



SAR EVALUATION REPORT

Applicant Name:

Samsung Electronics, Co. Ltd.
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Yeongtong-gu, Suwon-si
Gyeonggi-do 443-742, Korea

Date of Testing:

08/07/14 – 09/11/14

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

OY1408011604.A3L

FCC ID:

A3LSMN910V

APPLICANT:

SAMSUNG ELECTRONICS, CO. LTD.

DUT Type:

Portable Handset

Application Type:

Certification

FCC Rule Part(s):

CFR §2.1093

Model(s):

SM-N910V

Equipment Class	Band & Mode	Tx Frequency	SAR			
			1 gm Head (W/kg)	1 gm Body-Worn (W/kg)	1 gm Hotspot (W/kg)	10 gm Extremity (W/kg)
PCE	Cell. CDMA/EVDO	824.70 - 848.31 MHz	0.20	0.50	0.54	
PCE	PCS CDMA/EVDO	1851.25 - 1908.75 MHz	0.16	0.53	0.74	
PCE	GSM/GPRS/EDGE 850	824.20 - 848.80 MHz	0.19	0.35	1.03	
PCE	GSM/GPRS/EDGE 1900	1850.20 - 1909.80 MHz	< 0.1	0.20	0.59	
PCE	UMTS 850	826.40 - 846.60 MHz	0.17	0.25	0.57	
PCE	UMTS 1900	1852.4 - 1907.6 MHz	< 0.1	0.32	1.03	
PCE	LTE Band 13	782 MHz	0.15	0.19	0.40	
PCE	LTE Band 4 (AWS)	1712.5 - 1752.5 MHz	0.13	0.19	0.85	
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.67	0.14	0.14	
DTS	5.8 GHz WLAN	5745 - 5825 MHz	< 0.1	0.22	0.46	
NII	5.2 GHz WLAN	5180 - 5240 MHz	0.16	0.11		0.35
NII	5.3 GHz WLAN	5260 - 5320 MHz	0.14	0.12		0.37
NII	5.5 GHz WLAN	5500 - 5700 MHz	0.10	0.37		0.68
DSS/DTS	Bluetooth	2402 - 2480 MHz	N/A			
Simultaneous SAR per KDB 690783 D01v01r03:			0.88	1.06	1.40	0.68

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 1.9 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
Cell. CDMA/EVDO	Voice/Data	824.70 - 848.31 MHz
PCS CDMA/EVDO	Voice/Data	1851.25 - 1908.75 MHz
GSM/GPRS/EDGE 850	Voice/Data	824.20 - 848.80 MHz
GSM/GPRS/EDGE 1900	Voice/Data	1850.20 - 1909.80 MHz
UMTS 850	Voice/Data	826.40 - 846.60 MHz
UMTS 1900	Voice/Data	1852.4 - 1907.6 MHz
LTE Band 13	Voice/Data	782 MHz
LTE Band 4 (AWS)	Voice/Data	1712.5 - 1752.5 MHz
2.4 GHz WLAN	Data	2412 - 2462 MHz
5.8 GHz WLAN	Data	5745 - 5825 MHz
5.2 GHz WLAN	Data	5180 - 5240 MHz
5.3 GHz WLAN	Data	5260 - 5320 MHz
5.5 GHz WLAN	Data	5500 - 5700 MHz
Bluetooth	Data	2402 - 2480 MHz
NFC	Data	13.56 MHz
ANT+	Data	2402 - 2480 MHz

1.2 Power Reduction for SAR

The device utilizes power reduction using an independent single fixed level of reduction through a static table look-up, triggered by a single event/operation for the following modes:

1.2.1 LTE

- Power is reduced when simultaneously transmitting with 1x-RTT CDMA Voice in certain SVLTE conditions

1.2.2 CDMA2000

- Power is reduced when Hotspot is ON

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1.3 RF Output Target 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 D01v05.

1.3.1 GSM/UMTS 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	33.5	33.5	32.0	30.5	28.5	27.5	26.5	23.5	22.5
	Nominal	33.0	33.0	31.5	30.0	28.0	27.0	26.0	23.0	22.0
GSM/GPRS/EDGE 1900	Maximum	30.5	30.5	29.5	27.5	26.5	26.5	25.5	22.5	21.5
	Nominal	30.0	30.0	29.0	27.0	26.0	26.0	25.0	22.0	21.0

Mode / Band		Modulated Average (dBm)		
		3GPP WCDMA Rel 99	3GPP HSDPA Rel 5	3GPP HSUPA Rel 6
UMTS Band 5 (850 MHz)	Maximum	23.5	23.5	22.5
	Nominal	23.0	23.0	22.0
UMTS Band 2 (1900 MHz)	Maximum	21.8	20.5	20.5
	Nominal	21.3	20.0	20.0

1.3.2 LTE Maximum Output Power

Mode / Band		Modulated Average (dBm)
LTE Band 13	Maximum	23.5
	Nominal	23.0
LTE Band 4 (AWS)	Maximum	23.5
	Nominal	23.0

Mode / Band			Modulated Average (dBm)
LTE Band 13	CDMA Power ≥ Threshold Power	Maximum	19.5
		Nominal	19.0
LTE Band 4 (AWS)	CDMA Power ≥ Threshold Power	Maximum	19.5
		Nominal	19.0

(Only applies in SVLTE conditions where the 1x-RTT CDMA voice power is 18 dBm or greater)

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1.3.3 CDMA2000 Maximum Output Power

Mode / Band		Modulated Average (dBm)
Cell. CDMA/EVDO	Maximum	25.5
	Nominal	25.0
PCS CDMA/EVDO	Maximum	25.0
	Nominal	24.5

Mode / Band		Modulated Average (dBm)
Cell. CDMA/EVDO	Maximum	23.5
	Nominal	23.0
PCS CDMA/EVDO	Maximum	23.0
	Nominal	22.5

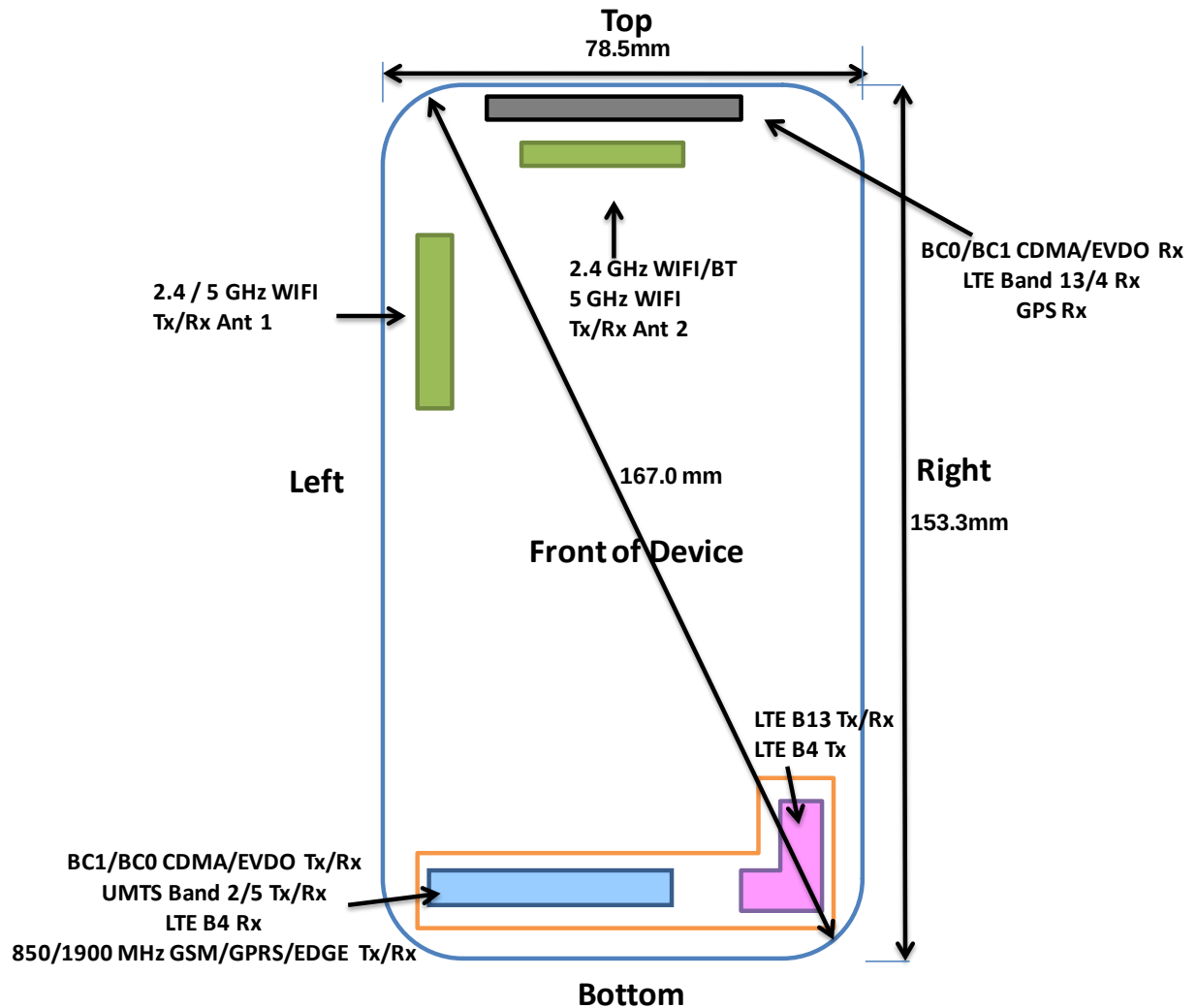
(Only when Hotspot is ON)

1.3.4 WLAN Maximum Output Power

Mode / Band		Modulated Average (dBm)
SISO IEEE 802.11b (2.4 GHz)	Maximum	15.5
	Nominal	15.0
SISO IEEE 802.11g (2.4 GHz)	Maximum	14.5
	Nominal	14.0
SISO IEEE 802.11n (2.4 GHz)	Maximum	13.5
	Nominal	13.0
MIMO IEEE 802.11n (2.4 GHz)	Maximum	15.5
	Nominal	15.0
SISO IEEE 802.11a (5 GHz)	Maximum	12.5
	Nominal	12.0
SISO IEEE 802.11n (5 GHz - 20 MHz Bandwidth)	Maximum	12.5
	Nominal	12.0
MIMO IEEE 802.11n (5 GHz - 20 MHz Bandwidth)	Maximum	15.5
	Nominal	15.0
SISO IEEE 802.11n (5 GHz - 40 MHz Bandwidth)	Maximum	9.5
	Nominal	9.0
MIMO IEEE 802.11n (5 GHz - 40 MHz Bandwidth)	Maximum	12.5
	Nominal	12.0
SISO IEEE 802.11ac (5 GHz - 80 MHz Bandwidth)	Maximum	10.5
	Nominal	10.0
MIMO IEEE 802.11ac (5 GHz - 80 MHz Bandwidth)	Maximum	13.5
	Nominal	13.0
Bluetooth	Maximum	12.0
	Nominal	11.5
Bluetooth LE	Maximum	8.0
	Nominal	7.5

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1.4 DUT Antenna Locations



Note: Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC Filing. Since the diagonal dimension of this device is > 160 mm and <200 mm, it is considered a "phablet".

Figure 1-1
DUT Antenna Locations

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Table 1-1
Mobile Sides for SAR Testing

Mobile Sides for SAR Testing						
Mode	Back	Front	Top	Bottom	Right	Left
Cell. EVDO	Yes	Yes	No	Yes	Yes	Yes
PCS EVDO	Yes	Yes	No	Yes	Yes	Yes
GPRS 850	Yes	Yes	No	Yes	Yes	Yes
GPRS 1900	Yes	Yes	No	Yes	Yes	Yes
UMTS 850	Yes	Yes	No	Yes	Yes	Yes
UMTS 1900	Yes	Yes	No	Yes	Yes	Yes
LTE Band 13	Yes	Yes	No	Yes	Yes	Yes
LTE Band 4 (AWS)	Yes	Yes	No	Yes	Yes	Yes
2.4 GHz WLAN Ant. 1 & MIMO	Yes	Yes	Yes	No	No	Yes
2.4 GHz WLAN Ant. 2	Yes	Yes	Yes	No	No	No
5 GHz WLAN Ant. 1 & MIMO	Yes	Yes	Yes	No	No	Yes
5 GHz WLAN Ant. 2	Yes	Yes	Yes	No	No	No

Note: Particular DUT edges were not required to be evaluated for Wireless Router SAR or Extremity SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v01 guidance, page 2 and FCC KDB 648474 D04v01r01. The distances between the transmit antennas and the edges of the device are included in the filing. When wireless router mode is enabled, 5.2-5.7 GHz WLAN operations are disabled.

1.5 Near Field Communications (NFC) Antenna

This DUT has NFC operations. The NFC antenna is integrated into the specialized battery. The SAR tests were performed with the specialized battery (model: EB-BN910BBZ).

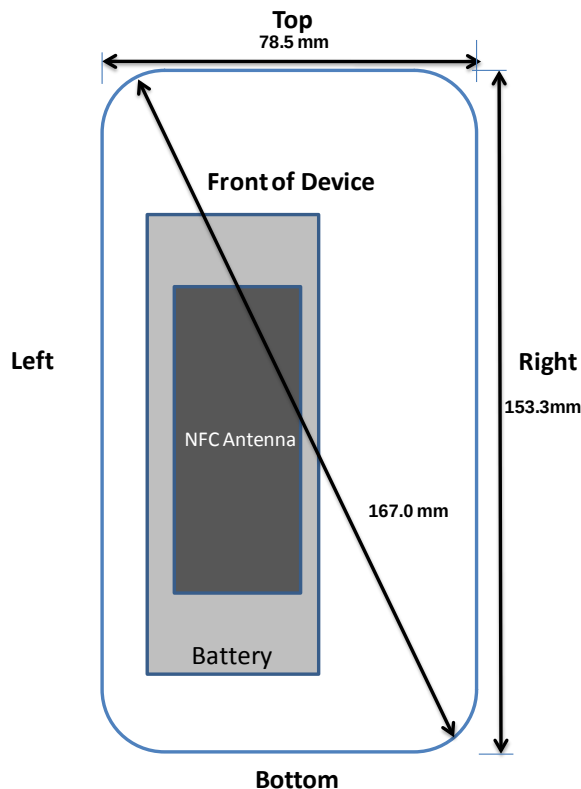


Figure 1-2
NFC Antenna Locations

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1.6 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D05v01, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-3 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another. This device supports MIMO Tx for IEEE 802.11n/ac. Each Wi-Fi antenna can transmit independently or together when operating in MIMO mode.



Figure 1-3
Simultaneous Transmission Paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v05 3) procedures.

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Head	Body-Worn Accessory	Wireless Router	Extremity	Notes
1	1x CDMA voice + 2.4 GHz Wi-Fi	Yes	Yes	N/A	Yes	
2	1x CDMA voice + 5 GHz Wi-Fi	Yes	Yes	N/A	Yes	
3	1x CDMA voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
4	GSM voice + 2.4 GHz Wi-Fi	Yes	Yes	N/A	Yes	
5	GSM voice + 5 GHz Wi-Fi	Yes	Yes	N/A	Yes	
6	GSM voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
7	UMTS voice/data + 2.4 GHz Wi-Fi	Yes	Yes	Yes	Yes	
8	UMTS voice/data + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
9	UMTS voice/data + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
10	LTE + 2.4 GHz Wi-Fi	Yes	Yes	Yes	Yes	
11	LTE + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	
12	LTE + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
13	CDMA/EVDO data + 2.4 GHz Wi-Fi	Yes*	Yes*	Yes	Yes	*Pre-installed VOIP applications are considered
14	CDMA/EVDO data + 5 GHz Wi-Fi	Yes*	Yes*	Yes	Yes	*Pre-installed VOIP applications are considered
15	CDMA/EVDO data + 2.4 GHz Bluetooth	N/A	Yes*	N/A	Yes	*Pre-installed VOIP applications are considered
16	GPRS/EDGE + 2.4 GHz Wi-Fi	N/A	N/A	Yes	Yes	
17	GPRS/EDGE + 5 GHz Wi-Fi	N/A	N/A	Yes	Yes	
18	1x CDMA voice + LTE	Yes	Yes	N/A	Yes	SVLTE
19	1x CDMA voice + LTE + 2.4 GHz Wi-Fi	Yes	Yes	Yes	Yes	SVLTE
20	1x CDMA voice + LTE + 5 GHz Wi-Fi	Yes	Yes	Yes	Yes	SVLTE
21	1x CDMA voice + LTE + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	SVLTE
22	1x CDMA voice + CDMA/EVDO data	N/A	N/A	N/A	N/A	Not supported by HW
23	CDMA/EVDO data + LTE	N/A	N/A	N/A	N/A	Not supported by SW
24	1x CDMA Voice + GSM/UMTS	N/A	N/A	N/A	N/A	Not supported by SW

- (*) = for VOIP applications possibly used by the end-user
- 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 [DPCH]) 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 is no simultaneous transmission scenarios involving WIFI direct beyond that listed in the above table.
- 5 GHz Wireless Router is only supported for the 5.8 GHz Band by S/W, therefore 5.2-5.7 GHz Bands were not evaluated for wireless router conditions.
- This device supports 2x2 MIMO Tx for IEEE 802.11n/ac. Each WLAN antenna can transmit independently or together when operating in MIMO mode.
- GSM/GPRS, UMTS, and LTE share the same antenna and cannot transmit simultaneously.

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1.7 Wireless Charging Cover

This DUT may be used with a standard battery cover or with an optional wireless charging battery cover. Per FCC KDB Publication 648474 D03, SAR was measured using the standard battery cover and then repeated with the wireless charging battery cover for the highest measured SAR for each wireless technology, frequency band, operating mode, and exposure condition. No additional testing with wireless charging cover was required since all the reported SAR was less than 1.2 W/kg.

1.8 SAR Test Exclusions Applied

(A) WIFI/BT

Since Wireless Router operations are not allowed by the chipset firmware using 5.2-5.7 GHz WIFI, only 2.4 GHz and 5.8 GHz WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v01.

Per FCC KDB 447498 D01v05, 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, Bluetooth SAR was not required; $[(16/15) * \sqrt{2.480}] = 1.7 < 3.0$. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

Per FCC KDB 447498 D01v05, the 10g SAR exclusion threshold for distances <50mm is defined by the following equation:

$$\frac{\text{Max Power of Channel (mW)}}{\text{Test Separation Dist (mm)}} * \sqrt{\text{Frequency(GHz)}} \leq 7.5$$

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, extremity Bluetooth SAR was not required; $[(16/5) * \sqrt{2.480}] = 5.0 < 7.5$. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

This device supports 20 MHz and 40 MHz Bandwidths for IEEE 802.11n for 5 GHz WIFI only. IEEE 802.11n was not evaluated for SAR since the average output power of 20 MHz and 40 MHz bandwidths was not more than 0.25 dB higher than the average output power of IEEE 802.11a.

This device supports IEEE 802.11ac with the following features:

- a) Up to 80 MHz Bandwidth only
- b) No aggregate channel configurations
- c) 2 Tx antenna output
- d) 256 QAM is supported
- e) No new 5 GHz channels

Per FCC KDB Publication 648474 D04v01r01, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Extremity SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Because wireless router operations are not supported for 5.2 – 5.7 GHz WLAN, extremity SAR tests were performed. Extremity SAR was not evaluated for 2.4 GHz and 5.8 GHz WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

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(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 D01v02.

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 D05v02.

Per FCC KDB Publication 648474 D04v01r01, this device is considered a "phablet" since the diagonal dimension is greater than 160mm and less than 200mm. Therefore, extremity SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR scales to > 1.2 W/kg when scaled to the maximum allowed output power tolerance. Extremity SAR was not evaluated for licensed technologies since wireless router 1g SAR was < 1.2 W/kg for these modes.

1.9 Guidance Applied

- IEEE 1528-2003
- FCC KDB Publication 941225 D01v02, D03v01, D05v02r03, D06v01r01 (2G/3G/4G and Hotspot)
- FCC KDB Publication 248227 D01v01r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v05r02 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r03, D02v01r01 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 648474 D03-D04 (Phablet Procedures, Wireless Charging Cover)
- April 2013 TCB Workshop Notes (IEEE 802.11ac)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)

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1.10 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.

	Head Serial Number	Body-Worn Serial Number	Hotspot Serial Number	Extremity Serial Number
Max Power Cell. CDMA/EVDO (25dBm)	318DB	318DB	-	-
Hotspot Reduced Cell. CDMA/EVDO (23dBm)	F5FFD	F5FFD	F5FFD	-
SVLTE Reduced Cell. CDMA/EVDO (18dBm)	31729	31729	31729	-
Max Power PCS CDMA/EVDO (24.5dBm)	318DB	318DB	-	-
Hotspot Reduced PCS CDMA/EVDO (22.5dBm)	3186B	F5FFA	3186B	-
SVLTE Reduced PCS CDMA/EVDO (18dBm)	31729	31729	31729	-
GSM/GPRS/EDGE 850	31865	F5FFA	31865	-
GSM/GPRS/EDGE 1900	31865	F5FFA	31865	-
UMTS 850	31865	F5FFA	31865	-
UMTS 1900	F5FFA	F5FFA	F5FFA	-
Max Power LTE Band 13 (23dBm)	31725	F5FFD	31725	-
SVLTE Reduced LTE Band 13 (19dBm)	31729	F5FFE	31729	-
Max Power LTE Band 4 (23dBm)	31725	F5FFD	31725	-
SVLTE Reduced LTE Band 4 (19dBm)	31729	F5FFE	31729	-
2.4 GHz WLAN Ant. 1	015D8	015D8	015D8	-
2.4 GHz WLAN Ant. 2 & MIMO	01FC3	015D8	015D8	-
5 GHz WLAN	015D8	015D8	015D8	015D7

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2 LTE INFORMATION

LTE Information			
FCC ID	A3LSMN910V		
Form Factor	Portable Handset		
Frequency Range of each LTE transmission band	LTE Band 13 (782 MHz)		
	LTE Band 4 (AWS) (1712.5 - 1752.5 MHz)		
Channel Bandwidths	LTE Band 13: 10 MHz		
	LTE Band 4 (AWS): 5 MHz, 10 MHz, 15 MHz, 20 MHz		
Channel Numbers and Frequencies (MHz)	Low	Mid	High
LTE Band 13: 10 MHz	782 (23230)	782 (23230)	782 (23230)
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)
UE Category	4		
Modulations Supported in UL	QPSK, 16QAM		
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES		
A-MPR (Additional MPR) disabled for SAR Testing?	YES		

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The FCC and Industry 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 D01v01 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 D01v01 (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 D01v01 (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.

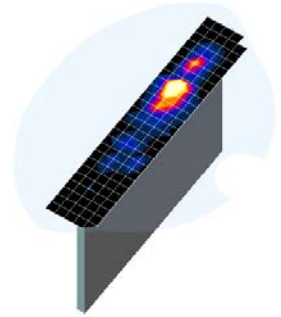


Figure 4-1
Sample SAR Area Scan

Table 4-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01*

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

*Also compliant to IEEE 1528-2013 Table 6

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5

DEFINITION OF REFERENCE POINTS

5.1 EAR REFERENCE POINT

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

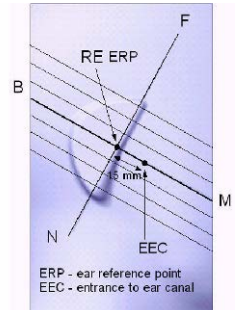


Figure 5-1
Close-Up Side view
of ERP

5.2 HANDSET REFERENCE POINTS

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



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

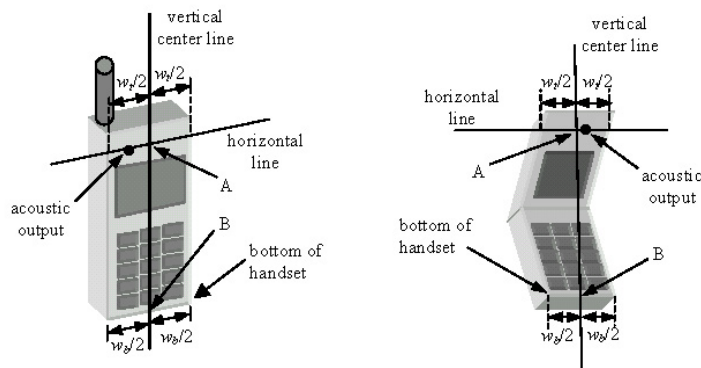


Figure 5-3
Handset Vertical Center & Horizontal Line Reference Points

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TEST CONFIGURATION POSITIONS FOR HANDSETS

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.

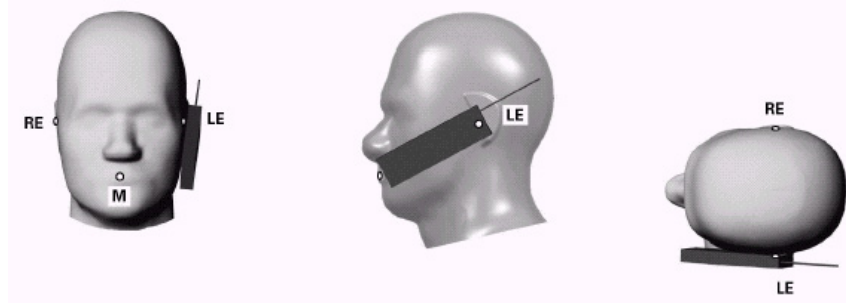


Figure 6-1 Front, Side and Top View of Cheek Position

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

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

6.6 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1-g body and 10-g extremity SAR Exclusion Thresholds found in KDB Publication 44798 D01v05 should be applied to determine SAR test requirements.

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC minitables that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04 v01r01DR04 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna ≤ 25 mm from that surface or edge, in direct contact with the phantom, for 10-g SAR. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g SAR is required only for the surfaces and edges with hotspot SAR > 1.2 W/kg when scaled to the maximum allowed output power including tolerance.

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 D06 v01 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.

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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 D01v05 publication 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.

There is mobile hotspot power reduction for CDMA/EVDO BC0/BC1.

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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 were performed using a base station simulator under digital average power.

8.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v05, 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 D01v01r02.

8.2 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01 "SAR Measurement Procedures for 3G Devices" v02, October 2007.

The device was 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 were 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 was 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 deviated by more than 5%, the SAR test and drift measurements were repeated.

8.3 SAR Measurement Conditions for CDMA2000

The following procedures were performed according to FCC KDB Publication 941225 D01 "SAR Measurement Procedures for 3G Devices" v02, October 2007.

8.3.1 Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by "SAR Measurement Procedures for 3G Devices" v02, October 2007. Maximum output power is verified on the High, Middle and Low channels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 tests were measured with power control bits in the "All Up" condition.

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a call using Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 8-1 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH₀ and demodulation of RC 3,4, or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bps Fundamental Channel and 9600 bps SCH₀ data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 8-2 was applied.

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Table 8-1
Parameters for Max. Power for RC1

Parameter	Units	Value
I_{or}	dBm/1.23 MHz	-104
$\frac{Pilot E_c}{I_{or}}$	dB	-7
$\frac{Traffic E_c}{I_{or}}$	dB	-7.4

Table 8-2
Parameters for Max. Power for RC3

Parameter	Units	Value
I_{or}	dBm/1.23 MHz	-86
$\frac{Pilot E_c}{I_{or}}$	dB	-7
$\frac{Traffic E_c}{I_{or}}$	dB	-7.4

5. FCHs were configured at full rate for maximum SAR with “All Up” power control bits.

8.3.2 Head SAR Measurements

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit at full rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximum average output of each channel is less than $\frac{1}{4}$ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1 using the exposure configuration that results in the highest SAR for that channel in RC3.

Head SAR was additionally evaluated using EVDO Rev. A to support compliance for VoIP operations. See Section 8.3.4 for EVDO Rev. A configuration parameters.

8.3.3 Body SAR Measurements

SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit at full rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiple code channels (FCH + SCH_n) is not required when the maximum average output of each RF channel is less than $\frac{1}{4}$ dB higher than that measured with FCH only. Otherwise, SAR is measured on the maximum output channel (FCH + SCH_n) with FCH at full rate and SCH₀ enabled at 9600 bps using the exposure configuration that results in the highest SAR for that channel with FCH only. When multiple code channels are enabled, the DUT output may shift by more than 0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR was measured using TDSO / SO32 with power control bits in the “All Up”

Body SAR in RC1 is not required when the maximum average output of each channel is less than $\frac{1}{4}$ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel in RC1; with Loopback Service Option SO55, at full rate, using the body exposure configuration that results in the highest SAR for that channel in RC3.

8.3.4 Handsets with EVDO

For handsets with Ev-Do capabilities, when the maximum average output of each channel in Rev. 0 is less than $\frac{1}{4}$ dB higher than that measured in RC3 (1x RTT), body SAR for EV-DO is not required. Otherwise, SAR for Rev. 0 is measured on the maximum output channel at 153.6 kbps using the body exposure configuration that results in the highest SAR for that channel in RC3. SAR for Rev. A is not required when the maximum average output of each channel is less than that measured in Rev. 0 or less than $\frac{1}{4}$ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum output channel for Rev. A using a Reverse Data Channel payload size of 4096 bits and a Termination Target of 16 slots defined for Subtype 2 Physical Layer configurations. A Forward Traffic Channel data rate corresponding to the 2-slot version of 307.2 kbps with the ACK Channel transmitting in all slots would be configured in the downlink for both Rev. 0 and Rev. A.

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8.3.5 Body SAR Measurements for EVDO Hotspot

Hotspot Body SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 per KDB Publication 941225 D01 procedures for “1x Ev-Do data Devices”. SAR for Subtype 2 Physical layer configurations is not required for Rev. A when the maximum average output of each RF channels is less than that measured in Subtype 0/1 Physical layer configurations. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for the RF channels in Rev. 0. The AT is tested with a Reverse Data Channel rate of 153.6 kbps in Subtype 0/1 Physical Layer configurations; and a Reverse Data Channel payload size of 4096 bits and Termination Target of 16 slots in Subtype 2 Physical Layer configurations.

SAR is not required for 1x RTT for Ev-Do devices that also support 1x RTT voice and/or data operations, when the maximum average output of each channel is less than 1/4 dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0. Otherwise, CDMA “Body-SAR Measurement” procedures for “CDMA 2000 1x Handsets” were applied.

8.4 SAR Measurement Conditions for UMTS

8.4.1 Output Power Verification

Maximum output power is measured on the High, Middle and Low channels for each applicable transmission band according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1s”.

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 (release 5), 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.

8.4.2 Head SAR Measurements for Handsets

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than 0.25 dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer) using the exposure configuration that resulted in the highest SAR for that RF channel in the 12.2 kbps RMC mode.

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”.

8.4.4 SAR Measurements for Handsets with Rel 5 HSDPA

Body SAR for HSDPA is not required for handsets with HSDPA capabilities when the maximum average output power of each RF channel with HSDPA active is less than 0.25 dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC

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is $\leq 75\%$ of the SAR limit. Otherwise, SAR is measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration measured in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that resulted in the highest SAR in 12.2 kbps RMC mode for that RF channel.

The H-set used in FRC for HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HSPDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the applicable H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the FRC for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 2 ms to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors of $\beta_c=9$ and $\beta_d=15$, and power offset parameters of $\Delta_{ACK} = \Delta_{NACK} = 5$ and $\Delta_{CQI}=2$ is used. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the FRC.

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

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{HS} = \beta_{HS}/\beta_c = 30/15 \Leftrightarrow \beta_{HS} = 30/15 * \beta_c$.
Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 8$ ($A_{HS} = 30/15$) with $\beta_{HS} = 30/15 * \beta_c$, and $\Delta_{CQI} = 7$ ($A_{HS} = 24/15$) with $\beta_{HS} = 24/15 * \beta_c$.
Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{HS}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Figure 8-1
Table C.10.1.4 of TS 234.121-1

8.4.5 SAR Measurements for Handsets with Rel 6 HSUPA

Body SAR for HSUPA is not required when the maximum average output of each RF channel with HSUPA/HSDPA active is less than 0.25 dB higher than as measured without HSUPA/HSDPA using 12.2 kbps RMC and maximum SAR for 12.2 kbps RMC is $\leq 75\%$ of the SAR limit. Otherwise SAR is measured on the maximum output channel for the body exposure configuration produced highest SAR in 12.2 kbps RMC for that RF channel, using the additional procedures under “Release 6 HSPA data devices”

Head SAR for VOIP operations under HSPA is not required when maximum average output of each RF channel with HSPA is less than 0.25 dB higher than as measured using 12.2 kbps RMC. Otherwise SAR is measured using same HSPA configuration as used for body SAR.

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Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{10}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed}: 47/15$ $\beta_{ed}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Rightarrow A_{10} = \beta_{10}/\beta_c = 30/15 \Rightarrow \beta_{10} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{10}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

8.5 SAR Measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05v02 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

8.5.1 Spectrum Plots for RB Configurations

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

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 D05v02r01:

- 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

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- 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 ½ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is <1.45 W/kg.

8.6 SAR Testing with 802.11 Transmitters

Normal network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g/n/ac transmitters. 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 D01v01r02 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. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

8.6.2 Frequency Channel Configurations [24]

For 2.4 GHz, the highest average RF output power channel between the low, mid and high channel at the lowest data rate was selected for SAR evaluation in 802.11b mode. 802.11g/n modes and higher data rates for 802.11b were additionally evaluated for SAR if the output power of the respective mode was 0.25 dB or higher than the powers of the SAR configurations tested in the 802.11b mode.

For 5 GHz, the highest average RF output power channel across the default test channels at the lowest data rate was selected for SAR evaluation in 802.11a. When the adjacent channels are higher in power than the default channels, these “required channels” were considered instead of the default channels for SAR testing. 802.11n modes and higher data rates for 802.11a/n were evaluated only if the respective mode was higher than 0.25 dB or more than the 802.11a mode. 802.11ac SAR was evaluated for highest 802.11a configuration in each 5 GHz band and each exposure condition. 802.11ac modes were additionally evaluated for SAR if the output power for the respective mode was more than 0.25 dB higher than powers of 802.11a modes.

If the maximum extrapolated peak SAR of the zoom scan for the highest output channel was less than 1.6 W/kg and if the 1g averaged SAR was less than 0.8 W/kg, SAR testing was not required for the other test channels in the band.

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8.6.3 MIMO SAR considerations

Per KDB 248227, SAR for MIMO was measured with both transmitting simultaneously and was evaluated independently of SISO operation. For 2.4 and 5 GHz MIMO, IEEE 802.11n 20 MHz bandwidth was evaluated. Other IEEE 802.11 modes and bandwidths were not investigated for MIMO operations since the maximum allowed output power (including tolerance) was not higher for these modes.

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9.1 CDMA2000 Conducted Powers

Table 9-1
Maximum Average RF Output Powers

Band	Channel	Frequency	SO55 [dBm]	SO55 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC	MHz	RC1	RC3	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	1013	824.7	24.41	24.46	24.44	24.44	24.50	24.43
	384	836.52	24.43	24.50	24.47	24.45	24.54	24.46
	777	848.31	24.45	24.49	24.46	24.44	24.52	24.45
PCS	25	1851.25	24.36	24.38	24.43	24.45	24.45	24.42
	600	1880	24.30	24.32	24.37	24.35	24.56	24.38
	1175	1908.75	24.47	24.50	24.47	24.52	24.43	24.41

Note: RC1 is only applicable for IS-95 compatibility.

Table 9-2
Hotspot Reduced Average RF Output Powers – Hotspot Mode On

Band	Channel	Frequency	SO55 [dBm]	SO55 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]	1x EvDO Rev. 0 [dBm]	1x EvDO Rev. A [dBm]
	F-RC	MHz	RC1	RC3	FCH+SCH	FCH	(RTAP)	(RETAP)
Cellular	1013	824.7	22.70	22.80	22.80	22.82	22.82	22.81
	384	836.52	22.82	22.89	22.85	22.86	22.90	22.89
	777	848.31	22.81	22.80	22.81	22.80	22.86	22.85
PCS	25	1851.25	22.40	22.50	22.45	22.49	22.42	22.41
	600	1880	22.48	22.52	22.47	22.53	22.52	22.51
	1175	1908.75	22.13	22.21	22.18	22.30	22.46	22.37

Note: RC1 is only applicable for IS-95 compatibility.

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Per KDB Publication 941225 D01v02:

1. Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output power was not more than 0.25 dB than the SO55 RC3 powers.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. Ev-Do and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers.
3. Hotspot SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0. If the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, then Rev. A SAR is not required. Otherwise, SAR is measured on the maximum output channel for Rev. A using the exposure configuration that results in the highest SAR for that RF channel in Rev. 0.
4. Head SAR was additionally evaluated with EVDO Rev. A to determine compliance for held-to-ear VoIP operations.
5. CDMA 1x-RTT SAR was additionally required to be evaluated for Hotspot exposure conditions to support simultaneous transmission capabilities.

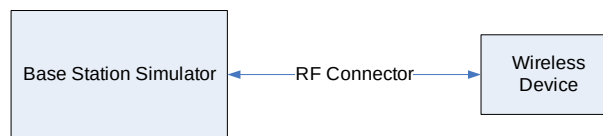


Figure 9-1
Power Measurement Setup

9.2 GSM Conducted Powers

		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	32.60	33.00	31.55	29.79	27.21	27.49	25.49	22.36	21.33
	190	32.91	33.34	31.45	29.83	27.34	27.42	25.34	22.32	21.70
	251	32.85	33.29	31.80	30.20	27.69	27.50	25.61	22.58	21.85
GSM 1900	512	29.73	29.89	28.63	26.62	26.15	26.08	24.56	21.04	19.98
	661	29.82	30.03	28.74	26.85	26.30	26.17	24.70	21.29	20.01
	810	29.83	30.16	28.61	26.71	26.39	26.06	24.67	21.25	20.00
GSM 850	Targets:	33.0	33.0	31.5	30.0	28.0	27.0	26.0	23.0	22.0
GSM 1900		30.0	30.0	29.0	27.0	26.0	26.0	25.0	22.0	21.0

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		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	23.57	23.97	25.53	25.53	24.20	18.46	19.47	18.10	18.32
	190	23.88	24.31	25.43	25.57	24.33	18.39	19.32	18.06	18.69
	251	23.82	24.26	25.78	25.94	24.68	18.47	19.59	18.32	18.84
GSM 1900	512	20.70	20.86	22.61	22.36	23.14	17.05	18.54	16.78	16.97
	661	20.79	21.00	22.72	22.59	23.29	17.14	18.68	17.03	17.00
	810	20.80	21.13	22.59	22.45	23.38	17.03	18.65	16.99	16.99
GSM 850	Frame	23.97	23.97	25.48	25.74	24.99	17.97	19.98	18.74	18.99
GSM 1900	Avg.Targets:	20.97	20.97	22.98	22.74	22.99	16.97	18.98	17.74	17.99

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. 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. 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.
4. 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 9-2
Power Measurement Setup

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9.3 UMTS Conducted Powers

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	22.72	22.79	23.09	21.16	21.80	21.46	-
99		12.2 kbps AMR	22.70	22.82	23.11	21.22	21.62	21.57	-
6	HSDPA	Subtest 1	21.80	21.88	22.26	19.80	19.92	19.93	0
6		Subtest 2	21.84	21.86	22.18	19.72	19.98	19.91	0
6		Subtest 3	21.50	21.41	21.74	19.79	20.02	19.97	0.5
6		Subtest 4	21.52	21.44	21.71	19.74	20.01	19.96	0.5
6	HSUPA	Subtest 1	21.33	21.66	22.11	19.37	19.83	19.46	0
6		Subtest 2	20.48	20.82	21.00	19.05	19.49	19.26	2
6		Subtest 3	20.92	20.79	21.09	19.29	19.51	19.61	1
6		Subtest 4	20.67	20.72	21.22	19.69	19.94	19.72	2
6		Subtest 5	21.77	21.73	22.25	19.73	19.96	19.55	0

UMTS SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

This device does not support DC-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 9-3
Power Measurement Setup

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9.4 LTE Conducted Powers

9.4.1 LTE Band 13

Table 9-3
LTE Band 13 Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	782.0	23230	10	QPSK	1	0	23.47	0	0
	782.0	23230	10	QPSK	1	25	23.38	0	0
	782.0	23230	10	QPSK	1	49	23.38	0	0
	782.0	23230	10	QPSK	25	0	22.37	0-1	1
	782.0	23230	10	QPSK	25	12	22.41	0-1	1
	782.0	23230	10	QPSK	25	25	22.35	0-1	1
	782.0	23230	10	QPSK	50	0	22.40	0-1	1
	782.0	23230	10	16QAM	1	0	22.25	0-1	1
	782.0	23230	10	16QAM	1	25	22.17	0-1	1
	782.0	23230	10	16QAM	1	49	22.16	0-1	1
	782.0	23230	10	16QAM	25	0	21.46	0-2	2
	782.0	23230	10	16QAM	25	12	21.39	0-2	2
	782.0	23230	10	16QAM	25	25	21.42	0-2	2
	782.0	23230	10	16QAM	50	0	21.39	0-2	2

9.4.2 LTE Band 4 (AWS)

Table 9-4
LTE Band 4 (AWS) Conducted Powers - 20 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	1732.5	20175	20	QPSK	1	0	22.99	0	0
	1732.5	20175	20	QPSK	1	50	23.20	0	0
	1732.5	20175	20	QPSK	1	99	23.07	0	0
	1732.5	20175	20	QPSK	50	0	21.95	0-1	1
	1732.5	20175	20	QPSK	50	25	21.93	0-1	1
	1732.5	20175	20	QPSK	50	50	21.83	0-1	1
	1732.5	20175	20	QPSK	100	0	21.86	0-1	1
	1732.5	20175	20	16QAM	1	0	21.86	0-1	1
	1732.5	20175	20	16QAM	1	50	21.95	0-1	1
	1732.5	20175	20	16QAM	1	99	21.97	0-1	1
	1732.5	20175	20	16QAM	50	0	20.98	0-2	2
	1732.5	20175	20	16QAM	50	25	21.05	0-2	2
	1732.5	20175	20	16QAM	50	50	20.92	0-2	2
	1732.5	20175	20	16QAM	100	0	20.97	0-2	2

Note: LTE Band 4 (AWS) at 20 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

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Table 9-5
LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1717.5	20025	15	QPSK	1	0	23.08	0	0
	1717.5	20025	15	QPSK	1	36	23.03	0	0
	1717.5	20025	15	QPSK	1	74	22.93	0	0
	1717.5	20025	15	QPSK	36	0	21.82	0-1	1
	1717.5	20025	15	QPSK	36	18	21.85	0-1	1
	1717.5	20025	15	QPSK	36	37	21.78	0-1	1
	1717.5	20025	15	QPSK	75	0	21.99	0-1	1
	1717.5	20025	15	16QAM	1	0	22.04	0-1	1
	1717.5	20025	15	16QAM	1	36	21.99	0-1	1
	1717.5	20025	15	16QAM	1	74	21.96	0-1	1
	1717.5	20025	15	16QAM	36	0	20.93	0-2	2
	1717.5	20025	15	16QAM	36	18	20.94	0-2	2
	1717.5	20025	15	16QAM	36	37	20.78	0-2	2
Mid	1732.5	20175	15	QPSK	1	0	22.93	0	0
	1732.5	20175	15	QPSK	1	36	23.10	0	0
	1732.5	20175	15	QPSK	1	74	23.00	0	0
	1732.5	20175	15	QPSK	36	0	21.97	0-1	1
	1732.5	20175	15	QPSK	36	18	21.95	0-1	1
	1732.5	20175	15	QPSK	36	37	21.91	0-1	1
	1732.5	20175	15	QPSK	75	0	21.95	0-1	1
	1732.5	20175	15	16QAM	1	0	21.83	0-1	1
	1732.5	20175	15	16QAM	1	36	21.92	0-1	1
	1732.5	20175	15	16QAM	1	74	21.87	0-1	1
	1732.5	20175	15	16QAM	36	0	20.96	0-2	2
	1732.5	20175	15	16QAM	36	18	21.02	0-2	2
	1732.5	20175	15	16QAM	36	37	20.88	0-2	2
	1732.5	20175	15	16QAM	75	0	20.96	0-2	2
High	1747.5	20325	15	QPSK	1	0	23.16	0	0
	1747.5	20325	15	QPSK	1	36	23.02	0	0
	1747.5	20325	15	QPSK	1	74	23.04	0	0
	1747.5	20325	15	QPSK	36	0	21.84	0-1	1
	1747.5	20325	15	QPSK	36	18	21.87	0-1	1
	1747.5	20325	15	QPSK	36	37	21.91	0-1	1
	1747.5	20325	15	QPSK	75	0	21.94	0-1	1
	1747.5	20325	15	16QAM	1	0	22.20	0-1	1
	1747.5	20325	15	16QAM	1	36	22.06	0-1	1
	1747.5	20325	15	16QAM	1	74	22.10	0-1	1
	1747.5	20325	15	16QAM	36	0	20.84	0-2	2
	1747.5	20325	15	16QAM	36	18	20.80	0-2	2
	1747.5	20325	15	16QAM	36	37	20.87	0-2	2
	1747.5	20325	15	16QAM	75	0	20.88	0-2	2

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Table 9-6
LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1715	20000	10	QPSK	1	0	23.08	0	0
	1715	20000	10	QPSK	1	25	23.00	0	0
	1715	20000	10	QPSK	1	49	23.02	0	0
	1715	20000	10	QPSK	25	0	21.92	0-1	1
	1715	20000	10	QPSK	25	12	21.83	0-1	1
	1715	20000	10	QPSK	25	25	21.83	0-1	1
	1715	20000	10	QPSK	50	0	21.92	0-1	1
	1715	20000	10	16QAM	1	0	22.00	0-1	1
	1715	20000	10	16QAM	1	25	21.99	0-1	1
	1715	20000	10	16QAM	1	49	22.00	0-1	1
	1715	20000	10	16QAM	25	0	21.01	0-2	2
	1715	20000	10	16QAM	25	12	20.96	0-2	2
	1715	20000	10	16QAM	25	25	20.96	0-2	2
Mid	1732.5	20175	10	QPSK	1	0	23.00	0	0
	1732.5	20175	10	QPSK	1	25	23.07	0	0
	1732.5	20175	10	QPSK	1	49	23.10	0	0
	1732.5	20175	10	QPSK	25	0	22.09	0-1	1
	1732.5	20175	10	QPSK	25	12	22.00	0-1	1
	1732.5	20175	10	QPSK	25	25	21.91	0-1	1
	1732.5	20175	10	QPSK	50	0	22.02	0-1	1
	1732.5	20175	10	16QAM	1	0	21.82	0-1	1
	1732.5	20175	10	16QAM	1	25	21.93	0-1	1
	1732.5	20175	10	16QAM	1	49	21.98	0-1	1
	1732.5	20175	10	16QAM	25	0	21.14	0-2	2
	1732.5	20175	10	16QAM	25	12	21.05	0-2	2
	1732.5	20175	10	16QAM	25	25	20.97	0-2	2
	1732.5	20175	10	16QAM	50	0	21.07	0-2	2
High	1750	20350	10	QPSK	1	0	22.96	0	0
	1750	20350	10	QPSK	1	25	22.99	0	0
	1750	20350	10	QPSK	1	49	23.01	0	0
	1750	20350	10	QPSK	25	0	21.87	0-1	1
	1750	20350	10	QPSK	25	12	21.92	0-1	1
	1750	20350	10	QPSK	25	25	21.92	0-1	1
	1750	20350	10	QPSK	50	0	21.90	0-1	1
	1750	20350	10	16QAM	1	0	22.03	0-1	1
	1750	20350	10	16QAM	1	25	22.02	0-1	1
	1750	20350	10	16QAM	1	49	22.00	0-1	1
	1750	20350	10	16QAM	25	0	20.96	0-2	2
	1750	20350	10	16QAM	25	12	20.95	0-2	2
	1750	20350	10	16QAM	25	25	20.98	0-2	2
	1750	20350	10	16QAM	50	0	20.90	0-2	2

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Table 9-7
LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1712.5	19975	5	QPSK	1	0	22.82	0	0
	1712.5	19975	5	QPSK	1	12	22.83	0	0
	1712.5	19975	5	QPSK	1	24	22.83	0	0
	1712.5	19975	5	QPSK	12	0	21.91	0-1	1
	1712.5	19975	5	QPSK	12	6	21.89	0-1	1
	1712.5	19975	5	QPSK	12	13	21.89	0-1	1
	1712.5	19975	5	QPSK	25	0	21.90	0-1	1
	1712.5	19975	5	16-QAM	1	0	22.08	0-1	1
	1712.5	19975	5	16-QAM	1	12	22.01	0-1	1
	1712.5	19975	5	16-QAM	1	24	22.09	0-1	1
	1712.5	19975	5	16-QAM	12	0	20.84	0-2	2
	1712.5	19975	5	16-QAM	12	6	20.86	0-2	2
	1712.5	19975	5	16-QAM	12	13	20.85	0-2	2
Mid	1732.5	20175	5	QPSK	1	0	23.24	0	0
	1732.5	20175	5	QPSK	1	12	23.12	0	0
	1732.5	20175	5	QPSK	1	24	23.05	0	0
	1732.5	20175	5	QPSK	12	0	22.13	0-1	1
	1732.5	20175	5	QPSK	12	6	21.98	0-1	1
	1732.5	20175	5	QPSK	12	13	21.92	0-1	1
	1732.5	20175	5	QPSK	25	0	21.99	0-1	1
	1732.5	20175	5	16-QAM	1	0	22.21	0-1	1
	1732.5	20175	5	16-QAM	1	12	22.15	0-1	1
	1732.5	20175	5	16-QAM	1	24	22.10	0-1	1
	1732.5	20175	5	16-QAM	12	0	21.16	0-2	2
	1732.5	20175	5	16-QAM	12	6	21.00	0-2	2
	1732.5	20175	5	16-QAM	12	13	20.94	0-2	2
	1732.5	20175	5	16-QAM	25	0	21.12	0-2	2
High	1752.5	20375	5	QPSK	1	0	23.00	0	0
	1752.5	20375	5	QPSK	1	12	22.99	0	0
	1752.5	20375	5	QPSK	1	24	22.98	0	0
	1752.5	20375	5	QPSK	12	0	21.96	0-1	1
	1752.5	20375	5	QPSK	12	6	21.97	0-1	1
	1752.5	20375	5	QPSK	12	13	21.84	0-1	1
	1752.5	20375	5	QPSK	25	0	21.88	0-1	1
	1752.5	20375	5	16-QAM	1	0	21.94	0-1	1
	1752.5	20375	5	16-QAM	1	12	21.91	0-1	1
	1752.5	20375	5	16-QAM	1	24	21.87	0-1	1
	1752.5	20375	5	16-QAM	12	0	20.85	0-2	2
	1752.5	20375	5	16-QAM	12	6	20.87	0-2	2
	1752.5	20375	5	16-QAM	12	13	20.85	0-2	2
	1752.5	20375	5	16-QAM	25	0	20.79	0-2	2

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9.5 WLAN Conducted Powers

Table 9-8
SISO IEEE 802.11b Average RF Power- Antenna 1

Mode	Freq [MHz]	Channel	802.11b Conducted Power [dBm]			
			Data Rate [Mbps]			
			1	2	5.5	11
802.11b	2412	1*	15.28	15.38	14.36	15.03
802.11b	2437	6*	15.10	15.15	14.85	15.36
802.11b	2462	11*	15.30	15.26	15.36	15.18

Table 9-9
SISO IEEE 802.11b Average RF Power- Antenna 2

Mode	Freq [MHz]	Channel	802.11b Conducted Power [dBm]			
			Data Rate [Mbps]			
			1	2	5.5	11
802.11b	2412	1*	14.44	14.81	14.79	14.94
802.11b	2437	6*	14.30	14.58	14.63	14.58
802.11b	2462	11*	14.80	14.84	14.86	14.78

Table 9-10
SISO IEEE 802.11g Average RF Power- Antenna 1

Mode	Freq [MHz]	Channel	802.11g Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11g	2412	1	13.53	13.45	13.52	13.57	14.12	13.74	13.66	14.02
802.11g	2437	6	13.22	13.17	13.16	13.26	13.84	13.41	13.32	13.71
802.11g	2462	11	13.45	13.37	13.47	13.56	14.03	13.62	13.56	13.98

Table 9-11
SISO IEEE 802.11g Average RF Power- Antenna 2

Mode	Freq [MHz]	Channel	802.11g Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11g	2412	1	13.18	12.95	13.05	13.16	13.66	13.25	13.35	13.60
802.11g	2437	6	12.97	12.90	13.00	13.09	13.47	13.24	13.17	13.50
802.11g	2462	11	13.38	13.32	13.36	13.32	13.83	13.46	13.58	13.92

Table 9-12
SISO IEEE 802.11n Average RF Power- Antenna 1

Mode	Freq [MHz]	Channel	802.11n (2.4GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	19.5	26	39	52	58.5	65
802.11n	2412	1	12.20	12.25	12.20	12.24	12.45	12.47	12.30	12.45
802.11n	2437	6	12.27	12.27	12.26	12.31	12.46	12.47	12.36	12.41
802.11n	2462	11	12.34	12.29	12.43	12.37	12.49	12.41	12.49	12.47

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Table 9-13
SISO IEEE 802.11n Average RF Power- Antenna 2

Mode	Freq [MHz]	Channel	802.11n (2.4GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	19.5	26	39	52	58.5	65
802.11n	2412	1	12.26	12.28	12.30	12.45	12.37	12.44	12.54	12.47
802.11n	2437	6	12.09	12.20	12.16	12.42	12.24	12.53	12.45	12.57
802.11n	2462	11	12.32	12.36	12.41	12.56	12.69	12.66	12.72	12.63

Table 9-14
MIMO IEEE 802.11n Average RF Power

802.11n (2.4 GHz) Conducted Power [dBm]			
Mode	Freq [MHz]	Channel	Data Rate [Mbps]
			13
802.11n	2412	1	15.24
802.11n	2437	6	15.19
802.11n	2462	11	15.34

Table 9-15
SISO IEEE 802.11a Average RF Power-Antenna 1

Mode	Freq [MHz]	Channel	802.11a Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	36*	11.50	11.75	11.63	11.61	11.70	11.67	11.65	11.82
802.11a	5200	40	11.50	11.67	11.60	11.53	11.69	11.67	11.63	11.80
802.11a	5220	44	11.51	11.72	11.52	11.52	11.76	11.75	11.64	11.77
802.11a	5240	48*	11.59	11.69	11.58	11.76	11.75	11.68	11.75	11.80
802.11a	5260	52*	11.71	11.92	11.81	11.83	11.92	12.03	11.84	12.05
802.11a	5280	56	11.87	11.86	11.85	11.84	11.97	12.07	12.03	12.13
802.11a	5300	60	11.91	11.88	11.80	11.86	11.98	11.97	11.96	12.11
802.11a	5320	64*	11.94	12.03	11.87	11.76	12.07	12.00	12.02	12.15
802.11a	5500	100	11.86	11.91	11.85	11.88	12.03	12.02	12.10	12.10
802.11a	5520	104*	11.92	11.96	11.90	11.92	12.14	12.02	12.11	12.07
802.11a	5540	108	11.89	12.11	11.99	11.88	12.10	12.03	12.17	12.14
802.11a	5560	112	11.99	12.06	12.02	11.86	12.18	12.07	12.20	12.11
802.11a	5580	116*	12.00	12.09	11.98	11.98	12.23	12.08	12.23	12.18
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5660	132	11.91	12.02	12.03	11.98	12.07	12.09	12.16	12.23
802.11a	5680	136*	11.98	12.16	11.98	11.91	12.12	12.04	12.22	12.16
802.11a	5700	140	11.82	12.03	11.98	11.96	12.12	12.05	11.94	12.10
802.11a	5745	149*	11.82	11.81	11.70	11.75	11.94	11.82	11.95	11.83
802.11a	5765	153	11.81	11.77	11.71	11.64	11.87	11.82	12.01	11.90
802.11a	5785	157*	11.85	11.68	11.54	11.59	11.79	11.67	12.05	11.78
802.11a	5805	161	11.73	11.62	11.63	11.56	11.75	11.62	12.08	11.70
802.11a	5825	165*	11.88	11.49	11.50	11.49	11.74	11.67	12.03	11.68

Per FCC KDB Publication 443999 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Band.

(*) – indicates default channels per KDB Publication 248227 D01v01r02. When the adjacent channels are higher in power then the default channels, these “required channels” are considered for SAR testing instead of the default channels.

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Table 9-16
SISO IEEE 802.11a Average RF Power-Antenna 2

Mode	Freq [MHz]	Channel	802.11a Conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	36*	11.75	11.79	11.83	11.87	11.91	12.02	12.01	12.10
802.11a	5200	40	11.92	11.75	11.71	11.84	12.11	12.13	12.12	12.12
802.11a	5220	44	11.75	11.81	11.76	11.75	11.92	12.06	11.88	12.07
802.11a	5240	48*	11.59	11.54	11.63	11.63	11.72	12.02	11.97	11.92
802.11a	5260	52*	11.54	11.55	11.34	11.44	11.68	11.73	11.74	11.74
802.11a	5280	56	11.37	11.33	11.36	11.36	11.52	11.53	11.68	11.72
802.11a	5300	60	11.24	11.38	11.23	11.29	11.31	11.50	11.59	11.55
802.11a	5320	64*	11.23	11.07	11.18	11.18	11.44	11.56	11.36	11.51
802.11a	5500	100	11.40	11.38	11.30	11.25	11.90	11.64	11.74	11.84
802.11a	5520	104*	11.45	11.48	11.45	11.56	11.91	11.71	11.64	12.06
802.11a	5540	108	11.53	11.15	11.19	11.41	11.96	11.66	11.58	11.98
802.11a	5560	112	11.49	11.37	11.22	11.38	11.80	11.55	11.63	11.93
802.11a	5580	116*	11.41	11.25	11.25	11.47	11.95	11.72	11.39	11.94
802.11a	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11a	5660	132	11.54	11.35	11.32	11.62	11.95	11.54	11.71	11.91
802.11a	5680	136*	11.68	11.33	11.54	11.40	12.09	11.49	11.77	12.10
802.11a	5700	140	11.92	11.49	11.43	11.49	12.02	11.86	11.89	12.12
802.11a	5745	149*	12.24	12.05	12.25	12.22	12.45	12.33	12.44	12.46
802.11a	5765	153	12.41	12.14	12.11	12.26	12.37	12.49	12.37	12.37
802.11a	5785	157*	12.31	12.09	12.04	12.21	12.46	12.48	12.49	12.37
802.11a	5805	161	12.14	12.06	12.13	12.31	12.26	12.40	12.41	12.44
802.11a	5825	165*	12.18	12.05	12.07	12.22	12.33	12.46	12.46	12.48

Per FCC KDB Publication 443999 and RSS-210 A9.2(3), transmission on channels which overlap the 5600-5650 MHz is prohibited as a client. This device does not transmit any beacons or initiate any transmissions in 5.3 and 5.5 GHz Band.

(*) – indicates default channels per KDB Publication 248227 D01v01r02. When the adjacent channels are higher in power then the default channels, these “required channels” are considered for SAR testing instead of the default channels.

