



SAR EVALUATION REPORT

Applicant Name:

LG Electronics MobileComm U.S.A., Inc.
1000 Sylvan Avenue
Englewood Cliffs, NJ 07632
United States

Date of Testing:

02/28/18 - 03/19/18

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

1M1802260030-01-R1.ZNF

FCC ID:

ZNFG710TM

APPLICANT:

LG ELECTRONICS MOBILECOMM U.S.A., INC.

DUT Type:

Portable Handset

Application Type:

Certification

FCC Rule Part(s):

CFR §2.1093

Model:

LM-G710TM

Additional Model(s):


LMG710TM, G710TM, LM-G710AWM, LMG710AWM, G710AWM

Equipment Class	Band & Mode	Tx Frequency	SAR			
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)	10g Phablet (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.15	0.32	0.32	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	< 0.1	0.24	0.38	N/A
PCE	UMTS 850	826.40 - 846.60 MHz	0.17	0.44	0.44	N/A
PCE	UMTS 1755	1712.4 - 1752.6 MHz	0.22	0.68	0.87	2.76
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.16	0.52	1.01	2.77
PCE	LTE Band 71	665.5 - 695.5 MHz	< 0.1	0.25	0.25	N/A
PCE	LTE Band 12	699.7 - 715.3 MHz	0.10	0.33	0.33	N/A
PCE	LTE Band 17	706.5 - 713.5 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 13	779.5 - 784.5 MHz	0.18	0.49	0.49	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.18	0.42	0.42	N/A
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.28	0.70	0.97	3.04
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	0.19	0.53	1.18	3.05
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 30	2307.5 - 2312.5 MHz	< 0.1	0.40	0.40	N/A
PCE	LTE Band 7	2502.5 - 2567.5 MHz	< 0.1	0.26	0.26	N/A
PCE	LTE Band 41	2498.5 - 2687.5 MHz	< 0.1	0.17	0.17	N/A
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.20	0.61	0.61	N/A
Nil	U-NII-1	5180 - 5240 MHz	N/A	N/A	0.86	N/A
Nil	U-NII-2A	5260 - 5320 MHz	0.44	0.81	N/A	2.00
Nil	U-NII-2C	5500 - 5720 MHz	0.48	0.52	N/A	1.08
Nil	U-NII-3	5745 - 5825 MHz	0.56	0.73	0.73	N/A
DSS/DTS	Bluetooth	2402 - 2480 MHz	< 0.1	< 0.1	< 0.1	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			0.93	1.57	1.58	3.91

Note: This revised Test Report (S/N: 1M1802260030-01-R1.ZNF) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.



This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.8 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.


Randy Ortanez
President





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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 71	Voice/Data	665.5 - 695.5 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 17	Voice/Data	706.5 - 713.5 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 25 (PCS)	Voice/Data	1850.7 - 1914.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 MHz
LTE Band 30	Voice/Data	2307.5 - 2312.5 MHz
LTE Band 7	Voice/Data	2502.5 - 2567.5 MHz
LTE Band 41	Voice/Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2462 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz
WMC	Data	500 Hz - 4 kHz

1.2 Power Reduction for SAR

This device uses a power reduction mechanism for SAR compliance. The power reduction mechanism is activated when the device is being used in close proximity to the user's hand. FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device when being used in phablet use conditions. Detailed descriptions of the power reduction mechanism are included in the operational description.

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This device uses an independent fixed level power reduction mechanism for WLAN operations during voice or VoIP held to ear scenarios. Per FCC Guidance, the held-to-ear exposure conditions were evaluated at reduced power according to the head SAR positions described in IEEE 1528-2013. Detailed descriptions of the power reduction mechanism are included in the operational description.



1.3 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v06.



1.3.1 Maximum PCE Output Power

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slot	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
GSM/GPRS 850	Maximum	33.7	33.7	32.7	30.2	28.7	27.7	27.7	26.7	26.7
	Nominal	33.2	33.2	32.2	29.7	28.2	27.2	27.2	26.2	26.2
GSM/GPRS 1900	Maximum	30.7	30.7	29.7	27.2	25.7	26.7	26.7	25.7	25.7
	Nominal	30.2	30.2	29.2	26.7	25.2	26.2	26.2	25.2	25.2

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	3GPP DC-HSDPA
UMTS Band 5 (850 MHz)	Maximum	25.5	25.5	25.5	25.5
	Nominal	25.0	25.0	25.0	25.0
UMTS Band 4 (1750 MHz)	Maximum	25.2	25.2	25.2	25.2
	Nominal	24.7	24.7	24.7	24.7
UMTS Band 2 (1900 MHz)	Maximum	25.5	25.5	25.5	25.5
	Nominal	25.0	25.0	25.0	25.0

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Mode / Band		Modulated Average (dBm)
LTE Band 71	Maximum	25.5
	Nominal	25.0
LTE Band 12	Maximum	25.5
	Nominal	25.0
LTE Band 17	Maximum	25.5
	Nominal	25.0
LTE Band 13	Maximum	25.5
	Nominal	25.0
LTE Band 5 (Cell)	Maximum	25.5
	Nominal	25.0
LTE Band 66 (AWS)	Maximum	25.2
	Nominal	24.7
LTE Band 4 (AWS)	Maximum	25.2
	Nominal	24.7
LTE Band 25 (PCS)	Maximum	25.5
	Nominal	25.0
LTE Band 2 (PCS)	Maximum	25.5
	Nominal	25.0
LTE Band 30	Maximum	25.5
	Nominal	25.0
LTE Band 7	Maximum	25.5
	Nominal	25.0
LTE Band 41	Maximum	25.2
	Nominal	24.7



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1.3.2

Reduced PCE Output Power

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	3GPP DC-HSDPA
UMTS Band 4 (1750 MHz)	Maximum	24.2	24.2	24.2	24.2
	Nominal	23.7	23.7	23.7	23.7
UMTS Band 2 (1900 MHz)	Maximum	24.5	24.5	24.5	24.5
	Nominal	24.0	24.0	24.0	24.0

Mode / Band		Modulated Average (dBm)
LTE Band 66 (AWS)	Maximum	24.2
	Nominal	23.7
LTE Band 4 (AWS)	Maximum	24.2
	Nominal	23.7
LTE Band 25 (PCS)	Maximum	24.5
	Nominal	24.0
LTE Band 2 (PCS)	Maximum	24.5
	Nominal	24.0

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1.3.3

Maximum WLAN and Bluetooth Output Power

Mode / Band		Modulated Average - Single Tx Chain (dBm)		
		Ch. 1-2	Ch. 3-9	Ch. 10-11
IEEE 802.11b (2.4 GHz)	Maximum	21.0	21.0	21.0
	Nominal	20.0	20.0	20.0
IEEE 802.11g (2.4 GHz)	Maximum	18.5	20.5	18.5
	Nominal	17.5	19.5	17.5
IEEE 802.11n (2.4 GHz)	Maximum	18.0	19.5	18.0
	Nominal	17.0	18.5	17.0
IEEE 802.11ac (2.4 GHz)	Maximum	18.0	19.5	18.0
	Nominal	17.0	18.5	17.0



Mode / Band		Modulated Average - MIMO (dBm)		
		Ch. 1-2	Ch. 3-9	Ch. 10-11
IEEE 802.11b (2.4 GHz)	Maximum	24.0	24.0	24.0
	Nominal	23.0	23.0	23.0
IEEE 802.11g (2.4 GHz)	Maximum	21.5	23.5	21.5
	Nominal	20.5	22.5	20.5
IEEE 802.11n (2.4 GHz)	Maximum	21.0	22.5	21.0
	Nominal	20.0	21.5	20.0
IEEE 802.11ac (2.4 GHz)	Maximum	21.0	22.5	21.0
	Nominal	20.0	21.5	20.0

Mode / Band		Modulated Average - Single Tx Chain (dBm)						
		20 MHz Bandwidth		40 MHz Bandwidth			80 MHz Bandwidth	
		Ch. 36, 44-52, 60-153, 165	Ch. 40, 56, 157, 161	Ch. 38	Ch. 62-102	Ch. 46-54, 110-159	Ch. 42, 106-155	Ch. 58
IEEE 802.11a (5 GHz)	Maximum	17.0	18.0					
	Nominal	16.0	17.0					
IEEE 802.11n (5 GHz)	Maximum	17.0	18.0	13.0	12.5	16.0		
	Nominal	16.0	17.0	12.0	11.5	15.0		
IEEE 802.11ac (5 GHz)	Maximum	17.0	18.0	13.0	12.5	16.0	13.5	10.5
	Nominal	16.0	17.0	12.0	11.5	15.0	12.5	9.5

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Mode / Band		Modulated Average - MIMO (dBm)						
		20 MHz Bandwidth		40 MHz Bandwidth			80 MHz Bandwidth	
		Ch. 36, 44-52, 60-153, 165	Ch. 40, 56, 157, 161	Ch. 38	Ch. 62-102	Ch. 46-54, 110-159	Ch. 42, 106-155	Ch. 58
IEEE 802.11a (5 GHz)	Maximum	20.0	21.0					
	Nominal	19.0	20.0					
IEEE 802.11n (5 GHz)	Maximum	20.0	21.0	16.0	15.5	19.0		
	Nominal	19.0	20.0	15.0	14.5	18.0		
IEEE 802.11ac (5 GHz)	Maximum	20.0	21.0	16.0	15.5	19.0	16.5	13.5
	Nominal	19.0	20.0	15.0	14.5	18.0	15.5	12.5

Mode / Band		Modulated Average - Single Tx Chain (dBm)
Bluetooth	Maximum	12.0
	Nominal	11.0
Bluetooth LE	Maximum	5.5
	Nominal	4.5



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1.3.4

Reduced WLAN Output Power (Held-to-Ear)

Mode / Band		Modulated Average - Single Tx Chain (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	18.0
	Nominal	17.0
IEEE 802.11g (2.4 GHz)	Maximum	18.0
	Nominal	17.0
IEEE 802.11n (2.4 GHz)	Maximum	18.0
	Nominal	17.0
IEEE 802.11ac (2.4 GHz)	Maximum	18.0
	Nominal	17.0

Mode / Band		Modulated Average - MIMO (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	21.0
	Nominal	20.0
IEEE 802.11g (2.4 GHz)	Maximum	21.0
	Nominal	20.0
IEEE 802.11n (2.4 GHz)	Maximum	21.0
	Nominal	20.0
IEEE 802.11ac (2.4 GHz)	Maximum	21.0
	Nominal	20.0



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1.3.5

Output Power during Scenarios with 2.4 GHz WLAN Ant 1 and 5 GHz WLAN Ant 2

Mode / Band		Modulated Average - Single Tx Chain, Antenna 1 (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	18.0
	Nominal	17.0
IEEE 802.11g (2.4 GHz)	Maximum	18.0
	Nominal	17.0
IEEE 802.11n (2.4 GHz)	Maximum	18.0
	Nominal	17.0
IEEE 802.11ac (2.4 GHz)	Maximum	18.0
	Nominal	17.0

Mode / Band		Modulated Average - Single Tx Chain, Antenna 2 (dBm)					
		20 MHz Bandwidth	40 MHz Bandwidth			80 MHz Bandwidth	
		Ch. 36-165	Ch. 38	Ch. 62-102	Ch. 46-54, 110-159	Ch. 58	Ch. 42, 106-155
IEEE 802.11a (5 GHz)	Maximum	15.0					
	Nominal	14.0					
IEEE 802.11n (5 GHz)	Maximum	15.0	13.0	12.5	15.0		
	Nominal	14.0	12.0	11.5	14.0		
IEEE 802.11ac (5 GHz)	Maximum	15.0	13.0	12.5	15.0	10.5	13.5
	Nominal	14.0	12.0	11.5	14.0	9.5	12.5

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1.4 DUT Antenna Locations

The overall dimensions of this device are > 9 x 5 cm. A diagram showing the location of the device antennas can be found in Appendix F. Since the diagonal dimension of this device is > 160 mm and <200 mm, it is considered a “phablet.”

Table 1-1
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	No	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 1750	Yes	Yes	No	Yes	No	Yes
UMTS 1900	Yes	Yes	No	Yes	No	Yes
LTE Band 71	Yes	Yes	No	Yes	Yes	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	Yes
LTE Band 5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 66 (AWS)	Yes	Yes	No	Yes	No	Yes
LTE Band 25 (PCS)	Yes	Yes	No	Yes	No	Yes
LTE Band 30	Yes	Yes	No	Yes	Yes	Yes
LTE Band 7	Yes	Yes	No	Yes	Yes	Yes
LTE Band 41	Yes	Yes	No	Yes	Yes	Yes
2.4 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
2.4 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 1	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant 2	Yes	Yes	Yes	No	No	Yes
Bluetooth	Yes	Yes	Yes	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for wireless router SAR or phablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III and FCC KDB Publication 648474 D04v01r03. The distances between the transmit antennas and the edges of the device are included in the filing.

1.5 Near Field Communications (NFC) Antenna

This DUT has NFC operations. The NFC antenna is integrated into the device for this model. Therefore, all SAR tests were performed with the device which already incorporates the NFC antenna. A diagram showing the location of the NFC antenna can be found in Appendix F.

1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v06 4.3.2 procedures.





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Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Phablet	Notes
1	GSM voice + 2.4 GHz Wi-Fi	Yes	Yes	N/A	Yes	
2	GSM voice + 5 GHz Wi-Fi	Yes	Yes	N/A	Yes	
3	GSM voice + 2.4 GHz Bluetooth	Yes^	Yes	N/A	Yes	^Bluetooth Tethering is considered
4	GSM voice + 2.4 GHz Wi-Fi MIMO	Yes	Yes	N/A	Yes	
5	GSM voice + 5 GHz Wi-Fi MIMO	Yes	Yes	N/A	Yes	
6	GSM voice + 2.4 GHz Wi-Fi Ant 1 + 5 GHz Wi-Fi Ant 2	Yes	Yes	N/A	Yes	
7	UMTS + 2.4 GHz Wi-Fi	Yes	Yes	Yes	Yes	
8	UMTS + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
9	UMTS + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^Bluetooth Tethering is considered
10	UMTS + 2.4 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
11	UMTS + 5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
12	UMTS + 2.4 GHz Wi-Fi Ant 1 + 5 GHz Wi-Fi Ant 2	Yes	Yes	Yes	Yes	
13	LTE + 2.4 GHz Wi-Fi	Yes	Yes	Yes	Yes	
14	LTE + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
15	LTE + 2.4 GHz Bluetooth	Yes^	Yes	Yes^	Yes	^Bluetooth Tethering is considered
16	LTE + 2.4 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
17	LTE + 5 GHz Wi-Fi MIMO	Yes	Yes	Yes	Yes	
18	LTE + 2.4 GHz Wi-Fi Ant 1 + 5 GHz Wi-Fi Ant 2	Yes	Yes	Yes	Yes	
19	GPRS/EDGE + 2.4 GHz Wi-Fi	Yes*	Yes*	Yes	Yes	* Pre-installed VOIP applications are considered
20	GPRS/EDGE + 5 GHz Wi-Fi	Yes*	Yes*	Yes	Yes	* Pre-installed VOIP applications are considered
21	GPRS/EDGE + 2.4 GHz Bluetooth	Yes^	Yes*	Yes^	Yes	* Pre-installed VOIP applications are considered ^Bluetooth Tethering is considered
22	GPRS/EDGE + 2.4 GHz Wi-Fi MIMO	Yes*	Yes*	Yes	Yes	* Pre-installed VOIP applications are considered
23	GPRS/EDGE + 5 GHz Wi-Fi MIMO	Yes*	Yes*	Yes	Yes	* Pre-installed VOIP applications are considered
24	GPRS/EDGE + 2.4 GHz Wi-Fi Ant 1 + 5 GHz Wi-Fi Ant 2	Yes*	Yes*	Yes	Yes	* Pre-installed VOIP applications are considered

1. All licensed modes share the same antenna path and cannot transmit simultaneously.
2. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.
3. Per the manufacturer, WIFI Direct is expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Simultaneous transmission scenarios involving WIFI direct are that listed in the above table.
4. 5 GHz Wireless Router is only supported for the U-NII-1 and U-NII-3 by S/W, therefore U-NII2A and U-NII2C were not evaluated for wireless router conditions.
5. This device supports 2x2 MIMO Tx for WLAN. 802.11a/g/n/ac modes support CDD and 802.11n/ac modes additionally support SDM. 802.11b mode supports TDD operations only. Each WLAN antenna can transmit independently or together when operating with MIMO.
6. This device supports VoLTE.
7. This device supports VoWIFI.
8. This device supports Bluetooth tethering.

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1.7 Miscellaneous SAR Test Considerations

(A) WIFI/BT

Since U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg, SAR is not required for U-NII-1 band according to FCC KDB Publication 248227 D01v02r02.

Since Wireless Router operations are not allowed by the chipset firmware using U-NII-2A & U-NII-2C WIFI, only 2.4 GHz, U-NII-1, and U-NII-3 WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v02r01.

This device supports IEEE 802.11ac with the following features:

- a) Up to 80 MHz Bandwidth only
- b) No aggregate channel configurations
- c) 2 Tx antenna output
- d) 256 QAM is supported
- e) TDWR and Band gap channels are supported

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Because wireless router operations are not supported for U-NII-2A & U-NII-2C WLAN, phablet SAR tests were performed. Phablet SAR was not evaluated for Bluetooth, 2.4 GHz, U-NII-1, and U-NII-3 WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

(B) Licensed Transmitter(s)

GSM/GPRS/EDGE DTM is not supported for US bands. Therefore, the GSM Voice modes in this report do not transmit simultaneously with GPRS/EDGE Data.



This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01v03r01.

LTE SAR for the higher modulations and lower bandwidths were not tested since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05v02r04.

This device supports 64QAM on the uplink and 256QAM on the downlink for LTE Operations. Conducted powers for 64QAM uplink configurations were measured per Section 5.1 of FCC KDB Publication 941225 D05v02r05. SAR was not required for 64QAM since the highest maximum output power for 64 QAM is $\leq \frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg, per Section 5.2.4 of FCC KDB Publication 941225 D05v02r05.

This device supports LTE Carrier Aggregation (CA) in the downlink. All uplink communications are identical to Release 8 specifications. Per FCC KDB Publication 941225 D05A v01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in downlink only LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.

Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.

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This device supports downlink 4x4 MIMO operations for some LTE Bands. Per May 2017 TCB Workshop Guidance, SAR for downlink 4x4 MIMO was not needed since the maximum average output power in 4x4 downlink MIMO mode was not > 0.25 dB higher than the maximum output power with downlink 4x4 MIMO inactive.

This device supports LTE capabilities with overlapping transmission frequency ranges. When the supported frequency range of an LTE Band falls completely within an LTE band with a larger transmission frequency range, both LTE bands have the same target power (or the band with the larger transmission frequency range has a higher target power), and both LTE bands share the same transmission path and signal characteristics, SAR was only assessed for the band with the larger transmission frequency range.



This device supports LTE Carrier Aggregation (CA) in the uplink for LTE Band 5 with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per 2017 Fall TCB Workshop Notes.

1.8 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D01v03r01, D05v02r04, D05Av01r02, D06v02r01 (2G/3G/4G and Hotspot)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 648474 D04v01r03 (Phablet Procedures)
- FCC KDB Publication 616217 D04v01r02 (Proximity Sensor)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)
- May 2017 TCB Workshop Notes (LTE 4x4 Downlink MIMO)
- Fall 2017 TCB Workshop Notes (LTE Carrier Aggregation)

1.9 Device Serial Numbers



Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units. The serial numbers used for each test are indicated alongside the results in Section 11.

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2

LTE INFORMATION

LTE Information				
FCC ID	ZNFG710TM			
Form Factor	Portable Handset			
Frequency Range of each LTE transmission band	LTE Band 71 (665.5 - 695.5 MHz)			
	LTE Band 12 (699.7 - 715.3 MHz)			
	LTE Band 17 (706.5 - 713.5 MHz)			
	LTE Band 13 (779.5 - 784.5 MHz)			
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)			
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)			
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)			
	LTE Band 25 (PCS) (1850.7 - 1914.3 MHz)			
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)			
	LTE Band 30 (2307.5 - 2312.5 MHz)			
	LTE Band 7 (2502.5 - 2567.5 MHz)			
	LTE Band 41 (2498.5 - 2687.5 MHz)			
	LTE Band 71: 5 MHz, 10 MHz, 15 MHz, 20 MHz			
	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz			
	LTE Band 17: 5 MHz, 10 MHz			
Channel Bandwidths	LTE Band 13: 5 MHz, 10 MHz			
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz			
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz			
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz			
	LTE Band 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz			
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz			
	LTE Band 30: 5 MHz, 10 MHz			
	LTE Band 7: 5 MHz, 10 MHz, 15 MHz, 20 MHz			
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz			
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High
LTE Band 71: 5 MHz	665.5 (133147)		680.5 (133297)	695.5 (133447)
LTE Band 71: 10 MHz	668 (133172)		680.5 (133297)	693 (133422)
LTE Band 71: 15 MHz	670.5 (133197)		680.5 (133297)	690.5 (133397)
LTE Band 71: 20 MHz	673 (133222)		680.5 (133297)	688 (133372)
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)	715.3 (23173)
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)	714.5 (23165)
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)	713.5 (23155)
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)	711 (23130)
LTE Band 17: 5 MHz	706.5 (23755)		710 (23790)	713.5 (23825)
LTE Band 17: 10 MHz	709 (23780)		710 (23790)	711 (23800)
LTE Band 13: 5 MHz	779.5 (23205)		782 (23230)	784.5 (23255)
LTE Band 13: 10 MHz	N/A		782 (23230)	N/A
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)	848.3 (20643)
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)	847.5 (20635)
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)	846.5 (20625)
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)	844 (20600)
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)		1745 (132322)	1779.3 (132665)
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)		1745 (132322)	1778.5 (132657)
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)		1745 (132322)	1777.5 (132647)
LTE Band 66 (AWS): 10 MHz	1715 (132022)		1745 (132322)	1775 (132622)
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)		1745 (132322)	1772.5 (132597)
LTE Band 66 (AWS): 20 MHz	1720 (132072)		1745 (132322)	1770 (132572)
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)
LTE Band 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)	1914.3 (26683)
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)	1913.5 (26675)
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)	1912.5 (26665)
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)	1910 (26640)
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)	1907.5 (26615)
LTE Band 25 (PCS): 20 MHz	1860 (26140)		1882.5 (26365)	1905 (26590)
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)
LTE Band 30: 5 MHz	2307.5 (27685)		2310 (27710)	2312.5 (27735)
LTE Band 30: 10 MHz	N/A		2310 (27710)	N/A
LTE Band 7: 5 MHz	2502.5 (20775)		2535 (21100)	2567.5 (21425)
LTE Band 7: 10 MHz	2505 (20800)		2535 (21100)	2565 (21400)
LTE Band 7: 15 MHz	2507.5 (20825)		2535 (21100)	2562.5 (21375)
LTE Band 7: 20 MHz	2510 (20850)		2535 (21100)	2560 (21350)
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)
UE Category	DL UE Cat 18 (QPSK, 16QAM, 64QAM, 256QAM), UL UE Cat 13 (QPSK, 16QAM, 64QAM)			
Modulations Supported in UL	QPSK, 16QAM, 64QAM			
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3-6.2.5? (manufacturer attestation to be provided)	YES			
A-MPR (Additional MPR) disabled for SAR Testing?	YES			
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations			
LTE Additional Information	This device does not support full CA features on 3G Release 12. It supports uplink carrier aggregation for LTE CA_5B with a maximum of two 10MHz component carriers. All other uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC unless otherwise specified. The following LTE Release 12 features are not supported: Relay, HetNet, Enhanced eCIC, MDH, eMBMS, Cross-carrier scheduling, Enhanced SC-FDMA.			

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3 INTRODUCTION

The FCC and Innovation, Science, and Economic Development Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [22]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields,” Report No. Vol 74. 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.

3.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

Equation 3-1
SAR Mathematical Equation

$$SAR = \frac{d}{dt} \left(\frac{dU}{dm} \right) = \frac{d}{dt} \left(\frac{dU}{\rho dv} \right)$$



SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

- σ = conductivity of the tissue-simulating material (S/m)
- ρ = mass density of the tissue-simulating material (kg/m³)
- E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

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4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013:

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):
 - a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).
 - b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

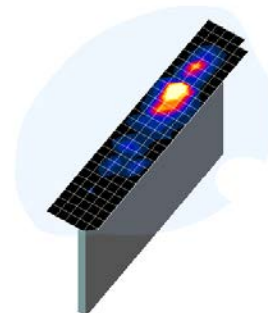




Figure 4-1
Sample SAR Area Scan

Table 4-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Frequency	Maximum Area Scan Resolution (mm) ($\Delta x_{\text{area}}, \Delta y_{\text{area}}$)	Maximum Zoom Scan Resolution (mm) ($\Delta x_{\text{zoom}}, \Delta y_{\text{zoom}}$)	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
				$\Delta z_{\text{zoom}}(n)$	$\Delta z_{\text{zoom}}(1)^*$	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5* $\Delta z_{\text{zoom}}(n-1)$	≥ 22

*Also compliant to IEEE 1528-2013 Table 6

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5.1 EAR REFERENCE POINT

Figure 5-2 shows the front, back and side views of the SAM Twin Phantom. The point “M” is the reference point for the center of the mouth, “LE” is the left ear reference point (ERP), and “RE” is the right ERP. The ERP is 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 5-1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front), also called the Reference Pivoting Line, is not perpendicular to the reference plane (see Figure 5-1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

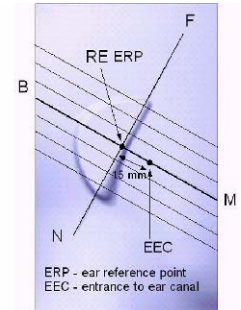


Figure 5-1
Close-Up Side view
of ERP

5.2 HANDSET REFERENCE POINTS

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the acoustic output located along the “vertical centerline” on the front of the device aligned to the “ear reference point” (See Figure 5-3). The acoustic output was then located at the same level as the center of the ear reference point. The test device was positioned so that the “vertical centerline” was bisecting the front surface of the handset at its top and bottom edges, positioning the “ear reference point” on the outer surface of the both the left and right head phantoms on the ear reference point.



Figure 5-2
Front, back and side view of SAM Twin Phantom

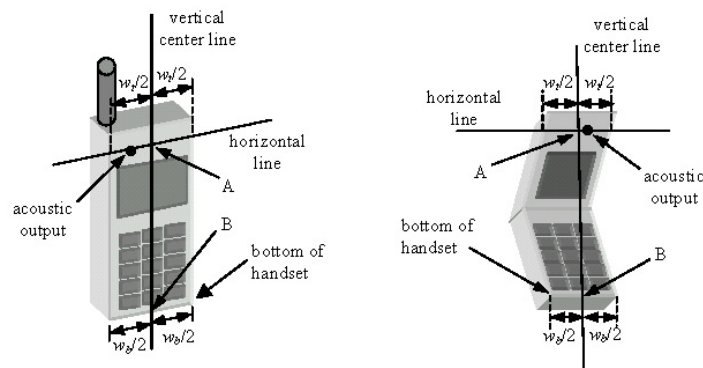




Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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6 TEST CONFIGURATION POSITIONS

6.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon = 3$ and loss tangent $\delta = 0.02$.

6.2 Positioning for Cheek

1. The test device was positioned with the device close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 6-1), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

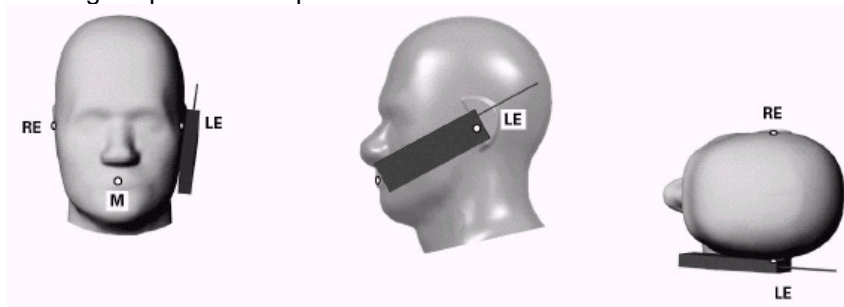




Figure 6-1 Front, Side and Top View of Cheek Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the pinna.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the reference plane.
4. The phone was then rotated around the vertical centerline until the phone (horizontal line) was symmetrical with respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the device contact with the ear, the device was rotated about the NF line until any point on the handset made contact with a phantom point below the ear (cheek) (See Figure 6-2).

6.3 Positioning for Ear / 15° Tilt

With the test device aligned in the “Cheek Position”:

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degrees.
2. The phone was then rotated around the horizontal line by 15 degrees.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the handset touched the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. In this situation, the tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 6-2).

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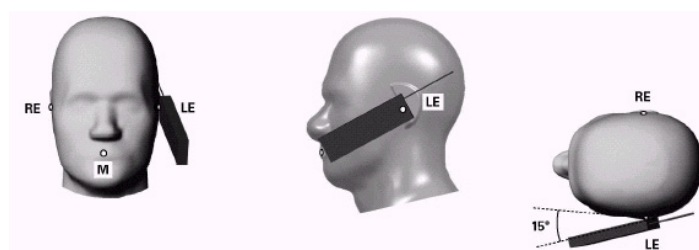


Figure 6-2 Front, Side and Top View of Ear/15° Tilt Position

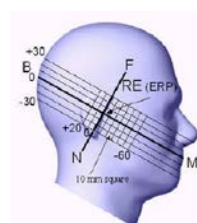


Figure 6-3 Side view w/ relevant markings

6.4 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

Antennas located near the bottom of a phone may require SAR measurements around the mouth and jaw regions of the SAM head phantom. This typically applies to clam-shell style phones that are generally longer in the unfolded normal use positions or to certain older style long rectangular phones. Per IEEE 1528-2013, a rotated SAM phantom is necessary to allow probe access to such regions. Both SAM heads of the TwinSAM-Chin20 are rotated 20 degrees around the NF line. Each head can be removed from the table for emptying and cleaning.

Under these circumstances, the following procedures apply, adopted from the FCC guidance on SAR handsets document FCC KDB Publication 648474 D04v01r03. The SAR required in these regions of SAM should be measured using a flat phantom. The phone should be positioned with a separation distance of 4 mm between the ear reference point (ERP) and the outer surface of the flat phantom shell. While maintaining this distance at the ERP location, the low (bottom) edge of the phone should be lowered from the phantom to establish the same separation distance between the peak SAR location identified by the truncated partial SAR distribution measured with the SAM phantom. The distance from the peak SAR location to the phone is determined by the straight line passing perpendicularly through the phantom surface. When it is not feasible to maintain 4 mm separation at the ERP while also establishing the required separation at the peak SAR location, the top edge of the phone will be allowed to touch the phantom with a separation < 4 mm at the ERP. The phone should not be tilted to the left or right while placed in this inclined position to the flat phantom.

6.5 Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6-4). Per FCC KDB Publication 648474 D04v01r03, 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 FCC KDB Publication 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. 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 that body-worn accessory with a headset attached to the handset.

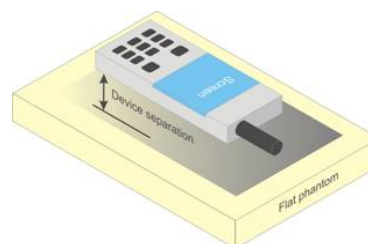




Figure 6-4 Sample Body-Worn Diagram

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not

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contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented.

Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

6.6 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1g body and 10g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v06 should be applied to determine SAR test requirements.

Per KDB Publication 447498 D01v06, Cell phones (handsets) are not normally designed to be used on extremities or operated in extremity only exposure conditions. The maximum output power levels of handsets generally do not require extremity SAR testing to show compliance. Therefore, extremity SAR was not evaluated for this device.



6.7 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v02r01 where SAR test considerations for handsets ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

6.8 Phablet Configurations

For smart phones with a display diagonal dimension > 150 mm or an overall diagonal dimension > 160 mm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that

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support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04v01r03 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna ≤ 25 mm from that surface or edge, in direct contact with the phantom, for 10g SAR. The UMPC mini-tablet 1g SAR at 5 mm is not required. When hotspot mode applies, 10g SAR is required only for the surfaces and edges with hotspot mode 1g SAR > 1.2 W/kg.

6.9 Additional Test Positions due to Proximity Conditions

This device uses a sensor to reduce voice and data powers in extremity (hand-held) use conditions.

When the sensor detects a user is touching the device on or near to the antenna the device reduces the maximum allowed output power. However, the proximity sensor is not active when the device is moved beyond the sensor triggering distance and the maximum output power is no longer limited. Therefore, an additional exposure condition is needed in the vicinity of the triggering distance to ensure SAR is compliant when the device is allowed to operate at a non-reduced output power level.

The proximity sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the proximity sensor entirely covers the antenna. FCC KDB Publication 616217 D04v01r02 Section 6 was used as a guideline for selecting SAR test distances for this device at these additional test positions. Sensor triggering distance summary data is included in Appendix G.

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7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.



7.2 Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 7-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT <i>General Population</i> (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT <i>Occupational</i> (W/kg) or (mW/g)
Peak Spatial Average SAR Head	1.6	8.0
Whole Body SAR	0.08	0.4
Peak Spatial Average SAR Hands, Feet, Ankle, Wrists, etc.	4.0	20

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

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8 FCC MEASUREMENT PROCEDURES

Power measurements for licensed transmitters are performed using a base station simulator under digital average power.

8.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported* SAR. The highest *reported* SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

8.2 3G SAR Test Reduction Procedure

In FCC KDB Publication 941225 D01v03r01, certain transmission modes within a frequency band and wireless mode evaluated for SAR are defined as primary modes. The equivalent modes considered for SAR test reduction are denoted as secondary modes. When the maximum output power including tune-up tolerance specified for production units in a secondary mode is ≤ 0.25 dB higher than the primary mode or when the highest reported SAR of the primary mode, scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode, is ≤ 1.2 W/kg, SAR measurements are not required for the secondary mode. These criteria are referred to as the 3G SAR test reduction procedure. When the 3G SAR test reduction procedure is not satisfied, SAR measurements are additionally required for the secondary mode.

8.3 Procedures Used to Establish RF Signal for SAR



The following procedures are according to FCC KDB Publication 941225 D01v03r01 “3G SAR Measurement Procedures.”

The device is placed into a simulated call using a base station simulator in a RF shielded chamber. Establishing connections in this manner ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. Devices under test are evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device is tested throughout the SAR test at maximum output power, the SAR measurement system measures a “point SAR” at an arbitrary reference point at the start and end of the 1 gram SAR evaluation, to assess for any power drifts during the evaluation. If the power drift deviates by more than 5%, the SAR test and drift measurements are repeated.

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC with TPC (transmit power control) set to all “1s” or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

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8.4.2 Head SAR Measurements

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1’s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure.

8.4.3 Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all “1s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCH_n configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreading code or DPDCH_n, for the highest reported SAR configuration in 12.2 kbps RMC.

8.4.4 SAR Measurements with Rel 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in 12.2 kbps RMC without HSDPA. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

8.4.5 SAR Measurements with Rel 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA.



When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing.

8.4.6 SAR Measurement Conditions for DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, 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.

8.5 SAR Measurement Conditions for LTE

LTE modes are tested according to FCC KDB 941225 D05v02r04 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 or Anritsu MT8820C simulators are used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

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8.5.1 Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

8.5.2 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

8.5.3 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

8.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:



- a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
 - i. The required channel and offset combination with the highest maximum output power is required for SAR.
 - ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
 - iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
- b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
- c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
- d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 5.2.1 through 5.2.3 is less than or equal to $\frac{1}{2}$ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/kg.

8.5.5 TDD

LTE TDD testing is performed using the SAR test guidance provided in FCC KDB 941225 D05v02r04. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05v02r04. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211 Section 4.

8.5.6 Downlink Only Carrier Aggregation

Conducted power measurements with LTE Carrier Aggregation (CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink

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carrier aggregation is inactive on the PCC. For every supported combination of downlink only carrier aggregation, additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band. Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for carrier aggregation configurations when the average output power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive.

8.6 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

8.6.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.



A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

8.6.2 U-NII-1 and U-NII-2A

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg. When different maximum output powers are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ratio of lower to higher specified maximum output power for the two bands, is > 1.2 W/kg. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 – 5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification. Unless band gap channels are permanently disabled, SAR must be considered for these channels. Each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

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8.6.4 Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.5 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

- 1) 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.
- 2) When the reported SAR is > 0.8 W/kg, SAR is required for that position 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.

2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.



8.6.6 OFDM Transmission Mode and SAR Test Channel Selection

When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11ac or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n and 802.11ac or 802.11g then 802.11n, is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

8.6.7 Initial Test Configuration Procedure

For OFDM, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order IEEE 802.11 mode. The channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR

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result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements (See Section 8.6.6). When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.8 Subsequent Test Configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR tests for the subsequent test configurations are required. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

8.6.9 MIMO SAR considerations

Per KDB Publication 248227 D01v02r02, the simultaneous SAR provisions in KDB Publication 447498 D01v06 should be applied to determine simultaneous transmission SAR test exclusion for WIFI MIMO. If the sum of 1g single transmission chain SAR measurements is <1.6 W/kg, no additional SAR measurements for MIMO are required. Alternatively, SAR for MIMO can be measured with all antennas transmitting simultaneously at the specified maximum output power of MIMO operation. When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

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9 RF CONDUCTED POWERS



9.1 GSM Conducted Powers

Table 9-1
Maximum Conducted Power

Maximum Burst-Averaged Output Power										
		Voice	GPRS Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	33.60	33.62	32.58	30.19	28.60	27.40	27.22	26.70	26.50
	190	33.62	33.59	32.65	30.15	28.68	27.35	27.26	26.69	26.61
	251	33.61	33.60	32.65	30.10	28.65	27.30	27.29	26.65	26.54
GSM 1900	512	30.62	30.60	29.68	27.10	25.64	26.45	26.20	25.66	25.45
	661	30.68	30.66	29.69	27.16	25.68	26.40	26.21	25.59	25.49
	810	30.68	30.70	29.63	27.20	25.64	26.40	26.31	25.64	25.49

Calculated Maximum Frame-Averaged Output Power										
		Voice	GPRS Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	24.57	24.59	26.56	25.93	25.59	18.37	21.20	22.44	23.49
	190	24.59	24.56	26.63	25.89	25.67	18.32	21.24	22.43	23.60
	251	24.58	24.57	26.63	25.84	25.64	18.27	21.27	22.39	23.53
GSM 1900	512	21.59	21.57	23.66	22.84	22.63	17.42	20.18	21.40	22.44
	661	21.65	21.63	23.67	22.90	22.67	17.37	20.19	21.33	22.48
	810	21.65	21.67	23.61	22.94	22.63	17.37	20.29	21.38	22.48

GSM 850	Frame Avg.Targets:	24.17	24.17	26.18	25.44	25.19	18.17	21.18	21.94	23.19
GSM 1900		21.17	21.17	23.18	22.44	22.19	17.17	20.18	20.94	22.19

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Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. GPRS/EDGE (GMSK) output powers were measured with coding scheme setting of 1 (CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our Investigation has shown that CS1 - CS4 settings do not have any impact on the output levels or modulation in the GPRS modes.
3. EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8PSK modulation do not have an impact on output power.

GSM Class: B
GPRS Multislot class: 12 (Max 4 Tx uplink slots)
EDGE Multislot class: 12 (Max 4 Tx uplink slots)
DTM Multislot Class: N/A



Figure 9-1
Power Measurement Setup

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9.2 UMTS Conducted Powers

Table 9-2
Maximum Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	25.40	25.44	25.41	25.20	25.17	25.10	25.41	25.48	25.49	-
99		12.2 kbps AMR	25.39	25.45	25.48	25.13	25.19	25.10	25.35	25.36	25.34	-
6	HSDPA	Subtest 1	24.51	24.58	24.43	24.19	24.20	24.23	24.41	24.44	24.39	0
6		Subtest 2	24.55	24.62	24.47	24.24	24.27	24.26	24.49	24.45	24.40	0
6		Subtest 3	24.01	24.07	23.94	23.73	23.74	23.76	23.92	23.97	23.92	0.5
6		Subtest 4	24.05	24.09	23.95	23.71	23.75	23.73	23.87	23.99	23.90	0.5
6	HSUPA	Subtest 1	24.41	24.54	24.35	24.22	24.23	24.27	24.49	24.46	24.41	0
6		Subtest 2	22.46	22.51	22.37	22.21	22.22	22.25	22.48	22.52	22.39	2
6		Subtest 3	23.44	23.53	23.38	23.25	23.23	23.26	23.51	23.53	23.44	1
6		Subtest 4	22.43	22.49	22.32	22.19	22.21	22.25	22.46	22.51	22.41	2
6		Subtest 5	24.42	24.51	24.33	24.23	24.26	24.28	24.49	24.52	24.43	0
8	DC-HSDPA	Subtest 1	24.43	24.51	24.32	24.23	24.26	24.21	24.44	24.51	24.45	0
8		Subtest 2	24.37	24.46	24.28	24.20	24.22	24.29	24.49	24.47	24.41	0
8		Subtest 3	23.95	23.98	23.83	23.69	23.71	23.74	23.94	23.96	23.89	0.5
8		Subtest 4	23.91	23.95	23.81	23.74	23.75	23.76	23.96	23.91	23.92	0.5

Table 9-3
Reduced Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	24.20	24.16	24.17	24.46	24.45	24.48	-
99		12.2 kbps AMR	24.18	24.16	24.15	24.49	24.45	24.41	-
6	HSDPA	Subtest 1	23.17	23.18	23.20	23.39	23.47	23.39	0
6		Subtest 2	23.17	23.20	23.23	23.42	23.50	23.41	0
6		Subtest 3	22.72	22.70	22.77	22.94	23.01	22.91	0.5
6		Subtest 4	22.68	22.69	22.72	22.90	22.97	22.93	0.5
6	HSUPA	Subtest 1	23.18	23.22	23.24	23.47	23.46	23.37	0
6		Subtest 2	21.19	21.21	21.23	21.46	21.51	21.39	2
6		Subtest 3	22.22	22.19	22.21	22.45	22.49	22.40	1
6		Subtest 4	21.17	21.24	21.22	21.41	21.46	21.37	2
6		Subtest 5	23.23	23.21	23.21	23.42	23.47	23.41	0
8	DC-HSDPA	Subtest 1	23.20	23.21	23.22	23.43	23.47	23.42	0
8		Subtest 2	23.18	23.19	23.23	23.46	23.49	23.39	0
8		Subtest 3	22.69	22.71	22.77	22.94	23.01	22.90	0.5
8		Subtest 4	22.71	22.69	22.71	22.91	22.98	22.89	0.5



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DC-HSDPA considerations

- 3GPP Specification 34.121-1 Release 8 Ver 8.10.0 was used for DC-HSDPA guidance
- H-Set 12 (QPSK) was confirmed to be used during DC-HSDPA measurements
- The DUT supports UE category 24 for HSDPA



Figure 9-2
Power Measurement Setup

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9.3 LTE Conducted Powers

9.3.1 LTE Band 71

Table 9-4
LTE Band 71 Conducted Powers - 20 MHz Bandwidth

LTE Band 71 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			133297 (680.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	25.45	0	0
	1	50	25.34		0
	1	99	25.16		0
	50	0	24.37	0-1	1
	50	25	24.33		1
	50	50	24.21		1
	100	0	24.23		1
16QAM	1	0	24.35	0-1	1
	1	50	24.22		1
	1	99	24.43		1
	50	0	23.42	0-2	2
	50	25	23.43		2
	50	50	23.33		2
	100	0	23.36		2
64QAM	1	0	23.25	0-2	2
	1	50	23.18		2
	1	99	23.43		2
	50	0	22.38	0-3	3
	50	25	22.36		3
	50	50	22.26		3
	100	0	22.25		3

Note: LTE Band 71 at 20 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.



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Table 9-5
LTE Band 71 Conducted Powers - 15 MHz Bandwidth

LTE Band 71 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			133297 (680.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	25.40	0	0
	1	36	25.42		0
	1	74	25.17		0
	36	0	24.44	0-1	1
	36	18	24.22		1
	36	37	24.19		1
	75	0	24.30		1
16QAM	1	0	24.30	0-1	1
	1	36	24.25		1
	1	74	24.48		1
	36	0	23.39	0-2	2
	36	18	23.40		2
	36	37	23.29		2
	75	0	23.40		2
64QAM	1	0	23.25	0-2	2
	1	36	23.18		2
	1	74	23.39		2
	36	0	22.31	0-3	3
	36	18	22.37		3
	36	37	22.23		3
	75	0	22.33		3

Note: LTE Band 71 at 15 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.





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Table 9-6
LTE Band 71 Conducted Powers - 10 MHz Bandwidth

LTE Band 71 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			133172 (668.0 MHz)	133297 (680.5 MHz)	133422 (693.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.47	25.50	25.42	0	0
	1	25	25.37	25.39	25.42		0
	1	49	25.24	25.19	25.18		0
	25	0	24.37	24.41	24.34	0-1	1
	25	12	24.36	24.28	24.41		1
	25	25	24.15	24.17	24.16		1
	50	0	24.15	24.23	24.26		1
16QAM	1	0	24.25	24.43	24.30	0-1	1
	1	25	24.14	24.22	24.20		1
	1	49	24.43	24.37	24.47		1
	25	0	23.43	23.42	23.41	0-2	2
	25	12	23.43	23.40	23.42		2
	25	25	23.38	23.31	23.29		2
	50	0	23.33	23.37	23.36		2
64QAM	1	0	23.17	23.38	23.22	0-2	2
	1	25	23.03	23.14	23.11		2
	1	49	23.42	23.32	23.45		2
	25	0	22.37	22.41	22.36	0-3	3
	25	12	22.43	22.39	22.32		3
	25	25	22.29	22.20	22.26		3
	50	0	22.27	22.35	22.32		3

Table 9-7
LTE Band 71 Conducted Powers - 5 MHz Bandwidth

LTE Band 71 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			133147 (665.5 MHz)	133297 (680.5 MHz)	133447 (695.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.39	25.50	25.40	0	0
	1	12	25.41	25.33	25.32		0
	1	24	25.11	25.16	25.15		0
	12	0	24.31	24.32	24.28	0-1	1
	12	6	24.28	24.37	24.25		1
	12	13	24.26	24.15	24.28		1
	25	0	24.32	24.29	24.22		1
16QAM	1	0	24.34	24.35	24.34	0-1	1
	1	12	24.27	24.13	24.26		1
	1	24	24.32	24.38	24.42		1
	12	0	23.48	23.42	23.49	0-2	2
	12	6	23.43	23.41	23.38		2
	12	13	23.30	23.27	23.29		2
	25	0	23.32	23.27	23.39		2
64QAM	1	0	23.22	23.23	23.28	0-2	2
	1	12	23.17	23.08	23.22		2
	1	24	23.26	23.35	23.30		2
	12	0	22.42	22.39	22.37	0-3	3
	12	6	22.40	22.33	22.34		3
	12	13	22.25	22.22	22.29		3
	25	0	22.27	22.21	22.32		3

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9.3.2

LTE Band 12

Table 9-8
LTE Band 12 Conducted Powers - 10 MHz Bandwidth

LTE Band 12 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23095 (707.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	25.24	0	0
	1	25	25.21		0
	1	49	25.11		0
	25	0	24.20	0-1	1
	25	12	24.23		1
	25	25	24.33		1
	50	0	24.26		1
16QAM	1	0	24.10	0-1	1
	1	25	24.31		1
	1	49	24.35		1
	25	0	23.23	0-2	2
	25	12	23.34		2
	25	25	23.35		2
	50	0	23.31		2
64QAM	1	0	23.08	0-2	2
	1	25	23.20		2
	1	49	23.31		2
	25	0	22.18	0-3	3
	25	12	22.24		3
	25	25	22.35		3
	50	0	22.19		3

Note: LTE Band 12 at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.



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Table 9-9
LTE Band 12 Conducted Powers - 5 MHz Bandwidth

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23035 (701.5 MHz)	23095 (707.5 MHz)	23155 (713.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.32	25.23	25.32	0	0
	1	12	25.27	25.18	25.23		0
	1	24	25.13	25.17	25.01		0
	12	0	24.20	24.22	24.19	0-1	1
	12	6	24.32	24.26	24.29		1
	12	13	24.32	24.39	24.23		1
	25	0	24.27	24.26	24.35		1
16QAM	1	0	24.00	24.08	24.10	0-1	1
	1	12	24.38	24.31	24.30		1
	1	24	24.36	24.33	24.28		1
	12	0	23.18	23.22	23.28	0-2	2
	12	6	23.37	23.36	23.40		2
	12	13	23.38	23.29	23.34		2
	25	0	23.32	23.26	23.36		2
64QAM	1	0	22.88	23.02	22.99	0-2	2
	1	12	23.33	23.30	23.24		2
	1	24	23.31	23.31	23.19		2
	12	0	22.06	22.18	22.17	0-3	3
	12	6	22.36	22.36	22.30		3
	12	13	22.26	22.21	22.31		3
	25	0	22.27	22.24	22.30		3

Table 9-10
LTE Band 12 Conducted Powers - 3 MHz Bandwidth

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23025 (700.5 MHz)	23095 (707.5 MHz)	23165 (714.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.24	25.18	25.29	0	0
	1	7	25.20	25.26	25.13		0
	1	14	25.12	25.07	25.13		0
	8	0	24.12	24.09	24.16	0-1	1
	8	4	24.14	24.25	24.20		1
	8	7	24.31	24.44	24.39		1
	15	0	24.23	24.27	24.27		1
16QAM	1	0	24.09	24.15	24.07	0-1	1
	1	7	24.35	24.30	24.24		1
	1	14	24.31	24.29	24.30		1
	8	0	23.26	23.11	23.26	0-2	2
	8	4	23.32	23.40	23.33		2
	8	7	23.37	23.34	23.39		2
	15	0	23.30	23.32	23.37		2
64QAM	1	0	23.02	23.09	22.95	0-2	2
	1	7	23.25	23.21	23.17		2
	1	14	23.30	23.18	23.25		2
	8	0	22.23	22.08	22.19	0-3	3
	8	4	22.28	22.30	22.33		3
	8	7	22.26	22.26	22.29		3
	15	0	22.22	22.27	22.27		3





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Table 9-11
LTE Band 12 Conducted Powers -1.4 MHz Bandwidth

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23017 (699.7 MHz)	23095 (707.5 MHz)	23173 (715.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.31	25.15	25.25	0	0
	1	2	25.20	25.14	25.13		0
	1	5	25.07	25.11	25.07		0
	3	0	25.22	25.28	25.29		0
	3	2	25.21	25.13	25.14		0
	3	3	25.11	25.13	25.13		0
	6	0	24.30	24.33	24.25	0-1	1
16QAM	1	0	24.19	24.10	24.05	0-1	1
	1	2	24.23	24.25	24.33		1
	1	5	24.28	24.34	24.37		1
	3	0	24.01	24.16	24.07		1
	3	2	24.32	24.29	24.30		1
	3	3	24.35	24.35	24.36		1
	6	0	23.26	23.36	23.31	0-2	2
64QAM	1	0	23.10	23.02	23.06	0-2	2
	1	2	23.02	23.23	23.12		2
	1	5	23.19	23.42	23.38		2
	3	0	23.22	23.24	23.19		2
	3	2	22.99	23.06	22.97		2
	3	3	23.25	23.21	23.22		2
	6	0	22.18	22.16	22.23	0-3	3

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9.3.3

LTE Band 13

Table 9-12
LTE Band 13 Conducted Powers - 10 MHz Bandwidth

LTE Band 13 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23230 (782.0 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	24.81	0	0
	1	25	25.48		0
	1	49	25.01		0
	25	0	24.35	0-1	1
	25	12	24.27		1
	25	25	23.89		1
	50	0	24.26		1
16QAM	1	0	23.85	0-1	1
	1	25	24.42		1
	1	49	23.68		1
	25	0	23.31	0-2	2
	25	12	23.35		2
	25	25	23.28		2
	50	0	23.39		2
64QAM	1	0	23.30	0-2	2
	1	25	23.15		2
	1	49	23.34		2
	25	0	22.16	0-3	3
	25	12	22.15		3
	25	25	22.10		3
	50	0	22.19		3





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Table 9-13
LTE Band 13 Conducted Powers - 5 MHz Bandwidth

LTE Band 13 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23230 (782.0 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	24.79	0	0
	1	12	25.49		0
	1	24	25.01		0
	12	0	24.35	0-1	1
	12	6	24.17		1
	12	13	23.89		1
	25	0	24.28		1
16QAM	1	0	23.84	0-1	1
	1	12	24.39		1
	1	24	23.65		1
	12	0	23.24	0-2	2
	12	6	23.33		2
	12	13	23.36		2
	25	0	23.42		2
64QAM	1	0	23.30	0-2	2
	1	12	23.31		2
	1	24	23.35		2
	12	0	22.26	0-3	3
	12	6	22.15		3
	12	13	22.14		3
	25	0	22.11		3

Note: LTE Band 13 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

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LTE Band 5 (Cell)

Table 9-14
LTE Band 5 (Cell) Conducted Powers - 10 MHz Bandwidth

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20525 (836.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	25.48	0	0
	1	25	25.47		0
	1	49	25.34		0
	25	0	24.30	0-1	1
	25	12	24.43		1
	25	25	24.40		1
	50	0	24.41		1
16QAM	1	0	24.39	0-1	1
	1	25	24.49		1
	1	49	24.25		1
	25	0	23.38	0-2	2
	25	12	23.49		2
	25	25	23.42		2
	50	0	23.42		2
64QAM	1	0	23.35	0-2	2
	1	25	23.38		2
	1	49	23.14		2
	25	0	22.27	0-3	3
	25	12	22.41		3
	25	25	22.36		3
	50	0	22.41		3

Note: LTE Band 5 (Cell) at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.



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Table 9-15
LTE Band 5 (Cell) Conducted Powers - 5 MHz Bandwidth

LTE Band 5 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20425 (826.5 MHz)	20525 (836.5 MHz)	20625 (846.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.45	25.34	25.27	0	0
	1	12	25.30	25.48	25.37		0
	1	24	25.44	25.27	25.36		0
	12	0	24.40	24.23	24.26	0-1	1
	12	6	24.37	24.41	24.41		1
	12	13	24.45	24.47	24.34		1
	25	0	24.37	24.41	24.34		1
16QAM	1	0	24.40	24.30	24.33	0-1	1
	1	12	24.49	24.50	24.30		1
	1	24	24.25	24.16	24.19		1
	12	0	23.39	23.31	23.37	0-2	2
	12	6	23.40	23.40	23.33		2
	12	13	23.34	23.36	23.41		2
	25	0	23.41	23.36	23.40		2
64QAM	1	0	23.36	23.24	23.28	0-2	2
	1	12	23.41	23.38	23.29		2
	1	24	23.23	23.15	23.11		2
	12	0	22.37	22.19	22.29	0-3	3
	12	6	22.36	22.35	22.32		3
	12	13	22.31	22.26	22.41		3
	25	0	22.34	22.30	22.35		3

Table 9-16
LTE Band 5 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 5 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20415 (825.5 MHz)	20525 (836.5 MHz)	20635 (847.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.37	25.36	25.45	0	0
	1	7	25.42	25.50	25.40		0
	1	14	25.35	25.32	25.39		0
	8	0	24.24	24.28	24.22	0-1	1
	8	4	24.43	24.42	24.38		1
	8	7	24.40	24.36	24.39		1
	15	0	24.31	24.33	24.37		1
16QAM	1	0	24.37	24.44	24.38	0-1	1
	1	7	24.46	24.44	24.39		1
	1	14	24.24	24.27	24.34		1
	8	0	23.41	23.45	23.38	0-2	2
	8	4	23.48	23.46	23.49		2
	8	7	23.36	23.44	23.45		2
	15	0	23.41	23.42	23.40		2
64QAM	1	0	23.27	23.32	23.31	0-2	2
	1	7	23.45	23.39	23.27		2
	1	14	23.23	23.17	23.27		2
	8	0	22.38	22.43	22.37	0-3	3
	8	4	22.36	22.43	22.39		3
	8	7	22.27	22.35	22.34		3
	15	0	22.29	22.32	22.31		3





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Table 9-17
LTE Band 5 (Cell) Conducted Powers -1.4 MHz Bandwidth

LTE Band 5 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20407 (824.7 MHz)	20525 (836.5 MHz)	20643 (848.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.48	25.38	25.39	0	0
	1	2	25.44	25.47	25.00		0
	1	5	25.26	25.34	25.27		0
	3	0	25.28	25.30	25.32		0
	3	2	25.45	25.50	25.40		0
	3	3	25.34	25.39	25.30		0
	6	0	24.47	24.39	24.36	0-1	1
16QAM	1	0	24.38	24.32	24.47	0-1	1
	1	2	24.45	24.30	24.43		1
	1	5	24.26	24.23	24.28		1
	3	0	24.21	24.36	24.33		1
	3	2	24.44	24.39	24.44		1
	3	3	24.38	24.48	24.35		1
	6	0	23.41	23.45	23.38	0-2	2
64QAM	1	0	23.33	23.24	23.47	0-2	2
	1	2	23.36	23.25	23.38		2
	1	5	23.25	23.18	23.22		2
	3	0	23.20	23.32	23.24		2
	3	2	23.40	23.33	23.42		2
	3	3	23.35	23.48	23.24		2
	6	0	22.39	22.35	22.26	0-3	3

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LTE Band 66 (AWS)

Table 9-18
LTE Band 66 (AWS) Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			132072 (1720.0 MHz)	132322 (1745.0 MHz)	132572 (1770.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.00	25.20	25.13	0	0
	1	50	24.96	25.11	25.13		0
	1	99	24.66	25.00	24.71		0
	50	0	23.91	24.18	24.13	0-1	1
	50	25	23.80	24.14	24.16		1
	50	50	23.84	24.05	24.16		1
	100	0	23.79	24.04	24.10		1
16QAM	1	0	24.00	24.12	24.10	0-1	1
	1	50	23.51	24.06	24.15		1
	1	99	23.87	24.20	24.16		1
	50	0	22.80	23.19	23.15	0-2	2
	50	25	22.73	23.02	23.10		2
	50	50	22.79	23.14	23.15		2
	100	0	22.83	23.13	23.05		2
64QAM	1	0	22.91	23.01	23.01	0-2	2
	1	50	22.46	23.02	23.04		2
	1	99	22.87	23.16	23.12		2
	50	0	21.70	22.08	22.15	0-3	3
	50	25	21.68	21.91	21.98		3
	50	50	21.67	22.10	22.07		3
	100	0	21.78	22.09	22.05		3



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Table 9-19
LTE Band 66 (AWS) Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			132047 (1717.5 MHz)	132322 (1745.0 MHz)	132597 (1772.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.92	25.13	25.06	0	0
	1	36	24.94	25.01	25.04		0
	1	74	24.57	24.93	24.65		0
	36	0	23.90	24.09	24.12	0-1	1
	36	18	23.76	24.11	24.11		1
	36	37	23.83	23.99	24.05		1
	75	0	23.73	23.99	24.09		1
16QAM	1	0	23.95	24.09	24.09	0-1	1
	1	36	23.43	24.00	24.11		1
	1	74	23.78	24.08	24.06		1
	36	0	22.79	23.17	23.11	0-2	2
	36	18	22.68	22.98	23.09		2
	36	37	22.70	23.12	23.08		2
	75	0	22.79	23.07	22.95		2
64QAM	1	0	22.88	23.01	23.02	0-2	2
	1	36	22.37	22.95	23.05		2
	1	74	22.66	23.02	22.95		2
	36	0	21.73	22.11	21.99	0-3	3
	36	18	21.61	21.92	22.04		3
	36	37	21.63	22.08	21.98		3
	75	0	21.76	22.06	21.88		3

Table 9-20
LTE Band 66 (AWS) Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			132022 (1715.0 MHz)	132322 (1745.0 MHz)	132622 (1775.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.99	25.17	25.10	0	0
	1	25	24.95	25.11	25.07		0
	1	49	24.54	24.89	24.69		0
	25	0	23.88	24.11	24.12	0-1	1
	25	12	23.73	24.09	24.07		1
	25	25	23.81	24.03	24.14		1
	50	0	23.78	23.95	24.05		1
16QAM	1	0	23.88	24.05	24.00	0-1	1
	1	25	23.47	23.98	24.13		1
	1	49	23.75	24.11	24.12		1
	25	0	22.71	23.13	23.13	0-2	2
	25	12	22.64	22.95	23.00		2
	25	25	22.77	23.11	23.07		2
	50	0	22.78	23.12	23.03		2
64QAM	1	0	22.76	22.97	22.97	0-2	2
	1	25	22.43	22.95	23.10		2
	1	49	22.74	23.00	23.09		2
	25	0	21.66	22.05	22.06	0-3	3
	25	12	21.54	21.88	21.89		3
	25	25	21.76	22.07	21.97		3
	50	0	21.74	22.01	21.96		3



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Table 9-21
LTE Band 66 (AWS) Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131997 (1712.5 MHz)	132322 (1745.0 MHz)	132647 (1777.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.93	25.08	25.12	0	0
	1	12	24.92	25.06	25.02		0
	1	24	24.64	24.98	24.68		0
	12	0	23.79	24.14	24.12	0-1	1
	12	6	23.78	24.12	24.15		1
	12	13	23.77	24.03	24.11		1
	25	0	23.74	23.95	24.04		1
16QAM	1	0	23.95	24.00	24.06	0-1	1
	1	12	23.42	24.04	24.05		1
	1	24	23.84	24.08	24.05		1
	12	0	22.75	23.07	23.03	0-2	2
	12	6	22.71	22.96	23.09		2
	12	13	22.67	23.13	23.11		2
	25	0	22.74	23.03	22.98		2
64QAM	1	0	22.89	22.95	23.04	0-2	2
	1	12	22.31	22.98	22.93		2
	1	24	22.78	23.05	22.93		2
	12	0	21.66	22.01	22.03	0-3	3
	12	6	21.70	21.91	21.97		3
	12	13	21.62	22.01	22.08		3
	25	0	21.69	21.99	21.98		3

Table 9-22
LTE Band 66 (AWS) Maximum Conducted Powers - 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131987 (1711.5 MHz)	132322 (1745.0 MHz)	132657 (1778.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.99	25.08	25.10	0	0
	1	7	24.91	25.10	25.03		0
	1	14	24.65	24.91	24.63		0
	8	0	23.86	24.14	24.11	0-1	1
	8	4	23.79	24.10	24.13		1
	8	7	23.79	23.94	24.14		1
	15	0	23.77	24.01	24.01		1
16QAM	1	0	23.88	24.05	24.07	0-1	1
	1	7	23.44	24.02	24.13		1
	1	14	23.77	24.13	24.08		1
	8	0	22.79	23.08	23.09	0-2	2
	8	4	22.68	23.00	23.01		2
	8	7	22.68	23.09	23.07		2
	15	0	22.72	23.01	23.00		2
64QAM	1	0	22.85	22.99	22.97	0-2	2
	1	7	22.33	23.01	23.06		2
	1	14	22.71	23.05	22.96		2
	8	0	21.67	21.97	22.02	0-3	3
	8	4	21.63	21.90	21.96		3
	8	7	21.63	21.99	22.03		3
	15	0	21.60	21.93	21.91		3



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Table 9-23
LTE Band 66 (AWS) Maximum Conducted Powers -1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131979 (1710.7 MHz)	132322 (1745.0 MHz)	132665 (1779.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.94	25.20	25.11	0	0
	1	2	24.87	25.08	25.09		0
	1	5	24.60	24.89	24.67		0
	3	0	25.00	25.08	25.09		0
	3	2	24.90	25.01	25.04		0
	3	3	24.58	24.91	24.60		0
	6	0	23.73	24.01	24.02	0-1	1
16QAM	1	0	23.91	24.08	23.99	0-1	1
	1	2	23.40	23.97	24.09		1
	1	5	23.83	24.19	24.15		1
	3	0	23.82	24.14	24.11		1
	3	2	23.73	24.04	24.10		1
	3	3	23.81	24.05	24.06		1
	6	0	22.78	23.11	22.94	0-2	2
64QAM	1	0	22.85	23.01	22.87	0-2	2
	1	2	22.30	22.88	23.04		2
	1	5	22.81	23.16	23.10		2
	3	0	22.82	23.09	23.04		2
	3	2	22.65	23.00	23.01		2
	3	3	22.77	22.97	22.99		2
	6	0	21.68	21.99	21.86	0-3	3



