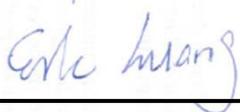


# FCC SAR Test Report

APPLICANT : Sony Mobile Communications Inc.  
BRAND NAME : Sony  
FCC ID : PY7-PM0922  
STANDARD : FCC 47 CFR Part 2 (2.1093)  
ANSI/IEEE C95.1-1992  
IEEE 1528-2013

We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

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



Reviewed by: Eric Huang / Deputy Manager



Approved by: Jones Tsai / Manager



## SPORTON INTERNATIONAL INC.

No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)



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**1. Attestation of Test Results**

<b>Applicant Name</b>	Sony Mobile Communications Inc.		
<b>EUT Description</b>	GSM/WCDMA/LTE Phone+Bluetooth, DTS/UNII a/b/g/n and NFC		
<b>Brand Name</b>	Sony		
<b>FCC ID</b>	PY7-PM0922		
<b>HW Version</b>	A		
<b>SW Version</b>	33.2.A.0.19		
<b>RF Exposure Conditions</b>	<b>Equipment Class</b>		
	<b>Licensed</b>	<b>DTS</b>	<b>U-NII</b>
<b>Head (1g SAR W/kg)</b>	0.50	0.33	0.57
<b>Body-Worn (1g SAR W/kg)</b>	0.76	0.09	0.09
<b>Wireless Router (1g SAR W/kg)</b>	1.23	0.22	
<b>Highest Simultaneous Transmission (1g SAR W/kg)</b>	Head:1.07 Body-worn:0.85 Hotspot:1.31	Head:0.83 Body-worn:0.85 Hotspot:1.31	Head:1.07 Body-worn:0.85 Hotspot: NA
<b>Date Tested</b>	2015/11/17~2016/1/13		
<b>Test Result</b>	Pass		
<b>Remark:</b>	<ol style="list-style-type: none"> <li>This device 2.4GHz WLAN supports Hotspot operation, and 2.4GHz / 5.2GHz / 5.3GHz / 5.5GHz / 5.8GHz WLAN supports WiFi Direct.</li> <li>WCDMA B2 / B4, and LTE B2 / B4 power reduction is activated in hotspot mode.</li> <li>The FCC ID: PY7-PM0920 and FCC ID: PY7-PM0922 is similar device, in this report all the WLAN SAR test results are referred to PY7-PM0920, Sporton Report No: FA500716 and spot checks were performed on PY7-PM0922 to ensure that the SAR measurements for both devices are the same.</li> </ol>		

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

## 2. Administration Data

Testing Laboratory	
Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

Applicant	
Company Name	Sony Mobile Communications Inc.
Address	Nya Vattentornet, 22188 Lund, Sweden

Manufacturer	
Company Name	Sony Mobile Communications Inc.
Address	1-8-15 Konan, Minato-ku, Tokyo, 108-0075, Japan

## 3. Guidance Standard

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

## 4. Equipment Under Test (EUT) Information

### 4.1 General Information

Wireless Technologies	Frequency	Operating Mode	
GSM	850 1900	· GSM Voice · GPRS (GMSK) · EDGE (8PSK)	Multi-Slot Class: Class 33
	Does device support dual transfer mode? (No)		
W-CDMA (UMTS)	Band 2 Band 4 Band 5	· AMR / RMC 12.2Kbps · HSDPA · HSUPA · DC-HSDPA · HSPA+ (16QAM uplink)	
LTE (FDD)	Band 2 Band 4 Band 5 Band 7 Band 12 Band 13 Band 17	· QPSK · 16QAM	
WiFi	2.4GHz: 2412 MHz ~ 2462 MHz	· 11b · 11g · 11n (HT20) · 11n (HT40)	
	5GHz: 5.2GHz: 5180 MHz ~ 5240 MHz 5.3GHz: 5260 MHz ~ 5320 MHz 5.5GHz: 5500 MHz ~ 5700 MHz 5.8GHz: 5745 MHz ~ 5825 MHz	· 11a · 11n (HT20) · 11n (HT40) · WLAN operation in 5600MHz ~ 5650MHz is notched	
Bluetooth	2.4GHz	Version 4.1 with LE	
NFC	13.56MHz	ASK	

Battery option	Battery 1	Brand Name	Sony	Model Name	LIS1618ERPC
		Power Rating	3.8Vdc, 2300mAh	Type	Li-ion
	Battery 2	Brand Name	Sony	Model Name	GB-S10-385871-010H
		Power Rating	3.8Vdc, 2300mAh	Type	Li-ion

### 4.2 Device Serial Number

Exposure Position	SN
GSM / UMTS	RQ3000DATG
LTE	RQ3000DAUH
WiFi	RQ3000DAVU

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



### 5. RF Exposure Limits

#### 5.1 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.

#### 5.2 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.

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

### **6.1 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.

### **6.2 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:

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

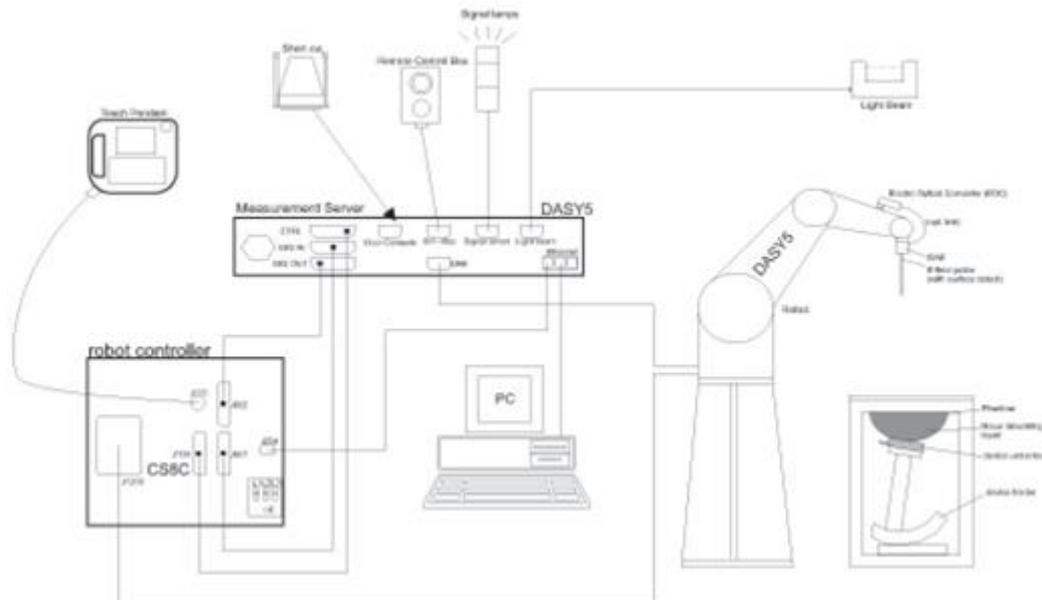
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

## 7. 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.

**7.1 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: ±0.2 dB (30 MHz – 4 GHz)	
<b>Directivity</b>	±0.2 dB in TSL (rotation around probe axis) ±0.3 dB in TSL (rotation normal to probe axis)	
<b>Dynamic Range</b>	5 µW/g – >100 mW/g; Linearity: ±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: 2.0 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: ±0.2 dB (30 MHz – 6 GHz)	
<b>Directivity</b>	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)	
<b>Dynamic Range</b>	10 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/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	

**7.2 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**

**7.3 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.

## **7.4 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

## **8. 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

### **8.1 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

**8.2 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.

**8.3 Area Scan**

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

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

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

### 8.4 Zoom Scan

Zoom scans are used to 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 whose 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.				



### **8.5 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.

### **8.6 Power Drift Monitoring**

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASYS 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.



**9. Test Equipment List**

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1012	May. 28, 2015	May. 27, 2016
SPEAG	835MHz System Validation Kit	D835V2	499	Mar. 20, 2015	Mar. 19, 2016
SPEAG	1750MHz System Validation Kit	D1750V2	1112	Feb. 19, 2015	Feb. 18, 2016
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Oct. 22, 2015	Oct. 21, 2016
SPEAG	2450MHz System Validation Kit	D2450V2	736	Aug. 20, 2015	Aug. 19, 2016
SPEAG	2600MHz System Validation Kit	D2600V2	1008	Aug. 19, 2015	Aug. 18, 2016
SPEAG	5GHz System Validation Kit	D5GHzV2	1128	Jul. 20, 2015	Jul. 19, 2016
SPEAG	Data Acquisition Electronics	DAE3	495	May. 22, 2015	May. 21, 2016
SPEAG	Data Acquisition Electronics	DAE4	1388	Sep. 25, 2015	Sep. 24, 2016
SPEAG	Data Acquisition Electronics	DAE4	778	Aug. 25, 2015	Aug. 24, 2016
SPEAG	Data Acquisition Electronics	DAE3	577	Sep. 24, 2015	Sep. 23, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3925	May. 27, 2015	May. 26, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3697	Sep. 28, 2015	Sep. 27, 2016
SPEAG	Dosimetric E-Field Probe	ES3DV3	3270	Sep. 28, 2015	Sep. 27, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Oct. 01, 2015	Sep. 30, 2016
WonDer	Thermometer	WD-5015	TM685	Oct. 16, 2015	Oct. 15, 2016
WonDer	Thermometer	WD-5015	TM281	Oct. 16, 2015	Oct. 15, 2016
Wisewind	Thermometer	HTC-1	TM560	Oct. 16, 2015	Oct. 15, 2016
Wisewind	Thermometer	HTC-1	TM225	Oct. 16, 2015	Oct. 15, 2016
Anritsu	Radio Communication Analyzer	MT8820C	6201074414	Feb. 06, 2015	Feb. 05, 2016
Agilent	Wireless Communication Test Set	E5515C	MY50266977	May. 14, 2015	May. 13, 2016
R&S	Radio communication Tester	CMW500	149638	Aug. 04, 2015	Aug. 03, 2016
SPEAG	Device Holder	N/A	N/A	N/A	N/A
R&S	Signal Generator	MG3710A	6201502524	May. 25, 2015	May. 24, 2016
Agilent	ENA Network Analyzer	E5071C	MY46316648	Feb. 11, 2015	Feb. 10, 2016
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Jul. 21, 2015	Jul. 20, 2016
LINE SEIKI	Digital Thermometer	LKMelectronic	DTM3000SPEZIAL/90900	Aug. 26, 2015	Aug. 25, 2016
Anritsu	Power Meter	ML2495A	1419002	May. 13, 2015	May. 12, 2016
Anritsu	Power Sensor	MA2411B	1339124	May. 13, 2015	May. 12, 2016
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 24, 2015	Aug. 23, 2016
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	
AR	Power Amplifier	5S1G4M2	0328767	Note 1	
Mini-Circuits	Power Amplifier	ZVE-3W	162601250	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.



## 10. System Verification

### 10.1 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity ( $\sigma$ )	Permittivity ( $\epsilon_r$ )
For Head								
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
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

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

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

**<Tissue Dielectric Parameter Check Results>**

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ε <sub>r</sub> )	Conductivity Target (σ)	Permittivity Target (ε <sub>r</sub> )	Delta (σ) (%)	Delta (ε <sub>r</sub> ) (%)	Limit (%)	Date
750	HSL	22.5	0.904	41.546	0.89	41.90	1.57	-0.84	±5	2015/11/22
750	MSL	22.6	0.977	54.230	0.96	55.50	1.77	-2.29	±5	2015/11/21
750	MSL	22.6	0.977	54.230	0.96	55.50	1.77	-2.29	±5	2015/11/21
835	HSL	22.5	0.889	40.797	0.90	41.50	-1.22	-1.69	±5	2015/11/21
835	MSL	22.7	0.985	56.563	0.97	55.20	1.55	2.47	±5	2015/11/18
1750	HSL	22.2	1.362	40.887	1.37	40.10	-0.58	1.96	±5	2015/12/1
1750	MSL	22.0	1.486	55.493	1.49	53.40	-0.27	3.92	±5	2015/11/26
1750	MSL	22.6	1.480	54.338	1.49	53.40	-0.67	1.76	±5	2015/12/3
1900	HSL	22.3	1.423	38.572	1.40	40.00	1.64	-3.57	±5	2015/11/23
1900	HSL	22.4	1.415	40.660	1.40	40.00	1.07	1.65	±5	2015/11/28
1900	HSL	22.0	1.457	39.905	1.40	40.00	4.07	-0.24	±5	2015/12/2
1900	MSL	22.7	1.556	51.544	1.52	53.30	2.37	-3.29	±5	2015/11/17
1900	MSL	22.0	1.546	55.342	1.52	53.30	1.71	3.83	±5	2015/11/26
1900	MSL	22.1	1.546	55.342	1.52	53.30	1.71	3.83	±5	2015/11/26
1900	MSL	22.2	1.574	54.700	1.52	53.30	3.55	2.63	±5	2015/12/2
2450	HSL	22.5	1.727	38.591	1.80	39.20	-4.06	-1.55	±5	2015/11/28
2450	MSL	22.2	1.974	51.268	1.95	52.70	1.23	-2.72	±5	2015/11/21
2600	HSL	22.4	1.894	38.059	1.96	39.00	-3.37	-2.41	±5	2015/11/28
2600	HSL	22.8	1.956	40.439	1.96	39.00	-0.20	3.69	±5	2016/1/13
2600	MSL	22.4	2.101	52.889	2.16	52.50	-2.73	0.74	±5	2015/11/22
5250	HSL	22.6	4.541	36.424	4.71	35.95	-3.59	1.32	±5	2015/11/22
5250	HSL	22.4	4.636	36.475	4.71	35.95	-1.57	1.46	±5	2015/11/28
5250	MSL	22.3	5.527	46.945	5.36	48.95	3.12	-4.10	±5	2015/11/21
5600	HSL	22.6	4.876	35.982	5.07	35.50	-3.83	1.36	±5	2015/11/22
5600	HSL	22.4	4.992	35.981	5.07	35.50	-1.54	1.35	±5	2015/11/28
5600	MSL	22.3	5.982	46.283	5.77	48.50	3.67	-4.57	±5	2015/11/21
5750	HSL	22.6	5.024	35.796	5.22	35.35	-3.75	1.26	±5	2015/11/22
5750	HSL	22.4	5.146	35.788	5.22	35.35	-1.42	1.24	±5	2015/11/28
5750	MSL	22.3	6.185	46.016	5.94	48.28	4.12	-4.69	±5	2015/11/21

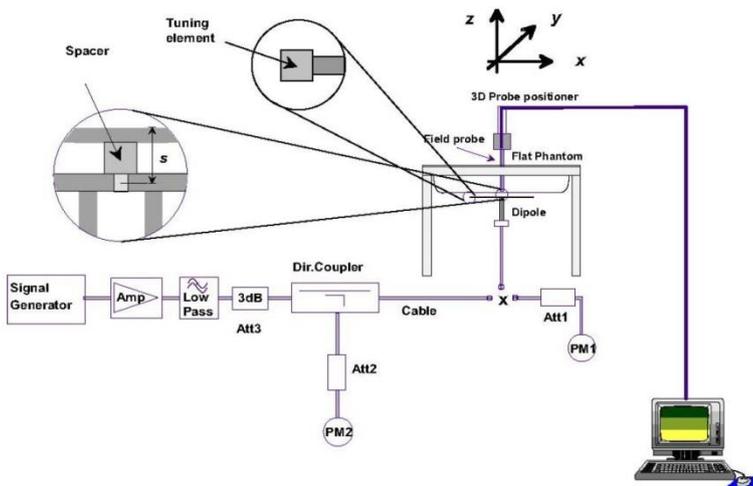


**10.2 System Performance Check Results**

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)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2015/11/22	750	HSL	250	D750V3-1012	ES3DV3 - SN3270	DAE4 Sn778	2.16	8.22	8.64	5.11
2015/11/21	750	MSL	250	D750V3-1012	EX3DV4 - SN3931	DAE3 Sn577	2.00	8.61	8.00	-7.08
2015/11/21	750	MSL	250	D750V3-1012	ES3DV3 - SN3270	DAE4 Sn778	2.34	8.61	9.36	8.71
2015/11/21	835	HSL	250	D835V2-499	ES3DV3 - SN3270	DAE4 Sn778	2.34	9.20	9.36	1.74
2015/11/18	835	MSL	250	D835V2-499	ES3DV3 - SN3270	DAE4 Sn778	2.47	9.30	9.88	6.24
2015/12/1	1750	HSL	250	D1750V2-1112	EX3DV4 - SN3931	DAE3 Sn577	8.88	37.00	35.52	-4.00
2015/11/26	1750	MSL	250	D1750V2-1112	EX3DV4 - SN3931	DAE3 Sn577	8.77	37.10	35.08	-5.44
2015/12/3	1750	MSL	250	D1750V2-1112	EX3DV4 - SN3931	DAE3 Sn577	9.61	37.10	38.44	3.61
2015/11/23	1900	HSL	250	D1900V2_5d041	ES3DV3 - SN3270	DAE4 Sn778	10.00	39.80	40.00	0.50
2015/11/28	1900	HSL	250	D1900V2_5d041	EX3DV4 - SN3931	DAE3 Sn577	9.12	39.80	36.48	-8.34
2015/12/2	1900	HSL	250	D1900V2_5d041	EX3DV4 - SN3931	DAE3 Sn577	10.30	39.80	41.20	3.52
2015/11/17	1900	MSL	250	D1900V2_5d041	ES3DV3 - SN3270	DAE4 Sn778	9.84	40.00	39.36	-1.60
2015/11/26	1900	MSL	250	D1900V2_5d041	EX3DV4 - SN3931	DAE3 Sn577	9.39	40.00	37.56	-6.10
2015/11/26	1900	MSL	250	D1900V2_5d041	EX3DV4 - SN3697	DAE4 Sn1388	9.70	40.00	38.80	-3.00
2015/12/2	1900	MSL	250	D1900V2_5d041	EX3DV4 - SN3931	DAE3 Sn577	10.10	40.00	40.40	1.00
2015/11/28	2450	HSL	250	D2450V2-736	EX3DV4 - SN3931	DAE3 Sn577	12.40	53.40	49.60	-7.12
2015/11/21	2450	MSL	250	D2450V2-736	ES3DV3 - SN3270	DAE4 Sn778	12.30	51.90	49.20	-5.20
2015/11/28	2600	HSL	250	D2600V2-1008	EX3DV4 - SN3931	DAE3 Sn577	13.20	56.30	52.80	-6.22
2016/1/13	2600	HSL	250	D2600V2-1008	EX3DV4 - SN3925	DAE3 Sn495	13.40	56.30	53.6	-4.80
2015/11/22	2600	MSL	250	D2600V2-1008	ES3DV3 - SN3270	DAE4 Sn778	13.10	55.80	52.40	-6.09
2015/11/22	5250	HSL	100	D5GHzV2-1128-5250	EX3DV4 - SN3931	DAE3 Sn577	7.37	80.80	73.70	-8.79
2015/11/28	5250	HSL	100	D5GHzV2-1128-5250	EX3DV4 - SN3931	DAE3 Sn577	7.62	80.80	76.20	-5.69
2015/11/21	5250	MSL	100	D5GHzV2-1128-5250	EX3DV4 - SN3931	DAE3 Sn577	7.12	76.20	71.20	-6.56
2015/11/22	5600	HSL	100	D5GHzV2-1128-5600	EX3DV4 - SN3931	DAE3 Sn577	8.22	82.00	82.20	0.24
2015/11/28	5600	HSL	100	D5GHzV2-1128-5600	EX3DV4 - SN3931	DAE3 Sn577	8.52	82.00	85.20	3.90
2015/11/21	5600	MSL	100	D5GHzV2-1128-5600	EX3DV4 - SN3931	DAE3 Sn577	7.83	79.30	78.30	-1.26
2015/11/22	5750	HSL	100	D5GHzV2-1128-5750	EX3DV4 - SN3931	DAE3 Sn577	7.51	79.70	75.10	-5.77
2015/11/28	5750	HSL	100	D5GHzV2-1128-5750	EX3DV4 - SN3931	DAE3 Sn577	8.10	79.70	81.00	1.63
2015/11/21	5750	MSL	100	D5GHzV2-1128-5750	EX3DV4 - SN3931	DAE3 Sn577	7.27	75.90	72.70	-4.22

