FCC SAR Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	XT2235-3
FCC ID	:	IHDT56AF3
STANDARD	:	FCC 47 CFR Part 2 (2.1093)

We, Sporton International Inc. (Shenzhen), would like to declare that the tested sample has been evaluated in accordance with the test procedures given in 47 CFR Part 2.1093 and FCC KDB and has been in compliance with the applicable technical standards.

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

Si Zhang

Approved by: Si Zhang

ACCREDITED Cert #5145.01

Sporton International Inc. (Shenzhen)
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People's Republic of China

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA232908-07	Rev. 01	Initial issue of report.	Oct. 11, 2022

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Motorola Mobility LLC, Mobile Cellular Phone, XT2235-3,** are as follows.

Highest 1g SAR Summary						
Equipment Class	Frequency Band		Head (Separation 0mm)	Hotspot (Separation 5mm)	Body-worn (Separation 5mm)	Highest Simultaneous Transmission 1g SAR (W/kg)
			1g SAR (W/kg)			
Licensed	GSM	GSM850	0.26	1.35	**1.35**	1.59
		GSM1900	0.18	1.36	1.14	
	WCDMA	Band II	0.23	**1.43**	1.26	
		Band V	0.29	1.15	1.15	
	LTE	Band 2	0.20	1.27	1.13	
		Band 26/Band 5	0.27	1.28	1.28	
		Band 7	0.63	1.37	1.34	
		Band 38	0.47	1.15	1.12	
		Band 41	0.42	1.32	1.26	
DTS	WLAN	2.4GHz WLAN	1.10	1.01	1.01	1.57
NII		5GHz WLAN	**1.14**	1.11	0.83	1.59
DSS	Bluetooth	2.4GHz Bluetooth	0.16	0.20	0.20	1.54

Highest 10g SAR Summary				
Equipment Class	Frequency Band		Product Specific 10g SAR (W/kg) (Separation 0mm)	Highest Simultaneous Transmission 10g SAR (W/kg)
License	GSM	GSM850	3.21	3.92
		GSM1900	2.88	
	WCDMA	Band II	3.34	
	LTE	Band 2	2.86	
		Band 26/Band 5	1.86	
		Band 7	**3.59**	
		Band 38	3.10	
		Band 41	3.56	
NII	WLAN	5GHz WLAN	1.63	3.92
Date of Testing:			2022/5/3 ~ 2022/5/18	

Remark: This device supports both LTE B5 and B26. Since the supported frequency span for LTE B5 falls completely within the supports frequency span for LTE B26, both LTE bands have the same target power, and both LTE bands share the same transmission path; therefore, SAR was only assessed for LTE B26.

Declaration of Conformity:
The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.
Comments and Explanations:
The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

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

2. Administration Data

Sporton International Inc. (Shenzhen) is accredited to ISO/IEC 17025:2017 by American Association for Laboratory Accreditation with Certificate Number 5145.01.

Testing Laboratory			
Test Firm	Sporton International Inc. (Shenzhen)		
Test Site Location	1/F, 2/F, Bldg 5, Shiling Industrial Zone, Xinwei Village, Xili, Nanshan, Shenzhen, 518055 People's Republic of China TEL: +86-755-86379589 FAX: +86-755-86379595		
Test Site No.	Sporton Site No.	FCC Designation No.	FCC Test Firm Registration No.
	SAR04-SZ	CN1256	421272

Applicant	
Company Name	Motorola Mobility LLC
Address	222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

Manufacturer	
Company Name	Motorola Mobility LLC
Address	222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

3. Guidance Applied

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 616217 D04 SAR for laptop and tablets v01r02
- 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

Product Feature & Specification	
Equipment Name	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT2235-3
FCC ID	IHDT56AF3
IMEI Code	Sample 1: IMEI 1: 353766430012277 IMEI 2: 353766430012285 Sample 2: IMEI 1: 353766430018910 IMEI 2: 353766430018928
Wireless Technology and Frequency Range	GSM850: 824 MHz ~ 849 MHz GSM1900: 1850 MHz ~ 1910 MHz WCDMA Band II: 1850 MHz ~ 1910 MHz WCDMA Band V: 824 MHz ~ 849 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 38: 2570 MHz ~ 2620 MHz LTE Band 41: 2496 MHz ~ 2690 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5720 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC: 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA/HSUPA DC-HSDPA HSPA+ (16QAM uplink is not supported) LTE: QPSK, 16QAM, 64QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth BR/EDR/LE NFC: ASK
HW Version	DVT2
SW Version	S2SN32.29
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Identical Prototype

Remark:

1. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
2. This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
3. This device 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).
4. This device does not support DTM operation and supports GPRS/EGPRS mode up to multi-slot class 12.
5. This device has NFC operations, the NFC antenna is integrated into the device for this model, therefore, all SAR test were performed with the device which already incorporates the NFC antenna. A diagram showing the location of the antenna can be found in the operational description. According to FCC KDB publication 447498 D01v06, transmitters are consider to be operating simultaneously when there is overlapping transmission, with the exception

of transmission during network hand-offs with maximum hand-off duration less than 30 seconds.

6. The device implements the power management and proximity sensor /receiver detection/hotspot mode for SAR compliance at different exposure conditions (head, body-worn, hotspot, extremity) and the details about the power management decision and sensor detection are provided in the operational description. And the device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to power table at appendix E.
7. For dual SIM card mobile has two SIM slots and supports dual SIM dual standby. The WWAN radio transmission will be enabled by either one SIM at a time (single active). After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose SIM1 slot to perform all tests.
8. For some WWAN bands, sensor on reduced power level is higher than hotspot reduced power level, so front/back sensor on SAR can represent hotspot conservatively.
9. There are two samples. The difference between them could be referred to the XT2235-3_Operational Description of Product Equality Declaration which is exhibited separately. According to the difference, we choose sample 1 for full testing and sample 2 for worst case verification.
10. The device has two headsets. Only suppliers are different. So we chose headset 1 to perform full SAR testing only.
11. This device has two batteries. For battery 1 was in sample 1, and battery 2 was in sample 2. They were all evaluated for SAR testing conservatively.