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Table 9-24
LTE Band 66 (AWS) Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			132072 (1720.0 MHz)	132322 (1745.0 MHz)	132572 (1770.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.17	24.18	24.12	0	0
	1	50	24.20	24.12	24.09		0
	1	99	24.16	24.13	24.03		0
	50	0	23.89	23.79	23.81	0-1	0
	50	25	23.75	23.80	23.86		0
	50	50	23.85	23.84	23.86		0
	100	0	23.80	23.76	23.81		0
16QAM	1	0	24.18	24.19	24.16	0-1	0
	1	50	24.09	24.16	24.15		0
	1	99	24.14	24.10	24.10		0
	50	0	23.11	23.13	23.13	0-2	1
	50	25	23.15	23.13	23.11		1
	50	50	23.00	23.05	23.08		1
	100	0	23.12	23.16	23.19		1
64QAM	1	0	23.11	23.16	23.09	0-2	1
	1	50	23.07	23.10	23.04		1
	1	99	23.06	23.07	22.99		1
	50	0	22.04	22.03	22.12	0-3	2
	50	25	22.09	22.01	22.07		2
	50	50	21.93	21.96	22.06		2
	100	0	22.11	22.04	22.07		2

Table 9-25
LTE Band 66 (AWS) Reduced Conducted Powers - 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			132047 (1717.5 MHz)	132322 (1745.0 MHz)	132597 (1772.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.14	24.15	24.13	0	0
	1	36	24.11	24.13	24.08		0
	1	74	24.17	24.10	24.09		0
	36	0	23.85	23.83	23.91	0-1	0
	36	18	23.71	23.79	23.84		0
	36	37	23.88	23.84	23.75		0
	75	0	23.76	23.77	23.89		0
16QAM	1	0	24.19	24.20	24.16	0-1	0
	1	36	24.15	24.16	24.16		0
	1	74	24.16	24.00	24.03		0
	36	0	23.04	23.16	23.17	0-2	1
	36	18	23.14	23.12	23.17		1
	36	37	22.98	23.06	23.11		1
	75	0	23.06	23.18	23.14		1
64QAM	1	0	23.14	23.19	23.10	0-2	1
	1	36	23.03	23.11	23.06		1
	1	74	23.11	22.97	22.92		1
	36	0	21.94	22.13	22.15	0-3	2
	36	18	22.11	22.05	22.06		2
	36	37	21.90	21.98	21.99		2
	75	0	21.98	22.11	22.10		2



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Table 9-26
LTE Band 66 (AWS) Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			132022 (1715.0 MHz)	132322 (1745.0 MHz)	132622 (1775.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.11	24.16	24.15	0	0
	1	25	24.19	24.07	24.05		0
	1	49	24.16	24.20	24.06		0
	25	0	23.95	23.77	23.89	0-1	0
	25	12	23.80	23.83	23.89		0
	25	25	23.90	23.88	23.78		0
	50	0	23.87	23.79	23.75		0
16QAM	1	0	24.10	24.17	24.16	0-1	0
	1	25	24.00	24.13	24.13		0
	1	49	24.14	24.04	24.17		0
	25	0	23.17	23.20	23.15	0-2	1
	25	12	23.12	23.20	23.16		1
	25	25	22.92	23.02	23.13		1
	50	0	23.20	23.17	23.16		1
64QAM	1	0	22.99	23.15	23.06	0-2	1
	1	25	23.00	23.12	23.06		1
	1	49	23.09	23.00	23.08		1
	25	0	22.13	22.19	22.09	0-3	2
	25	12	22.01	22.19	22.08		2
	25	25	21.91	21.99	22.03		2
	50	0	22.15	22.17	22.06		2

Table 9-27
LTE Band 66 (AWS) Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131997 (1712.5 MHz)	132322 (1745.0 MHz)	132647 (1777.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.18	24.18	24.16	0	0
	1	12	24.15	24.15	24.01		0
	1	24	24.16	24.07	24.03		0
	12	0	23.89	23.68	23.88	0-1	0
	12	6	23.83	23.87	23.87		0
	12	13	23.87	23.84	23.91		0
	25	0	23.81	23.82	23.86		0
16QAM	1	0	24.19	24.14	24.16	0-1	0
	1	12	24.15	24.11	24.07		0
	1	24	24.16	24.04	24.00		0
	12	0	23.10	23.09	23.16	0-2	1
	12	6	23.06	23.08	23.12		1
	12	13	22.98	23.00	23.02		1
	25	0	23.16	23.13	23.16		1
64QAM	1	0	23.17	23.08	23.08	0-2	1
	1	12	23.13	23.08	22.99		1
	1	24	23.09	22.97	22.99		1
	12	0	22.03	22.06	22.16	0-3	2
	12	6	21.97	22.00	22.05		2
	12	13	21.97	21.98	21.97		2
	25	0	22.14	22.12	22.05		2





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Table 9-28
LTE Band 66 (AWS) Reduced Conducted Powers - 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131987 (1711.5 MHz)	132322 (1745.0 MHz)	132657 (1778.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.12	24.11	24.16	0	0
	1	7	24.15	24.10	24.09		0
	1	14	24.08	24.07	23.93		0
	8	0	23.83	23.79	23.73	0-1	0
	8	4	23.71	23.76	23.89		0
	8	7	23.95	23.95	23.89		0
	15	0	23.80	23.80	23.88		0
16QAM	1	0	24.15	24.13	24.15	0-1	0
	1	7	24.09	24.11	24.16		0
	1	14	24.17	24.12	24.09		0
	8	0	23.14	23.05	23.15	0-2	1
	8	4	23.14	23.19	23.14		1
	8	7	22.97	23.07	23.01		1
	15	0	23.14	23.09	23.13		1
64QAM	1	0	23.08	23.03	23.06	0-2	1
	1	7	23.01	22.99	23.12		1
	1	14	23.05	23.10	22.98		1
	8	0	22.04	21.99	22.06	0-3	2
	8	4	22.04	22.12	22.03		2
	8	7	21.89	21.96	21.90		2
	15	0	22.11	22.04	22.03		2

Table 9-29
LTE Band 66 (AWS) Reduced Conducted Powers – 1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131979 (1710.7 MHz)	132322 (1745.0 MHz)	132665 (1779.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.18	24.08	24.16	0	0
	1	2	24.16	24.13	24.06		0
	1	5	24.10	24.13	24.00		0
	3	0	23.88	23.75	23.78		0
	3	2	23.78	23.72	23.89		0
	3	3	23.81	23.95	23.83		0
	6	0	23.88	23.76	23.84	0-1	0
16QAM	1	0	24.08	24.12	24.13	0-1	0
	1	2	24.06	24.18	24.13		0
	1	5	24.07	24.04	24.05		0
	3	0	24.10	24.20	24.16		0
	3	2	24.05	24.11	24.12		0
	3	3	24.13	24.04	24.10		0
	6	0	23.08	23.12	23.18	0-2	1
64QAM	1	0	23.01	23.05	23.04	0-2	1
	1	2	23.06	23.13	23.13		1
	1	5	22.98	22.95	22.94		1
	3	0	22.98	23.15	23.09		1
	3	2	22.98	23.02	23.10		1
	3	3	23.08	23.03	23.04		1
	6	0	22.05	22.07	22.17	0-3	2

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LTE Band 25 (PCS)

Table 9-30
LTE Band 25 (PCS) Maximum Conducted Powers - 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26140 (1860.0 MHz)	26365 (1882.5 MHz)	26590 (1905.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.43	25.31	25.21	0	0
	1	50	25.18	25.15	25.48		0
	1	99	25.05	24.79	25.02		0
	50	0	24.06	24.37	24.37	0-1	1
	50	25	23.94	24.06	24.50		1
	50	50	24.12	23.98	24.44		1
	100	0	24.07	24.11	24.20		1
16QAM	1	0	24.44	24.46	24.34	0-1	1
	1	50	24.22	24.30	24.44		1
	1	99	24.31	24.50	24.47		1
	50	0	23.17	23.37	23.50	0-2	2
	50	25	22.97	23.10	23.33		2
	50	50	23.08	23.01	23.47		2
	100	0	23.10	23.10	23.36		2
64QAM	1	0	23.36	23.45	23.28	0-2	2
	1	50	23.18	23.24	23.40		2
	1	99	23.25	23.45	23.38		2
	50	0	22.10	22.27	22.46	0-3	3
	50	25	21.87	22.01	22.29		3
	50	50	22.02	21.92	22.43		3
	100	0	22.07	22.03	22.26		3



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Table 9-31
LTE Band 25 (PCS) Maximum Conducted Powers - 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26115 (1857.5 MHz)	26365 (1882.5 MHz)	26615 (1907.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.31	25.31	25.12	0	0
	1	36	25.06	25.14	25.38		0
	1	74	25.02	24.79	25.00		0
	36	0	24.05	24.28	24.34	0-1	1
	36	18	23.86	24.03	24.38		1
	36	37	24.10	23.95	24.34		1
	75	0	23.96	24.11	24.10		1
16QAM	1	0	24.37	24.34	24.32	0-1	1
	1	36	24.13	24.29	24.39		1
	1	74	24.19	24.48	24.36		1
	36	0	23.09	23.27	23.45	0-2	2
	36	18	22.97	23.08	23.22		2
	36	37	23.07	22.99	23.44		2
	75	0	23.10	23.05	23.29		2
64QAM	1	0	23.27	23.24	23.29	0-2	2
	1	36	23.02	23.18	23.28		2
	1	74	23.19	23.43	23.28		2
	36	0	21.98	22.26	22.44	0-3	3
	36	18	21.96	22.00	22.16		3
	36	37	21.99	21.98	22.44		3
	75	0	22.07	21.98	22.27		3

Table 9-32
LTE Band 25 (PCS) Maximum Conducted Powers - 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26090 (1855.0 MHz)	26365 (1882.5 MHz)	26640 (1910.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.35	25.21	25.09	0	0
	1	25	25.13	25.05	25.45		0
	1	49	24.99	24.72	24.98		0
	25	0	24.03	24.35	24.34	0-1	1
	25	12	23.90	23.99	24.38		1
	25	25	24.07	23.93	24.33		1
	50	0	23.98	24.11	24.15		1
16QAM	1	0	24.32	24.39	24.26	0-1	1
	1	25	24.18	24.24	24.42		1
	1	49	24.23	24.38	24.40		1
	25	0	23.08	23.34	23.42	0-2	2
	25	12	22.90	23.03	23.23		2
	25	25	22.99	23.00	23.46		2
	50	0	22.99	22.98	23.34		2
64QAM	1	0	23.27	23.27	23.15	0-2	2
	1	25	23.06	23.20	23.31		2
	1	49	23.15	23.36	23.34		2
	25	0	21.99	22.31	22.34	0-3	3
	25	12	21.87	21.96	22.17		3
	25	25	21.91	21.91	22.45		3
	50	0	21.87	21.88	22.26		3



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Table 9-33
LTE Band 25 (PCS) Maximum Conducted Powers - 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26065 (1852.5 MHz)	26365 (1882.5 MHz)	26665 (1912.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.36	25.24	25.15	0	0
	1	12	25.16	25.13	25.47		0
	1	24	25.03	24.67	24.99		0
	12	0	24.00	24.34	24.36	0-1	1
	12	6	23.93	24.05	24.38		1
	12	13	24.01	23.91	24.40		1
	25	0	24.06	24.01	24.19		1
16QAM	1	0	24.38	24.40	24.22	0-1	1
	1	12	24.17	24.28	24.37		1
	1	24	24.23	24.47	24.35		1
	12	0	23.13	23.26	23.49	0-2	2
	12	6	22.85	23.00	23.26		2
	12	13	23.08	22.96	23.35		2
	25	0	23.09	23.02	23.35		2
64QAM	1	0	23.28	23.31	23.10	0-2	2
	1	12	23.10	23.17	23.37		2
	1	24	23.16	23.39	23.24		2
	12	0	22.10	22.24	22.39	0-3	3
	12	6	21.77	21.96	22.25		3
	12	13	22.02	21.86	22.30		3
	25	0	21.97	21.96	22.32		3

Table 9-34
LTE Band 25 (PCS) Maximum Conducted Powers - 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26055 (1851.5 MHz)	26365 (1882.5 MHz)	26675 (1913.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.34	25.19	25.21	0	0
	1	7	25.16	25.06	25.37		0
	1	14	25.00	24.69	24.97		0
	8	0	24.03	24.31	24.25	0-1	1
	8	4	23.90	23.94	24.44		1
	8	7	24.00	23.87	24.35		1
	15	0	24.03	23.99	24.19		1
16QAM	1	0	24.35	24.44	24.31	0-1	1
	1	7	24.15	24.28	24.41		1
	1	14	24.19	24.42	24.44		1
	8	0	23.13	23.29	23.40	0-2	2
	8	4	22.93	23.08	23.25		2
	8	7	23.05	22.95	23.45		2
	15	0	22.99	23.00	23.24		2
64QAM	1	0	23.28	23.32	23.26	0-2	2
	1	7	23.11	23.20	23.30		2
	1	14	23.18	23.30	23.43		2
	8	0	22.11	22.25	22.29	0-3	3
	8	4	21.84	22.00	22.22		3
	8	7	21.99	21.84	22.37		3
	15	0	21.95	21.90	22.13		3



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Table 9-35
LTE Band 25 (PCS) Maximum Conducted Powers -1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26047 (1850.7 MHz)	26365 (1882.5 MHz)	26683 (1914.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.39	25.19	25.18	0	0
	1	2	25.15	25.09	25.38		0
	1	5	25.04	24.68	25.02		0
	3	0	25.38	25.28	25.12		0
	3	2	25.17	25.12	25.46		0
	3	3	25.04	24.69	24.98		0
	6	0	24.06	24.00	24.20	0-1	1
16QAM	1	0	24.35	24.37	24.26	0-1	1
	1	2	24.10	24.18	24.36		1
	1	5	24.31	24.48	24.41		1
	3	0	24.00	24.35	24.26		1
	3	2	23.89	24.00	24.43		1
	3	3	24.07	23.88	24.36		1
	6	0	23.08	23.07	23.27	0-2	2
64QAM	1	0	23.33	23.28	23.17	0-2	2
	1	2	23.04	23.13	23.32		2
	1	5	23.30	23.45	23.32		2
	3	0	22.93	23.30	23.18		2
	3	2	22.84	22.96	23.35		2
	3	3	23.03	22.79	23.24		2
	6	0	22.04	22.01	22.22	0-3	3



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Table 9-36
LTE Band 25 (PCS) Reduced Conducted Powers - 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26140 (1860.0 MHz)	26365 (1882.5 MHz)	26590 (1905.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.48	24.50	24.43	0	0
	1	50	24.44	24.49	24.49		0
	1	99	24.39	24.46	24.47		0
	50	0	24.20	24.24	24.23	0-1	0
	50	25	24.13	24.13	24.08		0
	50	50	24.01	24.03	23.93		0
	100	0	24.06	24.20	24.05		0
16QAM	1	0	24.33	24.43	24.38	0-1	0
	1	50	24.38	24.38	24.32		0
	1	99	24.14	24.19	24.17		0
	50	0	23.28	23.26	23.32	0-2	1
	50	25	23.21	23.22	23.32		1
	50	50	23.06	23.14	23.21		1
	100	0	23.08	23.13	23.22		1
64QAM	1	0	23.27	23.32	23.30	0-2	1
	1	50	23.37	23.33	23.20		1
	1	99	23.06	23.16	23.13		1
	50	0	22.23	22.20	22.27	0-3	2
	50	25	22.17	22.13	22.26		2
	50	50	22.01	22.04	22.21		2
	100	0	21.98	22.10	22.20		2

Table 9-37
LTE Band 25 (PCS) Reduced Conducted Powers - 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26115 (1857.5 MHz)	26365 (1882.5 MHz)	26615 (1907.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.50	24.44	24.39	0	0
	1	36	24.42	24.43	24.40		0
	1	74	24.37	24.44	24.50		0
	36	0	24.09	24.24	24.16	0-1	0
	36	18	24.06	24.10	24.10		0
	36	37	24.10	24.11	23.90		0
	75	0	24.08	24.17	23.98		0
16QAM	1	0	24.41	24.37	24.38	0-1	0
	1	36	24.45	24.32	24.32		0
	1	74	24.24	24.23	24.15		0
	36	0	23.19	23.29	23.22	0-2	1
	36	18	23.19	23.18	23.29		1
	36	37	23.06	23.18	23.15		1
	75	0	23.06	23.12	23.16		1
64QAM	1	0	23.37	23.35	23.34	0-2	1
	1	36	23.36	23.20	23.30		1
	1	74	23.19	23.18	23.04		1
	36	0	22.16	22.25	22.22	0-3	2
	36	18	22.17	22.18	22.17		2
	36	37	22.03	22.14	22.07		2
	75	0	21.98	22.10	22.11		2



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Table 9-38
LTE Band 25 (PCS) Reduced Conducted Powers - 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26090 (1855.0 MHz)	26365 (1882.5 MHz)	26640 (1910.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.43	24.46	24.42	0	0
	1	25	24.42	24.42	24.47		0
	1	49	24.30	24.40	24.42		0
	25	0	24.17	24.17	24.18	0-1	0
	25	12	24.20	24.07	24.04		0
	25	25	24.10	24.06	23.90		0
	50	0	24.10	24.01	24.12		0
16QAM	1	0	24.45	24.47	24.39	0-1	0
	1	25	24.42	24.28	24.38		0
	1	49	24.04	24.20	24.12		0
	25	0	23.28	23.38	23.39	0-2	1
	25	12	23.27	23.16	23.34		1
	25	25	23.02	23.14	23.26		1
	50	0	23.11	23.19	23.23		1
64QAM	1	0	23.37	23.45	23.31	0-2	1
	1	25	23.36	23.24	23.35		1
	1	49	22.93	23.18	23.01		1
	25	0	22.24	22.26	22.39	0-3	2
	25	12	22.25	22.15	22.33		2
	25	25	22.00	22.12	22.19		2
	50	0	22.09	22.12	22.19		2

Table 9-39
LTE Band 25 (PCS) Reduced Conducted Powers - 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26065 (1852.5 MHz)	26365 (1882.5 MHz)	26665 (1912.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.47	24.43	24.42	0	0
	1	12	24.44	24.41	24.46		0
	1	24	24.28	24.41	24.42		0
	12	0	24.26	24.11	24.19	0-1	0
	12	6	24.18	24.12	24.10		0
	12	13	24.03	24.13	23.85		0
	25	0	23.99	24.01	24.03		0
16QAM	1	0	24.39	24.38	24.41	0-1	0
	1	12	24.31	24.32	24.33		0
	1	24	24.20	24.13	24.18		0
	12	0	23.22	23.22	23.25	0-2	1
	12	6	23.31	23.18	23.30		1
	12	13	22.97	23.10	23.18		1
	25	0	23.09	23.10	23.28		1
64QAM	1	0	23.32	23.31	23.35	0-2	1
	1	12	23.22	23.29	23.27		1
	1	24	23.18	23.02	23.10		1
	12	0	22.11	22.16	22.19	0-3	2
	12	6	22.30	22.16	22.21		2
	12	13	21.95	22.02	22.09		2
	25	0	21.98	21.99	22.17		2





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Table 9-40
LTE Band 25 (PCS) Reduced Conducted Powers - 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26055 (1851.5 MHz)	26365 (1882.5 MHz)	26675 (1913.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.48	24.49	24.50	0	0
	1	7	24.50	24.47	24.13		0
	1	14	24.43	24.45	24.45		0
	8	0	24.19	24.20	24.13	0-1	0
	8	4	24.10	24.09	23.98		0
	8	7	23.96	24.00	23.95		0
	15	0	24.09	23.99	23.95		0
16QAM	1	0	24.24	24.44	24.48	0-1	0
	1	7	24.35	24.34	24.38		0
	1	14	24.07	24.21	24.18		0
	8	0	23.25	23.31	23.38	0-2	1
	8	4	23.27	23.24	23.39		1
	8	7	23.10	23.24	23.14		1
	15	0	23.09	23.10	23.22		1
64QAM	1	0	23.23	23.44	23.39	0-2	1
	1	7	23.31	23.22	23.36		1
	1	14	23.06	23.12	23.13		1
	8	0	22.22	22.27	22.30	0-3	2
	8	4	22.26	22.19	22.30		2
	8	7	22.10	22.14	22.05		2
	15	0	21.99	21.99	22.16		2

Table 9-41
LTE Band 25 (PCS) Reduced Conducted Powers -1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26047 (1850.7 MHz)	26365 (1882.5 MHz)	26683 (1914.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.50	24.46	24.37	0	0
	1	2	24.44	24.49	24.47		0
	1	5	24.40	24.41	24.40		0
	3	0	24.29	24.07	24.27		0
	3	2	24.17	24.22	24.16		0
	3	3	23.97	23.96	23.89		0
	6	0	23.99	23.96	24.08	0-1	0
16QAM	1	0	24.25	24.34	24.32	0-1	0
	1	2	24.39	24.29	24.35		0
	1	5	24.15	24.21	24.23		0
	3	0	24.27	24.24	24.30		0
	3	2	24.23	24.19	24.06		0
	3	3	23.94	24.08	23.89		0
	6	0	23.17	23.15	23.28	0-2	1
64QAM	1	0	23.13	23.25	23.32	0-2	1
	1	2	23.38	23.22	23.31		1
	1	5	23.06	23.20	23.17		1
	3	0	23.22	23.23	23.25		1
	3	2	23.14	23.16	23.05		1
	3	3	22.88	22.98	22.81		1
	6	0	22.09	22.09	22.17	0-3	2

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LTE Band 30

Table 9-42
LTE Band 30 Conducted Powers - 10 MHz Bandwidth

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			27710 (2310.0 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	25.38	0	0
	1	25	25.37		0
	1	49	25.21		0
	25	0	24.15	0-1	1
	25	12	24.17		1
	25	25	24.04		1
	50	0	24.12		1
16QAM	1	0	24.33	0-1	1
	1	25	24.44		1
	1	49	24.31		1
	25	0	23.23	0-2	2
	25	12	23.10		2
	25	25	23.17		2
	50	0	23.24		2
64QAM	1	0	23.30	0-2	2
	1	25	23.15		2
	1	49	23.25		2
	25	0	22.10	0-3	3
	25	12	22.16		3
	25	25	22.25		3
	50	0	22.21		3





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Table 9-43
LTE Band 30 Conducted Powers - 5 MHz Bandwidth

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			27710 (2310.0 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	25.38	0	0
	1	12	25.27		0
	1	24	25.18		0
	12	0	24.05	0-1	1
	12	6	24.13		1
	12	13	23.97		1
	25	0	24.06		1
16QAM	1	0	24.21	0-1	1
	1	12	24.42		1
	1	24	24.25		1
	12	0	23.19	0-2	2
	12	6	23.09		2
	12	13	23.09		2
	25	0	23.23		2
64QAM	1	0	23.15	0-2	2
	1	12	23.18		2
	1	24	23.18		2
	12	0	22.18	0-3	3
	12	6	22.29		3
	12	13	22.15		3
	25	0	22.20		3

Note: LTE Band 30 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

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LTE Band 7

Table 9-44
LTE Band 7 Conducted Powers - 20 MHz Bandwidth

LTE Band 7 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20850 (2510.0 MHz)	21100 (2535.0 MHz)	21350 (2560.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.45	25.31	25.42	0	0
	1	50	25.19	25.24	25.43		0
	1	99	25.26	24.98	25.13		0
	50	0	24.36	24.28	24.05	0-1	1
	50	25	24.22	24.23	24.05		1
	50	50	24.20	24.04	24.05		1
	100	0	24.24	24.20	24.03		1
16QAM	1	0	24.37	24.46	24.50	0-1	1
	1	50	24.42	24.33	24.39		1
	1	99	24.42	24.32	24.35		1
	50	0	23.29	23.31	23.18	0-2	2
	50	25	23.24	23.17	23.14		2
	50	50	23.23	23.13	23.02		2
	100	0	23.24	23.22	23.09		2
64QAM	1	0	23.33	23.39	23.48	0-2	2
	1	50	23.33	23.24	23.34		2
	1	99	23.36	23.20	23.30		2
	50	0	22.24	22.25	22.11	0-3	3
	50	25	22.12	22.13	22.11		3
	50	50	22.20	22.06	21.99		3
	100	0	22.20	22.14	22.02		3



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Table 9-45
LTE Band 7 Conducted Powers - 15 MHz Bandwidth

LTE Band 7 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20825 (2507.5 MHz)	21100 (2535.0 MHz)	21375 (2562.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.35	25.19	25.31	0	0
	1	36	25.17	25.22	25.31		0
	1	74	25.25	24.90	25.05		0
	36	0	24.30	24.16	24.03	0-1	1
	36	18	24.11	24.22	23.98		1
	36	37	24.13	23.93	23.93		1
	75	0	24.17	24.12	23.92		1
16QAM	1	0	24.36	24.43	24.46	0-1	1
	1	36	24.41	24.30	24.33		1
	1	74	24.31	24.23	24.25		1
	36	0	23.19	23.31	23.11	0-2	2
	36	18	23.19	23.11	23.07		2
	36	37	23.14	23.09	22.98		2
	75	0	23.18	23.20	23.01		2
64QAM	1	0	23.28	23.41	23.35	0-2	2
	1	36	23.36	23.18	23.24		2
	1	74	23.24	23.13	23.19		2
	36	0	22.08	22.29	22.08	0-3	3
	36	18	22.12	22.02	22.06		3
	36	37	22.10	22.05	21.94		3
	75	0	22.15	22.11	21.89		3

Table 9-46
LTE Band 7 Conducted Powers - 10 MHz Bandwidth

LTE Band 7 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20800 (2505.0 MHz)	21100 (2535.0 MHz)	21400 (2565.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.41	25.29	25.33	0	0
	1	25	25.12	25.12	25.39		0
	1	49	25.21	24.96	25.12		0
	25	0	24.30	24.27	23.94	0-1	1
	25	12	24.13	24.14	24.04		1
	25	25	24.10	23.95	24.03		1
	50	0	24.13	24.19	23.91		1
16QAM	1	0	24.31	24.46	24.39	0-1	1
	1	25	24.34	24.29	24.32		1
	1	49	24.35	24.27	24.26		1
	25	0	23.27	23.27	23.06	0-2	2
	25	12	23.22	23.06	23.03		2
	25	25	23.14	23.10	22.93		2
	50	0	23.23	23.19	23.06		2
64QAM	1	0	23.26	23.45	23.37	0-2	2
	1	25	23.22	23.27	23.30		2
	1	49	23.31	23.16	23.24		2
	25	0	22.24	22.20	21.99	0-3	3
	25	12	22.13	22.02	21.93		3
	25	25	22.13	22.10	21.82		3
	50	0	22.12	22.13	21.99		3





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Table 9-47
LTE Band 7 Conducted Powers - 5 MHz Bandwidth

LTE Band 7 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			20775 (2502.5 MHz)	21100 (2535.0 MHz)	21425 (2567.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.38	25.26	25.32	0	0
	1	12	25.11	25.22	25.41		0
	1	24	25.15	24.87	25.05		0
	12	0	24.31	24.26	24.04	0-1	1
	12	6	24.21	24.21	24.02		1
	12	13	24.13	23.96	23.95		1
	25	0	24.13	24.08	23.95		1
16QAM	1	0	24.32	24.43	24.42	0-1	1
	1	12	24.39	24.24	24.33		1
	1	24	24.41	24.25	24.23		1
	12	0	23.26	23.22	23.09	0-2	2
	12	6	23.15	23.15	23.10		2
	12	13	23.13	23.03	22.90		2
	25	0	23.22	23.16	23.06		2
64QAM	1	0	23.24	23.31	23.37	0-2	2
	1	12	23.32	23.15	23.23		2
	1	24	23.31	23.19	23.21		2
	12	0	22.22	22.18	22.08	0-3	3
	12	6	22.05	22.09	22.07		3
	12	13	22.07	21.94	21.79		3
	25	0	22.11	22.07	21.95		3

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LTE Band 41

Table 9-48
LTE Band 41 Conducted Powers - 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	25.11	25.19	25.15	25.07	24.81	0	0
	1	50	25.01	25.06	25.07	25.01	25.09		0
	1	99	25.07	25.01	25.11	24.63	24.67		0
	50	0	24.05	24.10	24.01	23.83	23.98	0-1	1
	50	25	24.05	23.96	23.98	23.89	23.83		1
	50	50	23.99	23.91	23.96	23.83	23.91		1
	100	0	24.02	23.93	24.03	23.95	23.96		1
16QAM	1	0	23.99	24.10	24.14	23.85	24.16	0-1	1
	1	50	23.83	24.04	23.98	23.74	24.12		1
	1	99	23.81	24.02	23.93	23.75	24.13		1
	50	0	23.10	23.10	23.04	22.85	23.04	0-2	2
	50	25	23.01	23.04	22.94	22.90	22.92		2
	50	50	22.97	23.00	22.93	22.84	22.94		2
	100	0	23.04	22.96	22.99	22.92	22.96		2
64QAM	1	0	22.88	22.99	23.04	22.74	23.13	0-2	2
	1	50	22.75	22.98	22.86	22.63	23.04		2
	1	99	22.78	23.02	22.85	22.68	23.07		2
	50	0	22.05	22.04	21.95	21.73	22.01	0-3	3
	50	25	21.96	22.02	21.92	21.79	21.86		3
	50	50	21.94	21.96	21.88	21.78	21.83		3
	100	0	21.98	21.96	21.98	21.83	21.85		3

Table 9-49
LTE Band 41 Conducted Powers - 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	25.03	25.09	25.05	24.95	24.73	0	0
	1	36	24.91	24.95	25.03	25.01	24.98		0
	1	74	25.02	24.99	25.04	24.61	24.64		0
	36	0	23.99	23.99	23.90	23.75	23.88	0-1	1
	36	18	24.00	23.89	23.98	23.86	23.76		1
	36	37	23.95	23.81	23.88	23.73	23.85		1
	75	0	23.98	23.81	23.96	23.93	23.91		1
16QAM	1	0	23.92	24.05	24.11	23.77	24.11	0-1	1
	1	36	23.73	23.97	23.87	23.70	24.11		1
	1	74	23.71	23.97	23.83	23.67	24.02		1
	36	0	23.10	23.03	23.02	22.79	22.95	0-2	2
	36	18	22.90	23.02	22.91	22.89	22.91		2
	36	37	22.89	22.89	22.85	22.79	22.90		2
	75	0	22.95	22.90	22.93	22.91	22.84		2
64QAM	1	0	22.85	22.99	23.03	22.77	23.10	0-2	2
	1	36	22.66	22.89	22.84	22.59	23.10		2
	1	74	22.69	22.87	22.74	22.62	23.01		2
	36	0	22.08	21.95	21.93	21.68	21.93	0-3	3
	36	18	21.86	21.94	21.79	21.86	21.85		3
	36	37	21.83	21.84	21.83	21.74	21.88		3
	75	0	21.89	21.88	21.88	21.83	21.73		3





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Table 9-50
LTE Band 41 Conducted Powers - 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	24.99	25.17	25.04	25.07	24.76	0	0
	1	25	24.99	24.97	25.05	24.97	25.06		0
	1	49	25.00	24.93	25.09	24.56	24.60		0
	25	0	24.04	24.08	24.00	23.74	23.92	0-1	1
	25	12	23.98	23.94	23.97	23.81	23.78		1
	25	25	23.88	23.88	23.87	23.75	23.82		1
16QAM	50	0	24.00	23.89	23.96	23.84	23.84	0-1	1
	1	0	23.93	24.07	24.05	23.82	24.08		1
	1	25	23.71	23.96	23.97	23.63	24.11		1
	1	49	23.72	23.92	23.85	23.63	24.11	0-2	2
	25	0	23.00	23.06	22.97	22.76	23.01		2
	25	12	22.91	23.01	22.88	22.87	22.86		2
64QAM	25	25	22.92	22.89	22.83	22.74	22.93	0-2	2
	50	0	23.00	22.94	22.97	22.81	22.90		2
	1	0	22.86	23.00	23.01	22.70	22.97		0-3
	1	25	22.60	22.84	22.87	22.54	23.09	2	
	1	49	22.70	22.81	22.76	22.63	23.03	3	
	25	0	21.97	21.97	21.90	21.73	21.98	3	
64QAM	25	12	21.91	22.00	21.78	21.84	21.78	0-3	3
	25	25	21.89	21.81	21.81	21.66	21.89		3
	50	0	21.88	21.85	21.94	21.76	21.90		3

Table 9-51
LTE Band 41 Conducted Powers - 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	25.02	25.16	25.12	24.99	24.81	0	0
	1	12	24.93	25.05	25.01	24.97	25.06		0
	1	24	25.00	25.00	25.00	24.54	24.62		0
	12	0	23.95	23.98	23.91	23.79	23.88	0-1	1
	12	6	24.02	23.86	23.94	23.88	23.71		1
	12	13	23.87	23.79	23.88	23.74	23.89		1
16QAM	25	0	23.99	23.92	23.97	23.85	23.87	0-1	1
	1	0	23.98	23.98	24.05	23.77	24.11		1
	1	12	23.74	23.99	23.90	23.66	24.01		1
	1	24	23.77	23.93	23.81	23.74	24.03	0-2	2
	12	0	23.09	23.02	22.96	22.80	22.94		2
	12	6	22.92	22.94	22.87	22.79	22.89		2
64QAM	12	13	22.85	22.99	22.89	22.76	22.90	0-2	2
	25	0	22.92	22.94	22.87	22.88	22.92		2
	1	0	22.95	22.92	22.95	22.66	23.06		0-2
	1	12	22.71	22.97	22.80	22.61	22.90	2	
	1	24	22.75	22.85	22.79	22.73	23.01	0-3	
	12	0	21.98	21.97	21.88	21.78	21.84		3
12	6	21.84	21.90	21.79	21.69	21.83	3		
64QAM	12	13	21.73	21.91	21.84	21.73	21.88	0-3	3
	25	0	21.89	21.84	21.79	21.87	21.82		3

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9.3.10 LTE Uplink Carrier Aggregation Conducted Powers

Table 9-52
LTE Uplink Carrier Aggregation Conducted Powers

	PCC										SCC										Power	
Combination	PCC Band	PCC Bandwidth [MHz]	PCC UL Channel	PCC UL Frequency [MHz]	PCC DL Channel	PCC DL Frequency [MHz]	Modulation	PCC UL RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC UL Channel	SCC UL Frequency [MHz]	SCC DL Channel	SCC DL Frequency [MHz]	Modulation	SCC UL RB	SCC UL RB Offset	LTE Tx Power with UL CA Enabled (dBm)	LTE Single Carrier Power (dBm)		
CA_5B	LTE B5	10	20525	836.5	2525	881.5	QPSK	1	0	LTE B5	5	20453	829.3	2453	874.3	QPSK	1	24	25.18	25.48		

Notes:

1. This device supports uplink carrier aggregation for LTE CA_5B with a maximum of two 10 MHz component carriers. For intraband contiguous carrier aggregation scenarios, 3GPP 36.101 Table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when non-contiguous RB allocation is implemented. The conducted powers and MPR settings in this device are permanently implemented per the above 3GPP requirements.
2. Per FCC Guidance, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.

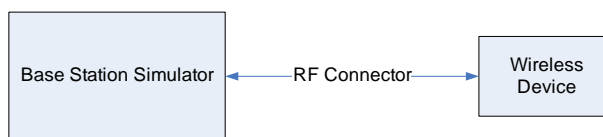




Figure 9-3
Power Measurement Setup

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9.4 WLAN Conducted Powers

Table 9-53
2.4 GHz WLAN Maximum Average RF Power – Ant 1

2.4GHz Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11b	802.11g
		Average	Average
2412	1	20.84	18.14
2437	6	20.84	19.88
2462	11	20.76	17.98

Table 9-54
2.4 GHz WLAN Maximum Average RF Power – Ant 2

2.4GHz Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11b	802.11g
		Average	Average
2412	1	20.75	17.96
2437	6	20.67	20.48
2462	11	20.78	18.37



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Table 9-55
5 GHz WLAN Maximum Average RF Power – Ant 1

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
		Average	Average	Average
5180	36	16.92	16.60	16.72
5200	40	17.76	17.43	17.48
5220	44	16.56	16.15	16.35
5240	48	16.67	16.54	16.43
5260	52	16.45	16.37	16.28
5280	56	17.67	17.42	17.52
5300	60	16.78	16.57	16.71
5320	64	16.85	16.41	16.43
5500	100	16.67	16.38	16.43
5600	120	16.76	16.34	16.43
5620	124	16.49	16.28	16.34
5720	144	16.68	16.67	16.39
5745	149	16.25	16.04	16.08
5785	157	17.42	17.24	17.27
5805	161	17.40	17.23	17.30
5825	165	16.65	16.28	16.52

Table 9-56
5 GHz WLAN Maximum Average RF Power – Ant 2

5GHz (20MHz) Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
		Average	Average	Average
5180	36	16.86	16.40	16.52
5200	40	17.73	17.42	17.47
5220	44	16.70	16.43	16.63
5240	48	16.75	16.35	16.24
5260	52	16.57	16.52	16.43
5280	56	17.67	17.52	17.62
5300	60	16.64	16.54	16.68
5320	64	16.69	16.21	16.23
5500	100	16.78	16.60	16.65
5600	120	16.59	16.29	16.38
5620	124	16.64	16.39	16.45
5720	144	16.87	16.87	16.59
5745	149	16.61	16.37	16.43
5785	157	17.57	17.36	17.39
5805	161	17.46	17.28	17.29
5825	165	16.67	16.11	16.35



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Table 9-57
5 GHz WLAN Maximum Average RF Power – MIMO

5GHz (20MHz) 802.11n Conducted Power [dBm]				
Freq [MHz]	Channel	ANT1	ANT2	MIMO
5180	36	16.60	16.40	19.51
5200	40	17.43	17.42	20.44
5220	44	16.15	16.43	19.30
5240	48	16.54	16.35	19.46
5260	52	16.37	16.52	19.46
5280	56	17.42	17.52	20.48
5300	60	16.57	16.54	19.57
5320	64	16.41	16.21	19.32
5500	100	16.38	16.60	19.50
5600	120	16.34	16.29	19.33
5620	124	16.28	16.39	19.35
5720	144	16.67	16.87	19.78
5745	149	16.04	16.37	19.22
5785	157	17.24	17.36	20.31
5805	161	17.23	17.28	20.27
5825	165	16.28	16.11	19.21



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Table 9-58
2.4 GHz WLAN Average RF Power – Ant 1 (Held-to-ear and During Conditions with 2.4 GHz Ant1 and 5 GHz WLAN Ant2)



2.4GHz Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ac
		Average	Average	Average	Average
2412	1	17.96	17.64	17.39	17.26
2437	6	17.80	17.48	17.25	17.26
2462	11	17.70	17.32	17.14	17.12

Table 9-59
2.4 GHz WLAN Average RF Power – Ant 2 (Held-to-ear)

2.4GHz Conducted Power [dBm]					
Freq [MHz]	Channel	IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ac
		Average	Average	Average	Average
2412	1	17.83	17.43	17.19	17.22
2437	6	17.57	17.30	17.05	17.07
2462	11	17.73	17.38	17.14	17.16

Table 9-60
5 GHz WLAN Output Powers During Conditions with 2.4 GHz Ant1 and 5 GHz WLAN Ant2

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
		Average	Average
5190	38	12.39	12.39
5230	46	14.53	14.51
5270	54	14.55	14.56
5310	62	11.87	11.92
5510	102	12.09	12.02
5550	110	14.51	14.51
5590	118	14.59	14.55
5630	126	14.61	14.59
5710	142	14.62	14.60
5755	151	14.42	14.39
5795	159	14.51	14.49

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Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.
- The bolded data rate and channel above were tested for SAR.

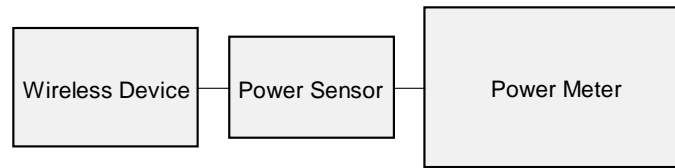




Figure 9-4
Power Measurement Setup



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9.5 Bluetooth Conducted Powers

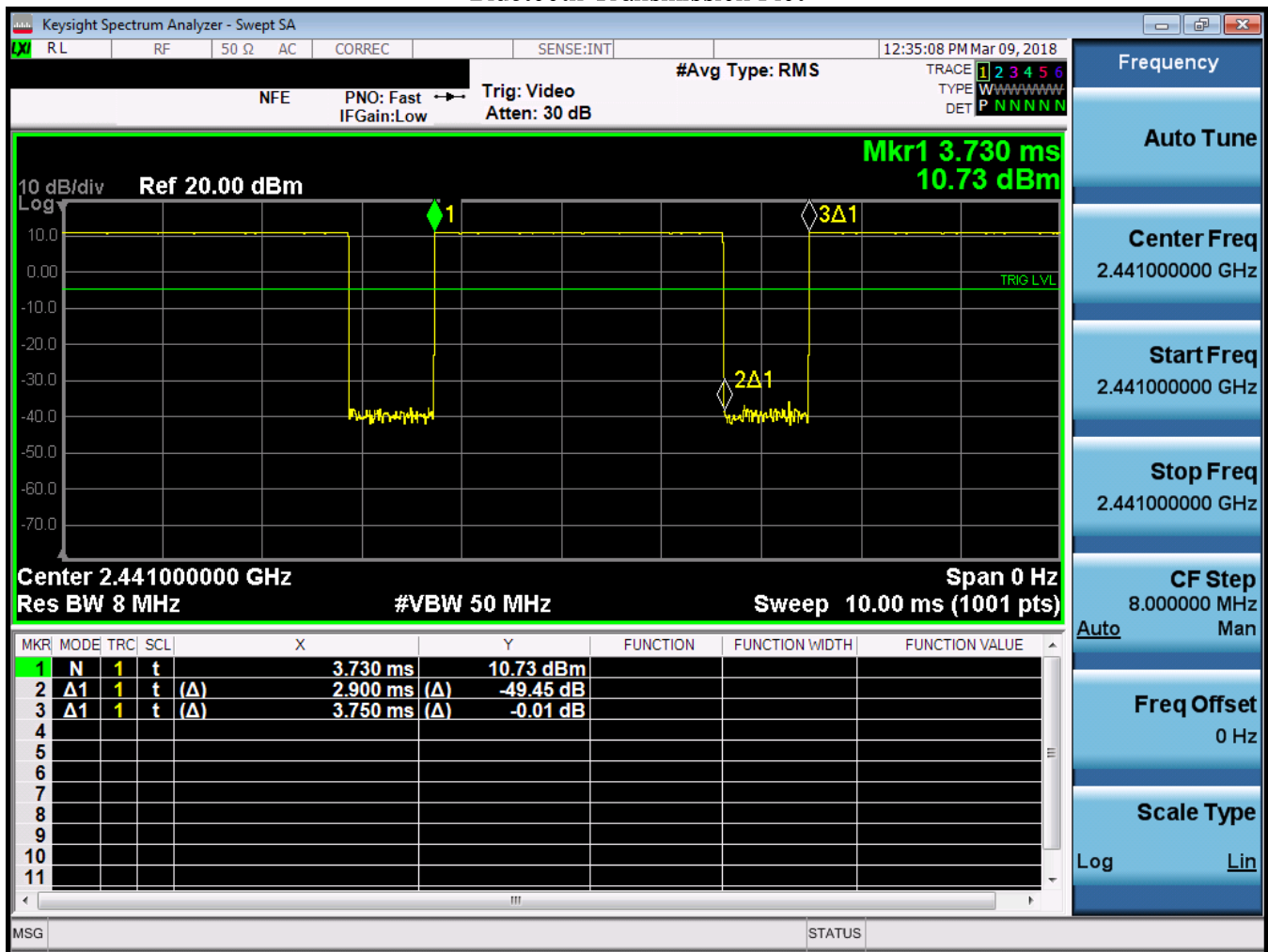
Table 9-61
Bluetooth Average RF Power



Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	11.97	15.745
2441	1.0	39	11.94	15.645
2480	1.0	78	11.64	14.596
2402	2.0	0	11.33	13.576
2441	2.0	39	11.48	14.060
2480	2.0	78	11.00	12.597
2402	3.0	0	11.40	13.790
2441	3.0	39	11.53	14.237
2480	3.0	78	11.07	12.800

Note: The bolded data rates and channel above were tested for SAR.

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Bluetooth Transmission Plot



FCC ID: ZNFG710TM	 PCTEST <small>ENGINEERING LABORATORY, INC.</small>	SAR EVALUATION REPORT 	Approved by: Quality Manager
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Equation 9-1
Bluetooth Duty Cycle Calculation

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.90\ ms}{3.75\ ms} * 100\% = 77.3\%$$

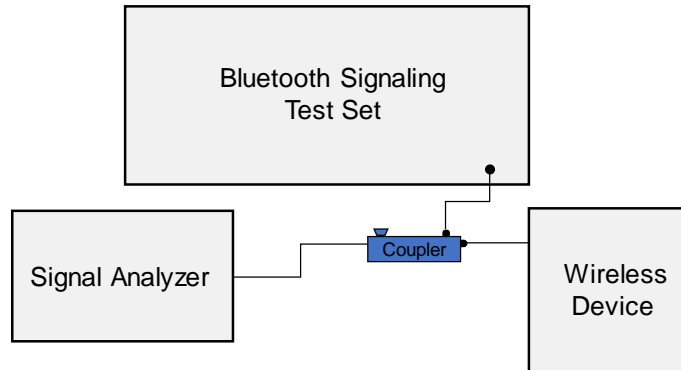




Figure 9-6
Power Measurement Setup

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10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
3/11/2018	750H	21.4	680	0.869	40.970	0.888	42.305	-2.14%	-3.16%
			695	0.874	40.925	0.889	42.227	-1.69%	-3.08%
			700	0.875	40.909	0.889	42.201	-1.57%	-3.06%
			710	0.878	40.878	0.890	42.149	-1.35%	-3.02%
			740	0.887	40.813	0.893	41.994	-0.67%	-2.81%
			755	0.892	40.775	0.894	41.916	-0.22%	-2.72%
			770	0.898	40.725	0.895	41.838	0.34%	-2.66%
3/8/2018	835H	21.6	785	0.904	40.690	0.896	41.760	0.89%	-2.56%
			820	0.887	41.707	0.899	41.578	-1.33%	0.31%
			835	0.901	41.528	0.900	41.500	0.11%	0.07%
3/13/2018	835H	20.8	850	0.915	41.341	0.916	41.500	-0.11%	-0.38%
			820	0.935	39.820	0.899	41.578	4.00%	-4.23%
			835	0.940	39.773	0.900	41.500	4.44%	-4.16%
3/2/2018	1750H	22.0	850	0.945	39.722	0.916	41.500	3.17%	-4.28%
			1710	1.357	38.601	1.348	40.142	0.67%	-3.84%
			1750	1.397	38.415	1.371	40.079	1.90%	-4.15%
3/5/2018	1750H	22.5	1790	1.437	38.238	1.394	40.016	3.08%	-4.44%
			1710	1.335	39.696	1.348	40.142	-0.96%	-1.11%
			1750	1.376	39.510	1.371	40.079	0.36%	-1.42%
3/2/2018	1900H	21.6	1790	1.415	39.337	1.394	40.016	1.51%	-1.70%
			1850	1.383	39.236	1.400	40.000	-1.21%	-1.91%
			1880	1.415	39.110	1.400	40.000	1.07%	-2.23%
3/5/2018	1900H	21.1	1910	1.448	38.983	1.400	40.000	3.43%	-2.54%
			1850	1.401	40.343	1.400	40.000	0.07%	0.86%
			1880	1.436	40.210	1.400	40.000	2.57%	0.53%
3/5/2018	2450H	21.5	1910	1.467	40.067	1.400	40.000	4.79%	0.17%
			2400	1.812	38.205	1.756	39.289	3.19%	-2.76%
			2450	1.868	38.023	1.800	39.200	3.78%	-3.00%
3/15/2018	2450H	21.6	2500	1.924	37.842	1.855	39.136	3.72%	-3.31%
			2400	1.815	39.863	1.756	39.289	3.36%	1.46%
			2450	1.876	39.676	1.800	39.200	4.22%	1.21%
3/18/2018	2450H	23.5	2500	1.934	39.480	1.855	39.136	4.26%	0.88%
			2550	1.994	39.278	1.909	39.073	4.45%	0.52%
			2300	1.674	40.541	1.670	39.500	0.24%	2.64%
			2310	1.686	40.540	1.679	39.480	0.42%	2.68%
			2320	1.698	40.479	1.687	39.460	0.65%	2.58%
03/12/2018	5200H-5800H	21.0	2500	1.913	39.830	1.855	39.136	3.13%	1.77%
			2550	1.970	39.599	1.909	39.073	3.20%	1.35%
			2600	2.024	39.431	1.964	39.009	3.05%	1.08%
			5240	4.558	37.199	4.696	35.940	-2.94%	3.50%
			5260	4.579	37.137	4.717	35.917	-2.93%	3.40%
			5280	4.607	37.110	4.737	35.894	-2.74%	3.39%
			5300	4.617	37.076	4.758	35.871	-2.96%	3.36%
			5320	4.641	37.051	4.778	35.849	-2.87%	3.35%
			5580	4.912	36.705	5.045	35.551	-2.64%	3.25%
			5600	4.933	36.664	5.065	35.529	-2.61%	3.19%
			5620	4.953	36.700	5.086	35.506	-2.62%	3.36%
			5700	5.041	36.555	5.168	35.414	-2.46%	3.22%
			5745	5.092	36.478	5.214	35.363	-2.34%	3.15%
			5765	5.109	36.439	5.234	35.340	-2.39%	3.11%
			5785	5.140	36.404	5.255	35.317	-2.19%	3.08%
			5800	5.150	36.401	5.270	35.300	-2.28%	3.12%





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Table 10-2
Measured Body Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
3/12/2018	750B	21.0	700	0.960	56.208	0.959	55.726	0.10%	0.86%
			710	0.964	56.200	0.960	55.687	0.42%	0.92%
			740	0.975	56.142	0.963	55.570	1.25%	1.03%
			755	0.980	56.089	0.964	55.512	1.66%	1.04%
			770	0.986	56.036	0.965	55.453	2.18%	1.05%
			785	0.991	55.994	0.966	55.395	2.59%	1.08%
			680	0.948	53.355	0.958	55.804	-1.04%	-4.39%
			695	0.954	53.333	0.959	55.745	-0.52%	-4.33%
3/14/2018	750B	21.0	700	0.956	53.324	0.959	55.726	-0.31%	-4.31%
			740	0.968	53.175	0.963	55.570	0.52%	-4.31%
			755	0.973	53.125	0.964	55.512	0.93%	-4.30%
			820	0.969	53.678	0.969	55.258	0.00%	-2.86%
			835	0.985	53.465	0.970	55.200	1.55%	-3.14%
3/7/2018	835B	20.7	850	0.999	53.377	0.988	55.154	1.11%	-3.22%
			820	0.958	52.797	0.969	55.258	-1.14%	-4.45%
			835	0.973	52.660	0.970	55.200	0.31%	-4.60%
3/19/2018	835B	20.9	850	0.988	52.533	0.988	55.154	0.00%	-4.75%
			1710	1.456	53.370	1.463	53.537	-0.48%	-0.31%
			1750	1.499	53.187	1.488	53.432	0.74%	-0.46%
2/28/2018	1750B	20.6	1790	1.549	53.045	1.514	53.326	2.31%	-0.53%
			1710	1.423	52.474	1.463	53.537	-2.73%	-1.99%
			1750	1.465	52.334	1.488	53.432	-1.55%	-2.05%
3/7/2018	1750B	21.7	1790	1.508	52.206	1.514	53.326	-0.40%	-2.10%
			1710	1.457	51.554	1.463	53.537	-0.41%	-3.70%
			1750	1.503	51.403	1.488	53.432	1.01%	-3.80%
3/14/2018	1750B	21.8	1790	1.543	51.240	1.514	53.326	1.92%	-3.91%
			1850	1.508	52.300	1.520	53.300	-0.79%	-1.88%
			1880	1.542	52.157	1.520	53.300	1.45%	-2.14%
			1910	1.577	52.100	1.520	53.300	3.75%	-2.25%
3/9/2018	1900B	21.3	1850	1.493	51.953	1.520	53.300	-1.78%	-2.53%
			1880	1.526	51.846	1.520	53.300	0.39%	-2.73%
			1910	1.561	51.759	1.520	53.300	2.70%	-2.89%
3/9/2018	1900B	22.5	1850	1.475	53.897	1.520	53.300	-2.96%	1.12%
			1880	1.510	53.801	1.520	53.300	-0.66%	0.94%
			1910	1.545	53.696	1.520	53.300	1.64%	0.74%
3/12/2018	1900B	22.6	1850	1.494	53.044	1.520	53.300	-1.71%	-0.48%
			1880	1.527	52.927	1.520	53.300	0.46%	-0.70%
			1910	1.558	52.781	1.520	53.300	2.50%	-0.97%
3/4/2018	2450B	21.9	2400	1.949	50.981	1.902	52.767	2.47%	-3.38%
			2450	2.004	50.846	1.950	52.700	2.77%	-3.52%
			2500	2.063	50.699	2.021	52.636	2.08%	-3.68%
			2300	1.848	51.259	1.809	52.900	2.16%	-3.10%
3/12/2018	2450B	22.7	2310	1.859	51.236	1.816	52.887	2.37%	-3.12%
			2400	1.955	50.991	1.902	52.767	2.79%	-3.37%
			2450	2.012	50.882	1.950	52.700	3.18%	-3.45%
			2500	2.070	50.740	2.021	52.636	2.42%	-3.60%
			2400	1.958	52.017	1.902	52.767	2.94%	-1.42%
			2450	2.006	51.873	1.950	52.700	2.87%	-1.57%
3/15/2018	2450B	22.4	2500	2.067	51.679	2.021	52.636	2.28%	-1.82%
			5180	5.412	47.831	5.276	49.041	2.58%	-2.47%
			5200	5.445	47.813	5.299	49.014	2.76%	-2.45%
03/11/2018	5200B-5800B	20.5	5220	5.482	47.756	5.323	48.987	2.99%	-2.51%
			5240	5.504	47.746	5.346	48.960	2.96%	-2.48%
			5260	5.528	47.668	5.369	48.933	2.96%	-2.59%
			5280	5.537	47.661	5.393	48.906	2.67%	-2.55%
			5300	5.565	47.603	5.416	48.879	2.75%	-2.61%
			5320	5.595	47.597	5.439	48.851	2.87%	-2.57%
			5500	5.853	47.254	5.650	48.607	3.59%	-2.78%
			5520	5.878	47.281	5.673	48.580	3.61%	-2.67%
			5540	5.905	47.238	5.696	48.553	3.67%	-2.71%
			5560	5.939	47.145	5.720	48.526	3.83%	-2.85%
			5580	5.954	47.122	5.743	48.499	3.67%	-2.84%
			5600	5.986	47.093	5.766	48.471	3.62%	-2.84%
			5620	6.011	47.098	5.790	48.444	3.82%	-2.78%
			5640	6.048	47.051	5.813	48.417	4.04%	-2.82%
			5660	6.075	47.018	5.837	48.390	4.08%	-2.84%
			5680	6.112	46.976	5.860	48.363	4.30%	-2.87%
			5700	6.137	46.929	5.883	48.336	4.32%	-2.91%
			5745	6.217	46.813	5.936	48.275	4.73%	-3.03%
			5765	6.242	46.785	5.959	48.248	4.75%	-3.03%
			5800	6.289	46.731	6.000	48.200	4.82%	-3.05%
			5805	6.293	46.728	6.006	48.193	4.78%	-3.04%
			5825	6.327	46.674	6.029	48.166	4.94%	-3.10%
			5200	5.469	47.487	5.299	49.014	3.21%	-3.12%
			5240	5.500	47.462	5.346	48.960	2.88%	-3.06%
			5260	5.516	47.381	5.369	48.933	2.74%	-3.17%
03/18/2018	5200B-5800B	20.7							

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB Publication 865664 D01v01r04 and IEEE 1528-2013 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

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10.2 Test System Verification

Prior to SAR assessment, the system is verified to $\pm 10\%$ of the SAR measurement on the reference dipole at the time of calibration by the calibration facility. Full system validation status and result summary can be found in Appendix E.

