



SAR EVALUATION REPORT

Applicant Name:

Samsung Electronics Co., Ltd.
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Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:

11/27/17 - 12/18/17

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

1M1711240303-01.A3L

FCC ID:

A3LSMA530W

APPLICANT:

SAMSUNG ELECTRONICS CO., LTD.

DUT Type:

Portable Handset

Application Type:

Certification

FCC Rule Part(s):

CFR §2.1093

Model:

SM-A530W

Equipment Class	Band & Mode	Tx Frequency	SAR		
			1g Head (W/kg)	1g Body-Worn (W/kg)	1g Hotspot (W/kg)
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.30	0.40	0.59
PCE	UMTS 850	826.40 - 846.60 MHz	0.23	0.33	0.37
PCE	UMTS 1750	1712.4 - 1752.6 MHz	0.23	0.67	0.76
PCE	UMTS 1900	1852.4 - 1907.6 MHz	0.19	0.89	1.09
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	0.10	0.52	1.08
PCE	LTE Band 12	699.7 - 715.3 MHz	0.17	0.31	0.41
PCE	LTE Band 17	706.5 - 713.5 MHz	N/A	N/A	N/A
PCE	LTE Band 13	779.5 - 784.5 MHz	0.16	0.26	0.41
PCE	LTE Band 26 (Cell)	814.7 - 848.3 MHz	0.12	0.17	0.33
PCE	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.16	0.19	0.35
PCE	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	0.27	0.86	1.09
PCE	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A	N/A	N/A
PCE	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	0.18	0.90	1.05
PCE	LTE Band 7	2502.5 - 2567.5 MHz	0.14	0.45	0.70
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.43	0.20	0.61
NII	U-NII-1	5180 - 5240 MHz	N/A	N/A	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.78	0.21	N/A
NII	U-NII-2C	5500 - 5720 MHz	0.53	0.44	N/A
NII	U-NII-3	5745 - 5825 MHz	0.41	0.40	0.92
DSS/DTS	Bluetooth	2402 - 2480 MHz	N/A	N/A	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			1.09	1.35	1.58

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
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
LTE Band 12	Voice/Data	699.7 - 715.3 MHz
LTE Band 17	Voice/Data	706.5 - 713.5 MHz
LTE Band 13	Voice/Data	779.5 - 784.5 MHz
LTE Band 26 (Cell)	Voice/Data	814.7 - 848.3 MHz
LTE Band 5 (Cell)	Voice/Data	824.7 - 848.3 MHz
LTE Band 66 (AWS)	Voice/Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Voice/Data	1710.7 - 1754.3 MHz
LTE Band 2 (PCS)	Voice/Data	1850.7 - 1909.3 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
ANT+	Data	2402 - 2480 MHz
MST	Data	555 Hz - 8.33 kHz

1.2 Power Reduction for SAR

This device utilizes a single step power reduction mechanism for SAR compliance under portable hotspot conditions for some wireless modes and bands. All hotspot SAR evaluations for this device were performed at the maximum allowed output power when hotspot is enabled. Detailed descriptions of the power reduction mechanism are included in the operational description.

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

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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 Output Power

Mode / Band		Voice (dBm)	Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slot	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
GSM/GPRS/EDGE 850	Maximum	34.0	34.0	32.0	31.2	30.0	28.0	26.5	25.0	24.0
	Nominal	33.5	33.5	31.5	30.7	29.5	27.5	26.0	24.5	23.5
GSM/GPRS/EDGE 1900	Maximum	30.7	30.7	28.0	26.5	26.0	26.5	24.5	23.5	22.0
	Nominal	30.2	30.2	27.5	26.0	25.5	26.0	24.0	23.0	21.5

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	3GPP DC-HSDPA
UMTS Band 5 (850 MHz)	Maximum	24.5	23.5	22.0	23.5
	Nominal	24.0	23.0	21.5	23.0
UMTS Band 4 (1750 MHz)	Maximum	23.5	23.5	22.0	23.5
	Nominal	23.0	23.0	21.5	23.0
UMTS Band 2 (1900 MHz)	Maximum	23.5	23.5	23.5	23.5
	Nominal	23.0	23.0	23.0	23.0

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Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	24.0
	Nominal	23.5
LTE Band 17	Maximum	24.0
	Nominal	23.5
LTE Band 13	Maximum	24.0
	Nominal	23.5
LTE Band 26 (Cell)	Maximum	23.5
	Nominal	23.0
LTE Band 5 (Cell)	Maximum	24.0
	Nominal	23.5
LTE Band 66 (AWS)	Maximum	24.0
	Nominal	23.5
LTE Band 4 (AWS)	Maximum	24.0
	Nominal	23.5
LTE Band 2 (PCS)	Maximum	23.5
	Nominal	23.0
LTE Band 7	Maximum	24.0
	Nominal	23.5

Mode / Band		Modulated Average (dBm)			
		Ch. 1	Ch. 2-9	Ch. 10	Ch. 11
IEEE 802.11b (2.4 GHz)	Maximum	18.5			
	Nominal	18.0			
IEEE 802.11g (2.4 GHz)	Maximum	14.5	16.5	15.5	12.5
	Nominal	14.0	16.0	15.0	12.0
IEEE 802.11n (2.4 GHz)	Maximum	13.5	16.5	15.5	11.5
	Nominal	13.0	16.0	15.0	11.0

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Mode / Band		Modulated Average (dBm)
Bluetooth	Maximum	9.5
	Nominal	9.0
Bluetooth LE	Maximum	7.0
	Nominal	6.5

Mode / Band		Modulated Average - Single Tx Chain (dBm)							
		20 MHz Bandwidth		40 MHz Bandwidth				80 MHz Bandwidth	
		Ch. 36	Ch. 40-165	Ch. 38	Ch. 62	Ch. 102	Ch. 46, 54, 110-159	Ch. 42, 106	Ch. 58 Ch. 122- 155
IEEE 802.11a (5 GHz)	Maximum	13.5	14.0						
	Nominal	13.0	13.5						
IEEE 802.11n (5 GHz)	Maximum	13.5	14.0	8.5	7.5	12.5	14.0		
	Nominal	13.0	13.5	8.0	7.0	12.0	13.5		
IEEE 802.11ac (5 GHz)	Maximum	13.5	14.0	8.5	7.5	12.5	14.0	7.5	5.5 12.5
	Nominal	13.0	13.5	8.0	7.0	12.0	13.5	7.0	5.0 12.0

1.3.2 Reduced Output Power

Mode / Band		Burst Average GMSK (dBm)				Burst Average 8-PSK (dBm)			
		1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots	1 TX Slots	2 TX Slots	3 TX Slots	4 TX Slots
GPRS 850	Maximum	33.0	31.0	29.2	29.0	28.0	26.5	25.0	24.0
	Nominal	32.5	30.5	28.7	28.5	27.5	26.0	24.5	23.5
GPRS 1950	Maximum	29.7	27.0	25.5	24.0	26.5	24.5	23.5	22.0
	Nominal	29.2	26.5	25.0	23.5	26.0	24.0	23.0	21.5

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA	3GPP DC-HSDPA
UMTS Band 5 (850 MHz)	Maximum	23.5	23.5	22.0	23.5
	Nominal	23.0	23.0	21.5	23.0
UMTS Band 4 (1750 MHz)	Maximum	20.0	20.0	20.0	20.0
	Nominal	19.5	19.5	19.5	19.5
UMTS Band 2 (1900 MHz)	Maximum	20.5	20.5	20.5	20.5
	Nominal	20.0	20.0	20.0	20.0

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Mode / Band		Modulated Average (dBm)
LTE Band 5 (Cell)	Maximum	23.0
	Nominal	22.5
LTE Band 66 (AWS)	Maximum	21.0
	Nominal	20.5
LTE Band 4 (AWS)	Maximum	20.5
	Nominal	20.0
LTE Band 2 (PCS)	Maximum	20.5
	Nominal	20.0
LTE Band 7	Maximum	21.0
	Nominal	20.5

Mode / Band		Modulated Average (dBm)	
		Ch. 1-10	Ch. 11
IEEE 802.11b (2.4 GHz)	Maximum	12.5	
	Nominal	12.0	
IEEE 802.11g (2.4 GHz)	Maximum	12.5	
	Nominal	12.0	
IEEE 802.11n (2.4 GHz)	Maximum	12.5	11.5
	Nominal	12.0	11.0

Mode / Band		Modulated Average - Single Tx Chain (dBm)						
		20 MHz Bandwidth	40 MHz Bandwidth			80 MHz Bandwidth		
			Ch. 38	Ch. 62	Ch. 46, 54, 102-159	Ch. 42, 106	Ch. 58	Ch. 122- 155
IEEE 802.11a (5 GHz)	Maximum	10.5						
	Nominal	10.0						
IEEE 802.11n (5 GHz)	Maximum	10.5	8.5	7.5	10.5			
	Nominal	10.0	8.0	7.0	10.0			
IEEE 802.11ac (5 GHz)	Maximum	10.5	8.5	7.5	10.5	7.5	5.5	10.5
	Nominal	10.0	8.0	7.0	10.0	7.0	5.0	10.0

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1.4 DUT Antenna Locations

The overall dimensions of this device are > 9 x 5 cm. The overall diagonal dimension of the device is ≤160 mm and the diagonal display is ≤150 mm. A diagram showing the location of the device antennas can be found in Appendix F.

Table 1-1
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 1750	Yes	Yes	No	Yes	Yes	Yes
UMTS 1900	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
LTE Band 12	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	Yes
LTE Band 26 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 5 (Cell)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 66 (AWS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 2 (PCS)	Yes	Yes	No	Yes	Yes	Yes
LTE Band 7	Yes	Yes	No	Yes	No	Yes
2.4 GHz WLAN	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN	Yes	Yes	Yes	No	No	Yes

Note: Particular DUT edges were not required to be evaluated for wireless router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v02r01 Section III. The distances between the transmit antennas and the edges of the device are included in the filing. When wireless router mode is enabled, U-NII-1, U-NII-2A, U-NII-2C operations are disabled. Therefore, U-NII-1, U-NII-2A, U-NII-2C operations are not considered in this section.

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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.

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
1	GSM voice + 2.4 GHz WI-FI	Yes	Yes	N/A
2	GSM voice + 5 GHz WI-FI	Yes	Yes	N/A
3	GSM voice + 2.4 GHz Bluetooth	N/A	Yes	N/A
4	UMTS + 2.4 GHz WI-FI	Yes	Yes	Yes
5	UMTS + 5 GHz WI-FI	Yes	Yes	Yes
6	UMTS + 2.4 GHz Bluetooth	N/A	Yes	N/A
7	LTE + 2.4 GHz WI-FI	Yes	Yes	Yes
8	LTE + 5 GHz WI-FI	Yes	Yes	Yes
9	LTE + 2.4 GHz Bluetooth	N/A	Yes	N/A
10	GPRS/EDGE + 2.4 GHz WI-FI	N/A	N/A	Yes
11	GPRS/EDGE + 5 GHz WI-FI	N/A	N/A	Yes
12	GPRS/EDGE + 2.4 GHz Bluetooth	N/A	N/A	N/A

- 2.4 GHz WLAN, 5 GHz WLAN, and 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.
- All licensed modes share the same antenna path and cannot transmit simultaneously.
- 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.
- Per the manufacturer, WIFI Direct is not expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.
- 5 GHz Wireless Router is only supported for the U-NII-3 by S/W, therefore U-NII-1, U-NII2A, and U-NII2C were not evaluated for wireless router conditions.
- This device supports VOLTE and VOWIFI.

1.7 Miscellaneous SAR Test Considerations

(A) WIFI/BT

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

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

Per FCC KDB 447498 D01v06, the 1g SAR exclusion threshold for distances <50mm is defined by the following equation:

$$\frac{\text{Max Power of Channel (mW)}}{\text{Test Separation Dist (mm)}} * \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, body-worn Bluetooth SAR was not required; $[(9/15) * \sqrt{2.480}] = 0.9 < 3.0$. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

This device supports IEEE 802.11ac with the following features:

- a) Up to 80 MHz Bandwidth only
- b) No aggregate channel configurations
- c) 1 Tx antenna output
- d) 256 QAM is supported
- e) TDWR and Band gap channels are supported

(B) Licensed Transmitter(s)

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

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

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

This device supports 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 LTE capabilities with overlapping transmission frequency ranges. When the supported frequency range of an LTE Band falls completely within an LTE band with a larger transmission frequency range, both LTE bands have the same target power (or the band with the larger transmission frequency range

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has a higher target power), and both LTE bands share the same transmission path and signal characteristics, SAR was only assessed for the band with the larger transmission frequency range.

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

1.9 Device Serial Numbers

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

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2 LTE INFORMATION

LTE Information			
FCC ID	A3LSMA530W		
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 13 (779.5 - 784.5 MHz)		
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)		
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)		
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)		
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)		
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)		
Channel Bandwidths	LTE Band 7 (2502.5 - 2567.5 MHz)		
	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
	LTE Band 17: 5 MHz, 10 MHz		
	LTE Band 13: 5 MHz, 10 MHz		
	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz		
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
Channel Numbers and Frequencies (MHz)	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
	LTE Band 7: 5 MHz, 10 MHz, 15 MHz, 20 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 13: 5 MHz	779.5 (23205)	782 (23230)	784.5 (23255)
LTE Band 13: 10 MHz	N/A	782 (23230)	N/A
LTE Band 26 (Cell): 1.4 MHz	814.7 (26697)	831.5 (26865)	848.3 (27033)
LTE Band 26 (Cell): 3 MHz	815.5 (26705)	831.5 (26865)	847.5 (27025)
LTE Band 26 (Cell): 5 MHz	816.5 (26715)	831.5 (26865)	846.5 (27015)
LTE Band 26 (Cell): 10 MHz	819 (26740)	831.5 (26865)	844 (26990)
LTE Band 26 (Cell): 15 MHz	821.5 (26765)	831.5 (26865)	841.5 (26965)
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)	836.5 (20525)	848.3 (20643)
LTE Band 5 (Cell): 3 MHz	825.5 (20415)	836.5 (20525)	847.5 (20635)
LTE Band 5 (Cell): 5 MHz	826.5 (20425)	836.5 (20525)	846.5 (20625)
LTE Band 5 (Cell): 10 MHz	829 (20450)	836.5 (20525)	844 (20600)
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)	1745 (132322)	1779.3 (132665)
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)	1745 (132322)	1778.5 (132657)
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)	1745 (132322)	1777.5 (132647)
LTE Band 66 (AWS): 10 MHz	1715 (132022)	1745 (132322)	1775 (132622)
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)	1745 (132322)	1772.5 (132597)
LTE Band 66 (AWS): 20 MHz	1720 (132072)	1745 (132322)	1770 (132572)
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)	1732.5 (20175)	1754.3 (20393)
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)	1732.5 (20175)	1753.5 (20385)
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)	1732.5 (20175)	1752.5 (20375)
LTE Band 4 (AWS): 10 MHz	1715 (20000)	1732.5 (20175)	1750 (20350)
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)	1732.5 (20175)	1747.5 (20325)
LTE Band 4 (AWS): 20 MHz	1720 (20050)	1732.5 (20175)	1745 (20300)
LTE Band 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 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	DL UE Cat 11; UL UE Cat 5		
Modulations Supported in UL	QPSK, 16QAM, 64QAM		
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3-6.2.5? (manufacturer attestation to be provided)	YES		
A-MPR (Additional MPR) disabled for SAR Testing?	YES		
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations		
LTE Additional Information	This device does not support full CA features on 3GPP Release 12. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 12 Features are not supported: Relay, HetNet, Enhanced MIMO, eCIC, WiFi Offloading, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.		

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3 INTRODUCTION

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

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

3.1 SAR Definition

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

Equation 3-1
SAR Mathematical Equation

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

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

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

where:

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

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

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4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

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

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

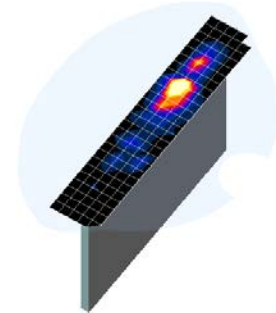


Figure 4-1
Sample SAR Area Scan

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

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

*Also compliant to IEEE 1528-2013 Table 6

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5 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].

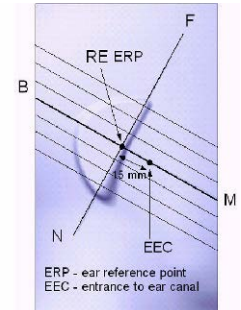


Figure 5-1
Close-Up Side view
of ERP

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

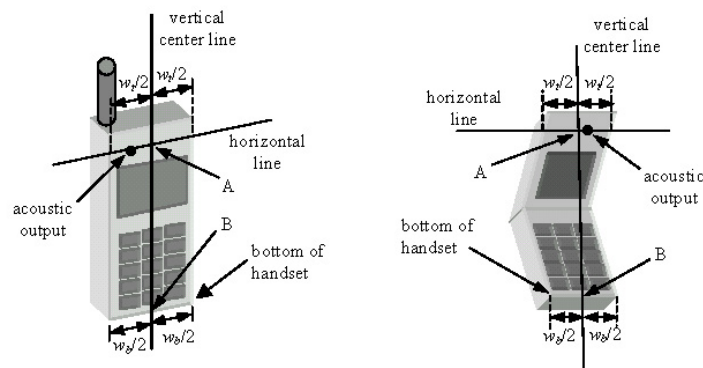


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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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.

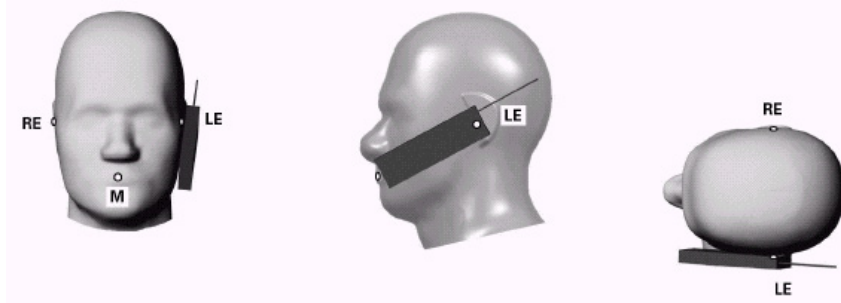


Figure 6-1 Front, Side and Top View of Cheek Position

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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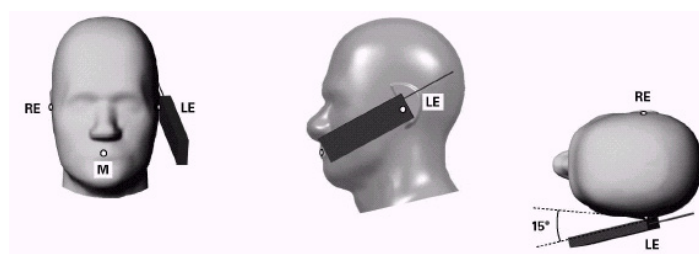


Figure 6-2 Front, Side and Top View of Ear/15° Tilt Position

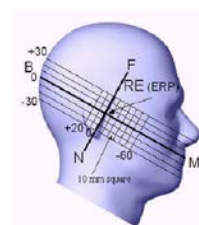


Figure 6-3 Side view w/ relevant markings

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.

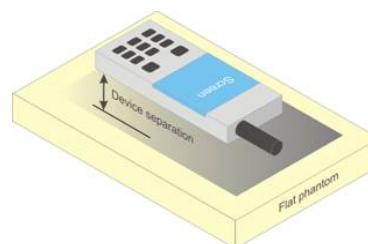


Figure 6-4 Sample Body-Worn Diagram

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 1g body and 10g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v06 should be applied to determine SAR test requirements.

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

6.7 Wireless Router Configurations

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

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

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7 RF EXPOSURE LIMITS

7.1 Uncontrolled Environment

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

7.2 Controlled Environment

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

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

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

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

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

8.1 Measured and Reported SAR

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

8.2 3G SAR Test Reduction Procedure

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

8.3 Procedures Used to Establish RF Signal for SAR

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

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

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

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

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8.4.2 Head SAR Measurements

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

8.4.3 Body SAR Measurements

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

8.4.4 SAR Measurements with Rel 5 HSDPA

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

8.4.5 SAR Measurements with Rel 6 HSUPA

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

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

8.4.6 SAR Measurement Conditions for DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

8.5 SAR Measurement Conditions for LTE

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

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8.5.1 Spectrum Plots for RB Configurations

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

8.5.2 MPR

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

8.5.3 A-MPR

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

8.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

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

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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.

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.

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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 ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.

8.6.5 2.4 GHz SAR Test Requirements

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

- 1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
- 2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

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

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.

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8.6.7 Initial Test Configuration Procedure

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

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements (See Section 8.6.6).

8.6.8 Subsequent Test Configuration Procedures

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

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9 RF CONDUCTED POWERS

9.1 GSM Conducted Powers

Table 9-1
Maximum Conducted Power

Maximum Burst-Averaged Output Power										
		Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	32.89	32.91	30.94	29.40	28.19	26.75	25.02	23.84	22.64
	190	33.10	33.09	31.19	29.61	28.20	26.87	25.05	23.88	22.89
	251	33.31	33.29	31.28	29.91	28.65	27.13	25.34	23.89	23.05
GSM 1900	512	30.47	30.35	27.94	26.45	24.58	26.47	24.33	23.18	21.95
	661	30.40	30.47	27.87	26.50	24.70	26.50	24.48	23.26	21.98
	810	30.45	30.39	27.89	26.35	24.48	26.41	24.44	23.25	21.83

Calculated Maximum Frame-Averaged Output Power										
		Voice	GPRS/EDGE Data (GMSK)				EDGE Data (8-PSK)			
Band	Channel	GSM [dBm] CS (1 Slot)	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot	EDGE [dBm] 1 Tx Slot	EDGE [dBm] 2 Tx Slot	EDGE [dBm] 3 Tx Slot	EDGE [dBm] 4 Tx Slot
GSM 850	128	23.86	23.88	24.92	25.14	25.18	17.72	19.00	19.58	19.63
	190	24.07	24.06	25.17	25.35	25.19	17.84	19.03	19.62	19.88
	251	24.28	24.26	25.26	25.65	25.64	18.10	19.32	19.63	20.04
GSM 1900	512	21.44	21.32	21.92	22.19	21.57	17.44	18.31	18.92	18.94
	661	21.37	21.44	21.85	22.24	21.69	17.47	18.46	19.00	18.97
	810	21.42	21.36	21.87	22.09	21.47	17.38	18.42	18.99	18.82

GSM 850	Frame Avg.Targets:	24.47	24.47	25.48	26.44	26.49	18.47	19.98	20.24	20.49
GSM 1900		21.17	21.17	21.48	21.74	22.49	16.97	17.98	18.74	18.49

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Table 9-2
Reduced Conducted Power

Maximum Burst-Averaged Output Power					
		GPRS/EDGE Data (GMSK)			
Band	Channel	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot
GSM 850	128	32.08	29.77	28.45	27.25
	190	32.36	30.04	28.73	27.31
	251	32.48	30.24	28.99	27.74
GSM 1900	512	29.48	26.98	25.45	23.75
	661	29.61	26.91	25.28	23.88
	810	29.57	26.88	25.31	23.71

Calculated Maximum Frame-Averaged Output Power					
		GPRS/EDGE Data (GMSK)			
Band	Channel	GPRS [dBm] 1 Tx Slot	GPRS [dBm] 2 Tx Slot	GPRS [dBm] 3 Tx Slot	GPRS [dBm] 4 Tx Slot
GSM 850	128	23.05	23.75	24.19	24.24
	190	23.33	24.02	24.47	24.30
	251	23.45	24.22	24.73	24.73
GSM 1900	512	20.45	20.96	21.19	20.74
	661	20.58	20.89	21.02	20.87
	810	20.54	20.86	21.05	20.70

GSM 850	Frame Avg.Targets:	23.47	24.48	24.44	25.49
GSM 1900		20.17	20.48	20.74	20.49

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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: 33 (Max 4 Tx uplink slots)
EDGE Multislot class: 33 (Max 4 Tx uplink slots)
DTM Multislot Class: N/A



Figure 9-1
Power Measurement Setup

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9.2 UMTS Conducted Powers

Table 9-2
Maximum Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	23.63	23.89	23.74	23.19	23.42	23.29	23.11	23.22	23.14	-
99		12.2 kbps AMR	23.65	23.91	23.77	23.25	23.47	23.37	23.18	23.26	23.17	-
6	HSDPA	Subtest 1	23.14	23.50	23.50	23.33	23.47	23.30	23.08	23.40	23.32	0
6		Subtest 2	22.31	22.58	22.54	22.41	22.57	22.41	22.33	23.03	22.41	0
6		Subtest 3	21.36	21.61	21.59	21.43	21.57	21.41	21.61	21.93	21.45	0.5
6		Subtest 4	21.40	21.54	21.05	21.46	21.60	21.38	21.65	22.00	21.45	0.5
6	HSUPA	Subtest 1	20.34	20.76	20.29	20.51	20.62	20.49	21.05	22.21	22.09	0
6		Subtest 2	18.61	18.92	18.48	18.54	18.58	18.54	19.04	19.49	19.72	2
6		Subtest 3	19.61	19.81	19.36	20.00	20.20	20.03	20.00	21.36	21.24	1
6		Subtest 4	18.74	18.95	18.53	18.49	18.62	18.57	19.07	20.44	20.33	2
6		Subtest 5	21.51	21.76	21.31	21.79	21.93	21.81	23.38	23.25	23.15	0
8	DC-HSDPA	Subtest 1	23.46	23.50	23.49	23.32	23.45	23.44	23.50	23.50	23.48	0
8		Subtest 2	22.55	23.03	22.90	22.37	22.60	22.62	23.24	23.41	22.98	0
8		Subtest 3	21.65	21.80	21.83	21.61	21.60	21.56	21.29	22.30	21.75	0.5
8		Subtest 4	21.59	21.59	21.05	21.46	21.46	21.51	21.91	22.02	21.49	0.5

Table 9-3
Reduced Conducted Power

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	23.40	23.48	23.50	19.88	19.86	19.87	20.47	20.37	20.38	-
99		12.2 kbps AMR	23.41	23.47	23.49	19.83	19.78	19.91	20.43	20.30	20.25	-
6	HSDPA	Subtest 1	23.14	23.50	23.50	19.93	19.98	20.00	20.41	20.35	20.22	0
6		Subtest 2	22.31	22.58	22.54	19.97	19.91	19.96	20.44	20.45	20.29	0
6		Subtest 3	21.36	21.61	21.59	19.94	19.97	19.97	20.48	20.48	20.28	0.5
6		Subtest 4	21.40	21.54	21.05	19.91	19.94	19.95	20.50	20.45	20.34	0.5
6	HSUPA	Subtest 1	20.34	20.76	20.29	18.87	18.93	18.99	19.48	19.40	19.32	0
6		Subtest 2	18.61	18.92	18.48	18.36	18.49	18.40	18.51	19.32	19.38	2
6		Subtest 3	19.61	19.81	19.36	18.92	18.94	18.98	19.47	19.44	19.36	1
6		Subtest 4	18.74	18.95	18.53	18.43	18.55	18.40	18.51	19.49	19.39	2
6		Subtest 5	21.51	21.76	21.31	19.75	19.78	19.78	20.33	20.17	20.07	0
8	DC-HSDPA	Subtest 1	23.46	23.50	23.49	19.75	19.62	19.67	20.47	20.28	20.27	0
8		Subtest 2	22.55	23.03	22.90	19.77	19.60	19.73	20.49	20.29	20.21	0
8		Subtest 3	21.65	21.80	21.83	19.76	19.59	19.72	20.05	20.34	20.26	0.5
8		Subtest 4	21.59	21.59	21.05	19.80	19.63	19.74	20.48	20.31	20.25	0.5

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DC-HSDPA considerations

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

It is expected by the manufacturer that MPR for some HSPA subtests may be up to 2 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model.



Figure 9-2
Power Measurement Setup

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9.3 LTE Conducted Powers

9.3.1

LTE Band 12

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

LTE Band 12 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23095 (707.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.99	0	0
	1	25	23.95		0
	1	49	23.82		0
	25	0	22.82	0-1	1
	25	12	22.81		1
	25	25	22.73		1
	50	0	22.81		1
16QAM	1	0	22.69	0-1	1
	1	25	22.66		1
	1	49	22.53		1
	25	0	21.84	0-2	2
	25	12	21.80		2
	25	25	21.76		2
	50	0	21.81		2
64QAM	1	0	21.81	0-2	2
	1	25	21.75		2
	1	49	21.63		2
	25	0	20.80	0-3	3
	25	12	20.84		3
	25	25	20.81		3
	50	0	20.80		3

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

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Table 9-4
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	23.95	23.76	23.81	0	0
	1	12	23.97	23.75	23.82		0
	1	24	23.96	23.71	23.84		0
	12	0	22.84	22.88	22.69	0-1	1
	12	6	22.90	22.81	22.71		1
	12	13	22.88	22.84	22.73		1
	25	0	22.83	22.85	22.70		1
16QAM	1	0	22.55	22.57	22.42	0-1	1
	1	12	22.59	22.55	22.41		1
	1	24	22.54	22.49	22.40		1
	12	0	21.74	21.75	21.61	0-2	2
	12	6	21.77	21.76	21.62		2
	12	13	21.79	21.77	21.63		2
	25	0	21.78	21.74	21.64		2
64QAM	1	0	21.73	21.74	21.61	0-2	2
	1	12	21.76	21.73	21.62		2
	1	24	21.80	21.72	21.59		2
	12	0	20.84	20.82	20.69	0-3	3
	12	6	20.82	20.81	20.71		3
	12	13	20.83	20.80	20.70		3
	25	0	20.84	20.79	20.71		3

Table 9-5
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	23.47	23.45	23.32	0	0
	1	7	23.52	23.46	23.31		0
	1	14	23.56	23.47	23.34		0
	8	0	22.44	22.41	22.29	0-1	1
	8	4	22.48	22.43	22.28		1
	8	7	22.50	22.40	22.27		1
	15	0	22.43	22.43	22.29		1
16QAM	1	0	22.13	22.19	21.95	0-1	1
	1	7	22.14	22.17	21.94		1
	1	14	22.15	22.18	21.97		1
	8	0	21.40	21.34	21.18	0-2	2
	8	4	21.42	21.37	21.20		2
	8	7	21.41	21.36	21.21		2
	15	0	21.46	21.39	21.25		2
64QAM	1	0	21.41	21.45	21.20	0-2	2
	1	7	21.43	21.47	21.18		2
	1	14	21.45	21.44	21.17		2
	8	0	20.44	20.41	20.25	0-3	3
	8	4	20.47	20.40	20.24		3
	8	7	20.48	20.39	20.26		3
	15	0	20.52	20.43	20.28		3

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Table 9-6
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	23.82	23.89	23.66	0	0
	1	2	23.88	23.88	23.68		0
	1	5	23.81	23.76	23.63		0
	3	0	23.80	23.84	23.61		0
	3	2	23.83	23.82	23.64		0
	3	3	23.79	23.83	23.62		0
	6	0	22.79	22.81	22.57	0-1	1
16QAM	1	0	22.42	22.52	22.21	0-1	1
	1	2	22.43	22.51	22.24		1
	1	5	22.41	22.54	22.23		1
	3	0	22.69	22.74	22.49		1
	3	2	22.74	22.73	22.52		1
	3	3	22.73	22.76	22.50		1
	6	0	21.72	21.69	21.55	0-2	2
64QAM	1	0	21.68	21.61	21.49	0-2	2
	1	2	21.69	21.60	21.52		2
	1	5	21.73	21.63	21.48		2
	3	0	21.71	21.76	21.50		2
	3	2	21.75	21.78	21.54		2
	3	3	21.74	21.77	21.53		2
	6	0	20.73	20.70	20.56	0-3	3

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LTE Band 13

Table 9-7
LTE Band 13 Conducted Powers - 10 MHz Bandwidth

LTE Band 13 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23230 (782.0 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.89	0	0
	1	25	23.87		0
	1	49	23.71		0
	25	0	22.69	0-1	1
	25	12	22.68		1
	25	25	22.66		1
	50	0	22.66		1
16QAM	1	0	22.70	0-1	1
	1	25	22.71		1
	1	49	22.56		1
	25	0	21.73	0-2	2
	25	12	21.76		2
	25	25	21.70		2
	50	0	21.71		2
64QAM	1	0	21.74	0-2	2
	1	25	21.68		2
	1	49	21.56		2
	25	0	20.77	0-3	3
	25	12	20.76		3
	25	25	20.71		3
	50	0	20.76		3

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Table 9-8
LTE Band 13 Conducted Powers - 5 MHz Bandwidth

LTE Band 13 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			23230 (782.0 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.75	0	0
	1	12	23.72		0
	1	24	23.69		0
	12	0	22.68	0-1	1
	12	6	22.70		1
	12	13	22.66		1
	25	0	22.71		1
16QAM	1	0	22.40	0-1	1
	1	12	22.41		1
	1	24	22.39		1
	12	0	21.65	0-2	2
	12	6	21.63		2
	12	13	21.62		2
	25	0	21.64		2
64QAM	1	0	21.53	0-2	2
	1	12	21.54		2
	1	24	21.51		2
	12	0	20.70	0-3	3
	12	6	20.69		3
	12	13	20.67		3
	25	0	20.66		3

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

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LTE Band 26 (Cell)

Table 9-9
LTE Band 26 (Cell) Conducted Powers - 15 MHz Bandwidth

LTE Band 26 (Cell) 15 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26865 (831.5 MHz)		
			Conducted Power [dBm]		
QPSK	1	0	23.41	0	0
	1	36	23.36		0
	1	74	23.31		0
	36	0	22.31	0-1	1
	36	18	22.23		1
	36	37	22.23		1
	75	0	22.30		1
16QAM	1	0	22.19	0-1	1
	1	36	22.16		1
	1	74	22.06		1
	36	0	21.20	0-2	2
	36	18	21.21		2
	36	37	21.19		2
	75	0	21.24		2
64QAM	1	0	21.05	0-2	2
	1	36	21.04		2
	1	74	20.92		2
	36	0	20.21	0-3	3
	36	18	20.18		3
	36	37	20.15		3
	75	0	20.20		3

Note: LTE Band 26 (Cell) at 15 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

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Table 9-10
LTE Band 26 (Cell) Conducted Powers - 10 MHz Bandwidth

LTE Band 26 (Cell) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26740 (819.0 MHz)	26865 (831.5 MHz)	26990 (844.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.40	23.28	23.15	0	0
	1	25	23.38	23.27	23.16		0
	1	49	23.36	23.26	23.05		0
	25	0	22.23	22.18	22.04	0-1	1
	25	12	22.25	22.13	22.01		1
	25	25	22.24	22.12	21.99		1
16QAM	50	0	22.26	22.20	22.02	0-1	1
	1	0	21.92	21.93	21.82		1
	1	25	21.90	21.95	21.71		1
	1	49	21.93	21.86	21.69	0-2	1
	25	0	21.19	21.18	20.98		2
	25	12	21.17	21.14	20.94		2
64QAM	25	25	21.18	21.13	20.96	0-2	2
	50	0	21.24	21.16	20.99		2
	1	0	21.13	21.18	20.94		0-2
	1	25	21.18	21.08	20.95	2	
	1	49	21.17	21.02	20.90	0-3	
	25	0	20.26	20.17	20.04		3
25	12	20.28	20.15	20.02	3		
	25	25	20.24	20.14	20.01	0-3	3
	50	0	20.27	20.18	20.00		3

Table 9-11
LTE Band 26 (Cell) Conducted Powers - 5 MHz Bandwidth

LTE Band 26 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26715 (816.5 MHz)	26865 (831.5 MHz)	27015 (846.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.37	23.29	23.09	0	0
	1	12	23.39	23.28	23.07		0
	1	24	23.41	23.27	23.06		0
	12	0	22.23	22.19	21.97	0-1	1
	12	6	22.26	22.17	21.99		1
	12	13	22.27	22.16	21.96		1
16QAM	25	0	22.22	22.18	21.93	0-1	1
	1	0	21.97	21.84	21.70		1
	1	12	21.99	21.80	21.63		1
	1	24	22.01	21.79	21.65	0-2	1
	12	0	21.22	21.12	20.92		2
	12	6	21.24	21.07	20.91		2
64QAM	12	13	21.21	21.14	20.88	0-2	2
	25	0	21.22	21.09	20.93		2
	1	0	21.20	21.14	20.92		0-2
	1	12	21.24	21.13	20.89	2	
	1	24	21.18	21.09	20.93	2	
	64QAM	12	0	20.26	20.19	19.97	0-3
12		6	20.28	20.18	19.96	3	
12		13	20.29	20.15	19.95	3	
25		0	20.27	20.16	19.98	0-3	3

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Table 9-12
LTE Band 26 (Cell) Conducted Powers - 3 MHz Bandwidth

LTE Band 26 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26705 (815.5 MHz)	26865 (831.5 MHz)	27025 (847.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.38	23.24	22.99	0	0
	1	7	23.40	23.20	23.02		0
	1	14	23.37	23.19	23.00		0
	8	0	22.24	22.16	21.93	0-1	1
	8	4	22.29	22.15	21.92		1
	8	7	22.27	22.17	21.90		1
	15	0	22.25	22.23	21.91		1
16QAM	1	0	21.96	21.91	21.62	0-1	1
	1	7	21.95	21.90	21.61		1
	1	14	21.91	21.89	21.59		1
	8	0	21.23	21.16	20.89	0-2	2
	8	4	21.21	21.14	20.91		2
	8	7	21.22	21.15	20.88		2
	15	0	21.24	21.16	20.94		2
64QAM	1	0	21.21	21.18	20.83	0-2	2
	1	7	21.18	21.12	20.85		2
	1	14	21.22	21.13	20.91		2
	8	0	20.28	20.15	19.99	0-3	3
	8	4	20.27	20.16	19.97		3
	8	7	20.29	20.18	19.95		3
	15	0	20.26	20.19	19.96		3

Table 9-13
LTE Band 26 (Cell) Conducted Powers -1.4 MHz Bandwidth

LTE Band 26 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			26697 (814.7 MHz)	26865 (831.5 MHz)	27033 (848.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.39	23.33	22.98	0	0
	1	2	23.35	23.27	23.03		0
	1	5	23.37	23.26	23.02		0
	3	0	23.34	23.22	23.01		0
	3	2	23.37	23.25	23.00		0
	3	3	23.35	23.21	23.02		0
	6	0	22.26	22.27	21.91	0-1	1
16QAM	1	0	21.99	21.87	21.62	0-1	1
	1	2	22.00	21.91	21.65		1
	1	5	21.97	21.86	21.60		1
	3	0	22.26	22.15	21.93		1
	3	2	22.24	22.16	21.95		1
	3	3	22.28	22.12	21.96		1
	6	0	21.26	21.15	20.94	0-2	2
64QAM	1	0	21.03	20.96	20.76	0-2	2
	1	2	21.08	20.95	20.75		2
	1	5	21.10	20.93	20.74		2
	3	0	21.23	21.18	20.93		2
	3	2	21.26	21.17	20.94		2
	3	3	21.24	21.15	20.96		2
	6	0	20.24	20.10	19.93	0-3	3

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LTE Band 5 (Cell)

Table 9-14
LTE Band 5 (Cell) Max 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	23.83	0	0
	1	25	23.75		0
	1	49	23.66		0
	25	0	22.69	0-1	1
	25	12	22.63		1
	25	25	22.62		1
	50	0	22.63		1
16QAM	1	0	22.73	0-1	1
	1	25	22.70		1
	1	49	22.64		1
	25	0	21.68	0-2	2
	25	12	21.66		2
	25	25	21.68		2
	50	0	21.71		2
64QAM	1	0	21.71	0-2	2
	1	25	21.69		2
	1	49	21.60		2
	25	0	20.66	0-3	3
	25	12	20.62		3
	25	25	20.59		3
	50	0	20.65		3

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

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Table 9-15
LTE Band 5 (Cell) Max 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	23.73	23.70	23.54	0	0
	1	12	23.79	23.74	23.53		0
	1	24	23.75	23.64	23.51		0
	12	0	22.69	22.56	22.43	0-1	1
	12	6	22.66	22.55	22.45		1
	12	13	22.71	22.58	22.44		1
	25	0	22.65	22.63	22.41		1
16QAM	1	0	22.43	22.39	22.17	0-1	1
	1	12	22.37	22.34	22.14		1
	1	24	22.39	22.32	22.15		1
	12	0	21.67	21.57	21.42	0-2	2
	12	6	21.66	21.56	21.43		2
	12	13	21.62	21.55	21.40		2
	25	0	21.68	21.58	21.42		2
64QAM	1	0	21.66	21.56	21.46	0-2	2
	1	12	21.68	21.47	21.34		2
	1	24	21.68	21.46	21.38		2
	12	0	20.73	20.62	20.50	0-3	3
	12	6	20.74	20.61	20.49		3
	12	13	20.72	20.60	20.48		3
	25	0	20.73	20.63	20.46		3

Table 9-16
LTE Band 5 (Cell) Max 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	23.78	23.65	23.48	0	0
	1	7	23.77	23.63	23.50		0
	1	14	23.75	23.61	23.46		0
	8	0	22.69	22.58	22.40	0-1	1
	8	4	22.70	22.56	22.43		1
	8	7	22.67	22.57	22.42		1
	15	0	22.71	22.59	22.41		1
16QAM	1	0	22.40	22.30	22.05	0-1	1
	1	7	22.35	22.33	22.02		1
	1	14	22.36	22.50	22.04		1
	8	0	21.66	21.53	21.37	0-2	2
	8	4	21.69	21.56	21.36		2
	8	7	21.68	21.55	21.38		2
	15	0	21.72	21.57	21.40		2
64QAM	1	0	21.60	21.61	21.40	0-2	2
	1	7	21.61	21.56	21.42		2
	1	14	21.59	21.60	21.41		2
	8	0	20.77	20.65	20.45	0-3	3
	8	4	20.76	20.66	20.45		3
	8	7	20.77	20.64	20.48		3
	15	0	20.75	20.64	20.46		3

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Table 9-17
LTE Band 5 (Cell) Max 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	23.90	23.65	23.58	0	0
	1	2	23.89	23.58	23.59		0
	1	5	23.88	23.63	23.57		0
	3	0	23.86	23.56	23.61		0
	3	2	23.87	23.57	23.60		0
	3	3	23.86	23.59	23.58		0
	6	0	22.81	22.57	22.53	0-1	1
16QAM	1	0	22.42	22.29	22.06	0-1	1
	1	2	22.46	22.28	22.19		1
	1	5	22.48	22.27	22.18		1
	3	0	22.76	22.49	22.41		1
	3	2	22.77	22.47	22.46		1
	3	3	22.75	22.48	22.45		1
	6	0	21.88	21.57	21.57	0-2	2
64QAM	1	0	21.77	21.33	21.23	0-2	2
	1	2	21.76	21.39	21.27		2
	1	5	21.74	21.41	21.26		2
	3	0	21.83	21.57	21.41		2
	3	2	21.86	21.57	21.37		2
	3	3	21.85	21.54	21.39		2
	6	0	20.86	20.58	20.44	0-3	3

Table 9-18
LTE Band 5 (Cell) Reduced 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	22.46	0	0
	1	25	22.40		0
	1	49	22.39		0
	25	0	22.45	0-1	0
	25	12	22.44		0
	25	25	22.44		0
	50	0	22.44		0
16QAM	1	0	22.38	0-1	0
	1	25	22.35		0
	1	49	22.31		0
	25	0	21.55	0-2	1
	25	12	21.51		1
	25	25	21.49		1
	50	0	21.57		1
64QAM	1	0	21.40	0-2	1
	1	25	21.38		1
	1	49	21.25		1
	25	0	20.54	0-3	2
	25	12	20.58		2
	25	25	20.55		2
	50	0	20.55		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.