4.2 General LTE SAR Test and Reporting Considerations

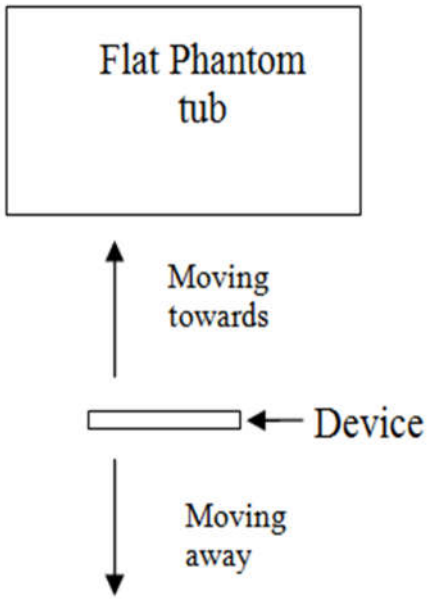
<table>
<tr><th colspan="2">Summarized necessary items addressed in KDB 941225 D05 v02r05</th></tr>
<tr><td>FCC ID</td><td>IHDT56AF3</td></tr>
<tr><td>Equipment Name</td><td>Mobile Cellular Phone</td></tr>
<tr><td>Operating Frequency Range of each LTE transmission band</td><td>LTE Band 2: 1850 MHz ~ 1910 MHz
LTE Band 5: 824 MHz ~ 849 MHz
LTE Band 7: 2500 MHz ~ 2570 MHz
LTE Band 26: 814 MHz ~ 849 MHz
LTE Band 38: 2570 MHz ~ 2620 MHz
LTE Band 41: 2496 MHz ~ 2690 MHz</td></tr>
<tr><td>Channel Bandwidth</td><td>LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz
LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz
LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz</td></tr>
<tr><td>uplink modulations used</td><td>QPSK / 16QAM / 64QAM</td></tr>
<tr><td>LTE Voice / Data requirements</td><td>Voice and Data</td></tr>
<tr><td>LTE Release Version</td><td>R10, Cat5</td></tr>
<tr><td>CA Support</td><td>Not Supported</td></tr>
<tr><td>LTE MPR permanently built-in by design</td><td>Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<tr><td>QPSK</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 1</td></tr>
<tr><td>16 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 3</td></tr>
<tr><td>256 QAM</td><td colspan="6">≥ 1</td><td>≤ 5</td></tr>
</table></td></tr>
<tr><td>LTE A-MPR</td><td>In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)</td></tr>
<tr><td>Spectrum plots for RB configuration</td><td>A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.</td></tr>
<tr><td>Power reduction applied to satisfy SAR compliance</td><td>Yes, when operating in Proximity sensors/receiver/hotspot detect mechanism, head/ body-worn/hotspot/extremity will trigger reduced power for some WWAN bands applied to satisfy SAR compliance, the detail please referred to section 13.</td></tr>
</table>

Transmission (H, M, L) channel numbers and frequencies in each LTE band												
LTE Band 2												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
LTE Band 5												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	20407	824.7	20415	825.5	20425	826.5	20450	829				
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5				
H	20643	848.3	20635	847.5	20625	846.5	20600	844				
LTE Band 7												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510				
M	21100	2535	21100	2535	21100	2535	21100	2535				
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560				
LTE Band 26												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	26697	814.7	26705	815.5	26715	816.5	26740	819	26765	821.5		
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5		
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5		
LTE Band 38												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580				
M	38000	2595	38000	2595	38000	2595	38000	2595				
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610				
LTE Band 41												
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz					
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)				
L	39675	2498.5	39700	2501	39725	2503.5	39750	2506				
LM	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5				
M	40620	2593	40620	2593	40620	2593	40620	2593				
HM	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5				
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680				

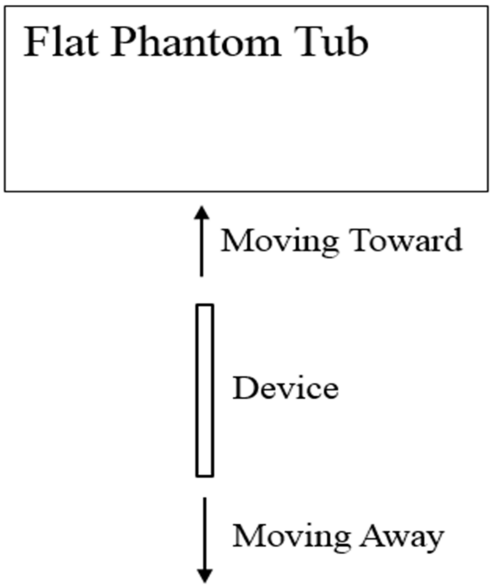
5. Proximity Sensor Triggering Test

<Proximity Sensor Triggering Distance>:

1. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed and the tissue-equivalent medium for highest frequency (2600MHz) and lowest (835MHz) frequency was used for proximity sensor triggering testing.
2. Capacitive proximity sensors placed coincident with antenna elements at the top and bottom ends of the phone are utilized to determine when the device comes in proximity of the user's body at the front or back of the device. The output power will reduce to body worn power level when top and bottom sensor pad be detected.
3. The sensors used to detect the proximity of the user's body at the front or back surface of the device use a detection threshold distance. The data shown in the sections below shows the distance(s). When front or back body worn condition is detected reduced power will be active.
4. The device employs proximity sensors also can detect the presence of the user's a finger or hand when handheld state at the front/back/bottom/right side of the device. When front/back/bottom/right side of handheld condition is detected reduced power will be active.
5. For verification of compliance of power reduction scheme, additional SAR testing with EUT transmitting at full RF power at a conservative trigger distance -1mm was performed:



Sensor/Handheld detection test set-up, Front and Back sides



Handheld detection test set-up, Bottom Side /Right Side

<P-Sensor>

Proximity Sensor Triggering Distance (mm)				
Position	Front		Back	
	Moving towards	Moving away	Moving towards	Moving away
Minimum	12	13	16	18

<Handheld for ANT1>

Proximity Sensor Triggering Distance (mm)								
Position	Front		Back		Right side		Bottom Side	
	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away
Minimum	12	13	18	22	3	5	16	19

