EX3DV4- SN:7409 June 19, 2019

10493						
10494	10492	AAE		LTE-TDD	8.41	± 9.6 %
10494	10493	AAE		LTE-TDD	8.55	± 9.6 %
10496   AAF   LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL   LTE-TDD   8.34   ±9.6 %   Subframe=2,34,74,9.9			Subframe=2,3,4,7,8,9)			
10496	10494	AAF		LTE-TDD	7.74	± 9.6 %
10496	10495	AAF		LTE-TDD	8.37	± 9.6 %
Subframe*2,3.47,8.9    AA LTE-TDD (SG-FDMA, 100% RB, 1.4 MHz, QPSK, UL   LTE-TDD	40400			LTE TOD	0.54	
10499	10496	AAF		LIE-IDD	8.54	±9.6%
10499	10497	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL	LTE-TDD	7.67	± 9.6 %
Subframe=2,3,4,7,8,9   ANA   LTE-TDD   SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL   LTE-TDD   T.67   ± 9.6 %   Subframe=2,3,4,7,8,9   LTE-TDD   SC-FDMA, 100% RB, 3 MHz, QPSK, UL   LTE-TDD   T.67   ± 9.6 %   Subframe=2,3,4,7,8,9   LTE-TDD   SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL   LTE-TDD   S.44   ± 9.6 %   Subframe=2,3,4,7,8,9   LTE-TDD   SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL   LTE-TDD   S.52   ± 9.6 %   Subframe=2,3,4,7,8,9   LTE-TDD   SC-FDMA, 100% RB, 5 MHz, QPSK, UL   LTE-TDD   T.772   ± 9.6 %   Subframe=2,3,4,7,8,9   LTE-TDD   SC-FDMA, 100% RB, 5 MHz, QPSK, UL   LTE-TDD   T.772   ± 9.6 %   Subframe=2,3,4,7,8,9   Subframe=2,3,4,7,8,9   LTE-TDD   SC-FDMA, 100% RB, 5 MHz, QPSK, UL   LTE-TDD   T.772   ± 9.6 %   Subframe=2,3,4,7,8,9   Subframe=2,3,4,7,8,9	10409		Subframe=2,3,4,7,8,9)	LTC TDD	9.40	1060/
Subframe=2,3,4,7,8,9    Subf	10490	AAA		LIE-IDD	0.40	19.0%
10500	10499	AAA		LTE-TDD	8.68	± 9.6 %
Subframe=2,3,4,7,8,9   Subframe=2,3,4,7,8,9	10500	AAB	Subtrame=2,3,4,7,8,9)   TE-TDD (SC-FDMA 100% RB 3 MHz OPSK 1)	LTE-TDD	7.67	+96%
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL   Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL   LTE-TDD (SC-FDMA, 100% RB, 16 MHz, QPSK, UL   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, GPSK, UL   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL   LTE-TDD (SC-FDMA,			Subframe=2,3,4,7,8,9)			
10502	10501	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL	LTE-TDD	8.44	±9.6%
Subframe=2,3,4,7,8,9	10502	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL	LTE-TDD	8.52	±9.6%
Subframe=2,3,4,7,8,9			Subframe=2,3,4,7,8,9)			
10504   AAE   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL   LTE-TDD   8.31   ± 9.6 %   Subframe=2,3,4,7,8,9   Subframe=2,3,4,7,8,9   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL   LTE-TDD   7.74   ± 9.6 %   Subframe=2,3,4,7,8,9   Subframe=2,3,4,7,8,9   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL   LTE-TDD   8.36   ± 9.6 %   Subframe=2,3,4,7,8,9   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL   LTE-TDD   8.36   ± 9.6 %   Subframe=2,3,4,7,8,9   Subframe=2,3,4,7,8,9   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL   LTE-TDD   8.55   ± 9.6 %   Subframe=2,3,4,7,8,9   Subfr	10503	AAE		LTE-TDD	7.72	± 9.6 %
10505	10504	AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL	LTE-TDD	8.31	±9.6 %
Subframe=2,3,4,7,8,9	40505		Subframe=2,3,4,7,8,9)			
10506	10505	AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2.3.4.7.8.9)	LIE-IDD	8.54	± 9.6 %
10507	10506	AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL	LTE-TDD	7.74	± 9.6 %
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL   LTE-TDD   S.55   ± 9.6 %   Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL   LTE-TDD   T.99   ± 9.6 %   Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL   LTE-TDD   S.49   ± 9.6 %   Subframe=2,3,4,7,8,9    Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL   LTE-TDD   S.51   ± 9.6 %   Subframe=2,3,4,7,8,9    Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL   LTE-TDD   T.74   ± 9.6 %   Subframe=2,3,4,7,8,9    Subframe=2,3,4,7,	10507	AAE		LTC TOD	0.26	1060/
10508	10307	AAE		E IE-IDD	0.30	19.0%
10509	10508	AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL	LTE-TDD	8.55	± 9.6 %
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL   LTE-TDD   8.49   ± 9.6 %   Subframe=2,3,4,7,8,9	10509	AAF	Subtrame=2,3,4,7,8,9)   LTF-TDD (SC-FDMA 100% RB 15 MHz OPSK 11)	LTE-TOD	7 99	+96%
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL   LTE-TDD   S.51			Subframe=2,3,4,7,8,9)			
10511	10510	AAE		LTE-TDD	8.49	± 9.6 %
10512	10511	AAE		LTE-TDD	8.51	± 9.6 %
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL   LTE-TDD   8.42	10510	A A F		I TE TOD	771	1000
10513	10512	AAF	Subframe=2.3.4.7.8.9)	LIE-IDD	7.74	± 9.6 %
10514	10513	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL	LTE-TDD	8.42	± 9.6 %
Subframe=2,3,4,7,8,9	10514	AAE		LTE TOD	0.45	1069/
10516       AAA       IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)       WLAN       1.57       ± 9.6 %         10517       AAA       IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)       WLAN       1.58       ± 9.6 %         10518       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)       WLAN       8.23       ± 9.6 %         10519       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)       WLAN       8.39       ± 9.6 %         10520       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)       WLAN       8.12       ± 9.6 %         10521       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)       WLAN       7.97       ± 9.6 %         10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11a/k WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20M	10014	^^'		LIE-IDD	0.40	19.0%
10517         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)         WLAN         1.58         ± 9.6 %           10518         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)         WLAN         8.23         ± 9.6 %           10519         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)         WLAN         8.39         ± 9.6 %           10520         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)         WLAN         8.12         ± 9.6 %           10521         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)         WLAN         7.97         ± 9.6 %           10522         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)         WLAN         8.45         ± 9.6 %           10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11ac/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10526         AAB         IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)         WLAN         8.21         ± 9.6						
10518         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)         WLAN         8.23         ± 9.6 %           10519         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)         WLAN         8.39         ± 9.6 %           10520         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)         WLAN         8.12         ± 9.6 %           10521         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)         WLAN         7.97         ± 9.6 %           10522         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)         WLAN         8.45         ± 9.6 %           10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10526         AAB         IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)         WLAN         8.21         ± 9.6 %           10527         AAB         IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)         WLAN         8.36         ± 9.6 %						
10519       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)       WLAN       8.39       ± 9.6 %         10520       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)       WLAN       8.12       ± 9.6 %         10521       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)       WLAN       7.97       ± 9.6 %         10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle) </td <td></td> <td></td> <td></td> <td></td> <td><del>-}</del></td> <td></td>					<del>-}</del>	
10520       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)       WLAN       8.12       ± 9.6 %         10521       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)       WLAN       7.97       ± 9.6 %         10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)						
10521       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)       WLAN       7.97       ± 9.6 %         10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN			IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)			
10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %						
10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10526         AAB         IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)         WLAN         8.42         ± 9.6 %           10527         AAB         IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)         WLAN         8.21         ± 9.6 %           10528         AAB         IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10529         AAB         IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10531         AAB         IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)         WLAN         8.43         ± 9.6 %           10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %						1
10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %			IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)			
10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %		<del></del>	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)			
10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %			IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)			
10527         AAB         IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)         WLAN         8.21         ± 9.6 %           10528         AAB         IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10529         AAB         IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10531         AAB         IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)         WLAN         8.43         ± 9.6 %           10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %						
10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %						± 9.6 %
10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %						
10531         AAB         IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)         WLAN         8.43         ± 9.6 %           10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %						1
10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %						· · · · · · · · · · · · · · · · · · ·
10533 AAB IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle) WLAN 8.38 ± 9.6 %						
10004   AMB   IEEE OUZ.TTac WIFT (40MHZ, MICSU, 99pc duty cycle)   WLAN   8.45   ± 9.6 %						
	10034	I WAR	TEEE OUZ. Frac WIFT (40MHZ, MICSU, 99pc duty cycle)	I WLAN	J 8.45	1 ± 9.6 %

4000					
10535	AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10536	AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	WLAN	8.32	±9.6 %
10537	AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	WLAN	8.44	±9.6 %
10538	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	WLAN	8.54	± 9.6 %
10540	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	WLAN	8.39	± 9.6 %
10541	AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	WLAN	8.46	± 9.6 %
10542	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	WLAN		± 9.6 %
10543	AAB	IEEE 002.11dc Wil 1 (40MHz, MCCO, 99pc duty cycle)	1	8.65	
		IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	WLAN	8.65	± 9.6 %
10544	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	WLAN	8.47	± 9.6 %
10545	AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	WLAN	8.55	± 9.6 %
10546	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	WLAN	8.35	± 9.6 %
10547	AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	WLAN	8.49	± 9.6 %
10548	AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	WLAN	8.37	± 9.6 %
10550	AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	WLAN	8.38	± 9.6 %
10551	AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	WLAN	8.50	± 9.6 %
10552	AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10553	AAB			****	
		IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	WLAN	8.45	±9.6 %
10554	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	WLAN	8.48	± 9.6 %
10555	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	WLAN	8.47	± 9.6 %
10556	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	WLAN	8.50	± 9.6 %
10557	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	WLAN	8.52	± 9.6 %
10558	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	WLAN	8.61	±9.6 %
10560	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	WLAN	8.73	± 9.6 %
10561	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	WLAN	8.56	± 9.6 %
10562	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	WLAN	8,69	± 9.6 %
10563					
	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	WLAN	8.77	± 9.6 %
10564	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty	WLAN	8.25	± 9.6 %
		cycle)			
10565	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty	WLAN	8.45	±9.6 %
		cycle)			
10566	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty	WLAN	8.13	± 9.6 %
		cycle)			
10567	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty	WLAN	8.00	± 9.6 %
		cycle)	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0.00	_ 5.5 %
10568	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty	WLAN	8.37	± 9.6 %
1,0000	/ / / / /	cycle)	WEAT	0.57	5.0 /6
10569	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty	MAIL A NI	0.40	1000
10309	AAA		WLAN	8.10	± 9.6 %
10570		cycle)	<del>                                     </del>		
10570	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty	WLAN	8.30	± 9.6 %
		cycle)			
10571	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	WLAN	1.99	± 9.6 %
10572	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	WLAN	1.99	±9.6%
10573	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	WLAN	1.98	± 9.6 %
10574	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	WLAN	1.98	±9.6%
10575	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty	WLAN	8.59	±9.6%
10010	7001	cycle)	VVL	0.55	± 0.0 %
10576	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty	WLAN	8.60	± 9.6 %
10376	AAAA	1	WLAN	0.00	19.0%
10555		cycle)			
10577	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty	WLAN	8.70	± 9.6 %
		cycle)			
10578	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty	WLAN	8.49	± 9.6 %
		cycle)		ł	
10579	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty	WLAN	8.36	± 9.6 %
		cycle)			
10580	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty	WLAN	8.76	± 9.6 %
1000	/ 5 5 1	cycle)	1112111	0.70	-0.0 %
10581	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty	WLAN	8.35	± 9.6 %
10301	\		AATVIA	0.55	1 3.0 76
10500	ΛΛΛ	cycle) IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty	10/1 001	0.67	+069/
10582	AAA		WLAN	8.67	± 9.6 %
10505	A 4 =	cycle)	1847		
10583	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	WLAN	8.59	± 9.6 %
10584	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.60	± 9.6 %
10585	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.70	± 9.6 %
10586	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.49	± 9.6 %
10587	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.36	± 9.6 %
			,	1 0.00	, _ 0.0 /0

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10588	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10589	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	± 9.6 %
10590	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	± 9.6 %
10591	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	WLAN	8.63	± 9.6 %
10592	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10593	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	WLAN	8.64	± 9.6 %
10594	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10595	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10596	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)			
***************************************			WLAN	8.71	± 9.6 %
10597	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	WLAN	8.72	± 9.6 %
10598	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	WLAN	8.50	± 9.6 %
10599	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10600	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	WLAN	8.88	± 9.6 %
10601	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10602	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	WLAN	8.94	±9.6 %
10603	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	WLAN	9.03	± 9.6 %
10604	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10605	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	WLAN	8.97	±9.6 %
10606	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10607	AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	WLAN	8.64	± 9.6 %
10608	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10609	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	WLAN		
				8.57	± 9.6 %
10610	AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	WLAN	8.78	± 9.6 %
10611	AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	WLAN	8.70	±9.6%
10612	AAB	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10613	AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10614	AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	WLAN	8.59	± 9.6 %
10615	AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10616	AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	WLAN	8,82	± 9.6 %
10617	AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10618	AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	WLAN	8.58	± 9.6 %
10619	AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	WLAN	8.86	± 9.6 %
10620	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	WLAN	8.87	± 9.6 %
10621	AAB	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10622	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	WLAN	8.68	± 9.6 %
10623	AAB				
		IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10624	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	WLAN	8.96	± 9.6 %
10625	AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	WLAN	8.96	±9.6 %
10626	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	WLAN	8.83	±9.6%
10627	AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	WLAN	8.88	± 9.6 %
10628	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	WLAN	8.71	± 9.6 %
10629	AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	WLAN	8.85	±9.6 %
10630	AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	WLAN	8.72	± 9.6 %
10631	AAB	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10632	AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10633	AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10634	AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	WLAN	8.80	± 9.6 %
10635	AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10636	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10637	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 30pc duty cycle)	WLAN		
10637	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)		8.79	± 9.6 %
		TEEE 902 4400 MIE! (400MLE MOOD 000 THE WOOD)	WLAN	8.86	± 9.6 %
10639	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	WLAN	8.85	± 9.6 %
10640	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	WLAN	8.98	± 9.6 %
10641	AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	WLAN	9.06	± 9.6 %
10642	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	WLAN	9.06	± 9.6 %
10643	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	WLAN	8.89	± 9.6 %
10644	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	WLAN	9.05	± 9.6 %
10645	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	WLAN	9.11	± 9.6 %
10646	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	± 9.6 %
10647	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	± 9.6 %
10648		CDMA2000 (1x Advanced)	CDMA2000	3.45	± 9.6 %
,	AAA			U. TU	± 0.0 /0
10652	AAA			***********	+060/
10652 10653	AAD	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	±9.6 %
10652 10653 10654				***********	± 9.6 % ± 9.6 % ± 9.6 %

40055	TAAE	LITE TOD (OFDIA OO NII) P TIAG L OF ( . 4/0/)	T		
10655	AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	± 9.6 %
10658 10659	AAA	Pulse Waveform (200Hz, 10%)	Test	10.00	± 9.6 %
	AAA	Pulse Waveform (200Hz, 20%)	Test	6.99	± 9.6 %
10660	AAA	Pulse Waveform (200Hz, 40%)	Test	3.98	±9.6%
10661	AAA	Pulse Waveform (200Hz, 60%)	Test	2.22	±9.6%
10662	AAA	Pulse Waveform (200Hz, 80%)	Test	0.97	± 9.6 %
10670	AAA	Bluetooth Low Energy	Bluetooth	2.19	± 9.6 %
10671	AAA	IEEE 802.11ax (20MHz, MCS0, 90pc duty cycle)	WLAN	9.09	± 9.6 %
10672 10673	AAA	IEEE 802.11ax (20MHz, MCS1, 90pc duty cycle)	WLAN	8.57	± 9.6 %
10673	AAA	IEEE 802.11ax (20MHz, MCS2, 90pc duty cycle)	WLAN	8.78	± 9.6 %
<u> </u>	AAA	IEEE 802.11ax (20MHz, MCS3, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10675 10676	AAA AAA	IEEE 802.11ax (20MHz, MCS4, 90pc duty cycle) IEEE 802.11ax (20MHz, MCS5, 90pc duty cycle)	WLAN WLAN	8.90	± 9.6 %
10677	AAA			8.77	± 9.6 %
10678	AAA	IEEE 802.11ax (20MHz, MCS6, 90pc duty cycle) IEEE 802.11ax (20MHz, MCS7, 90pc duty cycle)	WLAN	8.73	± 9.6 %
10679	AAA	IEEE 802.11ax (20MHz, MCS8, 90pc duty cycle)	WLAN WLAN	8.78	±9.6 % ±9.6 %
10680	AAA	IEEE 802.11ax (20MHz, MCS9, 90pc duty cycle)	WLAN	8.89	
10681	AAA	IEEE 802.11ax (20MHz, MCS10, 90pc duty cycle)	WLAN	8.80 8.62	± 9.6 % ± 9.6 %
10682	AAA	IEEE 802.11ax (20MHz, MCS11, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10683	AAA	IEEE 802.11ax (20MHz, MCS0, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10684	AAA	IEEE 802.11ax (20MHz, MCS1, 99pc duty cycle)	WLAN	8.26	
10685	AAA	IEEE 802.11ax (20MHz, MCS2, 99pc duty cycle)	WLAN	8.33	± 9.6 % ± 9.6 %
10686	AAA	IEEE 802.11ax (20MHz, MCS3, 99pc duty cycle)	WLAN	8.28	± 9.6 %
10687	AAA	IEEE 802.11ax (20MHz, MCS4, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10688	AAA	IEEE 802.11ax (20MHz, MCS5, 99pc duty cycle)	WLAN	8.29	± 9.6 %
10689	AAA	IEEE 802.11ax (20MHz, MCS6, 99pc duty cycle)	WLAN	8.55	± 9.6 %
10690	AAA	IEEE 802.11ax (20MHz, MCS7, 99pc duty cycle)	WLAN	8.29	± 9.6 %
10691	AAA	IEEE 802.11ax (20MHz, MCS8, 99pc duty cycle)	WLAN	8.25	± 9.6 %
10692	AAA	IEEE 802.11ax (20MHz, MCS9, 99pc duty cycle)	WLAN	8.29	± 9.6 %
10693	AAA	IEEE 802.11ax (20MHz, MCS10, 99pc duty cycle)	WLAN	8.25	±9.6 %
10694	AAA	IEEE 802.11ax (20MHz, MCS11, 99pc duty cycle)	WLAN	8.57	± 9.6 %
10695	AAA	IEEE 802.11ax (40MHz, MCS0, 90pc duty cycle)	WLAN	8.78	± 9.6 %
10696	AAA	IEEE 802.11ax (40MHz, MCS1, 90pc duty cycle)	WLAN	8.91	± 9.6 %
10697	AAA	IEEE 802.11ax (40MHz, MCS2, 90pc duty cycle)	WLAN	8.61	± 9.6 %
10698	AAA	IEEE 802.11ax (40MHz, MCS3, 90pc duty cycle)	WLAN	8.89	± 9.6 %
10699	AAA	IEEE 802.11ax (40MHz, MCS4, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10700	AAA	IEEE 802.11ax (40MHz, MCS5, 90pc duty cycle)	WLAN	8.73	± 9.6 %
10701	AAA	IEEE 802.11ax (40MHz, MCS6, 90pc duty cycle)	WLAN	8.86	±9.6%
10702	AAA	IEEE 802.11ax (40MHz, MCS7, 90pc duty cycle)	WLAN	8.70	±96%
10703	AAA	IEEE 802.11ax (40MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6%
10704	AAA	IEEE 802.11ax (40MHz, MCS9, 90pc duty cycle)	WLAN	8.56	± 9.6 %
10705	AAA	IEEE 802.11ax (40MHz, MCS10, 90pc duty cycle)	WLAN	8.69	± 9.6 %
10706	AAA	IEEE 802.11ax (40MHz, MCS11, 90pc duty cycle)	WLAN	8.66	± 9.6 %
10707	AAA	IEEE 802.11ax (40MHz, MCS0, 99pc duty cycle)	WLAN	8.32	± 9.6 %
10708	AAA	IEEE 802.11ax (40MHz, MCS1, 99pc duty cycle)	WLAN	8.55	± 9.6 %
10709 10710	AAA	IEEE 802.11ax (40MHz, MCS2, 99pc duty cycle)	WLAN	8.33	±9.6%
10710	AAA	IEEE 802.11ax (40MHz, MCS3, 99pc duty cycle)	WLAN WLAN	8.29	±9.6%
10711	AAA	IEEE 802.11ax (40MHz, MCS4, 99pc duty cycle) IEEE 802.11ax (40MHz, MCS5, 99pc duty cycle)	WLAN	8.39 8.67	± 9.6 % ± 9.6 %
10712	AAA	IEEE 802.11ax (40MHz, MCS6, 99pc duty cycle)	WLAN	8.33	±9.6 %
10713	AAA	IEEE 802.11ax (40MHz, MCS6, 99pc duty cycle)	WLAN	8.26	±9.6 %
10715	AAA	IEEE 802.11ax (40MHz, MCS8, 99pc duty cycle)	WLAN	8.45	±9.6 %
10716	AAA	IEEE 802.11ax (40MHz, MCS9, 99pc duty cycle)	WLAN	8.30	± 9.6 %
10717	AAA	IEEE 802.11ax (40MHz, MCS10, 99pc duty cycle)	WLAN	8.48	± 9.6 %
10718	AAA	IEEE 802.11ax (40MHz, MCS11, 99pc duty cycle)	WLAN	8.24	± 9.6 %
10719	AAA	IEEE 802.11ax (40MHz, MCS0, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10720	AAA	IEEE 802.11ax (80MHz, MCS1, 90pc duty cycle)	WLAN	8.87	±9.6 %
10721	AAA	IEEE 802.11ax (80MHz, MCS2, 90pc duty cycle)	WLAN	8.76	±9.6%
10722	AAA	IEEE 802.11ax (80MHz, MCS3, 90pc duty cycle)	WLAN	8.55	±9.6%
10723	AAA	IEEE 802.11ax (80MHz, MCS4, 90pc duty cycle)	WLAN	8.70	± 9.6 %
10724	AAA	IEEE 802.11ax (80MHz, MCS5, 90pc duty cycle)	WLAN	8.90	± 9.6 %
10725	AAA	IEEE 802.11ax (80MHz, MCS6, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10726	AAA	IEEE 802.11ax (80MHz, MCS7, 90pc duty cycle)	WLAN	8.72	± 9.6 %
10727	AAA	IEEE 802.11ax (80MHz, MCS8, 90pc duty cycle)	WLAN	8.66	± 9.6 %

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40700			·····		
10728	AAA	IEEE 802.11ax (80MHz, MCS9, 90pc duty cycle)	WLAN	8.65	± 9.6 %
10729	AAA	IEEE 802.11ax (80MHz, MCS10, 90pc duty cycle)	WLAN	8.64	± 9.6 %
10730	AAA	IEEE 802.11ax (80MHz, MCS11, 90pc duty cycle)	WLAN	8.67	± 9.6 %
10731	AAA	IEEE 802.11ax (80MHz, MCS0, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10732	AAA	IEEE 802.11ax (80MHz, MCS1, 99pc duty cycle)	WLAN	8.46	± 9.6 %
10733	AAA	IEEE 802.11ax (80MHz, MCS2, 99pc duty cycle)	WLAN	8.40	± 9.6 %
10734	AAA	IEEE 802.11ax (80MHz, MCS3, 99pc duty cycle)	WLAN	8.25	± 9.6 %
10735	AAA	IEEE 802.11ax (80MHz, MCS4, 99pc duty cycle)	WLAN	8.33	± 9.6 %
10736	AAA	IEEE 802.11ax (80MHz, MCS5, 99pc duty cycle)	WLAN	8.27	± 9.6 %
10737	AAA	IEEE 802.11ax (80MHz, MCS6, 99pc duty cycle)	WLAN	8.36	±9.6 %
10738	AAA	IEEE 802.11ax (80MHz, MCS7, 99pc duty cycle)	WLAN	8.42	±9.6 %
10739	AAA	IEEE 802.11ax (80MHz, MCS8, 99pc duty cycle)	WLAN	8.29	±9.6 %
10740	AAA	IEEE 802.11ax (80MHz, MCS9, 99pc duty cycle)	WLAN	8.48	± 9.6 %
10741	AAA	IEEE 802.11ax (80MHz, MCS10, 99pc duty cycle)	WLAN	8.40	± 9.6 %
10742	AAA	IEEE 802.11ax (80MHz, MCS11, 99pc duty cycle)	WLAN	8.43	± 9.6 %
10743	AAA	IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10744	AAA	IEEE 802.11ax (160MHz, MCS1, 90pc duty cycle)	WLAN	9.16	± 9.6 %
10745	AAA	IEEE 802.11ax (160MHz, MCS2, 90pc duty cycle)	WLAN	8.93	± 9.6 %
10746	AAA	IEEE 802.11ax (160MHz, MCS3, 90pc duty cycle)	WLAN	9.11	± 9.6 %
10747	AAA	IEEE 802.11ax (160MHz, MCS4, 90pc duty cycle)	WLAN	9.04	± 9.6 %
10748	AAA	IEEE 802.11ax (160MHz, MCS5, 90pc duty cycle)	WLAN	8.93	± 9.6 %
10749	AAA	IEEE 802.11ax (160MHz, MCS6, 90pc duty cycle)	WLAN	8.90	± 9.6 %
10750	AAA	IEEE 802.11ax (160MHz, MCS7, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10751	AAA	IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10752	AAA	IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)	WLAN	8.81	±9.6 %
10753	AAA	IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)	WLAN	9.00	±9.6 %
10754	AAA	IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10755	AAA	IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)	WLAN	8.64	± 9.6 %
10756	AAA	IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)	WLAN	8.77	± 9.6 %
10757	AAA	IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)	WLAN	8.77	±9.6 %
10758	AAA	IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)	WLAN	8.69	± 9.6 %
10759	AAA	IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)	WLAN	8.58	± 9.6 %
10760	AAA	IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)	WLAN	8.49	±9.6 %
10761	AAA	IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)	WLAN	8.58	± 9.6 %
10762	AAA	IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)	WLAN	8.49	± 9.6 %
10763	AAA	IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)	WLAN	8.53	± 9.6 %
10764	AAA	IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)	WLAN	8.54	± 9.6 %
10765	AAA	IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)	WLAN	8.54	± 9.6 %
10766	AAA	IEEE 802.11ax (160MHz, MCS11, 99pc duty cycle)	WLAN	8.51	± 9.6 %

<sup>&</sup>lt;sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

#### Calibration Laboratory of

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





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Accreditation No.: SCS 0108

Client

**PC Test** 

Certificate No: EX3-7406\_May19

### **CALIBRATION CERTIFICATE**

Object

EX3DV4 - SN:7406

Calibration procedure(s)

QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7

Calibration procedure for dosimetric E-field probes

Calibration date:

May 16, 2019

BN 23-2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 660	19-Dec-18 (No. DAE4-660_Dec18)	Dec-19
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check; Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Calibrated by:

Name

Function

Michael Weber

Laboratory Technician

Signature

Approved by:

Katja Pokovic

Technical Manager

Issued: May 16, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

#### Calibration Laboratory of

Schmid & Partner
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Zeughausstrasse 43, 8004 Zurich, Switzerland





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Accreditation No.: SCS 0108

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Glossary:

TSL NORMx,v,z tissue simulating liquid sensitivity in free space

ConvF DCP sensitivity in TSL / NORMx,y,z diode compression point

CF A, B, C, D crest factor (1/duty\_cycle) of the RF signal modulation dependent linearization parameters

Polarization φ

φ rotation around probe axis

Polarization 8

9 rotation around an axis that is in the plane normal to probe axis (at measurement center),

i.e., 9 = 0 is normal to probe axis

Connector Angle

information used in DASY system to align probe sensor X to the robot coordinate system

#### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- Techniques", June 2013
  b) IEC 62209-1, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from handheld and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 9 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z \* frequency\_response (see Frequency Response Chart). This linearization is
  implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included
  in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

**Basic Calibration Parameters** 

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)²) <sup>A</sup>	0.46	0.43	0.45	± 10.1 %
DCP (mV) <sup>B</sup>	102.8	102.2	100.4	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dBõV	С	D dB	VR mV	Max dev.	Max Unc <sup>E</sup> (k=2)
0	CW	Х	0.00	0.00	1.00	0.00	182.0	± 2.7 %	± 4.7 %
		Υ	0.00	0.00	1.00		172.4	1	
****		Z	0.00	0.00	1.00	1	174.6	[	
10352-	Pulse Waveform (200Hz, 10%)	Х	6.76	76.02	14.93	10.00	60.0	± 2.7 %	± 9.6 %
AAA		Y	6.25	75.48	14.76	1	60.0	1 /-	- 313 /6
		Z	15.00	84.32	17.62	1	60.0	1	
10353-	Pulse Waveform (200Hz, 20%)	Х	15.00	85.05	16.36	6.99	80.0	± 1.9 %	± 9.6 %
AAA		Υ	15.00	85.57	16.70		80.0		
		Z	15.00	85.96	16.90	1	80.0	1	
10354-	Pulse Waveform (200Hz, 40%)	Х	15.00	83.48	13.87	3.98	95.0	± 1.3 %	± 9.6 %
AAA		Y	15.00	88.48	16.53	1	95.0		, ,
		Z	15.00	85.80	15.05	1	95.0	1	
10355-	Pulse Waveform (200Hz, 60%)	Х	0.28	60.00	4.49	2.22	120.0	± 1.3 %	± 9.6 %
AAA		Υ	15.00	95.23	18.20		120.0		
		Z	0.39	62.12	5.82		120.0		
10387-	QPSK Waveform, 1 MHz	X	0.46	60.00	5.77	0.00	150.0	± 3.7 %	± 9.6 %
AAA		Υ	14.25	443.18	61.66		150.0		
		Z	0.48	60.00	6.06		150.0		
10388-	QPSK Waveform, 10 MHz	Х	2.03	67.70	15.44	0.00	150.0	± 1.2 %	± 9.6 %
AAA		Υ	2.30	72.35	18.27		150.0		
		Z	2.07	67.89	15.68		150.0		
10396-	64-QAM Waveform, 100 kHz	X	2.49	68.06	17.57	3.01	150.0	± 1.6 %	± 9.6 %
AAA		Y	1.98	66.67	17.49		150.0		
		Z	2.52	68,32	17.86		150.0		
10399-	64-QAM Waveform, 40 MHz	Х	3.39	67.06	15.71	0.00	150.0	± 2.2 %	± 9.6 %
AAA		Υ	3.39	68.23	16.67		150.0		
45.00		Z	3.40	67.01	15.79		150.0		
10414-	WLAN CCDF, 64-QAM, 40MHz	Χ	4.70	65.74	15.61	0.00	150.0	± 4.1 %	± 9.6 %
AAA		Y	4.47	66.54	16.20		150.0		
	details on LUD parameters and Am	Z	4.70	65.63	15.63		150.0		

Note: For details on UID parameters see Appendix

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

A The uncertainties of Norm X,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

B Numerical linearization parameter: uncertainty not required.

E Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

#### **Sensor Model Parameters**

	C1 fF	C2 fF	α V <sup>-1</sup>	T1 ms.V <sup>-2</sup>	T2 ms.V <sup>-1</sup>	T3 ms	T4 V <sup>-2</sup>	T5 V <sup>-1</sup>	Т6
X	34.8	265.14	36.82	6.17	0.37	5.06	0.00	0.44	1.01
Y	19.8	147.90	35.69	7.11	0.37	5.03	0.00	0.19	1.00
Z	35.4	271.85	37.42	5.60	0.38	5.06	0.15	0.41	1.01

#### **Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	27.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
30	55.0	0.75	16.10	16.10	16.10	0.00	1.00	± 13.3 %
750	41.9	0.89	10.26	10.26	10.26	0.44	0.93	± 12.0 %
835	41.5	0.90	9.78	9.78	9.78	0.44	0.91	± 12.0 %
1750	40.1	1.37	8.57	8.57	8.57	0.39	0.80	± 12.0 %
1900	40.0	1.40	8.18	8.18	8.18	0.39	0.80	± 12.0 %
2300	39.5	1.67	8.06	8.06	8.06	0.33	0.87	± 12.0 %
2450	39.2	1.80	7.67	7.67	7.67	0.37	0.87	± 12.0 %
2600	39.0	1.96	7.44	7.44	7.44	0.40	0.88	± 12.0 %
5250	35.9	4.71	5.54	5.54	5.54	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.94	4.94	4.94	0.40	1.80	± 13.1 %
5750	35.4	5.22	5.23	5.23	5.23	0.40	1.80	± 13.1 %

<sup>&</sup>lt;sup>c</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to  $\pm$  110 MHz. F At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to  $\pm$  10% if liquid compensation formula is applied to

measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to  $\pm$  5%. The uncertainty is the RSS of

the ConvF uncertainty for indicated target tissue parameters.

Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

#### Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) <sup>c</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) F	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
750	55.5	0.96	10.05	10.05	10.05	0.50	0.80	± 12.0 %
835	55.2	0.97	9.78	9.78	9.78	0.40	0.93	± 12.0 %
1750	53.4	1.49	8.13	8.13	8.13	0.43	0.80	± 12.0 %
1900	53.3	1.52	7.95	7.95	7.95	0.38	0.85	± 12.0 %
2300	52.9	1.81	7.76	7.76	7.76	0.44	0.85	± 12.0 %
2450	52.7	1.95	7.54	7.54	7.54	0.37	0.88	± 12.0 %
2600	52.5	2.16	7.47	7.47	7.47	0.25	1.05	± 12.0 %
5250	48.9	5.36	5.08	5.08	5.08	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.37	4.37	4.37	0.50	1.90	± 13.1 %
5750	48.3	5.94	4.53	4.53	4.53	0.50	1.90	± 13.1 %

<sup>&</sup>lt;sup>c</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

F At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to

measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of

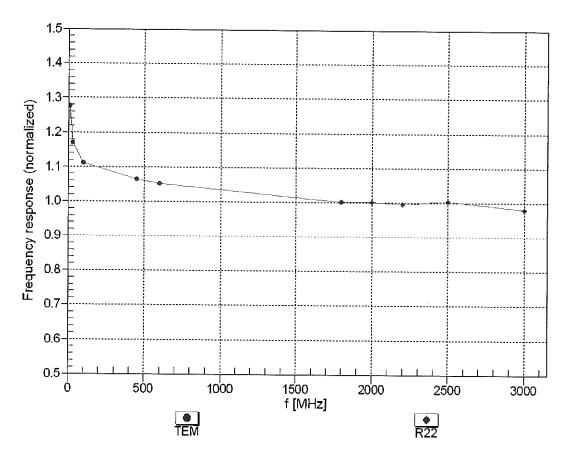
the ConvF uncertainty for indicated target tissue parameters.

A requestion of the convF uncertainty for indicated target tissue parameters.

A lipha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

# Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

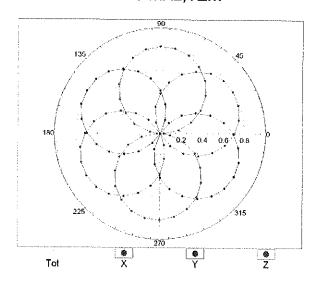


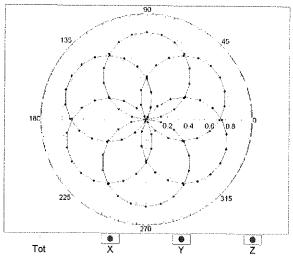
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

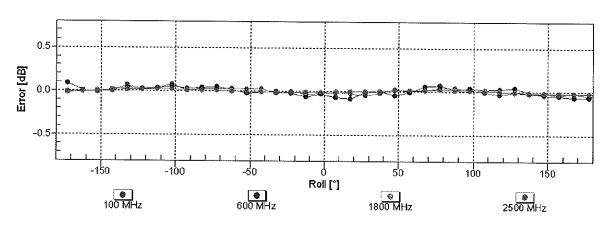
# Receiving Pattern ( $\phi$ ), $\vartheta = 0^{\circ}$

f=600 MHz,TEM

f=1800 MHz,R22

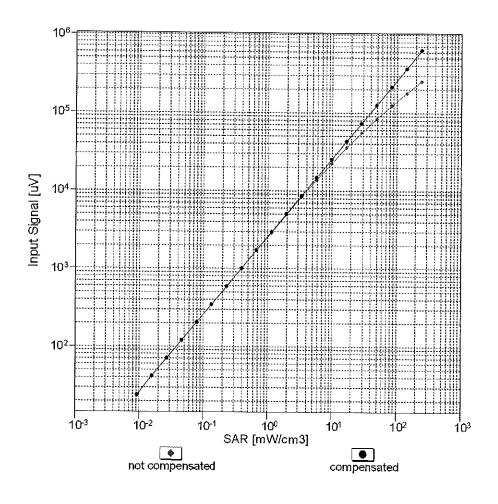


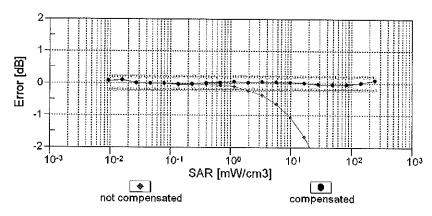




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

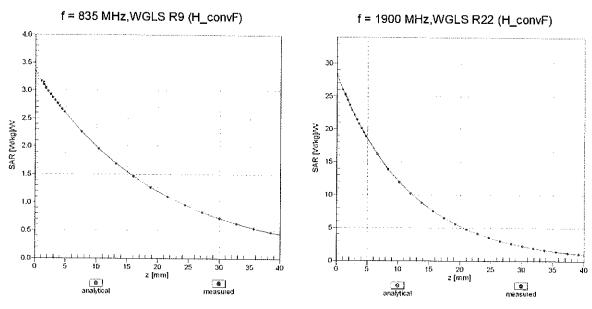
# Dynamic Range f(SAR<sub>head</sub>) (TEM cell , f<sub>eval</sub>= 1900 MHz)



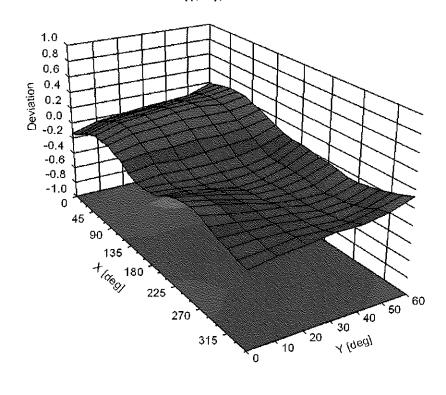


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

# **Conversion Factor Assessment**



Deviation from Isotropy in Liquid Error (φ, θ), f = 900 MHz



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### **Appendix: Modulation Calibration Parameters**

UID	Rev	Communication System Name	Group	PAR (dB)	Unc <sup>t</sup> (k=2)
0	*********	CW	CW	0.00	± 4.7 %
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	± 9.6 %
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	± 9.6 %
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	± 9.6 %
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	± 9.6 %
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth Bluetooth	1.87	± 9.6 % ± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16 7.74	± 9.6 %
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	4.53	± 9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3) IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	3.83	± 9.6 %
10035 10036	CAA CAA	IEEE 802.15.1 Bluetooth (P/4-DQPSK, DH5)	Bluetooth	8.01	± 9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	4.77	± 9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.10	± 9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	± 9.6 %
10033	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	AMPS	7.78	± 9.6 %
10042	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	± 9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	± 9.6 %
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	± 9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	± 9.6 %
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	± 9.6 %
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	± 9.6 %
10062	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	± 9.6 %
10063	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	± 9.6 %
10064	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	± 9.6 %
10065	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	± 9.6 %
10066	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	± 9.6 %
10067	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	± 9.6 %
10068	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	± 9.6 %
10069	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	9,83	±9.6%
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN WLAN	9.62 9.94	± 9.6 % ± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps) IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10074 10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	± 9.6 %
10076	CAB	IEEE 802.11g WiF1 2.4 GHz (DSSS/OFDM, 46 Mibps)	WLAN	11.00	± 9.6 %
10077	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	AMPS	4.77	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	± 9.6 %
10097	CAB	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	CAB	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %
10100	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10102	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10103	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10104	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10105	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	±9.6 %
10108	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	± 9.6 %

10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	± 9.6 %
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	± 9.6 %
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10114	CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10115	CAC	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
10116	CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
10117	CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6 %
10118	CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	± 9.6 %
10119	CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	± 9.6 %
10140	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10141	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6 %
10142	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10143	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6 %
10144	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6 %
10145	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6 %
10146	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	± 9.6 %
10147	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	± 9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 % ± 9.6 %
10151	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	±9.6 %
10152	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	
10153	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD		± 9.6 %
10154	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)		10.05	± 9.6 %
10155	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	5.75	± 9.6 %
10156	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	6.43	± 9.6 %
10157	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	5.79	± 9.6 %
10158	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.49	±9.6%
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10160	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.56	± 9.6 %
10161	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	5.82	± 9.6 %
10162	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.43	± 9.6 %
10166	CAF	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)  LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	6.58	±9.6 %
10167	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QFSK)  LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	5.46	± 9.6 %
10168	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	± 9.6 %
10169	CAE	LTE-FDD (SC-FDMA, 30% RB, 1.4 MHz, 64-QAM)  LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	6.79	± 9.6 %
10170	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QFSK)  LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	5.73	± 9.6 %
10171	AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10172	CAG	LTE TOD (SC FOMA 1 DD 20 MHz, OPOK)	LTE-FDD	6.49	± 9.6 %
10173	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	±9.6 %
10173	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10175	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10176	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10177	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10178	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10179	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10179	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	±9.6%
10182	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10183	AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10183	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10185	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
		LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6 %
10186 10187	AAE CAF	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10188	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10188		LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10193	AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
	CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	± 9.6 %
10194	CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	± 9.6 %
10195	CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	± 9.6 %
10196	CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10197	CAC	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10198	CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10219	CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	± 9.6 %
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40000	040	IEEE 800 44 n (UT Mixed 42 2 Mbno 46 OAM)	WLAN	8.13	± 9.6 %
10220 10221	CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM) IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10221	CAC	IEEE 802.111 (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.06	± 9.6 %
10222	CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	± 9.6 %
10224	CAC	IEEE 802.11n (HT Mixed, 30 Mbps, 64-QAM)	WLAN	8.08	± 9.6 %
10225	CAB	UMTS-FDD (HSPA+)	WCDMA	5.97	± 9.6 %
10226	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	± 9.6 %
10227	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	± 9.6 %
10228	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	± 9.6 %
10229	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10230	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10231	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9.19	± 9.6 %
10232	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	±9.6%
10233	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10234	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10235	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10236	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10237	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10238	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10239	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10240	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TOD	9.21	±9.6%
10241	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD LTE-TDD	9.82 9.86	± 9.6 % ± 9.6 %
10242	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)  LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.46	± 9.6 %
10243	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QFSK)  LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10244 10245	CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10245	CAC	LTE-TDD (SC-FDMA, 50 % RB, 3 MHz, QPSK)	LTE-TDD	9.30	±9.6 %
10246	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	± 9.6 %
10247	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD	10.09	± 9.6 %
10249	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10250	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	± 9.6 %
10251	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	± 9.6 %
10252	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10253	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	± 9.6 %
10254	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	± 9.6 %
10255	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	± 9.6 %
10256	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	± 9.6 %
10257	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	± 9.6 %
10258	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	± 9.6 %
10259	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.98	± 9.6 %
10260	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6 %
10261	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10262		LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	± 9.6 %
10263	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	± 9.6 %
10264	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	± 9.6 %
10265	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92 10.07	± 9.6 %
10266 10267	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)  LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10267	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSR)  LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10266	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 10-QAM)	LTE-TDD	10.00	± 9.6 %
10269	CAF	LTE-TDD (SC-PDMA, 100 % RB, 15 MHz, 04-QAM)	LTE-TOD	9.58	± 9.6 %
10274	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	WCDMA	4.87	± 9.6 %
10275	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	WCDMA	3.96	± 9.6 %
10277	CAA	PHS (QPSK)	PHS	11.81	± 9.6 %
10278	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	PHS	11.81	± 9.6 %
10279	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	PHS	12.18	± 9.6 %
10290	AAB	CDMA2000, RC1, SO55, Full Rate	CDMA2000	3.91	± 9.6 %
10291	AAB	CDMA2000, RC3, SO55, Full Rate	CDMA2000	3.46	± 9.6 %
10292	AAB	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.39	± 9.6 %
10293	AAB	CDMA2000, RC3, SO3, Full Rate	CDMA2000	3.50	± 9.6 %
10295	AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	CDMA2000	12.49	± 9.6 %
10297	AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	± 9.6 %
10298	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10299	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	± 9.6 %

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10300	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10301	AAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	WiMAX	12.03	± 9.6 %
10302	AAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL	WiMAX	12.57	± 9.6 %
10303	AAA	symbols)			
10303	AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	12.52	± 9.6 %
10305	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC) IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15	WiMAX	11.86	±9.6 %
10000	1	symbols)	WiMAX	15.24	± 9.6 %
10306	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18	10000000	ļ.,,,,,	
	1,00,	symbols)	WiMAX	14.67	± 9.6 %
10307	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18	WIMAX	44.40	1.0004
		symbols)	VVIIVIAA	14.49	± 9.6 %
10308	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	WiMAX	14.46	± 9.6 %
10309	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18	WIMAX	14.58	± 9.6 %
		symbols)	171111111111111111111111111111111111111	14.50	1.5.0 76
10310	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18	WIMAX	14.57	± 9.6 %
		symbols)		17.01	2 0.0 70
10311	AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	± 9.6 %
10313	AAA	iDEN 1:3	IDEN	10.51	± 9.6 %
10314	AAA	IDEN 1:6	iDEN	13.48	± 9.6 %
10315	AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	WLAN	1.71	± 9.6 %
10316	AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	± 9.6 %
10317	AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	± 9.6 %
10352 10353	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	± 9.6 %
	AAA	Pulse Waveform (200Hz, 20%)	Generic	6.99	± 9.6 %
10354 10355	AAA	Pulse Waveform (200Hz, 40%)	Generic	3.98	± 9.6 %
10356	AAA	Pulse Waveform (200Hz, 60%)	Generic	2.22	± 9.6 %
10336	AAA	Pulse Waveform (200Hz, 80%)	Generic	0.97	± 9.6 %
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	± 9.6 %
10396	AAA	QPSK Waveform, 10 MHz 64-QAM Waveform, 100 kHz	Generic	5.22	± 9.6 %
10399	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	± 9.6 %
10400	AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	Generic	6.27	± 9.6 %
10401	AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	WLAN	8.37	± 9.6 %
10402	AAD	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	WLAN	8.60	±9.6%
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	WLAN	8.53	± 9.6 %
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.76	± 9.6 %
10406	AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000 CDMA2000	3.77	±9.6 %
10410	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL	LTE-TDD	5.22 7.82	±9.6 %
		Subframe=2,3,4,7,8,9, Subframe Conf=4)	C. C. LOD	1.02	±9.6 %
10414	AAA	WLAN CCDF, 64-QAM, 40MHz	Generic	8.54	± 9.6 %
10415	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	WLAN	1.54	± 9.6 %
10416	AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
10417	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle,	WLAN	8.14	± 9.6 %
		Long preambule)		0.11	_ 0.0 %
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle,	WLAN	8.19	±9.6%
10100		Short preambule)			, .
10422	AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	± 9.6 %
10423	AAB	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.47	±9.6%
10424	AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.40	±9.6%
10425 10426	AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	± 9.6 %
10426	AAB	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	± 9.6 %
10427	AAB AAD	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	WLAN	8.41	± 9.6 %
10430	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.28	± 9.6 %
10431	AAC	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1) LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	LTE-FDD	8.38	±9.6%
10433	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)  LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	8.34	± 9.6 %
10434	AAA	W-CDMA (BS Test Model 1, 64 DPCH)	LTE-FDD	8.34	± 9.6 %
10435	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL	WCDMA	8.60	± 9.6 %
		Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10447	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.50	1060/
10448	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	± 9.6 %
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	LTE-FDD	7.53 7.51	±9.6 %
10450	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.51	± 9.6 % ± 9.6 %
		, , , , , , , , , , , , , , , , , , ,		7.70	± 0.0 /0

