



# PCTEST ENGINEERING LABORATORY, INC.

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## SAR EVALUATION REPORT

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

**Date of Testing:**  
07/05/16 - 07/25/16  
**Test Site/Location:**  
PCTEST Lab, Columbia, MD, USA  
**Document Serial No.:**  
0Y1607051171-R4.ZNF

**FCC ID:** ZNFH910

**APPLICANT:** LG ELECTRONICS MOBILECOMM U.S.A., INC.

**DUT Type:** Portable Handset  
**Application Type:** Certification  
**FCC Rule Part(s):** CFR §2.1093  
**Model(s):** LG-H910, LGH910, H910, LG-H915, LGH915, H915

Equipment Class	Band & Mode	Tx Frequency	SAR			
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)	10 gm Phablet (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.31	0.38	0.53	N/A
PCE	UMTS 850	826.40 - 846.60 MHz	0.44	0.29	0.43	N/A
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.40	1.11	1.11	N/A
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.21	0.48	0.48	N/A
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.32	0.75	0.75	N/A
PCE	LTE Band 12	699.7 - 715.3 MHz	0.87	0.30	0.36	N/A
PCE	LTE Band 17	706.5 - 713.5 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.54	0.41	0.56	N/A
PCE	LTE Band 66 (AWS)	1712.5 - 1777.5 MHz	0.41	1.18	1.18	N/A
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A	N/A
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	0.33	0.60	0.75	N/A
PCE	LTE Band 30	2307.5 - 2312.5 MHz	0.11	0.28	0.55	N/A
PCE	LTE Band 7	2502.5 - 2567.5 MHz	< 0.1	0.22	0.32	N/A
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.46	0.32	0.37	N/A
NIJ	U-NII-1	5180 - 5240 MHz	N/A	N/A	0.18	N/A
NIJ	U-NII-2A	5260 - 5320 MHz	0.39	<0.1	N/A	0.80
NIJ	U-NII-2C	5500 - 5720 MHz	0.39	0.23	N/A	0.55
NIJ	U-NII-3	5745 - 5825 MHz	0.49	0.25	0.32	N/A
DSS	Bluetooth	2402 - 2480 MHz	N/A	<0.1	N/A	0.11
<b>Simultaneous SAR per KDB 690783 D01v01r03:</b>			1.42	1.51	1.59	1.36

Note: This revised Test Report (S/N: 0Y1607051171-R4.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
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1750	Voice/Data	1712.4 - 1752.6 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 17	Voice/Data	706.5 - 713.5 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1712.5 - 1777.5 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 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
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

## 1.2 Power Reduction for SAR

This device uses a 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. The reduced powers for the power reduction mechanism were confirmed via conducted power measurements at the RF port (See Section 9).

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### 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 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
GSM/GPRS/EDGE 850	Maximum	<b>33.7</b>	<b>33.7</b>	<b>32.2</b>	<b>29.7</b>	<b>28.7</b>	<b>27.2</b>	<b>27.2</b>	<b>26.7</b>	<b>26.7</b>
	Nominal	<b>33.2</b>	<b>33.2</b>	<b>31.7</b>	<b>29.2</b>	<b>28.2</b>	<b>26.7</b>	<b>26.7</b>	<b>26.2</b>	<b>26.2</b>
GSM/GPRS/EDGE 1900	Maximum	<b>30.7</b>	<b>30.7</b>	<b>29.2</b>	<b>27.2</b>	<b>25.7</b>	<b>26.2</b>	<b>26.2</b>	<b>25.7</b>	<b>25.7</b>
	Nominal	<b>30.2</b>	<b>30.2</b>	<b>28.7</b>	<b>26.7</b>	<b>25.2</b>	<b>25.7</b>	<b>25.7</b>	<b>25.2</b>	<b>25.2</b>

Mode / Band		Modulated Average (dBm)		
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA
UMTS Band 5 (850 MHz)	Maximum	<b>24.7</b>	<b>24.7</b>	<b>24.7</b>
	Nominal	<b>24.2</b>	<b>24.2</b>	<b>24.2</b>
UMTS Band 4 (1750 MHz)	Maximum	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>
	Nominal	<b>24.5</b>	<b>24.5</b>	<b>24.5</b>
UMTS Band 2 (1900 MHz)	Maximum	<b>25.0</b>	<b>25.0</b>	<b>25.0</b>
	Nominal	<b>24.5</b>	<b>24.5</b>	<b>24.5</b>

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	<b>25.0</b>
	Nominal	<b>24.5</b>
LTE Band 17	Maximum	<b>25.0</b>
	Nominal	<b>24.5</b>
LTE Band 5 (Cell)	Maximum	<b>25.0</b>
	Nominal	<b>24.5</b>
LTE Band 66 (AWS)	Maximum	<b>25.0</b>
	Nominal	<b>24.5</b>
LTE Band 4 (AWS)	Maximum	<b>25.0</b>
	Nominal	<b>24.5</b>
LTE Band 2 (PCS)	Maximum	<b>25.2</b>
	Nominal	<b>24.7</b>
LTE Band 30	Maximum	<b>23.7</b>
	Nominal	<b>23.2</b>
LTE Band 7	Maximum	<b>23.7</b>
	Nominal	<b>23.2</b>

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### 1.3.1 Maximum WLAN/BT Power

This device only supports SISO operations on the secondary antenna for 802.11b. The below 802.11 a/g/n/ac secondary antenna powers are included to represent the maximum allowed output power the device can operate in CDD or MIMO SDM modes for simultaneous transmission evaluation purposes.

Mode / Band		Modulated Average - Single Tx Chain (Primary) (dBm)			Mode / Band		Modulated Average - Single Tx Chain (Secondary) (dBm)		
		Ch. 1-3	Ch. 4-8	Ch. 9-11			Ch. 1-3	Ch. 4-8	Ch. 9-11
IEEE 802.11b (2.4 GHz)	Maximum	19.0	20.0	18.0	IEEE 802.11b (2.4 GHz)	Maximum	19.5	20.0	19.0
	Nominal	18.0	19.0	17.0		Nominal	18.5	19.0	18.0
IEEE 802.11g (2.4 GHz)	Maximum	14.5	15.5	13.5	IEEE 802.11g (2.4 GHz)	Maximum	15.0	15.5	14.5
	Nominal	13.5	14.5	12.5		Nominal	14.0	14.5	13.5
IEEE 802.11n (2.4 GHz)	Maximum	14.5	15.5	13.5	IEEE 802.11n (2.4 GHz)	Maximum	15.0	15.5	14.5
	Nominal	13.5	14.5	12.5		Nominal	14.0	14.5	13.5
IEEE 802.11ac (2.4 GHz)	Maximum	14.5	15.5	13.5	IEEE 802.11ac (2.4 GHz)	Maximum	15.0	15.5	14.5
	Nominal	13.5	14.5	12.5		Nominal	14.0	14.5	13.5

Mode / Band		Modulated Average - MIMO (dBm)		
		Ch. 1-3	Ch. 4-8	Ch. 9-11
IEEE 802.11g (2.4 GHz)	Maximum	17.8	18.5	17.0
	Nominal	16.8	17.5	16.0
IEEE 802.11n (2.4 GHz)	Maximum	17.8	18.5	17.0
	Nominal	16.8	17.5	16.0
IEEE 802.11ac (2.4 GHz)	Maximum	17.8	18.5	17.0
	Nominal	16.8	17.5	16.0

Mode / Band		Modulated Average - Single Tx Chain (Primary) (dBm)			
		20 MHz Bandwidth	40 MHz Bandwidth		80 MHz Bandwidth
			Ch. 38, 62, 102	Ch. 46, 54, 110, 134, 142, 151, 159	Ch. 42, 58, 106
IEEE 802.11a (5 GHz)	Maximum	15.0			
	Nominal	14.0			
IEEE 802.11n (5 GHz)	Maximum	15.0	12.0	14.0	
	Nominal	14.0	11.0	13.0	
IEEE 802.11ac (5 GHz)	Maximum	15.0	12.0	14.0	11.5
	Nominal	14.0	11.0	13.0	10.5

Mode / Band		Modulated Average - Single Tx Chain (Secondary) (dBm)			
		20 MHz Bandwidth	40 MHz Bandwidth		80 MHz Bandwidth
			Ch. 38, 62, 102	Ch. 46, 54, 110, 134, 142, 151, 159	Ch. 42, 58, 106
IEEE 802.11a (5 GHz)	Maximum	14.0			
	Nominal	13.0			
IEEE 802.11n (5 GHz)	Maximum	14.0	11.0	13.0	
	Nominal	13.0	10.0	12.0	
IEEE 802.11ac (5 GHz)	Maximum	14.0	11.0	13.0	10.5
	Nominal	13.0	10.0	12.0	9.5

Mode / Band		Modulated Average - MIMO (dBm)			
		20 MHz Bandwidth	40 MHz Bandwidth		80 MHz Bandwidth
			Ch. 38, 62, 102	Ch. 46, 54, 110, 134, 142, 151, 159	Ch. 42, 58, 106
IEEE 802.11a (5 GHz)	Maximum	17.5			
	Nominal	16.5			
IEEE 802.11n (5 GHz)	Maximum	17.5	14.5	16.5	
	Nominal	16.5	13.5	15.5	
IEEE 802.11ac (5 GHz)	Maximum	17.5	14.5	16.5	14.0
	Nominal	16.5	13.5	15.5	13.0

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Mode / Band		Modulated Average (dBm)
Bluetooth (1 Mbps)	Maximum	<b>13.0</b>
	Nominal	<b>12.0</b>
Bluetooth (2 Mbps)	Maximum	<b>11.0</b>
	Nominal	<b>10.0</b>
Bluetooth (3 Mbps)	Maximum	<b>11.0</b>
	Nominal	<b>10.0</b>
Bluetooth LE	Maximum	<b>6.0</b>
	Nominal	<b>5.0</b>

### 1.3.2 Reduced WLAN Power

This device only supports SISO operations on the secondary antenna for 802.11b. The below 802.11 a/g/n/ac secondary antenna powers are included to represent the maximum allowed output power the device can operate in CDD or MIMO SDM modes for simultaneous transmission evaluation purposes.

Mode / Band		Modulated Average - Single Tx Chain (Primary) (dBm)	Mode / Band		Modulated Average - Single Tx Chain (Secondary) (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	<b>12.5</b>	IEEE 802.11b (2.4 GHz)	Maximum	<b>5.5</b>
	Nominal	<b>11.5</b>		Nominal	<b>4.5</b>
IEEE 802.11g (2.4 GHz)	Maximum	<b>12.5</b>	IEEE 802.11g (2.4 GHz)	Maximum	<b>5.5</b>
	Nominal	<b>11.5</b>		Nominal	<b>4.5</b>
IEEE 802.11n (2.4 GHz)	Maximum	<b>12.5</b>	IEEE 802.11n (2.4 GHz)	Maximum	<b>5.5</b>
	Nominal	<b>11.5</b>		Nominal	<b>4.5</b>
IEEE 802.11ac (2.4 GHz)	Maximum	<b>12.5</b>	IEEE 802.11ac (2.4 GHz)	Maximum	<b>5.5</b>
	Nominal	<b>11.5</b>		Nominal	<b>4.5</b>

Mode / Band		Modulated Average - MIMO (dBm)
IEEE 802.11g (2.4 GHz)	Maximum	<b>13.3</b>
	Nominal	<b>12.3</b>
IEEE 802.11n (2.4 GHz)	Maximum	<b>13.3</b>
	Nominal	<b>12.3</b>
IEEE 802.11ac (2.4 GHz)	Maximum	<b>13.3</b>
	Nominal	<b>12.3</b>

Mode / Band		Modulated Average - Single Tx Chain (Primary) (dBm)				
		20 MHz Bandwidth	40 MHz Bandwidth		80 MHz Bandwidth	
			Ch. 38, 62, 102	Ch. 46, 54, 110, 134, 142, 151, 159	Ch. 42, 58, 106	Ch. 138, 155
IEEE 802.11a (5 GHz)	Maximum	<b>13.0</b>				
	Nominal	<b>12.0</b>				
IEEE 802.11n (5 GHz)	Maximum	<b>13.0</b>	<b>12.0</b>	<b>13.0</b>		
	Nominal	<b>12.0</b>	<b>11.0</b>	<b>12.0</b>		
IEEE 802.11ac (5 GHz)	Maximum	<b>13.0</b>	<b>12.0</b>	<b>13.0</b>	<b>11.5</b>	<b>13.0</b>
	Nominal	<b>12.0</b>	<b>11.0</b>	<b>12.0</b>	<b>10.5</b>	<b>12.0</b>

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Mode / Band		Modulated Average - Single Tx Chain (Secondary) (dBm)				
		20 MHz Bandwidth	40 MHz Bandwidth		80 MHz Bandwidth	
IEEE 802.11a (5 GHz)	Maximum	5.5				
	Nominal	4.5				
IEEE 802.11n (5 GHz)	Maximum	5.5	5.5			
	Nominal	4.5	4.5			
IEEE 802.11ac (5 GHz)	Maximum	5.5	5.5		5.5	
	Nominal	4.5	4.5		4.5	
Mode / Band		Modulated Average - MIMO (dBm)				
		20 MHz Bandwidth	40 MHz Bandwidth		80 MHz Bandwidth	
			Ch. 38, 62, 102	Ch. 46, 54, 110, 134, 142, 151, 159	Ch. 42, 58, 106	Ch. 138, 155
IEEE 802.11a (5 GHz)	Maximum	13.7				
	Nominal	12.7				
IEEE 802.11n (5 GHz)	Maximum	13.7	12.9	13.7		
	Nominal	12.7	11.9	12.7		
IEEE 802.11ac (5 GHz)	Maximum	13.7	12.9	13.7	12.5	13.7
	Nominal	12.7	11.9	12.7	11.5	12.7

## 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 Ant 1	Yes	Yes	No	Yes	Yes	Yes
UMTS 850 Ant 1	Yes	Yes	No	Yes	Yes	Yes
UMTS 1750 Ant 2	Yes	Yes	No	Yes	No	Yes
GPRS 1900 Ant 2	Yes	Yes	No	Yes	No	Yes
UMTS 1900 Ant 2	Yes	Yes	No	Yes	No	Yes
LTE Band 12 Ant 1	Yes	Yes	No	Yes	Yes	Yes
LTE Band 5 (Cell) Ant 1	Yes	Yes	No	Yes	Yes	Yes
LTE Band 66 (AWS) Ant 2	Yes	Yes	No	Yes	No	Yes
LTE Band 2 (PCS) Ant 2	Yes	Yes	No	Yes	No	Yes
LTE Band 30 Ant 1	Yes	Yes	No	Yes	Yes	Yes
LTE Band 7 Ant 1	Yes	Yes	No	Yes	Yes	Yes
UMTS 850 Ant 3	Yes	Yes	Yes	No	Yes	Yes
LTE Band 12 Ant 3	Yes	Yes	Yes	No	Yes	Yes
LTE Band 5 (Cell) Ant 3	Yes	Yes	Yes	No	Yes	Yes
2.4 GHz WLAN Primary	Yes	Yes	Yes	No	Yes	No
2.4 GHz WLAN Secondary	Yes	Yes	Yes	No	Yes	No
2.4 GHz WLAN MIMO	Yes	Yes	Yes	No	Yes	No
5 GHz WLAN Primary	Yes	Yes	Yes	No	Yes	No
5 GHz WLAN Secondary	Yes	Yes	Yes	No	Yes	No
Bluetooth	Yes	Yes	Yes	No	Yes	No

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.

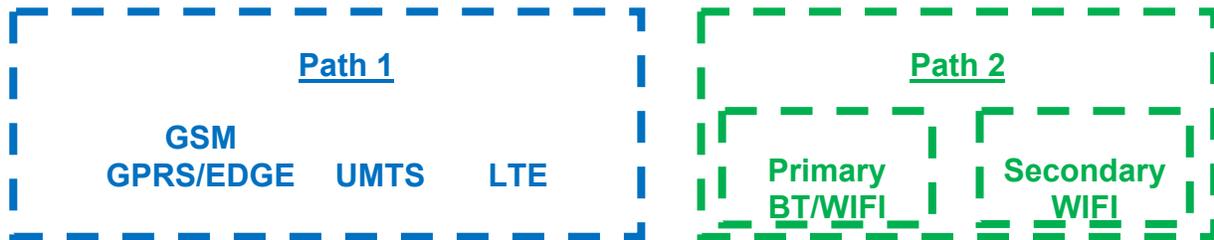
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## 1.5 Near Field Communications (NFC) Antenna

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. Possible transmission paths for the DUT are shown in Figure 1-1 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.



**Figure 1-1**  
**Simultaneous Transmission Paths**

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.

**Table 1-2**  
**Simultaneous Transmission Scenarios**

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

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1. All licensed modes share the same antenna path and cannot transmit simultaneously.
2. 2.4 GHz WLAN and 5 GHz WLAN that share the same antenna path cannot transmit simultaneously.
3. 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.
4. Per the manufacturer, WIFI Direct is expected to be used in conjunction with a held-to-ear or body-worn accessory voice call only. Simultaneous transmission scenarios involving WIFI direct are listed in the above table.
5. 5 GHz Wireless Router is only supported for the U-NII-1 and U-NII-3 by S/W, therefore U-NII-2A and U-NII-2C were not evaluated for wireless router conditions.
6. This device supports 2x2 MIMO Tx for WLAN 802.11 a/g/n/ac when both primary and secondary WLAN antennas transmit together. Independent (SISO) WLAN transmission from the secondary WLAN antenna is limited to 2.4 GHz 802.11b mode only.
7. This device supports VOLTE and VoWIFI.

## 1.7 Miscellaneous SAR Test Considerations

### (A) WIFI/BT

Since Wireless Router operations are not allowed by the chipset firmware using U-NII-2A & U-NII-2C WIFI, only 2.4 GHz and U-NII-1 & 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.

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, Head and Bodyworn SAR are not required for U-NII-1 band according to FCC KDB Publication 248227 D01v02r02. 10g SAR measurements analysis applies a factor of 2.5 to the procedures outlines above.

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) 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 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.

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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 LTE Carrier Aggregation (CA) in the downlink only. All uplink communications are identical to Release 8 specifications. Per FCC KDB Publication 941225 D05A v01r02, SAR for 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.

This device supports both LTE Band 12 and LTE Band 17. Since the supported frequency span for LTE Band 17 falls completely within the supported frequency span for LTE Band 12, LTE Band 17 target power is less than or equal to LTE Band 12 target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE Band 12.

This device supports both LTE Band 66 and LTE Band 4. Since the supported frequency span for LTE Band 4 falls completely within the supported frequency span for LTE Band 66, LTE Band 4 target power is less than or equal to LTE Band 66 target power, and both LTE bands share the same transmission path, SAR was only assessed for LTE Band 66.

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. Phablet SAR was not evaluated for licensed technologies since wireless router 1g SAR was < 1.2 W/kg for these modes.

## 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)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)

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## 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.

	Head Serial Number	Body-Worn Serial Number	Hotspot Serial Number	Phablet Serial Number
GSM/GPRS/EDGE 850 Ant 1	02747	02747	02747	-
UMTS 850 Ant 1	02747	02747	02747	-
UMTS 1750 Ant 2	02747	02747	02747	-
GSM/GPRS/EDGE 1900 Ant 2	02747	02754	02754	-
UMTS 1900 Ant 2	02747	02754	02754	-
LTE Band 12 Ant 1	02689	02689	02689	-
LTE Band 5 (Cell) Ant 1	03662	02697	02697	-
LTE Band 66 (AWS) Ant 2	02697	02689	02689	-
LTE Band 2 (PCS) Ant 2	02671	02663	02663	-
LTE Band 30 Ant 1	02689	02671	02671	-
LTE Band 7 Ant 1	02671	02663	02663	-
UMTS 850 Ant 3	02754	02754	02754	-
LTE Band 12 Ant 3	02671	02689	02689	-
LTE Band 5 (Cell) Ant 3	02671	02663	02663	-
2.4 GHz WLAN Primary/ Secondary	02655	02655	02655	-
2.4 GHz WLAN MIMO	N/A	02614	02614	-
5 GHz WLAN Primary/ Secondary	02655	02655	02655	02655
Bluetooth	N/A	02655	N/A	02655

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# 2

# LTE INFORMATION

LTE Information				
<b>FCC ID</b>	<b>ZNFH910</b>			
Form Factor	Portable Handset			
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)			
	LTE Band 17 (706.5 - 713.5 MHz)			
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)			
	LTE Band 66 (AWS) (1712.5 - 1777.5 MHz)			
	LTE Band 4 (AWS) (1710.7 - 1754.3 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)			
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz			
	LTE Band 17: 5 MHz, 10 MHz			
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz			
	LTE Band 66 (AWS): 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 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz			
	LTE Band 30: 5 MHz, 10 MHz			
Channel Numbers and Frequencies (MHz)	Low	Mid	High	
	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 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): 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 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)	
UE Category	11			
Modulations Supported in UL	QPSK, 16QAM			
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 Release 10 Additional Information	This device does not support full CA features on 3GPP Release 10. It supports a maximum of 3 carriers in the downlink. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 10 Features are not supported: Relay, HetNet, Enhanced MIMO, eICN, WiFi Offloading, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.			

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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 ( $\rho$ ). 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:

- $\sigma$  = conductivity of the tissue-simulating material (S/m)
- $\rho$  = mass density of the tissue-simulating material (kg/m<sup>3</sup>)
- 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]

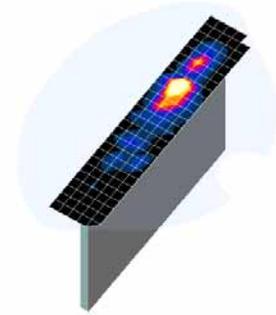
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# 4 DOSIMETRIC ASSESSMENT

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

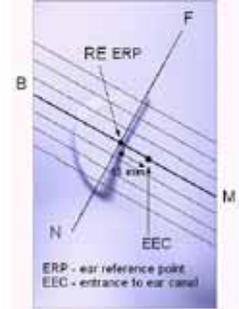
\*Also compliant to IEEE 1528-2013 Table 6

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# 5 DEFINITION OF REFERENCE POINTS

## 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].



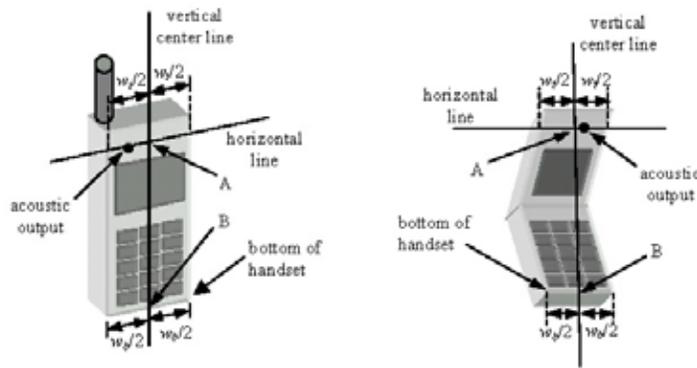
**Figure 5-1**  
Close-Up Side view of ERP

## 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

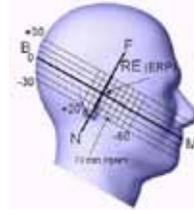
With the test device aligned in the “Cheek Position”:

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**

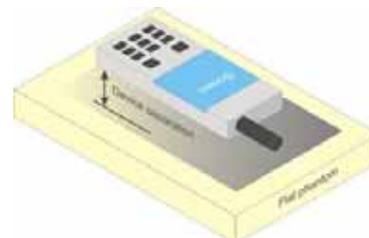
### 6.4 SAR Evaluations near the Mouth/Jaw Regions of the SAM Phantom

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 1-g body and 10-g 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.

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## 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 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  $\leq 25$  mm from that surface or edge, in direct contact with the phantom, for 10-g SAR. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g SAR > 1.2 W/kg.

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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)
<b>Peak Spatial Average SAR</b> Head	1.6	8.0
<b>Whole Body SAR</b>	0.08	0.4
<b>Peak Spatial Average SAR</b> 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<sub>n</sub> 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<sub>n</sub>, 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.

## 8.5 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).

### 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.

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## 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  $\leq 0.8$  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 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 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.

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## 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.

### 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.

### 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  $\leq 0.4$  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  $\leq 0.8$  W/kg or all test positions are measured.

### 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:

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- 1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is  $\leq 0.8$  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.

### 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  $\leq 0.8$  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 result is  $\leq 1.2$  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).

### 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  $\leq 1.2$  W/kg, no additional SAR tests for the subsequent test configurations are required.

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### 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 10-g 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

Maximum Burst-Averaged Output Power										
Band	Channel	Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
		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	33.50	33.40	<b>32.10</b>	29.50	28.49	27.10	27.08	26.63	26.60
	190	33.40	33.30	<b>32.11</b>	29.60	28.52	27.20	27.03	26.70	26.64
	251	33.35	33.33	<b>32.06</b>	29.44	28.40	27.01	27.03	26.66	26.51
GSM 1900	512	30.46	30.41	28.84	<b>26.76</b>	25.26	26.00	26.00	25.34	25.41
	661	30.54	30.55	28.80	<b>26.81</b>	25.30	26.10	26.03	25.40	25.46
	810	30.39	30.41	28.90	<b>26.83</b>	25.26	26.03	26.03	25.33	25.48

Calculated Maximum Frame-Averaged Output Power										
Band	Channel	Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
		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	24.47	24.37	<b>26.08</b>	25.24	25.48	18.07	21.06	22.37	23.59
	190	24.37	24.27	<b>26.09</b>	25.34	25.51	18.17	21.01	22.44	23.63
	251	24.32	24.30	<b>26.04</b>	25.18	25.39	17.98	21.01	22.40	23.50
GSM 1900	512	21.43	21.38	22.82	<b>22.50</b>	22.25	16.97	19.98	21.08	22.40
	661	21.51	21.52	22.78	<b>22.55</b>	22.29	17.07	20.01	21.14	22.45
	810	21.36	21.38	22.88	<b>22.57</b>	22.25	17.00	20.01	21.07	22.47

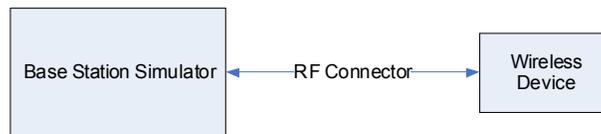
GSM 850	Frame Avg. Targets:	24.17	24.17	<b>25.68</b>	24.94	25.19	17.67	20.68	21.94	23.19
GSM 1900		21.17	21.17	22.68	<b>22.44</b>	22.19	16.67	19.68	20.94	22.19

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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**



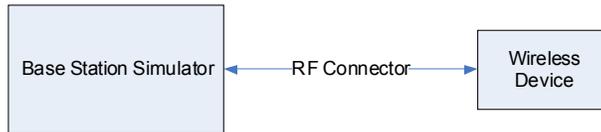
**Figure 9-1**  
**Power Measurement Setup**

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## 9.2 UMTS Conducted Powers

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	24.54	24.64	24.44	24.62	24.71	24.81	24.46	24.62	24.65	-
99		12.2 kbps AMR	24.57	24.59	24.58	24.67	24.69	24.82	24.52	24.48	24.63	-
6	HSDPA	Subtest 1	24.42	24.58	24.23	24.61	24.69	24.76	24.43	24.53	24.62	0
6		Subtest 2	24.46	24.60	24.42	24.58	24.57	24.72	24.41	24.52	24.63	0
6		Subtest 3	23.87	24.03	23.92	24.08	24.12	24.35	23.98	24.01	24.19	0.5
6		Subtest 4	23.88	24.11	23.93	24.11	24.14	24.31	23.94	24.03	24.13	0.5
6	HSUPA	Subtest 1	23.51	23.73	23.47	23.71	23.78	23.91	24.34	24.40	24.39	0
6		Subtest 2	22.34	22.53	22.32	22.63	22.69	22.82	22.67	22.63	22.68	2
6		Subtest 3	23.32	23.49	23.37	23.64	23.71	23.75	23.53	23.56	23.64	1
6		Subtest 4	22.32	22.53	22.31	22.56	22.71	22.81	22.56	22.66	22.51	2
6		Subtest 5	23.65	23.63	23.41	24.28	23.97	24.42	24.41	24.53	24.61	0

This device does not support DC-HSDPA.



**Figure 9-2**  
Power Measurement Setup

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### 9.3 LTE Conducted Powers

#### 9.3.1 LTE Band 12

Table 9-1  
LTE Band 12 Conducted Powers - 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	24.91	0	0
	1	25	24.80		0
	1	49	24.91		0
	25	0	23.84	0-1	1
	25	12	23.83		1
	25	25	23.90		1
	50	0	23.84		1
16QAM	1	0	23.98	0-1	1
	1	25	23.91		1
	1	49	23.95		1
	25	0	22.96	0-2	2
	25	12	22.94		2
	25	25	22.95		2
	50	0	22.92		2

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.

Table 9-2  
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	24.93	24.82	24.71	0	0
	1	12	24.96	24.73	24.71		0
	1	24	24.95	24.78	24.63		0
	12	0	23.83	23.76	23.70	0-1	1
	12	6	23.83	23.89	23.70		1
	12	13	23.84	23.89	23.72		1
	25	0	23.75	23.84	23.73		1
16QAM	1	0	23.99	23.94	23.97	0-1	1
	1	12	24.00	23.89	23.93		1
	1	24	23.94	23.84	23.92		1
	12	0	22.83	22.69	22.78	0-2	2
	12	6	22.90	22.86	22.73		2
	12	13	22.82	22.89	22.70		2
	25	0	22.72	22.91	22.73		2

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**Table 9-3  
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	24.80	24.77	24.79	0	0
	1	7	24.81	24.91	24.78		0
	1	14	24.76	24.90	24.91		0
	8	0	23.63	23.88	23.79	0-1	1
	8	4	23.71	23.83	23.76		1
	8	7	23.68	23.83	23.82		1
	15	0	23.71	23.78	23.79		1
16QAM	1	0	23.89	23.66	23.81	0-1	1
	1	7	23.96	23.79	23.81		1
	1	14	23.89	23.62	23.95		1
	8	0	22.65	22.77	22.73	0-2	2
	8	4	22.73	22.87	22.64		2
	8	7	22.66	22.76	22.70		2
	15	0	22.84	22.77	22.72		2

**Table 9-4  
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	24.80	24.78	24.81	0	0
	1	2	24.71	24.85	24.89		0
	1	5	24.68	24.91	24.81		0
	3	0	24.79	24.90	24.63		0
	3	2	24.84	24.92	24.68		0
	3	3	24.71	24.76	24.53	0	
	6	0	23.65	23.73	23.66	0-1	1
16QAM	1	0	23.90	23.77	23.63	0-1	1
	1	2	23.85	23.96	23.68		1
	1	5	23.78	23.70	23.55		1
	3	0	23.84	23.75	23.90		1
	3	2	23.73	23.75	23.99		1
	3	3	23.57	23.68	23.91		1
	6	0	22.69	22.80	22.62	0-2	2

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9.3.2

LTE Band 5 (Cell)

Table 9-5  
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	24.66	0	0
	1	25	24.46		0
	1	49	24.66		0
	25	0	23.63	0-1	1
	25	12	23.61		1
	25	25	23.60		1
	50	0	23.62		1
16QAM	1	0	23.69	0-1	1
	1	25	23.68		1
	1	49	23.62		1
	25	0	22.62	0-2	2
	25	12	22.67		2
	25	25	22.67		2
	50	0	22.57		2

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.

Table 9-6  
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	24.64	24.58	24.57	0	0
	1	12	24.64	24.35	24.54		0
	1	24	24.65	24.43	24.29		0
	12	0	23.59	23.40	23.43	0-1	1
	12	6	23.49	23.39	23.49		1
	12	13	23.50	23.38	23.47		1
	25	0	23.48	23.39	23.44		1
16QAM	1	0	23.62	23.48	23.62	0-1	1
	1	12	23.65	23.38	23.68		1
	1	24	23.68	23.50	23.62		1
	12	0	22.66	22.41	22.44	0-2	2
	12	6	22.58	22.47	22.53		2
	12	13	22.55	22.46	22.48		2
	25	0	22.50	22.56	22.44		2

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**Table 9-7**  
**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	24.63	24.68	24.48	0	0
	1	7	24.68	24.70	24.51		0
	1	14	24.59	24.59	24.54		0
	8	0	23.55	23.56	23.39	0-1	1
	8	4	23.60	23.36	23.49		1
	8	7	23.52	23.45	23.40		1
	15	0	23.56	23.52	23.48		1
16QAM	1	0	23.64	23.44	23.49	0-1	1
	1	7	23.62	23.51	23.59		1
	1	14	23.70	23.35	23.43		1
	8	0	22.56	22.58	22.28	0-2	2
	8	4	22.65	22.51	22.47		2
	8	7	22.54	22.52	22.40		2
	15	0	22.72	22.48	22.45		2

**Table 9-8**  
**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	24.68	24.49	24.38	0	0
	1	2	24.63	24.48	24.41		0
	1	5	24.61	24.52	24.26		0
	3	0	24.67	24.61	24.54		0
	3	2	24.51	24.61	24.53		0
	3	3	24.64	24.50	24.43		0
	6	0	23.53	23.39	23.31	0-1	1
16QAM	1	0	23.69	23.39	23.40	0-1	1
	1	2	23.66	23.39	23.49		1
	1	5	23.62	23.41	23.40		1
	3	0	23.65	23.57	23.48		1
	3	2	23.68	23.56	23.37		1
	3	3	23.70	23.54	23.30		1
	6	0	22.61	22.44	22.26	0-2	2

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LTE Band 66 (AWS)

**Table 9-9**  
**LTE Band 66 (AWS) 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	24.68	24.61	25.00	0	0
	1	50	24.64	24.95	24.82		0
	1	99	24.65	24.54	24.66		0
	50	0	23.79	23.80	23.88	0-1	1
	50	25	23.81	23.86	23.95		1
	50	50	23.72	23.74	23.92		1
16QAM	100	0	23.73	23.77	23.86	0-1	1
	1	0	23.84	23.71	23.86		1
	1	50	23.77	23.86	23.90		1
	1	99	23.58	23.64	23.99	0-2	1
	50	0	22.80	22.79	22.88		2
	50	25	22.80	22.84	22.96		2
	50	50	22.68	22.70	22.92	2	
	100	0	22.73	22.76	22.91	2	

**Table 9-10**  
**LTE Band 66 (AWS) 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	24.64	24.78	24.92	0	0
	1	36	24.66	24.71	25.00		0
	1	74	24.83	24.57	24.89		0
	36	0	23.66	23.82	23.96	0-1	1
	36	18	23.65	23.85	23.98		1
	36	37	23.57	23.75	23.99		1
16QAM	75	0	23.79	23.79	23.86	0-1	1
	1	0	23.50	23.93	23.93		1
	1	36	23.52	23.96	24.00		1
	1	74	23.56	23.85	23.92	0-2	1
	36	0	22.76	22.91	22.91		2
	36	18	22.75	22.85	22.95		2
	36	37	22.66	22.76	22.94	2	
	75	0	22.79	22.79	22.89	2	

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**Table 9-11**  
**LTE Band 66 (AWS) 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	24.73	25.00	24.71	0	0
	1	25	24.62	24.81	24.83		0
	1	49	24.67	24.75	24.87		0
	25	0	23.75	23.92	23.91	0-1	1
	25	12	23.70	23.87	23.93		1
	25	25	23.74	23.81	23.93		1
	50	0	23.70	23.84	23.95		1
16QAM	1	0	23.71	23.98	24.00	0-1	1
	1	25	23.73	23.94	23.98		1
	1	49	23.67	23.92	23.97		1
	25	0	22.73	22.97	22.87	0-2	2
	25	12	22.69	22.90	22.94		2
	25	25	22.68	22.82	22.93		2
	50	0	22.74	22.76	22.84		2

**Table 9-12**  
**LTE Band 66 (AWS) 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	24.64	24.80	24.91	0	0
	1	12	24.56	24.77	24.84		0
	1	24	24.61	24.67	24.71		0
	12	0	23.65	23.86	23.92	0-1	1
	12	6	23.61	23.86	23.86		1
	12	13	23.62	23.77	23.94		1
	25	0	23.61	23.79	23.97		1
16QAM	1	0	23.78	23.90	23.95	0-1	1
	1	12	23.69	23.95	23.90		1
	1	24	23.71	23.94	24.00		1
	12	0	22.69	22.81	22.94	0-2	2
	12	6	22.66	22.90	22.86		2
	12	13	22.60	22.76	22.82		2
	25	0	22.65	22.83	22.96		2

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9.3.4

LTE Band 2 (PCS)

**Table 9-13**  
**LTE Band 2 (PCS) Conducted Powers - 20 MHz Bandwidth**

LTE Band 2 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			18700 (1860.0 MHz)	18900 (1880.0 MHz)	19100 (1900.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.96	25.10	25.09	0	0
	1	50	24.92	25.14	24.90		0
	1	99	24.84	25.16	24.71		0
	50	0	24.04	24.01	24.11	0-1	1
	50	25	24.08	24.15	24.01		1
	50	50	23.87	24.05	23.86		1
16QAM	100	0	24.03	24.10	23.92	0-1	1
	1	0	24.20	24.18	24.04		1
	1	50	24.10	24.12	23.98		1
	1	99	24.13	24.20	23.82	0-2	1
	50	0	23.15	23.05	23.04		2
	50	25	23.20	23.20	23.08		2
	50	50	23.04	23.06	22.88	2	
	100	0	23.12	23.11	23.00	2	

**Table 9-14**  
**LTE Band 2 (PCS) Conducted Powers - 15 MHz Bandwidth**

LTE Band 2 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			18675 (1857.5 MHz)	18900 (1880.0 MHz)	19125 (1902.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	24.96	25.20	25.20	0	0
	1	36	25.04	25.09	25.12		0
	1	74	24.90	25.02	25.08		0
	36	0	23.96	24.01	24.13	0-1	1
	36	18	23.99	23.99	24.05		1
	36	37	23.96	23.99	24.00		1
16QAM	75	0	23.89	24.00	24.00	0-1	1
	1	0	24.15	23.86	24.20		1
	1	36	24.16	23.96	24.16		1
	1	74	24.04	23.84	24.12	0-2	1
	36	0	22.96	23.01	23.20		2
	36	18	23.11	23.03	23.17		2
	36	37	22.94	22.97	23.05	2	
	75	0	22.92	23.05	23.05	2	

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**Table 9-15**  
**LTE Band 2 (PCS) Conducted Powers - 10 MHz Bandwidth**

LTE Band 2 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			18650 (1855.0 MHz)	18900 (1880.0 MHz)	19150 (1905.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.15	25.10	25.14	0	0
	1	25	24.95	25.12	25.04		0
	1	49	25.03	25.13	25.00		0
	25	0	24.13	24.11	23.98	0-1	1
	25	12	23.98	24.14	23.94		1
	25	25	24.03	24.11	23.93		1
	50	0	24.02	24.11	23.90		1
16QAM	1	0	24.11	24.00	24.14	0-1	1
	1	25	24.11	24.10	23.94		1
	1	49	24.17	24.18	24.01		1
	25	0	23.10	23.13	23.09	0-2	2
	25	12	23.03	23.07	23.07		2
	25	25	23.08	23.10	23.08		2
	50	0	22.92	23.08	22.98		2

**Table 9-16**  
**LTE Band 2 (PCS) Conducted Powers - 5 MHz Bandwidth**

LTE Band 2 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			18625 (1852.5 MHz)	18900 (1880.0 MHz)	19175 (1907.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.15	25.12	25.02	0	0
	1	12	25.12	24.90	24.88		0
	1	24	25.16	24.93	24.87		0
	12	0	24.10	24.04	24.05	0-1	1
	12	6	24.05	24.04	23.97		1
	12	13	24.05	23.94	23.91		1
	25	0	24.01	24.06	23.97		1
16QAM	1	0	24.13	24.20	24.15	0-1	1
	1	12	24.13	24.08	24.02		1
	1	24	24.03	24.07	24.03		1
	12	0	23.07	23.06	23.02	0-2	2
	12	6	23.06	23.05	23.00		2
	12	13	23.02	22.98	22.91		2
	25	0	22.98	23.13	23.01		2

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**Table 9-17**  
**LTE Band 2 (PCS) Conducted Powers - 3 MHz Bandwidth**

LTE Band 2 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			18615 (1851.5 MHz)	18900 (1880.0 MHz)	19185 (1908.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.02	25.00	25.04	0	0
	1	7	25.10	25.13	25.02		0
	1	14	24.98	24.98	25.03		0
	8	0	23.99	24.01	23.93	0-1	1
	8	4	23.97	23.99	23.94		1
	8	7	24.00	24.03	23.89		1
	15	0	23.94	24.03	23.97		1
16QAM	1	0	24.19	23.99	23.87	0-1	1
	1	7	24.20	24.09	24.10		1
	1	14	24.11	23.76	23.93		1
	8	0	23.01	23.03	22.90	0-2	2
	8	4	23.00	23.05	22.91		2
	8	7	22.95	23.00	22.89		2
	15	0	23.05	22.92	22.91		2

**Table 9-18**  
**LTE Band 2 (PCS) Conducted Powers -1.4 MHz Bandwidth**

LTE Band 2 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			18607 (1850.7 MHz)	18900 (1880.0 MHz)	19193 (1909.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	25.03	24.91	24.91	0	0
	1	2	25.14	25.07	24.95		0
	1	5	25.01	25.00	24.97		0
	3	0	24.97	25.09	25.00		0
	3	2	25.04	25.14	25.04		0
	3	3	24.97	25.02	24.91		0
	6	0	23.90	23.95	23.81	0-1	1
16QAM	1	0	24.15	23.85	23.91	0-1	1
	1	2	24.16	24.00	24.01		1
	1	5	24.13	23.85	23.90		1
	3	0	24.09	24.05	23.97		1
	3	2	24.17	24.12	24.02		1
	3	3	24.07	24.07	24.00		1
	6	0	22.94	22.96	22.82	0-2	2

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LTE Band 30

**Table 9-19**  
**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	23.47	0	0
	1	25	23.22		0
	1	49	23.54		0
	25	0	22.35	0-1	1
	25	12	22.38		1
	25	25	22.46		1
	50	0	22.41		1
16QAM	1	0	22.54	0-1	1
	1	25	22.31		1
	1	49	22.61		1
	25	0	21.30	0-2	2
	25	12	21.35		2
	25	25	21.32		2
	50	0	21.31		2

**Table 9-20**  
**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	23.21	0	0
	1	12	23.27		0
	1	24	23.22		0
	12	0	22.25	0-1	1
	12	6	22.23		1
	12	13	22.27		1
	25	0	22.25		1
16QAM	1	0	22.34	0-1	1
	1	12	22.26		1
	1	24	22.33		1
	12	0	21.26	0-2	2
	12	6	21.32		2
	12	13	21.29		2
	25	0	21.29		2

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 9-21**  
**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	23.64	23.39	23.45	0	0
	1	50	23.48	23.51	23.45		0
	1	99	23.36	23.55	23.27		0
	50	0	22.50	22.53	22.55	0-1	1
	50	25	22.37	22.62	22.59		1
	50	50	22.31	22.68	22.55		1
16QAM	100	0	22.46	22.63	22.58	0-1	1
	1	0	22.63	22.60	22.70		1
	1	50	22.60	22.62	22.63		1
	1	99	22.48	22.61	22.60	0-2	1
	50	0	21.47	21.52	21.53		2
	50	25	21.40	21.59	21.55		2
	50	50	21.26	21.60	21.54	2	
	100	0	21.45	21.54	21.56	2	

**Table 9-22**  
**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	23.67	23.70	23.57	0	0
	1	36	23.59	23.69	23.67		0
	1	74	23.32	23.68	23.56		0
	36	0	22.59	22.65	22.58	0-1	1
	36	18	22.52	22.62	22.55		1
	36	37	22.39	22.64	22.62		1
16QAM	75	0	22.43	22.65	22.49	0-1	1
	1	0	22.61	22.61	22.60		1
	1	36	22.55	22.61	22.57		1
	1	74	22.56	22.50	22.61	0-2	1
	36	0	21.58	21.59	21.56		2
	36	18	21.54	21.56	21.56		2
	36	37	21.35	21.57	21.65	2	
	75	0	21.40	21.64	21.55	2	

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**Table 9-23**  
**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	23.63	23.64	23.63	0	0
	1	25	23.63	23.67	23.61		0
	1	49	23.61	23.66	23.63		0
	25	0	22.66	22.70	22.68	0-1	1
	25	12	22.61	22.66	22.64		1
	25	25	22.61	22.65	22.62		1
16QAM	50	0	22.70	22.65	22.67	0-1	1
	1	0	22.65	22.65	22.63		1
	1	25	22.64	22.65	22.62		1
	1	49	22.63	22.67	22.51	0-2	1
	25	0	21.62	21.64	21.67		2
	25	12	21.64	21.63	21.54		2
	25	25	21.57	21.65	21.56		2
50	0	21.63	21.70	21.64	2		

**Table 9-24**  
**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	23.69	23.62	23.64	0	0
	1	12	23.66	23.66	23.62		0
	1	24	23.65	23.55	23.53		0
	12	0	22.66	22.66	22.62	0-1	1
	12	6	22.66	22.65	22.63		1
	12	13	22.61	22.65	22.65		1
	25	0	22.54	22.62	22.61		1
16QAM	1	0	22.62	22.67	22.62	0-1	1
	1	12	22.63	22.64	22.68		1
	1	24	22.68	22.70	22.61		1
	12	0	21.70	21.62	21.70	0-2	2
	12	6	21.62	21.70	21.62		2
	12	13	21.61	21.64	21.65		2
	25	0	21.53	21.61	21.70		2

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## 9.3.7 LTE Carrier Aggregation Conducted Powers

**Table 9-25  
LTE Carrier Aggregation Conducted Powers 2CC Powers**

PCC Band	PCC								SCC				Power	
	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B2	15	740	1944	25.01	25.20
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	25.13	25.20
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B5	10	2525	881.5	25.06	25.20
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B12	10	5095	737.5	25.08	25.20
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B29	10	9715	722.5	25.03	25.20
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B30	10	9820	2355	25.02	25.20
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B2	20	900	1960	24.94	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B4	5	1975	2112.5	25.00	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B5	10	2525	881.5	24.99	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B7	20	3100	2655	24.96	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B12	10	5095	737.5	25.00	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B17	10	5790	740	24.97	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B29	10	9715	722.5	24.90	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B30	10	9820	2355	24.91	25.00
LTE B12	5	23035	701.5	QPSK	1	12	5035	731.5	LTE B2	20	900	1960	24.96	24.96
LTE B12	5	23035	701.5	QPSK	1	12	5035	731.5	LTE B4	20	2175	2132.5	25.00	24.96
LTE B12	5	23035	701.5	QPSK	1	12	5035	731.5	LTE B30	10	9820	2355	24.88	24.96
LTE B17	5	23790	710	QPSK	1	0	5790	740	LTE B4	20	2175	2132.5	24.63	24.70
LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B2	20	900	1960	24.88	24.66
LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B4	20	2175	2132.5	24.80	24.66
LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B30	10	9820	2355	24.65	24.66
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B2	20	900	1960	23.40	23.54
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B4	20	2175	2132.5	23.46	23.54
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B5	10	2525	881.5	23.38	23.54
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B12	10	5095	737.5	23.49	23.54
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B29	10	9715	722.5	23.44	23.54
LTE B7	15	21100	2535	QPSK	1	0	3100	2655	LTE B4	20	2175	2132.5	23.55	23.70
LTE B2	5	18625	1852.5	QPSK	1	24	625	1932.5	LTE B17	10	5790	740	25.15	25.16
LTE B17	5	23790	710	QPSK	1	0	5790	740	LTE B2	10	900	1960	24.68	24.70

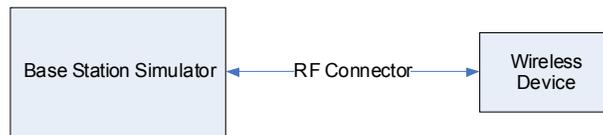
**Table 9-26  
LTE Carrier Aggregation Conducted Powers 3CC Powers**

PCC Band	PCC								SCC				SCC				Power	
	PCC Bandwidth [MHz]	PCC (UL) Channel	PCC (UL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	PCC (DL) Channel	PCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Channel	SCC (DL) Frequency [MHz]	LTE Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	LTE B5	10	2525	881.5	25.13	25.20
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	25.05	25.20
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	25.00	25.20
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	25.04	25.20
LTE B2	15	18900	1880	QPSK	1	0	900	1960	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	25.03	25.20
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B29	10	9715	722.5	LTE B30	10	9820	2355	24.99	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B5	10	2525	881.5	LTE B30	10	9820	2355	24.98	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B7	20	3100	2655	LTE B12	10	5095	737.5	24.98	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B12	10	5095	737.5	LTE B30	10	9820	2355	24.95	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B2	20	900	1960	LTE B12	10	5095	737.5	24.83	25.00
LTE B4	10	20300	1745	QPSK	1	0	2300	2145	LTE B2	20	900	1960	LTE B5	10	2525	881.5	25.00	25.00
LTE B12	5	23035	701.5	QPSK	1	12	5035	731.5	LTE B2	20	900	1960	LTE B30	10	9820	2355	24.96	24.96
LTE B12	5	23035	701.5	QPSK	1	12	5035	731.5	LTE B4	20	2175	2132.5	LTE B30	10	9820	2355	25.00	24.96
LTE B12	5	23035	701.5	QPSK	1	12	5035	731.5	LTE B7	20	3100	2655	LTE B4	20	2175	2132.5	24.90	24.96
LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B2	20	900	1960	LTE B30	10	9820	2355	24.70	24.66
LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B4	20	2175	2132.5	LTE B30	10	9820	2355	24.68	24.66
LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B4	20	2175	2132.5	LTE B2	20	900	1960	24.70	24.66
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B29	10	9715	722.5	LTE B2	20	900	1960	23.56	23.54
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B29	10	9715	722.5	LTE B4	20	2175	2132.5	23.58	23.54
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B5	10	2525	881.5	LTE B4	20	2175	2132.5	23.58	23.54
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B5	10	2525	881.5	LTE B2	20	900	1960	23.50	23.54
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B12	10	5095	737.5	LTE B2	20	900	1960	23.55	23.54
LTE B30	10	27710	2310	QPSK	1	49	9820	2355	LTE B12	10	5095	737.5	LTE B4	20	2175	2132.5	23.60	23.54
LTE B7	15	21100	2535	QPSK	1	0	3100	2655	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	23.64	23.70

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Notes:

1. The device only supports downlink Carrier Aggregation. Uplink Carrier Aggregation is not supported. For every supported combination of downlink carrier aggregation, power measurements were performed 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.
2. All control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
3. Since the supported frequency span for LTE B4 falls completely within the supported frequency span for LTE B66, both LTE bands have the same target power, and both LTE bands share the same transmission path, the configuration with the highest conducted power from LTE B66 was used to assess LTE CA combinations with LTE B4.
4. Since the supported frequency span for LTE B17 falls completely within the supported frequency span for LTE B12, both LTE bands have the same target power, and both LTE bands share the same transmission path, the configuration with the highest conducted power from LTE B12 was used to assess LTE CA combinations with LTE B17.