6. RF Exposure Limits

6.1 Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

6.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

7. Specific Absorption Rate (SAR)

7.1 Introduction

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

7.2 SAR Definition

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

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

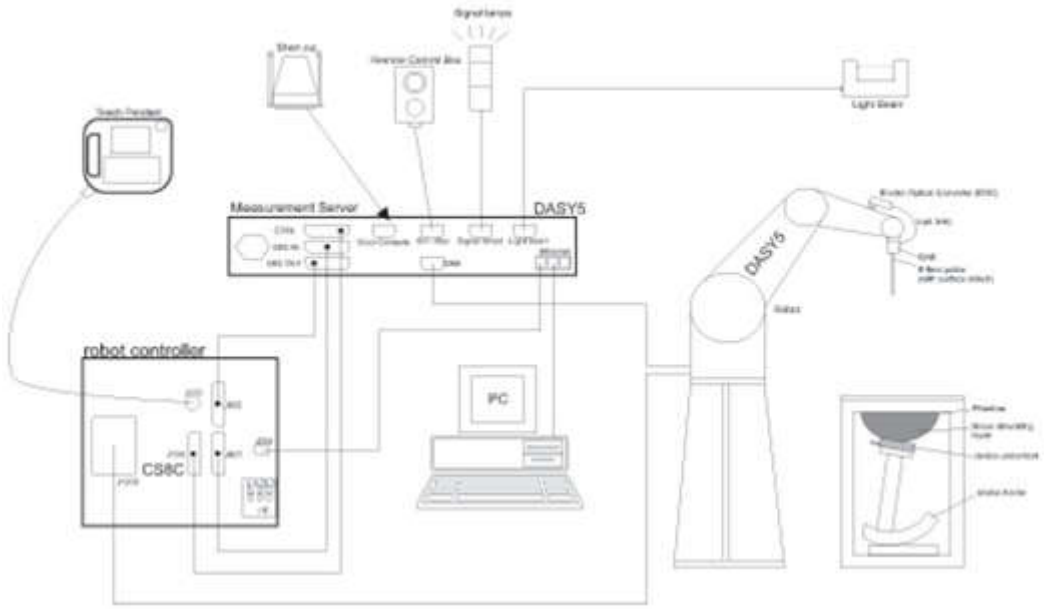
SAR is expressed in units of Watts per kilogram (W/kg)

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

8. System Description and Setup

The DASY5 system used for performing compliance tests consists of the following items:



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

8.1 E-Field Probe

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

<EX3DV4 Probe>

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

8.2 Data Acquisition Electronics (DAE)

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

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

Photo of DAE

8.3 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet
Measurement Areas	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>

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

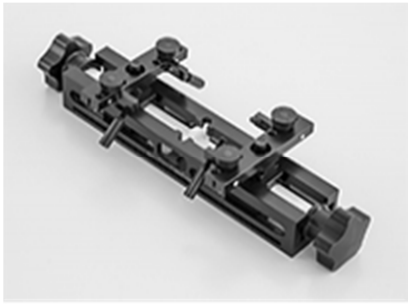
The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

8.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

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

Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

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

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

Mounting Device for Laptops

9. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

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

<SAR measurement>

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

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

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

9.1 Spatial Peak SAR Evaluation

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

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

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

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

9.2 Power Reference Measurement

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

9.3 Area Scan

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

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

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 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: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

9.4 Zoom Scan

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

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

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ 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 *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

9.5 Volume Scan Procedures

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

9.6 Power Drift Monitoring

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

10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d162	Dec. 17, 2021	Dec. 16, 2022
SPEAG	1900MHz System Validation Kit	D1900V2	5d182	Dec. 20, 2021	Dec. 19, 2022
SPEAG	2450MHz System Validation Kit	D2450V2	924	Sep. 02, 2020	Sep. 01, 2023
SPEAG	2600MHz System Validation Kit	D2600V2	1070	Dec. 20, 2021	Dec. 19, 2022
SPEAG	5000MHz System Validation Kit	D5GHzV2	1113	Sep. 24, 2019	Sep. 22, 2022
SPEAG	Data Acquisition Electronics	DAE4	715	Dec. 29, 2021	Dec. 28, 2022
SPEAG	Dosimetric E-Field Probe	EX3DV4	3975	Jun. 07, 2021	Jun. 06, 2022
SPEAG	SAM Twin Phantom	QD 000 P40 CC	TP-1500	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201341952	Dec. 28, 2021	Dec. 27, 2022
Anritsu	Radio communication analyzer	MT8821C	6262314715	Jun. 29, 2021	Jun. 28, 2022
Agilent	Wireless Communication Test Set	E5515C	MY50267224	Jul. 14, 2021	Jul. 13, 2022
Keysight	Network Analyzer	E5071C	MY46523671	Oct. 25, 2021	Oct. 24, 2022
Speag	Dielectric Assessment KIT	DAK-3.5	1138	Jun. 09, 2021	Jun. 08, 2022
Agilent	Signal Generator	N5181A	MY50145381	Dec. 28, 2021	Dec. 27, 2022
Anritsu	Power Senor	MA2411B	1306099	Sep. 29, 2021	Sep. 28, 2022
Anritsu	Power Meter	ML2495A	1349001	Sep. 29, 2021	Sep. 28, 2022
Anritsu	Power Sensor	MA2411B	1542004	Dec. 28, 2021	Dec. 27, 2022
Anritsu	Power Meter	ML2495A	1339473	Dec. 28, 2021	Dec. 27, 2022
R&S	CBT BLUETOOTH TESTER	CBT	100963	Dec. 28, 2021	Dec. 27, 2022
R&S	Spectrum Analyzer	FSP7	100818	Jul. 14, 2021	Jul. 13, 2022
TES	Hygrometer	1310	200505600	Jul. 17, 2021	Jul. 16, 2022
Anymetre	Thermo-Hygrometer	JR593	2018100802	Oct. 29, 2021	Oct. 28, 2022
Anymetre	Thermo-Hygrometer	JR593	2020062101	Jul. 17, 2021	Jul. 16, 2022
SPEAG	Device Holder	N/A	N/A	Note 1	
Weinschel	Attenuator 1	3M-10	N/A	Note 1	
Weinschel	Attenuator 2	3M-20	N/A	Note 1	
AR	Amplifier	5S1G4	0333096	Note 1	
mini-circuits	Amplifier	ZVE-3W-83+	599201528	Note 1	
ARRA	Power Divider	A3200-2	N/A	Note 1	
ET Industries	Dual Directional Coupler	C-058-10	N/A	Note 1	

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

11. System Verification

11.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 11.2.