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2015/11/22	750	HSL	250	D750V3-1012	ES3DV3 - SN3270	DAE4 Sn778	1.45	5.41	5.80	7.21
2015/11/21	750	MSL	250	D750V3-1012	EX3DV4 - SN3931	DAE3 Sn577	1.33	5.72	5.32	-6.99
2015/11/21	750	MSL	250	D750V3-1012	ES3DV3 - SN3270	DAE4 Sn778	1.53	5.72	6.12	6.99
2015/11/21	835	HSL	250	D835V2-499	ES3DV3 - SN3270	DAE4 Sn778	1.54	6.02	6.16	2.33
2015/11/18	835	MSL	250	D835V2-499	ES3DV3 - SN3270	DAE4 Sn778	1.64	6.12	6.56	7.19
2015/12/1	1750	HSL	250	D1750V2-1112	EX3DV4 - SN3931	DAE3 Sn577	4.77	19.80	19.08	-3.64
2015/11/26	1750	MSL	250	D1750V2-1112	EX3DV4 - SN3931	DAE3 Sn577	4.67	19.90	18.68	-6.13
2015/12/3	1750	MSL	250	D1750V2-1112	EX3DV4 - SN3931	DAE3 Sn577	5.08	19.90	20.32	2.11
2015/11/23	1900	HSL	250	D1900V2_5d041	ES3DV3 - SN3270	DAE4 Sn778	5.15	20.80	20.60	-0.96
2015/11/28	1900	HSL	250	D1900V2_5d041	EX3DV4 - SN3931	DAE3 Sn577	4.82	20.80	19.28	-7.31
2015/12/2	1900	HSL	250	D1900V2_5d041	EX3DV4 - SN3931	DAE3 Sn577	5.45	20.80	21.80	4.81
2015/11/17	1900	MSL	250	D1900V2_5d041	ES3DV3 - SN3270	DAE4 Sn778	5.17	21.20	20.68	-2.45
2015/11/26	1900	MSL	250	D1900V2_5d041	EX3DV4 - SN3931	DAE3 Sn577	5.01	21.20	20.04	-5.47
2015/11/26	1900	MSL	250	D1900V2_5d041	EX3DV4 - SN3697	DAE4 Sn1388	5.09	21.20	20.36	-3.96
2015/12/2	1900	MSL	250	D1900V2_5d041	EX3DV4 - SN3931	DAE3 Sn577	5.31	21.20	21.24	0.19
2015/11/28	2450	HSL	250	D2450V2-736	EX3DV4 - SN3931	DAE3 Sn577	5.79	25.20	23.16	-8.10
2015/11/21	2450	MSL	250	D2450V2-736	ES3DV3 - SN3270	DAE4 Sn778	5.64	24.20	22.56	-6.78
2015/11/28	2600	HSL	250	D2600V2-1008	EX3DV4 - SN3931	DAE3 Sn577	5.91	25.60	23.64	-7.66
2016/1/13	2600	HSL	250	D2600V2-1008	EX3DV4 - SN3925	DAE3 Sn495	5.94	25.60	23.76	-7.19
2015/11/22	2600	MSL	250	D2600V2-1008	ES3DV3 - SN3270	DAE4 Sn778	5.84	25.10	23.36	-6.93
2015/11/22	5250	HSL	100	D5GHzV2-1128-5250	EX3DV4 - SN3931	DAE3 Sn577	2.14	23.20	21.40	-7.76
2015/11/28	5250	HSL	100	D5GHzV2-1128-5250	EX3DV4 - SN3931	DAE3 Sn577	2.12	23.20	21.20	-8.62
2015/11/21	5250	MSL	100	D5GHzV2-1128-5250	EX3DV4 - SN3931	DAE3 Sn577	1.95	21.40	19.50	-8.88
2015/11/22	5600	HSL	100	D5GHzV2-1128-5600	EX3DV4 - SN3931	DAE3 Sn577	2.26	23.40	22.60	-3.42
2015/11/28	5600	HSL	100	D5GHzV2-1128-5600	EX3DV4 - SN3931	DAE3 Sn577	2.32	23.40	23.20	-0.85
2015/11/21	5600	MSL	100	D5GHzV2-1128-5600	EX3DV4 - SN3931	DAE3 Sn577	2.11	22.10	21.10	-4.52
2015/11/22	5750	HSL	100	D5GHzV2-1128-5750	EX3DV4 - SN3931	DAE3 Sn577	2.08	22.70	20.80	-8.37
2015/11/28	5750	HSL	100	D5GHzV2-1128-5750	EX3DV4 - SN3931	DAE3 Sn577	2.25	22.70	22.50	-0.88
2015/11/21	5750	MSL	100	D5GHzV2-1128-5750	EX3DV4 - SN3931	DAE3 Sn577	1.96	21.20	19.60	-7.55



**Fig 8.3.1 System Performance Check Setup**



**Fig 8.3.2 Setup Photo**

## 11. RF Exposure Positions

### 11.1 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.

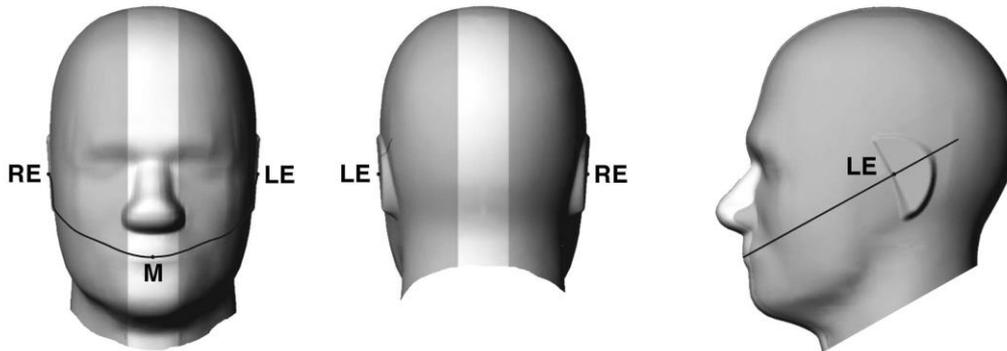


Fig 9.1.1 Front, back, and side views of SAM twin phantom

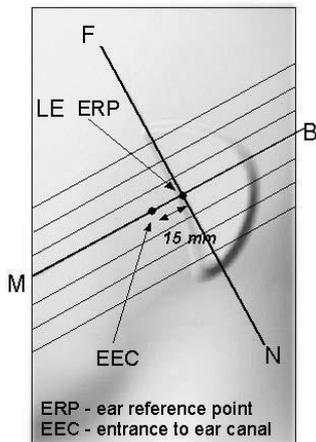


Fig 9.1.2 Close-up side view of phantom showing the ear region.

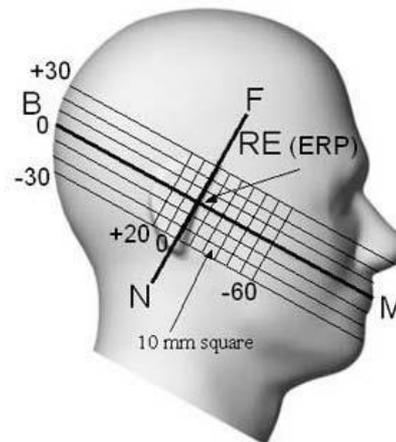
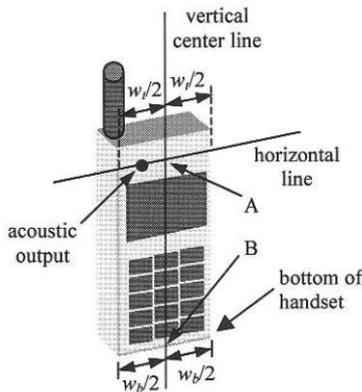


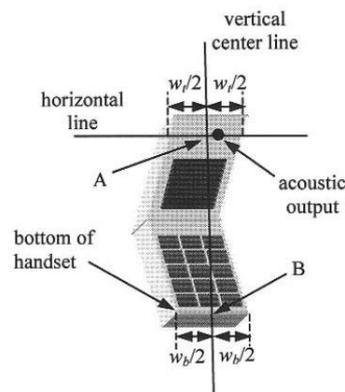
Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

**11.2 Definition of the cheek position**

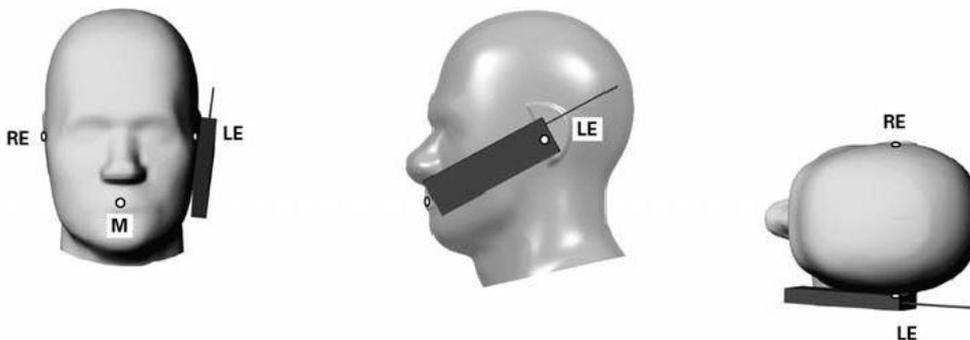
1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal 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”**



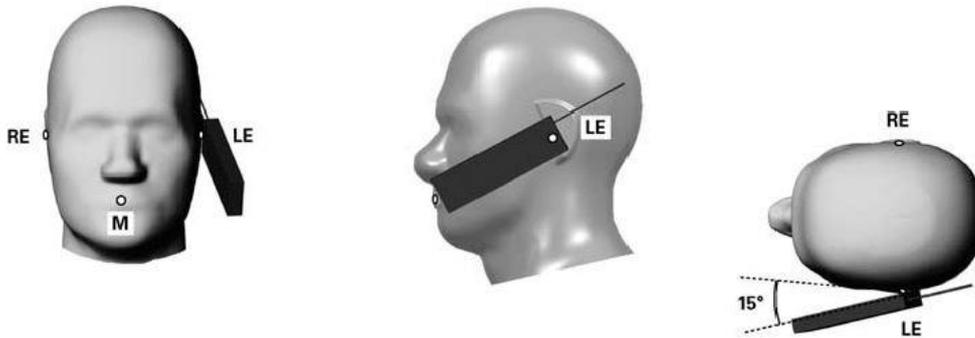
**Fig 9.2.2 Handset vertical and horizontal reference lines—“clam-shell case”**



**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.**

**11.3 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

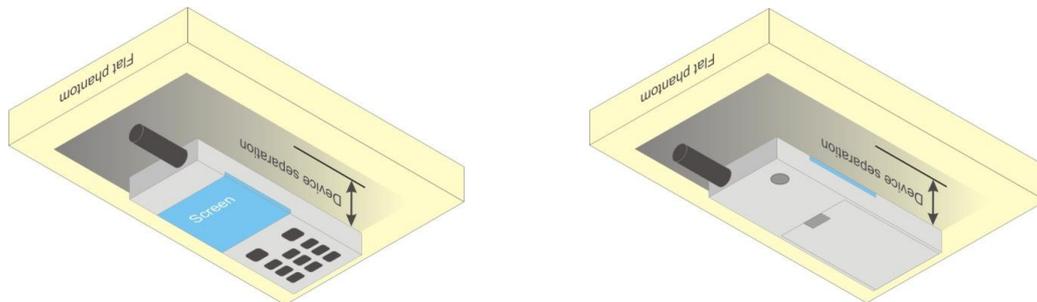


**Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.**

**11.4 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 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**

**11.5 Wireless Router**

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets (L x W ≥ 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.

**12. Conducted RF Output Power (Unit: dBm)**

**<GSM Conducted Power>**

**General Note:**

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, considering the possibility of e.g. 3rd party VoIP operation for Head and body-worn SAR test reduction for GSM and GPRS and 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 EUT was set in GPRS (4Tx slots) for GSM850/GSM1900.
3. Per KDB 941225 D01v03r01, for Hotspot SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance, for modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested, therefore, the EUT was set in GPRS (4Tx slots) for GSM850/GSM1900.

Band 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	33.18	33.13	33.10	33.50	24.18	24.13	24.10	24.50
GPRS 1 Tx slot	33.19	33.13	33.11	33.50	24.19	24.13	24.11	24.50
GPRS 2 Tx slots	29.59	29.54	29.51	30.50	23.59	23.54	23.51	24.50
GPRS 3 Tx slots	28.49	28.43	28.39	28.80	24.23	24.17	24.13	24.54
GPRS 4 Tx slots	27.96	27.90	27.85	28.00	24.96	24.90	24.85	25.00
EDGE 1 Tx slot	26.87	26.91	26.85	27.50	17.87	17.91	17.85	18.50
EDGE 2 Tx slots	26.82	26.85	26.77	27.30	20.82	20.85	20.77	21.30
EDGE 3 Tx slots	26.74	26.71	26.64	27.10	22.48	22.45	22.38	22.84
EDGE 4 Tx slots	26.59	26.63	26.59	26.90	23.59	23.63	23.59	23.90

Band 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	29.85	29.78	29.79	30.50	20.85	20.78	20.79	21.50
GPRS 1 Tx slot	29.86	29.79	29.81	30.50	20.86	20.79	20.81	21.50
GPRS 2 Tx slots	26.67	26.79	27.03	27.50	20.67	20.79	21.03	21.50
GPRS 3 Tx slots	25.15	25.29	25.61	25.80	20.89	21.03	21.35	21.54
GPRS 4 Tx slots	24.66	24.78	25.00	25.00	21.66	21.78	22.00	22.00
EDGE 1 Tx slot	25.52	25.68	25.90	26.00	16.52	16.68	16.90	17.00
EDGE 2 Tx slots	25.38	25.59	25.81	26.00	19.38	19.59	19.81	20.00
EDGE 3 Tx slots	25.25	25.40	25.50	25.50	20.99	21.14	21.24	21.24
EDGE 4 Tx slots	24.48	24.72	24.90	25.00	21.48	21.72	21.90	22.00

**<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 HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
4. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

**HSDPA Setup Configuration:**

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

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

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

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

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

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

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)	$\beta_c/\beta_d$	$\beta_{HS}$ (Note 1)	$\beta_{ec}$	$\beta_{ed}$ (Note 5) (Note 6)	$\beta_{ed}$ (SF)	$\beta_{ed}$ (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	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 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

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

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

Note 5: 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 6:  $\beta_{ed}$  can not be set directly, it is set by Absolute Grant Value.

**Setup Configuration**

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

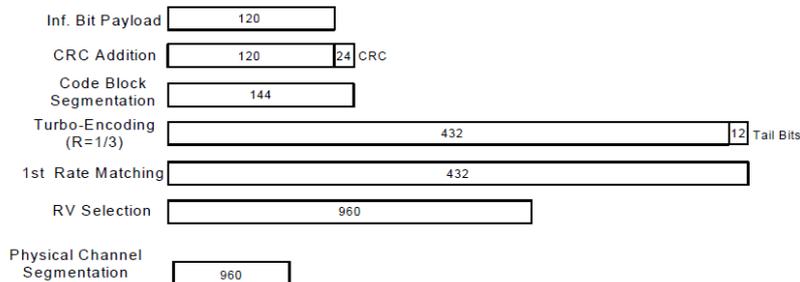
- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
  - i. Set RMC 12.2Kbps + HSDPA mode.
  - ii. Set Cell Power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

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

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

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

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



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

**Setup Configuration**



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

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

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

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

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

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

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

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

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

**Setup Configuration**



<WCDMA Conducted Power>

General Note:

1. Per KDB 941225 D01v03r01, SAR for Head / Hotspot / Body-worn exposure 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. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is  $\leq \frac{1}{4}$  dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

<Full Power Mode>

Band		WCDMA V			Tune-up Limit (dBm)	WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)
TX Channel		4132	4182	4233		9262	9400	9538		1312	1413	1513	
Rx Channel		4357	4407	4458		9662	9800	9938		1537	1638	1738	
Frequency (MHz)		826.4	836.4	846.6	1852.4	1880	1907.6	1712.4	1732.6	1752.6			
3GPP Rel 99	AMR 12.2Kbps	23.48	23.40	23.36	24.00	23.36	23.55	23.56	24.00	23.75	23.80	23.76	24.00
3GPP Rel 99	RMC 12.2Kbps	23.49	23.42	23.40	24.00	23.38	23.58	23.59	24.00	23.80	23.83	23.79	24.00
3GPP Rel 6	HSDPA Subtest-1	23.48	23.41	23.20	24.00	23.34	23.40	23.40	24.00	23.70	23.74	23.78	24.00
3GPP Rel 6	HSDPA Subtest-2	23.47	23.40	23.18	24.00	23.32	23.38	23.38	24.00	23.72	23.73	23.77	24.00
3GPP Rel 6	HSDPA Subtest-3	22.94	22.90	22.88	23.50	22.94	23.18	23.19	23.50	23.32	23.33	23.30	23.50
3GPP Rel 6	HSDPA Subtest-4	22.91	22.96	22.87	23.50	22.91	23.15	23.17	23.50	23.29	23.31	23.28	23.50
3GPP Rel 8	DC-HSDPA Subtest-1	23.39	23.31	23.10	24.00	23.33	23.40	23.39	24.00	23.72	23.74	23.79	24.00
3GPP Rel 8	DC-HSDPA Subtest-2	23.37	23.30	23.01	24.00	23.32	23.39	23.38	24.00	23.72	23.72	23.78	24.00
3GPP Rel 8	DC-HSDPA Subtest-3	22.82	22.77	22.78	23.50	22.93	23.16	23.18	23.50	23.31	23.31	23.28	23.50
3GPP Rel 8	DC-HSDPA Subtest-4	22.81	22.86	22.77	23.50	22.90	23.15	23.16	23.50	23.29	23.30	23.26	23.50
3GPP Rel 6	HSUPA Subtest-1	20.51	20.52	20.53	22.50	20.68	20.66	20.75	22.50	21.02	21.06	21.10	23.00
3GPP Rel 6	HSUPA Subtest-2	20.48	20.45	20.39	21.50	20.47	20.69	20.72	21.00	20.85	20.86	20.83	21.00
3GPP Rel 6	HSUPA Subtest-3	21.46	21.44	21.38	21.50	21.46	21.67	21.65	22.00	21.76	21.84	21.75	22.00
3GPP Rel 6	HSUPA Subtest-4	20.02	20.05	20.07	21.50	20.01	20.19	20.20	20.50	20.35	20.36	20.30	21.00
3GPP Rel 6	HSUPA Subtest-5	22.50	22.45	22.40	22.50	22.43	22.49	22.48	22.50	22.81	22.83	22.79	23.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	19.85	19.78	19.79	20.00	19.83	19.95	19.98	20.00	19.83	19.88	19.80	21.50

<Reduced Power Mode>

Band		WCDMA II			Tune-up Limit (dBm)	WCDMA IV			Tune-up Limit (dBm)
TX Channel		9262	9400	9538		1312	1413	1513	
Rx Channel		9662	9800	9938		1537	1638	1738	
Frequency (MHz)		1852.4	1880	1907.6	1712.4	1732.6	1752.6		
3GPP Rel 99	AMR 12.2Kbps	21.94	22.15	22.15	22.50	22.25	22.27	22.21	23.00
3GPP Rel 99	RMC 12.2Kbps	21.97	22.20	22.16	22.50	22.27	22.30	22.24	23.00
3GPP Rel 6	HSDPA Subtest-1	22.05	22.19	22.15	22.50	22.25	22.28	22.21	23.00
3GPP Rel 6	HSDPA Subtest-2	22.04	22.17	22.13	22.50	22.12	22.18	22.15	23.00
3GPP Rel 6	HSDPA Subtest-3	21.55	21.73	21.71	22.00	21.74	21.80	21.78	22.50
3GPP Rel 6	HSDPA Subtest-4	21.49	21.71	21.68	22.00	21.77	21.84	21.75	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	22.03	22.18	22.13	22.50	22.21	22.24	22.20	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	22.04	22.16	22.12	22.50	22.10	22.15	22.11	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.54	21.70	21.72	22.00	21.71	21.78	21.76	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.52	21.71	21.70	22.00	21.72	21.89	21.74	22.50
3GPP Rel 6	HSUPA Subtest-1	20.68	20.66	20.75	22.50	21.02	21.06	21.10	23.00
3GPP Rel 6	HSUPA Subtest-2	20.47	20.69	20.72	21.00	20.85	20.86	20.83	21.00
3GPP Rel 6	HSUPA Subtest-3	21.46	21.67	21.65	22.00	21.76	21.84	21.75	22.00
3GPP Rel 6	HSUPA Subtest-4	20.01	20.19	20.20	20.50	20.35	20.36	20.30	21.00
3GPP Rel 6	HSUPA Subtest-5	22.43	22.49	22.48	22.50	22.81	22.83	22.79	23.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	19.83	19.95	19.98	20.00	19.83	19.88	19.80	21.50



**<LTE Conducted Power>**

**General Note:**

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B4 / B5 / B12 / B13 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 17 SAR test was covered by Band 12; 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