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Table 9-19
LTE Band 5 (Cell) Reduced 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	22.35	22.19	22.27	0	0
	1	12	22.36	22.30	22.26		0
	1	24	22.28	22.11	22.11		0
	12	0	22.24	22.13	22.11	0-1	0
	12	6	22.30	22.16	22.07		0
	12	13	22.22	22.20	22.02		0
	25	0	22.26	22.20	22.12		0
16QAM	1	0	22.21	22.03	22.08	0-1	0
	1	12	22.34	22.16	22.19		0
	1	24	22.23	22.22	22.17		0
	12	0	21.33	21.20	21.08	0-2	1
	12	6	21.26	21.12	21.10		1
	12	13	21.22	21.08	21.06		1
	25	0	21.23	21.18	21.08		1
64QAM	1	0	21.43	21.42	21.28	0-2	1
	1	12	21.44	21.35	21.32		1
	1	24	21.35	21.29	21.30		1
	12	0	20.41	20.15	20.13	0-3	2
	12	6	20.35	20.20	20.20		2
	12	13	20.37	20.28	20.05		2
	25	0	20.34	20.25	20.17		2

Table 9-20
LTE Band 5 (Cell) Reduced 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	22.33	22.26	22.10	0	0
	1	7	22.24	22.15	22.07		0
	1	14	22.20	22.20	22.10		0
	8	0	22.14	22.20	22.07	0-1	0
	8	4	22.25	22.06	22.12		0
	8	7	22.20	22.08	22.07		0
	15	0	22.31	22.14	22.04		0
16QAM	1	0	22.18	22.16	21.92	0-1	0
	1	7	22.35	22.20	22.05		0
	1	14	22.41	22.16	22.16		0
	8	0	21.33	21.11	21.08	0-2	1
	8	4	21.29	21.16	21.06		1
	8	7	21.35	21.12	21.09		1
	15	0	21.33	21.17	21.14		1
64QAM	1	0	21.29	21.25	21.15	0-2	1
	1	7	21.38	21.26	21.21		1
	1	14	21.33	21.18	21.37		1
	8	0	20.37	20.34	20.13	0-3	2
	8	4	20.32	20.31	20.14		2
	8	7	20.31	20.18	20.04		2
	15	0	20.28	20.21	20.11		2

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Table 9-21
LTE Band 5 (Cell) Reduced 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	22.41	22.30	22.18	0	0
	1	2	22.40	22.37	22.15		0
	1	5	22.21	22.28	22.16		0
	3	0	22.39	22.30	22.11		0
	3	2	22.27	22.25	22.13		0
	3	3	22.39	22.27	22.19		0
	6	0	22.37	22.24	22.12	0-1	0
16QAM	1	0	22.20	22.38	22.07	0-1	0
	1	2	22.19	22.15	22.08		0
	1	5	22.23	21.83	22.05		0
	3	0	22.22	22.33	22.08		0
	3	2	22.15	22.23	22.10		0
	3	3	22.42	22.30	22.09		0
	6	0	21.39	21.31	21.21	0-2	1
64QAM	1	0	21.09	21.42	21.08	0-2	1
	1	2	21.14	21.24	21.05		1
	1	5	21.27	21.24	21.19		1
	3	0	21.22	21.28	21.22		1
	3	2	21.40	21.32	21.16		1
	3	3	21.32	21.24	21.31		1
	6	0	20.30	20.29	20.11	0-3	2

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LTE Band 66 (AWS)

Table 9-18
LTE Band 66 (AWS) Max 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	23.40	23.25	23.22	0	0
	1	50	23.36	23.24	23.23		0
	1	99	23.39	23.13	23.24		0
	50	0	22.44	22.28	22.18	0-1	1
	50	25	22.36	22.23	22.23		1
	50	50	22.33	22.13	22.17		1
	100	0	22.28	22.20	22.11		1
16QAM	1	0	22.05	21.98	22.01	0-1	1
	1	50	22.07	22.17	22.09		1
	1	99	22.10	21.75	21.93		1
	50	0	21.39	21.31	21.18	0-2	2
	50	25	21.39	21.29	21.17		2
	50	50	21.31	21.25	21.15		2
	100	0	21.32	21.25	21.26		2
64QAM	1	0	21.32	21.25	21.35	0-2	2
	1	50	21.33	21.29	21.33		2
	1	99	21.25	21.39	21.26		2
	50	0	20.25	20.30	20.20	0-3	3
	50	25	20.25	20.26	20.19		3
	50	50	20.20	20.27	20.18		3
	100	0	20.25	20.27	20.24		3

Table 9-19
LTE Band 66 (AWS) Max 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	23.28	23.16	23.11	0	0
	1	36	23.26	23.13	23.10		0
	1	74	23.19	23.08	23.02		0
	36	0	22.14	22.06	21.99	0-1	1
	36	18	22.16	22.04	21.98		1
	36	37	22.12	22.06	21.96		1
	75	0	22.13	22.05	21.95		1
16QAM	1	0	21.88	21.89	21.72	0-1	1
	1	36	21.96	21.86	21.65		1
	1	74	21.93	21.78	21.61		1
	36	0	21.17	21.08	21.01	0-2	2
	36	18	21.16	21.03	20.98		2
	36	37	21.13	21.02	20.97		2
	75	0	21.15	21.05	21.00		2
64QAM	1	0	21.15	21.05	20.99	0-2	2
	1	36	21.06	21.00	20.95		2
	1	74	21.08	20.96	20.89		2
	36	0	20.20	20.12	20.05	0-3	3
	36	18	20.21	20.08	20.03		3
	36	37	20.18	20.07	20.01		3
	75	0	20.17	20.08	20.02		3

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Table 9-20
LTE Band 66 (AWS) Max 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	23.45	23.13	23.26	0	0
	1	25	23.44	23.10	23.24		0
	1	49	23.39	23.07	23.21		0
	25	0	22.33	22.00	22.15	0-1	1
	25	12	22.34	22.02	22.14		1
	25	25	22.36	21.97	22.12		1
16QAM	50	0	22.35	21.99	22.13	0-1	1
	1	0	22.23	21.76	21.97		1
	1	25	22.25	21.67	21.92		1
	1	49	22.26	21.62	21.90	0-2	1
	25	0	21.36	20.98	21.12		2
	25	12	21.35	20.99	21.13		2
64QAM	25	25	21.34	20.96	21.09	0-2	2
	50	0	21.41	21.04	21.17		2
	1	0	21.24	20.95	20.96	0-2	2
	1	25	21.28	20.97	21.03		2
	1	49	21.22	20.88	20.98		2
	64QAM	25	0	20.39	20.03	20.15	0-3
25		12	20.38	20.01	20.13	3	
25		25	20.36	19.97	20.12	3	
50		0	20.37	20.02	20.13	3	

Table 9-21
LTE Band 66 (AWS) Max 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	23.28	23.17	23.07	0	0
	1	12	23.27	23.16	23.05		0
	1	24	23.29	23.13	23.03		0
	12	0	22.24	22.10	21.98	0-1	1
	12	6	22.23	22.08	22.02		1
	12	13	22.21	22.07	21.99		1
16QAM	25	0	22.22	22.14	21.98	0-1	1
	1	0	21.98	21.85	21.75		1
	1	12	21.99	21.86	21.82		1
	1	24	21.97	21.79	21.79	0-2	1
	12	0	21.22	21.10	20.99		2
	12	6	21.20	21.08	20.97		2
64QAM	12	13	21.21	21.07	20.96	0-2	2
	25	0	21.23	21.06	20.98		2
	1	0	21.16	20.96	20.90	0-2	2
	1	12	21.19	20.88	20.93		2
	1	24	21.15	20.89	20.89		2
	64QAM	12	0	20.25	20.10	19.95	0-3
12		6	20.22	20.11	19.99	3	
12		13	20.23	20.09	19.97	3	
25		0	20.24	20.08	20.00	3	

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

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131987 (1711.5 MHz)	132322 (1745.0 MHz)	132657 (1778.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.49	23.38	23.26	0	0
	1	7	23.51	23.39	23.27		0
	1	14	23.48	23.36	23.24		0
	8	0	22.41	22.29	22.17	0-1	1
	8	4	22.42	22.28	22.18		1
	8	7	22.39	22.30	22.16		1
16QAM	15	0	22.42	22.31	22.19	0-1	1
	1	0	22.16	22.02	21.91		1
	1	7	22.17	22.04	21.96		1
	1	14	22.15	21.98	21.89	0-2	1
	8	0	21.44	21.34	21.19		2
	8	4	21.44	21.32	21.22		2
64QAM	8	7	21.43	21.33	21.18	0-2	2
	15	0	21.45	21.34	21.20		2
	1	0	21.48	21.30	21.22	0-2	2
	1	7	21.46	21.29	21.19		2
	1	14	21.47	21.28	21.23	0-3	2
	8	0	20.41	20.31	20.21		3
8	4	20.42	20.33	20.19	3		
8	7	20.40	20.32	20.20	3		
	15	0	20.45	20.29	20.19		3

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

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131979 (1710.7 MHz)	132322 (1745.0 MHz)	132665 (1779.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	23.38	23.23	23.15	0	0
	1	2	23.40	23.24	23.16		0
	1	5	23.39	23.22	23.13		0
	3	0	23.36	23.20	23.12		0
	3	2	23.37	23.22	23.10		0
	3	3	23.35	23.21	23.13		0
	6	0	22.33	22.19	22.08	0-1	1
16QAM	1	0	21.99	21.91	21.71	0-1	1
	1	2	21.96	21.89	21.76		1
	1	5	21.97	21.86	21.74		1
	3	0	22.29	22.16	22.05		1
	3	2	22.30	22.19	22.08		1
	3	3	22.27	22.18	22.07	1	
64QAM	6	0	21.35	21.22	21.13	0-2	2
	1	0	21.17	21.09	20.95	0-2	2
	1	2	21.16	21.08	20.94		2
	1	5	21.15	21.07	20.93		2
	3	0	21.41	21.24	21.14		2
	3	2	21.40	21.26	21.16		2
	3	3	21.39	21.22	21.17	2	
6	0	20.34	20.19	20.09	0-3	3	

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

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			132072 (1720.0 MHz)	132322 (1745.0 MHz)	132572 (1770.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.45	20.39	20.15	0	0
	1	50	20.44	20.26	20.17		0
	1	99	20.26	20.28	20.21		0
	50	0	20.38	20.30	20.15	0-1	0
	50	25	20.32	20.22	20.25		0
	50	50	20.32	20.18	20.16		0
	100	0	20.28	20.27	20.11		0
16QAM	1	0	20.03	20.10	19.92	0-1	0
	1	50	20.15	20.14	20.14		0
	1	99	20.01	19.85	19.96		0
	50	0	20.32	20.30	20.11	0-2	0
	50	25	20.30	20.32	20.26		0
	50	50	20.29	20.17	20.19		0
	100	0	20.30	20.18	20.12		0
64QAM	1	0	20.41	20.25	20.38	0-2	0
	1	50	20.13	20.26	20.30		0
	1	99	20.09	20.21	20.24		0
	50	0	20.16	20.15	20.19	0-3	0
	50	25	20.15	20.13	20.20		0
	50	50	20.17	20.08	20.18		0
	100	0	20.23	20.23	20.22		0

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

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			132047 (1717.5 MHz)	132322 (1745.0 MHz)	132597 (1772.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.32	20.31	20.19	0	0
	1	36	20.37	20.29	20.24		0
	1	74	20.33	20.20	20.11		0
	36	0	20.23	20.21	20.05	0-1	0
	36	18	20.22	20.19	20.07		0
	36	37	20.20	20.15	20.05		0
	75	0	20.21	20.25	20.07		0
16QAM	1	0	20.03	20.05	20.01	0-1	0
	1	36	20.07	19.98	20.06		0
	1	74	19.98	19.97	19.88		0
	36	0	20.20	20.18	20.13	0-2	0
	36	18	20.24	20.16	20.08		0
	36	37	20.21	20.17	20.06		0
	75	0	20.19	20.18	20.09		0
64QAM	1	0	20.22	20.21	20.16	0-2	0
	1	36	20.36	20.19	20.18		0
	1	74	20.27	20.16	20.12		0
	36	0	20.26	20.22	20.15	0-3	0
	36	18	20.23	20.18	20.12		0
	36	37	20.25	20.17	20.10		0
	75	0	20.24	20.23	20.09		0

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

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			132022 (1715.0 MHz)	132322 (1745.0 MHz)	132622 (1775.0 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.31	20.32	20.17	0	0
	1	25	20.36	20.27	20.16		0
	1	49	20.38	20.24	20.18		0
	25	0	20.30	20.18	20.11	0-1	0
	25	12	20.28	20.17	20.12		0
	25	25	20.25	20.23	20.12		0
16QAM	50	0	20.27	20.22	20.21	0-1	0
	1	0	20.13	20.05	20.05		0
	1	25	20.16	20.02	20.03		0
	1	49	20.17	19.95	19.99	0-2	0
	25	0	20.29	20.22	20.13		0
	25	12	20.28	20.18	20.09		0
64QAM	25	25	20.32	20.20	20.12	0-2	0
	50	0	20.34	20.17	20.18		0
	1	0	20.31	20.23	20.14	0-2	0
	1	25	20.29	20.26	20.11		0
	1	49	20.27	20.15	20.01		0
	25	0	20.26	20.18	20.20	0-3	0
	25	12	20.27	20.24	20.14		0
	25	25	20.22	20.12	20.17		0
	50	0	20.29	20.19	20.15		0

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

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131997 (1712.5 MHz)	132322 (1745.0 MHz)	132647 (1777.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.39	20.31	20.25	0	0
	1	12	20.40	20.27	20.21		0
	1	24	20.36	20.26	20.19		0
	12	0	20.32	20.25	20.15	0-1	0
	12	6	20.27	20.22	20.19		0
	12	13	20.28	20.18	20.18		0
16QAM	25	0	20.30	20.21	20.16	0-1	0
	1	0	20.11	19.97	19.95		0
	1	12	20.14	19.95	19.96		0
	1	24	20.08	19.90	19.90	0-2	0
	12	0	20.31	20.23	20.09		0
	12	6	20.30	20.19	20.11		0
64QAM	12	13	20.28	20.17	20.08	0-2	0
	25	0	20.29	20.26	20.12		0
	1	0	20.34	20.29	20.24	0-2	0
	1	12	20.40	20.21	20.19		0
	1	24	20.33	20.39	20.26		0
	12	0	20.28	20.24	20.18	0-3	0
	12	6	20.24	20.22	20.17		0
	12	13	20.29	20.19	20.16		0
	25	0	20.26	20.23	20.19		0

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

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131987 (1711.5 MHz)	132322 (1745.0 MHz)	132657 (1778.5 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.46	20.38	20.30	0	0
	1	7	20.47	20.39	20.28		0
	1	14	20.49	20.34	20.32		0
	8	0	20.41	20.32	20.29	0-1	0
	8	4	20.44	20.36	20.26		0
	8	7	20.47	20.33	20.29		0
15	0	20.49	20.31	20.31	0		
16QAM	1	0	20.34	20.05	20.00	0-1	0
	1	7	20.26	19.98	19.94		0
	1	14	20.29	19.99	20.06		0
	8	0	20.46	20.25	20.24	0-2	0
	8	4	20.44	20.30	20.25		0
	8	7	20.39	20.33	20.26		0
15	0	20.41	20.32	20.24	0		
64QAM	1	0	20.41	20.41	20.29	0-2	0
	1	7	20.50	20.42	20.38		0
	1	14	20.46	20.39	20.31		0
	8	0	20.34	20.42	20.37	0-3	0
	8	4	20.43	20.35	20.26		0
	8	7	20.49	20.36	20.28		0
	15	0	20.44	20.35	20.25		0

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

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			131979 (1710.7 MHz)	132322 (1745.0 MHz)	132665 (1779.3 MHz)		
			Conducted Power [dBm]				
QPSK	1	0	20.32	20.19	20.08	0	0
	1	2	20.24	20.28	20.10		0
	1	5	20.23	20.20	20.11		0
	3	0	20.27	20.18	20.07		0
	3	2	20.32	20.22	20.09		0
	3	3	20.28	20.24	20.08		0
	6	0	20.21	20.20	20.11	0-1	0
16QAM	1	0	20.00	19.91	19.97	0-1	0
	1	2	20.06	19.89	20.02		0
	1	5	19.95	19.93	19.94		0
	3	0	20.19	20.24	20.16		0
	3	2	20.26	20.21	20.21		0
	3	3	20.24	20.26	20.17	0	
64QAM	6	0	20.24	20.25	20.23	0-2	0
	1	0	20.21	20.34	20.16	0-2	0
	1	2	20.26	20.37	20.09		0
	1	5	20.32	20.32	20.17		0
	3	0	20.25	20.30	20.14		0
	3	2	20.33	20.29	20.25		0
	3	3	20.26	20.34	20.20	0	
	6	0	20.26	20.22	20.16	0-3	0

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LTE Band 2 (PCS)

Table 9-30
LTE Band 2 (PCS) Max 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	23.14	23.33	23.32	0	0
	1	50	23.14	23.28	23.31		0
	1	99	23.15	23.28	23.31		0
	50	0	22.13	22.22	22.11	0-1	1
	50	25	22.19	22.20	22.09		1
	50	50	22.18	22.17	22.11		1
	100	0	22.18	22.19	22.11		1
16QAM	1	0	22.15	22.25	22.32	0-1	1
	1	50	22.02	22.29	22.28		1
	1	99	22.13	22.26	22.42		1
	50	0	21.18	21.19	21.09	0-2	2
	50	25	21.19	21.14	21.02		2
	50	50	21.22	21.17	21.02		2
	100	0	21.22	21.18	21.09		2
64QAM	1	0	21.01	21.11	21.25	0-2	2
	1	50	21.01	21.15	21.29		2
	1	99	20.95	21.12	21.20		2
	50	0	20.16	20.16	20.19	0-3	3
	50	25	20.16	20.15	20.11		3
	50	50	20.20	20.15	20.13		3
	100	0	20.17	20.16	20.15		3

Table 9-31
LTE Band 2 (PCS) Max 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	23.16	23.17	23.14	0	0
	1	36	23.15	23.14	23.15		0
	1	74	23.12	23.12	23.13		0
	36	0	22.04	22.06	21.93	0-1	1
	36	18	22.08	22.04	21.91		1
	36	37	22.09	22.01	21.94		1
	75	0	22.10	22.03	21.95		1
16QAM	1	0	22.06	22.09	22.14	0-1	1
	1	36	22.04	22.13	22.10		1
	1	74	22.03	22.10	22.24		1
	36	0	21.08	21.03	20.91	0-2	2
	36	18	21.09	21.06	20.84		2
	36	37	21.10	21.04	20.86		2
	75	0	21.04	21.02	20.91		2
64QAM	1	0	21.01	21.09	21.07	0-2	2
	1	36	21.03	21.05	21.11		2
	1	74	20.98	21.07	21.02		2
	36	0	20.04	20.06	20.01	0-3	3
	36	18	19.99	20.05	20.00		3
	36	37	20.00	20.03	20.01		3
	75	0	20.07	20.00	20.02		3

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Table 9-32
LTE Band 2 (PCS) Max 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	23.12	23.17	23.15	0	0
	1	25	23.11	23.12	23.13		0
	1	49	23.08	23.10	23.11		0
	25	0	22.12	22.14	22.11	0-1	1
	25	12	22.14	22.12	22.09		1
	25	25	22.13	22.09	22.02		1
16QAM	50	0	22.16	22.11	22.03	0-1	1
	1	0	22.12	22.16	22.12		1
	1	25	22.00	22.20	22.08		1
	1	49	22.12	22.17	22.22	0-2	1
	25	0	21.15	21.10	21.09		2
	25	12	21.13	21.15	21.13		2
64QAM	25	25	21.17	21.19	21.15	0-2	2
	50	0	21.18	21.21	21.19		2
	1	0	20.97	21.02	21.05	0-2	2
	1	25	20.99	21.06	21.09		2
	1	49	20.94	21.03	21.00		2
	64QAM	25	0	20.04	20.01	19.99	0-3
25		12	20.05	20.04	20.02	3	
25		25	20.06	20.00	20.30	3	
50		0	20.03	20.09	20.05	3	

Table 9-33
LTE Band 2 (PCS) Max 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	23.14	23.19	23.17	0	0
	1	12	23.13	23.16	23.18		0
	1	24	23.10	23.14	23.16		0
	12	0	22.04	22.08	22.06	0-1	1
	12	6	22.05	22.06	22.04		1
	12	13	22.04	22.03	22.03		1
16QAM	25	0	22.01	22.05	22.03	0-1	1
	1	0	22.04	22.11	22.07		1
	1	12	22.02	22.15	22.07		1
	1	24	22.01	22.12	22.04	0-2	1
	12	0	20.97	21.05	21.00		2
	12	6	20.95	21.00	20.99		2
64QAM	12	13	20.98	21.03	20.95	0-2	2
	25	0	21.02	21.04	21.01		2
	1	0	20.99	21.04	21.09		0-2
	1	12	21.01	21.06	21.03	2	
	1	24	20.96	20.97	21.04	2	
	64QAM	12	0	20.06	20.02	20.03	0-3
12		6	20.02	20.00	20.01	3	
12		13	20.04	20.04	20.03	3	
25		0	20.05	20.01	20.05		3

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Table 9-34
LTE Band 2 (PCS) Max 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	23.15	23.21	23.15	0	0
	1	7	23.14	23.18	23.16		0
	1	14	23.11	23.16	23.14		0
	8	0	22.05	22.10	22.08	0-1	1
	8	4	22.07	22.08	22.06		1
	8	7	22.04	22.05	22.04		1
16QAM	15	0	22.05	22.07	22.04	0-1	1
	1	0	22.01	22.13	22.15		1
	1	7	22.03	22.17	22.11		1
	1	14	22.01	22.14	22.25	0-2	1
	8	0	21.04	21.07	21.06		2
	8	4	21.02	21.02	21.03		2
64QAM	8	7	21.06	21.05	21.04	0-2	2
	15	0	21.03	21.06	21.04		2
	1	0	20.94	20.99	20.97		0-2
	1	7	20.96	21.03	20.95	2	
	1	14	20.91	21.00	20.96	2	
	64QAM	8	0	20.04	20.05	20.05	0-3
8		4	20.02	20.03	20.02	3	
8		7	20.03	20.07	20.03	3	
15		0	20.01	20.04	20.01		3

Table 9-35
LTE Band 2 (PCS) Max 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)		
QPSK	1	0	23.14	23.15	23.15	0	0
	1	2	23.15	23.08	23.06		0
	1	5	23.16	23.16	23.08		0
	3	0	23.13	23.10	23.04		0
	3	2	23.12	23.08	23.02		0
	3	3	23.14	23.05	23.05		0
	6	0	22.02	22.07	22.06	0-1	1
16QAM	1	0	22.01	22.08	22.05	0-1	1
	1	2	22.06	22.07	22.01		1
	1	5	22.04	22.06	22.05		1
	3	0	22.06	22.07	22.02		1
	3	2	22.03	22.05	22.05		1
	3	3	22.02	22.08	22.07		1
	6	0	21.07	21.06	21.06	0-2	2
64QAM	1	0	20.91	21.08	21.01	0-2	2
	1	2	20.93	21.03	21.05		2
	1	5	20.88	21.00	21.06		2
	3	0	20.90	20.99	20.96		2
	3	2	20.92	20.93	20.97		2
	3	3	20.93	20.97	20.99		2
	6	0	20.00	20.04	20.01	0-3	3

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Table 9-36
LTE Band 2 (PCS) Reduced 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	20.12	20.21	20.32	0	0
	1	50	20.20	20.19	20.30		0
	1	99	20.16	20.17	20.25		0
	50	0	20.10	20.18	20.19	0-1	0
	50	25	20.17	20.14	20.14		0
	50	50	20.16	20.14	20.14		0
	100	0	20.17	20.13	20.15		0
16QAM	1	0	20.30	20.31	20.22	0-1	0
	1	50	20.25	20.16	20.18		0
	1	99	20.31	20.30	20.16		0
	50	0	20.22	20.20	20.13	0-2	0
	50	25	20.19	20.20	20.16		0
	50	50	20.21	20.15	20.14		0
	100	0	20.20	20.28	20.11		0
64QAM	1	0	20.27	20.21	20.07	0-2	0
	1	50	20.30	20.31	20.09		0
	1	99	20.02	20.31	20.11		0
	50	0	20.08	20.10	20.06	0-3	0
	50	25	20.09	20.15	20.06		0
	50	50	20.08	20.13	20.05		0
	100	0	20.15	20.16	20.11		0

Table 9-37
LTE Band 2 (PCS) Reduced 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	20.25	20.18	20.04	0	0
	1	36	20.15	20.26	20.08		0
	1	74	20.19	20.24	20.07		0
	36	0	20.15	20.11	19.98	0-1	0
	36	18	20.16	20.15	19.95		0
	36	37	20.17	20.19	19.96		0
	75	0	20.11	20.10	20.05		0
16QAM	1	0	20.08	20.02	19.84	0-1	0
	1	36	20.02	20.07	19.82		0
	1	74	20.04	19.99	19.81		0
	36	0	20.11	20.07	20.05	0-2	0
	36	18	20.17	20.09	19.96		0
	36	37	20.12	20.08	19.98		0
	75	0	20.14	20.07	20.02		0
64QAM	1	0	20.26	20.25	20.03	0-2	0
	1	36	20.25	20.21	20.02		0
	1	74	20.30	20.20	20.09		0
	36	0	20.23	20.10	20.04	0-3	0
	36	18	20.20	20.08	20.12		0
	36	37	20.26	20.11	20.07		0
	75	0	20.18	20.12	20.05		0

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Table 9-38
LTE Band 2 (PCS) Reduced 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	20.29	20.31	20.22	0	0
	1	25	20.27	20.32	20.24		0
	1	49	20.26	20.29	20.26		0
	25	0	20.29	20.25	20.18	0-1	0
	25	12	20.26	20.28	20.14		0
	25	25	20.28	20.22	20.15		0
16QAM	50	0	20.25	20.24	20.13	0-1	0
	1	0	20.11	20.14	20.12		0
	1	25	20.16	20.12	19.94		0
	1	49	20.24	20.09	19.97	0-2	0
	25	0	20.28	20.26	20.14		0
	25	12	20.26	20.19	20.15		0
64QAM	25	25	20.29	20.21	20.13	0-2	0
	50	0	20.28	20.24	20.18		0
	1	0	20.27	20.21	20.13		0-2
	1	25	20.24	20.18	20.05	0	
	1	49	20.26	20.26	19.99	0-3	
	25	0	20.19	20.18	20.08		0
25	12	20.17	20.16	20.09	0		
25	25	20.15	20.17	20.11	0		
	50	0	20.17	20.23	20.13		0

Table 9-39
LTE Band 2 (PCS) Reduced 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	20.22	20.19	20.09	0	0	
	1	12	20.25	20.16	20.12		0	
	1	24	20.24	20.18	20.07		0	
	12	0	20.18	20.09	19.96	0-1	0	
	12	6	20.14	20.06	20.02		0	
	12	13	20.19	20.15	19.97		0	
16QAM	25	0	20.14	20.13	20.00	0-1	0	
	1	0	19.93	19.98	19.87		0	
	1	12	19.96	19.91	19.89		0	
	1	24	19.93	19.96	19.92	0-2	0	
	12	0	20.12	20.13	20.03		0	
	12	6	20.14	20.14	19.96		0	
	12	13	20.09	20.08	20.02		0	
64QAM	25	0	20.13	20.11	19.98	0-2	0	
	1	0	20.17	20.18	20.07		0-2	0
	1	12	20.19	19.96	20.04			0
	1	24	20.21	20.05	20.14	0-3		0
	12	0	20.10	20.16	19.98		0	
	12	6	20.16	20.18	20.00		0	
	12	13	20.14	20.08	20.07		0	
	25	0	20.08	20.15	20.01		0	

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Table 9-40
LTE Band 2 (PCS) Reduced 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	20.27	20.23	20.19	0	0
	1	7	20.29	20.25	20.18		0
	1	14	20.31	20.22	20.17		0
	8	0	20.26	20.24	20.10	0-1	0
	8	4	20.25	20.23	20.14		0
	8	7	20.24	20.21	20.11		0
16QAM	15	0	20.28	20.28	20.14	0-1	0
	1	0	20.16	20.13	20.08		0
	1	7	20.12	20.10	19.92		0
	1	14	20.13	20.05	19.96	0-2	0
	8	0	20.14	20.16	20.09		0
	8	4	20.19	20.26	20.12		0
64QAM	8	7	20.20	20.22	20.11	0-2	0
	15	0	20.21	20.16	20.18		0
	1	0	20.15	20.19	20.20	0-2	0
	1	7	20.13	20.11	20.13		0
	1	14	20.24	20.09	20.14		0
	8	0	20.21	20.25	20.19	0-3	0
	8	4	20.26	20.22	20.18		0
	8	7	20.25	20.27	20.21		0
	15	0	20.19	20.22	20.19		0

Table 9-41
LTE Band 2 (PCS) Reduced 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)		
QPSK	1	0	20.14	20.12	19.94	0	0
	1	2	20.12	20.11	19.96		0
	1	5	20.09	20.14	19.98		0
	3	0	20.11	20.06	19.99		0
	3	2	20.14	20.08	19.96		0
	3	3	20.13	20.05	20.02		0
	6	0	20.12	20.05	19.97	0-1	0
16QAM	1	0	19.97	19.92	19.92	0-1	0
	1	2	19.95	19.98	19.83		0
	1	5	19.89	19.93	19.85		0
	3	0	20.07	19.99	19.96		0
	3	2	20.08	19.96	19.91		0
	3	3	20.05	20.08	19.89		0
	6	0	20.06	20.06	20.00	0-2	0
64QAM	1	0	20.15	20.21	19.98	0-2	0
	1	2	20.11	20.26	20.07		0
	1	5	20.14	20.20	20.05		0
	3	0	20.16	20.29	20.04		0
	3	2	20.04	20.13	19.94		0
	3	3	20.12	20.24	20.03		0
	6	0	20.02	20.20	19.99	0-3	0

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LTE Band 7

Table 9-42
LTE Band 7 Max 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	23.36	23.64	23.27	0	0
	1	50	23.57	23.59	23.38		0
	1	99	23.59	23.47	23.62		0
	50	0	22.40	22.45	22.42	0-1	1
	50	25	22.40	22.39	22.34		1
	50	50	22.44	22.36	22.44		1
	100	0	22.42	22.41	22.40		1
16QAM	1	0	22.34	22.56	22.02	0-1	1
	1	50	22.53	22.57	22.25		1
	1	99	22.63	22.38	22.50		1
	50	0	21.32	21.35	21.47	0-2	2
	50	25	21.42	21.36	21.37		2
	50	50	21.51	21.35	21.50		2
	100	0	21.47	21.35	21.35		2
64QAM	1	0	21.12	21.32	21.16	0-2	2
	1	50	21.31	21.21	21.35		2
	1	99	21.40	21.15	21.69		2
	50	0	20.22	20.38	20.28	0-3	3
	50	25	20.36	20.40	20.40		3
	50	50	20.43	20.39	20.58		3
	100	0	20.38	20.37	20.47		3

Table 9-43
LTE Band 7 Max 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	23.37	23.61	23.36	0	0
	1	36	23.51	23.52	23.44		0
	1	74	23.65	23.36	23.66		0
	36	0	22.36	22.48	22.20	0-1	1
	36	18	22.37	22.40	22.24		1
	36	37	22.49	22.29	22.32		1
	75	0	22.41	22.41	22.29		1
16QAM	1	0	22.28	22.47	22.19	0-1	1
	1	36	22.39	22.35	22.33		1
	1	74	22.36	22.25	22.43		1
	36	0	21.25	21.45	21.12	0-2	2
	36	18	21.36	21.38	21.18		2
	36	37	21.41	21.36	21.29		2
	75	0	21.32	21.37	21.21		2
64QAM	1	0	21.41	21.52	21.22	0-2	2
	1	36	21.48	21.45	21.51		2
	1	74	21.61	21.37	21.56		2
	36	0	20.31	20.39	20.20	0-3	3
	36	18	20.29	20.37	20.19		3
	36	37	20.37	20.33	20.31		3
	75	0	20.30	20.38	20.23		3

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Table 9-44
LTE Band 7 Max 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	23.28	23.58	23.34	0	0
	1	25	23.36	23.57	23.35		0
	1	49	23.43	23.43	23.46		0
	25	0	22.31	22.39	22.30	0-1	1
	25	12	22.34	22.40	22.34		1
	25	25	22.45	22.33	22.24		1
16QAM	50	0	22.34	22.39	22.37	0-1	1
	1	0	22.15	22.58	22.33		1
	1	25	22.30	22.44	22.44		1
	1	49	22.51	22.23	22.41	0-2	1
	25	0	21.27	21.33	21.24		2
	25	12	21.30	21.30	21.38		2
64QAM	25	25	21.43	21.31	21.36	0-2	2
	50	0	21.35	21.36	21.29		2
	1	0	21.27	21.24	21.21		0-2
	1	25	21.26	21.33	21.38	2	
	1	49	21.27	21.40	21.36	0-3	
	25	0	20.20	20.36	20.24		3
25	12	20.15	20.45	20.27	3		
64QAM	25	25	20.34	20.33	20.31	0-3	3
	50	0	20.28	20.31	20.33		3

Table 9-45
LTE Band 7 Max 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	23.53	23.60	23.60	0	0	
	1	12	23.56	23.59	23.63		0	
	1	24	23.62	23.60	23.70		0	
	12	0	22.39	22.44	22.55	0-1	1	
	12	6	22.35	22.49	22.57		1	
	12	13	22.44	22.50	22.56		1	
16QAM	25	0	22.43	22.47	22.52	0-1	1	
	1	0	22.52	22.58	22.50		1	
	1	12	22.40	22.33	22.46		1	
	1	24	22.49	22.42	22.58	0-2	1	
	12	0	21.36	21.44	21.52		2	
	12	6	21.46	21.46	21.46		2	
64QAM	12	13	21.49	21.31	21.48	0-2	2	
	25	0	21.37	21.50	21.47		2	
	64QAM	1	0	21.42	21.64	21.59	0-2	2
		1	12	21.49	21.56	21.52		2
		1	24	21.59	21.43	21.53		2
		12	0	20.31	20.32	20.29	0-3	3
12		6	20.33	20.41	20.45	3		
12		13	20.40	20.40	20.47	3		
	25	0	20.27	20.48	20.46		3	

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Table 9-46
LTE Band 7 Reduced 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	20.27	20.64	20.21	0	0
	1	50	20.44	20.55	20.32		0
	1	99	20.57	20.47	20.57		0
	50	0	20.37	20.47	20.24	0-1	0
	50	25	20.40	20.35	20.38		0
	50	50	20.46	20.34	20.42		0
	100	0	20.44	20.39	20.33	0	
16QAM	1	0	20.17	20.49	20.00	0-1	0
	1	50	20.36	20.49	20.12		0
	1	99	20.44	20.31	20.33		0
	50	0	20.31	20.40	20.32	0-2	0
	50	25	20.40	20.36	20.38		0
	50	50	20.49	20.35	20.46		0
	100	0	20.42	20.38	20.33	0	
64QAM	1	0	20.25	20.55	20.27	0-2	0
	1	50	20.64	20.59	20.44		0
	1	99	20.63	20.52	20.63		0
	50	0	20.38	20.44	20.38	0-3	0
	50	25	20.53	20.44	20.49		0
	50	50	20.64	20.41	20.61		0
	100	0	20.47	20.47	20.52	0	

Table 9-47
LTE Band 7 Reduced 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	20.33	20.39	20.44	0	0
	1	36	20.37	20.48	20.49		0
	1	74	20.38	20.36	20.40		0
	36	0	20.24	20.42	20.44	0-1	0
	36	18	20.28	20.33	20.38		0
	36	37	20.30	20.29	20.42		0
	75	0	20.39	20.33	20.41	0	
16QAM	1	0	20.28	20.32	20.28	0-1	0
	1	36	20.25	20.27	20.31		0
	1	74	20.32	20.28	20.40		0
	36	0	20.28	20.33	20.40	0-2	0
	36	18	20.26	20.32	20.45		0
	36	37	20.29	20.29	20.51		0
	75	0	20.32	20.30	20.49	0	
64QAM	1	0	20.22	20.38	20.36	0-2	0
	1	36	20.21	20.33	20.39		0
	1	74	20.36	20.26	20.41		0
	36	0	20.30	20.43	20.42	0-3	0
	36	18	20.32	20.37	20.45		0
	36	37	20.35	20.32	20.47		0
	75	0	20.34	20.34	20.46	0	

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Table 9-48
LTE Band 7 Reduced 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	20.44	20.50	20.57	0	0
	1	25	20.37	20.47	20.58		0
	1	49	20.38	20.43	20.60		0
	25	0	20.32	20.44	20.51	0-1	0
	25	12	20.35	20.38	20.58		0
	25	25	20.39	20.35	20.57		0
	50	0	20.38	20.34	20.52		0
16QAM	1	0	20.22	20.25	20.40	0-1	0
	1	25	20.29	20.29	20.42		0
	1	49	20.38	20.32	20.49		0
	25	0	20.31	20.33	20.53	0-2	0
	25	12	20.28	20.38	20.56		0
	25	25	20.33	20.32	20.58		0
	50	0	20.35	20.35	20.59		0
64QAM	1	0	20.24	20.34	20.30	0-2	0
	1	25	20.34	20.31	20.42		0
	1	49	20.37	20.39	20.53		0
	25	0	20.30	20.32	20.49	0-3	0
	25	12	20.32	20.34	20.52		0
	25	25	20.38	20.38	20.54		0
	50	0	20.31	20.32	20.55		0

Table 9-49
LTE Band 7 Reduced 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	20.21	20.38	20.53	0	0
	1	12	20.34	20.36	20.54		0
	1	24	20.31	20.34	20.63		0
	12	0	20.25	20.32	20.61	0-1	0
	12	6	20.28	20.31	20.57		0
	12	13	20.30	20.34	20.58		0
	25	0	20.25	20.32	20.55		0
16QAM	1	0	20.28	20.27	20.33	0-1	0
	1	12	20.21	20.31	20.42		0
	1	24	20.29	20.28	20.45		0
	12	0	20.30	20.32	20.49	0-2	0
	12	6	20.29	20.29	20.47		0
	12	13	20.27	20.31	20.49		0
	25	0	20.22	20.26	20.50		0
64QAM	1	0	20.24	20.33	20.34	0-2	0
	1	12	20.30	20.36	20.41		0
	1	24	20.26	20.30	20.47		0
	12	0	20.24	20.38	20.46	0-3	0
	12	6	20.28	20.37	20.52		0
	12	13	20.26	20.32	20.56		0
	25	0	20.23	20.35	20.53		0

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9.3.8 LTE Carrier Aggregation Conducted Powers

Table 9-50
LTE Carrier Aggregation Max Conducted Powers – 2CC

Combination	PCC									SCC				Power	
	PCC Band	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 Tx.Power with DL CA Enabled (dBm)	LTE Carrier Tx Power (dBm)
CA_2A-4A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	23.25	23.33
CA_2A-5A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B5	10	2525	881.5	23.21	23.33
CA_2A-7A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B7	20	3100	2655	23.26	23.33
CA_2A-12A (1)	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B12	10	5095	737.5	23.22	23.33
CA_2A-13A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B13	10	5230	751	23.23	23.33
CA_2A-17A	LTE B2	5	18900	1880	QPSK	1	0	900	1960	LTE B17	10	5790	740	23.12	23.19
CA_2A-29A (2)	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B29	10	9715	722.5	23.21	23.33
CA_2A-4A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B2	20	900	1960	23.56	23.45
CA_4A-4A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B4	20	2300	2145	23.58	23.45
CA_4A-5A (1)	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B5	10	2525	881.5	23.55	23.45
CA_4A-7A (1)	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B7	20	3100	2655	23.57	23.45
CA_4A-12A (2)	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B12	10	5095	737.5	23.52	23.45
CA_4A-13A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B13	10	5230	751	23.54	23.45
CA_4A-17A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B17	10	5790	740	23.59	23.45
CA_4A-29A (2)	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B29	10	9715	722.5	23.43	23.45
CA_2A-5A	LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B2	20	900	1960	23.68	23.83
CA_4A-5A (1)	LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B4	20	2175	2132.5	23.70	23.83
CA_2A-7A	LTE B7	5	21425	2567.5	QPSK	1	24	3425	2687.5	LTE B2	20	900	1960	23.48	23.70
CA_4A-7A (1)	LTE B7	5	21425	2567.5	QPSK	1	24	3425	2687.5	LTE B4	20	2175	2132.5	23.56	23.70
CA_7A-7A (1)	LTE B7	5	21425	2567.5	QPSK	1	24	3425	2687.5	LTE B7	20	2850	2630	23.54	23.70
CA_2A-12A (1)	LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B2	20	900	1960	23.88	23.99
CA_2A-13A	LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B2	20	900	1960	23.68	23.89
CA_4A-13A	LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B4	20	2175	2132.5	23.66	23.89
CA_2A-17A	LTE B17	10	23790	710	QPSK	1	0	5790	740	LTE B2	10	900	1960	23.91	23.99
CA_66A-66A	LTE B66	10	132022	1715	QPSK	1	0	66486	2115	LTE B66	20	67236	2190	23.33	23.45
CA_66B	LTE B66	10	132022	1715	QPSK	1	0	66486	2115	LTE B66	10	66585	2124.9	23.30	23.45
CA_66C	LTE B66	10	132022	1715	QPSK	1	0	66486	2115	LTE B66	20	66630	2129.4	23.35	23.45