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Table 9-17
SISO IEEE 802.11n Average RF Power – 20 MHz Bandwidth- Antenna 1

Mode	Freq [MHz]	Channel	20MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	19.5	26	39	52	58.5	65
802.11n	5180	36	11.57	11.53	11.52	11.69	11.82	11.72	11.83	11.82
802.11n	5200	40	11.47	11.59	11.58	11.61	11.71	11.73	11.79	11.80
802.11n	5220	44	11.43	11.51	11.47	11.49	11.58	11.56	11.83	11.71
802.11n	5240	48	11.51	11.62	11.48	11.83	11.73	11.65	11.75	11.76
802.11n	5260	52	11.61	11.69	11.69	12.11	12.05	11.76	12.14	11.83
802.11n	5280	56	11.66	11.69	11.67	12.04	12.15	11.77	12.17	12.05
802.11n	5300	60	11.76	11.70	11.74	12.18	12.08	11.93	12.02	12.01
802.11n	5320	64	11.69	11.79	11.72	12.14	12.15	11.87	12.17	12.11
802.11n	5500	100	11.78	11.68	11.68	12.13	12.07	12.10	12.17	12.07
802.11n	5520	104	11.79	11.87	11.83	12.04	12.15	12.12	12.22	12.10
802.11n	5540	108	11.82	11.78	11.78	12.13	12.11	12.13	12.21	12.18
802.11n	5560	112	11.86	11.87	11.82	12.18	12.17	12.20	12.14	12.14
802.11n	5580	116	11.93	11.93	11.81	12.13	12.08	12.22	12.21	12.15
802.11n	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5660	132	11.96	11.94	11.89	12.04	12.19	12.19	12.23	12.17
802.11n	5680	136	11.87	11.86	11.79	12.23	12.15	12.21	12.19	12.16
802.11n	5700	140	11.85	11.86	11.90	12.17	12.18	12.23	12.22	12.18
802.11n	5745	149	11.92	11.58	11.63	11.87	11.89	11.94	11.88	11.92
802.11n	5765	153	11.58	11.58	11.59	11.89	11.88	11.91	11.82	11.85
802.11n	5785	157	11.50	11.50	11.51	11.91	11.77	11.83	11.80	11.83
802.11n	5805	161	11.47	11.50	11.46	11.71	11.86	11.76	11.78	11.83
802.11n	5825	165	11.33	11.37	11.40	11.78	11.70	11.81	11.72	11.72

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Table 9-18
SISO IEEE 802.11n Average RF Power – 20 MHz Bandwidth- Antenna 2

Mode	Freq [MHz]	Channel	20MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			6.5	13	19.5	26	39	52	58.5	65
802.11n	5180	36	11.96	11.94	11.87	12.02	12.07	12.05	12.08	12.07
802.11n	5200	40	11.96	11.78	11.99	12.06	12.13	12.00	12.06	12.11
802.11n	5220	44	11.86	11.86	11.97	12.03	12.09	12.04	12.10	12.15
802.11n	5240	48	11.83	11.83	11.92	11.94	12.11	11.91	12.10	12.13
802.11n	5260	52	11.56	11.50	11.53	11.68	11.76	11.74	11.69	11.71
802.11n	5280	56	11.67	11.63	11.57	11.69	11.76	11.72	11.72	11.71
802.11n	5300	60	11.55	11.54	11.51	11.76	11.74	11.70	11.67	11.71
802.11n	5320	64	11.47	11.51	11.42	11.66	11.61	11.62	11.56	11.59
802.11n	5500	100	11.24	11.28	11.29	11.81	11.56	11.59	11.44	11.65
802.11n	5520	104	11.38	11.30	11.31	11.68	11.55	11.63	11.72	11.63
802.11n	5540	108	11.38	11.41	11.39	11.59	11.63	11.66	11.73	11.56
802.11n	5560	112	11.32	11.51	11.20	11.68	11.63	11.52	11.57	11.63
802.11n	5580	116	11.54	11.42	11.45	11.54	11.71	11.54	11.57	11.48
802.11n	5600	120	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5620	124	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5640	128	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5660	132	11.52	11.45	11.46	11.79	11.78	11.79	11.86	11.73
802.11n	5680	136	11.70	11.61	11.63	11.74	11.88	11.87	11.78	11.74
802.11n	5700	140	11.51	11.40	11.49	11.77	11.82	11.73	11.67	11.61
802.11n	5745	149	11.75	11.30	11.12	11.61	11.66	11.71	11.50	11.58
802.11n	5765	153	11.32	11.32	11.15	11.67	11.61	11.52	11.57	11.56
802.11n	5785	157	11.22	11.30	11.11	11.59	11.52	11.53	11.48	11.55
802.11n	5805	161	11.29	11.22	11.18	11.51	11.49	11.49	11.52	11.66
802.11n	5825	165	11.23	11.28	11.17	11.54	11.51	11.50	11.47	11.60

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Table 9-19
MIMO IEEE 802.11n Average RF Power – 20 MHz Bandwidth

20MHz BW 802.11n (5GHz) Conducted Power [dBm]			
Mode	Freq [MHz]	Channel	Data Rate [Mbps]
			13
802.11n	5180	36	14.78
802.11n	5200	40	14.73
802.11n	5220	44	14.66
802.11n	5240	48	14.68
802.11n	5260	52	14.60
802.11n	5280	56	14.67
802.11n	5300	60	14.67
802.11n	5320	64	14.59
802.11n	5500	100	14.53
802.11n	5520	104	14.60
802.11n	5540	108	14.62
802.11n	5560	112	14.61
802.11n	5580	116	14.75
802.11n	5600	120	N/A
802.11n	5620	124	N/A
802.11n	5640	128	N/A
802.11n	5660	132	14.75
802.11n	5680	136	14.80
802.11n	5700	140	14.69
802.11n	5745	149	14.85
802.11n	5765	153	14.46
802.11n	5785	157	14.38
802.11n	5805	161	14.39
802.11n	5825	165	14.29

Table 9-20
SISO IEEE 802.11n Average RF Power – 40 MHz Bandwidth- Antenna 1

Mode	Freq [MHz]	Channel	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			13.5	27	40.5	54	81	108	121.5	135
802.11n	5190	38	9.19	8.95	9.14	9.48	9.38	9.25	9.34	9.41
802.11n	5230	46	9.09	9.20	9.21	9.44	9.14	9.32	9.43	9.18
802.11n	5270	54	9.07	9.30	9.07	9.22	9.31	9.38	9.40	9.36
802.11n	5310	62	9.03	9.09	9.32	9.45	9.46	9.46	9.42	9.42
802.11n	5510	102	9.47	9.30	9.27	9.37	9.37	9.37	9.49	9.19
802.11n	5550	110	9.35	9.45	9.49	9.49	9.47	9.43	9.30	9.36
802.11n	5590	118	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5630	126	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5670	134	9.48	9.20	9.32	9.47	9.41	9.45	9.48	9.22
802.11n	5755	151	9.25	9.21	9.17	9.24	9.16	9.21	9.15	9.16
802.11n	5795	159	9.06	9.02	9.14	9.21	9.30	9.28	9.27	9.19

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Table 9-21
SISO IEEE 802.11n Average RF Power – 40 MHz Bandwidth- Antenna 2

Mode	Freq [MHz]	Channel	40MHz BW 802.11n (5GHz) Conducted Power [dBm]							
			Data Rate [Mbps]							
			13.5	27	40.5	54	81	108	121.5	135
802.11n	5190	38	9.29	9.26	9.41	9.40	9.41	9.26	9.35	9.24
802.11n	5230	46	9.27	9.34	9.15	9.49	9.32	9.40	9.19	9.27
802.11n	5270	54	8.94	8.96	8.93	9.34	9.19	9.17	9.31	9.22
802.11n	5310	62	8.73	8.99	8.82	8.90	9.11	9.10	9.21	9.22
802.11n	5510	102	8.80	8.93	8.75	8.99	9.27	9.14	9.43	9.21
802.11n	5550	110	8.80	9.02	8.88	8.95	9.06	9.02	9.30	9.26
802.11n	5590	118	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5630	126	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
802.11n	5670	134	8.77	9.04	9.05	9.17	9.25	9.22	9.35	9.28
802.11n	5755	151	8.58	8.81	8.64	8.63	8.88	9.07	9.14	8.83
802.11n	5795	159	8.72	8.56	8.52	8.92	8.74	8.88	8.82	9.08

Table 9-22
MIMO IEEE 802.11n Average RF Power – 40 MHz Bandwidth

Mode	Freq [MHz]	Channel	Data Rate [Mbps]
			27
802.11n	5190	38	12.25
802.11n	5230	46	12.19
802.11n	5270	54	12.02
802.11n	5310	62	11.89
802.11n	5510	102	12.16
802.11n	5550	110	12.09
802.11n	5590	118	N/A
802.11n	5630	126	N/A
802.11n	5670	134	12.15
802.11n	5755	151	11.94
802.11n	5795	159	11.90

Table 9-23
SISO IEEE 802.11ac Average RF Power – 80 MHz Bandwidth- Antenna 1

Mode	Freq [MHz]	Channel	80MHz BW 802.11ac (5GHz) Conducted Power [dBm]									
			Data Rate [Mbps]									
			29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390
802.11ac	5210	42	9.88	9.71	9.61	9.99	10.07	9.94	9.89	9.95	10.04	10.02
802.11ac	5290	58	9.96	9.71	9.65	10.10	10.10	10.01	9.92	10.04	10.13	10.15
802.11ac	5530	106	9.92	9.98	9.95	10.01	10.13	9.93	9.87	9.97	10.06	10.05
802.11ac	5775	155	9.62	9.71	9.58	9.74	9.85	9.70	9.65	9.76	9.74	9.75

Table 9-24
SISO IEEE 802.11ac Average RF Power – 80 MHz Bandwidth- Antenna 2

Mode	Freq [MHz]	Channel	80MHz BW 802.11ac (5GHz) Conducted Power [dBm]									
			Data Rate [Mbps]									
			29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390
802.11ac	5210	42	10.04	9.95	9.98	10.17	10.24	10.15	10.26	10.12	10.21	10.19
802.11ac	5290	58	9.59	9.54	9.60	9.77	9.76	9.64	9.80	9.61	9.79	9.71
802.11ac	5530	106	9.50	9.43	9.55	9.59	9.72	9.72	9.68	9.71	9.66	9.62
802.11ac	5775	155	10.31	10.42	10.33	10.40	10.49	10.40	10.49	10.31	10.46	10.41

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Table 9-25
MIMO IEEE 802.11ac Average RF Power – 80 MHz Bandwidth

802.11ac (5 GHz) Conducted Power [dBm]			
Mode	Freq [MHz]	Channel	Data Rate [Mbps]
			58.5
802.11ac	5210	42	12.97
802.11ac	5290	58	12.79
802.11ac	5530	106	12.72
802.11ac	5775	155	12.99

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012/April 2013 FCC/TCB Meeting Notes:

- For 2.4 GHz SISO operations, highest average RF output power channel for the lowest data rate for IEEE 802.11b were selected for SAR evaluation. Other IEEE 802.11 SISO modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- For 5 GHz SISO operations, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. Other IEEE 802.11 SISO modes (including 802.11n 20 MHz and 40 MHz) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
- Full SAR tests for all SISO IEEE 802.11ac configurations were not required because the average output power was not more than 0.25 dB higher than IEEE 802.11a mode. IEEE 802.11ac in SISO mode was evaluated for the highest IEEE 802.11a position in each 5 GHz band and exposure condition.
- For MIMO 2.4 GHz and 5 GHz operations, the highest average RF output power channel for the lowest data rate for IEEE 802.11n (20 MHz bandwidth) was selected for SAR evaluation. Other IEEE 802.11 modes and bandwidths were not investigated for MIMO operations since the maximum allowed output power (including tolerance) was not higher for these modes.
- The individual spectra for each 2x2 MIMO WIFI Antenna were summed mathematically in linear power units for the MIMO output power measurements.
- When the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The bolded data rate and channel above were tested for SAR.

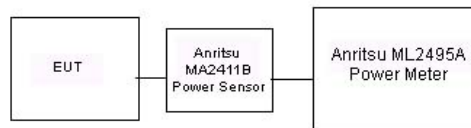


Figure 9-4
Power Measurement Setup for Bandwidths < 50 MHz

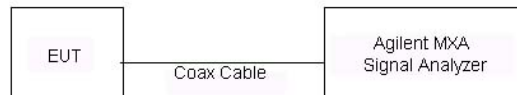


Figure 9-5
Power Measurement Setup for Bandwidths > 50 MHz

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10 LTE POWER REDUCTION

10.1 SVLTE Operation

This device is capable of Simultaneous Voice and LTE (SVLTE) calls, with the voice call supported by a CDMA 1x-RTT transmitter and the data connection supported by a separate LTE transmitter. A LTE power reduction scheme is applied during a LTE connection operating simultaneously with 1x-RTT voice calls. The maximum transmit power of LTE is limited depending on the CDMA 1x voice transmit power level. When CDMA 1x Voice is operating at a certain range of high power levels, the maximum LTE transmit power is limited. When CDMA 1x Voice transmit power is below a certain threshold transmit power level, LTE can transmit at the maximum power. Target levels of power reduction and CDMA voice threshold levels are provided in Table 10-1.

Table 10-1
SVLTE Power Reduction Scheme

Mode	Voice Avg Power(P) 1x 850/1900 MHz (dBm)	Max. B13/B4 LTE Data Avg Power (dBm)
SVLTE	$P \geq 18$	19
	$P < 18$	23

10.2 Output Power Verification

Per KDB Publication 941225 D05v02 Section 4.4, output powers were measured in SVLTE mode to determine that the power reduction mechanism was operating reliably and consistently. The power reduction was investigated by simultaneously connecting the device to both LTE and CDMA base station simulators. LTE output powers were measured through conducted RF connections by first connecting the device in a LTE data call and subsequently a CDMA 1x-RTT call. CDMA powers were controlled by configuring the CDMA base station simulator to active bits. The LTE output power was monitored while changing the cell output power level. The power reduction targets and threshold level described in Table 10-1 were confirmed. Please see results in Table 10-2.

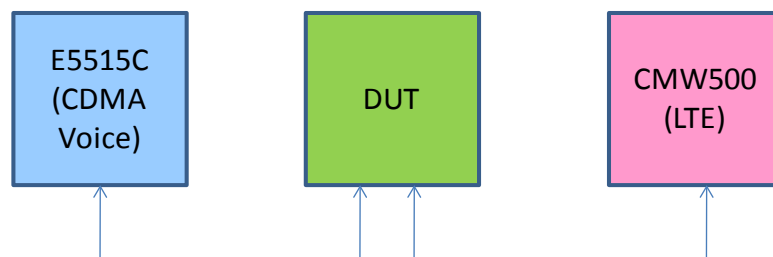


Figure 10-1
SVLTE Conducted Power Measurement Setup

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Table 10-2

1xRTT CDMA Voice Band	BCD 1xRTT CDMA Voice Channel	BCD 1xRTT CDMA Voice Tx [dBm]	LTE Band 13 Conducted Power (dBm)													
			Mid													
			QPSK 1 RB, Low Edge	QPSK 1 RB, Mid Edge	QPSK 1 RB, Upper Edge	QPSK 50% RB, Low Edge	QPSK 50% RB, Mid Edge	QPSK 50% RB, Upper Edge	QPSK 100% RB ORB offset	16 QAM 1 RB, Low Edge	16 QAM 1 RB, Mid Edge	16 QAM 1 RB, Upper Edge	16 QAM 50% RB, Low Edge	16 QAM 50% RB, Mid Edge	16 QAM 50% RB, Upper Edge	16 QAM 100% RB ORB offset
800 MHz	384	25	19.01	19.07	19.2	19.25	19.29	19.27	19.27	19.25	19.23	19.24	19.28	19.23	19.22	19.2
		24	19.01	19.07	19.2	19.25	19.29	19.27	19.27	19.25	19.23	19.24	19.28	19.23	19.22	19.2
		23	19.01	19.07	19.2	19.25	19.29	19.27	19.27	19.25	19.23	19.24	19.28	19.23	19.22	19.2
		22	19.01	19.07	19.2	19.25	19.29	19.27	19.27	19.25	19.23	19.24	19.28	19.23	19.22	19.2
		21	19.01	19.07	19.2	19.25	19.29	19.27	19.27	19.25	19.23	19.24	19.28	19.23	19.22	19.2
		20	19.01	19.07	19.2	19.25	19.29	19.27	19.27	19.25	19.23	19.24	19.28	19.23	19.22	19.2
		19	19.01	19.07	19.2	19.25	19.29	19.27	19.27	19.25	19.23	19.24	19.28	19.23	19.22	19.2
		18	19.01	19.07	19.2	19.25	19.29	19.27	19.27	19.25	19.23	19.24	19.28	19.23	19.22	19.2
		17	23.31	23.07	23.2	22.13	22.13	22.18	22.34	22.19	22.11	22.23	21.23	21.18	21.32	21.12
		16	23.31	23.07	23.2	22.13	22.13	22.18	22.34	22.19	22.11	22.23	21.23	21.18	21.32	21.12
		15	23.31	23.07	23.2	22.13	22.13	22.18	22.34	22.19	22.11	22.23	21.23	21.18	21.32	21.12
		14	23.31	23.07	23.2	22.13	22.13	22.18	22.34	22.19	22.11	22.23	21.23	21.18	21.32	21.12
		13	23.31	23.07	23.2	22.13	22.13	22.18	22.34	22.19	22.11	22.23	21.23	21.18	21.32	21.12
		12	23.31	23.07	23.2	22.13	22.13	22.18	22.34	22.19	22.11	22.23	21.23	21.18	21.32	21.12
		11	23.31	23.07	23.2	22.13	22.13	22.18	22.34	22.19	22.11	22.23	21.23	21.18	21.32	21.12

1xRTT CDMA Voice Band	BC1 1xRTT CDMA Voice Channel	BC1 1xRTT CDMA Voice Tx [dBm]	LTE Band 13 Conducted Power (dBm)													
			Mid													
			QPSK 1 RB, Low Edge	QPSK 1 RB, Mid Edge	QPSK 1 RB, Upper Edge	QPSK 50% RB, Low Edge	QPSK 50% RB, Mid Edge	QPSK 50% RB, Upper Edge	QPSK 100% RB ORB offset	16 QAM 1 RB, Low Edge	16 QAM 1 RB, Mid Edge	16 QAM 1 RB, Upper Edge	16 QAM 50% RB, Low Edge	16 QAM 50% RB, Mid Edge	16 QAM 50% RB, Upper Edge	16 QAM 100% RB ORB offset
1900 MHz	600	25	19.27	19.17	19.15	19.22	19.26	19.26	19.31	19.05	19.2	19.23	19.15	19.27	19.19	19.25
		24	19.27	19.17	19.15	19.22	19.26	19.26	19.31	19.05	19.2	19.23	19.15	19.27	19.19	19.25
		23	19.27	19.17	19.15	19.22	19.26	19.26	19.31	19.05	19.2	19.23	19.15	19.27	19.19	19.25
		22	19.27	19.17	19.15	19.22	19.26	19.26	19.31	19.05	19.2	19.23	19.15	19.27	19.19	19.25
		21	19.27	19.17	19.15	19.22	19.26	19.26	19.31	19.05	19.2	19.23	19.15	19.27	19.19	19.25
		20	19.27	19.17	19.15	19.22	19.26	19.26	19.31	19.05	19.2	19.23	19.15	19.27	19.19	19.25
		19	19.27	19.17	19.15	19.22	19.26	19.26	19.31	19.05	19.2	19.23	19.15	19.27	19.19	19.25
		18	19.27	19.17	19.15	19.22	19.26	19.26	19.31	19.05	19.2	19.23	19.15	19.27	19.19	19.25
		17	23.19	23.06	23.27	22.24	22.16	22.26	22.08	22.35	22.15	22.35	21.23	21.16	21.02	21.15
		16	23.19	23.06	23.27	22.24	22.16	22.26	22.08	22.35	22.15	22.35	21.23	21.16	21.02	21.15
		15	23.19	23.06	23.27	22.24	22.16	22.26	22.08	22.35	22.15	22.35	21.23	21.16	21.02	21.15
		14	23.19	23.06	23.27	22.24	22.16	22.26	22.08	22.35	22.15	22.35	21.23	21.16	21.02	21.15
		13	23.19	23.06	23.27	22.24	22.16	22.26	22.08	22.35	22.15	22.35	21.23	21.16	21.02	21.15
		12	23.19	23.06	23.27	22.24	22.16	22.26	22.08	22.35	22.15	22.35	21.23	21.16	21.02	21.15
		11	23.19	23.06	23.27	22.24	22.16	22.26	22.08	22.35	22.15	22.35	21.23	21.16	21.02	21.15

1xRTT CDMA Voice Band	BCD 1xRTT CDMA Voice Channel	BCD 1xRTT CDMA Voice Tx [dBm]	LTE Band 4 Conducted Power (dBm) - 20 MHz BW													
			Mid													
			QPSK 1 RB, Low Edge	QPSK 1 RB, Mid Edge	QPSK 1 RB, Upper Edge	QPSK 50% RB, Low Edge	QPSK 50% RB, Mid Edge	QPSK 50% RB, Upper Edge	QPSK 100% RB ORB offset	16 QAM 1 RB, Low Edge	16 QAM 1 RB, Mid Edge	16 QAM 1 RB, Upper Edge	16 QAM 50% RB, Low Edge	16 QAM 50% RB, Mid Edge	16 QAM 50% RB, Upper Edge	16 QAM 100% RB ORB offset
800 MHz	384	25	19.11	19.1	19.05	19.16	19.17	19.17	19.08	19.21	19.17	19.29	19.07	19.05	19.06	19.07
		24	19.11	19.1	19.05	19.16	19.17	19.17	19.08	19.21	19.17	19.29	19.07	19.05	19.06	19.07
		23	19.11	19.1	19.05	19.16	19.17	19.17	19.08	19.21	19.17	19.29	19.07	19.05	19.06	19.07
		22	19.11	19.1	19.05	19.16	19.17	19.17	19.08	19.21	19.17	19.29	19.07	19.05	19.06	19.07
		21	19.11	19.1	19.05	19.16	19.17	19.17	19.08	19.21	19.17	19.29	19.07	19.05	19.06	19.07
		20	19.11	19.1	19.05	19.16	19.17	19.17	19.08	19.21	19.17	19.29	19.07	19.05	19.06	19.07
		19	19.11	19.1	19.05	19.16	19.17	19.17	19.08	19.21	19.17	19.29	19.07	19.05	19.06	19.07
		18	19.11	19.1	19.05	19.16	19.17	19.17	19.08	19.21	19.17	19.29	19.07	19.05	19.06	19.07
		17	23.07	23.02	22.94	22.19	22.1	22.11	22.13	22.25	22.11	22.27	21.11	21.19	21.1	21.14
		16	23.07	23.02	22.94	22.19	22.1	22.11	22.13	22.25	22.11	22.27	21.11	21.19	21.1	21.14
		15	23.07	23.02	22.94	22.19	22.1	22.11	22.13	22.25	22.11	22.27	21.11	21.19	21.1	21.14
		14	23.07	23.02	22.94	22.19	22.1	22.11	22.13	22.25	22.11	22.27	21.11	21.19	21.1	21.14
		13	23.07	23.02	22.94	22.19	22.1	22.11	22.13	22.25	22.11	22.27	21.11	21.19	21.1	21.14
		12	23.07	23.02	22.94	22.19	22.1	22.11	22.13	22.25	22.11	22.27	21.11	21.19	21.1	21.14
		11	23.07	23.02	22.94	22.19	22.1	22.11	22.13	22.25	22.11	22.27	21.11	21.19	21.1	21.14

1xRTT CDMA Voice Band	BC1 1xRTT CDMA Voice Channel	BC1 1xRTT CDMA Voice Tx [dBm]	LTE Band 4 Conducted Power (dBm) - 20 MHz BW													
			Mid													
			QPSK 1 RB, Low Edge	QPSK 1 RB, Mid Edge	QPSK 1 RB, Upper Edge	QPSK 50% RB, Low Edge	QPSK 50% RB, Mid Edge	QPSK 50% RB, Upper Edge	QPSK 100% RB offset	16 QAM 1 RB, Low Edge	16 QAM 1 RB, Mid Edge	16 QAM 1 RB, Upper Edge	16 QAM 50% RB, Low Edge	16 QAM 50% RB, Mid Edge	16 QAM 50% RB, Upper Edge	16 QAM 100% RB ORB offset
1900 MHz	600	25	19.02	18.99	18.91	18.93	18.94	19.07	18.95	19.31	19.27	19.27	19.06	18.87	19.04	19.01
		24	19.02	18.99	18.91	18.93	18.94	19.07	18.95	19.31	19.27	19.27	19.06	18.87	19.04	19.01
		23	19.02	18.99	18.91	18.93	18.94	19.07	18.95	19.31	19.27	19.27	19.06	18.87	19.04	19.01
		22	19.02	18.99	18.91	18.93	18.94	19.07	18.95	19.31	19.27	19.27	19.06	18.87	19.04	19.01
		21	19.02	18.99	18.91	18.93	18.94	19.07	18.95	19.31	19.27	19.27	19.06	18.87	19.04	19.01
		20	19.02	18.99	18.91	18.93	18.94	19.07	18.95	19.31	19.27	19.27	19.06	18.87	19.04	19.01
		19	19.02	18.99	18.91	18.93	18.94	19.07	18.95	19.31	19.27	19.27	19.06	18.87	19.04	19.01
		18	19.02	18.99	18.91	18.93	18.94	19.07	18.95	19.31	19.27	19.27	19.06	18.87	19.04	19.01
		17	23.02	22.82	23.01	21.9	21.91	22.02	21.95	22.21	22.4	22.34	20.86	20.82	21.02	21.05
		16	23.02	22.82	23.01	21.9	21.91	22.02	21.95	22.21	22.4	22.34	20.86	20.82	21.02	21.05
		15	23.02	22.82	23.01	21.9	21.91	22.02	21.95	22.21	22.4	22.34	20.86	20.82	21.02	21.05
		14	23.02	22.82	23.01	21.9	21.91	22.02	21.95	22.21	22.4	22.34	20.86	20.82	21.02	21.05
		13	23.02	22.82	23.01	21.9	21.91	22.02	21.95	22.21	22.4	22.34	20.86	20.82	21.02	21.05
		12	23.02	22.82	23.01	21.9	21.91	22.02	21.95	22.21	22.4	22.34	20.86	20.82	21.02	21.05
		11	23.02	22.82	23.01	21.9	21.91	22.02	21.95	22.21	22.4	22.34	20.86	20.82	21.02	21.05

10.3 SVLTE SAR Testing Procedures

Per KDB 941225 D05v02 Section 4.4 B), SAR testing was additionally performed at the reduced CDMA and LTE power levels to evaluate each potential simultaneous transmission scenario. Separate test samples were tuned to fixed reduced power levels to represent the SVLTE conditions in a standalone environment for SAR testing purposes only.

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10.3.1 Reduced LTE B13 Conducted Powers

Table 10-3
Reduced LTE Band 13 Conducted Powers - 10 MHz Bandwidth

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	782.0	23230	10	QPSK	1	0	18.87	0	0
	782.0	23230	10	QPSK	1	25	18.73	0	0
	782.0	23230	10	QPSK	1	49	18.85	0	0
	782.0	23230	10	QPSK	25	0	18.76	0-1	0
	782.0	23230	10	QPSK	25	12	18.74	0-1	0
	782.0	23230	10	QPSK	25	25	18.83	0-1	0
	782.0	23230	10	QPSK	50	0	18.73	0-1	0
	782.0	23230	10	16QAM	1	0	18.76	0-1	0
	782.0	23230	10	16QAM	1	25	18.62	0-1	0
	782.0	23230	10	16QAM	1	49	18.75	0-1	0
	782.0	23230	10	16QAM	25	0	18.80	0-2	0
	782.0	23230	10	16QAM	25	12	18.81	0-2	0
	782.0	23230	10	16QAM	25	25	18.84	0-2	0
	782.0	23230	10	16QAM	50	0	18.77	0-2	0

10.3.2 Reduced LTE B4 Conducted Powers

Table 10-4
Reduced LTE Band 4 Conducted Power – 20MHz BW

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	1732.5	20175	20	QPSK	1	0	18.85	0	0
	1732.5	20175	20	QPSK	1	50	18.91	0	0
	1732.5	20175	20	QPSK	1	99	18.94	0	0
	1732.5	20175	20	QPSK	50	0	18.87	0-1	0
	1732.5	20175	20	QPSK	50	25	18.87	0-1	0
	1732.5	20175	20	QPSK	50	50	18.98	0-1	0
	1732.5	20175	20	QPSK	100	0	18.88	0-1	0
	1732.5	20175	20	16QAM	1	0	18.82	0-1	0
	1732.5	20175	20	16QAM	1	50	18.95	0-1	0
	1732.5	20175	20	16QAM	1	99	18.97	0-1	0
	1732.5	20175	20	16QAM	50	0	18.87	0-2	0
	1732.5	20175	20	16QAM	50	25	18.95	0-2	0
	1732.5	20175	20	16QAM	50	50	18.94	0-2	0
	1732.5	20175	20	16QAM	100	0	18.89	0-2	0

Note: LTE Band 4 (AWS) at 20 MHz BW 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 10-5
Reduced LTE Band 4 Conducted Power – 15 MHz BW

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1717.5	20025	15	QPSK	1	0	18.81	0	0
	1717.5	20025	15	QPSK	1	36	18.78	0	0
	1717.5	20025	15	QPSK	1	74	18.80	0	0
	1717.5	20025	15	QPSK	36	0	18.75	0-1	0
	1717.5	20025	15	QPSK	36	18	18.75	0-1	0
	1717.5	20025	15	QPSK	36	37	18.82	0-1	0
	1717.5	20025	15	QPSK	75	0	18.84	0-1	0
	1717.5	20025	15	16QAM	1	0	18.77	0-1	0
	1717.5	20025	15	16QAM	1	36	18.82	0-1	0
	1717.5	20025	15	16QAM	1	74	18.86	0-1	0
	1717.5	20025	15	16QAM	36	0	18.74	0-2	0
	1717.5	20025	15	16QAM	36	18	18.73	0-2	0
Mid	1717.5	20025	15	16QAM	36	37	18.76	0-2	0
	1717.5	20025	15	16QAM	75	0	18.83	0-2	0
	1732.5	20175	15	QPSK	1	0	18.82	0	0
	1732.5	20175	15	QPSK	1	36	18.86	0	0
	1732.5	20175	15	QPSK	1	74	18.80	0	0
	1732.5	20175	15	QPSK	36	0	18.86	0-1	0
	1732.5	20175	15	QPSK	36	18	18.87	0-1	0
	1732.5	20175	15	QPSK	36	37	18.89	0-1	0
	1732.5	20175	15	QPSK	75	0	18.76	0-1	0
	1732.5	20175	15	16QAM	1	0	18.82	0-1	0
	1732.5	20175	15	16QAM	1	36	18.78	0-1	0
	1732.5	20175	15	16QAM	1	74	18.89	0-1	0
High	1732.5	20175	15	16QAM	36	0	18.88	0-2	0
	1732.5	20175	15	16QAM	36	18	18.92	0-2	0
	1732.5	20175	15	16QAM	36	37	18.91	0-2	0
	1732.5	20175	15	16QAM	75	0	18.94	0-2	0
	1747.5	20325	15	QPSK	1	0	18.96	0	0
	1747.5	20325	15	QPSK	1	36	18.97	0	0
	1747.5	20325	15	QPSK	1	74	18.98	0	0
	1747.5	20325	15	QPSK	36	0	18.91	0-1	0
	1747.5	20325	15	QPSK	36	18	18.94	0-1	0
	1747.5	20325	15	QPSK	36	37	18.98	0-1	0
	1747.5	20325	15	QPSK	75	0	19.00	0-1	0
	1747.5	20325	15	16QAM	1	0	18.79	0-1	0
	1747.5	20325	15	16QAM	1	36	18.85	0-1	0
	1747.5	20325	15	16QAM	1	74	18.87	0-1	0
	1747.5	20325	15	16QAM	36	0	19.00	0-2	0
	1747.5	20325	15	16QAM	36	18	19.02	0-2	0
	1747.5	20325	15	16QAM	36	37	19.01	0-2	0
	1747.5	20325	15	16QAM	75	0	18.96	0-2	0

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Table 10-6
Reduced LTE Band 4 Conducted Power – 10MHz BW

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1715	20000	10	QPSK	1	0	18.76	0	0
	1715	20000	10	QPSK	1	25	18.74	0	0
	1715	20000	10	QPSK	1	49	18.78	0	0
	1715	20000	10	QPSK	25	0	18.72	0-1	0
	1715	20000	10	QPSK	25	12	18.75	0-1	0
	1715	20000	10	QPSK	25	25	18.79	0-1	0
	1715	20000	10	QPSK	50	0	18.78	0-1	0
	1715	20000	10	16QAM	1	0	18.77	0-1	0
	1715	20000	10	16QAM	1	25	18.80	0-1	0
	1715	20000	10	16QAM	1	49	18.88	0-1	0
	1715	20000	10	16QAM	25	0	18.78	0-2	0
	1715	20000	10	16QAM	25	12	18.75	0-2	0
	1715	20000	10	16QAM	25	25	18.77	0-2	0
Mid	1715	20000	10	16QAM	50	0	18.73	0-2	0
	1732.5	20175	10	QPSK	1	0	18.80	0	0
	1732.5	20175	10	QPSK	1	25	18.79	0	0
	1732.5	20175	10	QPSK	1	49	18.78	0	0
	1732.5	20175	10	QPSK	25	0	18.81	0-1	0
	1732.5	20175	10	QPSK	25	12	18.84	0-1	0
	1732.5	20175	10	QPSK	25	25	18.87	0-1	0
	1732.5	20175	10	QPSK	50	0	18.86	0-1	0
	1732.5	20175	10	16QAM	1	0	18.85	0-1	0
	1732.5	20175	10	16QAM	1	25	18.75	0-1	0
	1732.5	20175	10	16QAM	1	49	18.73	0-1	0
	1732.5	20175	10	16QAM	25	0	18.84	0-2	0
	1732.5	20175	10	16QAM	25	12	18.84	0-2	0
High	1732.5	20175	10	16QAM	25	25	18.89	0-2	0
	1732.5	20175	10	16QAM	50	0	18.88	0-2	0
	1750	20350	10	QPSK	1	0	18.91	0	0
	1750	20350	10	QPSK	1	25	18.89	0	0
	1750	20350	10	QPSK	1	49	18.94	0	0
	1750	20350	10	QPSK	25	0	18.92	0-1	0
	1750	20350	10	QPSK	25	12	18.93	0-1	0
	1750	20350	10	QPSK	25	25	18.98	0-1	0
	1750	20350	10	QPSK	50	0	18.96	0-1	0
	1750	20350	10	16QAM	1	0	18.80	0-1	0
	1750	20350	10	16QAM	1	25	18.81	0-1	0
	1750	20350	10	16QAM	1	49	18.80	0-1	0
	1750	20350	10	16QAM	25	0	18.89	0-2	0
	1750	20350	10	16QAM	25	12	18.91	0-2	0
	1750	20350	10	16QAM	25	25	18.95	0-2	0
	1750	20350	10	16QAM	50	0	18.89	0-2	0

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Table 10-7
Reduced LTE Band 4 Conducted Power – 5MHz BW

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1712.5	19975	5	QPSK	1	0	18.58	0	0
	1712.5	19975	5	QPSK	1	12	18.57	0	0
	1712.5	19975	5	QPSK	1	24	18.59	0	0
	1712.5	19975	5	QPSK	12	0	18.73	0-1	0
	1712.5	19975	5	QPSK	12	6	18.78	0-1	0
	1712.5	19975	5	QPSK	12	13	18.81	0-1	0
	1712.5	19975	5	QPSK	25	0	18.76	0-1	0
	1712.5	19975	5	16-QAM	1	0	18.94	0-1	0
	1712.5	19975	5	16-QAM	1	12	18.87	0-1	0
	1712.5	19975	5	16-QAM	1	24	18.92	0-1	0
	1712.5	19975	5	16-QAM	12	0	18.64	0-2	0
	1712.5	19975	5	16-QAM	12	6	18.65	0-2	0
Mid	1712.5	19975	5	16-QAM	12	13	18.69	0-2	0
	1712.5	19975	5	16-QAM	25	0	18.78	0-2	0
	1732.5	20175	5	QPSK	1	0	18.87	0	0
	1732.5	20175	5	QPSK	1	12	18.85	0	0
	1732.5	20175	5	QPSK	1	24	18.92	0	0
	1732.5	20175	5	QPSK	12	0	18.82	0-1	0
	1732.5	20175	5	QPSK	12	6	18.81	0-1	0
	1732.5	20175	5	QPSK	12	13	18.85	0-1	0
	1732.5	20175	5	QPSK	25	0	18.80	0-1	0
	1732.5	20175	5	16-QAM	1	0	18.95	0-1	0
	1732.5	20175	5	16-QAM	1	12	18.93	0-1	0
	1732.5	20175	5	16-QAM	1	24	19.06	0-1	0
High	1732.5	20175	5	16-QAM	12	0	18.84	0-2	0
	1732.5	20175	5	16-QAM	12	6	18.81	0-2	0
	1732.5	20175	5	16-QAM	12	13	18.82	0-2	0
	1732.5	20175	5	16-QAM	25	0	18.89	0-2	0
	1752.5	20375	5	QPSK	1	0	18.96	0	0
	1752.5	20375	5	QPSK	1	12	18.95	0	0
	1752.5	20375	5	QPSK	1	24	18.91	0	0
	1752.5	20375	5	QPSK	12	0	19.00	0-1	0
	1752.5	20375	5	QPSK	12	6	19.01	0-1	0
	1752.5	20375	5	QPSK	12	13	18.92	0-1	0
	1752.5	20375	5	QPSK	25	0	18.98	0-1	0
	1752.5	20375	5	16-QAM	1	0	18.96	0-1	0
	1752.5	20375	5	16-QAM	1	12	18.90	0-1	0
	1752.5	20375	5	16-QAM	1	24	18.91	0-1	0
	1752.5	20375	5	16-QAM	12	0	18.91	0-2	0
	1752.5	20375	5	16-QAM	12	6	18.93	0-2	0
	1752.5	20375	5	16-QAM	12	13	18.87	0-2	0
	1752.5	20375	5	16-QAM	25	0	18.99	0-2	0

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10.3.3 CDMA RF Output Powers (For SVLTE SAR assessment purposes)

Table 10-8
Fixed CDMA Conducted Powers

Band	Channel	Frequency	SO55 [dBm]	SO55 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]
	F-RC	MHz	RC1	RC3	FCH+SCH	FCH
Cellular	1013	824.7	17.70	17.73	17.82	17.87
	384	836.52	17.52	17.62	17.53	17.68
	777	848.31	17.45	17.50	17.64	17.63
PCS	25	1851.25	17.22	17.42	17.29	17.19
	600	1880	17.26	17.37	17.30	17.29
	1175	1908.75	17.82	17.80	17.86	17.78

Note:

- When the CDMA voice power is below a certain power threshold, LTE is allowed to operate at the maximum output power. The CDMA output powers represented in the table above was measured with the device tuned down (for SAR Test purposes only) to assess the standalone CDMA SAR in the SVLTE scenario where LTE is operating at maximum output power in conjunction with a low CDMA voice level (see Table 10-1).

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11 SYSTEM VERIFICATION

11.1 Tissue Verification

Table 11-1
Measured Head Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C°)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
08/13/2014	750H	20.5	725	0.882	40.597	0.891	42.071	-1.01%	-3.50%
			740	0.894	40.383	0.893	41.994	0.11%	-3.84%
			755	0.907	40.177	0.894	41.916	1.45%	-4.15%
			770	0.921	39.944	0.895	41.838	2.91%	-4.53%
			785	0.936	39.692	0.896	41.760	4.46%	-4.95%
08/08/2014	835H	23.3	820	0.916	41.681	0.899	41.578	1.89%	0.25%
			835	0.907	40.440	0.900	41.500	0.78%	-2.55%
			850	0.919	40.216	0.916	41.500	0.33%	-3.09%
09/01/2014	835H	22.2	820	0.906	42.097	0.899	41.578	0.78%	1.25%
			835	0.921	41.928	0.900	41.500	2.33%	1.03%
			850	0.935	41.719	0.916	41.500	2.07%	0.53%
08/09/2014	1750H	23.0	1710	1.295	39.191	1.348	40.142	-3.93%	-2.37%
			1750	1.336	39.019	1.371	40.079	-2.55%	-2.64%
			1790	1.374	38.834	1.394	40.016	-1.43%	-2.95%
08/11/2014	1900H	22.9	1850	1.370	40.452	1.400	40.000	-2.14%	1.13%
			1880	1.401	40.324	1.400	40.000	0.07%	0.81%
			1910	1.434	40.220	1.400	40.000	2.43%	0.55%
08/14/2014	1900H	22.6	1850	1.375	38.964	1.400	40.000	-1.79%	-2.59%
			1880	1.404	38.823	1.400	40.000	0.29%	-2.94%
			1910	1.438	38.686	1.400	40.000	2.71%	-3.29%
09/04/2014	1900H	23.6	1850	1.338	39.397	1.400	40.000	-4.43%	-1.51%
			1880	1.369	39.250	1.400	40.000	-2.21%	-1.88%
			1910	1.408	39.197	1.400	40.000	0.57%	-2.01%
08/28/2014	2450H	22.2	2401	1.795	38.318	1.756	39.287	2.22%	-2.47%
			2450	1.861	38.157	1.800	39.200	3.39%	-2.66%
			2499	1.906	37.915	1.853	39.138	2.86%	-3.12%
08/12/2014	5200H-5800H	22.8	5180	4.700	35.571	4.635	36.009	1.40%	-1.22%
			5200	4.724	35.490	4.655	35.986	1.48%	-1.38%
			5220	4.766	35.472	4.676	35.963	1.92%	-1.37%
			5240	4.800	35.467	4.696	35.940	2.21%	-1.32%
			5260	4.825	35.471	4.717	35.917	2.29%	-1.24%
			5280	4.830	35.454	4.737	35.894	1.96%	-1.23%
			5300	4.826	35.388	4.758	35.871	1.43%	-1.35%
			5320	4.850	35.358	4.778	35.849	1.51%	-1.37%
			5500	5.059	35.124	4.963	35.643	1.93%	-1.46%
			5520	5.078	35.101	4.983	35.620	1.91%	-1.46%
			5540	5.076	35.089	5.004	35.597	1.44%	-1.43%
			5580	5.090	34.981	5.045	35.551	0.89%	-1.60%
			5600	5.129	34.965	5.065	35.529	1.26%	-1.59%
			5680	5.205	34.890	5.147	35.437	1.13%	-1.54%
			5700	5.219	34.819	5.168	35.414	0.99%	-1.68%
			5745	5.306	34.780	5.214	35.363	1.76%	-1.65%
			5765	5.335	34.765	5.234	35.340	1.93%	-1.63%
			5785	5.340	34.778	5.255	35.317	1.62%	-1.53%
			5800	5.343	34.693	5.270	35.300	1.39%	-1.72%
			5825	5.358	34.622	5.296	35.271	1.17%	-1.84%

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Table 11-2
Measured Body Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
08/12/2014	750B	22.5	725	0.944	54.258	0.961	55.629	-1.77%	-2.46%
			740	0.959	54.081	0.963	55.570	-0.42%	-2.68%
			755	0.974	53.955	0.964	55.512	1.04%	-2.80%
			770	0.986	53.773	0.965	55.453	2.18%	-3.03%
			785	1.000	53.615	0.966	55.395	3.52%	-3.21%
08/31/2014	750B	22.1	725	0.942	54.492	0.961	55.629	-1.98%	-2.04%
			740	0.955	54.334	0.963	55.570	-0.83%	-2.22%
			755	0.969	54.183	0.964	55.512	0.52%	-2.39%
			770	0.984	53.990	0.965	55.453	1.97%	-2.64%
			785	0.999	53.827	0.966	55.395	3.42%	-2.83%
08/11/2014	835B	23.0	820	0.986	53.402	0.969	55.258	1.75%	-3.36%
			835	1.000	53.255	0.970	55.200	3.09%	-3.52%
			850	1.015	53.101	0.988	55.154	2.73%	-3.72%
08/19/2014	835B	23.0	820	0.988	53.746	0.969	55.258	1.96%	-2.74%
			835	1.003	53.663	0.970	55.200	3.40%	-2.78%
			850	1.019	53.542	0.988	55.154	3.14%	-2.92%
08/22/2014	835B	22.0	820	0.992	54.150	0.969	55.258	2.37%	-2.01%
			835	1.007	54.018	0.970	55.200	3.81%	-2.14%
			850	1.022	53.850	0.988	55.154	3.44%	-2.36%
08/29/2014	835B	22.9	820	0.993	54.156	0.969	55.258	2.48%	-1.99%
			835	1.009	53.980	0.970	55.200	4.02%	-2.21%
			850	1.022	53.859	0.988	55.154	3.44%	-2.35%
09/03/2014	835B	22.0	820	0.990	53.416	0.969	55.258	2.17%	-3.33%
			835	1.005	53.279	0.970	55.200	3.61%	-3.48%
			850	1.018	53.138	0.988	55.154	3.04%	-3.66%
08/11/2014	1750B	23.0	1710	1.400	52.361	1.463	53.537	-4.31%	-2.20%
			1750	1.443	52.140	1.488	53.432	-3.02%	-2.42%
			1790	1.485	52.023	1.514	53.326	-1.92%	-2.44%
08/29/2014	1750B	21.7	1710	1.421	51.878	1.463	53.537	-2.87%	-3.10%
			1750	1.462	51.676	1.488	53.432	-1.75%	-3.29%
			1790	1.507	51.549	1.514	53.326	-0.46%	-3.33%
08/11/2014	1900B	21.7	1850	1.497	53.087	1.520	53.300	-1.51%	-0.40%
			1880	1.532	52.985	1.520	53.300	0.79%	-0.59%
			1910	1.567	52.872	1.520	53.300	3.09%	-0.80%
08/20/2014	1900B	22.8	1850	1.486	52.330	1.520	53.300	-2.24%	-1.82%
			1880	1.524	52.206	1.520	53.300	0.26%	-2.05%
			1910	1.551	52.113	1.520	53.300	2.04%	-2.23%
09/01/2014	1900B	22.0	1850	1.454	52.229	1.520	53.300	-4.34%	-2.01%
			1880	1.488	52.130	1.520	53.300	-2.11%	-2.20%
			1910	1.520	52.028	1.520	53.300	0.00%	-2.39%
09/11/2014	1900B	22.5	1850	1.469	51.254	1.520	53.300	-3.36%	-3.84%
			1880	1.505	51.133	1.520	53.300	-0.99%	-4.07%
			1910	1.545	51.038	1.520	53.300	1.64%	-4.24%
08/07/2014	2450B	22.9	2401	1.839	51.034	1.903	52.765	-3.36%	-3.28%
			2450	1.903	50.849	1.950	52.700	-2.41%	-3.51%
			2499	1.969	50.697	2.019	52.638	-2.48%	-3.69%
08/11/2014	5200B-5800B	20.7	5180	5.353	47.869	5.276	49.041	1.46%	-2.39%
			5200	5.365	47.684	5.299	49.014	1.25%	-2.71%
			5220	5.415	47.736	5.323	48.987	1.73%	-2.55%
			5240	5.425	47.793	5.346	48.960	1.48%	-2.38%
			5260	5.447	47.871	5.369	48.933	1.45%	-2.17%
			5280	5.478	47.828	5.393	48.906	1.58%	-2.20%
			5300	5.483	47.707	5.416	48.879	1.24%	-2.40%
			5320	5.524	47.617	5.439	48.851	1.56%	-2.53%
			5500	5.726	47.237	5.650	48.607	1.35%	-2.82%
			5520	5.732	47.156	5.673	48.580	1.04%	-2.93%
			5540	5.755	46.979	5.696	48.553	1.04%	-3.24%
			5580	5.838	46.840	5.743	48.499	1.65%	-3.42%
			5600	5.861	46.839	5.766	48.471	1.65%	-3.37%
			5680	5.917	46.318	5.860	48.363	0.97%	-4.23%
			5700	5.978	46.386	5.883	48.336	1.61%	-4.03%
			5745	5.988	46.411	5.936	48.275	0.88%	-3.86%
			5765	5.997	46.229	5.959	48.248	0.64%	-4.18%
			5785	6.021	45.999	5.982	48.220	0.65%	-4.61%
			5800	6.062	45.948	6.000	48.200	1.03%	-4.67%
			5805	6.093	45.915	6.006	48.193	1.45%	-4.73%
			5825	6.138	46.091	6.029	48.166	1.81%	-4.31%
08/13/2014	5200B-5800B	24.0	5180	5.237	48.386	5.276	49.041	-0.74%	-1.34%
			5200	5.262	48.246	5.299	49.014	-0.70%	-1.57%
			5220	5.299	48.228	5.323	48.987	-0.45%	-1.55%
			5240	5.344	48.146	5.346	48.960	-0.04%	-1.66%
			5260	5.397	48.132	5.369	48.933	0.52%	-1.64%
			5280	5.416	48.124	5.393	48.906	0.43%	-1.60%
			5300	5.427	48.067	5.416	48.879	0.20%	-1.62%
			5320	5.450	47.979	5.439	48.851	0.20%	-1.79%
			5500	5.733	47.550	5.650	48.607	1.47%	-2.17%
			5520	5.773	47.507	5.673	48.580	1.76%	-2.21%
			5540	5.795	47.517	5.696	48.553	1.74%	-2.13%
			5580	5.835	47.398	5.743	48.499	1.60%	-2.27%
			5600	5.871	47.349	5.766	48.471	1.82%	-2.31%
			5680	5.999	47.173	5.860	48.363	2.37%	-2.46%
			5700	6.018	47.133	5.883	48.336	2.29%	-2.49%
			5745	6.114	47.032	5.936	48.275	3.00%	-2.57%
			5800	6.186	46.881	6.000	48.200	3.10%	-2.74%

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 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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11.2 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 11-3
System Verification Results

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR _{1g} (W/kg)	1 W Target SAR _{1g} (W/kg)	1 W Normalized SAR _{1g} (W/kg)	Deviation _{1g} (%)
I	750	HEAD	08/13/2014	23.6	21.8	0.100	1003	3209	0.846	8.370	8.460	1.08%
D	835	HEAD	08/08/2014	24.0	23.3	0.100	4d119	3263	0.967	9.220	9.670	4.88%
K	835	HEAD	09/01/2014	23.3	22.2	0.100	4d119	3287	0.951	9.220	9.510	3.15%
D	1750	HEAD	08/09/2014	24.2	23.0	0.100	1008	3263	3.470	36.900	34.700	-5.96%
K	1900	HEAD	08/11/2014	23.8	22.9	0.100	5d141	3287	4.010	40.100	40.100	0.00%
K	1900	HEAD	08/14/2014	24.2	22.6	0.100	5d141	3287	4.080	40.100	40.800	1.75%
I	1900	HEAD	09/04/2014	23.6	22.9	0.100	5d141	3209	4.060	40.100	40.600	1.25%
G	2450	HEAD	08/28/2014	24.1	22.2	0.100	797	3258	4.820	51.800	48.200	-6.95%
E	5200	HEAD	08/12/2014	24.2	22.8	0.100	1057	3914	7.570	78.000	75.700	-2.95%
E	5300	HEAD	08/12/2014	24.2	22.9	0.100	1057	3914	8.180	83.000	81.800	-1.45%
E	5500	HEAD	08/12/2014	24.3	22.9	0.100	1057	3914	7.920	84.300	79.200	-6.05%
E	5600	HEAD	08/12/2014	24.2	22.9	0.100	1057	3914	8.500	83.500	85.000	1.80%
E	5800	HEAD	08/12/2014	24.2	22.9	0.100	1057	3914	7.700	79.300	77.000	-2.90%
J	750	BODY	08/12/2014	23.2	22.5	0.100	1003	3332	0.916	8.770	9.160	4.45%
I	750	BODY	08/31/2014	22.9	22.1	0.100	1003	3209	0.908	8.770	9.080	3.53%
D	835	BODY	08/11/2014	23.3	23.0	0.100	4d119	3263	1.010	9.340	10.100	8.14%
D	835	BODY	08/19/2014	23.7	23.0	0.100	4d119	3263	0.897	9.340	8.970	-3.96%
D	835	BODY	08/22/2014	23.0	22.0	0.100	4d119	3263	1.000	9.340	10.000	7.07%
D	835	BODY	08/29/2014	24.4	22.9	0.100	4d119	3263	0.979	9.340	9.790	4.82%
D	835	BODY	09/03/2014	24.0	22.1	0.100	4d119	3263	0.979	9.340	9.790	4.82%
I	1750	BODY	08/11/2014	23.4	23.0	0.100	1008	3209	3.510	37.600	35.100	-6.65%
K	1750	BODY	08/29/2014	23.8	21.7	0.100	1008	3287	3.790	37.600	37.900	0.80%
K	1900	BODY	08/11/2014	23.8	22.6	0.100	5d141	3287	4.190	40.600	41.900	3.20%
H	1900	BODY	08/20/2014	23.5	22.3	0.100	5d141	3319	3.960	40.600	39.600	-2.46%
H	1900	BODY	09/01/2014	23.0	22.1	0.100	5d141	3319	3.920	40.600	39.200	-3.45%
H	1900	BODY	09/11/2014	23.6	22.5	0.100	5d141	3319	4.130	40.600	41.300	1.72%
H	2450	BODY	08/07/2014	23.9	23.0	0.100	797	3319	5.240	49.400	52.400	6.07%
A	5200	BODY	08/11/2014	22.4	21.3	0.100	1007	3920	7.510	72.600	75.100	3.44%
A	5300	BODY	08/11/2014	22.4	21.3	0.100	1007	3920	7.720	74.700	77.200	3.35%
A	5500	BODY	08/11/2014	22.4	21.3	0.100	1007	3920	7.810	75.900	78.100	2.90%
A	5600	BODY	08/11/2014	22.4	21.3	0.100	1007	3920	7.660	77.300	76.600	-0.91%
A	5800	BODY	08/11/2014	22.4	21.3	0.100	1007	3920	7.230	72.900	72.300	-0.82%
I	5800	BODY	08/13/2014	24.4	24.0	0.100	1057	3589	7.350	74.300	73.500	-1.08%

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System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date:	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Dipole SN	Probe SN	Measured SAR _{10g} (W/kg)	1 W Target SAR _{10g} (W/kg)	1 W Normalized SAR _{10g} (W/kg)	Deviation _{10g} (%)
I	5200	BODY	08/13/2014	24.4	24.0	0.100	1057	3589	2.250	21.000	22.500	7.14%
I	5300	BODY	08/13/2014	24.4	24.1	0.100	1057	3589	2.330	21.500	23.300	8.37%
I	5500	BODY	08/13/2014	24.3	23.9	0.100	1057	3589	2.300	22.000	23.000	4.55%
I	5600	BODY	08/13/2014	24.2	23.9	0.100	1057	3589	2.240	22.200	22.400	0.90%

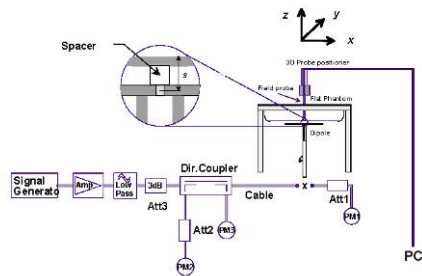


Figure 11-1
System Verification Setup Diagram



Figure 11-2
System Verification Setup Photo

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12 SAR DATA SUMMARY

12.1 Standalone Head SAR Data

Table 12-1
Cell. CDMA Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.52	384	Cell. CDMA	RC3 / SO55	25.5	24.50	-0.07	Right	Cheek	Standard	318DB	1:1	0.110	1.259	0.138	
836.52	384	Cell. CDMA	RC3 / SO55	25.5	24.50	0.14	Right	Tilt	Standard	318DB	1:1	0.097	1.259	0.122	
836.52	384	Cell. CDMA	RC3 / SO55	25.5	24.50	0.02	Left	Cheek	Standard	318DB	1:1	0.150	1.259	0.189	
836.52	384	Cell. CDMA	RC3 / SO55	25.5	24.50	-0.07	Left	Cheek	Wireless Charging Cover	318DB	1:1	0.155	1.259	0.195	A1
836.52	384	Cell. CDMA	RC3 / SO55	25.5	24.50	-0.12	Left	Tilt	Standard	318DB	1:1	0.086	1.259	0.108	
836.52	384	Cell. CDMA	RC3 / SO55	23.5	22.89	0.12	Right	Cheek	Standard	F5FFD	1:1	0.070	1.151	0.081	
836.52	384	Cell. CDMA	RC3 / SO55	23.5	22.89	0.14	Right	Tilt	Standard	F5FFD	1:1	0.036	1.151	0.041	
836.52	384	Cell. CDMA	RC3 / SO55	23.5	22.89	0.01	Left	Cheek	Standard	F5FFD	1:1	0.112	1.151	0.129	
836.52	384	Cell. CDMA	RC3 / SO55	23.5	22.89	0.19	Left	Tilt	Standard	F5FFD	1:1	0.042	1.151	0.048	
836.52	384	Cell. CDMA	RC3 / SO55	18.5	17.62	0.09	Right	Cheek	Standard	31729	1:1	0.012	1.225	0.015	
836.52	384	Cell. CDMA	RC3 / SO55	18.5	17.62	0.06	Right	Tilt	Standard	31729	1:1	0.007	1.225	0.009	
836.52	384	Cell. CDMA	RC3 / SO55	18.5	17.62	0.04	Left	Cheek	Standard	31729	1:1	0.020	1.225	0.025	
836.52	384	Cell. CDMA	RC3 / SO55	18.5	17.62	0.03	Left	Tilt	Standard	31729	1:1	0.010	1.225	0.012	
836.52	384	Cell. CDMA	EVDO Rev. A	25.5	24.46	0.01	Right	Cheek	Standard	318DB	1:1	0.099	1.271	0.126	
836.52	384	Cell. CDMA	EVDO Rev. A	25.5	24.46	0.04	Right	Tilt	Standard	318DB	1:1	0.079	1.271	0.100	
836.52	384	Cell. CDMA	EVDO Rev. A	25.5	24.46	0.05	Left	Cheek	Standard	318DB	1:1	0.146	1.271	0.186	
836.52	384	Cell. CDMA	EVDO Rev. A	25.5	24.46	-0.08	Left	Cheek	Wireless Charging Cover	318DB	1:1	0.146	1.271	0.186	
836.52	384	Cell. CDMA	EVDO Rev. A	25.5	24.46	0.15	Left	Tilt	Standard	318DB	1:1	0.065	1.271	0.083	
836.52	384	Cell. CDMA	EVDO Rev. A	23.5	22.89	-0.07	Right	Cheek	Standard	F5FFD	1:1	0.062	1.151	0.071	
836.52	384	Cell. CDMA	EVDO Rev. A	23.5	22.89	0.01	Right	Tilt	Standard	F5FFD	1:1	0.037	1.151	0.043	
836.52	384	Cell. CDMA	EVDO Rev. A	23.5	22.89	0.02	Left	Cheek	Standard	F5FFD	1:1	0.113	1.151	0.130	
836.52	384	Cell. CDMA	EVDO Rev. A	23.5	22.89	-0.05	Left	Tilt	Standard	F5FFD	1:1	0.044	1.151	0.051	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram							

18 dBm and 23 dBm CDMA voice standalone SAR data was included for the purpose of simultaneous Tx SAR assessments for SVLTE operations in Section 13.

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Table 12-2
PCS CDMA Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.											(W/kg)			
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.32	-0.08	Right	Cheek	Standard	318DB	1:1	0.075	1.169	0.088	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.32	-0.05	Right	Tilt	Standard	318DB	1:1	0.033	1.169	0.039	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.32	0.02	Left	Cheek	Standard	318DB	1:1	0.125	1.169	0.146	
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.32	-0.16	Left	Cheek	Wireless Charging Cover	318DB	1:1	0.139	1.169	0.162	A2
1880.00	600	PCS CDMA	RC3 / SO55	25.0	24.32	-0.11	Left	Tilt	Standard	318DB	1:1	0.034	1.169	0.040	
1880.00	600	PCS CDMA	RC3 / SO55	23.0	22.52	0.17	Right	Cheek	Standard	3186B	1:1	0.116	1.117	0.130	
1880.00	600	PCS CDMA	RC3 / SO55	23.0	22.52	-0.01	Right	Tilt	Standard	3186B	1:1	0.073	1.117	0.082	
1880.00	600	PCS CDMA	RC3 / SO55	23.0	22.52	-0.10	Left	Cheek	Standard	3186B	1:1	0.071	1.117	0.079	
1880.00	600	PCS CDMA	RC3 / SO55	23.0	22.52	-0.05	Left	Tilt	Standard	3186B	1:1	0.082	1.117	0.092	
1880.00	600	PCS CDMA	RC3 / SO55	18.5	17.37	0.07	Right	Cheek	Standard	31729	1:1	0.050	1.297	0.065	
1880.00	600	PCS CDMA	RC3 / SO55	18.5	17.37	0.03	Right	Tilt	Standard	31729	1:1	0.029	1.297	0.038	
1880.00	600	PCS CDMA	RC3 / SO55	18.5	17.37	-0.19	Left	Cheek	Standard	31729	1:1	0.027	1.297	0.035	
1880.00	600	PCS CDMA	RC3 / SO55	18.5	17.37	0.03	Left	Tilt	Standard	31729	1:1	0.008	1.297	0.010	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.38	0.04	Right	Cheek	Standard	318DB	1:1	0.072	1.153	0.083	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.38	-0.05	Right	Tilt	Standard	318DB	1:1	0.035	1.153	0.040	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.38	0.16	Left	Cheek	Standard	318DB	1:1	0.094	1.153	0.108	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.38	0.20	Left	Cheek	Wireless Charging Cover	318DB	1:1	0.106	1.153	0.122	
1880.00	600	PCS CDMA	EVDO Rev. A	25.0	24.38	0.03	Left	Tilt	Standard	318DB	1:1	0.030	1.153	0.035	
1880.00	600	PCS CDMA	EVDO Rev. A	23.0	22.51	0.00	Right	Cheek	Standard	3186B	1:1	0.093	1.119	0.104	
1880.00	600	PCS CDMA	EVDO Rev. A	23.0	22.51	-0.01	Right	Tilt	Standard	3186B	1:1	0.079	1.119	0.088	
1880.00	600	PCS CDMA	EVDO Rev. A	23.0	22.51	-0.04	Left	Cheek	Standard	3186B	1:1	0.079	1.119	0.088	
1880.00	600	PCS CDMA	EVDO Rev. A	23.0	22.51	0.01	Left	Tilt	Standard	3186B	1:1	0.088	1.119	0.098	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Head 1.6 W/kg (mW/g) averaged over 1 gram							

18 dBm and 23 dBm CDMA voice standalone SAR data was included for the purpose of simultaneous Tx SAR assessments for SVLTE operations in Section 13.

Table 12-3
GSM 850 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.											(W/kg)			
836.60	190	GSM 850	GSM	33.5	32.91	0.02	Right	Cheek	Standard	31865	1:8.3	0.070	1.146	0.080	
836.60	190	GSM 850	GSM	33.5	32.91	-0.01	Right	Tilt	Standard	31865	1:8.3	0.045	1.146	0.052	
836.60	190	GSM 850	GSM	33.5	32.91	-0.04	Left	Cheek	Standard	31865	1:8.3	0.168	1.146	0.193	A3
836.60	190	GSM 850	GSM	33.5	32.91	-0.05	Left	Cheek	Wireless Charging Cover	31865	1:8.3	0.143	1.146	0.164	
836.60	190	GSM 850	GSM	33.5	32.91	0.18	Left	Tilt	Standard	31865	1:8.3	0.057	1.146	0.065	
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 12-4
GSM 1900 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	661	GSM 1900	GSM	30.5	29.82	0.13	Right	Cheek	Standard	31865	1:8.3	0.079	1.169	0.092	A4
1880.00	661	GSM 1900	GSM	30.5	29.82	0.03	Right	Cheek	Wireless Charging Cover	31865	1:8.3	0.072	1.169	0.084	
1880.00	661	GSM 1900	GSM	30.5	29.82	-0.02	Right	Tilt	Standard	31865	1:8.3	0.042	1.169	0.049	
1880.00	661	GSM 1900	GSM	30.5	29.82	0.03	Left	Cheek	Standard	31865	1:8.3	0.062	1.169	0.072	
1880.00	661	GSM 1900	GSM	30.5	29.82	0.05	Left	Tilt	Standard	31865	1:8.3	0.032	1.169	0.037	
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 12-5
UMTS 850 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	23.5	22.79	0.03	Right	Cheek	Standard	31865	1:1	0.085	1.178	0.100	
836.60	4183	UMTS 850	RMC	23.5	22.79	0.08	Right	Tilt	Standard	31865	1:1	0.046	1.178	0.054	
836.60	4183	UMTS 850	RMC	23.5	22.79	0.04	Left	Cheek	Standard	31865	1:1	0.120	1.178	0.141	
836.60	4183	UMTS 850	RMC	23.5	22.79	0.07	Left	Cheek	Wireless Charging Cover	31865	1:1	0.143	1.178	0.168	A5
836.60	4183	UMTS 850	RMC	23.5	22.79	0.15	Left	Tilt	Standard	31865	1:1	0.045	1.178	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 12-6
UMTS 1900 Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Cover Type	Device Serial Number	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	0.11	Right	Cheek	Standard	F5FFA	1:1	0.049	1.000	0.049	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	0.00	Right	Tilt	Standard	F5FFA	1:1	0.040	1.000	0.040	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	0.06	Left	Cheek	Standard	F5FFA	1:1	0.091	1.000	0.091	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	-0.10	Left	Cheek	Wireless Charging Cover	F5FFA	1:1	0.092	1.000	0.092	A6
1880.00	9400	UMTS 1900	RMC	21.8	21.80	0.04	Left	Tilt	Standard	F5FFA	1:1	0.025	1.000	0.025	
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 12-7
LTE Band 13 Head SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Cover Type	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	Scaled SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.47	0.03	0	Right	Cheek	QPSK	1	0	31725	1.1	0.133	1.007	0.134	A7
782.00	23230	Mid	LTE Band 13	10	Wireless Charging Cover	23.5	23.47	-0.01	0	Right	Cheek	QPSK	1	0	31725	1.1	0.144	1.007	0.145	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	22.41	0.03	1	Right	Cheek	QPSK	25	12	31725	1.1	0.104	1.021	0.106	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.47	0.12	0	Right	Tilt	QPSK	1	0	31725	1.1	0.054	1.007	0.054	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	22.41	0.00	1	Right	Tilt	QPSK	25	12	31725	1.1	0.042	1.021	0.043	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.47	0.05	0	Left	Cheek	QPSK	1	0	31725	1.1	0.090	1.007	0.091	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	22.41	0.12	1	Left	Cheek	QPSK	25	12	31725	1.1	0.065	1.021	0.066	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.47	0.06	0	Left	Tilt	QPSK	1	0	31725	1.1	0.072	1.007	0.073	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	22.41	0.04	1	Left	Tilt	QPSK	25	12	31725	1.1	0.068	1.021	0.069	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.87	0.00	0	Right	Cheek	QPSK	1	0	31729	1.1	0.045	1.156	0.052	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.83	0.09	0	Right	Cheek	QPSK	25	25	31729	1.1	0.044	1.167	0.051	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.87	0.20	0	Right	Tilt	QPSK	1	0	31729	1.1	0.019	1.156	0.022	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.83	0.21	0	Right	Tilt	QPSK	25	25	31729	1.1	0.019	1.167	0.022	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.87	0.21	0	Left	Cheek	QPSK	1	0	31729	1.1	0.034	1.156	0.039	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.83	0.07	0	Left	Cheek	QPSK	25	25	31729	1.1	0.028	1.167	0.033	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.87	0.15	0	Left	Tilt	QPSK	1	0	31729	1.1	0.019	1.156	0.022	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.83	0.11	0	Left	Tilt	QPSK	25	25	31729	1.1	0.019	1.167	0.022	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Head										
Spatial Peak										1.6 W/kg (mW/g)										
Uncontrolled Exposure/General Population										averaged over 1 gram										

19 dBm LTE voice standalone SAR data was included for the purpose of simultaneous Tx SAR assessments for SVLTE operations in Section 13.