<Full Power Mode>

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	23.59	23.64	23.62	24
20	QPSK	1	49	23.48	23.48	23.55	
20	QPSK	1	99	23.46	23.50	23.60	
20	QPSK	50	0	22.65	22.73	22.69	23
20	QPSK	50	24	22.56	22.58	22.63	
20	QPSK	50	50	22.52	22.47	22.58	
20	QPSK	100	0	22.58	22.67	22.62	23
20	16QAM	1	0	22.79	22.88	22.82	
20	16QAM	1	49	22.79	22.72	22.80	
20	16QAM	1	99	22.71	22.75	22.73	22
20	16QAM	50	0	21.67	21.67	21.76	
20	16QAM	50	24	21.58	21.56	21.65	
20	16QAM	50	50	21.54	21.47	21.57	22
20	16QAM	100	0	21.60	21.56	21.68	
Channel				18675	18900	19125	
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	23.51	23.54	23.58	24
15	QPSK	1	37	23.51	23.51	23.56	
15	QPSK	1	74	23.44	23.46	23.60	
15	QPSK	36	0	22.60	22.63	22.67	23
15	QPSK	36	20	22.57	22.58	22.64	
15	QPSK	36	39	22.52	22.50	22.58	
15	QPSK	75	0	22.56	22.57	22.63	23
15	16QAM	1	0	22.73	22.77	22.84	
15	16QAM	1	37	22.80	22.74	22.79	
15	16QAM	1	74	22.72	22.71	22.72	22
15	16QAM	36	0	21.62	21.62	21.70	
15	16QAM	36	20	21.59	21.57	21.65	
15	16QAM	36	39	21.55	21.50	21.57	22
15	16QAM	75	0	21.59	21.57	21.65	
Channel				18650	18900	19150	
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	23.44	23.51	23.52	24
10	QPSK	1	25	23.48	23.49	23.56	
10	QPSK	1	49	23.45	23.47	23.61	
10	QPSK	25	0	22.52	22.56	22.63	23
10	QPSK	25	12	22.52	22.54	22.63	
10	QPSK	25	25	22.49	22.47	22.55	
10	QPSK	50	0	22.54	22.55	22.63	23
10	16QAM	1	0	22.67	22.76	22.78	
10	16QAM	1	25	22.75	22.73	22.75	
10	16QAM	1	49	22.74	22.73	22.76	22
10	16QAM	25	0	21.53	21.55	21.62	
10	16QAM	25	12	21.53	21.53	21.61	
10	16QAM	25	25	21.51	21.46	21.52	22
10	16QAM	50	0	21.55	21.53	21.61	



Channel				18625	18900	19175	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	23.42	23.48	23.58	24
5	QPSK	1	12	23.51	23.56	23.60	
5	QPSK	1	24	23.43	23.45	23.59	
5	QPSK	12	0	22.49	22.56	22.69	23
5	QPSK	12	7	22.52	22.58	22.70	
5	QPSK	12	13	22.50	22.54	22.63	
5	QPSK	25	0	22.50	22.55	22.67	23
5	16QAM	1	0	22.66	22.74	22.74	
5	16QAM	1	12	22.76	22.78	22.82	
5	16QAM	1	24	22.70	22.69	22.73	22
5	16QAM	12	0	21.50	21.56	21.67	
5	16QAM	12	7	21.54	21.58	21.67	
5	16QAM	12	13	21.53	21.54	21.60	22
5	16QAM	25	0	21.50	21.53	21.62	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	23.45	23.51	23.54	24
3	QPSK	1	8	23.56	23.50	23.59	
3	QPSK	1	14	23.46	23.49	23.55	
3	QPSK	8	0	22.52	22.58	22.72	23
3	QPSK	8	4	22.55	22.59	22.74	
3	QPSK	8	7	22.53	22.57	22.72	
3	QPSK	15	0	22.56	22.60	22.77	23
3	16QAM	1	0	22.67	22.75	22.76	
3	16QAM	1	8	22.78	22.79	22.84	
3	16QAM	1	14	22.71	22.70	22.79	22
3	16QAM	8	0	21.57	21.62	21.72	
3	16QAM	8	4	21.61	21.65	21.74	
3	16QAM	8	7	21.57	21.61	21.70	22
3	16QAM	15	0	21.53	21.59	21.71	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	23.35	23.42	23.62	24
1.4	QPSK	1	3	23.34	23.39	23.54	
1.4	QPSK	1	5	23.38	23.44	23.59	
1.4	QPSK	3	0	23.51	23.58	23.58	
1.4	QPSK	3	1	23.54	23.60	23.55	
1.4	QPSK	3	3	23.53	23.59	23.61	
1.4	QPSK	6	0	22.58	22.54	22.80	23
1.4	16QAM	1	0	22.60	22.67	22.70	23
1.4	16QAM	1	3	22.63	22.69	22.72	
1.4	16QAM	1	5	22.62	22.68	22.71	
1.4	16QAM	3	0	22.51	22.56	22.62	
1.4	16QAM	3	1	22.52	22.57	22.64	
1.4	16QAM	3	3	22.49	22.54	22.62	
1.4	16QAM	6	0	21.61	21.66	21.77	22



<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	23.58	23.63	23.48	24
20	QPSK	1	49	23.47	23.34	23.29	
20	QPSK	1	99	23.37	23.24	23.31	
20	QPSK	50	0	22.52	22.59	22.45	23
20	QPSK	50	24	22.42	22.41	22.32	
20	QPSK	50	50	22.49	22.38	22.23	
20	QPSK	100	0	22.46	22.48	22.32	23
20	16QAM	1	0	22.78	22.81	22.70	
20	16QAM	1	49	22.73	22.58	22.42	
20	16QAM	1	99	22.58	22.36	22.47	22
20	16QAM	50	0	21.56	21.35	21.37	
20	16QAM	50	24	21.49	21.38	21.29	
20	16QAM	50	50	21.48	21.32	21.15	22
20	16QAM	100	0	21.52	21.33	21.24	
Channel				20025	20175	20325	
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	23.58	23.49	23.36	24
15	QPSK	1	37	23.51	23.40	23.34	
15	QPSK	1	74	23.45	23.27	23.29	
15	QPSK	36	0	22.59	22.42	22.42	23
15	QPSK	36	20	22.54	22.44	22.39	
15	QPSK	36	39	22.52	22.39	22.30	
15	QPSK	75	0	22.56	22.42	22.38	23
15	16QAM	1	0	22.75	22.73	22.47	
15	16QAM	1	37	22.76	22.61	22.46	
15	16QAM	1	74	22.66	22.38	22.47	22
15	16QAM	36	0	21.56	21.40	21.34	
15	16QAM	36	20	21.53	21.41	21.30	
15	16QAM	36	39	21.49	21.35	21.24	22
15	16QAM	36	39	21.49	21.35	21.24	
15	16QAM	75	0	21.52	21.38	21.31	
Channel				20000	20175	20350	Tune-up limit (dBm)
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	23.54	23.42	23.35	24
10	QPSK	1	25	23.51	23.37	23.32	
10	QPSK	1	49	23.46	23.31	23.31	
10	QPSK	25	0	22.57	22.36	22.41	23
10	QPSK	25	12	22.53	22.41	22.36	
10	QPSK	25	25	22.49	22.40	22.30	
10	QPSK	50	0	22.54	22.40	22.37	23
10	16QAM	1	0	22.72	22.68	22.46	
10	16QAM	1	25	22.74	22.62	22.49	
10	16QAM	1	49	22.72	22.49	22.53	22
10	16QAM	25	0	21.51	21.34	21.31	
10	16QAM	25	12	21.49	21.39	21.29	
10	16QAM	25	25	21.46	21.36	21.22	22
10	16QAM	25	25	21.46	21.36	21.22	
10	16QAM	50	0	21.50	21.37	21.30	



Channel				19975	20175	20375	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	23.52	23.38	23.32	24
5	QPSK	1	12	23.61	23.44	23.40	
5	QPSK	1	24	23.46	23.32	23.30	
5	QPSK	12	0	22.53	22.36	22.35	23
5	QPSK	12	7	22.58	22.44	22.39	
5	QPSK	12	13	22.55	22.44	22.37	
5	QPSK	25	0	22.55	22.42	22.37	23
5	16QAM	1	0	22.68	22.61	22.47	
5	16QAM	1	12	22.77	22.65	22.57	
5	16QAM	1	24	22.78	22.51	22.52	22
5	16QAM	12	0	21.48	21.33	21.29	
5	16QAM	12	7	21.53	21.41	21.33	
5	16QAM	12	13	21.51	21.42	21.32	22
5	16QAM	25	0	21.48	21.37	21.29	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	23.54	23.41	23.35	24
3	QPSK	1	8	23.60	23.59	23.45	
3	QPSK	1	14	23.52	23.37	23.45	
3	QPSK	8	0	22.60	22.47	22.42	23
3	QPSK	8	4	22.61	22.48	22.44	
3	QPSK	8	7	22.58	22.45	22.40	
3	QPSK	15	0	22.62	22.49	22.44	23
3	16QAM	1	0	22.71	22.70	22.52	
3	16QAM	1	8	22.79	22.71	22.64	
3	16QAM	1	14	22.71	22.55	22.56	22
3	16QAM	8	0	21.58	21.49	21.35	
3	16QAM	8	4	21.61	21.49	21.44	
3	16QAM	8	7	21.56	21.46	21.39	22
3	16QAM	15	0	21.55	21.43	21.37	
Channel				19957	20175	20393	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	23.43	23.30	23.27	24
1.4	QPSK	1	3	23.41	23.44	23.24	
1.4	QPSK	1	5	23.45	23.42	23.29	
1.4	QPSK	3	0	23.60	23.52	23.43	
1.4	QPSK	3	1	23.61	23.48	23.44	
1.4	QPSK	3	3	23.60	23.32	23.44	
1.4	QPSK	6	0	22.63	22.51	22.48	23
1.4	16QAM	1	0	22.63	22.53	22.49	23
1.4	16QAM	1	3	22.65	22.55	22.51	
1.4	16QAM	1	5	22.64	22.53	22.49	
1.4	16QAM	3	0	22.53	22.43	22.38	
1.4	16QAM	3	1	22.55	22.46	22.40	
1.4	16QAM	3	3	22.53	22.42	22.38	
1.4	16QAM	6	0	21.63	21.51	21.46	22



<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)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	23.95	23.98	23.92	24
10	QPSK	1	25	23.87	23.93	23.85	
10	QPSK	1	49	23.92	23.90	23.89	
10	QPSK	25	0	22.96	22.99	22.91	23
10	QPSK	25	12	22.90	22.96	22.89	
10	QPSK	25	25	22.94	22.95	22.90	
10	QPSK	50	0	22.93	23.00	22.98	
10	16QAM	1	0	22.93	22.96	22.94	23
10	16QAM	1	25	22.89	22.93	22.91	
10	16QAM	1	49	22.88	22.89	22.81	
10	16QAM	25	0	21.82	21.88	21.97	22
10	16QAM	25	12	21.86	21.94	21.93	
10	16QAM	25	25	21.92	21.98	21.88	
10	16QAM	50	0	21.89	21.95	21.95	
Channel				20425	20525	20625	
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	23.79	23.91	23.89	24
5	QPSK	1	12	23.70	23.80	23.81	
5	QPSK	1	24	23.74	23.82	23.78	
5	QPSK	12	0	22.72	22.79	22.84	23
5	QPSK	12	7	22.78	22.89	22.89	
5	QPSK	12	13	22.78	22.90	22.87	
5	QPSK	25	0	22.76	22.84	22.86	
5	16QAM	1	0	22.84	22.87	22.91	23
5	16QAM	1	12	22.94	22.99	22.97	
5	16QAM	1	24	22.95	22.95	22.93	
5	16QAM	12	0	21.67	21.79	21.83	22
5	16QAM	12	7	21.73	21.89	21.87	
5	16QAM	12	13	21.74	21.90	21.87	
5	16QAM	25	0	21.69	21.83	21.83	
Channel				20415	20525	20635	
Frequency (MHz)				825.5	836.5	847.5	
3	QPSK	1	0	23.75	23.92	23.87	24
3	QPSK	1	8	23.85	23.74	23.87	
3	QPSK	1	14	23.64	23.78	23.72	
3	QPSK	8	0	22.69	22.80	22.81	23
3	QPSK	8	4	22.70	22.83	22.83	
3	QPSK	8	7	22.68	22.81	22.82	
3	QPSK	15	0	22.74	22.84	22.84	
3	16QAM	1	0	22.77	22.96	22.82	23
3	16QAM	1	8	22.87	22.99	22.92	
3	16QAM	1	14	22.80	22.90	22.84	
3	16QAM	8	0	21.66	21.86	21.84	22
3	16QAM	8	4	21.69	21.88	21.87	
3	16QAM	8	7	21.65	21.85	21.82	
3	16QAM	15	0	21.64	21.82	21.79	



Channel				20407	20525	20643	Tune-up limit (dBm)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	23.86	23.94	23.91	24
1.4	QPSK	1	3	23.65	23.74	23.75	
1.4	QPSK	1	5	23.69	23.86	23.76	
1.4	QPSK	3	0	23.83	23.76	23.93	
1.4	QPSK	3	1	23.61	23.76	23.77	
1.4	QPSK	3	3	23.85	23.86	23.91	
1.4	QPSK	6	0	22.86	22.95	22.95	23
1.4	16QAM	1	0	22.88	22.93	22.98	23
1.4	16QAM	1	3	22.85	22.99	22.95	
1.4	16QAM	1	5	22.86	22.92	22.98	
1.4	16QAM	3	0	22.73	22.90	22.87	
1.4	16QAM	3	1	22.76	22.90	22.90	
1.4	16QAM	3	3	22.73	22.90	22.88	
1.4	16QAM	6	0	21.82	21.99	21.97	22



<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)
Channel				20850	21100	21350	
Frequency (MHz)				2510	2535	2560	
20	QPSK	1	0	22.06	22.15	22.07	22.5
20	QPSK	1	49	21.99	22.09	21.94	
20	QPSK	1	99	22.03	22.04	21.89	
20	QPSK	50	0	21.13	21.20	21.18	22
20	QPSK	50	24	21.04	21.09	21.01	
20	QPSK	50	50	21.08	21.05	21.00	
20	QPSK	100	0	21.05	21.12	21.09	
20	16QAM	1	0	21.10	21.43	21.20	22
20	16QAM	1	49	21.18	21.39	21.31	
20	16QAM	1	99	21.39	21.45	21.44	
20	16QAM	50	0	20.03	20.07	20.00	21
20	16QAM	50	24	20.20	20.09	20.00	
20	16QAM	50	50	20.11	20.18	20.22	
20	16QAM	100	0	20.01	20.13	20.11	
Channel				20825	21100	21375	Tune-up limit (dBm)
Frequency (MHz)				2507.5	2535	2562.5	
15	QPSK	1	0	21.87	22.08	21.89	22.5
15	QPSK	1	37	21.98	22.10	22.11	
15	QPSK	1	74	22.02	22.00	22.03	
15	QPSK	36	0	21.04	21.04	21.05	22
15	QPSK	36	20	21.01	21.11	21.00	
15	QPSK	36	39	21.04	21.11	21.10	
15	QPSK	75	0	21.09	21.08	21.02	
15	16QAM	1	0	21.11	21.38	21.20	22
15	16QAM	1	37	21.16	21.38	21.32	
15	16QAM	1	74	21.24	21.25	21.39	
15	16QAM	36	0	20.09	20.04	20.08	21
15	16QAM	36	20	20.07	20.11	20.03	
15	16QAM	36	39	20.01	20.11	20.13	
15	16QAM	75	0	20.06	20.09	20.06	
Channel				20800	21100	21400	Tune-up limit (dBm)
Frequency (MHz)				2505	2535	2565	
10	QPSK	1	0	21.85	22.05	21.92	22.5
10	QPSK	1	25	21.92	22.06	21.98	
10	QPSK	1	49	21.94	21.99	22.01	
10	QPSK	25	0	21.03	21.05	21.04	22
10	QPSK	25	12	21.03	21.05	21.06	
10	QPSK	25	25	21.06	21.09	21.03	
10	QPSK	50	0	21.01	21.05	21.08	
10	16QAM	1	0	21.07	21.37	21.27	22
10	16QAM	1	25	21.12	21.38	21.34	
10	16QAM	1	49	21.16	21.28	21.37	
10	16QAM	25	0	20.08	20.05	20.08	21
10	16QAM	25	12	20.01	20.06	20.00	
10	16QAM	25	25	20.03	20.10	20.09	
10	16QAM	50	0	20.06	20.09	20.02	



Channel				20775	21100	21425	Tune-up limit (dBm)
Frequency (MHz)				2502.5	2535	2567.5	
5	QPSK	1	0	21.86	22.05	21.94	22.5
5	QPSK	1	12	21.99	22.11	22.06	
5	QPSK	1	24	21.93	22.03	22.01	
5	QPSK	12	0	21.06	21.04	21.07	22
5	QPSK	12	7	21.04	21.11	21.06	
5	QPSK	12	13	21.06	21.12	21.07	
5	QPSK	25	0	21.02	21.06	21.01	22
5	16QAM	1	0	21.06	21.35	21.30	
5	16QAM	1	12	21.16	21.42	21.41	
5	16QAM	1	24	21.10	21.30	21.34	21
5	16QAM	12	0	20.01	20.04	20.01	
5	16QAM	12	7	20.02	20.11	20.10	
5	16QAM	12	13	20.02	20.13	20.12	21
5	16QAM	25	0	20.01	20.06	20.02	



<LTE Band 12>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				23060	23095	23130	
Frequency (MHz)				704	707.5	711	
10	QPSK	1	0	23.63	23.73	23.63	24
10	QPSK	1	25	23.58	23.61	23.62	
10	QPSK	1	49	23.59	23.55	23.56	
10	QPSK	25	0	22.63	22.72	22.62	23
10	QPSK	25	12	22.59	22.64	22.55	
10	QPSK	25	25	22.57	22.67	22.53	
10	QPSK	50	0	22.60	22.69	22.56	
10	16QAM	1	0	22.93	22.86	22.90	23
10	16QAM	1	25	22.90	22.97	22.96	
10	16QAM	1	49	22.88	22.94	22.88	
10	16QAM	25	0	21.62	21.70	21.61	22
10	16QAM	25	12	21.67	21.90	21.67	
10	16QAM	25	25	21.63	21.75	21.57	
10	16QAM	50	0	21.65	21.73	21.60	
Channel				23035	23095	23155	
Frequency (MHz)				701.5	707.5	713.5	
5	QPSK	1	0	23.62	23.56	23.57	24
5	QPSK	1	12	23.70	23.68	23.69	
5	QPSK	1	24	23.59	23.60	23.59	
5	QPSK	12	0	22.56	22.61	22.62	23
5	QPSK	12	7	22.69	22.67	22.68	
5	QPSK	12	13	22.67	22.53	22.61	
5	QPSK	25	0	22.59	22.63	22.59	23
5	16QAM	1	0	22.95	22.87	22.87	
5	16QAM	1	12	22.99	23.00	22.93	
5	16QAM	1	24	22.88	22.93	22.85	
5	16QAM	12	0	21.61	21.68	21.66	22
5	16QAM	12	7	21.75	21.72	21.72	
5	16QAM	12	13	21.72	21.73	21.65	
5	16QAM	25	0	21.63	21.69	21.61	
Channel				23025	23095	23165	
Frequency (MHz)				700.5	707.5	714.5	
3	QPSK	1	0	23.67	23.61	23.62	24
3	QPSK	1	8	23.66	23.62	23.54	
3	QPSK	1	14	23.66	23.62	23.61	
3	QPSK	8	0	22.69	22.69	22.70	23
3	QPSK	8	4	22.73	22.71	22.70	
3	QPSK	8	7	22.73	22.69	22.68	
3	QPSK	15	0	22.73	22.70	22.73	
3	16QAM	1	0	22.97	22.91	22.83	23
3	16QAM	1	8	22.99	22.98	22.96	
3	16QAM	1	14	22.96	22.95	22.87	
3	16QAM	8	0	21.82	21.81	21.79	22
3	16QAM	8	4	21.87	21.84	21.80	
3	16QAM	8	7	21.82	21.80	21.76	
3	16QAM	15	0	21.75	21.75	21.74	



Channel				23017	23095	23173	Tune-up limit (dBm)
Frequency (MHz)				699.7	707.5	715.3	
1.4	QPSK	1	0	23.72	23.53	23.53	24
1.4	QPSK	1	3	23.56	23.52	23.51	
1.4	QPSK	1	5	23.59	23.55	23.54	
1.4	QPSK	3	0	23.64	23.69	23.70	
1.4	QPSK	3	1	23.60	23.71	23.71	
1.4	QPSK	3	3	23.62	23.70	23.70	
1.4	QPSK	6	0	22.75	22.72	22.72	23
1.4	16QAM	1	0	22.92	22.87	22.85	23
1.4	16QAM	1	3	22.95	22.90	22.81	
1.4	16QAM	1	5	22.90	22.88	22.78	
1.4	16QAM	3	0	22.76	22.72	22.66	
1.4	16QAM	3	1	22.77	22.72	22.68	
1.4	16QAM	3	3	22.74	22.71	22.65	
1.4	16QAM	6	0	21.87	21.83	21.80	22

