



# FCC SAR TEST REPORT

**FCC ID : IHDT56ZA2**  
**Equipment : Mobile Cellular Phone**  
**Brand Name : Motorola**  
**Model Name : XT2073-1**  
**Applicant : Motorola Mobility LLC**  
**222 W,Merchandise Mart Plaza, Chicago IL 60654 USA**  
**Manufacturer : Motorola Mobility LLC**  
**222 W,Merchandise Mart Plaza, Chicago IL 60654 USA**  
**Standard : FCC 47 CFR Part 2 (2.1093)**  
**ANSI/IEEE C95.1-1992**  
**IEEE 1528-2013**

The product was received on Mar. 17, 2020 and testing was started from Apr. 21, 2020 and completed on Apr. 30, 2020. We, SPORTON INTERNATIONAL 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 report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.

Approved by: Cona Huang / Deputy Manager

**SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory**

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### History of this test report

Report No.	Version	Description	Issued Date
FA011726-01	01	Initial issue of report	May 25, 2020



1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Motorola Mobility LLC, Mobile Cellular Phone, XT2073-1, are as follows.

Table with columns: Equipment Class, Frequency Band, Highest SAR Summary (Head, Body-worn, Hotspot, Product Specific), and Highest Simultaneous Transmission. Rows include Licensed (GSM850, GSM1900, WCDMA II, WCDMA V, LTE Band 5, LTE Band 7, LTE Band 38 / 41), DTS (2.4GHz WLAN), and DSS (Bluetooth).

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 1190) and the FCC designation No. TW1190 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC test. 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

Reviewed by: Jason Wang
Report Producer: Wan Liu

2. 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 D06 Hotspot Mode SAR v02r01
FCC KDB 941225 D07 UMPC Mini Tablet v01r02



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

#### 3.1 General Information

Product Feature & Specification	
Equipment Name	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2073-1
FCC ID	IHDT56ZA2
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2535 MHz ~ 2655 MHz WLAN 2.4GHz Band: 2400 MHz ~ 2483.5 MHz Bluetooth: 2400 MHz ~ 2483.5 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA LTE: QPSK, 16QAM, 64QAM WLAN: 802.11b/g/n HT20 Bluetooth BR/EDR/LE
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
<b>Remark:</b>	
<ol style="list-style-type: none"> <li>1. This device WLAN 2.4GHz supports Hotspot operation and Bluetooth support tethering applications.</li> <li>2. The device is used earpiece receiver to detect user head or body usage scenarios and separate head and body power table, when the receiver worked mean head condition is detected and head power table is used, when the receiver not worked mean body/hotspot/extremity condition is detected and body power table is used.</li> <li>3. The difference between battery1 and 2 is manufacturer so RF exposure is select battery1 to be tested</li> </ol>	

Accessories				
Battery 1	Brand Name	motorola(SCUD)	Model Name	JK50
Battery 2	Brand Name	motorola(ATL)	Model Name	JK50
Earphone 1	Brand Name	NEW LEADER	Model Name	NLD-EM301K-01SF
Earphone 2	Brand Name	Motorola(Lianyun)	Model Name	MI181 (SH38C37773)
Earphone 3	Brand Name	Motorola(Cosonic)	Model Name	MI181 (SH38C44959)



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

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																															
FCC ID	IHDT56ZA2																																																														
Equipment Name	Mobile Cellular Phone																																																														
Operating Frequency Range of each LTE transmission band	LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2535 MHz ~ 2655 MHz																																																														
Channel Bandwidth	LTE Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz																																																														
uplink modulations used	QPSK / 16QAM / 64QAM																																																														
LTE Voice / Data requirements	Voice and Data																																																														
LTE MPR permanently built-in by design	<b>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</b>																																																														
	<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" style="text-align: center;">≥ 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
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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, when operating in hotspot / Body-worn and extremity mode that LTE B7/B38/B41 power reduction applied to satisfy SAR compliance.																																																														



Transmission (H, M, L) channel numbers and frequencies in each LTE band								
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)
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)
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)
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
LTE Band 41								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	40065	2537.5	40090	2540	40115	2542.5	40140	2545
L	40385	2569.5	40390	2570	40395	2570.5	40400	2571
M	40705	2601.5	40690	2600	40685	2599.5	40670	2598
H	41215	2652.5	41190	2650	41165	2647.5	41140	2645



## 4. RF Exposure Limits

### 4.1 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.

### 4.2 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

1. 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.



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

### **5.1 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.

### **5.2 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:

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

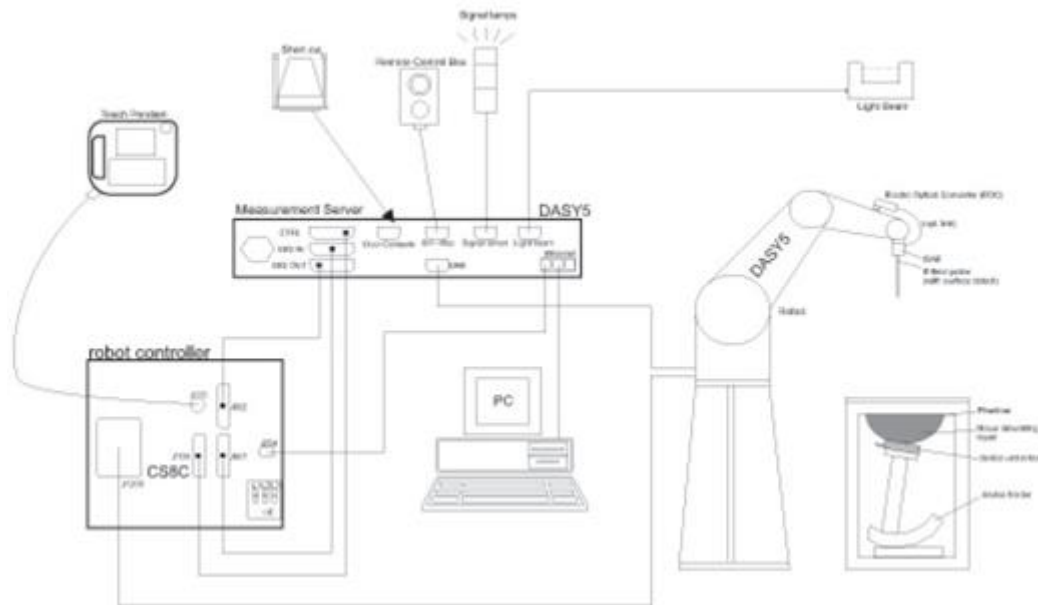
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

## **6. 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.


**6.1 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.

**<ES3DV3 Probe>**

<b>Construction</b>	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
<b>Frequency</b>	10 MHz – 4 GHz; Linearity: $\pm 0.2$ dB (30 MHz – 4 GHz)	
<b>Directivity</b>	$\pm 0.2$ dB in TSL (rotation around probe axis) $\pm 0.3$ dB in TSL (rotation normal to probe axis)	
<b>Dynamic Range</b>	5 $\mu$ W/g – >100 mW/g; Linearity: $\pm 0.2$ dB	
<b>Dimensions</b>	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

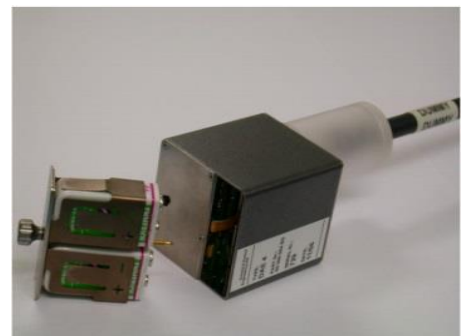
**<EX3DV4 Probe>**

<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	

**6.2 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.



**Fig 5.1 Photo of DAE**

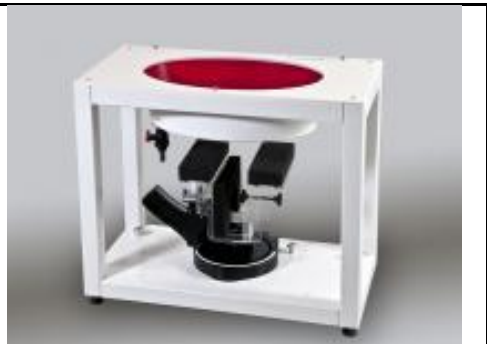
**6.3 Phantom**

**<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.

## **6.4 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

## **7. 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

### **7.1 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



7.2 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.

7.3 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.

Table with 3 columns: Parameter, ≤ 3 GHz, > 3 GHz. Rows include: Maximum distance from closest measurement point, Maximum probe angle, and Maximum area scan spatial resolution.

**7.4 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.				

**7.5 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.

**7.6 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.





### 8. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d167	Nov. 25, 2019	Nov. 24, 2020
SPEAG	1900MHz System Validation Kit	D1900V2	5d185	Mar. 07, 2019	Mar. 05, 2021
SPEAG	2450MHz System Validation Kit	D2450V2	736	Aug. 31, 2018	Aug. 29, 2020
SPEAG	2600MHz System Validation Kit	D2600V2	1008	Aug. 31, 2018	Aug. 29, 2020
SPEAG	Data Acquisition Electronics	DAE3	577	Sep. 17, 2019	Sep. 16, 2020
SPEAG	Data Acquisition Electronics	DAE4	778	May. 21, 2019	May. 20, 2020
SPEAG	Dosimetric E-Field Probe	ES3DV3	3270	Sep. 25, 2019	Sep. 24, 2020
SPEAG	Dosimetric E-Field Probe	EX3DV4	7306	Jul. 22, 2019	Jul. 21, 2020
RCPTWN	Thermometer	HTC-1	TM685-1	Nov. 12, 2019	Nov. 11, 2020
RCPTWN	Thermometer	HTC-1	TM560-2	Nov. 12, 2019	Nov. 11, 2020
Anritsu	Radio Communication Analyzer	MT8821C	6201341950	Oct. 31, 2019	Oct. 30, 2020
Agilent	Wireless Communication Test Set	E5515C	MY50267236	Mar. 18, 2020	Mar. 17, 2021
R&S	BT Base Station	CBT32	100519	Jun. 04, 2019	Jun. 03, 2020
SPEAG	Device Holder	N/A	N/A	N/A	N/A
Anritsu	Signal Generator	MG3710A	6201502524	Nov. 20, 2019	Nov. 19, 2020
Agilent	ENA Network Analyzer	E5071C	MY46104758	Sep. 06, 2019	Sep. 05, 2020
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Sep. 18, 2019	Sep. 17, 2020
LINE SEIKI	Digital Thermometer	DTM3000-spezial	3169	Sep. 10, 2019	Sep. 09, 2020
Anritsu	Power Meter	ML2495A	1036004	Aug. 08, 2019	Aug. 07, 2020
Anritsu	Power Sensor	MA2411B	1027253	Aug. 08, 2019	Aug. 07, 2020
Anritsu	Power Meter	ML2495A	1419002	May. 29, 2019	May. 28, 2020
Anritsu	Power Sensor	MA2411B	1339124	May. 29, 2019	May. 28, 2020
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 27, 2019	Aug. 26, 2020
Anritsu	Spectrum Analyzer	MS2830A	6201396378	Jun. 27, 2019	Jun. 26, 2020
Mini-Circuits	Power Amplifier	ZVE-8G+	6418	Oct. 16, 2019	Oct. 15, 2020
Mini-Circuits	Power Amplifier	ZVE-8G+	6382	Aug. 12, 2019	Aug. 11, 2020
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	

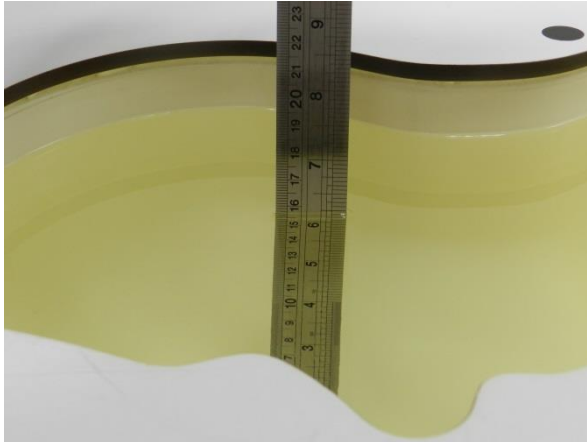
**General Note:**

1. 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.
2. Referring to KDB 865664 D01v01r04, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole D1900V2, SN: 5d185, D2450V2, SN: 736, D2600V2, SN: 1008, can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

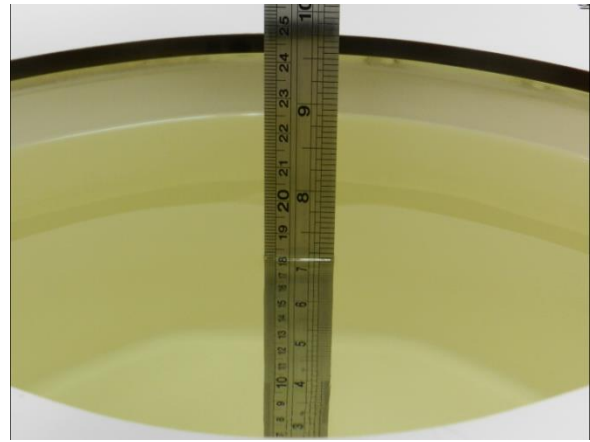
## **9. System Verification**

### **9.1 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 10.1** Photo of Liquid Height for Head SAR



**Fig 10.2** Photo of Liquid Height for Body SAR

### 9.2 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 ( $\epsilon_r$ )
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	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>

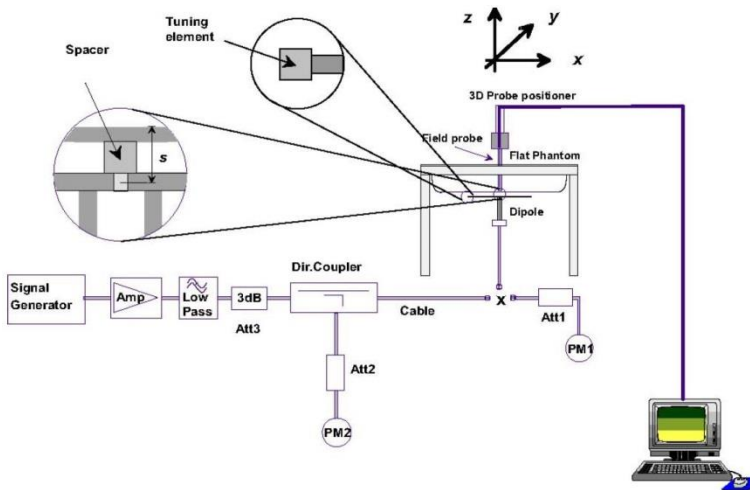
Frequency (MHz)	Liquid Temp. (°C)	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )	Conductivity Target ( $\sigma$ )	Permittivity Target ( $\epsilon_r$ )	Delta ( $\sigma$ ) (%)	Delta ( $\epsilon_r$ ) (%)	Limit (%)	Date
835	22.5	0.889	42.429	0.90	41.50	-1.22	2.24	±5	2020/4/21
835	22.5	0.875	41.872	0.90	41.50	-2.78	0.90	±5	2020/4/23
1900	22.5	1.439	38.156	1.40	40.00	2.79	-4.61	±5	2020/4/21
1900	22.5	1.379	40.691	1.40	40.00	-1.50	1.73	±5	2020/4/24
1900	22.5	1.422	41.123	1.40	40.00	1.57	2.81	±5	2020/4/25
2450	22.4	1.796	39.804	1.80	39.20	-0.22	1.54	±5	2020/4/22
2450	22.4	1.795	38.311	1.80	39.20	-0.28	-2.27	±5	2020/4/22
2450	22.4	1.836	39.182	1.80	39.20	2.00	-0.05	±5	2020/4/30
2600	22.4	1.979	39.240	1.96	39.00	0.97	0.62	±5	2020/4/22
2600	22.4	1.920	38.089	1.96	39.00	-2.04	-2.34	±5	2020/4/22

**9.3 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.

Date	Frequency (MHz)	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 (%)
2020/4/21	835	250	D835V2-4d167	ES3DV3 - SN3270	DAE4 Sn778	2.40	9.55	9.6	0.52
2020/4/23	835	250	D835V2-4d167	EX3DV4 - SN7306	DAE3 Sn577	2.44	9.55	9.76	2.20
2020/4/21	1900	250	D1900V2-5d185	ES3DV3 - SN3270	DAE4 Sn778	9.52	39.40	38.08	-3.35
2020/4/24	1900	250	D1900V2-5d185	EX3DV4 - SN7306	DAE3 Sn577	10.10	39.40	40.4	2.54
2020/4/25	1900	250	D1900V2-5d185	ES3DV3 - SN3270	DAE4 Sn778	10.00	39.40	40	1.52
2020/4/22	2450	250	D2450V2-736	ES3DV3 - SN3270	DAE4 Sn778	13.90	52.70	55.6	5.50
2020/4/22	2450	250	D2450V2-736	EX3DV4 - SN7306	DAE3 Sn577	13.90	52.70	55.6	5.50
2020/4/30	2450	250	D2450V2-736	ES3DV3 - SN3270	DAE4 Sn778	13.80	52.70	55.2	4.74
2020/4/22	2600	250	D2600V2-1008	ES3DV3 - SN3270	DAE4 Sn778	14.00	56.40	56	-0.71
2020/4/22	2600	250	D2600V2-1008	EX3DV4 - SN7306	DAE3 Sn577	14.50	56.40	58	2.84

Date	Frequency (MHz)	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 (%)
2020/4/21	1900	250	D1900V2-5d185	ES3DV3 - SN3270	DAE4 Sn778	4.94	20.50	19.76	-3.61
2020/4/24	1900	250	D1900V2-5d185	EX3DV4 - SN7306	DAE3 Sn577	5.14	20.50	20.56	0.29
2020/4/25	1900	250	D1900V2-5d185	ES3DV3 - SN3270	DAE4 Sn778	5.21	20.50	20.84	1.66
2020/4/22	2600	250	D2600V2-1008	ES3DV3 - SN3270	DAE4 Sn778	6.25	25.30	25	-1.19
2020/4/22	2600	250	D2600V2-1008	EX3DV4 - SN7306	DAE3 Sn577	6.31	25.30	25.24	-0.24



**Fig 8.3.1 System Performance Check Setup**



**Fig 8.3.2 Setup Photo**

## 10. RF Exposure Positions

### 10.1 Ear and handset reference point

Figure 9.1.1 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 9.1.2 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 9.1.3). 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 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

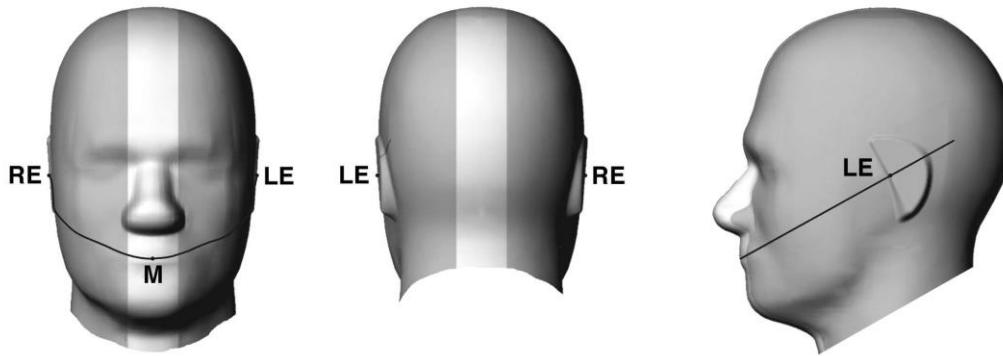


Fig 9.1.1 Front, back, and side views of SAM twin phantom

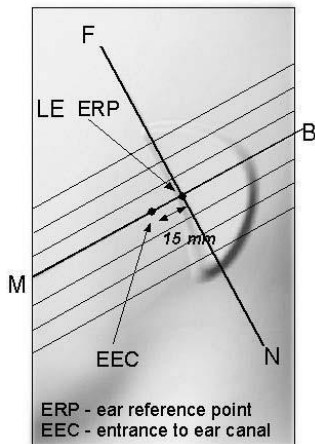


Fig 9.1.2 Close-up side view of phantom showing the ear region.

