SAR TEST REPORT

The following samples were submitted and identified on behalf of the client as:

Equipment Under Test	Rugged Handheld Computer
Brand Name	unitech
Model No.	PA720
Company Name	unitech electronics co., ltd.
Company Address	5F, No. 136, Lane 235, Pao-Chiao Rd., Hsin-Tien Dist., New Taipei City, Taiwan
Standards	IEEE/ANSI C95.1-1992, IEEE 1528-2013, KDB248227D01v02r02,KDB865664D01v01r04, KDB865664D02v01r02,KDB941225D01v03r01, KDB941225D05v02r05,KDB941225D06v02r01, KDB447498D01v06,KDB648474D04v01r03,
FCC ID	HLEPA720BTNFL
Date of Receipt	Jun. 16, 2016
Date of Test(s)	Aug. 17, 2016 ~ Aug. 25, 2016
Date of Issue	Sep. 12, 2016

In the configuration tested, the EUT complied with the standards specified above.

Remarks:

This report details the results of the testing carried out on one sample, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS Taiwan Electronic & Communication Laboratory or testing done by SGS Taiwan Electronic & Communication Laboratory in connection with distribution or use of the product described in this report must be approved by SGS Taiwan Electronic & Communication Laboratory in writing.

Signed on behalf of SGS

Engineer	**Supervisor**
Matt Kuo	John Yeh
Matt Kuo	**John Yeh**
Date: Sep. 12, 2016	**Date: Sep. 12, 2016**

Revision History

Report Number	Revision	Description	Issue Date
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Contents

1. General Information 4
1.1 Testing Laboratory 4
1.2 Details of Applicant 4
1.3 Description of EUT 5
1.4 Test Environment 46
1.5 Operation Description 46
1.6 Positioning Procedure 52
1.7 Evaluation Procedures 54
1.8 Probe Calibration Procedures 56
1.9 The SAR Measurement System 59
1.10 System Components 61
1.11 SAR System Verification 63
1.12 Tissue Simulant Fluid for the Frequency Band 65
1.13 Test Standards and Limits 68
2. Summary of Results 70
3. Simultaneous Transmission Analysis 82
3.1 Estimated SAR calculation 83
3.2 SPLSR evaluation and analysis 83
4. Instruments List 98
5. Measurements 100
6. SAR System Performance Verification 144
7. DAE & Probe Calibration Certificate 160
8. Uncertainty Budget 176
9. Phantom Description 178
10. System Validation from Original Equipment Supplier 179

1. General Information

1.1 Testing Laboratory

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1.2 Details of Applicant

Company Name	unitech electronics co., ltd.
Company Address	5F, No. 136, Lane 235, Pao-Chiao Rd., Hsin-Tien Dist., New Taipei City, Taiwan

1.3 Description of EUT

EUT Name	Rugged Handheld Computer		
Brand Name	unitech		
Model No.	PA720		
FCC ID	HLEPA720BTNFL		
Mode of Operation	☒GSM ☒GPRS ☒EDGE ☒WCDMA ☒HSDPA ☒HSUPA ☒DC-HSDPA ☒HSPA+ ☒LTE FDD ☒LTE TDD ☒WLAN802.11 a/b/g/n(20M/40M) ☒Bluetooth		
Duty Cycle	GSM (DTM multi class B)	1/8.3	
	GPRS (support multi class 12 max)	1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)	
	EDGE (support multi class 12 max)	1/2 (1Dn4UP) 1/2.76 (1Dn3UP) 1/4.1 (1Dn2UP) 1/8.3 (1Dn1UP)	
	LTE FDD	1	
	LTE TDD	0.633	
	WCDMA	1	
	WLAN802.11 a/b/g/n(20M/40M)	1	
	Bluetooth	1	
TX Frequency Range (MHz)	GSM850	824	— 849
	GSM1900	1850	— 1910
	WCDMA Band II	1850	— 1910
	WCDMA Band V	824	— 849
	LTE FDD Band II	1850	— 1910
	LTE FDD Band V	824	— 849

TX Frequency Range (MHz)	LTE FDD Band VII	2500	—	2570
	LTE TDD Band XXXVIII	2570	—	2620
	LTE TDD Band XLI	2555	—	2655
	WLAN802.11 b/g/n(20M)	2412	—	2462
	WLAN802.11 n(40M)	2422		2452
	WLAN802.11 a/n(20M) 5.2G	5180	—	5240
	WLAN802.11 n(40M) 5.2G	5190	—	5230
	WLAN802.11 a/n(20M) 5.3G	5260	—	5320
	WLAN802.11 n(40M) 5.3G	5270	—	5310
	WLAN802.11 a/n(20M) 5.6G	5500	—	5720
	WLAN802.11 n(40M) 5.6G	5510	—	5710
	WLAN802.11 a/n(20M) 5.8G	5745	—	5825
	WLAN802.11 n(40M) 5.8G	5710	—	5795
	Bluetooth	2402	—	2480
Channel Number (ARFCN)	GSM850	128	—	251
	GSM1900	512	—	810
	WCDMA Band II	9262	—	9538
	WCDMA Band V	4132	—	4233
	LTE FDD Band II	18607	—	19193
	LTE FDD Band V	20407	—	20643
	LTE TDD Band XXXVIII	37775	—	38225
	LTE TDD Band XLI	40265	—	41215
	WLAN802.11 b/g/n(20M)	1	—	11
	WLAN802.11 n(40M)	3		9
	WLAN802.11 a/n(20M) 5.2G	36	—	48
	WLAN802.11 n(40M) 5.2G	38	—	46

Channel Number (ARFCN)	WLAN802.11 a/n(20M) 5.3G	52	—	64
	WLAN802.11 n(40M) 5.3G	54	—	62
	WLAN802.11 a/n(20M) 5.6G	100	—	144
	WLAN802.11 n(40M) 5.6G	102	—	142
	WLAN802.11 a/n(20M) 5.8G	149	—	165
	WLAN802.11 n(40M) 5.8G	142	—	159
	Bluetooth	0	—	78

Max. SAR (1 g) (Unit: W/Kg)				
Mode	Band	Measured	Reported	Position / Channel
Head	GSM 850	0.221	0.248	☒Left ☐Right ☒Cheek ☐Tilt 190 Channel
	GSM 1900	0.072	0.075	☐Left ☒Right ☒Cheek ☐Tilt 661 Channel
	WCDMA Band II	0.130	0.130	☐Left ☒Right ☒Cheek ☐Tilt 9262 Channel
	WCDMA Band V	0.228	0.256	☒Left ☐Right ☒Cheek ☐Tilt 4183 Channel
	LTE FDD Band II	0.155	0.167	☐Left ☒Right ☒Cheek ☐Tilt 18700 Channel
	LTE FDD Band V	0.202	0.221	☐Left ☒Right ☒Cheek ☐Tilt 20525 Channel
	LTE FDD Band VII	0.147	0.165	☐Left ☒Right ☒Cheek ☐Tilt 20850 Channel
	LTE FDD XXXVIII	0.013	0.016	☐Left ☒Right ☒Cheek ☐Tilt 38000 Channel
	LTE FDD Band XLI	0.00464	0.006	☐Left ☒Right ☒Cheek ☐Tilt 41140 Channel

Max. SAR (1 g) (Unit: W/Kg)				
Mode	Band	Measured	Reported	Position / Channel
Head	WLAN802.11 b	0.277	0.398	☐Left ☒Right ☒Cheek ☐Tilt 11 Channel
	WLAN802.11 n(40M) 5.2G	0.040	0.058	☐Left ☒Right ☒Cheek ☐Tilt 46 Channel
	WLAN802.11 n(40M) 5.3G	0.074	0.105	☐Left ☒Right ☐Cheek ☒Tilt 62 Channel
	WLAN802.11 n(40M) 5.6G	0.092	0.131	☒Left ☐Right ☒Cheek ☐Tilt 118 Channel
	WLAN802.11 n(40M) 5.8G	0.184	0.265	☐Left ☒Right ☒Cheek ☐Tilt 159 Channel

Max. SAR (1 g) (Unit: W/Kg)				
Mode	Band	Measured	Reported	Position / Channel
Body-worn	GSM 850	0.276	0.310	☐Front ☒Back 190 Channel
	GSM 1900	0.429	0.449	☐Front ☒Back 661 Channel
	WLAN802.11 n(40M) 5.2G	0.151	0.220	☐Front ☒Back 46 Channel
	WLAN802.11 n(40M) 5.3G	0.186	0.265	☐Front ☒Back 62 Channel
	WLAN802.11 n(40M) 5.6G	0.142	0.202	☐Front ☒Back 118 Channel
	WLAN802.11 n(40M) 5.8G	0.168	0.242	☐Front ☒Back 159 Channel

Max. SAR (1 g) (Unit: W/Kg)				
Mode	Band	Measured	Reported	Position / Channel
Hotspot mode	GPRS 850 (1Dn4UP)	0.844	1.038	☐Front ☒Back ☐Bottom ☐Right ☐Left 128 Channel
	GPRS 1900 (1Dn4UP)	1.240	1.391	☐Front ☒Back ☐Bottom ☐Right ☐Left 810 Channel
	WCDMA Band II	1.100	1.179	☐Front ☒Back ☐Bottom ☐Right ☐Left 9538 Channel
	WCDMA Band V	0.419	0.471	☐Front ☒Back ☐Bottom ☐Right ☐Left 4183 Channel
	LTE FDD Band II	1.090	1.257	☐Front ☒Back ☐Bottom ☐Right ☐Left 19100 Channel
	LTE FDD Band V	0.315	0.345	☐Front ☒Back ☐Bottom ☐Right ☐Left 20525 Channel
	LTE FDD Band VII	0.537	0.603	☐Front ☒Back ☐Bottom ☐Right ☐Left 20850 Channel
	LTE FDD XXXVIII	0.152	0.181	☐Front ☒Back ☐Bottom ☐Right ☐Left 38000 Channel
	LTE FDD XLI	0.244	0.302	☐Front ☐Back ☒Bottom ☐Right ☐Left 41140 Channel

Max. SAR (10 g) (Unit: W/Kg)				
Mode	Band	Measured	Reported	Position / Channel
product specific 10-g SAR	GPRS 850	3.010	3.619	☐Front ☒Back ☐Top ☐Right 190 Channel
	GPRS 1900	3.120	3.501	☐Front ☒Back ☐Top ☐Right 810 Channel
	WCDMA Band II	2.940	3.150	☐Front ☒Back ☐Top ☐Right 9538 Channel
	WCDMA Band V	1.440	1.619	☐Front ☒Back ☐Top ☐Right 4183 Channel
	LTE FDD Band II	2.740	3.160	☐Front ☒Back ☐Top ☐Right 19100 Channel
	LTE FDD Band V	1.250	1.367	☐Front ☒Back ☐Top ☐Right 20525 Channel
	LTE FDD Band VII	0.948	1.064	☐Front ☒Back ☐Top ☐Right 20850 Channel
	LTE FDD XXXVIII	0.349	0.417	☐Front ☒Back ☐Top ☐Right 38000 Channel
	LTE FDD Band XLI	0.448	0.554	☐Front ☒Back ☐Top ☐Right 41140 Channel
	WLAN802.11b	0.306	0.439	☐Front ☒Back ☐Top ☐Right 11 Channel
	WLAN802.11 n(40M) 5.2G	0.221	0.322	☐Front ☒Back ☐Top ☐Right 46 Channel

Max. SAR (10 g) (Unit: W/Kg)				
Mode	Band	Measured	Reported	Position / Channel
product specific 10-g SAR	WLAN802.11 n(40M) 5.3G	0.306	0.436	☐Front ☒Back ☐Top ☐Right 62 Channel
	WLAN802.11 n(40M) 5.6G	0.268	0.382	☐Front ☒Back ☐Top ☐Right 118 Channel
	WLAN802.11 n(40M) 5.8G	0.241	0.348	☐Front ☒Back ☐Top ☐Right 159 Channel

GSM/GPRS/EDGE conducted power table:

EUT mode	Frequency (MHz)	CH	Max. Rated Avg. Power + Max. Tolerance (dBm)	Burst average power	Source -based time average power
				Avg. (dBm)	Avg. (dBm)
GSM850 (GMSK)	824.2	128	33.5	32.80	23.77
	836.6	190	33.5	33.00	23.97
	848.8	251	33.5	32.90	23.87
The division factor compared to the number of TX time slot					
Division factor				1 TX time slot	
				-9.03	

Burst average power						
Max. Rated Avg. Power + Max. Tolerance (dBm)			33.5	32.5	31	30
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)
GPRS 850	824.2	128	32.80	32.10	30.30	29.10
	836.6	190	33.00	32.30	30.40	29.20
	848.8	251	32.90	32.20	30.20	29.00
Source-based time average power						
GPRS 850	824.2	128	23.77	26.08	26.04	26.09
	836.6	190	23.97	26.28	26.14	26.19
	848.8	251	23.87	26.18	25.94	25.99
The division factor compared to the number of TX time slot						
Division factor			1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot
			-9.03	-6.02	-4.26	-3.01

Burst average power						
Max. Rated Avg. Power + Max. Tolerance (dBm)			27.5	26.5	24.5	23.5
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)
EDGE 850 (MCS5)	824.2	128	26.50	25.30	23.40	22.10
	836.6	190	26.40	25.20	23.30	22.10
	848.8	251	26.40	25.20	23.30	22.10
Source-based time average power						
EDGE 850 (MCS5)	824.2	128	17.47	19.28	19.14	19.09
	836.6	190	17.37	19.18	19.04	19.09
	848.8	251	17.37	19.18	19.04	19.09
The division factor compared to the number of TX time slot						
Division factor			1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot
			-9.03	-6.02	-4.26	-3.01

EUT mode	Frequency (MHz)	CH	Max. Rated Avg. Power + Max. Tolerance (dBm)	Burst average power	Source -based time average power
				Avg. (dBm)	Avg. (dBm)
GSM1900 (GMSK)	1850.2	512	30.5	30.10	21.07
	1800	661	30.5	30.30	21.27
	1909.8	810	30.5	30.10	21.07
The division factor compared to the number of TX time slot					
Division factor				1 TX time slot	
				-9.03	

Burst average power						
Max. Rated Avg. Power + Max. Tolerance (dBm)			30.5	29.5	28	27
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)
GPRS 1900	1850.2	512	30.10	29.30	27.20	26.00
	1880	661	30.30	29.50	27.60	26.40
	1909.8	810	30.10	29.40	27.60	26.50
Source-based time average power						
GPRS 1900	1850.2	512	21.07	23.28	22.94	22.99
	1880	661	21.27	23.48	23.34	23.39
	1909.8	810	21.07	23.38	23.34	23.49
The division factor compared to the number of TX time slot						
Division factor			1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot
			-9.03	-6.02	-4.26	-3.01

Burst average power						
Max. Rated Avg. Power + Max. Tolerance (dBm)			26.5	25.5	23.5	22.5
			1Dn1UP	1Dn2UP	1Dn3UP	1Dn4UP
EUT mode	Frequency (MHz)	CH	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)	Avg. (dBm)
EDGE 1900 (MCS5)	1850.2	512	25.60	24.30	22.40	21.30
	1880	661	25.60	24.30	22.50	21.30
	1909.8	810	25.60	24.30	22.50	21.40
Source-based time average power						
EDGE 1900 (MCS5)	1850.2	512	16.57	18.28	18.14	18.29
	1880	661	16.57	18.28	18.24	18.29
	1909.8	810	16.57	18.28	18.24	18.39
The division factor compared to the number of TX time slot						
Division factor			1 TX time slot	2 TX time slot	3 TX time slot	4 TX time slot
			-9.03	-6.02	-4.26	-3.01

WCDMA Band II / Band V - HSDPA / HSUPA / HSPA+ / DC-HSDPA conducted power table:

Band		WCDMA II		
TX Channel		9262	9400	9538
Frequency (MHz)		1852.4	1880	1907.6
Max. Rated Avg. Power+Max. Tolerance (dBm)		24.00		
3GPP Rel 99	RMC 12.2Kbps	23.99	23.79	23.70
3GPP Rel 5	HSDPA Subtest-1	22.93	22.68	22.61
	HSDPA Subtest-2	22.86	22.57	22.48
	HSDPA Subtest-3	22.41	22.14	22.11
	HSDPA Subtest-4	22.40	22.14	22.12
3GPP Rel 6	HSUPA Subtest-1	22.81	22.53	22.39
	HSUPA Subtest-2	22.39	22.08	21.92
	HSUPA Subtest-3	22.92	22.48	22.52
	HSUPA Subtest-4	22.88	22.55	22.48
	HSUPA Subtest-5	22.92	22.65	22.58
3GPP Rel 7	HSPA+	22.84	22.51	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	22.80	22.54	22.51
	DC-HSDPA Subtest-2	22.79	22.53	22.41
	DC-HSDPA Subtest-3	22.24	22.05	22.02
	DC-HSDPA Subtest-4	22.35	22.07	22.04
Band		WCDMA V		
TX Channel		4132	4183	4233
Frequency (MHz)		826.4	836.6	846.6
Max. Rated Avg. Power+Max. Tolerance (dBm)		24.00		
3GPP Rel 99	RMC 12.2Kbps	23.27	23.49	23.48
3GPP Rel 5	HSDPA Subtest-1	22.17	22.47	22.43
	HSDPA Subtest-2	22.15	22.41	22.40
	HSDPA Subtest-3	21.57	21.93	21.93
	HSDPA Subtest-4	21.57	21.93	21.93
3GPP Rel 6	HSUPA Subtest-1	21.94	22.20	22.19
	HSUPA Subtest-2	21.46	21.69	21.76
	HSUPA Subtest-3	21.83	22.21	22.18
	HSUPA Subtest-4	21.95	22.17	22.23
	HSUPA Subtest-5	22.18	22.44	22.41
3GPP Rel 7	HSPA+	22.01	22.31	22.30
3GPP Rel 8	DC-HSDPA Subtest-1	22.09	22.36	22.32
	DC-HSDPA Subtest-2	22.04	22.34	22.30
	DC-HSDPA Subtest-3	21.49	21.84	21.84
	DC-HSDPA Subtest-4	21.42	21.85	21.83

Subtests for HSDPA

SUB-TEST	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{HS} *(Note1, Note 2)*	CM (dB) *(Note 3)*	MPR (dB) *(Note 3)*
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15	15/15	64	12/15	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Subtests for HSUPA

SUB-TEST	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{HS} *(Note1)*	β_{ec}	β_{ed} *(Note 5) (Note 6)*	β_{ed} *(SF)*	β_{ed} *(Codes)*	CM *(dB) (Note 2)*	MPR *(dB) (Note 2)*	*AG Index (Note 6)*	*E-TFCI*
1	11/15	15/15	64	11/15	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	15/15	64	15/15	30/15	24/15	134/15	4	1	1.0	0.0	21	81

LTE FDD Band II / Band V / Band VII & LTE TDD XXXVIII / XLI conducted power table:

FDD Band 2								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
20	QPSK	1 RB	0	1860	18700	23.18	23.5	0
				1880	18900	22.74	23.5	0
				1900	19100	22.88	23.5	0
			50	1860	18700	22.94	23.5	0
				1880	18900	22.80	23.5	0
				1900	19100	22.85	23.5	0
			99	1860	18700	22.85	23.5	0
				1880	18900	22.78	23.5	0
				1900	19100	22.75	23.5	0
		50 RB	0	1860	18700	22.19	22.5	0-1
				1880	18900	21.86	22.5	0-1
				1900	19100	21.90	22.5	0-1
			25	1860	18700	22.10	22.5	0-1
				1880	18900	21.79	22.5	0-1
				1900	19100	21.91	22.5	0-1
			50	1860	18700	22.06	22.5	0-1
				1880	18900	21.90	22.5	0-1
				1900	19100	21.92	22.5	0-1
		100RB		1860	18700	21.99	22.5	0-1
				1880	18900	21.92	22.5	0-1
				1900	19100	21.79	22.5	0-1
	16-QAM	1 RB	0	1860	18700	22.10	22.5	0-1
				1880	18900	22.37	22.5	0-1
				1900	19100	22.08	22.5	0-1
			50	1860	18700	22.48	22.5	0-1
				1880	18900	21.96	22.5	0-1
				1900	19100	21.89	22.5	0-1
			99	1860	18700	21.88	22.5	0-1
				1880	18900	22.48	22.5	0-1
				1900	19100	22.36	22.5	0-1
		50 RB	0	1860	18700	21.26	21.5	0-2
				1880	18900	20.98	21.5	0-2
				1900	19100	21.08	21.5	0-2
			25	1860	18700	21.10	21.5	0-2
				1880	18900	21.03	21.5	0-2
				1900	19100	21.03	21.5	0-2
			50	1860	18700	21.06	21.5	0-2
				1880	18900	21.07	21.5	0-2
				1900	19100	20.92	21.5	0-2
		100RB		1860	18700	21.10	21.5	0-2
				1880	18900	20.86	21.5	0-2
				1900	19100	21.00	21.5	0-2

FDD Band 2								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
15	QPSK	1 RB	0	1857.5	18675	23.11	23.5	0
				1880	18900	22.82	23.5	0
				1902.5	19125	22.74	23.5	0
			36	1857.5	18675	23.07	23.5	0
				1880	18900	22.82	23.5	0
				1902.5	19125	22.80	23.5	0
			74	1857.5	18675	22.92	23.5	0
				1880	18900	22.78	23.5	0
				1902.5	19125	22.80	23.5	0
		36 RB	0	1857.5	18675	22.20	22.5	0-1
				1880	18900	21.95	22.5	0-1
				1902.5	19125	21.90	22.5	0-1
			18	1857.5	18675	22.15	22.5	0-1
				1880	18900	21.92	22.5	0-1
				1902.5	19125	21.93	22.5	0-1
			37	1857.5	18675	22.11	22.5	0-1
				1880	18900	21.89	22.5	0-1
				1902.5	19125	21.92	22.5	0-1
		75RB		1857.5	18675	22.13	22.5	0-1
				1880	18900	21.85	22.5	0-1
				1902.5	19125	21.87	22.5	0-1
	16-QAM	1 RB	0	1857.5	18675	22.23	22.5	0-1
				1880	18900	22.08	22.5	0-1
				1902.5	19125	22.36	22.5	0-1
			36	1857.5	18675	22.45	22.5	0-1
				1880	18900	22.39	22.5	0-1
				1902.5	19125	21.72	22.5	0-1
			74	1857.5	18675	22.50	22.5	0-1
				1880	18900	22.48	22.5	0-1
				1902.5	19125	22.25	22.5	0-1
		36 RB	0	1857.5	18675	21.21	21.5	0-2
				1880	18900	20.98	21.5	0-2
				1902.5	19125	20.99	21.5	0-2
			18	1857.5	18675	21.21	21.5	0-2
				1880	18900	21.01	21.5	0-2
				1902.5	19125	20.96	21.5	0-2
			37	1857.5	18675	21.14	21.5	0-2
				1880	18900	21.03	21.5	0-2
				1902.5	19125	21.02	21.5	0-2
		75RB		1857.5	18675	21.15	21.5	0-2
				1880	18900	20.93	21.5	0-2
				1902.5	19125	21.01	21.5	0-2

FDD Band 2								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
10	QPSK	1 RB	0	1855	18650	23.04	23.5	0
				1880	18900	22.71	23.5	0
				1905	19150	22.69	23.5	0
			25	1855	18650	22.96	23.5	0
				1880	18900	22.74	23.5	0
				1905	19150	22.70	23.5	0
			49	1855	18650	22.89	23.5	0
				1880	18900	22.73	23.5	0
				1905	19150	22.74	23.5	0
		25 RB	0	1855	18650	22.12	22.5	0-1
				1880	18900	21.86	22.5	0-1
				1905	19150	21.86	22.5	0-1
			12	1855	18650	22.09	22.5	0-1
				1880	18900	21.76	22.5	0-1
				1905	19150	21.90	22.5	0-1
			25	1855	18650	22.07	22.5	0-1
				1880	18900	21.89	22.5	0-1
				1905	19150	21.84	22.5	0-1
		50RB		1855	18650	22.14	22.5	0-1
				1880	18900	21.89	22.5	0-1
				1905	19150	21.91	22.5	0-1
	16-QAM	1 RB	0	1855	18650	22.34	22.5	0-1
				1880	18900	21.79	22.5	0-1
				1905	19150	22.26	22.5	0-1
			25	1855	18650	22.00	22.5	0-1
				1880	18900	22.15	22.5	0-1
				1905	19150	21.96	22.5	0-1
			49	1855	18650	22.03	22.5	0-1
				1880	18900	21.95	22.5	0-1
				1905	19150	22.33	22.5	0-1
		25 RB	0	1855	18650	21.23	21.5	0-2
				1880	18900	20.91	21.5	0-2
				1905	19150	20.96	21.5	0-2
			12	1855	18650	21.12	21.5	0-2
				1880	18900	21.01	21.5	0-2
				1905	19150	20.90	21.5	0-2
			25	1855	18650	21.13	21.5	0-2
				1880	18900	21.03	21.5	0-2
				1905	19150	20.86	21.5	0-2
		50RB		1855	18650	21.15	21.5	0-2
				1880	18900	20.90	21.5	0-2
				1905	19150	20.95	21.5	0-2

FDD Band 2								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
5	QPSK	1 RB	0	1852.5	18625	23.03	23.5	0
				1880	18900	22.72	23.5	0
				1907.5	19175	22.67	23.5	0
			12	1852.5	18625	23.00	23.5	0
				1880	18900	22.71	23.5	0
				1907.5	19175	22.68	23.5	0
			24	1852.5	18625	23.08	23.5	0
				1880	18900	22.77	23.5	0
				1907.5	19175	22.73	23.5	0
		12 RB	0	1852.5	18625	22.17	22.5	0-1
				1880	18900	21.91	22.5	0-1
				1907.5	19175	21.87	22.5	0-1
			6	1852.5	18625	22.20	22.5	0-1
				1880	18900	21.85	22.5	0-1
				1907.5	19175	21.86	22.5	0-1
			13	1852.5	18625	22.12	22.5	0-1
				1880	18900	21.85	22.5	0-1
				1907.5	19175	21.85	22.5	0-1
		25RB		1852.5	18625	22.10	22.5	0-1
				1880	18900	21.73	22.5	0-1
				1907.5	19175	21.84	22.5	0-1
	16-QAM	1 RB	0	1852.5	18625	22.23	22.5	0-1
				1880	18900	22.12	22.5	0-1
				1907.5	19175	22.01	22.5	0-1
			12	1852.5	18625	22.30	22.5	0-1
				1880	18900	22.47	22.5	0-1
				1907.5	19175	22.01	22.5	0-1
			24	1852.5	18625	22.44	22.5	0-1
				1880	18900	21.80	22.5	0-1
				1907.5	19175	21.68	22.5	0-1
		12 RB	0	1852.5	18625	21.30	21.5	0-2
				1880	18900	21.03	21.5	0-2
				1907.5	19175	20.95	21.5	0-2
			6	1852.5	18625	21.34	21.5	0-2
				1880	18900	21.06	21.5	0-2
				1907.5	19175	20.97	21.5	0-2
			13	1852.5	18625	21.25	21.5	0-2
				1880	18900	21.04	21.5	0-2
				1907.5	19175	20.97	21.5	0-2
		25RB		1852.5	18625	21.17	21.5	0-2
				1880	18900	20.97	21.5	0-2
				1907.5	19175	20.83	21.5	0-2

FDD Band 2								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
3	QPSK	1 RB	0	1851.5	18615	22.94	23.5	0
				1880	18900	22.70	23.5	0
				1908.5	19185	22.63	23.5	0
			7	1851.5	18615	23.00	23.5	0
				1880	18900	22.73	23.5	0
				1908.5	19185	22.77	23.5	0
			14	1851.5	18615	23.04	23.5	0
				1880	18900	22.78	23.5	0
				1908.5	19185	22.72	23.5	0
		8 RB	0	1851.5	18615	22.14	22.5	0-1
				1880	18900	21.85	22.5	0-1
				1908.5	19185	21.82	22.5	0-1
			4	1851.5	18615	22.10	22.5	0-1
				1880	18900	21.86	22.5	0-1
				1908.5	19185	21.83	22.5	0-1
			7	1851.5	18615	22.12	22.5	0-1
				1880	18900	21.85	22.5	0-1
				1908.5	19185	21.83	22.5	0-1
		15RB		1851.5	18615	22.15	22.5	0-1
				1880	18900	21.81	22.5	0-1
				1908.5	19185	21.76	22.5	0-1
	16-QAM	1 RB	0	1851.5	18615	22.25	22.5	0-1
				1880	18900	22.01	22.5	0-1
				1908.5	19185	21.87	22.5	0-1
			7	1851.5	18615	21.99	22.5	0-1
				1880	18900	22.44	22.5	0-1
				1908.5	19185	21.69	22.5	0-1
			14	1851.5	18615	22.43	22.5	0-1
				1880	18900	22.34	22.5	0-1
				1908.5	19185	21.89	22.5	0-1
		8 RB	0	1851.5	18615	21.29	21.5	0-2
				1880	18900	21.08	21.5	0-2
				1908.5	19185	20.94	21.5	0-2
			4	1851.5	18615	21.28	21.5	0-2
				1880	18900	21.07	21.5	0-2
				1908.5	19185	21.00	21.5	0-2
			7	1851.5	18615	21.29	21.5	0-2
				1880	18900	20.96	21.5	0-2
				1908.5	19185	20.81	21.5	0-2
		15RB		1851.5	18615	21.11	21.5	0-2
				1880	18900	20.95	21.5	0-2
				1908.5	19185	20.93	21.5	0-2

FDD Band 2								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
1.4	QPSK	1 RB	0	1850.7	18607	23.01	23.5	0
				1880	18900	22.75	23.5	0
				1909.3	19193	22.69	23.5	0
			2	1850.7	18607	23.10	23.5	0
				1880	18900	22.88	23.5	0
				1909.3	19193	22.82	23.5	0
			5	1850.7	18607	22.99	23.5	0
				1880	18900	22.78	23.5	0
				1909.3	19193	22.67	23.5	0
		3 RB	0	1850.7	18607	23.11	23.5	0
				1880	18900	22.82	23.5	0
				1909.3	19193	22.81	23.5	0
			2	1850.7	18607	23.06	23.5	0
				1880	18900	22.78	23.5	0
				1909.3	19193	22.82	23.5	0
			3	1850.7	18607	23.14	23.5	0
				1880	18900	22.87	23.5	0
				1909.3	19193	22.79	23.5	0
		6RB		1850.7	18607	22.13	22.5	0-1
				1880	18900	21.80	22.5	0-1
				1909.3	19193	21.82	22.5	0-1
	16-QAM	1 RB	0	1850.7	18607	22.10	22.5	0-1
				1880	18900	22.36	22.5	0-1
				1909.3	19193	22.26	22.5	0-1
			2	1850.7	18607	22.31	22.5	0-1
				1880	18900	22.23	22.5	0-1
				1909.3	19193	22.31	22.5	0-1
			5	1850.7	18607	22.44	22.5	0-1
				1880	18900	21.81	22.5	0-1
				1909.3	19193	21.77	22.5	0-1
		3 RB	0	1850.7	18607	22.14	22.5	0-1
				1880	18900	21.91	22.5	0-1
				1909.3	19193	21.91	22.5	0-1
			2	1850.7	18607	22.15	22.5	0-1
				1880	18900	21.91	22.5	0-1
				1909.3	19193	21.83	22.5	0-1
			3	1850.7	18607	22.03	22.5	0-1
				1880	18900	21.98	22.5	0-1
				1909.3	19193	21.82	22.5	0-1
		6RB		1850.7	18607	21.21	21.5	0-2
				1880	18900	21.02	21.5	0-2
				1909.3	19193	20.90	21.5	0-2

FDD Band 5								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
10	QPSK	1 RB	0	829	20450	22.98	23.5	0
				836.5	20525	23.11	23.5	0
				844	20600	22.65	23.5	0
			25	829	20450	22.87	23.5	0
				836.5	20525	22.83	23.5	0
				844	20600	22.64	23.5	0
			49	829	20450	22.90	23.5	0
				836.5	20525	22.74	23.5	0
				844	20600	22.83	23.5	0
		25 RB	0	829	20450	22.11	22.5	0-1
				836.5	20525	21.96	22.5	0-1
				844	20600	21.82	22.5	0-1
			12	829	20450	22.06	22.5	0-1
				836.5	20525	21.89	22.5	0-1
				844	20600	21.77	22.5	0-1
			25	829	20450	22.06	22.5	0-1
				836.5	20525	21.88	22.5	0-1
				844	20600	21.83	22.5	0-1
		50RB		829	20450	22.09	22.5	0-1
				836.5	20525	21.95	22.5	0-1
				844	20600	21.86	22.5	0-1
	16-QAM	1 RB	0	829	20450	22.22	22.5	0-1
				836.5	20525	22.32	22.5	0-1
				844	20600	21.75	22.5	0-1
			25	829	20450	22.00	22.5	0-1
				836.5	20525	21.96	22.5	0-1
				844	20600	21.84	22.5	0-1
			49	829	20450	22.27	22.5	0-1
				836.5	20525	22.00	22.5	0-1
				844	20600	22.14	22.5	0-1
		25 RB	0	829	20450	21.14	21.5	0-2
				836.5	20525	21.04	21.5	0-2
				844	20600	20.75	21.5	0-2
			12	829	20450	21.01	21.5	0-2
				836.5	20525	20.94	21.5	0-2
				844	20600	20.75	21.5	0-2
			25	829	20450	21.08	21.5	0-2
				836.5	20525	20.87	21.5	0-2
				844	20600	20.86	21.5	0-2
		50RB		829	20450	21.16	21.5	0-2
				836.5	20525	20.90	21.5	0-2
				844	20600	20.91	21.5	0-2

FDD Band 5								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
5	QPSK	1 RB	0	826.5	20425	23.08	23.5	0
				836.5	20525	22.88	23.5	0
				846.5	20625	22.78	23.5	0
			12	826.5	20425	23.05	23.5	0
				836.5	20525	22.90	23.5	0
				846.5	20625	22.86	23.5	0
			24	826.5	20425	22.96	23.5	0
				836.5	20525	22.76	23.5	0
				846.5	20625	22.77	23.5	0
		12 RB	0	826.5	20425	22.22	22.5	0-1
				836.5	20525	21.97	22.5	0-1
				846.5	20625	21.84	22.5	0-1
			6	826.5	20425	22.21	22.5	0-1
				836.5	20525	21.99	22.5	0-1
				846.5	20625	21.83	22.5	0-1
			13	826.5	20425	22.21	22.5	0-1
				836.5	20525	21.91	22.5	0-1
				846.5	20625	21.93	22.5	0-1
		25RB		826.5	20425	22.11	22.5	0-1
				836.5	20525	21.86	22.5	0-1
				846.5	20625	21.84	22.5	0-1
	16-QAM	1 RB	0	826.5	20425	22.03	22.5	0-1
				836.5	20525	22.45	22.5	0-1
				846.5	20625	22.07	22.5	0-1
			12	826.5	20425	22.50	22.5	0-1
				836.5	20525	22.40	22.5	0-1
				846.5	20625	21.76	22.5	0-1
			24	826.5	20425	22.44	22.5	0-1
				836.5	20525	22.30	22.5	0-1
				846.5	20625	21.74	22.5	0-1
		12 RB	0	826.5	20425	21.21	21.5	0-2
				836.5	20525	21.02	21.5	0-2
				846.5	20625	20.83	21.5	0-2
			6	826.5	20425	21.14	21.5	0-2
				836.5	20525	20.94	21.5	0-2
				846.5	20625	20.96	21.5	0-2
			13	826.5	20425	21.24	21.5	0-2
				836.5	20525	21.01	21.5	0-2
				846.5	20625	20.96	21.5	0-2
		25RB		826.5	20425	21.18	21.5	0-2
				836.5	20525	20.92	21.5	0-2
				846.5	20625	20.86	21.5	0-2

FDD Band 5								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
3	QPSK	1 RB	0	825.5	20415	22.92	23.5	0
				836.5	20525	22.74	23.5	0
				847.5	20635	22.74	23.5	0
			7	825.5	20415	23.05	23.5	0
				836.5	20525	22.75	23.5	0
				847.5	20635	22.80	23.5	0
			14	825.5	20415	23.01	23.5	0
				836.5	20525	22.78	23.5	0
				847.5	20635	22.65	23.5	0
		8 RB	0	825.5	20415	22.20	22.5	0-1
				836.5	20525	21.96	22.5	0-1
				847.5	20635	21.87	22.5	0-1
			4	825.5	20415	22.16	22.5	0-1
				836.5	20525	21.90	22.5	0-1
				847.5	20635	21.84	22.5	0-1
			7	825.5	20415	22.15	22.5	0-1
				836.5	20525	21.91	22.5	0-1
				847.5	20635	21.85	22.5	0-1
		15RB		825.5	20415	22.19	22.5	0-1
				836.5	20525	21.94	22.5	0-1
				847.5	20635	21.87	22.5	0-1
	16-QAM	1 RB	0	825.5	20415	21.96	22.5	0-1
				836.5	20525	22.45	22.5	0-1
				847.5	20635	22.31	22.5	0-1
			7	825.5	20415	22.43	22.5	0-1
				836.5	20525	22.08	22.5	0-1
				847.5	20635	22.08	22.5	0-1
			14	825.5	20415	22.21	22.5	0-1
				836.5	20525	22.06	22.5	0-1
				847.5	20635	22.35	22.5	0-1
		8 RB	0	825.5	20415	21.28	21.5	0-2
				836.5	20525	21.12	21.5	0-2
				847.5	20635	20.97	21.5	0-2
			4	825.5	20415	21.28	21.5	0-2
				836.5	20525	20.96	21.5	0-2
				847.5	20635	20.98	21.5	0-2
			7	825.5	20415	21.25	21.5	0-2
				836.5	20525	20.93	21.5	0-2
				847.5	20635	20.92	21.5	0-2
		15RB		825.5	20415	21.24	21.5	0-2
				836.5	20525	20.93	21.5	0-2
				847.5	20635	20.98	21.5	0-2