<LTE Band 13>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				23230			
Frequency (MHz)				782			
10	QPSK	1	0		23.88		24
10	QPSK	1	25		23.85		
10	QPSK	1	49		23.81		
10	QPSK	25	0		22.90		23
10	QPSK	25	12		22.89		
10	QPSK	25	25		22.83		
10	QPSK	50	0		22.86		
10	16QAM	1	0		22.89		23
10	16QAM	1	25		22.94		
10	16QAM	1	49		22.92		
10	16QAM	25	0		21.81		22
10	16QAM	25	12		21.84		
10	16QAM	25	25		21.79		
10	16QAM	50	0		21.82		
Channel				23205	23230	23255	Tune-up limit (dBm)
Frequency (MHz)				779.5	782	784.5	
5	QPSK	1	0	23.84	23.86	23.80	24
5	QPSK	1	12	23.85	23.81	23.82	
5	QPSK	1	24	23.84	23.85	23.80	
5	QPSK	12	0	22.78	22.82	22.86	23
5	QPSK	12	7	22.91	22.89	22.87	
5	QPSK	12	13	22.92	22.86	22.85	
5	QPSK	25	0	22.86	22.86	22.87	
5	16QAM	1	0	22.91	22.92	22.85	23
5	16QAM	1	12	22.99	22.97	22.95	
5	16QAM	1	24	22.93	22.88	22.85	
5	16QAM	12	0	21.78	21.81	21.80	22
5	16QAM	12	7	21.90	21.86	21.82	
5	16QAM	12	13	21.90	21.82	21.78	
5	16QAM	12	7	21.90	21.86	21.82	
5	16QAM	25	0	21.83	21.80	21.80	



<LTE Band 17>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				23780	23790	23800	
Frequency (MHz)				709	710	711	
10	QPSK	1	0	23.67	23.68	23.66	24
10	QPSK	1	25	23.65	23.66	23.65	
10	QPSK	1	49	23.66	23.65	23.60	
10	QPSK	25	0	22.63	22.71	22.67	23
10	QPSK	25	12	22.61	22.61	22.66	
10	QPSK	25	25	22.60	22.62	22.55	
10	QPSK	50	0	22.69	22.70	22.60	
10	16QAM	1	0	22.87	22.87	22.93	23
10	16QAM	1	25	22.98	22.99	22.98	
10	16QAM	1	49	22.92	22.90	22.92	
10	16QAM	25	0	21.70	21.68	21.66	22
10	16QAM	25	12	21.74	21.72	21.71	
10	16QAM	25	25	21.75	21.69	21.59	
10	16QAM	50	0	21.74	21.69	21.64	
Channel				23755	23790	23825	Tune-up limit (dBm)
Frequency (MHz)				706.5	710	713.5	
5	QPSK	1	0	23.59	23.61	23.60	24
5	QPSK	1	12	23.66	23.61	23.59	
5	QPSK	1	24	23.64	23.63	23.60	
5	QPSK	12	0	22.67	22.62	22.49	23
5	QPSK	12	7	22.71	22.70	22.72	
5	QPSK	12	13	22.72	22.73	22.64	
5	QPSK	25	0	22.68	22.67	22.64	
5	16QAM	1	0	22.99	22.93	22.89	23
5	16QAM	1	12	22.95	22.94	22.94	
5	16QAM	1	24	22.97	22.91	22.86	
5	16QAM	12	0	21.75	21.71	21.66	22
5	16QAM	12	7	21.79	21.78	21.76	
5	16QAM	12	13	21.79	21.80	21.68	
5	16QAM	12	13	21.79	21.80	21.68	
5	16QAM	25	0	21.73	21.72	21.65	



<Reduced Power Mode>

<LTE Band 2>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	22.29	22.32	22.31	22.5
20	QPSK	1	49	22.24	22.21	22.27	
20	QPSK	1	99	22.17	22.18	22.30	
20	QPSK	50	0	22.38	22.41	22.40	22.5
20	QPSK	50	24	22.27	22.27	22.32	
20	QPSK	50	50	22.23	22.16	22.26	
20	QPSK	100	0	22.30	22.25	22.36	22.5
20	16QAM	1	0	22.41	22.48	22.50	
20	16QAM	1	49	22.41	22.36	22.44	
20	16QAM	1	99	22.44	22.49	22.48	22.5
20	16QAM	50	0	21.61	21.62	21.65	
20	16QAM	50	24	21.62	21.58	21.56	
20	16QAM	50	50	21.54	21.51	21.58	22.5
20	16QAM	100	0	21.54	21.55	21.56	
Channel				18675	18900	19125	
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	22.23	22.26	22.27	22.5
15	QPSK	1	37	22.26	22.23	22.28	
15	QPSK	1	74	22.17	22.16	22.29	
15	QPSK	36	0	22.32	22.32	22.35	22.5
15	QPSK	36	20	22.29	22.28	22.32	
15	QPSK	36	39	22.23	22.18	22.25	
15	QPSK	75	0	22.28	22.26	22.31	22.5
15	16QAM	1	0	22.47	22.51	22.57	
15	16QAM	1	37	22.58	22.47	22.51	
15	16QAM	1	74	22.44	22.45	22.45	22.5
15	16QAM	36	0	21.56	21.52	21.51	
15	16QAM	36	20	21.54	21.53	21.53	
15	16QAM	36	39	21.57	21.51	21.58	22.5
15	16QAM	75	0	21.52	21.56	21.52	
Channel				18650	18900	19150	
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	22.18	22.21	22.26	22.5
10	QPSK	1	25	22.22	22.21	22.25	
10	QPSK	1	49	22.19	22.16	22.34	
10	QPSK	25	0	22.23	22.26	22.31	22.5
10	QPSK	25	12	22.23	22.22	22.31	
10	QPSK	25	25	22.21	22.16	22.23	
10	QPSK	50	0	22.25	22.24	22.30	22.5
10	16QAM	1	0	22.45	22.46	22.49	
10	16QAM	1	25	22.50	22.47	22.48	
10	16QAM	1	49	22.47	22.45	22.49	22.5
10	16QAM	25	0	21.56	21.58	21.56	
10	16QAM	25	12	21.57	21.55	21.53	
10	16QAM	25	25	21.55	21.56	21.52	22.5
10	16QAM	50	0	21.52	21.55	21.51	



Channel				18625	18900	19175	Tune-up limit (dBm)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	22.16	22.20	22.26	22.5
5	QPSK	1	12	22.25	22.28	22.38	
5	QPSK	1	24	22.17	22.17	22.32	
5	QPSK	12	0	22.21	22.24	22.36	22.5
5	QPSK	12	7	22.24	22.25	22.37	
5	QPSK	12	13	22.23	22.22	22.31	
5	QPSK	25	0	22.22	22.23	22.34	
5	16QAM	1	0	22.48	22.44	22.45	22.5
5	16QAM	1	12	22.48	22.49	22.50	
5	16QAM	1	24	22.45	22.43	22.49	
5	16QAM	12	0	21.55	21.52	21.64	22.5
5	16QAM	12	7	21.58	21.59	21.58	
5	16QAM	12	13	21.56	21.56	21.52	
5	16QAM	25	0	21.51	21.52	21.55	
Channel				18615	18900	19185	Tune-up limit (dBm)
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	22.19	22.22	22.36	22.5
3	QPSK	1	8	22.29	22.32	22.46	
3	QPSK	1	14	22.33	22.20	22.36	
3	QPSK	8	0	22.23	22.26	22.40	22.5
3	QPSK	8	4	22.26	22.28	22.42	
3	QPSK	8	7	22.24	22.25	22.40	
3	QPSK	15	0	22.26	22.29	22.45	
3	16QAM	1	0	22.42	22.45	22.49	22.5
3	16QAM	1	8	22.48	22.48	22.50	
3	16QAM	1	14	22.42	22.41	22.49	
3	16QAM	8	0	21.51	21.54	21.61	22.5
3	16QAM	8	4	21.54	21.57	21.56	
3	16QAM	8	7	21.55	21.53	21.59	
3	16QAM	15	0	21.52	21.50	21.55	
Channel				18607	18900	19193	Tune-up limit (dBm)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	22.10	22.15	22.25	22.5
1.4	QPSK	1	3	22.08	22.12	22.24	
1.4	QPSK	1	5	22.12	22.16	22.29	
1.4	QPSK	3	0	22.26	22.30	22.43	
1.4	QPSK	3	1	22.20	22.31	22.46	
1.4	QPSK	3	3	22.26	22.30	22.44	
1.4	QPSK	6	0	22.28	22.33	22.46	22.5
1.4	16QAM	1	0	22.35	22.39	22.46	22.5
1.4	16QAM	1	3	22.37	22.41	22.44	
1.4	16QAM	1	5	22.36	22.38	22.43	
1.4	16QAM	3	0	22.22	22.26	22.33	
1.4	16QAM	3	1	22.24	22.28	22.35	
1.4	16QAM	3	3	22.22	22.25	22.32	
1.4	16QAM	6	0	21.52	21.56	21.57	



<LTE Band 4>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	22.64	22.71	22.65	23
20	QPSK	1	49	22.55	22.44	22.37	
20	QPSK	1	99	22.42	22.28	22.34	
20	QPSK	50	0	22.67	22.68	22.53	23
20	QPSK	50	24	22.58	22.48	22.46	
20	QPSK	50	50	22.58	22.45	22.28	
20	QPSK	100	0	22.62	22.63	22.40	23
20	16QAM	1	0	22.59	22.60	22.66	
20	16QAM	1	49	22.78	22.64	22.47	
20	16QAM	1	99	22.66	22.40	22.51	23
20	16QAM	50	0	22.33	22.13	22.14	
20	16QAM	50	24	22.26	22.15	22.07	
20	16QAM	50	50	22.25	22.20	22.02	23
20	16QAM	100	0	22.29	22.11	22.01	
Channel				20025	20175	20325	
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	22.61	22.54	22.41	23
15	QPSK	1	37	22.57	22.46	22.48	
15	QPSK	1	74	22.47	22.31	22.34	
15	QPSK	36	0	22.64	22.48	22.47	23
15	QPSK	36	20	22.59	22.49	22.50	
15	QPSK	36	39	22.57	22.44	22.35	
15	QPSK	75	0	22.60	22.46	22.42	23
15	16QAM	1	0	22.82	22.78	22.53	
15	16QAM	1	37	22.80	22.67	22.52	
15	16QAM	1	74	22.71	22.44	22.52	23
15	16QAM	36	0	22.30	22.14	22.10	
15	16QAM	36	20	22.26	22.15	22.06	
15	16QAM	36	39	22.23	22.09	22.02	23
15	16QAM	75	0	22.29	22.11	22.05	
Channel				20000	20175	20350	
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	22.58	22.46	22.37	23
10	QPSK	1	25	22.55	22.42	22.35	
10	QPSK	1	49	22.50	22.35	22.34	
10	QPSK	25	0	22.59	22.39	22.44	23
10	QPSK	25	12	22.57	22.44	22.39	
10	QPSK	25	25	22.52	22.43	22.32	
10	QPSK	50	0	22.57	22.43	22.40	23
10	16QAM	1	0	22.78	22.71	22.48	
10	16QAM	1	25	22.77	22.66	22.51	
10	16QAM	1	49	22.76	22.52	22.55	23
10	16QAM	25	0	22.25	22.06	22.06	
10	16QAM	25	12	22.18	22.11	22.01	
10	16QAM	25	25	22.18	22.09	22.02	23
10	16QAM	50	0	22.20	22.10	22.03	



Channel				19975	20175	20375	Tune-up limit (dBm)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	22.70	22.41	22.36	23
5	QPSK	1	12	22.66	22.48	22.43	
5	QPSK	1	24	22.50	22.37	22.35	
5	QPSK	12	0	22.63	22.37	22.36	23
5	QPSK	12	7	22.55	22.46	22.41	
5	QPSK	12	13	22.58	22.47	22.39	
5	QPSK	25	0	22.47	22.43	22.39	
5	16QAM	1	0	22.79	22.64	22.49	23
5	16QAM	1	12	22.71	22.67	22.58	
5	16QAM	1	24	22.71	22.54	22.53	
5	16QAM	12	0	22.24	22.05	22.01	23
5	16QAM	12	7	22.19	22.13	22.06	
5	16QAM	12	13	22.23	22.13	22.03	
5	16QAM	25	0	22.20	22.08	22.01	
Channel				19965	20175	20385	Tune-up limit (dBm)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	22.68	22.46	22.39	23
3	QPSK	1	8	22.59	22.53	22.57	
3	QPSK	1	14	22.56	22.41	22.38	
3	QPSK	8	0	22.65	22.49	22.44	23
3	QPSK	8	4	22.64	22.50	22.56	
3	QPSK	8	7	22.62	22.47	22.43	
3	QPSK	15	0	22.66	22.51	22.54	
3	16QAM	1	0	22.82	22.65	22.54	23
3	16QAM	1	8	22.74	22.70	22.63	
3	16QAM	1	14	22.74	22.58	22.57	
3	16QAM	8	0	22.35	22.20	22.13	23
3	16QAM	8	4	22.34	22.22	22.15	
3	16QAM	8	7	22.29	22.17	22.12	
3	16QAM	15	0	22.29	22.15	22.10	
Channel				19957	20175	20393	Tune-up limit (dBm)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	22.51	22.34	22.50	23
1.4	QPSK	1	3	22.46	22.33	22.27	
1.4	QPSK	1	5	22.50	22.36	22.34	
1.4	QPSK	3	0	22.68	22.51	22.48	
1.4	QPSK	3	1	22.67	22.53	22.50	
1.4	QPSK	3	3	22.66	22.52	22.49	
1.4	QPSK	6	0	22.67	22.53	22.51	23
1.4	16QAM	1	0	22.68	22.56	22.52	23
1.4	16QAM	1	3	22.65	22.58	22.54	
1.4	16QAM	1	5	22.67	22.53	22.53	
1.4	16QAM	3	0	22.61	22.45	22.40	
1.4	16QAM	3	1	22.60	22.47	22.44	
1.4	16QAM	3	3	22.56	22.45	22.41	
1.4	16QAM	6	0	22.21	22.23	22.09	

**<WLAN Conducted Power>****General Note:**

1. 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.
2. 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).
3. 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.
4. 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)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
2.4GHz WLAN	802.11b	CH 1	2412	1Mbps	16.68	17.00	100.00
		CH 6	2437		16.65	17.00	
		CH 11	2462		16.99	17.00	
	802.11g	CH 1	2412	6Mbps	14.60	15.00	97.20
		CH 6	2437		14.57	15.00	
		CH 11	2462		14.85	15.00	
	802.11n-HT20	CH 1	2412	MCS0	13.42	13.50	97.04
		CH 6	2437		13.48	13.50	
		CH 11	2462		13.88	14.00	
	802.11n-HT40	CH 3	2422	MCS0	11.97	12.00	94.72
		CH 6	2437		12.99	13.00	
		CH 9	2452		11.91	12.00	

**<5GHz WLAN >**

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.2GHz WLAN	802.11a	CH 36	5180	6Mbps	14.90	15.00	97.20
		CH 40	5200		14.87	15.00	
		CH 44	5220		14.82	15.00	
		CH 48	5240		14.77	15.00	
	802.11n-HT20	CH 36	5180	MCS0	14.98	15.00	97.02
		CH 40	5200		14.72	15.00	
		CH 44	5220		14.65	15.00	
		CH 48	5240		14.71	15.00	
	802.11n-HT40	CH 38	5190	MCS0	12.24	12.50	94.20
		CH 46	5230		12.09	12.50	

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.3GHz WLAN	802.11a	CH 52	5260	6Mbps	14.51	15.00	97.20
		CH 56	5280		14.80	15.00	
		CH 60	5300		14.86	15.00	
		CH 64	5320		14.93	15.00	
	802.11n-HT20	CH 52	5260	MCS0	14.90	15.00	97.02
		CH 56	5280		14.54	15.00	
		CH 60	5300		14.85	15.00	
		CH 64	5320		14.93	15.00	
	802.11n-HT40	CH 54	5270	MCS0	12.14	12.50	94.20
		CH 62	5310		12.19	12.50	



	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.5GHz WLAN	802.11a	CH 100	5500	6Mbps	14.95	15.00	97.20
		CH 116	5580		14.66	15.00	
		CH 132	5660		14.68	15.00	
		CH 140	5700		14.85	15.00	
	802.11n-HT20	CH 100	5500	MCS0	14.68	15.00	97.02
		CH 116	5580		14.75	15.00	
		CH 132	5660		14.70	15.00	
		CH 140	5700		14.88	15.00	
	802.11n-HT40	CH 102	5510	MCS0	12.30	12.50	94.20
		CH 110	5550		12.36	12.50	
		CH 134	5670		12.48	12.50	

	Mode	Channel	Frequency (MHz)	Data Rate	Average power (dBm)	Tune-Up Limit	Duty Cycle %
5.8GHz WLAN	802.11a	CH 149	5745	MCS0	14.84	15.00	97.20
		CH 157	5785		14.83	15.00	
		CH 165	5825		14.63	15.00	
	802.11n-HT20	CH 149	5745	MCS0	14.64	15.00	97.02
		CH 157	5785		14.55	15.00	
		CH 165	5825		14.48	14.50	
	802.11n-HT40	CH 151	5755	MCS0	11.17	11.50	94.20
		CH 159	5795		11.27	11.50	

### 13. Bluetooth Exclusions Applied

Mode Band	Average power(dBm)	
	Bluetooth v3.0+EDR	Bluetooth v4.1+LE
2.4GHz Bluetooth	5.75	-1.25

**Note:**

- Per KDB 447498 D01v06, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:  

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$$
 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
  - f(GHz) is the RF channel transmit frequency in GHz
  - Power and distance are rounded to the nearest mW and mm before calculation
  - The result is rounded to one decimal place for comparison

Bluetooth Max Power (dBm)	Separation Distance (mm)	Frequency (GHz)	exclusion thresholds
5.75	< 5	2.48	1.26

**Note:**

Per KDB 447498 D01v06, when the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion. The test exclusion threshold is 1.26 which is ≤ 3, SAR testing is not required.

### 14. RF Exposure Conditions

Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	≤ 25mm	≤ 25mm	> 25mm	≤ 25mm	≤ 25mm	≤ 25mm
BT&WLAN	≤ 25mm	≤ 25mm	≤ 25mm	> 25mm	≤ 25mm	> 25mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	Yes	Yes	No	Yes	Yes	Yes
BT&WLAN	Yes	Yes	Yes	No	Yes	No

**General Note:**

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



## **15. SAR Test Results**

### **General Note:**

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
  - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
  - b. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
  - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)\*Tune-up Scaling Factor
  - d. For WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)\* Duty Cycle scaling factor \* Tune-up scaling factor
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. When hotspot mode is enabled, power reduction will be activated to limit the maximum power of UMTS B2 / B4 and LTE B2 / B4.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is  $\leq 1.2$  W/kg, SAR testing with a headset connected to the handset is not required.
5. This product have two battery manufactures, per KDB 648474 D04v01r03, for additional battery option need repeat SAR testing at the worst position for each wireless mode and each frequency band from Head / Body-worn and hotspot position.
6. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is  $\geq 0.8$ W/kg.
7. The FCC ID: PY7-PM0920 and FCC ID: PY7-PM0922 is similar device, in this report all the WLAN SAR test results are referred to PY7-PM0920, Sporton Report No: FA5O0716 and spot checks were performed on PY7-PM0922 to ensure that the SAR measurements for both devices are the same and the spot check results will compare with original results to found worse case to perform simultaneous transmission analysis.

### **GSM Note:**

1. Per KDB 941225 D01v03r01, considering the possibility of e.g. 3rd party VoIP operation for Head and body-worn SAR test reduction for GSM and GPRS and 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 EUT was set in GPRS (4Tx slots) for GSM850/GSM1900.
2. Per KDB 941225 D01v03r01, for Hotspot SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance, for modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested, therefore, the EUT was set in GPRS (4Tx slots) for GSM850/GSM1900.

### **UMTS Note:**

1. Per KDB 941225 D01v03r01, SAR for Head / Hotspot / Body-worn exposure 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. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is  $\leq \frac{1}{4}$  dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is  $\leq 1.2$  W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

**LTE Note:**

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are  $\leq 0.8$  W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is  $> 1.45$  W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, 16QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, Smaller bandwidth output power for each RB allocation configuration is  $>$  not  $\frac{1}{2}$  dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is  $\leq 1.45$  W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B4 / B5 / B12 / B13 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 17 SAR test was covered by Band 12; according to 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.