10451	AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	WCDMA	7.59	±9.6 %
10456	AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	WLAN	8.63	± 9.6 %
10457	AAA	UMTS-FDD (DC-HSDPA)	WCDMA	6.62	± 9.6 %
10458	AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	6.55	± 9.6 %
10459	AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	8.25	± 9.6 %
10460	AAA	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	± 9.6 %
10461	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	±9.6%
10462	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL	LTE-TDD	8.30	± 9.6 %
40400		Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL	LTE-TDD	8.56	± 9.6 %
10463	AAA	Subframe=2,3,4,7,8,9)			
10464	AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10465	AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL	LTE-TDD	8.32	±9.6 %
10466	AAB	Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL	LTE-TDD	8.57	± 9.6 %
40407	<u> </u>	Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10467	AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LIE-IDD	7.02	19.0 %
10468	AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10469	AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.56	± 9.6 %
10470	AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL	LTE-TDD	7.82	± 9.6 %
10471	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL	LTE-TDD	8.32	± 9.6 %
10472	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL	LTE-TDD	8.57	± 9.6 %
		Subframe=2,3,4,7,8,9)			
10473	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10474	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10475	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10477	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10478	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10479	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL	LTE-TDD	7.74	± 9.6 %
10480	AAA	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL	LTE-TDD	8.18	± 9.6 %
40404	A 8 4	Subframe=2,3,4,7,8,9)	I when the line	0.45	1000
10481	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	± 9.6 %
10482	AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.71	± 9.6 %
10483	AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL	LTE-TDD	8.39	± 9.6 %
10484	AAB	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL	LTE-TDD	8.47	± 9.6 %
10485	AAE	Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL	LTE-TDD	7.59	± 9.6 %
		Subframe=2.3.4.7.8.9)			
10486	AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.38	± 9.6 %
10487	AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.60	± 9.6 %
10488	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.70	± 9.6 %
10489	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL	LTE-TDD	8.31	± 9.6 %
10490	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL	LTE-TDD	8.54	± 9.6 %
		Subframe=2,3,4,7,8,9)		<u> </u>	
10491	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %

10492	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.41	± 9.6 %
10493	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	± 9.6 %
10494	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
10495	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	TE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL   1 TF-TDD   8.37		± 9.6 %
10496	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	± 9.6 %
10497	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	± 9.6 %
10498	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.40	± 9.6 %
10499	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.68	± 9.6 %
10500	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	± 9.6 %
10501	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.44	± 9.6 %
10502	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.52	± 9.6 %
10503	AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.72	± 9.6 %
10504	AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.31	± 9.6 %
10505	AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	± 9.6 %
10506	AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
10507	AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.36	± 9.6 %
10508	AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	± 9.6 %
10509	AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.99	± 9.6 %
10510	AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.49	± 9.6 %
10511	AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.51	± 9.6 %
10512	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
10513	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8,42	± 9.6 %
10514	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	± 9.6 %
10515	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	WLAN	1.58	± 9.6 %
10516	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	WLAN	1.57	± 9.6 %
10517	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	WLAN	1.58	± 9.6 %
10518	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
10519	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	WLAN		
10520	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)		8.39	± 9.6 %
10521	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	WLAN	8.12	± 9.6 %
10527	AAB	IFFE 802 11a/h WiFi 5 CHz (OFDM 20 MF)	WLAN	7.97	± 9.6 %
10523	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10523		IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	WLAN	8.08	± 9.6 %
	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	WLAN	8.27	±9.6%
10525	AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10526	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10527	AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	WLAN	8.21	± 9.6 %
10528	AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10529	AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10531	AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	WLAN	8.43	
10532	AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	WLAN		± 9.6 %
10533	AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	WLAN	8.29	± 9.6 %
10534	AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	WLAN	8.38	± 9.6 %
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10535	AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	WLAN	8.45	±9.6%
10536	AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	WLAN	8.32	±9.6 %
10537	AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	WLAN	8,44	±9.6%
10538	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	WLAN	8.54	± 9.6 %
10540	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	WLAN	8.39	±9.6%
10541	AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	WLAN	8.46	± 9.6 %
10542	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	WLAN	8.65	± 9.6 %
10542	AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	WLAN	8.65	± 9.6 %
10543	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	WLAN	8.47	±9.6%
10544	AAB	IEEE 802.11ac WiF (80MHz, MCS1, 99pc duty cycle)	WLAN	8.55	± 9.6 %
10545	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	WLAN	8.35	± 9.6 %
		IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	WLAN	8.49	± 9.6 %
10547	AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	WLAN	8.37	± 9.6 %
10548	AAB		WLAN	8.38	± 9.6 %
10550	AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)			
10551	AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	WLAN	8.50	±9.6%
10552	AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10553	AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10554	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	WLAN	8.48	± 9.6 %
10555	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	WLAN	8.47	±9.6%
10556	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	WLAN	8.50	± 9.6 %
10557	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	WLAN	8.52	±9.6 %
10558	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	WLAN	8.61	± 9.6 %
10560	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	WLAN	8.73	± 9.6 %
10561	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	WLAN	8.56	± 9.6 %
10562	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	WLAN	8.69	± 9.6 %
10563	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	WLAN	8.77	± 9.6 %
10564	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty	WLAN	8.25	± 9.6 %
		cycle)			
10565	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty	WLAN	8.45	± 9.6 %
		cycle)			
10566	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty	WLAN	8.13	± 9.6 %
		cycle)			
10567	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty	WLAN	8.00	± 9.6 %
		cycle)			
10568	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty	WLAN	8.37	± 9.6 %
		cycle)			
10569	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty	WLAN	8.10	± 9.6 %
	<u> </u>	cycle)			
10570	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty	WLAN	8.30	± 9.6 %
		cycle)			
10571	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	WLAN	1.99	± 9.6 %
10572	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	WLAN	1.99	± 9.6 %
10573	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	WLAN	1.98	± 9.6 %
10574	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	WLAN	1.98	± 9.6 %
10575	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty	WLAN	8.59	± 9.6 %
		cycle)			
10576	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty	WLAN	8.60	± 9.6 %
		cycle)			
10577	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty	WLAN	8.70	± 9.6 %
		cycle)			
10578	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty	WLAN	8.49	± 9.6 %
		cycle)			
10579	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty	WLAN	8.36	± 9.6 %
	1	cycle)			
10580	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty	WLAN	8.76	± 9.6 %
		cycle)	•		
10581	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty	WLAN	8.35	± 9.6 %
1.555,	1.7.	cycle)			
10582	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty	WLAN	8.67	± 9.6 %
1,0002	,,,,,	cycle)	1 =		
10583	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	WLAN	8.59	± 9.6 %
10584	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.60	± 9.6 %
		IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mpps, 90pc duty cycle)	WLAN	8.70	± 9.6 %
10585	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.49	± 9.6 %
10586	AAB	HEEE OUZ. Hatti VVICTO GEIZ (OFDIN, 10 MIDPS, 30PC GUTY CYCLS)	WLAN		± 9.6 %
10587	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	VALAIN	8.36	1 I J.O 70

40500	1 4 4 5				
10588	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10589	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	±9.6 %
10590	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	± 9.6 %
10591	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	WLAN	8.63	± 9.6 %
10592	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10593	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	WLAN	8.64	± 9.6 %
10594	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10595	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10596	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	WLAN	8.71	± 9.6 %
10597	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	WLAN	8.72	± 9.6 %
10598	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	WLAN	8.50	± 9.6 %
10599	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10600	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	WLAN	8.88	± 9.6 %
10601	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10602	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10603	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	WLAN	9.03	± 9.6 %
10604	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10605	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	WLAN	8.97	
10606	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	WLAN		±9.6 %
10607	AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10608	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)		8.64	± 9.6 %
10609	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10610	AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	WLAN	8.57	± 9.6 %
10611	AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	WLAN	8.78	± 9.6 %
10612	AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	WLAN	8.70	± 9.6 %
10613	AAB	IEEE 802.11ac WiFi (20MHz, MCSs, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10614	AAB	IEEE 202 11ac WIFI (20MI) MOSO, 90pc duty cycle)	WLAN	8.94	±9.6 %
10615	AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	WLAN	8.59	±9.6 %
10616	AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10617	AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10618		IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10619	AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	WLAN	8.58	± 9.6 %
10620	AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	WLAN	8.86	±9.6%
10620	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	WLAN	8.87	± 9.6 %
10621	AAB	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10623	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	WLAN	8.68	± 9.6 %
	AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10624	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	WLAN	8.96	± 9.6 %
10625	AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	WLAN	8.96	± 9.6 %
10626	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10627	AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	WLAN	8.88	± 9.6 %
10628	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	WLAN	8.71	± 9.6 %
10629	AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	WLAN	8.85	± 9.6 %
10630	AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	WLAN	8.72	±9.6%
10631	AAB	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	WLAN	8.81	± 9,6 %
10632	AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10633	AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10634	AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	WLAN	8.80	± 9.6 %
10635	AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10636	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10637	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10638	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	WLAN	8.86	± 9.6 %
10639	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	WLAN	8.85	± 9.6 %
10640	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	WLAN	8.98	± 9.6 %
10641	AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	WLAN	9.06	± 9.6 %
10642	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	WLAN	9.06	± 9.6 %
10643	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	WLAN	8.89	± 9.6 %
10644	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	WLAN	9.05	± 9.6 %
10645	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	WLAN	9.03	
10646	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	± 9.6 %
10647	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	LTE-TDD		± 9.6 %
10648	AAA	CDMA2000 (1x Advanced)	CDMA2000	11.96 3.45	± 9.6 %
10652	AAD	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD		± 9.6 %
10653	AAD	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	± 9.6 %
10654	AAD	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	± 9.6 %
	I	(	L L L L L D D	6.96	± 9.6 %

10055		LITE TOD (CEDMA COMILLE THICK OFFICE (101)	1 ( 75 755	7.04	
10655	AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21 10.00	± 9.6 %
10658 10659	AAA	Pulse Waveform (200Hz, 10%) Pulse Waveform (200Hz, 20%)	Test Test	6.99	± 9.6 % ± 9.6 %
10660	AAA	Pulse Waveform (200Hz, 40%)	Test	3.98	±9.6%
10661	AAA	Pulse Waveform (200Hz, 60%)	Test	2.22	± 9.6 %
10662	AAA	Pulse Waveform (200Hz, 80%)	Test	0.97	± 9.6 %
10670	AAA	Bluetooth Low Energy	Bluetooth	2.19	± 9.6 %
10671	AAA	IEEE 802.11ax (20MHz, MCS0, 90pc duty cycle)	WLAN	9.09	± 9.6 %
10672	AAA	IEEE 802.11ax (20MHz, MCS1, 90pc duty cycle)	WLAN	8.57	± 9.6 %
10673	AAA	IEEE 802.11ax (20MHz, MCS2, 90pc duty cycle)	WLAN	8.78	±9.6%
10674	AAA	IEEE 802.11ax (20MHz, MCS3, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10675	AAA	IEEE 802.11ax (20MHz, MCS4, 90pc duty cycle)	WLAN	8.90	± 9.6 %
10676	AAA	IEEE 802.11ax (20MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10677	AAA	IEEE 802.11ax (20MHz, MCS6, 90pc duty cycle)	WLAN	8.73	± 9.6 %
10678	AAA	IEEE 802.11ax (20MHz, MCS7, 90pc duty cycle)	WLAN	8.78	± 9.6 %
10679	AAA	IEEE 802.11ax (20MHz, MCS8, 90pc duty cycle)	WLAN	8.89	± 9.6 %
10680	AAA	IEEE 802.11ax (20MHz, MCS9, 90pc duty cycle)	WLAN	8.80	± 9.6 %
10681	AAA	IEEE 802.11ax (20MHz, MCS10, 90pc duty cycle)	WLAN	8.62	± 9.6 %
10682	AAA	IEEE 802.11ax (20MHz, MCS11, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10683	AAA	IEEE 802.11ax (20MHz, MCS0, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10684	AAA	IEEE 802.11ax (20MHz, MCS1, 99pc duty cycle)	WLAN	8.26	±9.6 %
10685	AAA	IEEE 802.11ax (20MHz, MCS2, 99pc duty cycle)	WLAN	8.33	± 9.6 %
10686	AAA	IEEE 802.11ax (20MHz, MCS3, 99pc duty cycle)	WLAN	8.28	±9.6%
10687 10688	AAA	IEEE 802.11ax (20MHz, MCS4, 99pc duty cycle)	WLAN WLAN	8.45 8.29	± 9.6 % ± 9.6 %
		IEEE 802.11ax (20MHz, MCS5, 99pc duty cycle)	WLAN	8.29	
10689 10690	AAA	IEEE 802.11ax (20MHz, MCS6, 99pc duty cycle)	WLAN	8.29	± 9.6 % ± 9.6 %
10690	AAA	IEEE 802.11ax (20MHz, MCS7, 99pc duty cycle) IEEE 802.11ax (20MHz, MCS8, 99pc duty cycle)	WLAN	8.25	± 9.6 %
10692	AAA	IEEE 802.11ax (20MHz, MCS9, 99pc duty cycle)	WLAN	8.29	± 9.6 %
10693	AAA	IEEE 802.11ax (20MHz, MCS10, 99pc duty cycle)	WLAN	8.25	± 9.6 %
10694	AAA	IEEE 802.11ax (20MHz, MCS11, 99pc duty cycle)	WLAN	8.57	± 9.6 %
10695	AAA	IEEE 802.11ax (40MHz, MCS0, 90pc duty cycle)	WLAN	8,78	± 9.6 %
10696	AAA	IEEE 802.11ax (40MHz, MCS1, 90pc duty cycle)	WLAN	8.91	± 9.6 %
10697	AAA	IEEE 802.11ax (40MHz, MCS2, 90pc duty cycle)	WLAN	8.61	± 9.6 %
10698	AAA	IEEE 802.11ax (40MHz, MCS3, 90pc duty cycle)	WLAN	8.89	± 9.6 %
10699	AAA	IEEE 802.11ax (40MHz, MCS4, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10700	AAA	IEEE 802.11ax (40MHz, MCS5, 90pc duty cycle)	WLAN	8.73	± 9.6 %
10701	AAA	IEEE 802.11ax (40MHz, MCS6, 90pc duty cycle)	WLAN	8.86	± 9.6 %
10702	AAA	IEEE 802.11ax (40MHz, MCS7, 90pc duty cycle)	WLAN	8.70	± 9.6 %
10703	AAA	IEEE 802.11ax (40MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6%
10704	AAA	IEEE 802.11ax (40MHz, MCS9, 90pc duty cycle)	WLAN	8.56	± 9.6 %
10705	AAA	IEEE 802.11ax (40MHz, MCS10, 90pc duty cycle)	WLAN	8.69	± 9.6 %
10706	AAA	IEEE 802.11ax (40MHz, MCS11, 90pc duty cycle)	WLAN	8.66	± 9.6 %
10707	AAA	IEEE 802.11ax (40MHz, MCS0, 99pc duty cycle)	WLAN	8.32	± 9.6 %
10708	AAA	IEEE 802.11ax (40MHz, MCS1, 99pc duty cycle)	WLAN	8.55	± 9.6 %
10709 10710	AAA	IEEE 802.11ax (40MHz, MCS2, 99pc duty cycle)   IEEE 802.11ax (40MHz, MCS3, 99pc duty cycle)	WLAN WLAN	8.33 8.29	±9.6 % ±9.6 %
10710	AAA	IEEE 802.11ax (40MHz, MCS3, 99pc duty cycle)	WLAN	8.39	± 9.6 %
10711	AAA	IEEE 802.11ax (40MHz, MCS5, 99pc duty cycle)	WLAN	8.67	± 9.6 %
10712	AAA	IEEE 802.11ax (40MHz, MCS6, 99pc duty cycle)	WLAN	8.33	± 9.6 %
10713	AAA	IEEE 802.11ax (40MHz, MCS7, 99pc duty cycle)	WLAN	8.26	± 9.6 %
10715	AAA	IEEE 802.11ax (40MHz, MCS8, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10716	AAA	IEEE 802.11ax (40MHz, MCS9, 99pc duty cycle)	WLAN	8.30	± 9.6 %
10717	AAA	IEEE 802.11ax (40MHz, MCS10, 99pc duty cycle)	WLAN	8.48	± 9.6 %
10718	AAA	IEEE 802.11ax (40MHz, MCS11, 99pc duty cycle)	WLAN	8.24	± 9.6 %
10719	AAA	IEEE 802.11ax (80MHz, MCS0, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10720	AAA	IEEE 802.11ax (80MHz, MCS1, 90pc duty cycle)	WLAN	8.87	± 9.6 %
10721	AAA	IEEE 802.11ax (80MHz, MCS2, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10722	AAA	IEEE 802.11ax (80MHz, MCS3, 90pc duty cycle)	WLAN	8.55	± 9.6 %
10723	AAA	IEEE 802.11ax (80MHz, MCS4, 90pc duty cycle)	WLAN	8.70	± 9.6 %
10724	AAA	IEEE 802.11ax (80MHz, MCS5, 90pc duty cycle)	WLAN	8.90	± 9.6 %
10725	AAA	IEEE 802.11ax (80MHz, MCS6, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10726	AAA	IEEE 802.11ax (80MHz, MCS7, 90pc duty cycle)	WLAN	8.72	± 9.6 %
10727	AAA	IEEE 802.11ax (80MHz, MCS8, 90pc duty cycle)	WLAN	8.66	± 9.6 %

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10728	40700	1 ^ ^ ^	JEEE COO 44 (CONTIL MOOD CO. 14			
10730	10728	AAA	IEEE 802.11ax (80MHz, MCS9, 90pc duty cycle)	WLAN	8.65	± 9.6 %
10731   AAA   IEEE 802.11ax (80MHz, MCS0, 99pc duty cycle)			IEEE 802.11ax (80MHz, MCS10, 90pc duty cycle)			
10732			IEEE 802.11ax (80MHz, MCS11, 90pc duty cycle)		<del>-)</del>	
10733			IEEE 802.11ax (80MHz, MCS0, 99pc duty cycle)		8.42	
10734					8.46	± 9.6 %
10735				WLAN	8.40	± 9.6 %
10736				WLAN	8.25	± 9.6 %
10737				WLAN	8.33	± 9.6 %
10738		<del>1</del>	IEEE 802.11ax (80MHz, MCS5, 99pc duty cycle)	WLAN	8.27	± 9.6 %
10739			IEEE 802.11ax (80MHz, MCS6, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10739				WLAN	8.42	± 9.6 %
10740				WLAN		
10741   AAA   IEEE 802.11ax (80MHz, MCS10, 99pc duty cycle)   WLAN   8.40   ± 9.6 %   10742   AAA   IEEE 802.11ax (80MHz, MCS11, 99pc duty cycle)   WLAN   8.43   ± 9.6 %   10743   AAA   IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10744   AAA   IEEE 802.11ax (160MHz, MCS1, 90pc duty cycle)   WLAN   9.16   ± 9.6 %   10745   AAA   IEEE 802.11ax (160MHz, MCS2, 90pc duty cycle)   WLAN   8.93   ± 9.6 %   10746   AAA   IEEE 802.11ax (160MHz, MCS3, 90pc duty cycle)   WLAN   8.93   ± 9.6 %   10747   AAA   IEEE 802.11ax (160MHz, MCS3, 90pc duty cycle)   WLAN   9.11   ± 9.6 %   10748   AAA   IEEE 802.11ax (160MHz, MCS3, 90pc duty cycle)   WLAN   9.04   ± 9.6 %   10749   AAA   IEEE 802.11ax (160MHz, MCS5, 90pc duty cycle)   WLAN   8.93   ± 9.6 %   10750   AAA   IEEE 802.11ax (160MHz, MCS6, 90pc duty cycle)   WLAN   8.90   ± 9.6 %   10751   AAA   IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)   WLAN   8.79   ± 9.6 %   10752   AAA   IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10753   AAA   IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10753   AAA   IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10755   AAA   IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10755   AAA   IEEE 802.11ax (160MHz, MCS1, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10756   AAA   IEEE 802.11ax (160MHz, MCS1, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10757   AAA   IEEE 802.11ax (160MHz, MCS1, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10758   AAA   IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)   WLAN   8.77   ± 9.6 %   10758   AAA   IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)   WLAN   8.77   ± 9.6 %   10760   AAA   IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)   WLAN   8.58   ± 9.6 %   10761   AAA   IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)   WLAN   8.58   ± 9.6 %   10760   AAA   IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)   WLAN   8.58   ± 9.6 %   10760   AAA   IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)   WLAN		-		WLAN	8.48	
10742				WLAN	8.40	
10743				WLAN	8.43	
10744			IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle)	WLAN	8.94	
10745			IEEE 802.11ax (160MHz, MCS1, 90pc duty cycle)	WLAN	9.16	
10746		-	IEEE 802.11ax (160MHz, MCS2, 90pc duty cycle)	WLAN	8.93	
10747         AAA         IEEE 802.11ax (160MHz, MCS4, 90pc duty cycle)         WLAN         9.04         ± 9.6 %           10748         AAA         IEEE 802.11ax (160MHz, MCS5, 90pc duty cycle)         WLAN         8.93         ± 9.6 %           10749         AAA         IEEE 802.11ax (160MHz, MCS6, 90pc duty cycle)         WLAN         8.90         ± 9.6 %           10750         AAA         IEEE 802.11ax (160MHz, MCS7, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10751         AAA         IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)         WLAN         8.82         ± 9.6 %           10752         AAA         IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10753         AAA         IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)         WLAN         9.00         ± 9.6 %           10754         AAA         IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)         WLAN         8.94         ± 9.6 %           10755         AAA         IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)         WLAN         8.64         ± 9.6 %           10756         AAA         IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)         WLAN         8.77         ± 9.6 %           10758         AAA         IEEE 802.11ax (160MHz, MCS2			IEEE 802.11ax (160MHz, MCS3, 90pc duty cycle)	WLAN	9.11	
10748         AAA         IEEE 802.11ax (160MHz, MCS5, 90pc duty cycle)         WLAN         8.93         ± 9.6 %           10749         AAA         IEEE 802.11ax (160MHz, MCS6, 90pc duty cycle)         WLAN         8.90         ± 9.6 %           10750         AAA         IEEE 802.11ax (160MHz, MCS7, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10751         AAA         IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)         WLAN         8.82         ± 9.6 %           10752         AAA         IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10753         AAA         IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)         WLAN         9.00         ± 9.6 %           10754         AAA         IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)         WLAN         8.94         ± 9.6 %           10755         AAA         IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)         WLAN         8.64         ± 9.6 %           10756         AAA         IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)         WLAN         8.77         ± 9.6 %           10757         AAA         IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)         WLAN         8.69         ± 9.6 %           10758         AAA         IEEE 802.11ax (160MHz, MCS4			IEEE 802.11ax (160MHz, MCS4, 90pc duty cycle)	WLAN	9.04	
10749       AAA       IEEE 802.11ax (160MHz, MCS6, 90pc duty cycle)       WLAN       8.90       ± 9.6 %         10750       AAA       IEEE 802.11ax (160MHz, MCS7, 90pc duty cycle)       WLAN       8.79       ± 9.6 %         10751       AAA       IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)       WLAN       8.82       ± 9.6 %         10752       AAA       IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)       WLAN       8.81       ± 9.6 %         10753       AAA       IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)       WLAN       9.00       ± 9.6 %         10754       AAA       IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)       WLAN       8.94       ± 9.6 %         10755       AAA       IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)       WLAN       8.64       ± 9.6 %         10756       AAA       IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)       WLAN       8.77       ± 9.6 %         10757       AAA       IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)       WLAN       8.77       ± 9.6 %         10758       AAA       IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10760       AAA       IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)       WLAN       8.58       ± 9.6 %				WLAN	8.93	
10750         AAA         IEEE 802.11ax (160MHz, MCS7, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10751         AAA         IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)         WLAN         8.82         ± 9.6 %           10752         AAA         IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10753         AAA         IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)         WLAN         9.00         ± 9.6 %           10754         AAA         IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)         WLAN         8.94         ± 9.6 %           10755         AAA         IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)         WLAN         8.64         ± 9.6 %           10756         AAA         IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)         WLAN         8.77         ± 9.6 %           10757         AAA         IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)         WLAN         8.77         ± 9.6 %           10758         AAA         IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)         WLAN         8.69         ± 9.6 %           10759         AAA         IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)         WLAN         8.58         ± 9.6 %           10760         AAA         IEEE 802.11ax (160MHz, MCS6			IEEE 802.11ax (160MHz, MCS6, 90pc duty cycle)	WLAN		
10751       AAA       IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)       WLAN       8.82       ± 9.6 %         10752       AAA       IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)       WLAN       8.81       ± 9.6 %         10753       AAA       IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)       WLAN       9.00       ± 9.6 %         10754       AAA       IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)       WLAN       8.94       ± 9.6 %         10755       AAA       IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)       WLAN       8.64       ± 9.6 %         10756       AAA       IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)       WLAN       8.77       ± 9.6 %         10757       AAA       IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)       WLAN       8.77       ± 9.6 %         10758       AAA       IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)       WLAN       8.69       ± 9.6 %         10759       AAA       IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10760       AAA       IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10761       AAA       IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)       WLAN       8.54       ± 9.6 %			IEEE 802.11ax (160MHz, MCS7, 90pc duty cycle)	WLAN	8.79	
10752         AAA         IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10753         AAA         IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)         WLAN         9.00         ± 9.6 %           10754         AAA         IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)         WLAN         8.94         ± 9.6 %           10755         AAA         IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)         WLAN         8.64         ± 9.6 %           10756         AAA         IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)         WLAN         8.77         ± 9.6 %           10757         AAA         IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)         WLAN         8.77         ± 9.6 %           10758         AAA         IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)         WLAN         8.69         ± 9.6 %           10759         AAA         IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)         WLAN         8.58         ± 9.6 %           10760         AAA         IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)         WLAN         8.58         ± 9.6 %           10761         AAA         IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)         WLAN         8.58         ± 9.6 %           10762         AAA         IEEE 802.11ax (160MHz, MCS9				WLAN	8.82	
10753         AAA         IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)         WLAN         9.00         ± 9.6 %           10754         AAA         IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)         WLAN         8.94         ± 9.6 %           10755         AAA         IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)         WLAN         8.64         ± 9.6 %           10756         AAA         IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)         WLAN         8.77         ± 9.6 %           10757         AAA         IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)         WLAN         8.77         ± 9.6 %           10758         AAA         IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)         WLAN         8.69         ± 9.6 %           10759         AAA         IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)         WLAN         8.58         ± 9.6 %           10760         AAA         IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)         WLAN         8.49         ± 9.6 %           10761         AAA         IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)         WLAN         8.58         ± 9.6 %           10762         AAA         IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)         WLAN         8.53         ± 9.6 %           10763         AAA         IEEE 802.11ax (160MHz, MCS1			IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)			
10754       AAA       IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)       WLAN       8.94       ± 9.6 %         10755       AAA       IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)       WLAN       8.64       ± 9.6 %         10756       AAA       IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)       WLAN       8.77       ± 9.6 %         10757       AAA       IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)       WLAN       8.77       ± 9.6 %         10758       AAA       IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)       WLAN       8.69       ± 9.6 %         10759       AAA       IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10760       AAA       IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10761       AAA       IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10762       AAA       IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10763       AAA       IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)       WLAN       8.53       ± 9.6 %         10765       AAA       IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)       WLAN       8.54       ± 9.6 %		AAA	IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)	WLAN		
10755       AAA       IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)       WLAN       8.64       ± 9.6 %         10756       AAA       IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)       WLAN       8.77       ± 9.6 %         10757       AAA       IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)       WLAN       8.77       ± 9.6 %         10758       AAA       IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)       WLAN       8.69       ± 9.6 %         10759       AAA       IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10760       AAA       IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10761       AAA       IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10762       AAA       IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10763       AAA       IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)       WLAN       8.53       ± 9.6 %         10764       AAA       IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)       WLAN       8.54       ± 9.6 %         10765       AAA       IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)       WLAN       8.54       ± 9.6 %			IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)			
10756         AAA         IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)         WLAN         8.77         ± 9.6 %           10757         AAA         IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)         WLAN         8.77         ± 9.6 %           10758         AAA         IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)         WLAN         8.69         ± 9.6 %           10759         AAA         IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)         WLAN         8.58         ± 9.6 %           10760         AAA         IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)         WLAN         8.49         ± 9.6 %           10761         AAA         IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)         WLAN         8.58         ± 9.6 %           10762         AAA         IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)         WLAN         8.49         ± 9.6 %           10763         AAA         IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)         WLAN         8.53         ± 9.6 %           10764         AAA         IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)         WLAN         8.54         ± 9.6 %           10765         AAA         IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)         WLAN         8.54         ± 9.6 %		AAA	IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)		8,64	
10757       AAA       IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)       WLAN       8.77       ± 9.6 %         10758       AAA       IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)       WLAN       8.69       ± 9.6 %         10759       AAA       IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10760       AAA       IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10761       AAA       IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10762       AAA       IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10763       AAA       IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)       WLAN       8.53       ± 9.6 %         10764       AAA       IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)       WLAN       8.54       ± 9.6 %         10765       AAA       IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)       WLAN       8.54       ± 9.6 %			IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)	WLAN		
10758       AAA       IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)       WLAN       8.69       ± 9.6 %         10759       AAA       IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10760       AAA       IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10761       AAA       IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10762       AAA       IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10763       AAA       IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)       WLAN       8.53       ± 9.6 %         10764       AAA       IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)       WLAN       8.54       ± 9.6 %         10765       AAA       IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)       WLAN       8.54       ± 9.6 %		L	IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)	WLAN	<del></del>	± 9.6 %
10759       AAA       IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10760       AAA       IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10761       AAA       IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10762       AAA       IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10763       AAA       IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)       WLAN       8.53       ± 9.6 %         10764       AAA       IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)       WLAN       8.54       ± 9.6 %         10765       AAA       IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)       WLAN       8.54       ± 9.6 %			IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)	WLAN		
10760       AAA       IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10761       AAA       IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)       WLAN       8.58       ± 9.6 %         10762       AAA       IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10763       AAA       IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)       WLAN       8.53       ± 9.6 %         10764       AAA       IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)       WLAN       8.54       ± 9.6 %         10765       AAA       IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)       WLAN       8.54       ± 9.6 %		AAA	IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)	WLAN		
10761         AAA         IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)         WLAN         8.58         ± 9.6 %           10762         AAA         IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)         WLAN         8.49         ± 9.6 %           10763         AAA         IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)         WLAN         8.53         ± 9.6 %           10764         AAA         IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)         WLAN         8.54         ± 9.6 %           10765         AAA         IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)         WLAN         8.54         ± 9.6 %		AAA	IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)			
10762       AAA       IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)       WLAN       8.49       ± 9.6 %         10763       AAA       IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)       WLAN       8.53       ± 9.6 %         10764       AAA       IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)       WLAN       8.54       ± 9.6 %         10765       AAA       IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)       WLAN       8.54       ± 9.6 %		AAA	IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)	***************************************		
10763       AAA       IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)       WLAN       8.53       ± 9.6 %         10764       AAA       IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)       WLAN       8.54       ± 9.6 %         10765       AAA       IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)       WLAN       8.54       ± 9.6 %			IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)			
10764       AAA       IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)       WLAN       8.54       ± 9.6 %         10765       AAA       IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)       WLAN       8.54       ± 9.6 %		AAA	IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)			
10765 AAA IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle) WLAN 8.54 ± 9.6 %		AAA	IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)			
40700 444 400444 400444			IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)			
	10766	AAA	IEEE 802.11ax (160MHz, MCS11, 99pc duty cycle)			

May 16, 2019

<sup>&</sup>lt;sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

# Calibration Laboratory of Schmid & Partner

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA

Multilateral Agreement for the recognition of calibration certificates

Client

**PC Test** 

Certificate No: EX3-7357\_Apr19

S

C

### **CALIBRATION CERTIFICATE**

Object

EX3DV4 - SN:7357

Calibration procedure(s)

QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v5, QA CAL-23.v5,

QA CAL-25.v7

Calibration procedure for dosimetric E-field probes

BN 4-29-2010

Calibration date:

April 24, 2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 660	19-Dec-18 (No. DAE4-660_Dec18)	Dec-19
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	(D	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check; Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Calibrated by:

Claudio Leubler

Claudio Leubler

Laboratory Technician

Approved by:

Katja Pokovic

Technical Manager

Issued: April 24, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

#### **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL NORMx,y,z tissue simulating liquid sensitivity in free space

ConvF DCP sensitivity in TSL / NORMx,y,z diode compression point

CF A, B, C, D crest factor (1/duty\_cycle) of the RF signal modulation dependent linearization parameters

Polarization φ

φ rotation around probe axis

Polarization 9

9 rotation around an axis that is in the plane normal to probe axis (at measurement center),

i.e., 9 = 0 is normal to probe axis

Connector Angle

information used in DASY system to align probe sensor X to the robot coordinate system

#### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from handheld and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 9 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
   NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z \* frequency\_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

EX3DV4 - SN:7357

### DASY/EASY - Parameters of Probe: EX3DV4 - SN:7357

#### **Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)²) <sup>A</sup>	0.37	0.48	0.41	± 10.1 %
DCP (mV) <sup>B</sup>	87.5	101.0	95.2	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dBõV	С	D dB	VR mV	Max dev.	Max Unc <sup>E</sup> (k=2)
0	CW	Х	0.00	0.00	1.00	0.00	175.5	± 2.7 %	± 4.7 %
		Y	0.00	0.00	1.00	1	162.7		
		Z	0.00	0.00	1.00	1	160.1		
10352-	Pulse Waveform (200Hz, 10%)	Х	1.63	60.99	8.59	10.00	60.0	± 3.2 %	± 9.6 %
AAA	· ·	Υ	15.00	88.78	20.10		60.0		
		Z	1.92	62,77	9.39	1	60.0		
10353-	Pulse Waveform (200Hz, 20%)	X	1.28	62.05	7.66	6.99	80.0	± 2.1 %	± 9.6 %
AAA		Y	15.00	92.12	20.60		80.0		
		Z	1.44	63.37	8.24	1	80.0		
10354-	Pulse Waveform (200Hz, 40%)	X	0.53	60.00	5.08	3.98	95.0	± 1.2 %	± 9.6 %
AAA		Y	15.00	98.74	22.38		95.0		
		Z	0.50	60.00	4.96		95.0		
10355-	Pulse Waveform (200Hz, 60%)	X	0.34	60.00	3.46	2.22	120.0	± 1.3 %	± 9.6 %
AAA		Y	15.00	122.09	31.59		120.0		
		Z	0.32	60.00	3.17		120.0		
10387-	QPSK Waveform, 1 MHz	Х	0.47	60.00	5.85	0.00	150.0	± 3.4 %	± 9.6 %
AAA		Υ	0.84	63.60	10.73		150.0		
		Z	0.47	60.00	5.64		150.0		
10388-	QPSK Waveform, 10 MHz	X	2.22	69.17	16.45	0.00	150.0	± 1.2 %	± 9.6 %
AAA		Υ	2.39	69.28	16.48		150.0		
		Z	2.05	67.86	15.44	1	150.0		
10396-	64-QAM Waveform, 100 kHz	Х	1.74	66.32	18.65	3.01	150.0	± 6.4 %	± 9.6 %
AAA		Υ	3.21	72.13	19.45		150.0		
		Z	2.50	68.64	18.00		150.0		
10399-	64-QAM Waveform, 40 MHz	X	3.50	67.46	16.21	0.00	150.0	± 2.5 %	± 9.6 %
AAA		Υ	3.59	67.57	16.11		150.0		
		Z	3.40	67.11	15.75		150.0		
10414-	WLAN CCDF, 64-QAM, 40MHz	Х	4.79	65.80	15.93	0.00	150.0	± 4.6 %	± 9.6 %
AAA		Υ	4.92	65.80	15.71	]	150.0		
		Z	4.73	65.72	15.66		150.0		

Note: For details on UID parameters see Appendix

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

A The uncertainties of Norm X,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

B Numerical linearization parameter: uncertainty not required.

C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

#### **Sensor Model Parameters**

	C1 fF	C2 fF	α V <sup>-1</sup>	T1 ms.V <sup>-2</sup>	T2 ms.V <sup>-1</sup>	T3 ms	T4 V <sup>-2</sup>	T5 V <sup>-1</sup>	Т6
X	37.3	299.85	40.64	5.98	0.77	5.00	0.00	0.00	1.02
Υ	48.9	366.83	35.90	10.43	0.11	5.09	1.58	0.24	1.01
Z	37.8	294.77	38.42	5.12	0.55	5.04	0.00	0.43	1.01

#### **Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	14.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

#### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) F	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
64	54.2	0.75	14.77	14.77	14.77	0.00	1.00	± 13.3 %
750	41.9	0.89	10.26	10.26	10.26	0.45	0.95	± 12.0 %
835	41.5	0.90	9.91	9.91	9.91	0.53	0.85	± 12.0 %
1750	40.1	1.37	8.69	8.69	8.69	0.35	0.80	± 12.0 %
1900	40.0	1.40	8.26	8.26	8.26	0.33	0.84	± 12.0 %
2300	39.5	1.67	7.70	7.70	7.70	0.33	0.85	± 12.0 %
2450	39.2	1.80	7.57	7.57	7.57	0.39	0.85	± 12.0 %
2600	39.0	1.96	7.31	7.31	7.31	0.40	0.80	± 12.0 %
5250	35.9	4.71	5.45	5.45	5.45	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.85	4.85	4.85	0.40	1.80	± 13.1 %
5750	35.4	5.22	5.06	5.06	5.06	0.40	1.80	± 13.1 %

<sup>&</sup>lt;sup>c</sup> Frequency validity above 300 MHz of  $\pm$  100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to  $\pm$  50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is  $\pm$  10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to  $\pm$  110 MHz.

<sup>6</sup> MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

F At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

the ConvF uncertainty for indicated target tissue parameters.

Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

#### Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) <sup>C</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) <sup>F</sup>	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>6</sup> (mm)	Unc (k=2)
750	55.5	0.96	10.19	10.19	10.19	0.37	0.96	± 12.0 %
835	55.2	0.97	9.95	9.95	9.95	0.47	0.80	± 12.0 %
1750	53.4	1.49	8.26	8.26	8.26	0.35	0.85	± 12.0 %
1900	53.3	1.52	7.93	7.93	7.93	0.32	0.90	± 12.0 %
2300	52.9	1.81	7.72	7.72	7.72	0.30	0.85	± 12.0 %
2450	52.7	1.95	7.59	7.59	7.59	0.35	0.86	± 12.0 %
2600	52.5	2.16	7.39	7.39	7.39	0.32	0.89	± 12.0 %
5250	48.9	5.36	4.61	4.61	4.61	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.03	4.03	4.03	0.50	1.90	± 13.1 %
5750	48.3	5.94	4.15	4.15	4.15	0.50	1.90	± 13.1 %

<sup>&</sup>lt;sup>c</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

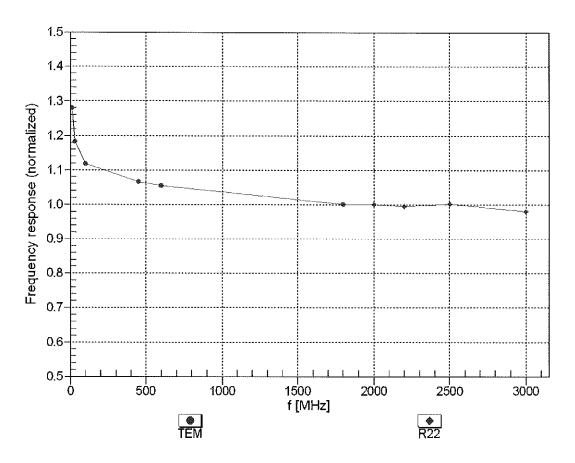
F At frequencies below 3 GHz, the validity of tissue parameters (e and a) can be relayed to ± 10% if liquid comprehensition formula is applied to

F At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

the ConvF uncertainty for indicated target tissue parameters.

Galpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

# Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)

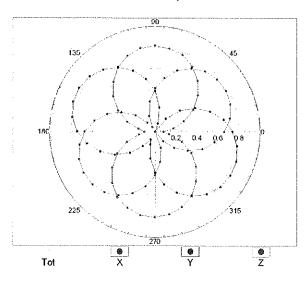


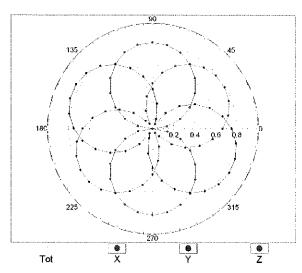
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

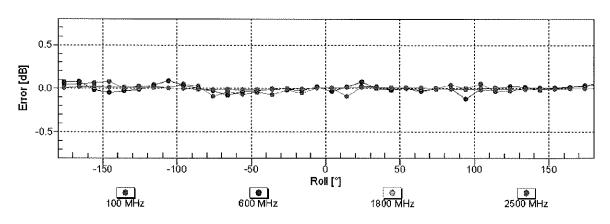
# Receiving Pattern ( $\phi$ ), $\vartheta = 0^{\circ}$

f=600 MHz,TEM

f=1800 MHz,R22

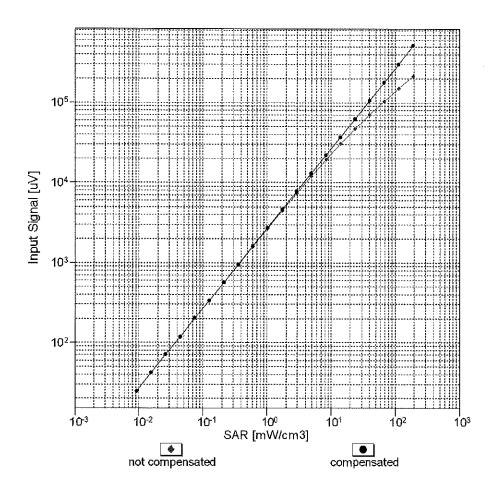


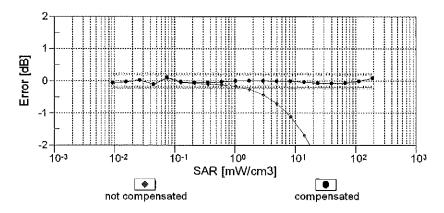




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

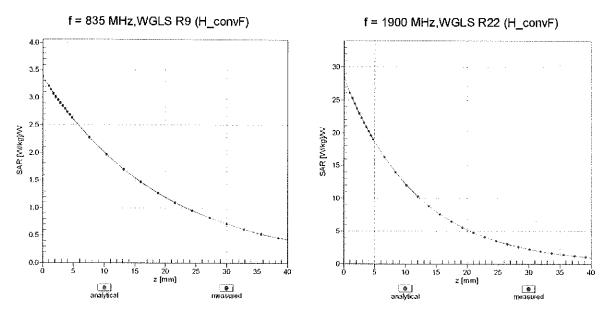
### Dynamic Range f(SAR<sub>head</sub>) (TEM cell , f<sub>eval</sub>= 1900 MHz)



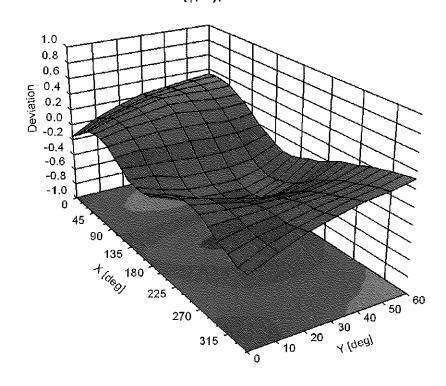


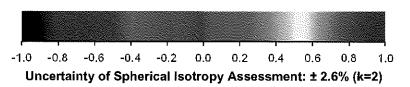
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

### **Conversion Factor Assessment**



**Deviation from Isotropy in Liquid** Error (φ, θ), f = 900 MHz





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### **Appendix: Modulation Calibration Parameters**

UID	Rev	Communication System Name	Group		
0		CW	CW	0.00	± 4.7 %
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	± 9.6 %
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	±9.6%
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	±9.6%
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	±9.6%
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	±9.6%
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	7.74	±96%
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	Bluetooth	4.53	±9.6%
10035	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	3.83	±9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.01	±9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	Bluetooth	4.77	±9.6 %
10038	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.10	±9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	± 9.6 %
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	AMPS	7.78	± 9.6 %
10044	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	±9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	±9.6%
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	±9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM WLAN	6.52	±9.6%
10059 10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12 2.83	± 9.6 % ± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps) IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	± 9.6 %
10061	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	± 9.6 %
10062	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	± 9.6 %
10063	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	± 9.6 %
10065	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	± 9.6 %
10066	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 16 Mbps)	WLAN	9.38	± 9.6 %
10067	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	± 9.6 %
10068	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	± 9.6 %
10069	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	9.83	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.62	± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	± 9.6 %
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	±9.6 %
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	±9.6%
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	11.00	± 9.6 %
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	AMPS	4.77	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	± 9.6 %
10097	CAB	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	CAB	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %
10100	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10102	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10103	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10104	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10105	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM) LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	10.01	±9.6%
10108	CAG		LTE-FDD	5.80	± 9.6 %

					,
10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-FDD	6.44	± 9.6 %
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	± 9.6 %
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD		
10114	CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	****	6.62	± 9.6 %
10115	CAC		WLAN	8.10	± 9.6 %
		IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
10116	CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
10117	CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6 %
10118	CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	± 9.6 %
10119	CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	± 9.6 %
10140	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10141	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6 %
10142	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	±9.6%
10143	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6 %
10144	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6 %
10145	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6 %
10146	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	
10147	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)			± 9.6 %
10149	CAE	LTE EDD (SC EDMA 50% PB 20 MHz 46 OAM)	LTE-FDD	6.72	± 9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10150	·	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	± 9.6 %
10152	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10153	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	± 9.6 %
10154	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10155	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10156	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	± 9.6 %
10157	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10158	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	± 9.6 %
10160	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD		
10161	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)		5.82	± 9.6 %
10162	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.43	± 9.6 %
10166	CAF		LTE-FDD	6.58	± 9.6 %
10167	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	± 9.6 %
	-	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	± 9.6 %
10168	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	±9.6 %
10169	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	±9.6%
10170	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	±9.6%
10171	AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	± 9.6 %
10172	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10173	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	±9.6%
10174	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10175	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10176	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10177	CAI	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	<del></del>	
10178	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	5.73	±9.6%
10179	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)		6.52	±9.6%
10170	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10181	CAE	LITE FOD (SC FOMA 4 DR 45 MUL ODOM)	LTE-FDD	6.50	±9.6%
		LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10182	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10183	AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10184	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10185	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6 %
10186	AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10187	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	±9.6 %
10188	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10189	AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10193	CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	± 9.6 %
10194	CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)			
10195	CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.12	±9.6%
10196	CAC	IEEE 802.11n (HT Greenlieid, 65 Mbps, 64-QAM)	WLAN	8.21	± 9.6 %
10190	CAC		WLAN	8.10	± 9.6 %
		IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	±9.6%
10198	CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10219	CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	± 9.6 %

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10220	CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10221	CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10222	CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN WLAN	8.06 8.48	± 9.6 % ± 9.6 %
10223	CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM) IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	±9.6 %
10225	CAB	UMTS-FDD (HSPA+)	WCDMA ·	5.97	± 9.6 %
10226	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	± 9.6 %
10227	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	± 9.6 %
10228	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	±9.6 %
10229	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9,48	±9.6 %
10230	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10231	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9,19	± 9.6 %
10232	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10233	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10234	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	±9.6%
10235	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	±9.6%
10236	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10237	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10238	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10239	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10240	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10241	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.82	± 9.6 %
10242	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	±9.6 %
10243	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.46	± 9.6 %
10244	CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	±9.6%
10245	CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	± 9.6 %
10246	CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-TDD	9.30	±9.6 %
10247	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	±9.6 % ±9.6 %
10248	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD LTE-TDD	10.09 9.29	± 9.6 %
10249 10250	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK) LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	± 9.6 %
10250	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TOD	10.17	±9.6 %
10251	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TOD	9.24	± 9.6 %
10252	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	± 9.6 %
10254	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	± 9.6 %
10255	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	± 9.6 %
10256	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	± 9.6 %
10257	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	± 9.6 %
10258	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	±9.6%
10259	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.98	±9.6%
10260	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	±9.6%
10261	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	±9.6%
10262	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	± 9.6 %
10263	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	± 9.6 %
10264	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	± 9.6 %
10265	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10266	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	± 9.6 %
10267	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10268	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10269	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	± 9.6 %
10270	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	± 9.6 %
10274	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	WCDMA	4.87	± 9.6 %
10275	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	WCDMA	3,96	± 9.6 %
10277	CAA	PHS (QPSK)	PHS	11.81	± 9.6 %
10278	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	PHS	11.81	± 9.6 %
10279	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	PHS CDMA2000	12.18 3.91	± 9.6 % ± 9.6 %
10290 10291	AAB AAB	CDMA2000, RC1, SO55, Full Rate  CDMA2000, RC3, SO55, Full Rate	CDMA2000 CDMA2000	3.46	± 9.6 %
10291	AAB	CDMA2000, RC3, SO33, Full Rate	CDMA2000 CDMA2000	3.39	± 9.6 %
10292	AAB	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.50	± 9.6 %
10295	AAB	CDMA2000, RC3, SO3, Pull Rate CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	CDMA2000	12.49	± 9.6 %
10293	AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	± 9.6 %
10297	AAD	LTE-FDD (SC-FDMA, 30 % RB, 3 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10299	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	± 9.6 %
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10300 10301	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10301	AAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, QPSK, PUSC) IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL	WiMAX WiMAX	12.03	± 9.6 %
10302	~~~	symbols)	WINAX	12.57	± 9.6 %
10303	AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	12.52	± 9.6 %
10304	AAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	WIMAX	11.86	± 9.6 %
10305	AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15	WIMAX	15.24	± 9.6 %
		symbols)	, , , , , , , , , , , , , , , , , , ,	10.21	20.070
10306	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18	WIMAX	14.67	± 9.6 %
		symbols)			,
10307	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18	WiMAX	14.49	± 9.6 %
40000		symbols)			
10308	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	WiMAX	14.46	± 9.6 %
10309	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18	WIMAX	14.58	± 9.6 %
10310	AAA	symbols)   IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18	18034036	44 67	
10010	1	symbols)	WiMAX	14.57	± 9.6 %
10311	AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	± 9.6 %
10313	AAA	iDEN 1:3	iDEN .	10.51	± 9.6 %
10314	AAA	iDEN 1:6	IDEN	13.48	± 9.6 %
10315	AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	WLAN	1.71	± 9.6 %
10316	AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	± 9.6 %
10317	AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	± 9.6 %
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	± 9.6 %
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	6.99	± 9.6 %
10354	AAA	Pulse Waveform (200Hz, 40%)	Generic	3.98	± 9.6 %
10355	AAA	Pulse Waveform (200Hz, 60%)	Generic	2.22	± 9.6 %
10356	AAA	Pulse Waveform (200Hz, 80%)	Generic	0.97	±9.6%
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	± 9.6 %
10388	AAA	QPSK Waveform, 10 MHz	Generic	5.22	± 9.6 %
10396 10399	AAA	64-QAM Waveform, 100 kHz	Generic	6.27	± 9.6 %
10399	AAA AAD	64-QAM Waveform, 40 MHz	Generic	6.27	± 9.6 %
10400	AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle) IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	WLAN	8.37	± 9.6 %
10401	AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	WLAN WLAN	8.60 8.53	± 9.6 %
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.76	± 9.6 % ± 9.6 %
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	± 9.6 %
10406	AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000	5.22	± 9.6 %
10410	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL	LTE-TDD	7.82	± 9.6 %
		Subframe=2,3,4,7,8,9, Subframe Conf=4)		1.02	± 0.0 /0
10414	AAA	WLAN CCDF, 64-QAM, 40MHz	Generic	8.54	± 9.6 %
10415	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	WLAN	1.54	± 9.6 %
10416	AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
10417	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle,	WLAN	8.14	± 9.6 %
10419	AAA	Long preambule) IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle,	1841 631	0.10	10000
10413	\_\_\\	Short preambule)	WLAN	8.19	± 9.6 %
10422	AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	0 20	1060/
10423	AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, 16-QAM)	WLAN	8.32 8.47	±9.6%
10424	AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.40	± 9.6 % ± 9.6 %
10425	AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	±9.6%
10426	AAB	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	±9.6%
10427	AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	WLAN	8.41	± 9.6 %
10430	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.28	± 9.6 %
10431	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	8.38	± 9.6 %
10432	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	LTE-FDD	8.34	±9.6 %
10433	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	8.34	± 9.6 %
10434	AAA	W-CDMA (BS Test Model 1, 64 DPCH)	WCDMA	8.60	± 9.6 %
10435	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL	LTE-TDD	7.82	± 9.6 %
10447	A A D	Subframe=2,3,4,7,8,9)			
10447 10448	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	± 9.6 %
10448	AAD AAC	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%) LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	LTE-FDD	7.53	± 9.6 %
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-1M 3.1, Clipping 44%)  LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.51	±9.6 %
10-700	11/10	ETE TOO (OF DIVIN, 20 WITZ, ETTW 3.1, CHIPPING 44%)	LTE-FDD	7.48	± 9.6 %

10451	AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	WCDMA	7.59	± 9.6 %
10456	AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	WLAN	8.63	± 9.6 %
10457	AAA	UMTS-FDD (DC-HSDPA)	WCDMA	6.62	± 9.6 %
10458	AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	6.55	± 9.6 %
10459	AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	8.25	± 9.6 %
10460	AAA	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	±9.6 %
10461	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL	LTE-TDD	7.82	±9.6 %
		Subframe=2,3,4,7,8,9)			
10462	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.30	± 9.6 %
10463	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.56	± 9,6 %
10464	AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10465	AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL	LTE-TDD	8.32	± 9.6 %
10466	AAB	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL	LTE-TDD	8.57	± 9.6 %
10467	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL	LTE-TDD	7.82	± 9.6 %
10468	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL.	LTE-TDD	8.32	± 9.6 %
10469	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL	LTE-TDD	8.56	± 9.6 %
10470	AAE	Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL	LTE-TDD	7.82	± 9.6 %
10471	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL	LTE-TDD	8.32	± 9.6 %
10472	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL	LTE-TDD	8.57	± 9.6 %
10473	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL	LTE-TDD	7.82	± 9.6 %
10474	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL	LTE-TDD	8.32	± 9.6 %
10475	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL	LTE-TDD	8.57	± 9.6 %
10477	AAF	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL	LTE-TDD	8.32	± 9.6 %
10478	AAF	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL	LTE-TDD	8.57	± 9.6 %
10479	AAA	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL	LTE-TDD	7.74	± 9.6 %
10480	AAA	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL	LTE-TDD	8.18	± 9.6 %
10481	AAA	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL	LTE-TDD	8.45	± 9.6 %
10482	AAB	Subframe=2,3,4,7,8,9) LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL	LTE-TDD	7.71	± 9.6 %
10483	AAB	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL	LTE-TDD	8.39	± 9.6 %
10484	AAB	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL	LTE-TDD	8.47	± 9.6 %
10485	AAE	Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL	LTE-TDD	7.59	± 9.6 %
		Subframe=2,3,4,7,8,9)  LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL	LTE-TDD	8.38	± 9.6 %
10486	AAE	Subframe=2,3,4,7,8,9)			
10487	AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.60	± 9.6 %
10488	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.70	± 9.6 %
10489	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.31	± 9.6 %
10490	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	± 9.6 %
10491	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %

10492						
1949a	10492	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL	LTE-TDD	8.41	± 9.6 %
19494	10493	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL	LTE-TDD	8.55	± 9.6 %
10496	10494	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL	LTE-TDD	7.74	± 9.6 %
10496	10495	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL	LTE-TDD	8.37	± 9.6 %
1049  AAA	10496	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL	LTE-TDD	8.54	± 9.6 %
10498	10497	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL	LTE-TDD	7.67	± 9.6 %
10499	10498	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL	LTE-TDD	8.40	± 9.6 %
10500	10499	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL	LTE-TDD	8.68	± 9.6 %
10501   AAB   LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL   LTE-TDD   6.44   ± 9.6 %   Subframe=2,3.4,7.8,9)     10502   AAB   LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL   LTE-TDD   7.72   ± 9.6 %   Subframe=2,3.4,7.8,9)     10503   AAE   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL   LTE-TDD   7.72   ± 9.6 %   Subframe=2,3.4,7.8,9)     10504   AE   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL   LTE-TDD   8.31   ± 9.6 %   Subframe=2,3.4,7.8,9)     10505   AE   LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL   LTE-TDD   8.54   ± 9.6 %   Subframe=2,3.4,7.8,9)     10506   AE   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL   LTE-TDD   7.74   ± 9.6 %   Subframe=2,3.4,7.8,9)     10507   AAE   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL   LTE-TDD   8.36   ± 9.6 %   Subframe=2,3.4,7.8,9)     10508   AAE   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, GP-QAM, UL   LTE-TDD   8.56   ± 9.6 %   Subframe=2,3.4,7.8,9)     10509   AAE   LTE-TDD (SC-FDMA, 100% RB, 10 MHz, GP-QAM, UL   LTE-TDD   8.55   ± 9.6 %   Subframe=2,3.4,7.8,9)     10510   AAE   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, GP-QAM, UL   LTE-TDD   8.55   ± 9.6 %   Subframe=2,3.4,7.8,9)     10511   AAE   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL   LTE-TDD   8.49   ± 9.6 %   Subframe=2,3.4,7.8,9)     10512   AAF   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL   LTE-TDD   8.49   ± 9.6 %   Subframe=2,3.4,7.8,9)     10513   AAF   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL   LTE-TDD   8.49   ± 9.6 %   Subframe=2,3.4,7.8,9)     10514   AAF   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL   LTE-TDD   8.42   ± 9.6 %   Subframe=2,3.4,7.8,9)     10515   AAA   LEEE 802.11b WiFl 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)   WLAN   1.57   ± 9.6 %   Subframe=2,3.4,7.8,9)     10516   AAA   LEEE 802.11b WiFl 5.4 GHz (DSSS, 5 Mbps, 99pc duty cycle)   WLAN   1.57   ± 9.6 %   Subframe=2,3.4,7.8,9)     10517   AAA   LEEE 802.11b WiFl 5.4 GHz (DSSS, 5 Mbps, 99pc duty cycle)   WLAN   1.58   ± 9.6 %   Subframe=2,3.4,7.8,9)   Subframe=2,3.4,7.8,9)   Subframe=2,3.4,7.8,9   Subframe=2,3.4,7.8,9   Subframe	10500	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL	LTE-TDD	7.67	± 9.6 %
10502	10501	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL	LTE-TDD	8.44	± 9.6 %
10503	10502	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL	LTE-TDD	8.52	± 9.6 %
10504	10503	AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL	LTE-TDD	7.72	± 9.6 %
10505	10504		LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL	LTE-TDD	8.31	± 9.6 %
Subframe=2,3,4,7,8,9    LTE-TDD   S.36   ± 9.6 %   Subframe=2,3,4,7,8,9    Subframe=2,3,4,7,8,9    Subframe=2,3,4,7,8,9    LTE-TDD   SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL   LTE-TDD   S.55   ± 9.6 %   Subframe=2,3,4,7,8,9    Subframe=2,3,4,7,8,9    LTE-TDD   SC-FDMA, 100% RB, 15 MHz, QPSK, UL   LTE-TDD   T.99   ± 9.6 %   Subframe=2,3,4,7,8,9    Subframe=2,3,4,7,8,9    LTE-TDD   SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL   LTE-TDD   S.49   ± 9.6 %   Subframe=2,3,4,7,8,9    Subframe=2,3,4,7,8,9    Subframe=2,3,4,7,8,9    LTE-TDD   SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL   LTE-TDD   S.51   ± 9.6 %   Subframe=2,3,4,7,8,9    Subframe=2,	10505	AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL	LTE-TDD	8.54	± 9.6 %
10507	10506	AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL	LTE-TDD	7.74	± 9.6 %
Subframe=2,3,4,7,8,9   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9   ± 9.6 % Subframe=2,3,4,7,8,9   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9   ± 9.6 % Subframe=2,3,4,7,8,9   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 10 MHz, 100% RB, 20 MHz, 10 MHz, 100% RB, 20 MHz, 10 MHz, 100% RB		AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL	LTE-TDD	8.36	± 9.6 %
Subframe=2,3,4,7,8,9    LTE-TDD   S.49   ±9.6 %   Subframe=2,3,4,7,8,9    LTE-TDD   S.51   ±9.6 %   Subframe=2,3,4,7,8,9    LTE-TDD   S.52   ±9.6 %   Subframe=2,3,4,7,8,9    LTE-TDD   S.42   ±9.6 %   Subframe=2,3,4,7,8,9    LTE-TDD   S.53   ±9.6 %   Subframe=2,3,4,7,8,9    LTE-TDD   S.45   ±9.6 %   Subframe=2,3,4,7,8,9    LEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)   WLAN   1.58   ±9.6 %   Subframe=2,3,4,7,8,9    LEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)   WLAN   1.58   ±9.6 %   Subframe=2,3,4,7,8,9    LEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)   WLAN   S.23   ±9.6 %   Subframe=2,3,4,7,8,9    LEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)   WLAN   S.39   ±9.6 %   Subframe=2,3,4,7,8,9    LEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)   WLAN   S.45   ±9.6 %   Subframe=2,3,4,7,8,9    LEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)   WLAN   S.45   ±9.6 %   Subframe=2,3,4,7,8,9    LEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)   WLAN   S.46   ±9.6 %   Subframe=2,3,4,7,8,9    LEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)   WLAN   S.46   ±9.6 %   Subframe=2,3,4,7,8,9    LEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)   WLAN   S.46   ±9.6 %   Subframe=2,3,4,7,8,9		AAE	Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	±9.6 %
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)   WLAN		AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.99	± 9.6 %
Subframe=2,3,4,7,8,9		AAE	Subframe=2,3,4,7,8,9)	LTE-TDD	8.49	±9.6 %
Subframe=2,3,4,7,8,9    LTE-TDD   S.42			Subframe=2,3,4,7,8,9)	LTE-TDD	8.51	±9.6%
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD   S.45			Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
Subframe=2,3,4,7,8,9    1.0515		AAF	Subframe=2,3,4,7,8,9)	LTE-TDD	8.42	± 9.6 %
10516         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)         WLAN         1.57         ± 9.6 %           10517         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)         WLAN         1.58         ± 9.6 %           10518         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)         WLAN         8.23         ± 9.6 %           10519         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)         WLAN         8.39         ± 9.6 %           10520         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)         WLAN         8.12         ± 9.6 %           10521         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)         WLAN         7.97         ± 9.6 %           10522         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)         WLAN         8.45         ± 9.6 %           10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36		AAF	Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	± 9.6 %
10516         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)         WLAN         1.57         ± 9.6 %           10517         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)         WLAN         1.58         ± 9.6 %           10518         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)         WLAN         8.23         ± 9.6 %           10519         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)         WLAN         8.39         ± 9.6 %           10520         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)         WLAN         8.12         ± 9.6 %           10521         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)         WLAN         7.97         ± 9.6 %           10522         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)         WLAN         8.45         ± 9.6 %           10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36			IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	WLAN	1.58	±9.6 %
10517         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)         WLAN         1.58         ± 9.6 %           10518         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)         WLAN         8.23         ± 9.6 %           10519         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)         WLAN         8.39         ± 9.6 %           10520         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)         WLAN         8.12         ± 9.6 %           10521         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)         WLAN         7.97         ± 9.6 %           10522         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)         WLAN         8.45         ± 9.6 %           10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10526         AAB         IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)         WLAN         8.21         ± 9.6			IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)		1.57	
10518         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)         WLAN         8.23         ± 9.6 %           10519         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)         WLAN         8.39         ± 9.6 %           10520         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)         WLAN         8.12         ± 9.6 %           10521         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)         WLAN         7.97         ± 9.6 %           10522         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)         WLAN         8.45         ± 9.6 %           10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10526         AAB         IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)         WLAN         8.21         ± 9.6 %           10527         AAB         IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)         WLAN         8.36         ± 9.6 %		<del>1</del>	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)		1.58	± 9.6 %
10520   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)   WLAN   8.12			IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)		8.23	
10520       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)       WLAN       8.12       ± 9.6 %         10521       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)       WLAN       7.97       ± 9.6 %         10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)			IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	WLAN	8.39	± 9.6 %
10521       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)       WLAN       7.97       ± 9.6 %         10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN			IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)		-	
10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN						
10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %				WLAN	8.45	
10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %			IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	WLAN		
10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10526         AAB         IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)         WLAN         8.42         ± 9.6 %           10527         AAB         IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)         WLAN         8.21         ± 9.6 %           10528         AAB         IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10529         AAB         IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10531         AAB         IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)         WLAN         8.43         ± 9.6 %           10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %			IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)			
10526         AAB         IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)         WLAN         8.42         ± 9.6 %           10527         AAB         IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)         WLAN         8.21         ± 9.6 %           10528         AAB         IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10529         AAB         IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10531         AAB         IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)         WLAN         8.43         ± 9.6 %           10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %			IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)			
10527         AAB         IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)         WLAN         8.21         ± 9.6 %           10528         AAB         IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10529         AAB         IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10531         AAB         IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)         WLAN         8.43         ± 9.6 %           10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %			IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)		8.42	
10528         AAB         IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10529         AAB         IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10531         AAB         IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)         WLAN         8.43         ± 9.6 %           10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %			IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)		8.21	
10529         AAB         IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10531         AAB         IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)         WLAN         8.43         ± 9.6 %           10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %					8.36	± 9.6 %
10531         AAB         IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)         WLAN         8.43         ± 9.6 %           10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %					8.36	± 9.6 %
10533 AAB IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle) WLAN 8.38 ± 9.6 %			IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)			
10F04			IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)			
10004   AAD   IEEE 802.T1ac WIFI (40MHz, MCS0, 99pc duty cycle)   WLAN   8.45   ± 9.6 %						
	10034	AAB	LIEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	WLAN	8.45	± 9.6 %

40505	1 4 4 5	LEEE 000 44 W/F: (4014) 11004 00 14	1 1411 453	7 0 45	
10535	AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10536	AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	WLAN	8.32	±9.6 %
10537	AAB	IEEE 802.11ac WIFi (40MHz, MCS3, 99pc duty cycle)	WLAN	8.44	±96%
10538	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	WLAN	8.54	± 9.6 %
10540	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	WLAN	8.39	±9.6 %
10541	AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	WLAN	8.46	± 9.6 %
10542	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	WLAN	8.65	± 9.6 %
10543	AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	WLAN	8.65	±9.6%
10544	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	WLAN	8.47	± 9.6 %
10545	AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	WLAN	8.55	±9.6%
10546	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	WLAN	8.35	± 9.6 %
10547	AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	WLAN	8.49	± 9.6 %
10548	AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	WLAN	8.37	± 9.6 %
10550	AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	WLAN	8.38	± 9.6 %
10551	AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	WLAN	8.50	± 9.6 %
10552	AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10553	AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10554	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	WLAN	8.48	± 9.6 %
10555	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	WLAN	8.47	±9.6 %
10556	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	WLAN	8.50	±9.6%
10557	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	WLAN	8.52	±9.6 %
10558	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	WLAN	8.61	±9.6 %
10560	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	WLAN	8.73	±9.6 %
10561	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	WLAN	8.56	±9.6%
10562	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	WLAN	8.69	±9.6 %
10563	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	WLAN	8.77	± 9.6 %
10564	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty	WLAN	8,25	± 9.6 %
	' ' ' '	cycle)			
10565	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10566	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty	WLAN	8.13	± 9.6 %
40507	1 A A A	cycle)	10/1 A N I	- 0.00	1000
10567	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty	WLAN	8.00	± 9.6 %
40500		cycle)	1071 0.01	0.07	1000
10568	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty	WLAN	8.37	±9.6 %
40500	^ ^	cycle)	WLAN	8.10	+0.6.9/
10569	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty	WLAIN	0.10	± 9.6 %
40E70	^ ^	cycle)	MI ANI	1000	+06%
10570	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty	WLAN	8.30	± 9.6 %
40574	1	cycle)	100 001	4.00	1000
10571	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	WLAN	1.99	± 9.6 %
10572	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	WLAN	1.99	±9.6%
10573	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	WLAN	1.98	± 9.6 %
10574	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	WLAN	1.98	± 9.6 %
10575	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty	WLAN	8.59	± 9.6 %
10576	1 ^ ^ ^	cycle) IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty	WLAN	9 60	+0.6%
10076	AAA	, , , , , ,	VVLAIN	8.60	± 9.6 %
10577	AAA	cycle) IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty	WLAN	970	± 9.6 %
100//	AAA		MATWIA	8.70	± 9.0 %
10570	000	cycle) IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty	VALL AND	0.40	± 9.6 %
10578	AAA		WLAN	8.49	T 9.0 %
40570	A A A	cycle)	JAM ANI	0.00	1069/
10579	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty	WLAN	8.36	±9.6 %
40500	1	cycle)	30/1 0 0 1	0.70	10.60/
10580	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty	WLAN	8.76	± 9.6 %
40504		cycle)	14/1 431		1069/
10581	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty	WLAN	8.35	± 9.6 %
10500	1	cycle)	14/1 4 5 1		
10582	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty	WLAN	8.67	± 9.6 %
40500		cycle)	18/1 811		1.000
10583	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	WLAN	8.59	± 9.6 %
10584	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.60	± 9.6 %
10585	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.70	± 9.6 %
10586	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.49	± 9.6 %
10587	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.36	± 9.6 %

10500	T :				
10588	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10589	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	± 9.6 %
10590	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	± 9.6 %
10591	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	WLAN	8.63	±9.6 %
10592	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10593	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	WLAN	8.64	± 9.6 %
10594	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10595	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10596	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	WLAN	8.71	± 9.6 %
10597	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	WLAN	8.72	± 9.6 %
10598	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	WLAN	8.50	± 9.6 %
10599	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10600	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	WLAN	8.88	± 9.6 %
10601	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10602	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10603	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	WLAN	9.03	± 9.6 %
10604	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10605	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	WLAN	8.97	± 9.6 %
10606	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	WLAN		
10607	AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)		8.82	± 9.6 %
10608	AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	WLAN	8.64	± 9.6 %
10609	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10610		TEEE 002.1 fac Wiri (20MHz, NICS2, 90pc duty cycle)	WLAN	8.57	±9.6%
10610	AAB AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	WLAN	8.78	± 9.6 %
		IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	WLAN	8.70	±9.6 %
10612	AAB	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10613	AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10614	AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	WLAN	8.59	± 9.6 %
10615	AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	WLAN	8.82	±9.6 %
10616	AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10617	AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	WLAN	8.81	±9.6%
10618	AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	WLAN	8.58	± 9.6 %
10619	AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	WLAN	8.86	± 9.6 %
10620	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	WLAN	8.87	±9.6%
10621	AAB	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9,6 %
10622	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	WLAN	8.68	±9.6%
10623	AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10624	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	WLAN	8.96	± 9.6 %
10625	AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	WLAN	8.96	±9.6 %
10626	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10627	AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	WLAN	8.88	± 9.6 %
10628	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	WLAN	8.71	± 9.6 %
10629	AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	WLAN	8.85	± 9.6 %
10630	AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	WLAN	8.72	± 9.6 %
10631	AAB	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10632	AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10633	AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10634	AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	WLAN	8.80	
10635	AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	WLAN		± 9.6 %
10636	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)		8.81	± 9.6 %
10637	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10638	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10639	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	WLAN	8.86	± 9.6 %
10640	AAC	TEEE 802.11ac WIFT (TOUWITZ, WCS3, SUPC OUTY CYCIE)	WLAN	8.85	± 9.6 %
10641	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	WLAN	8.98	± 9.6 %
10641		IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	WLAN	9.06	± 9.6 %
10642	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	WLAN	9.06	± 9,6 %
	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	WLAN	8.89	± 9,6 %
10644	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	WLAN	9.05	±9.6%
10645	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	WLAN	9.11	± 9.6 %
10646	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	± 9.6 %
10647	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	± 9.6 %
10648	AAA	CDMA2000 (1x Advanced)	CDMA2000	3.45	±9.6%
10652	AAD	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	±9.6%
10653	AAD	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	± 9.6 %
10654	AAD	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.96	± 9.6 %

10655	AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LITE TOD	7.04	1000
10658	AAA	Pulse Waveform (200Hz, 10%)	LTE-TDD	7.21	±9.6 %
10659	AAA	Pulse Waveform (200Hz, 10%)	Test	10.00	± 9.6 %
10660	AAA		Test	6.99	±9.6 %
10661	AAA	Pulse Waveform (200Hz, 40%)	Test	3.98	±9.6 %
10662	AAA	Pulse Waveform (200Hz, 60%) Pulse Waveform (200Hz, 80%)	Test	2.22	±9.6 %
10670	AAA	<u> </u>	Test	0.97	±9.6 %
		Bluetooth Low Energy	Bluetooth	2.19	±9.6 %
10671	AAA	IEEE 802.11ax (20MHz, MCS0, 90pc duty cycle)	WLAN	9.09	± 9.6 %
10672	AAA	IEEE 802.11ax (20MHz, MCS1, 90pc duty cycle)	WLAN	8.57	± 9.6 %
10673	AAA	IEEE 802.11ax (20MHz, MCS2, 90pc duty cycle)	WLAN	8.78	± 9.6 %
10674	AAA	IEEE 802.11ax (20MHz, MCS3, 90pc duty cycle)	WLAN	8.74	±9.6 %
10675	AAA	IEEE 802.11ax (20MHz, MCS4, 90pc duty cycle)	WLAN	8.90	± 9.6 %
10676	AAA	IEEE 802.11ax (20MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10677	AAA	IEEE 802.11ax (20MHz, MCS6, 90pc duty cycle)	WLAN	8.73	± 9.6 %
10678	AAA	IEEE 802.11ax (20MHz, MCS7, 90pc duty cycle)	WLAN	8.78	± 9.6 %
10679	AAA	IEEE 802.11ax (20MHz, MCS8, 90pc duty cycle)	WLAN	8.89	± 9.6 %
10680	AAA	IEEE 802.11ax (20MHz, MCS9, 90pc duty cycle)	WLAN	8.80	± 9.6 %
10681	AAA	IEEE 802.11ax (20MHz, MCS10, 90pc duty cycle)	WLAN	8.62	± 9.6 %
10682	AAA	IEEE 802.11ax (20MHz, MCS11, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10683	AAA	IEEE 802.11ax (20MHz, MCS0, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10684	AAA	IEEE 802.11ax (20MHz, MCS1, 99pc duty cycle)	WLAN	8.26	± 9.6 %
10685	AAA	IEEE 802.11ax (20MHz, MCS2, 99pc duty cycle)	WLAN	8.33	± 9.6 %
10686	AAA	IEEE 802.11ax (20MHz, MCS3, 99pc duty cycle)	WLAN	8.28	± 9.6 %
10687	AAA	IEEE 802.11ax (20MHz, MCS4, 99pc duty cycle)	WLAN	8.45	±9.6 %
10688	AAA	IEEE 802.11ax (20MHz, MCS5, 99pc duty cycle)			
10689	AAA	IEEE 802.11ax (20MHz, MCS6, 99pc duty cycle)	WLAN	8.29	± 9.6 %
10690	AAA	IEEE 802.11ax (20MHz, MCS7, 99pc duty cycle)	WLAN	8.55	±9.6 %
10691	AAA		WLAN	8.29	±9.6%
10691	<del>}</del>	IEEE 802.11ax (20MHz, MCS8, 99pc duty cycle)	WLAN	8.25	±9.6 %
	AAA	IEEE 802.11ax (20MHz, MCS9, 99pc duty cycle)	WLAN	8.29	±9.6 %
10693	AAA	IEEE 802.11ax (20MHz, MCS10, 99pc duty cycle)	WLAN	8.25	±9.6%
10694	AAA	IEEE 802.11ax (20MHz, MCS11, 99pc duty cycle)	WLAN	8.57	± 9.6 %
10695	AAA	IEEE 802.11ax (40MHz, MCS0, 90pc duty cycle)	WLAN	8.78	± 9.6 %
10696	AAA	IEEE 802.11ax (40MHz, MCS1, 90pc duty cycle)	WLAN	8.91	± 9.6 %
10697	AAA	IEEE 802.11ax (40MHz, MCS2, 90pc duty cycle)	WLAN	8.61	± 9.6 %
10698	AAA	IEEE 802.11ax (40MHz, MCS3, 90pc duty cycle)	WLAN	8.89	± 9.6 %
10699	AAA	IEEE 802.11ax (40MHz, MCS4, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10700	AAA	IEEE 802.11ax (40MHz, MCS5, 90pc duty cycle)	WLAN	8.73	± 9.6 %
10701	AAA	IEEE 802.11ax (40MHz, MCS6, 90pc duty cycle)	WLAN	8.86	± 9.6 %
10702	AAA	IEEE 802.11ax (40MHz, MCS7, 90pc duty cycle)	WLAN	8.70	±9.6 %
10703	AAA	IEEE 802.11ax (40MHz, MCS8, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10704	AAA	IEEE 802.11ax (40MHz, MCS9, 90pc duty cycle)	WLAN	8.56	± 9.6 %
10705	AAA	IEEE 802.11ax (40MHz, MCS10, 90pc duty cycle)	WLAN	8.69	± 9.6 %
10706	AAA	IEEE 802.11ax (40MHz, MCS11, 90pc duty cycle)	WLAN	8.66	± 9.6 %
10707	AAA	IEEE 802.11ax (40MHz, MCS0, 99pc duty cycle)	WLAN	8.32	± 9.6 %
10708	AAA	IEEE 802.11ax (40MHz, MCS1, 99pc duty cycle)	WLAN	8.55	± 9.6 %
10709	AAA	IEEE 802.11ax (40MHz, MCS2, 99pc duty cycle)	WLAN	8.33	± 9.6 %
10710	AAA	IEEE 802.11ax (40MHz, MCS3, 99pc duty cycle)	WLAN	8.29	±9.6 %
10711	AAA	IEEE 802.11ax (40MHz, MCS4, 99pc duty cycle)			
10712	AAA	IEEE 802.11ax (40MHz, MCS5, 99pc duty cycle)	WLAN	8.39	± 9.6 %
10712	AAA		WLAN	8.67	± 9.6 %
10713		IEEE 802.11ax (40MHz, MCS6, 99pc duty cycle)	WLAN	8.33	± 9.6 %
	AAA	IEEE 802.11ax (40MHz, MCS7, 99pc duty cycle)	WLAN	8.26	± 9.6 %
10715	AAA	IEEE 802.11ax (40MHz, MCS8, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10716	AAA	IEEE 802.11ax (40MHz, MCS9, 99pc duty cycle)	WLAN	8.30	± 9.6 %
10717	AAA	IEEE 802.11ax (40MHz, MCS10, 99pc duty cycle)	WLAN	8.48	± 9.6 %
10718	AAA	IEEE 802.11ax (40MHz, MCS11, 99pc duty cycle)	WLAN	8.24	± 9.6 %
10719	AAA	IEEE 802.11ax (80MHz, MCS0, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10720	AAA	IEEE 802.11ax (80MHz, MCS1, 90pc duty cycle)	WLAN	8.87	± 9.6 %
10721	AAA	IEEE 802.11ax (80MHz, MCS2, 90pc duty cycle)	WLAN	8.76	±9.6 %
10722	AAA	IEEE 802.11ax (80MHz, MCS3, 90pc duty cycle)	WLAN	8.55	±9.6 %
10723	AAA	IEEE 802.11ax (80MHz, MCS4, 90pc duty cycle)	WLAN	8.70	±9.6%
10724	AAA	IEEE 802.11ax (80MHz, MCS5, 90pc duty cycle)	WLAN	8.90	± 9.6 %
10725	AAA	IEEE 802.11ax (80MHz, MCS6, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10726	AAA	IEEE 802.11ax (80MHz, MCS7, 90pc duty cycle)	WLAN	8.72	± 9.6 %
10727	AAA	IEEE 802.11ax (80MHz, MCS8, 90pc duty cycle)	WLAN	8.66	± 9.6 %
		,, -, -, -, -, -, -, -, -, -, -, -, -, -,			5.5 76

10728	AAA	IEEE 802.11ax (80MHz, MCS9, 90pc duty cycle)	WLAN	8.65	± 9.6 %
10729	AAA	IEEE 802.11ax (80MHz, MCS10, 90pc duty cycle)	WLAN	8.64	± 9.6 %
10730	AAA	IEEE 802.11ax (80MHz, MCS11, 90pc duty cycle)	WLAN	8.67	± 9.6 %
10731	AAA	IEEE 802.11ax (80MHz, MCS0, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10732	AAA	IEEE 802.11ax (80MHz, MCS1, 99pc duty cycle)	WLAN	8.46	± 9.6 %
10733	AAA	IEEE 802.11ax (80MHz, MCS2, 99pc duty cycle)	WLAN	8.40	± 9.6 %
10734	AAA	IEEE 802.11ax (80MHz, MCS3, 99pc duty cycle)	WLAN	8.25	± 9.6 %
10735	AAA	IEEE 802.11ax (80MHz, MCS4, 99pc duty cycle)	WLAN	8.33	± 9.6 %
10736	AAA	IEEE 802.11ax (80MHz, MCS5, 99pc duty cycle)	WLAN	8.27	± 9.6 %
10737	AAA	IEEE 802.11ax (80MHz, MCS6, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10738	AAA	IEEE 802.11ax (80MHz, MCS7, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10739	AAA	IEEE 802.11ax (80MHz, MCS8, 99pc duty cycle)	WLAN	8.29	± 9.6 %
10740	AAA	IEEE 802.11ax (80MHz, MCS9, 99pc duty cycle)	WLAN	8.48	± 9.6 %
10741	AAA	IEEE 802.11ax (80MHz, MCS10, 99pc duty cycle)	WLAN	8.40	± 9.6 %
10742	AAA	IEEE 802.11ax (80MHz, MCS11, 99pc duty cycle)	WLAN	8.43	± 9.6 %
10743	AAA	IEEE 802.11ax (160MHz, MCS0, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10744	AAA	IEEE 802.11ax (160MHz, MCS1, 90pc duty cycle)	WLAN	9.16	± 9.6 %
10745	AAA	IEEE 802.11ax (160MHz, MCS2, 90pc duty cycle)	WLAN	8.93	± 9.6 %
10746	AAA	IEEE 802.11ax (160MHz, MCS3, 90pc duty cycle)	WLAN	9.11	± 9.6 %
10747	AAA	IEEE 802.11ax (160MHz, MCS4, 90pc duty cycle)	WLAN	9.04	± 9.6 %
10748	AAA	IEEE 802.11ax (160MHz, MCS5, 90pc duty cycle)	WLAN	8.93	± 9.6 %
10749	AAA	IEEE 802.11ax (160MHz, MCS6, 90pc duty cycle)	WLAN	8.90	± 9.6 %
10750	AAA	IEEE 802.11ax (160MHz, MCS7, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10751	AAA	IEEE 802.11ax (160MHz, MCS8, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10752	AAA	IEEE 802.11ax (160MHz, MCS9, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10753	AAA	IEEE 802.11ax (160MHz, MCS10, 90pc duty cycle)	WLAN	9.00	± 9.6 %
10754	AAA	IEEE 802.11ax (160MHz, MCS11, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10755	AAA	IEEE 802.11ax (160MHz, MCS0, 99pc duty cycle)	WLAN	8.64	± 9.6 %
10756	AAA	IEEE 802.11ax (160MHz, MCS1, 99pc duty cycle)	WLAN	8.77	± 9.6 %
10757	AAA	IEEE 802.11ax (160MHz, MCS2, 99pc duty cycle)	WLAN	8.77	± 9.6 %
10758	AAA	IEEE 802.11ax (160MHz, MCS3, 99pc duty cycle)	WLAN	8.69	± 9.6 %
10759	AAA	IEEE 802.11ax (160MHz, MCS4, 99pc duty cycle)	WLAN	8.58	± 9.6 %
10760	AAA	IEEE 802.11ax (160MHz, MCS5, 99pc duty cycle)	WLAN	8.49	± 9.6 %
10761	AAA	IEEE 802.11ax (160MHz, MCS6, 99pc duty cycle)	WLAN	8.58	± 9.6 %
10762	AAA	IEEE 802.11ax (160MHz, MCS7, 99pc duty cycle)	WLAN	8.49	± 9.6 %
10763	AAA	IEEE 802.11ax (160MHz, MCS8, 99pc duty cycle)	WLAN	8.53	± 9.6 %
10764	AAA	IEEE 802.11ax (160MHz, MCS9, 99pc duty cycle)	WLAN	8.54	± 9.6 %
10765	AAA	IEEE 802.11ax (160MHz, MCS10, 99pc duty cycle)	WLAN	8.54	± 9.6 %
10766	AAA	IEEE 802.11ax (160MHz, MCS11, 99pc duty cycle)	WLAN	8.51	± 9.6 %

<sup>&</sup>lt;sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

### **Calibration Laboratory of** Schmid & Partner **Engineering AG** Zeughausstrasse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura **Swiss Calibration Service** 

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Client

**PC Test** 

Certificate No: EX3-3914\_Feb19

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### CALIBRATION CERTIFICATE

EX3DV4 - SN:3914 Object

Calibration procedure(s)

alibration seamacum fur example to Chair arabes

Calibration date:

February 19, 2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
DAE4	SN: 660	19-Dec-18 (No. DAE4-660_Dec18)	Dec-19
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

Signature Name **Function** Calibrated by: Jeton Kastrati Laboratory Technician Approved by: Katja Pokovic Technical Manager

Issued: February 20, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

### **Calibration Laboratory of**

Schmid & Partner

Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

TSL NORMx,y,z tissue simulating liquid sensitivity in free space

ConvF DCP sensitivity in TSL / NORMx,y,z diode compression point

CF

crest factor (1/duty\_cycle) of the RF signal

A, B, C, D

modulation dependent linearization parameters

Polarization φ

φ rotation around probe axis

Polarization 9

§ rotation around an axis that is in the plane normal to probe axis (at measurement center),

i.e., 9 = 0 is normal to probe axis

Connector Angle

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information used in DASY system to align probe sensor X to the robot coordinate system

#### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from handheld and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Methods Applied and Interpretation of Parameters:

- NORMx,y,z: Assessed for E-field polarization 9 = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide).
   NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)x,y,z = NORMx,y,z \* frequency\_response (see Frequency Response Chart). This linearization is
  implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included
  in the stated uncertainty of ConvF.
- DCPx,y,z: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z \* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy): in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- Connector Angle: The angle is assessed using the information gained by determining the NORMx (no uncertainty required).

### DASY/EASY - Parameters of Probe: EX3DV4 - SN:3914

#### **Basic Calibration Parameters**

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m) <sup>2</sup> ) <sup>A</sup>	0.46	0.41	0.44	± 10.1 %
DCP (mV) <sup>B</sup>	98.0	104.4	100.8	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	dB√hΛ B	С	D dB	VR mV	Max dev.	Max Unc <sup>E</sup> (k=2)
0	CW	Х	0.00	0.00	1.00	0.00	135.8	± 3.3 %	± 4.7 %
		Y	0.00	0.00	1.00		149.1		
		Z	0.00	0.00	1.00		130.4		
10352-	Pulse Waveform (200Hz, 10%)	Х	11.50	82.25	17.46	10.00	60.0	± 2.9 %	± 9.6 %
AAA		Y	13.06	84.85	18.88		60.0		
		Z	15.00	85.74	19.04		60.0		
10353-	Pulse Waveform (200Hz, 20%)	Х	15.00	85.61	17.12	6.99	80.0	± 1.7 %	± 9.6 %
AAA		Υ	15.00	87.20	18.40		80.0		
		Z	15.00	86.88	18.11		80.0		
10354-	Pulse Waveform (200Hz, 40%)	Χ	15.00	85.07	15.18	3.98	95.0	± 1.1 %	± 9.6 %
AAA		Y	15.00	89.57	18.09		95.0		
		Z	15.00	87.22	16.52		95.0		
10355-	Pulse Waveform (200Hz, 60%)	Х	0.82	65.05	7.38	2.22	120.0	± 1.2 %	± 9.6 %
AAA		Y	15.00	94.17	19.03		120.0		
		Z	15.00	84.14	13.59		120.0		
10387-	QPSK Waveform, 1 MHz	Х	0.56	60.35	7.26	0.00	150.0	± 2.8 %	± 9.6 %
AAA		Υ	0.80	64.04	10.54		150.0		•
		Z	0.51	60.00	6.79		150.0		
10388-	QPSK Waveform, 10 MHz	X	2.18	68.24	15.67	0.00	150.0	± 1.2 %	± 9.6 %
AAA		Υ	2.41	70.06	16.91		150.0		
		Z	2.04	67.38	15.28		150.0		
10396-	64-QAM Waveform, 100 kHz	Х	2.71	69.05	18.06	3.01	150.0	± 0.7 %	± 9.6 %
AAA		Υ	3.50	74.05	20.22		150.0		
		Z	2.76	69.32	18.16		150.0		
10399-	64-QAM Waveform, 40 MHz	X	3.50	67.38	15.86	0.00	150.0	± 2.2 %	± 9.6 %
AAA		Υ	3.57	67.89	16.25		150.0	]	
		Z	3.38	66.82	15.58		150.0		
10414-	WLAN CCDF, 64-QAM, 40MHz	Х	4.87	65.94	15.72	0.00	150.0	± 4.2 %	± 9.6 %
AAA		Υ	4.84	65.99	15.74	]	150.0		
		Z	4.71	65.47	15.46	1	150.0		

Note: For details on UID parameters see Appendix

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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<sup>&</sup>lt;sup>^</sup> The uncertainties of Norm X,Y,Z do not affect the E<sup>2</sup>-field uncertainty inside TSL (see Pages 5 and 6).

<sup>B</sup> Numerical linearization parameter: uncertainty not required.