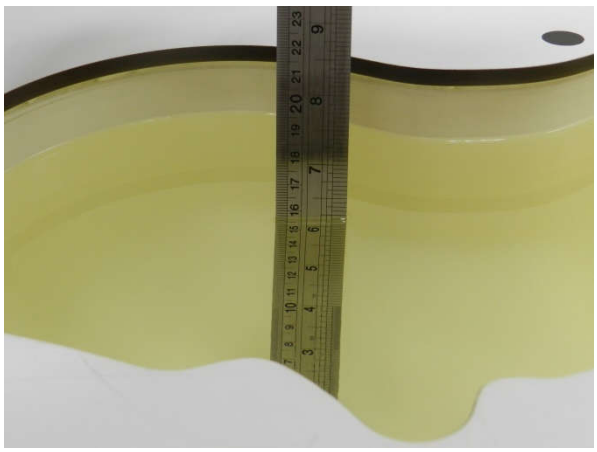


Fig 11.1 Photo of Liquid Height for Head SAR

Fig 11.2 Photo of Liquid Height for Body SAR

11.2 Tissue Verification

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

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

Simulating Liquid for 5GHz, Manufactured by SPEAG

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

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Head	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
835	Head	22.4	0.902	40.749	0.90	41.50	0.22	-1.81	±5	2022/5/4
835	Head	22.3	0.904	41.212	0.90	41.50	0.44	-0.69	±5	2022/5/11
1900	Head	22.1	1.455	39.186	1.40	40.00	3.93	-2.04	±5	2022/5/3
1900	Head	22.5	1.458	40.906	1.40	40.00	4.14	2.27	±5	2022/5/14
2450	Head	22.5	1.824	38.032	1.80	39.20	1.33	-2.98	±5	2022/5/9
2600	Head	22.4	1.915	39.536	1.96	39.00	-2.30	1.37	±5	2022/5/6
2600	Head	22.4	2.053	38.007	1.96	39.00	4.74	-2.55	±5	2022/5/16
5250	Head	22.8	4.657	37.533	4.71	35.95	-1.13	4.40	±5	2022/5/8
5250	Head	22.6	4.597	36.241	4.71	35.95	-2.40	0.81	±5	2022/5/17
5600	Head	22.5	5.058	36.915	5.07	35.50	-0.24	3.99	±5	2022/5/8
5600	Head	22.5	4.954	35.793	5.07	35.50	-2.29	0.83	±5	2022/5/18
5750	Head	22.2	5.237	36.667	5.22	35.35	0.33	3.73	±5	2022/5/9
5750	Head	22.3	5.119	35.497	5.22	35.35	-1.93	0.42	±5	2022/5/18

11.3 System Performance Check Results

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

<1g SAR>

Date	Frequency (MHz)	Head	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 (%)
2022/5/4	835	Head	250	4d162	3975	715	2.440	9.64	9.76	1.24
2022/5/11	835	Head	250	4d162	3975	715	2.490	9.64	9.96	3.32
2022/5/3	1900	Head	250	5d182	3975	715	10.800	39.60	43.2	9.09
2022/5/14	1900	Head	250	5d182	3975	715	10.400	39.60	41.6	5.05
2022/5/9	2450	Head	250	924	3975	715	13.300	51.40	53.2	3.50
2022/5/6	2600	Head	250	1070	3975	715	15.400	56.20	61.6	9.61
2022/5/16	2600	Head	250	1070	3975	715	14.900	56.20	59.6	6.05
2022/5/8	5250	Head	100	1113	3975	715	7.530	80.50	75.3	-6.46
2022/5/17	5250	Head	100	1113	3975	715	8.640	80.50	86.4	7.33
2022/5/8	5600	Head	100	1113	3975	715	7.780	83.40	77.8	-6.71
2022/5/18	5600	Head	100	1113	3975	715	8.830	83.40	88.3	5.88
2022/5/9	5750	Head	100	1113	3975	715	8.170	80.00	81.7	2.13
2022/5/18	5750	Head	100	1113	3975	715	8.710	80.00	87.1	8.88

<10g SAR>

Date	Frequency (MHz)	Head	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 (%)
2022/5/4	835	Head	250	4d162	3975	715	1.580	6.26	6.32	0.96
2022/5/11	835	Head	250	4d162	3975	715	1.570	6.26	6.28	0.32
2022/5/3	1900	Head	250	5d182	3975	715	5.520	20.20	22.08	9.31
2022/5/14	1900	Head	250	5d182	3975	715	5.380	20.20	21.52	6.53
2022/5/9	2450	Head	250	924	3975	715	6.110	24.00	24.44	1.83
2022/5/6	2600	Head	250	1070	3975	715	6.670	24.60	26.68	8.46
2022/5/16	2600	Head	250	1070	3975	715	6.720	24.60	26.88	9.27
2022/5/8	5250	Head	100	1113	3975	715	2.140	23.10	21.4	-7.36
2022/5/17	5250	Head	100	1113	3975	715	2.450	23.10	24.5	6.06
2022/5/8	5600	Head	100	1113	3975	715	2.230	23.80	22.3	-6.30
2022/5/18	5600	Head	100	1113	3975	715	2.500	23.80	25	5.04
2022/5/9	5750	Head	100	1113	3975	715	2.130	22.80	21.3	-6.58
2022/5/18	5750	Head	100	1113	3975	715	2.470	22.80	24.7	8.33

