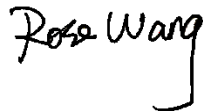


# FCC SAR Test Report

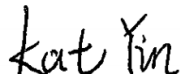
**APPLICANT** : Xiaomi Communications Co., Ltd.  
**EQUIPMENT** : Mobile Phone  
**BRAND NAME** : Redmi  
**MODEL NAME** : M1906G7G  
**FCC ID** : 2AFZZG7G  
**STANDARD** : FCC 47 CFR PART 2 (2.1093)  
ANSI/IEEE C95.1-1992  
IEEE 1528-2013

The product was received on Jun. 10, 2019 and testing was started from Jul. 29, 2019 and completed on Sep. 17, 2019. We, Sporton International (Kunshan) Inc., would like to declare that the tested sample has been evaluated in accordance with the test procedures and has been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Kunshan) Inc., the test report shall not be reproduced except in full.



Reviewed by: Rose Wang / Supervisor



Approved by: Kat Yin / Manager



**Sporton International (Kunshan) Inc.**  
No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300  
People's Republic of China



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**1. Statement of Compliance**

The maximum results of Specific Absorption Rate (SAR) found during testing for **Xiaomi Communications Co., Ltd., Mobile Phone, M1906G7G**, are as follows.

Highest Standalone 1g SAR Summary						Highest Simultaneous Transmission 1g SAR (W/kg)
Equipment Class	Frequency Band		Head (Separation 0mm)	Hotspot (Separation 10mm)	Body-worn (Separation 15mm)	
			1g SAR (W/kg)			
Licensed	GSM	GSM850	1.15	0.48	0.24	1.59
		GSM1900	0.71	1.16	0.48	
	WCDMA	Band II	1.15	1.18	0.79	
		Band IV	1.10	1.09	0.46	
		Band V	0.96	0.35	0.17	
	LTE	LTE Band 2	1.07	1.06	0.56	
		LTE Band 4	0.94	1.18	0.37	
		LTE Band 5	0.82	0.26	0.15	
		LTE Band 7	0.90	1.16	0.44	
		LTE Band 38	0.97	0.57	0.27	
DTS	WLAN	2.4GHz WLAN	0.73	0.26	<0.10	1.59
NII		5GHz WLAN	0.86	0.99	0.65	1.59
DSS	Bluetooth	Bluetooth	<0.10	<0.10	<0.10	1.59
Date of Testing			2019/7/29~2019/9/17			

Highest 10g SAR Summary				
Equipment Class	Frequency Band		Product Specific 10g SAR (W/kg) (Separation 0mm)	Highest Simultaneous Transmission 10g SAR (W/kg)
Licensed	GSM	GSM1900	3.35	3.45
	WCDMA	Band II	<b>3.45</b>	
	LTE	LTE Band 2	2.75	
NII	WLAN	5GHz WLAN	1.81	3.45
Date of Testing			2019/7/29~2019/9/17	

**Declaration of Conformity:**

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

**Comments and Explanations:**

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR, 4.0 W/kg for Product Specific 10g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.



### 2. Administration Data

Sporton International (Kunshan) Inc. is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.02.

Testing Laboratory		
Test Firm	Sporton International (Kunshan) Inc.	
Test Site Location	No. 1098, Pengxi North Road, Kunshan Economic Development Zone Jiangsu Province 215300 People's Republic of China TEL : +86-512-57900158 FAX : +86-512-57900958	
Test Site No.	FCC Designation No.	FCC Test Firm Registration No.
	CN1257	314309

Applicant	
Company Name	Xiaomi Communications Co., Ltd.
Address	The Rainbow City of China Resources,NO.68,Qinghe Middle Street,Haidian District,Beijing,China

Manufacturer	
Company Name	Xiaomi Communications Co., Ltd.
Address	The Rainbow City of China Resources,NO.68,Qinghe Middle Street,Haidian District,Beijing,China

### 3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02
- 
-



### 4. Equipment Under Test (EUT) Information

#### 4.1 General Information

Product Feature & Specification			
Equipment Name	Mobile Phone		
Brand Name	Redmi		
Model Name	M1906G7G		
FCC ID	2AFZZG7G		
IMEI Code	SIM1: 866498040017658 SIM2: 866498040017666		
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5805 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz		
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink) LTE: QPSK, 16QAM, 64QAM,256QAM(Downlink only) WLAN 2.4GHz : 802.11b/g/n/ HT20 WLAN 5GHz : 802.11a/n/ac HT20/HT40/VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE NFC:ASK		
HW Version	P2.2		
SW Version	MIUI10		
Antenna Function for Transmitter		Ant. 1	Ant. 2
	Bluetooth	V	V
	WLAN 2.4GHz 802.11 b/g/n SISO	V	V
	WLAN 5GHz 802.11 a/n/ac SISO	V	V
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network		
EUT Stage	Identical Prototype		
Remark:	<ol style="list-style-type: none"> <li>802.11n-HT40 is not supported in 2.4GHz WLAN.</li> <li>This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.</li> <li>This device does not support DTM operation and support GRPS/EGRPS mode up to multi-slot class 12.</li> <li>This device WLAN 2.4GHz supports hotspot operation and Bluetooth support tethering applications.</li> <li>This device 2.4GHz WLAN/5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).</li> <li>For dual SIM card mobile has two SIM slots and supports dual SIM dual standby. The WWAN radio transmission will</li> </ol>		

- be enabled by either one SIM at a time (single active). After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose SIM1 slot to perform all tests.
7. This device has two WWAN transmit antennas. WWAN bottom antenna is located at the bottom edge of the device, and WWAN top antenna is located at the top edge of the device which can refer to antenna location chapter. Top and Bottom antenna support the same WWAN frequency bands, and they can't transmit simultaneously.
  8. For top WWAN antenna:
    - a. When the phone is in talking mode and receiver worked, then power reduction will be implemented immediately in GSM850 and LTE B7/38/7C /38C.
    - b. When hotspot mode is enabled, power reduction will be activated to GSM850 and LTE B7/38/7C /38C. For GSM850 and LTE B7/38/7C /38C full power for hotspot mode can perform pass, no need to test reduced power.
  9. For bottom WWAN antenna:
    - a. The device employs proximity sensors that detect the presence of the user's body at the back or bottom faces of the device. When back or bottom of handheld state is detected, GSM1900, WCDMA B2/B4 and LTE B2/B4 for back/bottom sides of product specific 10g SAR condition reduced powers will be active for handheld state.
    - b. When hotspot mode is enabled, power reduction will be activated to GSM1900, WCDMA band II/IV, LTE band 2/4.
  10. For WLAN antenna
    - a. For WLAN 2.4GHz/5.2/5.3/5.5GHz Ant1, When the phone is in talking mode, receiver worked and it transmits simultaneously with WWAN or Bluetooth for head mode, power reduction will be triggered for this scenario.
    - b. When hotspot mode is enabled, power reduction will be activated to WLAN2.4GHz/5.2GHz.
  11. The 2.4GHz/5GHz WLAN & Bluetooth can transmit in SISO antenna mode only and they have no MIMO antenna mode.
  12. There are two types of EUT (Sample 1 and Sample 2). According to the difference, they have no effect on SAR distribution, so only choose sample 1 to perform full testing.



**4.2 General LTE SAR Test and Reporting Considerations**

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																															
FCC ID	2AFZZG7G																																																														
Equipment Name	Mobile Phone																																																														
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz																																																														
Channel Bandwidth	LTE Band 2: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 4: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz																																																														
Uplink Modulations used	QPSK / 16QAM / 64QAM / 256QAM(Downlink only)																																																														
LTE Voice / Data requirements	Voice and Data																																																														
LTE Release Version	R12, Cat 13																																																														
CA Support	Yes, Uplink and Downlink																																																														
LTE MPR permanently built-in by design	<p><b>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (N<sub>RB</sub>)</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>&gt; 5</td> <td>&gt; 4</td> <td>&gt; 8</td> <td>&gt; 12</td> <td>&gt; 16</td> <td>&gt; 18</td> <td>≤ 3</td> </tr> <tr> <td>256 QAM</td> <td colspan="6">≥ 1</td> <td>≤ 5</td> </tr> </tbody> </table>	Modulation	Channel bandwidth / Transmission bandwidth (N <sub>RB</sub> )						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2	64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3	256 QAM	≥ 1						≤ 5
Modulation	Channel bandwidth / Transmission bandwidth (N <sub>RB</sub> )						MPR (dB)																																																								
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz																																																									
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64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3																																																								
256 QAM	≥ 1						≤ 5																																																								
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)																																																														
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																																														
Power reduction applied to satisfy SAR compliance	Yes, For top WWAN antenna: When the phone is in talking mode and receiver worked, then power reduction will be implemented immediately for LTE B7/38/7C /38C. For bottom WWAN antenna: a. P-sensor can detect handheld state, LTE B2/B4 for back/bottom sides of product specific 10g SAR condition reduced powers will be active. b. When hotspot mode is enabled, power reduction will be activated to LTE band 2/4.																																																														
LTE Carrier Aggregation Combinations	Intra-Band possible combinations, the detail power verification please referred to section 13. SAR verified ,please referred to section 15																																																														
LTE Carrier Aggregation Additional Information	(1) This device supports LTE Carrier Aggregation (CA) in the uplink for LTE 7C / 38C with two component carriers in the uplink. SAR Measurements and conducted powers were evaluated per FCC Guidance. (2) This device supports maximum of 2 carriers in the downlink and 2 carriers in the uplink. Additional following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.																																																														

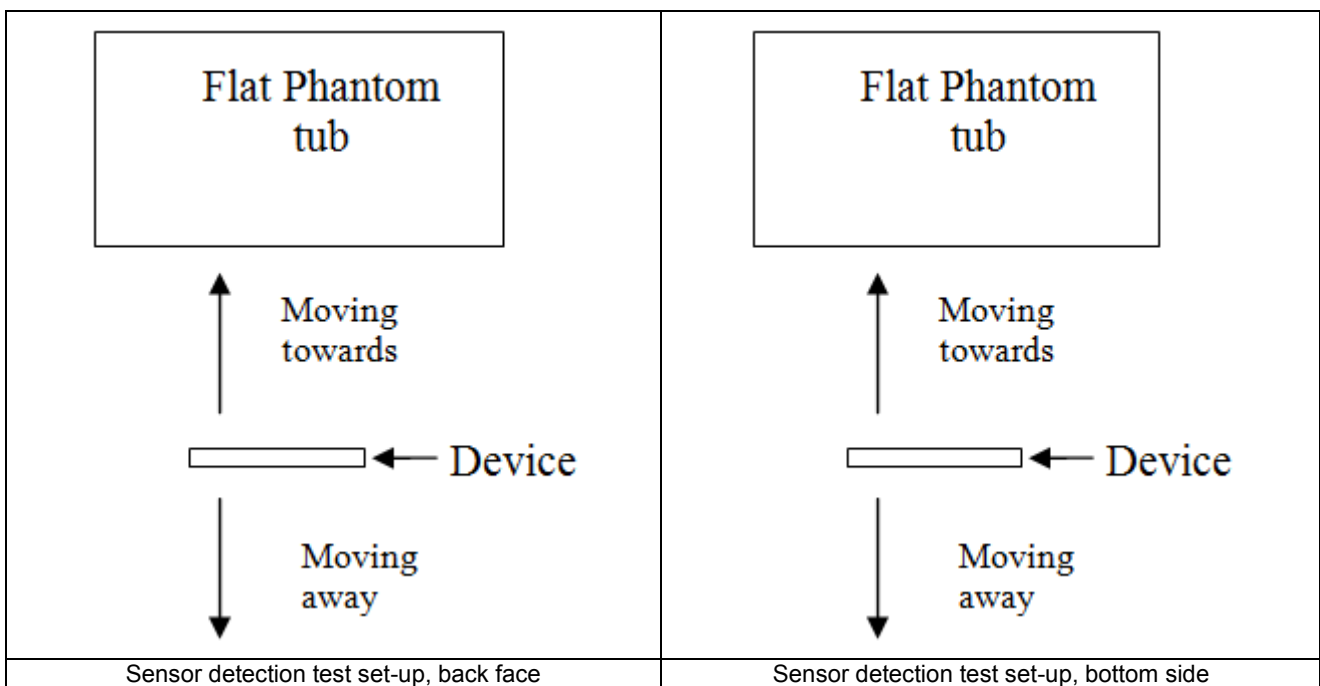


Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 4												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745
LTE Band 5												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829				
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5				
H	20643	848.3	20635	847.5	20625	846.5	20600	844				
LTE Band 7												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510				
M	21100	2535	21100	2535	21100	2535	21100	2535				
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560				
LTE Band 38												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580				
M	38000	2595	38000	2595	38000	2595	38000	2595				
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610				

## 5. Proximity Sensor Triggering Test

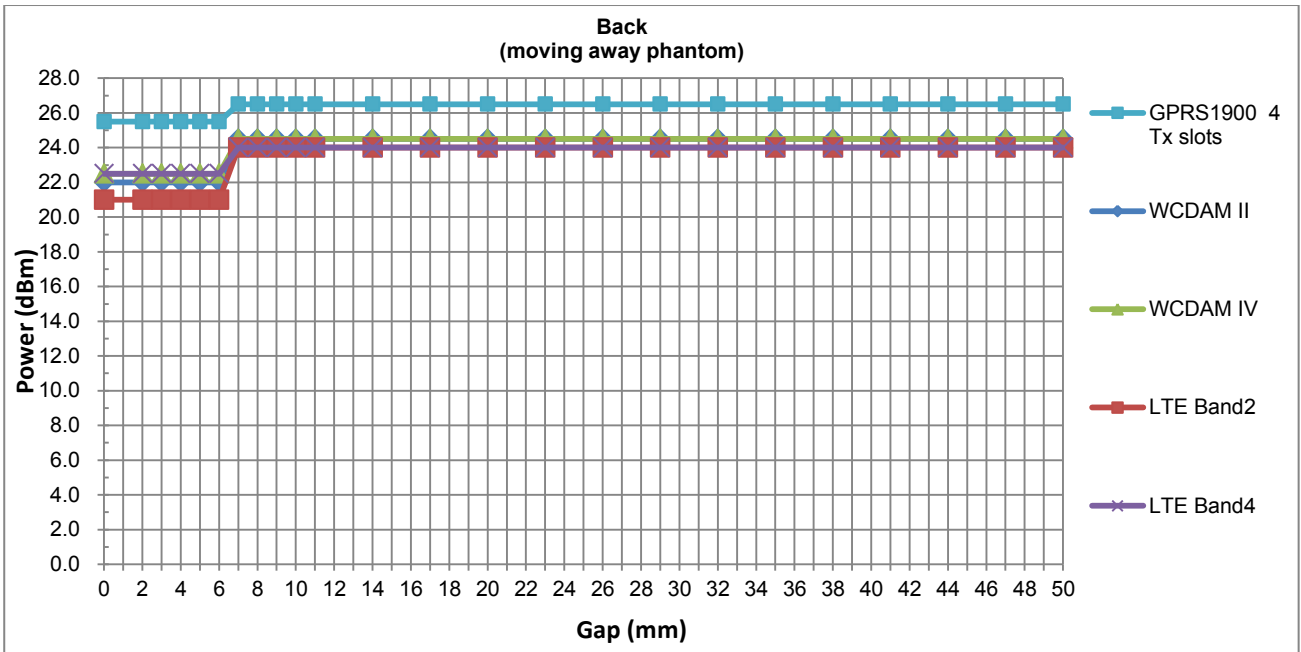
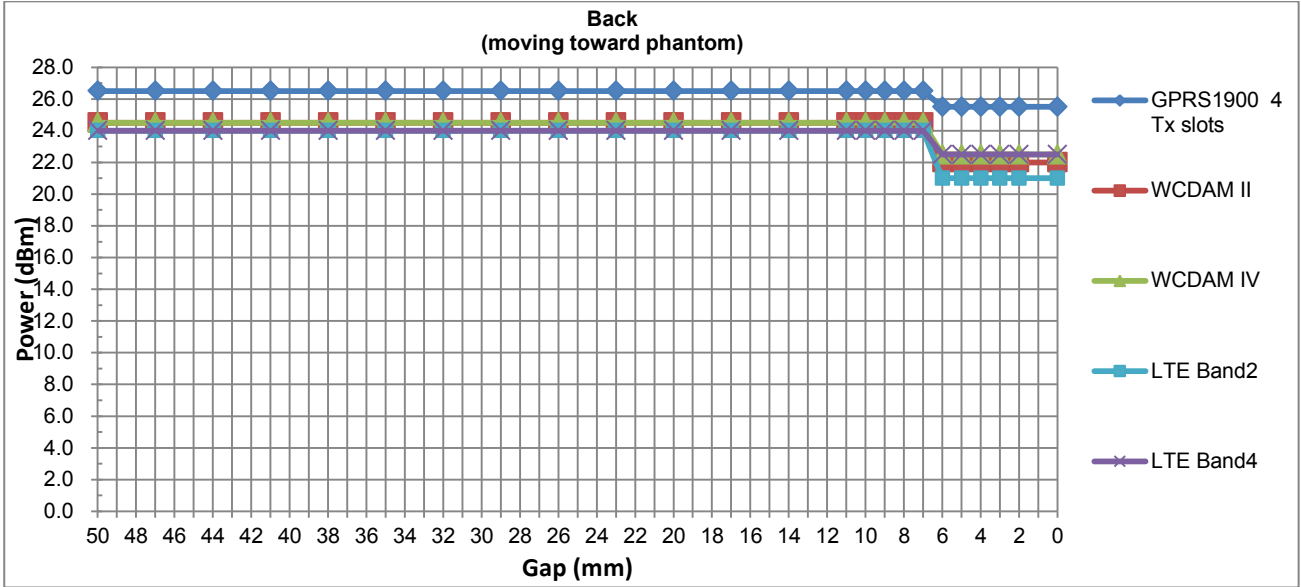
### 5.1 Proximity sensor triggering distances(Per KDB616217§6.2)

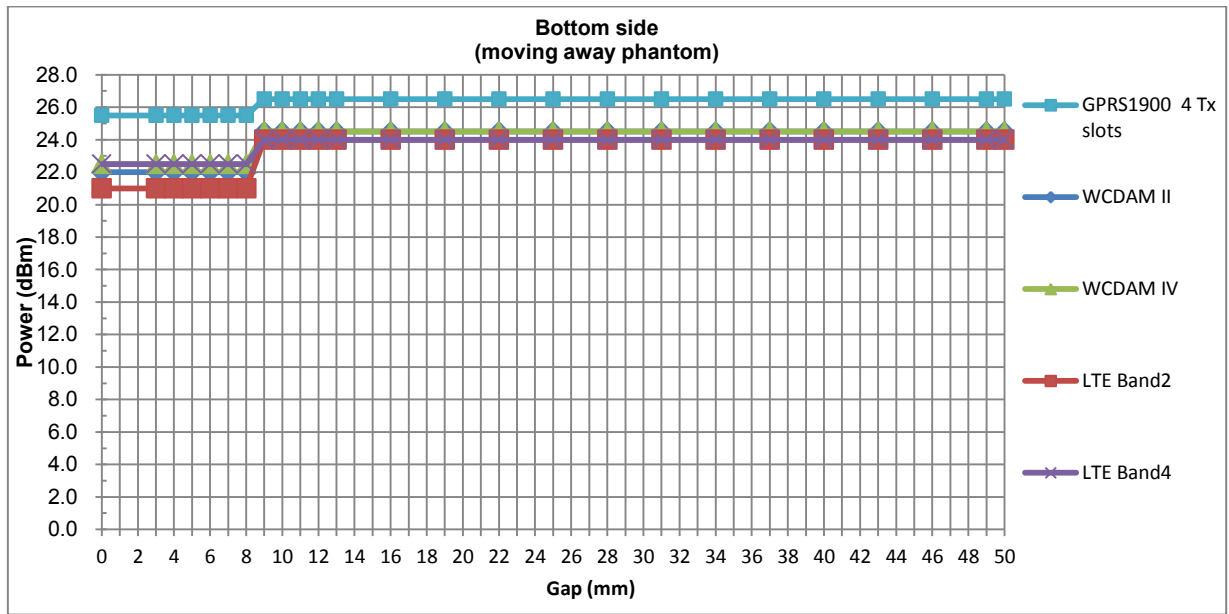
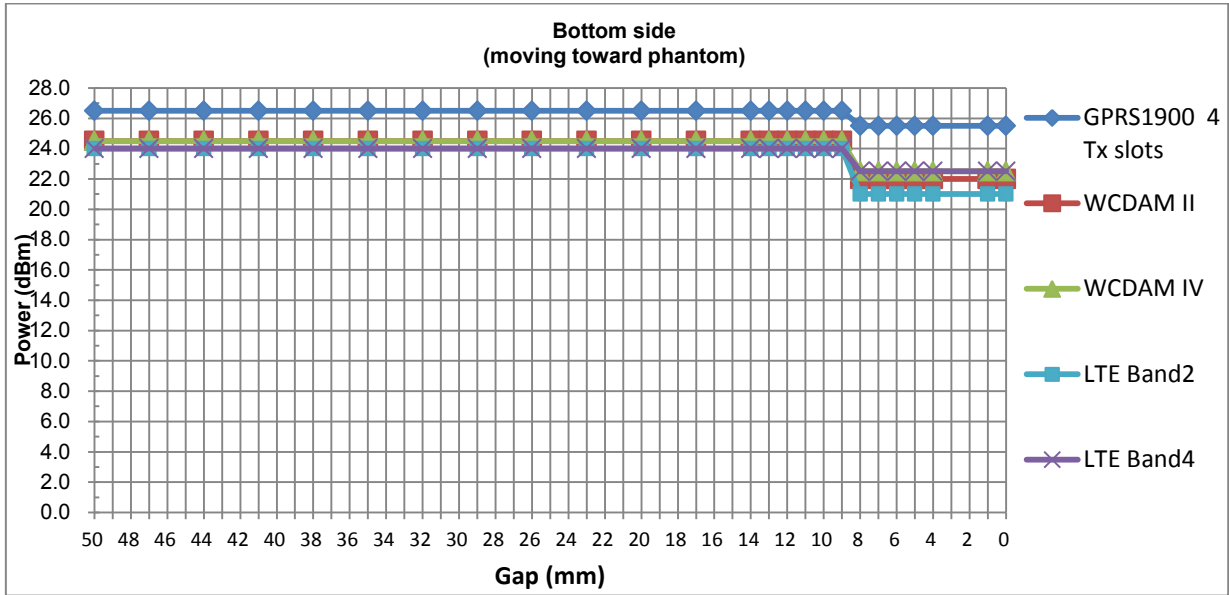
1. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed and the tissue-equivalent medium for highest frequency (1900MHz) and lowest (1750MHz) frequency was used for proximity sensor triggering testing.
2. Capacitive proximity sensor placed coincident with antenna elements at the bottom end of the phone are utilized to determine when the device comes in proximity of the user's body at the back or bottom side surface of the device. There is no need to do sensor coverage testing for the proximity sensor is designed to support sufficient detection range and sensitivity to cover regions of the sensors in all applicable directions since the proximity sensor entirely covers the antenna.
3. When the sensor is active, GSM900, WCDMA B2 / B4, and LTE B2 / B4 reduced power will be active.
4. The sensors used to detect the proximity of the user's finger or hand at the back or bottom side surface of the device use a detection threshold distance. The data shown in the sections below shows the distance(s).



Proximity Sensor Triggering Distance (mm)				
Position	Back		Bottom Side	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	6	6	8	8

<Sensor Trigger Distance and Measured Power>

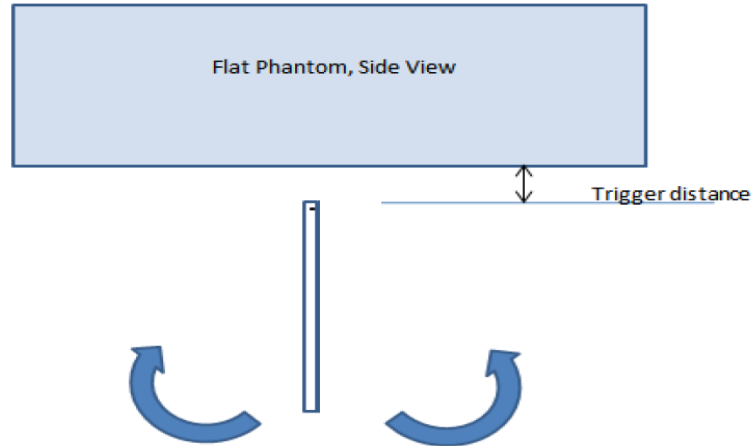




**5.2 Tilt angle influences to proximity sensor triggering(Per KDB616217 §6.4)**

The DUT was positioned directly below the flat phantom at the minimum measured trigger distance with bottom side parallel to the base of the flat phantom for each band.

The EUT was rotated about bottom side for angles up to +/- 45°. If the output power increased during the rotation the DUT was moved 1mm toward the phantom and the rotation repeated. This procedure was repeated until the power remained reduced for all angles up to +/- 45°.



**Proximity Sensor Coverage Assesment(Bottom Side)**

**Table: Summary of Tablet Tilt Angle Influence to Proximity Sensor Triggering (Bottom Side)**

Main ant Band(MHz)	Minimum trigger distance at which power reduction was maintained over ±45°	Power Reduction Status											
		-45°	-35°	-25°	-15°	-5°	0°	5°	15°	25°	35°	45°	
GSM1900	8mm	on	on	on	on	on	on	on	on	on	on	on	on
WCDMA Band II	8mm	on	on	on	on	on	on	on	on	on	on	on	on
WCDMA Band IV	8mm	on	on	on	on	on	on	on	on	on	on	on	on
LTE Band 2	8mm	on	on	on	on	on	on	on	on	on	on	on	on
LTE Band 4	8mm	on	on	on	on	on	on	on	on	on	on	on	on

**Conclusion:** As is shown from the validation data, it can be ensured that the proximity sensor can be valid triggered for the DUT tilt coverage exposure condition.

**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. The 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.

**Limits for Occupational/Controlled Exposure (W/kg)**

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

**Limits for General Population/Uncontrolled Exposure (W/kg)**

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

## **7. Specific Absorption Rate (SAR)**

### **7.1 Introduction**

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

### **7.2 SAR Definition**

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density ( $\rho$ ). The equation description is as below:

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

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

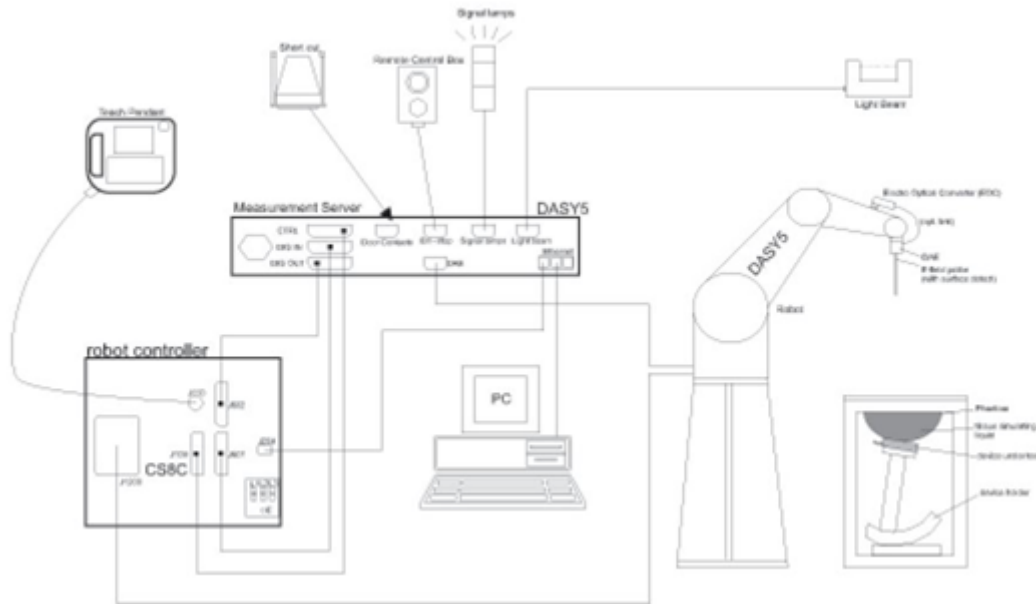
$$SAR = \frac{\sigma |E|^2}{\rho}$$

Where:  $\sigma$  is the conductivity of the tissue,  $\rho$  is the mass density of the tissue and E is the RMS electrical field strength.



## 8. System Description and Setup

The DASY system used for performing compliance tests consists of the following items:




- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

### 8.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG). The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

#### <EX3DV4 Probe>

<b>Construction</b>	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
<b>Frequency</b>	10 MHz – >6 GHz Linearity: $\pm 0.2$ dB (30 MHz – 6 GHz)	
<b>Directivity</b>	$\pm 0.3$ dB in TSL (rotation around probe axis) $\pm 0.5$ dB in TSL (rotation normal to probe axis)	
<b>Dynamic Range</b>	10 $\mu$ W/g – >100 mW/g Linearity: $\pm 0.2$ dB (noise: typically <1 $\mu$ W/g)	
<b>Dimensions</b>	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

### 8.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Photo of DAE

**8.3 Phantom**

**<SAM Twin Phantom>**

<b>Shell Thickness</b>	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
<b>Filling Volume</b>	Approx. 25 liters
<b>Dimensions</b>	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
<b>Measurement Areas</b>	Left Hand, Right Hand, Flat Phantom



The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

**<ELI Phantom>**

<b>Shell Thickness</b>	2 ± 0.2 mm (sagging: <1%)
<b>Filling Volume</b>	Approx. 30 liters
<b>Dimensions</b>	Major ellipse axis: 600 mm Minor axis: 400 mm



The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

## 8.4 Device Holder

### <Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.



Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

### <Mounting Device for Laptops and other Body-Worn Transmitters>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.



Mounting Device for Laptops

## 9. Measurement Procedures

The measurement procedures are as follows:

### <Conducted power measurement>

- (a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- (b) Read the WWAN RF power level from the base station simulator.
- (c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
- (d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

### <SAR measurement>

- (a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
- (b) Place the EUT in the positions as Appendix D demonstrates.
- (c) Set scan area, grid size and other setting on the DASY software.
- (d) Measure SAR results for the highest power channel on each testing position.
- (e) Find out the largest SAR result on these testing positions of each band
- (f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

### 9.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

**9.2 Power Reference Measurement**

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

**9.3 Area Scan**

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: $\Delta x_{Area}$ , $\Delta y_{Area}$	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

### 9.4 Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

		≤ 3 GHz	> 3 GHz	
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$		$\leq 2$ GHz: $\leq 8$ mm 2 – 3 GHz: $\leq 5$ mm*	3 – 4 GHz: $\leq 5$ mm* 4 – 6 GHz: $\leq 4$ mm*	
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	$\leq 5$ mm	3 – 4 GHz: $\leq 4$ mm 4 – 5 GHz: $\leq 3$ mm 5 – 6 GHz: $\leq 2$ mm	
	graded grid	$\Delta z_{Zoom}(1)$ : between 1 <sup>st</sup> two points closest to phantom surface	$\leq 4$ mm	3 – 4 GHz: $\leq 3$ mm 4 – 5 GHz: $\leq 2.5$ mm 5 – 6 GHz: $\leq 2$ mm
		$\Delta z_{Zoom}(n>1)$ : between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z	$\geq 30$ mm	3 – 4 GHz: $\geq 28$ mm 4 – 5 GHz: $\geq 25$ mm 5 – 6 GHz: $\geq 22$ mm	
Note: $\delta$ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 447498 is $\leq 1.4$ W/kg, $\leq 8$ mm, $\leq 7$ mm and $\leq 5$ mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

### 9.5 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

### 9.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.



**10. Test Equipment List**

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d151	2019/3/27	2020/3/26
SPEAG	1750MHz System Validation Kit	D1750V2	1090	2019/3/27	2020/3/26
SPEAG	1900MHz System Validation Kit	D1900V2	5d170	2019/3/26	2020/3/25
SPEAG	2450MHz System Validation Kit	D2450V2	908	2019/3/25	2020/3/24
SPEAG	2600MHz System Validation Kit	D2600V2	1061	2018/12/7	2019/12/6
SPEAG	5000MHz System Validation Kit	D5GHzV2	1006	2018/9/27	2019/9/26
SPEAG	Data Acquisition Electronics	DAE4	1338	2018/12/3	2019/12/2
SPEAG	Dosimetric E-Field Probe	EX3DV4	3857	2019/5/27	2020/5/26
SPEAG	SAM Twin Phantom	QD 000 P40 CB	TP-1754	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio Communication Analyzer	MT8821C	6201432831	2019/4/17	2020/4/16
Agilent	Wireless Communication Test Set	E5515C	MY52102706	2019/4/17	2020/4/16
Agilent	ENA Series Network Analyzer	E5071C	MY46111157	2019/4/17	2020/4/16
SPEAG	Dielectric Probe Kit	DAK-3.5	1138	2018/11/20	2019/11/19
Anritsu	Vector Signal Generator	MG3710A	6201682672	2019/1/14	2020/1/13
R&S	Power Meter	NRVD	102081	2018/8/20	2019/8/19
R&S	Power Sensor	NRV-Z5	100538	2018/8/20	2019/8/19
R&S	Power Sensor	NRV-Z5	100539	2018/8/20	2019/8/19
R&S	Power Meter	NRVD	102081	2019/8/19	2020/8/18
R&S	Power Sensor	NRV-Z5	100538	2019/8/19	2020/8/18
R&S	Power Sensor	NRV-Z5	100539	2019/8/19	2020/8/18
R&S	CBT BLUETOOTH TESTER	CBT	101641	2019/1/14	2020/1/13
EXA	Spectrum Analyzer	FSV7	101631	2019/1/14	2020/1/13
Testo	Hygrometer	608-H1	1241332126	2018/8/21	2019/8/20
Testo	Hygrometer	608-H1	1241332126	2019/8/20	2020/8/19
FLUKE	DIGITAC THERMOMETER	51II	97240029	2018/8/8	2019/8/7
FLUKE	DIGITAC THERMOMETER	51II	97240029	2019/8/7	2020/8/6
ARRA	Power Divider	A3200-2	N/A	Note	
MCL	Attenuation1	BW-S10W5+	N/A	Note	
MCL	Attenuation2	BW-S10W5+	N/A	Note	
MCL	Attenuation3	BW-S10W5+	N/A	Note	
BONN	POWER AMPLIFIER	BLMA 0830-3	087193A	Note	
BONN	POWER AMPLIFIER	BLMA 2060-2	087193B	Note	
Agilent	Dual Directional Coupler	778D	20500	Note	
Agilent	Dual Directional Coupler	11691D	MY48151020	Note	

**Note:**

Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.



## 11. System Verification

### 11.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.2.

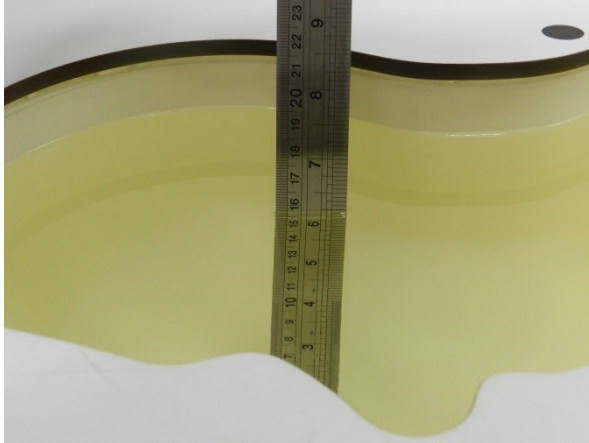


Fig 11.1.1 Photo of Liquid Height for Head SAR



Fig 11.1.2 Photo of Liquid Height for Body SAR

### 11.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )
For Head								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0

#### Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

#### <Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )	Conductivity Target ( $\sigma$ )	Permittivity Target ( $\epsilon_r$ )	Delta ( $\sigma$ ) (%)	Delta ( $\epsilon_r$ ) (%)	Limit (%)	Date
835	Head	22.6	0.939	41.947	0.90	41.50	4.33	1.08	±5	2019/8/5
1750	Head	22.8	1.413	39.151	1.37	40.10	3.14	-2.37	±5	2019/7/29
1900	Head	22.8	1.380	38.828	1.40	40.00	-1.43	-2.93	±5	2019/7/29
2450	Head	22.8	1.869	38.891	1.80	39.20	3.83	-0.79	±5	2019/8/10
2450	Head	22.8	1.860	40.274	1.80	39.20	3.33	2.74	±5	2019/9/17
2600	Head	22.9	2.039	39.681	1.96	39.00	4.03	1.75	±5	2019/8/13
5250	Head	22.7	4.555	34.767	4.71	35.90	-3.29	-3.16	±5	2019/8/15
5600	Head	22.7	4.896	34.293	5.07	35.50	-3.43	-3.40	±5	2019/8/15
5750	Head	22.5	5.048	34.062	5.22	35.40	-3.30	-3.78	±5	2019/8/17

**11.3 System Performance Check Results**

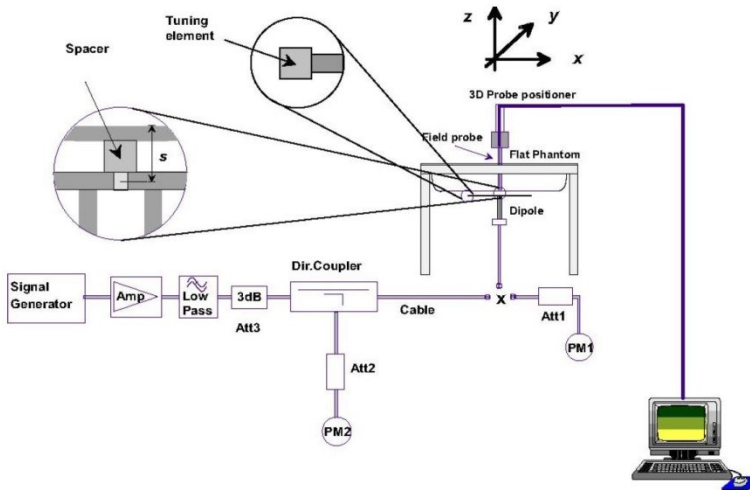
Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

**<1g SAR>**

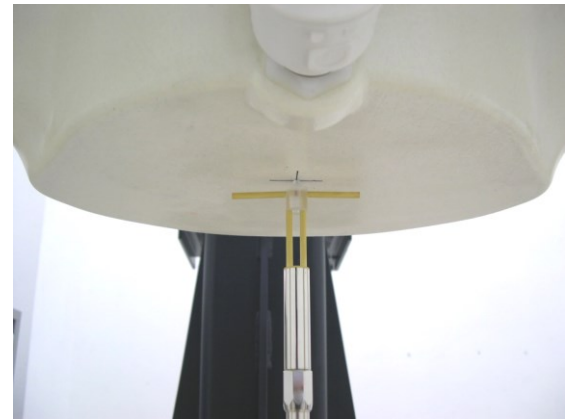
Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2019/8/5	835	Head	250	4d151	3857	1338	2.31	9.30	9.24	-0.65
2019/7/29	1750	Head	250	1090	3857	1338	9.80	36.40	39.2	7.69
2019/7/29	1900	Head	250	5d170	3857	1338	10.20	39.00	40.8	4.62
2019/8/10	2450	Head	250	908	3857	1338	14.20	52.80	56.8	7.58
2019/9/17	2450	Head	250	908	3857	1338	13.40	52.80	53.6	1.52
2019/8/13	2600	Head	250	1061	3857	1338	14.90	57.70	59.6	3.29
2019/8/15	5250	Head	100	1006	3857	1338	7.62	80.70	76.2	-5.58
2019/8/15	5600	Head	100	1006	3857	1338	7.77	83.30	77.7	-6.72
2019/8/17	5750	Head	100	1006	3857	1338	7.58	80.40	75.8	-5.72

**<10g SAR>**

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2019/7/29	1900	Head	250	5d170	3857	1338	5.49	20.30	21.96	8.18
2019/8/15	5250	Head	100	1006	3857	1338	2.24	23.20	22.4	-3.45
2019/8/15	5600	Head	100	1006	3857	1338	2.27	23.80	22.7	-4.62



**Fig 11.3.1 System Performance Check Setup**



**Fig 11.3.2 Setup Photo**

## 12. RF Exposure Positions

### 12.1 Ear and handset reference point

Figure 11.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 11.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 11.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 11.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

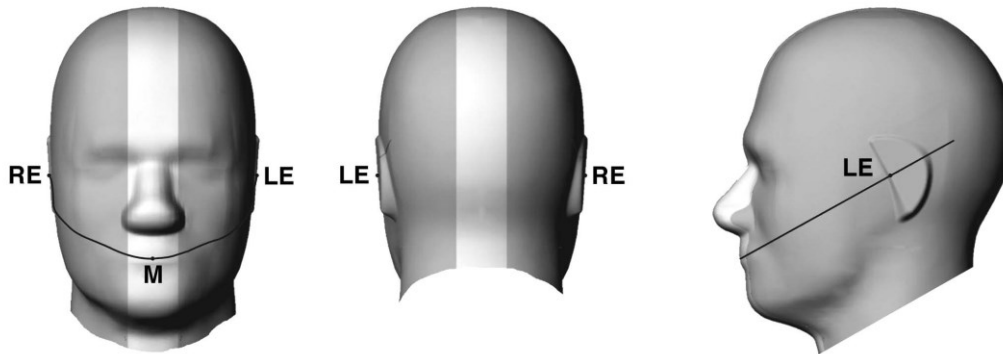


Fig 11.1.1 Front, back, and side views of SAM twin phantom

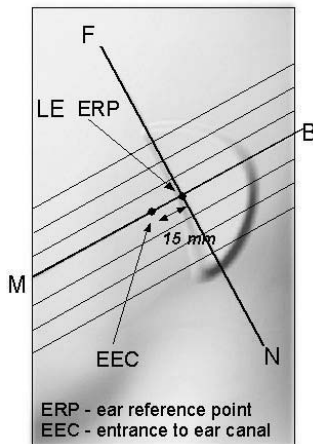


Fig 11.1.2 Close-up side view of phantom showing the ear region.