Table 12-8
LTE Band 4 (AWS) Head SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Cover Type	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	Scaled SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.20	0.02	0	Right	Cheek	QPSK	1	50	31725	1:1	0.116	1.072	0.124	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.95	0.03	1	Right	Cheek	QPSK	50	0	31725	1:1	0.096	1.135	0.109	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.20	-0.03	0	Right	Tilt	QPSK	1	50	31725	1:1	0.120	1.072	0.129	A8
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Wireless Charging Cover	23.5	23.20	0.01	0	Right	Tilt	QPSK	1	50	31725	1:1	0.107	1.072	0.115	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.95	-0.01	1	Right	Tilt	QPSK	50	0	31725	1:1	0.093	1.135	0.106	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.20	-0.02	0	Left	Cheek	QPSK	1	50	31725	1:1	0.111	1.072	0.119	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.95	-0.07	1	Left	Cheek	QPSK	50	0	31725	1:1	0.091	1.135	0.103	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.20	-0.07	0	Left	Tilt	QPSK	1	50	31725	1:1	0.099	1.072	0.106	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.95	0.03	1	Left	Tilt	QPSK	50	0	31725	1:1	0.080	1.135	0.091	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.94	0.14	0	Right	Cheek	QPSK	1	99	31729	1:1	0.053	1.138	0.060	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.98	0.03	0	Right	Cheek	QPSK	50	50	31729	1:1	0.053	1.127	0.060	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.94	0.12	0	Right	Tilt	QPSK	1	99	31729	1:1	0.043	1.138	0.049	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.98	-0.02	0	Right	Tilt	QPSK	50	50	31729	1:1	0.040	1.127	0.045	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.94	0.19	0	Left	Cheek	QPSK	1	99	31729	1:1	0.030	1.138	0.034	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.98	0.01	0	Left	Cheek	QPSK	50	50	31729	1:1	0.029	1.127	0.033	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.94	0.12	0	Left	Tilt	QPSK	1	99	31729	1:1	0.031	1.138	0.035	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.98	0.03	0	Left	Tilt	QPSK	50	50	31729	1:1	0.030	1.127	0.034	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Head 1.6 W/kg (mW/g) averaged over 1 gram										

19 dBm LTE voice standalone SAR data was included for the purpose of simultaneous Tx SAR assessments for SVLTE operations in Section 13.

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**Table 12-9
DTS Head SAR**

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Cover Type	Device Serial Number	Data Rate (Mbps)	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.													(W/kg)			
2462	11	IEEE 802.11b	DSSS	15.5	15.30	0.16	Right	Cheek	1	Standard	015D8	1	1:1	0.314	1.047	0.329	
2462	11	IEEE 802.11b	DSSS	15.5	15.30	0.06	Right	Tilt	1	Standard	015D8	1	1:1	0.206	1.047	0.216	
2462	11	IEEE 802.11b	DSSS	15.5	15.30	0.12	Left	Cheek	1	Standard	015D8	1	1:1	0.166	1.047	0.174	
2462	11	IEEE 802.11b	DSSS	15.5	15.30	0.12	Left	Tilt	1	Standard	015D8	1	1:1	0.090	1.047	0.094	
2462	11	IEEE 802.11b	DSSS	15.5	14.80	-0.05	Right	Cheek	2	Standard	01FC3	1	1:1	0.573	1.175	0.673	A9
2462	11	IEEE 802.11b	DSSS	15.5	14.80	0.02	Right	Cheek	2	Wireless Charging Cover	01FC3	1	1:1	0.544	1.175	0.639	
2462	11	IEEE 802.11b	DSSS	15.5	14.80	0.07	Right	Tilt	2	Standard	01FC3	1	1:1	0.330	1.175	0.388	
2462	11	IEEE 802.11b	DSSS	15.5	14.80	0.05	Left	Cheek	2	Standard	01FC3	1	1:1	0.442	1.175	0.519	
2462	11	IEEE 802.11b	DSSS	15.5	14.80	0.08	Left	Tilt	2	Standard	01FC3	1	1:1	0.312	1.175	0.367	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	-0.10	Right	Cheek	MIMO	Standard	01FC3	13	1:1	0.405	1.038	0.420	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	-0.12	Right	Cheek	MIMO	Wireless Charging Cover	01FC3	13	1:1	0.400	1.038	0.415	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	0.09	Right	Tilt	MIMO	Standard	01FC3	13	1:1	0.301	1.038	0.312	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	0.04	Left	Cheek	MIMO	Standard	01FC3	13	1:1	0.280	1.038	0.291	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	0.16	Left	Tilt	MIMO	Standard	01FC3	13	1:1	0.183	1.038	0.190	
5825	165	IEEE 802.11a	OFDM	12.5	11.88	0.11	Right	Cheek	1	Standard	015D8	6	1:1	0.074	1.153	0.085	
5775	155	IEEE 802.11ac	OFDM	10.5	9.62	0.16	Right	Cheek	1	Standard	015D8	29.3	1:1	0.045	1.225	0.055	
5825	165	IEEE 802.11a	OFDM	12.5	11.88	0.17	Right	Tilt	1	Standard	015D8	6	1:1	0.038	1.153	0.044	
5825	165	IEEE 802.11a	OFDM	12.5	11.88	-0.15	Left	Cheek	1	Standard	015D8	6	1:1	0.035	1.153	0.040	
5825	165	IEEE 802.11a	OFDM	12.5	11.88	0.19	Left	Tilt	1	Standard	015D8	6	1:1	0.000	1.153	0.000	
5765	153	IEEE 802.11a	OFDM	12.5	12.41	-0.08	Right	Cheek	2	Standard	015D8	6	1:1	0.025	1.021	0.026	
5765	153	IEEE 802.11a	OFDM	12.5	12.41	0.16	Right	Tilt	2	Standard	015D8	6	1:1	0.034	1.021	0.035	
5765	153	IEEE 802.11a	OFDM	12.5	12.41	0.13	Left	Cheek	2	Standard	015D8	6	1:1	0.039	1.021	0.040	
5775	155	IEEE 802.11ac	OFDM	10.5	10.31	-0.12	Left	Cheek	2	Standard	015D8	29.3	1:1	0.012	1.045	0.013	
5765	153	IEEE 802.11a	OFDM	12.5	12.41	0.07	Left	Tilt	2	Standard	015D8	6	1:1	0.035	1.021	0.036	
5745	149	IEEE 802.11n	OFDM	15.5	14.85	0.12	Right	Cheek	MIMO	Standard	015D8	13	1:1	0.169	1.161	0.196	A10
5745	149	IEEE 802.11n	OFDM	15.5	14.85	0.14	Right	Tilt	MIMO	Standard	015D8	13	1:1	0.080	1.161	0.093	
5745	149	IEEE 802.11n	OFDM	15.5	14.85	-0.16	Left	Cheek	MIMO	Standard	015D8	13	1:1	0.029	1.161	0.034	
5745	149	IEEE 802.11n	OFDM	15.5	14.85	0.12	Left	Tilt	MIMO	Standard	015D8	13	1:1	0.029	1.161	0.034	
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 12-10
NII Head SAR**

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Side	Test Position	Antenna Config.	Cover Type	Device Serial Number	Data Rate (Mbps)	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.													(W/kg)		(W/kg)	
5240	48	IEEE 802.11a	OFDM	12.5	11.59	-0.12	Right	Cheek	1	Standard	015D8	6	1:1	0.019	1.233	0.023	
5210	42	IEEE 802.11ac	OFDM	10.5	9.88	0.10	Right	Cheek	1	Standard	015D8	29.3	1:1	0.010	1.153	0.012	
5240	48	IEEE 802.11a	OFDM	12.5	11.59	0.16	Right	Tilt	1	Standard	015D8	6	1:1	0.007	1.233	0.009	
5240	48	IEEE 802.11a	OFDM	12.5	11.59	0.19	Left	Cheek	1	Standard	015D8	6	1:1	0.000	1.233	0.000	
5240	48	IEEE 802.11a	OFDM	12.5	11.59	0.10	Left	Tilt	1	Standard	015D8	6	1:1	0.000	1.233	0.000	
5320	64	IEEE 802.11a	OFDM	12.5	11.94	-0.14	Right	Cheek	1	Standard	015D8	6	1:1	0.015	1.138	0.017	
5290	58	IEEE 802.11ac	OFDM	10.5	9.96	-0.12	Right	Cheek	1	Standard	015D8	29.3	1:1	0.016	1.132	0.018	
5320	64	IEEE 802.11a	OFDM	12.5	11.94	0.14	Right	Tilt	1	Standard	015D8	6	1:1	0.011	1.138	0.013	
5320	64	IEEE 802.11a	OFDM	12.5	11.94	0.10	Left	Cheek	1	Standard	015D8	6	1:1	0.000	1.138	0.000	
5320	64	IEEE 802.11a	OFDM	12.5	11.94	0.19	Left	Tilt	1	Standard	015D8	6	1:1	0.000	1.138	0.000	
5580	116	IEEE 802.11a	OFDM	12.5	12.00	-0.03	Right	Cheek	1	Standard	015D8	6	1:1	0.086	1.122	0.096	
5530	106	IEEE 802.11ac	OFDM	10.5	9.92	0.13	Right	Cheek	1	Standard	015D8	29.3	1:1	0.033	1.143	0.038	
5580	116	IEEE 802.11a	OFDM	12.5	12.00	0.11	Right	Tilt	1	Standard	015D8	6	1:1	0.043	1.122	0.048	
5580	116	IEEE 802.11a	OFDM	12.5	12.00	0.12	Left	Cheek	1	Standard	015D8	6	1:1	0.035	1.122	0.039	
5580	116	IEEE 802.11a	OFDM	12.5	12.00	0.10	Left	Tilt	1	Standard	015D8	6	1:1	0.000	1.122	0.000	
5200	40	IEEE 802.11a	OFDM	12.5	11.92	0.16	Right	Cheek	2	Standard	015D8	6	1:1	0.096	1.143	0.110	
5200	40	IEEE 802.11a	OFDM	12.5	11.92	0.11	Right	Tilt	2	Standard	015D8	6	1:1	0.073	1.143	0.083	
5200	40	IEEE 802.11a	OFDM	12.5	11.92	0.13	Left	Cheek	2	Standard	015D8	6	1:1	0.139	1.143	0.159	
5200	40	IEEE 802.11a	OFDM	12.5	11.92	0.12	Left	Cheek	2	Wireless Charging Cover	015D8	6	1:1	0.140	1.143	0.160	
5210	42	IEEE 802.11ac	OFDM	10.5	10.04	0.14	Left	Cheek	2	Standard	015D8	29.3	1:1	0.058	1.112	0.064	
5200	40	IEEE 802.11a	OFDM	12.5	11.92	0.13	Left	Tilt	2	Standard	015D8	6	1:1	0.118	1.143	0.135	
5260	52	IEEE 802.11a	OFDM	12.5	11.54	0.18	Right	Cheek	2	Standard	015D8	6	1:1	0.075	1.247	0.094	
5260	52	IEEE 802.11a	OFDM	12.5	11.54	0.14	Right	Tilt	2	Standard	015D8	6	1:1	0.062	1.247	0.077	
5260	52	IEEE 802.11a	OFDM	12.5	11.54	0.12	Left	Cheek	2	Standard	015D8	6	1:1	0.115	1.247	0.143	
5290	58	IEEE 802.11ac	OFDM	10.5	9.59	0.14	Left	Cheek	2	Standard	015D8	29.3	1:1	0.046	1.233	0.057	
5260	52	IEEE 802.11a	OFDM	12.5	11.54	-0.02	Left	Tilt	2	Standard	015D8	6	1:1	0.097	1.247	0.121	
5700	140	IEEE 802.11a	OFDM	12.5	11.92	-0.15	Right	Cheek	2	Standard	015D8	6	1:1	0.026	1.143	0.030	
5700	140	IEEE 802.11a	OFDM	12.5	11.92	0.15	Right	Tilt	2	Standard	015D8	6	1:1	0.037	1.143	0.042	
5700	140	IEEE 802.11a	OFDM	12.5	11.92	0.13	Left	Cheek	2	Standard	015D8	6	1:1	0.050	1.143	0.057	
5530	106	IEEE 802.11ac	OFDM	10.5	9.50	0.14	Left	Cheek	2	Standard	015D8	29.3	1:1	0.032	1.259	0.040	
5700	140	IEEE 802.11a	OFDM	12.5	11.92	0.16	Left	Tilt	2	Standard	015D8	6	1:1	0.046	1.143	0.053	
5180	36	IEEE 802.11n	OFDM	15.5	14.78	0.12	Right	Cheek	MIMO	Standard	015D8	13	1:1	0.011	1.180	0.013	
5180	36	IEEE 802.11n	OFDM	15.5	14.78	0.16	Right	Tilt	MIMO	Standard	015D8	13	1:1	0.005	1.180	0.006	
5180	36	IEEE 802.11n	OFDM	15.5	14.78	-0.19	Left	Cheek	MIMO	Standard	015D8	13	1:1	0.106	1.180	0.125	
5180	36	IEEE 802.11n	OFDM	15.5	14.78	0.17	Left	Tilt	MIMO	Standard	015D8	13	1:1	0.085	1.180	0.100	
5280	56	IEEE 802.11n	OFDM	15.5	14.67	0.21	Right	Cheek	MIMO	Standard	015D8	13	1:1	0.039	1.211	0.047	
5280	56	IEEE 802.11n	OFDM	15.5	14.67	0.12	Right	Tilt	MIMO	Standard	015D8	13	1:1	0.018	1.211	0.022	
5280	56	IEEE 802.11n	OFDM	15.5	14.67	0.10	Left	Cheek	MIMO	Standard	015D8	13	1:1	0.076	1.211	0.092	
5280	56	IEEE 802.11n	OFDM	15.5	14.67	0.10	Left	Tilt	MIMO	Standard	015D8	13	1:1	0.061	1.211	0.074	
5680	136	IEEE 802.11n	OFDM	15.5	14.80	0.13	Right	Cheek	MIMO	Standard	015D8	13	1:1	0.187	1.175	0.220	
5680	136	IEEE 802.11n	OFDM	15.5	14.80	0.08	Right	Cheek	MIMO	Wireless Charging Cover	015D8	13	1:1	0.212	1.175	0.249	A11
5680	136	IEEE 802.11n	OFDM	15.5	14.80	0.16	Right	Tilt	MIMO	Standard	015D8	13	1:1	0.122	1.175	0.143	
5680	136	IEEE 802.11n	OFDM	15.5	14.80	-0.13	Left	Cheek	MIMO	Standard	015D8	13	1:1	0.035	1.175	0.041	
5680	136	IEEE 802.11n	OFDM	15.5	14.80	0.12	Left	Tilt	MIMO	Standard	015D8	13	1:1	0.037	1.175	0.043	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Head										
Spatial Peak							1.6 W/kg (mW/g)										
Uncontrolled Exposure/General Population							averaged over 1 gram										

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12.2 Standalone Body-Worn SAR Data

Table 12-11
GSM/UMTS/CDMA Body-Worn SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Cover Type	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	
836.52	384	Cell. CDMA	TD-SS / SO32	25.5	24.45	0.14	15 mm	Standard	318DB	N/A	1:1	back	0.392	1.274	0.499	A12
836.52	384	Cell. CDMA	TD-SS / SO32	25.5	24.45	0.00	15 mm	Wireless Charging Cover	318DB	N/A	1:1	back	0.367	1.274	0.468	
836.52	384	Cell. CDMA	TD-SS / SO32	23.5	22.86	0.04	15 mm	Standard	F5FFD	N/A	1:1	back	0.248	1.159	0.287	
836.52	384	Cell. CDMA	TD-SS / SO32	18.5	17.68	-0.02	15 mm	Standard	31729	N/A	1:1	back	0.060	1.208	0.072	
1880.00	600	PCS CDMA	TD-SS / SO32	25.0	24.35	-0.04	15 mm	Standard	318DB	N/A	1:1	back	0.456	1.161	0.529	A14
1880.00	600	PCS CDMA	TD-SS / SO32	25.0	24.35	0.07	15 mm	Wireless Charging Cover	318DB	N/A	1:1	back	0.369	1.161	0.428	
1880.00	600	PCS CDMA	TD-SS / SO32	23.0	22.53	-0.04	15 mm	Standard	F5FFA	N/A	1:1	back	0.311	1.114	0.346	
1908.75	1175	PCS CDMA	TD-SS / SO32	18.5	17.78	-0.06	15 mm	Standard	31729	N/A	1:1	back	0.051	1.180	0.060	
836.60	190	GSM 850	GSM	33.5	32.91	-0.02	15 mm	Standard	F5FFA	1	1:8.3	back	0.301	1.146	0.345	A16
836.60	190	GSM 850	GSM	33.5	32.91	-0.14	15 mm	Wireless Charging Cover	F5FFA	1	1:8.3	back	0.259	1.146	0.297	
1880.00	661	GSM 1900	GSM	30.5	29.82	0.02	15 mm	Standard	F5FFA	1	1:8.3	back	0.173	1.169	0.202	A18
1880.00	661	GSM 1900	GSM	30.5	29.82	0.04	15 mm	Wireless Charging Cover	F5FFA	1	1:8.3	back	0.161	1.169	0.188	
836.60	4183	UMTS 850	RMC	23.5	22.79	0.05	15 mm	Standard	F5FFA	N/A	1:1	back	0.213	1.178	0.251	A20
836.60	4183	UMTS 850	RMC	23.5	22.79	-0.16	15 mm	Wireless Charging Cover	F5FFA	N/A	1:1	back	0.183	1.178	0.216	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	-0.04	15 mm	Standard	F5FFA	N/A	1:1	back	0.322	1.000	0.322	A22
1880.00	9400	UMTS 1900	RMC	21.8	21.80	0.06	15 mm	Wireless Charging Cover	F5FFA	N/A	1:1	back	0.310	1.000	0.310	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body									
Spatial Peak							1.6 W/kg (mW/g)									
Uncontrolled Exposure/General Population							averaged over 1 gram									

18 dBm and 23 dBm CDMA body-worn standalone SAR data was included for the purpose of simultaneous Tx SAR assessments for SVLTE operations in Section 13.

Table 12-12
LTE Body-Worn SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Cover Type	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	Scaled SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.47	-0.03	0	F5FFD	QPSK	1	0	15 mm	back	1:1	0.186	1.007	0.187	A24
782.00	23230	Mid	LTE Band 13	10	Wireless Charging Cover	23.5	23.47	0.03	0	F5FFD	QPSK	1	0	15 mm	back	1:1	0.143	1.007	0.144	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	22.41	-0.01	1	F5FFD	QPSK	25	12	15 mm	back	1:1	0.114	1.021	0.116	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.87	0.06	0	F5FFE	QPSK	1	0	15 mm	back	1:1	0.059	1.156	0.068	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.83	0.04	0	F5FFE	QPSK	25	25	15 mm	back	1:1	0.053	1.167	0.062	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.20	-0.01	0	F5FFD	QPSK	1	50	15 mm	back	1:1	0.175	1.072	0.188	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Wireless Charging Cover	23.5	23.20	0.01	0	F5FFD	QPSK	1	50	15 mm	back	1:1	0.178	1.072	0.191	A26
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.95	-0.01	1	F5FFD	QPSK	50	0	15 mm	back	1:1	0.134	1.135	0.152	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.94	-0.01	0	F5FFE	QPSK	1	99	15 mm	back	1:1	0.074	1.138	0.084	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.98	0.02	0	F5FFE	QPSK	50	50	15 mm	back	1:1	0.075	1.127	0.085	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT														Body						
Spatial Peak														1.6 W/kg (mW/g)						
Uncontrolled Exposure/General Population														averaged over 1 gram						

19 dBm LTE body-worn standalone SAR data was included for the purpose of simultaneous Tx SAR assessments for SVLTE operations in Section 13.

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Table 12-13
DTs Body-Worn SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Cover Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.													(W/kg)		(W/kg)	
2462	11	IEEE 802.11b	DSSS	15.5	15.30	0.06	10 mm	1	Standard	015D8	1	back	1:1	0.128	1.047	0.134	A28
2462	11	IEEE 802.11b	DSSS	15.5	15.30	0.18	10 mm	1	Wireless Charging Cover	015D8	1	back	1:1	0.086	1.047	0.090	
2462	11	IEEE 802.11b	DSSS	15.5	14.80	0.08	10 mm	2	Standard	015D8	1	back	1:1	0.118	1.175	0.139	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	0.19	10 mm	MIMO	Standard	015D8	13	back	1:1	0.060	1.038	0.062	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	0.12	10 mm	MIMO	Wireless Charging Cover	015D8	13	back	1:1	0.045	1.038	0.047	
5825	165	IEEE 802.11a	OFDM	12.5	11.88	0.15	10 mm	1	Standard	015D8	6	back	1:1	0.048	1.153	0.055	
5775	155	IEEE 802.11ac	OFDM	10.5	9.62	0.12	10 mm	1	Standard	015D8	29.3	back	1:1	0.030	1.225	0.037	
5765	153	IEEE 802.11a	OFDM	12.5	12.41	-0.13	10 mm	2	Standard	015D8	6	back	1:1	0.214	1.021	0.218	
5775	155	IEEE 802.11ac	OFDM	10.5	10.31	-0.12	10 mm	2	Standard	015D8	29.3	back	1:1	0.092	1.045	0.096	
5745	149	IEEE 802.11n	OFDM	15.5	14.85	-0.13	10 mm	MIMO	Standard	015D8	13	back	1:1	0.292	1.161	0.369	A29
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 12-14
NII Body-Worn SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Cover Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.													(W/kg)		(W/kg)	
5240	48	IEEE 802.11a	OFDM	12.5	11.59	0.16	10 mm	1	Standard	015D8	6	back	1:1	0.022	1.233	0.027	
5210	42	IEEE 802.11ac	OFDM	10.5	9.88	0.15	10 mm	1	Standard	015D8	29.3	back	1:1	0.019	1.153	0.022	
5320	64	IEEE 802.11a	OFDM	12.5	11.94	0.10	10 mm	1	Standard	015D8	6	back	1:1	0.026	1.138	0.030	
5290	58	IEEE 802.11ac	OFDM	10.5	9.96	0.12	10 mm	1	Standard	015D8	29.3	back	1:1	0.018	1.132	0.020	
5580	116	IEEE 802.11a	OFDM	12.5	12.00	0.17	10 mm	1	Standard	015D8	6	back	1:1	0.046	1.122	0.052	
5530	106	IEEE 802.11ac	OFDM	10.5	9.92	0.16	10 mm	1	Standard	015D8	29.3	back	1:1	0.025	1.143	0.029	
5200	40	IEEE 802.11a	OFDM	12.5	11.92	-0.14	10 mm	2	Standard	015D8	6	back	1:1	0.092	1.143	0.105	
5210	42	IEEE 802.11ac	OFDM	10.5	10.04	-0.16	10 mm	2	Standard	015D8	29.3	back	1:1	0.059	1.112	0.066	
5260	52	IEEE 802.11a	OFDM	12.5	11.54	-0.04	10 mm	2	Standard	015D8	6	back	1:1	0.092	1.247	0.115	
5290	58	IEEE 802.11ac	OFDM	10.5	9.59	-0.13	10 mm	2	Standard	015D8	29.3	back	1:1	0.063	1.233	0.078	
5700	140	IEEE 802.11a	OFDM	12.5	11.92	-0.10	10 mm	2	Standard	015D8	6	back	1:1	0.272	1.143	0.311	
5700	140	IEEE 802.11a	OFDM	12.5	11.92	-0.12	10 mm	2	Wireless Charging Cover	015D8	6	back	1:1	0.321	1.143	0.367	
5530	106	IEEE 802.11ac	OFDM	10.5	9.50	-0.19	10 mm	2	Standard	015D8	29.3	back	1:1	0.157	1.259	0.198	
5180	36	IEEE 802.11n	OFDM	15.5	14.78	-0.14	10 mm	MIMO	Standard	015D8	13	back	1:1	0.127	1.180	0.150	
5280	56	IEEE 802.11n	OFDM	15.5	14.67	-0.17	10 mm	MIMO	Standard	015D8	13	back	1:1	0.147	1.211	0.178	
5540	108	IEEE 802.11n	OFDM	15.5	14.62	-0.12	10 mm	MIMO	Standard	015D8	13	back	1:1	0.385	1.225	0.472	
5580	116	IEEE 802.11n	OFDM	15.5	14.75	-0.15	10 mm	MIMO	Standard	015D8	13	back	1:1	0.428	1.189	0.509	
5680	136	IEEE 802.11n	OFDM	15.5	14.80	-0.12	10 mm	MIMO	Standard	015D8	13	back	1:1	0.454	1.175	0.533	A31
5680	136	IEEE 802.11n	OFDM	15.5	14.80	-0.10	10 mm	MIMO	Wireless Charging Cover	015D8	13	back	1:1	0.325	1.175	0.382	
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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12.3 Standalone Wireless Router SAR Data

Table 12-15
CDMA Hotspot SAR Data

MEASUREMENT RESULTS															
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Cover Type	Device Serial Number	Duty Cycle	Side	SAR(1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	
836.52	384	Cell. CDMA	TDSO / SO32	23.5	22.86	-0.02	10 mm	Standard	F5FFD	1:1	back	0.421	1.159	0.488	A13
836.52	384	Cell. CDMA	TDSO / SO32	23.5	22.86	0.00	10 mm	Standard	F5FFD	1:1	front	0.467	1.159	0.541	
836.52	384	Cell. CDMA	TDSO / SO32	23.5	22.86	-0.03	10 mm	Wireless Charging Cover	F5FFD	1:1	front	0.438	1.159	0.508	
836.52	384	Cell. CDMA	TDSO / SO32	23.5	22.86	-0.05	10 mm	Standard	F5FFD	1:1	bottom	0.230	1.159	0.267	
836.52	384	Cell. CDMA	TDSO / SO32	23.5	22.86	-0.09	10 mm	Standard	F5FFD	1:1	right	0.017	1.159	0.020	
836.52	384	Cell. CDMA	TDSO / SO32	23.5	22.86	-0.08	10 mm	Standard	F5FFD	1:1	left	0.179	1.159	0.207	
836.52	384	Cell. CDMA	TDSO / SO32	18.5	17.68	0.02	10 mm	Standard	31729	1:1	back	0.114	1.208	0.138	
836.52	384	Cell. CDMA	TDSO / SO32	18.5	17.68	0.07	10 mm	Standard	31729	1:1	front	0.142	1.208	0.172	
836.52	384	Cell. CDMA	TDSO / SO32	18.5	17.68	0.05	10 mm	Standard	31729	1:1	bottom	0.070	1.208	0.085	
836.52	384	Cell. CDMA	TDSO / SO32	18.5	17.68	0.03	10 mm	Standard	31729	1:1	right	0.011	1.208	0.013	
836.52	384	Cell. CDMA	TDSO / SO32	18.5	17.68	-0.16	10 mm	Standard	31729	1:1	left	0.058	1.208	0.070	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.5	22.90	-0.02	10 mm	Standard	F5FFD	1:1	back	0.396	1.148	0.455	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.5	22.90	-0.04	10 mm	Standard	F5FFD	1:1	front	0.434	1.148	0.498	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.5	22.90	-0.11	10 mm	Wireless Charging Cover	F5FFD	1:1	front	0.425	1.148	0.488	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.5	22.90	0.09	10 mm	Standard	F5FFD	1:1	bottom	0.232	1.148	0.266	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.5	22.90	-0.11	10 mm	Standard	F5FFD	1:1	right	0.016	1.148	0.018	
836.52	384	Cell. CDMA	EVDO Rev. 0	23.5	22.90	0.01	10 mm	Standard	F5FFD	1:1	left	0.182	1.148	0.209	
1880.00	600	PCS CDMA	TDSO / SO32	23.0	22.53	-0.01	10 mm	Standard	3186B	1:1	back	0.366	1.114	0.408	
1880.00	600	PCS CDMA	TDSO / SO32	23.0	22.53	-0.02	10 mm	Standard	3186B	1:1	front	0.399	1.114	0.444	
1880.00	600	PCS CDMA	TDSO / SO32	23.0	22.53	-0.03	10 mm	Standard	3186B	1:1	bottom	0.614	1.114	0.684	
1880.00	600	PCS CDMA	TDSO / SO32	23.0	22.53	0.05	10 mm	Wireless Charging Cover	3186B	1:1	bottom	0.621	1.114	0.692	
1880.00	600	PCS CDMA	TDSO / SO32	23.0	22.53	-0.01	10 mm	Standard	3186B	1:1	right	0.063	1.114	0.070	
1880.00	600	PCS CDMA	TDSO / SO32	23.0	22.53	-0.03	10 mm	Standard	3186B	1:1	left	0.149	1.114	0.166	
1908.75	1175	PCS CDMA	TDSO / SO32	18.5	17.78	-0.01	10 mm	Standard	31729	1:1	back	0.129	1.180	0.152	
1908.75	1175	PCS CDMA	TDSO / SO32	18.5	17.78	0.06	10 mm	Standard	31729	1:1	front	0.125	1.180	0.148	
1908.75	1175	PCS CDMA	TDSO / SO32	18.5	17.78	-0.09	10 mm	Standard	31729	1:1	bottom	0.214	1.180	0.253	
1908.75	1175	PCS CDMA	TDSO / SO32	18.5	17.78	0.15	10 mm	Standard	31729	1:1	right	0.022	1.180	0.026	
1908.75	1175	PCS CDMA	TDSO / SO32	18.5	17.78	-0.08	10 mm	Standard	31729	1:1	left	0.036	1.180	0.042	
1880.00	600	PCS CDMA	EVDO Rev. 0	23.0	22.52	0.00	10 mm	Standard	3186B	1:1	back	0.307	1.117	0.343	A15
1880.00	600	PCS CDMA	EVDO Rev. 0	23.0	22.52	-0.02	10 mm	Standard	3186B	1:1	front	0.374	1.117	0.418	
1880.00	600	PCS CDMA	EVDO Rev. 0	23.0	22.52	-0.01	10 mm	Standard	3186B	1:1	bottom	0.662	1.117	0.739	
1880.00	600	PCS CDMA	EVDO Rev. 0	23.0	22.52	0.06	10 mm	Wireless Charging Cover	3186B	1:1	bottom	0.595	1.117	0.665	
1880.00	600	PCS CDMA	EVDO Rev. 0	23.0	22.52	-0.04	10 mm	Standard	3186B	1:1	right	0.036	1.117	0.040	
1880.00	600	PCS CDMA	EVDO Rev. 0	23.0	22.52	0.04	10 mm	Standard	3186B	1:1	left	0.075	1.117	0.084	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body								
Spatial Peak							1.6 W/kg (mW/g)								
Uncontrolled Exposure/General Population							averaged over 1 gram								

18 dBm CDMA hotspot standalone SAR data was included for the purpose of simultaneous Tx SAR assessments for SVLTE operations in Section 13.

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Table 12-16
GPRS/UMTS Hotspot SAR Data

MEASUREMENT RESULTS																
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Cover Type	Device Serial Number	# of GPRS Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.												(W/kg)			
824.20	128	GSM 850	GPRS	30.5	29.79	0.01	10 mm	Standard	31865	3	1:2.76	back	0.594	1.178	0.700	
836.60	190	GSM 850	GPRS	30.5	29.83	-0.05	10 mm	Standard	31865	3	1:2.76	back	0.687	1.167	0.802	
848.80	251	GSM 850	GPRS	30.5	30.20	0.03	10 mm	Standard	31865	3	1:2.76	back	0.783	1.072	0.839	
824.20	128	GSM 850	GPRS	30.5	29.79	-0.04	10 mm	Standard	31865	3	1:2.76	front	0.631	1.178	0.743	
836.60	190	GSM 850	GPRS	30.5	29.83	-0.02	10 mm	Standard	31865	3	1:2.76	front	0.740	1.167	0.864	
848.80	251	GSM 850	GPRS	30.5	30.20	-0.06	10 mm	Standard	31865	3	1:2.76	front	0.878	1.072	0.941	
848.80	251	GSM 850	GPRS	30.5	30.20	-0.16	10 mm	Wireless Charging Cover	31865	3	1:2.76	front	0.964	1.072	1.033	A17
836.60	190	GSM 850	GPRS	30.5	29.83	0.01	10 mm	Standard	31865	3	1:2.76	bottom	0.497	1.167	0.580	
836.60	190	GSM 850	GPRS	30.5	29.83	0.17	10 mm	Standard	31865	3	1:2.76	right	0.072	1.167	0.084	
836.60	190	GSM 850	GPRS	30.5	29.83	0.02	10 mm	Standard	31865	3	1:2.76	left	0.443	1.167	0.517	
848.80	251	GSM 850	GPRS	30.5	30.20	-0.09	10 mm	Wireless Charging Cover	31865	3	1:2.76	front	0.893	1.072	0.957	
1880.00	661	GSM 1900	GPRS	26.5	26.30	-0.01	10 mm	Standard	31865	4	1:2.076	back	0.325	1.047	0.340	
1880.00	661	GSM 1900	GPRS	26.5	26.30	-0.12	10 mm	Standard	31865	4	1:2.076	front	0.369	1.047	0.386	
1880.00	661	GSM 1900	GPRS	26.5	26.30	0.03	10 mm	Standard	31865	4	1:2.076	bottom	0.546	1.047	0.572	
1880.00	661	GSM 1900	GPRS	26.5	26.30	-0.01	10 mm	Wireless Charging Cover	31865	4	1:2.076	bottom	0.561	1.047	0.587	A19
1880.00	661	GSM 1900	GPRS	26.5	26.30	-0.03	10 mm	Standard	31865	4	1:2.076	right	0.088	1.047	0.092	
1880.00	661	GSM 1900	GPRS	26.5	26.30	-0.01	10 mm	Standard	31865	4	1:2.076	left	0.071	1.047	0.074	
836.60	4183	UMTS 850	RMC	23.5	22.79	-0.01	10 mm	Standard	31865	N/A	1:1	back	0.470	1.178	0.554	
836.60	4183	UMTS 850	RMC	23.5	22.79	-0.02	10 mm	Wireless Charging Cover	31865	N/A	1:1	back	0.482	1.178	0.568	A21
836.60	4183	UMTS 850	RMC	23.5	22.79	-0.01	10 mm	Standard	31865	N/A	1:1	front	0.461	1.178	0.543	
836.60	4183	UMTS 850	RMC	23.5	22.79	-0.10	10 mm	Standard	31865	N/A	1:1	bottom	0.319	1.178	0.376	
836.60	4183	UMTS 850	RMC	23.5	22.79	0.01	10 mm	Standard	31865	N/A	1:1	right	0.051	1.178	0.060	
836.60	4183	UMTS 850	RMC	23.5	22.79	-0.09	10 mm	Standard	31865	N/A	1:1	left	0.263	1.178	0.310	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	-0.04	10 mm	Standard	F5FFA	N/A	1:1	back	0.734	1.000	0.734	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	0.05	10 mm	Standard	F5FFA	N/A	1:1	front	0.742	1.000	0.742	
1852.40	9262	UMTS 1900	RMC	21.8	21.16	0.17	10 mm	Standard	F5FFA	N/A	1:1	bottom	0.837	1.159	0.970	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	-0.05	10 mm	Standard	F5FFA	N/A	1:1	bottom	0.997	1.000	0.997	
1907.60	9538	UMTS 1900	RMC	21.8	21.46	0.03	10 mm	Standard	F5FFA	N/A	1:1	bottom	0.799	1.081	0.864	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	0.05	10 mm	Wireless Charging Cover	F5FFA	N/A	1:1	bottom	1.030	1.000	1.030	A23
1880.00	9400	UMTS 1900	RMC	21.8	21.80	0.04	10 mm	Standard	F5FFA	N/A	1:1	right	0.041	1.000	0.041	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	-0.01	10 mm	Standard	F5FFA	N/A	1:1	left	0.159	1.000	0.159	
1880.00	9400	UMTS 1900	RMC	21.8	21.80	0.05	10 mm	Wireless Charging Cover	F5FFA	N/A	1:1	bottom	1.000	1.000	1.000	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body									
Spatial Peak							1.6 W/kg (mW/g)									
Uncontrolled Exposure/General Population							averaged over 1 gram									

Blue highlighted entries represent variability measurement data

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Table 12-17
LTE Band 13 Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY		Mode	Bandwidth [MHz]	Cover Type	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	Scaled SAR (1g)	Plot #	
MHz	Ch.															(W/kg)		(W/kg)		
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.47	0.01	0	31725	QPSK	1	0	10 mm	back	1:1	0.272	1.007	0.274	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	22.41	0.06	1	31725	QPSK	25	12	10 mm	back	1:1	0.210	1.021	0.214	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.47	-0.06	0	31725	QPSK	1	0	10 mm	front	1:1	0.387	1.007	0.390	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	22.41	-0.11	1	31725	QPSK	25	12	10 mm	front	1:1	0.298	1.021	0.304	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.47	-0.09	0	31725	QPSK	1	0	10 mm	bottom	1:1	0.194	1.007	0.195	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	22.41	-0.03	1	31725	QPSK	25	12	10 mm	bottom	1:1	0.157	1.021	0.160	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.47	0.09	0	31725	QPSK	1	0	10 mm	right	1:1	0.399	1.007	0.402	A25
782.00	23230	Mid	LTE Band 13	10	Wireless Charging Cover	23.5	23.47	0.01	0	31725	QPSK	1	0	10 mm	right	1:1	0.394	1.007	0.397	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	22.41	0.02	1	31725	QPSK	25	12	10 mm	right	1:1	0.302	1.021	0.308	
782.00	23230	Mid	LTE Band 13	10	Standard	23.5	23.47	0.04	0	31725	QPSK	1	0	10 mm	left	1:1	0.084	1.007	0.085	
782.00	23230	Mid	LTE Band 13	10	Standard	22.5	22.41	0.15	1	31725	QPSK	25	12	10 mm	left	1:1	0.054	1.021	0.055	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.87	-0.17	0	31729	QPSK	1	0	10 mm	back	1:1	0.108	1.156	0.125	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.83	0.01	0	31729	QPSK	25	25	10 mm	back	1:1	0.104	1.167	0.121	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.87	0.01	0	31729	QPSK	1	0	10 mm	front	1:1	0.131	1.156	0.151	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.83	-0.06	0	31729	QPSK	25	25	10 mm	front	1:1	0.123	1.167	0.144	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.87	0.02	0	31729	QPSK	1	0	10 mm	bottom	1:1	0.093	1.156	0.108	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.83	0.05	0	31729	QPSK	25	25	10 mm	bottom	1:1	0.090	1.167	0.105	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.87	0.09	0	31729	QPSK	1	0	10 mm	right	1:1	0.146	1.156	0.169	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.83	0.04	0	31729	QPSK	25	25	10 mm	right	1:1	0.149	1.167	0.174	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.87	0.10	0	31729	QPSK	1	0	10 mm	left	1:1	0.038	1.156	0.044	
782.00	23230	Mid	LTE Band 13	10	Standard	19.5	18.83	-0.10	0	31729	QPSK	25	25	10 mm	left	1:1	0.029	1.167	0.034	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram										

19 dBm LTE hotspot standalone SAR data was included for the purpose of simultaneous Tx SAR assessments for SVLTE operations in Section 13.

Table 12-18
LTE Band 4 (AWS) Hotspot SAR

MEASUREMENT RESULTS																				
FREQUENCY			Mode	Bandwidth [MHz]	Cover Type	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	Scaled SAR (1g)	Plot #
MHz	Ch.	(W/kg)															(W/kg)			
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.20	-0.04	0	31725	QPSK	1	50	10 mm	back	1:1	0.505	1.072	0.541	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.95	0.02	1	31725	QPSK	50	0	10 mm	back	1:1	0.398	1.135	0.452	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.20	0.01	0	31725	QPSK	1	50	10 mm	front	1:1	0.664	1.072	0.712	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.95	-0.09	1	31725	QPSK	50	0	10 mm	front	1:1	0.512	1.135	0.581	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.20	-0.01	0	31725	QPSK	1	50	10 mm	bottom	1:1	0.792	1.072	0.849	A27
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Wireless Charging Cover	23.5	23.20	-0.02	0	31725	QPSK	1	50	10 mm	bottom	1:1	0.789	1.072	0.846	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.95	0.01	1	31725	QPSK	50	0	10 mm	bottom	1:1	0.602	1.135	0.683	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.86	-0.01	1	31725	QPSK	100	0	10 mm	bottom	1:1	0.618	1.159	0.716	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.20	0.09	0	31725	QPSK	1	50	10 mm	right	1:1	0.619	1.072	0.664	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.95	-0.01	1	31725	QPSK	50	0	10 mm	right	1:1	0.482	1.135	0.547	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	23.5	23.20	0.08	0	31725	QPSK	1	50	10 mm	left	1:1	0.076	1.072	0.081	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	22.5	21.95	0.01	1	31725	QPSK	50	0	10 mm	left	1:1	0.057	1.135	0.065	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.94	0.00	0	31729	QPSK	1	99	10 mm	back	1:1	0.228	1.138	0.259	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.98	0.03	0	31729	QPSK	50	50	10 mm	back	1:1	0.234	1.127	0.264	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.94	0.01	0	31729	QPSK	1	99	10 mm	front	1:1	0.276	1.138	0.314	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.98	-0.01	0	31729	QPSK	50	50	10 mm	front	1:1	0.286	1.127	0.322	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.94	-0.02	0	31729	QPSK	1	99	10 mm	bottom	1:1	0.304	1.138	0.346	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.98	-0.02	0	31729	QPSK	50	50	10 mm	bottom	1:1	0.297	1.127	0.335	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.94	0.00	0	31729	QPSK	1	99	10 mm	right	1:1	0.266	1.138	0.303	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.98	-0.01	0	31729	QPSK	50	50	10 mm	right	1:1	0.272	1.127	0.307	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.94	0.13	0	31729	QPSK	1	99	10 mm	left	1:1	0.019	1.138	0.022	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	Standard	19.5	18.98	0.01	0	31729	QPSK	50	50	10 mm	left	1:1	0.022	1.127	0.025	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT										Body										
Spatial Peak										1.6 W/kg (mW/g)										
Uncontrolled Exposure/General Population										averaged over 1 gram										

19 dBm LTE hotspot standalone SAR data was included for the purpose of simultaneous Tx SAR assessments for SVLTE operations in Section 13.

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Table 12-19
WLAN Hotspot SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Cover Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.													(W/kg)		(W/kg)	
2462	11	IEEE 802.11b	DSSS	15.5	15.30	0.06	10 mm	1	Standard	015D8	1	back	1:1	0.128	1.047	0.134	A28
2462	11	IEEE 802.11b	DSSS	15.5	15.30	0.18	10 mm	1	Wireless Charging Cover	015D8	1	back	1:1	0.086	1.047	0.090	
2462	11	IEEE 802.11b	DSSS	15.5	15.30	-0.09	10 mm	1	Standard	015D8	1	front	1:1	0.067	1.047	0.070	
2462	11	IEEE 802.11b	DSSS	15.5	15.30	0.10	10 mm	1	Standard	015D8	1	top	1:1	0.025	1.047	0.026	
2462	11	IEEE 802.11b	DSSS	15.5	15.30	0.12	10 mm	1	Standard	015D8	1	left	1:1	0.046	1.047	0.048	
2462	11	IEEE 802.11b	DSSS	15.5	14.80	0.08	10 mm	2	Standard	015D8	1	back	1:1	0.118	1.175	0.139	
2462	11	IEEE 802.11b	DSSS	15.5	14.80	-0.15	10 mm	2	Standard	015D8	1	front	1:1	0.064	1.175	0.075	
2462	11	IEEE 802.11b	DSSS	15.5	14.80	-0.12	10 mm	2	Standard	015D8	1	top	1:1	0.052	1.175	0.061	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	0.19	10 mm	MIMO	Standard	015D8	13	back	1:1	0.060	1.038	0.062	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	0.12	10 mm	MIMO	Wireless Charging Cover	015D8	13	back	1:1	0.045	1.038	0.047	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	0.12	10 mm	MIMO	Standard	015D8	13	front	1:1	0.038	1.038	0.039	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	0.18	10 mm	MIMO	Standard	015D8	13	top	1:1	0.018	1.038	0.019	
2462	11	IEEE 802.11n	OFDM	15.5	15.34	0.13	10 mm	MIMO	Standard	015D8	13	left	1:1	0.017	1.038	0.018	
5825	165	IEEE 802.11a	OFDM	12.5	11.88	0.15	10 mm	1	Standard	015D8	6	back	1:1	0.048	1.153	0.055	
5775	155	IEEE 802.11ac	OFDM	10.5	9.62	0.12	10 mm	1	Standard	015D8	29.3	back	1:1	0.030	1.225	0.037	
5825	165	IEEE 802.11a	OFDM	12.5	11.88	0.12	10 mm	1	Standard	015D8	6	front	1:1	0.011	1.153	0.013	
5825	165	IEEE 802.11a	OFDM	12.5	11.88	0.13	10 mm	1	Standard	015D8	6	top	1:1	0.020	1.153	0.023	
5825	165	IEEE 802.11a	OFDM	12.5	11.88	0.14	10 mm	1	Standard	015D8	6	left	1:1	0.022	1.153	0.025	
5765	153	IEEE 802.11a	OFDM	12.5	12.41	-0.13	10 mm	2	Standard	015D8	6	back	1:1	0.214	1.021	0.218	
5765	153	IEEE 802.11a	OFDM	12.5	12.41	-0.13	10 mm	2	Wireless Charging Cover	015D8	6	back	1:1	0.453	1.021	0.463	
5775	155	IEEE 802.11ac	OFDM	10.5	10.31	-0.12	10 mm	2	Standard	015D8	29.3	back	1:1	0.092	1.045	0.096	
5765	153	IEEE 802.11a	OFDM	12.5	12.41	-0.15	10 mm	2	Standard	015D8	6	front	1:1	0.030	1.021	0.031	
5765	153	IEEE 802.11a	OFDM	12.5	12.41	0.12	10 mm	2	Standard	015D8	6	top	1:1	0.058	1.021	0.059	
5745	149	IEEE 802.11n	OFDM	15.5	14.85	-0.13	10 mm	MIMO	Standard	015D8	13	back	1:1	0.292	1.161	0.339	
5745	149	IEEE 802.11n	OFDM	15.5	14.85	0.14	10 mm	MIMO	Wireless Charging Cover	015D8	13	back	1:1	0.482	1.161	0.560	A30
5745	149	IEEE 802.11n	OFDM	15.5	14.85	-0.15	10 mm	MIMO	Standard	015D8	13	front	1:1	0.023	1.161	0.027	
5745	149	IEEE 802.11n	OFDM	15.5	14.85	-0.13	10 mm	MIMO	Standard	015D8	13	top	1:1	0.136	1.161	0.158	
5745	149	IEEE 802.11n	OFDM	15.5	14.85	0.19	10 mm	MIMO	Standard	015D8	13	left	1:1	0.076	1.161	0.088	
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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12.4 Standalone Extremity SAR Data

Table 12-20
WLAN Extremity SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Cover Type	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle	SAR (10g)	Scaling Factor	Scaled SAR (10g) (W/kg)	Plot #
MHz	Ch.													(W/kg)		(W/kg)	
5240	48	IEEE 802.11a	OFDM	12.5	11.59	0.12	0 mm	1	Standard	015D7	6	back	1:1	0.100	1.233	0.123	
5210	42	IEEE 802.11ac	OFDM	10.5	9.88	0.12	0 mm	1	Standard	015D7	29.3	back	1:1	0.069	1.153	0.080	
5240	48	IEEE 802.11a	OFDM	12.5	11.59	0.12	0 mm	1	Standard	015D7	6	front	1:1	0.042	1.233	0.052	
5240	48	IEEE 802.11a	OFDM	12.5	11.59	0.19	0 mm	1	Standard	015D7	6	top	1:1	0.029	1.233	0.036	
5240	48	IEEE 802.11a	OFDM	12.5	11.59	-0.17	0 mm	1	Standard	015D7	6	left	1:1	0.058	1.233	0.072	
5320	64	IEEE 802.11a	OFDM	12.5	11.94	0.06	0 mm	1	Standard	015D7	6	back	1:1	0.105	1.138	0.119	
5290	58	IEEE 802.11ac	OFDM	10.5	9.96	0.13	0 mm	1	Standard	015D7	29.3	back	1:1	0.057	1.132	0.065	
5320	64	IEEE 802.11a	OFDM	12.5	11.94	0.16	0 mm	1	Standard	015D7	6	front	1:1	0.046	1.138	0.052	
5320	64	IEEE 802.11a	OFDM	12.5	11.94	0.14	0 mm	1	Standard	015D7	6	top	1:1	0.005	1.138	0.006	
5320	64	IEEE 802.11a	OFDM	12.5	11.94	-0.03	0 mm	1	Standard	015D7	6	left	1:1	0.099	1.138	0.113	
5580	116	IEEE 802.11a	OFDM	12.5	12.00	0.04	0 mm	1	Standard	015D7	6	back	1:1	0.136	1.122	0.153	
5580	116	IEEE 802.11a	OFDM	12.5	12.00	0.16	0 mm	1	Standard	015D7	6	front	1:1	0.046	1.122	0.052	
5580	116	IEEE 802.11a	OFDM	12.5	12.00	0.10	0 mm	1	Standard	015D7	6	top	1:1	0.004	1.122	0.004	
5580	116	IEEE 802.11a	OFDM	12.5	12.00	-0.13	0 mm	1	Standard	015D7	6	left	1:1	0.194	1.122	0.218	
5530	106	IEEE 802.11ac	OFDM	10.5	9.92	0.14	0 mm	1	Standard	015D7	29.3	left	1:1	0.191	1.143	0.218	
5200	40	IEEE 802.11a	OFDM	12.5	11.92	0.08	0 mm	2	Standard	015D7	6	back	1:1	0.305	1.143	0.349	
5210	42	IEEE 802.11ac	OFDM	10.5	10.04	-0.12	0 mm	2	Standard	015D7	29.3	back	1:1	0.176	1.112	0.196	
5200	40	IEEE 802.11a	OFDM	12.5	11.92	0.16	0 mm	2	Standard	015D7	6	front	1:1	0.068	1.143	0.078	
5200	40	IEEE 802.11a	OFDM	12.5	11.92	-0.02	0 mm	2	Standard	015D7	6	top	1:1	0.106	1.143	0.121	
5260	52	IEEE 802.11a	OFDM	12.5	11.54	-0.10	0 mm	2	Standard	015D7	6	back	1:1	0.297	1.247	0.370	
5290	58	IEEE 802.11ac	OFDM	10.5	9.59	-0.18	0 mm	2	Standard	015D7	29.3	back	1:1	0.164	1.233	0.202	
5260	52	IEEE 802.11a	OFDM	12.5	11.54	0.17	0 mm	2	Standard	015D7	6	front	1:1	0.050	1.247	0.062	
5260	52	IEEE 802.11a	OFDM	12.5	11.54	0.14	0 mm	2	Standard	015D7	6	top	1:1	0.099	1.247	0.123	
5700	140	IEEE 802.11a	OFDM	12.5	11.92	0.15	0 mm	2	Standard	015D7	6	back	1:1	0.595	1.143	0.680	A32
5700	140	IEEE 802.11a	OFDM	12.5	11.92	-0.13	0 mm	2	Wireless Charging Cover	015D7	6	back	1:1	0.500	1.143	0.572	
5530	106	IEEE 802.11ac	OFDM	10.5	9.50	-0.12	0 mm	2	Standard	015D7	29.3	back	1:1	0.225	1.259	0.283	
5700	140	IEEE 802.11a	OFDM	12.5	11.92	0.16	0 mm	2	Standard	015D7	6	front	1:1	0.047	1.143	0.054	
5700	140	IEEE 802.11a	OFDM	12.5	11.92	0.20	0 mm	2	Standard	015D7	6	top	1:1	0.136	1.143	0.155	
5180	36	IEEE 802.11n	OFDM	15.5	14.78	0.12	0 mm	MIMO	Standard	015D7	13	back	1:1	0.304	1.180	0.359	
5180	36	IEEE 802.11n	OFDM	15.5	14.78	0.03	0 mm	MIMO	Wireless Charging Cover	015D7	13	back	1:1	0.243	1.180	0.287	
5180	36	IEEE 802.11n	OFDM	15.5	14.78	0.12	0 mm	MIMO	Standard	015D7	13	front	1:1	0.096	1.180	0.113	
5180	36	IEEE 802.11n	OFDM	15.5	14.78	0.05	0 mm	MIMO	Standard	015D7	13	top	1:1	0.102	1.180	0.120	
5180	36	IEEE 802.11n	OFDM	15.5	14.78	-0.02	0 mm	MIMO	Standard	015D7	13	left	1:1	0.066	1.180	0.078	
5280	56	IEEE 802.11n	OFDM	15.5	14.67	0.12	0 mm	MIMO	Standard	015D7	13	back	1:1	0.303	1.211	0.367	
5280	56	IEEE 802.11n	OFDM	15.5	14.67	0.13	0 mm	MIMO	Standard	015D7	13	front	1:1	0.072	1.211	0.087	
5280	56	IEEE 802.11n	OFDM	15.5	14.67	0.13	0 mm	MIMO	Standard	015D7	13	top	1:1	0.090	1.211	0.109	
5280	56	IEEE 802.11n	OFDM	15.5	14.67	0.14	0 mm	MIMO	Standard	015D7	13	left	1:1	0.084	1.211	0.102	
5680	136	IEEE 802.11n	OFDM	15.5	14.80	0.18	0 mm	MIMO	Standard	015D7	13	back	1:1	0.285	1.175	0.335	
5680	136	IEEE 802.11n	OFDM	15.5	14.80	0.12	0 mm	MIMO	Standard	015D7	13	front	1:1	0.070	1.175	0.082	
5680	136	IEEE 802.11n	OFDM	15.5	14.80	0.15	0 mm	MIMO	Standard	015D7	13	top	1:1	0.134	1.175	0.157	
5680	136	IEEE 802.11n	OFDM	15.5	14.80	0.15	0 mm	MIMO	Standard	015D7	13	left	1:1	0.181	1.175	0.213	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Extremity 4.0 W/kg (mW/g) averaged over 10 grams										

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12.5 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, and FCC KDB Publication 447498 D01v05.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05.
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. A test separation distance of 10 mm for body-worn SAR was also used for 2.4/5 GHz WLAN as it is more conservative.
7. Per FCC KDB Publication 648474 D04v01, 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 D01 v01, variability SAR tests were performed when the measured 1 gram SAR results for a frequency band were greater than 0.8 W/kg or when the measured 10 gram SAR results for a frequency band were greater than 2.0 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 14 for variability analysis
9. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v01, 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 CDMA/EVDO B0/B1 under some portable hotspot conditions for SAR compliance. Therefore, these wireless router configurations were tested at reduced output power levels.
11. Per FCC KDB Publication 648474 D04v01r01, this device is considered a "phablet" since the diagonal dimension is > 160 mm and < 200 mm. Therefore, extremity SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg when scaled up to the maximum output power tolerances.
12. Per FCC KDB Publication 648474 D03, SAR was measured using the standard battery cover and then repeated with the wireless charging battery cover for the configuration with the highest measured SAR for each wireless technology, frequency band, operating mode, and exposure condition. Since reported 1 gram SAR did not exceed 1.2 W/kg, additional testing with the wireless charging battery cover was not required.

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 D03v01 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.

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3. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel was used.

CDMA Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 D01v02.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. EVDO and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers, per FCC KDB Publication 941225 D01v02.
3. CDMA Wireless Router SAR is measured using Subtype 0/1 Physical Layer configurations for Rev. 0 according to KDB 941225 D01 procedures for data devices. Since the average output power of Subtype 2 for Rev. A is less than the Rev. 0 power levels, EVDO Rev. A SAR is not required. SAR is not required for 1x RTT for Ev-Do hotspot devices when the maximum average output of each channel is less than 1/4 dB higher than that measured in Subtype 0/1 Physical Layer configurations for Rev. 0.
4. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel was used.
5. Head SAR was additionally evaluated using EVDO Rev. A to determine compliance for VoIP operations.
6. CDMA 1x-RTT SAR was required to be evaluated for Hotspot exposure conditions to support simultaneous transmission capabilities.
7. This device applies power reduction for CDMA/EVDO BC0/BC1 when Hotspot is ON. Therefore, CDMA/EVDO BC0/BC1 was evaluated at hotspot reduced power levels.

UMTS Notes:

1. UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
2. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is $> \frac{1}{2}$ 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 D05v02r01. 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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WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI SISO operations: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. Other SISO IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for SISO 5 GHz WIFI operations: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11a. Other IEEE SISO 802.11 modes (including 802.11n 20 MHz and 40 MHz bandwidths) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
3. Per April 2013 TCB Workshop notes, full SISO SAR tests for all IEEE 802.11ac configurations were not required because the average output power was not more than 0.25 dB higher than IEEE 802.11a mode. IEEE 802.11ac SISO was evaluated for the highest IEEE 802.11a position in each 5 GHz band and exposure condition.
4. When Hotspot is enabled, 5.2-5.7 GHz bands are disabled. Therefore no 5.2 – 5.7 GHz WIFI Wireless Router SAR Data was required.
5. Per KDB 248227, SAR for MIMO was measured with both transmitting simultaneously and was evaluated in dependently of SISO operation. For 2.4 GHz MIMO, IEEE 802.11n was evaluated. For 5 GHz MIMO, IEEE 802.11n 20 MHz bandwidth was evaluated. Additional evaluations for 40 MHz bandwidth 802.11n and 802.11ac were not required since the maximum allowed output power was not higher than 802.11n 20 Mhz Bandwidth.
6. WIFI transmission was verified using an uncalibrated spectrum analyzer.
7. When the maximum extrapolated peak 1g SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, 1g SAR testing on other default channels was required. Testing on other default channels was not required for 10 g Extremity SAR, since the reported 10g averaged SAR is <2.0 W/kg.

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13 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

13.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g/n/ac and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

13.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05 IV.C.1.iii and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific physical test configuration is ≤ 1.6 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05 4.3.2 2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated 1g SAR} = \frac{\sqrt{f(\text{GHz})}}{7.5} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

$$\text{Estimated 10g SAR} = \frac{\sqrt{f(\text{GHz})}}{18.75} * \frac{(\text{Max Power of channel, mW})}{\text{Min. Separation Distance, mm}}$$

Table 13-1
Estimated SAR

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated SAR (Body)
	[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	2480	12.00	15	0.224

Note: Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

Main antenna SAR testing was not required for extremity exposure conditions per FCC KDB 648474. Therefore, no further analysis was required to determine that possible simultaneous scenarios would not exceed the SAR limit.