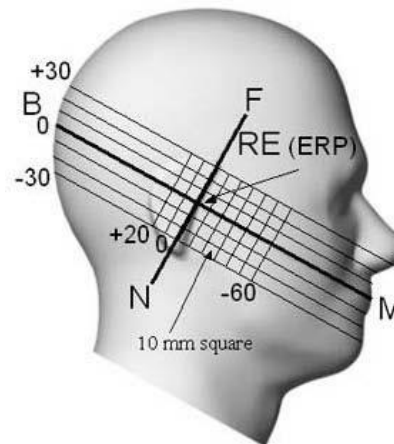
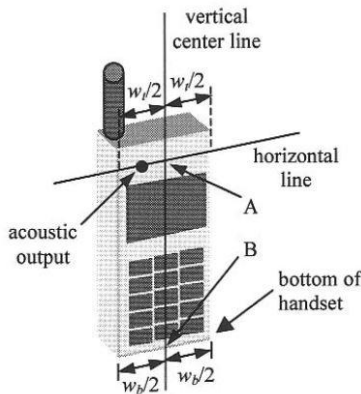


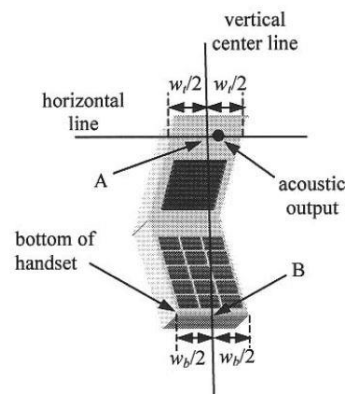
Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

**10.2 Definition of the cheek position**

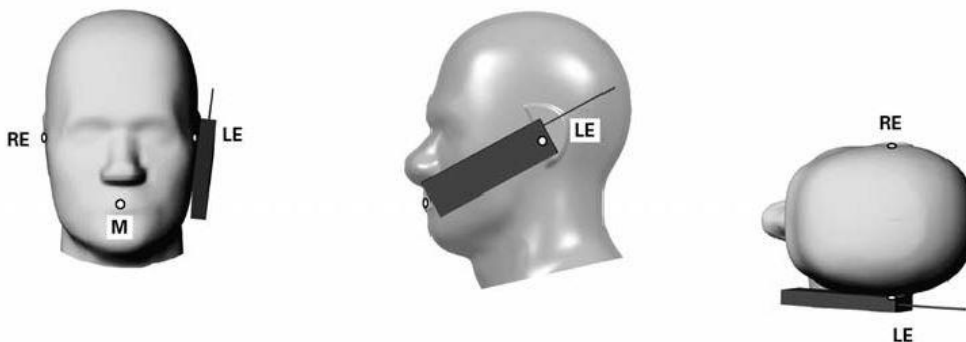
1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal 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 9.2.1 and Figure 9.2.2), 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 9.2.1). 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 9.2.2), 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 9.2.3), 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 9.2.3. The actual rotation angles should be documented in the test report.



**Fig 9.2.1 Handset vertical and horizontal reference lines—“fixed case”**



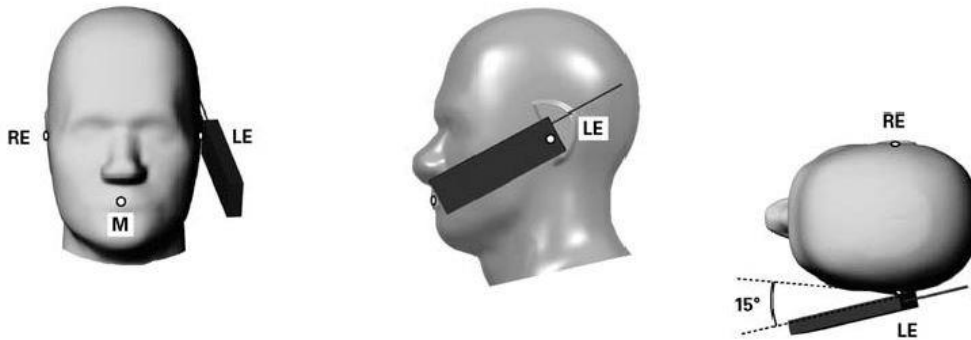
**Fig 9.2.2 Handset vertical and horizontal reference lines—“clam-shell case”**



**Fig 9.2.3 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.**

**10.3 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 9.3.1. 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

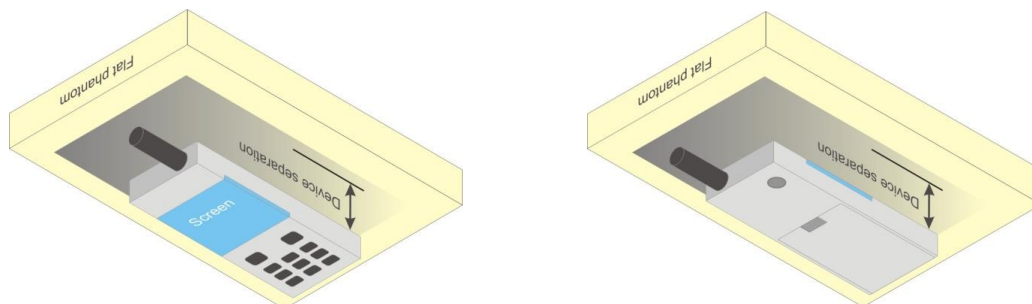


**Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.**

**10.4 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 9.4). 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 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 test 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 9.4 Body Worn Position**



### **10.5 Product Specific 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.

### **10.6 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 ( $L \times W \geq 9$  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.





**11. GSM/UMTS/LTE Output Power (Unit: dBm)**

**<GSM Conducted Power>**

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 is 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
4. Power reduction which is implemented in GSM850/GSM1900 band, for SAR testing EUT was set in reduced power mode and GPRS 4Tx slot due to its highest frame-average power.

**<At-Head Power Mode>**

GSM850 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
	Frequency (MHz)	824.2	836.4		848.8	824.2	836.4	
GSM 1 Tx slot	32.15	32.22	31.87	33.00	23.15	23.22	22.87	24.00
GPRS 1 Tx slot	32.16	32.23	31.89	33.00	23.16	23.23	22.89	24.00
GPRS 2 Tx slots	30.43	30.27	30.37	31.00	24.43	24.27	24.37	25.00
GPRS 3 Tx slots	28.89	28.52	28.60	29.50	24.63	24.26	24.34	25.24
GPRS 4 Tx slots	27.63	27.44	27.53	28.50	24.63	24.44	24.53	25.50
EDGE 1 Tx slot	26.54	26.36	26.40	27.00	17.54	17.36	17.40	18.00
EDGE 2 Tx slots	24.83	24.71	24.74	25.00	18.83	18.71	18.74	19.00
EDGE 3 Tx slots	22.56	22.52	22.57	23.00	18.30	18.26	18.31	18.74
EDGE 4 Tx slots	21.45	21.35	21.35	21.50	18.45	18.35	18.35	18.50

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	
GSM 1 Tx slot	29.86	29.81	29.75	30.50	20.86	20.81	20.75	21.50
GPRS 1 Tx slot	29.88	29.82	29.76	30.50	20.88	20.82	20.76	21.50
GPRS 2 Tx slots	28.20	28.15	28.11	29.00	22.20	22.15	22.11	23.00
GPRS 3 Tx slots	26.43	26.46	26.46	27.00	22.17	22.20	22.20	22.74
GPRS 4 Tx slots	25.45	25.38	25.34	26.00	22.45	22.38	22.34	23.00
EDGE 1 Tx slot	25.64	25.45	25.53	26.00	16.64	16.45	16.53	17.00
EDGE 2 Tx slots	23.89	23.92	23.85	25.00	17.89	17.92	17.85	19.00
EDGE 3 Tx slots	21.72	21.77	21.79	23.00	17.46	17.51	17.53	18.74
EDGE 4 Tx slots	20.61	20.55	20.52	22.00	17.61	17.55	17.52	19.00



**<Hotspot Power Mode>**

GSM850 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.15	32.22	31.87	33.00	23.15	23.22	22.87	24.00
GPRS 1 Tx slot	32.16	32.23	31.89	33.00	23.16	23.23	22.89	24.00
GPRS 2 Tx slots	30.43	30.27	30.37	31.00	24.43	24.27	24.37	25.00
GPRS 3 Tx slots	28.89	28.52	28.60	29.50	24.63	24.26	24.34	25.24
GPRS 4 Tx slots	27.63	27.44	27.53	28.50	24.63	24.44	24.53	25.50
EDGE 1 Tx slot	26.54	26.36	26.40	27.00	17.54	17.36	17.40	18.00
EDGE 2 Tx slots	24.83	24.71	24.74	25.00	18.83	18.71	18.74	19.00
EDGE 3 Tx slots	22.56	22.52	22.57	23.00	18.30	18.26	18.31	18.74
EDGE 4 Tx slots	21.45	21.35	21.35	21.50	18.45	18.35	18.35	18.50

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	27.06	27.10	27.20	28.00	18.06	18.10	18.20	19.00
GPRS 1 Tx slot	27.16	27.13	27.20	28.00	18.16	18.13	18.20	19.00
GPRS 2 Tx slots	25.74	25.70	25.73	26.50	19.74	19.70	19.73	20.50
GPRS 3 Tx slots	23.75	23.91	23.74	24.50	19.49	19.65	19.48	20.24
GPRS 4 Tx slots	23.27	23.25	23.16	23.50	20.27	20.25	20.16	20.50
EDGE 1 Tx slot	23.44	23.41	23.32	23.50	14.44	14.41	14.32	14.50
EDGE 2 Tx slots	22.10	22.03	21.93	22.50	16.10	16.03	15.93	16.50
EDGE 3 Tx slots	19.91	19.85	19.92	20.50	15.65	15.59	15.66	16.24
EDGE 4 Tx slots	18.72	18.61	18.51	19.50	15.72	15.61	15.51	16.50

**<Body-worn & Product Specific Power Mode>**

GSM850 TX Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.15	32.22	31.87	33.00	23.15	23.22	22.87	24.00
GPRS 1 Tx slot	32.16	32.23	31.89	33.00	23.16	23.23	22.89	24.00
GPRS 2 Tx slots	30.43	30.27	30.37	31.00	24.43	24.27	24.37	25.00
GPRS 3 Tx slots	28.89	28.52	28.60	29.50	24.63	24.26	24.34	25.24
GPRS 4 Tx slots	27.63	27.44	27.53	28.50	24.63	24.44	24.53	25.50
EDGE 1 Tx slot	26.54	26.36	26.40	27.00	17.54	17.36	17.40	18.00
EDGE 2 Tx slots	24.83	24.71	24.74	25.00	18.83	18.71	18.74	19.00
EDGE 3 Tx slots	22.56	22.52	22.57	23.00	18.30	18.26	18.31	18.74
EDGE 4 Tx slots	21.45	21.35	21.35	21.50	18.45	18.35	18.35	18.50

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	28.92	28.73	28.78	29.50	19.92	19.73	19.78	20.50
GPRS 1 Tx slot	28.93	28.74	28.80	29.50	19.93	19.74	19.80	20.50
GPRS 2 Tx slots	27.26	27.35	27.27	28.00	21.26	21.35	21.27	22.00
GPRS 3 Tx slots	25.51	25.44	25.52	26.00	21.25	21.18	21.26	21.74
GPRS 4 Tx slots	24.51	24.65	24.48	25.00	21.51	21.65	21.48	22.00
EDGE 1 Tx slot	24.51	24.59	24.53	25.00	15.51	15.59	15.53	16.00
EDGE 2 Tx slots	22.79	22.85	22.88	24.00	16.79	16.85	16.88	18.00
EDGE 3 Tx slots	20.70	20.72	20.82	22.00	16.44	16.46	16.56	17.74
EDGE 4 Tx slots	19.51	19.45	19.47	21.00	16.51	16.45	16.47	18.00

**<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 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, DPDCCH 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:**

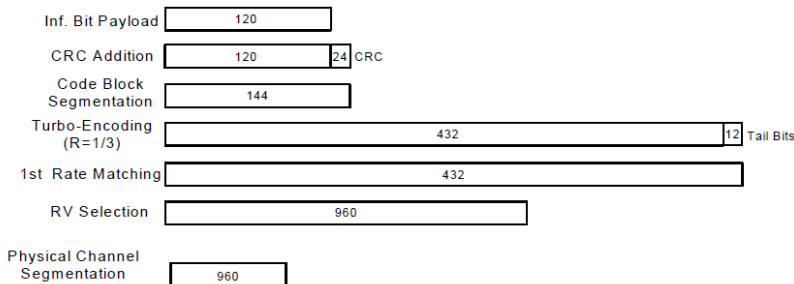
- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
  - i. Set RMC 12.2Kbps + HSDPA mode.
  - ii. Set Cell Power = -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**



**<WCDMA Conducted Power>**

**General 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 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 to RMC12.2Kbps and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than  $\frac{1}{4}$  dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

**<At-Head Power Mode>**

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		4132	4182	4233	
Rx Channel		9662	9800	9938	4357	4407	4458		
Frequency (MHz)		1852.4	1880	1907.6	826.4	836.4	846.6		
3GPP Rel 99	AMR 12.2Kbps	22.50	22.60	22.52	24.00	22.54	22.46	22.53	24.00
3GPP Rel 99	RMC 12.2Kbps	22.65	22.71	22.52	24.00	22.55	22.45	22.54	24.00
3GPP Rel 6	HSDPA Subtest-1	21.45	21.63	21.57	23.00	21.58	21.49	21.58	23.00
3GPP Rel 6	HSDPA Subtest-2	21.44	21.64	21.56	23.00	21.59	21.50	21.60	23.00
3GPP Rel 6	HSDPA Subtest-3	20.98	21.19	21.12	22.50	21.08	21.00	21.11	22.50
3GPP Rel 6	HSDPA Subtest-4	20.98	21.19	21.11	22.50	21.07	21.00	21.09	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	21.29	21.56	21.40	23.00	21.51	21.33	21.44	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.31	21.45	21.46	23.00	21.54	21.34	21.49	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	20.82	21.10	21.08	22.50	20.97	20.82	20.97	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	20.82	21.13	21.10	22.50	20.89	20.91	20.91	22.50
3GPP Rel 6	HSUPA Subtest-1	21.40	21.64	21.54	23.00	21.51	21.44	21.52	23.00
3GPP Rel 6	HSUPA Subtest-2	19.41	19.63	19.53	21.00	19.52	19.46	19.53	21.00
3GPP Rel 6	HSUPA Subtest-3	20.40	20.63	20.56	22.00	20.54	20.46	20.52	22.00
3GPP Rel 6	HSUPA Subtest-4	19.41	19.64	19.55	21.00	19.53	19.45	19.52	21.00
3GPP Rel 6	HSUPA Subtest-5	21.45	21.66	21.56	23.00	21.52	21.45	21.53	23.00

**<Hotspot Power Mode>**

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		4132	4182	4233	
Rx Channel		9662	9800	9938	4357	4407	4458		
Frequency (MHz)		1852.4	1880	1907.6	826.4	836.4	846.6		
3GPP Rel 99	AMR 12.2Kbps	17.00	17.27	17.09	18.50	22.54	22.46	22.53	24.00
3GPP Rel 99	RMC 12.2Kbps	17.01	17.28	17.11	18.50	22.55	22.45	22.54	24.00
3GPP Rel 6	HSDPA Subtest-1	15.97	16.22	16.11	17.50	21.58	21.49	21.58	23.00
3GPP Rel 6	HSDPA Subtest-2	15.99	16.24	16.14	17.50	21.59	21.50	21.60	23.00
3GPP Rel 6	HSDPA Subtest-3	15.48	15.75	15.64	17.00	21.08	21.00	21.11	22.50
3GPP Rel 6	HSDPA Subtest-4	15.50	15.74	15.64	17.00	21.07	21.00	21.09	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	15.92	16.28	16.18	17.50	21.51	21.33	21.44	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	16.05	16.17	16.17	17.50	21.54	21.34	21.49	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	15.38	15.66	15.63	17.00	20.97	20.82	20.97	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	15.54	15.71	15.56	17.00	20.89	20.91	20.91	22.50
3GPP Rel 6	HSUPA Subtest-1	15.87	16.08	15.97	17.50	21.51	21.44	21.52	23.00
3GPP Rel 6	HSUPA Subtest-2	13.88	14.11	14.02	15.50	19.52	19.46	19.53	21.00
3GPP Rel 6	HSUPA Subtest-3	14.87	15.13	15.02	16.50	20.54	20.46	20.52	22.00
3GPP Rel 6	HSUPA Subtest-4	13.88	14.13	14.04	15.50	19.53	19.45	19.52	21.00
3GPP Rel 6	HSUPA Subtest-5	15.86	16.07	15.95	17.50	21.52	21.45	21.53	23.00



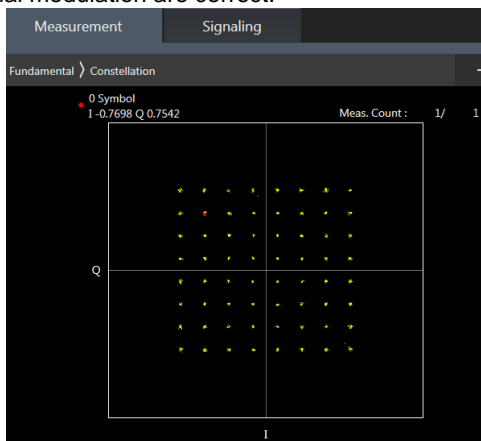
**<Body-worn & Product Specific Power Mode>**

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA V			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		4132	4182	4233	
Rx Channel		9662	9800	9938		4357	4407	4458	
Frequency (MHz)		1852.4	1880	1907.6		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	18.80	18.98	18.91	20.00	22.54	22.46	22.53	24.00
3GPP Rel 99	RMC 12.2Kbps	18.84	19.05	18.92	20.00	22.55	22.45	22.54	24.00
3GPP Rel 6	HSDPA Subtest-1	17.95	18.07	17.95	19.00	21.58	21.49	21.58	23.00
3GPP Rel 6	HSDPA Subtest-2	17.95	18.11	17.97	19.00	21.59	21.50	21.60	23.00
3GPP Rel 6	HSDPA Subtest-3	17.46	17.62	17.50	18.50	21.08	21.00	21.11	22.50
3GPP Rel 6	HSDPA Subtest-4	17.46	17.63	17.48	18.50	21.07	21.00	21.09	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	17.78	17.88	17.92	19.00	21.51	21.33	21.44	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	17.79	18.06	17.84	19.00	21.54	21.34	21.49	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	17.46	17.48	17.40	18.50	20.97	20.82	20.97	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	17.43	17.51	17.34	18.50	20.89	20.91	20.91	22.50
3GPP Rel 6	HSUPA Subtest-1	17.95	18.12	18.02	19.00	21.51	21.44	21.52	23.00
3GPP Rel 6	HSUPA Subtest-2	15.91	16.10	16.01	17.00	19.52	19.46	19.53	21.00
3GPP Rel 6	HSUPA Subtest-3	16.97	17.14	17.01	18.00	20.54	20.46	20.52	22.00
3GPP Rel 6	HSUPA Subtest-4	15.93	16.14	15.95	17.00	19.53	19.45	19.52	21.00
3GPP Rel 6	HSUPA Subtest-5	17.90	18.10	18.00	19.00	21.52	21.45	21.53	23.00

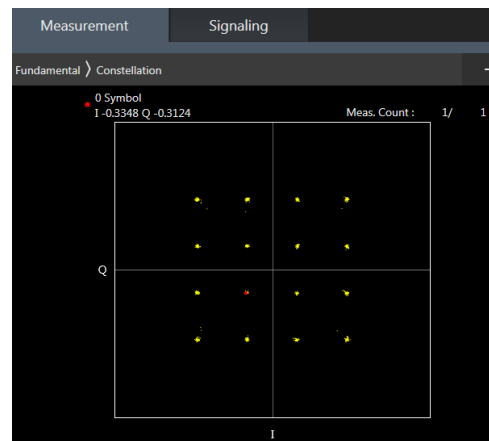
**<LTE Conducted Power>**

**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 B5 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. LTE band 38 SAR test was covered by Band 41; according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
  - a. the maximum output power, including tolerance, for the smaller band is  $\leq$  the larger band to qualify for the SAR test exclusion
  - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band
10. According to 2017 TCB workshop, for 64 QAM and 16 QAM 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**





<At-Head Power Mode>

<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	22.50	22.54	22.44	24	0
10	QPSK	1	25	22.48	22.48	22.49		
10	QPSK	1	49	22.53	22.40	22.43		
10	QPSK	25	0	21.54	21.57	21.48	23	1
10	QPSK	25	12	21.55	21.56	21.53		
10	QPSK	25	25	21.54	21.46	21.52		
10	QPSK	50	0	21.59	21.52	21.43		
10	16QAM	1	0	21.88	21.92	21.78	23	1
10	16QAM	1	25	21.84	21.79	21.87		
10	16QAM	1	49	21.91	21.78	21.76		
10	16QAM	25	0	20.62	20.64	20.54	22	2
10	16QAM	25	12	20.75	20.66	20.63		
10	16QAM	25	25	20.66	20.58	20.59		
10	16QAM	50	0	20.73	20.62	20.52		
10	64QAM	1	0	20.80	20.83	20.72	22	2
10	64QAM	1	25	20.78	20.78	20.77		
10	64QAM	1	49	20.80	20.71	20.71		
10	64QAM	25	0	19.65	19.67	19.55	21	3
10	64QAM	25	12	19.75	19.66	19.68		
10	64QAM	25	25	19.68	19.62	19.60		
10	64QAM	50	0	19.72	19.62	19.52		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.40	22.44	22.41	24	0
5	QPSK	1	12	22.45	22.45	22.39		
5	QPSK	1	24	22.46	22.32	22.36		
5	QPSK	12	0	21.50	21.45	21.44	23	1
5	QPSK	12	7	21.64	21.50	21.48		
5	QPSK	12	13	21.53	21.44	21.42		
5	QPSK	25	0	21.53	21.42	21.39		
5	16QAM	1	0	21.87	21.91	21.71	23	1
5	16QAM	1	12	21.82	21.73	21.83		
5	16QAM	1	24	21.84	21.75	21.70		
5	16QAM	12	0	20.57	20.59	20.50	22	2
5	16QAM	12	7	20.72	20.56	20.59		
5	16QAM	12	13	20.59	20.49	20.49		
5	16QAM	25	0	20.69	20.53	20.48		
5	64QAM	1	0	20.79	20.83	20.62	22	2
5	64QAM	1	12	20.77	20.75	20.68		
5	64QAM	1	24	20.77	20.70	20.63		
5	64QAM	12	0	19.64	19.67	19.45	21	3
5	64QAM	12	7	19.65	19.57	19.65		
5	64QAM	12	13	19.59	19.58	19.51		
5	64QAM	25	0	19.65	19.59	19.46		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.45	22.53	22.43	24	0
3	QPSK	1	8	22.46	22.46	22.43		
3	QPSK	1	14	22.48	22.34	22.43		
3	QPSK	8	0	21.47	21.46	21.40	23	1