**Figure 9-3**  
**Power Measurement Setup**

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## 9.4 WLAN Conducted Powers

**Table 9-27**  
2.4 GHz WLAN Maximum Average RF Power – Primary Antenna

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]			
		IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ac
2412	1	18.36	14.45	13.91	13.92
2427	4	19.23	15.35	14.69	14.71
2437	6	19.34	15.25	14.80	14.75
2447	8	19.45	15.35	14.78	14.75
2462	11	17.23	13.35	13.16	13.04

**Table 9-28**  
2.4 GHz WLAN Maximum Average RF Power – Secondary Antenna

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]			
		IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ac
2412	1	19.07	14.95	14.26	14.37
2427	4	19.45	15.30	14.63	14.65
2437	6	19.74	15.39	14.83	14.87
2447	8	19.50	15.38	14.73	14.79
2462	11	18.60	14.44	13.76	13.75

**Table 9-29**  
IEEE 802.11n MIMO Average RF Power

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]		
		Primary	Secondary	MIMO
2427	4	14.69	14.63	17.67
2437	6	14.80	14.83	17.83
2447	8	14.78	14.73	17.77

**Table 9-30**  
2.4 GHz WLAN Reduced Average RF Power – Primary Antenna

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]			
		IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ac
2412	1	11.59	12.26	12.11	12.16
2437	6	11.95	12.38	12.33	12.40
2462	11	11.78	12.37	12.05	12.13

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**Table 9-31**  
**2.4 GHz WLAN Reduced Average RF Power – Secondary Antenna**

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]			
		IEEE Transmission Mode			
		802.11b	802.11g	802.11n	802.11ac
2412	1	4.82	5.11	4.88	4.84
2437	6	5.49	5.49	5.48	5.46
2462	11	5.22	5.43	5.12	5.23

**Table 9-32**  
**5 GHz WLAN Maximum Average RF Power – Primary Antenna**

Freq [MHz]	Channel	5GHz (20MHz) Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	14.38	14.31	14.46
5200	40	14.38	14.55	14.53
5220	44	14.32	14.41	14.38
5240	48	14.51	14.36	14.45
5260	52	14.88	14.71	14.70
5280	56	14.70	14.60	14.65
5300	60	14.73	14.53	14.61
5320	64	14.68	14.62	14.63
5500	100	14.42	14.33	14.38
5580	116	14.39	14.32	14.23
5660	132	14.40	14.16	14.32
5720	144	14.21	14.10	14.30
5745	149	14.56	14.30	14.36
5785	157	14.48	14.34	14.45
5825	165	14.53	14.42	14.41

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**Table 9-33  
5 GHz WLAN Maximum Average RF Power – Secondary Antenna**

Freq [MHz]	Channel	5GHz (20MHz) Conducted Power [dBm]		
		IEEE Transmission Mode		
		802.11a	802.11n	802.11ac
5180	36	13.50	13.39	13.40
5200	40	13.79	13.37	13.30
5220	44	13.51	13.41	13.32
5240	48	13.49	13.50	13.36
5260	52	13.54	13.41	13.41
5280	56	13.47	13.49	13.30
5300	60	13.47	13.34	13.35
5320	64	13.45	13.43	13.40
5500	100	13.15	13.08	13.09
5580	116	13.50	13.25	13.33
5660	132	13.55	13.40	13.47
5720	144	13.56	13.52	13.45
5745	149	13.65	13.55	13.51
5785	157	13.38	13.56	13.57
5825	165	13.32	13.38	13.44

**Table 9-34  
5 GHz WLAN Reduced Average RF Power – Primary Antenna (40MHz)**

Freq [MHz]	Channel	5GHz (40MHz) Conducted Power [dBm]	
		IEEE Transmission Mode	
		802.11n	802.11ac
5190	38	11.39	11.25
5230	46	12.01	12.24
5270	54	12.07	12.06
5310	62	11.10	11.40

**Table 9-35  
5 GHz WLAN Reduced Average RF Power – Primary Antenna (80MHz)**

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5530	106	10.63
5690	138	11.92
5775	155	11.85

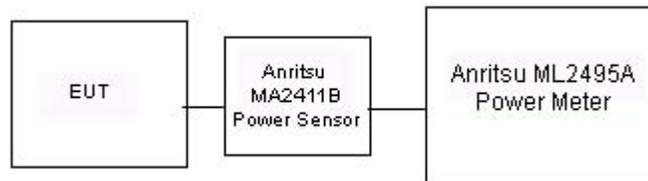
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**Table 9-36  
5 GHz WLAN Reduced Average RF Power – Secondary Antenna**

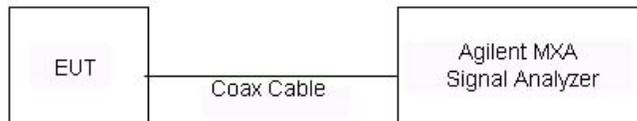
5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5210	42	<b>4.56</b>
5290	58	<b>4.66</b>
5530	106	<b>4.71</b>
5690	138	<b>4.92</b>
5775	155	<b>4.69</b>

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.
- This device only supports SISO operations on the secondary antenna for 802.11b. The above 802.11 a/g/n/ac secondary antenna powers are included to represent the maximum allowed output power the device can operate in CDD or MIMO SDM modes for simultaneous transmission evaluation purposes.



**Figure 9-4  
Power Measurement Setup for Bandwidths < 50 MHz**



**Figure 9-5  
Power Measurement Setup for Bandwidths > 50 MHz**

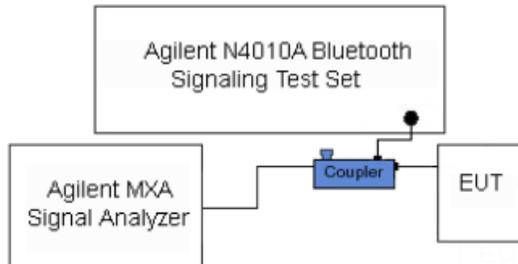
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## 9.5 Bluetooth Conducted Powers

**Table 9-37**  
**Bluetooth Average RF Powers**

Frequency [MHz]	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
			[dBm]	[mW]
2402	1.0	0	10.05	10.123
2441	1.0	39	12.44	17.548
2480	1.0	78	<b>12.72</b>	18.709
2402	2.0	0	6.93	4.927
2441	2.0	39	8.59	7.233
2480	2.0	78	8.17	6.568
2402	3.0	0	6.94	4.939
2441	3.0	39	8.61	7.266
2480	3.0	78	8.24	6.666

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



**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, $\sigma$ (S/m)	Measured Dielectric Constant, $\epsilon$	TARGET Conductivity, $\sigma$ (S/m)	TARGET Dielectric Constant, $\epsilon$	% dev $\sigma$	% dev $\epsilon$
7/14/2016	750H	22.3	700	0.847	41.879	0.889	42.201	-4.72%	-0.76%
			710	0.857	41.723	0.890	42.149	-3.71%	-1.01%
			740	0.886	41.315	0.893	41.994	-0.78%	-1.62%
			755	0.898	41.114	0.894	41.916	0.45%	-1.91%
7/12/2016	835H	22.1	820	0.895	41.897	0.899	41.578	-0.44%	0.77%
			835	0.908	41.718	0.900	41.500	0.89%	0.53%
			850	0.923	41.525	0.916	41.500	0.76%	0.06%
7/11/2016	1750H	22.0	1710	1.284	39.403	1.348	40.142	-4.75%	-1.84%
			1750	1.320	39.220	1.371	40.079	-3.72%	-2.14%
			1790	1.354	39.060	1.394	40.016	-2.87%	-2.39%
7/7/2016	1900H	23.2	1850	1.373	39.100	1.400	40.000	-1.93%	-2.25%
			1880	1.399	38.992	1.400	40.000	-0.07%	-2.52%
			1910	1.428	38.849	1.400	40.000	2.00%	-2.88%
7/11/2016	1900H	22.2	1850	1.410	39.142	1.400	40.000	0.71%	-2.14%
			1880	1.439	39.029	1.400	40.000	2.79%	-2.43%
			1910	1.466	38.883	1.400	40.000	4.71%	-2.79%
7/14/2016	2300H	21.7	2300	1.720	39.814	1.670	39.500	2.99%	0.79%
			2310	1.731	39.776	1.679	39.480	3.10%	0.75%
			2320	1.742	39.727	1.687	39.460	3.26%	0.68%
7/15/2016	2450H	22.6	2400	1.791	40.475	1.756	39.289	1.99%	3.02%
			2450	1.845	40.279	1.800	39.200	2.50%	2.75%
			2500	1.904	40.093	1.855	39.136	2.64%	2.45%
7/5/2016	2450-2600H	22.3	2450	1.860	38.548	1.800	39.200	3.33%	-1.66%
			2500	1.910	38.333	1.855	39.136	2.96%	-2.05%
			2550	1.976	38.090	1.909	39.073	3.51%	-2.52%
			2600	2.035	37.959	1.964	39.009	3.62%	-2.69%
07/15/2016	5200H-5800H	21.8	5240	4.565	36.748	4.696	35.940	-2.79%	2.25%
			5260	4.588	36.674	4.717	35.917	-2.73%	2.11%
			5280	4.603	36.660	4.737	35.894	-2.83%	2.13%
			5300	4.623	36.646	4.758	35.871	-2.84%	2.16%
			5680	5.038	36.106	5.147	35.437	-2.12%	1.89%
			5700	5.049	36.080	5.168	35.414	-2.30%	1.88%
			5745	5.097	36.009	5.214	35.363	-2.24%	1.83%
			5765	5.141	35.976	5.234	35.340	-1.78%	1.80%
			5785	5.159	35.955	5.255	35.317	-1.83%	1.81%

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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, $\sigma$ (S/m)	Measured Dielectric Constant, $\epsilon$	TARGET Conductivity, $\sigma$ (S/m)	TARGET Dielectric Constant, $\epsilon$	% dev $\sigma$	% dev $\epsilon$
7/6/2016	750B	22.6	700	0.923	55.338	0.959	55.726	-3.75%	-0.70%
			710	0.925	55.242	0.960	55.687	-3.65%	-0.80%
			740	0.950	54.839	0.963	55.570	-1.35%	-1.32%
			755	0.963	54.644	0.964	55.512	-0.10%	-1.56%
7/11/2016	835B	21.3	820	0.984	54.219	0.969	55.258	1.55%	-1.88%
			835	1.000	54.079	0.970	55.200	3.09%	-2.03%
			850	1.016	53.939	0.988	55.154	2.83%	-2.20%
7/11/2016	1750B	21.9	1710	1.466	52.776	1.463	53.537	0.21%	-1.42%
			1750	1.510	52.589	1.488	53.432	1.48%	-1.58%
			1790	1.552	52.438	1.514	53.326	2.51%	-1.67%
7/7/2016	1900B	22.5	1850	1.504	52.753	1.520	53.300	-1.05%	-1.03%
			1880	1.535	52.668	1.520	53.300	0.99%	-1.19%
			1910	1.567	52.529	1.520	53.300	3.09%	-1.45%
7/7/2016	2300B	22.5	2300	1.819	53.635	1.809	52.900	0.55%	1.39%
			2310	1.832	53.575	1.816	52.887	0.88%	1.30%
			2320	1.844	53.535	1.826	52.873	0.99%	1.25%
7/14/2016	2450-2600B	22.2	2400	1.946	53.581	1.902	52.767	2.31%	1.54%
			2450	2.018	53.383	1.950	52.700	3.49%	1.30%
			2500	2.085	53.218	2.021	52.636	3.17%	1.11%
			2550	2.156	53.006	2.092	52.573	3.06%	0.82%
			2600	2.227	52.832	2.163	52.509	2.96%	0.62%
7/21/2016	2450B	23.2	2400	1.886	53.004	1.902	52.767	-0.84%	0.45%
			2450	1.956	52.816	1.950	52.700	0.31%	0.22%
			2500	2.023	52.656	2.021	52.636	0.10%	0.04%
07/11/2016	5200B-5800B	21.7	5200	5.350	47.460	5.299	49.014	0.96%	-3.17%
			5240	5.405	47.389	5.346	48.960	1.10%	-3.21%
			5260	5.438	47.409	5.369	48.933	1.29%	-3.11%
			5500	5.723	46.987	5.650	48.607	1.29%	-3.33%
			5600	5.849	46.811	5.766	48.471	1.44%	-3.42%
			5700	5.983	46.726	5.883	48.336	1.70%	-3.33%
			5745	6.045	46.550	5.936	48.275	1.84%	-3.57%
			5765	6.069	46.587	5.959	48.248	1.85%	-3.44%
07/25/2016	5200B-5800B	21.1	5240	5.479	48.166	5.346	48.960	2.49%	-1.62%
			5260	5.487	48.170	5.369	48.933	2.20%	-1.56%
			5300	5.554	48.169	5.416	48.879	2.55%	-1.45%
			5320	5.599	48.112	5.439	48.851	2.94%	-1.51%
			5500	5.817	47.805	5.650	48.607	2.96%	-1.65%
			5600	5.980	47.608	5.766	48.471	3.71%	-1.78%
			5700	6.112	47.410	5.883	48.336	3.89%	-1.92%
			5745	6.173	47.441	5.936	48.275	3.99%	-1.73%
			5765	6.178	47.297	5.959	48.248	3.68%	-1.97%

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.

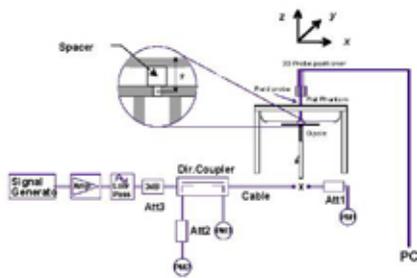
**Table 10-3  
System Verification Results**

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR <sub>1g</sub> (W/kg)	1 W Target SAR <sub>1g</sub> (W/kg)	1 W Normalized SAR <sub>1g</sub> (W/kg)	Deviation <sub>1g</sub> (%)
F	750	HEAD	07/14/2016	23.6	22.4	0.200	1046	3209	1.560	8.200	7.800	-4.88%
G	835	HEAD	07/12/2016	23.2	22.1	0.200	4d119	3334	1.790	9.140	8.950	-2.08%
E	1750	HEAD	07/11/2016	23.0	22.0	0.100	1051	7406	3.390	36.100	33.900	-6.09%
I	1900	HEAD	07/07/2016	23.0	23.2	0.100	5d141	3333	3.940	38.500	39.400	2.34%
G	1900	HEAD	07/11/2016	21.8	22.4	0.100	5d141	3334	3.770	38.500	37.700	-2.08%
K	2300	HEAD	07/14/2016	23.4	21.7	0.100	1064	7409	5.090	47.600	50.900	6.93%
G	2450	HEAD	07/05/2016	20.2	22.0	0.100	719	3334	5.430	54.200	54.300	0.18%
K	2450	HEAD	07/15/2016	21.9	22.6	0.100	719	7409	5.090	54.200	50.900	-6.09%
G	2600	HEAD	07/05/2016	20.2	22.0	0.100	1071	3334	5.240	55.900	52.400	-6.26%
D	5250	HEAD	07/15/2016	23.0	21.8	0.050	1120	3914	3.650	78.700	73.000	-7.24%
D	5750	HEAD	07/15/2016	23.0	21.8	0.050	1120	3914	3.690	79.100	73.800	-6.70%
K	750	BODY	07/06/2016	23.4	22.0	0.200	1046	7409	1.830	8.770	9.150	4.33%
I	835	BODY	07/11/2016	23.9	21.3	0.200	4d119	3333	1.960	9.140	9.800	7.22%
K	1750	BODY	07/11/2016	23.2	21.9	0.100	1051	7409	3.900	36.500	39.000	6.85%
H	1900	BODY	07/07/2016	23.8	22.5	0.100	5d141	3319	4.140	39.600	41.400	4.55%
G	2300	BODY	07/07/2016	22.0	22.0	0.100	1064	3334	4.740	45.500	47.400	4.18%
E	2450	BODY	07/14/2016	23.2	22.4	0.100	719	7406	5.250	51.900	52.500	1.16%
E	2600	BODY	07/14/2016	23.2	22.4	0.100	1071	7406	5.770	54.900	57.700	5.10%
D	5250	BODY	07/11/2016	21.9	21.7	0.050	1120	3914	3.710	75.600	74.200	-1.85%
D	5600	BODY	07/11/2016	21.9	21.7	0.050	1120	3914	3.740	80.800	74.800	-7.43%
D	5750	BODY	07/11/2016	21.9	21.7	0.050	1120	3914	3.500	76.500	70.000	-8.50%

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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)	Dipole SN	Probe SN	Measured SAR <sub>10g</sub> (W/kg)	1 W Target SAR <sub>10g</sub> (W/kg)	1 W Normalized SAR <sub>10g</sub> (W/kg)	Deviation <sub>10g</sub> (%)
E	2450	BODY	07/21/2016	22.3	23.2	0.100	719	7406	2.350	24.300	23.500	-3.29%
D	5250	BODY	07/25/2016	22.6	21.1	0.050	1120	3914	1.020	21.200	20.400	-3.77%
D	5600	BODY	07/25/2016	22.6	21.1	0.050	1120	3914	1.080	22.600	21.600	-4.42%
D	5750	BODY	07/25/2016	22.6	21.1	0.050	1120	3914	0.998	21.300	19.960	-6.29%



**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	Maximum 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	33.40	0.00	Right	Cheek	02747	1	1:8.3	0.243	1.072	0.260	
836.60	190	GSM 850	GSM	33.7	33.40	-0.04	Right	Tilt	02747	1	1:8.3	0.125	1.072	0.134	
836.60	190	GSM 850	GSM	33.7	33.40	0.10	Left	Cheek	02747	1	1:8.3	0.192	1.072	0.206	
836.60	190	GSM 850	GSM	33.7	33.40	0.17	Left	Tilt	02747	1	1:8.3	0.103	1.072	0.110	
836.60	190	GSM 850	GPRS	32.2	32.11	0.05	Right	Cheek	02747	2	1:4.15	0.299	1.021	0.305	A1
836.60	190	GSM 850	GPRS	32.2	32.11	0.00	Right	Tilt	02747	2	1:4.15	0.160	1.021	0.163	
836.60	190	GSM 850	GPRS	32.2	32.11	0.10	Left	Cheek	02747	2	1:4.15	0.252	1.021	0.257	
836.60	190	GSM 850	GPRS	32.2	32.11	0.21	Left	Tilt	02747	2	1:4.15	0.142	1.021	0.145	
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  
UMTS 850 Head SAR**

MEASUREMENT RESULTS																
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Tuner State	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	24.7	24.64	0.05	Right	Cheek	Ant 1	116	02747	1:1	0.223	1.014	0.226	
836.60	4183	UMTS 850	RMC	24.7	24.64	0.17	Right	Tilt	Ant 1	116	02747	1:1	0.091	1.014	0.092	
836.60	4183	UMTS 850	RMC	24.7	24.64	-0.01	Left	Cheek	Ant 1	116	02747	1:1	0.203	1.014	0.206	
836.60	4183	UMTS 850	RMC	24.7	24.64	0.05	Left	Tilt	Ant 1	116	02747	1:1	0.097	1.014	0.098	
836.60	4183	UMTS 850	RMC	24.7	24.64	-0.07	Right	Cheek	Ant 3	N/A	02754	1:1	0.395	1.014	0.401	
836.60	4183	UMTS 850	RMC	24.7	24.64	-0.07	Right	Tilt	Ant 3	N/A	02754	1:1	0.438	1.014	0.444	A2
836.60	4183	UMTS 850	RMC	24.7	24.64	0.04	Left	Cheek	Ant 3	N/A	02754	1:1	0.176	1.014	0.178	
836.60	4183	UMTS 850	RMC	24.7	24.64	0.11	Left	Tilt	Ant 3	N/A	02754	1:1	0.186	1.014	0.189	
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 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	25.0	24.71	0.07	Right	Cheek	02747	1:1	0.177	1.069	0.189	
1732.40	1412	UMTS 1750	RMC	25.0	24.71	0.07	Right	Tilt	02747	1:1	0.146	1.069	0.156	
1732.40	1412	UMTS 1750	RMC	25.0	24.71	0.15	Left	Cheek	02747	1:1	0.370	1.069	0.396	A3
1732.40	1412	UMTS 1750	RMC	25.0	24.71	0.09	Left	Tilt	02747	1:1	0.151	1.069	0.161	
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  
GSM 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	# 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	30.54	-0.03	Right	Cheek	02747	1	1:8.3	1.038	0.077		
1880.00	661	GSM 1900	GSM	30.7	30.54	0.21	Right	Tilt	02747	1	1:8.3	1.038	0.072		
1880.00	661	GSM 1900	GSM	30.7	30.54	-0.02	Left	Cheek	02747	1	1:8.3	1.038	0.158		
1880.00	661	GSM 1900	GSM	30.7	30.54	0.16	Left	Tilt	02747	1	1:8.3	1.038	0.056		
1880.00	661	GSM 1900	GPRS	27.2	26.81	0.10	Right	Cheek	02747	3	1:2.76	1.094	0.058		
1880.00	661	GSM 1900	GPRS	27.2	26.81	0.13	Right	Tilt	02747	3	1:2.76	1.094	0.040		
1880.00	661	GSM 1900	GPRS	27.2	26.81	0.03	Left	Cheek	02747	3	1:2.76	1.094	0.205	A4	
1880.00	661	GSM 1900	GPRS	27.2	26.81	0.14	Left	Tilt	02747	3	1:2.76	1.094	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 11-5  
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	25.0	24.62	0.03	Right	Cheek	02747	1:1	1.091	0.179		
1880.00	9400	UMTS 1900	RMC	25.0	24.62	-0.01	Right	Tilt	02747	1:1	1.091	0.116		
1880.00	9400	UMTS 1900	RMC	25.0	24.62	0.10	Left	Cheek	02747	1:1	1.091	0.321	A5	
1880.00	9400	UMTS 1900	RMC	25.0	24.62	0.08	Left	Tilt	02747	1:1	1.091	0.112		
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 12 Head SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	Tuner State	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	Md	LTE Band 12	10	25.0	24.91	-0.15	0	Right	Cheek	Ant 1	3	QPSK	1	0	02689	1:1	0.202	1.021	0.206	
707.50	23095	Md	LTE Band 12	10	24.0	23.90	0.00	1	Right	Cheek	Ant 1	3	QPSK	25	25	02689	1:1	0.141	1.023	0.144	
707.50	23095	Md	LTE Band 12	10	25.0	24.91	0.02	0	Right	Tilt	Ant 1	3	QPSK	1	0	02689	1:1	0.082	1.021	0.084	
707.50	23095	Md	LTE Band 12	10	24.0	23.90	0.14	1	Right	Tilt	Ant 1	3	QPSK	25	25	02689	1:1	0.065	1.023	0.066	
707.50	23095	Md	LTE Band 12	10	25.0	24.91	0.00	0	Left	Cheek	Ant 1	3	QPSK	1	0	02689	1:1	0.172	1.021	0.176	
707.50	23095	Md	LTE Band 12	10	24.0	23.90	0.09	1	Left	Cheek	Ant 1	3	QPSK	25	25	02689	1:1	0.117	1.023	0.120	
707.50	23095	Md	LTE Band 12	10	25.0	24.91	0.04	0	Left	Tilt	Ant 1	3	QPSK	1	0	02689	1:1	0.081	1.021	0.083	
707.50	23095	Md	LTE Band 12	10	24.0	23.90	0.08	1	Left	Tilt	Ant 1	3	QPSK	25	25	02689	1:1	0.062	1.023	0.063	
707.50	23095	Md	LTE Band 12	10	25.0	24.91	-0.05	0	Right	Cheek	Ant 3	N/A	QPSK	1	0	02671	1:1	0.845	1.021	0.863	
707.50	23095	Md	LTE Band 12	10	24.0	23.90	-0.12	1	Right	Cheek	Ant 3	N/A	QPSK	25	25	02671	1:1	0.666	1.023	0.681	
707.50	23095	Md	LTE Band 12	10	24.0	23.84	-0.04	1	Right	Cheek	Ant 3	N/A	QPSK	50	0	02671	1:1	0.674	1.038	0.700	
707.50	23095	Md	LTE Band 12	10	25.0	24.91	0.04	0	Right	Tilt	Ant 3	N/A	QPSK	1	0	02671	1:1	0.840	1.021	0.858	
707.50	23095	Md	LTE Band 12	10	24.0	23.90	0.06	1	Right	Tilt	Ant 3	N/A	QPSK	25	25	02671	1:1	0.671	1.023	0.686	
707.50	23095	Md	LTE Band 12	10	24.0	23.84	0.16	1	Right	Tilt	Ant 3	N/A	QPSK	50	0	02671	1:1	0.654	1.038	0.679	
707.50	23095	Md	LTE Band 12	10	25.0	24.91	-0.01	0	Left	Cheek	Ant 3	N/A	QPSK	1	0	02671	1:1	0.457	1.021	0.467	
707.50	23095	Md	LTE Band 12	10	24.0	23.90	0.00	1	Left	Cheek	Ant 3	N/A	QPSK	25	25	02671	1:1	0.365	1.023	0.373	
707.50	23095	Md	LTE Band 12	10	25.0	24.91	0.01	0	Left	Tilt	Ant 3	N/A	QPSK	1	0	02671	1:1	0.466	1.021	0.476	
707.50	23095	Md	LTE Band 12	10	24.0	23.90	-0.15	1	Left	Tilt	Ant 3	N/A	QPSK	25	25	02671	1:1	0.374	1.023	0.383	
707.50	23095	Md	LTE Band 12	10	25.0	24.91	0.00	0	Right	Cheek	Ant 3	N/A	QPSK	1	0	02671	1:1	0.856	1.021	0.874	A6
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram											

**Note: Blue Entry Represents Variability Measurement**

**Table 11-7  
LTE Band 5 (Cell) Head SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Antenna Config.	Tuner State	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR(1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.																(W/kg)		(W/kg)		
836.50	20525	Md	LTE Band 5 (Cell)	10	25.0	24.66	0.00	0	Right	Cheek	Ant 1	116	QPSK	1	0	03662	1:1	0.214	1.081	0.231	
836.50	20525	Md	LTE Band 5 (Cell)	10	24.0	23.63	0.07	1	Right	Cheek	Ant 1	116	QPSK	25	0	03662	1:1	0.166	1.089	0.181	
836.50	20525	Md	LTE Band 5 (Cell)	10	25.0	24.66	0.11	0	Right	Tilt	Ant 1	116	QPSK	1	0	03662	1:1	0.103	1.081	0.111	
836.50	20525	Md	LTE Band 5 (Cell)	10	24.0	23.63	0.12	1	Right	Tilt	Ant 1	116	QPSK	25	0	03662	1:1	0.072	1.089	0.078	
836.50	20525	Md	LTE Band 5 (Cell)	10	25.0	24.66	0.04	0	Left	Cheek	Ant 1	116	QPSK	1	0	03662	1:1	0.212	1.081	0.229	
836.50	20525	Md	LTE Band 5 (Cell)	10	24.0	23.63	0.18	1	Left	Cheek	Ant 1	116	QPSK	25	0	03662	1:1	0.149	1.089	0.162	
836.50	20525	Md	LTE Band 5 (Cell)	10	25.0	24.66	-0.14	0	Left	Tilt	Ant 1	116	QPSK	1	0	03662	1:1	0.100	1.081	0.108	
836.50	20525	Md	LTE Band 5 (Cell)	10	24.0	23.63	0.19	1	Left	Tilt	Ant 1	116	QPSK	25	0	03662	1:1	0.077	1.089	0.084	
836.50	20525	Md	LTE Band 5 (Cell)	10	25.0	24.66	-0.04	0	Right	Cheek	Ant 3	N/A	QPSK	1	0	02671	1:1	0.448	1.081	0.484	
836.50	20525	Md	LTE Band 5 (Cell)	10	24.0	23.63	0.02	1	Right	Cheek	Ant 3	N/A	QPSK	25	0	02671	1:1	0.339	1.089	0.369	
836.50	20525	Md	LTE Band 5 (Cell)	10	25.0	24.66	-0.13	0	Right	Tilt	Ant 3	N/A	QPSK	1	0	02671	1:1	0.497	1.081	0.537	A7
836.50	20525	Md	LTE Band 5 (Cell)	10	24.0	23.63	0.04	1	Right	Tilt	Ant 3	N/A	QPSK	25	0	02671	1:1	0.371	1.089	0.404	
836.50	20525	Md	LTE Band 5 (Cell)	10	25.0	24.66	0.08	0	Left	Cheek	Ant 3	N/A	QPSK	1	0	02671	1:1	0.188	1.081	0.203	
836.50	20525	Md	LTE Band 5 (Cell)	10	24.0	23.63	0.04	1	Left	Cheek	Ant 3	N/A	QPSK	25	0	02671	1:1	0.139	1.089	0.151	
836.50	20525	Md	LTE Band 5 (Cell)	10	25.0	24.66	0.04	0	Left	Tilt	Ant 3	N/A	QPSK	1	0	02671	1:1	0.200	1.081	0.216	
836.50	20525	Md	LTE Band 5 (Cell)	10	24.0	23.63	-0.01	1	Left	Tilt	Ant 3	N/A	QPSK	25	0	02671	1:1	0.148	1.089	0.161	
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 11-8  
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)		
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	25.00	0.02	0	Right	Cheek	QPSK	1	0	02697	1:1	0.187	1.000	0.187	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.95	0.09	1	Right	Cheek	QPSK	50	25	02697	1:1	0.155	1.012	0.157	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	25.00	0.07	0	Right	Tilt	QPSK	1	0	02697	1:1	0.145	1.000	0.145	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.95	0.16	1	Right	Tilt	QPSK	50	25	02697	1:1	0.107	1.012	0.108	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	25.00	0.06	0	Left	Cheek	QPSK	1	0	02697	1:1	0.410	1.000	0.410	A8
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.95	0.08	1	Left	Cheek	QPSK	50	25	02697	1:1	0.307	1.012	0.311	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	25.00	0.09	0	Left	Tilt	QPSK	1	0	02697	1:1	0.180	1.000	0.180	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.95	0.11	1	Left	Tilt	QPSK	50	25	02697	1:1	0.122	1.012	0.123	
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 11-9  
LTE Band 2 (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)		
1880.00	18900	Mid	LTE Band 2 (PCS)	20	25.2	25.16	0.05	0	Right	Cheek	QPSK	1	99	02671	1:1	0.184	1.009	0.186	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.2	24.15	0.07	1	Right	Cheek	QPSK	50	25	02671	1:1	0.158	1.012	0.160	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	25.2	25.16	0.05	0	Right	Tilt	QPSK	1	99	02671	1:1	0.143	1.009	0.144	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.2	24.15	0.07	1	Right	Tilt	QPSK	50	25	02671	1:1	0.103	1.012	0.104	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	25.2	25.16	-0.01	0	Left	Cheek	QPSK	1	99	02671	1:1	0.324	1.009	0.327	A9
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.2	24.15	0.03	1	Left	Cheek	QPSK	50	25	02671	1:1	0.261	1.012	0.264	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	25.2	25.16	0.04	0	Left	Tilt	QPSK	1	99	02671	1:1	0.137	1.009	0.138	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.2	24.15	0.05	1	Left	Tilt	QPSK	50	25	02671	1:1	0.101	1.012	0.102	
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 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	23.7	23.54	0.03	0	Right	Cheek	QPSK	1	49	02689	1:1	0.069	1.038	0.072	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.46	0.13	1	Right	Cheek	QPSK	25	25	02689	1:1	0.051	1.057	0.054	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.54	0.19	0	Right	Tilt	QPSK	1	49	02689	1:1	0.035	1.038	0.036	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.46	0.10	1	Right	Tilt	QPSK	25	25	02689	1:1	0.024	1.057	0.025	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.54	0.15	0	Left	Cheek	QPSK	1	49	02689	1:1	0.105	1.038	0.109	A10
2310.00	27710	Mid	LTE Band 30	10	22.7	22.46	0.11	1	Left	Cheek	QPSK	25	25	02689	1:1	0.079	1.057	0.084	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.54	0.12	0	Left	Tilt	QPSK	1	49	02689	1:1	0.039	1.038	0.040	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.46	0.17	1	Left	Tilt	QPSK	25	25	02689	1:1	0.026	1.057	0.027	
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 11-11  
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	23.7	23.64	0.18	0	Right	Cheek	QPSK	1	0	02671	1:1	1.014	0.024	A11
2535.00	21100	Mid	LTE Band 7	20	22.7	22.68	0.11	1	Right	Cheek	QPSK	50	50	02671	1:1	1.005	0.015	
2510.00	20850	Low	LTE Band 7	20	23.7	23.64	0.14	0	Right	Tilt	QPSK	1	0	02671	1:1	1.014	0.006	
2535.00	21100	Mid	LTE Band 7	20	22.7	22.68	0.12	1	Right	Tilt	QPSK	50	50	02671	1:1	1.005	0.003	
2510.00	20850	Low	LTE Band 7	20	23.7	23.64	-0.09	0	Left	Cheek	QPSK	1	0	02671	1:1	1.014	0.024	
2535.00	21100	Mid	LTE Band 7	20	22.7	22.68	-0.10	1	Left	Cheek	QPSK	50	50	02671	1:1	1.005	0.015	
2510.00	20850	Low	LTE Band 7	20	23.7	23.64	-0.06	0	Left	Tilt	QPSK	1	0	02671	1:1	1.014	0.015	
2535.00	21100	Mid	LTE Band 7	20	22.7	22.68	0.17	1	Left	Tilt	QPSK	50	50	02671	1:1	1.005	0.007	
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 11-12  
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)	
2437	6	802.11b	DSSS	22	12.5	11.95	0.10	Right	Cheek	Primary	02655	1	99.9	0.215	-	1.135	1.001	-	
2437	6	802.11b	DSSS	22	12.5	11.95	-0.04	Right	Tilt	Primary	02655	1	99.9	0.210	-	1.135	1.001	-	
2437	6	802.11b	DSSS	22	12.5	11.95	0.06	Left	Cheek	Primary	02655	1	99.9	0.654	0.402	1.135	1.001	0.457	A12
2437	6	802.11b	DSSS	22	12.5	11.95	0.18	Left	Tilt	Primary	02655	1	99.9	0.585	0.356	1.135	1.001	0.404	
2437	6	802.11b	DSSS	22	5.5	5.49	-0.14	Right	Cheek	Secondary	02655	1	99.9	0.042	-	1.002	1.001	-	
2437	6	802.11b	DSSS	22	5.5	5.49	0.17	Right	Tilt	Secondary	02655	1	99.9	0.043	-	1.002	1.001	-	
2437	6	802.11b	DSSS	22	5.5	5.49	0.14	Left	Cheek	Secondary	02655	1	99.9	0.129	0.073	1.002	1.001	0.073	
2437	6	802.11b	DSSS	22	5.5	5.49	0.15	Left	Tilt	Secondary	02655	1	99.9	0.101	-	1.002	1.001	-	
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 11-13  
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)	
5270	54	802.11n	OFDM	40	13.0	12.07	0.08	Right	Cheek	Primary	02655	13.5	99.3	0.474	0.104	1.239	1.007	0.130	
5270	54	802.11n	OFDM	40	13.0	12.07	0.03	Right	Tilt	Primary	02655	13.5	99.3	0.233	0.114	1.239	1.007	0.142	
5270	54	802.11n	OFDM	40	13.0	12.07	0.06	Left	Cheek	Primary	02655	13.5	99.3	0.427	-	1.239	1.007	-	
5270	54	802.11n	OFDM	40	13.0	12.07	0.05	Left	Tilt	Primary	02655	13.5	99.3	0.490	0.208	1.239	1.007	0.260	
5290	58	802.11ac	OFDM	80	5.5	4.66	0.05	Right	Cheek	Secondary	02655	29.3	98.4	0.300	-	1.213	1.016	-	
5290	58	802.11ac	OFDM	80	5.5	4.66	0.04	Right	Tilt	Secondary	02655	29.3	98.4	0.405	-	1.213	1.016	-	
5290	58	802.11ac	OFDM	80	5.5	4.66	-0.06	Left	Cheek	Secondary	02655	29.3	98.4	0.564	-	1.213	1.016	-	
5290	58	802.11ac	OFDM	80	5.5	4.66	0.06	Left	Tilt	Secondary	02655	29.3	98.4	0.825	0.314	1.213	1.016	0.387	
5690	138	802.11ac	OFDM	80	13.0	11.92	0.18	Right	Cheek	Primary	02655	29.3	98.4	0.295	0.118	1.282	1.016	0.154	
5690	138	802.11ac	OFDM	80	13.0	11.92	-0.18	Right	Tilt	Primary	02655	29.3	98.4	0.339	0.092	1.282	1.016	0.120	
5690	138	802.11ac	OFDM	80	13.0	11.92	0.14	Left	Cheek	Primary	02655	29.3	98.4	0.467	-	1.282	1.016	-	
5690	138	802.11ac	OFDM	80	13.0	11.92	0.14	Left	Tilt	Primary	02655	29.3	98.4	0.519	0.301	1.282	1.016	0.392	
5690	138	802.11ac	OFDM	80	5.5	4.92	0.16	Right	Cheek	Secondary	02655	29.3	98.4	0.158	-	1.143	1.016	-	
5690	138	802.11ac	OFDM	80	5.5	4.92	0.19	Right	Tilt	Secondary	02655	29.3	98.4	0.202	-	1.143	1.016	-	
5690	138	802.11ac	OFDM	80	5.5	4.92	0.18	Left	Cheek	Secondary	02655	29.3	98.4	0.295	-	1.143	1.016	-	
5690	138	802.11ac	OFDM	80	5.5	4.92	0.14	Left	Tilt	Secondary	02655	29.3	98.4	0.408	0.149	1.143	1.016	0.173	
5775	155	802.11ac	OFDM	80	13.0	11.85	0.18	Right	Cheek	Primary	02655	29.3	98.4	0.250	0.074	1.303	1.016	0.098	
5775	155	802.11ac	OFDM	80	13.0	11.85	-0.17	Right	Tilt	Primary	02655	29.3	98.4	0.366	0.096	1.303	1.016	0.127	
5775	155	802.11ac	OFDM	80	13.0	11.85	0.17	Left	Cheek	Primary	02655	29.3	98.4	0.487	0.131	1.303	1.016	0.173	
5775	155	802.11ac	OFDM	80	13.0	11.85	0.17	Left	Tilt	Primary	02655	29.3	98.4	0.624	0.370	1.303	1.016	0.490	A13
5775	155	802.11ac	OFDM	80	5.5	4.69	0.17	Right	Cheek	Secondary	02655	29.3	98.4	0.152	-	1.205	1.016	-	
5775	155	802.11ac	OFDM	80	5.5	4.69	0.17	Right	Tilt	Secondary	02655	29.3	98.4	0.157	-	1.205	1.016	-	
5775	155	802.11ac	OFDM	80	5.5	4.69	0.01	Left	Cheek	Secondary	02655	29.3	98.4	0.218	-	1.205	1.016	-	
5775	155	802.11ac	OFDM	80	5.5	4.69	0.11	Left	Tilt	Secondary	02655	29.3	98.4	0.323	0.108	1.205	1.016	0.132	
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 11-14**  
**GSM/UMTS Body-Worn SAR Data**