Table 10-3
System Verification Results – 1g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR _{1g} (W/kg)	1 W Target SAR _{1g} (W/kg)	1 W Normalized SAR _{1g} (W/kg)	Deviation _{1g} (%)
E	750	HEAD	03/11/2018	21.0	21.4	0.200	1003	3213	1.560	8.280	7.800	-5.80%
E	835	HEAD	03/08/2018	24.3	21.6	0.200	4d132	3213	1.880	9.360	9.400	0.43%
E	835	HEAD	03/13/2018	23.4	21.2	0.200	4d132	3213	2.010	9.360	10.050	7.37%
E	1750	HEAD	03/02/2018	23.5	22.0	0.100	1008	3213	3.710	36.400	37.100	1.92%
E	1750	HEAD	03/05/2018	23.7	22.5	0.100	1008	3213	3.840	36.400	38.400	5.49%
G	1900	HEAD	03/02/2018	20.8	21.6	0.100	5d080	3332	3.710	39.300	37.100	-5.60%
G	1900	HEAD	03/05/2018	22.8	21.5	0.100	5d080	3332	3.770	39.300	37.700	-4.07%
G	2300	HEAD	03/18/2018	21.7	21.5	0.100	1073	3332	4.630	48.600	46.300	-4.73%
H	2450	HEAD	03/05/2018	22.4	21.5	0.100	797	7410	5.340	52.700	53.400	1.33%
K	2450	HEAD	03/15/2018	22.9	21.6	0.100	797	7406	5.090	52.700	50.900	-3.42%
G	2600	HEAD	03/18/2018	21.7	21.5	0.100	1126	3332	5.550	56.400	55.500	-1.60%
H	5250	HEAD	03/12/2018	21.0	21.0	0.050	1191	3589	3.920	78.900	78.400	-0.63%
H	5600	HEAD	03/12/2018	21.0	21.0	0.050	1191	3589	3.930	83.600	78.600	-5.98%
H	5750	HEAD	03/12/2018	21.0	21.0	0.050	1191	3589	3.760	79.100	75.200	-4.93%
K	750	BODY	03/12/2018	21.9	21.0	0.200	1161	7406	1.800	8.430	9.000	6.76%
K	750	BODY	03/14/2018	22.5	21.0	0.200	1161	7406	1.800	8.430	9.000	6.76%
J	835	BODY	03/07/2018	21.0	20.7	0.200	4d133	3914	1.830	9.410	9.150	-2.76%
E	835	BODY	03/19/2018	23.7	20.9	0.200	4d132	3213	1.980	9.710	9.900	1.96%
J	1750	BODY	02/28/2018	21.5	20.6	0.100	1148	3914	3.900	37.000	39.000	5.41%
K	1750	BODY	03/07/2018	22.2	21.7	0.100	1148	7406	3.870	37.000	38.700	4.59%
H	1900	BODY	03/07/2018	21.9	21.4	0.100	5d080	7410	4.120	39.100	41.200	5.37%
H	1900	BODY	03/09/2018	22.8	20.8	0.100	5d148	7410	4.220	39.600	42.200	6.57%
G	2300	BODY	03/12/2018	21.0	22.7	0.100	1073	3332	4.770	48.100	47.700	-0.83%
K	2450	BODY	03/04/2018	22.7	21.9	0.100	797	7406	5.110	51.100	51.100	0.00%
G	2450	BODY	03/12/2018	21.0	22.7	0.100	797	3332	5.210	51.100	52.100	1.96%
G	2450	BODY	03/15/2018	22.6	21.4	0.100	797	3332	5.260	51.100	52.600	2.94%
G	2600	BODY	03/12/2018	21.0	22.7	0.100	1126	3332	5.710	54.300	57.100	5.16%
D	5250	BODY	03/11/2018	20.5	20.1	0.050	1237	7308	3.680	76.900	73.600	-4.29%
D	5250	BODY	03/18/2018	21.7	20.7	0.050	1237	7308	3.610	76.900	72.200	-6.11%
D	5600	BODY	03/11/2018	20.5	20.1	0.050	1237	7308	3.790	78.500	75.800	-3.44%
D	5750	BODY	03/11/2018	20.5	20.1	0.050	1237	7308	3.590	77.100	71.800	-6.87%



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Table 10-4
System Verification Results – 10g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR _{10g} (W/kg)	1 W Target SAR _{10g} (W/kg)	1 W Normalized SAR _{10g} (W/kg)	Deviation _{10g} (%)
H	1750	BODY	03/14/2018	23.0	21.8	0.100	1150	7410	2.060	19.500	20.600	5.64%
J	1900	BODY	03/09/2018	21.9	22.5	0.100	5d148	3914	2.190	20.900	21.900	4.78%
J	1900	BODY	03/12/2018	21.0	21.5	0.100	5d080	3914	2.090	20.700	20.900	0.97%
D	5250	BODY	03/11/2018	20.5	20.1	0.050	1237	7308	1.030	21.500	20.600	-4.19%
D	5600	BODY	03/11/2018	20.5	20.1	0.050	1237	7308	1.050	22.100	21.000	-4.98%
D	5750	BODY	03/11/2018	20.5	20.1	0.050	1237	7308	1.000	21.400	20.000	-6.54%

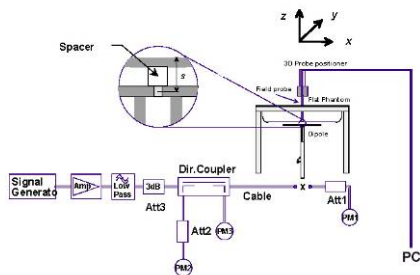




Figure 10-1
System Verification Setup Diagram



Figure 10-2
System Verification Setup Photo

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11 SAR DATA SUMMARY

11.1 Standalone Head SAR Data

Table 11-1
GSM 850 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maxium Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.7	33.62	0.11	Right	Cheek	04266	1	1:8.3	0.059	1.019	0.060	
836.60	190	GSM 850	GSM	33.7	33.62	0.19	Right	Tilt	04266	1	1:8.3	0.027	1.019	0.028	
836.60	190	GSM 850	GSM	33.7	33.62	0.04	Left	Cheek	04266	1	1:8.3	0.047	1.019	0.048	
836.60	190	GSM 850	GSM	33.7	33.62	0.15	Left	Tilt	04266	1	1:8.3	0.026	1.019	0.026	
836.60	190	GSM 850	GPRS	32.7	32.65	-0.06	Right	Cheek	04266	2	1:4.15	0.146	1.012	0.148	A1
836.60	190	GSM 850	GPRS	32.7	32.65	0.05	Right	Tilt	04266	2	1:4.15	0.075	1.012	0.076	
836.60	190	GSM 850	GPRS	32.7	32.65	0.15	Left	Cheek	04266	2	1:4.15	0.126	1.012	0.128	
836.60	190	GSM 850	GPRS	32.7	32.65	-0.05	Left	Tilt	04266	2	1:4.15	0.075	1.012	0.076	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-2
GSM 1900 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maxiumum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	# of Time Slots	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.7	30.68	-0.13	Right	Cheek	04241	1	1:8.3	0.043	1.005	0.043	
1880.00	661	GSM 1900	GSM	30.7	30.68	0.11	Right	Tilt	04241	1	1:8.3	0.039	1.005	0.039	
1880.00	661	GSM 1900	GSM	30.7	30.68	-0.05	Left	Cheek	04241	1	1:8.3	0.061	1.005	0.061	
1880.00	661	GSM 1900	GSM	30.7	30.68	0.01	Left	Tilt	04241	1	1:8.3	0.039	1.005	0.039	
1880.00	661	GSM 1900	GPRS	29.7	29.69	0.04	Right	Cheek	04241	2	1:4.15	0.049	1.002	0.049	
1880.00	661	GSM 1900	GPRS	29.7	29.69	0.05	Right	Tilt	04241	2	1:4.15	0.044	1.002	0.044	
1880.00	661	GSM 1900	GPRS	29.7	29.69	0.11	Left	Cheek	04241	2	1:4.15	0.070	1.002	0.070	A2
1880.00	661	GSM 1900	GPRS	29.7	29.69	0.13	Left	Tilt	04241	2	1:4.15	0.045	1.002	0.045	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram							



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Table 11-3
UMTS 850 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	25.5	25.44	0.00	Right	Cheek	04233	1:1	0.172	1.014	0.174	A3
836.60	4183	UMTS 850	RMC	25.5	25.44	0.11	Right	Tilt	04233	1:1	0.072	1.014	0.073	
836.60	4183	UMTS 850	RMC	25.5	25.44	0.11	Left	Cheek	04233	1:1	0.129	1.014	0.131	
836.60	4183	UMTS 850	RMC	25.5	25.44	0.14	Left	Tilt	04233	1:1	0.072	1.014	0.073	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-4
UMTS 1750 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	0.01	Right	Cheek	04241	1:1	0.126	1.007	0.127	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	-0.02	Right	Tilt	04241	1:1	0.181	1.007	0.182	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	-0.03	Left	Cheek	04241	1:1	0.195	1.007	0.196	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	-0.17	Left	Tilt	04241	1:1	0.220	1.007	0.222	A4
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11-5
UMTS 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	25.5	25.48	0.07	Right	Cheek	04217	1:1	0.105	1.005	0.106	
1880.00	9400	UMTS 1900	RMC	25.5	25.48	0.15	Right	Tilt	04217	1:1	0.097	1.005	0.097	
1880.00	9400	UMTS 1900	RMC	25.5	25.48	-0.11	Left	Cheek	04217	1:1	0.163	1.005	0.164	A5
1880.00	9400	UMTS 1900	RMC	25.5	25.48	0.08	Left	Tilt	04217	1:1	0.094	1.005	0.094	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Head 1.6 W/kg (mW/g) averaged over 1 gram							



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Table 11-6
LTE Band 71 Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
680.50	133297	Mid	LTE Band 71	20	25.5	25.45	0.07	0	Right	Cheek	QPSK	1	0	04217	1:1	0.073	1.012	0.074	A6
680.50	133297	Mid	LTE Band 71	20	24.5	24.37	0.05	1	Right	Cheek	QPSK	50	0	04217	1:1	0.062	1.030	0.064	
680.50	133297	Mid	LTE Band 71	20	25.5	25.45	0.20	0	Right	Tilt	QPSK	1	0	04217	1:1	0.032	1.012	0.032	
680.50	133297	Mid	LTE Band 71	20	24.5	24.37	0.10	1	Right	Tilt	QPSK	50	0	04217	1:1	0.028	1.030	0.029	
680.50	133297	Mid	LTE Band 71	20	25.5	25.45	0.11	0	Left	Cheek	QPSK	1	0	04217	1:1	0.056	1.012	0.057	
680.50	133297	Mid	LTE Band 71	20	24.5	24.37	-0.13	1	Left	Cheek	QPSK	50	0	04217	1:1	0.054	1.030	0.056	
680.50	133297	Mid	LTE Band 71	20	25.5	25.45	0.14	0	Left	Tilt	QPSK	1	0	04217	1:1	0.031	1.012	0.031	
680.50	133297	Mid	LTE Band 71	20	24.5	24.37	0.09	1	Left	Tilt	QPSK	50	0	04217	1:1	0.028	1.030	0.029	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-7
LTE Band 12 Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	25.5	25.24	0.16	0	Right	Cheek	QPSK	1	0	04217	1:1	0.090	1.062	0.096	A7
707.50	23095	Mid	LTE Band 12	10	24.5	24.33	0.00	1	Right	Cheek	QPSK	25	25	04217	1:1	0.090	1.040	0.094	
707.50	23095	Mid	LTE Band 12	10	25.5	25.24	-0.06	0	Right	Tilt	QPSK	1	0	04217	1:1	0.037	1.062	0.039	
707.50	23095	Mid	LTE Band 12	10	24.5	24.33	0.03	1	Right	Tilt	QPSK	25	25	04217	1:1	0.033	1.040	0.034	
707.50	23095	Mid	LTE Band 12	10	25.5	25.24	0.07	0	Left	Cheek	QPSK	1	0	04217	1:1	0.083	1.062	0.088	
707.50	23095	Mid	LTE Band 12	10	24.5	24.33	0.12	1	Left	Cheek	QPSK	25	25	04217	1:1	0.063	1.040	0.066	
707.50	23095	Mid	LTE Band 12	10	25.5	25.24	0.09	0	Left	Tilt	QPSK	1	0	04217	1:1	0.042	1.062	0.045	
707.50	23095	Mid	LTE Band 12	10	24.5	24.33	0.03	1	Left	Tilt	QPSK	25	25	04217	1:1	0.032	1.040	0.033	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-8
LTE Band 13 Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.	(W/kg)														(W/kg)			
782.00	23230	Mid	LTE Band 13	10	25.5	25.48	0.02	0	Right	Cheek	QPSK	1	25	04225	1:1	0.178	1.005	0.179	A8
782.00	23230	Mid	LTE Band 13	10	24.5	24.35	0.01	1	Right	Cheek	QPSK	25	0	04225	1:1	0.135	1.035	0.140	
782.00	23230	Mid	LTE Band 13	10	25.5	25.48	0.05	0	Right	Tilt	QPSK	1	25	04225	1:1	0.082	1.005	0.082	
782.00	23230	Mid	LTE Band 13	10	24.5	24.35	0.04	1	Right	Tilt	QPSK	25	0	04225	1:1	0.061	1.035	0.063	
782.00	23230	Mid	LTE Band 13	10	25.5	25.48	0.01	0	Left	Cheek	QPSK	1	25	04225	1:1	0.152	1.005	0.153	
782.00	23230	Mid	LTE Band 13	10	24.5	24.35	0.00	1	Left	Cheek	QPSK	25	0	04225	1:1	0.110	1.035	0.114	
782.00	23230	Mid	LTE Band 13	10	25.5	25.48	0.04	0	Left	Tilt	QPSK	1	25	04225	1:1	0.078	1.005	0.078	
782.00	23230	Mid	LTE Band 13	10	24.5	24.35	0.05	1	Left	Tilt	QPSK	25	0	04225	1:1	0.057	1.035	0.059	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										



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Table 11-9
LTE Band 5 (Cell) Head SAR

MEASUREMENT RESULTS																					
1 CC Uplink 2 CC Uplink	Component Carrier	FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
		MHz	Ch.														(W/kg)		(W/kg)		
1 CC Uplink	N/A	836.50	20525	Md	LTE Band 5 (Cell)	10	25.5	25.48	-0.17	0	Right	Cheek	QPSK	1	0	04233	1:1	0.175	1.005	0.176	A9
2 CC Uplink	PCC	836.50	20525	Md	LTE Band 5 (Cell)	10	25.5	25.18	0.07	0	Right	Cheek	QPSK	1	0	04233	1:1	0.167	1.076	0.180	
	SCC	829.30	20453	Md	LTE Band 5 (Cell)	5	25.5							1	24						
1 CC Uplink	N/A	836.50	20525	Md	LTE Band 5 (Cell)	10	24.5	24.43	0.13	1	Right	Cheek	QPSK	25	12	04233	1:1	0.132	1.016	0.134	
1 CC Uplink	N/A	836.50	20525	Md	LTE Band 5 (Cell)	10	25.5	25.48	0.14	0	Right	Tilt	QPSK	1	0	04233	1:1	0.074	1.005	0.074	
1 CC Uplink	N/A	836.50	20525	Md	LTE Band 5 (Cell)	10	24.5	24.43	0.05	1	Right	Tilt	QPSK	25	12	04233	1:1	0.060	1.016	0.061	
1 CC Uplink	N/A	836.50	20525	Md	LTE Band 5 (Cell)	10	25.5	25.48	0.02	0	Left	Cheek	QPSK	1	0	04233	1:1	0.125	1.005	0.126	
1 CC Uplink	N/A	836.50	20525	Md	LTE Band 5 (Cell)	10	24.5	24.43	0.08	1	Left	Cheek	QPSK	25	12	04233	1:1	0.100	1.016	0.102	
1 CC Uplink	N/A	836.50	20525	Md	LTE Band 5 (Cell)	10	25.5	25.48	0.14	0	Left	Tilt	QPSK	1	0	04233	1:1	0.065	1.005	0.065	
1 CC Uplink	N/A	836.50	20525	Md	LTE Band 5 (Cell)	10	24.5	24.43	0.13	1	Left	Tilt	QPSK	25	12	04233	1:1	0.052	1.016	0.053	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Head 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11-10
LTE Band 66 (AWS) Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	-0.05	0	Right	Cheek	QPSK	1	0	04241	1:1	0.193	1.000	0.193	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	0.01	1	Right	Cheek	QPSK	50	0	04241	1:1	0.146	1.005	0.147	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	-0.03	0	Right	Tilt	QPSK	1	0	04241	1:1	0.275	1.000	0.275	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	-0.01	1	Right	Tilt	QPSK	50	0	04241	1:1	0.201	1.005	0.202	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	0.11	0	Left	Cheek	QPSK	1	0	04241	1:1	0.229	1.000	0.229	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	0.06	1	Left	Cheek	QPSK	50	0	04241	1:1	0.182	1.005	0.183	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	0.00	0	Left	Tilt	QPSK	1	0	04241	1:1	0.289	1.000	0.289	A10
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	-0.01	1	Left	Tilt	QPSK	50	0	04241	1:1	0.224	1.005	0.225	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-11
LTE Band 25 (PCS) Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	0.21	0	Right	Cheek	QPSK	1	50	04241	1:1	0.132	1.005	0.133	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	0.05	1	Right	Cheek	QPSK	50	25	04241	1:1	0.110	1.000	0.110	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	-0.13	0	Right	Tilt	QPSK	1	50	04241	1:1	0.100	1.005	0.101	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	0.12	1	Right	Tilt	QPSK	50	25	04241	1:1	0.085	1.000	0.085	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	0.09	0	Left	Cheek	QPSK	1	50	04241	1:1	0.188	1.005	0.189	A11
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	0.10	1	Left	Cheek	QPSK	50	25	04241	1:1	0.146	1.000	0.146	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	0.19	0	Left	Tilt	QPSK	1	50	04241	1:1	0.145	1.005	0.146	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	0.07	1	Left	Tilt	QPSK	50	25	04241	1:1	0.085	1.000	0.085	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										



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Table 11-12
LTE Band 30 Head SAR



MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
2310.00	27710	Mid	LTE Band 30	10	25.5	25.38	0.12	0	Right	Cheek	QPSK	1	0	04258	1:1	0.008	1.028	0.008	
2310.00	27710	Mid	LTE Band 30	10	24.5	24.17	0.21	1	Right	Cheek	QPSK	25	12	04258	1:1	0.005	1.079	0.005	
2310.00	27710	Mid	LTE Band 30	10	25.5	25.38	0.04	0	Right	Tilt	QPSK	1	0	04258	1:1	0.006	1.028	0.006	
2310.00	27710	Mid	LTE Band 30	10	24.5	24.17	0.16	1	Right	Tilt	QPSK	25	12	04258	1:1	0.004	1.079	0.004	
2310.00	27710	Mid	LTE Band 30	10	25.5	25.38	0.14	0	Left	Cheek	QPSK	1	0	04258	1:1	0.010	1.028	0.010	A12
2310.00	27710	Mid	LTE Band 30	10	24.5	24.17	0.07	1	Left	Cheek	QPSK	25	12	04258	1:1	0.007	1.079	0.008	
2310.00	27710	Mid	LTE Band 30	10	25.5	25.38	0.13	0	Left	Tilt	QPSK	1	0	04258	1:1	0.003	1.028	0.003	
2310.00	27710	Mid	LTE Band 30	10	24.5	24.17	0.15	1	Left	Tilt	QPSK	25	12	04258	1:1	0.002	1.079	0.002	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-13
LTE Band 7 Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
2510.00	20850	Low	LTE Band 7	20	25.5	25.45	0.16	0	Right	Cheek	QPSK	1	0	04217	1:1	0.006	1.012	0.006	
2510.00	20850	Low	LTE Band 7	20	24.5	24.36	0.21	1	Right	Cheek	QPSK	50	0	04217	1:1	0.004	1.033	0.004	
2510.00	20850	Low	LTE Band 7	20	25.5	25.45	0.12	0	Right	Tilt	QPSK	1	0	04217	1:1	0.002	1.012	0.002	
2510.00	20850	Low	LTE Band 7	20	24.5	24.36	0.15	1	Right	Tilt	QPSK	50	0	04217	1:1	0.001	1.033	0.001	
2510.00	20850	Low	LTE Band 7	20	25.5	25.45	0.21	0	Left	Cheek	QPSK	1	0	04217	1:1	0.006	1.012	0.006	
2510.00	20850	Low	LTE Band 7	20	24.5	24.36	0.20	1	Left	Cheek	QPSK	50	0	04217	1:1	0.004	1.033	0.004	
2510.00	20850	Low	LTE Band 7	20	25.5	25.45	0.18	0	Left	Tilt	QPSK	1	0	04217	1:1	0.008	1.012	0.008	A13
2510.00	20850	Low	LTE Band 7	20	24.5	24.36	0.12	1	Left	Tilt	QPSK	50	0	04217	1:1	0.002	1.033	0.002	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

Table 11-14
LTE Band 41 Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
2549.50	40185	Low-Mid	LTE Band 41	20	25.2	25.19	0.17	0	Right	Cheek	QPSK	1	0	04217	1:1.58	0.003	1.002	0.003	
2549.50	40185	Low-Mid	LTE Band 41	20	24.2	24.10	0.16	1	Right	Cheek	QPSK	50	0	04217	1:1.58	0.002	1.023	0.002	
2549.50	40185	Low-Mid	LTE Band 41	20	25.2	25.19	0.20	0	Right	Tilt	QPSK	1	0	04217	1:1.58	0.001	1.002	0.001	
2549.50	40185	Low-Mid	LTE Band 41	20	24.2	24.10	0.16	1	Right	Tilt	QPSK	50	0	04217	1:1.58	0.000	1.023	0.000	
2549.50	40185	Low-Mid	LTE Band 41	20	25.2	25.19	0.18	0	Left	Cheek	QPSK	1	0	04217	1:1.58	0.004	1.002	0.004	A14
2549.50	40185	Low-Mid	LTE Band 41	20	24.2	24.10	0.20	1	Left	Cheek	QPSK	50	0	04217	1:1.58	0.003	1.023	0.003	
2549.50	40185	Low-Mid	LTE Band 41	20	25.2	25.19	0.13	0	Left	Tilt	QPSK	1	0	04217	1:1.58	0.002	1.002	0.002	
2549.50	40185	Low-Mid	LTE Band 41	20	24.2	24.10	0.18	1	Left	Tilt	QPSK	50	0	04217	1:1.58	0.002	1.023	0.002	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										



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**Table 11-15
DTS Head SAR**

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	18.0	17.96	0.15	Right	Cheek	1	04225	1	99.2	0.333	0.192	1.009	1.008	0.195	A15
2412	1	802.11b	DSSS	22	18.0	17.96	0.15	Right	Tilt	1	04225	1	99.2	0.308	-	1.009	1.008	-	
2412	1	802.11b	DSSS	22	18.0	17.96	0.06	Left	Cheek	1	04225	1	99.2	0.171	-	1.009	1.008	-	
2412	1	802.11b	DSSS	22	18.0	17.96	0.08	Left	Tilt	1	04225	1	99.2	0.205	-	1.009	1.008	-	
2412	1	802.11b	DSSS	22	18.0	17.83	0.10	Right	Cheek	2	04225	1	99.3	0.086	0.044	1.040	1.007	0.046	
2412	1	802.11b	DSSS	22	18.0	17.83	0.16	Right	Tilt	2	04225	1	99.3	0.030	-	1.040	1.007	-	
2412	1	802.11b	DSSS	22	18.0	17.83	0.13	Left	Cheek	2	04225	1	99.3	0.017	-	1.040	1.007	-	
2412	1	802.11b	DSSS	22	18.0	17.83	0.14	Left	Tilt	2	04225	1	99.3	0.010	-	1.040	1.007	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram											



**Table 11-16
NII Head SAR**

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5280	56	802.11a	OFDM	20	18.0	17.67	0.16	Right	Cheek	1	04266	6	98.3	0.916	0.401	1.079	1.017	0.440	
5280	56	802.11a	OFDM	20	18.0	17.67	0.21	Right	Tilt	1	04266	6	98.3	0.645	0.276	1.079	1.017	0.303	
5280	56	802.11a	OFDM	20	18.0	17.67	0.19	Left	Cheek	1	04266	6	98.3	0.249	-	1.079	1.017	-	
5280	56	802.11a	OFDM	20	18.0	17.67	0.12	Left	Tilt	1	04266	6	98.3	0.242	-	1.079	1.017	-	
5280	56	802.11a	OFDM	20	18.0	17.67	0.19	Right	Cheek	2	04266	6	98.3	0.093	0.031	1.079	1.017	0.034	
5280	56	802.11a	OFDM	20	18.0	17.67	0.21	Right	Tilt	2	04266	6	98.3	0.052	-	1.079	1.017	-	
5280	56	802.11a	OFDM	20	18.0	17.67	-0.21	Left	Cheek	2	04266	6	98.3	0.046	-	1.079	1.017	-	
5280	56	802.11a	OFDM	20	18.0	17.67	0.14	Left	Tilt	2	04266	6	98.3	0.047	-	1.079	1.017	-	
5600	120	802.11a	OFDM	20	17.0	16.76	0.15	Right	Cheek	1	04266	6	98.3	1.037	0.442	1.057	1.017	0.475	
5600	120	802.11a	OFDM	20	17.0	16.76	0.18	Right	Tilt	1	04266	6	98.3	0.811	0.392	1.057	1.017	0.421	
5600	120	802.11a	OFDM	20	17.0	16.76	-0.17	Left	Cheek	1	04266	6	98.3	0.375	-	1.057	1.017	-	
5600	120	802.11a	OFDM	20	17.0	16.76	0.16	Left	Tilt	1	04266	6	98.3	0.493	-	1.057	1.017	-	
5720	144	802.11a	OFDM	20	17.0	16.87	0.20	Right	Cheek	2	04266	6	98.3	0.109	0.029	1.030	1.017	0.030	
5720	144	802.11a	OFDM	20	17.0	16.87	0.19	Right	Tilt	2	04266	6	98.3	0.048	-	1.030	1.017	-	
5720	144	802.11a	OFDM	20	17.0	16.87	0.20	Left	Cheek	2	04266	6	98.3	0.081	-	1.030	1.017	-	
5720	144	802.11a	OFDM	20	17.0	16.87	0.19	Left	Tilt	2	04266	6	98.3	0.015	-	1.030	1.017	-	
5785	157	802.11a	OFDM	20	18.0	17.42	0.14	Right	Cheek	1	04266	6	98.3	1.035	0.444	1.143	1.017	0.516	
5785	157	802.11a	OFDM	20	18.0	17.42	0.18	Right	Tilt	1	04266	6	98.3	1.120	0.478	1.143	1.017	0.556	A16
5785	157	802.11a	OFDM	20	18.0	17.42	0.13	Left	Cheek	1	04266	6	98.3	0.447	-	1.143	1.017	-	
5785	157	802.11a	OFDM	20	18.0	17.42	0.20	Left	Tilt	1	04266	6	98.3	0.473	-	1.143	1.017	-	
5785	157	802.11a	OFDM	20	18.0	17.57	0.19	Right	Cheek	2	04266	6	98.3	0.128	0.079	1.104	1.017	0.089	
5785	157	802.11a	OFDM	20	18.0	17.57	0.20	Right	Tilt	2	04266	6	98.3	0.040	-	1.104	1.017	-	
5785	157	802.11a	OFDM	20	18.0	17.57	0.18	Left	Cheek	2	04266	6	98.3	0.097	-	1.104	1.017	-	
5785	157	802.11a	OFDM	20	18.0	17.57	-0.16	Left	Tilt	2	04266	6	98.3	0.035	-	1.104	1.017	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram											

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**Table 11-17
DSS Head SAR**

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Device Serial Number	Data Rate (Mbps)	Duty Cycle %	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2402.00	0	Bluetooth	FHSS	12.0	11.97	-0.02	Right	Cheek	04217	1	77.3	0.072	1.007	1.294	0.094	A17
2402.00	0	Bluetooth	FHSS	12.0	11.97	0.07	Right	Tilt	04217	1	77.3	0.068	1.007	1.294	0.089	
2402.00	0	Bluetooth	FHSS	12.0	11.97	0.13	Left	Cheek	04217	1	77.3	0.045	1.007	1.294	0.059	
2402.00	0	Bluetooth	FHSS	12.0	11.97	0.00	Left	Tilt	04217	1	77.3	0.056	1.007	1.294	0.073	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Head								
Spatial Peak								1.6 W/kg (mW/g)								
Uncontrolled Exposure/General Population								averaged over 1 gram								

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11.2 Standalone Body-Worn SAR Data

Table 11-18
GSM/UMTS Body-Worn SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	33.7	33.62	0.17	10 mm	04225	1	1:8.3	back	0.158	1.019	0.161	
836.60	190	GSM 850	GPRS	32.7	32.65	0.19	10 mm	04225	2	1:4.15	back	0.320	1.012	0.324	A18
1880.00	661	GSM 1900	GSM	30.7	30.68	0.21	10 mm	04233	1	1:8.3	back	0.190	1.005	0.191	
1880.00	661	GSM 1900	GPRS	29.7	29.69	-0.16	10 mm	04233	2	1:4.15	back	0.244	1.002	0.244	A19
836.60	4183	UMTS 850	RMC	25.5	25.44	-0.07	10 mm	04225	N/A	1:1	back	0.435	1.014	0.441	A21
1732.40	1412	UMTS 1750	RMC	25.2	25.17	0.02	10 mm	04225	N/A	1:1	back	0.672	1.007	0.677	A22
1880.00	9400	UMTS 1900	RMC	25.5	25.48	0.01	10 mm	04258	N/A	1:1	back	0.521	1.005	0.524	A24
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram								

Table 11-19
LTE Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
680.50	133297	Mid	LTE Band 71	20	25.5	25.45	0.00	0	04258	QPSK	1	0	10 mm	back	1:1	0.243	1.012	0.246	A26
680.50	133297	Mid	LTE Band 71	20	24.5	24.37	0.12	1	04258	QPSK	50	0	10 mm	back	1:1	0.225	1.030	0.232	
707.50	23095	Mid	LTE Band 12	10	25.5	25.24	0.01	0	04241	QPSK	1	0	10 mm	back	1:1	0.307	1.062	0.326	A27
707.50	23095	Mid	LTE Band 12	10	24.5	24.33	0.02	1	04241	QPSK	25	25	10 mm	back	1:1	0.275	1.040	0.286	
782.00	23230	Mid	LTE Band 13	10	25.5	25.48	0.01	0	04241	QPSK	1	25	10 mm	back	1:1	0.484	1.005	0.486	A28
782.00	23230	Mid	LTE Band 13	10	24.5	24.35	0.00	1	04241	QPSK	25	0	10 mm	back	1:1	0.391	1.035	0.405	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	0.04	0	04217	QPSK	1	0	10 mm	back	1:1	0.697	1.000	0.697	A30
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	0.05	1	04217	QPSK	50	0	10 mm	back	1:1	0.549	1.005	0.552	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	0.01	0	04217	QPSK	1	50	10 mm	back	1:1	0.523	1.005	0.526	A32
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	-0.01	1	04217	QPSK	50	25	10 mm	back	1:1	0.423	1.000	0.423	
2310.00	27710	Mid	LTE Band 30	10	25.5	25.38	0.04	0	04258	QPSK	1	0	10 mm	back	1:1	0.385	1.028	0.396	A34
2310.00	27710	Mid	LTE Band 30	10	24.5	24.17	0.02	1	04258	QPSK	25	12	10 mm	back	1:1	0.300	1.079	0.324	
2510.00	20850	Low	LTE Band 7	20	25.5	25.45	-0.06	0	04258	QPSK	1	0	10 mm	back	1:1	0.261	1.012	0.264	A35
2510.00	20850	Low	LTE Band 7	20	24.5	24.36	0.10	1	04258	QPSK	50	0	10 mm	back	1:1	0.174	1.033	0.180	
2549.50	40185	Low-Mid	LTE Band 41	20	25.2	25.19	0.01	0	04258	QPSK	1	0	10 mm	back	1:1.58	0.171	1.002	0.171	A36
2549.50	40185	Low-Mid	LTE Band 41	20	24.2	24.10	0.02	1	04258	QPSK	50	0	10 mm	back	1:1.58	0.134	1.023	0.137	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak									Body 1.6 W/kg (mW/g) averaged over 1 gram										
Uncontrolled Exposure/General Population																			

Table 11-20
LTE Band 5 (Cell) Body-Worn SAR

MEASUREMENT RESULTS																					
1 CC Uplink 2 CC Uplink	Component Carrier	FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
		MHz	Ch.														(W/kg)		(W/kg)		
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.48	0.02	0	04241	QPSK	1	0	10 mm	back	1:1	0.417	1.005	0.419	A29
2 CC Uplink	PCC	836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.18	0.01	0	04241	QPSK	1	0	10 mm	back	1:1	0.394	1.076	0.424	
	SCC	829.30	20453	Mid	LTE Band 5 (Cell)	5	25.5						24								
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.43	0.00	1	04241	QPSK	25	12	10 mm	back	1:1	0.339	1.016	0.344	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram									



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Table 11-21
DTS SISO Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	21.0	20.84	0.16	10 mm	1	04233	1	back	99.2	0.283	0.257	1.038	1.008	0.269	
2412	1	802.11b	DSSS	22	21.0	20.75	0.15	10 mm	2	04233	1	back	99.3	0.400	0.399	1.059	1.007	0.425	
2437	6	802.11b	DSSS	22	21.0	20.67	-0.05	10 mm	2	04233	1	back	99.3	0.526	0.492	1.079	1.007	0.535	
2462	11	802.11b	DSSS	22	21.0	20.78	0.02	10 mm	2	04233	1	back	99.3	0.958	0.574	1.052	1.007	0.608	A37
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

Table 11-22
DTS Body-Worn SAR for Conditions with 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	18.0	17.96	0.04	10 mm	1	04225	1	back	99.2	0.151	0.122	1.009	1.008	0.124	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

DTS was additionally evaluated at the maximum allowed output power during operations with simultaneous 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN. 5 GHz Ant 2 WIFI was not transmitting during the above evaluations.

Table 11-23
NII SISO Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5280	56	802.11a	OFDM	20	18.0	17.67	0.03	10 mm	1	04225	6	back	98.3	0.251	0.122	1.079	1.017	0.134	
5280	52	802.11a	OFDM	20	17.0	16.57	0.08	10 mm	2	04225	6	back	98.3	1.538	0.633	1.104	1.017	0.711	
5280	56	802.11a	OFDM	20	18.0	17.67	-0.03	10 mm	2	04225	6	back	98.3	1.743	0.739	1.079	1.017	0.811	
5320	64	802.11a	OFDM	20	17.0	16.69	-0.01	10 mm	2	04225	6	back	98.3	1.314	0.453	1.074	1.017	0.495	
5600	120	802.11a	OFDM	20	17.0	16.76	0.11	10 mm	1	04225	6	back	98.3	0.237	0.098	1.057	1.017	0.105	
5720	144	802.11a	OFDM	20	17.0	16.87	0.05	10 mm	2	04225	6	back	98.3	1.050	0.494	1.030	1.017	0.517	
5785	157	802.11a	OFDM	20	18.0	17.42	-0.17	10 mm	1	04225	6	back	98.3	0.428	0.215	1.143	1.017	0.250	
5785	157	802.11a	OFDM	20	18.0	17.57	0.16	10 mm	2	04225	6	back	98.3	1.401	0.650	1.104	1.017	0.730	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT																			
Spatial Peak								Body											
Uncontrolled Exposure/General Population								1.6 W/kg (mW/g) averaged over 1 gram											



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Table 11-24
NII MIMO Body-Worn SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan
MHz	Ch.															W/kg
5280	52	802.11n	OFDM	20	17.0	16.37	17.0	16.52	0.08	10 mm	MIMO	04225	13	back	98.3	1.554
5280	56	802.11n	OFDM	20	18.0	17.42	18.0	17.52	0.09	10 mm	MIMO	04225	13	back	98.3	1.816
5300	60	802.11n	OFDM	20	17.0	16.57	17.0	16.54	0.03	10 mm	MIMO	04225	13	back	98.3	1.414
5720	144	802.11n	OFDM	20	17.0	16.87	17.0	16.87	-0.02	10 mm	MIMO	04225	13	back	98.3	1.289
5785	157	802.11n	OFDM	20	18.0	17.24	18.0	17.36	0.04	10 mm	MIMO	04225	13	back	98.3	1.762
5805	161	802.11n	OFDM	20	18.0	17.23	18.0	17.28	0.01	10 mm	MIMO	04225	13	back	98.3	1.668
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Body						
Spatial Peak										1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population										averaged over 1 gram						

To achieve the 20.0 dBm (Ch. 52, 60, 144) and 21 dBm (Ch. 56, 157, 161) maximum allowed MIMO power shown in the documentation, each antenna transmits at a maximum allowed power of 17.0 dBm (Ch. 52, 60, 144) and 18.0 dBm (Ch. 56, 157, 161).



Table 11-25
NII Body-Worn SAR for Conditions with 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)
MHz	Ch.													W/kg	(W/kg)	(Duty Cycle)
5270	54	802.11n	OFDM	40	15.0	14.55	-0.18	10 mm	2	04225	13.5	back	97.4	0.895	0.390	1.109
5710	142	802.11n	OFDM	40	15.0	14.62	0.02	10 mm	2	04225	13.5	back	97.4	0.675	0.292	1.091
5795	159	802.11n	OFDM	40	15.0	14.51	-0.03	10 mm	2	04225	13.5	back	97.4	0.751	0.318	1.119
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Body						
Spatial Peak										1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population										averaged over 1 gram						

NII was additionally evaluated at the maximum allowed output power during operations with simultaneous 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN. 2.4 GHz Ant1 WIFI was not transmitting during the above evaluations.

Table 11-26
DSS Body-Worn SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2402	0	Bluetooth	FHSS	12.0	11.97	0.13	10 mm	04266	1	back	77.3	0.036	1.007	1.294	0.047	A40
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Body						
Spatial Peak										1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population										averaged over 1 gram						

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11.3 Standalone Hotspot SAR Data

Table 11-27
GPRS/UMTS Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	190	GSM 850	GPRS	32.7	32.65	0.19	10 mm	04225	2	1:4.15	back	0.320	1.012	0.324	A18
836.60	190	GSM 850	GPRS	32.7	32.65	0.12	10 mm	04225	2	1:4.15	front	0.223	1.012	0.226	
836.60	190	GSM 850	GPRS	32.7	32.65	-0.10	10 mm	04225	2	1:4.15	bottom	0.198	1.012	0.200	
836.60	190	GSM 850	GPRS	32.7	32.65	-0.14	10 mm	04225	2	1:4.15	right	0.218	1.012	0.221	
836.60	190	GSM 850	GPRS	32.7	32.65	-0.17	10 mm	04225	2	1:4.15	left	0.065	1.012	0.066	
1880.00	661	GSM 1900	GPRS	29.7	29.69	-0.16	10 mm	04233	2	1:4.15	back	0.244	1.002	0.244	
1880.00	661	GSM 1900	GPRS	29.7	29.69	-0.01	10 mm	04233	2	1:4.15	front	0.198	1.002	0.198	
1880.00	661	GSM 1900	GPRS	29.7	29.69	-0.04	10 mm	04233	2	1:4.15	bottom	0.379	1.002	0.380	A20
1880.00	661	GSM 1900	GPRS	29.7	29.69	-0.18	10 mm	04233	2	1:4.15	left	0.131	1.002	0.131	
836.60	4183	UMTS 850	RMC	25.5	25.44	-0.07	10 mm	04225	N/A	1:1	back	0.435	1.014	0.441	A21
836.60	4183	UMTS 850	RMC	25.5	25.44	0.04	10 mm	04225	N/A	1:1	front	0.372	1.014	0.377	
836.60	4183	UMTS 850	RMC	25.5	25.44	0.01	10 mm	04225	N/A	1:1	bottom	0.255	1.014	0.259	
836.60	4183	UMTS 850	RMC	25.5	25.44	-0.01	10 mm	04225	N/A	1:1	right	0.319	1.014	0.323	
836.60	4183	UMTS 850	RMC	25.5	25.44	-0.01	10 mm	04225	N/A	1:1	left	0.107	1.014	0.108	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	0.02	10 mm	04225	N/A	1:1	back	0.672	1.007	0.677	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	-0.03	10 mm	04225	N/A	1:1	front	0.598	1.007	0.602	
1712.40	1312	UMTS 1750	RMC	25.2	25.20	-0.09	10 mm	04225	N/A	1:1	bottom	0.828	1.000	0.828	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	0.19	10 mm	04225	N/A	1:1	bottom	0.835	1.007	0.841	
1752.60	1513	UMTS 1750	RMC	25.2	25.10	0.05	10 mm	04225	N/A	1:1	bottom	0.847	1.023	0.866	A23
1732.40	1412	UMTS 1750	RMC	25.2	25.17	0.11	10 mm	04225	N/A	1:1	left	0.419	1.007	0.422	
1880.00	9400	UMTS 1900	RMC	25.5	25.48	0.01	10 mm	04258	N/A	1:1	back	0.521	1.005	0.524	
1880.00	9400	UMTS 1900	RMC	25.5	25.48	0.01	10 mm	04258	N/A	1:1	front	0.521	1.005	0.524	
1852.40	9262	UMTS 1900	RMC	25.5	25.41	-0.01	10 mm	04258	N/A	1:1	bottom	0.985	1.021	1.006	A25
1880.00	9400	UMTS 1900	RMC	25.5	25.48	-0.01	10 mm	04258	N/A	1:1	bottom	0.937	1.005	0.942	
1907.60	9538	UMTS 1900	RMC	25.5	25.49	-0.03	10 mm	04258	N/A	1:1	bottom	0.873	1.002	0.875	
1880.00	9400	UMTS 1900	RMC	25.5	25.48	-0.01	10 mm	04258	N/A	1:1	left	0.324	1.005	0.326	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram								



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Table 11-28
LTE Band 71 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
680.50	133297	Mid	LTE Band 71	20	25.5	25.45	0.00	0	04258	QPSK	1	0	10 mm	back	1:1	0.243	1.012	0.246	A26
680.50	133297	Mid	LTE Band 71	20	24.5	24.37	0.12	1	04258	QPSK	50	0	10 mm	back	1:1	0.225	1.030	0.232	
680.50	133297	Mid	LTE Band 71	20	25.5	25.45	0.04	0	04258	QPSK	1	0	10 mm	front	1:1	0.153	1.012	0.155	
680.50	133297	Mid	LTE Band 71	20	24.5	24.37	0.05	1	04258	QPSK	50	0	10 mm	front	1:1	0.148	1.030	0.152	
680.50	133297	Mid	LTE Band 71	20	25.5	25.45	0.02	0	04258	QPSK	1	0	10 mm	bottom	1:1	0.121	1.012	0.122	
680.50	133297	Mid	LTE Band 71	20	24.5	24.37	0.03	1	04258	QPSK	50	0	10 mm	bottom	1:1	0.109	1.030	0.112	
680.50	133297	Mid	LTE Band 71	20	25.5	25.45	-0.16	0	04258	QPSK	1	0	10 mm	right	1:1	0.133	1.012	0.135	
680.50	133297	Mid	LTE Band 71	20	24.5	24.37	-0.15	1	04258	QPSK	50	0	10 mm	right	1:1	0.100	1.030	0.103	
680.50	133297	Mid	LTE Band 71	20	25.5	25.45	0.03	0	04258	QPSK	1	0	10 mm	left	1:1	0.070	1.012	0.071	
680.50	133297	Mid	LTE Band 71	20	24.5	24.37	0.00	1	04258	QPSK	50	0	10 mm	left	1:1	0.048	1.030	0.049	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

Table 11-29
LTE Band 12 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	25.5	25.24	0.01	0	04241	QPSK	1	0	10 mm	back	1:1	0.307	1.062	0.326	A27
707.50	23095	Mid	LTE Band 12	10	24.5	24.33	0.02	1	04241	QPSK	25	25	10 mm	back	1:1	0.275	1.040	0.286	
707.50	23095	Mid	LTE Band 12	10	25.5	25.24	0.04	0	04241	QPSK	1	0	10 mm	front	1:1	0.228	1.062	0.242	
707.50	23095	Mid	LTE Band 12	10	24.5	24.33	0.06	1	04241	QPSK	25	25	10 mm	front	1:1	0.206	1.040	0.214	
707.50	23095	Mid	LTE Band 12	10	25.5	25.24	0.03	0	04241	QPSK	1	0	10 mm	bottom	1:1	0.166	1.062	0.176	
707.50	23095	Mid	LTE Band 12	10	24.5	24.33	0.04	1	04241	QPSK	25	25	10 mm	bottom	1:1	0.150	1.040	0.156	
707.50	23095	Mid	LTE Band 12	10	25.5	25.24	0.06	0	04241	QPSK	1	0	10 mm	right	1:1	0.176	1.062	0.187	
707.50	23095	Mid	LTE Band 12	10	24.5	24.33	-0.01	1	04241	QPSK	25	25	10 mm	right	1:1	0.175	1.040	0.182	
707.50	23095	Mid	LTE Band 12	10	25.5	25.24	0.17	0	04241	QPSK	1	0	10 mm	left	1:1	0.066	1.062	0.070	
707.50	23095	Mid	LTE Band 12	10	24.5	24.33	0.07	1	04241	QPSK	25	25	10 mm	left	1:1	0.059	1.040	0.061	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

Table 11-30
LTE Band 13 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.	(W/kg)														(W/kg)			
782.00	23230	Mid	LTE Band 13	10	25.5	25.48	0.01	0	04241	QPSK	1	25	10 mm	back	1:1	0.484	1.005	0.486	A28
782.00	23230	Mid	LTE Band 13	10	24.5	24.35	0.00	1	04241	QPSK	25	0	10 mm	back	1:1	0.391	1.035	0.405	
782.00	23230	Mid	LTE Band 13	10	25.5	25.48	-0.01	0	04241	QPSK	1	25	10 mm	front	1:1	0.349	1.005	0.351	
782.00	23230	Mid	LTE Band 13	10	24.5	24.35	-0.01	1	04241	QPSK	25	0	10 mm	front	1:1	0.272	1.035	0.282	
782.00	23230	Mid	LTE Band 13	10	25.5	25.48	0.00	0	04241	QPSK	1	25	10 mm	bottom	1:1	0.285	1.005	0.286	
782.00	23230	Mid	LTE Band 13	10	24.5	24.35	0.01	1	04241	QPSK	25	0	10 mm	bottom	1:1	0.220	1.035	0.228	
782.00	23230	Mid	LTE Band 13	10	25.5	25.48	0.02	0	04241	QPSK	1	25	10 mm	right	1:1	0.281	1.005	0.282	
782.00	23230	Mid	LTE Band 13	10	24.5	24.35	-0.01	1	04241	QPSK	25	0	10 mm	right	1:1	0.224	1.035	0.232	
782.00	23230	Mid	LTE Band 13	10	25.5	25.48	0.08	0	04241	QPSK	1	25	10 mm	left	1:1	0.108	1.005	0.109	
782.00	23230	Mid	LTE Band 13	10	24.5	24.35	0.05	1	04241	QPSK	25	0	10 mm	left	1:1	0.091	1.035	0.094	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											



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Table 11-31
LTE Band 5 (Cell) Hotspot SAR

MEASUREMENT RESULTS																					
1 CC Uplink 2 CC Uplink	Component Carrier	FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
		MHz	Ch.														(W/kg)		(W/kg)		
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.48	0.02	0	04241	QPSK	1	0	10 mm	back	1:1	0.417	1.005	0.419	A29
2 CC Uplink	PCC	836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.18	0.01	0	04241	QPSK	1	0	10 mm	back	1:1	0.394	1.076	0.424	
	SCC	829.30	20453	Mid	LTE Band 5 (Cell)	5	25.5						1	24							
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.43	0.00	1	04241	QPSK	25	12	10 mm	back	1:1	0.339	1.016	0.344	
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.48	-0.02	0	04241	QPSK	1	0	10 mm	front	1:1	0.284	1.005	0.285	
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.43	0.01	1	04241	QPSK	25	12	10 mm	front	1:1	0.230	1.016	0.234	
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.48	0.02	0	04241	QPSK	1	0	10 mm	bottom	1:1	0.257	1.005	0.258	
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.43	0.02	1	04241	QPSK	25	12	10 mm	bottom	1:1	0.205	1.016	0.208	
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.48	0.14	0	04241	QPSK	1	0	10 mm	right	1:1	0.241	1.005	0.242	
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.43	0.16	1	04241	QPSK	25	12	10 mm	right	1:1	0.195	1.016	0.198	
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	25.5	25.48	0.14	0	04241	QPSK	1	0	10 mm	left	1:1	0.063	1.005	0.063	
1 CC Uplink	N/A	836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.43	0.12	1	04241	QPSK	25	12	10 mm	left	1:1	0.051	1.016	0.052	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT												Body									
Spatial Peak												1.6 W/kg (mW/g)									
Uncontrolled Exposure/General Population												averaged over 1 gram									

Table 11-32
LTE Band 66 (AWS) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	0.04	0	04217	QPSK	1	0	10 mm	back	1:1	0.697	1.000	0.697	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	0.05	1	04217	QPSK	50	0	10 mm	back	1:1	0.549	1.005	0.552	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	-0.07	0	04217	QPSK	1	0	10 mm	front	1:1	0.627	1.000	0.627	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	0.00	1	04217	QPSK	50	0	10 mm	front	1:1	0.476	1.005	0.478	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.2	25.00	0.03	0	04217	QPSK	1	0	10 mm	bottom	1:1	0.930	1.047	0.974	A31
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	-0.20	0	04217	QPSK	1	0	10 mm	bottom	1:1	0.872	1.000	0.872	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.2	25.13	0.02	0	04217	QPSK	1	0	10 mm	bottom	1:1	0.880	1.016	0.894	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	-0.13	1	04217	QPSK	50	0	10 mm	bottom	1:1	0.687	1.005	0.690	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.10	-0.06	1	04217	QPSK	100	0	10 mm	bottom	1:1	0.661	1.023	0.676	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	-0.03	0	04217	QPSK	1	0	10 mm	left	1:1	0.513	1.000	0.513	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	0.00	1	04217	QPSK	50	0	10 mm	left	1:1	0.399	1.005	0.401	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.2	25.00	-0.03	0	04217	QPSK	1	0	10 mm	bottom	1:1	0.838	1.047	0.877	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT									Body										
Spatial Peak									1.6 W/kg (mW/g)										
Uncontrolled Exposure/General Population									averaged over 1 gram										

Note: Blue entry indicates Variability measurement.



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Table 11-33
LTE Band 25 (PCS) Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)				(W/kg)
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	0.01	0	04217	QPSK	1	50	10 mm	back	1:1	0.523	1.005	0.526	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	-0.01	1	04217	QPSK	50	25	10 mm	back	1:1	0.423	1.000	0.423	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	0.00	0	04217	QPSK	1	50	10 mm	front	1:1	0.440	1.005	0.442	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	0.00	1	04217	QPSK	50	25	10 mm	front	1:1	0.358	1.000	0.358	
1860.00	26140	Low	LTE Band 25 (PCS)	20	25.5	25.43	0.12	0	04217	QPSK	1	0	10 mm	bottom	1:1	1.070	1.016	1.087	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.5	25.31	0.03	0	04217	QPSK	1	0	10 mm	bottom	1:1	1.130	1.045	1.181	A33
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	0.14	0	04217	QPSK	1	50	10 mm	bottom	1:1	0.983	1.005	0.988	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.5	24.12	0.10	1	04217	QPSK	50	50	10 mm	bottom	1:1	0.830	1.091	0.906	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.5	24.37	0.11	1	04217	QPSK	50	0	10 mm	bottom	1:1	0.884	1.030	0.911	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	0.09	1	04217	QPSK	50	25	10 mm	bottom	1:1	0.818	1.000	0.818	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.20	0.10	1	04217	QPSK	100	0	10 mm	bottom	1:1	0.858	1.072	0.920	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	-0.04	0	04217	QPSK	1	50	10 mm	left	1:1	0.318	1.005	0.320	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	0.02	1	04217	QPSK	50	25	10 mm	left	1:1	0.263	1.000	0.263	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	25.5	25.31	-0.13	0	04217	QPSK	1	0	10 mm	bottom	1:1	0.955	1.045	0.998	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak								Body 1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

Note: Blue entry indicates Variability measurement.

Table 11-34
LTE Band 30 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
2310.00	27710	Mid	LTE Band 30	10	25.5	25.38	0.04	0	04258	QPSK	1	0	10 mm	back	1:1	0.385	1.028	0.396	A34
2310.00	27710	Mid	LTE Band 30	10	24.5	24.17	0.02	1	04258	QPSK	25	12	10 mm	back	1:1	0.300	1.079	0.324	
2310.00	27710	Mid	LTE Band 30	10	25.5	25.38	0.03	0	04258	QPSK	1	0	10 mm	front	1:1	0.108	1.028	0.111	
2310.00	27710	Mid	LTE Band 30	10	24.5	24.17	-0.03	1	04258	QPSK	25	12	10 mm	front	1:1	0.084	1.079	0.091	
2310.00	27710	Mid	LTE Band 30	10	25.5	25.38	0.00	0	04258	QPSK	1	0	10 mm	bottom	1:1	0.341	1.028	0.351	
2310.00	27710	Mid	LTE Band 30	10	24.5	24.17	-0.02	1	04258	QPSK	25	12	10 mm	bottom	1:1	0.265	1.079	0.286	
2310.00	27710	Mid	LTE Band 30	10	25.5	25.38	0.18	0	04258	QPSK	1	0	10 mm	right	1:1	0.005	1.028	0.005	
2310.00	27710	Mid	LTE Band 30	10	24.5	24.17	0.18	1	04258	QPSK	25	12	10 mm	right	1:1	0.004	1.079	0.004	
2310.00	27710	Mid	LTE Band 30	10	25.5	25.38	0.16	0	04258	QPSK	1	0	10 mm	left	1:1	0.020	1.028	0.021	
2310.00	27710	Mid	LTE Band 30	10	24.5	24.17	0.13	1	04258	QPSK	25	12	10 mm	left	1:1	0.017	1.079	0.018	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											



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Table 11-35
LTE Band 7 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
2510.00	20850	Low	LTE Band 7	20	25.5	25.45	-0.06	0	04258	QPSK	1	0	10 mm	back	1:1	0.261	1.012	0.264	A35
2510.00	20850	Low	LTE Band 7	20	24.5	24.36	0.10	1	04258	QPSK	50	0	10 mm	back	1:1	0.174	1.033	0.180	
2510.00	20850	Low	LTE Band 7	20	25.5	25.45	0.11	0	04258	QPSK	1	0	10 mm	front	1:1	0.040	1.012	0.040	
2510.00	20850	Low	LTE Band 7	20	24.5	24.36	0.14	1	04258	QPSK	50	0	10 mm	front	1:1	0.027	1.033	0.028	
2510.00	20850	Low	LTE Band 7	20	25.5	25.45	0.01	0	04258	QPSK	1	0	10 mm	bottom	1:1	0.105	1.012	0.106	
2510.00	20850	Low	LTE Band 7	20	24.5	24.36	-0.02	1	04258	QPSK	50	0	10 mm	bottom	1:1	0.077	1.033	0.080	
2510.00	20850	Low	LTE Band 7	20	25.5	25.45	0.16	0	04258	QPSK	1	0	10 mm	right	1:1	0.004	1.012	0.004	
2510.00	20850	Low	LTE Band 7	20	24.5	24.36	0.18	1	04258	QPSK	50	0	10 mm	right	1:1	0.002	1.033	0.002	
2510.00	20850	Low	LTE Band 7	20	25.5	25.45	0.20	0	04258	QPSK	1	0	10 mm	left	1:1	0.020	1.012	0.020	
2510.00	20850	Low	LTE Band 7	20	24.5	24.36	0.17	1	04258	QPSK	50	0	10 mm	left	1:1	0.014	1.033	0.014	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-36
LTE Band 41 Hotspot SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.														(W/kg)		(W/kg)	
2549.50	40185	Low-Mid	LTE Band 41	20	25.2	25.19	0.01	0	04258	QPSK	1	0	10 mm	back	1:1.58	1.02	0.171	A36
2549.50	40185	Low-Mid	LTE Band 41	20	24.2	24.10	0.02	1	04258	QPSK	50	0	10 mm	back	1:1.58	1.023	0.137	
2549.50	40185	Low-Mid	LTE Band 41	20	25.2	25.19	0.18	0	04258	QPSK	1	0	10 mm	front	1:1.58	1.002	0.025	
2549.50	40185	Low-Mid	LTE Band 41	20	24.2	24.10	0.20	1	04258	QPSK	50	0	10 mm	front	1:1.58	1.023	0.020	
2549.50	40185	Low-Mid	LTE Band 41	20	25.2	25.19	0.12	0	04258	QPSK	1	0	10 mm	bottom	1:1.58	1.002	0.053	
2549.50	40185	Low-Mid	LTE Band 41	20	24.2	24.10	0.18	1	04258	QPSK	50	0	10 mm	bottom	1:1.58	1.023	0.042	
2549.50	40185	Low-Mid	LTE Band 41	20	25.2	25.19	0.21	0	04258	QPSK	1	0	10 mm	right	1:1.58	1.002	0.001	
2549.50	40185	Low-Mid	LTE Band 41	20	24.2	24.10	0.20	1	04258	QPSK	50	0	10 mm	right	1:1.58	1.023	0.000	
2549.50	40185	Low-Mid	LTE Band 41	20	25.2	25.19	0.14	0	04258	QPSK	1	0	10 mm	left	1:1.58	1.002	0.011	
2549.50	40185	Low-Mid	LTE Band 41	20	24.2	24.10	0.12	1	04258	QPSK	50	0	10 mm	left	1:1.58	1.023	0.008	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body										
Spatial Peak								1.6 W/kg (mW/g)										
Uncontrolled Exposure/General Population								averaged over 1 gram										



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Table 11-37
WLAN SISO Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan W/kg	SAR (1g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g) (W/kg)	Plot #
MHz	Ch.																		
2437	6	802.11b	DSSS	22	21.0	20.84	0.16	10 mm	1	04233	1	back	99.2	0.283	0.257	1.038	1.008	0.269	
2437	6	802.11b	DSSS	22	21.0	20.84	0.13	10 mm	1	04233	1	front	99.2	0.157	-	1.038	1.008	-	
2437	6	802.11b	DSSS	22	21.0	20.84	0.14	10 mm	1	04233	1	top	99.2	0.331	0.210	1.038	1.008	0.220	
2437	6	802.11b	DSSS	22	21.0	20.84	0.13	10 mm	1	04233	1	left	99.2	0.171	-	1.038	1.008	-	
2412	1	802.11b	DSSS	22	21.0	20.75	0.15	10 mm	2	04233	1	back	99.3	0.400	0.399	1.059	1.007	0.425	
2437	6	802.11b	DSSS	22	21.0	20.67	-0.05	10 mm	2	04233	1	back	99.3	0.526	0.492	1.079	1.007	0.535	
2462	11	802.11b	DSSS	22	21.0	20.78	0.02	10 mm	2	04233	1	back	99.3	0.958	0.574	1.052	1.007	0.608	A37
2462	11	802.11b	DSSS	22	21.0	20.78	0.16	10 mm	2	04233	1	front	99.3	0.055	0.045	1.052	1.007	0.048	
2462	11	802.11b	DSSS	22	21.0	20.78	0.13	10 mm	2	04233	1	top	99.3	0.040	-	1.052	1.007	-	
2462	11	802.11b	DSSS	22	21.0	20.78	0.21	10 mm	2	04233	1	left	99.3	0.190	0.165	1.052	1.007	0.175	
5200	40	802.11a	OFDM	20	18.0	17.76	0.19	10 mm	1	04225	6	back	98.3	0.236	0.136	1.057	1.017	0.146	
5200	40	802.11a	OFDM	20	18.0	17.76	0.17	10 mm	1	04225	6	front	98.3	0.044	-	1.057	1.017	-	
5200	40	802.11a	OFDM	20	18.0	17.76	-0.14	10 mm	1	04225	6	top	98.3	0.036	-	1.057	1.017	-	
5200	40	802.11a	OFDM	20	18.0	17.76	0.08	10 mm	1	04225	6	left	98.3	0.054	-	1.057	1.017	-	
5180	36	802.11a	OFDM	20	17.0	16.86	0.03	10 mm	2	04225	6	back	98.3	1.188	0.572	1.033	1.017	0.601	
5200	40	802.11a	OFDM	20	18.0	17.73	0.07	10 mm	2	04225	6	back	98.3	1.837	0.792	1.064	1.017	0.857	
5240	48	802.11a	OFDM	20	17.0	16.75	0.06	10 mm	2	04225	6	back	98.3	1.420	0.646	1.059	1.017	0.696	
5200	40	802.11a	OFDM	20	18.0	17.73	0.00	10 mm	2	04225	6	front	98.3	0.037	-	1.064	1.017	-	
5200	40	802.11a	OFDM	20	18.0	17.73	0.10	10 mm	2	04225	6	top	98.3	0.115	-	1.064	1.017	-	
5200	40	802.11a	OFDM	20	18.0	17.73	0.15	10 mm	2	04225	6	left	98.3	0.461	0.222	1.064	1.017	0.240	
5785	157	802.11a	OFDM	20	18.0	17.42	-0.17	10 mm	1	04225	6	back	98.3	0.428	0.215	1.143	1.017	0.250	
5785	157	802.11a	OFDM	20	18.0	17.42	0.10	10 mm	1	04225	6	front	98.3	0.062	-	1.143	1.017	-	
5785	157	802.11a	OFDM	20	18.0	17.42	0.15	10 mm	1	04225	6	top	98.3	0.159	-	1.143	1.017	-	
5785	157	802.11a	OFDM	20	18.0	17.42	0.14	10 mm	1	04225	6	left	98.3	0.102	-	1.143	1.017	-	
5785	157	802.11a	OFDM	20	18.0	17.57	0.16	10 mm	2	04225	6	back	98.3	1.401	0.650	1.104	1.017	0.730	
5785	157	802.11a	OFDM	20	18.0	17.57	0.10	10 mm	2	04225	6	front	98.3	0.019	-	1.104	1.017	-	
5785	157	802.11a	OFDM	20	18.0	17.57	-0.12	10 mm	2	04225	6	top	98.3	0.085	-	1.104	1.017	-	
5785	157	802.11a	OFDM	20	18.0	17.57	-0.19	10 mm	2	04225	6	left	98.3	0.381	0.162	1.104	1.017	0.182	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											



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Table 11-38
WLAN MIMO Hotspot SAR

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate [Mbps]	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
5180	36	802.11n	OFDM	20	17.0	16.60	17.0	16.40	0.19	10 mm	MIMO	04225	13	back	98.3	1.460	0.628	1.148	1.017	0.733	A39
5200	40	802.11n	OFDM	20	18.0	17.43	18.0	17.42	-0.11	10 mm	MIMO	04225	13	back	98.3	1.754	0.843	1.143	1.017	0.980	
5240	48	802.11n	OFDM	20	17.0	16.54	17.0	16.35	-0.19	10 mm	MIMO	04225	13	back	98.3	1.544	0.671	1.161	1.017	0.792	
5200	40	802.11n	OFDM	20	18.0	17.43	18.0	17.42	0.20	10 mm	MIMO	04225	13	front	98.3	0.048	0.021	1.143	1.017	0.024	
5200	40	802.11n	OFDM	20	18.0	17.43	18.0	17.42	-0.15	10 mm	MIMO	04225	13	top	98.3	0.112	-	1.143	1.017	-	
5200	40	802.11n	OFDM	20	18.0	17.43	18.0	17.42	0.16	10 mm	MIMO	04225	13	left	98.3	0.423	0.201	1.143	1.017	0.234	
5200	40	802.11n	OFDM	20	18.0	17.43	18.0	17.42	0.06	10 mm	MIMO	04225	13	back	98.3	1.636	0.817	1.143	1.017	0.950	
5785	157	802.11n	OFDM	20	18.0	17.24	18.0	17.36	0.04	10 mm	MIMO	04225	13	back	98.3	1.752	0.746	1.191	1.017	0.904	
5805	161	802.11n	OFDM	20	18.0	17.23	18.0	17.28	0.01	10 mm	MIMO	04225	13	back	98.3	1.668	0.764	1.194	1.017	0.928	
5785	157	802.11n	OFDM	20	18.0	17.24	18.0	17.36	-0.18	10 mm	MIMO	04225	13	front	98.3	0.053	0.020	1.191	1.017	0.024	
5785	157	802.11n	OFDM	20	18.0	17.24	18.0	17.36	0.18	10 mm	MIMO	04225	13	top	98.3	0.171	-	1.191	1.017	-	
5785	157	802.11n	OFDM	20	18.0	17.24	18.0	17.36	0.16	10 mm	MIMO	04225	13	left	98.3	0.395	0.164	1.191	1.017	0.199	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT											Body										
Spatial Peak											1.6 W/kg (mW/g)										
Uncontrolled Exposure/General Population											averaged over 1 gram										



Note:

1. Blue entry indicates Variability measurement.
2. To achieve the 5GHz WLAN 20.0 dBm (Ch. 36, 48) and 21 dBm (Ch. 40, 157, 161) maximum allowed MIMO power shown in the documentation, each antenna transmits at a maximum allowed power of 17.0 dBm (Ch. 36, 48) and 18.0 dBm (Ch. 40, 157, 161).

Table 11-39
WLAN Hotspot SAR for Conditions with 2.4 GHz Ant 1 and 5 GHz WLAN Ant 2



MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2412	1	802.11b	DSSS	22	18.0	17.96	0.04	10 mm	1	04225	1	back	99.2	0.151	0.122	1.009	1.008	0.124	
2412	1	802.11b	DSSS	22	18.0	17.96	0.15	10 mm	1	04225	1	front	99.2	0.058	-	1.009	1.008	-	
2412	1	802.11b	DSSS	22	18.0	17.96	0.15	10 mm	1	04225	1	top	99.2	0.132	-	1.009	1.008	-	
2412	1	802.11b	DSSS	22	18.0	17.96	0.17	10 mm	1	04225	1	left	99.2	0.060	-	1.009	1.008	-	
5230	46	802.11n	OFDM	40	15.0	14.53	0.02	10 mm	2	04225	13.5	back	97.4	0.819	0.382	1.114	1.027	0.437	
5230	46	802.11n	OFDM	40	15.0	14.53	-0.19	10 mm	2	04225	13.5	front	97.4	0.014	0.004	1.114	1.027	0.005	
5230	46	802.11n	OFDM	40	15.0	14.53	0.00	10 mm	2	04225	13.5	top	97.4	0.048	-	1.114	1.027	-	
5230	46	802.11n	OFDM	40	15.0	14.53	0.19	10 mm	2	04225	13.5	left	97.4	0.214	0.095	1.114	1.027	0.109	
5795	159	802.11n	OFDM	40	15.0	14.51	-0.03	10 mm	2	04225	13.5	back	97.4	0.751	0.318	1.119	1.027	0.365	
5795	159	802.11n	OFDM	40	15.0	14.51	0.19	10 mm	2	04225	13.5	front	97.4	0.007	0.000	1.119	1.027	0.000	
5795	159	802.11n	OFDM	40	15.0	14.51	-0.12	10 mm	2	04225	13.5	top	97.4	0.040	-	1.119	1.027	-	
5795	159	802.11n	OFDM	40	15.0	14.51	-0.19	10 mm	2	04225	13.5	left	97.4	0.176	-	1.119	1.027	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

DTS and NII were additionally evaluated at the maximum allowed output power during operations with Simultaneous 2.4 GHz Ant 1 and 5 GHz Ant 2 WLAN. 2.4 GHz Ant 1 WIFI was not transmitting during the NII evaluations, and 5 GHz Ant 2 WIFI was not transmitting during the DTS evaluations.

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**Table 11-40
DSS Hotspot SAR**

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.											(W/kg)			(W/kg)	
2402	0	Bluetooth	FHSS	12.0	11.97	0.13	10 mm	04266	1	back	77.3	0.036	1.007	1.294	0.047	A40
2402	0	Bluetooth	FHSS	12.0	11.97	-0.14	10 mm	04266	1	front	77.3	0.009	1.007	1.294	0.012	
2402	0	Bluetooth	FHSS	12.0	11.97	-0.05	10 mm	04266	1	top	77.3	0.014	1.007	1.294	0.018	
2402	0	Bluetooth	FHSS	12.0	11.97	-0.06	10 mm	04266	1	left	77.3	0.014	1.007	1.294	0.018	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram									

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11.4 Standalone Phablet SAR Data

Table 11-41
GPRS/UMTS Phablet SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	0.03	5 mm	04241	1:1	back	0.925	1.007	0.931	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	-0.10	2 mm	04241	1:1	front	1.420	1.007	1.430	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	-0.02	6 mm	04241	1:1	bottom	0.899	1.007	0.905	
1732.40	1412	UMTS 1750	RMC	25.2	25.17	-0.04	0 mm	04241	1:1	left	1.020	1.007	1.027	
1712.40	1312	UMTS 1750	RMC	24.2	24.20	0.00	0 mm	04241	1:1	back	2.200	1.000	2.200	
1732.40	1412	UMTS 1750	RMC	24.2	24.16	-0.01	0 mm	04241	1:1	back	2.180	1.009	2.200	
1752.60	1513	UMTS 1750	RMC	24.2	24.17	0.01	0 mm	04241	1:1	back	2.110	1.007	2.125	
1732.40	1412	UMTS 1750	RMC	24.2	24.16	-0.02	0 mm	04241	1:1	front	1.960	1.009	1.978	
1712.40	1312	UMTS 1750	RMC	24.2	24.20	-0.09	0 mm	04241	1:1	bottom	2.690	1.000	2.690	
1732.40	1412	UMTS 1750	RMC	24.2	24.16	-0.05	0 mm	04241	1:1	bottom	2.730	1.009	2.755	A41
1752.60	1513	UMTS 1750	RMC	24.2	24.17	-0.04	0 mm	04241	1:1	bottom	2.700	1.007	2.719	
1880.00	9400	UMTS 1900	RMC	25.5	25.48	-0.08	5 mm	04258	1:1	back	0.756	1.005	0.760	
1880.00	9400	UMTS 1900	RMC	25.5	25.48	0.00	2 mm	04258	1:1	front	1.180	1.005	1.186	
1880.00	9400	UMTS 1900	RMC	25.5	25.48	-0.04	6 mm	04258	1:1	bottom	0.924	1.005	0.929	
1880.00	9400	UMTS 1900	RMC	25.5	25.48	-0.09	0 mm	04258	1:1	left	0.967	1.005	0.972	
1880.00	9400	UMTS 1900	RMC	24.5	24.45	0.15	0 mm	04258	1:1	back	1.550	1.012	1.569	
1880.00	9400	UMTS 1900	RMC	24.5	24.45	0.05	0 mm	04258	1:1	front	1.700	1.012	1.720	
1852.40	9262	UMTS 1900	RMC	24.5	24.46	0.01	0 mm	04258	1:1	bottom	2.730	1.009	2.755	
1880.00	9400	UMTS 1900	RMC	24.5	24.45	-0.11	0 mm	04258	1:1	bottom	2.740	1.012	2.773	A42
1907.60	9538	UMTS 1900	RMC	24.5	24.48	-0.02	0 mm	04258	1:1	bottom	2.720	1.005	2.734	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Phablet							
Spatial Peak							4.0 W/kg (mW/g)							
Uncontrolled Exposure/General Population							averaged over 10 grams							



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Table 11-42
LTE Phablet SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (10g)	Scaling Factor	Reported SAR (10g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	0.09	0	04258	QPSK	1	0	5 mm	back	1:1	0.983	1.000	0.983	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	-0.03	1	04258	QPSK	50	0	5 mm	back	1:1	0.778	1.005	0.782	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	0.01	0	04258	QPSK	1	0	2 mm	front	1:1	1.420	1.000	1.420	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	-0.08	1	04258	QPSK	50	0	2 mm	front	1:1	1.140	1.005	1.146	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	-0.06	0	04258	QPSK	1	0	6 mm	bottom	1:1	0.974	1.000	0.974	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	-0.05	1	04258	QPSK	50	0	6 mm	bottom	1:1	0.764	1.005	0.768	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.2	25.20	-0.10	0	04258	QPSK	1	0	0 mm	left	1:1	1.110	1.000	1.110	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	0.04	1	04258	QPSK	50	0	0 mm	left	1:1	0.899	1.005	0.903	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.2	24.20	0.07	0	04258	QPSK	1	50	0 mm	back	1:1	2.100	1.000	2.100	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	-0.04	0	04258	QPSK	1	0	0 mm	back	1:1	2.140	1.005	2.151	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.12	0.01	0	04258	QPSK	1	0	0 mm	back	1:1	2.070	1.019	2.109	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.2	23.89	-0.01	0	04258	QPSK	50	0	0 mm	back	1:1	2.100	1.074	2.255	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	23.84	-0.02	0	04258	QPSK	50	50	0 mm	back	1:1	1.890	1.086	2.053	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	23.86	-0.01	0	04258	QPSK	50	50	0 mm	back	1:1	1.840	1.081	1.989	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	23.81	-0.02	0	04258	QPSK	100	0	0 mm	back	1:1	1.890	1.094	2.068	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.2	24.20	-0.14	0	04258	QPSK	1	50	0 mm	front	1:1	2.070	1.000	2.070	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	-0.09	0	04258	QPSK	1	0	0 mm	front	1:1	2.090	1.005	2.100	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.12	-0.14	0	04258	QPSK	1	0	0 mm	front	1:1	2.020	1.019	2.058	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.2	23.89	-0.19	0	04258	QPSK	50	0	0 mm	front	1:1	2.050	1.074	2.202	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	23.84	-0.14	0	04258	QPSK	50	50	0 mm	front	1:1	1.860	1.086	2.020	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	23.86	-0.18	0	04258	QPSK	50	50	0 mm	front	1:1	1.790	1.081	1.935	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	23.81	-0.11	0	04258	QPSK	100	0	0 mm	front	1:1	1.840	1.094	2.013	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.2	24.20	-0.03	0	04258	QPSK	1	50	0 mm	bottom	1:1	2.680	1.000	2.680	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	24.18	-0.05	0	04258	QPSK	1	0	0 mm	bottom	1:1	2.890	1.005	2.904	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.12	-0.06	0	04258	QPSK	1	0	0 mm	bottom	1:1	2.980	1.019	3.037	A43
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.2	23.89	-0.05	0	04258	QPSK	50	0	0 mm	bottom	1:1	2.670	1.074	2.868	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.2	23.84	-0.04	0	04258	QPSK	50	50	0 mm	bottom	1:1	2.610	1.086	2.834	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	23.86	-0.04	0	04258	QPSK	50	50	0 mm	bottom	1:1	2.680	1.081	2.897	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	23.81	-0.05	0	04258	QPSK	100	0	0 mm	bottom	1:1	2.730	1.094	2.987	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.2	24.12	-0.05	0	04258	QPSK	1	0	0 mm	bottom	1:1	2.860	1.019	2.914	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	0.02	0	04233	QPSK	1	50	5 mm	back	1:1	0.574	1.005	0.577	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	0.04	1	04233	QPSK	50	25	5 mm	back	1:1	0.461	1.000	0.461	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	0.06	0	04233	QPSK	1	50	2 mm	front	1:1	1.170	1.005	1.176	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	0.08	1	04233	QPSK	50	25	2 mm	front	1:1	0.959	1.000	0.959	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	-0.04	0	04233	QPSK	1	50	6 mm	bottom	1:1	0.991	1.005	0.996	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	-0.10	1	04233	QPSK	50	25	6 mm	bottom	1:1	0.819	1.000	0.819	
1905.00	26590	High	LTE Band 25 (PCS)	20	25.5	25.48	-0.09	0	04233	QPSK	1	50	0 mm	left	1:1	1.000	1.005	1.005	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.50	0.16	1	04233	QPSK	50	25	0 mm	left	1:1	0.832	1.000	0.832	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.5	24.50	-0.07	0	04233	QPSK	1	0	0 mm	back	1:1	1.560	1.000	1.560	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.5	24.24	0.05	0	04233	QPSK	50	0	0 mm	back	1:1	1.600	1.062	1.699	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.5	24.50	-0.06	0	04233	QPSK	1	0	0 mm	front	1:1	1.590	1.000	1.590	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.5	24.24	-0.03	0	04233	QPSK	50	0	0 mm	front	1:1	1.620	1.062	1.720	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.5	24.48	-0.04	0	04233	QPSK	1	0	0 mm	bottom	1:1	2.660	1.005	2.673	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.5	24.50	0.01	0	04233	QPSK	1	0	0 mm	bottom	1:1	2.720	1.000	2.720	
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.49	-0.19	0	04233	QPSK	1	50	0 mm	bottom	1:1	2.680	1.002	2.685	
1860.00	26140	Low	LTE Band 25 (PCS)	20	24.5	24.20	-0.21	0	04233	QPSK	50	0	0 mm	bottom	1:1	2.730	1.072	2.927	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.5	24.24	-0.04	0	04233	QPSK	50	0	0 mm	bottom	1:1	2.870	1.062	3.048	A44
1905.00	26590	High	LTE Band 25 (PCS)	20	24.5	24.23	-0.16	0	04233	QPSK	50	0	0 mm	bottom	1:1	2.800	1.064	2.979	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.5	24.20	0.17	0	04233	QPSK	100	0	0 mm	bottom	1:1	2.810	1.072	3.012	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	24.5	24.24	-0.16	0	04233	QPSK	50	0	0 mm	bottom	1:1	2.690	1.062	2.857	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Phablet 4.0 W/kg (mW/g) averaged over 10 grams											

Note: Blue entries indicate Variability measurement.