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3	QPSK	8	4	21.58	21.47	21.49		
3	QPSK	8	7	21.53	21.45	21.51		
3	QPSK	15	0	21.51	21.50	21.43		
3	16QAM	1	0	21.85	21.89	21.78	23	1
3	16QAM	1	8	21.78	21.70	21.84		
3	16QAM	1	14	21.82	21.70	21.73		
3	16QAM	8	0	20.61	20.55	20.44	22	2
3	16QAM	8	4	20.73	20.64	20.53		
3	16QAM	8	7	20.58	20.56	20.50		
3	16QAM	15	0	20.65	20.55	20.49		
3	64QAM	1	0	20.79	20.82	20.66	22	2
3	64QAM	1	8	20.75	20.71	20.71		
3	64QAM	1	14	20.72	20.68	20.71		
3	64QAM	8	0	19.62	19.57	19.45	21	3
3	64QAM	8	4	19.69	19.60	19.60		
3	64QAM	8	7	19.59	19.54	19.51		
3	64QAM	15	0	19.64	19.57	19.47		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.50	22.46	22.44	24	0
1.4	QPSK	1	3	22.43	22.46	22.45		
1.4	QPSK	1	5	22.47	22.31	22.33		
1.4	QPSK	3	0	22.50	22.49	22.44		
1.4	QPSK	3	1	22.47	22.40	22.47		
1.4	QPSK	3	3	22.52	22.36	22.34		
1.4	QPSK	6	0	21.52	21.52	21.47	23	1
1.4	16QAM	1	0	21.55	21.54	21.46	23	1
1.4	16QAM	1	3	21.52	21.43	21.43		
1.4	16QAM	1	5	21.52	21.50	21.39		
1.4	16QAM	3	0	21.55	21.51	21.48		
1.4	16QAM	3	1	21.56	21.44	21.46		
1.4	16QAM	3	3	21.58	21.42	21.43		
1.4	16QAM	6	0	20.61	20.64	20.49	22	2
1.4	64QAM	1	0	20.73	20.57	20.60	22	2
1.4	64QAM	1	3	20.65	20.49	20.51		
1.4	64QAM	1	5	20.59	20.58	20.51		
1.4	64QAM	3	0	20.73	20.62	20.56		
1.4	64QAM	3	1	20.65	20.48	20.50		
1.4	64QAM	3	3	20.73	20.59	20.42		
1.4	64QAM	6	0	19.63	19.57	19.51	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	22.63	22.83	22.69	24	0
20	QPSK	1	49	22.68	22.74	22.71		
20	QPSK	1	99	22.69	22.82	22.77		
20	QPSK	50	0	21.75	21.90	21.76	23	1
20	QPSK	50	24	21.76	21.84	21.81		
20	QPSK	50	50	21.82	21.87	21.83		
20	QPSK	100	0	21.86	21.87	21.78	23	1
20	16QAM	1	0	21.93	22.07	22.02		
20	16QAM	1	49	21.97	22.06	22.09		
20	16QAM	1	99	22.20	22.14	22.08	22	2
20	16QAM	50	0	20.81	20.87	20.86		
20	16QAM	50	24	20.84	20.92	20.94		
20	16QAM	50	50	20.99	20.96	20.91	22	2
20	16QAM	100	0	20.91	20.89	20.89		
20	64QAM	1	0	20.90	20.99	20.97		
20	64QAM	1	49	20.92	21.05	21.05	22	2
20	64QAM	1	99	21.12	21.06	21.04		
20	64QAM	50	0	19.83	19.93	19.87		
20	64QAM	50	24	19.84	19.94	19.95	21	3
20	64QAM	50	50	19.99	19.99	19.95		
20	64QAM	100	0	19.99	19.91	19.92		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	22.60	22.74	22.63	24	0
15	QPSK	1	37	22.64	22.69	22.67		
15	QPSK	1	74	22.62	22.75	22.69		
15	QPSK	36	0	21.67	21.86	21.69	23	1
15	QPSK	36	20	21.69	21.84	21.81		
15	QPSK	36	39	21.79	21.86	21.78		
15	QPSK	75	0	21.76	21.79	21.69	23	1
15	16QAM	1	0	21.93	22.05	22.01		
15	16QAM	1	37	21.87	22.02	22.09		
15	16QAM	1	74	22.10	22.13	21.98	22	2
15	16QAM	36	0	20.81	20.77	20.79		
15	16QAM	36	20	20.76	20.88	20.84		
15	16QAM	36	39	20.89	20.86	20.91	22	2
15	16QAM	75	0	20.89	20.85	20.80		
15	64QAM	1	0	20.83	20.95	20.89		
15	64QAM	1	37	20.83	20.95	21.01	22	2
15	64QAM	1	74	21.05	21.01	20.98		
15	64QAM	36	0	19.76	19.88	19.82		
15	64QAM	36	20	19.83	19.86	19.91	21	3
15	64QAM	36	39	19.93	19.96	19.91		
15	64QAM	75	0	19.98	19.85	19.85		
Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	22.57	22.76	22.60	24	0
10	QPSK	1	25	22.62	22.64	22.67		
10	QPSK	1	49	22.61	22.79	22.67		
10	QPSK	25	0	21.67	21.86	21.74	23	1
10	QPSK	25	12	21.76	21.78	21.73		



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10	QPSK	25	25	21.80	21.85	21.82		
10	QPSK	50	0	21.81	21.83	21.76		
10	16QAM	1	0	21.91	21.98	21.94		
10	16QAM	1	25	21.90	21.98	22.02	23	1
10	16QAM	1	49	22.17	22.09	22.04		
10	16QAM	25	0	20.71	20.84	20.79		
10	16QAM	25	12	20.83	20.92	20.84	22	2
10	16QAM	25	25	20.94	20.93	20.87		
10	16QAM	50	0	20.86	20.84	20.88		
10	64QAM	1	0	20.87	20.98	20.89	22	2
10	64QAM	1	25	20.86	20.99	21.05		
10	64QAM	1	49	21.02	20.99	20.98		
10	64QAM	25	0	19.83	19.83	19.82	21	3
10	64QAM	25	12	19.76	19.87	19.92		
10	64QAM	25	25	19.96	19.92	19.94		
10	64QAM	50	0	19.98	19.91	19.90		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	22.57	22.79	22.64	24	0
5	QPSK	1	12	22.59	22.67	22.70		
5	QPSK	1	24	22.60	22.82	22.67		
5	QPSK	12	0	21.70	21.83	21.74	23	1
5	QPSK	12	7	21.72	21.82	21.80		
5	QPSK	12	13	21.80	21.84	21.78		
5	QPSK	25	0	21.82	21.87	21.78		
5	16QAM	1	0	21.86	22.07	22.01	23	1
5	16QAM	1	12	21.93	21.99	22.06		
5	16QAM	1	24	22.12	22.09	22.06		
5	16QAM	12	0	20.74	20.77	20.83	22	2
5	16QAM	12	7	20.77	20.84	20.85		
5	16QAM	12	13	20.94	20.94	20.85		
5	16QAM	25	0	20.90	20.89	20.84		
5	64QAM	1	0	20.85	20.91	20.95	22	2
5	64QAM	1	12	20.91	21.02	21.03		
5	64QAM	1	24	21.02	21.02	20.96		
5	64QAM	12	0	19.81	19.84	19.84	21	3
5	64QAM	12	7	19.77	19.85	19.88		
5	64QAM	12	13	19.99	19.95	19.91		
5	64QAM	25	0	19.92	19.85	19.84		



<Hotspot Power Mode>

<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	22.50	22.54	22.44	24	0
10	QPSK	1	25	22.48	22.48	22.49		
10	QPSK	1	49	22.53	22.40	22.43		
10	QPSK	25	0	21.54	21.57	21.48	23	1
10	QPSK	25	12	21.55	21.56	21.53		
10	QPSK	25	25	21.54	21.46	21.52		
10	QPSK	50	0	21.59	21.52	21.43	23	1
10	16QAM	1	0	21.88	21.92	21.78		
10	16QAM	1	25	21.84	21.79	21.87		
10	16QAM	1	49	21.91	21.78	21.76	22	2
10	16QAM	25	0	20.62	20.64	20.54		
10	16QAM	25	12	20.75	20.66	20.63		
10	16QAM	25	25	20.66	20.58	20.59	22	2
10	16QAM	50	0	20.73	20.62	20.52		
10	64QAM	1	0	20.80	20.83	20.72		
10	64QAM	1	25	20.78	20.78	20.77	22	2
10	64QAM	1	49	20.80	20.71	20.71		
10	64QAM	25	0	19.65	19.67	19.55		
10	64QAM	25	12	19.75	19.66	19.68	21	3
10	64QAM	25	25	19.68	19.62	19.60		
10	64QAM	50	0	19.72	19.62	19.52		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.40	22.44	22.41	24	0
5	QPSK	1	12	22.45	22.45	22.39		
5	QPSK	1	24	22.46	22.32	22.36		
5	QPSK	12	0	21.50	21.45	21.44	23	1
5	QPSK	12	7	21.64	21.50	21.48		
5	QPSK	12	13	21.53	21.44	21.42		
5	QPSK	25	0	21.53	21.42	21.39	23	1
5	16QAM	1	0	21.87	21.91	21.71		
5	16QAM	1	12	21.82	21.73	21.83		
5	16QAM	1	24	21.84	21.75	21.70	22	2
5	16QAM	12	0	20.57	20.59	20.50		
5	16QAM	12	7	20.72	20.56	20.59		
5	16QAM	12	13	20.59	20.49	20.49	22	2
5	16QAM	25	0	20.69	20.53	20.48		
5	64QAM	1	0	20.79	20.83	20.62		
5	64QAM	1	12	20.77	20.75	20.68	22	2
5	64QAM	1	24	20.77	20.70	20.63		
5	64QAM	12	0	19.64	19.67	19.45		
5	64QAM	12	7	19.65	19.57	19.65	21	3
5	64QAM	12	13	19.59	19.58	19.51		
5	64QAM	25	0	19.65	19.59	19.46		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.45	22.53	22.43	24	0
3	QPSK	1	8	22.46	22.46	22.43		
3	QPSK	1	14	22.48	22.34	22.43		
3	QPSK	8	0	21.47	21.46	21.40	23	1



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3	QPSK	8	4	21.58	21.47	21.49		
3	QPSK	8	7	21.53	21.45	21.51		
3	QPSK	15	0	21.51	21.50	21.43		
3	16QAM	1	0	21.85	21.89	21.78	23	1
3	16QAM	1	8	21.78	21.70	21.84		
3	16QAM	1	14	21.82	21.70	21.73		
3	16QAM	8	0	20.61	20.55	20.44	22	2
3	16QAM	8	4	20.73	20.64	20.53		
3	16QAM	8	7	20.58	20.56	20.50		
3	16QAM	15	0	20.65	20.55	20.49		
3	64QAM	1	0	20.79	20.82	20.66	22	2
3	64QAM	1	8	20.75	20.71	20.71		
3	64QAM	1	14	20.72	20.68	20.71		
3	64QAM	8	0	19.62	19.57	19.45	21	3
3	64QAM	8	4	19.69	19.60	19.60		
3	64QAM	8	7	19.59	19.54	19.51		
3	64QAM	15	0	19.64	19.57	19.47		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.50	22.46	22.44	24	0
1.4	QPSK	1	3	22.43	22.46	22.45		
1.4	QPSK	1	5	22.47	22.31	22.33		
1.4	QPSK	3	0	22.50	22.49	22.44		
1.4	QPSK	3	1	22.47	22.40	22.47		
1.4	QPSK	3	3	22.52	22.36	22.34		
1.4	QPSK	6	0	21.52	21.52	21.47	23	1
1.4	16QAM	1	0	21.55	21.54	21.46	23	1
1.4	16QAM	1	3	21.52	21.43	21.43		
1.4	16QAM	1	5	21.52	21.50	21.39		
1.4	16QAM	3	0	21.55	21.51	21.48		
1.4	16QAM	3	1	21.56	21.44	21.46		
1.4	16QAM	3	3	21.58	21.42	21.43		
1.4	16QAM	6	0	20.61	20.64	20.49	22	2
1.4	64QAM	1	0	20.73	20.57	20.60	22	2
1.4	64QAM	1	3	20.65	20.49	20.51		
1.4	64QAM	1	5	20.59	20.58	20.51		
1.4	64QAM	3	0	20.73	20.62	20.56		
1.4	64QAM	3	1	20.65	20.48	20.50		
1.4	64QAM	3	3	20.73	20.59	20.42		
1.4	64QAM	6	0	19.63	19.57	19.51	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	20.5	0
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	19.22	19.30	19.29	20.5	0
20	QPSK	1	49	19.02	19.14	19.18		
20	QPSK	1	99	19.21	19.26	19.25		
20	QPSK	50	0	19.27	19.29	19.26	20.5	0
20	QPSK	50	24	19.24	19.22	19.23		
20	QPSK	50	50	19.20	19.17	19.25		
20	QPSK	100	0	19.25	19.26	19.25	20.5	0
20	16QAM	1	0	19.09	19.12	19.12		
20	16QAM	1	49	19.15	19.16	19.18		
20	16QAM	1	99	19.28	19.26	19.26	20.5	0
20	16QAM	50	0	19.01	19.06	19.06		
20	16QAM	50	24	19.04	19.14	19.13		
20	16QAM	50	50	19.16	19.15	19.16	20.5	0
20	16QAM	100	0	19.11	19.11	19.12		
20	64QAM	1	0	19.00	19.02	19.06		
20	64QAM	1	49	19.02	19.07	19.17	20.5	0
20	64QAM	1	99	19.20	19.26	19.27		
20	64QAM	50	0	18.90	18.93	18.96		
20	64QAM	50	24	18.92	18.97	19.03	20.5	0
20	64QAM	50	50	19.00	19.02	19.05		
20	64QAM	100	0	18.99	18.96	18.99		
Channel				20825	21100	21375	20.5	0
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	19.12	19.25	19.25	20.5	0
15	QPSK	1	37	18.96	19.05	19.14		
15	QPSK	1	74	19.11	19.18	19.15		
15	QPSK	36	0	19.20	19.29	19.26	20.5	0
15	QPSK	36	20	19.17	19.23	19.26		
15	QPSK	36	39	19.19	19.13	19.18		
15	QPSK	75	0	19.24	19.12	19.20	20.5	0
15	16QAM	1	0	19.02	19.06	19.10		
15	16QAM	1	37	19.15	19.16	19.18		
15	16QAM	1	74	19.24	19.16	19.18	20.5	0
15	16QAM	36	0	18.99	19.01	19.02		
15	16QAM	36	20	19.00	19.08	19.07		
15	16QAM	36	39	19.09	19.06	19.12	20.5	0
15	16QAM	75	0	19.07	19.04	19.08		
15	64QAM	1	0	18.93	18.95	19.04		
15	64QAM	1	37	19.00	19.06	19.08	20.5	0
15	64QAM	1	74	19.10	19.22	19.17		
15	64QAM	36	0	18.83	18.93	18.95		
15	64QAM	36	20	18.92	18.94	18.97	20.5	0
15	64QAM	36	39	18.96	19.02	18.99		
15	64QAM	75	0	18.89	18.87	18.93		
Channel				20800	21100	21400	20.5	0
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	19.14	19.25	19.23	20.5	0
10	QPSK	1	25	18.94	19.07	19.16		
10	QPSK	1	49	19.13	19.17	19.19		
10	QPSK	25	0	19.23	19.26	19.28	20.5	0
10	QPSK	25	12	19.19	19.26	19.23		



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10	QPSK	25	25	19.17	19.13	19.16		
10	QPSK	50	0	19.16	19.18	19.15		
10	16QAM	1	0	19.07	19.02	19.05	20.5	0
10	16QAM	1	25	19.13	19.14	19.18		
10	16QAM	1	49	19.27	19.16	19.22		
10	16QAM	25	0	19.00	19.02	19.06	20.5	0
10	16QAM	25	12	18.95	19.06	19.13		
10	16QAM	25	25	19.13	19.05	19.12		
10	16QAM	50	0	19.04	19.05	19.03	20.5	0
10	64QAM	1	0	18.99	18.94	19.03		
10	64QAM	1	25	18.96	19.05	19.12		
10	64QAM	1	49	19.19	19.24	19.18	20.5	0
10	64QAM	25	0	18.84	18.93	18.86		
10	64QAM	25	12	18.89	18.95	18.97		
10	64QAM	25	25	18.93	19.01	18.98	20.5	0
10	64QAM	50	0	18.99	18.89	18.99		
Channel				20775	21100	21425		
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	19.12	19.23	19.28	20.5	0
5	QPSK	1	12	18.92	19.09	19.08		
5	QPSK	1	24	19.15	19.19	19.20		
5	QPSK	12	0	19.27	19.25	19.26	20.5	0
5	QPSK	12	7	19.18	19.28	19.24		
5	QPSK	12	13	19.15	19.07	19.18		
5	QPSK	25	0	19.17	19.17	19.21	20.5	0
5	16QAM	1	0	18.99	19.05	19.06		
5	16QAM	1	12	19.15	19.06	19.09		
5	16QAM	1	24	19.26	19.21	19.16	20.5	0
5	16QAM	12	0	18.99	18.99	19.06		
5	16QAM	12	7	18.99	19.08	19.03		
5	16QAM	12	13	19.13	19.08	19.11	20.5	0
5	16QAM	25	0	19.10	19.04	19.03		
5	64QAM	1	0	18.92	18.98	19.04		
5	64QAM	1	12	18.99	19.05	19.17	20.5	0
5	64QAM	1	24	19.16	19.23	19.20		
5	64QAM	12	0	18.85	18.84	18.93		
5	64QAM	12	7	18.92	18.91	19.03	20.5	0
5	64QAM	12	13	18.93	18.95	19.00		
5	64QAM	25	0	18.93	18.91	18.97		





<Body-worn & Product Specific Power Mode>

<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	22.50	22.54	22.44	24	0
10	QPSK	1	25	22.48	22.48	22.49		
10	QPSK	1	49	22.53	22.40	22.43		
10	QPSK	25	0	21.54	21.57	21.48	23	1
10	QPSK	25	12	21.55	21.56	21.53		
10	QPSK	25	25	21.54	21.46	21.52		
10	QPSK	50	0	21.59	21.52	21.43	23	1
10	16QAM	1	0	21.88	21.92	21.78		
10	16QAM	1	25	21.84	21.79	21.87		
10	16QAM	1	49	21.91	21.78	21.76	22	2
10	16QAM	25	0	20.62	20.64	20.54		
10	16QAM	25	12	20.75	20.66	20.63		
10	16QAM	25	25	20.66	20.58	20.59	22	2
10	16QAM	50	0	20.73	20.62	20.52		
10	64QAM	1	0	20.80	20.83	20.72		
10	64QAM	1	25	20.78	20.78	20.77	22	2
10	64QAM	1	49	20.80	20.71	20.71		
10	64QAM	25	0	19.65	19.67	19.55		
10	64QAM	25	12	19.75	19.66	19.68	21	3
10	64QAM	25	25	19.68	19.62	19.60		
10	64QAM	50	0	19.72	19.62	19.52		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.40	22.44	22.41	24	0
5	QPSK	1	12	22.45	22.45	22.39		
5	QPSK	1	24	22.46	22.32	22.36		
5	QPSK	12	0	21.50	21.45	21.44	23	1
5	QPSK	12	7	21.64	21.50	21.48		
5	QPSK	12	13	21.53	21.44	21.42		
5	QPSK	25	0	21.53	21.42	21.39	23	1
5	16QAM	1	0	21.87	21.91	21.71		
5	16QAM	1	12	21.82	21.73	21.83		
5	16QAM	1	24	21.84	21.75	21.70	22	2
5	16QAM	12	0	20.57	20.59	20.50		
5	16QAM	12	7	20.72	20.56	20.59		
5	16QAM	12	13	20.59	20.49	20.49	22	2
5	16QAM	25	0	20.69	20.53	20.48		
5	64QAM	1	0	20.79	20.83	20.62		
5	64QAM	1	12	20.77	20.75	20.68	22	2
5	64QAM	1	24	20.77	20.70	20.63		
5	64QAM	12	0	19.64	19.67	19.45		
5	64QAM	12	7	19.65	19.57	19.65	21	3
5	64QAM	12	13	19.59	19.58	19.51		
5	64QAM	25	0	19.65	19.59	19.46		
Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.45	22.53	22.43	24	0
3	QPSK	1	8	22.46	22.46	22.43		
3	QPSK	1	14	22.48	22.34	22.43		
3	QPSK	8	0	21.47	21.46	21.40	23	1