FDD Band 5								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
1.4	QPSK	1 RB	0	824.7	20407	23.00	23.5	0
				836.5	20525	22.81	23.5	0
				848.3	20643	22.76	23.5	0
			2	824.7	20407	23.07	23.5	0
				836.5	20525	22.90	23.5	0
				848.3	20643	22.83	23.5	0
			5	824.7	20407	23.05	23.5	0
				836.5	20525	22.77	23.5	0
				848.3	20643	22.74	23.5	0
		3 RB	0	824.7	20407	23.06	23.5	0
				836.5	20525	22.85	23.5	0
				848.3	20643	22.82	23.5	0
			2	824.7	20407	23.01	23.5	0
				836.5	20525	22.77	23.5	0
				848.3	20643	22.81	23.5	0
			3	824.7	20407	23.04	23.5	0
				836.5	20525	22.81	23.5	0
				848.3	20643	22.80	23.5	0
		6RB		824.7	20407	22.19	22.5	0-1
				836.5	20525	21.86	22.5	0-1
				848.3	20643	21.81	22.5	0-1
	16-QAM	1 RB	0	824.7	20407	22.29	22.5	0-1
				836.5	20525	22.07	22.5	0-1
				848.3	20643	22.03	22.5	0-1
			2	824.7	20407	22.10	22.5	0-1
				836.5	20525	22.42	22.5	0-1
				848.3	20643	21.89	22.5	0-1
			5	824.7	20407	22.39	22.5	0-1
				836.5	20525	22.32	22.5	0-1
				848.3	20643	21.97	22.5	0-1
		3 RB	0	824.7	20407	22.21	22.5	0-1
				836.5	20525	21.88	22.5	0-1
				848.3	20643	21.96	22.5	0-1
			2	824.7	20407	22.12	22.5	0-1
				836.5	20525	21.93	22.5	0-1
				848.3	20643	21.73	22.5	0-1
			3	824.7	20407	22.18	22.5	0-1
				836.5	20525	21.85	22.5	0-1
				848.3	20643	21.93	22.5	0-1
		6RB		824.7	20407	21.20	21.5	0-2
				836.5	20525	20.94	21.5	0-2
				848.3	20643	20.96	21.5	0-2

FDD Band 7								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
20	QPSK	1 RB	0	2510	20850	22.30	23	0
				2535	21100	22.18	23	0
				2560	21350	22.33	23	0
			50	2510	20850	22.39	23	0
				2535	21100	22.24	23	0
				2560	21350	22.00	23	0
			99	2510	20850	22.50	23	0
				2535	21100	22.44	23	0
				2560	21350	22.01	23	0
		50 RB	0	2510	20850	21.41	22	0-1
				2535	21100	21.21	22	0-1
				2560	21350	21.14	22	0-1
			25	2510	20850	21.45	22	0-1
				2535	21100	21.36	22	0-1
				2560	21350	21.04	22	0-1
			50	2510	20850	21.42	22	0-1
				2535	21100	21.40	22	0-1
				2560	21350	21.05	22	0-1
		100RB		2510	20850	21.50	22	0-1
				2535	21100	21.34	22	0-1
				2560	21350	21.02	22	0-1
	16-QAM	1 RB	0	2510	20850	21.49	22	0-1
				2535	21100	21.50	22	0-1
				2560	21350	21.43	22	0-1
			50	2510	20850	21.50	22	0-1
				2535	21100	21.21	22	0-1
				2560	21350	20.84	22	0-1
			99	2510	20850	21.48	22	0-1
				2535	21100	21.44	22	0-1
				2560	21350	21.28	22	0-1
		50 RB	0	2510	20850	20.37	21	0-2
				2535	21100	20.26	21	0-2
				2560	21350	20.14	21	0-2
			25	2510	20850	20.44	21	0-2
				2535	21100	20.38	21	0-2
				2560	21350	19.96	21	0-2
			50	2510	20850	20.46	21	0-2
				2535	21100	20.44	21	0-2
				2560	21350	19.88	21	0-2
		100RB		2510	20850	20.50	21	0-2
				2535	21100	20.32	21	0-2
				2560	21350	20.02	21	0-2

FDD Band 7								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
15	QPSK	1 RB	0	2507.5	20825	22.31	23	0
				2535	21100	22.11	23	0
				2562.5	21375	22.08	23	0
			36	2507.5	20825	22.42	23	0
				2535	21100	22.21	23	0
				2562.5	21375	21.09	23	0
			74	2507.5	20825	22.49	23	0
				2535	21100	22.46	23	0
				2562.5	21375	21.08	23	0
		36 RB	0	2507.5	20825	21.36	22	0-1
				2535	21100	21.25	22	0-1
				2562.5	21375	20.99	22	0-1
			18	2507.5	20825	21.49	22	0-1
				2535	21100	21.36	22	0-1
				2562.5	21375	20.89	22	0-1
			37	2507.5	20825	21.40	22	0-1
				2535	21100	21.47	22	0-1
				2562.5	21375	20.93	22	0-1
		75RB		2507.5	20825	21.42	22	0-1
				2535	21100	21.36	22	0-1
				2562.5	21375	20.91	22	0-1
	16-QAM	1 RB	0	2507.5	20825	21.44	22	0-1
				2535	21100	21.44	22	0-1
				2562.5	21375	21.50	22	0-1
			36	2507.5	20825	21.43	22	0-1
				2535	21100	21.42	22	0-1
				2562.5	21375	20.98	22	0-1
			74	2507.5	20825	21.38	22	0-1
				2535	21100	21.36	22	0-1
				2562.5	21375	21.07	22	0-1
		36 RB	0	2507.5	20825	20.35	21	0-2
				2535	21100	20.23	21	0-2
				2562.5	21375	19.96	21	0-2
			18	2507.5	20825	20.49	21	0-2
				2535	21100	20.31	21	0-2
				2562.5	21375	19.91	21	0-2
			37	2507.5	20825	20.41	21	0-2
				2535	21100	20.48	21	0-2
				2562.5	21375	19.89	21	0-2
		75RB		2507.5	20825	20.50	21	0-2
				2535	21100	20.35	21	0-2
				2562.5	21375	19.94	21	0-2

FDD Band 7								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
10	QPSK	1 RB	0	2505	20800	22.12	23	0
				2535	21100	22.24	23	0
				2565	21400	22.14	23	0
			25	2505	20800	22.04	23	0
				2535	21100	22.25	23	0
				2565	21400	22.09	23	0
			49	2505	20800	22.19	23	0
				2535	21100	22.40	23	0
				2565	21400	22.18	23	0
		25 RB	0	2505	20800	21.13	22	0-1
				2535	21100	21.25	22	0-1
				2565	21400	21.13	22	0-1
			12	2505	20800	21.14	22	0-1
				2535	21100	21.29	22	0-1
				2565	21400	21.14	22	0-1
			25	2505	20800	21.17	22	0-1
				2535	21100	21.40	22	0-1
				2565	21400	21.22	22	0-1
		50RB		2505	20800	21.17	22	0-1
				2535	21100	21.34	22	0-1
				2565	21400	21.15	22	0-1
	16-QAM	1 RB	0	2505	20800	21.46	22	0-1
				2535	21100	21.31	22	0-1
				2565	21400	21.50	22	0-1
			25	2505	20800	21.44	22	0-1
				2535	21100	21.28	22	0-1
				2565	21400	21.27	22	0-1
			49	2505	20800	21.72	22	0-1
				2535	21100	21.43	22	0-1
				2565	21400	21.37	22	0-1
		25 RB	0	2505	20800	20.10	21	0-2
				2535	21100	20.26	21	0-2
				2565	21400	20.11	21	0-2
			12	2505	20800	20.06	21	0-2
				2535	21100	20.33	21	0-2
				2565	21400	20.16	21	0-2
			25	2505	20800	20.23	21	0-2
				2535	21100	20.39	21	0-2
				2565	21400	20.24	21	0-2
		50RB		2505	20800	20.21	21	0-2
				2535	21100	20.31	21	0-2
				2565	21400	20.18	21	0-2

FDD Band 7								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
5	QPSK	1 RB	0	2502.5	20775	22.19	23	0
				2535	21100	22.27	23	0
				2567.5	21425	22.13	23	0
			12	2502.5	20775	22.20	23	0
				2535	21100	22.30	23	0
				2567.5	21425	22.23	23	0
			24	2502.5	20775	22.07	23	0
				2535	21100	22.27	23	0
				2567.5	21425	22.14	23	0
		12 RB	0	2502.5	20775	21.17	22	0-1
				2535	21100	21.31	22	0-1
				2567.5	21425	21.22	22	0-1
			6	2502.5	20775	21.21	22	0-1
				2535	21100	21.35	22	0-1
				2567.5	21425	21.25	22	0-1
			13	2502.5	20775	21.21	22	0-1
				2535	21100	21.39	22	0-1
				2567.5	21425	21.25	22	0-1
		25RB		2502.5	20775	21.18	22	0-1
				2535	21100	21.31	22	0-1
				2567.5	21425	21.20	22	0-1
	16-QAM	1 RB	0	2502.5	20775	21.21	22	0-1
				2535	21100	21.48	22	0-1
				2567.5	21425	21.32	22	0-1
			12	2502.5	20775	21.30	22	0-1
				2535	21100	21.43	22	0-1
				2567.5	21425	21.11	22	0-1
			24	2502.5	20775	20.97	22	0-1
				2535	21100	21.43	22	0-1
				2567.5	21425	21.29	22	0-1
		12 RB	0	2502.5	20775	20.21	21	0-2
				2535	21100	20.21	21	0-2
				2567.5	21425	20.19	21	0-2
			6	2502.5	20775	20.15	21	0-2
				2535	21100	20.31	21	0-2
				2567.5	21425	20.29	21	0-2
			13	2502.5	20775	20.18	21	0-2
				2535	21100	20.31	21	0-2
				2567.5	21425	20.27	21	0-2
		25RB		2502.5	20775	20.14	21	0-2
				2535	21100	20.30	21	0-2
				2567.5	21425	20.26	21	0-2

TDD Band 38								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
20	QPSK	1 RB	0	2580	37850	22.59	23.5	0
				2595	38000	22.73	23.5	0
				2610	38150	22.70	23.5	0
			50	2580	37850	22.62	23.5	0
				2595	38000	22.58	23.5	0
				2610	38150	22.58	23.5	0
			99	2580	37850	22.61	23.5	0
				2595	38000	22.55	23.5	0
				2610	38150	22.64	23.5	0
		50 RB	0	2580	37850	21.73	22.5	0-1
				2595	38000	21.76	22.5	0-1
				2610	38150	21.75	22.5	0-1
			25	2580	37850	21.74	22.5	0-1
				2595	38000	21.71	22.5	0-1
				2610	38150	21.72	22.5	0-1
			50	2580	37850	21.74	22.5	0-1
				2595	38000	21.73	22.5	0-1
				2610	38150	21.79	22.5	0-1
		100RB		2580	37850	21.71	22.5	0-1
				2595	38000	21.76	22.5	0-1
				2610	38150	21.79	22.5	0-1
	16-QAM	1 RB	0	2580	37850	21.88	22.5	0-1
				2595	38000	22.00	22.5	0-1
				2610	38150	22.07	22.5	0-1
			50	2580	37850	21.89	22.5	0-1
				2595	38000	21.88	22.5	0-1
				2610	38150	21.89	22.5	0-1
			99	2580	37850	21.89	22.5	0-1
				2595	38000	21.94	22.5	0-1
				2610	38150	22.03	22.5	0-1
		50 RB	0	2580	37850	20.77	21.5	0-2
				2595	38000	20.79	21.5	0-2
				2610	38150	20.83	21.5	0-2
			25	2580	37850	20.78	21.5	0-2
				2595	38000	20.77	21.5	0-2
				2610	38150	20.84	21.5	0-2
			50	2580	37850	20.77	21.5	0-2
				2595	38000	20.80	21.5	0-2
				2610	38150	20.87	21.5	0-2
		100RB		2580	37850	20.74	21.5	0-2
				2595	38000	20.82	21.5	0-2
				2610	38150	20.83	21.5	0-2

TDD Band 38								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
15	QPSK	1 RB	0	2577.5	37825	22.65	23.5	0
				2595	38000	22.72	23.5	0
				2612.5	38175	22.69	23.5	0
			36	2577.5	37825	22.61	23.5	0
				2595	38000	22.69	23.5	0
				2612.5	38175	22.66	23.5	0
			74	2577.5	37825	22.64	23.5	0
				2595	38000	22.68	23.5	0
				2612.5	38175	22.71	23.5	0
		36 RB	0	2577.5	37825	21.67	22.5	0-1
				2595	38000	21.78	22.5	0-1
				2612.5	38175	21.76	22.5	0-1
			18	2577.5	37825	21.70	22.5	0-1
				2595	38000	21.78	22.5	0-1
				2612.5	38175	21.77	22.5	0-1
			37	2577.5	37825	21.74	22.5	0-1
				2595	38000	21.78	22.5	0-1
				2612.5	38175	21.83	22.5	0-1
		75RB		2577.5	37825	21.72	22.5	0-1
				2595	38000	21.83	22.5	0-1
				2612.5	38175	21.82	22.5	0-1
	16-QAM	1 RB	0	2577.5	37825	21.85	22.5	0-1
				2595	38000	21.97	22.5	0-1
				2612.5	38175	21.97	22.5	0-1
			36	2577.5	37825	21.82	22.5	0-1
				2595	38000	21.93	22.5	0-1
				2612.5	38175	21.94	22.5	0-1
			74	2577.5	37825	21.86	22.5	0-1
				2595	38000	21.87	22.5	0-1
				2612.5	38175	22.04	22.5	0-1
		36 RB	0	2577.5	37825	20.65	21.5	0-2
				2595	38000	20.78	21.5	0-2
				2612.5	38175	20.77	21.5	0-2
			18	2577.5	37825	20.68	21.5	0-2
				2595	38000	20.77	21.5	0-2
				2612.5	38175	20.78	21.5	0-2
			37	2577.5	37825	20.73	21.5	0-2
				2595	38000	20.79	21.5	0-2
				2612.5	38175	20.85	21.5	0-2
		75RB		2577.5	37825	20.74	21.5	0-2
				2595	38000	20.84	21.5	0-2
				2612.5	38175	20.87	21.5	0-2

TDD Band 38								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
10	QPSK	1 RB	0	2575	37800	22.46	23.5	0
				2595	38000	22.59	23.5	0
				2615	38200	22.64	23.5	0
			25	2575	37800	22.51	23.5	0
				2595	38000	22.65	23.5	0
				2615	38200	22.68	23.5	0
			49	2575	37800	22.45	23.5	0
				2595	38000	22.55	23.5	0
				2615	38200	22.64	23.5	0
		25 RB	0	2575	37800	21.67	22.5	0-1
				2595	38000	21.80	22.5	0-1
				2615	38200	21.84	22.5	0-1
			12	2575	37800	21.62	22.5	0-1
				2595	38000	21.78	22.5	0-1
				2615	38200	21.87	22.5	0-1
			25	2575	37800	21.57	22.5	0-1
				2595	38000	21.73	22.5	0-1
				2615	38200	21.82	22.5	0-1
		50RB		2575	37800	21.62	22.5	0-1
				2595	38000	21.73	22.5	0-1
				2615	38200	21.89	22.5	0-1
	16-QAM	1 RB	0	2575	37800	21.80	22.5	0-1
				2595	38000	21.99	22.5	0-1
				2615	38200	22.02	22.5	0-1
			25	2575	37800	21.74	22.5	0-1
				2595	38000	21.94	22.5	0-1
				2615	38200	22.06	22.5	0-1
			49	2575	37800	21.76	22.5	0-1
				2595	38000	21.87	22.5	0-1
				2615	38200	22.03	22.5	0-1
		25 RB	0	2575	37800	20.70	21.5	0-2
				2595	38000	20.85	21.5	0-2
				2615	38200	20.91	21.5	0-2
			12	2575	37800	20.65	21.5	0-2
				2595	38000	20.83	21.5	0-2
				2615	38200	20.95	21.5	0-2
			25	2575	37800	20.61	21.5	0-2
				2595	38000	20.80	21.5	0-2
				2615	38200	20.91	21.5	0-2
		50RB		2575	37800	20.66	21.5	0-2
				2595	38000	20.82	21.5	0-2
				2615	38200	20.98	21.5	0-2

TDD Band 38								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
5	QPSK	1 RB	0	2572.5	37775	22.44	23.5	0
				2595	38000	22.58	23.5	0
				2617.5	38225	22.66	23.5	0
			12	2572.5	37775	22.49	23.5	0
				2595	38000	22.59	23.5	0
				2617.5	38225	22.70	23.5	0
			24	2572.5	37775	22.39	23.5	0
				2595	38000	22.52	23.5	0
				2617.5	38225	22.59	23.5	0
		12 RB	0	2572.5	37775	21.62	22.5	0-1
				2595	38000	21.78	22.5	0-1
				2617.5	38225	21.87	22.5	0-1
			6	2572.5	37775	21.55	22.5	0-1
				2595	38000	21.71	22.5	0-1
				2617.5	38225	21.81	22.5	0-1
			13	2572.5	37775	21.64	22.5	0-1
				2595	38000	21.78	22.5	0-1
				2617.5	38225	21.88	22.5	0-1
		25RB		2572.5	37775	21.60	22.5	0-1
				2595	38000	21.73	22.5	0-1
				2617.5	38225	21.84	22.5	0-1
	16-QAM	1 RB	0	2572.5	37775	21.69	22.5	0-1
				2595	38000	21.86	22.5	0-1
				2617.5	38225	21.94	22.5	0-1
			12	2572.5	37775	21.72	22.5	0-1
				2595	38000	21.89	22.5	0-1
				2617.5	38225	21.99	22.5	0-1
			24	2572.5	37775	21.64	22.5	0-1
				2595	38000	21.81	22.5	0-1
				2617.5	38225	21.90	22.5	0-1
		12 RB	0	2572.5	37775	20.65	21.5	0-2
				2595	38000	20.82	21.5	0-2
				2617.5	38225	20.92	21.5	0-2
			6	2572.5	37775	20.60	21.5	0-2
				2595	38000	20.76	21.5	0-2
				2617.5	38225	20.88	21.5	0-2
			13	2572.5	37775	20.70	21.5	0-2
				2595	38000	20.86	21.5	0-2
				2617.5	38225	20.98	21.5	0-2
		25RB		2572.5	37775	20.65	21.5	0-2
				2595	38000	20.80	21.5	0-2
				2617.5	38225	20.92	21.5	0-2

TDD Band 41								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
20	QPSK	1 RB	0	2565	40340	21.99	23	0
				2605	40740	21.62	23	0
				2645	41140	22.08	23	0
			50	2565	40340	21.95	23	0
				2605	40740	21.53	23	0
				2645	41140	21.84	23	0
			99	2565	40340	21.81	23	0
				2605	40740	21.67	23	0
				2645	41140	21.75	23	0
		50 RB	0	2565	40340	21.11	22	0-1
				2605	40740	20.64	22	0-1
				2645	41140	21.26	22	0-1
			25	2565	40340	21.07	22	0-1
				2605	40740	20.66	22	0-1
				2645	41140	21.00	22	0-1
			50	2565	40340	21.01	22	0-1
				2605	40740	20.71	22	0-1
				2645	41140	20.92	22	0-1
		100RB		2565	40340	21.04	22	0-1
				2605	40740	20.65	22	0-1
				2645	41140	20.98	22	0-1
	16-QAM	1 RB	0	2565	40340	21.25	22	0-1
				2605	40740	20.93	22	0-1
				2645	41140	21.48	22	0-1
			50	2565	40340	21.19	22	0-1
				2605	40740	20.85	22	0-1
				2645	41140	21.32	22	0-1
			99	2565	40340	21.07	22	0-1
				2605	40740	20.94	22	0-1
				2645	41140	21.20	22	0-1
		50 RB	0	2565	40340	20.11	21	0-2
				2605	40740	19.70	21	0-2
				2645	41140	20.31	21	0-2
			25	2565	40340	20.09	21	0-2
				2605	40740	19.70	21	0-2
				2645	41140	20.21	21	0-2
			50	2565	40340	20.02	21	0-2
				2605	40740	19.73	21	0-2
				2645	41140	20.12	21	0-2
		100RB		2565	40340	20.05	21	0-2
				2605	40740	19.69	21	0-2
				2645	41140	20.06	21	0-2

TDD Band 41								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
15	QPSK	1 RB	0	2562.5	40315	21.85	23	0
				2605	40740	21.66	23	0
				2647.5	41165	22.02	23	0
			36	2562.5	40315	21.84	23	0
				2605	40740	21.65	23	0
				2647.5	41165	22.05	23	0
			74	2562.5	40315	21.82	23	0
				2605	40740	21.70	23	0
				2647.5	41165	21.98	23	0
		36 RB	0	2562.5	40315	20.91	22	0-1
				2605	40740	20.67	22	0-1
				2647.5	41165	21.21	22	0-1
			18	2562.5	40315	20.93	22	0-1
				2605	40740	20.67	22	0-1
				2647.5	41165	21.15	22	0-1
			37	2562.5	40315	20.92	22	0-1
				2605	40740	20.73	22	0-1
				2647.5	41165	21.07	22	0-1
		75RB		2562.5	40315	20.88	22	0-1
				2605	40740	20.68	22	0-1
				2647.5	41165	21.14	22	0-1
	16-QAM	1 RB	0	2562.5	40315	21.01	22	0-1
				2605	40740	20.86	22	0-1
				2647.5	41165	21.44	22	0-1
			36	2562.5	40315	21.01	22	0-1
				2605	40740	20.83	22	0-1
				2647.5	41165	21.31	22	0-1
			74	2562.5	40315	20.98	22	0-1
				2605	40740	20.92	22	0-1
				2647.5	41165	21.22	22	0-1
		36 RB	0	2562.5	40315	19.88	21	0-2
				2605	40740	19.69	21	0-2
				2647.5	41165	20.22	21	0-2
			18	2562.5	40315	19.87	21	0-2
				2605	40740	19.64	21	0-2
				2647.5	41165	20.12	21	0-2
			37	2562.5	40315	19.83	21	0-2
				2605	40740	19.67	21	0-2
				2647.5	41165	20.04	21	0-2
		75RB		2562.5	40315	19.88	21	0-2
				2605	40740	19.70	21	0-2
				2647.5	41165	20.18	21	0-2

TDD Band 41								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
10	QPSK	1 RB	0	2560	40290	21.90	23	0
				2605	40740	21.53	23	0
				2650	41190	21.81	23	0
			25	2560	40290	21.92	23	0
				2605	40740	21.52	23	0
				2650	41190	21.70	23	0
			49	2560	40290	21.86	23	0
				2605	40740	21.48	23	0
				2650	41190	21.69	23	0
		25 RB	0	2560	40290	21.03	22	0-1
				2605	40740	20.66	22	0-1
				2650	41190	20.91	22	0-1
			12	2560	40290	20.99	22	0-1
				2605	40740	20.63	22	0-1
				2650	41190	20.84	22	0-1
			25	2560	40290	21.00	22	0-1
				2605	40740	20.63	22	0-1
				2650	41190	20.84	22	0-1
		50RB		2560	40290	21.01	22	0-1
				2605	40740	20.63	22	0-1
				2650	41190	20.89	22	0-1
	16-QAM	1 RB	0	2560	40290	21.13	22	0-1
				2605	40740	20.89	22	0-1
				2650	41190	21.13	22	0-1
			25	2560	40290	21.16	22	0-1
				2605	40740	20.84	22	0-1
				2650	41190	21.04	22	0-1
			49	2560	40290	21.11	22	0-1
				2605	40740	20.80	22	0-1
				2650	41190	20.98	22	0-1
		25 RB	0	2560	40290	20.05	21	0-2
				2605	40740	19.72	21	0-2
				2650	41190	19.94	21	0-2
			12	2560	40290	20.02	21	0-2
				2605	40740	19.65	21	0-2
				2650	41190	19.89	21	0-2
			25	2560	40290	20.03	21	0-2
				2605	40740	19.67	21	0-2
				2650	41190	19.91	21	0-2
		50RB		2560	40290	20.03	21	0-2
				2605	40740	19.67	21	0-2
				2650	41190	19.92	21	0-2

TDD Band 41								
BW(Mhz)	Modulation	RB Size	RB Offset	Frequency (MHz)	Channel	Conducted power (dBm)	Target Power + Max. Tolerance (dBm)	MPR Allowed per 3GPP(dB)
5	QPSK	1 RB	0	2557.5	40265	21.93	23	0
				2605	40740	21.54	23	0
				2652.5	41215	21.95	23	0
			12	2557.5	40265	21.97	23	0
				2605	40740	21.58	23	0
				2652.5	41215	22.02	23	0
			24	2557.5	40265	21.82	23	0
				2605	40740	21.46	23	0
				2652.5	41215	21.92	23	0
		12 RB	0	2557.5	40265	21.04	22	0-1
				2605	40740	20.67	22	0-1
				2652.5	41215	21.19	22	0-1
			6	2557.5	40265	21.01	22	0-1
				2605	40740	20.62	22	0-1
				2652.5	41215	21.16	22	0-1
			13	2557.5	40265	21.00	22	0-1
				2605	40740	20.65	22	0-1
				2652.5	41215	21.19	22	0-1
		25RB		2557.5	40265	21.21	22	0-1
				2605	40740	20.62	22	0-1
				2652.5	41215	21.15	22	0-1
	16-QAM	1 RB	0	2557.5	40265	20.97	22	0-1
				2605	40740	20.83	22	0-1
				2652.5	41215	21.04	22	0-1
			12	2557.5	40265	21.19	22	0-1
				2605	40740	20.90	22	0-1
				2652.5	41215	21.37	22	0-1
			24	2557.5	40265	20.10	22	0-1
				2605	40740	20.75	22	0-1
				2652.5	41215	21.26	22	0-1
		12 RB	0	2557.5	40265	20.05	21	0-2
				2605	40740	19.70	21	0-2
				2652.5	41215	20.24	21	0-2
			6	2557.5	40265	20.20	21	0-2
				2605	40740	19.68	21	0-2
				2652.5	41215	20.23	21	0-2
			13	2557.5	40265	20.15	21	0-2
				2605	40740	19.69	21	0-2
				2652.5	41215	20.25	21	0-2
		25RB		2557.5	40265	20.03	21	0-2
				2605	40740	19.65	21	0-2
				2652.5	41215	20.19	21	0-2

WLAN802.11 a/b/g/n(20M/40M) conducted power table:

802.11 b		Max. Rated Avg. Power + Max. Tolerance (dBm)	Average conducted output power (dBm)
CH	Frequency (MHz)		Data Rate (Mbps)
			1
1	2412	17.5	15.72
6	2437	17.5	15.67
11	2462	17.5	15.93

802.11 g		Max. Rated Avg. Power + Max. Tolerance (dBm)	Average conducted output power (dBm)
CH	Frequency (MHz)		Data Rate (Mbps)
			6
1	2412	14.50	12.87
6	2437	14.50	12.79
11	2462	14.50	12.72

802.11 n(20M)		Max. Rated Avg. Power + Max. Tolerance (dBm)	Average conducted output power (dBm)
CH	Frequency (MHz)		Data Rate (Mbps)
			6.5
1	2412	14.5	12.74
6	2437	14.5	12.63
11	2462	14.5	12.66

802.11 n(40M)		Max. Rated Avg. Power + Max. Tolerance (dBm)	Average conducted output power (dBm)
CH	Frequency (MHz)		Data Rate (Mbps)
			6.5
3	2422	14.50	12.81
6	2437	14.50	12.63
9	2452	14.50	12.84

802.11 a		Max. Rated Avg. Power + Max. Tolerance (dBm)	Average conducted output power(dBm)
5.2/5.3/5.6/5.8G			Data Rate (Mbps)
CH	Frequency (MHz)		6
36	5180	14.50	12.97
44	5220	14.50	12.97
48	5240	14.50	12.98
52	5260	14.50	12.83
60	5300	14.50	12.93
64	5320	14.50	12.97
100	5500	14.50	12.98
120	5600	14.50	12.95
140	5700	14.50	12.97
149	5745	14.50	12.99
157	5785	14.50	12.94
161	5805	14.50	12.88

802.11 n(20M)		Max. Rated Avg. Power + Max. Tolerance (dBm)	Average conducted output power(dBm)
5.2/5.3/5.6/5.8G			Data Rate (Mbps)
CH	Frequency (MHz)		6.5
36	5180	14.50	12.93
44	5220	14.50	12.97
48	5240	14.50	12.94
52	5260	14.50	12.91
60	5300	14.50	12.93
64	5320	14.50	12.90
100	5500	14.50	12.94
120	5600	14.50	12.96
140	5700	14.50	12.99
149	5745	14.50	12.97
157	5785	14.50	12.86
161	5805	14.50	12.89

802.11 n(40M)		Max. Rated Avg. Power + Max. Tolerance (dBm)	Average conducted output power(dBm)
5.2/5.3/5.6/5.8G			Data Rate (Mbps)
CH	Frequency (MHz)		13.5
38	5190	14.50	12.86
46	5230	14.50	12.87
54	5270	14.50	12.92
62	5310	14.50	12.96
102	5510	14.50	12.83
118	5590	14.50	12.96
134	5670	14.50	12.89
151	5755	14.50	12.84
159	5795	14.50	12.91

Bluetooth conducted power table:

Frequency (MHz)	Data Rate	Max. tune-up power	Average	
			dBm	mW
2402	1	1.5	1.17	1.309
2441	1	1.5	0.62	1.153
2480	1	1.5	1.45	1.396
2402	2	1.5	-1.08	0.780
2441	2	1.5	-1.58	0.695
2480	2	1.5	-0.93	0.807
2402	3	1.5	-0.93	0.807
2441	3	1.5	-1.51	0.706
2480	3	1.5	-0.69	0.853

Frequency (MHz)	BT4.0 Average	
	dBm	mW
2402	-3.15	0.484
2442	-3.52	0.445
2480	-2.81	0.524

1.4 Test Environment

Ambient Temperature: 22±2° C
Tissue Simulating Liquid: 22±2° C

1.5 Operation Description

1. The EUT is controlled by using a Radio Communication Tester (Anritsu MT8820C / R&S CMW500), and the communication between the EUT and the tester is established by air link.

2. Measurements are performed respectively on the lowest, middle and highest channels of the operating band(s). The EUT is set to maximum power level during all tests, and at the beginning of each test the battery is fully charged.

3. During the SAR testing, the DASY 5 system checks power drift by comparing the e-field strength of one specific location measured at the beginning with that measured at the end of the SAR testing.

4. SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power. The data mode with highest specified time-averaged output power should be tested for SAR compliance. The GMSK EDGE configurations are grouped with GPRS and considered with respect to time-averaged maximum output power to determine compliance. The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode. Since the maximum output power in a secondary mode (8-PSK EDGE) is ≤ ¼ dB higher than the primary mode (GMSK GPRS/EDGE), SAR measurement is not required for the secondary mode (8-PSK EDGE).

5. The 3G SAR test reduction procedure is applied to HSDPA with 12.2 kbps RMC as the primary mode. Since the maximum output power in a secondary mode (HSDPA) is ≤ ¼ dB higher than the primary mode (WCDMA), SAR measurement is not required for the secondary mode (HSDPA).

6. The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) with 12.2 kbps RMC as the primary mode. Since the maximum output power in a secondary mode (HSPA) is ≤ ¼ dB higher than the primary mode (WCDMA), SAR measurement is not required for the secondary mode (HSPA).

7. The 3G SAR test reduction procedure is applied to (uplink) HSPA+ with 12.2 kbps RMC as the primary mode. Power is measured for HSPA+ that supports uplink 16 QAM according to configurations in Table C.11.1.4 of 3GPP TS

34.121-1 to determine SAR test reduction. Since the maximum output power in a secondary mode (HSPA+) is ≤ ¼ dB higher than the primary mode (WCDMA), SAR measurement is not required for the secondary mode (HSPA+).

Table C.11.1.4**: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM**

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

8. SAR test exclusion for DC-HSDPA. The 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable. Since the maximum output power in a secondary mode (DC-HSDPA) is ≤ ¼ dB higher than the primary mode (WCDMA), SAR measurement is not required for the secondary mode (DC-HSDPA).

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK

Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.

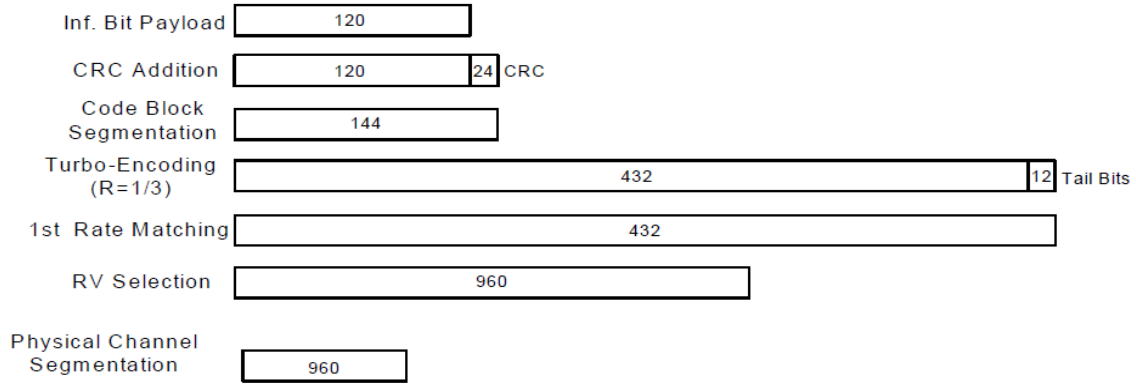


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 sub-tests for HSDPA were completed according to Release 8 procedures in section 5.2 of 3GPP TS34.121. A summary of subtest settings are illustrated below:

Sub-set	β_c	β_d	β_d (SF)	β_d/β_d	β_{hs} (note 1, note 2)	CM(dB) (note 3)	MPR(dB)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (note 4)	15/15 (note 4)	64	12/15 (note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI}= 8⇔A_{hs} = β_{hs}/β_c=30/15⇔β_{hs}=30/15*β_c

Note2: CM=1 for β_c/β_d=12/15, β_{hs}/β_c=24/15.

Note3: For subtest 2 the $\beta_c\beta_d$ ratio of 12/15 for the TFC during the measurement period(TF1,TF0) is achieved by setting the signaled gain factors for the reference TFC (TFC1,TF1) to β_c=11/15 and β_d=15/15.

9. LTE modes test according to **KDB 941225D05v02r05.**

a. Per Section 5.2.1, the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation.

- Using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
- When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel.
- When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

b. Per Section 5.2.2, the largest channel bandwidth and measure SAR for QPSK with 50% RB allocation

- The procedures required for 1 RB allocation in 5.2.1 are applied to measure the SAR for QPSK with 50% RB allocation.

c. Per Section 5.2.3, the largest channel bandwidth and measure SAR for QPSK with 100% RB allocation

- For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 5.2.1 and 5.2.2 are ≤ 0.8 W/kg.
- Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

d. Per Section 5.2.4, Higher order modulations

- For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in sections 5.2.1, 5.2.2 and 5.2.3 to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

e. Per Section 5.3, other channel bandwidth standalone SAR test requirements

- For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section 5.2 to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg. The equivalent channel configuration for the RB allocation, RB offset and modulation etc. is determined for the smaller channel bandwidth according to the same number of RB allocated in the largest channel bandwidth.

TDD LTE was tested at highest duty factor using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.

WLAN

802.11b DSSS SAR Test Requirements:

10. SAR is measured for 2.4 GHz 802.11b DSSS mode using the highest measured maximum output power channel, when the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

11. When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

802.11g/n OFDM SAR Test Exclusion Requirements:

12. SAR is not required for 802.11g/n since the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

Initial Test Configuration:

13. An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band.

14. SAR is measured using the highest measured maximum output power channel. When the reported SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for the subsequent next highest measured output power channel(s) in the initial test configuration until the reported SAR is ≤ 1.2 W/kg or all required channels are tested.

15. For WLAN, 5.2n(40)/5.3n(40)/5.6n(40)/5.8n(40) is chosen to be the initial test configurations.

16. For WLAN, since the highest reported SAR for the initial test configuration is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is≦1.2 W/kg, SAR is not required for subsequent test configurations.

Other

17. BT and WLAN use the same antenna path and Bluetooth can't transmit simultaneously with WLAN.

18. According to **KDB447498D01v06**, testing of other required channels is not required when the reported 1-g SAR for the highest output channel is ≤ 0.8 W/kg, when the transmission band is ≤ 100MHz.

19. According to **KDB865664D01v01r04**, SAR measurement variability must be assessed for each frequency band. When the original highest measured SAR is ≥

0.8 W/kg, repeated that measurement once. Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit). The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.

