



SAR EVALUATION REPORT

Applicant Name:

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Date of Testing:

08/03/15 - 08/07/15 &
10/28/15 - 11/03/15

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Document Serial No.:

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FCC ID:

A3LSMT377V

APPLICANT:

SAMSUNG ELECTRONICS, CO. LTD.

DUT Type:

Portable Tablet

Application Type:

Certification

FCC Rule Part(s):

CFR §2.1093

Model(s):

SM-T377V

Equipment Class	Band & Mode	Tx Frequency	SAR
			1 gm Body (W/kg)
PCB	UMTS 850	826.40 - 846.60 MHz	0.61
PCB	UMTS 1900	1852.4 - 1907.6 MHz	0.54
PCB	LTE Band 13	779.5 - 784.5 MHz	0.54
PCB	LTE Band 5 (Cell)	824.7 - 848.3 MHz	0.60
PCB	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	0.61
PCB	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	0.67
DTS	2.4 GHz WLAN	2412 - 2462 MHz	0.93
NII	U-NII-1	5180 - 5240 MHz	
NII	U-NII-2A	5260 - 5320 MHz	0.97
NII	U-NII-2C	5500 - 5720 MHz	0.89
NII	U-NII-3	5745 - 5825 MHz	0.56
DSS/DTS	Bluetooth	2402 - 2480 MHz	N/A
Simultaneous SAR per KDB 690783 D01v01r03:			1.58

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.7 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



The SAR Tick is an initiative of the Mobile Manufacturers Forum (MMF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MMF. Further details can be obtained by emailing: sartick@mmfai.info.

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
UMTS 850	Data	826.40 - 846.60 MHz
UMTS 1900	Data	1852.4 - 1907.6 MHz
LTE Band 13	Data	779.5 - 784.5 MHz
LTE Band 5 (Cell)	Data	824.7 - 848.3 MHz
LTE Band 4 (AWS)	Data	1710.7 - 1754.3 MHz
LTE Band 2 (PCS)	Data	1850.7 - 1909.3 MHz
2.4 GHz WLAN	Data	2412 - 2462 MHz
U-NII-1	Data	5180 - 5240 MHz
U-NII-2A	Data	5260 - 5320 MHz
U-NII-2C	Data	5500 - 5720 MHz
U-NII-3	Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz
ANT+	Data	2402 - 2480 MHz

1.2 Power Reduction for SAR

This device uses a power reduction mechanism for PCB SAR compliance. The power reduction mechanism is activated when the device is used in close proximity to the user's body. FCC KDB Publication 616217 D04 Section 6 was used as a guideline for selecting SAR test distances for this device.

1.3 Nominal and Maximum Output Power Specifications

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

Maximum Output Powers

Mode / Band		Modulated Average (dBm)		
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA
UMTS Band 5 (850 MHz)	Maximum	24.0	24.0	24.0
	Nominal	23.5	23.5	23.5
UMTS Band 2 (1900 MHz)	Maximum	24.0	24.0	24.0
	Nominal	23.5	23.5	23.5

Mode / Band		Modulated Average (dBm)
LTE Band 13	Maximum	24.5
	Nominal	24.0
LTE Band 5 (Cell)	Maximum	24.5
	Nominal	24.0
LTE Band 4 (AWS)	Maximum	24.3
	Nominal	23.8
LTE Band 2 (PCS)	Maximum	24.0
	Nominal	23.5

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Mode / Band		Modulated Average - Single Tx Chain (dBm)
IEEE 802.11b (2.4 GHz)	Maximum	13.5
	Nominal	13.0
IEEE 802.11g (2.4 GHz)	Maximum	12.5
	Nominal	12.0
IEEE 802.11n (2.4 GHz)	Maximum	11.5
	Nominal	11.0
Bluetooth	Maximum	9.5
	Nominal	9.0
Bluetooth LE	Maximum	7.5
	Nominal	7.0

Mode / Band		Modulated Average - Single Tx Chain (dBm)	
		20 MHz Bandwidth	40 MHz Bandwidth
IEEE 802.11a (5 GHz)	Maximum	11.5	
	Nominal	11.0	
IEEE 802.11n (5 GHz)	Maximum	11.5	11.5
	Nominal	11.0	11.0

Reduced Output Powers

Mode / Band		Modulated Average (dBm)		
		3GPP WCDMA	3GPP HSDPA	3GPP HSUPA
UMTS Band 5 (850 MHz)	Maximum	19.5	19.5	19.5
	Nominal	19.0	19.0	19.0
UMTS Band 2 (1900 MHz)	Maximum	11.5	11.5	11.5
	Nominal	11.0	11.0	11.0

Mode / Band		Modulated Average (dBm)
LTE Band 13	Maximum	18.0
	Nominal	17.5
LTE Band 5 (Cell)	Maximum	19.5
	Nominal	19.0
LTE Band 4 (AWS)	Maximum	13.0
	Nominal	12.5
LTE Band 2 (PCS)	Maximum	12.0
	Nominal	11.5

1.4 DUT Antenna Locations

The overall diagonal dimension of the device is > 200 mm. A diagram showing the locations of the device antennas can be found in Appendix F. Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC filing.

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Table 1-1
Sides for SAR Testing

Mode	Back	Top	Bottom	Right	Left
UMTS 850	Yes	Yes	No	No	Yes
UMTS 1900	Yes	Yes	No	No	Yes
LTE Band 13	Yes	Yes	No	No	Yes
LTE Band 5 (Cell)	Yes	Yes	No	No	Yes
LTE Band 4 (AWS)	Yes	Yes	No	No	Yes
LTE Band 2 (PCS)	Yes	Yes	No	No	Yes
2.4 GHz WLAN	Yes	Yes	No	No	No
5 GHz WLAN	Yes	Yes	No	No	No

Note: Per FCC KDB 616217 D04v01r02, particular DUT edges were not required to be evaluated for SAR based on the SAR exclusion threshold in KDB 447498 D01v05r01.

1.5 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 1-1 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.



Figure 1-1
Simultaneous Transmission Paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v06 3) procedures.

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Body
1	UMTS + 2.4 GHz Wi-Fi	Yes
2	UMTS + 5 GHz Wi-Fi	Yes
3	UMTS + 2.4 GHz Bluetooth	Yes
4	LTE + 2.4 GHz Wi-Fi	Yes
5	LTE + 5 GHz Wi-Fi	Yes
6	LTE + 2.4 GHz Bluetooth	Yes

- 2.4 GHz WLAN, 5 GHz WLAN, and 2.4 GHz Bluetooth share the same antenna path and cannot transmit simultaneously.
- All licensed modes share the same antenna path and cannot transmit simultaneously.

1.6 Miscellaneous SAR Test Considerations

(A) WIFI/BT

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

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

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, Bluetooth Body SAR was not required; $[(9/5) * \sqrt{2.480}] = 2.8 < 3.0$. Per KDB Publication 447498 D01v05, the maximum power of the channel was rounded to the nearest mW before calculation.

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

(B) Licensed Transmitter(s)

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 D01v04.

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 D05v02r03.

1.7 Guidance Applied

- FCC KDB Publication 941225 D01v03r01, D05v02r04 (3G/4G)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r01 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 616217 D04v01r02 (Tablet SAR Considerations)

1.8 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.

	Max Power Serial Number	Reduced Power Serial Number
UMTS 850	32488	33015
UMTS 1900	32207	33015
LTE Band 13	32207	33056
LTE Band 5 (Cell)	32488	33056
LTE Band 4 (AWS)	32488	33015
LTE Band 2 (PCS)	32207	33015
2.4 GHz WLAN	8019	-
5 GHz WLAN	8159	-

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LTE INFORMATION

LTE Information			
FCC ID	A3LSMT377V		
Form Factor	Portable Tablet		
Frequency Range of each LTE transmission band	LTE Band 13 (779.5 - 784.5 MHz)		
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)		
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)		
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)		
Channel Bandwidths	LTE Band 13: 5 MHz, 10 MHz		
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz		
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz		
Channel Numbers and Frequencies (MHz)	Low	Mid	High
LTE Band 13: 5 MHz	779.5 (23205)	782 (23230)	784.5 (23255)
LTE Band 13: 10 MHz	N/A	782 (23230)	N/A
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)	836.5 (20525)	848.3 (20643)
LTE Band 5 (Cell): 3 MHz	825.5 (20415)	836.5 (20525)	847.5 (20635)
LTE Band 5 (Cell): 5 MHz	826.5 (20425)	836.5 (20525)	846.5 (20625)
LTE Band 5 (Cell): 10 MHz	829 (20450)	836.5 (20525)	844 (20600)
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)	1732.5 (20175)	1754.3 (20393)
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)	1732.5 (20175)	1753.5 (20385)
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)	1732.5 (20175)	1752.5 (20375)
LTE Band 4 (AWS): 10 MHz	1715 (20000)	1732.5 (20175)	1750 (20350)
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)	1732.5 (20175)	1747.5 (20325)
LTE Band 4 (AWS): 20 MHz	1720 (20050)	1732.5 (20175)	1745 (20300)
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)	1880 (18900)	1909.3 (19193)
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)	1880 (18900)	1908.5 (19185)
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)	1880 (18900)	1907.5 (19175)
LTE Band 2 (PCS): 10 MHz	1855 (18650)	1880 (18900)	1905 (19150)
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)	1880 (18900)	1902.5 (19125)
LTE Band 2 (PCS): 20 MHz	1860 (18700)	1880 (18900)	1900 (19100)
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		
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations		
LTE Release 10 Additional Information	This device does not support full CA features on 3GPP Release 10. It supports a maximum of 2 carriers in the downlink. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. Due to carrier capability, only the combinations listed are supported. The following LTE Release 10 Features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WIFI Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.		

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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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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.

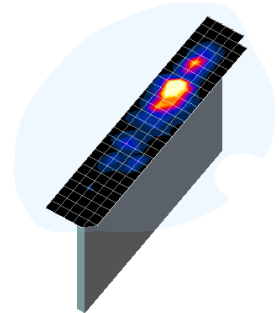


Figure 4-1
Sample SAR Area Scan

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

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

*Also compliant to IEEE 1528-2013 Table 6

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5 SAR TESTING PROCEDURES

5.1 SAR Testing for Tablet per KDB Publication 616217 D04v01

Per FCC KDB Publication 616217 D04, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR Exclusion Threshold in KDB 447498 D01v06 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

5.2 Proximity Sensor Considerations

This device uses a power reduction mechanism to reduce output powers in certain use conditions when the device is used close the user's body.

When the device's antenna is within a certain distance of the user, the sensor activates and reduces the maximum allowed output power. However, the sensor is not active when the device is moved beyond the sensor triggering distance and the maximum output power is no longer limited. Therefore, additional evaluation is needed in the vicinity of the triggering distance to ensure SAR is compliant when the device is allowed to operate at a non-reduced output power level. FCC KDB Publication 616217 D04 Section 6 was used as a guideline for selecting SAR test distances for this device at these additional test positions. Sensor triggering distance summary data is included in Appendix G.

The sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the sensor entirely covers the antennas.

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6 RF EXPOSURE LIMITS

6.1 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.

6.2 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 6-1
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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7 FCC MEASUREMENT PROCEDURES

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

7.1 Measured and Reported SAR

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

7.2 3G SAR Test Reduction Procedure

In FCC KDB Publication 941225 D01v03, certain transmission modes within a frequency band and wireless mode evaluated for SAR are defined as primary modes. The equivalent modes considered for SAR test reduction are denoted as secondary modes. When the maximum output power including tune-up tolerance specified for production units in a secondary mode is ≤ 0.25 dB higher than the primary mode or when the highest reported SAR of the primary mode, scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode, is ≤ 1.2 W/kg, SAR measurements are not required for the secondary mode. These criteria are referred to as the 3G SAR test reduction procedure. When the 3G SAR test reduction procedure is not satisfied, SAR measurements are additionally required for the secondary mode.

7.3 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01v03 "3G SAR Measurement Procedures."

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

7.4 SAR Measurement Conditions for UMTS

7.4.1 Output Power Verification

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

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7.4.2 Body SAR Measurements

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

7.4.3 SAR Measurements with Rel 5 HSDPA

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

7.4.4 SAR Measurements with Rel 6 HSUPA

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

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

7.5 SAR Measurement Conditions for LTE

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

7.5.1 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.

7.5.2 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.

7.5.3 A-MPR

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

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7.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

- a. Per Section 4.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
 - i. The required channel and offset combination with the highest maximum output power is required for SAR.
 - ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
 - iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
- b. Per Section 4.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 4.2.1.
- c. Per Section 4.2.3, 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 4.2.4 and 4.3, 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 4.2.1 through 4.2.3 is less than or equal to $\frac{1}{2}$ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/kg.

7.5.5 Downlink Carrier Aggregation

LTE Carrier Aggregation (CA) measurements are made in accordance to 3GPP TS 36.521-1 V10.4.0 (2012-12). The RRC connection is only handled by one cell, the Primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds the Secondary component carrier (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to release 8 specifications on the PCC. Additional output powers are measured using two carriers in the downlink for the release 8 configurations with the highest output power among all channels, RB configurations and bandwidths for each uplink band. Per FCC KDB Publication 941225 D05A v01r02, no SAR measurements are required when the average output power with downlink carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink carrier aggregation inactive.

7.6 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01 DR02-41929 for more details.

7.6.1 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.

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

7.6.2 U-NII-1 and U-NII-2A

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

7.6.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 – 5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification.

Unless band gap channels are permanently disabled, SAR must be considered for these channels. When band gap channels are disabled, each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

7.6.4 2.4 GHz SAR Test Requirements

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

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

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

7.6.5 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 GHz and 5 GHz bands, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations;

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

7.6.6 Initial Test Configuration Procedure

For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, and lowest data rate. The channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements (See Section 7.6.5).

7.6.7 Subsequent Test Configuration Procedures

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

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8 RF CONDUCTED POWERS

8.1 UMTS Conducted Powers

Table 8-1
Maximum Average RF Output 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	23.24	23.29	23.26	23.17	23.14	23.30	-
5	HSDPA	Subtest 1	23.08	23.13	23.09	23.28	23.24	23.42	0
5		Subtest 2	23.14	23.10	23.04	23.00	22.96	23.11	0
5		Subtest 3	22.19	22.15	22.04	22.04	22.29	22.55	0.5
5		Subtest 4	21.30	21.17	21.14	21.13	21.34	21.55	0.5
6	HSPA	Subtest 1	22.86	22.98	22.85	23.05	22.97	23.02	0
6		Subtest 2	21.35	21.36	21.23	21.31	21.18	21.37	2
6		Subtest 3	22.25	22.21	22.27	22.28	22.22	22.34	1
6		Subtest 4	21.35	21.23	21.32	21.12	21.28	21.64	2
6		Subtest 5	23.41	23.16	23.27	23.29	23.28	23.36	0

Table 8-2
Reduced Average RF Output 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	19.05	19.18	19.02	11.11	11.03	11.15	-
6	HSDPA	Subtest 1	19.18	19.13	19.07	10.93	11.06	10.77	0
6		Subtest 2	19.22	19.19	19.15	10.79	10.86	10.59	0
6		Subtest 3	19.20	19.21	19.12	10.66	10.72	10.44	0.5
6		Subtest 4	19.19	19.23	19.15	10.68	10.69	10.43	0.5
6	HSPA	Subtest 1	19.11	19.14	19.08	11.24	11.22	11.26	0
6		Subtest 2	19.22	19.23	19.16	11.35	11.27	11.39	2
6		Subtest 3	18.36	18.41	18.33	11.42	11.35	11.46	1
6		Subtest 4	19.28	19.22	19.16	11.38	11.33	11.41	2
6		Subtest 5	19.18	19.24	19.15	11.38	11.36	11.29	0

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.

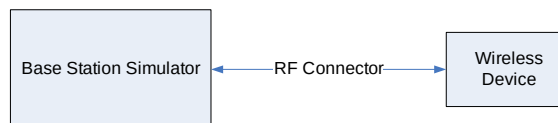


Figure 8-1
Power Measurement Setup

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8.2 LTE Conducted Powers

8.2.1 LTE Band 13

Table 8-3

LTE Band 13 Conducted Powers - 10 MHz Bandwidth Maximum Average RF Output Powers

	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	23.57	0	0
	782.0	23230	10	QPSK	1	25	24.00	0	0
	782.0	23230	10	QPSK	1	49	23.98	0	0
	782.0	23230	10	QPSK	25	0	22.15	0-1	1
	782.0	23230	10	QPSK	25	12	22.08	0-1	1
	782.0	23230	10	QPSK	25	25	22.11	0-1	1
	782.0	23230	10	QPSK	50	0	22.08	0-1	1
	782.0	23230	10	16QAM	1	0	22.00	0-1	1
	782.0	23230	10	16QAM	1	25	22.01	0-1	1
	782.0	23230	10	16QAM	1	49	22.04	0-1	1
	782.0	23230	10	16QAM	25	0	21.99	0-2	2
	782.0	23230	10	16QAM	25	12	21.98	0-2	2
	782.0	23230	10	16QAM	25	25	21.96	0-2	2
	782.0	23230	10	16QAM	50	0	22.00	0-2	2

Table 8-4

LTE Band 13 Conducted Powers - 5 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	782.0	23230	5	QPSK	1	0	24.00	0	0
	782.0	23230	5	QPSK	1	12	23.90	0	0
	782.0	23230	5	QPSK	1	24	23.95	0	0
	782.0	23230	5	QPSK	12	0	22.04	0-1	1
	782.0	23230	5	QPSK	12	6	22.05	0-1	1
	782.0	23230	5	QPSK	12	13	22.03	0-1	1
	782.0	23230	5	QPSK	25	0	22.04	0-1	1
	782.0	23230	5	16-QAM	1	0	22.21	0-1	1
	782.0	23230	5	16-QAM	1	12	22.00	0-1	1
	782.0	23230	5	16-QAM	1	24	22.13	0-1	1
	782.0	23230	5	16-QAM	12	0	21.96	0-2	2
	782.0	23230	5	16-QAM	12	6	21.90	0-2	2
	782.0	23230	5	16-QAM	12	13	21.91	0-2	2
	782.0	23230	5	16-QAM	25	0	22.00	0-2	2

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

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Table 8-5
LTE Band 13 Conducted Powers - 10 MHz Bandwidth Reduced Average RF Output Powers

	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	17.81	0	0
	782.0	23230	10	QPSK	1	25	17.95	0	0
	782.0	23230	10	QPSK	1	49	17.98	0	0
	782.0	23230	10	QPSK	25	0	16.18	0-1	1
	782.0	23230	10	QPSK	25	12	16.11	0-1	1
	782.0	23230	10	QPSK	25	25	16.13	0-1	1
	782.0	23230	10	QPSK	50	0	16.04	0-1	1
	782.0	23230	10	16QAM	1	0	16.15	0-1	1
	782.0	23230	10	16QAM	1	25	16.03	0-1	1
	782.0	23230	10	16QAM	1	49	16.04	0-1	1
	782.0	23230	10	16QAM	25	0	15.99	0-2	2
	782.0	23230	10	16QAM	25	12	16.00	0-2	2
	782.0	23230	10	16QAM	25	25	15.98	0-2	2
	782.0	23230	10	16QAM	50	0	16.00	0-2	2

Table 8-6
LTE Band 13 Conducted Powers - 5 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	782.0	23230	5	QPSK	1	0	18.00	0	0
	782.0	23230	5	QPSK	1	12	17.98	0	0
	782.0	23230	5	QPSK	1	24	17.99	0	0
	782.0	23230	5	QPSK	12	0	16.17	0-1	1
	782.0	23230	5	QPSK	12	6	16.15	0-1	1
	782.0	23230	5	QPSK	12	13	16.19	0-1	1
	782.0	23230	5	QPSK	25	0	16.09	0-1	1
	782.0	23230	5	16-QAM	1	0	16.05	0-1	1
	782.0	23230	5	16-QAM	1	12	16.00	0-1	1
	782.0	23230	5	16-QAM	1	24	16.07	0-1	1
	782.0	23230	5	16-QAM	12	0	15.98	0-2	2
	782.0	23230	5	16-QAM	12	6	16.00	0-2	2
	782.0	23230	5	16-QAM	12	13	16.00	0-2	2
	782.0	23230	5	16-QAM	25	0	15.97	0-2	2

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

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8.2.2 LTE Band 5 (Cell)

Table 8-7

LTE Band 5 (Cell) Conducted Powers - 10 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	836.5	20525	10	QPSK	1	0	24.01	0	0
	836.5	20525	10	QPSK	1	25	24.08	0	0
	836.5	20525	10	QPSK	1	49	23.97	0	0
	836.5	20525	10	QPSK	25	0	23.04	0-1	1
	836.5	20525	10	QPSK	25	12	22.97	0-1	1
	836.5	20525	10	QPSK	25	25	22.90	0-1	1
	836.5	20525	10	QPSK	50	0	23.03	0-1	1
	836.5	20525	10	16QAM	1	0	22.57	0-1	1
	836.5	20525	10	16QAM	1	25	22.50	0-1	1
	836.5	20525	10	16QAM	1	49	22.52	0-1	1
	836.5	20525	10	16QAM	25	0	21.97	0-2	2
	836.5	20525	10	16QAM	25	12	22.05	0-2	2
	836.5	20525	10	16QAM	25	25	21.92	0-2	2
	836.5	20525	10	16QAM	50	0	22.06	0-2	2

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

Table 8-8

LTE Band 5 (Cell) Conducted Powers - 5 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	826.5	20425	5	QPSK	1	0	24.31	0	0
	826.5	20425	5	QPSK	1	12	24.09	0	0
	826.5	20425	5	QPSK	1	24	24.10	0	0
	826.5	20425	5	QPSK	12	0	22.98	0-1	1
	826.5	20425	5	QPSK	12	6	22.99	0-1	1
	826.5	20425	5	QPSK	12	13	22.97	0-1	1
	826.5	20425	5	QPSK	25	0	23.02	0-1	1
	826.5	20425	5	16-QAM	1	0	22.62	0-1	1
	826.5	20425	5	16-QAM	1	12	22.50	0-1	1
	826.5	20425	5	16-QAM	1	24	22.51	0-1	1
	826.5	20425	5	16-QAM	12	0	22.00	0-2	2
	826.5	20425	5	16-QAM	12	6	21.95	0-2	2
	826.5	20425	5	16-QAM	12	13	21.98	0-2	2
	826.5	20425	5	16-QAM	25	0	22.09	0-2	2
Mid	836.5	20525	5	QPSK	1	0	24.25	0	0
	836.5	20525	5	QPSK	1	12	24.27	0	0
	836.5	20525	5	QPSK	1	24	24.20	0	0
	836.5	20525	5	QPSK	12	0	23.11	0-1	1
	836.5	20525	5	QPSK	12	6	22.96	0-1	1
	836.5	20525	5	QPSK	12	13	22.94	0-1	1
	836.5	20525	5	QPSK	25	0	22.98	0-1	1
	836.5	20525	5	16-QAM	1	0	22.57	0-1	1
	836.5	20525	5	16-QAM	1	12	22.50	0-1	1
	836.5	20525	5	16-QAM	1	24	22.70	0-1	1
	836.5	20525	5	16-QAM	12	0	22.03	0-2	2
	836.5	20525	5	16-QAM	12	6	22.04	0-2	2
	836.5	20525	5	16-QAM	12	13	22.02	0-2	2
	836.5	20525	5	16-QAM	25	0	22.07	0-2	2
High	846.5	20625	5	QPSK	1	0	24.11	0	0
	846.5	20625	5	QPSK	1	12	23.92	0	0
	846.5	20625	5	QPSK	1	24	24.08	0	0
	846.5	20625	5	QPSK	12	0	22.97	0-1	1
	846.5	20625	5	QPSK	12	6	22.85	0-1	1
	846.5	20625	5	QPSK	12	13	22.80	0-1	1
	846.5	20625	5	QPSK	25	0	22.80	0-1	1
	846.5	20625	5	16-QAM	1	0	22.57	0-1	1
	846.5	20625	5	16-QAM	1	12	22.62	0-1	1
	846.5	20625	5	16-QAM	1	24	22.60	0-1	1
	846.5	20625	5	16-QAM	12	0	21.93	0-2	2
	846.5	20625	5	16-QAM	12	6	21.84	0-2	2
	846.5	20625	5	16-QAM	12	13	21.83	0-2	2
	846.5	20625	5	16-QAM	25	0	21.93	0-2	2

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Table 8-9
LTE Band 5 (Cell) Conducted Powers - 3 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	825.5	20415	3	QPSK	1	0	24.33	0	0
	825.5	20415	3	QPSK	1	7	24.25	0	0
	825.5	20415	3	QPSK	1	14	24.07	0	0
	825.5	20415	3	QPSK	8	0	22.53	0-1	1
	825.5	20415	3	QPSK	8	4	22.52	0-1	1
	825.5	20415	3	QPSK	8	7	22.52	0-1	1
	825.5	20415	3	QPSK	15	0	22.51	0-1	1
	825.5	20415	3	16-QAM	1	0	22.65	0-1	1
	825.5	20415	3	16-QAM	1	7	22.58	0-1	1
	825.5	20415	3	16-QAM	1	14	22.50	0-1	1
	825.5	20415	3	16-QAM	8	0	21.58	0-2	2
	825.5	20415	3	16-QAM	8	4	21.58	0-2	2
	825.5	20415	3	16-QAM	8	7	21.57	0-2	2
	825.5	20415	3	16-QAM	15	0	21.55	0-2	2
Mid	836.5	20525	3	QPSK	1	0	24.19	0	0
	836.5	20525	3	QPSK	1	7	24.15	0	0
	836.5	20525	3	QPSK	1	14	24.22	0	0
	836.5	20525	3	QPSK	8	0	22.54	0-1	1
	836.5	20525	3	QPSK	8	4	22.55	0-1	1
	836.5	20525	3	QPSK	8	7	22.50	0-1	1
	836.5	20525	3	QPSK	15	0	22.52	0-1	1
	836.5	20525	3	16-QAM	1	0	22.56	0-1	1
	836.5	20525	3	16-QAM	1	7	22.61	0-1	1
	836.5	20525	3	16-QAM	1	14	22.54	0-1	1
	836.5	20525	3	16-QAM	8	0	21.56	0-2	2
	836.5	20525	3	16-QAM	8	4	21.68	0-2	2
	836.5	20525	3	16-QAM	8	7	21.58	0-2	2
	836.5	20525	3	16-QAM	15	0	21.50	0-2	2
High	847.5	20635	3	QPSK	1	0	23.98	0	0
	847.5	20635	3	QPSK	1	7	23.92	0	0
	847.5	20635	3	QPSK	1	14	24.00	0	0
	847.5	20635	3	QPSK	8	0	22.60	0-1	1
	847.5	20635	3	QPSK	8	4	22.64	0-1	1
	847.5	20635	3	QPSK	8	7	22.64	0-1	1
	847.5	20635	3	QPSK	15	0	22.67	0-1	1
	847.5	20635	3	16-QAM	1	0	22.86	0-1	1
	847.5	20635	3	16-QAM	1	7	22.87	0-1	1
	847.5	20635	3	16-QAM	1	14	22.84	0-1	1
	847.5	20635	3	16-QAM	8	0	21.69	0-2	2
	847.5	20635	3	16-QAM	8	4	21.67	0-2	2
	847.5	20635	3	16-QAM	8	7	21.76	0-2	2
	847.5	20635	3	16-QAM	15	0	21.69	0-2	2