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Tuner State	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	33.40	0.06	10 mm	Ant 1	N/A	02747	1	1:8.3	back	0.256	1.072	0.274	
836.60	190	GSM 850	GPRS	32.2	32.11	0.01	10 mm	Ant 1	N/A	02747	2	1:4.15	back	0.372	1.021	0.380	A14
836.60	4183	UMTS 850	RMC	24.7	24.64	0.00	10 mm	Ant 1	116	02747	N/A	1:1	back	0.287	1.014	0.291	A16
836.60	4183	UMTS 850	RMC	24.7	24.64	-0.03	10 mm	Ant 3	N/A	02754	N/A	1:1	back	0.094	1.014	0.095	
1712.40	1312	UMTS 1750	RMC	25.0	24.62	-0.05	10 mm	Ant 2	N/A	02747	N/A	1:1	back	1.020	1.091	1.113	
1732.40	1412	UMTS 1750	RMC	25.0	24.71	-0.04	10 mm	Ant 2	N/A	02747	N/A	1:1	back	1.040	1.069	1.112	
1752.60	1513	UMTS 1750	RMC	25.0	24.81	-0.03	10 mm	Ant 2	N/A	02747	N/A	1:1	back	1.060	1.045	1.108	A18
1880.00	661	GSM 1900	GSM	30.7	30.54	-0.03	10 mm	Ant 2	N/A	02754	1	1:8.3	back	0.353	1.038	0.366	
1880.00	661	GSM 1900	GPRS	27.2	26.81	-0.07	10 mm	Ant 2	N/A	02754	3	1:2.76	back	0.436	1.094	0.477	A19
1880.00	9400	UMTS 1900	RMC	25.0	24.62	-0.01	10 mm	Ant 2	N/A	02754	N/A	1:1	back	0.685	1.091	0.747	A20
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 11-15**  
**LTE Body-Worn SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Tuner State	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	25.0	24.91	-0.01	0	Ant 1	3	02689	QPSK	1	0	10 mm	back	1:1	0.295	1.021	0.301	A21
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	-0.03	1	Ant 1	3	02689	QPSK	25	25	10 mm	back	1:1	0.218	1.023	0.223	
707.50	23095	Mid	LTE Band 12	10	25.0	24.91	-0.11	0	Ant 3	N/A	02689	QPSK	1	0	10 mm	back	1:1	0.105	1.021	0.107	
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	-0.03	1	Ant 3	N/A	02689	QPSK	25	25	10 mm	back	1:1	0.085	1.023	0.087	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	0.00	0	Ant 1	116	02697	QPSK	1	0	10 mm	back	1:1	0.377	1.081	0.408	A23
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	0.00	1	Ant 1	116	02697	QPSK	25	0	10 mm	back	1:1	0.286	1.089	0.311	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	0.02	0	Ant 3	N/A	02663	QPSK	1	0	10 mm	back	1:1	0.095	1.081	0.103	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	-0.08	1	Ant 3	N/A	02663	QPSK	25	0	10 mm	back	1:1	0.071	1.089	0.077	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.68	-0.07	0	Ant 2	N/A	02689	QPSK	1	0	10 mm	back	1:1	1.070	1.076	1.151	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.0	24.95	0.03	0	Ant 2	N/A	02689	QPSK	1	50	10 mm	back	1:1	1.170	1.012	1.184	A25
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	25.00	0.00	0	Ant 2	N/A	02689	QPSK	1	0	10 mm	back	1:1	1.120	1.000	1.120	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.81	-0.04	1	Ant 2	N/A	02689	QPSK	50	25	10 mm	back	1:1	0.884	1.045	0.924	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.86	-0.01	1	Ant 2	N/A	02689	QPSK	50	25	10 mm	back	1:1	0.923	1.033	0.953	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.95	-0.02	1	Ant 2	N/A	02689	QPSK	50	25	10 mm	back	1:1	0.896	1.012	0.907	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.86	-0.01	1	Ant 2	N/A	02689	QPSK	100	0	10 mm	back	1:1	1.000	1.033	1.033	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.0	24.95	0.02	0	Ant 2	N/A	02689	QPSK	1	50	10 mm	back	1:1	1.030	1.012	1.042	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	25.2	25.16	0.17	0	Ant 2	N/A	02663	QPSK	1	99	10 mm	back	1:1	0.591	1.009	0.596	A26
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.2	24.15	0.00	1	Ant 2	N/A	02663	QPSK	50	25	10 mm	back	1:1	0.521	1.012	0.527	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.54	-0.03	0	Ant 1	N/A	02671	QPSK	1	49	10 mm	back	1:1	0.267	1.038	0.277	A28
2310.00	27710	Mid	LTE Band 30	10	22.7	22.46	-0.11	1	Ant 1	N/A	02671	QPSK	25	25	10 mm	back	1:1	0.207	1.057	0.219	
2510.00	20850	Low	LTE Band 7	20	23.7	23.64	-0.02	0	Ant 1	N/A	02663	QPSK	1	0	10 mm	back	1:1	0.218	1.014	0.221	A30
2535.00	21100	Mid	LTE Band 7	20	22.7	22.68	0.05	1	Ant 1	N/A	02663	QPSK	50	50	10 mm	back	1:1	0.154	1.005	0.155	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram												

**Note: Blue Entry Represents Variability Measurement**

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**Table 11-16  
DTS 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)	
2447	8	802.11b	DSSS	22	20.0	19.45	0.02	10 mm	Primary	02655	1	back	99.9	0.445	0.285	1.135	1.001	0.324	A32
2437	6	802.11b	DSSS	22	20.0	19.74	0.16	10 mm	Secondary	02655	1	back	99.9	0.197	0.118	1.062	1.001	0.125	
2437	6	802.11n	OFDM	20	18.5	17.83	-0.04	10 mm	MIMO	02614	13	back	99.2	0.196	0.117	1.175	1.008	0.139	
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 11-17  
NII 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)	
5260	52	802.11a	OFDM	20	15.0	14.88	-0.16	10 mm	Primary	02655	6	back	99.4	0.170	0.075	1.028	1.006	0.078	
5260	52	802.11a	OFDM	20	14.0	13.54	0.18	10 mm	Secondary	02655	6	back	99.4	0.138	0.069	1.112	1.006	0.077	
5500	100	802.11a	OFDM	20	15.0	14.42	0.03	10 mm	Primary	02655	6	back	99.4	0.462	0.199	1.143	1.006	0.229	
5720	144	802.11a	OFDM	20	14.0	13.56	0.18	10 mm	Secondary	02655	6	back	99.4	0.118	0.062	1.107	1.006	0.069	
5745	149	802.11a	OFDM	20	15.0	14.56	0.10	10 mm	Primary	02655	6	back	99.4	0.526	0.223	1.107	1.006	0.248	A34
5745	149	802.11a	OFDM	20	14.0	13.65	0.16	10 mm	Secondary	02655	6	back	99.4	0.120	0.060	1.084	1.006	0.065	
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 11-18  
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	Reported SAR (1g)	Plot #		
MHz	Ch.											(W/kg)		(W/kg)			
2480	78	Bluetooth	FHSS	13.0	12.72	0.16	10 mm	02655	1	back	1:1	0.023	1.067	0.025	A36		
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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# 11.3 Standalone Hotspot SAR Data

**Table 11-19  
GPRS/UMTS Hotspot SAR Data**

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Tuner State	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	32.2	32.11	0.01	10 mm	Ant 1	N/A	02747	2	1.4.15	back	0.372	1.021	0.380	
836.60	190	GSM 850	GPRS	32.2	32.11	-0.06	10 mm	Ant 1	N/A	02747	2	1.4.15	front	0.410	1.021	0.419	
836.60	190	GSM 850	GPRS	32.2	32.11	-0.04	10 mm	Ant 1	N/A	02747	2	1.4.15	bottom	0.514	1.021	0.525	A15
836.60	190	GSM 850	GPRS	32.2	32.11	0.00	10 mm	Ant 1	N/A	02747	2	1.4.15	right	0.414	1.021	0.423	
836.60	190	GSM 850	GPRS	32.2	32.11	0.01	10 mm	Ant 1	N/A	02747	2	1.4.15	left	0.273	1.021	0.279	
836.60	4183	UMTS 850	RMC	24.7	24.64	0.00	10 mm	Ant 1	116	02747	N/A	1:1	back	0.287	1.014	0.291	
836.60	4183	UMTS 850	RMC	24.7	24.64	0.03	10 mm	Ant 1	116	02747	N/A	1:1	front	0.328	1.014	0.333	
836.60	4183	UMTS 850	RMC	24.7	24.64	-0.04	10 mm	Ant 1	116	02747	N/A	1:1	bottom	0.427	1.014	0.433	A17
836.60	4183	UMTS 850	RMC	24.7	24.64	0.01	10 mm	Ant 1	116	02747	N/A	1:1	right	0.311	1.014	0.315	
836.60	4183	UMTS 850	RMC	24.7	24.64	0.01	10 mm	Ant 1	116	02747	N/A	1:1	left	0.198	1.014	0.201	
836.60	4183	UMTS 850	RMC	24.7	24.64	-0.03	10 mm	Ant 3	N/A	02754	N/A	1:1	back	0.094	1.014	0.095	
836.60	4183	UMTS 850	RMC	24.7	24.64	0.04	10 mm	Ant 3	N/A	02754	N/A	1:1	front	0.107	1.014	0.108	
836.60	4183	UMTS 850	RMC	24.7	24.64	-0.02	10 mm	Ant 3	N/A	02754	N/A	1:1	top	0.104	1.014	0.105	
836.60	4183	UMTS 850	RMC	24.7	24.64	0.03	10 mm	Ant 3	N/A	02754	N/A	1:1	right	0.062	1.014	0.063	
836.60	4183	UMTS 850	RMC	24.7	24.64	0.03	10 mm	Ant 3	N/A	02754	N/A	1:1	left	0.066	1.014	0.067	
1712.40	1312	UMTS 1750	RMC	25.0	24.62	-0.05	10 mm	Ant 2	N/A	02747	N/A	1:1	back	1.020	1.091	1.113	
1732.40	1412	UMTS 1750	RMC	25.0	24.71	-0.04	10 mm	Ant 2	N/A	02747	N/A	1:1	back	1.040	1.069	1.112	
1752.60	1513	UMTS 1750	RMC	25.0	24.81	-0.03	10 mm	Ant 2	N/A	02747	N/A	1:1	back	1.060	1.045	1.108	A18
1712.40	1312	UMTS 1750	RMC	25.0	24.62	0.07	10 mm	Ant 2	N/A	02747	N/A	1:1	front	0.902	1.091	0.984	
1732.40	1412	UMTS 1750	RMC	25.0	24.71	0.07	10 mm	Ant 2	N/A	02747	N/A	1:1	front	0.919	1.069	0.982	
1752.60	1513	UMTS 1750	RMC	25.0	24.81	0.05	10 mm	Ant 2	N/A	02747	N/A	1:1	front	0.938	1.045	0.980	
1712.40	1312	UMTS 1750	RMC	25.0	24.62	-0.02	10 mm	Ant 2	N/A	02747	N/A	1:1	bottom	0.941	1.091	1.027	
1732.40	1412	UMTS 1750	RMC	25.0	24.71	-0.03	10 mm	Ant 2	N/A	02747	N/A	1:1	bottom	0.903	1.069	0.965	
1752.60	1513	UMTS 1750	RMC	25.0	24.81	-0.01	10 mm	Ant 2	N/A	02747	N/A	1:1	bottom	0.813	1.045	0.850	
1712.40	1312	UMTS 1750	RMC	25.0	24.62	0.01	10 mm	Ant 2	N/A	02747	N/A	1:1	left	0.722	1.091	0.788	
1732.40	1412	UMTS 1750	RMC	25.0	24.71	0.03	10 mm	Ant 2	N/A	02747	N/A	1:1	left	0.749	1.069	0.801	
1752.60	1513	UMTS 1750	RMC	25.0	24.81	0.02	10 mm	Ant 2	N/A	02747	N/A	1:1	left	0.778	1.045	0.813	
1880.00	661	GSM 1900	GPRS	27.2	26.81	-0.07	10 mm	Ant 2	N/A	02754	3	1.2.76	back	0.436	1.094	0.477	A19
1880.00	661	GSM 1900	GPRS	27.2	26.81	0.03	10 mm	Ant 2	N/A	02754	3	1.2.76	front	0.370	1.094	0.405	
1880.00	661	GSM 1900	GPRS	27.2	26.81	-0.05	10 mm	Ant 2	N/A	02754	3	1.2.76	bottom	0.347	1.094	0.380	
1880.00	661	GSM 1900	GPRS	27.2	26.81	0.00	10 mm	Ant 2	N/A	02754	3	1.2.76	left	0.279	1.094	0.305	
1880.00	9400	UMTS 1900	RMC	25.0	24.62	-0.01	10 mm	Ant 2	N/A	02754	N/A	1:1	back	0.685	1.091	0.747	A20
1880.00	9400	UMTS 1900	RMC	25.0	24.62	-0.03	10 mm	Ant 2	N/A	02754	N/A	1:1	front	0.613	1.091	0.669	
1880.00	9400	UMTS 1900	RMC	25.0	24.62	0.00	10 mm	Ant 2	N/A	02754	N/A	1:1	bottom	0.576	1.091	0.628	
1880.00	9400	UMTS 1900	RMC	25.0	24.62	-0.02	10 mm	Ant 2	N/A	02754	N/A	1:1	left	0.477	1.091	0.520	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram										

FCC ID: ZNFH910		SAR EVALUATION REPORT		Reviewed by: Quality Manager
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**Table 11-20  
LTE Band 12 Hotspot SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Tuner State	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	25.0	24.91	-0.01	0	Ant 1	3	02689	QPSK	1	0	10 mm	back	1:1	0.295	1.021	0.301	
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	-0.03	1	Ant 1	3	02689	QPSK	25	25	10 mm	back	1:1	0.218	1.023	0.223	
707.50	23095	Mid	LTE Band 12	10	25.0	24.91	-0.16	0	Ant 1	3	02689	QPSK	1	0	10 mm	front	1:1	0.238	1.021	0.243	
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	-0.01	1	Ant 1	3	02689	QPSK	25	25	10 mm	front	1:1	0.176	1.023	0.180	
707.50	23095	Mid	LTE Band 12	10	25.0	24.91	-0.05	0	Ant 1	3	02689	QPSK	1	0	10 mm	bottom	1:1	0.247	1.021	0.252	
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	0.01	1	Ant 1	3	02689	QPSK	25	25	10 mm	bottom	1:1	0.188	1.023	0.192	
707.50	23095	Mid	LTE Band 12	10	25.0	24.91	0.02	0	Ant 1	3	02689	QPSK	1	0	10 mm	right	1:1	0.357	1.021	0.364	A22
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	0.05	1	Ant 1	3	02689	QPSK	25	25	10 mm	right	1:1	0.272	1.023	0.278	
707.50	23095	Mid	LTE Band 12	10	25.0	24.91	0.10	0	Ant 1	3	02689	QPSK	1	0	10 mm	left	1:1	0.175	1.021	0.179	
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	0.03	1	Ant 1	3	02689	QPSK	25	25	10 mm	left	1:1	0.147	1.023	0.150	
707.50	23095	Mid	LTE Band 12	10	25.0	24.91	-0.11	0	Ant 3	N/A	02689	QPSK	1	0	10 mm	back	1:1	0.105	1.021	0.107	
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	-0.03	1	Ant 3	N/A	02689	QPSK	25	25	10 mm	back	1:1	0.085	1.023	0.087	
707.50	23095	Mid	LTE Band 12	10	25.0	24.91	0.08	0	Ant 3	N/A	02689	QPSK	1	0	10 mm	front	1:1	0.086	1.021	0.088	
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	-0.06	1	Ant 3	N/A	02689	QPSK	25	25	10 mm	front	1:1	0.057	1.023	0.058	
707.50	23095	Mid	LTE Band 12	10	25.0	24.91	-0.01	0	Ant 3	N/A	02689	QPSK	1	0	10 mm	top	1:1	0.041	1.021	0.042	
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	-0.16	1	Ant 3	N/A	02689	QPSK	25	25	10 mm	top	1:1	0.035	1.023	0.036	
707.50	23095	Mid	LTE Band 12	10	25.0	24.91	-0.01	0	Ant 3	N/A	02689	QPSK	1	0	10 mm	right	1:1	0.081	1.021	0.083	
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	0.01	1	Ant 3	N/A	02689	QPSK	25	25	10 mm	right	1:1	0.067	1.023	0.069	
707.50	23095	Mid	LTE Band 12	10	25.0	24.91	-0.12	0	Ant 3	N/A	02689	QPSK	1	0	10 mm	left	1:1	0.086	1.021	0.088	
707.50	23095	Mid	LTE Band 12	10	24.0	23.90	0.01	1	Ant 3	N/A	02689	QPSK	25	25	10 mm	left	1:1	0.081	1.023	0.083	
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 11-21  
LTE Band 5 (Cell) Hotspot SAR**

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Tuner State	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)		
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	0.00	0	Ant 1	116	02697	QPSK	1	0	10 mm	back	1:1	0.377	1.081	0.408	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	0.00	1	Ant 1	116	02697	QPSK	25	0	10 mm	back	1:1	0.286	1.089	0.311	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	-0.14	0	Ant 1	116	02697	QPSK	1	0	10 mm	front	1:1	0.387	1.081	0.418	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	-0.05	1	Ant 1	116	02697	QPSK	25	0	10 mm	front	1:1	0.302	1.089	0.329	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	0.01	0	Ant 1	116	02697	QPSK	1	0	10 mm	bottom	1:1	0.520	1.081	0.562	A24
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	-0.01	1	Ant 1	116	02697	QPSK	25	0	10 mm	bottom	1:1	0.396	1.089	0.431	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	-0.01	0	Ant 1	116	02697	QPSK	1	0	10 mm	right	1:1	0.432	1.081	0.467	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	-0.01	1	Ant 1	116	02697	QPSK	25	0	10 mm	right	1:1	0.327	1.089	0.356	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	0.01	0	Ant 1	116	02697	QPSK	1	0	10 mm	left	1:1	0.270	1.081	0.292	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	0.03	1	Ant 1	116	02697	QPSK	25	0	10 mm	left	1:1	0.195	1.089	0.212	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	0.02	0	Ant 3	N/A	02663	QPSK	1	0	10 mm	back	1:1	0.095	1.081	0.103	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	0.08	1	Ant 3	N/A	02663	QPSK	25	0	10 mm	back	1:1	0.071	1.089	0.077	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	-0.03	0	Ant 3	N/A	02663	QPSK	1	0	10 mm	front	1:1	0.112	1.081	0.121	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	0.00	1	Ant 3	N/A	02663	QPSK	25	0	10 mm	front	1:1	0.089	1.089	0.097	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	-0.04	0	Ant 3	N/A	02663	QPSK	1	0	10 mm	top	1:1	0.090	1.081	0.097	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	-0.01	1	Ant 3	N/A	02663	QPSK	25	0	10 mm	top	1:1	0.071	1.089	0.077	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	0.03	0	Ant 3	N/A	02663	QPSK	1	0	10 mm	right	1:1	0.070	1.081	0.076	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	0.03	1	Ant 3	N/A	02663	QPSK	25	0	10 mm	right	1:1	0.052	1.089	0.057	
836.50	20525	Mid	LTE Band 5 (Cell)	10	25.0	24.66	0.01	0	Ant 3	N/A	02663	QPSK	1	0	10 mm	left	1:1	0.068	1.081	0.074	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.63	0.07	1	Ant 3	N/A	02663	QPSK	25	0	10 mm	left	1:1	0.049	1.089	0.053	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak										Body 1.6 W/kg (mW/g) averaged over 1 gram											
Uncontrolled Exposure/General Population																					

FCC ID: ZNFH910		<b>SAR EVALUATION REPORT</b>		<b>Reviewed by:</b> Quality Manager
<b>Document S/N:</b> OY1607051171-R4.ZNF	<b>Test Dates:</b> 07/05/16 - 07/25/16	<b>DUT Type:</b> Portable Handset	Page 62 of 83	

**Table 11-22  
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)		
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.68	-0.07	0	02689	QPSK	1	0	10 mm	back	1:1	1.070	1.076	1.151	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.0	24.95	0.03	0	02689	QPSK	1	50	10 mm	back	1:1	1.170	1.012	1.184	A25
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	25.00	0.00	0	02689	QPSK	1	0	10 mm	back	1:1	1.120	1.000	1.120	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.81	-0.04	1	02689	QPSK	50	25	10 mm	back	1:1	0.884	1.045	0.924	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.86	-0.01	1	02689	QPSK	50	25	10 mm	back	1:1	0.923	1.033	0.953	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.95	-0.02	1	02689	QPSK	50	25	10 mm	back	1:1	0.896	1.012	0.907	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.86	-0.01	1	02689	QPSK	100	0	10 mm	back	1:1	1.000	1.033	1.033	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.68	0.18	0	02689	QPSK	1	0	10 mm	front	1:1	1.040	1.076	1.119	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.0	24.95	0.11	0	02689	QPSK	1	50	10 mm	front	1:1	1.070	1.012	1.083	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	25.00	0.07	0	02689	QPSK	1	0	10 mm	front	1:1	1.050	1.000	1.050	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.81	0.08	1	02689	QPSK	50	25	10 mm	front	1:1	0.842	1.045	0.880	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.86	0.09	1	02689	QPSK	50	25	10 mm	front	1:1	0.851	1.033	0.879	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.95	0.10	1	02689	QPSK	50	25	10 mm	front	1:1	0.837	1.012	0.847	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.86	0.12	1	02689	QPSK	100	0	10 mm	front	1:1	0.838	1.033	0.866	
1720.00	132072	Low	LTE Band 66 (AWS)	20	25.0	24.68	-0.02	0	02689	QPSK	1	0	10 mm	bottom	1:1	0.946	1.076	1.018	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.0	24.95	-0.07	0	02689	QPSK	1	50	10 mm	bottom	1:1	1.020	1.012	1.032	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	25.00	-0.01	0	02689	QPSK	1	0	10 mm	bottom	1:1	0.956	1.000	0.956	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.81	0.01	1	02689	QPSK	50	25	10 mm	bottom	1:1	0.798	1.045	0.834	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.86	0.08	1	02689	QPSK	50	25	10 mm	bottom	1:1	0.813	1.033	0.840	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.95	-0.01	1	02689	QPSK	50	25	10 mm	bottom	1:1	0.795	1.012	0.805	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.86	0.02	1	02689	QPSK	100	0	10 mm	bottom	1:1	0.787	1.033	0.813	
1770.00	132572	High	LTE Band 66 (AWS)	20	25.0	25.00	0.04	0	02689	QPSK	1	0	10 mm	left	1:1	0.754	1.000	0.754	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.95	-0.06	1	02689	QPSK	50	25	10 mm	left	1:1	0.568	1.012	0.575	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	25.0	24.95	0.02	0	02689	QPSK	1	50	10 mm	back	1:1	1.030	1.012	1.042	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Body 1.6 W/kg (mW/g) averaged over 1 gram										

**Note: Blue Entry Represents Variability**

**Table 11-23  
LTE Band 2 (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)		
1880.00	18900	Mid	LTE Band 2 (PCS)	20	25.2	25.16	0.17	0	02663	QPSK	1	99	10 mm	back	1:1	0.591	1.009	0.596	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.2	24.15	0.00	1	02663	QPSK	50	25	10 mm	back	1:1	0.521	1.012	0.527	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	25.2	25.16	0.01	0	02663	QPSK	1	99	10 mm	front	1:1	0.744	1.009	0.751	A27
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.2	24.15	0.01	1	02663	QPSK	50	25	10 mm	front	1:1	0.601	1.012	0.608	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	25.2	25.16	-0.05	0	02663	QPSK	1	99	10 mm	bottom	1:1	0.535	1.009	0.540	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.2	24.15	0.00	1	02663	QPSK	50	25	10 mm	bottom	1:1	0.463	1.012	0.469	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	25.2	25.16	0.00	0	02663	QPSK	1	99	10 mm	left	1:1	0.496	1.009	0.500	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	24.2	24.15	-0.01	1	02663	QPSK	50	25	10 mm	left	1:1	0.416	1.012	0.421	
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 11-24  
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) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	Plot #	
MHz	Ch.																		
2310.00	27710	Mid	LTE Band 30	10	23.7	23.54	-0.03	0	02671	QPSK	1	49	10 mm	back	1:1	0.267	1.038	0.277	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.46	-0.11	1	02671	QPSK	25	25	10 mm	back	1:1	0.207	1.057	0.219	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.54	0.00	0	02671	QPSK	1	49	10 mm	front	1:1	0.534	1.038	0.554	A29
2310.00	27710	Mid	LTE Band 30	10	22.7	22.46	-0.08	1	02671	QPSK	25	25	10 mm	front	1:1	0.416	1.057	0.440	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.54	-0.05	0	02671	QPSK	1	49	10 mm	bottom	1:1	0.448	1.038	0.465	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.46	-0.04	1	02671	QPSK	25	25	10 mm	bottom	1:1	0.347	1.057	0.367	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.54	0.00	0	02671	QPSK	1	49	10 mm	right	1:1	0.056	1.038	0.058	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.46	-0.16	1	02671	QPSK	25	25	10 mm	right	1:1	0.040	1.057	0.042	
2310.00	27710	Mid	LTE Band 30	10	23.7	23.54	0.13	0	02671	QPSK	1	49	10 mm	left	1:1	0.087	1.038	0.090	
2310.00	27710	Mid	LTE Band 30	10	22.7	22.46	0.06	1	02671	QPSK	25	25	10 mm	left	1:1	0.068	1.057	0.072	
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 11-25  
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) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	Plot #	
MHz	Ch.																		
2510.00	20850	Low	LTE Band 7	20	23.7	23.64	-0.02	0	02663	QPSK	1	0	10 mm	back	1:1	0.218	1.014	0.221	
2535.00	21100	Mid	LTE Band 7	20	22.7	22.68	0.05	1	02663	QPSK	50	50	10 mm	back	1:1	0.154	1.005	0.155	
2510.00	20850	Low	LTE Band 7	20	23.7	23.64	-0.05	0	02663	QPSK	1	0	10 mm	front	1:1	0.165	1.014	0.167	
2535.00	21100	Mid	LTE Band 7	20	22.7	22.68	0.01	1	02663	QPSK	50	50	10 mm	front	1:1	0.093	1.005	0.093	
2510.00	20850	Low	LTE Band 7	20	23.7	23.64	0.10	0	02663	QPSK	1	0	10 mm	bottom	1:1	0.317	1.014	0.321	A31
2535.00	21100	Mid	LTE Band 7	20	22.7	22.68	0.14	1	02663	QPSK	50	50	10 mm	bottom	1:1	0.241	1.005	0.242	
2510.00	20850	Low	LTE Band 7	20	23.7	23.64	0.05	0	02663	QPSK	1	0	10 mm	right	1:1	0.032	1.014	0.032	
2535.00	21100	Mid	LTE Band 7	20	22.7	22.68	0.18	1	02663	QPSK	50	50	10 mm	right	1:1	0.022	1.005	0.022	
2510.00	20850	Low	LTE Band 7	20	23.7	23.64	0.00	0	02663	QPSK	1	0	10 mm	left	1:1	0.019	1.014	0.019	
2535.00	21100	Mid	LTE Band 7	20	22.7	22.68	0.13	1	02663	QPSK	50	50	10 mm	left	1:1	0.009	1.005	0.009	
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 11-26  
WLAN 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	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
2447	8	802.11b	DSSS	22	20.0	19.45	0.02	10 mm	Primary	02655	1	back	99.9	0.445	-	1.135	1.001	-	
2447	8	802.11b	DSSS	22	20.0	19.45	-0.05	10 mm	Primary	02655	1	front	99.9	0.476	0.323	1.135	1.001	0.367	A33
2447	8	802.11b	DSSS	22	20.0	19.45	0.07	10 mm	Primary	02655	1	top	99.9	0.273	-	1.135	1.001	-	
2447	8	802.11b	DSSS	22	20.0	19.45	-0.02	10 mm	Primary	02655	1	right	99.9	0.397	-	1.135	1.001	-	
2437	6	802.11b	DSSS	22	20.0	19.74	0.16	10 mm	Secondary	02655	1	back	99.9	0.197	-	1.062	1.001	-	
2437	6	802.11b	DSSS	22	20.0	19.74	0.03	10 mm	Secondary	02655	1	front	99.9	0.228	-	1.062	1.001	-	
2437	6	802.11b	DSSS	22	20.0	19.74	0.08	10 mm	Secondary	02655	1	top	99.9	0.250	0.153	1.062	1.001	0.163	
2437	6	802.11b	DSSS	22	20.0	19.74	-0.13	10 mm	Secondary	02655	1	right	99.9	0.028	-	1.062	1.001	-	
2437	6	802.11n	OFDM	20	18.5	17.83	-0.04	10 mm	MIMO	02614	13	back	99.2	0.196	0.117	1.175	1.008	0.139	
2437	6	802.11n	OFDM	20	18.5	17.83	0.04	10 mm	MIMO	02614	13	front	99.2	0.207	0.141	1.175	1.008	0.167	
2437	6	802.11n	OFDM	20	18.5	17.83	-0.03	10 mm	MIMO	02614	13	top	99.2	0.176	-	1.175	1.008	-	
2437	6	802.11n	OFDM	20	18.5	17.83	0.12	10 mm	MIMO	02614	13	right	99.2	0.130	-	1.175	1.008	-	
5240	48	802.11a	OFDM	20	15.0	14.51	-0.14	10 mm	Primary	02655	6	back	99.4	0.133	0.061	1.119	1.006	0.069	
5240	48	802.11a	OFDM	20	15.0	14.51	-0.12	10 mm	Primary	02655	6	front	99.4	0.066	-	1.119	1.006	-	
5240	48	802.11a	OFDM	20	15.0	14.51	-0.19	10 mm	Primary	02655	6	top	99.4	0.179	0.081	1.119	1.006	0.091	
5240	48	802.11a	OFDM	20	15.0	14.51	-0.15	10 mm	Primary	02655	6	right	99.4	0.043	-	1.119	1.006	-	
5200	40	802.11a	OFDM	20	14.0	13.79	-0.14	10 mm	Secondary	02655	6	back	99.4	0.116	0.077	1.050	1.006	0.081	
5200	40	802.11a	OFDM	20	14.0	13.79	0.13	10 mm	Secondary	02655	6	front	99.4	0.265	0.136	1.050	1.006	0.144	
5200	40	802.11a	OFDM	20	14.0	13.79	-0.06	10 mm	Secondary	02655	6	top	99.4	0.354	0.166	1.050	1.006	0.175	
5200	40	802.11a	OFDM	20	14.0	13.79	0.14	10 mm	Secondary	02655	6	right	99.4	0.107	-	1.050	1.006	-	
5745	149	802.11a	OFDM	20	15.0	14.56	0.10	10 mm	Primary	02655	6	back	99.4	0.526	0.223	1.107	1.006	0.248	
5745	149	802.11a	OFDM	20	15.0	14.56	0.12	10 mm	Primary	02655	6	front	99.4	0.204	-	1.107	1.006	-	
5745	149	802.11a	OFDM	20	15.0	14.56	0.06	10 mm	Primary	02655	6	top	99.4	0.685	0.291	1.107	1.006	0.324	A35
5745	149	802.11a	OFDM	20	15.0	14.56	0.16	10 mm	Primary	02655	6	right	99.4	0.091	-	1.107	1.006	-	
5745	149	802.11a	OFDM	20	14.0	13.65	0.16	10 mm	Secondary	02655	6	back	99.4	0.120	0.060	1.084	1.006	0.065	
5745	149	802.11a	OFDM	20	14.0	13.65	0.15	10 mm	Secondary	02655	6	front	99.4	0.180	0.082	1.084	1.006	0.089	
5745	149	802.11a	OFDM	20	14.0	13.65	0.10	10 mm	Secondary	02655	6	top	99.4	0.230	0.105	1.084	1.006	0.115	
5745	149	802.11a	OFDM	20	14.0	13.65	0.16	10 mm	Secondary	02655	6	right	99.4	0.056	-	1.084	1.006	-	
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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# 11.4 Standalone Phablet SAR Data

**Table 11-27  
WLAN 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	SAR (10g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (10g)	Plot #
MHz	Ch.													W/kg	(W/kg)			(W/kg)	
5260	52	802.11a	OFDM	20	15.0	14.88	0.10	0 mm	Primary	02655	6	back	99.4	3.840	0.253	1.028	1.006	0.262	
5260	52	802.11a	OFDM	20	15.0	14.88	0.18	0 mm	Primary	02655	6	front	99.4	0.679	-	1.028	1.006	-	
5260	52	802.11a	OFDM	20	15.0	14.88	-0.09	0 mm	Primary	02655	6	top	99.4	2.556	-	1.028	1.006	-	
5260	52	802.11a	OFDM	20	15.0	14.88	0.11	0 mm	Primary	02655	6	right	99.4	0.684	-	1.028	1.006	-	
5260	52	802.11a	OFDM	20	14.0	13.54	0.16	0 mm	Secondary	02655	6	back	99.4	0.917	-	1.112	1.006	-	
5260	52	802.11a	OFDM	20	14.0	13.54	-0.12	0 mm	Secondary	02655	6	front	99.4	8.740	-	1.112	1.006	-	
5260	52	802.11a	OFDM	20	14.0	13.54	0.01	0 mm	Secondary	02655	6	top	99.4	8.329	0.674	1.112	1.006	0.754	
5300	60	802.11a	OFDM	20	14.0	13.47	0.13	0 mm	Secondary	02655	6	top	99.4	7.625	0.676	1.130	1.006	0.768	
5320	64	802.11a	OFDM	20	14.0	13.45	0.17	0 mm	Secondary	02655	6	top	99.4	6.810	0.703	1.135	1.006	0.803	A37
5260	52	802.11a	OFDM	20	14.0	13.54	0.14	0 mm	Secondary	02655	6	right	99.4	0.417	-	1.112	1.006	-	
5500	100	802.11a	OFDM	20	15.0	14.42	0.14	0 mm	Primary	02655	6	back	99.4	8.834	0.481	1.143	1.006	0.553	
5500	100	802.11a	OFDM	20	15.0	14.42	0.12	0 mm	Primary	02655	6	front	99.4	1.135	-	1.143	1.006	-	
5500	100	802.11a	OFDM	20	15.0	14.42	0.03	0 mm	Primary	02655	6	top	99.4	4.343	-	1.143	1.006	-	
5500	100	802.11a	OFDM	20	15.0	14.42	0.13	0 mm	Primary	02655	6	right	99.4	1.326	-	1.143	1.006	-	
5720	144	802.11a	OFDM	20	14.0	13.56	0.19	0 mm	Secondary	02655	6	back	99.4	0.893	-	1.107	1.006	-	
5720	144	802.11a	OFDM	20	14.0	13.56	0.15	0 mm	Secondary	02655	6	front	99.4	3.130	-	1.107	1.006	-	
5720	144	802.11a	OFDM	20	14.0	13.56	0.10	0 mm	Secondary	02655	6	top	99.4	4.861	0.376	1.107	1.006	0.419	
5720	144	802.11a	OFDM	20	14.0	13.56	0.12	0 mm	Secondary	02655	6	right	99.4	0.204	-	1.107	1.006	-	
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 11-28  
Bluetooth Phablet 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 (10g)	Scaling Factor	Reported SAR (10g)	Plot #		
MHz	Ch.											(W/kg)		(W/kg)			
2480	78	Bluetooth	FHSS	13.0	12.72	-0.12	0 mm	02655	1	back	1:1	0.077	1.067	0.082			
2480	78	Bluetooth	FHSS	13.0	12.72	0.17	0 mm	02655	1	front	1:1	0.050	1.067	0.053			
2480	78	Bluetooth	FHSS	13.0	12.72	-0.14	0 mm	02655	1	top	1:1	0.061	1.067	0.065			
2480	78	Bluetooth	FHSS	13.0	12.72	0.01	0 mm	02655	1	right	1:1	0.106	1.067	0.113	A38		
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  $\leq 1.2$  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. This device supports dynamic antenna tuning for some bands on Antenna 1. Per FCC Guidance, SAR was measured according to the normally required SAR measurement configurations with the tuner active. The auto-tune state determined by the device was verified before and after each SAR measurement and is listed in the tables above. Please see Section 14 for supplemental data.

### 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  $\leq 0.8$  W/kg 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 > ½ 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.

### 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  $\leq 0.8$  W/kg 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 > ½ dB, instead of the middle channel, the highest output power channel was used.

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**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 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 KDB Publication 941225 D05Av01r02, SAR for 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.

**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  $\leq 0.4$  W/kg, 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  $\leq 0.8$  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 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. 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. For some evaluations with 2.4 GHz WLAN Body, MIMO SAR was measured with both antennas transmitting simultaneously at the specified maximum output power in MIMO mode following the initial test configuration procedures, per KDB Publication 248227 D01v02r02. Please see Section 12 for complete analysis.
5. When the maximum reported 1g averaged SAR is  $\leq 0.8$  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  $\leq 1.20$  W/kg or all test channels were measured. When 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.
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. Under normal operation this device supports independent (SISO) WLAN transmission from the primary antenna for all modes and from the secondary antenna for 2.4 GHz 802.11b mode only. Other WLAN modes tested for standalone scenarios for the secondary antenna were evaluated using the test mode software provided by the manufacturer to determine simultaneous transmission SAR compliance for potential MIMO operations.

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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 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is  $\leq 1.6$  W/kg. The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1-g or 10-g SAR.

## 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 Primary Antenna SAR (W/kg)	2.4 GHz WLAN Secondary Antenna SAR (W/kg)	$\Sigma$ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	GSM/GPRS 850	0.305	0.457	0.073	0.835
	UMTS 850	0.444	0.457	0.073	0.974
	UMTS 1750	0.396	0.457	0.073	0.926
	GSM/GPRS 1900	0.205	0.457	0.073	0.735
	UMTS 1900	0.321	0.457	0.073	0.851
	LTE Band 12	0.874	0.457	0.073	<b>1.404</b>
	LTE Band 5 (Cell)	0.537	0.457	0.073	1.067
	LTE Band 66 (AWS)	0.410	0.457	0.073	0.940
	LTE Band 2 (PCS)	0.327	0.457	0.073	0.857
	LTE Band 30	0.109	0.457	0.073	0.639
LTE Band 7	0.024	0.457	0.073	0.554	

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**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 Primary Antenna SAR (W/kg)	5 GHz WLAN Secondary Antenna SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	GSM/GPRS 850	0.305	0.490	0.387	1.182
	UMTS 850	0.444	0.490	0.387	1.321
	UMTS 1750	0.396	0.490	0.387	1.273
	GSM/GPRS 1900	0.205	0.490	0.387	1.082
	UMTS 1900	0.321	0.490	0.387	1.198
	LTE Band 12	0.874	0.490	0.387	See Table 12-3
	LTE Band 5 (Cell)	0.537	0.490	0.387	<b>1.414</b>
	LTE Band 66 (AWS)	0.410	0.490	0.387	1.287
	LTE Band 2 (PCS)	0.327	0.490	0.387	1.204
	LTE Band 30	0.109	0.490	0.387	0.986
	LTE Band 7	0.024	0.490	0.387	0.901

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

Simult Tx	Configuration	LTE Band 12 SAR (W/kg)	5 GHz WLAN Primary Antenna SAR (W/kg)	5 GHz WLAN Secondary Antenna SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Head SAR	Right Cheek	0.874	0.154	0.387*	<b>1.415</b>
	Right Tilt	0.858	0.142	0.387*	1.387
	Left Cheek	0.467	0.173	0.387*	1.027
	Left Tilt	0.476	0.490	0.387	1.353

**Note: (\*) Represents Worst Case Configuration**

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## 12.4 Body-Worn Simultaneous Transmission Analysis

**Table 12-4**  
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 Primary Antenna SAR (W/kg)	2.4 GHz WLAN Secondary Antenna SAR (W/kg)	$\Sigma$ SAR (W/kg)	
		1	2	3	1+2	1+3
Body-Worn	GSM/GPRS 850	0.380	0.324	0.125	0.704	0.505
	UMTS 850	0.291	0.324	0.125	0.615	0.416
	UMTS 1750	1.113	0.324	0.125	1.437	1.238
	GSM/GPRS 1900	0.477	0.324	0.125	0.801	0.602
	UMTS 1900	0.747	0.324	0.125	1.071	0.872
	LTE Band 12	0.301	0.324	0.125	0.625	0.426
	LTE Band 5 (Cell)	0.408	0.324	0.125	0.732	0.533
	LTE Band 66 (AWS)	1.184	0.324	0.125	<b>1.508</b>	1.309
	LTE Band 2 (PCS)	0.596	0.324	0.125	0.920	0.721
	LTE Band 30	0.277	0.324	0.125	0.601	0.402
	LTE Band 7	0.221	0.324	0.125	0.545	0.346

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	$\Sigma$ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM/GPRS 850	0.380	0.139	0.519
	UMTS 850	0.291	0.139	0.430
	UMTS 1750	1.113	0.139	1.252
	GSM/GPRS 1900	0.477	0.139	0.616
	UMTS 1900	0.747	0.139	0.886
	LTE Band 12	0.301	0.139	0.440
	LTE Band 5 (Cell)	0.408	0.139	0.547
	LTE Band 66 (AWS)	1.184	0.139	<b>1.323</b>
	LTE Band 2 (PCS)	0.596	0.139	0.735
	LTE Band 30	0.277	0.139	0.416
	LTE Band 7	0.221	0.139	0.360

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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 Primary Antenna SAR (W/kg)	5 GHz WLAN Secondary Antenna SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Body-Worn	GSM/GPRS 850	0.380	0.248	0.077	0.705
	UMTS 850	0.291	0.248	0.077	0.616
	UMTS 1750	1.113	0.248	0.077	1.438
	GSM/GPRS 1900	0.477	0.248	0.077	0.802
	UMTS 1900	0.747	0.248	0.077	1.072
	LTE Band 12	0.301	0.248	0.077	0.626
	LTE Band 5 (Cell)	0.408	0.248	0.077	0.733
	LTE Band 66 (AWS)	1.184	0.248	0.077	<b>1.509</b>
	LTE Band 2 (PCS)	0.596	0.248	0.077	0.921
	LTE Band 30	0.277	0.248	0.077	0.602
	LTE Band 7	0.221	0.248	0.077	0.546

**Table 12-7  
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	
Body-Worn	GSM/GPRS 850	0.380	0.025	0.405
	UMTS 850	0.291	0.025	0.316
	UMTS 1750	1.113	0.025	1.138
	GSM/GPRS 1900	0.477	0.025	0.502
	UMTS 1900	0.747	0.025	0.772
	LTE Band 12	0.301	0.025	0.326
	LTE Band 5 (Cell)	0.408	0.025	0.433
	LTE Band 66 (AWS)	1.184	0.025	<b>1.209</b>
	LTE Band 2 (PCS)	0.596	0.025	0.621
	LTE Band 30	0.277	0.025	0.302
	LTE Band 7	0.221	0.025	0.246

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## 12.5 Hotspot SAR Simultaneous Transmission Analysis

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 (“-“).