Table 9-51
LTE Carrier Aggregation Max Conducted Powers – 3CC

Combination	PCC									SCC 1				SCC 2				Power	
	PCC Band	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 Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-4A-5A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	LTE B5	10	2525	881.5	23.13	23.33
CA_2A-4A-7A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	LTE B7	20	3100	2655	23.09	23.33
CA_2A-4A-12A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	23.11	23.33
CA_2A-4A-29A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B4	20	2175	2132.5	LTE B29	10	9715	722.5	23.15	23.33
CA_2A-7A-7A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B7	20	3100	2655	LTE B7	20	2850	2630	23.05	23.33
CA_2A-7A-12A	LTE B2	20	18900	1880	QPSK	1	0	900	1960	LTE B7	20	3100	2655	LTE B12	10	5095	737.5	23.07	23.33
CA_2A-4A-5A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B2	20	900	1960	LTE B5	10	2525	881.5	23.31	23.45
CA_2A-4A-7A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B2	20	900	1960	LTE B7	20	3100	2655	23.28	23.45
CA_2A-4A-12A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B2	20	900	1960	LTE B12	10	5095	737.5	23.30	23.45
CA_2A-4A-29A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B2	20	900	1960	LTE B29	10	9715	722.5	23.42	23.45
CA_4A-4A-12A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B4	20	2300	2145	LTE B12	10	5095	737.5	23.29	23.45
CA_4A-4A-13A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B4	20	2300	2145	LTE B13	10	5230	751	23.33	23.45
CA_4A-4A-29A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B4	20	2300	2145	LTE B29	10	9715	722.5	23.38	23.45
CA_4A-7A-7A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B7	20	3100	2655	LTE B7	20	2850	2630	23.20	23.45
CA_4A-7A-12A	LTE B4	10	20000	1715	QPSK	1	0	2000	2115	LTE B7	20	3100	2655	LTE B12	10	5095	737.5	23.19	23.45
CA_2A-4A-5A	LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	23.72	23.83
CA_2A-4A-7A	LTE B7	5	21425	2567.5	QPSK	1	24	3425	2687.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	23.55	23.70
CA_2A-7A-7A	LTE B7	5	21425	2567.5	QPSK	1	24	3425	2687.5	LTE B7	20	2850	2630	LTE B2	20	900	1960	23.56	23.70
CA_2A-7A-12A	LTE B7	5	21425	2567.5	QPSK	1	24	3425	2687.5	LTE B2	20	900	1960	LTE B12	10	5095	737.5	23.59	23.70
CA_4A-7A-7A	LTE B7	5	21425	2567.5	QPSK	1	24	3425	2687.5	LTE B7	20	2850	2630	LTE B4	20	2175	2132.5	23.57	23.70
CA_4A-7A-12A	LTE B7	5	21425	2567.5	QPSK	1	24	3425	2687.5	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	23.61	23.70
CA_2A-7A-12A	LTE B12	10	23095	707.5	QPSK	1	0	5095	737.5	LTE B2	20	900	1960	LTE B7	20	3100	2655	23.94	23.99
CA_4A-4A-13A	LTE B13	10	23230	782	QPSK	1	0	5230	751	LTE B4	20	2175	2132.5	LTE B4	10	2350	2150	23.81	23.89

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Table 9-52
LTE Carrier Aggregation Reduced Conducted Powers – 2CC

Combination	PCC									SCC				Power	
	PCC Band	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 Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-4A	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B4	20	2175	2132.5	20.18	20.32
CA_2A-5A	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B5	10	2525	881.5	20.11	20.32
CA_2A-7A	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B7	20	3100	2655	20.08	20.32
CA_2A-12A (1)	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B12	10	5095	737.5	20.12	20.32
CA_2A-13A	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B13	10	5230	751	20.11	20.32
CA_2A-17A	LTE B2	10	18900	1880	QPSK	1	25	900	1960	LTE B17	10	5790	740	19.98	20.32
CA_2A-29A (2)	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B29	10	9715	722.5	20.10	20.32
CA_2A-4A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B2	20	900	1960	20.34	20.45
CA_4A-4A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B4	20	2300	2145	20.32	20.45
CA_4A-5A (1)	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B5	10	2525	881.5	20.33	20.45
CA_4A-7A (1)	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B7	20	3100	2655	20.31	20.45
CA_4A-12A (2)	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B12	10	5095	737.5	20.29	20.45
CA_4A-13A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B13	10	5230	751	20.32	20.45
CA_4A-17A	LTE B4	5	19975	1712.5	QPSK	1	12	1975	2112.5	LTE B17	10	5790	740	20.18	20.40
CA_4A-29A (2)	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B29	10	9715	722.5	20.34	20.45
CA_2A-5A	LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B2	20	900	1960	22.42	22.46
CA_4A-5A (1)	LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B4	20	2175	2132.5	22.39	22.46
CA_2A-7A	LTE B7	20	21100	2510	QPSK	1	0	3100	2655	LTE B2	20	900	1960	20.62	20.64
CA_4A-7A (1)	LTE B7	20	21100	2510	QPSK	1	0	3100	2655	LTE B4	20	2175	2132.5	20.65	20.64
CA_7A-7A (1)	LTE B7	20	21100	2510	QPSK	1	0	3100	2655	LTE B7	20	3350	2680	20.60	20.64
CA_66A-66A	LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B66	20	67236	2190	20.65	20.45
CA_66B	LTE B66	5	131997	1712.5	QPSK	1	12	66461	2112.5	LTE B66	15	66554	2121.8	20.47	20.40
CA_66C	LTE B66	20	132072	1720	QPSK	1	0	66536	2120	LTE B66	20	66734	2139.8	20.68	20.45

Table 9-53
LTE Carrier Aggregation Reduced Conducted Powers – 3CC

Combination	PCC									SCC 1				SCC 2				Power	
	PCC Band	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 Tx.Power with DL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_2A-4A-5A	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B4	20	2175	2132.5	LTE B5	10	2525	881.5	20.11	20.32
CA_2A-4A-7A	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B4	20	2175	2132.5	LTE B7	20	3100	2655	20.13	20.32
CA_2A-4A-12A	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	20.10	20.32
CA_2A-4A-29A	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B4	20	2175	2132.5	LTE B29	10	9715	722.5	20.02	20.32
CA_2A-7A-7A	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B7	20	3100	2655	LTE B7	20	2850	2630	20.17	20.32
CA_2A-7A-12A	LTE B2	20	19100	1900	QPSK	1	0	1100	1980	LTE B7	20	3100	2655	LTE B12	10	5095	737.5	20.21	20.32
CA_2A-4A-5A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B2	20	900	1960	LTE B5	10	2525	881.5	20.43	20.45
CA_2A-4A-7A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B2	20	900	1960	LTE B7	20	3100	2655	20.41	20.45
CA_2A-4A-12A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B2	20	900	1960	LTE B12	10	5095	737.5	20.42	20.45
CA_2A-4A-29A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B2	20	900	1960	LTE B29	10	9715	722.5	20.36	20.45
CA_4A-4A-12A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B4	20	2300	2145	LTE B12	10	5095	737.5	20.40	20.45
CA_4A-4A-13A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B4	20	2300	2145	LTE B13	10	5230	751	20.35	20.45
CA_4A-4A-29A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B4	20	2300	2145	LTE B29	10	9715	722.5	20.43	20.45
CA_4A-7A-7A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B7	20	3100	2655	LTE B7	20	2850	2630	20.39	20.45
CA_4A-7A-12A	LTE B4	20	20050	1720	QPSK	1	0	2050	2120	LTE B7	20	3100	2655	LTE B12	10	5095	737.5	20.37	20.45
CA_2A-4A-5A	LTE B5	10	20525	836.5	QPSK	1	0	2525	881.5	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	22.54	22.46
CA_2A-4A-7A	LTE B7	20	21100	2510	QPSK	1	0	3100	2655	LTE B2	20	900	1960	LTE B4	20	2175	2132.5	20.63	20.64
CA_2A-7A-7A	LTE B7	20	21100	2510	QPSK	1	0	3100	2655	LTE B7	20	3350	2680	LTE B2	20	900	1960	20.61	20.64
CA_2A-7A-12A	LTE B7	20	21100	2510	QPSK	1	0	3100	2655	LTE B2	20	900	1960	LTE B12	10	5095	737.5	20.57	20.64
CA_4A-7A-7A	LTE B7	20	21100	2510	QPSK	1	0	3100	2655	LTE B7	20	3350	2680	LTE B4	20	2175	2132.5	20.55	20.64
CA_4A-7A-12A	LTE B7	20	21100	2510	QPSK	1	0	3100	2655	LTE B4	20	2175	2132.5	LTE B12	10	5095	737.5	20.59	20.64

Notes:

- 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.
- All control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
- For downlink carrier aggregation combinations, PCC uplink channel was selected based on section C)3)b)ii) of KBD 941225 D05 V01r02. The downlink PCC channel was paired with the selected PCC uplink channel according to normal configurations without carrier aggregation. For inter-band CA, the SCC downlink channels were selected near the middle of their transmission bands. For contiguous intra-band CA, the downlink channel spacing between the component carriers was set to multiple of 300 kHz less than the nominal channel spacing defined in section 5.4.1A of 3GPP TS 36.521. For non-contiguous intra-band CA, the downlink channel spacing between the component carriers was set to be larger than the nominal channel spacing and provided maximum separation between the component carriers. All

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selected downlink channels remained fully within the downlink transmission band of the respective component carrier.

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

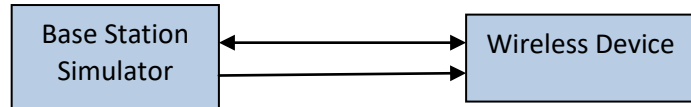


Figure 9-3
Power Measurement Setup

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9.4 WLAN Conducted Powers

Table 9-54
2.4 GHz WLAN Maximum Average RF Power

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	17.80	13.63	13.11
2437	6	18.34	15.43	15.00
2457	10	18.01	15.31	14.92
2462	11	17.99	12.01	11.11

Table 9-55
2.4 GHz WLAN Reduced Average RF Power

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
		Average	Average	Average
2412	1	11.86	12.46	11.77
2437	6	11.63	11.71	12.18
2462	11	12.35	11.64	11.11

Table 9-56
5 GHz WLAN Maximum Average RF Power – 40 MHz Bandwidth

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
		Average	Average
5190	38	8.05	8.13
5230	46	13.60	13.42
5270	54	13.58	13.35
5310	62	6.62	7.30
5510	102	11.81	11.92
5590	118	13.61	13.40
5630	126	13.72	13.39
5710	142	13.48	13.60
5755	151	13.82	13.80
5795	159	13.98	13.67

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Table 9-57
5 GHz WLAN Reduced Average RF Power – 40 MHz Bandwidth

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
		Average	Average
5190	38	8.05	8.13
5230	46	9.62	10.41
5270	54	10.22	9.56
5310	62	6.62	7.30
5510	102	9.70	10.08
5590	118	10.09	10.19
5630	126	10.23	10.35
5710	142	9.73	9.65
5755	151	10.46	9.56
5795	159	10.21	10.12

Table 9-58
5 GHz WLAN Reduced Average RF Power – 80 MHz Bandwidth

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
		Average
5210	42	7.05
5290	58	4.85
5530	106	7.32
5610	122	9.95
5690	138	9.25
5775	155	9.92

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

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

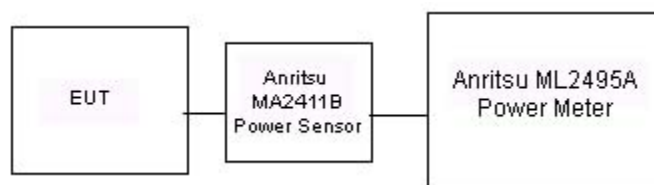


Figure 9-4

Power Measurement Setup for Bandwidths < 50 MHz

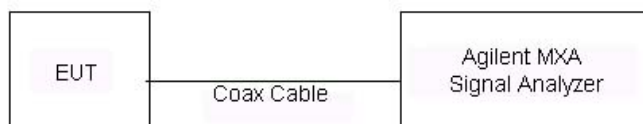


Figure 9-5

Power Measurement Setup for Bandwidths > 50 MHz

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10 SYSTEM VERIFICATION

10.1 Tissue Verification

Table 10-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
12/6/2017	750H	21.3	700	0.847	42.152	0.899	42.201	-4.72%	-0.11%
			710	0.856	42.025	0.890	42.149	-3.92%	-0.29%
			740	0.884	41.626	0.893	41.994	-1.01%	-0.88%
			755	0.898	41.419	0.894	41.916	0.45%	-1.19%
			770	0.912	41.208	0.895	41.838	1.90%	-1.51%
			785	0.924	41.023	0.896	41.760	3.13%	-1.76%
			800	0.938	40.835	0.897	41.682	4.57%	-2.03%
			820	0.879	40.712	0.899	41.578	-2.22%	-2.08%
11/27/2017	835H	20.9	835	0.893	40.509	0.900	41.500	-0.78%	-2.39%
			860	0.908	40.310	0.916	41.500	-0.87%	-2.87%
			820	0.877	40.938	0.899	41.578	-2.45%	-1.54%
12/1/2017	835H	21.3	835	0.891	40.763	0.900	41.500	-1.00%	-1.78%
			850	0.906	40.582	0.916	41.500	-1.09%	-2.21%
			1710	1.347	38.751	1.348	40.142	-0.07%	-3.47%
12/4/2017	1750H	21.0	1750	1.386	38.546	1.371	40.079	1.09%	-3.82%
			1790	1.426	38.347	1.394	40.016	2.30%	-4.17%
			1850	1.388	40.784	1.400	40.000	-0.86%	1.96%
12/9/2017	1900H	22.5	1880	1.419	40.684	1.400	40.000	1.36%	1.71%
			1910	1.451	40.584	1.400	40.000	3.64%	1.46%
			2400	1.815	39.548	1.756	39.289	3.38%	0.66%
11/27/2017	2450H-2600H	21.5	2450	1.869	39.368	1.800	39.200	3.83%	0.43%
			2500	1.926	39.161	1.855	39.136	3.83%	0.06%
			2550	1.987	38.996	1.909	39.073	4.09%	-0.20%
			2600	2.039	38.792	1.964	39.009	3.82%	-0.56%
			5240	4.484	34.500	4.696	35.940	-4.51%	-4.01%
			5260	4.506	34.484	4.717	35.917	-4.47%	-3.99%
			5280	4.527	34.433	4.737	35.894	-4.43%	-4.07%
			5300	4.543	34.418	4.758	35.871	-4.52%	-4.05%
12/04/2017	5200H-5800H	20.7	5320	4.562	34.389	4.778	35.849	-4.52%	-4.07%
			5600	4.840	34.010	5.065	35.529	-4.44%	-4.28%
			5620	4.862	34.001	5.086	35.506	-4.40%	-4.24%
			5640	4.887	33.945	5.106	35.483	-4.29%	-4.33%
			5745	5.001	33.798	5.214	35.363	-4.09%	-4.43%
			5765	5.016	33.805	5.234	35.340	-4.17%	-4.34%
			5785	5.042	33.757	5.255	35.317	-4.05%	-4.42%
			700	0.912	57.981	0.959	55.726	-4.90%	4.05%
			710	0.921	57.889	0.960	55.687	-4.06%	3.95%
			720	0.931	57.808	0.961	55.648	-3.12%	3.88%
			725	0.936	57.765	0.961	55.629	-2.60%	3.84%
			740	0.950	57.625	0.963	55.570	-1.35%	3.70%
12/1/2017	835B	20.8	755	0.964	57.477	0.964	55.512	0.00%	1.54%
			770	0.979	57.315	0.965	55.453	1.35%	3.36%
			785	0.992	57.161	0.966	55.396	2.69%	3.19%
			820	0.989	54.115	0.969	55.258	-2.06%	-2.07%
			835	1.004	53.977	0.970	55.200	3.51%	-2.22%
			850	1.020	53.819	0.988	55.154	3.24%	-2.42%
			820	0.963	54.701	0.969	55.258	-0.62%	-1.01%
			835	0.979	54.573	0.970	55.200	0.93%	-1.14%
12/4/2017	835B	21.0	850	0.994	54.431	0.988	55.154	0.61%	-1.31%
			820	0.957	52.957	0.969	55.258	-1.24%	-4.20%
			835	0.972	52.787	0.970	55.200	0.21%	-4.37%
12/18/2017	835B	21.5	850	0.967	52.629	0.988	55.154	-0.10%	-4.59%
			1710	1.478	51.575	1.463	53.537	1.03%	-3.66%
			1750	1.525	51.401	1.488	53.432	2.49%	-3.80%
12/1/2017	1750B	21.3	1790	1.567	51.225	1.514	53.326	3.50%	-3.94%
			1710	1.470	51.345	1.463	53.537	0.48%	-4.09%
			1750	1.518	51.179	1.488	53.432	2.02%	-4.22%
12/5/2017	1750B	21.5	1790	1.562	51.012	1.514	53.326	3.17%	-4.34%
			1850	1.489	52.496	1.520	53.300	-2.04%	-1.51%
			1880	1.521	52.370	1.520	53.300	0.07%	-1.74%
11/27/2017	1900B	22.5	1910	1.563	52.266	1.520	53.300	2.83%	-1.94%
			1850	1.528	52.420	1.520	53.300	0.63%	-1.46%
			1880	1.562	52.405	1.520	53.300	2.76%	-1.65%
12/8/2017	1900B	22.2	1910	1.594	52.295	1.520	53.300	4.87%	-1.89%
			2400	1.929	51.621	1.902	52.767	1.42%	-2.17%
			2450	1.996	51.436	1.950	52.700	2.36%	-2.40%
11/29/2017	2450B-2600B	22.5	2500	2.063	51.217	2.021	52.636	2.08%	-2.70%
			2550	2.130	51.029	2.092	52.573	1.82%	-2.94%
			2600	2.200	50.820	2.163	52.509	1.71%	-3.22%
			2400	1.969	51.205	1.902	52.767	3.52%	-2.96%
			2450	2.037	51.011	1.950	52.700	4.48%	-3.20%
			2500	2.109	50.787	2.021	52.636	4.35%	-3.51%
12/04/2017	5200B-5800B	21.6	5240	5.453	47.289	5.346	48.960	2.00%	-3.41%
			5260	5.480	47.243	5.369	48.933	2.07%	-3.44%
			5280	5.494	47.232	5.393	48.906	1.87%	-3.42%
			5600	5.924	46.669	5.766	48.471	2.74%	-3.72%
			5620	5.946	46.614	5.790	48.444	2.69%	-3.78%
			5640	5.961	46.575	5.813	48.417	2.89%	-3.80%
			5745	6.134	46.423	5.936	48.275	3.34%	-3.84%
			5765	6.157	46.396	5.959	48.248	3.32%	-3.84%
			5785	6.183	46.348	5.982	48.220	3.36%	-3.88%
			5800	6.195	46.327	6.000	48.200	3.25%	-3.89%

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 10-2
System Verification Results

System Verification												
TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR _{1g} (W/kg)	1 W Target SAR _{1g} (W/kg)	1 W Normalized SAR _{1g} (W/kg)	Deviation _{1g} (%)
H	750	HEAD	12/06/2017	23.2	21.3	0.200	1054	7410	1.580	8.370	7.900	-5.62%
K	835	HEAD	11/27/2017	22.6	20.9	0.200	4d133	7406	1.990	9.520	9.950	4.52%
K	835	HEAD	12/01/2017	23.0	21.3	0.200	4d133	7406	1.920	9.520	9.600	0.84%
I	1750	HEAD	12/04/2017	21.9	21.0	0.100	1148	3213	3.670	36.400	36.700	0.82%
K	1900	HEAD	12/03/2017	21.5	21.0	0.100	5d149	7406	3.770	39.600	37.700	-4.80%
E	2450	HEAD	11/27/2017	22.6	21.5	0.100	981	3319	5.460	52.800	54.600	3.41%
E	2600	HEAD	11/27/2017	22.6	21.5	0.100	1126	3319	5.940	56.400	59.400	5.32%
H	5250	HEAD	12/04/2017	22.0	20.7	0.050	1057	3914	3.770	81.600	75.400	-7.60%
H	5600	HEAD	12/04/2017	22.0	20.7	0.050	1057	3914	4.080	83.700	81.600	-2.51%
H	5750	HEAD	12/04/2017	22.0	20.7	0.050	1057	3914	3.790	80.000	75.800	-5.25%
E	750	BODY	12/04/2017	20.8	21.2	0.200	1161	3319	1.650	8.430	8.250	-2.14%
H	835	BODY	12/01/2017	22.6	20.8	0.200	4d133	7410	2.060	9.410	10.300	9.46%
G	835	BODY	12/04/2017	21.0	21.0	0.200	4d132	3332	1.920	9.800	9.600	-2.04%
I	835	BODY	12/18/2017	23.2	20.7	0.200	4d133	3213	1.890	9.410	9.450	0.43%
I	1750	BODY	12/01/2017	23.8	21.1	0.100	1148	3213	3.860	37.000	38.600	4.32%
E	1750	BODY	12/05/2017	22.7	21.5	0.100	1148	3319	3.760	37.000	37.600	1.62%
G	1900	BODY	11/27/2017	22.9	21.1	0.100	5d149	3332	3.760	40.100	37.600	-6.23%
K	1900	BODY	12/08/2017	22.3	21.7	0.100	5d149	7406	3.900	40.100	39.000	-2.74%
E	2450	BODY	11/28/2017	24.5	22.5	0.100	981	3319	5.320	50.800	53.200	4.72%
E	2450	BODY	12/08/2017	22.0	21.7	0.100	719	3319	4.860	50.100	48.600	-2.99%
E	2600	BODY	11/28/2017	24.5	22.5	0.100	1126	3319	5.900	54.300	59.000	8.66%
D	5250	BODY	12/04/2017	22.3	20.4	0.050	1237	7308	3.630	76.900	72.600	-5.59%
D	5600	BODY	12/04/2017	22.3	20.4	0.050	1237	7308	3.820	78.500	76.400	-2.68%
D	5750	BODY	12/04/2017	22.3	20.4	0.050	1237	7308	3.670	77.100	73.400	-4.80%

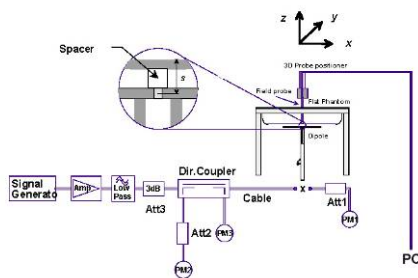


Figure 10-1
System Verification Setup Diagram



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	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	34.0	33.10	0.03	Right	Cheek	07349	1:8.3	0.245	1.230	0.301	A1
836.60	190	GSM 850	GSM	34.0	33.10	0.05	Right	Tilt	07349	1:8.3	0.131	1.230	0.161	
836.60	190	GSM 850	GSM	34.0	33.10	0.11	Left	Cheek	07349	1:8.3	0.203	1.230	0.250	
836.60	190	GSM 850	GSM	34.0	33.10	-0.03	Left	Tilt	07349	1:8.3	0.146	1.230	0.180	
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	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	24.5	23.89	0.08	Right	Cheek	07349	1:1	0.203	1.151	0.234	A2
836.60	4183	UMTS 850	RMC	24.5	23.89	0.11	Right	Tilt	07349	1:1	0.108	1.151	0.124	
836.60	4183	UMTS 850	RMC	24.5	23.89	0.11	Left	Cheek	07349	1:1	0.186	1.151	0.214	
836.60	4183	UMTS 850	RMC	24.5	23.89	0.05	Left	Tilt	07349	1:1	0.128	1.151	0.147	
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 11-3
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	23.5	23.42	-0.03	Right	Cheek	07265	1:1	0.119	1.019	0.121	
1732.40	1412	UMTS 1750	RMC	23.5	23.42	0.16	Right	Tilt	07265	1:1	0.079	1.019	0.081	
1732.40	1412	UMTS 1750	RMC	23.5	23.42	0.09	Left	Cheek	07265	1:1	0.225	1.019	0.229	A3
1732.40	1412	UMTS 1750	RMC	23.5	23.42	0.00	Left	Tilt	07265	1:1	0.095	1.019	0.097	
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 11-4
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	23.5	23.22	0.09	Right	Cheek	07240	1:1	0.126	1.067	0.134	
1880.00	9400	UMTS 1900	RMC	23.5	23.22	0.19	Right	Tilt	07240	1:1	0.060	1.067	0.064	
1880.00	9400	UMTS 1900	RMC	23.5	23.22	0.13	Left	Cheek	07240	1:1	0.181	1.067	0.193	A4
1880.00	9400	UMTS 1900	RMC	23.5	23.22	0.17	Left	Tilt	07240	1:1	0.050	1.067	0.053	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11-5
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	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.7	30.40	0.11	Right	Cheek	07240	1:8.3	0.066	1.072	0.071	
1880.00	661	GSM 1900	GSM	30.7	30.40	0.18	Right	Tilt	07240	1:8.3	0.033	1.072	0.035	
1880.00	661	GSM 1900	GSM	30.7	30.40	0.20	Left	Cheek	07240	1:8.3	0.091	1.072	0.098	A5
1880.00	661	GSM 1900	GSM	30.7	30.40	0.13	Left	Tilt	07240	1:8.3	0.022	1.072	0.024	
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 11-6
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	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	24.0	23.99	-0.08	0	Right	Cheek	QPSK	1	0	07349	1:1	0.172	1.002	0.172	A6
707.50	23095	Mid	LTE Band 12	10	23.0	22.82	0.02	1	Right	Cheek	QPSK	25	0	07349	1:1	0.130	1.042	0.135	
707.50	23095	Mid	LTE Band 12	10	24.0	23.99	0.14	0	Right	Tilt	QPSK	1	0	07349	1:1	0.108	1.002	0.108	
707.50	23095	Mid	LTE Band 12	10	23.0	22.82	0.15	1	Right	Tilt	QPSK	25	0	07349	1:1	0.078	1.042	0.081	
707.50	23095	Mid	LTE Band 12	10	24.0	23.99	-0.03	0	Left	Cheek	QPSK	1	0	07349	1:1	0.132	1.002	0.132	
707.50	23095	Mid	LTE Band 12	10	23.0	22.82	0.15	1	Left	Cheek	QPSK	25	0	07349	1:1	0.105	1.042	0.109	
707.50	23095	Mid	LTE Band 12	10	24.0	23.99	0.08	0	Left	Tilt	QPSK	1	0	07349	1:1	0.103	1.002	0.103	
707.50	23095	Mid	LTE Band 12	10	23.0	22.82	0.05	1	Left	Tilt	QPSK	25	0	07349	1:1	0.081	1.042	0.084	
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 11-7
LTE Band 13 Head SAR

MEASUREMENT RESULTS																			
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.	(W/kg)														(W/kg)			
782.00	23230	Mid	LTE Band 13	10	24.0	23.89	-0.03	0	Right	Cheek	QPSK	1	0	07349	1:1	0.159	1.026	0.163	A7
782.00	23230	Mid	LTE Band 13	10	23.0	22.69	0.10	1	Right	Cheek	QPSK	25	0	07349	1:1	0.115	1.074	0.124	
782.00	23230	Mid	LTE Band 13	10	24.0	23.89	0.21	0	Right	Tilt	QPSK	1	0	07349	1:1	0.091	1.026	0.093	
782.00	23230	Mid	LTE Band 13	10	23.0	22.69	-0.08	1	Right	Tilt	QPSK	25	0	07349	1:1	0.065	1.074	0.070	
782.00	23230	Mid	LTE Band 13	10	24.0	23.89	0.13	0	Left	Cheek	QPSK	1	0	07349	1:1	0.103	1.026	0.106	
782.00	23230	Mid	LTE Band 13	10	23.0	22.69	0.06	1	Left	Cheek	QPSK	25	0	07349	1:1	0.073	1.074	0.078	
782.00	23230	Mid	LTE Band 13	10	24.0	23.89	0.07	0	Left	Tilt	QPSK	1	0	07349	1:1	0.100	1.026	0.103	
782.00	23230	Mid	LTE Band 13	10	23.0	22.69	0.08	1	Left	Tilt	QPSK	25	0	07349	1:1	0.071	1.074	0.076	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT																			
Spatial Peak										Head									
Uncontrolled Exposure/General Population										1.6 W/kg (mW/g) averaged over 1 gram									

Table 11-8
LTE Band 26 (Cell) 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)		
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	23.41	0.08	0	Right	Cheek	QPSK	1	0	07349	1:1	0.120	1.021	0.123	A8
831.50	26865	Mid	LTE Band 26 (Cell)	15	22.5	22.31	0.04	1	Right	Cheek	QPSK	36	0	07349	1:1	0.098	1.045	0.102	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	23.41	0.03	0	Right	Tilt	QPSK	1	0	07349	1:1	0.077	1.021	0.079	
831.50	26865	Mid	LTE Band 26 (Cell)	15	22.5	22.31	0.11	1	Right	Tilt	QPSK	36	0	07349	1:1	0.061	1.045	0.064	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	23.41	0.16	0	Left	Cheek	QPSK	1	0	07349	1:1	0.091	1.021	0.093	
831.50	26865	Mid	LTE Band 26 (Cell)	15	22.5	22.31	0.19	1	Left	Cheek	QPSK	36	0	07349	1:1	0.074	1.045	0.077	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	23.41	0.19	0	Left	Tilt	QPSK	1	0	07349	1:1	0.074	1.021	0.076	
831.50	26865	Mid	LTE Band 26 (Cell)	15	22.5	22.31	0.12	1	Left	Tilt	QPSK	36	0	07349	1:1	0.065	1.045	0.068	
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 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	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	Mid	LTE Band 5 (Cell)	10	24.0	23.83	-0.15	0	Right	Cheek	QPSK	1	0	07372	1:1	0.153	1.040	0.159	A9
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.69	-0.03	1	Right	Cheek	QPSK	25	0	07372	1:1	0.117	1.074	0.126	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.83	-0.19	0	Right	Tilt	QPSK	1	0	07372	1:1	0.091	1.040	0.095	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.69	-0.01	1	Right	Tilt	QPSK	25	0	07372	1:1	0.067	1.074	0.072	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.83	0.18	0	Left	Cheek	QPSK	1	0	07372	1:1	0.118	1.040	0.123	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.69	0.14	1	Left	Cheek	QPSK	25	0	07372	1:1	0.096	1.074	0.103	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.83	0.01	0	Left	Tilt	QPSK	1	0	07372	1:1	0.105	1.040	0.109	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.69	0.08	1	Left	Tilt	QPSK	25	0	07372	1:1	0.086	1.074	0.092	
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 11-10
LTE Band 66 (AWS) Head SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Side	Test Position	Modulation	RB Size	RB Offset	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.40	0.01	0	Right	Cheek	QPSK	1	0	07265	1:1	0.142	1.148	0.163	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.0	22.44	0.03	1	Right	Cheek	QPSK	50	0	07265	1:1	0.098	1.138	0.112	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.40	0.07	0	Right	Tilt	QPSK	1	0	07265	1:1	0.090	1.148	0.103	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.0	22.44	0.14	1	Right	Tilt	QPSK	50	0	07265	1:1	0.069	1.138	0.079	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.40	0.15	0	Left	Cheek	QPSK	1	0	07265	1:1	0.238	1.148	0.273	A10
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.0	22.44	0.08	1	Left	Cheek	QPSK	50	0	07265	1:1	0.190	1.138	0.216	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.40	-0.07	0	Left	Tilt	QPSK	1	0	07265	1:1	0.086	1.148	0.099	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.0	22.44	0.10	1	Left	Tilt	QPSK	50	0	07265	1:1	0.064	1.138	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 11-11
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 #
																(W/kg)		(W/kg)	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	23.33	0.18	0	Right	Cheek	QPSK	1	0	07240	1:1	0.114	1.040	0.119	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.5	22.22	0.13	1	Right	Cheek	QPSK	50	0	07240	1:1	0.090	1.067	0.096	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	23.33	0.03	0	Right	Tilt	QPSK	1	0	07240	1:1	0.037	1.040	0.038	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.5	22.22	0.15	1	Right	Tilt	QPSK	50	0	07240	1:1	0.039	1.067	0.042	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	23.33	0.16	0	Left	Cheek	QPSK	1	0	07240	1:1	0.170	1.040	0.177	A11
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.5	22.22	0.08	1	Left	Cheek	QPSK	50	0	07240	1:1	0.143	1.067	0.153	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	23.33	0.16	0	Left	Tilt	QPSK	1	0	07240	1:1	0.037	1.040	0.038	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.5	22.22	-0.03	1	Left	Tilt	QPSK	50	0	07240	1:1	0.029	1.067	0.031	
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
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)			
2535.00	21100	Mid	LTE Band 7	20	24.0	23.64	0.16	0	Right	Cheek	QPSK	1	0	07372	1:1	0.118	1.086	0.128	
2535.00	21100	Mid	LTE Band 7	20	23.0	22.45	0.11	1	Right	Cheek	QPSK	50	0	07372	1:1	0.084	1.135	0.095	
2535.00	21100	Mid	LTE Band 7	20	24.0	23.64	-0.16	0	Right	Tilt	QPSK	1	0	07372	1:1	0.101	1.086	0.110	
2535.00	21100	Mid	LTE Band 7	20	23.0	22.45	0.08	1	Right	Tilt	QPSK	50	0	07372	1:1	0.077	1.135	0.087	
2535.00	21100	Mid	LTE Band 7	20	24.0	23.64	0.11	0	Left	Cheek	QPSK	1	0	07372	1:1	0.129	1.086	0.140	A12
2535.00	21100	Mid	LTE Band 7	20	23.0	22.45	0.19	1	Left	Cheek	QPSK	50	0	07372	1:1	0.101	1.135	0.115	
2535.00	21100	Mid	LTE Band 7	20	24.0	23.64	0.16	0	Left	Tilt	QPSK	1	0	07372	1:1	0.056	1.086	0.061	
2535.00	21100	Mid	LTE Band 7	20	23.0	22.45	0.11	1	Left	Tilt	QPSK	50	0	07372	1:1	0.047	1.135	0.053	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population									Head 1.6 W/kg (mW/g) averaged over 1 gram										

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**Table 11-13
DTS Head SAR**

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	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)	
2462	11	802.11b	DSSS	22	12.5	12.35	0.17	Right	Cheek	07232	1	99.7	0.519	0.413	1.035	1.003	0.429	A13
2462	11	802.11b	DSSS	22	12.5	12.35	0.10	Right	Tilt	07232	1	99.7	0.479	0.406	1.035	1.003	0.421	
2462	11	802.11b	DSSS	22	12.5	12.35	0.17	Left	Cheek	07232	1	99.7	0.246	-	1.035	1.003	-	
2462	11	802.11b	DSSS	22	12.5	12.35	-0.09	Left	Tilt	07232	1	99.7	0.224	-	1.035	1.003	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT									Head									
Spatial Peak									1.6 W/kg (mW/g)									
Uncontrolled Exposure/General Population									averaged over 1 gram									

**Table 11-14
NII Head SAR**

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	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	10.5	10.22	-0.06	Right	Cheek	07265	13.5	96.3	1.522	0.708	1.067	1.038	0.784	A14
5310	62	802.11n	OFDM	40	7.5	6.62	-0.10	Right	Cheek	07265	13.5	96.3	0.487	0.212	1.225	1.038	0.270	
5270	54	802.11n	OFDM	40	10.5	10.22	0.17	Right	Tilt	07265	13.5	96.3	1.160	0.544	1.067	1.038	0.603	
5270	54	802.11n	OFDM	40	10.5	10.22	0.10	Left	Cheek	07265	13.5	96.3	0.917	-	1.067	1.038	-	
5270	54	802.11n	OFDM	40	10.5	10.22	0.14	Left	Tilt	07265	13.5	96.3	0.723	-	1.067	1.038	-	
5610	122	802.11ac	OFDM	80	10.5	9.95	0.12	Right	Cheek	07265	29.3	97.3	0.946	0.458	1.135	1.028	0.534	
5610	122	802.11ac	OFDM	80	10.5	9.95	0.18	Right	Tilt	07265	29.3	97.3	0.783	0.350	1.135	1.028	0.408	
5610	122	802.11ac	OFDM	80	10.5	9.95	0.19	Left	Cheek	07265	29.3	97.3	0.680	-	1.135	1.028	-	
5610	122	802.11ac	OFDM	80	10.5	9.95	0.09	Left	Tilt	07265	29.3	97.3	0.527	-	1.135	1.028	-	
5775	155	802.11ac	OFDM	80	10.5	9.92	0.14	Right	Cheek	07265	29.3	97.3	0.710	0.347	1.143	1.028	0.408	
5775	155	802.11ac	OFDM	80	10.5	9.92	0.19	Right	Tilt	07265	29.3	97.3	0.440	0.267	1.143	1.028	0.314	
5775	155	802.11ac	OFDM	80	10.5	9.92	0.11	Left	Cheek	07265	29.3	97.3	0.411	-	1.143	1.028	-	
5775	155	802.11ac	OFDM	80	10.5	9.92	0.16	Left	Tilt	07265	29.3	97.3	0.409	-	1.143	1.028	-	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT																		
Spatial Peak									Head									
Uncontrolled Exposure/General Population									1.6 W/kg (mW/g) averaged over 1 gram									

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11.2 Standalone Body-Worn SAR Data

Table 11-15
GSM/UMTS Body-Worn SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	190	GSM 850	GSM	34.0	33.10	-0.06	15 mm	07265	1:8.3	back	0.323	1.230	0.397	A15
836.60	4183	UMTS 850	RMC	24.5	23.89	0.00	15 mm	07232	1:1	back	0.284	1.151	0.327	A17
1712.40	1312	UMTS 1750	RMC	23.5	23.19	0.01	15 mm	07372	1:1	back	0.544	1.074	0.584	
1732.40	1412	UMTS 1750	RMC	23.5	23.42	-0.04	15 mm	07372	1:1	back	0.614	1.019	0.626	
1752.60	1513	UMTS 1750	RMC	23.5	23.29	0.03	15 mm	07372	1:1	back	0.634	1.050	0.666	A19
1852.40	9262	UMTS 1900	RMC	23.5	23.11	-0.04	15 mm	07265	1:1	back	0.814	1.094	0.891	A21
1880.00	9400	UMTS 1900	RMC	23.5	23.22	0.01	15 mm	07265	1:1	back	0.789	1.067	0.842	
1907.60	9538	UMTS 1900	RMC	23.5	23.14	-0.02	15 mm	07265	1:1	back	0.755	1.086	0.820	
1880.00	661	GSM 1900	GSM	30.7	30.40	0.02	15 mm	07265	1:8.3	back	0.480	1.072	0.515	A23
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 11-16
LTE Body-Worn SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
707.50	23095	Mid	LTE Band 12	10	24.0	23.99	-0.04	0	07232	QPSK	1	0	15 mm	back	1:1	0.307	1.002	0.308	A25
707.50	23095	Mid	LTE Band 12	10	23.0	22.82	-0.01	1	07232	QPSK	25	0	15 mm	back	1:1	0.234	1.042	0.244	
782.00	23230	Mid	LTE Band 13	10	24.0	23.89	0.00	0	07232	QPSK	1	0	15 mm	back	1:1	0.253	1.026	0.260	A27
782.00	23230	Mid	LTE Band 13	10	23.0	22.69	0.06	1	07232	QPSK	25	0	15 mm	back	1:1	0.188	1.074	0.202	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	23.41	0.02	0	07349	QPSK	1	0	15 mm	back	1:1	0.163	1.021	0.166	A29
831.50	26865	Mid	LTE Band 26 (Cell)	15	22.5	22.31	0.04	1	07349	QPSK	36	0	15 mm	back	1:1	0.133	1.045	0.139	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.0	23.83	0.04	0	07265	QPSK	1	0	15 mm	back	1:1	0.185	1.040	0.192	A31
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.69	-0.01	1	07265	QPSK	25	0	15 mm	back	1:1	0.147	1.074	0.158	
1720.00	132072	Low	LTE Band 66 (AWS)	20	24.0	23.40	0.01	0	07232	QPSK	1	0	15 mm	back	1:1	0.557	1.148	0.639	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	24.0	23.25	-0.01	0	07232	QPSK	1	0	15 mm	back	1:1	0.629	1.189	0.748	
1770.00	132572	High	LTE Band 66 (AWS)	20	24.0	23.24	0.03	0	07232	QPSK	1	99	15 mm	back	1:1	0.721	1.191	0.859	A33
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.0	22.44	-0.02	1	07232	QPSK	50	0	15 mm	back	1:1	0.471	1.138	0.536	
1720.00	132072	Low	LTE Band 66 (AWS)	20	23.0	22.28	-0.02	1	07232	QPSK	100	0	15 mm	back	1:1	0.470	1.180	0.555	
1860.00	18700	Low	LTE Band 2 (PCS)	20	23.5	23.15	0.01	0	07265	QPSK	1	99	15 mm	back	1:1	0.832	1.084	0.902	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	23.5	23.33	0.06	0	07265	QPSK	1	0	15 mm	back	1:1	0.858	1.040	0.892	A35
1900.00	19100	High	LTE Band 2 (PCS)	20	23.5	23.32	0.01	0	07265	QPSK	1	0	15 mm	back	1:1	0.848	1.042	0.884	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.5	22.22	-0.01	1	07265	QPSK	50	0	15 mm	back	1:1	0.654	1.067	0.698	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	22.5	22.19	-0.01	1	07265	QPSK	100	0	15 mm	back	1:1	0.651	1.074	0.699	
2535.00	21100	Mid	LTE Band 7	20	24.0	23.64	0.00	0	07232	QPSK	1	0	15 mm	back	1:1	0.416	1.086	0.452	A37
2535.00	21100	Mid	LTE Band 7	20	23.0	22.45	0.01	1	07232	QPSK	50	0	15 mm	back	1:1	0.324	1.135	0.368	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT																			
Spatial Peak									Body										
Uncontrolled Exposure/General Population									1.6 W/kg (mW/g)										
									averaged over 1 gram										

Table 11-17
DTS Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	18.5	18.34	-0.18	15 mm	07232	1	back	99.7	0.243	0.187	1.038	1.003	0.195	A39
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
NII Body-Worn SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	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)	
5270	54	802.11n	OFDM	40	14.0	13.58	-0.12	15 mm	07349	13.5	back	96.3	0.353	0.181	1.102	1.038	0.207	
5630	126	802.11n	OFDM	40	14.0	13.72	0.05	15 mm	07349	13.5	back	96.3	0.884	0.400	1.067	1.038	0.443	A41
5795	159	802.11n	OFDM	40	14.0	13.98	-0.05	15 mm	07349	13.5	back	96.3	0.910	0.387	1.005	1.038	0.404	
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	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	29.0	27.31	-0.04	10 mm	07265	4	1:2.076	back	0.398	1.476	0.587	A16
836.60	190	GSM 850	GPRS	29.0	27.31	-0.01	10 mm	07265	4	1:2.076	front	0.357	1.476	0.527	
836.60	190	GSM 850	GPRS	29.0	27.31	0.06	10 mm	07265	4	1:2.076	bottom	0.241	1.476	0.356	
836.60	190	GSM 850	GPRS	29.0	27.31	-0.01	10 mm	07265	4	1:2.076	right	0.376	1.476	0.555	
836.60	190	GSM 850	GPRS	29.0	27.31	0.03	10 mm	07265	4	1:2.076	left	0.169	1.476	0.249	
836.60	4183	UMTS 850	RMC	23.5	23.48	-0.04	10 mm	07232	N/A	1:1	back	0.369	1.005	0.371	A18
836.60	4183	UMTS 850	RMC	23.5	23.48	-0.07	10 mm	07232	N/A	1:1	front	0.292	1.005	0.293	
836.60	4183	UMTS 850	RMC	23.5	23.48	-0.03	10 mm	07232	N/A	1:1	bottom	0.206	1.005	0.207	
836.60	4183	UMTS 850	RMC	23.5	23.48	-0.02	10 mm	07232	N/A	1:1	right	0.283	1.005	0.284	
836.60	4183	UMTS 850	RMC	23.5	23.48	0.01	10 mm	07232	N/A	1:1	left	0.122	1.005	0.123	
1732.40	1412	UMTS 1750	RMC	20.0	19.86	0.01	10 mm	07372	N/A	1:1	back	0.451	1.033	0.466	
1732.40	1412	UMTS 1750	RMC	20.0	19.86	0.00	10 mm	07372	N/A	1:1	front	0.374	1.033	0.386	
1712.40	1312	UMTS 1750	RMC	20.0	19.88	-0.05	10 mm	07372	N/A	1:1	bottom	0.604	1.028	0.621	
1732.40	1412	UMTS 1750	RMC	20.0	19.86	-0.05	10 mm	07372	N/A	1:1	bottom	0.650	1.033	0.671	
1752.60	1513	UMTS 1750	RMC	20.0	19.87	-0.06	10 mm	07372	N/A	1:1	bottom	0.733	1.030	0.755	A20
1732.40	1412	UMTS 1750	RMC	20.0	19.86	-0.06	10 mm	07372	N/A	1:1	right	0.072	1.033	0.074	
1732.40	1412	UMTS 1750	RMC	20.0	19.86	-0.02	10 mm	07372	N/A	1:1	left	0.119	1.033	0.123	
1880.00	9400	UMTS 1900	RMC	20.5	20.37	0.00	10 mm	07265	N/A	1:1	back	0.566	1.030	0.583	
1880.00	9400	UMTS 1900	RMC	20.5	20.37	0.00	10 mm	07265	N/A	1:1	front	0.499	1.030	0.514	
1852.40	9262	UMTS 1900	RMC	20.5	20.47	-0.04	10 mm	07265	N/A	1:1	bottom	1.040	1.007	1.047	
1880.00	9400	UMTS 1900	RMC	20.5	20.37	-0.02	10 mm	07265	N/A	1:1	bottom	1.030	1.030	1.061	
1907.60	9538	UMTS 1900	RMC	20.5	20.38	-0.05	10 mm	07265	N/A	1:1	bottom	1.060	1.028	1.090	A22
1880.00	9400	UMTS 1900	RMC	20.5	20.37	-0.10	10 mm	07265	N/A	1:1	right	0.088	1.030	0.091	
1880.00	9400	UMTS 1900	RMC	20.5	20.37	-0.13	10 mm	07265	N/A	1:1	left	0.107	1.030	0.110	
1907.60	9538	UMTS 1900	RMC	20.5	20.38	-0.11	10 mm	07265	N/A	1:1	bottom	1.020	1.028	1.049	
1880.00	661	GSM 1900	GPRS	25.5	25.28	-0.05	10 mm	07265	3	1:2.76	back	0.580	1.052	0.610	
1880.00	661	GSM 1900	GPRS	25.5	25.28	0.06	10 mm	07265	3	1:2.76	front	0.487	1.052	0.512	
1850.20	512	GSM 1900	GPRS	25.5	25.45	-0.02	10 mm	07265	3	1:2.76	bottom	0.874	1.012	0.884	
1880.00	661	GSM 1900	GPRS	25.5	25.28	-0.08	10 mm	07265	3	1:2.76	bottom	0.910	1.052	0.957	
1909.80	810	GSM 1900	GPRS	25.5	25.31	0.20	10 mm	07265	3	1:2.76	bottom	1.030	1.045	1.076	A24
1880.00	661	GSM 1900	GPRS	25.5	25.28	-0.08	10 mm	07265	3	1:2.76	right	0.085	1.052	0.089	
1880.00	661	GSM 1900	GPRS	25.5	25.28	-0.16	10 mm	07265	3	1:2.76	left	0.106	1.052	0.112	
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Note: Blue entry represents variability measurement.