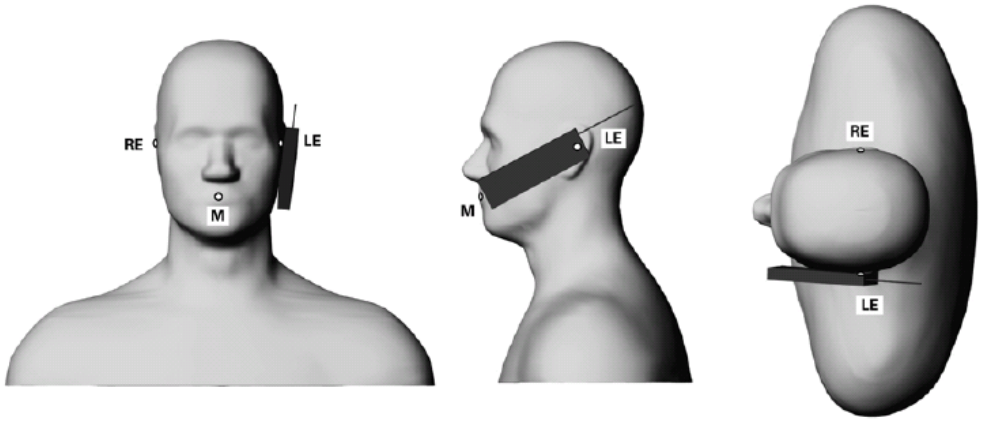
20. According to **KDB447498D01v06** – The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances≤ 50 mm are determined by: [(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR, and ≤ 7.5 for product specific 10-g SAR.

mode	position	max. power (dB)	max. power (mW)	f(GHz)	calculation	SAR exclusion threshold	SAR test exclusion
BT	body-worn	1.5	1.413	2.48	0.445	3	yes
BT	product specific 10-g SAR	1.5	1.413	2.48	0.445	7.5	yes

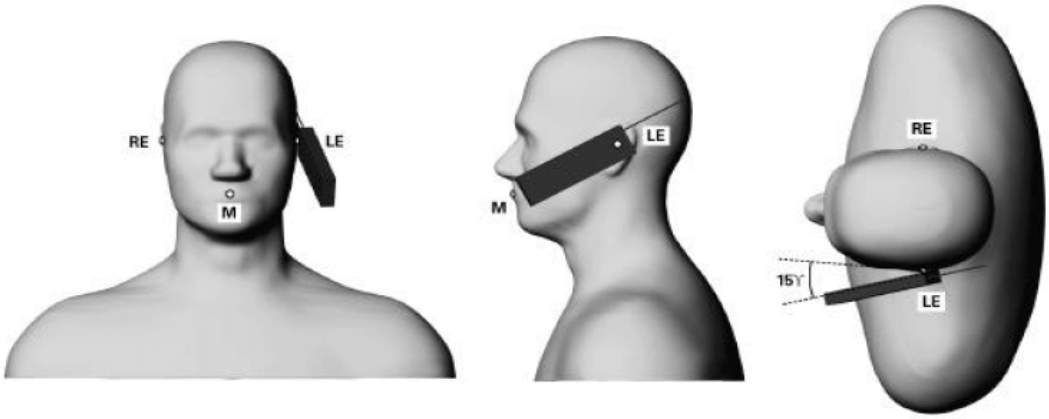
21. For backside positions of hotspot and extremity exposures, the test configuration has been confirmed by FCC KDB inquiry.

1.6 Positioning Procedure

Head SAR measurement statement



Phone position 1, “cheek” or “touch” position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning.



Phone position 2, “tilted position.” The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning.

Cheek/Touch Position:
The handset was brought toward the mouth of the head phantom by pivoting against the ear reference point until any point of the mouthpiece or keypad touched the phantom.
Ear/Tilt Position:
With the phone aligned in the Cheek/Touch position, the handset was tilted away from the mouth with respect to the test device reference point by 15 degrees.

Body SAR measurement statement

1. Body-worn exposure: 10mm
   Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. When the same wireless transmission configuration is used for testing body-worn accessory and hotspot mode SAR, respectively, in voice and data mode, SAR results for the most conservative test separation distance configuration may be used to support both SAR conditions. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for the body-worn accessory with a headset attached to the handset.

2. Hotspot exposure: 10mm
   A test separation distance of 10 mm is required between the phantom and all surfaces and edges with a transmitting antenna located within 25 mm from that surface or edge when the form factor of a handset is larger than 9 cm × 5 cm,
   Test configurations of WWAN
   (1) Front side
   (2) Back side
   (3) Bottom side.
   (4) Right side.
   Test configurations of WLAN
   (1) Front side
   (2) Back side
   (3) Top side.
   (4) Left side
3. Phablet SAR test consideration

Since the device is a phablet (overall diagonal dimension > 16.0 cm), the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for product specific 10-g SAR. When hotspot mode applies, product specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg; however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.

1.7 Evaluation Procedures

The entire evaluation of the spatial peak values is performed within the Post-processing engine (SEMCAD). The system always gives the maximum values for the 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan.
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters).
3. The generation of a high-resolution mesh within the measured volume.
4. The interpolation of all measured values from the measurement grid to the high-resolution grid.
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface.
6. The calculation of the averaged SAR within masses of 1g and 10g.

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within –2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5mm.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 7x7x7 scans.

The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 30x30x30mm contains about 30g of tissue. The first procedure is an extrapolation (incl. Boundary correction) to get the points

between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume. In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found.
If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

1.8 Probe Calibration Procedures

For the calibration of E-field probes in lossy liquids, an electric field with an accurately known field strength must be produced within the measured liquid. For standardization purposes it would be desirable if all measurements which are necessary to assess the correct field strength would be traceable to standardized measurement procedures. In the following two different calibration techniques are summarized:

1.8.1 Transfer Calibration with Temperature Probes

In lossy liquids the specific absorption rate (SAR) is related both to the electric field (E) and the temperature gradient ($\delta T / \delta t$) in the liquid.

$$SAR = \frac{\sigma}{\rho}|E|^2 = c\frac{\delta T}{\delta t}$$

Whereby σ is the conductivity, ρ the density and c the heat capacity of the liquid.

Hence, the electric field in lossy liquid can be measured indirectly by measuring the temperature gradient in the liquid. Non-disturbing temperature probes (optical probes or thermistor probes with resistive lines) with high spatial resolution (<1-2 mm) and fast reaction time (<1 s) are available and can be easily calibrated with high precision [1]. The setup and the exciting source have no influence on the calibration; only the relative positioning uncertainties of the standard temperature probe and the E-field probe to be calibrated must be considered. However, several problems limit the available accuracy of probe calibrations with temperature probes:

1. The temperature gradient is not directly measurable but must be evaluated from temperature measurements at different time steps. Special precaution is necessary to avoid measurement errors caused by temperature gradients due to energy equalizing effects or convection currents in the liquid. Such effects cannot be completely avoided, as the measured field itself destroys the

thermal equilibrium in the liquid. With a careful setup these errors can be kept small.

2. The measured volume around the temperature probe is not well defined. It is difficult to calculate the energy transfer from a surrounding gradient temperature field into the probe. These effects must be considered, since temperature probes are calibrated in liquid with homogeneous temperatures. There is no traceable standard for temperature rise measurements.
3. The calibration depends on the assessment of the specific density, the heat capacity and the conductivity of the medium. While the specific density and heat capacity can be measured accurately with standardized procedures (~ 2% for c; much better for ρ), there is no standard for the measurement of the conductivity. Depending on the method and liquid, the error can well exceed ±5%.
4. Temperature rise measurements are not very sensitive and therefore are often performed at a higher power level than the E-field measurements. The nonlinearities in the system (e.g., power measurements, different components, etc.) must be considered.

Considering these problems, the possible accuracy of the calibration of E-field probes with temperature gradient measurements in a carefully designed setup is about ±10% (RSS) [2]. Recently, a setup which is a combination of the waveguide techniques and the thermal measurements was presented in [3]. The estimated uncertainty of the setup is ±5% (RSS) when the same liquid is used for the calibration and for actual measurements and ±7-9% (RSS) when not, which is in good agreement with the estimates given in [2].

1.8.2 Calibration with Analytical Fields

In this method a technical setup is used in which the field can be calculated analytically from measurements of other physical magnitudes (e.g., input power). This corresponds to the standard field method for probe calibration in air; however, there is no standard defined for fields in lossy liquids.

When using calculated fields in lossy liquids for probe calibration, several points must be considered in the assessment of the uncertainty:

1. The setup must enable accurate determination of the incident power.
2. The accuracy of the calculated field strength will depend on the assessment of the dielectric parameters of the liquid.
3. Due to the small wavelength in liquids with high permittivity, even small setups might be above the resonant cutoff frequencies. The field distribution in the setup must be carefully checked for conformity with the theoretical field distribution.

References

(1) N. Kuster, Q. Balzano, and J.C. Lin, Eds., *Mobile Communications Safety*, Chapman & Hall, London, 1997.

(2) K. Meier, M. Burkhardt, T. Schmid, and N. Kuster, \Broadband calibration of E-field probes in lossy media", *IEEE Transactions on Microwave Theory and Techniques*, vol. 44, no. 10, pp. 1954{1962, Oct. 1996.

(3) K. Jokela, P. Hyysalo, and L. Puranen, \Calibration of specific absorption rate (SAR) probes in waveguide at 900 MHz", *IEEE Transactions on Instrumentation and Measurements*, vol. 47, no. 2, pp. 432{438, Apr. 1998.

1.9 The SAR Measurement System

A block diagram of the SAR measurement system is given in Fig. a. This SAR measurement system uses a Computer-controlled 3-D stepper motor system (SPEAG DASY 5 professional system). Model EX3DV4 field probes are used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-simulant.

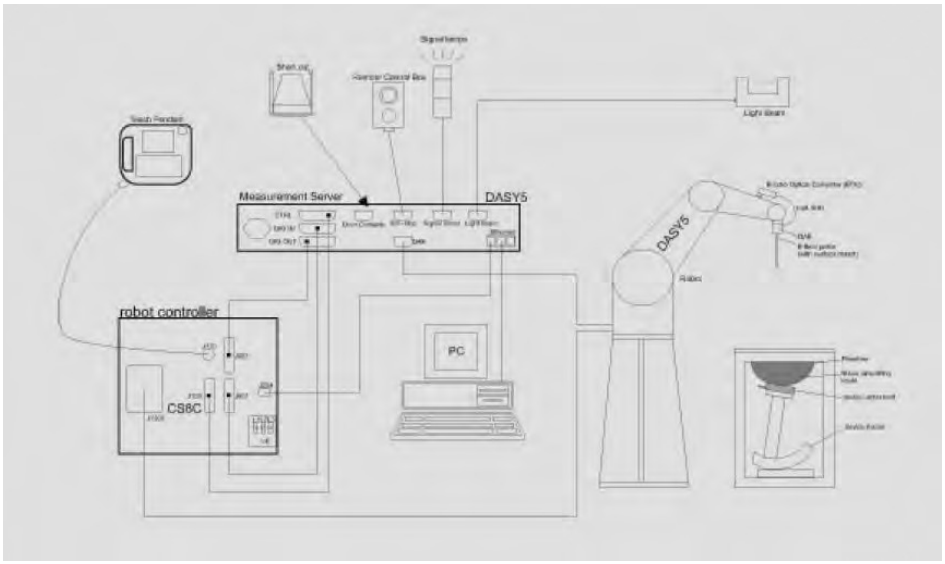


Fig. a A block diagram of the SAR measurement system

The DASY 5 system for performing compliance tests consists of the following items:

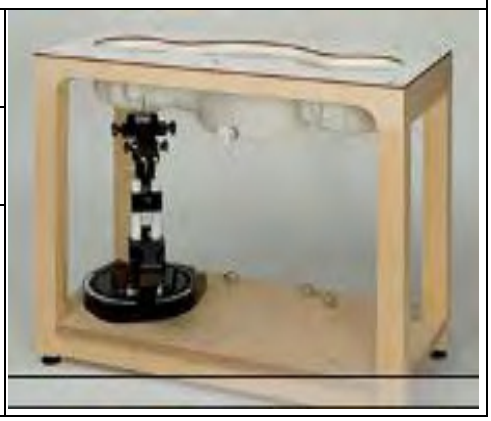
1. A standard high precision 6-axis robot (Staubli RX family) with controller, teach pendant and software. An arm extension is for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
3. Data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
4. The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
5. The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
6. A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
7. A computer operating Windows7
8. DASY 5 software.
9. Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
10. The SAM twin phantom enabling testing left-hand and right-hand usage.
11. The device holder for handheld mobile phones.
12. Tissue simulating liquid mixed according to the given recipes.
13. Validation dipole kits allowing to validate the proper functioning of the system.

1.10 System Components

EX3DV4 E-Field Probe

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL835/1900/2450/2600/5200/5300/5600/5800 MHz Additional CF for other liquids and frequencies upon request	
Frequency	10 MHz to > 6 GHz, Linearity: ± 0.6 dB	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Tip diameter: 2.5 mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	

SAM PHANTOM V4.0C

Construction:	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.	
Shell Thickness:	2 ± 0.2 mm	
Filling Volume:	Approx. 25 liters	
Dimensions:	Height: 850 mm; Length: 1000 mm; Width: 500 mm	

DEVICE HOLDER

Construction	In combination with the Twin SAM Phantom V4.0/V4.0C or Twin SAM, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).	 Device Holder

1.11 SAR System Verification

The microwave circuit arrangement for system verification is sketched in Fig. b. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% (according to KDB865664D01v01r04) from the target SAR values.
These tests were done at 835/1900/2450/2600/5200/5300/5600/5800 MHz. The tests were conducted on the same days as the measurement of the DUT. The obtained results from the system accuracy verification are displayed in the table 1. During the tests, the ambient temperature of the laboratory was 21.7°C, the relative humidity was 62% and the liquid depth above the ear reference points was above 15 cm (≤3G) or 10 cm (>3G) in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

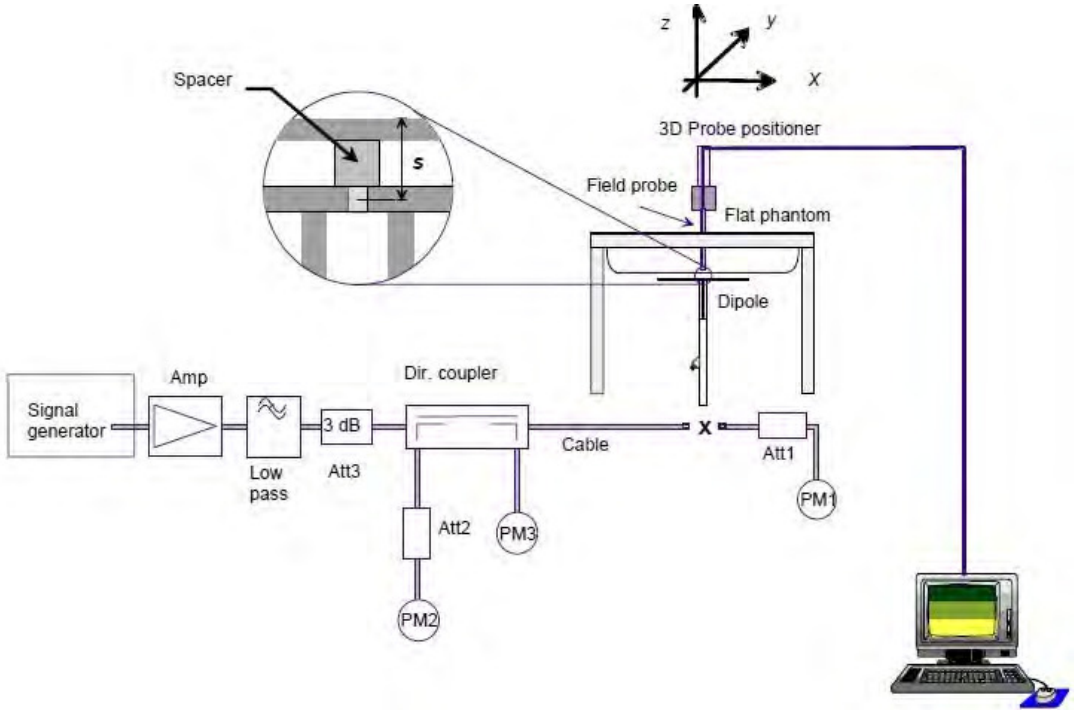


Fig. b The block diagram of system verification

Validation Kit	S/N	Frequency (MHz)		1W Target SAR-1g (mW/g)	Measured SAR-1g (mW/g)	Measured SAR-1g normalized to 1W (mW/g)	Deviation (%)	Measured Date
D835V2	4d120	835	Head	9.42	2.36	9.44	0.21%	Aug. 17, 2016
			Body	9.52	2.44	9.76	2.52%	Aug. 22, 2016
D1900V2	5d027	1900	Head	38.7	9.71	38.84	0.36%	Aug. 17, 2016
			Body	39.7	9.96	39.84	0.35%	Aug. 23, 2016
D2450V2	727	2450	Head	51	13.1	52.4	2.75%	Aug. 19, 2016
			Body	49.6	11.9	47.6	-4.03%	Aug. 25, 2016
D2600V2	1005	2600	Head	55.2	14.6	58.4	5.80%	Aug. 18, 2016
			Body	53.9	14.2	56.8	5.38%	Aug. 24, 2016
D5GHzV2	1023	5200	Head	77	8.01	80.1	4.03%	Aug. 19, 2016
			Body	71.9	7.53	75.3	4.73%	Aug. 25, 2016
		5300	Head	79.9	8.25	82.5	3.25%	Aug. 19, 2016
			Body	75.1	7.68	76.8	2.26%	Aug. 25, 2016
		5600	Head	82.6	8.4	84	1.69%	Aug. 19, 2016
			Body	78.3	8.03	80.3	2.55%	Aug. 25, 2016
		5800	Head	77.3	7.89	78.9	2.07%	Aug. 19, 2016
			Body	75.3	7.65	76.5	1.59%	Aug. 25, 2016

Table 1. Results of system validation

1.12 Tissue Simulant Fluid for the Frequency Band

The dielectric properties for this Head-simulant fluid were measured by using the Agilent Model 85070E Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with Network Analyzer.
All dielectric parameters of tissue simulates were measured within 24 hours of SAR measurements. The depth of the tissue simulant in the flat section of the phantom was at least 15 cm (≤3G) or 10 cm (>3G) during all tests. (Appendix Fig. 2)

Tissue Type	Measured Frequency (MHz)	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	% dev εr	% dev σ	Measurement Date
Head	829	41.531	0.900	41.182	0.887	0.84%	1.39%	2016/8/17
	835	41.500	0.900	41.106	0.893	0.95%	0.99%	
	836.5	41.500	0.902	41.081	0.895	1.01%	0.74%	
	836.6	41.500	0.902	41.060	0.896	1.06%	0.63%	
	1852.4	40.000	1.400	39.500	1.381	1.25%	1.34%	2016/8/17
	1860	40.000	1.400	39.472	1.389	1.32%	0.79%	
	1880	40.000	1.400	39.444	1.408	1.39%	-0.57%	
	1900	40.000	1.400	39.416	1.429	1.46%	-2.07%	
	2450	39.200	1.800	38.541	1.779	1.68%	1.17%	2016/8/19
	2462	39.185	1.813	38.529	1.791	1.67%	1.22%	
	2510	39.124	1.865	38.423	1.839	1.79%	1.42%	2016/8/18
	2565	39.054	1.925	38.292	1.895	1.95%	1.56%	
	2595	39.015	1.958	38.243	1.925	1.98%	1.67%	
	2600	39.009	1.964	38.206	1.929	2.06%	1.76%	
	2610	38.996	1.975	38.138	1.938	2.20%	1.85%	
	2645	38.952	2.013	38.060	1.985	2.29%	1.40%	
	5200	35.986	4.655	35.115	4.544	2.42%	2.38%	2016/8/19
	5230	35.951	4.686	35.067	4.575	2.46%	2.35%	
	5300	35.871	4.758	34.942	4.647	2.59%	2.32%	2016/8/19
	5310	35.860	4.768	34.895	4.658	2.69%	2.30%	
	5590	35.540	5.055	34.509	4.937	2.90%	2.33%	2016/8/19
	5600	35.529	5.065	34.488	4.949	2.93%	2.29%	
	5795	35.306	5.265	34.239	5.145	3.02%	2.28%	2016/8/19
	5800	35.300	5.270	34.192	5.150	3.14%	2.28%	

Tissue Type	Measured Frequency (MHz)	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	% dev εr	% dev σ	Measurement Date
Body	824.2	55.242	0.969	55.911	0.974	-1.21%	-0.47%	2016/8/22
	826.4	55.234	0.969	55.841	0.975	-1.10%	-0.58%	
	829	55.223	0.970	55.765	0.977	-0.98%	-0.77%	
	835	55.200	0.970	55.680	0.984	-0.88%	-1.25%	
	836.5	55.195	0.972	55.654	0.985	-0.83%	-1.34%	
	836.6	55.195	0.972	55.570	0.985	-0.74%	-0.07%	
	846.6	55.164	0.984	55.523	0.995	-0.66%	-0.85%	
	848.8	55.158	0.987	55.439	0.998	-0.51%	-1.12%	
	1850.2	53.300	1.520	54.339	1.511	-1.95%	0.59%	2016/8/23
	1852.4	53.300	1.520	54.275	1.512	-1.83%	0.53%	
	1860	53.300	1.520	54.190	1.521	-1.67%	-0.07%	
	1880	53.300	1.520	54.153	1.542	-1.60%	-1.45%	
	1900	53.300	1.520	54.078	1.562	-1.46%	-2.76%	
	1907.6	53.300	1.520	54.046	1.569	-1.40%	-3.22%	
	1909.8	53.300	1.520	54.009	1.570	-1.33%	-3.29%	
	2412	52.751	1.914	54.149	1.951	-2.65%	-1.96%	2016/8/25
	2450	52.700	1.950	54.044	1.990	-2.55%	-2.05%	
	2510	52.624	2.035	53.960	2.061	-2.54%	-1.27%	2016/8/24
	2565	52.554	2.113	53.831	2.114	-2.43%	-0.04%	
	2595	52.515	2.156	53.734	2.145	-2.32%	0.49%	
	2600	52.509	2.163	53.659	2.150	-2.19%	0.59%	
	2610	52.496	2.177	53.620	2.161	-2.14%	0.73%	
	2645	52.452	2.227	53.506	2.192	-2.01%	1.55%	
	5200	49.014	5.299	50.740	5.446	-3.52%	-2.76%	2016/8/25
	5230	48.974	5.334	50.629	5.476	-3.38%	-2.66%	
	5300	48.879	5.416	50.492	5.547	-3.30%	-2.42%	2016/8/25
	5310	48.865	5.428	50.424	5.558	-3.19%	-2.40%	
	5590	48.485	5.755	49.944	5.839	-3.01%	-1.46%	2016/8/25
	5600	48.471	5.766	49.921	5.850	-2.99%	-1.46%	
	5795	48.207	5.994	49.585	6.046	-2.86%	-0.86%	2016/8/25
	5800	48.200	6.000	49.550	6.051	-2.80%	-0.85%	

Table 2. Dielectric Parameters of Tissue Simulant Fluid

The composition of the tissue simulating liquid:

Frequency (MHz)	Mode	Ingredient						Total amount
		DGMBE	Water	Salt	Preventol D-7	Cellulose	Sugar	
850	Head	—	532.98 g	18.3 g	2.4 g	3.2 g	766 g	1.3L(Kg)
	Body	—	631.68 g	11.72 g	1.2 g	—	600 g	1.0L(Kg)
1900	Head	444.52 g	552.42 g	3.06 g	—	—	—	1.0L(Kg)
	Body	300.67 g	716.56 g	4.0 g	—	—	—	1.0L(Kg)
2450	Head	550ml	450ml	—	—	—	—	1.0L(Kg)
	Body	301.7ml	698.3ml	—	—	—	—	1.0L(Kg)
2600	Head	550ml	450ml	—	—	—	—	1.0L(Kg)
	Body	301.7ml	698.3ml	—	—	—	—	1.0L(Kg)

Simulating Liquids for 5 GHz, Manufactured by SPEAG:

Ingredients	Water	Esters, Emulsifiers, Inhibitors	Sodium and Salt
(% by weight)	60-80	20-40	0-1.5

Table 3. Recipes for tissue simulating liquid

1.13 Test Standards and Limits

According to FCC 47CFR §2.1093(d) The limits to be used for evaluation are based generally on criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (“SAR”) in Section 4.2 of “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz,” ANSI/IEEE C95.1, By the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017.
These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in “Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields,” NCRP Report No. 86, Section 17.4.5. Copyright NCRP, 1986, Bethesda, Maryland 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards. The criteria to be used are specified in paragraphs (d)(1) and (d)(2) of this section and shall apply for portable devices transmitting in the frequency range from 100 kHz to 6 GHz. Portable devices that transmit at frequencies above 6 GHz are to be evaluated in terms of the MPE limits specified in § 1.1310 of this chapter.
Measurements and calculations to demonstrate compliance with MPE field strength or power density limits for devices operating above 6 GHz should be made at a minimum distance of 5 cm from the radiating source.

1. Limits for Occupational/Controlled exposure: 0.4 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 8 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube). Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 20 W/kg, as averaged over a 10 grams of tissue (defined as a tissue volume in the shape of a cube).

Occupational/Controlled limits apply when persons are exposed as a consequence of their employment provided these persons are fully aware of and exercise control over their exposure. Awareness of exposure can be accomplished by use of warning labels or by specific training or education through appropriate means, such as an RF safety program in a work environment.

2. Limits for General Population/Uncontrolled exposure: 0.08 W/kg as averaged over the whole-body and spatial peak SAR not exceeding 1.6 W/kg as averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube).

Exceptions are the hands, wrists, feet and ankles where the spatial peak SAR shall not exceed 4 W/kg, as averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube).
General Population/Uncontrolled limits apply when the general public may be exposed, or when persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or do not exercise control over their exposure.
Warning labels placed on consumer devices such as cellular telephones will not be sufficient reason to allow these devices to be evaluated subject to limits for occupational/controlled exposure in paragraph (d)(1) of this section.(Table .6)

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR (Brain)	1.60 W/kg	8.00 W/kg
Spatial Average SAR (Whole Body)	0.08 W/kg	0.40 W/kg
Spatial Peak SAR (Hands/Feet/Ankle/Wrist)	4.00 W/kg	20.00 W/kg

Table 4. RF exposure limits

Notes:
1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

2. Summary of Results

GSM 850

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
								Measured	Reported	
GSM850 (Head)	Re Cheek	-	190	836.6	33.50	33.00	12.20%	0.210	0.236	-
	Re Tilt	-	190	836.6	33.50	33.00	12.20%	0.135	0.151	-
	Le Cheek	-	190	836.6	33.50	33.00	12.20%	0.221	0.248	100
	Le Tilt	-	190	836.6	33.50	33.00	12.20%	0.162	0.182	-
GSM850 (Body-Worn)	Front side	10	190	836.6	33.50	33.00	12.20%	0.218	0.245	-
	Back side	10	190	836.6	33.50	33.00	12.20%	0.276	0.310	101
GPRS850 (Hotspot) (1Dn4UP)	Front side	10	190	836.6	30.00	29.20	20.23%	0.551	0.662	-
	Back side	10	128	824.2	30.00	29.10	23.03%	0.844	1.038	-
	Back side	10	190	836.6	30.00	29.20	20.23%	0.858	1.032	102
	Back side*	10	190	836.6	30.00	29.20	20.23%	0.855	1.028	-
	Back side	10	251	848.8	30.00	29.00	25.89%	0.793	0.998	-
	Bottom side	10	190	836.6	30.00	29.20	20.23%	0.391	0.470	-
	Right side	10	190	836.6	30.00	29.20	20.23%	0.129	0.155	-

* - repeated at the highest SAR measurement according to the KDB865664D01v01r04

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
								Measured	Reported	
GPRS 850 (product specific 10-g SAR)	Back side	0	128	824.2	30	29.1	123.03%	2.930	3.605	-
	Back side	0	190	836.6	30	29.2	120.23%	3.010	3.619	103
	Back side	0	251	848.8	30	29	125.89%	2.780	3.500	-

GSM 1900

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
								Measured	Reported	
GSM1900 (Head)	Re Cheek	-	661	1880	30.50	30.30	4.71%	0.072	0.075	104
	Re Tilt	-	661	1880	30.50	30.30	4.71%	0.013	0.014	-
	Le Cheek	-	661	1880	30.50	30.30	4.71%	0.040	0.042	-
	Le Tilt	-	661	1880	30.50	30.30	4.71%	0.012	0.013	-
GSM1900 (Body-Worn)	Front side	10	661	1880	30.50	30.30	4.71%	0.166	0.174	-
	Back side	10	661	1880	30.50	30.30	4.71%	0.429	0.449	105
GPRS1900 (Hotspot) (1Dn4UP)	Front side	10	810	1909.8	27.00	26.50	12.20%	0.466	0.523	-
	Back side	10	512	1850.2	27.00	26.00	25.89%	0.779	0.981	-
	Back side	10	661	1880	27.00	26.40	14.82%	1.040	1.194	-
	Back side	10	810	1909.8	27.00	26.50	12.20%	1.240	1.391	106
	Back side*	10	810	1909.8	27.00	26.50	12.20%	1.210	1.358	-
	Bottom side	10	512	1850.2	27.00	26.00	25.89%	0.470	0.592	-
	Bottom side	10	661	1880	27.00	26.40	14.82%	0.749	0.860	-
	Bottom side	10	810	1909.8	27.00	26.50	12.20%	0.966	1.084	-
	Right side	10	810	1909.8	27.00	26.50	12.20%	0.147	0.165	-

* - repeated at the highest SAR measurement according to the KDB865664D01v01r04

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
								Measured	Reported	
GPRS 1900 (product specific 10-g SAR)	Back side	0	512	1850.2	27	26.0	125.89%	1.980	2.493	-
	Back side	0	661	1880	27	26.4	114.82%	2.630	3.020	-
	Back side	0	810	1909.8	27	26.5	112.20%	3.120	3.501	107

WCDMA Band II

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
								Measured	Reported	
R99 (Head)	RE Cheek	-	9262	1852.4	24	23.99	0.23%	0.130	0.130	108
	RE Tilt	-	9262	1852.4	24	23.99	0.23%	0.043	0.043	-
	LE Cheek	-	9262	1852.4	24	23.99	0.23%	0.082	0.082	-
	LE Tilt	-	9262	1852.4	24	23.99	0.23%	0.035	0.035	-
Hotspot	Front side	10	9262	1852.4	24	23.99	0.23%	0.262	0.263	-
	Back side	10	9262	1852.4	24	23.99	0.23%	0.751	0.753	-
	Back side	10	9400	1880	24	23.79	4.95%	0.959	1.007	-
	Back side	10	9538	1907.6	24	23.70	7.15%	1.100	1.179	109
	Back side*	10	9538	1907.6	24	23.70	7.15%	1.080	1.157	-
	Bottom side	10	9262	1852.4	24	23.99	0.23%	0.443	0.444	-
	Right side	10	9262	1852.4	24	23.99	0.23%	0.181	0.181	-

* - repeated at the highest SAR measurement according to the KDB865664D01v01r04

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
								Measured	Reported	
R99 (product specific 10-g SAR)	Back side	0	9262	1852.4	24	23.99	100.23%	2.880	2.887	-
	Back side	0	9400	1880	24	23.79	104.95%	2.900	3.044	-
	Back side	0	9538	1907.6	24	23.70	107.15%	2.940	3.150	110

WCDMA Band V

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
								Measured	Reported	
R99 (Head)	RE Cheek	-	4183	836.6	24	23.49	12.46%	0.211	0.237	-
	RE Tilt	-	4183	836.6	24	23.49	12.46%	0.134	0.151	-
	LE Cheek	-	4183	836.6	24	23.49	12.46%	0.228	0.256	111
	LE Tilt	-	4183	836.6	24	23.49	12.46%	0.163	0.183	-
Hotspot	Front side	10	4183	836.6	24	23.49	12.46%	0.272	0.306	-
	Back side	10	4183	836.6	24	23.49	12.46%	0.419	0.471	112
	Bottom side	10	4183	836.6	24	23.49	12.46%	0.192	0.216	-
	Right side	10	4183	836.6	24	23.49	12.46%	0.052	0.058	-

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
								Measured	Reported	
R99 (product specific 10-g SAR)	Back side	0	4183	836.6	24	23.49	112.46%	1.440	1.619	113

LTE FDD Band II

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
												Measured	Reported	
LTE Band 2 (Head)	20MHz	QPSK	1 RB	0	RE Cheek	-	18700	1860	23.5	23.18	7.65%	0.155	0.167	114
					RE Tilt	-	18700	1860	23.5	23.18	7.65%	0.037	0.040	-
					LE Cheek	-	18700	1860	23.5	23.18	7.65%	0.096	0.103	-
					LE Tilt	-	18700	1860	23.5	23.18	7.65%	0.040	0.043	-
			50 RB	0	RE Cheek	-	18700	1860	22.5	22.19	7.40%	0.128	0.137	-
					RE Tilt	-	18700	1860	22.5	22.19	7.40%	0.030	0.032	-
					LE Cheek	-	18700	1860	22.5	22.19	7.40%	0.081	0.087	-
					LE Tilt	-	18700	1860	22.5	22.19	7.40%	0.032	0.034	-
			100 RB		RE Cheek	-	18700	1860	22.5	21.99	12.46%	0.131	0.147	-
					RE Tilt	-	18700	1860	22.5	21.99	12.46%	0.029	0.033	-
					LE Cheek	-	18700	1860	22.5	21.99	12.46%	0.081	0.091	-
					LE Tilt	-	18700	1860	22.5	21.99	12.46%	0.030	0.034	-
LTE Band 2 (Hotspot)	20MHz	QPSK	1 RB	0	Front side	10	18700	1860	23.5	23.18	7.65%	0.271	0.292	-
					Back side	10	18700	1860	23.5	23.18	7.65%	0.821	0.884	-
					Back side	10	18900	1880	23.5	22.74	19.12%	0.913	1.088	-
					Back side	10	19100	1900	23.5	22.88	15.35%	1.090	1.257	115
					Back side*	10	19100	1900	23.5	22.88	15.35%	1.070	1.234	-
					Bottom side	10	18700	1860	23.5	23.18	7.65%	0.431	0.464	-
					Right side	10	18700	1860	23.5	23.18	7.65%	0.152	0.164	-
			50 RB	0	Front side	10	18700	1860	22.5	22.19	7.40%	0.232	0.249	-
					Back side	10	18700	1860	22.5	22.19	7.40%	0.727	0.781	-
					Bottom side	10	18700	1860	22.5	22.19	7.40%	0.382	0.410	-
					Right side	10	18700	1860	22.5	22.19	7.40%	0.113	0.121	-
			100 RB		Front side	10	18700	1860	22.5	21.99	12.46%	0.227	0.255	-
					Back side	10	18700	1860	22.5	21.99	12.46%	0.719	0.809	-
					Bottom side	10	18700	1860	22.5	21.99	12.46%	0.376	0.423	-
					Right side	10	18700	1860	22.5	21.99	12.46%	0.110	0.124	-

* - repeated at the highest SAR measurement according to the FCC KDB865664D01v01r04

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
												Measured	Reported	
LTE Band 2 (product specific 10-g SAR)	20MHz	QPSK	1 RB	0	Back side	0	18700	1860	23.5	23.18	7.65%	2.290	2.465	-
					Back side	0	18900	1880	23.5	22.74	19.12%	2.320	2.764	-
					Back side	0	19100	1900	23.5	22.88	15.35%	2.740	3.160	116
			50 RB	0	Back side	0	18700	1860	22.5	22.19	7.40%	1.850	1.987	-
			100 RB		Back side	0	18700	1860	22.5	21.99	12.46%	1.780	2.002	-

LTE FDD Band V

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
												Measured	Reported	
LTE Band 5 (Head)	10MHz	QPSK	1 RB	0	RE Cheek	-	20525	836.5	23.5	23.11	9.40%	0.202	0.221	117
					RE Tilt	-	20525	836.5	23.5	23.11	9.40%	0.152	0.166	-
					LE Cheek	-	20525	836.5	23.5	23.11	9.40%	0.125	0.137	-
					LE Tilt	-	20525	836.5	23.5	23.11	9.40%	0.056	0.061	-
			25 RB	0	RE Cheek	-	20450	826	22.5	22.11	9.40%	0.165	0.181	-
					RE Tilt	-	20450	826	22.5	22.11	9.40%	0.126	0.138	-
					LE Cheek	-	20450	826	22.5	22.11	9.40%	0.096	0.105	-
					LE Tilt	-	20450	826	22.5	22.11	9.40%	0.044	0.048	-
			50 RB		RE Cheek	-	20450	829	22.5	22.09	9.90%	0.168	0.185	-
					RE Tilt	-	20450	829	22.5	22.09	9.90%	0.126	0.138	-
					LE Cheek	-	20450	829	22.5	22.09	9.90%	0.096	0.106	-
					LE Tilt	-	20450	829	22.5	22.09	9.90%	0.043	0.047	-
LTE Band 5 (Hotspot)	10MHz	QPSK	1 RB	0	Front side	10	20525	836.5	23.5	23.11	9.40%	0.198	0.217	-
					Back side	10	20525	836.5	23.5	23.11	9.40%	0.315	0.345	118
					Bottom side	10	20525	836.5	23.5	23.11	9.40%	0.209	0.229	-
					Right side	10	20525	836.5	23.5	23.11	9.40%	0.058	0.063	-
			25 RB	0	Front side	10	20450	829	22.5	22.11	9.40%	0.171	0.187	-
					Back side	10	20450	829	22.5	22.11	9.40%	0.256	0.280	-
					Bottom side	10	20450	829	22.5	22.11	9.40%	0.177	0.194	-
					Right side	10	20450	829	22.5	22.11	9.40%	0.044	0.048	-
			50 RB		Front side	10	20450	829	22.5	22.09	9.90%	0.168	0.185	-
					Back side	10	20450	829	22.5	22.09	9.90%	0.244	0.268	-
					Bottom side	10	20450	829	22.5	22.09	9.90%	0.171	0.188	-
					Right side	10	20450	829	22.5	22.09	9.90%	0.039	0.043	-

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
												Measured	Reported	
LTE Band 5 (product specific 10-g SAR)	10MHz	QPSK	1 RB	0	Back side	0	20525	836.5	23.5	23.11	9.40%	1.250	1.367	119
			25 RB	0	Back side	0	20450	829	22.5	22.11	9.40%	0.952	1.041	-
			50 RB		Back side	0	20450	829	22.5	22.09	9.90%	0.944	1.037	-