Table 8-10

LTE Band 5 (Cell) Conducted Powers – 1.4 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	824.7	20407	1.4	QPSK	1	0	24.36	0	0
	824.7	20407	1.4	QPSK	1	2	24.24	0	0
	824.7	20407	1.4	QPSK	1	5	24.33	0	0
	824.7	20407	1.4	QPSK	3	0	24.07	0	0
	824.7	20407	1.4	QPSK	3	2	24.08	0	0
	824.7	20407	1.4	QPSK	3	3	24.08	0	0
	824.7	20407	1.4	QPSK	6	0	22.50	0-1	1
	824.7	20407	1.4	16-QAM	1	0	22.74	0-1	1
	824.7	20407	1.4	16-QAM	1	2	22.98	0-1	1
	824.7	20407	1.4	16-QAM	1	5	22.88	0-1	1
	824.7	20407	1.4	16-QAM	3	0	22.50	0-1	1
	824.7	20407	1.4	16-QAM	3	2	22.57	0-1	1
	824.7	20407	1.4	16-QAM	3	3	22.66	0-1	1
	824.7	20407	1.4	16-QAM	6	0	21.55	0-2	2
Mid	836.5	20525	1.4	QPSK	1	0	24.10	0	0
	836.5	20525	1.4	QPSK	1	2	24.08	0	0
	836.5	20525	1.4	QPSK	1	5	24.15	0	0
	836.5	20525	1.4	QPSK	3	0	23.89	0	0
	836.5	20525	1.4	QPSK	3	2	23.85	0	0
	836.5	20525	1.4	QPSK	3	3	23.88	0	0
	836.5	20525	1.4	QPSK	6	0	22.59	0-1	1
	836.5	20525	1.4	16-QAM	1	0	22.93	0-1	1
	836.5	20525	1.4	16-QAM	1	2	22.80	0-1	1
	836.5	20525	1.4	16-QAM	1	5	22.73	0-1	1
	836.5	20525	1.4	16-QAM	3	0	22.68	0-1	1
	836.5	20525	1.4	16-QAM	3	2	22.50	0-1	1
	836.5	20525	1.4	16-QAM	3	3	22.63	0-1	1
	836.5	20525	1.4	16-QAM	6	0	21.80	0-2	2
High	848.3	20643	1.4	QPSK	1	0	24.22	0	0
	848.3	20643	1.4	QPSK	1	2	24.20	0	0
	848.3	20643	1.4	QPSK	1	5	24.21	0	0
	848.3	20643	1.4	QPSK	3	0	24.00	0	0
	848.3	20643	1.4	QPSK	3	2	24.00	0	0
	848.3	20643	1.4	QPSK	3	3	23.96	0	0
	848.3	20643	1.4	QPSK	6	0	22.50	0-1	1
	848.3	20643	1.4	16-QAM	1	0	22.63	0-1	1
	848.3	20643	1.4	16-QAM	1	2	22.69	0-1	1
	848.3	20643	1.4	16-QAM	1	5	22.68	0-1	1
	848.3	20643	1.4	16-QAM	3	0	22.56	0-1	1
	848.3	20643	1.4	16-QAM	3	2	22.56	0-1	1
	848.3	20643	1.4	16-QAM	3	3	22.50	0-1	1
	848.3	20643	1.4	16-QAM	6	0	21.56	0-2	2

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Table 8-11
LTE Band 5 Conducted Powers - 10 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Mid	836.5	20525	10	QPSK	1	0	19.21	0	0
	836.5	20525	10	QPSK	1	25	19.20	0	0
	836.5	20525	10	QPSK	1	49	19.20	0	0
	836.5	20525	10	QPSK	25	0	18.13	0-1	1
	836.5	20525	10	QPSK	25	12	18.18	0-1	1
	836.5	20525	10	QPSK	25	25	18.07	0-1	1
	836.5	20525	10	QPSK	50	0	18.07	0-1	1
	836.5	20525	10	16QAM	1	0	17.72	0-1	1
	836.5	20525	10	16QAM	1	25	17.55	0-1	1
	836.5	20525	10	16QAM	1	49	17.53	0-1	1
	836.5	20525	10	16QAM	25	0	17.19	0-2	2
	836.5	20525	10	16QAM	25	12	17.16	0-2	2
	836.5	20525	10	16QAM	25	25	17.11	0-2	2
	836.5	20525	10	16QAM	50	0	17.10	0-2	2

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

Table 8-12
LTE Band 5 Conducted Powers - 5 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	826.5	20425	5	QPSK	1	0	19.19	0	0
	826.5	20425	5	QPSK	1	12	19.18	0	0
	826.5	20425	5	QPSK	1	24	19.22	0	0
	826.5	20425	5	QPSK	12	0	18.12	0-1	1
	826.5	20425	5	QPSK	12	6	18.15	0-1	1
	826.5	20425	5	QPSK	12	13	18.08	0-1	1
	826.5	20425	5	QPSK	25	0	18.08	0-1	1
	826.5	20425	5	16-QAM	1	0	17.74	0-1	1
	826.5	20425	5	16-QAM	1	12	17.55	0-1	1
	826.5	20425	5	16-QAM	1	24	17.69	0-1	1
	826.5	20425	5	16-QAM	12	0	17.11	0-2	2
	826.5	20425	5	16-QAM	12	6	17.01	0-2	2
	826.5	20425	5	16-QAM	12	13	17.02	0-2	2
	826.5	20425	5	16-QAM	25	0	17.00	0-2	2
Mid	836.5	20525	5	QPSK	1	0	19.15	0	0
	836.5	20525	5	QPSK	1	12	19.22	0	0
	836.5	20525	5	QPSK	1	24	19.35	0	0
	836.5	20525	5	QPSK	12	0	18.13	0-1	1
	836.5	20525	5	QPSK	12	6	18.14	0-1	1
	836.5	20525	5	QPSK	12	13	18.08	0-1	1
	836.5	20525	5	QPSK	25	0	18.06	0-1	1
	836.5	20525	5	16-QAM	1	0	17.52	0-1	1
	836.5	20525	5	16-QAM	1	12	17.60	0-1	1
	836.5	20525	5	16-QAM	1	24	17.74	0-1	1
	836.5	20525	5	16-QAM	12	0	17.07	0-2	2
	836.5	20525	5	16-QAM	12	6	17.03	0-2	2
	836.5	20525	5	16-QAM	12	13	17.02	0-2	2
	836.5	20525	5	16-QAM	25	0	17.11	0-2	2
High	846.5	20625	5	QPSK	1	0	19.26	0	0
	846.5	20625	5	QPSK	1	12	19.18	0	0
	846.5	20625	5	QPSK	1	24	19.22	0	0
	846.5	20625	5	QPSK	12	0	18.07	0-1	1
	846.5	20625	5	QPSK	12	6	17.88	0-1	1
	846.5	20625	5	QPSK	12	13	17.99	0-1	1
	846.5	20625	5	QPSK	25	0	17.99	0-1	1
	846.5	20625	5	16-QAM	1	0	17.66	0-1	1
	846.5	20625	5	16-QAM	1	12	17.64	0-1	1
	846.5	20625	5	16-QAM	1	24	17.70	0-1	1
	846.5	20625	5	16-QAM	12	0	17.01	0-2	2
	846.5	20625	5	16-QAM	12	6	16.85	0-2	2
	846.5	20625	5	16-QAM	12	13	17.02	0-2	2
	846.5	20625	5	16-QAM	25	0	16.98	0-2	2

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Table 8-13
LTE Band 5 Conducted Powers - 3 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	825.5	20415	3	QPSK	1	0	19.25	0	0
	825.5	20415	3	QPSK	1	7	19.20	0	0
	825.5	20415	3	QPSK	1	14	19.21	0	0
	825.5	20415	3	QPSK	8	0	17.59	0-1	1
	825.5	20415	3	QPSK	8	4	17.55	0-1	1
	825.5	20415	3	QPSK	8	7	17.51	0-1	1
	825.5	20415	3	QPSK	15	0	17.56	0-1	1
	825.5	20415	3	16-QAM	1	0	17.55	0-1	1
	825.5	20415	3	16-QAM	1	7	17.52	0-1	1
	825.5	20415	3	16-QAM	1	14	17.53	0-1	1
	825.5	20415	3	16-QAM	8	0	16.62	0-2	2
	825.5	20415	3	16-QAM	8	4	16.61	0-2	2
	825.5	20415	3	16-QAM	8	7	16.54	0-2	2
	825.5	20415	3	16-QAM	15	0	16.59	0-2	2
	836.5	20525	3	QPSK	1	0	19.31	0	0
Mid	836.5	20525	3	QPSK	1	7	19.26	0	0
	836.5	20525	3	QPSK	1	14	19.28	0	0
	836.5	20525	3	QPSK	8	0	17.58	0-1	1
	836.5	20525	3	QPSK	8	4	17.53	0-1	1
	836.5	20525	3	QPSK	8	7	17.59	0-1	1
	836.5	20525	3	QPSK	15	0	17.64	0-1	1
	836.5	20525	3	16-QAM	1	0	17.65	0-1	1
	836.5	20525	3	16-QAM	1	7	17.52	0-1	1
	836.5	20525	3	16-QAM	1	14	17.62	0-1	1
	836.5	20525	3	16-QAM	8	0	16.54	0-2	2
	836.5	20525	3	16-QAM	8	4	16.64	0-2	2
	836.5	20525	3	16-QAM	8	7	16.53	0-2	2
	836.5	20525	3	16-QAM	15	0	16.57	0-2	2
	847.5	20635	3	QPSK	1	0	19.20	0	0
	847.5	20635	3	QPSK	1	7	19.18	0	0
High	847.5	20635	3	QPSK	1	14	19.17	0	0
	847.5	20635	3	QPSK	8	0	17.57	0-1	1
	847.5	20635	3	QPSK	8	4	17.51	0-1	1
	847.5	20635	3	QPSK	8	7	17.52	0-1	1
	847.5	20635	3	QPSK	15	0	17.55	0-1	1
	847.5	20635	3	16-QAM	1	0	17.77	0-1	1
	847.5	20635	3	16-QAM	1	7	17.65	0-1	1
	847.5	20635	3	16-QAM	1	14	17.62	0-1	1
	847.5	20635	3	16-QAM	8	0	16.52	0-2	2
	847.5	20635	3	16-QAM	8	4	16.50	0-2	2
	847.5	20635	3	16-QAM	8	7	16.52	0-2	2
	847.5	20635	3	16-QAM	15	0	16.58	0-2	2

Table 8-14
LTE Band 5 Conducted Powers – 1.4 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	824.7	20407	1.4	QPSK	1	0	19.15	0	0
	824.7	20407	1.4	QPSK	1	2	19.18	0	0
	824.7	20407	1.4	QPSK	1	5	19.14	0	0
	824.7	20407	1.4	QPSK	3	0	19.01	0	0
	824.7	20407	1.4	QPSK	3	2	18.98	0	0
	824.7	20407	1.4	QPSK	3	3	19.02	0	0
	824.7	20407	1.4	QPSK	6	0	17.57	0-1	1
	824.7	20407	1.4	16-QAM	1	0	17.74	0-1	1
	824.7	20407	1.4	16-QAM	1	2	17.67	0-1	1
	824.7	20407	1.4	16-QAM	1	5	17.76	0-1	1
	824.7	20407	1.4	16-QAM	3	0	17.50	0-1	1
	824.7	20407	1.4	16-QAM	3	2	17.56	0-1	1
	824.7	20407	1.4	16-QAM	3	3	17.58	0-1	1
	824.7	20407	1.4	16-QAM	6	0	16.58	0-2	2
Mid	836.5	20525	1.4	QPSK	1	0	19.37	0	0
	836.5	20525	1.4	QPSK	1	2	19.29	0	0
	836.5	20525	1.4	QPSK	1	5	19.41	0	0
	836.5	20525	1.4	QPSK	3	0	19.08	0	0
	836.5	20525	1.4	QPSK	3	2	19.09	0	0
	836.5	20525	1.4	QPSK	3	3	19.04	0	0
	836.5	20525	1.4	QPSK	6	0	17.50	0-1	1
	836.5	20525	1.4	16-QAM	1	0	17.84	0-1	1
	836.5	20525	1.4	16-QAM	1	2	17.86	0-1	1
	836.5	20525	1.4	16-QAM	1	5	17.79	0-1	1
	836.5	20525	1.4	16-QAM	3	0	17.54	0-1	1
	836.5	20525	1.4	16-QAM	3	2	17.52	0-1	1
	836.5	20525	1.4	16-QAM	3	3	17.54	0-1	1
	836.5	20525	1.4	16-QAM	6	0	16.55	0-2	2
High	848.3	20643	1.4	QPSK	1	0	19.25	0	0
	848.3	20643	1.4	QPSK	1	2	19.28	0	0
	848.3	20643	1.4	QPSK	1	5	19.31	0	0
	848.3	20643	1.4	QPSK	3	0	18.99	0	0
	848.3	20643	1.4	QPSK	3	2	18.92	0	0
	848.3	20643	1.4	QPSK	3	3	19.06	0	0
	848.3	20643	1.4	QPSK	6	0	17.53	0-1	1
	848.3	20643	1.4	16-QAM	1	0	17.52	0-1	1
	848.3	20643	1.4	16-QAM	1	2	17.54	0-1	1
	848.3	20643	1.4	16-QAM	1	5	17.53	0-1	1
	848.3	20643	1.4	16-QAM	3	0	17.56	0-1	1
	848.3	20643	1.4	16-QAM	3	2	17.59	0-1	1
	848.3	20643	1.4	16-QAM	3	3	17.58	0-1	1
	848.3	20643	1.4	16-QAM	6	0	16.59	0-2	2

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8.2.3 LTE Band 4 (AWS)

Table 8-15

LTE Band 4 (AWS) Conducted Powers - 20 MHz Bandwidth Maximum Average RF Output Powers

	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	23.76	0	0
	1732.5	20175	20	QPSK	1	50	23.89	0	0
	1732.5	20175	20	QPSK	1	99	23.81	0	0
	1732.5	20175	20	QPSK	50	0	22.80	0-1	1
	1732.5	20175	20	QPSK	50	25	22.79	0-1	1
	1732.5	20175	20	QPSK	50	50	22.73	0-1	1
	1732.5	20175	20	QPSK	100	0	22.77	0-1	1
	1732.5	20175	20	16QAM	1	0	22.69	0-1	1
	1732.5	20175	20	16QAM	1	50	22.72	0-1	1
	1732.5	20175	20	16QAM	1	99	22.83	0-1	1
	1732.5	20175	20	16QAM	50	0	21.82	0-2	2
	1732.5	20175	20	16QAM	50	25	21.90	0-2	2
	1732.5	20175	20	16QAM	50	50	21.85	0-2	2
	1732.5	20175	20	16QAM	100	0	21.80	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.

Table 8-16

LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth Maximum Average RF Output Powers

	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	23.54	0	0
	1717.5	20025	15	QPSK	1	36	23.48	0	0
	1717.5	20025	15	QPSK	1	74	23.50	0	0
	1717.5	20025	15	QPSK	36	0	22.28	0-1	1
	1717.5	20025	15	QPSK	36	18	22.29	0-1	1
	1717.5	20025	15	QPSK	36	37	22.37	0-1	1
	1717.5	20025	15	QPSK	75	0	22.34	0-1	1
	1717.5	20025	15	16QAM	1	0	22.20	0-1	1
	1717.5	20025	15	16QAM	1	36	22.24	0-1	1
	1717.5	20025	15	16QAM	1	74	22.07	0-1	1
	1717.5	20025	15	16QAM	36	0	21.34	0-2	2
	1717.5	20025	15	16QAM	36	18	21.42	0-2	2
	1717.5	20025	15	16QAM	36	37	21.40	0-2	2
	1717.5	20025	15	16QAM	75	0	21.40	0-2	2
Mid	1732.5	20175	15	QPSK	1	0	23.25	0	0
	1732.5	20175	15	QPSK	1	36	23.42	0	0
	1732.5	20175	15	QPSK	1	74	23.20	0	0
	1732.5	20175	15	QPSK	36	0	22.33	0-1	1
	1732.5	20175	15	QPSK	36	18	22.33	0-1	1
	1732.5	20175	15	QPSK	36	37	22.37	0-1	1
	1732.5	20175	15	QPSK	75	0	22.35	0-1	1
	1732.5	20175	15	16QAM	1	0	22.30	0-1	1
	1732.5	20175	15	16QAM	1	36	22.28	0-1	1
	1732.5	20175	15	16QAM	1	74	22.21	0-1	1
	1732.5	20175	15	16QAM	36	0	21.36	0-2	2
	1732.5	20175	15	16QAM	36	18	21.34	0-2	2
	1732.5	20175	15	16QAM	36	37	21.40	0-2	2
	1732.5	20175	15	16QAM	75	0	21.36	0-2	2
High	1747.5	20325	15	QPSK	1	0	23.19	0	0
	1747.5	20325	15	QPSK	1	36	23.25	0	0
	1747.5	20325	15	QPSK	1	74	23.24	0	0
	1747.5	20325	15	QPSK	36	0	22.24	0-1	1
	1747.5	20325	15	QPSK	36	18	22.34	0-1	1
	1747.5	20325	15	QPSK	36	37	22.37	0-1	1
	1747.5	20325	15	QPSK	75	0	22.34	0-1	1
	1747.5	20325	15	16QAM	1	0	22.25	0-1	1
	1747.5	20325	15	16QAM	1	36	22.25	0-1	1
	1747.5	20325	15	16QAM	1	74	22.21	0-1	1
	1747.5	20325	15	16QAM	36	0	21.31	0-2	2
	1747.5	20325	15	16QAM	36	18	21.36	0-2	2
	1747.5	20325	15	16QAM	36	37	21.38	0-2	2
	1747.5	20325	15	16QAM	75	0	21.39	0-2	2

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Table 8-17

LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth Maximum Average RF Output Powers

	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	23.65	0	0
	1715	20000	10	QPSK	1	25	23.61	0	0
	1715	20000	10	QPSK	1	49	23.60	0	0
	1715	20000	10	QPSK	25	0	22.38	0-1	1
	1715	20000	10	QPSK	25	12	22.36	0-1	1
	1715	20000	10	QPSK	25	25	22.37	0-1	1
	1715	20000	10	QPSK	50	0	22.38	0-1	1
	1715	20000	10	16QAM	1	0	22.23	0-1	1
	1715	20000	10	16QAM	1	25	22.29	0-1	1
	1715	20000	10	16QAM	1	49	22.32	0-1	1
	1715	20000	10	16QAM	25	0	21.34	0-2	2
	1715	20000	10	16QAM	25	12	21.42	0-2	2
	1715	20000	10	16QAM	25	25	21.40	0-2	2
	1715	20000	10	16QAM	50	0	21.40	0-2	2
Mid	1732.5	20175	10	QPSK	1	0	23.28	0	0
	1732.5	20175	10	QPSK	1	25	23.30	0	0
	1732.5	20175	10	QPSK	1	49	23.30	0	0
	1732.5	20175	10	QPSK	25	0	22.26	0-1	1
	1732.5	20175	10	QPSK	25	12	22.32	0-1	1
	1732.5	20175	10	QPSK	25	25	22.35	0-1	1
	1732.5	20175	10	QPSK	50	0	22.36	0-1	1
	1732.5	20175	10	16QAM	1	0	22.28	0-1	1
	1732.5	20175	10	16QAM	1	25	22.28	0-1	1
	1732.5	20175	10	16QAM	1	49	22.15	0-1	1
	1732.5	20175	10	16QAM	25	0	21.37	0-2	2
	1732.5	20175	10	16QAM	25	12	21.42	0-2	2
	1732.5	20175	10	16QAM	25	25	21.39	0-2	2
	1732.5	20175	10	16QAM	50	0	21.37	0-2	2
High	1750	20350	10	QPSK	1	0	23.36	0	0
	1750	20350	10	QPSK	1	25	23.44	0	0
	1750	20350	10	QPSK	1	49	23.35	0	0
	1750	20350	10	QPSK	25	0	22.31	0-1	1
	1750	20350	10	QPSK	25	12	22.37	0-1	1
	1750	20350	10	QPSK	25	25	22.37	0-1	1
	1750	20350	10	QPSK	50	0	22.39	0-1	1
	1750	20350	10	16QAM	1	0	22.29	0-1	1
	1750	20350	10	16QAM	1	25	22.18	0-1	1
	1750	20350	10	16QAM	1	49	22.27	0-1	1
	1750	20350	10	16QAM	25	0	21.40	0-2	2
	1750	20350	10	16QAM	25	12	21.38	0-2	2
	1750	20350	10	16QAM	25	25	21.43	0-2	2
	1750	20350	10	16QAM	50	0	21.41	0-2	2

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Table 8-18
LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth Maximum Average RF Output Powers

	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	23.49	0	0
	1712.5	19975	5	QPSK	1	12	23.34	0	0
	1712.5	19975	5	QPSK	1	24	23.45	0	0
	1712.5	19975	5	QPSK	12	0	22.34	0-1	1
	1712.5	19975	5	QPSK	12	6	22.32	0-1	1
	1712.5	19975	5	QPSK	12	13	22.33	0-1	1
	1712.5	19975	5	QPSK	25	0	22.34	0-1	1
	1712.5	19975	5	16-QAM	1	0	22.19	0-1	1
	1712.5	19975	5	16-QAM	1	12	22.29	0-1	1
	1712.5	19975	5	16-QAM	1	24	22.38	0-1	1
	1712.5	19975	5	16-QAM	12	0	21.27	0-2	2
	1712.5	19975	5	16-QAM	12	6	21.33	0-2	2
	1712.5	19975	5	16-QAM	12	13	21.31	0-2	2
	1712.5	19975	5	16-QAM	25	0	21.39	0-2	2
Mid	1732.5	20175	5	QPSK	1	0	23.10	0	0
	1732.5	20175	5	QPSK	1	12	23.17	0	0
	1732.5	20175	5	QPSK	1	24	23.13	0	0
	1732.5	20175	5	QPSK	12	0	22.08	0-1	1
	1732.5	20175	5	QPSK	12	6	22.06	0-1	1
	1732.5	20175	5	QPSK	12	13	22.10	0-1	1
	1732.5	20175	5	QPSK	25	0	22.37	0-1	1
	1732.5	20175	5	16-QAM	1	0	22.15	0-1	1
	1732.5	20175	5	16-QAM	1	12	22.13	0-1	1
	1732.5	20175	5	16-QAM	1	24	22.40	0-1	1
	1732.5	20175	5	16-QAM	12	0	21.31	0-2	2
	1732.5	20175	5	16-QAM	12	6	21.32	0-2	2
	1732.5	20175	5	16-QAM	12	13	21.29	0-2	2
	1732.5	20175	5	16-QAM	25	0	21.42	0-2	2
High	1752.5	20375	5	QPSK	1	0	23.27	0	0
	1752.5	20375	5	QPSK	1	12	23.31	0	0
	1752.5	20375	5	QPSK	1	24	23.12	0	0
	1752.5	20375	5	QPSK	12	0	22.28	0-1	1
	1752.5	20375	5	QPSK	12	6	22.26	0-1	1
	1752.5	20375	5	QPSK	12	13	22.27	0-1	1
	1752.5	20375	5	QPSK	25	0	22.24	0-1	1
	1752.5	20375	5	16-QAM	1	0	22.30	0-1	1
	1752.5	20375	5	16-QAM	1	12	22.13	0-1	1
	1752.5	20375	5	16-QAM	1	24	22.10	0-1	1
	1752.5	20375	5	16-QAM	12	0	21.21	0-2	2
	1752.5	20375	5	16-QAM	12	6	21.15	0-2	2
	1752.5	20375	5	16-QAM	12	13	21.20	0-2	2
	1752.5	20375	5	16-QAM	25	0	21.29	0-2	2