<sup>E</sup> Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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# DASY/EASY - Parameters of Probe: EX3DV4 - SN:3914

### **Sensor Model Parameters**

	C1	C2	α	T1	T2	Т3	T4	T5	Т6
	fF	fF	V-1	ms.V⁻²	ms.V⁻¹	ms	V⁻2	V-1	
X	42.5	324.17	36.82	9.95	0.55	5.06	0.00	0.49	1.01
Υ	42.9	310.45	33.81	12.34	0.63	5.02	2.00	0.15	1.01
Z	39.7	301.66	36.55	9.75	0.75	5.05	0.45	0.44	1.01

#### **Other Probe Parameters**

Sensor Arrangement	Triangular
Connector Angle (°)	0.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

February 19, 2019

### DASY/EASY - Parameters of Probe: EX3DV4 - SN:3914

### Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) <sup>c</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) F	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
6	55.5	0.75	21.24	21.24	21.24	0.00	1.00	± 13.3 %
13	55.5	0.75	18.06	18.06	18.06	0.00	1.00	± 13.3 %
750	41.9	0.89	10.00	10.00	10.00	0.54	0.82	± 12.0 %
835	41.5	0.90	9.50	9.50	9.50	0.50	0.86	± 12.0 %
1750	40.1	1.37	8.16	8.16	8.16	0.41	0.80	± 12.0 %
1900	40.0	1.40	7.80	7.80	7.80	0.40	0.84	± 12.0 %
2300	39.5	1.67	7.44	7.44	7.44	0.37	0.84	± 12.0 %
2450	39.2	1.80	7.13	7.13	7.13	0.39	0.86	± 12.0 %
2600	39.0	1.96	7.11	7.11	7.11	0.39	0.89	± 12.0 %
3500	37.9	2.91	6.99	6.99	6.99	0.25	1.20	± 13.1 %
3700	37.7	3.12	6.75	6.75	6.75	0.25	1.20	± 13.1 %
5250	35.9	4.71	5.19	5.19	5.19	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.73	4.73	4.73	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.90	4.90	4.90	0.40	1.80	± 13.1 %

<sup>&</sup>lt;sup>C</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

F At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to  $\pm$  10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to  $\pm$  5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

<sup>&</sup>lt;sup>G</sup> Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

### DASY/EASY - Parameters of Probe: EX3DV4 - SN:3914

### Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) <sup>c</sup>	Relative Permittivity <sup>F</sup>	Conductivity (S/m) F	ConvF X	ConvF Y	ConvF Z	Alpha <sup>G</sup>	Depth <sup>G</sup> (mm)	Unc (k=2)
750	55.5	0.96	9.73	9.73	9.73	0.54	0.84	± 12.0 %
835	55.2	0.97	9.46	9.46	9.46	0.50	0.80	± 12.0 %
1750	53.4	1,49	7.89	7.89	7.89	0.38	0.84	± 12.0 %
1900	53.3	1.52	7.60	7.60	7.60	0.29	1.03	± 12.0 %
2300	52.9	1.81	7.43	7.43	7.43	0.38	0.84	± 12.0 %
2450	52.7	1.95	7.34	7.34	7.34	0.33	0.87	± 12.0 %
2600	52.5	2.16	7.15	7.15	7.15	0.26	0.97	± 12.0 %
3500	51.3	3.31	6.88	6.88	6.88	0.25	1.15	± 13.1 %
3700	51.0	3.55	6.58	6.58	6.58	0.30	1.15	± 13.1 %
5250	48.9	5.36	4.61	4.61	4.61	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.92	3.92	3.92	0.50	1.90	± 13.1 %
5750	48.3	5.94	4.05	4.05	4.05	0.50	1,90	± 13.1 %

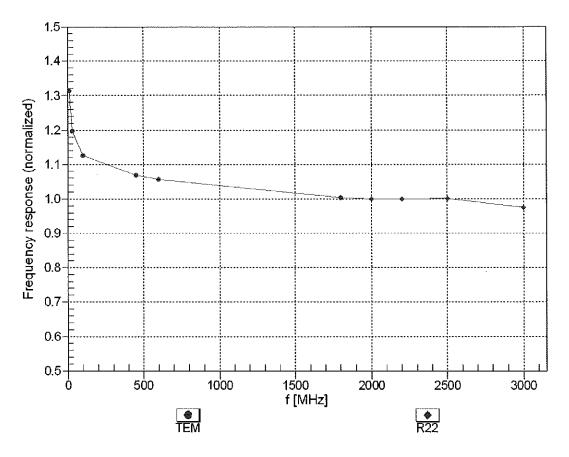
<sup>&</sup>lt;sup>C</sup> Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

F At frequencies below 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) can be relaxed to  $\pm$  10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters ( $\epsilon$  and  $\sigma$ ) is restricted to  $\pm$  5%. The uncertainty is the RSS of the Copy 5 properties for indicated to properties.

the ConvF uncertainty for indicated target tissue parameters.

Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

# Frequency Response of E-Field (TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

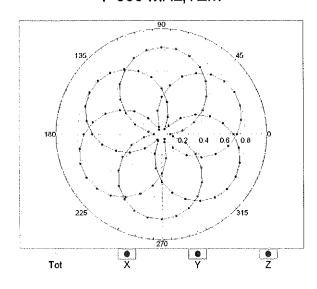
February 19, 2019

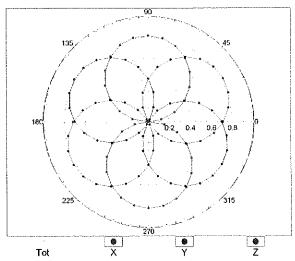
# Receiving Pattern ( $\phi$ ), $\vartheta = 0^{\circ}$

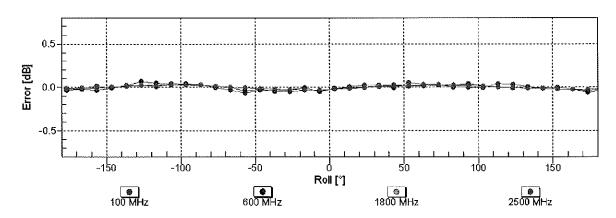


EX3DV4-SN:3914

f=1800 MHz,R22

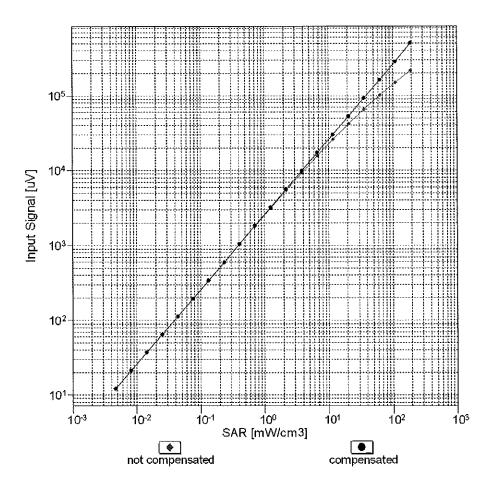


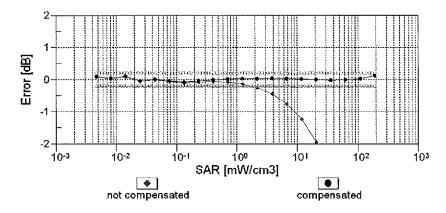




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

### Dynamic Range f(SAR<sub>head</sub>) (TEM cell , f<sub>eval</sub>= 1900 MHz)

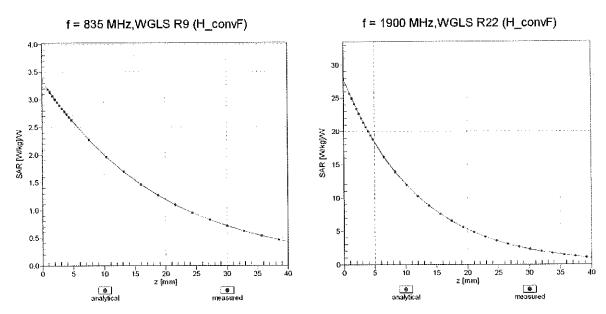




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

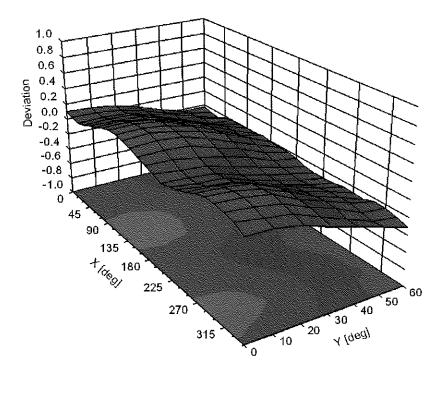
February 19, 2019

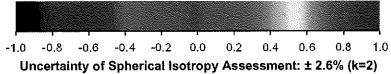
### **Conversion Factor Assessment**



# **Deviation from Isotropy in Liquid**

Error  $(\phi, \vartheta)$ , f = 900 MHz





EX3DV4-SN:3914

### **Appendix: Modulation Calibration Parameters**

UID	Rev	Communication System Name	Group	PAR	Unc
		444444444444444444444444444444444444444		(dB)	(k=2)
0		CW	CW	0.00	± 4.7 %
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	± 9.6 %
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	± 9.6 %
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	± 9.6 %
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	± 9.6 %
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	± 9.6 %
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	7.74	± 9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	Bluetooth	4.53	± 9.6 %
10035	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	3.83	± 9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.01	±9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	Bluetooth	4.77	±9.6 %
10038	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.10	± 9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	± 9.6 %
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	AMPS	7.78	± 9.6 %
10044	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	±9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	±9.6%
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	± 9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	± 9.6 %
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	± 9.6 %
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	±9.6 %
10062	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	± 9.6 %
10063	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	±9.6%
10064	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	± 9.6 %
10065	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	± 9.6 %
10066	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	± 9.6 %
10067	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	±9.6%
10068	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	± 9.6 %
10069	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	9.83	± 9.6 %
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.62	± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	± 9.6 %
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	± 9.6 %
10076	CAB	IEEE 802.11g WiFl 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	± 9.6 %
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	11.00	± 9.6 %
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	AMPS	4.77	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	± 9.6 %
10097	CAB	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	CAB	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %
10100	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	±9.6 %
10102	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	±9.6 %
10103	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	±9.6 %
	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10104	) UMG				
10104 10105	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	± 9.6 %

1 40400 T	~ ~ ~	LTE EDD (OO ED) (A (OO) DD (O.)	LITE EDD	0.40	
10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
\$	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM) LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD LTE-FDD	6.44 6.59	± 9.6 % ± 9.6 %
	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
	CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	±9.6 %
	CAC	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
<u>_</u>	CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
	CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6 %
	CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	± 9.6 %
	CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	± 9.6 %
	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10141	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6 %
10142	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6 %
	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6 %
	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6 %
	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	± 9.6 %
10147	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	± 9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
<u></u>	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10151	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	± 9.6 %
10152	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10153	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM) LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD LTE-FDD	10.05 5.75	± 9.6 % ± 9.6 %
	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)  LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	±9.6 %
10155	CAG CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 10-QAM)  LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	± 9.6 %
10156	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QFSK)  LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10157	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	± 9.6 %
10160	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	± 9.6 %
	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
<del></del>	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	± 9.6 %
10166	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	± 9.6 %
10167	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	± 9.6 %
10168	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	± 9.6 %
10169	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10170	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
	AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	± 9.6 %
10172	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	±9.6%
10173	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10174	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10175		LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	±9.6 %
10176	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	±9.6 %
10177	CAC	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD LTE-FDD	5.73 6.52	± 9.6 % ± 9.6 %
10178 10179	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM) LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 % ± 9.6 %
10179	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10180	CAE	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 04-QAM)  LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10181	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10183	AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10184	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10185	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6 %
10186	AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10187	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10188	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10189	AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10193	CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	± 9.6 %
10194	CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	± 9.6 %
10195	CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	± 9.6 %
10196	CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10197	CAC	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10198	CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10219	CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	± 9.6 %

10220	CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	100 000		
10221	CAC		WLAN	8.13	± 9.6 %
10221	CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10223	CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.06	±9.6%
10223		IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	± 9.6 %
10224	CAC	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	± 9.6 %
10225	CAB	UMTS-FDD (HSPA+)	WCDMA	5.97	±9.6%
	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	±9.6%
10227	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	±9.6%
10228		LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	± 9.6 %
10229	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10230	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	±9.6%
10231 10232	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9.19	±9.6%
	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	±9.6%
10233	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10234	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10235	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10236	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	±9.6%
10237	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10238	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10239	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10240	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TDD	9.21	±9.6%
10241	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.82	± 9.6 %
10242	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	±9.6%
10243	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.46	±9.6%
10244	CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10245	CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	± 9.6 %
10246	CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10247	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	±9.6%
10248	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD	10.09	± 9.6 %
10249	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-TDD	9.29	±9.6%
10250	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	±9.6%
10251	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	±9.6%
10252	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.24	±9.6%
10253	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	± 9.6 %
10254	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	± 9.6 %
10255	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	± 9.6 %
10256	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	± 9.6 %
10257	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	± 9.6 %
10258	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	± 9.6 %
10259	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.98	± 9.6 %
10260	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6 %
10261	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10262	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	± 9.6 %
10263	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	± 9.6 %
10264	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	± 9.6 %
10265	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TOD	9.92	± 9.6 %
10266	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	±9.6 %
10267 10268	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10269	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	± 9.6 %
10270	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	± 9.6 %
10274 10275	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rei8.10)	WCDMA	4.87	± 9.6 %
	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	WCDMA	3.96	± 9.6 %
10277	CAA	PHS (QPSK)	PHS	11.81	± 9.6 %
10278	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	PHS	11.81	± 9.6 %
10279	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	PHS	12.18	± 9.6 %
10290	AAB	CDMA2000, RC1, SO55, Full Rate	CDMA2000	3.91	± 9.6 %
10291	AAB	CDMA2000, RC3, SO55, Full Rate	CDMA2000	3.46	± 9.6 %
10292	AAB	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.39	± 9.6 %
10293	AAB	CDMA2000, RC3, SO3, Full Rate	CDMA2000	3.50	± 9.6 %
10295	AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	CDMA2000	12.49	± 9.6 %
10297	AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	± 9.6 %
10298 10299	AAD AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	±9.6%
10299	HAU	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	± 9.6 %

10300	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10301	AAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	WiMAX	12.03	± 9.6 %
10301	AAA	IEEE 802.16e WIMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL	WiMAX	12.57	±9.6 %
10002	''' '	symbols)	***************************************	12.01	= 0.0 /0
10303	AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	12.52	±9.6%
10304	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	WIMAX	11.86	± 9.6 %
10305	AAA	IEEE 802.16e WIMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15	WiMAX	15.24	± 9.6 %
10000	7001	symbols)	V 11V4 () \	,0.2.	20.0 %
10306	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18	WiMAX	14.67	±9.6%
10000	' ' ' '	symbols)	171111111111111111111111111111111111111	, ,,,,,,	- 515 ,5
10307	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18	WiMAX	14.49	±9.6%
1000.	/ 0 0 \	symbols)			
10308	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	WiMAX	14.46	± 9.6 %
10309	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18	WiMAX	14.58	± 9.6 %
		symbols)			Í
10310	AAA	IEEE 802.16e WIMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18	WiMAX	14.57	±9.6%
		symbols)			
10311	AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	±9.6 %
10313	AAA	IDEN 1:3	iDEN	10.51	± 9.6 %
10314	AAA	iDEN 1:6	iDEN	13.48	± 9.6 %
10315	AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	WLAN	1.71	± 9.6 %
10316	AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	±9.6 %
10317	AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	± 9.6 %
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	±9.6%
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	6.99	± 9.6 %
10354	AAA	Pulse Waveform (200Hz, 40%)	Generic	3.98	± 9.6 %
10355	AAA	Pulse Waveform (200Hz, 40%)	Generic	2.22	± 9.6 %
10356	AAA	Pulse Waveform (200Hz, 80%)	Generic	0.97	± 9.6 %
10330	AAA	QPSK Waveform, 1 MHz	Generic	5.10	± 9.6 %
10388	AAA	QPSK Waveform, 10 MHz	Generic	5.22	± 9.6 %
10396	+	64-QAM Waveform, 100 kHz	Generic	6.27	± 9.6 %
10399	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	± 9.6 %
10399	AAA AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	WLAN	8.37	± 9.6 %
10400	AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	WLAN	8.60	± 9.6 %
10401	AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	WLAN	8.53	± 9.6 %
10402	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.76	± 9.6 %
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.77	± 9.6 %
1	<del></del>	CDMA2000 (1XEV-DO, Rev. A) CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000	5.22	± 9.6 %
10406 10410	AAB	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL	LTE-TDD	7.82	± 9.6 %
10410	AAF	Subframe=2,3,4,7,8,9, Subframe Conf=4)		7.02	2 3.0 %
10414	AAA	WLAN CCDF, 64-QAM, 40MHz	Generic	8.54	± 9.6 %
10414	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	WLAN	1.54	± 9.6 %
		IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
10416 10417	AAA AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
		IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle,	WLAN	8.14	± 9.6 %
10418	AAA		VVLAN	0.14	J. 9.0 70
10419	AAA	Long preambule) IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle,	WLAN	8.19	± 9.6 %
10415	\~~~	Short preambule)	44	0.19	± 0.0 /0
10422	AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	± 9.6 %
10422	AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BF3R)	WLAN	8.47	± 9.6 %
10423		IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.40	± 9.6 %
	AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.41	± 9.6 %
10425	AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.45	± 9.6 %
10426	AAB		WLAN	8.41	± 9.6 %
10427	AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	LTE-FDD	8.28	± 9.6 %
10430	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.38	± 9.6 %
10431	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	8.34	± 9.6 %
10432	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	8.34	± 9.6 %
10433	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)			± 9.6 %
10434	AAA	W-CDMA (BS Test Model 1, 64 DPCH)	WCDMA	8.60	
10435	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL	LTE-TDD	7.82	± 9.6 %
40447	A A D	Subframe=2,3,4,7,8,9)	I TE EDD	7.56	± 9.6 %
10447	AAD_	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD LTE-FDD		± 9.6 %
10448	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)		7.53	
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	LTE-FDD	7.51	± 9.6 %
10450	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	± 9.6 %

10451	AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	WCDMA	7.59	± 9.6 %
10456	AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	WLAN	8.63	± 9.6 %
10457	AAA	UMTS-FDD (DC-HSDPA)	WCDMA	6.62	±9.6 %
10458	AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	6.55	± 9.6 %
10459	AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	8.25	± 9.6 %
10460	AAA	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	± 9.6 %
10461	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10462	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.30	± 9.6 %
10463	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.56	± 9.6 %
10464	AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10465	AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10466	AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10467	AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10468	AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10469	AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.56	± 9.6 %
10470	AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10471	AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10472	AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10473	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10474	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10475	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10477	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10478	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10479	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	±9.6 %
10480	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.18	± 9.6 %
10481	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	± 9.6 %
10482	AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL. Subframe=2,3,4,7,8,9)	LTE-TDD	7.71	±9.6%
10483	AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.39	± 9.6 %
10484	AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.47	± 9.6 %
10485	AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.59	± 9.6 %
10486	AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.38	± 9.6 %
10487	AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.60	± 9.6 %
10488	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.70	± 9.6 %
10489	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.31	± 9.6 %
10490	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	± 9.6 %
10491	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %

10492   AAE   LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL   LTE-TDD   B.41   ± 9.6 % Subframe-2, 34, 78, 9)						
10493   AAE   LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL   LTE-TDD   8.55   ± 9.6 %   Subframe-2, 34, 78, 9)	10492	AAE		LTE-TDD	8.41	± 9.6 %
10494	10493	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL	LTE-TDD	8.55	± 9.6 %
10496	10494	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL	LTE-TDD	7.74	± 9.6 %
10496	10495	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL	LTE-TDD	8.37	± 9.6 %
10498	10496	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL	LTE-TDD	8.54	± 9.6 %
10498	10497	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL	LTE-TDD	7.67	± 9.6 %
10499	10498	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL	LTE-TDD	8.40	± 9.6 %
10500	10499	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2.3.4.7.8.9)	LTE-TDD	8.68	± 9.6 %
Subframe=2,3,4,7,8,9	10500	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	± 9.6 %
Subframe=2,3,4,7,8,9    10504   AAE	10501	AAB	Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9    LTE-TDD   S.5-FDMA, 100% RB, 5 MHz, 16-QAM, UL   LTE-TDD   S.5-FDMA, 100% RB, 5 MHz, 16-QAM, UL   LTE-TDD   S.5-FDMA, 100% RB, 5 MHz, 64-QAM, UL   LTE-TDD   S.5-FDMA, 100% RB, 5 MHz, 64-QAM, UL   LTE-TDD   S.5-FDMA, 100% RB, 10 MHz, QPSK, UL   LTE-TDD   T.7-74   19.6 %   Subframe=2,3,4,7,8,9    Subframe=2,3,4,7,8,9	10502	AAB	Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL   LTE-TDD   R.54			LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL   LTE-TDD   R.36			Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL   LTE-TDD   S.36			Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL   LTE-TDD   S.55		AAE	Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL   LTE-TDD   S.49			Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 20			Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9   LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL			Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)   WLAN			Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9    LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)   LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 90 MLAN 1.58			Subframe=2,3,4,7,8,9)			
Subframe=2,3,4,7,8,9			Subframe=2,3,4,7,8,9)		Ì	
Subframe=2,3,4,7,8,9	ù.		Subframe=2,3,4,7,8,9)			
10516         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)         WLAN         1.57         ± 9.6 %           10517         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)         WLAN         1.58         ± 9.6 %           10518         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)         WLAN         8.23         ± 9.6 %           10519         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)         WLAN         8.39         ± 9.6 %           10520         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)         WLAN         8.12         ± 9.6 %           10521         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)         WLAN         7.97         ± 9.6 %           10522         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)         WLAN         8.45         ± 9.6 %           10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)         WLAN         8.42         ± 9.6	10514	AAF	Subframe=2,3,4,7,8,9)			
10517         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)         WLAN         1.58         ± 9.6 %           10518         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)         WLAN         8.23         ± 9.6 %           10519         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)         WLAN         8.39         ± 9.6 %           10520         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)         WLAN         8.12         ± 9.6 %           10521         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)         WLAN         7.97         ± 9.6 %           10522         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)         WLAN         8.45         ± 9.6 %           10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10526         AAB         IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)         WLAN         8.21         ± 9.6	10515	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	WLAN	1.58	<u> ± 9.6 %</u>
10517         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)         WLAN         1.58         ± 9.6 %           10518         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)         WLAN         8.23         ± 9.6 %           10519         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)         WLAN         8.39         ± 9.6 %           10520         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)         WLAN         8.12         ± 9.6 %           10521         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)         WLAN         7.97         ± 9.6 %           10522         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)         WLAN         8.45         ± 9.6 %           10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10526         AAB         IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)         WLAN         8.21         ± 9.6	10516	AAA	IEEE 802,11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	WLAN	1.57	± 9.6 %
10518         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)         WLAN         8.23         ± 9.6 %           10519         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)         WLAN         8.39         ± 9.6 %           10520         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)         WLAN         8.12         ± 9.6 %           10521         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)         WLAN         7.97         ± 9.6 %           10522         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)         WLAN         8.45         ± 9.6 %           10523         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)         WLAN         8.08         ± 9.6 %           10524         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)         WLAN         8.27         ± 9.6 %           10525         AAB         IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)         WLAN         8.36         ± 9.6 %           10526         AAB         IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)         WLAN         8.42         ± 9.6 %           10527         AAB         IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)         WLAN         8.36         ± 9.6 %				WLAN	1.58	
10519       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)       WLAN       8.39       ± 9.6 %         10520       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)       WLAN       8.12       ± 9.6 %         10521       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)       WLAN       7.97       ± 9.6 %         10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle) </td <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
10520       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)       WLAN       8.12       ± 9.6 %         10521       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)       WLAN       7.97       ± 9.6 %         10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)						
10521       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)       WLAN       7.97       ± 9.6 %         10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN						
10522       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)       WLAN       8.45       ± 9.6 %         10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.29       ± 9.6 %						
10523       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)       WLAN       8.08       ± 9.6 %         10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %						
10524       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)       WLAN       8.27       ± 9.6 %         10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %						
10525       AAB       IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %						
10526       AAB       IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)       WLAN       8.42       ± 9.6 %         10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %						
10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %						
10527       AAB       IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)       WLAN       8.21       ± 9.6 %         10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %	10526	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10528       AAB       IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %						
10529       AAB       IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)       WLAN       8.36       ± 9.6 %         10531       AAB       IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)       WLAN       8.43       ± 9.6 %         10532       AAB       IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)       WLAN       8.29       ± 9.6 %         10533       AAB       IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)       WLAN       8.38       ± 9.6 %						
10531         AAB         IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)         WLAN         8.43         ± 9.6 %           10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %						
10532         AAB         IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)         WLAN         8.29         ± 9.6 %           10533         AAB         IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)         WLAN         8.38         ± 9.6 %						
10533 AAB IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle) WLAN 8.38 ± 9.6 %						
					<del>-</del>	
10004   AAD   IEEE OUZ. I IBC WIFT (40MITZ, MOOU, 38PC QULY CYCLE)   WEAR   0.40   £ 9.0 %						- <del></del>
	10534	AAB	TIEEE OUZ.TTRC WIFT (40WIFZ, WIGSU, 99pc duty cycle)	VALMIN	0.45	I 5.0 %

10537   AAB     EEE 802.11ac WFI (40MHz, MCS2, 99pc duty cycle)   WLAN   8.44   9.6     10538   AAB   EEE 802.11ac WFI (40MHz, MCS4, 99pc duty cycle)   WLAN   8.44   9.6     10540   AAB   EEE 802.11ac WFI (40MHz, MCS4, 99pc duty cycle)   WLAN   8.39   9.6     10541   AAB   EEE 802.11ac WFI (40MHz, MCS4, 99pc duty cycle)   WLAN   8.40   9.6     10541   AAB   EEE 802.11ac WFI (40MHz, MCS5, 99pc duty cycle)   WLAN   8.65   9.6     10542   AAB   EEE 802.11ac WFI (40MHz, MCS5, 99pc duty cycle)   WLAN   8.65   9.6     10543   AAB   EEE 802.11ac WFI (40MHz, MCS5, 99pc duty cycle)   WLAN   8.65   9.6     10544   AAB   EEE 802.11ac WFI (60MHz, MCS5, 99pc duty cycle)   WLAN   8.65   9.6     10545   AAB   EEE 802.11ac WFI (60MHz, MCS5, 99pc duty cycle)   WLAN   8.47   9.6     10546   AAB   EEE 802.11ac WFI (60MHz, MCS5, 99pc duty cycle)   WLAN   8.35   9.6     10547   AAB   EEE 802.11ac WFI (60MHz, MCS5, 99pc duty cycle)   WLAN   8.37   9.6     10548   AAB   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.37   9.6     10550   AAB   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.37   9.6     10551   AAB   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.39   9.9     10552   AAB   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.42   9.6     10553   AAB   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.42   9.6     10556   AAC   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.42   9.6     10556   AAC   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.44   9.6     10556   AAC   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.48   9.6     10556   AAC   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.48   9.6     10556   AAC   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.48   9.6     10556   AAC   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.48   9.6     10566   AAC   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)   WLAN   8.49   9.6     10566   AAC   EEE 802.11ac WFI (60MHz, MCS6, 99pc duty cycle)		T				
10533   AAB     EEE 802.11ac WFI (40MHz, MCS3, 98pc duty cycle)	10535	AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	WLAN		±9.6 %
19559					8.32	±9.6 %
19540   AAB   IEEE 802.11ac WIFI (40MHz, MCS6, 99bc duty cycle)   WLAN   8.49   6.96				WLAN	8.44	± 9.6 %
10541   AAB   IEEE 802.11ac WFI (40MHz, MCS6, 99pc duty cycle)   WLAN   8.46   2.96	10538	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	WLAN	8.54	± 9.6 %
10541   AAB   IEEE 802.11ac WIFI (40MHz, MCS7, 99pc duty cycle)   WLAN   8.65   9.6 c	10540	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	WLAN	8.39	±9.6%
10842   AAB   IEEE 80Z.11ac WIFI (40MHz, MCSS, 99pc duty cycle)	10541	AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)			±9.6%
10543   AAB   IEEE 802.11ac WIFI (40MHz, MCS0, 99c duly cycle)	10542	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)			
19544   AAB   IEEE 802.11ac WIF (80MHz, MCS1, 99pc duty cycle)	10543					
10545			IEEE 802 11ac WiFi (80MHz, MCS0, 99pc duty cycle)			
10546   AAB   IEEE 802.11ac WIFI (80MHz, MCS2, 99bc duty cycle)			IFFE 802 11ac WiFi (80MHz, MCS1, 99nc duty cycle)			
10547   AAB   IEEE 802.11ac WiFi (80MHz, MCSA, 98pc duty cycle)   WILAN   8.49   4.96   10550   AAB   IEEE 802.11ac WiFi (80MHz, MCSA, 98pc duty cycle)   WILAN   8.37   4.96   10550   AAB   IEEE 802.11ac WiFi (80MHz, MCSA, 98pc duty cycle)   WILAN   8.38   4.96   10551   AAB   IEEE 802.11ac WiFi (80MHz, MCSA, 98pc duty cycle)   WILAN   8.40   4.96   10552   AAB   IEEE 802.11ac WiFi (80MHz, MCSA, 98pc duty cycle)   WILAN   8.42   4.96   10553   AAB   IEEE 802.11ac WiFi (80MHz, MCSB, 98pc duty cycle)   WILAN   8.42   4.96   10553   AAB   IEEE 802.11ac WiFi (80MHz, MCSB, 98pc duty cycle)   WILAN   8.45   4.96   10554   AAC   IEEE 802.11ac WiFi (80MHz, MCSB, 98pc duty cycle)   WILAN   8.45   4.96   10555   AAC   IEEE 802.11ac WiFi (80MHz, MCSB, 98pc duty cycle)   WILAN   8.47   4.96   10555   AAC   IEEE 802.11ac WiFi (160MHz, MCSB, 99pc duty cycle)   WILAN   8.47   4.96   10556   AAC   IEEE 802.11ac WiFi (160MHz, MCSB, 99pc duty cycle)   WILAN   8.50   4.96   10556   AAC   IEEE 802.11ac WiFi (160MHz, MCSB, 99pc duty cycle)   WILAN   8.51   4.96   10556   AAC   IEEE 802.11ac WiFi (160MHz, MCSB, 99pc duty cycle)   WILAN   8.51   4.96   10566   AAC   IEEE 802.11ac WiFi (160MHz, MCSB, 99pc duty cycle)   WILAN   8.58   4.96   10566   AAC   IEEE 802.11ac WiFi (160MHz, MCSB, 99pc duty cycle)   WILAN   8.58   4.96   10566   AAC   IEEE 802.11ac WiFi (160MHz, MCSB, 99pc duty cycle)   WILAN   8.58   4.96   10566   AAC   IEEE 802.11ac WiFi (160MHz, MCSB, 99pc duty cycle)   WILAN   8.58   4.96   10566   AAC   IEEE 802.11ac WiFi (160MHz, MCSB, 99pc duty cycle)   WILAN   8.50   4.96   10566   AAA   IEEE 802.11ac WiFi (160MHz, MCSB, 99pc duty cycle)   WILAN   8.50   4.96   10566   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty   WILAN   8.45   4.96   10566   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty   WILAN   8.30   4.96   10566   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty   WILAN   8.30   4.96   10566   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty   WILA	7771-1-1-1					
10558			IEEE 902.11ac WiF (00MHz, MCS2, 99pc duty cycle)		·····•	
10550			IEEE 002.11ac WIFI (00MIE, MCC4, 00 and duty cycle)			
19551   AAB			IEEE 802, I Tac WIFT (80MHz, MCS4, 99pc duty cycle)			
10552   AAB   IEEE 802.11ac WiFl (80MHz, MCS8, 99pc duty cycle)			TEEE 802.11ac WIFI (80IVIHZ, MICS6, 99pc duty cycle)			
10553			IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)			
10554					8.42	± 9.6 %
10555		<b>_</b>			8.45	±9.6 %
10566		AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	WLAN	8.48	±9.6 %
10566		AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	WLAN	8.47	± 9.6 %
10557   AAC   IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)   WLAN   8.52   ± 9.6	10556	AAC		WLAN	8.50	±9.6%
10558	10557	AAC				±9.6 %
10560					·-···	± 9.6 %
10561   AAC   IEEE 802.11ac WIFI (160MHz, MCSR, 99pc duty cycle)   WLAN   8.56   ± 9.6 to 10562   AAC   IEEE 802.11ac WIFI (160MHz, MCSR, 99pc duty cycle)   WLAN   8.69   ± 9.6 to 10564   AAC   IEEE 802.11ac WIFI (160MHz, MCSR, 99pc duty cycle)   WLAN   8.77   ± 9.6 to 10565   AAC   IEEE 802.11g WIFI 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)   WLAN   8.25   ± 9.6 to 10565   AAA   IEEE 802.11g WIFI 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)   WLAN   8.45   ± 9.6 to 10566   AAA   IEEE 802.11g WIFI 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)   WLAN   8.13   ± 9.6 to 10567   AAA   IEEE 802.11g WIFI 2.4 GHz (DSSS-OFDM, 14 Mbps, 99pc duty cycle)   WLAN   8.00   ± 9.6 to 10567   AAA   IEEE 802.11g WIFI 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)   WLAN   8.37   ± 9.6 to 10568   AAA   IEEE 802.11g WIFI 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)   WLAN   8.37   ± 9.6 to 10569   AAA   IEEE 802.11g WIFI 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)   WLAN   8.10   ± 9.6 to 10569   AAA   IEEE 802.11g WIFI 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)   WLAN   8.30   ± 9.6 to 10571   AAA   IEEE 802.11b WIFI 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)   WLAN   8.30   ± 9.6 to 10571   AAA   IEEE 802.11b WIFI 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)   WLAN   1.99   ± 9.6 to 10572   AAA   IEEE 802.11b WIFI 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)   WLAN   1.99   ± 9.6 to 10573   AAA   IEEE 802.11b WIFI 2.4 GHz (DSSS, 55 Mbps, 90pc duty cycle)   WLAN   1.99   ± 9.6 to 10574   AAA   IEEE 802.11b WIFI 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)   WLAN   1.99   ± 9.6 to 10575   AAA   IEEE 802.11b WIFI 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)   WLAN   1.98   ± 9.6 to 10575   AAA   IEEE 802.11b WIFI 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)   WLAN   1.98   ± 9.6 to 10575   AAA   IEEE 802.11b WIFI 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)   WLAN   8.60   ± 9.6 to 10575   AAA   IEEE 802.11g WIFI 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)   WLAN   8.60   ± 9.6 to 10575   AAA   IEEE 802.11g WIFI 2.4 GHz (D						
10562						
10563					<del></del>	
10564			IEEE 002.11ac WIFT (100MHz, MCS0, 99pc duty cycle)		<del></del>	
10565			TEEE 002.1 Tab WIFT (TOUVITZ, MCS9, 9900 duty cycle)			
10565	10564	AAA		WLAN	8.25	± 9.6 %
Cycle   10566   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty   WLAN   8.13   ± 9.6 cycle   10567   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty   WLAN   8.00   ± 9.6 cycle   10568   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty   WLAN   8.37   ± 9.6 cycle   10569   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty   WLAN   8.10   ± 9.6 cycle   10570   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty   WLAN   8.30   ± 9.6 cycle   10571   AAA   IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle   WLAN   1.99   ± 9.6 cycle   10572   AAA   IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle   WLAN   1.99   ± 9.6 cycle   10573   AAA   IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle   WLAN   1.99   ± 9.6 cycle   10574   AAA   IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle   WLAN   1.98   ± 9.6 cycle   10575   AAA   IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle   WLAN   1.98   ± 9.6 cycle   10576   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty   WLAN   8.59   ± 9.6 cycle   10576   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty   WLAN   8.60   ± 9.6 cycle   10578   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty   WLAN   8.70   ± 9.6 cycle   10578   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty   WLAN   8.70   ± 9.6 cycle   10578   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty   WLAN   8.70   ± 9.6 cycle   10578   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty   WLAN   8.70   ± 9.6 cycle   10578   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty   WLAN   8.70   ± 9.6 cycle   10578   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty   WLAN   8.70   ± 9.6 cycle   10580   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty   WLAN   8.70   ± 9.6 cycle   10580   AAA   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty   10580   WLAN   8.70   ± 9.6 cycle   10580   AA	40505				<u> </u>	
10566	10565	AAA	1	WLAN	8.45	± 9.6 %
Cycle   10567						
10567	10566	AAA	,	WLAN	8.13	± 9.6 %
10568						
10568	10567	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty	WLAN	8.00	± 9.6 %
10569					ļ	
10569	10568	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty	WLAN	8.37	± 9.6 %
Cycle   10570			cycle)			
Cycle   10570	10569	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty	WLAN	8.10	± 9.6 %
10571			1			
10571	10570	AAA	IEEE 802,11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty	WLAN	8.30	± 9.6 %
10571   AAA   IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)   WLAN   1.99   ± 9.6 strong   10572   AAA   IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)   WLAN   1.99   ± 9.6 strong   10573   AAA   IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)   WLAN   1.98   ± 9.6 strong   10574   AAA   IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)   WLAN   1.98   ± 9.6 strong   10575   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)   WLAN   8.59   ± 9.6 strong   10576   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)   WLAN   8.60   ± 9.6 strong   10577   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)   WLAN   8.70   ± 9.6 strong   10578   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)   WLAN   8.49   ± 9.6 strong   10579   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)   WLAN   8.36   ± 9.6 strong   10580   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)   WLAN   8.76   ± 9.6 strong   10581   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)   WLAN   8.67   ± 9.6 strong   10582   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)   WLAN   8.67   ± 9.6 strong   10583   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)   WLAN   8.60   ± 9.6 strong   10584   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)   WLAN   8.70   ± 9.6 strong   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)   WLAN   8.70   ± 9.6 strong   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)   WLAN   8.70   ± 9.6 strong   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)   WLAN   8.49   ± 9.6 strong   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)   WLAN   8.49   ± 9.6 strong   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)   WLAN   8.49   ± 9.6 strong   10586   AAB   IEEE 802.11a/h WiF		İ		1		7
10572         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)         WLAN         1.99         ± 9.6 s           10573         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)         WLAN         1.98         ± 9.6 s           10574         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)         WLAN         1.98         ± 9.6 s           10575         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)         WLAN         8.59         ± 9.6 s           10576         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 s           10577         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 s           10578         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 s           10579         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)         WLAN         8.36         ± 9.6 s           10580         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)         WLAN         8.35         ± 9.6 s           10581         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle) <t< td=""><td>10571</td><td>AAA</td><td></td><td>WIAN</td><td>1 99</td><td>+96%</td></t<>	10571	AAA		WIAN	1 99	+96%
10573         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)         WLAN         1.98         ± 9.6 G           10574         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)         WLAN         1.98         ± 9.6 G           10575         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)         WLAN         8.59         ± 9.6 G           10576         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 G           10577         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 G           10578         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 G           10579         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)         WLAN         8.36         ± 9.6 G           10580         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)         WLAN         8.36         ± 9.6 G           10581         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)         WLAN         8.67         ± 9.6 G           10582         AAA         IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle) <t< td=""><td></td><td><del></del></td><td></td><td></td><td><del></del></td><td></td></t<>		<del></del>			<del></del>	
10574         AAA         IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)         WLAN         1.98         ± 9.6 G           10575         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)         WLAN         8.59         ± 9.6 G           10576         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 G           10577         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 G           10578         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 G           10579         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)         WLAN         8.36         ± 9.6 G           10580         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)         WLAN         8.76         ± 9.6 G           10581         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)         WLAN         8.67         ± 9.6 G           10582         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)         WLAN         8.67         ± 9.6 G           10583         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)		<del></del>				
10575		<del></del>				
Cycle   10576						***************************************
10576	10070	AAA	, , , , , , , , , , , , , , , , , , , ,	WLAN	0.59	±9.6%
Cycle   10577	40570			14/1 001	<del></del>	1.000
10577	105/6	AAA		WLAN	8.60	±9.6 %
Cycle   10578   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle   10579   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle   10580   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle   10581   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle   10582   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle   10583   AAB   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle   10584   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle   WLAN   8.59   ± 9.6 Graph   10585   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle   WLAN   8.60   ± 9.6 Graph   10585   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle   WLAN   8.70   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle   WLAN   8.70   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle   WLAN   8.49   ± 9.6 Graph   10586   AAB   IEEE 802.11a/h WiFi	405==	L				
10578       AAA       IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)       WLAN       8.49       ± 9.6 Grade 10.579         10579       AAA       IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)       WLAN       8.36       ± 9.6 Grade 10.580         10580       AAA       IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)       WLAN       8.76       ± 9.6 Grade 10.581         10581       AAA       IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)       WLAN       8.35       ± 9.6 Grade 10.582         10582       AAA       IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)       WLAN       8.67       ± 9.6 Grade 10.583         10583       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)       WLAN       8.59       ± 9.6 Grade 10.585         10585       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)       WLAN       8.70       ± 9.6 Grade 10.585         10586       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)       WLAN       8.49       ± 9.6 Grade 10.585	105/7	AAA		WLAN	8.70	± 9.6 %
Cycle   10579   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)   WLAN   8.36		L				
10579         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)         WLAN         8.36         ± 9.6 G/s           10580         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)         WLAN         8.76         ± 9.6 G/s           10581         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)         WLAN         8.35         ± 9.6 G/s           10582         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)         WLAN         8.67         ± 9.6 G/s           10583         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)         WLAN         8.59         ± 9.6 G/s           10584         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 G/s           10585         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 G/s           10586         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 G/s	10578	AAA		WLAN	8.49	± 9.6 %
cycle)         cycle)           10580         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)         WLAN         8.76         ± 9.6 S           10581         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)         WLAN         8.35         ± 9.6 S           10582         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)         WLAN         8.67         ± 9.6 S           10583         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)         WLAN         8.59         ± 9.6 S           10584         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 S           10585         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 S           10586         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 S						
Cycle   10580   AAA   IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)   WLAN   8.76   ± 9.6 Structure    10579	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty	WLAN	8.36	± 9.6 %	
cycle)         cycle)           10581         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)         WLAN         8.35         ± 9.6 °C           10582         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)         WLAN         8.67         ± 9.6 °C           10583         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)         WLAN         8.59         ± 9.6 °C           10584         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 °C           10585         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 °C           10586         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 °C			cycle)			
cycle)         cycle)           10581         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)         WLAN         8.35         ± 9.6 °C           10582         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)         WLAN         8.67         ± 9.6 °C           10583         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)         WLAN         8.59         ± 9.6 °C           10584         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 °C           10585         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 °C           10586         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 °C	10580	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty	WLAN	8.76	± 9.6 %
10581       AAA       IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)       WLAN       8.35       ± 9.6 °C         10582       AAA       IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)       WLAN       8.67       ± 9.6 °C         10583       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)       WLAN       8.59       ± 9.6 °C         10584       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)       WLAN       8.60       ± 9.6 °C         10585       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)       WLAN       8.70       ± 9.6 °C         10586       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)       WLAN       8.49       ± 9.6 °C						
cycle)         cycle)           10582         AAA         IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)         WLAN         8.67         ± 9.6 °C           10583         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)         WLAN         8.59         ± 9.6 °C           10584         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 °C           10585         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 °C           10586         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 °C	10581	AAA		WLAN	8.35	± 9.6 %
10582       AAA       IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)       WLAN       8.67       ± 9.6 G         10583       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)       WLAN       8.59       ± 9.6 G         10584       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)       WLAN       8.60       ± 9.6 G         10585       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)       WLAN       8.70       ± 9.6 G         10586       AAB       IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)       WLAN       8.49       ± 9.6 G						- 3/3 /3
cycle)         LEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)         WLAN         8.59         ± 9.6 G           10584         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 G           10585         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 G           10586         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 G	10582	AAA		WLAN	8.67	+96%
10583         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)         WLAN         8.59         ± 9.6 °C           10584         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 °C           10585         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 °C           10586         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 °C		" " "		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0.01	
10584         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)         WLAN         8.60         ± 9.6 °C           10585         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 °C           10586         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 °C	10583	AAR		WI ANI	8.50	+08%
10585         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)         WLAN         8.70         ± 9.6 °C           10586         AAB         IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)         WLAN         8.49         ± 9.6 °C						
10586 AAB IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle) WLAN 8.49 ± 9.6 °		<del></del>				
		<del>}</del>				
1.40E07   8.5D   IEEE 000.44.0.340E08.01.70E044.04.50		<del></del>			~~~	
10587   AAB   IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)   WLAN   8.36   ± 9.6 °	10587	AAB	IEEE 802.11a/n WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.36	± 9.6 %