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3	QPSK	8	4	21.58	21.47	21.49		
3	QPSK	8	7	21.53	21.45	21.51		
3	QPSK	15	0	21.51	21.50	21.43		
3	16QAM	1	0	21.85	21.89	21.78	23	1
3	16QAM	1	8	21.78	21.70	21.84		
3	16QAM	1	14	21.82	21.70	21.73		
3	16QAM	8	0	20.61	20.55	20.44	22	2
3	16QAM	8	4	20.73	20.64	20.53		
3	16QAM	8	7	20.58	20.56	20.50		
3	16QAM	15	0	20.65	20.55	20.49		
3	64QAM	1	0	20.79	20.82	20.66	22	2
3	64QAM	1	8	20.75	20.71	20.71		
3	64QAM	1	14	20.72	20.68	20.71		
3	64QAM	8	0	19.62	19.57	19.45	21	3
3	64QAM	8	4	19.69	19.60	19.60		
3	64QAM	8	7	19.59	19.54	19.51		
3	64QAM	15	0	19.64	19.57	19.47		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.50	22.46	22.44	24	0
1.4	QPSK	1	3	22.43	22.46	22.45		
1.4	QPSK	1	5	22.47	22.31	22.33		
1.4	QPSK	3	0	22.50	22.49	22.44		
1.4	QPSK	3	1	22.47	22.40	22.47		
1.4	QPSK	3	3	22.52	22.36	22.34		
1.4	QPSK	6	0	21.52	21.52	21.47	23	1
1.4	16QAM	1	0	21.55	21.54	21.46	23	1
1.4	16QAM	1	3	21.52	21.43	21.43		
1.4	16QAM	1	5	21.52	21.50	21.39		
1.4	16QAM	3	0	21.55	21.51	21.48		
1.4	16QAM	3	1	21.56	21.44	21.46		
1.4	16QAM	3	3	21.58	21.42	21.43		
1.4	16QAM	6	0	20.61	20.64	20.49	22	2
1.4	64QAM	1	0	20.73	20.57	20.60	22	2
1.4	64QAM	1	3	20.65	20.49	20.51		
1.4	64QAM	1	5	20.59	20.58	20.51		
1.4	64QAM	3	0	20.73	20.62	20.56		
1.4	64QAM	3	1	20.65	20.48	20.50		
1.4	64QAM	3	3	20.73	20.59	20.42		
1.4	64QAM	6	0	19.63	19.57	19.51	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	20.5	0
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	19.22	19.30	19.29	20.5	0
20	QPSK	1	49	19.02	19.14	19.18		
20	QPSK	1	99	19.21	19.26	19.25		
20	QPSK	50	0	19.27	19.29	19.26	20.5	0
20	QPSK	50	24	19.24	19.22	19.23		
20	QPSK	50	50	19.20	19.17	19.25		
20	QPSK	100	0	19.25	19.26	19.25	20.5	0
20	16QAM	1	0	19.09	19.12	19.12		
20	16QAM	1	49	19.15	19.16	19.18		
20	16QAM	1	99	19.28	19.26	19.26	20.5	0
20	16QAM	50	0	19.01	19.06	19.06		
20	16QAM	50	24	19.04	19.14	19.13		
20	16QAM	50	50	19.16	19.15	19.16	20.5	0
20	16QAM	100	0	19.11	19.11	19.12		
20	64QAM	1	0	19.00	19.02	19.06		
20	64QAM	1	49	19.02	19.07	19.17	20.5	0
20	64QAM	1	99	19.20	19.26	19.27		
20	64QAM	50	0	18.90	18.93	18.96		
20	64QAM	50	24	18.92	18.97	19.03	20.5	0
20	64QAM	50	50	19.00	19.02	19.05		
20	64QAM	100	0	18.99	18.96	18.99		
Channel				20825	21100	21375	20.5	0
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	19.12	19.25	19.25	20.5	0
15	QPSK	1	37	18.96	19.05	19.14		
15	QPSK	1	74	19.11	19.18	19.15		
15	QPSK	36	0	19.20	19.29	19.26	20.5	0
15	QPSK	36	20	19.17	19.23	19.26		
15	QPSK	36	39	19.19	19.13	19.18		
15	QPSK	75	0	19.24	19.12	19.20	20.5	0
15	16QAM	1	0	19.02	19.06	19.10		
15	16QAM	1	37	19.15	19.16	19.18		
15	16QAM	1	74	19.24	19.16	19.18	20.5	0
15	16QAM	36	0	18.99	19.01	19.02		
15	16QAM	36	20	19.00	19.08	19.07		
15	16QAM	36	39	19.09	19.06	19.12	20.5	0
15	16QAM	75	0	19.07	19.04	19.08		
15	64QAM	1	0	18.93	18.95	19.04		
15	64QAM	1	37	19.00	19.06	19.08	20.5	0
15	64QAM	1	74	19.10	19.22	19.17		
15	64QAM	36	0	18.83	18.93	18.95		
15	64QAM	36	20	18.92	18.94	18.97	20.5	0
15	64QAM	36	39	18.96	19.02	18.99		
15	64QAM	75	0	18.89	18.87	18.93		
Channel				20800	21100	21400	20.5	0
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	19.14	19.25	19.23	20.5	0
10	QPSK	1	25	18.94	19.07	19.16		
10	QPSK	1	49	19.13	19.17	19.19		
10	QPSK	25	0	19.23	19.26	19.28	20.5	0
10	QPSK	25	12	19.19	19.26	19.23		



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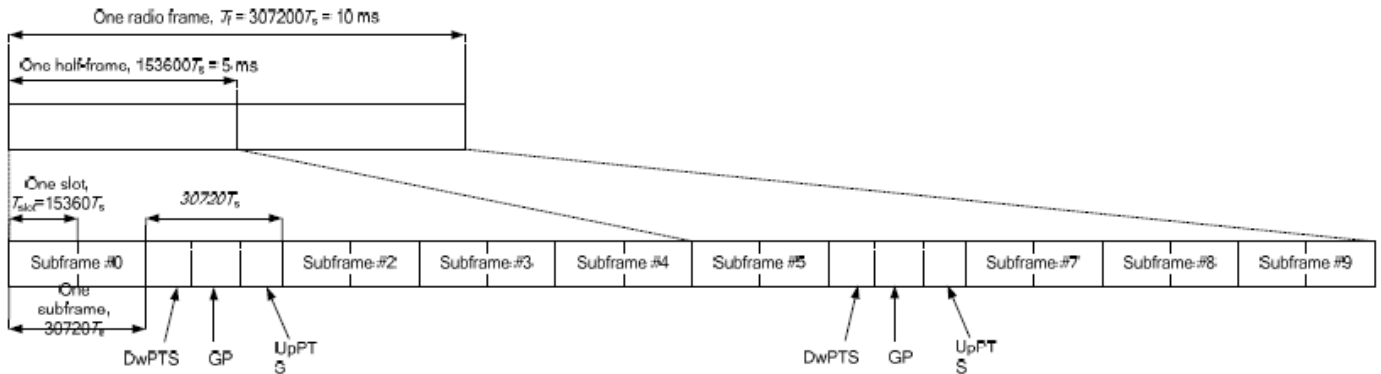
10	QPSK	25	25	19.17	19.13	19.16		
10	QPSK	50	0	19.16	19.18	19.15		
10	16QAM	1	0	19.07	19.02	19.05	20.5	0
10	16QAM	1	25	19.13	19.14	19.18		
10	16QAM	1	49	19.27	19.16	19.22		
10	16QAM	25	0	19.00	19.02	19.06	20.5	0
10	16QAM	25	12	18.95	19.06	19.13		
10	16QAM	25	25	19.13	19.05	19.12		
10	16QAM	50	0	19.04	19.05	19.03	20.5	0
10	64QAM	1	0	18.99	18.94	19.03		
10	64QAM	1	25	18.96	19.05	19.12		
10	64QAM	1	49	19.19	19.24	19.18	20.5	0
10	64QAM	25	0	18.84	18.93	18.86		
10	64QAM	25	12	18.89	18.95	18.97		
10	64QAM	25	25	18.93	19.01	18.98	20.5	0
10	64QAM	50	0	18.99	18.89	18.99		
Channel				20775	21100	21425		
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	19.12	19.23	19.28	20.5	0
5	QPSK	1	12	18.92	19.09	19.08		
5	QPSK	1	24	19.15	19.19	19.20		
5	QPSK	12	0	19.27	19.25	19.26	20.5	0
5	QPSK	12	7	19.18	19.28	19.24		
5	QPSK	12	13	19.15	19.07	19.18		
5	QPSK	25	0	19.17	19.17	19.21	20.5	0
5	16QAM	1	0	18.99	19.05	19.06		
5	16QAM	1	12	19.15	19.06	19.09		
5	16QAM	1	24	19.26	19.21	19.16	20.5	0
5	16QAM	12	0	18.99	18.99	19.06		
5	16QAM	12	7	18.99	19.08	19.03		
5	16QAM	12	13	19.13	19.08	19.11	20.5	0
5	16QAM	25	0	19.10	19.04	19.03		
5	64QAM	1	0	18.92	18.98	19.04		
5	64QAM	1	12	18.99	19.05	19.17	20.5	0
5	64QAM	1	24	19.16	19.23	19.20		
5	64QAM	12	0	18.85	18.84	18.93		
5	64QAM	12	7	18.92	18.91	19.03	20.5	0
5	64QAM	12	13	18.93	18.95	19.00		
5	64QAM	25	0	18.93	18.91	18.97		

**<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	20480 · Ts			4384 · Ts	5120 · Ts		
6	19760 · Ts	23040 · Ts						
7	21952 · Ts	4384 · Ts	5120 · Ts	12800 · Ts	4384 · Ts	5120 · Ts		
8	24144 · Ts			-				-
9	13168 · Ts	-	-	-	-	-		

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

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



<At-Head 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	22.61	22.69	22.58			24	0
20	QPSK	1	49	22.61	22.62	22.56	23	1		
20	QPSK	1	99	22.63	22.66	22.61				
20	QPSK	50	0	21.68	21.83	21.72				
20	QPSK	50	24	21.78	21.78	21.72	23	1		
20	QPSK	50	50	21.79	21.77	21.72				
20	QPSK	100	0	21.74	21.75	21.71				
20	16QAM	1	0	21.74	21.73	21.64	23	1		
20	16QAM	1	49	21.68	21.67	21.65				
20	16QAM	1	99	21.76	21.72	21.66				
20	16QAM	50	0	20.78	20.86	20.79	22	2		
20	16QAM	50	24	20.91	20.85	20.79				
20	16QAM	50	50	20.88	20.84	20.80				
20	16QAM	100	0	20.90	20.84	20.82	22	2		
20	64QAM	1	0	20.48	20.50	20.43				
20	64QAM	1	49	20.48	20.48	20.43				
20	64QAM	1	99	20.54	20.50	20.47	21	3		
20	64QAM	50	0	19.78	19.86	19.78				
20	64QAM	50	24	19.92	19.89	19.83				
20	64QAM	50	50	19.90	19.88	19.80	21	3		
20	64QAM	100	0	19.92	19.83	19.79				
Channel				37825	38000	38175			Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5	24	0		
15	QPSK	1	0	22.61	22.65	22.57				
15	QPSK	1	37	22.53	22.58	22.47				
15	QPSK	1	74	22.63	22.57	22.57	23	1		
15	QPSK	36	0	21.58	21.78	21.65				
15	QPSK	36	20	21.78	21.74	21.72				
15	QPSK	36	39	21.74	21.67	21.66	23	1		
15	QPSK	75	0	21.74	21.72	21.68				
15	16QAM	1	0	21.71	21.71	21.57				
15	16QAM	1	37	21.60	21.59	21.57	23	1		
15	16QAM	1	74	21.66	21.72	21.56				
15	16QAM	36	0	20.69	20.78	20.73				
15	16QAM	36	20	20.84	20.85	20.73	22	2		
15	16QAM	36	39	20.83	20.79	20.80				
15	16QAM	75	0	20.82	20.83	20.80				
15	64QAM	1	0	20.41	20.41	20.36	22	2		
15	64QAM	1	37	20.46	20.48	20.40				
15	64QAM	1	74	20.49	20.41	20.45				
15	64QAM	36	0	19.74	19.77	19.78	21	3		
15	64QAM	36	20	19.91	19.87	19.81				
15	64QAM	36	39	19.85	19.86	19.77				
15	64QAM	75	0	19.89	19.78	19.78	21	3		
Channel				37800	38000	38200			Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615				
10	QPSK	1	0	22.55	22.63	22.50	24	0		
10	QPSK	1	25	22.61	22.58	22.53				
10	QPSK	1	49	22.61	22.56	22.51				
10	QPSK	25	0	21.60	21.81	21.65	23	1		



10	QPSK	25	12	21.73	21.69	21.65		
10	QPSK	25	25	21.71	21.70	21.67		
10	QPSK	50	0	21.69	21.69	21.68		
10	16QAM	1	0	21.70	21.68	21.61	23	1
10	16QAM	1	25	21.65	21.58	21.61		
10	16QAM	1	49	21.70	21.69	21.59		
10	16QAM	25	0	20.68	20.79	20.70	22	2
10	16QAM	25	12	20.83	20.80	20.71		
10	16QAM	25	25	20.81	20.81	20.72		
10	16QAM	50	0	20.81	20.82	20.76		
10	64QAM	1	0	20.48	20.50	20.38	22	2
10	64QAM	1	25	20.38	20.38	20.39		
10	64QAM	1	49	20.52	20.48	20.42		
10	64QAM	25	0	19.71	19.79	19.72	21	3
10	64QAM	25	12	19.88	19.86	19.81		
10	64QAM	25	25	19.90	19.87	19.72		
10	64QAM	50	0	19.88	19.80	19.75		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	22.56	22.61	22.54	24	0
5	QPSK	1	12	22.61	22.60	22.51		
5	QPSK	1	24	22.55	22.64	22.53		
5	QPSK	12	0	21.65	21.75	21.69	23	1
5	QPSK	12	7	21.70	21.78	21.64		
5	QPSK	12	13	21.75	21.67	21.67		
5	QPSK	25	0	21.68	21.74	21.70		
5	16QAM	1	0	21.74	21.63	21.58	23	1
5	16QAM	1	12	21.66	21.58	21.55		
5	16QAM	1	24	21.76	21.65	21.63		
5	16QAM	12	0	20.72	20.82	20.70	22	2
5	16QAM	12	7	20.90	20.84	20.70		
5	16QAM	12	13	20.79	20.78	20.80		
5	16QAM	25	0	20.86	20.77	20.74		
5	64QAM	1	0	20.40	20.45	20.40	22	2
5	64QAM	1	12	20.39	20.46	20.38		
5	64QAM	1	24	20.54	20.46	20.37		
5	64QAM	12	0	19.71	19.84	19.69	21	3
5	64QAM	12	7	19.82	19.87	19.75		
5	64QAM	12	13	19.87	19.88	19.77		
5	64QAM	25	0	19.84	19.77	19.74		





<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Low Ch. / Freq.	Power Middle High Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				40140	40400	40670	41140		
Frequency (MHz)				2545	2571	2598	2645		
20	QPSK	1	0	22.98	22.82	22.75	22.84	24	0
20	QPSK	1	49	22.83	22.77	22.68	22.75		
20	QPSK	1	99	22.88	22.81	22.74	22.83		
20	QPSK	50	0	21.92	21.90	21.83	21.88	23	1
20	QPSK	50	24	21.90	21.84	21.80	21.85		
20	QPSK	50	50	21.91	21.89	21.81	21.87		
20	QPSK	100	0	21.90	21.83	21.80	21.85	23	1
20	16QAM	1	0	21.97	21.93	21.80	21.91		
20	16QAM	1	49	21.95	21.91	21.75	21.94		
20	16QAM	1	99	22.01	21.92	21.80	21.95	22	2
20	16QAM	50	0	20.99	20.95	20.90	20.92		
20	16QAM	50	24	21.02	20.96	20.92	20.95		
20	16QAM	50	50	21.02	20.95	20.90	20.95	22	2
20	16QAM	100	0	21.01	20.95	20.87	20.92		
20	64QAM	1	0	20.70	20.65	20.62	20.66		
20	64QAM	1	49	20.71	20.68	20.57	20.64	22	2
20	64QAM	1	99	20.79	20.66	20.59	20.71		
20	64QAM	50	0	19.99	19.95	19.91	19.95		
20	64QAM	50	24	20.02	19.96	19.92	19.95	21	3
20	64QAM	50	50	20.02	19.97	19.94	19.99		
20	64QAM	100	0	20.01	19.97	19.89	19.94		
Channel				40115	40395	40685	41165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2542.5	2570.5	2599.5	2647.5		
15	QPSK	1	0	22.92	22.83	22.76	22.81	24	0
15	QPSK	1	37	22.89	22.82	22.75	22.78		
15	QPSK	1	74	22.97	22.91	22.80	22.92		
15	QPSK	36	0	21.90	21.86	21.80	21.86	23	1
15	QPSK	36	20	21.95	21.88	21.82	21.88		
15	QPSK	36	39	21.94	21.84	21.79	21.86		
15	QPSK	75	0	21.92	21.82	21.79	21.86	23	1
15	16QAM	1	0	22.01	21.97	21.80	21.96		
15	16QAM	1	37	22.01	21.92	21.80	21.96		
15	16QAM	1	74	22.14	21.97	21.88	22.03	22	2
15	16QAM	36	0	20.98	20.90	20.85	20.92		
15	16QAM	36	20	20.99	20.96	20.86	20.95		
15	16QAM	36	39	20.97	20.95	20.86	20.91	22	2
15	16QAM	75	0	21.03	20.97	20.89	20.97		
15	64QAM	1	0	20.75	20.74	20.59	20.71		
15	64QAM	1	37	20.78	20.74	20.57	20.68	22	2
15	64QAM	1	74	20.86	20.78	20.66	20.78		
15	64QAM	36	0	20.03	19.99	19.90	19.97		
15	64QAM	36	20	20.05	19.99	19.92	19.99	21	3
15	64QAM	36	39	20.05	19.97	19.91	19.95		
15	64QAM	75	0	20.08	20.00	19.94	19.99		
Channel				40090	40390	40690	41190	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2540	2570	2600	2650		
10	QPSK	1	0	22.88	22.83	22.80	22.81	24	0
10	QPSK	1	25	22.88	22.88	22.80	22.84		
10	QPSK	1	49	22.92	22.90	22.86	22.89		
10	QPSK	25	0	21.89	21.87	21.82	21.85	23	1
10	QPSK	25	12	21.92	21.88	21.85	21.87		



10	QPSK	25	25	21.94	21.87	21.82	21.89		
10	QPSK	50	0	21.97	21.92	21.85	21.90		
10	16QAM	1	0	22.03	21.98	21.86	21.98	23	1
10	16QAM	1	25	22.03	21.95	21.87	21.98		
10	16QAM	1	49	22.05	21.94	21.88	21.99		
10	16QAM	25	0	21.02	20.98	20.89	20.99	22	2
10	16QAM	25	12	21.06	21.00	20.93	20.99		
10	16QAM	25	25	21.04	21.00	20.94	21.01		
10	16QAM	50	0	21.07	21.02	20.91	20.99		
10	64QAM	1	0	20.77	20.73	20.64	20.71	22	2
10	64QAM	1	25	20.79	20.72	20.63	20.72		
10	64QAM	1	49	20.79	20.74	20.66	20.79		
10	64QAM	25	0	20.07	20.03	19.94	20.01	21	3
10	64QAM	25	12	20.10	20.07	19.98	20.06		
10	64QAM	25	25	20.12	20.07	20.01	20.07		
10	64QAM	50	0	20.07	20.00	19.96	19.97		
Channel				40065	40385	40705	41215	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2537.5	2569.5	2601.5	2652.5		
5	QPSK	1	0	22.88	22.84	22.77	22.78	24	0
5	QPSK	1	12	22.91	22.84	22.80	22.82		
5	QPSK	1	24	22.87	22.83	22.75	22.78		
5	QPSK	12	0	21.89	21.89	21.80	21.86	23	1
5	QPSK	12	7	21.96	21.91	21.83	21.85		
5	QPSK	12	13	21.95	21.92	21.82	21.90		
5	QPSK	25	0	21.92	21.85	21.79	21.87		
5	16QAM	1	0	21.96	21.98	21.81	21.89	23	1
5	16QAM	1	12	22.03	21.95	21.83	21.95		
5	16QAM	1	24	22.02	21.97	21.84	21.95		
5	16QAM	12	0	20.95	20.95	20.83	20.88	22	2
5	16QAM	12	7	21.01	20.96	20.87	20.94		
5	16QAM	12	13	21.02	20.95	20.85	20.92		
5	16QAM	25	0	21.03	20.98	20.89	20.95		
5	64QAM	1	0	20.73	20.72	20.63	20.66	22	2
5	64QAM	1	12	20.77	20.74	20.63	20.71		
5	64QAM	1	24	20.78	20.76	20.65	20.73		
5	64QAM	12	0	20.05	20.01	19.90	19.96	21	3
5	64QAM	12	7	20.08	20.03	19.94	20.01		
5	64QAM	12	13	20.08	20.03	19.92	19.98		
5	64QAM	25	0	20.06	20.02	19.92	19.99		