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Table 11-43
WLAN SISO Phablet SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan W/kg	SAR (10g) (W/kg)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g) (W/kg)	Plot #
MHz	Ch.																		
5280	56	802.11a	OFDM	20	18.0	17.67	0.16	0 mm	1	04225	6	back	98.3	0.553	-	1.079	1.017	-	
5280	56	802.11a	OFDM	20	18.0	17.67	0.19	0 mm	1	04225	6	front	98.3	0.635	0.087	1.079	1.017	0.095	
5280	56	802.11a	OFDM	20	18.0	17.67	0.12	0 mm	1	04225	6	top	98.3	0.526	-	1.079	1.017	-	
5280	56	802.11a	OFDM	20	18.0	17.67	0.10	0 mm	1	04225	6	left	98.3	0.348	-	1.079	1.017	-	
5260	52	802.11a	OFDM	20	17.0	16.57	0.18	0 mm	2	04225	6	back	98.3	31.606	1.610	1.104	1.017	1.808	
5280	56	802.11a	OFDM	20	18.0	17.67	0.13	0 mm	2	04225	6	back	98.3	36.648	1.820	1.079	1.017	1.997	
5320	64	802.11a	OFDM	20	17.0	16.69	-0.05	0 mm	2	04225	6	back	98.3	21.081	1.450	1.074	1.017	1.584	
5280	56	802.11a	OFDM	20	18.0	17.67	0.00	0 mm	2	04225	6	front	98.3	0.436	0.066	1.079	1.017	0.072	
5280	56	802.11a	OFDM	20	18.0	17.67	0.15	0 mm	2	04225	6	top	98.3	0.214	-	1.079	1.017	-	
5280	56	802.11a	OFDM	20	18.0	17.67	0.00	0 mm	2	04225	6	left	98.3	5.176	0.428	1.079	1.017	0.470	
5600	120	802.11a	OFDM	20	17.0	16.76	0.18	0 mm	1	04225	6	back	98.3	0.454	-	1.057	1.017	-	
5600	120	802.11a	OFDM	20	17.0	16.76	0.18	0 mm	1	04225	6	front	98.3	0.703	0.094	1.057	1.017	0.101	
5600	120	802.11a	OFDM	20	17.0	16.76	0.10	0 mm	1	04225	6	top	98.3	0.366	-	1.057	1.017	-	
5600	120	802.11a	OFDM	20	17.0	16.76	0.10	0 mm	1	04225	6	left	98.3	0.512	-	1.057	1.017	-	
5720	144	802.11a	OFDM	20	17.0	16.87	0.10	0 mm	2	04225	6	back	98.3	7.780	1.030	1.030	1.017	1.079	
5720	144	802.11a	OFDM	20	17.0	16.87	0.00	0 mm	2	04225	6	front	98.3	0.391	0.050	1.030	1.017	0.052	
5720	144	802.11a	OFDM	20	17.0	16.87	0.19	0 mm	2	04225	6	top	98.3	0.152	-	1.030	1.017	-	
5720	144	802.11a	OFDM	20	17.0	16.87	0.13	0 mm	2	04225	6	left	98.3	2.147	0.234	1.030	1.017	0.245	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Phablet											
Spatial Peak								4.0 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 10 grams											

Table 11-44
WLAN MIMO Phablet SAR

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power (Ant 1) [dBm]	Conducted Power (Ant 1) [dBm]	Maximum Allowed Power (Ant 2) [dBm]	Conducted Power (Ant 2) [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.															W/kg	(W/kg)			(W/kg)	
5260	52	802.11n	OFDM	20	17.0	16.37	17.0	16.52	0.06	0 mm	MIMO	04225	13	back	98.3	27.715	1.770	1.156	1.017	2.081	A45
5280	56	802.11n	OFDM	20	18.0	17.42	18.0	17.52	-0.15	0 mm	MIMO	04225	13	back	98.3	42.184	1.900	1.143	1.017	2.209	
5300	60	802.11n	OFDM	20	17.0	16.57	17.0	16.54	-0.02	0 mm	MIMO	04225	13	back	98.3	34.693	1.620	1.112	1.017	1.832	
5280	56	802.11n	OFDM	20	18.0	17.42	18.0	17.52	0.21	0 mm	MIMO	04225	13	front	98.3	1.340	0.207	1.143	1.017	0.241	
5280	56	802.11n	OFDM	20	18.0	17.42	18.0	17.52	0.16	0 mm	MIMO	04225	13	top	98.3	0.679	-	1.143	1.017	-	
5280	56	802.11n	OFDM	20	18.0	17.42	18.0	17.52	0.13	0 mm	MIMO	04225	13	left	98.3	3.632	0.389	1.143	1.017	0.452	
5720	144	802.11n	OFDM	20	17.0	16.67	17.0	16.87	-0.02	0 mm	MIMO	04225	13	back	98.3	12.975	1.340	1.079	1.017	1.470	
5720	144	802.11n	OFDM	20	17.0	16.67	17.0	16.87	0.17	0 mm	MIMO	04225	13	front	98.3	1.762	0.216	1.079	1.017	0.237	
5720	144	802.11n	OFDM	20	17.0	16.67	17.0	16.87	0.08	0 mm	MIMO	04225	13	top	98.3	0.836	-	1.079	1.017	-	
5720	144	802.11n	OFDM	20	17.0	16.67	17.0	16.87	0.03	0 mm	MIMO	04225	13	left	98.3	2.031	0.251	1.079	1.017	0.275	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT																Phablet					
Spatial Peak																4.0 W/kg (mW/g)					
Uncontrolled Exposure/General Population																averaged over 10 grams					

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11.5 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was ≤ 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were required.
8. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. Per FCC KDB Publication 648474 D04v01r03, this device is considered a "phablet" since the diagonal dimension is > 160 mm and < 200 mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.
11. This device utilizes power reduction for some wireless modes and technologies, as outlined in Section 1.3. The maximum output power allowed for each transmitter and exposure condition was evaluated for SAR compliance based on expected use conditions and simultaneous transmission scenarios.
12. Additional SAR tests for phablet SAR were evaluated per KDB 616217 Section 6 (See Section 6.9 for more information).
13. Unless otherwise noted, when 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds below.

GSM Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2. Justification for reduced test configurations per KDB Publication 941225 D01v03r01 and October 2013 TCB Workshop Notes: The source-based frame-averaged output power was evaluated for all GPRS/EDGE slot configurations. The configuration with the highest target frame averaged output power was evaluated for hotspot SAR. When the maximum frame-averaged powers are equivalent across two or more slots (within 0.25 dB), the configuration with the most number of time slots was tested.
3. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel was used.
4. GPRS was additionally evaluated for head and body-worn exposure conditions to address possible VoIP scenarios.

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UMTS Notes:



1. UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. AMR and HSPA SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel was used.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 8.5.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 and MCC=001 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).
4. Per FCC KDB Publication 447498 D01v06, when the reported LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for 1g evaluations, testing at the other channels was required for such test configurations.
5. TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r04. Testing was performed 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.
6. Per KDB Publication 941225 D05Av01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in LTE CA mode was not > 0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.
7. For LTE Band 5, per Fall TCB Workshop Notes, SAR was first measured with only a single carrier active in the uplink (carrier aggregation not active). For each exposure condition, the uplink CA scenario with two component carriers was additionally tested for the configuration with the highest SAR when carrier aggregation was not active. The SCC was configured with the closest available contiguous channel. The two component carriers were configured so the resource blocks are physically allocated side by side to achieve the maximum output power.

WLAN Notes:

1. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g evaluations, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 8.6.5 for more information.
3. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not



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investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations. See Section 8.6.6 for more information.

4. Per KDB Publication 248227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498 D01v06 by either evaluating the sum of the 1g SAR values of each antenna transmitting independently or making a SAR measurement with both antennas transmitting simultaneously. Please see Section 12 for complete analysis.
5. When the maximum reported 1g averaged SAR is ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
6. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.
7. When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

Bluetooth Notes

1. Bluetooth SAR was measured with the device connected to a call box with hopping disabled with DH5 operation and Tx Tests test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor to determine compliance. See Section 9.5 for the time domain plot and calculation for the duty factor of the device.

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12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction



The following procedures adopted from FCC KDB Publication 447498 D01v06 are applicable to devices with built-in unlicensed transmitters such as 802.11 and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

12.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB Publication 447498 D01v06 4.3.2 and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1g or 10g SAR for all the simultaneous transmitting antennas in a specific physical test configuration is ≤ 1.6 W/kg for 1g and ≤ 4 W/kg for 10g. The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1g or 10g SAR.

Per FCC KDB Publication 941225 D06v02r01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("-").

(*) For test positions that were not required to be evaluated for WLAN SAR per FCC KDB publication 248227, the worst case WLAN SAR result for applicable exposure conditions was used for simultaneous transmission analysis.

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12.3 Head SAR Simultaneous Transmission Analysis

Table 12-1
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM/GPRS 850	0.148	0.195	0.046	0.343	0.194	0.389
	GSM/GPRS 1900	0.070	0.195	0.046	0.265	0.116	0.311
	UMTS 850	0.174	0.195	0.046	0.369	0.220	0.415
	UMTS 1750	0.222	0.195	0.046	0.417	0.268	0.463
	UMTS 1900	0.164	0.195	0.046	0.359	0.210	0.405
	LTE Band 71	0.074	0.195	0.046	0.269	0.120	0.315
	LTE Band 12	0.096	0.195	0.046	0.291	0.142	0.337
	LTE Band 13	0.179	0.195	0.046	0.374	0.225	0.420
	LTE Band 5 (Cell)	0.180	0.195	0.046	0.375	0.226	0.421
	LTE Band 66 (AWS)	0.289	0.195	0.046	0.484	0.335	0.530
	LTE Band 25 (PCS)	0.189	0.195	0.046	0.384	0.235	0.430
	LTE Band 30	0.010	0.195	0.046	0.205	0.056	0.251
	LTE Band 7	0.008	0.195	0.046	0.203	0.054	0.249
	LTE Band 41	0.004	0.195	0.046	0.199	0.050	0.245

Table 12-2
Simultaneous Transmission Scenario with 5 GHz WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Head SAR	GSM/GPRS 850	0.148	0.556	0.089	0.704	0.237	0.793
	GSM/GPRS 1900	0.070	0.556	0.089	0.626	0.159	0.715
	UMTS 850	0.174	0.556	0.089	0.730	0.263	0.819
	UMTS 1750	0.222	0.556	0.089	0.778	0.311	0.867
	UMTS 1900	0.164	0.556	0.089	0.720	0.253	0.809
	LTE Band 71	0.074	0.556	0.089	0.630	0.163	0.719
	LTE Band 12	0.096	0.556	0.089	0.652	0.185	0.741
	LTE Band 13	0.179	0.556	0.089	0.735	0.268	0.824
	LTE Band 5 (Cell)	0.180	0.556	0.089	0.736	0.269	0.825
	LTE Band 66 (AWS)	0.289	0.556	0.089	0.845	0.378	0.934
	LTE Band 25 (PCS)	0.189	0.556	0.089	0.745	0.278	0.834
	LTE Band 30	0.010	0.556	0.089	0.566	0.099	0.655
	LTE Band 7	0.008	0.556	0.089	0.564	0.097	0.653
	LTE Band 41	0.004	0.556	0.089	0.560	0.093	0.649





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Table 12-3
Simultaneous Transmission Scenario with 2.4 GHz WLAN and 5 GHz WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	GSM/GPRS 850	0.148	0.195	0.089	0.432
	GSM/GPRS 1900	0.070	0.195	0.089	0.354
	UMTS 850	0.174	0.195	0.089	0.458
	UMTS 1750	0.222	0.195	0.089	0.506
	UMTS 1900	0.164	0.195	0.089	0.448
	LTE Band 71	0.074	0.195	0.089	0.358
	LTE Band 12	0.096	0.195	0.089	0.380
	LTE Band 13	0.179	0.195	0.089	0.463
	LTE Band 5 (Cell)	0.180	0.195	0.089	0.464
	LTE Band 66 (AWS)	0.289	0.195	0.089	0.573
	LTE Band 25 (PCS)	0.189	0.195	0.089	0.473
	LTE Band 30	0.010	0.195	0.089	0.294
	LTE Band 7	0.008	0.195	0.089	0.292
	LTE Band 41	0.004	0.195	0.089	0.288

Table 12-4
Simultaneous Transmission Scenario with Bluetooth (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM/GPRS 850	0.148	0.094	0.242
	GSM/GPRS 1900	0.070	0.094	0.164
	UMTS 850	0.174	0.094	0.268
	UMTS 1750	0.222	0.094	0.316
	UMTS 1900	0.164	0.094	0.258
	LTE Band 71	0.074	0.094	0.168
	LTE Band 12	0.096	0.094	0.190
	LTE Band 13	0.179	0.094	0.273
	LTE Band 5 (Cell)	0.180	0.094	0.274
	LTE Band 66 (AWS)	0.289	0.094	0.383
	LTE Band 25 (PCS)	0.189	0.094	0.283
	LTE Band 30	0.010	0.094	0.104
	LTE Band 7	0.008	0.094	0.102
	LTE Band 41	0.004	0.094	0.098

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12.4 Body-Worn Simultaneous Transmission Analysis

Table 12-5
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body-Worn	GSM/GPRS 850	0.324	0.269	0.608	0.593	0.932	1.201
	GSM/GPRS 1900	0.244	0.269	0.608	0.513	0.852	1.121
	UMTS 850	0.441	0.269	0.608	0.710	1.049	1.318
	UMTS 1750	0.677	0.269	0.608	0.946	1.285	1.554
	UMTS 1900	0.524	0.269	0.608	0.793	1.132	1.401
	LTE Band 71	0.246	0.269	0.608	0.515	0.854	1.123
	LTE Band 12	0.326	0.269	0.608	0.595	0.934	1.203
	LTE Band 13	0.486	0.269	0.608	0.755	1.094	1.363
	LTE Band 5 (Cell)	0.424	0.269	0.608	0.693	1.032	1.301
	LTE Band 66 (AWS)	0.697	0.269	0.608	0.966	1.305	1.574
	LTE Band 25 (PCS)	0.526	0.269	0.608	0.795	1.134	1.403
	LTE Band 30	0.396	0.269	0.608	0.665	1.004	1.273
	LTE Band 7	0.264	0.269	0.608	0.533	0.872	1.141
	LTE Band 41	0.171	0.269	0.608	0.440	0.779	1.048



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Table 12-6
Simultaneous Transmission Scenario with 5 GHz WLAN (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Body-Worn	GSM/GPRS 850	0.324	0.250	0.811	0.574	1.135
	GSM/GPRS 1900	0.244	0.250	0.811	0.494	1.055
	UMTS 850	0.441	0.250	0.811	0.691	1.252
	UMTS 1750	0.677	0.250	0.811	0.927	1.488
	UMTS 1900	0.524	0.250	0.811	0.774	1.335
	LTE Band 71	0.246	0.250	0.811	0.496	1.057
	LTE Band 12	0.326	0.250	0.811	0.576	1.137
	LTE Band 13	0.486	0.250	0.811	0.736	1.297
	LTE Band 5 (Cell)	0.424	0.250	0.811	0.674	1.235
	LTE Band 66 (AWS)	0.697	0.250	0.811	0.947	1.508
	LTE Band 25 (PCS)	0.526	0.250	0.811	0.776	1.337
	LTE Band 30	0.396	0.250	0.811	0.646	1.207
	LTE Band 7	0.264	0.250	0.811	0.514	1.075
	LTE Band 41	0.171	0.250	0.811	0.421	0.982



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Table 12-7
Simultaneous Transmission Scenario with 5 GHz WLAN MIMO (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Body-Worn	GSM/GPRS 850	0.324	0.942	1.266	N/A
	GSM/GPRS 1900	0.244	0.942	1.186	N/A
	UMTS 850	0.441	0.942	1.383	N/A
	UMTS 1750	0.677	0.942	See Note 1	0.02
	UMTS 1900	0.524	0.942	1.466	N/A
	LTE Band 71	0.246	0.942	1.188	N/A
	LTE Band 12	0.326	0.942	1.268	N/A
	LTE Band 13	0.486	0.942	1.428	N/A
	LTE Band 5 (Cell)	0.424	0.942	1.366	N/A
	LTE Band 66 (AWS)	0.697	0.942	See Note 1	0.02
	LTE Band 25 (PCS)	0.526	0.942	1.468	N/A
	LTE Band 30	0.396	0.942	1.338	N/A
	LTE Band 7	0.264	0.942	1.206	N/A
	LTE Band 41	0.171	0.942	1.113	N/A

Table 12-8
Simultaneous Transmission Scenario with 2.4 GHz WLAN and 5 GHz WLAN (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 at 17 dBm SAR (W/kg)	5 GHz WLAN Ant 2 at 14 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Body-Worn	GSM/GPRS 850	0.324	0.124	0.444	0.892
	GSM/GPRS 1900	0.244	0.124	0.444	0.812
	UMTS 850	0.441	0.124	0.444	1.009
	UMTS 1750	0.677	0.124	0.444	1.245
	UMTS 1900	0.524	0.124	0.444	1.092
	LTE Band 71	0.246	0.124	0.444	0.814
	LTE Band 12	0.326	0.124	0.444	0.894
	LTE Band 13	0.486	0.124	0.444	1.054
	LTE Band 5 (Cell)	0.424	0.124	0.444	0.992
	LTE Band 66 (AWS)	0.697	0.124	0.444	1.265
	LTE Band 25 (PCS)	0.526	0.124	0.444	1.094
	LTE Band 30	0.396	0.124	0.444	0.964
	LTE Band 7	0.264	0.124	0.444	0.832
	LTE Band 41	0.171	0.124	0.444	0.739





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Table 12-9
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM/GPRS 850	0.324	0.047	0.371
	GSM/GPRS 1900	0.244	0.047	0.291
	UMTS 850	0.441	0.047	0.488
	UMTS 1750	0.677	0.047	0.724
	UMTS 1900	0.524	0.047	0.571
	LTE Band 71	0.246	0.047	0.293
	LTE Band 12	0.326	0.047	0.373
	LTE Band 13	0.486	0.047	0.533
	LTE Band 5 (Cell)	0.424	0.047	0.471
	LTE Band 66 (AWS)	0.697	0.047	0.744
	LTE Band 25 (PCS)	0.526	0.047	0.573
	LTE Band 30	0.396	0.047	0.443
	LTE Band 7	0.264	0.047	0.311
	LTE Band 41	0.171	0.047	0.218

Notes:

1. No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was not greater than 0.04 per FCC KDB 447498 D01v06. See Section 12.7 for detailed SPLS ratio analysis.

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12.5 Hotspot SAR Simultaneous Transmission Analysis

Table 12-10
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	0.324	0.269	0.608	0.593	0.932	1.201
	GPRS 1900	0.380	0.269	0.608	0.649	0.988	1.257
	UMTS 850	0.441	0.269	0.608	0.710	1.049	1.318
	UMTS 1750	0.866	0.269	0.608	1.135	1.474	See Table Below
	UMTS 1900	1.006	0.269	0.608	1.275	See Table Below	See Table Below
	LTE Band 71	0.246	0.269	0.608	0.515	0.854	1.123
	LTE Band 12	0.326	0.269	0.608	0.595	0.934	1.203
	LTE Band 13	0.486	0.269	0.608	0.755	1.094	1.363
	LTE Band 5 (Cell)	0.424	0.269	0.608	0.693	1.032	1.301
	LTE Band 66 (AWS)	0.974	0.269	0.608	1.243	1.582	See Table Below
	LTE Band 25 (PCS)	1.181	0.269	0.608	1.450	See Table Below	See Table Below
	LTE Band 30	0.396	0.269	0.608	0.665	1.004	1.273
	LTE Band 7	0.264	0.269	0.608	0.533	0.872	1.141
	LTE Band 41	0.171	0.269	0.608	0.440	0.779	1.048

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2+3		
Hotspot SAR	Back	0.677	0.269	0.608	1.554		
	Front	0.602	0.269*	0.048	0.919		
	Top	-	0.220	0.608*	0.828		
	Bottom	0.866	-	-	0.866		
	Right	-	-	-	0.000		
	Left	0.422	0.269*	0.175	0.866		
Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	0.524	0.269	0.608	0.793	1.132	1.401
	Front	0.524	0.269*	0.048	0.793	0.572	0.841
	Top	-	0.220	0.608*	0.220	0.608	0.828
	Bottom	1.006	-	-	1.006	1.006	1.006
	Right	-	-	-	0.000	0.000	0.000
	Left	0.326	0.269*	0.175	0.595	0.501	0.770
Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2+3		
Hotspot SAR	Back	0.697	0.269	0.608	1.574		
	Front	0.627	0.269*	0.048	0.944		
	Top	-	0.220	0.608*	0.828		
	Bottom	0.974	-	-	0.974		
	Right	-	-	-	0.000		
	Left	0.513	0.269*	0.175	0.957		
Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Hotspot SAR	Back	0.526	0.269	0.608	0.795	1.134	1.403
	Front	0.442	0.269*	0.048	0.711	0.490	0.759
	Top	-	0.220	0.608*	0.220	0.608	0.828
	Bottom	1.181	-	-	1.181	1.181	1.181
	Right	-	-	-	0.000	0.000	0.000
	Left	0.320	0.269*	0.175	0.589	0.495	0.764



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Table 12-11
Simultaneous Transmission Scenario with 5 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Hotspot SAR	GPRS 850	0.324	0.250	0.857	0.574	1.181
	GPRS 1900	0.380	0.250	0.857	0.630	1.237
	UMTS 850	0.441	0.250	0.857	0.691	1.298
	UMTS 1750	0.866	0.250	0.857	1.116	See Table Below
	UMTS 1900	1.006	0.250	0.857	1.256	See Table Below
	LTE Band 71	0.246	0.250	0.857	0.496	1.103
	LTE Band 12	0.326	0.250	0.857	0.576	1.183
	LTE Band 13	0.486	0.250	0.857	0.736	1.343
	LTE Band 5 (Cell)	0.424	0.250	0.857	0.674	1.281
	LTE Band 66 (AWS)	0.974	0.250	0.857	1.224	See Table Below
	LTE Band 25 (PCS)	1.181	0.250	0.857	1.431	See Table Below
	LTE Band 30	0.396	0.250	0.857	0.646	1.253
	LTE Band 7	0.264	0.250	0.857	0.514	1.121
	LTE Band 41	0.171	0.250	0.857	0.421	1.028

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2			1	2	1+2
Hotspot SAR	Back	0.677	0.857	1.534	Hotspot SAR	Back	0.524	0.857	1.381
	Front	0.602	0.857*	1.459		Front	0.524	0.857*	1.381
	Top	-	0.857*	0.857		Top	-	0.857*	0.857
	Bottom	0.866	-	0.866		Bottom	1.006	-	1.006
	Right	-	-	-		Right	-	-	-
	Left	0.422	0.240	0.662		Left	0.326	0.240	0.566
Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2			1	2	1+2
Hotspot SAR	Back	0.697	0.857	1.554	Hotspot SAR	Back	0.526	0.857	1.383
	Front	0.627	0.857*	1.484		Front	0.442	0.857*	1.299
	Top	-	0.857*	0.857		Top	-	0.857*	0.857
	Bottom	0.974	-	0.974		Bottom	1.181	-	1.181
	Right	-	-	-		Right	-	-	-
	Left	0.513	0.240	0.753		Left	0.320	0.240	0.560



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Table 12-12
Simultaneous Transmission Scenario with 5 GHz WLAN MIMO (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.324	0.980	1.304
	GPRS 1900	0.380	0.980	1.360
	UMTS 850	0.441	0.980	1.421
	UMTS 1750	0.866	0.980	See Table Below
	UMTS 1900	1.006	0.980	See Table Below
	LTE Band 71	0.246	0.980	1.226
	LTE Band 12	0.326	0.980	1.306
	LTE Band 13	0.486	0.980	1.466
	LTE Band 5 (Cell)	0.424	0.980	1.404
	LTE Band 66 (AWS)	0.974	0.980	See Table Below
	LTE Band 25 (PCS)	1.181	0.980	See Table Below
	LTE Band 30	0.396	0.980	1.376
	LTE Band 7	0.264	0.980	1.244
	LTE Band 41	0.171	0.980	1.151

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Hotspot SAR	Back	0.677	0.980	See Note 1	0.02
	Front	0.602	0.024	0.626	N/A
	Top	-	0.980*	0.980	N/A
	Bottom	0.866	-	0.866	N/A
	Right	-	-	-	N/A
	Left	0.422	0.234	0.656	N/A
Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Hotspot SAR	Back	0.697	0.980	See Note 1	0.02
	Front	0.627	0.024	0.651	N/A
	Top	-	0.980*	0.980	N/A
	Bottom	0.974	-	0.974	N/A
	Right	-	-	-	N/A
	Left	0.513	0.234	0.747	N/A

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.524	0.980	1.504
	Front	0.524	0.024	0.548
	Top	-	0.980*	0.980
	Bottom	1.006	-	1.006
	Right	-	-	-
	Left	0.326	0.234	0.560
Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.526	0.980	1.506
	Front	0.442	0.024	0.466
	Top	-	0.980*	0.980
	Bottom	1.181	-	1.181
	Right	-	-	-
	Left	0.320	0.234	0.554



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Table 12-13
Simultaneous Transmission Scenario with 2.4 GHz WLAN and 5 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 at 17 dBm SAR (W/kg)	5 GHz WLAN Ant 2 at 14 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	GPRS 850	0.324	0.124	0.437	0.885
	GPRS 1900	0.380	0.124	0.437	0.941
	UMTS 850	0.441	0.124	0.437	1.002
	UMTS 1750	0.866	0.124	0.437	1.427
	UMTS 1900	1.006	0.124	0.437	1.567
	LTE Band 71	0.246	0.124	0.437	0.807
	LTE Band 12	0.326	0.124	0.437	0.887
	LTE Band 13	0.486	0.124	0.437	1.047
	LTE Band 5 (Cell)	0.424	0.124	0.437	0.985
	LTE Band 66 (AWS)	0.974	0.124	0.437	1.535
	LTE Band 25 (PCS)	1.181	0.124	0.437	See Table Below
	LTE Band 30	0.396	0.124	0.437	0.957
	LTE Band 7	0.264	0.124	0.437	0.825
	LTE Band 41	0.171	0.124	0.437	0.732

Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	2.4 GHz WLAN Ant 1 at 17 dBm SAR (W/kg)	5 GHz WLAN Ant 2 at 14 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	Back	0.526	0.124	0.437	1.087
	Front	0.442	0.124*	0.005	0.571
	Top	-	0.124*	0.437*	0.561
	Bottom	1.181	-	-	1.181
	Right	-	-	-	-
	Left	0.320	0.124*	0.109	0.553





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Table 12-14
Simultaneous Transmission Scenario with Bluetooth (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.324	0.047	0.371
	GPRS 1900	0.380	0.047	0.427
	UMTS 850	0.441	0.047	0.488
	UMTS 1750	0.866	0.047	0.913
	UMTS 1900	1.006	0.047	1.053
	LTE Band 71	0.246	0.047	0.293
	LTE Band 12	0.326	0.047	0.373
	LTE Band 13	0.486	0.047	0.533
	LTE Band 5 (Cell)	0.424	0.047	0.471
	LTE Band 66 (AWS)	0.974	0.047	1.021
	LTE Band 25 (PCS)	1.181	0.047	1.228
	LTE Band 30	0.396	0.047	0.443
	LTE Band 7	0.264	0.047	0.311
	LTE Band 41	0.171	0.047	0.218

Notes:

1. No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was not greater than 0.04 per FCC KDB 447498 D01v06. See Section 12.7 for detailed SPLS ratio analysis.

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12.6 Phablet Simultaneous Transmission Analysis

For SAR summation, the highest reported SAR across all test distances was used as the most conservative evaluation for simultaneous transmission analysis for each device edge.

Table 12-15
Simultaneous Transmission Scenario with 5 GHz WLAN (Phablet)

Exposure Condition	Mode	3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Phablet SAR	UMTS 1750	2.755	0.101	1.997	2.856	See Table Below
	UMTS 1900	2.773	0.101	1.997	2.874	See Table Below
	LTE Band 66 (AWS)	3.037	0.101	1.997	3.138	See Table Below
	LTE Band 25 (PCS)	3.048	0.101	1.997	3.149	See Table Below

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	SPLSR	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2	1+2			1	2	1+2
Phablet SAR	Back	2.200	1.997	See Note 1	0.07	Phablet SAR	Back	1.569	1.997	3.566
	Front	1.978	0.072	2.050	N/A		Front	1.720	0.072	1.792
	Top	-	1.997*	1.997	N/A		Top	-	1.997*	1.997
	Bottom	2.755	-	2.755	N/A		Bottom	2.773	-	2.773
	Right	-	-	-	N/A		Right	-	-	-
	Left	1.027	0.470	1.497	N/A		Left	0.972	0.470	1.442
Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	SPLSR	Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2	1+2			1	2	1+2
Phablet SAR	Back	2.255	1.997	See Note 1	0.07	Phablet SAR	Back	1.699	1.997	3.696
	Front	2.202	0.072	2.274	N/A		Front	1.720	0.072	1.792
	Top	-	1.997*	1.997	N/A		Top	-	1.997*	1.997
	Bottom	3.037	-	3.037	N/A		Bottom	3.048	-	3.048
	Right	-	-	-	N/A		Right	-	-	-
	Left	1.110	0.470	1.580	N/A		Left	1.005	0.470	1.475



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Table 12-16
Simultaneous Transmission Scenario with 5 GHz WLAN MIMO (Phablet)



Exposure Condition	Mode	3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	
		1	2	1+2	
Phablet SAR	UMTS 1750	2.755	2.209	See Table Below	
	UMTS 1900	2.773	2.209	See Table Below	
	LTE Band 66 (AWS)	3.037	2.209	See Table Below	
	LTE Band 25 (PCS)	3.048	2.209	See Table Below	

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	2.200	2.209	See Note 1	0.08
	Front	1.978	0.241	2.219	N/A
	Top	-	2.209*	2.209	N/A
	Bottom	2.755	-	2.755	N/A
	Right	-	-	-	N/A
	Left	1.027	0.452	1.479	N/A
Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	SPLSR
		1	2	1+2	1+2
Phablet SAR	Back	2.255	2.209	See Note 1	0.08
	Front	2.202	0.241	2.443	N/A
	Top	-	2.209*	2.209	N/A
	Bottom	3.037	-	3.037	N/A
	Right	-	-	-	N/A
	Left	1.110	0.452	1.562	N/A

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	1.569	2.209	3.778
	Front	1.720	0.241	1.961
	Top	-	2.209*	2.209
	Bottom	2.773	-	2.773
	Right	-	-	-
	Left	0.972	0.452	1.424
Simult Tx	Configuration	LTE Band 25 (PCS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Phablet SAR	Back	1.699	2.209	3.908
	Front	1.720	0.241	1.961
	Top	-	2.209*	2.209
	Bottom	3.048	-	3.048
	Right	-	-	-
	Left	1.005	0.452	1.457

Notes:

- No evaluation was performed to determine the aggregate 10g SAR for these configurations as the SPLSR ratio between the antenna pairs was not greater than 0.1 per FCC KDB 447498 D01v06. See Section 12.7 for detailed SPLSR ratio analysis.

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12.7 SPLSR Evaluation and Analysis

Per FCC KDB Publication 447498 D01v06, when the sum of the standalone transmitters is more than 1.6 W/kg for 1g and 4 W/kg for 10g, the SAR sum to peak locations can be analyzed to determine SAR distribution overlaps. When the SAR peak to location ratio (shown below) for each pair of antennas is ≤ 0.04 for 1g and ≤ 0.10 for 10g, simultaneous SAR evaluation is not required. The distance between the transmitters was calculated using the following formula.

$$\text{Distance}_{\text{Tx1} - \text{Tx2}} = R_i = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

$$\text{SPLS Ratio} = \frac{(SAR_1 + SAR_2)^{1.5}}{R_i}$$

12.7.1 Back Side Body-Worn SPLSR Evaluation and Analysis

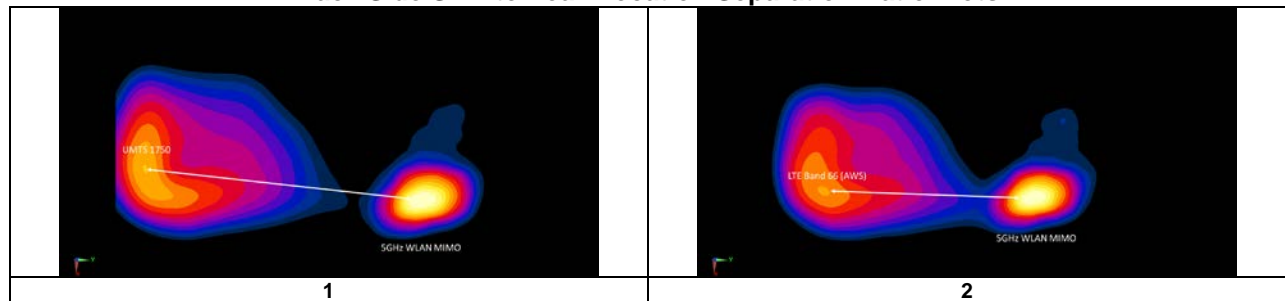
Table 12-17
Peak SAR Locations for Body Back Side



Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
5 GHz WLAN MIMO	10.00	41.00	0.942
UMTS 1750	-10.00	-72.00	0.677
LTE Band 66 (AWS)	-15.50	-74.50	0.697

Table 12-18
Back Side SAR to Peak Location Separation Ratio Calculations

Antenna Pair		Standalone SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D _{a-b}	(a+b) ^{1.5} /D _{a-b}	
5 GHz WLAN MIMO	UMTS 1750	0.942	0.677	1.619	114.76	0.02	1
5 GHz WLAN MIMO	LTE Band 66 (AWS)	0.942	0.697	1.639	118.28	0.02	2

Table 12-19
Back Side SAR to Peak Location Separation Ratio Plots



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12.7.2 Back Side Hotspot SPLSR Evaluation and Analysis

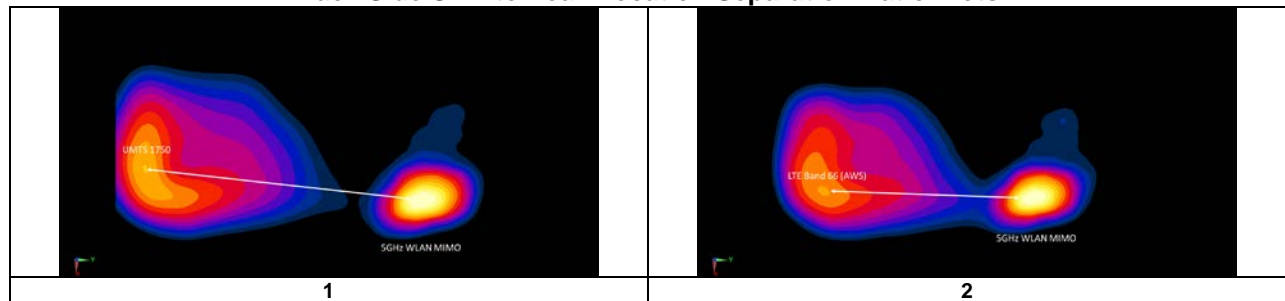
Table 12-20
Peak SAR Locations for Body Back Side



Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
5 GHz WLAN MIMO	11.00	42.00	0.980
UMTS 1750	-10.00	-72.00	0.677
LTE Band 66 (AWS)	-15.50	-74.50	0.697

Table 12-21
Back Side SAR to Peak Location Separation Ratio Calculations

Antenna Pair		Standalone SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D _{a-b}	$(a+b)^{1.5}/D_{a-b}$	
5 GHz WLAN MIMO	UMTS 1750	0.98	0.677	1.657	115.92	0.02	1
5 GHz WLAN MIMO	LTE Band 66 (AWS)	0.98	0.697	1.677	119.48	0.02	2

Table 12-22
Back Side SAR to Peak Location Separation Ratio Plots



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12.7.3 Back Side Phablet SPLSR Evaluation and Analysis

Table 12-23
Peak SAR Locations for Body Back Side

Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
5 GHz WLAN Ant 2	12.00	49.00	1.997
5 GHz WLAN MIMO	13.00	45.00	2.209
UMTS 1750	-2.50	-66.50	2.2
LTE Band 66 (AWS)	-0.50	-70.50	2.255

Table 12-24
Back Side SAR to Peak Location Separation Ratio Calculations

Antenna Pair		Standalone SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D_{a-b}	$(a+b)^{1.5}/D_{a-b}$	
5 GHz WLAN Ant 2	UMTS 1750	1.997	2.2	4.197	116.41	0.07	1
5 GHz WLAN Ant 2	LTE Band 66 (AWS)	1.997	2.255	4.252	120.15	0.07	2
5 GHz WLAN MIMO	UMTS 1750	2.209	2.2	4.409	112.57	0.08	3
5 GHz WLAN MIMO	LTE Band 66 (AWS)	2.209	2.255	4.464	116.29	0.08	4



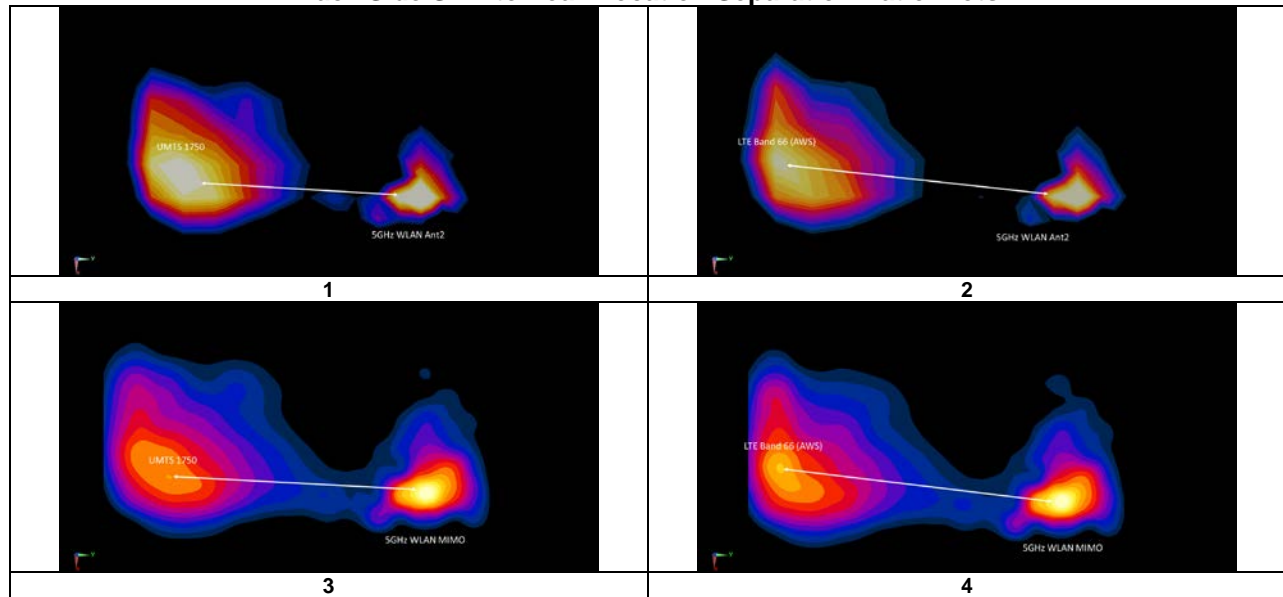


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Table 12-25
Back Side SAR to Peak Location Separation Ratio Plots



12.8 Simultaneous Transmission Conclusion

The above numerical summed SAR results and SPLSR analysis are sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528- 2013 Section 6.3.4.1.

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13 SAR MEASUREMENT VARIABILITY

13.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:



- 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
- 2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg ($\sim 10\%$ from the 1g SAR limit).
- 3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
- 4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg
- 5) When 10g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

Table 13-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Data Rate (Mbps)	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)
1750	1720.00	132072	LTE Band 66 (AWS), 20 MHz Bandwidth	QPSK, 1 RB, 0 RB Offset	N/A	bottom	10 mm	0.930	0.838	1.11	N/A	N/A	N/A
1900	1882.50	26365	LTE Band 25 (PCS), 20 MHz Bandwidth	QPSK, 1 RB, 0 RB Offset	N/A	bottom	10 mm	1.130	0.955	1.18	N/A	N/A	N/A
5250	5200.00	40	802.11n, 20 MHz Bandwidth	OFDM, MIMO	13	back	10 mm	0.843	0.817	1.03	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body						
Spatial Peak							1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population							averaged over 1 gram						



Table 13-2
Phablet SAR Measurement Variability Results

PHABLET VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (10g)	1st Repeated SAR (10g)	Ratio	2nd Repeated SAR (10g)	Ratio	3rd Repeated SAR (10g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1750	1770.00	132572	LTE Band 66 (AWS), 20 MHz Bandwidth	QPSK, 1 RB, 0 RB Offset	bottom	0 mm	2.980	2.860	1.04	N/A	N/A	N/A	N/A
1900	1882.50	26365	LTE Band 25 (PCS), 20 MHz Bandwidth	QPSK, 50 RB, 0 RB Offset	bottom	0 mm	2.870	2.690	1.07	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Phablet						
Spatial Peak							4.0 W/kg (mW/g)						
Uncontrolled Exposure/General Population							averaged over 10 grams						

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13.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for 1g and <3.75 W/kg for 10g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

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14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/17/2017	Annual	8/17/2018	MY40003841
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Agilent	E4432B	ESG-D Series Signal Generator	3/24/2017	Annual	3/24/2018	US40053896
Agilent	E4438C	ESG Vector Signal Generator	3/24/2017	Biennial	3/24/2019	MY42082385
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/22/2017	Annual	3/22/2018	MY45470194
Agilent	N5182A	MXG Vector Signal Generator	1/24/2018	Annual	1/24/2019	MY47420651
Agilent	N9020A	MXA Signal Analyzer	1/24/2018	Annual	1/24/2019	US46470561
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB46170464
Anritsu	MA24106A	USB Power Sensor	6/7/2017	Annual	6/7/2018	1231535
Anritsu	MA24106A	USB Power Sensor	6/7/2017	Annual	6/7/2018	1231538
Anritsu	MA2411B	Pulse Power Sensor	10/22/2017	Annual	10/22/2018	846215
Anritsu	MA2411B	Pulse Power Sensor	10/22/2017	Annual	10/22/2018	1315051
Anritsu	ML2495A	Power Meter	10/22/2017	Annual	10/22/2018	941001
Anritsu	MT8820C	Radio Communication Analyzer	5/23/2017	Annual	5/23/2018	6201240328
Anritsu	MT8821C	Radio Communication Analyzer	8/15/2017	Annual	8/15/2018	620901190
Anritsu	MT8821C	Radio Communication Analyzer	7/25/2017	Annual	7/25/2018	6201664756
Anritsu	MT8821C	Radio Communication Analyzer	11/17/2017	Annual	11/17/2018	6201381794
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	4040	Therm./ Clock/ Humidity Monitor	3/1/2017	Biennial	3/1/2019	170152009
Control Company	4352	Ultra Long Stem Thermometer	1/8/2018	Annual	1/8/2019	160508097
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	4/11/2017	Annual	4/11/2018	836371/0079
Rohde & Schwarz	CMW500	Radio Communication Tester	3/29/2017	Annual	3/29/2018	128633
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	7/20/2017	Annual	7/20/2018	132885
Seekonk	NC-100	Torque Wrench (8" lb)	9/1/2016	Biennial	9/1/2018	21053
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	1/22/2018	Annual	1/22/2019	N/A
SPEAG	D750V3	750 MHz SAR Dipole	1/15/2018	Annual	1/15/2019	1003
SPEAG	D835V2	835 MHz SAR Dipole	1/15/2018	Annual	1/15/2019	4d132
SPEAG	D1765V2	1765 MHz SAR Dipole	5/9/2017	Annual	5/9/2018	1008
SPEAG	D1900V2	1900 MHz SAR Dipole	7/8/2016	Biennial	7/8/2018	5d080
SPEAG	D2300V2	2300 MHz SAR Dipole	7/25/2016	Biennial	7/25/2018	1073
SPEAG	D2450V2	2450 MHz SAR Dipole	9/11/2017	Annual	9/11/2018	797
SPEAG	D2600V2	2600 MHz SAR Dipole	7/10/2017	Annual	7/10/2018	1126
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/21/2016	Biennial	9/21/2018	1191
SPEAG	D750V3	750 MHz SAR Dipole	7/13/2016	Biennial	7/13/2018	1161
SPEAG	D835V2	835 MHz SAR Dipole	7/11/2017	Annual	7/11/2018	4d133
SPEAG	D1750V2	1750 MHz SAR Dipole	5/9/2017	Annual	5/9/2018	1148
SPEAG	D1900V2	1900 MHz SAR Dipole	2/7/2018	Annual	2/7/2019	5d148
SPEAG	D5GHzV2	5 GHz SAR Dipole	8/15/2017	Annual	8/15/2018	1237
SPEAG	D1750V2	1750 MHz SAR Dipole	7/14/2016	Biennial	7/14/2018	1150
SPEAG	ES3DV3	SAR Probe	2/13/2018	Annual	2/13/2019	3213
SPEAG	ES3DV3	SAR Probe	8/14/2017	Annual	8/14/2018	3332
SPEAG	EX3DV4	SAR Probe	7/17/2017	Annual	7/17/2018	7410
SPEAG	EX3DV4	SAR Probe	4/18/2017	Annual	4/18/2018	7406
SPEAG	EX3DV4	SAR Probe	1/16/2018	Annual	1/16/2019	3589
SPEAG	EX3DV4	SAR Probe	2/14/2018	Annual	2/14/2019	3914
SPEAG	EX3DV4	SAR Probe	8/16/2017	Annual	8/16/2018	7308
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2018	Annual	2/9/2019	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/9/2017	Annual	8/9/2018	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/13/2017	Annual	7/13/2018	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/11/2017	Annual	4/11/2018	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/15/2018	Annual	2/15/2019	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/14/2017	Annual	6/14/2018	1334
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2017	Annual	5/10/2018	1070

Note:



CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

Each equipment item was used solely within its respective calibration period.

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15 MEASUREMENT UNCERTAINTIES

a	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	Tol. (± %)	Prob. Dist.	Div.	c _i 1gm	c _i 10 gms	1gm u _i (± %)	10gms u _i (± %)	v _i
Measurement System								
Probe Calibration	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	2.0	R	1.73	1.0	1.0	1.2	1.2	∞
Linearity	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	0.25	R	1.73	1.0	1.0	0.1	0.1	∞
Readout Electronics	0.3	N	1	1.0	1.0	0.3	0.3	∞
Response Time	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions - Noise	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
RF Ambient Conditions - Reflections	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	6.7	R	1.73	1.0	1.0	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Test Sample Related								
Test Sample Positioning	2.7	N	1	1.0	1.0	2.7	2.7	35
Device Holder Uncertainty	1.67	N	1	1.0	1.0	1.7	1.7	5
Output Power Variation - SAR drift measurement	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
SAR Scaling	0.0	R	1.73	1.0	1.0	0.0	0.0	∞
Phantom & Tissue Parameters								
Phantom Uncertainty (Shape & Thickness tolerances)	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	4.2	N	1	0.78	0.71	3.3	3.0	10
Liquid Permittivity - measurement uncertainty	4.1	N	1	0.23	0.26	1.0	1.1	10
Liquid Conductivity - Temperature Uncertainty	3.4	R	1.73	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Uncertainty	0.6	R	1.73	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)	RSS					11.5	11.3	60
Expanded Uncertainty (95% CONFIDENCE LEVEL)	k=2					23.0	22.6	



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16 CONCLUSION

16.1 Measurement Conclusion



The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]



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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04266

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.902 \text{ S/m}$; $\epsilon_r = 41.508$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 03-08-2018; Ambient Temp: 24.3°C; Tissue Temp: 21.6°C

Probe: ES3DV3 - SN3213; ConvF(6.42, 6.42, 6.42); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

Mode: GPRS 850, Right Head, Cheek, Mid.ch, 2 Tx slots

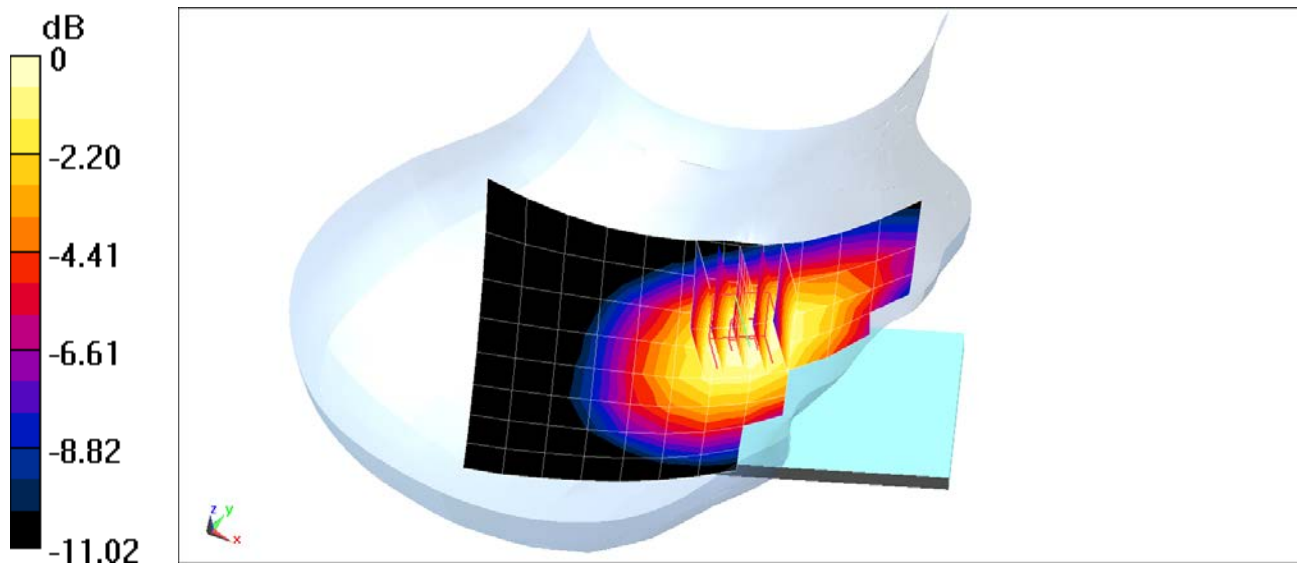
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.14 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.191 W/kg

SAR(1 g) = 0.146 W/kg



0 dB = 0.159 W/kg = -7.99 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04241

Communication System: UID 0, _GSM GPRS; 2 Tx slots (0); Frequency: 1880 MHz; Duty Cycle: 1:4.14954

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.436 \text{ S/m}$; $\epsilon_r = 40.21$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 03-05-2018; Ambient Temp: 22.8°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3332; ConvF(5.33, 5.33, 5.33); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10 (0);SEMCAD X Version 14.6.10 (7417)

Mode: GPRS 1900, Left Head, Cheek, Mid.ch, 2 Tx slots

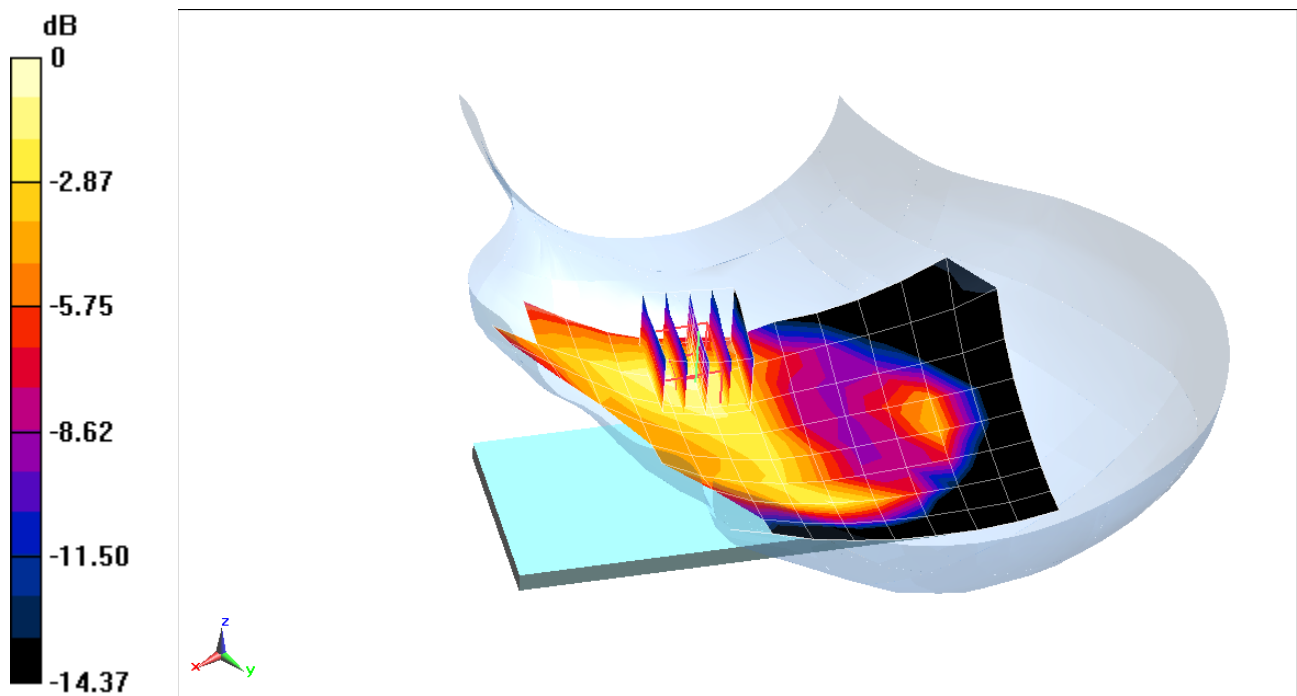
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 7.447 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.118 W/kg

SAR(1 g) = 0.070 W/kg



0 dB = 0.0869 W/kg = -10.61 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04233

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.902 \text{ S/m}$; $\epsilon_r = 41.508$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 03-08-2018; Ambient Temp: 24.3°C; Tissue Temp: 21.6°C

Probe: ES3DV3 - SN3213; ConvF(6.42, 6.42, 6.42); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 850, Right Head, Cheek, Mid.ch

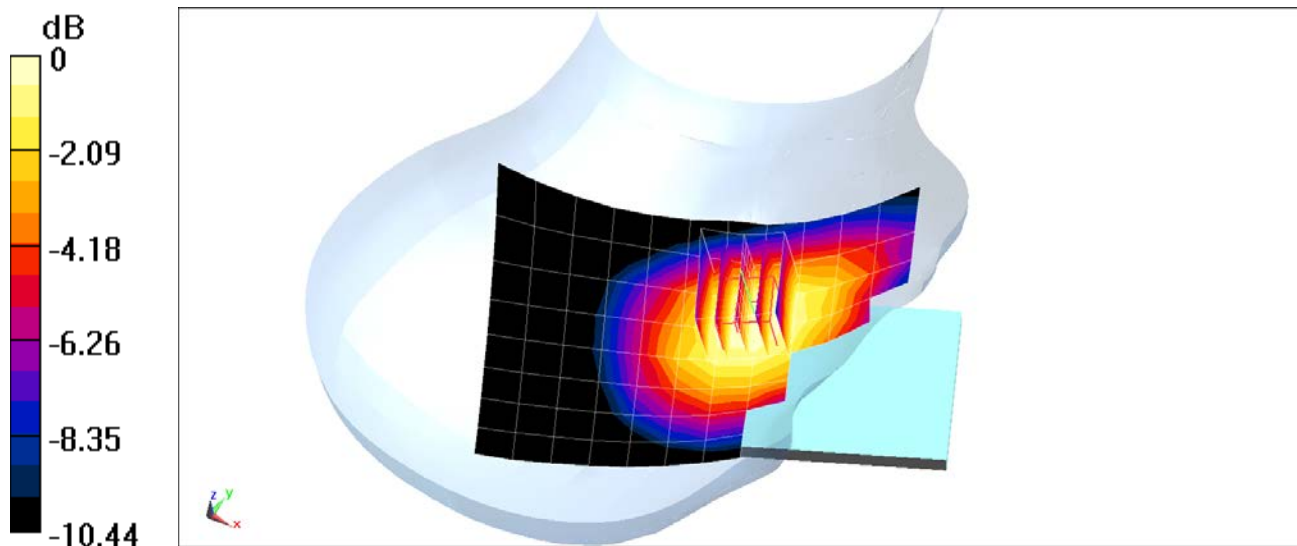
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 14.32 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.225 W/kg

SAR(1 g) = 0.172 W/kg



0 dB = 0.188 W/kg = -7.26 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04241

Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.4 \text{ MHz}$; $\sigma = 1.358 \text{ S/m}$; $\epsilon_r = 39.592$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 03-05-2018; Ambient Temp: 23.7°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3213; ConvF(5.45, 5.45, 5.45); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1750, Left Head, Tilt, Mid.ch

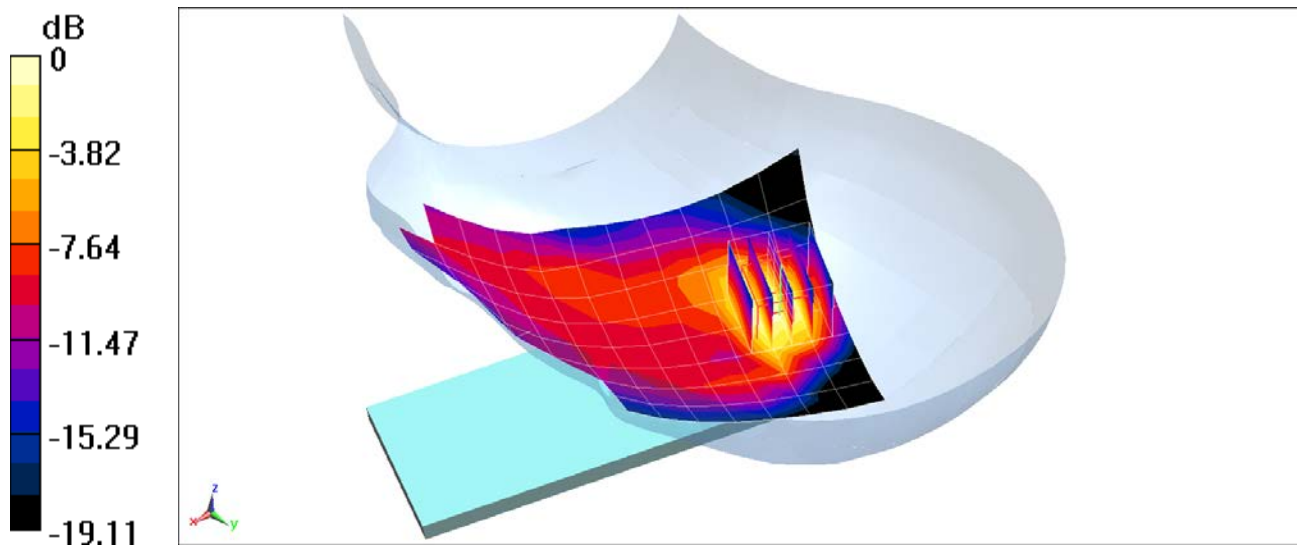
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 14.90 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.390 W/kg

SAR(1 g) = 0.220 W/kg



0 dB = 0.280 W/kg = -5.53 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04217

Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.415 \text{ S/m}$; $\epsilon_r = 39.11$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 03-02-2018; Ambient Temp: 20.8°C; Tissue Temp: 21.6°C

Probe: ES3DV3 - SN3332; ConvF(5.33, 5.33, 5.33); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1900, Left Head, Cheek, Mid.ch