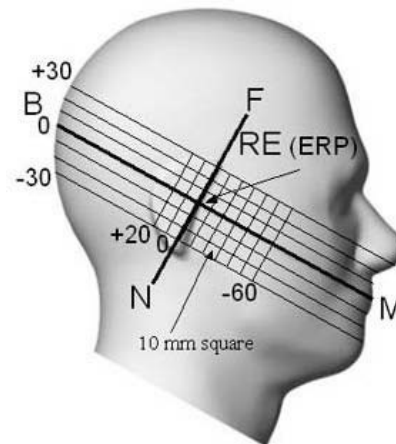


Fig 11.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

## 12.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width  $w_t$  of the handset at the level of the acoustic output (point A in Figure 11.2.1 and Figure 11.2.2), and the midpoint of the width  $w_b$  of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 11.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 11.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 11.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 11.2.3. The actual rotation angles should be documented in the test report.

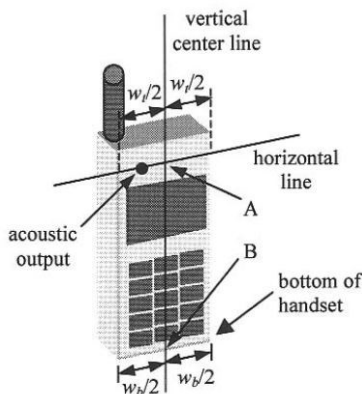


Fig 11.2.1 Handset vertical and horizontal reference lines—"fixed case"

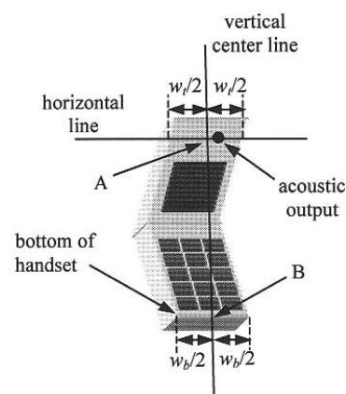


Fig 11.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

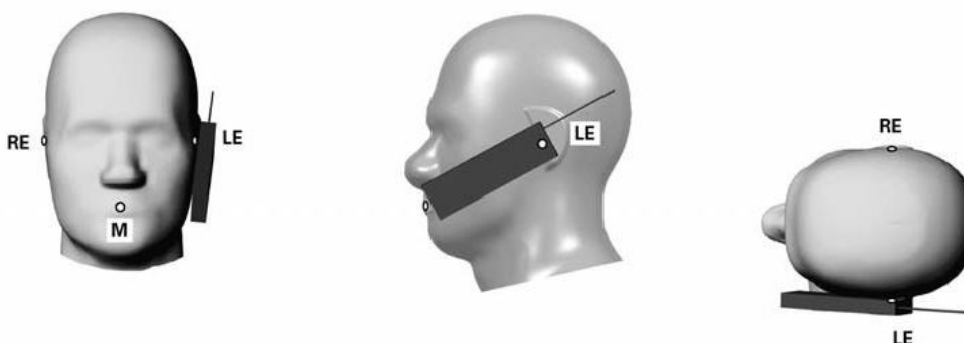


Fig 11.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

### 12.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 11.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

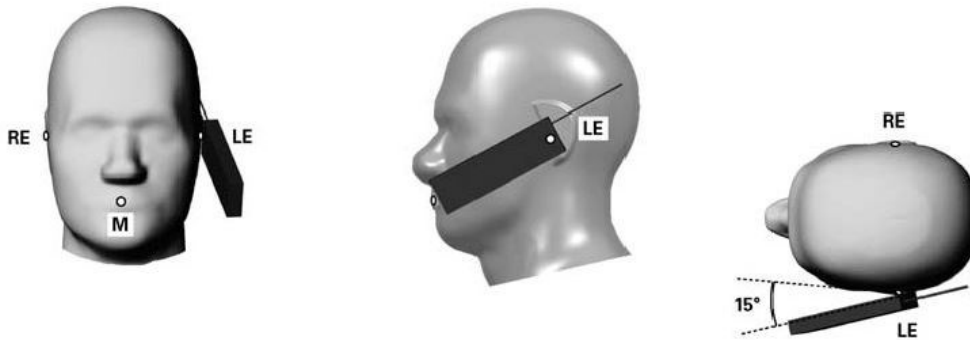


Fig 11.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

## 12.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 11.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is  $> 1.2 \text{ W/kg}$ , the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

Accessories for body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

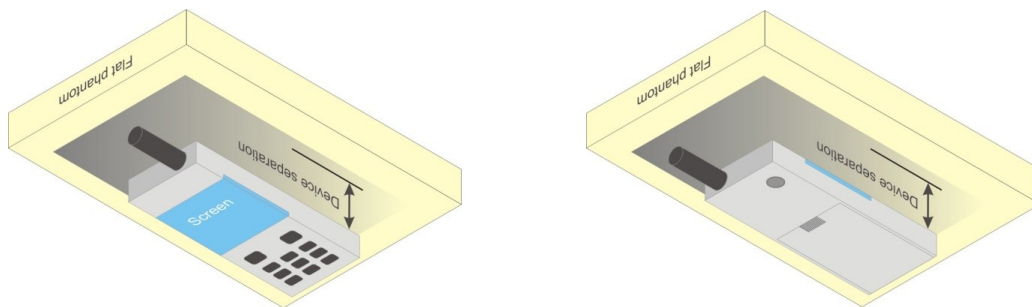


Fig 11.4 Body Worn Position



### **12.5 Product Specific 10g SAR Exposure**

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, According to KDB648474 D04v01r03, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.
2. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at  $\leq 25$  mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions.6 The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

### **12.6 Wireless Router**

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets (L x W  $\geq 9$  cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

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





### 13. Conducted RF Output Power (Unit: dBm)

#### <GSM Conducted Power>

**General Note:**

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS 4Tx slots for GSM850/GSM1900 are considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is  $\leq \frac{1}{4}$  dB higher than the primary mode, SAR measurement is not required for the secondary mode.

#### <WWAN Top/Bottom Antenna--Full Power Mode>

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	Tx Channel	128	189		251	128	189	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	31.97	31.85	31.84	33.00	22.97	22.85	22.84	24.00
GPRS 1 Tx slot	31.96	31.84	31.83	33.00	22.96	22.84	22.83	24.00
GPRS 2 Tx slots	31.49	31.37	31.35	32.00	25.49	25.37	25.35	26.00
GPRS 3 Tx slots	29.98	29.93	29.90	30.00	25.72	25.67	25.64	25.74
GPRS 4 Tx slots	28.97	28.84	28.78	29.00	25.97	25.84	25.78	26.00
EDGE 1 Tx slot	26.91	26.74	26.49	28.00	17.91	17.74	17.49	19.00
EDGE 2 Tx slots	25.61	25.62	25.43	27.00	19.61	19.62	19.43	21.00
EDGE 3 Tx slots	23.72	23.50	23.31	25.00	19.46	19.24	19.05	20.74
EDGE 4 Tx slots	22.23	22.13	22.17	24.00	19.23	19.13	19.17	21.00
GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
Tx Channel	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	29.87	29.99	30.03	30.50	20.87	20.99	21.03	21.50
GPRS 1 Tx slot	29.85	29.98	30.02	30.50	20.85	20.98	21.02	21.50
GPRS 2 Tx slots	29.13	29.33	29.35	29.50	23.13	23.33	23.35	23.50
GPRS 3 Tx slots	27.40	27.50	27.47	27.50	23.14	23.24	23.21	23.24
GPRS 4 Tx slots	26.33	26.44	26.39	26.50	23.33	23.44	23.39	23.50
EDGE 1 Tx slot	26.02	26.21	26.13	27.00	17.02	17.21	17.13	18.00
EDGE 2 Tx slots	25.13	25.38	25.31	26.00	19.13	19.38	19.31	20.00
EDGE 3 Tx slots	23.37	23.63	23.60	24.00	19.11	19.37	19.34	19.74
EDGE 4 Tx slots	22.36	22.65	22.60	23.00	19.36	19.65	19.60	20.00

**Remark:** The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

- Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
- Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
- Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
- Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

**<WWAN Top Antenna --Reduced Power for Receiver On/Hotspot On>**

GSM850	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	Tx Channel	128	189		251	128	189	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	31.86	31.80	31.72	33.00	22.86	22.80	22.72	24.00
GPRS 1 Tx slot	31.85	31.79	31.71	33.00	22.85	22.79	22.71	24.00
GPRS 2 Tx slots	31.16	31.08	31.00	31.50	25.16	25.08	25.00	25.50
GPRS 3 Tx slots	29.50	29.40	29.29	29.50	25.24	25.14	25.03	25.24
GPRS 4 Tx slots	28.48	28.37	28.25	28.50	25.48	25.37	25.25	25.50
EDGE 1 Tx slot	26.91	26.74	26.49	28.00	17.91	17.74	17.49	19.00
EDGE 2 Tx slots	25.61	25.62	25.43	27.00	19.61	19.62	19.43	21.00
EDGE 3 Tx slots	23.72	23.50	23.31	25.00	19.46	19.24	19.05	20.74
EDGE 4 Tx slots	22.23	22.13	22.17	24.00	19.23	19.13	19.17	21.00

**Remark:** The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

- Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
- Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
- Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
- Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

**<WWAN Bottom Antenna --Reduced Power for Handheld On>**

GSM1900	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	Tx Channel	512	661		810	512	661	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	28.92	29.06	29.03	30.50	19.92	20.06	20.03	21.50
GPRS 1 Tx slot	28.91	29.05	29.03	30.50	19.91	20.05	20.03	21.50
GPRS 2 Tx slots	27.76	27.90	27.93	28.50	21.76	21.90	21.93	22.50
GPRS 3 Tx slots	25.74	25.89	25.92	26.50	21.48	21.63	21.66	22.24
GPRS 4 Tx slots	24.78	24.94	24.87	25.50	21.78	21.94	21.87	22.50
EDGE 1 Tx slot	26.02	26.21	26.13	27.00	17.02	17.21	17.13	18.00
EDGE 2 Tx slots	25.13	25.38	25.31	26.00	19.13	19.38	19.31	20.00
EDGE 3 Tx slots	23.37	23.63	23.60	24.00	19.11	19.37	19.34	19.74
EDGE 4 Tx slots	22.36	22.65	22.60	23.00	19.36	19.65	19.60	20.00

**Remark:** The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

- Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
- Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
- Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
- Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

**<WWAN Bottom Antenna --Reduced Power for Hotspot On>**

GSM1900 Tx Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	28.91	29.03	29.04	30.00	19.91	20.03	20.04	21.00
GPRS 1 Tx slot	28.90	29.03	29.03	30.00	19.90	20.03	20.03	21.00
GPRS 2 Tx slots	26.31	26.44	26.50	27.00	20.31	20.44	20.50	21.00
GPRS 3 Tx slots	24.29	24.46	24.49	25.00	20.03	20.20	20.23	20.74
GPRS 4 Tx slots	23.30	23.54	23.51	24.00	20.30	20.54	20.51	<b>21.00</b>
EDGE 1 Tx slot	26.02	26.21	26.13	27.00	17.02	17.21	17.13	18.00
EDGE 2 Tx slots	25.13	25.38	25.31	26.00	19.13	19.38	19.31	20.00
EDGE 3 Tx slots	23.37	23.63	23.60	24.00	19.11	19.37	19.34	19.74
EDGE 4 Tx slots	22.36	22.65	22.60	23.00	19.36	19.65	19.60	20.00

**Remark:** The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

- Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
- Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
- Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
- Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

**<WCDMA Conducted Power>**

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
4. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

**HSDPA Setup Configuration:**

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
  - i. Set Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters were set according to each
  - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
  - iii. Set RMC 12.2Kbps + HSDPA mode.
  - iv. Set Cell Power = -86 dBm
  - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
  - vi. Select HSDPA Uplink Parameters
  - vii. Set Delta ACK, Delta NACK and Delta CQI = 8
  - viii. Set Ack-Nack Repetition Factor to 3
  - ix. Set CQI Feedback Cycle (k) to 4 ms
  - x. Set CQI Repetition Factor to 2
  - xi. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

**Table C.10.1.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH**

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{hs}$ (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1:  $\Delta_{ACK}, \Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ .

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA,  $\Delta_{ACK}$  and  $\Delta_{NACK} = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ , and  $\Delta_{CQI} = 24/15$  with  $\beta_{hs} = 24/15 * \beta_c$ .

Note 3: CM = 1 for  $\beta_c/\beta_d = 12/15, \beta_{hs}/\beta_c = 24/15$ . For all other combinations of DPCCH, DPCCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the  $\beta_c/\beta_d$  ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to  $\beta_c = 11/15$  and  $\beta_d = 15/15$ .

**Setup Configuration**

**HSUPA Setup Configuration:**

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting \* :
  - i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
  - ii. Set the Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
  - iii. Set Cell Power = -86 dBm
  - iv. Set Channel Type = 12.2k + HSPA
  - v. Set UE Target Power
  - vi. Power Ctrl Mode= Alternating bits
  - vii. Set and observe the E-TFCl
  - viii. Confirm that E-TFCl is equal to the target E-TFCl of 75 for sub-test 1, and other subtest's E-TFCl
- d. The transmitted maximum output power was recorded.

**Table C.11.1.3:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH**

Sub-test	$\beta_c$	$\beta_d$	$\beta_d$ (SF)	$\beta_c/\beta_d$	$\beta_{HS}$ (Note1)	$\beta_{ec}$	$\beta_{ed}$ (Note 4) (Note 5)	$\beta_{ed}$ (SF)	$\beta_{ed}$ (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCl
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4,  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{hs} = 30/15 * \beta_c$ . For sub-test 5,  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 5/15$  with  $\beta_{hs} = 5/15 * \beta_c$ .

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

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

Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.

Note 5:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.

Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

**Setup Configuration**

**DC-HSDPA 3GPP release 8 Setup Configuration:**

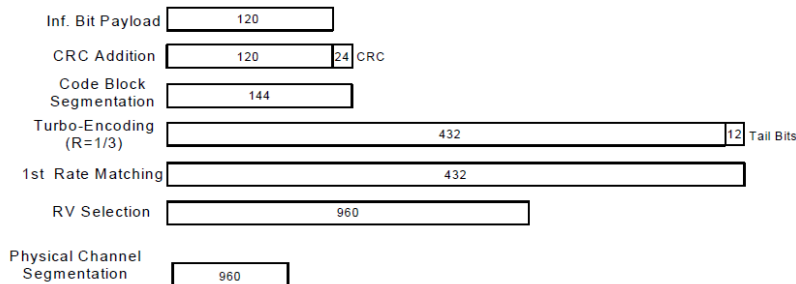
- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
  - i. Set RMC 12.2Kbps + HSDPA mode.
  - ii. Set Cell Power = -25 dBm
  - iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
  - iv. Select HSDPA Uplink Parameters
  - v. Set Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
    - a). Subtest 1:  $\beta_c/\beta_d=2/15$
    - b). Subtest 2:  $\beta_c/\beta_d=12/15$
    - c). Subtest 3:  $\beta_c/\beta_d=15/8$
    - d). Subtest 4:  $\beta_c/\beta_d=15/4$
  - vi. Set Delta ACK, Delta NACK and Delta CQI = 8
  - vii. Set Ack-Nack Repetition Factor to 3
  - viii. Set CQI Feedback Cycle (k) to 4 ms
  - ix. Set CQI Repetition Factor to 2
  - x. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification. A summary of these settings are illustrated below:

**C.8.1.12 Fixed Reference Channel Definition H-Set 12**

**Table C.8.1.12: Fixed Reference Channel H-Set 12**

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload ( $N_{INF}$ )	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		



**Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)**

**Setup Configuration**

**HSPA+ 3GPP release 7 (uplink category 7) 16QAM, Setup Configuration:**

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting \* :
  - i. Call Configs = 5.2E:HSPA+:UL with 16QAM
  - ii. Set the Gain Factors ( $\beta_c$  and  $\beta_d$ ) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.4, quoted from the TS 34.121-1 s5.2E
  - iii. Set Channel Parm
  - iv. Set Cell Power = -86 dBm
  - v. Set Channel Type = HSPA
  - vi. Set UE Target Power =21 dBm
  - vii. Power Ctrl Mode= All Up Bits
  - viii. Set Manual Uplink DPCH Bc/Bd = Manual
  - ix. Set Manual Uplink DPCH Bc and Bd=15,15(for 34.121-1 v8.10.0 table C11.1.4 sub-test 1)
  - x. Set HSPA Conn DL Channel Levels
  - xi. Set HS-SCCH Configs
  - xii. Set RB Test Mode Setup
  - xiii. Set Common HSUPA Parameters
  - xiv. Set Serving Grant
  - xv. Confirm that E-TFCI is equal to the target E-TFCI of 105 for sub-test 1, and other subtest's E-TFCI
- d. The transmitted maximum output power was recorded.

**Table C.11.1.4:  $\beta$  values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM**

Sub-test	$\beta_c$ (Note 3)	$\beta_d$	$\beta_{HS}$ (Note 1)	$\beta_{ec}$	$\beta_{ed}$ (2xSF2) (Note 4)	$\beta_{ed}$ (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	$\beta_{ed1}$ : 30/15 $\beta_{ed2}$ : 30/15	$\beta_{ed3}$ : 24/15 $\beta_{ed4}$ : 24/15	3.5	2.5	14	105	105

Note 1:  $\Delta_{ACK}$ ,  $\Delta_{NACK}$  and  $\Delta_{CQI} = 30/15$  with  $\beta_{HS} = 30/15 * \beta_c$ .

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the  $\beta_c$  is set to 1 and  $\beta_d = 0$  by default.

Note 4:  $\beta_{ed}$  can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.

**Setup Configuration**



<WCDMA Conducted Power>

General Note:

- Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
- Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is ≤ ¼ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than ¼ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

<WWAN Top/Bottom Antenna--Full Power Mode>

Band		WCDMA Band II			Tune-up Limit (dBm)	WCDMA Band IV			Tune-up Limit (dBm)	WCDMA Band V			Tune-up Limit (dBm)
Tx Channel		9262	9400	9538		1312	1413	1513		4132	4182	4233	
Rx Channel		9662	9800	9938		1537	1638	1738		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6	1712.4	1732.6	1752.6	826.4	836.4	846.6			
3GPP Rel 99	AMR 12.2Kbps	23.95	23.97	24.06	24.50	24.22	24.09	24.17	24.50	24.10	24.02	24.00	24.50
3GPP Rel 99	RMC 12.2Kbps	23.96	23.98	24.08	24.50	24.23	24.10	24.19	24.50	24.12	24.04	24.01	24.50
3GPP Rel 6	HSDPA Subtest-1	22.60	22.70	22.75	23.50	23.28	23.16	23.24	23.50	23.08	23.01	23.05	23.50
3GPP Rel 6	HSDPA Subtest-2	22.54	22.63	22.72	23.50	23.24	23.19	23.25	23.50	23.09	22.90	22.89	23.50
3GPP Rel 6	HSDPA Subtest-3	22.15	22.14	22.23	23.00	22.77	22.67	22.77	23.00	22.44	22.37	22.44	23.00
3GPP Rel 6	HSDPA Subtest-4	22.15	22.19	22.25	23.00	22.73	22.66	22.78	23.00	22.46	22.38	22.35	23.00
3GPP Rel 8	DC-HSDPA Subtest-1	22.50	22.67	22.65	23.50	23.17	23.03	23.14	23.50	22.95	22.92	22.92	23.50
3GPP Rel 8	DC-HSDPA Subtest-2	22.40	22.56	22.65	23.50	23.15	23.10	23.12	23.50	23.00	22.83	22.97	23.50
3GPP Rel 8	DC-HSDPA Subtest-3	22.03	22.05	22.13	23.00	22.67	22.53	22.63	23.00	22.34	22.26	22.33	23.00
3GPP Rel 8	DC-HSDPA Subtest-4	22.04	22.10	22.12	23.00	22.67	22.54	22.64	23.00	22.33	22.23	22.23	23.00
3GPP Rel 6	HSUPA Subtest-1	20.58	20.71	20.74	21.50	21.28	21.11	21.20	21.50	21.10	21.11	20.99	21.50
3GPP Rel 6	HSUPA Subtest-2	20.69	20.65	20.76	21.50	21.28	21.12	21.24	21.50	21.16	21.08	21.09	21.50
3GPP Rel 6	HSUPA Subtest-3	21.66	21.72	21.74	22.50	22.24	22.18	22.21	22.50	22.09	21.96	22.06	22.50
3GPP Rel 6	HSUPA Subtest-4	20.16	20.13	20.21	21.50	20.79	20.64	20.72	21.50	20.57	20.53	20.54	21.50
3GPP Rel 6	HSUPA Subtest-5	21.70	21.70	21.70	23.50	22.30	22.10	22.30	23.50	22.10	22.00	21.90	23.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	21.50	21.48	21.23	22.50	21.63	21.74	21.83	22.50	21.65	21.57	21.58	22.50





<WWAN Bottom Antenna --Reduced Power for Handheld On>

Band		WCDMA Band II			Tune-up Limit (dBm)	WCDMA Band IV			Tune-up Limit (dBm)
Tx Channel		9262	9400	9538		1312	1413	1513	
Rx Channel		9662	9800	9938		1537	1638	1738	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6	
3GPP Rel 99	AMR 12.2Kbps	21.25	21.28	21.30	22.00	21.64	21.65	21.67	22.50
3GPP Rel 99	RMC 12.2Kbps	21.26	21.29	21.31	22.00	21.71	21.66	21.70	22.50
3GPP Rel 6	HSDPA Subtest-1	20.77	20.78	20.85	21.00	21.18	21.14	21.16	21.50
3GPP Rel 6	HSDPA Subtest-2	20.75	20.73	20.88	21.00	21.10	21.03	21.11	21.50
3GPP Rel 6	HSDPA Subtest-3	20.23	20.28	20.38	20.50	20.59	20.53	20.54	21.00
3GPP Rel 6	HSDPA Subtest-4	20.25	20.29	20.29	20.50	20.57	20.55	20.64	21.00
3GPP Rel 8	DC-HSDPA Subtest-1	20.76	20.75	20.80	21.00	21.15	21.10	21.15	21.50
3GPP Rel 8	DC-HSDPA Subtest-2	20.70	20.70	20.84	21.00	21.10	21.00	21.10	21.50
3GPP Rel 8	DC-HSDPA Subtest-3	20.21	20.25	20.36	20.50	20.56	20.52	20.50	21.00
3GPP Rel 8	DC-HSDPA Subtest-4	20.25	20.26	20.30	20.50	20.50	20.50	20.61	21.00
3GPP Rel 6	HSUPA Subtest-1	18.75	18.79	18.84	19.00	19.10	19.04	19.19	19.50
3GPP Rel 6	HSUPA Subtest-2	18.72	18.84	18.91	19.00	19.19	19.10	19.18	19.50
3GPP Rel 6	HSUPA Subtest-3	19.76	19.77	19.89	20.00	20.07	20.09	20.24	20.50
3GPP Rel 6	HSUPA Subtest-4	18.27	18.35	18.39	19.00	18.53	18.60	18.67	19.50
3GPP Rel 6	HSUPA Subtest-5	19.80	19.80	19.90	21.00	20.20	20.20	20.30	21.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	19.80	19.85	19.93	20.00	20.22	20.44	20.48	20.50

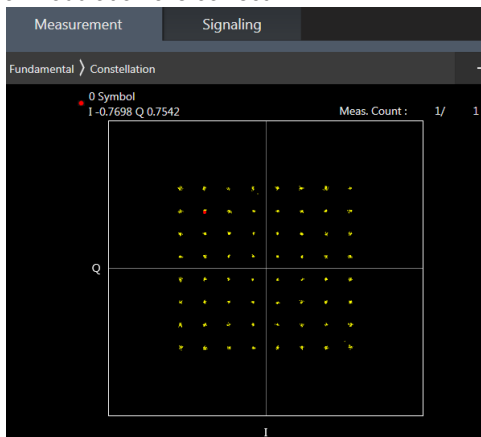
<WWAN Bottom Antenna --Reduced Power for Hotspot On>

Band		WCDMA Band II			Tune-up Limit (dBm)	WCDMA Band IV			Tune-up Limit (dBm)
Tx Channel		9262	9400	9538		1312	1413	1513	
Rx Channel		9662	9800	9938		1537	1638	1738	
Frequency (MHz)		1852.4	1880	1907.6		1712.4	1732.6	1752.6	
3GPP Rel 99	AMR 12.2Kbps	19.25	19.30	19.35	20.50	21.64	21.65	21.67	22.50
3GPP Rel 99	RMC 12.2Kbps	19.26	19.31	19.36	20.50	21.71	21.66	21.70	22.50
3GPP Rel 6	HSDPA Subtest-1	18.82	18.86	18.95	19.50	21.18	21.14	21.16	21.50
3GPP Rel 6	HSDPA Subtest-2	18.79	18.85	18.95	19.50	21.10	21.03	21.11	21.50
3GPP Rel 6	HSDPA Subtest-3	18.31	18.37	18.43	19.00	20.59	20.53	20.54	21.00
3GPP Rel 6	HSDPA Subtest-4	18.26	18.31	18.41	19.00	20.57	20.55	20.64	21.00
3GPP Rel 8	DC-HSDPA Subtest-1	18.81	18.85	18.90	19.50	21.15	21.10	21.15	21.50
3GPP Rel 8	DC-HSDPA Subtest-2	18.76	18.75	18.91	19.50	21.10	21.00	21.10	21.50
3GPP Rel 8	DC-HSDPA Subtest-3	18.30	18.30	18.40	19.00	20.56	20.52	20.50	21.00
3GPP Rel 8	DC-HSDPA Subtest-4	18.25	18.31	18.40	19.00	20.50	20.50	20.61	21.00
3GPP Rel 6	HSUPA Subtest-1	16.74	16.76	16.82	17.50	19.10	19.04	19.19	19.50
3GPP Rel 6	HSUPA Subtest-2	16.70	16.70	16.83	17.50	19.19	19.10	19.18	19.50
3GPP Rel 6	HSUPA Subtest-3	17.73	17.73	17.82	18.50	20.07	20.09	20.24	20.50
3GPP Rel 6	HSUPA Subtest-4	16.26	16.25	16.33	17.50	18.53	18.60	18.67	19.50
3GPP Rel 6	HSUPA Subtest-5	17.70	17.80	17.90	19.50	20.20	20.20	20.30	21.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	17.80	17.86	17.98	18.50	20.22	20.44	20.48	20.50

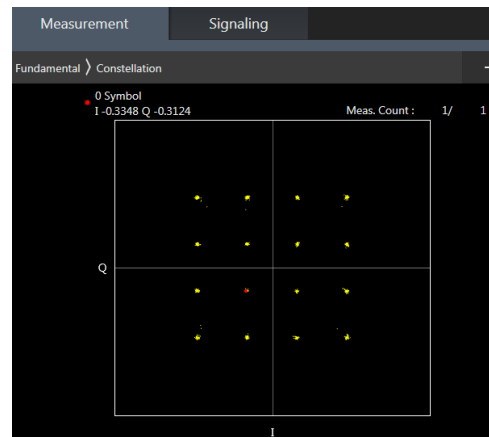
**<LTE Conducted Power>**

**General Note:**

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B38 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, 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.
9. According to 2017 TCB workshop, for 64QAM and 16QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



**64QAM**



**16QAM**



<WWAN Top/Bottom Antenna-- Full Power Mode>

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	23.69	23.88	23.57	24	0
20	QPSK	1	49	23.80	23.73	23.66		
20	QPSK	1	99	23.67	23.61	23.63		
20	QPSK	50	0	22.77	22.85	22.70	23	1
20	QPSK	50	24	22.84	22.73	22.69		
20	QPSK	50	50	22.69	22.70	22.58		
20	QPSK	100	0	22.71	22.71	22.61	23	1
20	16QAM	1	0	22.79	22.98	22.67		
20	16QAM	1	49	22.61	22.79	22.77		
20	16QAM	1	99	22.64	22.79	22.70	22	2
20	16QAM	50	0	21.68	21.80	21.71		
20	16QAM	50	24	21.83	21.72	21.74		
20	16QAM	50	50	21.66	21.77	21.57	22	2
20	16QAM	100	0	21.61	21.77	21.64		
20	64QAM	1	0	21.70	21.70	21.70		
20	64QAM	1	49	21.82	21.70	21.90	22	2
20	64QAM	1	99	21.54	21.75	21.78		
20	64QAM	50	0	20.76	20.85	20.85		
20	64QAM	50	24	20.88	20.81	20.74	21	3
20	64QAM	50	50	20.86	20.82	20.56		
20	64QAM	100	0	20.83	20.93	20.74		



Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	23.82	23.75	23.69	24	0
15	QPSK	1	37	23.87	23.63	23.67		
15	QPSK	1	74	23.72	23.64	23.69		
15	QPSK	36	0	22.77	22.78	22.65	23	1
15	QPSK	36	20	22.81	22.72	22.76		
15	QPSK	36	39	22.74	22.64	22.55		
15	QPSK	75	0	22.78	22.75	22.70	23	1
15	16QAM	1	0	22.98	22.55	22.69		
15	16QAM	1	37	22.93	22.90	22.82		
15	16QAM	1	74	22.90	22.77	22.99	22	2
15	16QAM	36	0	21.73	21.78	21.71		
15	16QAM	36	20	21.77	21.70	21.71		
15	16QAM	36	39	21.77	21.64	21.71	22	2
15	16QAM	75	0	21.73	21.69	21.66		
15	64QAM	1	0	21.84	21.86	21.85		
15	64QAM	1	37	21.93	21.91	21.84	22	2
15	64QAM	1	74	21.89	21.88	21.80		
15	64QAM	36	0	20.92	20.85	20.85		
15	64QAM	36	20	20.81	20.85	20.76	21	3
15	64QAM	36	39	20.82	20.70	20.80		
15	64QAM	75	0	20.82	20.80	20.74		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	23.78	23.68	23.60	24	0
10	QPSK	1	25	23.75	23.71	23.63		
10	QPSK	1	49	23.68	23.70	23.65		
10	QPSK	25	0	22.69	22.68	22.72	23	1
10	QPSK	25	12	22.82	22.64	22.65		
10	QPSK	25	25	22.67	22.68	22.60		
10	QPSK	50	0	22.71	22.76	22.68	23	1
10	16QAM	1	0	22.98	22.52	22.94		
10	16QAM	1	25	22.98	22.64	22.73		
10	16QAM	1	49	22.92	22.83	22.76	22	2
10	16QAM	25	0	21.64	21.56	21.72		
10	16QAM	25	12	21.78	21.67	21.77		
10	16QAM	25	25	21.69	21.69	21.63	22	2
10	16QAM	50	0	21.66	21.71	21.61		
10	64QAM	1	0	21.83	21.56	21.88		
10	64QAM	1	25	21.91	21.59	21.83	22	2
10	64QAM	1	49	21.82	21.58	21.79		
10	64QAM	25	0	20.67	20.80	20.68		
10	64QAM	25	12	20.79	20.76	20.78	21	3
10	64QAM	25	25	20.74	20.71	20.59		
10	64QAM	50	0	20.60	20.79	20.59		



Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	23.70	23.63	23.62	24	0
5	QPSK	1	12	23.74	23.65	23.65		
5	QPSK	1	24	23.71	23.65	23.53		
5	QPSK	12	0	22.68	22.74	22.62	23	1
5	QPSK	12	7	22.84	22.73	22.68		
5	QPSK	12	13	22.74	22.67	22.65		
5	QPSK	25	0	22.83	22.62	22.62	23	1
5	16QAM	1	0	22.94	22.66	22.61		
5	16QAM	1	12	22.93	22.63	22.91		
5	16QAM	1	24	22.79	22.80	22.95	22	2
5	16QAM	12	0	21.75	21.67	21.70		
5	16QAM	12	7	21.85	21.73	21.67		
5	16QAM	12	13	21.78	21.66	21.64	22	2
5	16QAM	25	0	21.78	21.59	21.65		
5	64QAM	1	0	21.77	21.78	21.46		
5	64QAM	1	12	21.67	21.80	21.77	22	2
5	64QAM	1	24	21.81	21.69	21.61		
5	64QAM	12	0	20.62	20.59	20.56		
5	64QAM	12	7	20.91	20.54	20.64	21	3
5	64QAM	12	13	20.74	20.63	20.46		
5	64QAM	25	0	20.74	20.65	20.67		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	23.68	23.55	23.56	24	0
3	QPSK	1	8	23.74	23.59	23.65		
3	QPSK	1	14	23.67	23.63	23.56		
3	QPSK	8	0	22.83	22.76	22.81	23	1
3	QPSK	8	4	22.92	22.88	22.81		
3	QPSK	8	7	22.83	22.82	22.77		
3	QPSK	15	0	22.94	22.80	22.72	23	1
3	16QAM	1	0	22.82	22.52	22.47		
3	16QAM	1	8	22.72	22.81	22.62		
3	16QAM	1	14	22.73	22.67	22.90	22	2
3	16QAM	8	0	21.97	21.81	21.77		
3	16QAM	8	4	21.96	21.84	21.83		
3	16QAM	8	7	21.93	21.80	21.83	22	2
3	16QAM	15	0	21.85	21.96	21.67		
3	64QAM	1	0	21.52	21.58	21.48		
3	64QAM	1	8	21.81	21.54	21.51	22	2
3	64QAM	1	14	21.53	21.53	21.61		
3	64QAM	8	0	20.85	20.80	20.74		
3	64QAM	8	4	20.94	20.84	20.89	21	3
3	64QAM	8	7	20.81	20.81	21.00		
3	64QAM	15	0	20.96	20.66	20.73		



Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	23.60	23.38	23.42	24	0
1.4	QPSK	1	3	23.66	23.56	23.52		
1.4	QPSK	1	5	23.54	23.38	23.55		
1.4	QPSK	3	0	23.67	23.61	23.54		
1.4	QPSK	3	1	23.72	23.63	23.56		
1.4	QPSK	3	3	23.63	23.49	23.55		
1.4	QPSK	6	0	22.73	22.59	22.67	23	1
1.4	16QAM	1	0	22.55	22.68	22.41	23	1
1.4	16QAM	1	3	22.64	22.74	22.73		
1.4	16QAM	1	5	22.70	22.32	22.26		
1.4	16QAM	3	0	22.64	22.47	22.47		
1.4	16QAM	3	1	22.61	22.62	22.68		
1.4	16QAM	3	3	22.63	22.64	22.60		
1.4	16QAM	6	0	21.74	21.70	21.64	22	2
1.4	64QAM	1	0	21.63	21.55	21.50	22	2
1.4	64QAM	1	3	21.70	21.55	21.43		
1.4	64QAM	1	5	21.63	21.73	21.52		
1.4	64QAM	3	0	21.91	21.61	21.56		
1.4	64QAM	3	1	21.74	21.68	21.56		
1.4	64QAM	3	3	21.68	21.55	21.48		
1.4	64QAM	6	0	20.81	20.75	20.60	21	3