**Table 12-8**  
**Simultaneous Transmission Scenario (2.4 GHz Hotspot at 1.0 cm)**

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Primary Antenna SAR (W/kg)	2.4 GHz WLAN Secondary Antenna SAR (W/kg)	Σ SAR (W/kg)	
		1	2	3	1+2	1+3
Hotspot SAR	GPRS 850	0.525	0.367	0.163	0.892	0.688
	UMTS 850	0.433	0.367	0.163	0.800	0.596
	UMTS 1750	1.113	0.367	0.163	1.480	1.276
	GPRS 1900	0.477	0.367	0.163	0.844	0.640
	UMTS 1900	0.747	0.367	0.163	1.114	0.910
	LTE Band 12	0.364	0.367	0.163	0.731	0.527
	LTE Band 5 (Cell)	0.562	0.367	0.163	0.929	0.725
	LTE Band 66 (AWS)	1.184	0.367	0.163	<b>1.551</b>	1.347
	LTE Band 2 (PCS)	0.751	0.367	0.163	1.118	0.914
	LTE Band 30	0.554	0.367	0.163	0.921	0.717
	LTE Band 7	0.321	0.367	0.163	0.688	0.484

**Table 12-9**  
**Simultaneous Transmission Scenario with 2.4 GHz MIMO (Hotspot at 1.0 cm)**

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.525	0.167	0.692
	UMTS 850	0.433	0.167	0.600
	UMTS 1750	1.113	0.167	1.280
	GPRS 1900	0.477	0.167	0.644
	UMTS 1900	0.747	0.167	0.914
	LTE Band 12	0.364	0.167	0.531
	LTE Band 5 (Cell)	0.562	0.167	0.729
	LTE Band 66 (AWS)	1.184	0.167	<b>1.351</b>
	LTE Band 2 (PCS)	0.751	0.167	0.918
	LTE Band 30	0.554	0.167	0.721
	LTE Band 7	0.321	0.167	0.488

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**Table 12-10**  
**Simultaneous Transmission Scenario with 5 GHz WLAN (Hotspot at 1.0 cm)**

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Primary Antenna SAR (W/kg)	5 GHz WLAN Secondary Antenna SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	GPRS 850	0.525	0.324	0.175	1.024
	UMTS 850	0.433	0.324	0.175	0.932
	UMTS 1750	1.113	0.324	0.175	See Table 12-11
	GPRS 1900	0.477	0.324	0.175	0.976
	UMTS 1900	0.747	0.324	0.175	1.246
	LTE Band 12	0.364	0.324	0.175	0.863
	LTE Band 5 (Cell)	0.562	0.324	0.175	1.061
	LTE Band 66 (AWS)	1.184	0.324	0.175	See Table 12-11
	LTE Band 2 (PCS)	0.751	0.324	0.175	1.250
	LTE Band 30	0.554	0.324	0.175	1.053
	LTE Band 7	0.321	0.324	0.175	0.820

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

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN Primary Antenna SAR (W/kg)	5 GHz WLAN Secondary Antenna SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	
Hotspot SAR	Back	1.113	0.248	0.081	1.442
	Front	0.984	0.324*	0.144	<b>1.452</b>
	Top	-	0.324	0.175	0.499
	Bottom	1.027	-	-	1.027
	Right	-	0.324*	0.175*	0.499
	Left	0.813	-	-	0.813

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Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN Primary Antenna SAR (W/kg)	5 GHz WLAN Secondary Antenna SAR (W/kg)	Σ SAR (W/kg)
		1	2	3	1+2+3
Hotspot SAR	Back	1.184	0.248	0.081	1.513
	Front	1.119	0.324*	0.144	<b>1.587</b>
	Top	-	0.324	0.175	0.499
	Bottom	1.032	-	-	1.032
	Right	-	0.324*	0.175*	0.499
	Left	0.754	-	-	0.754

Note: (\*) Represents Worst Case Configuration

## 12.6 Phablet SAR Simultaneous Transmission Analysis

Main antenna, 2.4 GHz WIFI SAR testing was not required for extremity exposure conditions per FCC KDB 648474 D04v01r02. Therefore, no further analysis beyond **Table 12-12** was required to determine that possible simultaneous scenarios would not exceed the SAR limit.

**Table 12-12**  
Simultaneous Transmission Scenario for MIMO 5 GHz WLAN (Phablet at 0.0 cm)

Exposure Condition	5 GHz WLAN Primary Antenna SAR (W/kg)	5 GHz WLAN Secondary Antenna SAR (W/kg)	Σ SAR (W/kg)
Phablet SAR	0.553	0.803	<b>1.356</b>

## 12.7 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is 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 6.3.4.1.2.

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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  $\geq 0.80$  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  $\geq 1.45$  W/kg (~ 10% from the 1-g SAR limit).
- 3) A third repeated measurement was performed only if the original, first or second repeated measurement was  $\geq 1.5$  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 10-g SAR measurement is considered, a factor of 2.5 is applied to the thresholds above.

**Table 13-1  
Head SAR Measurement Variability Results**

HEAD VARIABILITY RESULTS													
Band	FREQUENCY		Mode/Band	Service	Side	Test Position	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
750	707.50	23095	LTE Band 12, 10 MHz Bandwidth, Ant 3	QPSK, 1 RB, 0 RB Offset	Right	Cheek	0.845	0.856	1.01	N/A	N/A	N/A	N/A
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 13-2  
Body SAR Measurement Variability Results**

BODY VARIABILITY RESULTS													
Band	FREQUENCY		Mode	Service	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1750	1745.00	132322	LTE Band 66 (AWS), 20 MHz Bandwidth	QPSK, 1 RB, 50 RB Offset	back	10 mm	1.170	1.030	1.14	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population						Body 1.6 W/kg (mW/g) averaged over 1 gram							

## 13.2 Measurement Uncertainty

The measured SAR was  $< 1.5$  W/kg 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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The following test procedures were followed to demonstrate that the SAR results in Section 11 represented the appropriate SAR test conditions. For bands with dynamic tuning implemented, SAR was measured according to the required FCC SAR test procedures with the dynamic tuner active to allow the device to automatically tune to the antenna state for the respective RF exposure test configurations. Additional single point SAR time-sweep measurements were evaluated for other tuner states to determine that the other tuner configurations would result in equivalent or lower SAR values. The additional tuner hardware has no influence to the antenna characteristics, other than impedance matching.

To evaluate all of the tuner states, the 144 tuner states were divided evenly among band, mode and exposure combinations so that at least one single point SAR measurement was measured among the configurations. Single point time-sweep measurements were performed at the peak SAR location determined by the zoom scan of the configuration with the highest reported SAR for each combination. The tuner state was able to be established remotely so that the device was not moved for the entire series of single point SAR for the tuner states in each combination. The SAR probe remained stationary at the same position throughout the entire series of single point measurements for each combination.

The operational description contains more information about the design and implementation of the dynamic antenna tuning.

**Table 14-1**  
**Supplemental Head SAR Data**

Supplemental Head SAR Data					
LTE Band 12		LTE Band 5		UMTS Band 5	
QPSK, 10MHz Bandwidth, 1 RB, 0 RB Offset		QPSK, 10MHz Bandwidth, 1 RB, 0 RB Offset		RMC	
Test Position	Right Cheek	Test Position	Right Cheek	Test Position	Right Cheek
Frequency (MHz)	707.5	Frequency (MHz)	836.5	Frequency (MHz)	836.6
Channel	23095	Channel	20525	Channel	4183
Measured 1g SAR (W/kg)	0.202	Measured 1g SAR (W/kg)	0.214	Measured 1g SAR (W/kg)	0.223
Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)	
Auto-tune (State 3)	0.228	Auto-tune (State 116)	0.267	Auto-tune (State 116)	0.245
Default (State 2)	0.226	Default (State 5)	0.262	Default (State 5)	0.237
State 1	0.100	State 7	0.265	State 26	0.221
State 3	0.214	State 8	0.265	State 27	0.218
State 21	0.192	State 11	0.219	State 33	0.137
State 29	0.056	State 14	0.161	State 35	0.104
State 39	0.214	State 17	0.095	State 47	0.176
State 42	0.142	State 24	0.261	State 50	0.128
State 45	0.068	State 32	0.172	State 53	0.076
State 48	0.027	State 56	0.262	State 57	0.235
State 51	0.011	State 61	0.249	State 64	0.190
State 54	0.001	State 63	0.224	State 66	0.162
State 58	0.183	State 65	0.199	State 68	0.135
State 60	0.160	State 72	0.033	State 70	0.102
State 69	0.019	State 78	0.263	State 91	0.218
State 92	0.210	State 82	0.241	State 103	0.156
State 94	0.189	State 84	0.215	State 114	0.241
State 97	0.136	State 87	0.153	State 116	0.238
State 112	0.190	State 90	0.036	State 117	0.231
State 113	0.173	State 99	0.230	State 120	0.190
State 115	0.130	State 102	0.183	State 123	0.137
State 121	0.025	State 105	0.128	State 126	0.031
State 124	0.010	State 116	0.264	State 130	0.239
State 131	0.174	State 134	0.249	State 132	0.228
State 136	0.062	State 137	0.198	State 138	0.169
State 140	0.019	State 139	0.165	State 142	0.098
State 144	0.001	State 141	0.124	State 143	0.085

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**Table 14-2  
Supplemental Body SAR Data**

Supplemental Body SAR Data					
LTE Band 12		LTE Band 5		UMTS Band 5	
QPSK, 10MHz Bandwidth, 1 RB, 0 RB Offset		QPSK, 10MHz Bandwidth, 1 RB, 0 RB Offset		RMC	
Test Position	Right Edge	Test Position	Bottom Edge	Test Position	Bottom Edge
Frequency (MHz)	707.5	Frequency (MHz)	836.5	Frequency (MHz)	836.6
Channel	23095	Channel	20525	Channel	4183
Measured 1g SAR (W/kg)	0.357	Measured 1g SAR (W/kg)	0.520	Measured 1g SAR (W/kg)	0.427
Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)		Average Value of Time Sweep (W/kg)	
Auto-tune (State 3)	0.429	Auto-tune (State 116)	0.731	Auto-tune (State 116)	0.548
Default (State 2)	0.437	Default (State 5)	0.715	Default (State 5)	0.524
State 2	0.437	State 5	0.715	State 3	0.513
State 3	0.428	State 19	0.651	State 9	0.529
State 4	0.387	State 25	0.731	State 12	0.455
State 6	0.306	State 34	0.374	State 15	0.318
State 10	0.129	State 36	0.103	State 18	0.061
State 13	0.055	State 40	0.729	State 28	0.495
State 16	0.024	State 43	0.704	State 30	0.448
State 20	0.387	State 46	0.621	State 37	0.511
State 22	0.383	State 49	0.469	State 38	0.530
State 23	0.368	State 52	0.280	State 41	0.532
State 31	0.086	State 55	0.725	State 59	0.532
State 44	0.200	State 62	0.695	State 76	0.548
State 67	0.082	State 71	0.289	State 79	0.544
State 74	0.399	State 73	0.631	State 85	0.436
State 75	0.395	State 81	0.735	State 88	0.296
State 77	0.359	State 100	0.665	State 93	0.547
State 80	0.251	State 101	0.601	State 95	0.539
State 83	0.116	State 108	0.090	State 96	0.534
State 86	0.059	State 110	0.730	State 104	0.348
State 89	0.027	State 116	0.733	State 106	0.258
State 98	0.027	State 119	0.667	State 111	0.543
State 107	0.027	State 122	0.515	State 116	0.549
State 109	0.219	State 125	0.311	State 118	0.525
State 116	0.251	State 127	0.658	State 129	0.553
State 128	0.425	State 133	0.724	State 135	0.506

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# 15 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/2/2016	Annual	3/2/2017	MY45470194
Agilent	8753E	(30kHz-6GHz) Network Analyzer	3/2/2016	Annual	3/2/2017	JP38020182
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	E4438C	ESG Vector Signal Generator	3/2/2016	Annual	3/2/2017	MY47270002
Agilent	E4432B	ESG-D Series Signal Generator	3/5/2016	Annual	3/5/2017	US40053896
Agilent	N9020A	MXA Signal Analyzer	11/5/2015	Annual	11/5/2016	US46470561
Agilent	N5182A	MXG Vector Signal Generator	2/27/2016	Annual	2/27/2017	MY47420651
Agilent	8753ES	S-Parameter Network Analyzer	3/3/2016	Annual	3/3/2017	US39170122
Agilent	E5515C	Wireless Communications Test Set	11/20/2014	Biennial	11/20/2016	GB43163447
Agilent	N4010A	Wireless Connectivity Test Set	CBT	N/A	CBT	GB44450273
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433971
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433972
Anritsu	ML2496A	Power Meter	2/28/2016	Annual	2/28/2017	1306009
Anritsu	ML2438A	Power Meter	3/3/2016	Annual	3/3/2017	1070030
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	941001
Anritsu	ML2495A	Power Meter	10/16/2015	Biennial	10/16/2017	1039008
Anritsu	MA2481A	Power Sensor	3/3/2016	Annual	3/3/2017	2400
Anritsu	MA2411B	Pulse Power Sensor	8/3/2015	Annual	8/3/2016	1126066
Anritsu	MA2411B	Pulse Power Sensor	12/7/2015	Annual	12/7/2016	1207364
Anritsu	MT8820C	Radio Communication Analyzer	7/24/2015	Annual	7/24/2016	6200901190
Anritsu	MT8820C	Radio Communication Analyzer	9/1/2015	Annual	9/1/2016	6201144419
Anritsu	MA24106A	USB Power Sensor	2/27/2016	Annual	2/27/2017	1344559
Anritsu	MA24106A	USB Power Sensor	2/27/2016	Annual	2/27/2017	1349503
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
COMTECH	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M155A00-009
Control Company	4040	Digital Thermometer	3/15/2015	Biennial	3/15/2017	150194929
Control Company	4353	Long Stem Thermometer	1/22/2015	Biennial	1/22/2017	150053081
Control Company	4352	Ultra Long Stem Thermometer	3/8/2016	Biennial	3/8/2018	160261701
Gigatronics	80701A	(0.05-18GHz) Power Sensor	11/4/2015	Annual	11/4/2016	1833460
Gigatronics	8651A	Universal Power Meter	11/4/2015	Annual	11/4/2016	8650319
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+	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
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mitutoyo	CD-6"CSX	Digital Caliper	3/2/2016	Biennial	3/2/2018	13264162
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	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMU200	Base Station Simulator	3/29/2016	Annual	3/29/2017	836371/0079
Rohde & Schwarz	CMW500	Radio Communication Tester	6/3/2016	Annual	6/3/2017	108843
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	7/20/2016	Annual	7/20/2017	132885
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
SPEAG	D1750V2	1750 MHz SAR Dipole	4/13/2016	Annual	4/13/2017	1051
SPEAG	D1900V2	1900 MHz SAR Dipole	4/12/2016	Annual	4/12/2017	5d141
SPEAG	D2300V2	2300 MHz SAR Dipole	12/8/2015	Annual	12/8/2016	1064
SPEAG	D2450V2	2450 MHz SAR Dipole	8/20/2015	Annual	8/20/2016	719
SPEAG	D2600V2	2600 MHz SAR Dipole	10/21/2015	Annual	10/21/2016	1071
SPEAG	D5GHzV2	5 GHz SAR Dipole	2/25/2016	Annual	2/25/2017	1120
SPEAG	D750V3	750 MHz SAR Dipole	2/16/2016	Annual	2/16/2017	1046
SPEAG	D835V2	835 MHz SAR Dipole	4/14/2016	Annual	4/14/2017	4d119
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/27/2015	Annual	10/27/2016	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/11/2015	Annual	11/11/2016	1334
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/11/2015	Annual	11/11/2016	1415
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/18/2016	Annual	2/18/2017	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/14/2016	Annual	3/14/2017	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/14/2016	Annual	4/14/2017	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/11/2016	Annual	5/11/2017	859
SPEAG	DAK-3.5	Dielectric Assessment Kit	10/20/2015	Annual	10/20/2016	1091
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2016	Annual	5/10/2017	1070
SPEAG	DAK-12	Dielectric Assessment Kit (10MHz - 3GHz)	3/1/2016	Annual	3/1/2017	1102
SPEAG	ES3DV3	SAR Probe	10/29/2015	Annual	10/29/2016	3333
SPEAG	ES3DV3	SAR Probe	11/17/2015	Annual	11/17/2016	3334
SPEAG	EX3DV4	SAR Probe	2/22/2016	Annual	2/22/2017	3914
SPEAG	ES3DV3	SAR Probe	3/18/2016	Annual	3/18/2017	3209
SPEAG	ES3DV3	SAR Probe	3/18/2016	Annual	3/18/2017	3319
SPEAG	EX3DV4	SAR Probe	4/19/2016	Annual	4/19/2017	7406
SPEAG	EX3DV4	SAR Probe	5/17/2016	Annual	5/17/2017	7409

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.

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# 16 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 <sub>1</sub> 1gm	c <sub>1</sub> 10 gms	1gm u <sub>1</sub> (± %)	10gms u <sub>1</sub> (± %)	v <sub>1</sub>
<b>Measurement System</b>								
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	∞
<b>Test Sample Related</b>								
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	∞
<b>Phantom &amp; Tissue Parameters</b>								
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	∞
<b>Combined Standard Uncertainty (k=1)</b>	RSS					11.5	11.3	60
<b>Expanded Uncertainty</b> (95% CONFIDENCE LEVEL)	k=2					23.0	22.6	

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# 17 CONCLUSION

## 17.1 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: ZNFH910; Type: Portable Handset; Serial: 02747**

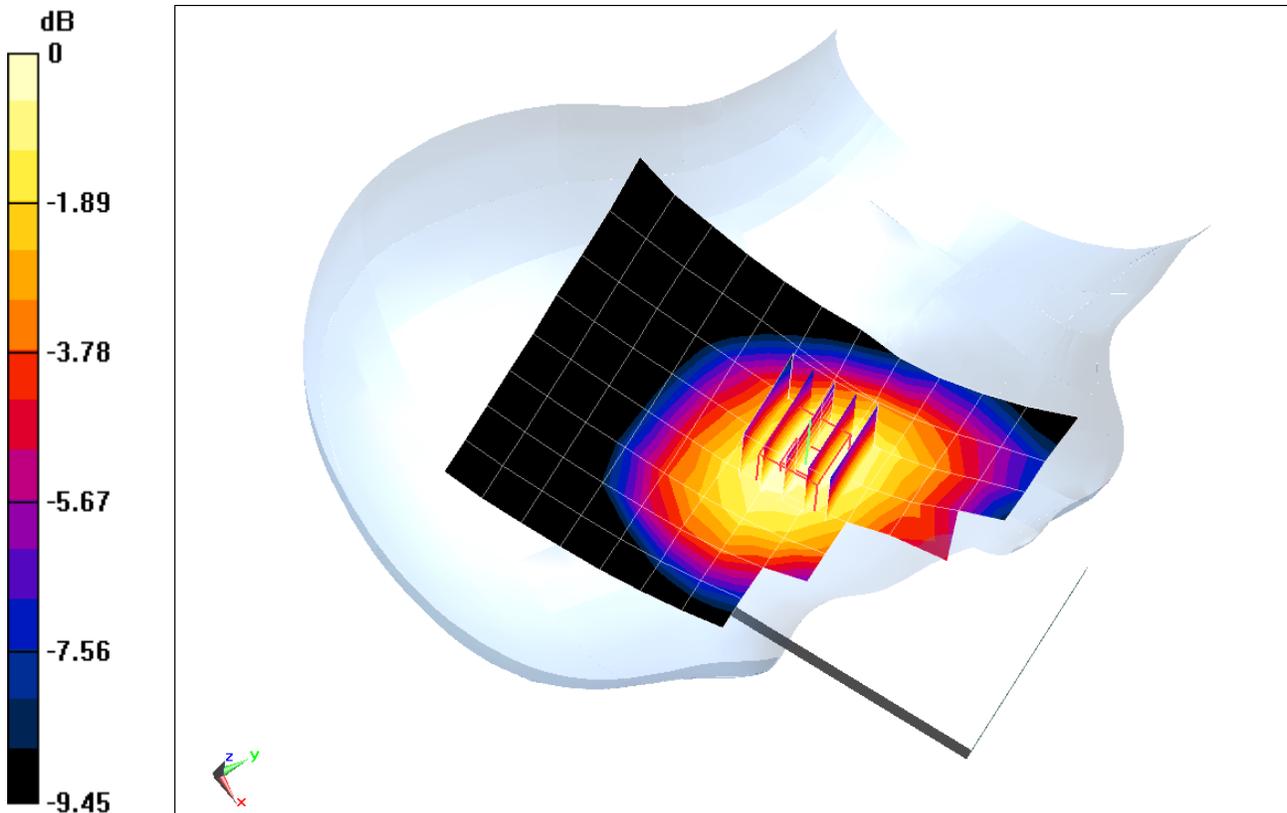
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15  
Medium: 835 Head Medium parameters used (interpolated):  
 $f = 836.6 \text{ MHz}$ ;  $\sigma = 0.91 \text{ S/m}$ ;  $\epsilon_r = 41.697$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

Test Date: 07-12-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3334; ConvF(6.37, 6.37, 6.37); Calibrated: 11/17/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015  
Phantom: SAM Front; Type: SAM; Serial: 1686  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: GPRS 850, Right 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 = 18.74 V/m; Power Drift = 0.05 dB  
Peak SAR (extrapolated) = 0.377 W/kg  
**SAR(1 g) = 0.299 W/kg**



0 dB = 0.324 W/kg = -4.89 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02754**

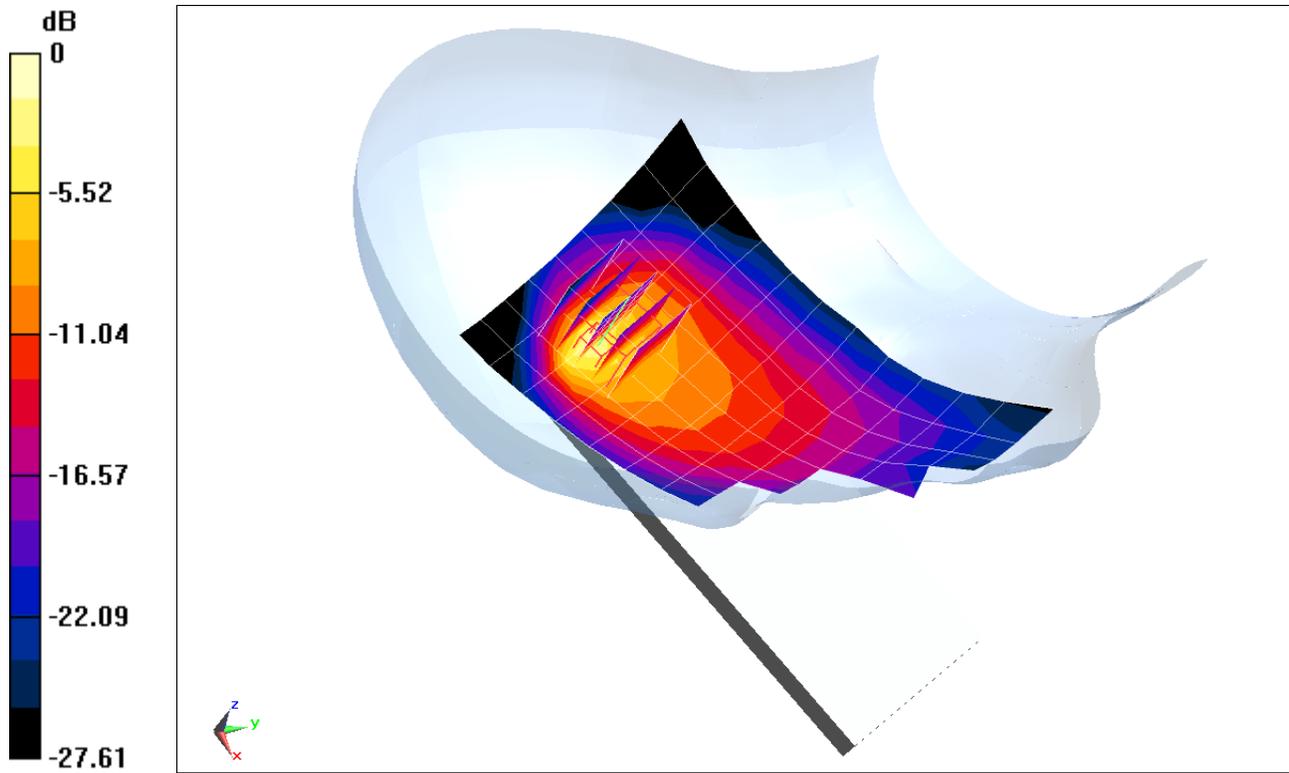
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1  
Medium: 835 Head Medium parameters used (interpolated):  
 $f = 836.6 \text{ MHz}$ ;  $\sigma = 0.91 \text{ S/m}$ ;  $\epsilon_r = 41.697$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

Test Date: 07-12-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3334; ConvF(6.37, 6.37, 6.37); Calibrated: 11/17/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015  
Phantom: SAM Front; Type: SAM; Serial: 1686  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: UMTS 850, Right Head, Tilt, Mid.ch, Antenna 3**

**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 = 23.62 V/m; Power Drift = -0.07 dB  
Peak SAR (extrapolated) = 1.74 W/kg  
**SAR(1 g) = 0.438 W/kg**



0 dB = 0.669 W/kg = -1.75 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02747**

Communication System: UID 0, UMTS; Frequency: 1732.4 MHz; Duty Cycle: 1:1  
Medium: 1750 Head Medium parameters used (interpolated):  
 $f = 1732.4 \text{ MHz}$ ;  $\sigma = 1.304 \text{ S/m}$ ;  $\epsilon_r = 39.301$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

Test Date: 07-11-2016; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7406; ConvF(8.85, 8.85, 8.85); Calibrated: 4/19/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016  
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: UMTS 1750, Left Head, Cheek, Mid.ch**

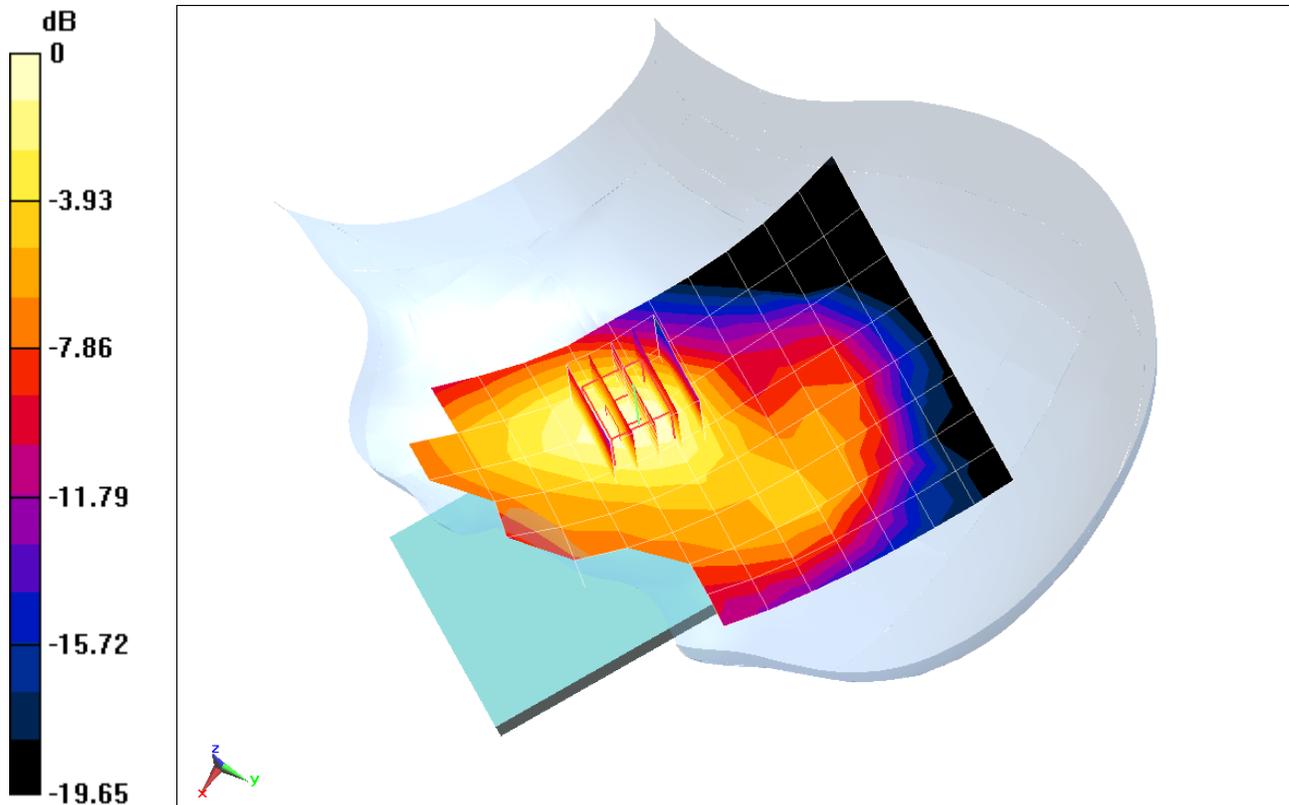
**Area Scan (9x15x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.32 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.530 W/kg

**SAR(1 g) = 0.370 W/kg**



0 dB = 0.463 W/kg = -3.34 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02747**

Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.76

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.439 \text{ S/m}$ ;  $\epsilon_r = 39.029$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 07-11-2016; Ambient Temp: 21.8°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3334; ConvF(5.18, 5.18, 5.18); Calibrated: 11/17/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1415; Calibrated: 11/11/2015

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: GPRS 1900, Left Head, Cheek, Mid.ch, 3 Tx Slot**

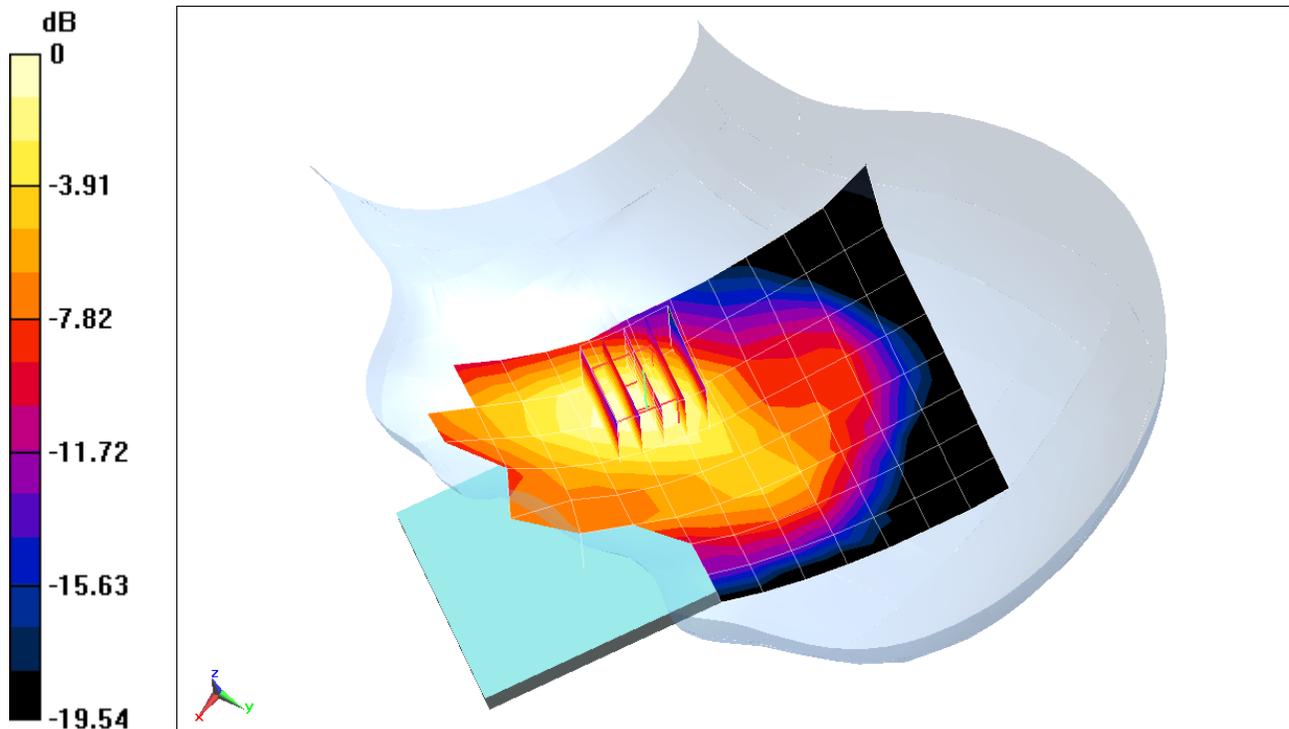
**Area Scan (9x14x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.85 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.283 W/kg

**SAR(1 g) = 0.187 W/kg**



0 dB = 0.211 W/kg = -6.76 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02747**

Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: 1900 Head Medium parameters used:  
 $f = 1880 \text{ MHz}$ ;  $\sigma = 1.399 \text{ S/m}$ ;  $\epsilon_r = 38.992$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

Test Date:07-07-2016; Ambient Temp: 23.0°C; Tissue Temp:23.2°C

Probe: ES3DV3 - SN3333; ConvF(5.03, 5.03, 5.03); Calibrated: 10/29/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015  
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

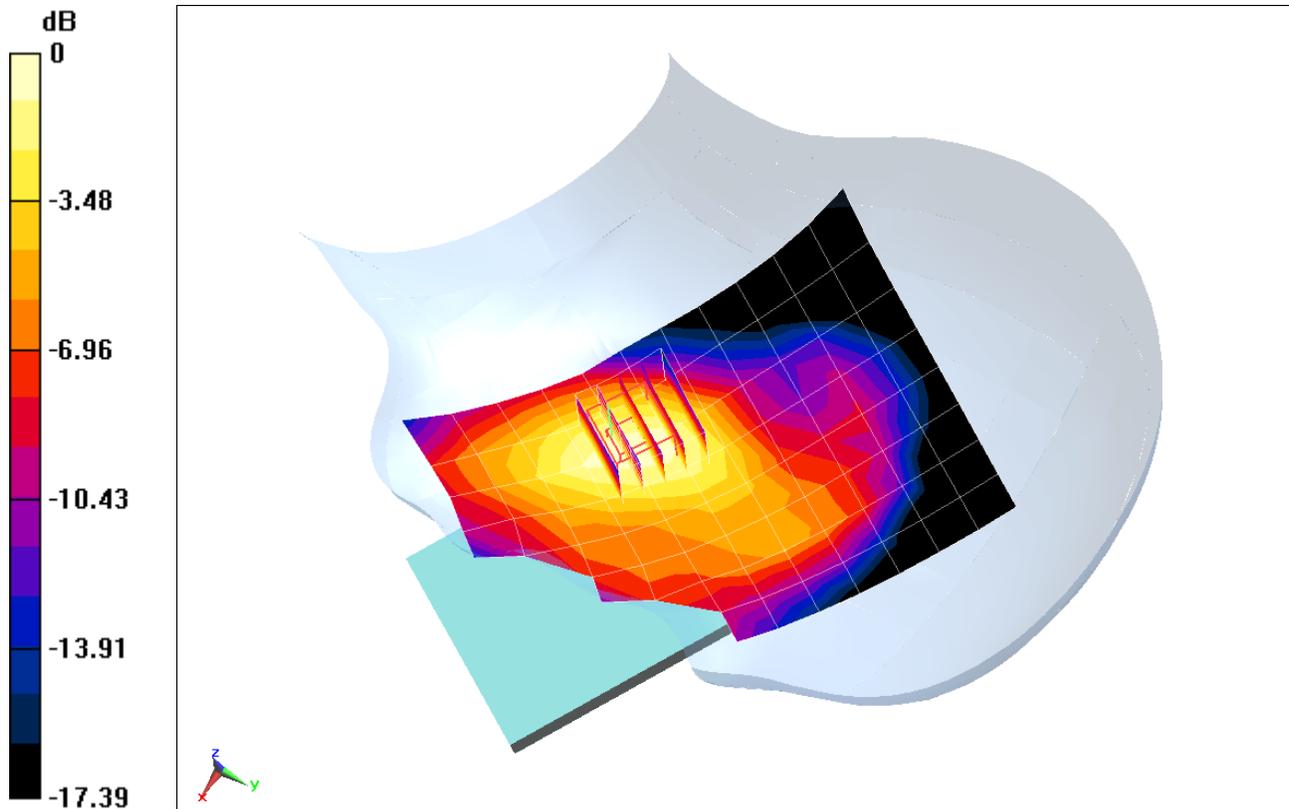
**Area Scan (9x15x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 14.97 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.441 W/kg

**SAR(1 g) = 0.294 W/kg**



0 dB = 0.337 W/kg = -4.72 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02671**

Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1  
Medium: 710 Head Medium parameters used (interpolated):  
 $f = 707.5 \text{ MHz}$ ;  $\sigma = 0.855 \text{ S/m}$ ;  $\epsilon_r = 41.762$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

Test Date: 07-14-2016; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(6.6, 6.6, 6.6); Calibrated: 3/18/2016;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1334; Calibrated: 11/11/2015  
Phantom: SAM Left; Type: SAM; Serial: 1688

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 12, Right Head, Cheek, Mid.ch,  
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset, Antenna 3**

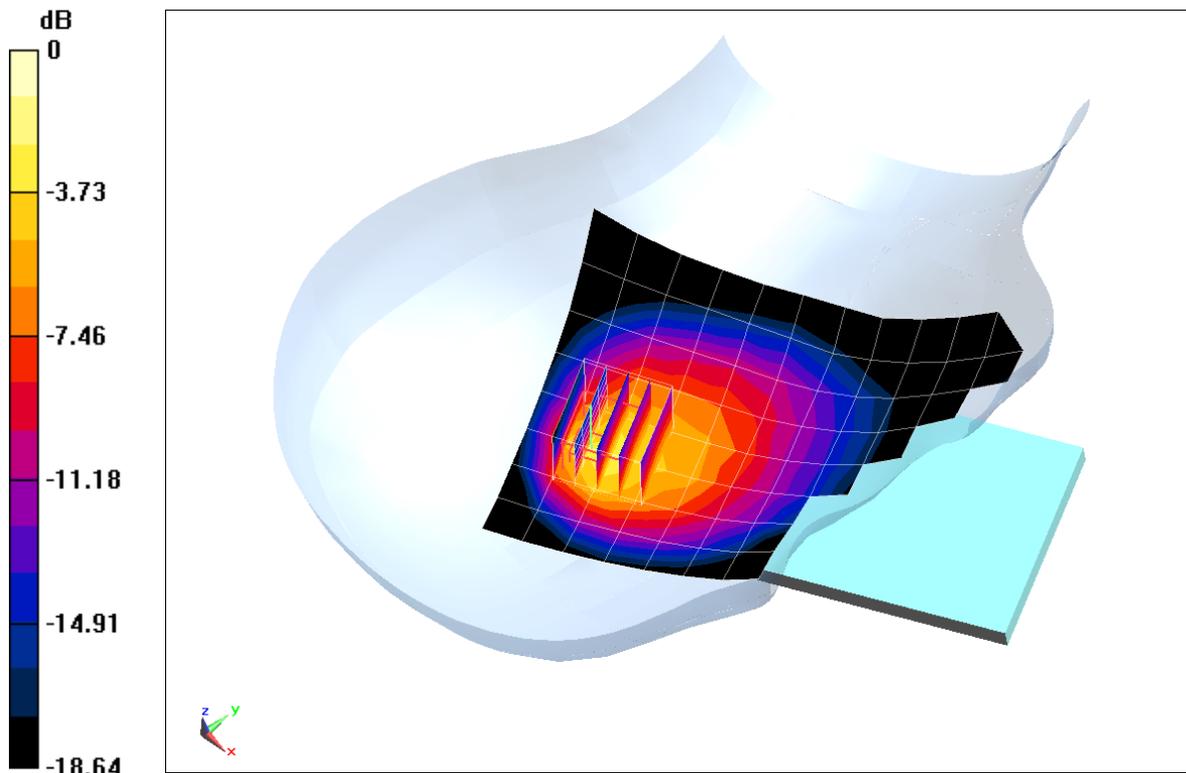
**Area Scan (9x13x1):** Measurement grid:  $dx=15\text{mm}$ ,  $dy=15\text{mm}$

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

Reference Value = 27.94 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 2.65 W/kg

**SAR(1 g) = 0.856 W/kg**



0 dB = 1.23 W/kg = 0.90 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02671**

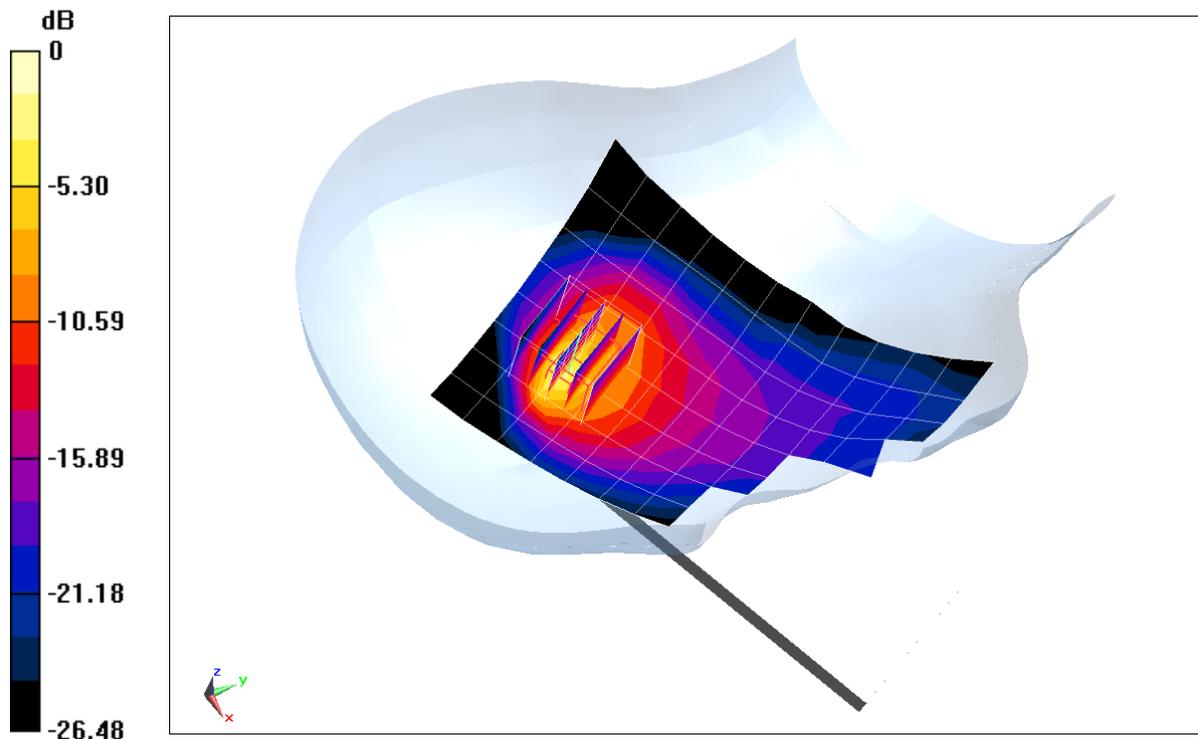
Communication System: UID 0, LTE Band 5 (Cell.); Frequency: 836.5 MHz; Duty Cycle: 1:1  
Medium: 835 Head Medium parameters used (interpolated):  
 $f = 836.5 \text{ MHz}$ ;  $\sigma = 0.909 \text{ S/m}$ ;  $\epsilon_r = 41.699$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

Test Date: 07-12-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3334; ConvF(6.37, 6.37, 6.37); Calibrated: 11/17/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015  
Phantom: SAM Front; Type: SAM; Serial: 1686  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 5 (Cell.), Right Head, Tilt, Mid.ch,  
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset, Antenna 3**

**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 = 30.72 V/m; Power Drift = -0.13 dB  
Peak SAR (extrapolated) = 2.09 W/kg  
**SAR(1 g) = 0.497 W/kg**



0 dB = 0.799 W/kg = -0.97 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02697**

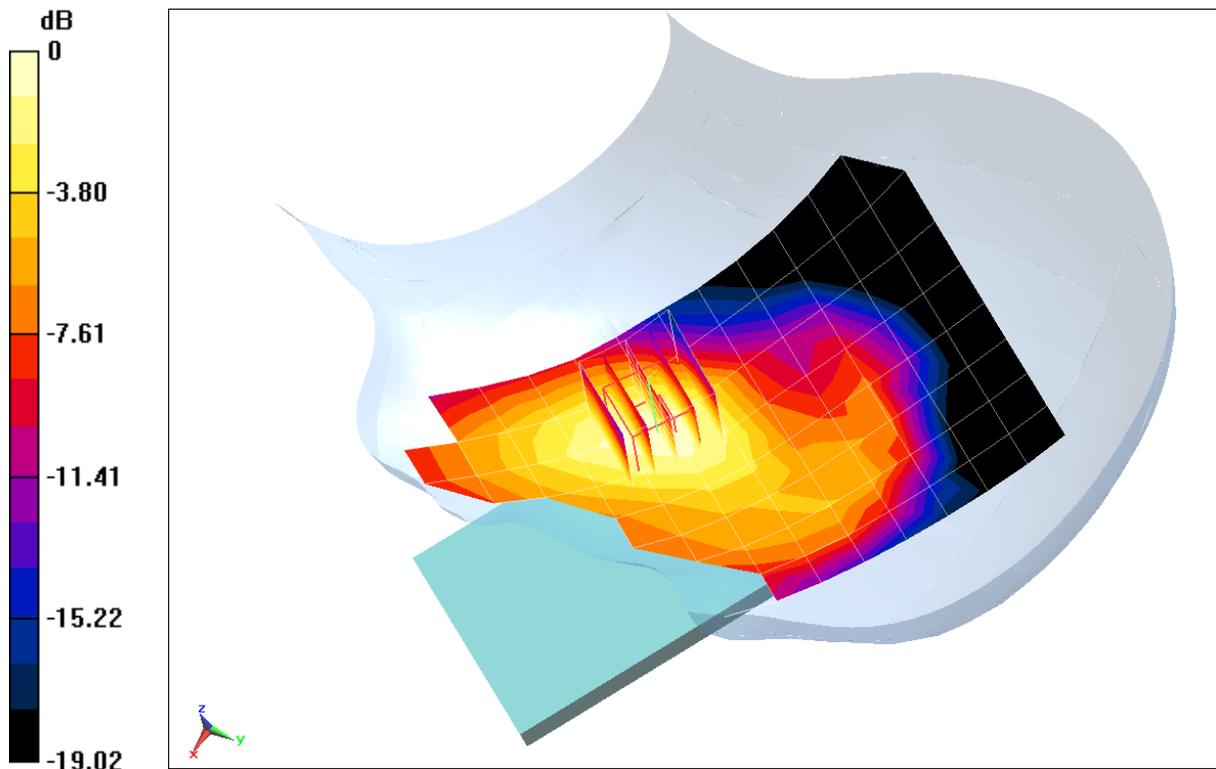
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1  
Medium: 1750 Head Medium parameters used (interpolated):  
 $f = 1770 \text{ MHz}$ ;  $\sigma = 1.337 \text{ S/m}$ ;  $\epsilon_r = 39.14$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