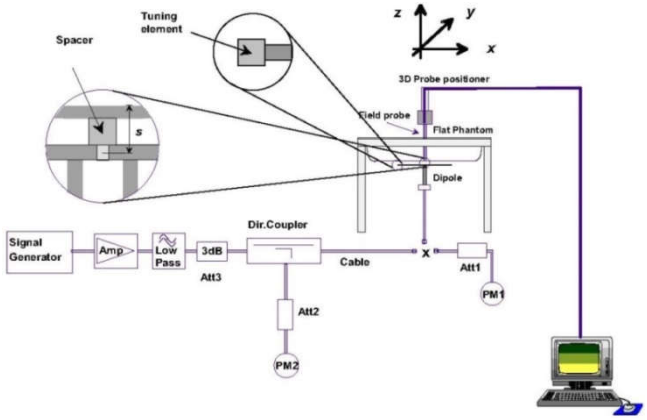


Fig 11.3.1 System Performance Check Setup

Fig 11.3.2 Setup Photo

12. RF Exposure Positions

12.1 Ear and handset reference point

Figure 12.1.1 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 12.1.2 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 12.1.3). 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 12.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

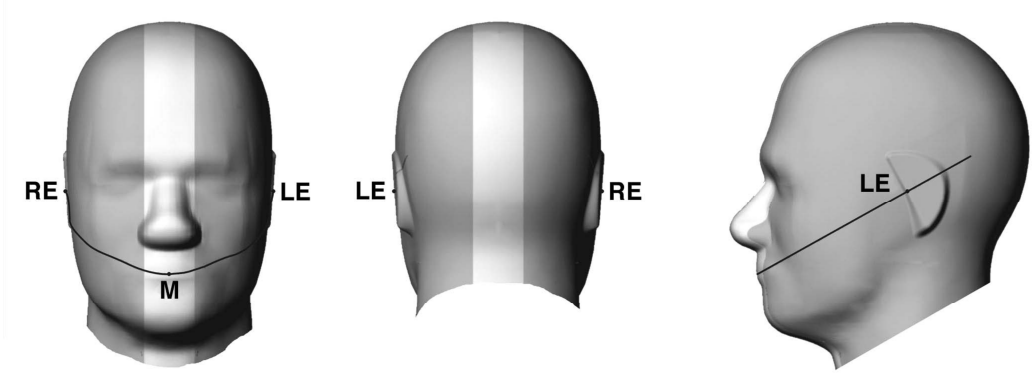


Fig 12.1.1 Front, back, and side views of SAM twin phantom

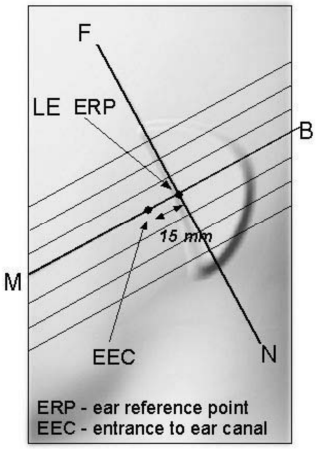


Fig 12.1.2 Close-up side view of phantom showing the ear region.

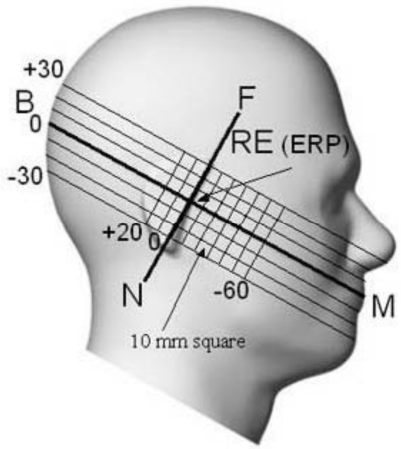


Fig 12.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

12.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width wt of the handset at the level of the acoustic output (point A in Figure 12.2.1 and Figure 12.2.2), and the midpoint of the width wb 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 12.2.1). 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 12.2.2), 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 12.2.3), 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 12.2.3. The actual rotation angles should be documented in the test report.

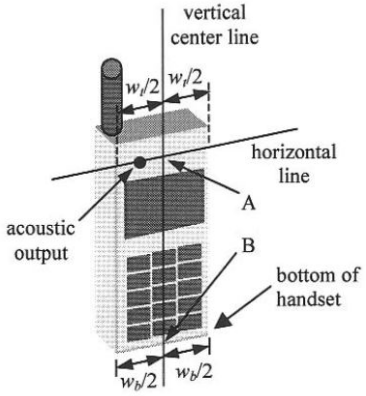


Fig 12.2.1 Handset vertical and horizontal reference lines—"fixed case

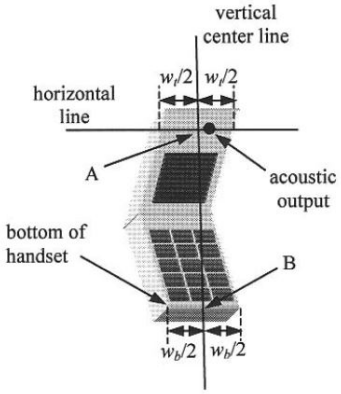


Fig 12.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

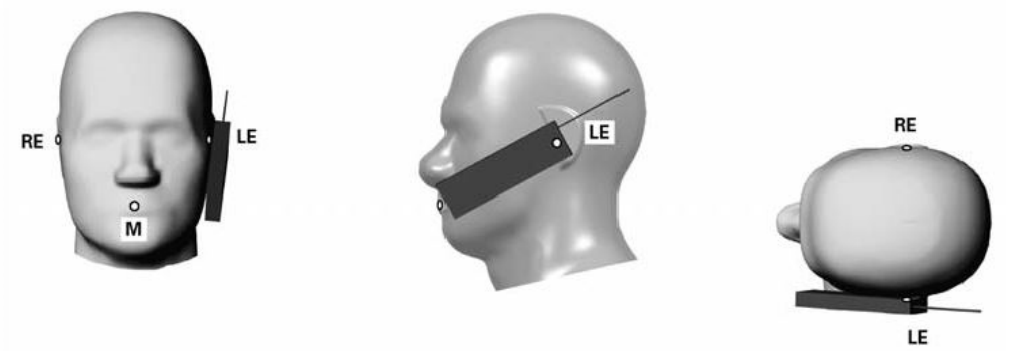


Fig 12.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

12.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 12.3.1. 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