<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	23.48	23.74	23.62	24	0
20	QPSK	1	49	23.73	23.60	23.48		
20	QPSK	1	99	23.44	23.46	23.39		
20	QPSK	50	0	22.64	22.84	22.68	23	1
20	QPSK	50	24	22.68	22.66	22.63		
20	QPSK	50	50	22.80	22.49	22.48		
20	QPSK	100	0	22.66	22.59	22.60	23	1
20	16QAM	1	0	22.68	22.92	22.97		
20	16QAM	1	49	22.99	22.85	22.64		
20	16QAM	1	99	22.80	22.79	22.60	22	2
20	16QAM	50	0	21.63	21.58	21.62		
20	16QAM	50	24	21.81	21.70	21.47		
20	16QAM	50	50	21.85	21.47	21.51	22	2
20	16QAM	100	0	21.79	21.69	21.50		
20	64QAM	1	0	21.80	21.67	21.95		
20	64QAM	1	49	21.79	21.59	21.67	22	2
20	64QAM	1	99	21.61	21.84	21.60		
20	64QAM	50	0	20.62	20.69	20.64		
20	64QAM	50	24	20.73	20.75	20.52	21	3
20	64QAM	50	50	20.71	20.48	20.53		
20	64QAM	100	0	20.78	20.50	20.59		



Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	23.55	23.69	23.58	24	0
15	QPSK	1	37	23.54	23.56	23.48		
15	QPSK	1	74	23.59	23.47	23.20		
15	QPSK	36	0	22.55	22.62	22.49	23	1
15	QPSK	36	20	22.60	22.61	22.38		
15	QPSK	36	39	22.63	22.60	22.45		
15	QPSK	75	0	22.72	22.59	22.51	23	1
15	16QAM	1	0	22.97	22.85	22.79		
15	16QAM	1	37	23.00	22.58	22.98		
15	16QAM	1	74	22.84	22.53	22.79	22	2
15	16QAM	36	0	21.63	21.73	21.70		
15	16QAM	36	20	21.62	21.63	21.52		
15	16QAM	36	39	21.64	21.58	21.44	22	2
15	16QAM	75	0	21.72	21.61	21.43		
15	64QAM	1	0	21.66	21.80	21.91		
15	64QAM	1	37	21.68	21.69	21.64	22	2
15	64QAM	1	74	21.66	21.57	21.60		
15	64QAM	36	0	20.61	20.67	20.63		
15	64QAM	36	20	20.65	20.71	20.54	21	3
15	64QAM	36	39	20.64	20.63	20.36		
15	64QAM	75	0	20.74	20.58	20.56		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	23.65	23.57	23.48	24	0
10	QPSK	1	25	23.63	23.61	23.41		
10	QPSK	1	49	23.57	23.43	23.26		
10	QPSK	25	0	22.53	22.63	22.43	23	1
10	QPSK	25	12	22.59	22.65	22.53		
10	QPSK	25	25	22.63	22.60	22.35		
10	QPSK	50	0	22.62	22.56	22.40	23	1
10	16QAM	1	0	22.93	22.67	22.74		
10	16QAM	1	25	22.91	22.76	22.69		
10	16QAM	1	49	22.85	22.59	22.59	22	2
10	16QAM	25	0	21.58	21.61	21.47		
10	16QAM	25	12	21.67	21.80	21.55		
10	16QAM	25	25	21.51	21.60	21.35	22	2
10	16QAM	50	0	21.53	21.56	21.37		
10	64QAM	1	0	21.90	21.75	21.60		
10	64QAM	1	25	21.87	21.67	21.67	22	2
10	64QAM	1	49	21.95	21.87	21.65		
10	64QAM	25	0	20.50	20.61	20.54		
10	64QAM	25	12	20.68	20.67	20.48	21	3
10	64QAM	25	25	20.61	20.67	20.34		
10	64QAM	50	0	20.60	20.56	20.41		





Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	23.57	23.53	23.30	24	0
5	QPSK	1	12	23.56	23.65	23.38		
5	QPSK	1	24	23.29	23.50	23.31		
5	QPSK	12	0	22.56	22.60	22.39	23	1
5	QPSK	12	7	22.63	22.70	22.39		
5	QPSK	12	13	22.61	22.58	22.37		
5	QPSK	25	0	22.64	22.61	22.33	23	1
5	16QAM	1	0	22.59	22.93	22.72		
5	16QAM	1	12	22.81	22.76	22.71		
5	16QAM	1	24	22.74	22.95	22.72	22	2
5	16QAM	12	0	21.64	21.66	21.33		
5	16QAM	12	7	21.67	21.58	21.36		
5	16QAM	12	13	21.54	21.62	21.32	22	2
5	16QAM	25	0	21.57	21.67	21.39		
5	64QAM	1	0	21.53	21.58	21.48		
5	64QAM	1	12	21.46	21.66	21.38	22	2
5	64QAM	1	24	21.39	21.86	21.45		
5	64QAM	12	0	20.54	20.57	20.36		
5	64QAM	12	7	20.54	20.63	20.38	21	3
5	64QAM	12	13	20.55	20.54	20.30		
5	64QAM	25	0	20.65	20.59	20.47		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	23.52	23.46	23.24	24	0
3	QPSK	1	8	23.57	23.56	23.30		
3	QPSK	1	14	23.51	23.51	23.23		
3	QPSK	8	0	22.58	22.69	22.45	23	1
3	QPSK	8	4	22.83	22.79	22.58		
3	QPSK	8	7	22.66	22.73	22.51		
3	QPSK	15	0	22.71	22.81	22.39	23	1
3	16QAM	1	0	22.80	22.66	22.60		
3	16QAM	1	8	22.61	22.94	22.78		
3	16QAM	1	14	22.71	22.60	22.45	22	2
3	16QAM	8	0	21.92	21.86	21.60		
3	16QAM	8	4	21.87	21.83	21.65		
3	16QAM	8	7	21.78	21.84	21.80	22	2
3	16QAM	15	0	21.87	21.73	21.56		
3	64QAM	1	0	21.83	21.66	21.61		
3	64QAM	1	8	21.60	21.67	21.46	22	2
3	64QAM	1	14	21.52	21.85	21.61		
3	64QAM	8	0	20.68	20.77	20.59		
3	64QAM	8	4	20.91	20.88	20.48	21	3
3	64QAM	8	7	20.75	20.79	20.42		
3	64QAM	15	0	20.67	20.72	20.45		



Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	23.43	23.45	23.08	24	0
1.4	QPSK	1	3	23.43	23.54	23.11		
1.4	QPSK	1	5	23.30	23.33	23.10		
1.4	QPSK	3	0	23.51	23.55	23.24		
1.4	QPSK	3	1	23.44	23.60	23.19		
1.4	QPSK	3	3	23.39	23.60	23.23		
1.4	QPSK	6	0	22.57	22.69	22.27	23	1
1.4	16QAM	1	0	22.45	22.48	22.53	23	1
1.4	16QAM	1	3	22.70	22.60	22.71		
1.4	16QAM	1	5	22.69	22.79	22.37		
1.4	16QAM	3	0	22.32	22.43	22.33		
1.4	16QAM	3	1	22.48	22.55	22.37		
1.4	16QAM	3	3	22.44	22.56	22.25		
1.4	16QAM	6	0	21.69	21.77	21.47	22	2
1.4	64QAM	1	0	21.43	21.42	21.23	22	2
1.4	64QAM	1	3	21.43	21.44	21.15		
1.4	64QAM	1	5	21.39	21.34	21.30		
1.4	64QAM	3	0	21.54	21.59	21.32		
1.4	64QAM	3	1	21.29	21.37	21.29		
1.4	64QAM	3	3	21.53	21.50	21.18		
1.4	64QAM	6	0	20.67	20.73	20.46	21	3



<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	23.58	23.77	23.64	24	0
10	QPSK	1	25	23.73	23.62	23.58		
10	QPSK	1	49	23.58	23.53	23.58		
10	QPSK	25	0	22.56	22.64	22.58	23	1
10	QPSK	25	12	22.62	22.58	22.60		
10	QPSK	25	25	22.62	22.51	22.51		
10	QPSK	50	0	22.64	22.66	22.57	23	1
10	16QAM	1	0	22.86	22.90	22.91		
10	16QAM	1	25	22.95	22.79	22.94		
10	16QAM	1	49	22.93	22.69	22.97	22	2
10	16QAM	25	0	21.67	21.62	21.39		
10	16QAM	25	12	21.74	21.73	21.54		
10	16QAM	25	25	21.61	21.66	21.53	22	2
10	16QAM	50	0	21.65	21.65	21.45		
10	64QAM	1	0	21.74	21.92	21.79		
10	64QAM	1	25	21.74	21.80	21.89	22	2
10	64QAM	1	49	21.76	21.71	21.75		
10	64QAM	25	0	20.59	20.67	20.60		
10	64QAM	25	12	20.74	20.70	20.58	21	3
10	64QAM	25	25	20.71	20.67	20.58		
10	64QAM	50	0	20.58	20.72	20.49		



Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	23.58	23.46	23.48	24	0
5	QPSK	1	12	23.70	23.65	23.63		
5	QPSK	1	24	23.46	23.51	23.68		
5	QPSK	12	0	22.61	22.56	22.61	23	1
5	QPSK	12	7	22.69	22.65	22.58		
5	QPSK	12	13	22.60	22.56	22.60		
5	QPSK	25	0	22.74	22.52	22.63	23	1
5	16QAM	1	0	22.86	22.70	22.65		
5	16QAM	1	12	22.80	22.81	22.63		
5	16QAM	1	24	22.91	22.87	22.68	22	2
5	16QAM	12	0	21.58	21.58	21.56		
5	16QAM	12	7	21.70	21.80	21.52		
5	16QAM	12	13	21.67	21.56	21.61	22	2
5	16QAM	25	0	21.69	21.73	21.67		
5	64QAM	1	0	21.79	21.64	21.69		
5	64QAM	1	12	21.75	21.77	21.47	22	2
5	64QAM	1	24	21.62	21.57	21.70		
5	64QAM	12	0	20.64	20.55	20.50		
5	64QAM	12	7	20.51	20.77	20.69	21	3
5	64QAM	12	13	20.70	20.55	20.49		
5	64QAM	25	0	20.70	20.65	20.64		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	23.29	23.25	23.15	24	0
3	QPSK	1	8	23.32	23.17	23.44		
3	QPSK	1	14	23.35	23.31	23.25		
3	QPSK	8	0	22.62	22.42	22.46	23	1
3	QPSK	8	4	22.64	22.54	22.70		
3	QPSK	8	7	22.54	22.53	22.49		
3	QPSK	15	0	22.62	22.45	22.56	23	1
3	16QAM	1	0	22.63	22.60	22.61		
3	16QAM	1	8	22.55	22.72	22.83		
3	16QAM	1	14	22.52	22.40	22.50	22	2
3	16QAM	8	0	21.78	21.60	21.57		
3	16QAM	8	4	21.70	21.74	21.56		
3	16QAM	8	7	21.54	21.58	21.58	22	2
3	16QAM	15	0	21.55	21.45	21.59		
3	64QAM	1	0	21.50	21.48	21.51		
3	64QAM	1	8	21.55	21.83	21.81	22	2
3	64QAM	1	14	21.47	21.82	21.49		
3	64QAM	8	0	20.55	20.58	20.45		
3	64QAM	8	4	20.64	20.62	20.62	21	3
3	64QAM	8	7	20.52	20.58	20.56		
3	64QAM	15	0	20.50	20.57	20.48		



Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	23.46	23.37	23.50	24	0
1.4	QPSK	1	3	23.44	23.40	23.51		
1.4	QPSK	1	5	23.37	23.31	23.45		
1.4	QPSK	3	0	23.53	23.41	23.48		
1.4	QPSK	3	1	23.54	23.48	23.56		
1.4	QPSK	3	3	23.53	23.49	23.56		
1.4	QPSK	6	0	22.60	22.55	22.59	23	1
1.4	16QAM	1	0	22.54	22.60	22.50	23	1
1.4	16QAM	1	3	22.97	22.75	22.92		
1.4	16QAM	1	5	22.94	22.86	22.59		
1.4	16QAM	3	0	22.56	22.45	22.51		
1.4	16QAM	3	1	22.57	22.57	22.61		
1.4	16QAM	3	3	22.60	22.54	22.47		
1.4	16QAM	6	0	21.84	21.76	21.54	22	2
1.4	64QAM	1	0	21.61	21.96	21.51	22	2
1.4	64QAM	1	3	21.61	21.61	21.61		
1.4	64QAM	1	5	21.54	21.58	21.74		
1.4	64QAM	3	0	21.38	21.48	21.58		
1.4	64QAM	3	1	21.65	21.52	21.41		
1.4	64QAM	3	3	21.57	21.40	21.50		
1.4	64QAM	6	0	20.61	20.59	20.63	21	3



<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	23.43	23.52	23.50	24	0
20	QPSK	1	49	23.55	23.67	23.82		
20	QPSK	1	99	23.56	23.64	23.81		
20	QPSK	50	0	22.32	22.66	22.55	23	1
20	QPSK	50	24	22.54	22.71	22.81		
20	QPSK	50	50	22.67	22.61	22.61		
20	QPSK	100	0	22.47	22.59	22.57	23	1
20	16QAM	1	0	22.53	22.54	22.54		
20	16QAM	1	49	22.59	22.63	22.58		
20	16QAM	1	99	22.39	22.73	22.83	22	2
20	16QAM	50	0	21.49	21.66	21.58		
20	16QAM	50	24	21.49	21.68	21.74		
20	16QAM	50	50	21.59	21.63	21.71		
20	16QAM	100	0	21.43	21.58	21.67	22	2
20	64QAM	1	0	21.29	21.76	21.54		
20	64QAM	1	49	21.40	21.67	21.72		
20	64QAM	1	99	21.86	21.73	21.82	21	3
20	64QAM	50	0	20.38	20.66	20.53		
20	64QAM	50	24	20.53	20.73	20.72		
20	64QAM	50	50	20.63	20.61	20.57		
20	64QAM	100	0	20.48	20.54	20.63		



Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	23.34	23.56	23.62	24	0
15	QPSK	1	37	23.60	23.65	23.80		
15	QPSK	1	74	23.58	23.58	23.78		
15	QPSK	36	0	22.32	22.62	22.60	23	1
15	QPSK	36	20	22.54	22.59	22.68		
15	QPSK	36	39	22.56	22.60	22.71		
15	QPSK	75	0	22.50	22.69	22.70	23	1
15	16QAM	1	0	22.66	22.52	22.64		
15	16QAM	1	37	22.88	22.70	22.80		
15	16QAM	1	74	22.36	22.85	22.78	22	2
15	16QAM	36	0	21.47	21.58	21.74		
15	16QAM	36	20	21.55	21.69	21.77		
15	16QAM	36	39	21.48	21.62	21.73	22	2
15	16QAM	75	0	21.50	21.67	21.71		
15	64QAM	1	0	21.43	21.78	21.64		
15	64QAM	1	37	21.80	21.73	21.75	22	2
15	64QAM	1	74	21.58	21.54	21.83		
15	64QAM	36	0	20.36	20.65	20.73		
15	64QAM	36	20	20.43	20.64	20.75	21	3
15	64QAM	36	39	20.63	20.65	20.71		
15	64QAM	75	0	20.42	20.57	20.63		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	23.59	23.49	23.65	24	0
10	QPSK	1	25	23.46	23.64	23.76		
10	QPSK	1	49	23.45	23.54	23.64		
10	QPSK	25	0	22.40	22.64	22.76	23	1
10	QPSK	25	12	22.54	22.62	22.79		
10	QPSK	25	25	22.42	22.63	22.71		
10	QPSK	50	0	22.49	22.55	22.79	23	1
10	16QAM	1	0	22.69	22.64	22.81		
10	16QAM	1	25	22.83	22.48	22.84		
10	16QAM	1	49	22.80	22.77	22.80	22	2
10	16QAM	25	0	21.39	21.72	21.67		
10	16QAM	25	12	21.60	21.68	21.82		
10	16QAM	25	25	21.51	21.64	21.68	22	2
10	16QAM	50	0	21.47	21.64	21.70		
10	64QAM	1	0	21.30	21.60	21.70		
10	64QAM	1	25	21.78	21.80	21.79	22	2
10	64QAM	1	49	21.54	21.83	21.80		
10	64QAM	25	0	20.43	20.60	20.70		
10	64QAM	25	12	20.47	20.69	20.74	21	3
10	64QAM	25	25	20.45	20.57	20.65		
10	64QAM	50	0	20.47	20.68	20.77		



Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	23.54	23.59	23.69	24	0
5	QPSK	1	12	23.44	23.73	23.69		
5	QPSK	1	24	23.37	23.63	23.77		
5	QPSK	12	0	22.38	22.55	22.80	23	1
5	QPSK	12	7	22.44	22.63	22.83		
5	QPSK	12	13	22.39	22.67	22.71		
5	QPSK	25	0	22.47	22.60	22.75	23	1
5	16QAM	1	0	22.67	22.34	22.73		
5	16QAM	1	12	22.62	22.74	22.81		
5	16QAM	1	24	22.68	22.68	22.76	22	2
5	16QAM	12	0	21.40	21.63	21.75		
5	16QAM	12	7	21.53	21.73	21.77		
5	16QAM	12	13	21.44	21.57	21.80	22	2
5	16QAM	25	0	21.48	21.65	21.63		
5	64QAM	1	0	21.31	21.47	21.69		
5	64QAM	1	12	21.86	21.70	21.77	22	2
5	64QAM	1	24	21.50	21.70	21.59		
5	64QAM	12	0	20.43	20.54	20.69		
5	64QAM	12	7	20.45	20.69	20.81	21	3
5	64QAM	12	13	20.44	20.60	20.72		
5	64QAM	25	0	20.42	20.59	20.84		





<WWAN Top Antenna --Reduced Power for Receiver On/Hotspot On >

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	19.48	19.65	19.68	20.5	0
20	QPSK	1	49	19.72	19.87	19.89		
20	QPSK	1	99	19.70	19.77	19.82		
20	QPSK	50	0	19.56	19.82	19.74	20.5	0
20	QPSK	50	24	19.73	19.87	19.88		
20	QPSK	50	50	19.82	19.79	19.81		
20	QPSK	100	0	19.66	19.79	19.80	20.5	0
20	16QAM	1	0	19.76	19.76	19.88		
20	16QAM	1	49	19.80	19.44	19.80		
20	16QAM	1	99	19.86	19.85	19.80	20.5	0
20	16QAM	50	0	19.56	19.82	19.75		
20	16QAM	50	24	19.71	19.88	19.80		
20	16QAM	50	50	19.81	19.79	19.83	20.5	0
20	16QAM	100	0	19.65	19.77	19.77		
20	64QAM	1	0	19.72	19.82	19.88		
20	64QAM	1	49	19.77	19.80	19.77	20.5	0
20	64QAM	1	99	19.82	19.82	19.72		
20	64QAM	50	0	19.43	19.82	19.52		
20	64QAM	50	24	19.61	19.77	19.67	20.5	0
20	64QAM	50	50	19.60	19.67	19.51		
20	64QAM	100	0	19.52	19.61	19.72		



Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	19.45	19.58	19.61	20.5	0
15	QPSK	1	37	19.55	19.81	19.74		
15	QPSK	1	74	19.60	19.75	19.75		
15	QPSK	36	0	19.49	19.70	19.64	20.5	0
15	QPSK	36	20	19.56	19.71	19.84		
15	QPSK	36	39	19.70	19.76	19.76		
15	QPSK	75	0	19.70	19.70	19.70	20.5	0
15	16QAM	1	0	19.75	19.85	19.80		
15	16QAM	1	37	19.80	19.80	19.80		
15	16QAM	1	74	19.85	19.85	19.75	20.5	0
15	16QAM	36	0	19.46	19.85	19.55		
15	16QAM	36	20	19.64	19.80	19.70		
15	16QAM	36	39	19.63	19.70	19.54	20.5	0
15	16QAM	75	0	19.55	19.64	19.75		
15	64QAM	1	0	19.68	19.78	19.84		
15	64QAM	1	37	19.73	19.88	19.73	20.5	0
15	64QAM	1	74	19.78	19.78	19.68		
15	64QAM	36	0	19.39	19.78	19.48		
15	64QAM	36	20	19.57	19.73	19.63	20.5	0
15	64QAM	36	39	19.56	19.63	19.47		
15	64QAM	75	0	19.48	19.57	19.68		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	19.55	19.62	19.65	20.5	0
10	QPSK	1	25	19.69	19.75	19.85		
10	QPSK	1	49	19.70	19.74	19.80		
10	QPSK	25	0	19.53	19.70	19.70	20.5	0
10	QPSK	25	12	19.70	19.84	19.52		
10	QPSK	25	25	19.55	19.55	19.78		
10	QPSK	50	0	19.63	19.76	19.75	20.5	0
10	16QAM	1	0	19.75	19.81	19.85		
10	16QAM	1	25	19.80	19.85	19.81		
10	16QAM	1	49	19.81	19.83	19.85	20.5	0
10	16QAM	25	0	19.53	19.70	19.70		
10	16QAM	25	12	19.59	19.85	19.50		
10	16QAM	25	25	19.78	19.75	19.80	20.5	0
10	16QAM	50	0	19.70	19.74	19.80		
10	64QAM	1	0	19.66	19.76	19.82		
10	64QAM	1	25	19.71	19.87	19.71	20.5	0
10	64QAM	1	49	19.76	19.76	19.66		
10	64QAM	25	0	19.37	19.76	19.46		
10	64QAM	25	12	19.55	19.71	19.61	20.5	0
10	64QAM	25	25	19.54	19.61	19.45		
10	64QAM	50	0	19.46	19.55	19.66		



Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	19.43	19.56	19.59	20.5	0
5	QPSK	1	12	19.63	19.78	19.74		
5	QPSK	1	24	19.54	19.80	19.73		
5	QPSK	12	0	19.47	19.73	19.75	20.5	0
5	QPSK	12	7	19.55	19.75	19.81		
5	QPSK	12	13	19.73	19.70	19.70		
5	QPSK	25	0	19.60	19.70	19.69	20.5	0
5	16QAM	1	0	19.67	19.80	19.80		
5	16QAM	1	12	19.70	19.85	19.86		
5	16QAM	1	24	19.85	19.85	19.86	20.5	0
5	16QAM	12	0	19.47	19.73	19.70		
5	16QAM	12	7	19.55	19.75	19.81		
5	16QAM	12	13	19.72	19.70	19.71	20.5	0
5	16QAM	25	0	19.56	19.68	19.68		
5	64QAM	1	0	19.65	19.75	19.81		
5	64QAM	1	12	19.70	19.86	19.70	20.5	0
5	64QAM	1	24	19.75	19.75	19.65		
5	64QAM	12	0	19.36	19.75	19.45		
5	64QAM	12	7	19.54	19.70	19.60	20.5	0
5	64QAM	12	13	19.53	19.60	19.44		
5	64QAM	25	0	19.45	19.54	19.65		



**<WWAN Bottom Antenna --Reduced Power for Handheld On>**

**<LTE Band 2>**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	20.22	20.46	20.15	21	0
20	QPSK	1	49	20.31	20.30	20.28		
20	QPSK	1	99	20.15	20.13	20.12		
20	QPSK	50	0	20.38	20.39	20.32	21	0
20	QPSK	50	24	20.31	20.33	20.31		
20	QPSK	50	50	20.27	20.26	20.27		
20	QPSK	100	0	20.15	20.39	20.26	21	0
20	16QAM	1	0	20.39	20.40	20.38		
20	16QAM	1	49	20.39	20.39	20.45		
20	16QAM	1	99	20.41	20.40	20.35	21	0
20	16QAM	50	0	20.32	20.32	20.30		
20	16QAM	50	24	20.31	20.33	20.33		
20	16QAM	50	50	20.25	20.24	20.20	21	0
20	16QAM	100	0	20.20	20.29	20.28		
20	64QAM	1	0	19.95	20.19	20.15		
20	64QAM	1	49	20.00	20.35	20.22	21	0
20	64QAM	1	99	19.96	20.17	20.26		
20	64QAM	50	0	20.04	20.10	20.26		
20	64QAM	50	24	20.05	20.13	20.25	21	0
20	64QAM	50	50	20.08	20.06	20.21		
20	64QAM	100	0	20.14	20.29	20.15		



Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	20.15	20.23	20.07	21	0
15	QPSK	1	37	20.20	20.25	20.20		
15	QPSK	1	74	20.13	20.15	20.20		
15	QPSK	36	0	20.30	20.24	20.21	21	0
15	QPSK	36	20	20.24	20.26	20.26		
15	QPSK	36	39	20.20	20.23	20.19		
15	QPSK	75	0	20.04	20.26	20.20	21	0
15	16QAM	1	0	20.30	20.34	20.31		
15	16QAM	1	37	20.34	20.36	20.31		
15	16QAM	1	74	20.35	20.34	20.30	21	0
15	16QAM	36	0	20.31	20.30	20.27		
15	16QAM	36	20	20.26	20.28	20.29		
15	16QAM	36	39	20.27	20.21	20.14	21	0
15	16QAM	75	0	20.18	20.26	20.25		
15	64QAM	1	0	19.86	20.02	20.11		
15	64QAM	1	37	19.90	20.20	20.14	21	0
15	64QAM	1	74	19.88	19.97	20.09		
15	64QAM	36	0	19.95	20.00	20.20		
15	64QAM	36	20	19.98	19.95	20.15	21	0
15	64QAM	36	39	19.96	19.92	20.18		
15	64QAM	75	0	20.06	20.17	20.08		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	20.10	20.19	20.03	21	0
10	QPSK	1	25	20.06	20.18	20.15		
10	QPSK	1	49	20.15	20.31	20.05		
10	QPSK	25	0	20.30	20.15	19.96	21	0
10	QPSK	25	12	20.24	20.30	20.18		
10	QPSK	25	25	20.21	20.15	20.15		
10	QPSK	50	0	20.10	20.24	20.18	21	0
10	16QAM	1	0	20.35	20.34	20.42		
10	16QAM	1	25	20.34	20.31	20.31		
10	16QAM	1	49	20.31	20.21	20.28	21	0
10	16QAM	25	0	20.26	20.15	20.22		
10	16QAM	25	12	20.20	20.26	20.26		
10	16QAM	25	25	20.18	20.17	20.15	21	0
10	16QAM	50	0	20.13	20.22	20.21		
10	64QAM	1	0	19.87	20.13	20.17		
10	64QAM	1	25	19.95	20.10	20.18	21	0
10	64QAM	1	49	19.91	20.05	20.18		
10	64QAM	25	0	19.98	20.05	20.27		
10	64QAM	25	12	19.98	20.06	20.27	21	0
10	64QAM	25	25	19.99	19.98	20.22		
10	64QAM	50	0	20.11	20.19	20.13		



Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	20.10	20.17	20.01	21	0
5	QPSK	1	12	20.20	20.21	20.15		
5	QPSK	1	24	20.05	20.04	20.03		
5	QPSK	12	0	20.27	20.15	20.19	21	0
5	QPSK	12	7	20.20	20.24	20.22		
5	QPSK	12	13	20.15	20.14	20.15		
5	QPSK	25	0	20.06	20.20	20.17	21	0
5	16QAM	1	0	20.40	20.38	20.35		
5	16QAM	1	12	20.38	20.42	20.36		
5	16QAM	1	24	20.33	20.36	20.27	21	0
5	16QAM	12	0	20.26	20.23	20.21		
5	16QAM	12	7	20.20	20.18	20.26		
5	16QAM	12	13	20.19	20.15	20.11	21	0
5	16QAM	25	0	20.15	20.18	20.10		
5	64QAM	1	0	19.82	20.09	20.05		
5	64QAM	1	12	19.93	20.24	20.23	21	0
5	64QAM	1	24	19.89	20.09	20.04		
5	64QAM	12	0	20.06	20.11	20.10		
5	64QAM	12	7	20.12	20.18	20.17	21	0
5	64QAM	12	13	20.07	20.11	20.14		
5	64QAM	25	0	20.08	20.09	20.11		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	20.08	20.14	19.98	21	0
3	QPSK	1	8	20.15	20.18	20.16		
3	QPSK	1	14	20.03	20.01	20.00		
3	QPSK	8	0	20.20	20.20	20.15	21	0
3	QPSK	8	4	20.19	20.21	20.19		
3	QPSK	8	7	20.13	20.16	20.16		
3	QPSK	15	0	20.03	20.17	20.14	21	0
3	16QAM	1	0	20.37	20.31	20.38		
3	16QAM	1	8	20.38	20.39	20.33		
3	16QAM	1	14	20.20	20.37	20.21	21	0
3	16QAM	8	0	20.20	20.20	20.18		
3	16QAM	8	4	20.15	20.25	20.26		
3	16QAM	8	7	20.13	20.12	20.08	21	0
3	16QAM	15	0	20.05	20.15	20.15		
3	64QAM	1	0	19.75	19.90	19.98		
3	64QAM	1	8	19.83	20.00	20.08	21	0
3	64QAM	1	14	19.75	19.90	19.96		
3	64QAM	8	0	19.96	20.05	20.00		
3	64QAM	8	4	20.02	20.08	20.07	21	0
3	64QAM	8	7	19.97	20.02	20.03		
3	64QAM	15	0	19.98	19.99	20.02		



Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	20.10	20.16	20.00	21	0
1.4	QPSK	1	3	20.21	20.20	20.15		
1.4	QPSK	1	5	20.15	20.03	20.02		
1.4	QPSK	3	0	20.28	20.21	20.04		
1.4	QPSK	3	1	20.20	20.23	20.21		
1.4	QPSK	3	3	20.17	20.15	20.17		
1.4	QPSK	6	0	20.15	20.19	20.16	21	0
1.4	16QAM	1	0	20.41	20.31	20.39	21	0
1.4	16QAM	1	3	20.31	20.41	20.31		
1.4	16QAM	1	5	20.31	20.28	20.25		
1.4	16QAM	3	0	20.26	20.22	20.20		
1.4	16QAM	3	1	20.21	20.20	20.23		
1.4	16QAM	3	3	20.15	20.14	20.08		
1.4	16QAM	6	0	20.10	20.15	20.18	21	0
1.4	64QAM	1	0	19.80	20.07	19.94	21	0
1.4	64QAM	1	3	19.88	20.18	20.03		
1.4	64QAM	1	5	19.85	20.08	20.05		
1.4	64QAM	3	0	19.99	20.06	20.08		
1.4	64QAM	3	1	20.02	20.14	20.11		
1.4	64QAM	3	3	19.97	20.08	20.06		
1.4	64QAM	6	0	20.02	20.01	20.03	21	0



<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	21.59	21.67	21.65	22.5	0
20	QPSK	1	49	21.60	21.66	21.67		
20	QPSK	1	99	21.60	21.65	21.65		
20	QPSK	50	0	21.59	21.66	21.59	22.5	0
20	QPSK	50	24	21.60	21.65	21.50		
20	QPSK	50	50	21.40	21.43	21.35		
20	QPSK	100	0	21.51	21.52	21.51	22.5	0
20	16QAM	1	0	21.75	21.80	21.80		
20	16QAM	1	49	21.80	21.85	21.81		
20	16QAM	1	99	21.50	21.55	21.50	22	0.5
20	16QAM	50	0	21.06	21.11	21.15		
20	16QAM	50	24	21.15	21.18	21.06		
20	16QAM	50	50	20.92	20.92	21.00	22	0.5
20	16QAM	100	0	20.92	21.00	20.99		
20	64QAM	1	0	21.00	20.87	21.15		
20	64QAM	1	49	20.99	20.79	20.87	21	1.5
20	64QAM	1	99	20.81	21.04	20.80		
20	64QAM	50	0	19.82	19.89	19.84		
20	64QAM	50	24	19.93	19.95	19.72	21	1.5
20	64QAM	50	50	19.91	19.68	19.73		
20	64QAM	100	0	19.98	19.70	19.79		





Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	21.57	21.57	21.62	22.5	0
15	QPSK	1	37	21.57	21.60	21.63		
15	QPSK	1	74	21.51	21.31	21.30		
15	QPSK	36	0	21.56	21.55	21.65	22.5	0
15	QPSK	36	20	21.50	21.62	21.47		
15	QPSK	36	39	21.37	21.25	21.30		
15	QPSK	75	0	21.48	21.49	21.48	22.5	0
15	16QAM	1	0	21.62	21.65	21.60		
15	16QAM	1	37	21.77	21.70	21.65		
15	16QAM	1	74	21.51	21.52	21.45	22	0.5
15	16QAM	36	0	21.00	21.08	21.35		
15	16QAM	36	20	21.12	21.10	21.03		
15	16QAM	36	39	20.85	20.85	21.15	22	0.5
15	16QAM	75	0	20.80	20.90	20.96		
15	64QAM	1	0	20.86	21.00	21.11		
15	64QAM	1	37	20.88	20.89	20.84	21	1.5
15	64QAM	1	74	20.86	20.77	20.80		
15	64QAM	36	0	19.81	19.87	19.83		
15	64QAM	36	20	19.85	19.91	19.74	21	1.5
15	64QAM	36	39	19.84	19.83	19.56		
15	64QAM	75	0	19.94	19.78	19.76		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	21.50	21.51	21.56	22.5	0
10	QPSK	1	25	21.51	21.55	21.55		
10	QPSK	1	49	21.21	21.25	21.21		
10	QPSK	25	0	21.56	21.51	21.49	22.5	0
10	QPSK	25	12	21.51	21.56	21.41		
10	QPSK	25	25	21.50	21.30	21.30		
10	QPSK	50	0	21.42	21.36	21.37	22.5	0
10	16QAM	1	0	21.55	21.51	21.71		
10	16QAM	1	25	21.65	21.56	21.38		
10	16QAM	1	49	21.39	21.30	21.41	22	0.5
10	16QAM	25	0	20.95	20.95	21.10		
10	16QAM	25	12	21.15	21.09	20.95		
10	16QAM	25	25	20.83	20.86	20.91	22	0.5
10	16QAM	50	0	20.92	20.91	21.06		
10	64QAM	1	0	21.10	20.95	20.80		
10	64QAM	1	25	21.07	20.87	20.87	21	1.5
10	64QAM	1	49	21.15	21.07	20.85		
10	64QAM	25	0	19.70	19.81	19.74		
10	64QAM	25	12	19.88	19.87	19.68	21	1.5
10	64QAM	25	25	19.81	19.87	19.54		
10	64QAM	50	0	19.80	19.76	19.61		



Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	21.52	21.53	21.58	22.5	0
5	QPSK	1	12	21.52	21.59	21.60		
5	QPSK	1	24	21.23	21.27	21.48		
5	QPSK	12	0	21.52	21.51	21.51	22.5	0
5	QPSK	12	7	21.51	21.58	21.43		
5	QPSK	12	13	21.33	21.30	21.30		
5	QPSK	25	0	21.45	21.45	21.44	22.5	0
5	16QAM	1	0	21.68	21.49	21.49		
5	16QAM	1	12	21.62	21.51	21.55		
5	16QAM	1	24	21.43	21.49	21.43	22	0.5
5	16QAM	12	0	21.15	21.15	21.15		
5	16QAM	12	7	21.08	21.11	20.99		
5	16QAM	12	13	20.85	20.95	21.15	22	0.5
5	16QAM	25	0	20.85	20.93	20.92		
5	64QAM	1	0	20.73	20.78	20.68		
5	64QAM	1	12	20.66	20.86	20.58	22	0.5
5	64QAM	1	24	20.59	21.06	20.65		
5	64QAM	12	0	19.74	19.77	19.56		
5	64QAM	12	7	19.74	19.83	19.58	21	1.5
5	64QAM	12	13	19.75	19.74	19.50		
5	64QAM	25	0	19.85	19.79	19.67		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	21.49	21.50	21.55	22.5	0
3	QPSK	1	8	21.50	21.56	21.57		
3	QPSK	1	14	21.15	21.50	21.20		
3	QPSK	8	0	21.49	21.50	21.35	22.5	0
3	QPSK	8	4	21.48	21.48	21.40		
3	QPSK	8	7	21.30	21.33	21.15		
3	QPSK	15	0	21.49	21.49	21.41	22.5	0
3	16QAM	1	0	21.65	21.70	21.49		
3	16QAM	1	8	21.55	21.48	21.71		
3	16QAM	1	14	21.40	21.45	21.48	22	0.5
3	16QAM	8	0	21.10	21.15	21.05		
3	16QAM	8	4	21.05	21.08	21.01		
3	16QAM	8	7	20.80	20.95	20.90	22	0.5
3	16QAM	15	0	20.82	20.90	20.85		
3	64QAM	1	0	21.03	20.86	20.81		
3	64QAM	1	8	20.80	20.87	20.66	21	1.5
3	64QAM	1	14	20.72	21.05	20.81		
3	64QAM	8	0	19.88	19.97	19.79		
3	64QAM	8	4	20.11	20.08	19.68	21	1.5
3	64QAM	8	7	19.95	19.99	19.62		
3	64QAM	15	0	19.87	19.92	19.65		



Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	21.47	21.48	21.53	22.5	0
1.4	QPSK	1	3	21.48	21.54	21.55		
1.4	QPSK	1	5	21.37	21.39	21.49		
1.4	QPSK	3	0	21.47	21.48	21.47		
1.4	QPSK	3	1	21.36	21.51	21.15		
1.4	QPSK	3	3	21.28	21.31	21.23		
1.4	QPSK	6	0	21.49	21.55	21.39	22.5	0
1.4	16QAM	1	0	21.63	21.68	21.55	22.5	0
1.4	16QAM	1	3	21.51	21.51	21.56		
1.4	16QAM	1	5	21.38	21.43	21.38		
1.4	16QAM	3	0	20.95	21.10	21.10		
1.4	16QAM	3	1	21.03	21.06	21.04		
1.4	16QAM	3	3	20.90	21.06	21.05		
1.4	16QAM	6	0	20.80	20.88	20.96	22	0.5
1.4	64QAM	1	0	20.63	20.62	20.43	22	0.5
1.4	64QAM	1	3	20.63	20.64	20.35		
1.4	64QAM	1	5	20.59	20.54	20.50		
1.4	64QAM	3	0	20.74	20.79	20.52		
1.4	64QAM	3	1	20.49	20.57	20.49		
1.4	64QAM	3	3	20.73	20.70	20.38		
1.4	64QAM	6	0	19.87	19.93	19.66	21	1.5



**<WWAN Bottom Antenna --Reduced Power for Hotspot On>**

**<LTE Band 2>**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	19.34	19.36	19.29	20	0
20	QPSK	1	49	19.15	19.28	19.16		
20	QPSK	1	99	19.08	19.09	19.10		
20	QPSK	50	0	19.25	19.36	19.30	20	0
20	QPSK	50	24	19.35	19.33	19.32		
20	QPSK	50	50	19.21	19.30	19.16		
20	QPSK	100	0	19.23	19.33	19.22	20	0
20	16QAM	1	0	19.45	19.42	19.43		
20	16QAM	1	49	19.60	19.58	19.57		
20	16QAM	1	99	19.35	19.36	19.39	20	0
20	16QAM	50	0	19.24	19.34	19.28		
20	16QAM	50	24	19.34	19.33	19.30		
20	16QAM	50	50	19.21	19.30	19.15	20	0
20	16QAM	100	0	19.22	19.32	19.20		
20	64QAM	1	0	19.33	19.31	19.28		
20	64QAM	1	49	19.49	19.46	19.45	20	0
20	64QAM	1	99	19.20	19.23	19.28		
20	64QAM	50	0	19.24	19.33	19.25		
20	64QAM	50	24	19.30	19.31	19.29	20	0
20	64QAM	50	50	19.21	19.28	19.13		
20	64QAM	100	0	19.22	19.31	19.21		



Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	19.22	19.24	19.21	20	0
15	QPSK	1	37	19.31	19.32	19.31		
15	QPSK	1	74	19.19	19.18	19.20		
15	QPSK	36	0	19.20	19.26	19.26	20	0
15	QPSK	36	20	19.25	19.27	19.27		
15	QPSK	36	39	19.26	19.26	19.17		
15	QPSK	75	0	19.24	19.29	19.25	20	0
15	16QAM	1	0	19.50	19.47	19.49		
15	16QAM	1	37	19.59	19.60	19.56		
15	16QAM	1	74	19.48	19.46	19.47	20	0
15	16QAM	36	0	19.24	19.28	19.26		
15	16QAM	36	20	19.26	19.27	19.23		
15	16QAM	36	39	19.25	19.28	19.19	20	0
15	16QAM	75	0	19.23	19.28	19.24		
15	64QAM	1	0	19.39	19.39	19.38		
15	64QAM	1	37	19.48	19.46	19.42	20	0
15	64QAM	1	74	19.34	19.32	19.36		
15	64QAM	36	0	19.22	19.27	19.25		
15	64QAM	36	20	19.25	19.25	19.24	20	0
15	64QAM	36	39	19.25	19.26	19.18		
15	64QAM	75	0	19.23	19.27	19.25		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	19.24	19.30	19.26	20	0
10	QPSK	1	25	19.27	19.30	19.31		
10	QPSK	1	49	19.24	19.21	19.24		
10	QPSK	25	0	19.19	19.26	19.23	20	0
10	QPSK	25	12	19.27	19.27	19.28		
10	QPSK	25	25	19.24	19.23	19.16		
10	QPSK	50	0	19.22	19.28	19.23	20	0
10	16QAM	1	0	19.57	19.57	19.53		
10	16QAM	1	25	19.58	19.61	19.57		
10	16QAM	1	49	19.53	19.50	19.53	20	0
10	16QAM	25	0	19.21	19.27	19.25		
10	16QAM	25	12	19.29	19.31	19.28		
10	16QAM	25	25	19.22	19.23	19.20	20	0
10	16QAM	50	0	19.23	19.25	19.21		
10	64QAM	1	0	19.45	19.46	19.39		
10	64QAM	1	25	19.47	19.48	19.50	20	0
10	64QAM	1	49	19.41	19.38	19.42		
10	64QAM	25	0	19.20	19.25	19.26		
10	64QAM	25	12	19.25	19.28	19.29	20	0
10	64QAM	25	25	19.23	19.23	19.17		
10	64QAM	50	0	19.21	19.24	19.19		



Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	19.14	19.19	19.14	20	0
5	QPSK	1	12	19.25	19.26	19.25		
5	QPSK	1	24	19.10	19.14	19.16		
5	QPSK	12	0	19.17	19.23	19.22	20	0
5	QPSK	12	7	19.24	19.25	19.27		
5	QPSK	12	13	19.18	19.22	19.21		
5	QPSK	25	0	19.19	19.21	19.20	20	0
5	16QAM	1	0	19.42	19.45	19.43		
5	16QAM	1	12	19.54	19.57	19.54		
5	16QAM	1	24	19.41	19.44	19.46	20	0
5	16QAM	12	0	19.17	19.21	19.21		
5	16QAM	12	7	19.24	19.27	19.26		
5	16QAM	12	13	19.18	19.21	19.19	20	0
5	16QAM	12	7	19.24	19.27	19.26		
5	16QAM	12	13	19.18	19.21	19.19		
5	16QAM	25	0	19.22	19.25	19.23	20	0
5	64QAM	1	0	19.30	19.32	19.32		
5	64QAM	1	12	19.46	19.44	19.46		
5	64QAM	1	24	19.26	19.30	19.35	20	0
5	64QAM	12	0	19.15	19.21	19.21		
5	64QAM	12	7	19.19	19.23	19.21		
5	64QAM	12	13	19.16	19.17	19.18	20	0
5	64QAM	12	13	19.16	19.17	19.18		
5	64QAM	25	0	19.20	19.24	19.22		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	18.91	18.91	18.90	20	0
3	QPSK	1	8	18.98	19.00	19.00		
3	QPSK	1	14	18.88	18.90	18.90		
3	QPSK	8	0	19.11	19.14	19.15	20	0
3	QPSK	8	4	19.19	19.21	19.19		
3	QPSK	8	7	19.10	19.13	19.13		
3	QPSK	15	0	19.10	19.13	19.11	20	0
3	16QAM	1	0	19.19	19.20	19.16		
3	16QAM	1	8	19.29	19.24	19.24		
3	16QAM	1	14	19.17	19.21	19.22	20	0
3	16QAM	8	0	19.17	19.19	19.17		
3	16QAM	8	4	19.21	19.24	19.25		
3	16QAM	8	7	19.17	19.18	19.17	20	0
3	16QAM	15	0	19.11	19.15	19.13		
3	64QAM	1	0	19.05	19.09	19.06		
3	64QAM	1	8	19.18	19.17	19.20	20	0
3	64QAM	1	14	19.07	19.03	19.07		
3	64QAM	8	0	19.11	19.15	19.12		
3	64QAM	8	4	19.18	19.22	19.20	20	0
3	64QAM	8	7	19.11	19.15	19.12		
3	64QAM	15	0	19.07	19.11	19.08		



Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	19.01	19.05	19.02	20	0
1.4	QPSK	1	3	19.07	19.11	19.12		
1.4	QPSK	1	5	19.02	19.05	19.03		
1.4	QPSK	3	0	19.14	19.14	19.14		
1.4	QPSK	3	1	19.15	19.18	19.16		
1.4	QPSK	3	3	19.13	19.16	19.15		
1.4	QPSK	6	0	19.23	19.25	19.22	20	0
1.4	16QAM	1	0	19.27	19.34	19.27	20	0
1.4	16QAM	1	3	19.38	19.43	19.40		
1.4	16QAM	1	5	19.26	19.32	19.31		
1.4	16QAM	3	0	19.15	19.14	19.15		
1.4	16QAM	3	1	19.17	19.20	19.19		
1.4	16QAM	3	3	19.13	19.19	19.16		
1.4	16QAM	6	0	19.32	19.34	19.33	20	0
1.4	64QAM	1	0	19.15	19.21	19.21	20	0
1.4	64QAM	1	3	19.24	19.27	19.24		
1.4	64QAM	1	5	19.13	19.19	19.19		
1.4	64QAM	3	0	19.19	19.20	19.19		
1.4	64QAM	3	1	19.19	19.22	19.22		
1.4	64QAM	3	3	19.19	19.21	19.21		
1.4	64QAM	6	0	19.25	19.27	19.26	20	0



<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	21.59	21.67	21.65	22.5	0
20	QPSK	1	49	21.60	21.66	21.67		
20	QPSK	1	99	21.60	21.65	21.65		
20	QPSK	50	0	21.59	21.66	21.59	22.5	0
20	QPSK	50	24	21.60	21.65	21.50		
20	QPSK	50	50	21.40	21.43	21.35		
20	QPSK	100	0	21.51	21.52	21.51	22.5	0
20	16QAM	1	0	21.75	21.80	21.80		
20	16QAM	1	49	21.80	21.85	21.81		
20	16QAM	1	99	21.50	21.55	21.50	22	0.5
20	16QAM	50	0	21.06	21.11	21.15		
20	16QAM	50	24	21.15	21.18	21.06		
20	16QAM	50	50	20.92	20.92	21.00	22	0.5
20	16QAM	100	0	20.92	21.00	20.99		
20	64QAM	1	0	21.00	20.87	21.15		
20	64QAM	1	49	20.99	20.79	20.87	21	1.5
20	64QAM	1	99	20.81	21.04	20.80		
20	64QAM	50	0	19.82	19.89	19.84		
20	64QAM	50	24	19.93	19.95	19.72	21	1.5
20	64QAM	50	50	19.91	19.68	19.73		
20	64QAM	100	0	19.98	19.70	19.79		





Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	21.57	21.57	21.62	22.5	0
15	QPSK	1	37	21.57	21.60	21.63		
15	QPSK	1	74	21.51	21.31	21.30		
15	QPSK	36	0	21.56	21.55	21.65	22.5	0
15	QPSK	36	20	21.50	21.62	21.47		
15	QPSK	36	39	21.37	21.25	21.30		
15	QPSK	75	0	21.48	21.49	21.48	22.5	0
15	16QAM	1	0	21.62	21.65	21.60		
15	16QAM	1	37	21.77	21.70	21.65		
15	16QAM	1	74	21.51	21.52	21.45	22	0.5
15	16QAM	36	0	21.00	21.08	21.35		
15	16QAM	36	20	21.12	21.10	21.03		
15	16QAM	36	39	20.85	20.85	21.15	22	0.5
15	16QAM	75	0	20.80	20.90	20.96		
15	64QAM	1	0	20.86	21.00	21.11		
15	64QAM	1	37	20.88	20.89	20.84	22	0.5
15	64QAM	1	74	20.86	20.77	20.80		
15	64QAM	36	0	19.81	19.87	19.83		
15	64QAM	36	20	19.85	19.91	19.74	21	1.5
15	64QAM	36	39	19.84	19.83	19.56		
15	64QAM	75	0	19.94	19.78	19.76		
Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	21.50	21.51	21.56	22.5	0
10	QPSK	1	25	21.51	21.55	21.55		
10	QPSK	1	49	21.21	21.25	21.21		
10	QPSK	25	0	21.56	21.51	21.49	22.5	0
10	QPSK	25	12	21.51	21.56	21.41		
10	QPSK	25	25	21.50	21.30	21.30		
10	QPSK	50	0	21.42	21.36	21.37	22.5	0
10	16QAM	1	0	21.55	21.51	21.71		
10	16QAM	1	25	21.65	21.56	21.38		
10	16QAM	1	49	21.39	21.30	21.41	22	0.5
10	16QAM	25	0	20.95	20.95	21.10		
10	16QAM	25	12	21.15	21.09	20.95		
10	16QAM	25	25	20.83	20.86	20.91	22	0.5
10	16QAM	50	0	20.92	20.91	21.06		
10	64QAM	1	0	21.10	20.95	20.80		
10	64QAM	1	25	21.07	20.87	20.87	21	1.5
10	64QAM	1	49	21.15	21.07	20.85		
10	64QAM	25	0	19.70	19.81	19.74		
10	64QAM	25	12	19.88	19.87	19.68	21	1.5
10	64QAM	25	25	19.81	19.87	19.54		
10	64QAM	50	0	19.80	19.76	19.61		



Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	21.52	21.53	21.58	22.5	0
5	QPSK	1	12	21.52	21.59	21.60		
5	QPSK	1	24	21.23	21.27	21.48		
5	QPSK	12	0	21.52	21.51	21.51	22.5	0
5	QPSK	12	7	21.51	21.58	21.43		
5	QPSK	12	13	21.33	21.30	21.30		
5	QPSK	25	0	21.45	21.45	21.44	22.5	0
5	16QAM	1	0	21.68	21.49	21.49		
5	16QAM	1	12	21.62	21.51	21.55		
5	16QAM	1	24	21.43	21.49	21.43	22	0.5
5	16QAM	12	0	21.15	21.15	21.15		
5	16QAM	12	7	21.08	21.11	20.99		
5	16QAM	12	13	20.85	20.95	21.15	22	0.5
5	16QAM	25	0	20.85	20.93	20.92		
5	64QAM	1	0	20.73	20.78	20.68		
5	64QAM	1	12	20.66	20.86	20.58	22	0.5
5	64QAM	1	24	20.59	21.06	20.65		
5	64QAM	12	0	19.74	19.77	19.56		
5	64QAM	12	7	19.74	19.83	19.58	21	1.5
5	64QAM	12	13	19.75	19.74	19.50		
5	64QAM	25	0	19.85	19.79	19.67		
Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	21.49	21.50	21.55	22.5	0
3	QPSK	1	8	21.50	21.56	21.57		
3	QPSK	1	14	21.15	21.50	21.20		
3	QPSK	8	0	21.49	21.50	21.35	22.5	0
3	QPSK	8	4	21.48	21.48	21.40		
3	QPSK	8	7	21.30	21.33	21.15		
3	QPSK	15	0	21.49	21.49	21.41	22.5	0
3	16QAM	1	0	21.65	21.70	21.49		
3	16QAM	1	8	21.55	21.48	21.71		
3	16QAM	1	14	21.40	21.45	21.48	22	0.5
3	16QAM	8	0	21.10	21.15	21.05		
3	16QAM	8	4	21.05	21.08	21.01		
3	16QAM	8	7	20.80	20.95	20.90	22	0.5
3	16QAM	15	0	20.82	20.90	20.85		
3	64QAM	1	0	21.03	20.86	20.81		
3	64QAM	1	8	20.80	20.87	20.66	21	1.5
3	64QAM	1	14	20.72	21.05	20.81		
3	64QAM	8	0	19.88	19.97	19.79		
3	64QAM	8	4	20.11	20.08	19.68	21	1.5
3	64QAM	8	7	19.95	19.99	19.62		
3	64QAM	15	0	19.87	19.92	19.65		



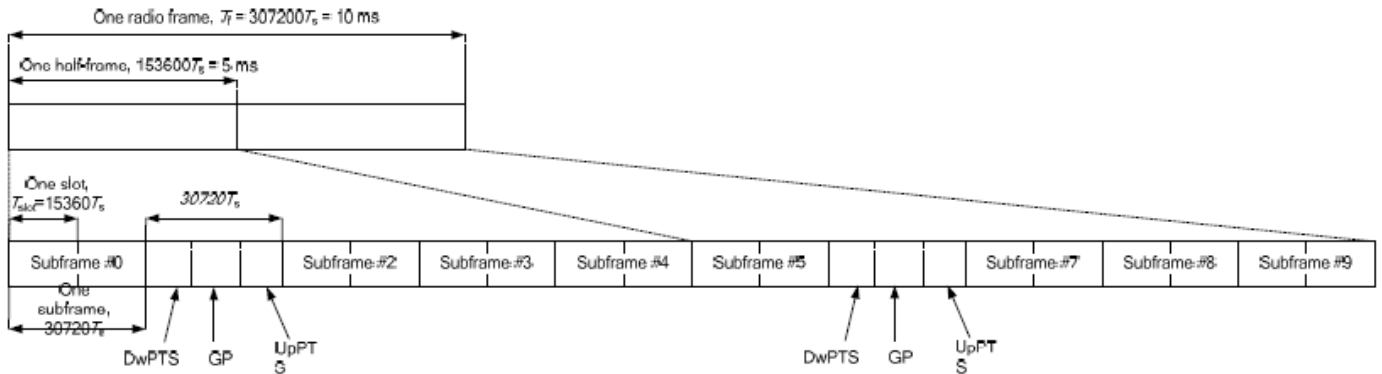
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	21.47	21.48	21.53	22.5	0
1.4	QPSK	1	3	21.48	21.54	21.55		
1.4	QPSK	1	5	21.37	21.39	21.49		
1.4	QPSK	3	0	21.47	21.48	21.47		
1.4	QPSK	3	1	21.36	21.51	21.15		
1.4	QPSK	3	3	21.28	21.31	21.23		
1.4	QPSK	6	0	21.49	21.55	21.39	22.5	0
1.4	16QAM	1	0	21.63	21.68	21.55	22.5	0
1.4	16QAM	1	3	21.51	21.51	21.56		
1.4	16QAM	1	5	21.38	21.43	21.38		
1.4	16QAM	3	0	20.95	21.10	21.10		
1.4	16QAM	3	1	21.03	21.06	21.04		
1.4	16QAM	3	3	20.90	21.06	21.05		
1.4	16QAM	6	0	20.80	20.88	20.96	22	0.5
1.4	64QAM	1	0	20.63	20.62	20.43	22	0.5
1.4	64QAM	1	3	20.63	20.64	20.35		
1.4	64QAM	1	5	20.59	20.54	20.50		
1.4	64QAM	3	0	20.74	20.79	20.52		
1.4	64QAM	3	1	20.49	20.57	20.49		
1.4	64QAM	3	3	20.73	20.70	20.38		
1.4	64QAM	6	0	19.87	19.93	19.66	21	1.5

**<TDD LTE SAR Measurement>**

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

- a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
- c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.



**Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).**

**Table 4.2-2: Uplink-downlink configurations.**

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

**Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).**

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	6592 · Ts	2192 · Ts	2560 · Ts	7680 · Ts	2192 · Ts	2560 · Ts
1	19760 · Ts			20480 · Ts		
2	21952 · Ts			23040 · Ts		
3	24144 · Ts			25600 · Ts		
4	26336 · Ts			7680 · Ts	4384 · Ts	5120 · Ts
5	6592 · Ts	4384 · Ts	5120 · Ts	20480 · Ts		
6	19760 · Ts			23040 · Ts		
7	21952 · Ts			12800 · Ts		
8	24144 · Ts			-	-	-
9	13168 · Ts			-		

Special subframe (30720·T <sub>s</sub> ): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~4	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T <sub>s</sub> ): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~3	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

- i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subframes, uplink operation is in 3 uplink subframes and 1 special subframe.
- ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is:  $(3+0.167)/5 = 63.3\%$
- iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is:  $(3+0.143)/5 = 62.9\%$
- v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix  $63.3\%/62.9\% = 1.006$  is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)\* Tune-up Scaling Factor\* scaling factor for extended cyclic prefix.



<WWAN Top/Bottom Antenna-- Full Power Mode>

<LTE Band 38>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				37850	38000	38150		
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	23.66	23.95	23.64	24	0
20	QPSK	1	49	23.90	23.78	23.86		
20	QPSK	1	99	23.78	23.69	23.73		
20	QPSK	50	0	22.80	22.97	22.77	23	1
20	QPSK	50	24	22.91	22.84	22.88		
20	QPSK	50	50	22.87	22.81	22.80		
20	QPSK	100	0	22.83	22.80	22.78		
20	16QAM	1	0	22.82	22.76	22.74	23	1
20	16QAM	1	49	22.93	22.96	22.92		
20	16QAM	1	99	22.86	22.83	22.79		
20	16QAM	50	0	21.91	21.77	21.83	22	2
20	16QAM	50	24	21.95	21.88	21.90		
20	16QAM	50	50	21.93	21.88	21.87		
20	16QAM	100	0	21.89	21.79	21.77		
20	64QAM	1	0	21.57	21.51	21.51	22	2
20	64QAM	1	49	21.73	21.70	21.66		
20	64QAM	1	99	21.62	21.58	21.64		
20	64QAM	50	0	20.86	20.72	20.75	21	3
20	64QAM	50	24	20.92	20.83	20.85		
20	64QAM	50	50	20.84	20.89	20.81		
20	64QAM	100	0	20.95	20.88	20.85		



Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	23.75	23.73	23.72	24	0
15	QPSK	1	37	23.90	23.85	23.90		
15	QPSK	1	74	23.82	23.81	23.82		
15	QPSK	36	0	22.84	22.77	22.75	23	1
15	QPSK	36	20	22.88	22.79	22.87		
15	QPSK	36	39	22.87	22.85	22.84		
15	QPSK	75	0	22.88	22.85	22.85		
15	16QAM	1	0	22.93	22.87	22.84	23	1
15	16QAM	1	37	22.92	22.88	22.93		
15	16QAM	1	74	22.98	22.93	22.95		
15	16QAM	36	0	21.77	21.76	21.72	22	2
15	16QAM	36	20	21.90	21.78	21.87		
15	16QAM	36	39	21.87	21.83	21.80		
15	16QAM	75	0	21.90	21.87	21.88		
15	64QAM	1	0	21.70	21.61	21.59	22	2
15	64QAM	1	37	21.75	21.71	21.66		
15	64QAM	1	74	21.74	21.66	21.69		
15	64QAM	36	0	20.88	20.82	20.78	21	3
15	64QAM	36	20	20.92	20.89	20.93		
15	64QAM	36	39	20.93	20.88	20.82		
15	64QAM	75	0	20.90	20.85	20.88		
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	23.83	23.77	23.73	24	0
10	QPSK	1	25	23.88	23.80	23.83		
10	QPSK	1	49	23.94	23.84	23.86		
10	QPSK	25	0	22.87	22.80	22.81	23	1
10	QPSK	25	12	22.92	22.83	22.85		
10	QPSK	25	25	22.88	22.84	22.85		
10	QPSK	50	0	22.93	22.85	22.84		
10	16QAM	1	0	22.90	22.91	22.92	23	1
10	16QAM	1	25	22.98	22.95	22.87		
10	16QAM	1	49	22.97	22.96	22.97		
10	16QAM	25	0	21.88	21.82	21.87	22	2
10	16QAM	25	12	21.96	21.93	21.95		
10	16QAM	25	25	21.93	21.93	21.89		
10	16QAM	50	0	21.89	21.90	21.92		
10	64QAM	1	0	21.71	21.66	21.65	22	2
10	64QAM	1	25	21.75	21.67	21.62		
10	64QAM	1	49	21.76	21.73	21.71		
10	64QAM	25	0	20.86	20.80	20.83	21	3
10	64QAM	25	12	20.92	20.86	20.89		
10	64QAM	25	25	20.94	20.86	20.86		
10	64QAM	50	0	20.87	20.85	20.85		



Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	23.74	23.71	23.70	24	0
5	QPSK	1	12	23.87	23.78	23.82		
5	QPSK	1	24	23.73	23.63	23.68		
5	QPSK	12	0	22.83	22.79	22.86	23	1
5	QPSK	12	7	22.88	22.85	22.88		
5	QPSK	12	13	22.86	22.78	22.83		
5	QPSK	25	0	22.90	22.80	22.83		
5	16QAM	1	0	22.86	22.81	22.74	23	1
5	16QAM	1	12	22.95	22.94	22.93		
5	16QAM	1	24	22.90	22.84	22.86		
5	16QAM	12	0	21.86	21.79	21.85	22	2
5	16QAM	12	7	21.90	21.82	21.86		
5	16QAM	12	13	21.86	21.80	21.83		
5	16QAM	25	0	21.92	21.84	21.91		
5	64QAM	1	0	21.64	21.56	21.56	22	2
5	64QAM	1	12	21.78	21.70	21.69		
5	64QAM	1	24	21.67	21.62	21.67		
5	64QAM	12	0	20.85	20.78	20.79	21	3
5	64QAM	12	7	20.83	20.81	20.84		
5	64QAM	12	13	20.86	20.79	20.78		
5	64QAM	25	0	20.91	20.80	20.86		





**<WWAN Top Antenna --Reduced Power for Receiver On/Hotspot On>**

**<LTE Band 38>**

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				37850	38000	38150		
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	23.35	23.44	23.28	23.5	0
20	QPSK	1	49	23.43	23.40	23.38		
20	QPSK	1	99	23.39	23.36	23.37		
20	QPSK	50	0	22.95	22.79	22.76	23	0.5
20	QPSK	50	24	22.94	22.88	22.85		
20	QPSK	50	50	22.93	22.89	22.77		
20	QPSK	100	0	22.88	22.85	22.79	23	0.5
20	16QAM	1	0	22.92	22.83	22.81		
20	16QAM	1	49	22.95	22.95	22.92		
20	16QAM	1	99	22.93	22.89	22.92	22	1.5
20	16QAM	50	0	21.90	21.83	21.78		
20	16QAM	50	24	22.00	21.91	21.89		
20	16QAM	50	50	21.99	21.90	21.83	22	1.5
20	16QAM	100	0	21.89	21.87	21.79		
20	64QAM	1	0	21.25	21.28	21.29		
20	64QAM	1	49	21.30	21.38	21.30	21	2.5
20	64QAM	1	99	21.25	21.24	21.31		
20	64QAM	50	0	20.65	20.64	20.66		
20	64QAM	50	24	20.66	20.70	20.71	21	2.5
20	64QAM	50	50	20.74	20.71	20.70		
20	64QAM	100	0	20.65	20.66	20.68		



Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	23.35	23.20	23.21	23.5	0
15	QPSK	1	37	23.36	23.35	23.31		
15	QPSK	1	74	23.15	23.29	23.30		
15	QPSK	36	0	22.75	22.65	22.68	23	0.5
15	QPSK	36	20	22.65	22.81	22.78		
15	QPSK	36	39	22.86	22.78	22.65		
15	QPSK	75	0	22.70	22.75	22.74	23	0.5
15	16QAM	1	0	22.85	22.76	22.70		
15	16QAM	1	37	22.86	22.81	22.81		
15	16QAM	1	74	22.85	22.80	22.83	22	1.5
15	16QAM	36	0	21.80	21.76	21.71		
15	16QAM	36	20	21.91	21.84	21.82		
15	16QAM	36	39	21.92	21.80	21.70	21	2.5
15	16QAM	75	0	21.82	21.80	21.72		
15	64QAM	1	0	21.18	21.21	21.22		
15	64QAM	1	37	21.23	21.31	21.23	22	1.5
15	64QAM	1	74	21.18	21.17	21.24		
15	64QAM	36	0	20.58	20.57	20.59		
15	64QAM	36	20	20.59	20.63	20.64	21	2.5
15	64QAM	36	39	20.67	20.64	20.63		
15	64QAM	75	0	20.58	20.59	20.61		
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	23.31	23.25	23.30	23.5	0
10	QPSK	1	25	23.30	23.37	23.35		
10	QPSK	1	49	23.01	23.31	23.31		
10	QPSK	25	0	22.86	22.76	22.71	23	0.5
10	QPSK	25	12	22.84	22.65	22.82		
10	QPSK	25	25	22.91	22.81	22.81		
10	QPSK	50	0	22.80	22.82	22.76	23	0.5
10	16QAM	1	0	22.89	22.79	22.90		
10	16QAM	1	25	23.00	22.85	22.89		
10	16QAM	1	49	22.84	22.81	22.89	22	1.5
10	16QAM	25	0	21.82	21.69	21.69		
10	16QAM	25	12	21.97	21.84	21.76		
10	16QAM	25	25	21.94	21.87	21.80	22	1.5
10	16QAM	50	0	21.86	21.84	21.76		
10	64QAM	1	0	21.22	21.25	21.26		
10	64QAM	1	25	21.27	21.35	21.27	22	1.5
10	64QAM	1	49	21.22	21.21	21.28		
10	64QAM	25	0	20.62	20.61	20.63		
10	64QAM	25	12	20.63	20.67	20.68	21	2.5
10	64QAM	25	25	20.71	20.68	20.67		
10	64QAM	50	0	20.62	20.63	20.65		



Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	23.26	23.18	23.19	23.5	0
5	QPSK	1	12	23.34	23.31	23.31		
5	QPSK	1	24	23.25	23.24	23.28		
5	QPSK	12	0	22.76	22.70	22.65	23	0.5
5	QPSK	12	7	22.87	22.74	22.76		
5	QPSK	12	13	22.81	22.80	22.67		
5	QPSK	25	0	22.79	22.70	22.70		
5	16QAM	1	0	22.80	22.74	22.60	23	0.5
5	16QAM	1	12	22.94	22.86	22.83		
5	16QAM	1	24	22.81	22.79	22.70		
5	16QAM	12	0	21.81	21.74	21.65	22	1.5
5	16QAM	12	7	21.90	21.80	21.80		
5	16QAM	12	13	21.90	21.81	21.74		
5	16QAM	25	0	21.80	21.78	21.70		
5	64QAM	1	0	21.16	21.19	21.20	22	1.5
5	64QAM	1	12	21.21	21.29	21.21		
5	64QAM	1	24	21.16	21.15	21.22		
5	64QAM	12	0	20.56	20.55	20.57	21	2.5
5	64QAM	12	7	20.57	20.61	20.62		
5	64QAM	12	13	20.65	20.62	20.61		
5	64QAM	25	0	20.56	20.57	20.59		



**<LTE Carrier Aggregation>**

**General Note:**

- 1. This device supports Carrier Aggregation on downlink for CA\_7C /CA\_38C and uplink for CA\_7C/ CA\_38C. For the device supports bands and bandwidths and configurations are provided as follow table was according to 3GPP.
- 2. In applying the existing power measurement procedures of KDB 941225 D05A for DL CA SAR test exclusion, only the subset with the largest number of combinations of frequency bands and CCs in each row need combination, and for this device that all the configurations were choose to power measurement.
- 3. All permutations exist. No restrictions on Pcell & Scell combinations.

Index	2CC	Restriction	Completely Covered by Measurement Superset
2CC #1	CA_7C		No
2CC #2	CA_38C		No

**LTE Carrier Aggregation Conducted Power (Downlink)**

**General Note:**

- i. According to KDB941225 D05A v01r02, uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.
- ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.
- iii. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
- iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.
- v. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

$$\text{Nominal channel spacing} = \left\lceil \frac{BW_{\text{Channel}(1)} + BW_{\text{Channel}(2)} - 0.1|BW_{\text{Channel}(1)} - BW_{\text{Channel}(2)}|}{0.6} \right\rceil 0.3 \text{ [MHz]}$$

**<WWAN Top/Bottom Antenna--Full Power Mode>**

**<Two Carrier power verification>**

Configure		CA Configuration (BCS)	PCC							SCC				Power	
			LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx. Power (dBm)	Without CA Tx. Power (dBm)
Intra-Band	Contiguous	CA_7C	Band 7	20M	2560	21350	QPSK	1	49	Band 7	20M	2660.2	3152	23.75	23.82
		CA_38C	Band 38	20M	2585.1	37901	QPSK	1	0	Band 38	20M	2604.9	38099	23.81	23.95

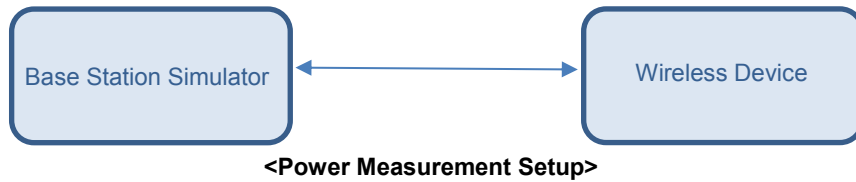
**<WWAN Top Antenna --Reduced Power for Receiver On/Hotspot On>**

**<Two Carrier power verification>**

Configure		CA Configuration (BCS)	PCC							SCC				Power	
			LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx. Power (dBm)	Without CA Tx. Power (dBm)
Intra-Band	Contiguous	CA_7C	Band 7	20M	2560	21350	QPSK	1	49	Band 7	20M	2660.2	3152	19.73	19.89
		CA_38C	Band 38	20M	2585.1	37901	QPSK	1	0	Band 38	20M	2604.9	38099	23.25	23.44

**LTE Carrier Aggregation Conducted Power (Uplink)**

1. This device supports uplink carrier aggregation for LTE CA\_7C, CA\_38C with a maximum of two 20MHz component carriers. For intra band contiguous carrier aggregation scenarios, 3GPP 36.101 Table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. For the non-contiguously allocated resource blocks which the MPR level is determined by various RB separation and RB sizes requirement, and the allowed MPR levels, settings and the conducted powers are permanently implemented in this device per the 3GPP 36.36.101 section 6.2.3A.1.3 requirements.
2. According to November 2017 TCB workshop, the output power with uplink CA active was measured for the high / middle / low channel configuration with the highest reported SAR for each exposure condition, the power was measured with wideband signal integration over both component carriers.
3. In applying the power measurement procedures of KDB 941225 D05A for DL CA to qualify for UL SAR test exclusion, power measurement is required only for the subset in each row with the largest combination of frequency bands and CCs
4. Maximum output power measurement is required for each UL CA configuration for the required test channels described in KDB 941225 D05. The required test channel should be associated with the UL PCC. For channels at the ends of a frequency band, the SCC and subsequent CCs are added to the side within the transmission band. Otherwise, the CCs should be added alternatively to either side of the PCC.



**<WWAN Top/Bottom Antenna--Full Power Mode>**

**<LTE Band 7>**

CA_7C										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
20850	21048	QPSK	1	49	0	0	1	0	23.08	24.00
21100	20902	QPSK	1	49	0	0	2	0	23.71	24.00
21350	21152	QPSK	1	49	0	0	2	0	23.69	24.00

**<LTE Band 38>**

CA_38C										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
37850	38048	QPSK	1	0	0	0	1	0	23.3	24.00
37901	38099	QPSK	1	0	0	0	1	0	23.58	24.00
38150	37952	QPSK	1	0	0	0	2	0	23.86	24.00

**<WWAN Top Antenna --Reduced Power for Receiver On/Hotspot On>**

**<LTE Band 7>**

CA_7C										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
20850	21048	QPSK	50	24	0	0	1	0	19.65	20.50
21100	20902	QPSK	50	24	0	0	2	0	19.75	20.50
21350	21152	QPSK	50	24	0	0	2	0	19.89	20.50

**<LTE Band 38>**

CA_38C										
Combination 20MHz+20MHz (100RB+100RB)										
PCC Channel	SCC Channel	Modulation	PCC		SCC		Total RB Size	Target MPR Level (dB)	Measured Power (dBm)	Tune up Power (dBm)
			RB Size	RB offset	RB Size	RB offset				
37850	38048	QPSK	1	0	0	0	1	0	22.78	23.50
37901	38099	QPSK	1	0	0	0	1	0	23.09	23.50
38150	37952	QPSK	1	0	0	0	2	0	22.73	23.50



**<WLAN Conducted Power>**

**General Note:**

4. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. For OFDM, in both 2.4 and 5 GHz bands, an initial test configuration must be determined for each standalone and aggregated frequency band, according to the transmission mode configuration with the highest maximum output power specified for production units to perform SAR measurements. If the same highest maximum output power applies to different combinations of channel bandwidths, modulations and data rates, additional procedures are applied to determine which test configurations require SAR measurement. When applicable, an initial test position may be applied to reduce the number of SAR measurements required for next to the ear, UMPC mini-tablet or hotspot mode configurations with multiple test positions.
5. For 2.4 GHz 802.11b DSSS, either the initial test position procedure for multiple exposure test positions or the DSSS procedure for fixed exposure position is applied; these are mutually exclusive. For 2.4 GHz and 5 GHz OFDM configurations, the initial test configuration is applied to measure SAR using either the initial test position procedure for multiple exposure test position configurations or the initial test configuration procedures for fixed exposure test conditions. Based on the reported SAR of the measured configurations and maximum output power of the transmission mode configurations that are not included in the initial test configuration, the subsequent test configuration and initial test position procedures are applied to determine if SAR measurements are required for the remaining OFDM transmission configurations. In general, the number of test channels that require SAR measurement is minimized based on maximum output power measured for the test sample(s).
6. For OFDM transmission configurations in the 2.4 GHz and 5 GHz bands, When the same maximum power is specified for multiple transmission modes in a frequency band, the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order 802.11a/g/n/ac mode is used for SAR measurement, on the highest measured output power channel for each frequency band.
7. DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures.18 The initial test position procedure is described in the following:
  - a. When the reported SAR of the initial test position is  $\leq 0.4$  W/kg, further SAR measurement is not required for the other test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band.
  - b. When the reported SAR of the test position is  $> 0.4$  W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is  $\leq 0.8$  W/kg or all required test position are tested.
  - c. For all positions/configurations, when the reported SAR is  $> 0.8$  W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is  $\leq 1.2$  W/kg or all required channels are tested.