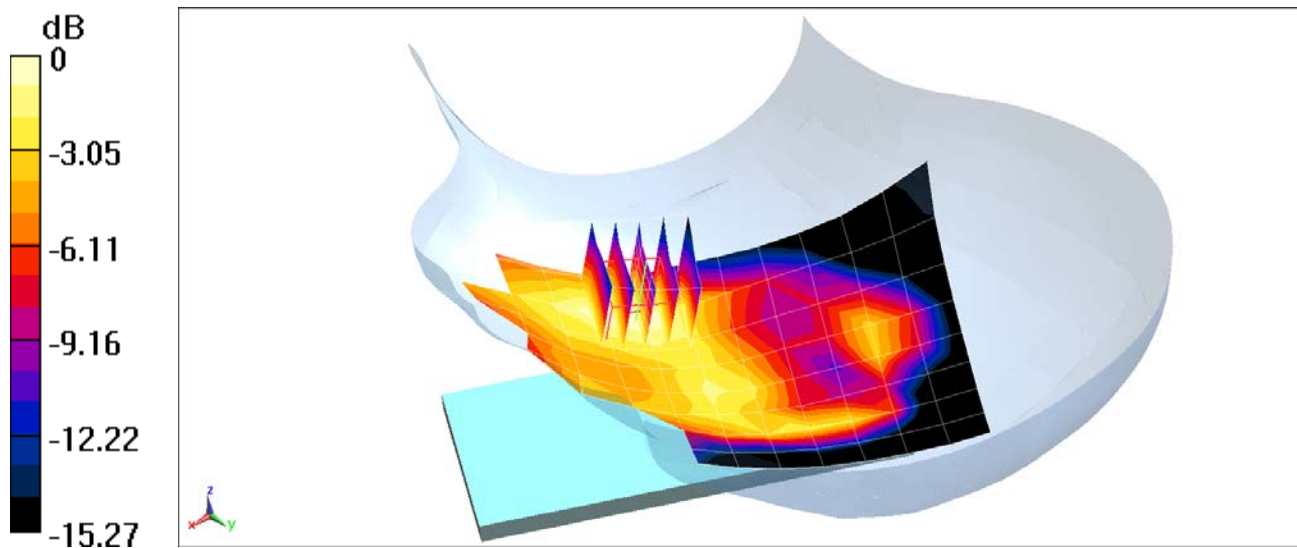
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.30 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 0.262 W/kg

SAR(1 g) = 0.163 W/kg



0 dB = 0.189 W/kg = -7.24 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04217

Communication System: UID 0, LTE Band 71; Frequency: 680.5 MHz; Duty Cycle: 1:1

Medium: 750 Head Medium parameters used (interpolated):

$f = 680.5 \text{ MHz}$; $\sigma = 0.869 \text{ S/m}$; $\epsilon_r = 40.968$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 03-11-2018; Ambient Temp: 21.0°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3213; ConvF(6.75, 6.75, 6.75); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 71, Right Head, Cheek, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

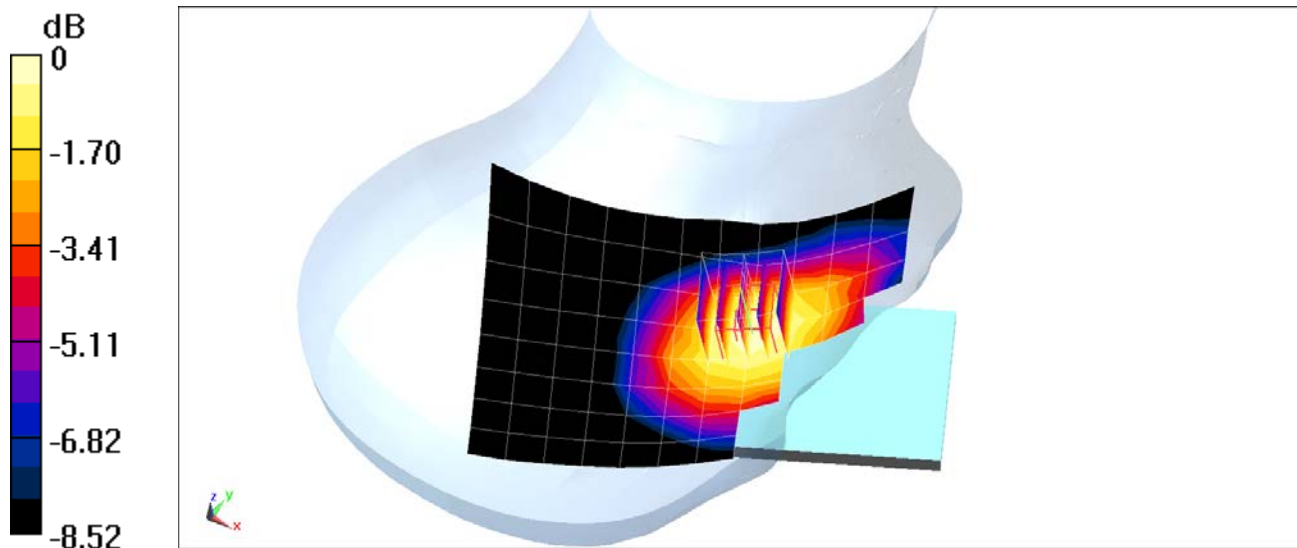
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.903 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.0930 W/kg

SAR(1 g) = 0.073 W/kg



0 dB = 0.0800 W/kg = -10.97 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04217

Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 750 Head Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.877 \text{ S/m}$; $\epsilon_r = 40.886$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 03-11-2018; Ambient Temp: 21.0°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3213; ConvF(6.75, 6.75, 6.75); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 12, Right Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

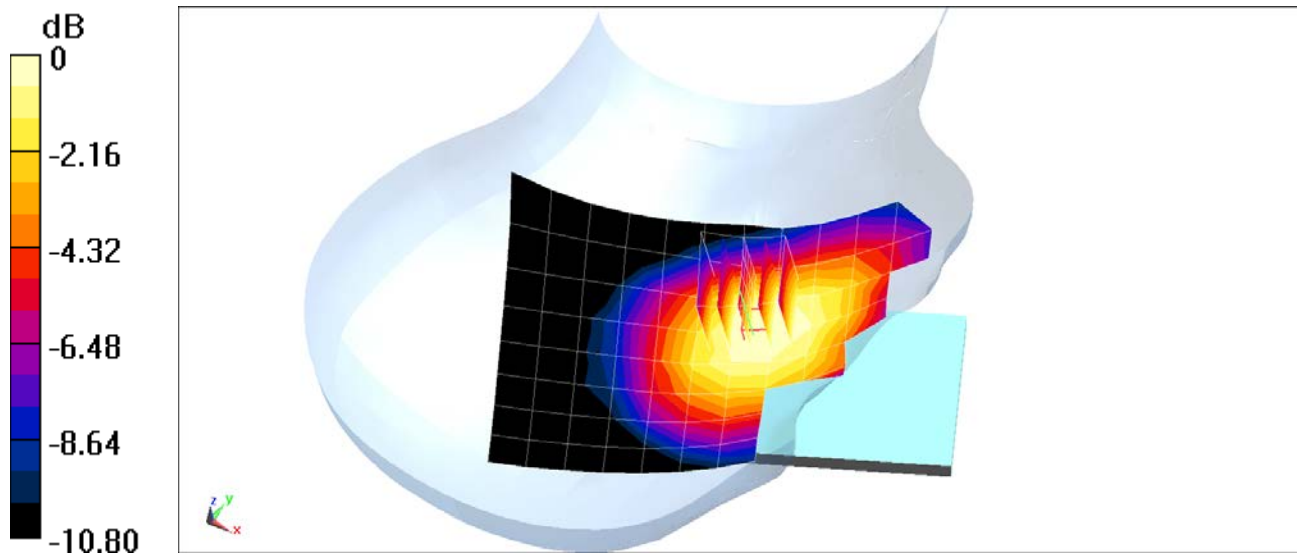
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.87 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.115 W/kg

SAR(1 g) = 0.090 W/kg



0 dB = 0.0975 W/kg = -10.11 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04225

Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 750 Head Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.903 \text{ S/m}$; $\epsilon_r = 40.697$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 03-11-2018; Ambient Temp: 21.0°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3213; ConvF(6.75, 6.75, 6.75); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 13, Right Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset**

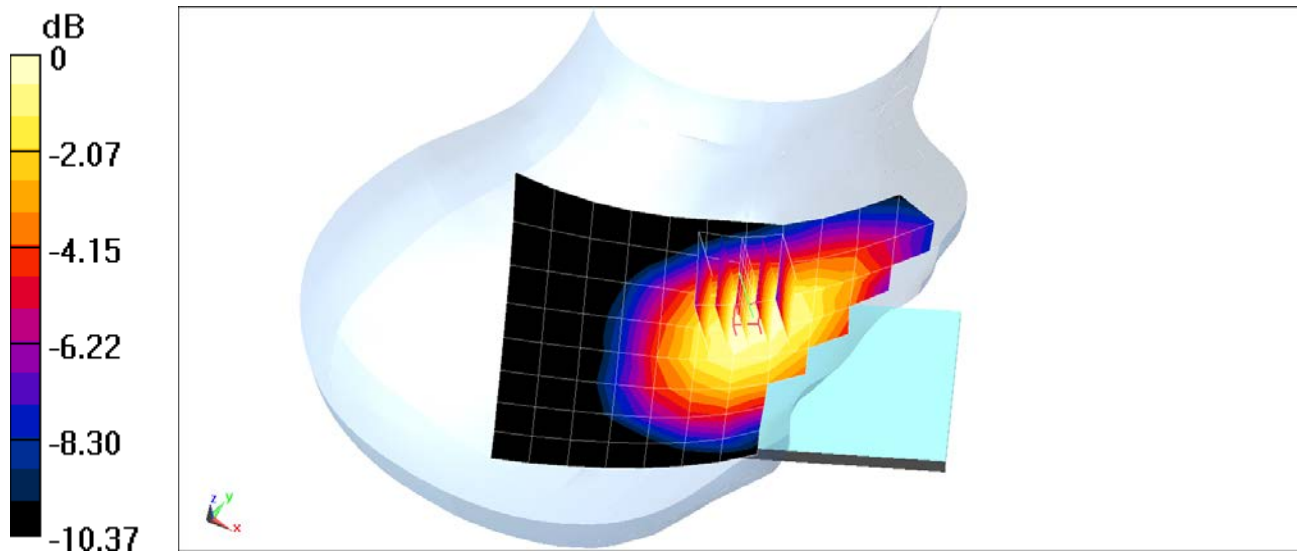
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 15.17 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.226 W/kg

SAR(1 g) = 0.178 W/kg



0 dB = 0.195 W/kg = -7.10 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04233

Communication System: UID 0, LTE Band 5 (Cell.); Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.5$ MHz; $\sigma = 0.941$ S/m; $\epsilon_r = 39.768$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Test Date: 03-13-2018; Ambient Temp: 23.4°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(6.42, 6.42, 6.42); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 5 (Cell.), Right Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

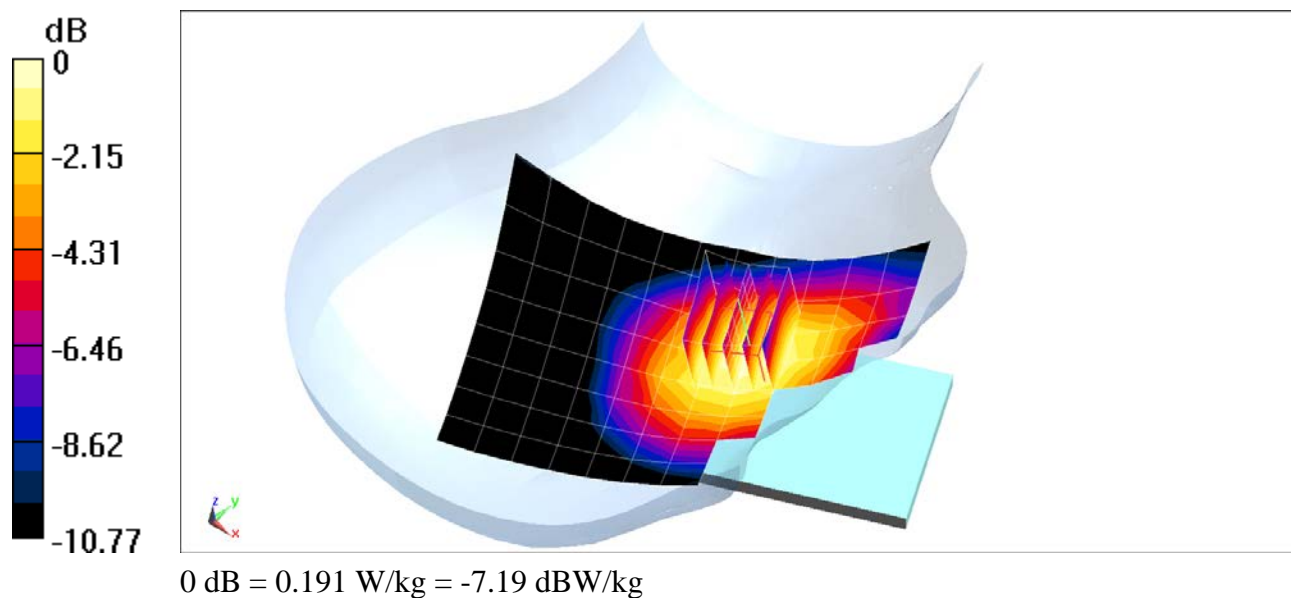
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.18 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.229 W/kg

SAR(1 g) = 0.175 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04241

Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1745 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1745 \text{ MHz}$; $\sigma = 1.392 \text{ S/m}$; $\epsilon_r = 38.438$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 03-02-2018; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3213; ConvF(5.45, 5.45, 5.45); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 66 (AWS), Left Head, Tilt, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

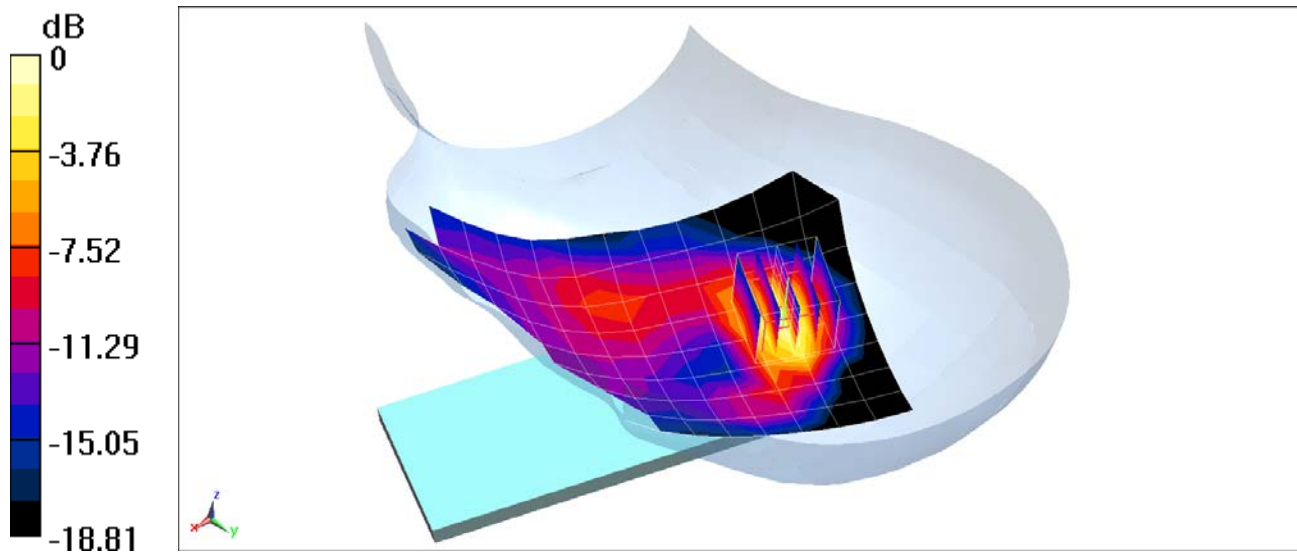
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 16.75 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.522 W/kg

SAR(1 g) = 0.289 W/kg



0 dB = 0.367 W/kg = -4.35 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04241

Communication System: UID 0, _LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1905 \text{ MHz}$; $\sigma = 1.462 \text{ S/m}$; $\epsilon_r = 40.091$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 03-05-2018; Ambient Temp: 22.8°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3332; ConvF(5.33, 5.33, 5.33); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 25 (PCS), Left Head, Cheek, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset**

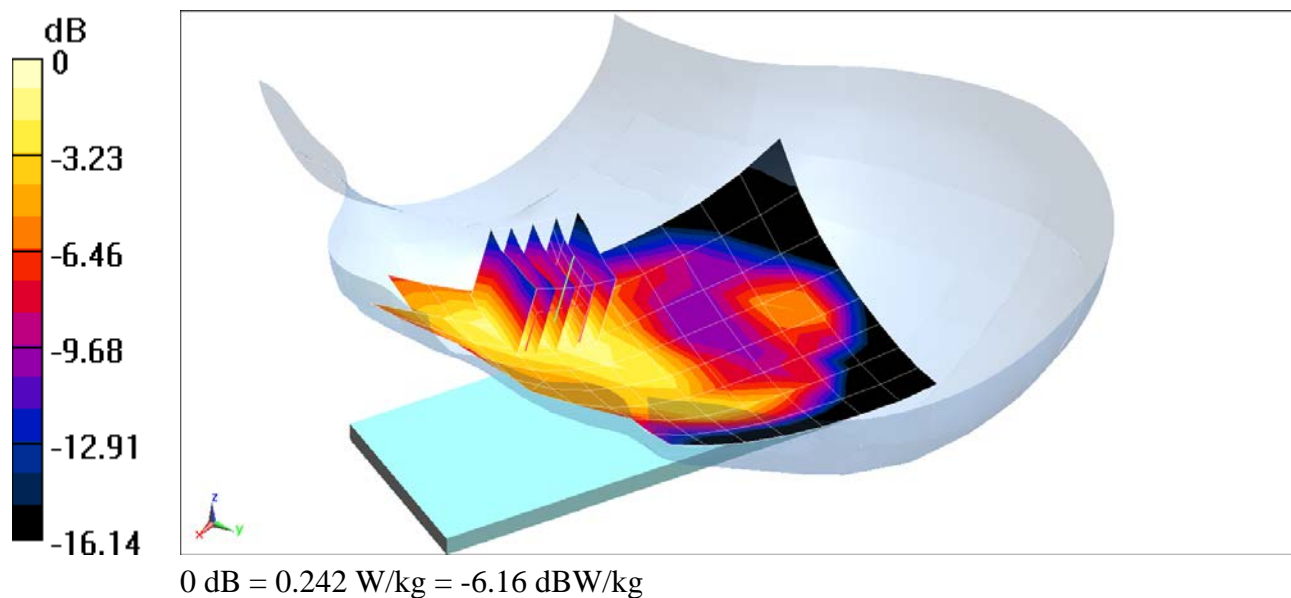
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.38 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.315 W/kg

SAR(1 g) = 0.188 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04258

Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2310 \text{ MHz}$; $\sigma = 1.686 \text{ S/m}$; $\epsilon_r = 40.54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 03-18-2018; Ambient Temp: 21.7°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3332; ConvF(4.99, 4.99, 4.99); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 30, Left Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

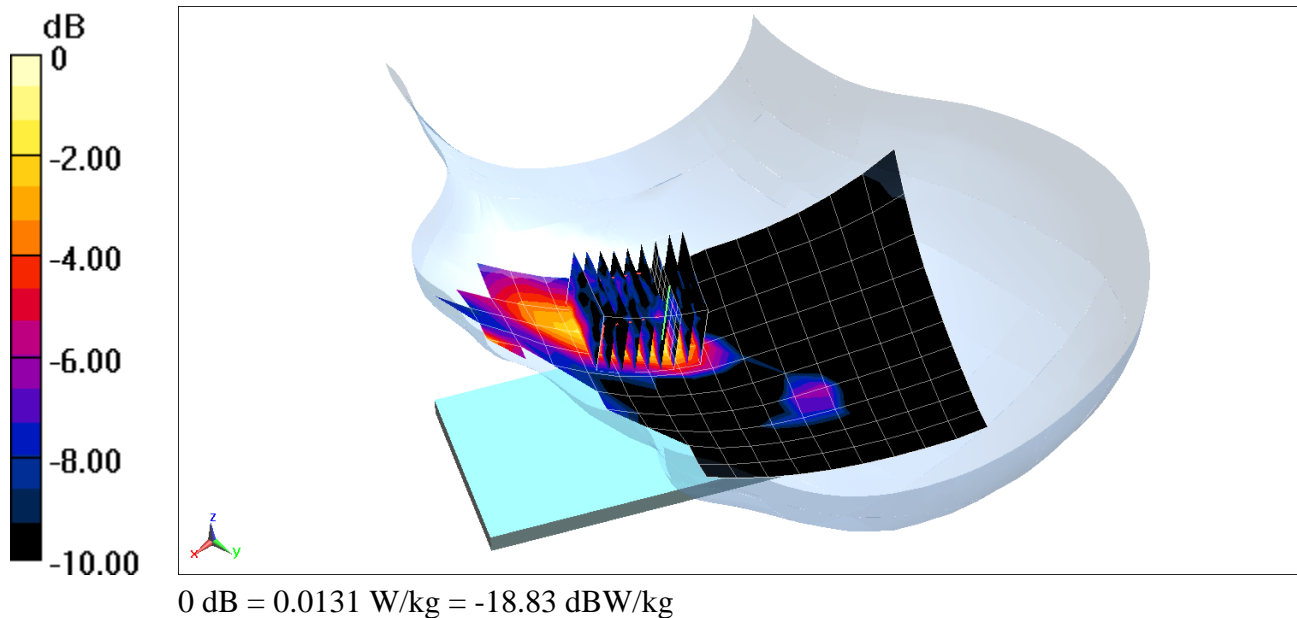
Area Scan (11x18x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (8x9x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 2.696 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.0180 W/kg

SAR(1 g) = 0.010 W/kg;



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04217

Communication System: UID 0, _LTE Band 7; Frequency: 2510 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2510 \text{ MHz}$; $\sigma = 1.946 \text{ S/m}$; $\epsilon_r = 39.44$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 03-15-2018; Ambient Temp: 22.9°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7406; ConvF(7.68, 7.68, 7.68); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 7, Left Head, Tilt, Low.ch, QPSK,
20 MHz Bandwidth, 1 RB, 0 RB Offset**

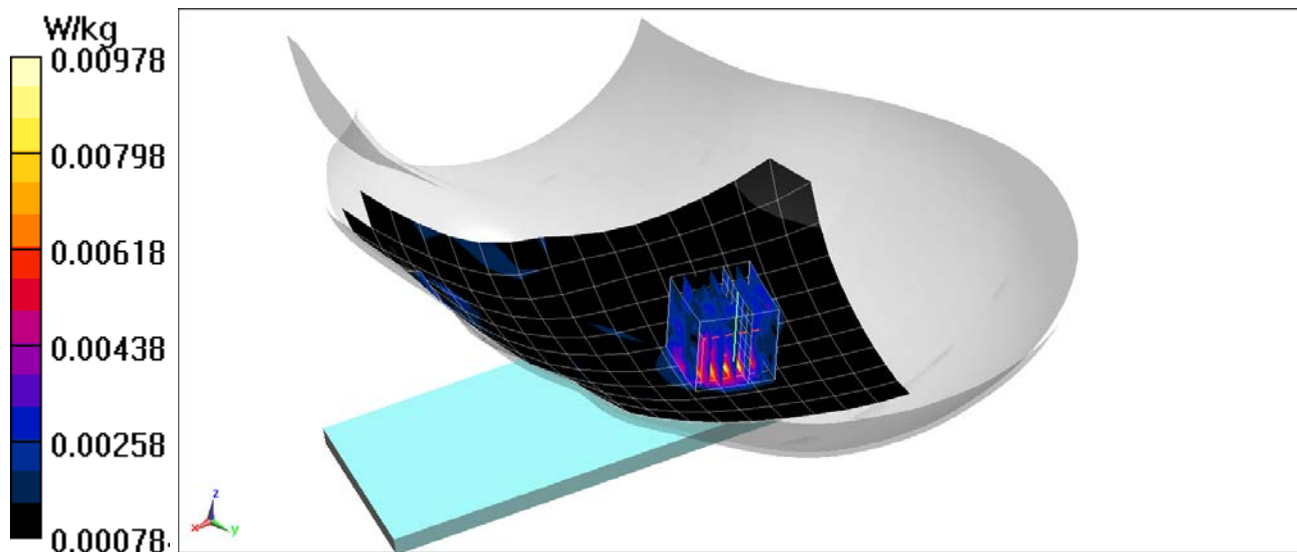
Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 2.361 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.0150 W/kg

SAR(1 g) = 0.008 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04217

Communication System: UID 0, LTE Band 41; Frequency: 2549.5 MHz; Duty Cycle: 1:1.58

Medium: 2450 Head Medium parameters used:

$f = 2550 \text{ MHz}$; $\sigma = 1.97 \text{ S/m}$; $\epsilon_r = 39.599$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 03-18-2018; Ambient Temp: 21.7°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3332; ConvF(4.56, 4.56, 4.56); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 41, Left Head, Cheek, Low-Mid.ch, QPSK,
20 MHz Bandwidth, 1 RB, 0 RB Offset**

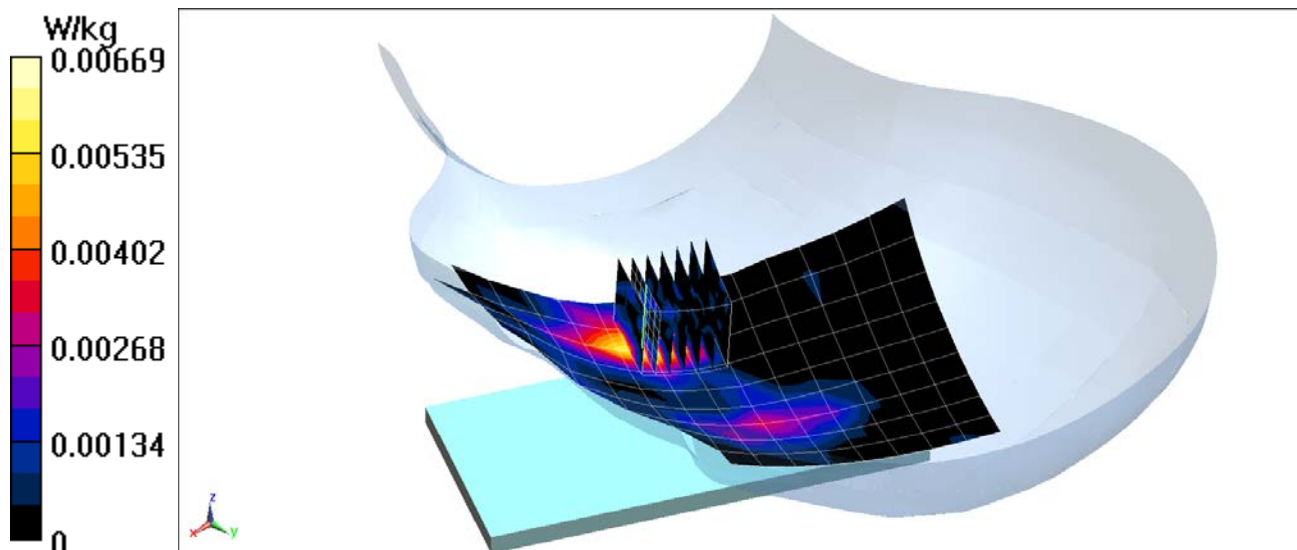
Area Scan (10x17x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 1.980 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.0210 W/kg

SAR(1 g) = 0.004 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04225

Communication System: UID 0, IEEE 802.11b; Frequency: 2412 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.825 \text{ S/m}$; $\epsilon_r = 38.161$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 03-05-2018; Ambient Temp: 22.4°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7410; ConvF(7.68, 7.68, 7.68); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: IEEE 802.11b, Antenna 1, 22 MHz Bandwidth, Right Head, Cheek, Ch 1, 1 Mbps

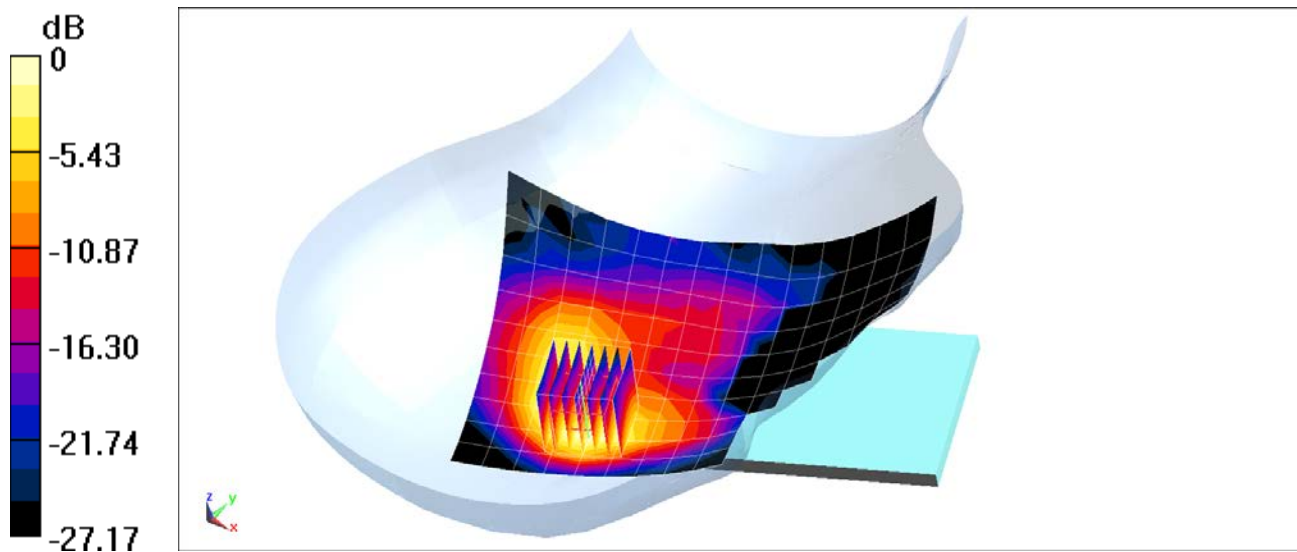
Area Scan (11x18x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 9.077 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.483 W/kg

SAR(1 g) = 0.192 W/kg



0 dB = 0.372 W/kg = -4.29 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04266

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5785 MHz; Duty Cycle: 1:1

Medium: 5GHz Head Medium parameters used:

$f = 5785 \text{ MHz}$; $\sigma = 5.14 \text{ S/m}$; $\epsilon_r = 36.404$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 03-12-2018; Ambient Temp: 21.0°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3589; ConvF(4.42, 4.42, 4.42); Calibrated: 1/16/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: IEEE 802.11a, Antenna 1, U-NII-3, 20 MHz Bandwidth,
Right Head, Tilt, Ch 157, 6 Mbps**

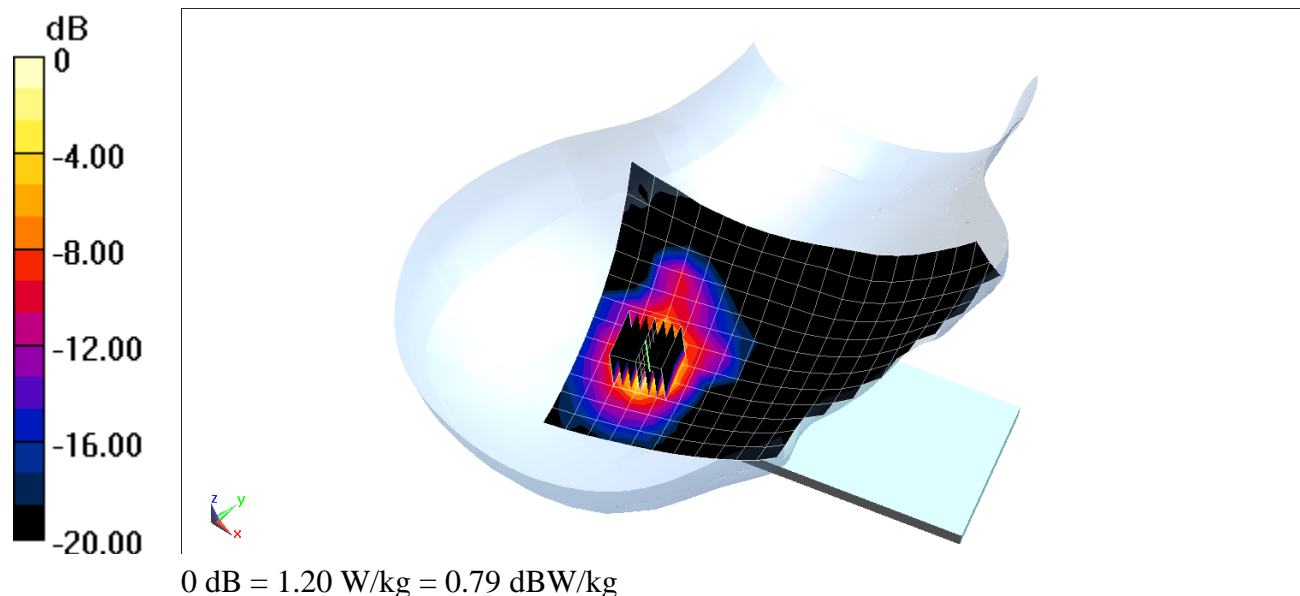
Area Scan (13x20x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 4.922 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 2.39 W/kg

SAR(1 g) = 0.478 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04217

Communication System: UID 0, Bluetooth; Frequency: 2402 MHz; Duty Cycle: 1:1.294

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2402 \text{ MHz}$; $\sigma = 1.817 \text{ S/m}$; $\epsilon_r = 39.856$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 03-15-2018; Ambient Temp: 22.9°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7406; ConvF(7.68, 7.68, 7.68); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: Bluetooth, Right Head, Cheek, Ch 0, 1 Mbps

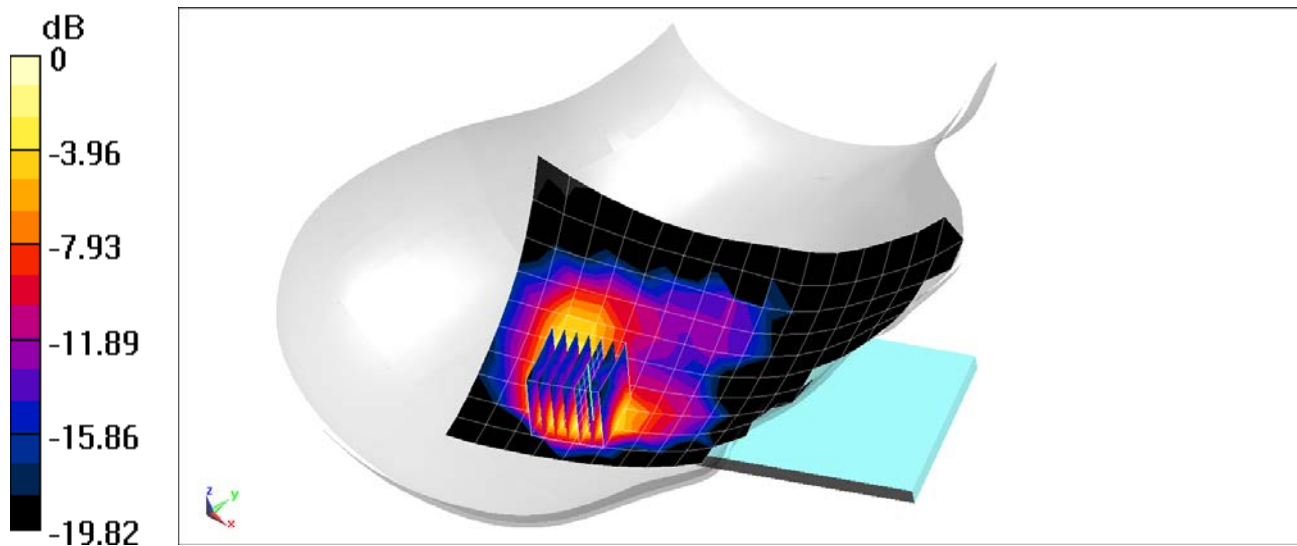
Area Scan (11x19x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 6.545 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.189 W/kg

SAR(1 g) = 0.072 W/kg



0 dB = 0.134 W/kg = -8.73 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04225

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6$ MHz; $\sigma = 0.986$ S/m; $\epsilon_r = 53.456$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-07-2018; Ambient Temp: 21.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(9.57, 9.57, 9.57); Calibrated: 2/14/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/15/2018

Phantom: Twin-SAM V5.0 Right; Type: QD 000 P40 CD; Serial: 1800

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

Mode: GPRS 850, Body SAR, Back side, Mid.ch, 2 Tx Slots

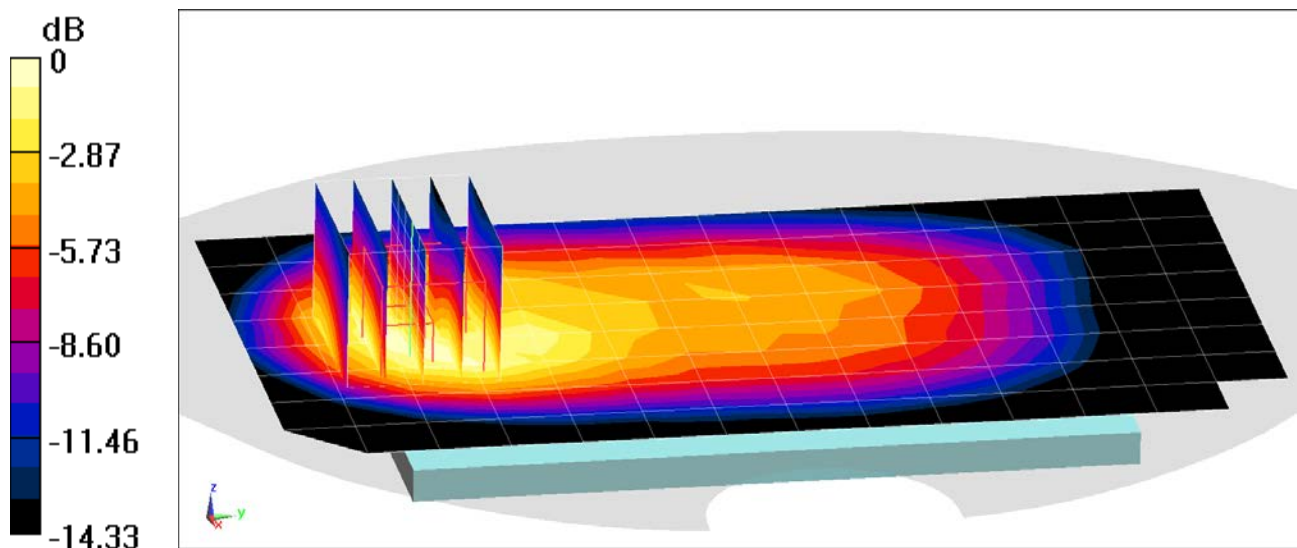
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 14.76 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.564 W/kg

SAR(1 g) = 0.320 W/kg



0 dB = 0.473 W/kg = -3.25 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04233

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.526 \text{ S/m}$; $\epsilon_r = 51.846$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-09-2018; Ambient Temp: 22.8°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(7.98, 7.98, 7.98); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: GPRS 1900, Body SAR, Back side, Mid.ch, 2 Tx Slots

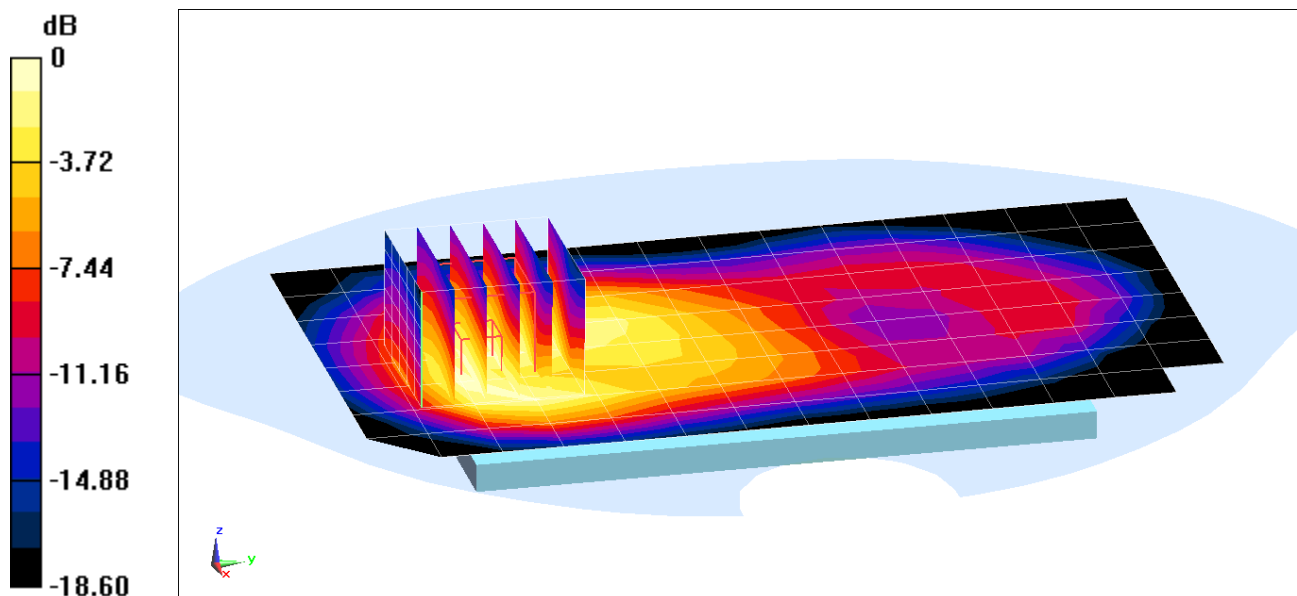
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 13.34 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.398 W/kg

SAR(1 g) = 0.244 W/kg



0 dB = 0.344 W/kg = -4.64 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04233

Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:4.15

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.526 \text{ S/m}$; $\epsilon_r = 51.846$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-09-2018; Ambient Temp: 22.8°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(7.98, 7.98, 7.98); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

Mode: GPRS 1900, Body SAR, Bottom Edge, Mid.ch, 2 Tx Slots

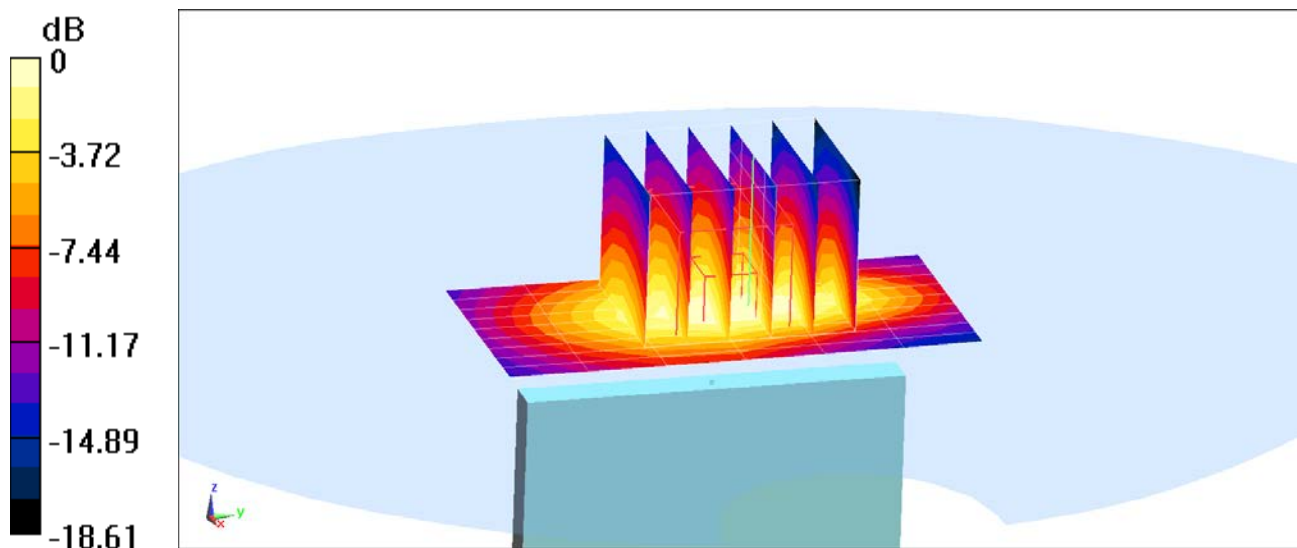
Area Scan (10x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 16.49 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.631 W/kg

SAR(1 g) = 0.379 W/kg



0 dB = 0.541 W/kg = -2.67 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04225

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.986 \text{ S/m}$; $\epsilon_r = 53.456$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-07-2018; Ambient Temp: 21.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(9.57, 9.57, 9.57); Calibrated: 2/14/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/15/2018

Phantom: Twin-SAM V5.0 Right; Type: QD 000 P40 CD; Serial: 1800

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 850, Body SAR, Back side, Mid.ch

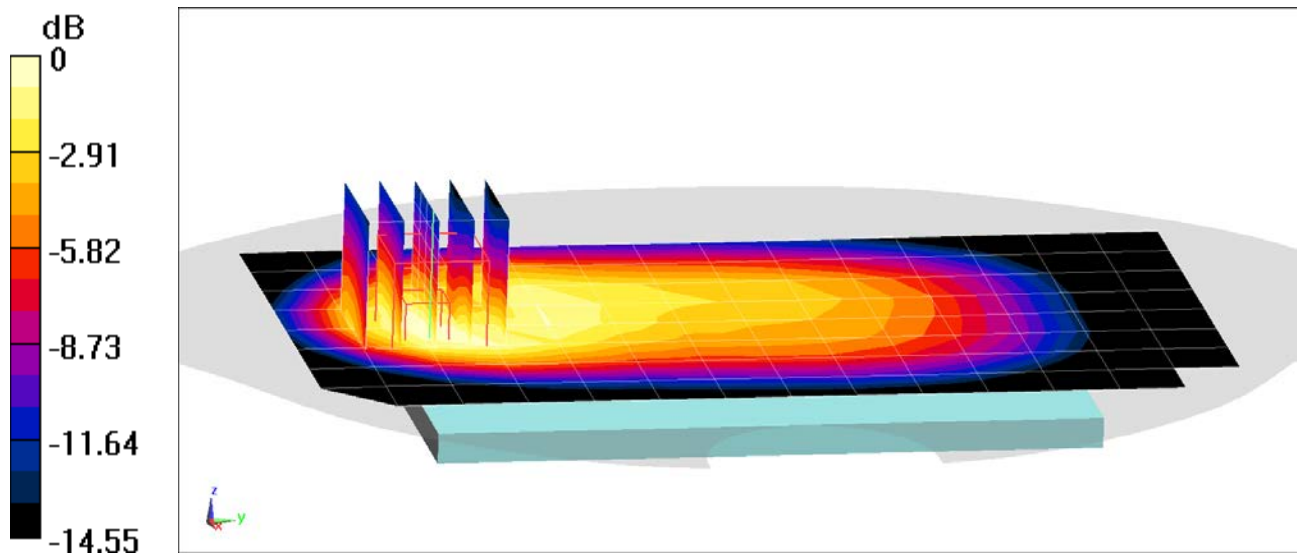
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.44 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.779 W/kg

SAR(1 g) = 0.435 W/kg



0 dB = 0.634 W/kg = -1.98 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04225

Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.4 \text{ MHz}$; $\sigma = 1.48 \text{ S/m}$; $\epsilon_r = 53.268$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2018; Ambient Temp: 21.5°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN3914; ConvF(7.91, 7.91, 7.91); Calibrated: 2/14/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/15/2018

Phantom: Twin-SAM V5.0 Right; Type: QD 000 P40 CD; Serial: 1800

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1750, Body SAR, Back side, Mid.ch

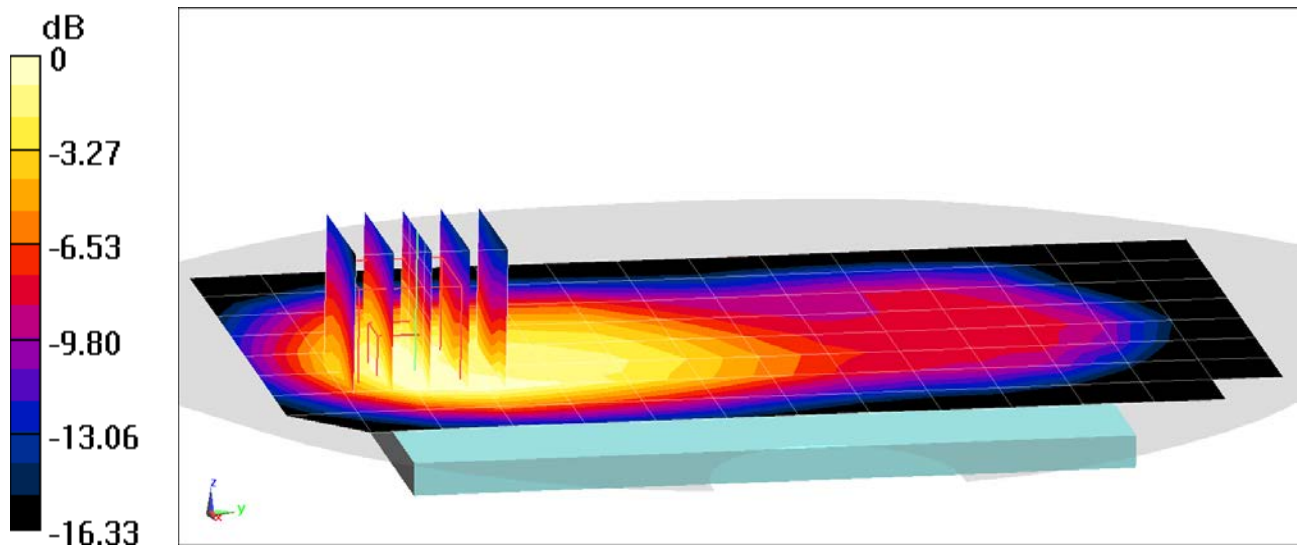
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.92 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.672 W/kg



0 dB = 0.914 W/kg = -0.39 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04225

Communication System: UID 0, UMTS; Frequency: 1752.6 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1752.6$ MHz; $\sigma = 1.502$ S/m; $\epsilon_r = 53.178$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2018; Ambient Temp: 21.5°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN3914; ConvF(7.91, 7.91, 7.91); Calibrated: 2/14/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/15/2018

Phantom: Twin-SAM V5.0 Right; Type: QD 000 P40 CD; Serial: 1800

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1750, Body SAR, Bottom Edge, High.ch

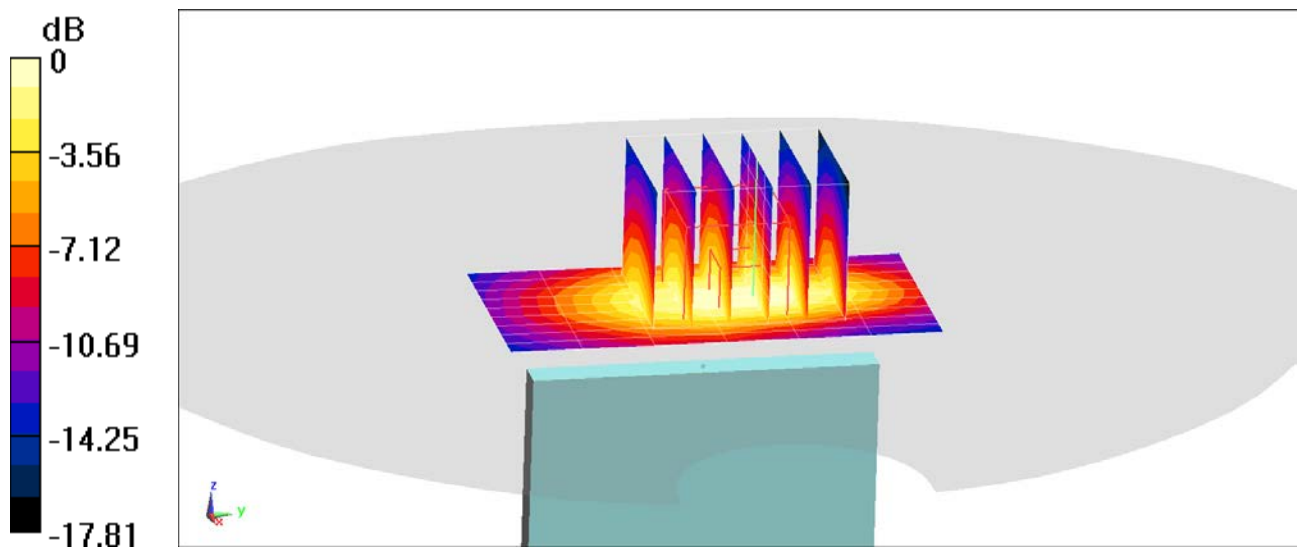
Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.54 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.40 W/kg

SAR(1 g) = 0.847 W/kg



0 dB = 1.22 W/kg = 0.86 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04258

Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.526 \text{ S/m}$; $\epsilon_r = 51.846$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-09-2018; Ambient Temp: 22.8°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(7.98, 7.98, 7.98); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1900, Body SAR, Back side, Mid.ch

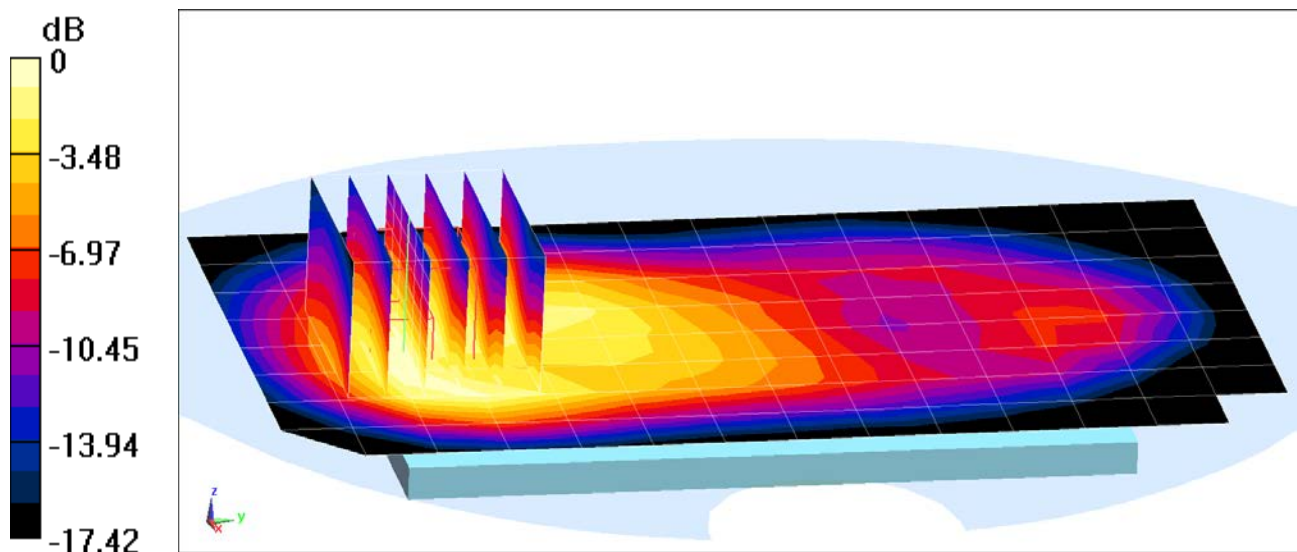
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (7x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 19.23 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.848 W/kg

SAR(1 g) = 0.521 W/kg



0 dB = 0.743 W/kg = -1.29 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04258

Communication System: UID 0, _UMTS; Frequency: 1852.4 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1852.4 \text{ MHz}$; $\sigma = 1.496 \text{ S/m}$; $\epsilon_r = 51.944$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-09-2018; Ambient Temp: 22.8°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(7.98, 7.98, 7.98); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1900, Body SAR, Bottom Edge, Low.ch

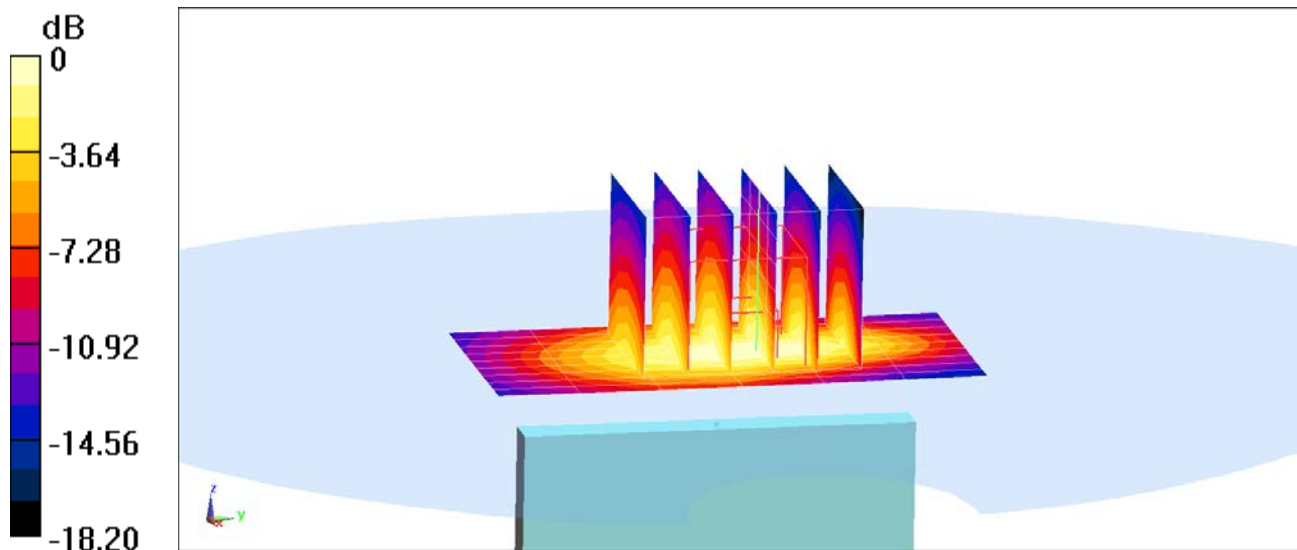
Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm

Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.06 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 0.985 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04258

Communication System: UID 0, LTE Band 71; Frequency: 680.5 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 680.5 \text{ MHz}$; $\sigma = 0.948 \text{ S/m}$; $\epsilon_r = 53.354$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-14-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(9.9, 9.9, 9.9); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 71, Body SAR, Back side, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

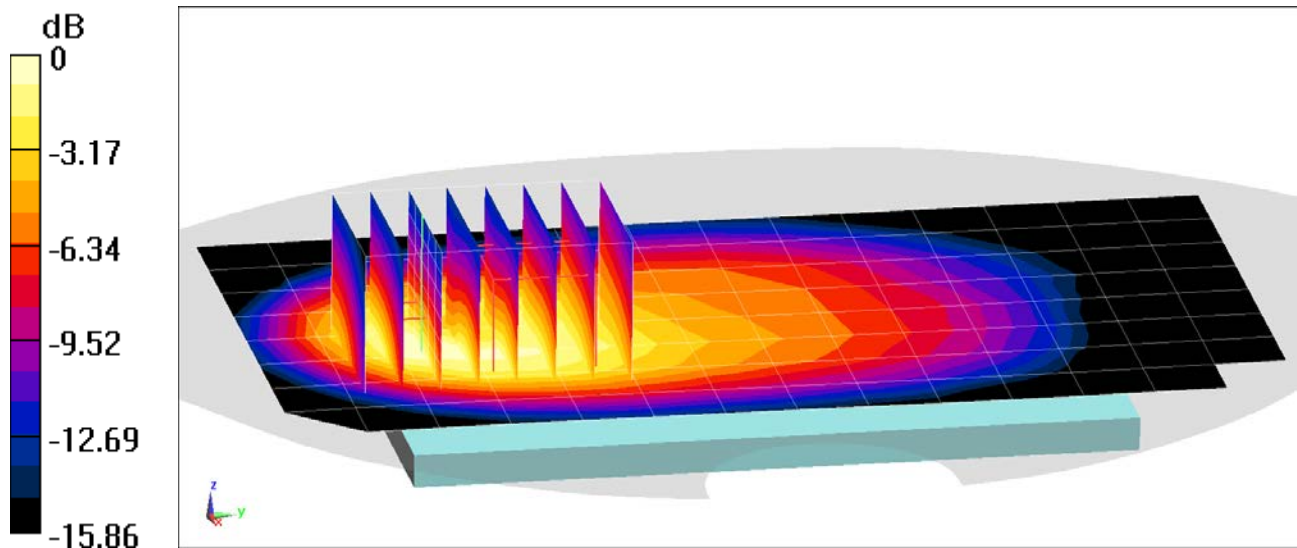
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (6x8x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.74 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.479 W/kg

SAR(1 g) = 0.243 W/kg



0 dB = 0.390 W/kg = -4.09 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04241

Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.963 \text{ S/m}$; $\epsilon_r = 56.202$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.9°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(9.9, 9.9, 9.9); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 12, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

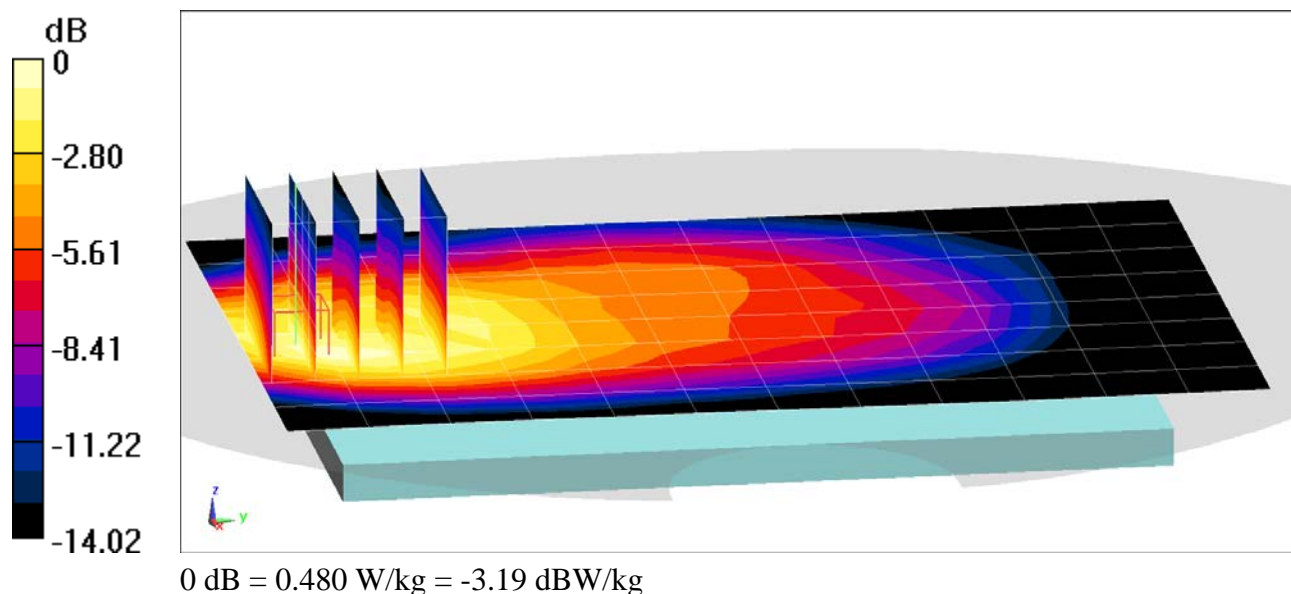
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.11 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.588 W/kg

SAR(1 g) = 0.307 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04241

Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.99 \text{ S/m}$; $\epsilon_r = 56.002$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.9°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(9.9, 9.9, 9.9); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 13, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 25 RB Offset**