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13.3 Head SAR Simultaneous Transmission Analysis

Table 13-2
Simultaneous Transmission Scenario with 2.4 GHz WLAN Ant 1 (Held to Ear)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.138	0.329	0.467	Head SAR	Right Cheek	0.071	0.329	0.400
	Right Tilt	0.122	0.216	0.338		Right Tilt	0.043	0.216	0.259
	Left Cheek	0.195	0.174	0.369		Left Cheek	0.130	0.174	0.304
	Left Tilt	0.108	0.094	0.202		Left Tilt	0.051	0.094	0.145
Simult Tx	Configuration	PCS CDMA SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.088	0.329	0.417	Head SAR	Right Cheek	0.104	0.329	0.433
	Right Tilt	0.039	0.216	0.255		Right Tilt	0.088	0.216	0.304
	Left Cheek	0.162	0.174	0.336		Left Cheek	0.088	0.174	0.262
	Left Tilt	0.040	0.094	0.134		Left Tilt	0.098	0.094	0.192
Simult Tx	Configuration	GSM 850 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.080	0.329	0.409	Head SAR	Right Cheek	0.092	0.329	0.421
	Right Tilt	0.052	0.216	0.268		Right Tilt	0.049	0.216	0.265
	Left Cheek	0.193	0.174	0.367		Left Cheek	0.072	0.174	0.246
	Left Tilt	0.065	0.094	0.159		Left Tilt	0.037	0.094	0.131
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.100	0.329	0.429	Head SAR	Right Cheek	0.049	0.329	0.378
	Right Tilt	0.054	0.216	0.270		Right Tilt	0.040	0.216	0.256
	Left Cheek	0.168	0.174	0.342		Left Cheek	0.092	0.174	0.266
	Left Tilt	0.053	0.094	0.147		Left Tilt	0.025	0.094	0.119
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.145	0.329	0.474	Head SAR	Right Cheek	0.124	0.329	0.453
	Right Tilt	0.054	0.216	0.270		Right Tilt	0.129	0.216	0.345
	Left Cheek	0.091	0.174	0.265		Left Cheek	0.119	0.174	0.293
	Left Tilt	0.073	0.094	0.167		Left Tilt	0.106	0.094	0.200

Table 13-3
Simultaneous Transmission Scenario with 2.4 GHz WLAN Ant 2 (Held to Ear)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.138	0.673	0.811	Head SAR	Right Cheek	0.071	0.673	0.744
	Right Tilt	0.122	0.388	0.510		Right Tilt	0.043	0.388	0.431
	Left Cheek	0.195	0.519	0.714		Left Cheek	0.130	0.519	0.649
	Left Tilt	0.108	0.367	0.475		Left Tilt	0.051	0.367	0.418

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Simult Tx	Configuration	PCS CDMA SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.088	0.673	0.761	Head SAR	Right Cheek	0.104	0.673	0.777
	Right Tilt	0.039	0.388	0.427		Right Tilt	0.088	0.388	0.476
	Left Cheek	0.162	0.519	0.681		Left Cheek	0.088	0.519	0.607
	Left Tilt	0.040	0.367	0.407		Left Tilt	0.098	0.367	0.465
Simult Tx	Configuration	GSM 850 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.080	0.673	0.753	Head SAR	Right Cheek	0.092	0.673	0.765
	Right Tilt	0.052	0.388	0.440		Right Tilt	0.049	0.388	0.437
	Left Cheek	0.193	0.519	0.712		Left Cheek	0.072	0.519	0.591
	Left Tilt	0.065	0.367	0.432		Left Tilt	0.037	0.367	0.404
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.100	0.673	0.773	Head SAR	Right Cheek	0.049	0.673	0.722
	Right Tilt	0.054	0.388	0.442		Right Tilt	0.040	0.388	0.428
	Left Cheek	0.168	0.519	0.687		Left Cheek	0.092	0.519	0.611
	Left Tilt	0.053	0.367	0.420		Left Tilt	0.025	0.367	0.392
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.145	0.673	0.818	Head SAR	Right Cheek	0.124	0.673	0.797
	Right Tilt	0.054	0.388	0.442		Right Tilt	0.129	0.388	0.517
	Left Cheek	0.091	0.519	0.610		Left Cheek	0.119	0.519	0.638
	Left Tilt	0.073	0.367	0.440		Left Tilt	0.106	0.367	0.473

Table 13-4
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO (Held to Ear)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.138	0.420	0.558	Head SAR	Right Cheek	0.071	0.420	0.491
	Right Tilt	0.122	0.312	0.434		Right Tilt	0.043	0.312	0.355
	Left Cheek	0.195	0.291	0.486		Left Cheek	0.130	0.291	0.421
	Left Tilt	0.108	0.190	0.298		Left Tilt	0.051	0.190	0.241
Simult Tx	Configuration	PCS CDMA SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.088	0.420	0.508	Head SAR	Right Cheek	0.104	0.420	0.524
	Right Tilt	0.039	0.312	0.351		Right Tilt	0.088	0.312	0.400
	Left Cheek	0.162	0.291	0.453		Left Cheek	0.088	0.291	0.379
	Left Tilt	0.040	0.190	0.230		Left Tilt	0.098	0.190	0.288
Simult Tx	Configuration	GSM 850 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GSM 1900 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.080	0.420	0.500	Head SAR	Right Cheek	0.092	0.420	0.512
	Right Tilt	0.052	0.312	0.364		Right Tilt	0.049	0.312	0.361
	Left Cheek	0.193	0.291	0.484		Left Cheek	0.072	0.291	0.363
	Left Tilt	0.065	0.190	0.255		Left Tilt	0.037	0.190	0.227

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Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.100	0.420	0.520	Head SAR	Right Cheek	0.049	0.420	0.469
	Right Tilt	0.054	0.312	0.366		Right Tilt	0.040	0.312	0.352
	Left Cheek	0.168	0.291	0.459		Left Cheek	0.092	0.291	0.383
	Left Tilt	0.053	0.190	0.243		Left Tilt	0.025	0.190	0.215
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.145	0.420	0.565	Head SAR	Right Cheek	0.124	0.420	0.544
	Right Tilt	0.054	0.312	0.366		Right Tilt	0.129	0.312	0.441
	Left Cheek	0.091	0.291	0.382		Left Cheek	0.119	0.291	0.410
	Left Tilt	0.073	0.190	0.263		Left Tilt	0.106	0.190	0.296

Table 13-5
Simultaneous Transmission Scenario with 5 GHz WLAN Ant 1 (Held to Ear)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.138	0.096	0.234	Head SAR	Right Cheek	0.071	0.096	0.167
	Right Tilt	0.122	0.048	0.170		Right Tilt	0.043	0.048	0.091
	Left Cheek	0.195	0.040	0.235		Left Cheek	0.130	0.040	0.170
	Left Tilt	0.108	0.000	0.108		Left Tilt	0.051	0.000	0.051
Simult Tx	Configuration	PCS CDMA SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.088	0.096	0.184	Head SAR	Right Cheek	0.104	0.096	0.200
	Right Tilt	0.039	0.048	0.087		Right Tilt	0.088	0.048	0.136
	Left Cheek	0.162	0.040	0.202		Left Cheek	0.088	0.040	0.128
	Left Tilt	0.040	0.000	0.040		Left Tilt	0.098	0.000	0.098
Simult Tx	Configuration	GSM 850 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GSM 1900 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.080	0.096	0.176	Head SAR	Right Cheek	0.092	0.096	0.188
	Right Tilt	0.052	0.048	0.100		Right Tilt	0.049	0.048	0.097
	Left Cheek	0.193	0.040	0.233		Left Cheek	0.072	0.040	0.112
	Left Tilt	0.065	0.000	0.065		Left Tilt	0.037	0.000	0.037
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.100	0.096	0.196	Head SAR	Right Cheek	0.049	0.096	0.145
	Right Tilt	0.054	0.048	0.102		Right Tilt	0.040	0.048	0.088
	Left Cheek	0.168	0.040	0.208		Left Cheek	0.092	0.040	0.132
	Left Tilt	0.053	0.000	0.053		Left Tilt	0.025	0.000	0.025
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.145	0.096	0.241	Head SAR	Right Cheek	0.124	0.096	0.220
	Right Tilt	0.054	0.048	0.102		Right Tilt	0.129	0.048	0.177
	Left Cheek	0.091	0.040	0.131		Left Cheek	0.119	0.041	0.160
	Left Tilt	0.073	0.000	0.073		Left Tilt	0.106	0.000	0.106

The worst case 5 GHz WIFI reported SAR for each head configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

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Table 13-6
Simultaneous Transmission Scenario with 5 GHz WLAN Ant 2 (Held to Ear)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.138	0.110	0.248	Head SAR	Right Cheek	0.071	0.110	0.181
	Right Tilt	0.122	0.083	0.205		Right Tilt	0.043	0.083	0.126
	Left Cheek	0.195	0.160	0.355		Left Cheek	0.130	0.160	0.290
	Left Tilt	0.108	0.135	0.243		Left Tilt	0.051	0.135	0.186
Simult Tx	Configuration	PCS CDMA SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.088	0.110	0.198	Head SAR	Right Cheek	0.104	0.110	0.214
	Right Tilt	0.039	0.083	0.122		Right Tilt	0.088	0.083	0.171
	Left Cheek	0.162	0.160	0.322		Left Cheek	0.088	0.160	0.248
	Left Tilt	0.040	0.135	0.175		Left Tilt	0.098	0.135	0.233
Simult Tx	Configuration	GSM 850 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GSM 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.080	0.110	0.190	Head SAR	Right Cheek	0.092	0.110	0.202
	Right Tilt	0.052	0.083	0.135		Right Tilt	0.049	0.083	0.132
	Left Cheek	0.193	0.160	0.353		Left Cheek	0.072	0.160	0.232
	Left Tilt	0.065	0.135	0.200		Left Tilt	0.037	0.135	0.172
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.100	0.110	0.210	Head SAR	Right Cheek	0.049	0.110	0.159
	Right Tilt	0.054	0.083	0.137		Right Tilt	0.040	0.083	0.123
	Left Cheek	0.168	0.160	0.328		Left Cheek	0.092	0.160	0.252
	Left Tilt	0.053	0.135	0.188		Left Tilt	0.025	0.135	0.160
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.145	0.110	0.255	Head SAR	Right Cheek	0.124	0.110	0.234
	Right Tilt	0.054	0.083	0.137		Right Tilt	0.129	0.083	0.212
	Left Cheek	0.091	0.160	0.251		Left Cheek	0.119	0.160	0.279
	Left Tilt	0.073	0.135	0.208		Left Tilt	0.106	0.135	0.241

The worst case 5 GHz WIFI reported SAR for each head configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

Table 13-7
Simultaneous Transmission Scenario with 5 GHz WLAN MIMO (Held to Ear)

Simult Tx	Configuration	Cell. CDMA SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.138	0.249	0.387	Head SAR	Right Cheek	0.071	0.249	0.320
	Right Tilt	0.122	0.143	0.265		Right Tilt	0.043	0.143	0.186
	Left Cheek	0.195	0.125	0.320		Left Cheek	0.130	0.125	0.255
	Left Tilt	0.108	0.100	0.208		Left Tilt	0.051	0.100	0.151
Simult Tx	Configuration	PCS CDMA SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.088	0.249	0.337	Head SAR	Right Cheek	0.104	0.249	0.353
	Right Tilt	0.039	0.143	0.182		Right Tilt	0.088	0.143	0.231
	Left Cheek	0.162	0.125	0.287		Left Cheek	0.088	0.125	0.213
	Left Tilt	0.040	0.100	0.140		Left Tilt	0.098	0.100	0.198

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Simult Tx	Configuration	GSM 850 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GSM 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.080	0.249	0.329	Head SAR	Right Cheek	0.092	0.249	0.341
	Right Tilt	0.052	0.143	0.195		Right Tilt	0.049	0.143	0.192
	Left Cheek	0.193	0.125	0.318		Left Cheek	0.072	0.125	0.197
	Left Tilt	0.065	0.100	0.165		Left Tilt	0.037	0.100	0.137
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.100	0.249	0.349	Head SAR	Right Cheek	0.049	0.249	0.298
	Right Tilt	0.054	0.143	0.197		Right Tilt	0.040	0.143	0.183
	Left Cheek	0.168	0.125	0.293		Left Cheek	0.092	0.125	0.217
	Left Tilt	0.053	0.100	0.153		Left Tilt	0.025	0.100	0.125
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Head SAR	Right Cheek	0.145	0.249	0.394	Head SAR	Right Cheek	0.124	0.249	0.373
	Right Tilt	0.054	0.143	0.197		Right Tilt	0.129	0.143	0.272
	Left Cheek	0.091	0.125	0.216		Left Cheek	0.119	0.125	0.244
	Left Tilt	0.073	0.100	0.173		Left Tilt	0.106	0.100	0.206

The worst case 5 GHz WIFI reported SAR for each head configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

13.4 Body-Worn Simultaneous Transmission Analysis

For SAR summations for body-worn back side at 15 mm, WLAN SAR values for 1.0 cm were used since the 1.0 cm test distance for WLAN was more conservative. “<” denotes that the 1.0 cm WLAN SAR values were used for summation purposes.

Table 13-8
Simultaneous Transmission Scenario with 2.4 GHz WLAN Ant 1 (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Back Side	Cell. CDMA	0.499	<0.134	<0.633
Back Side	PCS CDMA	0.529	<0.134	<0.663
Back Side	GSM 850	0.345	<0.134	<0.479
Back Side	GSM 1900	0.202	<0.134	<0.336
Back Side	UMTS 850	0.251	<0.134	<0.385
Back Side	UMTS 1900	0.322	<0.134	<0.456
Back Side	LTE Band 13	0.187	<0.134	<0.321
Back Side	LTE Band 4 (AWS)	0.191	<0.134	<0.325

Table 13-9
Simultaneous Transmission Scenario with 2.4 GHz WLAN Ant 2 (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Back Side	Cell. CDMA	0.499	<0.139	<0.638
Back Side	PCS CDMA	0.529	<0.139	<0.668
Back Side	GSM 850	0.345	<0.139	<0.484
Back Side	GSM 1900	0.202	<0.139	<0.341
Back Side	UMTS 850	0.251	<0.139	<0.390
Back Side	UMTS 1900	0.322	<0.139	<0.461
Back Side	LTE Band 13	0.187	<0.139	<0.326
Back Side	LTE Band 4 (AWS)	0.191	<0.139	<0.330

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Table 13-10
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Back Side	Cell. CDMA	0.499	<0.062	<0.561
Back Side	PCS CDMA	0.529	<0.062	< 0.591
Back Side	GSM 850	0.345	<0.062	<0.407
Back Side	GSM 1900	0.202	<0.062	<0.264
Back Side	UMTS 850	0.251	<0.062	<0.313
Back Side	UMTS 1900	0.322	<0.062	<0.384
Back Side	LTE Band 13	0.187	<0.062	<0.249
Back Side	LTE Band 4 (AWS)	0.191	<0.062	<0.253

Table 13-11
Simultaneous Transmission Scenario with 5 GHz WLAN Ant 1 (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Back Side	Cell. CDMA	0.499	<0.055	<0.554
Back Side	PCS CDMA	0.529	<0.055	< 0.584
Back Side	GSM 850	0.345	<0.055	<0.400
Back Side	GSM 1900	0.202	<0.055	<0.257
Back Side	UMTS 850	0.251	<0.055	<0.306
Back Side	UMTS 1900	0.322	<0.055	<0.377
Back Side	LTE Band 13	0.187	<0.055	<0.242
Back Side	LTE Band 4 (AWS)	0.191	<0.055	<0.246

Table 13-12
Simultaneous Transmission Scenario with 5 GHz WLAN Ant 2 (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Back Side	Cell. CDMA	0.499	<0.367	<0.866
Back Side	PCS CDMA	0.529	<0.367	< 0.896
Back Side	GSM 850	0.345	<0.367	<0.712
Back Side	GSM 1900	0.202	<0.367	<0.569
Back Side	UMTS 850	0.251	<0.367	<0.618
Back Side	UMTS 1900	0.322	<0.367	<0.689
Back Side	LTE Band 13	0.187	<0.367	<0.554
Back Side	LTE Band 4 (AWS)	0.191	<0.367	<0.558

Table 13-13
Simultaneous Transmission Scenario with 5 GHz WLAN MIMO (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Back Side	Cell. CDMA	0.499	<0.533	<1.032
Back Side	PCS CDMA	0.529	<0.533	< 1.062
Back Side	GSM 850	0.345	<0.533	<0.878
Back Side	GSM 1900	0.202	<0.533	<0.735
Back Side	UMTS 850	0.251	<0.533	<0.784
Back Side	UMTS 1900	0.322	<0.533	<0.855
Back Side	LTE Band 13	0.187	<0.533	<0.720
Back Side	LTE Band 4 (AWS)	0.191	<0.533	<0.724

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Table 13-14
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.5 cm)

Configuration	Mode	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Back Side	Cell. CDMA	0.499	0.224	0.723
Back Side	PCS CDMA	0.529	0.224	0.753
Back Side	GSM 850	0.345	0.224	0.569
Back Side	GSM 1900	0.202	0.224	0.426
Back Side	UMTS 850	0.251	0.224	0.475
Back Side	UMTS 1900	0.322	0.224	0.546
Back Side	LTE Band 13	0.187	0.224	0.411
Back Side	LTE Band 4 (AWS)	0.191	0.224	0.415

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

13.5 Hotspot SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v01, the devices edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("–").

Table 13-15
Simultaneous Transmission Scenario (2.4 GHz Hotspot at 1.0 cm)

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.455	0.134	0.589	Body SAR	Back	0.343	0.134	0.477
	Front	0.498	0.070	0.568		Front	0.418	0.070	0.488
	Top	–	0.026	0.026		Top	–	0.026	0.026
	Bottom	0.266	–	0.266		Bottom	0.739	–	0.739
	Right	0.018	–	0.018		Right	0.040	–	0.040
	Left	0.209	0.048	0.257		Left	0.084	0.048	0.132
Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.839	0.134	0.973	Body SAR	Back	0.340	0.134	0.474
	Front	1.033	0.070	1.103		Front	0.386	0.070	0.456
	Top	–	0.026	0.026		Top	–	0.026	0.026
	Bottom	0.580	–	0.580		Bottom	0.587	–	0.587
	Right	0.084	–	0.084		Right	0.092	–	0.092
	Left	0.517	0.048	0.565		Left	0.074	0.048	0.122
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.568	0.134	0.702	Body SAR	Back	0.734	0.134	0.868
	Front	0.543	0.070	0.613		Front	0.742	0.070	0.812
	Top	–	0.026	0.026		Top	–	0.026	0.026
	Bottom	0.376	–	0.376		Bottom	1.030	–	1.030
	Right	0.060	–	0.060		Right	0.041	–	0.041
	Left	0.310	0.048	0.358		Left	0.159	0.048	0.207
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.274	0.134	0.408	Body SAR	Back	0.541	0.134	0.675
	Front	0.390	0.070	0.460		Front	0.712	0.070	0.782
	Top	–	0.026	0.026		Top	–	0.026	0.026
	Bottom	0.195	–	0.195		Bottom	0.849	–	0.849
	Right	0.402	–	0.402		Right	0.664	–	0.664
	Left	0.085	0.048	0.133		Left	0.081	0.048	0.129

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Table 13-16
Simultaneous Transmission Scenario (2.4 GHz WLAN Ant 2 at 1.0 cm)

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.455	0.139	0.594	Body SAR	Back	0.343	0.139	0.482
	Front	0.498	0.075	0.573		Front	0.418	0.075	0.493
	Top	-	0.061	0.061		Top	-	0.061	0.061
	Bottom	0.266	-	0.266		Bottom	0.739	-	0.739
	Right	0.018	-	0.018		Right	0.040	-	0.040
	Left	0.209	-	0.209		Left	0.084	-	0.084
Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.839	0.139	0.978	Body SAR	Back	0.340	0.139	0.479
	Front	1.033	0.075	1.108		Front	0.386	0.075	0.461
	Top	-	0.061	0.061		Top	-	0.061	0.061
	Bottom	0.580	-	0.580		Bottom	0.587	-	0.587
	Right	0.084	-	0.084		Right	0.092	-	0.092
	Left	0.517	-	0.517		Left	0.074	-	0.074
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.568	0.139	0.707	Body SAR	Back	0.734	0.139	0.873
	Front	0.543	0.075	0.618		Front	0.742	0.075	0.817
	Top	-	0.061	0.061		Top	-	0.061	0.061
	Bottom	0.376	-	0.376		Bottom	1.030	-	1.030
	Right	0.060	-	0.060		Right	0.041	-	0.041
	Left	0.310	-	0.310		Left	0.159	-	0.159
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.274	0.139	0.413	Body SAR	Back	0.541	0.139	0.680
	Front	0.390	0.075	0.465		Front	0.712	0.075	0.787
	Top	-	0.061	0.061		Top	-	0.061	0.061
	Bottom	0.195	-	0.195		Bottom	0.849	-	0.849
	Right	0.402	-	0.402		Right	0.664	-	0.664
	Left	0.085	-	0.085		Left	0.081	-	0.081

Table 13-17
Simultaneous Transmission Scenario (2.4 GHz WLAN MIMO at 1.0 cm)

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.455	0.062	0.517	Body SAR	Back	0.343	0.062	0.405
	Front	0.498	0.039	0.537		Front	0.418	0.039	0.457
	Top	-	0.019	0.019		Top	-	0.019	0.019
	Bottom	0.266	-	0.266		Bottom	0.739	-	0.739
	Right	0.018	-	0.018		Right	0.040	-	0.040
	Left	0.209	0.018	0.227		Left	0.084	0.018	0.102
Simult Tx	Configuration	GPRS 850 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.839	0.062	0.901	Body SAR	Back	0.340	0.062	0.402
	Front	1.033	0.039	1.072		Front	0.386	0.039	0.425
	Top	-	0.019	0.019		Top	-	0.019	0.019
	Bottom	0.580	-	0.580		Bottom	0.587	-	0.587
	Right	0.084	-	0.084		Right	0.092	-	0.092
	Left	0.517	0.018	0.535		Left	0.074	0.018	0.092

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Simult Tx	Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.568	0.062	0.630	Body SAR	Back	0.734	0.062	0.796
	Front	0.543	0.039	0.582		Front	0.742	0.039	0.781
	Top	-	0.019	0.019		Top	-	0.019	0.019
	Bottom	0.376	-	0.376		Bottom	1.030	-	1.030
	Right	0.060	-	0.060		Right	0.041	-	0.041
	Left	0.310	0.018	0.328		Left	0.159	0.018	0.177
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.274	0.062	0.336	Body SAR	Back	0.541	0.062	0.603
	Front	0.390	0.039	0.429		Front	0.712	0.039	0.751
	Top	-	0.019	0.019		Top	-	0.019	0.019
	Bottom	0.195	-	0.195		Bottom	0.849	-	0.849
	Right	0.402	-	0.402		Right	0.664	-	0.664
	Left	0.085	0.018	0.103		Left	0.081	0.018	0.099

Table 13-18
Simultaneous Transmission Scenario (5 GHz WLAN Ant 1 at 1.0 cm)

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.455	0.055	0.510	Body SAR	Back	0.343	0.055	0.398
	Front	0.498	0.013	0.511		Front	0.418	0.013	0.431
	Top	-	0.023	0.023		Top	-	0.023	0.023
	Bottom	0.266	-	0.266		Bottom	0.739	-	0.739
	Right	0.018	-	0.018		Right	0.040	-	0.040
	Left	0.209	0.025	0.234		Left	0.084	0.025	0.109
Simult Tx	Configuration	GPRS 850 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.839	0.055	0.894	Body SAR	Back	0.340	0.055	0.395
	Front	1.033	0.013	1.046		Front	0.386	0.013	0.399
	Top	-	0.023	0.023		Top	-	0.023	0.023
	Bottom	0.580	-	0.580		Bottom	0.587	-	0.587
	Right	0.084	-	0.084		Right	0.092	-	0.092
	Left	0.517	0.025	0.542		Left	0.074	0.025	0.099
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.568	0.055	0.623	Body SAR	Back	0.734	0.055	0.789
	Front	0.543	0.013	0.556		Front	0.742	0.013	0.755
	Top	-	0.023	0.023		Top	-	0.023	0.023
	Bottom	0.376	-	0.376		Bottom	1.030	-	1.030
	Right	0.060	-	0.060		Right	0.041	-	0.041
	Left	0.310	0.025	0.335		Left	0.159	0.025	0.184
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.274	0.055	0.329	Body SAR	Back	0.541	0.055	0.596
	Front	0.390	0.013	0.403		Front	0.712	0.013	0.725
	Top	-	0.023	0.023		Top	-	0.023	0.023
	Bottom	0.195	-	0.195		Bottom	0.849	-	0.849
	Right	0.402	-	0.402		Right	0.664	-	0.664
	Left	0.085	0.025	0.110		Left	0.081	0.025	0.106

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Table 13-19
Simultaneous Transmission Scenario (5 GHz WLAN Ant 2 at 1.0 cm)

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.455	0.463	0.918	Body SAR	Back	0.343	0.463	0.806
	Front	0.498	0.031	0.529		Front	0.418	0.031	0.449
	Top	-	0.059	0.059		Top	-	0.059	0.059
	Bottom	0.266	-	0.266		Bottom	0.739	-	0.739
	Right	0.018	-	0.018		Right	0.040	-	0.040
	Left	0.209	-	0.209		Left	0.084	-	0.084
Simult Tx	Configuration	GPRS 850 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.839	0.463	1.302	Body SAR	Back	0.340	0.463	0.803
	Front	1.033	0.031	1.064		Front	0.386	0.031	0.417
	Top	-	0.059	0.059		Top	-	0.059	0.059
	Bottom	0.580	-	0.580		Bottom	0.587	-	0.587
	Right	0.084	-	0.084		Right	0.092	-	0.092
	Left	0.517	-	0.517		Left	0.074	-	0.074
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.568	0.463	1.031	Body SAR	Back	0.734	0.463	1.197
	Front	0.543	0.031	0.574		Front	0.742	0.031	0.773
	Top	-	0.059	0.059		Top	-	0.059	0.059
	Bottom	0.376	-	0.376		Bottom	1.030	-	1.030
	Right	0.060	-	0.060		Right	0.041	-	0.041
	Left	0.310	-	0.310		Left	0.159	-	0.159
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.274	0.463	0.737	Body SAR	Back	0.541	0.463	1.004
	Front	0.390	0.031	0.421		Front	0.712	0.031	0.743
	Top	-	0.059	0.059		Top	-	0.059	0.059
	Bottom	0.195	-	0.195		Bottom	0.849	-	0.849
	Right	0.402	-	0.402		Right	0.664	-	0.664
	Left	0.085	-	0.085		Left	0.081	-	0.081

Table 13-20
Simultaneous Transmission Scenario (5 GHz WLAN MIMO at 1.0 cm)

Simult Tx	Configuration	Cell. EVDO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	PCS EVDO SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.455	0.560	1.015	Body SAR	Back	0.343	0.560	0.903
	Front	0.498	0.027	0.525		Front	0.418	0.027	0.445
	Top	-	0.158	0.158		Top	-	0.158	0.158
	Bottom	0.266	-	0.266		Bottom	0.739	-	0.739
	Right	0.018	-	0.018		Right	0.040	-	0.040
	Left	0.209	0.088	0.297		Left	0.084	0.088	0.172

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Simult Tx	Configuration	GPRS 850 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	GPRS 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.839	0.560	1.399	Body SAR	Back	0.340	0.560	0.900
	Front	1.033	0.027	1.060		Front	0.386	0.027	0.413
	Top	-	0.158	0.158		Top	-	0.158	0.158
	Bottom	0.580	-	0.580		Bottom	0.587	-	0.587
	Right	0.084	-	0.084		Right	0.092	-	0.092
	Left	0.517	0.088	0.605		Left	0.074	0.088	0.162
Simult Tx	Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.568	0.560	1.128	Body SAR	Back	0.734	0.560	1.294
	Front	0.543	0.027	0.570		Front	0.742	0.027	0.769
	Top	-	0.158	0.158		Top	-	0.158	0.158
	Bottom	0.376	-	0.376		Bottom	1.030	-	1.030
	Right	0.060	-	0.060		Right	0.041	-	0.041
	Left	0.310	0.088	0.398		Left	0.159	0.088	0.247
Simult Tx	Configuration	LTE Band 13 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
Body SAR	Back	0.274	0.560	0.834	Body SAR	Back	0.541	0.560	1.101
	Front	0.390	0.027	0.417		Front	0.712	0.027	0.739
	Top	-	0.158	0.158		Top	-	0.158	0.158
	Bottom	0.195	-	0.195		Bottom	0.849	-	0.849
	Right	0.402	-	0.402		Right	0.664	-	0.664
	Left	0.085	0.088	0.173		Left	0.081	0.088	0.169

13.6 SVLTE Simultaneous Transmission Analysis

13.6.1 Head SAR Simultaneous Transmission Analysis

Table 13-21
Simultaneous Transmission – Held to Ear

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	Σ SAR (W/kg)
Head SAR	P ≥ 18	Tx Antenna	1	2	1+2	Head SAR	P ≥ 18	Tx Antenna	1	2	1+2
		Target Power (without tolerance) (dBm)	25	19				Target Power (without tolerance) (dBm)	25	19	
		Right Cheek	0.138	0.052	0.190			Right Cheek	0.138	0.060	0.198
		Right Tilt	0.122	0.022	0.144			Right Tilt	0.122	0.049	0.171
		Left Cheek	0.195	0.039	0.234			Left Cheek	0.195	0.034	0.229
		Left Tilt	0.108	0.022	0.130			Left Tilt	0.108	0.035	0.143
	P < 18	Target Power (without tolerance) (dBm)	18	23			P < 18	Target Power (without tolerance) (dBm)	18	23	
		Right Cheek	0.015	0.145	0.160			Right Cheek	0.015	0.124	0.139
		Right Tilt	0.009	0.054	0.063			Right Tilt	0.009	0.129	0.138
		Left Cheek	0.025	0.091	0.116			Left Cheek	0.025	0.119	0.144
		Left Tilt	0.012	0.073	0.085			Left Tilt	0.012	0.106	0.118
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	Σ SAR (W/kg)
Head SAR	P ≥ 18	Tx Antenna	1	2	1+2	Head SAR	P ≥ 18	Tx Antenna	1	2	1+2
		Target Power (without tolerance) (dBm)	24.5	19				Target Power (without tolerance) (dBm)	24.5	19	
		Right Cheek	0.088	0.052	0.140			Right Cheek	0.088	0.060	0.148
		Right Tilt	0.039	0.022	0.061			Right Tilt	0.039	0.049	0.088
		Left Cheek	0.162	0.039	0.201			Left Cheek	0.162	0.034	0.196
		Left Tilt	0.040	0.022	0.062			Left Tilt	0.040	0.035	0.075
	P < 18	Target Power (without tolerance) (dBm)	18	23			P < 18	Target Power (without tolerance) (dBm)	18	23	
		Right Cheek	0.065	0.145	0.210			Right Cheek	0.065	0.124	0.189
		Right Tilt	0.038	0.054	0.092			Right Tilt	0.038	0.129	0.167
		Left Cheek	0.035	0.091	0.126			Left Cheek	0.035	0.119	0.154
		Left Tilt	0.010	0.073	0.083			Left Tilt	0.010	0.106	0.116

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Table 13-22
Simultaneous Transmission Scenario with 2.4 GHz WLAN Ant 1 (Held to Ear)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	15	1+2+3			Target Power (without tolerance) (dBm)	23	19	15	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.081	0.052	0.329	0.462	Head SAR	P ≥ 18	Right Cheek	0.081	0.060	0.329	0.470
		Right Tilt	0.041	0.022	0.216	0.279			Right Tilt	0.041	0.049	0.216	0.306
		Left Cheek	0.129	0.039	0.174	0.342			Left Cheek	0.129	0.034	0.174	0.337
		Left Tilt	0.048	0.022	0.094	0.164			Left Tilt	0.048	0.035	0.094	0.177
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	
	P < 18	Right Cheek	0.015	0.145	0.329	0.489		P < 18	Right Cheek	0.015	0.124	0.329	0.468
		Right Tilt	0.009	0.054	0.216	0.279			Right Tilt	0.009	0.129	0.216	0.354
		Left Cheek	0.025	0.091	0.174	0.290			Left Cheek	0.025	0.119	0.174	0.318
		Left Tilt	0.012	0.073	0.094	0.179			Left Tilt	0.012	0.106	0.094	0.212
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3			Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.130	0.052	0.329	0.511	Head SAR	P ≥ 18	Right Cheek	0.130	0.060	0.329	0.519
		Right Tilt	0.082	0.022	0.216	0.320			Right Tilt	0.082	0.049	0.216	0.347
		Left Cheek	0.079	0.039	0.174	0.292			Left Cheek	0.079	0.034	0.174	0.287
		Left Tilt	0.092	0.022	0.094	0.208			Left Tilt	0.092	0.035	0.094	0.221
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	
	P < 18	Right Cheek	0.065	0.145	0.329	0.539		P < 18	Right Cheek	0.065	0.124	0.329	0.518
		Right Tilt	0.038	0.054	0.216	0.308			Right Tilt	0.038	0.129	0.216	0.383
		Left Cheek	0.035	0.091	0.174	0.300			Left Cheek	0.035	0.119	0.174	0.328
		Left Tilt	0.010	0.073	0.094	0.177			Left Tilt	0.010	0.106	0.094	0.210
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				

Table 13-23
Simultaneous Transmission Scenario with 2.4 GHz WLAN Ant 2 (Held to Ear)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	15	1+2+3			Target Power (without tolerance) (dBm)	23	19	15	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.081	0.052	0.673	0.806	Head SAR	P ≥ 18	Right Cheek	0.081	0.060	0.673	0.814
		Right Tilt	0.041	0.022	0.388	0.451			Right Tilt	0.041	0.049	0.388	0.478
		Left Cheek	0.129	0.039	0.519	0.687			Left Cheek	0.129	0.034	0.519	0.682
		Left Tilt	0.048	0.022	0.367	0.437			Left Tilt	0.048	0.035	0.367	0.450
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	
	P < 18	Right Cheek	0.015	0.145	0.673	0.833		P < 18	Right Cheek	0.015	0.124	0.673	0.812
		Right Tilt	0.009	0.054	0.388	0.451			Right Tilt	0.009	0.129	0.388	0.526
		Left Cheek	0.025	0.091	0.519	0.635			Left Cheek	0.025	0.119	0.519	0.663
		Left Tilt	0.012	0.073	0.367	0.452			Left Tilt	0.012	0.106	0.367	0.485
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3			Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.130	0.052	0.673	0.855	Head SAR	P ≥ 18	Right Cheek	0.130	0.060	0.673	0.863
		Right Tilt	0.082	0.022	0.388	0.492			Right Tilt	0.082	0.049	0.388	0.519
		Left Cheek	0.079	0.039	0.519	0.637			Left Cheek	0.079	0.034	0.519	0.632
		Left Tilt	0.092	0.022	0.367	0.481			Left Tilt	0.092	0.035	0.367	0.494
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	
	P < 18	Right Cheek	0.065	0.145	0.673	0.883		P < 18	Right Cheek	0.065	0.124	0.673	0.862
		Right Tilt	0.038	0.054	0.388	0.480			Right Tilt	0.038	0.129	0.388	0.555
		Left Cheek	0.035	0.091	0.519	0.645			Left Cheek	0.035	0.119	0.519	0.673
		Left Tilt	0.010	0.073	0.367	0.450			Left Tilt	0.010	0.106	0.367	0.483
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				

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Table 13-24
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO (Held to Ear)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	15	1+2+3			Target Power (without tolerance) (dBm)	23	19	15	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.081	0.052	0.420	0.553	Head SAR	P ≥ 18	Right Cheek	0.081	0.060	0.420	0.561
		Right Tilt	0.041	0.022	0.312	0.375			Right Tilt	0.041	0.049	0.312	0.402
		Left Cheek	0.129	0.039	0.291	0.459			Left Cheek	0.129	0.034	0.291	0.454
		Left Tilt	0.048	0.022	0.190	0.260			Left Tilt	0.048	0.035	0.190	0.273
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	
	P < 18	Right Cheek	0.015	0.145	0.420	0.580		P < 18	Right Cheek	0.015	0.124	0.420	0.559
		Right Tilt	0.009	0.054	0.312	0.375			Right Tilt	0.009	0.129	0.312	0.450
		Left Cheek	0.025	0.091	0.291	0.407			Left Cheek	0.025	0.119	0.291	0.435
		Left Tilt	0.012	0.073	0.190	0.275			Left Tilt	0.012	0.106	0.190	0.308
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3			Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.130	0.052	0.420	0.602	Head SAR	P ≥ 18	Right Cheek	0.130	0.060	0.420	0.610
		Right Tilt	0.082	0.022	0.312	0.416			Right Tilt	0.082	0.049	0.312	0.443
		Left Cheek	0.079	0.039	0.291	0.409			Left Cheek	0.079	0.034	0.291	0.404
		Left Tilt	0.092	0.022	0.190	0.304			Left Tilt	0.092	0.035	0.190	0.317
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	
	P < 18	Right Cheek	0.065	0.145	0.420	0.630		P < 18	Right Cheek	0.065	0.124	0.420	0.609
		Right Tilt	0.038	0.054	0.312	0.404			Right Tilt	0.038	0.129	0.312	0.479
		Left Cheek	0.035	0.091	0.291	0.417			Left Cheek	0.035	0.119	0.291	0.445
		Left Tilt	0.010	0.073	0.190	0.273			Left Tilt	0.010	0.106	0.190	0.306
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				

Table 13-25
Simultaneous Transmission Scenario with 5 GHz WLAN Ant 1 (Held to Ear)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	12	1+2+3			Target Power (without tolerance) (dBm)	23	19	12	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.081	0.052	0.096	0.229	Head SAR	P ≥ 18	Right Cheek	0.081	0.060	0.096	0.237
		Right Tilt	0.041	0.022	0.048	0.111			Right Tilt	0.041	0.049	0.048	0.138
		Left Cheek	0.129	0.039	0.040	0.208			Left Cheek	0.129	0.034	0.040	0.203
		Left Tilt	0.048	0.022	0.000	0.070			Left Tilt	0.048	0.035	0.000	0.083
		Target Power (without tolerance) (dBm)	18	23	12				Target Power (without tolerance) (dBm)	18	23	12	
	P < 18	Right Cheek	0.015	0.145	0.096	0.256		P < 18	Right Cheek	0.015	0.124	0.096	0.235
		Right Tilt	0.009	0.054	0.048	0.111			Right Tilt	0.009	0.129	0.048	0.186
		Left Cheek	0.025	0.091	0.040	0.156			Left Cheek	0.025	0.119	0.040	0.184
		Left Tilt	0.012	0.073	0.000	0.085			Left Tilt	0.012	0.106	0.000	0.118
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	22.5	19	12	1+2+3			Target Power (without tolerance) (dBm)	22.5	19	12	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.130	0.052	0.096	0.278	Head SAR	P ≥ 18	Right Cheek	0.130	0.060	0.096	0.286
		Right Tilt	0.082	0.022	0.048	0.152			Right Tilt	0.082	0.049	0.048	0.179
		Left Cheek	0.079	0.039	0.040	0.158			Left Cheek	0.079	0.034	0.040	0.153
		Left Tilt	0.092	0.022	0.000	0.114			Left Tilt	0.092	0.035	0.000	0.127
		Target Power (without tolerance) (dBm)	18	23	12				Target Power (without tolerance) (dBm)	18	23	12	
	P < 18	Right Cheek	0.065	0.145	0.096	0.306		P < 18	Right Cheek	0.065	0.124	0.096	0.285
		Right Tilt	0.038	0.054	0.048	0.140			Right Tilt	0.038	0.129	0.048	0.215
		Left Cheek	0.035	0.091	0.040	0.166			Left Cheek	0.035	0.119	0.040	0.194
		Left Tilt	0.010	0.073	0.000	0.083			Left Tilt	0.010	0.106	0.000	0.116
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				

The worst case 5 GHz WIFI reported SAR for each head configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

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Table 13-26
Simultaneous Transmission Scenario with 5 GHz WLAN Ant 2 (Held to Ear)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	12	1+2+3			Target Power (without tolerance) (dBm)	23	19	12	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.081	0.052	0.110	0.243	Head SAR	P ≥ 18	Right Cheek	0.081	0.060	0.110	0.251
		Right Tilt	0.041	0.022	0.083	0.146			Right Tilt	0.041	0.049	0.083	0.173
		Left Cheek	0.129	0.039	0.160	0.328			Left Cheek	0.129	0.034	0.160	0.323
		Left Tilt	0.048	0.022	0.135	0.205			Left Tilt	0.048	0.035	0.135	0.218
		Target Power (without tolerance) (dBm)	18	23	12				Target Power (without tolerance) (dBm)	18	23	12	
	P < 18	Right Cheek	0.015	0.145	0.110	0.270		P < 18	Right Cheek	0.015	0.124	0.110	0.249
		Right Tilt	0.009	0.054	0.083	0.146			Right Tilt	0.009	0.129	0.083	0.221
		Left Cheek	0.025	0.091	0.160	0.276			Left Cheek	0.025	0.119	0.160	0.304
		Left Tilt	0.012	0.073	0.135	0.220			Left Tilt	0.012	0.106	0.135	0.253
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	22.5	19	12	1+2+3			Target Power (without tolerance) (dBm)	22.5	19	12	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.130	0.052	0.110	0.292	Head SAR	P ≥ 18	Right Cheek	0.130	0.060	0.110	0.300
		Right Tilt	0.082	0.022	0.083	0.187			Right Tilt	0.082	0.049	0.083	0.214
		Left Cheek	0.079	0.039	0.160	0.278			Left Cheek	0.079	0.034	0.160	0.273
		Left Tilt	0.092	0.022	0.135	0.249			Left Tilt	0.092	0.035	0.135	0.262
		Target Power (without tolerance) (dBm)	18	23	12				Target Power (without tolerance) (dBm)	18	23	12	
	P < 18	Right Cheek	0.065	0.145	0.110	0.320		P < 18	Right Cheek	0.065	0.124	0.110	0.299
		Right Tilt	0.038	0.054	0.083	0.175			Right Tilt	0.038	0.129	0.083	0.250
		Left Cheek	0.035	0.091	0.160	0.286			Left Cheek	0.035	0.119	0.160	0.314
		Left Tilt	0.010	0.073	0.135	0.218			Left Tilt	0.010	0.106	0.135	0.251
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				

The worst case 5 GHz WIFI reported SAR for each head configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

Table 13-27
Simultaneous Transmission Scenario with 5 GHz WLAN MIMO (Held to Ear)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	15	1+2+3			Target Power (without tolerance) (dBm)	23	19	15	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.081	0.052	0.249	0.382	Head SAR	P ≥ 18	Right Cheek	0.081	0.060	0.249	0.390
		Right Tilt	0.041	0.022	0.143	0.206			Right Tilt	0.041	0.049	0.143	0.233
		Left Cheek	0.129	0.039	0.125	0.293			Left Cheek	0.129	0.034	0.125	0.288
		Left Tilt	0.048	0.022	0.100	0.170			Left Tilt	0.048	0.035	0.100	0.183
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	
	P < 18	Right Cheek	0.015	0.145	0.249	0.409		P < 18	Right Cheek	0.015	0.124	0.249	0.388
		Right Tilt	0.009	0.054	0.143	0.206			Right Tilt	0.009	0.129	0.143	0.281
		Left Cheek	0.025	0.091	0.125	0.241			Left Cheek	0.025	0.119	0.125	0.269
		Left Tilt	0.012	0.073	0.100	0.185			Left Tilt	0.012	0.106	0.100	0.218
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3			Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3
Head SAR	P ≥ 18	Right Cheek	0.130	0.052	0.249	0.431	Head SAR	P ≥ 18	Right Cheek	0.130	0.060	0.249	0.439
		Right Tilt	0.082	0.022	0.143	0.247			Right Tilt	0.082	0.049	0.143	0.274
		Left Cheek	0.079	0.039	0.125	0.243			Left Cheek	0.079	0.034	0.125	0.238
		Left Tilt	0.092	0.022	0.100	0.214			Left Tilt	0.092	0.035	0.100	0.227
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	
	P < 18	Right Cheek	0.065	0.145	0.249	0.459		P < 18	Right Cheek	0.065	0.124	0.249	0.438
		Right Tilt	0.038	0.054	0.143	0.235			Right Tilt	0.038	0.129	0.143	0.310
		Left Cheek	0.035	0.091	0.125	0.251			Left Cheek	0.035	0.119	0.125	0.279
		Left Tilt	0.010	0.073	0.100	0.183			Left Tilt	0.010	0.106	0.100	0.216
		Target Power (without tolerance) (dBm)							Target Power (without tolerance) (dBm)				

The worst case 5 GHz WIFI reported SAR for each head configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

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13.6.2 Body-Worn SAR Simultaneous Transmission Analysis

Table 13-28
Simultaneous Transmission – (Body-Worn at 1.5 cm)

Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	
			Target Power (without tolerance) (dBm)		19	
Back Side	P ≥ 18	Cell. CDMA	25.0	0.499	0.068	0.567
Back Side		PCS CDMA	24.5	0.529	0.068	0.597
			Target Power (without tolerance) (dBm)	18	23	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.187	0.259
Back Side		PCS CDMA	18.0	0.060	0.187	0.247
Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	
			Target Power (without tolerance) (dBm)		19	
Back Side	P ≥ 18	Cell. CDMA	25.0	0.499	0.085	0.584
Back Side		PCS CDMA	24.5	0.529	0.085	0.614
			Target Power (without tolerance) (dBm)	18	23	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.191	0.263
Back Side		PCS CDMA	18.0	0.060	0.191	0.251

Table 13-29
Simultaneous Transmission Scenario with 2.4 GHz WLAN Ant 1 (Body-Worn at 1.5 cm)

Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	15	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.068	<0.134	<0.489
Back Side		PCS CDMA	22.5	0.346	0.068	<0.134	<0.548
			Target Power (without tolerance) (dBm)	18	23	15	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.187	<0.134	<0.393
Back Side		PCS CDMA	18.0	0.060	0.187	<0.134	<0.381
Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	15	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.085	<0.134	<0.506
Back Side		PCS CDMA	22.5	0.346	0.085	<0.134	<0.565
			Target Power (without tolerance) (dBm)	18	23	15	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.191	<0.134	<0.397
Back Side		PCS CDMA	18.0	0.060	0.191	<0.134	<0.385

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Table 13-30
Simultaneous Transmission Scenario with 2.4 GHz WLAN Ant 2 (Body-Worn at 1.5 cm)

Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	15	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.068	<0.139	<0.494
Back Side		PCS CDMA	22.5	0.346	0.068	<0.139	<0.553
			Target Power (without tolerance) (dBm)	18	23	15	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.187	<0.139	<0.398
Back Side		PCS CDMA	18.0	0.060	0.187	<0.139	<0.386
Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	15	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.085	<0.139	<0.511
Back Side		PCS CDMA	22.5	0.346	0.085	<0.139	<0.570
			Target Power (without tolerance) (dBm)	18	23	15	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.191	<0.139	<0.402
Back Side		PCS CDMA	18.0	0.060	0.191	<0.139	<0.390

Table 13-31
Simultaneous Transmission Scenario with 2.4 GHz WLAN MIMO (Body-Worn at 1.5 cm)

Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	15	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.068	<0.062	<0.417
Back Side		PCS CDMA	22.5	0.346	0.068	<0.062	<0.476
			Target Power (without tolerance) (dBm)	18	23	15	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.187	<0.062	<0.321
Back Side		PCS CDMA	18.0	0.060	0.187	<0.062	<0.309
Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	15	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.085	<0.062	<0.434
Back Side		PCS CDMA	22.5	0.346	0.085	<0.062	<0.493
			Target Power (without tolerance) (dBm)	18	23	15	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.191	<0.062	<0.325
Back Side		PCS CDMA	18.0	0.060	0.191	<0.062	<0.313

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Table 13-32
Simultaneous Transmission Scenario with 5 GHz WLAN Ant 1 (Body-Worn at 1.5 cm)

Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	12	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.068	<0.055	<0.410
Back Side		PCS CDMA	22.5	0.346	0.068	<0.055	<0.469
			Target Power (without tolerance) (dBm)	18	23	12	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.187	<0.055	<0.314
Back Side		PCS CDMA	18.0	0.060	0.187	<0.055	<0.302
Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	12	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.085	<0.055	<0.427
Back Side		PCS CDMA	22.5	0.346	0.085	<0.055	<0.486
			Target Power (without tolerance) (dBm)	18	23	12	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.191	<0.055	<0.318
Back Side		PCS CDMA	18.0	0.060	0.191	<0.055	<0.306

The worst case 5 GHz WIFI reported SAR for each body-worn configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

Table 13-33
Simultaneous Transmission Scenario with 5 GHz WLAN Ant 2 (Body-Worn at 1.5 cm)

Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	12	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.068	<0.367	<0.722
Back Side		PCS CDMA	22.5	0.346	0.068	<0.367	<0.781
			Target Power (without tolerance) (dBm)	18	23	12	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.187	<0.367	<0.626
Back Side		PCS CDMA	18.0	0.060	0.187	<0.367	<0.614
Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	12	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.085	<0.367	<0.739
Back Side		PCS CDMA	22.5	0.346	0.085	<0.367	<0.798
			Target Power (without tolerance) (dBm)	18	23	12	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.191	<0.367	<0.630
Back Side		PCS CDMA	18.0	0.060	0.191	<0.367	<0.618

The worst case 5 GHz WIFI reported SAR for each body-worn configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

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Table 13-34
Simultaneous Transmission Scenario with 5 GHz WLAN MIMO (Body-Worn at 1.5 cm)

Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	15	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.068	<0.533	<0.888
Back Side		PCS CDMA	22.5	0.346	0.068	<0.533	<0.947
			Target Power (without tolerance) (dBm)	18	23	15	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.187	<0.533	<0.792
Back Side		PCS CDMA	18.0	0.060	0.187	<0.533	<0.780
Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	15	
Back Side	P ≥ 18	Cell. CDMA	23.0	0.287	0.085	<0.533	<0.905
Back Side		PCS CDMA	22.5	0.346	0.085	<0.533	<0.964
			Target Power (without tolerance) (dBm)	18	23	15	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.191	<0.533	<0.796
Back Side		PCS CDMA	18.0	0.060	0.191	<0.533	<0.784

The worst case 5 GHz WIFI reported SAR for each body-worn configuration was considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WIFI channel has WIFI Hotspot capability, for simplicity to determine compliance. Please note that the actual simultaneous transmission SAR will not exceed the summed levels indicated.

Table 13-35
Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 1.5 cm)

Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	11.5	
Back Side	P ≥ 18	Cell. CDMA	25.0	0.499	0.068	0.224	0.791
Back Side		PCS CDMA	24.5	0.529	0.068	0.224	0.821
			Target Power (without tolerance) (dBm)	18	23	11.5	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.187	0.224	0.483
Back Side		PCS CDMA	18.0	0.060	0.187	0.224	0.471
Configuration	CDMA Target Power Level (dBm)	Mode		CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
			Tx Antenna	1	2	3	
			Target Power (without tolerance) (dBm)		19	11.5	
Back Side	P ≥ 18	Cell. CDMA	25.0	0.499	0.085	0.224	0.808
Back Side		PCS CDMA	24.5	0.529	0.085	0.224	0.838
			Target Power (without tolerance) (dBm)	18	23	11.5	
Back Side	P < 18	Cell. CDMA	18.0	0.072	0.191	0.224	0.487
Back Side		PCS CDMA	18.0	0.060	0.191	0.224	0.475

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

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13.6.3 Wireless Router SAR Simultaneous Transmission Analysis

Table 13-36

Simultaneous Transmission Scenario with 2.4 GHz WLAN Ant 1 (Hotspot at 1.0 cm)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	15	1+2+3			Target Power (without tolerance) (dBm)	23	19	15	1+2+3
Body SAR	P ≥ 18	Back	0.488	0.125	0.134	0.747	Body SAR	P ≥ 18	Back	0.488	0.264	0.134	0.886
		Front	0.541	0.151	0.070	0.762			Front	0.541	0.322	0.070	0.933
		Top	-	-	0.026	0.026			Top	-	-	0.026	0.026
		Bottom	0.267	0.108	-	0.375			Bottom	0.267	0.346	-	0.613
		Right	0.020	0.174	-	0.194			Right	0.020	0.307	-	0.327
		Left	0.207	0.044	0.048	0.299			Left	0.207	0.025	0.048	0.280
	P < 18	Target Power (without tolerance) (dBm)	18	23	15			P < 18	Target Power (without tolerance) (dBm)	18	23	15	
		Back	0.138	0.274	0.134	0.546			Back	0.138	0.541	0.134	0.813
		Front	0.172	0.390	0.070	0.632			Front	0.172	0.712	0.070	0.954
		Top	-	-	0.026	0.026			Top	-	-	0.026	0.026
		Bottom	0.085	0.195	-	0.280			Bottom	0.085	0.849	-	0.934
		Right	0.013	0.402	-	0.415			Right	0.013	0.664	-	0.677
		Left	0.070	0.085	0.048	0.203			Left	0.070	0.081	0.048	0.199
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3			Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3
Body SAR	P ≥ 18	Back	0.408	0.125	0.134	0.667	Body SAR	P ≥ 18	Back	0.408	0.264	0.134	0.806
		Front	0.444	0.151	0.070	0.665			Front	0.444	0.322	0.070	0.836
		Top	-	-	0.026	0.026			Top	-	-	0.026	0.026
		Bottom	0.692	0.108	-	0.800			Bottom	0.692	0.346	-	1.038
		Right	0.070	0.174	-	0.244			Right	0.070	0.307	-	0.377
		Left	0.166	0.044	0.048	0.258			Left	0.166	0.025	0.048	0.239
	P < 18	Target Power (without tolerance) (dBm)	18	23	15			P < 18	Target Power (without tolerance) (dBm)	18	23	15	
		Back	0.152	0.274	0.134	0.560			Back	0.152	0.541	0.134	0.827
		Front	0.148	0.390	0.070	0.608			Front	0.148	0.712	0.070	0.930
		Top	-	-	0.026	0.026			Top	-	-	0.026	0.026
		Bottom	0.253	0.195	-	0.448			Bottom	0.253	0.849	-	1.102
		Right	0.026	0.402	-	0.428			Right	0.026	0.664	-	0.690
		Left	0.042	0.085	0.048	0.175			Left	0.042	0.081	0.048	0.171

Table 13-37

Simultaneous Transmission Scenario (2.4 GHz WLAN Ant 2 at 1.0 cm)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	15	1+2+3			Target Power (without tolerance) (dBm)	23	19	15	1+2+3
Body SAR	P ≥ 18	Back	0.488	0.125	0.139	0.752	Body SAR	P ≥ 18	Back	0.488	0.264	0.139	0.891
		Front	0.541	0.151	0.075	0.767			Front	0.541	0.322	0.075	0.938
		Top	-	-	0.061	0.061			Top	-	-	0.061	0.061
		Bottom	0.267	0.108	-	0.375			Bottom	0.267	0.346	-	0.613
		Right	0.020	0.174	-	0.194			Right	0.020	0.307	-	0.327
		Left	0.207	0.044	-	0.251			Left	0.207	0.025	-	0.232
	P < 18	Target Power (without tolerance) (dBm)	18	23	15			P < 18	Target Power (without tolerance) (dBm)	18	23	15	
		Back	0.138	0.274	0.139	0.551			Back	0.138	0.541	0.139	0.818
		Front	0.172	0.390	0.075	0.637			Front	0.172	0.712	0.075	0.959
		Top	-	-	0.061	0.061			Top	-	-	0.061	0.061
		Bottom	0.085	0.195	-	0.280			Bottom	0.085	0.849	-	0.934
		Right	0.013	0.402	-	0.415			Right	0.013	0.664	-	0.677
		Left	0.070	0.085	-	0.155			Left	0.070	0.081	-	0.151
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3				Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3			Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3
Body SAR	P ≥ 18	Back	0.408	0.125	0.139	0.672	Body SAR	P ≥ 18	Back	0.408	0.264	0.139	0.811
		Front	0.444	0.151	0.075	0.670			Front	0.444	0.322	0.075	0.841
		Top	-	-	0.061	0.061			Top	-	-	0.061	0.061
		Bottom	0.692	0.108	-	0.800			Bottom	0.692	0.346	-	1.038
		Right	0.070	0.174	-	0.244			Right	0.070	0.307	-	0.377
		Left	0.166	0.044	-	0.210			Left	0.166	0.025	-	0.191
	P < 18	Target Power (without tolerance) (dBm)	18	23	15			P < 18	Target Power (without tolerance) (dBm)	18	23	15	
		Back	0.152	0.274	0.139	0.565			Back	0.152	0.541	0.139	0.832
		Front	0.148	0.390	0.075	0.613			Front	0.148	0.712	0.075	0.935
		Top	-	-	0.061	0.061			Top	-	-	0.061	0.061
		Bottom	0.253	0.195	-	0.448			Bottom	0.253	0.849	-	1.102
		Right	0.026	0.402	-	0.428			Right	0.026	0.664	-	0.690
		Left	0.042	0.085	-	0.127			Left	0.042	0.081	-	0.123

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Table 13-38
Simultaneous Transmission Scenario (2.4 GHz WLAN MIMO at 1.0 cm)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	1+2+3			Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	15				23	19	15	1+2+3	
Body SAR	P ≥ 18	Back	0.488	0.125	0.062	0.675	Body SAR	P ≥ 18	Back	0.488	0.264	0.062	0.814
		Front	0.541	0.151	0.039	0.731			Front	0.541	0.322	0.039	0.902
		Top	-	-	0.019	0.019			Top	-	-	0.019	0.019
		Bottom	0.267	0.108	-	0.375			Bottom	0.267	0.346	-	0.613
		Right	0.020	0.174	-	0.194			Right	0.020	0.307	-	0.327
		Left	0.207	0.044	0.018	0.269			Left	0.207	0.025	0.018	0.250
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	
	P < 18	Back	0.138	0.274	0.062	0.474		P < 18	Back	0.138	0.541	0.062	0.741
		Front	0.172	0.390	0.039	0.601			Front	0.172	0.712	0.039	0.923
		Top	-	-	0.019	0.019			Top	-	-	0.019	0.019
		Bottom	0.085	0.195	-	0.280			Bottom	0.085	0.849	-	0.934
		Right	0.013	0.402	-	0.415			Right	0.013	0.664	-	0.677
		Left	0.070	0.085	0.018	0.173			Left	0.070	0.081	0.018	0.169
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	Tx Antenna			1	2	3		
		Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3			22.5	19	15	1+2+3	
Body SAR	P ≥ 18	Back	0.408	0.125	0.062	0.595	Body SAR	P ≥ 18	Back	0.408	0.264	0.062	0.734
		Front	0.444	0.151	0.039	0.634			Front	0.444	0.322	0.039	0.805
		Top	-	-	0.019	0.019			Top	-	-	0.019	0.019
		Bottom	0.692	0.108	-	0.800			Bottom	0.692	0.346	-	1.038
		Right	0.070	0.174	-	0.244			Right	0.070	0.307	-	0.377
		Left	0.166	0.044	0.018	0.228			Left	0.166	0.025	0.018	0.209
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	
	P < 18	Back	0.152	0.274	0.062	0.488		P < 18	Back	0.152	0.541	0.062	0.755
		Front	0.148	0.390	0.039	0.577			Front	0.148	0.712	0.039	0.899
		Top	-	-	0.019	0.019			Top	-	-	0.019	0.019
		Bottom	0.253	0.195	-	0.448			Bottom	0.253	0.849	-	1.102
		Right	0.026	0.402	-	0.428			Right	0.026	0.664	-	0.690
		Left	0.042	0.085	0.018	0.145			Left	0.042	0.081	0.018	0.141
		Target Power (without tolerance) (dBm)	18	23	15				Target Power (without tolerance) (dBm)	18	23	15	

Table 13-39
Simultaneous Transmission Scenario (5 GHz WLAN Ant 1 at 1.0 cm)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	1+2+3			Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	12				Target Power (without tolerance) (dBm)	23	19	12	
Body SAR	P ≥ 18	Back	0.488	0.125	0.055	0.668	Body SAR	P ≥ 18	Back	0.488	0.264	0.055	0.807
		Front	0.541	0.151	0.013	0.705			Front	0.541	0.322	0.013	0.876
		Top	-	-	0.023	0.023			Top	-	-	0.023	0.023
		Bottom	0.267	0.108	-	0.375			Bottom	0.267	0.346	-	0.613
		Right	0.020	0.174	-	0.194			Right	0.020	0.307	-	0.327
		Left	0.207	0.044	0.025	0.276			Left	0.207	0.025	0.025	0.257
		Target Power (without tolerance) (dBm)	18	23	12				Target Power (without tolerance) (dBm)	18	23	12	
	P < 18	Back	0.138	0.274	0.055	0.467		P < 18	Back	0.138	0.541	0.055	0.734
		Front	0.172	0.390	0.013	0.575			Front	0.172	0.712	0.013	0.897
		Top	-	-	0.023	0.023			Top	-	-	0.023	0.023
		Bottom	0.085	0.195	-	0.280			Bottom	0.085	0.849	-	0.934
		Right	0.013	0.402	-	0.415			Right	0.013	0.664	-	0.677
		Left	0.070	0.085	0.025	0.180			Left	0.070	0.081	0.025	0.176
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 1 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	Tx Antenna			1	2	3		
		Target Power (without tolerance) (dBm)	22.5	19	12	1+2+3			Target Power (without tolerance) (dBm)	22.5	19	12	1+2+3
Body SAR	P ≥ 18	Back	0.408	0.125	0.055	0.588	Body SAR	P ≥ 18	Back	0.408	0.264	0.055	0.727
		Front	0.444	0.151	0.013	0.608			Front	0.444	0.322	0.013	0.779
		Top	-	-	0.023	0.023			Top	-	-	0.023	0.023
		Bottom	0.692	0.108	-	0.800			Bottom	0.692	0.346	-	1.038
		Right	0.070	0.174	-	0.244			Right	0.070	0.307	-	0.377
		Left	0.166	0.044	0.025	0.235			Left	0.166	0.025	0.025	0.216
		Target Power (without tolerance) (dBm)	18	23	12				Target Power (without tolerance) (dBm)	18	23	12	
	P < 18	Back	0.152	0.274	0.055	0.481		P < 18	Back	0.152	0.541	0.055	0.748
		Front	0.148	0.390	0.013	0.551			Front	0.148	0.712	0.013	0.873
		Top	-	-	0.023	0.023			Top	-	-	0.023	0.023
		Bottom	0.253	0.195	-	0.448			Bottom	0.253	0.849	-	1.102
		Right	0.026	0.402	-	0.428			Right	0.026	0.664	-	0.690
		Left	0.042	0.085	0.025	0.152			Left	0.042	0.081	0.025	0.148
		Target Power (without tolerance) (dBm)	18	23	12				Target Power (without tolerance) (dBm)	18	23	12	

Table 13-40
Simultaneous Transmission Scenario (5 GHz WLAN Ant 2 at 1.0 cm)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	1+2+3			Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	12				23	19	12	1+2+3	
Body SAR	P ≥ 18	Back	0.488	0.125	0.463	1.076	Body SAR	P ≥ 18	Back	0.488	0.264	0.463	1.215
		Front	0.541	0.151	0.031	0.723			Front	0.541	0.322	0.031	0.894
		Top	-	-	0.059	0.059			Top	-	-	0.059	0.059
		Bottom	0.267	0.108	-	0.375			Bottom	0.267	0.346	-	0.613
		Right	0.020	0.174	-	0.194			Right	0.020	0.307	-	0.327
		Left	0.207	0.044	-	0.251			Left	0.207	0.025	-	0.232
	P < 18	Target Power (without tolerance) (dBm)	18	23	12			P < 18	Target Power (without tolerance) (dBm)	18	23	12	
		Back	0.138	0.274	0.463	0.875			Back	0.138	0.541	0.463	1.142
		Front	0.172	0.390	0.031	0.593			Front	0.172	0.712	0.031	0.915
		Top	-	-	0.059	0.059			Top	-	-	0.059	0.059
		Bottom	0.085	0.195	-	0.280			Bottom	0.085	0.849	-	0.934
		Right	0.013	0.402	-	0.415			Right	0.013	0.664	-	0.677
		Left	0.070	0.085	-	0.155			Left	0.070	0.081	-	0.151
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN Ant 2 SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	1+2+3			Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	22.5	19	12				22.5	19	12	1+2+3	
Body SAR	P ≥ 18	Back	0.408	0.125	0.463	0.996	Body SAR	P ≥ 18	Back	0.408	0.264	0.463	1.135
		Front	0.444	0.151	0.031	0.626			Front	0.444	0.322	0.031	0.797
		Top	-	-	0.059	0.059			Top	-	-	0.059	0.059
		Bottom	0.692	0.108	-	0.800			Bottom	0.692	0.346	-	1.038
		Right	0.070	0.174	-	0.244			Right	0.070	0.307	-	0.377
		Left	0.166	0.044	-	0.210			Left	0.166	0.025	-	0.191
	P < 18	Target Power (without tolerance) (dBm)	18	23	12			P < 18	Target Power (without tolerance) (dBm)	18	23	12	
		Back	0.152	0.274	0.463	0.889			Back	0.152	0.541	0.463	1.156
		Front	0.148	0.390	0.031	0.569			Front	0.148	0.712	0.031	0.891
		Top	-	-	0.059	0.059			Top	-	-	0.059	0.059
		Bottom	0.253	0.195	-	0.448			Bottom	0.253	0.849	-	1.102
		Right	0.026	0.402	-	0.428			Right	0.026	0.664	-	0.690
		Left	0.042	0.085	-	0.127			Left	0.042	0.081	-	0.123

Table 13-41
Simultaneous Transmission Scenario (5 GHz WLAN MIMO at 1.0 cm)

Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	Cell. CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	1+2+3			Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	23	19	15				Target Power (without tolerance) (dBm)	23	19	15	1+2+3
Body SAR	P ≥ 18	Back	0.488	0.125	0.560	1.173	Body SAR	P ≥ 18	Back	0.488	0.264	0.560	1.312
		Front	0.541	0.151	0.027	0.719			Front	0.541	0.322	0.027	0.890
		Top	-	-	0.158	0.158			Top	-	-	0.158	0.158
		Bottom	0.267	0.108	-	0.375			Bottom	0.267	0.346	-	0.613
		Right	0.020	0.174	-	0.194			Right	0.020	0.307	-	0.327
		Left	0.207	0.044	0.088	0.339			Left	0.207	0.025	0.088	0.320
	P < 18	Target Power (without tolerance) (dBm)	18	23	15			P < 18	Target Power (without tolerance) (dBm)	18	23	15	
		Back	0.138	0.274	0.560	0.972			Back	0.138	0.541	0.560	1.239
		Front	0.172	0.390	0.027	0.589			Front	0.172	0.712	0.027	0.911
		Top	-	-	0.158	0.158			Top	-	-	0.158	0.158
		Bottom	0.085	0.195	-	0.280			Bottom	0.085	0.849	-	0.934
		Right	0.013	0.402	-	0.415			Right	0.013	0.664	-	0.677
		Left	0.070	0.085	0.088	0.243			Left	0.070	0.081	0.088	0.239
Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 13 SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)	Simult Tx	CDMA Target Power Level (dBm)	Configuration	PCS CDMA SAR (W/kg)	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN MIMO SAR (W/kg)	Σ SAR (W/kg)
		Tx Antenna	1	2	3	1+2+3			Tx Antenna	1	2	3	
		Target Power (without tolerance) (dBm)	22.5	19	15				Target Power (without tolerance) (dBm)	22.5	19	15	1+2+3
Body SAR	P ≥ 18	Back	0.408	0.125	0.560	1.093	Body SAR	P ≥ 18	Back	0.408	0.264	0.560	1.232
		Front	0.444	0.151	0.027	0.622			Front	0.444	0.322	0.027	0.793
		Top	-	-	0.158	0.158			Top	-	-	0.158	0.158
		Bottom	0.692	0.108	-	0.800			Bottom	0.692	0.346	-	1.038
		Right	0.070	0.174	-	0.244			Right	0.070	0.307	-	0.377
		Left	0.166	0.044	0.088	0.298			Left	0.166	0.025	0.088	0.279
	P < 18	Target Power (without tolerance) (dBm)	18	23	15			P < 18	Target Power (without tolerance) (dBm)	18	23	15	
		Back	0.152	0.274	0.560	0.986			Back	0.152	0.541	0.560	1.253
		Front	0.148	0.390	0.027	0.565			Front	0.148	0.712	0.027	0.887
		Top	-	-	0.158	0.158			Top	-	-	0.158	0.158
		Bottom	0.253	0.195	-	0.448			Bottom	0.253	0.849	-	1.102
		Right	0.026	0.402	-	0.428			Right	0.026	0.664	-	0.690
		Left	0.042	0.085	0.088	0.215			Left	0.042	0.081	0.088	0.211

13.7 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05 and IEEE 1528-2013 Section 6.3.4.1.2.