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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]	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	24.0	23.99	-0.03	0	07232	QPSK	1	0	10 mm	back	1:1	0.409	1.002	0.410	A26
707.50	23095	Mid	LTE Band 12	10	23.0	22.82	0.03	1	07232	QPSK	25	0	10 mm	back	1:1	0.315	1.042	0.328	
707.50	23095	Mid	LTE Band 12	10	24.0	23.99	-0.04	0	07232	QPSK	1	0	10 mm	front	1:1	0.323	1.002	0.324	
707.50	23095	Mid	LTE Band 12	10	23.0	22.82	-0.05	1	07232	QPSK	25	0	10 mm	front	1:1	0.246	1.042	0.256	
707.50	23095	Mid	LTE Band 12	10	24.0	23.99	-0.05	0	07232	QPSK	1	0	10 mm	bottom	1:1	0.157	1.002	0.157	
707.50	23095	Mid	LTE Band 12	10	23.0	22.82	0.01	1	07232	QPSK	25	0	10 mm	bottom	1:1	0.117	1.042	0.122	
707.50	23095	Mid	LTE Band 12	10	24.0	23.99	-0.03	0	07232	QPSK	1	0	10 mm	right	1:1	0.361	1.002	0.362	
707.50	23095	Mid	LTE Band 12	10	23.0	22.82	-0.04	1	07232	QPSK	25	0	10 mm	right	1:1	0.285	1.042	0.297	
707.50	23095	Mid	LTE Band 12	10	24.0	23.99	-0.03	0	07232	QPSK	1	0	10 mm	left	1:1	0.259	1.002	0.260	
707.50	23095	Mid	LTE Band 12	10	23.0	22.82	-0.07	1	07232	QPSK	25	0	10 mm	left	1:1	0.193	1.042	0.201	
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 11-21
LTE Band 13 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
782.00	23230	Mid	LTE Band 13	10	24.0	23.89	0.02	0	07232	QPSK	1	0	10 mm	back	1:1	0.403	1.026	0.413	A28
782.00	23230	Mid	LTE Band 13	10	23.0	22.69	-0.01	1	07232	QPSK	25	0	10 mm	back	1:1	0.307	1.074	0.330	
782.00	23230	Mid	LTE Band 13	10	24.0	23.89	-0.01	0	07232	QPSK	1	0	10 mm	front	1:1	0.295	1.026	0.303	
782.00	23230	Mid	LTE Band 13	10	23.0	22.69	-0.01	1	07232	QPSK	25	0	10 mm	front	1:1	0.216	1.074	0.232	
782.00	23230	Mid	LTE Band 13	10	24.0	23.89	-0.05	0	07232	QPSK	1	0	10 mm	bottom	1:1	0.227	1.026	0.233	
782.00	23230	Mid	LTE Band 13	10	23.0	22.69	-0.03	1	07232	QPSK	25	0	10 mm	bottom	1:1	0.170	1.074	0.183	
782.00	23230	Mid	LTE Band 13	10	24.0	23.89	0.06	0	07232	QPSK	1	0	10 mm	right	1:1	0.279	1.026	0.286	
782.00	23230	Mid	LTE Band 13	10	23.0	22.69	-0.06	1	07232	QPSK	25	0	10 mm	right	1:1	0.223	1.074	0.240	
782.00	23230	Mid	LTE Band 13	10	24.0	23.89	-0.05	0	07232	QPSK	1	0	10 mm	left	1:1	0.108	1.026	0.111	
782.00	23230	Mid	LTE Band 13	10	23.0	22.69	0.04	1	07232	QPSK	25	0	10 mm	left	1:1	0.083	1.074	0.089	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

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Table 11-22
LTE Band 26 (Cell) 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)		
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	23.41	0.05	0	07349	QPSK	1	0	10 mm	back	1:1	0.319	1.021	0.326	A30
831.50	26865	Mid	LTE Band 26 (Cell)	15	22.5	22.31	0.07	1	07349	QPSK	36	0	10 mm	back	1:1	0.268	1.045	0.280	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	23.41	0.07	0	07349	QPSK	1	0	10 mm	front	1:1	0.240	1.021	0.245	
831.50	26865	Mid	LTE Band 26 (Cell)	15	22.5	22.31	-0.01	1	07349	QPSK	36	0	10 mm	front	1:1	0.198	1.045	0.207	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	23.41	0.01	0	07349	QPSK	1	0	10 mm	bottom	1:1	0.153	1.021	0.156	
831.50	26865	Mid	LTE Band 26 (Cell)	15	22.5	22.31	-0.06	1	07349	QPSK	36	0	10 mm	bottom	1:1	0.130	1.045	0.136	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	23.41	0.01	0	07349	QPSK	1	0	10 mm	right	1:1	0.239	1.021	0.244	
831.50	26865	Mid	LTE Band 26 (Cell)	15	22.5	22.31	-0.02	1	07349	QPSK	36	0	10 mm	right	1:1	0.205	1.045	0.214	
831.50	26865	Mid	LTE Band 26 (Cell)	15	23.5	23.41	-0.02	0	07349	QPSK	1	0	10 mm	left	1:1	0.088	1.021	0.090	
831.50	26865	Mid	LTE Band 26 (Cell)	15	22.5	22.31	0.07	1	07349	QPSK	36	0	10 mm	left	1:1	0.072	1.045	0.075	
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 11-23
LTE Band 5 (Cell) 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)		
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.46	-0.04	0	07265	QPSK	1	0	10 mm	back	1:1	0.300	1.132	0.340	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.45	-0.02	0	07265	QPSK	25	0	10 mm	back	1:1	0.304	1.135	0.345	A32
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.46	0.00	0	07265	QPSK	1	0	10 mm	front	1:1	0.238	1.132	0.269	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.45	0.02	0	07265	QPSK	25	0	10 mm	front	1:1	0.242	1.135	0.275	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.46	-0.01	0	07265	QPSK	1	0	10 mm	bottom	1:1	0.146	1.132	0.165	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.45	-0.01	0	07265	QPSK	25	0	10 mm	bottom	1:1	0.153	1.135	0.174	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.46	0.00	0	07265	QPSK	1	0	10 mm	right	1:1	0.228	1.132	0.258	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.45	0.02	0	07265	QPSK	25	0	10 mm	right	1:1	0.228	1.135	0.259	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.46	-0.05	0	07265	QPSK	1	0	10 mm	left	1:1	0.076	1.132	0.086	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.0	22.45	0.02	0	07265	QPSK	25	0	10 mm	left	1:1	0.070	1.135	0.079	
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 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	21.0	20.45	-0.01	0	07232	QPSK	1	0	10 mm	back	1:1	0.484	1.135	0.549	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.0	20.38	0.02	0	07232	QPSK	50	0	10 mm	back	1:1	0.498	1.153	0.574	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.0	20.45	0.01	0	07232	QPSK	1	0	10 mm	front	1:1	0.421	1.135	0.478	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.0	20.38	0.01	0	07232	QPSK	50	0	10 mm	front	1:1	0.436	1.153	0.503	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.0	20.45	0.00	0	07232	QPSK	1	0	10 mm	bottom	1:1	0.682	1.135	0.774	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.0	20.38	-0.02	0	07232	QPSK	50	0	10 mm	bottom	1:1	0.719	1.153	0.829	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	21.0	20.30	0.00	0	07232	QPSK	50	0	10 mm	bottom	1:1	0.757	1.175	0.889	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.25	-0.01	0	07232	QPSK	50	25	10 mm	bottom	1:1	0.917	1.189	1.090	A34
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.0	20.28	-0.02	0	07232	QPSK	100	0	10 mm	bottom	1:1	0.716	1.180	0.845	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.0	20.45	0.00	0	07232	QPSK	1	0	10 mm	right	1:1	0.022	1.135	0.025	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.0	20.38	-0.17	0	07232	QPSK	50	0	10 mm	right	1:1	0.033	1.153	0.038	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.0	20.45	-0.01	0	07232	QPSK	1	0	10 mm	left	1:1	0.180	1.135	0.204	
1720.00	132072	Low	LTE Band 66 (AWS)	20	21.0	20.38	-0.03	0	07232	QPSK	50	0	10 mm	left	1:1	0.178	1.153	0.205	
1770.00	132572	High	LTE Band 66 (AWS)	20	21.0	20.25	-0.05	0	07232	QPSK	50	25	10 mm	bottom	1:1	0.913	1.189	1.086	
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.

Table 11-25
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)			
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	20.32	-0.05	0	07265	QPSK	1	0	10 mm	back	1:1	0.633	1.042	0.660	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	20.19	0.01	0	07265	QPSK	50	0	10 mm	back	1:1	0.618	1.074	0.664	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	20.32	0.04	0	07265	QPSK	1	0	10 mm	front	1:1	0.560	1.042	0.584	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	20.19	-0.05	0	07265	QPSK	50	0	10 mm	front	1:1	0.551	1.074	0.592	
1860.00	18700	Low	LTE Band 2 (PCS)	20	20.5	20.20	-0.06	0	07265	QPSK	1	50	10 mm	bottom	1:1	0.945	1.072	1.013	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.5	20.21	-0.05	0	07265	QPSK	1	0	10 mm	bottom	1:1	0.979	1.069	1.047	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	20.32	-0.05	0	07265	QPSK	1	0	10 mm	bottom	1:1	0.982	1.042	1.023	A36
1860.00	18700	Low	LTE Band 2 (PCS)	20	20.5	20.17	0.00	0	07265	QPSK	50	25	10 mm	bottom	1:1	0.952	1.079	1.027	
1880.00	18900	Mid	LTE Band 2 (PCS)	20	20.5	20.18	-0.02	0	07265	QPSK	50	0	10 mm	bottom	1:1	0.951	1.076	1.023	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	20.19	-0.04	0	07265	QPSK	50	0	10 mm	bottom	1:1	0.957	1.074	1.028	
1860.00	18700	Low	LTE Band 2 (PCS)	20	20.5	20.17	-0.01	0	07265	QPSK	100	0	10 mm	bottom	1:1	0.940	1.079	1.014	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	20.32	-0.07	0	07265	QPSK	1	0	10 mm	right	1:1	0.087	1.042	0.091	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	20.19	0.02	0	07265	QPSK	50	0	10 mm	right	1:1	0.080	1.074	0.086	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	20.32	-0.09	0	07265	QPSK	1	0	10 mm	left	1:1	0.105	1.042	0.109	
1900.00	19100	High	LTE Band 2 (PCS)	20	20.5	20.19	-0.02	0	07265	QPSK	50	0	10 mm	left	1:1	0.109	1.074	0.117	
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
LTE Band 7 Hotspot SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
2535.00	21100	Mid	LTE Band 7	20	21.0	20.64	0.02	0	07232	QPSK	1	0	10 mm	back	1:1	0.370	1.086	0.402	
2535.00	21100	Mid	LTE Band 7	20	21.0	20.47	-0.01	0	07232	QPSK	50	0	10 mm	back	1:1	0.367	1.130	0.415	
2535.00	21100	Mid	LTE Band 7	20	21.0	20.64	0.01	0	07232	QPSK	1	0	10 mm	front	1:1	0.321	1.086	0.349	
2535.00	21100	Mid	LTE Band 7	20	21.0	20.47	0.05	0	07232	QPSK	50	0	10 mm	front	1:1	0.320	1.130	0.362	
2535.00	21100	Mid	LTE Band 7	20	21.0	20.64	0.05	0	07232	QPSK	1	0	10 mm	bottom	1:1	0.641	1.086	0.696	A38
2510.00	20850	Low	LTE Band 7	20	21.0	20.46	0.03	0	07232	QPSK	50	50	10 mm	bottom	1:1	0.604	1.132	0.684	
2535.00	21100	Mid	LTE Band 7	20	21.0	20.47	-0.06	0	07232	QPSK	50	0	10 mm	bottom	1:1	0.618	1.130	0.698	
2560.00	21350	High	LTE Band 7	20	21.0	20.42	-0.03	0	07232	QPSK	50	50	10 mm	bottom	1:1	0.574	1.143	0.656	
2535.00	21100	Mid	LTE Band 7	20	21.0	20.64	-0.02	0	07232	QPSK	1	0	10 mm	left	1:1	0.206	1.086	0.224	
2535.00	21100	Mid	LTE Band 7	20	21.0	20.47	-0.06	0	07232	QPSK	50	0	10 mm	left	1:1	0.211	1.130	0.238	
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 11-27
WLAN Hotspot SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	Peak SAR of Area Scan	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	Plot #
MHz	Ch.												W/kg	(W/kg)			(W/kg)	
2437	6	802.11b	DSSS	22	18.5	18.34	0.11	10 mm	07232	1	back	99.7	0.399	-	1.038	1.003	-	
2437	6	802.11b	DSSS	22	18.5	18.34	0.00	10 mm	07232	1	front	99.7	0.437	0.344	1.038	1.003	0.358	
2412	1	802.11b	DSSS	22	18.5	17.80	-0.02	10 mm	07232	1	top	99.7	0.425	0.357	1.175	1.003	0.421	
2437	6	802.11b	DSSS	22	18.5	18.34	0.12	10 mm	07232	1	top	99.7	0.699	0.584	1.038	1.003	0.608	A40
2462	11	802.11b	DSSS	22	18.5	17.99	-0.01	10 mm	07232	1	top	99.7	0.551	0.447	1.125	1.003	0.504	
2437	6	802.11b	DSSS	22	18.5	18.34	-0.02	10 mm	07232	1	left	99.7	0.390	-	1.038	1.003	-	
5755	151	802.11n	OFDM	40	14.0	13.82	0.09	10 mm	07349	13.5	back	96.3	2.216	0.847	1.042	1.038	0.916	A42
5795	159	802.11n	OFDM	40	14.0	13.98	-0.02	10 mm	07349	13.5	back	96.3	1.640	0.704	1.005	1.038	0.734	
5795	159	802.11n	OFDM	40	14.0	13.98	0.10	10 mm	07349	13.5	front	96.3	0.149	0.052	1.005	1.038	0.054	
5795	159	802.11n	OFDM	40	14.0	13.98	0.13	10 mm	07349	13.5	top	96.3	0.166	0.057	1.005	1.038	0.059	
5795	159	802.11n	OFDM	40	14.0	13.98	0.15	10 mm	07349	13.5	left	96.3	0.115	-	1.005	1.038	-	
5755	151	802.11n	OFDM	40	14.0	13.82	0.19	10 mm	07349	13.5	back	96.3	2.235	0.807	1.042	1.038	0.873	
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.

11.4 SAR Test Notes

General Notes:

- 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.
- Batteries are fully charged at the beginning of the SAR measurements.
- Liquid tissue depth was at least 15.0 cm for all frequencies.
- 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.

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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 15 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported body-worn SAR was ≤ 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were required.
8. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 13 for variability analysis.
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
10. This device utilizes power reduction for some wireless modes and technologies, as outlined in Section 1.2. 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.

GSM Test Notes:

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

UMTS Notes:

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

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 8.5.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 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).

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4. Per KDB Publication 941225 D05Av01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.

WLAN Notes:

1. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg for 1g evaluations, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI 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 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 for 1g evaluations. See Section 8.6.6 for more information.
4. When the maximum reported 1g averaged SAR is ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
5. 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.

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12 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

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

12.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB Publication 447498 D01v06 4.3.2 and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1g SAR for all the simultaneous transmitting antennas in a specific physical test configuration is ≤ 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 1g or 10g SAR.

When standalone SAR is not required to be measured, per FCC KDB 447498 D01v06 4.3.2 b), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated SAR} = \frac{\sqrt{f(\text{GHz})}}{7.5} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

Table 12-1
Estimated SAR

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated SAR (Body)
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2480	9.50	15	0.126

Note: Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

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12.3 Head SAR Simultaneous Transmission Analysis

Table 12-2
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Held to Ear)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM 850	0.301	0.429	0.730
	UMTS 850	0.234	0.429	0.663
	UMTS 1750	0.229	0.429	0.658
	UMTS 1900	0.193	0.429	0.622
	GSM 1900	0.098	0.429	0.527
	LTE Band 12	0.172	0.429	0.601
	LTE Band 13	0.163	0.429	0.592
	LTE Band 26 (Cell)	0.123	0.429	0.552
	LTE Band 5 (Cell)	0.159	0.429	0.588
	LTE Band 66 (AWS)	0.273	0.429	0.702
	LTE Band 2 (PCS)	0.177	0.429	0.606
	LTE Band 7	0.140	0.429	0.569

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

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Head SAR	GSM 850	0.301	0.784	1.085
	UMTS 850	0.234	0.784	1.018
	UMTS 1750	0.229	0.784	1.013
	UMTS 1900	0.193	0.784	0.977
	GSM 1900	0.098	0.784	0.882
	LTE Band 12	0.172	0.784	0.956
	LTE Band 13	0.163	0.784	0.947
	LTE Band 26 (Cell)	0.123	0.784	0.907
	LTE Band 5 (Cell)	0.159	0.784	0.943
	LTE Band 66 (AWS)	0.273	0.784	1.057
	LTE Band 2 (PCS)	0.177	0.784	0.961
	LTE Band 7	0.140	0.784	0.924

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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 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM 850	0.397	0.195	0.592
	UMTS 850	0.327	0.195	0.522
	UMTS 1750	0.666	0.195	0.861
	UMTS 1900	0.891	0.195	1.086
	GSM 1900	0.515	0.195	0.710
	LTE Band 12	0.308	0.195	0.503
	LTE Band 13	0.260	0.195	0.455
	LTE Band 26 (Cell)	0.166	0.195	0.361
	LTE Band 5 (Cell)	0.192	0.195	0.387
	LTE Band 66 (AWS)	0.859	0.195	1.054
	LTE Band 2 (PCS)	0.902	0.195	1.097
	LTE Band 7	0.452	0.195	0.647

Table 12-5
Simultaneous Transmission Scenario with 5 GHz WLAN (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM 850	0.397	0.443	0.840
	UMTS 850	0.327	0.443	0.770
	UMTS 1750	0.666	0.443	1.109
	UMTS 1900	0.891	0.443	1.334
	GSM 1900	0.515	0.443	0.958
	LTE Band 12	0.308	0.443	0.751
	LTE Band 13	0.260	0.443	0.703
	LTE Band 26 (Cell)	0.166	0.443	0.609
	LTE Band 5 (Cell)	0.192	0.443	0.635
	LTE Band 66 (AWS)	0.859	0.443	1.302
	LTE Band 2 (PCS)	0.902	0.443	1.345
	LTE Band 7	0.452	0.443	0.895

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Table 12-6
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.5 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body-Worn	GSM 850	0.397	0.126	0.523
	UMTS 850	0.327	0.126	0.453
	UMTS 1750	0.666	0.126	0.792
	UMTS 1900	0.891	0.126	1.017
	GSM 1900	0.515	0.126	0.641
	LTE Band 12	0.308	0.126	0.434
	LTE Band 13	0.260	0.126	0.386
	LTE Band 26 (Cell)	0.166	0.126	0.292
	LTE Band 5 (Cell)	0.192	0.126	0.318
	LTE Band 66 (AWS)	0.859	0.126	0.985
	LTE Band 2 (PCS)	0.902	0.126	1.028
	LTE Band 7	0.452	0.126	0.578

Note: Bluetooth SAR was not required to be measured per FCC KDB Publication 447498 D01v06. Estimated SAR results were used in the above table to determine simultaneous transmission SAR test exclusion.

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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 (“-”).

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

Table 12-7
Simultaneous Transmission Scenario with 2.4 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.587	0.608	1.195
	UMTS 850	0.371	0.608	0.979
	UMTS 1750	0.755	0.608	1.363
	UMTS 1900	1.090	0.608	See Table Below
	GPRS 1900	1.076	0.608	See Table Below
	LTE Band 12	0.410	0.608	1.018
	LTE Band 13	0.413	0.608	1.021
	LTE Band 26 (Cell)	0.326	0.608	0.934
	LTE Band 5 (Cell)	0.345	0.608	0.953
	LTE Band 66 (AWS)	1.090	0.608	See Table Below
	LTE Band 2 (PCS)	1.047	0.608	See Table Below
	LTE Band 7	0.698	0.608	1.306

Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.583	0.608*	1.191
	Front	0.514	0.358	0.872
	Top	-	0.608	0.608
	Bottom	1.090	-	1.090
	Right	0.091	-	0.091
	Left	0.110	0.608*	0.718

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Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.610	0.608*	1.218
	Front	0.512	0.358	0.870
	Top	-	0.608	0.608
	Bottom	1.076	-	1.076
	Right	0.089	-	0.089
	Left	0.112	0.608*	0.720

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.574	0.608*	1.182
	Front	0.503	0.358	0.861
	Top	-	0.608	0.608
	Bottom	1.090	-	1.090
	Right	0.038	-	0.038
	Left	0.205	0.608*	0.813

Simult Tx	Configuration	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.664	0.608*	1.272
	Front	0.592	0.358	0.950
	Top	-	0.608	0.608
	Bottom	1.047	-	1.047
	Right	0.091	-	0.091
	Left	0.117	0.608*	0.725

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Table 12-8
Simultaneous Transmission Scenario with 5 GHz WLAN (Hotspot at 1.0 cm)

Exposure Condition	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	GPRS 850	0.587	0.916	1.503
	UMTS 850	0.371	0.916	1.287
	UMTS 1750	0.755	0.916	See Table Below
	UMTS 1900	1.090	0.916	See Table Below
	GPRS 1900	1.076	0.916	See Table Below
	LTE Band 12	0.410	0.916	1.326
	LTE Band 13	0.413	0.916	1.329
	LTE Band 26 (Cell)	0.326	0.916	1.242
	LTE Band 5 (Cell)	0.345	0.916	1.261
	LTE Band 66 (AWS)	1.090	0.916	See Table Below
	LTE Band 2 (PCS)	1.047	0.916	See Table Below
	LTE Band 7	0.698	0.916	See Table Below

Simult Tx	Configuration	UMTS 1750 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.466	0.916	1.382
	Front	0.386	0.054	0.440
	Top	-	0.059	0.059
	Bottom	0.755	-	0.755
	Right	0.074	-	0.074
	Left	0.123	0.916*	1.039

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Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.583	0.916	1.499
	Front	0.514	0.054	0.568
	Top	-	0.059	0.059
	Bottom	1.090	-	1.090
	Right	0.091	-	0.091
	Left	0.110	0.916*	1.026

Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.610	0.916	1.526
	Front	0.512	0.054	0.566
	Top	-	0.059	0.059
	Bottom	1.076	-	1.076
	Right	0.089	-	0.089
	Left	0.112	0.916*	1.028

Simult Tx	Configuration	LTE Band 66 (AWS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.574	0.916	1.490
	Front	0.503	0.054	0.557
	Top	-	0.059	0.059
	Bottom	1.090	-	1.090
	Right	0.038	-	0.038
	Left	0.205	0.916*	1.121

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Simult Tx	Configuration	LTE Band 2 (PCS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.664	0.916	1.580
	Front	0.592	0.054	0.646
	Top	-	0.059	0.059
	Bottom	1.047	-	1.047
	Right	0.091	-	0.091
	Left	0.117	0.916*	1.033

Simult Tx	Configuration	LTE Band 7 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Hotspot SAR	Back	0.415	0.916	1.331
	Front	0.362	0.054	0.416
	Top	-	0.059	0.059
	Bottom	0.698	-	0.698
	Right	-	-	0.000
	Left	0.238	0.916*	1.154

12.6 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 ≥ 0.80 W/kg, the measurement was repeated once.
- 2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1g SAR limit).
- 3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
- 4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

Table 13-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS															
Band	FREQUENCY		Mode	Service	# of Time Slots	Data Rate (Mbps)	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	1770.00	132572	LTE Band 66 (AWS), 20 MHz Bandwidth	QPSK, 50 RB, 25 RB Offset	N/A	N/A	bottom	10 mm	0.917	0.913	1.00	N/A	N/A	N/A	N/A
1900	1907.60	9538	UMTS 1900	RMC	N/A	N/A	bottom	10 mm	1.060	1.020	1.04	N/A	N/A	N/A	N/A
5750	5755.00	151	802.11n, 40 MHz Bandwidth	OFDM	N/A	13.5	back	10 mm	0.847	0.807	1.05	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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14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E4432B	ESG-D Series Signal Generator	3/24/2017	Annual	3/24/2018	US40053896
Agilent	E5515C	Wireless Communications Test Set	1/29/2016	Biennial	1/29/2018	GB46310798
Agilent	E5515C	Wireless Communications Test Set	1/8/2015	Triennial	1/8/2018	GB43163447
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/22/2017	Annual	3/22/2018	MY45470194
Agilent	N5182A	MXG Vector Signal Generator	2/28/2017	Annual	2/28/2018	MY47420800
Agilent	E4438C	ESG Vector Signal Generator	3/24/2017	Biennial	3/24/2019	MY42082385
Agilent	E4438C	ESG Vector Signal Generator	3/23/2017	Annual	3/23/2018	MY47270002
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Anritsu	MA24106A	USB Power Sensor	6/7/2017	Annual	6/7/2018	1231538
Anritsu	MA24106A	USB Power Sensor	6/7/2017	Annual	6/7/2018	1231535
Anritsu	MA24106A	USB Power Sensor	6/7/2017	Annual	6/7/2018	1244524
Anritsu	MA24106A	USB Power Sensor	6/7/2017	Annual	6/7/2018	1244515
Anritsu	MT8820C	Radio Communication Analyzer	5/23/2017	Annual	5/23/2018	6201240328
Anritsu	MT8821C	Radio Communication Analyzer	7/25/2017	Annual	7/25/2018	6201664756
Anritsu	ML2496A	Power Meter	3/28/2017	Annual	3/28/2018	1351001
Anritsu	ML2496A	Power Meter	4/20/2017	Annual	4/20/2018	1306009
Anritsu	MA2411B	Pulse Power Sensor	2/10/2017	Annual	2/10/2018	1339018
Rohde & Schwarz	CMW500	Radio Communication Tester	11/3/2017	Annual	11/3/2018	100976
Rohde & Schwarz	CMW500	Radio Communication Tester	5/4/2017	Annual	5/4/2018	112347
Rohde & Schwarz	CMW500	Radio Communication Tester	5/4/2017	Annual	5/4/2018	101699
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	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	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Seekonk	NC-100	Torque Wrench (8" lb)	9/1/2016	Biennial	9/1/2018	21053
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/2/2016	Biennial	3/2/2018	N/A
Seekonk	NC-100	Torque Wrench (8" lb)	8/30/2016	Biennial	8/30/2018	N/A
SPEAG	D750V3	750 MHz Dipole	3/7/2017	Annual	3/7/2018	1054
SPEAG	D835V2	835 MHz SAR Dipole	7/11/2017	Annual	7/11/2018	4d133
SPEAG	D1750V2	1750 MHz SAR Dipole	5/9/2017	Annual	5/9/2018	1148
SPEAG	D1900V2	1900 MHz SAR Dipole	7/11/2017	Annual	7/11/2018	5d149
SPEAG	D2450V2	2450 MHz SAR Dipole	7/25/2016	Biennial	7/25/2018	981
SPEAG	D2600V2	2600 MHz SAR Dipole	7/10/2017	Annual	7/10/2018	1126
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/20/2017	Annual	1/20/2018	1057
SPEAG	D750V3	750 MHz SAR Dipole	7/13/2016	Biennial	7/13/2018	1161
SPEAG	D835V2	835 MHz SAR Dipole	1/11/2017	Annual	1/11/2018	4d132
SPEAG	D2450V2	2450 MHz SAR Dipole	8/17/2017	Annual	8/17/2018	719
SPEAG	D5GHzV2	5 GHz SAR Dipole	8/15/2017	Annual	8/15/2018	1237
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/13/2017	Annual	7/13/2018	1322
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/11/2017	Annual	4/11/2018	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2017	Annual	2/9/2018	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/8/2017	Annual	3/8/2018	1368
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/9/2017	Annual	2/9/2018	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/9/2017	Annual	8/9/2018	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/14/2017	Annual	6/14/2018	1334
COMTECH	AR85729-5/5759B	Solid State Amplifier	N/A	N/A	N/A	M3W1A00-1002
COMTECH	AR85729-5	Solid State Amplifier	N/A	N/A	N/A	M155A00-009
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/10/2017	Annual	5/10/2018	1070
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Amplifier Research	1551G6	Amplifier	N/A	N/A	N/A	433971
Amplifier Research	1551G6	Amplifier	N/A	N/A	N/A	433972
Amplifier Research	1551G6	Amplifier	N/A	N/A	N/A	433974
Mitutoyo	CD-6"CSX	Digital Caliper	3/2/2016	Biennial	3/2/2018	13264162
Mitutoyo	CD-6"CSX	Digital Caliper	3/2/2016	Biennial	3/2/2018	13264165
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
SPEAG	EX3DV4	SAR Probe	7/17/2017	Annual	7/17/2018	7410
SPEAG	EX3DV4	SAR Probe	4/18/2017	Annual	4/18/2018	7406
SPEAG	ES3DV3	SAR Probe	2/10/2017	Annual	2/10/2018	3213
SPEAG	ES3DV3	SAR Probe	3/14/2017	Annual	3/14/2018	3319
SPEAG	EX3DV4	SAR Probe	2/13/2017	Annual	2/13/2018	3914
SPEAG	ES3DV3	SAR Probe	8/14/2017	Annual	8/14/2018	3332
SPEAG	EX3DV4	SAR Probe	8/16/2017	Annual	8/16/2018	7308
Agilent	8753ES	S-Parameter Vector Network Analyzer	8/17/2017	Annual	8/17/2018	MY40003841
Control Company	4040	Therm./ Clock/ Humidity Monitor	3/1/2017	Biennial	3/1/2019	170152009
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330144
Control Company	4352	Ultra Long Stem Thermometer	3/8/2016	Biennial	3/8/2018	160261729
Control Company	4352	Ultra Long Stem Thermometer	3/8/2016	Biennial	3/8/2018	160261694

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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15 MEASUREMENT UNCERTAINTIES

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

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16 CONCLUSION

16.1 Measurement Conclusion

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

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

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07349

Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.895 \text{ S/m}$; $\epsilon_r = 40.488$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 11-27-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP: 7535

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

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

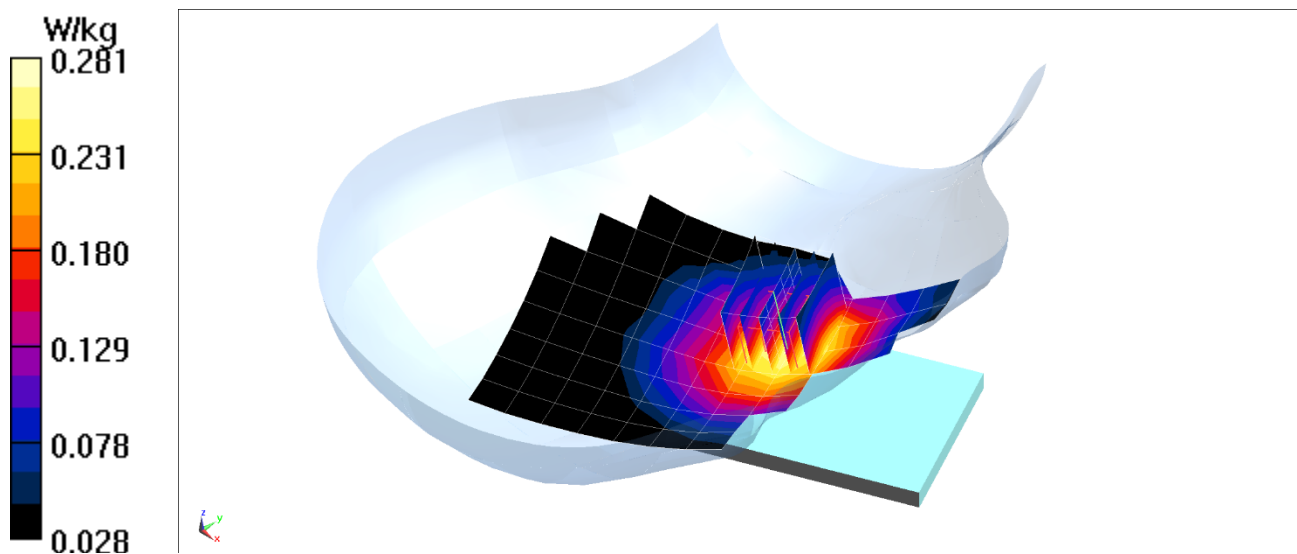
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 16.25 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.303 W/kg

SAR(1 g) = 0.245 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07349

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.895 \text{ S/m}$; $\epsilon_r = 40.488$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 11-27-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP: 7535

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

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

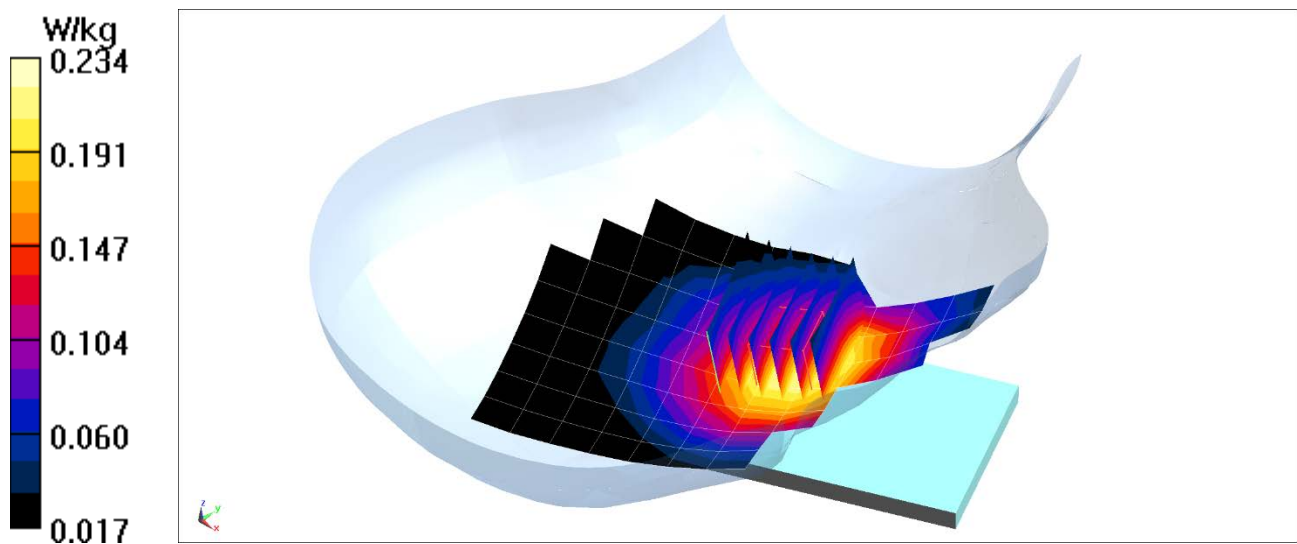
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 15.09 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.256 W/kg

SAR(1 g) = 0.203 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

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

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.4 \text{ MHz}$; $\sigma = 1.369 \text{ S/m}$; $\epsilon_r = 38.636$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-04-2017; Ambient Temp: 21.9°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3213; ConvF(5.49, 5.49, 5.49); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

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

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

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

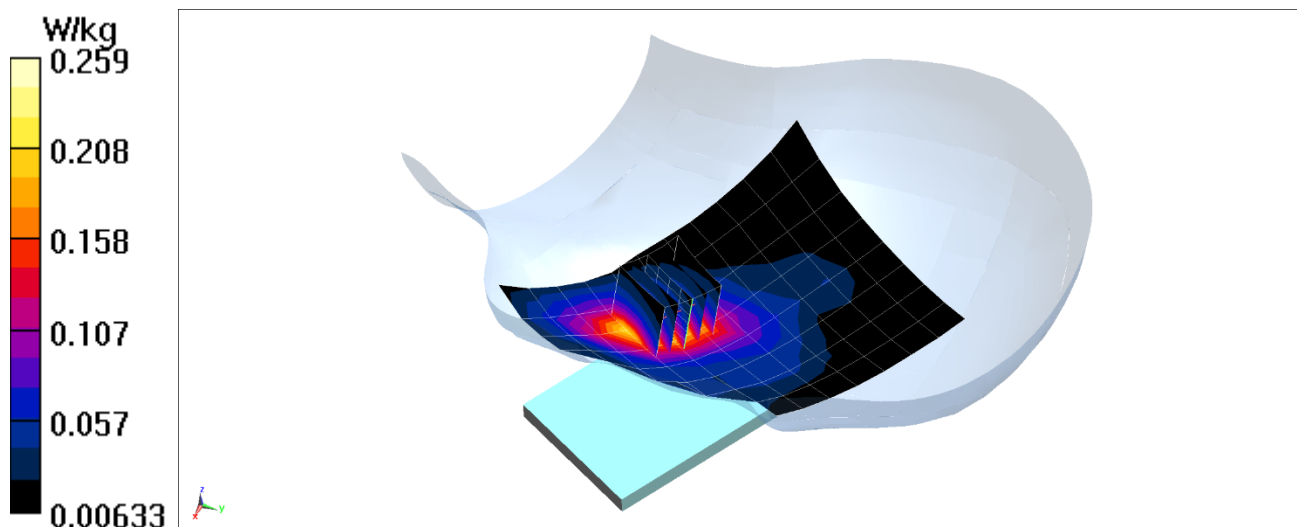
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 13.42 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.346 W/kg

SAR(1 g) = 0.225 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07240

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.419 \text{ S/m}$; $\epsilon_r = 40.684$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-03-2017; Ambient Temp: 21.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(8.4, 8.4, 8.4); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP:7535