Test Date: 07-11-2016; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7406; ConvF(8.85, 8.85, 8.85); Calibrated: 4/19/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016  
Phantom: SAM 5.0 front; Type: QD000P40CD; Serial: TP:-1648  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 66 (AWS), Left Head, Cheek, High.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 = 18.87 V/m; Power Drift = 0.06 dB  
Peak SAR (extrapolated) = 0.598 W/kg  
**SAR(1 g) = 0.410 W/kg**



0 dB = 0.522 W/kg = -2.82 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02671**

Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.399 \text{ S/m}$ ;  $\epsilon_r = 38.992$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date:07-07-2016; Ambient Temp: 23.0°C; Tissue Temp:23.2°C

Probe: ES3DV3 - SN3333; ConvF(5.03, 5.03, 5.03); Calibrated: 10/29/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 10/27/2015

Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 2 (PCS), Left Head, Cheek, Mid.ch,  
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset**

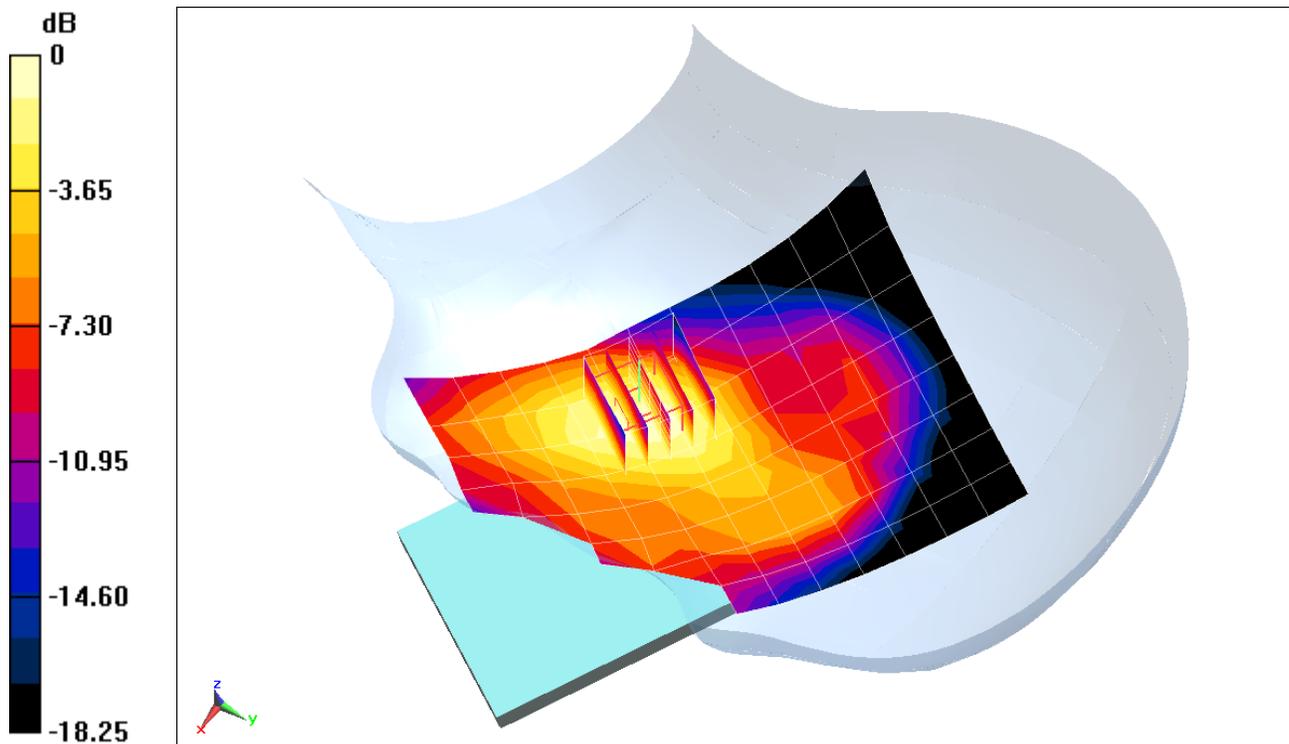
**Area Scan (9x15x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 16.63 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.482 W/kg

**SAR(1 g) = 0.324 W/kg**



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

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02689**

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

Medium: 2300 Head Medium parameters used:

$f = 2310 \text{ MHz}$ ;  $\sigma = 1.731 \text{ S/m}$ ;  $\epsilon_r = 39.776$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 07-14-2016; Ambient Temp: 23.4°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7409; ConvF(7.22, 7.22, 7.22); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 30, Left Head, Cheek, Mid.ch,  
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset**

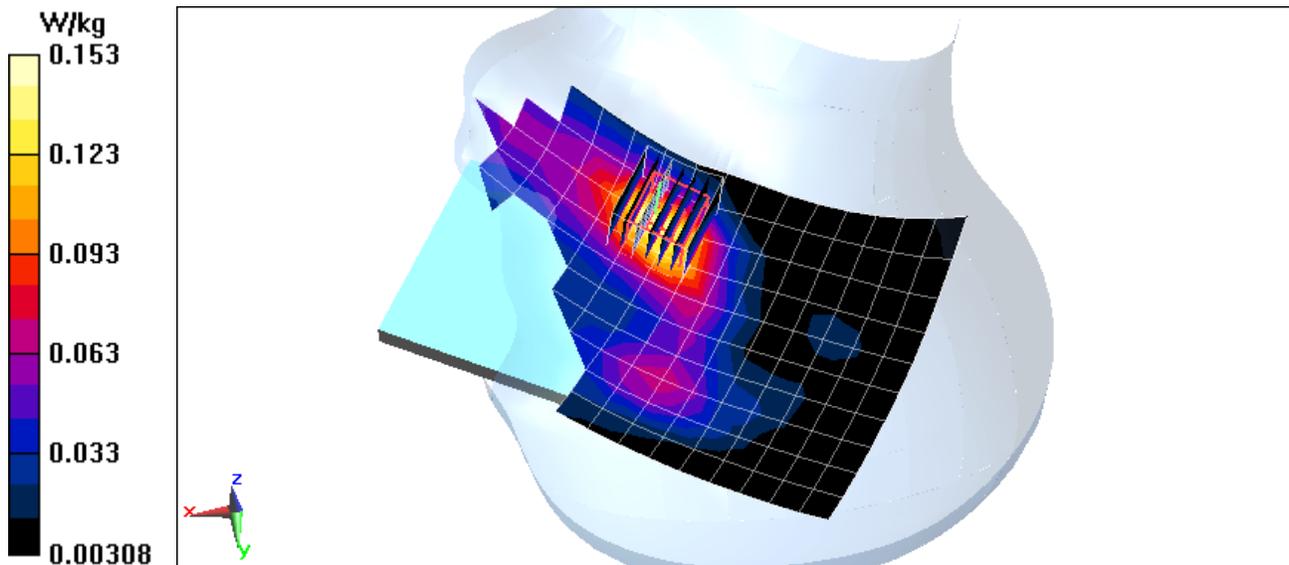
**Area Scan (11x18x1):** Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 8.286 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.187 W/kg

**SAR(1 g) = 0.105 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02671**

Communication System: UID 0, LTE Band 7; Frequency: 2510 MHz; Duty Cycle: 1:1  
Medium: 2450-2600 Head Medium parameters used (interpolated):  
 $f = 2510 \text{ MHz}$ ;  $\sigma = 1.923 \text{ S/m}$ ;  $\epsilon_r = 38.284$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Right Section

Test Date: 07-05-2016; Ambient Temp: 20.2°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3334; ConvF(4.58, 4.58, 4.58); Calibrated: 11/17/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015  
Phantom: SAM Front; Type: SAM; Serial: 1686  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

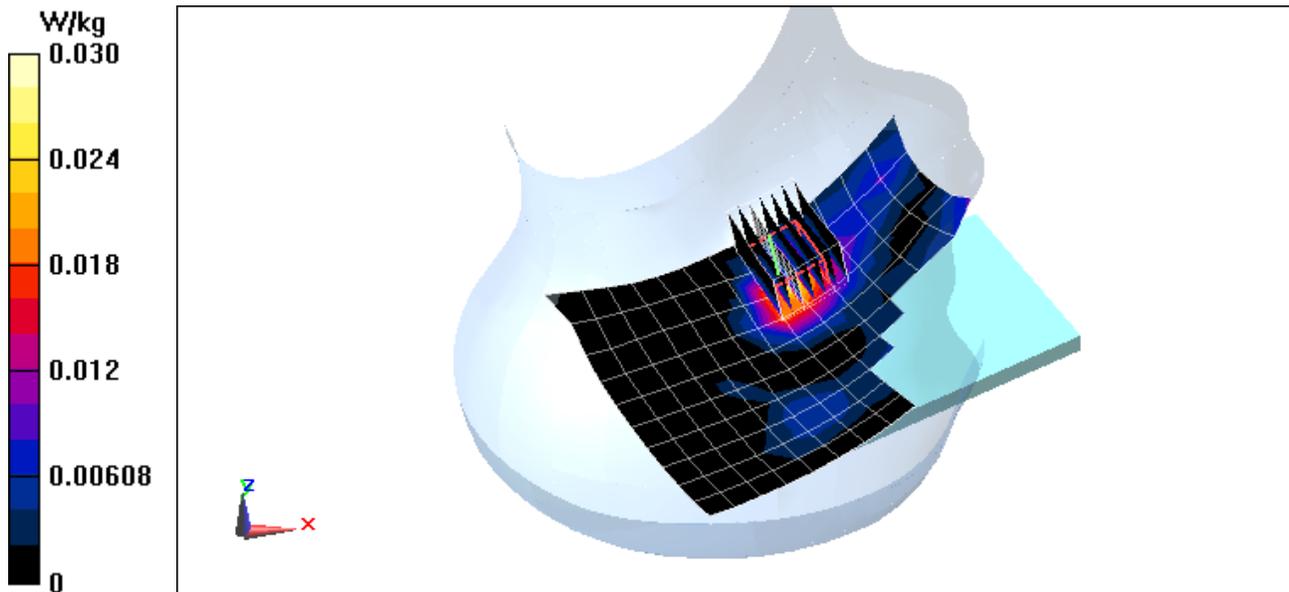
**Area Scan (11x17x1):** Measurement grid: dx=12mm, dy=12mm

**Zoom Scan (8x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.974 V/m; Power Drift = 0.18 dB

Peak SAR (extrapolated) = 0.0460 W/kg

**SAR(1 g) = 0.024 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02655**

Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1  
Medium: 2450 Head Medium parameters used (interpolated):  
 $f = 2437 \text{ MHz}$ ;  $\sigma = 1.831 \text{ S/m}$ ;  $\epsilon_r = 40.33$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Left Section

Test Date: 07-15-2016; Ambient Temp: 21.9°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7409; ConvF(6.9, 6.9, 6.9); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11b, 22 MHz Bandwidth, Left Head, Cheek,  
Ch 06, 1 Mbps, Primary Antenna**

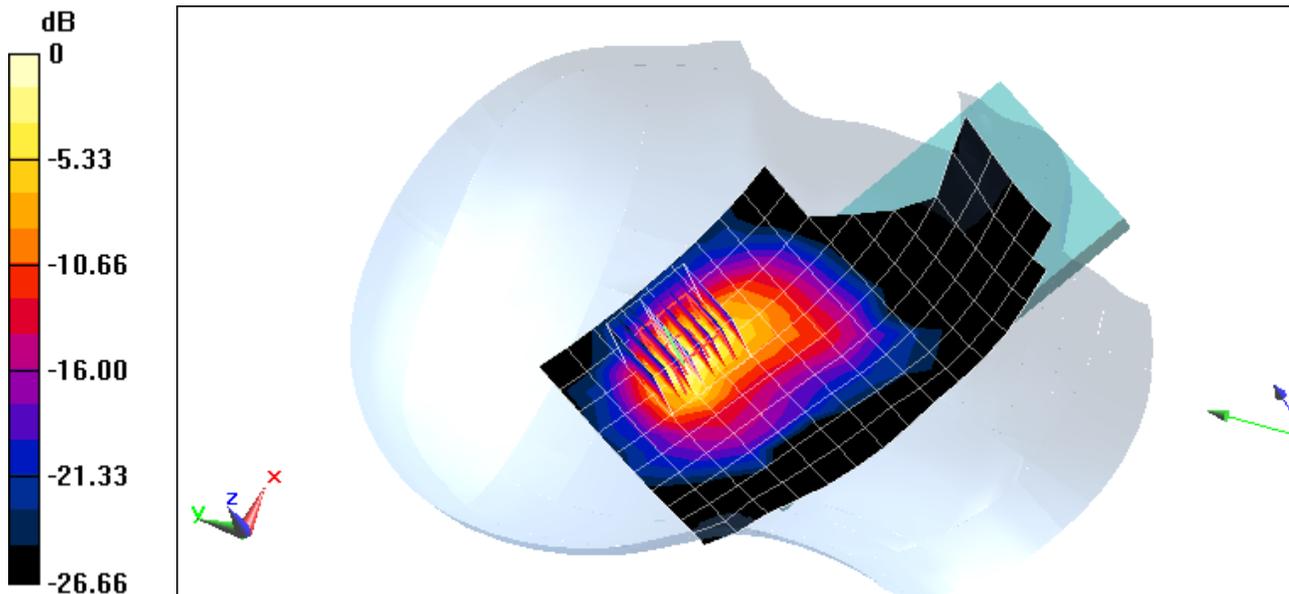
**Area Scan (11x18x1):** Measurement grid: dx=12mm, dy=12mm

**Zoom Scan (7x8x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.78 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.03 W/kg

**SAR(1 g) = 0.402 W/kg**



0 dB = 0.765 W/kg = -1.16 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02655**

Communication System: UID 0, IEEE 802.11ac; Frequency: 5775 MHz; Duty Cycle: 1:1  
Medium: 5 GHz Head Medium parameters used (interpolated):  
 $f = 5775$  MHz;  $\sigma = 5.15$  S/m;  $\epsilon_r = 35.965$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Left Section

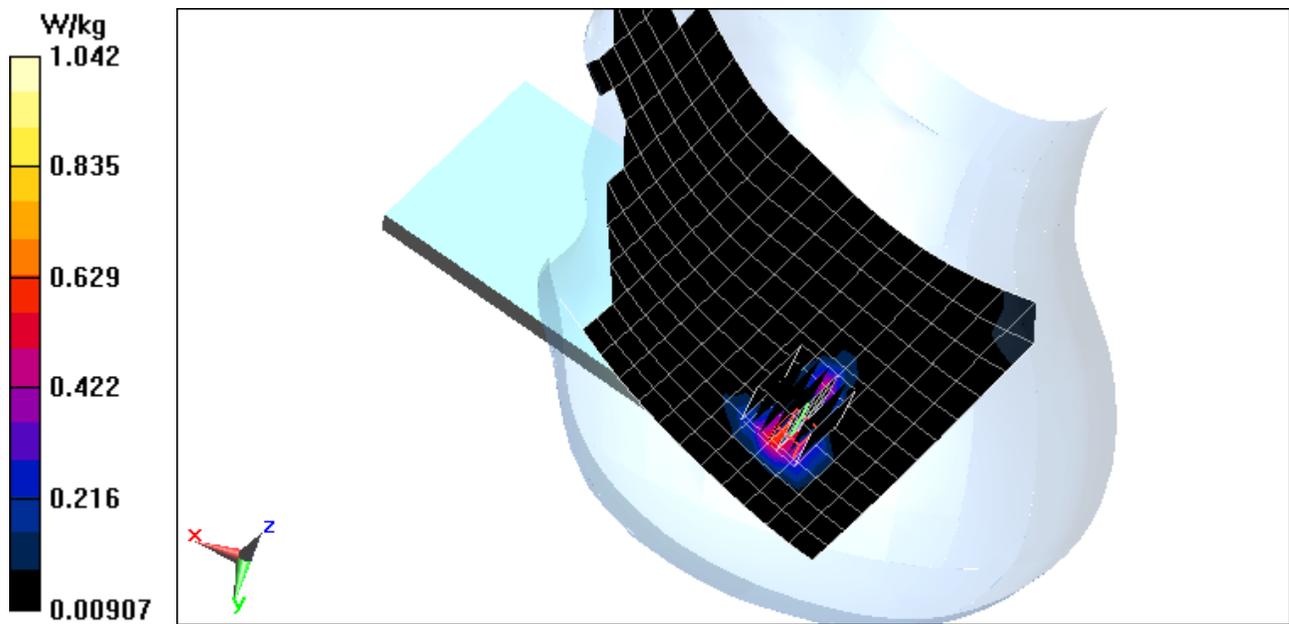
Test Date: 07-15-2016; Ambient Temp: 23.0°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN3914; ConvF(4.74, 4.74, 4.74); Calibrated: 2/22/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016  
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11ac, U-NII-3, 80 MHz Bandwidth, Left Head, Tilt,  
Ch 155, 29.3 Mbps, Primary Antenna**

**Area Scan (13x22x1):** 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 = 7.226 V/m; Power Drift = 0.17 dB  
Peak SAR (extrapolated) = 1.90 W/kg  
**SAR(1 g) = 0.370 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02747**

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;  $\sigma = 1.002$  S/m;  $\epsilon_r = 54.064$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 23.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3333; ConvF(6.25, 6.25, 6.25); Calibrated: 10/29/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 10/27/2015

Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

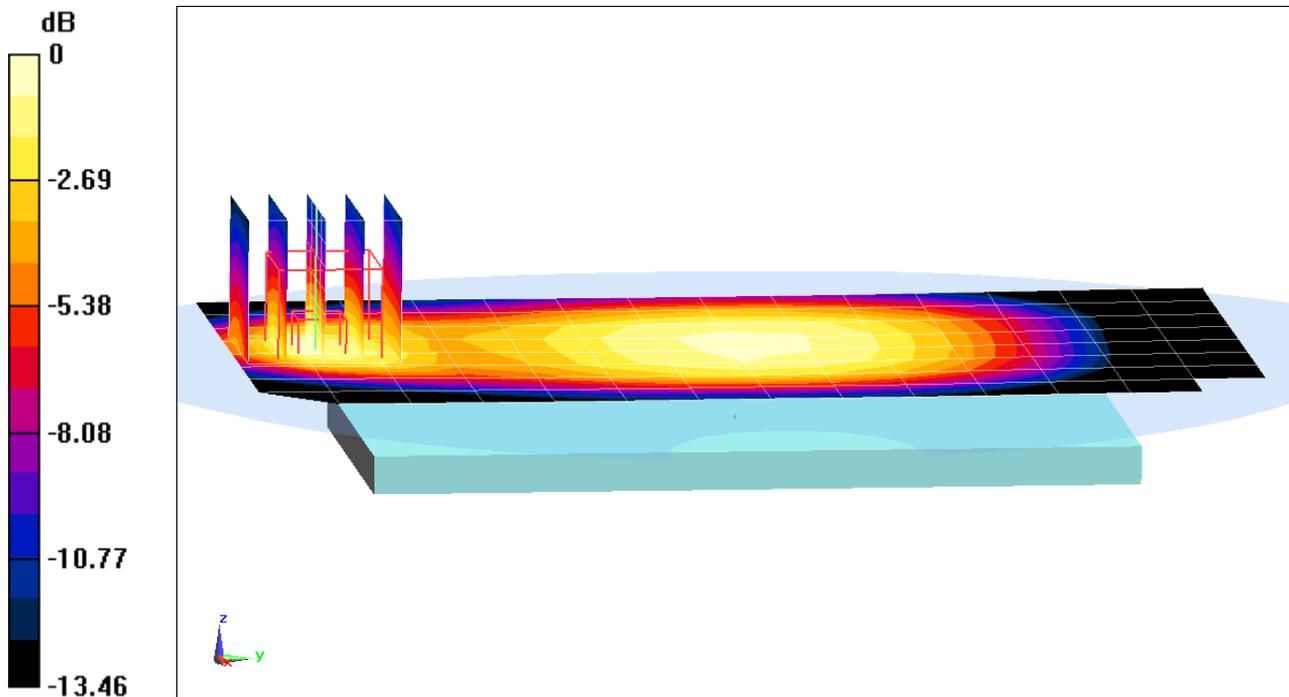
**Area Scan (9x15x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 20.51 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.610 W/kg

**SAR(1 g) = 0.372 W/kg**



0 dB = 0.310 W/kg = -5.09 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02747**

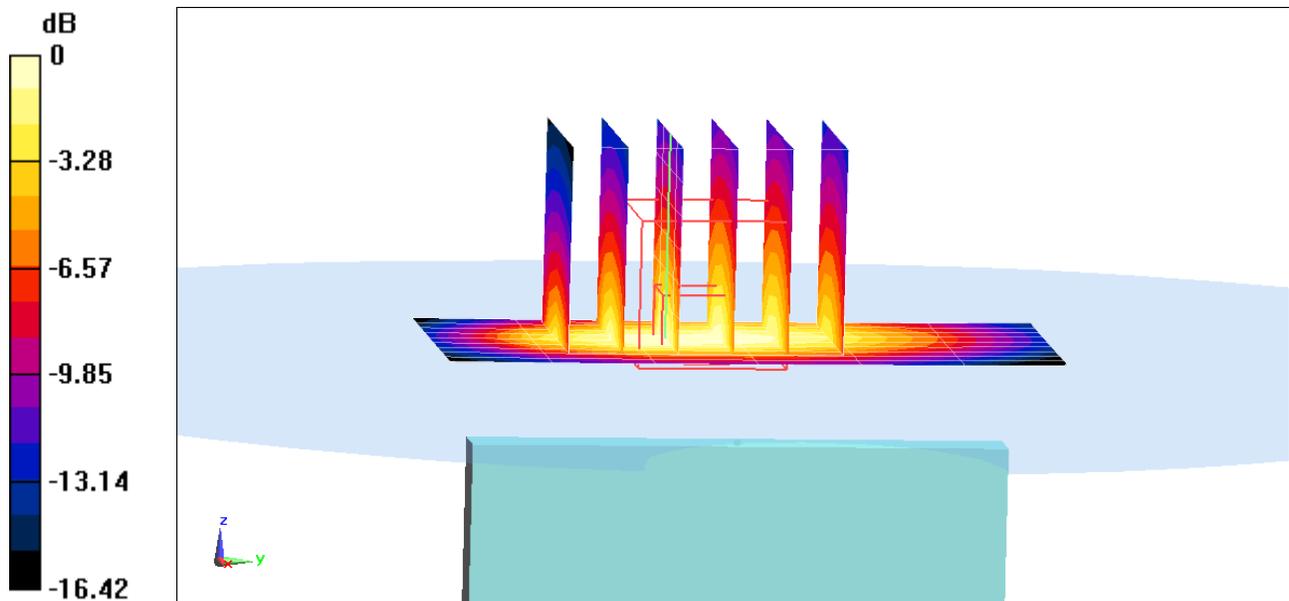
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:4.15  
Medium: 835 Body Medium parameters used (interpolated):  
 $f = 836.6 \text{ MHz}$ ;  $\sigma = 1.002 \text{ S/m}$ ;  $\epsilon_r = 54.064$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 23.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3333; ConvF(6.25, 6.25, 6.25); Calibrated: 10/29/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015  
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: GPRS 850, Body SAR, Bottom Edge, Mid.ch, 2 Tx Slots**

**Area Scan (10x7x1):** Measurement grid: dx=5mm, dy=15mm  
**Zoom Scan (5x6x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 24.02 V/m; Power Drift = -0.04 dB  
Peak SAR (extrapolated) = 0.887 W/kg  
**SAR(1 g) = 0.514 W/kg**



0 dB = 0.628 W/kg = -2.02 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02747**

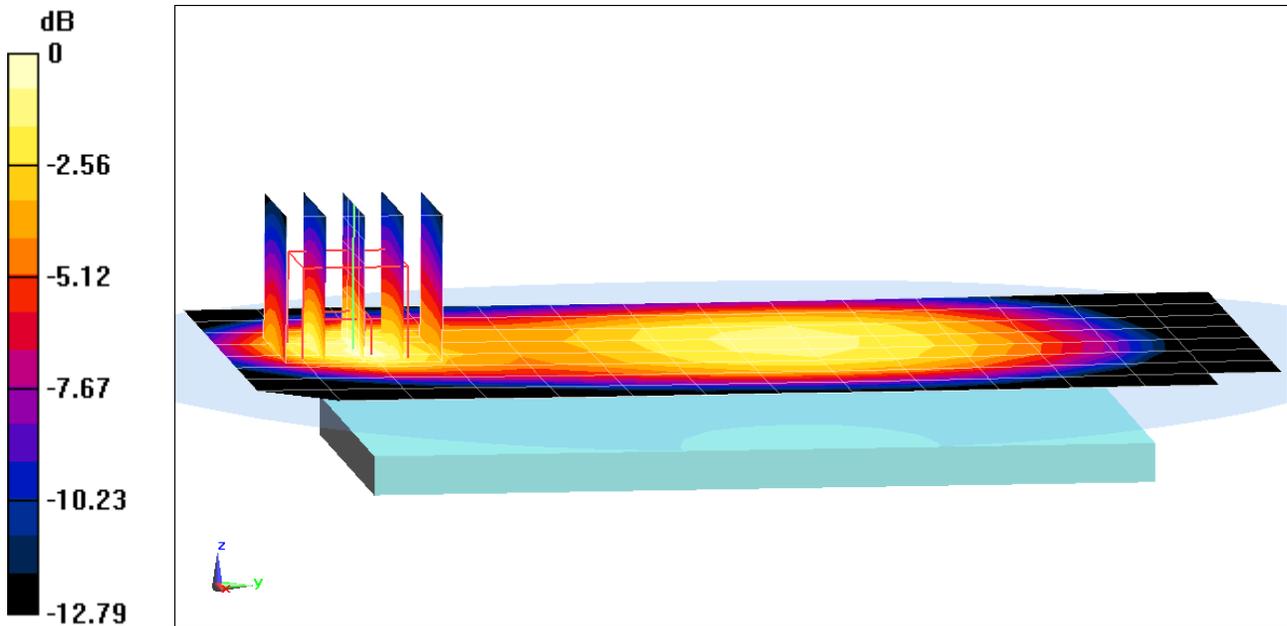
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1  
Medium: 835 Body Medium parameters used (interpolated):  
 $f = 836.6 \text{ MHz}$ ;  $\sigma = 1.002 \text{ S/m}$ ;  $\epsilon_r = 54.064$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 23.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3333; ConvF(6.25, 6.25, 6.25); Calibrated: 10/29/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015  
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: UMTS 850, Body SAR, Back side, Mid.ch, Antenna 1**

**Area Scan (9x15x1):** Measurement grid: dx=15mm, dy=15mm  
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 18.00 V/m; Power Drift = 0.00 dB  
Peak SAR (extrapolated) = 0.470 W/kg  
**SAR(1 g) = 0.287 W/kg**



0 dB = 0.349 W/kg = -4.57 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02747**

Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1  
Medium: 835 Body Medium parameters used (interpolated):  
 $f = 836.6 \text{ MHz}$ ;  $\sigma = 1.002 \text{ S/m}$ ;  $\epsilon_r = 54.064$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 23.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3333; ConvF(6.25, 6.25, 6.25); Calibrated: 10/29/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015  
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: UMTS 850, Body SAR, Bottom Edge, Mid.ch, Antenna 1**

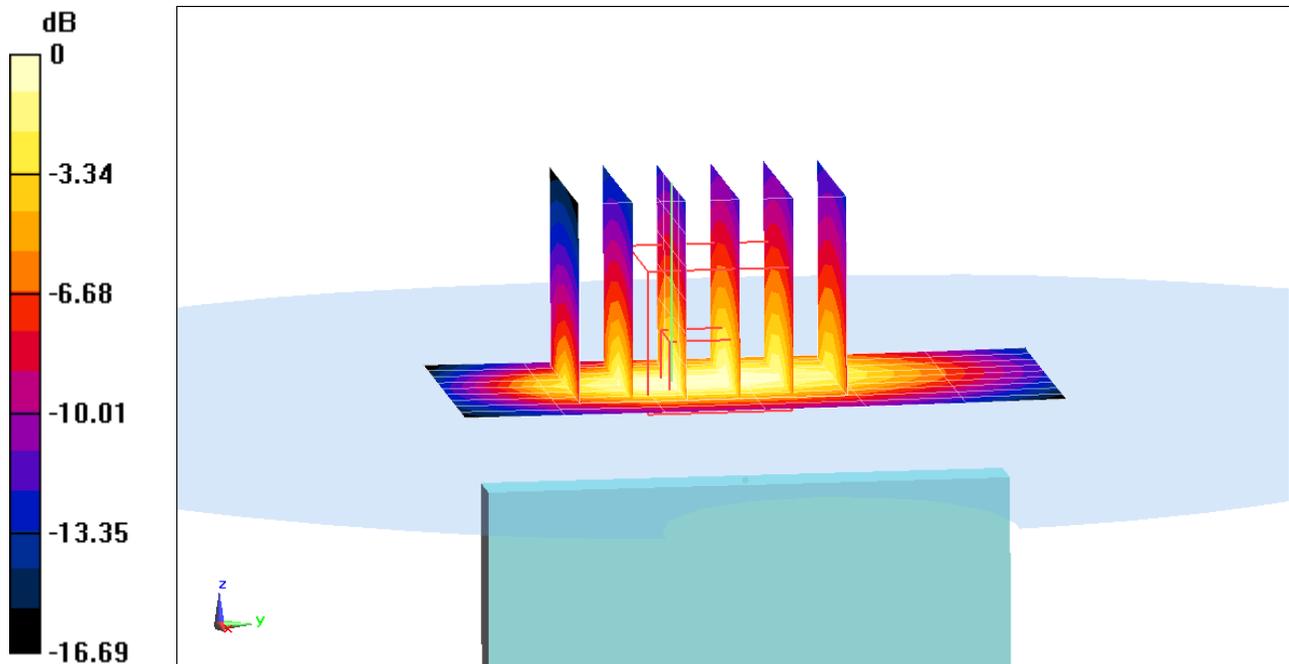
**Area Scan (10x7x1):** Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 21.70 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.746 W/kg

**SAR(1 g) = 0.427 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02747**

Communication System: UID 0, UMTS; Frequency: 1752.6 MHz; Duty Cycle: 1:1  
Medium: 1750 Body Medium parameters used (interpolated):  
 $f = 1752.6 \text{ MHz}$ ;  $\sigma = 1.513 \text{ S/m}$ ;  $\epsilon_r = 52.579$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 23.2°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7409; ConvF(7.72, 7.72, 7.72); Calibrated: 5/17/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn859; Calibrated: 5/11/2016  
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: UMTS 1750, Body SAR, Back side, High ch**

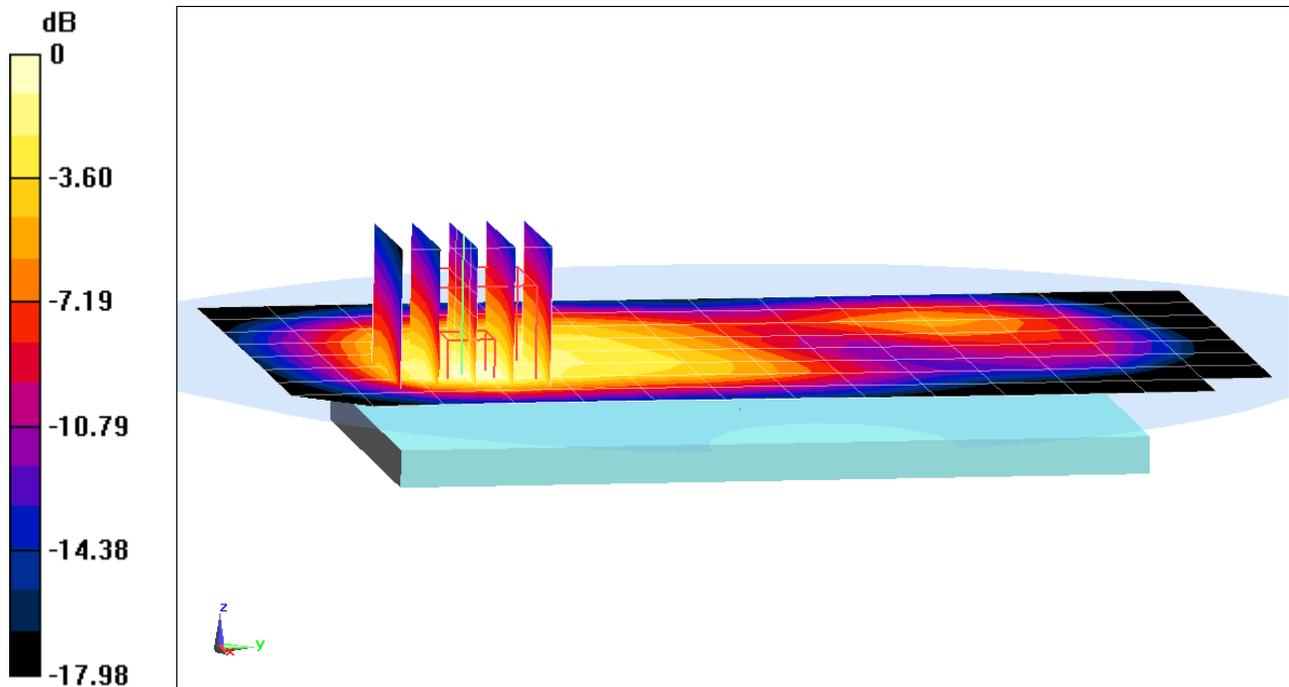
**Area Scan (9x15x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 27.41 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.90 W/kg

**SAR(1 g) = 1.06 W/kg**



0 dB = 1.57 W/kg = 1.96 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02754**

Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.76

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.535 \text{ S/m}$ ;  $\epsilon_r = 52.668$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-07-2016; Ambient Temp: 23.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3319; ConvF(4.7, 4.7, 4.7); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: GPRS 1900, Body SAR, Back side, Mid.ch, 3 Tx Slots**

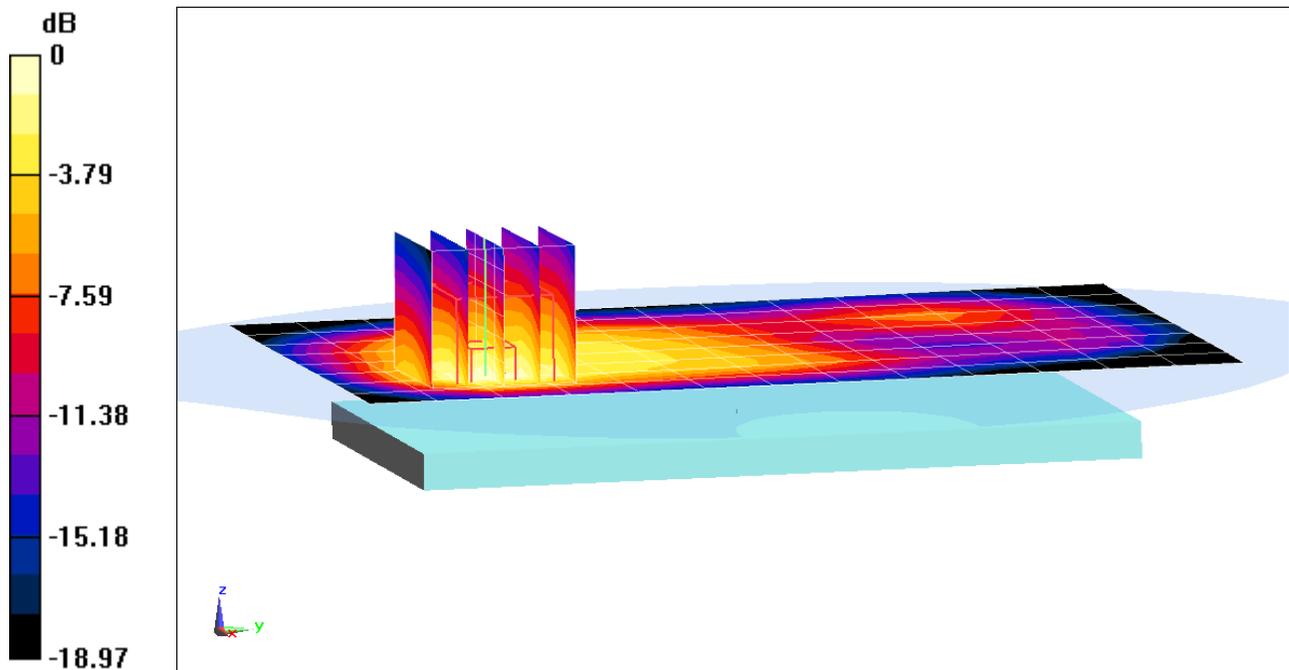
**Area Scan (9x14x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.13 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.771 W/kg

**SAR(1 g) = 0.436 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02754**

Communication System: UID 0, UMTS; Frequency: 1880 MHz; Duty Cycle: 1:1  
Medium: 1900 Body Medium parameters used:  
 $f = 1880 \text{ MHz}$ ;  $\sigma = 1.535 \text{ S/m}$ ;  $\epsilon_r = 52.668$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-07-2016; Ambient Temp: 23.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3319; ConvF(4.7, 4.7, 4.7); Calibrated: 3/18/2016;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

Phantom: SAM with CRP v5.0 (Right); Type: QD000P40CD; Serial: TP:1759  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

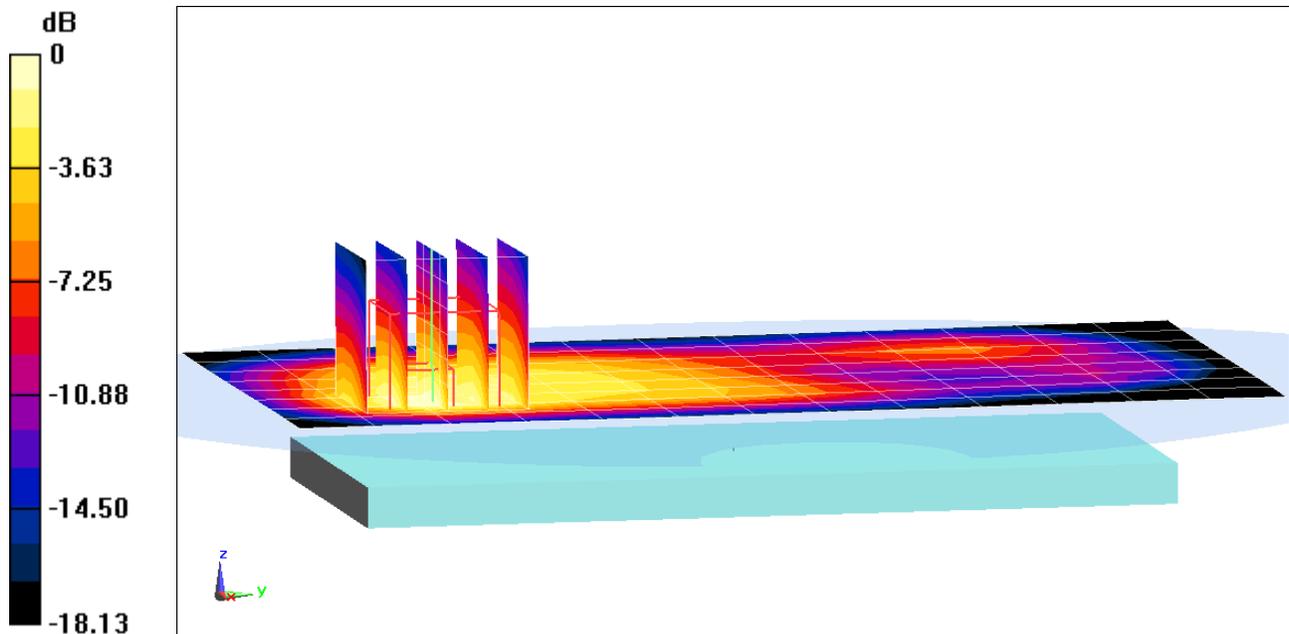
**Area Scan (9x14x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 22.58 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.22 W/kg

**SAR(1 g) = 0.685 W/kg**



0 dB = 0.843 W/kg = -0.74 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02689**

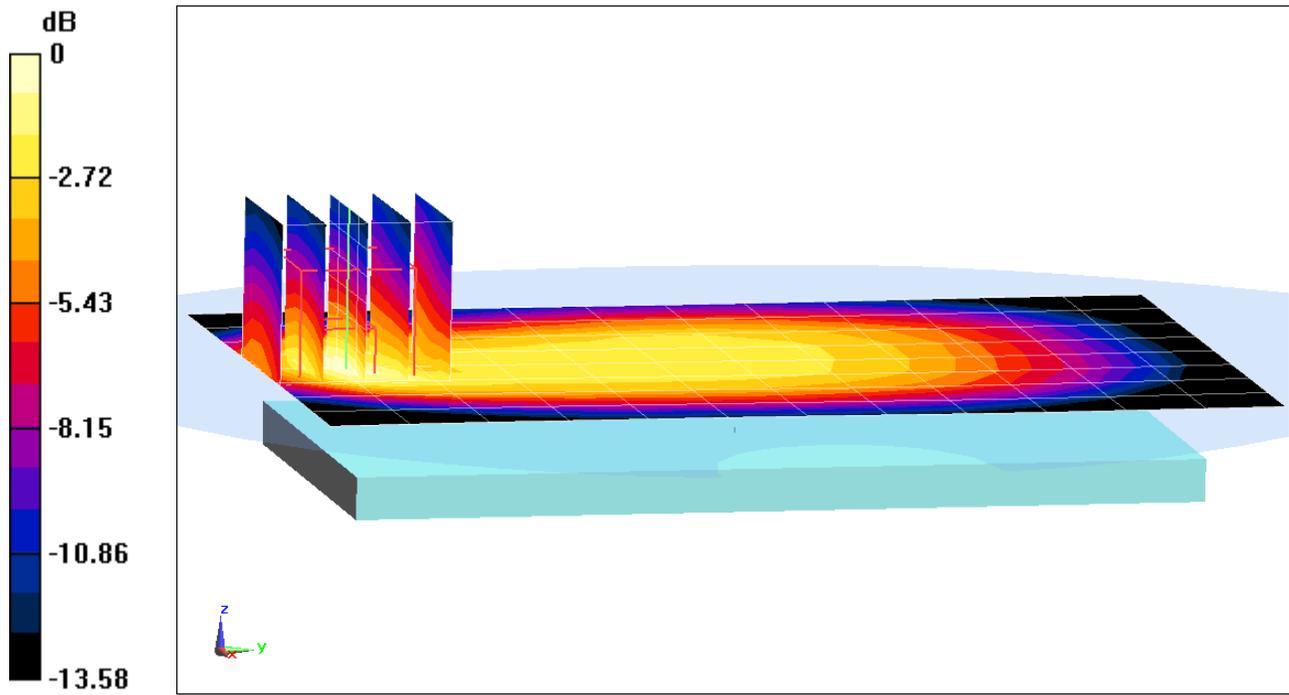
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1  
Medium: 750 Body Medium parameters used (interpolated):  
 $f = 707.5 \text{ MHz}$ ;  $\sigma = 0.924 \text{ S/m}$ ;  $\epsilon_r = 55.266$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-06-2016; Ambient Temp: 23.4°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7409; ConvF(9.46, 9.46, 9.46); Calibrated: 5/17/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn859; Calibrated: 5/11/2016  
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

**Area Scan (9x13x1):** Measurement grid: dx=15mm, dy=15mm  
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 18.68 V/m; Power Drift = -0.01 dB  
Peak SAR (extrapolated) = 0.552 W/kg  
**SAR(1 g) = 0.295 W/kg**



0 dB = 0.458 W/kg = -3.39 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02689**