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14 SAR MEASUREMENT VARIABILITY

14.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01, 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.

Per FCC KDB Publication 865664 D01v01, Extremity SAR measurement variability was not assessed since measured 10g SAR for each frequency band was below 2.0 W/kg.

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 1-g 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 14-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	# of Time Slots	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)	
835	848.80	251	GSM 850	GPRS	3	front	10 mm	0.964	0.893	1.08	N/A	N/A	N/A	N/A
1900	1880.00	9400	UMTS 1900	RMC	N/A	bottom	10 mm	1.030	1.000	1.03	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							

14.2 Measurement Uncertainty

The measured 1g SAR was < 1.5 W/kg and 10g SAR was < 3.75 W/kg for all frequency bands. Therefore, per KDB Publication 865664 D01v01, the extended measurement uncertainty analysis per IEEE 1528-2003 was not required.

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15 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E5515C	Wireless Communications Test Set	9/24/2012	Biennial	9/24/2014	G843163447
Agilent	N9020A	MXA Signal Analyzer	10/29/2013	Annual	10/29/2014	U546470561
Agilent	8753ES	S-Parameter Network Analyzer	10/29/2013	Annual	10/29/2014	US39170122
Agilent	E8257D	(250kHz-20GHz) Signal Generator	4/15/2014	Annual	4/15/2015	MY45470194
Agilent	8648D	(9kHz-4GHz) Signal Generator	4/15/2014	Annual	4/15/2015	3629U00687
Agilent	E4438C	ESG Vector Signal Generator	4/15/2014	Annual	4/15/2015	MY45091346
Agilent	N5182A	MXG Vector Signal Generator	4/15/2014	Annual	4/15/2015	MY47420800
Agilent	E4438C	ESG Vector Signal Generator	4/25/2014	Annual	4/25/2015	MY42082385
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433978
Anritsu	MA2481A	Power Sensor	10/30/2013	Annual	10/30/2014	5605
Anritsu	MT8820C	Radio Communication Analyzer	12/12/2013	Annual	12/12/2014	6200901190
Anritsu	MA2411B	Pulse Power Sensor	2/3/2014	Annual	2/3/2015	1339018
Anritsu	ML2469A	Power Meter	3/14/2014	Annual	3/14/2015	1306009
Anritsu	ML2495A	Power Meter	10/31/2013	Annual	10/31/2014	1039008
Anritsu	MA2411B	Pulse Power Sensor	3/25/2014	Annual	3/25/2015	1207470
Anritsu	MA24106A	USB Power Sensor	5/15/2014	Annual	5/15/2015	1244524
Anritsu	MA24106A	USB Power Sensor	5/15/2014	Annual	5/15/2015	1244512
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	61220-416	Long-Stem Thermometer	4/29/2014	Biennial	4/29/2016	111331323
Control Company	36934-158	Wall-Mounted Thermometer	4/29/2014	Biennial	4/29/2016	122014488
Fisher Scientific	S97611	Thermometer	4/12/2013	Biennial	4/12/2015	130219304
Fisher Scientific	15-077-960	Digital Thermometer	12/4/2013	Biennial	12/4/2015	130764558
Gigatronics	80701A	(0.05-18GHz) Power Sensor	10/30/2013	Annual	10/30/2014	1833460
Gigatronics	8651A	Universal Power Meter	10/30/2013	Annual	10/30/2014	8650319
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mitutoyo	CD-6"CSX	Digital Caliper	5/8/2014	Biennial	5/8/2016	13264165
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	BW-53W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	NRVD	Dual Channel Power Meter	10/12/2012	Biennial	10/12/2014	101695
Rohde & Schwarz	NRV-232	Peak Power Sensor	10/12/2012	Biennial	10/12/2014	836019/013
Rohde & Schwarz	CMW500	Radio Communication Tester	10/4/2013	Annual	10/4/2014	108798
Rohde & Schwarz	SME06	Signal Generator	10/30/2013	Annual	10/30/2014	832026
Rohde & Schwarz	NRVS	Single Channel Power Meter	10/31/2013	Annual	10/31/2014	835360/0079
Rohde & Schwarz	CMU200	Base Station Simulator	6/6/2014	Annual	6/6/2015	109892
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	22313
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/18/2014	Biennial	3/18/2016	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/6/2014	Annual	5/6/2015	1070
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/23/2013	Annual	9/23/2014	1007
SPEAG	EX3DV4	SAR Probe	10/23/2013	Annual	10/23/2014	3914
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/18/2013	Annual	11/18/2014	1407
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/19/2013	Annual	11/19/2014	1333
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/19/2013	Annual	11/19/2014	1408
SPEAG	ES3DV3	SAR Probe	11/20/2013	Annual	11/20/2014	3287
SPEAG	ES3DV3	SAR Probe	11/25/2013	Annual	11/25/2014	3332
SPEAG	DAE4	Dasy Data Acquisition Electronics	12/12/2013	Annual	12/12/2014	649
SPEAG	EX3DV4	SAR Probe	12/18/2013	Annual	12/18/2014	3920
SPEAG	D750V3	750 MHz Dipole	1/20/2014	Annual	1/20/2015	1003
SPEAG	D2450V2	2450 MHz SAR Dipole	1/21/2014	Annual	1/21/2015	797
SPEAG	D5GHzV2	5 GHz SAR Dipole	1/27/2014	Annual	1/27/2015	1057
SPEAG	EX3DV4	SAR Probe	1/29/2014	Annual	1/29/2015	3589
SPEAG	ES3DV3	SAR Probe	2/25/2014	Annual	2/25/2015	3258
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/26/2014	Annual	2/25/2015	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/17/2014	Annual	3/17/2015	1334
SPEAG	ES3DV3	SAR Probe	3/19/2014	Annual	3/19/2015	3209
SPEAG	D835V2	835 MHz SAR Dipole	4/7/2014	Annual	4/7/2015	4d119
SPEAG	D1900V2	1900 MHz SAR Dipole	4/9/2014	Annual	4/9/2015	5d141
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/11/2014	Annual	4/11/2015	1368
SPEAG	ES3DV3	SAR Probe	4/17/2014	Annual	4/17/2015	3319
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/6/2014	Annual	5/6/2015	1070
SPEAG	D1765V2	1765 MHz SAR Dipole	5/7/2014	Annual	5/7/2015	1008
SPEAG	DAE4	Dasy Data Acquisition Electronics	5/14/2014	Annual	5/14/2015	859
SPEAG	ES3DV3	SAR Probe	5/15/2014	Annual	5/15/2015	3263
Tektronix	RSA6114A	Real Time Spectrum Analyzer	4/16/2014	Annual	4/16/2015	8010177

Note:

1. 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.
2. Each equipment item was used solely within its respective calibration period.

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16 MEASUREMENT UNCERTAINTIES

Applicable for frequencies less than 3000 MHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c _i 1gm	c _i 10 gms	1gm u _i (± %)	10gms u _i (± %)	v _i
Measurement System									
Probe Calibration	E.2.1	6.0	N	1	1.0	1.0	6.0	6.0	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)							RSS	12.1	11.7
Expanded Uncertainty (95% CONFIDENCE LEVEL)							k=2	24.2	23.5

The above measurement uncertainties are according to IEEE Std. 1528-2003

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Applicable for frequencies up to 6 GHz.

a	b	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	IEEE 1528 Sec.	Tol. (± %)	Prob. Dist.	Div.	c _i 1gm	c _i 10 gms	1gm u _i (± %)	10gms u _i (± %)	v _i
Measurement System									
Probe Calibration	E.2.1	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	E.2.2	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	E.2.2	1.3	N	1	1.0	1.0	1.3	1.3	∞
Boundary Effect	E.2.3	0.4	N	1	1.0	1.0	0.4	0.4	∞
Linearity	E.2.4	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	E.2.5	5.1	N	1	1.0	1.0	5.1	5.1	∞
Readout Electronics	E.2.6	1.0	N	1	1.0	1.0	1.0	1.0	∞
Response Time	E.2.7	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	E.2.8	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	E.6.3	2.9	R	1.73	1.0	1.0	1.7	1.7	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	E.5	1.0	R	1.73	1.0	1.0	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	6.0	N	1	1.0	1.0	6.0	6.0	287
Device Holder Uncertainty	E.4.1	3.32	R	1.73	1.0	1.0	1.9	1.9	∞
Output Power Variation - SAR drift measurement	6.6.2	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
Phantom & Tissue Parameters									
Phantom Uncertainty (Shape & Thickness tolerances)	E.3.1	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Liquid Conductivity - deviation from target values	E.3.2	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity - measurement uncertainty	E.3.3	3.8	N	1	0.64	0.43	2.4	1.6	6
Liquid Permittivity - deviation from target values	E.3.2	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Liquid Permittivity - measurement uncertainty	E.3.3	4.5	N	1	0.60	0.49	2.7	2.2	6
Combined Standard Uncertainty (k=1)							RSS	12.4	12.0
Expanded Uncertainty (95% CONFIDENCE LEVEL)							k=2	24.7	24.0

The above measurement uncertainties are according to IEEE Std. 1528-2003

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17 CONCLUSION

17.1 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Industry 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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Document S/N: OY1408011604.A3L	Test Dates: 08/07/14 – 09/11/14	DUT Type: Portable Handset		Page 99 of 99

APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 318DB

Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 0.908 \text{ S/m}$; $\epsilon_r = 40.417$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 08-08-2014; Ambient Temp: 24.0°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3263; ConvF(6.23, 6.23, 6.23); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

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

Mode: Cell. CDMA, Left Head, Cheek, Mid.ch, Wireless Charging Cover

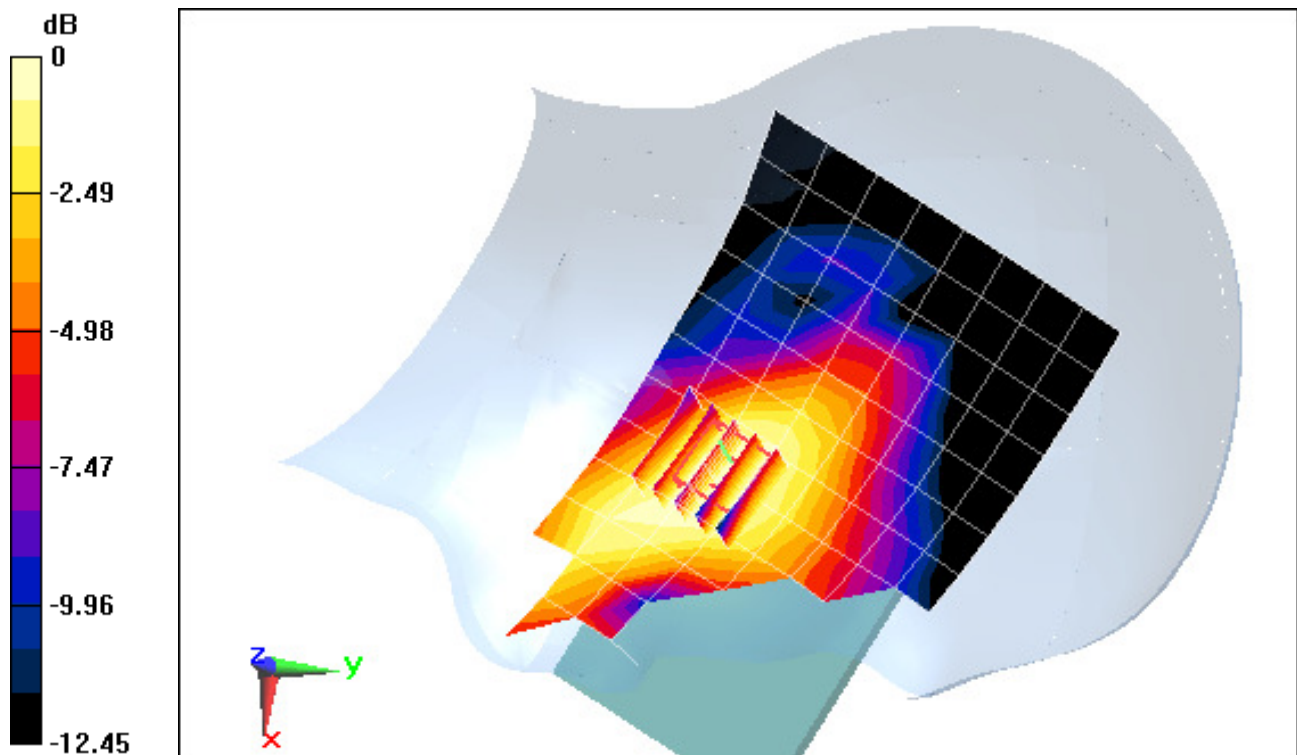
Area Scan (9x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 13.15 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.208 W/kg

SAR(1 g) = 0.155 W/kg



0 dB = 0.170 W/kg = -7.70 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 318DB

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

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.404 \text{ S/m}$; $\epsilon_r = 38.823$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 08-14-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3287; ConvF(5.08, 5.08, 5.08); Calibrated: 11/20/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 11/19/2013

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797

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

Mode: PCS CDMA, Left Head, Cheek, Mid.ch, Wireless Charging Cover

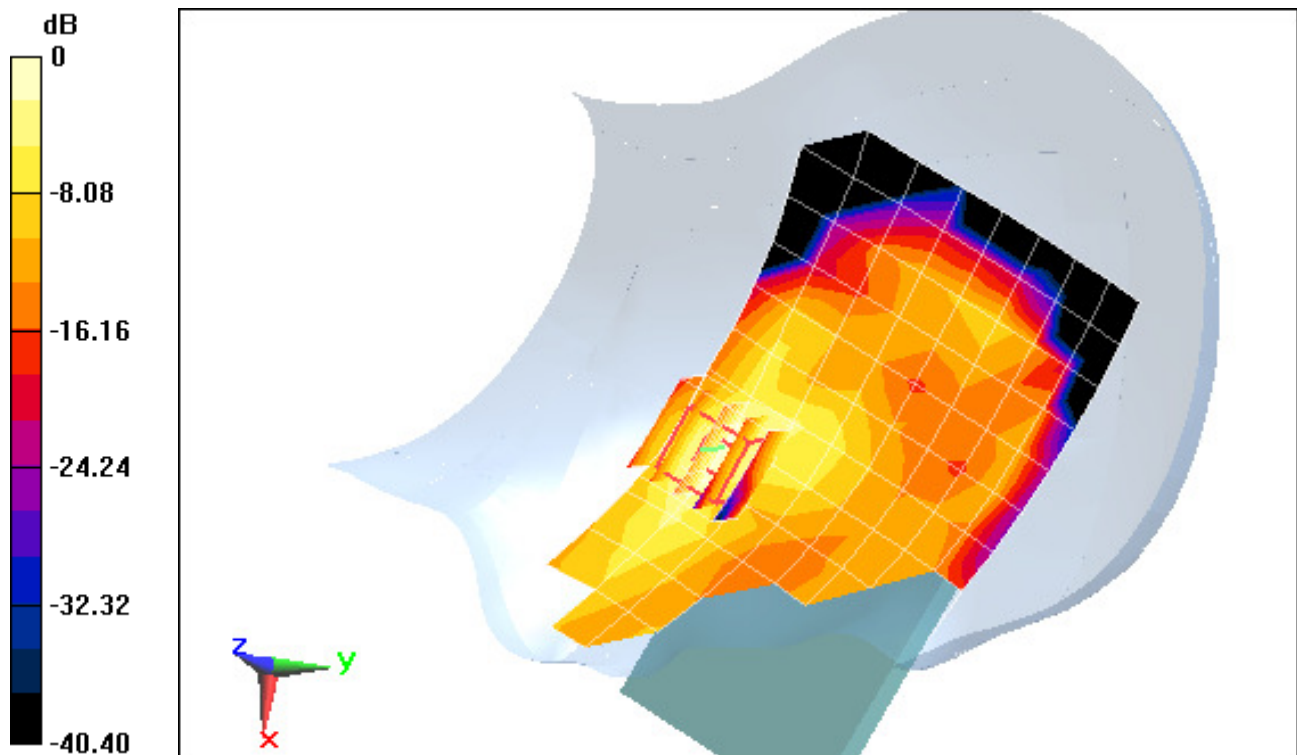
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

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

Peak SAR (extrapolated) = 0.251 W/kg

SAR(1 g) = 0.139 W/kg



0 dB = 0.183 W/kg = -7.38 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 31865

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.908 \text{ S/m}$; $\epsilon_r = 40.416$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 08-08-2014; Ambient Temp: 24.0°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3263; ConvF(6.23, 6.23, 6.23); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

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

Mode: GSM 850, Left Head, Cheek, Mid.ch, Standard Cover

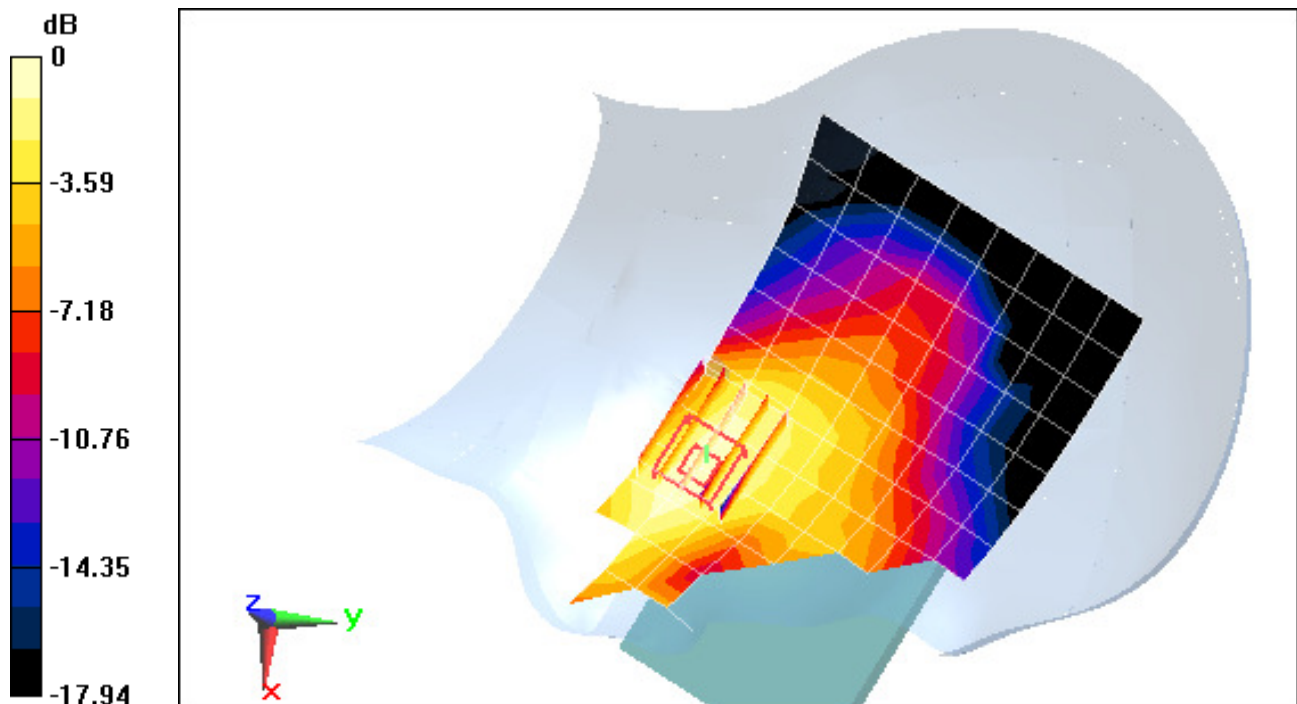
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 14.14 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.221 W/kg

SAR(1 g) = 0.168 W/kg



0 dB = 0.192 W/kg = -7.17 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 31865

Communication System: UID 0, GSM1900; Frequency: 1880 MHz; Duty Cycle: 1:8.3

Medium: 1900 Head Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.401 \text{ S/m}$; $\epsilon_r = 40.324$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 08-11-2014; Ambient Temp: 23.8°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3287; ConvF(5.08, 5.08, 5.08); Calibrated: 11/20/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 11/19/2013

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797

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

Mode: GSM 1900, Right Head, Cheek, Mid.ch, Standard Cover

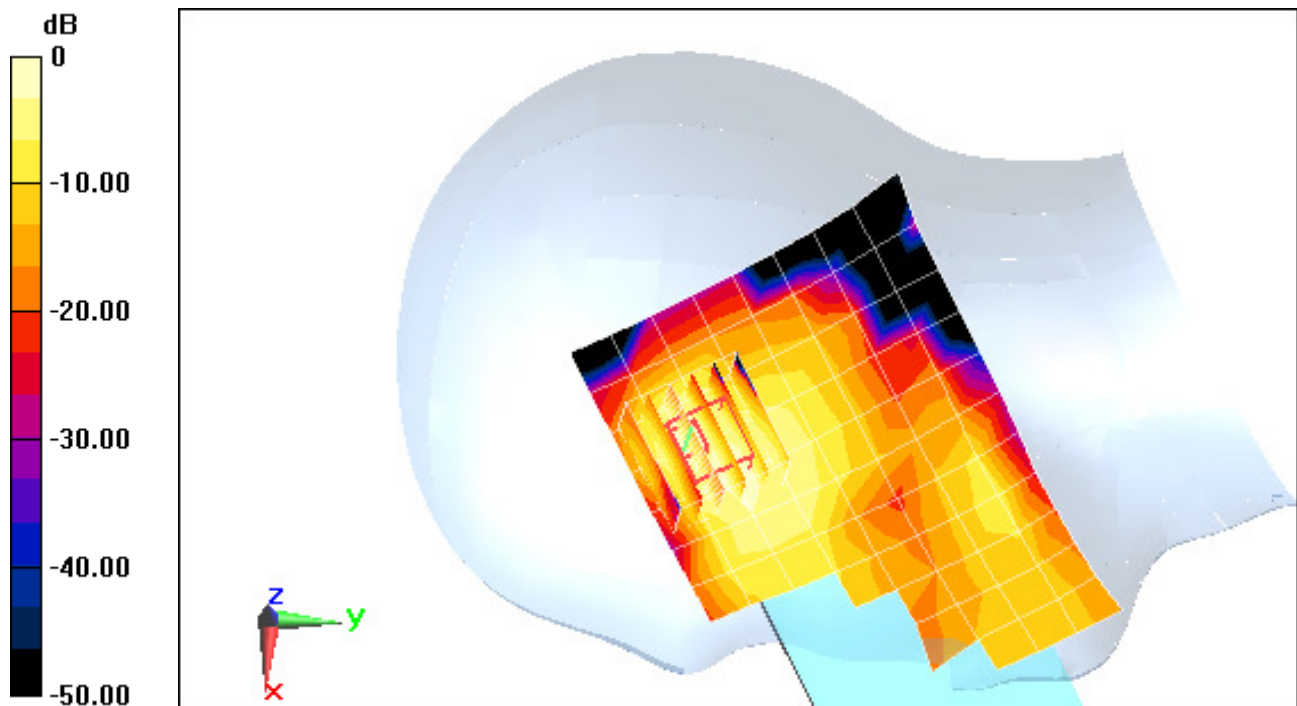
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 7.309 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.157 W/kg

SAR(1 g) = 0.079 W/kg



0 dB = 0.107 W/kg = -9.71 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 31865

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

Medium: 835 Head Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 0.908 \text{ S/m}$; $\epsilon_r = 40.416$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Left Section

Test Date: 08-08-2014; Ambient Temp: 24.0°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3263; ConvF(6.23, 6.23, 6.23); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

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

Mode: UMTS 850, Left Head, Cheek, Mid.ch, Wireless Charging Cover

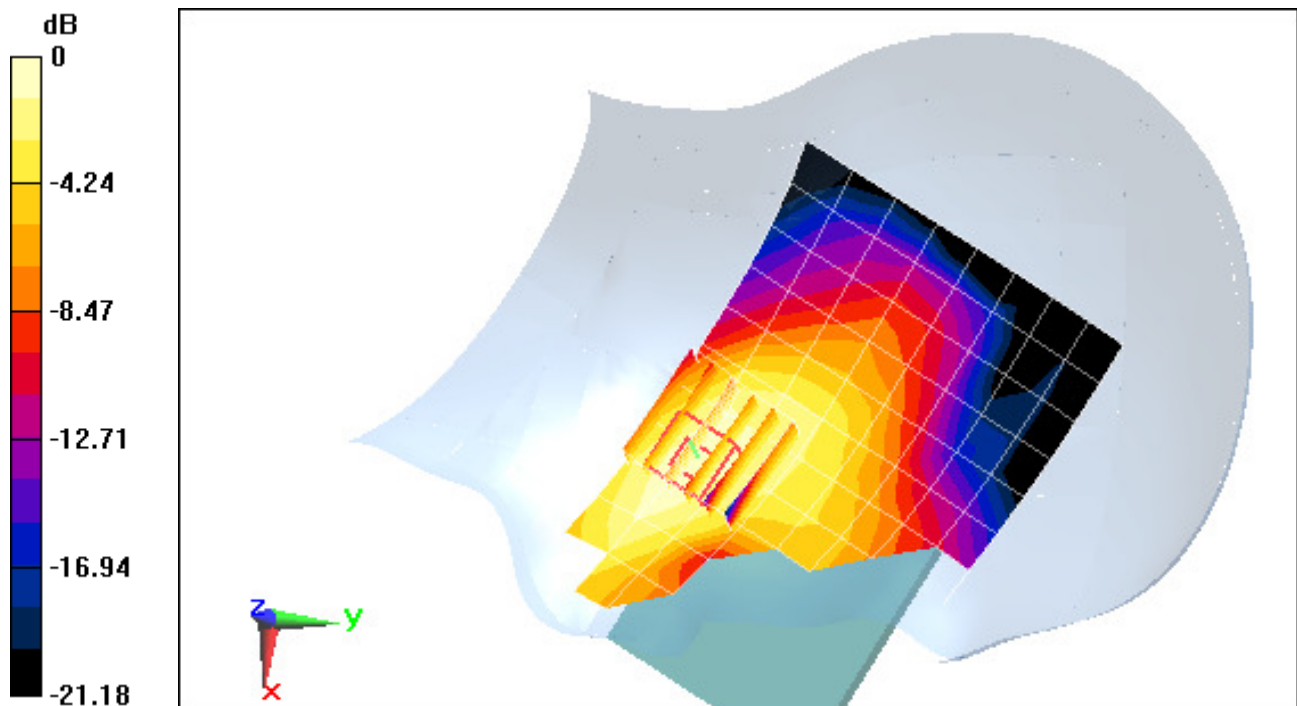
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.94 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.188 W/kg

SAR(1 g) = 0.143 W/kg



0 dB = 0.164 W/kg = -7.85 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: F5FFA

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

Medium: 1900 Head Medium parameters used:

$$f = 1880 \text{ MHz}; \sigma = 1.369 \text{ S/m}; \epsilon_r = 39.25; \rho = 1000 \text{ kg/m}^3$$

Phantom section: Left Section

Test Date: 09-04-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3209; ConvF(5.13, 5.13, 5.13); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM left; Type: QD000P40CD; Serial: TP:1715

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

Mode: UMTS 1900, Left Head, Cheek, Mid.ch, Wireless Charging Cover

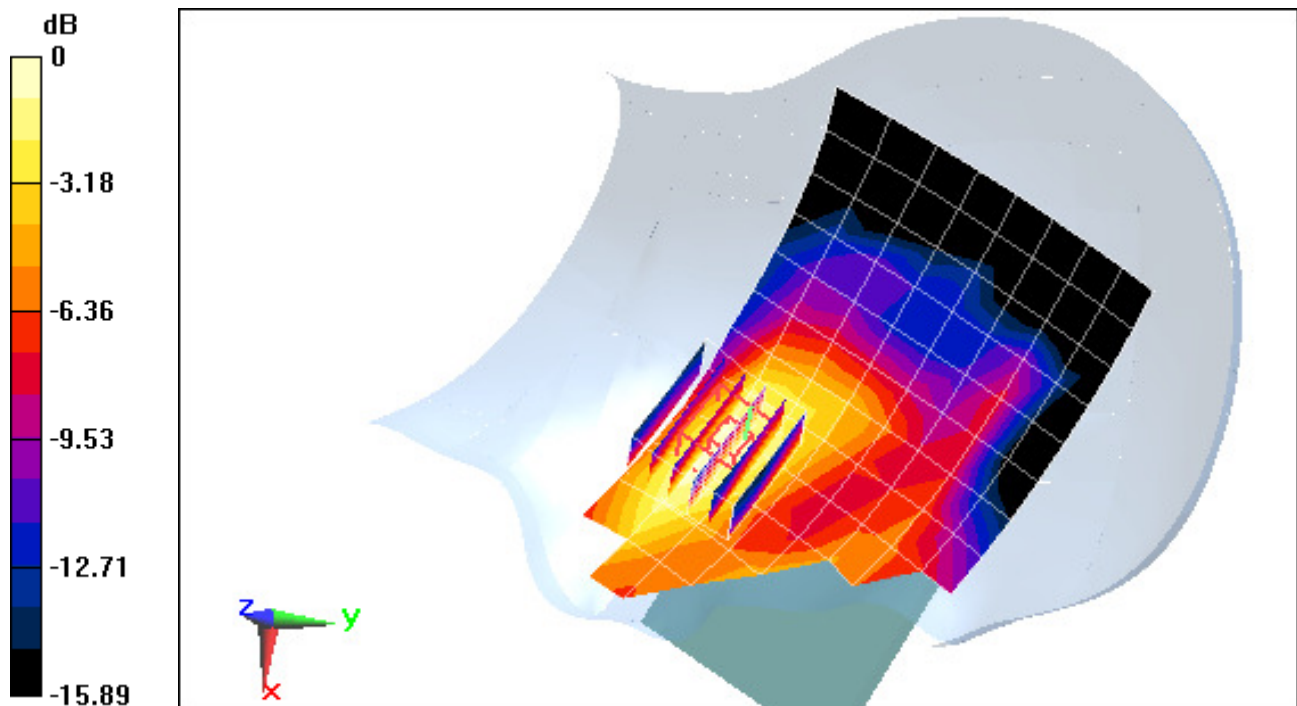
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 8.109 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.142 W/kg

SAR(1 g) = 0.092 W/kg



0 dB = 0.104 W/kg = -9.83 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 31725

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

Medium: 750 Head Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.933 \text{ S/m}$; $\epsilon_r = 39.742$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 08-13-2014; Ambient Temp: 23.6°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3209; ConvF(6.43, 6.43, 6.43); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

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

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

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

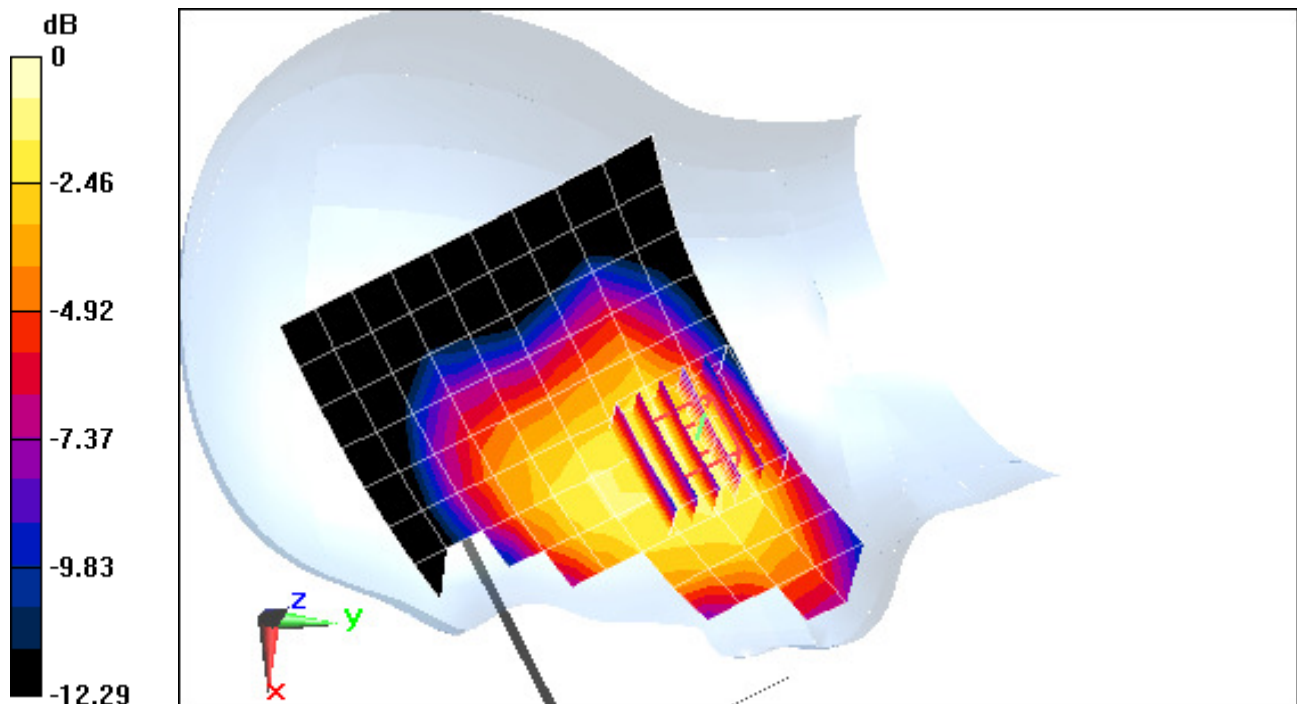
Area Scan (10x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 12.33 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.208 W/kg

SAR(1 g) = 0.144 W/kg



0 dB = 0.172 W/kg = -7.64 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 31725

Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Head Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.318 \text{ S/m}$; $\epsilon_r = 39.094$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 08-09-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(5.41, 5.41, 5.41); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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

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

**Mode: LTE Band 4 (AWS), Right Head, Tilt, Mid.ch, 20 MHz Bandwidth,
QPSK, 1 RB, 50 RB Offset, Standard Cover**

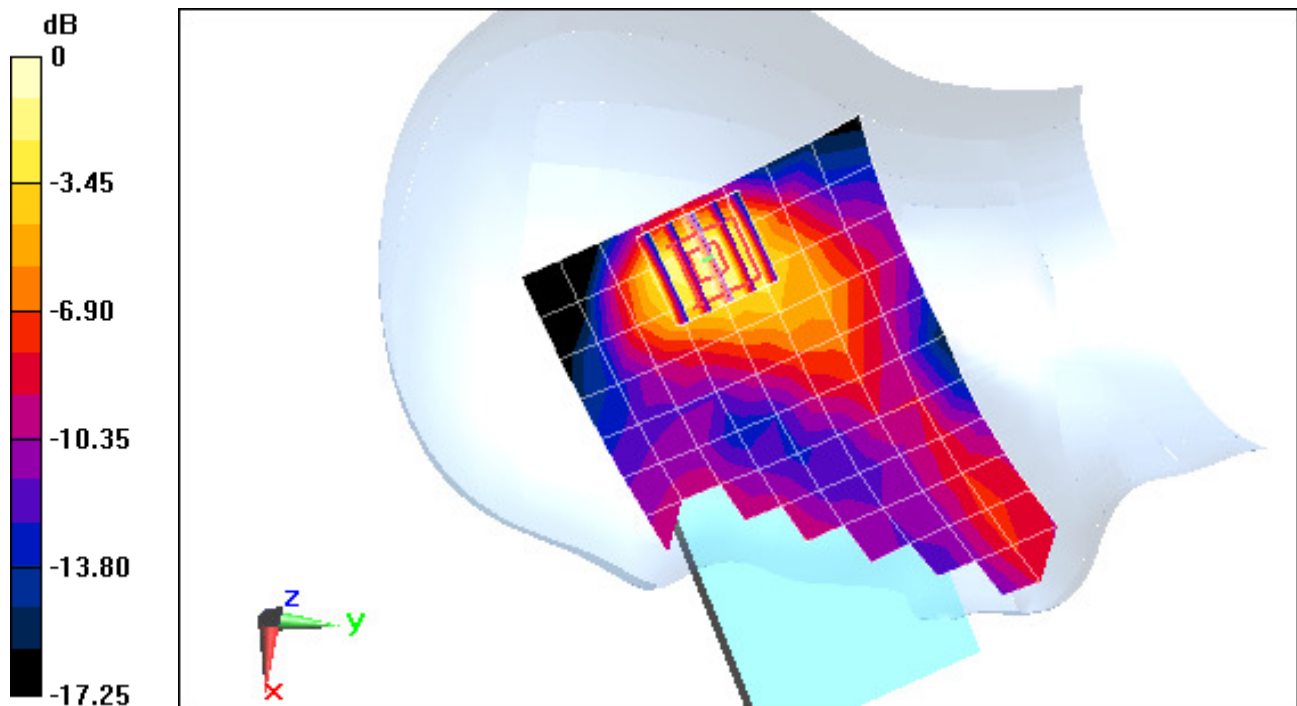
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 10.99 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.192 W/kg

SAR(1 g) = 0.120 W/kg



0 dB = 0.148 W/kg = -8.30 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 01FC3

Communication System: UID 0, IEEE 802.11b; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium: 2450 Head Medium parameters used (interpolated):
 $f = 2462 \text{ MHz}$; $\sigma = 1.872 \text{ S/m}$; $\epsilon_r = 38.098$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section

Test Date: 08-28-2014; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(4.52, 4.52, 4.52); Calibrated: 2/25/2014;
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn665; Calibrated: 2/26/2014
Phantom: SAM Front; Type: SAM; Serial: 1686
Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11b, Right Head, Cheek, Ch 11, 1 Mbps,
Antenna 2, Standard Cover**

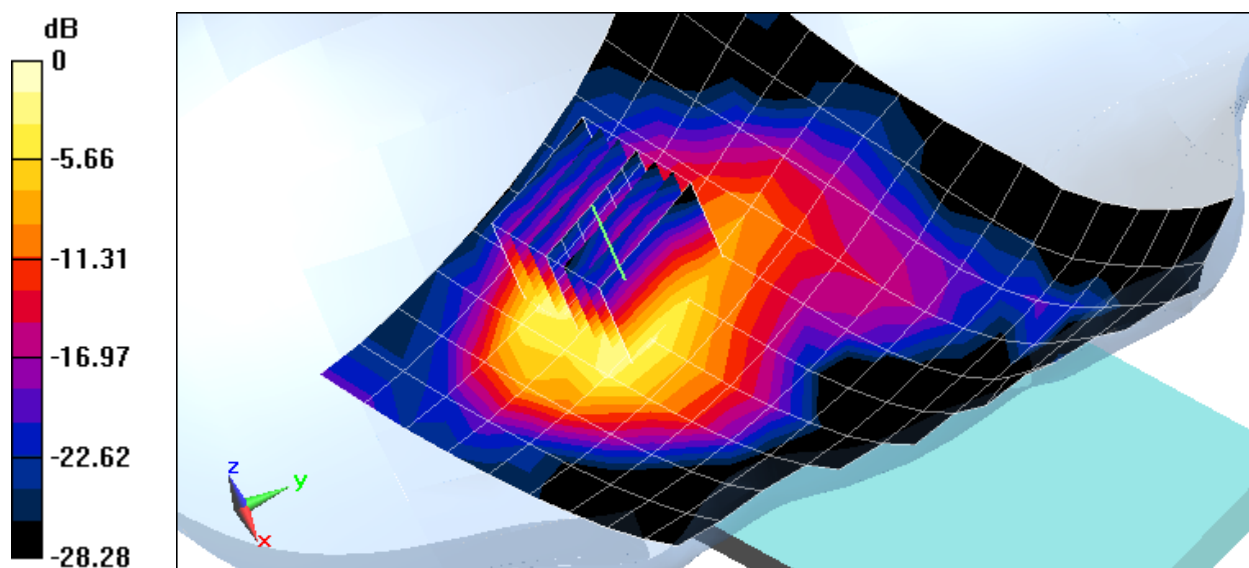
Area Scan (11x18x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Reference Value = 20.063 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.48 W/kg

SAR(1 g) = 0.573 W/kg



0 dB = 0.808 W/kg = -0.93 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 015D8

Communication System: UID 0, IEEE 802.11n; Frequency: 5745 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5745 \text{ MHz}$; $\sigma = 5.306 \text{ S/m}$; $\epsilon_r = 34.78$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 08-12-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3914; ConvF(4.52, 4.52, 4.52); Calibrated: 10/23/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 11/19/2013

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

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

**Mode: IEEE 802.11n, 5.8 GHz, Right Head, Cheek, Ch 149, 13 Mbps,
MIMO, Standard Cover**

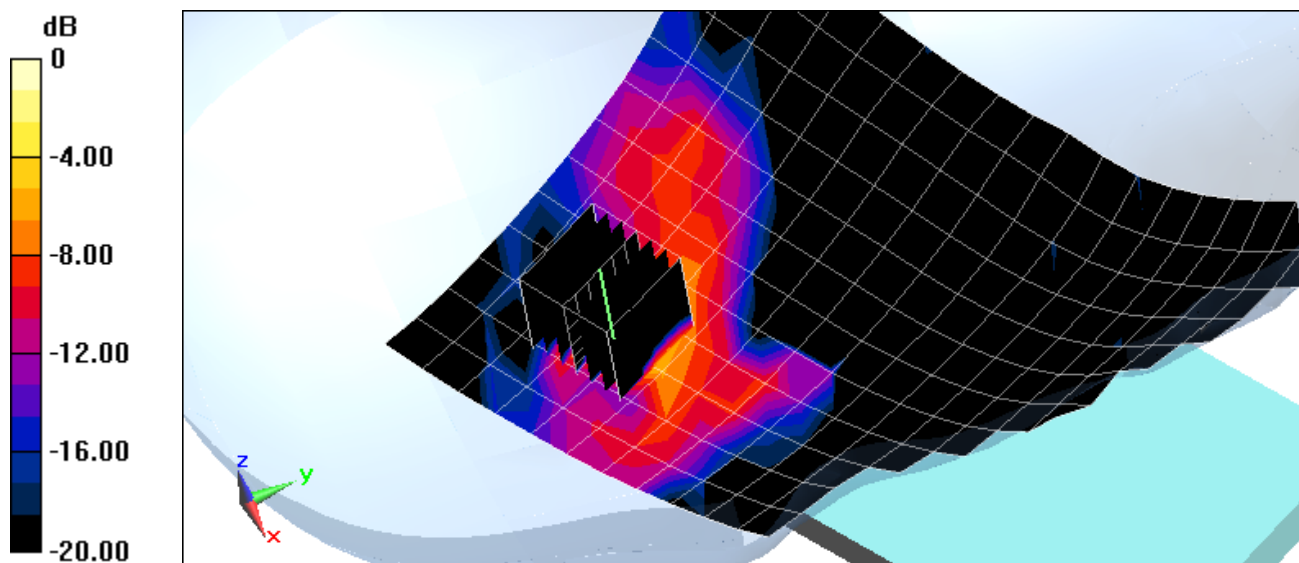
Area Scan (13x22x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 2.082 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.840 W/kg

SAR(1 g) = 0.169 W/kg



0 dB = 0.515 W/kg = -2.88 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 015D8

Communication System: UID 0, IEEE 802.11n; Frequency: 5680 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5680 \text{ MHz}$; $\sigma = 5.205 \text{ S/m}$; $\epsilon_r = 34.89$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Right Section

Test Date: 08-12-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3914; ConvF(4.37, 4.37, 4.37); Calibrated: 10/23/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 11/19/2013

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

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

**Mode: IEEE 802.11n, 5.5 GHz, Right Head, Cheek, Ch 136, 13 Mbps,
MIMO, Wireless Charging Cover**

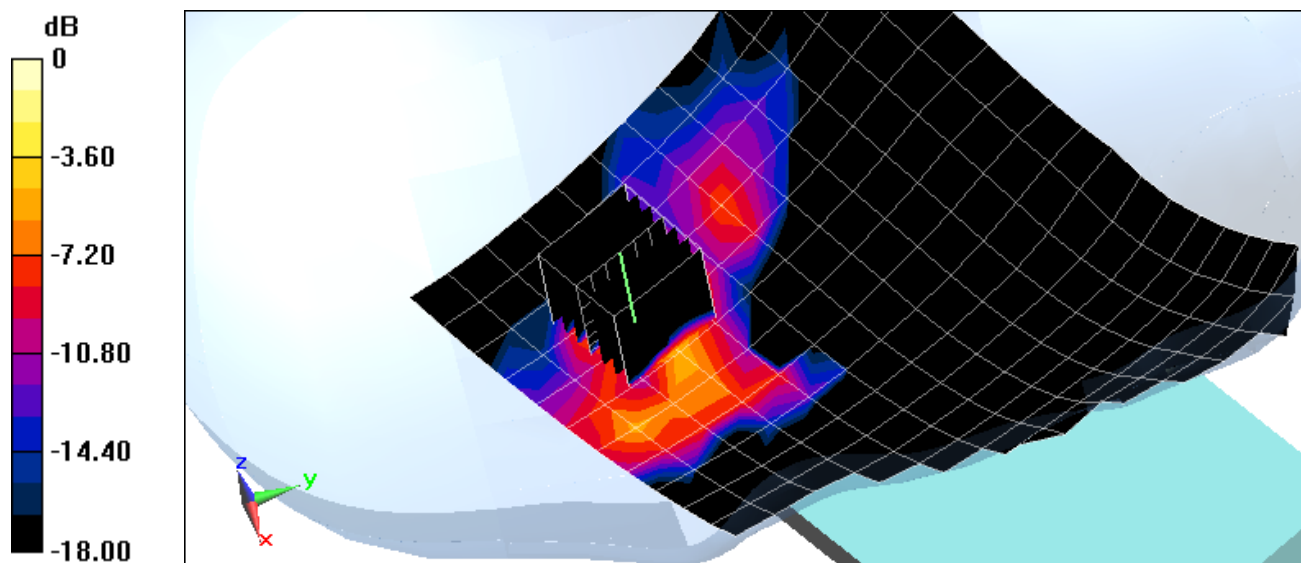
Area Scan (13x19x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

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

Reference Value = 7.391 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.966 W/kg

SAR(1 g) = 0.212 W/kg



0 dB = 0.603 W/kg = -2.20 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 318DB

Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 1.009 \text{ S/m}$; $\epsilon_r = 54.001$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 08-22-2014; Ambient Temp: 23.0°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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

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

Mode: Cell. CDMA, Body SAR, Back side, Mid.ch, Standard Cover

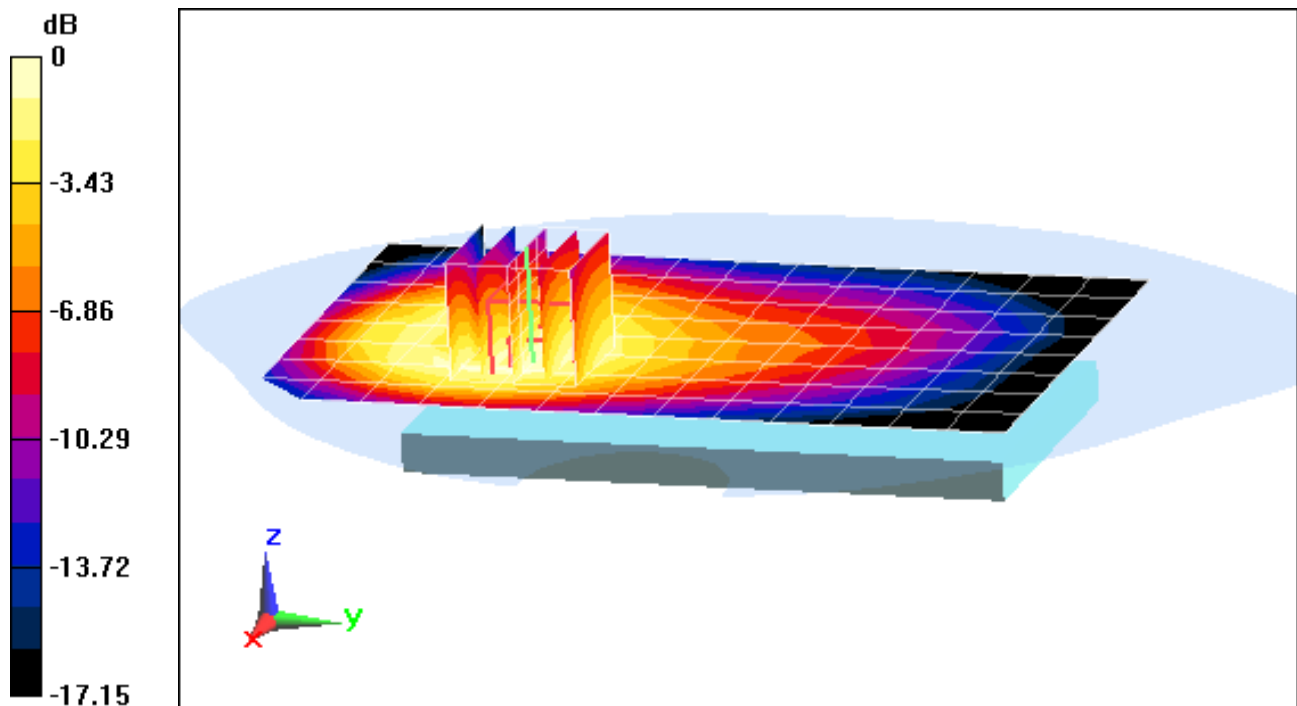
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 20.05 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.569 W/kg

SAR(1 g) = 0.392 W/kg



0 dB = 0.448 W/kg = -3.49 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: F5FFD

Communication System: UID 0, CDMA; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.52 \text{ MHz}$; $\sigma = 1.01 \text{ S/m}$; $\epsilon_r = 53.968$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-29-2014; Ambient Temp: 24.4°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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

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

Mode: Cell. CDMA, Body SAR, Front side, Mid.ch, Standard Cover

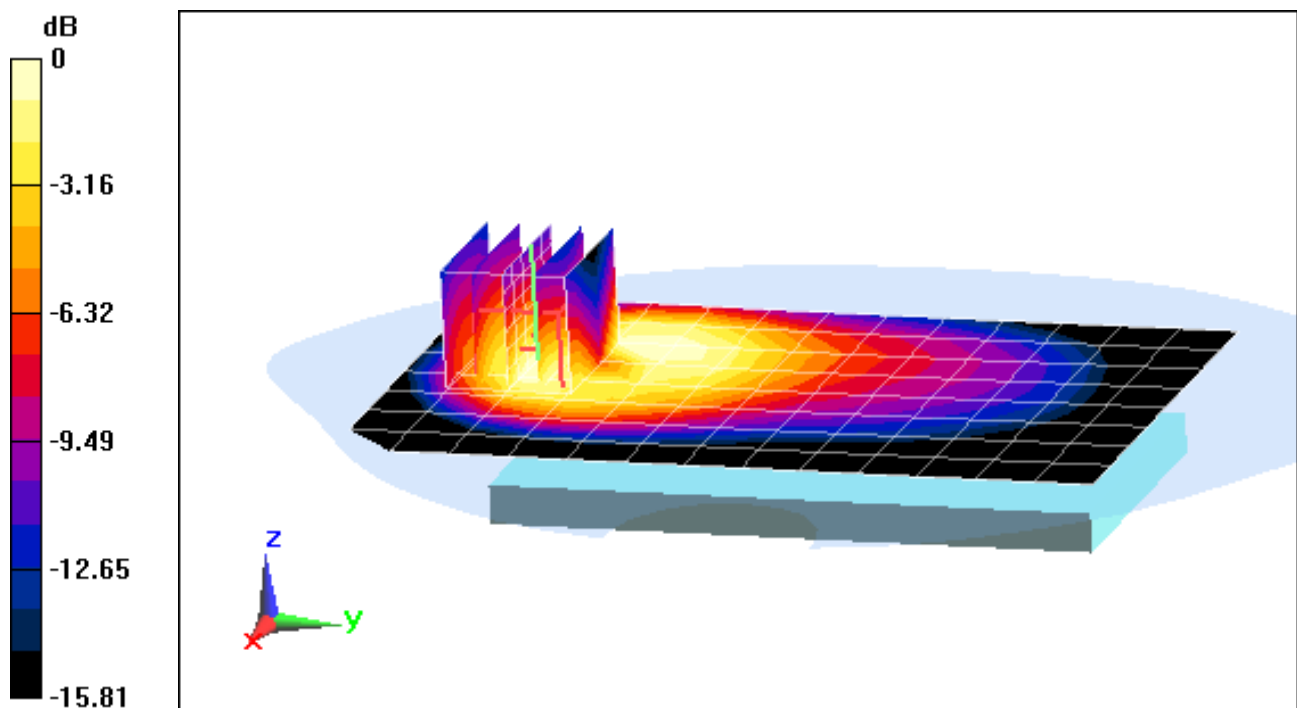
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 22.33 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 0.789 W/kg

SAR(1 g) = 0.467 W/kg



0 dB = 0.549 W/kg = -2.60 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 318DB

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.524 \text{ S/m}$; $\epsilon_r = 52.206$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 08-20-2014; Ambient Temp: 23.5°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202

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

Mode: PCS CDMA, Body SAR, Back side, Mid.ch, Standard Cover

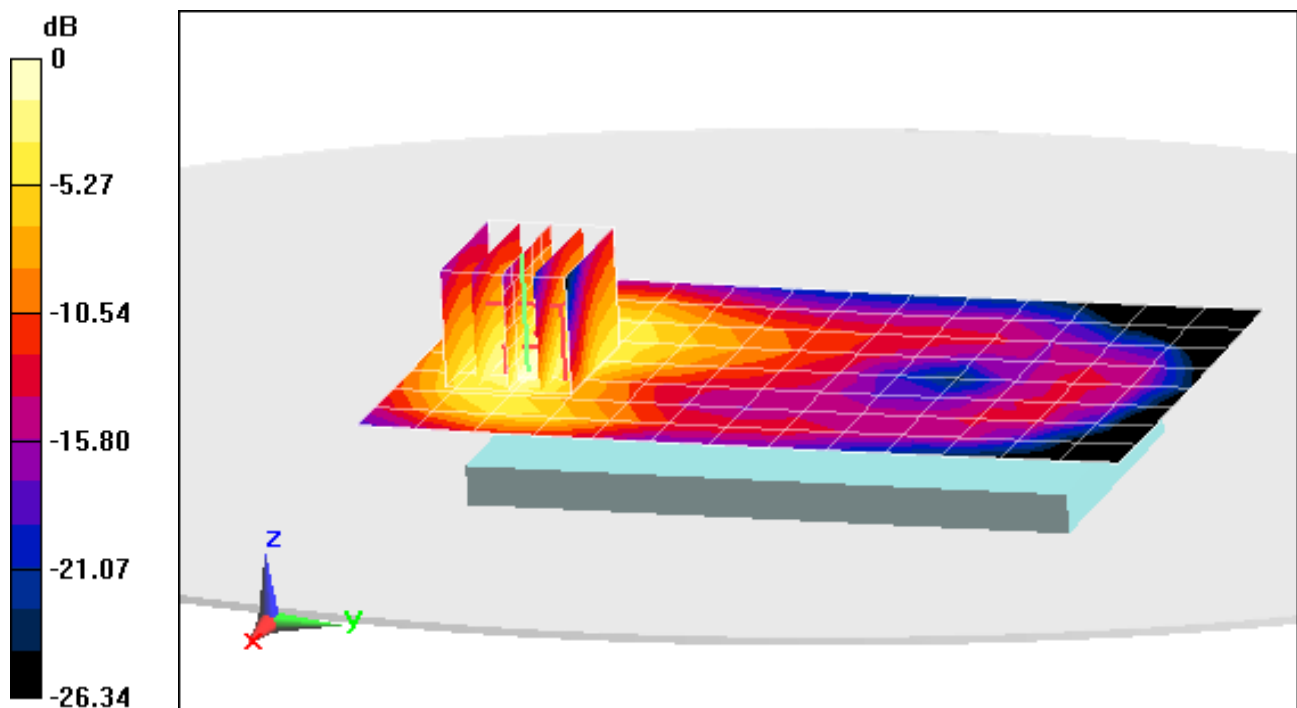
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.61 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.754 W/kg

SAR(1 g) = 0.456 W/kg



0 dB = 0.564 W/kg = -2.49 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 3186B

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.524 \text{ S/m}$; $\epsilon_r = 52.206$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-20-2014; Ambient Temp: 23.5°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202

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

Mode: PCS EVDO, Body SAR, Bottom Edge, Mid.ch, Standard Cover

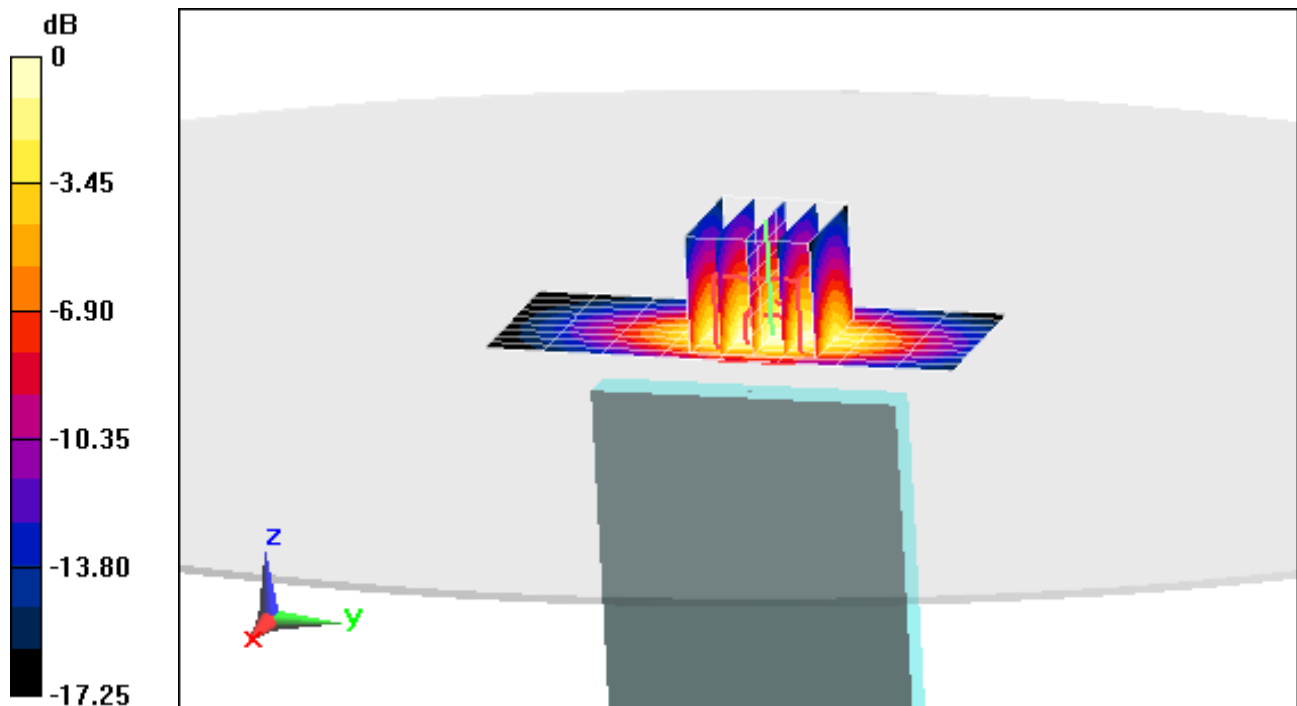
Area Scan (10x9x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 21.68 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.07 W/kg

SAR(1 g) = 0.662 W/kg



0 dB = 0.813 W/kg = -0.90 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: F5FFA

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 1.006 \text{ S/m}$; $\epsilon_r = 53.264$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 09-03-2014; Ambient Temp: 24.0°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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