19588   AAB   IEEE 802.11an WHI 5 GHz (OFDM, 38 Mbps, 90pc duty cycle)   VILAN   8.75   ±9.6 %   19590   AAB   IEEE 802.11an WHI 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)   VILAN   8.35   ±9.6 %   19590   AAB   IEEE 802.11an WHI 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)   VILAN   8.35   ±9.6 %   19592   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.36   ±9.6 %   19592   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.46   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.47   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.47   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.47   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.47   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.47   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.47   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.47   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.47   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 20MHz, MCS3, 90pc duty cycle)   VILAN   8.47   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 40MHz, MCS3, 90pc duty cycle)   VILAN   8.48   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 40MHz, MCS3, 90pc duty cycle)   VILAN   8.48   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 40MHz, MCS3, 90pc duty cycle)   VILAN   8.48   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 40MHz, MCS3, 90pc duty cycle)   VILAN   8.48   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 40MHz, MCS3, 90pc duty cycle)   VILAN   8.48   ±9.6 %   19593   AAB   IEEE 802.11an (HT Msed, 40MHz, MCS3, 90pc duty cycle)   VILAN   8.49   ±9.6 %   19593   AAB   IEEE 802.11ac (HT (MMHz, MCS3, 90pc duty cycle)   VILAN   8.49   ±9.6 %   19593   AAB   IEEE 802.11ac WHz (MMHz, MCS3, 90pc duty cycle)   VIL	,	,				
10599   AAB	10588	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10592   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90p otthy cycle)   WILAN   8.79 ± 9.6 %   10593   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90p otthy cycle)   WILAN   8.74 ± 9.6 %   10594   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90p otthy cycle)   WILAN   8.74 ± 9.6 %   10595   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90p otthy cycle)   WILAN   8.74 ± 9.6 %   10595   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90p otthy cycle)   WILAN   8.74 ± 9.6 %   10595   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90p otthy cycle)   WILAN   8.71 ± 9.6 %   10599   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90p otthy cycle)   WILAN   8.72 ± 9.6 %   10599   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90p otthy cycle)   WILAN   8.72 ± 9.6 %   10599   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90p otthy cycle)   WILAN   8.70 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90p otthy cycle)   WILAN   8.79 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90p otthy cycle)   WILAN   8.80 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90p otthy cycle)   WILAN   8.82 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90p otthy cycle)   WILAN   8.82 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90p otthy cycle)   WILAN   8.82 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90p otthy cycle)   WILAN   8.97 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90p otthy cycle)   WILAN   8.97 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90p otthy cycle)   WILAN   8.97 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90p otthy cycle)   WILAN   8.76 ± 9.6 %   10590   AAB   IEEE 802.11n (WIT AMBER, 40MHz, MCS3, 90p otthy cycle)   WILAN   8.76 ± 9.6 %   10590   AAB   IEEE 802.11nc Wiff (20MHz, MCS3, 90p otthy cycle)   WILAN   8.77 ± 9.6 %   10590   AAB   IEEE 802.11nc Wiff (20MHz, MCS3, 90p otthy cycle)   WILAN   8.77 ± 9.6 %   10590   AAB   IEEE 802.11nc Wiff (20MHz, MCS3, 90p otthy cycle)   WILAN   8.77 ± 9.6 %   10590   A	10589	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	± 9.6 %
10592   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90p otthy cycle)   WILAN   8.79 ± 9.6 %   10593   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90p otthy cycle)   WILAN   8.74 ± 9.6 %   10594   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90p otthy cycle)   WILAN   8.74 ± 9.6 %   10595   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90p otthy cycle)   WILAN   8.74 ± 9.6 %   10595   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90p otthy cycle)   WILAN   8.74 ± 9.6 %   10595   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90p otthy cycle)   WILAN   8.71 ± 9.6 %   10599   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90p otthy cycle)   WILAN   8.72 ± 9.6 %   10599   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90p otthy cycle)   WILAN   8.72 ± 9.6 %   10599   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90p otthy cycle)   WILAN   8.70 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90p otthy cycle)   WILAN   8.79 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90p otthy cycle)   WILAN   8.80 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90p otthy cycle)   WILAN   8.82 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90p otthy cycle)   WILAN   8.82 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90p otthy cycle)   WILAN   8.82 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90p otthy cycle)   WILAN   8.97 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90p otthy cycle)   WILAN   8.97 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90p otthy cycle)   WILAN   8.97 ± 9.6 %   10590   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90p otthy cycle)   WILAN   8.76 ± 9.6 %   10590   AAB   IEEE 802.11n (WIT AMBER, 40MHz, MCS3, 90p otthy cycle)   WILAN   8.76 ± 9.6 %   10590   AAB   IEEE 802.11nc Wiff (20MHz, MCS3, 90p otthy cycle)   WILAN   8.77 ± 9.6 %   10590   AAB   IEEE 802.11nc Wiff (20MHz, MCS3, 90p otthy cycle)   WILAN   8.77 ± 9.6 %   10590   AAB   IEEE 802.11nc Wiff (20MHz, MCS3, 90p otthy cycle)   WILAN   8.77 ± 9.6 %   10590   A	10590	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	± 9.6 %
10592   AAB     EEE 802.11n (hT Mixed; 20MHz, MCS2, 90pc duty cycle)   WLAN   8.79   ± 9.6 %   10594   AAB     EEE 802.11n (hT Mixed; 20MHz, MCS2, 90pc duty cycle)   WLAN   8.74   ± 9.6 %   10594   AAB     EEE 802.11n (hT Mixed; 20MHz, MCS3, 90pc duty cycle)   WLAN   8.74   ± 9.6 %   10596   AAB     EEE 802.11n (hT Mixed; 20MHz, MCS3, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10599   AAB     EEE 802.11n (hT Mixed; 20MHz, MCS3, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10599   AAB     EEE 802.11n (hT Mixed; 20MHz, MCS3, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10599   AAB     EEE 802.11n (hT Mixed; 20MHz, MCS3, 90pc duty cycle)   WLAN   8.75   ± 9.6 %   10599   AAB     EEE 802.11n (hT Mixed; 40MHz, MCS3, 90pc duty cycle)   WLAN   8.75   ± 9.6 %   10600   AAB     EEE 802.11n (hT Mixed; 40MHz, MCS3, 90pc duty cycle)   WLAN   8.88   ± 9.6 %   10600   AAB     EEE 802.11n (hT Mixed; 40MHz, MCS3, 90pc duty cycle)   WLAN   8.84   ± 9.6 %   10600   AAB     EEE 802.11n (hT Mixed; 40MHz, MCS3, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10600   AAB     EEE 802.11n (hT Mixed; 40MHz, MCS3, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10600   AAB     EEE 802.11n (hT Mixed; 40MHz, MCS3, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10600   AAB     EEE 802.11n (hT Mixed; 40MHz, MCS3, 90pc duty cycle)   WLAN   8.76   ± 9.6 %   10600   AAB     EEE 802.11n (hT Mixed; 40MHz, MCS3, 90pc duty cycle)   WLAN   8.76   ± 9.6 %   10600   AAB     EEE 802.11n (hT Mixed; 40MHz, MCS3, 90pc duty cycle)   WLAN   8.76   ± 9.6 %   10600   AAB     EEE 802.11n (hT Mixed; 40MHz, MCS3, 90pc duty cycle)   WLAN   8.76   ± 9.6 %   10600   AAB     EEE 802.11ac Wirl (20MHz, MCS3, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10600   AAB     EEE 802.11ac Wirl (20MHz, MCS3, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10600   AAB     EEE 802.11ac Wirl (20MHz, MCS3, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10600   AAB     EEE 802.11ac Wirl (20MHz, MCS3, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10600   AAB     EEE 802.11ac Wirl (20MHz, MCS3, 90pc duty cycle)				WLAN	8.63	± 9.6 %
10593   AAB						
10595   AAB     EEE 802.111 ()+T Mixed, 20MHz, MCS3, 90pc duty cycle)						
10595   AAB   EEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)   WLAN   8.74   ± 9.8 %   10597   AAB   EEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)   WLAN   8.72   ± 9.8 %   10597   AAB   EEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)   WLAN   8.72   ± 9.8 %   10599   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.79   ± 9.8 %   10599   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.79   ± 9.8 %   10590   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.82   ± 9.8 %   10591   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.82   ± 9.8 %   10591   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.82   ± 9.8 %   10592   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.82   ± 9.8 %   10592   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.94   5 %   10593   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.93   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.93   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, MCS6, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, MCS6, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, MCS6, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, MCS6, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, MCS6, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, MCS6, 90pc duty cycle)   WLAN   8.78   ± 9.6 %   10593   AAB   EEE 802.11n (HT Mixed, MCS6, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10593   AAB   EEE 802.11n (WT (20MHz, MCS6, 90pc du						
10599						
10699   AAB   IEEE 802.11n (HT Mixed, 20MHz, MCSF, 90pc duty cycle)   WLAN   8.70   ± 9.8 %   10699   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSD, 90pc duty cycle)   WLAN   8.79   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSD, 90pc duty cycle)   WLAN   8.79   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSC), 90pc duty cycle)   WLAN   8.82   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSZ, 90pc duty cycle)   WLAN   8.82   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSZ, 90pc duty cycle)   WLAN   8.82   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSZ, 90pc duty cycle)   WLAN   9.03   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSZ, 90pc duty cycle)   WLAN   9.03   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSZ, 90pc duty cycle)   WLAN   8.76   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSZ, 90pc duty cycle)   WLAN   8.77   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSZ, 90pc duty cycle)   WLAN   8.94   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSZ, 90pc duty cycle)   WLAN   8.97   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCSZ, 90pc duty cycle)   WLAN   8.97   ± 9.8 %   10690   AAB   IEEE 802.11n (WH (20MHz, MCSZ, 90pc duty cycle)   WLAN   8.77   ± 9.8 %   10690   AAB   IEEE 802.11n (WH (20MHz, MCSZ, 90pc duty cycle)   WLAN   8.77   ± 9.8 %   10690   AAB   IEEE 802.11n (WH (20MHz, MCSZ, 90pc duty cycle)   WLAN   8.77   ± 9.8 %   10690   AAB   IEEE 802.11n (WH (20MHz, MCSZ, 90pc duty cycle)   WLAN   8.78   ± 9.8 %   10690   AAB   IEEE 802.11n (WH (20MHz, MCSZ, 90pc duty cycle)   WLAN   8.78   ± 9.8 %   10691   AAB   IEEE 802.11n (WH (20MHz, MCSZ, 90pc duty cycle)   WLAN   8.78   ± 9.8 %   10691   AAB   IEEE 802.11n (WH (20MHz, MCSZ, 90pc duty cycle)   WLAN   8.78   ± 9.8 %   10691   AAB   IEEE 802.11n (WH (20MHz, MCSZ, 90pc duty cycle)   WLAN   8.79   ± 9.8 %   10691   AAB   IEEE 802.11n (WH (20MHz, MCSZ, 90pc duty cycle)   WLAN   8.89   ± 9.8 %   10691   AAB   IEEE 802.11n (W						
10699   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)   WLAN   8.79   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)   WLAN   8.88   ± 9.8 %   10690   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)   WLAN   8.88   ± 9.8 %   10692   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)   WLAN   8.84   ± 9.8 %   10692   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10693   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)   WLAN   9.93   ± 9.6 %   10693   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10693   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10693   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10693   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10693   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)   WLAN   8.97   ± 9.6 %   10693   AAB   IEEE 802.11ac WHI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10693   AAB   IEEE 802.11ac WHI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10693   AAB   IEEE 802.11ac WHI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10610   AAB   IEEE 802.11ac WHI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10611   AAB   IEEE 802.11ac WHI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10611   AAB   IEEE 802.11ac WHI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.70   ± 9.6 %   10613   AAB   IEEE 802.11ac WHI (20MHz, MCS6, 90pc duty cycle)   WLAN   8.70   ± 9.6 %   10613   AAB   IEEE 802.11ac WHI (20MHz, MCS6, 90pc duty cycle)   WLAN   8.70   ± 9.6 %   10614   AAB   IEEE 802.11ac WHI (20MHz, MCS6, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10615   AAB   IEEE 802.11ac WHI (40MHz, MCS6, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10616   AAB   IEEE 802.11ac WHI (40MHz, MCS6, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10616   AAB   IEEE 802.11ac WHI						***************************************
10690						
10600   AAB						
10601   AAB						
10602	10600	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	WLAN	8.88	± 9.6 %
19603   AAB	10601	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	WLAN	8.82	±9.6%
10603   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)   WLAN   9.03   ±9.6 %   10605   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)   WLAN   8.76   ±9.6 %   10606   AAB   IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)   WLAN   8.87   ±9.6 %   10607   AAB   IEEE 802.11n (WIT Mixed, 40MHz, MCS7, 90pc duty cycle)   WLAN   8.82   ±9.6 %   10608   AAB   IEEE 802.11nc WIFI (20MHz, MCS7, 90pc duty cycle)   WLAN   8.74   ±9.6 %   10609   AAB   IEEE 802.11nc WIFI (20MHz, MCS7, 90pc duty cycle)   WLAN   8.77   ±9.6 %   10609   AAB   IEEE 802.11nc WIFI (20MHz, MCS7, 90pc duty cycle)   WLAN   8.77   ±9.6 %   10610   AAB   IEEE 802.11nc WIFI (20MHz, MCS8, 90pc duty cycle)   WLAN   8.77   ±9.6 %   10611   AAB   IEEE 802.11nc WIFI (20MHz, MCS8, 90pc duty cycle)   WLAN   8.78   ±9.6 %   10611   AAB   IEEE 802.11nc WIFI (20MHz, MCS8, 90pc duty cycle)   WLAN   8.70   ±9.6 %   10613   AAB   IEEE 802.11nc WIFI (20MHz, MCS8, 90pc duty cycle)   WLAN   8.77   ±9.6 %   10614   AAB   IEEE 802.11nc WIFI (20MHz, MCS8, 90pc duty cycle)   WLAN   8.77   ±9.6 %   10614   AAB   IEEE 802.11nc WIFI (20MHz, MCS8, 90pc duty cycle)   WLAN   8.79   ±9.6 %   10616   AAB   IEEE 802.11nc WIFI (20MHz, MCS8, 90pc duty cycle)   WLAN   8.59   ±9.6 %   10617   AAB   IEEE 802.11nc WIFI (20MHz, MCS8, 90pc duty cycle)   WLAN   8.59   ±9.6 %   10618   AAB   IEEE 802.11nc WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.82   ±9.6 %   10617   AAB   IEEE 802.11nc WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.82   ±9.6 %   10618   AAB   IEEE 802.11nc WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ±9.6 %   10619   AAB   IEEE 802.11nc WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ±9.6 %   10620   AAB   IEEE 802.11nc WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ±9.6 %   10620   AAB   IEEE 802.11nc WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.87   ±9.6 %   10620   AAB   IEEE 802.11nc WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ±9.6 %   10620   AAB   IEEE 802.11nc WIFI (40MHz, MCS9, 90pc duty cycle)   WLA	10602	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10604   AAB				WLAN	9.03	± 9.6 %
10605						
10606						
10607   AAB   IEEE 802.11ac WiFI (20MHz, MCS1, 90pc duty cycle)   WLAN   8.64   £9.6 %   10609   AAB   IEEE 802.11ac WiFI (20MHz, MCS1, 90pc duty cycle)   WLAN   8.77   £9.6 %   10610   AAB   IEEE 802.11ac WiFI (20MHz, MCS2, 90pc duty cycle)   WLAN   8.77   £9.6 %   10610   AAB   IEEE 802.11ac WiFI (20MHz, MCS3, 90pc duty cycle)   WLAN   8.78   £9.6 %   10610   AAB   IEEE 802.11ac WiFI (20MHz, MCS3, 90pc duty cycle)   WLAN   8.70   £9.6 %   10611   AAB   IEEE 802.11ac WiFI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.70   £9.6 %   10612   AAB   IEEE 802.11ac WiFI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.77   £9.6 %   10613   AAB   IEEE 802.11ac WiFI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.77   £9.6 %   10614   AAB   IEEE 802.11ac WiFI (20MHz, MCS7, 90pc duty cycle)   WLAN   8.94   £9.6 %   10616   AAB   IEEE 802.11ac WiFI (20MHz, MCS7, 90pc duty cycle)   WLAN   8.82   £9.6 %   10616   AAB   IEEE 802.11ac WiFI (20MHz, MCS7, 90pc duty cycle)   WLAN   8.82   £9.6 %   10616   AAB   IEEE 802.11ac WiFI (40MHz, MCS0, 90pc duty cycle)   WLAN   8.82   £9.6 %   10619   AAB   IEEE 802.11ac WiFI (40MHz, MCS1, 90pc duty cycle)   WLAN   8.82   £9.6 %   10619   AAB   IEEE 802.11ac WiFI (40MHz, MCS1, 90pc duty cycle)   WLAN   8.81   £9.6 %   10619   AAB   IEEE 802.11ac WiFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.81   £9.6 %   10620   AAB   IEEE 802.11ac WiFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.86   £9.6 %   10622   AAB   IEEE 802.11ac WiFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.87   £9.6 %   10622   AAB   IEEE 802.11ac WiFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.87   £9.6 %   10622   AAB   IEEE 802.11ac WiFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.87   £9.6 %   10623   AAB   IEEE 802.11ac WiFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.88   £9.6 %   10623   AAB   IEEE 802.11ac WiFI (60MHz, MCS3, 90pc duty cycle)   WLAN   8.88   £9.6 %   10626   AAB   IEEE 802.11ac WiFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.88   £9.6 %   10626   AAB   IEEE 802.11ac WiFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.89   £9.6 %						
10608						
106609   AAB   IEEE 802.11ac WIFI (20MHz, MCS2, 90pc duty cycle)   WLAN   8.76   ± 9.6 %   10610   AAB   IEEE 802.11ac WIFI (20MHz, MCS3, 90pc duty cycle)   WLAN   8.76   ± 9.6 %   10612   AAB   IEEE 802.11ac WIFI (20MHz, MCS4, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10612   AAB   IEEE 802.11ac WIFI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10613   AAB   IEEE 802.11ac WIFI (20MHz, MCS5, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10614   AAB   IEEE 802.11ac WIFI (20MHz, MCS7, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10615   AAB   IEEE 802.11ac WIFI (20MHz, MCS7, 90pc duty cycle)   WLAN   8.59   ± 9.6 %   10616   AAB   IEEE 802.11ac WIFI (20MHz, MCS7, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10616   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10617   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10618   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10619   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.86   ± 9.6 %   10620   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.86   ± 9.6 %   10621   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.87   ± 9.6 %   10622   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.87   ± 9.6 %   10624   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.87   ± 9.6 %   10625   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.88   ± 9.8 %   10626   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.88   ± 9.8 %   10626   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.89   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.89   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.89   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.89   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)						
10610   AAB   IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)   WLAN   8.76   ± 9.6 %   10611   AAB   IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10613   AAB   IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10613   AAB   IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10614   AAB   IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)   WLAN   8.94   ± 9.6 %   10616   AAB   IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)   WLAN   8.92   ± 9.8 %   10616   AAB   IEEE 802.11ac WiFi (20MHz, MCS9, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10616   AAB   IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10617   AAB   IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10618   AAB   IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10619   AAB   IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)   WLAN   8.58   ± 9.6 %   10620   AAB   IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)   WLAN   8.64   ± 9.6 %   10621   AAB   IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)   WLAN   8.67   ± 9.6 %   10622   AAB   IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)   WLAN   8.67   ± 9.6 %   10622   AAB   IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)   WLAN   8.67   ± 9.6 %   10622   AAB   IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10624   AAB   IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10625   AAB   IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)   WLAN   8.86   ± 9.6 %   10626   AAB   IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10626   AAB   IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)						
10611						
10612	- · · · · · · ·					
10613						
10614   AAB   IEEE 802.11ac WIFI (20MHz, MCS7, 90pc duty cycle)   WLAN   8.59   ± 9.6 %   10616   AAB   IEEE 802.11ac WIFI (20MHz, MCS9, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10617   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10617   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10618   AAB   IEEE 802.11ac WIFI (40MHz, MCS2, 90pc duty cycle)   WLAN   8.58   ± 9.6 %   10619   AAB   IEEE 802.11ac WIFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10620   AAB   IEEE 802.11ac WIFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.86   ± 9.6 %   10620   AAB   IEEE 802.11ac WIFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.87   ± 9.6 %   10622   AAB   IEEE 802.11ac WIFI (40MHz, MCS5, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10622   AAB   IEEE 802.11ac WIFI (40MHz, MCS6, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10623   AAB   IEEE 802.11ac WIFI (40MHz, MCS6, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10624   AAB   IEEE 802.11ac WIFI (40MHz, MCS6, 90pc duty cycle)   WLAN   8.62   ± 9.6 %   10625   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10627   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10627   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10634   AAC   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)						***************************************
10616   AAB   IEEE 802.11ac WIFI (20MHz, MCS8, 90pc duty cycle)   WLAN   8.82 ± 9.6 %   10617   AAB   IEEE 802.11ac WIFI (40MHz, MCS1, 90pc duty cycle)   WLAN   8.81 ± 9.6 %   10618   AAB   IEEE 802.11ac WIFI (40MHz, MCS1, 90pc duty cycle)   WLAN   8.81 ± 9.6 %   10618   AAB   IEEE 802.11ac WIFI (40MHz, MCS2, 90pc duty cycle)   WLAN   8.58 ± 9.6 %   10619   AAB   IEEE 802.11ac WIFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.86 ± 9.6 %   10620   AAB   IEEE 802.11ac WIFI (40MHz, MCS4, 90pc duty cycle)   WLAN   8.87 ± 9.6 %   10621   AAB   IEEE 802.11ac WIFI (40MHz, MCS4, 90pc duty cycle)   WLAN   8.77 ± 9.6 %   10622   AAB   IEEE 802.11ac WIFI (40MHz, MCS5, 90pc duty cycle)   WLAN   8.77 ± 9.6 %   10623   AAB   IEEE 802.11ac WIFI (40MHz, MCS6, 90pc duty cycle)   WLAN   8.68 ± 9.6 %   10623   AAB   IEEE 802.11ac WIFI (40MHz, MCS7, 90pc duty cycle)   WLAN   8.68 ± 9.6 %   10624   AAB   IEEE 802.11ac WIFI (40MHz, MCS7, 90pc duty cycle)   WLAN   8.68 ± 9.6 %   10625   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96 ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96 ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96 ± 9.6 %   10627   AAB   IEEE 802.11ac WIFI (80MHz, MCS1, 90pc duty cycle)   WLAN   8.83 ± 9.6 %   10628   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.83 ± 9.6 %   10628   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.83 ± 9.6 %   10630   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.81 ± 9.6 %   10631   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.81 ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.81 ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.81 ± 9.6 %   10634   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.81 ± 9.6 %   10634   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.83 ± 9.6 %   10634   AAB   IEEE 8	10613	AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)		8.94	
10616   AAB   IEEE 802.11ac WIFI (40MHz, MCS0, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10617   AAB   IEEE 802.11ac WIFI (40MHz, MCS2, 90pc duty cycle)   WLAN   8.58   ± 9.6 %   10619   AAB   IEEE 802.11ac WIFI (40MHz, MCS2, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10620   AAB   IEEE 802.11ac WIFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.86   ± 9.6 %   10620   AAB   IEEE 802.11ac WIFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.87   ± 9.6 %   10621   AAB   IEEE 802.11ac WIFI (40MHz, MCS4, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10622   AAB   IEEE 802.11ac WIFI (40MHz, MCS5, 90pc duty cycle)   WLAN   8.67   ± 9.6 %   10622   AAB   IEEE 802.11ac WIFI (40MHz, MCS6, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10623   AAB   IEEE 802.11ac WIFI (40MHz, MCS7, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10624   AAB   IEEE 802.11ac WIFI (40MHz, MCS8, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10625   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10627   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10629   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10630   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10631   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS3, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10634   AAB   IEEE 802.11ac WIFI (80MHz, MCS4, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10636   AAC   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10636   AAC   IEEE 802.11ac WIFI (106MHz, MCS9, 90pc duty cycle)	10614	AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	WLAN	8.59	± 9.6 %
10616   AAB   IEEE 802.11ac WIFI (40MHz, MCS0, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10617   AAB   IEEE 802.11ac WIFI (40MHz, MCS2, 90pc duty cycle)   WLAN   8.58   ± 9.6 %   10619   AAB   IEEE 802.11ac WIFI (40MHz, MCS2, 90pc duty cycle)   WLAN   8.58   ± 9.6 %   10620   AAB   IEEE 802.11ac WIFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.86   ± 9.6 %   10620   AAB   IEEE 802.11ac WIFI (40MHz, MCS3, 90pc duty cycle)   WLAN   8.87   ± 9.6 %   10621   AAB   IEEE 802.11ac WIFI (40MHz, MCS5, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10622   AAB   IEEE 802.11ac WIFI (40MHz, MCS5, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10623   AAB   IEEE 802.11ac WIFI (40MHz, MCS6, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10624   AAB   IEEE 802.11ac WIFI (40MHz, MCS6, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10625   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10627   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10628   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10630   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10631   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10634   AAB   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10636   AAC   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10636   AAC   IEEE 802.11ac WIFI (160MHz, MCS9, 90pc duty cycle)	10615	AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10617   AAB			IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10618					8.81	
10619						
10620						
10621   AAB   IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)   WLAN   8.77   ± 9.6 %   10622   AAB   IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10623   AAB   IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10624   AAB   IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10625   AAB   IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10627   AAB   IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10628   AAB   IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10628   AAB   IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10629   AAB   IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10630   AAB   IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10631   AAB   IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10632   AAB   IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10633   AAB   IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10633   AAB   IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10634   AAB   IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10635   AAB   IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10636   AAC   IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10637   AAC   IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10638   AAC   IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)   WLAN   8.86   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)   WLAN   8.89   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cyc						
10622   AAB   IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)   WLAN   8.68   ± 9.6 %   10623   AAB   IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)   WLAN   8.82   ± 9.6 %   10624   AAB   IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10625   AAB   IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10627   AAB   IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10627   AAB   IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10628   AAB   IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10630   AAB   IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10630   AAB   IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10631   AAB   IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10633   AAB   IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10633   AAB   IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10633   AAB   IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10634   AAB   IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10635   AAB   IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10636   AAC   IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)   WLAN   8.80   ± 9.6 %   10637   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10640   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10640   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.89   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty c					,,	
10623						
10624   AAB   IEEE 802.11ac WIFi (40MHz, MCS8, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10625   AAB   IEEE 802.11ac WIFi (40MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10626   AAB   IEEE 802.11ac WIFI (80MHz, MCS0, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10627   AAB   IEEE 802.11ac WIFI (80MHz, MCS1, 90pc duty cycle)   WLAN   8.88   ± 9.6 %   10628   AAB   IEEE 802.11ac WIFI (80MHz, MCS1, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10629   AAB   IEEE 802.11ac WIFI (80MHz, MCS2, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10630   AAB   IEEE 802.11ac WIFI (80MHz, MCS4, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10631   AAB   IEEE 802.11ac WIFI (80MHz, MCS5, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10632   AAB   IEEE 802.11ac WIFI (80MHz, MCS5, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS5, 90pc duty cycle)   WLAN   8.74   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS6, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10633   AAB   IEEE 802.11ac WIFI (80MHz, MCS8, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10636   AAC   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10636   AAC   IEEE 802.11ac WIFI (80MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10637   AAC   IEEE 802.11ac WIFI (160MHz, MCS1, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10639   AAC   IEEE 802.11ac WIFI (160MHz, MCS1, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10640   AAC   IEEE 802.11ac WIFI (160MHz, MCS3, 90pc duty cycle)   WLAN   8.86   ± 9.6 %   10640   AAC   IEEE 802.11ac WIFI (160MHz, MCS3, 90pc duty cycle)   WLAN   8.89   ± 9.6 %   10644   AAC   IEEE 802.11ac WIFI (160MHz, MCS5, 90pc duty cycle)   WLAN   8.89   ± 9.6 %   10644   AAC   IEEE 802.11ac WIFI (160MHz, MCS5, 90pc duty cycle)   WLAN   8.89   ± 9.6 %   10644   AAC   IEEE 802.11ac WIFI (160MHz, MCS5, 90pc duty cycle)   WLAN   8.89   ± 9.6 %   10646   AAF   LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)   LTE-TDD   11.96   ± 9.6 %   10647   AAC   IEEE 802.11ac WIFI (160MHz, MCS9, 9		<del></del>				
10625		<del></del>				
10626   AAB   IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10627   AAB   IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)   WLAN   8.88   ± 9.6 %   10628   AAB   IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10629   AAB   IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10630   AAB   IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10631   AAB   IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10632   AAB   IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   WLAN   8.74   ± 9.6 %   10633   AAB   IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   WLAN   8.74   ± 9.6 %   10633   AAB   IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10634   AAB   IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)   WLAN   8.80   ± 9.6 %   10635   AAB   IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)   WLAN   8.80   ± 9.6 %   10636   AAC   IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10636   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10638   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.87   ± 9.6 %   10639   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.86   ± 9.6 %   10640   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10640   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.96   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.99   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.90   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.90   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.90   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   9.05   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160Mtz, MCS9, 90pc d						
10627   AAB   IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)   WLAN   8.88   ± 9.6 %   10628   AAB   IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)   WLAN   8.71   ± 9.6 %   10629   AAB   IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10630   AAB   IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)   WLAN   8.72   ± 9.6 %   10631   AAB   IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10632   AAB   IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)   WLAN   8.74   ± 9.6 %   10633   AAB   IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10634   AAB   IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)   WLAN   8.80   ± 9.6 %   10634   AAB   IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)   WLAN   8.80   ± 9.6 %   10636   AAC   IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)   WLAN   8.81   ± 9.6 %   10636   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10637   AAC   IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)   WLAN   8.83   ± 9.6 %   10638   AAC   IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)   WLAN   8.86   ± 9.6 %   10639   AAC   IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10640   AAC   IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)   WLAN   8.85   ± 9.6 %   10641   AAC   IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)   WLAN   8.98   ± 9.6 %   10642   AAC   IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)   WLAN   8.98   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)   WLAN   8.98   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)   WLAN   9.06   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)   WLAN   9.06   ± 9.6 %   10644   AAC   IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)   WLAN   9.05   ± 9.6 %   10646   AAF   LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)   LTE-TDD   11.96   ± 9.6 %   10648   AAA   CDMA2000 (1x Advanced)   CDMA20	10625	AAB				
10628         AAB         IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)         WLAN         8.71         ± 9.6 %           10629         AAB         IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10630         AAB         IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)         WLAN         8.72         ± 9.6 %           10631         AAB         IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10632         AAB         IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)         WLAN         8.74         ± 9.6 %           10633         AAB         IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10634         AAB         IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)         WLAN         8.80         ± 9.6 %           10635         AAB         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10636         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)         WLAN         8.86         ± 9.6 %           10639         AAC <td>10626</td> <td>AAB</td> <td>IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)</td> <td></td> <td>8.83</td> <td></td>	10626	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)		8.83	
10629         AAB         IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10630         AAB         IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)         WLAN         8.72         ± 9.6 %           10631         AAB         IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10632         AAB         IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)         WLAN         8.74         ± 9.6 %           10633         AAB         IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10634         AAB         IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10635         AAB         IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10636         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10638         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC <td>10627</td> <td>AAB</td> <td>IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)</td> <td></td> <td>8.88</td> <td></td>	10627	AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)		8.88	
10629         AAB         IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10630         AAB         IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)         WLAN         8.72         ± 9.6 %           10631         AAB         IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10632         AAB         IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)         WLAN         8.74         ± 9.6 %           10634         AAB         IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10635         AAB         IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10636         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10639         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC <td>10628</td> <td>AAB</td> <td>IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)</td> <td>WLAN</td> <td>8.71</td> <td>± 9.6 %</td>	10628	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	WLAN	8.71	± 9.6 %
10630         AAB         IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)         WLAN         8.72         ± 9.6 %           10631         AAB         IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10632         AAB         IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)         WLAN         8.74         ± 9.6 %           10633         AAB         IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10634         AAB         IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)         WLAN         8.80         ± 9.6 %           10635         AAB         IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10636         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10638         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC </td <td></td> <td>AAB</td> <td></td> <td>WLAN</td> <td>8.85</td> <td>± 9.6 %</td>		AAB		WLAN	8.85	± 9.6 %
10631         AAB         IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10632         AAB         IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)         WLAN         8.74         ± 9.6 %           10633         AAB         IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10634         AAB         IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)         WLAN         8.80         ± 9.6 %           10635         AAB         IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10636         AAC         IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10638         AAC         IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)         WLAN         8.86         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.95         ± 9.6 %           10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC </td <td></td> <td><del></del></td> <td></td> <td>WLAN</td> <td></td> <td>± 9.6 %</td>		<del></del>		WLAN		± 9.6 %
10632         AAB         IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)         WLAN         8.74         ± 9.6 %           10633         AAB         IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10634         AAB         IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)         WLAN         8.80         ± 9.6 %           10635         AAB         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10636         AAC         IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10638         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.86         ± 9.6 %           10639         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC						
10633         AAB         IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10634         AAB         IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)         WLAN         8.80         ± 9.6 %           10635         AAB         IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10636         AAC         IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10638         AAC         IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)         WLAN         8.86         ± 9.6 %           10639         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10643         AAC						
10634         AAB         IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)         WLAN         8.80         ± 9.6 %           10635         AAB         IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10636         AAC         IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10638         AAC         IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)         WLAN         8.86         ± 9.6 %           10639         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10643         AAC         IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         AA						
10635         AAB         IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)         WLAN         8.81         ± 9.6 %           10636         AAC         IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10638         AAC         IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)         WLAN         8.86         ± 9.6 %           10639         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         8.89         ± 9.6 %           10643         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         8.89         ± 9.6 %           10644         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         A						
10636         AAC         IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)         WLAN         8.83         ± 9.6 %           10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10638         AAC         IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)         WLAN         8.86         ± 9.6 %           10639         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10643         AAC         IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)         WLAN         8.89         ± 9.6 %           10644         AAC         IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.11         ± 9.6 %           10646						
10637         AAC         IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)         WLAN         8.79         ± 9.6 %           10638         AAC         IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)         WLAN         8.86         ± 9.6 %           10639         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10643         AAC         IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)         WLAN         8.89         ± 9.6 %           10644         AAC         IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.11         ± 9.6 %           10646         AAF         LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10648		-				
10638         AAC         IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)         WLAN         8.86         ± 9.6 %           10639         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10643         AAC         IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)         WLAN         8.89         ± 9.6 %           10644         AAC         IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.11         ± 9.6 %           10646         AAF         LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10648         AAA         CDMA2000 (1x Advanced)         CDMA2000         3.45         ± 9.6 %           10652         AAD						
10639         AAC         IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)         WLAN         8.85         ± 9.6 %           10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10643         AAC         IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)         WLAN         8.89         ± 9.6 %           10644         AAC         IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.11         ± 9.6 %           10646         AAF         LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10647         AAF         LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10652         AAD         LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         6.91         ± 9.6 %           10653 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>						
10640         AAC         IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)         WLAN         8.98         ± 9.6 %           10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10643         AAC         IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)         WLAN         8.89         ± 9.6 %           10644         AAC         IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.11         ± 9.6 %           10646         AAF         LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10647         AAF         LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10648         AAA         CDMA2000 (1x Advanced)         CDMA2000         3.45         ± 9.6 %           10652         AAD         LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %					<u> </u>	
10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10643         AAC         IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)         WLAN         8.89         ± 9.6 %           10644         AAC         IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.11         ± 9.6 %           10646         AAF         LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10647         AAF         LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10648         AAA         CDMA2000 (1x Advanced)         CDMA2000         3.45         ± 9.6 %           10652         AAD         LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %           10653         AAD         LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %						
10641         AAC         IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10643         AAC         IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)         WLAN         8.89         ± 9.6 %           10644         AAC         IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.11         ± 9.6 %           10646         AAF         LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10647         AAF         LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10648         AAA         CDMA2000 (1x Advanced)         CDMA2000         3.45         ± 9.6 %           10652         AAD         LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %           10653         AAD         LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %	10640	AAC				
10642         AAC         IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)         WLAN         9.06         ± 9.6 %           10643         AAC         IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)         WLAN         8.89         ± 9.6 %           10644         AAC         IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.11         ± 9.6 %           10646         AAF         LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10647         AAF         LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10648         AAA         CDMA2000 (1x Advanced)         CDMA2000         3.45         ± 9.6 %           10652         AAD         LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %           10653         AAD         LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %	10641	AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)			
10643       AAC       IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)       WLAN       8.89       ± 9.6 %         10644       AAC       IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)       WLAN       9.05       ± 9.6 %         10645       AAC       IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)       WLAN       9.11       ± 9.6 %         10646       AAF       LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)       LTE-TDD       11.96       ± 9.6 %         10647       AAF       LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)       LTE-TDD       11.96       ± 9.6 %         10648       AAA       CDMA2000 (1x Advanced)       CDMA2000       3.45       ± 9.6 %         10652       AAD       LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)       LTE-TDD       6.91       ± 9.6 %         10653       AAD       LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)       LTE-TDD       7.42       ± 9.6 %				WLAN	9.06	
10644         AAC         IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)         WLAN         9.05         ± 9.6 %           10645         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.11         ± 9.6 %           10646         AAF         LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10647         AAF         LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10648         AAA         CDMA2000 (1x Advanced)         CDMA2000         3.45         ± 9.6 %           10652         AAD         LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         6.91         ± 9.6 %           10653         AAD         LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %					8.89	± 9.6 %
10645         AAC         IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)         WLAN         9.11         ± 9.6 %           10646         AAF         LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10647         AAF         LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10648         AAA         CDMA2000 (1x Advanced)         CDMA2000         3.45         ± 9.6 %           10652         AAD         LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         6.91         ± 9.6 %           10653         AAD         LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %						
10646         AAF         LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10647         AAF         LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10648         AAA         CDMA2000 (1x Advanced)         CDMA2000         3.45         ± 9.6 %           10652         AAD         LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         6.91         ± 9.6 %           10653         AAD         LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %						
10647         AAF         LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)         LTE-TDD         11.96         ± 9.6 %           10648         AAA         CDMA2000 (1x Advanced)         CDMA2000         3.45         ± 9.6 %           10652         AAD         LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         6.91         ± 9.6 %           10653         AAD         LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %						
10648         AAA         CDMA2000 (1x Advanced)         CDMA2000         3.45         ± 9.6 %           10652         AAD         LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         6.91         ± 9.6 %           10653         AAD         LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %						
10652         AAD         LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         6.91         ± 9.6 %           10653         AAD         LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)         LTE-TDD         7.42         ± 9.6 %						
10653 AAD LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%) LTE-TDD 7.42 ± 9.6 %						
	******					
10654   AAD   LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)   LTE-TDD   6.96   ± 9.6 %					·	
	10654	AAD	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LIE-IUU	6.96	1 ± 9.6 %

10655	AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	± 9.6 %
10658	AAA	Pulse Waveform (200Hz, 10%)	Test	10.00	± 9.6 %
10659	AAA	Pulse Waveform (200Hz, 20%)	Test	6.99	± 9.6 %
10660	AAA	Pulse Waveform (200Hz, 40%)	Test	3.98	± 9.6 %
10661	AAA	Pulse Waveform (200Hz, 60%)	Test	2.22	± 9.6 %
10662	AAA	Pulse Waveform (200Hz, 80%)	Test	0.97	±9.6 %
10670	AAA	Bluetooth Low Energy	Bluetooth	2.19	± 9.6 %

E Uncertainty is determined using the max, deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

### Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client

**PC Test** 

Certificate No: D750V3-1054\_Mar19/2

# CALIBRATION CERTIFICATE (Replacement of No:D750V3-1154\_Mar19)

Object D750V3 - SN:1054

Calibration procedure(s) QA CAL-05.v11

Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

4-29-2010

Calibration date:

March 18, 2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	31-Dec-18 (No. EX3-7349_Dec18)	Dec-19
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19
Secondary Standards	ID#	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	07-Oct-15 (in house check Feb-19)	Iл house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19
	Name	Function	Signature
Calibrated by:	Manu Seltz	Laboratory Techniclan	
Approved by:	Katja Pokovic	Technical Manager	2014

Issued: April 12, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D750V3-1054\_Mar19/2

Page 1 of 11

### **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





S

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Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA

Multilateral Agreement for the recognition of calibration certificates

#### Glossarv:

TSL

tissue simulating liquid

ConvF

sensitivity in TSL / NORM x,y,z

N/A

not applicable or not measured

### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

e) DASY4/5 System Handbook

#### **Methods Applied and Interpretation of Parameters:**

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

### **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	750 MHz ± 1 MHz	

### **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.1 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		<b>*</b>

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.29 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.48 W/kg ± 16.5 % (k=2)

### **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.5 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	₩ 24 A4 A4	

### SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.18 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.55 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.67 W/kg ± 16.5 % (k=2)

### Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.5 Ω - 0.3 jΩ
Return Loss	- 27.2 dB

### **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	50.2 Ω - 3.0 jΩ
Return Loss	- 30.3 dB

### General Antenna Parameters and Design

Electrical Delay (one direction)	1.035 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

Manufactured by	SPEAG

Certificate No: D750V3-1054\_Mar19/2

### Appendix (Additional assessments outside the scope of SCS 0108)

#### **Measurement Conditions**

DASY system configuration, as far as not given on page 1 and 3.

Phantom SAM Head Phantom For usage with cSAR3DV2-R/L	Phantom
--	---------

### SAR result with SAM Head (Top)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.93 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	7.72 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.23 W/kg ± 16.9 % (k=2)

### SAR result with SAM Head (Mouth)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.20 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.55 W/kg ± 16.9 % (k=2)

### SAR result with SAM Head (Neck)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.00 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.00 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.51 W/kg ± 16.9 % (k=2)

### SAR result with SAM Head (Ear)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.66 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.64 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	4.55 W/kg ± 16.9 % (k=2)

### **DASY5 Validation Report for Head TSL**

Date: 13.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1054

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: f = 750 MHz;  $\sigma = 0.89 \text{ S/m}$ ;  $\varepsilon_f = 42.1$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

### DASY52 Configuration:

• Probe: EX3DV4 - SN7349; ConvF(10.32, 10.32, 10.32) @ 750 MHz; Calibrated: 31.12.2018

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 04.10.2018

Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

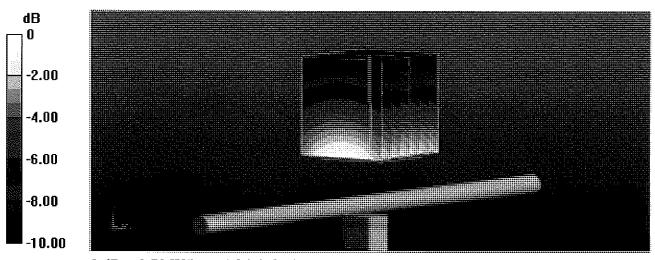
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 58.96 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 3.06 W/kg

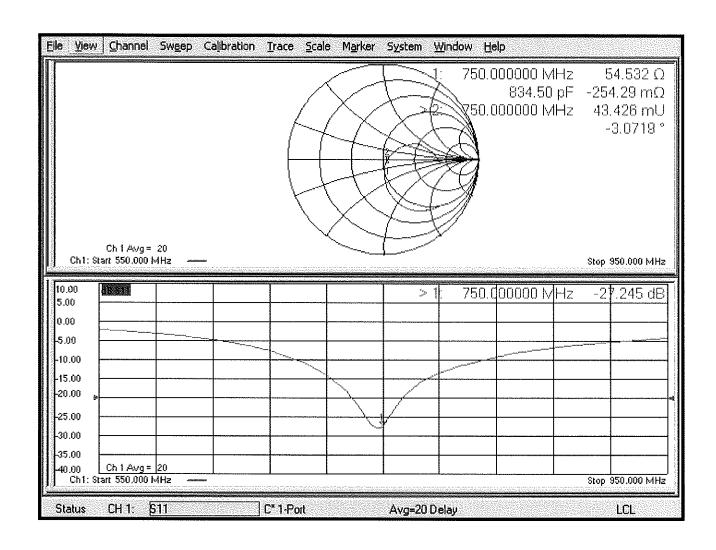
SAR(1 g) = 2.07 W/kg; SAR(10 g) = 1.37 W/kg

Maximum value of SAR (measured) = 2.73 W/kg



0 dB = 2.73 W/kg = 4.36 dBW/kg

### Impedance Measurement Plot for Head TSL



#### **DASY5 Validation Report for Body TSL**

Date: 13.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1054

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: f = 750 MHz;  $\sigma = 0.98 \text{ S/m}$ ;  $\varepsilon_r = 54.5$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(10.29, 10.29, 10.29) @ 750 MHz; Calibrated: 31.12.2018

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 04.10.2018

• Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005

• DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

### Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

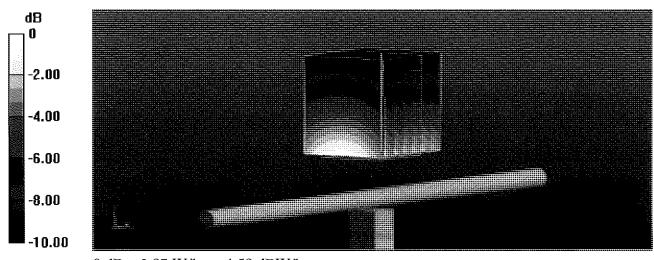
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.37 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.19 W/kg

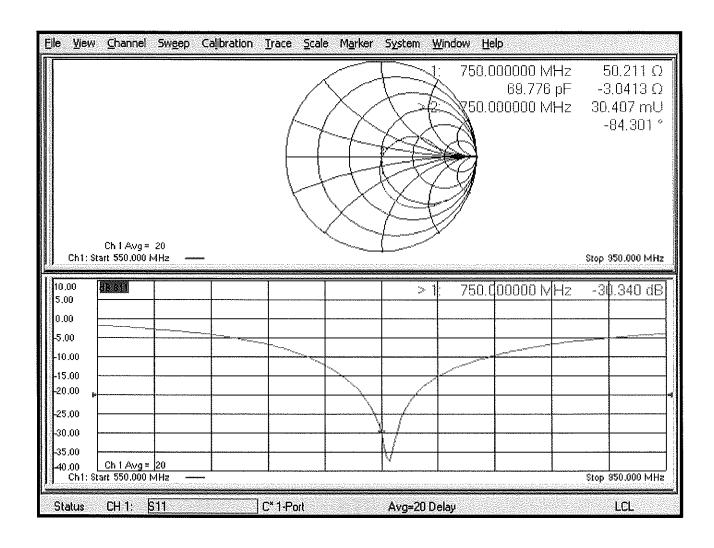
SAR(1 g) = 2.18 W/kg; SAR(10 g) = 1.44 W/kg

Maximum value of SAR (measured) = 2.87 W/kg



0 dB = 2.87 W/kg = 4.58 dBW/kg

# Impedance Measurement Plot for Body TSL



#### **DASY5 Validation Report for SAM Head**

Date: 18.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1054

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: f = 750 MHz;  $\sigma = 0.904 \text{ S/m}$ ;  $\varepsilon_r = 44.22$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### **DASY52** Configuration:

- Probe: EX3DV4 SN7349; ConvF(10.32, 10.32, 10.32) @ 750 MHz; Calibrated: 31.12.2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: SAM Head
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

#### SAM Right/Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.66 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 2.80 W/kg

SAR(1 g) = 1.93 W/kg; SAR(10 g) = 1.31 W/kg

Maximum value of SAR (measured) = 2.52 W/kg

#### SAM Right/Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm,

dz=5mm

Reference Value = 57.68 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 2.98 W/kg

SAR(1 g) = 2.05 W/kg; SAR(10 g) = 1.39 W/kg

Maximum value of SAR (measured) = 2.68 W/kg

#### SAM Right/Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.23 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 2.82 W/kg

SAR(1 g) = 2 W/kg; SAR(10 g) = 1.38 W/kg

Maximum value of SAR (measured) = 2.56 W/kg

#### SAM Right/Head/Ear/Zoom Scan (8x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

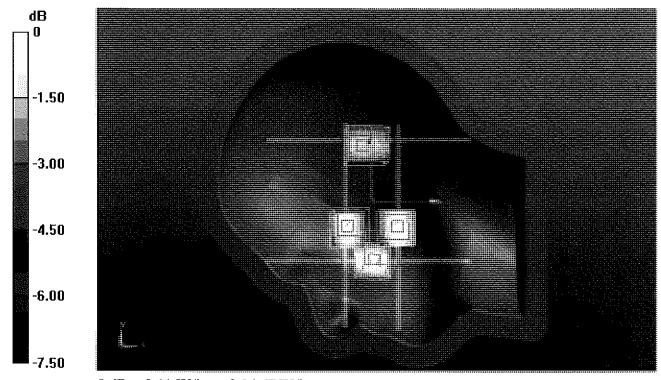
Reference Value = 50.76 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 2.32 W/kg

SAR(1 g) = 1.66 W/kg; SAR(10 g) = 1.14 W/kg

Maximum value of SAR (measured) = 2.11 W/kg

Certificate No: D750V3-1054\_Mar19/2



0 dB = 2.11 W/kg = 3.24 dBW/kg

# Calibration Laboratory of

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
Service sulsse d'étalonnage
Servizio svizzero di taratura
Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA

Multilateral Agreement for the recognition of calibration certificates

Client

**PC Test** 

Certificate No: D750V3-1161\_Oct18

Object	D750V3 - SN:116	j)	
Calibration procedure(s)	QA CAL-05.v10 Calibration proce	dure for dipole validation kits abo	ve 700 MHz
			,
Calibration date:	October 19, 2018		its of measurements (SI). BNV
			10-30-20
his calibration certificate documer	nts the traceability to nati	onal standards, which realize the physical un	its of measurements (Si), BNV9
		robability are given on the following pages an	d are part of the certificate. 10-20
	·	, ,	
All calibrations have been conducte	ed in the closed laborator	y facility: environment temperature (22 ± 3)°(	C and humidity < 70%.
			-
Calibration Equipment used (M&TE	critical for calibration)		
Primans Standarda	lin a	Cai Data (Carliffonta No.)	0-1-1-1-1-0-0-01-0-0-01-0
	ID#	Cai Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power meter NRP Power sensor NRP-Z91	SN: 104778 SN: 103244	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672)	Apr-19 Apr-19
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91	SN: 104778 SN: 103244 SN: 103245	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673)	Apr-19 Apr-19 Apr-19
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k)	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682)	Apr-19 Apr-19 Apr-19 Apr-19
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17)	Apr-19 Apr-19 Apr-19 Apr-19
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18) Check Date (in house)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18) Check Date (in house) 07-Oct-15 (In house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards Power meter EPM-442A Power sensor HP 8481A	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID # SN: GB37480704 SN: US37292783	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20 In house check: Oct-20
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards Power meter EPM-442A Power sensor HP 8481A RF generator R&S SMT-06	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID # SN: GB37480704 SN: US37292783 SN: MY41092317	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20 In house check: Oct-20 In house check: Oct-20
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID # SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18) 31-Mar-14 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20 In house check: Oct-19
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer Agilent E8358A	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047,2 / 06327 SN: 7349 SN: 601  ID # SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477  Name	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18) 31-Mar-14 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A RF generator R&S SMT-06 Retwork Analyzer Agilent E8358A	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID # SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18) 31-Mar-14 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20 In house check: Oct-19
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards Power meter EPM-442A Power sensor HP 8481A RF generator R&S SMT-06	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047,2 / 06327 SN: 7349 SN: 601  ID # SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477  Name	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18) 31-Mar-14 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20 In house check: Oct-19

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Certificate No: D750V3-1161\_Oct18

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# **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

TSL tissue simulating liquid

ConvF sensitivity in TSL / NORM x,y,z N/A not applicable or not measured

#### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### **Additional Documentation:**

e) DASY4/5 System Handbook

#### **Methods Applied and Interpretation of Parameters:**

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point.
   No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: D750V3-1161\_Oct18 Page 2 of 8

#### **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, $dy$ , $dz = 5 mm$	
Frequency	750 MHz ± 1 MHz	

# **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.8 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

### SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.03 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.26 W/kg ± 16.5 % (k=2)

### **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.1 ± 6 %	0.96 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

# SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.43 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.39 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.55 W/kg ± 16.5 % (k=2)

Certificate No: D750V3-1161\_Oct18 Page 3 of 8

# Appendix (Additional assessments outside the scope of SCS 0108)

#### **Antenna Parameters with Head TSL**

Impedance, transformed to feed point	55.6 Ω - 1.9 jΩ
Return Loss	- 25.0 dB

# Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.6 Ω - 4.2 jΩ
Return Loss	- 27.6 dB

#### **General Antenna Parameters and Design**

Electrical Delay (one direction)	1.032 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	November 19, 2015

Certificate No: D750V3-1161\_Oct18 Page 4 of 8

#### **DASY5 Validation Report for Head TSL**

Date: 19.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1161

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: f = 750 MHz;  $\sigma = 0.89 \text{ S/m}$ ;  $\varepsilon_r = 40.8$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63,19-2011)

# DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22) @ 750 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 04.10.2018

• Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

# Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

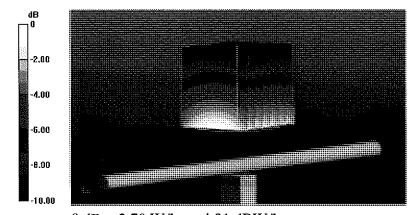
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 58.51 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.04 W/kg

SAR(1 g) = 2.02 W/kg; SAR(10 g) = 1.32 W/kg

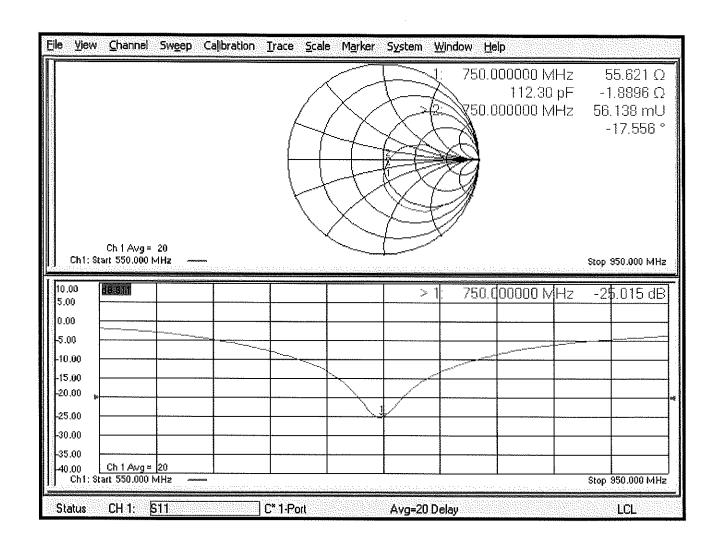
Maximum value of SAR (measured) = 2.70 W/kg



0 dB = 2.70 W/kg = 4.31 dBW/kg

Certificate No: D750V3-1161\_Oct18

# Impedance Measurement Plot for Head TSL



#### **DASY5 Validation Report for Body TSL**

Date: 19.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1161

Communication System: UID 0 - CW; Frequency: 750 MHz

Medium parameters used: f = 750 MHz;  $\sigma = 0.96 \text{ S/m}$ ;  $\varepsilon_r = 55.1$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(10.19, 10.19, 10.19) @ 750 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 04.10.2018

Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

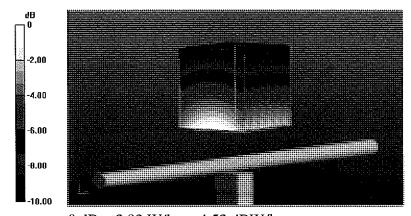
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.57 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.18 W/kg

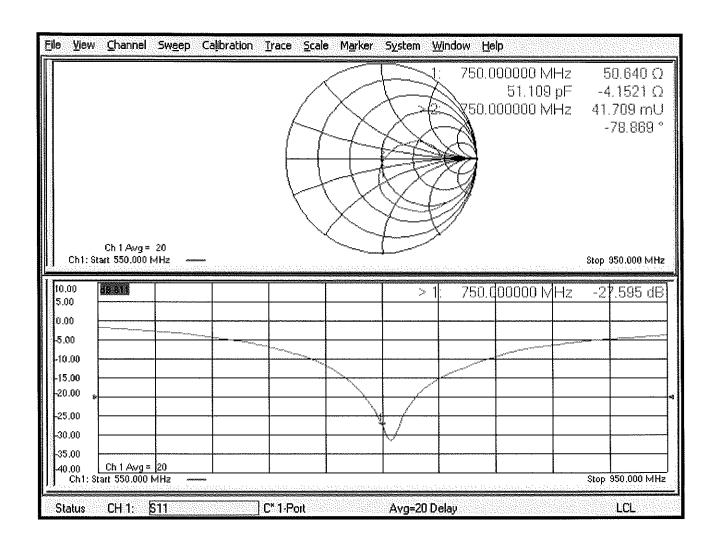
SAR(1 g) = 2.11 W/kg; SAR(10 g) = 1.39 W/kg

Maximum value of SAR (measured) = 2.83 W/kg



0 dB = 2.83 W/kg = 4.52 dBW/kg

# Impedance Measurement Plot for Body TSL



# PCTEST ENGINEERING LABORATORY, INC.



7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. +1.410.290.6652 / Fax +1.410.290.6654 http://www.pctest.com



# **Certification of Calibration**

Object D750V3 – SN:1161

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extended Calibration date: October 18, 2019

Description: SAR Validation Dipole at 750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor		Biennial	6/29/2021	192291470
Control Company	4352	Ultra Long Stem Thermometer	8/2/2018	Biennial	8/2/2020	181334684
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	10/11/2019	Annual	10/11/2020	101307
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/13/2019	Annual	8/13/2020	1041
Anritsu	MA2411B	Pulse Power Sensor	8/14/2019	Annual	8/14/2020	1315051
Anritsu	MA2411B	Pulse Power Sensor	8/8/2019	Annual	8/8/2020	1339008
Anritsu	ML2495A	Power Meter	11/20/2018	Annual	11/20/2019	1039008
Agilent	N5182A	MXG Vector Signal Generator	8/19/2019	Annual	8/19/2020	MY47420837
Seekonk	NC-100	Torque Wrench	5/9/2018	Biennial	5/9/2020	22217
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
MiniCircuits	ZHDC-16-63-S+	Bidirectional Coupler	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
SPEAG	EX3DV4	SAR Probe	4/24/2019	Annual	4/24/2020	7357
SPEAG	EX3DV4	SAR Probe	7/16/2019	Annual	7/16/2020	7410
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2019	Annual	7/11/2020	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/18/2019	Annual	4/18/2020	1407

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

#### Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Team Lead Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	20K

Object:	Date Issued:	Page 1 of 4
D750V3 - SN:1161	10/18/2019	Page 1 of 4

# **DIPOLE CALIBRATION EXTENSION**

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

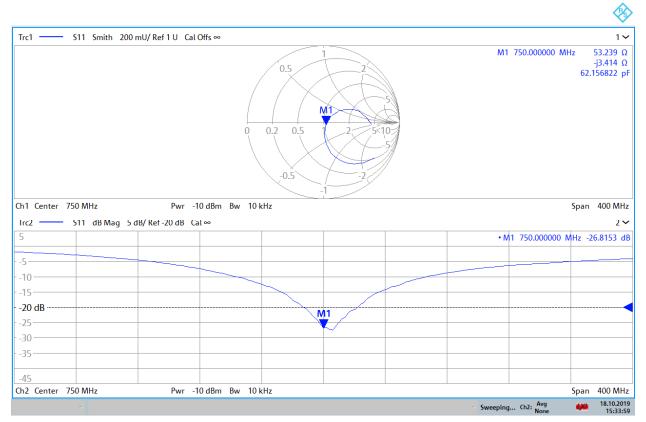
- 1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
- 2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
- 3. The measurement of real or imaginary parts of impedance does not deviate more than  $5\Omega$  from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Head SAR (1g)	(96)	Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	(10a) W/ka @	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
10/19/2018	10/18/2019	1.032	1.61	1.64	2.12%	1.05	1.08	2.66%	55.6	53.2	2.4	-1.9	-3.4	1.5	-25	-26.8	-7.30%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	(96)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	(10a) W/ka @	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
10/19/2018	10/18/2019	1.032	1.69	1.76	4.39%	1.11	1.17	5.41%	50.6	50	0.6	-4.2	-4	0.2	-27.6	-28.1	-1.60%	PASS

Object:	Date Issued:	Page 2 of 4
D750V3 - SN:1161	10/18/2019	Page 2 01 4

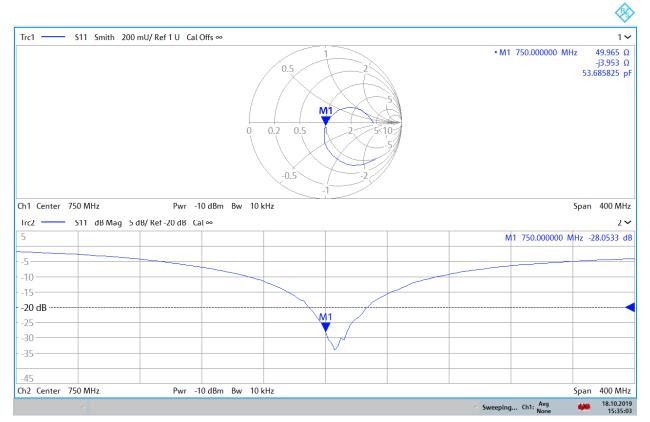
#### Impedance & Return-Loss Measurement Plot for Head TSL



15:34:00 18.10.2019

Object:	Date Issued:	Page 3 of 4
D750V3 - SN:1161	10/18/2019	Page 3 of 4

# Impedance & Return-Loss Measurement Plot for Body TSL



15:35:04 18.10.2019

Object:	Date Issued:	Page 4 of 4
D750V3 - SN:1161	10/18/2019	Page 4 of 4

## Calibration Laboratory of Schmid & Partner **Engineering AG** Zeughausstrasse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst Service suisse d'étalonnage C Servizio svizzero di taratura S **Swiss Calibration Service** 

Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates Accreditation No.: SCS 0108

Client

**PC Test** 

Certificate No: D835V2-4d047 Mar19

# **CALIBRATION CERTIFICATE**

Object D835V2 - SN:4d047

QA CAL-05.v11 Calibration procedure(s)

Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date:

March 13, 2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%,

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	31-Dec-18 (No. EX3-7349_Dec18)	Dec-19
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19
Secondary Standards	ID#	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	07-Oct-15 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19
	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by	Red Balan	<u> </u>	
Approved by:	Katja Pokovic	Technical Manager	ISM

Issued: March 13, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D835V2-4d047\_Mar19

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# **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
Service suisse d'étalonnage
Servizio svizzero di taratura
Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

TSL

tissue simulating liquid

ConvF

sensitivity in TSL / NORM x,y,z

N/A not applicable or not measured

#### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

e) DASY4/5 System Handbook

#### **Methods Applied and Interpretation of Parameters:**

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point.
   No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: D835V2-4d047\_Mar19 Page 2 of 8

#### **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

# **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.9 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.42 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.13 W/kg ± 16.5 % (k=2)

**Body TSL parameters**The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	****	

# **SAR** result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.47 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.27 W/kg ± 16.5 % (k=2)

Certificate No: D835V2-4d047\_Mar19 Page 3 of 8

# Appendix (Additional assessments outside the scope of SCS 0108)

#### **Antenna Parameters with Head TSL**

Impedance, transformed to feed point	51.4 Ω - 2.6 jΩ
Return Loss	- 30.7 dB

#### **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	46.8 Ω - 6.1 jΩ
Return Loss	- 22.9 dB

#### **General Antenna Parameters and Design**

Electrical Delay (one direction)	1.387 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

Manufactured by	SPEAG

Certificate No: D835V2-4d047\_Mar19 Page 4 of 8

#### **DASY5 Validation Report for Head TSL**

Date: 13.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d047

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: f = 835 MHz;  $\sigma = 0.91$  S/m;  $\varepsilon_r = 41.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(10, 10, 10) @ 835 MHz; Calibrated: 31.12.2018

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 04.10.2018

• Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001

• DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

# Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

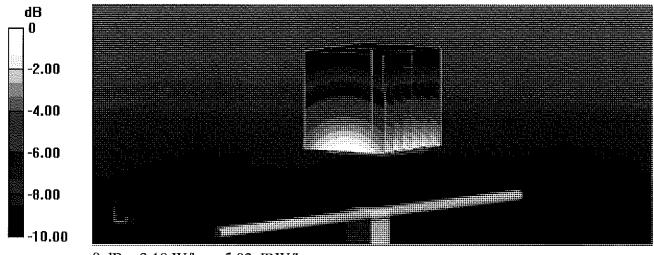
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 62.48 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 3.60 W/kg

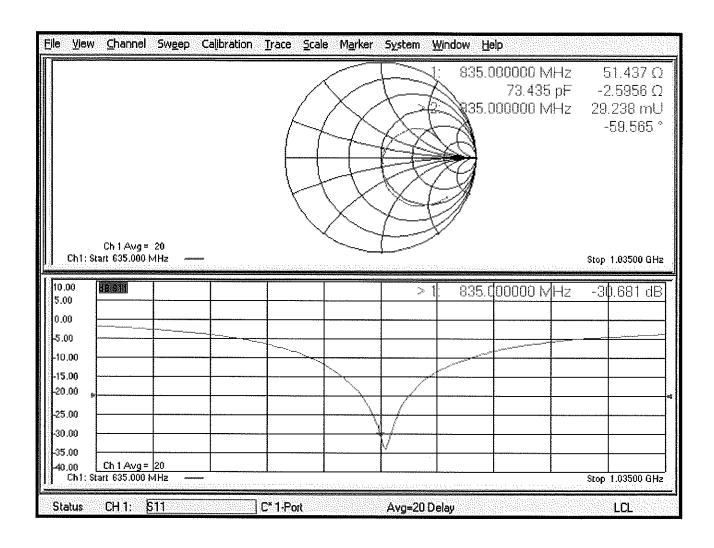
SAR(1 g) = 2.37 W/kg; SAR(10 g) = 1.54 W/kg

Maximum value of SAR (measured) = 3.18 W/kg



0 dB = 3.18 W/kg = 5.02 dBW/kg

# **Impedance Measurement Plot for Head TSL**



#### **DASY5 Validation Report for Body TSL**

Date: 13.03.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d047

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: f = 835 MHz;  $\sigma = 1.01 \text{ S/m}$ ;  $\varepsilon_r = 54.3$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

### **DASY52 Configuration:**

Probe: EX3DV4 - SN7349; ConvF(10.15, 10.15, 10.15) @ 835 MHz; Calibrated: 31.12.2018

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 04.10.2018

• Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005

• DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

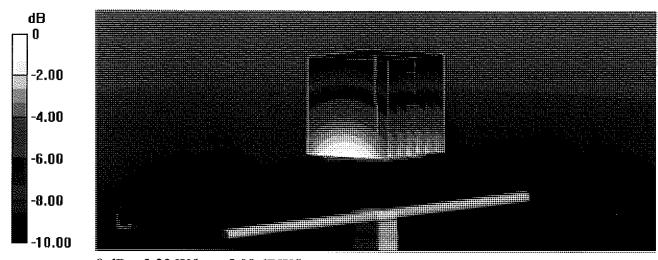
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 60.49 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.58 W/kg

SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.61 W/kg

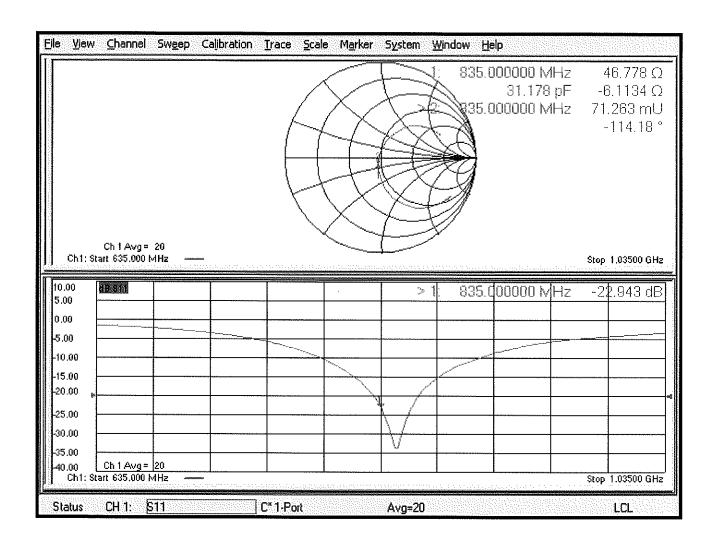
Maximum value of SAR (measured) = 3.23 W/kg



0 dB = 3.23 W/kg = 5.09 dBW/kg

Certificate No: D835V2-4d047\_Mar19

# Impedance Measurement Plot for Body TSL



### Calibration Laboratory of

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA

Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client

C Test

Certificate No: D835V2-4d133\_Oct18

CALIBRATION	CERTIFICATE
Object	D835V2:-SN:4d133
Calibration procedure(s)	QA GAL-05:v10 Galibration procedure for dipole validation kits above 700 MHz ان اعداد ان ان انتخاب
Calibration date:	October 19, 2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate,

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19
Secondary Standards	ID#	Check Date (In house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19
	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
*			<u> </u>
Approved by:	Katja Pokovic	Technical Manager	2711
			44 47
			•

Issued: October 22, 2018

This calibration certificate shall not be reproduced except In full without written approval of the laboratory.

Certificate No: D835V2-4d133\_Oct18

Page 1 of 8

#### **Calibration Laboratory of**

Schmid & Partner
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Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

TSL

tissue simulating liquid

ConvF N/A sensitivity in TSL / NORM x,y,z

not applicable or not measured

### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### **Additional Documentation:**

e) DASY4/5 System Handbook

#### **Methods Applied and Interpretation of Parameters:**

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point.
   No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: D835V2-4d133\_Oct18 Page 2 of 8

### **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters
The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.6 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.43 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.10 W/kg ± 16.5 % (k=2)

# **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity		
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m		
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.9 ± 6 %	0.98 mho/m ± 6 %		
Body TSL temperature change during test	< 0.5 °C		aif on the tax		

# SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.46 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.75 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.40 W/kg ± 16.5 % (k=2)

Certificate No: D835V2-4d133\_Oct18

#### Appendix (Additional assessments outside the scope of SCS 0108)

#### **Antenna Parameters with Head TSL**

Impedance, transformed to feed point	50.6 Ω - 2.4 jΩ
Return Loss	- 32,2 dB

#### **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	45.0 Ω - 6.7 jΩ
Return Loss	- 21.1 dB

#### **General Antenna Parameters and Design**

Electrical Delay (one direction)	1.397 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	July 22, 2011

Certificate No: D835V2-4d133\_Oct18 Page 4 of 8

#### **DASY5 Validation Report for Head TSL**

Date: 19.10.2018

Test Laboratory: The name of your organization

#### DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d133

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: f = 835 MHz;  $\sigma = 0.91$  S/m;  $\varepsilon_r = 40.6$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9) @ 835 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 04.10.2018

Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001

• DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

# Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

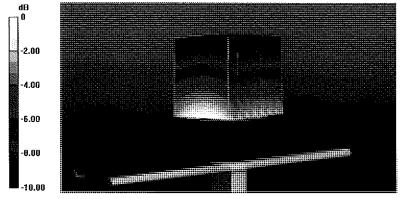
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 63.02 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.68 W/kg

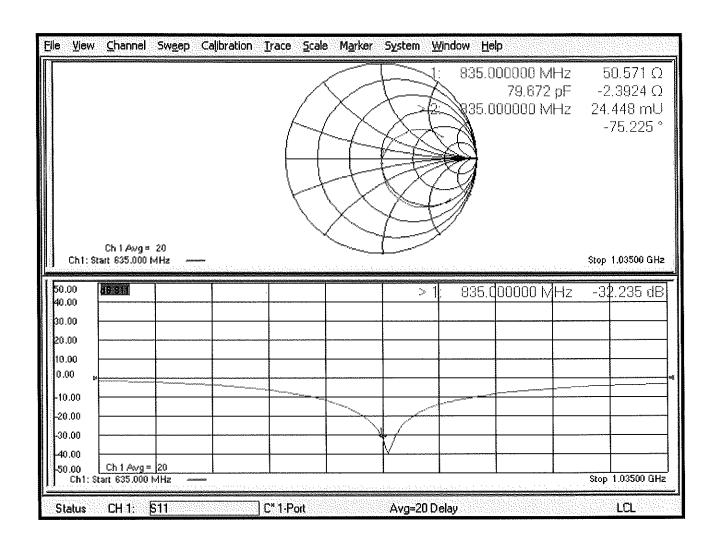
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.54 W/kg

Maximum value of SAR (measured) = 3.24 W/kg



0 dB = 3.24 W/kg = 5.11 dBW/kg

# Impedance Measurement Plot for Head TSL



#### **DASY5 Validation Report for Body TSL**

Date: 19.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

#### **DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d133**

Communication System: UID 0 - CW; Frequency: 835 MHz

Medium parameters used: f = 835 MHz;  $\sigma = 0.98 \text{ S/m}$ ;  $\varepsilon_r = 54.9$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

# DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(10.05, 10.05, 10.05) @ 835 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 04.10.2018

Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

#### Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

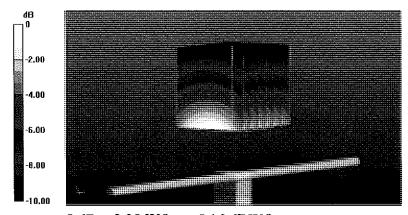
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 61.61 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.69 W/kg

SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.61 W/kg

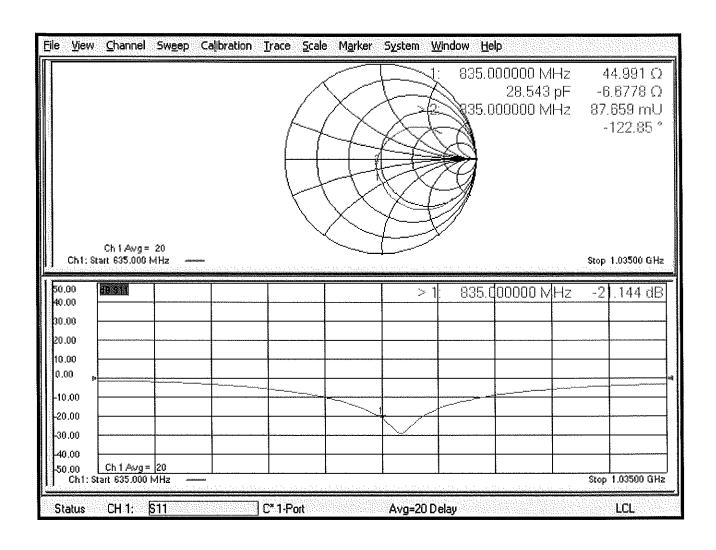
Maximum value of SAR (measured) = 3.28 W/kg



0 dB = 3.28 W/kg = 5.16 dBW/kg

Certificate No: D835V2-4d133\_Oct18

# **Impedance Measurement Plot for Body TSL**



# PCTEST ENGINEERING LABORATORY, INC.



7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. +1.410.290.6652 / Fax +1.410.290.6654 http://www.pctest.com



# **Certification of Calibration**

Object D835V2 – SN:4d133

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extended Calibration date: October 18, 2019

Description: SAR Validation Dipole at 835 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	6/29/2019	Biennial	6/29/2021	192291470
Control Company	4352	Ultra Long Stem Thermometer	8/2/2018	Biennial	8/2/2020	181334684
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	10/11/2019	Annual	10/11/2020	101307
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/13/2019	Annual	8/13/2020	1041
Anritsu	MA2411B	Pulse Power Sensor	8/14/2019	Annual	8/14/2020	1315051
Anritsu	MA2411B	Pulse Power Sensor	8/8/2019	Annual	8/8/2020	1339008
Anritsu	ML2495A	Power Meter	11/20/2018	Annual	11/20/2019	1039008
Agilent	N5182A	MXG Vector Signal Generator	8/19/2019	Annual	8/19/2020	MY47420837
Seekonk	NC-100	Torque Wrench	5/9/2018	Biennial	5/9/2020	22217
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
MiniCircuits	ZHDC-16-63-S+	Bidirectional Coupler	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
SPEAG	EX3DV4	SAR Probe	9/19/2019	Annual	9/19/2020	7551
SPEAG	EX3DV4	SAR Probe	4/24/2019	Annual	4/24/2020	7357
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/17/2019	Annual	9/17/2020	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/18/2019	Annual	4/18/2020	1407

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

#### Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Team Lead Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	XDK-

Object:	Date Issued:	Page 1 of 4
D835V2 - SN:4d133	10/18/2019	Page 1 of 4

# **DIPOLE CALIBRATION EXTENSION**

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

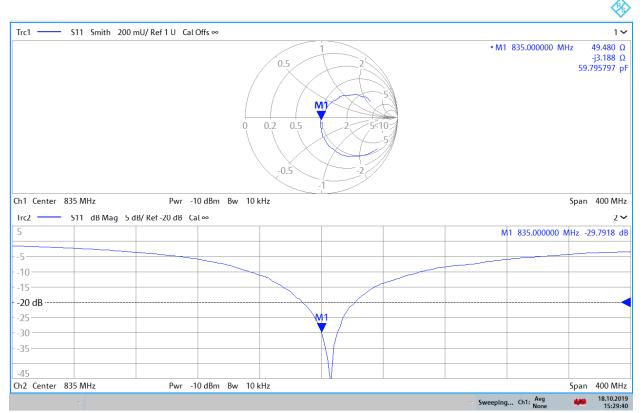
- 1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
- 2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
- 3. The measurement of real or imaginary parts of impedance does not deviate more than  $5\Omega$  from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Head SAR (1g)		Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	(10a) W/ka @	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
10/19/2018	10/18/2019	1.397	1.886	2.03	7.64%	1.22	1.32	8.20%	50.6	49.5	1.1	-2.4	-3.2	0.8	-32.2	-29.8	7.50%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm		Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	(40-) M(4 ©	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
10/19/2018	10/18/2019	1.397	1.95	2.07	6.15%	1.28	1.36	6.25%	45	45.1	0.1	-6.7	-5.1	1.6	-21.1	-22.6	-6.90%	PASS

Object:	Date Issued:	Page 2 of 4
D835V2 - SN:4d133	10/18/2019	Fage 2 01 4

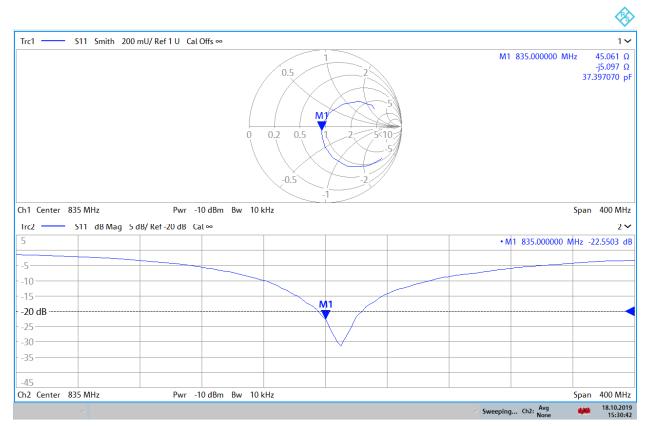
### Impedance & Return-Loss Measurement Plot for Head TSL



15:29:41 18.10.2019

Object:	Date Issued:	Page 3 of 4
D835V2 - SN:4d133	10/18/2019	

# Impedance & Return-Loss Measurement Plot for Body TSL



15:30:43 18.10.2019

Object:	Date Issued:	Page 4 of 4
D835V2 - SN:4d133	10/18/2019	Page 4 of 4

# Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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Swiss Calibration Service

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Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client

PC Test

Certificate No: D1750V2-1148\_May19

# **CALIBRATION CERTIFICATE**

Object

D1750V2 - SN:1148

Calibration procedure(s)

QA CAL-05.v11

Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

05-23-20

Calibration date:

May 15, 2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 7349	31-Dec-18 (No. EX3-7349_Dec18)	Dec-19
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20
Secondary Standards	ID#	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19
	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	Seif Alen
Approved by:	Katja Pokovic	Technical Manager	MAG

Issued: May 15, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D1750V2-1148\_May19

### **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





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Servizio svizzero di taratura
Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA

Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

TSL

tissue simulating liquid

ConvF

sensitivity in TSL / NORM x,y,z

N/A not applicable or not measured

### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### **Additional Documentation:**

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point.
   No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: D1750V2-1148\_May19 Page 2 of 11

### **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	1750 MHz ± 1 MHz	

### **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.0 ± 6 %	1.34 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	<b></b>	

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.13 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.0 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.83 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.5 W/kg ± 16.5 % (k=2)

### **Body TSL parameters**

The following parameters and calculations were applied.

<u> </u>	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.5 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

### SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.35 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.7 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.93 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	19.8 W/kg ± 16.5 % (k=2)

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#### Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.4 Ω - 0.2 jΩ
Return Loss	- 37.0 dB

#### **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	47.4 Ω - 0.5 jΩ
Return Loss	- 31.4 dB

#### **General Antenna Parameters and Design**

Electrical Delay (one direction)	1.222 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

Manufactured by SPEAG
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# Appendix (Additional assessments outside the scope of SCS 0108)

### **Measurement Conditions**

DASY system configuration, as far as not given on page 1 and 3.

	Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L
- 1			

### SAR result with SAM Head (Top)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.9 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.3 W/kg ± 16.9 % (k=2)

### **SAR result with SAM Head (Mouth)**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.8 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.3 W/kg ± 16.9 % (k=2)

### SAR result with SAM Head (Neck)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.6 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.9 W/kg ± 16.9 % (k=2)

### SAR result with SAM Head (Ear)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	7.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	28.7 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	3.98 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	16.0 W/kg ± 16.9 % (k=2)

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#### **DASY5 Validation Report for Head TSL**

Date: 08.05.2019

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1148

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma = 1.34$  S/m;  $\varepsilon_r = 40$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.59, 8.59, 8.59) @ 1750 MHz; Calibrated: 31.12.2018

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 30.04.2019

Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

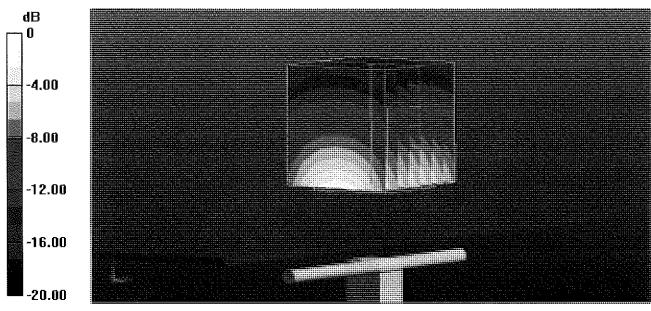
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 107.8 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 16.7 W/kg

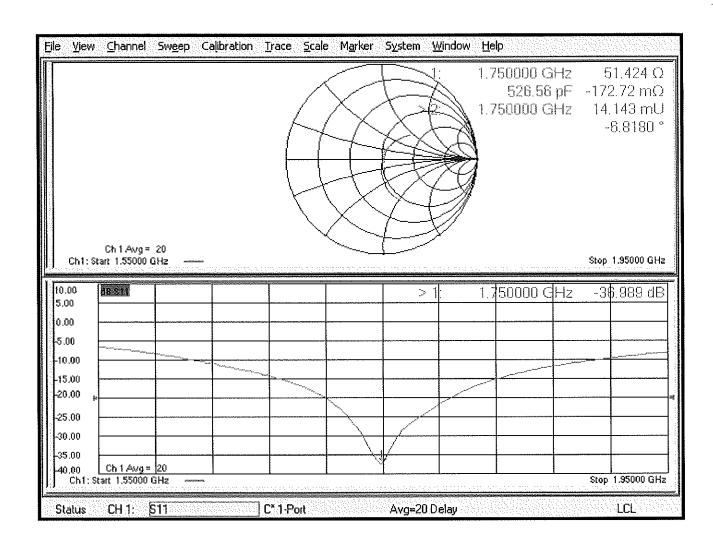
SAR(1 g) = 9.13 W/kg; SAR(10 g) = 4.83 W/kg

Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/kg

## Impedance Measurement Plot for Head TSL



#### **DASY5 Validation Report for Body TSL**

Date: 08.05,2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1148

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma = 1.47 \text{ S/m}$ ;  $\varepsilon_r = 53.5$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### **DASY52 Configuration:**

Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43) @ 1750 MHz; Calibrated: 31.12.2018

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 30.04.2019

Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

### Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

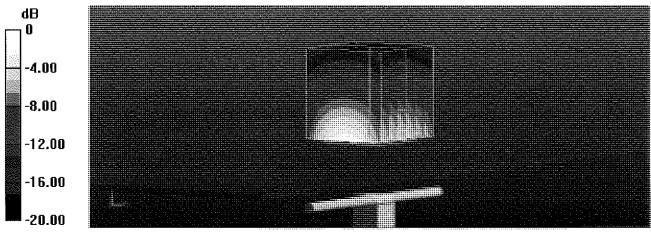
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.1 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 17.2 W/kg

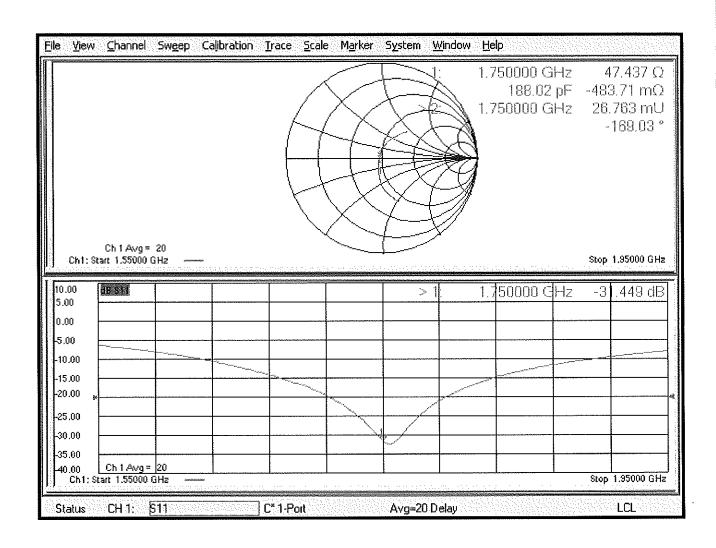
SAR(1 g) = 9.35 W/kg; SAR(10 g) = 4.93 W/kg

Maximum value of SAR (measured) = 14.4 W/kg



0 dB = 14.4 W/kg = 11.58 dBW/kg

## Impedance Measurement Plot for Body TSL



#### **DASY5 Validation Report for SAM Head**

Date: 15.05.2019

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1148

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma = 1.37 \text{ S/m}$ ;  $\varepsilon_r = 42.1$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.59, 8.59, 8.59) @ 1750 MHz; Calibrated: 31.12.2018

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 30.04.2019

· Phantom: SAM Head

DASY52 52.10.2(1495); SEMCAD X 14.6,12(7450)

### SAM Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 107.2 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 16.6 W/kg

SAR(1 g) = 9.38 W/kg; SAR(10 g) = 5.04 W/kg

Maximum value of SAR (measured) = 14.2 W/kg

### SAM Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.7 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 16.5 W/kg

SAR(1 g) = 9.34 W/kg; SAR(10 g) = 5.04 W/kg

Maximum value of SAR (measured) = 13.9 W/kg

#### SAM Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.3 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 15.5 W/kg

SAR(1 g) = 9.06 W/kg; SAR(10 g) = 4.95 W/kg

Maximum value of SAR (measured) = 13.1 W/kg

#### SAM Head/Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

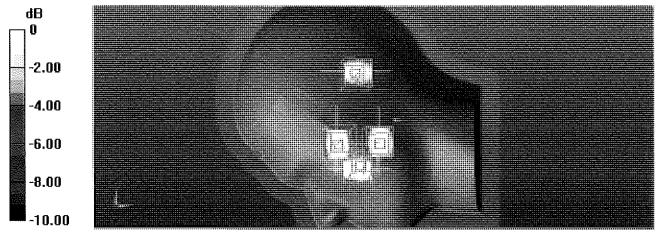
Reference Value = 90.82 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 12.0 W/kg

SAR(1 g) = 7.11 W/kg; SAR(10 g) = 3.98 W/kg

Maximum value of SAR (measured) = 10.2 W/kg

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0 dB = 10.2 W/kg = 10.09 dBW/kg

#### Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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CALIBRATION CERTIFICATE

Accreditation No.: SCS 0108

Issued: May 23, 2018

Client

**PC** Test

Certificate No: D1765V2-1008\_May18

	D1765V2 - SN:1	008	
Calibration procedure(s)	QA CAL-05.v10 Calibration proce	edure for dipole validation kits ab	OVE 700 MHz 7/16/2018 BNV 05/2012
Calibration date:	May 23, 2018		BN 05/2012
This calibration certificate docum The measurements and the unce	ents the traceability to nat rtainties with confidence p	ional standards, which realize the physical ur probability are given on the following pages ar	nits of measurements (SI). nd are part of the certificate.
All calibrations have been conduc	cted in the closed laborato	ory facility: environment temperature (22 ± 3)°	C and humidity < 70%.
Calibration Equipment used (M&7	ΓE critical for calibration)		
Primary Standards	iD#	Cal Date (Certificate No.)	Scheduled Calibration
ower meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
ower sensor NRP-Z91	SN: 104778 SN: 103244	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672)	Apr-19 Apr-19
Power sensor NRP-Z91 Power sensor NRP-Z91			Apr-19
Power sensor NRP-Z91 Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19 Apr-19
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator	SN: 103244 SN: 103245	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673)	Apr-19 Apr-19 Apr-19
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination	SN: 103244 SN: 103245 SN: 5058 (20k)	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683)	Apr-19 Apr-19 Apr-19 Apr-19
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4	SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682)	Apr-19 Apr-19 Apr-19
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4	SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17)	Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-18
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards	SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 26-Oct-17 (No. DAE4-601_Oct17) Check Date (in house)	Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-18 Scheduled Check
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards Power meter EPM-442A	SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 26-Oct-17 (No. DAE4-601_Oct17)	Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-18
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A	SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID #	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 26-Oct-17 (No. DAE4-601_Oct17) Check Date (in house) 07-Oct-15 (in house check Oct-16)	Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-18 Scheduled Check In house check: Oct-18 In house check: Oct-18
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4  Secondary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A RF generator R&S SMT-06	SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID # SN: GB374B0704 SN: US37292783	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 26-Oct-17 (No. DAE4-601_Oct17)  Check Date (in house) 07-Oct-15 (in house check Oct-16) 07-Oct-15 (in house check Oct-16)	Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-18 Scheduled Check In house check: Oct-18
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A RF generator R&S SMT-06	SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID # SN: GB37480704 SN: US37292783 SN: MY41092317	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 26-Oct-17 (No. DAE4-601_Oct17)  Check Date (in house) 07-Oct-15 (in house check Oct-16) 07-Oct-15 (in house check Oct-16) 07-Oct-15 (in house check Oct-16)	Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-18 Scheduled Check In house check: Oct-18 In house check: Oct-18 In house check: Oct-18
Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer HP 8753E	SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972 SN: US37390585  Name	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 26-Oct-17 (No. DAE4-601_Oct17)  Check Date (in house) 07-Oct-15 (in house check Oct-16) 07-Oct-15 (in house check Oct-16) 15-Jun-15 (in house check Oct-16) 15-Jun-15 (in house check Oct-16) 18-Oct-01 (in house check Oct-17)	Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-18 Scheduled Check In house check: Oct-18
Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4  Secondary Standards Power meter EPM-442A Power sensor HP 8481A RF generator R&S SMT-06	SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972 SN: US37390585	04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 26-Oct-17 (No. DAE4-601_Oct17)  Check Date (in house) 07-Oct-15 (in house check Oct-16) 07-Oct-15 (in house check Oct-16) 15-Jun-15 (in house check Oct-16) 18-Oct-01 (in house check Oct-17)	Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-18  Scheduled Check In house check: Oct-18

Certificate No: D1765V2-1008\_May18

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### **Calibration Laboratory of**

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Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

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#### Glossary:

TSL

tissue simulating liquid

ConvF

sensitivity in TSL / NORM x,y,z

N/A not applicable or not measured

### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### **Additional Documentation:**

e) DASY4/5 System Handbook

#### **Methods Applied and Interpretation of Parameters:**

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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### **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	1750 MHz ± 1 MHz	

### **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permitti∨ity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0 ± 6 %	1.34 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

### **SAR** result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.94 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.2 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.71 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.0 W/kg ± 16.5 % (k=2)

### **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.2 ± 6 %	1.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

### **SAR** result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.21 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.4 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.92 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	19.9 W/kg ± 16.5 % (k=2)

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### Appendix (Additional assessments outside the scope of SCS 0108)

#### **Antenna Parameters with Head TSL**

Impedance, transformed to feed point	47.7 Ω - 6.5 jΩ
Return Loss	- 23.0 dB

### **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	43.3 Ω - 6.0 jΩ
Return Loss	- 20.3 dB

#### **General Antenna Parameters and Design**

Electrical Delay (one direction)	1.210 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	October 06, 2005

Certificate No: D1765V2-1008\_May18 Page 4 of 11

### Appendix (Additional assessments outside the scope of SCS 0108)

#### **Measurement Conditions**

DASY system configuration, as far as not given on page 1 and 3.