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Table 8-19
LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1711.5	19965	3	QPSK	1	0	23.70	0	0
	1711.5	19965	3	QPSK	1	7	23.72	0	0
	1711.5	19965	3	QPSK	1	14	23.72	0	0
	1711.5	19965	3	QPSK	8	0	22.27	0-1	1
	1711.5	19965	3	QPSK	8	4	22.35	0-1	1
	1711.5	19965	3	QPSK	8	7	22.34	0-1	1
	1711.5	19965	3	QPSK	15	0	22.35	0-1	1
	1711.5	19965	3	16-QAM	1	0	22.50	0-1	1
	1711.5	19965	3	16-QAM	1	7	22.43	0-1	1
	1711.5	19965	3	16-QAM	1	14	22.48	0-1	1
	1711.5	19965	3	16-QAM	8	0	21.55	0-2	2
	1711.5	19965	3	16-QAM	8	4	21.41	0-2	2
	1711.5	19965	3	16-QAM	8	7	21.36	0-2	2
	1711.5	19965	3	16-QAM	15	0	21.36	0-2	2
Mid	1732.5	20175	3	QPSK	1	0	23.72	0	0
	1732.5	20175	3	QPSK	1	7	23.71	0	0
	1732.5	20175	3	QPSK	1	14	23.63	0	0
	1732.5	20175	3	QPSK	8	0	22.50	0-1	1
	1732.5	20175	3	QPSK	8	4	22.41	0-1	1
	1732.5	20175	3	QPSK	8	7	22.36	0-1	1
	1732.5	20175	3	QPSK	15	0	22.39	0-1	1
	1732.5	20175	3	16-QAM	1	0	22.30	0-1	1
	1732.5	20175	3	16-QAM	1	7	22.28	0-1	1
	1732.5	20175	3	16-QAM	1	14	22.46	0-1	1
	1732.5	20175	3	16-QAM	8	0	21.42	0-2	2
	1732.5	20175	3	16-QAM	8	4	21.46	0-2	2
	1732.5	20175	3	16-QAM	8	7	21.41	0-2	2
	1732.5	20175	3	16-QAM	15	0	21.32	0-2	2
High	1753.5	20385	3	QPSK	1	0	23.69	0	0
	1753.5	20385	3	QPSK	1	7	23.67	0	0
	1753.5	20385	3	QPSK	1	14	23.55	0	0
	1753.5	20385	3	QPSK	8	0	22.32	0-1	1
	1753.5	20385	3	QPSK	8	4	22.46	0-1	1
	1753.5	20385	3	QPSK	8	7	22.26	0-1	1
	1753.5	20385	3	QPSK	15	0	22.27	0-1	1
	1753.5	20385	3	16-QAM	1	0	22.16	0-1	1
	1753.5	20385	3	16-QAM	1	7	22.18	0-1	1
	1753.5	20385	3	16-QAM	1	14	22.36	0-1	1
	1753.5	20385	3	16-QAM	8	0	21.33	0-2	2
	1753.5	20385	3	16-QAM	8	4	21.35	0-2	2
	1753.5	20385	3	16-QAM	8	7	21.34	0-2	2
	1753.5	20385	3	16-QAM	15	0	21.23	0-2	2

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Table 8-20

LTE Band 4 (AWS) Conducted Powers - 1.4 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1710.7	19957	1.4	QPSK	1	0	23.68	0	0
	1710.7	19957	1.4	QPSK	1	2	23.66	0	0
	1710.7	19957	1.4	QPSK	1	5	23.64	0	0
	1710.7	19957	1.4	QPSK	3	0	23.40	0	0
	1710.7	19957	1.4	QPSK	3	2	23.36	0	0
	1710.7	19957	1.4	QPSK	3	3	23.40	0	0
	1710.7	19957	1.4	QPSK	6	0	22.39	0-1	1
	1710.7	19957	1.4	16-QAM	1	0	22.34	0-1	1
	1710.7	19957	1.4	16-QAM	1	2	22.58	0-1	1
	1710.7	19957	1.4	16-QAM	1	5	22.60	0-1	1
	1710.7	19957	1.4	16-QAM	3	0	22.48	0-1	1
	1710.7	19957	1.4	16-QAM	3	2	22.33	0-1	1
Mid	1710.7	19957	1.4	16-QAM	3	3	22.33	0-1	1
	1710.7	19957	1.4	16-QAM	6	0	21.29	0-2	2
	1732.5	20175	1.4	QPSK	1	0	23.65	0	0
	1732.5	20175	1.4	QPSK	1	2	23.55	0	0
	1732.5	20175	1.4	QPSK	1	5	23.61	0	0
	1732.5	20175	1.4	QPSK	3	0	23.31	0	0
	1732.5	20175	1.4	QPSK	3	2	23.33	0	0
	1732.5	20175	1.4	QPSK	3	3	23.41	0	0
	1732.5	20175	1.4	QPSK	6	0	22.38	0-1	1
	1732.5	20175	1.4	16-QAM	1	0	22.69	0-1	1
	1732.5	20175	1.4	16-QAM	1	2	22.59	0-1	1
	1732.5	20175	1.4	16-QAM	1	5	22.54	0-1	1
High	1732.5	20175	1.4	16-QAM	3	0	22.49	0-1	1
	1732.5	20175	1.4	16-QAM	3	2	22.31	0-1	1
	1732.5	20175	1.4	16-QAM	3	3	22.35	0-1	1
	1732.5	20175	1.4	16-QAM	6	0	21.46	0-2	2
	1754.3	20393	1.4	QPSK	1	0	23.70	0	0
	1754.3	20393	1.4	QPSK	1	2	23.57	0	0
	1754.3	20393	1.4	QPSK	1	5	23.61	0	0
	1754.3	20393	1.4	QPSK	3	0	23.31	0	0
	1754.3	20393	1.4	QPSK	3	2	23.40	0	0
	1754.3	20393	1.4	QPSK	3	3	23.35	0	0
	1754.3	20393	1.4	QPSK	6	0	22.26	0-1	1
	1754.3	20393	1.4	16-QAM	1	0	22.62	0-1	1
	1754.3	20393	1.4	16-QAM	1	2	22.35	0-1	1
	1754.3	20393	1.4	16-QAM	1	5	22.52	0-1	1
	1754.3	20393	1.4	16-QAM	3	0	22.48	0-1	1
	1754.3	20393	1.4	16-QAM	3	2	22.40	0-1	1
	1754.3	20393	1.4	16-QAM	3	3	22.30	0-1	1
	1754.3	20393	1.4	16-QAM	6	0	21.22	0-2	2

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Table 8-21

LTE Band 4 (AWS) Conducted Powers - 20 MHz Bandwidth Reduced Average RF Output Powers

	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	12.58	0	0
	1732.5	20175	20	QPSK	1	50	12.61	0	0
	1732.5	20175	20	QPSK	1	99	12.55	0	0
	1732.5	20175	20	QPSK	50	0	12.39	0-1	0
	1732.5	20175	20	QPSK	50	25	12.42	0-1	0
	1732.5	20175	20	QPSK	50	50	12.35	0-1	0
	1732.5	20175	20	QPSK	100	0	12.36	0-1	0
	1732.5	20175	20	16QAM	1	0	12.49	0-1	0
	1732.5	20175	20	16QAM	1	50	12.50	0-1	0
	1732.5	20175	20	16QAM	1	99	12.52	0-1	0
	1732.5	20175	20	16QAM	50	0	12.46	0-2	0
	1732.5	20175	20	16QAM	50	25	12.43	0-2	0
	1732.5	20175	20	16QAM	50	50	12.45	0-2	0
	1732.5	20175	20	16QAM	100	0	12.36	0-2	0

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.

Table 8-22

LTE Band 4 (AWS) Conducted Powers - 15 MHz Bandwidth Reduced Average RF Output Powers

	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	12.80	0	0
	1717.5	20025	15	QPSK	1	36	12.82	0	0
	1717.5	20025	15	QPSK	1	74	12.75	0	0
	1717.5	20025	15	QPSK	36	0	12.76	0-1	0
	1717.5	20025	15	QPSK	36	18	12.73	0-1	0
	1717.5	20025	15	QPSK	36	37	12.79	0-1	0
	1717.5	20025	15	QPSK	75	0	12.65	0-1	0
	1717.5	20025	15	16QAM	1	0	12.92	0-1	0
	1717.5	20025	15	16QAM	1	36	12.91	0-1	0
	1717.5	20025	15	16QAM	1	74	12.88	0-1	0
	1717.5	20025	15	16QAM	36	0	12.83	0-2	0
	1717.5	20025	15	16QAM	36	18	12.81	0-2	0
	1717.5	20025	15	16QAM	36	37	12.74	0-2	0
	1717.5	20025	15	16QAM	75	0	12.80	0-2	0
Mid	1732.5	20175	15	QPSK	1	0	12.72	0	0
	1732.5	20175	15	QPSK	1	36	12.73	0	0
	1732.5	20175	15	QPSK	1	74	12.74	0	0
	1732.5	20175	15	QPSK	36	0	12.82	0-1	0
	1732.5	20175	15	QPSK	36	18	12.83	0-1	0
	1732.5	20175	15	QPSK	36	37	12.79	0-1	0
	1732.5	20175	15	QPSK	75	0	12.73	0-1	0
	1732.5	20175	15	16QAM	1	0	12.93	0-1	0
	1732.5	20175	15	16QAM	1	36	12.89	0-1	0
	1732.5	20175	15	16QAM	1	74	12.82	0-1	0
	1732.5	20175	15	16QAM	36	0	12.83	0-2	0
	1732.5	20175	15	16QAM	36	18	12.82	0-2	0
	1732.5	20175	15	16QAM	36	37	12.85	0-2	0
	1732.5	20175	15	16QAM	75	0	12.71	0-2	0
High	1747.5	20325	15	QPSK	1	0	12.78	0	0
	1747.5	20325	15	QPSK	1	36	12.82	0	0
	1747.5	20325	15	QPSK	1	74	12.75	0	0
	1747.5	20325	15	QPSK	36	0	12.74	0-1	0
	1747.5	20325	15	QPSK	36	18	12.77	0-1	0
	1747.5	20325	15	QPSK	36	37	12.76	0-1	0
	1747.5	20325	15	QPSK	75	0	12.77	0-1	0
	1747.5	20325	15	16QAM	1	0	12.70	0-1	0
	1747.5	20325	15	16QAM	1	36	12.62	0-1	0
	1747.5	20325	15	16QAM	1	74	12.72	0-1	0
	1747.5	20325	15	16QAM	36	0	12.71	0-2	0
	1747.5	20325	15	16QAM	36	18	12.74	0-2	0
	1747.5	20325	15	16QAM	36	37	12.73	0-2	0
	1747.5	20325	15	16QAM	75	0	12.66	0-2	0

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Table 8-23

LTE Band 4 (AWS) Conducted Powers - 10 MHz Bandwidth Reduced Average RF Output Powers

	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	12.73	0	0
	1715	20000	10	QPSK	1	25	12.79	0	0
	1715	20000	10	QPSK	1	49	12.72	0	0
	1715	20000	10	QPSK	25	0	12.75	0-1	0
	1715	20000	10	QPSK	25	12	12.85	0-1	0
	1715	20000	10	QPSK	25	25	12.83	0-1	0
	1715	20000	10	QPSK	50	0	12.74	0-1	0
	1715	20000	10	16QAM	1	0	12.75	0-1	0
	1715	20000	10	16QAM	1	25	12.64	0-1	0
	1715	20000	10	16QAM	1	49	12.46	0-1	0
	1715	20000	10	16QAM	25	0	12.81	0-2	0
	1715	20000	10	16QAM	25	12	12.84	0-2	0
Mid	1715	20000	10	16QAM	25	25	12.87	0-2	0
	1715	20000	10	16QAM	50	0	12.76	0-2	0
	1732.5	20175	10	QPSK	1	0	12.83	0	0
	1732.5	20175	10	QPSK	1	25	12.89	0	0
	1732.5	20175	10	QPSK	1	49	12.88	0	0
	1732.5	20175	10	QPSK	25	0	12.73	0-1	0
	1732.5	20175	10	QPSK	25	12	12.76	0-1	0
	1732.5	20175	10	QPSK	25	25	12.69	0-1	0
	1732.5	20175	10	QPSK	50	0	12.81	0-1	0
	1732.5	20175	10	16QAM	1	0	12.67	0-1	0
	1732.5	20175	10	16QAM	1	25	12.61	0-1	0
	1732.5	20175	10	16QAM	1	49	12.56	0-1	0
High	1732.5	20175	10	16QAM	25	0	12.85	0-2	0
	1732.5	20175	10	16QAM	25	12	12.89	0-2	0
	1732.5	20175	10	16QAM	25	25	12.83	0-2	0
	1732.5	20175	10	16QAM	50	0	12.73	0-2	0
	1750	20350	10	QPSK	1	0	12.73	0	0
	1750	20350	10	QPSK	1	25	12.75	0	0
	1750	20350	10	QPSK	1	49	12.77	0	0
	1750	20350	10	QPSK	25	0	12.72	0-1	0
	1750	20350	10	QPSK	25	12	12.74	0-1	0
	1750	20350	10	QPSK	25	25	12.78	0-1	0
	1750	20350	10	QPSK	50	0	12.72	0-1	0
	1750	20350	10	16QAM	1	0	12.60	0-1	0
	1750	20350	10	16QAM	1	25	12.62	0-1	0
	1750	20350	10	16QAM	1	49	12.66	0-1	0
	1750	20350	10	16QAM	25	0	12.75	0-2	0
	1750	20350	10	16QAM	25	12	12.85	0-2	0
	1750	20350	10	16QAM	25	25	12.76	0-2	0
	1750	20350	10	16QAM	50	0	12.79	0-2	0

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Table 8-24
LTE Band 4 (AWS) Conducted Powers - 5 MHz Bandwidth Reduced Average RF Output Powers

	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	12.61	0	0
	1712.5	19975	5	QPSK	1	12	12.56	0	0
	1712.5	19975	5	QPSK	1	24	12.60	0	0
	1712.5	19975	5	QPSK	12	0	12.77	0-1	0
	1712.5	19975	5	QPSK	12	6	12.78	0-1	0
	1712.5	19975	5	QPSK	12	13	12.74	0-1	0
	1712.5	19975	5	QPSK	25	0	12.70	0-1	0
	1712.5	19975	5	16-QAM	1	0	12.66	0-1	0
	1712.5	19975	5	16-QAM	1	12	12.55	0-1	0
	1712.5	19975	5	16-QAM	1	24	12.71	0-1	0
	1712.5	19975	5	16-QAM	12	0	12.70	0-2	0
	1712.5	19975	5	16-QAM	12	6	12.76	0-2	0
Mid	1712.5	19975	5	16-QAM	12	13	12.78	0-2	0
	1712.5	19975	5	16-QAM	25	0	12.81	0-2	0
	1732.5	20175	5	QPSK	1	0	12.77	0	0
	1732.5	20175	5	QPSK	1	12	12.78	0	0
	1732.5	20175	5	QPSK	1	24	12.72	0	0
	1732.5	20175	5	QPSK	12	0	12.81	0-1	0
	1732.5	20175	5	QPSK	12	6	12.75	0-1	0
	1732.5	20175	5	QPSK	12	13	12.80	0-1	0
	1732.5	20175	5	QPSK	25	0	12.79	0-1	0
	1732.5	20175	5	16-QAM	1	0	12.77	0-1	0
	1732.5	20175	5	16-QAM	1	12	12.68	0-1	0
	1732.5	20175	5	16-QAM	1	24	12.76	0-1	0
High	1732.5	20175	5	16-QAM	12	0	12.80	0-2	0
	1732.5	20175	5	16-QAM	12	6	12.75	0-2	0
	1732.5	20175	5	16-QAM	12	13	12.77	0-2	0
	1732.5	20175	5	16-QAM	25	0	12.82	0-2	0
	1752.5	20375	5	QPSK	1	0	12.62	0	0
	1752.5	20375	5	QPSK	1	12	12.63	0	0
	1752.5	20375	5	QPSK	1	24	12.65	0	0
	1752.5	20375	5	QPSK	12	0	12.65	0-1	0
	1752.5	20375	5	QPSK	12	6	12.66	0-1	0
	1752.5	20375	5	QPSK	12	13	12.60	0-1	0
	1752.5	20375	5	QPSK	25	0	12.57	0-1	0
	1752.5	20375	5	16-QAM	1	0	12.76	0-1	0
	1752.5	20375	5	16-QAM	1	12	12.66	0-1	0
	1752.5	20375	5	16-QAM	1	24	12.72	0-1	0
	1752.5	20375	5	16-QAM	12	0	12.55	0-2	0
	1752.5	20375	5	16-QAM	12	6	12.58	0-2	0
	1752.5	20375	5	16-QAM	12	13	12.62	0-2	0
	1752.5	20375	5	16-QAM	25	0	12.54	0-2	0

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Table 8-25
LTE Band 4 (AWS) Conducted Powers - 3 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1711.5	19965	3	QPSK	1	0	12.85	0	0
	1711.5	19965	3	QPSK	1	7	12.84	0	0
	1711.5	19965	3	QPSK	1	14	12.87	0	0
	1711.5	19965	3	QPSK	8	0	12.66	0-1	0
	1711.5	19965	3	QPSK	8	4	12.74	0-1	0
	1711.5	19965	3	QPSK	8	7	12.75	0-1	0
	1711.5	19965	3	QPSK	15	0	12.65	0-1	0
	1711.5	19965	3	16-QAM	1	0	12.58	0-1	0
	1711.5	19965	3	16-QAM	1	7	12.79	0-1	0
	1711.5	19965	3	16-QAM	1	14	12.78	0-1	0
	1711.5	19965	3	16-QAM	8	0	12.65	0-2	0
	1711.5	19965	3	16-QAM	8	4	12.59	0-2	0
Mid	1732.5	20175	3	QPSK	1	0	12.85	0	0
	1732.5	20175	3	QPSK	1	7	12.78	0	0
	1732.5	20175	3	QPSK	1	14	12.89	0	0
	1732.5	20175	3	QPSK	8	0	12.76	0-1	0
	1732.5	20175	3	QPSK	8	4	12.78	0-1	0
	1732.5	20175	3	QPSK	8	7	12.80	0-1	0
	1732.5	20175	3	QPSK	15	0	12.82	0-1	0
	1732.5	20175	3	16-QAM	1	0	12.64	0-1	0
	1732.5	20175	3	16-QAM	1	7	12.70	0-1	0
	1732.5	20175	3	16-QAM	1	14	12.72	0-1	0
	1732.5	20175	3	16-QAM	8	0	12.82	0-2	0
	1732.5	20175	3	16-QAM	8	4	12.81	0-2	0
High	1753.5	20385	3	QPSK	1	0	12.64	0	0
	1753.5	20385	3	QPSK	1	7	12.65	0	0
	1753.5	20385	3	QPSK	1	14	12.69	0	0
	1753.5	20385	3	QPSK	8	0	12.66	0-1	0
	1753.5	20385	3	QPSK	8	4	12.62	0-1	0
	1753.5	20385	3	QPSK	8	7	12.66	0-1	0
	1753.5	20385	3	QPSK	15	0	12.65	0-1	0
	1753.5	20385	3	16-QAM	1	0	12.74	0-1	0
	1753.5	20385	3	16-QAM	1	7	12.71	0-1	0
	1753.5	20385	3	16-QAM	1	14	12.79	0-1	0
	1753.5	20385	3	16-QAM	8	0	12.59	0-2	0
	1753.5	20385	3	16-QAM	8	4	12.57	0-2	0
	1753.5	20385	3	16-QAM	8	7	12.60	0-2	0
	1753.5	20385	3	16-QAM	15	0	12.54	0-2	0

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Table 8-26

LTE Band 4 (AWS) Conducted Powers – 1.4 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1710.7	19957	1.4	QPSK	1	0	12.93	0	0
	1710.7	19957	1.4	QPSK	1	2	12.91	0	0
	1710.7	19957	1.4	QPSK	1	5	12.91	0	0
	1710.7	19957	1.4	QPSK	3	0	12.73	0	0
	1710.7	19957	1.4	QPSK	3	2	12.79	0	0
	1710.7	19957	1.4	QPSK	3	3	12.79	0	0
	1710.7	19957	1.4	QPSK	6	0	12.75	0-1	0
	1710.7	19957	1.4	16-QAM	1	0	12.94	0-1	0
	1710.7	19957	1.4	16-QAM	1	2	12.95	0-1	0
	1710.7	19957	1.4	16-QAM	1	5	12.93	0-1	0
	1710.7	19957	1.4	16-QAM	3	0	12.42	0-1	0
	1710.7	19957	1.4	16-QAM	3	2	12.48	0-1	0
Mid	1710.7	19957	1.4	16-QAM	3	3	12.53	0-1	0
	1710.7	19957	1.4	16-QAM	6	0	12.64	0-2	0
	1732.5	20175	1.4	QPSK	1	0	12.88	0	0
	1732.5	20175	1.4	QPSK	1	2	12.92	0	0
	1732.5	20175	1.4	QPSK	1	5	12.91	0	0
	1732.5	20175	1.4	QPSK	3	0	12.80	0	0
	1732.5	20175	1.4	QPSK	3	2	12.79	0	0
	1732.5	20175	1.4	QPSK	3	3	12.85	0	0
	1732.5	20175	1.4	QPSK	6	0	12.88	0-1	0
	1732.5	20175	1.4	16-QAM	1	0	12.74	0-1	0
	1732.5	20175	1.4	16-QAM	1	2	12.81	0-1	0
	1732.5	20175	1.4	16-QAM	1	5	12.74	0-1	0
High	1732.5	20175	1.4	16-QAM	3	0	12.60	0-1	0
	1732.5	20175	1.4	16-QAM	3	2	12.52	0-1	0
	1732.5	20175	1.4	16-QAM	3	3	12.61	0-1	0
	1732.5	20175	1.4	16-QAM	6	0	12.80	0-2	0
	1754.3	20393	1.4	QPSK	1	0	12.93	0	0
	1754.3	20393	1.4	QPSK	1	2	12.92	0	0
	1754.3	20393	1.4	QPSK	1	5	12.94	0	0
	1754.3	20393	1.4	QPSK	3	0	12.64	0	0
	1754.3	20393	1.4	QPSK	3	2	12.69	0	0
	1754.3	20393	1.4	QPSK	3	3	12.75	0	0
	1754.3	20393	1.4	QPSK	6	0	12.66	0-1	0
	1754.3	20393	1.4	16-QAM	1	0	12.70	0-1	0
	1754.3	20393	1.4	16-QAM	1	2	12.85	0-1	0
	1754.3	20393	1.4	16-QAM	1	5	12.76	0-1	0
	1754.3	20393	1.4	16-QAM	3	0	12.60	0-1	0
	1754.3	20393	1.4	16-QAM	3	2	12.54	0-1	0
	1754.3	20393	1.4	16-QAM	3	3	12.58	0-1	0
	1754.3	20393	1.4	16-QAM	6	0	12.62	0-2	0

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8.2.4 LTE Band 2 (PCS)

Table 8-27

LTE Band 2 (PCS) Conducted Powers - 20 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1860	18700	20	QPSK	1	0	23.45	0	0
	1860	18700	20	QPSK	1	50	23.92	0	0
	1860	18700	20	QPSK	1	99	23.80	0	0
	1860	18700	20	QPSK	50	0	22.76	0-1	1
	1860	18700	20	QPSK	50	25	22.79	0-1	1
	1860	18700	20	QPSK	50	50	22.75	0-1	1
	1860	18700	20	QPSK	100	0	22.69	0-1	1
	1860	18700	20	16QAM	1	0	22.61	0-1	1
	1860	18700	20	16QAM	1	50	22.79	0-1	1
	1860	18700	20	16QAM	1	99	22.76	0-1	1
	1860	18700	20	16QAM	50	0	21.76	0-2	2
	1860	18700	20	16QAM	50	25	21.77	0-2	2
	1860	18700	20	16QAM	50	50	21.76	0-2	2
	1860	18700	20	16QAM	100	0	21.63	0-2	2
	1880.0	18900	20	QPSK	1	0	23.67	0	0
	1880.0	18900	20	QPSK	1	50	23.90	0	0
	1880.0	18900	20	QPSK	1	99	23.83	0	0
	1880.0	18900	20	QPSK	50	0	22.73	0-1	1
Mid	1880.0	18900	20	QPSK	50	25	22.75	0-1	1
	1880.0	18900	20	QPSK	50	50	22.72	0-1	1
	1880.0	18900	20	QPSK	100	0	22.70	0-1	1
	1880.0	18900	20	16QAM	1	0	22.64	0-1	1
	1880.0	18900	20	16QAM	1	50	22.77	0-1	1
	1880.0	18900	20	16QAM	1	99	22.75	0-1	1
	1880.0	18900	20	16QAM	50	0	21.67	0-2	2
	1880.0	18900	20	16QAM	50	25	21.69	0-2	2
	1880.0	18900	20	16QAM	50	50	21.69	0-2	2
	1880.0	18900	20	16QAM	100	0	21.67	0-2	2
	1900	19100	20	QPSK	1	0	23.77	0	0
	1900	19100	20	QPSK	1	50	23.98	0	0
	1900	19100	20	QPSK	1	99	23.00	0	0
	1900	19100	20	QPSK	50	0	22.76	0-1	1
	1900	19100	20	QPSK	50	25	22.89	0-1	1
	1900	19100	20	QPSK	50	50	22.83	0-1	1
	1900	19100	20	QPSK	100	0	22.84	0-1	1
	1900	19100	20	16QAM	1	0	22.56	0-1	1
	1900	19100	20	16QAM	1	50	22.68	0-1	1
High	1900	19100	20	16QAM	1	99	22.20	0-1	1
	1900	19100	20	16QAM	50	0	21.80	0-2	2
	1900	19100	20	16QAM	50	25	21.82	0-2	2
	1900	19100	20	16QAM	50	50	21.78	0-2	2
	1900	19100	20	16QAM	100	0	21.81	0-2	2