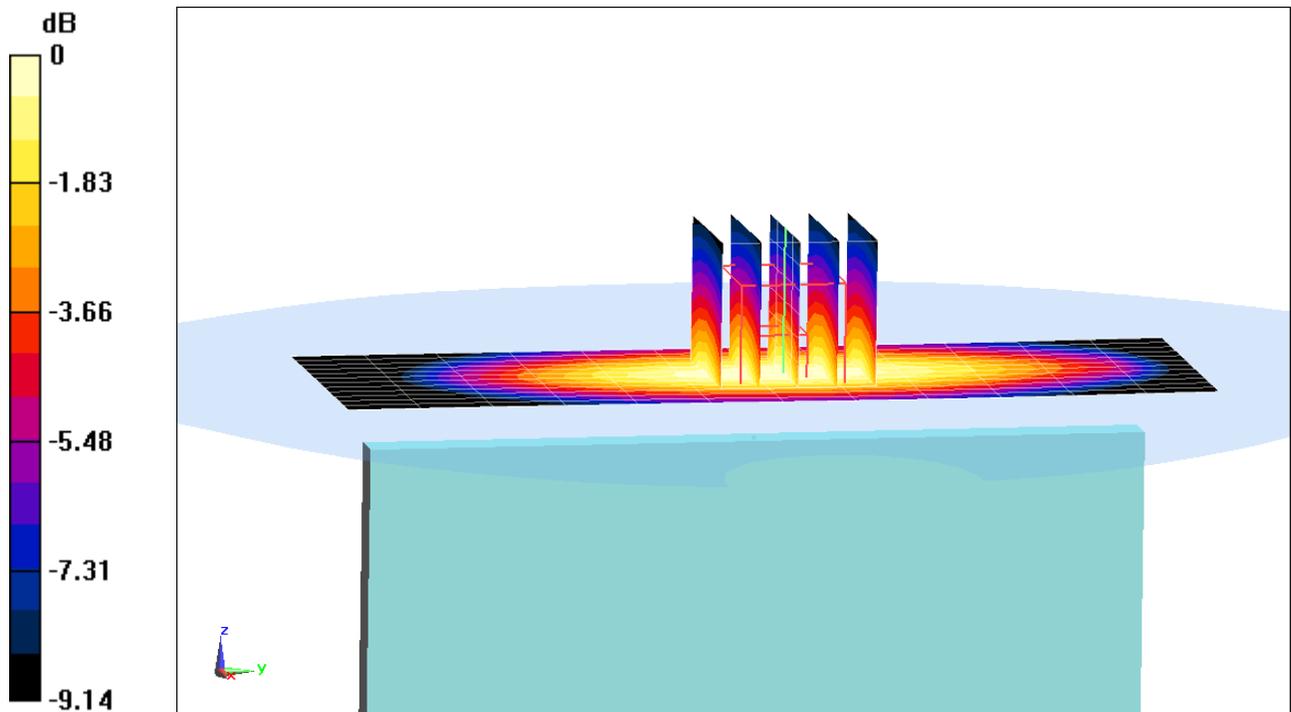
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1  
Medium: 750 Body Medium parameters used (interpolated):  
 $f = 707.5 \text{ MHz}$ ;  $\sigma = 0.924 \text{ S/m}$ ;  $\epsilon_r = 55.266$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-06-2016; Ambient Temp: 23.4°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7409; ConvF(9.46, 9.46, 9.46); Calibrated: 5/17/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn859; Calibrated: 5/11/2016  
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

**Area Scan (13x13x1):** Measurement grid: dx=5mm, dy=15mm  
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 19.96 V/m; Power Drift = 0.02 dB  
Peak SAR (extrapolated) = 0.537 W/kg  
**SAR(1 g) = 0.357 W/kg**



0 dB = 0.471 W/kg = -3.27 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02697**

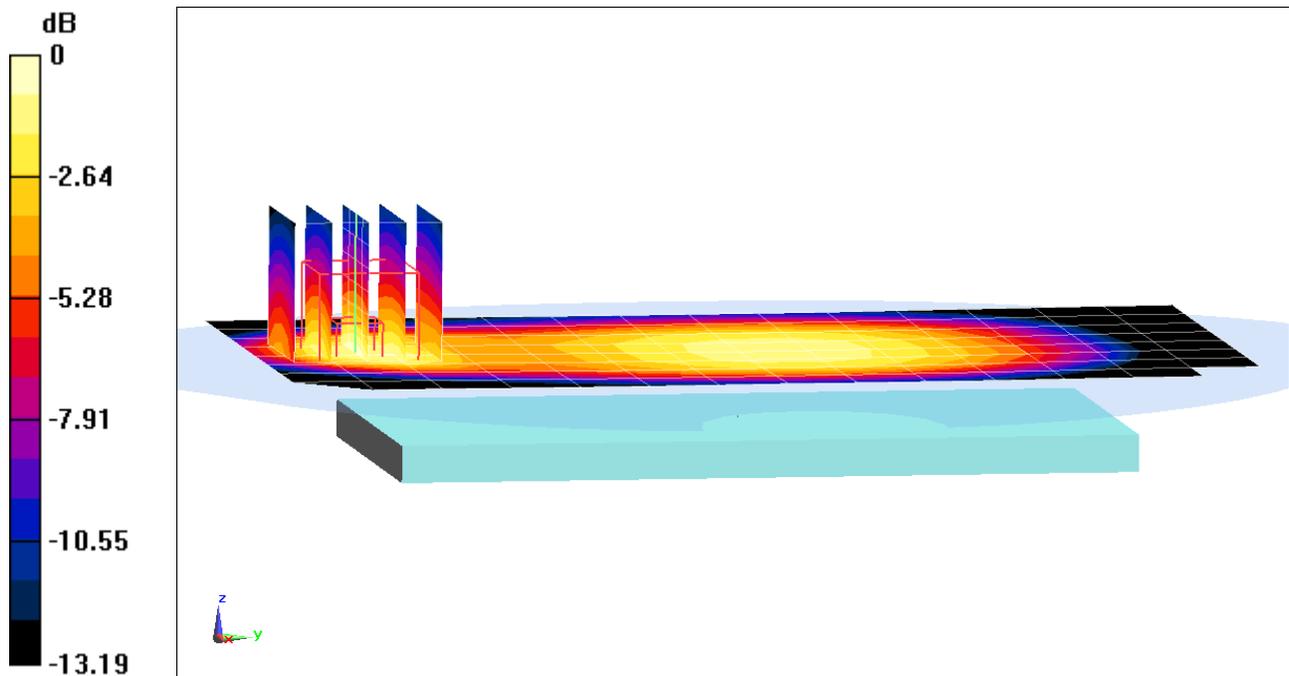
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1  
Medium: 835 Body Medium parameters used (interpolated):  
 $f = 836.5$  MHz;  $\sigma = 1.002$  S/m;  $\epsilon_r = 54.065$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 23.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3333; ConvF(6.25, 6.25, 6.25); Calibrated: 10/29/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015  
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

**Area Scan (9x15x1):** Measurement grid: dx=15mm, dy=15mm  
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 20.71 V/m; Power Drift = 0.00 dB  
Peak SAR (extrapolated) = 0.614 W/kg  
**SAR(1 g) = 0.377 W/kg**



0 dB = 0.460 W/kg = -3.37 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02697**

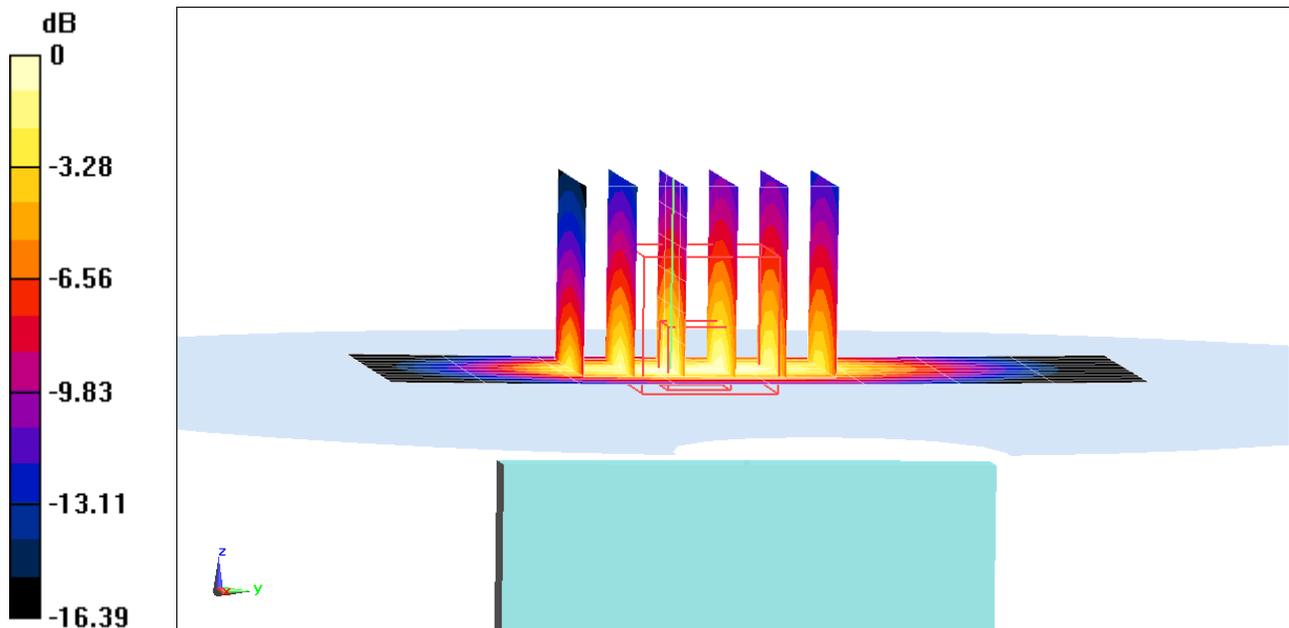
Communication System: UID 0, LTE Band 5 (Cell.); Frequency: 836.5 MHz; Duty Cycle: 1:1  
Medium: 835 Body Medium parameters used (interpolated):  
 $f = 836.5 \text{ MHz}$ ;  $\sigma = 1.002 \text{ S/m}$ ;  $\epsilon_r = 54.065$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 23.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3333; ConvF(6.25, 6.25, 6.25); Calibrated: 10/29/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015  
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

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

**Area Scan (11x9x1):** Measurement grid: dx=5mm, dy=15mm  
**Zoom Scan (5x6x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Reference Value = 24.05 V/m; Power Drift = 0.01 dB  
Peak SAR (extrapolated) = 0.899 W/kg  
**SAR(1 g) = 0.520 W/kg**



0 dB = 0.633 W/kg = -1.99 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02689**

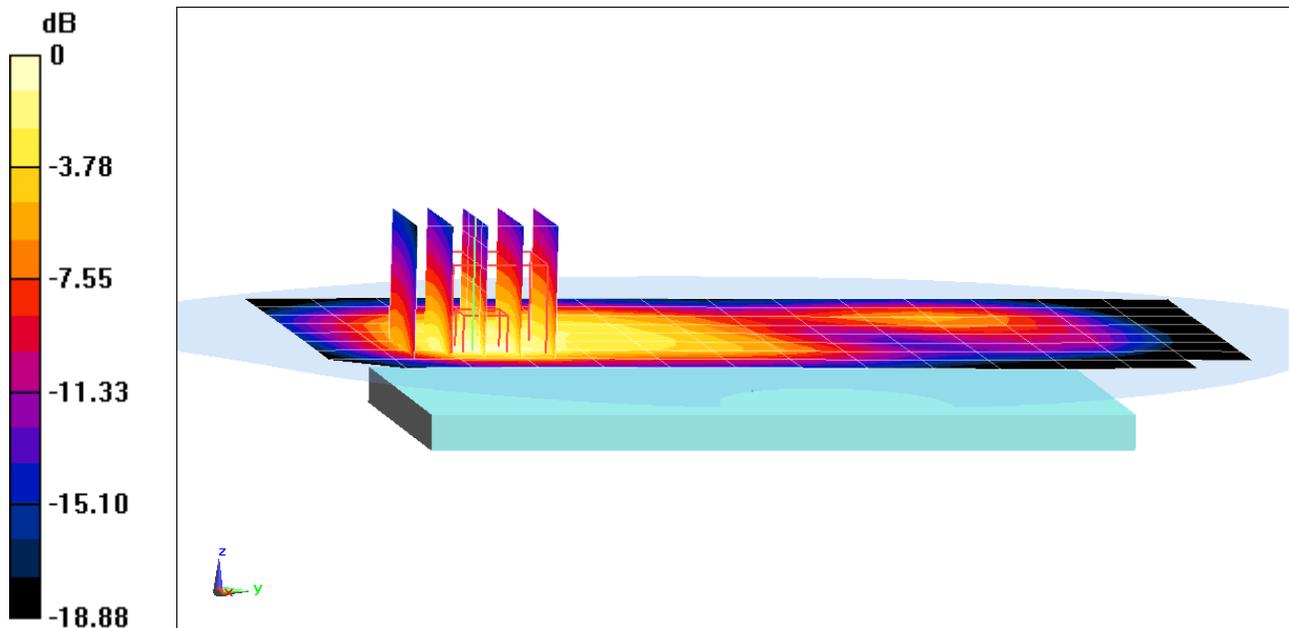
Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1745 MHz; Duty Cycle: 1:1  
Medium: 1750 Body Medium parameters used (interpolated):  
 $f = 1745 \text{ MHz}$ ;  $\sigma = 1.504 \text{ S/m}$ ;  $\epsilon_r = 52.612$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 23.2°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7409; ConvF(7.72, 7.72, 7.72); Calibrated: 5/17/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn859; Calibrated: 5/11/2016  
Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 66 (AWS), Body SAR, Back side, Mid.ch,  
20 MHz Bandwidth, QPSK, 1 RB, 50 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 = 28.74 V/m; Power Drift = 0.03 dB  
Peak SAR (extrapolated) = 2.08 W/kg  
**SAR(1 g) = 1.17 W/kg**



0 dB = 1.74 W/kg = 2.41 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02663**

Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.535 \text{ S/m}$ ;  $\epsilon_r = 52.668$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-07-2016; Ambient Temp: 23.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3319; ConvF(4.7, 4.7, 4.7); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 2 (PCS), Body SAR, Back side, Mid.ch,  
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset**

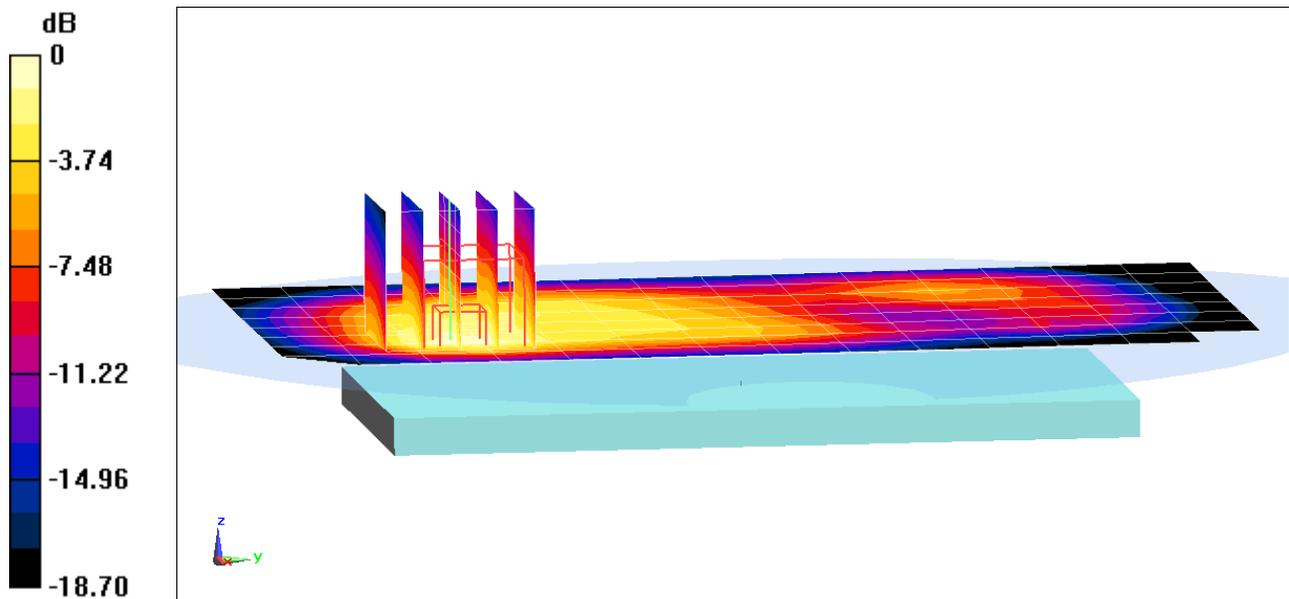
**Area Scan (9x15x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 20.93 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 1.05 W/kg

**SAR(1 g) = 0.591 W/kg**



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

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02663**

Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$ ;  $\sigma = 1.535 \text{ S/m}$ ;  $\epsilon_r = 52.668$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-07-2016; Ambient Temp: 23.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3319; ConvF(4.7, 4.7, 4.7); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 2 (PCS), Body SAR, Front side, Mid.ch,  
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset**

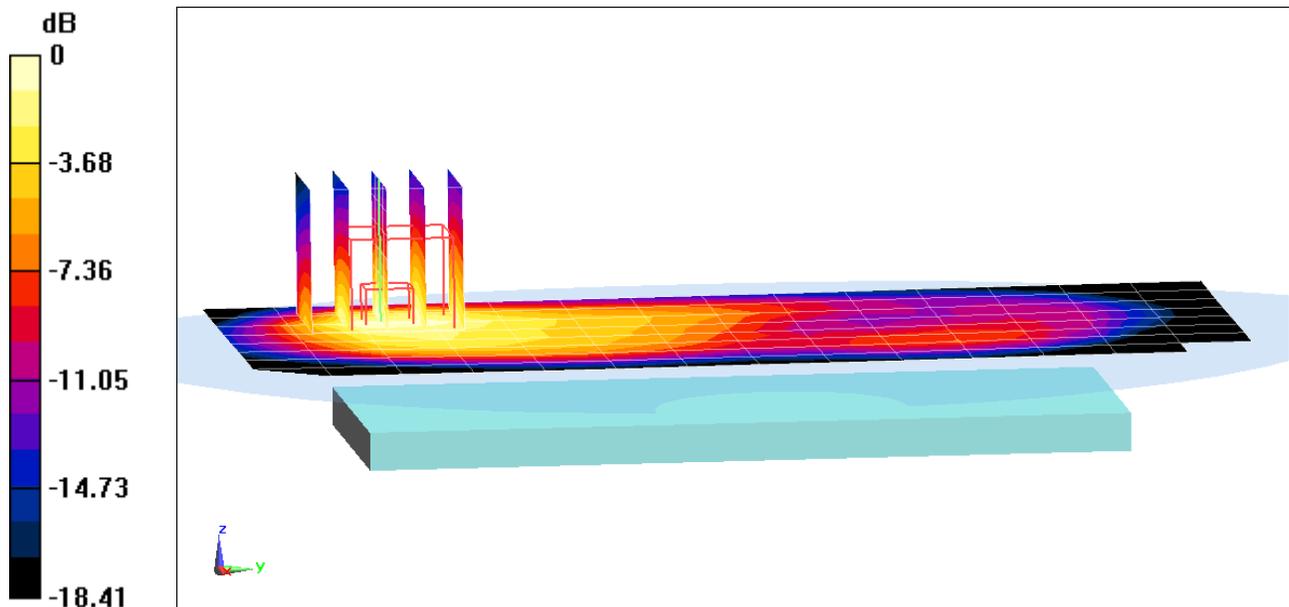
**Area Scan (9x15x1):** Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 23.03 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.34 W/kg

**SAR(1 g) = 0.744 W/kg**



0 dB = 0.869 W/kg = -0.61 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02671**

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

Medium: 2300 Body Medium parameters used:

$f = 2310$  MHz;  $\sigma = 1.832$  S/m;  $\epsilon_r = 53.575$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-07-2016; Ambient Temp: 22.0°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3334; ConvF(4.61, 4.61, 4.61); Calibrated: 11/17/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1415; Calibrated: 11/11/2015

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 30, Body SAR, Back side, Mid.ch,  
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset**

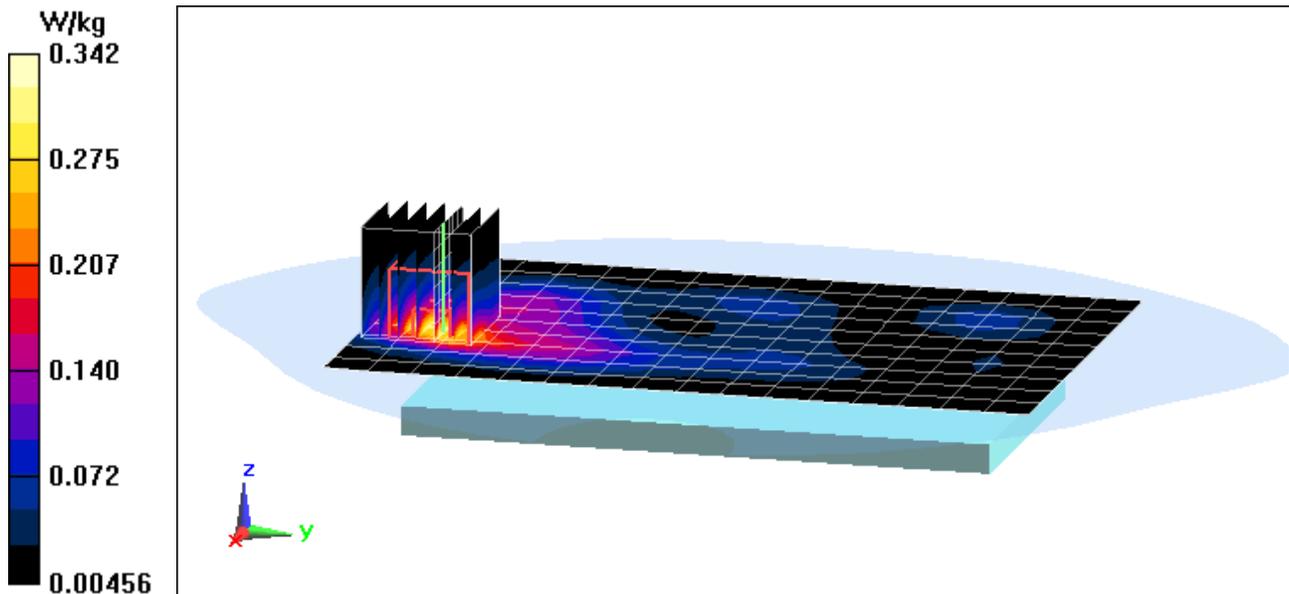
**Area Scan (11x17x1):** Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 12.68 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.539 W/kg

**SAR(1 g) = 0.267 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02671**

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

Medium: 2300 Body Medium parameters used:

$f = 2310 \text{ MHz}$ ;  $\sigma = 1.832 \text{ S/m}$ ;  $\epsilon_r = 53.575$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-07-2016; Ambient Temp: 22.0°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3334; ConvF(4.61, 4.61, 4.61); Calibrated: 11/17/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1415; Calibrated: 11/11/2015

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 30, Body SAR, Front side, Mid.ch,  
10 MHz Bandwidth, QPSK, 1 RB, 49 RB Offset**

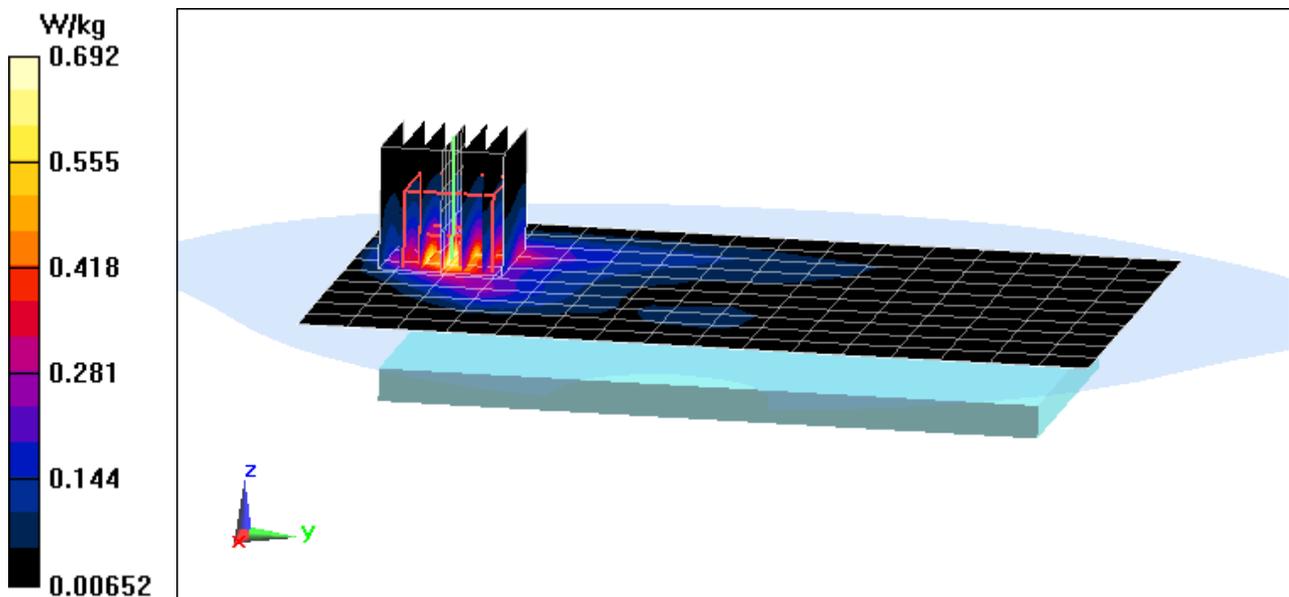
**Area Scan (11x17x1):** Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 18.43 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 1.14 W/kg

**SAR(1 g) = 0.534 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02663**

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

Medium: 2450-2600 Body Medium parameters used (interpolated):

$f = 2510$  MHz;  $\sigma = 2.099$  S/m;  $\epsilon_r = 53.176$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-14-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 7, Body SAR, Back side, Low.ch,  
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

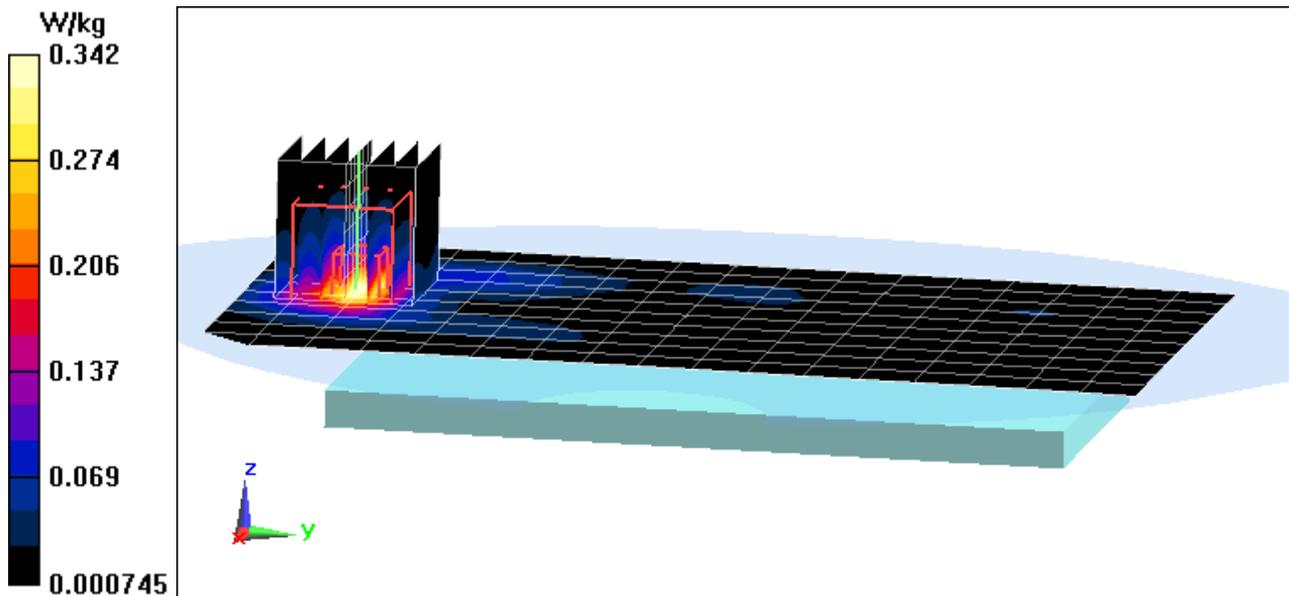
**Area Scan (11x18x1):** Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 10.88 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.429 W/kg

**SAR(1 g) = 0.218 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02663**

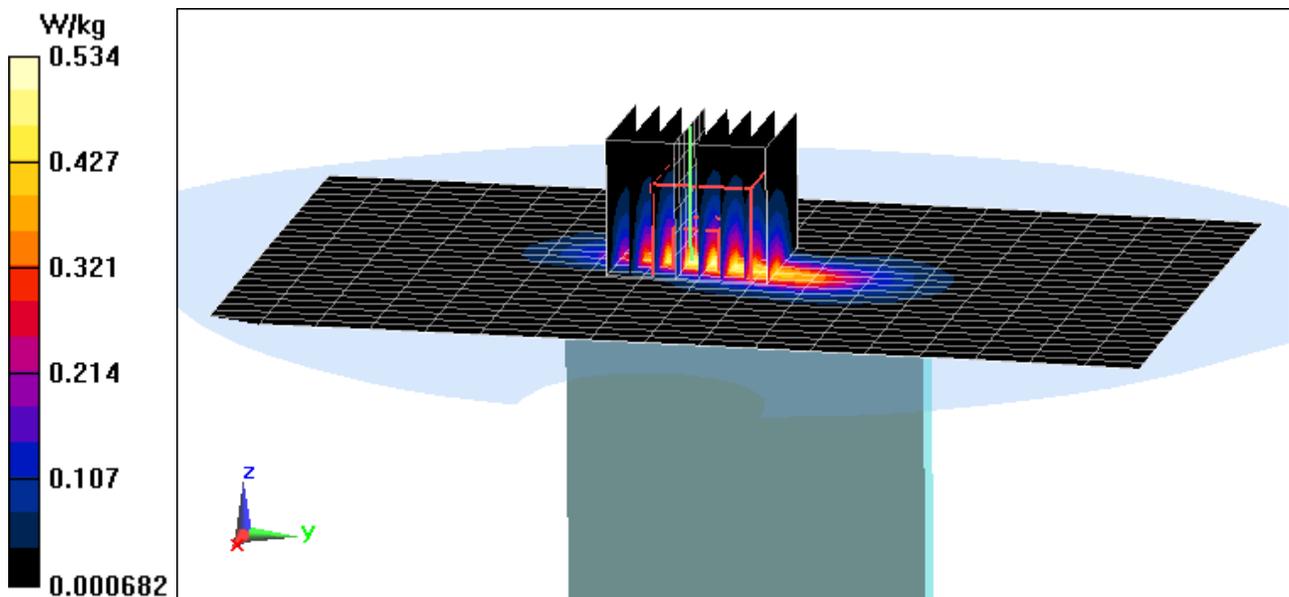
Communication System: UID 0, LTE Band 7; Frequency: 2510 MHz; Duty Cycle: 1:1  
Medium: 2450-2600 Body Medium parameters used (interpolated):  
 $f = 2510$  MHz;  $\sigma = 2.099$  S/m;  $\epsilon_r = 53.176$ ;  $\rho = 1000$  kg/m<sup>3</sup>  
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-14-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016  
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: LTE Band 7, Body SAR, Bottom Edge, Low.ch,  
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

**Area Scan (25x18x1):** Measurement grid: dx=5mm, dy=12mm  
**Zoom Scan (7x8x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 8.758 V/m; Power Drift = 0.10 dB  
Peak SAR (extrapolated) = 0.670 W/kg  
**SAR(1 g) = 0.317 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02655**

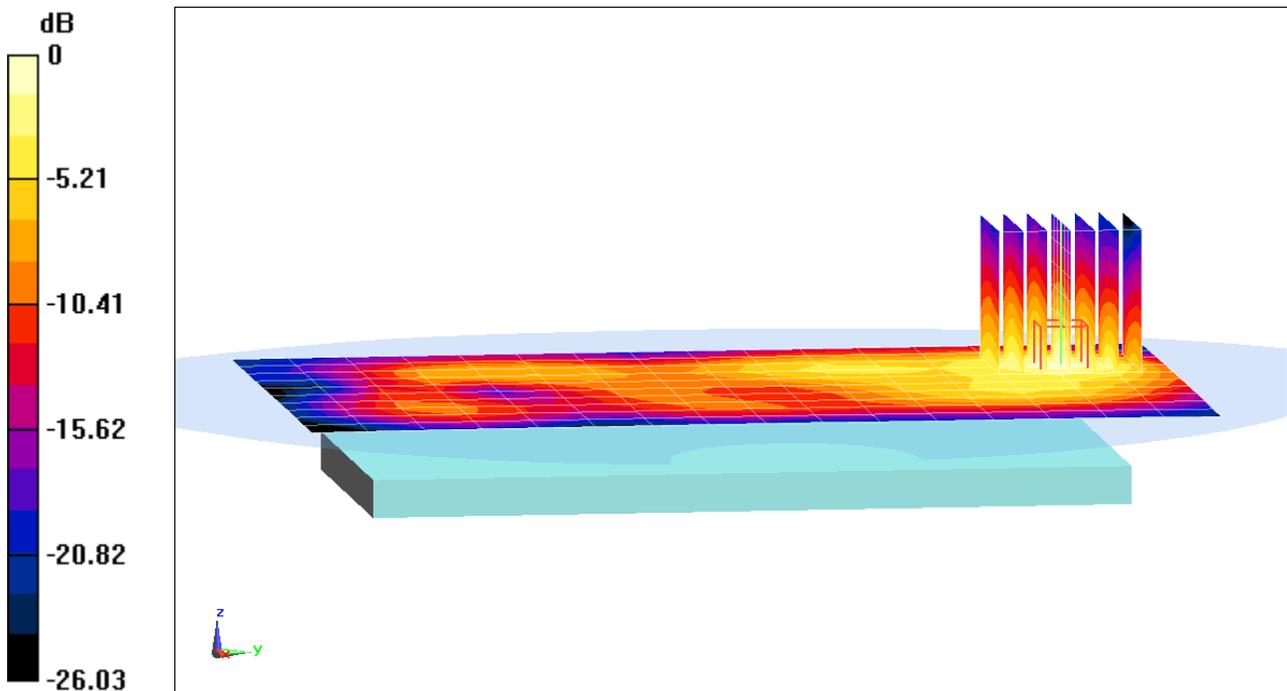
Communication System: UID 0, IEEE 802.11b; Frequency: 2447 MHz; Duty Cycle: 1:1  
Medium: 2450 Body Medium parameters used (interpolated):  
 $f = 2447 \text{ MHz}$ ;  $\sigma = 2.014 \text{ S/m}$ ;  $\epsilon_r = 53.395$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-14-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016  
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11b, 22 MHz Bandwidth,  
Body SAR, Ch 8, 1 Mbps, Back Side, Primary Antenna**

**Area Scan (11x17x1):** Measurement grid: dx=12mm, dy=12mm  
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 12.72 V/m; Power Drift = 0.02 dB  
Peak SAR (extrapolated) = 0.600 W/kg  
**SAR(1 g) = 0.285 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02655**

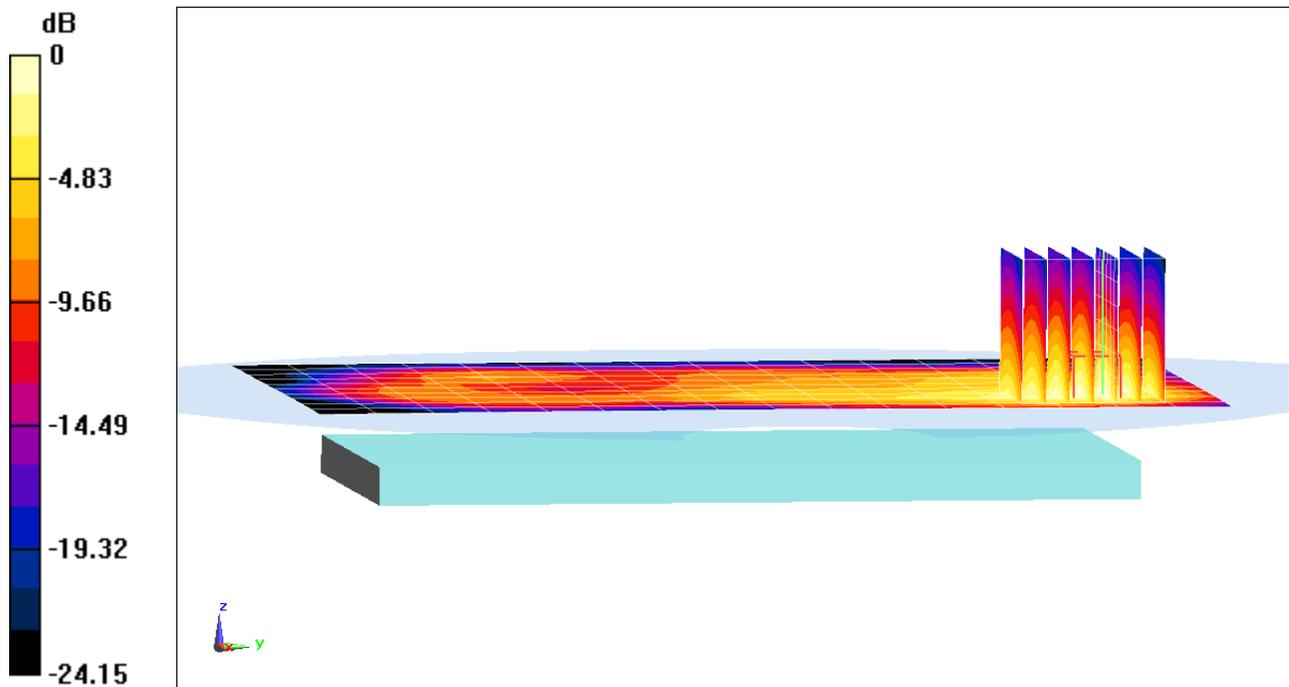
Communication System: UID 0, IEEE 802.11b; Frequency: 2447 MHz; Duty Cycle: 1:1  
Medium: 2450 Body Medium parameters used (interpolated):  
 $f = 2447 \text{ MHz}$ ;  $\sigma = 2.014 \text{ S/m}$ ;  $\epsilon_r = 53.395$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-14-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016  
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11b, 22 MHz Bandwidth,  
Body SAR, Ch 8, 1 Mbps, Front Side, Primary Antenna**

**Area Scan (11x17x1):** Measurement grid: dx=12mm, dy=12mm  
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 13.18 V/m; Power Drift = -0.05 dB  
Peak SAR (extrapolated) = 0.650 W/kg  
**SAR(1 g) = 0.323 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02655**

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5745 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5745 \text{ MHz}$ ;  $\sigma = 6.045 \text{ S/m}$ ;  $\epsilon_r = 46.55$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 21.9°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN3914; ConvF(3.86, 3.86, 3.86); Calibrated: 2/22/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/18/2016

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11a, UNII-3, 20 MHz Bandwidth,  
Body SAR, Ch 149, 6 Mbps, Back Side, Primary Antenna**

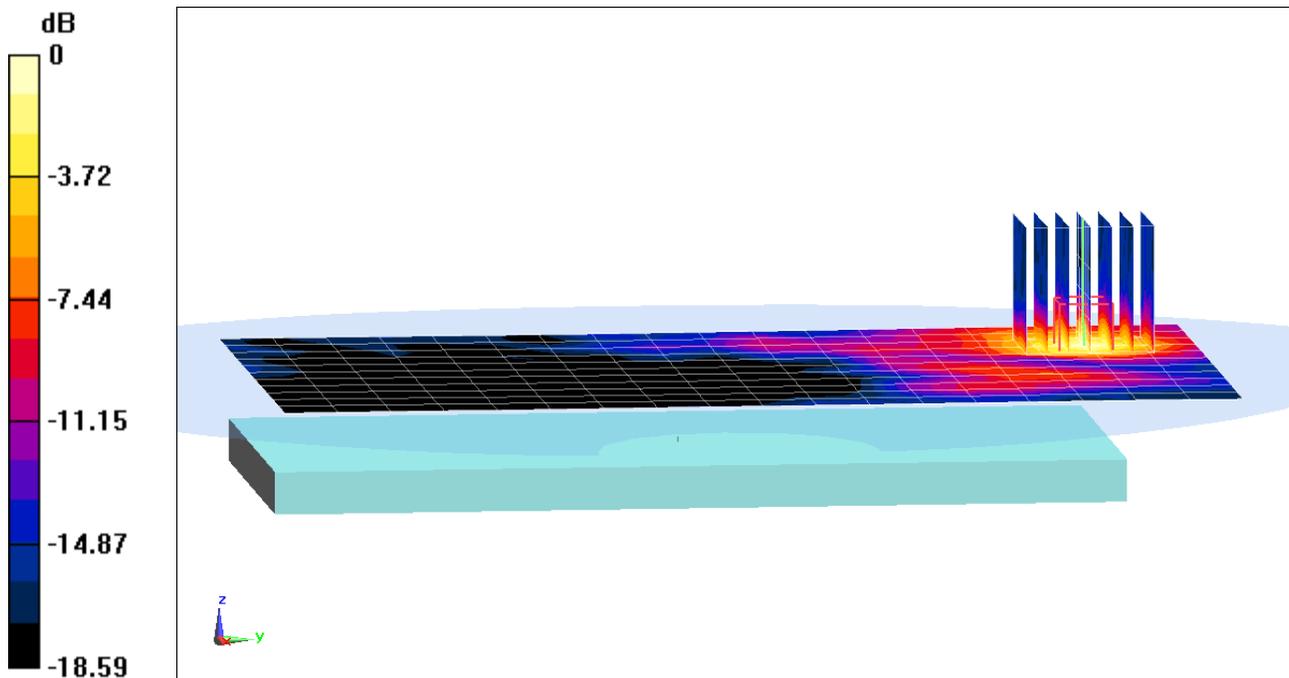
**Area Scan (12x19x1):** Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 6.561 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 0.883 W/kg

**SAR(1 g) = 0.223 W/kg**



0 dB = 0.540 W/kg = -2.68 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02655**

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5745 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5745 \text{ MHz}$ ;  $\sigma = 6.045 \text{ S/m}$ ;  $\epsilon_r = 46.55$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 21.9°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN3914; ConvF(3.86, 3.86, 3.86); Calibrated: 2/22/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/18/2016

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11a, U-NII-3, 20 MHz Bandwidth,  
Body SAR, Ch 149, 6 Mbps, Top Edge, Primary Antenna**

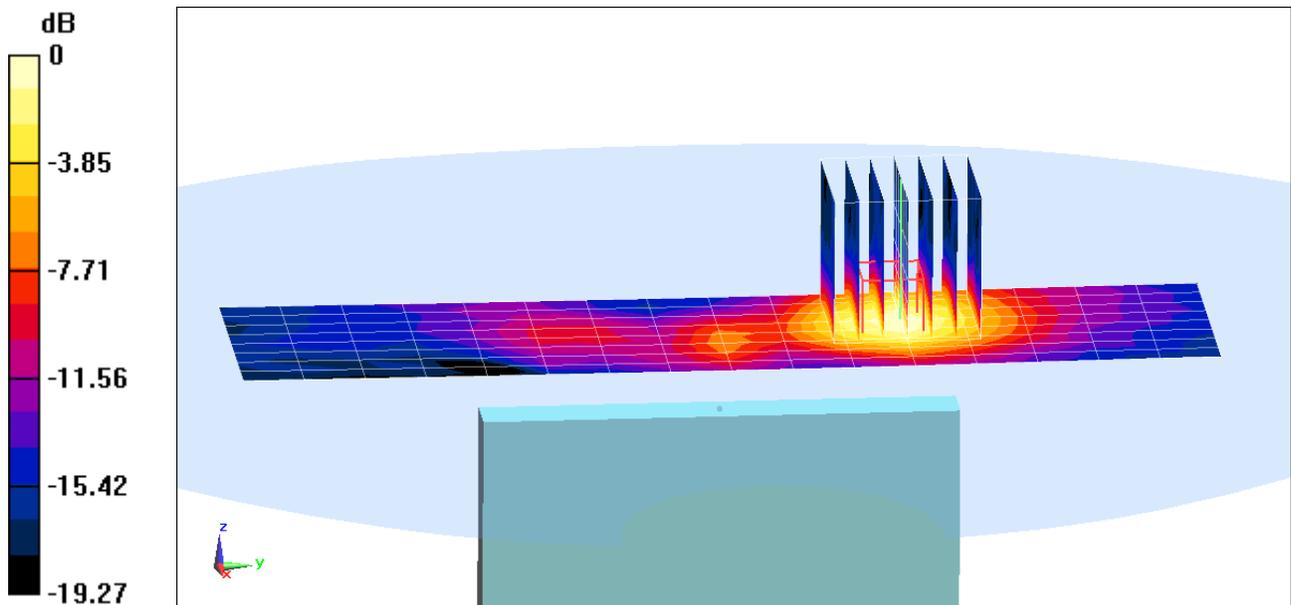
**Area Scan (9x17x1):** Measurement grid: dx=5mm, dy=10mm