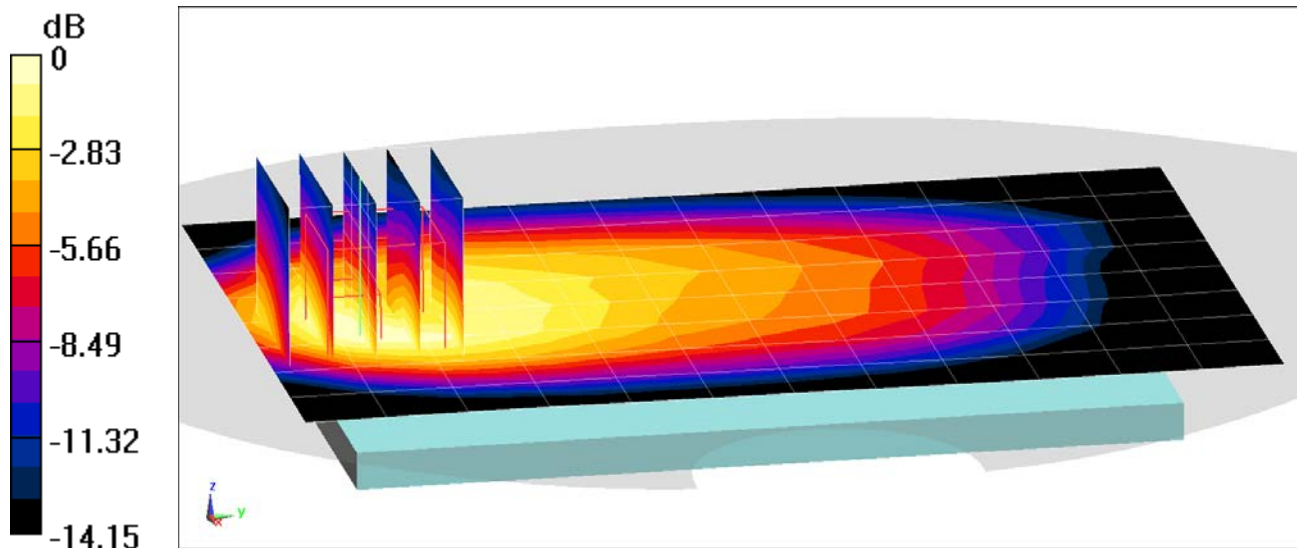
Area Scan (9x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 23.09 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.868 W/kg

SAR(1 g) = 0.484 W/kg



0 dB = 0.724 W/kg = -1.40 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04241

Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.5$ MHz; $\sigma = 0.975$ S/m; $\epsilon_r = 52.647$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-19-2018; Ambient Temp: 23.7°C; Tissue Temp: 20.9°C

Probe: ES3DV3 - SN3213; ConvF(6.2, 6.2, 6.2); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 5 (Cell.), Body SAR, Back side, Mid.ch, 10 MHz Bandwidth,
QPSK, 1 RB, 0 RB Offset**

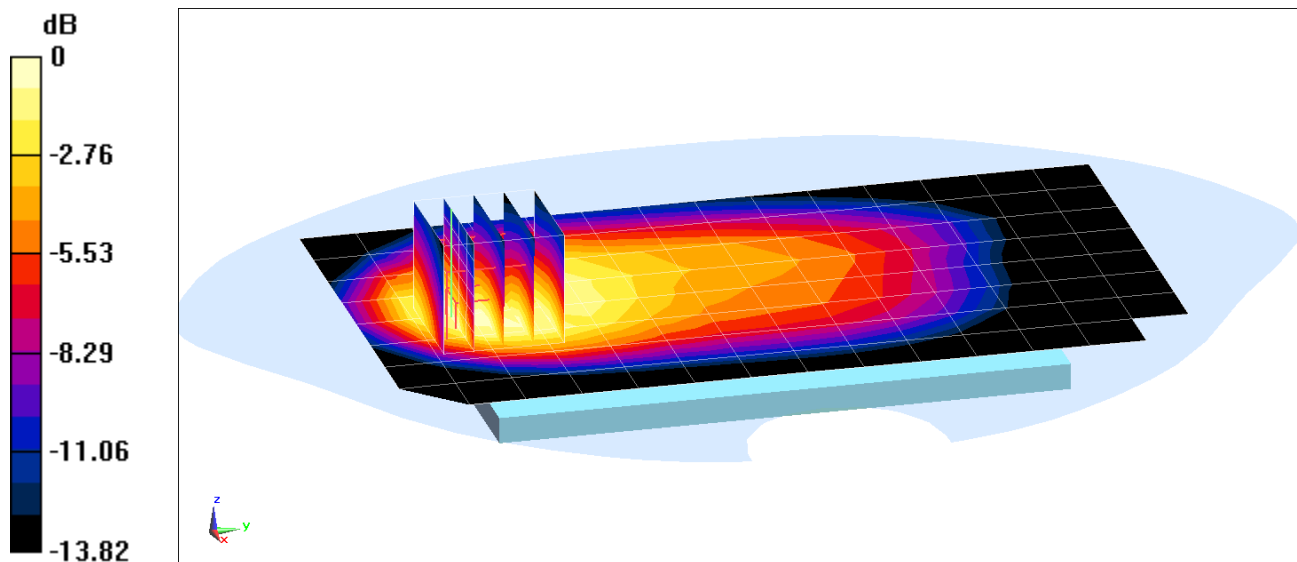
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.57 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.713 W/kg

SAR(1 g) = 0.417 W/kg



0 dB = 0.495 W/kg = -3.05 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04217

Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1745 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1745 \text{ MHz}$; $\sigma = 1.46 \text{ S/m}$; $\epsilon_r = 52.352$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-07-2018; Ambient Temp: 22.2°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7406; ConvF(8.08, 8.08, 8.08); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 66 (AWS), Body SAR, Back side, Mid.ch, 20 MHz Bandwidth,
QPSK, 1 RB, 0 RB Offset**

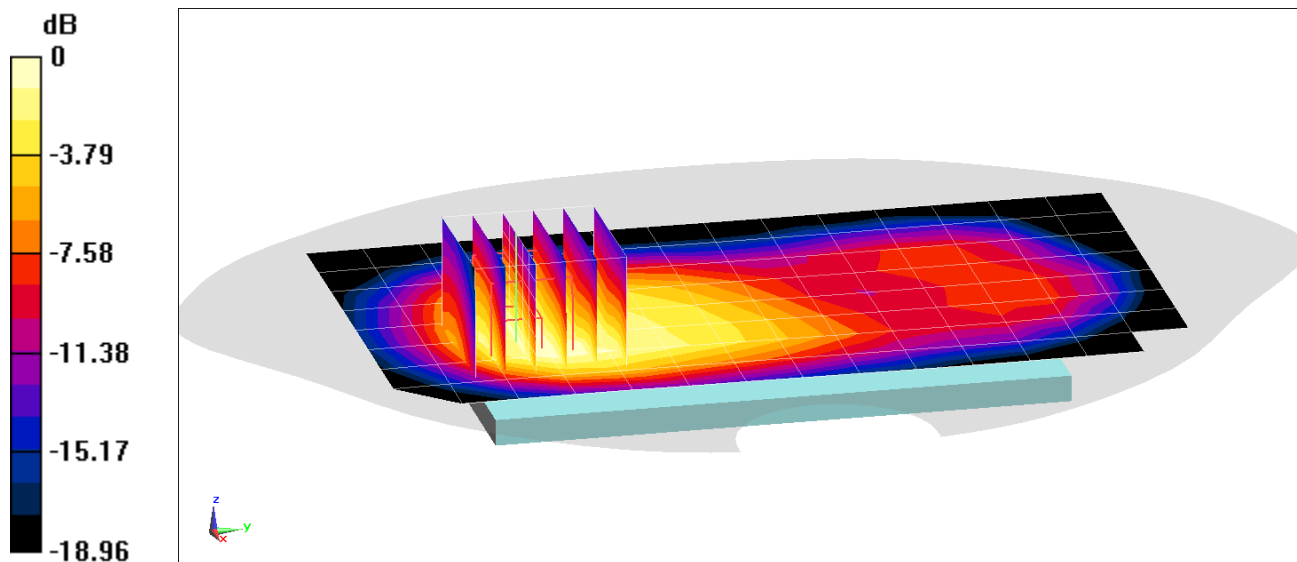
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (6x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.16 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.16 W/kg

SAR(1 g) = 0.697 W/kg



0 dB = 1.00 W/kg = 0.00 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04217

Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1720 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1720 \text{ MHz}$; $\sigma = 1.434 \text{ S/m}$; $\epsilon_r = 52.439$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-07-2018; Ambient Temp: 22.2°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7406; ConvF(8.08, 8.08, 8.08); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 66 (AWS), Body SAR, Bottom Edge, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

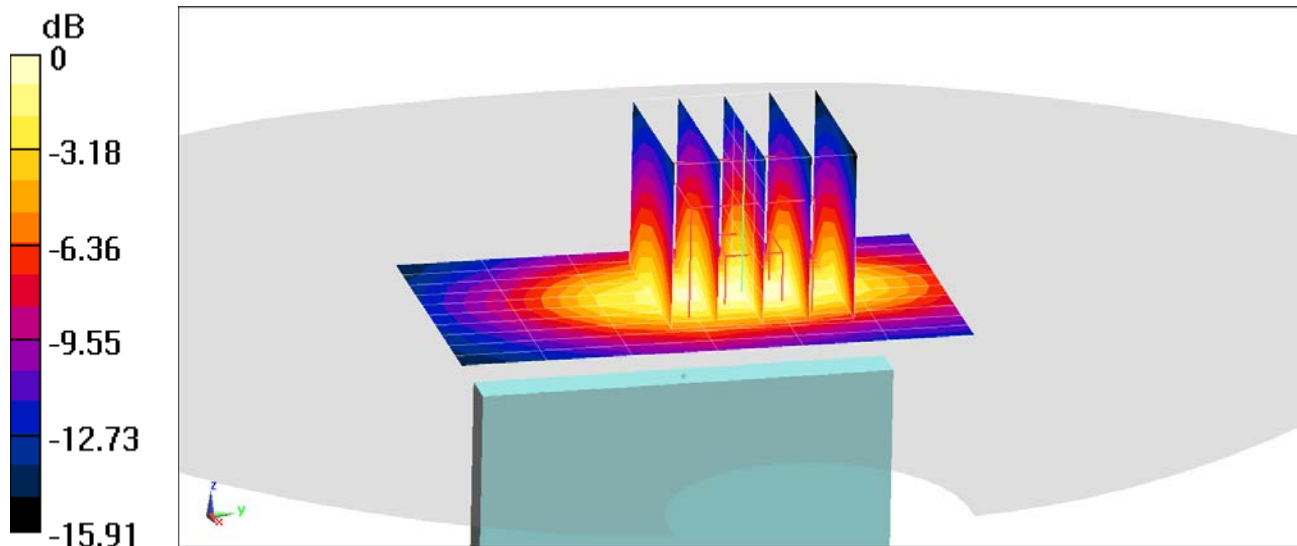
Area Scan (11x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 26.73 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.59 W/kg

SAR(1 g) = 0.930 W/kg



0 dB = 1.34 W/kg = 1.27 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04217

Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1905 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1905 \text{ MHz}$; $\sigma = 1.571 \text{ S/m}$; $\epsilon_r = 52.109$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-07-2018; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7410; ConvF(7.98, 7.98, 7.98); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 25 (PCS), Body SAR, Back side, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset**

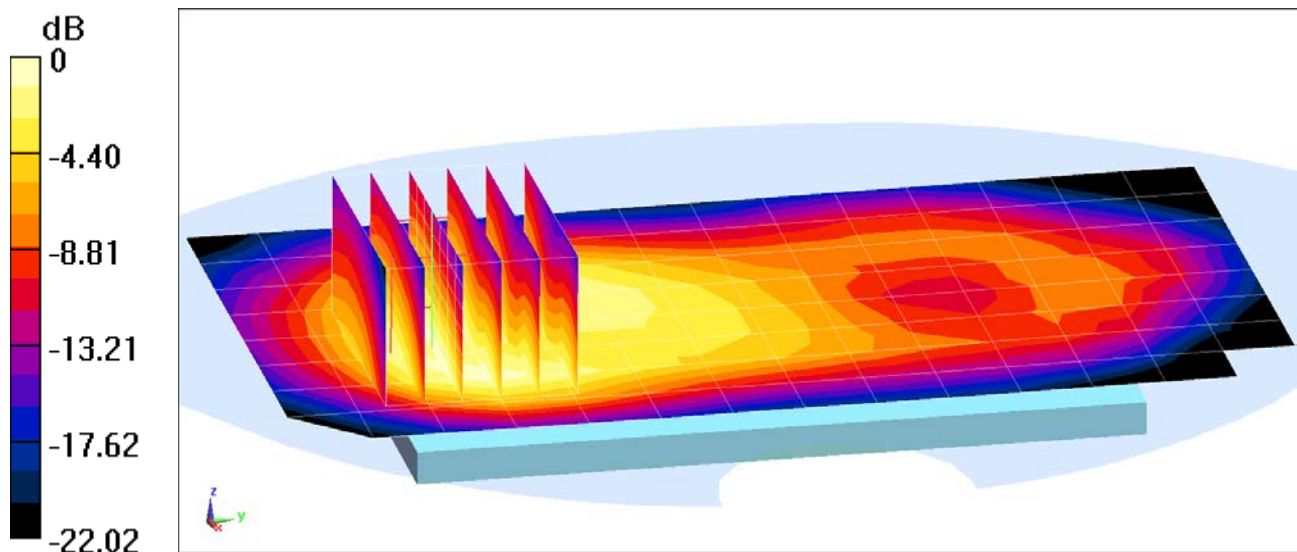
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (8x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.93 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.839 W/kg

SAR(1 g) = 0.523 W/kg



0 dB = 0.738 W/kg = -1.32 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04217

Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1882.5 \text{ MHz}$; $\sigma = 1.545 \text{ S/m}$; $\epsilon_r = 52.152$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-07-2018; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7410; ConvF(7.98, 7.98, 7.98); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 25 (PCS), Body SAR, Bottom Edge, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

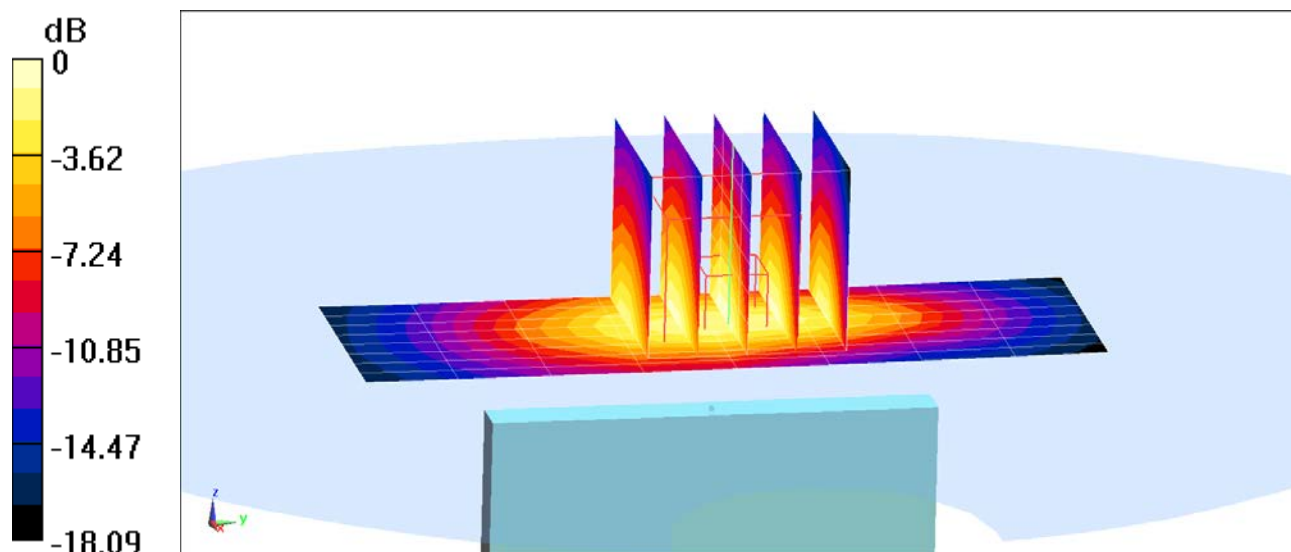
Area Scan (9x9x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 27.65 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.83 W/kg

SAR(1 g) = 1.13 W/kg



0 dB = 1.47 W/kg = 1.67 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04258

Communication System: UID 0, LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2310 \text{ MHz}$; $\sigma = 1.859 \text{ S/m}$; $\epsilon_r = 51.236$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.0°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3332; ConvF(4.74, 4.74, 4.74); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 30, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

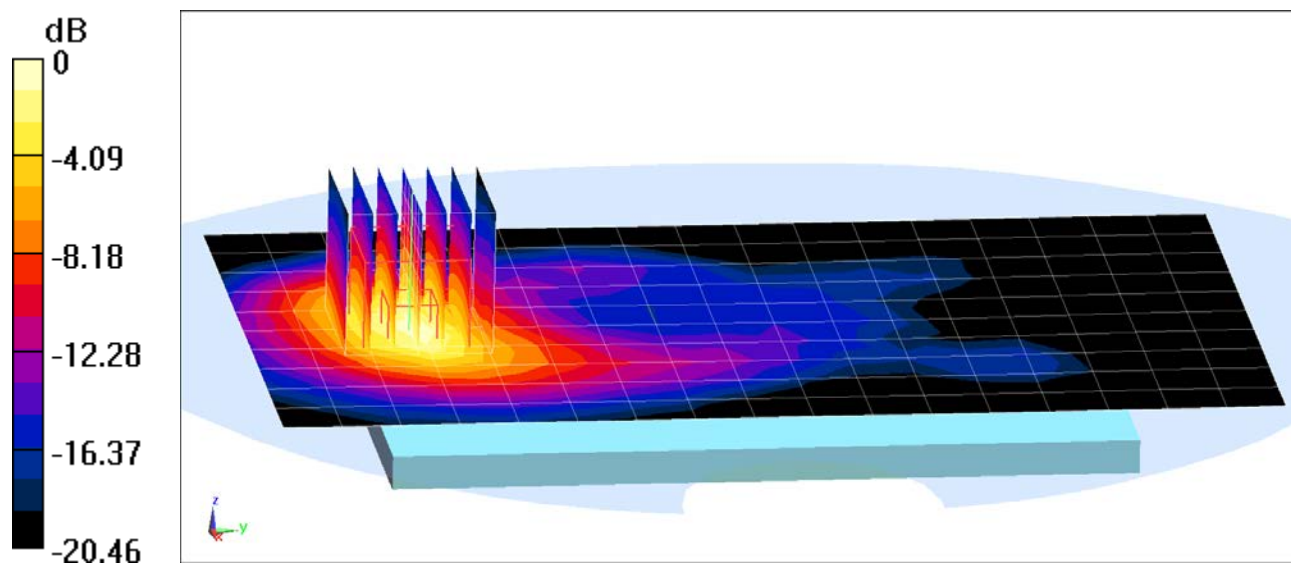
Area Scan (11x18x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 15.86 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.731 W/kg

SAR(1 g) = 0.385 W/kg



0 dB = 0.504 W/kg = -2.98 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04258

Communication System: UID 0, LTE Band 7; Frequency: 2510 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2510 \text{ MHz}$; $\sigma = 2.083 \text{ S/m}$; $\epsilon_r = 50.713$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.0°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3332; ConvF(4.55, 4.55, 4.55); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 7, Body SAR, Back side, Low.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

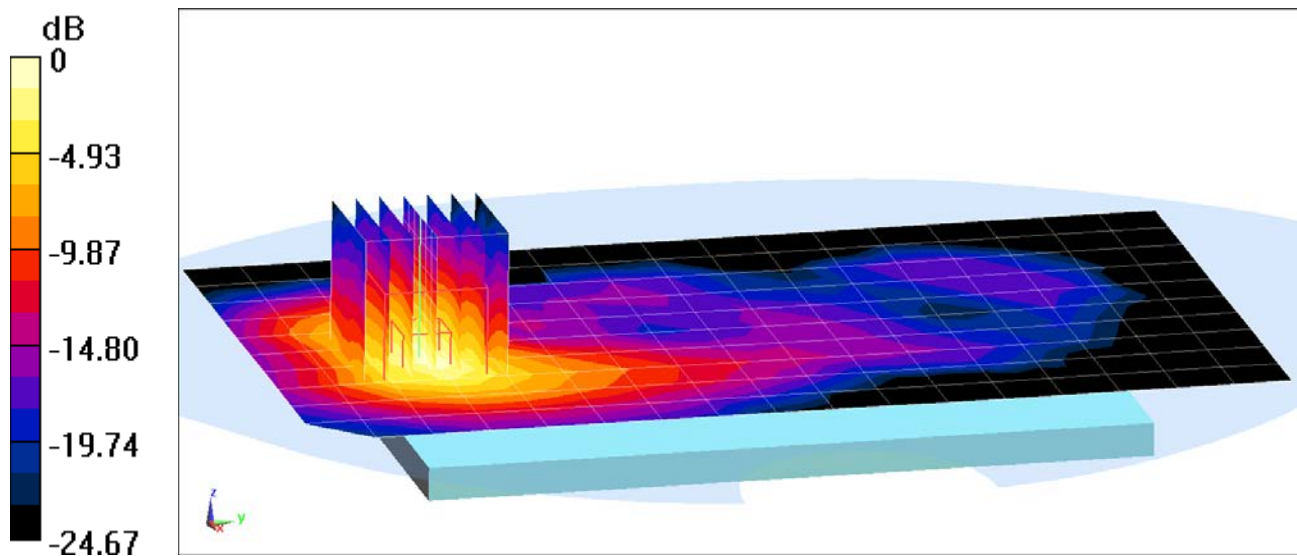
Area Scan (11x18x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 12.30 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.574 W/kg

SAR(1 g) = 0.261 W/kg



0 dB = 0.353 W/kg = -4.52 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04258

Communication System: UID 0, LTE Band 41; Frequency: 2549.5 MHz; Duty Cycle: 1:1.58

Medium: 2450 Body Medium parameters used:

$f = 2550 \text{ MHz}$; $\sigma = 2.135 \text{ S/m}$; $\epsilon_r = 50.604$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.0°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3332; ConvF(4.43, 4.43, 4.43); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 41, Body SAR, Back side, Low-Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

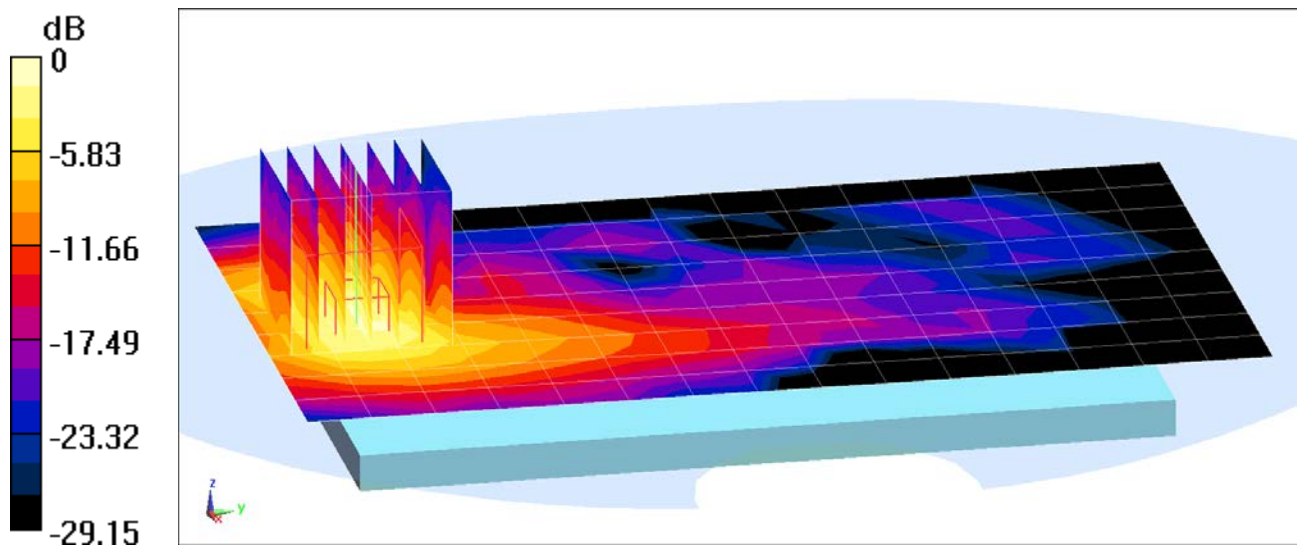
Area Scan (10x16x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 9.879 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.405 W/kg

SAR(1 g) = 0.171 W/kg



0 dB = 0.240 W/kg = -6.20 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04233

Communication System: UID 0, _IEEE 802.11b (0); Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 2.018 \text{ S/m}$; $\epsilon_r = 50.811$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 03-04-2018; Ambient Temp: 22.70°C; Tissue Temp: 21.90°C

Probe: EX3DV4 - SN7406; ConvF(7.6, 7.6, 7.6); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797

Measurement SW: DASY52, Version 52.10 (0);SEMCAD X Version 14.6.10 (7417)

Mode: IEEE 802.11b, Antenna 2, 22 MHz Bandwidth, Body SAR, Ch 11, 1 Mbps, Back Side

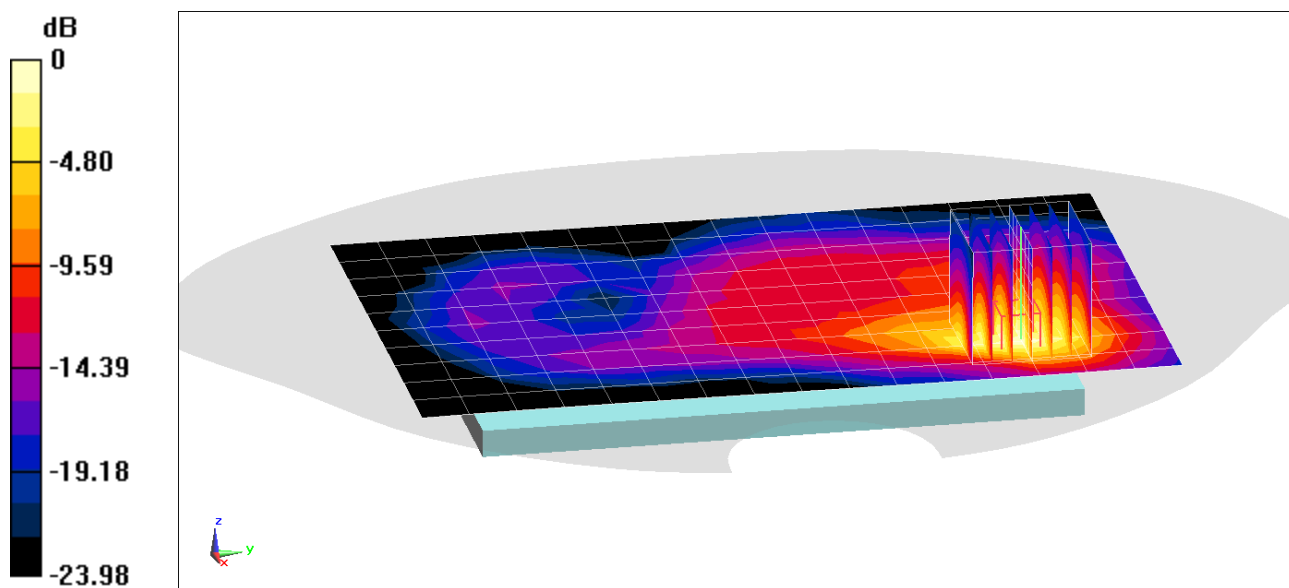
Area Scan (11x17x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 18.39 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.574 W/kg



0 dB = 0.999 W/kg = -0.00 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04225

Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5280 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5280 \text{ MHz}$; $\sigma = 5.537 \text{ S/m}$; $\epsilon_r = 47.661$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-11-2018; Ambient Temp: 20.5°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7308; ConvF(4.84, 4.84, 4.84); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: IEEE 802.11n, MIMO, UNII-2A, 20 MHz Bandwidth, Body SAR,
Ch 56, 13 Mbps, Back Side**

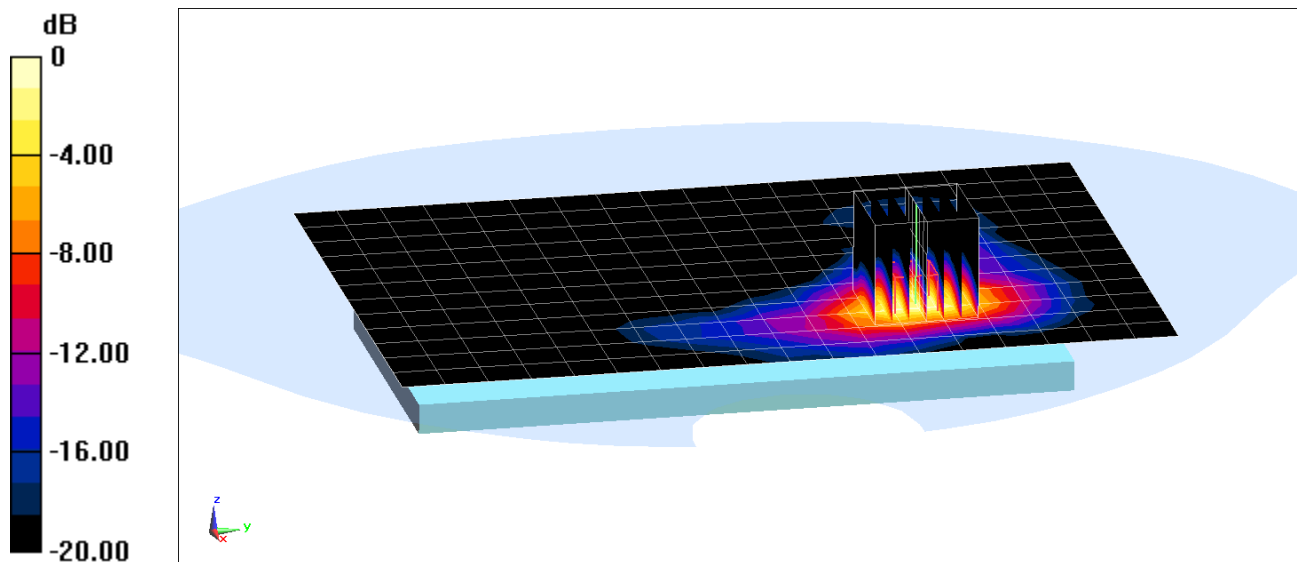
Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 12.74 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 3.70 W/kg

SAR(1 g) = 0.810 W/kg



0 dB = 2.06 W/kg = 3.14 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04225

Communication System: UID 0, 802.11n 5.2-5.8 GHz Band;

Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 5.445 \text{ S/m}$; $\epsilon_r = 47.813$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-11-2018; Ambient Temp: 20.5°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7308; ConvF(4.84, 4.84, 4.84); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: IEEE 802.11n, MIMO, UNII-1, 20 MHz Bandwidth,
Body SAR, Ch 40, 13 Mbps, Back Side**

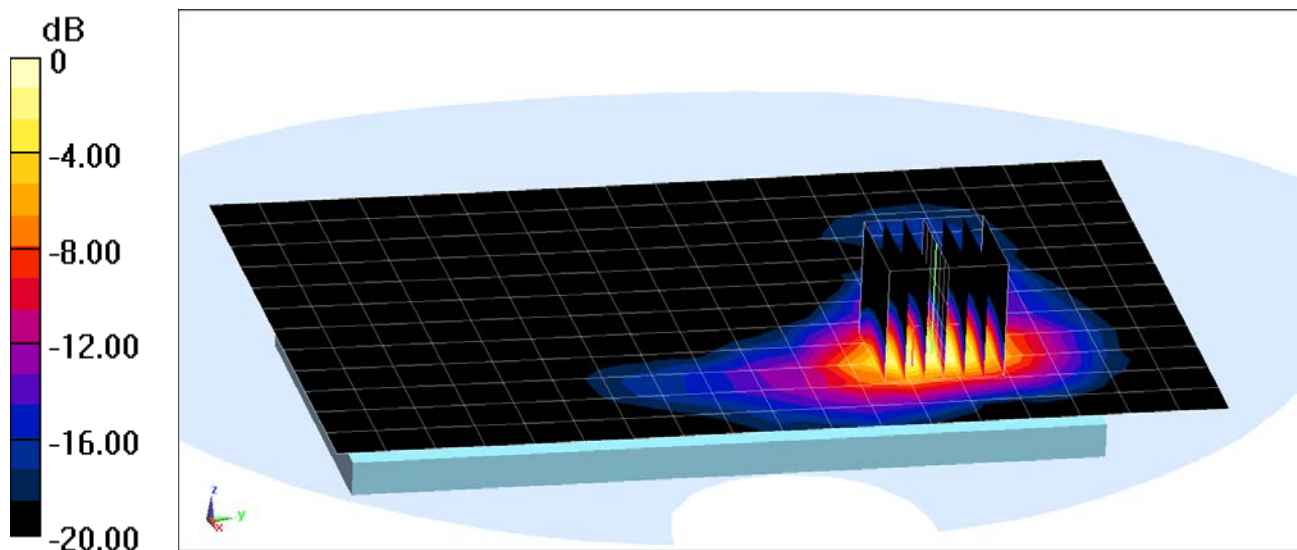
Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 13.42 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 3.68 W/kg

SAR(1 g) = 0.843 W/kg



0 dB = 2.13 W/kg = 3.28 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04266

Communication System: UID 0, Bluetooth; Frequency: 2402 MHz; Duty Cycle: 1:1.294

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2402 \text{ MHz}$; $\sigma = 1.96 \text{ S/m}$; $\epsilon_r = 52.011$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-15-2018; Ambient Temp: 22.6°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3332; ConvF(4.55, 4.55, 4.55); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

Mode: Bluetooth, Body SAR, Ch 0, 1 Mbps, Back Side

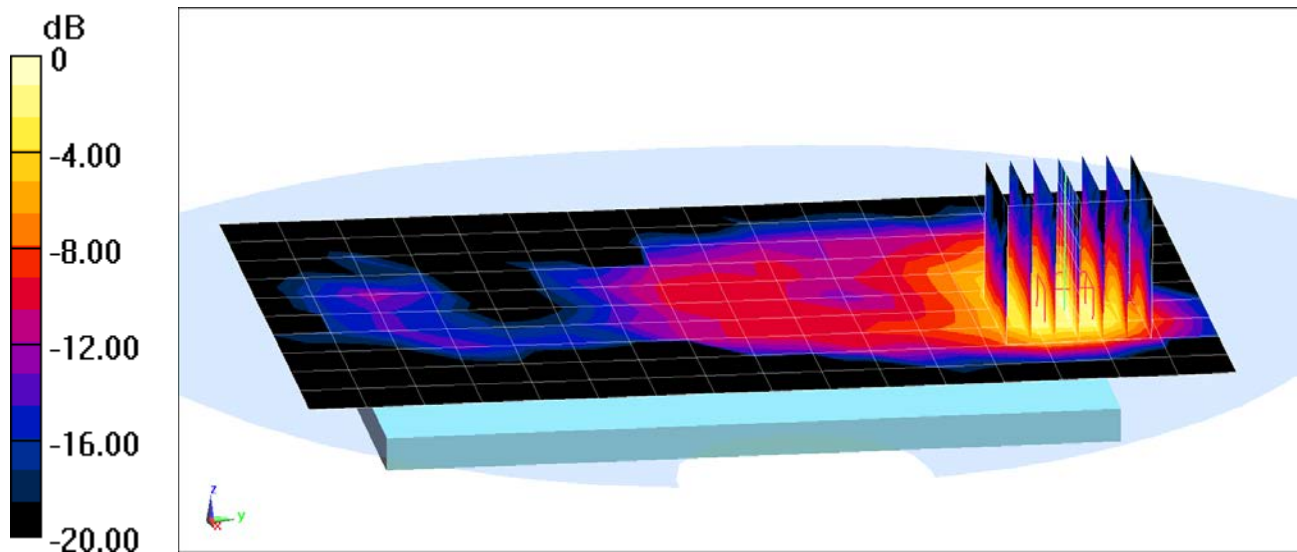
Area Scan (11x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 4.573 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.0760 W/kg

SAR(1 g) = 0.036 W/kg



0 dB = 0.0474 W/kg = -13.24 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04241

Communication System: UID 0, _UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.4 \text{ MHz}$; $\sigma = 1.483 \text{ S/m}$; $\epsilon_r = 51.469$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 03-14-2017; Ambient Temp: 23.0°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7410; ConvF(8.32, 8.32, 8.32); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1750, Phablet SAR, Bottom Edge, Mid.ch

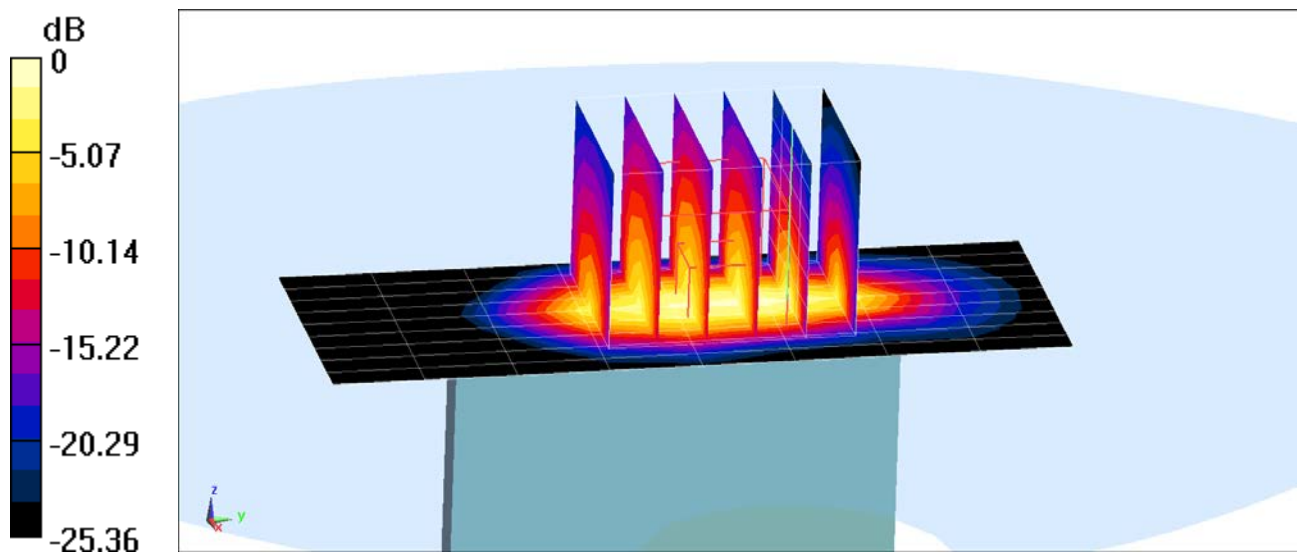
Area Scan (10x9x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 66.96 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 16.4 W/kg

SAR(10 g) = 2.73 W/kg



0 dB = 13.3 W/kg = 11.24 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04258

Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.51 \text{ S/m}$; $\epsilon_r = 53.801$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 03-09-2018; Ambient Temp: 21.9°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3914; ConvF(7.62, 7.62, 7.62); Calibrated: 2/14/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/15/2018

Phantom: Twin-SAM V5.0 left; Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

Mode: UMTS 1900, Phablet SAR, Bottom Edge, Mid.ch

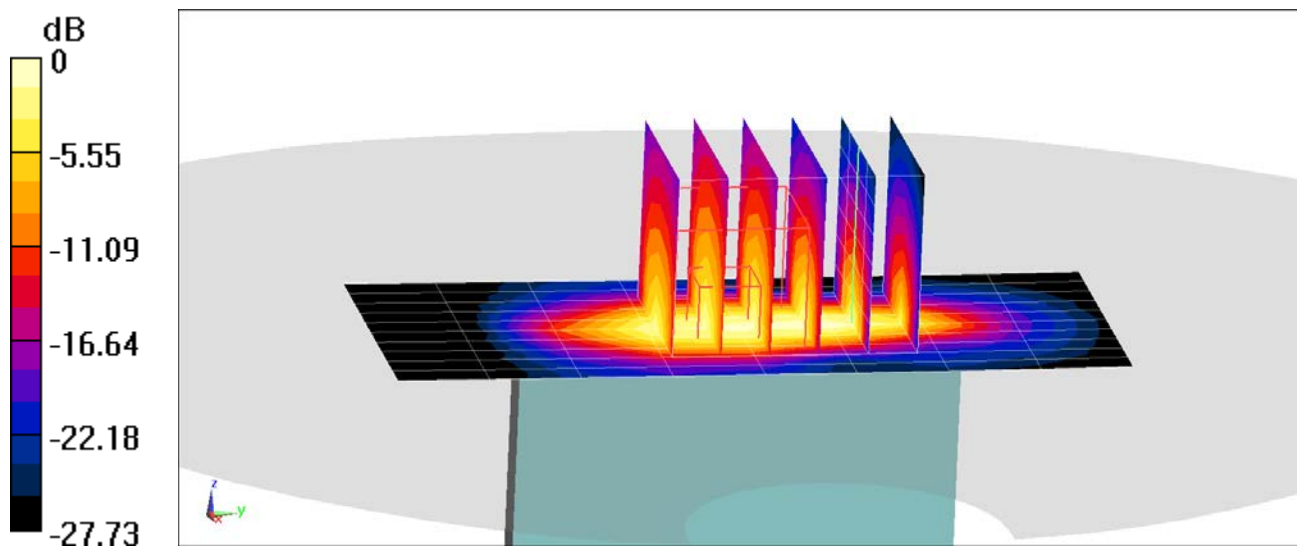
Area Scan (11x9x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 65.74 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 15.6 W/kg

SAR(10 g) = 2.74 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04258

Communication System: UID 0, _LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1770 \text{ MHz}$; $\sigma = 1.523 \text{ S/m}$; $\epsilon_r = 51.321$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 03-14-2017; Ambient Temp: 23.0°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7410; ConvF(8.32, 8.32, 8.32); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 66 (AWS), Phablet SAR, Bottom Edge,
High.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

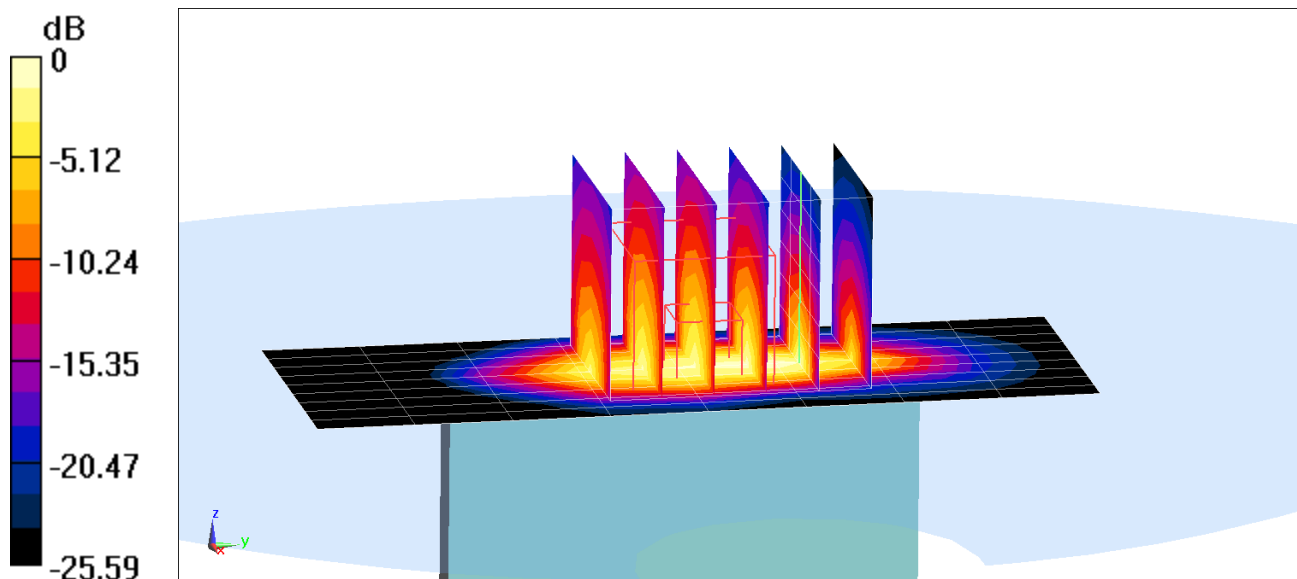
Area Scan (10x9x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 69.46 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 16.5 W/kg

SAR(10 g) = 2.98 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04233

Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1882.5 \text{ MHz}$; $\sigma = 1.53 \text{ S/m}$; $\epsilon_r = 52.915$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.5°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3914; ConvF(7.62, 7.62, 7.62); Calibrated: 2/14/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/15/2018

Phantom: Twin-SAM V5.0 left; Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: LTE Band 25 (PCS), Phablet SAR, Bottom Edge,
Mid.ch, 20 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset**

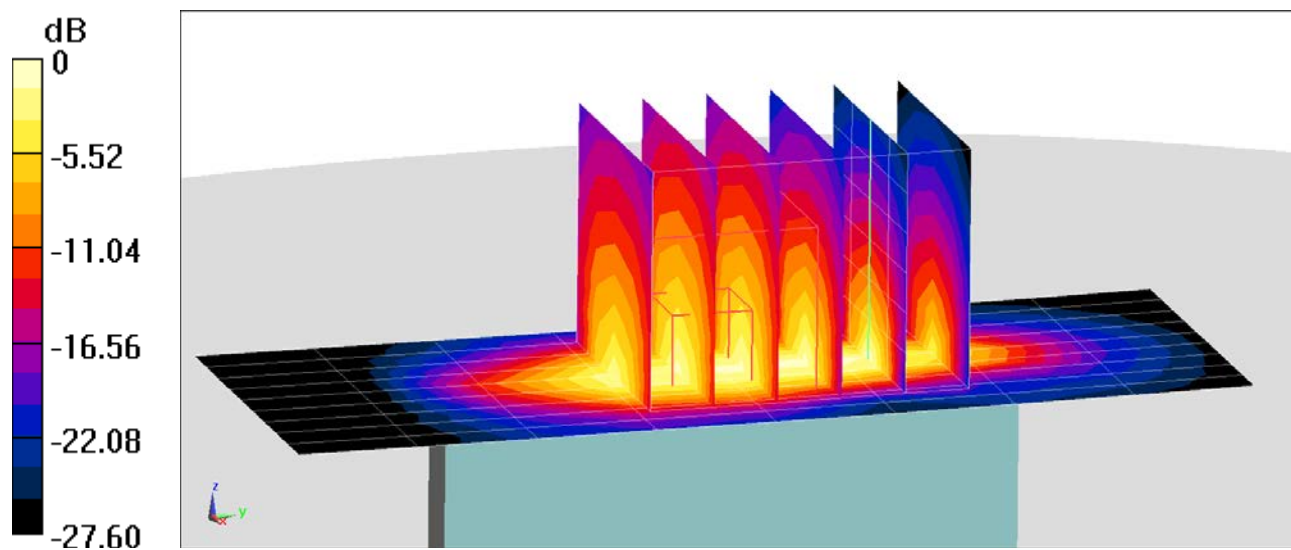
Area Scan (10x9x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 65.72 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 16.4 W/kg

SAR(10 g) = 2.87 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: ZNFG710TM; Type: Portable Handset; Serial: 04225

Communication System: UID 0, 802.11n 5.2-5.8 GHz Band;

Frequency: 5280 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5280 \text{ MHz}$; $\sigma = 5.537 \text{ S/m}$; $\epsilon_r = 47.661$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 03-11-2018; Ambient Temp: 20.5°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7308; ConvF(4.84, 4.84, 4.84); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

**Mode: IEEE 802.11n, MIMO, U-NII-2A, 20 MHz Bandwidth,
Phablet SAR, Ch 56, 13 Mbps, Back Side**

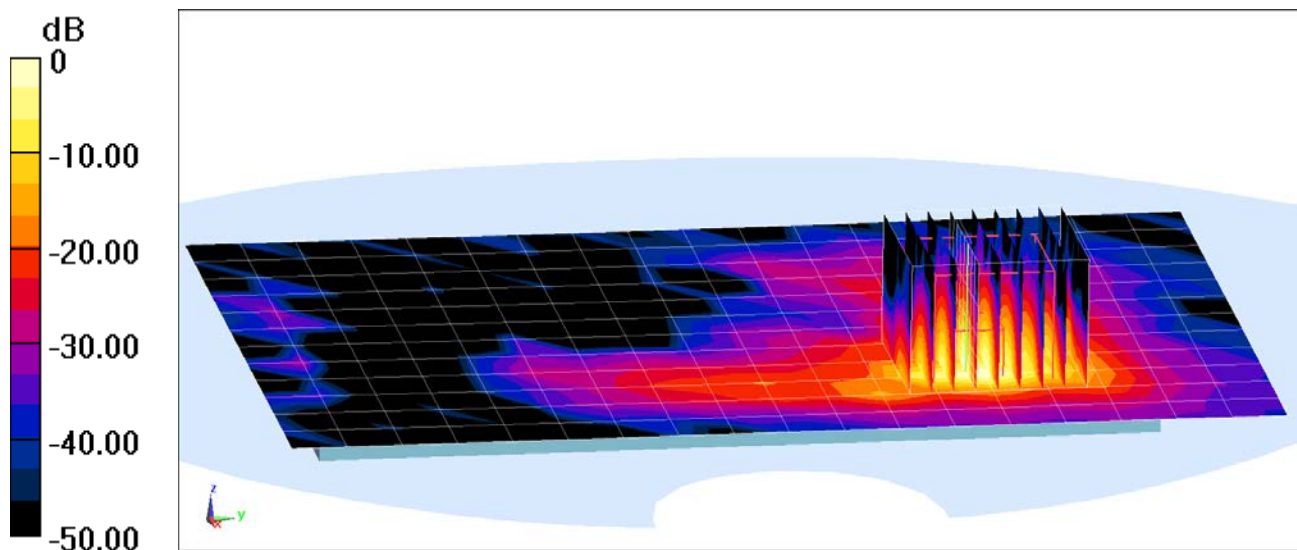
Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (9x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 47.00 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 93.3 W/kg

SAR(10 g) = 1.9 W/kg



0 dB = 32.9 W/kg = 15.17 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1003

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 750 Head Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.89 \text{ S/m}$; $\epsilon_r = 40.788$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-11-2018; Ambient Temp: 21.0°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3213; ConvF(6.75, 6.75, 6.75); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

750 MHz System Verification at 23.0 dBm (200 mW)

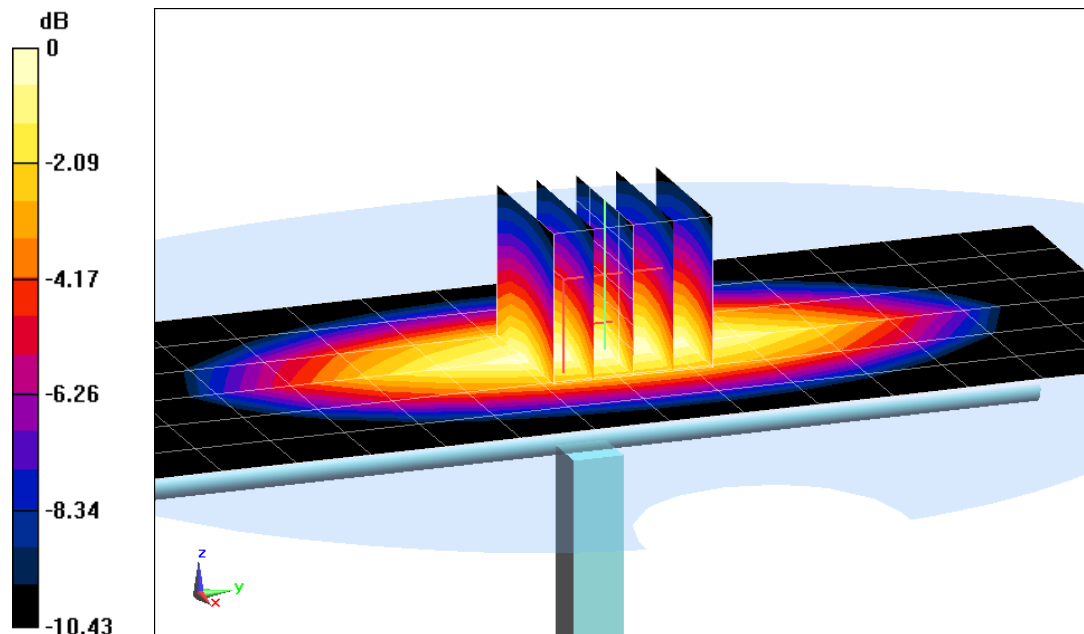
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.31 W/kg

SAR(1 g) = 1.56 W/kg

Deviation(1 g) = -5.80%



0 dB = 1.82 W/kg = 2.60 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d132

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.901 \text{ S/m}$; $\epsilon_r = 41.528$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-08-2018; Ambient Temp: 24.3°C; Tissue Temp: 21.6°C

Probe: ES3DV3 - SN3213; ConvF(6.42, 6.42, 6.42); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

835 MHz System Verification at 23.0 dBm (200 mW)

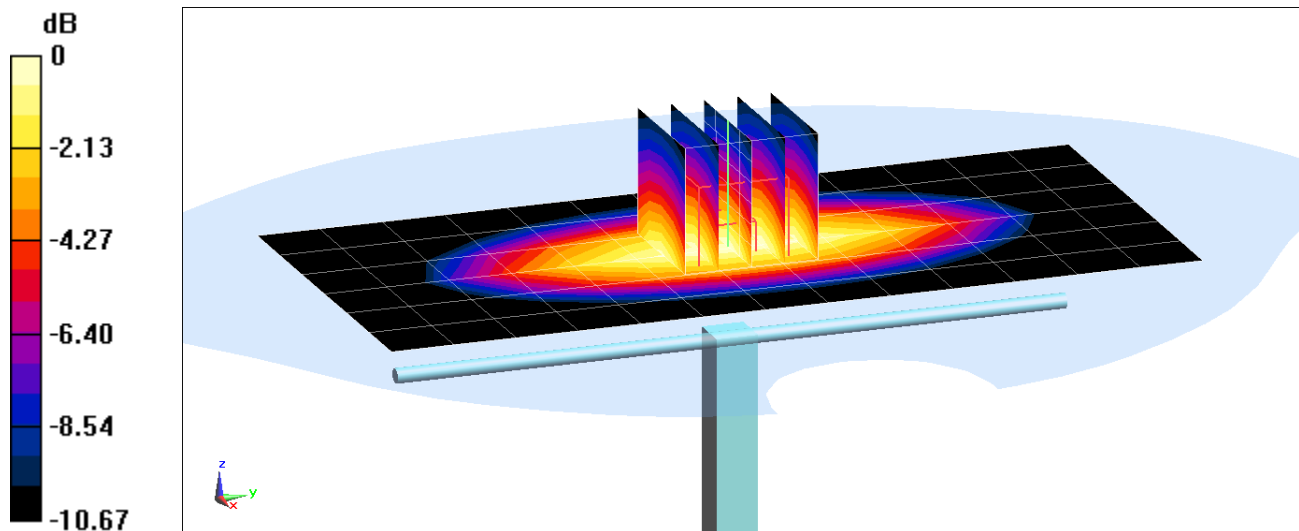
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.80 W/kg

SAR(1 g) = 1.88 W/kg

Deviation(1 g) = 0.43%



0 dB = 2.20 W/kg = 3.42 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d132

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.94 \text{ S/m}$; $\epsilon_r = 39.773$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-13-2018; Ambient Temp: 23.4°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3213; ConvF(6.42, 6.42, 6.42); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

835 MHz System Verification at 23.0 dBm (200 mW)

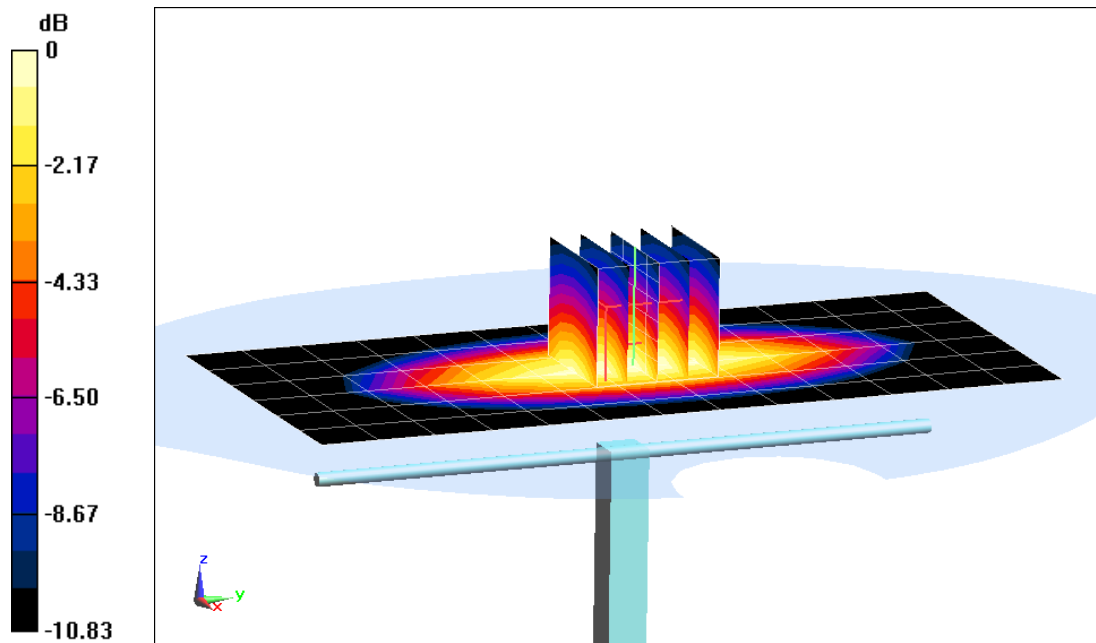
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 3.01 W/kg

SAR(1 g) = 2.01 W/kg

Deviation(1 g) = 7.37%



0 dB = 2.36 W/kg = 3.73 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.397 \text{ S/m}$; $\epsilon_r = 38.415$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-02-2018; Ambient Temp: 23.5°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3213; ConvF(5.45, 5.45, 5.45); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

1750 MHz System Verification at 20.0 dBm (100mW)

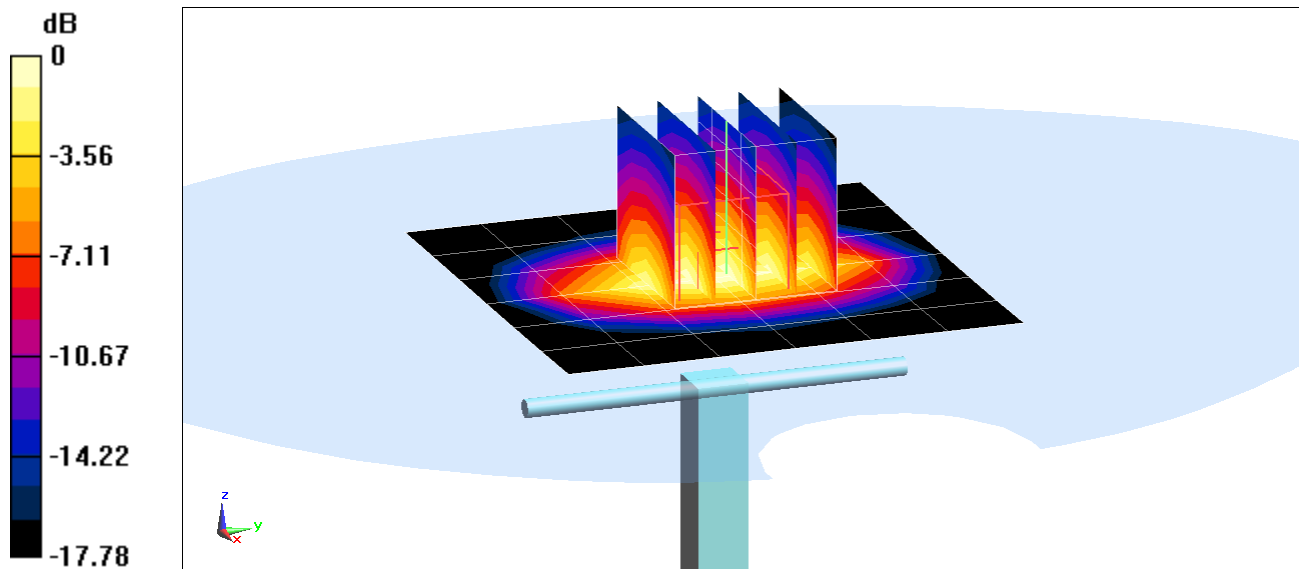
Area Scan (7x7x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 6.70 W/kg

SAR(1 g) = 3.71 W/kg

Deviation(1 g) = 1.92%



0 dB = 4.66 W/kg = 6.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.376 \text{ S/m}$; $\epsilon_r = 39.51$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-05-2018; Ambient Temp: 23.7°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3213; ConvF(5.45, 5.45, 5.45); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: 1648

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

1750 MHz System Verification at 20.0 dBm (100 mW)

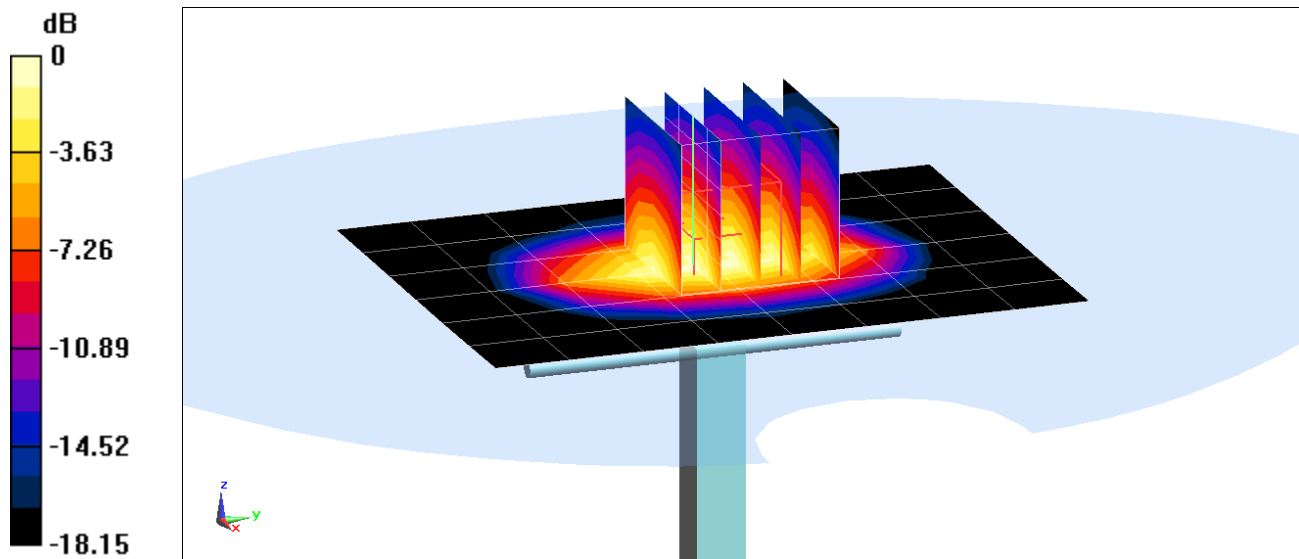
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 7.02 W/kg

SAR(1 g) = 3.84 W/kg

Deviation(1 g) = 5.49%



0 dB = 4.78 W/kg = 6.79 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.437 \text{ S/m}$; $\epsilon_r = 39.025$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-02-2018; Ambient Temp: 20.8°C; Tissue Temp: 21.6°C

Probe: ES3DV3 - SN3332; ConvF(5.33, 5.33, 5.33); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