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Table 8-28
LTE Band 2 (PCS) Conducted Powers - 15 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1857.5	18675	15	QPSK	1	0	23.22	0	0
	1857.5	18675	15	QPSK	1	36	23.31	0	0
	1857.5	18675	15	QPSK	1	74	23.52	0	0
	1857.5	18675	15	QPSK	36	0	22.25	0-1	1
	1857.5	18675	15	QPSK	36	18	22.30	0-1	1
	1857.5	18675	15	QPSK	36	37	22.35	0-1	1
	1857.5	18675	15	QPSK	75	0	22.29	0-1	1
	1857.5	18675	15	16QAM	1	0	22.22	0-1	1
	1857.5	18675	15	16QAM	1	36	22.20	0-1	1
	1857.5	18675	15	16QAM	1	74	22.20	0-1	1
	1857.5	18675	15	16QAM	36	0	21.24	0-2	2
	1857.5	18675	15	16QAM	36	18	21.24	0-2	2
	1857.5	18675	15	16QAM	36	37	21.26	0-2	2
	1857.5	18675	15	16QAM	75	0	21.26	0-2	2
Mid	1880.0	18900	15	QPSK	1	0	23.95	0	0
	1880.0	18900	15	QPSK	1	36	24.00	0	0
	1880.0	18900	15	QPSK	1	74	23.99	0	0
	1880.0	18900	15	QPSK	36	0	22.70	0-1	1
	1880.0	18900	15	QPSK	36	18	22.48	0-1	1
	1880.0	18900	15	QPSK	36	37	22.54	0-1	1
	1880.0	18900	15	QPSK	75	0	22.51	0-1	1
	1880.0	18900	15	16QAM	1	0	22.35	0-1	1
	1880.0	18900	15	16QAM	1	36	22.42	0-1	1
	1880.0	18900	15	16QAM	1	74	22.41	0-1	1
	1880.0	18900	15	16QAM	36	0	21.45	0-2	2
	1880.0	18900	15	16QAM	36	18	21.44	0-2	2
	1880.0	18900	15	16QAM	36	37	21.50	0-2	2
	1880.0	18900	15	16QAM	75	0	21.49	0-2	2
High	1902.5	19125	15	QPSK	1	0	23.68	0	0
	1902.5	19125	15	QPSK	1	36	23.78	0	0
	1902.5	19125	15	QPSK	1	74	23.71	0	0
	1902.5	19125	15	QPSK	36	0	22.66	0-1	1
	1902.5	19125	15	QPSK	36	18	22.64	0-1	1
	1902.5	19125	15	QPSK	36	37	22.47	0-1	1
	1902.5	19125	15	QPSK	75	0	22.47	0-1	1
	1902.5	19125	15	16QAM	1	0	22.48	0-1	1
	1902.5	19125	15	16QAM	1	36	22.47	0-1	1
	1902.5	19125	15	16QAM	1	74	22.42	0-1	1
	1902.5	19125	15	16QAM	36	0	21.49	0-2	2
	1902.5	19125	15	16QAM	36	18	21.49	0-2	2
	1902.5	19125	15	16QAM	36	37	21.49	0-2	2
	1902.5	19125	15	16QAM	75	0	21.49	0-2	2

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Table 8-29

LTE Band 2 (PCS) Conducted Powers - 10 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1855	18650	10	QPSK	1	0	23.23	0	0
	1855	18650	10	QPSK	1	25	23.30	0	0
	1855	18650	10	QPSK	1	49	23.46	0	0
	1855	18650	10	QPSK	25	0	22.22	0-1	1
	1855	18650	10	QPSK	25	12	22.24	0-1	1
	1855	18650	10	QPSK	25	25	22.27	0-1	1
	1855	18650	10	QPSK	50	0	22.29	0-1	1
	1855	18650	10	16QAM	1	0	22.06	0-1	1
	1855	18650	10	16QAM	1	25	22.17	0-1	1
	1855	18650	10	16QAM	1	49	22.20	0-1	1
	1855	18650	10	16QAM	25	0	21.25	0-2	2
	1855	18650	10	16QAM	25	12	21.19	0-2	2
	1855	18650	10	16QAM	25	25	21.32	0-2	2
	1855	18650	10	16QAM	50	0	21.29	0-2	2
	1880.0	18900	10	QPSK	1	0	23.62	0	0
	1880.0	18900	10	QPSK	1	25	23.64	0	0
Mid	1880.0	18900	10	QPSK	1	49	23.73	0	0
	1880.0	18900	10	QPSK	25	0	22.56	0-1	1
	1880.0	18900	10	QPSK	25	12	22.47	0-1	1
	1880.0	18900	10	QPSK	25	25	22.53	0-1	1
	1880.0	18900	10	QPSK	50	0	22.51	0-1	1
	1880.0	18900	10	16QAM	1	0	22.39	0-1	1
	1880.0	18900	10	16QAM	1	25	22.42	0-1	1
	1880.0	18900	10	16QAM	1	49	22.41	0-1	1
	1880.0	18900	10	16QAM	25	0	21.50	0-2	2
	1880.0	18900	10	16QAM	25	12	21.50	0-2	2
	1880.0	18900	10	16QAM	25	25	21.51	0-2	2
	1880.0	18900	10	16QAM	50	0	21.49	0-2	2
High	1905	19150	10	QPSK	1	0	23.61	0	0
	1905	19150	10	QPSK	1	25	23.73	0	0
	1905	19150	10	QPSK	1	49	23.54	0	0
	1905	19150	10	QPSK	25	0	22.60	0-1	1
	1905	19150	10	QPSK	25	12	22.67	0-1	1
	1905	19150	10	QPSK	25	25	22.47	0-1	1
	1905	19150	10	QPSK	50	0	22.58	0-1	1
	1905	19150	10	16QAM	1	0	22.30	0-1	1
	1905	19150	10	16QAM	1	25	22.45	0-1	1
	1905	19150	10	16QAM	1	49	22.42	0-1	1
	1905	19150	10	16QAM	25	0	21.49	0-2	2
	1905	19150	10	16QAM	25	12	21.50	0-2	2
	1905	19150	10	16QAM	25	25	21.48	0-2	2
	1905	19150	10	16QAM	50	0	21.48	0-2	2

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Table 8-30
LTE Band 2 (PCS) Conducted Powers - 5 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1852.5	18625	5	QPSK	1	0	23.35	0	0
	1852.5	18625	5	QPSK	1	12	23.32	0	0
	1852.5	18625	5	QPSK	1	24	23.32	0	0
	1852.5	18625	5	QPSK	12	0	22.22	0-1	1
	1852.5	18625	5	QPSK	12	6	22.24	0-1	1
	1852.5	18625	5	QPSK	12	13	22.26	0-1	1
	1852.5	18625	5	QPSK	25	0	22.27	0-1	1
	1852.5	18625	5	16-QAM	1	0	22.24	0-1	1
	1852.5	18625	5	16-QAM	1	12	22.14	0-1	1
	1852.5	18625	5	16-QAM	1	24	22.04	0-1	1
	1852.5	18625	5	16-QAM	12	0	21.16	0-2	2
	1852.5	18625	5	16-QAM	12	6	21.11	0-2	2
	1852.5	18625	5	16-QAM	12	13	21.15	0-2	2
	1852.5	18625	5	16-QAM	25	0	21.19	0-2	2
Mid	1880.0	18900	5	QPSK	1	0	23.88	0	0
	1880.0	18900	5	QPSK	1	12	23.82	0	0
	1880.0	18900	5	QPSK	1	24	23.77	0	0
	1880.0	18900	5	QPSK	12	0	22.74	0-1	1
	1880.0	18900	5	QPSK	12	6	22.69	0-1	1
	1880.0	18900	5	QPSK	12	13	22.52	0-1	1
	1880.0	18900	5	QPSK	25	0	22.49	0-1	1
	1880.0	18900	5	16-QAM	1	0	22.25	0-1	1
	1880.0	18900	5	16-QAM	1	12	22.28	0-1	1
	1880.0	18900	5	16-QAM	1	24	22.53	0-1	1
	1880.0	18900	5	16-QAM	12	0	21.38	0-2	2
	1880.0	18900	5	16-QAM	12	6	21.38	0-2	2
	1880.0	18900	5	16-QAM	12	13	21.40	0-2	2
	1880.0	18900	5	16-QAM	25	0	21.54	0-2	2
High	1907.5	19175	5	QPSK	1	0	23.74	0	0
	1907.5	19175	5	QPSK	1	12	23.71	0	0
	1907.5	19175	5	QPSK	1	24	23.82	0	0
	1907.5	19175	5	QPSK	12	0	22.64	0-1	1
	1907.5	19175	5	QPSK	12	6	22.43	0-1	1
	1907.5	19175	5	QPSK	12	13	22.44	0-1	1
	1907.5	19175	5	QPSK	25	0	22.59	0-1	1
	1907.5	19175	5	16-QAM	1	0	22.32	0-1	1
	1907.5	19175	5	16-QAM	1	12	22.24	0-1	1
	1907.5	19175	5	16-QAM	1	24	22.27	0-1	1
	1907.5	19175	5	16-QAM	12	0	21.41	0-2	2
	1907.5	19175	5	16-QAM	12	6	21.33	0-2	2
	1907.5	19175	5	16-QAM	12	13	21.38	0-2	2
	1907.5	19175	5	16-QAM	25	0	21.50	0-2	2

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Table 8-31
LTE Band 2 (PCS) Conducted Powers - 3 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1851.5	18615	3	QPSK	1	0	23.37	0	0
	1851.5	18615	3	QPSK	1	7	23.44	0	0
	1851.5	18615	3	QPSK	1	14	23.34	0	0
	1851.5	18615	3	QPSK	8	0	22.25	0-1	1
	1851.5	18615	3	QPSK	8	4	22.26	0-1	1
	1851.5	18615	3	QPSK	8	7	22.28	0-1	1
	1851.5	18615	3	QPSK	15	0	22.27	0-1	1
	1851.5	18615	3	16-QAM	1	0	22.31	0-1	1
	1851.5	18615	3	16-QAM	1	7	22.00	0-1	1
	1851.5	18615	3	16-QAM	1	14	22.17	0-1	1
	1851.5	18615	3	16-QAM	8	0	21.34	0-2	2
	1851.5	18615	3	16-QAM	8	4	21.35	0-2	2
	1851.5	18615	3	16-QAM	8	7	21.36	0-2	2
	1851.5	18615	3	16-QAM	15	0	21.23	0-2	2
	1880.0	18900	3	QPSK	1	0	23.82	0	0
Mid	1880.0	18900	3	QPSK	1	7	23.69	0	0
	1880.0	18900	3	QPSK	1	14	23.80	0	0
	1880.0	18900	3	QPSK	8	0	22.52	0-1	1
	1880.0	18900	3	QPSK	8	4	22.51	0-1	1
	1880.0	18900	3	QPSK	8	7	22.51	0-1	1
	1880.0	18900	3	QPSK	15	0	22.53	0-1	1
	1880.0	18900	3	16-QAM	1	0	22.50	0-1	1
	1880.0	18900	3	16-QAM	1	7	22.51	0-1	1
	1880.0	18900	3	16-QAM	1	14	22.67	0-1	1
	1880.0	18900	3	16-QAM	8	0	21.52	0-2	2
	1880.0	18900	3	16-QAM	8	4	21.56	0-2	2
	1880.0	18900	3	16-QAM	8	7	21.67	0-2	2
	1880.0	18900	3	16-QAM	15	0	21.52	0-2	2
	1908.5	19185	3	QPSK	1	0	23.66	0	0
	1908.5	19185	3	QPSK	1	7	23.78	0	0
High	1908.5	19185	3	QPSK	1	14	23.77	0	0
	1908.5	19185	3	QPSK	8	0	22.50	0-1	1
	1908.5	19185	3	QPSK	8	4	22.47	0-1	1
	1908.5	19185	3	QPSK	8	7	22.45	0-1	1
	1908.5	19185	3	QPSK	15	0	22.46	0-1	1
	1908.5	19185	3	16-QAM	1	0	22.21	0-1	1
	1908.5	19185	3	16-QAM	1	7	22.20	0-1	1
	1908.5	19185	3	16-QAM	1	14	22.27	0-1	1
	1908.5	19185	3	16-QAM	8	0	21.52	0-2	2
	1908.5	19185	3	16-QAM	8	4	21.54	0-2	2
	1908.5	19185	3	16-QAM	8	7	21.51	0-2	2
	1908.5	19185	3	16-QAM	15	0	21.45	0-2	2

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Table 8-32
LTE Band 2 (PCS) Conducted Powers -1.4 MHz Bandwidth Maximum Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1850.7	18607	1.4	QPSK	1	0	23.60	0	0
	1850.7	18607	1.4	QPSK	1	2	23.51	0	0
	1850.7	18607	1.4	QPSK	1	5	23.57	0	0
	1850.7	18607	1.4	QPSK	3	0	23.29	0	0
	1850.7	18607	1.4	QPSK	3	2	23.37	0	0
	1850.7	18607	1.4	QPSK	3	3	23.35	0	0
	1850.7	18607	1.4	QPSK	6	0	22.31	0-1	1
	1850.7	18607	1.4	16-QAM	1	0	22.48	0-1	1
	1850.7	18607	1.4	16-QAM	1	2	22.51	0-1	1
	1850.7	18607	1.4	16-QAM	1	5	22.54	0-1	1
	1850.7	18607	1.4	16-QAM	3	0	22.34	0-1	1
	1850.7	18607	1.4	16-QAM	3	2	22.29	0-1	1
	1850.7	18607	1.4	16-QAM	3	3	22.27	0-1	1
	1850.7	18607	1.4	16-QAM	6	0	21.31	0-2	2
Mid	1880.0	18900	1.4	QPSK	1	0	23.71	0	0
	1880.0	18900	1.4	QPSK	1	2	23.75	0	0
	1880.0	18900	1.4	QPSK	1	5	23.63	0	0
	1880.0	18900	1.4	QPSK	3	0	23.42	0	0
	1880.0	18900	1.4	QPSK	3	2	23.45	0	0
	1880.0	18900	1.4	QPSK	3	3	23.54	0	0
	1880.0	18900	1.4	QPSK	6	0	22.56	0-1	1
	1880.0	18900	1.4	16-QAM	1	0	22.79	0-1	1
	1880.0	18900	1.4	16-QAM	1	2	22.96	0-1	1
	1880.0	18900	1.4	16-QAM	1	5	22.77	0-1	1
	1880.0	18900	1.4	16-QAM	3	0	22.51	0-1	1
	1880.0	18900	1.4	16-QAM	3	2	22.48	0-1	1
	1880.0	18900	1.4	16-QAM	3	3	22.62	0-1	1
	1880.0	18900	1.4	16-QAM	6	0	21.46	0-2	2
High	1909.3	19193	1.4	QPSK	1	0	23.59	0	0
	1909.3	19193	1.4	QPSK	1	2	23.71	0	0
	1909.3	19193	1.4	QPSK	1	5	23.63	0	0
	1909.3	19193	1.4	QPSK	3	0	23.44	0	0
	1909.3	19193	1.4	QPSK	3	2	23.56	0	0
	1909.3	19193	1.4	QPSK	3	3	23.58	0	0
	1909.3	19193	1.4	QPSK	6	0	22.49	0-1	1
	1909.3	19193	1.4	16-QAM	1	0	22.82	0-1	1
	1909.3	19193	1.4	16-QAM	1	2	22.84	0-1	1
	1909.3	19193	1.4	16-QAM	1	5	22.64	0-1	1
	1909.3	19193	1.4	16-QAM	3	0	22.50	0-1	1
	1909.3	19193	1.4	16-QAM	3	2	22.61	0-1	1
	1909.3	19193	1.4	16-QAM	3	3	22.54	0-1	1
	1909.3	19193	1.4	16-QAM	6	0	21.47	0-2	2

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Table 8-33
LTE Band 2 (PCS) Conducted Powers - 20 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1860	18700	20	QPSK	1	0	11.32	0	0
	1860	18700	20	QPSK	1	50	11.45	0	0
	1860	18700	20	QPSK	1	99	11.57	0	0
	1860	18700	20	QPSK	50	0	11.24	0-1	0
	1860	18700	20	QPSK	50	25	11.34	0-1	0
	1860	18700	20	QPSK	50	50	11.32	0-1	0
	1860	18700	20	QPSK	100	0	11.26	0-1	0
	1860	18700	20	16QAM	1	0	11.30	0-1	0
	1860	18700	20	16QAM	1	50	11.42	0-1	0
	1860	18700	20	16QAM	1	99	11.43	0-1	0
	1860	18700	20	16QAM	50	0	11.20	0-2	0
	1860	18700	20	16QAM	50	25	11.29	0-2	0
	1860	18700	20	16QAM	50	50	11.37	0-2	0
	1860	18700	20	16QAM	100	0	11.32	0-2	0
	1880.0	18900	20	QPSK	1	0	11.33	0	0
	1880.0	18900	20	QPSK	1	50	11.53	0	0
Mid	1880.0	18900	20	QPSK	1	99	11.58	0	0
	1880.0	18900	20	QPSK	50	0	11.47	0-1	0
	1880.0	18900	20	QPSK	50	25	11.51	0-1	0
	1880.0	18900	20	QPSK	50	50	11.60	0-1	0
	1880.0	18900	20	QPSK	100	0	11.54	0-1	0
	1880.0	18900	20	16QAM	1	0	11.65	0-1	0
	1880.0	18900	20	16QAM	1	50	11.80	0-1	0
	1880.0	18900	20	16QAM	1	99	11.78	0-1	0
	1880.0	18900	20	16QAM	50	0	11.50	0-2	0
	1880.0	18900	20	16QAM	50	25	11.64	0-2	0
	1880.0	18900	20	16QAM	50	50	11.72	0-2	0
	1880.0	18900	20	16QAM	100	0	11.59	0-2	0
	1900	19100	20	QPSK	1	0	11.52	0	0
	1900	19100	20	QPSK	1	50	11.62	0	0
	1900	19100	20	QPSK	1	99	11.73	0	0
	1900	19100	20	QPSK	50	0	11.49	0-1	0
High	1900	19100	20	QPSK	50	25	11.44	0-1	0
	1900	19100	20	QPSK	50	50	11.61	0-1	0
	1900	19100	20	QPSK	100	0	11.52	0-1	0
	1900	19100	20	16QAM	1	0	11.48	0-1	0
	1900	19100	20	16QAM	1	50	11.60	0-1	0
	1900	19100	20	16QAM	1	99	11.43	0-1	0
	1900	19100	20	16QAM	50	0	11.48	0-2	0
	1900	19100	20	16QAM	50	25	11.46	0-2	0
	1900	19100	20	16QAM	50	50	11.55	0-2	0
	1900	19100	20	16QAM	100	0	11.54	0-2	0

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Table 8-34
LTE Band 2 (PCS) Conducted Powers - 15 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1857.5	18675	15	QPSK	1	0	11.72	0	0
	1857.5	18675	15	QPSK	1	36	11.89	0	0
	1857.5	18675	15	QPSK	1	74	11.85	0	0
	1857.5	18675	15	QPSK	36	0	11.71	0-1	0
	1857.5	18675	15	QPSK	36	18	11.77	0-1	0
	1857.5	18675	15	QPSK	36	37	11.80	0-1	0
	1857.5	18675	15	QPSK	75	0	11.64	0-1	0
	1857.5	18675	15	16QAM	1	0	11.72	0-1	0
	1857.5	18675	15	16QAM	1	36	11.73	0-1	0
	1857.5	18675	15	16QAM	1	74	11.77	0-1	0
	1857.5	18675	15	16QAM	36	0	11.80	0-2	0
	1857.5	18675	15	16QAM	36	18	11.77	0-2	0
	1857.5	18675	15	16QAM	36	37	11.76	0-2	0
	1857.5	18675	15	16QAM	75	0	11.72	0-2	0
	1880.0	18900	15	QPSK	1	0	11.90	0	0
Mid	1880.0	18900	15	QPSK	1	36	11.98	0	0
	1880.0	18900	15	QPSK	1	74	11.97	0	0
	1880.0	18900	15	QPSK	36	0	11.69	0-1	0
	1880.0	18900	15	QPSK	36	18	11.71	0-1	0
	1880.0	18900	15	QPSK	36	37	11.82	0-1	0
	1880.0	18900	15	QPSK	75	0	11.72	0-1	0
	1880.0	18900	15	16QAM	1	0	11.76	0-1	0
	1880.0	18900	15	16QAM	1	36	11.91	0-1	0
	1880.0	18900	15	16QAM	1	74	11.88	0-1	0
	1880.0	18900	15	16QAM	36	0	11.74	0-2	0
	1880.0	18900	15	16QAM	36	18	11.78	0-2	0
	1880.0	18900	15	16QAM	36	37	11.80	0-2	0
	1880.0	18900	15	16QAM	75	0	11.72	0-2	0
	1902.5	19125	15	QPSK	1	0	11.67	0	0
	1902.5	19125	15	QPSK	1	36	11.66	0	0
High	1902.5	19125	15	QPSK	1	74	11.50	0	0
	1902.5	19125	15	QPSK	36	0	11.73	0-1	0
	1902.5	19125	15	QPSK	36	18	11.75	0-1	0
	1902.5	19125	15	QPSK	36	37	11.72	0-1	0
	1902.5	19125	15	QPSK	75	0	11.77	0-1	0
	1902.5	19125	15	16QAM	1	0	11.62	0-1	0
	1902.5	19125	15	16QAM	1	36	11.74	0-1	0
	1902.5	19125	15	16QAM	1	74	11.80	0-1	0
	1902.5	19125	15	16QAM	36	0	11.81	0-2	0
	1902.5	19125	15	16QAM	36	18	11.76	0-2	0
	1902.5	19125	15	16QAM	36	37	11.85	0-2	0
	1902.5	19125	15	16QAM	75	0	11.76	0-2	0

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Table 8-35
LTE Band 2 (PCS) Conducted Powers - 10 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1855	18650	10	QPSK	1	0	11.73	0	0
	1855	18650	10	QPSK	1	25	11.85	0	0
	1855	18650	10	QPSK	1	49	11.89	0	0
	1855	18650	10	QPSK	25	0	11.71	0-1	0
	1855	18650	10	QPSK	25	12	11.78	0-1	0
	1855	18650	10	QPSK	25	25	11.80	0-1	0
	1855	18650	10	QPSK	50	0	11.62	0-1	0
	1855	18650	10	16QAM	1	0	11.68	0-1	0
	1855	18650	10	16QAM	1	25	11.76	0-1	0
	1855	18650	10	16QAM	1	49	11.80	0-1	0
	1855	18650	10	16QAM	25	0	11.85	0-2	0
	1855	18650	10	16QAM	25	12	11.73	0-2	0
	1855	18650	10	16QAM	25	25	11.76	0-2	0
	1855	18650	10	16QAM	50	0	11.69	0-2	0
Mid	1880.0	18900	10	QPSK	1	0	11.95	0	0
	1880.0	18900	10	QPSK	1	25	11.98	0	0
	1880.0	18900	10	QPSK	1	49	11.92	0	0
	1880.0	18900	10	QPSK	25	0	11.68	0-1	0
	1880.0	18900	10	QPSK	25	12	11.62	0-1	0
	1880.0	18900	10	QPSK	25	25	11.77	0-1	0
	1880.0	18900	10	QPSK	50	0	11.75	0-1	0
	1880.0	18900	10	16QAM	1	0	11.72	0-1	0
	1880.0	18900	10	16QAM	1	25	11.89	0-1	0
	1880.0	18900	10	16QAM	1	49	11.89	0-1	0
	1880.0	18900	10	16QAM	25	0	11.73	0-2	0
	1880.0	18900	10	16QAM	25	12	11.83	0-2	0
	1880.0	18900	10	16QAM	25	25	11.80	0-2	0
	1880.0	18900	10	16QAM	50	0	11.70	0-2	0
High	1905	19150	10	QPSK	1	0	11.62	0	0
	1905	19150	10	QPSK	1	25	11.66	0	0
	1905	19150	10	QPSK	1	49	11.45	0	0
	1905	19150	10	QPSK	25	0	11.73	0-1	0
	1905	19150	10	QPSK	25	12	11.76	0-1	0
	1905	19150	10	QPSK	25	25	11.74	0-1	0
	1905	19150	10	QPSK	50	0	11.73	0-1	0
	1905	19150	10	16QAM	1	0	11.59	0-1	0
	1905	19150	10	16QAM	1	25	11.79	0-1	0
	1905	19150	10	16QAM	1	49	11.78	0-1	0
	1905	19150	10	16QAM	25	0	11.83	0-2	0
	1905	19150	10	16QAM	25	12	11.79	0-2	0
	1905	19150	10	16QAM	25	25	11.83	0-2	0
	1905	19150	10	16QAM	50	0	11.78	0-2	0

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Table 8-36
LTE Band 2 (PCS) Conducted Powers - 5 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1852.5	18625	5	QPSK	1	0	11.68	0	0
	1852.5	18625	5	QPSK	1	12	11.88	0	0
	1852.5	18625	5	QPSK	1	24	11.87	0	0
	1852.5	18625	5	QPSK	12	0	11.75	0-1	0
	1852.5	18625	5	QPSK	12	6	11.74	0-1	0
	1852.5	18625	5	QPSK	12	13	11.84	0-1	0
	1852.5	18625	5	QPSK	25	0	11.61	0-1	0
	1852.5	18625	5	16-QAM	1	0	11.69	0-1	0
	1852.5	18625	5	16-QAM	1	12	11.77	0-1	0
	1852.5	18625	5	16-QAM	1	24	11.82	0-1	0
	1852.5	18625	5	16-QAM	12	0	11.86	0-2	0
	1852.5	18625	5	16-QAM	12	6	11.69	0-2	0
	1852.5	18625	5	16-QAM	12	13	11.80	0-2	0
	1852.5	18625	5	16-QAM	25	0	11.66	0-2	0
	1880.0	18900	5	QPSK	1	0	11.88	0	0
Mid	1880.0	18900	5	QPSK	1	12	11.94	0	0
	1880.0	18900	5	QPSK	1	24	11.73	0	0
	1880.0	18900	5	QPSK	12	0	11.69	0-1	0
	1880.0	18900	5	QPSK	12	6	11.65	0-1	0
	1880.0	18900	5	QPSK	12	13	11.78	0-1	0
	1880.0	18900	5	QPSK	25	0	11.74	0-1	0
	1880.0	18900	5	16-QAM	1	0	11.71	0-1	0
	1880.0	18900	5	16-QAM	1	12	11.84	0-1	0
	1880.0	18900	5	16-QAM	1	24	11.90	0-1	0
	1880.0	18900	5	16-QAM	12	0	11.76	0-2	0
	1880.0	18900	5	16-QAM	12	6	11.84	0-2	0
	1880.0	18900	5	16-QAM	12	13	11.81	0-2	0
	1880.0	18900	5	16-QAM	25	0	11.75	0-2	0
	1907.5	19175	5	QPSK	1	0	11.64	0	0
	1907.5	19175	5	QPSK	1	12	11.65	0	0
High	1907.5	19175	5	QPSK	1	24	11.40	0	0
	1907.5	19175	5	QPSK	12	0	11.75	0-1	0
	1907.5	19175	5	QPSK	12	6	11.73	0-1	0
	1907.5	19175	5	QPSK	12	13	11.71	0-1	0
	1907.5	19175	5	QPSK	25	0	11.71	0-1	0
	1907.5	19175	5	16-QAM	1	0	11.55	0-1	0
	1907.5	19175	5	16-QAM	1	12	11.82	0-1	0
	1907.5	19175	5	16-QAM	1	24	11.74	0-1	0
	1907.5	19175	5	16-QAM	12	0	11.86	0-2	0
	1907.5	19175	5	16-QAM	12	6	11.82	0-2	0
	1907.5	19175	5	16-QAM	12	13	11.86	0-2	0
	1907.5	19175	5	16-QAM	25	0	11.81	0-2	0