<Hotspot, Body-worn & Product Specific 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	22.13	22.30	22.16	23	0
20	QPSK	1	49	22.12	22.14	22.12		
20	QPSK	1	99	22.12	22.15	22.15		
20	QPSK	50	0	22.21	22.22	22.13	22.5	0.5
20	QPSK	50	24	22.16	22.15	22.10		
20	QPSK	50	50	22.20	22.21	22.12		
20	QPSK	100	0	22.16	22.17	22.12	22.5	0.5
20	16QAM	1	0	22.07	22.08	22.05		
20	16QAM	1	49	22.04	22.08	22.06		
20	16QAM	1	99	22.13	22.13	22.13	21.5	1.5
20	16QAM	50	0	21.12	21.20	21.21		
20	16QAM	50	24	21.27	21.24	21.20		
20	16QAM	50	50	21.26	21.27	21.23	21.5	1.5
20	16QAM	100	0	21.27	21.25	21.19		
20	64QAM	1	0	20.82	20.88	20.83		
20	64QAM	1	49	20.81	20.85	20.85	21.5	1.5
20	64QAM	1	99	20.93	20.93	20.91		
20	64QAM	50	0	20.15	20.20	20.21		
20	64QAM	50	24	20.30	20.28	20.22	20.5	2.5
20	64QAM	50	50	20.26	20.28	20.25		
20	64QAM	100	0	20.29	20.21	20.23		
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	22.16	22.22	22.17	23	0
15	QPSK	1	37	22.17	22.22	22.19		
15	QPSK	1	74	22.22	22.15	22.25		
15	QPSK	36	0	22.03	22.12	22.06	22.5	0.5
15	QPSK	36	20	22.05	22.15	22.11		
15	QPSK	36	39	22.06	22.16	22.09		
15	QPSK	75	0	22.05	22.12	22.11	22.5	0.5
15	16QAM	1	0	22.10	22.15	22.10		
15	16QAM	1	37	22.09	22.15	22.11		
15	16QAM	1	74	22.10	22.16	22.17	21.5	1.5
15	16QAM	36	0	21.11	21.20	21.20		
15	16QAM	36	20	21.16	21.21	21.16		
15	16QAM	36	39	21.16	21.22	21.19	21.5	1.5
15	16QAM	75	0	21.17	21.22	21.22		
15	64QAM	1	0	20.85	20.92	20.91		
15	64QAM	1	37	20.88	20.92	20.88	21.5	1.5
15	64QAM	1	74	20.88	20.96	20.95		
15	64QAM	36	0	20.17	20.26	20.25		
15	64QAM	36	20	20.20	20.28	20.23	20.5	2.5
15	64QAM	36	39	20.20	20.27	20.25		
15	64QAM	75	0	20.15	20.23	20.22		
Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	22.14	22.19	22.13	23	0
10	QPSK	1	25	22.14	22.21	22.17		
10	QPSK	1	49	22.12	22.19	22.16		
10	QPSK	25	0	21.99	22.11	22.04	22.5	0.5



10	QPSK	25	12	22.04	22.16	22.11		
10	QPSK	25	25	22.05	22.11	22.11		
10	QPSK	50	0	22.05	22.09	22.07		
10	16QAM	1	0	22.04	22.09	22.10	22.5	0.5
10	16QAM	1	25	22.06	22.12	22.13		
10	16QAM	1	49	22.09	22.15	22.17		
10	16QAM	25	0	21.06	21.15	21.12	21.5	1.5
10	16QAM	25	12	21.09	21.18	21.15		
10	16QAM	25	25	21.07	21.16	21.16		
10	16QAM	50	0	21.14	21.18	21.17		
10	64QAM	1	0	20.84	20.88	20.86	21.5	1.5
10	64QAM	1	25	20.83	20.94	20.88		
10	64QAM	1	49	20.89	20.93	20.92		
10	64QAM	25	0	20.15	20.21	20.21	20.5	2.5
10	64QAM	25	12	20.15	20.25	20.24		
10	64QAM	25	25	20.15	20.26	20.21		
10	64QAM	50	0	20.17	20.25	20.23		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	22.13	22.18	22.15	23	0
5	QPSK	1	12	22.16	22.21	22.17		
5	QPSK	1	24	22.13	22.16	22.13		
5	QPSK	12	0	22.03	22.11	22.08	22.5	0.5
5	QPSK	12	7	22.05	22.14	22.11		
5	QPSK	12	13	22.06	22.10	22.12		
5	QPSK	25	0	22.07	22.09	22.08		
5	16QAM	1	0	22.05	22.10	22.07	22.5	0.5
5	16QAM	1	12	22.06	22.14	22.13		
5	16QAM	1	24	22.08	22.15	22.15		
5	16QAM	12	0	21.09	21.14	21.13	21.5	1.5
5	16QAM	12	7	21.10	21.15	21.17		
5	16QAM	12	13	21.09	21.16	21.16		
5	16QAM	25	0	21.13	21.20	21.19		
5	64QAM	1	0	20.84	20.90	20.82	21.5	1.5
5	64QAM	1	12	20.81	20.91	20.89		
5	64QAM	1	24	20.87	20.96	20.91		
5	64QAM	12	0	20.13	20.23	20.20	20.5	2.5
5	64QAM	12	7	20.17	20.23	20.24		
5	64QAM	12	13	20.14	20.23	20.22		
5	64QAM	25	0	20.17	20.27	20.23		



<LTE Band 41>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Low Ch. / Freq.	Power Middle High Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				40140	40400	40670	41140		
Frequency (MHz)				2545	2571	2598	2645		
20	QPSK	1	0	22.40	22.41	22.32	22.39	23	0
20	QPSK	1	49	22.38	22.40	22.28	22.38		
20	QPSK	1	99	22.35	22.36	22.28	22.36		
20	QPSK	50	0	22.05	22.08	21.88	21.94	22.5	0.5
20	QPSK	50	24	22.02	22.01	21.86	21.88		
20	QPSK	50	50	22.04	22.03	21.82	21.92		
20	QPSK	100	0	22.15	21.99	21.96	21.96	22.5	0.5
20	16QAM	1	0	22.18	22.06	21.96	22.07		
20	16QAM	1	49	22.12	22.01	21.85	22.04		
20	16QAM	1	99	22.05	21.95	21.92	21.98	21.5	1.5
20	16QAM	50	0	21.16	21.10	21.02	21.08		
20	16QAM	50	24	21.10	20.99	20.97	21.05		
20	16QAM	50	50	21.05	21.03	21.01	21.04	21.5	1.5
20	16QAM	100	0	21.18	21.09	21.03	21.11		
20	64QAM	1	0	20.91	20.82	20.72	20.85		
20	64QAM	1	49	20.90	20.75	20.65	20.82	21.5	1.5
20	64QAM	1	99	20.88	20.80	20.70	20.81		
20	64QAM	50	0	20.16	20.11	20.03	20.08		
20	64QAM	50	24	20.14	20.05	19.97	20.05	20.5	2.5
20	64QAM	50	50	20.12	20.08	20.00	20.03		
20	64QAM	100	0	20.19	20.16	20.04	20.11		
Channel				40115	40395	40685	41165	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2542.5	2570.5	2599.5	2647.5		
15	QPSK	1	0	22.30	22.39	22.31	22.36	23	0
15	QPSK	1	37	22.33	22.40	22.21	22.30		
15	QPSK	1	74	22.28	22.33	22.25	22.27		
15	QPSK	36	0	22.03	21.98	21.87	21.90	22.5	0.5
15	QPSK	36	20	21.94	21.98	21.85	21.84		
15	QPSK	36	39	22.04	22.02	21.74	21.89		
15	QPSK	75	0	22.12	21.89	21.92	21.95	22.5	0.5
15	16QAM	1	0	22.18	22.01	21.95	22.01		
15	16QAM	1	37	22.03	21.91	21.83	22.03		
15	16QAM	1	74	21.98	21.91	21.89	21.92	21.5	1.5
15	16QAM	36	0	21.08	21.00	21.02	21.02		
15	16QAM	36	20	21.09	20.92	20.96	20.99		
15	16QAM	36	39	20.99	20.95	20.91	21.03	21.5	1.5
15	16QAM	75	0	21.12	21.08	20.96	21.01		
15	64QAM	1	0	20.85	20.78	20.66	20.80		
15	64QAM	1	37	20.88	20.75	20.62	20.80	21.5	1.5
15	64QAM	1	74	20.84	20.78	20.60	20.75		
15	64QAM	36	0	20.12	20.08	20.00	20.07		
15	64QAM	36	20	20.08	19.96	19.93	20.04	20.5	2.5
15	64QAM	36	39	20.07	20.00	20.00	19.97		
15	64QAM	75	0	20.09	20.11	19.95	20.03		
Channel				40090	40390	40690	41190	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2540	2570	2600	2650		
10	QPSK	1	0	22.32	22.35	22.22	22.39	23	0
10	QPSK	1	25	22.37	22.37	22.23	22.37		
10	QPSK	1	49	22.35	22.34	22.23	22.26		
10	QPSK	25	0	22.00	22.02	21.78	21.87	22.5	0.5
10	QPSK	25	12	21.95	21.95	21.77	21.82		



10	QPSK	25	25	21.98	21.93	21.77	21.91		
10	QPSK	50	0	22.07	21.99	21.91	21.93		
10	16QAM	1	0	22.09	22.06	21.87	22.04	22.5	0.5
10	16QAM	1	25	22.07	21.97	21.77	22.00		
10	16QAM	1	49	21.98	21.94	21.91	21.93		
10	16QAM	25	0	21.07	21.09	20.98	21.08	21.5	1.5
10	16QAM	25	12	21.07	20.92	20.88	20.98		
10	16QAM	25	25	21.01	21.00	20.91	20.96		
10	16QAM	50	0	21.11	21.03	21.02	21.03		
10	64QAM	1	0	20.81	20.78	20.71	20.80	21.5	1.5
10	64QAM	1	25	20.84	20.69	20.61	20.80		
10	64QAM	1	49	20.83	20.78	20.67	20.80		
10	64QAM	25	0	20.13	20.01	19.97	20.07	20.5	2.5
10	64QAM	25	12	20.11	20.02	19.88	20.02		
10	64QAM	25	25	20.04	20.00	19.93	20.00		
10	64QAM	50	0	20.17	20.16	19.96	20.08		
Channel				40065	40385	40705	41215	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2537.5	2569.5	2601.5	2652.5		
5	QPSK	1	0	22.33	22.39	22.31	22.34	23	0
5	QPSK	1	12	22.30	22.31	22.23	22.30		
5	QPSK	1	24	22.33	22.26	22.23	22.30		
5	QPSK	12	0	22.04	22.01	21.88	21.92	22.5	0.5
5	QPSK	12	7	22.01	21.94	21.76	21.81		
5	QPSK	12	13	21.94	22.01	21.82	21.85		
5	QPSK	25	0	22.14	21.89	21.96	21.94		
5	16QAM	1	0	22.14	22.05	21.95	22.04	22.5	0.5
5	16QAM	1	12	22.02	21.91	21.80	21.95		
5	16QAM	1	24	22.02	21.93	21.87	21.95		
5	16QAM	12	0	21.06	21.06	20.93	21.08	21.5	1.5
5	16QAM	12	7	21.06	20.94	20.95	21.00		
5	16QAM	12	13	21.05	20.96	20.98	20.95		
5	16QAM	25	0	21.09	21.07	21.02	21.04		
5	64QAM	1	0	20.90	20.76	20.71	20.76	21.5	1.5
5	64QAM	1	12	20.88	20.71	20.61	20.78		
5	64QAM	1	24	20.81	20.79	20.69	20.81		
5	64QAM	12	0	20.07	20.06	20.02	20.04	20.5	2.5
5	64QAM	12	7	20.09	20.00	19.96	20.00		
5	64QAM	12	13	20.11	20.00	19.90	19.99		
5	64QAM	25	0	20.11	20.09	20.03	20.09		



## 12. WiFi/Bluetooth Output Power (Unit: dBm)

**General Note:**

1. The maximum output power specified for production units are determined for all applicable 802.11 transmission modes in each standalone and aggregated frequency band. Maximum output power is measured for the highest maximum output power configuration(s) in each frequency band according to the default power measurement procedures. For “Not required”, SAR Test reduction was applied from KDB 248227 guidance, Sec. 2.1, b), 1) 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 in the initial test configuration, for each frequency band. Additional output power measurements were not deemed necessary.
2. 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.
3. 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).
4. 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.
5. 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.

**<2.4GHz WLAN>**

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b 1Mbps	1	2412	18.24	18.50	100.00
		6	2437	18.78	19.50	
		11	2462	18.14	18.50	
	802.11g 6Mbps	1	2412	16.45	16.50	97.93
		6	2437	17.73	18.00	
		11	2462	16.41	16.50	
	802.11n-HT20 MCS0	1	2412	15.29	15.50	97.79
		6	2437	17.58	18.00	
		11	2462	16.33	16.50	







### 13. 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
  - e. 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 Reported TDD LTE SAR = measured SAR (W/kg)\* Tune-up Scaling Factor\* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
  - $\leq 0.8$  W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\leq 100$  MHz
  - $\leq 0.6$  W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
  - $\leq 0.4$  W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is  $\geq 200$  MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is  $\geq 0.8$ W/kg.
4. Per KDB648474 D04v01r03, when the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is  $> 1.2$  W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.
5. 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 B7/B41, therefore product specific SAR is necessary.
6. For front and back position at hotspot exposure condition was choose higher power level between hotspot power table and body-worn power table for SAR compliance.

**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 (3Tx slots) for GSM850/GSM1900 is 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  $\leq 1/4$  dB higher than the primary mode, SAR measurement is not required for the secondary mode.
3. Power reduction which is implemented in GSM850/GSM1900 band, for SAR testing EUT was set in reduced power mode and GPRS 4Tx slot due to its highest frame-average power.

**UMTS 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 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 to RMC12.2Kbps and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA, and according to the following RF output power, the output power results of the secondary modes (HSUPA, HSDPA, DC-HSDPA) are less than  $\frac{1}{4}$  dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

**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 B5 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.
7. LTE band 38 SAR test was covered by Band 41; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
8. The maximum output power, including tolerance, for the smaller band is  $\leq$  the larger band to qualify for the SAR test exclusion.
  - a. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.

**WLAN 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.



13.1 Head SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	GSM850	GPRS (4 Tx slots)	Right Cheek	0mm	128	824.2	27.63	28.50	1.222	0.12	0.157	0.192
	GSM850	GPRS (4 Tx slots)	Right Tilted	0mm	128	824.2	27.63	28.50	1.222	0.03	0.089	0.109
01	GSM850	GPRS (4 Tx slots)	Left Cheek	0mm	128	824.2	27.63	28.50	1.222	0.1	0.173	0.211
	GSM850	GPRS (4 Tx slots)	Left Tilted	0mm	128	824.2	27.63	28.50	1.222	-0.18	0.086	0.105
02	GSM1900	GPRS (4 Tx slots)	Right Cheek	0mm	512	1850.2	25.45	26.00	1.135	-0.13	0.082	0.093
	GSM1900	GPRS (4 Tx slots)	Right Tilted	0mm	512	1850.2	25.45	26.00	1.135	-0.01	0.065	0.074
	GSM1900	GPRS (4 Tx slots)	Left Cheek	0mm	512	1850.2	25.45	26.00	1.135	0.03	0.069	0.078
	GSM1900	GPRS (4 Tx slots)	Left Tilted	0mm	512	1850.2	25.45	26.00	1.135	-0.09	0.063	0.072

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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	RMC 12.2Kbps	Right Cheek	0mm	9400	1880	22.71	24.00	1.346	-0.14	0.217	0.292
	WCDMA II	RMC 12.2Kbps	Right Tilted	0mm	9400	1880	22.71	24.00	1.346	-0.01	0.180	0.242
	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	9400	1880	22.71	24.00	1.346	0.03	0.191	0.257
	WCDMA II	RMC 12.2Kbps	Left Tilted	0mm	9400	1880	22.71	24.00	1.346	0.06	0.169	0.227
	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	4132	826.4	22.55	24.00	1.396	0.17	0.115	0.161
	WCDMA V	RMC 12.2Kbps	Right Tilted	0mm	4132	826.4	22.55	24.00	1.396	0.15	0.108	0.151
04	WCDMA V	RMC 12.2Kbps	Left Cheek	0mm	4132	826.4	22.55	24.00	1.396	0.16	0.122	0.170
	WCDMA V	RMC 12.2Kbps	Left Tilted	0mm	4132	826.4	22.55	24.00	1.396	0.12	0.113	0.158

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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	10M	QPSK	1	0	Right Cheek	0mm	20525	836.5	22.54	24.00	1.400	0.16	0.105	0.147
	LTE Band 5	10M	QPSK	25	0	Right Cheek	0mm	20525	836.5	21.57	23.00	1.390	-0.08	0.073	0.101
	LTE Band 5	10M	QPSK	1	0	Right Tilted	0mm	20525	836.5	22.54	24.00	1.400	-0.03	0.082	0.115
	LTE Band 5	10M	QPSK	25	0	Right Tilted	0mm	20525	836.5	21.57	23.00	1.390	0	0.048	0.067
05	LTE Band 5	10M	QPSK	1	0	Left Cheek	0mm	20525	836.5	22.54	24.00	1.400	0.15	0.123	0.172
	LTE Band 5	10M	QPSK	25	0	Left Cheek	0mm	20525	836.5	21.57	23.00	1.390	0.11	0.104	0.145
	LTE Band 5	10M	QPSK	1	0	Left Tilted	0mm	20525	836.5	22.54	24.00	1.400	0.19	0.083	0.116
	LTE Band 5	10M	QPSK	25	0	Left Tilted	0mm	20525	836.5	21.57	23.00	1.390	-0.07	0.047	0.065
06	LTE Band 7	20M	QPSK	1	0	Right Cheek	0mm	21100	2535	22.83	24.00	1.309	-0.16	0.081	0.106
	LTE Band 7	20M	QPSK	50	0	Right Cheek	0mm	21100	2535	21.90	23.00	1.288	0.03	0.072	0.093
	LTE Band 7	20M	QPSK	1	0	Right Tilted	0mm	21100	2535	22.83	24.00	1.309	0.05	0.035	0.046
	LTE Band 7	20M	QPSK	50	0	Right Tilted	0mm	21100	2535	21.90	23.00	1.288	0.03	0.028	0.036
	LTE Band 7	20M	QPSK	1	0	Left Cheek	0mm	21100	2535	22.83	24.00	1.309	0.01	0.050	0.065
	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	21100	2535	21.90	23.00	1.288	-0.05	0.033	0.043
	LTE Band 7	20M	QPSK	1	0	Left Tilted	0mm	21100	2535	22.83	24.00	1.309	-0.09	0.038	0.050
	LTE Band 7	20M	QPSK	50	0	Left Tilted	0mm	21100	2535	21.90	23.00	1.288	-0.11	0.001	0.001



**<TDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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)
07	LTE Band 41	20M	QPSK	1	0	Right Cheek	0mm	40140	2545	22.98	24.00	1.265	62.9	1.006	0.09	0.026	0.033
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	40140	2545	21.92	23.00	1.282	62.9	1.006	0.03	0.020	0.026
	LTE Band 41	20M	QPSK	1	0	Right Tilted	0mm	40140	2545	22.98	24.00	1.265	62.9	1.006	-0.03	0.015	0.019
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	40140	2545	21.92	23.00	1.282	62.9	1.006	-0.11	0.011	0.014
	LTE Band 41	20M	QPSK	1	0	Left Cheek	0mm	40140	2545	22.98	24.00	1.265	62.9	1.006	-0.06	0.023	0.029
	LTE Band 41	20M	QPSK	50	0	Left Cheek	0mm	40140	2545	21.92	23.00	1.282	62.9	1.006	-0.08	0.018	0.023
	LTE Band 41	20M	QPSK	1	0	Left Tilted	0mm	40140	2545	22.98	24.00	1.265	62.9	1.006	-0.01	0.014	0.018
	LTE Band 41	20M	QPSK	50	0	Left Tilted	0mm	40140	2545	21.92	23.00	1.282	62.9	1.006	0.06	0.011	0.014