**<Full Power>**

**<2.4GHz WLAN Ant.1>**

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	14.20	15.00	99.05
		6	2437	14.90	15.00	
		11	2462	16.50	17.00	
	802.11g 6Mbps	1	2412	14.10	15.00	96.54
		6	2437	16.10	16.50	
		11	2462	14.50	15.00	
	802.11n-HT20 MCS0	1	2412	13.40	14.00	96.68
		6	2437	15.00	15.50	
		11	2462	13.70	14.00	

**<2.4GHz WLAN Ant.2>**

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	13.80	15.00	98.93
		6	2437	14.40	15.00	
		11	2462	16.20	17.00	
	802.11g 6Mbps	1	2412	13.90	15.00	96.55
		6	2437	15.30	16.50	
		11	2462	14.20	15.00	
	802.11n-HT20 MCS0	1	2412	13.20	14.00	96.68
		6	2437	14.20	15.50	
		11	2462	13.50	14.00	



<5GHz WLAN Ant.1>

5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	36	5180	16.29	17.00	96.19
		40	5200	16.16	17.00	
		44	5220	16.09	17.00	
		48	5240	16.18	17.00	
	802.11n-HT20 MCS0	36	5180	16.38	16.50	95.94
		40	5200	16.30	16.50	
		44	5220	16.25	16.50	
		48	5240	16.19	16.50	
	802.11n-HT40 MCS0	38	5190	12.40	13.50	93.06
46		5230	14.71	15.50		
802.11ac-VHT20 MCS0	36	5180	15.92	16.50	96.70	
	40	5200	15.78	16.50		
	44	5220	15.72	16.50		
	48	5240	15.95	16.50		
802.11ac-VHT40 MCS0	38	5190	12.00	13.50	93.14	
	46	5230	14.80	15.50		
802.11ac-VHT80 MCS0	42	5210	10.60	12.50	88.08	

5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	52	5260	16.22	17.00	96.19
		56	5280	16.27	17.00	
		60	5300	16.24	17.00	
		64	5320	16.17	17.00	
	802.11n-HT20 MCS0	52	5260	16.36	16.50	95.94
		56	5280	16.29	16.50	
		60	5300	16.28	16.50	
		64	5320	16.30	16.50	
	802.11n-HT40 MCS0	54	5270	14.87	15.50	93.06
62		5310	12.40	15.50		
802.11ac-VHT20 MCS0	52	5260	15.97	16.50	96.70	
	56	5280	15.90	16.50		
	60	5300	15.83	16.50		
	64	5320	15.76	16.50		
802.11ac-VHT40 MCS0	54	5270	14.95	15.50	93.14	
	62	5310	12.30	13.50		
802.11ac-VHT80 MCS0	58	5290	11.20	12.00	88.08	



5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	=Duty Cycle %
	802.11a 6Mbps	100	5500	15.84	16.50	96.19
		116	5580	15.62	16.50	
		124	5620	15.64	16.50	
		132	5660	15.89	16.50	
		140	5700	13.60	14.50	
	802.11n-HT20 MCS0	100	5500	13.40	14.50	95.94
		116	5580	15.78	16.50	
		124	5620	15.89	16.50	
		132	5660	15.85	16.50	
140		5700	13.00	14.00		
802.11n-HT40 MCS0	102	5510	11.60	12.50	93.06	
	110	5550	14.43	15.50		
	126	5630	14.40	15.50		
	134	5670	14.55	15.50		
802.11ac-VHT20 MCS0	100	5500	13.10	14.50	96.70	
	116	5580	15.45	16.50		
	124	5620	15.50	16.50		
	132	5660	15.64	16.50		
	140	5700	12.60	14.00		
802.11ac-VHT40 MCS0	102	5510	11.40	12.50	93.14	
	110	5550	14.66	15.50		
	126	5630	14.51	15.50		
	134	5670	14.71	15.50		
802.11ac-VHT80 MCS0	106	5530	11.20	12.50	88.08	
	122	5610	13.90	14.50		

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a MCS0	149	5745	13.00	13.50	96.19
		157	5785	12.50	13.50	
		161	5805	12.50	13.50	
	802.11n-HT20 MCS0	149	5745	12.90	13.50	95.94
		157	5785	12.60	13.50	
		161	5805	12.30	13.50	
	802.11n-HT40 MCS0	151	5755	11.50	13.00	93.06
		159	5795	11.60	13.00	
	802.11ac-VHT20 MCS0	149	5745	12.80	13.50	96.70
157		5785	12.50	13.50		
161		5805	12.20	13.50		
802.11ac-VHT40 MCS0	151	5755	11.40	13.00	93.14	
	159	5795	11.50	13.00		
802.11ac-VHT80 MCS0	155	5775	10.80	12.00	88.08	



<5GHz WLAN Ant.2>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	12.78	14.00	96.89
		40	5200	12.62	14.00	
		44	5220	12.65	14.00	
		48	5240	12.95	14.00	
	802.11n-HT20 MCS0	36	5180	12.65	13.50	96.67
		40	5200	12.52	13.50	
		44	5220	12.55	13.50	
		48	5240	12.80	13.50	
	802.11n-HT40 MCS0	38	5190	11.69	12.50	93.10
		46	5230	11.80	12.50	
	802.11ac-VHT20 MCS0	36	5180	12.63	13.50	96.70
		40	5200	12.49	13.50	
		44	5220	12.56	13.50	
		48	5240	12.79	13.50	
802.11ac-VHT40 MCS0	38	5190	11.75	12.50	93.17	
	46	5230	11.84	12.50		
802.11ac-VHT80 MCS0	42	5210	11.10	12.50	87.50	

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a 6Mbps	52	5260	12.92	14.00	96.89
		56	5280	12.69	14.00	
		60	5300	12.54	14.00	
		64	5320	12.77	14.00	
	802.11n-HT20 MCS0	52	5260	12.78	13.50	96.67
		56	5280	12.52	13.50	
		60	5300	12.40	13.50	
		64	5320	12.66	13.50	
	802.11n-HT40 MCS0	54	5270	11.90	12.50	93.10
		62	5310	11.63	12.50	
	802.11ac-VHT20 MCS0	52	5260	12.74	13.50	96.70
		56	5280	12.61	13.50	
		60	5300	12.48	13.50	
		64	5320	12.73	13.50	
	802.11ac-VHT40 MCS0	54	5270	11.91	12.50	93.17
		62	5310	11.64	12.50	
802.11ac-VHT80 MCS0	58	5290	11.27	12.00	87.50	



5.5GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	100	5500	12.84	14.00	96.89
		116	5580	12.75	14.00	
		124	5620	12.71	14.00	
		132	5660	12.23	14.00	
		140	5700	12.42	14.00	
	802.11n-HT20 MCS0	100	5500	12.76	14.00	96.67
		116	5580	12.56	14.00	
		124	5620	12.49	14.00	
		132	5660	12.17	14.00	
140		5700	12.26	14.00		
802.11n-HT40 MCS0	102	5510	11.83	13.00	93.10	
	110	5550	11.72	13.00		
	126	5630	11.68	13.00		
	134	5670	11.30	13.00		
802.11ac-VHT20 MCS0	100	5500	12.70	14.00	96.70	
	116	5580	12.64	14.00		
	124	5620	12.57	14.00		
	132	5660	12.12	14.00		
	140	5700	12.15	14.00		
802.11ac-VHT40 MCS0	102	5510	11.85	13.00	93.17	
	110	5550	11.77	13.00		
	126	5630	11.81	13.00		
	134	5670	11.32	13.00		
802.11ac-VHT80 MCS0	106	5530	11.06	12.00	87.50	
	122	5610	10.99	12.00		

5.8GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a MCS0	149	5745	12.07	13.50	96.89
		157	5785	12.02	13.50	
		161	5805	11.86	13.50	
	802.11n-HT20 MCS0	149	5745	11.95	13.50	96.67
		157	5785	11.99	13.50	
		161	5805	11.83	13.50	
	802.11n-HT40 MCS0	151	5755	11.12	13.00	93.10
		159	5795	11.16	13.00	
	802.11ac-VHT20 MCS0	149	5745	11.92	13.50	96.70
157		5785	11.93	13.50		
161		5805	11.72	13.50		
802.11ac-VHT40 MCS0	151	5755	11.22	13.00	93.17	
	159	5795	11.16	13.00		
802.11ac-VHT80 MCS0	155	5775	10.48	12.00	87.50	



**<Reduced Power for transmitting simultaneously with WWAN/Bluetooth>**

**<2.4GHz WLAN Ant.1>**

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	13.93	15.00	99.05
		6	2437	14.21	15.00	
		11	2462	13.89	15.00	
	802.11g 6Mbps	1	2412	14.10	15.00	96.54
		6	2437	13.88	15.00	
		11	2462	14.50	15.00	
	802.11n-HT20 MCS0	1	2412	13.40	14.00	96.68
		6	2437	14.19	15.00	
		11	2462	13.70	14.00	

**<2.4GHz WLAN Ant.2>**

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	13.80	15.00	98.93
		6	2437	14.40	15.00	
		11	2462	14.22	15.00	
	802.11g 6Mbps	1	2412	13.90	15.00	96.55
		6	2437	14.40	15.00	
		11	2462	14.20	15.00	
	802.11n-HT20 MCS0	1	2412	13.20	14.00	96.68
		6	2437	14.20	15.00	
		11	2462	13.50	14.00	



<5GHz WLAN Ant.1>

5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	36	5180	13.20	14.50	96.19
		40	5200	13.02	14.50	
		44	5220	13.00	14.50	
		48	5240	13.04	14.50	
	802.11n-HT20 MCS0	36	5180	12.36	14.00	95.94
		40	5200	12.41	14.00	
		44	5220	12.46	14.00	
		48	5240	12.43	14.00	
	802.11n-HT40 MCS0	38	5190	12.40	13.50	93.06
46		5230	12.37	14.00		
802.11ac-VHT20 MCS0	36	5180	12.29	14.00	96.70	
	40	5200	12.35	14.00		
	44	5220	12.37	14.00		
	48	5240	12.28	14.00		
802.11ac-VHT40 MCS0	38	5190	12.00	13.00	93.14	
	46	5230	12.48	14.00		
802.11ac-VHT80 MCS0	42	5210	10.60	12.50	88.08	

5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	52	5260	13.05	14.50	96.19
		56	5280	13.11	14.50	
		60	5300	13.07	14.50	
		64	5320	13.02	14.50	
	802.11n-HT20 MCS0	52	5260	12.46	14.00	95.94
		56	5280	12.25	14.00	
		60	5300	12.32	14.00	
		64	5320	12.37	14.00	
	802.11n-HT40 MCS0	54	5270	12.21	14.00	93.06
		62	5310	12.31	14.00	
	802.11ac-VHT20 MCS0	52	5260	12.21	14.00	96.70
		56	5280	12.15	14.00	
		60	5300	12.28	14.00	
64		5320	12.33	14.00		
802.11ac-VHT40 MCS0	54	5270	12.31	14.00	93.14	
	62	5310	12.30	13.50		
802.11ac-VHT80 MCS0	58	5290	11.20	12.00	88.08	



	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	13.45	14.50	96.19
		116	5580	13.44	14.50	
		124	5620	13.45	14.50	
		132	5660	13.48	14.50	
		140	5700	13.46	14.50	
	802.11n-HT20 MCS0	100	5500	12.38	14.00	95.94
		116	5580	12.17	14.00	
		124	5620	12.32	14.00	
		132	5660	12.29	14.00	
		140	5700	12.20	14.00	
	802.11n-HT40 MCS0	102	5510	11.60	12.50	93.06
		110	5550	12.32	14.00	
		126	5630	12.26	14.00	
		134	5670	12.11	14.00	
	802.11ac-VHT20 MCS0	100	5500	12.36	14.00	96.70
		116	5580	12.13	14.00	
		124	5620	12.28	14.00	
		132	5660	12.21	14.00	
		140	5700	12.03	14.00	
	802.11ac-VHT40 MCS0	102	5510	11.40	12.50	93.14
		110	5550	12.39	14.00	
		126	5630	12.33	14.00	
		134	5670	12.25	14.00	
	802.11ac-VHT80 MCS0	106	5530	11.20	12.50	88.08
122		5610	12.17	14.00		





<5GHz WLAN Ant.2>

5.2GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	36	5180	10.34	11.50	96.89
		40	5200	10.31	11.50	
		44	5220	10.15	11.50	
		48	5240	10.28	11.50	
	802.11n-HT20 MCS0	36	5180	10.29	11.00	96.67
		40	5200	10.22	11.00	
		44	5220	10.16	11.00	
		48	5240	10.25	11.00	
	802.11n-HT40 MCS0	38	5190	10.69	11.00	93.10
46		5230	10.78	11.00		
802.11ac-VHT20 MCS0	36	5180	10.26	11.00	96.70	
	40	5200	10.17	11.00		
	44	5220	10.13	11.00		
	48	5240	10.22	11.00		
802.11ac-VHT40 MCS0	38	5190	10.77	11.00	93.17	
	46	5230	10.71	11.00		
802.11ac-VHT80 MCS0	42	5210	10.85	11.00	87.50	

5.3GHz WLAN	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
	802.11a 6Mbps	52	5260	10.53	11.50	96.89
		56	5280	10.39	11.50	
		60	5300	10.29	11.50	
		64	5320	10.31	11.50	
	802.11n-HT20 MCS0	52	5260	10.49	11.00	96.67
		56	5280	10.32	11.00	
		60	5300	10.23	11.00	
		64	5320	10.26	11.00	
	802.11n-HT40 MCS0	54	5270	10.39	11.00	93.10
62		5310	10.15	11.00		
802.11ac-VHT20 MCS0	52	5260	10.40	11.00	96.70	
	56	5280	10.33	11.00		
	60	5300	10.26	11.00		
	64	5320	10.18	11.00		
802.11ac-VHT40 MCS0	54	5270	10.39	11.00	93.17	
	62	5310	10.22	11.00		
802.11ac-VHT80 MCS0	58	5290	10.88	11.00	87.50	



	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a 6Mbps	100	5500	11.21	12.00	96.89
		116	5580	10.88	12.00	
		124	5620	11.02	12.00	
		132	5660	10.70	12.00	
		140	5700	10.81	12.00	
	802.11n-HT20 MCS0	100	5500	10.92	11.50	96.67
		116	5580	10.87	11.50	
		124	5620	10.79	11.50	
		132	5660	10.55	11.50	
		140	5700	10.69	11.50	
	802.11n-HT40 MCS0	102	5510	10.64	11.50	93.10
		110	5550	10.36	11.50	
		126	5630	10.28	11.50	
		134	5670	10.03	11.50	
	802.11ac-VHT20 MCS0	100	5500	10.92	11.50	96.70
		116	5580	10.86	11.50	
		124	5620	10.90	11.50	
		132	5660	10.53	11.50	
		140	5700	10.63	11.50	
	802.11ac-VHT40 MCS0	102	5510	10.65	11.50	93.17
		110	5550	10.42	11.50	
		126	5630	10.33	11.50	
		134	5670	10.03	11.50	
	802.11ac-VHT80 MCS0	106	5530	10.42	11.50	87.50
122		5610	10.37	11.50		

**<Reduced Power for Hotspot On >**

**<2.4GHz WLAN Ant.1>**

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	13.93	15.00	99.05
		6	2437	14.21	15.00	
		11	2462	13.89	15.00	
	802.11g 6Mbps	1	2412	14.10	15.00	96.54
		6	2437	13.88	15.00	
		11	2462	14.50	15.00	
	802.11n-HT20 MCS0	1	2412	13.40	14.00	96.68
		6	2437	14.19	15.00	
		11	2462	13.70	14.00	

**<2.4GHz WLAN Ant.2>**

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	13.80	15.00	98.93
		6	2437	14.40	15.00	
		11	2462	14.22	15.00	
	802.11g 6Mbps	1	2412	13.90	15.00	96.55
		6	2437	14.40	15.00	
		11	2462	14.20	15.00	
	802.11n-HT20 MCS0	1	2412	13.20	14.00	96.68
		6	2437	14.20	15.00	
		11	2462	13.50	14.00	



<5GHz WLAN Ant.1>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	13.20	14.50	96.19
		40	5200	13.02	14.50	
		44	5220	13.00	14.50	
		48	5240	13.04	14.50	
	802.11n-HT20 MCS0	36	5180	12.36	14.00	95.94
		40	5200	12.41	14.00	
		44	5220	12.46	14.00	
		48	5240	12.43	14.00	
	802.11n-HT40 MCS0	38	5190	12.40	13.50	93.06
		46	5230	12.37	14.00	
	802.11ac-VHT20 MCS0	36	5180	12.29	14.00	96.70
		40	5200	12.35	14.00	
		44	5220	12.37	14.00	
		48	5240	12.28	14.00	
	802.11ac-VHT40 MCS0	38	5190	12.00	13.00	93.14
		46	5230	12.48	14.00	
802.11ac-VHT80 MCS0	42	5210	10.60	12.50	88.08	

<5GHz WLAN Ant.2>

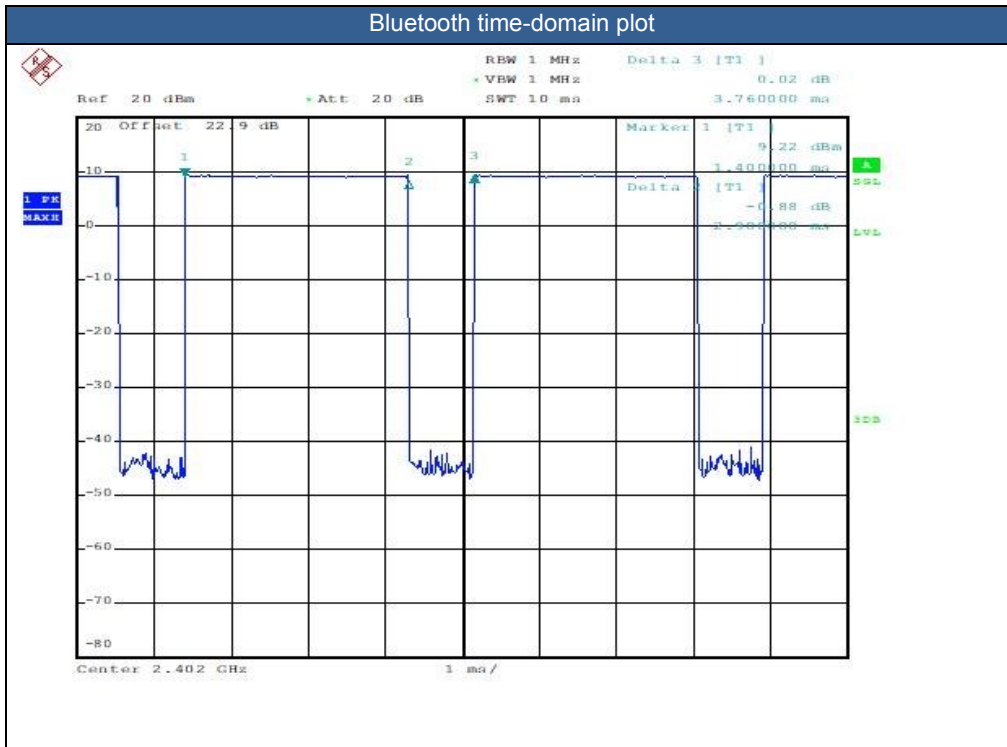
	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a 6Mbps	36	5180	10.34	11.50	96.89
		40	5200	10.31	11.50	
		44	5220	10.15	11.50	
		48	5240	10.28	11.50	
	802.11n-HT20 MCS0	36	5180	10.29	11.00	96.67
		40	5200	10.22	11.00	
		44	5220	10.16	11.00	
		48	5240	10.25	11.00	
	802.11n-HT40 MCS0	38	5190	10.69	11.00	93.10
		46	5230	10.78	11.00	
	802.11ac-VHT20 MCS0	36	5180	10.26	11.00	96.70
		40	5200	10.17	11.00	
		44	5220	10.13	11.00	
		48	5240	10.22	11.00	
	802.11ac-VHT40 MCS0	38	5190	10.77	11.00	93.17
		46	5230	10.71	11.00	
802.11ac-VHT80 MCS0	42	5210	10.85	11.00	87.50	

<2.4GHz Bluetooth>

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle are 77.13 % for Antenna1 and 76.60 % for Antenna2 as following figure, according to 2016 Oct. TCB workshop for Bluetooth SAR scaling need further consideration and the theoretical duty cycle is 83.3%, therefore the actual duty cycle will be scaled up to the theoretical value of Bluetooth reported SAR calculation.

<Bluetooth Antenna 1>

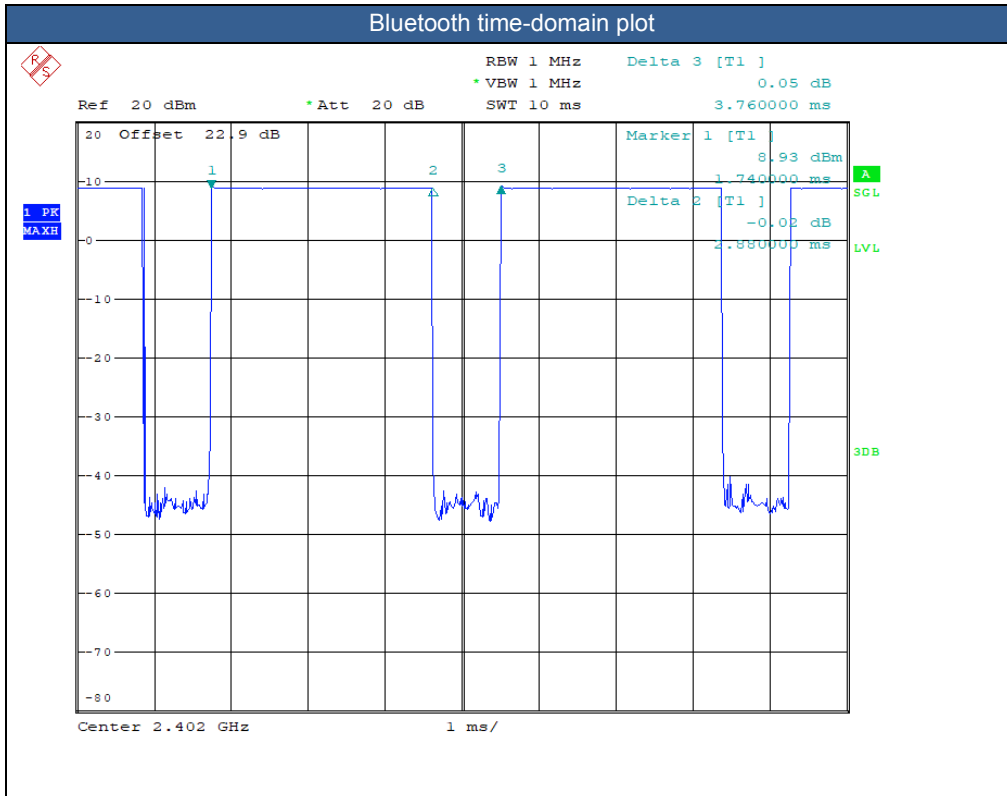


Mode	Channel	Frequency (MHz)	Data Rate
			1Mbps
BR/EDR	CH 00	2402	9.13
	CH 39	2441	9.11
	CH 78	2480	6.60
Tune-up Limit			10.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
v4.0 LE	CH 00	2402	4.40
	CH 19	2440	5.10
	CH 39	2480	2.80
Tune-up Limit			7.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
v5.0 LE	CH 00	2402	4.50
	CH 19	2440	5.20
	CH 39	2480	2.90
Tune-up Limit			6.00

<Bluetooth Antenna 2>

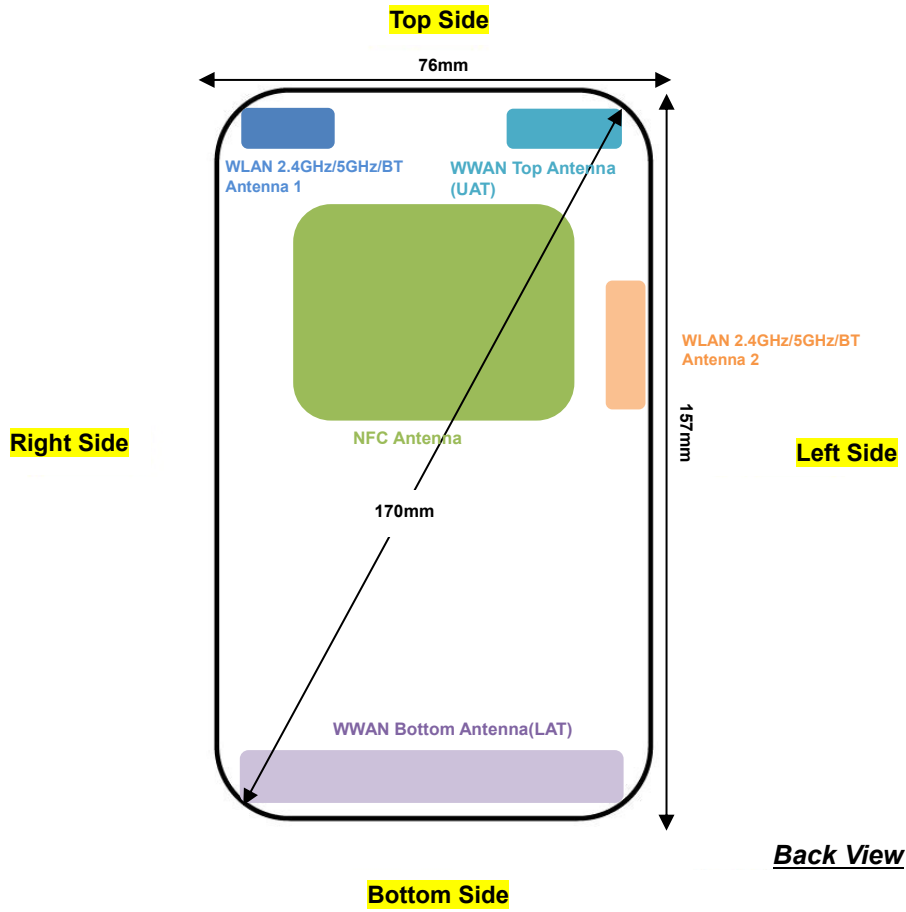


Mode	Channel	Frequency (MHz)	Data Rate
			1Mbps
BR/EDR	CH 00	2402	7.96
	CH 39	2441	7.34
	CH 78	2480	5.70
Tune-up Limit			9.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
v4.0 LE	CH 00	2402	4.00
	CH 19	2440	4.70
	CH 39	2480	2.70
Tune-up Limit			7.00

Mode	Channel	Frequency (MHz)	Average power (dBm)
			GFSK
v5.0 LE	CH 00	2402	4.10
	CH 19	2440	4.80
	CH 39	2480	2.80
Tune-up Limit			6.00

**14. Antenna Location**



Antenna	Support Band
WWAN Top Antenna	GSM: 850 / 1900 WCDMA: B2 / B4 / B5 LTE: B2 / B4 / B5 / B7 / B38
WWAN Bottom Antenna	GSM: 850 / 1900 WCDMA: B2 / B4 / B5 LTE: B2 / B4 / B5 / B7 / B38
WLAN 2.4GHz/5GHz/BT Antenna 1	WLAN 2.4GHz WLAN 5GHz Bluetooth
WLAN 2.4GHz/5GHz/BT Antenna 2	WLAN 2.4GHz WLAN 5GHz Bluetooth
NFC Antenna	NFC

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Top Antenna(UAT)	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	>25mm	≤ 25mm
WWAN Bottom Antenna(LAT)	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
WLAN 2.4GHz/5GHz/BT Antenna 1	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm
WLAN 2.4GHz/5GHz /BT Antenna 2	≤ 25mm	≤ 25mm	>25mm	>25mm	>25mm	≤ 25mm

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Top Antenna	Yes	Yes	Yes	No	No	Yes
WWAN Bottom Antenna	Yes	Yes	No	Yes	Yes	Yes
WLAN 2.4GHz/5GHz/BT Antenna 1	Yes	Yes	Yes	No	Yes	No
WLAN 2.4GHz/5GHz/BT Antenna 2	Yes	Yes	No	No	No	Yes

**General Note:**

Referring to KDB 941225 D06 v02r01, when the overall device length and width are ≥ 9cm\*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.





## **15. SAR Test Results**

### **General Note:**

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
  - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
  - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
  - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)\*Tune-up Scaling Factor
  - d. For WLAN/Bluetooth: Reported SAR(W/kg)= Measured SAR(W/kg)\* Duty Cycle scaling factor \* Tune-up scaling factor
2. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is  $\geq 0.8$ W/kg.
3. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is  $\leq 1.2$  W/kg, SAR testing with a headset connected to the handset is not required.
4. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g product specific SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg, however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold, for this device only bottom side SAR for WWAN transmitter scaled to maximum output power is higher than 1.2W/kg of GSM1900,WCDMA B2, and LTE B2, therefore product specific SAR is necessary.
5. For 5.3GHz / 5.5GHz WLAN product specific SAR is necessary too, due to an overall diagonal dimension is > 16cm.
6. For top WWAN antenna:
  - a. When the phone is in talking mode and receiver worked, then power reduction will be implemented immediately in GSM850 and LTE B7/38/7C /38C.
  - b. When hotspot mode is enabled, power reduction will be activated to GSM850 and LTE B7/38/7C /38C. For GSM850 and LTE B7/38/7C /38C full power for hotspot mode can perform pass, no need to test reduced power.
7. For bottom WWAN antenna:
  - a. The device employs proximity sensors that detect the presence of the user's body at the back or bottom faces of the device. When back or bottom of handheld state is detected, GSM1900, WCDMA B2/B4 and LTE B2/B4 for back/bottom sides of product specific 10g SAR condition reduced powers will be active for handheld state.
  - b. When hotspot mode is enabled, power reduction will be activated to GSM1900, WCDMA band II/IV, LTE band 2/4.
8. For WLAN antenna
  - a. For WLAN 2.4GHz/5.2/5.3/5.5GHz Ant1, When the phone is in talking mode, receiver worked and it transmits simultaneously with WWAN or Bluetooth for head mode, power reduction will be triggered for this scenario.
  - b. When hotspot mode is enabled, power reduction will be activated to WLAN2.4GHz/5.2GHz.
9. The 2.4GHz/5GHz WLAN & Bluetooth can transmit in SISO antenna mode only and they have no MIMO antenna mode.
10. There are two types of EUT (Sample 1 and Sample 2). According to the difference, they have no effect on SAR distribution, so only choose sample 1 to perform full testing.
11. UAT means top antenna, LAT means bottom antenna.



**GSM Note:**

1. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS (4Tx slots) for GSM850/GSM1900 are considered as the primary mode.
2. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is  $\leq \frac{1}{4}$  dB higher than the primary mode, SAR measurement is not required for the secondary mode.

**WCDMA Note:**

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is  $\leq \frac{1}{4}$  dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+.) are less than  $\frac{1}{4}$  dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.



**LTE Note:**

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4 / B5 / B38 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, 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.

**WLAN/Bluetooth Note:**

1. Per KDB 248227 D01v02r02, for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is  $\leq 1.2$  W/kg.
2. When the reported SAR of the test position is  $> 0.4$  W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position to measure the subsequent next closet/smallest test separation distance and maximum coupling test position on the highest maximum output power channel, until the report SAR is  $\leq 0.8$  W/kg or all required test position are tested.
3. For all positions / configurations, when the reported SAR is  $> 0.8$  W/kg, SAR is measured for these test positions / configurations on the subsequent next highest measured output power channel(s) until the reported SAR is  $\leq 1.2$  W/kg or all required channels are tested.
4. During SAR testing the WLAN transmission was verified using a spectrum analyzer.



15.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM 850-UAT	GPRS 4 Tx slots	Right Cheek	0	Reduced	189	836.4	28.37	28.50	1.030	-0.06	1.040	1.072
01	GSM 850-UAT	GPRS 4 Tx slots	Right Cheek	0	Reduced	128	824.2	28.48	28.50	1.005	-0.04	1.140	1.145
	GSM 850-UAT	GPRS 4 Tx slots	Right Cheek	0	Reduced	251	848.8	28.25	28.50	1.059	0.02	1.030	1.091
	GSM 850-UAT	GPRS 4 Tx slots	Right Tilted	0	Reduced	189	836.4	28.37	28.50	1.030	0.03	1.040	1.072
	GSM 850-UAT	GPRS 4 Tx slots	Right Tilted	0	Reduced	128	824.2	28.48	28.50	1.005	-0.02	1.070	1.075
	GSM 850-UAT	GPRS 4 Tx slots	Right Tilted	0	Reduced	251	848.8	28.25	28.50	1.059	0.02	0.992	1.051
	GSM 850-UAT	GPRS 4 Tx slots	Left Cheek	0	Reduced	189	836.4	28.37	28.50	1.030	0.03	0.987	1.017
	GSM 850-UAT	GPRS 4 Tx slots	Left Cheek	0	Reduced	128	824.2	28.48	28.50	1.005	0.01	1.080	1.085
	GSM 850-UAT	GPRS 4 Tx slots	Left Cheek	0	Reduced	251	848.8	28.25	28.50	1.059	0.014	0.999	1.058
	GSM 850-UAT	GPRS 4 Tx slots	Left Tilted	0	Reduced	189	836.4	28.37	28.50	1.030	0.02	0.924	0.952
	GSM 850-UAT	GPRS 4 Tx slots	Left Tilted	0	Reduced	128	824.2	28.48	28.50	1.005	0.03	0.965	0.969
	GSM 850-UAT	GPRS 4 Tx slots	Left Tilted	0	Reduced	251	848.8	28.25	28.50	1.059	0.05	0.797	0.844
	GSM 850-LAT	GPRS 4 Tx slots	Right Cheek	0	Full	128	824.2	28.97	29.00	1.007	-0.03	0.210	0.211
	GSM 850-LAT	GPRS 4 Tx slots	Right Tilted	0	Full	128	824.2	28.97	29.00	1.007	0.03	0.093	0.094
	GSM 850-LAT	GPRS 4 Tx slots	Left Cheek	0	Full	128	824.2	28.97	29.00	1.007	0.01	0.165	0.166
	GSM 850-LAT	GPRS 4 Tx slots	Left Tilted	0	Full	128	824.2	28.97	29.00	1.007	0.1	0.091	0.091
02	GSM1900-UAT	GPRS 4 Tx slots	Right Cheek	0	Full	661	1880	26.44	26.50	1.014	-0.03	0.703	0.713
	GSM1900-UAT	GPRS 4 Tx slots	Right Tilted	0	Full	661	1880	26.44	26.50	1.014	0.03	0.531	0.538
	GSM1900-UAT	GPRS 4 Tx slots	Left Cheek	0	Full	661	1880	26.44	26.50	1.014	0.02	0.468	0.475
	GSM1900-UAT	GPRS 4 Tx slots	Left Tilted	0	Full	661	1880	26.44	26.50	1.014	-0.03	0.266	0.270
	GSM1900-LAT	GPRS 4 Tx slots	Right Cheek	0	Full	661	1880	26.44	26.50	1.014	-0.08	0.074	0.075
	GSM1900-LAT	GPRS 4 Tx slots	Right Tilted	0	Full	661	1880	26.44	26.50	1.014	0.09	0.046	0.047
	GSM1900-LAT	GPRS 4 Tx slots	Left Cheek	0	Full	661	1880	26.44	26.50	1.014	-0.03	0.062	0.063
	GSM1900-LAT	GPRS 4 Tx slots	Left Tilted	0	Full	661	1880	26.44	26.50	1.014	0.03	0.054	0.055



<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
03	WCDMA II-UAT	RMC 12.2Kbps	Right Cheek	0	Full	9538	1907.6	24.08	24.50	1.102	-0.08	1.040	1.146
	WCDMA II-UAT	RMC 12.2Kbps	Right Cheek	0	Full	9262	1852.4	23.96	24.50	1.132	0.01	1.010	1.144
	WCDMA II-UAT	RMC 12.2Kbps	Right Cheek	0	Full	9400	1880	23.98	24.50	1.127	0.03	0.976	1.100
	WCDMA II-UAT	RMC 12.2Kbps	Right Tilted	0	Full	9538	1907.6	24.08	24.50	1.102	0.05	0.817	0.900
	WCDMA II-UAT	RMC 12.2Kbps	Right Tilted	0	Full	9262	1852.4	23.96	24.50	1.132	0.07	0.823	0.932
	WCDMA II-UAT	RMC 12.2Kbps	Right Tilted	0	Full	9400	1880	23.98	24.50	1.127	0.02	0.807	0.910
	WCDMA II-UAT	RMC 12.2Kbps	Left Cheek	0	Full	9538	1907.6	24.08	24.50	1.102	0.01	0.501	0.552
	WCDMA II-UAT	RMC 12.2Kbps	Left Tilted	0	Full	9538	1907.6	24.08	24.50	1.102	-0.05	0.409	0.451
	WCDMA II-LAT	RMC 12.2Kbps	Right Cheek	0	Full	9538	1907.6	24.08	24.50	1.102	0.05	0.101	0.111
	WCDMA II-LAT	RMC 12.2Kbps	Right Tilted	0	Full	9538	1907.6	24.08	24.50	1.102	0.02	0.044	0.049
	WCDMA II-LAT	RMC 12.2Kbps	Left Cheek	0	Full	9538	1907.6	24.08	24.50	1.102	0.07	0.093	0.103
	WCDMA II-LAT	RMC 12.2Kbps	Left Tilted	0	Full	9538	1907.6	24.08	24.50	1.102	0.03	0.072	0.079
	WCDMA IV-UAT	RMC 12.2Kbps	Right Cheek	0	Full	1312	1712.4	24.23	24.50	1.064	0.15	0.886	0.943
	WCDMA IV-UAT	RMC 12.2Kbps	Right Cheek	0	Full	1413	1732.6	24.10	24.50	1.096	0.14	0.925	1.014
04	WCDMA IV-UAT	RMC 12.2Kbps	Right Cheek	0	Full	1513	1752.6	24.19	24.50	1.074	0.03	1.020	1.095
	WCDMA IV-UAT	RMC 12.2Kbps	Right Tilted	0	Full	1312	1712.4	24.23	24.50	1.064	0.01	0.703	0.748
	WCDMA IV-UAT	RMC 12.2Kbps	Left Cheek	0	Full	1312	1712.4	24.23	24.50	1.064	0.07	0.680	0.724
	WCDMA IV-UAT	RMC 12.2Kbps	Left Tilted	0	Full	1312	1712.4	24.23	24.50	1.064	0.05	0.385	0.410
	WCDMA IV-LAT	RMC 12.2Kbps	Right Cheek	0	Full	1312	1712.4	24.23	24.50	1.064	0.14	0.072	0.077
	WCDMA IV-LAT	RMC 12.2Kbps	Right Tilted	0	Full	1312	1712.4	24.23	24.50	1.064	0.15	0.051	0.054
	WCDMA IV-LAT	RMC 12.2Kbps	Left Cheek	0	Full	1312	1712.4	24.23	24.50	1.064	0.03	0.078	0.083
	WCDMA IV-LAT	RMC 12.2Kbps	Left Tilted	0	Full	1312	1712.4	24.23	24.50	1.064	0.03	0.047	0.049
	WCDMA V-UAT	RMC 12.2Kbps	Right Cheek	0	Full	4132	826.4	24.12	24.50	1.091	-0.03	0.767	0.837
	WCDMA V-UAT	RMC 12.2Kbps	Right Cheek	0	Full	4182	836.4	24.04	24.50	1.112	0.01	0.834	0.927
05	WCDMA V-UAT	RMC 12.2Kbps	Right Cheek	0	Full	4233	846.6	24.01	24.50	1.119	-0.02	0.857	0.959
	WCDMA V-UAT	RMC 12.2Kbps	Right Tilted	0	Full	4132	826.4	24.12	24.50	1.091	0.07	0.714	0.779
	WCDMA V-UAT	RMC 12.2Kbps	Left Cheek	0	Full	4132	826.4	24.12	24.50	1.091	0.04	0.701	0.765
	WCDMA V-UAT	RMC 12.2Kbps	Left Tilted	0	Full	4132	826.4	24.12	24.50	1.091	0.01	0.653	0.713
	WCDMA V-LAT	RMC 12.2Kbps	Right Cheek	0	Full	4132	826.4	24.12	24.50	1.091	0.08	0.166	0.181
	WCDMA V-LAT	RMC 12.2Kbps	Right Tilted	0	Full	4132	826.4	24.12	24.50	1.091	-0.02	0.075	0.081
	WCDMA V-LAT	RMC 12.2Kbps	Left Cheek	0	Full	4132	826.4	24.12	24.50	1.091	-0.04	0.121	0.132
	WCDMA V-LAT	RMC 12.2Kbps	Left Tilted	0	Full	4132	826.4	24.12	24.50	1.091	0.02	0.072	0.078