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

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

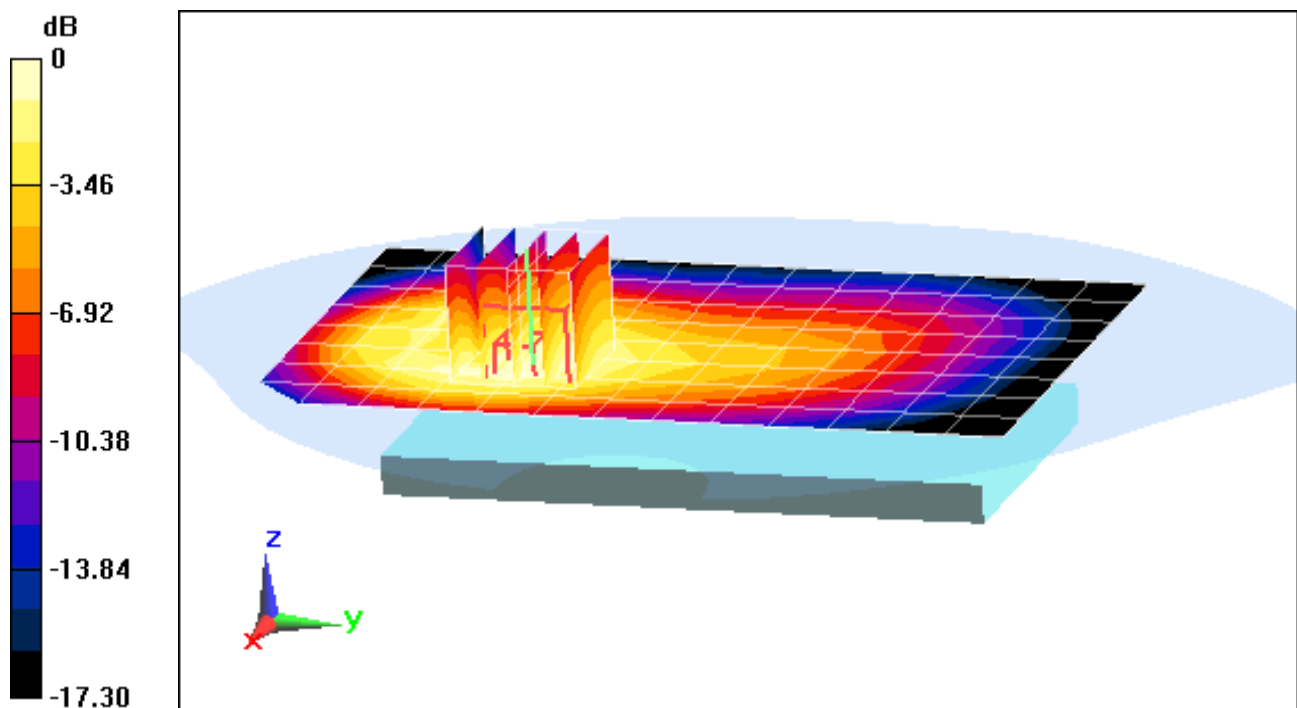
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 17.60 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.430 W/kg

SAR(1 g) = 0.301 W/kg



0 dB = 0.341 W/kg = -4.67 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 31865

Communication System: UID 0, GSM GPRS; 3 Tx slots; Frequency: 848.8 MHz; Duty Cycle: 1:2.76

Medium: 835 Body Medium parameters used (interpolated):

$f = 848.8 \text{ MHz}$; $\sigma = 1.018 \text{ S/m}$; $\epsilon_r = 53.552$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-19-2014; Ambient Temp: 23.7°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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

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

Mode: GPRS 850, Body SAR, Front side, High.ch, 3 Tx Slots, Wireless Charging Cover

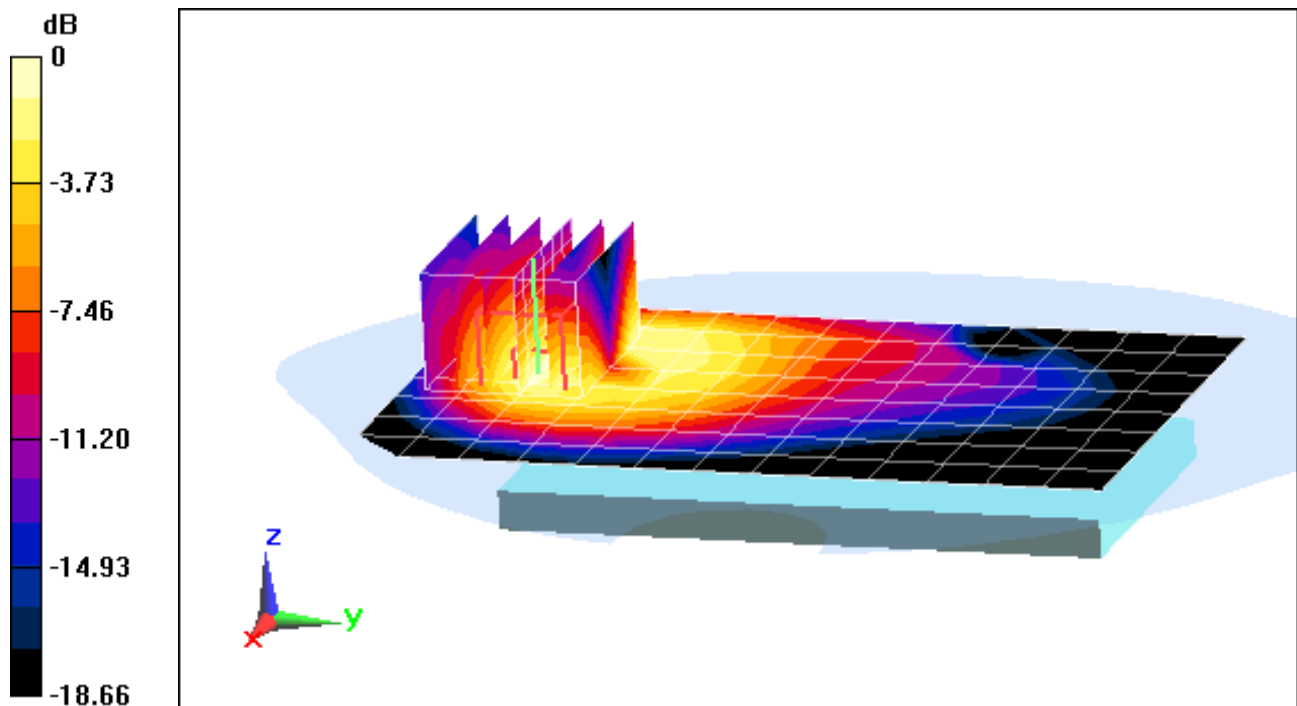
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 32.77 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 1.65 W/kg

SAR(1 g) = 0.964 W/kg



0 dB = 1.19 W/kg = 0.76 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: F5FFA

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.488 \text{ S/m}$; $\epsilon_r = 52.13$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 09-01-2014; Ambient Temp: 23.0°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202

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

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

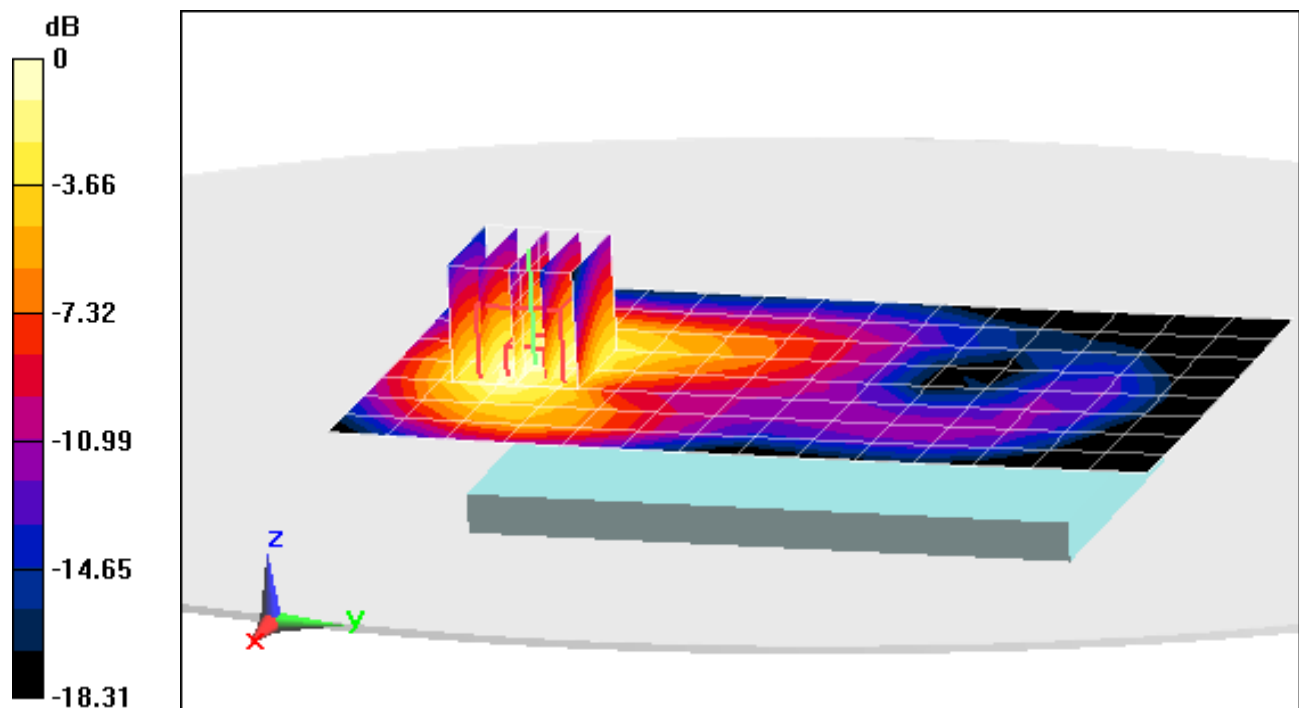
Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.10 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.266 W/kg

SAR(1 g) = 0.173 W/kg



0 dB = 0.204 W/kg = -6.90 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 31865

Communication System: UID 0, GSM GPRS; 4 Tx slots; Frequency: 1880 MHz; Duty Cycle: 1:2.076

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.532 \text{ S/m}$; $\epsilon_r = 52.985$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 23.8°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 11/19/2013

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

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

Mode: GPRS 1900, Body SAR, Bottom Edge, Mid.ch, 4 Tx Slots, Wireless Charging Cover

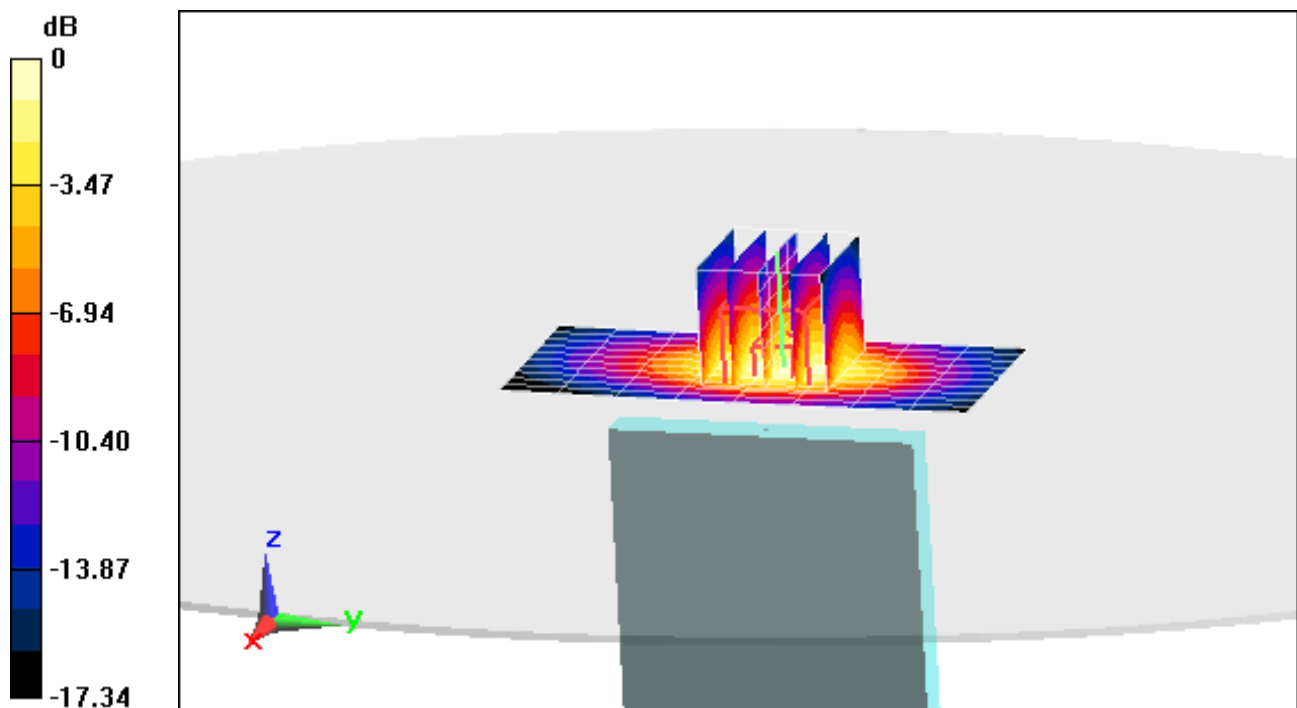
Area Scan (11x9x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 20.01 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 0.924 W/kg

SAR(1 g) = 0.561 W/kg



0 dB = 0.689 W/kg = -1.62 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: F5FFA

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 1.006 \text{ S/m}$; $\epsilon_r = 53.264$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 09-03-2014; Ambient Temp: 24.0°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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

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

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

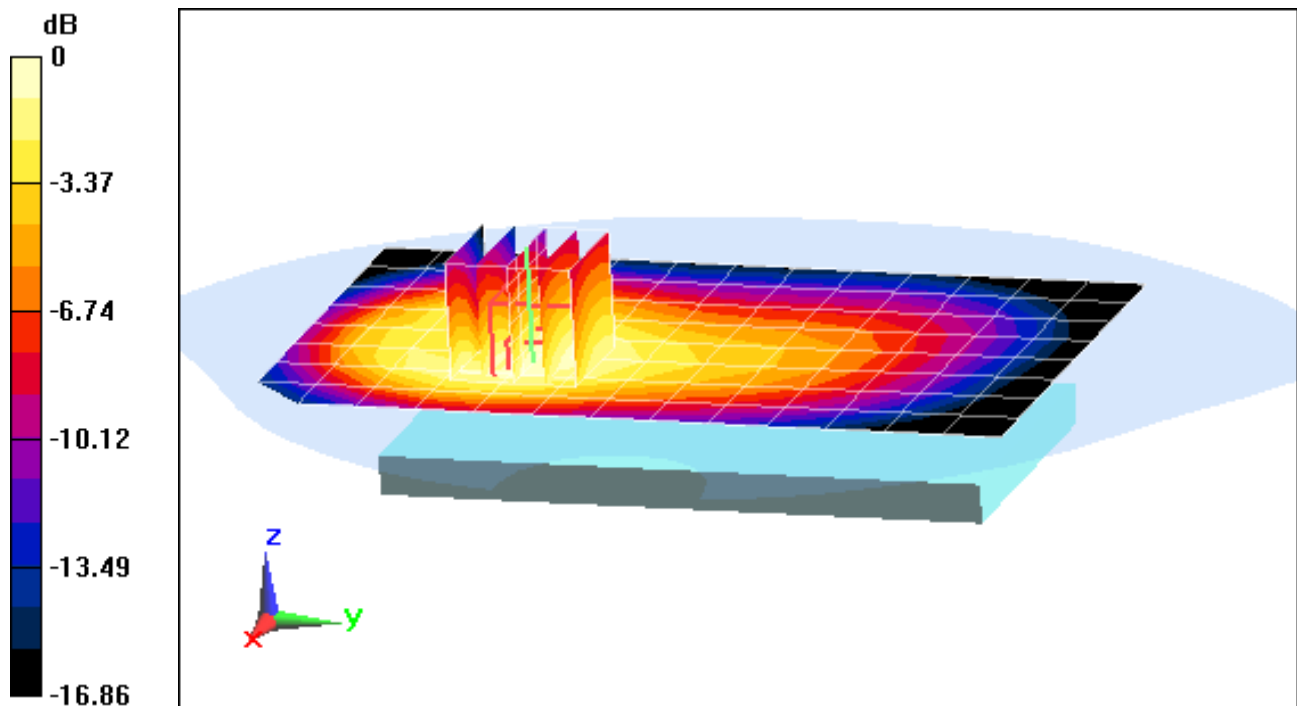
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 14.59 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.303 W/kg

SAR(1 g) = 0.213 W/kg



0 dB = 0.243 W/kg = -6.14 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 31865

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 1.002 \text{ S/m}$; $\epsilon_r = 53.239$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 23.3°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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

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

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

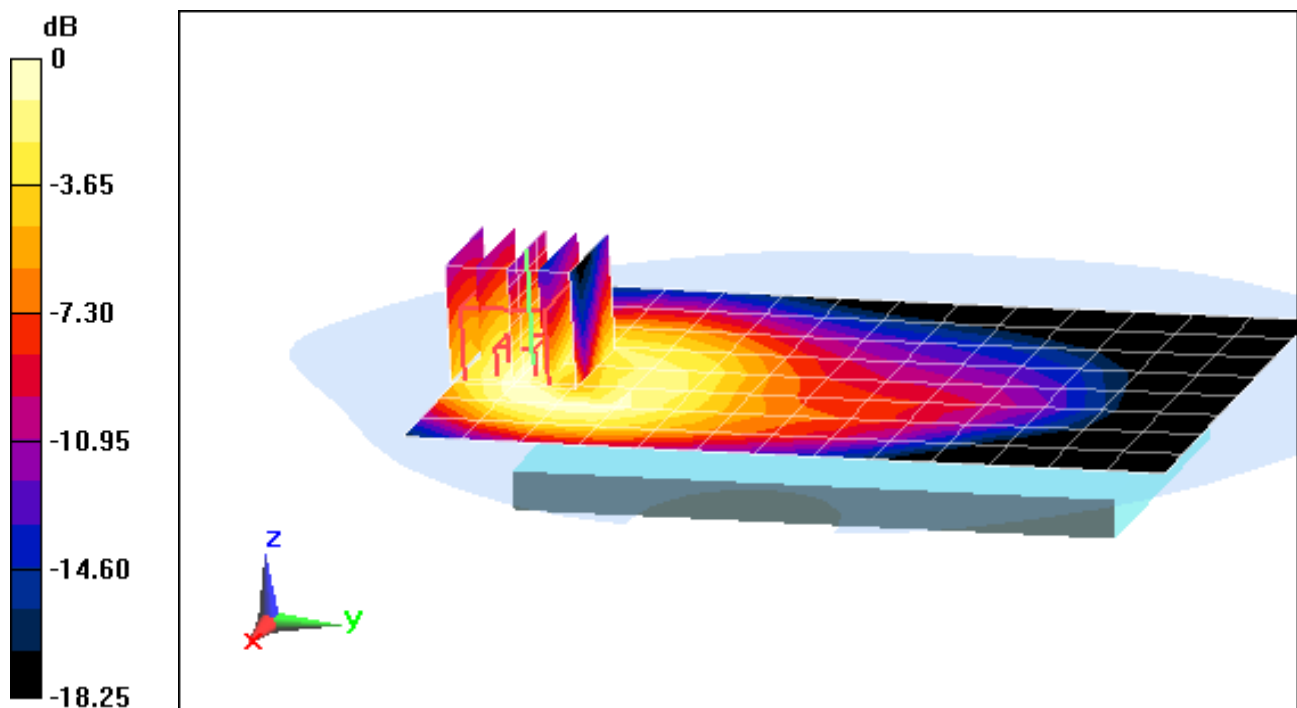
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 23.32 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.797 W/kg

SAR(1 g) = 0.482 W/kg



0 dB = 0.584 W/kg = -2.34 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: F5FFA

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.488 \text{ S/m}$; $\epsilon_r = 52.13$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 09-01-2014; Ambient Temp: 23.0°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202

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

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

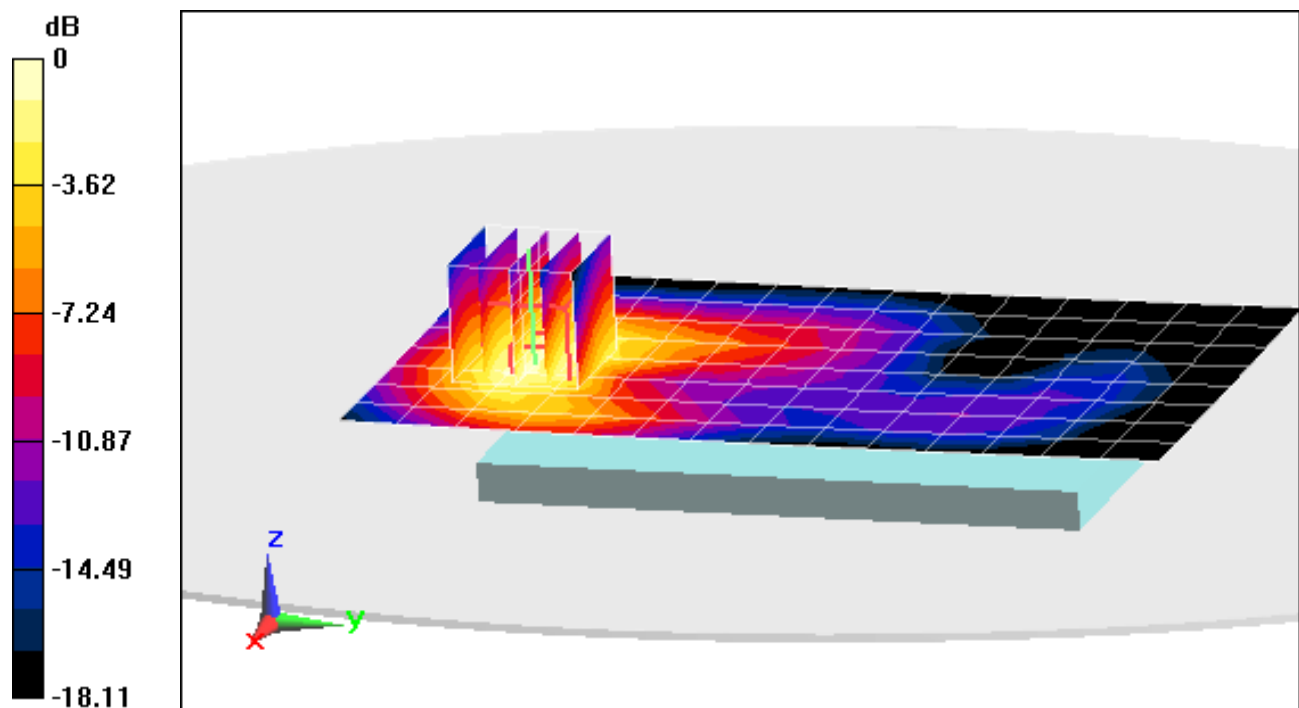
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 14.62 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.502 W/kg

SAR(1 g) = 0.322 W/kg



0 dB = 0.384 W/kg = -4.16 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: F5FFA

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.488 \text{ S/m}$; $\epsilon_r = 52.13$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 09-01-2014; Ambient Temp: 23.0°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202

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

Mode: UMTS 1900, Body SAR, Bottom Edge, Mid.ch, Wireless Charging Cover

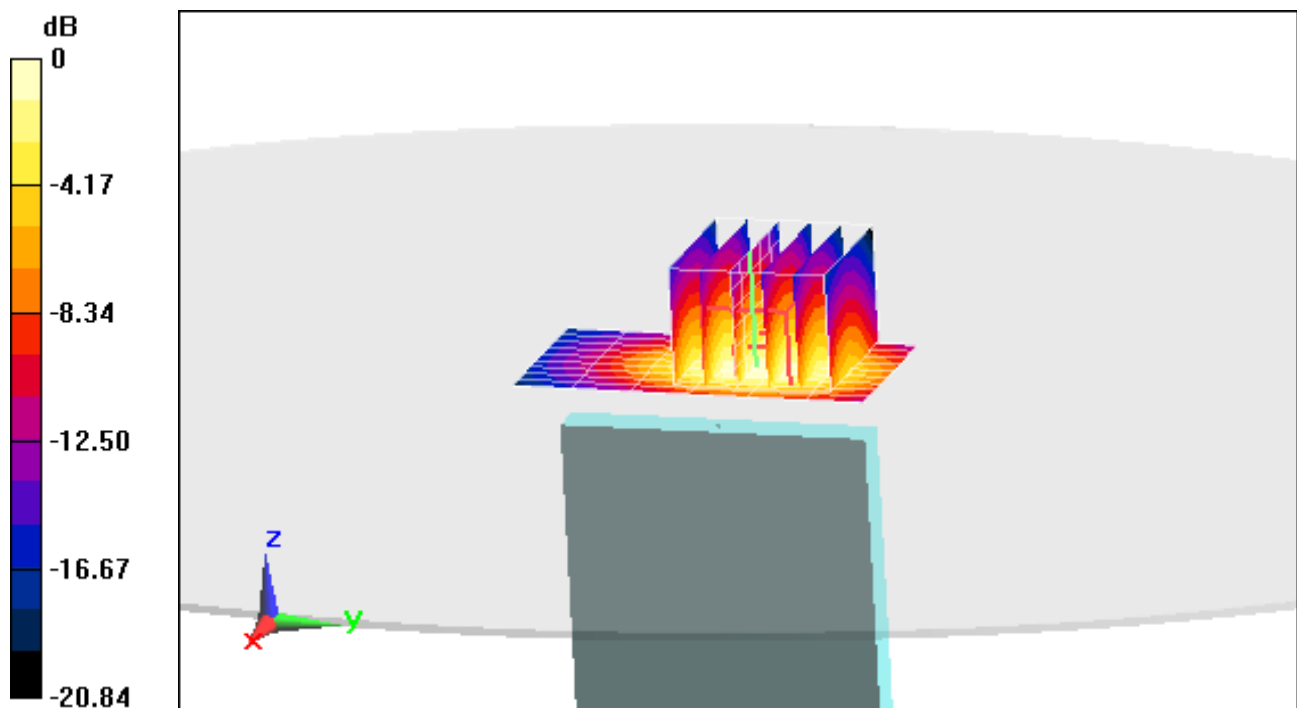
Area Scan (10x7x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 28.37 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.69 W/kg

SAR(1 g) = 1.03 W/kg



0 dB = 1.26 W/kg = 1.00 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: F5FFD

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.996 \text{ S/m}$; $\epsilon_r = 53.86$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 08-31-2014; Ambient Temp: 22.9°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3209; ConvF(6.16, 6.16, 6.16); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

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

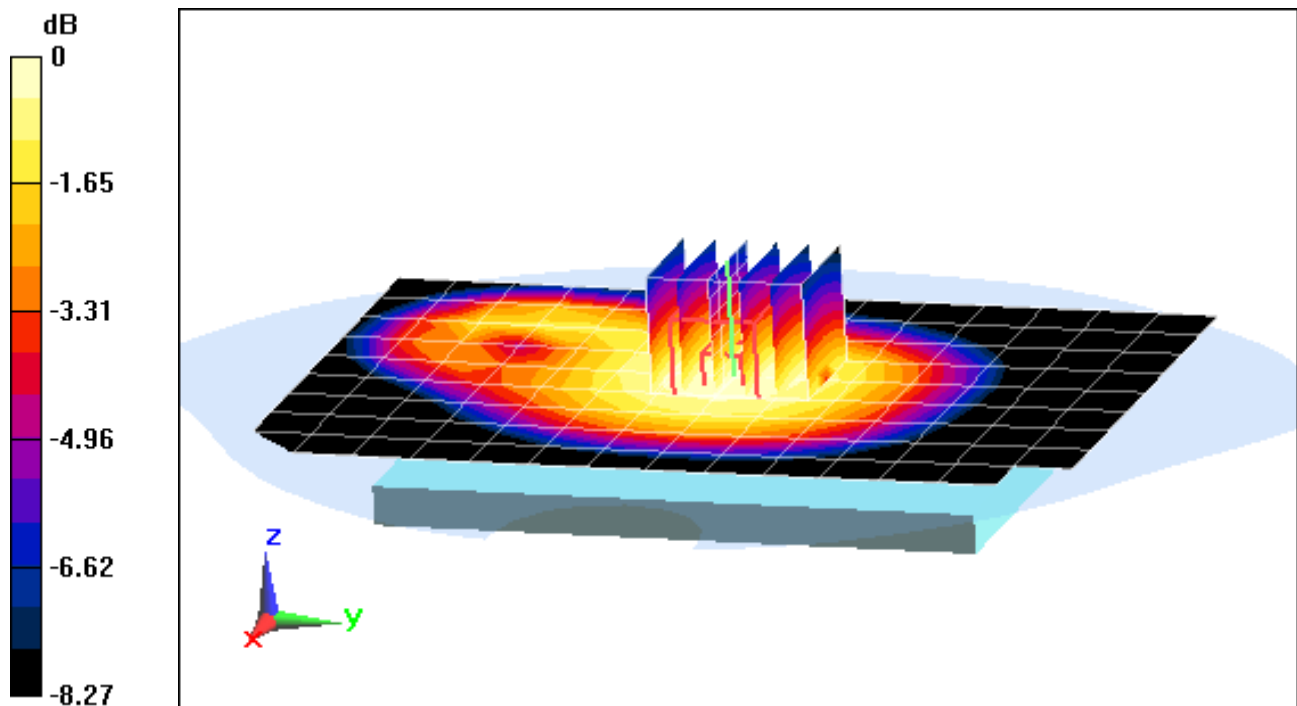
Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 14.24 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.237 W/kg

SAR(1 g) = 0.186 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 31725

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 0.997 \text{ S/m}$; $\epsilon_r = 53.647$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-12-2014; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3332; ConvF(6.21, 6.21, 6.21); Calibrated: 11/25/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1226

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

**Mode: LTE Band 13, Body SAR, Right Edge, Mid.ch, 10 MHz Bandwidth,
QPSK, 1 RB, 0 RB Offset, Standard Cover**

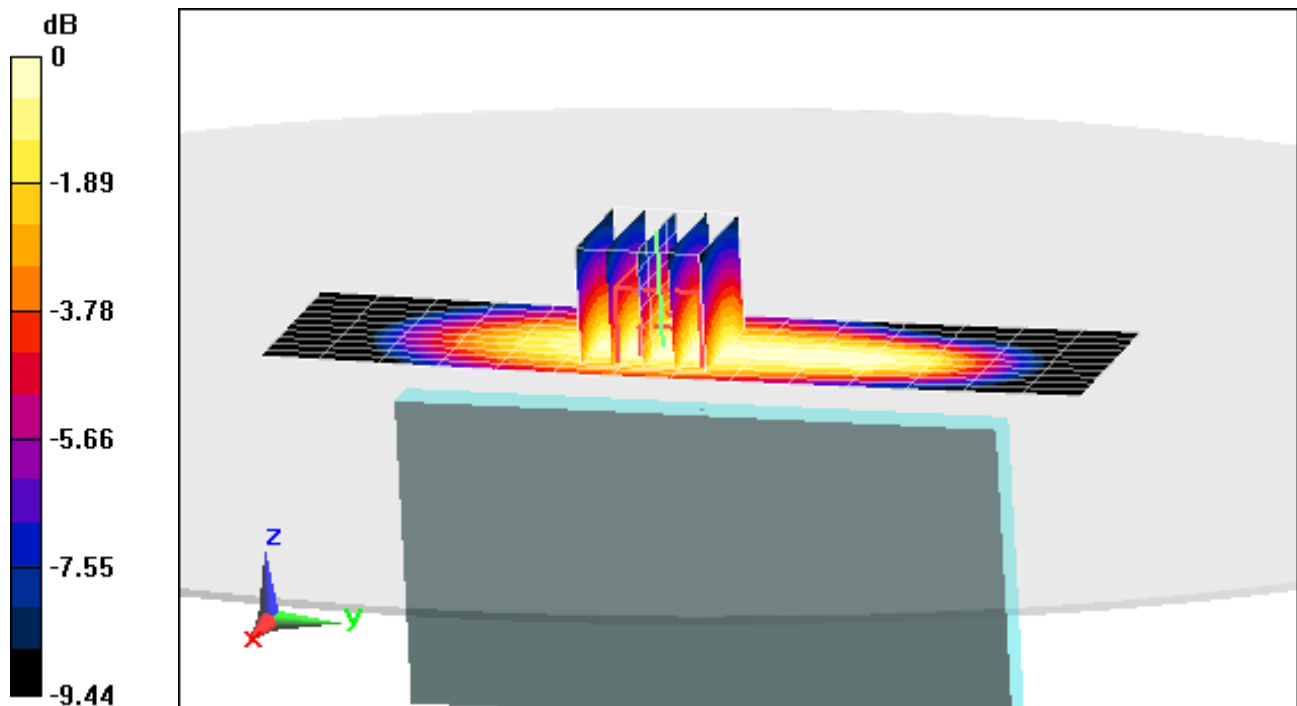
Area Scan (11x15x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 20.51 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.554 W/kg

SAR(1 g) = 0.399 W/kg



0 dB = 0.457 W/kg = -3.40 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: F5FFD

Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.444 \text{ S/m}$; $\epsilon_r = 51.764$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 08-29-2014; Ambient Temp: 23.8°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3287; ConvF(4.93, 4.93, 4.93); Calibrated: 11/20/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 11/19/2013

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

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

**Mode: LTE Band 4 (AWS), Body SAR, Back side, Mid.ch, 20 MHz Bandwidth,
QPSK, 1 RB, 50 RB Offset, Wireless Charging Cover**

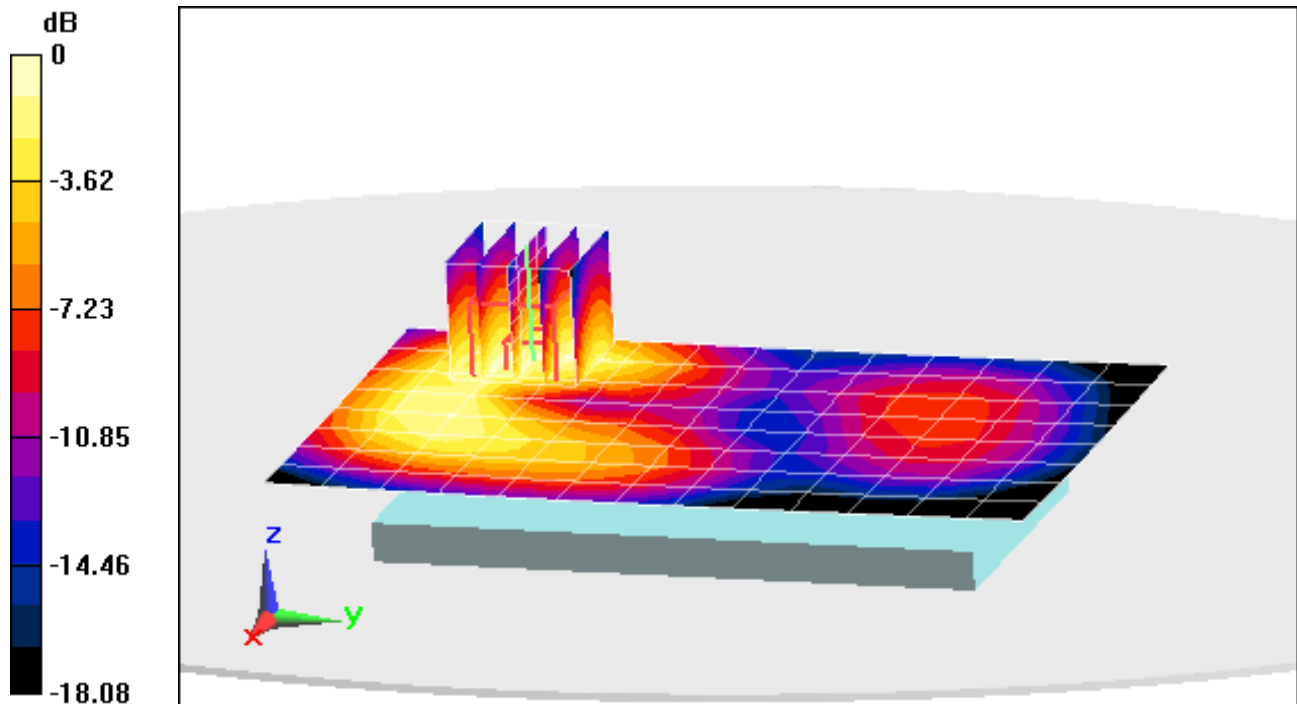
Area Scan (9x14x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 11.87 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 0.282 W/kg

SAR(1 g) = 0.178 W/kg



0 dB = 0.214 W/kg = -6.70 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 31725

Communication System: UID 0, LTE Band 4 (AWS); Frequency: 1732.5 MHz; Duty Cycle: 1:1

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.424 \text{ S/m}$; $\epsilon_r = 52.237$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 23.4°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3209; ConvF(4.85, 4.85, 4.85); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM left; Type: QD000P40CD; Serial: TP:1715

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

**Mode: LTE Band 4 (AWS), Body SAR, Bottom Edge, Mid.ch, 20 MHz Bandwidth,
QPSK, 1 RB, 50 RB Offset, Standard Cover**

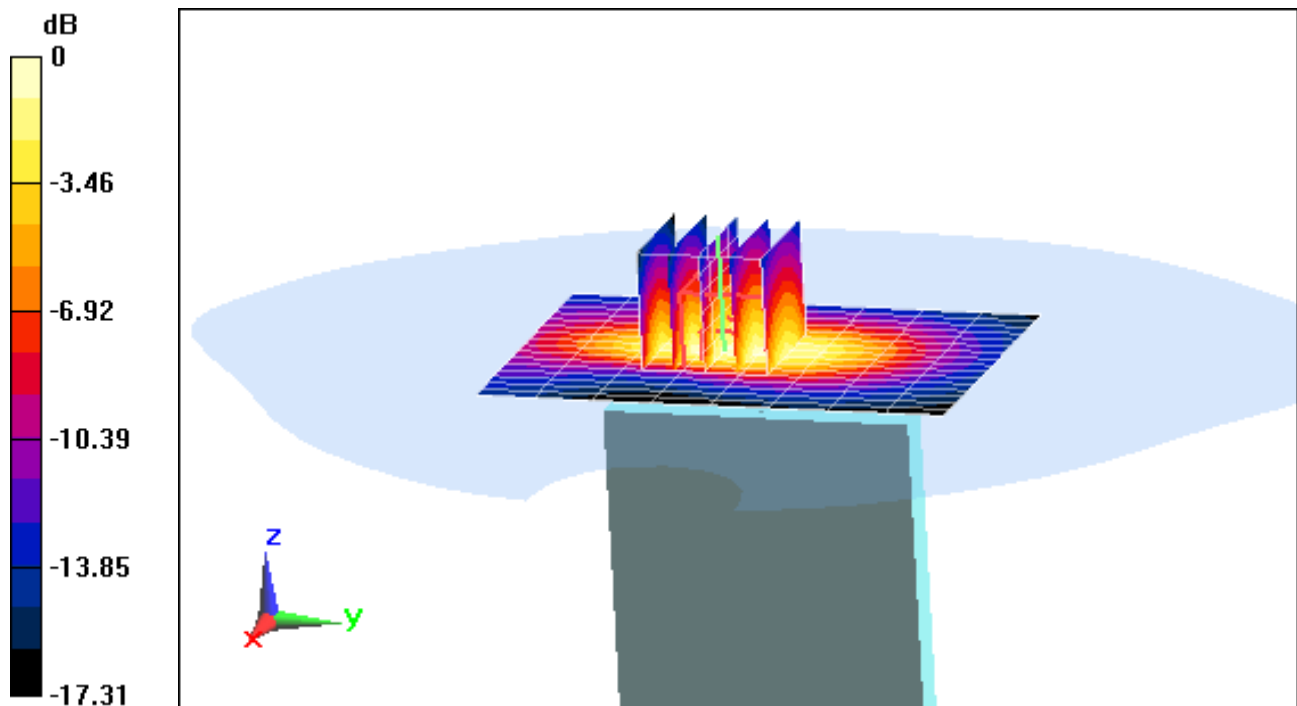
Area Scan (17x9x1): Measurement grid: dx=5mm, dy=15mm

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

Reference Value = 25.47 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.30 W/kg

SAR(1 g) = 0.792 W/kg



0 dB = 0.977 W/kg = -0.10 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 015D8

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

Medium: 2450 Body Medium parameters used (interpolated):

$f = 2462 \text{ MHz}$; $\sigma = 1.919 \text{ S/m}$; $\epsilon_r = 50.812$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-07-2014; Ambient Temp: 23.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3319; ConvF(4.24, 4.24, 4.24); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202

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

**Mode: IEEE 802.11b, Body SAR, Ch 11, 1 Mbps, Back Side,
Antenna 1, Standard Cover**

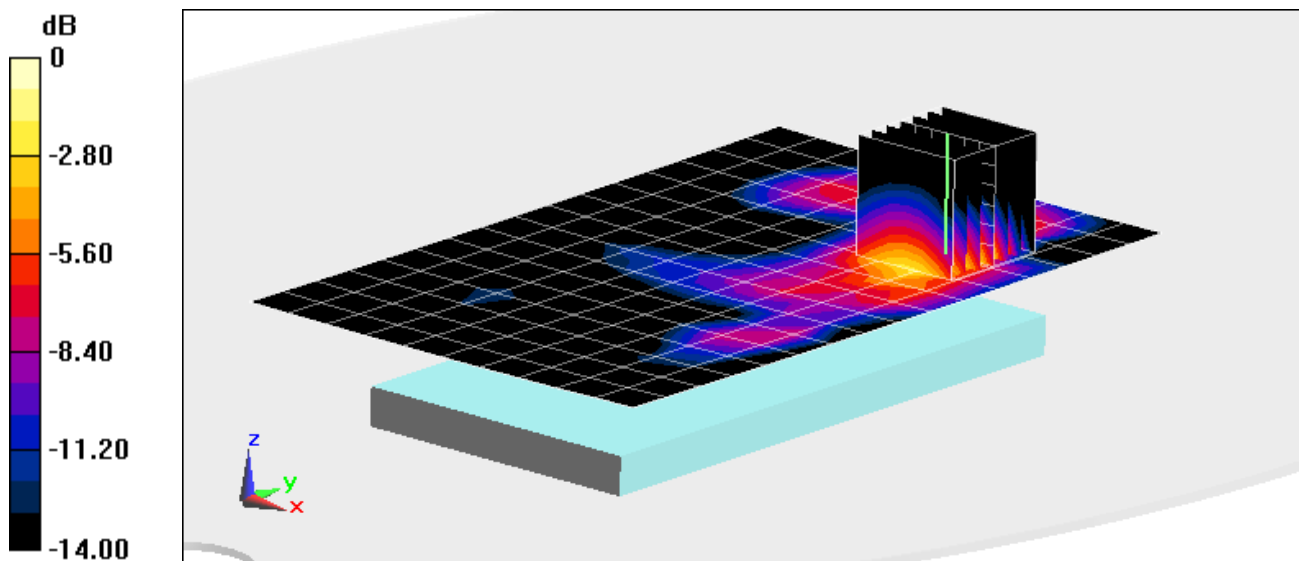
Area Scan (11x17x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Reference Value = 8.728 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.270 W/kg

SAR(1 g) = 0.128 W/kg



0 dB = 0.161 W/kg = -7.93 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 015D8

Communication System: UID 0, IEEE 802.11n; Frequency: 5745 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
 $f = 5745 \text{ MHz}$; $\sigma = 5.988 \text{ S/m}$; $\epsilon_r = 46.411$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 22.4°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3920; ConvF(4, 4, 4); Calibrated: 12/18/2013;
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn649; Calibrated: 12/12/2013
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357
Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

**Mode: IEEE 802.11n, 5.8 GHz, Body SAR, Ch 149, 13 Mbps, Back Side,
MIMO, Standard Cover**

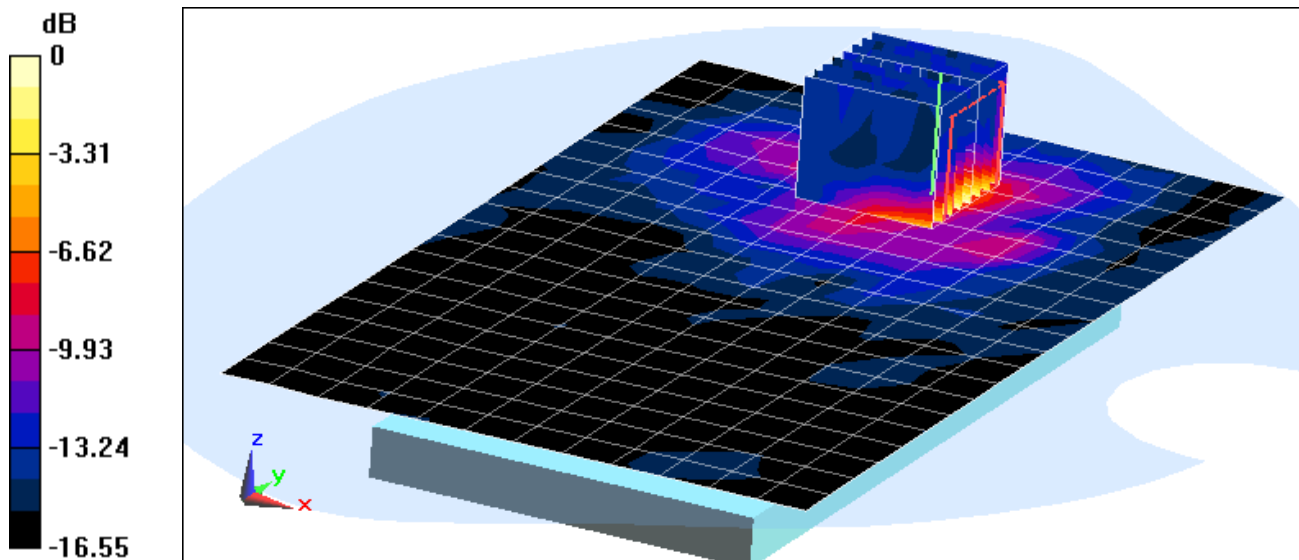
Area Scan (13x21x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 5.652 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 1.44 W/kg

SAR(1 g) = 0.292 W/kg



0 dB = 0.652 W/kg = -1.86 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 015D8

Communication System: UID 0, IEEE 802.11n; Frequency: 5745 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5745 \text{ MHz}$; $\sigma = 6.114 \text{ S/m}$; $\epsilon_r = 47.032$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-13-2014; Ambient Temp: 24.4°C; Tissue Temp: 24.0°C

Probe: EX3DV4 - SN3589; ConvF(3.97, 3.97, 3.97); Calibrated: 1/29/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

**Mode: IEEE 802.11n, 5.8 GHz, Body SAR, Ch 149, 13 Mbps, Back Side,
MIMO, Wireless Charging Cover**

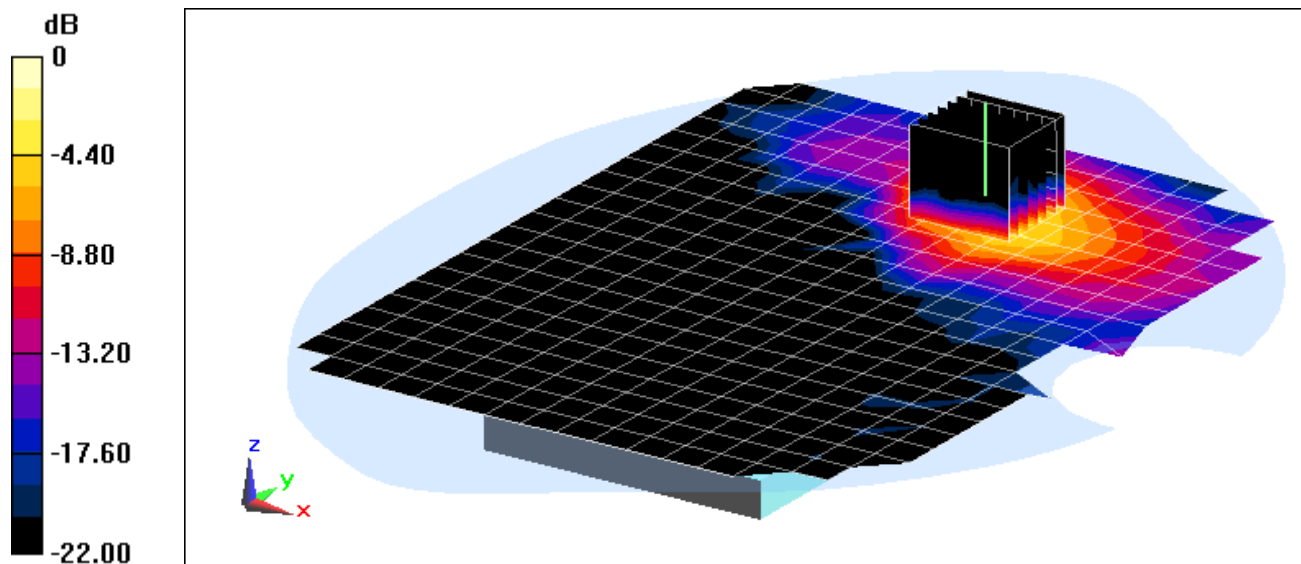
Area Scan (17x22x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (8x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 7.354 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 2.21 W/kg

SAR(1 g) = 0.482 W/kg



0 dB = 1.17 W/kg = 0.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 015D8

Communication System: UID 0, IEEE 802.11n; Frequency: 5680 MHz, Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5680 \text{ MHz}$; $\sigma = 5.917 \text{ S/m}$; $\epsilon_r = 46.318$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 22.4°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3920; ConvF(3.62, 3.62, 3.62); Calibrated: 12/18/2013,

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

Mode: IEEE 802.11n, 5.5-5.7 GHz, Body SAR, Ch 136, 13 Mbps, Back Side, MIMO, Standard Cover

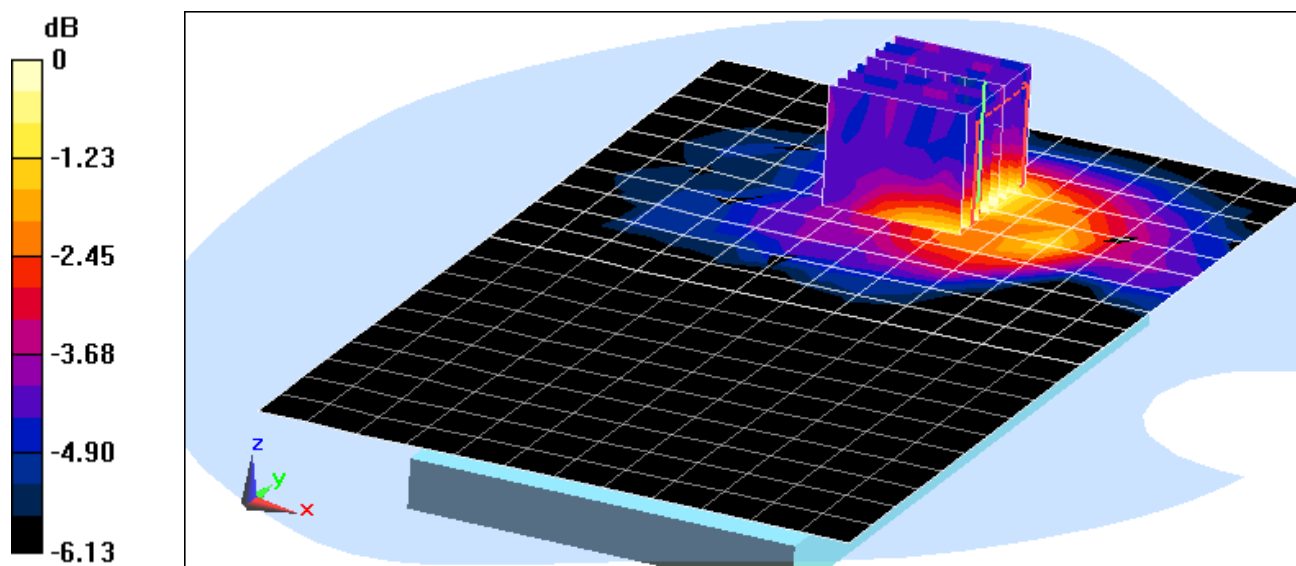
Area Scan (13x21x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 7.062 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 2.06 W/kg

SAR(1 g) = 0.454 W/kg



0 dB = 0.718 W/kg = -1.44 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMN910V; Type: Portable Handset; Serial: 015D7

Communication System: UID 0, IEEE 802.11a; Frequency: 5700 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5700 \text{ MHz}$; $\sigma = 6.018 \text{ S/m}$; $\epsilon_r = 47.133$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 08-13-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.9°C

Probe: EX3DV4 - SN3589; ConvF(3.81, 3.81, 3.81); Calibrated: 1/29/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

Mode: IEEE 802.11a, 5.5-5.7 GHz, Extremity SAR, Ch 140, 6 Mbps, Back Side, Antenna 2, Standard Cover

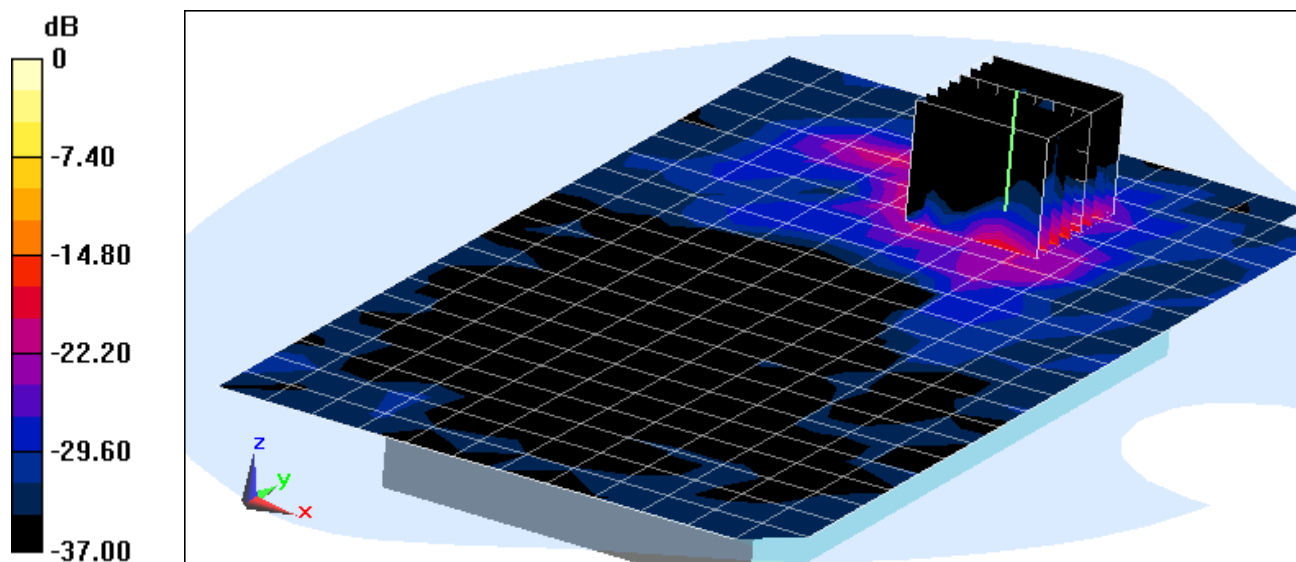
Area Scan (13x22x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Reference Value = 24.200 V/m; Power Drift = 0.15 dB

Peak SAR (extrapolated) = 32.0 W/kg

SAR(10 g) = 0.595 W/kg



0 dB = 14.5 W/kg = 11.61 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1003

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

Medium: 750 Head Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.903 \text{ S/m}$; $\epsilon_r = 40.246$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 08-13-2014; Ambient Temp: 23.6°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3209; ConvF(6.43, 6.43, 6.43); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

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

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

750 MHz System Verification

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

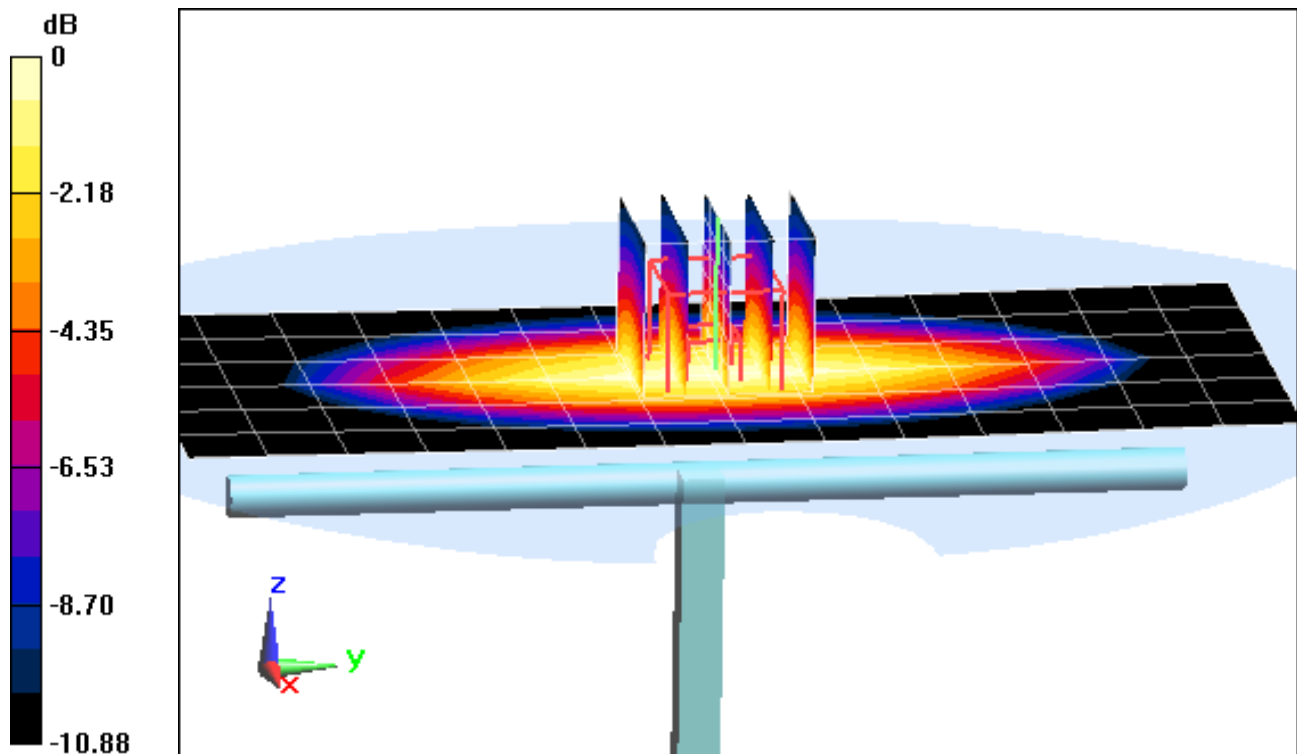
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.846 W/kg

Deviation: 1.08%



0 dB = 0.997 W/kg = -0.01 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.907 \text{ S/m}$; $\epsilon_r = 40.44$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 08-08-2014; Ambient Temp: 24.0°C; Tissue Temp: 23.3°C

Probe: ES3DV3 - SN3263; ConvF(6.23, 6.23, 6.23); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

Phantom: SAM v5.0 Left; Type: QD000P40CD; Serial: TP: 1687

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

835 MHz System Verification

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

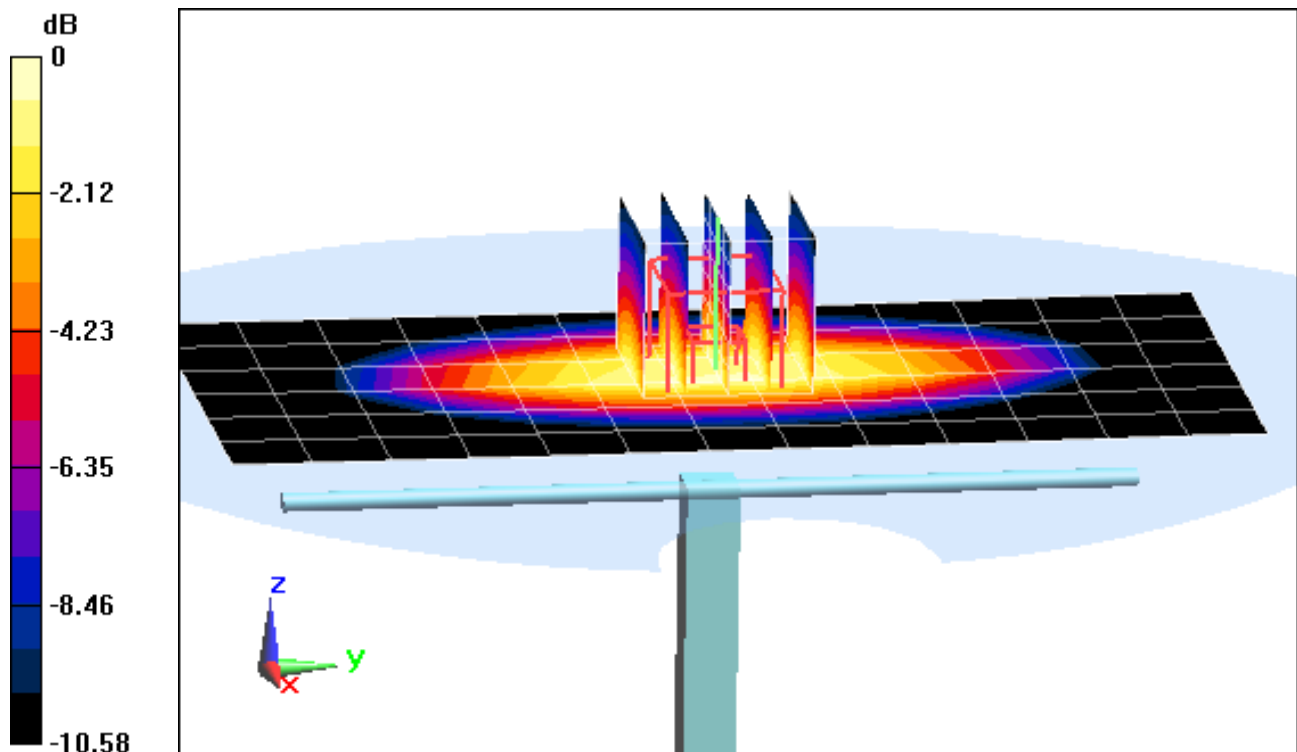
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.44 W/kg

SAR(1 g) = 0.967 W/kg

Deviation: 4.88%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Head Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.921 \text{ S/m}$; $\epsilon_r = 41.928$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 09-01-2014; Ambient Temp: 23.3°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3287; ConvF(6.3, 6.3, 6.3); Calibrated: 11/20/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 11/19/2013