LTE FDD Band VII

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
												Measured	Reported	
LTE Band 7 (Head)	20MHz	QPSK	1 RB	99	RE Cheek	-	20850	2510	23	22.50	12.20%	0.147	0.165	120
					RE Tilt	-	20850	2510	23	22.50	12.20%	0.026	0.029	-
					LE Cheek	-	20850	2510	23	22.50	12.20%	0.023	0.026	-
					LE Tilt	-	20850	2510	23	22.50	12.20%	0.014	0.016	-
			50 RB	25	RE Cheek	-	20850	2510	22	21.45	13.50%	0.116	0.132	-
					RE Tilt	-	20850	2510	22	21.45	13.50%	0.019	0.022	-
					LE Cheek	-	20850	2510	22	21.45	13.50%	0.021	0.024	-
					LE Tilt	-	20850	2510	22	21.45	13.50%	0.013	0.015	-
			100 RB		RE Cheek	-	20850	2510	22	21.50	12.20%	0.117	0.131	-
					RE Tilt	-	20850	2510	22	21.50	12.20%	0.017	0.019	-
					LE Cheek	-	20850	2510	22	21.50	12.20%	0.028	0.031	-
					LE Tilt	-	20850	2510	22	21.50	12.20%	0.013	0.015	-
LTE Band 7 (Hotspot)	20MHz	QPSK	1 RB	99	Front side	10	20850	2510	23	22.50	12.20%	0.261	0.293	-
					Back side	10	20850	2510	23	22.50	12.20%	0.537	0.603	121
					Bottom side	10	20850	2510	23	22.50	12.20%	0.498	0.559	-
					Right side	10	20850	2510	23	22.50	12.20%	0.137	0.154	-
			50 RB	25	Front side	10	20850	2510	22	21.45	13.50%	0.222	0.252	-
					Back side	10	20850	2510	22	21.45	13.50%	0.482	0.547	-
					Bottom side	10	20850	2510	22	21.45	13.50%	0.451	0.512	-
					Right side	10	20850	2510	22	21.45	13.50%	0.122	0.138	-
			100 RB		Front side	10	20850	2510	22	21.50	12.20%	0.228	0.256	-
					Back side	10	20850	2510	22	21.50	12.20%	0.488	0.548	-
					Bottom side	10	20850	2510	22	21.50	12.20%	0.452	0.507	-
					Right side	10	20850	2510	22	21.50	12.20%	0.123	0.138	-

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
												Measured	Reported	
LTE Band 7 (product specific 10-g SAR)	20MHz	QPSK	1 RB	99	Back side	0	20850	2510	23	22.50	12.20%	0.948	1.064	122
			50 RB	25	Back side	0	20850	2510	22	21.45	13.50%	0.731	0.830	-
			100 RB		Back side	0	20850	2510	22	21.50	12.20%	0.742	0.833	-

LTE TDD Band XXXVIII

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
												Measured	Reported	
LTE Band 38 (Head)	20MHz	QPSK	1 RB	0	RE Cheek	-	38000	2595	23.5	22.73	19.40%	0.013	0.016	123
					RE Tilt	-	38000	2595	23.5	22.73	19.40%	0.000770	0.001	-
					LE Cheek	-	38000	2595	23.5	22.73	19.40%	0.00113	0.001	-
					LE Tilt	-	38000	2595	23.5	22.73	19.40%	0.000656	0.001	-
			50 RB	50	RE Cheek	-	38150	2610	22.5	21.79	17.76%	0.0033	0.004	-
					RE Tilt	-	38150	2610	22.5	21.79	17.76%	0.000398	0.000	-
					LE Cheek	-	38150	2610	22.5	21.79	17.76%	0.00129	0.002	-
					LE Tilt	-	38150	2610	22.5	21.79	17.76%	0.000254	0.000	-
			100 RB		RE Cheek	-	38150	2610	22.5	21.79	17.76%	0.00314	0.004	-
					RE Tilt	-	38150	2610	22.5	21.79	17.76%	0.00157	0.002	-
					LE Cheek	-	38150	2610	22.5	21.79	17.76%	0.000938	0.001	-
					LE Tilt	-	38150	2610	22.5	21.79	17.76%	0.00102	0.001	-
LTE Band 38 (Hotspot)	20MHz	QPSK	1 RB	0	Front side	10	38000	2595	23.5	22.73	19.40%	0.091	0.109	-
					Back side	10	38000	2595	23.5	22.73	19.40%	0.152	0.181	124
					Bottom side	10	38000	2595	23.5	22.73	19.40%	0.144	0.172	-
					Right side	10	38000	2595	23.5	22.73	19.40%	0.045	0.054	-
			50 RB	50	Front side	10	38150	2610	22.5	21.79	17.76%	0.077	0.091	-
					Back side	10	38150	2610	22.5	21.79	17.76%	0.122	0.144	-
					Bottom side	10	38150	2610	22.5	21.79	17.76%	0.108	0.127	-
					Right side	10	38150	2610	22.5	21.79	17.76%	0.038	0.045	-
			100 RB		Front side	10	38150	2610	22.5	21.79	17.76%	0.076	0.089	-
					Back side	10	38150	2610	22.5	21.79	17.76%	0.119	0.140	-
					Bottom side	10	38150	2610	22.5	21.79	17.76%	0.103	0.121	-
					Right side	10	38150	2610	22.5	21.79	17.76%	0.036	0.042	-

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
												Measured	Reported	
LTE Band 38 (product specific 10-g SAR)	20MHz	QPSK	1 RB	0	Back side	0	38000	2595	23.5	22.73	19.40%	0.349	0.417	125

LTE TDD Band XLI

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
												Measured	Reported	
LTE Band 41 (Head)	20MHz	QPSK	1 RB	0	RE Cheek	-	41140	2645	23	22.08	23.59%	0.00464	0.006	126
					RE Tilt	-	41140	2645	23	22.08	23.59%	0.001150	0.001	-
					LE Cheek	-	41140	2645	23	22.08	23.59%	0.000998	0.001	-
					LE Tilt	-	41140	2645	23	22.08	23.59%	0.000558	0.001	-
			50 RB	0	RE Cheek	-	41140	2645	22	21.26	18.58%	0.00132	0.002	-
					RE Tilt	-	41140	2645	22	21.26	18.58%	0.000691	0.001	-
					LE Cheek	-	41140	2645	22	21.26	18.58%	0.000844	0.001	-
					LE Tilt	-	41140	2645	22	21.26	18.58%	0.000481	0.001	-
			100 RB		RE Cheek	-	40340	2565	22	21.04	24.74%	0.00139	0.002	-
					RE Tilt	-	40340	2565	22	21.04	24.74%	0.00205	0.003	-
					LE Cheek	-	40340	2565	22	21.04	24.74%	0.00013	0.000	-
					LE Tilt	-	40340	2565	22	21.04	24.74%	0.000269	0.000	-
LTE Band 41 (Hotspot)	20MHz	QPSK	1 RB	0	Front side	10	41140	2645	23	22.08	23.59%	0.131	0.162	-
					Back side	10	41140	2645	23	22.08	23.59%	0.242	0.299	-
					Bottom side	10	41140	2645	23	22.08	23.59%	0.244	0.302	127
					Right side	10	41140	2645	23	22.08	23.59%	0.065	0.080	-
			50 RB	0	Front side	10	41140	2645	22	21.26	18.58%	0.111	0.132	-
					Back side	10	41140	2645	22	21.26	18.58%	0.213	0.253	-
					Bottom side	10	41140	2645	22	21.26	18.58%	0.216	0.256	-
					Right side	10	41140	2645	22	21.26	18.58%	0.058	0.069	-
			100 RB		Front side	10	40340	2565	22	21.04	24.74%	0.107	0.133	-
					Back side	10	40340	2565	22	21.04	24.74%	0.209	0.261	-
					Bottom side	10	40340	2565	22	21.04	24.74%	0.211	0.263	-
					Right side	10	40340	2565	22	21.04	24.74%	0.055	0.069	-

Mode	Bandwidth (MHz)	Modulation	RB Size	RB start	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
												Measured	Reported	
LTE Band 41 (product specific 10-g SAR)	20MHz	QPSK	1 RB	0	Back side	0	41140	2645	23	22.08	23.59%	0.448	0.554	128
			50 RB	0	Back side	0	41140	2645	22	21.26	18.58%	0.362	0.429	-
			100 RB		Back side	0	20340	2565	22	21.04	24.74%	0.347	0.433	-

WLAN802.11 b

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
								Measured	Reported	
WLAN 802.11 b (Head)	RE Cheek	-	11	2462	17.5	15.93	143.55%	0.277	0.398	129
	RE Tilt	-	11	2462	17.5	15.93	143.55%	0.144	0.207	-
	LE Cheek	-	11	2462	17.5	15.93	143.55%	0.126	0.181	-
	LE Tilt	-	11	2462	17.5	15.93	143.55%	0.075	0.108	-
Hotspot	Front side	10	11	2462	17.5	15.93	143.55%	0.074	0.106	-
	Back side	10	11	2462	17.5	15.93	143.55%	0.141	0.202	-
	Top side	10	11	2462	17.5	15.93	143.55%	0.011	0.016	-
	Left side	10	11	2462	17.5	15.93	143.55%	0.186	0.267	130

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
								Measured	Reported	
WLAN 802.11b (Product specific 10-g SAR)	Front side	0	11	2462	17.5	15.93	143.55%	0.176	0.253	-
	Back side	0	11	2462	17.5	15.93	143.55%	0.306	0.439	131
	Top side	0	11	2462	17.5	15.93	143.55%	0.038	0.055	-
	Left side	0	11	2462	17.5	15.93	143.55%	0.291	0.418	-

WLAN802.11 n(40M) 5.2G

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
								Measured	Reported	
WLAN 802.11 n(40M) 5.2G (Head)	RE Cheek	-	46	5230	14.5	12.87	145.55%	0.040	0.058	132
	RE Tilt	-	46	5230	14.5	12.87	145.55%	0.018	0.026	-
	LE Cheek	-	46	5230	14.5	12.87	145.55%	0.012	0.017	-
	LE Tilt	-	46	5230	14.5	12.87	145.55%	0.00704	0.010	-
Body-worn	Front side	10	46	5230	14.5	12.87	145.55%	0.011	0.016	-
	Back side	10	46	5230	14.5	12.87	145.55%	0.151	0.220	133

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
								Measured	Reported	
WLAN 802.11 n(40M) 5.2G (Product specific 10-g SAR)	Front side	0	46	5230	14.5	12.87	145.55%	0.011	0.016	-
	Back side	0	46	5230	14.5	12.87	145.55%	0.221	0.322	134
	Top side	0	46	5230	14.5	12.87	145.55%	0.024	0.035	-
	Left side	0	46	5230	14.5	12.87	145.55%	0.100	0.146	-

WLAN 802.11 n(40M) 5.3G

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
									Reported	
WLAN 802.11 n(40M) 5.3G (Head)	RE Cheek	-	62	5310	14.5	12.96	142.56%	0.068	0.097	-
	RE Tilt	-	62	5310	14.5	12.96	142.56%	0.074	0.105	135
	LE Cheek	-	62	5310	14.5	12.96	142.56%	0.042	0.060	-
	LE Tilt	-	62	5310	14.5	12.96	142.56%	0.056	0.080	-
Body-worn	Front side	10	62	5310	14.5	12.96	142.56%	0.011	0.016	-
	Back side	10	62	5310	14.5	12.96	142.56%	0.186	0.265	136

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
								Measured	Reported	
WLAN 802.11 n(40M) 5.3G (Product specific 10-g SAR)	Front side	0	62	5310	14.5	12.96	142.56%	0.039	0.056	-
	Back side	0	62	5310	14.5	12.96	142.56%	0.306	0.436	137
	Top side	0	62	5310	14.5	12.96	142.56%	0.041	0.058	-
	Left side	0	62	5310	14.5	12.96	142.56%	0.140	0.200	-

WLAN 802.11 n(40M) 5.6G

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
									Reported	
WLAN 802.11 n(40M) 5.6G (Head)	RE Cheek	-	118	5590	14.5	12.96	142.56%	0.057	0.081	-
	RE Tilt	-	118	5590	14.5	12.96	142.56%	0.046	0.066	-
	LE Cheek	-	118	5590	14.5	12.96	142.56%	0.092	0.131	138
	LE Tilt	-	118	5590	14.5	12.96	142.56%	0.078	0.111	-
Body-worn	Front side	10	118	5590	14.5	12.96	142.56%	0.015	0.021	-
	Back side	10	118	5590	14.5	12.96	142.56%	0.142	0.202	139

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
								Measured	Reported	
WLAN 802.11 n(40M) 5.6G (Product specific 10-g SAR)	Front side	0	118	5590	14.5	12.96	142.56%	0.012	0.017	-
	Back side	0	118	5590	14.5	12.96	142.56%	0.268	0.382	140
	Top side	0	118	5590	14.5	12.96	142.56%	0.029	0.041	-
	Left side	0	118	5590	14.5	12.96	142.56%	0.048	0.068	-

WLAN 802.11 n(40M) 5.8G

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 1g (W/kg)		Plot page
								Measured	Reported	
WLAN 802.11 n(40M) 5.8G (Head)	RE Cheek	-	159	5795	14.5	12.91	144.21%	0.184	0.265	141
	RE Tilt	-	159	5795	14.5	12.91	144.21%	0.063	0.091	-
	LE Cheek	-	159	5795	14.5	12.91	144.21%	0.093	0.134	-
	LE Tilt	-	159	5795	14.5	12.91	144.21%	0.059	0.085	-
Body-worn	Front side	10	159	5795	14.5	12.91	144.21%	0.010	0.014	-
	Back side	10	159	5795	14.5	12.91	144.21%	0.168	0.242	142

Mode	Position	Distance (mm)	CH	Freq. (MHz)	Max. Rated Avg. Power + Max. Tolerance (dBm)	Measured Avg. Power (dBm)	Scaling	Averaged SAR over 10g (W/kg)		Plot page
								Measured	Reported	
WLAN 802.11 n(40M) 5.8G (Product specific 10-g SAR)	Front side	0	159	5795	14.5	12.91	144.21%	0.036	0.052	-
	Back side	0	159	5795	14.5	12.91	144.21%	0.241	0.348	143
	Top side	0	159	5795	14.5	12.91	144.21%	0.021	0.030	-
	Left side	0	159	5795	14.5	12.91	144.21%	0.044	0.063	-

3. Simultaneous Transmission Analysis

Simultaneous Transmission Scenarios:

Simultaneous Transmit Configurations	Head	Body-Worn	Hotspot	Product specific 10-g SAR
GSM + 2.4GHz Wi-Fi	Yes	Yes	No	Yes
GPRS + 2.4GHz Wi-Fi	No	No	Yes	Yes
WCDMA + 2.4GHz Wi-Fi	Yes	Yes	Yes	Yes
LTE + 2.4GHz Wi-Fi	Yes	Yes	Yes	Yes
GSM + 5GHz Wi-Fi	Yes	Yes	No	Yes
GPRS + 5GHz Wi-Fi	No	No	No	Yes
WCDMA + 5GHz Wi-Fi	Yes	Yes	No	Yes
LTE + 5GHz Wi-Fi	Yes	Yes	No	Yes
GSM + BT	No	Yes	No	Yes
GPRS + BT	No	No	No	Yes
WCDMA + BT	No	Yes	No	Yes
LTE + BT	No	Yes	No	Yes

Notes:

1. WiFi and BT can't transmit simultaneously.
2. The device does not support DTM function. Body-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
3.Based on KDB447498D01 note 36, when SAR test exclusion is allowed by other published RF exposure KDB procedures, such as the 2.5 cm hotspot mode SAR test exclusion for an edge or surface, then estimated SAR is not required to determine simultaneous SAR test exclusion. Also, based on KDB648474D04 note 6, simultaneous transmission SAR for product specific 10-g SAR requires consideration only when standalone 10-g SAR is required.

3.1 Estimated SAR calculation

According to KDB447498 D01v05 – When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone 1g-SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

$$\text{Estimated SAR} = \frac{\text{Max. tune up power(mW)}}{\text{Min. test separation distance(mm)}} \times \frac{\sqrt{f(\text{GHz})}}{7.5}$$

If the minimum test separation distance is < 5mm, a distance of 5mm is used for estimated SAR calculation. When the test separation distance is >50mm, the 0.4W/kg is used for 1g-SAR and 1.0W/kg is used for 10g-SAR.

mode	position	max. power (dB)	max. power (mW)	f(GHz)	distance (mm)	x	Estimated SAR
BT	body-worn	1.5	1.413	2.48	10	7.5	0.03 (1g)
BT	product specific 10g-SAR	1.5	1.413	2.48	5	18.5	0.024 (10g)

3.2 SPLSR evaluation and analysis

Per KDB447498D01, when the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR sum to peak location separation ratio (SPLSR).

The simultaneous transmitting antennas in each operating mode and exposure condition combination must be considered one pair at a time to determine the SAR to peak location separation ratio to qualify for test exclusion.

The ratio is determined by (SAR1 + SAR2)^1.5/Ri, rounded to two decimal digits, and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. When 10-g SAR applies, the ratio must be ≤ 0.1.

SAR1 and SAR2 are the highest reported or estimated SAR for each antenna in the pair, and Ri is the separation distance between the peak SAR locations for the antenna pair in mm.

When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna.

Simultaneous Transmission Combination

reported SAR WWAN and WLAN 2.4GHz, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	WLAN	<1.6W/kg
GSM 850	Head	Right cheek	0.236	0.398	0.634
		Right tilt	0.151	0.207	0.358
		Left cheek	0.248	0.181	0.429
		Left tilt	0.182	0.108	0.290
GPRS 850 (1Dn4UP)	Hotspot	Front	0.662	0.106	0.768
		Back	1.032	0.202	1.234
		Top	-	0.016	-
		Bottom	0.470	-	-
		Right	0.155	-	-
		Left	-	0.267	-
GSM 1900	Head	Right cheek	0.075	0.398	0.473
		Right tilt	0.014	0.207	0.221
		Left cheek	0.042	0.181	0.223
		Left tilt	0.013	0.108	0.121
GPRS 1900 (1Dn4UP)	Hotspot	Front	0.523	0.106	0.629
		Back	1.391	0.202	1.593
		Top	-	0.016	-
		Bottom	1.084	-	-
		Right	0.165	-	-
		Left	-	0.267	-
WCDMA Band II	Head	Right cheek	0.130	0.398	0.528
		Right tilt	0.043	0.207	0.250
		Left cheek	0.082	0.181	0.263
		Left tilt	0.035	0.108	0.143
	Hotspot	Front	0.263	0.106	0.369
		Back	1.179	0.202	1.381
		Top	-	0.016	-
		Bottom	0.444	-	-
		Right	0.181	-	-
		Left	-	0.267	-

reported SAR WWAN and WLAN 2.4GHz, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	WLAN	<1.6W/kg
WCDMA Band V	Head	Right cheek	0.237	0.398	0.635
		Right tilt	0.151	0.207	0.358
		Left cheek	0.256	0.181	0.437
		Left tilt	0.183	0.108	0.291
	Hotspot	Front	0.306	0.106	0.412
		Back	0.471	0.202	0.673
		Top	-	0.016	-
		Bottom	0.216	-	-
		Right	0.058	-	-
		Left	-	0.267	-
LTE FDD Band II	Head	Right cheek	0.167	0.398	0.565
		Right tilt	0.040	0.207	0.247
		Left cheek	0.103	0.181	0.284
		Left tilt	0.043	0.108	0.151
	Hotspot	Front	0.292	0.106	0.398
		Back	1.257	0.202	1.459
		Top	-	0.016	-
		Bottom	0.464	-	-
		Right	0.164	-	-
		Left	-	0.267	-
LTE FDD Band V	Head	Right cheek	0.221	0.398	0.619
		Right tilt	0.166	0.207	0.373
		Left cheek	0.137	0.181	0.318
		Left tilt	0.061	0.108	0.169
	Hotspot	Front	0.217	0.106	0.323
		Back	0.345	0.202	0.547
		Top	-	0.016	-
		Bottom	0.229	-	-
		Right	0.063	-	-
		Left	-	0.267	-

reported SAR WWAN and WLAN 2.4GHz, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	WLAN	<1.6W/kg
LTE FDD Band VII	Head	Right cheek	0.165	0.398	0.563
		Right tilt	0.029	0.207	0.236
		Left cheek	0.031	0.181	0.212
		Left tilt	0.016	0.108	0.124
	Hotspot	Front	0.293	0.106	0.399
		Back	0.603	0.202	0.805
		Top	-	0.016	-
		Bottom	0.559	-	-
		Right	0.154	-	-
		Left	-	0.267	-
LTE TDD Band XXXVIII	Head	Right cheek	0.016	0.398	0.414
		Right tilt	0.002	0.207	0.209
		Left cheek	0.002	0.181	0.183
		Left tilt	0.001	0.108	0.109
	Hotspot	Front	0.109	0.106	0.215
		Back	0.181	0.202	0.383
		Top	-	0.016	-
		Bottom	0.172	-	-
		Right	0.054	-	-
		Left	-	0.267	-
LTE TDD Band XLI	Head	Right cheek	0.006	0.398	0.404
		Right tilt	0.003	0.207	0.210
		Left cheek	0.001	0.181	0.182
		Left tilt	0.001	0.108	0.109
	Hotspot	Front	0.162	0.106	0.268
		Back	0.299	0.202	0.501
		Top	-	0.016	-
		Bottom	0.302	-	-
		Right	0.080	-	-
		Left	-	0.267	-

reported SAR WWAN and WLAN 5GHz, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	WLAN	<1.6W/kg
GSM 850	Head	Right cheek	0.236	0.265	0.501
		Right tilt	0.151	0.105	0.256
		Left cheek	0.248	0.134	0.382
		Left tilt	0.182	0.111	0.293
	Body-worn	Front	0.245	0.021	0.266
		Back	0.310	0.265	0.575
GSM 1900	Head	Right cheek	0.075	0.265	0.340
		Right tilt	0.014	0.105	0.119
		Left cheek	0.042	0.134	0.176
		Left tilt	0.013	0.111	0.124
	Body-worn	Front	0.174	0.021	0.195
		Back	0.449	0.265	0.714
WCDMA Band II	Head	Right cheek	0.130	0.265	0.395
		Right tilt	0.043	0.105	0.148
		Left cheek	0.082	0.134	0.216
		Left tilt	0.035	0.111	0.146
	Body-worn	Front	0.263	0.021	0.284
		Back	1.179	0.265	1.444
WCDMA Band V	Head	Right cheek	0.237	0.265	0.502
		Right tilt	0.151	0.105	0.256
		Left cheek	0.256	0.134	0.390
		Left tilt	0.183	0.111	0.294
	Body-worn	Front	0.306	0.021	0.327
		Back	0.471	0.265	0.736

reported SAR WWAN and WLAN 5GHz, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	WLAN	<1.6W/kg
LTE FDD Band II	Head	Right cheek	0.167	0.265	0.432
		Right tilt	0.040	0.105	0.145
		Left cheek	0.103	0.134	0.237
		Left tilt	0.043	0.111	0.154
	Body-worn	Front	0.292	0.021	0.313
		Back	1.257	0.265	1.522
LTE FDD Band V	Head	Right cheek	0.221	0.265	0.486
		Right tilt	0.166	0.105	0.271
		Left cheek	0.137	0.134	0.271
		Left tilt	0.061	0.111	0.172
	Body-worn	Front	0.217	0.021	0.238
		Back	0.345	0.265	0.610
LTE FDD Band VII	Head	Right cheek	0.165	0.265	0.430
		Right tilt	0.029	0.105	0.134
		Left cheek	0.031	0.134	0.165
		Left tilt	0.016	0.111	0.127
	Body-worn	Front	0.293	0.021	0.314
		Back	0.603	0.265	0.868
LTE TDD Band XXXVIII	Head	Right cheek	0.016	0.265	0.281
		Right tilt	0.002	0.105	0.107
		Left cheek	0.002	0.134	0.136
		Left tilt	0.001	0.111	0.112
	Body-worn	Front	0.109	0.021	0.130
		Back	0.181	0.265	0.446
LTE TDD Band XLI	Head	Right cheek	0.006	0.265	0.271
		Right tilt	0.003	0.105	0.108
		Left cheek	0.001	0.134	0.135
		Left tilt	0.001	0.111	0.112
	Body-worn	Front	0.162	0.021	0.183
		Back	0.299	0.265	0.564

reported SAR WWAN and Bluetooth, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	Bluetooth	<1.6W/kg
GSM 850	Body-Worn	Front	0.245	0.030	0.275
		Back	0.310	0.030	0.340
GSM 1900	Body-Worn	Front	0.174	0.030	0.204
		Back	0.449	0.030	0.479
WCDMA Band II	Body-Worn	Front	0.263	0.030	0.293
		Back	1.179	0.030	1.209
WCDMA Band V	Body-Worn	Front	0.306	0.030	0.336
		Back	0.471	0.030	0.501
LTE FDD Band II	Body-Worn	Front	0.292	0.030	0.322
		Back	1.257	0.030	1.287
LTE FDD Band V	Body-Worn	Front	0.217	0.030	0.247
		Back	0.345	0.030	0.375
LTE FDD Band VII	Body-Worn	Front	0.293	0.030	0.323
		Back	0.603	0.030	0.633
LTE TDD Band XXXVIII	Body-Worn	Front	0.109	0.030	0.139
		Back	0.181	0.030	0.211
LTE TDD Band XLI	Body-Worn	Front	0.162	0.030	0.192
		Back	0.299	0.030	0.329

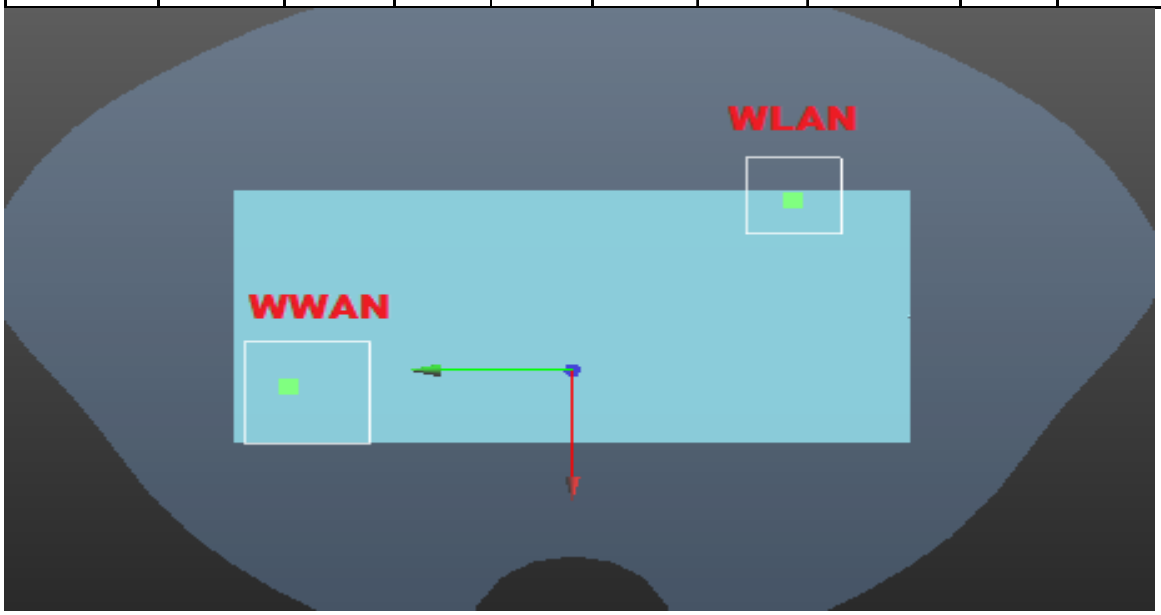
reported SAR WWAN and WLAN 2.4G, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	WLAN	<4.0W/kg
GPRS 850	product specific 10-g SAR	Front	-	0.253	-
		Back	3.619	0.439	**4.058**
		Top	-	0.038	-
		Left	-	0.291	-
GPRS 1900	product specific 10-g SAR	Front	-	0.253	-
		Back	3.501	0.439	3.940
		Top	-	0.038	-
		Left	-	0.291	-
WCDMA Band II	product specific 10-g SAR	Front	-	0.253	-
		Back	3.150	0.439	3.589
		Top	-	0.038	-
		Left	-	0.291	-
WCDMA Band V	product specific 10-g SAR	Front	-	0.253	-
		Back	1.619	0.439	2.058
		Top	-	0.038	-
		Left	-	0.291	-
LTE FDD Band II	product specific 10-g SAR	Front	-	0.253	-
		Back	3.160	0.439	3.599
		Top	-	0.038	-
		Left	-	0.291	-
LTE FDD Band V	product specific 10-g SAR	Front	-	0.253	-
		Back	1.367	0.439	1.806
		Top	-	0.038	-
		Left	-	0.291	-

Conditions	Position	SAR Value (W/kg)	Coordinates (cm)			ΣSAR (W/kg)	Peak Location Separation Distance (mm)	SPLSR	Simultaneous Transmission SAR Test
			x	y	z				
WWAN	Back side	3.619	22.40	71.80	-0.75	4.058	144.97	0.056	SPLSR<0.1, Not required
WLAN		0.439	-38.40	-59.80	-0.57				

reported SAR WWAN and WLAN 5G, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	WLAN	<4.0W/kg
LTE FDD Band VII	product specific 10-g SAR	Front	-	0.253	-
		Back	1.064	0.439	1.503
		Top	-	0.038	-
		Left	-	0.291	-
LTE TDD Band XXXVIII	product specific 10-g SAR	Front	-	0.253	-
		Back	0.417	0.439	0.856
		Top	-	0.038	-
		Left	-	0.291	-
LTE TDD Band XLI	product specific 10-g SAR	Front	-	0.253	-
		Back	0.554	0.439	0.993
		Top	-	0.038	-
		Left	-	0.291	-

reported SAR WWAN and WLAN 5G, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	WLAN	<4.0W/kg
GPRS 850	product specific 10-g SAR	Front	-	0.056	-
		Back	3.619	0.436	**4.055**
		Top	-	0.058	-
		Left	-	0.200	-
GPRS 1900	product specific 10-g SAR	Front	-	0.056	-
		Back	3.501	0.436	3.937
		Top	-	0.058	-
		Left	-	0.200	-
WCDMA Band II	product specific 10-g SAR	Front	-	0.056	-
		Back	3.150	0.436	3.586
		Top	-	0.058	-
		Left	-	0.200	-
WCDMA Band V	product specific 10-g SAR	Front	-	0.056	-
		Back	1.619	0.436	2.055
		Top	-	0.058	-
		Left	-	0.200	-
LTE FDD Band II	product specific 10-g SAR	Front	-	0.056	-
		Back	3.160	0.436	3.596
		Top	-	0.058	-
		Left	-	0.200	-
LTE FDD Band V	product specific 10-g SAR	Front	-	0.056	-
		Back	1.367	0.436	1.803
		Top	-	0.058	-
		Left	-	0.200	-

Conditions	Position	SAR Value (W/kg)	Coordinates (cm)			ΣSAR (W/kg)	Peak Location Separation Distance (mm)	SPLSR	Simultaneous Transmission SAR Test
			x	y	z				
WWAN	Back side	3.619	22.40	71.80	-0.75	4.055	140.68	0.058	SPLSR<0.1, Not required
WLAN		0.436	-36.40	-56.00	-0.51				



reported SAR WWAN and WLAN 5G, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	WLAN	<4.0W/kg
LTE FDD Band VII	product specific 10-g SAR	Front	-	0.056	-
		Back	1.064	0.436	1.500
		Top	-	0.058	-
		Left	-	0.200	-
LTE TDD Band XXXVIII	product specific 10-g SAR	Front	-	0.056	-
		Back	0.417	0.436	0.853
		Top	-	0.058	-
		Left	-	0.200	-
LTE TDD Band XLI	product specific 10-g SAR	Front	-	0.056	-
		Back	0.554	0.436	0.990
		Top	-	0.058	-
		Left	-	0.200	-

reported SAR WWAN and Bluetooth, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	Bluetooth	<4.0W/kg
GPRS 850	product specific 10-g SAR	Front	-	0.024	-
		Back	3.619	0.024	3.643
		Top	-	0.024	-
		Left	-	0.024	-
GPRS 1900	product specific 10-g SAR	Front	-	0.024	-
		Back	3.501	0.024	3.525
		Top	-	0.024	-
		Left	-	0.024	-
WCDMA Band II	product specific 10-g SAR	Front	-	0.024	-
		Back	3.150	0.024	3.174
		Top	-	0.024	-
		Left	-	0.024	-
WCDMA Band V	product specific 10-g SAR	Front	-	0.024	-
		Back	1.619	0.024	1.643
		Top	-	0.024	-
		Left	-	0.024	-
LTE FDD Band II	product specific 10-g SAR	Front	-	0.024	-
		Back	3.160	0.024	3.184
		Top	-	0.024	-
		Left	-	0.024	-
LTE FDD Band V	product specific 10-g SAR	Front	-	0.024	-
		Back	1.367	0.024	1.391
		Top	-	0.024	-
		Left	-	0.024	-

reported SAR WWAN and Bluetooth, ΣSAR evaluation					
Frequency band	Position		reported SAR / W/kg		ΣSAR
			WWAN	Bluetooth	<4.0W/kg
LTE FDD Band VII	product specific 10-g SAR	Front	-	0.024	-
		Back	1.064	0.024	1.088
		Top	-	0.024	-
		Left	-	0.024	-
LTE TDD Band XXXVIII	product specific 10-g SAR	Front	-	0.024	-
		Back	0.417	0.024	0.441
		Top	-	0.024	-
		Left	-	0.024	-
LTE TDD Band XLI	product specific 10-g SAR	Front	-	0.024	-
		Back	0.554	0.024	0.578
		Top	-	0.024	-
		Left	-	0.024	-

4. Instruments List

Manufacturer	Device	Type	Serial number	Date of last calibration	Date of next calibration
Schmid & Partner Engineering AG	Dosimetric E-Field Probe	EX3DV4	3938	Oct.01,2015	Sep,30,2016
Schmid & Partner Engineering AG	System Validation Dipole	D835V2	4d120	Jun.22,2016	Jun.21,2017
		D1900V2	5d027	Apr.25,2016	Apr.24,2017
		D2450V2	727	Apr.19,2016	Apr.18,2017
		D2600V2	1005	Jan.21,2016	Jan.20,2017
		D5GHzV2	1023	Jan.26,2016	Jan.25,2017
Schmid & Partner Engineering AG	Data acquisition Electronics	DAE4	1260	Sep.24,2015	Sep.23,2016
Schmid & Partner Engineering AG	Software	DASY 52 V52.8.8	N/A	Calibration not required	Calibration not required
Schmid & Partner Engineering AG	Phantom	SAM	N/A	Calibration not required	Calibration not required
Network Analyzer	Agilent	E5071C	MY46107530	Jan.07,2016	Jan.06,2017
Agilent	Dielectric Probe Kit	85070E	MY44300677	Calibration not required	Calibration not required
Agilent	Dual-directional coupler	772D	MY52180142	Apr.13,2016	Apr.12,2017
		778D	MY52180302	Apr.13,2016	Apr.12,2017

Manufacturer	Device	Type	Serial number	Date of last calibration	Date of next calibration
Agilent	RF Signal Generator	N5181A	MY50145142	Feb.19,2016	Feb.18,2017
Agilent	Power Meter	E4417A	MY51410006	Jan.07,2016	Jan.06,2017
Agilent	Power Sensor	E9301H	MY51470001	Jan.07,2016	Jan.06,2017
		E9301H	MY51470002	Jan.07,2016	Jan.06,2017
TECPEL	Digital thermometer	DTM-303A	TP130073	Feb.26,2016	Feb.25,2017
Anritsu	Radio Communication Test	MT8820C	6201061014	Oct.07,2015	Oct.06,2016
R&S	Radio Communication Test	CMW500	125470	Jul.09,2016	Jul.08,2017

5. Measurements

Date: 2016/8/17

GSM 850_Head_Le Cheek_CH 190

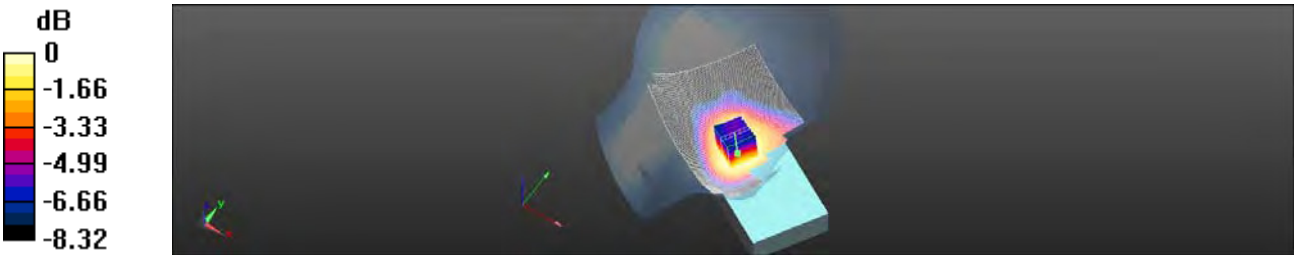
Communication System: GSM; Frequency: 836.6 MHz
Medium parameters used: f = 837 MHz; σ = 0.896 S/m; ε_r = 41.06; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.35, 9.35, 9.35); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x181x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.254 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.194 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.282 W/kg
SAR(1 g) = 0.221 W/kg; SAR(10 g) = 0.166 W/kg
Maximum value of SAR (measured) = 0.256 W/kg