**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. Per KDB 248227 D01v02r02, for U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is  $\leq 1.2$  W/kg, SAR is not required for U-NII-1 band.
3. 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.
4. 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.
5. During SAR testing the WLAN transmission was verified using a spectrum analyzer.



15.1 Head SAR

<GSM SAR>

Plot No.	Band	Modulation	Mode	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	GSM850	GMSK	GPRS (4 Tx slots)	Right Cheek	0mm	Battery1	128	824.2	27.96	28.00	1.009	-0.01	0.256	0.258	0.190	0.192
	GSM850	GMSK	GPRS (4 Tx slots)	Right Tilted	0mm	Battery1	128	824.2	27.96	28.00	1.009	0.03	0.137	0.138	0.105	0.106
	GSM850	GMSK	GPRS (4 Tx slots)	Left Cheek	0mm	Battery1	128	824.2	27.96	28.00	1.009	0.02	0.301	0.304	0.227	0.229
	GSM850	GMSK	GPRS (4 Tx slots)	Left Cheek	0mm	Battery1	189	836.4	27.90	28.00	1.023	0.03	0.354	0.362	0.266	0.272
01	GSM850	GMSK	GPRS (4 Tx slots)	Left Cheek	0mm	Battery1	251	848.8	27.85	28.00	1.035	0.03	0.460	0.476	0.346	0.358
	GSM850	GMSK	GPRS (4 Tx slots)	Left Tilted	0mm	Battery1	128	824.2	27.96	28.00	1.009	0.09	0.160	0.161	0.126	0.127
	GSM1900	GMSK	GPRS (4 Tx slots)	Right Cheek	0mm	Battery1	810	1909.8	25.00	25.00	1.000	0.1	0.175	0.175	0.109	0.109
	GSM1900	GMSK	GPRS (4 Tx slots)	Right Tilted	0mm	Battery1	810	1909.8	25.00	25.00	1.000	0.1	0.050	0.050	0.024	0.024
02	GSM1900	GMSK	GPRS (4 Tx slots)	Left Cheek	0mm	Battery1	810	1909.8	25.00	25.00	1.000	0.13	0.228	0.228	0.138	0.138
	GSM1900	GMSK	GPRS (4 Tx slots)	Left Cheek	0mm	Battery1	512	1850.2	24.66	25.00	1.081	0.15	0.170	0.184	0.106	0.115
	GSM1900	GMSK	GPRS (4 Tx slots)	Left Cheek	0mm	Battery1	661	1880	24.78	25.00	1.052	0.16	0.197	0.207	0.121	0.127
	GSM1900	GMSK	GPRS (4 Tx slots)	Left Tilted	0mm	Battery1	810	1909.8	25.00	25.00	1.000	-0.17	0.068	0.068	0.038	0.038

<WCDMA SAR>

Plot No.	Band	Modulation	Mode	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WCDMA II	QPSK	RMC 12.2Kbps	Right Cheek	0mm	Battery1	9538	1907.6	23.59	24.00	1.099	0.13	0.233	0.256	0.147	0.162
	WCDMA II	QPSK	RMC 12.2Kbps	Right Tilted	0mm	Battery1	9538	1907.6	23.59	24.00	1.099	-0.11	0.063	0.069	0.036	0.040
03	WCDMA II	QPSK	RMC 12.2Kbps	Left Cheek	0mm	Battery1	9538	1907.6	23.59	24.00	1.099	0.09	0.320	0.352	0.199	0.219
	WCDMA II	QPSK	RMC 12.2Kbps	Left Cheek	0mm	Battery1	9262	1852.4	23.38	24.00	1.153	0.17	0.281	0.324	0.178	0.205
	WCDMA II	QPSK	RMC 12.2Kbps	Left Cheek	0mm	Battery1	9400	1880	23.58	24.00	1.102	0.1	0.310	0.341	0.195	0.215
	WCDMA II	QPSK	RMC 12.2Kbps	Left Tilted	0mm	Battery1	9538	1907.6	23.59	24.00	1.099	0.16	0.105	0.115	0.060	0.066
	WCDMA IV	QPSK	RMC 12.2Kbps	Right Cheek	0mm	Battery1	1413	1732.6	23.83	24.00	1.040	-0.09	0.287	0.298	0.191	0.199
	WCDMA IV	QPSK	RMC 12.2Kbps	Right Cheek	0mm	Battery1	1312	1712.4	23.80	24.00	1.047	-0.03	0.289	0.303	0.195	0.204
04	WCDMA IV	QPSK	RMC 12.2Kbps	Right Cheek	0mm	Battery1	1513	1752.6	23.79	24.00	1.050	-0.02	0.302	0.317	0.201	0.211
	WCDMA IV	QPSK	RMC 12.2Kbps	Right Tilted	0mm	Battery1	1413	1732.6	23.83	24.00	1.040	-0.09	0.081	0.084	0.049	0.051
	WCDMA IV	QPSK	RMC 12.2Kbps	Left Cheek	0mm	Battery1	1413	1732.6	23.83	24.00	1.040	0.03	0.240	0.250	0.159	0.165
	WCDMA IV	QPSK	RMC 12.2Kbps	Left Tilted	0mm	Battery1	1413	1732.6	23.83	24.00	1.040	0.03	0.102	0.106	0.066	0.069
	WCDMA V	QPSK	RMC 12.2Kbps	Right Cheek	0mm	Battery1	4132	826.4	23.49	24.00	1.125	-0.03	0.261	0.294	0.201	0.226
	WCDMA V	QPSK	RMC 12.2Kbps	Right Tilted	0mm	Battery1	4132	826.4	23.49	24.00	1.125	-0.16	0.146	0.164	0.115	0.129
	WCDMA V	QPSK	RMC 12.2Kbps	Left Cheek	0mm	Battery1	4132	826.4	23.49	24.00	1.125	0.05	0.282	0.317	0.215	0.242
	WCDMA V	QPSK	RMC 12.2Kbps	Left Cheek	0mm	Battery1	4182	836.4	23.42	24.00	1.143	0.04	0.344	0.393	0.261	0.298
05	WCDMA V	QPSK	RMC 12.2Kbps	Left Cheek	0mm	Battery1	4233	846.6	23.40	24.00	1.148	0.15	0.434	0.498	0.329	0.378
	WCDMA V	QPSK	RMC 12.2Kbps	Left Tilted	0mm	Battery1	4132	826.4	23.49	24.00	1.125	-0.06	0.138	0.155	0.109	0.123



<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
06	LTE Band 2	20M	QPSK	1	0	Right Cheek	0mm	Battery1	18900	1880	23.64	24.00	1.086	-0.03	0.294	0.319	0.192	0.209
	LTE Band 2	20M	QPSK	1	0	Right Cheek	0mm	Battery1	18700	1860	23.59	24.00	1.099	-0.03	0.287	0.315	0.184	0.202
	LTE Band 2	20M	QPSK	1	0	Right Cheek	0mm	Battery1	19100	1900	23.62	24.00	1.091	0.02	0.259	0.283	0.167	0.182
	LTE Band 2	20M	QPSK	50	0	Right Cheek	0mm	Battery1	18900	1880	22.73	23.00	1.064	-0.01	0.235	0.250	0.153	0.163
	LTE Band 2	20M	QPSK	1	0	Right Tilted	0mm	Battery1	18900	1880	23.64	24.00	1.086	0.02	0.111	0.121	0.067	0.073
	LTE Band 2	20M	QPSK	50	0	Right Tilted	0mm	Battery1	18900	1880	22.73	23.00	1.064	-0.04	0.091	0.097	0.054	0.057
	LTE Band 2	20M	QPSK	1	0	Left Cheek	0mm	Battery1	18900	1880	23.64	24.00	1.086	-0.01	0.211	0.229	0.135	0.147
	LTE Band 2	20M	QPSK	50	0	Left Cheek	0mm	Battery1	18900	1880	22.73	23.00	1.064	0.01	0.174	0.185	0.111	0.118
	LTE Band 2	20M	QPSK	1	0	Left Tilted	0mm	Battery1	18900	1880	23.64	24.00	1.086	-0.09	0.135	0.147	0.082	0.089
	LTE Band 2	20M	QPSK	50	0	Left Tilted	0mm	Battery1	18900	1880	22.73	23.00	1.064	0.05	0.109	0.116	0.066	0.070
07	LTE Band 4	20M	QPSK	1	0	Right Cheek	0mm	Battery1	20175	1732.5	23.63	24.00	1.089	0.14	0.274	0.298	0.186	0.203
	LTE Band 4	20M	QPSK	50	0	Right Cheek	0mm	Battery1	20175	1732.5	22.59	23.00	1.099	0.1	0.218	0.240	0.148	0.163
	LTE Band 4	20M	QPSK	1	0	Right Tilted	0mm	Battery1	20175	1732.5	23.63	24.00	1.089	0.06	0.073	0.079	0.046	0.050
	LTE Band 4	20M	QPSK	50	0	Right Tilted	0mm	Battery1	20175	1732.5	22.59	23.00	1.099	0.1	0.218	0.240	0.148	0.163
	LTE Band 4	20M	QPSK	1	0	Left Cheek	0mm	Battery1	20175	1732.5	23.63	24.00	1.089	0.04	0.209	0.228	0.137	0.149
	LTE Band 4	20M	QPSK	50	0	Left Cheek	0mm	Battery1	20175	1732.5	22.59	23.00	1.099	0.01	0.164	0.180	0.108	0.119
	LTE Band 4	20M	QPSK	1	0	Left Tilted	0mm	Battery1	20175	1732.5	23.63	24.00	1.089	0.02	0.089	0.097	0.059	0.064
	LTE Band 4	20M	QPSK	50	0	Left Tilted	0mm	Battery1	20175	1732.5	22.59	23.00	1.099	0.18	0.068	0.075	0.045	0.049
	LTE Band 5	10M	QPSK	1	0	Right Cheek	0mm	Battery1	20525	836.5	23.98	24.00	1.005	-0.03	0.362	0.364	0.277	0.278
	LTE Band 5	10M	QPSK	25	0	Right Cheek	0mm	Battery1	20525	836.5	22.99	23.00	1.002	0.03	0.303	0.304	0.231	0.232
	LTE Band 5	10M	QPSK	1	0	Right Tilted	0mm	Battery1	20525	836.5	23.98	24.00	1.005	-0.03	0.225	0.226	0.175	0.176
	LTE Band 5	10M	QPSK	25	0	Right Tilted	0mm	Battery1	20525	836.5	22.99	23.00	1.002	0.09	0.188	0.188	0.146	0.146
08	LTE Band 5	10M	QPSK	1	0	Left Cheek	0mm	Battery1	20525	836.5	23.98	24.00	1.005	-0.07	0.435	0.437	0.337	0.339
	LTE Band 5	10M	QPSK	25	0	Left Cheek	0mm	Battery1	20525	836.5	22.99	23.00	1.002	-0.02	0.362	0.363	0.281	0.282
	LTE Band 5	10M	QPSK	1	0	Left Tilted	0mm	Battery1	20525	836.5	23.98	24.00	1.005	-0.01	0.206	0.207	0.162	0.163
	LTE Band 5	10M	QPSK	25	0	Left Tilted	0mm	Battery1	20525	836.5	22.99	23.00	1.002	0.02	0.167	0.167	0.132	0.132
	LTE Band 7	20M	QPSK	1	0	Right Cheek	0mm	Battery1	21100	2535	22.15	22.50	1.084	-0.03	0.152	0.165	0.083	0.090
	LTE Band 7	20M	QPSK	50	0	Right Cheek	0mm	Battery1	21100	2535	21.20	22.00	1.202	0.05	0.140	0.168	0.075	0.090
	LTE Band 7	20M	QPSK	1	0	Right Tilted	0mm	Battery1	21100	2535	22.15	22.50	1.084	-0.12	0.123	0.133	0.063	0.068
	LTE Band 7	20M	QPSK	50	0	Right Tilted	0mm	Battery1	21100	2535	21.20	22.00	1.202	-0.08	0.120	0.144	0.063	0.076
	LTE Band 7	20M	QPSK	1	0	Left Cheek	0mm	Battery1	21100	2535	22.15	22.50	1.084	0.14	0.301	0.326	0.148	0.160
	LTE Band 7	20M	QPSK	1	0	Left Cheek	0mm	Battery1	20850	2510	22.06	22.50	1.107	0.1	0.276	0.305	0.137	0.152
09	LTE Band 7	20M	QPSK	1	0	Left Cheek	0mm	Battery1	21350	2560	22.07	22.50	1.104	0.12	0.408	0.450	0.201	0.222
	LTE Band 7	20M	QPSK	50	0	Left Cheek	0mm	Battery1	21100	2535	21.20	22.00	1.202	0.07	0.281	0.338	0.138	0.166
	LTE Band 7	20M	QPSK	1	0	Left Tilted	0mm	Battery1	21100	2535	22.15	22.50	1.084	-0.04	0.067	0.073	0.035	0.038
	LTE Band 7	20M	QPSK	50	0	Left Tilted	0mm	Battery1	21100	2535	21.20	22.00	1.202	0.09	0.063	0.076	0.033	0.040
	LTE Band 12	10M	QPSK	1	0	Right Cheek	0mm	Battery1	23095	707.5	23.73	24.00	1.064	-0.01	0.116	0.123	0.093	0.099
	LTE Band 12	10M	QPSK	25	0	Right Cheek	0mm	Battery1	23095	707.5	22.72	23.00	1.067	0.06	0.104	0.111	0.083	0.089
	LTE Band 12	10M	QPSK	1	0	Right Tilted	0mm	Battery1	23095	707.5	23.73	24.00	1.064	0.07	0.052	0.055	0.033	0.035
	LTE Band 12	10M	QPSK	25	0	Right Tilted	0mm	Battery1	23095	707.5	22.72	23.00	1.067	0.03	0.048	0.051	0.030	0.032
10	LTE Band 12	10M	QPSK	1	0	Left Cheek	0mm	Battery1	23095	707.5	23.73	24.00	1.064	0.07	0.135	0.144	0.107	0.114
	LTE Band 12	10M	QPSK	25	0	Left Cheek	0mm	Battery1	23095	707.5	22.72	23.00	1.067	0.03	0.122	0.130	0.096	0.102
	LTE Band 12	10M	QPSK	1	0	Left Tilted	0mm	Battery1	23095	707.5	23.73	24.00	1.064	-0.04	0.052	0.055	0.035	0.037
	LTE Band 12	10M	QPSK	25	0	Left Tilted	0mm	Battery1	23095	707.5	22.72	23.00	1.067	0.06	0.048	0.051	0.032	0.034
	LTE Band 13	10M	QPSK	1	0	Right Cheek	0mm	Battery1	23230	782	23.88	24.00	1.028	0.05	0.299	0.307	0.234	0.241
	LTE Band 13	10M	QPSK	25	0	Right Cheek	0mm	Battery1	23230	782	22.90	23.00	1.023	0.03	0.246	0.252	0.193	0.197
	LTE Band 13	10M	QPSK	1	0	Right Tilted	0mm	Battery1	23230	782	23.88	24.00	1.028	0.09	0.176	0.181	0.142	0.146
	LTE Band 13	10M	QPSK	25	0	Right Tilted	0mm	Battery1	23230	782	22.90	23.00	1.023	0.03	0.145	0.148	0.117	0.120
11	LTE Band 13	10M	QPSK	1	0	Left Cheek	0mm	Battery1	23230	782	23.88	24.00	1.028	0.03	0.316	0.325	0.246	0.253
	LTE Band 13	10M	QPSK	25	0	Left Cheek	0mm	Battery1	23230	782	22.90	23.00	1.023	0.03	0.262	0.268	0.203	0.208
	LTE Band 13	10M	QPSK	1	0	Left Tilted	0mm	Battery1	23230	782	23.88	24.00	1.028	0.05	0.193	0.198	0.153	0.157
	LTE Band 13	10M	QPSK	25	0	Left Tilted	0mm	Battery1	23230	782	22.90	23.00	1.023	0.03	0.160	0.164	0.126	0.129



<WLAN SAR>

Plot No.	Band	Modulation	Mode	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Right Cheek	0mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	0.14	0.210	0.210	0.103	0.103	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Right Tilted	0mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	-0.16	0.170	0.170	0.082	0.082	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Left Cheek	0mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	-0.06	0.304	0.305	0.128	0.128	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Left Cheek	0mm	Battery1	1	2412	16.68	17.00	1.076	100	1.000	0.09	0.265	0.285	0.114	0.123	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Left Cheek	0mm	Battery1	6	2437	16.65	17.00	1.084	100	1.000	-0.19	0.259	0.281	0.117	0.127	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Left Cheek	0mm	Battery2	11	2462	16.99	17.00	1.002	100	1.000	0.16	0.279	0.280	0.117	0.117	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Left Tilted	0mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	0.06	0.225	0.226	0.103	0.103	
Spot Check																			
12	WLAN2.4GHz	DSSS	802.11b 1Mbps	Left Cheek	0mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	0.16	0.329	0.330	0.128	0.128	
	WLAN5GHz	OFDM	802.11a 6Mbps	Right Cheek	0mm	Battery1	64	5320	14.93	15.00	1.015	97.2	1.029	0.1	0.220	0.230	0.070	0.073	
	WLAN5GHz	OFDM	802.11a 6Mbps	Right Tilted	0mm	Battery1	64	5320	14.93	15.00	1.015	97.2	1.029	-0.17	0.209	0.218	0.067	0.070	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	64	5320	14.93	15.00	1.015	97.2	1.029	0.18	0.313	0.327	0.096	0.100	
13	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	56	5280	14.80	15.00	1.047	97.2	1.029	0.01	0.408	0.440	0.107	0.115	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery2	56	5280	14.80	15.00	1.047	97.2	1.029	0.12	0.327	0.352	0.086	0.093	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Tilted	0mm	Battery1	64	5320	14.93	15.00	1.015	97.2	1.029	-0.1	0.235	0.246	0.068	0.071	
Spot Check																			
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	56	5280	14.80	15.00	1.047	97.2	1.029	0.04	0.350	0.377	0.105	0.113	
	WLAN5GHz	OFDM	802.11a 6Mbps	Right Cheek	0mm	Battery1	100	5500	14.95	15.00	1.011	97.2	1.029	0.05	0.083	0.086	0.027	0.028	
	WLAN5GHz	OFDM	802.11a 6Mbps	Right Tilted	0mm	Battery1	100	5500	14.95	15.00	1.011	97.2	1.029	0.03	0.151	0.157	0.053	0.055	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	100	5500	14.95	15.00	1.011	97.2	1.029	0.14	0.418	0.435	0.110	0.114	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	116	5580	14.66	15.00	1.081	97.2	1.029	0.14	0.450	0.500	0.135	0.150	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	132	5660	14.68	15.00	1.076	97.2	1.029	0.1	0.488	0.541	0.147	0.163	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	140	5700	14.85	15.00	1.034	97.2	1.029	0	0.362	0.385	0.107	0.114	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery2	132	5660	14.68	15.00	1.076	97.2	1.029	0.14	0.471	0.522	0.141	0.156	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Tilted	0mm	Battery1	100	5500	14.95	15.00	1.011	97.2	1.029	0.19	0.169	0.176	0.050	0.052	
Spot Check																			
14	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	132	5660	14.68	15.00	1.076	97.2	1.029	0.1	0.514	0.569	0.155	0.172	
	WLAN5GHz	OFDM	802.11a 6Mbps	Right Cheek	0mm	Battery1	149	5745	14.84	15.00	1.038	97.2	1.029	0.04	0.127	0.136	0.045	0.048	
	WLAN5GHz	OFDM	802.11a 6Mbps	Right Tilted	0mm	Battery1	149	5745	14.84	15.00	1.038	97.2	1.029	-0.07	0.122	0.130	0.045	0.048	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	149	5745	14.84	15.00	1.038	97.2	1.029	0.12	0.452	0.483	0.134	0.143	
15	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	157	5785	14.83	15.00	1.040	97.2	1.029	0.15	0.490	0.524	0.147	0.157	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	165	5825	14.63	15.00	1.089	97.2	1.029	-0.1	0.431	0.483	0.130	0.146	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery2	157	5785	14.83	15.00	1.040	97.2	1.029	0.12	0.461	0.493	0.137	0.147	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Tilted	0mm	Battery1	149	5745	14.84	15.00	1.038	97.2	1.029	-0.16	0.251	0.268	0.078	0.083	
	WLAN5GHz	OFDM	802.11a 6Mbps	Left Cheek	0mm	Battery1	157	5785	14.83	15.00	1.040	97.2	1.029	-0.1	0.468	0.501	0.140	0.150	