**<WLAN SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	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	0mm	6	2437	18.78	19.50	1.180	100	1.000	0.06	0.460	0.543
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0mm	6	2437	18.78	19.50	1.180	100	1.000	0.01	0.568	0.670
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	6	2437	18.78	19.50	1.180	100	1.000	0.05	0.923	1.089
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	1	2412	18.24	18.50	1.062	100	1.000	0.05	0.844	0.896
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	11	2462	18.14	18.50	1.086	100	1.000	0.05	0.823	0.894
08	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	6	2437	18.78	19.50	1.180	100	1.000	0.19	1.070	1.263
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	1	2412	18.24	18.50	1.062	100	1.000	-0.03	0.787	0.836
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	11	2462	18.14	18.50	1.086	100	1.000	0.02	0.804	0.873

**<Bluetooth SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	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	0mm	39	2441	13.70	14.00	1.072	76.86	1.084	0.18	0.194	0.225
	Bluetooth	1Mbps	Right Tilted	0mm	39	2441	13.70	14.00	1.072	76.86	1.084	0.01	0.256	0.297
	Bluetooth	1Mbps	Left Cheek	0mm	39	2441	13.70	14.00	1.072	76.86	1.084	0.05	0.420	0.488
09	Bluetooth	1Mbps	Left Tilted	0mm	39	2441	13.70	14.00	1.072	76.86	1.084	-0.11	0.449	0.522



**13.2 Hotspot SAR**

**<GSM SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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)
	GSM850	GPRS (4 Tx slots)	Front	5mm	OFF	128	824.2	27.63	28.50	1.222	0.01	0.121	0.148
10	GSM850	GPRS (4 Tx slots)	Back	5mm	OFF	128	824.2	27.63	28.50	1.222	0.02	0.413	0.505
	GSM850	GPRS (4 Tx slots)	Left Side	5mm	OFF	128	824.2	27.63	28.50	1.222	0.03	0.089	0.109
	GSM850	GPRS (4 Tx slots)	Right Side	5mm	OFF	128	824.2	27.63	28.50	1.222	0.11	0.117	0.143
	GSM850	GPRS (4 Tx slots)	Bottom Side	5mm	OFF	128	824.2	27.63	28.50	1.222	0.08	0.114	0.139
	GSM1900	GPRS (4 Tx slots)	Front	5mm	ON	661	1880	24.65	25.00	1.084	0.06	0.614	0.666
	GSM1900	GPRS (4 Tx slots)	Back	5mm	ON	661	1880	24.65	25.00	1.084	0.15	1.160	1.257
	GSM1900	GPRS (4 Tx slots)	Back	5mm	ON	512	1850.2	24.51	25.00	1.119	0.12	1.130	1.265
11	GSM1900	GPRS (4 Tx slots)	Back	5mm	ON	810	1909.8	24.48	25.00	1.127	0.03	1.220	1.375
	GSM1900	GPRS (4 Tx slots)	Left Side	5mm	ON	512	1850.2	23.27	23.50	1.054	-0.18	0.058	0.061
	GSM1900	GPRS (4 Tx slots)	Right Side	5mm	ON	512	1850.2	23.27	23.50	1.054	0.03	0.071	0.075
	GSM1900	GPRS (4 Tx slots)	Bottom Side	5mm	ON	512	1850.2	23.27	23.50	1.054	-0.05	1.010	1.065
	GSM1900	GPRS (4 Tx slots)	Bottom Side	5mm	ON	661	1880	23.25	23.50	1.059	-0.11	0.990	1.049
	GSM1900	GPRS (4 Tx slots)	Bottom Side	5mm	ON	810	1909.8	23.16	23.50	1.081	-0.04	1.150	1.244

**<WCDMA SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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	RMC 12.2Kbps	Front	5mm	ON	9400	1880	19.05	20.00	1.245	0.01	0.390	0.485
	WCDMA II	RMC 12.2Kbps	Back	5mm	ON	9400	1880	19.05	20.00	1.245	0.02	0.922	1.147
12	WCDMA II	RMC 12.2Kbps	Back	5mm	ON	9262	1852.4	18.84	20.00	1.306	0.14	1.040	1.358
	WCDMA II	RMC 12.2Kbps	Back	5mm	ON	9538	1907.6	18.92	20.00	1.282	0.03	0.811	1.040
	WCDMA II	RMC 12.2Kbps	Left Side	5mm	ON	9400	1880	17.28	18.50	1.324	0.02	0.047	0.062
	WCDMA II	RMC 12.2Kbps	Right Side	5mm	ON	9400	1880	17.28	18.50	1.324	0.06	0.106	0.140
	WCDMA II	RMC 12.2Kbps	Bottom Side	5mm	ON	9400	1880	17.28	18.50	1.324	-0.03	0.866	1.147
	WCDMA II	RMC 12.2Kbps	Bottom Side	5mm	ON	9262	1852.4	17.01	18.50	1.409	0.16	0.921	1.298
	WCDMA II	RMC 12.2Kbps	Bottom Side	5mm	ON	9538	1907.6	17.11	18.50	1.377	-0.01	0.755	1.040
	WCDMA V	RMC 12.2Kbps	Front	5mm	OFF	4132	826.4	22.55	24.00	1.396	0.15	0.167	0.233
13	WCDMA V	RMC 12.2Kbps	Back	5mm	OFF	4132	826.4	22.55	24.00	1.396	0.12	0.572	0.799
	WCDMA V	RMC 12.2Kbps	Left Side	5mm	OFF	4132	826.4	22.55	24.00	1.396	0.19	0.123	0.172
	WCDMA V	RMC 12.2Kbps	Right Side	5mm	OFF	4132	826.4	22.55	24.00	1.396	0.02	0.162	0.226
	WCDMA V	RMC 12.2Kbps	Bottom Side	5mm	OFF	4132	826.4	22.55	24.00	1.396	-0.14	0.158	0.221



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	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	10M	QPSK	1	0	Front	5mm	OFF	20525	836.5	22.54	24.00	1.400	0.06	0.259	0.362
	LTE Band 5	10M	QPSK	25	0	Front	5mm	OFF	20525	836.5	21.57	23.00	1.390	0.12	0.151	0.210
14	LTE Band 5	10M	QPSK	1	0	Back	5mm	OFF	20525	836.5	22.54	24.00	1.400	0.08	0.465	0.651
	LTE Band 5	10M	QPSK	25	0	Back	5mm	OFF	20525	836.5	21.57	23.00	1.390	-0.09	0.265	0.368
	LTE Band 5	10M	QPSK	1	0	Left Side	5mm	OFF	20525	836.5	22.54	24.00	1.400	-0.12	0.210	0.294
	LTE Band 5	10M	QPSK	25	0	Left Side	5mm	OFF	20525	836.5	21.57	23.00	1.390	-0.18	0.122	0.170
	LTE Band 5	10M	QPSK	1	0	Right Side	5mm	OFF	20525	836.5	22.54	24.00	1.400	-0.03	0.148	0.207
	LTE Band 5	10M	QPSK	25	0	Right Side	5mm	OFF	20525	836.5	21.57	23.00	1.390	0.09	0.086	0.120
	LTE Band 5	10M	QPSK	1	0	Bottom Side	5mm	OFF	20525	836.5	22.54	24.00	1.400	-0.08	0.176	0.246
	LTE Band 5	10M	QPSK	25	0	Bottom Side	5mm	OFF	20525	836.5	21.57	23.00	1.390	0.06	0.082	0.114
	LTE Band 7	20M	QPSK	1	0	Front	5mm	ON	21100	2535	19.30	20.50	1.318	0.05	0.307	0.405
	LTE Band 7	20M	QPSK	50	0	Front	5mm	ON	21100	2535	19.29	20.50	1.321	0.08	0.210	0.277
15	LTE Band 7	20M	QPSK	1	0	Back	5mm	ON	21100	2535	19.30	20.50	1.318	-0.14	0.955	1.259
	LTE Band 7	20M	QPSK	1	0	Back	5mm	ON	20850	2510	19.22	20.50	1.343	0.03	0.845	1.135
	LTE Band 7	20M	QPSK	1	0	Back	5mm	ON	21350	2560	19.29	20.50	1.321	0.02	0.859	1.135
	LTE Band 7	20M	QPSK	50	0	Back	5mm	ON	21100	2535	19.29	20.50	1.321	0.03	0.909	1.201
	LTE Band 7	20M	QPSK	50	0	Back	5mm	ON	20850	2510	19.27	20.50	1.327	0.12	0.803	1.066
	LTE Band 7	20M	QPSK	50	0	Back	5mm	ON	21350	2560	19.26	20.50	1.330	0.05	0.818	1.088
	LTE Band 7	20M	QPSK	100	0	Back	5mm	ON	21100	2535	19.26	20.50	1.330	0.07	0.828	1.102
	LTE Band 7	20M	QPSK	1	0	Left Side	5mm	ON	21100	2535	19.30	20.50	1.318	-0.05	0.001	0.001
	LTE Band 7	20M	QPSK	50	0	Left Side	5mm	ON	21100	2535	19.29	20.50	1.321	-0.02	0.001	0.001
	LTE Band 7	20M	QPSK	1	0	Right Side	5mm	ON	21100	2535	19.30	20.50	1.318	-0.01	0.100	0.132
	LTE Band 7	20M	QPSK	50	0	Right Side	5mm	ON	21100	2535	19.29	20.50	1.321	0.02	0.073	0.096
	LTE Band 7	20M	QPSK	1	0	Bottom Side	5mm	ON	21100	2535	19.30	20.50	1.318	0.05	0.834	1.099
	LTE Band 7	20M	QPSK	1	0	Bottom Side	5mm	ON	20850	2510	19.22	20.50	1.343	0.07	0.820	1.101
	LTE Band 7	20M	QPSK	1	0	Bottom Side	5mm	ON	21350	2560	19.29	20.50	1.321	-0.06	0.791	1.045
	LTE Band 7	20M	QPSK	50	0	Bottom Side	5mm	ON	21100	2535	19.29	20.50	1.321	-0.09	0.804	1.062
	LTE Band 7	20M	QPSK	50	0	Bottom Side	5mm	ON	20850	2510	19.27	20.50	1.327	-0.1	0.786	1.043
	LTE Band 7	20M	QPSK	50	0	Bottom Side	5mm	ON	21350	2560	19.26	20.50	1.330	0.05	0.753	1.002
	LTE Band 7	20M	QPSK	100	0	Bottom Side	5mm	ON	21100	2535	19.26	20.50	1.330	0.08	0.702	0.934



<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	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 41	20M	QPSK	1	0	Front	5mm	ON	40400	2571	22.41	23.00	1.146	62.9	1.006	0.06	0.297	0.342
	LTE Band 41	20M	QPSK	50	0	Front	5mm	ON	40400	2571	22.08	22.50	1.102	62.9	1.006	-0.01	0.288	0.319
	LTE Band 41	20M	QPSK	1	0	Back	5mm	ON	40400	2571	22.41	23.00	1.146	62.9	1.006	0.09	0.975	1.124
	LTE Band 41	20M	QPSK	1	0	Back	5mm	ON	40140	2545	22.40	23.00	1.148	62.9	1.006	0.08	0.993	1.147
16	LTE Band 41	20M	QPSK	1	0	Back	5mm	ON	40670	2598	22.32	23.00	1.169	62.9	1.006	-0.12	1.030	1.212
	LTE Band 41	20M	QPSK	1	0	Back	5mm	ON	41140	2645	22.39	23.00	1.151	62.9	1.006	0.06	0.899	1.041
	LTE Band 41	20M	QPSK	50	0	Back	5mm	ON	40400	2571	22.08	22.50	1.102	62.9	1.006	0.01	0.939	1.041
	LTE Band 41	20M	QPSK	50	0	Back	5mm	ON	40140	2545	22.05	22.50	1.109	62.9	1.006	-0.03	0.957	1.068
	LTE Band 41	20M	QPSK	50	0	Back	5mm	ON	40670	2598	21.88	22.50	1.153	62.9	1.006	0.02	0.993	1.152
	LTE Band 41	20M	QPSK	50	0	Back	5mm	ON	41140	2645	21.94	22.50	1.138	62.9	1.006	0.09	0.880	1.007
	LTE Band 41	20M	QPSK	100	0	Back	5mm	ON	40140	2545	22.15	22.50	1.084	62.9	1.006	0.01	0.966	1.053
	LTE Band 41	20M	QPSK	1	0	Left Side	5mm	ON	40400	2571	22.41	23.00	1.146	62.9	1.006	-0.03	0.001	0.001
	LTE Band 41	20M	QPSK	50	0	Left Side	5mm	ON	40400	2571	22.08	22.50	1.102	62.9	1.006	-0.08	0.001	0.001
	LTE Band 41	20M	QPSK	1	0	Right Side	5mm	ON	40400	2571	22.41	23.00	1.146	62.9	1.006	0.09	0.077	0.089
	LTE Band 41	20M	QPSK	50	0	Right Side	5mm	ON	40400	2571	22.08	22.50	1.102	62.9	1.006	-0.01	0.052	0.058
	LTE Band 41	20M	QPSK	1	0	Bottom Side	5mm	ON	40400	2571	22.41	23.00	1.146	62.9	1.006	-0.08	0.830	0.956
	LTE Band 41	20M	QPSK	1	0	Bottom Side	5mm	ON	40140	2545	22.40	23.00	1.148	62.9	1.006	-0.09	0.992	1.146
	LTE Band 41	20M	QPSK	1	0	Bottom Side	5mm	ON	40670	2598	22.32	23.00	1.169	62.9	1.006	-0.05	0.864	1.017
	LTE Band 41	20M	QPSK	1	0	Bottom Side	5mm	ON	41140	2645	22.39	23.00	1.151	62.9	1.006	0.01	0.761	0.881
	LTE Band 41	20M	QPSK	50	0	Bottom Side	5mm	ON	40400	2571	22.08	22.50	1.102	62.9	1.006	0.08	0.827	0.916
	LTE Band 41	20M	QPSK	50	0	Bottom Side	5mm	ON	40140	2545	22.05	22.50	1.109	62.9	1.006	0.06	0.863	0.963
	LTE Band 41	20M	QPSK	50	0	Bottom Side	5mm	ON	40670	2598	21.88	22.50	1.153	62.9	1.006	-0.02	0.804	0.933
	LTE Band 41	20M	QPSK	50	0	Bottom Side	5mm	ON	41140	2645	21.94	22.50	1.138	62.9	1.006	0.03	0.789	0.903
	LTE Band 41	20M	QPSK	100	0	Bottom Side	5mm	ON	40140	2645	22.15	22.50	1.084	62.9	1.006	-0.05	0.786	0.857

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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	5mm	6	2437	18.78	19.50	1.180	100	1.000	0.15	0.448	0.529
17	WLAN2.4GHz	802.11b 1Mbps	Back	5mm	6	2437	18.78	19.50	1.180	100	1.000	-0.15	0.667	0.787
	WLAN2.4GHz	802.11b 1Mbps	Right Side	5mm	6	2437	18.78	19.50	1.180	100	1.000	0.19	0.297	0.351
	WLAN2.4GHz	802.11b 1Mbps	Top Side	5mm	6	2437	18.78	19.50	1.180	100	1.000	0.09	0.623	0.735

<Bluetooth SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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	5mm	39	2441	13.70	14.00	1.072	76.86	1.084	0.18	0.259	0.301
	Bluetooth	1Mbps	Back	5mm	39	2441	13.70	14.00	1.072	76.86	1.084	0.12	0.334	0.388
	Bluetooth	1Mbps	Right Side	5mm	39	2441	13.70	14.00	1.072	76.86	1.084	0.13	0.226	0.263
18	Bluetooth	1Mbps	Top Side	5mm	39	2441	13.70	14.00	1.072	76.86	1.084	0	0.498	0.578

**13.3 Body Worn Accessory SAR**
**<GSM SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Headset	Power Reduction	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)
	GSM850	GPRS (4 Tx slots)	Front	5mm	-	OFF	128	824.2	27.63	28.50	1.222	0.01	0.121	0.148
19	GSM850	GPRS (4 Tx slots)	Back	5mm	-	OFF	128	824.2	27.63	28.50	1.222	0.02	0.413	0.505
	GSM1900	GPRS (4 Tx slots)	Front	5mm	-	ON	661	1880	24.65	25.00	1.084	0.06	0.614	0.666
	GSM1900	GPRS (4 Tx slots)	Back	5mm	-	ON	661	1880	24.65	25.00	1.084	0.15	1.160	1.257
	GSM1900	GPRS (4 Tx slots)	Back	5mm	-	ON	512	1850.2	24.51	25.00	1.119	0.12	1.130	1.265
20	GSM1900	GPRS (4 Tx slots)	Back	5mm	-	ON	810	1909.8	24.48	25.00	1.127	0.03	1.220	1.375
	GSM1900	GPRS (4 Tx slots)	Back	5mm	Headset 1	ON	810	1909.8	24.48	25.00	1.127	-0.02	1.060	1.195
	GSM1900	GPRS (4 Tx slots)	Back	5mm	Headset 2	ON	810	1909.8	24.48	25.00	1.127	-0.05	1.050	1.184
	GSM1900	GPRS (4 Tx slots)	Back	5mm	Headset 3	ON	810	1909.8	24.48	25.00	1.127	-0.11	1.010	1.138

**<WCDMA SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Headset	Power Reduction	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	RMC 12.2Kbps	Front	5mm	-	ON	9400	1880	19.05	20.00	1.245	0.01	0.390	0.485
	WCDMA II	RMC 12.2Kbps	Back	5mm	-	ON	9400	1880	19.05	20.00	1.245	0.02	0.922	1.147
21	WCDMA II	RMC 12.2Kbps	Back	5mm	-	ON	9262	1852.4	18.84	20.00	1.306	0.14	1.040	1.358
	WCDMA II	RMC 12.2Kbps	Back	5mm	-	ON	9538	1907.6	18.92	20.00	1.282	0.03	0.811	1.040
	WCDMA II	RMC 12.2Kbps	Back	5mm	Headset 1	ON	9262	1852.4	18.84	20.00	1.306	-0.11	0.792	1.034
	WCDMA II	RMC 12.2Kbps	Back	5mm	Headset 2	ON	9262	1852.4	18.84	20.00	1.306	-0.05	0.799	1.044
	WCDMA II	RMC 12.2Kbps	Back	5mm	Headset 3	ON	9262	1852.4	18.84	20.00	1.306	-0.06	0.800	1.045
	WCDMA V	RMC 12.2Kbps	Front	5mm	-	OFF	4132	826.4	22.55	24.00	1.396	0.15	0.167	0.233
22	WCDMA V	RMC 12.2Kbps	Back	5mm	-	OFF	4132	826.4	22.55	24.00	1.396	0.12	0.572	0.799

**<FDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Headset	Power Reduction	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	10M	QPSK	1	0	Front	5mm	-	OFF	20525	836.5	22.54	24.00	1.400	0.06	0.259	0.362
	LTE Band 5	10M	QPSK	25	0	Front	5mm	-	OFF	20525	836.5	21.57	23.00	1.390	0.12	0.151	0.210
23	LTE Band 5	10M	QPSK	1	0	Back	5mm	-	OFF	20525	836.5	22.54	24.00	1.400	0.08	0.465	0.651
	LTE Band 5	10M	QPSK	25	0	Back	5mm	-	OFF	20525	836.5	21.57	23.00	1.390	-0.09	0.265	0.368
	LTE Band 7	20M	QPSK	1	0	Front	5mm	-	ON	21100	2535	19.30	20.50	1.318	0.05	0.307	0.405
	LTE Band 7	20M	QPSK	50	0	Front	5mm	-	ON	21100	2535	19.29	20.50	1.321	0.08	0.210	0.277
24	LTE Band 7	20M	QPSK	1	0	Back	5mm	-	ON	21100	2535	19.30	20.50	1.318	-0.14	0.955	1.259
	LTE Band 7	20M	QPSK	1	0	Back	5mm	-	ON	20850	2510	19.22	20.50	1.343	0.03	0.845	1.135
	LTE Band 7	20M	QPSK	1	0	Back	5mm	-	ON	21350	2560	19.29	20.50	1.321	0.02	0.859	1.135
	LTE Band 7	20M	QPSK	50	0	Back	5mm	-	ON	21100	2535	19.29	20.50	1.321	0.03	0.909	1.201
	LTE Band 7	20M	QPSK	50	0	Back	5mm	-	ON	20850	2510	19.27	20.50	1.327	0.12	0.803	1.066
	LTE Band 7	20M	QPSK	50	0	Back	5mm	-	ON	21350	2560	19.26	20.50	1.330	0.05	0.818	1.088
	LTE Band 7	20M	QPSK	100	0	Back	5mm	-	ON	21100	2535	19.26	20.50	1.330	0.07	0.828	1.102
	LTE Band 7	20M	QPSK	1	0	Back	5mm	Headset 1	ON	21100	2535	19.30	20.50	1.318	0.05	0.902	1.189
	LTE Band 7	20M	QPSK	1	0	Back	5mm	Headset 2	ON	21100	2535	19.30	20.50	1.318	-0.09	0.910	1.200
	LTE Band 7	20M	QPSK	1	0	Back	5mm	Headset 3	ON	21100	2535	19.30	20.50	1.318	-0.04	0.905	1.193