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Table 8-37
LTE Band 2 (PCS) Conducted Powers - 3 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1851.5	18615	3	QPSK	1	0	11.63	0	0
	1851.5	18615	3	QPSK	1	7	11.89	0	0
	1851.5	18615	3	QPSK	1	14	11.91	0	0
	1851.5	18615	3	QPSK	8	0	11.76	0-1	0
	1851.5	18615	3	QPSK	8	4	11.70	0-1	0
	1851.5	18615	3	QPSK	8	7	11.79	0-1	0
	1851.5	18615	3	QPSK	15	0	11.65	0-1	0
	1851.5	18615	3	16-QAM	1	0	11.65	0-1	0
	1851.5	18615	3	16-QAM	1	7	11.81	0-1	0
	1851.5	18615	3	16-QAM	1	14	11.87	0-1	0
	1851.5	18615	3	16-QAM	8	0	11.86	0-2	0
	1851.5	18615	3	16-QAM	8	4	11.67	0-2	0
	1851.5	18615	3	16-QAM	8	7	11.85	0-2	0
	1851.5	18615	3	16-QAM	15	0	11.63	0-2	0
	1880.0	18900	3	QPSK	1	0	11.97	0	0
Mid	1880.0	18900	3	QPSK	1	7	11.95	0	0
	1880.0	18900	3	QPSK	1	14	11.76	0	0
	1880.0	18900	3	QPSK	8	0	11.70	0-1	0
	1880.0	18900	3	QPSK	8	4	11.59	0-1	0
	1880.0	18900	3	QPSK	8	7	11.68	0-1	0
	1880.0	18900	3	QPSK	15	0	11.70	0-1	0
	1880.0	18900	3	16-QAM	1	0	11.76	0-1	0
	1880.0	18900	3	16-QAM	1	7	11.84	0-1	0
	1880.0	18900	3	16-QAM	1	14	11.85	0-1	0
	1880.0	18900	3	16-QAM	8	0	11.78	0-2	0
	1880.0	18900	3	16-QAM	8	4	11.80	0-2	0
	1880.0	18900	3	16-QAM	8	7	11.77	0-2	0
	1880.0	18900	3	16-QAM	15	0	11.76	0-2	0
	1908.5	19185	3	QPSK	1	0	11.62	0	0
	1908.5	19185	3	QPSK	1	7	11.63	0	0
	1908.5	19185	3	QPSK	1	14	11.43	0	0
High	1908.5	19185	3	QPSK	8	0	11.79	0-1	0
	1908.5	19185	3	QPSK	8	4	11.76	0-1	0
	1908.5	19185	3	QPSK	8	7	11.71	0-1	0
	1908.5	19185	3	QPSK	15	0	11.71	0-1	0
	1908.5	19185	3	16-QAM	1	0	11.56	0-1	0
	1908.5	19185	3	16-QAM	1	7	11.77	0-1	0
	1908.5	19185	3	16-QAM	1	14	11.73	0-1	0
	1908.5	19185	3	16-QAM	8	0	11.90	0-2	0
	1908.5	19185	3	16-QAM	8	4	11.78	0-2	0
	1908.5	19185	3	16-QAM	8	7	11.84	0-2	0
	1908.5	19185	3	16-QAM	15	0	11.84	0-2	0

Table 8-38
LTE Band 2 (PCS) Conducted Powers – 1.4 MHz Bandwidth Reduced Average RF Output Powers

	Frequency [MHz]	Channel	Bandwidth [MHz]	Modulation	RB Size	RB Offset	Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
Low	1850.7	18607	1.4	QPSK	1	0	11.68	0	0
	1850.7	18607	1.4	QPSK	1	2	11.93	0	0
	1850.7	18607	1.4	QPSK	1	5	11.94	0	0
	1850.7	18607	1.4	QPSK	3	0	11.78	0	0
	1850.7	18607	1.4	QPSK	3	2	11.73	0	0
	1850.7	18607	1.4	QPSK	3	3	11.81	0	0
	1850.7	18607	1.4	QPSK	6	0	11.64	0-1	0
	1850.7	18607	1.4	16-QAM	1	0	11.69	0-1	0
	1850.7	18607	1.4	16-QAM	1	2	11.79	0-1	0
	1850.7	18607	1.4	16-QAM	1	5	11.83	0-1	0
	1850.7	18607	1.4	16-QAM	3	0	11.85	0-1	0
	1850.7	18607	1.4	16-QAM	3	2	11.69	0-1	0
	1850.7	18607	1.4	16-QAM	3	3	11.86	0-1	0
	1850.7	18607	1.4	16-QAM	6	0	11.65	0-2	0
Mid	1880.0	18900	1.4	QPSK	1	0	11.81	0	0
	1880.0	18900	1.4	QPSK	1	2	11.87	0	0
	1880.0	18900	1.4	QPSK	1	5	11.74	0	0
	1880.0	18900	1.4	QPSK	3	0	11.68	0	0
	1880.0	18900	1.4	QPSK	3	2	11.69	0	0
	1880.0	18900	1.4	QPSK	3	3	11.72	0	0
	1880.0	18900	1.4	QPSK	6	0	11.66	0-1	0
	1880.0	18900	1.4	16-QAM	1	0	11.72	0-1	0
	1880.0	18900	1.4	16-QAM	1	2	11.79	0-1	0
	1880.0	18900	1.4	16-QAM	1	5	11.80	0-1	0
	1880.0	18900	1.4	16-QAM	3	0	11.74	0-1	0
	1880.0	18900	1.4	16-QAM	3	2	11.80	0-1	0
	1880.0	18900	1.4	16-QAM	3	3	11.73	0-1	0
	1880.0	18900	1.4	16-QAM	6	0	11.76	0-2	0
High	1909.3	19193	1.4	QPSK	1	0	11.58	0	0
	1909.3	19193	1.4	QPSK	1	2	11.64	0	0
	1909.3	19193	1.4	QPSK	1	5	11.45	0	0
	1909.3	19193	1.4	QPSK	3	0	11.74	0	0
	1909.3	19193	1.4	QPSK	3	2	11.75	0	0
	1909.3	19193	1.4	QPSK	3	3	11.72	0	0
	1909.3	19193	1.4	QPSK	6	0	11.67	0-1	0
	1909.3	19193	1.4	16-QAM	1	0	11.53	0-1	0
	1909.3	19193	1.4	16-QAM	1	2	11.73	0-1	0
	1909.3	19193	1.4	16-QAM	1	5	11.69	0-1	0
	1909.3	19193	1.4	16-QAM	3	0	11.91	0-1	0
	1909.3	19193	1.4	16-QAM	3	2	11.74	0-1	0
	1909.3	19193	1.4	16-QAM	3	3	11.88	0-1	0
	1909.3	19193	1.4	16-QAM	6	0	11.84	0-2	0

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8.2.5 LTE Carrier Aggregation Conducted Powers

Table 8-39
Two Component Carrier Maximum Average RF Output Powers

PCC						SCC				Power	
PCC Band	PCC Bandwidth [MHz]	PCC (UL) Frequency [MHz]	PCC (UL) Channel	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Frequency [MHz]	SCC (DL) Channel	LTE Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B13	10	782	23230	1	25	LTE B4	10	2132.5	2175	24.17	24.00
LTE B13	10	782	23230	1	25	LTE B2	10	1960	900	24.20	24.00
LTE B4	10	1715	20000	1	0	LTE B13	10	751	5230	23.85	23.65
LTE B2	5	1880	18900	1	0	LTE B13	10	751	5230	24.00	23.88

Table 8-40
Two Component Carrier Reduced Average RF Output Powers

PCC						SCC				Power	
PCC Band	PCC Bandwidth [MHz]	PCC (UL) Frequency [MHz]	PCC (UL) Channel	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (DL) Frequency [MHz]	SCC (DL) Channel	LTE Rel 10 Tx.Power (dBm)	LTE Rel. 8 Tx.Power (dBm)
LTE B13	10	782	23230	1	49	LTE B4	10	2132.5	2175	18.00	17.98
LTE B13	10	782	23230	1	49	LTE B2	10	1960	900	17.97	17.98
LTE B4	10	1732.5	20175	1	25	LTE B13	10	751	5230	12.83	12.89
LTE B2	10	1880	18900	1	25	LTE B13	10	751	5230	11.63	11.98

Notes:

1. The device does not support all Rel. 10 Carrier Aggregation features due to modem chipset limitation.
2. The device only supports downlink Carrier Aggregation. Uplink Carrier Aggregation is not supported. Power measurements were performed with DL carriers for the Release 8 configuration that had the highest output power (across all bandwidths, channels and RB Configurations) for each band.
3. All control and acknowledge data is sent on uplink channels that operate identical to release 8 specifications.

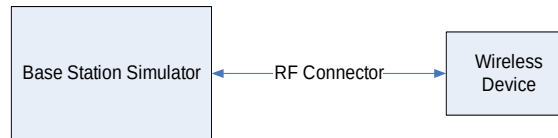


Figure 8-2
Power Measurement Setup

8.3 WLAN Conducted Powers

Table 8-41
2.4 GHz Average RF Powers

Freq [MHz]	Channel	2.4GHz Conducted Power [dBm]	
		IEEE Transmission Mode	
		802.11b	802.11g
2412	1	13.43	12.48
2437	6	13.33	12.22
2462	11	13.34	12.30

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Table 8-42
5 GHz (40 MHz Bandwidth) Average RF Powers

Freq [MHz]	Channel	5GHz (40MHz) Conducted Power [dBm]
		IEEE
		802.11n
5190	38	11.07
5230	46	11.11
5270	54	11.31
5310	62	11.11
5510	102	11.49
5590	118	10.50
5630	126	10.42
5710	142	10.71
5755	151	11.41
5795	159	11.47

Justification for test configurations for WLAN per KDB Publication 248227 D01v02:

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

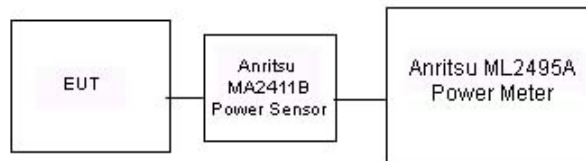


Figure 8-3
Power Measurement Setup

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9 SYSTEM VERIFICATION

9.1 Tissue Verification

Table 9-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (C°)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ϵ	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ϵ	% dev σ	% dev ϵ
11/3/2015	750B	22.3	725	0.947	54.634	0.961	55.629	-1.46%	-1.79%
			740	0.963	54.472	0.963	55.570	0.00%	-1.98%
			755	0.977	54.394	0.964	55.512	1.35%	-2.01%
			770	0.990	54.211	0.965	55.453	2.59%	-2.24%
			785	1.006	54.080	0.966	55.395	4.14%	-2.37%
10/28/2015	835B	22.0	820	0.981	54.452	0.969	55.258	1.24%	-1.46%
			835	1.000	54.366	0.970	55.200	3.09%	-1.51%
			850	1.011	54.216	0.988	55.154	2.33%	-1.70%
11/2/2015	835B	21.9	820	0.975	54.523	0.969	55.258	0.62%	-1.33%
			835	0.988	54.405	0.970	55.200	1.86%	-1.44%
			850	1.005	54.263	0.988	55.154	1.72%	-1.62%
10/28/2015	1750B	21.8	1710	1.415	51.903	1.463	53.537	-3.28%	-3.05%
			1750	1.457	51.783	1.488	53.432	-2.08%	-3.09%
			1790	1.505	51.630	1.514	53.326	-0.59%	-3.18%
10/28/2015	1900B	22.1	1850	1.513	52.198	1.520	53.300	-0.46%	-2.07%
			1880	1.548	52.029	1.520	53.300	1.84%	-2.38%
			1910	1.586	51.910	1.520	53.300	4.34%	-2.61%
8/7/2015	2450B	22.0	2400	1.966	51.361	1.902	52.767	3.36%	-2.66%
			2450	2.035	51.219	1.950	52.700	4.36%	-2.81%
			2500	2.095	51.043	2.021	52.636	3.66%	-3.03%
08/03/2015	5200B - 5800B	22.8	5260	5.374	46.966	5.369	48.933	0.09%	-4.02%
			5280	5.399	47.135	5.393	48.906	0.11%	-3.62%
			5300	5.436	46.955	5.416	48.879	0.37%	-3.94%
			5320	5.452	46.867	5.439	48.851	0.24%	-4.06%
			5500	5.672	46.417	5.650	48.607	0.39%	-4.51%
			5520	5.692	46.411	5.673	48.580	0.33%	-4.46%
			5700	5.922	46.264	5.883	48.336	0.66%	-4.29%
			5745	5.969	46.155	5.936	48.275	0.56%	-4.39%
			5785	6.080	46.180	5.982	48.220	1.64%	-4.23%
			5800	6.109	46.184	6.000	48.200	1.82%	-4.18%

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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9.2 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 9-2
System Verification Results

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} (%)
C	750	BODY	11/03/2015	22.9	22.3	0.200	1046	3288	1.680	8.290	8.400	1.33%
G	835	BODY	10/28/2015	21.9	22.0	0.200	4d119	3318	1.960	9.200	9.800	6.52%
C	835	BODY	11/02/2015	22.3	21.9	0.200	4d132	3288	1.960	9.140	9.800	7.22%
H	1750	BODY	10/28/2015	22.3	21.8	0.100	1051	3263	3.730	37.100	37.300	0.54%
K	1900	BODY	10/28/2015	22.5	22.1	0.100	5d141	3022	4.110	40.000	41.100	2.75%
E	2450	BODY	08/07/2015	22.1	21.9	0.100	719	3332	4.970	51.800	49.700	-4.05%
A	5300	BODY	08/03/2015	24.5	23.4	0.050	1191	3914	4.140	79.900	82.800	3.63%
A	5500	BODY	08/03/2015	24.5	23.4	0.050	1191	3914	4.330	83.100	86.600	4.21%
A	5800	BODY	08/03/2015	24.5	23.4	0.050	1191	3914	4.050	78.000	81.000	3.85%

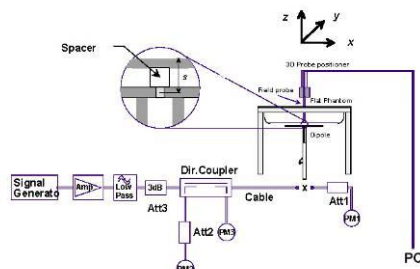


Figure 9-1
System Verification Setup Diagram



Figure 9-2
System Verification Setup Photo

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10 SAR DATA SUMMARY

10.1 Standalone Body SAR Data

Table 10-1
UMTS Body SAR Data

MEASUREMENT RESULTS														
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #
MHz	Ch.										(W/kg)		(W/kg)	
836.60	4183	UMTS 850	RMC	24.0	23.29	0.00	19 mm	32488	1:1	back	0.285	1.178	0.336	
836.60	4183	UMTS 850	RMC	24.0	23.29	0.00	14 mm	32488	1:1	top	0.263	1.178	0.310	
836.60	4183	UMTS 850	RMC	24.0	23.29	-0.04	8 mm	32488	1:1	left	0.197	1.178	0.232	
836.60	4183	UMTS 850	RMC	19.5	19.18	0.00	0 mm	33015	1:1	back	0.571	1.076	0.614	A1
836.60	4183	UMTS 850	RMC	19.5	19.18	0.00	0 mm	33015	1:1	top	0.320	1.076	0.344	
836.60	4183	UMTS 850	RMC	19.5	19.18	0.06	0 mm	33015	1:1	left	0.299	1.076	0.322	
1880.00	9400	UMTS 1900	RMC	24.0	23.14	-0.04	19 mm	32207	1:1	back	0.441	1.219	0.538	
1880.00	9400	UMTS 1900	RMC	24.0	23.14	0.05	14 mm	32207	1:1	top	0.438	1.219	0.534	
1880.00	9400	UMTS 1900	RMC	24.0	23.14	-0.06	8 mm	32207	1:1	left	0.342	1.219	0.417	
1880.00	9400	UMTS 1900	RMC	11.5	11.03	-0.07	0 mm	33015	1:1	back	0.443	1.114	0.494	A2
1880.00	9400	UMTS 1900	RMC	11.5	11.03	0.00	0 mm	33015	1:1	top	0.116	1.114	0.129	
1880.00	9400	UMTS 1900	RMC	11.5	11.03	0.06	0 mm	33015	1:1	left	0.084	1.114	0.094	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 10-2
LTE Band 13 Body SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
782.00	23230	Mid	LTE Band 13	10	18.0	17.98	-0.16	0	33056	QPSK	1	49	0 mm	back	1:1	0.532	1.005	0.535	A3
782.00	23230	Mid	LTE Band 13	10	17.0	16.18	0.04	1	33056	QPSK	25	0	0 mm	back	1:1	0.344	1.208	0.416	
782.00	23230	Mid	LTE Band 13	10	18.0	17.98	-0.05	0	33056	QPSK	1	49	0 mm	top	1:1	0.262	1.005	0.263	
782.00	23230	Mid	LTE Band 13	10	17.0	16.18	0.02	1	33056	QPSK	25	0	0 mm	top	1:1	0.165	1.208	0.199	
782.00	23230	Mid	LTE Band 13	10	18.0	17.98	-0.06	0	33056	QPSK	1	49	0 mm	left	1:1	0.205	1.005	0.206	
782.00	23230	Mid	LTE Band 13	10	17.0	16.18	0.04	1	33056	QPSK	25	0	0 mm	left	1:1	0.125	1.208	0.151	
782.00	23230	Mid	LTE Band 13	10	24.5	24.00	-0.03	0	32207	QPSK	1	25	19 mm	back	1:1	0.401	1.122	0.450	
782.00	23230	Mid	LTE Band 13	10	23.5	22.15	0.09	1	32207	QPSK	25	0	19 mm	back	1:1	0.237	1.365	0.324	
782.00	23230	Mid	LTE Band 13	10	24.5	24.00	-0.04	0	32207	QPSK	1	25	14 mm	top	1:1	0.276	1.122	0.310	
782.00	23230	Mid	LTE Band 13	10	23.5	22.15	0.08	1	32207	QPSK	25	0	14 mm	top	1:1	0.174	1.365	0.238	
782.00	23230	Mid	LTE Band 13	10	24.5	24.00	-0.02	0	32207	QPSK	1	25	8 mm	left	1:1	0.182	1.122	0.204	
782.00	23230	Mid	LTE Band 13	10	23.5	22.15	-0.04	1	32207	QPSK	25	0	8 mm	left	1:1	0.111	1.365	0.152	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

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Table 10-3
LTE Band 5 (Cell) Body SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.5	19.21	0.11	0	33056	QPSK	1	0	0 mm	back	1:1	0.559	1.069	0.598	A4
836.50	20525	Mid	LTE Band 5 (Cell)	10	18.5	18.18	0.06	1	33056	QPSK	25	12	0 mm	back	1:1	0.434	1.076	0.467	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.5	19.21	0.10	0	33056	QPSK	1	0	0 mm	top	1:1	0.284	1.069	0.304	
836.50	20525	Mid	LTE Band 5 (Cell)	10	18.5	18.18	0.03	1	33056	QPSK	25	12	0 mm	top	1:1	0.223	1.076	0.240	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.5	19.21	-0.04	0	33056	QPSK	1	0	0 mm	left	1:1	0.338	1.069	0.361	
836.50	20525	Mid	LTE Band 5 (Cell)	10	18.5	18.18	0.04	1	33056	QPSK	25	12	0 mm	left	1:1	0.264	1.076	0.284	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.08	0.07	0	32488	QPSK	1	25	19 mm	back	1:1	0.377	1.102	0.415	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.04	-0.01	1	32488	QPSK	25	0	19 mm	back	1:1	0.282	1.112	0.314	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.08	0.15	0	32488	QPSK	1	25	14 mm	top	1:1	0.348	1.102	0.383	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.04	-0.04	1	32488	QPSK	25	0	14 mm	top	1:1	0.261	1.112	0.290	
836.50	20525	Mid	LTE Band 5 (Cell)	10	24.5	24.08	0.01	0	32488	QPSK	1	25	8 mm	left	1:1	0.222	1.102	0.245	
836.50	20525	Mid	LTE Band 5 (Cell)	10	23.5	23.04	-0.01	1	32488	QPSK	25	0	8 mm	left	1:1	0.199	1.112	0.221	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body											
Spatial Peak								1.6 W/kg (mW/g)											
Uncontrolled Exposure/General Population								averaged over 1 gram											

Table 10-4
LTE Band 4 (AWS) Body SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Scaled SAR (1g)	Plot #	
MHz	Ch.														(W/kg)		(W/kg)		
1732.50	20175	Mid	LTE Band 4 (AWS)	20	13.0	12.61	0.01	0	33015	QPSK	1	50	0 mm	back	1:1	0.556	1.094	0.608	A5
1732.50	20175	Mid	LTE Band 4 (AWS)	20	13.0	12.42	-0.10	0	33015	QPSK	50	25	0 mm	back	1:1	0.535	1.143	0.612	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	13.0	12.61	-0.05	0	33015	QPSK	1	50	0 mm	top	1:1	0.216	1.094	0.236	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	13.0	12.42	-0.15	0	33015	QPSK	50	25	0 mm	top	1:1	0.218	1.143	0.249	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	13.0	12.61	-0.10	0	33015	QPSK	1	50	0 mm	left	1:1	0.198	1.094	0.217	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	13.0	12.42	-0.13	0	33015	QPSK	50	25	0 mm	left	1:1	0.185	1.143	0.211	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.3	23.89	-0.07	0	32488	QPSK	1	50	19 mm	back	1:1	0.390	1.099	0.429	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.3	22.80	-0.01	1	32488	QPSK	50	0	19 mm	back	1:1	0.316	1.122	0.355	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.3	23.89	0.05	0	32488	QPSK	1	50	14 mm	top	1:1	0.456	1.099	0.501	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.3	22.80	-0.07	1	32488	QPSK	50	0	14 mm	top	1:1	0.349	1.122	0.392	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	24.3	23.89	0.08	0	32488	QPSK	1	50	8 mm	left	1:1	0.546	1.099	0.600	
1732.50	20175	Mid	LTE Band 4 (AWS)	20	23.3	22.80	0.02	1	32488	QPSK	50	0	8 mm	left	1:1	0.434	1.122	0.487	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram											

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Table 10-5
LTE Band 2 (PCS) Body SAR

MEASUREMENT RESULTS																			
FREQUENCY		Mode	Bandwidth [MHz]	Maxium 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)		
1900.00	19100	High	LTE Band 2 (PCS)	20	12.0	11.73	-0.09	0	33015	QPSK	1	99	0 mm	back	1:1	0.445	1.064	0.473	A6
1900.00	19100	High	LTE Band 2 (PCS)	20	12.0	11.61	0.00	0	33015	QPSK	50	50	0 mm	back	1:1	0.445	1.094	0.487	
1900.00	19100	High	LTE Band 2 (PCS)	20	12.0	11.73	-0.06	0	33015	QPSK	1	99	0 mm	top	1:1	0.138	1.064	0.147	
1900.00	19100	High	LTE Band 2 (PCS)	20	12.0	11.61	-0.04	0	33015	QPSK	50	50	0 mm	top	1:1	0.135	1.094	0.148	
1900.00	19100	High	LTE Band 2 (PCS)	20	12.0	11.73	0.07	0	33015	QPSK	1	99	0 mm	left	1:1	0.083	1.064	0.088	
1900.00	19100	High	LTE Band 2 (PCS)	20	12.0	11.61	0.20	0	33015	QPSK	50	50	0 mm	left	1:1	0.087	1.094	0.095	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.0	23.98	-0.12	0	32207	QPSK	1	50	19 mm	back	1:1	0.665	1.005	0.668	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.0	22.89	-0.05	1	32207	QPSK	50	25	19 mm	back	1:1	0.512	1.026	0.525	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.0	23.98	0.17	0	32207	QPSK	1	50	14 mm	top	1:1	0.560	1.005	0.563	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.0	22.89	-0.01	1	32207	QPSK	50	25	14 mm	top	1:1	0.425	1.026	0.436	
1900.00	19100	High	LTE Band 2 (PCS)	20	24.0	23.98	0.11	0	32207	QPSK	1	50	8 mm	left	1:1	0.533	1.005	0.536	
1900.00	19100	High	LTE Band 2 (PCS)	20	23.0	22.89	-0.03	1	32207	QPSK	50	25	8 mm	left	1:1	0.414	1.026	0.425	
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 10-6
WLAN Body SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Scaled SAR (1g) (W/kg)	Plot #
MHz	Ch.												(W/kg)				
2412	1	802.11b	DSSS	22	13.5	13.43	-0.05	0 mm	8019	1	back	99.7	0.897	1.016	1.004	0.915	
2462	11	802.11b	DSSS	22	13.5	13.34	-0.03	0 mm	8019	1	back	99.7	0.865	1.038	1.004	0.902	
2412	1	802.11b	DSSS	22	13.5	13.43	-0.03	0 mm	8019	1	top	99.7	0.357	1.016	1.004	0.364	
2412	1	802.11b	DSSS	22	13.5	13.43	-0.11	0 mm	8019	1	back	99.7	0.914	1.016	1.004	0.933	A7
5270	54	802.11n	OFDM	40	11.5	11.31	0.19	0 mm	8159	13.5	back	96.8	0.898	1.045	1.033	0.969	A8
5310	62	802.11n	OFDM	40	11.5	11.11	-0.16	0 mm	8159	13.5	back	96.8	0.853	1.094	1.033	0.964	
5270	54	802.11n	OFDM	40	11.5	11.31	0.12	0 mm	8159	13.5	top	96.8	0.712	1.045	1.033	0.769	
5510	102	802.11n	OFDM	40	11.5	11.49	-0.05	0 mm	8159	13.5	back	96.8	0.837	1.002	1.033	0.867	
5710	142	802.11n	OFDM	40	11.5	10.71	0.10	0 mm	8159	13.5	back	96.8	0.665	1.199	1.033	0.823	
5510	102	802.11n	OFDM	40	11.5	11.49	0.19	0 mm	8159	13.5	top	96.8	0.859	1.002	1.033	0.889	
5710	142	802.11n	OFDM	40	11.5	10.71	0.13	0 mm	8159	13.5	top	96.8	0.394	1.199	1.033	0.488	
5795	159	802.11n	OFDM	40	11.5	11.47	0.12	0 mm	8159	13.5	back	96.8	0.534	1.007	1.033	0.556	
5795	159	802.11n	OFDM	40	11.5	11.47	0.13	0 mm	8159	13.5	top	96.8	0.353	1.007	1.033	0.367	
5270	54	802.11n	OFDM	40	11.5	11.31	0.12	0 mm	8159	13.5	back	96.8	0.854	1.045	1.033	0.921	
5510	102	802.11n	OFDM	40	11.5	11.49	0.05	0 mm	8159	13.5	top	96.8	0.841	1.002	1.033	0.871	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population								Body 1.6 W/kg (mW/g) averaged over 1 gram									

Note: Variability data is highlighted blue in the table above.