15.2 Hotspot SAR

<GSM SAR>

Plot No.	Band	Modulation	Mode	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	GSM850	GMSK	GPRS (4 Tx slots)	Front	10mm	Battery1	OFF	128	824.2	27.96	28.00	1.009	0.05	0.397	0.401	0.300	0.303
	GSM850	GMSK	GPRS (4 Tx slots)	Back	10mm	Battery1	OFF	128	824.2	27.96	28.00	1.009	-0.12	0.527	0.532	0.399	0.403
	GSM850	GMSK	GPRS (4 Tx slots)	Back	10mm	Battery1	OFF	189	836.4	27.90	28.00	1.023	-0.01	0.594	0.608	0.450	0.460
16	GSM850	GMSK	GPRS (4 Tx slots)	Back	10mm	Battery1	OFF	251	848.8	27.85	28.00	1.035	-0.14	0.689	0.713	0.525	0.543
	GSM850	GMSK	GPRS (4 Tx slots)	Back	10mm	Battery2	OFF	251	848.8	27.85	28.00	1.035	-0.01	0.604	0.625	0.457	0.473
	GSM850	GMSK	GPRS (4 Tx slots)	Left Side	10mm	Battery1	OFF	128	824.2	27.96	28.00	1.009	-0.14	0.355	0.358	0.248	0.250
	GSM850	GMSK	GPRS (4 Tx slots)	Right Side	10mm	Battery1	OFF	128	824.2	27.96	28.00	1.009	0	0.332	0.335	0.223	0.225
	GSM850	GMSK	GPRS (4 Tx slots)	Bottom Side	10mm	Battery1	OFF	128	824.2	27.96	28.00	1.009	-0.06	0.196	0.198	0.102	0.103
	GSM1900	GMSK	GPRS (4 Tx slots)	Front	10mm	Battery1	OFF	810	1909.8	25.00	25.00	1.000	-0.14	0.542	0.542	0.304	0.304
17	GSM1900	GMSK	GPRS (4 Tx slots)	Back	10mm	Battery1	OFF	810	1909.8	25.00	25.00	1.000	-0.12	0.807	0.807	0.436	0.436
	GSM1900	GMSK	GPRS (4 Tx slots)	Back	10mm	Battery1	OFF	512	1850.2	24.66	25.00	1.081	0.07	0.733	0.793	0.401	0.434
	GSM1900	GMSK	GPRS (4 Tx slots)	Back	10mm	Battery1	OFF	661	1880	24.78	25.00	1.052	0.09	0.723	0.761	0.399	0.420
	GSM1900	GMSK	GPRS (4 Tx slots)	Back	10mm	Battery2	OFF	810	1909.8	25.00	25.00	1.000	0.13	0.789	0.789	0.420	0.420
	GSM1900	GMSK	GPRS (4 Tx slots)	Left Side	10mm	Battery1	OFF	810	1909.8	25.00	25.00	1.000	0.03	0.245	0.245	0.136	0.136
	GSM1900	GMSK	GPRS (4 Tx slots)	Right Side	10mm	Battery1	OFF	810	1909.8	25.00	25.00	1.000	-0.02	0.140	0.140	0.081	0.081
	GSM1900	GMSK	GPRS (4 Tx slots)	Bottom Side	10mm	Battery1	OFF	810	1909.8	25.00	25.00	1.000	-0.03	0.670	0.670	0.354	0.354

<WCDMA SAR>

Plot No.	Band	Modulation	Mode	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WCDMA II	QPSK	RMC 12.2Kbps	Front	10mm	Battery1	ON	9400	1880	22.20	22.50	1.072	-0.01	0.675	0.723	0.381	0.408
	WCDMA II	QPSK	RMC 12.2Kbps	Back	10mm	Battery1	ON	9400	1880	22.20	22.50	1.072	-0.11	0.958	1.027	0.525	0.563
18	WCDMA II	QPSK	RMC 12.2Kbps	Back	10mm	Battery1	ON	9262	1852.4	21.97	22.50	1.130	0.1	0.930	1.051	0.517	0.584
	WCDMA II	QPSK	RMC 12.2Kbps	Back	10mm	Battery1	ON	9538	1907.6	22.16	22.50	1.081	-0.05	0.949	1.026	0.515	0.557
	WCDMA II	QPSK	RMC 12.2Kbps	Back	10mm	Battery2	ON	9262	1852.4	21.97	22.50	1.130	0.03	0.801	0.905	0.474	0.536
	WCDMA II	QPSK	RMC 12.2Kbps	Left Side	10mm	Battery1	ON	9400	1880	22.20	22.50	1.072	-0.17	0.255	0.273	0.142	0.152
	WCDMA II	QPSK	RMC 12.2Kbps	Right Side	10mm	Battery1	ON	9400	1880	22.20	22.50	1.072	-0.03	0.134	0.144	0.079	0.085
	WCDMA II	QPSK	RMC 12.2Kbps	Bottom Side	10mm	Battery1	ON	9400	1880	22.20	22.50	1.072	-0.15	0.836	0.896	0.436	0.467
	WCDMA II	QPSK	RMC 12.2Kbps	Bottom Side	10mm	Battery1	ON	9262	1852.4	21.97	22.50	1.130	-0.17	0.891	1.007	0.461	0.521
	WCDMA II	QPSK	RMC 12.2Kbps	Bottom Side	10mm	Battery1	ON	9538	1907.6	22.16	22.50	1.081	-0.11	0.759	0.821	0.399	0.431
	WCDMA IV	QPSK	RMC 12.2Kbps	Front	10mm	Battery1	ON	1413	1732.6	22.30	23.00	1.175	0	0.747	0.878	0.454	0.533
	WCDMA IV	QPSK	RMC 12.2Kbps	Front	10mm	Battery1	ON	1312	1712.4	22.27	23.00	1.183	-0.01	0.755	0.893	0.452	0.535
	WCDMA IV	QPSK	RMC 12.2Kbps	Front	10mm	Battery1	ON	1513	1752.6	22.24	23.00	1.191	0.01	0.726	0.865	0.444	0.529
	WCDMA IV	QPSK	RMC 12.2Kbps	Back	10mm	Battery1	ON	1413	1732.6	22.30	23.00	1.175	0.06	0.848	0.996	0.501	0.589
	WCDMA IV	QPSK	RMC 12.2Kbps	Back	10mm	Battery1	ON	1312	1712.4	22.27	23.00	1.183	0.12	0.813	0.962	0.480	0.568
	WCDMA IV	QPSK	RMC 12.2Kbps	Back	10mm	Battery1	ON	1513	1752.6	22.24	23.00	1.191	0.05	0.865	1.030	0.496	0.591
	WCDMA IV	QPSK	RMC 12.2Kbps	Left Side	10mm	Battery1	ON	1413	1732.6	22.30	23.00	1.175	-0.18	0.293	0.344	0.166	0.195
	WCDMA IV	QPSK	RMC 12.2Kbps	Right Side	10mm	Battery1	ON	1413	1732.6	22.30	23.00	1.175	-0.01	0.162	0.190	0.102	0.120
	WCDMA IV	QPSK	RMC 12.2Kbps	Bottom Side	10mm	Battery1	ON	1413	1732.6	22.30	23.00	1.175	-0.16	0.950	1.116	0.496	0.583
19	WCDMA IV	QPSK	RMC 12.2Kbps	Bottom Side	10mm	Battery1	ON	1312	1712.4	22.27	23.00	1.183	-0.13	0.969	1.146	0.502	0.594
	WCDMA IV	QPSK	RMC 12.2Kbps	Bottom Side	10mm	Battery1	ON	1513	1752.6	22.24	23.00	1.191	-0.12	0.894	1.065	0.473	0.563
	WCDMA IV	QPSK	RMC 12.2Kbps	Bottom Side	10mm	Battery2	ON	1312	1712.4	22.27	23.00	1.183	-0.11	0.945	1.118	0.496	0.587
	WCDMA V	QPSK	RMC 12.2Kbps	Front	10mm	Battery1	OFF	4132	826.4	23.49	24.00	1.125	0.01	0.406	0.457	0.307	0.345
	WCDMA V	QPSK	RMC 12.2Kbps	Back	10mm	Battery1	OFF	4132	826.4	23.49	24.00	1.125	-0.1	0.507	0.570	0.384	0.432
	WCDMA V	QPSK	RMC 12.2Kbps	Back	10mm	Battery1	OFF	4182	836.4	23.42	24.00	1.143	-0.02	0.595	0.680	0.456	0.521
20	WCDMA V	QPSK	RMC 12.2Kbps	Back	10mm	Battery1	OFF	4233	846.6	23.40	24.00	1.148	0.07	0.640	0.735	0.491	0.564
	WCDMA V	QPSK	RMC 12.2Kbps	Back	10mm	Battery2	OFF	4233	846.6	23.40	24.00	1.148	-0.02	0.604	0.693	0.462	0.530
	WCDMA V	QPSK	RMC 12.2Kbps	Left Side	10mm	Battery1	OFF	4132	826.4	23.49	24.00	1.125	0.04	0.294	0.331	0.205	0.231
	WCDMA V	QPSK	RMC 12.2Kbps	Right Side	10mm	Battery1	OFF	4132	826.4	23.49	24.00	1.125	-0.01	0.324	0.364	0.219	0.246
	WCDMA V	QPSK	RMC 12.2Kbps	Bottom Side	10mm	Battery1	OFF	4132	826.4	23.49	24.00	1.125	-0.04	0.255	0.287	0.128	0.144



<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	LTE Band 2	20M	QPSK	1	0	Front	10mm	Battery1	ON	18900	1880	22.32	22.50	1.042	-0.04	0.850	0.886	0.515	0.537
	LTE Band 2	20M	QPSK	1	0	Front	10mm	Battery1	ON	18700	1860	22.29	22.50	1.050	0	0.893	0.937	0.540	0.567
	LTE Band 2	20M	QPSK	1	0	Front	10mm	Battery1	ON	19100	1900	22.31	22.50	1.045	-0.01	0.811	0.847	0.492	0.514
	LTE Band 2	20M	QPSK	50	0	Front	10mm	Battery1	ON	18900	1880	22.41	22.50	1.021	-0.02	0.877	0.895	0.531	0.542
	LTE Band 2	20M	QPSK	50	0	Front	10mm	Battery1	ON	18700	1860	22.38	22.50	1.028	-0.04	0.891	0.916	0.539	0.554
	LTE Band 2	20M	QPSK	50	0	Front	10mm	Battery1	ON	19100	1900	22.40	22.50	1.023	-0.08	0.812	0.831	0.496	0.508
	LTE Band 2	20M	QPSK	100	0	Front	10mm	Battery1	ON	19100	1900	22.36	22.50	1.033	0	0.799	0.825	0.483	0.499
	LTE Band 2	20M	QPSK	1	0	Back	10mm	Battery1	ON	18900	1880	22.32	22.50	1.042	0.09	1.060	1.105	0.599	0.624
21	LTE Band 2	20M	QPSK	1	0	Back	10mm	Battery1	ON	18700	1860	22.29	22.50	1.050	0.06	1.070	1.123	0.610	0.640
	LTE Band 2	20M	QPSK	1	0	Back	10mm	Battery1	ON	19100	1900	22.31	22.50	1.045	0.02	1.070	1.118	0.599	0.626
	LTE Band 2	20M	QPSK	1	0	Back	10mm	Battery2	ON	18700	1860	22.29	22.50	1.050	0.05	0.993	1.042	0.576	0.605
	LTE Band 2	20M	QPSK	50	0	Back	10mm	Battery1	ON	18900	1880	22.41	22.50	1.021	0.04	1.090	1.113	0.616	0.629
	LTE Band 2	20M	QPSK	50	0	Back	10mm	Battery1	ON	18700	1860	22.38	22.50	1.028	0.04	0.930	0.956	0.542	0.557
	LTE Band 2	20M	QPSK	50	0	Back	10mm	Battery1	ON	19100	1900	22.40	22.50	1.023	0.05	0.906	0.927	0.530	0.542
	LTE Band 2	20M	QPSK	100	0	Back	10mm	Battery1	ON	19100	1900	22.36	22.50	1.033	0.05	1.080	1.115	0.611	0.631
	LTE Band 2	20M	QPSK	1	0	Left Side	10mm	Battery1	ON	18900	1880	22.32	22.50	1.042	-0.11	0.275	0.287	0.153	0.159
	LTE Band 2	20M	QPSK	50	0	Left Side	10mm	Battery1	ON	18900	1880	22.41	22.50	1.021	-0.13	0.273	0.279	0.152	0.155
	LTE Band 2	20M	QPSK	1	0	Right Side	10mm	Battery1	ON	18900	1880	22.32	22.50	1.042	-0.04	0.121	0.126	0.077	0.080
	LTE Band 2	20M	QPSK	50	0	Right Side	10mm	Battery1	ON	18900	1880	22.41	22.50	1.021	-0.02	0.122	0.125	0.078	0.080
	LTE Band 2	20M	QPSK	1	0	Bottom Side	10mm	Battery1	ON	18900	1880	22.32	22.50	1.042	-0.01	0.038	0.040	0.023	0.024
	LTE Band 2	20M	QPSK	50	0	Bottom Side	10mm	Battery1	ON	18900	1880	22.41	22.50	1.021	-0.05	0.039	0.040	0.024	0.025
	LTE Band 4	20M	QPSK	1	0	Front	10mm	Battery1	ON	20175	1732.5	22.71	23.00	1.069	0	0.792	0.847	0.476	0.509
	LTE Band 4	20M	QPSK	50	0	Front	10mm	Battery1	ON	20175	1732.5	22.68	23.00	1.076	0.01	0.794	0.855	0.481	0.518
	LTE Band 4	20M	QPSK	100	0	Front	10mm	Battery1	ON	20175	1732.5	22.63	23.00	1.089	0.04	0.784	0.854	0.481	0.524
	LTE Band 4	20M	QPSK	1	0	Back	10mm	Battery1	ON	20175	1732.5	22.71	23.00	1.069	-0.05	0.873	0.933	0.523	0.559
	LTE Band 4	20M	QPSK	50	0	Back	10mm	Battery1	ON	20175	1732.5	22.68	23.00	1.076	-0.01	0.876	0.943	0.524	0.564
	LTE Band 4	20M	QPSK	100	0	Back	10mm	Battery1	ON	20175	1732.5	22.63	23.00	1.089	0.02	0.861	0.938	0.524	0.571
	LTE Band 4	20M	QPSK	1	0	Left Side	10mm	Battery1	ON	20175	1732.5	22.71	23.00	1.069	-0.07	0.174	0.186	0.101	0.108
	LTE Band 4	20M	QPSK	50	0	Left Side	10mm	Battery1	ON	20175	1732.5	22.68	23.00	1.076	-0.07	0.182	0.196	0.105	0.113
	LTE Band 4	20M	QPSK	1	0	Right Side	10mm	Battery1	ON	20175	1732.5	22.71	23.00	1.069	0	0.120	0.128	0.076	0.081
	LTE Band 4	20M	QPSK	50	0	Right Side	10mm	Battery1	ON	20175	1732.5	22.68	23.00	1.076	0.07	0.126	0.136	0.080	0.086
22	LTE Band 4	20M	QPSK	1	0	Bottom Side	10mm	Battery1	ON	20175	1732.5	22.71	23.00	1.069	0.08	1.150	1.229	0.612	0.654
	LTE Band 4	20M	QPSK	50	0	Bottom Side	10mm	Battery1	ON	20175	1732.5	22.68	23.00	1.076	0.01	0.896	0.965	0.480	0.517
	LTE Band 4	20M	QPSK	100	0	Bottom Side	10mm	Battery1	ON	20175	1732.5	22.63	23.00	1.089	0.08	0.874	0.952	0.480	0.523
	LTE Band 4	20M	QPSK	1	0	Bottom Side	10mm	Battery2	ON	20175	1732.5	22.71	23.00	1.069	-0.09	1.030	1.101	0.563	0.602
	LTE Band 5	10M	QPSK	1	0	Front	10mm	Battery1	OFF	20525	836.5	23.98	24.00	1.005	0	0.473	0.475	0.361	0.363
	LTE Band 5	10M	QPSK	25	0	Front	10mm	Battery1	OFF	20525	836.5	22.99	23.00	1.002	-0.02	0.403	0.404	0.307	0.308
23	LTE Band 5	10M	QPSK	1	0	Back	10mm	Battery1	OFF	20525	836.5	23.98	24.00	1.005	-0.02	0.593	0.596	0.456	0.458
	LTE Band 5	10M	QPSK	25	0	Back	10mm	Battery1	OFF	20525	836.5	22.99	23.00	1.002	-0.03	0.507	0.508	0.390	0.391
	LTE Band 5	10M	QPSK	1	0	Back	10mm	Battery2	OFF	20525	836.5	23.98	24.00	1.005	-0.13	0.576	0.579	0.443	0.445
	LTE Band 5	10M	QPSK	1	0	Left Side	10mm	Battery1	OFF	20525	836.5	23.98	24.00	1.005	-0.01	0.593	0.596	0.407	0.409
	LTE Band 5	10M	QPSK	25	0	Left Side	10mm	Battery1	OFF	20525	836.5	22.99	23.00	1.002	0.01	0.484	0.485	0.331	0.332
	LTE Band 5	10M	QPSK	1	0	Right Side	10mm	Battery1	OFF	20525	836.5	23.98	24.00	1.005	-0.03	0.505	0.507	0.340	0.342
	LTE Band 5	10M	QPSK	25	0	Right Side	10mm	Battery1	OFF	20525	836.5	22.99	23.00	1.002	0	0.419	0.420	0.282	0.283
	LTE Band 5	10M	QPSK	1	0	Bottom Side	10mm	Battery1	OFF	20525	836.5	23.98	24.00	1.005	0.04	0.349	0.351	0.167	0.168
	LTE Band 5	10M	QPSK	25	0	Bottom Side	10mm	Battery1	OFF	20525	836.5	22.99	23.00	1.002	0.1	0.289	0.290	0.138	0.138



Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	LTE Band 7	20M	QPSK	1	0	Front	10mm	Battery1	OFF	21100	2535	22.15	22.50	1.084	-0.07	0.490	0.531	0.255	0.276
	LTE Band 7	20M	QPSK	50	0	Front	10mm	Battery1	OFF	21100	2535	21.20	22.00	1.202	-0.09	0.372	0.447	0.193	0.232
	LTE Band 7	20M	QPSK	1	0	Back	10mm	Battery1	OFF	21100	2535	22.15	22.50	1.084	-0.02	1.000	1.084	0.456	0.494
	LTE Band 7	20M	QPSK	1	0	Back	10mm	Battery1	OFF	20850	2510	22.06	22.50	1.107	-0.01	0.786	0.870	0.365	0.404
24	LTE Band 7	20M	QPSK	1	0	Back	10mm	Battery1	OFF	21350	2560	22.07	22.50	1.104	-0.15	1.050	1.159	0.467	0.516
	LTE Band 7	20M	QPSK	1	0	Back	10mm	Battery2	OFF	21350	2560	22.07	22.50	1.104	-0.02	1.030	1.137	0.467	0.516
	LTE Band 7	20M	QPSK	50	0	Back	10mm	Battery1	OFF	21100	2535	21.20	22.00	1.202	-0.04	0.772	0.928	0.349	0.420
	LTE Band 7	20M	QPSK	50	0	Back	10mm	Battery1	OFF	20850	2510	21.13	22.00	1.222	-0.17	0.705	0.861	0.318	0.389
	LTE Band 7	20M	QPSK	50	0	Back	10mm	Battery1	OFF	21350	2560	21.18	22.00	1.208	-0.1	0.859	1.038	0.382	0.461
	LTE Band 7	20M	QPSK	100	0	Back	10mm	Battery1	OFF	21100	2535	21.12	22.00	1.225	-0.12	0.835	1.023	0.373	0.457
	LTE Band 7	20M	QPSK	1	0	Left Side	10mm	Battery1	OFF	21100	2535	22.15	22.50	1.084	0.05	0.265	0.287	0.141	0.153
	LTE Band 7	20M	QPSK	50	0	Left Side	10mm	Battery1	OFF	21100	2535	21.20	22.00	1.202	0.03	0.208	0.250	0.110	0.132
	LTE Band 7	20M	QPSK	1	0	Right Side	10mm	Battery1	OFF	21100	2535	22.15	22.50	1.084	0.15	0.113	0.122	0.061	0.066
	LTE Band 7	20M	QPSK	50	0	Right Side	10mm	Battery1	OFF	21100	2535	21.20	22.00	1.202	0.17	0.086	0.103	0.046	0.055
	LTE Band 7	20M	QPSK	1	0	Bottom Side	10mm	Battery1	OFF	21100	2535	22.15	22.50	1.084	-0.01	0.632	0.685	0.304	0.330
	LTE Band 7	20M	QPSK	50	0	Bottom Side	10mm	Battery1	OFF	21100	2535	21.20	22.00	1.202	-0.07	0.485	0.583	0.233	0.280
	LTE Band 12	10M	QPSK	1	0	Front	10mm	Battery1	OFF	23095	707.5	23.73	24.00	1.064	-0.04	0.154	0.164	0.107	0.114
	LTE Band 12	10M	QPSK	25	0	Front	10mm	Battery1	OFF	23095	707.5	22.72	23.00	1.067	0.02	0.137	0.146	0.096	0.102
25	LTE Band 12	10M	QPSK	1	0	Back	10mm	Battery1	OFF	23095	707.5	23.73	24.00	1.064	-0.12	0.242	0.258	0.168	0.179
	LTE Band 12	10M	QPSK	25	0	Back	10mm	Battery1	OFF	23095	707.5	22.72	23.00	1.067	-0.02	0.219	0.234	0.152	0.162
	LTE Band 12	10M	QPSK	1	0	Left Side	10mm	Battery1	OFF	23095	707.5	23.73	24.00	1.064	0.01	0.150	0.160	0.106	0.113
	LTE Band 12	10M	QPSK	25	0	Left Side	10mm	Battery1	OFF	23095	707.5	22.72	23.00	1.067	0.02	0.136	0.145	0.097	0.103
	LTE Band 12	10M	QPSK	1	0	Right Side	10mm	Battery1	OFF	23095	707.5	23.73	24.00	1.064	0.04	0.081	0.086	0.058	0.062
	LTE Band 12	10M	QPSK	25	0	Right Side	10mm	Battery1	OFF	23095	707.5	22.72	23.00	1.067	0.04	0.075	0.080	0.053	0.057
	LTE Band 12	10M	QPSK	1	0	Bottom Side	10mm	Battery1	OFF	23095	707.5	23.73	24.00	1.064	-0.08	0.059	0.063	0.030	0.032
	LTE Band 12	10M	QPSK	25	0	Bottom Side	10mm	Battery1	OFF	23095	707.5	22.72	23.00	1.067	-0.02	0.053	0.057	0.027	0.029
	LTE Band 12	10M	QPSK	1	0	Back	10mm	Battery2	OFF	23095	707.5	23.73	24.00	1.064	0	0.235	0.250	0.167	0.178
	LTE Band 13	10M	QPSK	1	0	Front	10mm	Battery1	OFF	23230	782	23.88	24.00	1.028	-0.12	0.398	0.409	0.304	0.313
	LTE Band 13	10M	QPSK	25	0	Front	10mm	Battery1	OFF	23230	782	22.90	23.00	1.023	0.04	0.329	0.337	0.252	0.258
26	LTE Band 13	10M	QPSK	1	0	Back	10mm	Battery1	OFF	23230	782	23.88	24.00	1.028	0	0.513	0.527	0.394	0.405
	LTE Band 13	10M	QPSK	25	0	Back	10mm	Battery1	OFF	23230	782	22.90	23.00	1.023	0	0.415	0.425	0.319	0.326
	LTE Band 13	10M	QPSK	1	0	Left Side	10mm	Battery1	OFF	23230	782	23.88	24.00	1.028	0.04	0.353	0.363	0.248	0.255
	LTE Band 13	10M	QPSK	25	0	Left Side	10mm	Battery1	OFF	23230	782	22.90	23.00	1.023	0.02	0.291	0.298	0.204	0.209
	LTE Band 13	10M	QPSK	1	0	Right Side	10mm	Battery1	OFF	23230	782	23.88	24.00	1.028	0	0.280	0.288	0.195	0.200
	LTE Band 13	10M	QPSK	25	0	Right Side	10mm	Battery1	OFF	23230	782	22.90	23.00	1.023	0	0.236	0.241	0.164	0.168
	LTE Band 13	10M	QPSK	1	0	Bottom Side	10mm	Battery1	OFF	23230	782	23.88	24.00	1.028	0.01	0.107	0.110	0.058	0.060
	LTE Band 13	10M	QPSK	25	0	Bottom Side	10mm	Battery1	OFF	23230	782	22.90	23.00	1.023	0.02	0.089	0.091	0.048	0.049
	LTE Band 13	10M	QPSK	1	0	Back	10mm	Battery2	OFF	23230	782	23.88	24.00	1.028	0.08	0.452	0.465	0.294	0.302

<WLAN SAR>

Plot No.	Band	Modulation	Mode	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Front	10mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	-0.12	0.081	0.081	0.044	0.044	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Back	10mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	0.19	0.146	0.146	0.075	0.075	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Right Side	10mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	0.07	0.006	0.006	0.003	0.003	
27	WLAN2.4GHz	DSSS	802.11b 1Mbps	Top Side	10mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	-0.04	0.218	0.219	0.109	0.109	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Top Side	10mm	Battery1	1	2412	16.68	17.00	1.076	100	1.000	-0.03	0.156	0.168	0.080	0.086	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Top Side	10mm	Battery1	6	2437	16.65	17.00	1.084	100	1.000	0.13	0.197	0.214	0.100	0.108	
Spot Check																			
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Top Side	10mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	0.01	0.216	0.216	0.108	0.108	

**15.3 Body Worn Accessory SAR**

**<GSM SAR>**

Plot No.	Band	Modulation	Mode	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	GSM850	GMSK	GPRS (4 Tx slots)	Front	15mm	Battery1	128	824.2	27.96	28.00	1.009	-0.01	0.361	0.364	0.273	0.276
	GSM850	GMSK	GPRS (4 Tx slots)	Back	15mm	Battery1	128	824.2	27.96	28.00	1.009	-0.06	0.448	0.452	0.339	0.342
	GSM850	GMSK	GPRS (4 Tx slots)	Back	15mm	Battery1	189	836.4	27.90	28.00	1.023	-0.06	0.505	0.517	0.385	0.394
28	GSM850	GMSK	GPRS (4 Tx slots)	Back	15mm	Battery1	251	848.8	27.85	28.00	1.035	0.07	0.575	0.595	0.437	0.452
	GSM1900	GMSK	GPRS (4 Tx slots)	Front	15mm	Battery1	810	1909.8	25.00	25.00	1.000	-0.04	0.288	0.288	0.176	0.176
	GSM1900	GMSK	GPRS (4 Tx slots)	Back	15mm	Battery1	810	1909.8	25.00	25.00	1.000	0	0.406	0.406	0.238	0.238
29	GSM1900	GMSK	GPRS (4 Tx slots)	Back	15mm	Battery1	512	1850.2	24.66	25.00	1.081	-0.01	0.381	0.412	0.227	0.245
	GSM1900	GMSK	GPRS (4 Tx slots)	Back	15mm	Battery1	661	1880	24.78	25.00	1.052	-0.12	0.371	0.390	0.220	0.231

**<WCDMA SAR>**

Plot No.	Band	Modulation	Mode	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	WCDMA II	QPSK	RMC 12.2Kbps	Front	15mm	Battery1	9538	1907.6	23.59	24.00	1.099	-0.06	0.491	0.540	0.301	0.331
	WCDMA II	QPSK	RMC 12.2Kbps	Back	15mm	Battery1	9538	1907.6	23.59	24.00	1.099	0.04	0.660	0.725	0.392	0.431
	WCDMA II	QPSK	RMC 12.2Kbps	Back	15mm	Battery1	9262	1852.4	23.38	24.00	1.153	-0.18	0.568	0.655	0.343	0.396
30	WCDMA II	QPSK	RMC 12.2Kbps	Back	15mm	Battery1	9400	1880	23.58	24.00	1.102	-0.01	0.690	0.760	0.410	0.452
	WCDMA IV	QPSK	RMC 12.2Kbps	Front	15mm	Battery1	1413	1732.6	23.83	24.00	1.040	-0.07	0.606	0.630	0.380	0.395
31	WCDMA IV	QPSK	RMC 12.2Kbps	Back	15mm	Battery1	1413	1732.6	23.83	24.00	1.040	0.05	0.659	0.685	0.415	0.432
	WCDMA IV	QPSK	RMC 12.2Kbps	Back	15mm	Battery1	1312	1712.4	23.80	24.00	1.047	-0.04	0.627	0.657	0.393	0.412
	WCDMA IV	QPSK	RMC 12.2Kbps	Back	15mm	Battery1	1513	1752.6	23.79	24.00	1.050	0.01	0.650	0.682	0.409	0.429
	WCDMA V	QPSK	RMC 12.2Kbps	Front	15mm	Battery1	4132	826.4	23.49	24.00	1.125	0.04	0.403	0.453	0.305	0.343
	WCDMA V	QPSK	RMC 12.2Kbps	Back	15mm	Battery1	4132	826.4	23.49	24.00	1.125	0.01	0.433	0.487	0.330	0.371
	WCDMA V	QPSK	RMC 12.2Kbps	Back	15mm	Battery1	4182	836.4	23.42	24.00	1.143	0.07	0.514	0.587	0.389	0.445
32	WCDMA V	QPSK	RMC 12.2Kbps	Back	15mm	Battery1	4233	846.6	23.40	24.00	1.148	0	0.579	0.665	0.440	0.505



<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	LTE Band 2	20M	QPSK	1	0	Front	15mm	Battery1	18900	1880	23.64	24.00	1.086	0.09	0.665	0.722	0.413	0.449
	LTE Band 2	20M	QPSK	50	0	Front	15mm	Battery1	18900	1880	22.73	23.00	1.064	-0.02	0.550	0.585	0.339	0.361
33	LTE Band 2	20M	QPSK	1	0	Back	15mm	Battery1	18900	1880	23.64	24.00	1.086	0.03	0.680	0.739	0.418	0.454
	LTE Band 2	20M	QPSK	1	0	Back	15mm	Battery1	18700	1860	23.59	22.50	0.778	0.12	0.693	0.539	0.427	0.332
	LTE Band 2	20M	QPSK	1	0	Back	15mm	Battery1	19100	1900	23.62	22.50	0.773	-0.03	0.695	0.537	0.425	0.328
	LTE Band 2	20M	QPSK	50	0	Back	15mm	Battery1	18900	1880	22.73	23.00	1.064	0.04	0.562	0.598	0.345	0.367
	LTE Band 4	20M	QPSK	1	0	Front	15mm	Battery1	20175	1732.5	23.63	24.00	1.089	0.01	0.517	0.563	0.333	0.363
	LTE Band 4	20M	QPSK	50	0	Front	15mm	Battery1	20175	1732.5	22.59	23.00	1.099	0	0.410	0.451	0.264	0.290
34	LTE Band 4	20M	QPSK	1	0	Back	15mm	Battery1	20175	1732.5	23.63	24.00	1.089	-0.03	0.554	0.603	0.352	0.383
	LTE Band 4	20M	QPSK	50	0	Back	15mm	Battery1	20175	1732.5	22.59	23.00	1.099	-0.03	0.443	0.487	0.281	0.309
	LTE Band 5	10M	QPSK	1	0	Front	15mm	Battery1	20525	836.5	23.98	24.00	1.005	-0.01	0.475	0.477	0.363	0.365
	LTE Band 5	10M	QPSK	25	0	Front	15mm	Battery1	20525	836.5	22.99	23.00	1.002	0	0.386	0.387	0.294	0.295
35	LTE Band 5	10M	QPSK	1	0	Back	15mm	Battery1	20525	836.5	23.98	24.00	1.005	0.1	0.498	0.500	0.379	0.381
	LTE Band 5	10M	QPSK	25	0	Back	15mm	Battery1	20525	836.5	22.99	23.00	1.002	-0.06	0.432	0.433	0.329	0.330
	LTE Band 7	20M	QPSK	1	0	Front	15mm	Battery1	21100	2535	22.15	22.50	1.084	-0.02	0.244	0.264	0.136	0.147
	LTE Band 7	20M	QPSK	50	0	Front	15mm	Battery1	21100	2535	21.20	22.00	1.202	-0.01	0.186	0.224	0.103	0.124
36	LTE Band 7	20M	QPSK	1	0	Back	15mm	Battery1	21100	2535	22.15	22.50	1.084	-0.07	0.541	0.586	0.273	0.296
	LTE Band 7	20M	QPSK	1	0	Back	15mm	Battery1	20850	2510	22.06	22.50	1.107	-0.08	0.471	0.521	0.239	0.264
	LTE Band 7	20M	QPSK	1	0	Back	15mm	Battery1	21350	2560	22.07	22.50	1.104	-0.03	0.531	0.586	0.266	0.294
	LTE Band 7	20M	QPSK	50	0	Back	15mm	Battery1	21100	2535	21.20	22.00	1.202	-0.07	0.416	0.500	0.210	0.252
	LTE Band 12	10M	QPSK	1	0	Front	15mm	Battery1	23095	707.5	23.73	24.00	1.064	0.05	0.142	0.151	0.109	0.116
	LTE Band 12	10M	QPSK	25	0	Front	15mm	Battery1	23095	707.5	22.72	23.00	1.067	0.03	0.130	0.139	0.100	0.107
37	LTE Band 12	10M	QPSK	1	0	Back	15mm	Battery1	23095	707.5	23.73	24.00	1.064	0.01	0.193	0.205	0.147	0.156
	LTE Band 12	10M	QPSK	25	0	Back	15mm	Battery1	23095	707.5	22.72	23.00	1.067	0.03	0.176	0.188	0.134	0.143
	LTE Band 13	10M	QPSK	1	0	Front	15mm	Battery1	23230	782	23.88	24.00	1.028	-0.01	0.390	0.401	0.296	0.304
	LTE Band 13	10M	QPSK	25	0	Front	15mm	Battery1	23230	782	22.90	23.00	1.023	0.02	0.321	0.328	0.243	0.249
38	LTE Band 13	10M	QPSK	1	0	Back	15mm	Battery1	23230	782	23.88	24.00	1.028	-0.02	0.476	0.489	0.361	0.371
	LTE Band 13	10M	QPSK	25	0	Back	15mm	Battery1	23230	782	22.90	23.00	1.023	-0.07	0.381	0.390	0.289	0.296



<WLAN SAR>

Plot No.	Band	Modulation	Mode	Test Position	Gap (mm)	Battery	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)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Front	15mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	0.01	0.042	0.042	0.023	0.023	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Back	15mm	Battery1	11	2462	16.99	17.00	1.002	100	1.000	0.17	0.068	0.068	0.037	0.037	
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Back	15mm	Battery1	1	2412	16.68	17.00	1.076	100	1.000	-0.01	0.063	0.068	0.033	0.036	
39	WLAN2.4GHz	DSSS	802.11b 1Mbps	Back	15mm	Battery1	6	2437	16.65	17.00	1.084	100	1.000	0.03	0.082	0.089	0.043	0.047	
Spot Check																			
	WLAN2.4GHz	DSSS	802.11b 1Mbps	Back	15mm	Battery1	6	2437	16.65	17.00	1.084	100	1.000	-0.13	0.069	0.075	0.039	0.042	
	WLAN5GHz	OFDM	802.11a 6Mbps	Front	15mm	Battery1	64	5320	14.93	15.00	1.015	97.2	1.029	-0.18	0.014	0.015	0.005	0.005	
	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	64	5320	14.93	15.00	1.015	97.2	1.029	0.12	0.026	0.027	0.010	0.010	
	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	56	5280	14.80	15.00	1.047	97.2	1.029	0.03	0.035	0.038	0.012	0.013	
Spot Check																			
40	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	56	5280	14.80	15.00	1.047	97.2	1.029	-0.14	0.077	0.083	0.025	0.027	
	WLAN5GHz	OFDM	802.11a 6Mbps	Front	15mm	Battery1	100	5500	14.95	15.00	1.011	97.2	1.029	0.15	0.018	0.019	0.004	0.004	
	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	100	5500	14.95	15.00	1.011	97.2	1.029	0.1	0.035	0.036	0.012	0.012	
	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	116	5580	14.66	15.00	1.081	97.2	1.029	-0.12	0.042	0.047	0.015	0.017	
	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	132	5660	14.68	15.00	1.076	97.2	1.029	-0.08	0.042	0.047	0.015	0.017	
	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	140	5700	14.85	15.00	1.034	97.2	1.029	-0.17	0.055	0.059	0.020	0.021	
Spot Check																			
41	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	140	5700	14.85	15.00	1.034	97.2	1.029	0.1	0.087	0.093	0.027	0.029	
	WLAN5GHz	OFDM	802.11a 6Mbps	Front	15mm	Battery1	149	5745	14.84	15.00	1.038	97.2	1.029	-0.11	0.022	0.023	0.007	0.008	
	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	149	5745	14.84	15.00	1.038	97.2	1.029	0	0.035	0.037	0.013	0.014	
	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	157	5785	14.83	15.00	1.040	97.2	1.029	0.02	0.042	0.045	0.015	0.016	
42	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	157	5785	14.83	15.00	1.040	97.2	1.029	0.12	0.044	0.047	0.016	0.017	
Spot Check																			
	WLAN5GHz	OFDM	802.11a 6Mbps	Back	15mm	Battery1	165	5825	14.63	15.00	1.089	97.2	1.029	0.17	0.037	0.041	0.012	0.013	

15.4 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	Battery	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 2	20M	QPSK	50	0	Back	10mm	Battery1	ON	18900	1880	22.41	22.50	1.021	0.04	1.090	-	1.113
2nd	LTE Band 2	20M	QPSK	50	0	Back	10mm	Battery1	ON	18900	1880	22.41	22.50	1.021	0.06	1.050	1.04	1.072
1st	LTE Band 4	20M	QPSK	1	0	Bottom Side	10mm	Battery1	ON	20175	1732.5	22.71	23.00	1.069	0.08	1.150	-	1.229
2nd	LTE Band 4	20M	QPSK	1	0	Bottom Side	10mm	Battery1	ON	20175	1732.5	22.71	23.00	1.069	0.04	0.927	1.24	0.991
1st	LTE Band 7	20M	QPSK	1	0	Back	10mm	Battery1	OFF	21350	2560	22.07	22.50	1.104	-0.15	1.050	-	1.159
2nd	LTE Band 7	20M	QPSK	1	0	Back	10mm	Battery1	OFF	21350	2560	22.07	22.50	1.104	-0.15	1.040	1.01	1.148

General Note:

- Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is  $\geq 0.8W/kg$ .
- 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.
- The ratio is the difference in percentage between original and repeated *measured SAR*.
- All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

### 16. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset			Note
		Head	Body-worn	Hotspot	
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	Hotspot
5.	GSM Voice + Bluetooth		Yes		
6.	GPRS/EDGE + Bluetooth		Yes		WWAN VoIP
7.	WCDMA+ Bluetooth		Yes		WWAN VoIP
8.	LTE + Bluetooth		Yes		WWAN VoIP
9.	GSM Voice + WLAN5GHz	Yes	Yes		
10.	GPRS/EDGE + WLAN5GHz	Yes	Yes		WWAN VoIP
11.	WCDMA + WLAN5GHz	Yes	Yes		WWAN VoIP
12.	LTE + WLAN5GHz	Yes	Yes		WWAN VoIP

**General Note:**

- This device supported VoIP in EGPRS, WCDMA, LTE (e.g. 3rd party VoIP).
- This device 2.4GHz WLAN supports Hotspot operation, and 2.4GHz / 5.2GHz / 5.3GHz / 5.5GHz / 5.8GHz WLAN supports WiFi Direct.
- The worst case WLAN reported SAR for each configuration was used for SAR summation. Therefore, the following summations represent the absolute worst cases for simultaneous transmission with WLAN.
- WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
- EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment.
- The Scaled SAR summation is calculated based on the same configuration and test position.
- Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
  - Scalar SAR summation < 1.6W/kg.
  - $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$ , and the peak separation distance is determined from the square root of  $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$ , where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
  - If  $SPLSR \leq 0.04$ , simultaneously transmission SAR measurement is not necessary.
  - Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg.
- For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
  - $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x] \text{ W/kg}$  for test separation distances  $\leq 50 \text{ mm}$ ; where  $x = 7.5$  for 1-g SAR, and  $x = 18.75$  for 10-g SAR.
  - When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
  - 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Bluetooth Max Power	Exposure Position	Body worn
	Test separation	15 mm
5.75 dBm	Estimated 1g SAR (W/kg)	0.056 W/kg