### SAR result with SAM Head (Top)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.4 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.9 W/kg ± 16.9 % (k=2)

### SAR result with SAM Head (Mouth)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	38.2 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.06 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.4 W/kg ± 16.9 % (k=2)

### SAR result with SAM Head (Neck)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.26 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	37.4 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.02 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.2 W/kg ± 16.9 % (k=2)

## SAR result with SAM Head (Ear)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	<b>7</b> .12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	28.7 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	16.1 W/kg ± 16.9 % (k=2)

Certificate No: D1765V2-1008\_May18 Page 5 of 11

#### **DASY5 Validation Report for Head TSL**

Date: 15.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN:1008

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma = 1.34 \text{ S/m}$ ;  $\varepsilon_r = 39$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

• Probe: EX3DV4 - SN7349; ConvF(8.5, 8.5, 8.5) @ 1750 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 26.10.2017

Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001

• DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

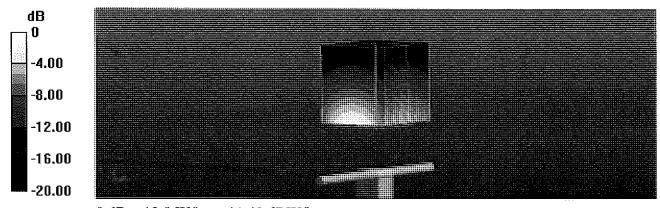
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 106.6 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 16.4 W/kg

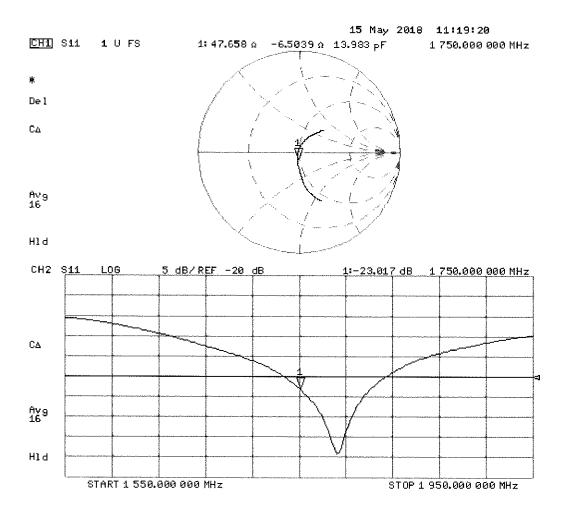
SAR(1 g) = 8.94 W/kg; SAR(10 g) = 4.71 W/kg

Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

## Impedance Measurement Plot for Head TSL



#### **DASY5 Validation Report for Body TSL**

Date: 15.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN:1008

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma = 1.46 \text{ S/m}$ ;  $\varepsilon_r = 53.2$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.35, 8.35, 8.35) @ 1750 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 26.10.2017

• Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002

• DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

### Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

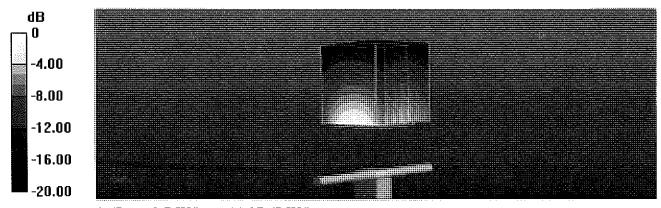
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 102.4 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 16.1 W/kg

SAR(1 g) = 9.21 W/kg; SAR(10 g) = 4.92 W/kg

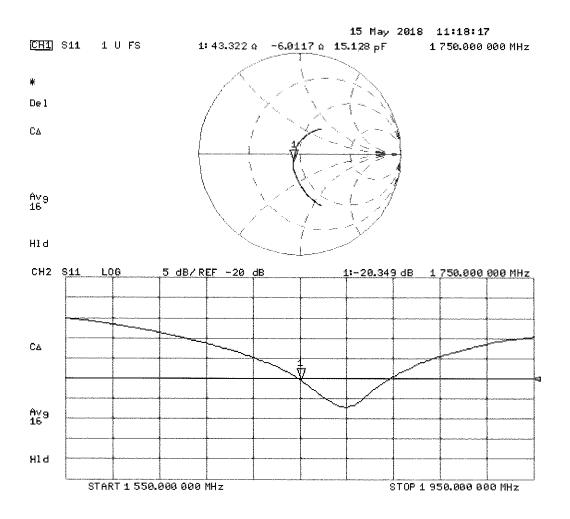
Maximum value of SAR (measured) = 13.7 W/kg



0 dB = 13.7 W/kg = 11.37 dBW/kg

Certificate No: D1765V2-1008\_May18 Page 8 of 11

## Impedance Measurement Plot for Body TSL



#### **DASY5 Validation Report for SAM Head**

Date: 23.05.2018

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 1765 MHz; Type: D1765V2; Serial: D1765V2 - SN:1008

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: f = 1750 MHz;  $\sigma = 1.37 \text{ S/m}$ ;  $\varepsilon_r = 41.8$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

• Probe: EX3DV4 - SN7349; ConvF(8.5, 8.5, 8.5) @ 1750 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 26.10.2017

· Phantom: SAM Head

• DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

#### SAM/Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 105.8 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 16.4 W/kg

SAR(1 g) = 9.26 W/kg; SAR(10 g) = 4.95 W/kg

Maximum value of SAR (measured) = 13.9 W/kg

#### SAM/Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.2 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 16.6 W/kg

SAR(1 g) = 9.47 W/kg; SAR(10 g) = 5.06 W/kg

Maximum value of SAR (measured) = 13.7 W/kg

#### SAM/Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.7 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 15.8 W/kg

SAR(1 g) = 9.26 W/kg; SAR(10 g) = 5.02 W/kg

Maximum value of SAR (measured) = 13.8 W/kg

#### SAM/Head/Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

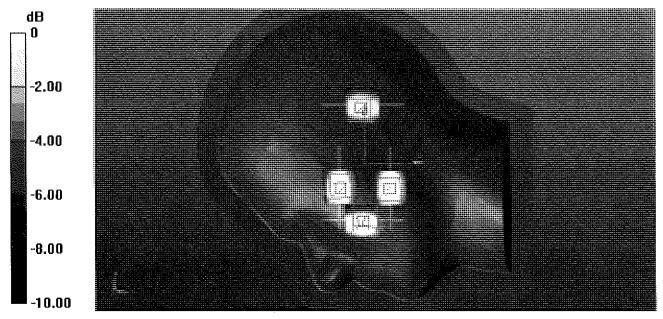
Reference Value = 90.46 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 11.8 W/kg

SAR(1 g) = 7.12 W/kg; SAR(10 g) = 4.01 W/kg

Maximum value of SAR (measured) = 10.3 W/kg

Certificate No: D1765V2-1008\_May18



0 dB = 10.3 W/kg = 10.13 dBW/kg

### PCTEST ENGINEERING LABORATORY, INC.



7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. +1.410.290.6652 / Fax +1.410.290.6654 http://www.pctest.com



# **Certification of Calibration**

Object D1765V2 – SN: 1008

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extension Calibration date: 5/17/2019

Description: SAR Validation Dipole at 1750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	3/11/2019	Annual	3/11/2020	US39170122
Agilent	N5182A	MXG Vector Signal Generator	11/28/2018	Annual	11/28/2019	MY47420603
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1027293
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1126066
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/9/2018	Biennial	10/9/2020	181647811
Control Company	4352	Ultra Long Stem Thermometer	6/6/2018	Biennial	6/6/2020	181334678
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
SPEAG	EX3DV4	SAR Probe	6/25/2018	Annual	6/25/2019	7409
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	3914
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/14/2019	Annual	2/14/2020	1272
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091

### Measurement Uncertainty = $\pm 23\%$ (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	20K

Object:	Date Issued:	Page 1 of 4
D1765V2 – SN: 1008	05/17/2019	rage 1014

### **DIPOLE CALIBRATION EXTENSION**

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

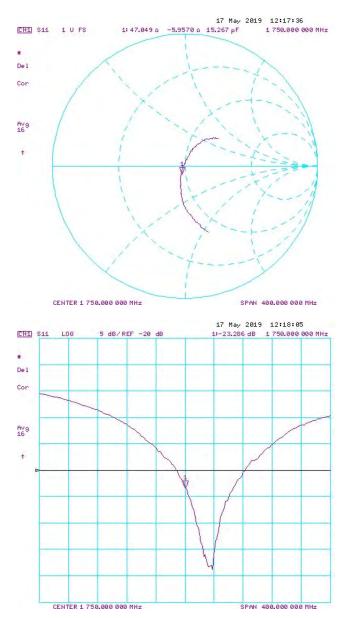
- 1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
- 2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
- 3. The measurement of real or imaginary parts of impedance does not deviate more than  $5\Omega$  from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

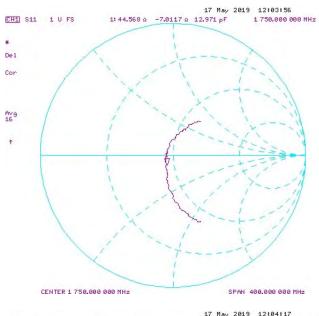
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	W/kg @ 20.0	(94)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)		Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
5/23/2019	5/17/2019	1.21	3.62	3.63	0.28%	1.9	1.92	1.05%	47.7	47	0.7	-6.5	-6	0.5	-23	-23.3	-1.20%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	W/kg @ 20.0	(%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)		Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
5/23/2019	5/17/2019	1.21	3.74	3.95	5.61%	1.99	2.08	4.52%	43.3	44.6	1.3	-6	-7	1	-20.3	-20.5	-0.90%	PASS

Object:	Date Issued:	Page 2 of 4	
D1765V2 – SN: 1008	05/17/2019	Fage 2 01 4	

#### Impedance & Return-Loss Measurement Plot for Head TSL



### Impedance & Return-Loss Measurement Plot for Body TSL





## Calibration Laboratory of Schmid & Partner

**Engineering AG** Zeughausstrasse 43, 8004 Zurich, Switzerland





C

Schweizerischer Kalibrierdienst Service sulsse d'étalonnage Servizio svizzero di taratura **Swiss Calibration Service** 

Accredited by the Swiss Accreditation Service (SAS) The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates Accreditation No.: SCS 0108

Client

Certificate No: D1900V2-5d080\_Oct18

CALIBRATION C			
Dbject	D1900V2 - SN:50	1080	
Calibration procedure(s)	QA CAL-05 v10		
	Calibration proce	dure for dipole validation kits al	DOVE 700 WITZ
			BN
Calibration date:	October 23, 2018		BN 10-30-2018 BN 10-30-2018
			BNV
	•	onal standards, which realize the physical	units of theastrements (51). 10 -
he measurements and the uncert	aintles with confidence p	robability are given on the following pages	and are part of the certificate.
All calibrations have been conducte	ed in the closed laborato	y facility; environment temperature (22 $\pm$ 3	s)°C and humidity < 70%.
Calibration Equipment used (M&TE	aritical for calibration		
Salibration Editibulant read (Motte	conicarior campianory		
Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	<b>S</b> N: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
ype-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18 ·
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19
Secondary Standards	ID#	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	in house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19
	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	te la
Approved by:	Katja Pokovic	Technical Manager	
			Issued: October 23, 2018

Certificate No: D1900V2-5d080\_Oct18

Page 1 of 8

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

### **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
Service suisse d'étalonnage
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Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

TSL tissue simulating liquid

ConvF sensitivity in TSL / NORM x,y,z N/A not applicable or not measured

### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### **Additional Documentation:**

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: D1900V2-5d080\_Oct18 Page 2 of 8

### **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

## **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.3 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	do to to	

### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.93 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	39.8 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.18 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.7 W/kg ± 16.5 % (k=2)

### **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.9 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

## **SAR result with Body TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	, , , , , ,
SAR measured	250 mW input power	9.62 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	39.2 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.6 W/kg ± 16.5 % (k=2)

Certificate No: D1900V2-5d080\_Oct18

### Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5 Ω + 7.9 jΩ		
Return Loss	- 21.8 dB		

### **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	48.1 Ω + 8.1 jΩ	
Return Loss	- 21.5 dB	

### **General Antenna Parameters and Design**

Electrical Delay (one direction)	1.193 ns	

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	June 28, 2006

Certificate No: D1900V2-5d080\_Oct18

#### **DASY5 Validation Report for Head TSL**

Date: 23.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d080

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz;  $\sigma = 1.4 \text{ S/m}$ ;  $\varepsilon_r = 40.3$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.18, 8.18, 8.18) @ 1900 MHz; Calibrated: 30.12.2017

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 04.10.2018

• Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

### Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

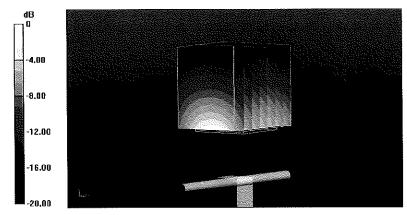
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 110.0 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 18.7 W/kg

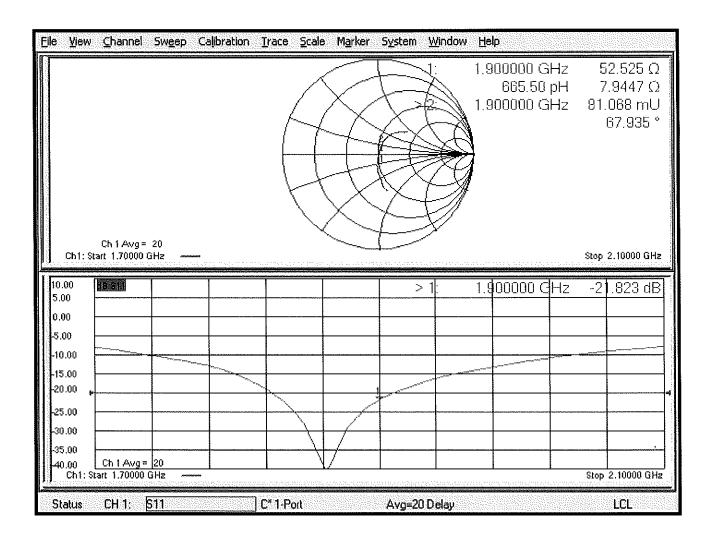
SAR(1 g) = 9.93 W/kg; SAR(10 g) = 5.18 W/kg

Maximum value of SAR (measured) = 15.6 W/kg



0 dB = 15.6 W/kg = 11.93 dBW/kg

### Impedance Measurement Plot for Head TSL



#### **DASY5 Validation Report for Body TSL**

Date: 23.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d080

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz;  $\sigma = 1.47 \text{ S/m}$ ;  $\varepsilon_r = 52.9$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.15, 8.15, 8.15) @ 1900 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 04.10.2018

Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002

• DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

### Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

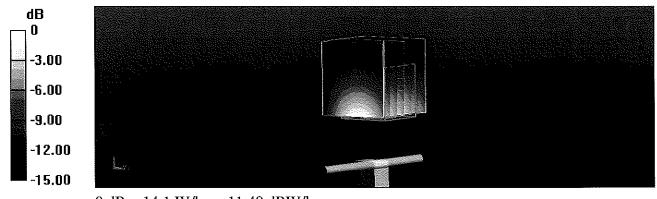
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.86 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 17.3 W/kg

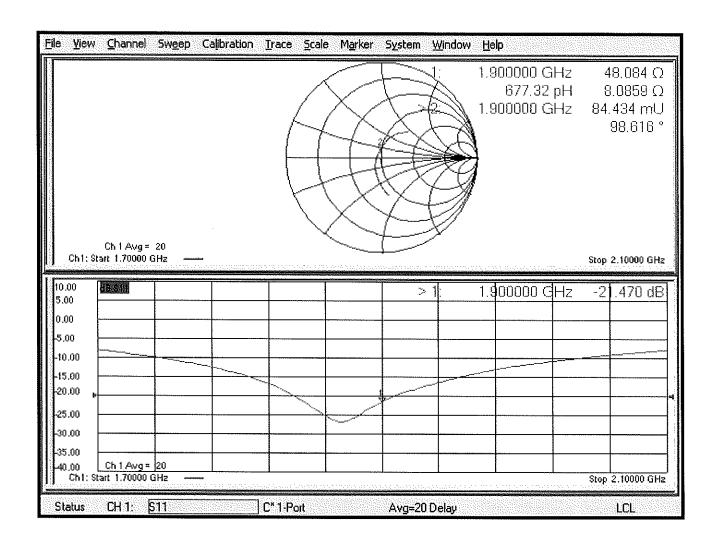
SAR(1 g) = 9.62 W/kg; SAR(10 g) = 5.09 W/kg

Maximum value of SAR (measured) = 14.1 W/kg



0 dB = 14.1 W/kg = 11.49 dBW/kg

## Impedance Measurement Plot for Body TSL



### PCTEST ENGINEERING LABORATORY, INC.



7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. +1.410.290.6652 / Fax +1.410.290.6654 http://www.pctest.com



# **Certification of Calibration**

Object D1900V2 – SN:5d080

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extended Calibration date: October 18, 2019

Description: SAR Validation Dipole at 1900 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	6/29/2019	Biennial	6/29/2021	192291470
Control Company	4352	Ultra Long Stem Thermometer	8/2/2018	Biennial	8/2/2020	181334684
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	10/11/2019	Annual	10/11/2020	101307
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/13/2019	Annual	8/13/2020	1041
Anritsu	MA2411B	Pulse Power Sensor	8/14/2019	Annual	8/14/2020	1315051
Anritsu	MA2411B	Pulse Power Sensor	8/8/2019	Annual	8/8/2020	1339008
Anritsu	ML2495A	Power Meter	11/20/2018	Annual	11/20/2019	1039008
Agilent	N5182A	MXG Vector Signal Generator	8/19/2019	Annual	8/19/2020	MY47420837
Seekonk	NC-100	Torque Wrench	5/9/2018	Biennial	5/9/2020	22217
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
MiniCircuits	ZHDC-16-63-S+	Bidirectional Coupler	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	3914
SPEAG	EX3DV4	SAR Probe	5/16/2019	Annual	5/16/2020	7406
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/8/2019	Annual	5/8/2020	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/14/2019	Annual	2/14/2020	1272

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

#### Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Team Lead Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	20K

Object:	Date Issued:	Page 1 of 4	
D1900V2 - SN: 5d080	10/18/2019	Page 1 of 4	

### **DIPOLE CALIBRATION EXTENSION**

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

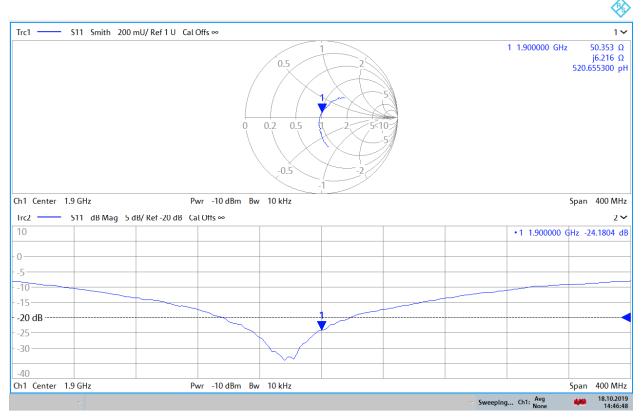
- 1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
- 2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
- 3. The measurement of real or imaginary parts of impedance does not deviate more than  $5\Omega$  from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)		Measured Head SAR (1g) W/kg @ 20.0 dBm	(0/)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	(40-) M(4 ©	Deviation 10g (%)		Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
10/23/2018	10/18/2019	1.193	3.98	4.16	4.52%	2.07	2.13	2.90%	52.5	50.4	2.1	7.9	6.2	1.7	-21.8	-24.2	-10.90%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)		Measured Body SAR (1g) W/kg @ 20.0 dBm	(0/)		(40-) M/4 (2)	Deviation 10g (%)		Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
10/23/2018	10/18/2019	1.193	3.92	4.21	7.40%	2.06	2.16	4.85%	48.1	46.5	1.6	8.1	6.6	1.5	-21.5	-22.2	-3.40%	PASS

Object:	Date Issued:	Page 2 of 4	
D1900V2 - SN: 5d080	10/18/2019	raye 2 01 4	

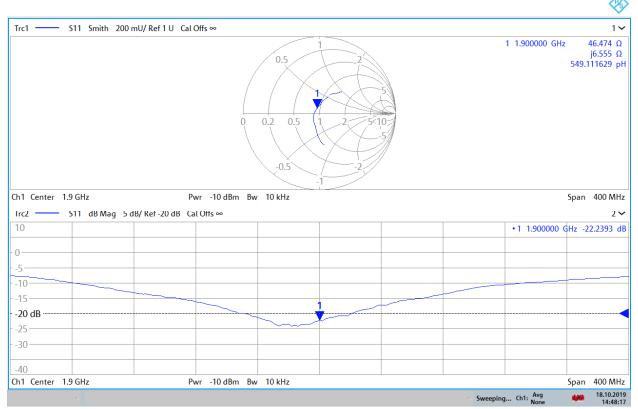
### Impedance & Return-Loss Measurement Plot for Head TSL



14:46:49 18.10.2019

Object:	Date Issued:	Page 3 of 4	
D1900V2 - SN: 5d080	10/18/2019		

## Impedance & Return-Loss Measurement Plot for Body TSL



14:48:18 18.10.2019

Object:	Date Issued:	Page 4 of 4
D1900V2 - SN: 5d080	10/18/2019	Page 4 of 4

## **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA

Multilateral Agreement for the recognition of calibration certificates

Client

**PC Test** 

Certificate No: D1900V2-5d148 Feb19

# **CALIBRATION CERTIFICATE**

Object

D1900V2 - SN:5d148

Calibration procedure(s)

QA CAL-05.v11

Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

1300

Calibration date:

February 21, 2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22  $\pm$  3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	31-Dec-18 (No. EX3-7349_Dec18)	Dec-19
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	07-Oct-15 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19
	Name	Function	Signature
Calibrated by:	Manu Seltz	Laboratory Technician	- Pi
			770
Approved by:	Katja Pokovic	Technical Manager	AUG

Issued: February 21, 2019

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

## **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





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Service suisse d'étalonnage
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Swiss Calibration Service

Accreditation No.: SCS 0108

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### Glossary:

TSL

tissue simulating liquid

ConvF N/A sensitivity in TSL / NORM x,y,z

not applicable or not measured

## Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### **Additional Documentation:**

e) DASY4/5 System Handbook

#### **Methods Applied and Interpretation of Parameters:**

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point.
   No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: D1900V2-5d148\_Feb19

Page 2 of 8

## **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, $dy$ , $dz = 5 mm$	
Frequency	1900 MHz ± 1 MHz	

# **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.9 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

## SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.65 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	39.1 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.4 W/kg ± 16.5 % (k=2)

# **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.6 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

# SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.56 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	39.1 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.05 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.5 W/kg ± 16.5 % (k=2)

# Appendix (Additional assessments outside the scope of SCS 0108)

### Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8 Ω + 6.8 jΩ
Return Loss	- 23.2 dB

# **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	48.4 Ω + 7.8 jΩ
Return Loss	- 21.9 dB

# **General Antenna Parameters and Design**

Electrical Delay (one direction)	
Liectrical Delay (one direction)	1.170 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### **Additional EUT Data**

Manufactured by	SPEAG

### **DASY5 Validation Report for Head TSL**

Date: 21.02,2019

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d148

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz;  $\sigma = 1.38 \text{ S/m}$ ;  $\varepsilon_r = 40.9$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

### **DASY52 Configuration:**

Probe: EX3DV4 - SN7349; ConvF(8.26, 8.26, 8.26) @ 1900 MHz; Calibrated: 31.12.2018

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 04.10.2018

Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

# Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

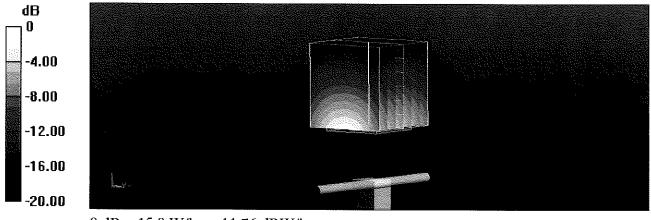
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 109.4 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 17.8 W/kg

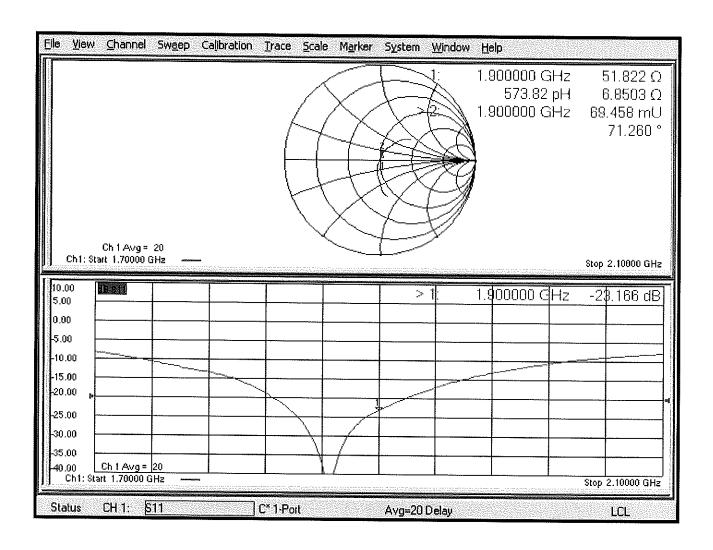
SAR(1 g) = 9.65 W/kg; SAR(10 g) = 5.05 W/kg

Maximum value of SAR (measured) = 15.0 W/kg



0 dB = 15.0 W/kg = 11.76 dBW/kg

# Impedance Measurement Plot for Head TSL



## **DASY5 Validation Report for Body TSL**

Date: 21.02.2019

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d148

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz;  $\sigma = 1.47 \text{ S/m}$ ;  $\varepsilon_r = 53.6$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

## DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.23, 8.23, 8.23) @ 1900 MHz; Calibrated: 31.12.2018

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 04.10,2018

Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

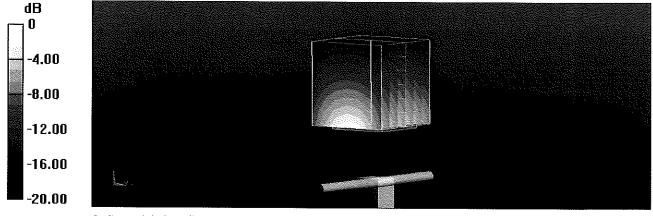
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.7 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 17.0 W/kg

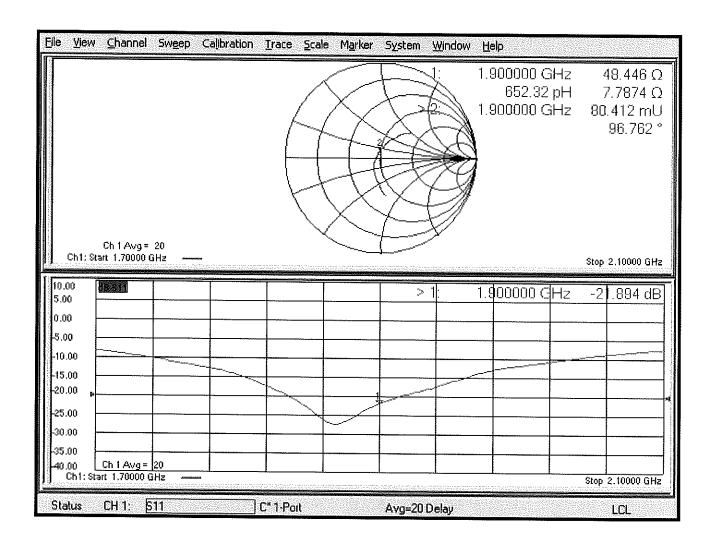
SAR(1 g) = 9.56 W/kg; SAR(10 g) = 5.05 W/kg

Maximum value of SAR (measured) = 14.4 W/kg



0 dB = 14.4 W/kg = 11.58 dBW/kg

# Impedance Measurement Plot for Body TSL



## Calibration Laboratory of

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





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Accreditation No.: SCS 0108

Client

PC Test

Certificate No: D1900V2-5d149\_Oct18

Object	D1900V2-SN:50	1149	
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Calibration procedure(s)	QA CAL-05.v10	dura for dipola validation bits abo	wo 700 MB→
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			$\rho_{ m N}V$
	Total Control of the		BNV 10-30-2018 10-20-20
Calibration date:	October 23, 2018	3	10-30-
			BNY
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	•	ional standards, which realize the physical uni	• •
he measurements and the uncert	tainties with confidence p	robability are given on the following pages an	d are part of the certificate.
All actibrations have been analyst			O I b I-da- 2700/
ui caidiations have been conque	ed in the closed laborato	ry facility: environment temperature (22 ± 3)°C	Jana numidity < 70%.
Colibration Equipment used (MRT)	E critical for calibration)		
Jauniauon Equipinen used (Mai)			
Januarion Equipment used (Math	E crided for calibrationy		
, ,	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Primary Standards	1	Cal Date (Certificate No.) 04-Apr-18 (No. 217-02672/02673)	Scheduled Calibration Apr-19
Primary Standards Power meter NRP	ID#		
Primary Standards Power meter NRP Power sensor NRP-Z91	ID# SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91	ID # SN: 104778 SN: 103244	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672)	Apr-19 Apr-19
Calibration Equipment used (M&TI Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination	ID # SN: 104778 SN: 103244 SN: 103245	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673)	Apr-19 Apr-19 Apr-19
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k)	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682)	Apr-19 Apr-19 Apr-19 Apr-19
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18) Check Date (in house)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4  Secondary Standards Power meter EPM-442A	ID #  SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A	ID #  SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704 SN: US37292783	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20 In house check: Oct-20
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A	ID #  SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704 SN: US37292783 SN: MY41092317	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20 In house check: Oct-20 In house check: Oct-20
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards Power meter EPM-442A Power sensor HP 8481A Recomer sensor HP 8481A Recomer sensor HP 8481A Recomer sensor HP 8481A	ID #  SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19  Scheduled Check In house check: Oct-20
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Power sensor HP 8481A Power sensor HP 8481A RF generator R&S SMT-06	ID #  SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19 Scheduled Check In house check: Oct-20 In house check: Oct-20 In house check: Oct-20
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A RF generator R&S SMT-06	ID #  SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19  Scheduled Check In house check: Oct-20
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer Agilent E8358A	ID #  SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18) 31-Mar-14 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19  Scheduled Check In house check: Oct-20 In house check: Oct-19
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A	ID #  SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477  Name	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18) 31-Mar-14 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19  Scheduled Check In house check: Oct-20 In house check: Oct-19
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Recondary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A RF generator R&S SMT-06 Network Analyzer Agilent E8358A	ID #  SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601  ID #  SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477  Name	04-Apr-18 (No. 217-02672/02673) 04-Apr-18 (No. 217-02672) 04-Apr-18 (No. 217-02673) 04-Apr-18 (No. 217-02682) 04-Apr-18 (No. 217-02683) 30-Dec-17 (No. EX3-7349_Dec17) 04-Oct-18 (No. DAE4-601_Oct18)  Check Date (in house) 07-Oct-15 (in house check Oct-18) 07-Oct-15 (in house check Oct-18) 15-Jun-15 (in house check Oct-18) 31-Mar-14 (in house check Oct-18)	Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Apr-19 Dec-18 Oct-19  Scheduled Check In house check: Oct-20 In house check: Oct-19

Certificate No: D1900V2-5d149\_Oct18

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This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

## **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





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Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA

Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL

tissue simulating liquid

ConvF N/A sensitivity in TSL / NORM x,y,z

not applicable or not measured

# Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### **Additional Documentation:**

e) DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

### **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2	
Extrapolation	Advanced Extrapolation		
Phantom	Modular Flat Phantom		
Distance Dipole Center - TSL	10 mm	with Spacer	
Zoom Scan Resolution	dx, $dy$ , $dz = 5 mm$		
Frequency	1900 MHz ± 1 MHz		

# **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	40.3 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		MALE

## SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.80 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	39.3 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.5 W/kg ± 16.5 % (k=2)

## **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.9 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

# **SAR** result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.68 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	39.4 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.7 W/kg ± 16.5 % (k=2)

## Appendix (Additional assessments outside the scope of SCS 0108)

#### **Antenna Parameters with Head TSL**

Impedance, transformed to feed point	52.9 Ω + 6.3 jΩ
Return Loss	- 23.4 dB

## **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	48.5 Ω + 8.2 jΩ
Return Loss	- 21.5 dB

### **General Antenna Parameters and Design**

Electrical Dela	y (one direction)	1.193 ns	

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### **Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	March 11, 2011

Certificate No: D1900V2-5d149\_Oct18

## **DASY5 Validation Report for Head TSL**

Date: 23.10.2018

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d149

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz;  $\sigma = 1.4 \text{ S/m}$ ;  $\varepsilon_r = 40.3$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.18, 8.18, 8.18) @ 1900 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 04.10.2018

Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001

DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

## Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

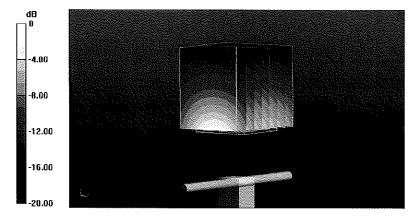
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 110.0 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 18.5 W/kg

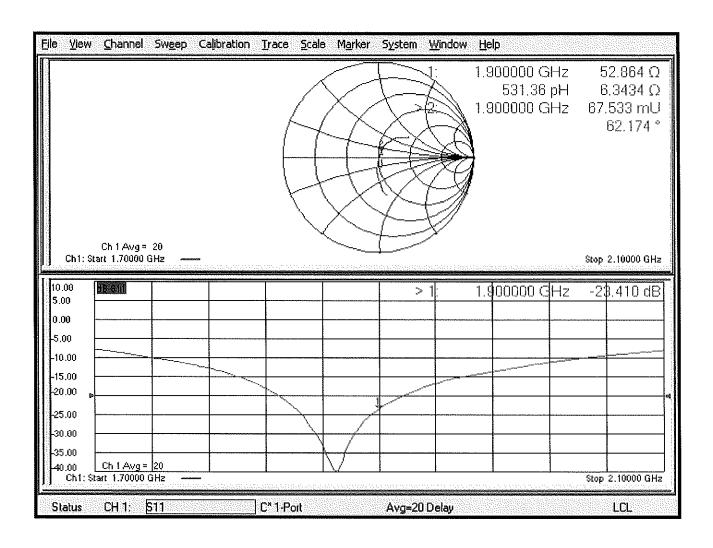
SAR(1 g) = 9.8 W/kg; SAR(10 g) = 5.11 W/kg

Maximum value of SAR (measured) = 15.4 W/kg



0 dB = 15.4 W/kg = 11.88 dBW/kg

# Impedance Measurement Plot for Head TSL



### **DASY5 Validation Report for Body TSL**

Date: 23,10,2018

Test Laboratory: SPEAG, Zurich, Switzerland

# DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d149

Communication System: UID 0 - CW; Frequency: 1900 MHz

Medium parameters used: f = 1900 MHz;  $\sigma = 1.47 \text{ S/m}$ ;  $\varepsilon_r = 52.9$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.15, 8.15, 8.15) @ 1900 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 04.10.2018

• Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002

• DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

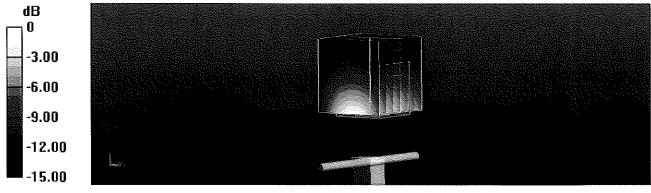
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 103.1 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 17.5 W/kg

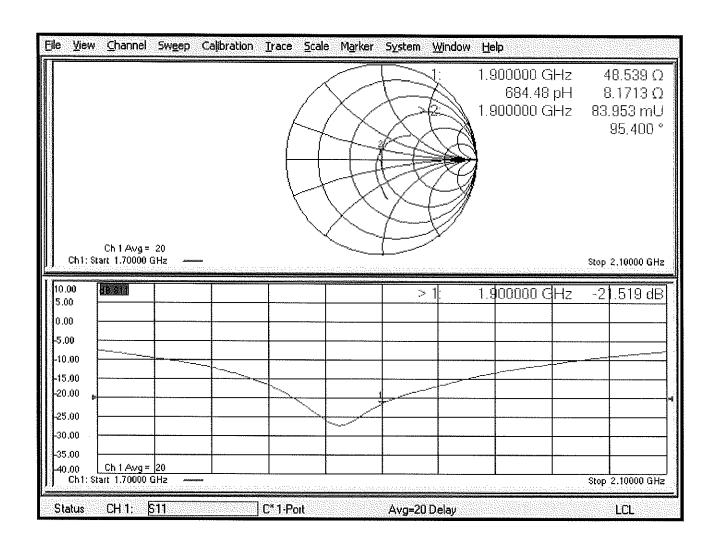
SAR(1 g) = 9.68 W/kg; SAR(10 g) = 5.11 W/kg

Maximum value of SAR (measured) = 14.2 W/kg



0 dB = 14.2 W/kg = 11.52 dBW/kg

# Impedance Measurement Plot for Body TSL



# PCTEST ENGINEERING LABORATORY, INC.



7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. +1.410.290.6652 / Fax +1.410.290.6654 http://www.pctest.com



# **Certification of Calibration**

Object D1900V2 – SN:5d149

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extended Calibration date: October 18, 2019

Description: SAR Validation Dipole at 1900 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	6/29/2019	Biennial	6/29/2021	192291470
Control Company	4352	Ultra Long Stem Thermometer	8/2/2018	Biennial	8/2/2020	181334684
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Rohde & Schwarz	ZNLE6	Vector Network Analyzer	10/11/2019	Annual	10/11/2020	101307
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/13/2019	Annual	8/13/2020	1041
Anritsu	MA2411B	Pulse Power Sensor	8/14/2019	Annual	8/14/2020	1315051
Anritsu	MA2411B	Pulse Power Sensor	8/8/2019	Annual	8/8/2020	1339008
Anritsu	ML2495A	Power Meter	11/20/2018	Annual	11/20/2019	1039008
Agilent	N5182A	MXG Vector Signal Generator	8/19/2019	Annual	8/19/2020	MY47420837
Seekonk	NC-100	Torque Wrench	5/9/2018	Biennial	5/9/2020	22217
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
MiniCircuits	ZHDC-16-63-S+	Bidirectional Coupler	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	3914
SPEAG	EX3DV4	SAR Probe	5/16/2019	Annual	5/16/2020	7406
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/8/2019	Annual	5/8/2020	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/14/2019	Annual	2/14/2020	1272

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

## Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Team Lead Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	304

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D1900V2 - SN: 5d149	10/18/2019	Page 1 of 4

## **DIPOLE CALIBRATION EXTENSION**

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

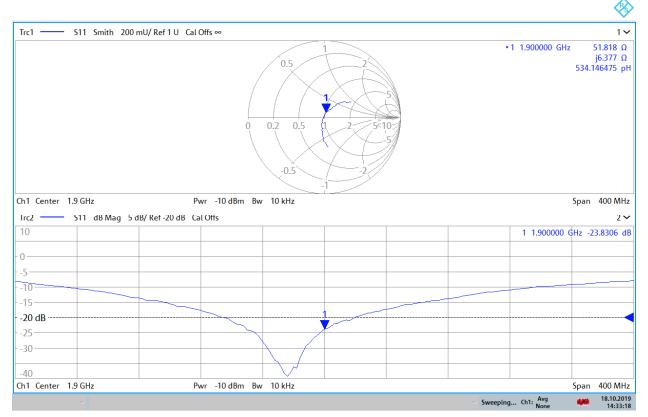
- 1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
- 2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
- 3. The measurement of real or imaginary parts of impedance does not deviate more than  $5\Omega$  from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Head SAR (1g)		Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	(10a) W/ka @	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
10/23/2018	10/18/2019	1.193	3.93	4.24	7.89%	2.05	2.18	6.34%	52.9	51.8	1.1	6.3	6.4	0.1	-23.4	-23.8	-1.80%	Pass
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	(40-) M(4 ©	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
10/23/2018	10/18/2019	1.193	3.94	4.2	6.60%	2.07	2.15	3.86%	48.5	48.4	0.1	8.2	7.6	0.6	-21.5	-22.1	-2.60%	PASS

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D1900V2 - SN: 5d149	10/18/2019	Fage 2 01 4

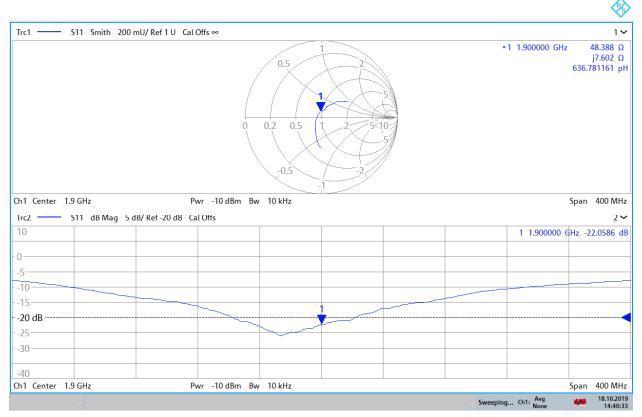
## Impedance & Return-Loss Measurement Plot for Head TSL



14:33:19 18.10.2019

Object:	Date Issued:	Page 3 of 4
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## Impedance & Return-Loss Measurement Plot for Body TSL



14:40:34 18.10.2019

Object:	Date Issued:	Page 4 of 4
D1900V2 - SN: 5d149	10/18/2019	Page 4 of 4

# Calibration Laboratory of

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
Service suisse d'étalonnage
Servizio svizzero di taratura
S Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client

**PC Test** 

Certificate No: D2450V2-719\_Aug19

# **CALIBRATION CERTIFICATE**

Object D2450V2 - SN:719

Calibration procedure(s) QA CAL-05.v11

Calibration Procedure for SAR Validation Sources between 0.7-3 GHz

Calibration date:

August 14, 2019

98/20/20

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

ID#	Cal Date (Certificate No.)	Scheduled Calibration
SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
SN: 5047,2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
SN: 7349	29-May-19 (No. EX3-7349_May19)	May-20
SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20
ID#	Check Date (in house)	Scheduled Check
SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19
Name	Function	Signature 1
Claudio Leubler	Laboratory Technician	
Katja Pokovic	Technical Manager	
	SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047,2 / 06327 SN: 7349 SN: 601  ID # SN: GB39512475 SN: US37292783 SN: MY41092317 SN: 100972 SN: US41080477  Name Claudio Leubler	SN: 104778

Issued: August 15, 2019

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Certificate No: D2450V2-719\_Aug19

Page 1 of 8

## **Calibration Laboratory of**

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Zeughausstrasse 43, 8004 Zurich, Switzerland





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Schweizerischer Kalibrierdienst Service suisse d'étalonnage Servizio svizzero di taratura Swiss Calibration Service

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### Glossary:

TSL

tissue simulating liquid

ConvF

sensitivity in TSL / NORM x,y,z

N/A not applicable or not measured

## Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

### **Additional Documentation:**

Certificate No: D2450V2-719\_Aug19

e) DASY4/5 System Handbook

### Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point.
   No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

## **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, $dy$ , $dz = 5 mm$	
Frequency	2450 MHz ± 1 MHz	

# **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.83 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

## SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	53.1 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.25 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.7 W/kg ± 16.5 % (k=2)

### **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.8 ± 6 %	2.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

# SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	50.8 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.09 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.0 W/kg ± 16.5 % (k=2)

Certificate No: D2450V2-719\_Aug19 Page 3 of 8

## Appendix (Additional assessments outside the scope of SCS 0108)

### **Antenna Parameters with Head TSL**

Impedance, transformed to feed point	54.6 Ω + 5.6 jΩ
Return Loss	- 23.2 dB

### **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	51.0 Ω + 8.4 jΩ
Return Loss	- 21.6 dB

### **General Antenna Parameters and Design**

Electrical Delay (one direction)	1.150 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### **Additional EUT Data**

Manufactured by	SPEAG

### **DASY5 Validation Report for Head TSL**

Date: 14.08,2019

Test Laboratory: SPEAG, Zurich, Switzerland

### DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:719

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz;  $\sigma = 1.83 \text{ S/m}$ ;  $\varepsilon_r = 37.8$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(7.9, 7.9, 7.9) @ 2450 MHz; Calibrated: 29.05.2019

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 30.04.2019

• Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001

DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

## Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

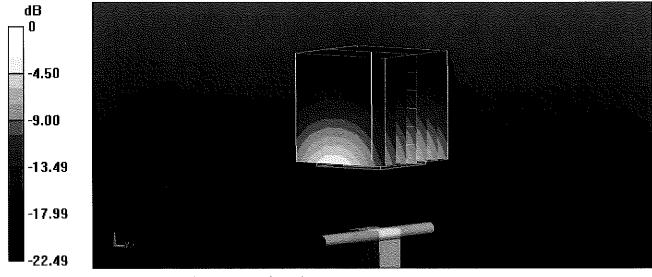
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 117.1 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 26.6 W/kg

SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.25 W/kg

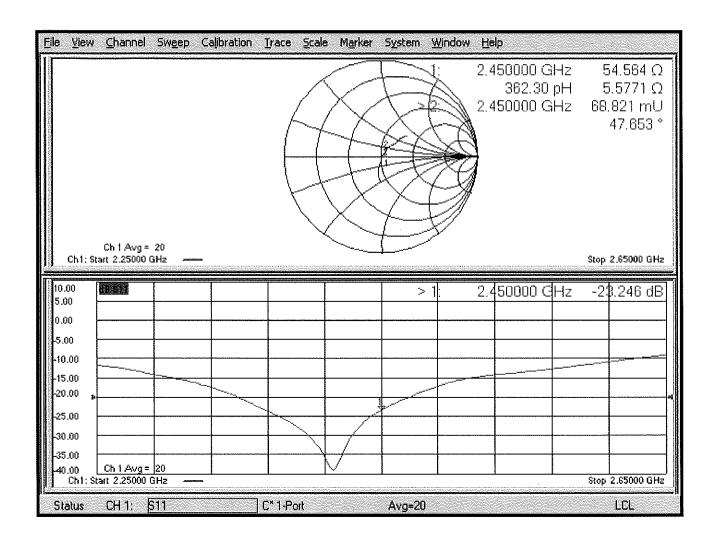
Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dBW/kg

Certificate No: D2450V2-719\_Aug19 Page 5 of 8

# Impedance Measurement Plot for Head TSL



## **DASY5 Validation Report for Body TSL**

Date: 14.08.2019

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:719** 

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz;  $\sigma = 2.01 \text{ S/m}$ ;  $\varepsilon_r = 50.8$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(7.94, 7.94, 7.94) @ 2450 MHz; Calibrated: 29.05.2019

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 30.04.2019

Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002

DASY52 52.10.2(1504); SEMCAD X 14.6.12(7470)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

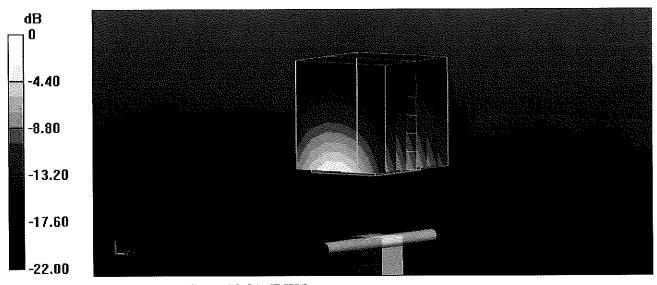
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 105.2 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 25.6 W/kg

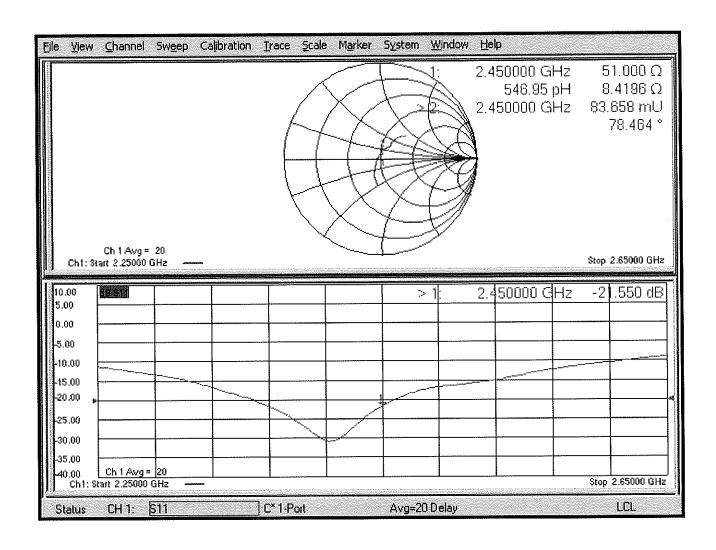
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.09 W/kg

Maximum value of SAR (measured) = 20.0 W/kg



0 dB = 20.0 W/kg = 13.01 dBW/kg

# Impedance Measurement Plot for Body TSL



### Calibration Laboratory of Schmid & Partner Engineering AG

Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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Accreditation No.: SCS 0108