**<TDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Headset	Power Reduction	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 41	20M	QPSK	1	0	Front	5mm	-	ON	40400	2571	22.41	23.00	1.146	62.9	1.006	0.06	0.297	0.342
	LTE Band 41	20M	QPSK	50	0	Front	5mm	-	ON	40400	2571	22.08	22.50	1.102	62.9	1.006	-0.01	0.288	0.319
	LTE Band 41	20M	QPSK	1	0	Back	5mm	-	ON	40400	2571	22.41	23.00	1.146	62.9	1.006	0.09	0.975	1.124
	LTE Band 41	20M	QPSK	1	0	Back	5mm	-	ON	40140	2545	22.40	23.00	1.148	62.9	1.006	0.08	0.993	1.147
25	LTE Band 41	20M	QPSK	1	0	Back	5mm	-	ON	40670	2598	22.32	23.00	1.169	62.9	1.006	-0.12	1.030	1.212
	LTE Band 41	20M	QPSK	1	0	Back	5mm	-	ON	41140	2645	22.39	23.00	1.151	62.9	1.006	0.06	0.899	1.041
	LTE Band 41	20M	QPSK	50	0	Back	5mm	-	ON	40400	2571	22.08	22.50	1.102	62.9	1.006	0.01	0.939	1.041
	LTE Band 41	20M	QPSK	50	0	Back	5mm	-	ON	40140	2545	22.05	22.50	1.109	62.9	1.006	-0.03	0.957	1.068
	LTE Band 41	20M	QPSK	50	0	Back	5mm	-	ON	40670	2598	21.88	22.50	1.153	62.9	1.006	0.02	0.993	1.152
	LTE Band 41	20M	QPSK	50	0	Back	5mm	-	ON	41140	2645	21.94	22.50	1.138	62.9	1.006	0.09	0.880	1.007
	LTE Band 41	20M	QPSK	100	0	Back	5mm	-	ON	40140	2545	22.15	22.50	1.084	62.9	1.006	0.01	0.966	1.053
	LTE Band 41	20M	QPSK	1	0	Back	5mm	Headset 1	ON	40670	2598	22.32	23.00	1.169	62.9	1.006	-0.08	0.993	1.168
	LTE Band 41	20M	QPSK	1	0	Back	5mm	Headset 2	ON	40670	2598	22.32	23.00	1.169	62.9	1.006	-0.13	0.987	1.161
	LTE Band 41	20M	QPSK	1	0	Back	5mm	Headset 3	ON	40670	2598	22.32	23.00	1.169	62.9	1.006	0.06	0.990	1.165

**<WLAN SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Headset	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	5mm	-	6	2437	18.78	19.50	1.180	100	1.000	0.15	0.448	0.529
26	WLAN2.4GHz	802.11b 1Mbps	Back	5mm	-	6	2437	18.78	19.50	1.180	100	1.000	-0.15	0.667	0.787

**<Bluetooth SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Headset	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	5mm	-	39	2441	13.70	14.00	1.072	76.86	1.084	0.18	0.259	0.301
27	Bluetooth	1Mbps	Back	5mm	-	39	2441	13.70	14.00	1.072	76.86	1.084	0.12	0.334	0.388

**13.4 Product Specific SAR**

**<GSM SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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)
	GSM1900	GPRS (4 Tx slots)	Back	0mm	ON	661	1880	24.65	25.00	1.084	0.01	1.070	1.160
	GSM1900	GPRS (4 Tx slots)	Back	0mm	ON	512	1850.2	24.51	25.00	1.119	0.03	1.030	1.153
	GSM1900	GPRS (4 Tx slots)	Back	0mm	ON	810	1909.8	24.48	25.00	1.127	0.08	1.000	1.127
28	GSM1900	GPRS (4 Tx slots)	Bottom Side	0mm	ON	661	1880	24.65	25.00	1.084	0.09	1.950	2.114
	GSM1900	GPRS (4 Tx slots)	Bottom Side	0mm	ON	512	1850.2	24.51	25.00	1.119	0.03	1.880	2.105
	GSM1900	GPRS (4 Tx slots)	Bottom Side	0mm	ON	810	1909.8	24.48	25.00	1.127	0.08	1.740	1.961



**<WCDMA SAR>**

Plot No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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)
	WCDMA II	RMC 12.2Kbps	Back	0mm	ON	9400	1880	19.05	20.00	1.245	-0.06	1.000	1.245
	WCDMA II	RMC 12.2Kbps	Back	0mm	ON	9262	1852.4	18.84	20.00	1.306	-0.05	1.080	1.411
	WCDMA II	RMC 12.2Kbps	Back	0mm	ON	9538	1907.6	18.92	20.00	1.282	-0.04	0.993	1.273
	WCDMA II	RMC 12.2Kbps	Bottom Side	0mm	ON	9400	1880	19.05	20.00	1.245	0.02	1.470	1.829
29	WCDMA II	RMC 12.2Kbps	Bottom Side	0mm	ON	9262	1852.4	18.84	20.00	1.306	0.01	1.560	2.038
	WCDMA II	RMC 12.2Kbps	Bottom Side	0mm	ON	9262	1852.4	18.84	20.00	1.306	-0.06	1.470	1.920

**<FDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	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)
30	LTE Band 7	20M	QPSK	1	0	Back	0mm	ON	21100	2535	19.30	20.50	1.318	0.13	1.740	2.294
	LTE Band 7	20M	QPSK	1	0	Back	0mm	ON	20850	2510	19.22	20.50	1.343	0.05	1.650	2.216
	LTE Band 7	20M	QPSK	1	0	Back	0mm	ON	21350	2560	19.29	20.50	1.321	0.03	1.640	2.167
	LTE Band 7	20M	QPSK	1	0	Bottom Side	0mm	ON	21100	2535	19.30	20.50	1.318	0.08	1.330	1.753
	LTE Band 7	20M	QPSK	1	0	Bottom Side	0mm	ON	20850	2510	19.22	20.50	1.343	0.09	1.300	1.746
	LTE Band 7	20M	QPSK	1	0	Bottom Side	0mm	ON	21350	2560	19.29	20.50	1.321	0.08	1.280	1.691

**<TDD LTE SAR>**

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Power Reduction	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)
	LTE Band 41	20M	QPSK	1	0	Back	0mm	ON	40400	2571	22.41	23.00	1.146	62.9	1.006	0.02	1.910	2.201
	LTE Band 41	20M	QPSK	1	0	Back	0mm	ON	40140	2545	22.40	23.00	1.148	62.9	1.006	-0.01	1.950	2.252
31	LTE Band 41	20M	QPSK	1	0	Back	0mm	ON	40670	2598	22.32	23.00	1.169	62.9	1.006	0.04	1.940	2.282
	LTE Band 41	20M	QPSK	1	0	Back	0mm	ON	41140	2645	22.39	23.00	1.151	62.9	1.006	0.09	1.680	1.945



**13.5 Repeated SAR Measurement**

No.	Band	Mode	Test Position	Gap (mm)	Power Reduction	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	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	-	6	2437	18.78	19.50	1.180	100	1.000	0.19	1.070	-	1.263
2nd	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	-	6	2437	18.78	19.50	1.180	100	1.000	-0.12	1.010	1.06	1.192
1st	GSM1900	GPRS (4 Tx slots)	Back	5mm	ON	810	1909.8	24.48	25.00	1.127	100	1.000	0.03	1.220	-	1.375
2nd	GSM1900	GPRS (4 Tx slots)	Back	5mm	ON	810	1909.8	24.48	25.00	1.127	100	1.000	0.17	1.210	1.01	1.364
1st	LTE Band 41	20M_QPSK_1_0	Back	5mm	ON	40670	2598	22.32	23.00	1.169	62.9	1.006	-0.12	1.030	-	1.212
2nd	LTE Band 41	20M_QPSK_1_0	Back	5mm	ON	40670	2598	22.32	23.00	1.169	62.9	1.006	0.15	1.010	1.02	1.188

**General Note:**

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is  $\geq 0.8W/kg$ .
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is  $\leq 1.2$  and the measured SAR  $< 1.45W/kg$ , only one repeated measurement is required.
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.

**14. Simultaneous Transmission Analysis**

NO.	Simultaneous Transmission Configurations	Portable Handset			
		Head	Body-worn	Hotspot	Product Specific
1.	WWAN + WLAN2.4GHz	Yes	Yes	Yes	Yes
2.	WWAN + Bluetooth	Yes	Yes	Yes	Yes

**General Note:**

1. This device WLAN 2.4GHz supports Hotspot operation and Bluetooth support tethering applications.
2. All licensed modes share the same antenna part and cannot transmit simultaneously.
3. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
4. The Scaled SAR summation is calculated based on the same configuration and test position.
5. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
  - i) Scalar SAR summation < 1.6W/kg.
  - ii)  $SPLSR = (SAR1 + SAR2)^{1.5} / (\min. \text{ separation distance, mm})$ , 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  $SPLSR \leq 0.04$ , simultaneously transmission SAR measurement is not necessary.
  - iv) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
  - v) The SPLSR calculated results please refer to section 15.4



**14.1 Head Exposure Conditions**

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN 1g SAR (W/kg)	2.4GHz WLAN 1g SAR (W/kg)	Bluetooth 1g SAR (W/kg)		
GSM	GSM850	Right Cheek	0.192	0.543	0.225	<b>0.735</b>	<b>0.417</b>
		Right Tilted	0.109	0.670	0.297	<b>0.779</b>	<b>0.406</b>
		Left Cheek	0.211	1.089	0.488	<b>1.300</b>	<b>0.699</b>
		Left Tilted	0.105	1.263	0.522	<b>1.368</b>	<b>0.627</b>
	GSM1900	Right Cheek	0.093	0.543	0.225	<b>0.636</b>	<b>0.318</b>
		Right Tilted	0.074	0.670	0.297	<b>0.744</b>	<b>0.371</b>
		Left Cheek	0.078	1.089	0.488	<b>1.167</b>	<b>0.566</b>
		Left Tilted	0.072	1.263	0.522	<b>1.335</b>	<b>0.594</b>
WCDMA	WCDMA II	Right Cheek	0.292	0.543	0.225	<b>0.835</b>	<b>0.517</b>
		Right Tilted	0.242	0.670	0.297	<b>0.912</b>	<b>0.539</b>
		Left Cheek	0.257	1.089	0.488	<b>1.346</b>	<b>0.745</b>
		Left Tilted	0.227	1.263	0.522	<b>1.490</b>	<b>0.749</b>
	WCDMA V	Right Cheek	0.161	0.543	0.225	<b>0.704</b>	<b>0.386</b>
		Right Tilted	0.151	0.670	0.297	<b>0.821</b>	<b>0.448</b>
		Left Cheek	0.170	1.089	0.488	<b>1.259</b>	<b>0.658</b>
		Left Tilted	0.158	1.263	0.522	<b>1.421</b>	<b>0.680</b>
LTE	LTE Band 5	Right Cheek	0.147	0.543	0.225	<b>0.690</b>	<b>0.372</b>
		Right Tilted	0.115	0.670	0.297	<b>0.785</b>	<b>0.412</b>
		Left Cheek	0.172	1.089	0.488	<b>1.261</b>	<b>0.660</b>
		Left Tilted	0.116	1.263	0.522	<b>1.379</b>	<b>0.638</b>
	LTE Band 7	Right Cheek	0.106	0.543	0.225	<b>0.649</b>	<b>0.331</b>
		Right Tilted	0.046	0.670	0.297	<b>0.716</b>	<b>0.343</b>
		Left Cheek	0.065	1.089	0.488	<b>1.154</b>	<b>0.553</b>
		Left Tilted	0.050	1.263	0.522	<b>1.313</b>	<b>0.572</b>
	LTE Band 41	Right Cheek	0.033	0.543	0.225	<b>0.576</b>	<b>0.258</b>
		Right Tilted	0.019	0.670	0.297	<b>0.689</b>	<b>0.316</b>
		Left Cheek	0.029	1.089	0.488	<b>1.118</b>	<b>0.517</b>
		Left Tilted	0.018	1.263	0.522	<b>1.281</b>	<b>0.540</b>



14.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+2 SPLSR	1+2 Case No	1+3 SPLSR	1+3 Case No
			WWAN 1g SAR (W/kg)	2.4GHz WLAN 1g SAR (W/kg)	Bluetooth 1g SAR (W/kg)						
GSM	GSM850	Front	0.148	0.529	0.301	0.677	0.449				
		Back	0.505	0.787	0.388	1.292	0.893				
		Left side	0.109			0.109	0.109				
		Right side	0.143	0.351	0.263	0.494	0.406				
		Top side		0.735	0.578	0.735	0.578				
		Bottom side	0.139			0.139	0.139				
	GSM1900	Front	0.666	0.529	0.301	1.195	0.967				
		Back	1.375	0.787	0.388	2.162	1.763	0.02	Case 1	0.01	Case 3
		Left side	0.061			0.061	0.061				
		Right side	0.075	0.351	0.263	0.426	0.338				
		Top side		0.735	0.578	0.735	0.578				
		Bottom side	1.244			1.244	1.244				
WCDMA	WCDMA II	Front	0.485	0.529	0.301	1.014	0.786				
		Back	1.358	0.787	0.388	2.145	1.746	0.02	Case 4	0.01	Case 6
		Left side	0.062			0.062	0.062				
		Right side	0.140	0.351	0.263	0.491	0.403				
		Top side		0.735	0.578	0.735	0.578				
		Bottom side	1.298			1.298	1.298				
	WCDMA V	Front	0.233	0.529	0.301	0.762	0.534				
		Back	0.799	0.787	0.388	1.586	1.187				
		Left side	0.172			0.172	0.172				
		Right side	0.226	0.351	0.263	0.577	0.489				
		Top side		0.735	0.578	0.735	0.578				
		Bottom side	0.221			0.221	0.221				
LTE	LTE Band 5	Front	0.362	0.529	0.301	0.891	0.663				
		Back	0.651	0.787	0.388	1.438	1.039				
		Left side	0.294			0.294	0.294				
		Right side	0.207	0.351	0.263	0.558	0.470				
		Top side		0.735	0.578	0.735	0.578				
		Bottom side	0.246			0.246	0.246				
	LTE Band 7	Front	0.405	0.529	0.301	0.934	0.706				
		Back	1.259	0.787	0.388	2.046	1.647	0.02	Case7	0.01	Case 9
		Left side	0.001			0.001	0.001				
		Right side	0.132	0.351	0.263	0.483	0.395				
		Top side		0.735	0.578	0.735	0.578				
		Bottom side	1.101			1.101	1.101				
	LTE Band 41	Front	0.342	0.529	0.301	0.871	0.643				
		Back	1.212	0.787	0.388	1.999	1.600	0.02	Case 10	0.01	Case 12
		Left side	0.001			0.001	0.001				
		Right side	0.089	0.351	0.263	0.440	0.352				
		Top side		0.735	0.578	0.735	0.578				
		Bottom side	1.146			1.146	1.146				



**14.3 Body-Worn Accessory Exposure Conditions**

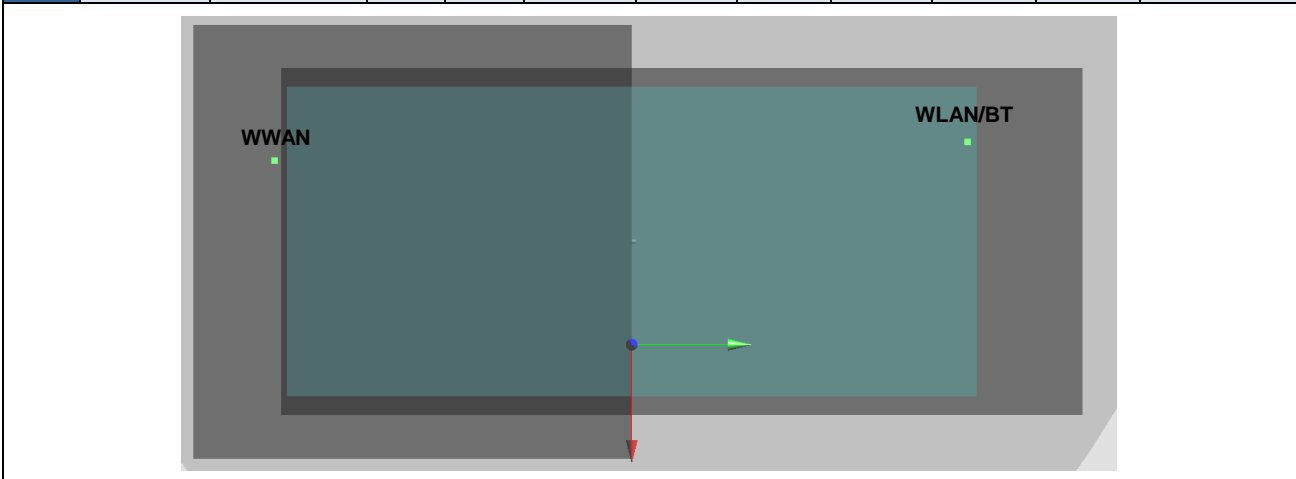
WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+2 SPLSR	1+2 Case No	1+3 SPLSR	1+3 Case No
			WWAN 1g SAR (W/kg)	2.4GHz WLAN 1g SAR (W/kg)	Bluetooth 1g SAR (W/kg)						
GSM	GSM850	Front	0.148	0.529	0.301	0.677	0.449				
		Back	0.505	0.787	0.388	1.292	0.893				
	GSM1900	Front	0.666	0.529	0.301	1.195	0.967				
		Back	1.375	0.787	0.388	2.162	1.763	0.02	Case 1	0.01	Case 3
		Back with Headset	1.195	0.787	0.388	1.982	1.583	0.02	Case 2		
WCDMA	WCDMA II	Front	0.485	0.529	0.301	1.014	0.786				
		Back	1.358	0.787	0.388	2.145	1.746	0.02	Case 4	0.01	Case 6
		Back with Headset	1.045	0.787	0.388	1.832	1.433	0.02	Case 5		
	WCDMA V	Front	0.233	0.529	0.301	0.762	0.534				
		Back	0.799	0.787	0.388	1.586	1.187				
LTE	LTE Band 5	Front	0.362	0.529	0.301	0.891	0.663				
		Back	0.651	0.787	0.388	1.438	1.039				
	LTE Band 7	Front	0.405	0.529	0.301	0.934	0.706				
		Back	1.259	0.787	0.388	2.046	1.647	0.02	Case 7	0.01	Case 9
	LTE Band 41	Back with Headset	1.200	0.787	0.388	1.987	1.588	0.02	Case 8		
		Front	0.342	0.529	0.301	0.871	0.643				
		Back	1.212	0.787	0.388	1.999	1.600	0.02	Case 10	0.01	Case 12
	Back with Headset	1.168	0.787	0.388	1.955	1.556	0.02	Case 11			

**14.4 SPLSR Evaluation and Analysis**

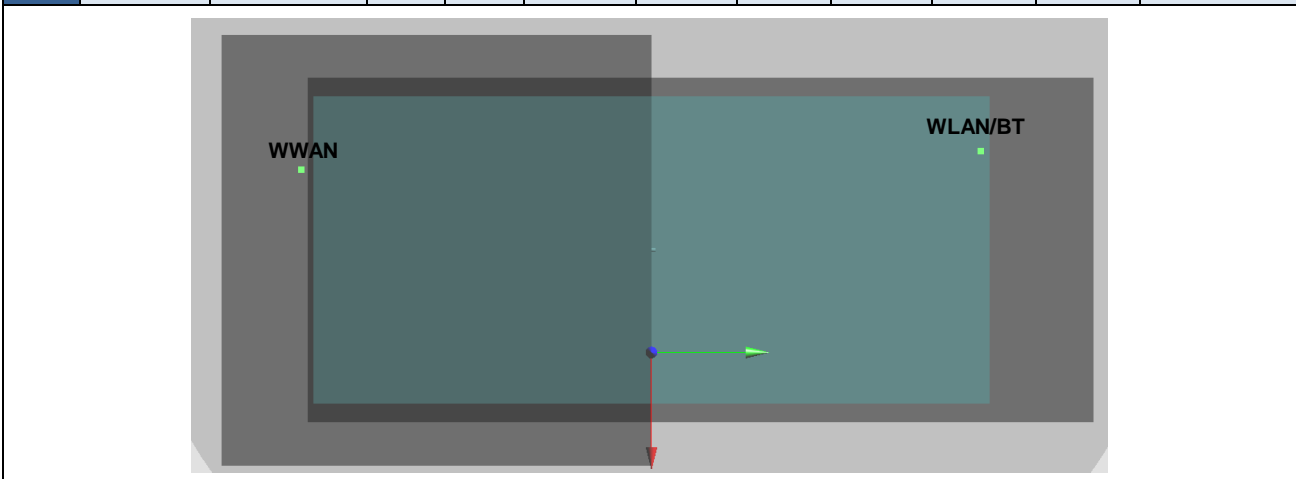
**General Note:**

1.  $SPLSR = (SAR_1 + SAR_2)^{1.5} / (min. \text{ separation distance, mm})$ . If  $SPLSR \leq 0.04$ , simultaneously transmission SAR measurement is not necessary
2. The detail hotspot point for each transmitter in each exposure condition are showing as below figure and the minimum 3D distance for each sum combination is used for SPLSR analysis.