**16.1 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)	5GHz WLAN 1g SAR (W/kg)		
GSM	GSM850	Right Cheek	0.258	0.210	0.230	0.47	0.49
		Right Tilted	0.138	0.170	0.218	0.31	0.36
		Left Cheek	0.476	0.330	0.569	0.81	1.05
		Left Tilted	0.161	0.226	0.268	0.39	0.43
	GSM1900	Right Cheek	0.175	0.210	0.230	0.39	0.41
		Right Tilted	0.050	0.170	0.218	0.22	0.27
		Left Cheek	0.228	0.330	0.569	0.56	0.80
		Left Tilted	0.068	0.226	0.268	0.29	0.34
WCDMA	WCDMA II	Right Cheek	0.256	0.210	0.230	0.47	0.49
		Right Tilted	0.069	0.170	0.218	0.24	0.29
		Left Cheek	0.352	0.330	0.569	0.68	0.92
		Left Tilted	0.115	0.226	0.268	0.34	0.38
	WCDMA IV	Right Cheek	0.317	0.210	0.230	0.53	0.55
		Right Tilted	0.084	0.170	0.218	0.25	0.30
		Left Cheek	0.250	0.330	0.569	0.58	0.82
		Left Tilted	0.106	0.226	0.268	0.33	0.37
	WCDMA V	Right Cheek	0.294	0.210	0.230	0.50	0.52
		Right Tilted	0.164	0.170	0.218	0.33	0.38
		Left Cheek	0.498	0.330	0.569	0.83	1.07
		Left Tilted	0.155	0.226	0.268	0.38	0.42
LTE	LTE Band 2	Right Cheek	0.319	0.210	0.230	0.53	0.55
		Right Tilted	0.121	0.170	0.218	0.29	0.34
		Left Cheek	0.229	0.330	0.569	0.56	0.80
		Left Tilted	0.147	0.226	0.268	0.37	0.42
	LTE Band 4	Right Cheek	0.298	0.210	0.230	0.51	0.53
		Right Tilted	0.240	0.170	0.218	0.41	0.46
		Left Cheek	0.228	0.330	0.569	0.56	0.80
		Left Tilted	0.097	0.226	0.268	0.32	0.37
	LTE Band 5	Right Cheek	0.364	0.210	0.230	0.57	0.59
		Right Tilted	0.226	0.170	0.218	0.40	0.44
		Left Cheek	0.437	0.330	0.569	0.77	1.01
		Left Tilted	0.207	0.226	0.268	0.43	0.48
	LTE Band 7	Right Cheek	0.168	0.210	0.230	0.38	0.40
		Right Tilted	0.144	0.170	0.218	0.31	0.36
		Left Cheek	0.450	0.330	0.569	0.78	1.02
		Left Tilted	0.076	0.226	0.268	0.30	0.34
	LTE Band 12	Right Cheek	0.123	0.210	0.230	0.33	0.35
		Right Tilted	0.055	0.170	0.218	0.23	0.27
		Left Cheek	0.144	0.330	0.569	0.47	0.71
		Left Tilted	0.055	0.226	0.268	0.28	0.32
	LTE Band 13	Right Cheek	0.307	0.210	0.230	0.52	0.54
		Right Tilted	0.181	0.170	0.218	0.35	0.40
		Left Cheek	0.325	0.330	0.569	0.66	0.89
		Left Tilted	0.198	0.226	0.268	0.42	0.47



WWAN Band		Exposure Position	1	2	3	1+2 Summed 10g SAR (W/kg)	1+3 Summed 10g SAR (W/kg)
			WWAN 10g SAR (W/kg)	2.4GHz WLAN 10g SAR (W/kg)	5GHz WLAN 10g SAR (W/kg)		
GSM	GSM850	Right Cheek	0.192	0.103	0.073	<b>0.30</b>	<b>0.27</b>
		Right Tilted	0.106	0.082	0.070	<b>0.19</b>	<b>0.18</b>
		Left Cheek	0.358	0.128	0.172	<b>0.49</b>	<b>0.53</b>
		Left Tilted	0.127	0.103	0.083	<b>0.23</b>	<b>0.21</b>
	GSM1900	Right Cheek	0.109	0.103	0.073	<b>0.21</b>	<b>0.18</b>
		Right Tilted	0.024	0.082	0.070	<b>0.11</b>	<b>0.09</b>
		Left Cheek	0.138	0.128	0.172	<b>0.27</b>	<b>0.31</b>
		Left Tilted	0.038	0.103	0.083	<b>0.14</b>	<b>0.12</b>
WCDMA	WCDMA II	Right Cheek	0.162	0.103	0.073	<b>0.27</b>	<b>0.24</b>
		Right Tilted	0.040	0.082	0.070	<b>0.12</b>	<b>0.11</b>
		Left Cheek	0.219	0.128	0.172	<b>0.35</b>	<b>0.39</b>
		Left Tilted	0.066	0.103	0.083	<b>0.17</b>	<b>0.15</b>
	WCDMA IV	Right Cheek	0.211	0.103	0.073	<b>0.31</b>	<b>0.28</b>
		Right Tilted	0.051	0.082	0.070	<b>0.13</b>	<b>0.12</b>
		Left Cheek	0.165	0.128	0.172	<b>0.29</b>	<b>0.34</b>
		Left Tilted	0.069	0.103	0.083	<b>0.17</b>	<b>0.15</b>
	WCDMA V	Right Cheek	0.226	0.103	0.073	<b>0.33</b>	<b>0.30</b>
		Right Tilted	0.129	0.082	0.070	<b>0.21</b>	<b>0.20</b>
		Left Cheek	0.378	0.128	0.172	<b>0.51</b>	<b>0.55</b>
		Left Tilted	0.123	0.103	0.083	<b>0.23</b>	<b>0.21</b>
LTE	LTE Band 2	Right Cheek	0.209	0.103	0.073	<b>0.31</b>	<b>0.28</b>
		Right Tilted	0.073	0.082	0.070	<b>0.16</b>	<b>0.14</b>
		Left Cheek	0.147	0.128	0.172	<b>0.28</b>	<b>0.32</b>
		Left Tilted	0.089	0.103	0.083	<b>0.19</b>	<b>0.17</b>
	LTE Band 4	Right Cheek	0.203	0.103	0.073	<b>0.31</b>	<b>0.28</b>
		Right Tilted	0.163	0.082	0.070	<b>0.25</b>	<b>0.23</b>
		Left Cheek	0.149	0.128	0.172	<b>0.28</b>	<b>0.32</b>
		Left Tilted	0.064	0.103	0.083	<b>0.17</b>	<b>0.15</b>
	LTE Band 5	Right Cheek	0.278	0.103	0.073	<b>0.38</b>	<b>0.35</b>
		Right Tilted	0.176	0.082	0.070	<b>0.26</b>	<b>0.25</b>
		Left Cheek	0.339	0.128	0.172	<b>0.47</b>	<b>0.51</b>
		Left Tilted	0.163	0.103	0.083	<b>0.27</b>	<b>0.25</b>
	LTE Band 7	Right Cheek	0.090	0.103	0.073	<b>0.19</b>	<b>0.16</b>
		Right Tilted	0.076	0.082	0.070	<b>0.16</b>	<b>0.15</b>
		Left Cheek	0.222	0.128	0.172	<b>0.35</b>	<b>0.39</b>
		Left Tilted	0.040	0.103	0.083	<b>0.14</b>	<b>0.12</b>
	LTE Band 12	Right Cheek	0.099	0.103	0.073	<b>0.20</b>	<b>0.17</b>
		Right Tilted	0.035	0.082	0.070	<b>0.12</b>	<b>0.11</b>
		Left Cheek	0.114	0.128	0.172	<b>0.24</b>	<b>0.29</b>
		Left Tilted	0.037	0.103	0.083	<b>0.14</b>	<b>0.12</b>
	LTE Band 13	Right Cheek	0.241	0.103	0.073	<b>0.34</b>	<b>0.31</b>
		Right Tilted	0.146	0.082	0.070	<b>0.23</b>	<b>0.22</b>
		Left Cheek	0.253	0.128	0.172	<b>0.38</b>	<b>0.43</b>
		Left Tilted	0.157	0.103	0.083	<b>0.26</b>	<b>0.24</b>



**16.2 Hotspot Exposure Conditions**

WWAN Band		Exposure Position	1	2	1+2 Summed 1g SAR (W/kg)
			WWAN 1g SAR (W/kg)	2.4GHz WLAN 1g SAR (W/kg)	
GSM	GSM850	Front	0.401	0.081	<b>0.48</b>
		Back	0.713	0.146	<b>0.86</b>
		Left side	0.358		<b>0.36</b>
		Right side	0.335	0.006	<b>0.34</b>
		Top side		0.219	<b>0.22</b>
		Bottom side	0.198		<b>0.20</b>
	GSM1900	Front	0.542	0.081	<b>0.62</b>
		Back	0.807	0.146	<b>0.95</b>
		Left side	0.245		<b>0.25</b>
		Right side	0.140	0.006	<b>0.15</b>
		Top side		0.219	<b>0.22</b>
		Bottom side	0.670		<b>0.67</b>
WCDMA	WCDMA II	Front	0.723	0.081	<b>0.80</b>
		Back	1.051	0.146	<b>1.20</b>
		Left side	0.273		<b>0.27</b>
		Right side	0.144	0.006	<b>0.15</b>
		Top side		0.219	<b>0.22</b>
		Bottom side	1.007		<b>1.01</b>
	WCDMA IV	Front	0.893	0.081	<b>0.97</b>
		Back	1.030	0.146	<b>1.18</b>
		Left side	0.344		<b>0.34</b>
		Right side	0.190	0.006	<b>0.20</b>
		Top side		0.219	<b>0.22</b>
		Bottom side	1.146		<b>1.15</b>
	WCDMA V	Front	0.457	0.081	<b>0.54</b>
		Back	0.735	0.146	<b>0.88</b>
		Left side	0.331		<b>0.33</b>
Right side		0.364	0.006	<b>0.37</b>	
Top side			0.219	<b>0.22</b>	
	Bottom side	0.287		<b>0.29</b>	



WWAN Band		Exposure Position	1	2	1+2 Summed 1g SAR (W/kg)
			WWAN 1g SAR (W/kg)	2.4GHz WLAN 1g SAR (W/kg)	
LTE	LTE Band 2	Front	0.937	0.081	1.02
		Back	1.123	0.146	1.27
		Left side	0.287		0.29
		Right side	0.126	0.006	0.13
		Top side		0.219	0.22
		Bottom side	0.040		0.04
	LTE Band 4	Front	0.855	0.081	0.94
		Back	0.943	0.146	1.09
		Left side	0.196		0.20
		Right side	0.136	0.006	0.14
		Top side		0.219	0.22
		Bottom side	1.229		1.23
	LTE Band 5	Front	0.475	0.081	0.56
		Back	0.596	0.146	0.74
		Left side	0.596		0.60
		Right side	0.507	0.006	0.51
		Top side		0.219	0.22
		Bottom side	0.351		0.35
	LTE Band 7	Front	0.531	0.081	0.61
		Back	1.159	0.146	1.31
		Left side	0.287		0.29
		Right side	0.122	0.006	0.13
		Top side		0.219	0.22
		Bottom side	0.685		0.69
	LTE Band 12	Front	0.164	0.081	0.25
		Back	0.258	0.146	0.40
		Left side	0.160		0.16
		Right side	0.086	0.006	0.09
		Top side		0.219	0.22
		Bottom side	0.063		0.06
LTE Band 13	Front	0.409	0.081	0.49	
	Back	0.527	0.146	0.67	
	Left side	0.363		0.36	
	Right side	0.288	0.006	0.29	
	Top side		0.219	0.22	
	Bottom side	0.110		0.11	

WWAN Band		Exposure Position	1	2	1+2 Summed 10g SAR (W/kg)
			WWAN 10g SAR (W/kg)	2.4GHz WLAN 10g SAR (W/kg)	
GSM	GSM850	Front	0.303	0.044	<b>0.35</b>
		Back	0.543	0.075	<b>0.62</b>
		Left side	0.250		<b>0.25</b>
		Right side	0.225	0.003	<b>0.23</b>
		Top side		0.109	<b>0.11</b>
		Bottom side	0.103		<b>0.10</b>
	GSM1900	Front	0.304	0.044	<b>0.35</b>
		Back	0.436	0.075	<b>0.51</b>
		Left side	0.136		<b>0.14</b>
		Right side	0.081	0.003	<b>0.08</b>
	Top side		0.109	<b>0.11</b>	
	Bottom side	0.354		<b>0.35</b>	
WCDMA	WCDMA II	Front	0.408	0.044	<b>0.45</b>
		Back	0.584	0.075	<b>0.66</b>
		Left side	0.152		<b>0.15</b>
		Right side	0.085	0.003	<b>0.09</b>
		Top side		0.109	<b>0.11</b>
		Bottom side	0.521		<b>0.52</b>
	WCDMA IV	Front	0.535	0.044	<b>0.58</b>
		Back	0.591	0.075	<b>0.67</b>
		Left side	0.195		<b>0.20</b>
		Right side	0.120	0.003	<b>0.12</b>
		Top side		0.109	<b>0.11</b>
		Bottom side	0.594		<b>0.59</b>
	WCDMA V	Front	0.345	0.044	<b>0.39</b>
		Back	0.564	0.075	<b>0.64</b>
		Left side	0.231		<b>0.23</b>
Right side		0.246	0.003	<b>0.25</b>	
Top side			0.109	<b>0.11</b>	
	Bottom side	0.144		<b>0.14</b>	



WWAN Band		Exposure Position	1	2	1+2 Summed 10g SAR (W/kg)
			WWAN 10g SAR (W/kg)	2.4GHz WLAN 10g SAR (W/kg)	
LTE	LTE Band 2	Front	0.567	0.044	0.61
		Back	0.640	0.075	0.72
		Left side	0.159		0.16
		Right side	0.080	0.003	0.08
		Top side		0.109	0.11
		Bottom side	0.025		0.03
	LTE Band 4	Front	0.524	0.044	0.57
		Back	0.571	0.075	0.65
		Left side	0.113		0.11
		Right side	0.086	0.003	0.09
		Top side		0.109	0.11
		Bottom side	0.654		0.65
	LTE Band 5	Front	0.363	0.044	0.41
		Back	0.458	0.075	0.53
		Left side	0.409		0.41
		Right side	0.342	0.003	0.35
		Top side		0.109	0.11
		Bottom side	0.168		0.17
	LTE Band 7	Front	0.276	0.044	0.32
		Back	0.516	0.075	0.59
		Left side	0.153		0.15
		Right side	0.066	0.003	0.07
		Top side		0.109	0.11
		Bottom side	0.330		0.33
	LTE Band 12	Front	0.114	0.044	0.16
		Back	0.179	0.075	0.25
		Left side	0.113		0.11
		Right side	0.062	0.003	0.07
		Top side		0.109	0.11
		Bottom side	0.032		0.03
LTE Band 13	Front	0.313	0.044	0.36	
	Back	0.405	0.075	0.48	
	Left side	0.255		0.26	
	Right side	0.200	0.003	0.20	
	Top side		0.109	0.11	
	Bottom side	0.060		0.06	



**16.3 Body-Worn Accessory Exposure Conditions**

WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
			WWAN 1g SAR (W/kg)	2.4GHz WLAN 1g SAR (W/kg)	5GHz WLAN 1g SAR (W/kg)	Bluetooth Estimated 1g SAR (W/kg)			
GSM	GSM850	Front	0.364	0.042	0.023	0.056	0.41	0.39	0.42
		Back	0.595	0.089	0.093	0.056	0.68	0.69	0.65
	GSM1900	Front	0.288	0.042	0.023	0.056	0.33	0.31	0.34
		Back	0.412	0.089	0.093	0.056	0.50	0.51	0.47
WCDMA	WCDMA II	Front	0.540	0.042	0.023	0.056	0.58	0.56	0.60
		Back	0.760	0.089	0.093	0.056	0.85	0.85	0.82
	WCDMA IV	Front	0.630	0.042	0.023	0.056	0.67	0.65	0.69
		Back	0.685	0.089	0.093	0.056	0.77	0.78	0.74
	WCDMA V	Front	0.453	0.042	0.023	0.056	0.50	0.48	0.51
		Back	0.665	0.089	0.093	0.056	0.75	0.76	0.72
LTE	LTE Band 2	Front	0.722	0.042	0.023	0.056	0.76	0.75	0.78
		Back	0.739	0.089	0.093	0.056	0.83	0.83	0.80
	LTE Band 4	Front	0.563	0.042	0.023	0.056	0.61	0.59	0.62
		Back	0.603	0.089	0.093	0.056	0.69	0.70	0.66
	LTE Band 5	Front	0.477	0.042	0.023	0.056	0.52	0.50	0.53
		Back	0.500	0.089	0.093	0.056	0.59	0.59	0.56
	LTE Band 7	Front	0.264	0.042	0.023	0.056	0.31	0.29	0.32
		Back	0.586	0.089	0.093	0.056	0.68	0.68	0.64
	LTE Band 12	Front	0.151	0.042	0.023	0.056	0.19	0.17	0.21
		Back	0.205	0.089	0.093	0.056	0.29	0.30	0.26
	LTE Band 13	Front	0.401	0.042	0.023	0.056	0.44	0.42	0.46
		Back	0.489	0.089	0.093	0.056	0.58	0.58	0.55

WWAN Band		Exposure Position	1	2	3	1+2 Summed 10g SAR (W/kg)	1+3 Summed 10g SAR (W/kg)
			WWAN 10g SAR (W/kg)	2.4GHz WLAN 10g SAR (W/kg)	5GHz WLAN 10g SAR (W/kg)		
GSM	GSM850	Front	0.276	0.023	0.008	0.30	0.28
		Back	0.452	0.047	0.029	0.50	0.48
	GSM1900	Front	0.176	0.023	0.008	0.20	0.18
		Back	0.245	0.047	0.029	0.29	0.27
WCDMA	WCDMA II	Front	0.331	0.023	0.008	0.35	0.34
		Back	0.452	0.047	0.029	0.50	0.48
	WCDMA IV	Front	0.395	0.023	0.008	0.42	0.40
		Back	0.432	0.047	0.029	0.48	0.46
	WCDMA V	Front	0.343	0.023	0.008	0.37	0.35
		Back	0.505	0.047	0.029	0.55	0.53
LTE	LTE Band 2	Front	0.449	0.023	0.008	0.47	0.46
		Back	0.454	0.047	0.029	0.50	0.48
	LTE Band 4	Front	0.363	0.023	0.008	0.39	0.37
		Back	0.383	0.047	0.029	0.43	0.41
	LTE Band 5	Front	0.365	0.023	0.008	0.39	0.37
		Back	0.381	0.047	0.029	0.43	0.41
	LTE Band 7	Front	0.147	0.023	0.008	0.17	0.16
		Back	0.296	0.047	0.029	0.34	0.33
	LTE Band 12	Front	0.116	0.023	0.008	0.14	0.12
		Back	0.156	0.047	0.029	0.20	0.19
	LTE Band 13	Front	0.304	0.023	0.008	0.33	0.31
		Back	0.371	0.047	0.029	0.42	0.40

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## **17. Uncertainty Assessment**

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture’s specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

<b>Uncertainty Distributions</b>	<b>Normal</b>	<b>Rectangular</b>	<b>Triangular</b>	<b>U-Shape</b>
Multi-plying Factor <sup>(a)</sup>	1/k <sup>(b)</sup>	1/√3	1/√6	1/√2

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b)  $\kappa$  is the coverage factor

**Table 17.1. Standard Uncertainty for Assumed Distribution**

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual “root-sum-squares” (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.



Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
<b>Measurement System</b>							
Probe Calibration	6.0	N	1	1	1	6.0	6.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	1.0	R	1.732	1	1	0.6	0.6
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	2.9	R	1.732	1	1	1.7	1.7
Max. SAR Eval.	2.0	R	1.732	1	1	1.2	1.2
<b>Test Sample Related</b>							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
<b>Phantom and Setup</b>							
Phantom Uncertainty	6.1	R	1.732	1	1	3.5	3.5
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
<b>Combined Std. Uncertainty</b>						11.4%	11.4%
<b>Coverage Factor for 95 %</b>						K=2	K=2
<b>Expanded STD Uncertainty</b>						22.9%	22.7%

**Table 17.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz**



Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
<b>Measurement System</b>							
Probe Calibration	6.55	N	1	1	1	6.6	6.6
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	2.0	R	1.732	1	1	1.2	1.2
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	6.7	R	1.732	1	1	3.9	3.9
Max. SAR Eval.	4.0	R	1.732	1	1	2.3	2.3
<b>Test Sample Related</b>							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
<b>Phantom and Setup</b>							
Phantom Uncertainty	6.6	R	1.732	1	1	3.8	3.8
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
<b>Combined Std. Uncertainty</b>						12.5%	12.5%
<b>Coverage Factor for 95 %</b>						K=2	K=2
<b>Expanded STD Uncertainty</b>						25.0%	24.9%

**Table 17.3. Uncertainty Budget for frequency range 3 GHz to 6 GHz**



## **18. References**

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- [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
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- [10] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.
- [11] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [12] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.