Client

**PC Test** 

Certificate No: D2450V2-797\_Sep17

	CERTIFICATI		•
Object	D2450V2 - SN:7	97	
Callbration procedure(s)	QA CAL-05.v9 Calibration proce	edure for dipole validation kits abo	(o)o)
Callbration date:	September 11, 2	017	Extended PMV 9/20/2
The measurements and the unce	rtainties with confidence p	ional standards, which realize the physical un probability are given on the following pages ar	ilts of measurements (SI). BNV ad are part of the certificate.
All camprations have been conduc	cted in the closed laborato	ry facility: environment temperature (22 $\pm$ 3)°(	C and humidity < 70%.
Calibration Equipment used (M&	TE critical for calibration)		
	FE critical for calibration)	Cal Date (Certificate No.)	Scheduled Calibration
Primary Standards Power meler NRP		Cal Date (Certificate No.) 04-Apr-17 (No. 217-02521/02522)	Scheduled Calibration Apr-18
Primary Standards Power meler NRP	1D #		Apr-18
Primary Standards Power meler NRP Power sensor NRP-Z91	ID # SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator	ID # SN: 104778 SN: 103244	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521)	Apr-18 Apr-18 . î. Apr-18
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination	ID # SN: 104778 SN: 103244 SN: 103245	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522)	Apr-18 Apr-18 a
Primary Standards Power meler NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k)	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528)	Apr-18 Apr-18 : Apr-16 Apr-18
Primary Standards Power meler NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02529)	Apr-18 Apr-18 : Apr-16 Apr-18 Apr-18
Primary Standards Power meier NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02529) 07-Apr-17 (No. 217-02529) 31-May-17 (No. EX3-7349_May17) 28-Mar-17 (No. DAE4-601_Mar17)	Apr-18 Apr-18 Apr-16 Apr-16 Apr-18 Apr-18 Apr-18 May-18 May-18
Primary Standards Power meler NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02528) 07-Apr-17 (No. 217-02529) 07-Apr-17 (No. EX3-7349_May17) 28-Mar-17 (No. DAE4-601_Mar17)	Apr-18 Apr-18 Apr-16 Apr-16 Apr-18 Apr-18 May-18 May-18 Mar-18
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02529) 07-Apr-17 (No. 217-02529) 31-May-17 (No. EX3-7349_May17) 28-Mar-17 (No. DAE4-601_Mar17) Check Date (in house)	Apr-18 Apr-18 Apr-18 Apr-18 Apr-18 Apr-18 May-18 Mar-18 Scheduled Check In house check: Oct-18
Primary Standards Power meler NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A	ID # SN: 104779 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID # SN: GB37480704	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02529) 07-Apr-17 (No. 217-02529) 31-May-17 (No. EX3-7349_May17) 28-Mar-17 (No. DAE4-601_Mar17)  Check Date (in house) 07-Oct-15 (in house check Oct-16)	Apr-18 Apr-18 Apr-18 Apr-18 Apr-18 Apr-18 May-18 Mar-18 Scheduled Check In house check: Oct-18 In house check: Oct-18
Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID # SN: GB37480704 SN: US37292783	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02529) 07-Apr-17 (No. 217-02529) 31-May-17 (No. EX3-7349_May17) 28-Mar-17 (No. DAE4-601_Mar17)  Check Date (in house) 07-Oct-15 (in house check Oct-16) 07-Oct-15 (in house check Oct-16)	Apr-18 Apr-18 Apr-18 Apr-18 Apr-18 Apr-18 May-18 Mar-18 Scheduled Check In house check: Oct-18 In house check: Oct-18
Primary Standards Power meler NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A RF generator R&S SMT-06	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID # SN: GB37480704 SN: US37292783 SN: MY41092317	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02529) 07-Apr-17 (No. 217-02529) 31-May-17 (No. EX3-7349_May17) 28-Mar-17 (No. DAE4-601_Mar17)  Check Date (in house) 07-Oct-15 (in house check Oct-16)	Apr-18 Apr-18 Apr-18 Apr-18 Apr-18 Apr-18 May-18 Mar-18 Scheduled Check In house check: Oct-18 In house check: Oct-18
Calibration Equipment used (M&T Primary Standards Power meter NRP Power sensor NRP-Z91 Power sensor NRP-Z91 Reference 20 dB Attenuator Type-N mismatch combination Reference Probe EX3DV4 DAE4 Secondary Standards Power meter EPM-442A Power sensor HP 8481A Power sensor HP 8481A RF generator R&S SMT-08 Network Analyzer HP 8753E	ID # SN: 104778 SN: 103244 SN: 103245 SN: 5058 (20k) SN: 5047.2 / 06327 SN: 7349 SN: 601 ID # SN: GB37480704 SN: US37292783 SN: MY41092317 SN: 100972	04-Apr-17 (No. 217-02521/02522) 04-Apr-17 (No. 217-02521) 04-Apr-17 (No. 217-02522) 07-Apr-17 (No. 217-02529) 07-Apr-17 (No. 217-02529) 31-May-17 (No. EX3-7349_May17) 28-Mar-17 (No. DAE4-601_Mar17)  Check Date (in house) 07-Oct-15 (in house check Oct-16) 07-Oct-15 (in house check Oct-16) 15-Jun-15 (in house check Oct-16)	Apr-18 Apr-18 Apr-18 Apr-18 Apr-18 Apr-18 May-18 Mar-18 Scheduled Check In house check: Oct-18

Issued: September 11, 2017

Certificate No: D2450V2-797\_Sep17

Katja Pokovic

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Approved by:

Technical Manager

## Calibration Laboratory of

Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





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### Glossarv:

TSL

tissue simulating liquid

ConvF

sensitivity in TSL / NORM x,v,z

N/A

not applicable or not measured

## Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

e) DASY4/5 System Handbook

#### Methods Applied and Interpretation of Parameters:

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- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result,

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

# **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	-
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, $dy$ , $dz = 5 mm$	
Frequency	2450 MHz ± 1 MHz	

# **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	-	Mhana

# SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.7 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.8 W/kg ± 16.5 % (k=2)

# **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.9 ± 6 %	2.04 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	N.S. o. o.	7

# SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	51.1 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.2 W/kg ± 16.5 % (k=2)

# Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.8 Ω + 7.4 jΩ
Return Loss	- 21.9 dB

### **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	49.7 Ω + 9.1 jΩ
Return Loss	- 20,9 dB

### General Antenna Parameters and Design

	, ·
I Fleatrical Delay (one direction)	1.152 ns
Electrical Delay (one direction)	I 1.152 ns I

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	January 24, 2006

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### **DASY5 Validation Report for Head TSL**

Date: 11.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 797

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz;  $\sigma = 1.86$  S/m;  $\varepsilon_r = 37.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

• Probe: EX3DV4 - SN7349; ConvF(8.12, 8.12, 8.12); Calibrated: 31.05.2017;

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 28.03.2017

Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001

DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

# Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 113.5 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 26.9 W/kg

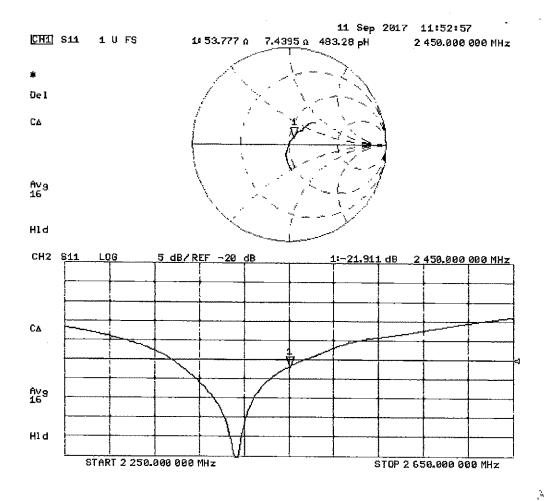
SAR(1 g) = 13.5 W/kg; SAR(10 g) = 6.28 W/kg

Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 21.6 W/kg = 13.34 dBW/kg

# Impedance Measurement Plot for Head TSL



## **DASY5 Validation Report for Body TSL**

Date: 11.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 797

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz;  $\sigma = 2.04$  S/m;  $\epsilon_r = 51.9$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(8.1, 8.1, 8.1); Calibrated: 31.05.2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 28.03.2017

Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002

DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

# Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

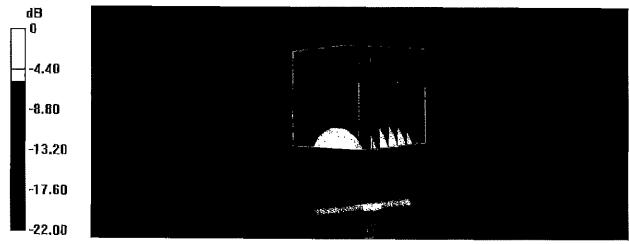
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 105.4 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 25.6 W/kg

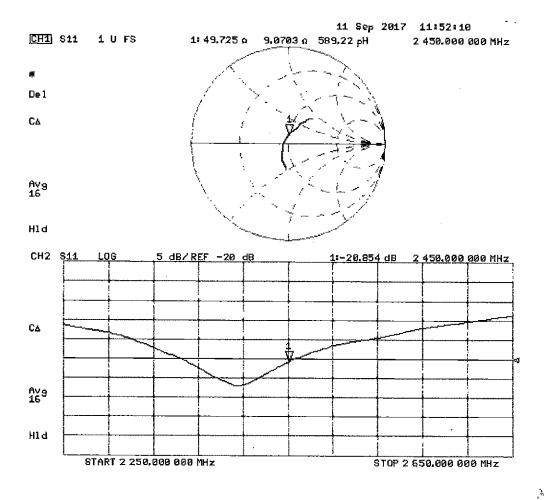
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.14 W/kg

Maximum value of SAR (measured) = 20.3 W/kg



0 dB = 20.3 W/kg = 13.07 dBW/kg

## Impedance Measurement Plot for Body TSL



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7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. +1.410.290.6652 / Fax +1.410.290.6654 http://www.pctest.com



## **Certification of Calibration**

Object

D2450V2 - SN: 797

Calibration procedure(s)

Procedure for Calibration Extension for SAR Dipoles.

**Extended Calibration date:** 

September 11, 2018

Description:

SAR Validation Dipole at 2450 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Blennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	8iennial	5/2/2019	170330156
Amplifier Research	15S1G6	Amplifler	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/30/2018	Annuai	8/30/2019	MY40003841
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT .	N/A	CBT	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7410
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2018	Annual	7/11/2019	1322
SPEAG	ES3DV3	SAR Probe	3/13/2018	Annual	3/13/2019	3319
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/7/2018	Annual	3/7/2019	1368
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1207364
Anritsu	MA2411B	Pulse Power Sensor	3/2/2018	Annual	3/2/2019	1339018
Anritsu	ML2495A	Power Meter	10/22/2017	Annuəl	10/22/2018	1328004
Agllent	N5182A	MXG Vector Signal Generator	4/18/2018	Annual	4/18/2019	MY47420800
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	СВТ	N/A
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

#### Measurement Uncertainty = $\pm 23\%$ (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Team Lead Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	304

Object:	Date Issued:	Page 1 of 4
D2450V2 - SN: 797	09/11/2018	Page 1 of 4

#### **DIPOLE CALIBRATION EXTENSION**

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

- 1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
- 2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
- 3. The measurement of real or imaginary parts of impedance does not deviate more than  $5\Omega$  from the previous measurement.

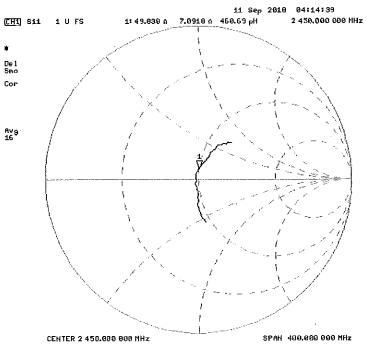
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

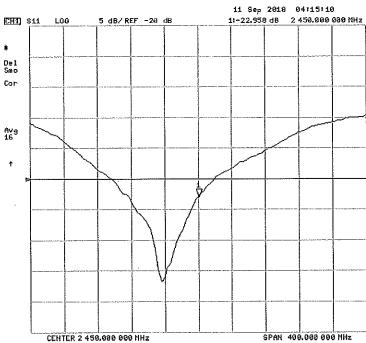
Calibration Date	Extension Date		Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	(%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	(10a) W/ka @	Deviation 10g (%)						Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/11/2017	9/11/2018	1.152	5.27	5.52	4.74%	2.48	2.54	2.42%	53.8	49.8	4	7.4	7.1	0.3	-21.9	-23	-4.80%	PASS

	Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Body SAR (1g)	(%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)		Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
ſ	9/11/2017	9/11/2018	1.152	5.11	5.17	1.17%	2.42	2.37	-2.07%	49.7	49.8	0.1	9.1	7.2	1.9	-20.9	-22.6	-8.20%	PASS
				•															

Object:	Date Issued:	Page 2 of 4
D2450V2 – SN: 797	09/11/2018	Fage 2 01 4

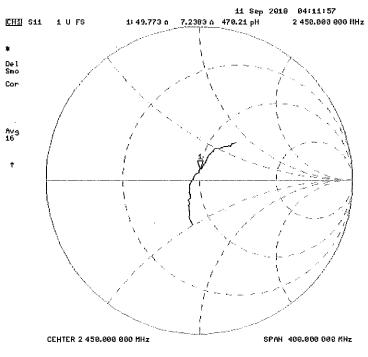
#### Impedance & Return-Loss Measurement Plot for Head TSL

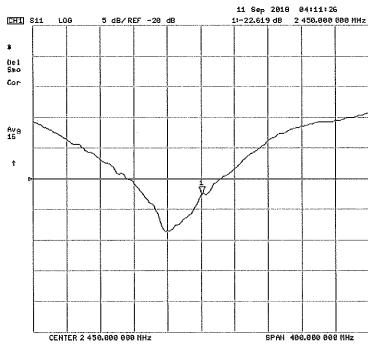




Object:	Date Issued:	Page 3 of 4
D2450V2 SN: 797	09/11/2018	r ago o or r

#### Impedance & Return-Loss Measurement Plot for Body TSL





Object:	Date Issued:	Page 4 of 4
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## **Certification of Calibration**

Object D2450V2 – SN: 797

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extended Calibration date: September 9, 2019

Description: SAR Validation Dipole at 2450 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	N5182A	MXG Vector Signal Generator	6/27/2019	Annual	6/27/2020	US46240505
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	5/23/2018	Biennial	5/23/2020	N/A
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	7417
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/13/2019	Annual	2/13/2020	665
SPEAG	EX3DV4	SAR Probe	7/15/2019	Annual	7/15/2020	7547
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2019	Annual	7/11/2020	1323
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path.

#### Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Team Lead Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	20K-

Object:	Date Issued:	Page 1 of 4
D2450V2 - SN: 797	09/9/2019	Page 1 of 4

#### **DIPOLE CALIBRATION EXTENSION**

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

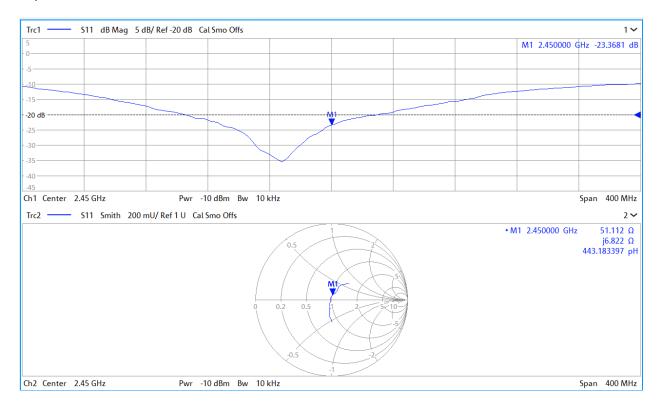
- 1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
- 2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
- 3. The measurement of real or imaginary parts of impedance does not deviate more than  $5\Omega$  from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 3-year calibration period from the calibration date:

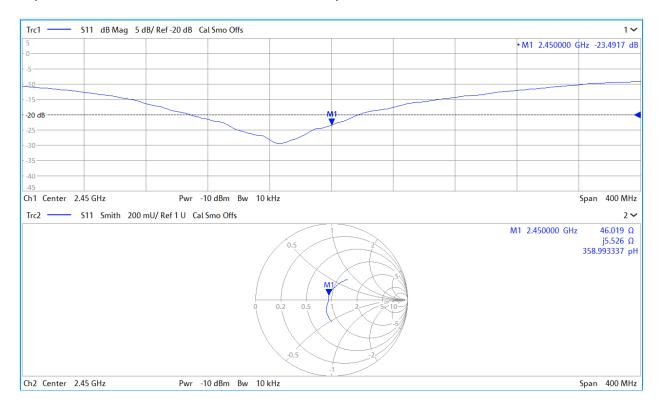
Calibration Date	Extension Date		Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	(0/)		(40-) M(4 G)	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/11/2017	9/9/2019	1.152	5.27	5.19	-1.52%	2.48	2.41	-2.82%	53.8	51.1	2.7	7.4	6.8	0.6	-21.9	-23.4	-6.70%	PASS
Calibration Date	Extension Date		Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	(0/)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	(40-) M(4 (-)	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/11/2017	9/9/2019	1.152	5.11	5.17	1.17%	2.42	2.38	-1.65%	49.7	46	3.7	9.1	5.5	3.6	-20.9	-23.5	-12.40%	PASS

Object:	Date Issued:	Page 2 of 4
D2450V2 – SN: 797	09/9/2019	Fage 2 01 4

#### Impedance & Return-Loss Measurement Plot for Head TSL



#### Impedance & Return-Loss Measurement Plot for Body TSL



#### Calibration Laboratory of

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





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Accreditation No.: SCS 0108

Client

PC Test

Certificate No: D2450V2-981\_Aug18

#### CALIBRATION CERTIFICATE

Object

D2450V2 - SN:981

Calibration procedure(s)

QA CAL-05.v10

Calibration procedure for dipole validation kits above 700 MHz

BN V 09-06/201

Calibration date:

August 16, 2018

BNV 08/10/2016

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature  $(22 \pm 3)$ °C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)		Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe EX3DV4	SN: 7349	04-Apr-18 (No. 217-02683)	Apr-19
DAE4	1	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
UAL-	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18
Secondary Standards	₹D#	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check, Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18
-	,	or marity (in house check Oct-17)	In house check: Oct-18
	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	D 1 42/4
		•	Sel Tile
Approved by:	Katja Pokovic	Technical Manager	
	*		ASE COS

Issued: August 23, 2018

Certificate No: D2450V2-981\_Aug18

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This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

### Calibration Laboratory of

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





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Accreditation No.: SCS 0108

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The Swiss Accreditation Service is one of the signature.

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

**TSL** 

tissue simulating liquid

ConvF

sensitivity in TSL / NORM x,y,z

N/A

not applicable or not measured

## Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### Additional Documentation:

e) DASY4/5 System Handbook

## Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end
  of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

### **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	2450 MHz ± 1 MHz	

#### **Head TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.7 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

### **SAR result with Head TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	52.3 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.20 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.4 W/kg ± 16.5 % (k=2)

### **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.8 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

## SAR result with Body TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	50.9 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.2 W/kg ± 16.5 % (k=2)

### Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.0 Ω + 2.3 jΩ
Return Loss	- 25.6 dB

#### Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.2 Ω + 4.7 jΩ
Return Loss	- 26.6 dB

#### General Antenna Parameters and Design

Electrical Delay (one direction) 1.162 ns	Electrical Delay (one direction)	1.162 ns
---	----------------------------------	----------

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### Additional EUT Data

Manufactured by	SPEAG	
Manufactured on	December 30, 2014	

Certificate No: D2450V2-981\_Aug18

## Appendix (Additional assessments outside the scope of SCS 0108)

## **Measurement Conditions**

DASY system configuration, as far as not given on page 1 and 3.

Phantom	0.4144	
T Halltolli	SAM Head Phantom	For usage with cSAR3DV2-R/L
	<del></del>	1 0 404g0 Will OOA 10D VZ-11/L

## SAR result with SAM Head (Top)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	54.0 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.2 W/kg ± 16.9 % (k=2)

## SAR result with SAM Head (Mouth)

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	54.0 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.3 W/kg ± 16.9 % (k=2)

## SAR result with SAM Head (Neck)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.9 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	51.2 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	24.4 W/kg ± 16.9 % (k=2)

## SAR result with SAM Head (Ear)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	8.74 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	34.7 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	17.5 W/kg ± 16.9 % (k=2)

Certificate No: D2450V2-981\_Aug18

## **DASY5 Validation Report for Head TSL**

Date: 13.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:981

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz;  $\sigma = 1.86$  S/m;  $\epsilon_r = 37.7$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 26.10.2017

Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001

• DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

## Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

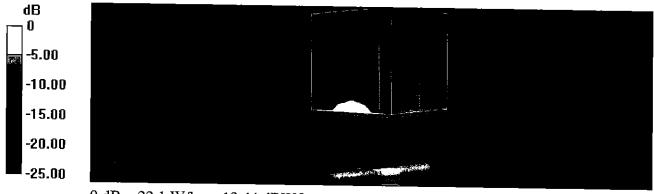
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 116.6 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 26.7 W/kg

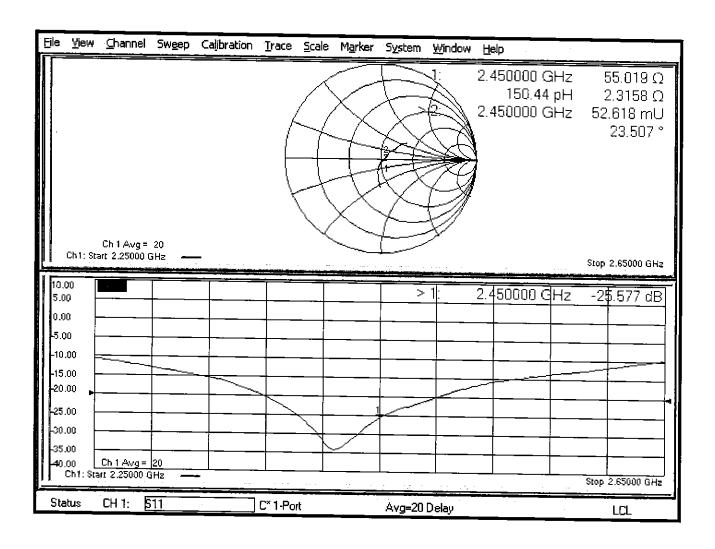
SAR(1 g) = 13.4 W/kg; SAR(10 g) = 6.2 W/kg

Maximum value of SAR (measured) = 22.1 W/kg



0 dB = 22.1 W/kg = 13.44 dBW/kg

## Impedance Measurement Plot for Head TSL



## **DASY5 Validation Report for Body TSL**

Date: 13.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:981

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz;  $\sigma = 2.02$  S/m;  $\epsilon_r = 51.8$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

• Probe: EX3DV4 - SN7349; ConvF(8.01, 8.01, 8.01) @ 2450 MHz; Calibrated: 30.12.2017

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 26.10.2017

Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002

• DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

## Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 107.0 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 25.3 W/kg

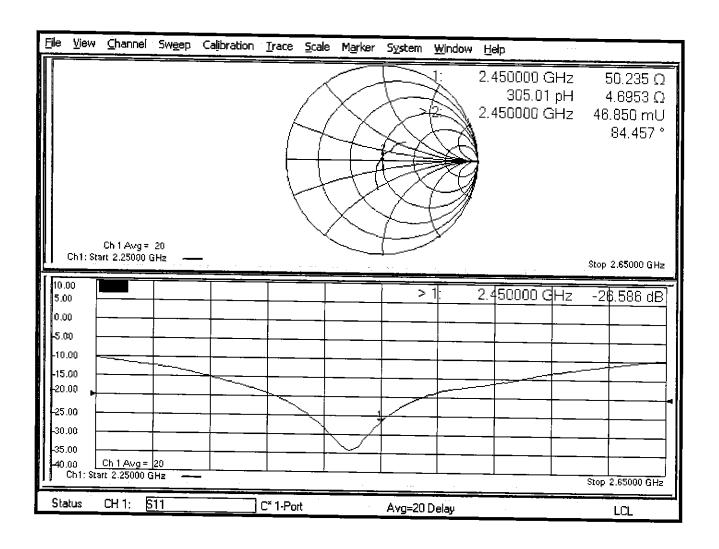
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.11 W/kg

Maximum value of SAR (measured) = 20.7 W/kg



0 dB = 20.7 W/kg = 13.16 dBW/kg

## Impedance Measurement Plot for Body TSL



#### **DASY5 Validation Report for SAM Head**

Date: 16.08.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:981

Communication System: UID 0 - CW; Frequency: 2450 MHz

Medium parameters used: f = 2450 MHz;  $\sigma = 1.85$  S/m;  $\epsilon_r = 40.2$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

- Probe: EX3DV4 SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

## SAM Head Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 116.2 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 26.4 W/kg

SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.33 W/kg

Maximum value of SAR (measured) = 22.0 W/kg

## SAM Head Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 116.9 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 26.3 W/kg

SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.35 W/kg

Maximum value of SAR (measured) = 21.7 W/kg

## SAM Head Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 112.0 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 24.1 W/kg

SAR(1 g) = 12.9 W/kg; SAR(10 g) = 6.11 W/kg

Maximum value of SAR (measured) = 20.5 W/kg

## SAM Head Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

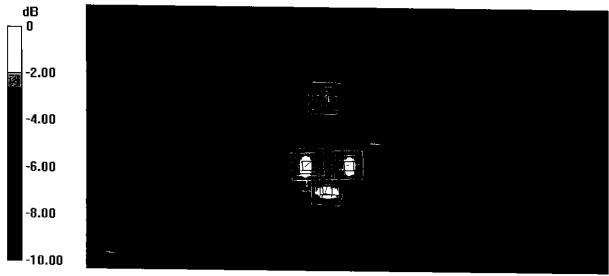
Reference Value = 91.03 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 15.8 W/kg

SAR(1 g) = 8.74 W/kg; SAR(10 g) = 4.4 W/kg

Maximum value of SAR (measured) = 13.5 W/kg

Certificate No: D2450V2-981\_Aug18



0 dB = 22.0 W/kg = 13.42 dBW/kg

#### PCTEST ENGINEERING LABORATORY, INC.



7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. +1.410.290.6652 / Fax +1.410.290.6654 http://www.pctest.com



## **Certification of Calibration**

Object D2450V2 – SN: 981

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Calibration date: 08/09/2019

Description: SAR Validation Dipole at 2450 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	N5182A	MXG Vector Signal Generator	6/27/2019	Annual	6/27/2020	US46240505
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	7/2/2019	Annual	7/2/2020	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	NC-100	Torque Wrench	5/23/2018	Biennial	5/23/2020	N/A
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	7417
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/13/2019	Annual	2/13/2020	665
SPEAG	EX3DV4	SAR Probe	7/15/2019	Annual	7/15/2020	7547
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/11/2019	Annual	7/11/2020	1323
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091

#### Measurement Uncertainty = $\pm 23\%$ (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BRODIE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	304

Object:	Date Issued:	Page 1 of 4
D2450V2 – SN: 981	08/09/2019	Page 1 of 4

### **DIPOLE CALIBRATION EXTENSION**

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

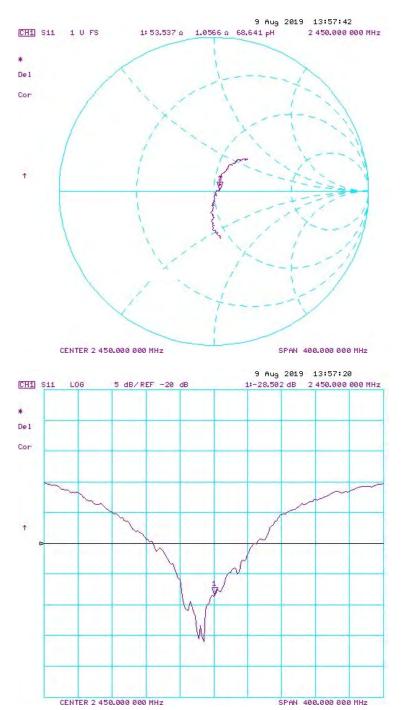
- 1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
- 2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
- 3. The measurement of real or imaginary parts of impedance does not deviate more than  $5\Omega$  from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	(0/)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	(40-) M(4 ©	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
8/16/2018	8/9/2019	1.162	5.23	5.53	5.74%	2.44	2.56	4.92%	55	53.5	1.5	2.3	1.1	1.2	-25.6	-28.5	-11.30%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	(0/)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	(40-) M(4 @	Deviation 10g (%)		Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
8/16/2018	8/9/2019	1.162	5.09	4.98	-2.16%	2.42	2.28	-5.79%	50.2	47.8	2.4	4.7	1.1	3.6	-26.6	-31.8	-19.60%	PASS

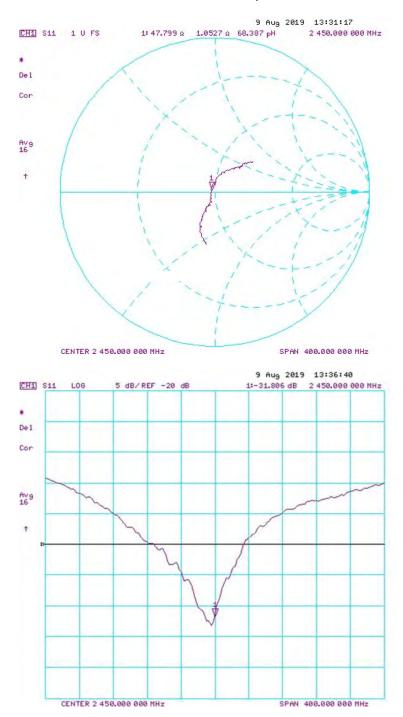
Object:	Date Issued:	Page 2 of 4	
D2450V2 – SN: 981	08/09/2019	Fage 2 01 4	

#### Impedance & Return-Loss Measurement Plot for Head TSL



Object:	Date Issued:	Page 2 of 4
D2450V2 - SN: 981	08/09/2019	Page 3 of 4

#### Impedance & Return-Loss Measurement Plot for Body TSL



Object:	Date Issued:	Dogo 4 of 4	
D2450V2 – SN: 981	08/09/2019	Page 4 of 4	

#### Calibration Laboratory of Schmid & Partner Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst Service suïsse d'étalonnage Servizio svizzero di taratura

Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client

PC Test

Certificate No: D2600V2=1004\_Apr18

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PALIBRATION	gerrie Gar		
pject	D2600V2 - SN:1	004	
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alibration date:	April 11, 2018		
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te measurements and the unce	ertainties with confidence p	probability are given on the following page	at units of measurements (SI).  is and are part of the certificate.
		ry facility: environment temperature (22 ±	
		ry radility: environment temperature (22 ±	:3)°C and humidity < 70%.
alibration Equipment used (M&	TE critical for calibration)		
mary Standards	ID#	Cal Date (Certificate No.)	Scheduled Calibration
wer meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
wer sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
wer sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	•
ference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
pe-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
eference Probe EX3DV4	SN: 7349		Apr-19
\E4	SN: 601	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
	1 0.11 001	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18
condary Standards	ID#	Check Date (in house)	Scheduled Check
wer meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
wer sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
wer sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	
twork Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18 In house check: Oct-18
		·	
	Name	Function	Signature
librated by:	Michael Weber	Laboratory Technician	
			A. PUST
proved by:	Katja Pokovic	Technical Manager	
			LXU4
is calibration certificate shall no	of he reproduced assess in	And Latter 1 (a)	Issued: April 12, 2018

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D2600V2-1004\_Apr18

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#### **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

TSL

tissue simulating liquid

ConvF N/A

sensitivity in TSL / NORM x,y,z

not applicable or not measured

#### Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### **Additional Documentation:**

e) DASY4/5 System Handbook

#### **Methods Applied and Interpretation of Parameters:**

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed
  point exactly below the center marking of the flat phantom section, with the arms oriented
  parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: D2600V2-1004\_Apr18

Page 2 of 8

#### **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	·
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

**Head TSL parameters**The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	2.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.3 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	55.9 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	25.1 W/kg ± 16.5 % (k=2)

### **Body TSL parameters**

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.1 ± 6 %	2.19 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

### **SAR result with Body TSL**

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.8 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	54.8 W/kg ± 17.0 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.20 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	24.7 W/kg ± 16.5 % (k=2)

Certificate No: D2600V2-1004\_Apr18 Page 3 of 8

#### Appendix (Additional assessments outside the scope of SCS 0108)

#### **Antenna Parameters with Head TSL**

Impedance, transformed to feed point	47.7 Ω - 5.7 jΩ			
Return Loss	- 24.1 dB			

#### **Antenna Parameters with Body TSL**

Impedance, transformed to feed point	46.0 Ω - 3.8 jΩ
Return Loss	- 24.9 dB

#### **General Antenna Parameters and Design**

Electrical Delay (one direction)	ļ	1.149 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

Manufactured by	SPEAG
Manufactured on	December 23, 2006

#### **DASY5 Validation Report for Head TSL**

Date: 11.04.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1004

Communication System: UID 0 - CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz;  $\sigma = 2.03 \text{ S/m}$ ;  $\varepsilon_r = 37.8$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

• Probe: EX3DV4 - SN7349; ConvF(7.7, 7.7, 7.7); Calibrated: 30.12.2017;

• Sensor-Surface: 1.4mm (Mechanical Surface Detection)

• Electronics: DAE4 Sn601; Calibrated: 26.10.2017

• Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001

DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

#### Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

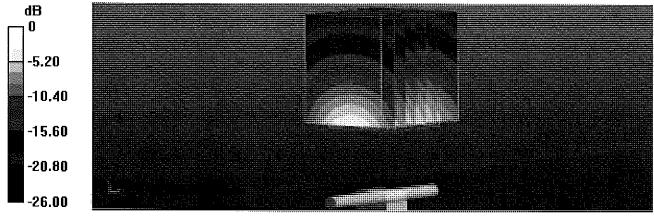
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 118.5 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 28.6 W/kg

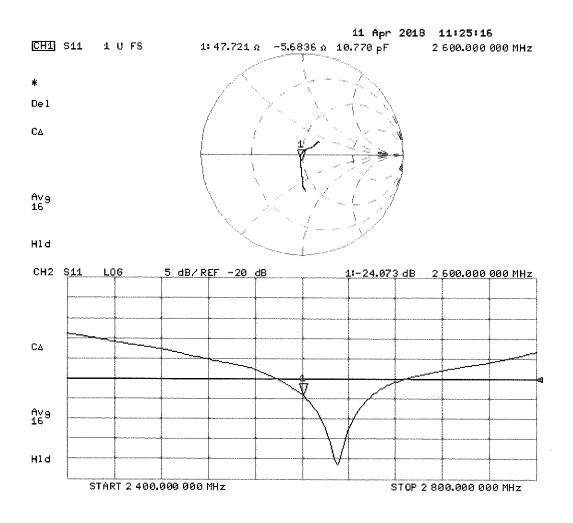
SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.35 W/kg

Maximum value of SAR (measured) = 23.9 W/kg



0 dB = 23.9 W/kg = 13.78 dBW/kg

### Impedance Measurement Plot for Head TSL



#### **DASY5 Validation Report for Body TSL**

Date: 11.04.2018

Test Laboratory: SPEAG, Zurich, Switzerland

#### DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1004

Communication System: UID 0 - CW; Frequency: 2600 MHz

Medium parameters used: f = 2600 MHz;  $\sigma = 2.19 \text{ S/m}$ ;  $\varepsilon_r = 52.1$ ;  $\rho = 1000 \text{ kg/m}^3$ 

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

#### DASY52 Configuration:

• Probe: EX3DV4 - SN7349; ConvF(7.81, 7.81, 7.81); Calibrated: 30.12.2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn601; Calibrated: 26.10.2017

Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002

• DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

#### Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

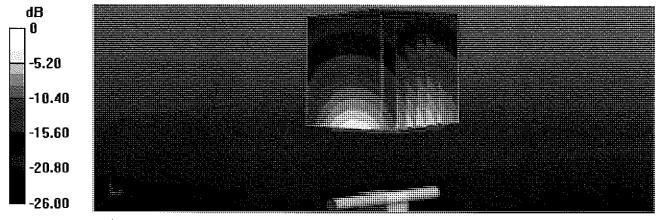
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 108.5 V/m; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 28.3 W/kg

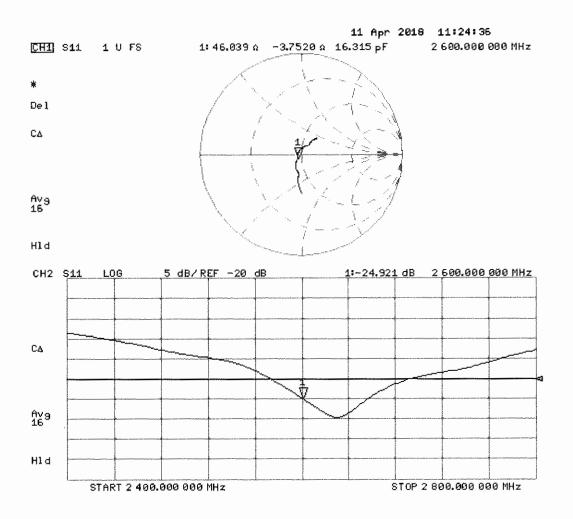
SAR(1 g) = 13.8 W/kg; SAR(10 g) = 6.2 W/kg

Maximum value of SAR (measured) = 22.9 W/kg



0 dB = 22.9 W/kg = 13.60 dBW/kg

## Impedance Measurement Plot for Body TSL



### PCTEST ENGINEERING LABORATORY, INC.



7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. +1.410.290.6652 / Fax +1.410.290.6654 http://www.pctest.com



## **Certification of Calibration**

Object D2600V2 – SN: 1004

Calibration procedure(s) Procedure for Calibration Extension for SAR Dipoles.

Extension Calibration date: 4/11/2019

Description: SAR Validation Dipole at 2600 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	3/11/2019	Annual	3/11/2020	US39170122
Agilent	N5182A	MXG Vector Signal Generator	4/18/2018	Annual	4/18/2019	MY47420800
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1027293
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1126066
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Control Company	4040	Therm./ Clock/ Humidity Monitor	10/9/2018	Biennial	10/9/2020	181647811
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
SPEAG	EX3DV4	SAR Probe	6/25/2018	Annual	6/25/2019	7409
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/18/2018	Annual	6/18/2019	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/13/2019	Annual	2/13/2020	665
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	7417
SPEAG	DAK-3.5	Dielectric Assessment Kit	9/11/2018	Annual	9/11/2019	1091

#### Measurement Uncertainty = $\pm 23\%$ (k=2)

	Name	Function	Signature
Calibrated By:	Brodie Halbfoster	Test Engineer	BROPTE HALBFOSTER
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	304

Object:	Date Issued:	Page 1 of 4
D2600V2 – SN: 1004	04/11/2019	Page 1 of 4

#### **DIPOLE CALIBRATION EXTENSION**

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

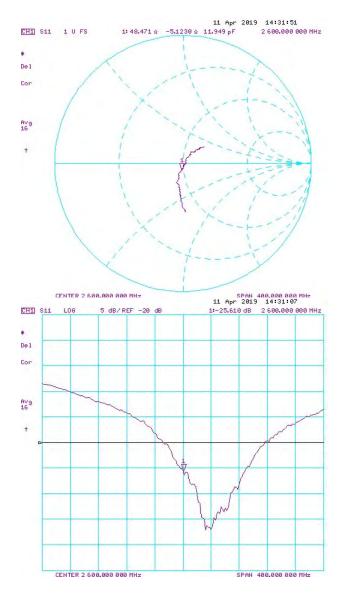
- 1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
- 2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
- 3. The measurement of real or imaginary parts of impedance does not deviate more than  $5\Omega$  from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

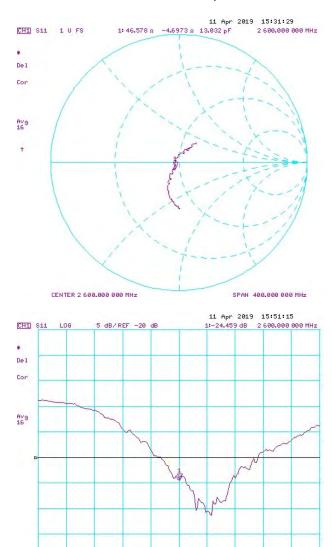
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Head SAR (1g)	(0/)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Head SAR	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
4/11/2018	4/11/2019	1.149	5.59	5.51	-1.43%	2.51	2.47	-1.59%	47.7	48.5	0.8	-5.7	-5.1	0.6	-24.1	-25.6	-6.30%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	(0/)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	(40-) M(4 @	Deviation 10g (%)		Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
4/11/2018	4/11/2019	1.149	5.48	5.65	3.10%	2.47	2.48	0.40%	46	46.6	0.6	-3.8	-4.7	0.9	-24.9	-24.5	1.80%	PASS

Object:	Date Issued:	Page 2 of 4	
D2600V2 – SN: 1004	04/11/2019	Fage 2 01 4	

#### Impedance & Return-Loss Measurement Plot for Head TSL



#### Impedance & Return-Loss Measurement Plot for Body TSL



CENTER 2 600.000 000 MHz

SPAN 400.000 000 MHz

#### Engineering AG Zeughausstrasse 43, 8004 Zurich, Switzerland





S Schweizerischer Kalibrierdienst
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S Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Client

**PC Test** 

Certificate No: D5GHzV2-1191\_Sep19

## **CALIBRATION CERTIFICATE**

Object D5GHzV2 - SN:1191

Calibration procedure(s) QA CAL-22.v4

Calibration Procedure for SAR Validation Sources between 3-6 GHz

09/26/2019

Calibration date:

Primary Standards

September 17, 2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

ID#

· minur j oturiuu. 20	1.5 "	our pare (corrinduto ric.)	Corrodated Calibration
Power meter NRP	SN: 104778	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-19 (No. 217-02894)	Apr-20
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-19 (No. 217-02895)	Apr-20
Reference Probe EX3DV4	SN: 3503	25-Mar-19 (No. EX3-3503_Mar19)	Mar-20
DAE4	SN: 601	30-Apr-19 (No. DAE4-601_Apr19)	Apr-20
Secondary Standards	ID#	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB39512475	30-Oct-14 (in house check Feb-19)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19
	Name	Function	Signature
Calibrated by:	Manu Seltz	Laboratory Technician	
Approved by	Valla Balcada	<del> </del>	
Approved by:	Katja Pokovic	Technical Manager	MUX.
			ran Martin and plant and a second

Cal Date (Certificate No.)

Issued: September 18, 2019

Scheduled Calibration

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

#### **Calibration Laboratory of**

Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland





Schweizerischer Kalibrierdienst

C Service suisse d'étalonnage Servizio svizzero di taratura

Swiss Calibration Service

Accreditation No.: SCS 0108

Accredited by the Swiss Accreditation Service (SAS)

The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

#### Glossary:

TSL

tissue simulating liquid

ConvF

sensitivity in TSL / NORM x,y,z

N/A

not applicable or not measured

#### **Calibration is Performed According to the Following Standards:**

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
- d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

#### **Additional Documentation:**

e) DASY4/5 System Handbook

#### **Methods Applied and Interpretation of Parameters:**

- Measurement Conditions: Further details are available from the Validation Report at the end
  of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- Antenna Parameters with TSL: The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole
  positioned under the liquid filled phantom. The impedance stated is transformed from the
  measurement at the SMA connector to the feed point. The Return Loss ensures low
  reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point.
   No uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1 W at the antenna connector.
- SAR for nominal TSL parameters: The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

## **Measurement Conditions**

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0  mm, dz = 1.4  mm	Graded Ratio = 1.4 (Z direction)
Frequency	5200 MHz ± 1 MHz 5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz 5800 MHz ± 1 MHz	

## Head TSL parameters at 5250 MHz The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.1 ± 6 %	4.53 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.13 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.8 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.0 W/kg ± 19.5 % (k=2)

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#### Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	4.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	W 44 10 M	

#### SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	82.7 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.4 W/kg ± 19.5 % (k=2)

## Head TSL parameters at 5750 MHz The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.4 ± 6 %	5.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C		

#### SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.08 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.2 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	22.7 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

To following parameters and executations were appro-	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	49.0	5.30 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.9 ± 6 %	5.44 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

### SAR result with Body TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.55 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	74.9 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.11 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.9 W/kg ± 19.5 % (k=2)

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.9 ± 6 %	5.51 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

### SAR result with Body TSL at 5250 MHz

Certificate No: D5GHzV2-1191\_Sep19

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.76 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	77.0 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.16 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.4 W/kg ± 19.5 % (k=2)

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Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

no lonowing parameters and care and	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.2 ± 6 %	5.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	44 FF FF	

### SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.93 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	78.6 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.9 W/kg ± 19.5 % (k=2)

**Body TSL parameters at 5750 MHz** 

The following parameters and calculations were applied.

no tonoming parameters and exceedings of	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.0 ± 6 %	6.19 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

#### SAR result with Body TSL at 5750 MHz

Certificate No: D5GHzV2-1191\_Sep19

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.75 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	76.9 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.15 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.3 W/kg ± 19.5 % (k=2)

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# Body TSL parameters at 5800 MHz The following parameters and calculations were applied.

, in the second	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.2	6.00 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	45.9 ± 6 %	6.26 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C		

## SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm <sup>3</sup> (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.66 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	76.0 W/kg ± 19.9 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.12 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.0 W/kg ± 19.5 % (k=2)

Certificate No: D5GHzV2-1191\_Sep19

## Appendix (Additional assessments outside the scope of SCS 0108)

#### Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	53.5 Ω - 6.2 jΩ
Return Loss	- 23.2 dB

## Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	56.4 Ω - 4.3 jΩ
Return Loss	- 22,8 dB

## Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	59.1 Ω + 1.9 jΩ
Return Loss	- 21.4 dB

Certificate No: D5GHzV2-1191\_Sep19 Page 8 of 19

#### Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	50.9 Ω - 8.6 jΩ
Return Loss	- 21.3 dB

#### Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	53.2 Ω - 4.1 jΩ
Return Loss	- 26.0 dB

### Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	58.1 Ω - 4.2 jΩ
Return Loss	- 21.4 dB

#### Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	60.3 Ω + 2.3 jΩ
Return Loss	- 20.4 dB

### Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	57.5 Ω + 2.3 jΩ
Return Loss	- 22.7 dB

#### **General Antenna Parameters and Design**

Flootrical Dalay (one direction)		
Liectifical Delay (offe direction)	Electrical Delay (one direction)	1.202 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

#### **Additional EUT Data**

Manufactured by	SPEAG

Certificate No: D5GHzV2-1191\_Sep19 Page 9 of 19

## Appendix (Additional assessments outside the scope of SCS 0108)

## Measurement Conditions (f=5200 MHz)

DASY system configuration, as far as not given on page 1 and 3.

- 7	, , , , , , , , , , , , , , , , , , ,		
	Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L

#### SAR result with SAM Head (Top)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.4 W/kg ± 20.3 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.34 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.4 W/kg ± 19.9 % (k=2)

## SAR result with SAM Head (Mouth)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	83.8 W/kg ± 20.3 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.6 W/kg ± 19.9 % (k=2)

## SAR result with SAM Head (Neck)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.04 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	80.4 W/kg ± 20.3 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	23.6W/kg ± 19.9 % (k=2)

## SAR result with SAM Head (Ear)

SAR averaged over 1 cm <sup>3</sup> (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	5.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	51.1 W/kg ± 20.3 % (k=2)

SAR averaged over 10 cm <sup>3</sup> (10 g) of Head TSL	condition	
SAR measured	100 mW input power	1.78 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	17.8 W/kg ± 19.9 % (k=2)

Certificate No: D5GHzV2-1191\_Sep19 Page 10 of 19