Case 1	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	GSM1900	Back	1.375	5mm	-14.7	-80.7	-1.04	162.3	2.16	0.02	Not required
	WLAN2.4GHz		0.787	5mm	-22	81.4	-1.24				

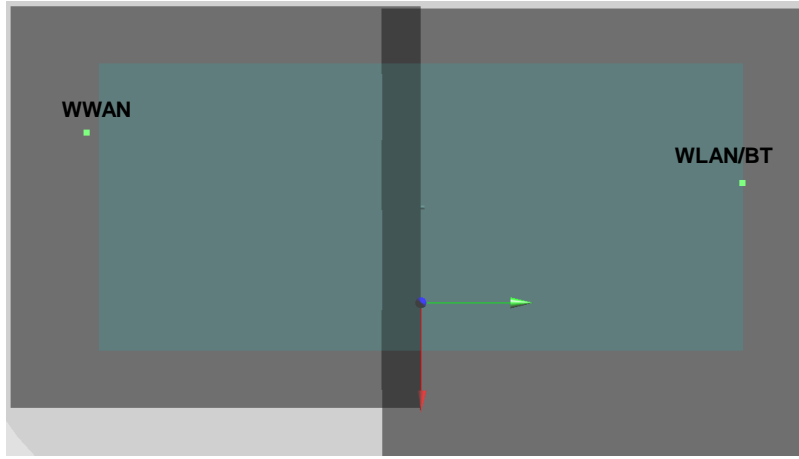


Case 2	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	GSM1900	Back with Headset	1.195	5mm	-14.5	-80.6	-1.05	161.9	1.98	0.02	Not required
	WLAN2.4GHz		0.787	5mm	-21.8	81.1	-1.23				

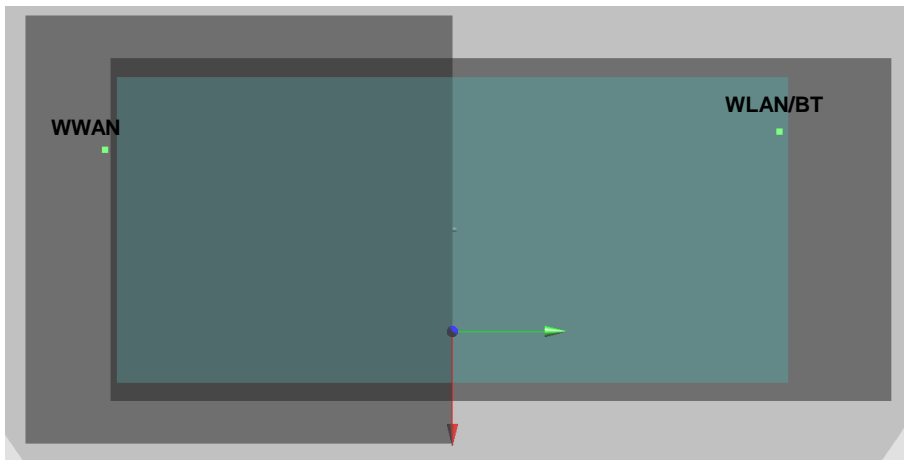




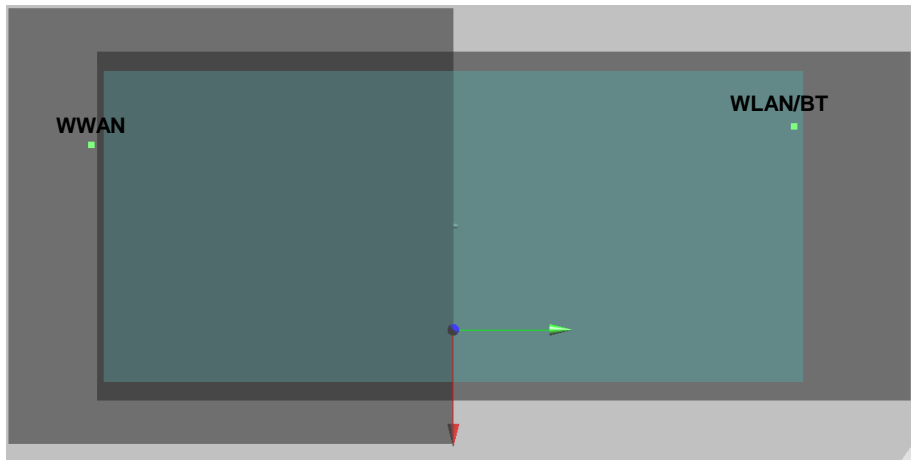
Case 3	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	GSM1900	Back	1.375	5mm	-14.7	-80.7	-1.04	162.1	1.76	0.01	Not required
	Bluetooth		0.388	5mm	-15.34	81.41	-1.1				



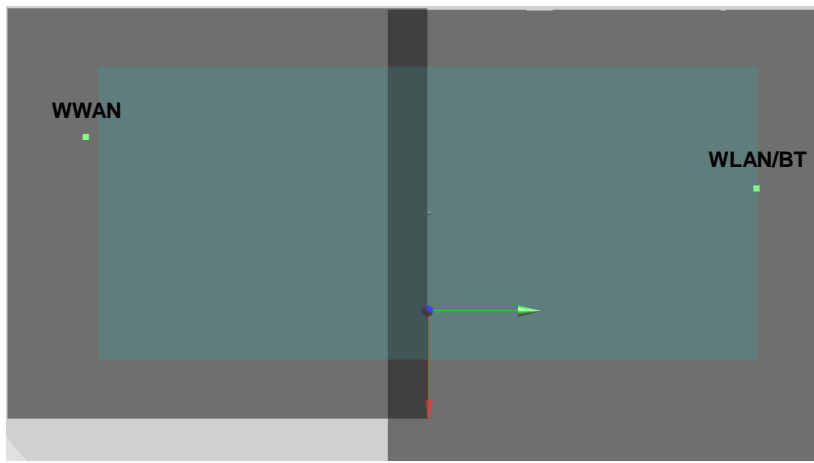
Case 4	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	WCDMA II	Back	1.358	5mm	-11.5	-83.9	-1.02	165.6	2.15	0.02	Not required
	WLAN2.4GHz		0.787	5mm	-22	81.4	-1.24				



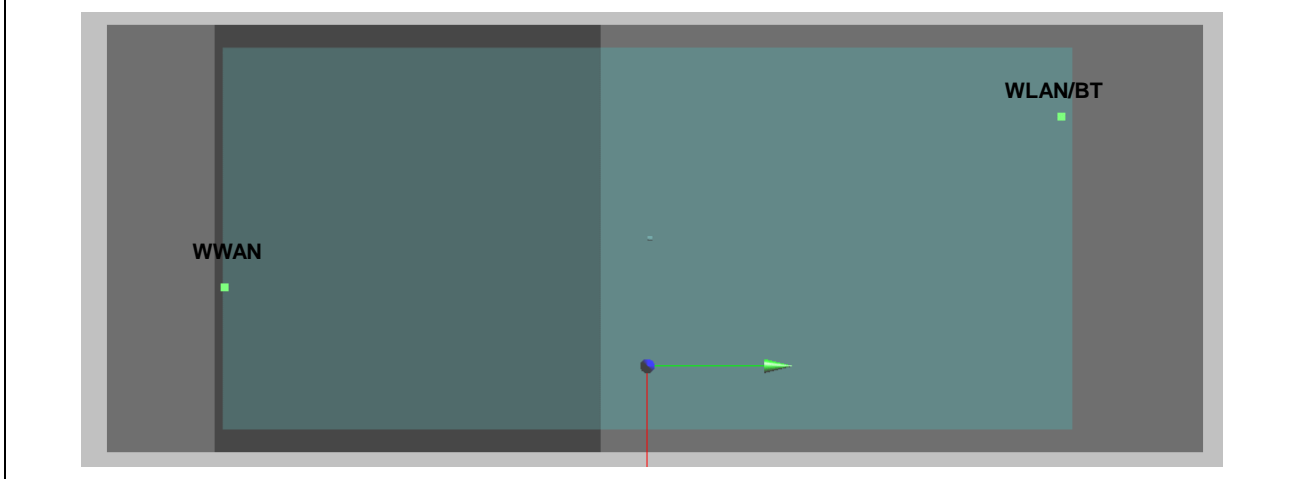
Case 5	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	WCDMA II	Back with Headset	1.045	5mm	-11.3	-83.7	-1.04	165.1	1.83	0.02	Not required
	WLAN2.4GHz		0.787	5mm	-21.8	81.1	-1.23				



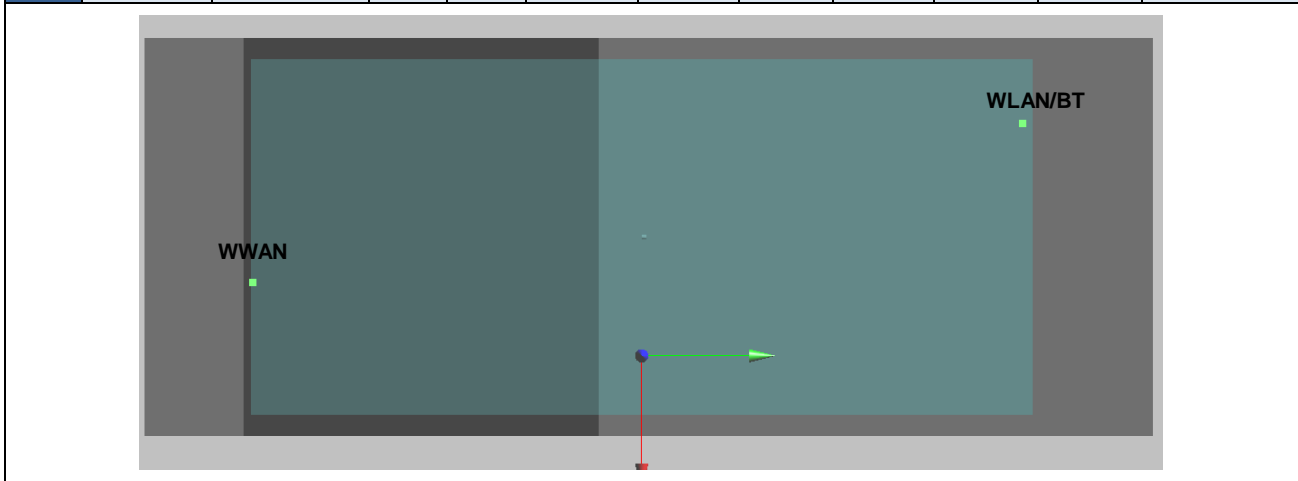
Case 6	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	WCDMA II	Back	1.358	5mm	-11.5	-83.9	-1.02	165.4	1.75	0.01	Not required
	Bluetooth		0.388	5mm	-15.34	81.41	-1.1				



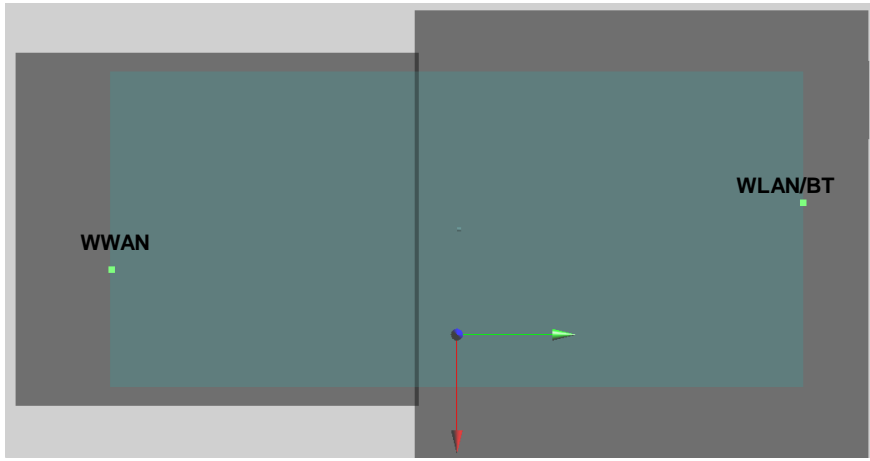
Case 7	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 7	BACK	1.259	5mm	-8.6	-79.2	-0.83	161.2	2.05	0.02	Not required
	WLAN2.4GHz		0.787	5mm	-22	81.4	-1.24				



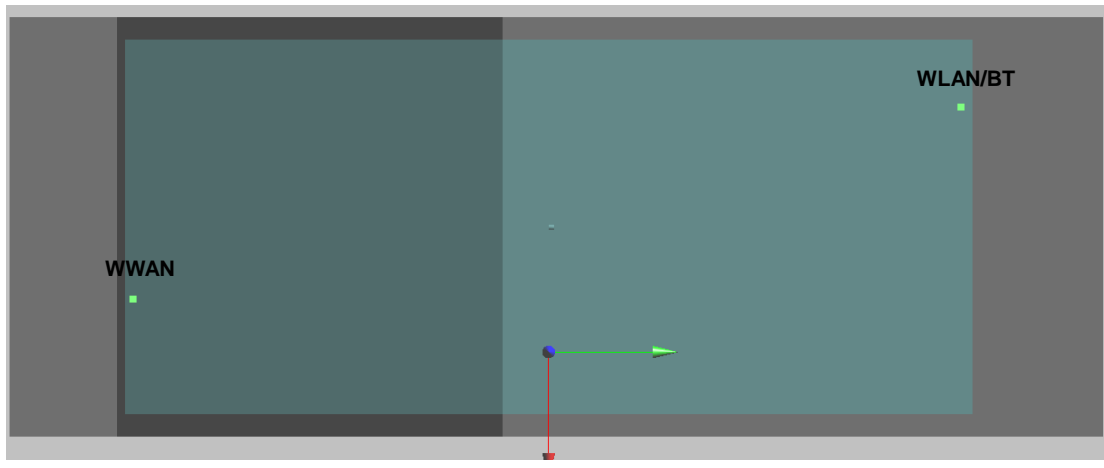
Case 8	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 7	Back	1.2	5mm	-8.5	-79.3	-0.85	161.0	1.99	0.02	Not required
	WLAN2.4GHz		0.787	5mm	-21.8	81.1	-1.23				



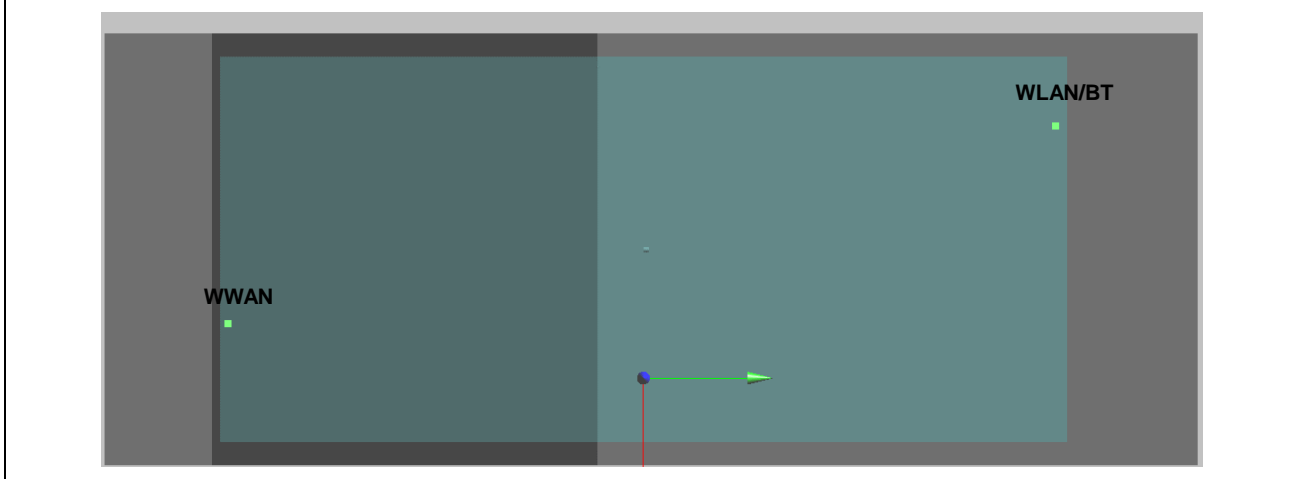
Case 9	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 7	Back with Headset	1.259	5mm	-8.6	-79.2	-0.83	160.8	1.65	0.01	Not required
	Bluetooth		0.388	5mm	-15.34	81.41	-1.1				



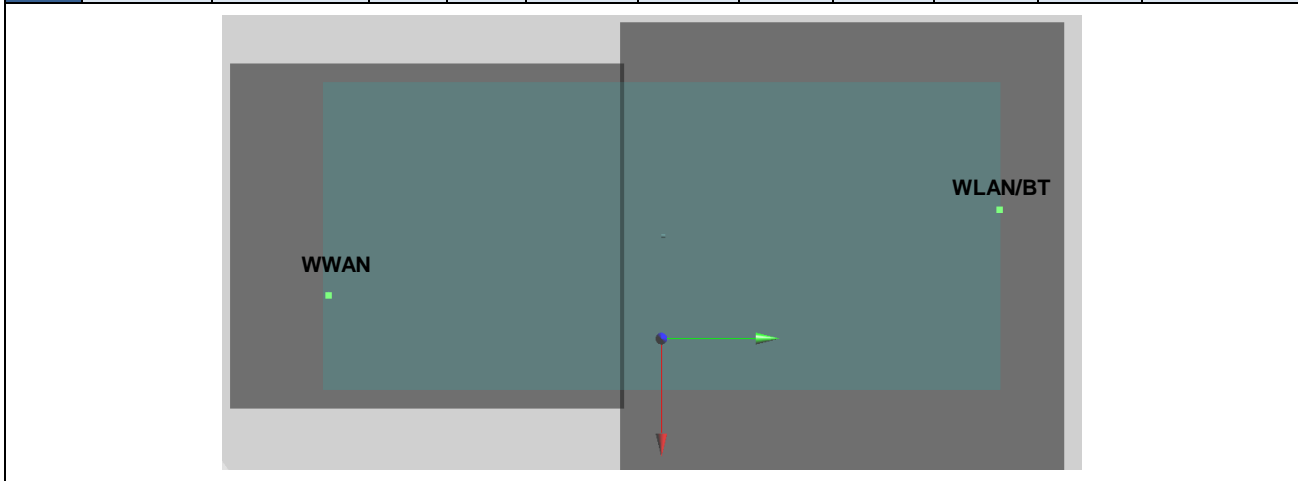
Case 10	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 41	Back	1.212	5mm	7.4	-79	-0.85	163.1	2.00	0.02	Not required
	WLAN2.4GHz		0.787	5mm	-22	81.4	-1.24				



Case	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
11	LTE Band 41	Back	1.168	5mm	7.3	-78.9	-0.86	162.6	1.96	0.02	Not required
	WLAN2.4GHz		0.787	5mm	-21.8	81.1	-1.23				



Case	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
12	LTE Band 41	Back with Headset	1.212	5mm	7.4	-79	-0.85	162.0	1.60	0.01	Not required
	Bluetooth		0.388	5mm	-15.34	81.41	-1.1				



**Test Engineer :** White Huang Jay Jian Willy Yu Andy Chiang Lemon Su and Wilson Lin



## **15. Uncertainty Assessment**

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be  $\leq 30\%$ , for a confidence interval of  $k = 2$ . If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg and highest measured 10-g SAR is less 3.75W/kg . Therefore, the measurement uncertainty table is not required in this report.

## **16. References**

- [1] FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"
- [2] ANSI/IEEE Std. C95.1-1992, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz", September 1992
- [3] IEEE Std. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", Sep 2013
- [4] SPEAG DASY System Handbook
- [5] FCC KDB 248227 D01 v02r02, "SAR Guidance for IEEE 802.11 (WiFi) Transmitters", Oct 2015.
- [6] FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 2015
- [7] FCC KDB 648474 D04 v01r03, "SAR Evaluation Considerations for Wireless Handsets", Oct 2015.
- [8] FCC KDB 941225 D01 v03r01, "3G SAR MEAUREMENT PROCEDURES", Oct 2015
- [9] FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 2015
- [10] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.
- [11] FCC KDB 941225 D07 v01r02, " SAR Evaluation Procedures for UMPC Mini-Tablet Devices", Oct 2015.
- [12] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [13] FCC KDB 865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations" Oct 2015.