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

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

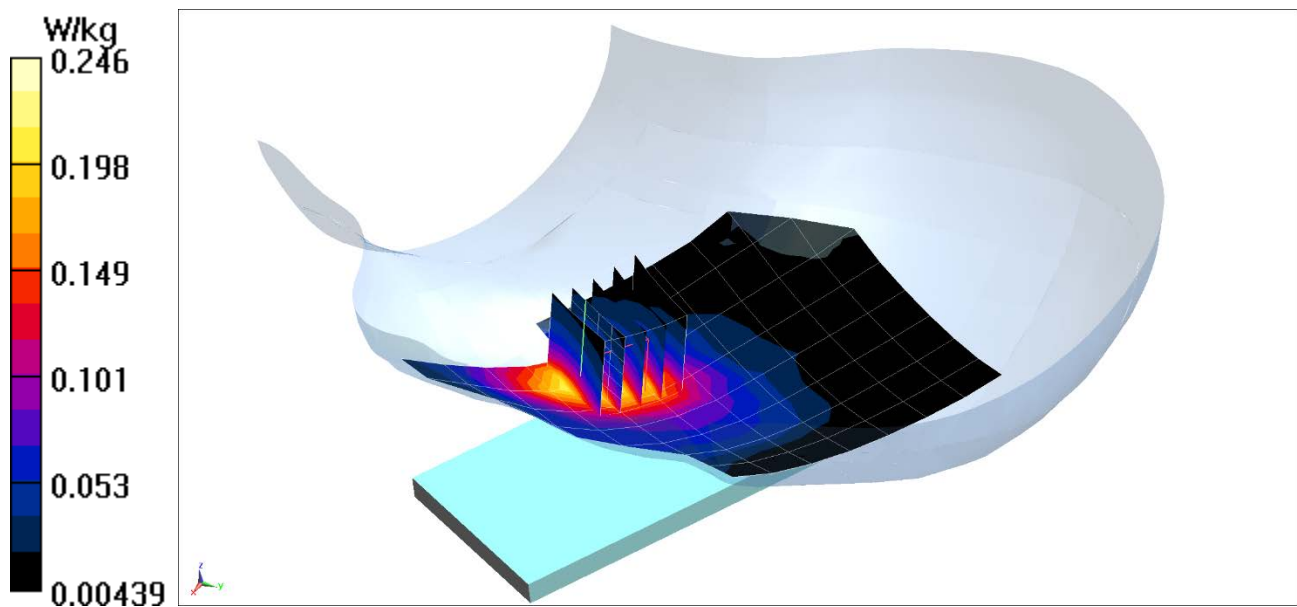
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 11.46 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.293 W/kg

SAR(1 g) = 0.181 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07240

Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.419 \text{ S/m}$; $\epsilon_r = 40.684$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-03-2017; Ambient Temp: 21.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(8.4, 8.4, 8.4); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP:7535

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

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

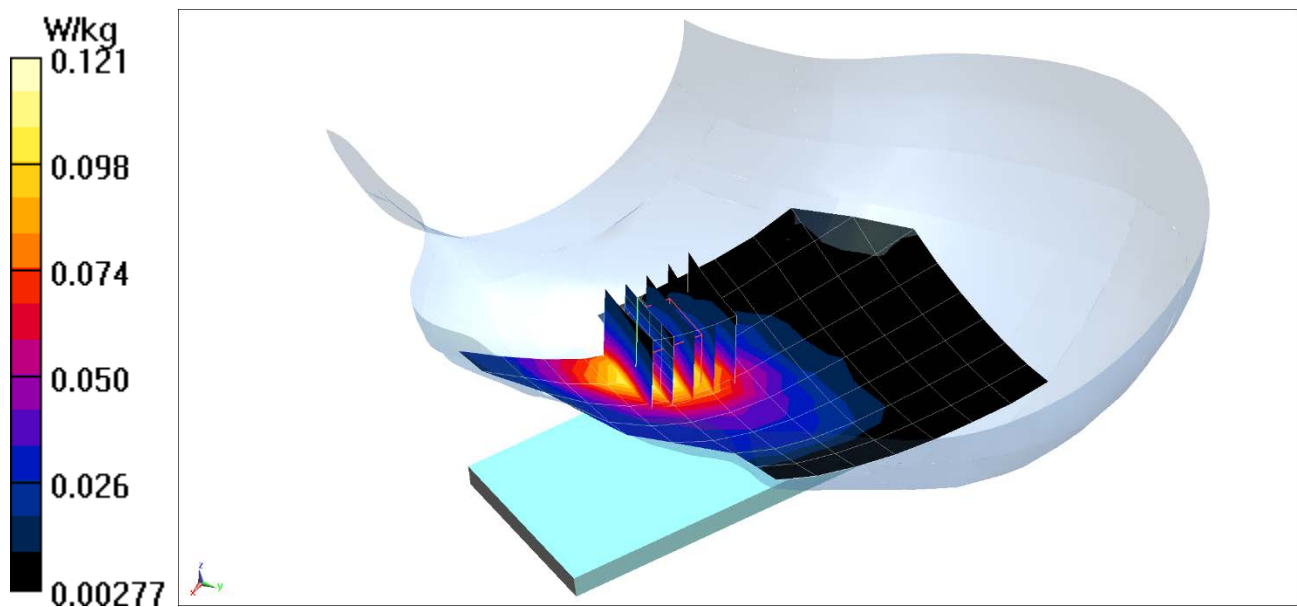
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 8.200 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 0.144 W/kg

SAR(1 g) = 0.091 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07349

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

Medium: 750 MHz Medium parameters used (interpolated):

$f = 707.5$ MHz; $\sigma = 0.854$ S/m; $\epsilon_r = 42.057$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Test Date: 12-06-2017; Ambient Temp: 23.2°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7410; ConvF(10.6, 10.6, 10.6); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

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

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

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

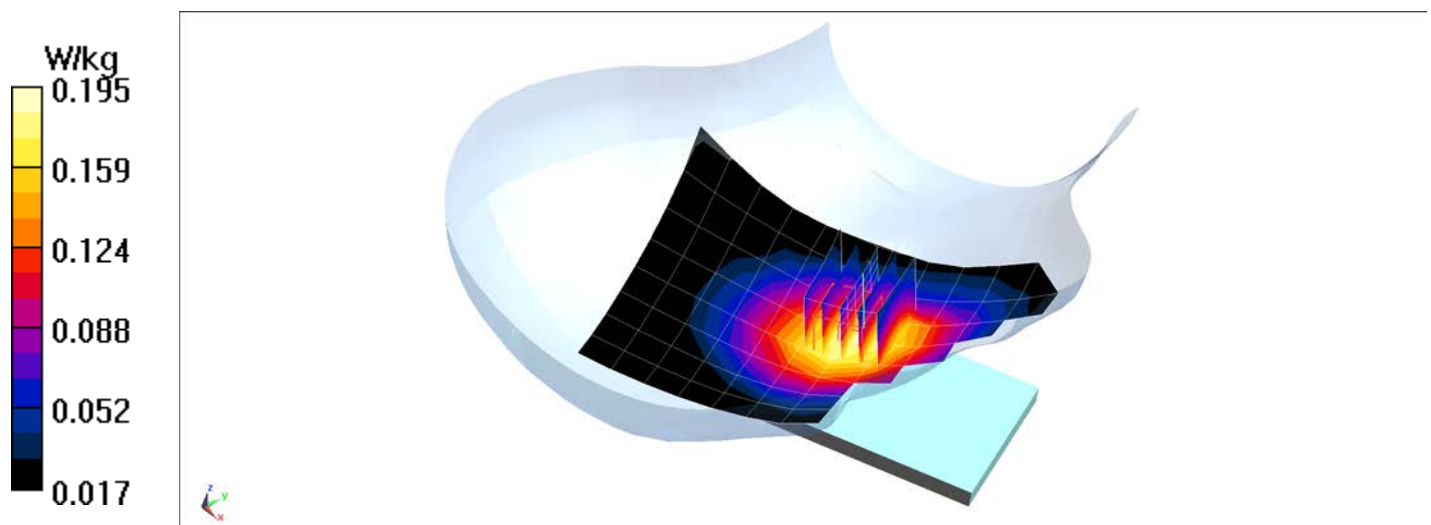
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 14.89 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.208 W/kg

SAR(1 g) = 0.172 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07349

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

Medium: 750 MHz Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.922 \text{ S/m}$; $\epsilon_r = 41.06$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 12-06-2017; Ambient Temp: 23.2°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7410; ConvF(10.6, 10.6, 10.6); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 13, Right Head, Cheek, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

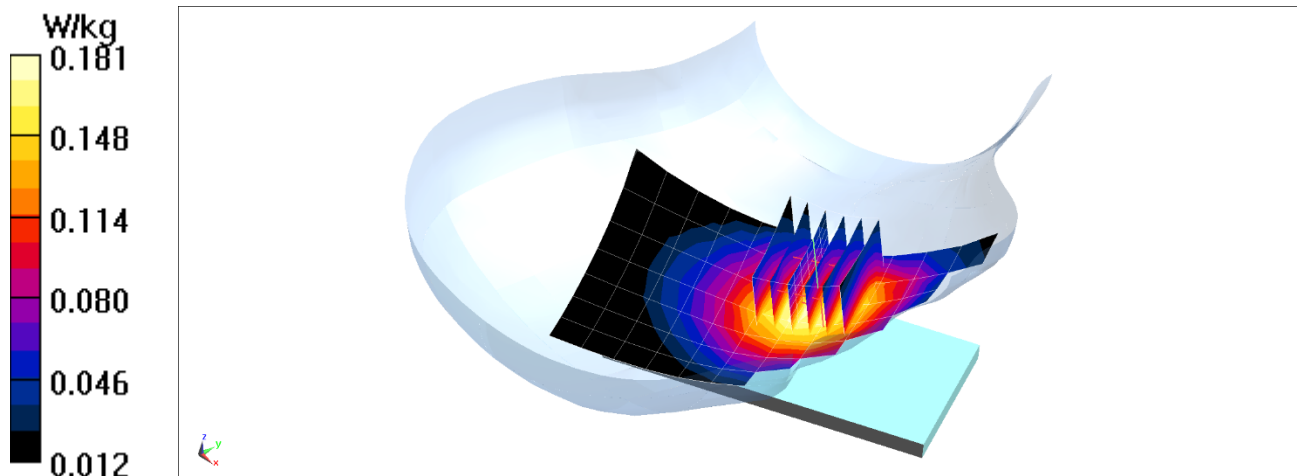
Area Scan (8x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.66 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.199 W/kg

SAR(1 g) = 0.159 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07349

Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 831.5 \text{ MHz}$; $\sigma = 0.89 \text{ S/m}$; $\epsilon_r = 40.556$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 11-27-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP: 7535

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

**Mode: LTE Band 26 (Cell.), Right Head, Cheek, Mid.ch,
15 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

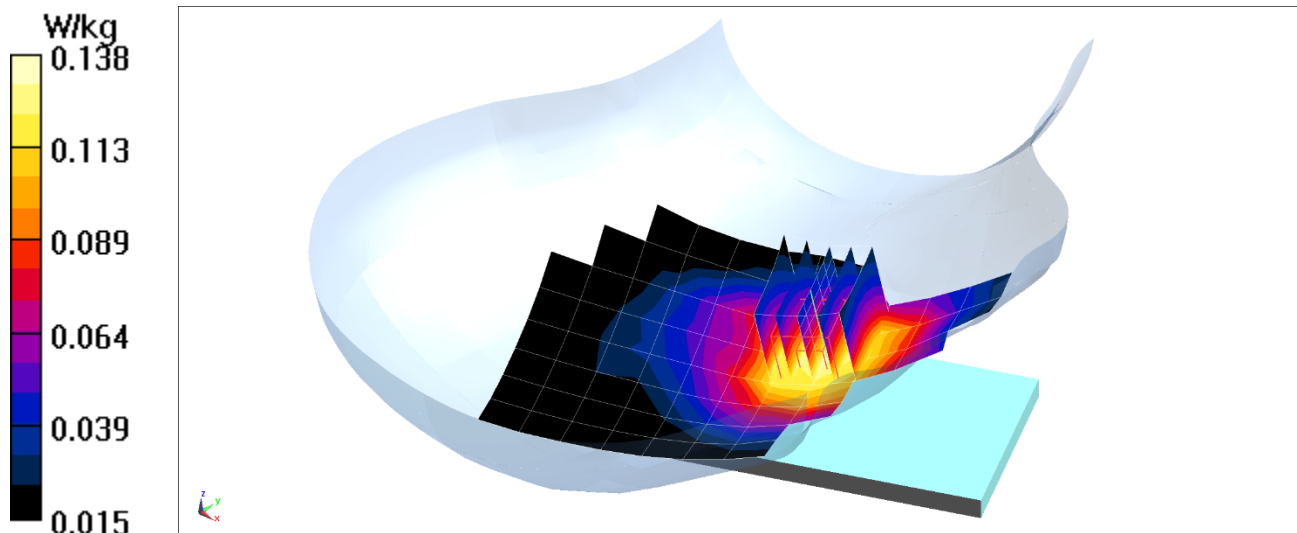
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.91 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.154 W/kg

SAR(1 g) = 0.120 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07372

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.5$ MHz; $\sigma = 0.893$ S/m; $\epsilon_r = 40.745$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Test Date: 12-01-2017; Ambient Temp: 23.0°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP:7535

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

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

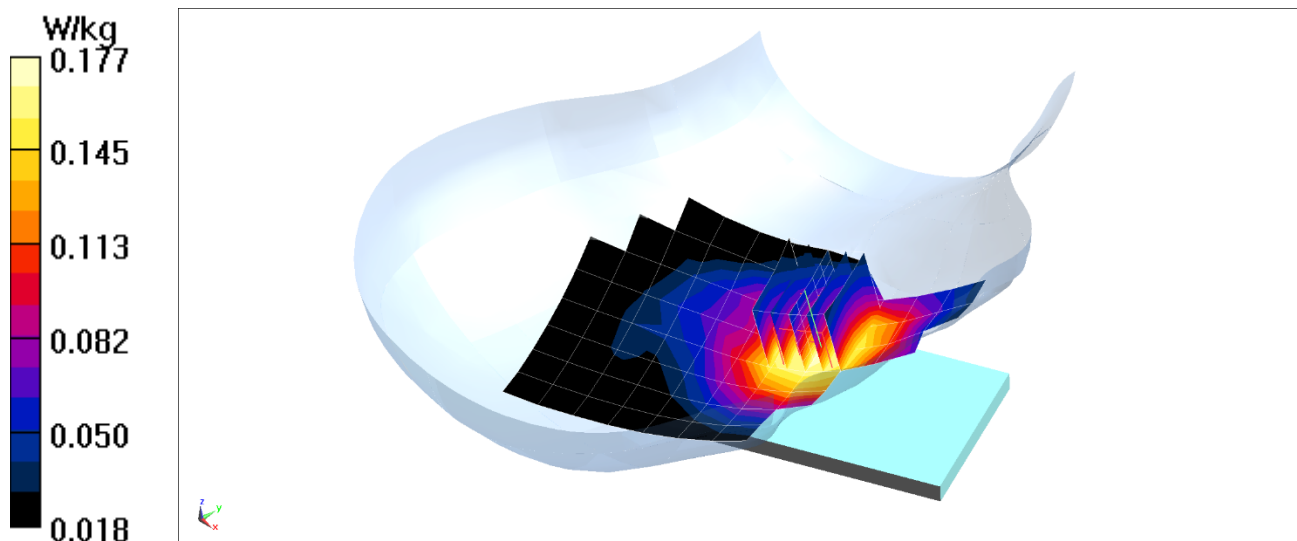
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.41 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 0.189 W/kg

SAR(1 g) = 0.153 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

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

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1720 \text{ MHz}$; $\sigma = 1.357 \text{ S/m}$; $\epsilon_r = 38.7$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-04-2017; Ambient Temp: 21.9°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3213; ConvF(5.49, 5.49, 5.49); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

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

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

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

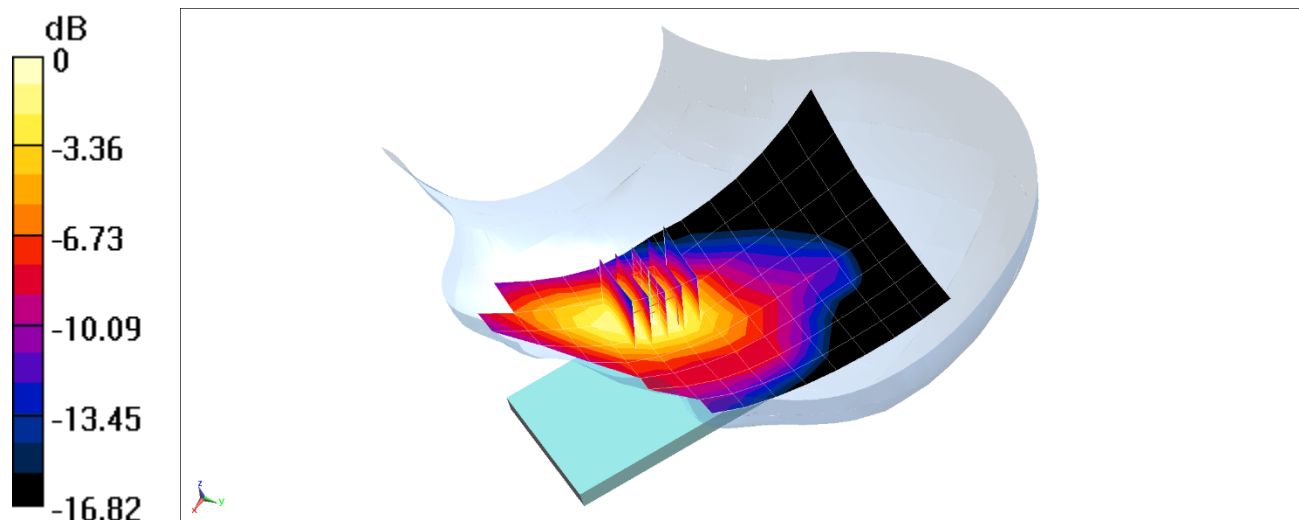
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 14.70 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 0.365 W/kg

SAR(1 g) = 0.238 W/kg



0 dB = 0.278 W/kg = -5.56 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07240

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.419 \text{ S/m}$; $\epsilon_r = 40.684$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 12-03-2017; Ambient Temp: 21.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(8.4, 8.4, 8.4); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

Phantom: SAM with CRP v5.0, Right; Type: QD000P40CD; Serial: TP:7535

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

**Mode: LTE Band 2 (PCS), Left Head, Cheek, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

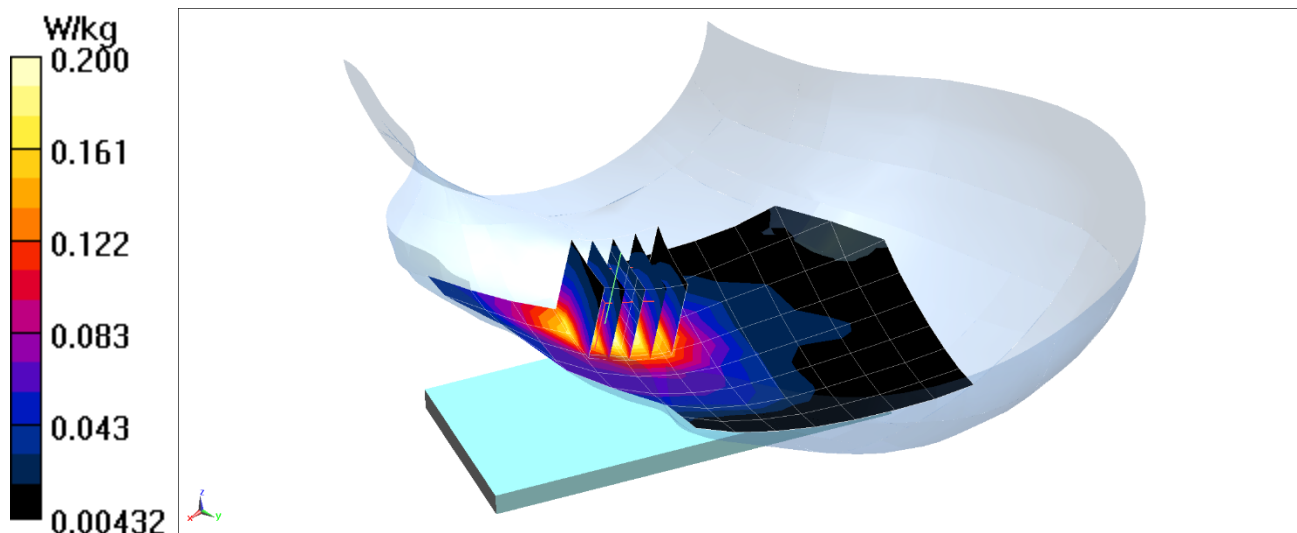
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 11.34 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 0.289 W/kg

SAR(1 g) = 0.170 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07372

Communication System: UID 0, LTE Band 7; Frequency: 2535 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2535 \text{ MHz}$; $\sigma = 1.969 \text{ S/m}$; $\epsilon_r = 39.046$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 11-27-2017; Ambient Temp: 22.6°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3319; ConvF(4.41, 4.41, 4.41); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

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

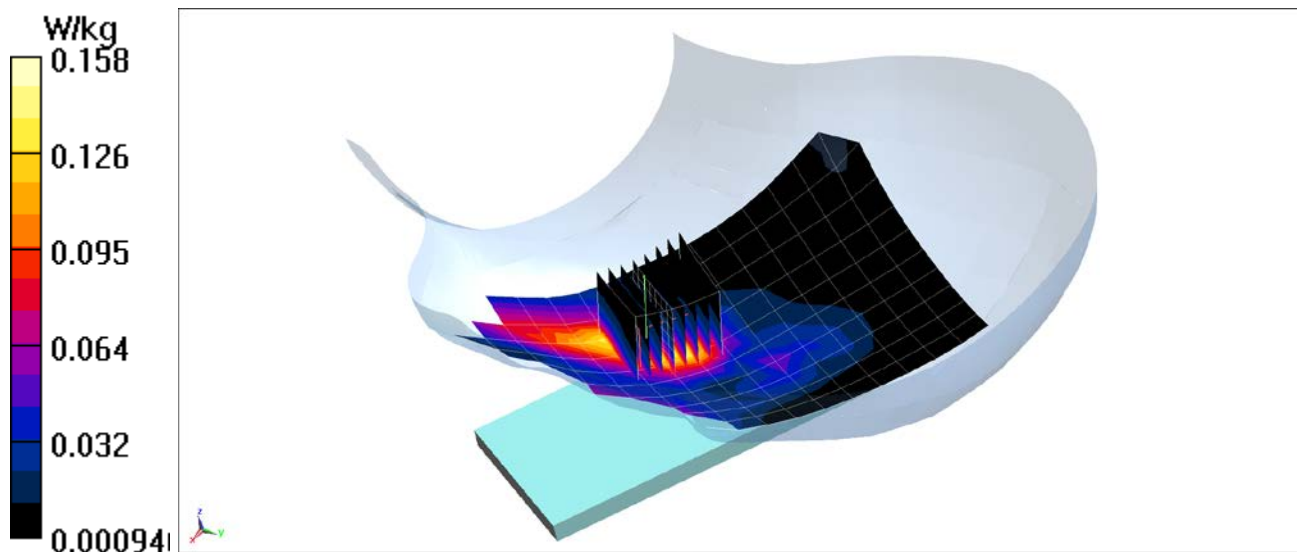
Area Scan (11x18x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 8.631 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.237 W/kg

SAR(1 g) = 0.129 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

Communication System: UID 0, IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1

Medium: 2450 Head Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.883 \text{ S/m}$; $\epsilon_r = 39.318$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 11-27-2017; Ambient Temp: 22.6°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3319; ConvF(4.6, 4.6, 4.6); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

**Mode: IEEE 802.11b, 22 MHz Bandwidth,
Right Head, Cheek, Ch 11, 1 Mbps**

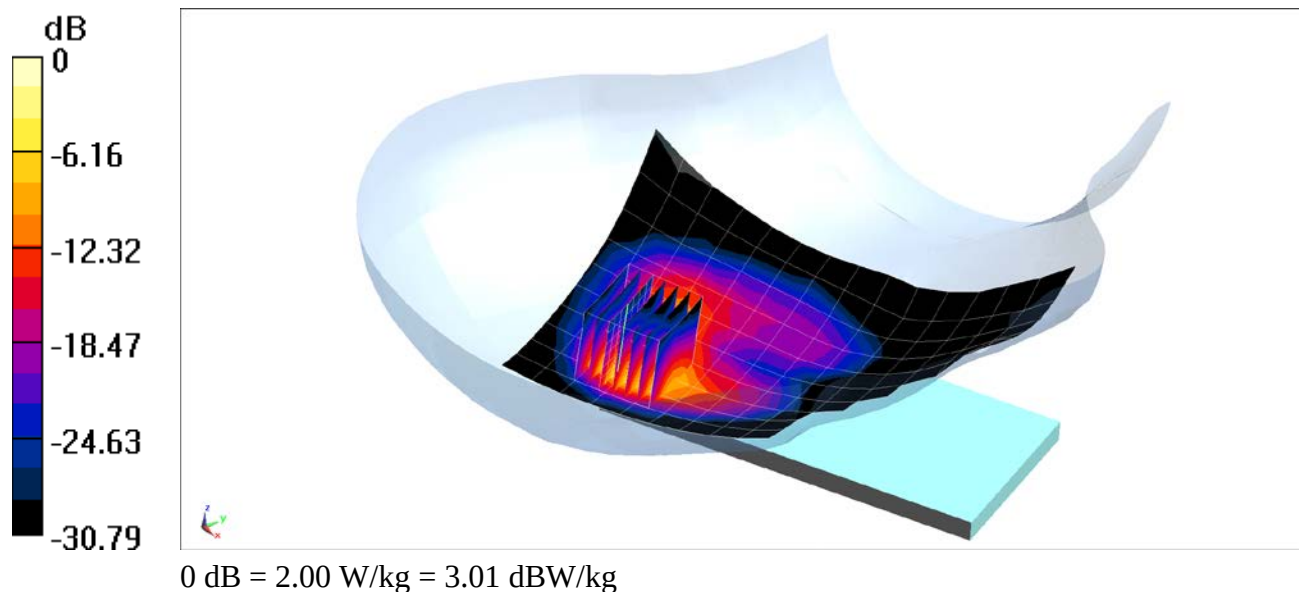
Area Scan (11x18x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

Zoom Scan (8x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 11.05 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 1.06 W/kg

SAR(1 g) = 0.413 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5270 MHz; Duty Cycle: 1:1

Medium: 5 GHz Medium parameters used (interpolated):

$f = 5270$ MHz; $\sigma = 4.517$ S/m; $\epsilon_r = 34.459$; $\rho = 1000$ kg/m³

Phantom section: Right Section

Test Date: 12-04-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(5.49, 5.49, 5.49); Calibrated: 2/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/9/2017

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

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

**Mode: IEEE 802.11n, U-NII-2A, 40 MHz Bandwidth,
Right Head, Cheek, Ch 54, 13.5 Mbps**

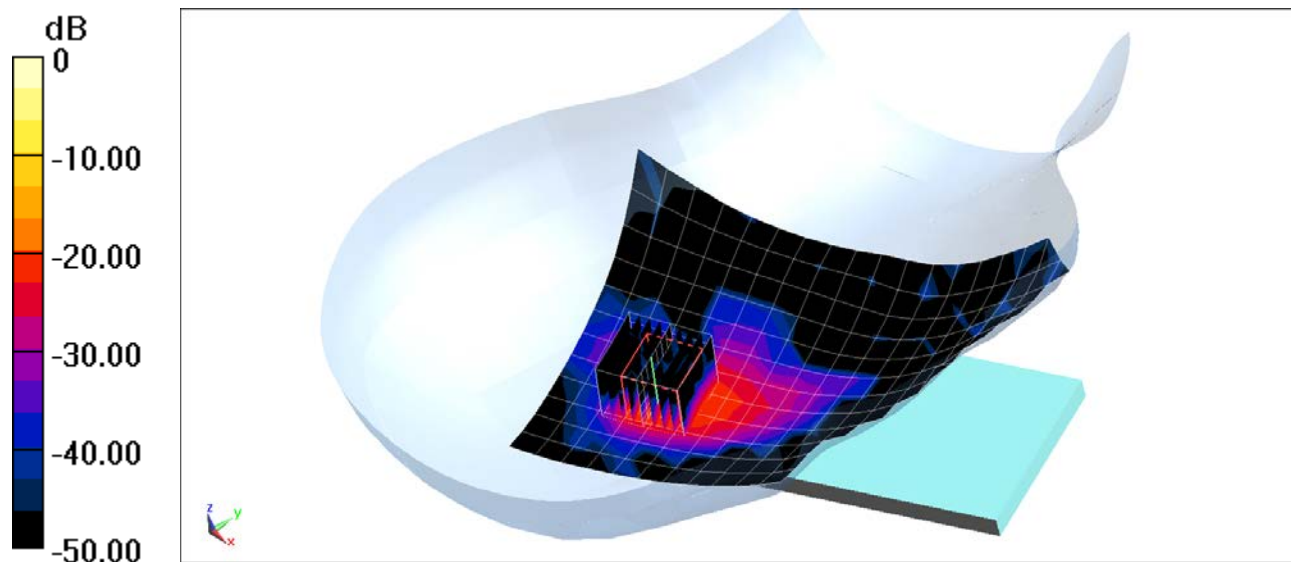
Area Scan (13x22x1): Measurement grid: dx=10mm, dy=10mm

Zoom Scan (8x9x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Reference Value = 2.424 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 3.41 W/kg

SAR(1 g) = 0.708 W/kg



0 dB = 50.0 W/kg = 16.99 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

Communication System: UID 0, GSM; Frequency: 836.6 MHz; Duty Cycle: 1:8.3

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.974 \text{ S/m}$; $\epsilon_r = 52.77$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-18-2017; Ambient Temp: 23.2°C; Tissue Temp: 20.7°C

Probe: ES3DV3 - SN3213; ConvF(6.28, 6.28, 6.28); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

Phantom: SAM Right; Type: SAM; Serial: 1757

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

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

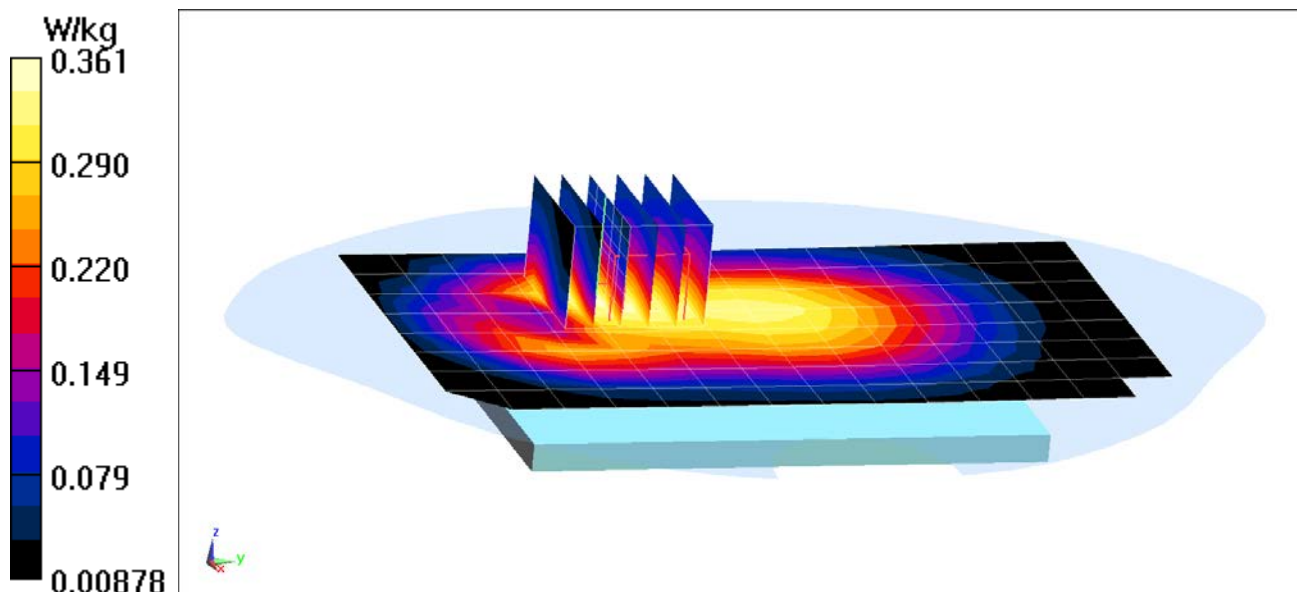
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 19.01 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.435 W/kg

SAR(1 g) = 0.323 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

Communication System: UID 0, GSM GPRS; 4 Tx slots; Frequency: 836.6 MHz; Duty Cycle: 1:2.076

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 1.006 \text{ S/m}$; $\epsilon_r = 53.96$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-01-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 850, Body SAR, Back side, Mid.ch, 4 Tx Slots

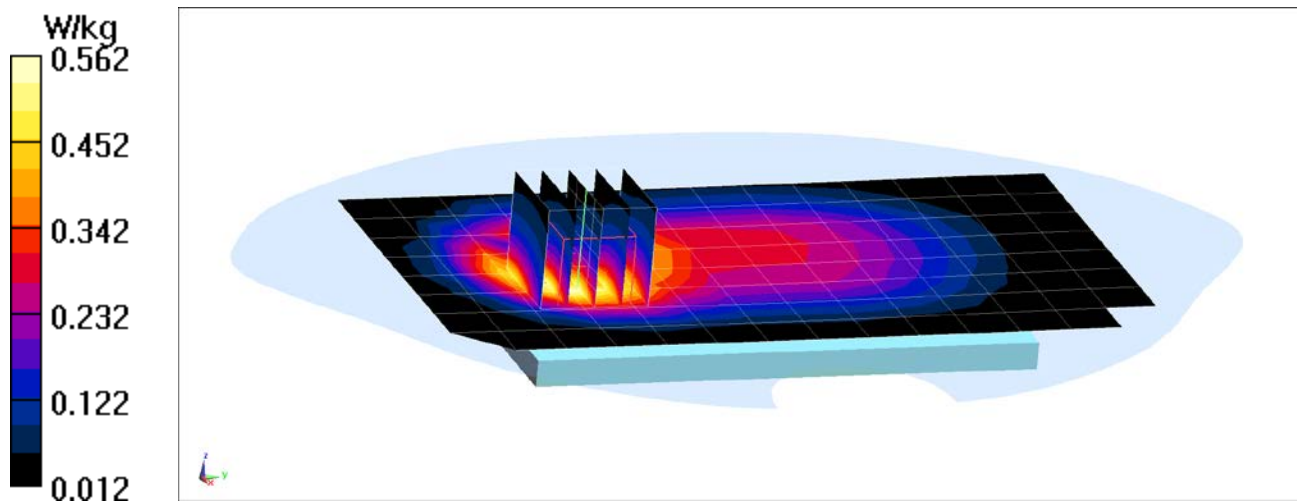
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 20.69 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.674 W/kg

SAR(1 g) = 0.398 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.981 \text{ S/m}$; $\epsilon_r = 54.558$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-04-2017; Ambient Temp: 21.0°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3332; ConvF(6.47, 6.47, 6.47); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

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

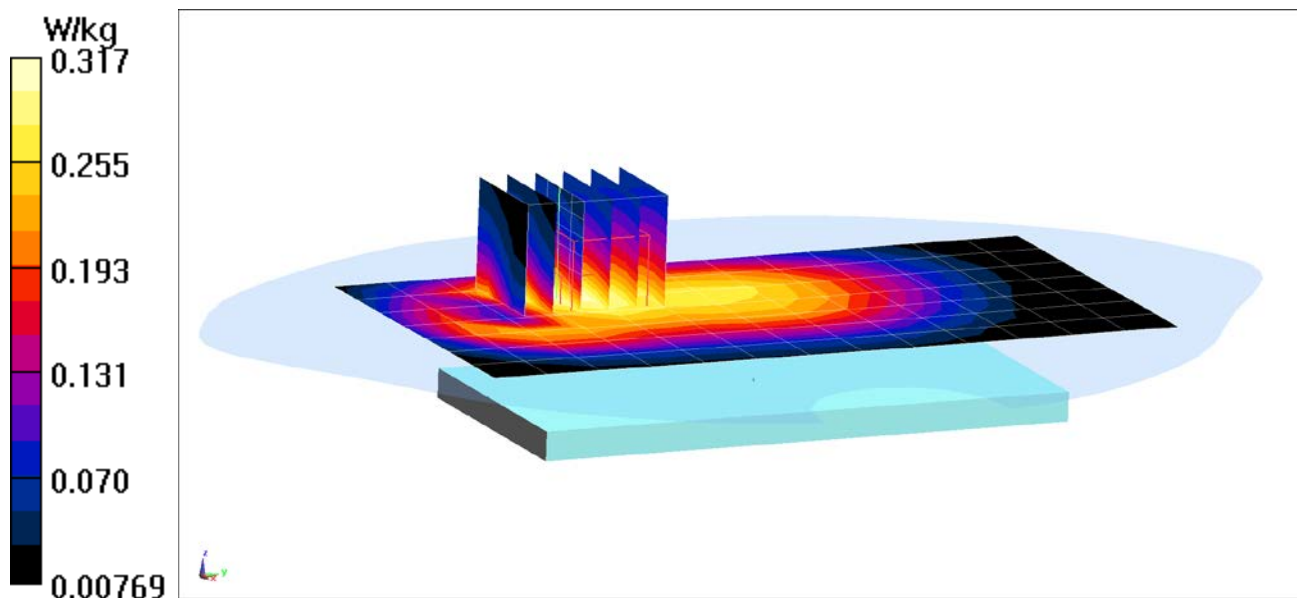
Area Scan (8x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 17.73 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.382 W/kg

SAR(1 g) = 0.284 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.981 \text{ S/m}$; $\epsilon_r = 54.558$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 21.0°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3332; ConvF(6.47, 6.47, 6.47); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

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

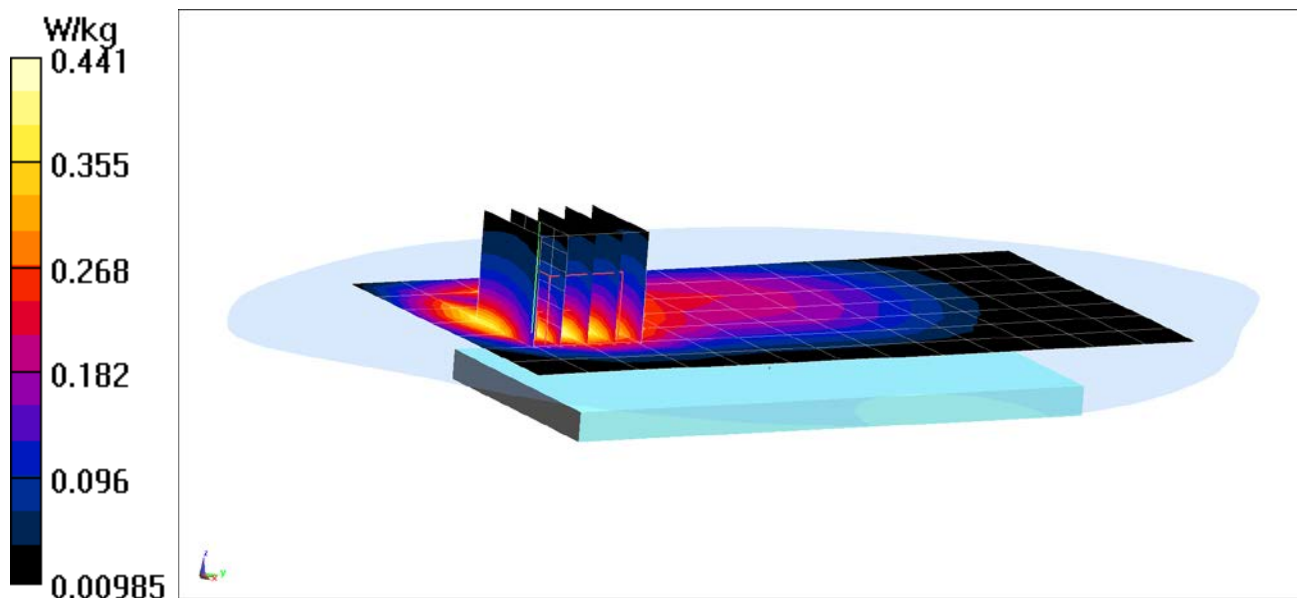
Area Scan (8x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 20.31 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.628 W/kg

SAR(1 g) = 0.369 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07372

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

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1752.6 \text{ MHz}$; $\sigma = 1.528 \text{ S/m}$; $\epsilon_r = 51.39$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-01-2017; Ambient Temp: 23.8°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3213; ConvF(5.09, 5.09, 5.09); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

Phantom: SAM Right; Type: SAM; Serial: 1757

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

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

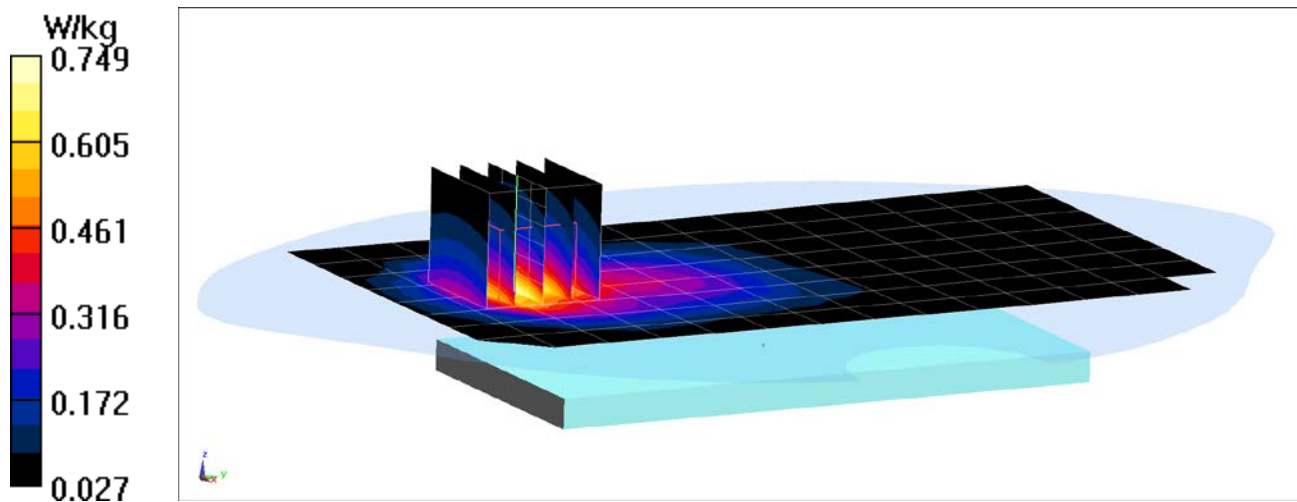
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 21.59 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.972 W/kg

SAR(1 g) = 0.634 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07372

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

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1752.6 \text{ MHz}$; $\sigma = 1.528 \text{ S/m}$; $\epsilon_r = 51.39$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-01-2017; Ambient Temp: 23.8°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3213; ConvF(5.09, 5.09, 5.09); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