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797

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

835 MHz System Verification

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

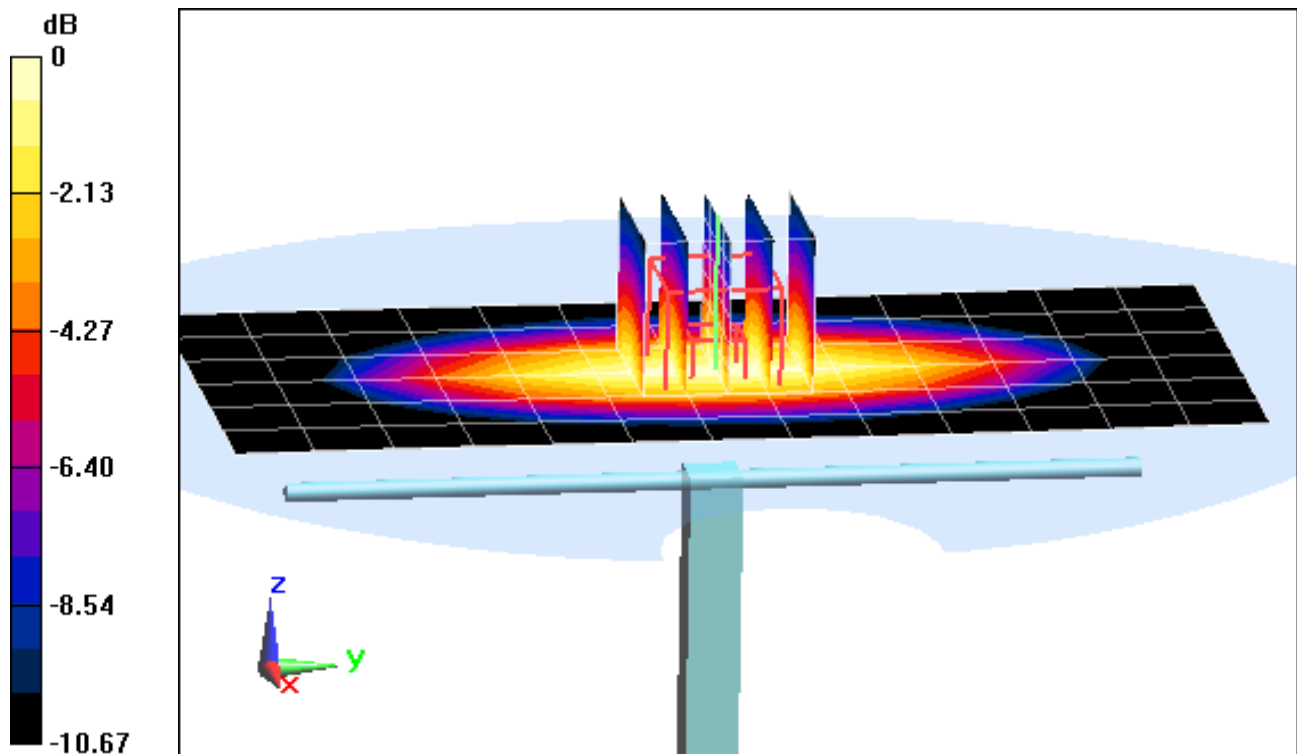
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.951 W/kg

Deviation: 3.15%



0 dB = 1.11 W/kg = 0.45 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

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

Medium: 1750 Head Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.336 \text{ S/m}$; $\epsilon_r = 39.019$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-09-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(5.41, 5.41, 5.41); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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

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

1750 MHz System Verification

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

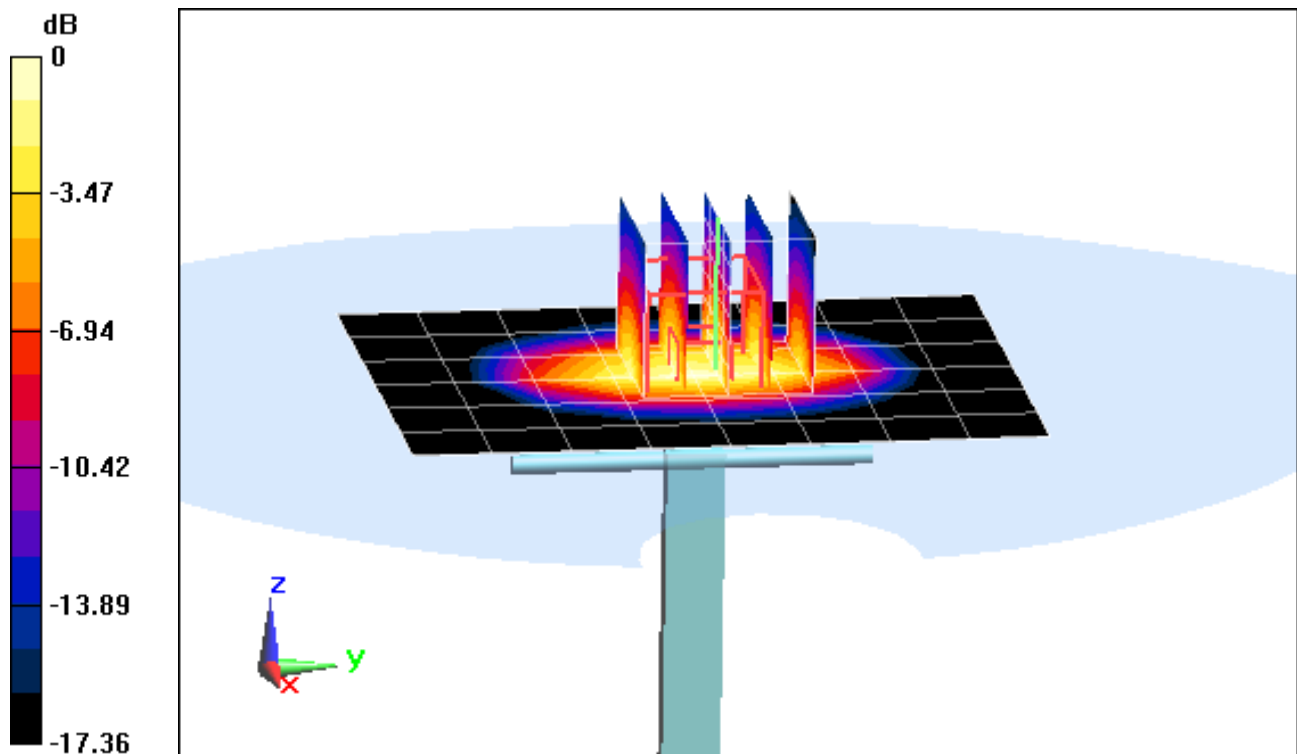
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 6.17 W/kg

SAR(1 g) = 3.47 W/kg

Deviation: -5.96%



0 dB = 4.33 W/kg = 6.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.427 \text{ S/m}$; $\epsilon_r = 38.732$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-14-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3287; ConvF(5.08, 5.08, 5.08); Calibrated: 11/20/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 11/19/2013

Phantom: SAM with CRP v4.0; Type: QD000P40CD; Serial: TP:1797

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

1900 MHz System Verification

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

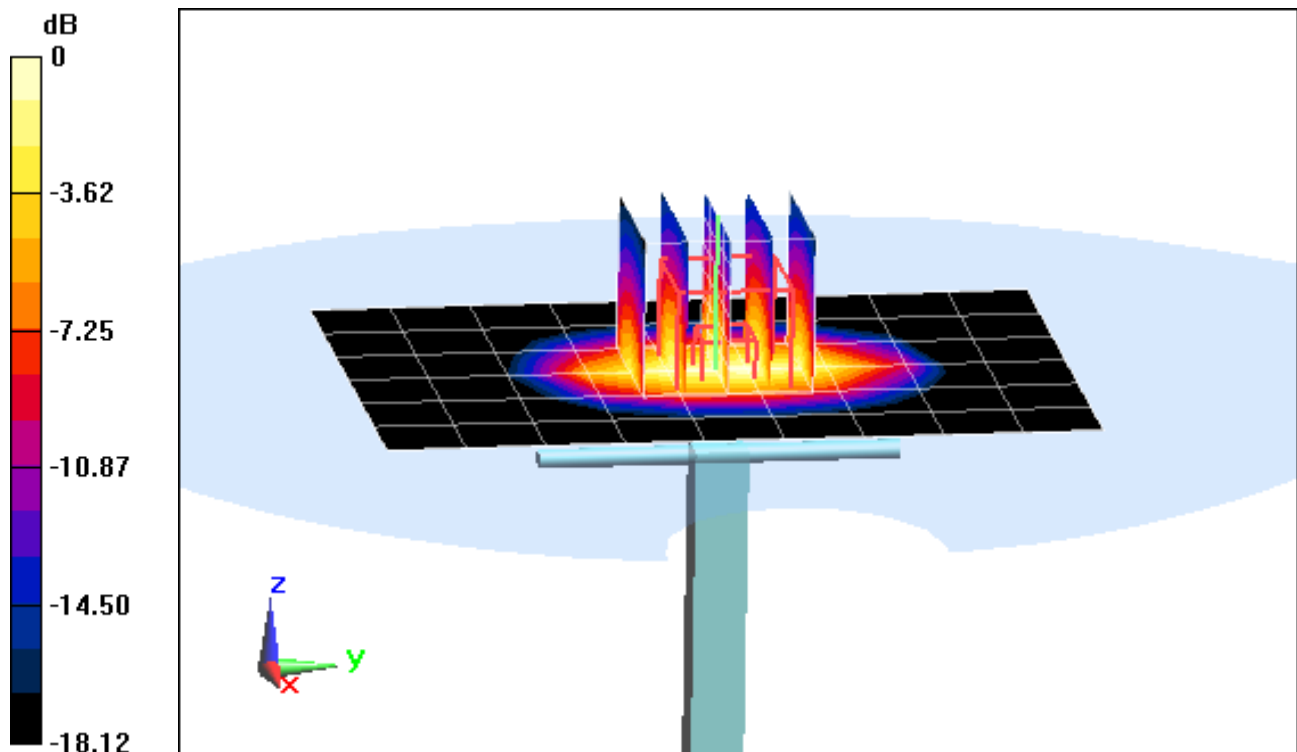
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.38 W/kg

SAR(1 g) = 4.08 W/kg

Deviation: 1.75%



0 dB = 5.16 W/kg = 7.13 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Head Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.395 \text{ S/m}$; $\epsilon_r = 39.215$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 09-04-2014; Ambient Temp: 23.6°C; Tissue Temp: 22.9°C

Probe: ES3DV3 - SN3209; ConvF(5.13, 5.13, 5.13); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM left; Type: QD000P40CD; Serial: TP:1715

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

1900 MHz System Verification

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

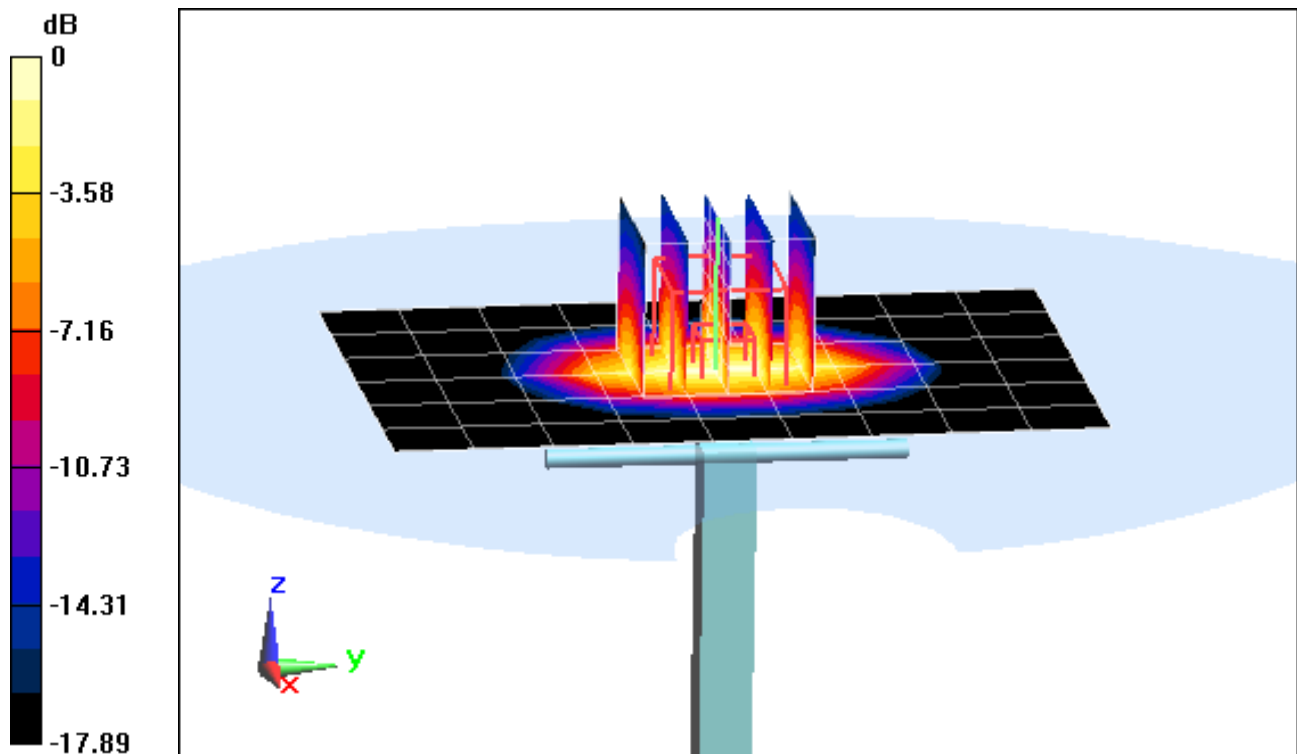
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.38 W/kg

SAR(1 g) = 4.06 W/kg

Deviation: 1.25%



0 dB = 5.13 W/kg = 7.10 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

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

Medium: 2450 Head Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.861 \text{ S/m}$; $\epsilon_r = 38.157$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-28-2014; Ambient Temp: 24.1°C; Tissue Temp: 22.2°C

Probe: ES3DV3 - SN3258; ConvF(4.52, 4.52, 4.52); Calibrated: 2/25/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/26/2014

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

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

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

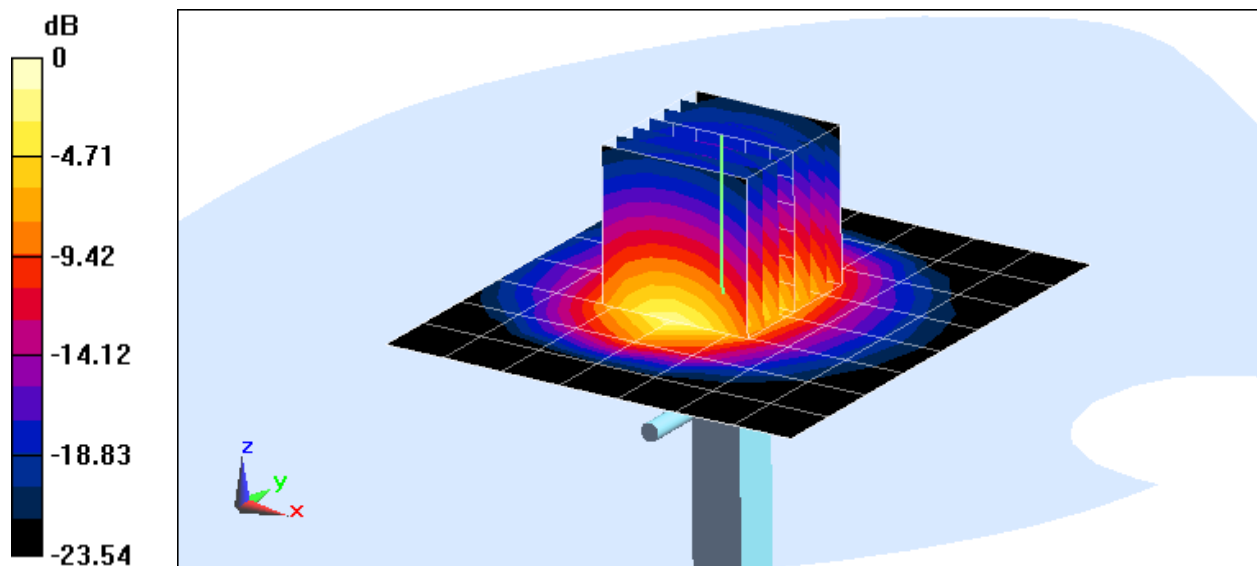
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 10.3 W/kg

SAR(1 g) = 4.82 W/kg

Deviation: -6.95%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1057

Communication System: UID 0, CW; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 4.724 \text{ S/m}$; $\epsilon_r = 35.49$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-12-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.8°C

Probe: EX3DV4 - SN3914; ConvF(4.99, 4.99, 4.99); Calibrated: 10/23/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 11/19/2013

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

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

5200 MHz System Verification

Area Scan (7x7x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

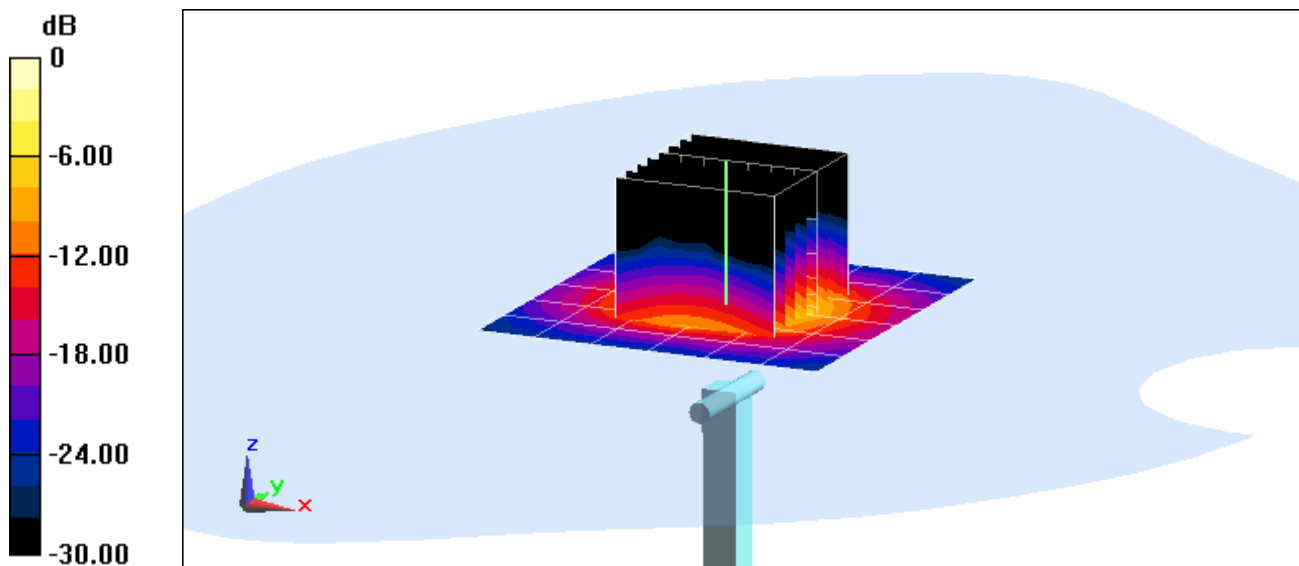
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 31.6 W/kg

SAR(1 g) = 7.57 W/kg

Deviation: -2.95%



0 dB = 17.6 W/kg = 12.46 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5300 MHz; Type: D5GHzV2; Serial: 1057

Communication System: UID 0, CW; Frequency: 5300 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5300 \text{ MHz}$; $\sigma = 4.826 \text{ S/m}$; $\epsilon_r = 35.388$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-12-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3914; ConvF(4.82, 4.82, 4.82); Calibrated: 10/23/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 11/19/2013

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

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

5300 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

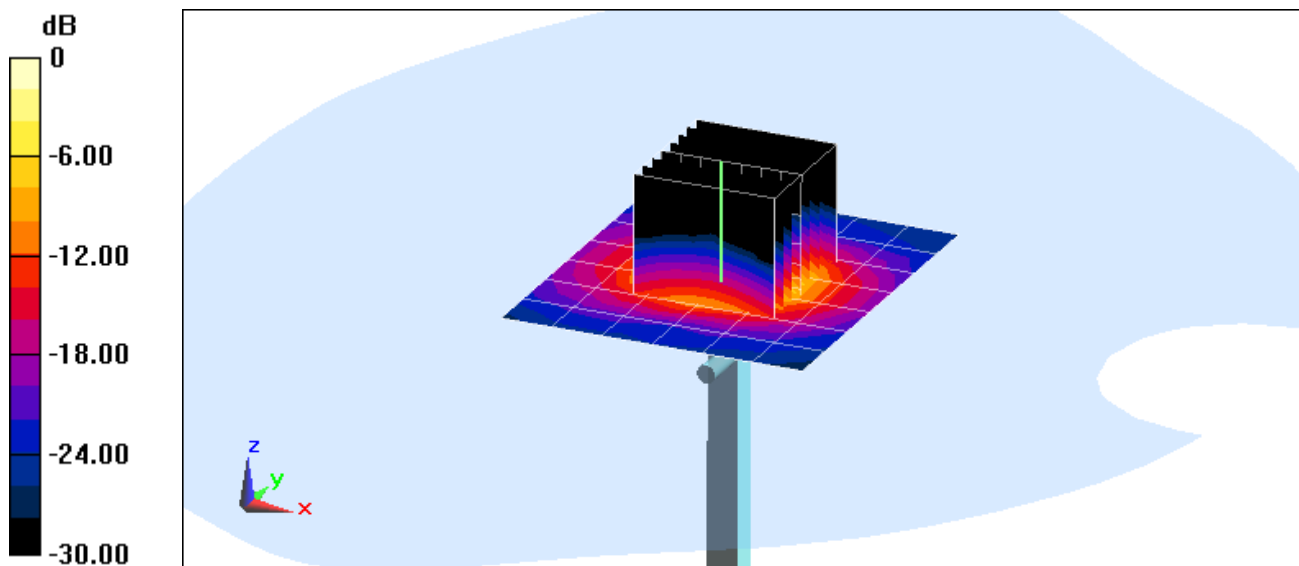
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 35.5 W/kg

SAR(1 g) = 8.18 W/kg

Deviation: -1.45%



0 dB = 19.1 W/kg = 12.81 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1057

Communication System: UID 0, CW; Frequency: 5500 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.059 \text{ S/m}$; $\epsilon_r = 35.124$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-12-2014; Ambient Temp: 24.3°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3914; ConvF(4.55, 4.55, 4.55); Calibrated: 10/23/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 11/19/2013

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

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

5500 MHz System Verification

Area Scan (7x7x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

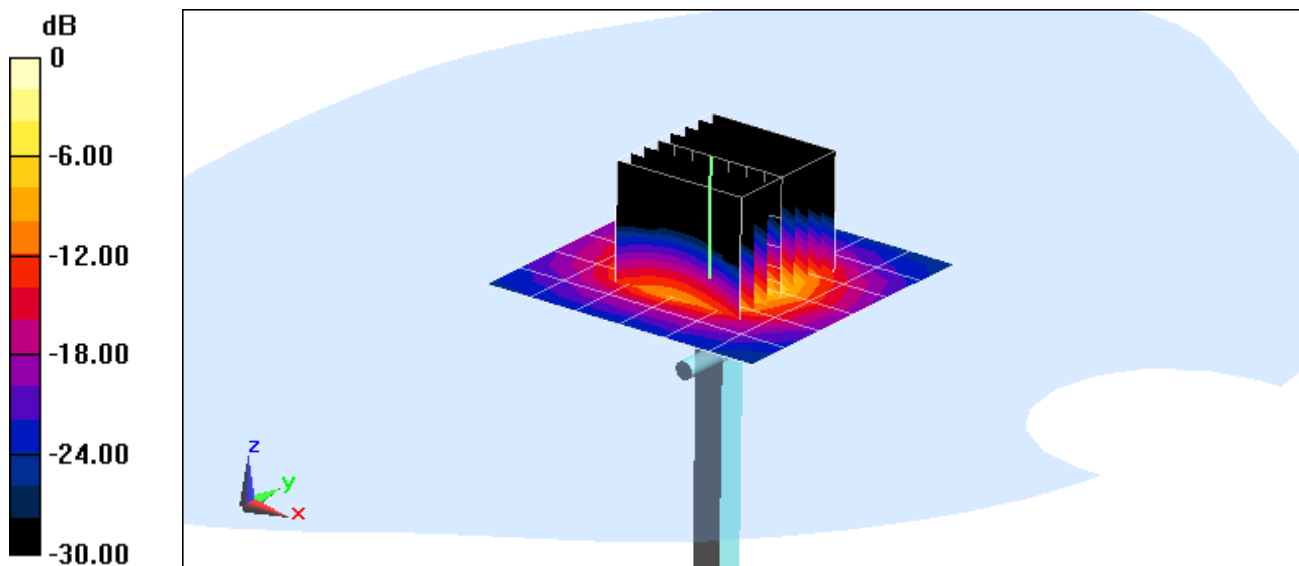
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 34.8 W/kg

SAR(1 g) = 7.92 W/kg

Deviation: -6.05%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5600 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Head Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 5.129 \text{ S/m}$; $\epsilon_r = 34.965$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-12-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3914; ConvF(4.37, 4.37, 4.37); Calibrated: 10/23/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 11/19/2013

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

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

5600 MHz System Verification

Area Scan (7x7x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

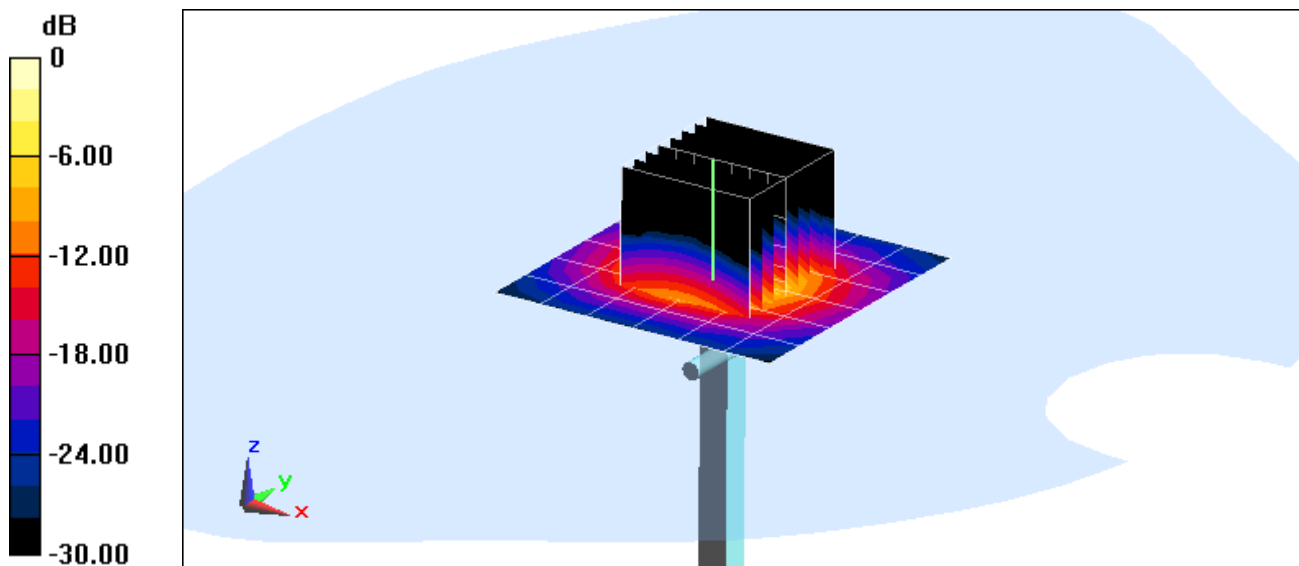
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 38.1 W/kg

SAR(1 g) = 8.50 W/kg

Deviation: 1.80%



0 dB = 20.6 W/kg = 13.14 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1057

Communication System: UID 0, CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: 5 GHz Head Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 5.343 \text{ S/m}$; $\epsilon_r = 34.693$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-12-2014; Ambient Temp: 24.2°C; Tissue Temp: 22.9°C

Probe: EX3DV4 - SN3914; ConvF(4.52, 4.52, 4.52); Calibrated: 10/23/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 11/19/2013

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

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

5800 MHz System Verification

Area Scan (7x7x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

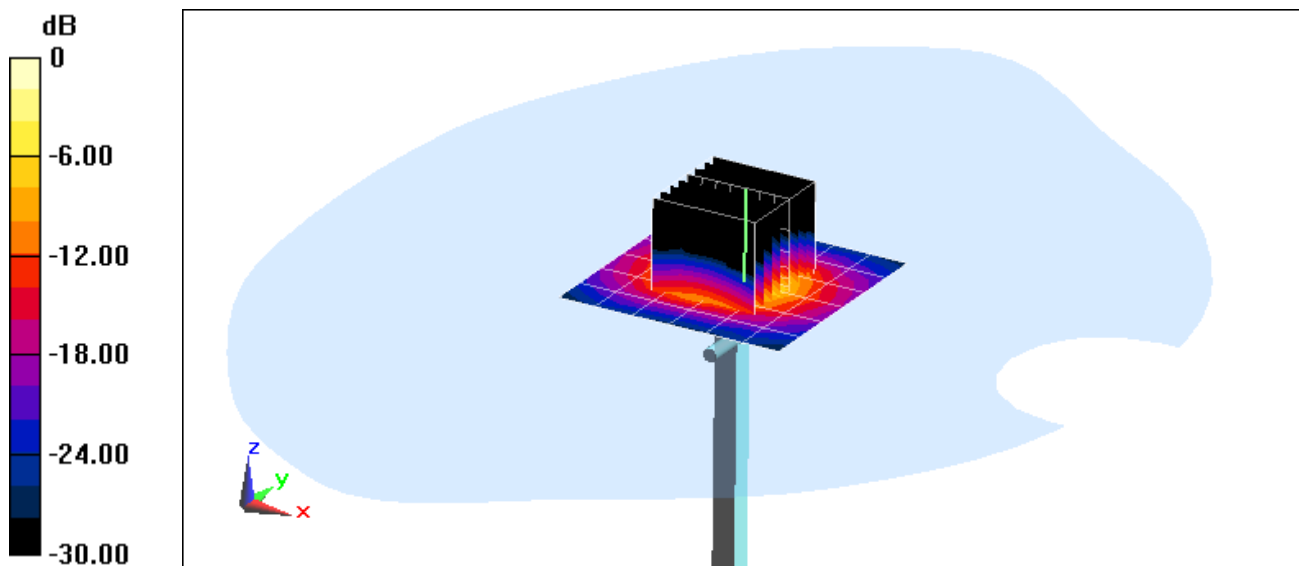
Zoom Scan (8x8x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 36.2 W/kg

SAR(1 g) = 7.70 W/kg

Deviation: -2.90%



0 dB = 19.0 W/kg = 12.79 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1003

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.969 \text{ S/m}$; $\epsilon_r = 53.997$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 08-12-2014; Ambient Temp: 23.2°C; Tissue Temp: 22.5°C

Probe: ES3DV3 - SN3332; ConvF(6.21, 6.21, 6.21); Calibrated: 11/25/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1407; Calibrated: 11/18/2013

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1226

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

750 MHz System Verification

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

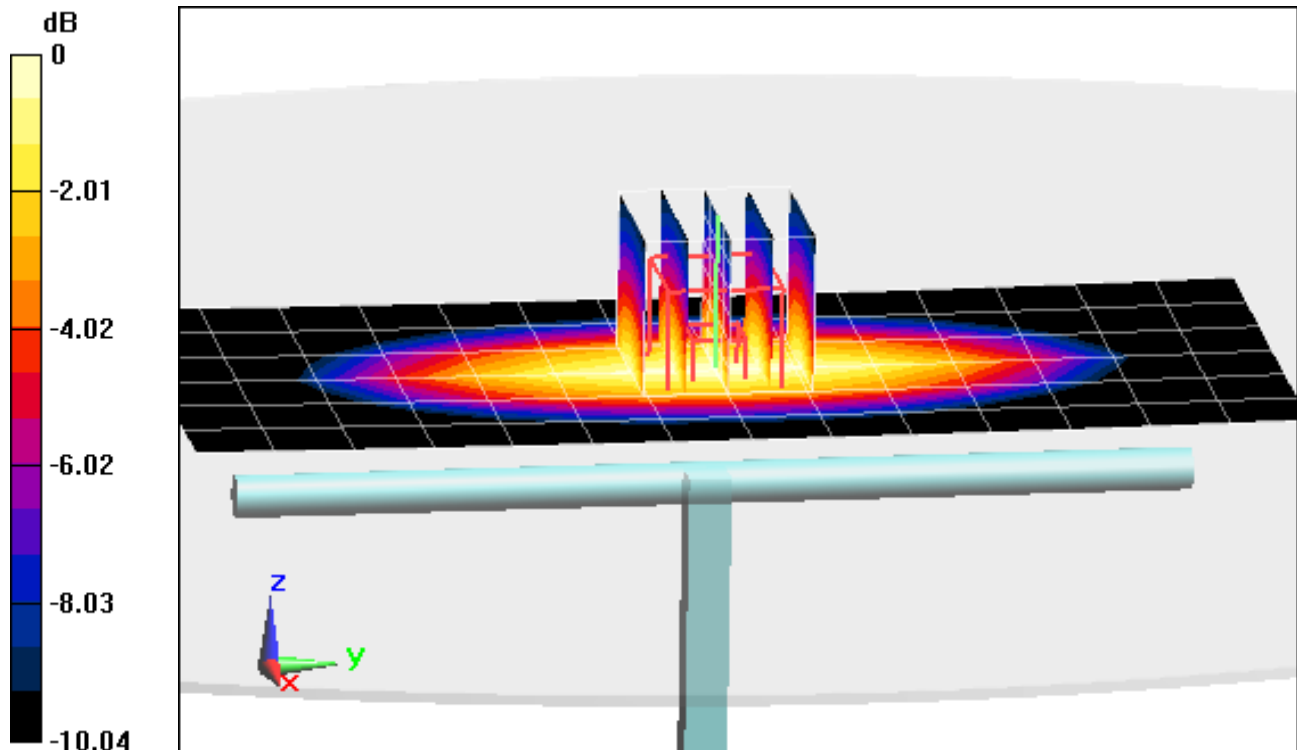
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.916 W/kg

Deviation: 4.45%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1003

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.964 \text{ S/m}$; $\epsilon_r = 54.233$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 08-31-2014; Ambient Temp: 22.9°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3209; ConvF(6.16, 6.16, 6.16); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

750 MHz System Verification

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

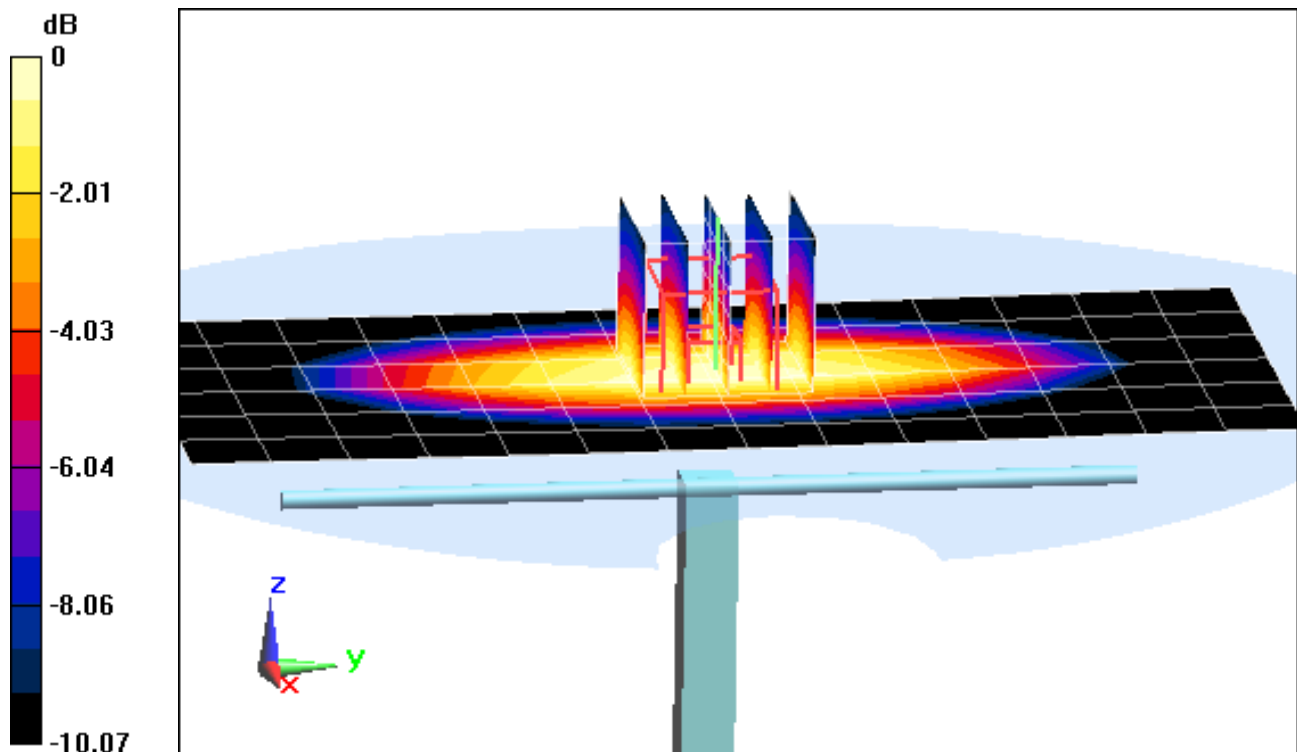
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.908 W/kg

Deviation: 3.53%



0 dB = 1.06 W/kg = 0.25 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 1 \text{ S/m}$; $\epsilon_r = 53.255$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.5 cm

Test Date: 08-11-2014; Ambient Temp: 23.3°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3263; ConvF(6.16, 6.16, 6.16); Calibrated: 5/15/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 5/14/2014

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

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

835 MHz System Verification

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

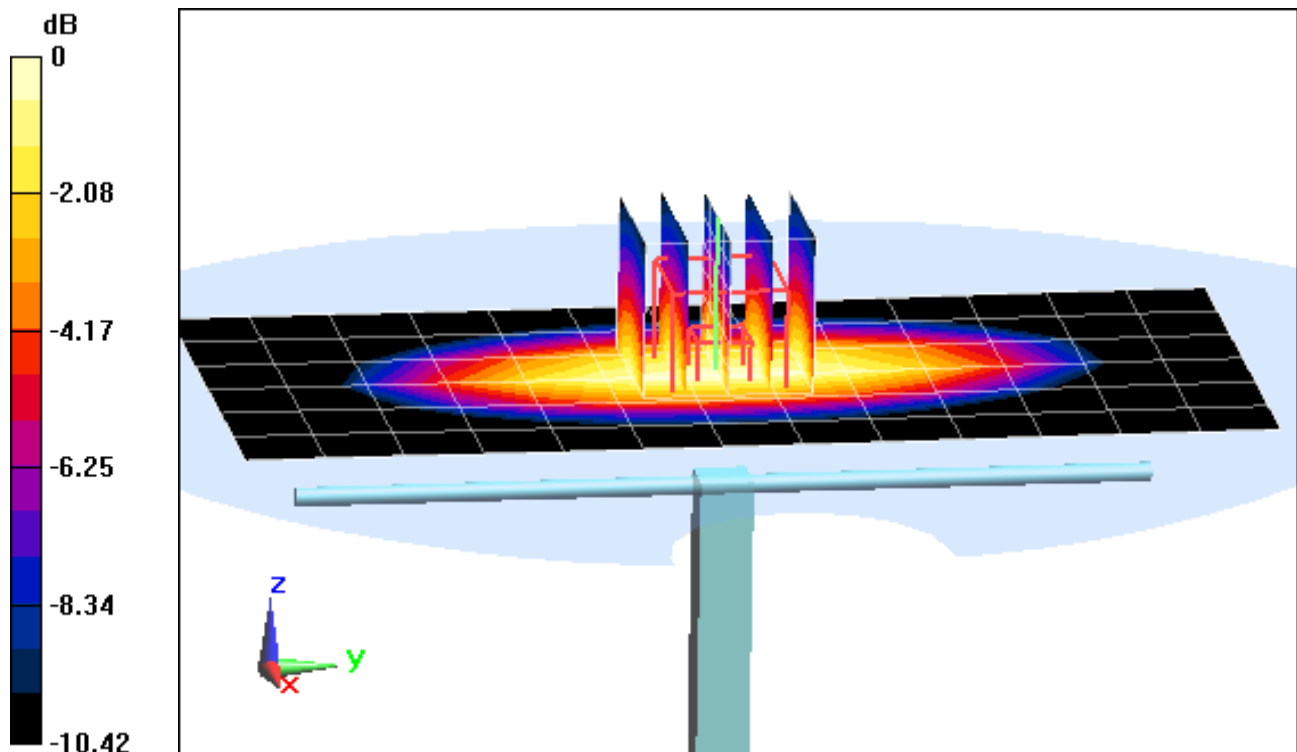
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 1.48 W/kg

SAR(1 g) = 1.01 W/kg

Deviation: 8.14%



0 dB = 1.17 W/kg = 0.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

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

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.443 \text{ S/m}$; $\epsilon_r = 52.14$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 23.4°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3209; ConvF(4.85, 4.85, 4.85); Calibrated: 3/19/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM left; Type: QD000P40CD; Serial: TP:1715

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

1750 MHz System Verification

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

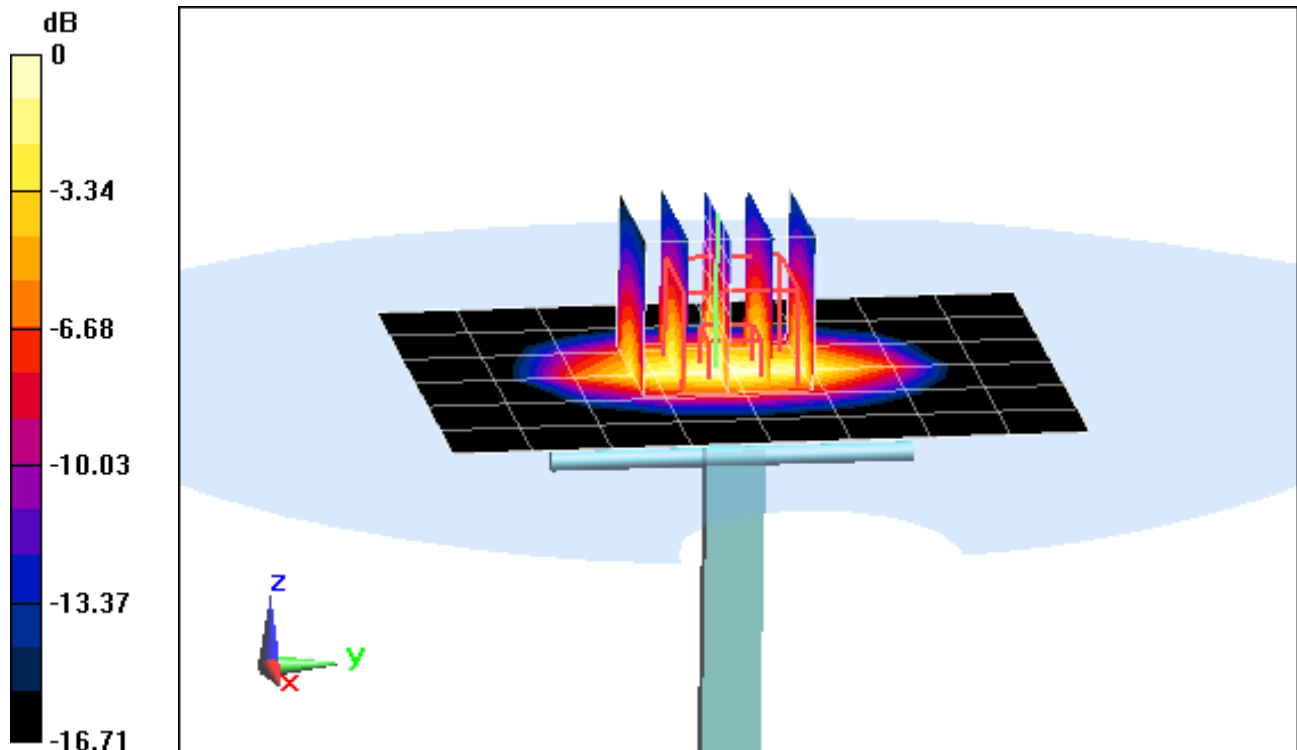
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 6.09 W/kg

SAR(1 g) = 3.51 W/kg

Deviation: -6.65%



0 dB = 4.35 W/kg = 6.38 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 1750 MHz; Type: D1765V2; Serial: 1008

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

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.462 \text{ S/m}$; $\epsilon_r = 51.676$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-29-2014; Ambient Temp: 23.8°C; Tissue Temp: 21.7°C

Probe: ES3DV3 - SN3287; ConvF(4.93, 4.93, 4.93); Calibrated: 11/20/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 11/19/2013

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

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

1750 MHz System Verification

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

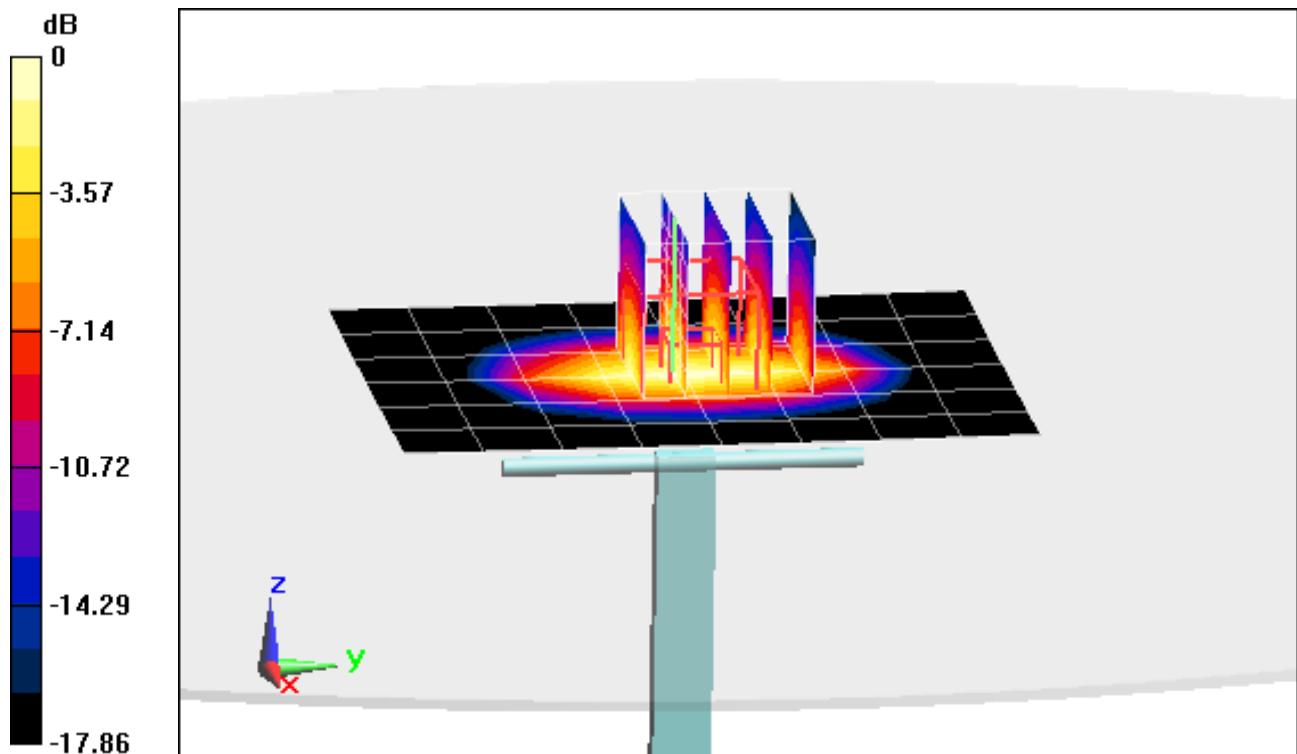
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 6.61 W/kg

SAR(1 g) = 3.79 W/kg

Deviation: 0.80%



0 dB = 4.66 W/kg = 6.68 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.555 \text{ S/m}$; $\epsilon_r = 52.91$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 23.8°C; Tissue Temp: 22.6°C

Probe: ES3DV3 - SN3287; ConvF(4.67, 4.67, 4.67); Calibrated: 11/20/2013;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1408; Calibrated: 11/19/2013

Phantom: ELI v5.0; Type: QDOVA001BB; Serial: 1229

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

1900 MHz System Verification

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

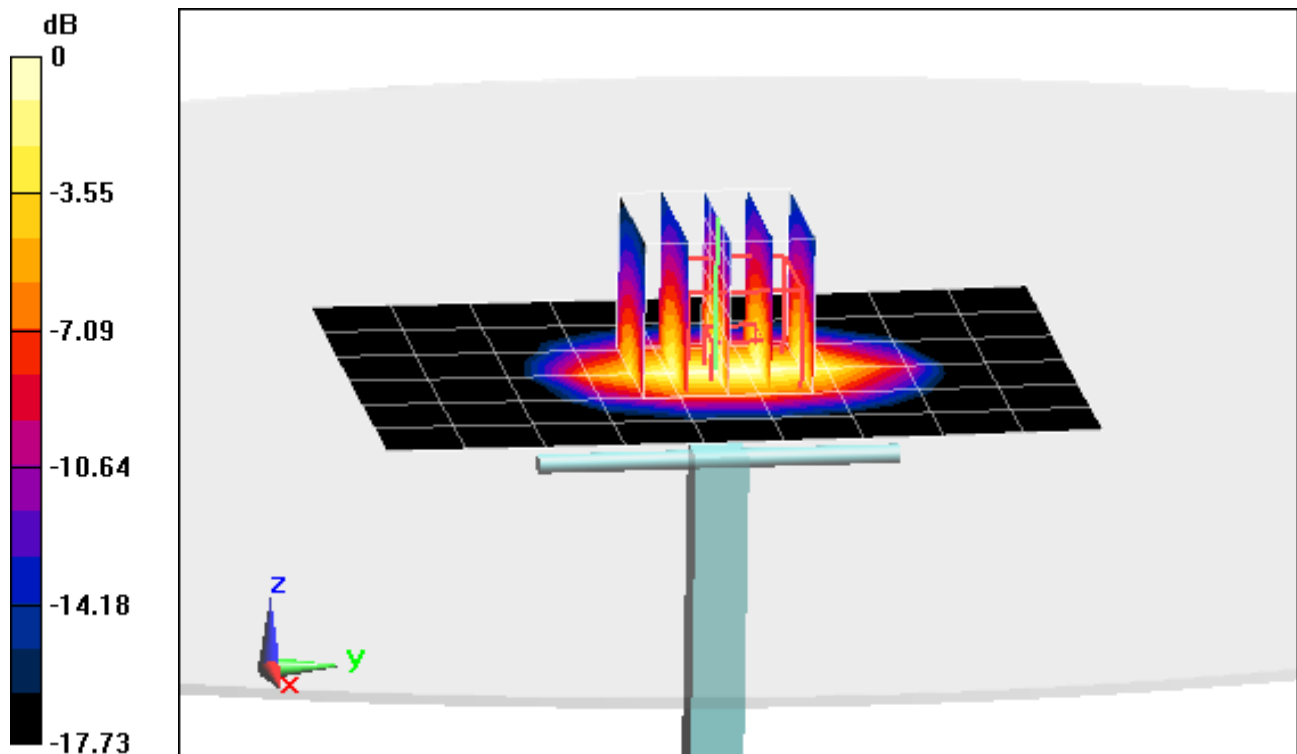
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 7.40 W/kg

SAR(1 g) = 4.19 W/kg

Deviation: 3.20%



PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.509 \text{ S/m}$; $\epsilon_r = 52.062$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 09-01-2014; Ambient Temp: 23.0°C; Tissue Temp: 22.1°C

Probe: ES3DV3 - SN3319; ConvF(4.67, 4.67, 4.67); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202

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

1900 MHz System Verification

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

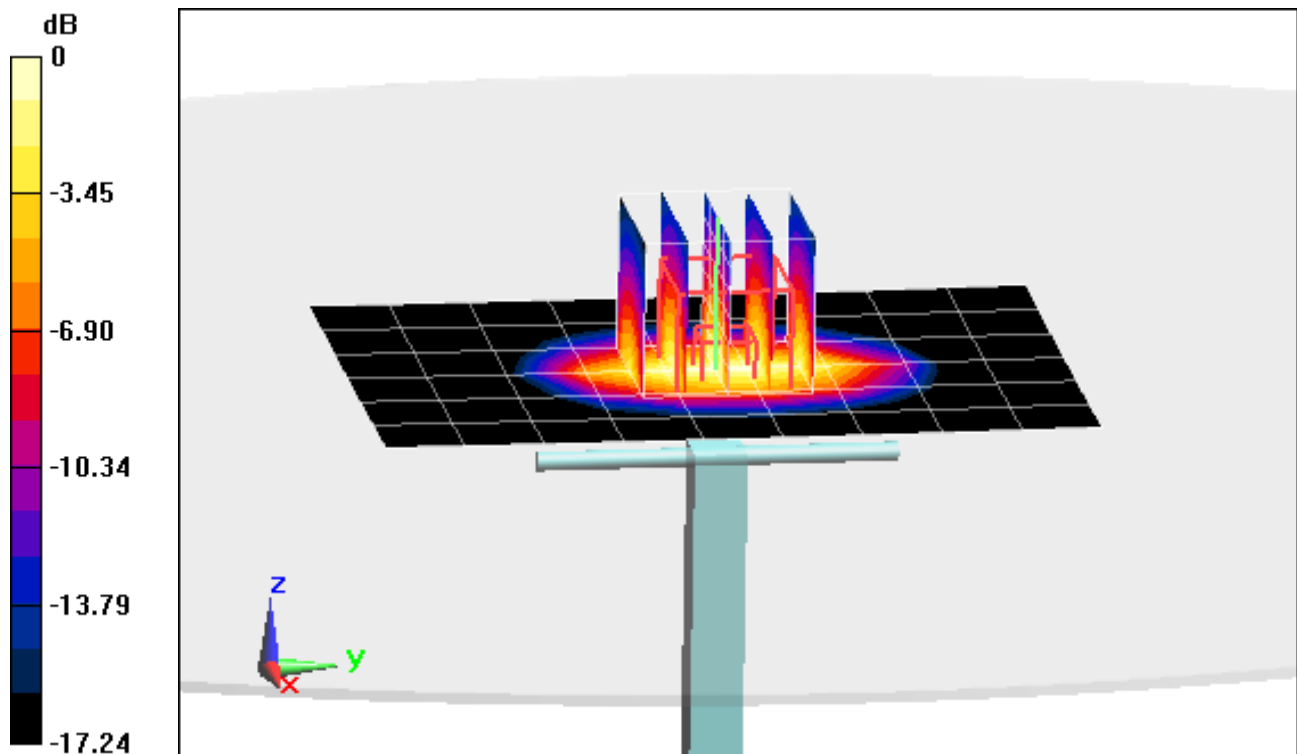
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 6.80 W/kg

SAR(1 g) = 3.92 W/kg

Deviation: -3.45%



0 dB = 4.92 W/kg = 6.92 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 797

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

Medium: 2450 Body Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 1.903 \text{ S/m}$; $\epsilon_r = 50.849$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-07-2014; Ambient Temp: 23.9°C; Tissue Temp: 23.0°C

Probe: ES3DV3 - SN3319; ConvF(4.24, 4.24, 4.24); Calibrated: 4/17/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1368; Calibrated: 4/11/2014

Phantom: ELI left; Type: QDOVA002AA; Serial: TP:1202

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

2450 MHz System Verification

Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

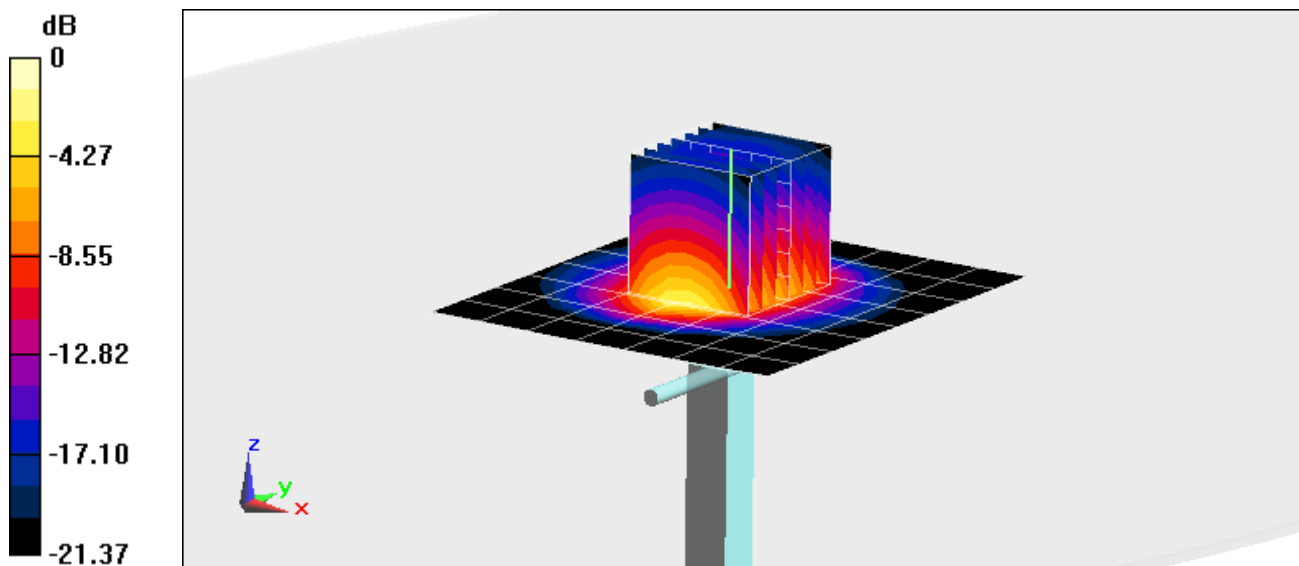
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 11.0 W/kg

SAR(1 g) = 5.24 W/kg

Deviation: 6.07%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1007

Communication System: UID 0, CW; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 5.365 \text{ S/m}$; $\epsilon_r = 47.684$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 22.4°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3920; ConvF(4.23, 4.23, 4.23); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

5200MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

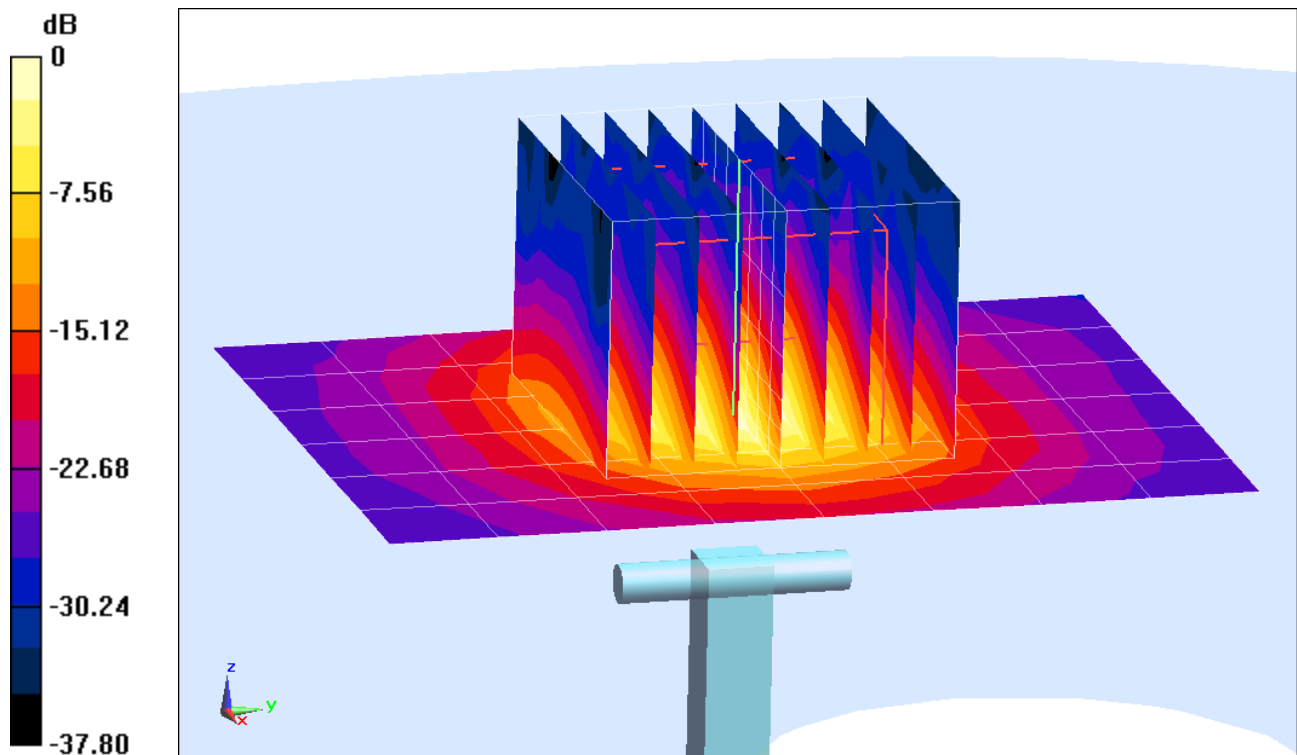
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 28.6 W/kg

SAR(1 g) = 7.51 W/kg

Deviation: 3.44%



0 dB = 19.1 W/kg = 12.81 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5200 MHz; Type: D5GHzV2; Serial: 1057

Communication System: UID 0, CW; Frequency: 5200 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5200 \text{ MHz}$; $\sigma = 5.262 \text{ S/m}$; $\epsilon_r = 48.246$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-13-2014; Ambient Temp: 24.4°C; Tissue Temp: 24.0°C

Probe: EX3DV4 - SN3589; ConvF(4.19, 4.19, 4.19); Calibrated: 1/29/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

5200 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

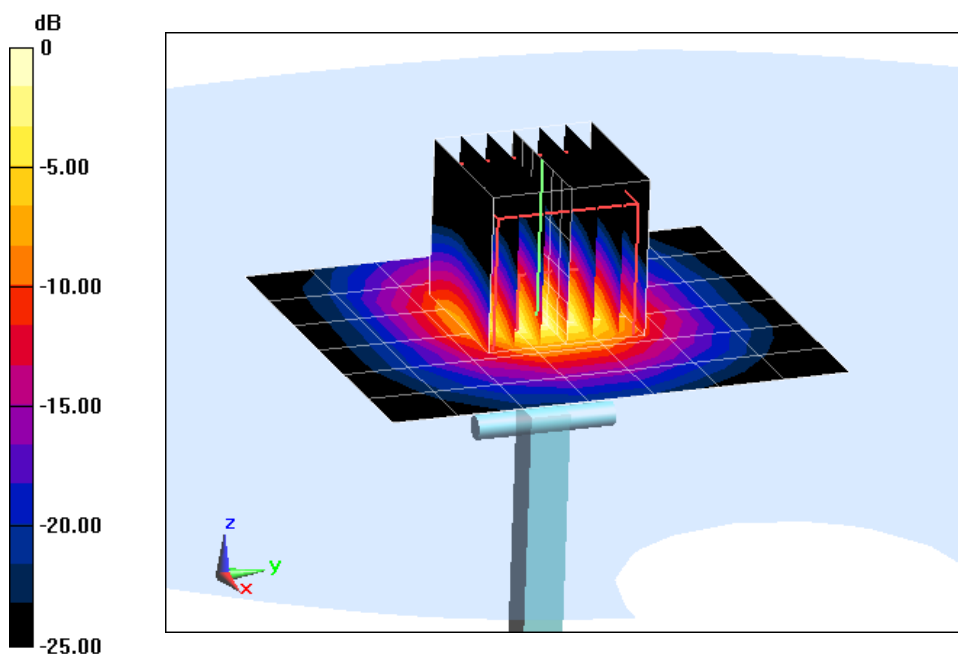
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 33.8 W/kg

SAR(10 g) = 2.25 W/kg

Deviation: 7.14%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5300 MHz; Type: D5GHzV2; Serial: 1007

Communication System: UID 0, CW; Frequency: 5300 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5300 \text{ MHz}$; $\sigma = 5.483 \text{ S/m}$; $\epsilon_r = 47.707$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 22.4°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3920; ConvF(4.11, 4.11, 4.11); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