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2-UAT	20M	QPSK	1	0	Right Cheek	0	Full	18900	1880	23.88	24.00	1.028	0.06	0.857	0.881
	LTE Band 2-UAT	20M	QPSK	1	0	Right Cheek	0	Full	18700	1860	23.69	24.00	1.074	0.03	0.852	0.915
06	LTE Band 2-UAT	20M	QPSK	1	0	Right Cheek	0	Full	19100	1900	23.57	24.00	1.104	0.06	0.970	1.071
	LTE Band 2-UAT	20M	QPSK	50	0	Right Cheek	0	Full	18900	1880	22.85	23.00	1.035	-0.01	0.830	0.859
	LTE Band 2-UAT	20M	QPSK	50	0	Right Cheek	0	Full	18700	1860	22.77	23.00	1.054	0.06	0.783	0.826
	LTE Band 2-UAT	20M	QPSK	50	0	Right Cheek	0	Full	19100	1900	22.70	23.00	1.072	0.02	0.812	0.870
	LTE Band 2-UAT	20M	QPSK	100	0	Right Cheek	0	Full	18900	1880	22.71	23.00	1.069	0.02	0.827	0.884
	LTE Band 2-UAT	20M	QPSK	1	0	Right Tilted	0	Full	18900	1880	23.88	24.00	1.028	0.01	0.724	0.744
	LTE Band 2-UAT	20M	QPSK	50	0	Right Tilted	0	Full	18900	1880	22.85	23.00	1.035	0.06	0.606	0.627
	LTE Band 2-UAT	20M	QPSK	1	0	Left Cheek	0	Full	18900	1880	23.88	24.00	1.028	0.06	0.585	0.601
	LTE Band 2-UAT	20M	QPSK	50	0	Left Cheek	0	Full	18900	1880	22.85	23.00	1.035	0.03	0.489	0.506
	LTE Band 2-UAT	20M	QPSK	1	0	Left Tilted	0	Full	18900	1880	23.88	24.00	1.028	0.01	0.315	0.324
	LTE Band 2-UAT	20M	QPSK	50	0	Left Tilted	0	Full	18900	1880	22.85	23.00	1.035	-0.03	0.239	0.247
	LTE Band 2-LAT	20M	QPSK	1	0	Right Cheek	0	Full	18900	1880	23.88	24.00	1.028	-0.18	0.089	0.092
	LTE Band 2-LAT	20M	QPSK	50	0	Right Cheek	0	Full	18900	1880	22.85	23.00	1.035	-0.09	0.084	0.086
	LTE Band 2-LAT	20M	QPSK	1	0	Right Tilted	0	Full	18900	1880	23.88	24.00	1.028	0.01	0.051	0.052
	LTE Band 2-LAT	20M	QPSK	50	0	Right Tilted	0	Full	18900	1880	22.85	23.00	1.035	0.02	0.051	0.052
	LTE Band 2-LAT	20M	QPSK	1	0	Left Cheek	0	Full	18900	1880	23.88	24.00	1.028	0.06	0.070	0.071
	LTE Band 2-LAT	20M	QPSK	50	0	Left Cheek	0	Full	18900	1880	22.85	23.00	1.035	0.06	0.064	0.067
	LTE Band 2-LAT	20M	QPSK	1	0	Left Tilted	0	Full	18900	1880	23.88	24.00	1.028	0.02	0.057	0.058
	LTE Band 2-LAT	20M	QPSK	50	0	Left Tilted	0	Full	18900	1880	22.85	23.00	1.035	0.06	0.050	0.052
07	LTE Band 4-UAT	20M	QPSK	1	0	Right Cheek	0	Full	20175	1732.5	23.74	24.00	1.062	-0.05	0.885	0.940
	LTE Band 4-UAT	20M	QPSK	50	0	Right Cheek	0	Full	20175	1732.5	22.84	23.00	1.038	0.06	0.709	0.736
	LTE Band 4-UAT	20M	QPSK	100	0	Right Cheek	0	Full	20175	1732.5	22.59	23.00	1.099	-0.04	0.723	0.795
	LTE Band 4-UAT	20M	QPSK	1	0	Right Tilted	0	Full	20175	1732.5	23.74	24.00	1.062	0.06	0.671	0.712
	LTE Band 4-UAT	20M	QPSK	50	0	Right Tilted	0	Full	20175	1732.5	22.84	23.00	1.038	0.01	0.502	0.521
	LTE Band 4-UAT	20M	QPSK	1	0	Left Cheek	0	Full	20175	1732.5	23.74	24.00	1.062	-0.02	0.540	0.573
	LTE Band 4-UAT	20M	QPSK	50	0	Left Cheek	0	Full	20175	1732.5	22.84	23.00	1.038	0.05	0.383	0.397
	LTE Band 4-UAT	20M	QPSK	1	0	Left Tilted	0	Full	20175	1732.5	23.74	24.00	1.062	0.03	0.335	0.356
	LTE Band 4-UAT	20M	QPSK	50	0	Left Tilted	0	Full	20175	1732.5	22.84	23.00	1.038	0.14	0.257	0.267
	LTE Band 4-LAT	20M	QPSK	1	0	Right Cheek	0	Full	20175	1732.5	23.74	24.00	1.062	0.11	0.061	0.065
	LTE Band 4-LAT	20M	QPSK	50	0	Right Cheek	0	Full	20175	1732.5	22.84	23.00	1.038	-0.03	0.062	0.064
	LTE Band 4-LAT	20M	QPSK	1	0	Right Tilted	0	Full	20175	1732.5	23.74	24.00	1.062	0.03	0.036	0.039
	LTE Band 4-LAT	20M	QPSK	50	0	Right Tilted	0	Full	20175	1732.5	22.84	23.00	1.038	0.05	0.037	0.039
	LTE Band 4-LAT	20M	QPSK	1	0	Left Cheek	0	Full	20175	1732.5	23.74	24.00	1.062	0.03	0.070	0.074
	LTE Band 4-LAT	20M	QPSK	50	0	Left Cheek	0	Full	20175	1732.5	22.84	23.00	1.038	0.14	0.056	0.058
	LTE Band 4-LAT	20M	QPSK	1	0	Left Tilted	0	Full	20175	1732.5	23.74	24.00	1.062	0.01	0.033	0.035
	LTE Band 4-LAT	20M	QPSK	50	0	Left Tilted	0	Full	20175	1732.5	22.84	23.00	1.038	0.06	0.029	0.030



Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 5-UAT	10M	QPSK	1	0	Right Cheek	0	Full	20525	836.5	23.77	24.00	1.054	0.06	0.774	0.816
	LTE Band 5-UAT	10M	QPSK	25	0	Right Cheek	0	Full	20525	836.5	22.64	23.00	1.086	0.06	0.573	0.623
	LTE Band 5-UAT	10M	QPSK	50	0	Right Cheek	0	Full	20525	836.5	22.66	23.00	1.081	-0.08	0.626	0.677
08	LTE Band 5-UAT	10M	QPSK	1	0	Right Tilted	0	Full	20525	836.5	23.77	24.00	1.054	0.06	0.775	0.817
	LTE Band 5-UAT	10M	QPSK	25	0	Right Tilted	0	Full	20525	836.5	22.64	23.00	1.086	0.02	0.527	0.573
	LTE Band 5-UAT	10M	QPSK	50	0	Right Tilted	0	Full	20525	836.5	22.66	23.00	1.081	0.05	0.594	0.642
	LTE Band 5-UAT	10M	QPSK	1	0	Left Cheek	0	Full	20525	836.5	23.77	24.00	1.054	0.01	0.673	0.710
	LTE Band 5-UAT	10M	QPSK	25	0	Left Cheek	0	Full	20525	836.5	22.64	23.00	1.086	0.03	0.467	0.507
	LTE Band 5-UAT	10M	QPSK	1	0	Left Tilted	0	Full	20525	836.5	23.77	24.00	1.054	0.01	0.467	0.492
	LTE Band 5-UAT	10M	QPSK	25	0	Left Tilted	0	Full	20525	836.5	22.64	23.00	1.086	0.05	0.400	0.435
	LTE Band 5-LAT	10M	QPSK	1	0	Right Cheek	0	Full	20525	836.5	23.77	24.00	1.054	-0.02	0.142	0.150
	LTE Band 5-LAT	10M	QPSK	25	0	Right Cheek	0	Full	20525	836.5	22.64	23.00	1.086	0.07	0.120	0.130
	LTE Band 5-LAT	10M	QPSK	1	0	Right Tilted	0	Full	20525	836.5	23.77	24.00	1.054	0.06	0.051	0.053
	LTE Band 5-LAT	10M	QPSK	25	0	Right Tilted	0	Full	20525	836.5	22.64	23.00	1.086	0.06	0.035	0.038
	LTE Band 5-LAT	10M	QPSK	1	0	Left Cheek	0	Full	20525	836.5	23.77	24.00	1.054	0.03	0.091	0.095
	LTE Band 5-LAT	10M	QPSK	25	0	Left Cheek	0	Full	20525	836.5	22.64	23.00	1.086	0.06	0.080	0.087
	LTE Band 5-LAT	10M	QPSK	1	0	Left Tilted	0	Full	20525	836.5	23.77	24.00	1.054	0.06	0.051	0.054
	LTE Band 5-LAT	10M	QPSK	25	0	Left Tilted	0	Full	20525	836.5	22.64	23.00	1.086	0.06	0.030	0.033
	LTE Band 7-UAT	20M	QPSK	1	49	Right Cheek	0	Reduced	21350	2560	19.89	20.50	1.151	-0.05	0.770	0.886
	LTE Band 7-UAT	20M	QPSK	1	49	Right Cheek	0	Reduced	21100	2535	19.87	20.50	1.156	0.02	0.710	0.821
	LTE Band 7-UAT	20M	QPSK	1	49	Right Cheek	0	Reduced	20850	2510	19.72	20.50	1.197	0.03	0.670	0.802
09	LTE Band 7-UAT	20M	QPSK	50	24	Right Cheek	0	Reduced	21350	2560	19.88	20.50	1.153	0.01	0.777	0.896
	LTE Band 7-UAT	20M	QPSK	50	24	Right Cheek	0	Reduced	21350+21152	2560+2540.2	19.89	20.50	1.151	0.07	0.747	0.860
	LTE Band 7-UAT	20M	QPSK	50	24	Right Cheek	0	Reduced	21100	2535	19.87	20.50	1.156	0.02	0.650	0.751
	LTE Band 7-UAT	20M	QPSK	50	24	Right Cheek	0	Reduced	20850	2510	19.73	20.50	1.194	0.03	0.681	0.813
	LTE Band 7-UAT	20M	QPSK	100	0	Right Cheek	0	Reduced	21350	2560	19.80	20.50	1.175	-0.05	0.680	0.799
	LTE Band 7-UAT	20M	QPSK	1	49	Right Tilted	0	Reduced	21350	2560	19.89	20.50	1.151	0.05	0.647	0.745
	LTE Band 7-UAT	20M	QPSK	50	24	Right Tilted	0	Reduced	21350	2560	19.88	20.50	1.153	0.06	0.657	0.758
	LTE Band 7-UAT	20M	QPSK	1	49	Left Cheek	0	Reduced	21350	2560	19.89	20.50	1.151	0.01	0.286	0.329
	LTE Band 7-UAT	20M	QPSK	50	24	Left Cheek	0	Reduced	21350	2560	19.88	20.50	1.153	0.05	0.287	0.331
	LTE Band 7-UAT	20M	QPSK	1	49	Left Tilted	0	Reduced	21350	2560	19.89	20.50	1.151	0.01	0.234	0.269
	LTE Band 7-UAT	20M	QPSK	50	24	Left Tilted	0	Reduced	21350	2560	19.88	20.50	1.153	0.06	0.233	0.269
	LTE Band 7-LAT	20M	QPSK	1	49	Right Cheek	0	Full	21350	2560	23.82	24.00	1.042	0.05	0.084	0.088
	LTE Band 7-LAT	20M	QPSK	1	49	Right Cheek	0	Full	21350+21152	2560+2540.2	23.69	24.00	1.074	0.01	0.078	0.084
	LTE Band 7-LAT	20M	QPSK	50	24	Right Cheek	0	Full	21350	2560	22.81	23.00	1.045	0.02	0.055	0.057
	LTE Band 7-LAT	20M	QPSK	1	49	Right Tilted	0	Full	21350	2560	23.82	24.00	1.042	0.01	0.069	0.072
	LTE Band 7-LAT	20M	QPSK	50	24	Right Tilted	0	Full	21350	2560	22.81	23.00	1.045	0.03	0.051	0.053
	LTE Band 7-LAT	20M	QPSK	1	49	Left Cheek	0	Full	21350	2560	23.82	24.00	1.042	0.02	0.059	0.061
	LTE Band 7-LAT	20M	QPSK	50	24	Left Cheek	0	Full	21350	2560	22.81	23.00	1.045	0.03	0.049	0.051
	LTE Band 7-LAT	20M	QPSK	1	49	Left Tilted	0	Full	21350	2560	23.82	24.00	1.042	0.07	0.041	0.043
	LTE Band 7-LAT	20M	QPSK	50	24	Left Tilted	0	Full	21350	2560	22.81	23.00	1.045	0.06	0.037	0.039



<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
10	LTE Band 38-UAT	20M	QPSK	1	0	Right Cheek	0	Reduced	38000	2595	23.44	23.50	1.014	62.9	1.006	0.01	0.949	0.968
	LTE Band 38-UAT	20M	QPSK	1	0	Right Cheek	0	Reduced	37901+38099	2585.1+2604.9	23.09	23.50	1.099	62.9	1.006	0.03	0.860	0.951
	LTE Band 38-UAT	20M	QPSK	50	0	Right Cheek	0	Reduced	38000	2595	22.79	23.00	1.050	62.9	1.006	0.01	0.887	0.937
	LTE Band 38-UAT	20M	QPSK	100	0	Right Cheek	0	Reduced	38000	2595	22.85	23.00	1.035	62.9	1.006	-0.02	0.708	0.737
	LTE Band 38-UAT	20M	QPSK	1	0	Right Tilted	0	Reduced	38000	2595	23.44	23.50	1.014	62.9	1.006	0.03	0.750	0.765
	LTE Band 38-UAT	20M	QPSK	50	0	Right Tilted	0	Reduced	38000	2595	22.79	23.00	1.050	62.9	1.006	0.11	0.688	0.726
	LTE Band 38-UAT	20M	QPSK	1	0	Left Cheek	0	Reduced	38000	2595	23.44	23.50	1.014	62.9	1.006	0.02	0.257	0.262
	LTE Band 38-UAT	20M	QPSK	50	0	Left Cheek	0	Reduced	38000	2595	22.79	23.00	1.050	62.9	1.006	0.05	0.218	0.230
	LTE Band 38-UAT	20M	QPSK	1	0	Left Tilted	0	Reduced	38000	2595	23.44	23.50	1.014	62.9	1.006	-0.03	0.216	0.220
	LTE Band 38-UAT	20M	QPSK	50	0	Left Tilted	0	Reduced	38000	2595	22.79	23.00	1.050	62.9	1.006	0.06	0.192	0.203
	LTE Band 38-LAT	20M	QPSK	1	0	Right Cheek	0	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.08	0.054	0.055
	LTE Band 38-LAT	20M	QPSK	1	0	Right Cheek	0	Full	37901+38099	2585.1+2604.9	23.58	24.00	1.102	62.9	1.006	-0.04	0.049	0.054
	LTE Band 38-LAT	20M	QPSK	50	0	Right Cheek	0	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.04	0.045	0.046
	LTE Band 38-LAT	20M	QPSK	1	0	Right Tilted	0	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.01	0.045	0.046
	LTE Band 38-LAT	20M	QPSK	50	0	Right Tilted	0	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.11	0.039	0.040
	LTE Band 38-LAT	20M	QPSK	1	0	Left Cheek	0	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.02	0.054	0.055
	LTE Band 38-LAT	20M	QPSK	50	0	Left Cheek	0	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	-0.08	0.048	0.049
	LTE Band 38-LAT	20M	QPSK	1	0	Left Tilted	0	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.08	0.030	0.030
	LTE Band 38-LAT	20M	QPSK	50	0	Left Tilted	0	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	-0.08	0.024	0.025





<WLAN 2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz-	802.11b 1Mbps	Right Cheek	0	1	Full	11	2462	16.50	17.00	1.122	99.05	1.010	0.02	0.324	0.367
	WLAN2.4GHz-	802.11b 1Mbps	Right Tilted	0	1	Full	11	2462	16.50	17.00	1.122	99.05	1.010	0.01	0.340	0.385
11	WLAN2.4GHz-	802.11b 1Mbps	Left Cheek	0	1	Full	11	2462	16.50	17.00	1.122	99.05	1.010	0.09	0.640	0.725
	WLAN2.4GHz-	802.11b 1Mbps	Left Tilted	0	1	Full	11	2462	16.50	17.00	1.122	99.05	1.010	0.08	0.607	0.688
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0	1	Reduced	6	2437	14.21	15.00	1.199	99.05	1.010	0.02	0.245	0.297
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0	1	Reduced	6	2437	14.21	15.00	1.199	99.05	1.010	0.06	0.255	0.309
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0	1	Reduced	6	2437	14.21	15.00	1.199	99.05	1.010	0.01	0.416	0.504
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0	1	Reduced	6	2437	14.21	15.00	1.199	99.05	1.010	0.03	0.425	0.515
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0	2	Full	11	2462	16.20	17.00	1.202	98.93	1.011	-0.16	0.222	0.270
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0	2	Full	11	2462	16.20	17.00	1.202	98.93	1.011	0.18	0.043	0.052
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0	2	Full	11	2462	16.20	17.00	1.202	98.93	1.011	0.08	0.108	0.131
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0	2	Full	11	2462	16.20	17.00	1.202	98.93	1.011	0.03	0.027	0.032

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Right Cheek	0	1	Full	0	2402	9.13	10.00	1.222	77.13	1.080	0.07	0.028	0.037
	Bluetooth	1Mbps	Right Tilted	0	1	Full	0	2402	9.13	10.00	1.222	77.13	1.080	0.18	0.039	0.052
	Bluetooth	1Mbps	Left Cheek	0	1	Full	0	2402	9.13	10.00	1.222	77.13	1.080	-0.04	0.062	0.081
12	Bluetooth	1Mbps	Left Tilted	0	1	Full	0	2402	9.13	10.00	1.222	77.13	1.080	0.04	0.062	0.082
	Bluetooth	1Mbps	Right Cheek	0	2	Full	0	2402	7.96	9.00	1.271	76.6	1.087	0.01	0.027	0.037
	Bluetooth	1Mbps	Right Tilted	0	2	Full	0	2402	7.96	9.00	1.271	76.6	1.087	0.03	0.009	0.013
	Bluetooth	1Mbps	Left Cheek	0	2	Full	0	2402	7.96	9.00	1.271	76.6	1.087	0.04	0.014	0.020
	Bluetooth	1Mbps	Left Tilted	0	2	Full	0	2402	7.96	9.00	1.271	76.6	1.087	0.06	0.007	0.009



<WLAN 5GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN5.3GHz	802.11a 6Mbps	Right Cheek	0	1	Full	56	5280	16.27	17.00	1.183	96.19	1.040	0.01	0.282	0.347
	WLAN5.3GHz	802.11a 6Mbps	Right Tilted	0	1	Full	56	5280	16.27	17.00	1.183	96.19	1.040	0.03	0.405	0.498
	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	0	1	Full	56	5280	16.27	17.00	1.183	96.19	1.040	-0.04	0.380	0.468
13	WLAN5.3GHz	802.11a 6Mbps	Left Tilted	0	1	Full	56	5280	16.27	17.00	1.183	96.19	1.040	-0.03	0.696	0.856
	WLAN5.3GHz	802.11a 6Mbps	Left Tilted	0	1	Full	60	5300	16.24	17.00	1.191	96.19	1.040	-0.06	0.404	0.501
	WLAN5.3GHz	802.11a 6Mbps	Right Cheek	0	1	Reduced	56	5280	13.11	14.50	1.377	96.19	1.040	0.05	0.154	0.221
	WLAN5.3GHz	802.11a 6Mbps	Right Tilted	0	1	Reduced	56	5280	13.11	14.50	1.377	96.19	1.040	0.06	0.195	0.279
	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	0	1	Reduced	56	5280	13.11	14.50	1.377	96.19	1.040	0.08	0.248	0.355
	WLAN5.3GHz	802.11a 6Mbps	Left Tilted	0	1	Reduced	56	5280	13.11	14.50	1.377	96.19	1.040	0.06	0.263	0.377
	WLAN5.3GHz	802.11a 6Mbps	Right Cheek	0	2	Full	52	5260	12.92	14.00	1.282	96.89	1.032	0.05	0.086	0.114
	WLAN5.3GHz	802.11a 6Mbps	Right Tilted	0	2	Full	52	5260	12.92	14.00	1.282	96.89	1.032	0.01	0.020	0.026
	WLAN5.3GHz	802.11a 6Mbps	Left Cheek	0	2	Full	52	5260	12.92	14.00	1.282	96.89	1.032	0.03	0.053	0.071
	WLAN5.3GHz	802.11a 6Mbps	Left Tilted	0	2	Full	52	5260	12.92	14.00	1.282	96.89	1.032	0.01	0.014	0.018
	WLAN5.5GHz	802.11a 6Mbps	Right Cheek	0	1	Full	132	5660	15.89	16.50	1.151	96.19	1.040	0.02	0.322	0.385
	WLAN5.5GHz	802.11a 6Mbps	Right Tilted	0	1	Full	132	5660	15.89	16.50	1.151	96.19	1.040	0.03	0.437	0.523
	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	0	1	Full	132	5660	15.89	16.50	1.151	96.19	1.040	-0.01	0.406	0.486
14	WLAN5.5GHz	802.11a 6Mbps	Left Tilted	0	1	Full	132	5660	15.89	16.50	1.151	96.19	1.040	-0.02	0.697	0.834
	WLAN5.5GHz	802.11a 6Mbps	Left Tilted	0	1	Full	100	5500	15.84	16.50	1.164	96.19	1.040	0.03	0.671	0.812
	WLAN5.5GHz	802.11a 6Mbps	Right Cheek	0	1	Reduced	132	5660	13.48	14.50	1.265	96.19	1.040	0.02	0.242	0.318
	WLAN5.5GHz	802.11a 6Mbps	Right Tilted	0	1	Reduced	132	5660	13.48	14.50	1.265	96.19	1.040	0.03	0.297	0.391
	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	0	1	Reduced	132	5660	13.48	14.50	1.265	96.19	1.040	0.01	0.307	0.404
	WLAN5.5GHz	802.11a 6Mbps	Left Tilted	0	1	Reduced	132	5660	13.48	14.50	1.265	96.19	1.040	0.06	0.341	0.449
	WLAN5.5GHz	802.11a 6Mbps	Right Cheek	0	2	Full	100	5500	12.84	14.00	1.306	96.89	1.032	0.03	0.067	0.091
	WLAN5.5GHz	802.11a 6Mbps	Right Tilted	0	2	Full	100	5500	12.84	14.00	1.306	96.89	1.032	0.02	0.064	0.087
	WLAN5.5GHz	802.11a 6Mbps	Left Cheek	0	2	Full	100	5500	12.84	14.00	1.306	96.89	1.032	0.05	0.053	0.071
	WLAN5.5GHz	802.11a 6Mbps	Left Tilted	0	2	Full	100	5500	12.84	14.00	1.306	96.89	1.032	-0.01	0.054	0.072
	WLAN5.8GHz	802.11a 6Mbps	Right Cheek	0	1	Full	149	5745	13.00	13.50	1.122	96.19	1.040	0.01	0.251	0.293
	WLAN5.8GHz	802.11a 6Mbps	Right Tilted	0	1	Full	149	5745	13.00	13.50	1.122	96.19	1.040	0.02	0.276	0.322
	WLAN5.8GHz	802.11a 6Mbps	Left Cheek	0	1	Full	149	5745	13.00	13.50	1.122	96.19	1.040	0.09	0.328	0.383
15	WLAN5.8GHz	802.11a 6Mbps	Left Tilted	0	1	Full	149	5745	13.00	13.50	1.122	96.19	1.040	0.06	0.383	0.447
	WLAN5.8GHz	802.11a 6Mbps	Right Cheek	0	2	Full	149	5745	12.07	13.50	1.390	96.89	1.032	-0.03	0.080	0.115
	WLAN5.8GHz	802.11a 6Mbps	Right Tilted	0	2	Full	149	5745	12.07	13.50	1.390	96.89	1.032	0.02	0.022	0.032
	WLAN5.8GHz	802.11a 6Mbps	Left Cheek	0	2	Full	149	5745	12.07	13.50	1.390	96.89	1.032	0.01	0.073	0.105
	WLAN5.8GHz	802.11a 6Mbps	Left Tilted	0	2	Full	149	5745	12.07	13.50	1.390	96.89	1.032	0.07	0.026	0.037



**15.2 Hotspot SAR**

**<GSM SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	GSM 850-UAT	GPRS 4 Tx slots	Front	10	Full	128	824.2	28.97	29.00	1.007	-0.01	0.393	0.396
16	GSM 850-UAT	GPRS 4 Tx slots	Back	10	Full	128	824.2	28.97	29.00	1.007	0.02	0.473	<b>0.476</b>
	GSM 850-UAT	GPRS 4 Tx slots	Left Side	10	Full	128	824.2	28.97	29.00	1.007	0.02	0.408	0.411
	GSM 850-UAT	GPRS 4 Tx slots	Top Side	10	Full	128	824.2	28.97	29.00	1.007	0.06	0.431	0.434
	GSM 850-LAT	GPRS 4 Tx slots	Front	10	Full	128	824.2	28.97	29.00	1.007	0.02	0.263	0.265
	GSM 850-LAT	GPRS 4 Tx slots	Back	10	Full	128	824.2	28.97	29.00	1.007	0.09	0.355	0.357
	GSM 850-LAT	GPRS 4 Tx slots	Left Side	10	Full	128	824.2	28.97	29.00	1.007	0.05	0.141	0.142
	GSM 850-LAT	GPRS 4 Tx slots	Right Side	10	Full	128	824.2	28.97	29.00	1.007	0.01	0.306	0.308
	GSM 850-LAT	GPRS 4 Tx slots	Bottom Side	10	Full	128	824.2	28.97	29.00	1.007	0.08	0.235	0.237
	GSM1900-UAT	GPRS 4 Tx slots	Front	10	Full	661	1880	26.44	26.50	1.014	0.09	0.127	0.129
	GSM1900-UAT	GPRS 4 Tx slots	Back	10	Full	661	1880	26.44	26.50	1.014	-0.02	0.219	0.222
	GSM1900-UAT	GPRS 4 Tx slots	Left Side	10	Full	661	1880	26.44	26.50	1.014	0.02	0.185	0.188
	GSM1900-UAT	GPRS 4 Tx slots	Top Side	10	Full	661	1880	26.44	26.50	1.014	0.05	0.135	0.137
	GSM1900-LAT	GPRS 4 Tx slots	Front	10	Reduced	661	1880	23.54	24.00	1.112	0.03	0.316	0.351
	GSM1900-LAT	GPRS 4 Tx slots	Back	10	Reduced	661	1880	23.54	24.00	1.112	-0.02	0.481	0.535
	GSM1900-LAT	GPRS 4 Tx slots	Left Side	10	Reduced	661	1880	23.54	24.00	1.112	0.02	0.060	0.067
	GSM1900-LAT	GPRS 4 Tx slots	Right Side	10	Reduced	661	1880	23.54	24.00	1.112	0.04	0.068	0.076
	GSM1900-LAT	GPRS 4 Tx slots	Bottom Side	10	Reduced	661	1880	23.54	24.00	1.112	0.06	0.752	0.836
	GSM1900-LAT	GPRS 4 Tx slots	Bottom Side	10	Reduced	512	1850.2	23.30	24.00	1.175	0.08	0.570	0.670
17	GSM1900-LAT	GPRS 4 Tx slots	Bottom Side	10	Reduced	810	1909.8	23.51	24.00	1.119	0.08	1.040	<b>1.164</b>



<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WCDMA II-UAT	RMC 12.2Kbps	Front	10	Full	9538	1907.6	24.08	24.50	1.102	-0.05	0.178	0.196
	WCDMA II-UAT	RMC 12.2Kbps	Back	10	Full	9538	1907.6	24.08	24.50	1.102	0.07	0.330	0.364
	WCDMA II-UAT	RMC 12.2Kbps	Left Side	10	Full	9538	1907.6	24.08	24.50	1.102	0.01	0.296	0.326
	WCDMA II-UAT	RMC 12.2Kbps	Top Side	10	Full	9538	1907.6	24.08	24.50	1.102	0.04	0.261	0.288
	WCDMA II-LAT	RMC 12.2Kbps	Front	10	Reduced	9538	1907.6	19.36	20.50	1.300	0.03	0.392	0.510
	WCDMA II-LAT	RMC 12.2Kbps	Back	10	Reduced	9538	1907.6	19.36	20.50	1.300	-0.06	0.475	0.618
	WCDMA II-LAT	RMC 12.2Kbps	Left Side	10	Reduced	9538	1907.6	19.36	20.50	1.300	0.02	0.066	0.086
	WCDMA II-LAT	RMC 12.2Kbps	Right Side	10	Reduced	9538	1907.6	19.36	20.50	1.300	0.1	0.076	0.099
	WCDMA II-LAT	RMC 12.2Kbps	Bottom Side	10	Reduced	9400	1880	19.31	20.50	1.315	-0.08	0.805	1.059
	WCDMA II-LAT	RMC 12.2Kbps	Bottom Side	10	Reduced	9262	1852.4	19.26	20.50	1.330	0.08	0.690	0.918
18	WCDMA II-LAT	RMC 12.2Kbps	Bottom Side	10	Reduced	9538	1907.6	19.36	20.50	1.300	0.07	0.908	1.181
	WCDMA IV-UAT	RMC 12.2Kbps	Front	10	Full	1312	1712.4	24.23	24.50	1.064	0.15	0.165	0.176
	WCDMA IV-UAT	RMC 12.2Kbps	Back	10	Full	1312	1712.4	24.23	24.50	1.064	0.03	0.216	0.230
	WCDMA IV-UAT	RMC 12.2Kbps	Left Side	10	Full	1312	1712.4	24.23	24.50	1.064	0.03	0.216	0.230
	WCDMA IV-UAT	RMC 12.2Kbps	Top Side	10	Full	1312	1712.4	24.23	24.50	1.064	0.074	0.285	0.303
	WCDMA IV-LAT	RMC 12.2Kbps	Front	10	Reduced	1312	1712.4	21.71	22.50	1.199	0.06	0.359	0.431
	WCDMA IV-LAT	RMC 12.2Kbps	Back	10	Reduced	1312	1712.4	21.71	22.50	1.199	-0.1	0.498	0.597
	WCDMA IV-LAT	RMC 12.2Kbps	Left Side	10	Reduced	1312	1712.4	21.71	22.50	1.199	0.04	0.066	0.079
	WCDMA IV-LAT	RMC 12.2Kbps	Right Side	10	Reduced	1312	1712.4	21.71	22.50	1.199	0.08	0.080	0.096
	WCDMA IV-LAT	RMC 12.2Kbps	Bottom Side	10	Reduced	1312	1712.4	21.71	22.50	1.199	0.06	0.811	0.973
	WCDMA IV-LAT	RMC 12.2Kbps	Bottom Side	10	Reduced	1413	1732.6	21.66	22.50	1.213	0.01	0.839	1.018
19	WCDMA IV-LAT	RMC 12.2Kbps	Bottom Side	10	Reduced	1513	1752.6	21.70	22.50	1.202	0.06	0.910	1.094
	WCDMA V-UAT	RMC 12.2Kbps	Front	10	Full	4132	826.4	24.12	24.50	1.091	0.08	0.243	0.265
	WCDMA V-UAT	RMC 12.2Kbps	Back	10	Full	4132	826.4	24.12	24.50	1.091	0.03	0.262	0.286
	WCDMA V-UAT	RMC 12.2Kbps	Left Side	10	Full	4132	826.4	24.12	24.50	1.091	0.09	0.201	0.219
	WCDMA V-UAT	RMC 12.2Kbps	Top Side	10	Full	4132	826.4	24.12	24.50	1.091	-0.09	0.236	0.258
	WCDMA V-LAT	RMC 12.2Kbps	Front	10	Full	4132	826.4	24.12	24.50	1.091	0.06	0.144	0.157
20	WCDMA V-LAT	RMC 12.2Kbps	Back	10	Full	4132	826.4	24.12	24.50	1.091	0.01	0.318	0.347
	WCDMA V-LAT	RMC 12.2Kbps	Left Side	10	Full	4132	826.4	24.12	24.50	1.091	0.01	0.066	0.072
	WCDMA V-LAT	RMC 12.2Kbps	Right Side	10	Full	4132	826.4	24.12	24.50	1.091	0.06	0.191	0.208
	WCDMA V-LAT	RMC 12.2Kbps	Bottom Side	10	Full	4132	826.4	24.12	24.50	1.091	0.06	0.153	0.167



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2-UAT	20M	QPSK	1	0	Front	10	Full	18900	1880	23.88	24.00	1.028	0.03	0.164	0.169
	LTE Band 2-UAT	20M	QPSK	50	0	Front	10	Full	18900	1880	22.85	23.00	1.035	0.01	0.107	0.111
	LTE Band 2-UAT	20M	QPSK	1	0	Back	10	Full	18900	1880	23.88	24.00	1.028	0.04	0.327	0.336
	LTE Band 2-UAT	20M	QPSK	50	0	Back	10	Full	18900	1880	22.85	23.00	1.035	0.03	0.216	0.224
	LTE Band 2-UAT	20M	QPSK	1	0	Left Side	10	Full	18900	1880	23.88	24.00	1.028	-0.08	0.219	0.225
	LTE Band 2-UAT	20M	QPSK	50	0	Left Side	10	Full	18900	1880	22.85	23.00	1.035	0.06	0.178	0.184
	LTE Band 2-UAT	20M	QPSK	1	0	Top Side	10	Full	18900	1880	23.88	24.00	1.028	0.03	0.236	0.243
	LTE Band 2-UAT	20M	QPSK	50	0	Top Side	10	Full	18900	1880	22.85	23.00	1.035	0.06	0.150	0.155
	LTE Band 2-LAT	20M	QPSK	1	0	Front	10	Reduced	18900	1880	19.36	20.00	1.159	0.06	0.318	0.368
	LTE Band 2-LAT	20M	QPSK	50	0	Front	10	Reduced	18900	1880	19.36	20.00	1.159	0.02	0.321	0.372
	LTE Band 2-LAT	20M	QPSK	1	0	Back	10	Reduced	18900	1880	19.36	20.00	1.159	0.05	0.452	0.524
	LTE Band 2-LAT	20M	QPSK	50	0	Back	10	Reduced	18900	1880	19.36	20.00	1.159	-0.03	0.459	0.532
	LTE Band 2-LAT	20M	QPSK	1	0	Left Side	10	Reduced	18900	1880	19.36	20.00	1.159	0.06	0.060	0.070
	LTE Band 2-LAT	20M	QPSK	50	0	Left Side	10	Reduced	18900	1880	19.36	20.00	1.159	0.03	0.060	0.070
	LTE Band 2-LAT	20M	QPSK	1	0	Right Side	10	Reduced	18900	1880	19.36	20.00	1.159	0.01	0.061	0.071
	LTE Band 2-LAT	20M	QPSK	50	0	Right Side	10	Reduced	18900	1880	19.36	20.00	1.159	-0.04	0.067	0.078
	LTE Band 2-LAT	20M	QPSK	1	0	Bottom Side	10	Reduced	18900	1880	19.36	20.00	1.159	0.08	0.648	0.751
	LTE Band 2-LAT	20M	QPSK	50	0	Bottom Side	10	Reduced	18900	1880	19.36	20.00	1.159	-0.03	0.699	0.810
	LTE Band 2-LAT	20M	QPSK	50	0	Bottom Side	10	Reduced	18700	1860	19.25	20.00	1.189	0.03	0.658	0.782
21	LTE Band 2-LAT	20M	QPSK	50	0	Bottom Side	10	Reduced	19100	1900	19.30	20.00	1.175	-0.11	0.903	1.061
	LTE Band 2-LAT	20M	QPSK	100	0	Bottom Side	10	Reduced	18900	1880	19.33	20.00	1.167	0.04	0.810	0.945
	LTE Band 4-UAT	20M	QPSK	1	0	Front	10	Full	20175	1732.5	23.74	24.00	1.062	0.03	0.150	0.159
	LTE Band 4-UAT	20M	QPSK	50	0	Front	10	Full	20175	1732.5	22.84	23.00	1.038	0.04	0.104	0.108
	LTE Band 4-UAT	20M	QPSK	1	0	Back	10	Full	20175	1732.5	23.74	24.00	1.062	-0.07	0.197	0.209
	LTE Band 4-UAT	20M	QPSK	50	0	Back	10	Full	20175	1732.5	22.84	23.00	1.038	-0.13	0.152	0.158
	LTE Band 4-UAT	20M	QPSK	1	0	Left Side	10	Full	20175	1732.5	23.74	24.00	1.062	0.07	0.156	0.166
	LTE Band 4-UAT	20M	QPSK	50	0	Left Side	10	Full	20175	1732.5	22.84	23.00	1.038	0.03	0.128	0.133
	LTE Band 4-UAT	20M	QPSK	1	0	Top Side	10	Full	20175	1732.5	23.74	24.00	1.062	0.06	0.263	0.279
	LTE Band 4-UAT	20M	QPSK	50	0	Top Side	10	Full	20175	1732.5	22.84	23.00	1.038	0.03	0.166	0.172
	LTE Band 4-LAT	20M	QPSK	1	0	Front	10	Reduced	20175	1732.5	21.67	22.50	1.211	-0.03	0.383	0.464
	LTE Band 4-LAT	20M	QPSK	50	0	Front	10	Reduced	20175	1732.5	21.66	22.50	1.213	0.01	0.378	0.459
	LTE Band 4-LAT	20M	QPSK	1	0	Back	10	Reduced	20175	1732.5	21.67	22.50	1.211	0.17	0.554	0.671
	LTE Band 4-LAT	20M	QPSK	50	0	Back	10	Reduced	20175	1732.5	21.66	22.50	1.213	-0.07	0.531	0.644
	LTE Band 4-LAT	20M	QPSK	1	0	Left Side	10	Reduced	20175	1732.5	21.67	22.50	1.211	0.02	0.069	0.084
	LTE Band 4-LAT	20M	QPSK	50	0	Left Side	10	Reduced	20175	1732.5	21.66	22.50	1.213	0.01	0.065	0.079
	LTE Band 4-LAT	20M	QPSK	1	0	Right Side	10	Reduced	20175	1732.5	21.67	22.50	1.211	0.02	0.072	0.088
	LTE Band 4-LAT	20M	QPSK	50	0	Right Side	10	Reduced	20175	1732.5	21.66	22.50	1.213	0.03	0.070	0.085
	LTE Band 4-LAT	20M	QPSK	1	0	Bottom Side	10	Reduced	20175	1732.5	21.67	22.50	1.211	0.01	0.866	1.048
	LTE Band 4-LAT	20M	QPSK	50	0	Bottom Side	10	Reduced	20175	1732.5	21.66	22.50	1.213	-0.02	0.897	1.088
22	LTE Band 4-LAT	20M	QPSK	100	0	Bottom Side	10	Reduced	20175	1732.5	21.52	22.50	1.253	0.03	0.939	1.177



Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 5-UAT	10M	QPSK	1	0	Front	10	Full	20525	836.5	23.77	24.00	1.054	0.03	0.191	0.201
	LTE Band 5-UAT	10M	QPSK	25	0	Front	10	Full	20525	836.5	22.64	23.00	1.086	0.01	0.100	0.109
23	LTE Band 5-UAT	10M	QPSK	1	0	Back	10	Full	20525	836.5	23.77	24.00	1.054	-0.09	0.242	0.255
	LTE Band 5-UAT	10M	QPSK	25	0	Back	10	Full	20525	836.5	22.64	23.00	1.086	0.02	0.175	0.190
	LTE Band 5-UAT	10M	QPSK	1	0	Left Side	10	Full	20525	836.5	23.77	24.00	1.054	-0.02	0.149	0.157
	LTE Band 5-UAT	10M	QPSK	25	0	Left Side	10	Full	20525	836.5	22.64	23.00	1.086	-0.09	0.118	0.128
	LTE Band 5-UAT	10M	QPSK	1	0	Top Side	10	Full	20525	836.5	23.77	24.00	1.054	0.02	0.209	0.220
	LTE Band 5-UAT	10M	QPSK	25	0	Top Side	10	Full	20525	836.5	22.64	23.00	1.086	-0.06	0.136	0.148
	LTE Band 5-LAT	10M	QPSK	1	0	Front	10	Full	20525	836.5	23.77	24.00	1.054	0.03	0.123	0.130
	LTE Band 5-LAT	10M	QPSK	25	0	Front	10	Full	20525	836.5	22.64	23.00	1.086	-0.13	0.114	0.124
	LTE Band 5-LAT	10M	QPSK	1	0	Back	10	Full	20525	836.5	23.77	24.00	1.054	-0.18	0.184	0.194
	LTE Band 5-LAT	10M	QPSK	25	0	Back	10	Full	20525	836.5	22.64	23.00	1.086	0.04	0.150	0.163
	LTE Band 5-LAT	10M	QPSK	1	0	Left Side	10	Full	20525	836.5	23.77	24.00	1.054	0.11	0.057	0.060
	LTE Band 5-LAT	10M	QPSK	25	0	Left Side	10	Full	20525	836.5	22.64	23.00	1.086	-0.04	0.045	0.049
	LTE Band 5-LAT	10M	QPSK	1	0	Right Side	10	Full	20525	836.5	23.77	24.00	1.054	0.04	0.158	0.167
	LTE Band 5-LAT	10M	QPSK	25	0	Right Side	10	Full	20525	836.5	22.64	23.00	1.086	-0.07	0.136	0.148
	LTE Band 5-LAT	10M	QPSK	1	0	Bottom Side	10	Full	20525	836.5	23.77	24.00	1.054	0.1	0.134	0.141
	LTE Band 5-LAT	10M	QPSK	25	0	Bottom Side	10	Full	20525	836.5	22.64	23.00	1.086	-0.01	0.102	0.111
	LTE Band 7-UAT	20M	QPSK	1	49	Front	10	Full	21350	2560	23.82	24.00	1.042	0.09	0.277	0.289
	LTE Band 7-UAT	20M	QPSK	50	24	Front	10	Full	21350	2560	22.81	23.00	1.045	0.02	0.217	0.227
	LTE Band 7-UAT	20M	QPSK	1	49	Back	10	Full	21350	2560	23.82	24.00	1.042	0.07	0.332	0.346
	LTE Band 7-UAT	20M	QPSK	50	24	Back	10	Full	21350	2560	22.81	23.00	1.045	0.01	0.213	0.223
	LTE Band 7-UAT	20M	QPSK	1	49	Left Side	10	Full	21350	2560	23.82	24.00	1.042	0.08	0.452	0.471
	LTE Band 7-UAT	20M	QPSK	1	49	Left Side	10	Full	21350+ 21152	2560+ 2540.2	23.69	24.00	1.074	-0.03	0.418	0.449
	LTE Band 7-UAT	20M	QPSK	50	24	Left Side	10	Full	21350	2560	22.81	23.00	1.045	0.08	0.386	0.403
	LTE Band 7-UAT	20M	QPSK	1	49	Top Side	10	Full	21350	2560	23.82	24.00	1.042	0.04	0.176	0.183
	LTE Band 7-UAT	20M	QPSK	50	24	Top Side	10	Full	21350	2560	22.81	23.00	1.045	-0.07	0.132	0.138
	LTE Band 7-LAT	20M	QPSK	1	49	Front	10	Full	21350	2560	23.82	24.00	1.042	-0.03	0.636	0.663
	LTE Band 7-LAT	20M	QPSK	50	24	Front	10	Full	21350	2560	22.81	23.00	1.045	0.03	0.518	0.541
	LTE Band 7-LAT	20M	QPSK	1	49	Back	10	Full	21350	2560	23.82	24.00	1.042	-0.15	0.791	0.824
	LTE Band 7-LAT	20M	QPSK	1	49	Back	10	Full	20850	2510	23.55	24.00	1.109	0.06	0.697	0.773
	LTE Band 7-LAT	20M	QPSK	1	49	Back	10	Full	21100	2535	23.67	24.00	1.079	0.06	0.698	0.753
	LTE Band 7-LAT	20M	QPSK	50	24	Back	10	Full	21350	2560	22.81	23.00	1.045	-0.04	0.568	0.593
	LTE Band 7-LAT	20M	QPSK	100	0	Back	10	Full	21100	2535	22.59	23.00	1.099	0.03	0.558	0.613
	LTE Band 7-LAT	20M	QPSK	1	49	Left Side	10	Full	21350	2560	23.82	24.00	1.042	0.03	0.376	0.392
	LTE Band 7-LAT	20M	QPSK	50	24	Left Side	10	Full	21350	2560	22.81	23.00	1.045	0.1	0.296	0.309
	LTE Band 7-LAT	20M	QPSK	1	49	Right Side	10	Full	21350	2560	23.82	24.00	1.042	-0.02	0.164	0.171
	LTE Band 7-LAT	20M	QPSK	50	24	Right Side	10	Full	21350	2560	22.81	23.00	1.045	0.02	0.131	0.137
24	LTE Band 7-LAT	20M	QPSK	1	49	Bottom Side	10	Full	21350	2560	23.82	24.00	1.042	0.09	1.110	1.157
	LTE Band 7-LAT	20M	QPSK	1	49	Bottom Side	10	Full	21350+ 21152	2560+ 2540.2	23.69	24.00	1.074	0.01	0.958	1.029
	LTE Band 7-LAT	20M	QPSK	1	49	Bottom Side	10	Full	20850	2510	23.55	24.00	1.109	0.05	0.871	0.966
	LTE Band 7-LAT	20M	QPSK	1	49	Bottom Side	10	Full	21100	2535	23.67	24.00	1.079	0.06	0.875	0.944
	LTE Band 7-LAT	20M	QPSK	50	24	Bottom Side	10	Full	21350	2560	22.81	23.00	1.045	0.03	0.786	0.821
	LTE Band 7-LAT	20M	QPSK	50	24	Bottom Side	10	Full	20850	2510	22.54	23.00	1.112	0.03	0.778	0.865
	LTE Band 7-LAT	20M	QPSK	50	24	Bottom Side	10	Full	21100	2535	22.71	23.00	1.069	0.1	0.834	0.892
	LTE Band 7-LAT	20M	QPSK	100	0	Bottom Side	10	Full	21100	2535	22.59	23.00	1.099	-0.02	0.805	0.885



<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 38-UAT	20M	QPSK	1	0	Front	10	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	-0.06	0.152	0.155
	LTE Band 38-UAT	20M	QPSK	50	0	Front	10	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.01	0.138	0.140
	LTE Band 38-UAT	20M	QPSK	1	0	Back	10	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.04	0.188	0.191
	LTE Band 38-UAT	20M	QPSK	50	0	Back	10	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.04	0.121	0.123
	LTE Band 38-UAT	20M	QPSK	1	0	Left Side	10	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	-0.02	0.268	0.273
	LTE Band 38-UAT	20M	QPSK	1	0	Left Side	10	Full	37901+38099	2585.1+2604.9	23.58	24.00	1.102	62.9	1.006	0.03	0.224	0.248
	LTE Band 38-UAT	20M	QPSK	50	0	Left Side	10	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.06	0.190	0.192
	LTE Band 38-UAT	20M	QPSK	1	0	Top Side	10	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	-0.1	0.097	0.099
	LTE Band 38-UAT	20M	QPSK	50	0	Top Side	10	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	-0.12	0.070	0.071
	LTE Band 38-LAT	20M	QPSK	1	0	Front	10	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.06	0.397	0.404
	LTE Band 38-LAT	20M	QPSK	50	0	Front	10	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.02	0.338	0.342
25	LTE Band 38-LAT	20M	QPSK	1	0	Back	10	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.03	0.556	0.566
	LTE Band 38-LAT	20M	QPSK	1	0	Back	10	Full	37901+38099	2585.1+2604.9	23.58	24.00	1.102	62.9	1.006	-0.02	0.424	0.470
	LTE Band 38-LAT	20M	QPSK	50	0	Back	10	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.05	0.409	0.414
	LTE Band 38-LAT	20M	QPSK	1	0	Left Side	10	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.06	0.237	0.241
	LTE Band 38-LAT	20M	QPSK	50	0	Left Side	10	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.08	0.187	0.189
	LTE Band 38-LAT	20M	QPSK	1	0	Right Side	10	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.02	0.103	0.105
	LTE Band 38-LAT	20M	QPSK	50	0	Right Side	10	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.05	0.084	0.085
	LTE Band 38-LAT	20M	QPSK	1	0	Bottom Side	10	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.05	0.533	0.542
	LTE Band 38-LAT	20M	QPSK	50	0	Bottom Side	10	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.03	0.440	0.446



<WLAN 2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	10	1	Full	11	2462	16.50	17.00	1.122	99.05	1.010	0.06	0.134	0.152
	WLAN2.4GHz	802.11b 1Mbps	Back	10	1	Full	11	2462	16.50	17.00	1.122	99.05	1.010	0.03	0.227	0.257
	WLAN2.4GHz	802.11b 1Mbps	Right Side	10	1	Full	11	2462	16.50	17.00	1.122	99.05	1.010	-0.13	0.120	0.136
26	WLAN2.4GHz	802.11b 1Mbps	Top Side	10	1	Full	11	2462	16.50	17.00	1.122	99.05	1.010	-0.08	0.232	0.263
	WLAN2.4GHz	802.11b 1Mbps	Front	10	2	Full	11	2462	16.20	17.00	1.202	98.93	1.011	0.03	0.044	0.054
	WLAN2.4GHz	802.11b 1Mbps	Back	10	2	Full	11	2462	16.20	17.00	1.202	98.93	1.011	-0.07	0.061	0.074
	WLAN2.4GHz	802.11b 1Mbps	Left Side	10	2	Full	11	2462	16.20	17.00	1.202	98.93	1.011	-0.07	0.079	0.096

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	10	1	Full	0	2402	9.13	10.00	1.222	77.13	1.080	0.01	0.014	0.018
27	Bluetooth	1Mbps	Back	10	1	Full	0	2402	9.13	10.00	1.222	77.13	1.080	0.05	0.025	0.034
	Bluetooth	1Mbps	Right Side	10	1	Full	0	2402	9.13	10.00	1.222	77.13	1.080	0.01	0.013	0.017
	Bluetooth	1Mbps	Top Side	10	1	Full	0	2402	9.13	10.00	1.222	77.13	1.080	-0.07	0.023	0.030
	Bluetooth	1Mbps	Front	10	2	Full	0	2402	7.96	9.00	1.271	76.6	1.087	0.03	0.009	0.012
	Bluetooth	1Mbps	Back	10	2	Full	0	2402	7.96	9.00	1.271	76.6	1.087	-0.09	0.013	0.018
	Bluetooth	1Mbps	Left Side	10	2	Full	0	2402	7.96	9.00	1.271	76.6	1.087	0.06	0.010	0.014





<WLAN 5GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN5.2GHz	802.11a 6Mbps	Front	10	1	Full	36	5180	16.29	17.00	1.178	96.19	1.040	0.04	0.036	0.044
28	WLAN5.2GHz	802.11a 6Mbps	Back	10	1	Full	36	5180	16.29	17.00	1.178	96.19	1.040	0.01	0.804	0.985
	WLAN5.2GHz	802.11a 6Mbps	Back	10	1	Full	48	5240	16.18	17.00	1.208	96.19	1.040	0.04	0.527	0.662
	WLAN5.2GHz	802.11a 6Mbps	Right Side	10	1	Full	36	5180	16.29	17.00	1.178	96.19	1.040	0.01	0.155	0.190
	WLAN5.2GHz	802.11a 6Mbps	Top Side	10	1	Full	36	5180	16.29	17.00	1.178	96.19	1.040	0.01	0.296	0.363
	WLAN5.2GHz	802.11a 6Mbps	Front	10	2	Full	48	5240	12.95	14.00	1.274	96.89	1.032	0.03	0.063	0.083
	WLAN5.2GHz	802.11a 6Mbps	Back	10	2	Full	48	5240	12.95	14.00	1.274	96.89	1.032	0.05	0.129	0.170
	WLAN5.2GHz	802.11a 6Mbps	Left Side	10	2	Full	48	5240	12.95	14.00	1.274	96.89	1.032	0.01	0.149	0.196
	WLAN5.8GHz	802.11a 6Mbps	Front	10	1	Full	149	5745	13.00	13.50	1.122	96.19	1.040	0.1	0.109	0.127
29	WLAN5.8GHz	802.11a 6Mbps	Back	10	1	Full	149	5745	13.00	13.50	1.122	96.19	1.040	-0.07	0.663	0.774
	WLAN5.8GHz	802.11a 6Mbps	Right Side	10	1	Full	149	5745	13.00	13.50	1.122	96.19	1.040	0.03	0.212	0.247
	WLAN5.8GHz	802.11a 6Mbps	Top Side	10	1	Full	149	5745	13.00	13.50	1.122	96.19	1.040	0.01	0.246	0.287
	WLAN5.8GHz	802.11a 6Mbps	Front	10	2	Full	149	5745	12.07	13.50	1.390	96.89	1.032	0.01	0.044	0.063
	WLAN5.8GHz	802.11a 6Mbps	Back	10	2	Full	149	5745	12.07	13.50	1.390	96.89	1.032	-0.17	0.076	0.108
	WLAN5.8GHz	802.11a 6Mbps	Left Side	10	2	Full	149	5745	12.07	13.50	1.390	96.89	1.032	0.01	0.197	0.283



15.3 Body Worn Accessory SAR

<GSM SAR>

Table with 14 columns: Plot No., Band, Mode, Test Position, Gap (mm), Power State, Ch., Freq. (MHz), Average Power (dBm), Tune-Up Limit (dBm), Tune-up Scaling Factor, Power Drift (dB), Measured 1g SAR (W/kg), Reported 1g SAR (W/kg). Rows include GSM 850-UAT, GSM 850-LAT, GSM1900-UAT, and GSM1900-LAT configurations.

<WCDMA SAR>

Table with 14 columns: Plot No., Band, Mode, Test Position, Gap (mm), Power State, Ch., Freq. (MHz), Average Power (dBm), Tune-Up Limit (dBm), Tune-up Scaling Factor, Power Drift (dB), Measured 1g SAR (W/kg), Reported 1g SAR (W/kg). Rows include WCDMA II-UAT, WCDMA IV-UAT, and WCDMA V-UAT configurations.



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 2-UAT	20M	QPSK	1	0	Front	15	Full	18900	1880	23.88	24.00	1.028	-0.08	0.095	0.098
	LTE Band 2-UAT	20M	QPSK	50	0	Front	15	Full	18900	1880	22.85	23.00	1.035	-0.01	0.080	0.082
	LTE Band 2-UAT	20M	QPSK	1	0	Back	15	Full	18900	1880	23.88	24.00	1.028	-0.04	0.161	0.166
	LTE Band 2-UAT	20M	QPSK	50	0	Back	15	Full	18900	1880	22.85	23.00	1.035	0.08	0.122	0.126
	LTE Band 2-LAT	20M	QPSK	1	0	Front	15	Full	18900	1880	23.88	24.00	1.028	0.05	0.406	0.417
	LTE Band 2-LAT	20M	QPSK	50	0	Front	15	Full	18900	1880	22.85	23.00	1.035	0.07	0.328	0.340
35	LTE Band 2-LAT	20M	QPSK	1	0	Back	15	Full	18900	1880	23.88	24.00	1.028	0.03	0.540	0.555
	LTE Band 2-LAT	20M	QPSK	50	0	Back	15	Full	18900	1880	22.85	23.00	1.035	0.02	0.434	0.449
	LTE Band 4-UAT	20M	QPSK	1	0	Front	15	Full	20175	1732.5	23.74	24.00	1.062	0.08	0.101	0.107
	LTE Band 4-UAT	20M	QPSK	50	0	Front	15	Full	20175	1732.5	22.84	23.00	1.038	0.04	0.103	0.107
	LTE Band 4-UAT	20M	QPSK	1	0	Back	15	Full	20175	1732.5	23.74	24.00	1.062	-0.04	0.108	0.115
	LTE Band 4-UAT	20M	QPSK	50	0	Back	15	Full	20175	1732.5	22.84	23.00	1.038	-0.06	0.089	0.093
	LTE Band 4-LAT	20M	QPSK	1	0	Front	15	Full	20175	1732.5	23.74	24.00	1.062	0	0.270	0.287
	LTE Band 4-LAT	20M	QPSK	50	0	Front	15	Full	20175	1732.5	22.84	23.00	1.038	0.12	0.214	0.222
36	LTE Band 4-LAT	20M	QPSK	1	0	Back	15	Full	20175	1732.5	23.74	24.00	1.062	0.17	0.344	0.365
	LTE Band 4-LAT	20M	QPSK	50	0	Back	15	Full	20175	1732.5	22.84	23.00	1.038	0.06	0.273	0.283
	LTE Band 5-UAT	10M	QPSK	1	0	Front	15	Full	20525	836.5	23.77	24.00	1.054	-0.14	0.103	0.109
	LTE Band 5-UAT	10M	QPSK	25	0	Front	15	Full	20525	836.5	22.64	23.00	1.086	0.02	0.084	0.091
37	LTE Band 5-UAT	10M	QPSK	1	0	Back	15	Full	20525	836.5	23.77	24.00	1.054	-0.04	0.141	0.149
	LTE Band 5-UAT	10M	QPSK	25	0	Back	15	Full	20525	836.5	22.64	23.00	1.086	0.06	0.117	0.127
	LTE Band 5-LAT	10M	QPSK	1	0	Front	15	Full	20525	836.5	23.77	24.00	1.054	-0.09	0.101	0.106
	LTE Band 5-LAT	10M	QPSK	25	0	Front	15	Full	20525	836.5	22.64	23.00	1.086	0.02	0.082	0.089
	LTE Band 5-LAT	10M	QPSK	1	0	Back	15	Full	20525	836.5	23.77	24.00	1.054	-0.07	0.115	0.121
	LTE Band 5-LAT	10M	QPSK	25	0	Back	15	Full	20525	836.5	22.64	23.00	1.086	0.03	0.094	0.103
	LTE Band 7-UAT	20M	QPSK	1	49	Front	15	Full	21350	2560	23.82	24.00	1.042	-0.02	0.159	0.166
	LTE Band 7-UAT	20M	QPSK	50	24	Front	15	Full	21350	2560	22.81	23.00	1.045	0.05	0.126	0.132
	LTE Band 7-UAT	20M	QPSK	1	49	Back	15	Full	21350	2560	23.82	24.00	1.042	-0.17	0.163	0.170
	LTE Band 7-UAT	20M	QPSK	1	49	Back	15	Full	21350+	2560+	23.69	24.00	1.074	0.03	0.132	0.142
	LTE Band 7-UAT	20M	QPSK	50	24	Back	15	Full	21350	2560	22.81	23.00	1.045	-0.03	0.134	0.140
	LTE Band 7-LAT	20M	QPSK	1	49	Front	15	Full	21350	2560	23.82	24.00	1.042	0.09	0.378	0.394
	LTE Band 7-LAT	20M	QPSK	50	24	Front	15	Full	21350	2560	22.81	23.00	1.045	0.08	0.306	0.320
38	LTE Band 7-LAT	20M	QPSK	1	49	Back	15	Full	21350	2560	23.82	24.00	1.042	-0.01	0.418	0.436
	LTE Band 7-LAT	20M	QPSK	1	49	Back	15	Full	21350+	2560+	23.69	24.00	1.074	0.03	0.390	0.419
	LTE Band 7-LAT	20M	QPSK	50	24	Back	15	Full	21350	2560	22.81	23.00	1.045	0.05	0.321	0.335



<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	LTE Band 38-UAT	20M	QPSK	1	0	Front	15	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	-0.06	0.080	0.081
	LTE Band 38-UAT	20M	QPSK	50	0	Front	15	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.02	0.066	0.067
	LTE Band 38-UAT	20M	QPSK	1	0	Back	15	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	-0.01	0.116	0.118
	LTE Band 38-UAT	20M	QPSK	1	0	Back	15	Full	37901+38099	2585.1+2604.9	23.58	24.00	1.102	62.9	1.006	0.01	0.079	0.088
	LTE Band 38-UAT	20M	QPSK	50	0	Back	15	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.05	0.106	0.107
39	LTE Band 38-LAT	20M	QPSK	1	0	Front	15	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.02	0.265	0.270
	LTE Band 38-LAT	20M	QPSK	1	0	Front	15	Full	37901+38099	2585.1+2604.9	23.58	24.00	1.102	62.9	1.006	0.01	0.239	0.265
	LTE Band 38-LAT	20M	QPSK	50	0	Front	15	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.04	0.209	0.212
	LTE Band 38-LAT	20M	QPSK	1	0	Back	15	Full	38000	2595	23.95	24.00	1.012	62.9	1.006	0.07	0.264	0.269
	LTE Band 38-LAT	20M	QPSK	50	0	Back	15	Full	38000	2595	22.97	23.00	1.007	62.9	1.006	0.01	0.206	0.209



<WLAN 2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN2.4GHz	802.11b 1Mbps	Front	15	1	Full	11	2462	16.50	17.00	1.122	99.05	1.010	-0.07	0.061	0.069
	WLAN2.4GHz	802.11b 1Mbps	Back	15	1	Full	11	2462	16.50	17.00	1.122	99.05	1.010	-0.03	0.063	0.071
	WLAN2.4GHz	802.11b 1Mbps	Front	15	2	Full	11	2462	16.20	17.00	1.202	98.93	1.011	-0.09	0.047	0.057
40	WLAN2.4GHz	802.11b 1Mbps	Back	15	2	Full	11	2462	16.20	17.00	1.202	98.93	1.011	-0.01	0.063	0.077

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	Bluetooth	1Mbps	Front	15	1	Full	0	2402	9.13	10.00	1.222	77.13	1.080	0.01	0.013	0.017
41	Bluetooth	1Mbps	Back	15	1	Full	0	2402	9.13	10.00	1.222	77.13	1.080	-0.03	0.015	0.020
	Bluetooth	1Mbps	Front	15	2	Full	0	2402	7.96	9.00	1.271	76.6	1.087	0.01	0.008	0.011
	Bluetooth	1Mbps	Back	15	2	Full	0	2402	7.96	9.00	1.271	76.6	1.087	0.02	0.011	0.015

<WLAN 5GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	WLAN5.3GHz	802.11a 6Mbps	Front	15	1	Full	56	5280	16.27	17.00	1.183	96.19	1.040	0.03	0.034	0.042
42	WLAN5.3GHz	802.11a 6Mbps	Back	15	1	Full	56	5280	16.27	17.00	1.183	96.19	1.040	0.06	0.526	0.647
	WLAN5.3GHz	802.11a 6Mbps	Front	15	2	Full	52	5260	12.92	14.00	1.282	96.89	1.032	0.05	0.042	0.056
	WLAN5.3GHz	802.11a 6Mbps	Back	15	2	Full	52	5260	12.92	14.00	1.282	96.89	1.032	0.03	0.073	0.097
	WLAN5.5GHz	802.11a 6Mbps	Front	15	1	Full	132	5660	15.89	16.50	1.151	96.19	1.040	0.04	0.052	0.063
43	WLAN5.5GHz	802.11a 6Mbps	Back	15	1	Full	132	5660	15.89	16.50	1.151	96.19	1.040	0.09	0.389	0.466
	WLAN5.5GHz	802.11a 6Mbps	Front	15	2	Full	100	5500	12.84	14.00	1.306	96.89	1.032	0.02	0.042	0.057
	WLAN5.5GHz	802.11a 6Mbps	Back	15	2	Full	100	5500	12.84	14.00	1.306	96.89	1.032	0.01	0.067	0.090
	WLAN5.8GHz	802.11a 6Mbps	Front	15	1	Full	149	5745	13.00	13.50	1.122	96.19	1.040	-0.02	0.085	0.099
44	WLAN5.8GHz	802.11a 6Mbps	Back	15	1	Full	149	5745	13.00	13.50	1.122	96.19	1.040	-0.09	0.288	0.336
	WLAN5.8GHz	802.11a 6Mbps	Front	15	2	Full	149	5745	12.07	13.50	1.390	96.89	1.032	0.08	0.041	0.059
	WLAN5.8GHz	802.11a 6Mbps	Back	15	2	Full	149	5745	12.07	13.50	1.390	96.89	1.032	-0.01	0.046	0.066



**15.4 Product Specific SAR**

**<GSM SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
45	GSM1900-LAT	GPRS 4 Tx slots	Bottom Side	0	Reduced	661	1880	24.94	25.50	1.138	0.02	2.940	3.345
	GSM1900-LAT	GPRS 4 Tx slots	Bottom Side	0	Reduced	512	1850.2	24.78	25.50	1.180	0.06	2.330	2.750
	GSM1900-LAT	GPRS 4 Tx slots	Bottom Side	0	Reduced	810	1909.8	24.87	25.50	1.156	0.01	2.580	2.983

**<WCDMA SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
46	WCDMA II-LAT	RMC 12.2Kbps	Bottom Side	0	Reduced	9538	1907.6	21.31	22.00	1.172	0.06	2.940	3.446
	WCDMA II-LAT	RMC 12.2Kbps	Bottom Side	0	Reduced	9400	1880	21.29	22.00	1.178	0.04	2.790	3.286
	WCDMA II-LAT	RMC 12.2Kbps	Bottom Side	0	Reduced	9262	1852.4	21.26	22.00	1.186	0.01	2.800	3.320

**<FDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	LTE Band 2-LAT	20M	QPSK	1	0	Bottom Side	0	Reduced	18900	1880	20.46	21.00	1.132	0.05	2.270	2.571
	LTE Band 2-LAT	20M	QPSK	1	0	Bottom Side	0	Reduced	18700	1860	20.22	21.00	1.197	0.06	2.080	2.489
	LTE Band 2-LAT	20M	QPSK	1	0	Bottom Side	0	Reduced	19100	1900	20.15	21.00	1.216	0.02	2.080	2.530
47	LTE Band 2-LAT	20M	QPSK	50	0	Bottom Side	0	Reduced	18900	1880	20.39	21.00	1.151	0.08	2.390	2.750
	LTE Band 2-LAT	20M	QPSK	50	0	Bottom Side	0	Reduced	18700	1860	20.38	21.00	1.153	0.03	2.250	2.595
	LTE Band 2-LAT	20M	QPSK	50	0	Bottom Side	0	Reduced	19100	1900	20.32	21.00	1.169	0.01	2.220	2.596
	LTE Band 2-LAT	20M	QPSK	100	0	Bottom Side	0	Reduced	18900	1880	20.39	21.00	1.151	0.05	2.350	2.704

**<WLAN 5GHz SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WLAN5.3GHz	802.11a 6Mbps	Front	0	1	Full	56	5280	16.27	17.00	1.183	96.19	1.040	0.01	0.212	0.261
48	WLAN5.3GHz	802.11a 6Mbps	Back	0	1	Full	56	5280	16.27	17.00	1.183	96.19	1.040	-0.07	1.470	1.809
	WLAN5.3GHz	802.11a 6Mbps	Right Side	0	1	Full	56	5280	16.27	17.00	1.183	96.19	1.040	0.08	0.065	0.080
	WLAN5.3GHz	802.11a 6Mbps	Top Side	0	1	Full	56	5280	16.27	17.00	1.183	96.19	1.040	0.03	0.839	1.032
	WLAN5.3GHz	802.11a 6Mbps	Front	0	2	Full	52	5260	12.92	14.00	1.282	96.89	1.032	-0.13	0.259	0.343
	WLAN5.3GHz	802.11a 6Mbps	Back	0	2	Full	52	5260	12.92	14.00	1.282	96.89	1.032	0.06	0.222	0.294
	WLAN5.3GHz	802.11a 6Mbps	Left Side	0	2	Full	52	5260	12.92	14.00	1.282	96.89	1.032	0.01	0.064	0.085
	WLAN5.5GHz	802.11a 6Mbps	Front	0	1	Full	132	5660	15.89	16.50	1.151	96.19	1.040	0.06	0.305	0.365
49	WLAN5.5GHz	802.11a 6Mbps	Back	0	1	Full	132	5660	15.89	16.50	1.151	96.19	1.040	0.05	1.270	1.520
	WLAN5.5GHz	802.11a 6Mbps	Right Side	0	1	Full	132	5660	15.89	16.50	1.151	96.19	1.040	0.09	0.086	0.103
	WLAN5.5GHz	802.11a 6Mbps	Top Side	0	1	Full	132	5660	15.89	16.50	1.151	96.19	1.040	-0.03	0.688	0.823
	WLAN5.5GHz	802.11a 6Mbps	Front	0	2	Full	100	5500	12.84	14.00	1.306	96.89	1.032	0.08	0.234	0.315
	WLAN5.5GHz	802.11a 6Mbps	Back	0	2	Full	100	5500	12.84	14.00	1.306	96.89	1.032	0.04	0.195	0.263
	WLAN5.5GHz	802.11a 6Mbps	Left Side	0	2	Full	100	5500	12.84	14.00	1.306	96.89	1.032	0.08	0.072	0.097



**15.5 Repeated SAR Measurement**

**<1g SAR>**

No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	GSM 850-UAT	-	-	-	-	GPRS 4 Tx slots	Right Cheek	0		Reduced	128	824.2	28.48	28.50	1.005		1.000	-0.04	1.140	1	1.145
2nd	GSM 850-UAT	-	-	-	-	GPRS 4 Tx slots	Right Cheek	0		Reduced	128	824.2	28.48	28.50	1.005		1.000	-0.04	1.090	1.046	1.095
1st	WCDMA II-UAT	-	-	-	-	RMC 12.2Kbps	Right Cheek	0		Full	9538	1907.6	24.08	24.50	1.102		1.000	-0.08	1.040	1	1.146
2nd	WCDMA II-UAT	-	-	-	-	RMC 12.2Kbps	Right Cheek	0		Full	9538	1907.6	24.08	24.50	1.102		1.000	0.01	1.010	1.030	1.113
1st	WCDMA IV-UAT	-	-	-	-	RMC 12.2Kbps	Right Cheek	0		Full	1513	1752.6	24.19	24.50	1.074		1.000	0.03	1.020	1	1.095
2nd	WCDMA IV-UAT	-	-	-	-	RMC 12.2Kbps	Right Cheek	0		Full	1513	1752.6	24.19	24.50	1.074		1.000	0.09	0.938	1.087	1.007
1st	LTE Band 7-LAT	20M	QPSK	1	49	-	Bottom Side	10		Full	21350	2560	23.82	24.00	1.042		1.000	0.09	1.110	1	1.157
2nd	LTE Band 7-LAT	20M	QPSK	1	49	-	Bottom Side	10		Full	21350	2560	23.82	24.00	1.042		1.000	0.09	1.050	1.057	1.094
1st	WLAN5GHz	-	-	-	-	802.11a 6Mbps	Back	10	1	Full	36	5180	16.29	17.00	1.178	96.19	1.040	0.01	0.804	1	0.985
2nd	WLAN5GHz	-	-	-	-	802.11a 6Mbps	Back	10	1	Full	36	5180	16.29	17.00	1.178	96.19	1.040	0.08	0.800	1.005	0.980

**<10g SAR>**

No.	Band	Mode	Test Position	Gap (mm)	Power State	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Ratio	Reported 10g SAR (W/kg)
1st	WCDMA II-LAT	RMC 12.2Kbps	Bottom Side	0	Reduced	9538	1907.6	21.31	22.00	1.172		1.000	0.06	2.940	1	3.446
2nd	WCDMA II-LAT	RMC 12.2Kbps	Bottom Side	0	Reduced	9538	1907.6	21.31	22.00	1.172		1.000	-0.02	2.830	1.039	3.317

**General Note:**

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is  $\geq 0.8$ W/kg.
2. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure to the corresponding SAR thresholds.
3. The ratio is the difference in percentage between original and repeated *measured* SAR.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

## 16. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Portable Handset			
		Head	Body-worn	Hotspot	Product specific
1.	GSM Voice + Bluetooth SISO	Yes	Yes		Yes
2.	GPRS/EDGE + Bluetooth SISO	Yes	Yes	Yes	Yes
3.	WCDMA + Bluetooth SISO	Yes	Yes	Yes	Yes
4.	LTE + Bluetooth SISO	Yes	Yes	Yes	Yes
5.	GSM Voice + 2.4GHz WLAN SISO	Yes	Yes		Yes
6.	GPRS/EDGE + 2.4GHz WLAN SISO	Yes	Yes	Yes	Yes
7.	WCDMA +2.4GHz WLAN SISO	Yes	Yes	Yes	Yes
8.	LTE + 2.4GHz WLAN SISO	Yes	Yes	Yes	Yes
9.	GSM Voice + WLAN5.3/5.5GHz SISO	Yes	Yes		Yes
10.	GPRS/EDGE + WLAN5.3/5.5GHz SISO	Yes	Yes		Yes
11.	WCDMA + WLAN5.3/5.5GHz SISO	Yes	Yes		Yes
12.	LTE + WLAN5.3/5.5GHz SISO	Yes	Yes		Yes
13.	GSM Voice + WLAN5.2/5.8GHz SISO	Yes	Yes		Yes
14.	GPRS/EDGE + WLAN5.2/5.8GHz SISO	Yes	Yes	Yes	Yes
15.	WCDMA + WLAN5.2/5.8GHz SISO	Yes	Yes	Yes	Yes
16.	LTE + WLAN5.2/5.8GHz SISO	Yes	Yes	Yes	Yes
17.	WLAN5GHz SISO+ Bluetooth SISO	Yes	Yes	Yes	Yes
18.	GSM Voice + Bluetooth SISO+ WLAN5.3/5.5GHz SISO	Yes	Yes		Yes
19.	GPRS/EDGE + Bluetooth SISO+ WLAN5.3/5.5GHz SISO	Yes	Yes		Yes
20.	WCDMA + Bluetooth SISO+ WLAN5.3/5.5GHz SISO	Yes	Yes		Yes
21.	LTE + Bluetooth SISO+ WLAN5.3/5.5GHz SISO	Yes	Yes		Yes
22.	GSM Voice + Bluetooth SISO+ WLAN5.2/5.8GHz SISO	Yes	Yes		Yes
23.	GPRS/EDGE + Bluetooth SISO+ WLAN5.2/5.8GHz SISO	Yes	Yes	Yes	Yes
24.	WCDMA + Bluetooth SISO+ WLAN5.2/5.8GHz SISO	Yes	Yes	Yes	Yes
25.	LTE + Bluetooth SISO+ WLAN5.2/5.8GHz SISO	Yes	Yes	Yes	Yes

**General Note:**

1. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), and LTE supports VoLTE function.
2. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
3. This device WLAN 2.4GHz supports hotspot operation and Bluetooth support tethering applications.
4. This device 2.4GHz WLAN/5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).
5. WLAN 2.4GHz and Bluetooth share the same antenna so can't transmit simultaneously.
6. According to the character of EUT, WLAN5GHz and Bluetooth can transmit simultaneously.
7. According to the character of EUT, WLAN5GHz and WLAN 2.4GHz can't transmit simultaneously.
8. For simultaneously analysis, since the SAR summation of 3 transmitters can cover others combination of 2 transmitters, therefore in this section did not additional to evaluate 2TX combination of simultaneously transmission.
9. All licensed modes share the same antenna part and cannot transmit simultaneously.
10. The reported SAR summation is calculated based on the same configuration and test position
11. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
  - i) 1g Scalar SAR summation < 1.6W/kg and 10g Scalar SAR summation < 4.0W/kg.
  - ii)  $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$ , and the peak separation distance is determined from the square root of  $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$ , where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
  - iii) If  $SPLSR \leq 0.04$  for 1g SAR,  $SPLSR \leq 0.10$  for 10g SAR simultaneously transmission SAR measurement is not necessary.
  - iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg and 10g SAR < 4.0W/kg.
  - v) For WWAN/Bluetooth product specific 10g stand-alone SAR is not required for a transmitter or antenna, due to 1g hotspot SAR is <1.2W/kg.