Phantom: SAM Right; Type: SAM; Serial: 1757

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

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

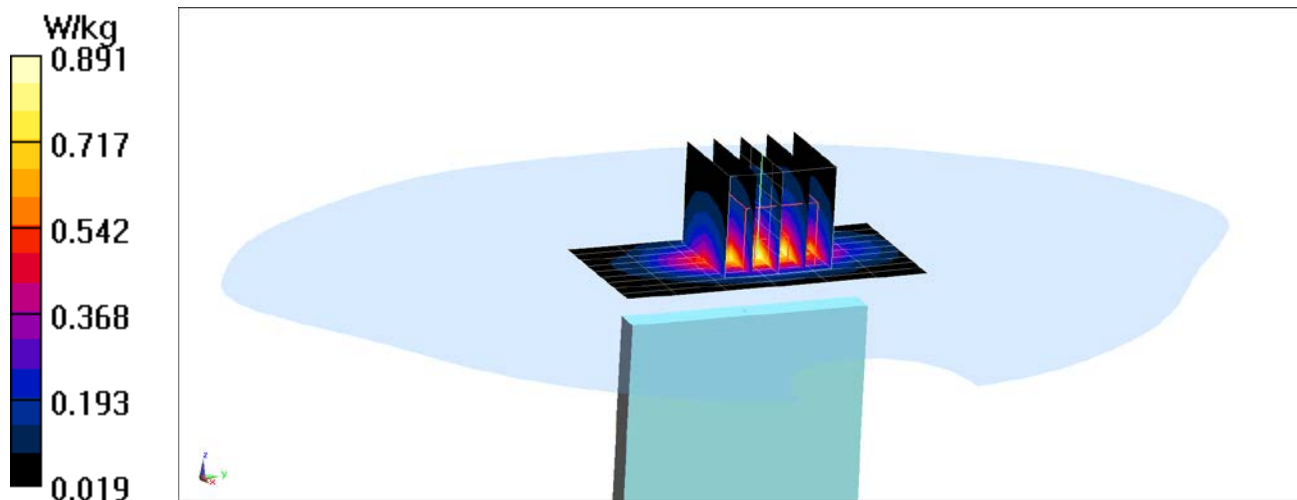
Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 23.44 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.22 W/kg

SAR(1 g) = 0.733 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1852.4 \text{ MHz}$; $\sigma = 1.492 \text{ S/m}$; $\epsilon_r = 52.486$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-27-2017; Ambient Temp: 22.9°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3332; ConvF(4.95, 4.95, 4.95); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

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

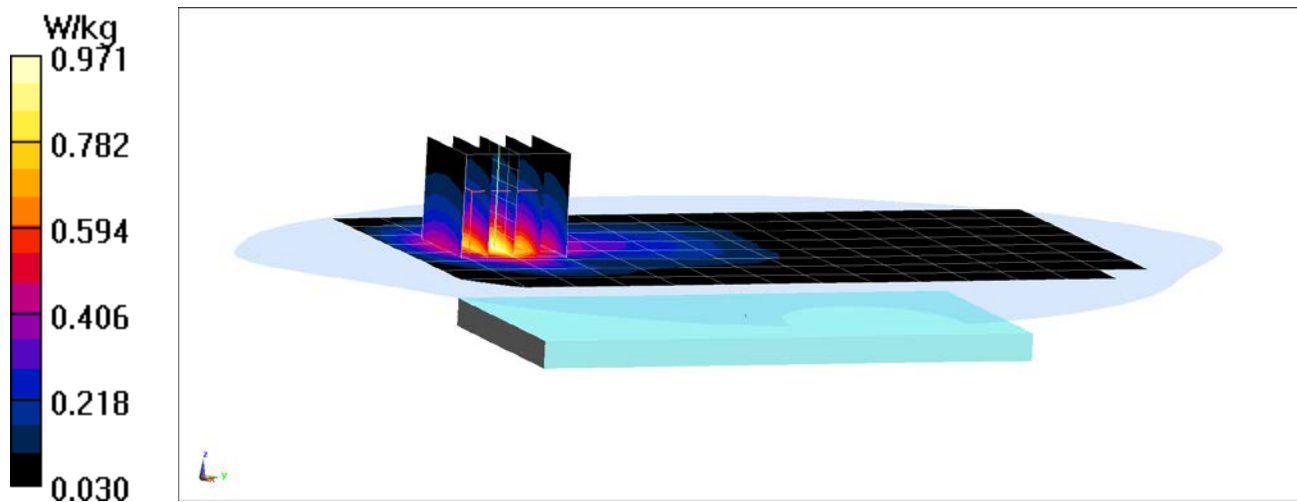
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 24.95 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.25 W/kg

SAR(1 g) = 0.814 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

Communication System: UID 0, UMTS; Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1907.6 \text{ MHz}$; $\sigma = 1.56 \text{ S/m}$; $\epsilon_r = 52.274$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-27-2017; Ambient Temp: 22.9°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3332; ConvF(4.95, 4.95, 4.95); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

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

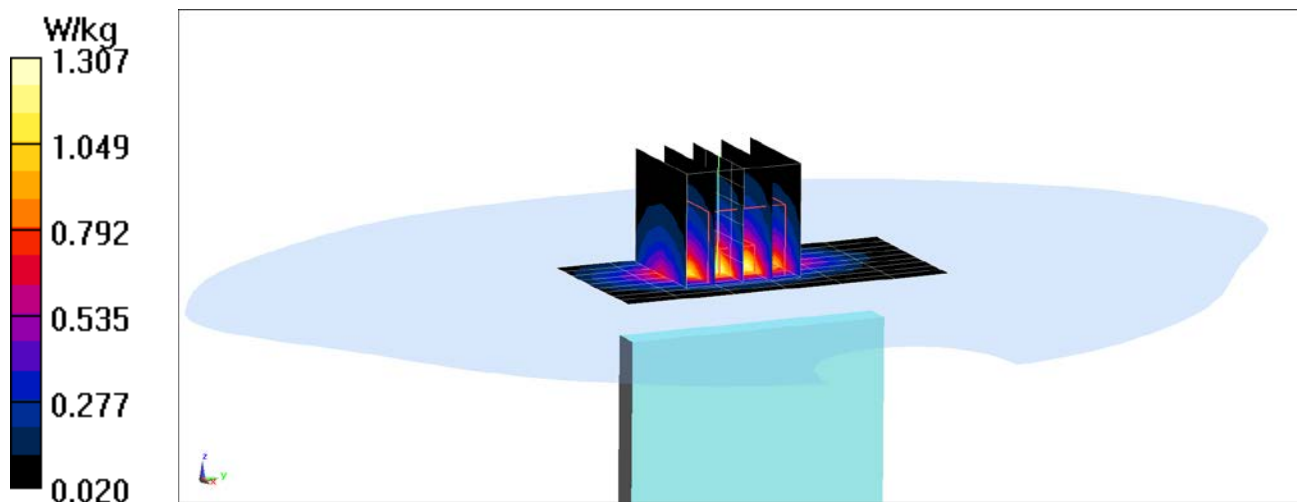
Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 28.22 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.80 W/kg

SAR(1 g) = 1.06 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

Communication System: UID 0, GSM; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.521 \text{ S/m}$; $\epsilon_r = 52.37$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-27-2017; Ambient Temp: 22.9°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3332; ConvF(4.95, 4.95, 4.95); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

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

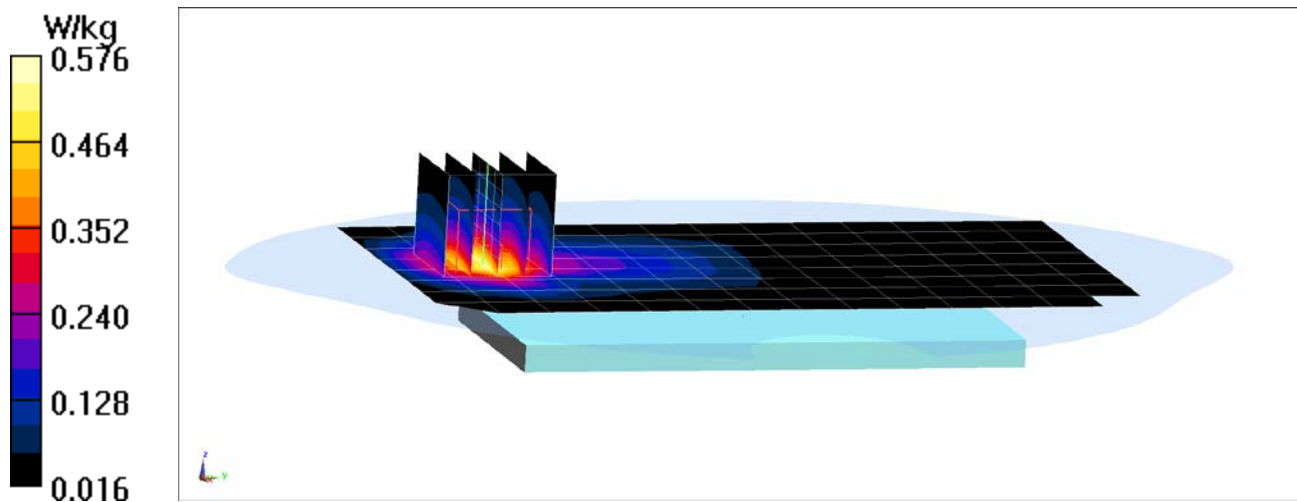
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 18.99 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.748 W/kg

SAR(1 g) = 0.480 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 1910 MHz; Duty Cycle: 1:2.76

Medium: 1900 Body Medium parameters used:

$f = 1910 \text{ MHz}$; $\sigma = 1.563 \text{ S/m}$; $\epsilon_r = 52.266$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-27-2017; Ambient Temp: 22.9°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3332; ConvF(4.95, 4.95, 4.95); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

Mode: GPRS 1900, Body SAR, Bottom Edge, High.ch, 3 Tx Slots

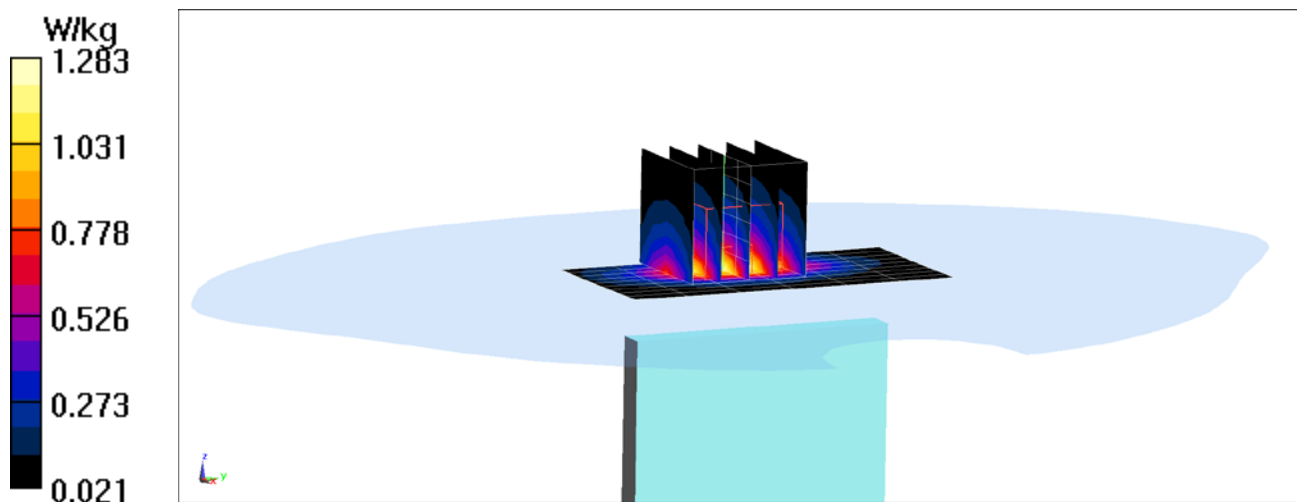
Area Scan (10x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 27.04 V/m; Power Drift = 0.20 dB

Peak SAR (extrapolated) = 1.74 W/kg

SAR(1 g) = 1.03 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.919 \text{ S/m}$; $\epsilon_r = 57.912$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-04-2017; Ambient Temp: 20.8°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3319; ConvF(6.37, 6.37, 6.37); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

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

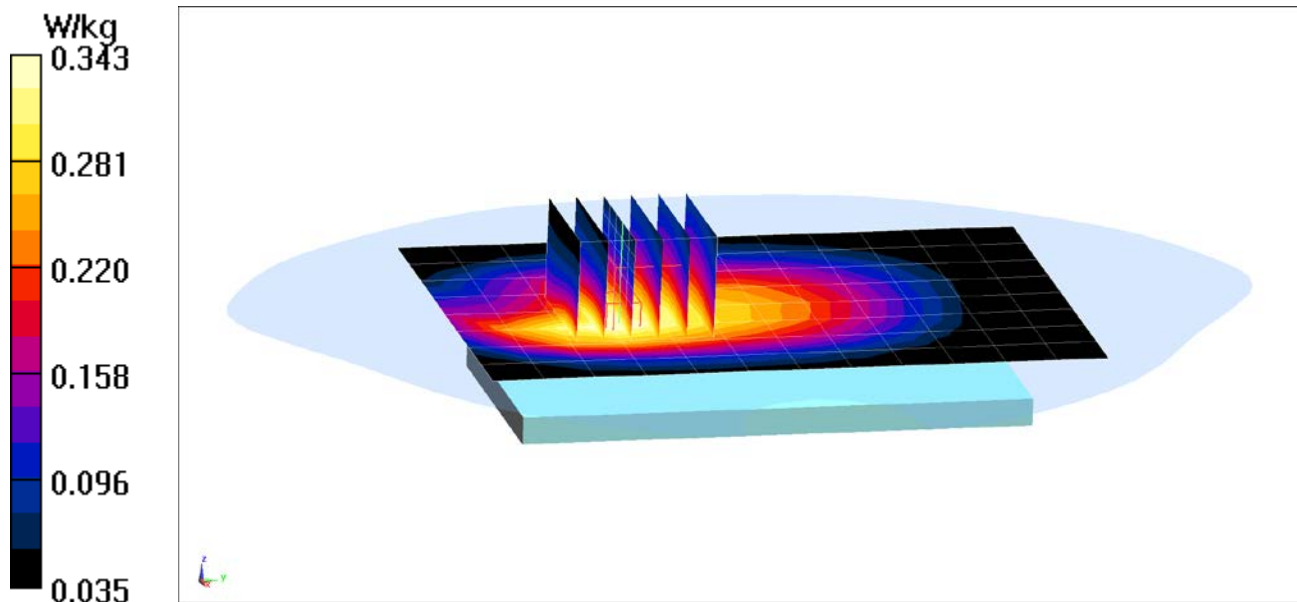
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 19.00 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.411 W/kg

SAR(1 g) = 0.307 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 707.5 \text{ MHz}$; $\sigma = 0.919 \text{ S/m}$; $\epsilon_r = 57.912$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 20.8°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3319; ConvF(6.37, 6.37, 6.37); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

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

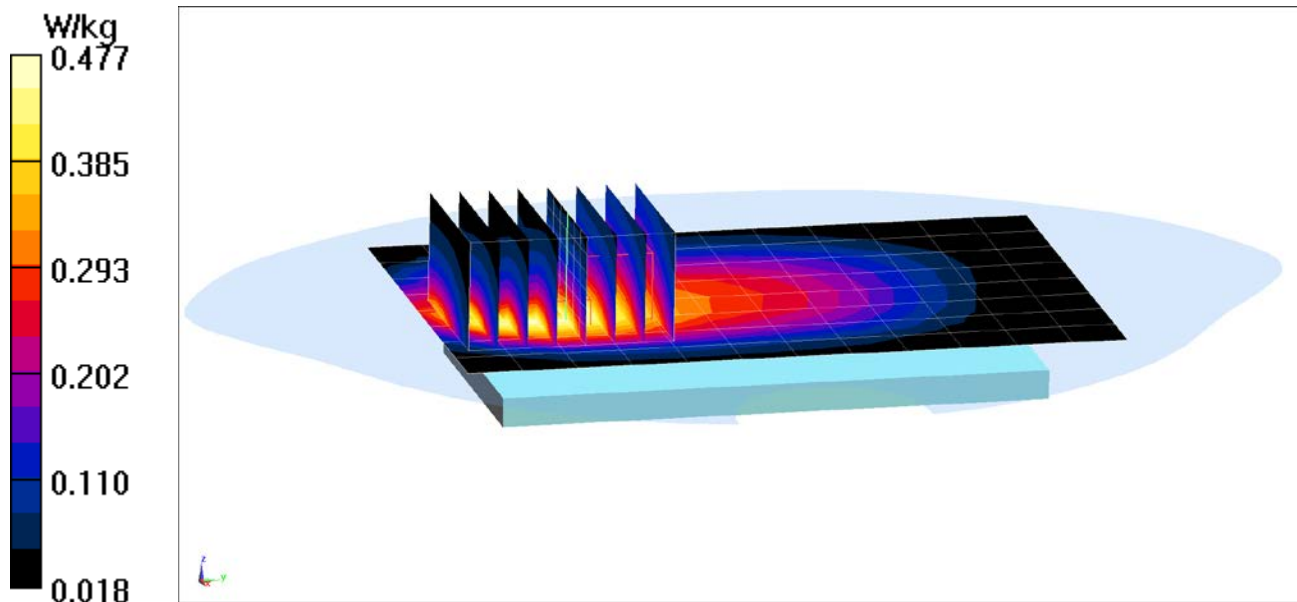
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (7x8x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.45 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.638 W/kg

SAR(1 g) = 0.409 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.989 \text{ S/m}$; $\epsilon_r = 57.192$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-04-2017; Ambient Temp: 20.8°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3319; ConvF(6.37, 6.37, 6.37); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

**Mode: LTE Band 13, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

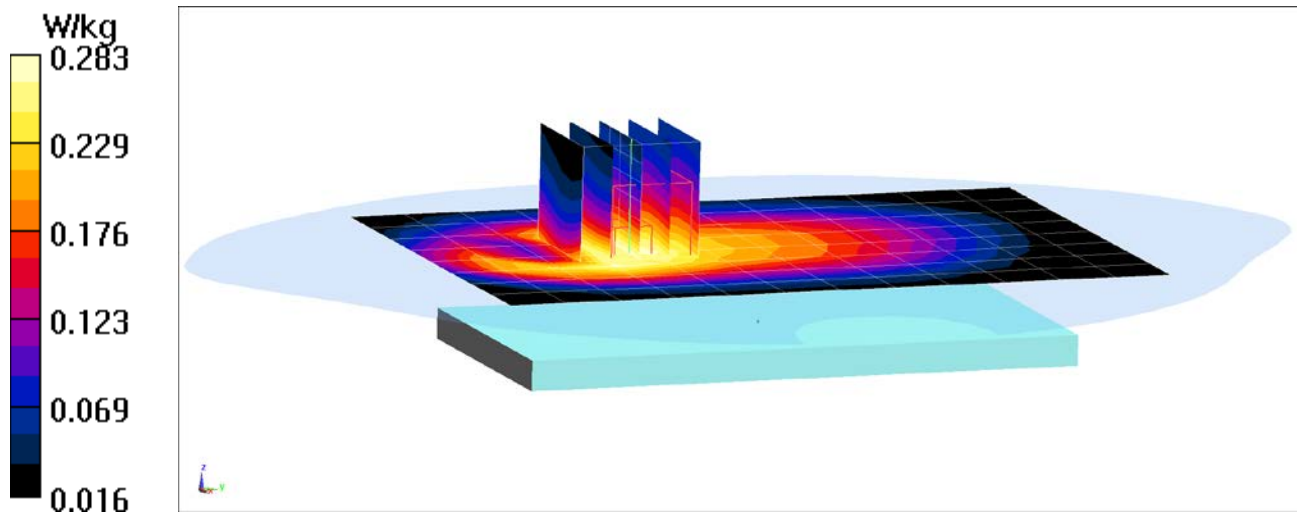
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 16.55 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.341 W/kg

SAR(1 g) = 0.253 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.989 \text{ S/m}$; $\epsilon_r = 57.192$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 20.8°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3319; ConvF(6.37, 6.37, 6.37); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

**Mode: LTE Band 13, Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

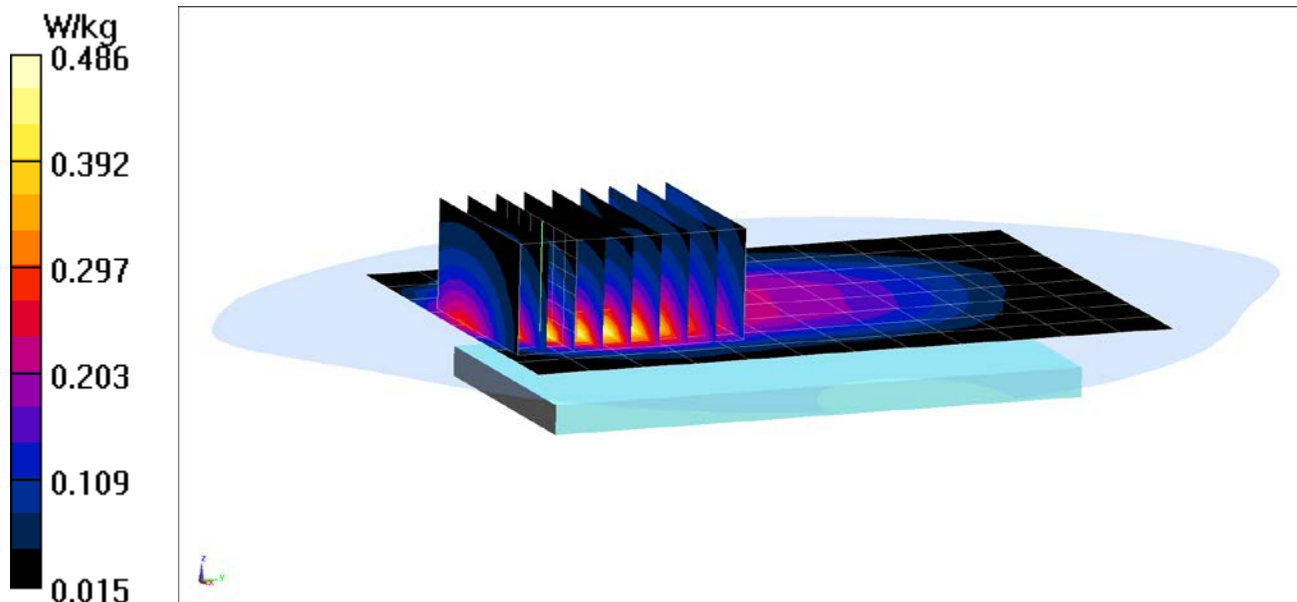
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

Zoom Scan (8x9x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 21.30 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.678 W/kg

SAR(1 g) = 0.403 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07349

Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 831.5 \text{ MHz}$; $\sigma = 1 \text{ S/m}$; $\epsilon_r = 54.009$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-01-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 26 (Cell.), Body SAR, Back side, Mid.ch,
15 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

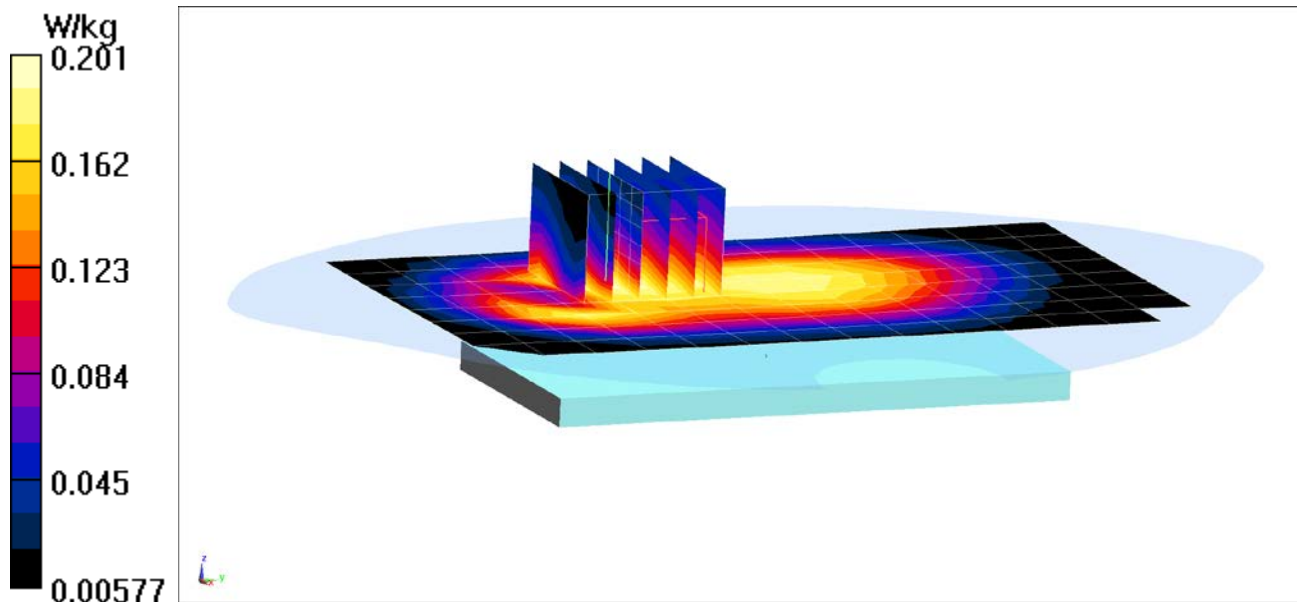
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.16 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.220 W/kg

SAR(1 g) = 0.163 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07349

Communication System: UID 0, LTE Band 26; Frequency: 831.5 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 831.5 \text{ MHz}$; $\sigma = 1 \text{ S/m}$; $\epsilon_r = 54.009$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-01-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 26 (Cell.), Body SAR, Back side, Mid.ch,
15 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

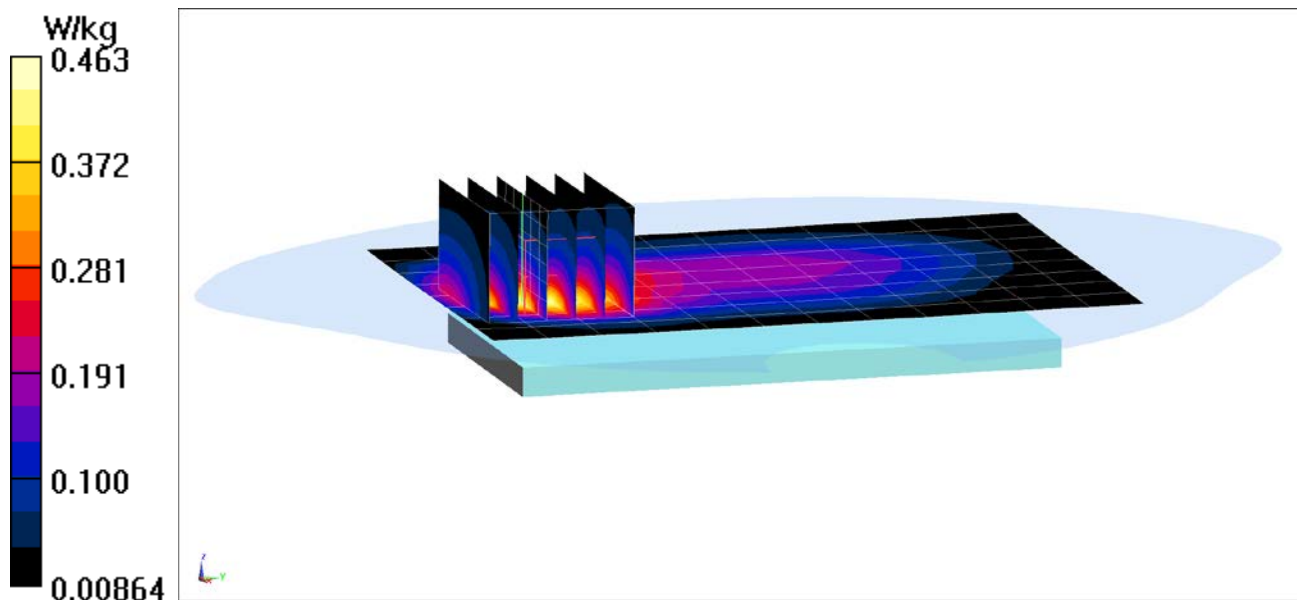
Area Scan (9x13x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.55 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.557 W/kg

SAR(1 g) = 0.319 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

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; $\sigma = 1.006$ S/m; $\epsilon_r = 53.961$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-01-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

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

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

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

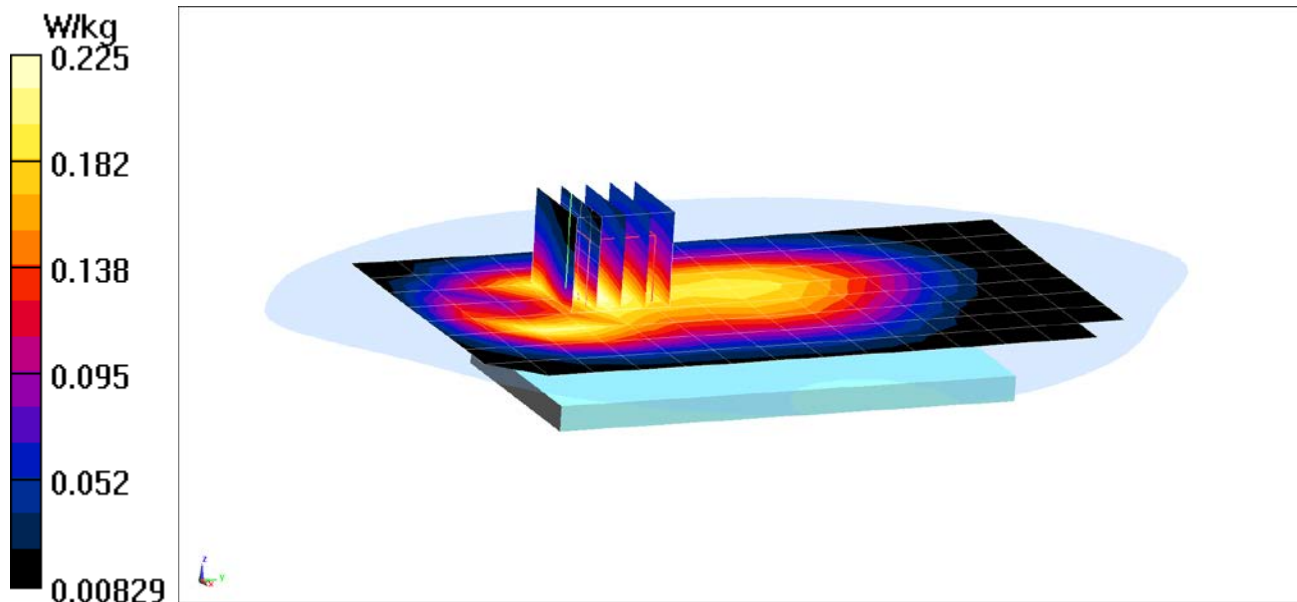
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.84 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 0.251 W/kg

SAR(1 g) = 0.185 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

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; $\sigma = 1.006$ S/m; $\epsilon_r = 53.961$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-01-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 5 (Cell.), Body SAR, Back side, Mid.ch,
10 MHz Bandwidth, QPSK, 25 RB, 0 RB Offset**

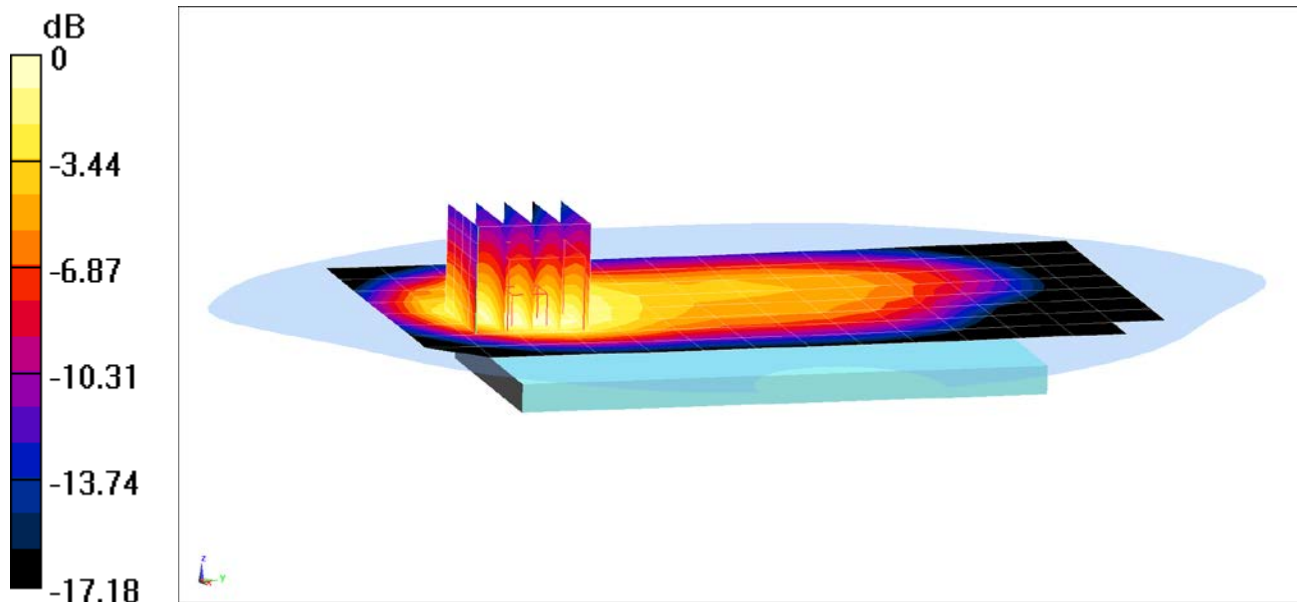
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 18.20 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.519 W/kg

SAR(1 g) = 0.304 W/kg



0 dB = 0.435 W/kg = -3.62 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1770 \text{ MHz}$; $\sigma = 1.546 \text{ S/m}$; $\epsilon_r = 51.313$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-01-2017; Ambient Temp: 23.8°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3213; ConvF(5.09, 5.09, 5.09); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

Phantom: SAM Right; Type: SAM; Serial: 1757

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

**Mode: LTE Band 66 (AWS), Body SAR, Back side, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset**

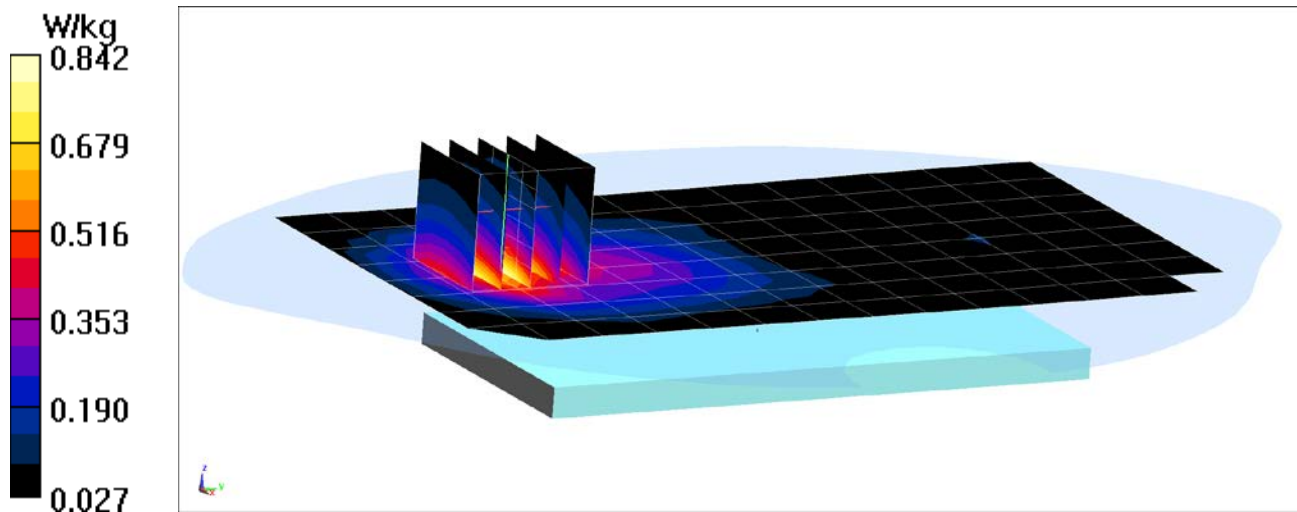
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 22.69 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.721 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

Communication System: UID 0, LTE Band 66 (AWS); Frequency: 1770 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1770 \text{ MHz}$; $\sigma = 1.546 \text{ S/m}$; $\epsilon_r = 51.313$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-01-2017; Ambient Temp: 23.8°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3213; ConvF(5.09, 5.09, 5.09); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

Phantom: SAM Right; Type: SAM; Serial: 1757

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

**Mode: LTE Band 66 (AWS), Body SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 50 RB, 25 RB Offset**

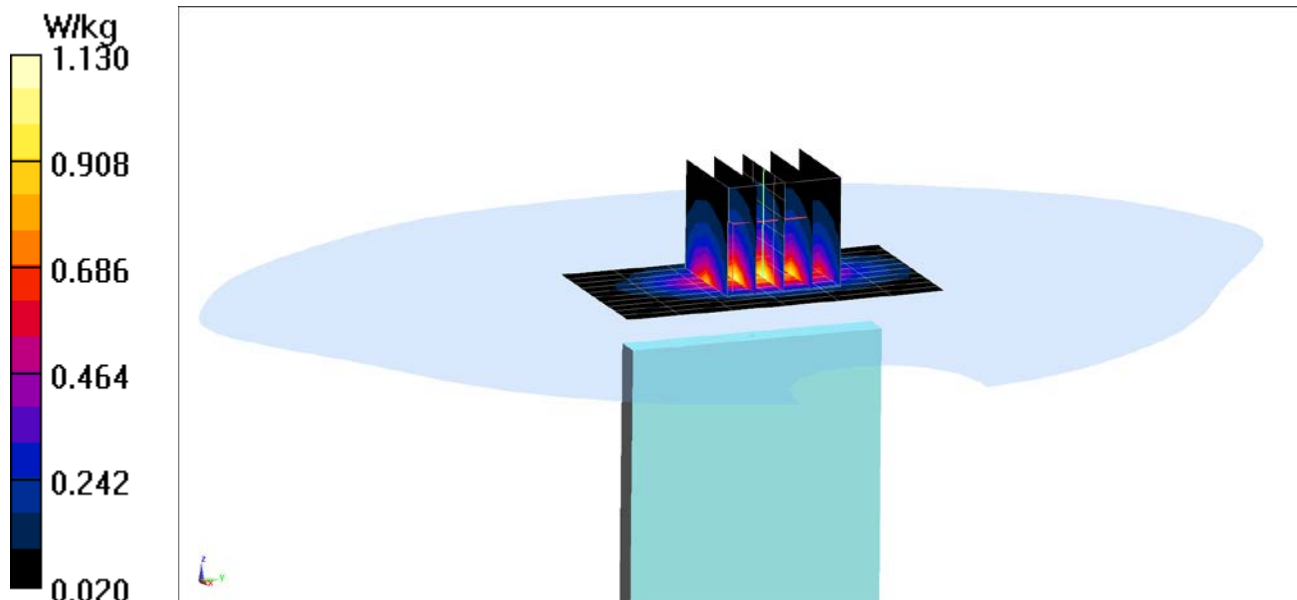
Area Scan (11x7x1): Measurement grid: $dx=5\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 26.20 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.55 W/kg

SAR(1 g) = 0.917 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.521 \text{ S/m}$; $\epsilon_r = 52.37$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-27-2017; Ambient Temp: 22.9°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3332; ConvF(4.95, 4.95, 4.95); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 2 (PCS), Body SAR, Back side, Mid.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

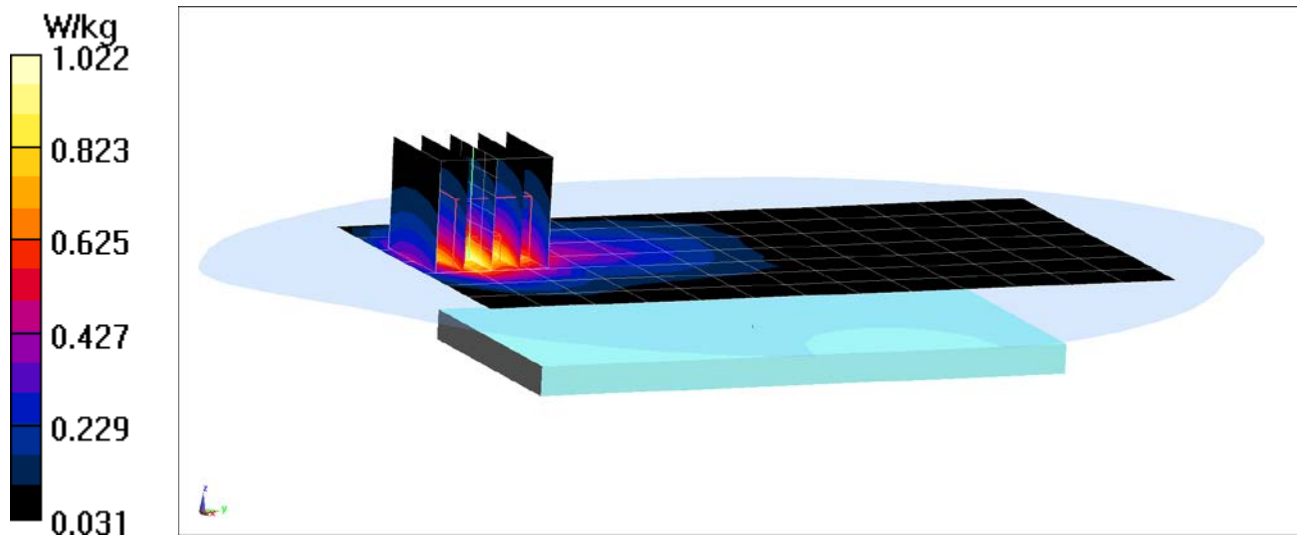
Area Scan (8x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 25.23 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.858 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07265

Communication System: UID 0, LTE Band 2 (PCS); Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.549 \text{ S/m}$; $\epsilon_r = 52.301$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-27-2017; Ambient Temp: 22.9°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3332; ConvF(4.95, 4.95, 4.95); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