10.2 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 616217 D04v01r02 and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.

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5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Per FCC KDB 865664 D01 v01, variability SAR tests were performed when the measured SAR results for a frequency band were greater than 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 12 for variability analysis.
7. FCC KDB Publication 616217 D04 Section 4.3, SAR tests are required for the back surface and edges of the tablet with the tablet touching the phantom. The SAR Exclusion Threshold in FCC KDB 447498 D01v06 was applied to determine SAR test exclusion for adjacent edge configurations.

UMTS Notes:

1. UMTS mode was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03. HSPA SAR was not required per 3G Test Reduction Procedures.
2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel was used.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 0.
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).

WLAN Notes:

1. Justification for test configurations for WLAN per KDB Publication 248227 D01v02 for 2.4 GHz WIFI operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 7.6.4 for more information.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02 for 5 GHz WIFI operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg. See Section 7.6.5 for more information.
3. When the maximum reported 1g averaged SAR is ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg or all test channels were measured.
4. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated EMC test reports.

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11 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

11.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05r02 are applicable to devices with built-in unlicensed transmitters such as 802.11 and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

11.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v06 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 a physical test configuration is ≤ 1.6 W/kg. The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1-g or 10-g SAR.

When standalone SAR is not required to be measured, per FCC KDB 447498 D01v06 4.3.2 2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter.

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

Table 11-1
Estimated SAR

Mode	Configuration	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated SAR (Body)
		[MHz]	[dBm]	[mm]	[W/kg]
Bluetooth	Back Side, Top Edge	2480	9.50	5	0.378

Notes:

1. Per FCC KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.
2. Per FCC KDB Publication 447498, when the test separation distance is < 5 mm, a distance of 5 mm is applied to determine estimated SAR.
3. When the antenna separation distance was > 50 mm, an estimated SAR of 0.4 W/kg was used to determine the simultaneous transmission SAR exclusion, for configurations excluded per FCC KDB Publication 447498 D01v06.

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11.3 Body SAR Simultaneous Transmission Analysis

Table 11-2
Simultaneous Transmission Scenario with 2.4 GHz WLAN

Configuration	UMTS 850 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR	Configuration	UMTS 1900 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Back	0.614	0.933	1.547	N/A	Back	0.538	0.933	1.471	N/A
Top	0.344	0.364	0.708	N/A	Top	0.534	0.364	0.898	N/A
Bottom	0.400	0.400	0.800	N/A	Bottom	0.400	0.400	0.800	N/A
Right	0.400	0.400	0.800	N/A	Right	0.400	0.400	0.800	N/A
Left	0.322	0.400	0.722	N/A	Left	0.417	0.400	0.817	N/A
Configuration	LTE Band 13 SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR	Configuration	LTE Band 5 (Cell) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Back	0.535	0.933	1.468	N/A	Back	0.598	0.933	1.531	N/A
Top	0.310	0.364	0.674	N/A	Top	0.383	0.364	0.747	N/A
Bottom	0.400	0.400	0.800	N/A	Bottom	0.400	0.400	0.800	N/A
Right	0.400	0.400	0.800	N/A	Right	0.400	0.400	0.800	N/A
Left	0.206	0.400	0.606	N/A	Left	0.361	0.400	0.761	N/A
Configuration	LTE Band 4 (AWS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR	Configuration	LTE Band 2 (PCS) SAR (W/kg)	2.4 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Back	0.612	0.933	1.545	N/A	Back	0.668	0.933	See Note 1	0.04
Top	0.501	0.364	0.865	N/A	Top	0.563	0.364	0.927	N/A
Bottom	0.400	0.400	0.800	N/A	Bottom	0.400	0.400	0.800	N/A
Right	0.400	0.400	0.800	N/A	Right	0.400	0.400	0.800	N/A
Left	0.600	0.400	1.000	N/A	Left	0.536	0.400	0.936	N/A

Table 11-3
Simultaneous Transmission Scenario with 5 GHz WLAN

Configuration	UMTS 850 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR	Configuration	UMTS 1900 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Back	0.614	0.969	1.583	N/A	Back	0.538	0.969	1.507	N/A
Top	0.344	0.889	1.233	N/A	Top	0.534	0.889	1.423	N/A
Bottom	0.400	0.400	0.800	N/A	Bottom	0.400	0.400	0.800	N/A
Right	0.400	0.400	0.800	N/A	Right	0.400	0.400	0.800	N/A
Left	0.322	0.400	0.722	N/A	Left	0.417	0.400	0.817	N/A
Configuration	LTE Band 13 SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR	Configuration	LTE Band 5 (Cell) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Back	0.535	0.969	1.504	N/A	Back	0.598	0.969	1.567	N/A
Top	0.310	0.889	1.199	N/A	Top	0.383	0.889	1.272	N/A
Bottom	0.400	0.400	0.800	N/A	Bottom	0.400	0.400	0.800	N/A
Right	0.400	0.400	0.800	N/A	Right	0.400	0.400	0.800	N/A
Left	0.206	0.400	0.606	N/A	Left	0.361	0.400	0.761	N/A
Configuration	LTE Band 4 (AWS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR	Configuration	LTE Band 2 (PCS) SAR (W/kg)	5 GHz WLAN SAR (W/kg)	Σ SAR (W/kg)	SPLSR
Back	0.612	0.969	1.581	N/A	Back	0.668	0.969	See Note 1	0.04
Top	0.501	0.889	1.390	N/A	Top	0.563	0.889	1.452	N/A
Bottom	0.400	0.400	0.800	N/A	Bottom	0.400	0.400	0.800	N/A
Right	0.400	0.400	0.800	N/A	Right	0.400	0.400	0.800	N/A
Left	0.600	0.400	1.000	N/A	Left	0.536	0.400	0.936	N/A

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Table 11-4
Simultaneous Transmission Scenario with Bluetooth

Configuration	UMTS 850 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)	Configuration	UMTS 1900 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Back	0.614	0.378	0.992	Back	0.538	0.378	0.916
Top	0.344	0.378	0.722	Top	0.534	0.378	0.912
Bottom	0.400	0.400	0.800	Bottom	0.400	0.400	0.800
Right	0.400	0.400	0.800	Right	0.400	0.400	0.800
Left	0.322	0.400	0.722	Left	0.417	0.400	0.817
Configuration	LTE Band 13 SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)	Configuration	LTE Band 5 (Cell) SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Back	0.535	0.378	0.913	Back	0.598	0.378	0.976
Top	0.310	0.378	0.688	Top	0.383	0.378	0.761
Bottom	0.400	0.400	0.800	Bottom	0.400	0.400	0.800
Right	0.400	0.400	0.800	Right	0.400	0.400	0.800
Left	0.206	0.400	0.606	Left	0.361	0.400	0.761
Configuration	LTE Band 4 (AWS) SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)	Configuration	LTE Band 2 (PCS) SAR (W/kg)	Bluetooth SAR (W/kg)	Σ SAR (W/kg)
Back	0.612	0.378	0.990	Back	0.668	0.378	1.046
Top	0.501	0.378	0.879	Top	0.563	0.378	0.941
Bottom	0.400	0.400	0.800	Bottom	0.400	0.400	0.800
Right	0.400	0.400	0.800	Right	0.400	0.400	0.800
Left	0.600	0.400	1.000	Left	0.536	0.400	0.936

Notes:

1. No evaluation was performed to determine the aggregate 1g SAR for these configurations as the SPLS ratio between the antenna pairs was not greater than 0.04 per FCC KDB 447498 D01v06. See Section 11.4 for detailed SPLS ratio analysis.
2. For SAR summation the highest reported SAR across all test distances was used as the most conservative evaluation for simultaneous transmission analysis for each device edge.

11.4 SPLSR Evaluation and Analysis

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

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

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

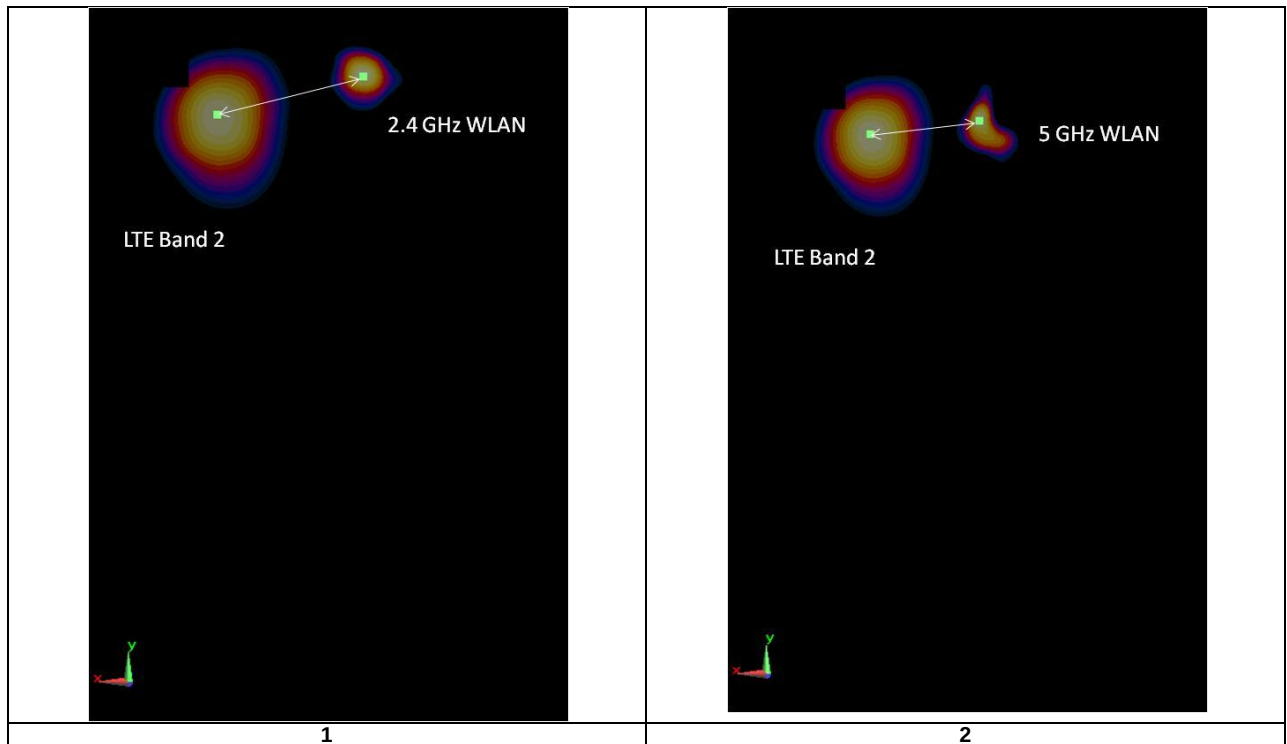
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Table 11-5
Peak SAR Locations for Body Back Side

Mode/Band	x (mm)	y (mm)	Reported SAR (W/kg)
2.4 GHz WLAN	-28.00	93.60	0.933
5 GHz WLAN	-27.00	94.00	0.969
LTE Band 2 (PCS) Max	19.00	81.00	0.668

Table 11-6
SAR Sum to Peak Location Separation Ratio Calculations

Antenna Pair		Standalone 1g SAR (W/kg)		Standalone SAR Sum (W/kg)	Peak SAR Separation Distance (mm)	SPLS Ratio	Plot Number
Ant "a"	Ant "b"	a	b	a+b	D _{a-b}	$(a+b)^{1.5}/D_{a-b}$	
2.4 GHz WLAN	LTE Band 2 (PCS) Max	0.933	0.668	1.601	48.66	0.04	1
5 GHz WLAN	LTE Band 2 (PCS) Max	0.969	0.668	1.637	47.80	0.04	2



11.5 Simultaneous Transmission Conclusion

The above numerical summed SAR results and SPLSR analysis are sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013 Section 6.3.4.1.2.

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12 SAR MEASUREMENT VARIABILITY

12.1 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.

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 12-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Data Rate (Mbps)	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)	
2450	2412	1	802.11b 22 MHz Bandwidth	DSSS	1	back	0 mm	0.897	0.914	1.02	N/A	N/A	N/A	N/A
5300	5270	54	802.11n 40 MHz Bandwidth	OFDM	13.5	back	0 mm	0.898	0.854	1.05	N/A	N/A	N/A	N/A
5500	5510	102	802.11n 40 MHz Bandwidth	OFDM	13.5	top	0 mm	0.859	0.841	1.02	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT							Body							
Spatial Peak							1.6 W/kg (mW/g)							
Uncontrolled Exposure/General Population							averaged over 1 gram							

12.2 Measurement Uncertainty

The measured SAR was < 1.5 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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13 EQUIPMENT LIST

Equipment used for test dates 08/03/15 - 08/07/15

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8648D	(9kHz-4GHz) Signal Generator	3/15/2015	Annual	3/15/2016	3629U00687
Agilent	8753E	(30kHz-6GHz) Network Analyzer	12/30/2014	Annual	12/30/2015	JP38020182
Agilent	8753ES	S-Parameter Network Analyzer	3/12/2015	Annual	3/12/2016	MY40000670
Agilent	8753ES	Network Analyzer	3/20/2015	Annual	3/20/2016	MY40001472
Agilent	8753ES	S-Parameter Network Analyzer	1/20/2015	Annual	1/20/2016	US39170122
Agilent	E4432B	ESG-D Series Signal Generator	3/16/2015	Annual	3/16/2016	US40053896
Agilent	E4438C	ESG Vector Signal Generator	3/13/2015	Annual	3/13/2016	MY42082385
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/15/2015	Annual	3/15/2016	MY45470194
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB44450273
Agilent	N5182A	MXG Vector Signal Generator	3/16/2015	Annual	3/16/2016	MY47420651
Agilent	N5182A	MXG Vector Signal Generator	3/16/2015	Annual	3/16/2016	MY47420800
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433971
Amplifier Research	1551G6	Amplifier	CBT	N/A	CBT	433974
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1231535
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1231538
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1244512
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1244515
Anritsu	MA2411B	Pulse Power Sensor	11/17/2014	Annual	11/17/2015	1207364
Anritsu	MA2411B	Pulse Power Sensor	3/13/2015	Annual	3/13/2016	1207470
Anritsu	ML2496A	Power Meter	3/13/2015	Annual	3/13/2016	1306009
Anritsu	ML2496A	Power Meter	3/13/2015	Annual	3/13/2016	1351001
Anritsu	ML2495A	Power Meter	10/31/2013	Biennial	10/31/2015	941001
COMTECH	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M155A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	4040	Digital Thermometer	3/18/2015	Biennial	3/18/2017	150194895
Control Company	4353	Long Stem Thermometer	1/22/2015	Biennial	1/22/2017	150053029
Fisher Scientific	S407993	Long Stem Thermometer	11/4/2013	Biennial	11/4/2015	130671826
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	5/8/2014	Biennial	5/8/2016	13264162
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	NC-100	Torque Wrench	5/21/2015	Biennial	5/21/2017	N/A
Pasternack	NC-100	Torque Wrench	5/21/2015	Biennial	5/21/2017	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	N/A
SPEAG	D2450V2	2450 MHz SAR Dipole	8/11/2014	Annual	8/11/2015	719
SPEAG	D5GHZV2	5 GHz SAR Dipole	9/25/2014	Annual	9/25/2015	1191
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/17/2014	Annual	9/17/2015	1323
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/31/2014	Annual	10/31/2015	1333
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/12/2015	Annual	5/12/2016	1070
SPEAG	DAKS VNA R140	VNA for Portable DAK	8/16/2015	Annual	8/16/2016	80513
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	7/14/2015	Annual	7/14/2016	1039
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/19/2015	Annual	8/19/2016	1041
SPEAG	ES3DV3	SAR Probe	9/18/2014	Annual	9/18/2015	3332
SPEAG	EX3DV4	SAR Probe	2/10/2015	Annual	2/10/2016	3914
SPEAG	Planar R140	Reflectometer	8/2/2015	Annual	8/2/2016	50513

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Equipment used for test dates 10/28/15 - 11/03/15

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8594A	(9kHz-2.9GHz) Spectrum Analyzer	N/A	N/A	N/A	3051A00187
Agilent	8648D	(9kHz-4GHz) Signal Generator	3/15/2015	Annual	3/15/2016	3629U00687
Agilent	8753E	(30kHz-6GHz) Network Analyzer	12/30/2014	Annual	12/30/2015	JP38020182
Agilent	8753ES	S-Parameter Network Analyzer	3/12/2015	Annual	3/12/2016	MY40000670
Agilent	8753ES	Network Analyzer	3/20/2015	Annual	3/20/2016	MY40001472
Agilent	8753ES	S-Parameter Network Analyzer	1/20/2015	Annual	1/20/2016	US39170122
Agilent	E4432B	ESG-D Series Signal Generator	3/16/2015	Annual	3/16/2016	US40053896
Agilent	E4438C	ESG Vector Signal Generator	3/13/2015	Annual	3/13/2016	MY42082385
Agilent	E8257D	(250kHz-20GHz) Signal Generator	3/15/2015	Annual	3/15/2016	MY45470194
Agilent	N4010A	Wireless Connectivity Test Set	N/A	N/A	N/A	GB44450273
Agilent	N5182A	MXG Vector Signal Generator	3/16/2015	Annual	3/16/2016	MY47420651
Agilent	N5182A	MXG Vector Signal Generator	3/16/2015	Annual	3/16/2016	MY47420800
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433971
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	433974
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1231535
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1231538
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1244512
Anritsu	MA24106A	USB Power Sensor	5/29/2015	Annual	5/29/2016	1244515
Anritsu	MA2411B	Pulse Power Sensor	11/17/2014	Annual	11/17/2015	1207364
Anritsu	MA2411B	Pulse Power Sensor	3/13/2015	Annual	3/13/2016	1207470
Anritsu	ML2496A	Power Meter	3/13/2015	Annual	3/13/2016	1306009
Anritsu	ML2496A	Power Meter	3/13/2015	Annual	3/13/2016	1351001
Anritsu	MT8820C	Radio Communication Analyzer	7/24/2015	Annual	7/24/2016	6200901190
COMTECH	AR85729-5	Solid State Amplifier	CBT	N/A	CBT	M155A00-009
COMTECH	AR85729-5/5759B	Solid State Amplifier	CBT	N/A	CBT	M3W1A00-1002
Control Company	4040	Digital Thermometer	3/18/2015	Biennial	3/18/2017	150194895
Control Company	4353	Long Stem Thermometer	1/22/2015	Biennial	1/22/2017	150053029
Fisher Scientific	S407993	Long Stem Thermometer	11/4/2013	Biennial	11/4/2015	130671826
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
MiniCircuits	SLP-2400+	Low Pass Filter	CBT	N/A	CBT	R8979500903
Mini-Circuits	BW-N20W5	Power Attenuator	CBT	N/A	CBT	1226
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	5/8/2014	Biennial	5/8/2016	13264162
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	NC-100	Torque Wrench	5/21/2015	Biennial	5/21/2017	N/A
Pasternack	NC-100	Torque Wrench	5/21/2015	Biennial	5/21/2017	N/A
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMW500	Radio Communication tester	5/5/2015	Annual	5/5/2016	140144
Rohde & Schwarz	CMW500	Radio Communication Tester	4/8/2015	Annual	4/8/2016	140148
Seekonk	NC-100	Torque Wrench	3/18/2014	Biennial	3/18/2016	N/A
SPEAG	D1750V2	1750 MHz SAR Dipole	4/15/2015	Annual	4/15/2016	1051
SPEAG	D1900V2	1900 MHz SAR Dipole	4/14/2015	Annual	4/14/2016	5d141
SPEAG	D750V3	750 MHz SAR Dipole	2/19/2015	Annual	2/19/2016	1046
SPEAG	D835V2	835 MHz SAR Dipole	4/13/2015	Annual	4/13/2016	4d119
SPEAG	D835V2	835 MHz SAR Dipole	1/16/2015	Annual	1/16/2016	4d132
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/18/2015	Annual	2/18/2016	665
SPEAG	DAE4	Dasy Data Acquisition Electronics	6/17/2015	Annual	6/17/2016	859
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/14/2015	Annual	1/14/2016	1272
SPEAG	DAE4	Dasy Data Acquisition Electronics	9/18/2015	Annual	9/18/2016	1364
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/12/2015	Annual	5/12/2016	1070
SPEAG	DAKS_VNA R140	VNA for Portable DAK	8/16/2015	Annual	8/16/2016	80513
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	7/14/2015	Annual	7/14/2016	1039
SPEAG	DAKS-3.5	Portable Dielectric Assessment Kit	8/19/2015	Annual	8/19/2016	1041
SPEAG	ES3DV2	SAR Probe	8/26/2015	Annual	8/26/2016	3022
SPEAG	ES3DV3	SAR Probe	5/20/2015	Annual	5/20/2016	3263
SPEAG	ES3DV3	SAR Probe	9/18/2015	Annual	9/18/2016	3288
SPEAG	ES3DV3	SAR Probe	1/23/2015	Annual	1/23/2016	3318
SPEAG	Planar R140	Reflectometer	8/2/2015	Annual	8/2/2016	50513

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

All equipment was used solely within its calibration period.