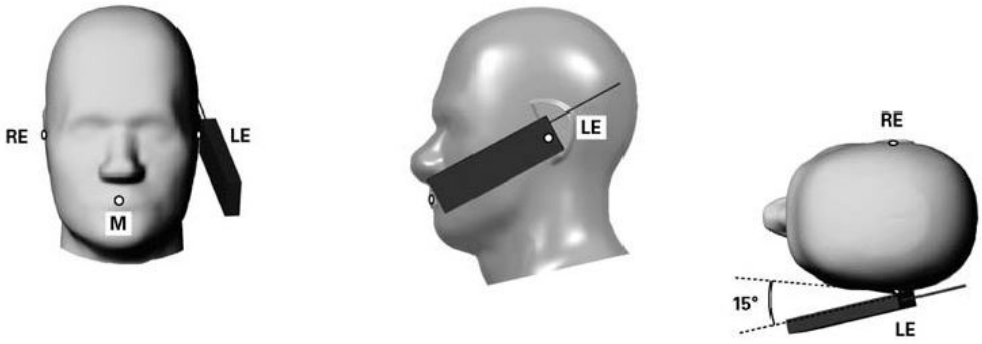


Fig 12.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

12.4 Body Worn Accessory

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 12.4). Per KDB648474 D04v01r03, body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for body-worn accessory, measured without a headset connected to the handset is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a handset attached to the handset.

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

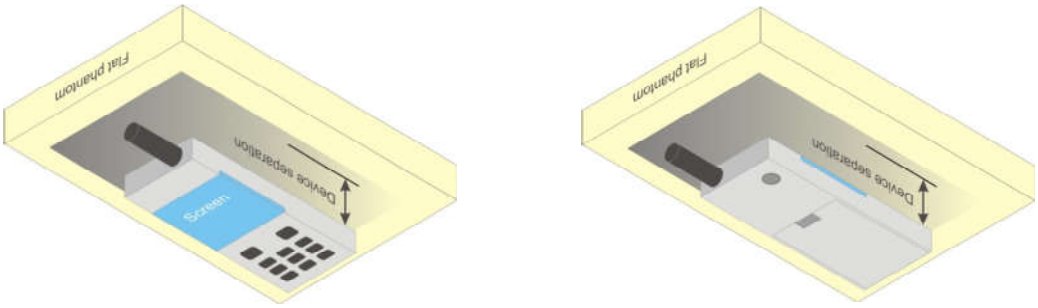


Fig 12.4 Body Worn Position

12.5 Product Specific 10g SAR Exposure

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

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.

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

12.6 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets (L x W ≥ 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 form general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

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

13. Conducted RF Output Power (Unit: dBm)

The detailed conducted power table can refer to Appendix E.

<GSM Conducted Power>

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS 2Tx slots for GSM850 and GSM1900 are considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode, SAR measurement is not required for the secondary mode.

<WCDMA Conducted Power>

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

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_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: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

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

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_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 β_c/β_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 β_c = 11/15 and β_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 (β_c and β_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-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	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	$\beta_{ed}1$: 47/15 $\beta_{ed}2$: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c. For sub-test 5, Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 5/15 with β_{hs} = 5/15 * β_c.

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

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

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

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

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

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

a. The EUT was connected to Base Station 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 (β_c and β_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: β_c/β_d=2/15
      b). Subtest 2: β_c/β_d=12/15
      c). Subtest 3: β_c/β_d=15/8
      d). Subtest 4: β_c/β_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	Proces ses	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.		
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

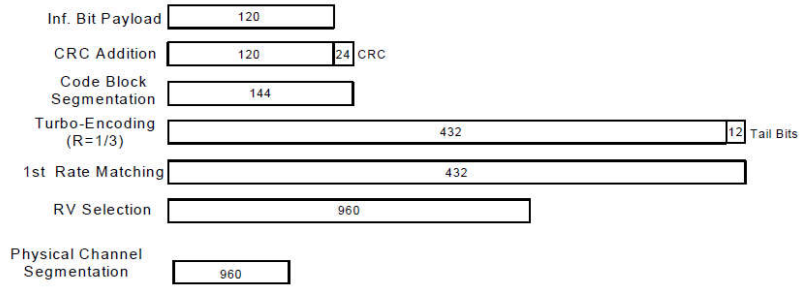


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<WCDMA Conducted Power>

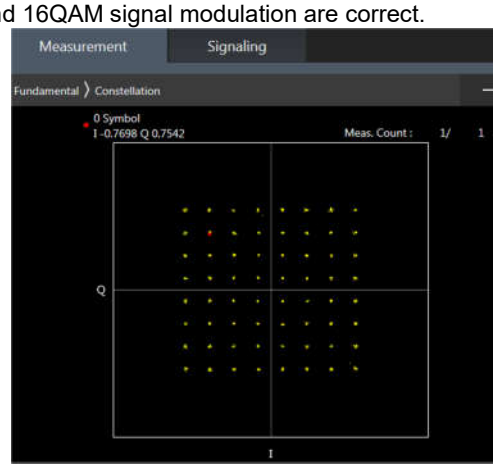
General Note:

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

<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 ≤ 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/64QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B5/B26/B38 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. LTE B5 SAR test was covered by B26; 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 ≤ the larger band to qualify for the SAR test exclusion
   b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band
10. According to May 2017 TCB workshop, for 64 QAM and 16 QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