0 dB = 0.256 W/kg = -5.91 dBW/kg

Date: 2016/8/22

GSM 850_Body-worn_Back side_CH 190_10mm

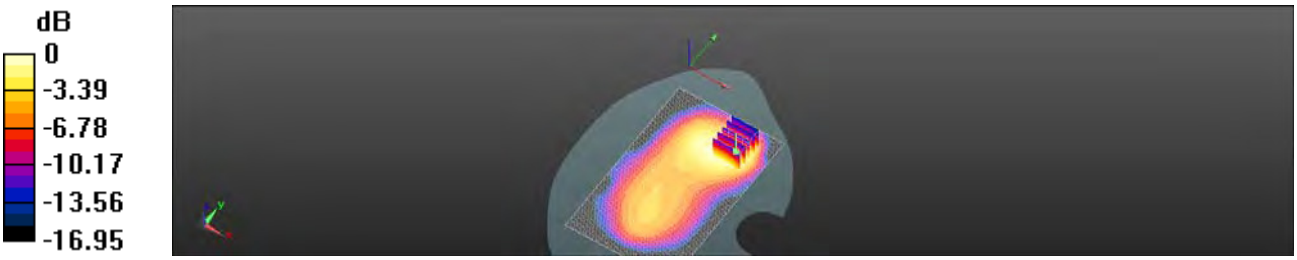
Communication System: GSM; Frequency: 836.6 MHz
Medium parameters used: f = 837 MHz; σ = 0.985 S/m; ε_r = 55.57; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.3, 9.3, 9.3); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.387 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.96 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.456 W/kg
SAR(1 g) = 0.276 W/kg; SAR(10 g) = 0.168 W/kg
Maximum value of SAR (measured) = 0.368 W/kg



0 dB = 0.368 W/kg = -4.34 dBW/kg

Date: 2016/8/22

GPRS 850_Hotspot_Back side_CH 190_10mm

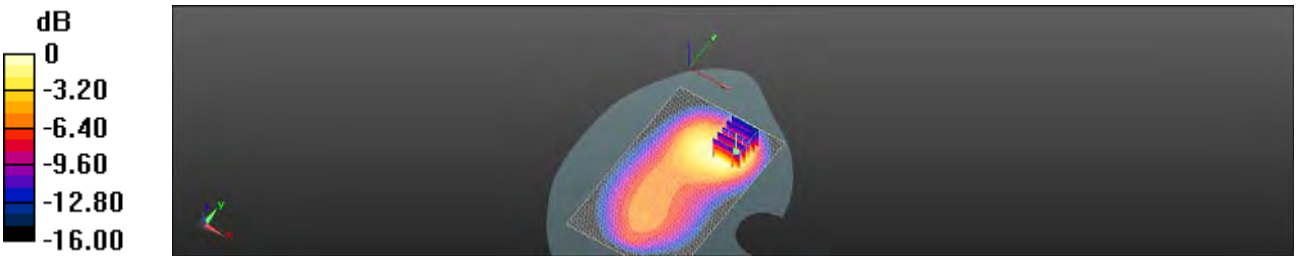
Communication System: GPRS (1Dn4Up); Frequency: 836.6 MHz
Medium parameters used: f = 837 MHz; σ = 0.985 S/m; ε_r = 55.57; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.3, 9.3, 9.3); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 1.20 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.84 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 1.46 W/kg
SAR(1 g) = 0.858 W/kg; SAR(10 g) = 0.517 W/kg
Maximum value of SAR (measured) = 1.15 W/kg



0 dB = 1.15 W/kg = 0.60 dBW/kg

Date: 2016/8/22

GPRS 850_Product specific 10-g SAR_Back side_CH 190_0mm

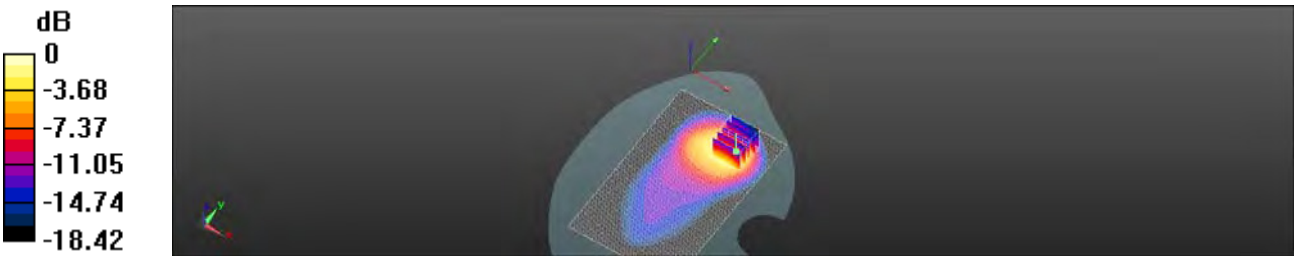
Communication System: GPRS (1Dn4Up); Frequency: 836.6 MHz
Medium parameters used: f = 837 MHz; σ = 0.985 S/m; ε_r = 55.57; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.3, 9.3, 9.3); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 8.31 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 21.64 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 11.3 W/kg
SAR(1 g) = 5.49 W/kg; SAR(10 g) = 3.01 W/kg
Maximum value of SAR (measured) = 7.55 W/kg



0 dB = 7.55 W/kg = 8.78 dBW/kg

Date: 2016/8/17

GSM 1900_Head_Re Cheek_CH 661

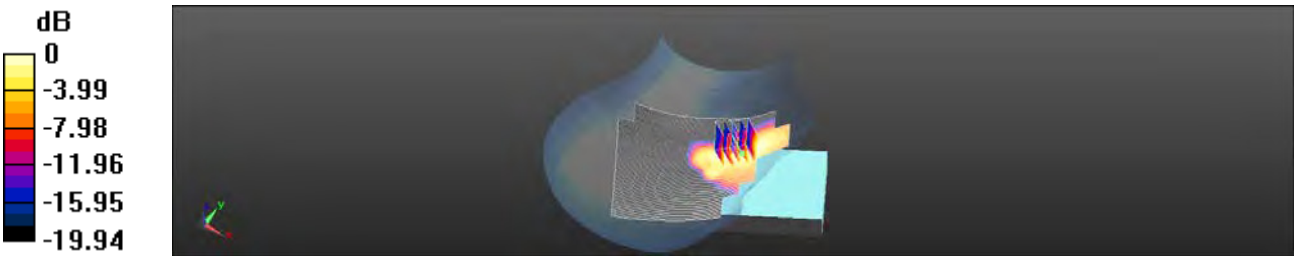
Communication System: GSM; Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.408 S/m; ε_r = 39.444; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.89, 7.89, 7.89); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x141x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.155 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.095 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.117 W/kg
SAR(1 g) = 0.072 W/kg; SAR(10 g) = 0.038 W/kg
Maximum value of SAR (measured) = 0.0974 W/kg



0 dB = 0.0974 W/kg = -10.11 dBW/kg

Date: 2016/8/23

GSM 1900_Body-worn_Back side _CH 661_10mm

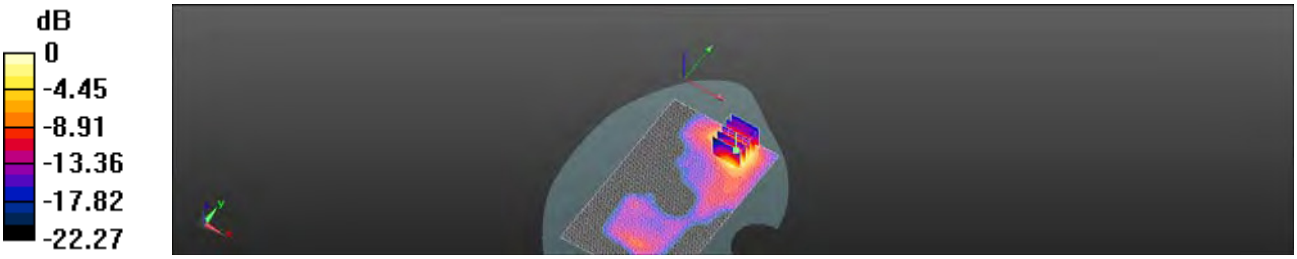
Communication System: GSM; Frequency: 1880 MHz
Medium parameters used: f = 1880 MHz; σ = 1.542 S/m; ε_r = 54.153; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.585 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.8830 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.766 W/kg
SAR(1 g) = 0.429 W/kg; SAR(10 g) = 0.212 W/kg
Maximum value of SAR (measured) = 0.609 W/kg



0 dB = 0.609 W/kg = -2.16 dBW/kg

Date: 2016/8/23

GPRS 1900_Hotspot_Back side_CH 810_10mm

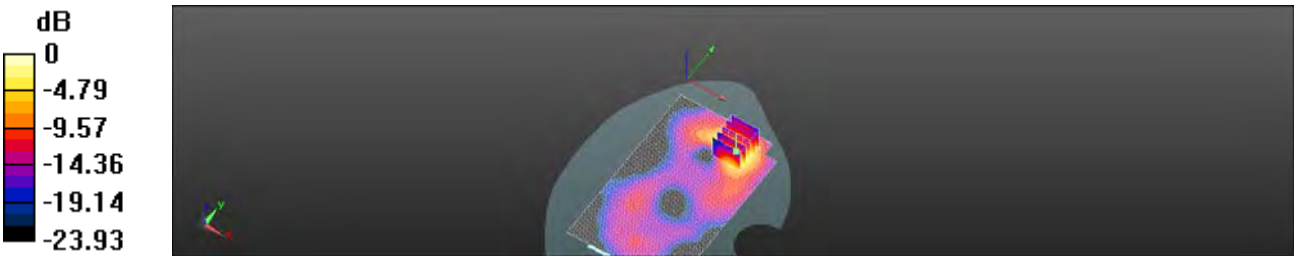
Communication System: GPRS (1Dn4Up); Frequency: 1909.8 MHz
Medium parameters used: f = 1910 MHz; σ = 1.570 S/m; ε_r = 54.009; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 1.96 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.237 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 2.20 W/kg
SAR(1 g) = 1.24 W/kg; SAR(10 g) = 0.623 W/kg
Maximum value of SAR (measured) = 1.77 W/kg



0 dB = 1.77 W/kg = 2.47 dBW/kg

Date: 2016/8/23

GPRS 1900_Product specific 10-g SAR_Back side_CH 810_0mm

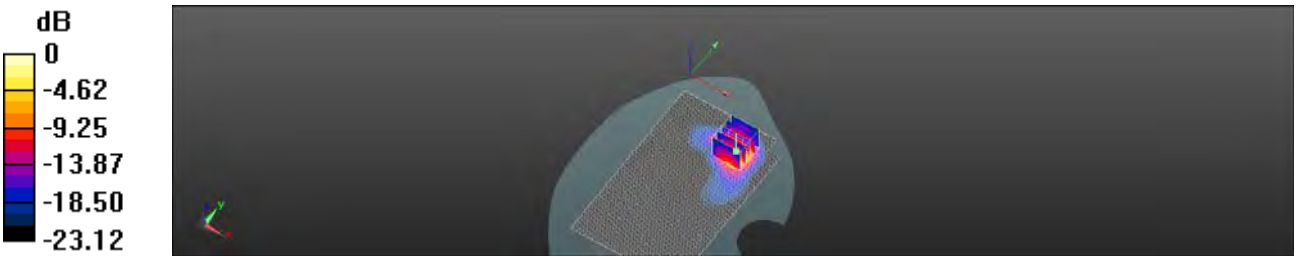
Communication System: GPRS (1Dn4Up); Frequency: 1909.8 MHz
Medium parameters used: f = 1910 MHz; σ = 1.570 S/m; ε_r = 54.009; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 12.1 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.548 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 15.5 W/kg
SAR(1 g) = 7.49 W/kg; SAR(10 g) = 3.12 W/kg
Maximum value of SAR (measured) = 11.6 W/kg



0 dB = 11.6 W/kg = 10.64 dBW/kg

Date: 2016/8/17

WCDMA Band II_Head_Re Cheek_CH 9262

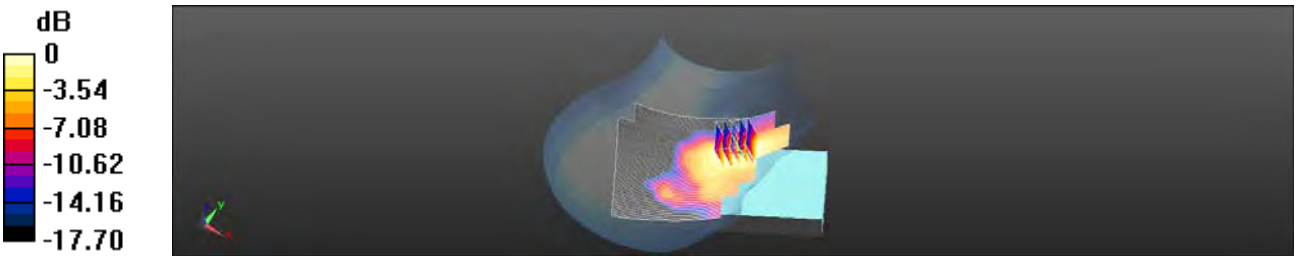
Communication System: WCDMA; Frequency: 1852.4 MHz
Medium parameters used: f = 1852.4 MHz; σ = 1.381 S/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.89, 7.89, 7.89); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x141x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.182 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.532 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.208 W/kg
SAR(1 g) = 0.130 W/kg; SAR(10 g) = 0.074 W/kg
Maximum value of SAR (measured) = 0.173 W/kg



0 dB = 0.173 W/kg = -7.62 dBW/kg

Date: 2016/8/23

WCDMA Band II_Hotspot_Back side_CH 9538_10mm

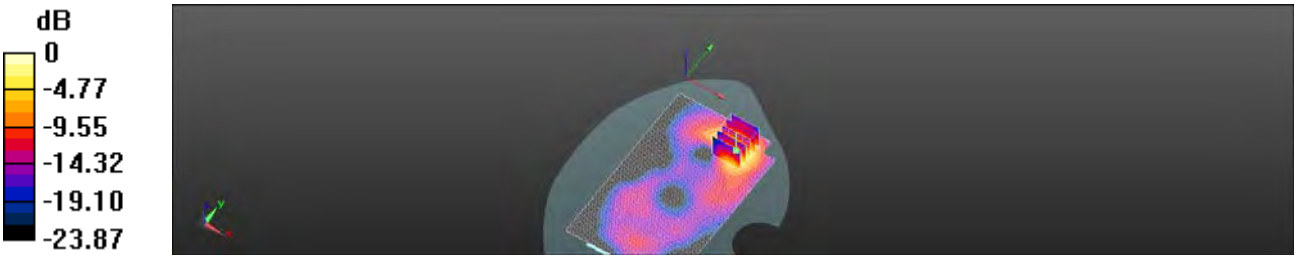
Communication System: WCDMA; Frequency: 1907.6 MHz
Medium parameters used: f = 1908 MHz; σ = 1.569 S/m; ε_r = 54.046; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 1.75 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.6410 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 1.94 W/kg
SAR(1 g) = 1.1 W/kg; SAR(10 g) = 0.553 W/kg
Maximum value of SAR (measured) = 1.56 W/kg



0 dB = 1.56 W/kg = 1.93 dBW/kg

Date: 2016/8/23

WCDMA Band II_Product specific 10-g SAR_Back side_CH 9538_0mm

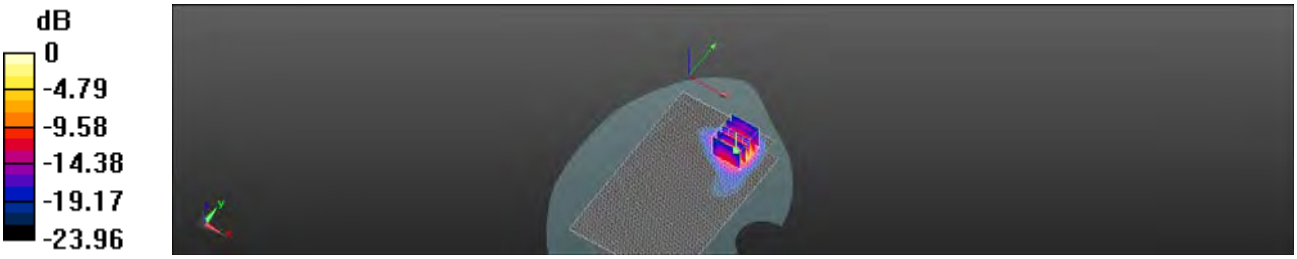
Communication System: WCDMA; Frequency: 1907.6 MHz
Medium parameters used: f = 1908 MHz; σ = 1.569 S/m; ε_r = 54.046; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 12.0 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.74 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 15.5 W/kg
SAR(1 g) = 7.43 W/kg; SAR(10 g) = 2.94 W/kg
Maximum value of SAR (measured) = 11.2 W/kg



0 dB = 11.2 W/kg = 10.50 dBW/kg

Date: 2016/8/17

WCDMA Band 5_Head_Le Cheek_CH 4183

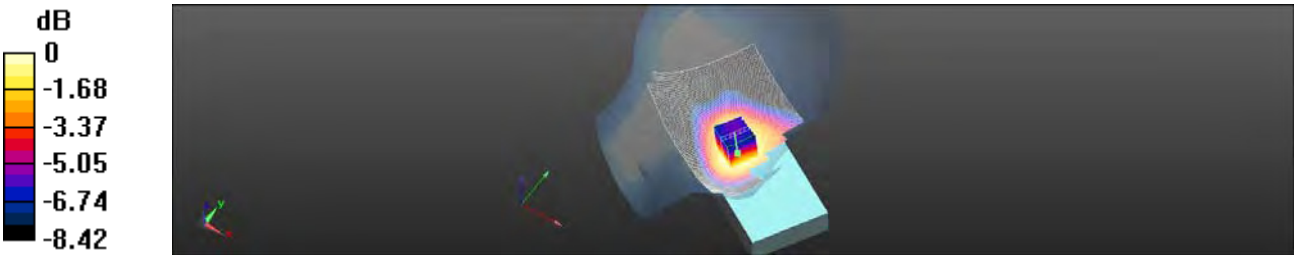
Communication System: WCDMA; Frequency: 836.6 MHz
Medium parameters used: f = 837 MHz; σ = 0.896 S/m; ε_r = 41.06; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.35, 9.35, 9.35); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x181x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.260 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.103 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.295 W/kg
SAR(1 g) = 0.228 W/kg; SAR(10 g) = 0.171 W/kg
Maximum value of SAR (measured) = 0.268 W/kg



0 dB = 0.268 W/kg = -5.72 dBW/kg

Date: 2016/8/22

WCDMA Band 5_Hotspot_Back side_CH 4183_10mm

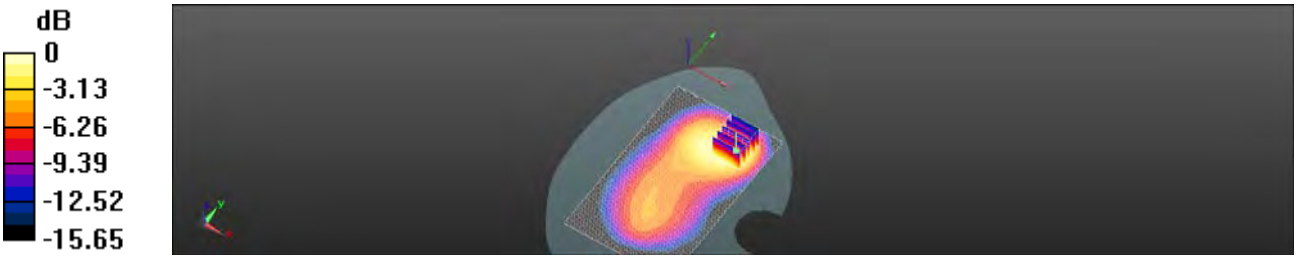
Communication System: WCDMA; Frequency: 836.6 MHz
Medium parameters used: f = 837 MHz; σ = 0.985 S/m; ε_r = 55.57; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.3, 9.3, 9.3); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.584 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.03 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.694 W/kg
SAR(1 g) = 0.419 W/kg; SAR(10 g) = 0.256 W/kg
Maximum value of SAR (measured) = 0.561 W/kg



0 dB = 0.561 W/kg = -2.51 dBW/kg

Date: 2016/8/22

WCDMA Band 5_Product specific 10-g SAR_Back side_CH 4183_0mm

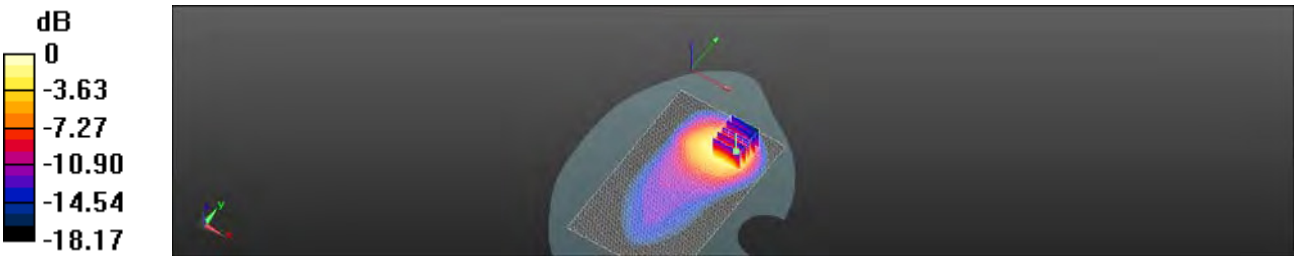
Communication System: WCDMA; Frequency: 836.6 MHz
Medium parameters used: f = 837 MHz; σ = 0.985 S/m; ε_r = 55.57; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.3, 9.3, 9.3); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 3.48 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.23 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 5.28 W/kg
SAR(1 g) = 2.57 W/kg; SAR(10 g) = 1.44 W/kg
Maximum value of SAR (measured) = 3.55 W/kg



0 dB = 3.55 W/kg = 5.50 dBW/kg

Date: 2016/8/17

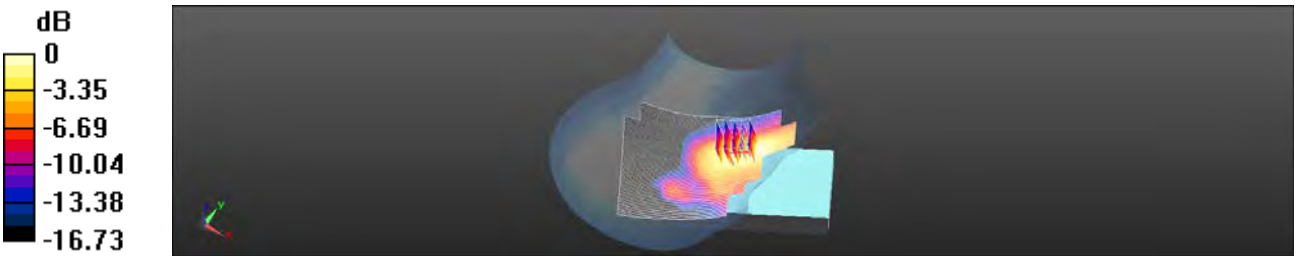
LTE Band 2 (20MHz)_Head_Re Cheek_CH 18700_QPSK_1-0
Communication System: LTE; Frequency: 1860 MHz
Medium parameters used: f = 1860 MHz; σ = 1.389 S/m; ε_r = 39.472; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.89, 7.89, 7.89); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x141x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.209 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.208 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.246 W/kg
SAR(1 g) = 0.155 W/kg; SAR(10 g) = 0.093 W/kg
Maximum value of SAR (measured) = 0.205 W/kg



0 dB = 0.205 W/kg = -6.88 dBW/kg

Date: 2016/8/23

LTE Band 2 (20MHz)_Hotspot_Back side_CH 19100_QPSK_1-0_10mm

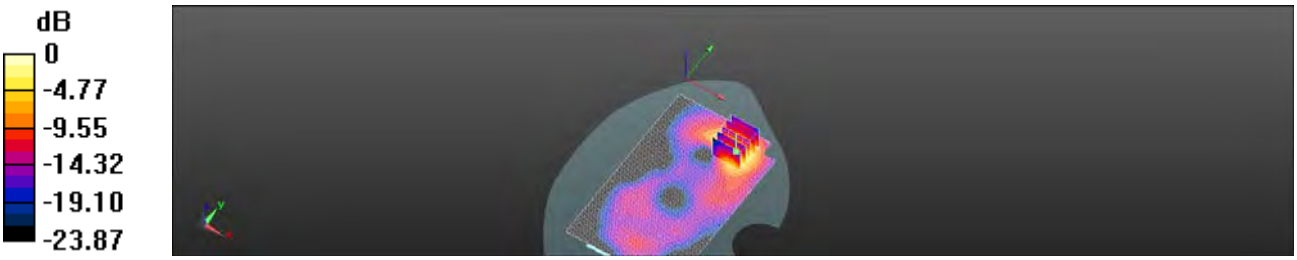
Communication System: LTE; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.562 S/m; ε_r = 54.078; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 1.74 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.6470 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.93 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.549 W/kg
Maximum value of SAR (measured) = 1.55 W/kg



0 dB = 1.55 W/kg = 1.90 dBW/kg

Date: 2016/8/23

LTE Band 2 (20MHz)_Product specific 10-g SAR_Back side_CH 19100_QPSK_1-0_0mm

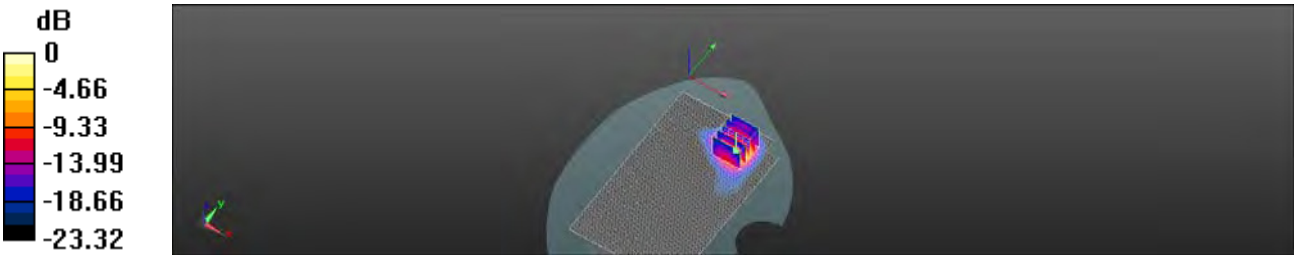
Communication System: LTE; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.562 S/m; ε_r = 54.078; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 11.8 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.31 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 14.3 W/kg
SAR(1 g) = 6.76 W/kg; SAR(10 g) = 2.74 W/kg
Maximum value of SAR (measured) = 10.4 W/kg



0 dB = 10.4 W/kg = 10.18 dBW/kg

Date: 2016/8/17

LTE Band 5 (10MHz)_Head_Re Cheek_CH 20525_QPSK_1-0

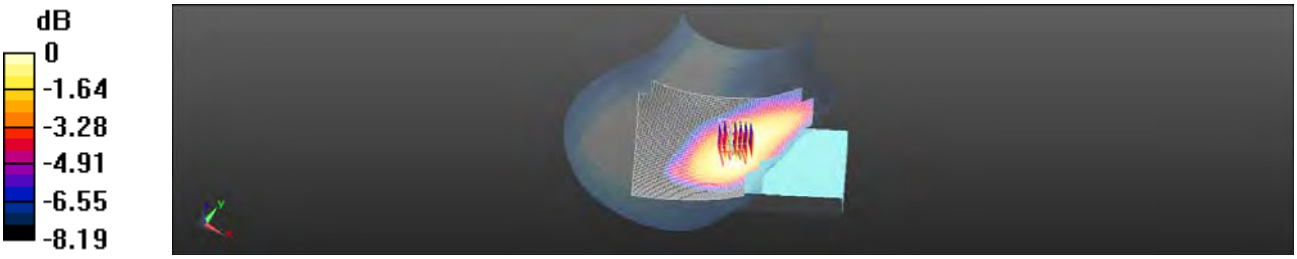
Communication System: LTE; Frequency: 836.5 MHz
Medium parameters used: f = 836.5 MHz; σ = 0.895 S/m; ε_r = 41.081; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.35, 9.35, 9.35); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x181x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.235 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.060 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.264 W/kg
SAR(1 g) = 0.202 W/kg; SAR(10 g) = 0.154 W/kg
Maximum value of SAR (measured) = 0.232 W/kg



0 dB = 0.232 W/kg = -6.34 dBW/kg

Date: 2016/8/22

LTE Band 5 (10MHz)_Hotspot_Back side_CH 20525_QPSK_1-0_10mm

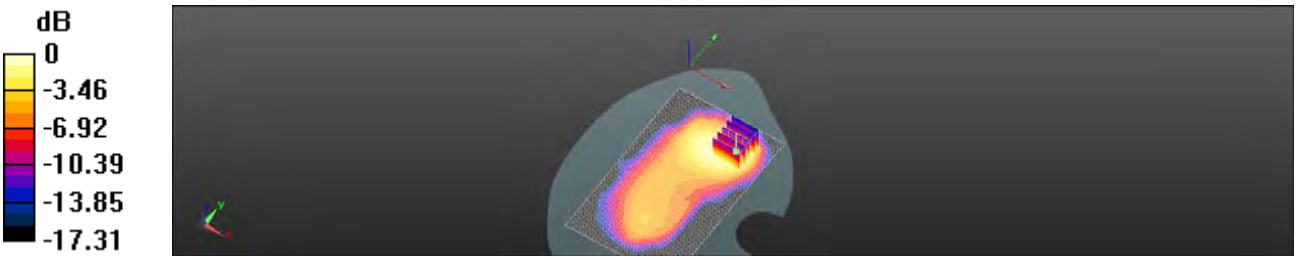
Communication System: LTE; Frequency: 836.5 MHz
Medium parameters used: f = 836.5 MHz; σ = 0.985 S/m; ε_r = 55.654; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.3, 9.3, 9.3); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 0.442 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.62 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.523 W/kg
SAR(1 g) = 0.315 W/kg; SAR(10 g) = 0.192 W/kg
Maximum value of SAR (measured) = 0.422 W/kg



0 dB = 0.422 W/kg = -3.74 dBW/kg

Date: 2016/8/22

LTE Band 5 (10MHz)_Product specific 10-g SAR_Back side_CH 20525_QPSK_1-0_0mm

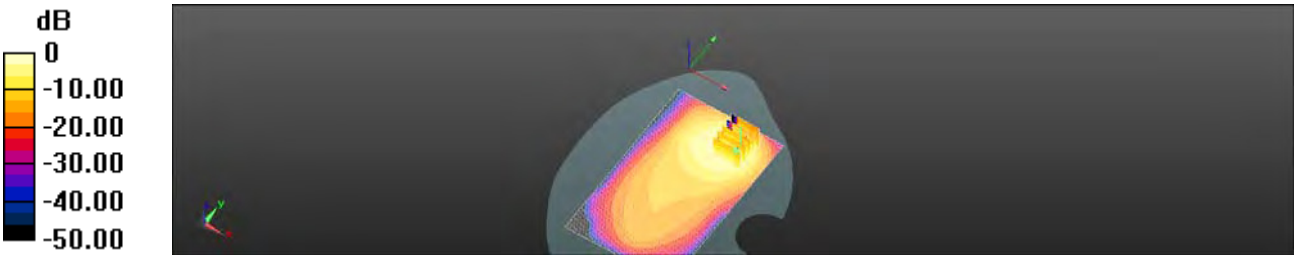
Communication System: LTE; Frequency: 836.5 MHz
Medium parameters used: f = 836.5 MHz; σ = 0.985 S/m; ε_r = 55.654; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.3, 9.3, 9.3); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (81x131x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 3.29 W/kg

Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.03 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 4.54 W/kg
SAR(1 g) = 2.36 W/kg; SAR(10 g) = 1.25 W/kg
Maximum value of SAR (measured) = 3.34 W/kg



0 dB = 3.34 W/kg = 5.24 dBW/kg

Date: 2016/8/18

LTE Band 7 (20MHz)_Head_Re Cheek_CH 20850_QPSK_1-99

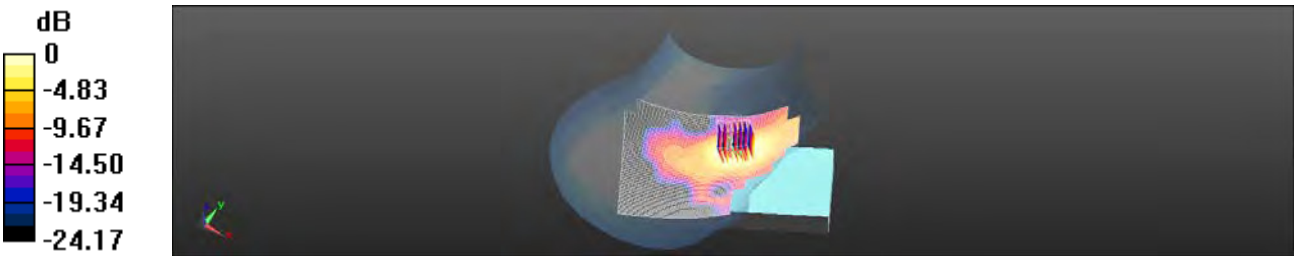
Communication System: LTE; Frequency: 2510 MHz
Medium parameters used: f = 2510 MHz; σ = 1.839 S/m; ε_r = 38.423; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.79, 6.79, 6.79); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x181x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.206 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.041 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.279 W/kg
SAR(1 g) = 0.147 W/kg; SAR(10 g) = 0.075 W/kg
Maximum value of SAR (measured) = 0.210 W/kg



0 dB = 0.210 W/kg = -6.78 dBW/kg

Date: 2016/8/24

LTE Band 7 (20MHz)_Hotspot_Back side_CH 20850_QPSK_1-99_10mm

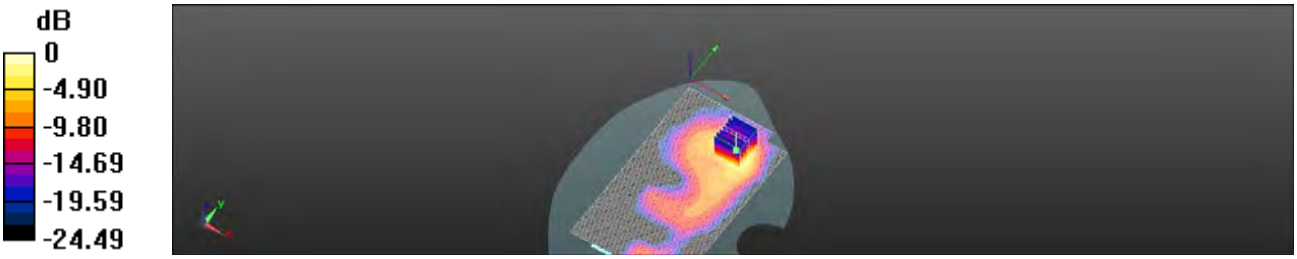
Communication System: LTE; Frequency: 2510 MHz
Medium parameters used: f = 2510 MHz; σ = 2.061 S/m; ε_r = 53.96; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.89, 6.89, 6.89); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x171x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.793 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.275 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.537 W/kg; SAR(10 g) = 0.249 W/kg
Maximum value of SAR (measured) = 0.809 W/kg



0 dB = 0.809 W/kg = -0.92 dBW/kg

Date: 2016/8/24

LTE Band 7 (20MHz)_Product specific 10-g SAR_Back side_CH 20850_QPSK_1-99_0mm

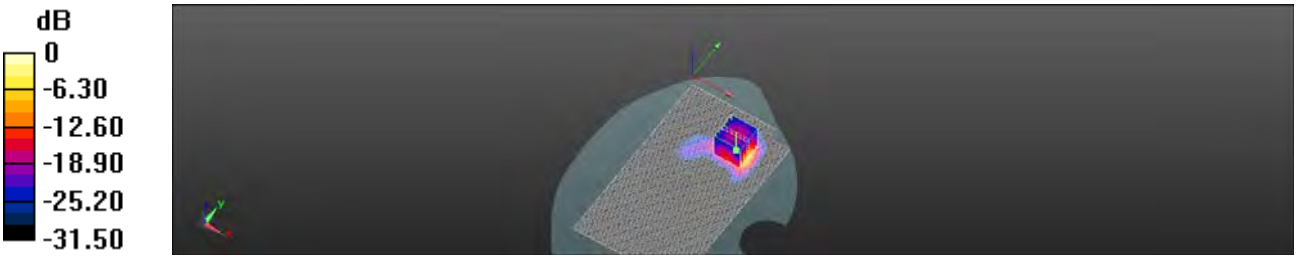
Communication System: LTE; Frequency: 2510 MHz
Medium parameters used: f = 2510 MHz; σ = 2.061 S/m; ε_r = 53.96; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.89, 6.89, 6.89); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x171x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 5.89 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.7130 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 6.65 W/kg
SAR(1 g) = 2.68 W/kg; SAR(10 g) = 0.948 W/kg
Maximum value of SAR (measured) = 4.57 W/kg



0 dB = 4.57 W/kg = 6.60 dBW/kg

Date: 2016/8/18

LTE Band 38 (20MHz)_Head_Re Cheek_CH 38000_QPSK_1-0

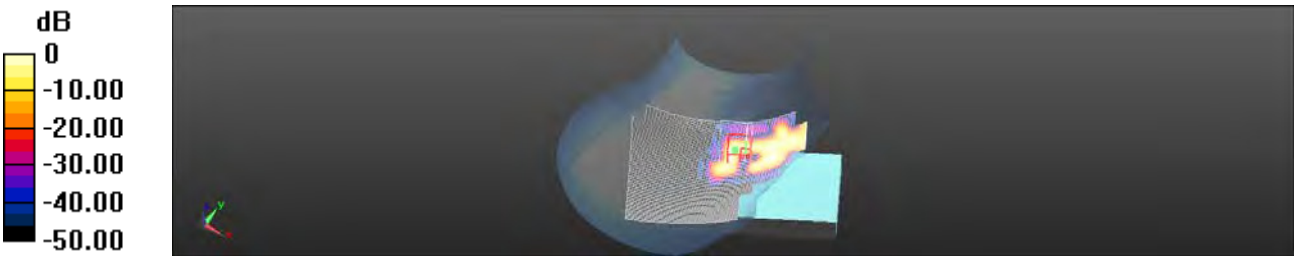
Communication System: LTE; Frequency: 2595 MHz
Medium parameters used: f = 2595 MHz; σ = 1.925 S/m; ε_r = 38.243; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.79, 6.79, 6.79); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x181x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.0152 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.4240 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.0590 W/kg
SAR(1 g) = 0.013 W/kg; SAR(10 g) = 0.00458 W/kg
Maximum value of SAR (measured) = 0.0222 W/kg