1900 MHz System Verification at 20.0 dBm (100 mW)

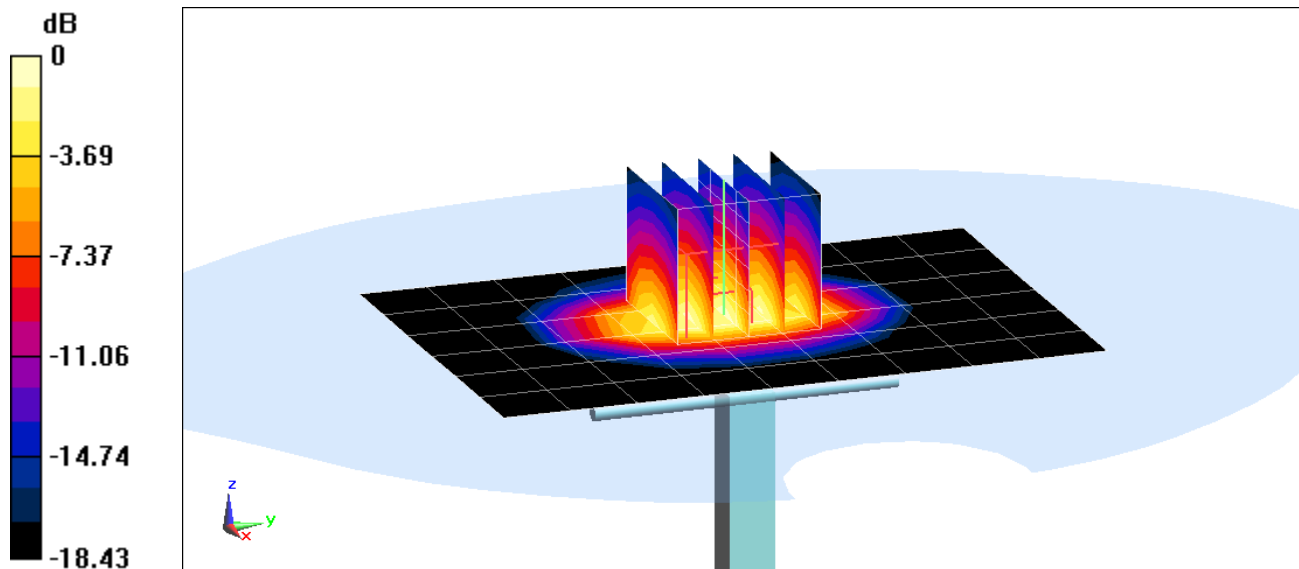
Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 6.76 W/kg

SAR(1 g) = 3.71 W/kg

Deviation(1 g) = -5.60%



0 dB = 4.72 W/kg = 6.74 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.457 \text{ S/m}$; $\epsilon_r = 40.115$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-05-2018; Ambient Temp: 22.8°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3332; ConvF(5.33, 5.33, 5.33); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

1900 MHz System Verification at 20.0 dBm (100 mW)

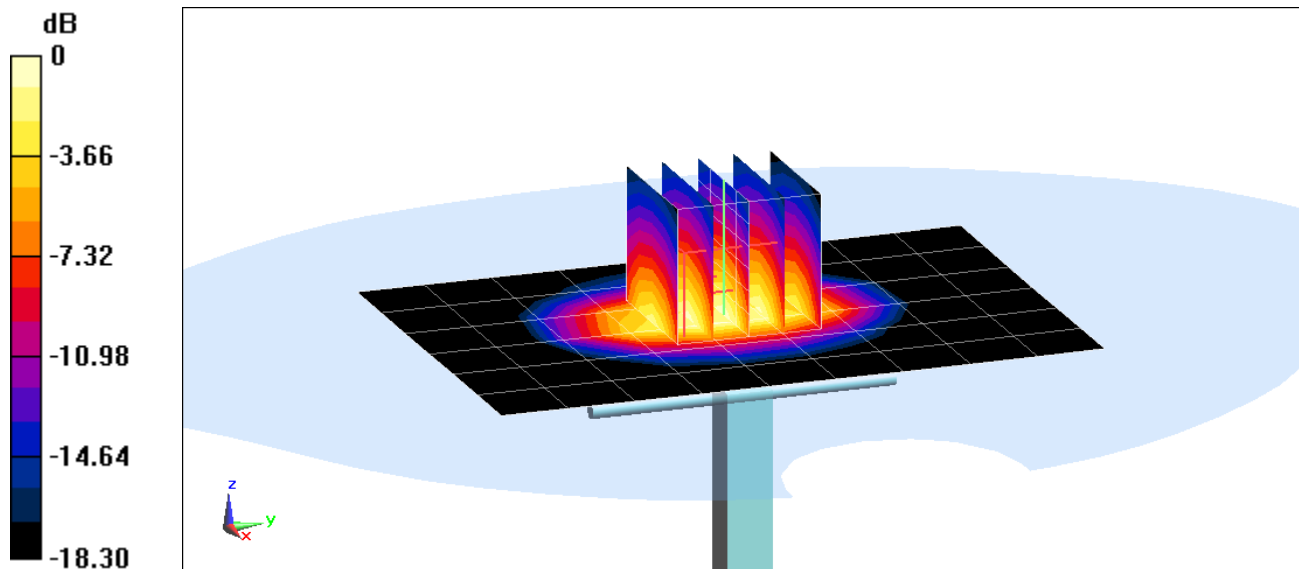
Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 6.90 W/kg

SAR(1 g) = 3.77 W/kg

Deviation(1 g) = -4.07%



0 dB = 4.81 W/kg = 6.82 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1073

Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2300 \text{ MHz}$; $\sigma = 1.674 \text{ S/m}$; $\epsilon_r = 40.541$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-18-2018; Ambient Temp: 21.7°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3332; ConvF(4.99, 4.99, 4.99); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

2300 MHz System Verification at 20.0 dBm (100 mW)

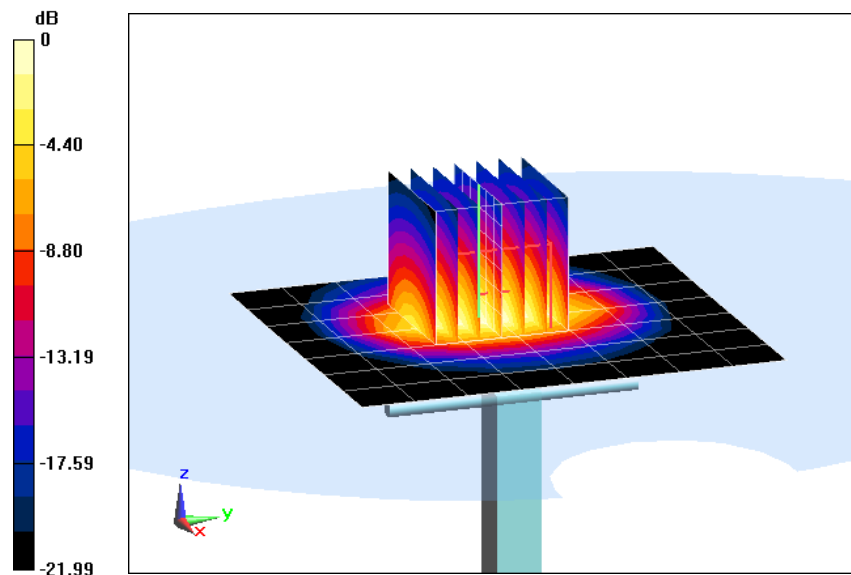
Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 9.35 W/kg

SAR(1 g) = 4.63 W/kg

Deviation(1 g) = -4.73%



0 dB = 6.04 W/kg = 7.81 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.868 \text{ S/m}$; $\epsilon_r = 38.023$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0cm

Test Date: 03-05-2018; Ambient Temp: 22.4°C; Tissue Temp: 21.5°C

Probe: EX3DV4 - SN7410; ConvF(7.68, 7.68, 7.68); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

2450 MHz System Verification at 20.0 dBm (100 mW)

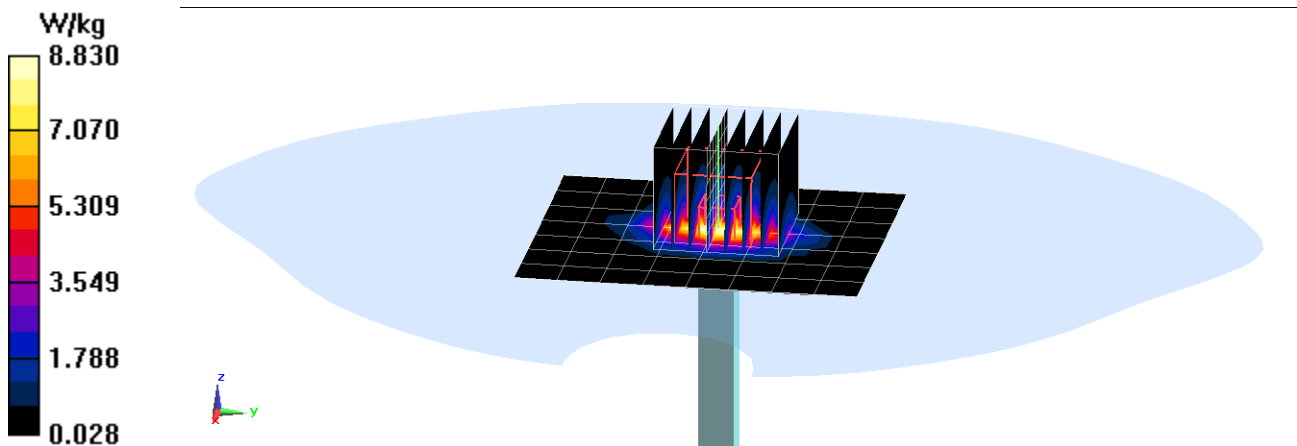
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Peak SAR (extrapolated) = 11.7 W/kg

SAR(1 g) = 5.34 W/kg

Deviation(1 g) = 1.33%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.876 \text{ S/m}$; $\epsilon_r = 39.676$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-15-2018; Ambient Temp: 22.9°C; Tissue Temp: 21.6°C

Probe: EX3DV4 - SN7406; ConvF(7.68, 7.68, 7.68); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: LeftTwin-SAM V5.0; Type: QD 000 P40 CD; Serial: TP1375

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

2450 MHz System Verification at 20.0 dBm (100 mW)

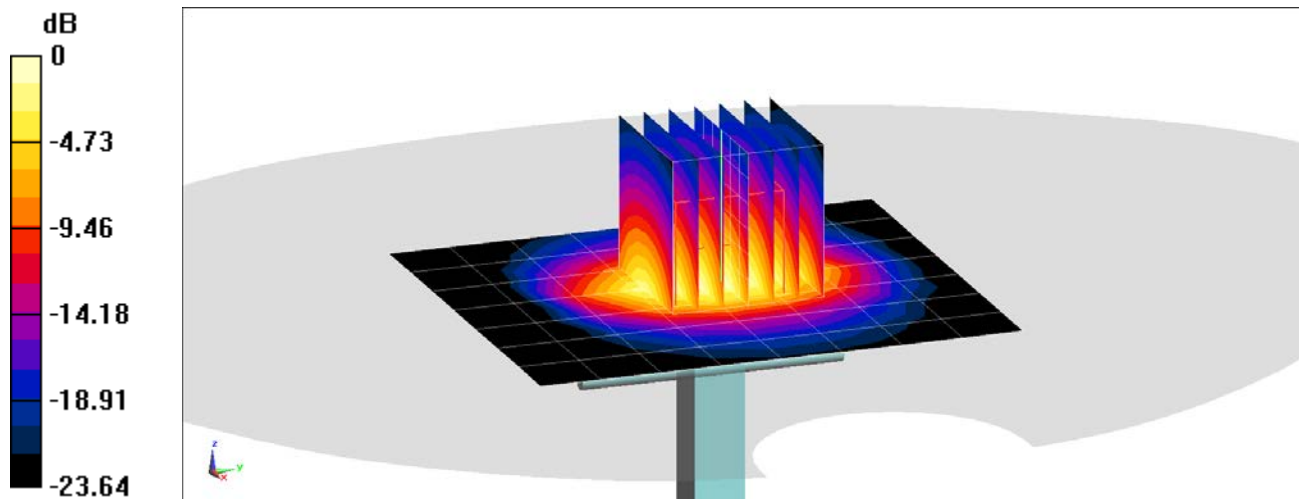
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 11.2 W/kg

SAR(1 g) = 5.09 W/kg

Deviation(1 g) = -3.42%



0 dB = 8.73 W/kg = 9.41 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1126

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 2.024 \text{ S/m}$; $\epsilon_r = 39.431$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-18-2018; Ambient Temp: 21.7°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3332; ConvF(4.56, 4.56, 4.56); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

2600 MHz System Verification at 20.0 dBm (100 mW)

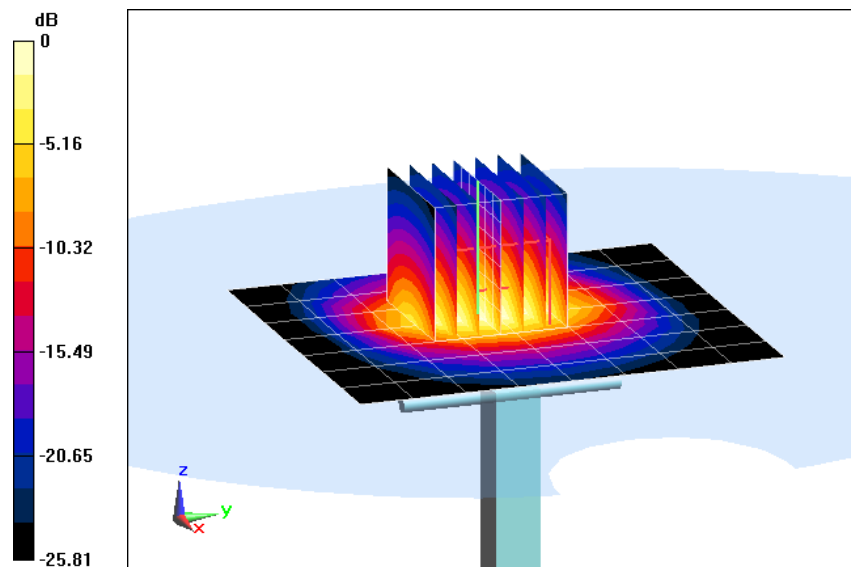
Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 12.6 W/kg

SAR(1 g) = 5.55 W/kg

Deviation(1 g) = -1.60%



0 dB = 7.39 W/kg = 8.69 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: 5GHz Head Medium parameters used (interpolated):

$f = 5250 \text{ MHz}$; $\sigma = 4.569 \text{ S/m}$; $\epsilon_r = 37.168$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.0°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3589; ConvF(4.69, 4.69, 4.69); Calibrated: 1/16/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

5250 MHz System Verification at 17.0 dBm (50 mW)

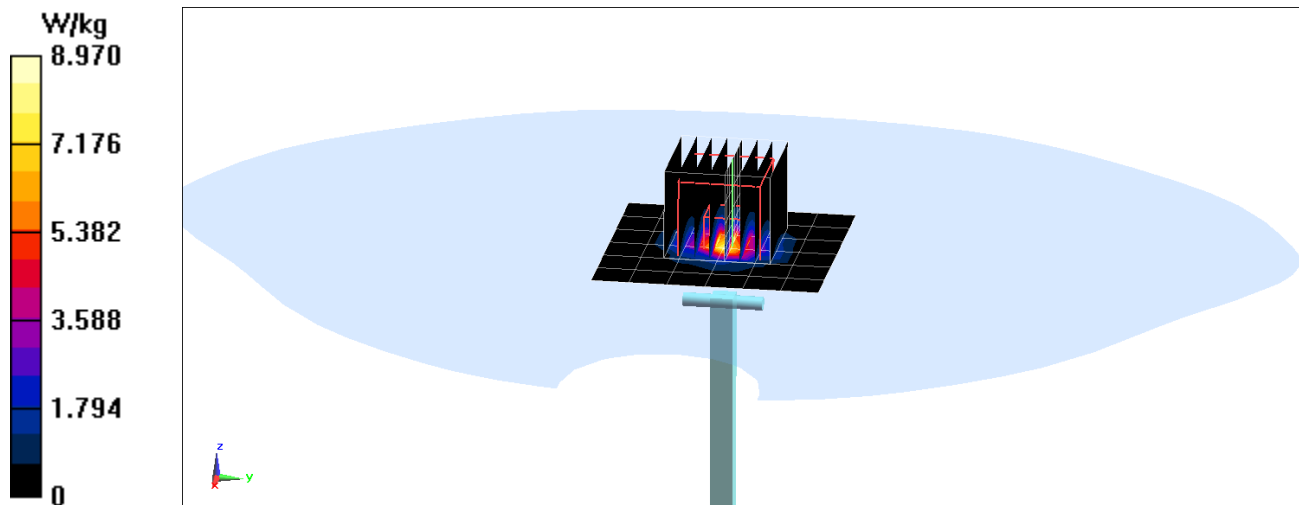
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 16.3 W/kg

SAR(1 g) = 3.92 W/kg

Deviation(1 g) = -0.63%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5GHz Head Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 4.933 \text{ S/m}$; $\epsilon_r = 36.664$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.0°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3589; ConvF(4.17, 4.17, 4.17); Calibrated: 1/16/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

5600 MHz System Verification at 17.0 dBm (50 mW)

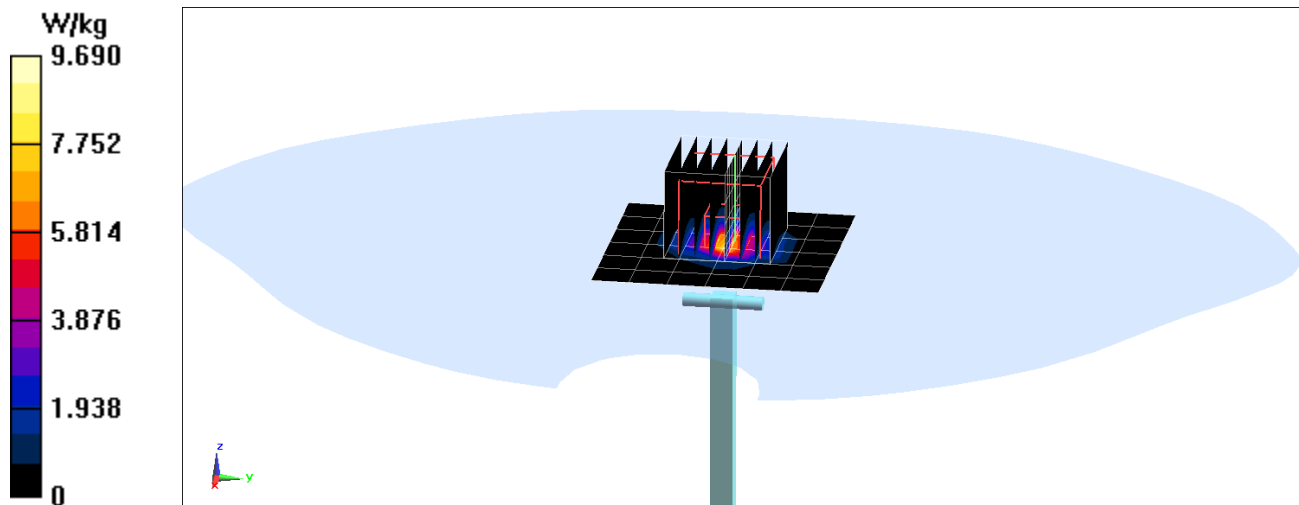
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 17.4 W/kg

SAR(1 g) = 3.93 W/kg

Deviation(1 g) = -5.98%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: 5GHz Head Medium parameters used (interpolated):

$f = 5750 \text{ MHz}$; $\sigma = 5.096 \text{ S/m}$; $\epsilon_r = 36.468$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.0°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN3589; ConvF(4.42, 4.42, 4.42); Calibrated: 1/16/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

5750 MHz System Verification at 17.0 dBm (50 mW)

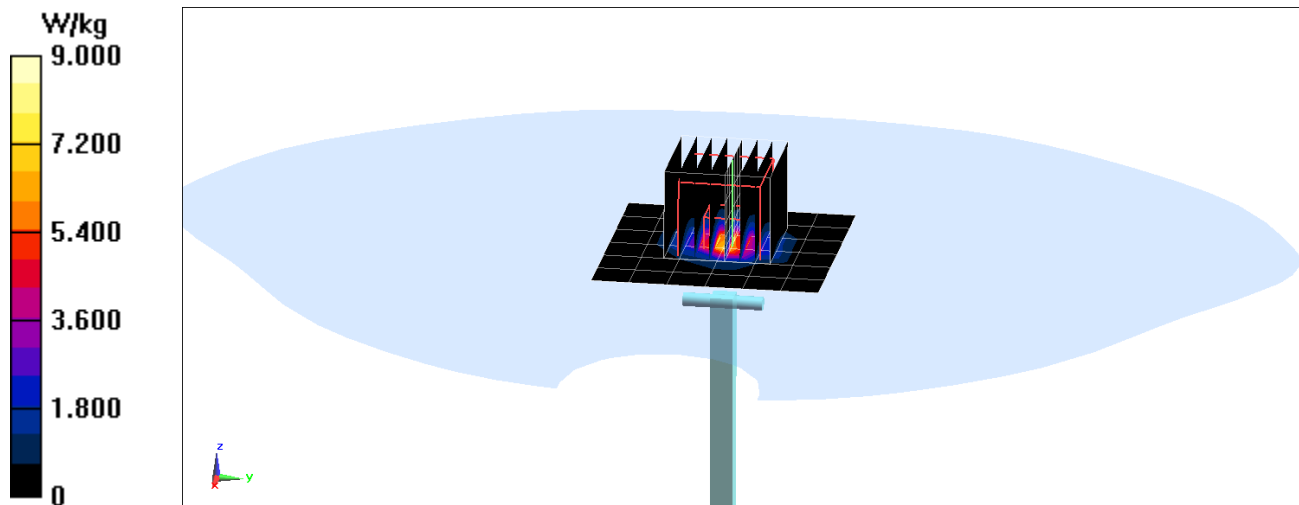
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 17.1 W/kg

SAR(1 g) = 3.76 W/kg

Deviation(1 g) = -4.93%



PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.978 \text{ S/m}$; $\epsilon_r = 56.107$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-12-2018; Ambient Temp: 21.9°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(9.9, 9.9, 9.9); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

750 MHz System Verification at 23.0 dBm (200 mW)

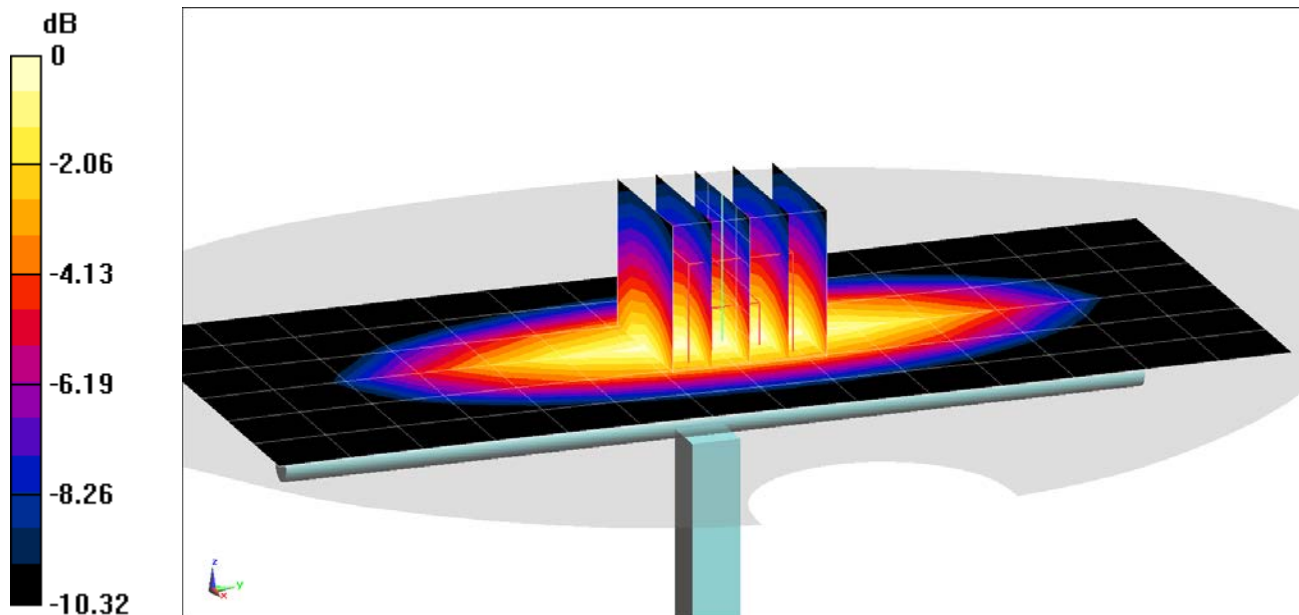
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.69 W/kg

SAR(1 g) = 1.8 W/kg

Deviation(1 g) = 6.76%



0 dB = 2.40 W/kg = 3.80 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.971 \text{ S/m}$; $\epsilon_r = 53.142$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 3-14-2018; Ambient Temp: 22.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(9.9, 9.9, 9.9); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

750 MHz System Verification at 23.0 dBm (200 mW)

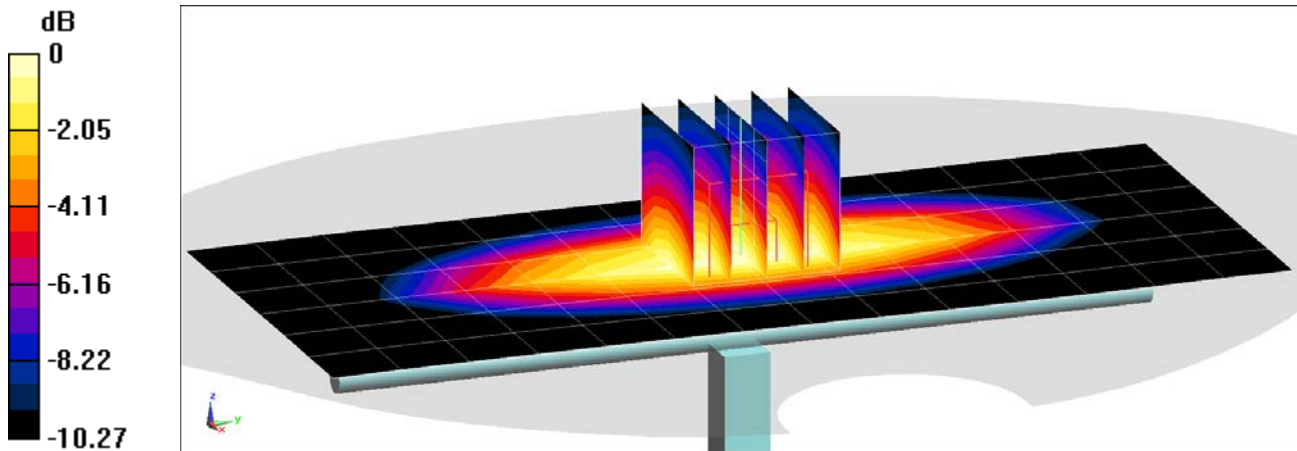
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.68 W/kg

SAR(1 g) = 1.8 W/kg

Deviation(1 g) = 6.76%



0 dB = 2.38 W/kg = 3.77 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d133

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.985 \text{ S/m}$; $\epsilon_r = 53.465$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-07-2018; Ambient Temp: 21.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(9.57, 9.57, 9.57); Calibrated: 2/14/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/15/2018

Phantom: Twin-SAM V5.0 Right; Type: QD 000 P40 CD; Serial: 1800

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

835 MHz System Verification at 23.0 dBm (200 mW)

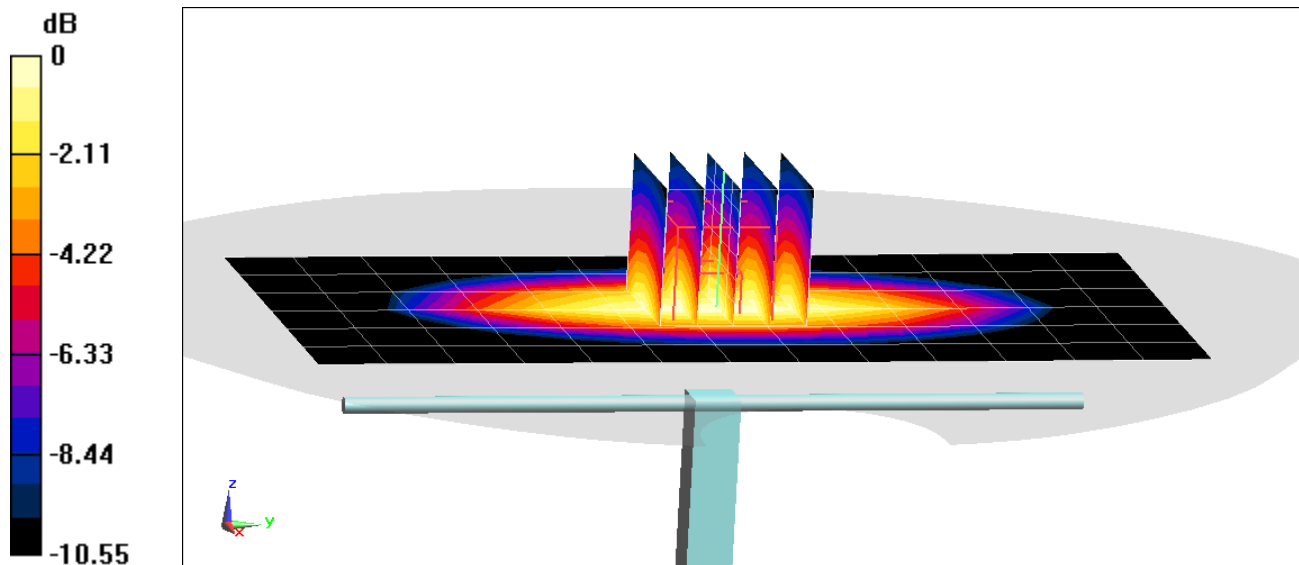
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.73 W/kg

SAR(1 g) = 1.83 W/kg

Deviation(1 g) = -2.76%



0 dB = 2.43 W/kg = 3.86 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d132

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.973 \text{ S/m}$; $\epsilon_r = 52.66$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 03-19-2018; Ambient Temp: 23.7°C; Tissue Temp: 20.9°C

Probe: ES3DV3 - SN3213; ConvF(6.2, 6.2, 6.2); Calibrated: 2/13/2018;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2018

Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

835 MHz System Verification at 23.0 dBm (200 mW)

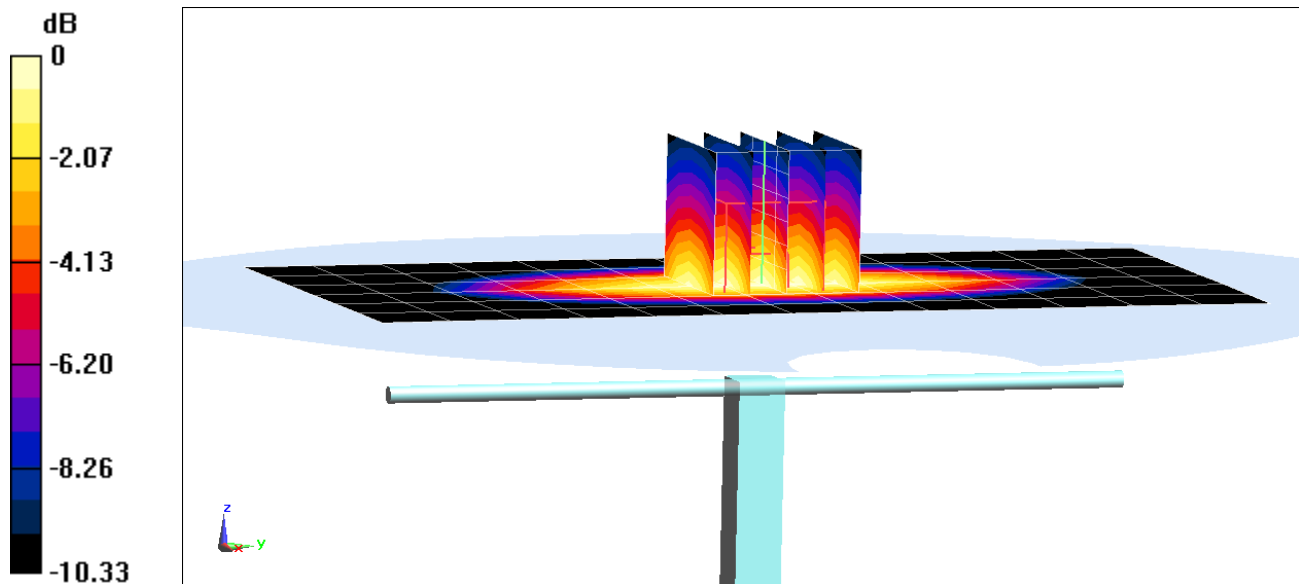
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 2.91 W/kg

SAR(1 g) = 1.98 W/kg

Deviation(1 g) = 1.96%



0 dB = 2.32 W/kg = 3.65 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.499 \text{ S/m}$; $\epsilon_r = 53.187$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 02-28-2018; Ambient Temp: 21.5°C; Tissue Temp: 20.6°C

Probe: EX3DV4 - SN3914; ConvF(7.91, 7.91, 7.91); Calibrated: 2/14/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/15/2018

Phantom: Twin-SAM V5.0 Right; Type: QD 000 P40 CD; Serial: 1800

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

1750 MHz System Verification at 20.0 dBm (100 mW)

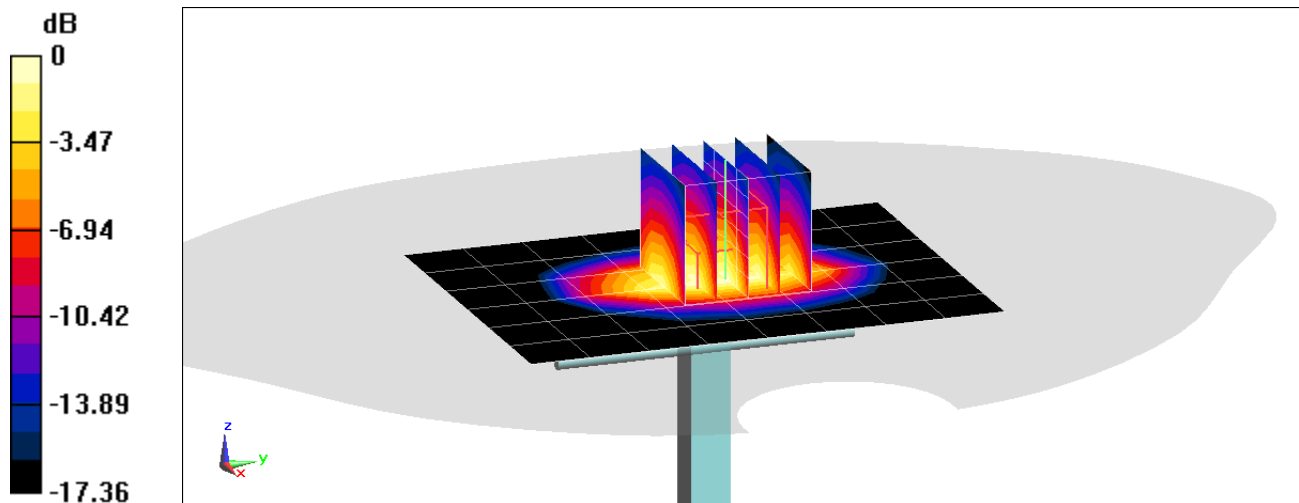
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 7.05 W/kg

SAR(1 g) = 3.9 W/kg

Deviation(1 g) = 5.41%



0 dB = 5.84 W/kg = 7.66 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.465 \text{ S/m}$; $\epsilon_r = 52.334$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-07-2018; Ambient Temp: 22.2°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7406; ConvF(8.08, 8.08, 8.08); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

1750 MHz System Verification at 20.0 dBm (100 mW)

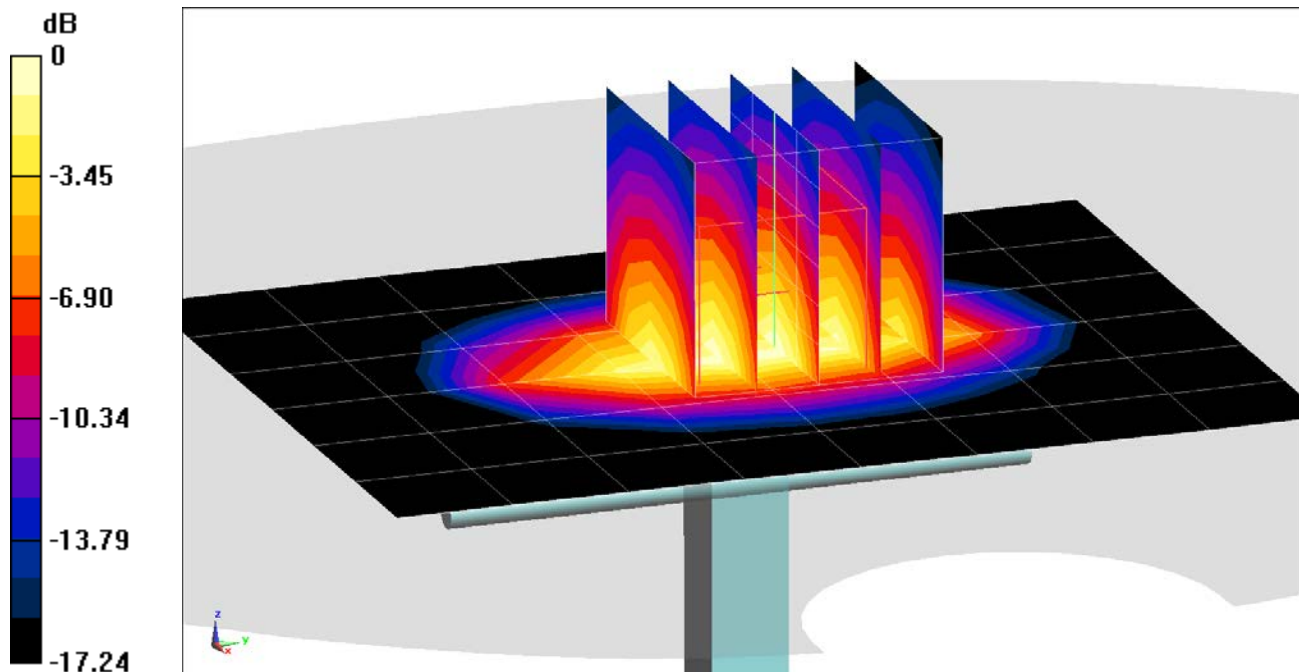
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 6.92 W/kg

SAR(1 g) = 3.87 W/kg

Deviation(1 g) = 4.59%



0 dB = 5.84 W/kg = 7.66 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900$ MHz; $\sigma = 1.565$ S/m; $\epsilon_r = 52.119$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-07-2018; Ambient Temp: 21.9°C; Tissue Temp: 21.4°C

Probe: EX3DV4 - SN7410; ConvF(7.98, 7.98, 7.98); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10;SEMCAD X Version 14.6.10 (7417)

1900 MHz System Verification at 20.0 dBm (100 mW)

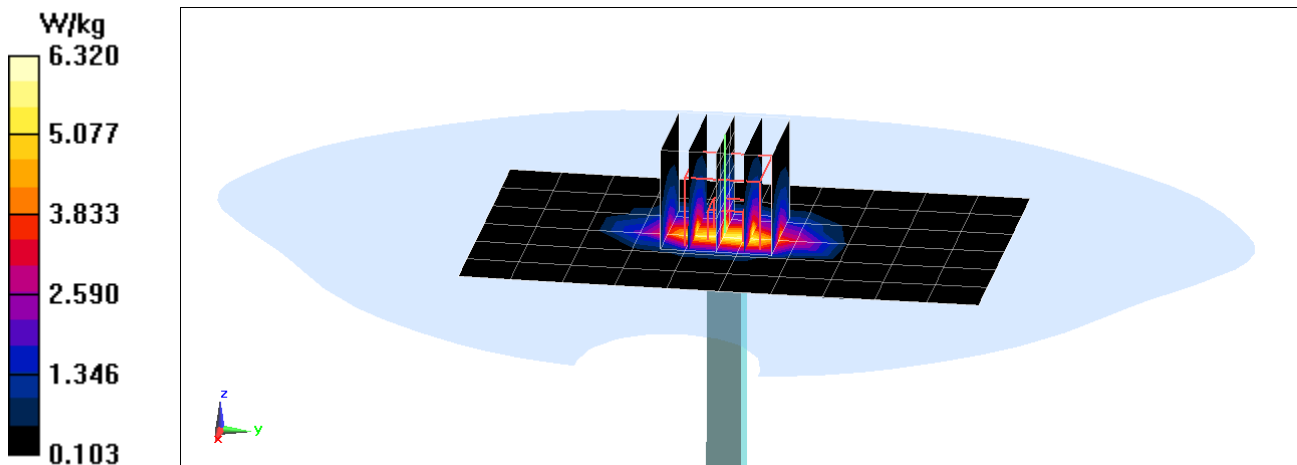
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 7.38 W/kg

SAR(1 g) = 4.12 W/kg

Deviation(1 g) = 5.37%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.549 \text{ S/m}$; $\epsilon_r = 51.788$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-09-2018; Ambient Temp: 22.8°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(7.98, 7.98, 7.98); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

1900 MHz System Verification at 20.0 dBm (100 mW)

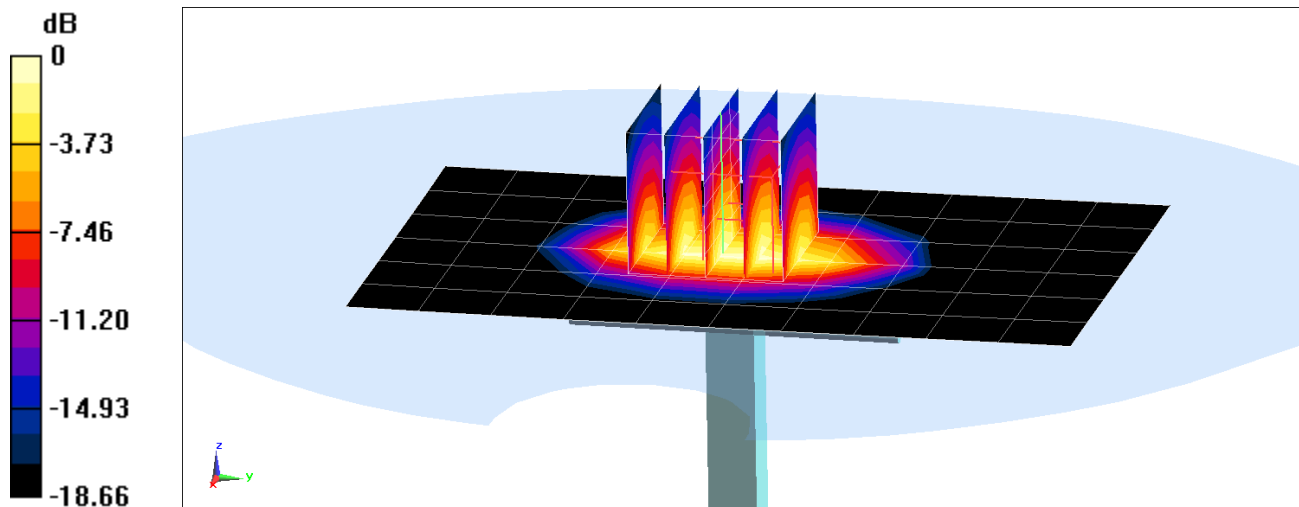
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.62 W/kg

SAR(1 g) = 4.22 W/kg

Deviation(1 g) = 6.57%



0 dB = 6.45 W/kg = 8.10 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1073

Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2300$ MHz; $\sigma = 1.848$ S/m; $\epsilon_r = 51.259$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.0°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3332; ConvF(4.74, 4.74, 4.74); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

2300 MHz System Verification at 20.0 dBm (100 mW)

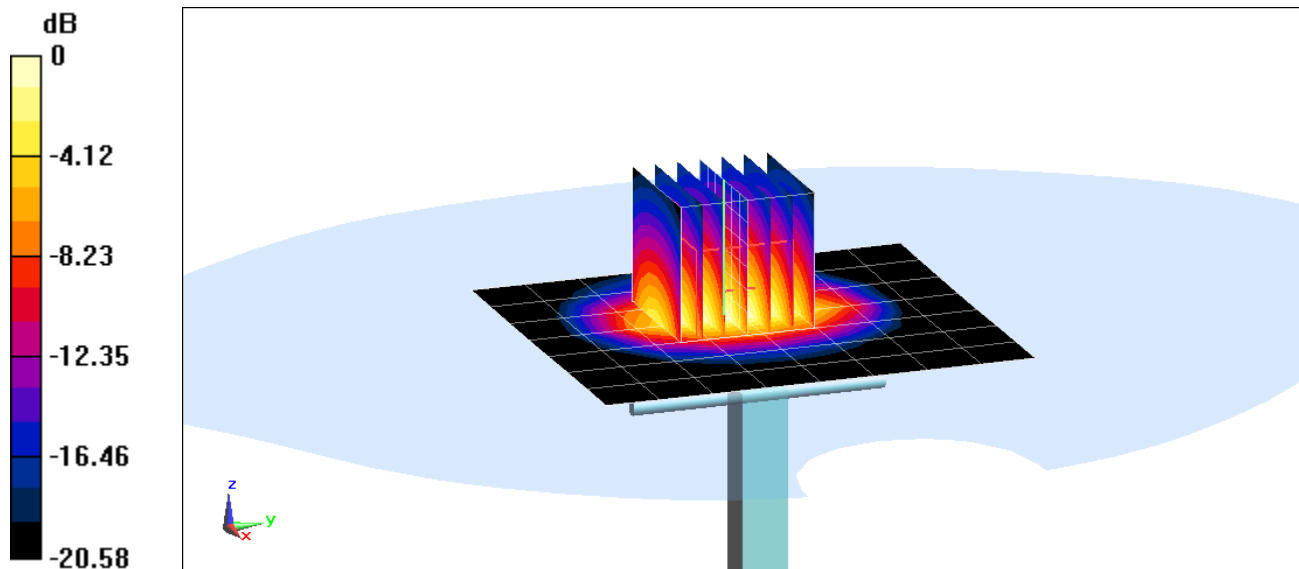
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 9.38 W/kg

SAR(1 g) = 4.77 W/kg

Deviation(1 g) = -0.83%



0 dB = 6.26 W/kg = 7.97 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.004 \text{ S/m}$; $\epsilon_r = 50.846$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-04-2018; Ambient Temp: 22.7°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7406; ConvF(7.6, 7.6, 7.6); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/11/2017

Phantom: Right Twin-SAM V5.0; Type: QD 000 P40 CD; Serial: 1797 Measurement SW:

DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

2450 MHz System Verification at 20.0 dBm (100 mW)

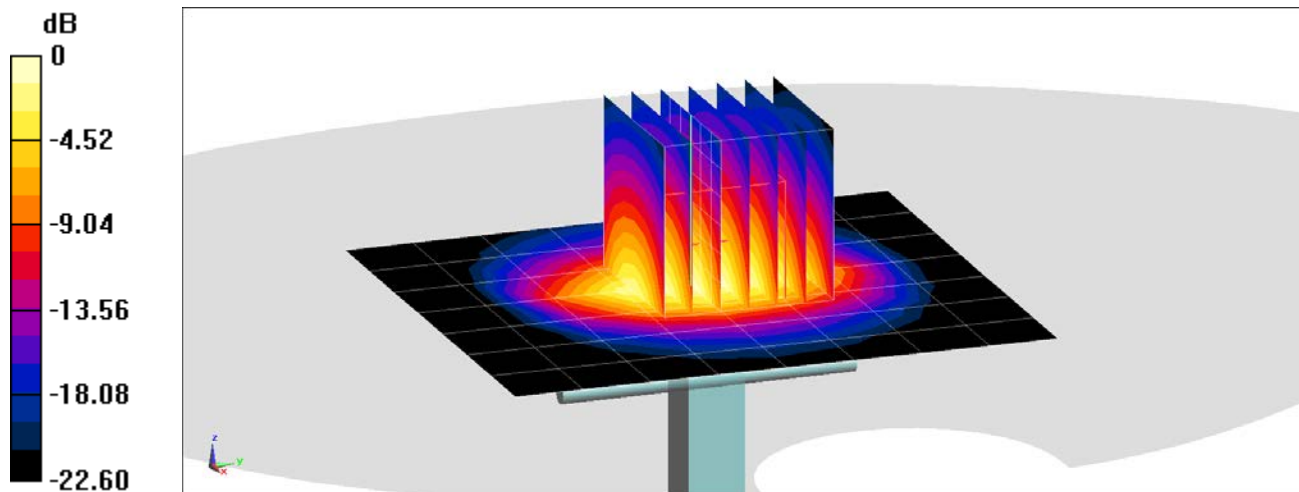
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 10.7 W/kg

SAR(1 g) = 5.11 W/kg

Deviation(1 g) = 0.00%



0 dB = 8.51 W/kg = 9.30 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2450$ MHz; $\sigma = 2.012$ S/m; $\epsilon_r = 50.882$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.0°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3332; ConvF(4.55, 4.55, 4.55); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

2450 MHz System Verification at 20.0 dBm (100 mW)

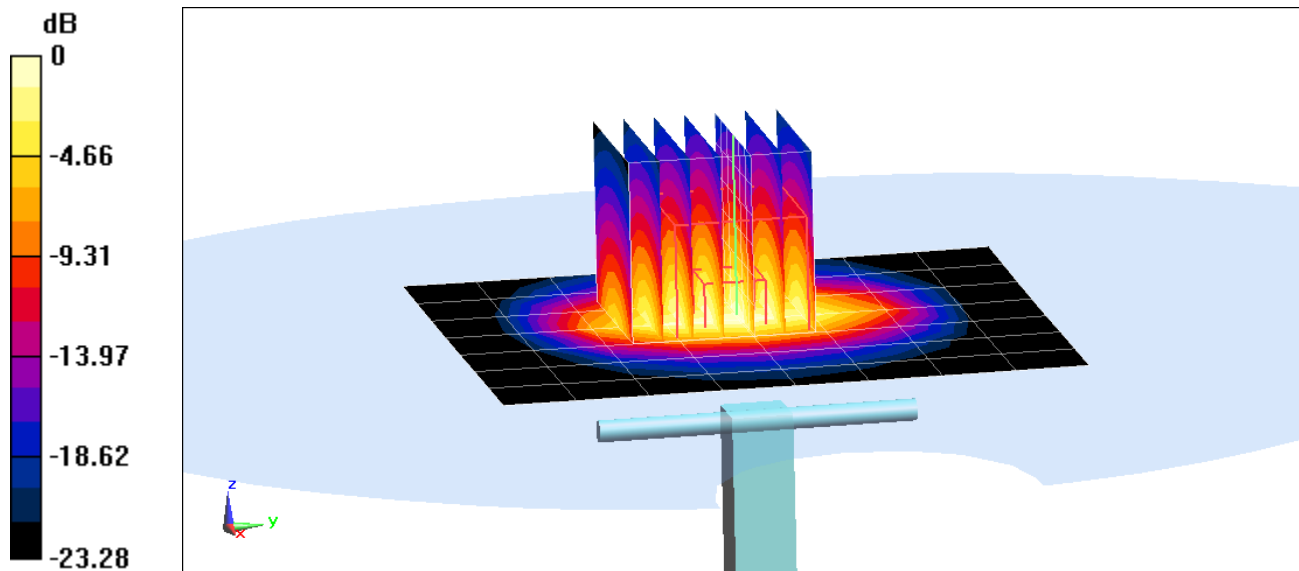
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 11.1 W/kg

SAR(1 g) = 5.21 W/kg

Deviation(1 g) = 1.96%



0 dB = 6.88 W/kg = 8.38 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.006 \text{ S/m}$; $\epsilon_r = 51.873$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-15-2018; Ambient Temp: 22.6°C; Tissue Temp: 21.4°C

Probe: ES3DV3 - SN3332; ConvF(4.55, 4.55, 4.55); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

2450 MHz System Verification at 20.0 dBm (100 mW)

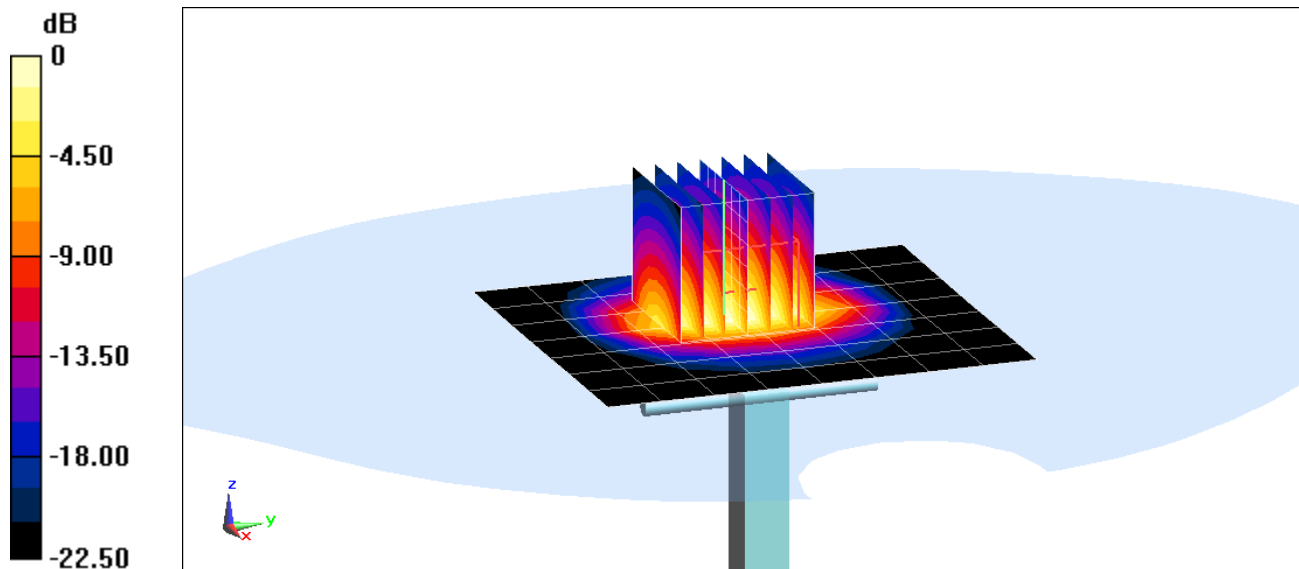
Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 10.9 W/kg

SAR(1 g) = 5.26 W/kg

Deviation(1 g) = 2.94%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1126

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2600$ MHz; $\sigma = 2.192$ S/m; $\epsilon_r = 50.441$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.0°C; Tissue Temp: 22.7°C

Probe: ES3DV3 - SN3332; ConvF(4.43, 4.43, 4.43); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 8/9/2017

Phantom: SAM Front; Type: SAM; Serial: 1686

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

2600 MHz System Verification at 20.0 dBm (100 mW)

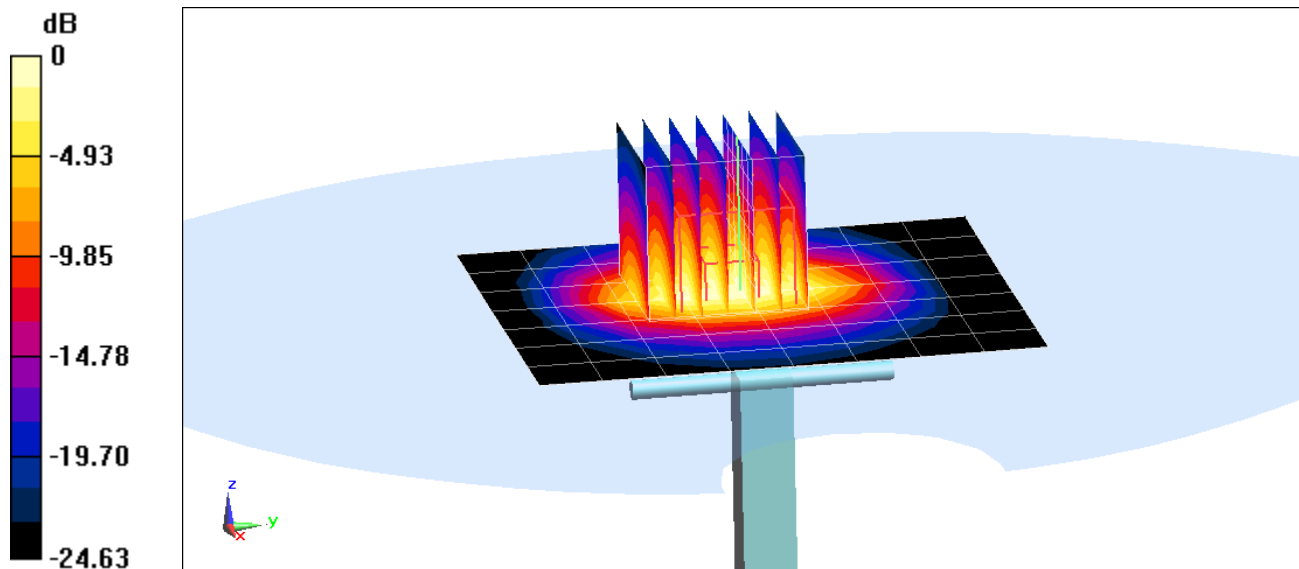
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 12.9 W/kg

SAR(1 g) = 5.71 W/kg

Deviation(1 g) = 5.16%



0 dB = 7.59 W/kg = 8.80 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5250 \text{ MHz}$; $\sigma = 5.516 \text{ S/m}$; $\epsilon_r = 47.707$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-11-2018; Ambient Temp: 20.5°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7308; ConvF(4.84, 4.84, 4.84); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

5250 MHz System Verification at 17.0 dBm (50 mW)

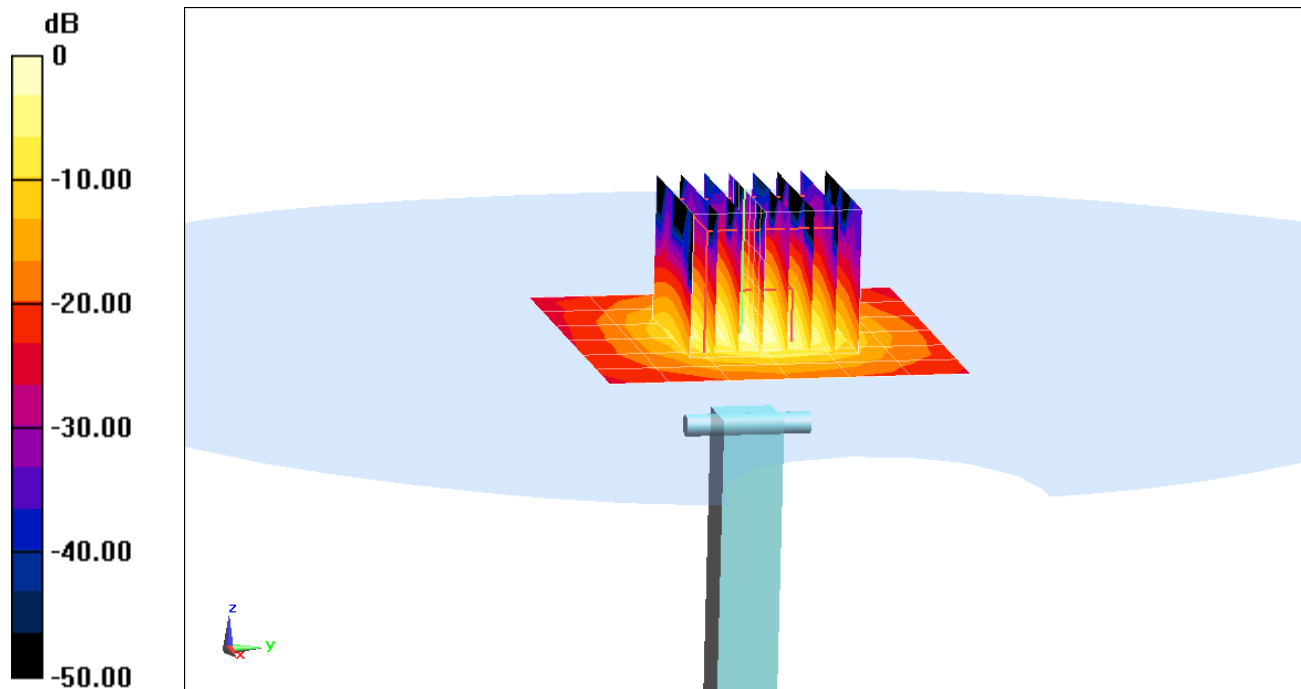
Area Scan (7x7x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Peak SAR (extrapolated) = 16.8 W/kg

SAR(1 g) = 3.68 W/kg; SAR(10 g) = 1.03 W/kg

Deviation(1 g) = -4.29%; Deviation(10 g) = -4.19%



0 dB = 9.05 W/kg = 9.57 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5250 \text{ MHz}$; $\sigma = 5.508 \text{ S/m}$; $\epsilon_r = 47.422$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-18-2018; Ambient Temp: 21.7°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN7308; ConvF(4.84, 4.84, 4.84); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

5250 MHz System Verification at 17.0 dBm (50 mW)

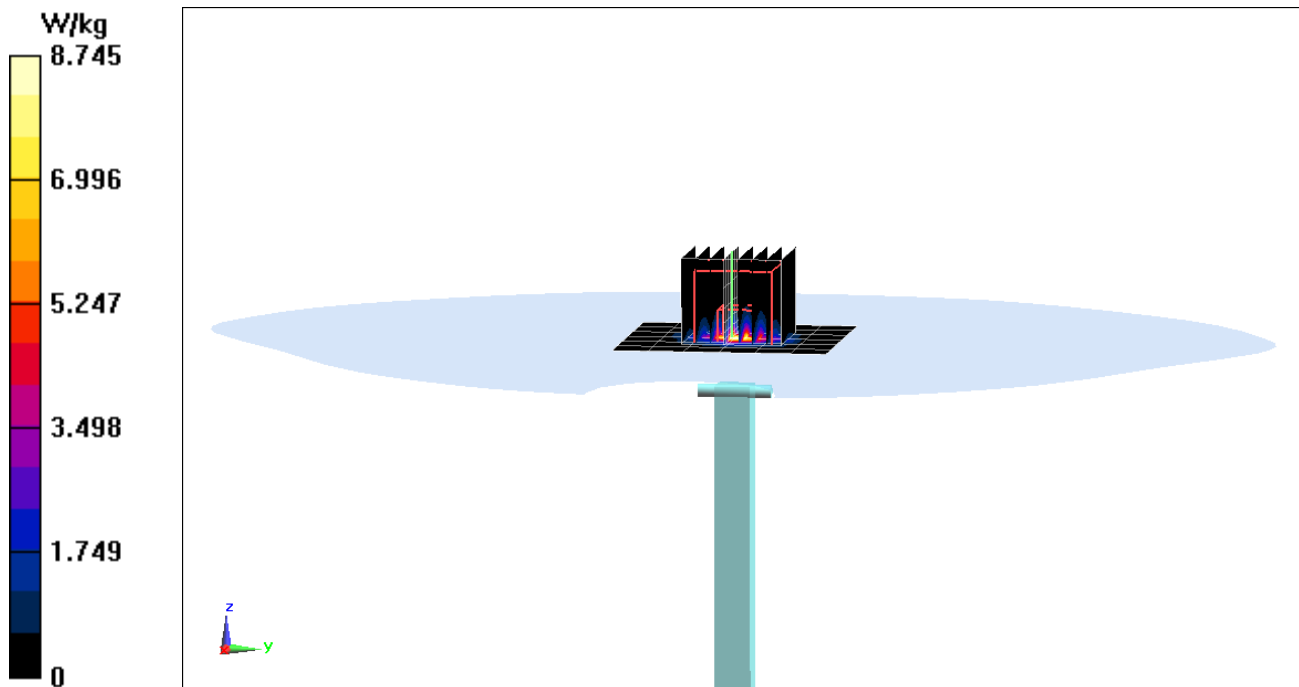
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 16.5 W/kg

SAR(1 g) = 3.61 W/kg

Deviation(1 g) = -6.11%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 5.986 \text{ S/m}$; $\epsilon_r = 47.093$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-11-2018; Ambient Temp: 20.5°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7308; ConvF(4.23, 4.23, 4.23); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