64QAM

16QAM

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

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

a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations

b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS

c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

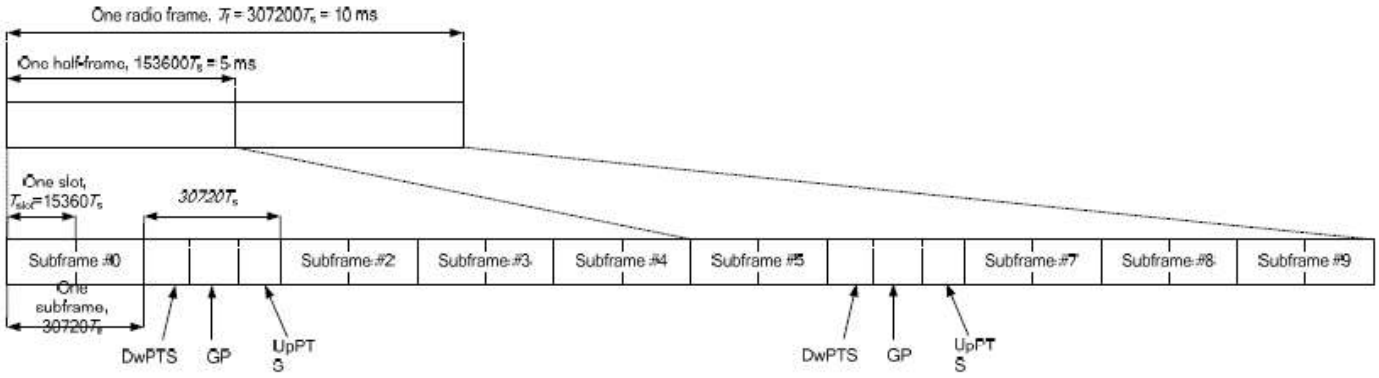


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

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

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

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

Special subframe (30720·T_s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~4**	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T_s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	**Normal cyclic prefix in uplink**	**Extended cyclic prefix in uplink**
Uplink duty factor in one special subframe	**0~3**	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

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

<WLAN Conducted Power>

General Note:

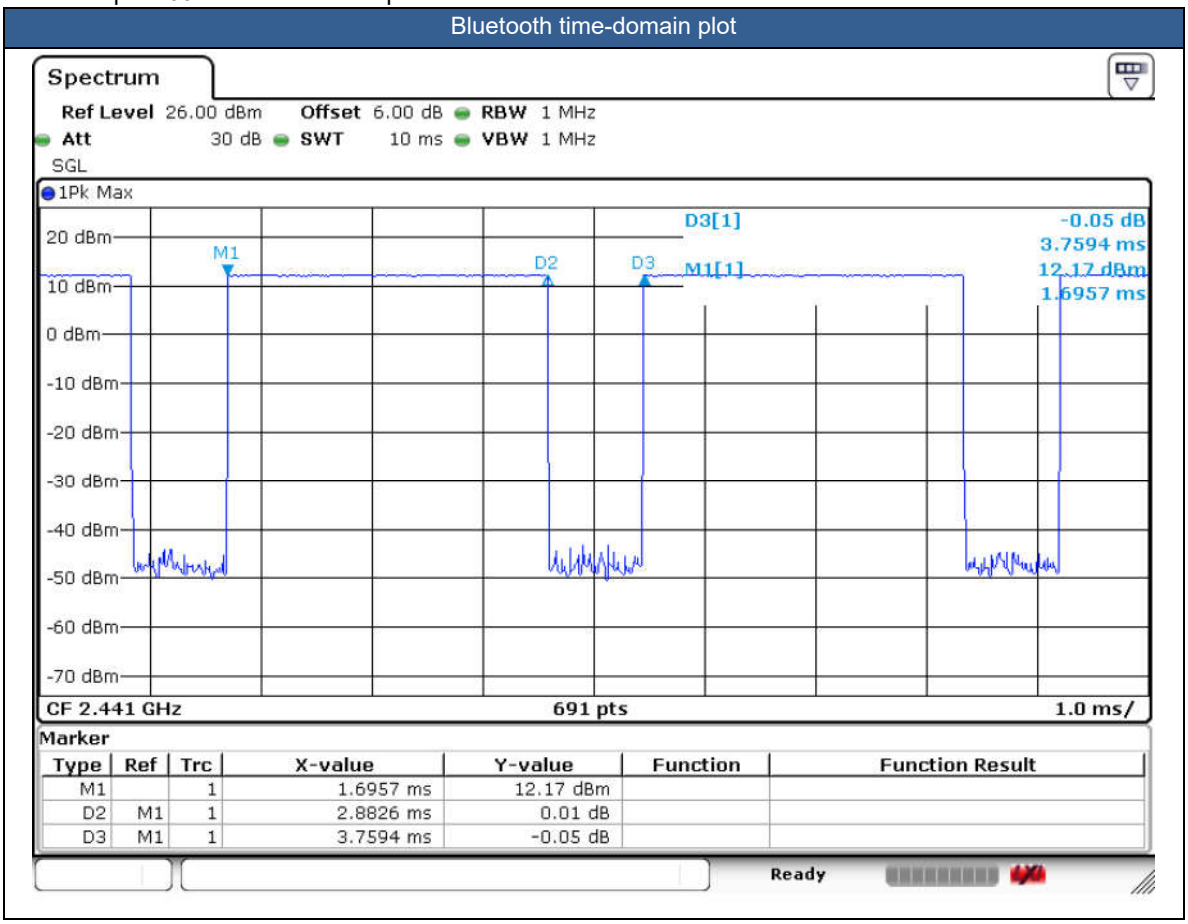
1. Per KDB 248227 D01v02r02, SAR test reduction is determined according to 802.11 transmission mode configurations and certain exposure conditions with multiple test positions. In the 2.4 GHz band, separate SAR procedures are applied to DSSS and OFDM configurations to simplify DSSS test requirements. 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 ≤ 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 ≤ 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 ≤ 1.2 W/kg or all required channels are tested.

<2.4GHz Bluetooth>

General Note:

1. For 2.4GHz Bluetooth SAR testing was selected 1Mbps, due to its highest average power.
2. The Bluetooth duty cycle is 76.68% as following figure, according to 2016 Oct. TCB workshop for Bluetooth SAR scaling need further consideration and the maximum duty cycle is 100%, therefore the actual duty cycle will be scaled up to100% for Bluetooth reported SAR calculation

Bluetooth time-domain plot



14. Antenna Location

The detailed antenna location information can refer to SAR Test Setup Photos.