**Mode: LTE Band 2 (PCS), Body SAR, Bottom Edge, High.ch,
20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset**

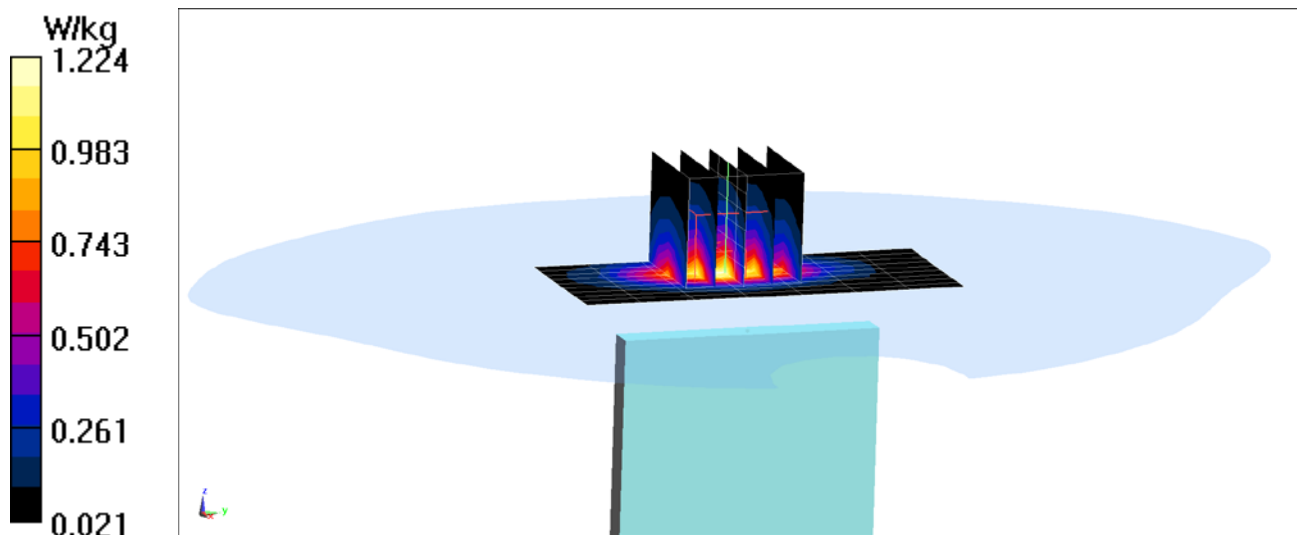
Area Scan (10x8x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 27.41 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.66 W/kg

SAR(1 g) = 0.982 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

Communication System: UID 0, LTE Band 7; Frequency: 2535 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2535 \text{ MHz}$; $\sigma = 2.11 \text{ S/m}$; $\epsilon_r = 51.085$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-28-2017; Ambient Temp: 24.5°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3319; ConvF(4.18, 4.18, 4.18); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

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

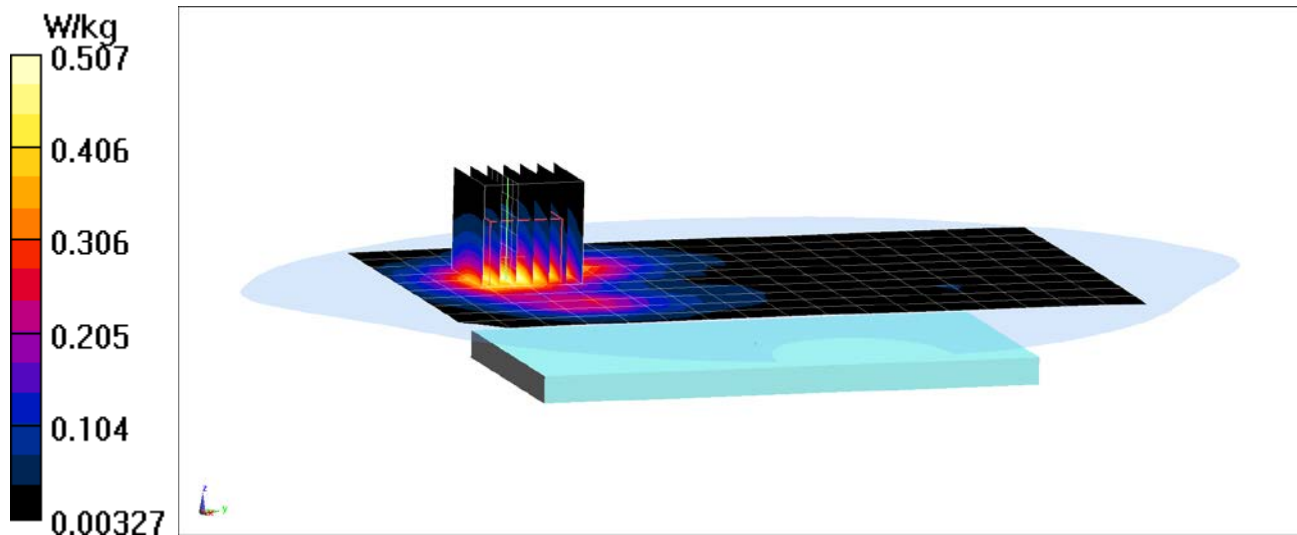
Area Scan (11x18x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Reference Value = 14.84 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.762 W/kg

SAR(1 g) = 0.416 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

Communication System: UID 0, LTE Band 7; Frequency: 2535 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2535 \text{ MHz}$; $\sigma = 2.11 \text{ S/m}$; $\epsilon_r = 51.085$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-28-2017; Ambient Temp: 24.5°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3319; ConvF(4.18, 4.18, 4.18); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

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

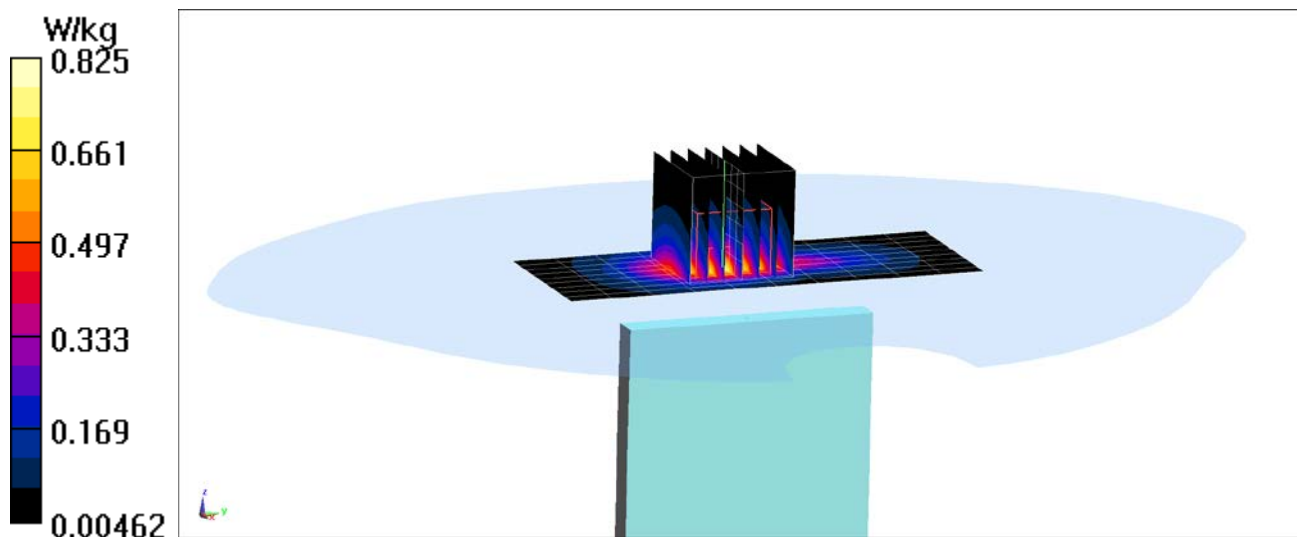
Area Scan (10x11x1): Measurement grid: dx=5mm, dy=12mm

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

Reference Value = 18.75 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.25 W/kg

SAR(1 g) = 0.641 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 2.019 \text{ S/m}$; $\epsilon_r = 51.061$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-08-2017; Ambient Temp: 22.0°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(4.42, 4.42, 4.42); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

**Mode: IEEE 802.11b, 22 MHz Bandwidth,
Body SAR, Ch 6, 1 Mbps, Back Side**

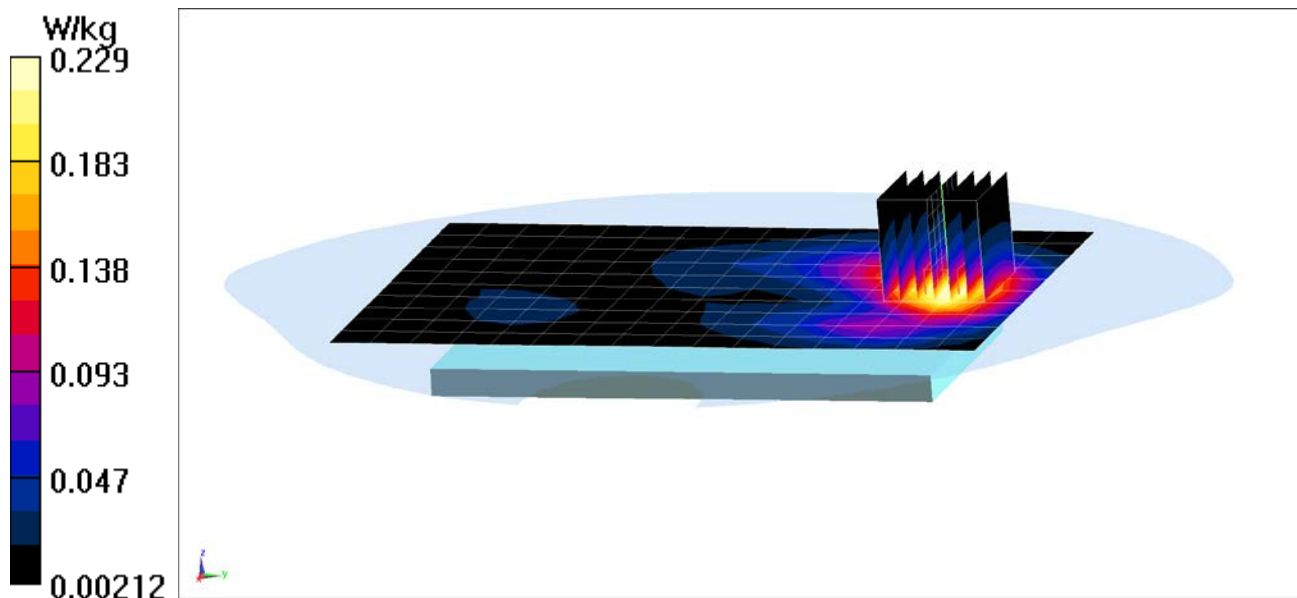
Area Scan (11x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Reference Value = 10.49 V/m; Power Drift = -0.18 dB

Peak SAR (extrapolated) = 0.333 W/kg

SAR(1 g) = 0.187 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07232

Communication System: UID 0, IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2437 \text{ MHz}$; $\sigma = 2.019 \text{ S/m}$; $\epsilon_r = 51.061$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2017; Ambient Temp: 22.0°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(4.42, 4.42, 4.42); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

**Mode: IEEE 802.11b, 22 MHz Bandwidth,
Body SAR, Ch 6, 1 Mbps, Top Edge**

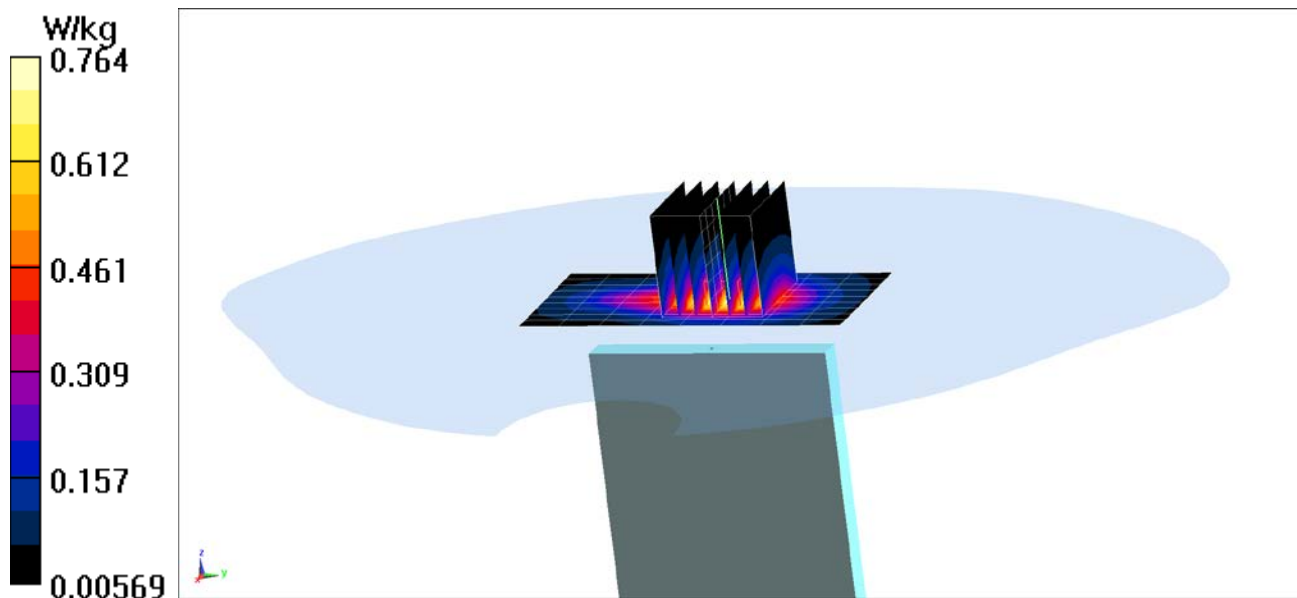
Area Scan (10x9x1): Measurement grid: dx=5mm, dy=12mm

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

Reference Value = 17.62 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.14 W/kg

SAR(1 g) = 0.584 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07349

Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5630 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5630 \text{ MHz}$; $\sigma = 5.963 \text{ S/m}$; $\epsilon_r = 46.594$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-04-2017; Ambient Temp: 22.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7308; ConvF(4.23, 4.23, 4.23); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

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

**Mode: IEEE 802.11n, UNII-2C, 40 MHz Bandwidth,
Body SAR, Ch 126, 13.5 Mbps, Back Side**

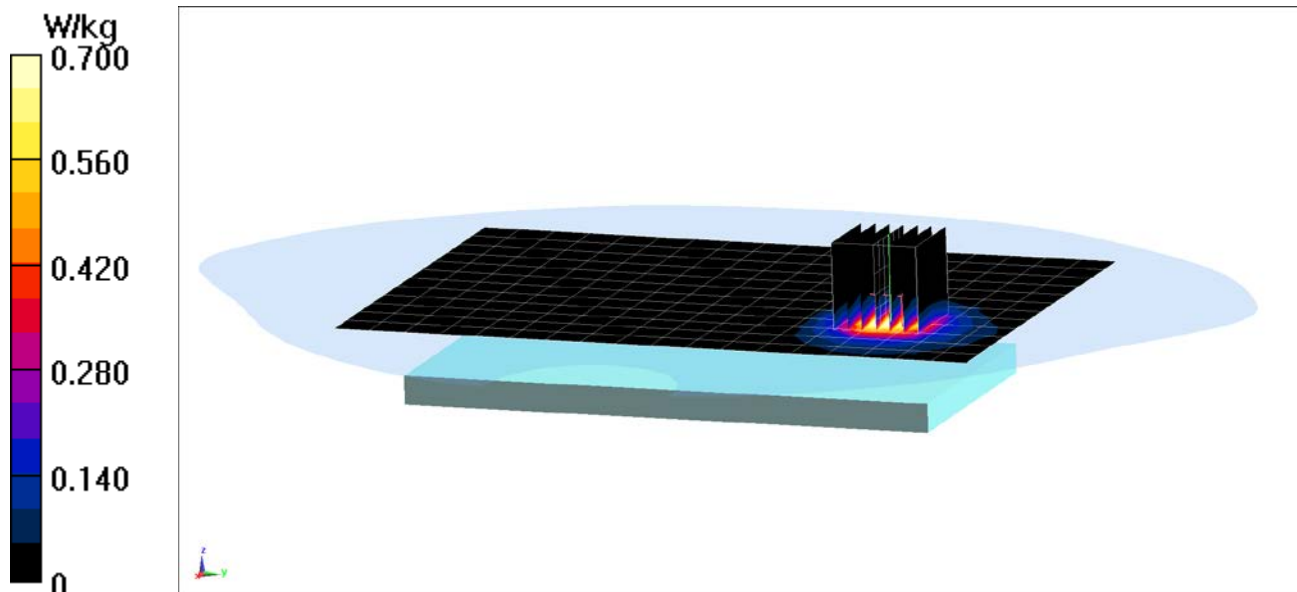
Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 8.561 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.74 W/kg

SAR(1 g) = 0.400 W/kg



PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMA530W; Type: Portable Handset; Serial: 07349

Communication System: UID 0, 802.11n 5.2-5.8 GHz Band; Frequency: 5755 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5755 \text{ MHz}$; $\sigma = 6.145 \text{ S/m}$; $\epsilon_r = 46.41$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7308; ConvF(4.5, 4.5, 4.5); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

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

**Mode: IEEE 802.11n, UNII-3, 40 MHz Bandwidth,
Body SAR, Ch 151, 13.5 Mbps, Back Side**

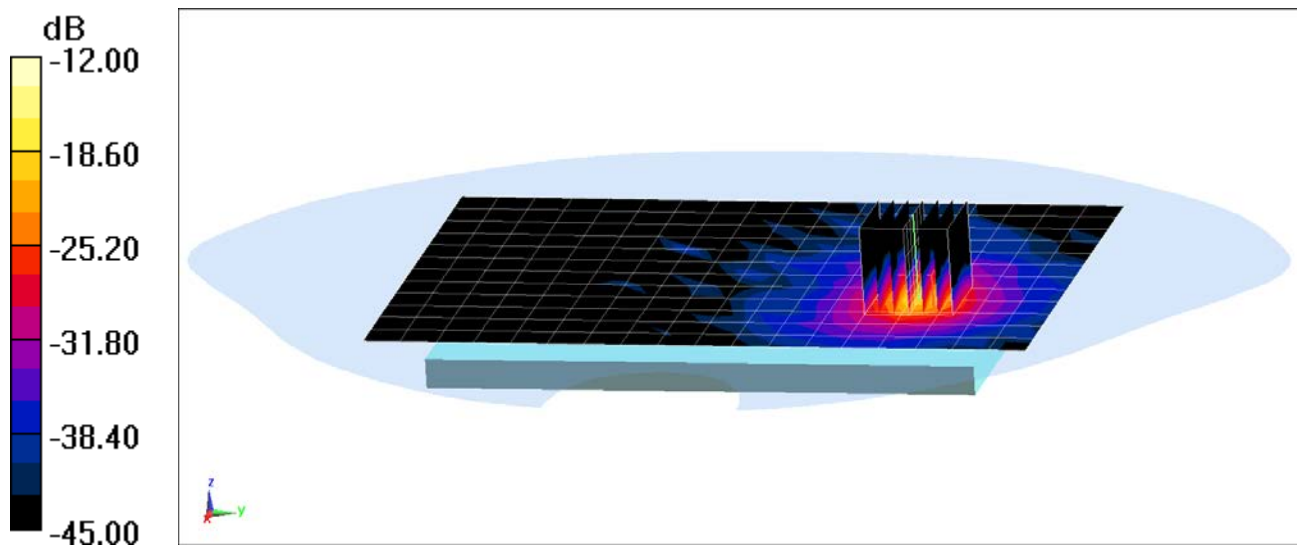
Area Scan (13x19x1): Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 12.50 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 4.31 W/kg

SAR(1 g) = 0.847 W/kg



0 dB = 150 W/kg = 21.76 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1054

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

Medium: 750 MHz Head Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.893 \text{ S/m}$; $\epsilon_r = 41.488$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-06-2017; Ambient Temp: 23.2°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN7410; ConvF(10.6, 10.6, 10.6); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

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

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

750 MHz System Verification at 23.0 dBm (200 mW)

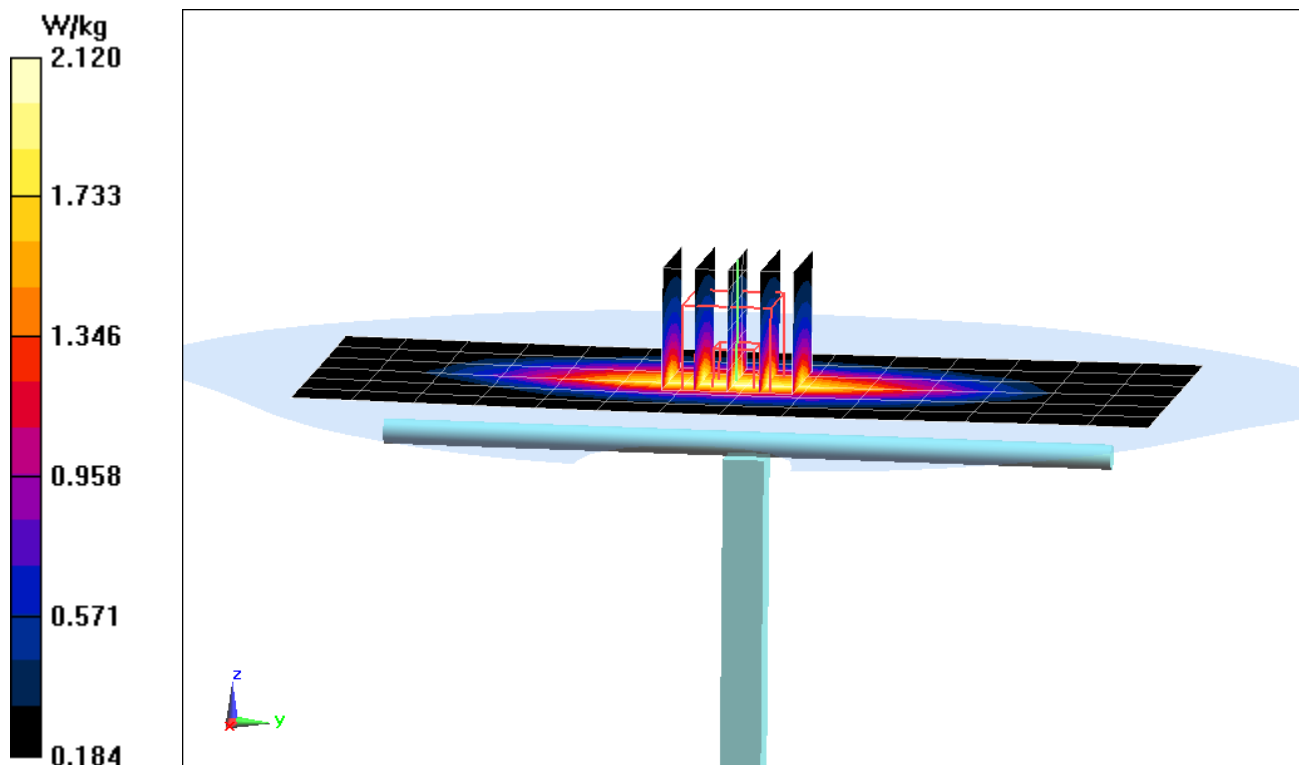
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 2.38 W/kg

SAR(1 g) = 1.58 W/kg

Deviation(1 g) = -5.62%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d133

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

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.893 \text{ S/m}$; $\epsilon_r = 40.509$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-27-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN7406; ConvF(9.97, 9.97, 9.97); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

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

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

835 MHz System Verification at 23.0 dBm (200 mW)

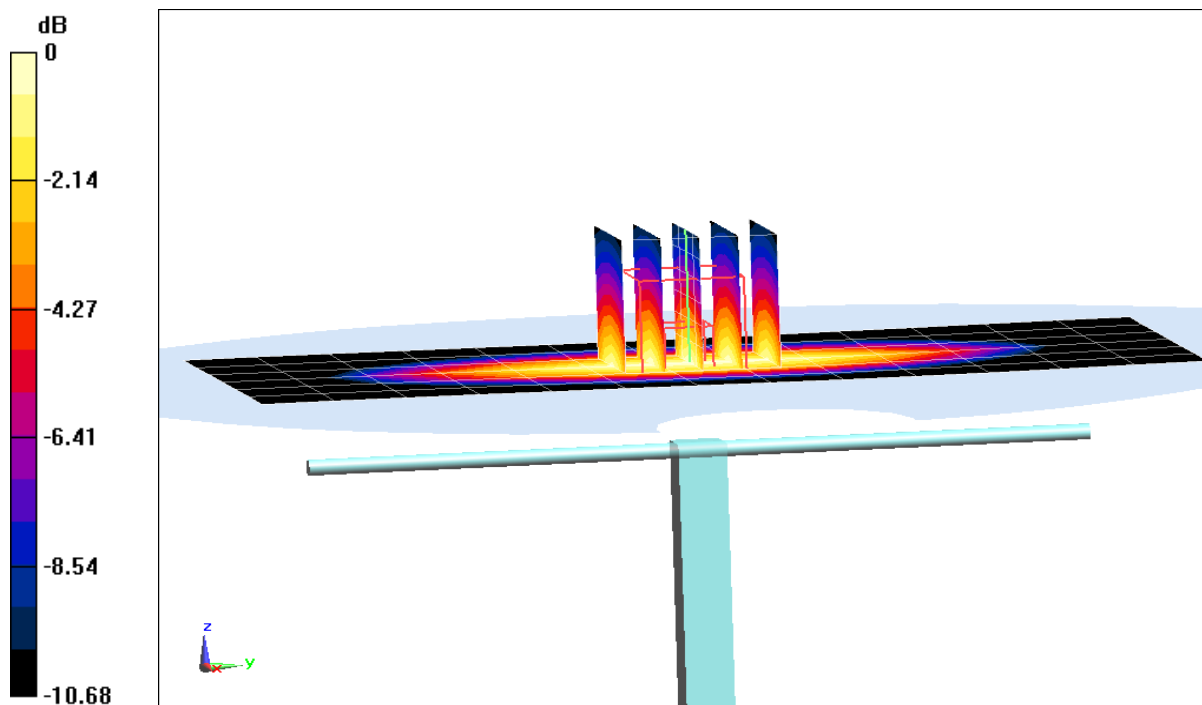
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 3.00 W/kg

SAR(1 g) = 1.99 W/kg

Deviation(1 g) = 4.52%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.386 \text{ S/m}$; $\epsilon_r = 38.546$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 21.9°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3213; ConvF(5.49, 5.49, 5.49); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

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

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

1750 MHz System Verification at 20.0 dBm (100 mW)

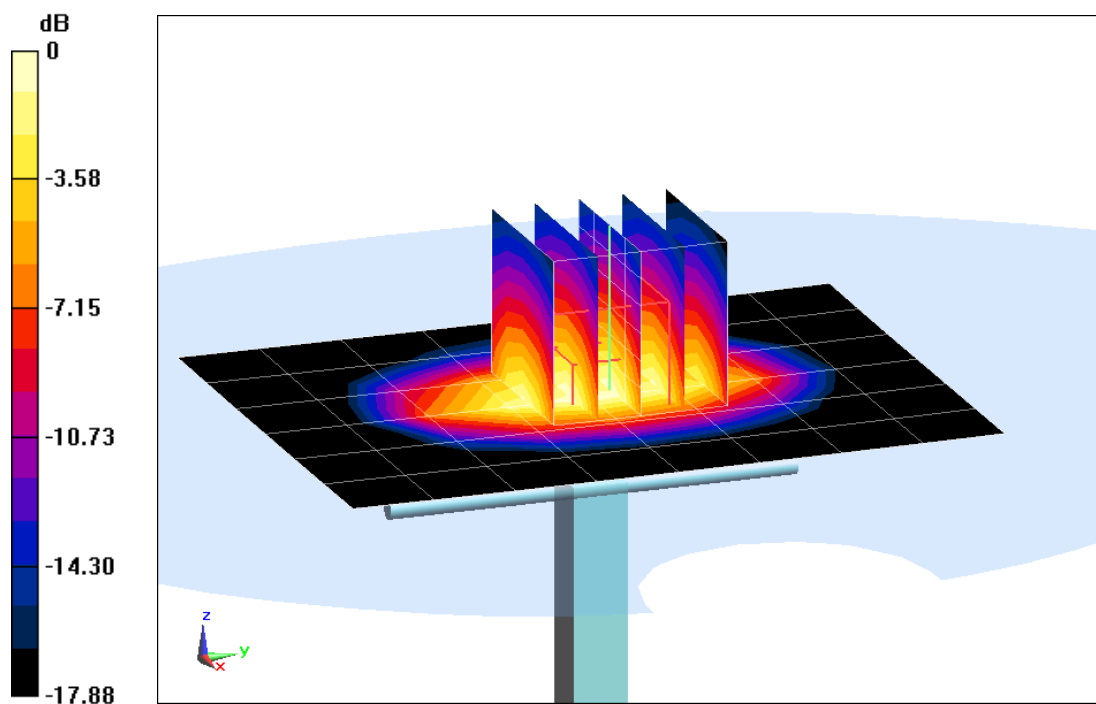
Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 6.68 W/kg

SAR(1 g) = 3.67 W/kg

Deviation(1 g) = 0.82%



0 dB = 4.60 W/kg = 6.63 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

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

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.44 \text{ S/m}$; $\epsilon_r = 40.617$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-03-2017; Ambient Temp: 21.5°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7406; ConvF(8.4, 8.4, 8.4); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

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

1900 MHz System Verification at 20.0 dBm (100 mW)

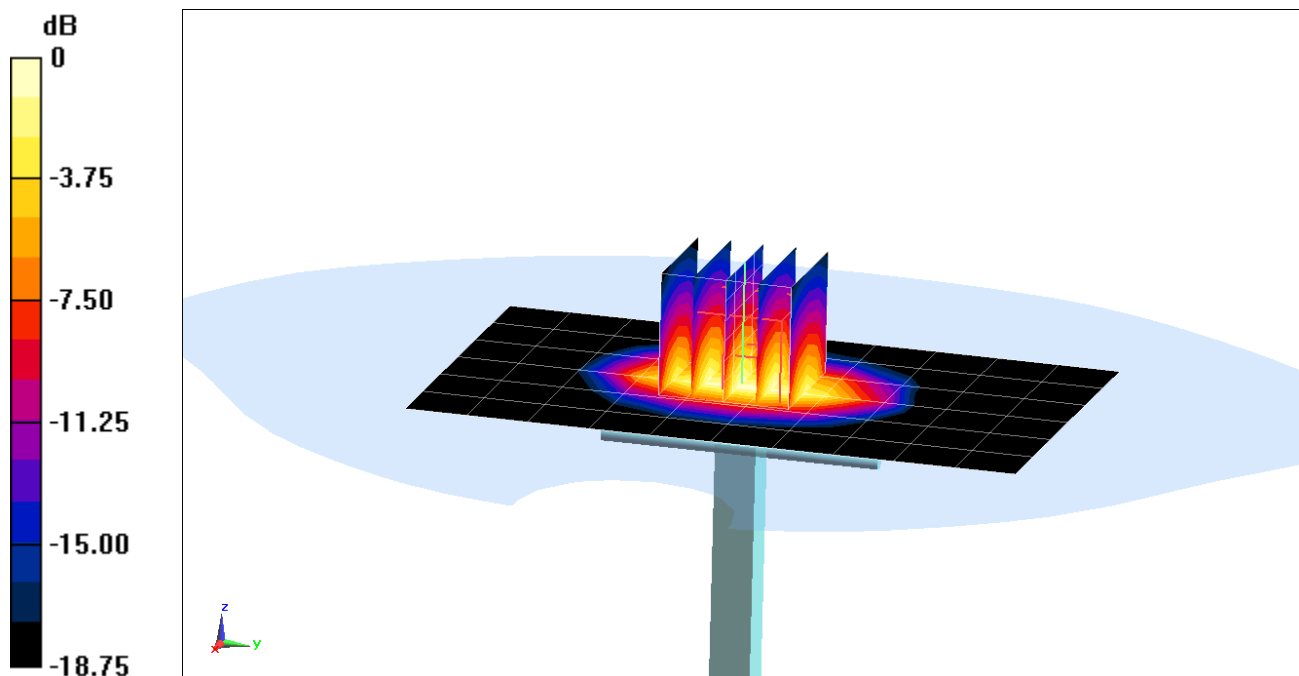
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.30 W/kg

SAR(1 g) = 3.77 W/kg

Deviation(1 g) = -4.80%



0 dB = 6.02 W/kg = 7.80 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

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

Medium: 2450-2600 Head Medium parameters used:

$f = 2450$ MHz; $\sigma = 1.869$ S/m; $\epsilon_r = 39.368$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-27-2017; Ambient Temp: 22.6°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3319; ConvF(4.6, 4.6, 4.6); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

2450 MHz System Verification at 20.0 dBm (100 mW)

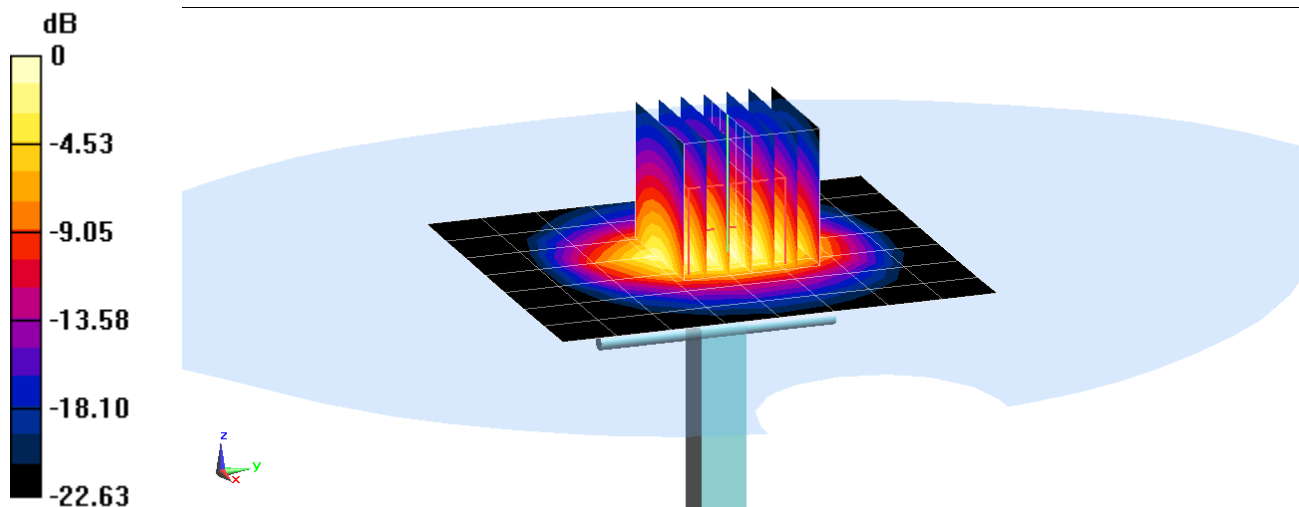
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 11.4 W/kg

SAR(1 g) = 5.46 W/kg

Deviation(1 g) = 3.41%



0 dB = 7.14 W/kg = 8.54 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1126

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

Medium: 2600 Head Medium parameters used:

$f = 2600 \text{ MHz}$; $\sigma = 2.039 \text{ S/m}$; $\epsilon_r = 38.792$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-27-2017; Ambient Temp: 22.6°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3319; ConvF(4.41, 4.41, 4.41); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

2600 MHz System Verification at 20.0 dBm (100 mW)

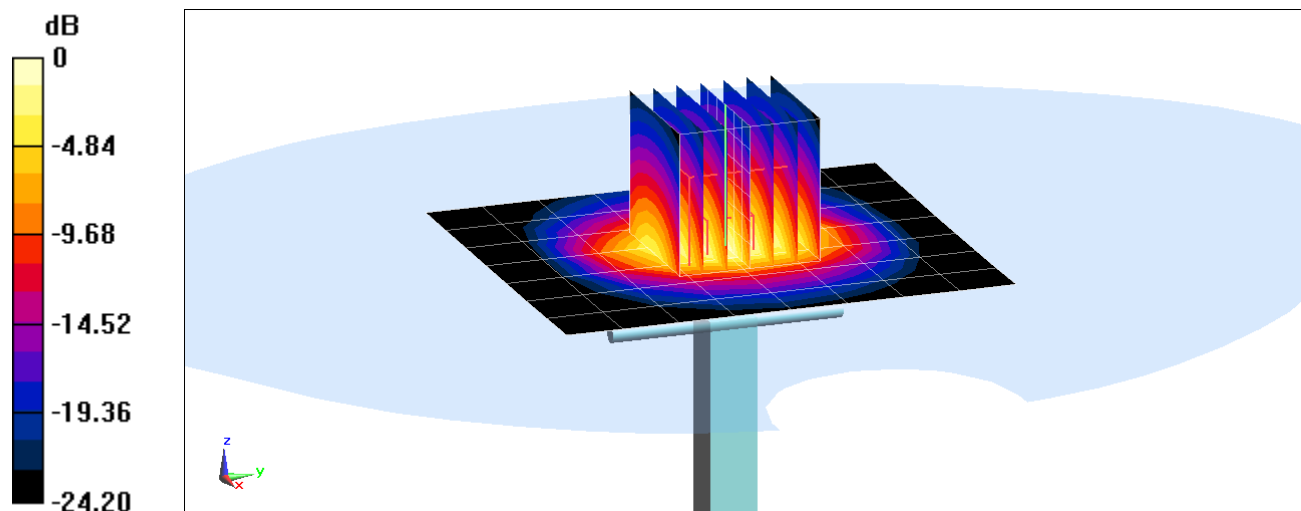
Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Peak SAR (extrapolated) = 13.0 W/kg

SAR(1 g) = 5.94 W/kg

Deviation(1 g) = 5.32%



0 dB = 7.79 W/kg = 8.92 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used (interpolated):

$f = 5250 \text{ MHz}$; $\sigma = 4.495 \text{ S/m}$; $\epsilon_r = 34.492$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(5.49, 5.49, 5.49); Calibrated: 2/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/9/2017

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

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

5250 MHz System Verification at 17.0 dBm (50 mW)

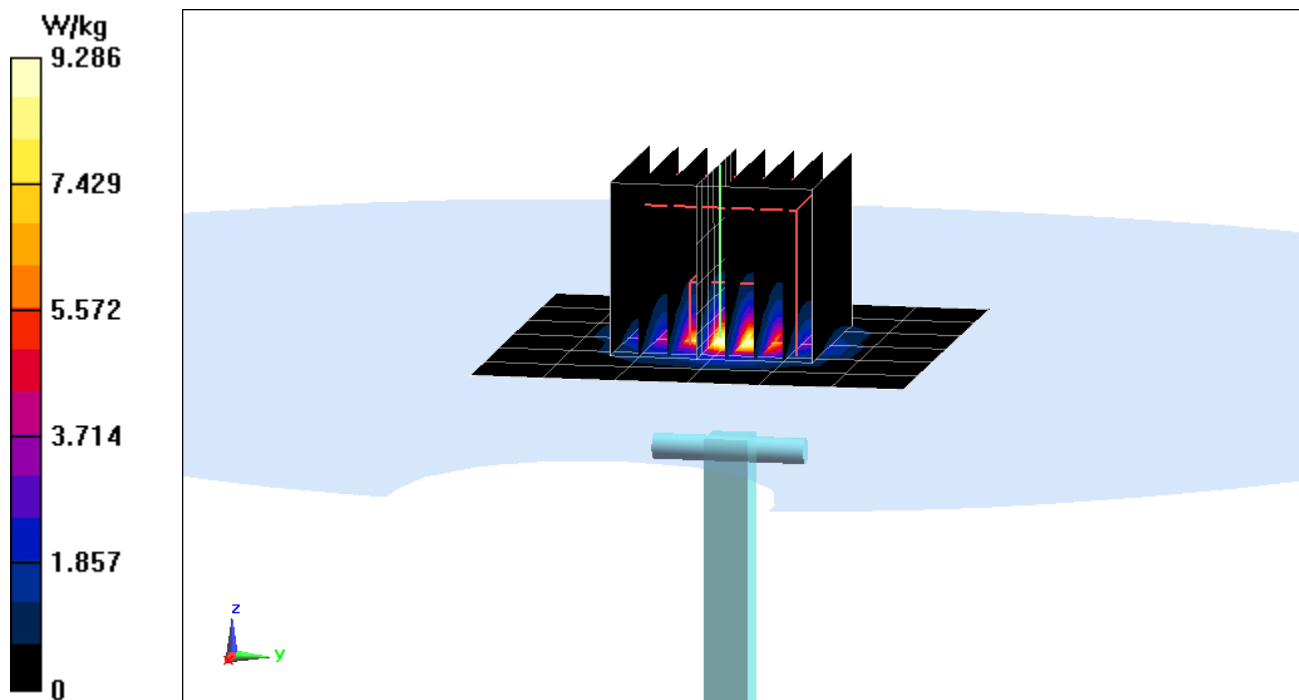
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

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

Peak SAR (extrapolated) = 16.1 W/kg

SAR(1 g) = 3.77 W/kg

Deviation(1 g) = -7.60%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 4.84 \text{ S/m}$; $\epsilon_r = 34.01$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(4.94, 4.94, 4.94); Calibrated: 2/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/9/2017

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

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

5600 MHz System Verification at 17.0 dBm (50 mW)

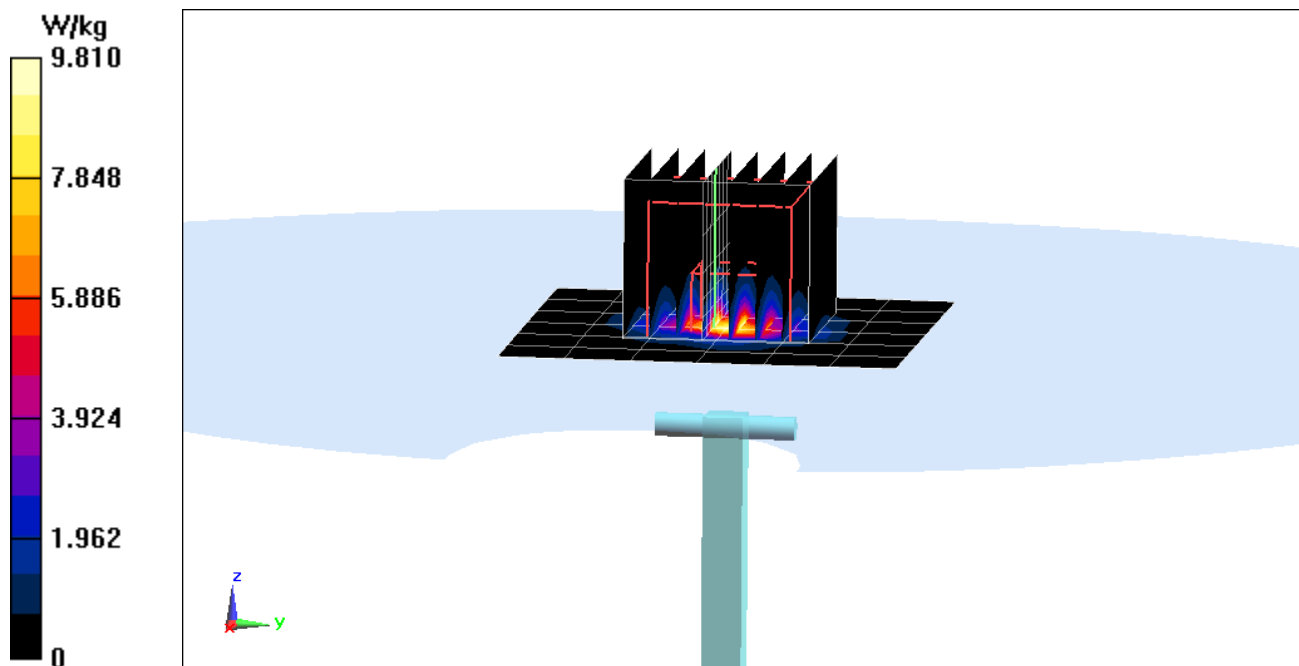
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