5300MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

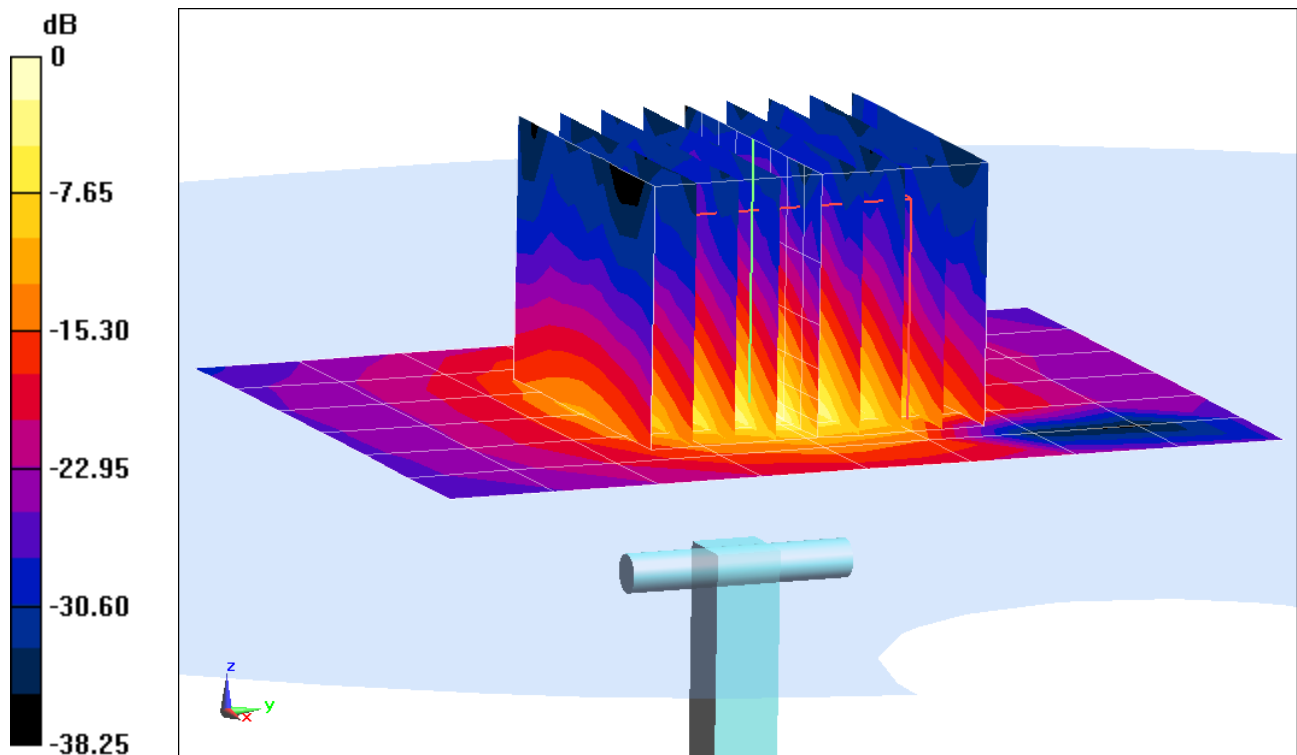
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 29.5 W/kg

SAR(1 g) = 7.72 W/kg

Deviation: 3.35%



0 dB = 18.9 W/kg = 12.76 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5300 MHz; Type: D5GHzV2; Serial: 1057

Communication System: UID 0, CW; Frequency: 5300 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5300 \text{ MHz}$; $\sigma = 5.427 \text{ S/m}$; $\epsilon_r = 48.087$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-13-2014; Ambient Temp: 24.4°C; Tissue Temp: 24.1°C

Probe: EX3DV4 - SN3589; ConvF(3.98, 3.98, 3.98); Calibrated: 1/29/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

5300 MHz System Verification

Area Scan (7x8x1): Measurement grid: dx=10mm, dy=10mm

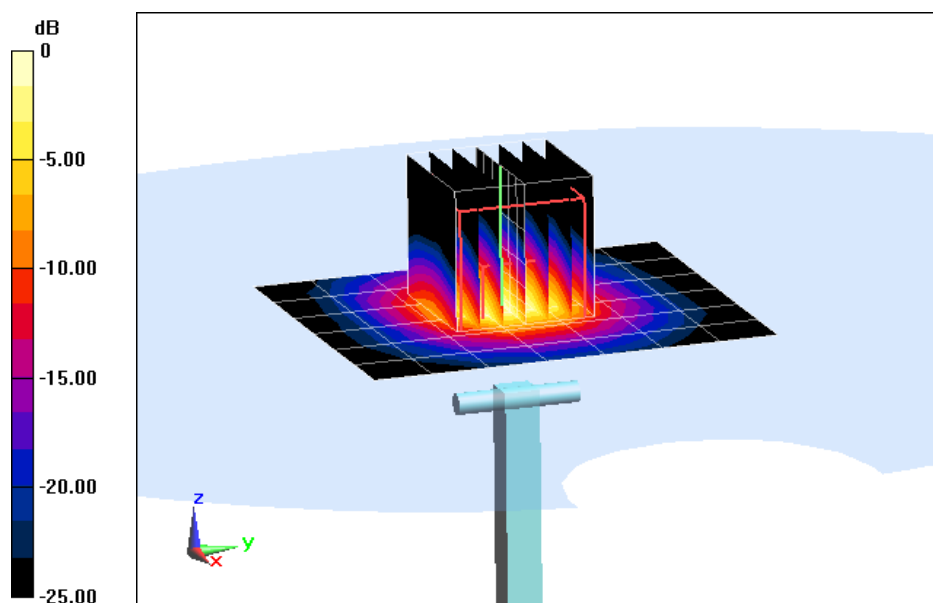
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 36.4 W/kg

SAR(10 g) = 2.33 W/kg

Deviation: 8.37%



0 dB = 21.5 W/kg = 13.32 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5500 MHz; Type: D5GHzV2; Serial: 1007

Communication System: UID 0, CW; Frequency: 5500 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.726 \text{ S/m}$; $\epsilon_r = 47.237$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 22.4°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3920; ConvF(3.8, 3.8, 3.8); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

5500MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

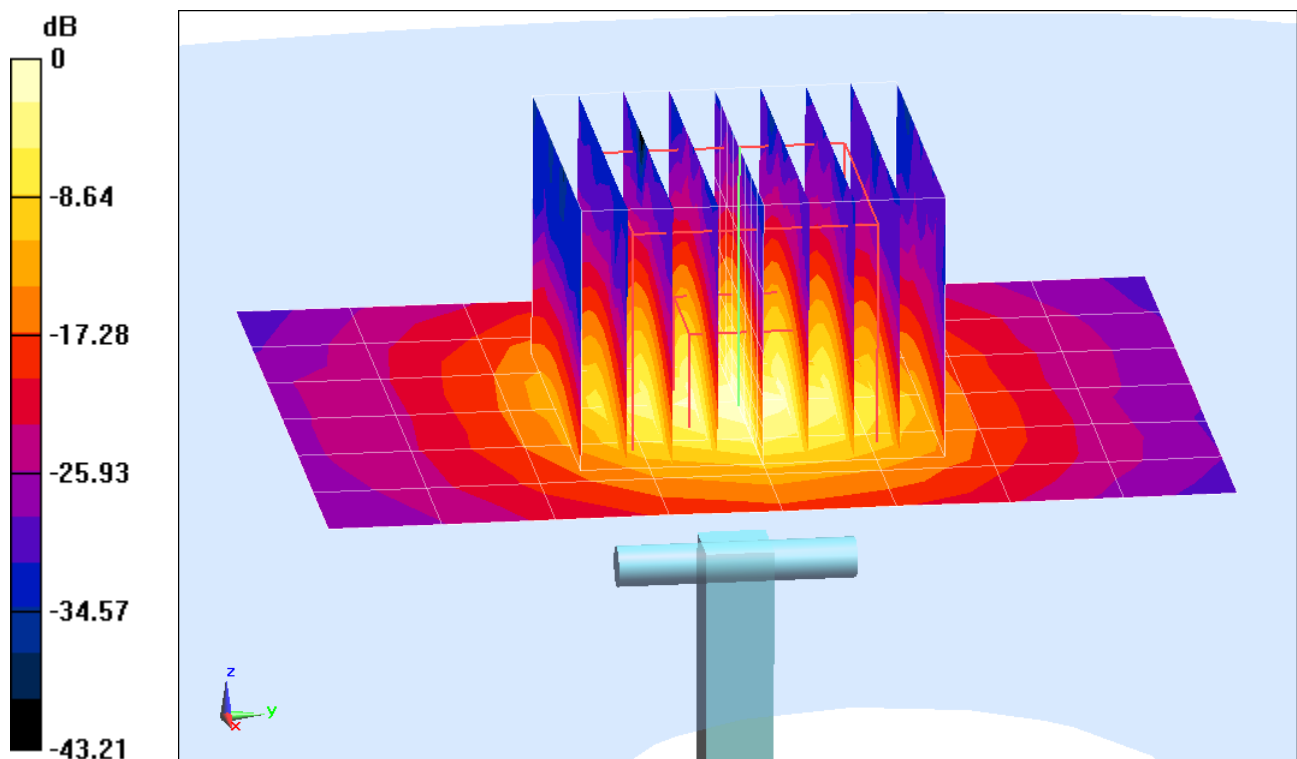
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 30.7 W/kg

SAR(1 g) = 7.81 W/kg

Deviation: 2.90%



0 dB = 19.8 W/kg = 12.97 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT:Dipole 5500 MHz; Type: D5GHzV2; Serial: 1057

Communication System: UID 0, CW; Frequency: 5500 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.733 \text{ S/m}$; $\epsilon_r = 47.55$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-13-2014; Ambient Temp: 24.3°C; Tissue Temp: 23.9°C

Probe: EX3DV4 - SN3589; ConvF(3.76, 3.76, 3.76); Calibrated: 1/29/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

5500 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

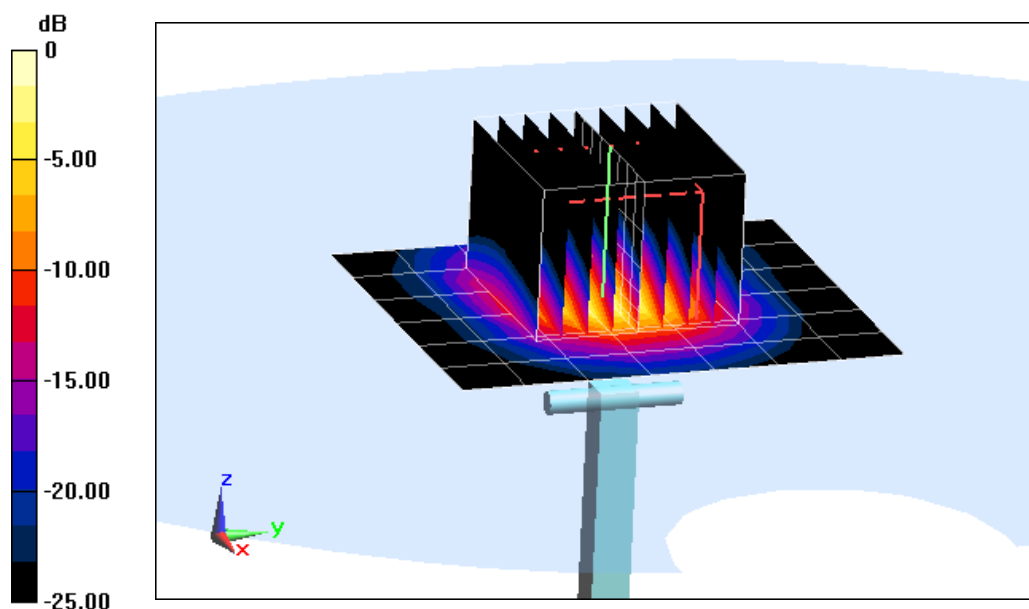
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 37.5 W/kg

SAR(10 g) = 2.3 W/kg

Deviation: 4.55%



0 dB = 21.7 W/kg = 13.36 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5600 MHz; Type: D5GHzV2; Serial: 1007

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

Medium: 5 GHz Body Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 5.861 \text{ S/m}$; $\epsilon_r = 46.839$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 22.4°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3920; ConvF(3.62, 3.62, 3.62); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

5600MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

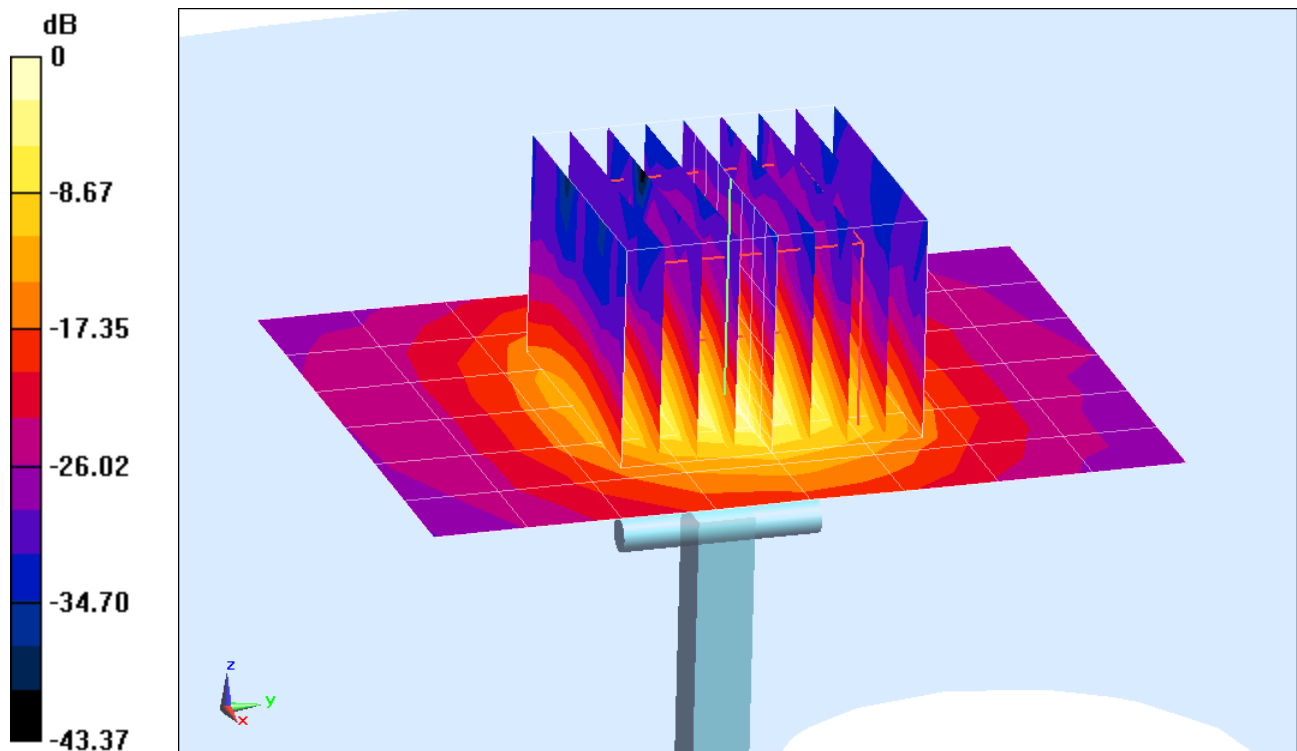
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 32.1 W/kg

SAR(1 g) = 7.66 W/kg

Deviation: -0.91%



0 dB = 19.6 W/kg = 12.92 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5600 MHz; Type: D5GHzV2; Serial: 1057

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

Medium: 5 GHz Body Medium parameters used:

$f = 5600 \text{ MHz}$; $\sigma = 5.871 \text{ S/m}$; $\epsilon_r = 47.349$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-13-2014; Ambient Temp: 24.2°C; Tissue Temp: 23.9°C

Probe: EX3DV4 - SN3589; ConvF(3.81, 3.81, 3.81); Calibrated: 1/29/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

5600 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

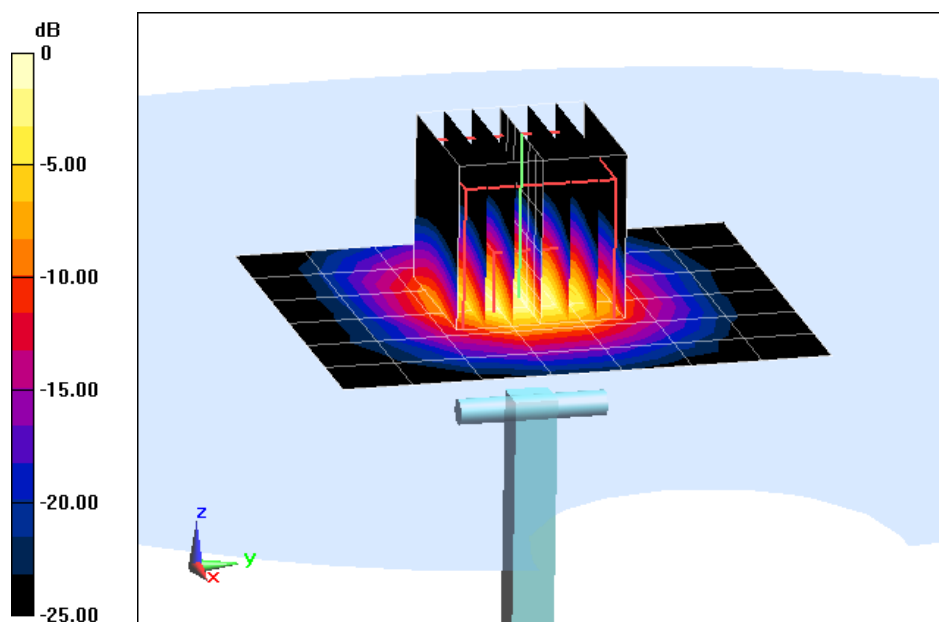
Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 40.4 W/kg

SAR(10 g) = 2.24 W/kg

Deviation: 0.90%



0 dB = 21.6 W/kg = 13.34 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1007

Communication System: UID 0, CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 6.062 \text{ S/m}$; $\epsilon_r = 45.948$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 08-11-2014; Ambient Temp: 22.4°C; Tissue Temp: 21.3°C

Probe: EX3DV4 - SN3920; ConvF(4, 4, 4); Calibrated: 12/18/2013;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn649; Calibrated: 12/12/2013

Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1357

Measurement SW: DASY4, Version 4.7 (80); SEMCAD X Version 14.6.10 (7331)

5800MHz System Verification

Area Scan (7x9x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

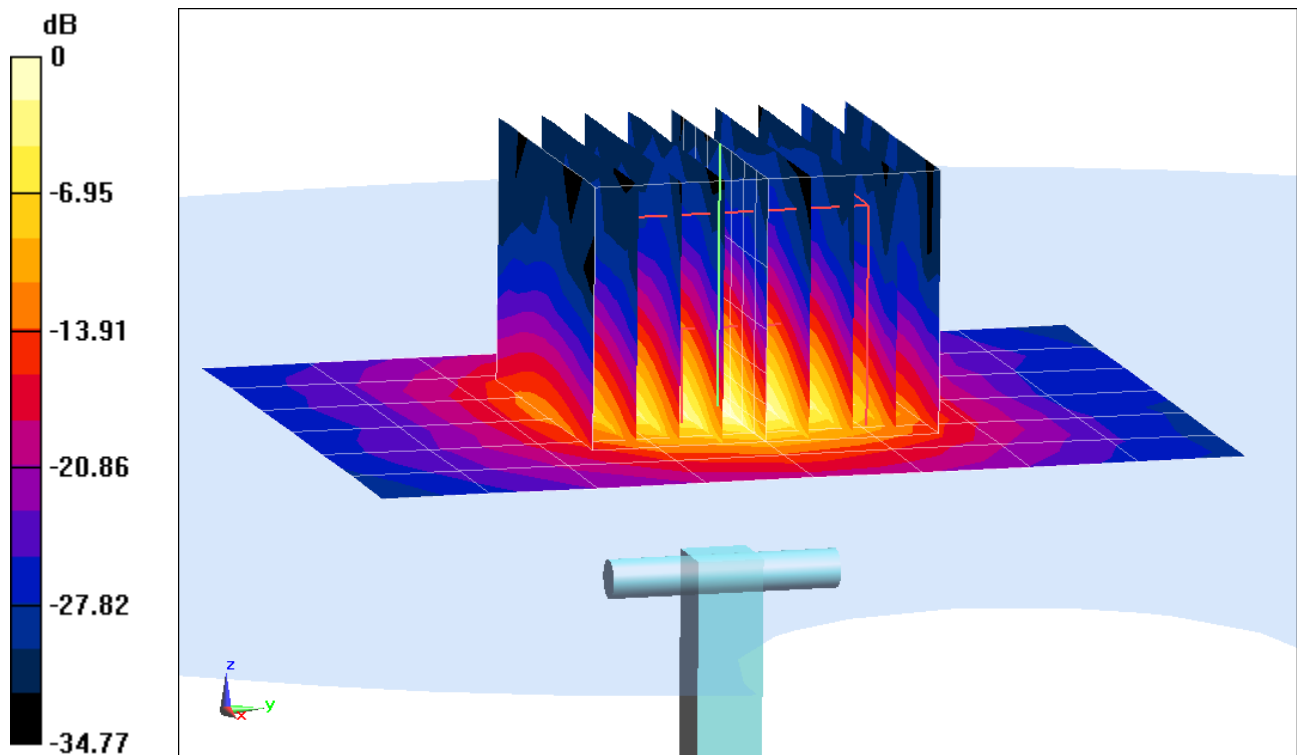
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 35.4 W/kg

SAR(1 g) = 7.23 W/kg

Deviation: -0.82%



0 dB = 18.7 W/kg = 12.72 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 5800 MHz; Type: D5GHzV2; Serial: 1057

Communication System: UID 0, CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 6.186 \text{ S/m}$; $\epsilon_r = 46.881$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section ; Space: 1.0 cm

Test Date: 08-13-2014; Ambient Temp: 24.4°C; Tissue Temp: 24.0°C

Probe: EX3DV4 - SN3589; ConvF(3.97, 3.97, 3.97); Calibrated: 1/29/2014;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1334; Calibrated: 3/17/2014

Phantom: SAM front; Type: QD000P40CD; Serial: TP:1759

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

5800 MHz System Verification

Area Scan (7x8x1): Measurement grid: $dx=10\text{mm}$, $dy=10\text{mm}$

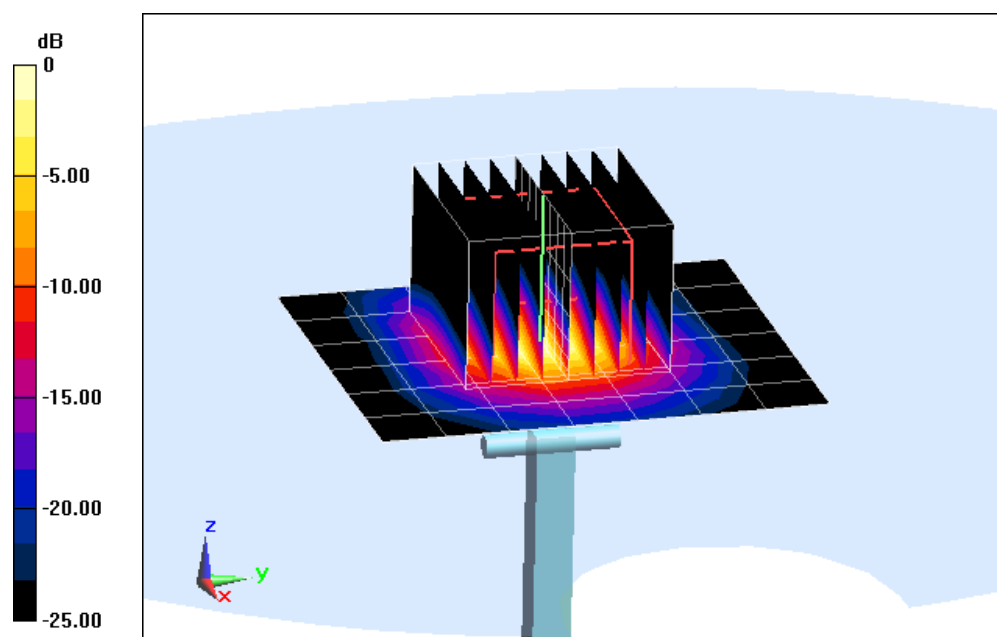
Zoom Scan (9x9x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$; Graded Ratio: 1.4

Input Power: 20.0 dBm (100 mW)

Peak SAR (extrapolated) = 35.8 W/kg

SAR(1 g) = 7.35 W/kg

Deviation: -1.08%



APPENDIX C: PROBE CALIBRATION



Accredited by the Swiss Accreditation Service (SAS)
 The Swiss Accreditation Service is one of the signatories to the EA
 Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D750V3-1003_Jan14**

CALIBRATION CERTIFICATE

Object **D750V3 - SN: 1003**

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

Calibration date: **January 20, 2014**

CC
21/14 ✓

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-13 (No. 217-01736)	Apr-14
Type-N mismatch combination	SN: 5047.3 / 06327	04-Apr-13 (No. 217-01739)	Apr-14
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by: **Israe El-Naouq** **Laboratory Technician**

Signature

Approved by: **Katja Pokovic** **Technical Manager**

Issued: January 21, 2014

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	40.8 $\pm$ 6 %	0.92 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	8.37 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.46 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	54.0 $\pm$ 6 %	0.98 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	8.77 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	5.78 W/kg $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.7 Ω - 0.2 j Ω
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.5 Ω - 2.6 j Ω
Return Loss	- 31.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.043 ns
----------------------------------	----------

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 21, 2009

DASY5 Validation Report for Head TSL

Date: 20.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1003

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

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.92 \text{ S/m}$; $\epsilon_r = 40.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.37, 6.37, 6.37); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

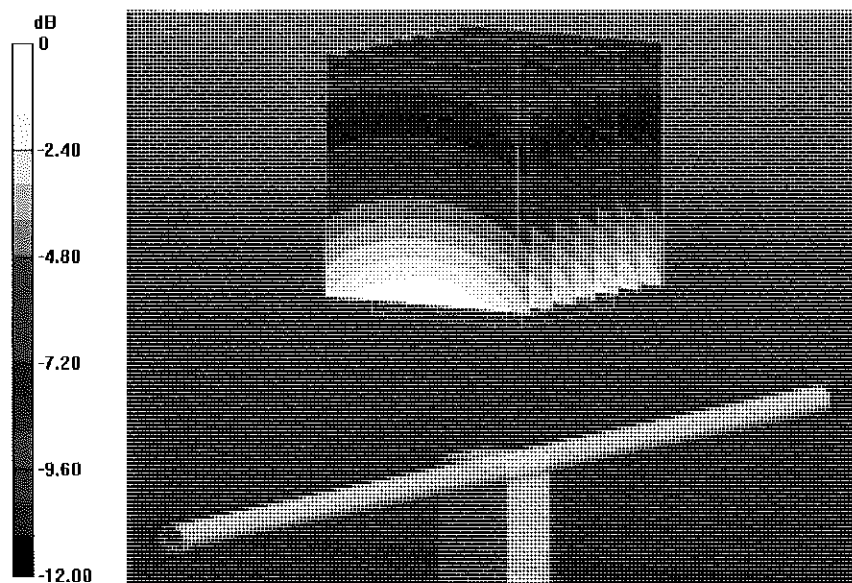
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 53.711 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 3.27 W/kg

SAR(1 g) = 2.16 W/kg; SAR(10 g) = 1.4 W/kg

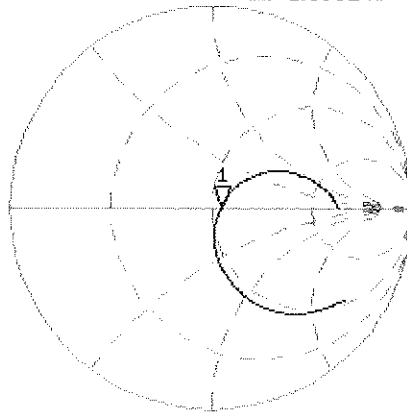
Maximum value of SAR (measured) = 2.51 W/kg



Impedance Measurement Plot for Head TSL

20 Jan 2014 16:36:06
 CH1 S11 1 U FS 1: 54.678 Ω -156.25 m Ω 1.3581 nF 750.000 000 MHz

*
 Del
 CA



Avg
 16

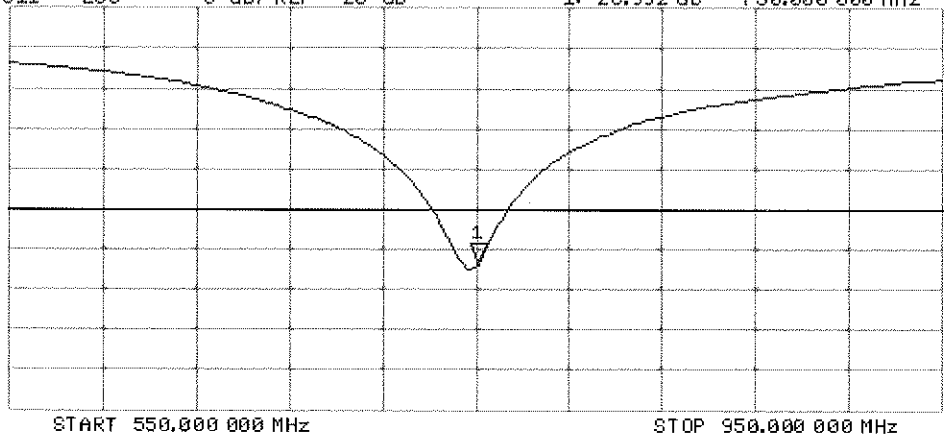
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1: -26.992 dB 750.000 000 MHz

CA

Avg
 16

H1d



DASY5 Validation Report for Body TSL

Date: 20.01.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1003

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

Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.98 \text{ S/m}$; $\epsilon_r = 54$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.13, 6.13, 6.13); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

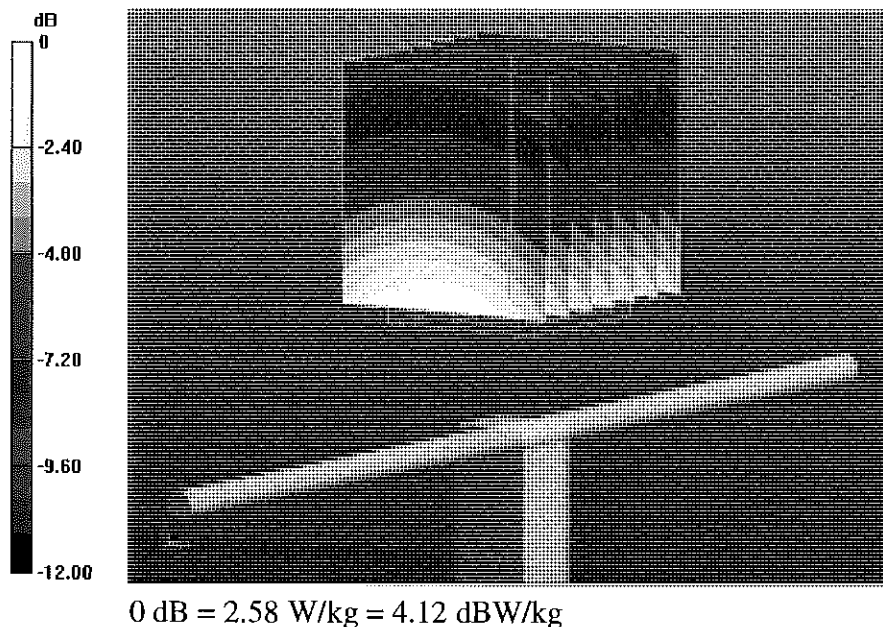
Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 53.082 V/m; Power Drift = 0.03 dB

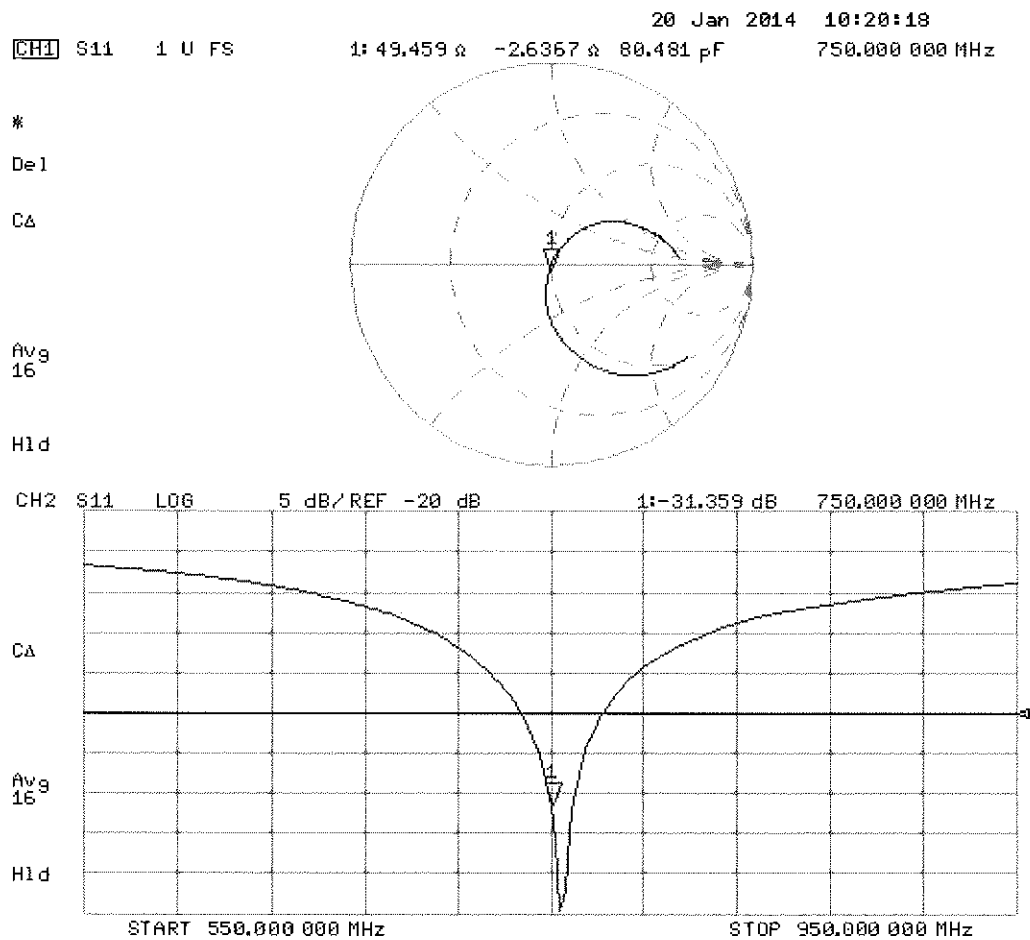
Peak SAR (extrapolated) = 3.31 W/kg

SAR(1 g) = 2.24 W/kg; SAR(10 g) = 1.47 W/kg

Maximum value of SAR (measured) = 2.58 W/kg



Impedance Measurement Plot for Body TSL





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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D835V2-4d119_Apr14**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d119**

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

CCV
4/25/14

Calibration date: **April 07, 2014**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

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

Issued: April 9, 2014

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



Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 108**

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

Glossary:

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

Calibration is Performed According to the Following Standards:

- a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	41.6 $\pm$ 6 %	0.94 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.38 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.22 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	5.97 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	53.6 $\pm$ 6 %	1.02 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.44 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.34 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	6.15 W/kg $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.2 Ω - 1.6 j Ω
Return Loss	- 34.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.3 Ω - 4.5 j Ω
Return Loss	- 24.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.386 ns
----------------------------------	----------

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	June 29, 2010

DASY5 Validation Report for Head TSL

Date: 07.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d119

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

Medium parameters used: $f = 835$ MHz; $\sigma = 0.94$ S/m; $\epsilon_r = 41.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.22, 6.22, 6.22); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

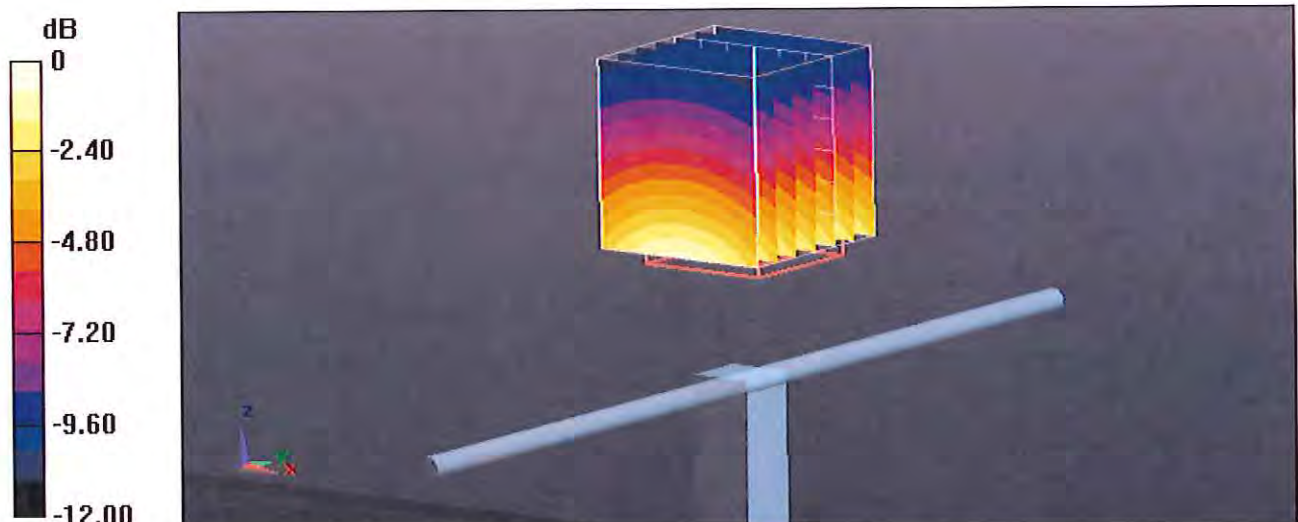
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.289 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.59 W/kg

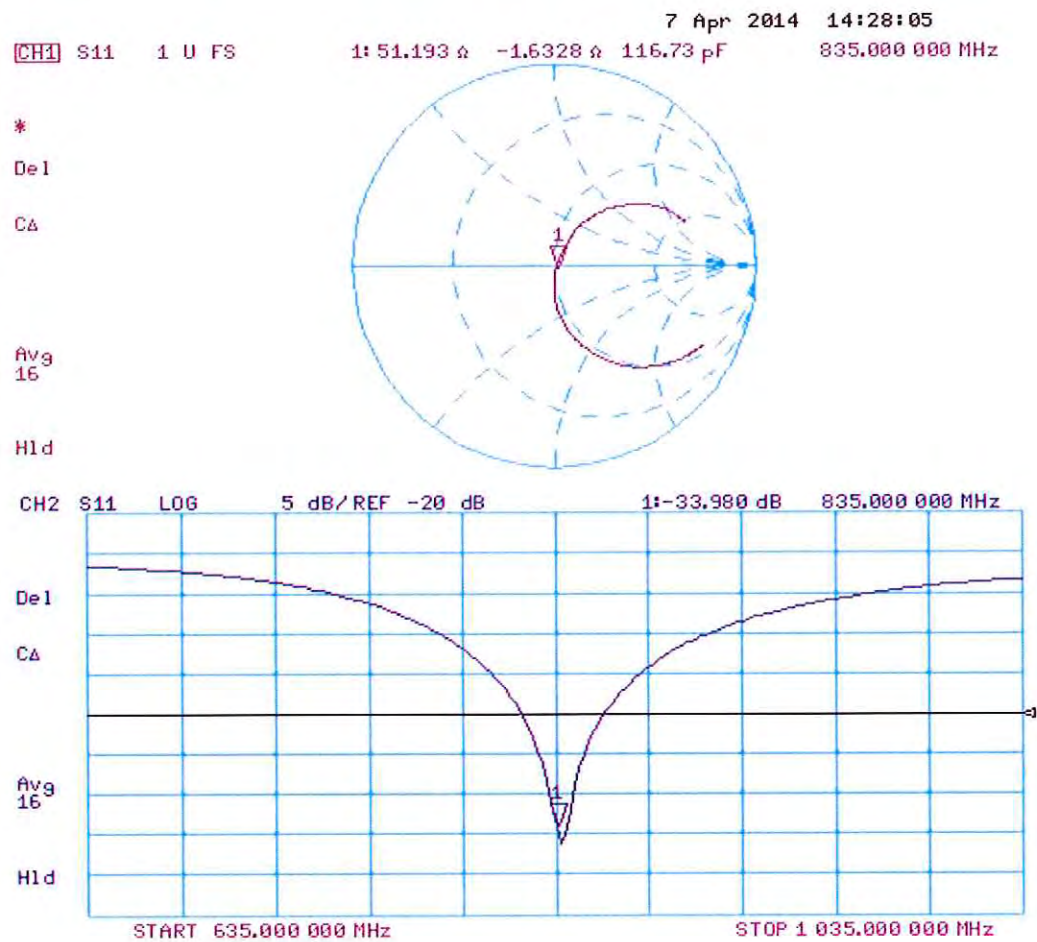
SAR(1 g) = 2.38 W/kg; SAR(10 g) = 1.53 W/kg

Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d119

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

Medium parameters used: $f = 835$ MHz; $\sigma = 1.02$ S/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.09, 6.09, 6.09); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

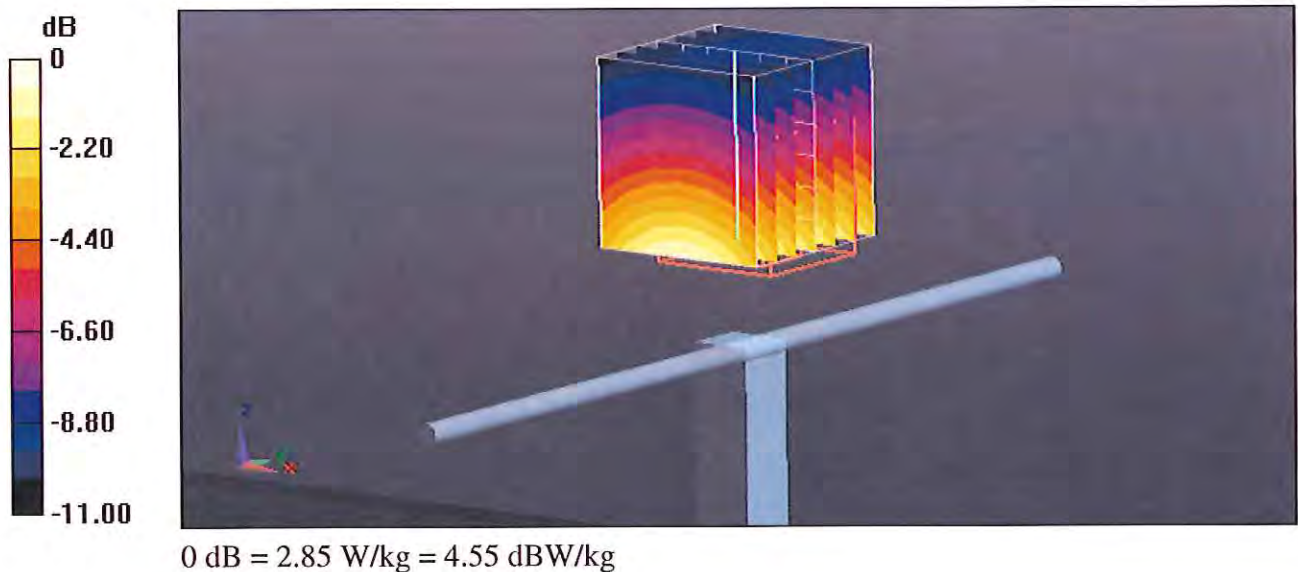
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 54.594 V/m; Power Drift = -0.01 dB

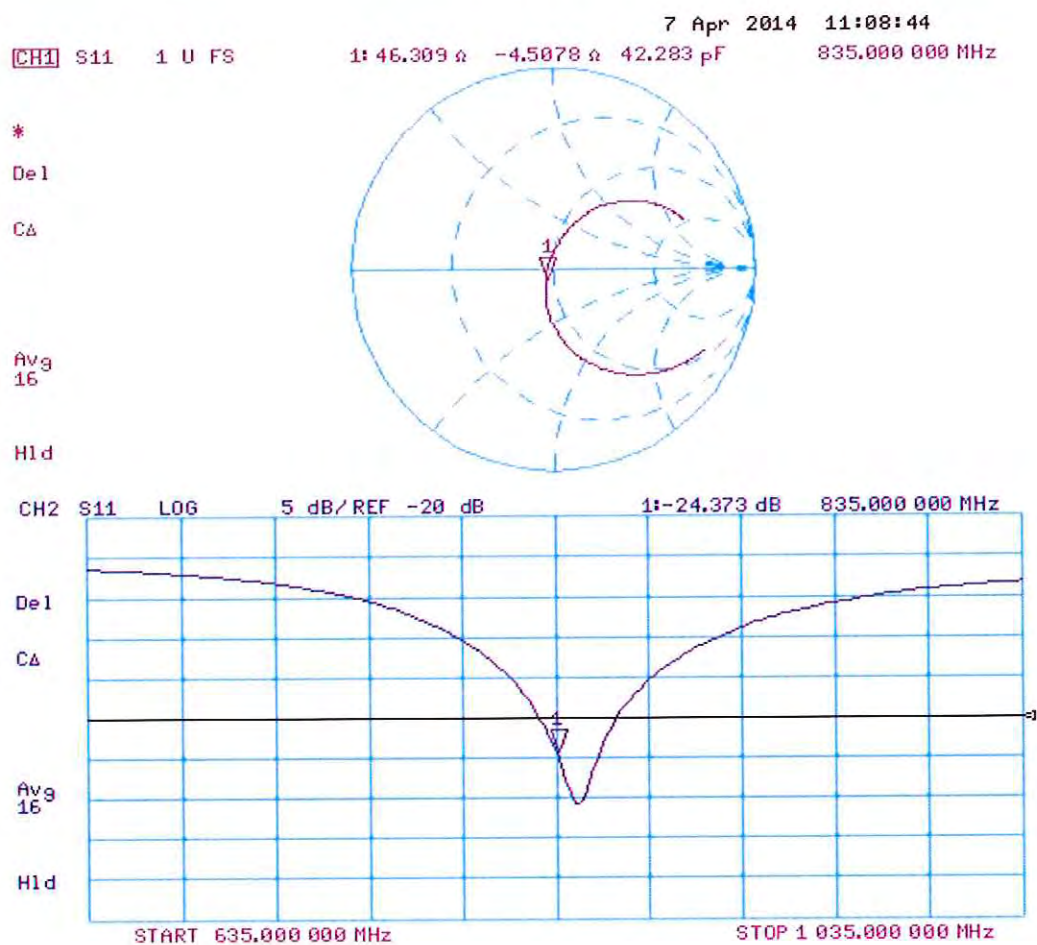
Peak SAR (extrapolated) = 3.61 W/kg

SAR(1 g) = 2.44 W/kg; SAR(10 g) = 1.59 W/kg

Maximum value of SAR (measured) = 2.85 W/kg



Impedance Measurement Plot for Body TSL





Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D1765V2-1008_May14**

CALIBRATION CERTIFICATE

Object **D1765V2 - SN: 1008**

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

CCV
6/2/14

Calibration date: **May 07, 2014**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by: **Name** **Function** **Signature**
Jeton Kastrati **Laboratory Technician**

Approved by: **Katja Pokovic** **Technical Manager**

Issued: May 12, 2014

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



Accredited by the Swiss Accreditation Service (SAS)

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.0 $\pm$ 6 %	1.36 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.23 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.9 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.87 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.5 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	52.2 $\pm$ 6 %	1.48 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.6 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.02 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.1 W/kg $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.7 Ω - 6.1 j Ω
Return Loss	- 23.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.7 Ω - 6.4 j Ω
Return Loss	- 20.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.211 ns
----------------------------------	----------

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

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 06, 2005

DASY5 Validation Report for Head TSL

Date: 07.05.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 39$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.23, 5.23, 5.23); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

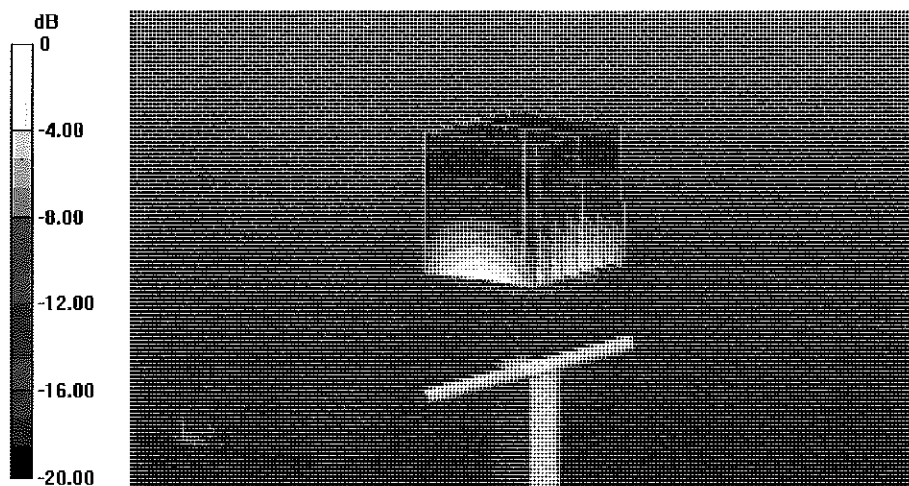
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.06 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 16.7 W/kg

SAR(1 g) = 9.23 W/kg; SAR(10 g) = 4.87 W/kg

Maximum value of SAR (measured) = 11.7 W/kg

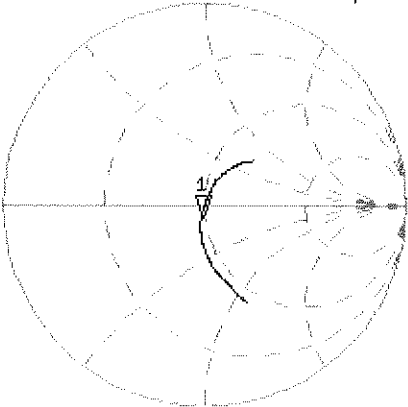


0 dB = 11.7 W/kg = 10.68 dBW/kg

Impedance Measurement Plot for Head TSL

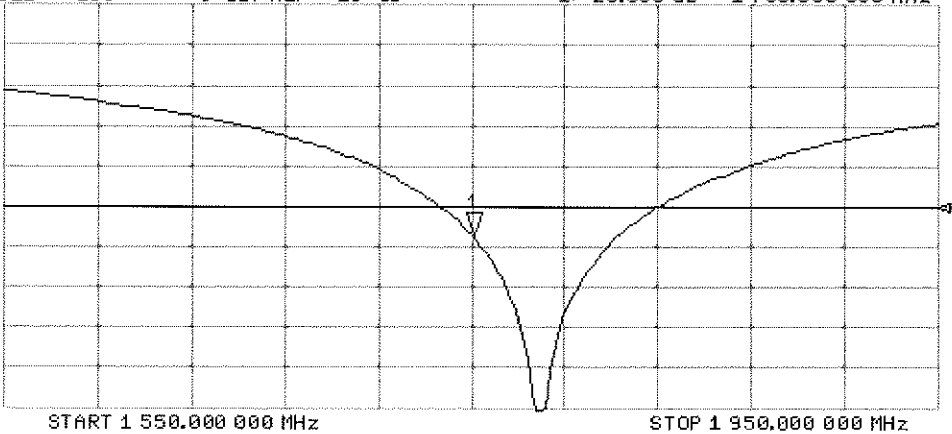
7 May 2014 09:22:36
[CH1] S11 1 U FS 1: 47.709 Ω -6.0566 Ω 15.016 pF 1 750.000 000 MHz

*
De1
CA
Avg
16
H1d



CH2 S11 LOG 5 dB/REF -20 dB 1:-23.588 dB 1 750.000 000 MHz

CA
Avg
16
H1d



DASY5 Validation Report for Body TSL

Date: 07.05.2014

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.89, 4.89, 4.89); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

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

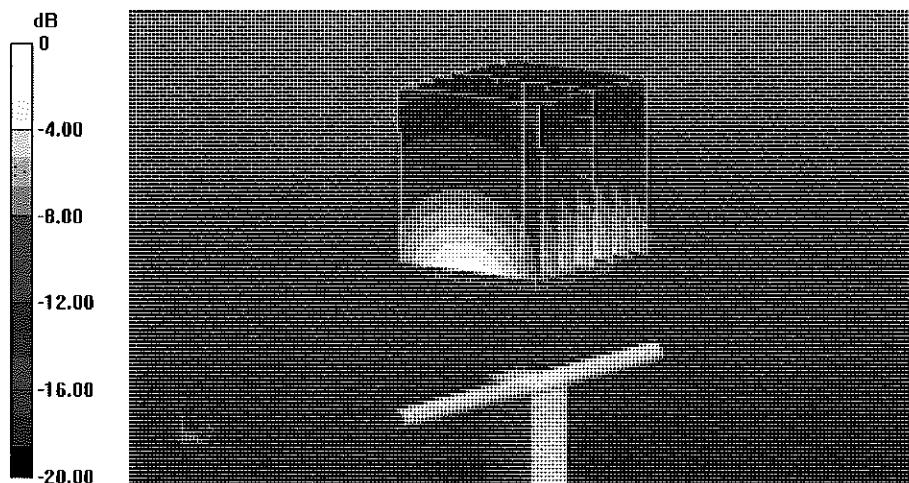
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.01 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 16.3 W/kg

SAR(1 g) = 9.41 W/kg; SAR(10 g) = 5.02 W/kg

Maximum value of SAR (measured) = 11.8 W/kg

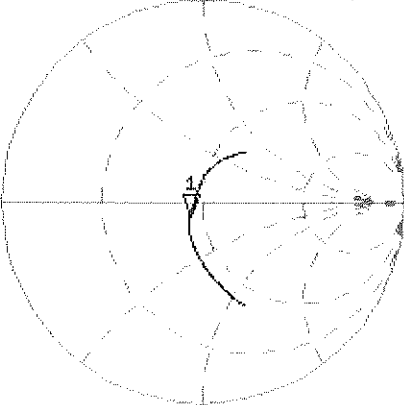


0 dB = 11.8 W/kg = 10.72 dBW/kg

Impedance Measurement Plot for Body TSL

7 May 2014 09:21:55
[CH1] S11 1 U FS 1: 43.727 $\angle$ -6.3691 $\angle$ 14.279 pF 1 750.000 000 MHz

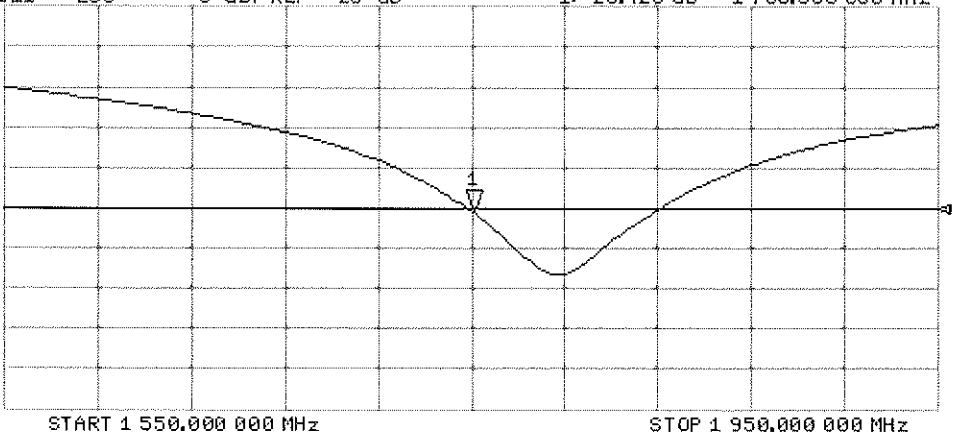
*
De1
CA



Avg
16
H1d

CH2 S11 LOG 5 dB/REF -20 dB 1:-20.428 dB 1 750.000 000 MHz

CA
Avg
16
H1d





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Accreditation No.: **SCS 108**

Client **PC Test**

Certificate No: **D1900V2-5d141_Apr14**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d141**

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

Calibration date: **April 09, 2014**

✓
KOK
5/7/14

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	25-Apr-13 (No. DAE4-601_Apr13)	Apr-14
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

Calibrated by: **Name** Claudio Leubler **Function** Laboratory Technician

Approved by: **Name** Katja Pokovic **Function** Technical Manager

Signature

Issued: April 9, 2014

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Accreditation No.: **SCS 108**

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Multilateral Agreement for the recognition of calibration certificates

Glossary:

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

Calibration is Performed According to the Following Standards:

- IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.7
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	39.1 $\pm$ 6 %	1.36 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.91 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.1 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.17 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	20.8 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	52.4 $\pm$ 6 %	1.52 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	40.6 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.41 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	21.6 W/kg $\pm$ 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	$52.8 \Omega + 5.5 j\Omega$
Return Loss	- 24.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$48.8 \Omega + 6.3 j\Omega$
Return Loss	- 23.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.199 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 11, 2011

DASY5 Validation Report for Head TSL

Date: 09.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d141

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.36$ S/m; $\epsilon_r = 39.1$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

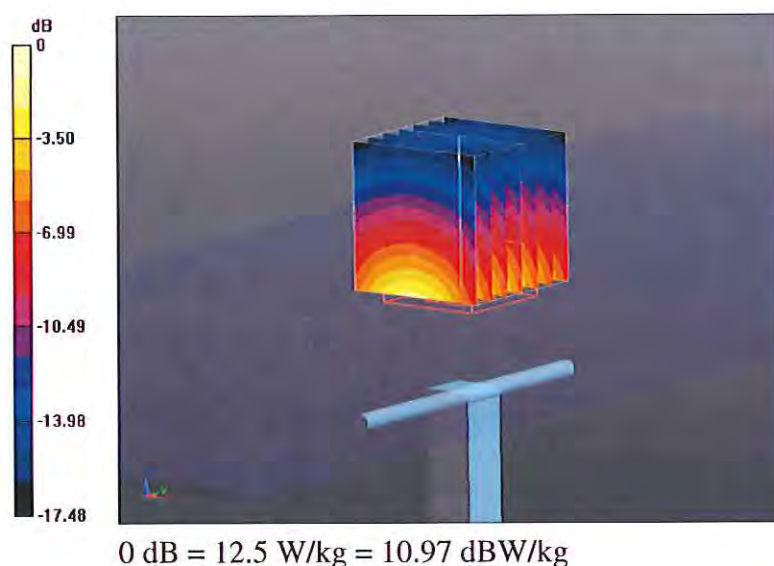
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.080 V/m; Power Drift = 0.01 dB

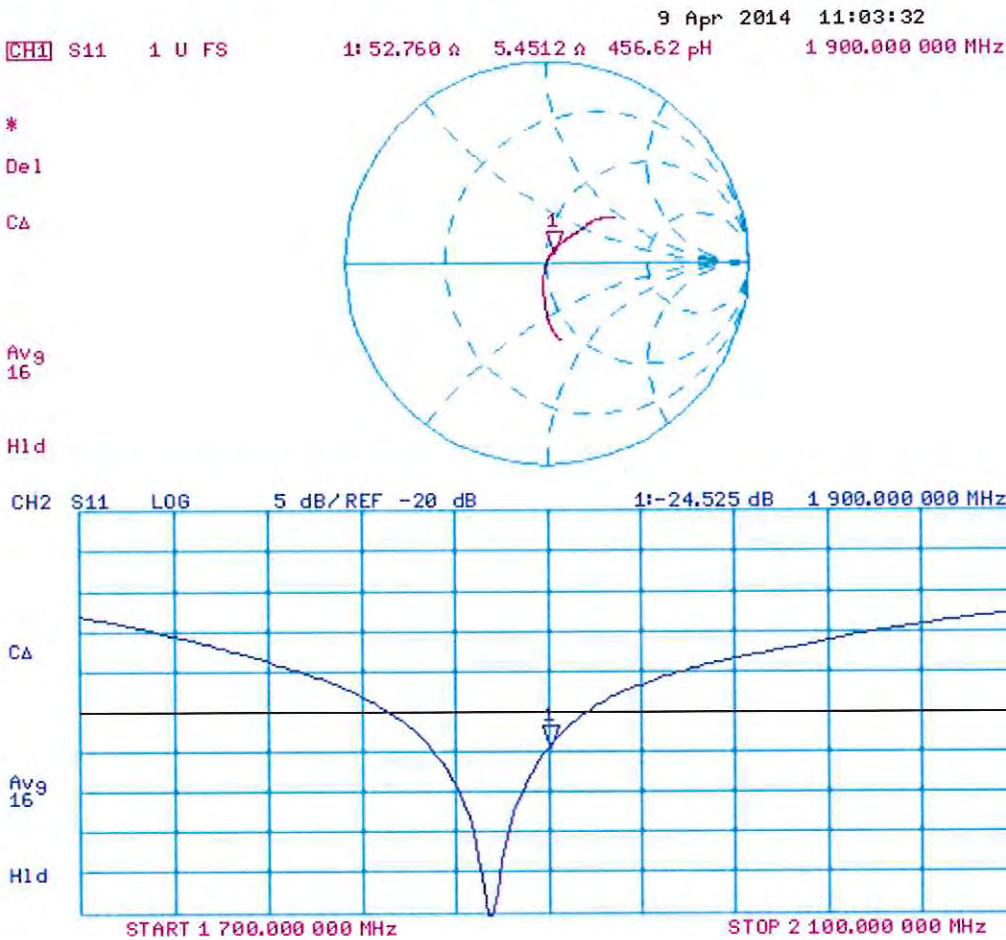
Peak SAR (extrapolated) = 18.2 W/kg

SAR(1 g) = 9.91 W/kg; SAR(10 g) = 5.17 W/kg

Maximum value of SAR (measured) = 12.5 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 09.04.2014

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d141

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

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.52$ S/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 25.04.2013
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.7(1137); SEMCAD X 14.6.10(7164)

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

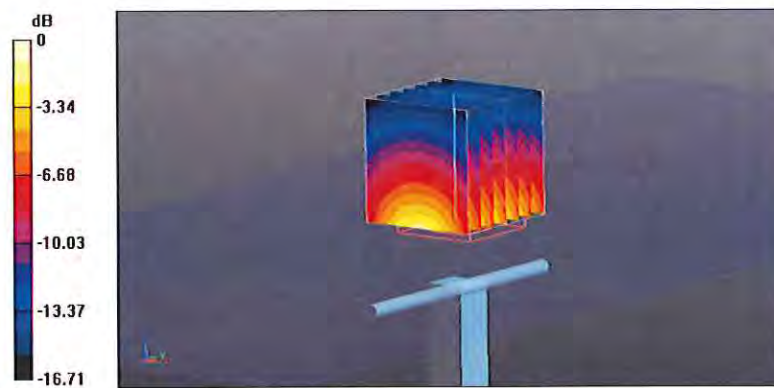
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.820 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 17.9 W/kg

SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.41 W/kg

Maximum value of SAR (measured) = 12.9 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

Impedance Measurement Plot for Body TSL