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14 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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15 CONCLUSION

15.1 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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FCC ID: A3LSMT377V		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: OY1509141808.A3L	Test Dates: 08/03/15 - 08/07/15 & 10/28/15 - 11/03/15	DUT Type: Portable Tablet		Page 66 of 67

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FCC ID: A3LSMT377V		SAR EVALUATION REPORT		Reviewed by: Quality Manager
Document S/N: OY1509141808.A3L	Test Dates: 08/03/15 - 08/07/15 & 10/28/15 - 11/03/15	DUT Type: Portable Tablet		Page 67 of 67

APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMT377V; Type: Portable Tablet; Serial: 33015

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.6 \text{ MHz}$; $\sigma = 1.001 \text{ S/m}$; $\epsilon_r = 54.35$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-28-2015; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3318; ConvF(6.23, 6.23, 6.23); Calibrated: 1/23/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/14/2015

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

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

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

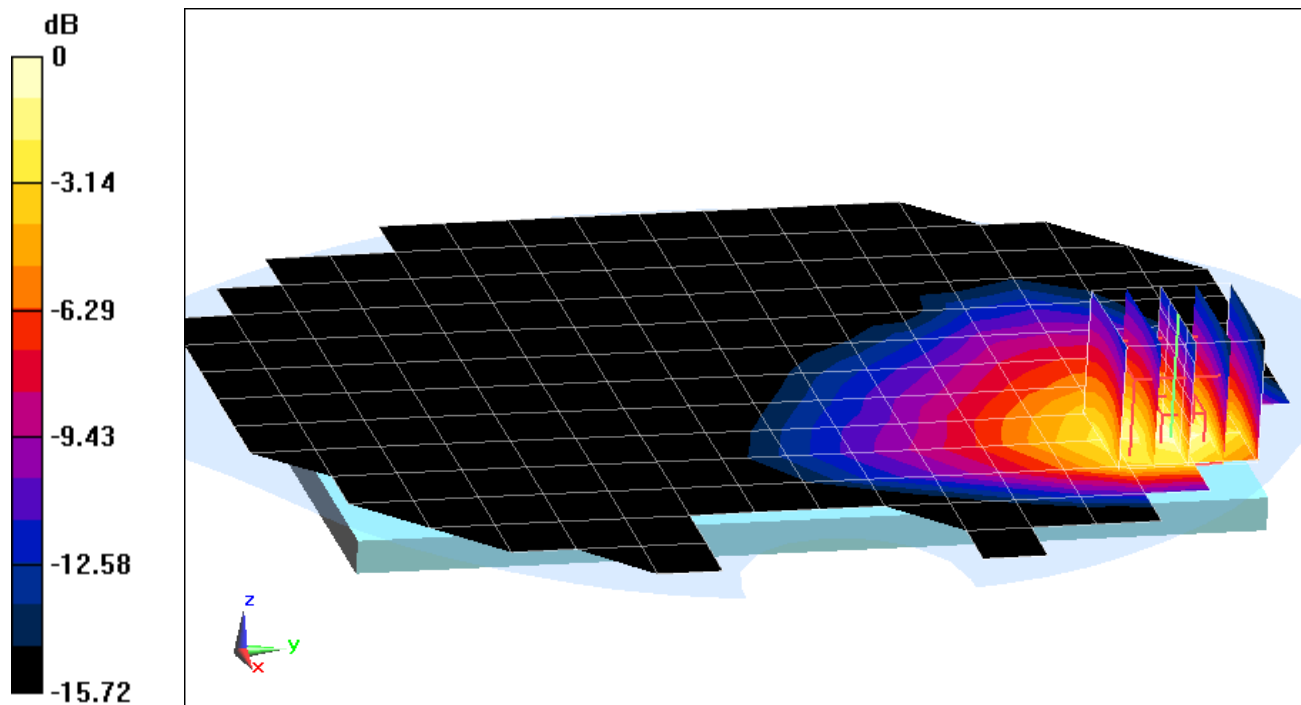
Area Scan (14x17x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 25.38 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.571 W/kg



0 dB = 0.726 W/kg = -1.39 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMT377V; Type: Portable Tablet; Serial: 33015

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

Medium: 1900 Body Medium parameters used:

$f = 1880 \text{ MHz}$; $\sigma = 1.548 \text{ S/m}$; $\epsilon_r = 52.029$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-28-2015; Ambient Temp: 22.5°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(4.56, 4.56, 4.56); Calibrated: 8/26/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/18/2015

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

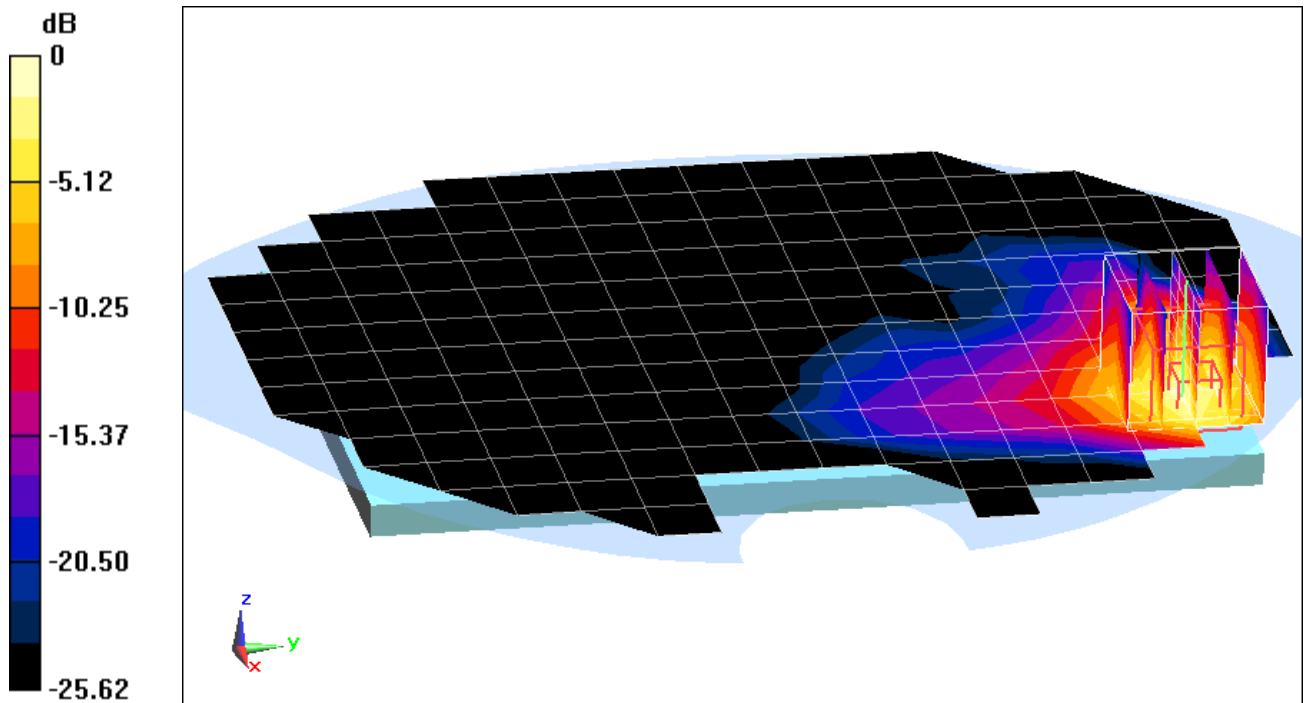
Area Scan (13x17x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 13.33 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.899 W/kg

SAR(1 g) = 0.443 W/kg



0 dB = 0.585 W/kg = -2.33 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMT377V; Type: Portable Tablet; Serial: 33056

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 782 \text{ MHz}$; $\sigma = 1.003 \text{ S/m}$; $\epsilon_r = 54.106$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-03-2015; Ambient Temp: 22.9°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3288; ConvF(6.57, 6.57, 6.57); Calibrated: 9/18/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2015

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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, 49 RB Offset

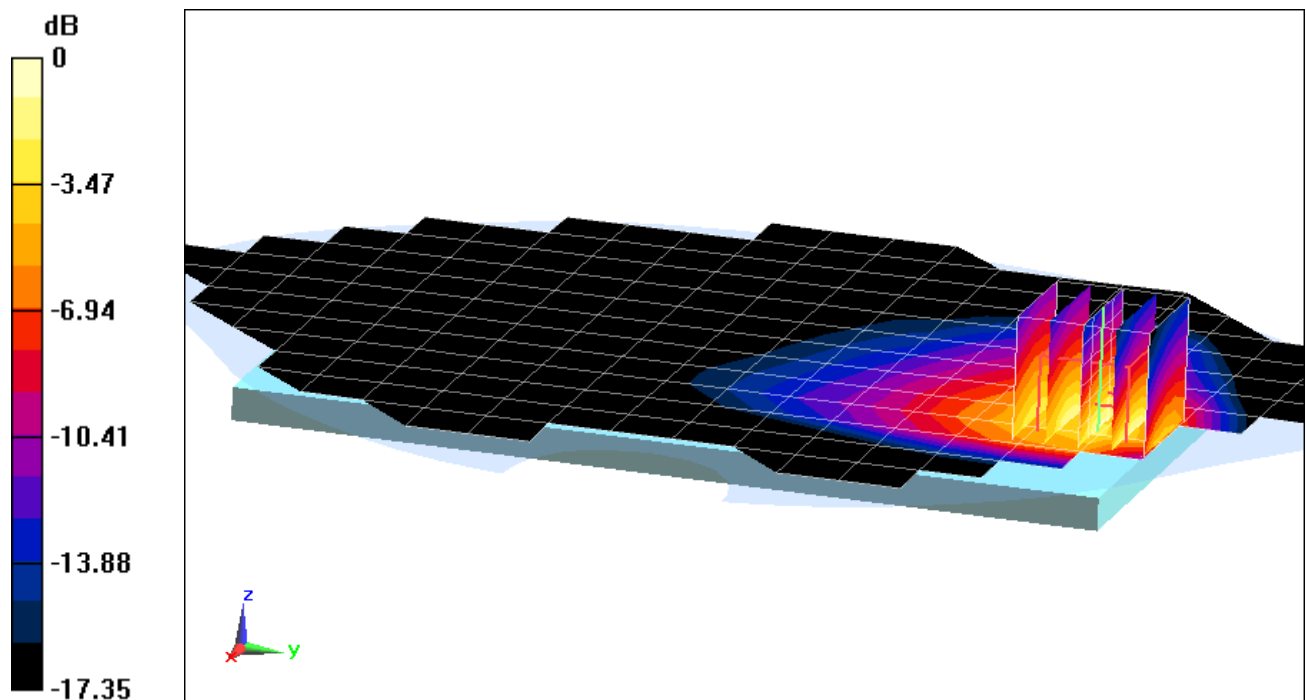
Area Scan (15x21x1): Measurement grid: dx=15mm, dy=15mm

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

Reference Value = 22.55 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.532 W/kg



0 dB = 0.644 W/kg = -1.91 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMT377V; Type: Portable Tablet; Serial: 33056

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

Medium: 835 Body Medium parameters used (interpolated):

$f = 836.5 \text{ MHz}$; $\sigma = 0.99 \text{ S/m}$; $\epsilon_r = 54.391$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 11-02-2015; Ambient Temp: 22.3°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3288; ConvF(6.4, 6.4, 6.4); Calibrated: 9/18/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2015

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

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

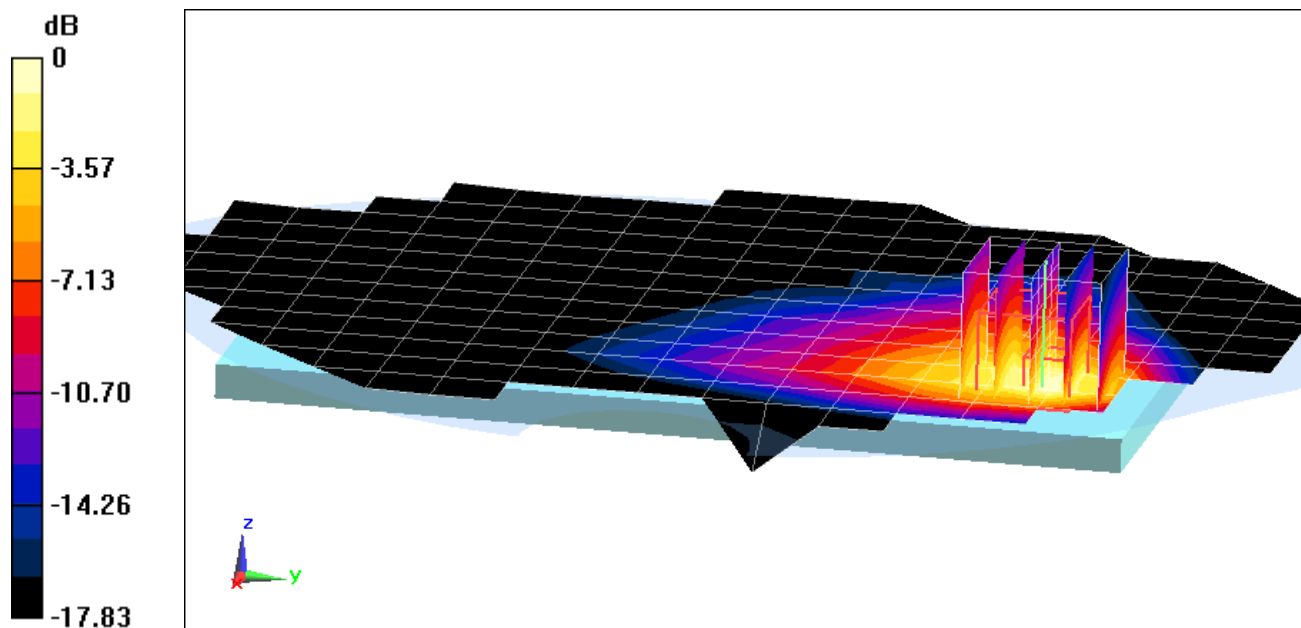
Area Scan (15x19x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 22.77 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.559 W/kg



0 dB = 0.699 W/kg = -1.56 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMT377V; Type: Portable Tablet; Serial: 33015

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

Medium: 1750 Body Medium parameters used (interpolated):

$f = 1732.5 \text{ MHz}$; $\sigma = 1.439 \text{ S/m}$; $\epsilon_r = 51.836$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 0.0 cm

Test Date: 10-28-2015; Ambient Temp: 22.3°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3263; ConvF(4.88, 4.88, 4.88); Calibrated: 5/20/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 6/17/2015

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

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

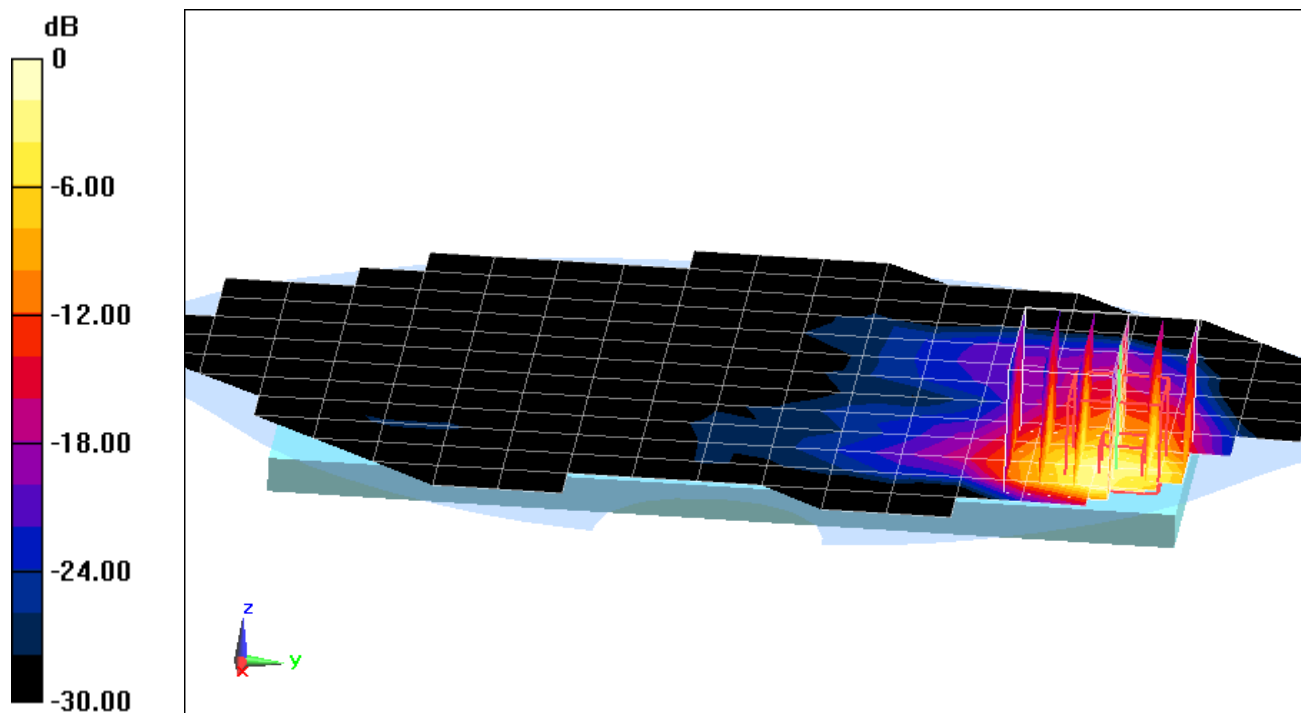
Area Scan (15x19x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 18.64 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.556 W/kg



0 dB = 0.734 W/kg = -1.34 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMT377V; Type: Portable Tablet; Serial: 32207

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

Medium: 1900 Body Medium parameters used (interpolated):

$f = 1900 \text{ MHz}$; $\sigma = 1.573 \text{ S/m}$; $\epsilon_r = 51.95$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.9 cm

Test Date: 10-28-2015; Ambient Temp: 22.5°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(4.56, 4.56, 4.56); Calibrated: 8/26/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/18/2015

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: LTE Band 2 (PCS), Body SAR, Back side, High.ch
20 MHz Bandwidth, QPSK, 1 RB, 50 RB Offset

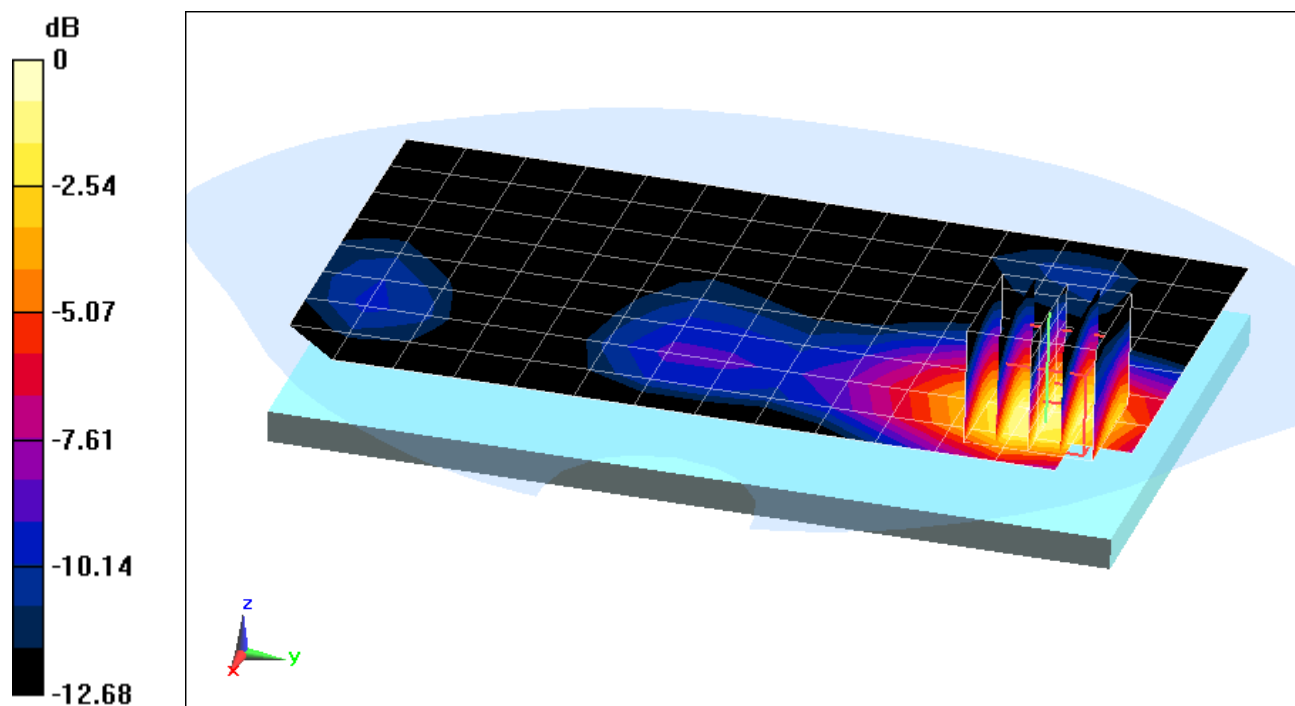
Area Scan (9x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Reference Value = 20.75 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.665 W/kg



0 dB = 0.782 W/kg = -1.07 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMT377V; Type: Portable Tablet; Serial: 8019

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

Medium: 2450 Body; Medium parameters used (interpolated):

$f = 2412 \text{ MHz}$; $\sigma = 1.983 \text{ S/m}$; $\epsilon_r = 51.327$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space = 0.0 cm

Test Date: 08-07-2015; Ambient Temp: 22.1°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3332; ConvF(4.31, 4.31, 4.31); Calibrated: 9/18/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

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

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

Mode: IEEE 802.11b, 22 MHz Bandwidth, Body SAR, Ch 01, 1 Mbps, Back Side

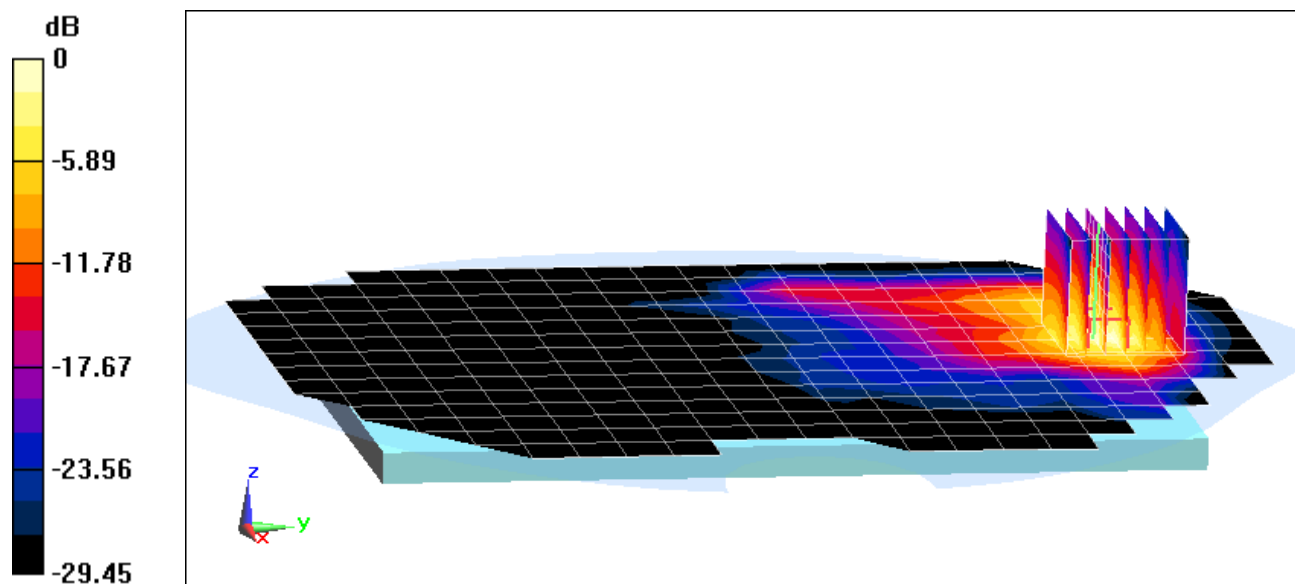
Area Scan (15x22x1): Measurement grid: dx=12mm, dy=12mm

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

Reference Value = 22.32 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 2.41 W/kg

SAR(1 g) = 0.914 W/kg



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

PCTEST ENGINEERING LABORATORY, INC.

DUT: A3LSMT377V; Type: Portable Tablet; Serial: 8159

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

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

$f = 5270 \text{ MHz}$; $\sigma = 5.386 \text{ S/m}$; $\epsilon_r = 47.051$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space = 0.0 cm

Test Date: 08-03-2015; Ambient Temp: 24.5°C; Tissue Temp: 23.4°C

Probe: EX3DV4 - SN3914; ConvF(4.33, 4.33, 4.33); Calibrated: 2/10/2015;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 10/31/2014

Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357

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

Mode:IEEE 802.11n, U-NII-2A, 40 MHz Bandwidth, Body SAR, Ch 54, 13.5 Mbps, Back Side

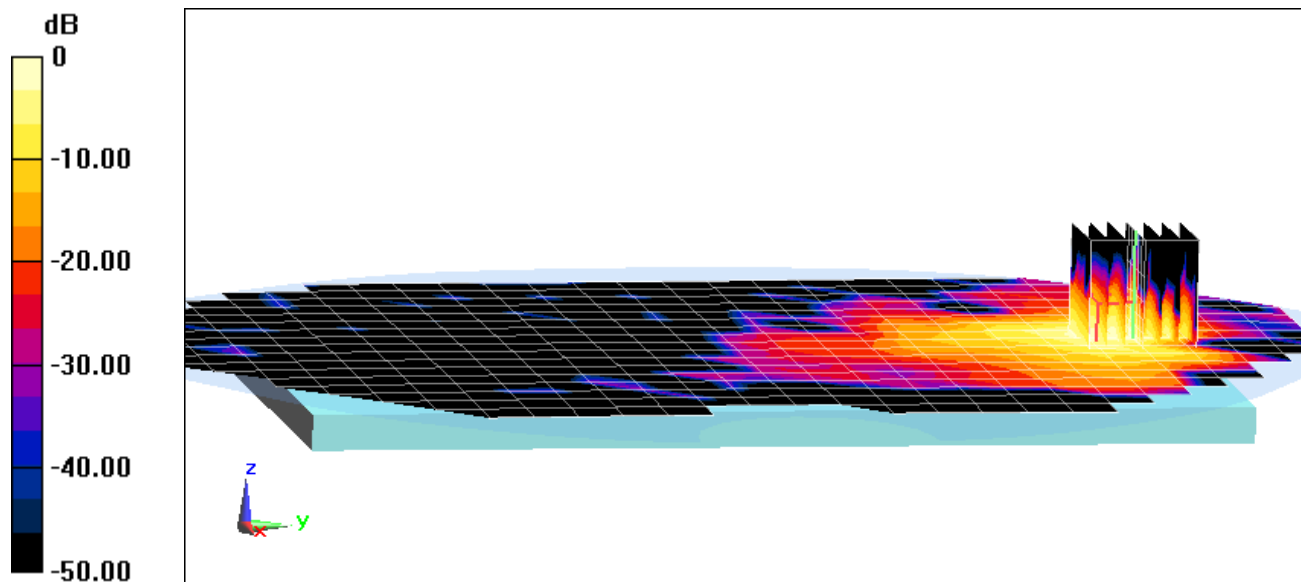
Area Scan (18x27x1): Measurement grid: dx=10mm, dy=10mm

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

Reference Value = 13.61 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 4.46 W/kg

SAR(1 g) = 0.898 W/kg



0 dB = 2.17 W/kg = 3.36 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 750 Body Medium parameters used (interpolated):

$f = 750 \text{ MHz}$; $\sigma = 0.972 \text{ S/m}$; $\epsilon_r = 54.42$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-03-2015; Ambient Temp: 22.9°C; Tissue Temp: 22.3°C

Probe: ES3DV3 - SN3288; ConvF(6.57, 6.57, 6.57); Calibrated: 9/18/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2015