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

Peak SAR (extrapolated) = 18.0 W/kg

SAR(1 g) = 4.08 W/kg

Deviation(1 g) = -2.51%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1057

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used (interpolated):

$f = 5750 \text{ MHz}$; $\sigma = 5.005 \text{ S/m}$; $\epsilon_r = 33.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.0°C; Tissue Temp: 20.7°C

Probe: EX3DV4 - SN3914; ConvF(4.91, 4.91, 4.91); Calibrated: 2/13/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/9/2017

Phantom: SAM with CRP (Left); Type: SAM; Serial: 1715

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

5750 MHz System Verification at 17.0 dBm (50 mW)

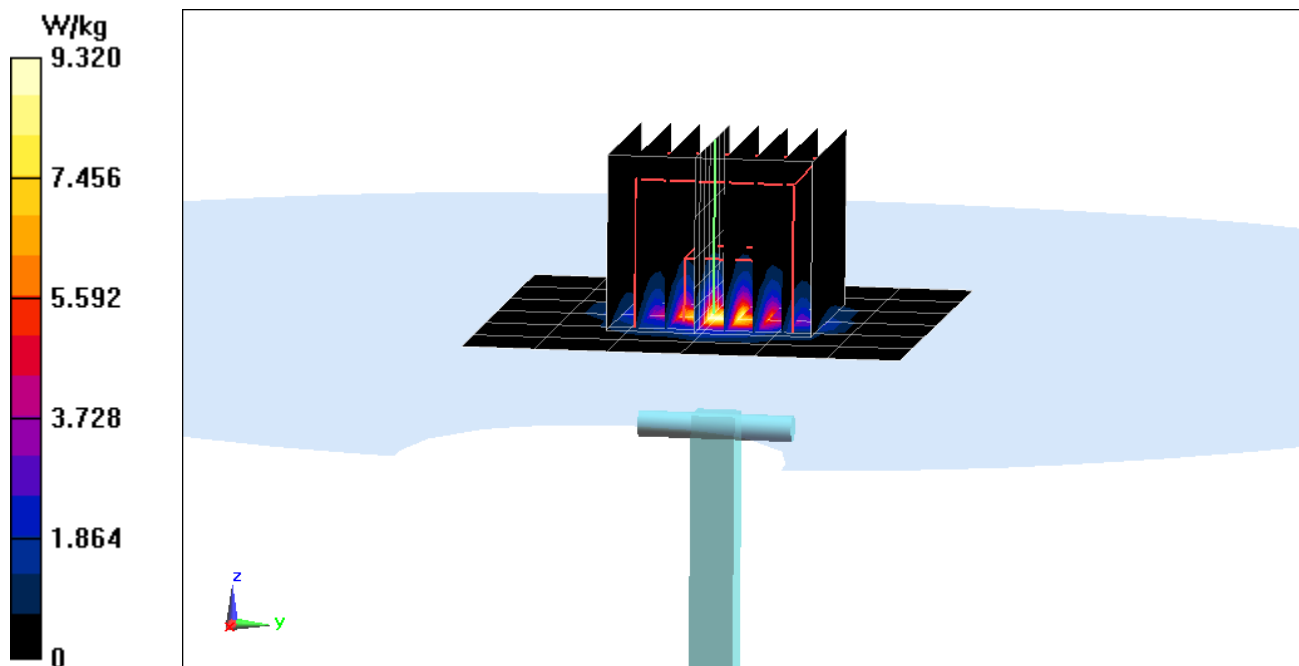
Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm

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

Peak SAR (extrapolated) = 17.1 W/kg

SAR(1 g) = 3.79 W/kg

Deviation(1 g) = -5.25%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.959 \text{ S/m}$; $\epsilon_r = 57.526$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-04-2017; Ambient Temp: 20.8°C; Tissue Temp: 21.2°C

Probe: ES3DV3 - SN3319; ConvF(6.37, 6.37, 6.37); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

750 MHz System Verification at 23.0 dBm (200 mW)

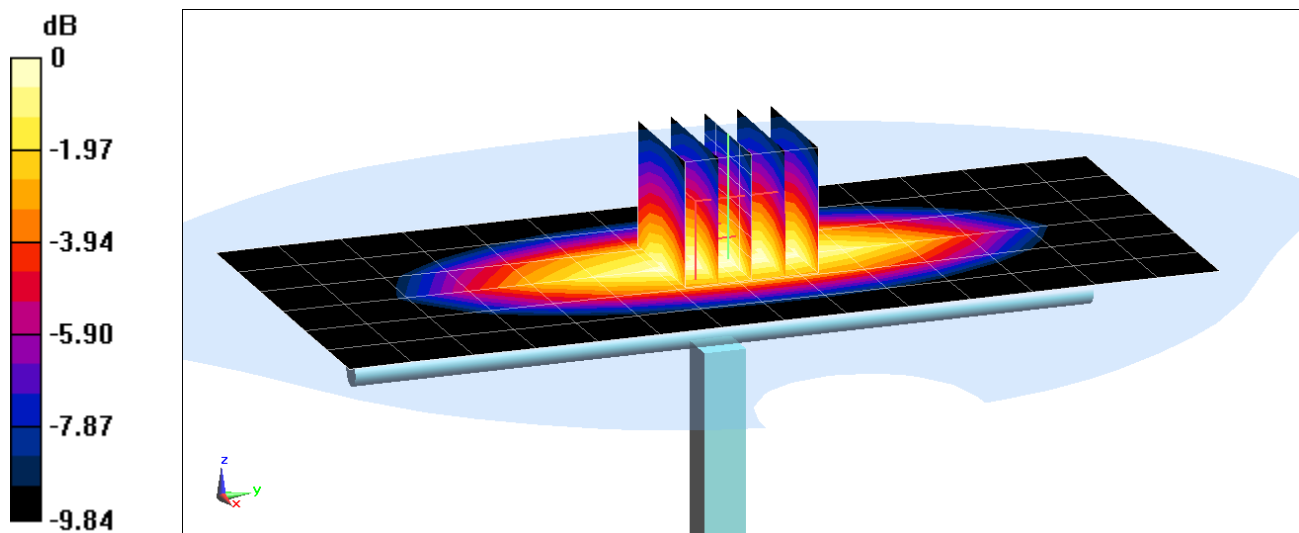
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 2.39 W/kg

SAR(1 g) = 1.65 W/kg

Deviation(1 g) = -2.14%



0 dB = 1.91 W/kg = 2.81 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d133

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 1.004 \text{ S/m}$; $\epsilon_r = 53.977$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-01-2017; Ambient Temp: 22.6°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN7410; ConvF(9.95, 9.95, 9.95); Calibrated: 7/17/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

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

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

835 MHz System Verification at 23.0 dBm (200 mW)

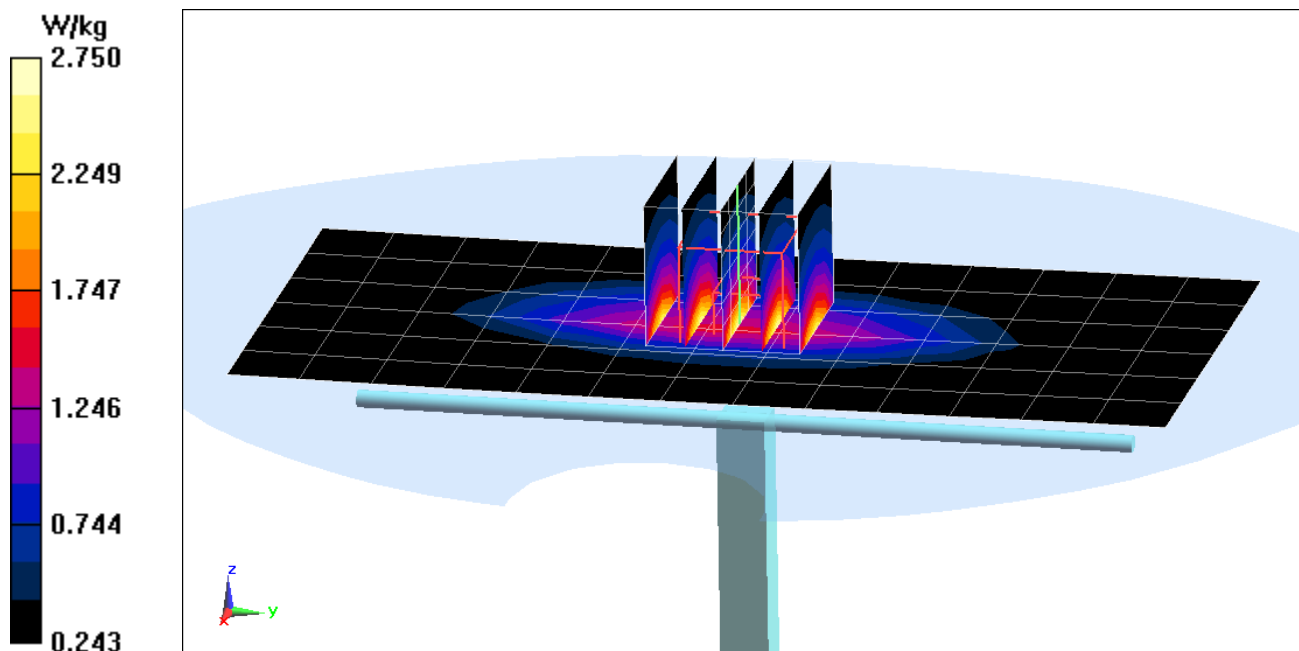
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 3.08 W/kg

SAR(1 g) = 2.06 W/kg

Deviation(1 g) = 9.46%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d132

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.979 \text{ S/m}$; $\epsilon_r = 54.573$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-04-2017; Ambient Temp: 21.0°C; Tissue Temp: 21.0°C

Probe: ES3DV3 - SN3332; ConvF(6.47, 6.47, 6.47); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

835 MHz System Verification at 23.0 dBm (200 mW)

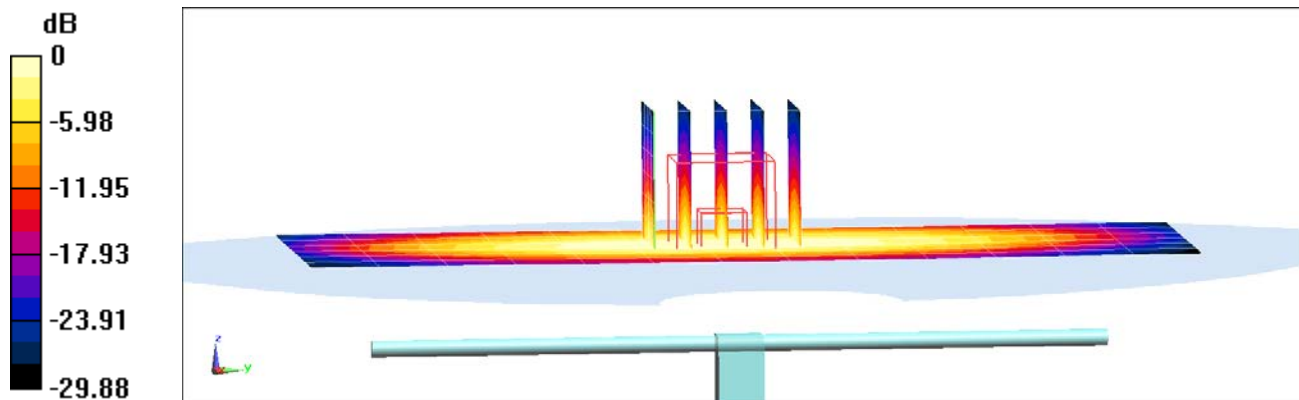
Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 2.77 W/kg

SAR(1 g) = 1.92 W/kg;

Deviation(1 g) = -2.04%



0 dB = 1.94 W/kg = 2.88 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d133

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.972 \text{ S/m}$; $\epsilon_r = 52.787$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 12-18-2017; Ambient Temp: 23.2°C; Tissue Temp: 20.7°C

Probe: ES3DV3 - SN3213; ConvF(6.28, 6.28, 6.28); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

Phantom: SAM Right; Type: SAM; Serial: 1757

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

835 MHz System Verification at 23.0 dBm (200 mW)

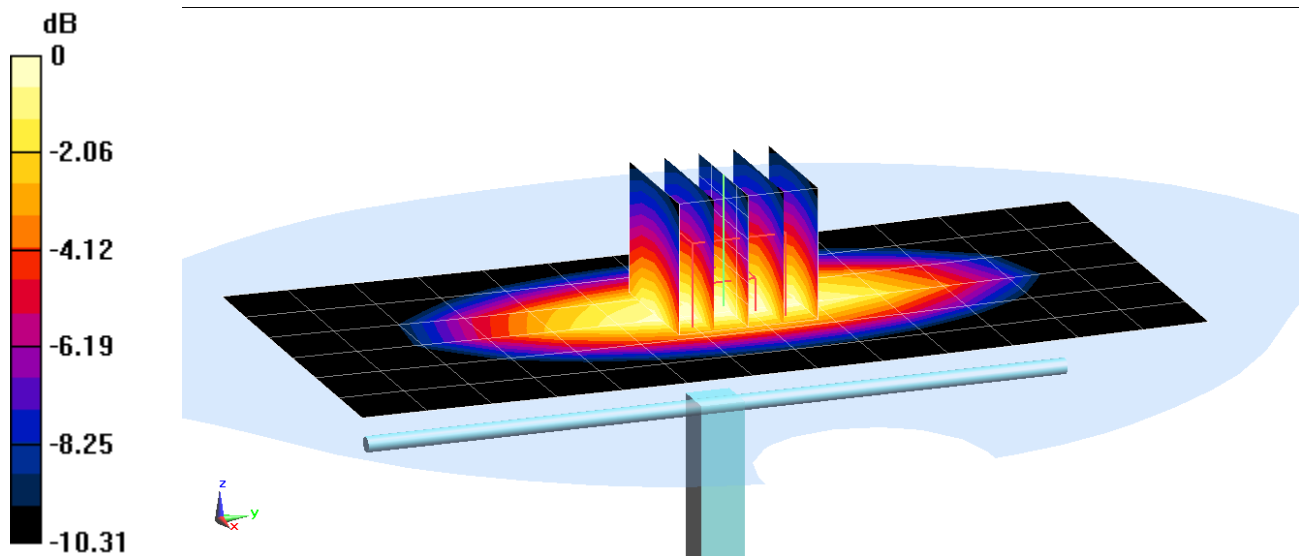
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 2.79 W/kg

SAR(1 g) = 1.89 W/kg

Deviation(1 g) = 0.43%



0 dB = 2.21 W/kg = 3.44 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.525 \text{ S/m}$; $\epsilon_r = 51.401$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-01-2017; Ambient Temp: 23.8°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3213; ConvF(5.09, 5.09, 5.09); Calibrated: 2/10/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 2/9/2017

Phantom: SAM Right; Type: SAM; Serial: 1757

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

1750 MHz System Verification at 20.0 dBm (100 mW)

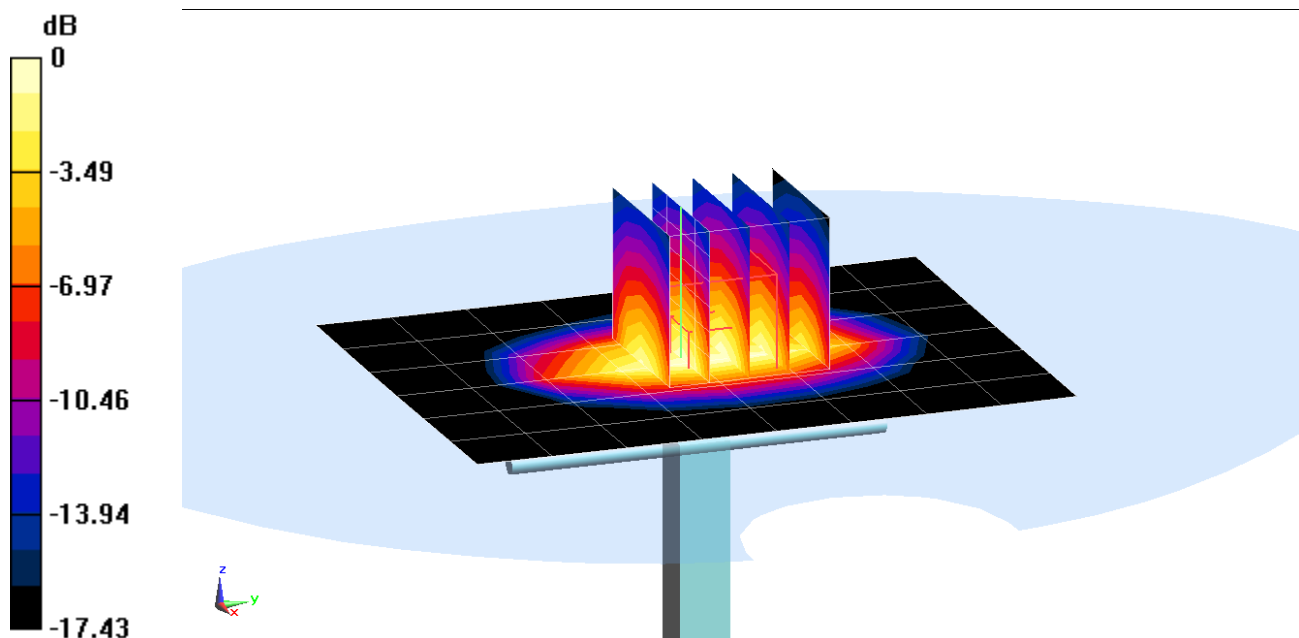
Area Scan (7x9x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 6.84 W/kg

SAR(1 g) = 3.86 W/kg

Deviation(1 g) = 4.32%



0 dB = 4.75 W/kg = 6.77 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.518 \text{ S/m}$; $\epsilon_r = 51.179$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-05-2017; Ambient Temp: 22.7°C; Tissue Temp: 21.5°C

Probe: ES3DV3 - SN3319; ConvF(5.07, 5.07, 5.07); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

1750 MHz System Verification at 20.0 dBm (100 mW)

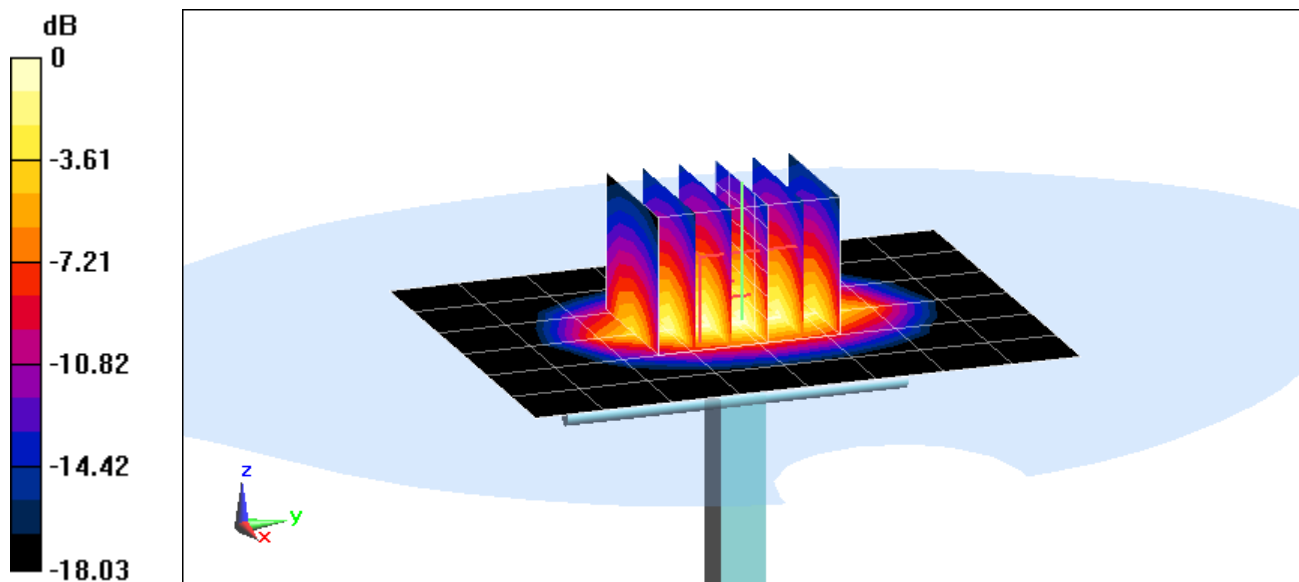
Area Scan (7x9x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 6.51 W/kg

SAR(1 g) = 3.76 W/kg

Deviation(1 g) = 1.62%



0 dB = 4.72 W/kg = 6.74 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.549 \text{ S/m}$; $\epsilon_r = 52.301$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-27-2017; Ambient Temp: 22.9°C; Tissue Temp: 21.1°C

Probe: ES3DV3 - SN3332; ConvF(4.95, 4.95, 4.95); Calibrated: 8/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

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

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

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

1900 MHz System Verification at 20.0 dBm (100 mW)

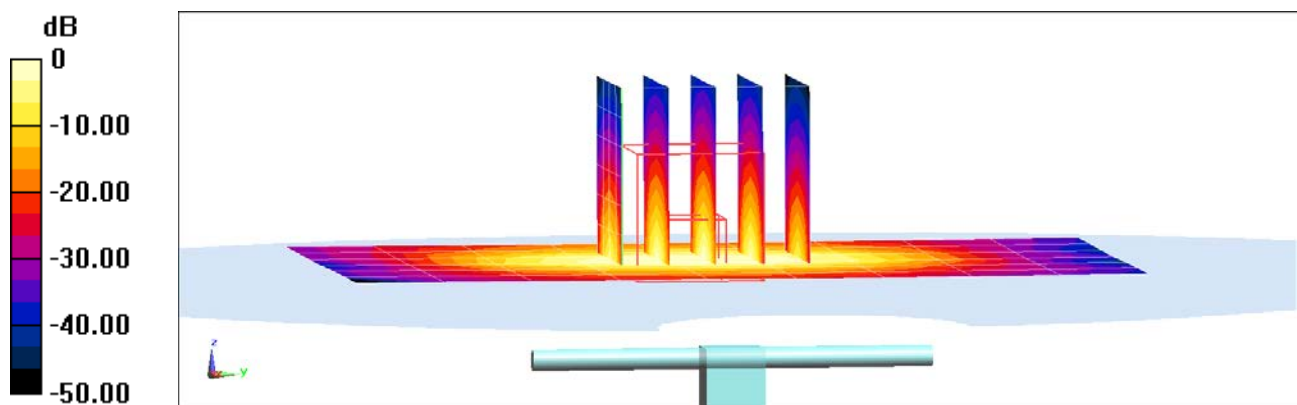
Area Scan (7x10x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 6.68 W/kg

SAR(1 g) = 3.76 W/kg

Deviation(1 g) = -6.23%



0 dB = 3.57 W/kg = 5.53 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d149

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.583 \text{ S/m}$; $\epsilon_r = 52.332$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2017; Ambient Temp: 22.3°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7406; ConvF(7.81, 7.81, 7.81); Calibrated: 4/18/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

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

Phantom: SAM Left; Type: QD000P40CC; Serial: TP: 1375

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

1900 MHz System Verification at 20.0 dBm (100 mW)

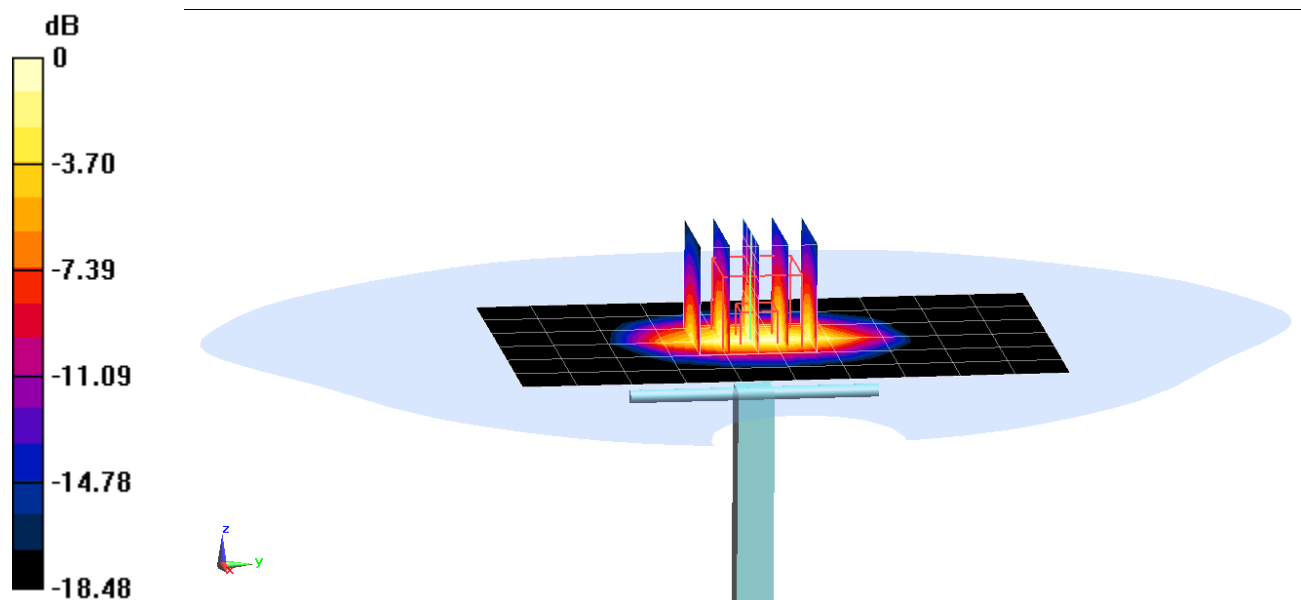
Area Scan (7x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 7.24 W/kg

SAR(1 g) = 3.9 W/kg

Deviation(1 g) = -2.74%



0 dB = 6.04 W/kg = 7.81 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 981

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

Medium: 2450-2600 Body Medium parameters used:

$f = 2450$ MHz; $\sigma = 1.996$ S/m; $\epsilon_r = 51.436$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-28-2017; Ambient Temp: 24.5°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3319; ConvF(4.42, 4.42, 4.42); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

2450 MHz System Verification at 20.0 dBm (100 mW)

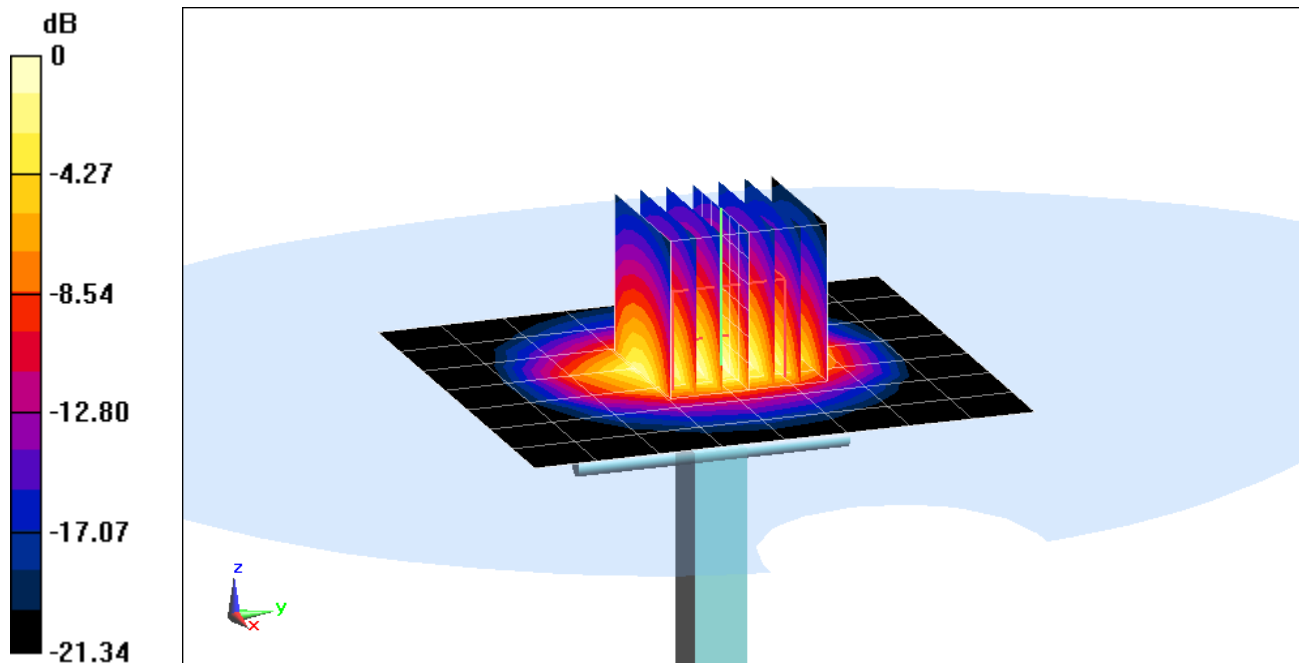
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 10.6 W/kg

SAR(1 g) = 5.32 W/kg

Deviation(1 g) = 4.72%



0 dB = 6.88 W/kg = 8.38 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:

$f = 2450 \text{ MHz}$; $\sigma = 2.037 \text{ S/m}$; $\epsilon_r = 51.011$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-08-2017; Ambient Temp: 22.0°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3319; ConvF(4.42, 4.42, 4.42); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

2450 MHz System Verification at 20.0 dBm (100 mW)

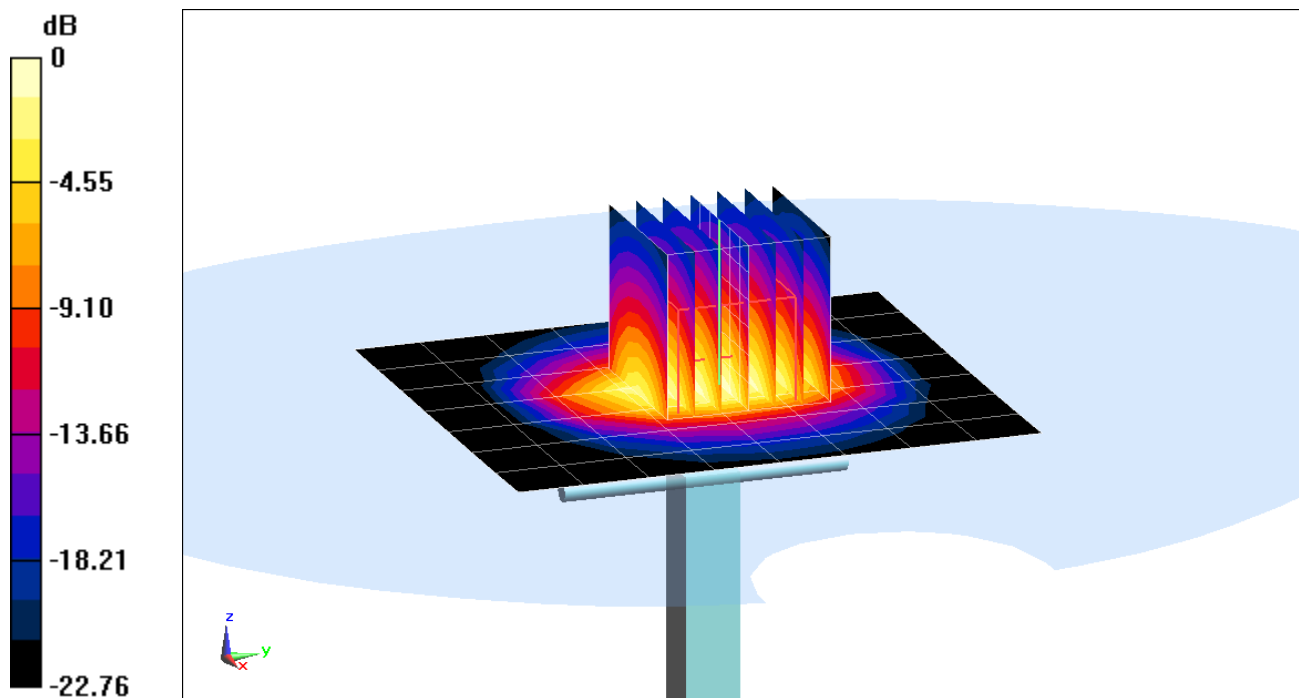
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 10.3 W/kg

SAR(1 g) = 4.86 W/kg

Deviation(1 g) = -2.99%



0 dB = 6.43 W/kg = 8.08 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1126

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

Medium: 2450-2600 Body Medium parameters used:

$f = 2600$ MHz; $\sigma = 2.2$ S/m; $\epsilon_r = 50.82$; $\rho = 1000$ kg/m³

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 11-28-2017; Ambient Temp: 24.5°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3319; ConvF(4.18, 4.18, 4.18); Calibrated: 3/14/2017;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 3/8/2017

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

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

2600 MHz System Verification at 20.0 dBm (100 mW)

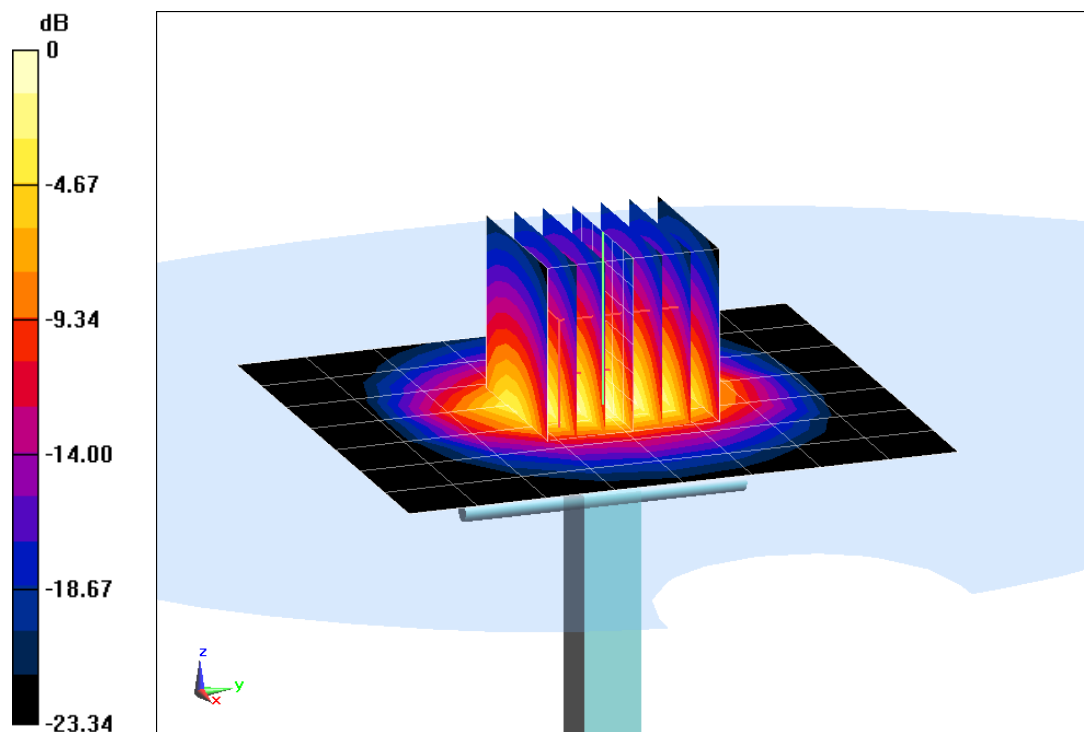
Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm

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

Peak SAR (extrapolated) = 12.7 W/kg

SAR(1 g) = 5.9 W/kg

Deviation(1 g) = 8.66%



0 dB = 7.65 W/kg = 8.84 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5250 \text{ MHz}$; $\sigma = 5.466 \text{ S/m}$; $\epsilon_r = 47.269$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7308; ConvF(4.84, 4.84, 4.84); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

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

5250 MHz System Verification at 17.0 dBm (50 mW)

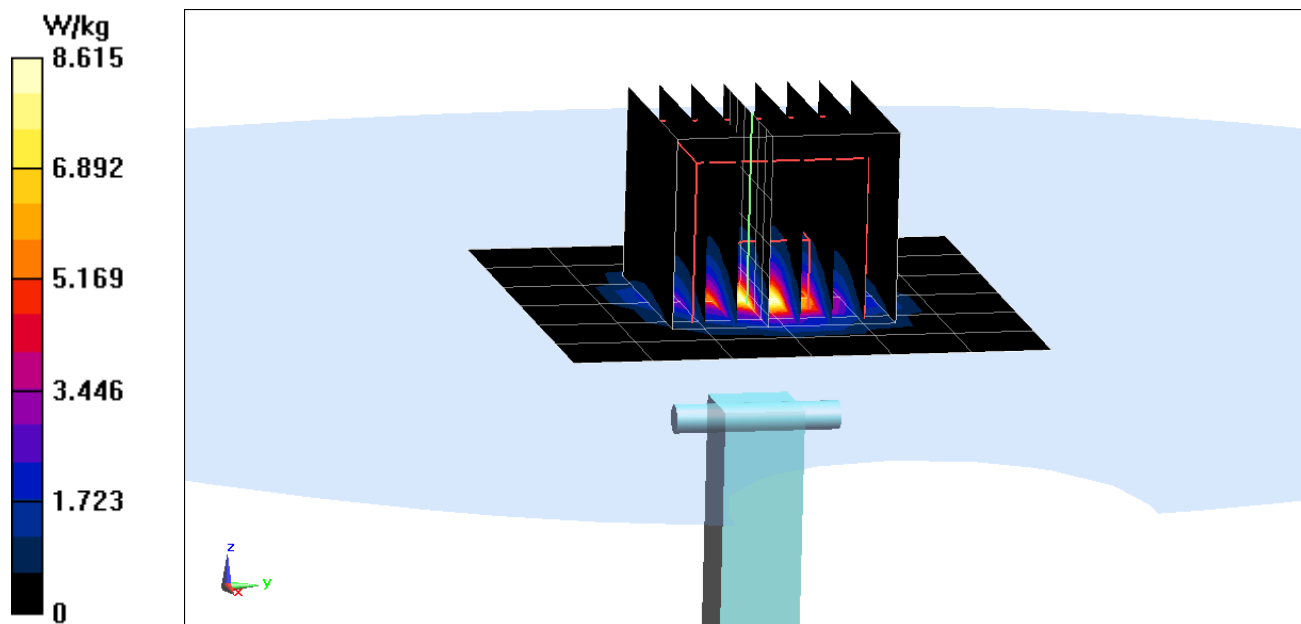
Area Scan (7x7x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Peak SAR (extrapolated) = 17.0 W/kg

SAR(1 g) = 3.63 W/kg

Deviation(1 g) = -5.59%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

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

Medium: 5 GHz Body Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 5.924 \text{ S/m}$; $\epsilon_r = 46.669$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7308; ConvF(4.23, 4.23, 4.23); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

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

5600 MHz System Verification at 17.0 dBm (50 mW)

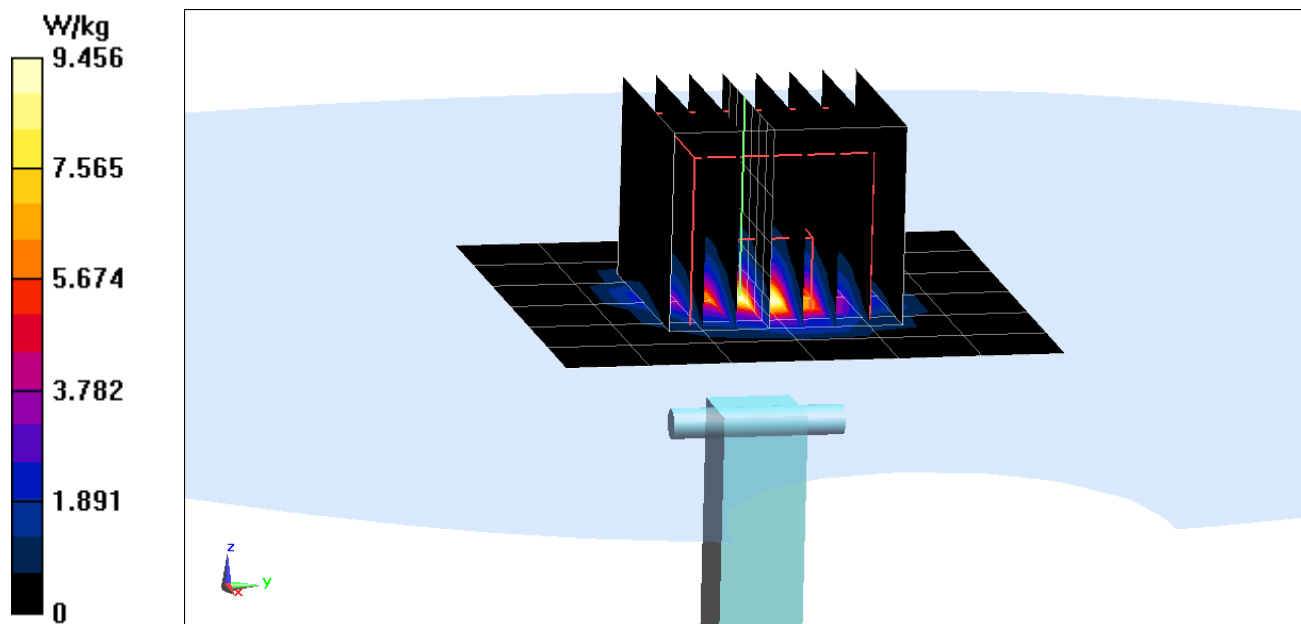
Area Scan (7x7x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Peak SAR (extrapolated) = 18.7 W/kg

SAR(1 g) = 3.82 W/kg

Deviation(1 g) = -2.68%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1237

Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used (interpolated):

$f = 5750 \text{ MHz}$; $\sigma = 6.14 \text{ S/m}$; $\epsilon_r = 46.416$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 12-04-2017; Ambient Temp: 22.3°C; Tissue Temp: 20.4°C

Probe: EX3DV4 - SN7308; ConvF(4.5, 4.5, 4.5); Calibrated: 8/16/2017;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 6/14/2017

Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: 1646

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

5750 MHz System Verification at 17.0 dBm (50 mW)

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

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

Peak SAR (extrapolated) = 18.9 W/kg

SAR(1 g) = 3.67 W/kg

Deviation(1 g) = -4.80%