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

Reference Value = 7.375 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.15 W/kg

**SAR(1 g) = 0.291 W/kg**



0 dB = 0.670 W/kg = -1.74 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02655**

Communication System: UID 0, Bluetooth; Frequency: 2480 MHz; Duty Cycle: 1:1  
Medium: 2450 Body Medium parameters used (interpolated):  
 $f = 2480 \text{ MHz}$ ;  $\sigma = 2.058 \text{ S/m}$ ;  $\epsilon_r = 53.284$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-14-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;  
Sensor-Surface: 1.4 mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016  
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: Bluetooth, Body SAR, Ch 78, 1 Mbps, Back Side**

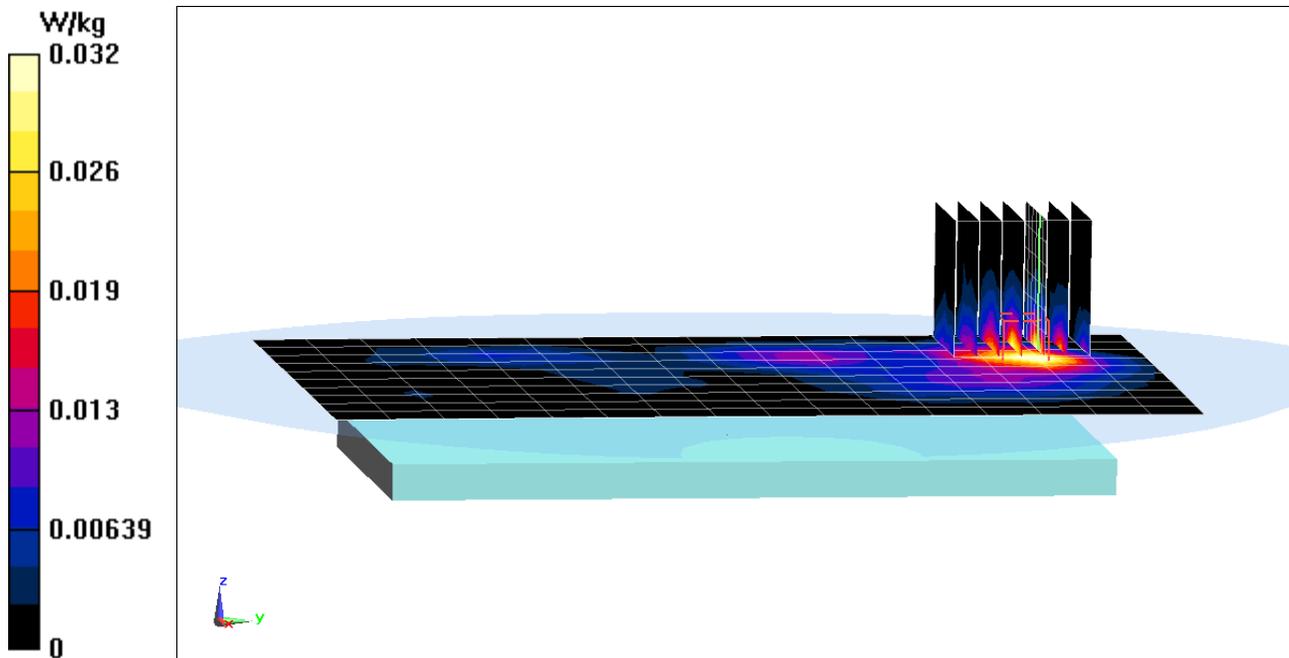
**Area Scan (11x17x1):** Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 3.358 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.139 W/kg

**SAR(1 g) = 0.023 W/kg**



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02655**

Communication System: UID 0, 802.11a 5.2-5.8 GHz Band; Frequency: 5320 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5320 \text{ MHz}$ ;  $\sigma = 5.599 \text{ S/m}$ ;  $\epsilon_r = 48.112$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-25-2016; Ambient Temp: 22.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3914; ConvF(4.32, 4.32, 4.32); Calibrated: 2/22/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/18/2016

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11a, UNII-2A, 20 MHz Bandwidth, Phablet SAR,  
Ch 64, 6 Mbps, Top Side, Secondary Antenna**

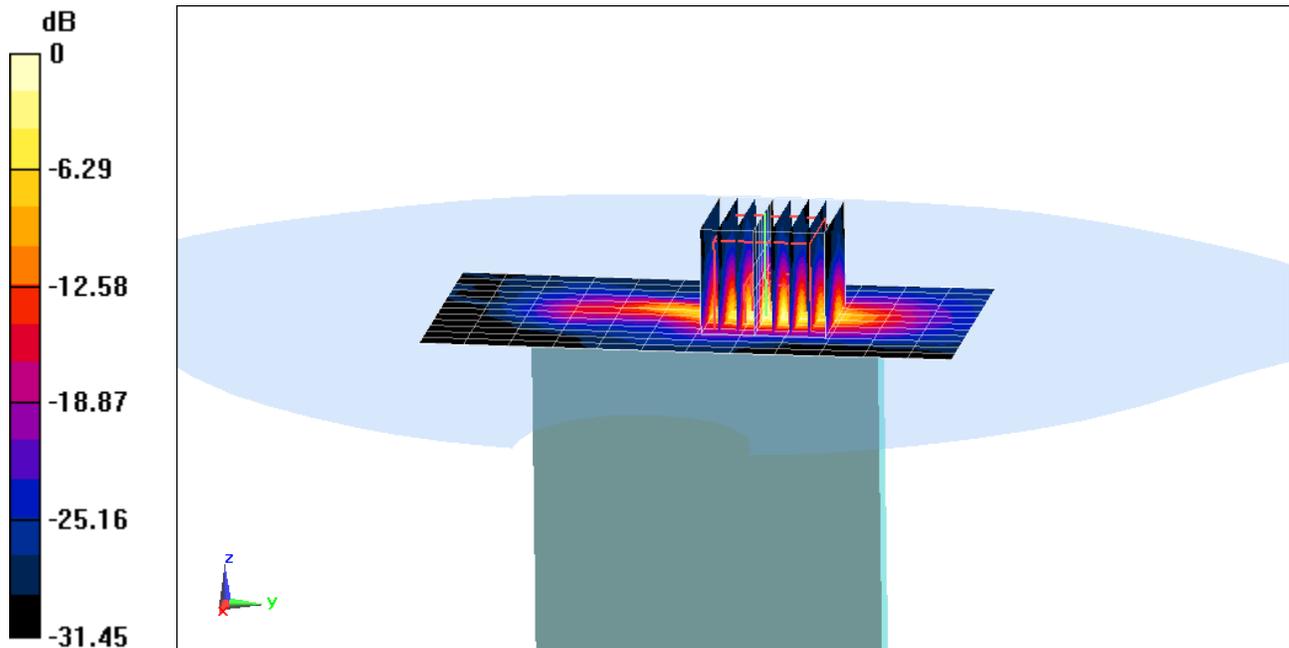
**Area Scan (13x13x1):** Measurement grid: dx=5mm, dy=10mm

**Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 23.34 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 23.5 W/kg

**SAR(10 g) = 0.703 W/kg**



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

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: ZNFH910; Type: Portable Handset; Serial: 02655**

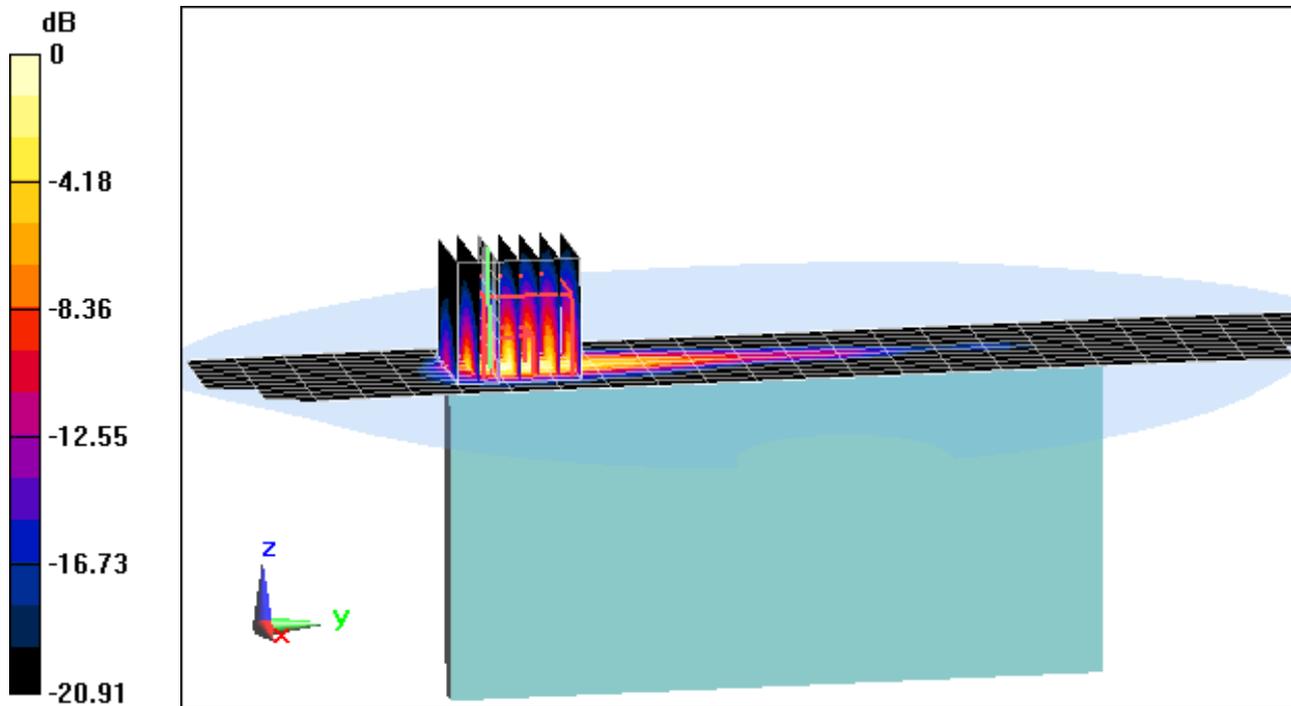
Communication System: UID 0, Bluetooth; Frequency: 2480 MHz; Duty Cycle: 1:1  
Medium: 2450 Body Medium parameters used (interpolated):  
 $f = 2480 \text{ MHz}$ ;  $\sigma = 1.996 \text{ S/m}$ ;  $\epsilon_r = 52.720$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 07-21-2016; Ambient Temp: 22.3°C; Tissue Temp: 23.2°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1407; Calibrated: 4/14/2016  
Phantom: SAM V5.0 Right; Type: QD000P40CD; Serial: 1647  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: Bluetooth, Phablet SAR, Ch 78, 1 Mbps, Right Edge**

**Area Scan (10x17x1):** Measurement grid: dx=12mm, dy=12mm  
**Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm  
Reference Value = 12.89 V/m; Power Drift = 0.01 dB  
Peak SAR (extrapolated) = 0.898 W/kg  
**SAR(10 g) = 0.106 W/kg**



0 dB = 0.604 W/kg = -2.19 dBW/kg

## APPENDIX B: SYSTEM VERIFICATION

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 750 MHz; Type: D750V3; Serial: 1046**

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 750 Head Medium parameters used (interpolated):

$f = 750 \text{ MHz}$ ;  $\sigma = 0.894 \text{ S/m}$ ;  $\epsilon_r = 41.181$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-14-2016; Ambient Temp: 23.6°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3209; ConvF(6.6, 6.6, 6.6); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 11/11/2015

Phantom: SAM Left; Type: SAM; Serial: 1688

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 750 MHz System Verification at 23.0 dBm (200 mW)

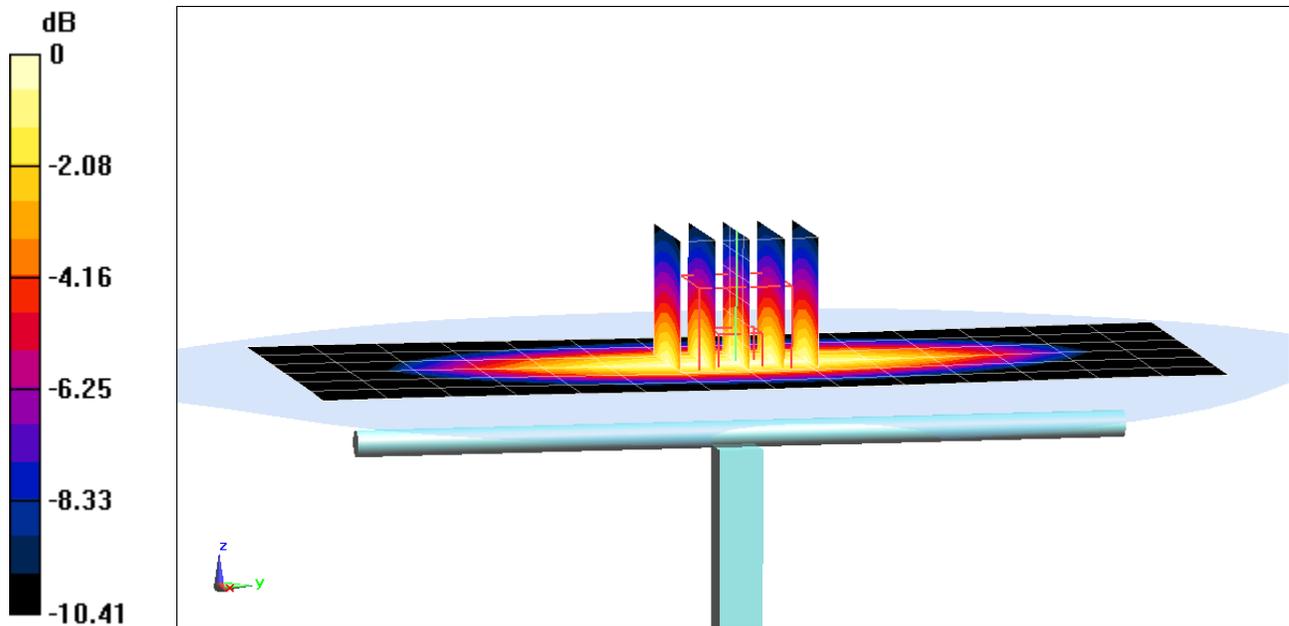
**Area Scan (7x15x1):** Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 2.29 W/kg

**SAR(1 g) = 1.56 W/kg**

Deviation(1 g) = -4.88%



0 dB = 1.83 W/kg = 2.62 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 0.908 \text{ S/m}$ ;  $\epsilon_r = 41.718$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-12-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3334; ConvF(6.37, 6.37, 6.37); Calibrated: 11/17/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1415; Calibrated: 11/11/2015

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 835 MHz System Verification at 23.0 dBm (200 mW)

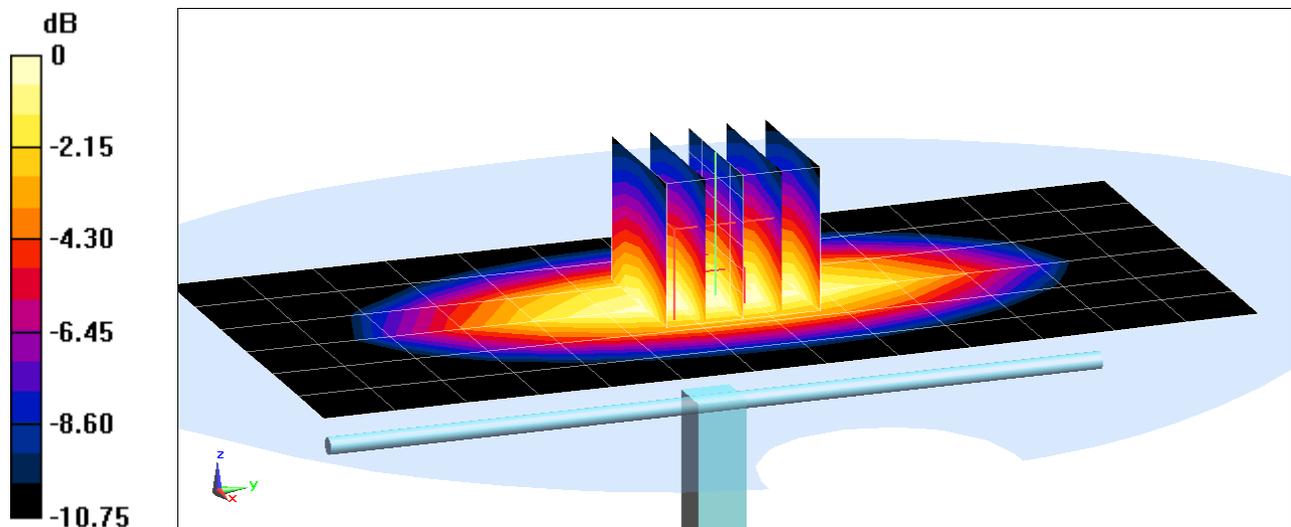
**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 2.69 W/kg

**SAR(1 g) = 1.79 W/kg**

Deviation(1 g) = -2.08%



0 dB = 2.06 W/kg = 3.14 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1051**

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Head; Medium parameters used:

$f = 1750 \text{ MHz}$ ;  $\sigma = 1.32 \text{ S/m}$ ;  $\epsilon_r = 39.22$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7406; ConvF(8.85, 8.85, 8.85); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 1750 MHz System Verification at 20.0 dBm (100 mW)

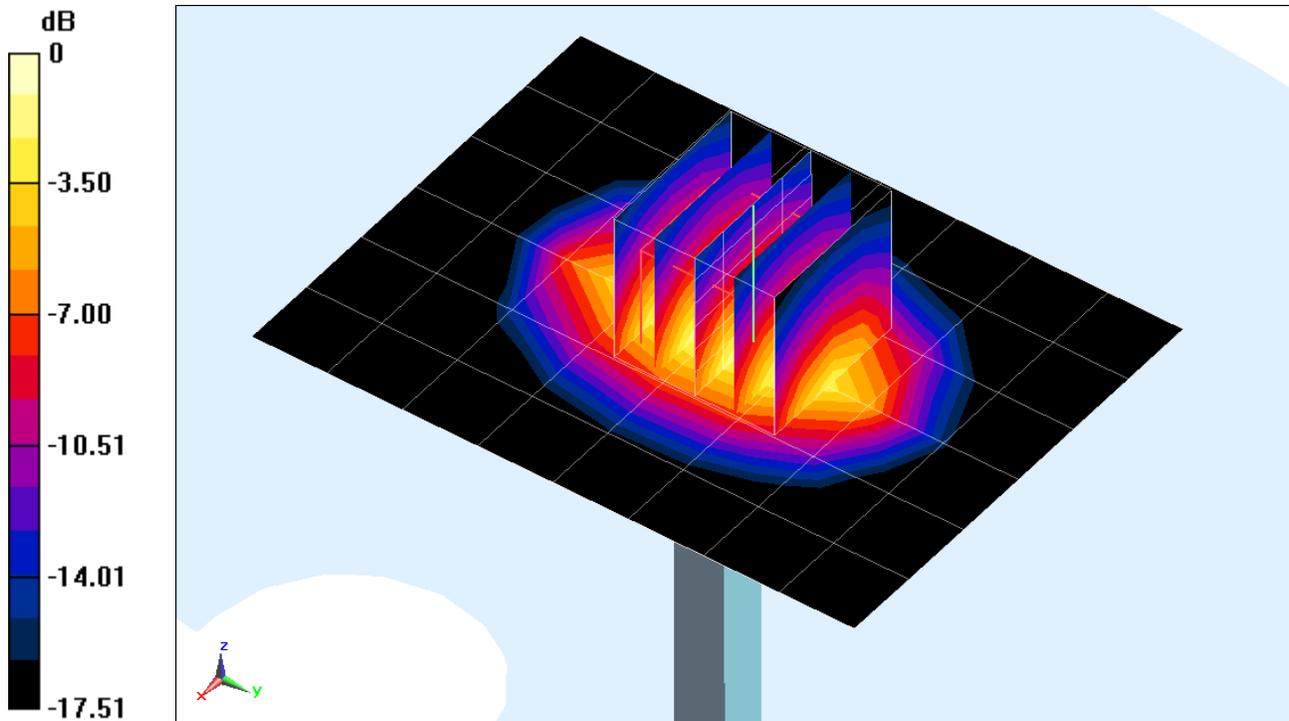
**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 6.01 W/kg

**SAR(1 g) = 3.39 W/kg**

Deviation(1 g) = -6.09%



0 dB = 5.07 W/kg = 7.05 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

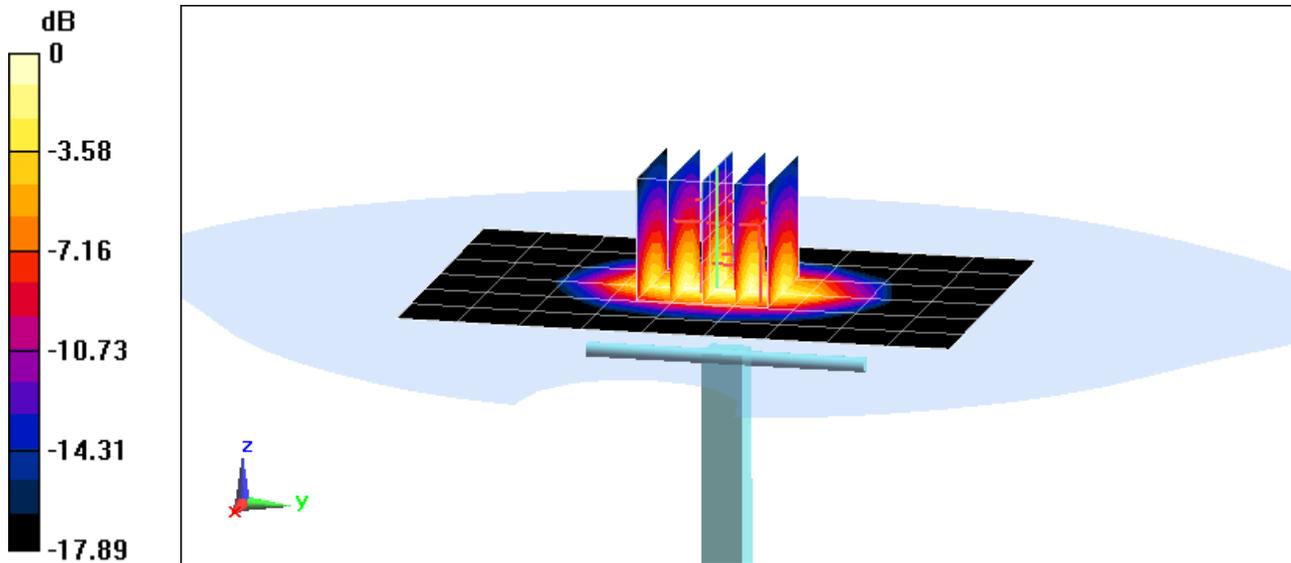
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1  
Medium: 1900 Head Medium parameters used (interpolated):  
 $f = 1900 \text{ MHz}$ ;  $\sigma = 1.418 \text{ S/m}$ ;  $\epsilon_r = 38.897$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-07-2016; Ambient Temp: 23.0°C; Tissue Temp: 23.2°C

Probe: ES3DV3 - SN3333; ConvF(5.03, 5.03, 5.03); Calibrated: 10/29/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1333; Calibrated: 10/27/2015  
Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 1900 MHz System Verification at 20.0 dBm (100 mW)

**Area Scan (7x10x1):** Measurement grid: dx=15mm, dy=15mm  
**Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm  
Peak SAR (extrapolated) = 7.08 W/kg  
**SAR(1 g) = 3.94 W/kg**  
Deviation(1 g) = 2.34%



0 dB = 4.98 W/kg = 6.97 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.457 \text{ S/m}$ ;  $\epsilon_r = 38.932$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 21.8°C; Tissue Temp: 22.4°C

Probe: ES3DV3 - SN3334; ConvF(5.18, 5.18, 5.18); Calibrated: 11/17/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1415; Calibrated: 11/11/2015

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 1900 MHz System Verification at 20.0 dBm (100 mW)

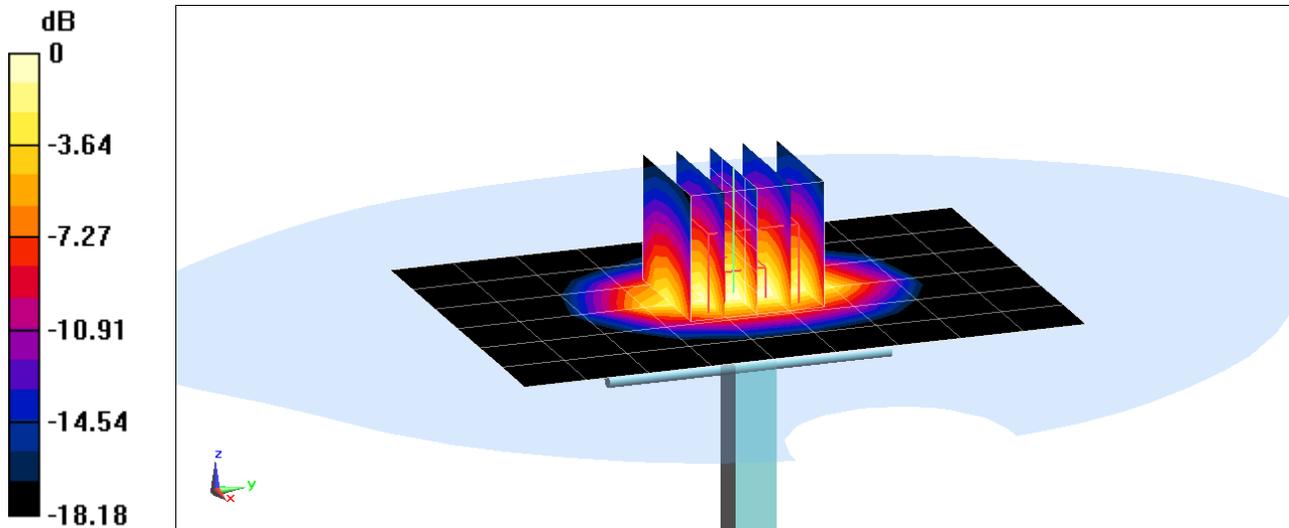
**Area Scan (7x10x1):** Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 6.88 W/kg

**SAR(1 g) = 3.77 W/kg**

Deviation(1 g) = -2.08%



0 dB = 4.79 W/kg = 6.80 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1064**

Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1

Medium: 2300 Head Medium parameters used:

$f = 2300 \text{ MHz}$ ;  $\sigma = 1.72 \text{ S/m}$ ;  $\epsilon_r = 39.814$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-14-2016; Ambient Temp: 23.4°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7409; ConvF(7.22, 7.22, 7.22); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

## 2300 MHz System Verification at 20.0 dBm (100 mW)

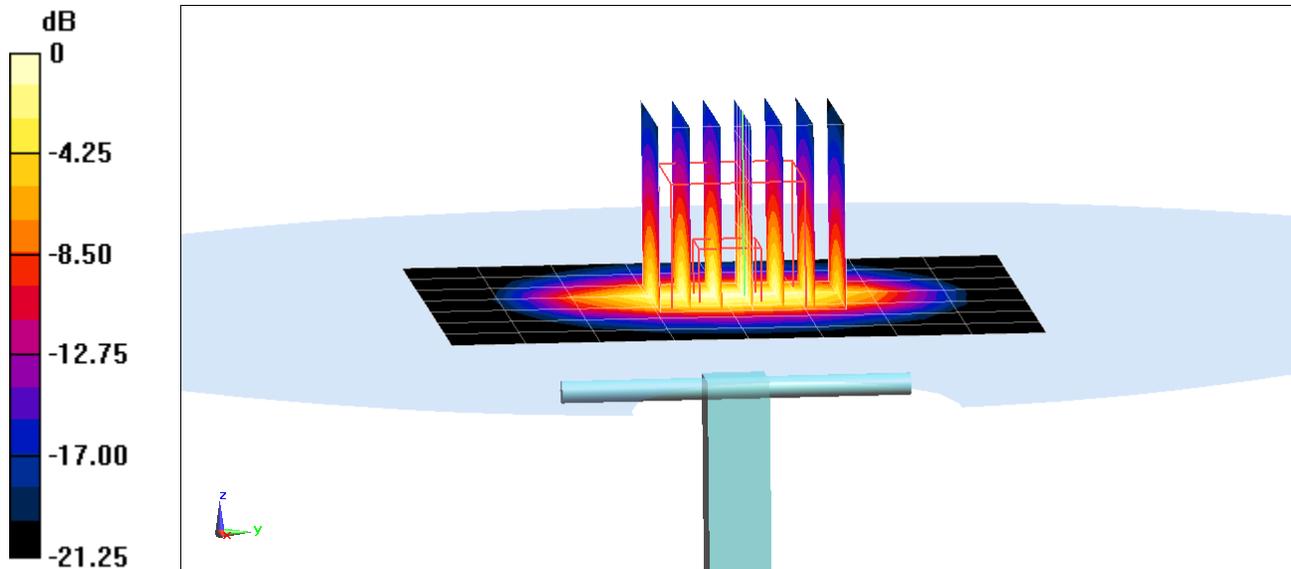
**Area Scan (8x9x1):** Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 10.7 W/kg

**SAR(1 g) = 5.09 W/kg**

Deviation(1 g) = 6.93%



0 dB = 8.44 W/kg = 9.26 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719**

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450-2600 Head; Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.86 \text{ S/m}$ ;  $\epsilon_r = 38.548$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2016; Ambient Temp: 20.2°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3334; ConvF(4.58, 4.58, 4.58); Calibrated: 11/17/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1415; Calibrated: 11/11/2015

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 2450 MHz System Verification at 20.0 dBm (100 mW)

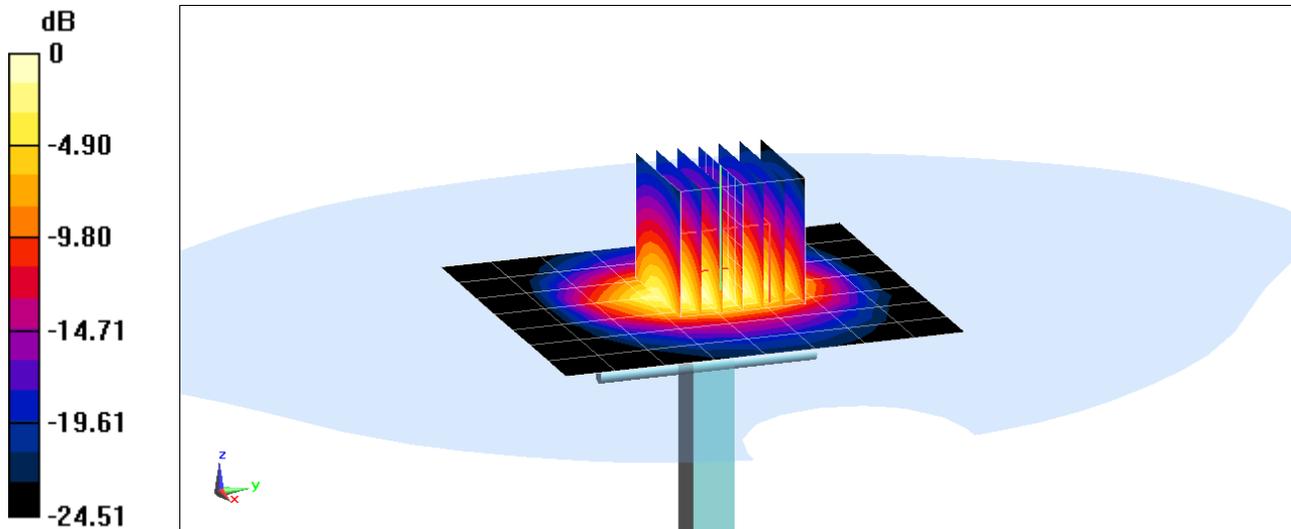
**Area Scan (8x9x1):** Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 11.9 W/kg

**SAR(1 g) = 5.43 W/kg**

Deviation(1 g) = 0.18%



0 dB = 7.16 W/kg = 8.55 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719**

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Head; Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.845 \text{ S/m}$ ;  $\epsilon_r = 40.279$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-15-2016; Ambient Temp: 21.9°C; Tissue Temp: 22.6°C

Probe: EX3DV4 - SN7409; ConvF(6.9, 6.9, 6.9); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 2450 MHz System Verification at 20.0 dBm (100 mW)

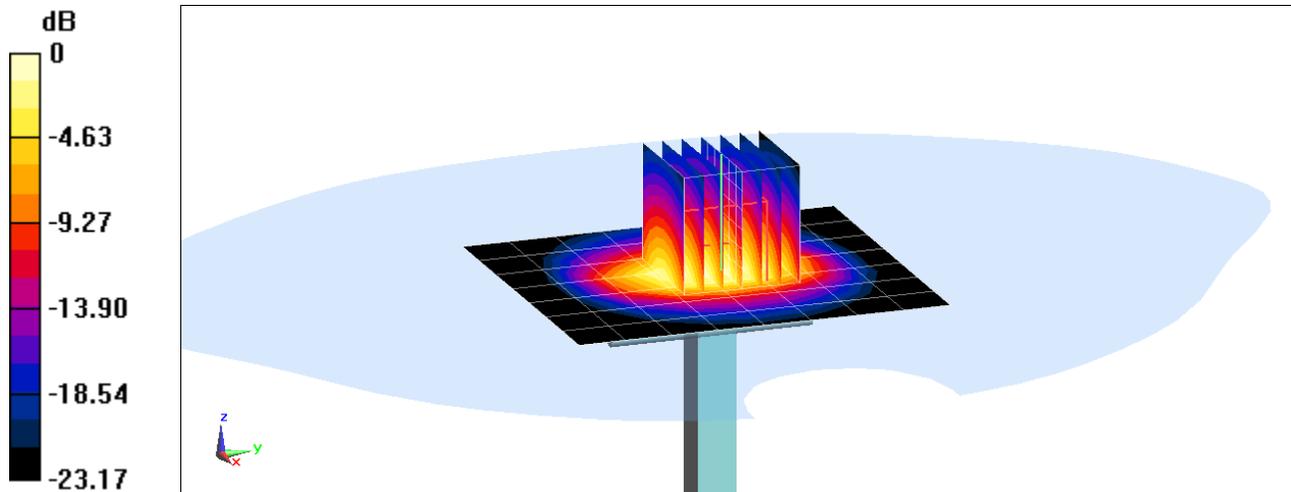
**Area Scan (8x9x1):** Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 11.0 W/kg

**SAR(1 g) = 5.09 W/kg**

Deviation(1 g) = -6.09%



0 dB = 8.63 W/kg = 9.36 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1071**

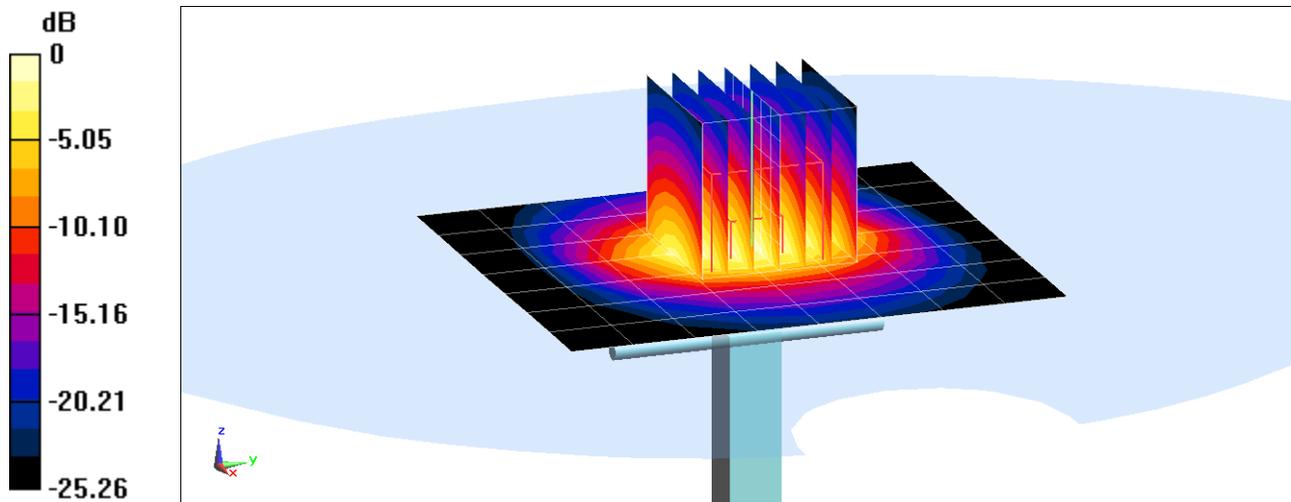
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1  
Medium: 2450-2600 Head Medium parameters used:  
 $f = 2600 \text{ MHz}$ ;  $\sigma = 2.035 \text{ S/m}$ ;  $\epsilon_r = 37.959$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-05-2016; Ambient Temp: 20.2°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3334; ConvF(4.46, 4.46, 4.46); Calibrated: 11/17/2015;  
Sensor-Surface: 3mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1415; Calibrated: 11/11/2015  
Phantom: SAM Front; Type: SAM; Serial: 1686  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 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) = 11.7 W/kg  
**SAR(1 g) = 5.24 W/kg**  
Deviation(1 g) = -6.26%



0 dB = 7.06 W/kg = 8.49 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120**

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1  
Medium: 5 GHz Head Medium parameters used (interpolated):  
 $f = 5250 \text{ MHz}$ ;  $\sigma = 4.577 \text{ S/m}$ ;  $\epsilon_r = 36.711$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-15-2016; Ambient Temp: 23.0°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN3914; ConvF(5.07, 5.07, 5.07); Calibrated: 2/22/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016  
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 5250 MHz System Verification at 17.0 dBm (50 mW)

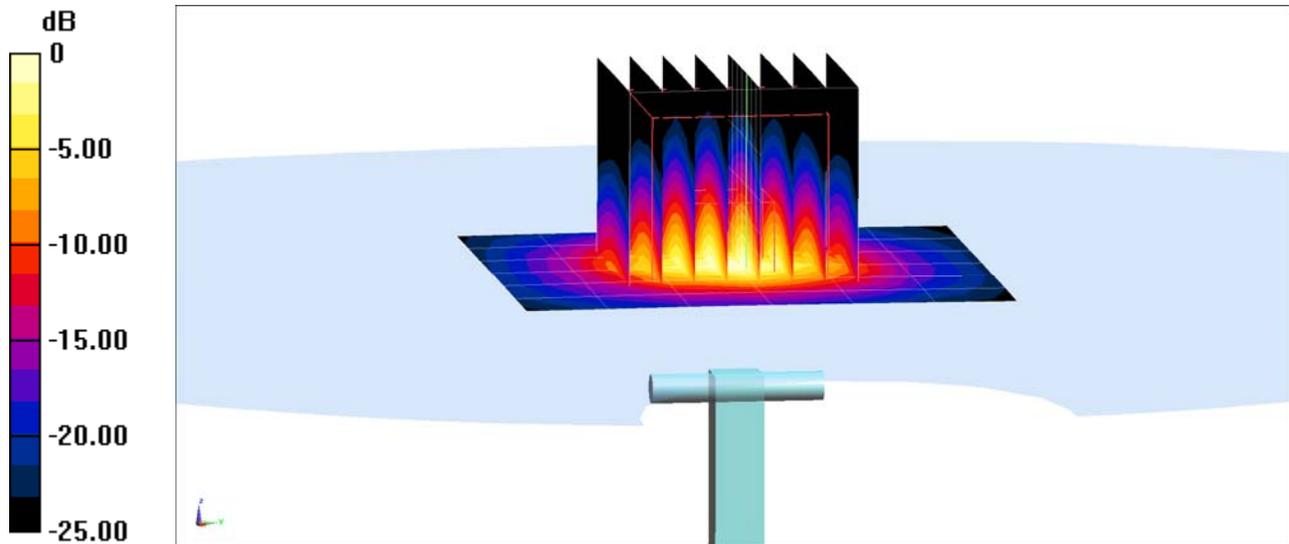
**Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

**Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 15.5 W/kg

**SAR(1 g) = 3.65 W/kg**

Deviation(1 g) = -7.24%



0 dB = 8.43 W/kg = 9.26 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120**

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1  
Medium: 5 GHz Head Medium parameters used (interpolated):  
 $f = 5750 \text{ MHz}$ ;  $\sigma = 5.108 \text{ S/m}$ ;  $\epsilon_r = 36.001$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-15-2016; Ambient Temp: 23.0°C; Tissue Temp: 21.8°C

Probe: EX3DV4 - SN3914; ConvF(4.74, 4.74, 4.74); Calibrated: 2/22/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016  
Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 5750 MHz System Verification at 17.0 dBm (50 mW)

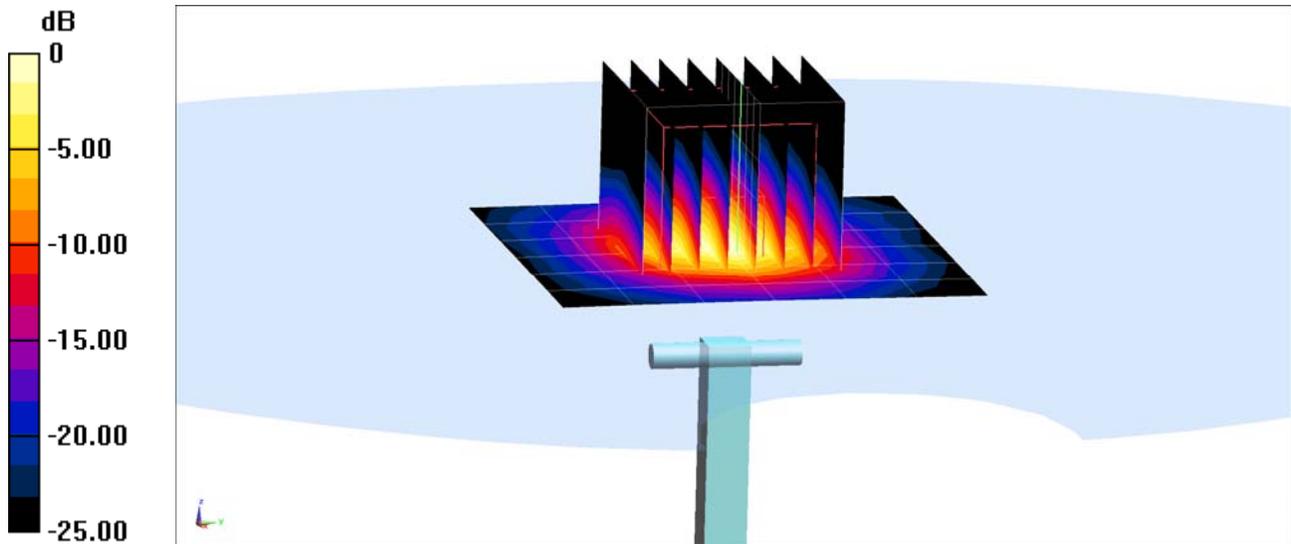
**Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

**Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 17.0 W/kg

**SAR(1 g) = 3.69 W/kg**

Deviation(1 g) = -6.70%



0 dB = 8.80 W/kg = 9.44 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 750 MHz; Type: D750V3; Serial: 1046**

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1

Medium: 750 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$ ;  $\sigma = 0.959 \text{ S/m}$ ;  $\epsilon_r = 54.709$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-06-2016; Ambient Temp: 23.4°C; Tissue Temp: 22.0°C

Probe: EX3DV4 - SN7409; ConvF(9.46, 9.46, 9.46); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 750 MHz System Verification at 23.0 dBm (200 mW)