16.1 Head Exposure Conditions

<Top Antenna>

WWAN Band	Exposure Position	1	2	3	4	5	6	7	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4+6 Summed 1g SAR (W/kg)	1+5+6 Summed 1g SAR (W/kg)	1+4+7 Summed 1g SAR (W/kg)	1+5+7 Summed 1g SAR (W/kg)		
		WWAN	2.4GHz WLAN Ant.1	2.4GHz WLAN Ant.2	5GHz WLAN Ant.1	5GHz WLAN Ant.2	Bluetooth Ant.1	Bluetooth Ant.2								
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)								
GSM	GSM850	Right Cheek	1.145	0.297	0.270	0.318	0.115	0.037	0.037	1.44	1.42	1.50	1.30	1.50	1.30	
		Right Tilted	1.075	0.309	0.052	0.391	0.087	0.052	0.013	1.38	1.13	1.52	1.21	1.48	1.18	
		Left Cheek	1.085	0.504	0.131	0.404	0.105	0.081	0.020	1.59	1.22	1.57	1.27	1.51	1.21	
		Left Tilted	0.969	0.515	0.032	0.449	0.072	0.082	0.009	1.48	1.00	1.50	1.12	1.43	1.05	
	GSM1900	Right Cheek	0.713	0.297	0.270	0.318	0.115	0.037	0.037	1.01	0.98	1.07	0.87	1.07	0.87	
		Right Tilted	0.538	0.309	0.052	0.391	0.087	0.052	0.013	0.85	0.59	0.98	0.68	0.94	0.64	
		Left Cheek	0.475	0.504	0.131	0.404	0.105	0.081	0.020	0.98	0.61	0.96	0.66	0.90	0.60	
		Left Tilted	0.270	0.515	0.032	0.449	0.072	0.082	0.009	0.79	0.30	0.80	0.42	0.73	0.35	
WCDMA	Band II	Right Cheek	1.146	0.297	0.270	0.318	0.115	0.037	0.037	1.44	1.42	1.50	1.30	1.50	1.30	
		Right Tilted	0.932	0.309	0.052	0.391	0.087	0.052	0.013	1.24	0.98	1.38	1.07	1.34	1.03	
		Left Cheek	0.552	0.504	0.131	0.404	0.105	0.081	0.020	1.06	0.68	1.04	0.74	0.98	0.68	
		Left Tilted	0.451	0.515	0.032	0.449	0.072	0.082	0.009	0.97	0.48	0.98	0.61	0.91	0.53	
	Band IV	Right Cheek	1.095	0.297	0.270	0.318	0.115	0.037	0.037	1.39	1.37	1.45	1.25	1.45	1.25	
		Right Tilted	0.748	0.309	0.052	0.391	0.087	0.052	0.013	1.06	0.80	1.19	0.89	1.15	0.85	
		Left Cheek	0.724	0.504	0.131	0.404	0.105	0.081	0.020	1.23	0.86	1.21	0.91	1.15	0.85	
		Left Tilted	0.410	0.515	0.032	0.449	0.072	0.082	0.009	0.93	0.44	0.94	0.56	0.87	0.49	
	Band V	Right Cheek	0.959	0.297	0.270	0.318	0.115	0.037	0.037	1.26	1.23	1.31	1.11	1.31	1.11	
		Right Tilted	0.779	0.309	0.052	0.391	0.087	0.052	0.013	1.09	0.83	1.22	0.92	1.18	0.88	
		Left Cheek	0.765	0.504	0.131	0.404	0.105	0.081	0.020	1.27	0.90	1.25	0.95	1.19	0.89	
		Left Tilted	0.713	0.515	0.032	0.449	0.072	0.082	0.009	1.23	0.75	1.24	0.87	1.17	0.79	
	LTE	Band 2	Right Cheek	1.071	0.297	0.270	0.318	0.115	0.037	0.037	1.37	1.34	1.43	1.22	1.43	1.22
			Right Tilted	0.744	0.309	0.052	0.391	0.087	0.052	0.013	1.05	0.80	1.19	0.88	1.15	0.84
			Left Cheek	0.601	0.504	0.131	0.404	0.105	0.081	0.020	1.11	0.73	1.09	0.79	1.03	0.73
			Left Tilted	0.324	0.515	0.032	0.449	0.072	0.082	0.009	0.84	0.36	0.86	0.48	0.78	0.41
Band 4		Right Cheek	0.940	0.297	0.270	0.318	0.115	0.037	0.037	1.24	1.21	1.30	1.09	1.30	1.09	
		Right Tilted	0.712	0.309	0.052	0.391	0.087	0.052	0.013	1.02	0.76	1.16	0.85	1.12	0.81	
		Left Cheek	0.573	0.504	0.131	0.404	0.105	0.081	0.020	1.08	0.70	1.06	0.76	1.00	0.70	
		Left Tilted	0.356	0.515	0.032	0.449	0.072	0.082	0.009	0.87	0.39	0.89	0.51	0.81	0.44	
Band 5		Right Cheek	0.816	0.297	0.270	0.318	0.115	0.037	0.037	1.11	1.09	1.17	0.97	1.17	0.97	
		Right Tilted	0.817	0.309	0.052	0.391	0.087	0.052	0.013	1.13	0.87	1.26	0.96	1.22	0.92	
		Left Cheek	0.710	0.504	0.131	0.404	0.105	0.081	0.020	1.21	0.84	1.20	0.90	1.13	0.84	
		Left Tilted	0.492	0.515	0.032	0.449	0.072	0.082	0.009	1.01	0.52	1.02	0.65	0.95	0.57	
Band 7		Right Cheek	0.896	0.297	0.270	0.318	0.115	0.037	0.037	1.19	1.17	1.25	1.05	1.25	1.05	
		Right Tilted	0.758	0.309	0.052	0.391	0.087	0.052	0.013	1.07	0.81	1.20	0.90	1.16	0.86	
		Left Cheek	0.331	0.504	0.131	0.404	0.105	0.081	0.020	0.84	0.46	0.82	0.52	0.76	0.46	
		Left Tilted	0.269	0.515	0.032	0.449	0.072	0.082	0.009	0.78	0.30	0.80	0.42	0.73	0.35	
Band 38		Right Cheek	0.968	0.297	0.270	0.318	0.115	0.037	0.037	1.27	1.24	1.32	1.12	1.32	1.12	
		Right Tilted	0.765	0.309	0.052	0.391	0.087	0.052	0.013	1.07	0.82	1.21	0.90	1.17	0.87	
		Left Cheek	0.262	0.504	0.131	0.404	0.105	0.081	0.020	0.77	0.39	0.75	0.45	0.69	0.39	
		Left Tilted	0.220	0.515	0.032	0.449	0.072	0.082	0.009	0.74	0.25	0.75	0.37	0.68	0.30	



<Bottom Antenna>

WWAN Band	Exposure Position	1	2	3	4	5	6	7	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4+6 Summed 1g SAR (W/kg)	1+5+6 Summed 1g SAR (W/kg)	1+4+7 Summed 1g SAR (W/kg)	1+5+7 Summed 1g SAR (W/kg)	
		WWAN	2.4GHz WLAN Ant.1	2.4GHz WLAN Ant.2	5GHz WLAN Ant.1	5GHz WLAN Ant.2	Bluetooth Ant.1	Bluetooth Ant.2							
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)							
GSM	GSM850	Right Cheek	0.211	0.297	0.270	0.318	0.115	0.037	0.037	0.51	0.48	0.57	0.36	0.57	0.36
		Right Tilted	0.094	0.309	0.052	0.391	0.087	0.052	0.013	0.40	0.15	0.54	0.23	0.50	0.19
		Left Cheek	0.166	0.504	0.131	0.404	0.105	0.081	0.020	0.67	0.30	0.65	0.35	0.59	0.29
		Left Tilted	0.091	0.515	0.032	0.449	0.072	0.082	0.009	0.61	0.12	0.62	0.25	0.55	0.17
	GSM1900	Right Cheek	0.075	0.297	0.270	0.318	0.115	0.037	0.037	0.37	0.35	0.43	0.23	0.43	0.23
		Right Tilted	0.047	0.309	0.052	0.391	0.087	0.052	0.013	0.36	0.10	0.49	0.19	0.45	0.15
		Left Cheek	0.063	0.504	0.131	0.404	0.105	0.081	0.020	0.57	0.19	0.55	0.25	0.49	0.19
		Left Tilted	0.055	0.515	0.032	0.449	0.072	0.082	0.009	0.57	0.09	0.59	0.21	0.51	0.14
WCDMA	Band II	Right Cheek	0.111	0.297	0.270	0.318	0.115	0.037	0.037	0.41	0.38	0.47	0.26	0.47	0.26
		Right Tilted	0.049	0.309	0.052	0.391	0.087	0.052	0.013	0.36	0.10	0.49	0.19	0.45	0.15
		Left Cheek	0.103	0.504	0.131	0.404	0.105	0.081	0.020	0.61	0.23	0.59	0.29	0.53	0.23
		Left Tilted	0.079	0.515	0.032	0.449	0.072	0.082	0.009	0.59	0.11	0.61	0.23	0.54	0.16
	Band IV	Right Cheek	0.077	0.297	0.270	0.318	0.115	0.037	0.037	0.37	0.35	0.43	0.23	0.43	0.23
		Right Tilted	0.054	0.309	0.052	0.391	0.087	0.052	0.013	0.36	0.11	0.50	0.19	0.46	0.15
		Left Cheek	0.083	0.504	0.131	0.404	0.105	0.081	0.020	0.59	0.21	0.57	0.27	0.51	0.21
		Left Tilted	0.049	0.515	0.032	0.449	0.072	0.082	0.009	0.56	0.08	0.58	0.20	0.51	0.13
	Band V	Right Cheek	0.181	0.297	0.270	0.318	0.115	0.037	0.037	0.48	0.45	0.54	0.33	0.54	0.33
		Right Tilted	0.081	0.309	0.052	0.391	0.087	0.052	0.013	0.39	0.13	0.52	0.22	0.49	0.18
		Left Cheek	0.132	0.504	0.131	0.404	0.105	0.081	0.020	0.64	0.26	0.62	0.32	0.56	0.26
		Left Tilted	0.078	0.515	0.032	0.449	0.072	0.082	0.009	0.59	0.11	0.61	0.23	0.54	0.16
LTE	Band 2	Right Cheek	0.092	0.297	0.270	0.318	0.115	0.037	0.037	0.39	0.36	0.45	0.24	0.45	0.24
		Right Tilted	0.052	0.309	0.052	0.391	0.087	0.052	0.013	0.36	0.10	0.50	0.19	0.46	0.15
		Left Cheek	0.071	0.504	0.131	0.404	0.105	0.081	0.020	0.58	0.20	0.56	0.26	0.50	0.20
		Left Tilted	0.058	0.515	0.032	0.449	0.072	0.082	0.009	0.57	0.09	0.59	0.21	0.52	0.14
	Band 4	Right Cheek	0.065	0.297	0.270	0.318	0.115	0.037	0.037	0.36	0.34	0.42	0.22	0.42	0.22
		Right Tilted	0.039	0.309	0.052	0.391	0.087	0.052	0.013	0.35	0.09	0.48	0.18	0.44	0.14
		Left Cheek	0.074	0.504	0.131	0.404	0.105	0.081	0.020	0.58	0.21	0.56	0.26	0.50	0.20
		Left Tilted	0.035	0.515	0.032	0.449	0.072	0.082	0.009	0.55	0.07	0.57	0.19	0.49	0.12
	Band 5	Right Cheek	0.150	0.297	0.270	0.318	0.115	0.037	0.037	0.45	0.42	0.51	0.30	0.51	0.30
		Right Tilted	0.053	0.309	0.052	0.391	0.087	0.052	0.013	0.36	0.11	0.50	0.19	0.46	0.15
		Left Cheek	0.095	0.504	0.131	0.404	0.105	0.081	0.020	0.60	0.23	0.58	0.28	0.52	0.22
		Left Tilted	0.054	0.515	0.032	0.449	0.072	0.082	0.009	0.57	0.09	0.59	0.21	0.51	0.14
	Band 7	Right Cheek	0.088	0.297	0.270	0.318	0.115	0.037	0.037	0.39	0.36	0.44	0.24	0.44	0.24
		Right Tilted	0.072	0.309	0.052	0.391	0.087	0.052	0.013	0.38	0.12	0.52	0.21	0.48	0.17
		Left Cheek	0.061	0.504	0.131	0.404	0.105	0.081	0.020	0.57	0.19	0.55	0.25	0.49	0.19
		Left Tilted	0.043	0.515	0.032	0.449	0.072	0.082	0.009	0.56	0.08	0.57	0.20	0.50	0.12
	Band 38	Right Cheek	0.055	0.297	0.270	0.318	0.115	0.037	0.037	0.35	0.33	0.41	0.21	0.41	0.21
		Right Tilted	0.046	0.309	0.052	0.391	0.087	0.052	0.013	0.36	0.10	0.49	0.19	0.45	0.15
		Left Cheek	0.055	0.504	0.131	0.404	0.105	0.081	0.020	0.56	0.19	0.54	0.24	0.48	0.18
		Left Tilted	0.030	0.515	0.032	0.449	0.072	0.082	0.009	0.55	0.06	0.56	0.18	0.49	0.11



16.2 Hotspot Exposure Conditions

<Top Antenna>

WWAN Band	Exposure Position	1	2	3	4	5	6	7	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4+6 Summed 1g SAR (W/kg)	1+5+6 Summed 1g SAR (W/kg)	1+4+7 Summed 1g SAR (W/kg)	1+5+7 Summed 1g SAR (W/kg)		
		WWAN	2.4GHz WLAN Ant.1	2.4GHz WLAN Ant.2	5GHz WLAN Ant.1	5GHz WLAN Ant.2	Bluetooth Ant.1	Bluetooth Ant.2								
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)								
GSM	GSM850	Front	0.396	0.152	0.054	0.127	0.083	0.018	0.012	0.55	0.45	0.54	0.50	0.54	0.49	
		Back	0.476	0.257	0.074	0.985	0.170	0.034	0.018	0.73	0.55	1.50	0.68	1.48	0.66	
		Left side	0.411		0.096		0.283		0.014	0.41	0.51	0.41	0.69	0.43	0.71	
		Top side	0.434	0.263		0.363		0.030		0.70	0.43	0.83	0.46	0.80	0.43	
	GSM1900	Front	0.129	0.152	0.054	0.127	0.083	0.018	0.012	0.28	0.18	0.27	0.23	0.27	0.22	
		Back	0.222	0.257	0.074	0.985	0.170	0.034	0.018	0.48	0.30	1.24	0.43	1.23	0.41	
		Left side	0.188		0.096		0.283		0.014	0.19	0.28	0.19	0.47	0.20	0.49	
		Top side	0.137	0.263		0.363		0.030		0.40	0.14	0.53	0.17	0.50	0.14	
WCDMA	Band II	Front	0.196	0.152	0.054	0.127	0.083	0.018	0.012	0.35	0.25	0.34	0.30	0.34	0.29	
		Back	0.364	0.257	0.074	0.985	0.170	0.034	0.018	0.62	0.44	1.38	0.57	1.37	0.55	
		Left side	0.326		0.096		0.283		0.014	0.33	0.42	0.33	0.61	0.34	0.62	
		Top side	0.288	0.263		0.363		0.030		0.55	0.29	0.68	0.32	0.65	0.29	
	Band IV	Front	0.176	0.152	0.054	0.127	0.083	0.018	0.012	0.33	0.23	0.32	0.28	0.32	0.27	
		Back	0.230	0.257	0.074	0.985	0.170	0.034	0.018	0.49	0.30	1.25	0.43	1.23	0.42	
		Left side	0.230		0.096		0.283		0.014	0.23	0.33	0.23	0.51	0.24	0.53	
		Top side	0.303	0.263		0.363		0.030		0.57	0.30	0.70	0.33	0.67	0.30	
	Band V	Front	0.265	0.152	0.054	0.127	0.083	0.018	0.012	0.42	0.32	0.41	0.37	0.40	0.36	
		Back	0.286	0.257	0.074	0.985	0.170	0.034	0.018	0.54	0.36	1.31	0.49	1.29	0.47	
		Left side	0.219		0.096		0.283		0.014	0.22	0.32	0.22	0.50	0.23	0.52	
		Top side	0.258	0.263		0.363		0.030		0.52	0.26	0.65	0.29	0.62	0.26	
	LTE	Band 2	Front	0.169	0.152	0.054	0.127	0.083	0.018	0.012	0.32	0.22	0.31	0.27	0.31	0.26
			Back	0.336	0.257	0.074	0.985	0.170	0.034	0.018	0.59	0.41	1.36	0.54	1.34	0.52
			Left side	0.225		0.096		0.283		0.014	0.23	0.32	0.23	0.51	0.24	0.52
			Top side	0.243	0.263		0.363		0.030		0.51	0.24	0.64	0.27	0.61	0.24
Band 4		Front	0.159	0.152	0.054	0.127	0.083	0.018	0.012	0.31	0.21	0.30	0.26	0.30	0.25	
		Back	0.209	0.257	0.074	0.985	0.170	0.034	0.018	0.47	0.28	1.23	0.41	1.21	0.40	
		Left side	0.166		0.096		0.283		0.014	0.17	0.26	0.17	0.45	0.18	0.46	
		Top side	0.279	0.263		0.363		0.030		0.54	0.28	0.67	0.31	0.64	0.28	
Band 5		Front	0.201	0.152	0.054	0.127	0.083	0.018	0.012	0.35	0.26	0.35	0.30	0.34	0.30	
		Back	0.255	0.257	0.074	0.985	0.170	0.034	0.018	0.51	0.33	1.27	0.46	1.26	0.44	
		Left side	0.157		0.096		0.283		0.014	0.16	0.25	0.16	0.44	0.17	0.45	
		Top side	0.220	0.263		0.363		0.030		0.48	0.22	0.61	0.25	0.58	0.22	
Band 7		Front	0.289	0.152	0.054	0.127	0.083	0.018	0.012	0.44	0.34	0.43	0.39	0.43	0.38	
		Back	0.346	0.257	0.074	0.985	0.170	0.034	0.018	0.60	0.42	1.37	0.55	1.35	0.53	
		Left side	0.471		0.096		0.283		0.014	0.47	0.57	0.47	0.75	0.49	0.77	
		Top side	0.183	0.263		0.363		0.030		0.45	0.18	0.58	0.21	0.55	0.18	
Band 38		Front	0.155	0.152	0.054	0.127	0.083	0.018	0.012	0.31	0.21	0.30	0.26	0.29	0.25	
		Back	0.191	0.257	0.074	0.985	0.170	0.034	0.018	0.45	0.27	1.21	0.40	1.19	0.38	
		Left side	0.273		0.096		0.283		0.014	0.27	0.37	0.27	0.56	0.29	0.57	
		Top side	0.099	0.263		0.363		0.030		0.36	0.10	0.49	0.13	0.46	0.10	



<Bottom Antenna>

WWAN Band	Exposure Position	1	2	3	4	5	6	7	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+5+6 Summed 1g SAR (W/kg)	1+5+7 Summed 1g SAR (W/kg)		
		WWAN	2.4GHz WLAN Ant.1	2.4GHz WLAN Ant.2	5GHz WLAN Ant.1	5GHz WLAN Ant.2	Bluetooth Ant.1	Bluetooth Ant.2						
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)						
GSM	GSM850	Front	0.265	0.152	0.054	0.127	0.083	0.018	0.012	0.42	0.32	0.37	0.36	
		Back	0.357	0.257	0.074	0.985	0.170	0.034	0.018	0.61	0.43	0.56	0.55	
		Left side	0.142		0.096		0.283		0.014	0.14	0.24	0.43	0.44	
		Right side	0.308	0.136		0.247		0.017		0.44	0.31	0.33	0.31	
		Bottom side	0.237							0.24	0.24	0.24	0.24	
	GSM1900	Front	0.351	0.152	0.054	0.127	0.083	0.018	0.012	0.50	0.41	0.45	0.45	
		Back	0.535	0.257	0.074	0.985	0.170	0.034	0.018	0.79	0.61	0.74	0.72	
		Left side	0.067		0.096		0.283		0.014	0.07	0.16	0.35	0.36	
		Right side	0.076	0.136		0.247		0.017		0.21	0.08	0.09	0.08	
		Bottom side	1.164							1.16	1.16	1.16	1.16	
WCDMA	Band II	Front	0.510	0.152	0.054	0.127	0.083	0.018	0.012	0.66	0.56	0.61	0.61	
		Back	0.618	0.257	0.074	0.985	0.170	0.034	0.018	0.88	0.69	0.82	0.81	
		Left side	0.086		0.096		0.283		0.014	0.09	0.18	0.37	0.38	
		Right side	0.099	0.136		0.247		0.017		0.24	0.10	0.12	0.10	
		Bottom side	1.181							1.18	1.18	1.18	1.18	
	Band IV	Front	0.431	0.152	0.054	0.127	0.083	0.018	0.012	0.58	0.49	0.53	0.53	
		Back	0.597	0.257	0.074	0.985	0.170	0.034	0.018	0.85	0.67	0.80	0.79	
		Left side	0.079		0.096		0.283		0.014	0.08	0.18	0.36	0.38	
		Right side	0.096	0.136		0.247		0.017		0.23	0.10	0.11	0.10	
		Bottom side	1.094							1.09	1.09	1.09	1.09	
	Band V	Front	0.157	0.152	0.054	0.127	0.083	0.018	0.012	0.31	0.21	0.26	0.25	
		Back	0.347	0.257	0.074	0.985	0.170	0.034	0.018	0.60	0.42	0.55	0.54	
		Left side	0.072		0.096		0.283		0.014	0.07	0.17	0.36	0.37	
		Right side	0.208	0.136		0.247		0.017		0.34	0.21	0.23	0.21	
		Bottom side	0.167							0.17	0.17	0.17	0.17	
	LTE	Band 2	Front	0.372	0.152	0.054	0.127	0.083	0.018	0.012	0.52	0.43	0.47	0.47
			Back	0.532	0.257	0.074	0.985	0.170	0.034	0.018	0.79	0.61	0.74	0.72
			Left side	0.070		0.096		0.283		0.014	0.07	0.17	0.35	0.37
			Right side	0.078	0.136		0.247		0.017		0.21	0.08	0.10	0.08
			Bottom side	1.061							1.06	1.06	1.06	1.06
Band 4		Front	0.464	0.152	0.054	0.127	0.083	0.018	0.012	0.62	0.52	0.57	0.56	
		Back	0.671	0.257	0.074	0.985	0.170	0.034	0.018	0.93	0.75	0.88	0.86	
		Left side	0.084		0.096		0.283		0.014	0.08	0.18	0.37	0.38	
		Right side	0.088	0.136		0.247		0.017		0.22	0.09	0.11	0.09	
		Bottom side	1.177							1.18	1.18	1.18	1.18	
Band 5		Front	0.130	0.152	0.054	0.127	0.083	0.018	0.012	0.28	0.18	0.23	0.23	
		Back	0.194	0.257	0.074	0.985	0.170	0.034	0.018	0.45	0.27	0.40	0.38	
		Left side	0.060		0.096		0.283		0.014	0.06	0.16	0.34	0.36	
		Right side	0.167	0.136		0.247		0.017		0.30	0.17	0.18	0.17	
		Bottom side	0.141							0.14	0.14	0.14	0.14	
Band 7		Front	0.663	0.152	0.054	0.127	0.083	0.018	0.012	0.82	0.72	0.76	0.76	
		Back	0.824	0.257	0.074	0.985	0.170	0.034	0.018	1.08	0.90	1.03	1.01	
		Left side	0.392		0.096		0.283		0.014	0.39	0.49	0.68	0.69	
		Right side	0.171	0.136		0.247		0.017		0.31	0.17	0.19	0.17	
		Bottom side	1.157							1.16	1.16	1.16	1.16	
Band 38	Front	0.404	0.152	0.054	0.127	0.083	0.018	0.012	0.56	0.46	0.51	0.50		
	Back	0.566	0.257	0.074	0.985	0.170	0.034	0.018	0.82	0.64	0.77	0.75		
	Left side	0.241		0.096		0.283		0.014	0.24	0.34	0.52	0.54		
	Right side	0.105	0.136		0.247		0.017		0.24	0.11	0.12	0.11		
	Bottom side	0.542							0.54	0.54	0.54	0.54		



WWAN Band	Exposure Position	1	2	3	4	5	6	7	1+4+6			1+4+7			
		WWAN	2.4GHz WLAN Ant.1	2.4GHz WLAN Ant.2	5GHz WLAN Ant.1	5GHz WLAN Ant.2	Bluetooth Ant.1	Bluetooth Ant.2	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No	
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)							
GSM	GSM850	Front	0.265	0.152	0.054	0.127	0.083	0.018	0.012	0.41			0.40		
		Back	0.357	0.257	0.074	0.985	0.170	0.034	0.018	1.38			1.36		
		Left side	0.142		0.096		0.283		0.014	0.14			0.16		
		Right side	0.308	0.136		0.247		0.017		0.57			0.56		
		Bottom side	0.237							0.24			0.24		
	GSM1900	Front	0.351	0.152	0.054	0.127	0.083	0.018	0.012	0.50			0.49		
		Back	0.535	0.257	0.074	0.985	0.170	0.034	0.018	1.55			1.54		
		Left side	0.067		0.096		0.283		0.014	0.07			0.08		
		Right side	0.076	0.136		0.247		0.017		0.34			0.32		
		Bottom side	1.164							1.16			1.16		
WCDMA	Band II	Front	0.510	0.152	0.054	0.127	0.083	0.018	0.012	0.66			0.65		
		Back	0.618	0.257	0.074	0.985	0.170	0.034	0.018	1.64	0.01	#01	1.62	0.01	#02
		Left side	0.086		0.096		0.283		0.014	0.09			0.10		
		Right side	0.099	0.136		0.247		0.017		0.36			0.35		
		Bottom side	1.181							1.18			1.18		
	Band IV	Front	0.431	0.152	0.054	0.127	0.083	0.018	0.012	0.58			0.57		
		Back	0.597	0.257	0.074	0.985	0.170	0.034	0.018	1.62	0.01	#03	1.60	0.01	#04
		Left side	0.079		0.096		0.283		0.014	0.08			0.09		
		Right side	0.096	0.136		0.247		0.017		0.36			0.34		
		Bottom side	1.094							1.09			1.09		
	Band V	Front	0.157	0.152	0.054	0.127	0.083	0.018	0.012	0.30			0.30		
		Back	0.347	0.257	0.074	0.985	0.170	0.034	0.018	1.37			1.35		
		Left side	0.072		0.096		0.283		0.014	0.07			0.09		
		Right side	0.208	0.136		0.247		0.017		0.47			0.46		
		Bottom side	0.167							0.17			0.17		
LTE	Band 2	Front	0.372	0.152	0.054	0.127	0.083	0.018	0.012	0.52			0.51		
		Back	0.532	0.257	0.074	0.985	0.170	0.034	0.018	1.55			1.54		
		Left side	0.070		0.096		0.283		0.014	0.07			0.08		
		Right side	0.078	0.136		0.247		0.017		0.34			0.33		
		Bottom side	1.061							1.06			1.06		
	Band 4	Front	0.464	0.152	0.054	0.127	0.083	0.018	0.012	0.61			0.60		
		Back	0.671	0.257	0.074	0.985	0.170	0.034	0.018	1.69	0.01	#05	1.67	0.01	#06
		Left side	0.084		0.096		0.283		0.014	0.08			0.10		
		Right side	0.088	0.136		0.247		0.017		0.35			0.34		
		Bottom side	1.177							1.18			1.18		
	Band 5	Front	0.130	0.152	0.054	0.127	0.083	0.018	0.012	0.28			0.27		
		Back	0.194	0.257	0.074	0.985	0.170	0.034	0.018	1.21			1.20		
		Left side	0.060		0.096		0.283		0.014	0.06			0.07		
		Right side	0.167	0.136		0.247		0.017		0.43			0.41		
		Bottom side	0.141							0.14			0.14		
	Band 7	Front	0.663	0.152	0.054	0.127	0.083	0.018	0.012	0.81			0.80		
		Back	0.824	0.257	0.074	0.985	0.170	0.034	0.018	1.84	0.02	#07	1.83	0.02	#08
		Left side	0.392		0.096		0.283		0.014	0.39			0.41		
		Right side	0.171	0.136		0.247		0.017		0.44			0.42		
		Bottom side	1.157							1.16			1.16		
	Band 38	Front	0.404	0.152	0.054	0.127	0.083	0.018	0.012	0.55			0.54		
		Back	0.566	0.257	0.074	0.985	0.170	0.034	0.018	1.59			1.57		
		Left side	0.241		0.096		0.283		0.014	0.24			0.26		
		Right side	0.105	0.136		0.247		0.017		0.37			0.35		
Bottom side		0.542							0.54			0.54			



**16.3 Body-Worn Accessory Exposure Conditions**

<Top Antenna>

WWAN Band		Exposure Position	1	2	3	4	5	6	7	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4+6 Summed 1g SAR (W/kg)	1+5+6 Summed 1g SAR (W/kg)	1+4+7 Summed 1g SAR (W/kg)	1+5+7 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN Ant.1	2.4GHz WLAN Ant.2	5GHz WLAN Ant.1	5GHz WLAN Ant.2	Bluetooth Ant.1	Bluetooth Ant.2						
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)						
GSM	GSM850	Front	0.201	0.069	0.057	0.099	0.059	0.017	0.011	0.27	0.26	0.32	0.28	0.31	0.27
		Back	0.242	0.071	0.077	0.647	0.097	0.020	0.015	0.31	0.32	0.91	0.36	0.90	0.35
	GSM1900	Front	0.070	0.069	0.057	0.099	0.059	0.017	0.011	0.14	0.13	0.19	0.15	0.18	0.14
		Back	0.119	0.071	0.077	0.647	0.097	0.020	0.015	0.19	0.20	0.79	0.24	0.78	0.23
WCDMA	Band II	Front	0.129	0.069	0.057	0.099	0.059	0.017	0.011	0.20	0.19	0.25	0.21	0.24	0.20
		Back	0.198	0.071	0.077	0.647	0.097	0.020	0.015	0.27	0.28	0.87	0.32	0.86	0.31
	Band IV	Front	0.126	0.069	0.057	0.099	0.059	0.017	0.011	0.20	0.18	0.24	0.20	0.24	0.20
		Back	0.114	0.071	0.077	0.647	0.097	0.020	0.015	0.19	0.19	0.78	0.23	0.78	0.23
	Band V	Front	0.135	0.069	0.057	0.099	0.059	0.017	0.011	0.20	0.19	0.25	0.21	0.25	0.21
		Back	0.174	0.071	0.077	0.647	0.097	0.020	0.015	0.25	0.25	0.84	0.29	0.84	0.29
LTE	Band 2	Front	0.098	0.069	0.057	0.099	0.059	0.017	0.011	0.17	0.16	0.21	0.17	0.21	0.17
		Back	0.166	0.071	0.077	0.647	0.097	0.020	0.015	0.24	0.24	0.83	0.28	0.83	0.28
	Band 4	Front	0.107	0.069	0.057	0.099	0.059	0.017	0.011	0.18	0.16	0.22	0.18	0.22	0.18
		Back	0.115	0.071	0.077	0.647	0.097	0.020	0.015	0.19	0.19	0.78	0.23	0.78	0.23
	Band 5	Front	0.109	0.069	0.057	0.099	0.059	0.017	0.011	0.18	0.17	0.23	0.19	0.22	0.18
		Back	0.149	0.071	0.077	0.647	0.097	0.020	0.015	0.22	0.23	0.82	0.27	0.81	0.26
	Band 7	Front	0.166	0.069	0.057	0.099	0.059	0.017	0.011	0.24	0.22	0.28	0.24	0.28	0.24
		Back	0.170	0.071	0.077	0.647	0.097	0.020	0.015	0.24	0.25	0.84	0.29	0.83	0.28
	Band 38	Front	0.081	0.069	0.057	0.099	0.059	0.017	0.011	0.15	0.14	0.20	0.16	0.19	0.15
		Back	0.118	0.071	0.077	0.647	0.097	0.020	0.015	0.19	0.20	0.79	0.24	0.78	0.23



<Bottom Antenna>

WWAN Band	Exposure Position	1	2	3	4	5	6	7	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4+6 Summed 1g SAR (W/kg)	1+5+6 Summed 1g SAR (W/kg)	1+4+7 Summed 1g SAR (W/kg)	1+5+7 Summed 1g SAR (W/kg)	
		WWAN	2.4GHz WLAN Ant.1	2.4GHz WLAN Ant.2	5GHz WLAN Ant.1	5GHz WLAN Ant.2	Bluetooth Ant.1	Bluetooth Ant.2							
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)							
GSM	GSM850	Front	0.217	0.069	0.057	0.099	0.059	0.017	0.011	0.29	0.27	0.33	0.29	0.33	0.29
		Back	0.244	0.071	0.077	0.647	0.097	0.020	0.015	0.32	0.32	0.91	0.36	0.91	0.36
	GSM1900	Front	0.298	0.069	0.057	0.099	0.059	0.017	0.011	0.37	0.36	0.41	0.37	0.41	0.37
		Back	0.479	0.071	0.077	0.647	0.097	0.020	0.015	0.55	0.56	1.15	0.60	1.14	0.59
WCDMA	Band II	Front	0.517	0.069	0.057	0.099	0.059	0.017	0.011	0.59	0.57	0.63	0.59	0.63	0.59
		Back	0.794	0.071	0.077	0.647	0.097	0.020	0.015	0.87	0.87	1.46	0.91	1.46	0.91
	Band IV	Front	0.308	0.069	0.057	0.099	0.059	0.017	0.011	0.38	0.37	0.42	0.38	0.42	0.38
		Back	0.458	0.071	0.077	0.647	0.097	0.020	0.015	0.53	0.54	1.13	0.58	1.12	0.57
	Band V	Front	0.138	0.069	0.057	0.099	0.059	0.017	0.011	0.21	0.20	0.25	0.21	0.25	0.21
		Back	0.155	0.071	0.077	0.647	0.097	0.020	0.015	0.23	0.23	0.82	0.27	0.82	0.27
LTE	Band 2	Front	0.417	0.069	0.057	0.099	0.059	0.017	0.011	0.49	0.47	0.53	0.49	0.53	0.49
		Back	0.555	0.071	0.077	0.647	0.097	0.020	0.015	0.63	0.63	1.22	0.67	1.22	0.67
	Band 4	Front	0.287	0.069	0.057	0.099	0.059	0.017	0.011	0.36	0.34	0.40	0.36	0.40	0.36
		Back	0.365	0.071	0.077	0.647	0.097	0.020	0.015	0.44	0.44	1.03	0.48	1.03	0.48
	Band 5	Front	0.106	0.069	0.057	0.099	0.059	0.017	0.011	0.18	0.16	0.22	0.18	0.22	0.18
		Back	0.121	0.071	0.077	0.647	0.097	0.020	0.015	0.19	0.20	0.79	0.24	0.78	0.23
	Band 7	Front	0.394	0.069	0.057	0.099	0.059	0.017	0.011	0.46	0.45	0.51	0.47	0.50	0.46
		Back	0.436	0.071	0.077	0.647	0.097	0.020	0.015	0.51	0.51	1.10	0.55	1.10	0.55
	Band 38	Front	0.270	0.069	0.057	0.099	0.059	0.017	0.011	0.34	0.33	0.39	0.35	0.38	0.34
		Back	0.269	0.071	0.077	0.647	0.097	0.020	0.015	0.34	0.35	0.94	0.39	0.93	0.38



16.4 Product specific 10g SAR Exposure Conditions

<Bottom Antenna>

WWAN Band		Exposure Position	1	2	3	1+2 Summed 10g SAR (W/kg)	1+3 Summed 10g SAR (W/kg)
			WWAN	5GHz WLAN Ant.1	5GHz WLAN Ant.2		
			10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)		
GSM	GSM1900	Bottom side	3.345			3.35	3.35
WCDMA	Band II	Bottom side	3.446			3.45	3.45
LTE	Band 2	Bottom side	2.750			2.75	2.75

Remark:

For Bluetooth Product specific 10g stand-alone SAR is not required for a transmitter or antenna, due to 1g hotspot SAR is <1.2W/kg.

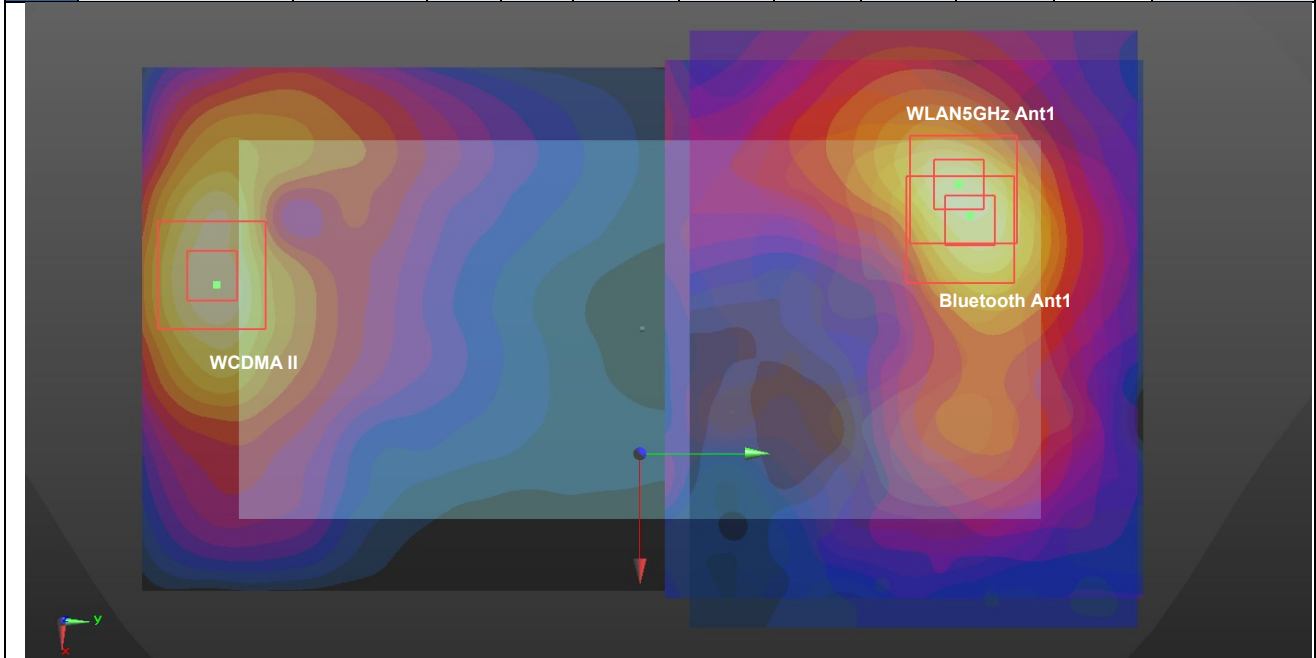


**16.5 SPLSR Evaluation and Analysis**

**General Note:**

1. When standalone SAR is measured for both antennas in the pair, the peak location separation distance is computed by the square root of  $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$ , where  $(x1, y1, z1)$  and  $(x2, y2, z2)$  are the coordinates in the area scans or extrapolated peak SAR locations in the zoom scans, as appropriate.
2.  $SPLSR = (SAR1 + SAR2)1.5 / (\text{min. separation distance, mm})$ . If  $SPLSR \leq 0.04$  for 1g SAR and  $SPLSR \leq 0.10$  for 10g SAR, simultaneously transmission SAR measurement is not necessary.

Case #01	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	WCDMA II	Back	0.618	10	-9	-85	2.32	150.2	1.64	0.01	Not required
	WLAN5G Ant1		0.985	10	-28.2	64	0.92				
	BT Ant1		0.034	10	-26.2	69.8	1.31				
	WCDMA II	Back	0.618	10	-9	-85	2.32	155.8	1.64	0.01	Not required
	BT Ant1		0.034	10	-26.2	69.8	1.31				
	WLAN5G Ant1		0.985	10	-28.2	64	0.92				



Case #02	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (mm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	WCDMA II	Back	0.618	10	-9	-85	2.32	135.7	0.64	0.00	Not required
	BT Ant2		0.018	10	35.6	43.2	1.89				
	WCDMA II	Back	0.618	10	-9	-85	2.32	150.2	1.60	0.01	Not required
	WLAN5G Ant1		0.985	10	-28.2	64	0.92				
	BT Ant2	Back	0.018	10	35.6	43.2	1.89	67.1	1.00	0.01	Not required
	WLAN5G Ant1		0.985	10	-28.2	64	0.92				