5600 MHz System Verification at 17.0 dBm (50 mW)

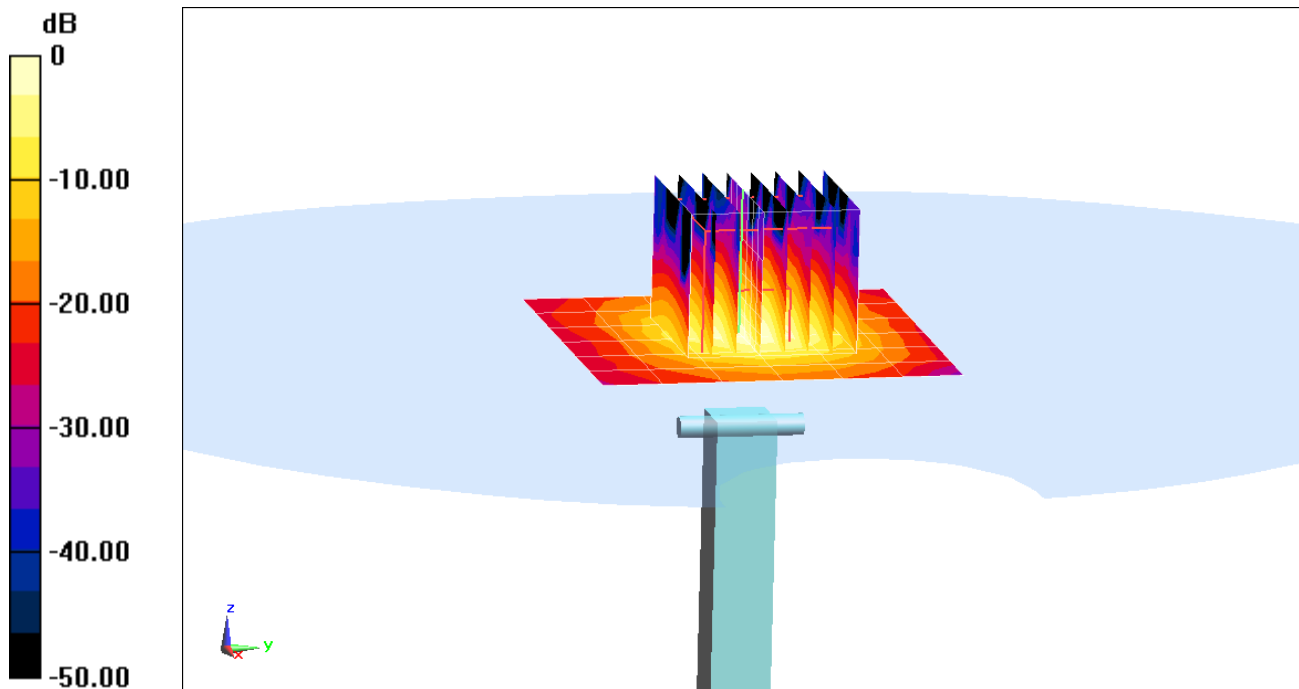
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 18.5 W/kg

SAR(1 g) = 3.79 W/kg; SAR(10 g) = 1.05 W/kg

Deviation(1 g) = -3.44%; Deviation(10 g) = -4.98%



0 dB = 9.55 W/kg = 9.80 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5750 \text{ MHz}$; $\sigma = 6.223 \text{ S/m}$; $\epsilon_r = 46.806$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-11-2018; Ambient Temp: 20.5°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7308; ConvF(4.5, 4.5, 4.5); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

5750 MHz System Verification at 17.0 dBm (50 mW)

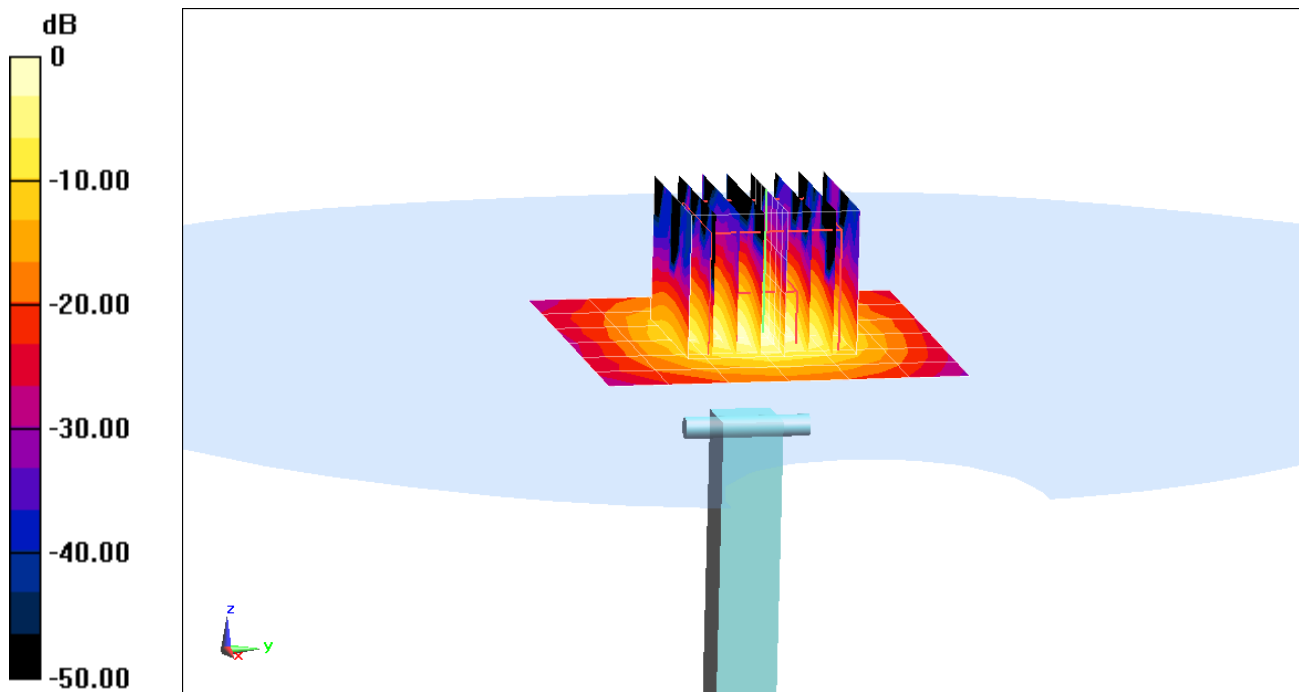
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 18.3 W/kg

SAR(1 g) = 3.59 W/kg; SAR(10 g) = 1.000 W/kg

Deviation(1 g) = -6.87%; Deviation(10 g) = -6.54%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1150

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.503 \text{ S/m}$; $\epsilon_r = 51.403$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-14-2017; Ambient Temp: 23.0°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN7410; ConvF(8.32, 8.32, 8.32); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1322; Calibrated: 7/13/2017

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

1750 MHz System Verification at 20.0 dBm (100 mW)

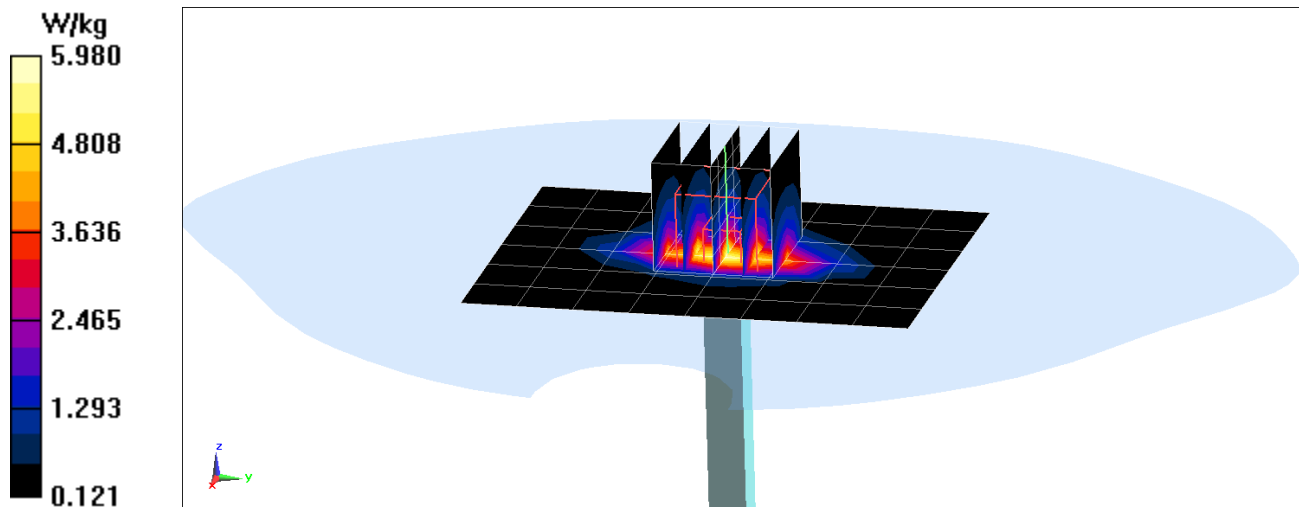
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 7.00 W/kg

SAR(10 g) = 2.06 W/kg

Deviation(10 g) = 5.64%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d148

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.533 \text{ S/m}$; $\epsilon_r = 53.731$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-09-2018; Ambient Temp: 21.9°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3914; ConvF(7.62, 7.62, 7.62); Calibrated: 2/14/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/15/2018

Phantom: Twin-SAM V5.0 left; Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

1900 MHz System Verification at 20.0 dBm (100 mW)

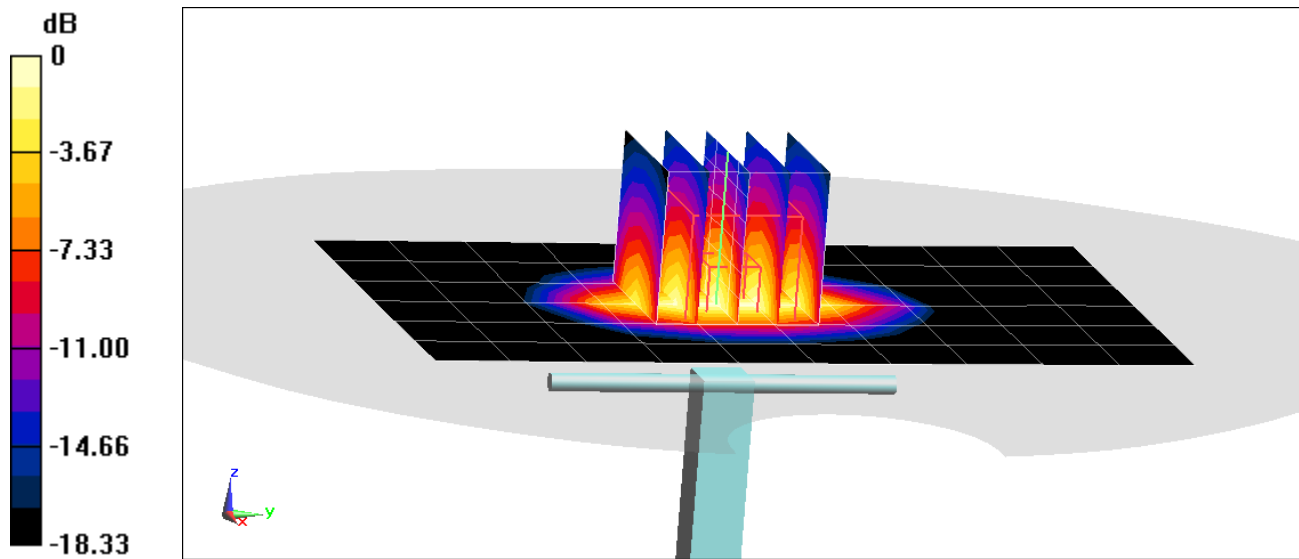
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Peak SAR (extrapolated) = 7.89 W/kg

SAR(10 g) = 2.19 W/kg

Deviation(10 g) = 4.78%



0 dB = 6.65 W/kg = 8.23 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d080

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.548 \text{ S/m}$; $\epsilon_r = 52.83$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 03-12-2018; Ambient Temp: 21.5°C; Tissue Temp: 22.5°C

Probe: EX3DV4 - SN3914; ConvF(7.62, 7.62, 7.62); Calibrated: 2/14/2018;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/15/2018

Phantom: Twin-SAM V5.0 left; Type: QD 000 P40 CD; Serial: 1692

Measurement SW: DASY52, Version 52.10; SEMCAD X Version 14.6.10 (7417)

1900 MHz System Verification at 20.0 dBm (100 mW)

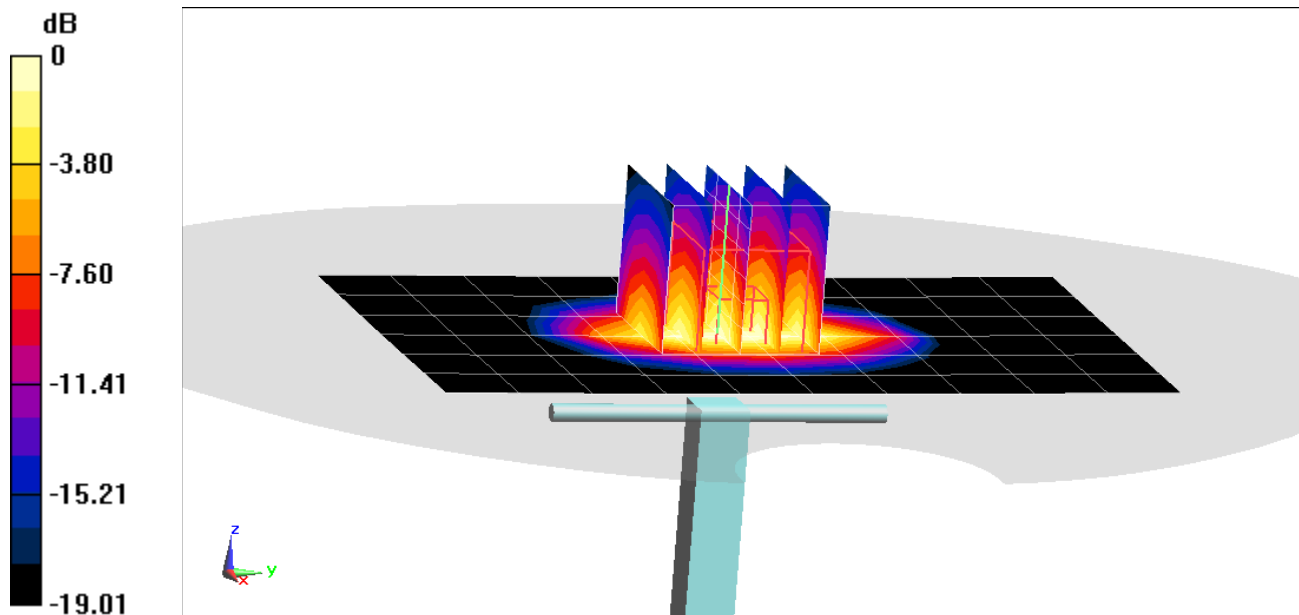
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Peak SAR (extrapolated) = 7.75 W/kg

SAR(10 g) = 2.09 W/kg

Deviation(10 g) = 0.97%



0 dB = 6.19 W/kg = 7.92 dBW/kg

APPENDIX C: PROBE CALIBRATION



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D750V3-1003_Jan18**

CALIBRATION CERTIFICATE

Object **D750V3 - SN:1003**

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

Calibration date: **January 15, 2018**

BN
01-25-2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

Calibrated by: **Leif Klysner** Function: **Laboratory Technician**

Approved by: **Katja Pokovic** Technical Manager

Signature

Leif Klysner

Katja Pokovic

Issued: January 15, 2018

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

Calibration Laboratory of

Schmid & Partner

Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland



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

- 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
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	750 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	40.9 \pm 6 %	0.90 mho/m \pm 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	2.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.28 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.42 W/kg \pm 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 \pm 0.2) °C	55.0 \pm 6 %	0.96 mho/m \pm 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	2.15 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.58 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.43 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.71 W/kg \pm 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.8 Ω - 2.1 j Ω
Return Loss	- 27.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.2 Ω - 6.2 j Ω
Return Loss	- 24.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.043 ns
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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 21, 2009

Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions

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

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L
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SAR result with SAM Head (Top)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.98 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	7.94 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.32 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.05 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.22 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.52 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Neck)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.01 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.06 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.52 W/kg ± 16.9 % (k=2)

SAR result with SAM Head (Ear)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	1.67 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.70 W/kg ± 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	4.60 W/kg ± 16.9 % (k=2)

DASY5 Validation Report for Head TSL

Date: 12.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1003

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

Medium parameters used: $f = 750$ MHz; $\sigma = 0.9$ S/m; $\epsilon_r = 40.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

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

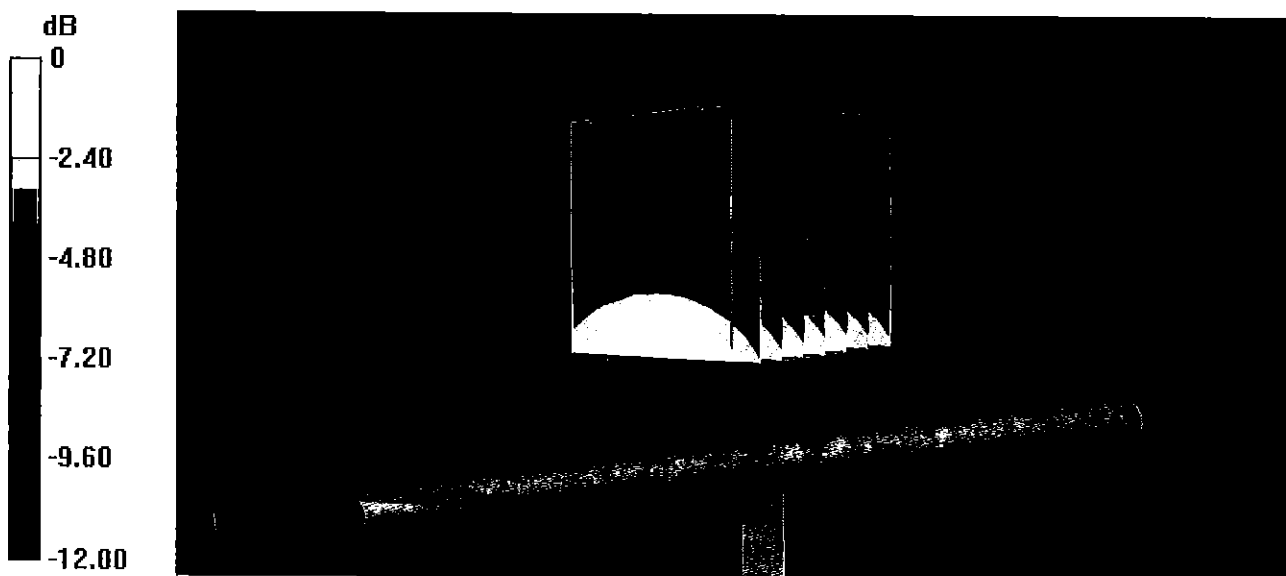
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 59.11 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.15 W/kg

SAR(1 g) = 2.1 W/kg; SAR(10 g) = 1.37 W/kg

Maximum value of SAR (measured) = 2.80 W/kg

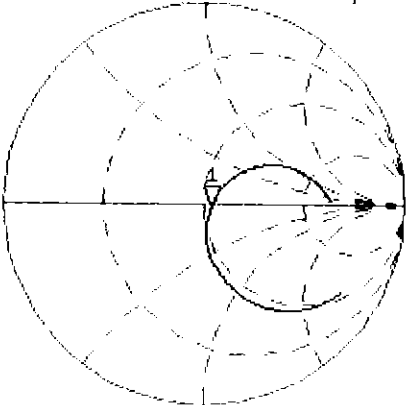


0 dB = 2.80 W/kg = 4.47 dBW/kg

Impedance Measurement Plot for Head TSL

12 Jan 2018 13:14:07
CH1 S11 1 U FS 1: 53.754 Ω -2.0996 Ω 101.07 pF 750.000 000 MHz

*
De1
CA

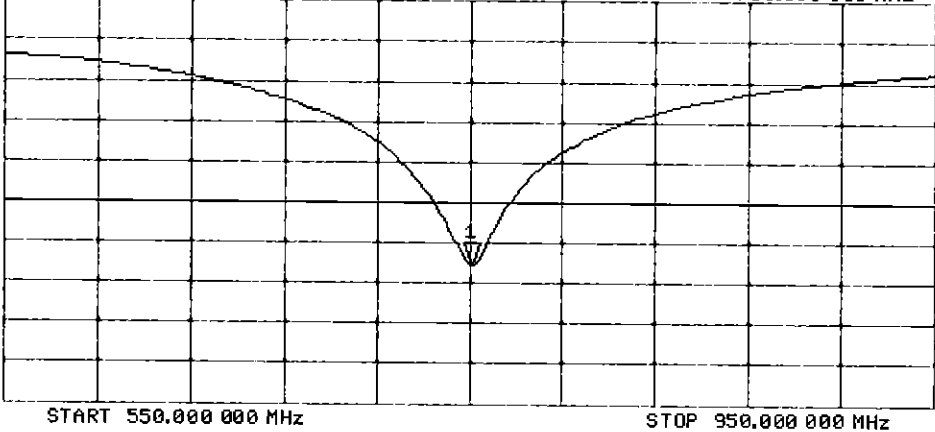


Avg
16
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1:-27.643 dB 750.000 000 MHz

CA

Avg
16
H1d



DASY5 Validation Report for Body TSL

Date: 12.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1003

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

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.96 \text{ S/m}$; $\epsilon_r = 55$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.19, 10.19, 10.19); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x8x7)/Cube 0:

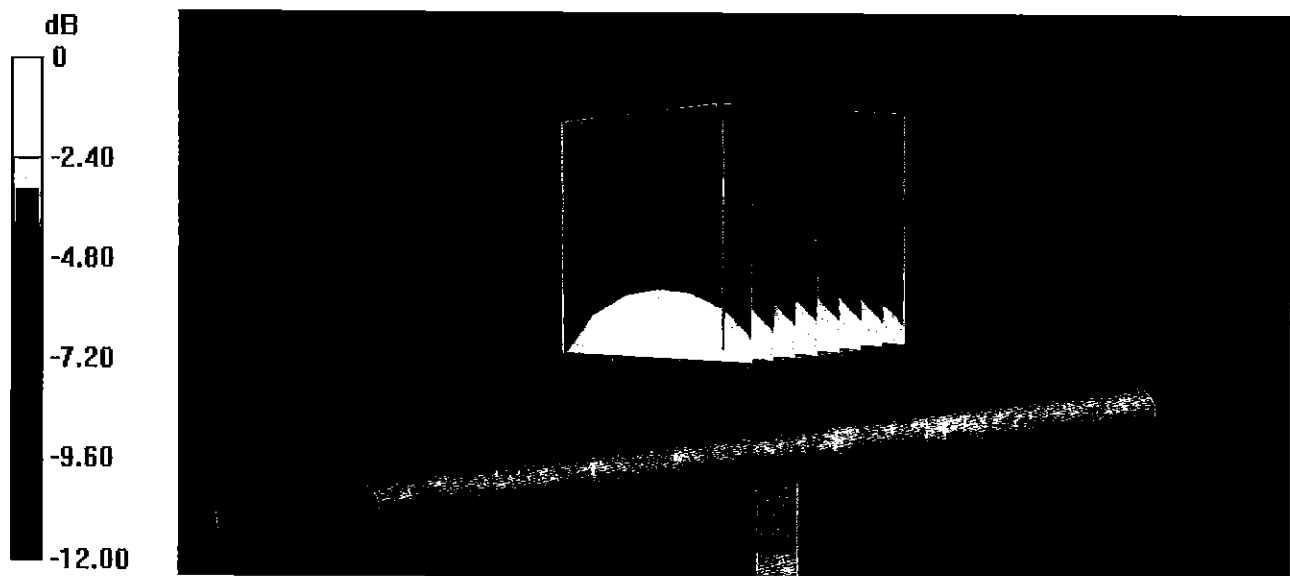
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.31 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 3.17 W/kg

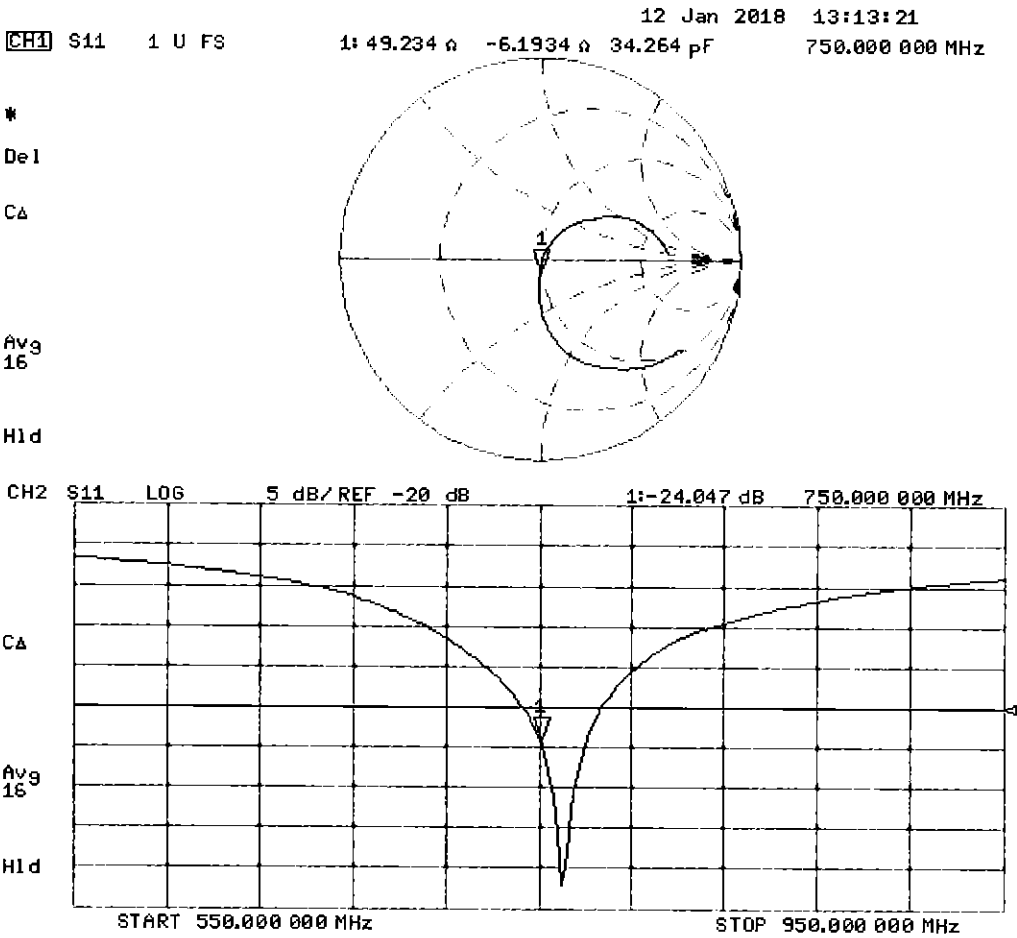
SAR(1 g) = 2.15 W/kg; SAR(10 g) = 1.43 W/kg

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



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

Impedance Measurement Plot for Body TSL



DASY5 Validation Report for SAM Head

Date: 15.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1003

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

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.9 \text{ S/m}$; $\epsilon_r = 44.2$; $\rho = 1000 \text{ kg/m}^3$

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.22, 10.22, 10.22); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

SAM Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.79 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 2.89 W/kg

SAR(1 g) = 1.98 W/kg; SAR(10 g) = 1.33 W/kg

Maximum value of SAR (measured) = 2.58 W/kg

SAM Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.85 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 2.94 W/kg

SAR(1 g) = 2.05 W/kg; SAR(10 g) = 1.38 W/kg

Maximum value of SAR (measured) = 2.62 W/kg

SAM Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 56.29 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 2.78 W/kg

SAR(1 g) = 2.01 W/kg; SAR(10 g) = 1.38 W/kg

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

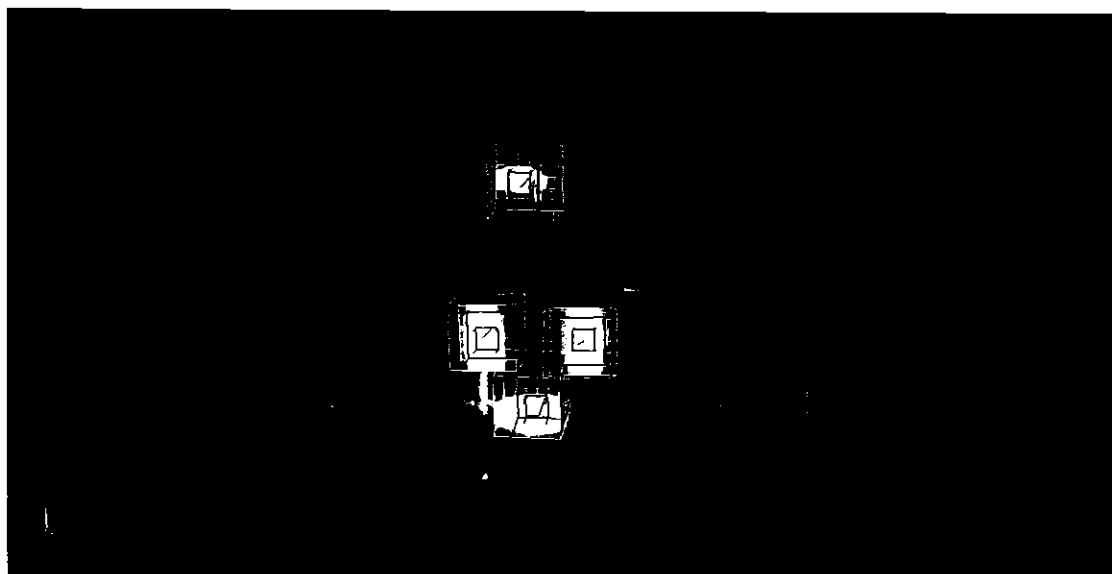
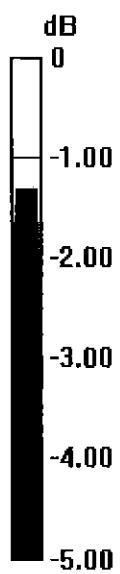
SAM Head/Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 51.01 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 2.31 W/kg

SAR(1 g) = 1.67 W/kg; SAR(10 g) = 1.15 W/kg

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



0 dB = 2.58 W/kg = 4.12 dBW/kg



Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D835V2-4d132_Jan18**

CALIBRATION CERTIFICATE

Object **D835V2 - SN:4d132**

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

Calibration date: **January 15, 2018**

BNV
01-25-2018

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

Calibrated by: **Leif Klysner** Name: **Leif Klysner** Function: **Laboratory Technician**

Approved by: **Katja Pokovic** Name: **Katja Pokovic** Function: **Technical Manager**

Signature
Leif Klysner
Katja Pokovic

Issued: January 15, 2018

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



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:

- 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
- IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5.0 mm	
Frequency	835 MHz \pm 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 \pm 0.2) °C	40.7 \pm 6 %	0.92 mho/m \pm 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	2.39 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.36 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (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	6.10 W/kg \pm 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 \pm 0.2) °C	54.8 \pm 6 %	0.99 mho/m \pm 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	2.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.71 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.62 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.39 W/kg \pm 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.8 Ω - 2.9 j Ω
Return Loss	- 29.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.4 Ω - 5.7 j Ω
Return Loss	- 23.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 22, 2011

Appendix (Additional assessments outside the scope of SCS 0108)

Measurement Conditions

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

Phantom	SAM Head Phantom	For usage with cSAR3DV2-R/L
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SAR result with SAM Head (Top)

SAR averaged over 1 cm ³ (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	9.41 W/kg \pm 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.58 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.21 W/kg \pm 16.9 % (k=2)

SAR result with SAM Head (Mouth)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.47 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.69 W/kg \pm 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.64 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.45 W/kg \pm 16.9 % (k=2)

SAR result with SAM Head (Neck)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.22 W/kg \pm 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	6.25 W/kg \pm 16.9 % (k=2)

SAR result with SAM Head (Ear)

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.03 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	7.96 W/kg \pm 17.5 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.37 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.39 W/kg \pm 16.9 % (k=2)

DASY5 Validation Report for Head TSL

Date: 08.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d132

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

Medium parameters used: $f = 835$ MHz; $\sigma = 0.92$ S/m; $\epsilon_r = 40.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

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

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

Reference Value = 63.23 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.64 W/kg

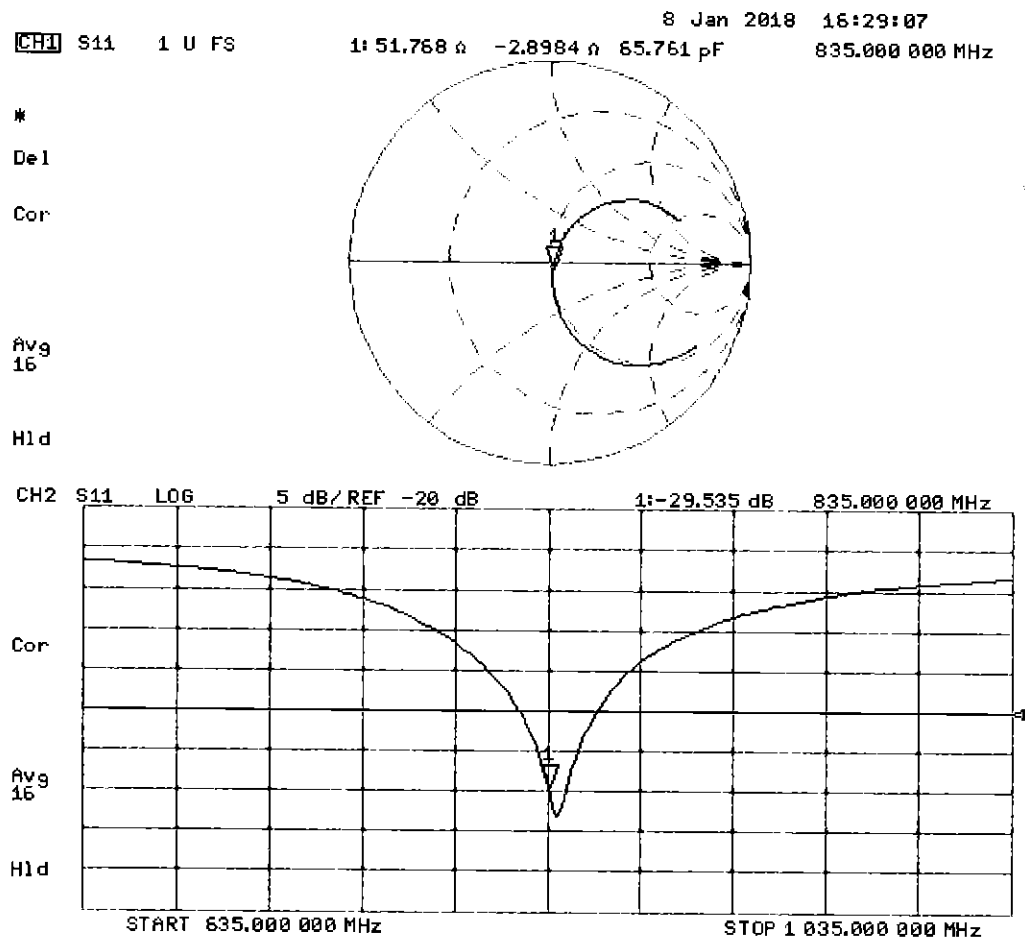
SAR(1 g) = 2.39 W/kg; SAR(10 g) = 1.55 W/kg

Maximum value of SAR (measured) = 3.22 W/kg



0 dB = 3.22 W/kg = 5.08 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 08.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d132

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

Medium parameters used: $f = 835$ MHz; $\sigma = 0.99$ S/m; $\epsilon_r = 54.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.05, 10.05, 10.05); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

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

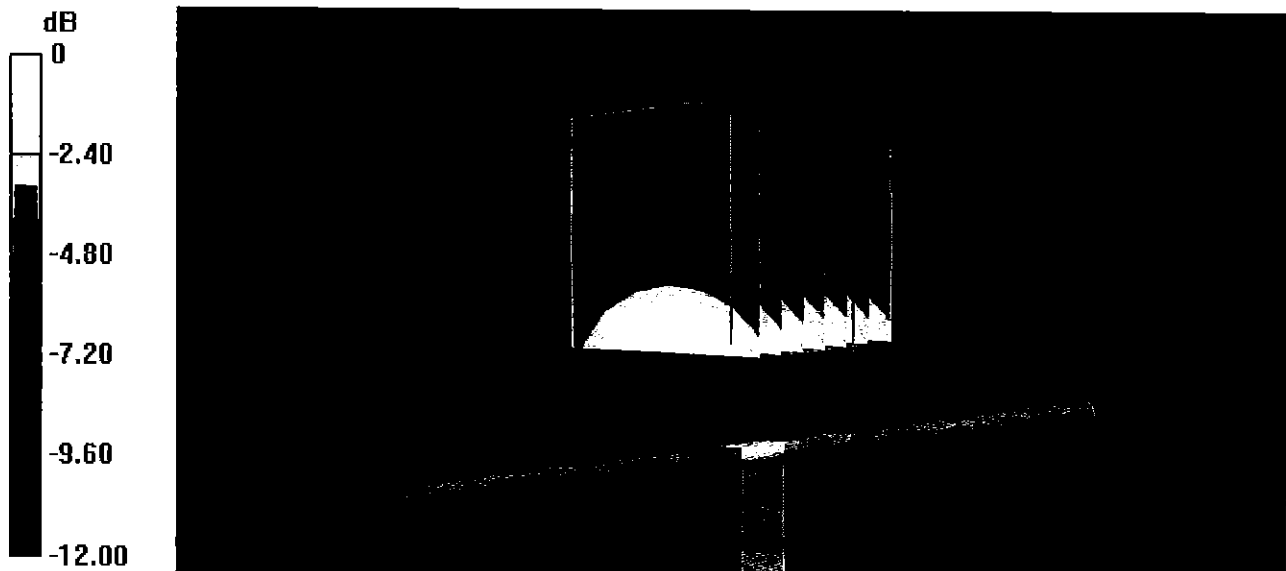
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 60.55 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 3.66 W/kg

SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.62 W/kg

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

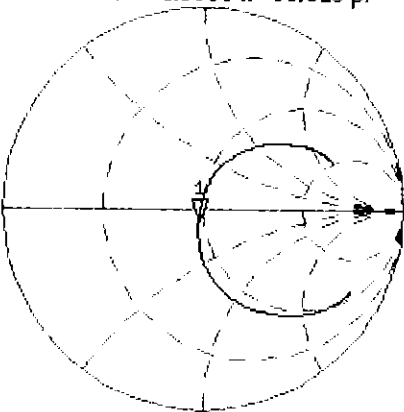


0 dB = 3.24 W/kg = 5.11 dBW/kg

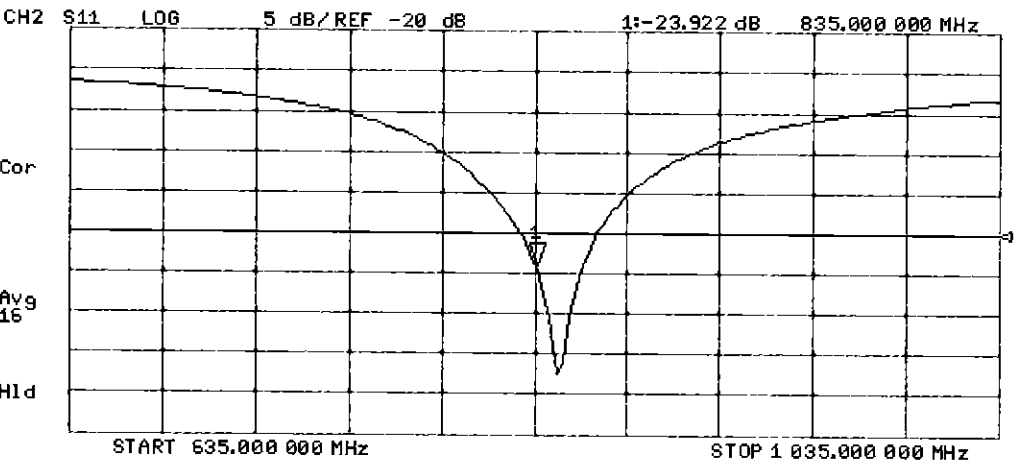
Impedance Measurement Plot for Body TSL

8 Jan 2018 16:27:09
CH1 S11 1 U FS 1: 47.447 Ω -5.6680 Ω 33.628 pF 835.000 000 MHz

*
De1
Cor



Avg
16
H1d



DASY5 Validation Report for SAM Head

Date: 15.01.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d132

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

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.94 \text{ S/m}$; $\epsilon_r = 44.1$; $\rho = 1000 \text{ kg/m}^3$

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(9.9, 9.9, 9.9); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: SAM Head
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

SAM Head/Top/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 61.00 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.56 W/kg

SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.58 W/kg

Maximum value of SAR (measured) = 3.16 W/kg

SAM Head/Mouth/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 60.99 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 3.65 W/kg

SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.64 W/kg

Maximum value of SAR (measured) = 3.19 W/kg

SAM Head/Neck/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 59.20 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 3.33 W/kg

SAR(1 g) = 2.35 W/kg; SAR(10 g) = 1.59 W/kg

Maximum value of SAR (measured) = 3.04 W/kg

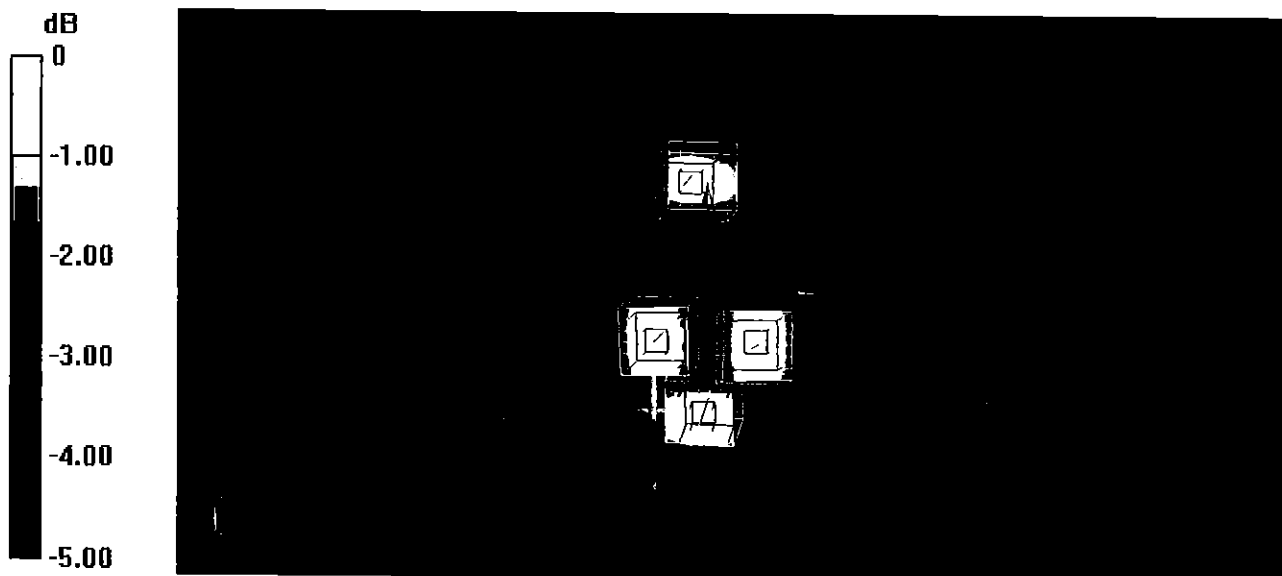
SAM Head/Ear/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 55.03 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 2.90 W/kg

SAR(1 g) = 2.03 W/kg; SAR(10 g) = 1.37 W/kg

Maximum value of SAR (measured) = 2.61 W/kg



0 dB = 2.61 W/kg = 4.17 dBW/kg



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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

Client **PC Test**

Certificate No: **D1765V2-1008_May17**

CALIBRATION CERTIFICATE

Object **D1765V2 - SN:1008**

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

Calibration date: **May 09, 2017**

BNV
05-23-2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-Dec-16 (No. EX3-7349_Dec16)	Dec-17
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

Calibrated by: **Claudio Leubler** Function: **Laboratory Technician**

Signature

Approved by: **Katja Pokovic** Technical Manager

Issued: May 11, 2017

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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:

- 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
- 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
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz \pm 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 \pm 0.2) °C	39.0 \pm 6 %	1.36 mho/m \pm 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	9.07 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.4 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.79 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.2 W/kg \pm 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.50 mho/m
Measured Body TSL parameters	(22.0 \pm 0.2) °C	53.7 \pm 6 %	1.47 mho/m \pm 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	9.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.5 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.95 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.0 W/kg \pm 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.6 Ω - 6.6 j Ω
Return Loss	- 22.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.9 Ω - 6.7 j Ω
Return Loss	- 20.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.212 ns
----------------------------------	----------

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 06, 2005

DASY5 Validation Report for Head TSL

Date: 09.05.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.46, 8.46, 8.46); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.10.0(1444); SEMCAD X 14.6.10(7416)

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

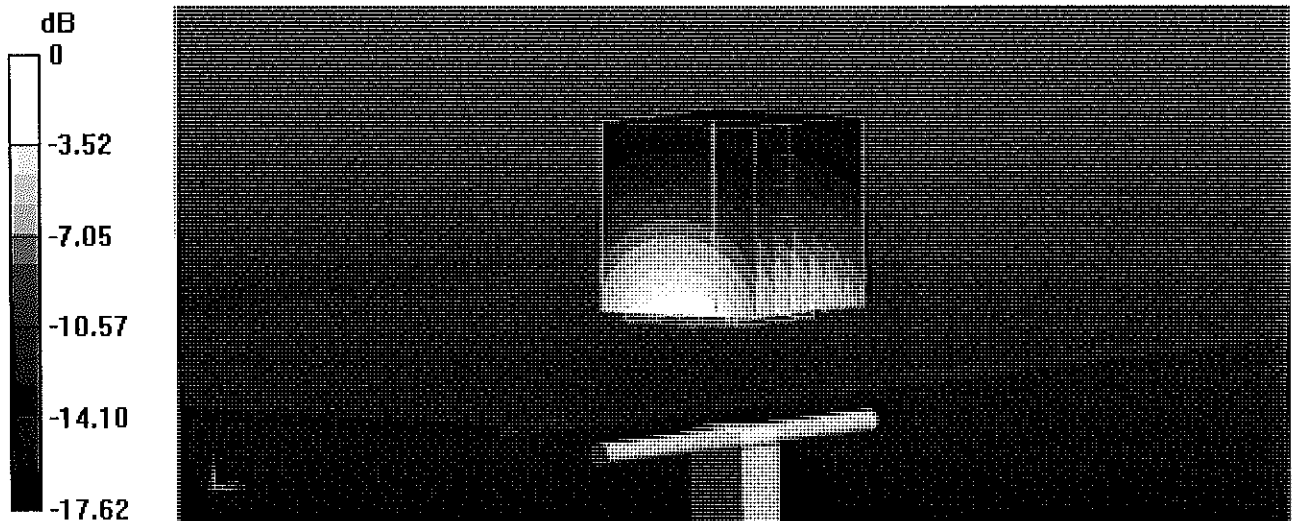
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 105.0 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 16.5 W/kg

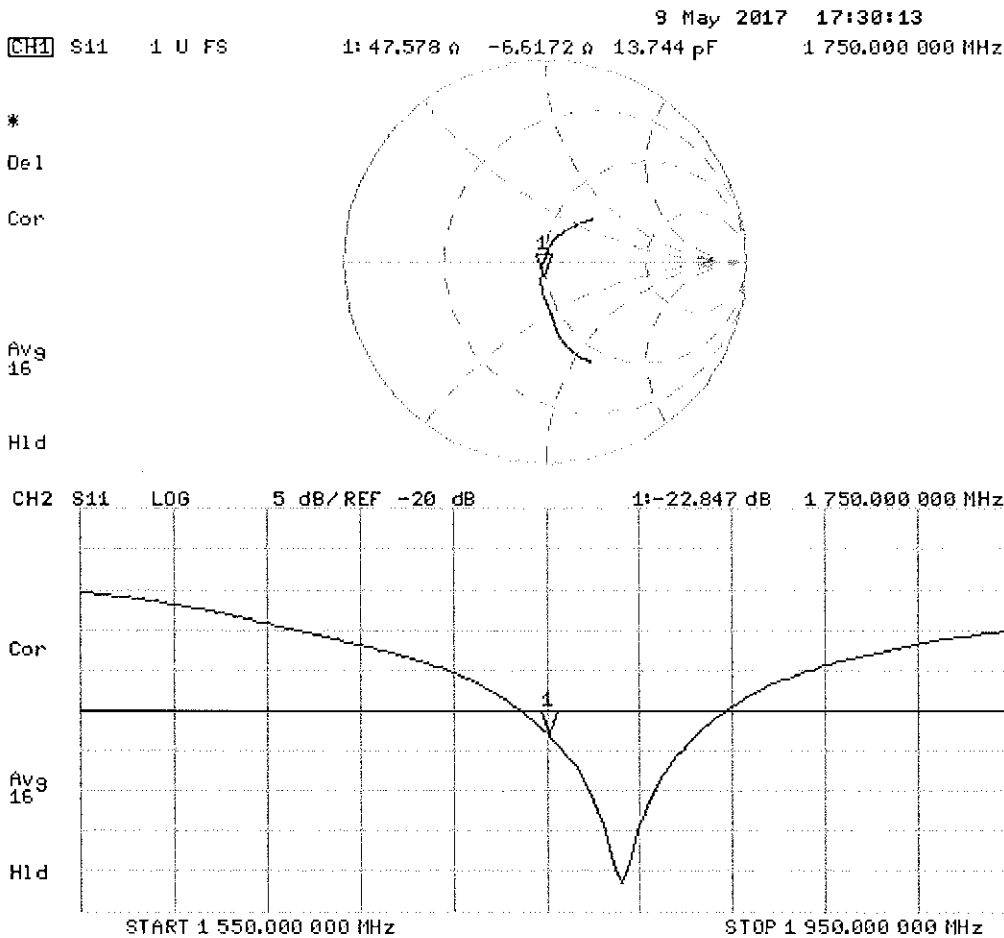
SAR(1 g) = 9.07 W/kg; SAR(10 g) = 4.79 W/kg

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



0 dB = 13.9 W/kg = 11.43 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 09.05.2017

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.47$ S/m; $\epsilon_r = 53.7$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.25, 8.25, 8.25); Calibrated: 31.12.2016;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1444); SEMCAD X 14.6.10(7416)

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

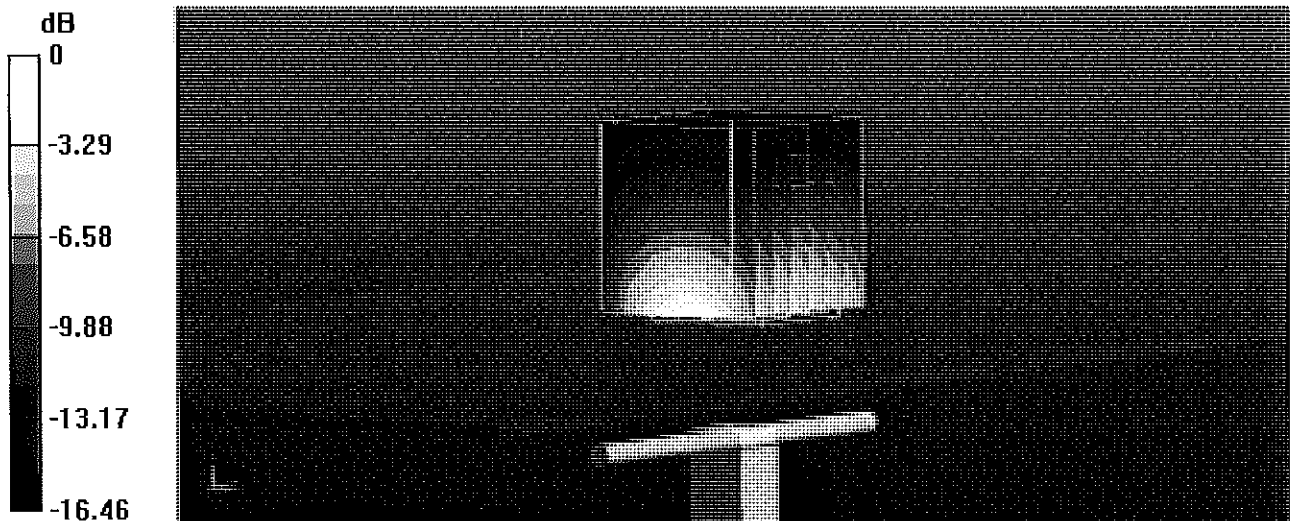
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.5 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 16.0 W/kg

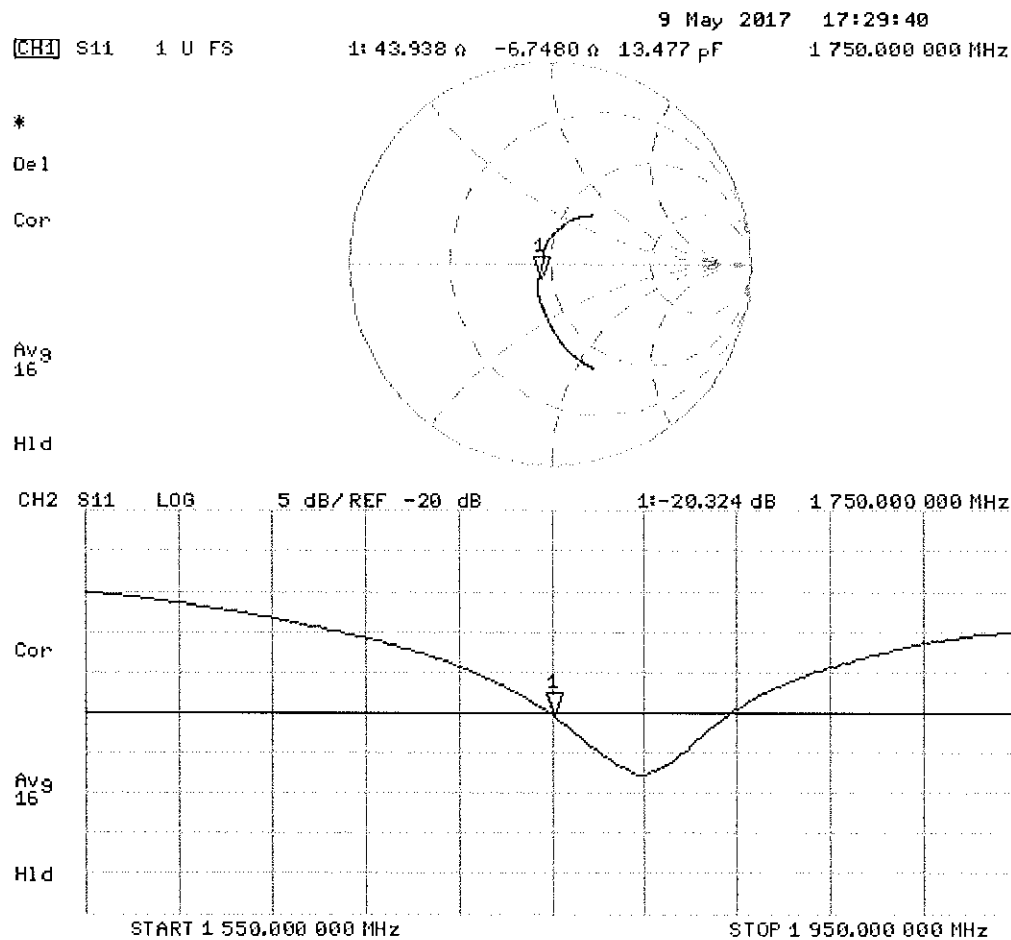
SAR(1 g) = 9.24 W/kg; SAR(10 g) = 4.95 W/kg

Maximum value of SAR (measured) = 13.6 W/kg



0 dB = 13.6 W/kg = 11.34 dBW/kg

Impedance Measurement Plot for Body TSL





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Accreditation No.: **SCS 0108**

Client **PC Test**

Certificate No: **D1900V2-5d080_Jul16**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN:5d080**

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

Calibration date: **July 08, 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

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

Issued: July 13, 2016

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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:

- 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
- 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
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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 \pm 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 \pm 0.2) °C	39.8 \pm 6 %	1.38 mho/m \pm 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	9.76 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	39.3 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.5 W/kg \pm 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 \pm 0.2) °C	52.7 \pm 6 %	1.51 mho/m \pm 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	9.75 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	39.1 W/kg \pm 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.7 W/kg \pm 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$52.1 \Omega + 5.3 j\Omega$
Return Loss	- 25.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$47.4 \Omega + 6.8 j\Omega$
Return Loss	- 22.6 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.192 ns
----------------------------------	----------

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	June 28, 2006

DASY5 Validation Report for Head TSL

Date: 08.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.38$ S/m; $\epsilon_r = 39.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.99, 7.99, 7.99); Calibrated: 15.06.2016;
- 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:

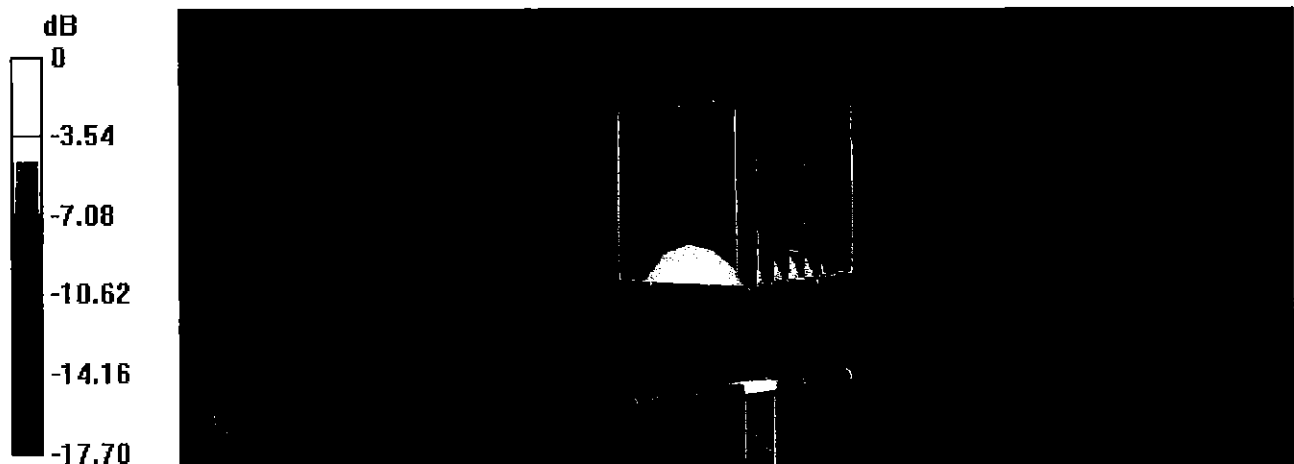
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 106.6 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 18.4 W/kg

SAR(1 g) = 9.76 W/kg; SAR(10 g) = 5.1 W/kg

Maximum value of SAR (measured) = 15.0 W/kg

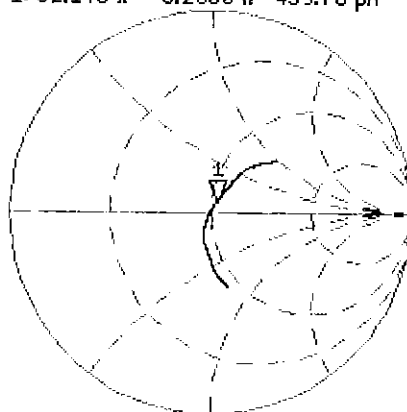


0 dB = 15.0 W/kg = 11.76 dBW/kg

Impedance Measurement Plot for Head TSL

8 Jul 2016 16:18:04
 CH1 S11 1 U FS 1: 52.143 Ω 5.2500 Ω 439.78 μH 1 900.000 000 MHz

*
 Del
 Cor



Avg
 16

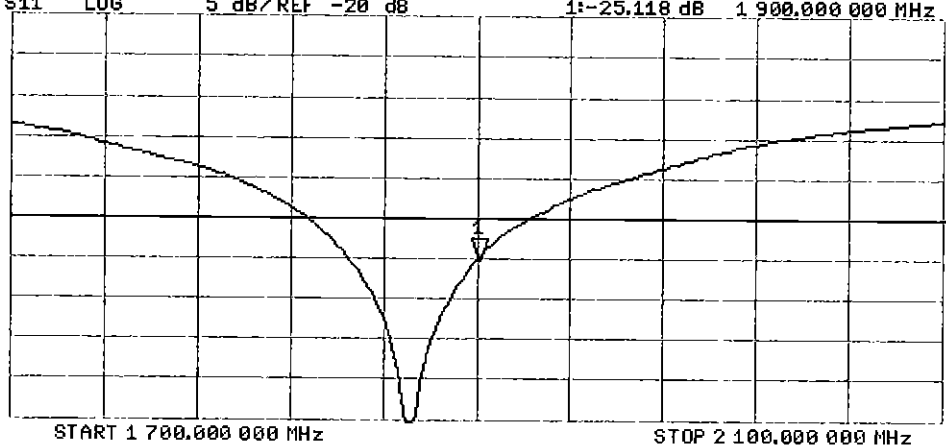
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1:-25.118 dB 1 900.000 000 MHz

Cor

Avg
 16

H1d



DASY5 Validation Report for Body TSL

Date: 08.07.2016

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.51$ S/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

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: 15.06.2016;
- 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 = 103.1 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 17.1 W/kg

SAR(1 g) = 9.75 W/kg; SAR(10 g) = 5.17 W/kg

Maximum value of SAR (measured) = 14.7 W/kg

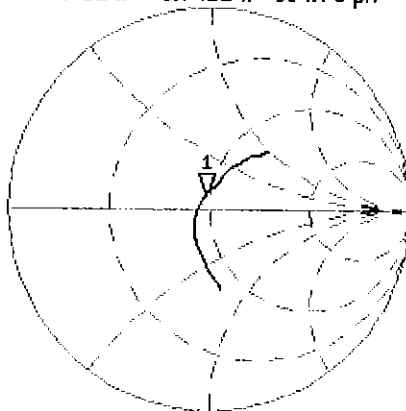


0 dB = 14.7 W/kg = 11.67 dBW/kg

Impedance Measurement Plot for Body TSL

8 Jul 2016 16:16:56
CH1 S11 1 U FS 1: 47.412 Ω 6.7422 Ω 564.78 μH 1 900.000 000 MHz

*
De1
Cor



Avg
16

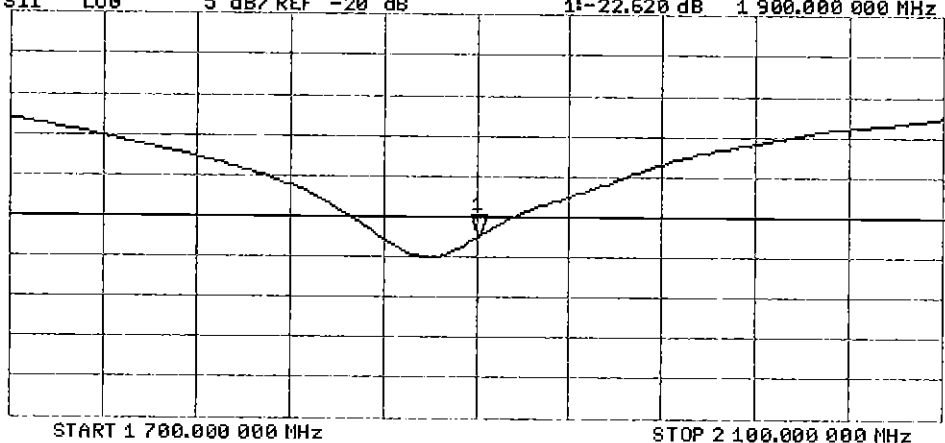
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1:-22.620 dB 1 900.000 000 MHz

Cor

Avg
16

H1d



Certification of Calibration

Object D1900V2 – SN: 5d080

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

Calibration date: July 06, 2017

Description: SAR Validation Dipole at 1900 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433971
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/1/2017	Annual	6/1/2018	MY53401181
Agilent	8753ES	S-Parameter Network Analyzer	10/26/2016	Annual	10/26/2017	US39170118
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/13/2017	Annual	3/13/2018	1415
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2017	Annual	5/10/2018	1070
SPEAG	ES3DV3	SAR Probe	3/14/2017	Annual	3/14/2018	3209
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1207364
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1339018
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Agilent	N5182A	MXG Vector Signal Generator	2/28/2017	Annual	2/28/2018	MY47420800
Seekonk	NC-100	Torque Wrench	11/6/2015	Biennial	11/6/2017	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A

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

	Name	Function	Signature
Calibrated By:	Brodie Halfoster	Test Engineer	<i>BRODIE HALFOSTER</i>
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	<i>KOK</i>

DIPOLE CALIBRATION EXTENSION

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

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

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

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
7/8/2016	7/8/2017	1.192	3.93	3.86	-1.78%	2.05	2	-2.44%	52.1	52.9	0.8	5.3	4.7	0.6	-25.1	-25.6	-2.00%	PASS
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
7/8/2016	7/8/2017	1.192	3.91	4.05	3.58%	2.07	2.11	1.93%	47.4	48.5	1.1	6.8	5.1	1.7	-22.6	-25.5	-12.80%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL