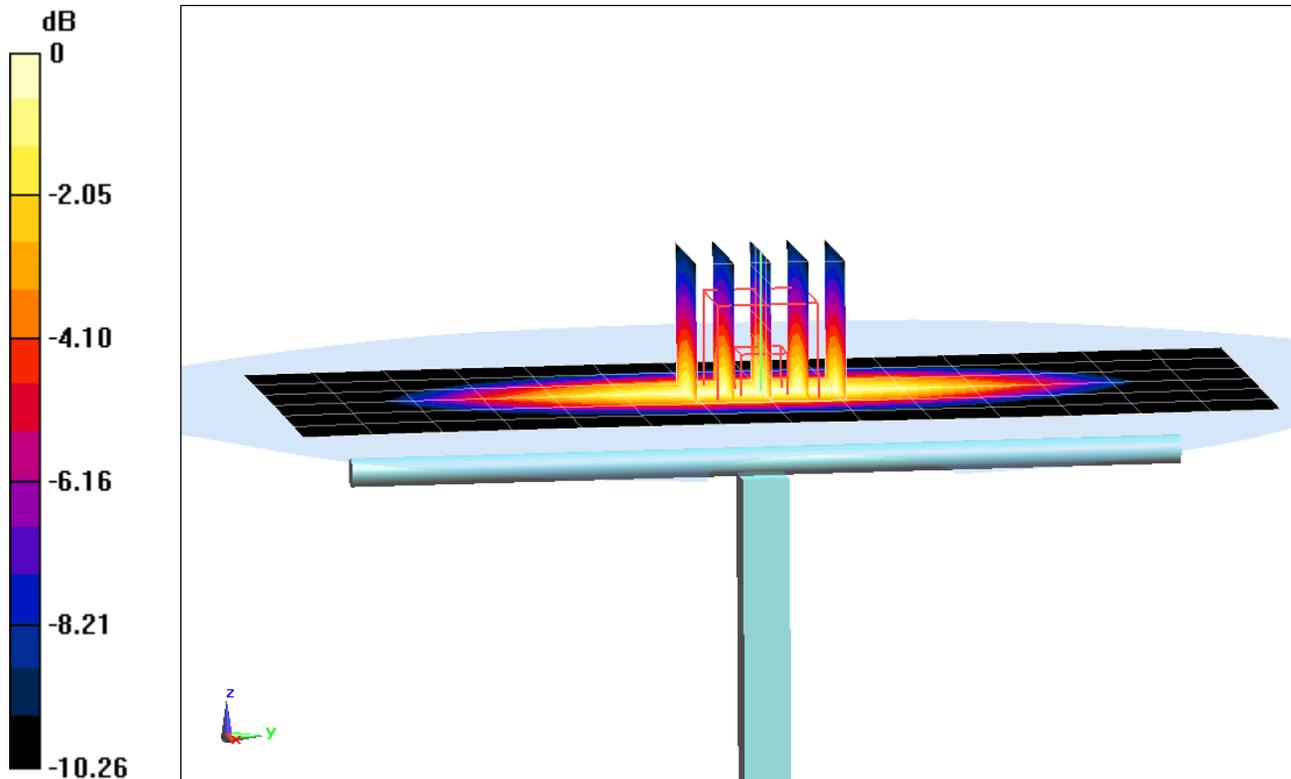
**Area Scan (7x15x1):** Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 2.77 W/kg

**SAR(1 g) = 1.83 W/kg**

Deviation(1 g) = 4.33%



0 dB = 2.45 W/kg = 3.89 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d119**

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$ ;  $\sigma = 1 \text{ S/m}$ ;  $\epsilon_r = 54.079$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 07-11-2016; Ambient Temp: 23.9°C; Tissue Temp: 21.3°C

Probe: ES3DV3 - SN3333; ConvF(6.25, 6.25, 6.25); Calibrated: 10/29/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 10/27/2015

Phantom: SAM Front; Type: QD000P40CD; Serial: TP:1758

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 835 MHz System Verification at 23.0 dBm (200 mW)

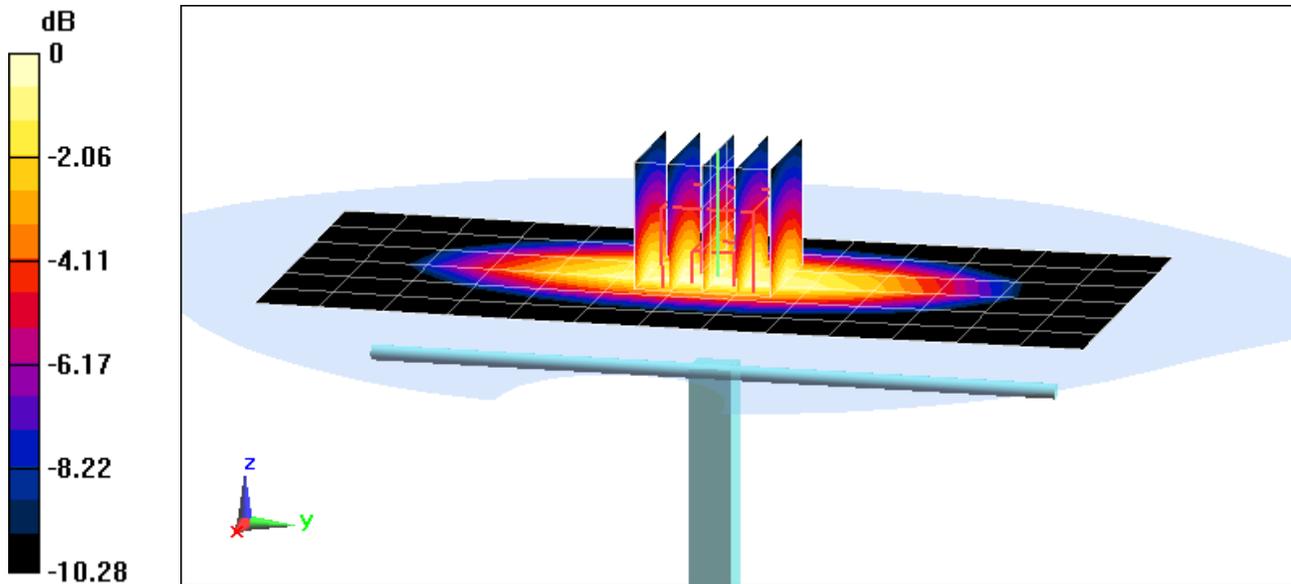
**Area Scan (7x14x1):** Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 2.85 W/kg

**SAR(1 g) = 1.96 W/kg**

Deviation(1 g) = 7.22%



0 dB = 2.29 W/kg = 3.60 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1051**

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$ ;  $\sigma = 1.51 \text{ S/m}$ ;  $\epsilon_r = 52.589$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 23.2°C; Tissue Temp: 21.9°C

Probe: EX3DV4 - SN7409; ConvF(7.72, 7.72, 7.72); Calibrated: 5/17/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/11/2016

Phantom: SAM Right; Type: QD000P40CD; Serial: TP:7535

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 1750 MHz System Verification at 20.0 dBm (100 mW)

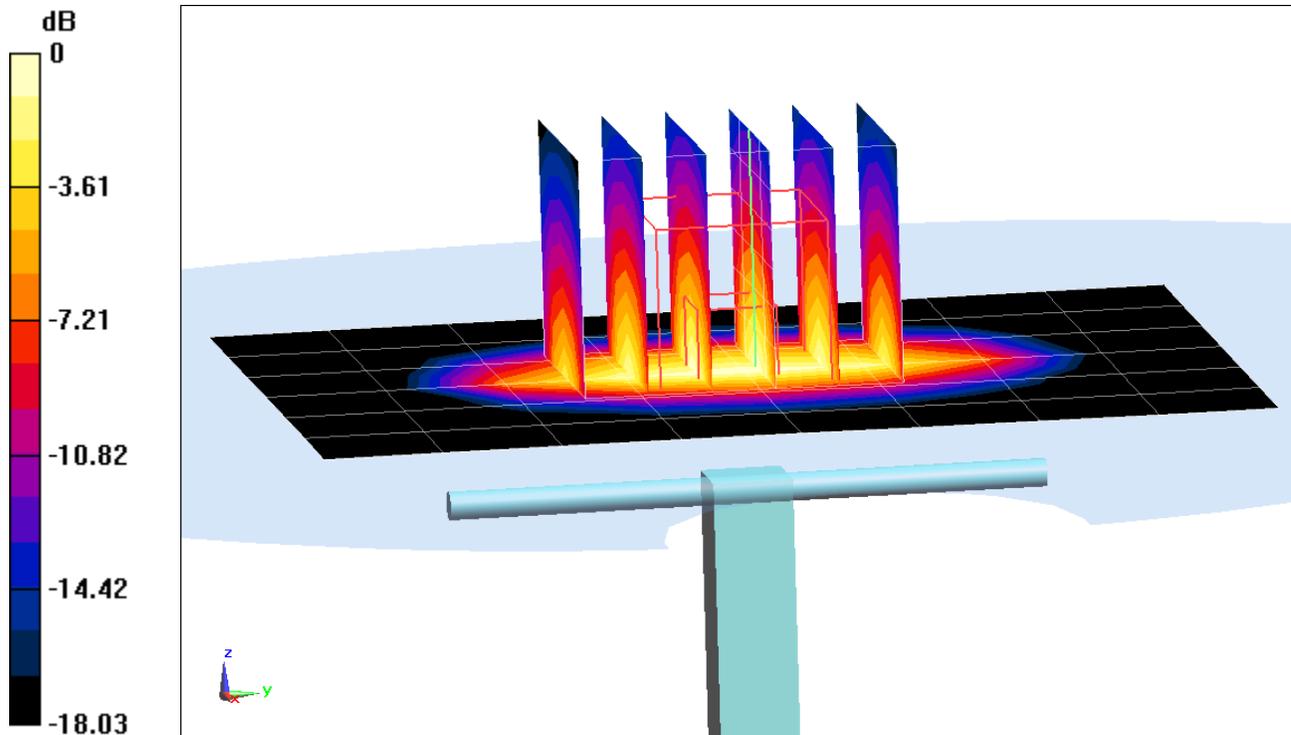
**Area Scan (7x9x1):** Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.06 W/kg

**SAR(1 g) = 3.9 W/kg**

Deviation(1 g) = 6.85%



0 dB = 5.94 W/kg = 7.74 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d141**

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body; Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$ ;  $\sigma = 1.556 \text{ S/m}$ ;  $\epsilon_r = 52.575$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-07-2016; Ambient Temp: 23.8°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3319; ConvF(4.7, 4.7, 4.7); Calibrated: 3/18/2016;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/14/2016

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 1900 MHz System Verification at 20.0 dBm (100 mW)

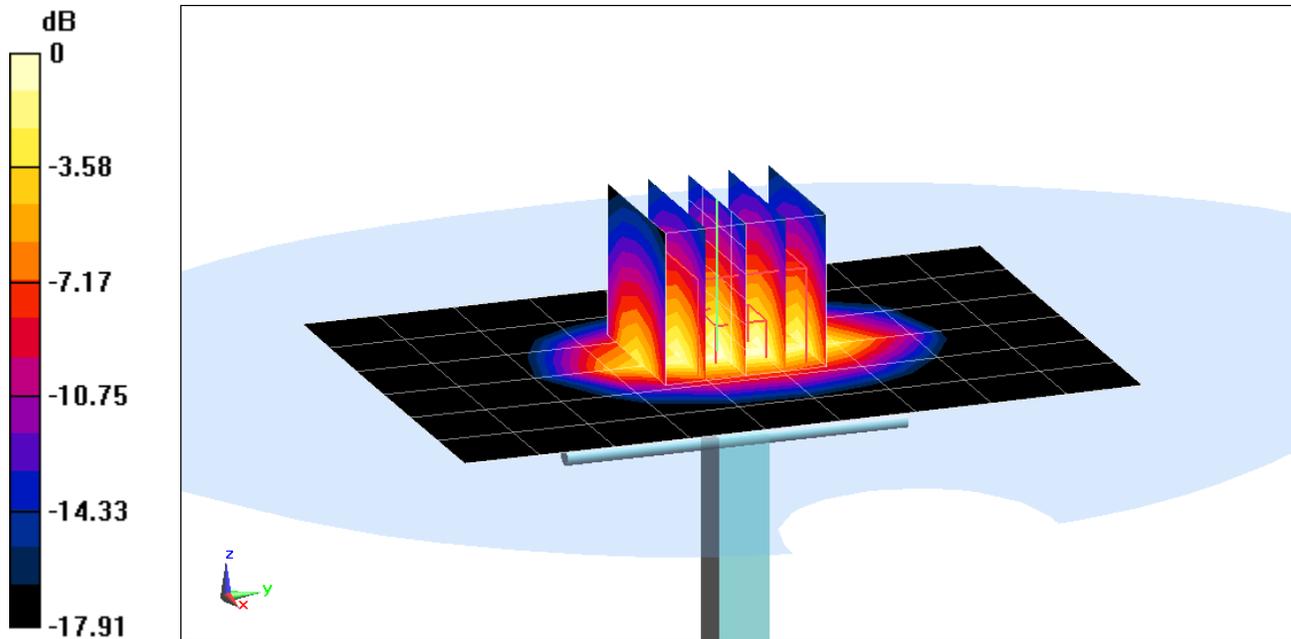
**Area Scan (7x10x1):** Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.39 W/kg

**SAR(1 g) = 4.14 W/kg**

Deviation(1 g) = 4.55%



0 dB = 5.18 W/kg = 7.14 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2300 MHz; Type: D2300V2; Serial: 1064**

Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1

Medium: 2300 Body Medium parameters used:

$f = 2300 \text{ MHz}$ ;  $\sigma = 1.819 \text{ S/m}$ ;  $\epsilon_r = 53.635$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-07-2016; Ambient Temp: 22.0°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3334; ConvF(4.61, 4.61, 4.61); Calibrated: 11/17/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1415; Calibrated: 11/11/2015

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

Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

## 2300 MHz System Verification at 20.0 dBm (100 mW)

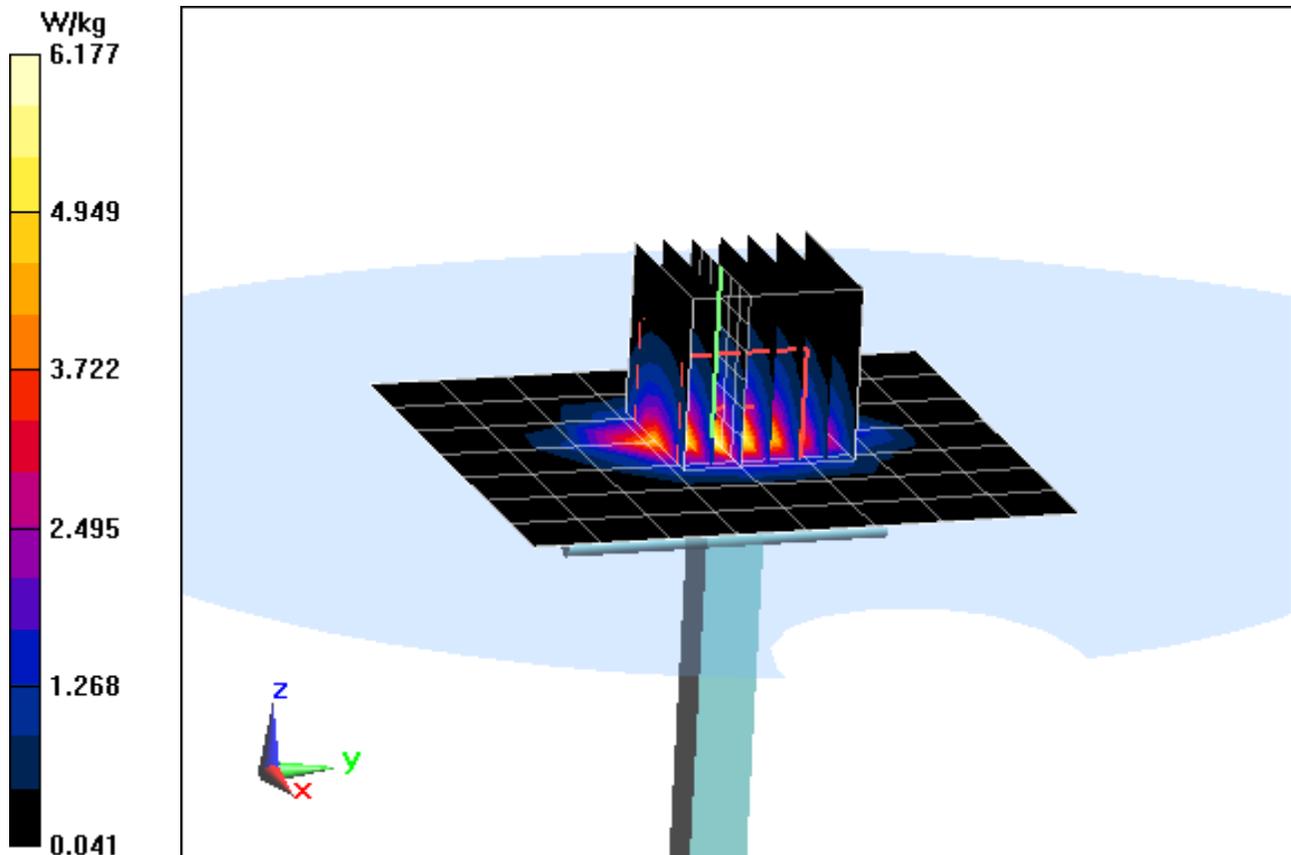
**Area Scan (8x9x1):** Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 9.56 W/kg

**SAR(1 g) = 4.74 W/kg**

Deviation (1 g) = 4.18%



# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719**

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 -2600 Body Medium parameters used:

$f = 2450$  MHz;  $\sigma = 2.018$  S/m;  $\epsilon_r = 53.383$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-14-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

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

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 2450 MHz System Verification at 20.0 dBm (100 mW)

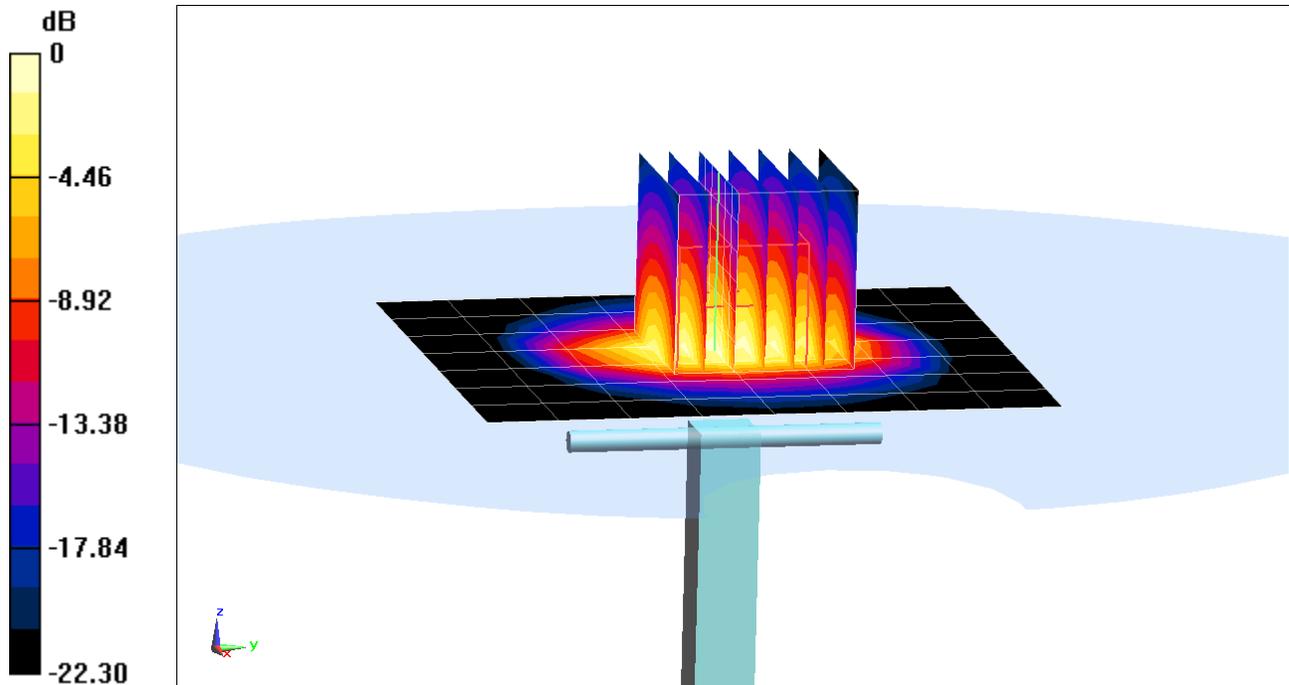
**Area Scan (8x9x1):** Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 10.7 W/kg

**SAR(1 g) = 5.25 W/kg**

Deviation(1 g) = 1.16%



0 dB = 8.62 W/kg = 9.36 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 719**

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$ ;  $\sigma = 1.956 \text{ S/m}$ ;  $\epsilon_r = 52.816$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-21-2016; Ambient Temp: 22.3°C; Tissue Temp: 23.2°C

Probe: EX3DV4 - SN7406; ConvF(7.24, 7.24, 7.24); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

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

Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

## 2450 MHz System Verification at 20.0 dBm (100 mW)

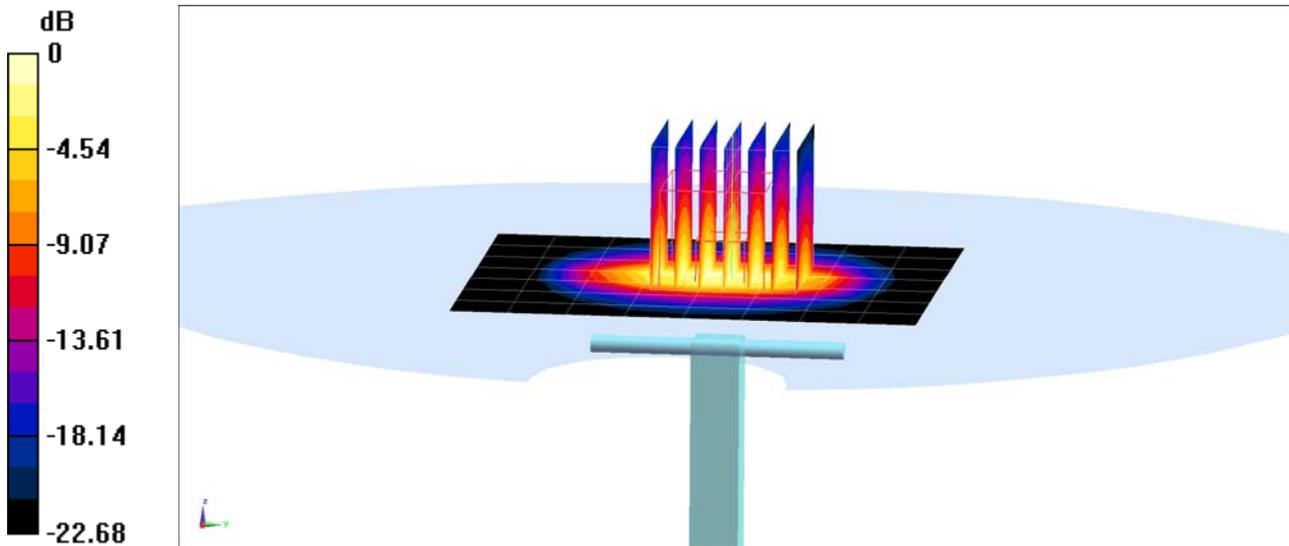
**Area Scan (8x9x1):** Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 10.7 W/kg

**SAR(10 g) = 2.35 W/kg**

Deviation(10 g) = -3.29%



0 dB = 8.51 W/kg = 9.30 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1071**

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: 2450-2600 Body Medium parameters used:

$f = 2600$  MHz;  $\sigma = 2.227$  S/m;  $\epsilon_r = 52.832$ ;  $\rho = 1000$  kg/m<sup>3</sup>

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-14-2016; Ambient Temp: 23.2°C; Tissue Temp: 22.4°C

Probe: EX3DV4 - SN7406; ConvF(6.94, 6.94, 6.94); Calibrated: 4/19/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 4/14/2016

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

Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

## 2600 MHz System Verification at 20.0 dBm (100 mW)

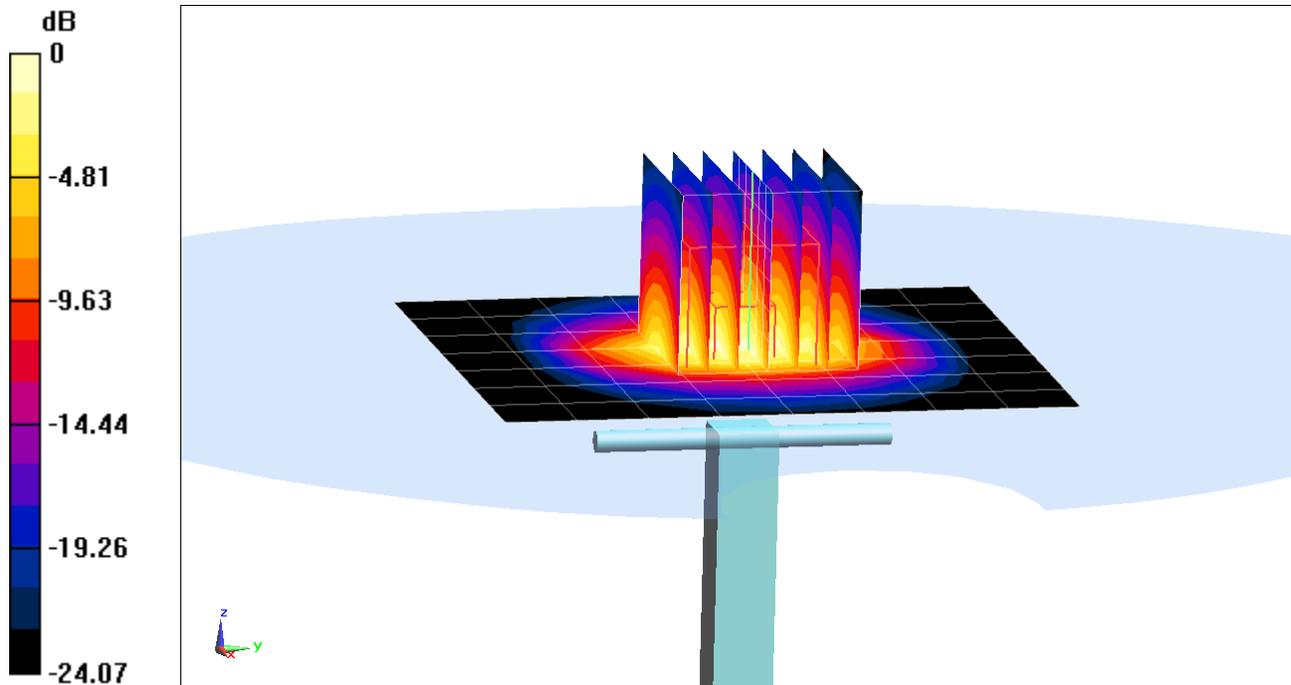
**Area Scan (8x9x1):** Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 12.8 W/kg

**SAR(1 g) = 5.77 W/kg**

Deviation(1 g) = 5.10%



0 dB = 10.0 W/kg = 10.00 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120**

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1  
Medium: 5 GHz Body Medium parameters used (interpolated):  
 $f = 5250 \text{ MHz}$ ;  $\sigma = 5.422 \text{ S/m}$ ;  $\epsilon_r = 47.399$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 21.9°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN3914; ConvF(4.32, 4.32, 4.32); Calibrated: 2/22/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016  
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646  
Measurement SW: DASYS2, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 5250 MHz System Verification at 17.0 dBm (50 mW)

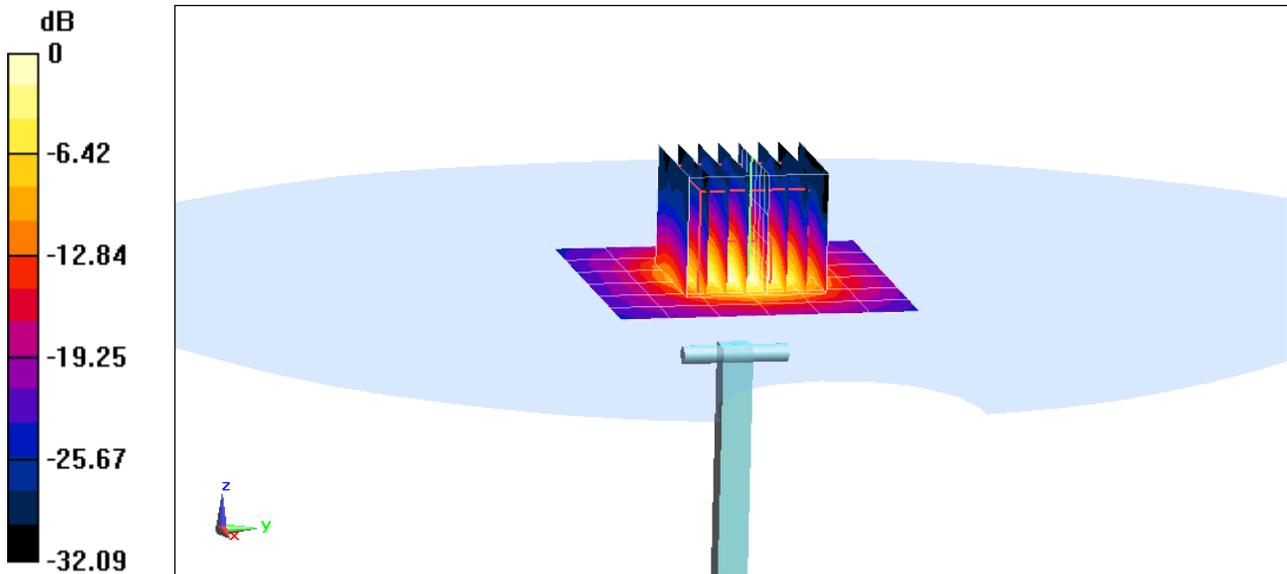
**Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

**Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 15.2 W/kg

**SAR(1 g) = 3.71 W/kg**

Deviation(1 g) = -1.85%



0 dB = 8.83 W/kg = 9.46 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120**

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5600 \text{ MHz}$ ;  $\sigma = 5.849 \text{ S/m}$ ;  $\epsilon_r = 46.811$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 21.9°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN3914; ConvF(3.63, 3.63, 3.63); Calibrated: 2/22/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/18/2016

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 5600 MHz System Verification at 17.0 dBm (50 mW)

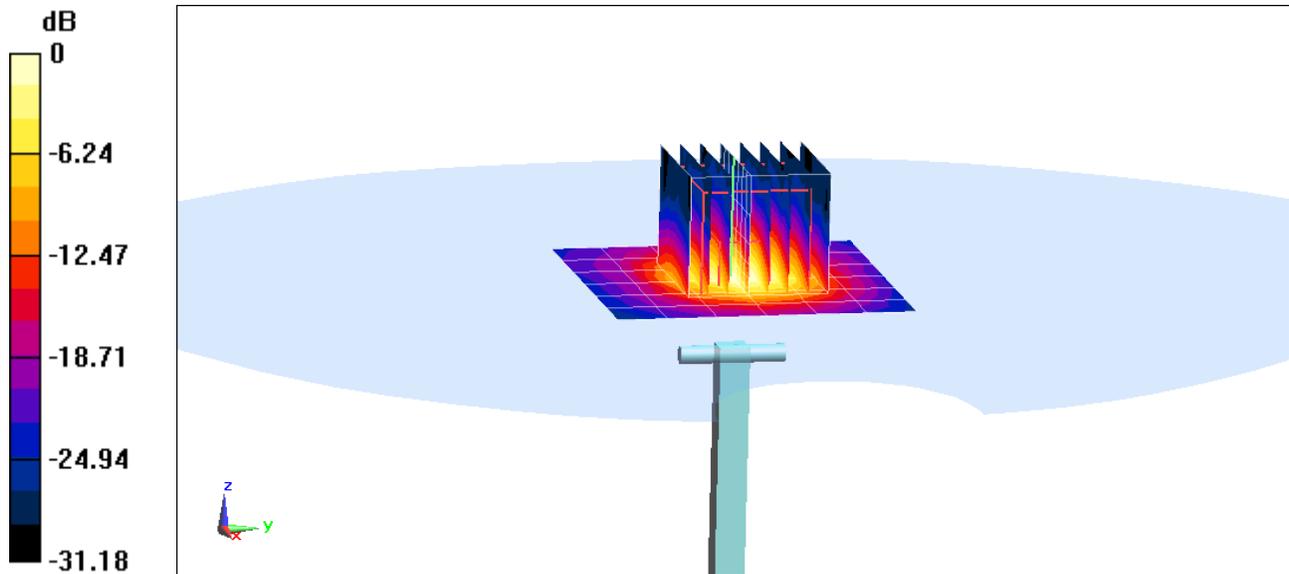
**Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

**Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 15.3 W/kg

**SAR(1 g) = 3.74 W/kg**

Deviation(1 g) = -7.43%



0 dB = 8.98 W/kg = 9.53 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120**

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1  
Medium: 5 GHz Body Medium parameters used (interpolated):  
 $f = 5750 \text{ MHz}$ ;  $\sigma = 6.051 \text{ S/m}$ ;  $\epsilon_r = 46.559$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-11-2016; Ambient Temp: 21.9°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN3914; ConvF(3.86, 3.86, 3.86); Calibrated: 2/22/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016  
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646  
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

## 5750 MHz System Verification at 17.0 dBm (50 mW)

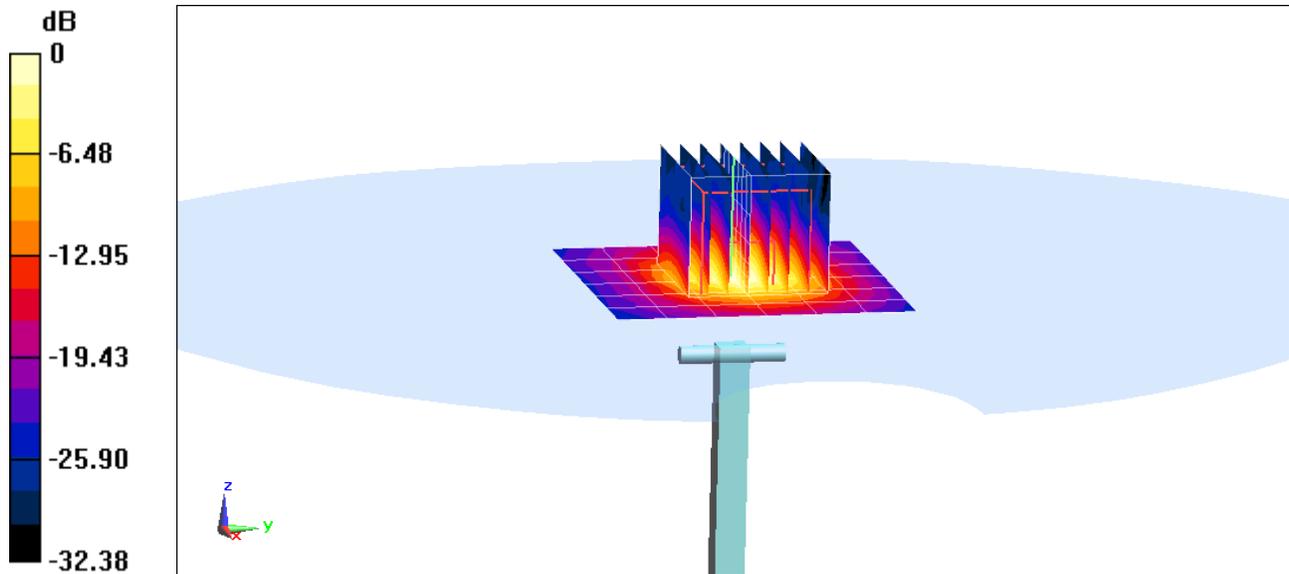
**Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

**Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 15.1 W/kg

**SAR(1 g) = 3.50 W/kg**

Deviation(1 g) = -8.50%



0 dB = 8.57 W/kg = 9.33 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120**

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1  
Medium: 5 GHz Body Medium parameters used (interpolated):  
 $f = 5250 \text{ MHz}$ ;  $\sigma = 5.483 \text{ S/m}$ ;  $\epsilon_r = 48.168$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-25-2016; Ambient Temp: 22.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3914; ConvF(4.32, 4.32, 4.32); Calibrated: 2/22/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016  
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646  
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

## 5250 MHz System Verification at 17.0 dBm (50 mW)

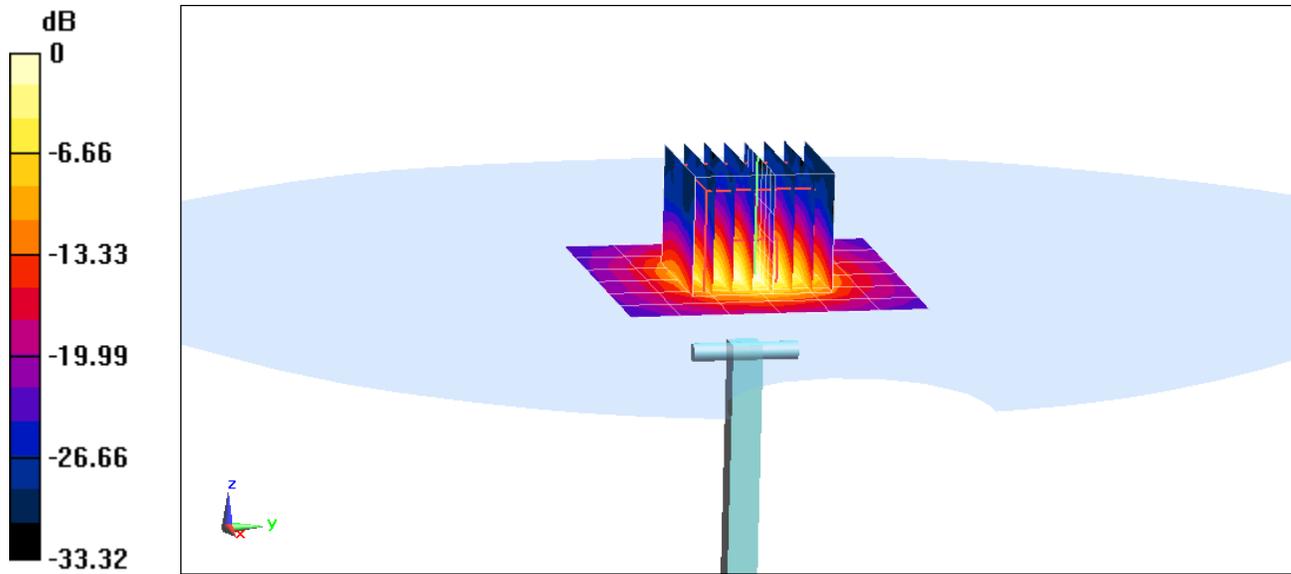
**Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

**Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 14.6 W/kg

**SAR(10 g) = 1.02 W/kg**

Deviation(10 g) = -3.77%



0 dB = 8.61 W/kg = 9.35 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120**

Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5600 \text{ MHz}$ ;  $\sigma = 5.98 \text{ S/m}$ ;  $\epsilon_r = 47.608$ ;  $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 07-25-2016; Ambient Temp: 22.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3914; ConvF(3.63, 3.63, 3.63); Calibrated: 2/22/2016;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/18/2016

Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646

Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

## 5600 MHz System Verification at 17.0 dBm (50 mW)

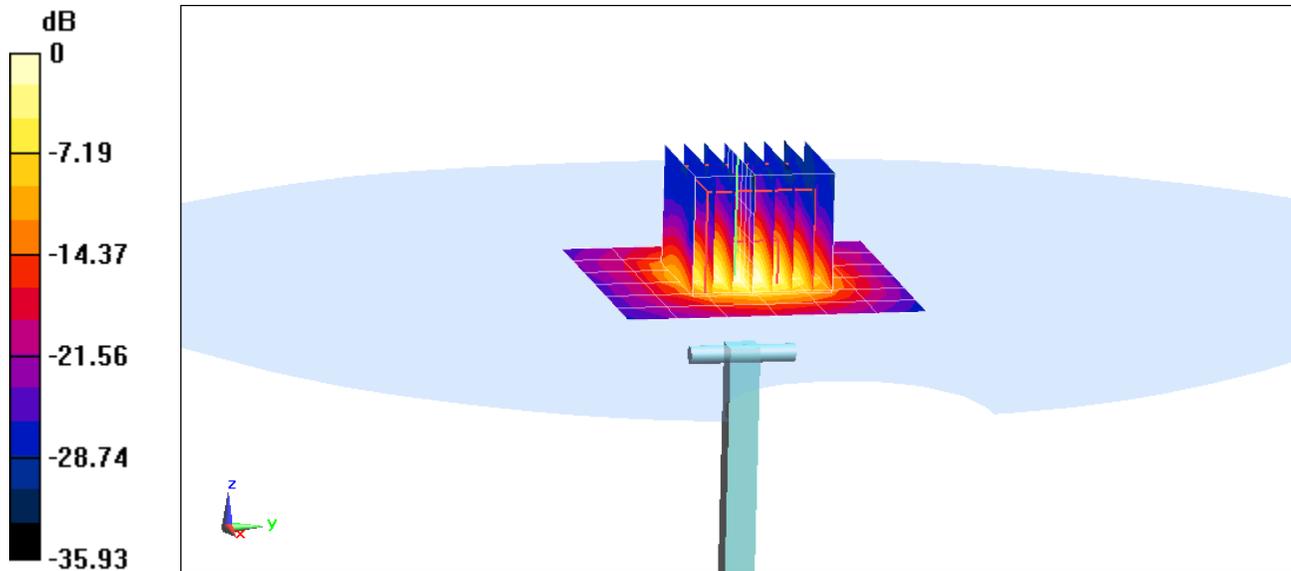
**Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

**Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 15.8 W/kg

**SAR(10 g) = 1.08 W/kg**

Deviation(10 g) = -4.42%



0 dB = 9.15 W/kg = 9.61 dBW/kg

# PCTEST ENGINEERING LABORATORY, INC.

**DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1120**

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1  
Medium: 5 GHz Body Medium parameters used (interpolated):  
 $f = 5750 \text{ MHz}$ ;  $\sigma = 6.174 \text{ S/m}$ ;  $\epsilon_r = 47.405$ ;  $\rho = 1000 \text{ kg/m}^3$   
Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 07-25-2016; Ambient Temp: 22.6°C; Tissue Temp: 21.1°C

Probe: EX3DV4 - SN3914; ConvF(3.86, 3.86, 3.86); Calibrated: 2/22/2016;  
Sensor-Surface: 1.4mm (Mechanical Surface Detection)  
Electronics: DAE4 Sn1272; Calibrated: 2/18/2016  
Phantom: SAM v5.0 front; Type: QD000P40CD; Serial: TP-1646  
Measurement SW: DASY52, Version 52.8 (8);SEMCAD X Version 14.6.10 (7331)

## 5750 MHz System Verification at 17.0 dBm (50 mW)

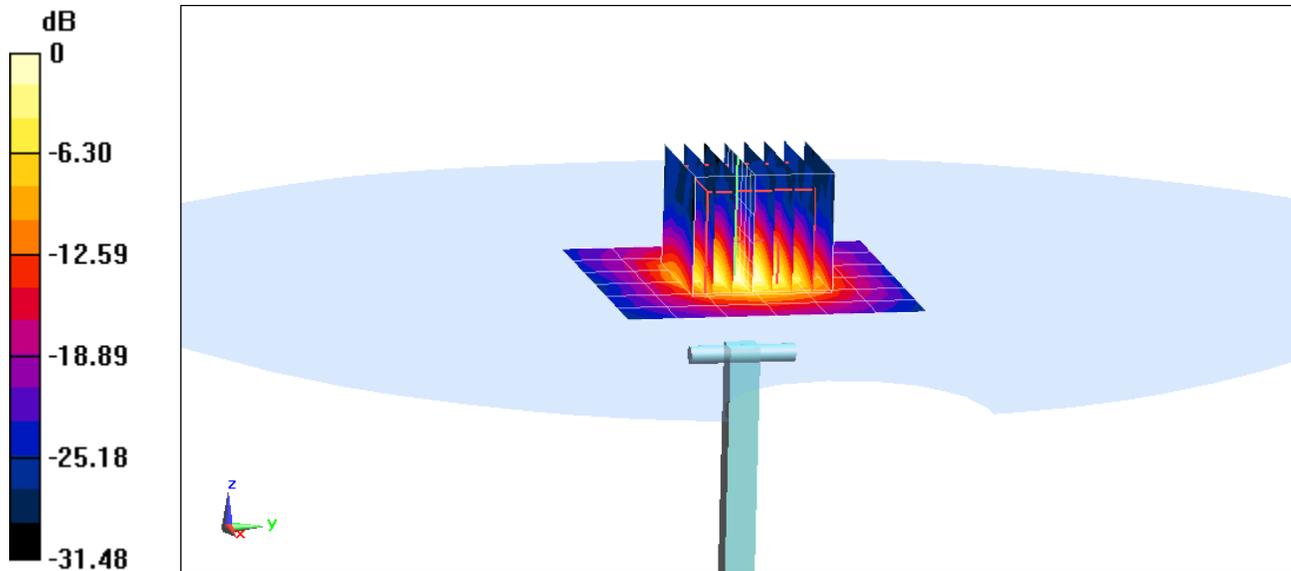
**Area Scan (7x7x1):** Measurement grid: dx=10mm, dy=10mm

**Zoom Scan (8x8x7)/Cube 0:** Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Peak SAR (extrapolated) = 15.2 W/kg

**SAR(10 g) = 0.998 W/kg**

Deviation(10 g) = -6.29%



0 dB = 8.70 W/kg = 9.40 dBW/kg