0 dB = 0.0222 W/kg = -16.53 dBW/kg

Date: 2016/8/24

LTE Band 38 (20MHz)_Hotspot_Back side_CH 38000_QPSK_1-0_10mm

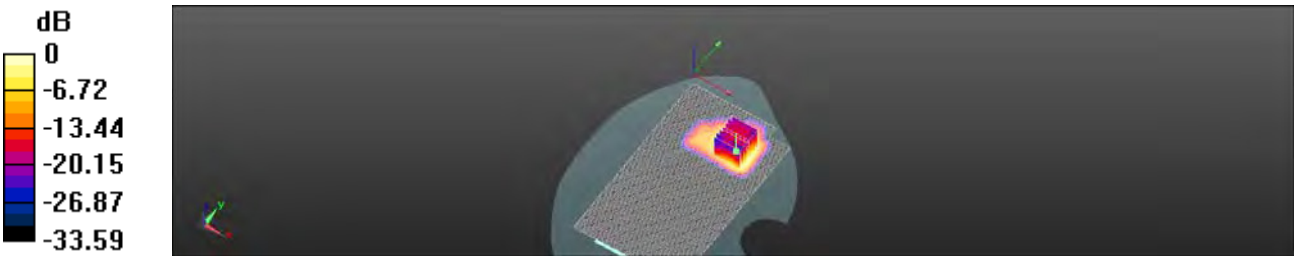
Communication System: LTE; Frequency: 2595 MHz
Medium parameters used: f = 2595 MHz; σ = 2.145 S/m; ε_r = 53.734; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.89, 6.89, 6.89); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x171x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.255 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.5491 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.327 W/kg
SAR(1 g) = 0.152 W/kg; SAR(10 g) = 0.065 W/kg
Maximum value of SAR (measured) = 0.236 W/kg



0 dB = 0.236 W/kg = -6.27 dBW/kg

Date: 2016/8/24

LTE Band 38 (20MHz)_Product specific 10-g SAR_Back side_CH 38000_QPSK_1-0_0mm

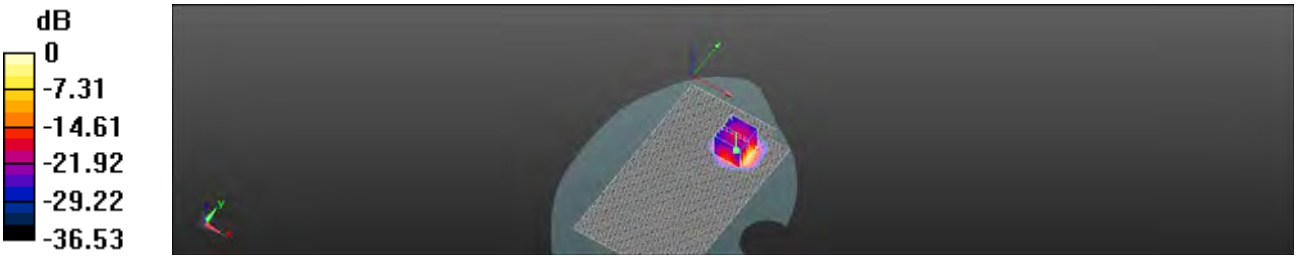
Communication System: LTE; Frequency: 2595 MHz
Medium parameters used: f = 2595 MHz; σ = 2.145 S/m; ε_r = 53.734; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.89, 6.89, 6.89); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x171x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 2.74 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.9120 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 2.54 W/kg
SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.349 W/kg
Maximum value of SAR (measured) = 1.73 W/kg



0 dB = 1.73 W/kg = 2.38 dBW/kg

Date: 2016/8/18

LTE Band 41 (20MHz)_Head_Re Cheek_CH 41140_QPSK_1-0

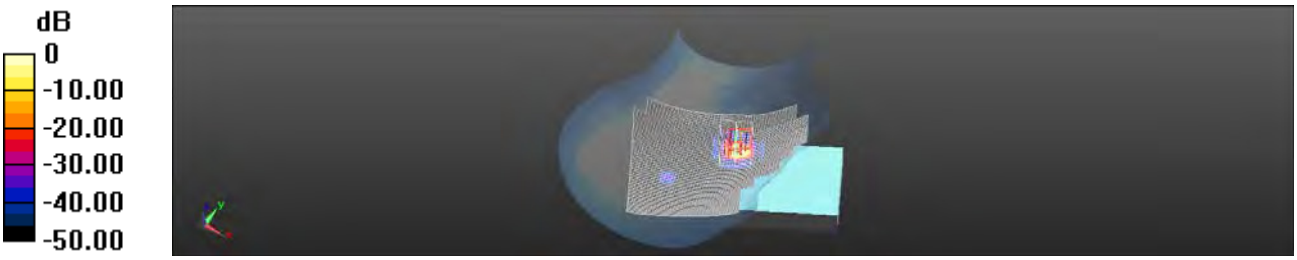
Communication System: LTE; Frequency: 2645 MHz
Medium parameters used: f = 2645 MHz; σ = 1.985 S/m; ε_r = 38.06; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.79, 6.79, 6.79); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x181x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.0105 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.723 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.0290 W/kg
SAR(1 g) = 0.00464 W/kg; SAR(10 g) = 0.0014 W/kg
Maximum value of SAR (measured) = 0.0101 W/kg



0 dB = 0.0101 W/kg = -19.94 dBW/kg

Date: 2016/8/24

LTE Band 41 (20MHz)_Hotspot_Bottom side_CH 41140_QPSK_1-0_10mm

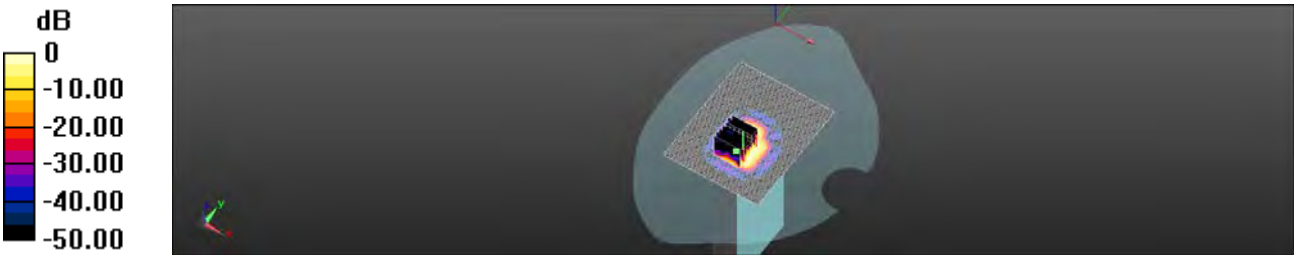
Communication System: LTE; Frequency: 2645 MHz
Medium parameters used: f = 2645 MHz; σ = 2.192 S/m; ε_r = 53.506; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.89, 6.89, 6.89); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (91x111x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.661 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.182 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.938 W/kg
SAR(1 g) = 0.244 W/kg; SAR(10 g) = 0.091 W/kg
Maximum value of SAR (measured) = 0.381 W/kg



0 dB = 0.381 W/kg = -4.20 dBW/kg

Date: 2016/8/24

LTE Band 41 (20MHz)_Product specific 10-g SAR_Back side_CH 41140_QPSK_1-0_0mm

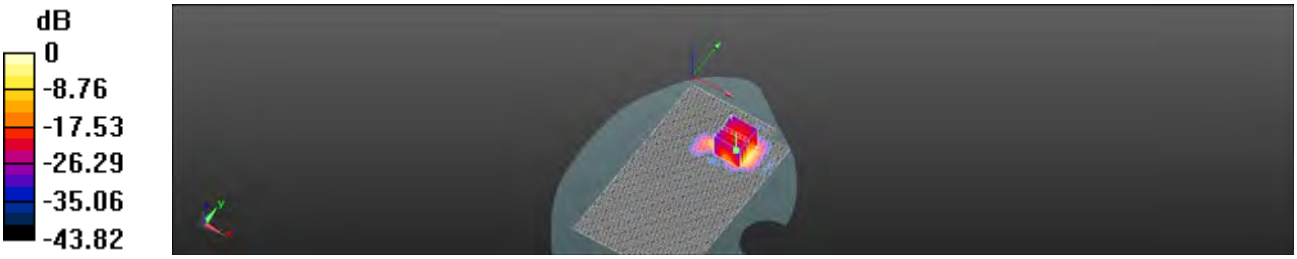
Communication System: LTE; Frequency: 2645 MHz
Medium parameters used: f = 2645 MHz; σ = 2.192 S/m; ε_r = 53.506; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.89, 6.89, 6.89); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x171x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 4.05 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 0.1197 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 3.35 W/kg
SAR(1 g) = 1.32 W/kg; SAR(10 g) = 0.448 W/kg
Maximum value of SAR (measured) = 2.30 W/kg



0 dB = 2.30 W/kg = 3.63 dBW/kg

Date: 2016/8/19

WLAN 802.11b_Head_Re Cheek_CH 11

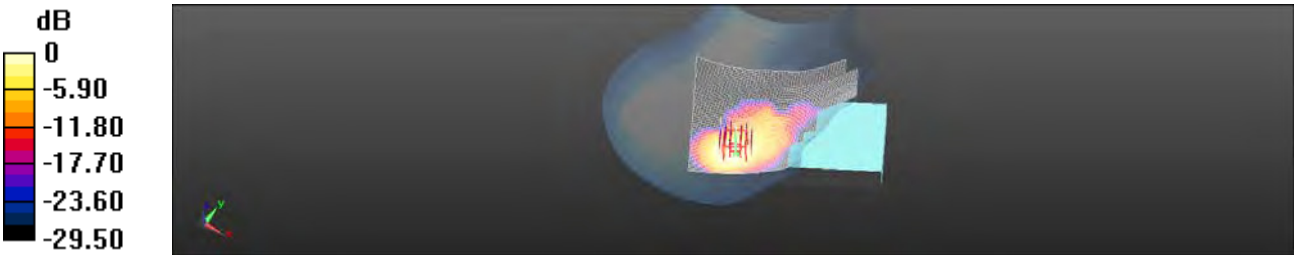
Communication System: WLAN 2.45G; Frequency: 2462 MHz
Medium parameters used: f = 2462 MHz; σ = 1.791 S/m; ε_r = 38.529; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.11, 7.11, 7.11); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x161x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.407 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.473 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.579 W/kg
SAR(1 g) = 0.277 W/kg; SAR(10 g) = 0.133 W/kg
Maximum value of SAR (measured) = 0.422 W/kg



0 dB = 0.422 W/kg = -3.75 dBW/kg

Date: 2016/8/25

WLAN 802.11b_Hotspot_Left side_CH 11_10mm

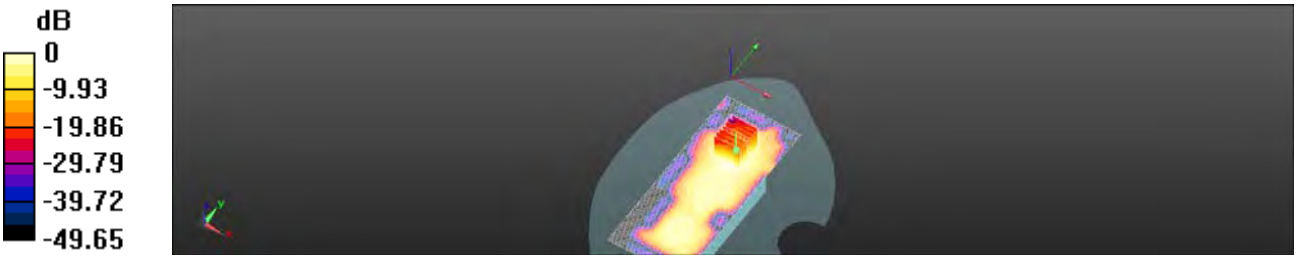
Communication System: WLAN 2.45G; Frequency: 2462 MHz
Medium parameters used: f = 2462 MHz; σ = 2.002 S/m; ε_r = 54.031; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.17, 7.17, 7.17); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x171x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 0.263 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.176 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.359 W/kg
SAR(1 g) = 0.186 W/kg; SAR(10 g) = 0.089 W/kg
Maximum value of SAR (measured) = 0.265 W/kg



0 dB = 0.265 W/kg = -5.76 dBW/kg

Date: 2016/8/25

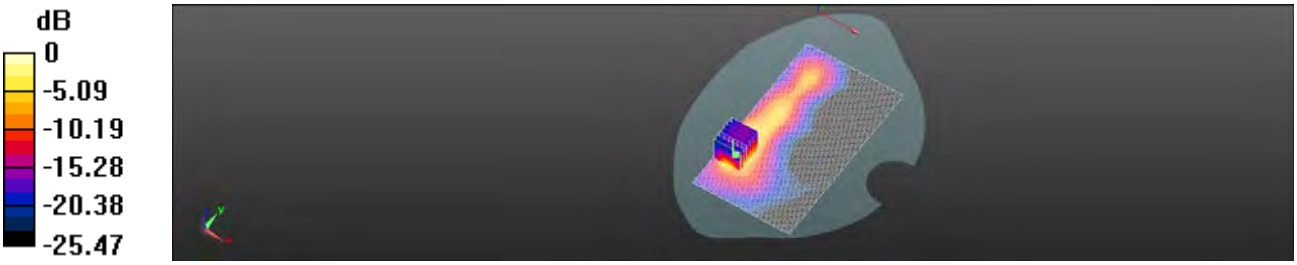
WLAN 802.11b_Product specific 10-g SAR_Back side_CH 11_0mm
Communication System: WLAN 2.45G; Frequency: 2462 MHz
Medium parameters used: f = 2412 MHz; σ = 2.002 S/m; ε_r = 54.031; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.17, 7.17, 7.17); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (91x171x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 1.01 W/kg

Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.94 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.94 W/kg
SAR(1 g) = 0.782 W/kg; SAR(10 g) = 0.306 W/kg
Maximum value of SAR (measured) = 1.03 W/kg



0 dB = 1.03 W/kg = 0.12 dBW/kg

Date: 2016/8/19

WLAN 802.11n(40M) 5.2G_Head_Re Cheek_CH 46

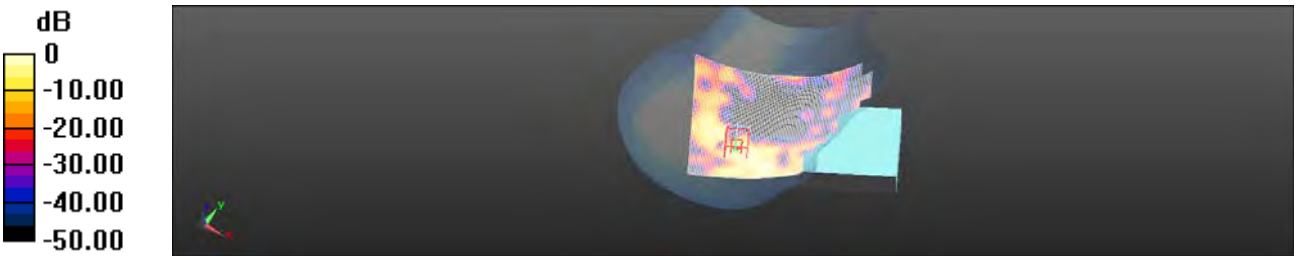
Communication System: WLAN 5G; Frequency: 5230 MHz
Medium parameters used: f = 5230 MHz; σ = 4.575 S/m; ε_r = 35.067; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.9, 4.9, 4.9); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (121x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.102 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.6579 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.194 W/kg
SAR(1 g) = 0.040 W/kg; SAR(10 g) = 0.00896 W/kg
Maximum value of SAR (measured) = 0.0897 W/kg



0 dB = 0.0897 W/kg = -10.47 dBW/kg

Date: 2016/8/25

WLAN 802.11n(40M) 5.2G_Body_Back side_CH 46_10mm

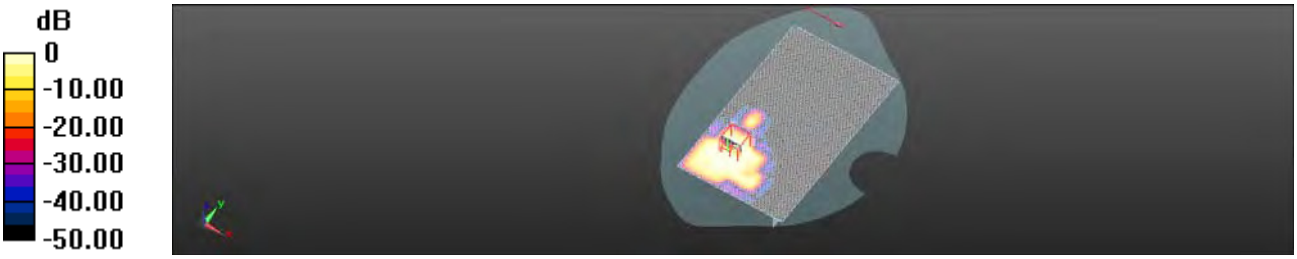
Communication System: WLAN 5G; Frequency: 5230 MHz
Medium parameters used: f = 5230 MHz; σ = 5.476 S/m; ε_r = 50.629; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.19, 4.19, 4.19); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (121x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.334 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 2.012 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.895 W/kg
SAR(1 g) = 0.151 W/kg; SAR(10 g) = 0.056 W/kg
Maximum value of SAR (measured) = 0.312 W/kg



0 dB = 0.312 W/kg = -5.06 dBW/kg

Date: 2016/8/25

WLAN 802.11n(40M) 5.2G_Product specific 10-g SAR_Back side_CH 46_0mm

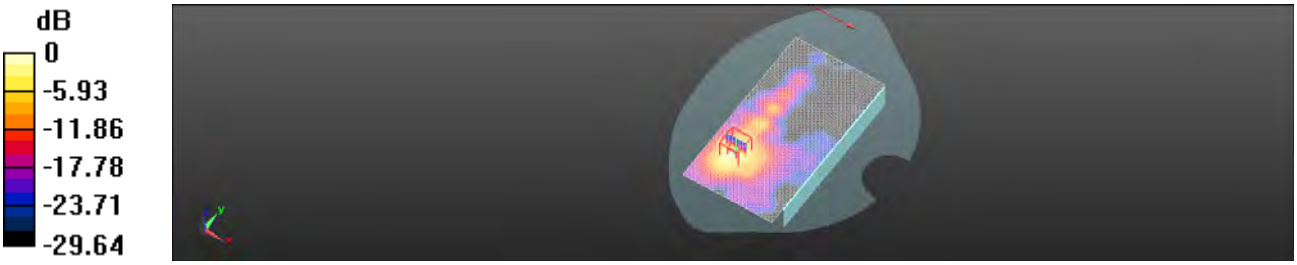
Communication System: WLAN 5G; Frequency: 5230 MHz
Medium parameters used: f = 5230 MHz; σ = 5.476 S/m; ε_r = 50.629; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.19, 4.19, 4.19); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 1.80 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.474 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 4.21 W/kg
SAR(1 g) = 0.858 W/kg; SAR(10 g) = 0.221 W/kg
Maximum value of SAR (measured) = 1.96 W/kg



0 dB = 1.96 W/kg = 2.92 dBW/kg

Date: 2016/8/19

WLAN 802.11n(40M) 5.3G_Head_Re Tilt_CH 62

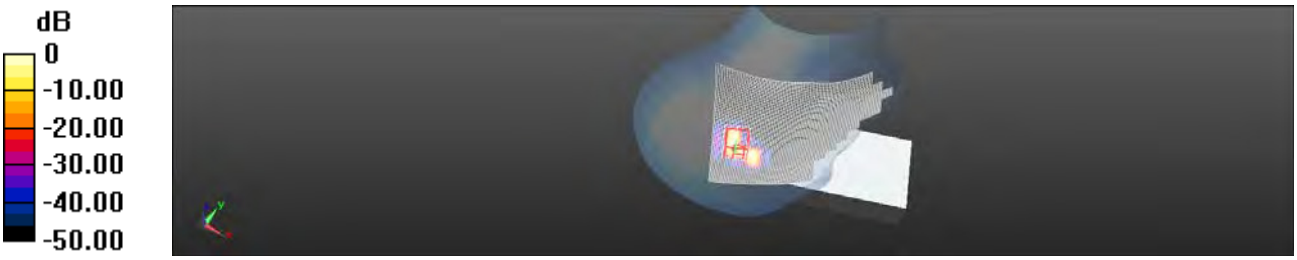
Communication System: WLAN 5G; Frequency: 5310 MHz
Medium parameters used: f = 5310 MHz; σ = 4.658 S/m; ε_r = 34.895; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.81, 4.81, 4.81); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (121x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.241 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.5000 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.00 W/kg
SAR(1 g) = 0.074 W/kg; SAR(10 g) = 0.019 W/kg
Maximum value of SAR (measured) = 0.152 W/kg



0 dB = 0.152 W/kg = -8.17 dBW/kg

Date: 2016/8/25

WLAN 802.11n(40M) 5.3G_Body_Back side_CH 62_10mm

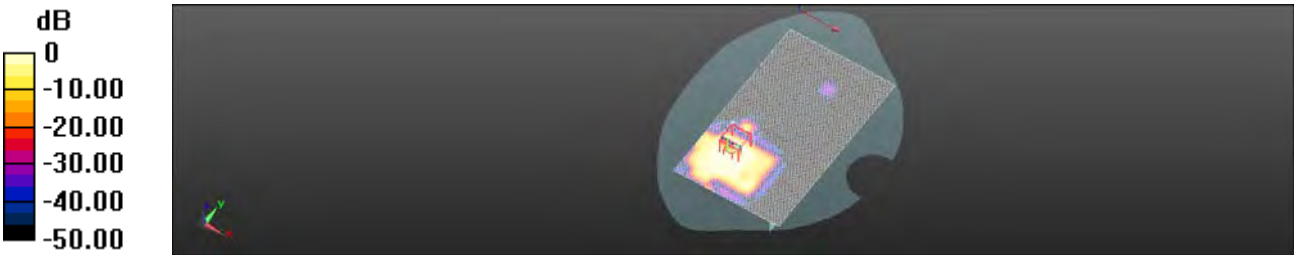
Communication System: WLAN 5G; Frequency: 5310 MHz
Medium parameters used: f = 5310 MHz; σ = 5.558 S/m; ε_r = 50.424; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.09, 4.09, 4.09); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (121x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.429 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.056 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.743 W/kg
SAR(1 g) = 0.186 W/kg; SAR(10 g) = 0.062 W/kg
Maximum value of SAR (measured) = 0.388 W/kg



0 dB = 0.388 W/kg = -4.11 dBW/kg

Date: 2016/8/25

WLAN 802.11n(40M) 5.3G_Product specific 10-g SAR_Back side_CH 62_0mm

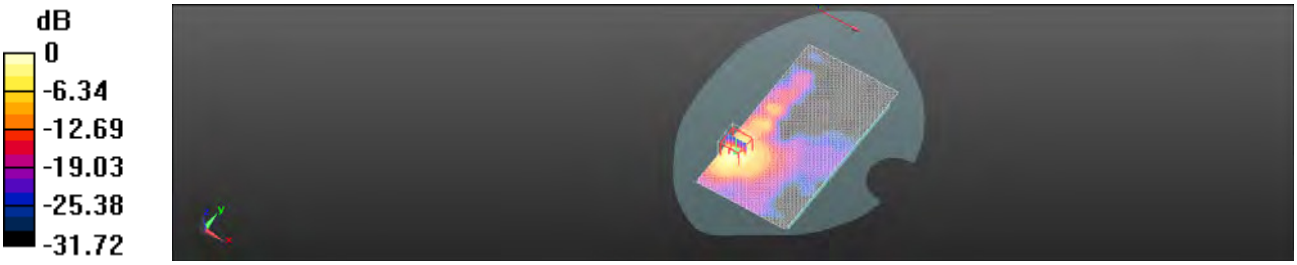
Communication System: WLAN 5G; Frequency: 5310 MHz
Medium parameters used: f = 5310 MHz; σ = 5.558 S/m; ε_r = 50.424; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.09, 4.09, 4.09); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 2.41 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 4.991 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 5.94 W/kg
SAR(1 g) = 1.19 W/kg; SAR(10 g) = 0.306 W/kg
Maximum value of SAR (measured) = 3.92 W/kg



0 dB = 3.92 W/kg = 5.93 dBW/kg

Date: 2016/8/19

WLAN 802.11n(40M) 5.6G_Head_Le Cheek_CH 118

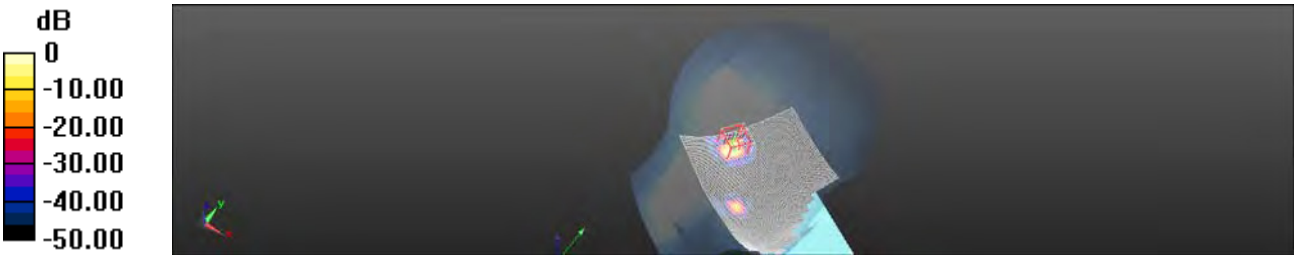
Communication System: WLAN 5G; Frequency: 5590 MHz
Medium parameters used: f = 5590 MHz; σ = 4.937 S/m; ε_r = 34.509; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.28, 4.28, 4.28); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (121x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.145 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.6450 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.092 W/kg; SAR(10 g) = 0.023 W/kg
Maximum value of SAR (measured) = 0.126 W/kg



0 dB = 0.126 W/kg = -8.98 dBW/kg

Date: 2016/8/25

WLAN 802.11n(40M) 5.6G_Body_Back side_CH 118_10mm

Communication System: WLAN 5G; Frequency: 5590 MHz
Medium parameters used: f = 5590 MHz; σ = 5.839 S/m; ε_r = 49.944; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(3.66, 3.66, 3.66); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (121x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.417 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.4770 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.683 W/kg
SAR(1 g) = 0.142 W/kg; SAR(10 g) = 0.046 W/kg
Maximum value of SAR (measured) = 0.345 W/kg

0 dB = 0.345 W/kg = -4.63 dBW/kg

Date: 2016/8/25

WLAN 802.11n(40M) 5.6G_Product specific 10-g SAR_Back side_CH 118_0mm

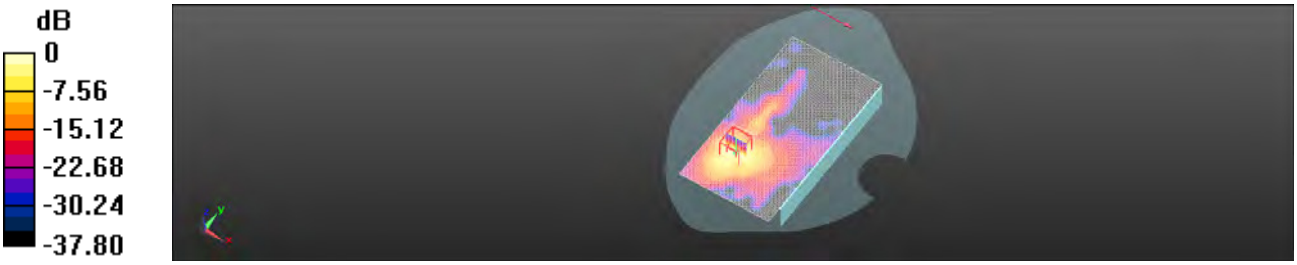
Communication System: WLAN 5G; Frequency: 5590 MHz
Medium parameters used: f = 5590 MHz; σ = 5.839 S/m; ε_r = 49.944; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(3.66, 3.66, 3.66); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 2.21 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 1.900 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 6.10 W/kg
SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.268 W/kg
Maximum value of SAR (measured) = 2.53 W/kg



0 dB = 2.53 W/kg = 4.04 dBW/kg

Date: 2016/8/19

WLAN 802.11n(40M) 5.8G_Head_Re Cheek_CH 159

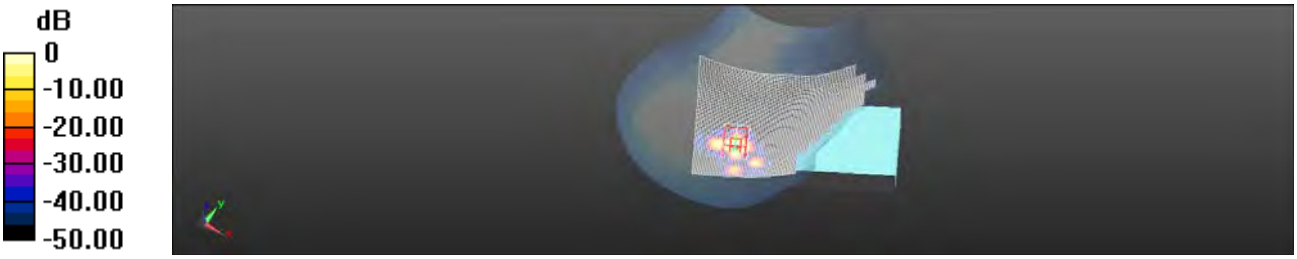
Communication System: WLAN 5G; Frequency: 5795 MHz
Medium parameters used: f = 5795 MHz; σ = 5.145 S/m; ε_r = 34.239; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.41, 4.41, 4.41); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (121x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.546 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.9220 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.184 W/kg; SAR(10 g) = 0.047 W/kg
Maximum value of SAR (measured) = 0.508 W/kg



0 dB = 0.508 W/kg = -2.94 dBW/kg

Date: 2016/8/25

WLAN 802.11n(40M) 5.8G_Body_Back side_CH 159_10mm

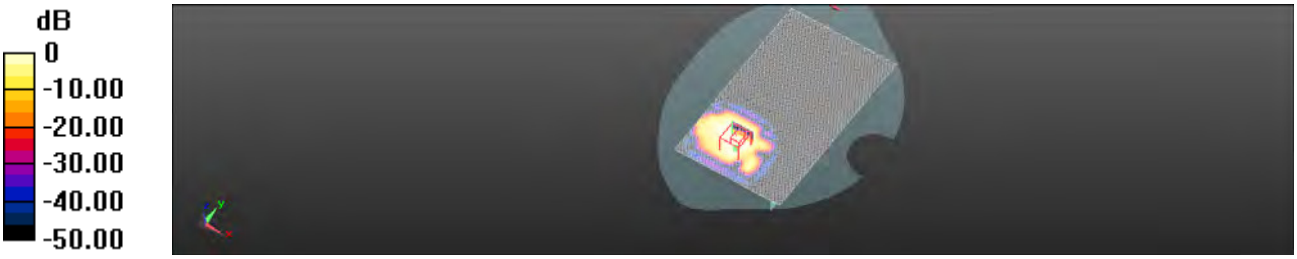
Communication System: WLAN 5G; Frequency: 5795 MHz
Medium parameters used: f = 5795 MHz; σ = 6.046 S/m; ε_r = 49.585; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(3.87, 3.87, 3.87); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (121x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 0.490 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.8907 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.795 W/kg
SAR(1 g) = 0.168 W/kg; SAR(10 g) = 0.057 W/kg
Maximum value of SAR (measured) = 0.379 W/kg



0 dB = 0.379 W/kg = -4.22 dBW/kg

Date: 2016/8/25

WLAN 802.11n(40M) 5.8G_Product specific 10-g SAR_Back side_CH 159_0mm

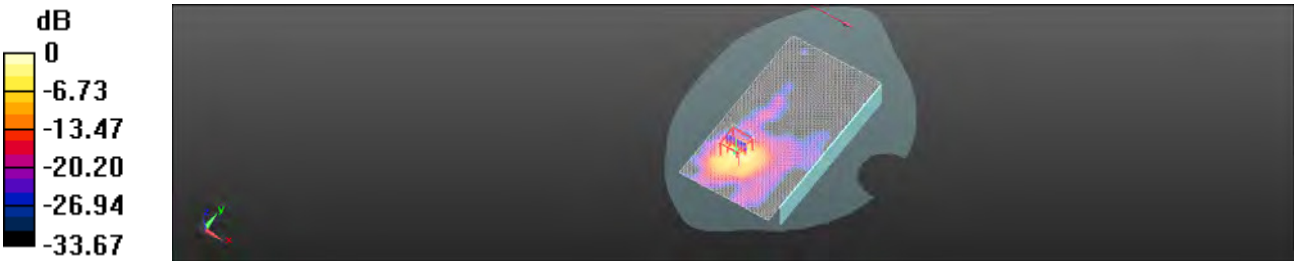
Communication System: WLAN 5G; Frequency: 5795 MHz
Medium parameters used: f = 5795 MHz; σ = 6.046 S/m; ε_r = 49.585; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(3.87, 3.87, 3.87); Calibrated: 2015/10/01;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (101x201x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 2.54 W/kg

Configuration/Head/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 0.7192 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 5.34 W/kg
SAR(1 g) = 1.07 W/kg; SAR(10 g) = 0.241 W/kg
Maximum value of SAR (measured) = 2.52 W/kg



0 dB = 2.52 W/kg = 4.02 dBW/kg

6. SAR System Performance Verification

Date: 2016/8/17

Dipole 835 MHz_SN:4d120_Head

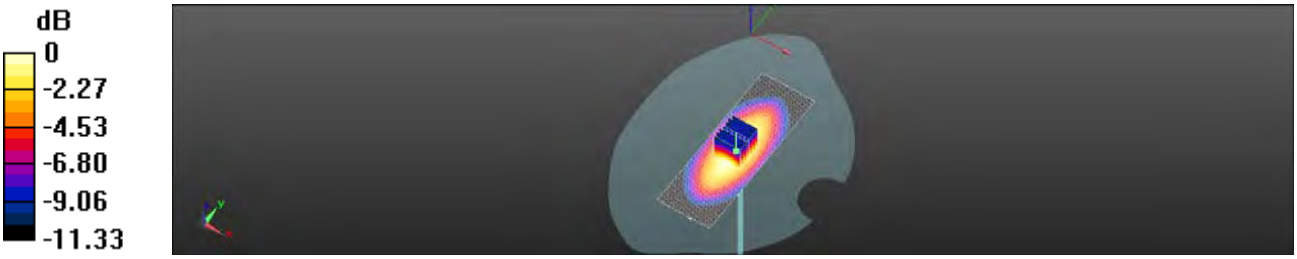
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.893 S/m; ε_r = 41.106; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.35, 9.35, 9.35); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=250mW/Area Scan (41x121x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 3.06 W/kg

Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.79 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.69 W/kg
SAR(1 g) = 2.36 W/kg; SAR(10 g) = 1.51 W/kg
Maximum value of SAR (measured) = 3.06 W/kg



0 dB = 3.06 W/kg = 4.86 dBW/kg

Date: 2016/8/22

Dipole 835 MHz_SN:4d120_Body

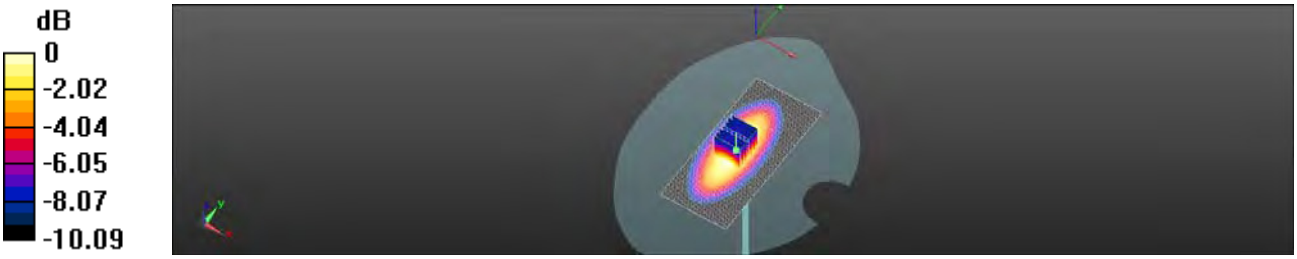
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.984 S/m; ε_r = 55.68; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(9.3, 9.3, 9.3); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=250mW/Area Scan (51x111x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 3.07 W/kg

Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.81 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.54 W/kg
SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.62 W/kg
Maximum value of SAR (measured) = 3.07 W/kg



0 dB = 3.07 W/kg = 4.87 dBW/kg

Date: 2016/8/17

Dipole 1900 MHz_SN:5d027_Head

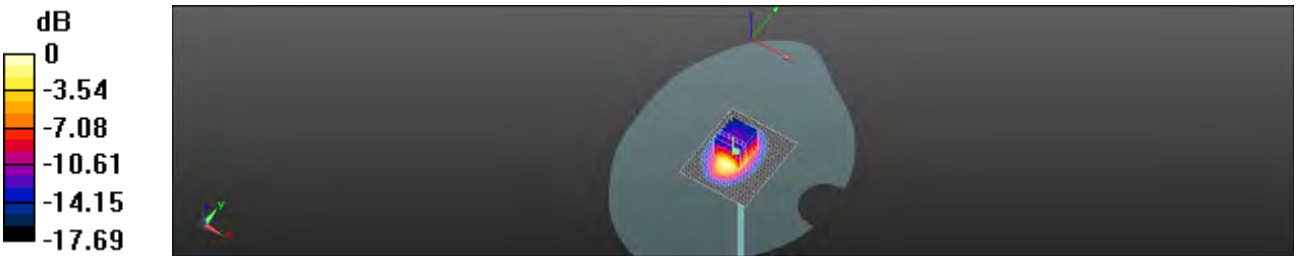
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.429 S/m; ε_r = 39.416; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.89, 7.89, 7.89); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=250mW/Area Scan (51x61x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 12.1 W/kg

Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.36 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 18.0 W/kg
SAR(1 g) = 9.71 W/kg; SAR(10 g) = 5.2 W/kg
Maximum value of SAR (measured) = 14.2 W/kg



0 dB = 14.2 W/kg = 11.53 dBW/kg

Date: 2016/8/23

Dipole 1900 MHz_SN:5d027_Body

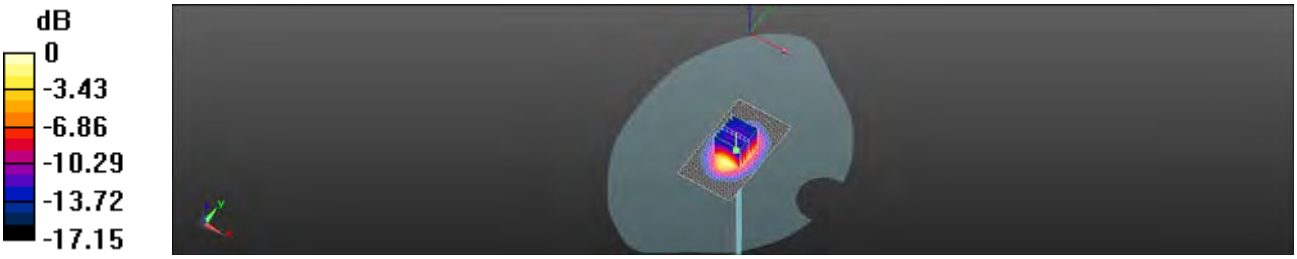
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.562 S/m; ε_r = 54.078; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.41, 7.41, 7.41); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=250mW/Area Scan (41x71x1): Interpolated grid: dx=15 mm, dy=15 mm
Maximum value of SAR (interpolated) = 15.3 W/kg

Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.04 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 9.96 W/kg; SAR(10 g) = 5.17 W/kg
Maximum value of SAR (measured) = 14.3 W/kg



0 dB = 14.3 W/kg = 11.57 dBW/kg

Date: 2016/8/19

Dipole 2450 MHz_SN:727_Head

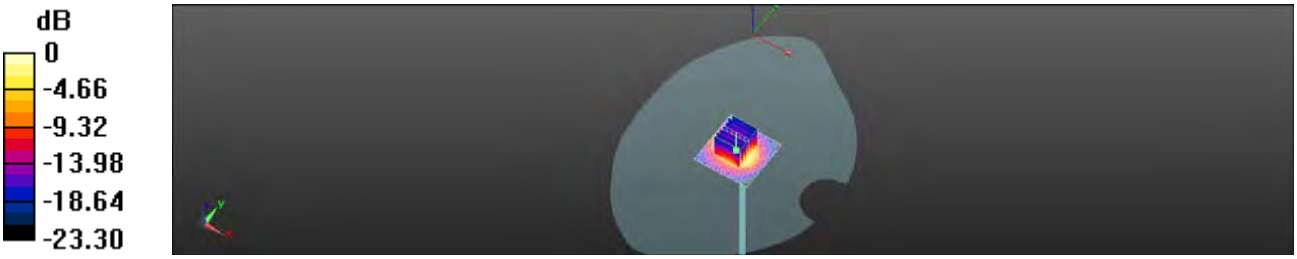
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.779 S/m; ε_r = 38.541; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.11, 7.11, 7.11); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=250mW/Area Scan (51x51x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 22.8 W/kg

Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 109.9 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 29.5 W/kg
SAR(1 g) = 13.1 W/kg; SAR(10 g) = 6.15 W/kg
Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 21.6 W/kg = 13.35 dBW/kg

Date: 2016/8/25

Dipole 2450 MHz_SN:727_Body

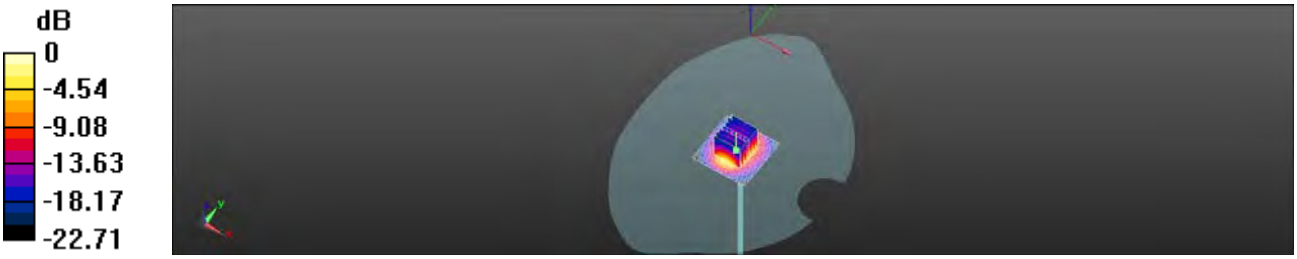
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.99 S/m; ε_r = 54.044; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(7.17, 7.17, 7.17); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=250mW/Area Scan (51x51x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 19.8 W/kg

Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.87 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 24.6 W/kg
SAR(1 g) = 11.9 W/kg; SAR(10 g) = 5.65 W/kg
Maximum value of SAR (measured) = 18.3 W/kg



0 dB = 18.3 W/kg = 12.63 dBW/kg

Date: 2016/8/18

Dipole 2600 MHz_SN:1005_Head

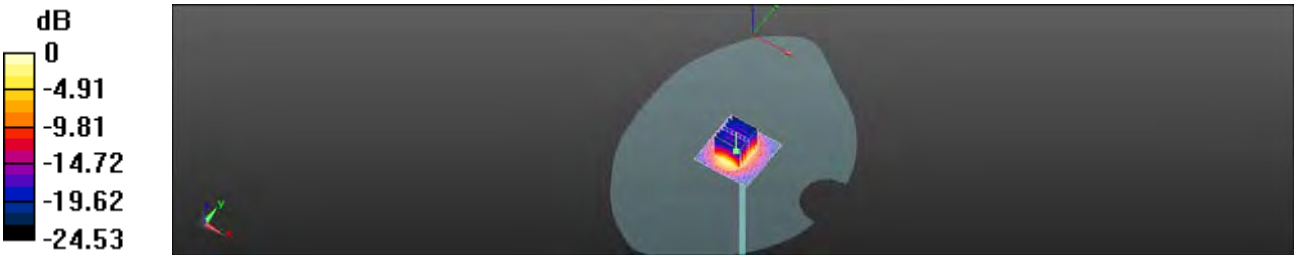
Communication System: CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 1.929 S/m; ε_r = 38.206; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.79, 6.79, 6.79); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=250mW/Area Scan (51x51x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 26.0 W/kg

Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 108.1 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 34.2 W/kg
SAR(1 g) = 14.6 W/kg; SAR(10 g) = 6.5 W/kg
Maximum value of SAR (measured) = 24.5 W/kg



0 dB = 24.5 W/kg = 13.89 dBW/kg

Date: 2016/8/24

Dipole 2600 MHz_SN:1005_Body

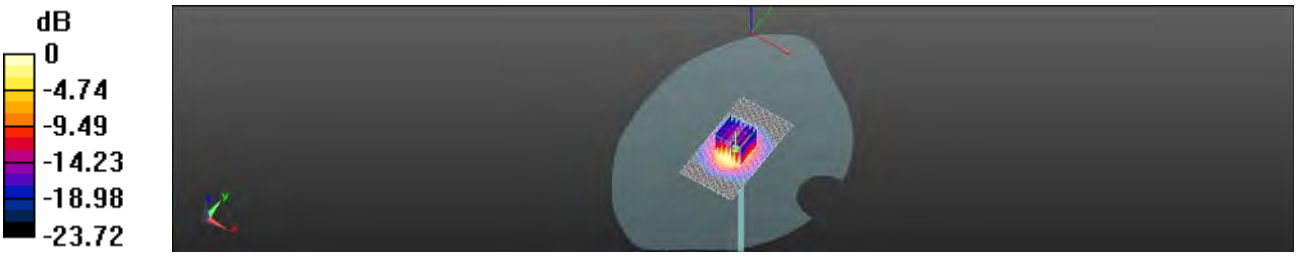
Communication System: CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.15 S/m; ε_r = 53.659; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(6.9, 6.9, 6.9); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=250mW/Area Scan (51x91x1): Interpolated grid: dx=12 mm, dy=12 mm
Maximum value of SAR (interpolated) = 25.0 W/kg

Configuration/Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.0 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 31.2 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.29 W/kg
Maximum value of SAR (measured) = 22.6 W/kg



0 dB = 22.6 W/kg = 13.54 dBW/kg

Date: 2016/8/19

Dipole 5200 MHz_SN:1023_Head

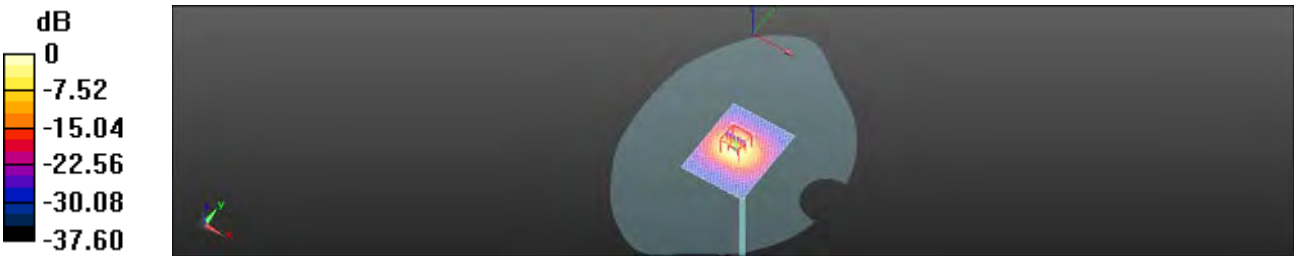
Communication System: CW; Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 4.544 S/m; ε_r = 35.115; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.9, 4.9, 4.9); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=100mW/Area Scan (71x91x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 17.2 W/kg

Configuration/Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 59.33 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 28.6 W/kg
SAR(1 g) = 8.01 W/kg; SAR(10 g) = 2.3 W/kg
Maximum value of SAR (measured) = 16.1 W/kg



0 dB = 16.1 W/kg = 12.06 dBW/kg

Date: 2016/8/25

Dipole 5200 MHz_SN:1023_Body

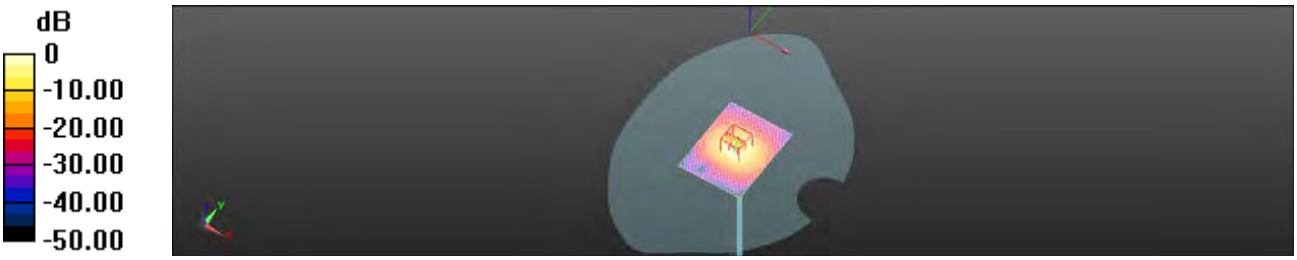
Communication System: CW; Frequency: 5200 MHz
Medium parameters used: f = 5200 MHz; σ = 5.446 S/m; ε_r = 50.74; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.19, 4.19, 4.19); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=100mW/Area Scan (71x91x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 15.0 W/kg

Configuration/Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 56.71 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 25.6 W/kg
SAR(1 g) = 7.53 W/kg; SAR(10 g) = 2.12 W/kg
Maximum value of SAR (measured) = 14.8 W/kg



0 dB = 14.8 W/kg = 11.70 dBW/kg

Date: 2016/8/19

Dipole 5300 MHz_SN:1023_Head

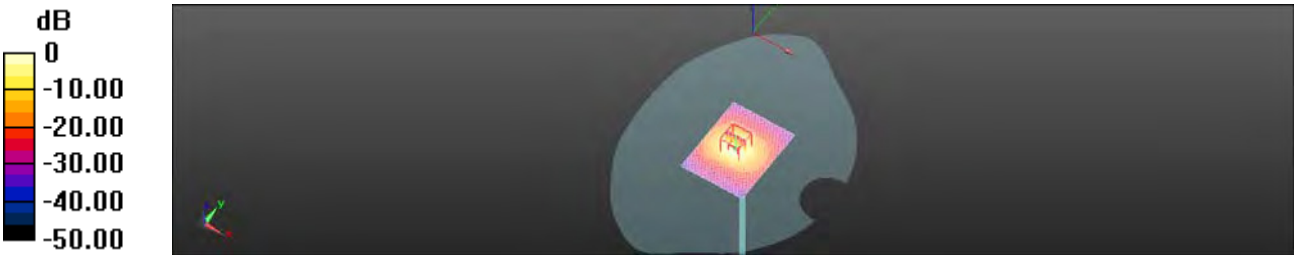
Communication System: CW; Frequency: 5300 MHz
Medium parameters used: f = 5300 MHz; σ = 4.647 S/m; ε_r = 34.942; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.81, 4.81, 4.81); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=100mW/Area Scan (71x91x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 17.9 W/kg

Configuration/Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 69.55 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 29.7 W/kg
SAR(1 g) = 8.25 W/kg; SAR(10 g) = 2.41 W/kg
Maximum value of SAR (measured) = 16.8 W/kg



0 dB = 16.8 W/kg = 12.24 dBW/kg

Date: 2016/8/25

Dipole 5300 MHz_SN:1023_Body

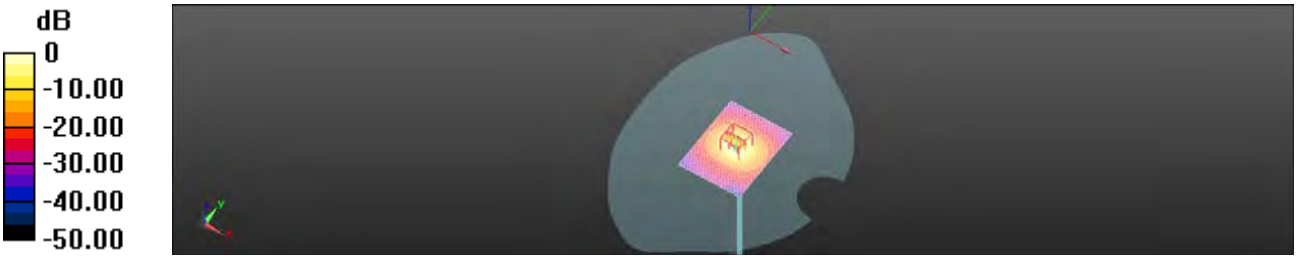
Communication System: CW; Frequency: 5300 MHz
Medium parameters used: f = 5300 MHz; σ = 5.547 S/m; ε_r = 50.492; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.09, 4.09, 4.09); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=100mW/Area Scan (71x91x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 15.7 W/kg

Configuration/Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 66.45 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 27.8 W/kg
SAR(1 g) = 7.68 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 15.3 W/kg



0 dB = 15.3 W/kg = 11.86 dBW/kg

Date: 2016/8/19

Dipole 5600 MHz_SN:1023_Head

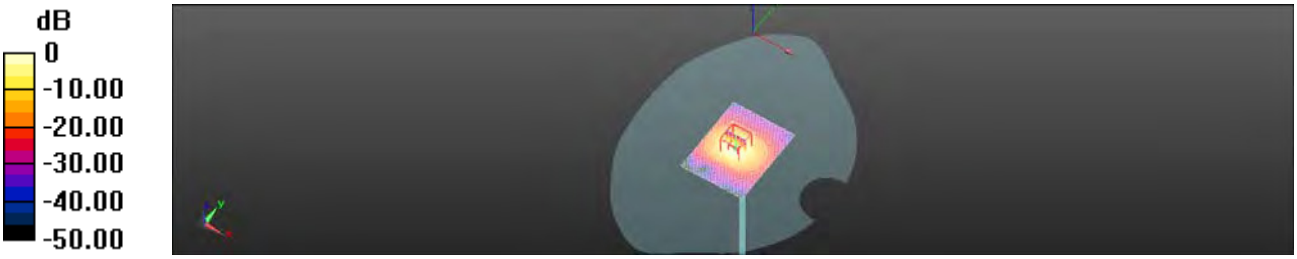
Communication System: CW; Frequency: 5600 MHz
Medium parameters used: f = 5600 MHz; σ = 4.949 S/m; ε_r = 34.488; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.28, 4.28, 4.28); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=100mW/Area Scan (71x91x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 18.3 W/kg

Configuration/Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 69.21 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 31.8 W/kg
SAR(1 g) = 8.4 W/kg; SAR(10 g) = 2.42 W/kg
Maximum value of SAR (measured) = 17.1 W/kg



0 dB = 17.1 W/kg = 12.34 dBW/kg

Date: 2016/8/25

Dipole 5600 MHz_SN:1023_Body

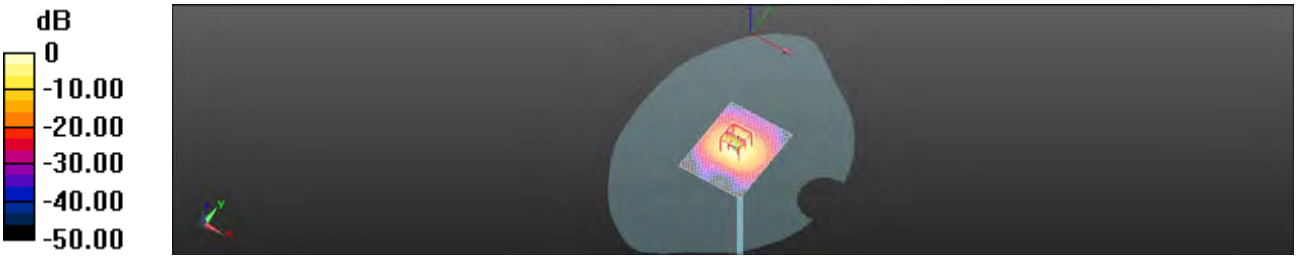
Communication System: CW; Frequency: 5600 MHz
Medium parameters used: f = 5600 MHz; σ = 5.85 S/m; ε_r = 49.921; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(3.66, 3.66, 3.66); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=100mW/Area Scan (71x91x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 17.1 W/kg

Configuration/Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 65.04 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 34.0 W/kg
SAR(1 g) = 8.03 W/kg; SAR(10 g) = 2.28 W/kg
Maximum value of SAR (measured) = 17.0 W/kg



0 dB = 17.0 W/kg = 12.32 dBW/kg

Date: 2016/8/19

Dipole 5800 MHz_SN:1023_Head

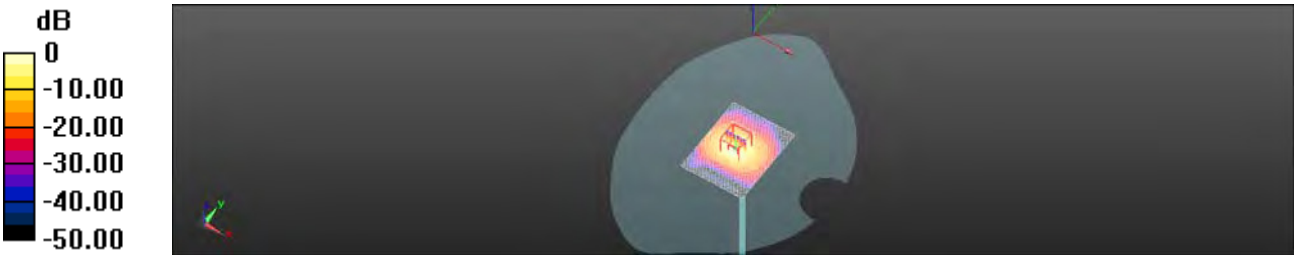
Communication System: CW; Frequency: 5800 MHz
Medium parameters used: f = 5800 MHz; σ = 5.15 S/m; ε_r = 34.192; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(4.41, 4.41, 4.41); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=100mW/Area Scan (71x91x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 17.6 W/kg

Configuration/Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 67.10 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 32.4 W/kg
SAR(1 g) = 7.89 W/kg; SAR(10 g) = 2.27 W/kg
Maximum value of SAR (measured) = 16.9 W/kg



0 dB = 16.9 W/kg = 12.28 dBW/kg

Date: 2016/8/25

Dipole 5800 MHz_SN:1023_Body

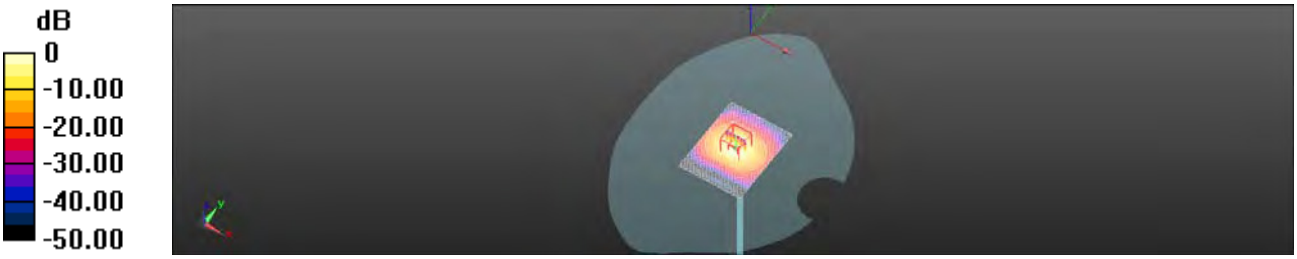
Communication System: CW; Frequency: 5800 MHz
Medium parameters used: f = 5800 MHz; σ = 6.051 S/m; ε_r = 49.55; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3938; ConvF(3.87, 3.87, 3.87); Calibrated: 2015/10/1;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1260; Calibrated: 2015/9/24
- Phantom: Head
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Pin=100mW/Area Scan (71x91x1): Interpolated grid: dx=10 mm, dy=10 mm
Maximum value of SAR (interpolated) = 15.1 W/kg

Configuration/Pin=100mW/Zoom Scan (7x7x12)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=2mm
Reference Value = 62.71 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 7.65 W/kg; SAR(10 g) = 2.18 W/kg
Maximum value of SAR (measured) = 15.1 W/kg



0 dB = 15.1 W/kg = 11.79 dBW/kg

7. DAE & Probe Calibration Certificate

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Zeughausstrasse 43, 8004 Zurich, Switzerland

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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

Accreditation No.: SCS 0108

Client SGS - TW (Auden)

Certificate No: DAE4-1260_Sep15

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BM - SN: 1260
Calibration procedure(s)	QA CAL-06.v29 Calibration procedure for the data acquisition electronics (DAE)
Calibration date	September 24, 2015

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
Keithley Multimeter Type 2001	SN: 0810278	09-Sep-15 (No:17153)	Sep-16
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Auto DAE Calibration Unit	SE UWS 053 AA 1001	06-Jan-15 (in house check)	In house check: Jan-16
Calibrator Box V2.1	SE UMS 006 AA 1002	06-Jan-15 (in house check)	In house check: Jan-16

	Name	Function	Signature
Calibrated by:	Eric Hainfeld	Technician	
Approved by:	Fin Bomholt	Deputy Technical Manager	

Issued: September 24, 2015

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

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Accreditation No.: SCS 0108

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Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity*: Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity*: Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation*: Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted*: Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current*: Typical value for information. Maximum channel input offset current, not considering the input resistance.
  - *Input resistance*: Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage*: Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption*: Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	406.043 ± 0.02% (k=2)	405.010 ± 0.02% (k=2)	405.577 ± 0.02% (k=2)
Low Range	3.95755 ± 1.50% (k=2)	4.01958 ± 1.50% (k=2)	4.00483 ± 1.50% (k=2)

Connector Angle

Connector Angle to be used in DASY system	84.5 ° ± 1 °

Appendix (Additional assessments outside the scope of SCS0108)

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199996.71	-0.71	-0.00
Channel X	+ Input	20003.42	1.97	0.01
Channel X	- Input	-19997.29	3.64	-0.02
Channel Y	+ Input	199997.03	-0.74	-0.00
Channel Y	+ Input	20002.19	0.75	0.00
Channel Y	- Input	-20000.65	-0.08	0.00
Channel Z	+ Input	199995.02	-2.52	-0.00
Channel Z	+ Input	20000.79	-0.63	-0.00
Channel Z	- Input	-20001.97	-1.09	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2001.31	0.02	0.00
Channel X	+ Input	201.74	0.05	0.03
Channel X	- Input	-197.79	0.49	-0.25
Channel Y	+ Input	2001.47	0.11	0.01
Channel Y	+ Input	201.57	-0.09	-0.04
Channel Y	- Input	-198.16	0.02	-0.01
Channel Z	+ Input	2001.06	-0.19	-0.01
Channel Z	+ Input	200.35	-1.16	-0.58
Channel Z	- Input	-199.72	-1.47	0.74

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	1.97	-0.02
	- 200	0.99	-1.30
Channel Y	200	13.29	13.11
	- 200	-13.69	-13.98
Channel Z	200	-0.48	-0.25
	- 200	-1.06	-1.87

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	5.95	-2.35
Channel Y	200	9.12	-	6.99
Channel Z	200	9.45	7.26	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15911	14818
Channel Y	15818	16372
Channel Z	16044	16664

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-0.60	-1.69	0.60	0.44
Channel Y	-0.89	-3.18	0.27	0.50
Channel Z	-1.05	-1.97	0.26	0.49

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	-0.01	-8	-9

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Accreditation No.: SCS 0108

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Client: SGS-TW (Auden)

Certificate No: EX3-3938_Oct15

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3938

Calibration procedure(s): QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: October 1, 2015

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 E4419B	GB41293874	01-Apr-15 (No. 217-02125)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02125)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Israel Elraboh	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: October 2, 2015

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	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 ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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 ϑ = 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).

Probe EX3DV4

SN:3938

Manufactured: May 2, 2013
Calibrated: October 1, 2015

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3938

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)^2)^A	0.52	0.57	0.34	± 10.1 %
DCP (mV)^B	100.8	99.7	104.1	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	141.3	±2.7 %
		Y	0.0	0.0	1.0		147.2	
		Z	0.0	0.0	1.0		128.1	

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 E^2-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.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3938

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	9.69	9.69	9.69	0.19	1.67	± 12.0 %
835	41.5	0.90	9.35	9.35	9.35	0.26	1.23	± 12.0 %
900	41.5	0.97	9.15	9.15	9.15	0.18	1.86	± 12.0 %
1450	40.5	1.20	7.86	7.86	7.86	0.13	2.63	± 12.0 %
1750	40.1	1.37	8.17	8.17	8.17	0.36	0.80	± 12.0 %
1900	40.0	1.40	7.89	7.89	7.89	0.32	0.80	± 12.0 %
2000	40.0	1.40	7.89	7.89	7.89	0.36	0.75	± 12.0 %
2300	39.5	1.67	7.46	7.46	7.46	0.34	0.88	± 12.0 %
2450	39.2	1.80	7.11	7.11	7.11	0.32	0.94	± 12.0 %
2600	39.0	1.96	6.79	6.79	6.79	0.24	1.23	± 12.0 %
5250	35.9	4.71	4.90	4.90	4.90	0.40	1.80	± 13.1 %
5300	35.9	4.76	4.81	4.81	4.81	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.28	4.28	4.28	0.50	1.80	± 13.1 %
5750	35.4	5.22	4.41	4.41	4.41	0.50	1.80	± 13.1 %

[C] 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. 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.

[G] 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:3938

Calibration Parameter Determined in Body Tissue Simulating Media

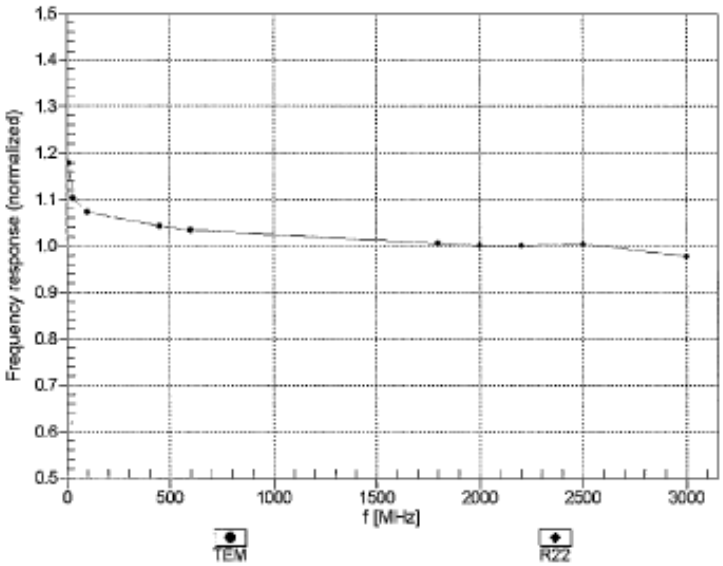
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	9.50	9.50	9.50	0.31	1.13	± 12.0 %
835	55.2	0.97	9.30	9.30	9.30	0.28	1.26	± 12.0 %
900	55.0	1.05	9.22	9.22	9.22	0.34	1.05	± 12.0 %
1450	54.0	1.30	7.96	7.96	7.96	0.16	2.05	± 12.0 %
1750	53.4	1.49	7.73	7.73	7.73	0.42	0.80	± 12.0 %
1900	53.3	1.52	7.41	7.41	7.41	0.32	0.90	± 12.0 %
2000	53.3	1.52	7.55	7.55	7.55	0.26	1.05	± 12.0 %
2300	52.9	1.81	7.27	7.27	7.27	0.36	0.84	± 12.0 %
2450	52.7	1.95	7.17	7.17	7.17	0.37	0.85	± 12.0 %
2600	52.5	2.16	6.90	6.90	6.90	0.33	0.90	± 12.0 %
5250	48.9	5.36	4.19	4.19	4.19	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.09	4.09	4.09	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.66	3.66	3.66	0.55	1.90	± 13.1 %
5750	48.3	5.94	3.87	3.87	3.87	0.55	1.90	± 13.1 %

[C] 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. 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.

[G] 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)

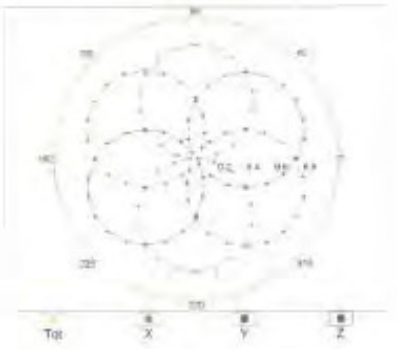


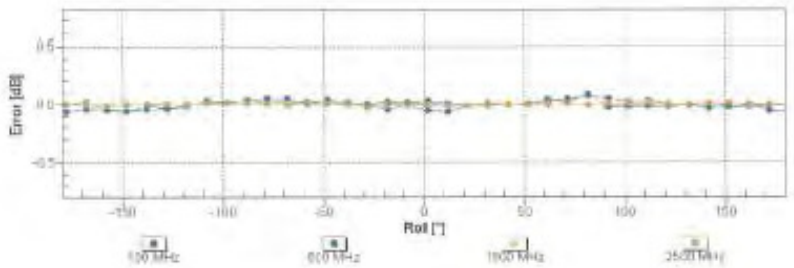
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

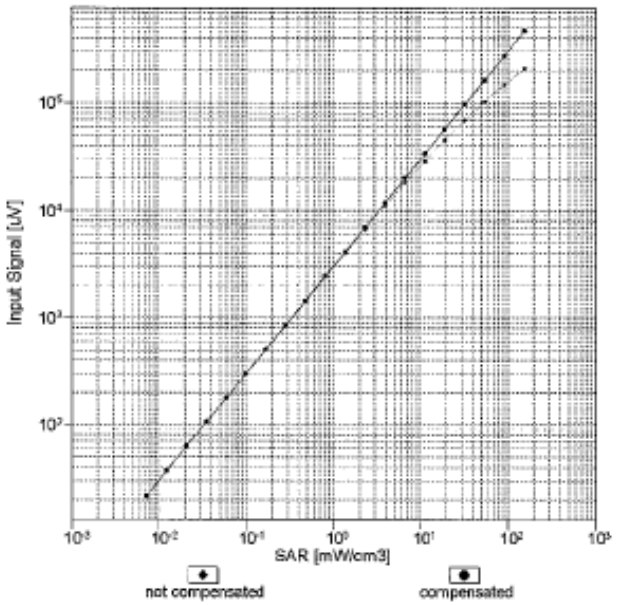
f=1800 MHz,R22

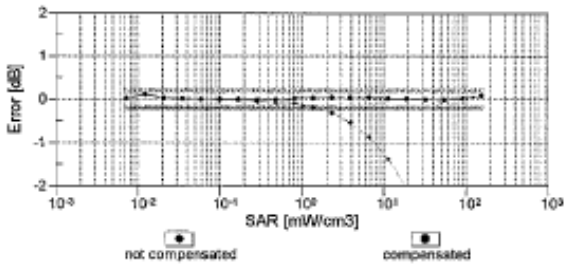




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

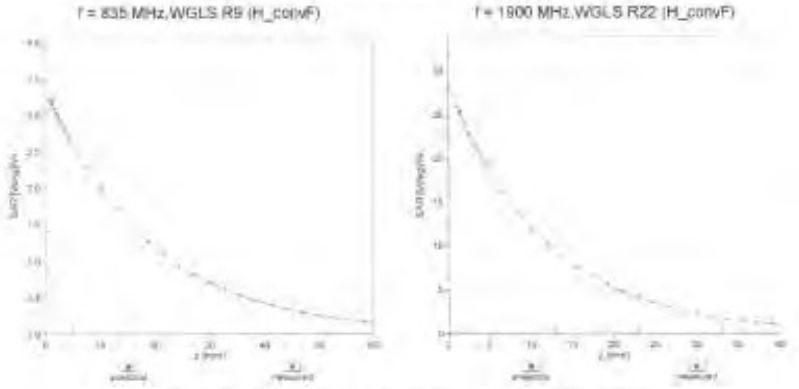
Dynamic Range f(SAR$_{head}$)
(TEM cell , f_{eval}= 1900 MHz)





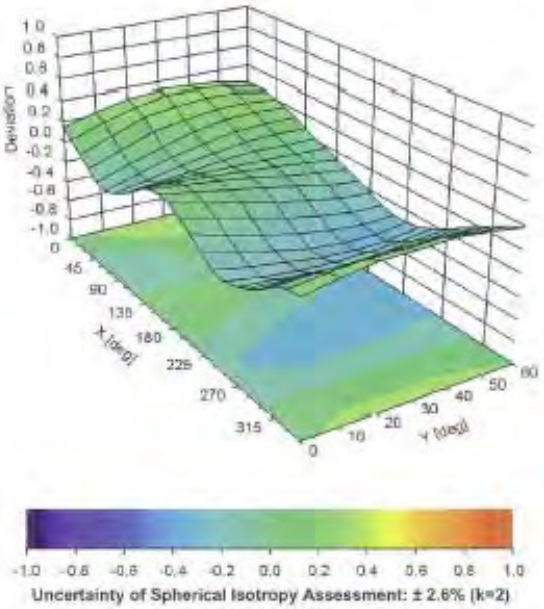
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3938

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-28.1
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

8. Uncertainty Budget

Measurement Uncertainty evaluation template for DUT SAR test (3-6G)

A	c	D	e		f	g	h=c * f / e	i=c * g / e	k
Source of Uncertainty	Tolerance/ Uncertainty	Probability	Div	Div Value	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
Measurement system									
Probe calibration	6.55%	N	1	1	1	1	6.55%	6.55%	∞
Isotropy , Axial	3.50%	R	√3	1.732	1	1	2.02%	2.02%	∞
Isotropy, Hemispherical	9.60%	R	√3	1.732	1	1	5.54%	5.54%	∞
Modulation Response	2.40%	R	√3	1.732	1	1	1.40%	1.40%	∞
Boundary Effect	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Linearity	4.70%	R	√3	1.732	1	1	2.71%	2.71%	∞
Detection Limits	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Readout Electronics	0.30%	N	1	1	1	1	0.30%	0.30%	∞
Response time	0.80%	R	√3	1.732	1	1	0.46%	0.46%	∞
Integration Time	2.60%	R	√3	1.732	1	1	1.50%	1.50%	∞
Measurement drift (class A evaluation)	1.75%	R	√3	1.732	1	1	1.01%	1.01%	∞
RF ambient condition - noise	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
RF ambient conditions - reflections	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
Probe positioner Mechanical restrictions	0.40%	R	√3	1.732	1	1	0.23%	0.23%	∞
Probe Positioning with respect to phantom	2.90%	R	√3	1.732	1	1	1.67%	1.67%	∞
Post-processing	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Max SAR Eval	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Test Sample related									
Test sample positioning	2.90%	N	1	1	1	1	2.90%	2.90%	M-1
Device Holder Uncertainty	3.60%	N	1	1	1	1	3.60%	3.60%	M-1
Drift of output power	5.00%	R	√3	1.732	1	1	2.89%	2.89%	∞
Phantom and Setup									
Phantom Uncertainty	4.00%	R	√3	1.732	1	1	2.31%	2.31%	∞
Liquid permittivity (mea.)	3.52%	N	1	1	0.64	0.43	2.25%	1.51%	M
Liquid Conductivity (mea.)	3.38%	N	1	1	0.6	0.49	2.03%	1.66%	M
Combined standard uncertainty		RSS					12.10%	11.92%	
Expant uncertainty (95% confidence							24.20%	23.84%	

Measurement Uncertainty evaluation template for DUT SAR test (0.3-3G)

A	c	D	e		f	g	h=c * f / e	i=c * g / e	k
Source of Uncertainty	Tolerance/ Uncertainty	Probability	Div	Div Value	ci (1g)	ci (10g)	Standard uncertainty	Standard uncertainty	vi, or Veff
Measurement system									
Probe calibration	6.00%	N	1	1	1	1	6.00%	6.00%	∞
Isotropy , Axial	3.50%	R	√3	1.732	1	1	2.02%	2.02%	∞
Isotropy, Hemispherical	9.60%	R	√3	1.732	1	1	5.54%	5.54%	∞
Modulation Response	2.40%	R	√3	1.732	1	1	1.40%	1.40%	∞
Boundary Effect	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Linearity	4.70%	R	√3	1.732	1	1	2.71%	2.71%	∞
Detection Limits	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Readout Electronics	0.30%	N	1	1	1	1	0.30%	0.30%	∞
Response time	0.80%	R	√3	1.732	1	1	0.46%	0.46%	∞
Integration Time	2.60%	R	√3	1.732	1	1	1.50%	1.50%	∞
Measurement drift (class A evaluation)	1.75%	R	√3	1.732	1	1	1.01%	1.01%	∞
RF ambient condition - noise	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
RF ambient conditions - reflections	3.00%	R	√3	1.732	1	1	1.73%	1.73%	∞
Probe positioner Mechanical restrictions	0.40%	R	√3	1.732	1	1	0.23%	0.23%	∞
Probe Positioning with respect to phantom	2.90%	R	√3	1.732	1	1	1.67%	1.67%	∞
Post-processing	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Max SAR Eval	1.00%	R	√3	1.732	1	1	0.58%	0.58%	∞
Test Sample related									
Test sample positioning	2.90%	N	1	1	1	1	2.90%	2.90%	M-1
Device Holder Uncertainty	3.60%	N	1	1	1	1	3.60%	3.60%	M-1
Drift of output power	5.00%	R	√3	1.732	1	1	2.89%	2.89%	∞
Phantom and Setup									
Phantom Uncertainty	4.00%	R	√3	1.732	1	1	2.31%	2.31%	∞
Liquid permittivity (mea.)	2.65%	N	1	1	0.64	0.43	1.70%	1.14%	M
Liquid Conductivity (mea.)	3.29%	N	1	1	0.6	0.49	1.97%	1.61%	M
Combined standard uncertainty		RSS					11.71%	11.58%	
Expant uncertainty (95% confidence							23.42%	23.16%	

9. Phantom Description

Schmid & Partner Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Certificate of Conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 C
Series No	TP-1150 and higher
Manufacturer	SPEAG Zeughausstrasse 43 CH-8004 Zürich Switzerland

Tests
The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series items (called samples) or are tested at each item.

Test	Requirement	Details	Units tested
Dimensions	Compliant with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness of shell	Compliant with the requirements according to the standards	2mm +/- 0.2mm in flat and specific areas of head section	First article, Samples, TP-1314 ff.
Material thickness at ERP	Compliant with the requirements according to the standards	6mm +/- 0.2mm at ERP	First article, All items
Material parameters	Dielectric parameters for required frequencies	300 MHz – 6 GHz: Relative permittivity < 5. Loss tangent < 0.05	Material samples
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions. Observe technical Note for material compatibility	DEGMBE based simulating liquids	Pre-series, First article, Material samples
Sagging	Compliant with the requirements according to the standards. Sagging of the flat section when filled with tissue simulating liquid	< 1% typical < 0.8% if filled with 155mm of HSL900 and without OUT below	Prototypes, Sample testing

Standards
[1] CENELEC EN 50361
[2] IEEE Std 1528-2003
[3] IEC 62209 Part I
[4] FCC OET Bulletin 65, Supplement C, Edition 01-01
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of the other documents.

Conformity
Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standards [1] to [4].

Date 07.07.2005

Signature / Stamp

Schmid & Partner Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

10. System Validation from Original Equipment Supplier

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
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: Auden

Certificate No: D835V2-4d120_Jun16

CALIBRATION CERTIFICATE

Object: D835V2 - SN:4d120

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: June 22, 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 ± 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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	15-Jun-16 (No. EX3-7349_Jun16)	Jun-17
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 27, 2016

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

Certificate No: D835V2-4d120_Jun16 Page 1 of 8

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
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

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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	V52.8.8
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	41.0 ± 6 %	0.92 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	2.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.42 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.11 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	54.4 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (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	**9.52 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.23 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	51.7 Ω - 4.1 jΩ
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6 Ω - 6.5 jΩ
Return Loss	- 22.5 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 feed point 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 29, 2010

DASY5 Validation Report for Head TSL

Date: 22.06.2016

Test Laboratory: SPEAG, Zurich, Switzerland

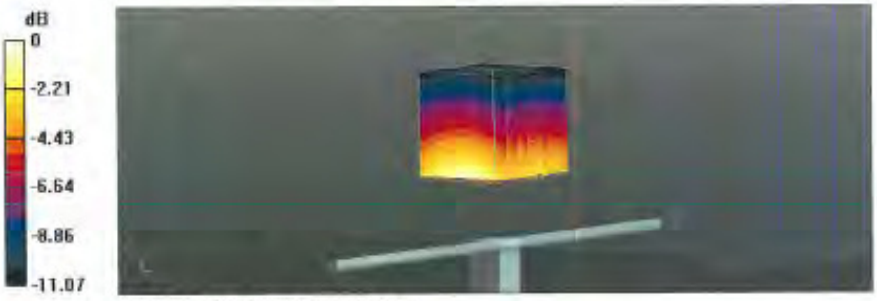
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d120

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.92 S/m; ε_r = 41; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

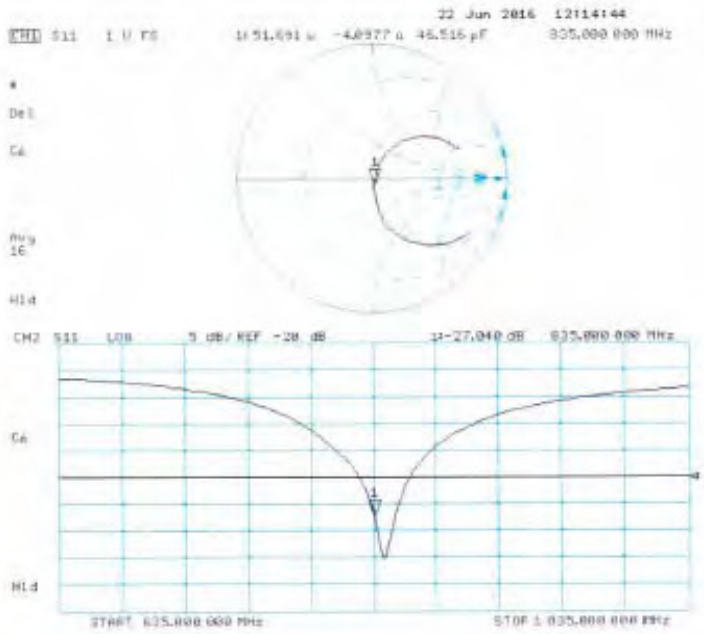
- Probe: EX3DV4 - SN7349; ConvF(9.72, 9.72, 9.72); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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 = 61.88 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.60 W/kg
SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.55 W/kg
Maximum value of SAR (measured) = 3.21 W/kg



0 dB = 3.21 W/kg = 5.07 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.06.2016

Test Laboratory: SPEAG, Zurich, Switzerland

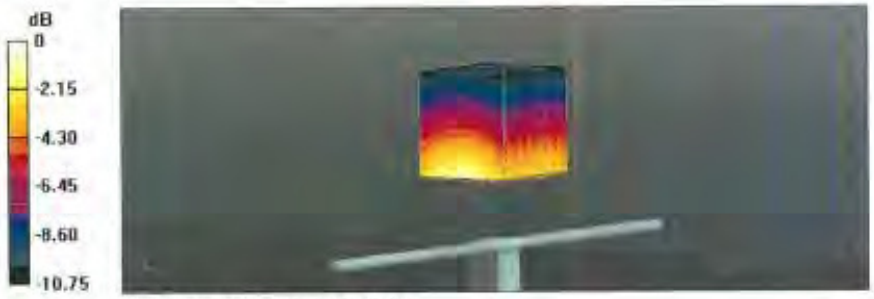
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d120

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

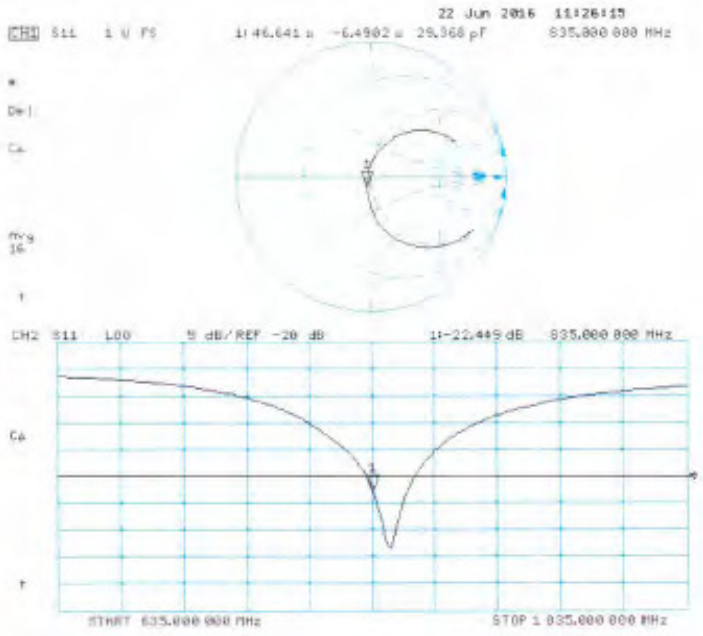
- Probe: EX3DV4 - SN7349; ConvF(9.73, 9.73, 9.73); Calibrated: 15.06.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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 = 59.94 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.62 W/kg
SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.6 W/kg
Maximum value of SAR (measured) = 3.25 W/kg



0 dB = 3.25 W/kg = 5.12 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client SGS-TW (Auden)

Certificate No: D1900V2-5d027_Apr16

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d027
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date	April 25, 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 ± 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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 3047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	31-Dec-15 (No. EX3-7349_Dec15)	Dec-16
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 26, 2016

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Accreditation No.: **SCS 0108**

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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:

a) 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	V52.8.8
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	40.0 ± 6 %	1.37 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	9.55 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**38.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.03 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.3 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 %	1.49 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	---	---

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.83 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**39.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.21 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.0 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	50.8 Ω + 4.4 jΩ
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.5 Ω + 5.6 jΩ
Return Loss	- 23.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.196 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 17, 2002

DASY5 Validation Report for Head TSL

Date: 25.04.2016

Test Laboratory: SPEAG, Zurich, Switzerland

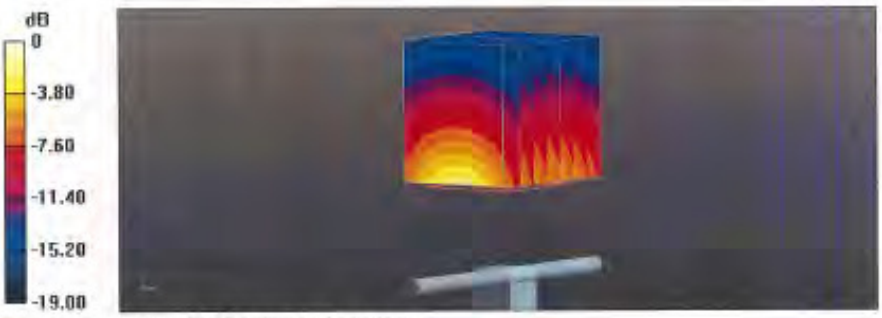
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d027

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.37 S/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

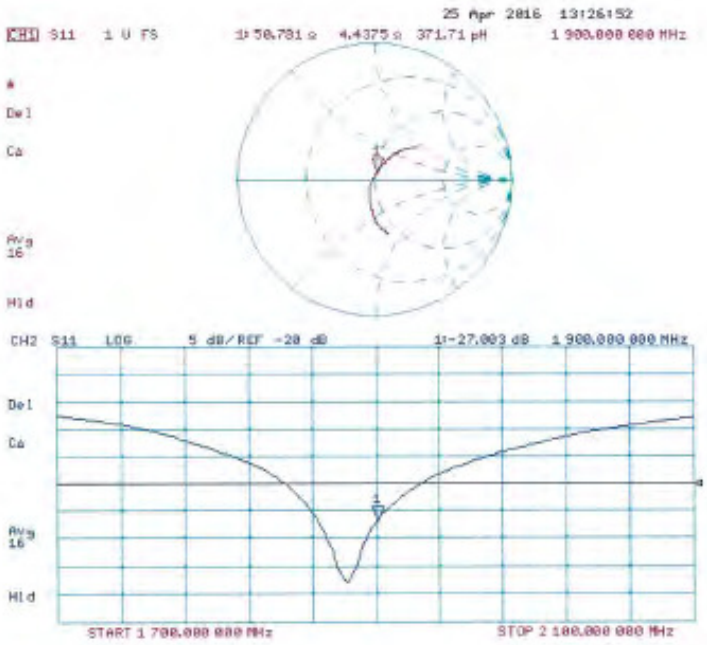
- Probe: EX3DV4 - SN7349; ConvF(8.2, 8.2, 8.2); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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 = 106.9 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 9.55 W/kg; SAR(10 g) = 5.03 W/kg
Maximum value of SAR (measured) = 14.3 W/kg



0 dB = 14.3 W/kg = 11.55 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.04.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d027

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.49 S/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

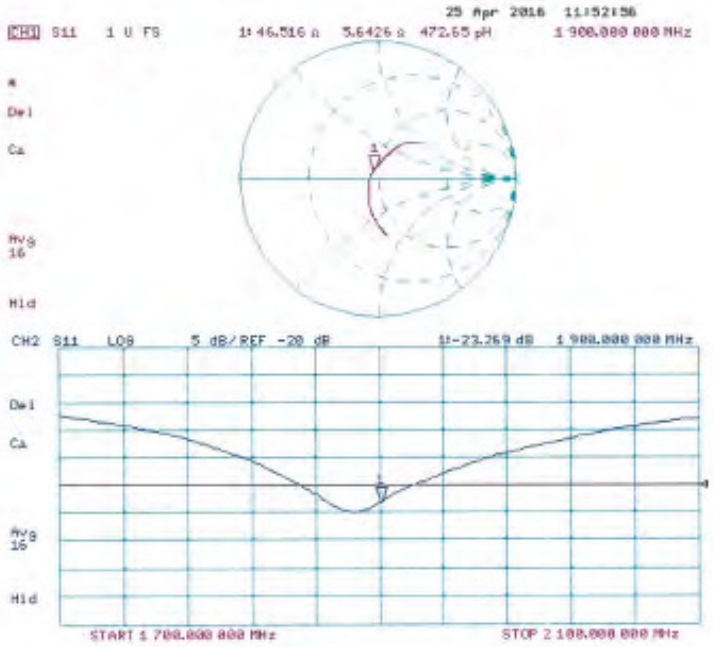
DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.03, 8.03, 8.03); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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 = 104.2 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 9.83 W/kg; SAR(10 g) = 5.21 W/kg
Maximum value of SAR (measured) = 14.7 W/kg

0 dB = 14.7 W/kg = 11.67 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client SGS-TW (Auden)

Certificate No: D2450V2-727_Apr16

CALIBRATION CERTIFICATE

Object: D2450V2 - SN:727

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: April 19, 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 ± 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	06-Apr-16 (No. 217-02288/02289)	Apr-17
Power sensor NRP-Z91	SN: 103244	06-Apr-16 (No. 217-02288)	Apr-17
Power sensor NRP-Z91	SN: 103245	06-Apr-16 (No. 217-02289)	Apr-17
Reference 20 dB Attenuator	SN: 5058 (20k)	05-Apr-16 (No. 217-02292)	Apr-17
Type-N mismatch combination	SN: 5047.2 / 06327	05-Apr-16 (No. 217-02295)	Apr-17
Reference Probe EX3DV4	SN: 7349	31-Dec-15 (No. EX3-7349_Dec15)	Dec-16
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (No. 217-02222)	In house check: Oct-16
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (No. 217-02223)	In house check: Oct-16
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Jun-15)	In house check: Oct-16
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 20, 2016

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Accreditation No.: SCS 0108

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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	V52.8.8
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	40.0 ± 6 %	1.83 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	12.8 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**51.0 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.93 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.7 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	52.7 ± 6 %	1.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.5 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**49.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.86 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.3 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	55.3 Ω + 2.0 jΩ
Return Loss	- 25.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	52.1 Ω + 4.8 jΩ
Return Loss	- 25.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.148 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	January 09, 2003

DASY5 Validation Report for Head TSL

Date: 19.04.2016

Test Laboratory: SPEAG, Zurich, Switzerland

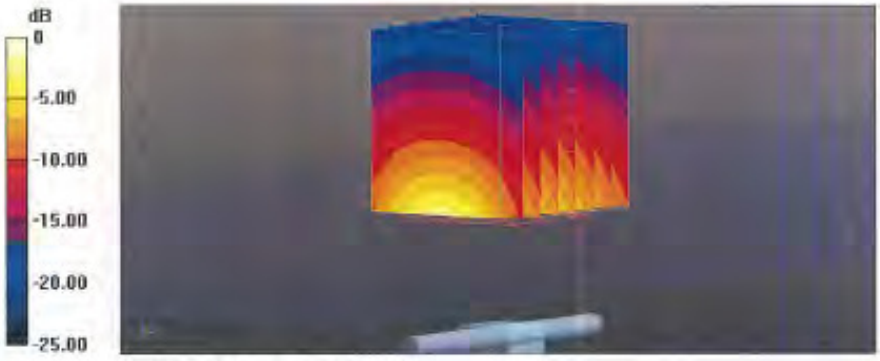
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 727

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.83 S/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

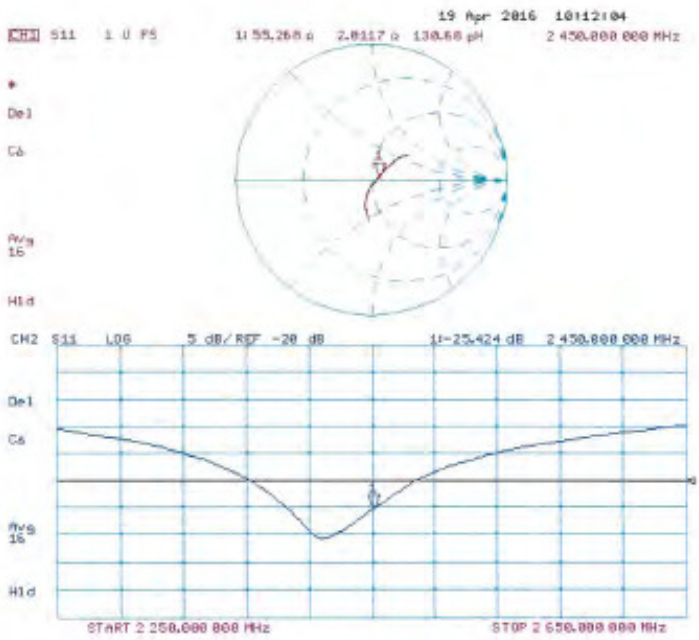
- Probe: EX3DV4 - SN7349; ConvF(7.76, 7.76, 7.76); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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 = 112.1 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 25.7 W/kg
SAR(1 g) = 12.8 W/kg; SAR(10 g) = 5.93 W/kg
Maximum value of SAR (measured) = 20.8 W/kg



0 dB = 20.8 W/kg = 13.18 dBW/kg

Impedance Measurement Plot for Head TSL



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Accreditation No.: SCS 0108

Client SGS-TW (Auden)

Certificate No: D2600V2-1005_Jan16

CALIBRATION CERTIFICATE

Object	D2600V2 - SN: 1005
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date	January 21, 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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	US37292783	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	MY41092317	07-Oct-15 (No. 217-02223)	Oct-16
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe EX3DV4	SN: 7349	31-Dec-15 (No. EX3-7349_Dec15)	Dec-16
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100972	15-Jun-15 (in house check Jun-15)	In house check: Jun-18
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by:	Leif Klysner	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 26, 2016

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Accreditation No.: SCS 0108

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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
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	V52.8.8
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	37.3 ± 6 %	2.04 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.2 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**55.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.29 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	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.6 ± 6 %	2.22 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.7 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**53.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.10 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	51.2 Ω - 4.2 jΩ
Return Loss	- 27.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.6 Ω - 3.3 jΩ
Return Loss	- 24.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.154 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: 21.01.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1005

Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.04 S/m; ε_r = 37.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

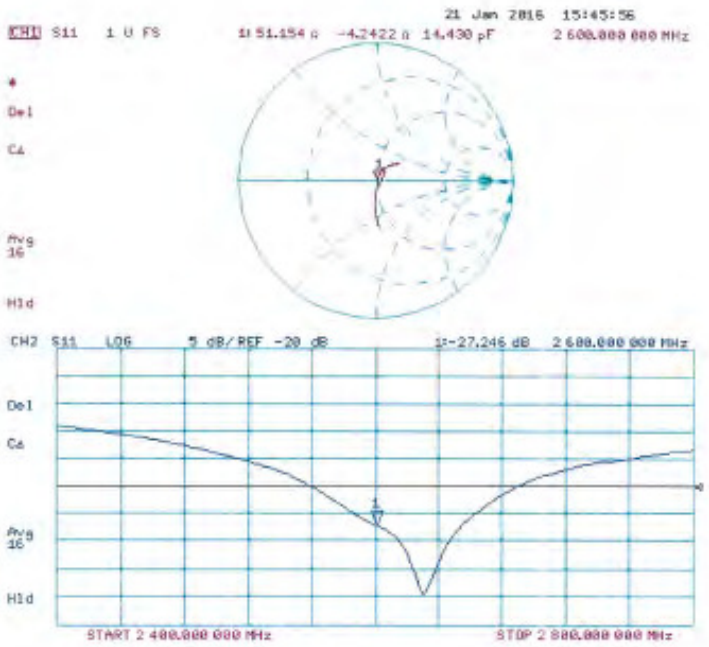
- Probe: EX3DV4 - SN7349; ConvF(7.49, 7.49, 7.49); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

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 = 114.8 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 30.2 W/kg
SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.29 W/kg
Maximum value of SAR (measured) = 24.0 W/kg

0 dB = 24.0 W/kg = 13.80 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 21.01.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1005

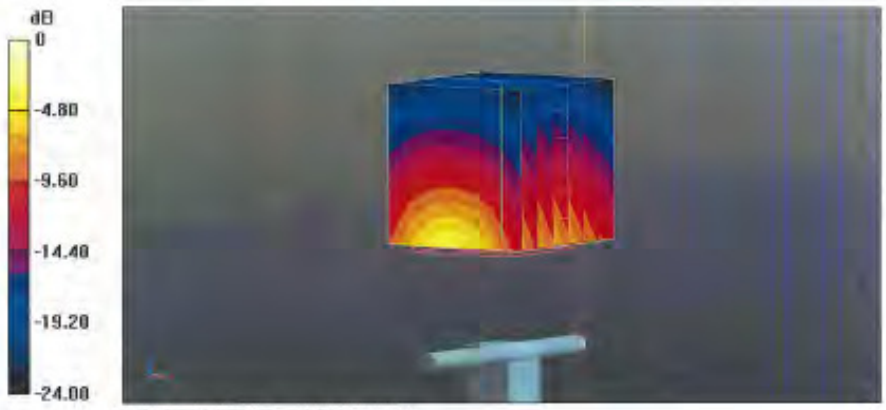
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.22 S/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.6, 7.6, 7.6); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

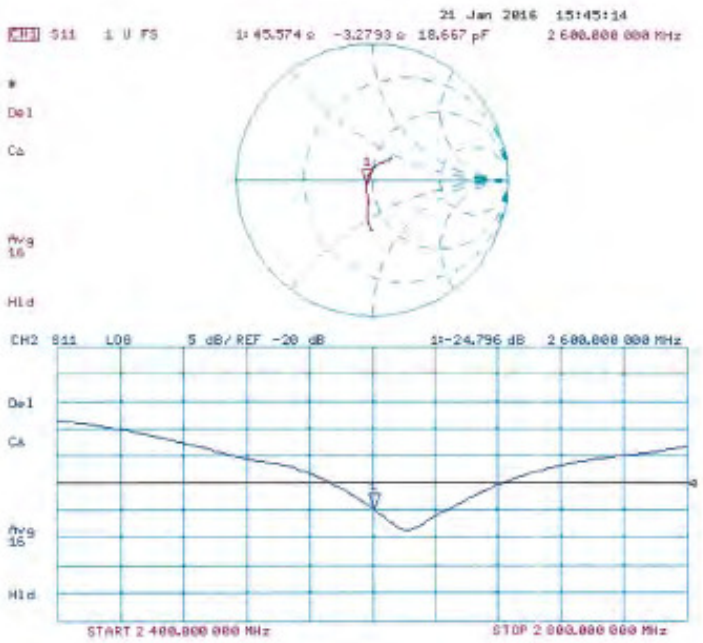
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.7 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 28.4 W/kg
SAR(1 g) = 13.7 W/kg; SAR(10 g) = 6.1 W/kg
Maximum value of SAR (measured) = 22.8 W/kg



0 dB = 22.8 W/kg = 13.58 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client SGS-TW (Auden)

Certificate No: D5GHzV2-1023_Jan16

CALIBRATION CERTIFICATE

Object D5GHzV2 - SN: 1023

Calibration procedure(s) QA CAL-22.v2
Calibration procedure for dipole validation kits between 3-6 GHz

Calibration date: January 26, 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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	US37292783	07-Oct-15 (No. 217-02222)	Oct-16
Power sensor HP 8481A	MY41092317	07-Oct-15 (No. 217-02223)	Oct-16
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02151)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02154)	Mar-16
Reference Probe EX3DV4	SN: 3503	31-Dec-15 (No. EX3-3503_Dec15)	Dec-16
DAE4	SN: 601	30-Dec-15 (No. DAE4-601_Dec15)	Dec-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100972	15-Jun-15 (in house check Jun-15)	In house check: Jun-18
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-15)	In house check: Oct-16

	Name	Function	Signature
Calibrated by	Michael Weber	Laboratory Technician	
Approved by	Katja Pokovic	Technical Manager	

Issued: January 28, 2016

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Accreditation No.: SCS 0108

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 62209-2, "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
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) 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	V52.8.8
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 5300 MHz ± 1 MHz 5600 MHz ± 1 MHz 5800 MHz ± 1 MHz	

Head TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	36.0	4.66 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.2 ± 6 %	4.51 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5200 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.74 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**77.0 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.1 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.9	4.76 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.1 ± 6 %	4.60 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5300 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.03 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**79.9 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 W/kg ± 19.5 % (k=2)**

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	34.7 ± 6 %	4.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**82.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.6 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.3	5.27 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.4 ± 6 %	5.10 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	7.78 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**77.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.22 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**22.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5200 MHz

The following parameters and calculations were applied.

	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	47.1 ± 6 %	5.37 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	7.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**71.9 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.05 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.3 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5300 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.42 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.9 ± 6 %	5.50 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5300 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.57 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.2 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	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	46.4 ± 6 %	5.91 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

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	7.89 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**78.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.23 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.1 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5800 MHz

The following parameters and calculations were applied.

	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	46.0 ± 6 %	6.19 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5800 MHz

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.59 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**75.3 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.13 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.1 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5200 MHz

Impedance, transformed to feed point	49.1 Ω - 8.4 jΩ
Return Loss	- 21.4 dB

Antenna Parameters with Head TSL at 5300 MHz

Impedance, transformed to feed point	49.6 Ω - 4.2 jΩ
Return Loss	- 27.4 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	54.9 Ω - 1.4 jΩ
Return Loss	- 26.3 dB

Antenna Parameters with Head TSL at 5800 MHz

Impedance, transformed to feed point	55.9 Ω + 2.2 jΩ
Return Loss	- 24.5 dB

Antenna Parameters with Body TSL at 5200 MHz

Impedance, transformed to feed point	49.4 Ω - 6.8 jΩ
Return Loss	- 23.3 dB

Antenna Parameters with Body TSL at 5300 MHz

Impedance, transformed to feed point	50.9 Ω - 2.4 jΩ
Return Loss	- 31.6 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	56.0 Ω - 0.1 jΩ
Return Loss	- 25.0 dB

Antenna Parameters with Body TSL at 5800 MHz

Impedance, transformed to feed point	56.4 Ω + 2.4 jΩ
Return Loss	- 23.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 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	February 05, 2004

DASY5 Validation Report for Head TSL

Date: 26.01.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1023

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 4.51 S/m; ε_r = 35.2; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 4.6 S/m; ε_r = 35.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 4.9 S/m; ε_r = 34.7; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 5.1 S/m; ε_r = 34.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

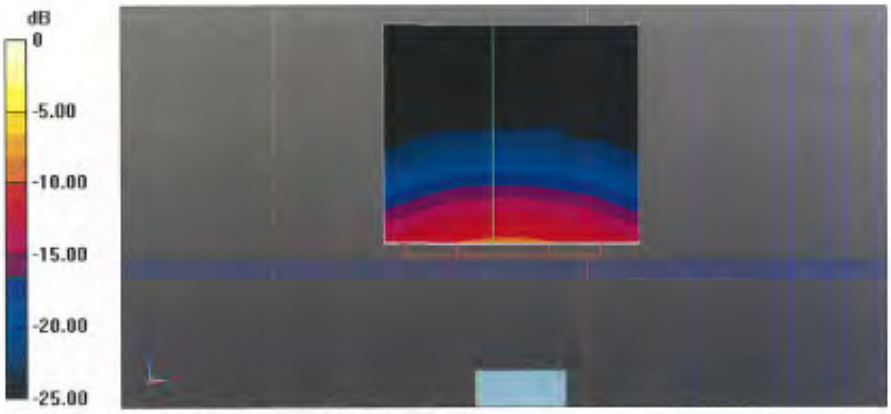
- Probe: EX3DV4 - SN3503; ConvF(5.59, 5.59, 5.59); Calibrated: 31.12.2015, ConvF(5.25, 5.25, 5.25); Calibrated: 31.12.2015, ConvF(4.99, 4.99, 4.99); Calibrated: 31.12.2015, ConvF(4.95, 4.95, 4.95); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 72.68 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 28.1 W/kg
SAR(1 g) = 7.74 W/kg; SAR(10 g) = 2.23 W/kg
Maximum value of SAR (measured) = 17.8 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 73.14 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 30.0 W/kg
SAR(1 g) = 8.03 W/kg; SAR(10 g) = 2.33 W/kg
Maximum value of SAR (measured) = 18.7 W/kg

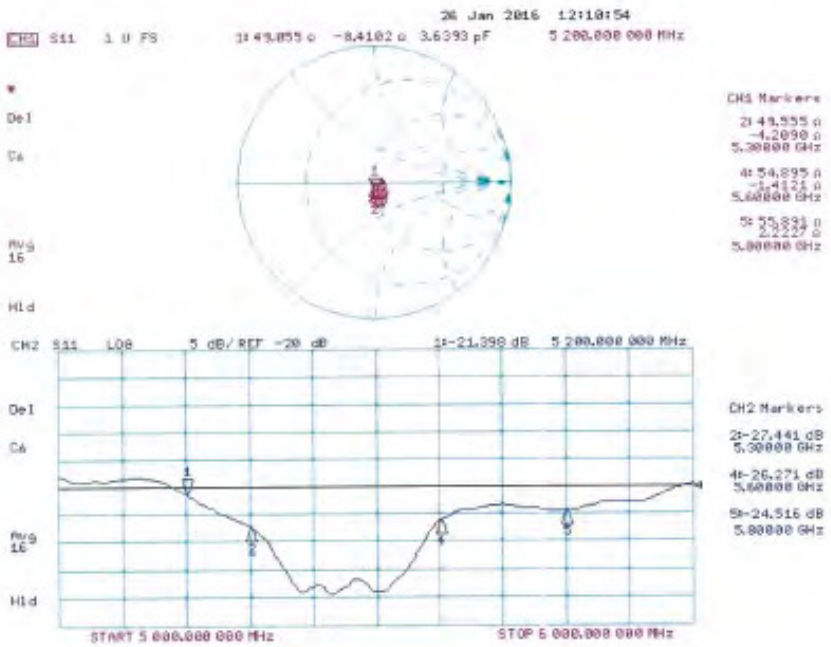
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 73.32 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 32.6 W/kg
SAR(1 g) = 8.31 W/kg; SAR(10 g) = 2.38 W/kg
Maximum value of SAR (measured) = 19.8 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 70.15 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 32.0 W/kg
SAR(1 g) = 7.78 W/kg; SAR(10 g) = 2.22 W/kg
Maximum value of SAR (measured) = 18.8 W/kg



0 dB = 18.8 W/kg = 12.74 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.01.2016

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 5GHz; Type: D5GHzV2; Serial: D5GHzV2 - SN: 1023

Communication System: UID 0 - CW; Frequency: 5200 MHz, Frequency: 5300 MHz, Frequency: 5600 MHz, Frequency: 5800 MHz
Medium parameters used: f = 5200 MHz; σ = 5.37 S/m; ε_r = 47.1; ρ = 1000 kg/m^3 , Medium parameters used: f = 5300 MHz; σ = 5.5 S/m; ε_r = 46.9; ρ = 1000 kg/m^3 , Medium parameters used: f = 5600 MHz; σ = 5.91 S/m; ε_r = 46.4; ρ = 1000 kg/m^3 , Medium parameters used: f = 5800 MHz; σ = 6.19 S/m; ε_r = 46; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

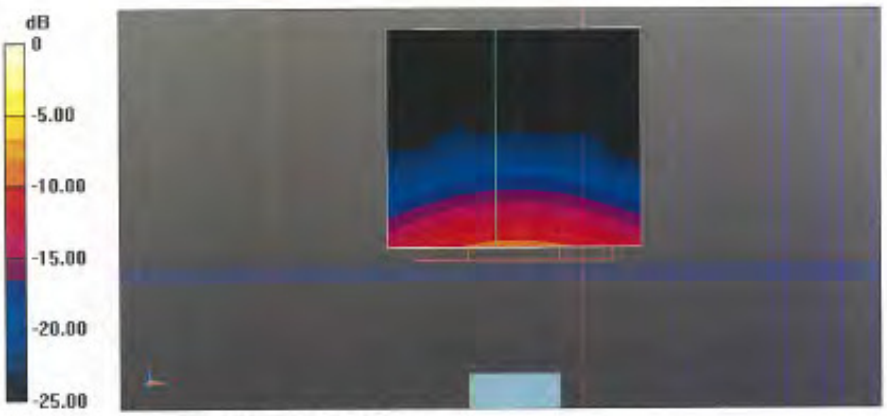
- Probe: EX3DV4 - SN3503; ConvF(4.99, 4.99, 4.99); Calibrated: 31.12.2015, ConvF(4.75, 4.75, 4.75); Calibrated: 31.12.2015, ConvF(4.35, 4.35, 4.35); Calibrated: 31.12.2015, ConvF(4.27, 4.27, 4.27); Calibrated: 31.12.2015;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.12.2015
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7372)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5200 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 66.72 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 27.1 W/kg
SAR(1 g) = 7.25 W/kg; SAR(10 g) = 2.05 W/kg
Maximum value of SAR (measured) = 16.8 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5300 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.43 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 29.1 W/kg
SAR(1 g) = 7.57 W/kg; SAR(10 g) = 2.14 W/kg
Maximum value of SAR (measured) = 17.7 W/kg

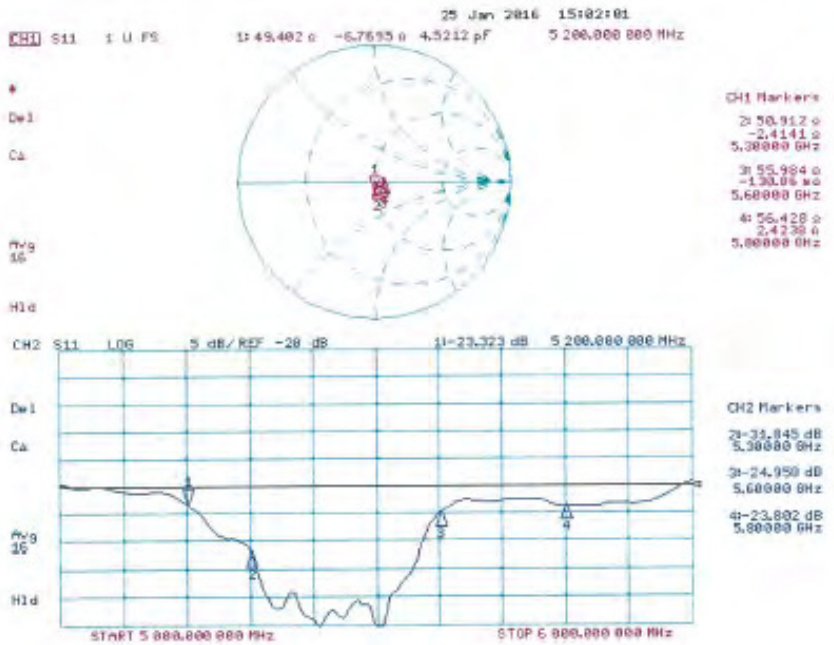
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.67 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 32.6 W/kg
SAR(1 g) = 7.89 W/kg; SAR(10 g) = 2.23 W/kg
Maximum value of SAR (measured) = 19.1 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5800 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 65.76 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 7.59 W/kg; SAR(10 g) = 2.13 W/kg
Maximum value of SAR (measured) = 18.5 W/kg



0 dB = 18.5 W/kg = 12.67 dBW/kg

Impedance Measurement Plot for Body TSL



- End of 1st part of report -