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

750 MHz System Verification at 23.0 dBm (200 mW)

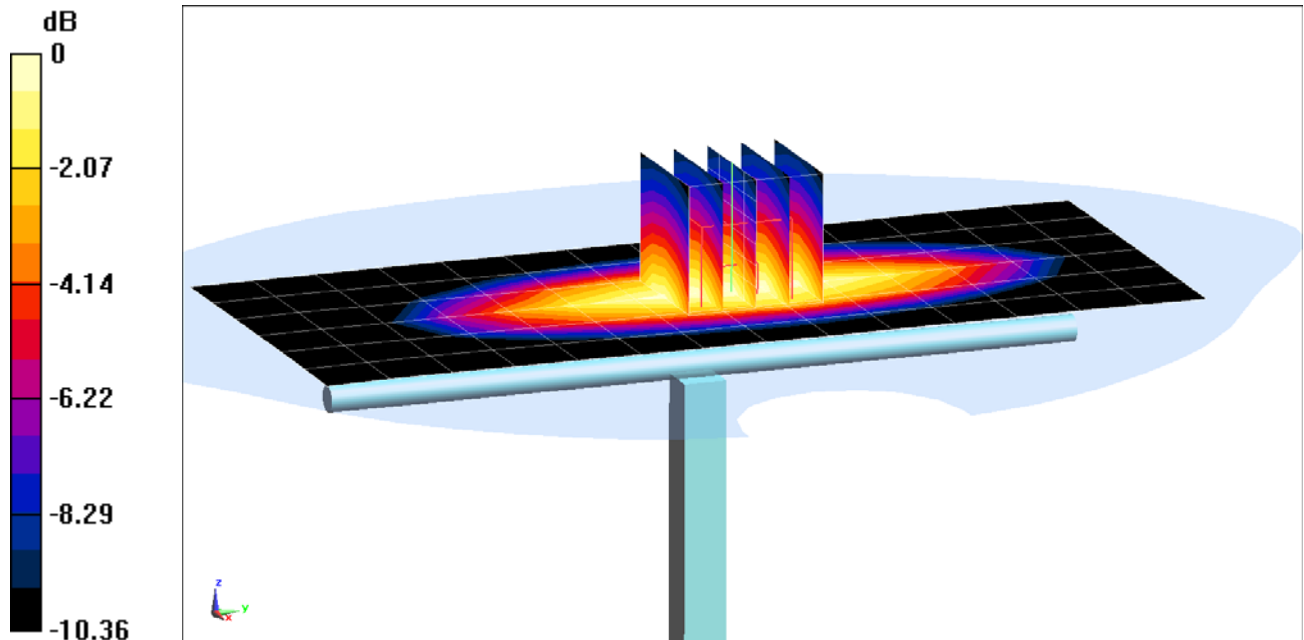
Area Scan (7x15x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 2.54 W/kg

SAR(1 g) = 1.68 W/kg

Deviation = 1.33%



0 dB = 1.95 W/kg = 2.90 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 1 \text{ S/m}$; $\epsilon_r = 54.366$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 10-28-2015; Ambient Temp: 21.9°C; Tissue Temp: 22.0°C

Probe: ES3DV3 - SN3318; ConvF(6.23, 6.23, 6.23); Calibrated: 1/23/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1272; Calibrated: 1/14/2015

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

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

835 MHz System Verification at 23.0 dBm (200 mW)

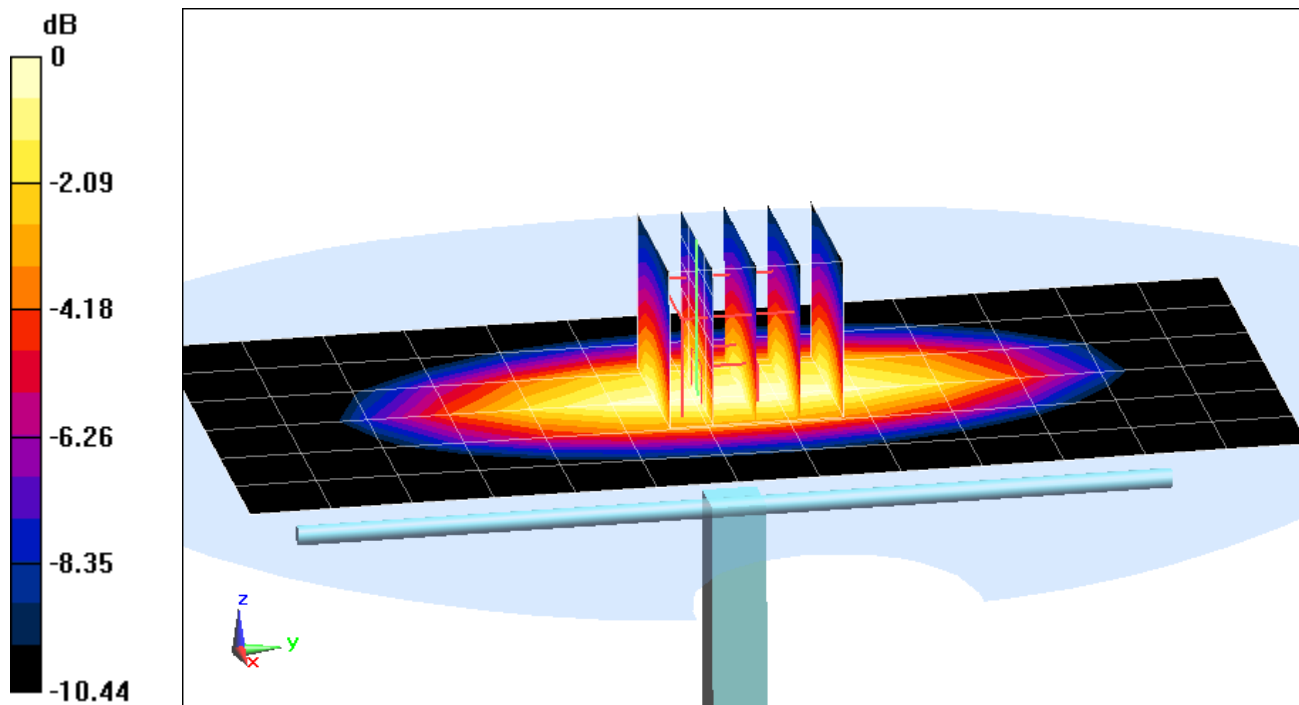
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 2.91 W/kg

SAR(1 g) = 1.96 W/kg

Deviation (1 g) = 6.52%



0 dB = 2.27 W/kg = 3.56 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d132

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

Medium: 835 Body Medium parameters used:

$f = 835 \text{ MHz}$; $\sigma = 0.988 \text{ S/m}$; $\epsilon_r = 54.405$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.5 cm

Test Date: 11-02-2015; Ambient Temp: 22.3°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3288; ConvF(6.4, 6.4, 6.4); Calibrated: 9/18/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1364; Calibrated: 9/18/2015

Phantom: Sub TWIN SAM; Type: QD000P40CC; Serial: TP-1357

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

835 MHz System Verification at 23.0 dBm (200 mW)

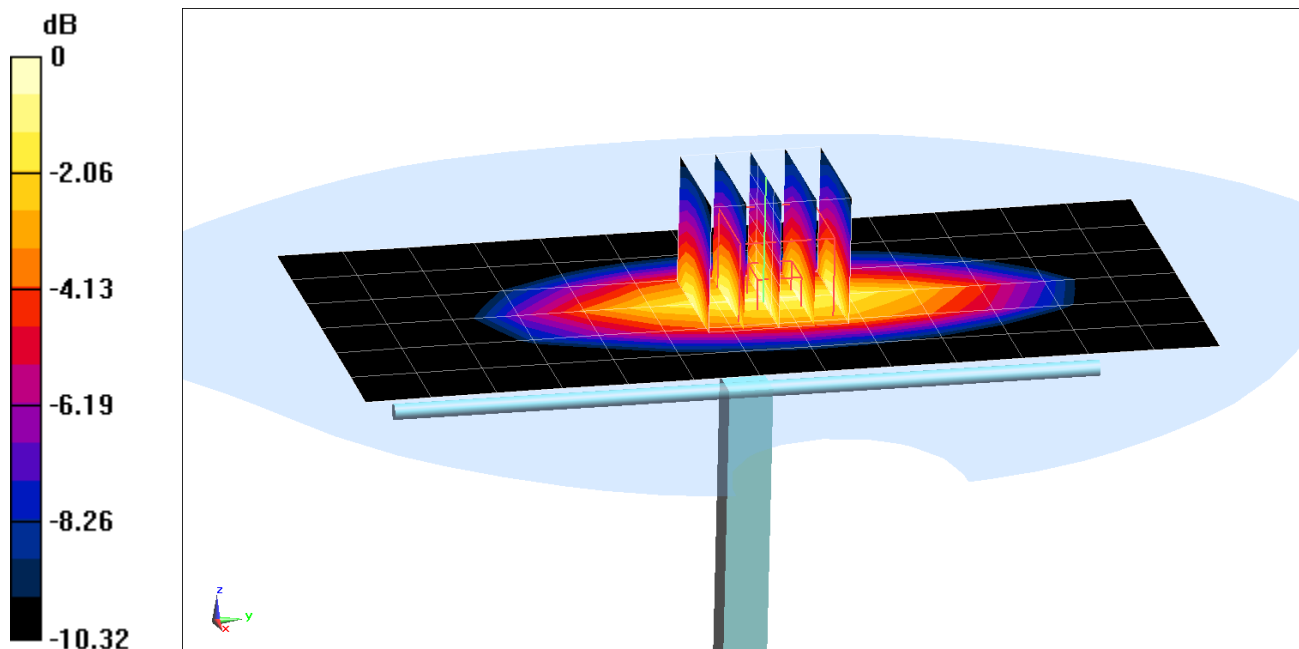
Area Scan (7x14x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 2.85 W/kg

SAR(1 g) = 1.96 W/kg

Deviation = 7.22%



0 dB = 2.27 W/kg = 3.56 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 1750 Body Medium parameters used:

$f = 1750 \text{ MHz}$; $\sigma = 1.457 \text{ S/m}$; $\epsilon_r = 51.783$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-28-2015; Ambient Temp: 22.3°C; Tissue Temp: 21.8°C

Probe: ES3DV3 - SN3263; ConvF(4.88, 4.88, 4.88); Calibrated: 5/20/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn859; Calibrated: 6/17/2015

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

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

1750 MHz System Verification at 20.0 dBm (100 mW)

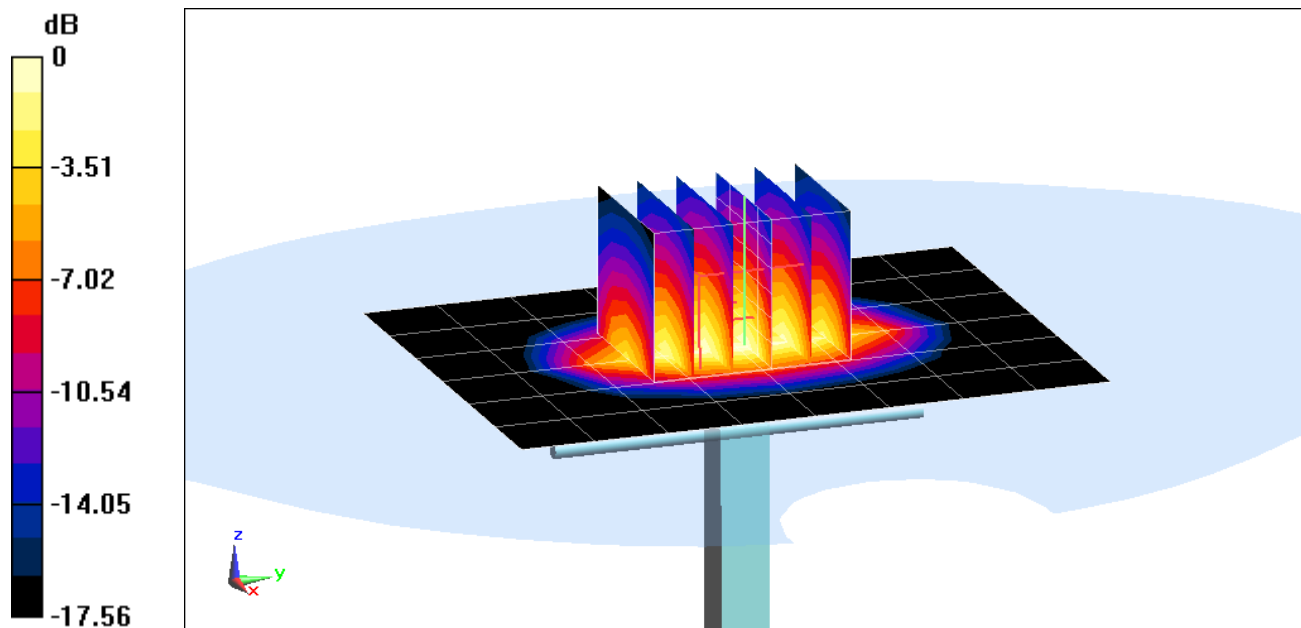
Area Scan (7x9x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

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

Peak SAR (extrapolated) = 6.40 W/kg

SAR(1 g) = 3.73 W/kg

Deviation(1 g) = 0.54%



0 dB = 4.68 W/kg = 6.70 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):

$f = 1900 \text{ MHz}$; $\sigma = 1.573 \text{ S/m}$; $\epsilon_r = 51.95$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space: 1.0 cm

Test Date: 10-28-2015; Ambient Temp: 22.5°C; Tissue Temp: 22.1°C

Probe: ES3DV2 - SN3022; ConvF(4.56, 4.56, 4.56); Calibrated: 8/26/2015;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn665; Calibrated: 2/18/2015

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 at 20.0 dBm (100 mW)

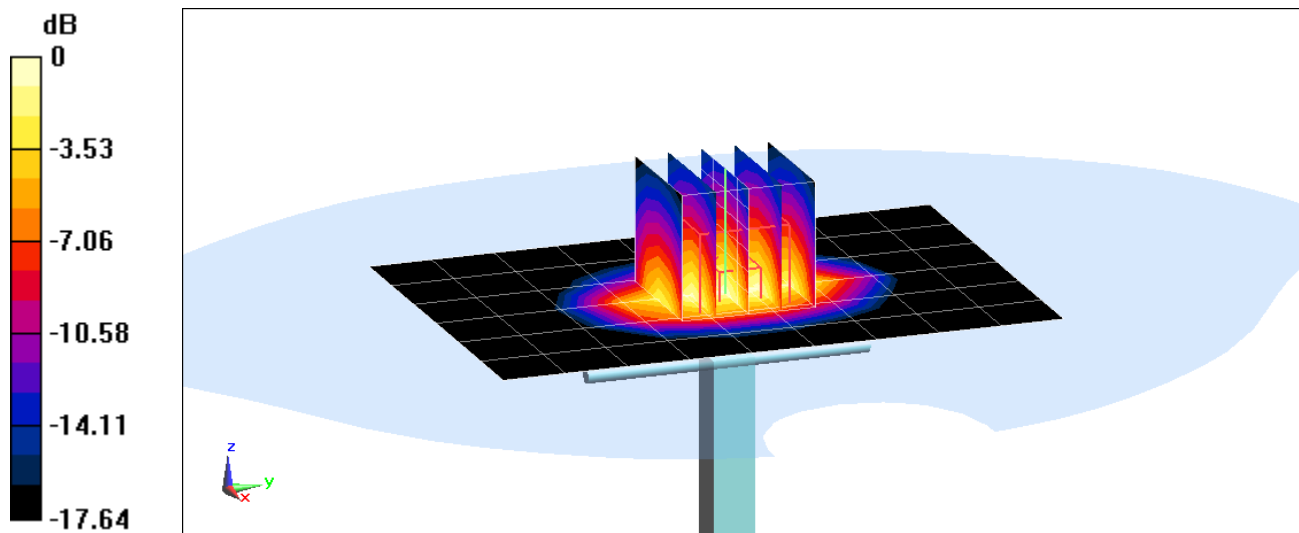
Area Scan (7x10x1): Measurement grid: dx=15mm, dy=15mm

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

Peak SAR (extrapolated) = 7.34 W/kg

SAR(1 g) = 4.11 W/kg

Deviation(1 g) = 2.75%



0 dB = 5.20 W/kg = 7.16 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

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

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

Medium: 2450 Body; Medium parameters used:

$f = 2450 \text{ MHz}$; $\sigma = 2.035 \text{ S/m}$; $\epsilon_r = 51.219$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space = 1.0 cm

Test Date: 08-07-2015; Ambient Temp: 22.1°C; Tissue Temp: 21.9°C

Probe: ES3DV3 - SN3332; ConvF(4.31, 4.31, 4.31); Calibrated: 9/18/2014;

Sensor-Surface: 3mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1323; Calibrated: 9/17/2014

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

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

2450 MHz System Verification at 20.0 dBm (100 mW)

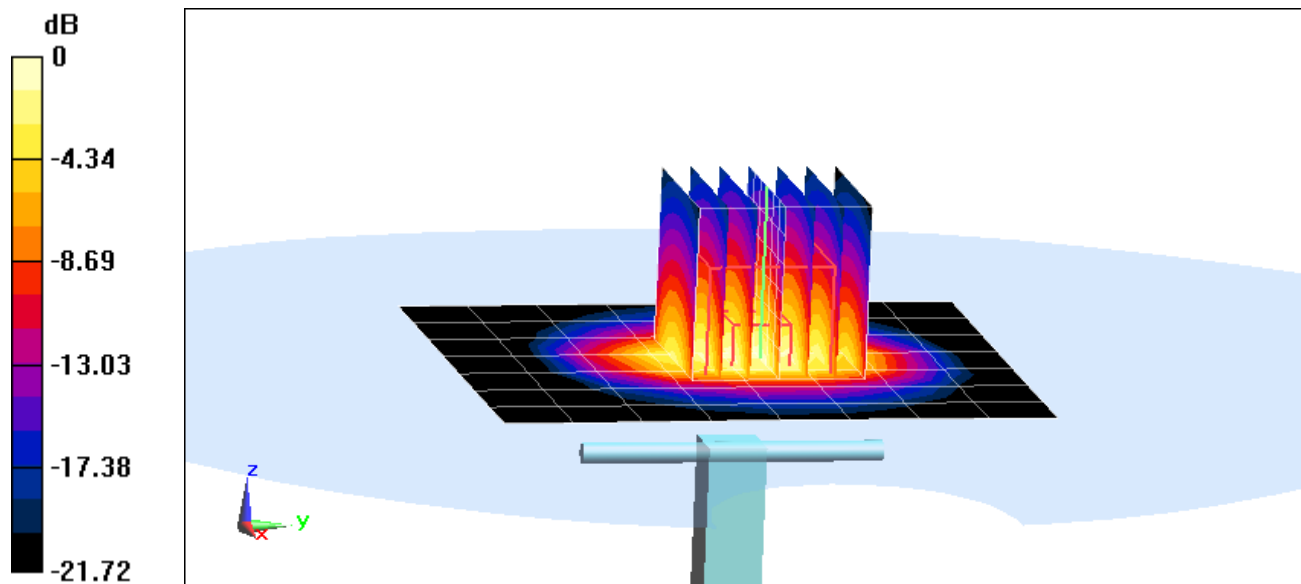
Area Scan (8x9x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$

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

Peak SAR (extrapolated) = 10.3 W/kg

SAR(1 g) = 4.97 W/kg

Deviation (1g) = -4.05%



0 dB = $6.57 \text{ W/kg} = 8.18 \text{ dBW/kg}$

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5300 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body; Medium parameters used:

$f = 5300 \text{ MHz}$; $\sigma = 5.436 \text{ S/m}$; $\epsilon_r = 46.955$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space = 1.0 cm

Test Date: 08-03-2015; Ambient Temp: 24.5°C; Tissue Temp: 23.4°C

Probe: EX3DV4 - SN3914; ConvF(4.33, 4.33, 4.33); Calibrated: 2/10/2015;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 10/31/2014

Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357

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

5300 MHz System Verification at 17.0 dBm (50 mW)

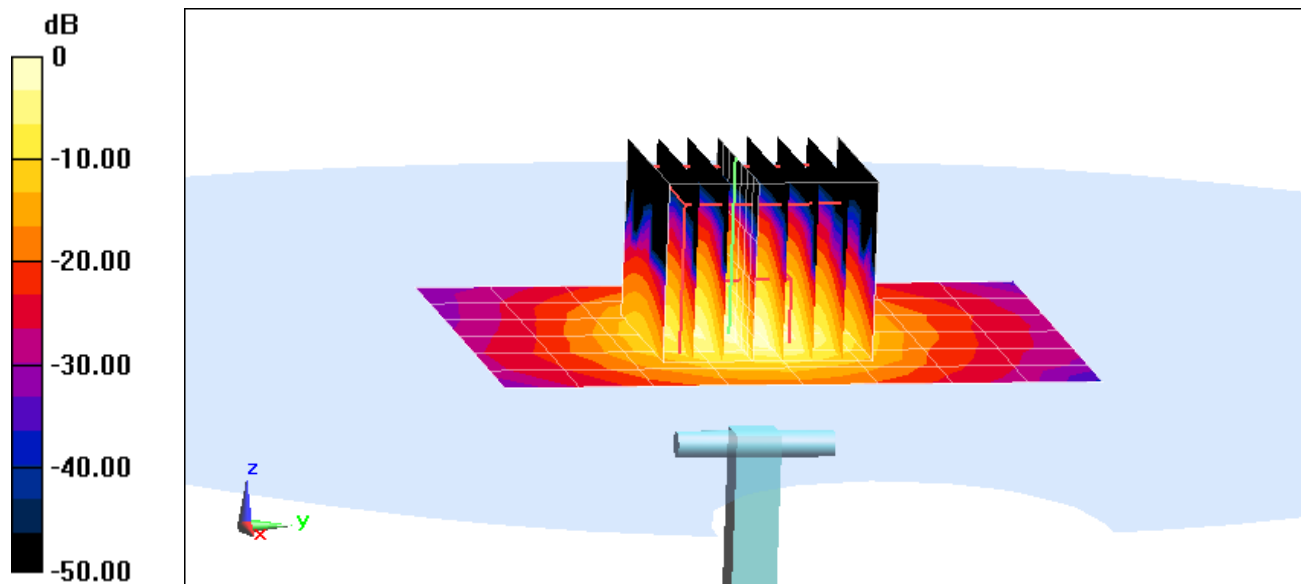
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

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

Peak SAR (extrapolated) = 17.3 W/kg

SAR(1 g) = 4.14 W/kg

Deviation (1g) = 3.63 %



0 dB = 10.2 W/kg = 10.09 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5500 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body; Medium parameters used:

$f = 5500 \text{ MHz}$; $\sigma = 5.672 \text{ S/m}$; $\epsilon_r = 46.417$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space = 1.0 cm

Test Date: 08-03-2015; Ambient Temp: 24.5°C; Tissue Temp: 23.4°C

Probe: EX3DV4 - SN3914; ConvF(3.91, 3.91, 3.91); Calibrated: 2/10/2015;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 10/31/2014

Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357

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

5500 MHz System Verification at 17.0 dBm (50 mW)

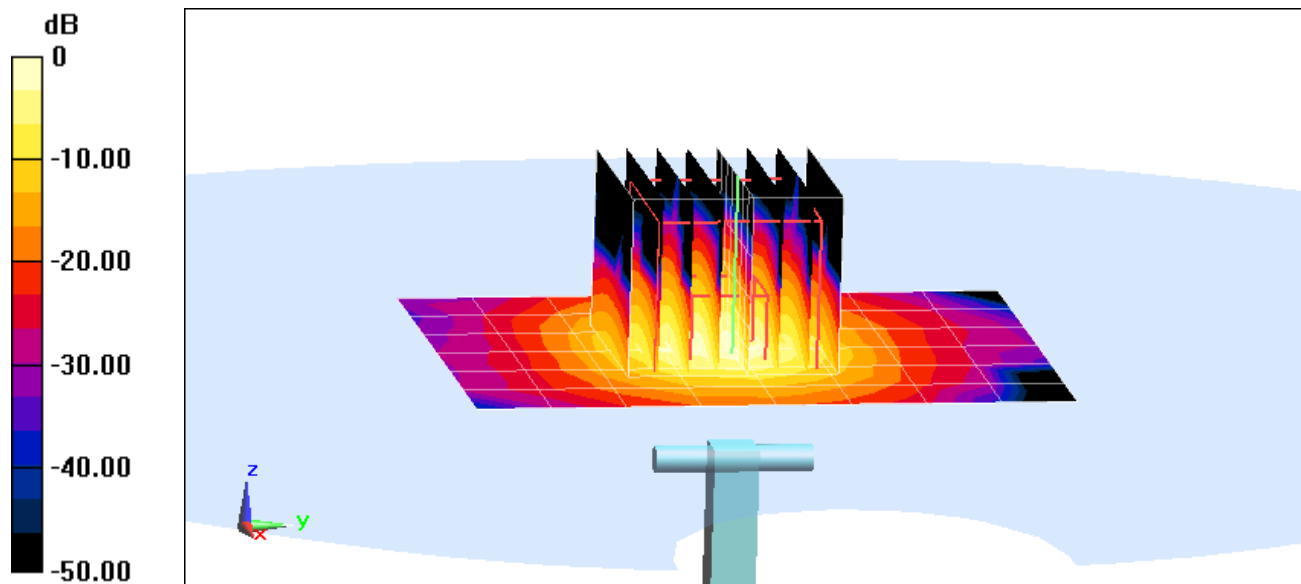
Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

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

Peak SAR (extrapolated) = 18.5 W/kg

SAR(1 g) = 4.33 W/kg

Deviation (1g) = 4.21 %



PCTEST ENGINEERING LABORATORY, INC.

DUT: SAR Dipole 5 GHz; Type: D5GHzV2; Serial: 1191

Communication System: UID 0, CW; Frequency: 5800 MHz; Duty Cycle: 1:1

Medium: 5 GHz Body; Medium parameters used:

$f = 5800 \text{ MHz}$; $\sigma = 6.109 \text{ S/m}$; $\epsilon_r = 46.184$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section; Space = 1.0 cm

Test Date: 08-03-2015; Ambient Temp: 24.5°C; Tissue Temp: 23.4°C

Probe: EX3DV4 - SN3914; ConvF(4.01, 4.01, 4.01); Calibrated: 2/10/2015;

Sensor-Surface: 1.4mm (Mechanical Surface Detection)

Electronics: DAE4 Sn1333; Calibrated: 10/31/2014

Phantom: SAM Sub ; Type: QD000P40CC; Serial: TP:1357

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

5800 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x9x1): Measurement grid: dx=10mm, dy=10mm

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

Peak SAR (extrapolated) = 17.9 W/kg

SAR(1 g) = 4.05 W/kg

Deviation (1g) = 3.85 %