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 BT/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 BT/WLAN: Reported SAR(W/kg)= Measured SAR(W/kg)* Duty Cycle scaling factor * Tune-up scaling factor
   e. For TDD LTE SAR measurement of power class 3, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result. The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
   - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
   - ≤ 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
   - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8W/kg. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The device implements the power management and proximity sensor /receiver detection/hotspot mode for SAR compliance at different exposure conditions (head, body-worn, hotspot, extremity) and the details about the power management decision and sensor detection are provided in the operational description. And the device will invoke corresponding work scenarios power level base on frequency bands/antennas, which can refer to power table at appendix E.
5. For some WWAN bands, sensor on reduced power level is higher than hotspot reduced power level, so front/back sensor on SAR can represent hotspot conservatively.
6. For dual SIM card mobile has two SIM slots and supports dual SIM dual standby. The WWAN radio transmission will be enabled by either one SIM at a time (single active). After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose SIM1 slot to perform all tests.
7. There are two samples. The difference between them could be referred to the XT2235-3_Operational Description of Product Equality Declaration which is exhibited separately. According to the difference, we choose sample 1 for full testing and sample 2 for worst case verification.
8. The device has two headsets. Only suppliers are different. So we chose headset 1 to perform full SAR testing only.
9. This device has two batteries. For battery 1 was in sample 1, and battery 2 was in sample 2. They were all evaluated for SAR testing conservatively.
10. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg, however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.
    a. For this device SAR for WWAN/WLAN transmitter scaled to maximum output power mode for product specific 10g SAR is higher than 1.2W/kg of GSM850/1900, WCDMA Band II, LTE Band 2/5/7/26/38/41, WLAN 5.2GHz/5.8GHz, therefore product specific 10g SAR is necessary.
    b. WLAN 5.3/5.5GHz tested the product specific 10g SAR since it has no hotspot mode.
    c. When 10-g product specific 10g SAR is considered, SAR thresholds is specified in the procedures for SAR test reduction and exclusion should be multiplied by 2.5.
11. For distance SAR and non-distance SAR, always chose higher SAR to do co-located analysis.

GSM Note:

1. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS 2Tx slots for GSM850 and GSM1900 are considered as the primary mode.
2. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode, SAR measurement is not required for the secondary mode.

WCDMA Note:

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

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 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/64QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B5/B26/B38 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
7. LTE B5 SAR test was covered by B26; 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 ≤ 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 ≤ 1.2 W/kg.
2. Per KDB 248227 D01v02r02, U-NII-1 SAR testing is not required when the U-NII-2A band highest reported SAR for a test configuration is ≤ 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 ≤ 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 ≤ 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

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	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)
835MHz																					
01	GSM850	-	-	-	-	GPRS(2 Tx slots)	Right Cheek	0mm	Ant1	Full	189	836.4	1	30.86	32.00	1.300	-	-	-0.16	0.200	**0.260**
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Right Tilted	0mm	Ant1	Full	189	836.4	1	30.86	32.00	1.300	-	-	-0.12	0.090	0.117
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Left Cheek	0mm	Ant1	Full	189	836.4	1	30.86	32.00	1.300	-	-	0.16	0.164	0.213
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Left Tilted	0mm	Ant1	Full	189	836.4	1	30.86	32.00	1.300	-	-	0.02	0.066	0.086
02	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant1	Full	4182	836.4	1	23.35	24.00	1.161	-	-	0.01	0.247	**0.287**
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant1	Full	4182	836.4	2	23.35	24.00	1.161	-	-	-0.19	0.239	0.278
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant1	Full	4182	836.4	1	23.35	24.00	1.161	-	-	0.03	0.115	0.134
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant1	Full	4182	836.4	1	23.35	24.00	1.161	-	-	0.12	0.218	0.253
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant1	Full	4182	836.4	1	23.35	24.00	1.161	-	-	0.11	0.109	0.127
03	LTE Band 26	15M	QPSK	1	37	-	Right Cheek	0mm	Ant1	Full	26865	831.5	1	23.42	24.00	1.143	-	-	-0.01	0.236	**0.270**
	LTE Band 26	15M	QPSK	1	37	-	Right Tilted	0mm	Ant1	Full	26865	831.5	1	23.42	24.00	1.143	-	-	0.03	0.121	0.138
	LTE Band 26	15M	QPSK	1	37	-	Left Cheek	0mm	Ant1	Full	26865	831.5	1	23.42	24.00	1.143	-	-	-0.16	0.203	0.232
	LTE Band 26	15M	QPSK	1	37	-	Left Tilted	0mm	Ant1	Full	26865	831.5	1	23.42	24.00	1.143	-	-	-0.13	0.102	0.117
	LTE Band 26	15M	QPSK	36	0	-	Right Cheek	0mm	Ant1	Full	26865	831.5	1	22.23	23.00	1.194	-	-	0.1	0.111	0.133
	LTE Band 26	15M	QPSK	36	0	-	Right Tilted	0mm	Ant1	Full	26865	831.5	1	22.23	23.00	1.194	-	-	0.16	0.060	0.072
	LTE Band 26	15M	QPSK	36	0	-	Left Cheek	0mm	Ant1	Full	26865	831.5	1	22.23	23.00	1.194	-	-	-0.14	0.102	0.122
	LTE Band 26	15M	QPSK	36	0	-	Left Tilted	0mm	Ant1	Full	26865	831.5	1	22.23	23.00	1.194	-	-	-0.16	0.051	0.061
1900MHz																					
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Right Cheek	0mm	Ant1	Full	661	1880	1	27.44	28.50	1.276	-	-	-0.16	0.090	0.115
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Right Tilted	0mm	Ant1	Full	661	1880	1	27.44	28.50	1.276	-	-	-0.09	0.077	0.098
04	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Left Cheek	0mm	Ant1	Full	661	1880	1	27.44	28.50	1.276	-	-	-0.04	0.140	**0.179**
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Left Tilted	0mm	Ant1	Full	661	1880	1	27.44	28.50	1.276	-	-	0.08	0.062	0.079
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Cheek	0mm	Ant1	Full	9400	1880	1	22.92	24.00	1.282	-	-	-0.09	0.134	0.172
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Tilted	0mm	Ant1	Full	9400	1880	1	22.92	24.00	1.282	-	-	0.12	0.120	0.154
05	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant1	Full	9400	1880	1	22.92	24.00	1.282	-	-	0.02	0.179	**0.230**
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Cheek	0mm	Ant1	Full	9400	1880	2	22.92	24.00	1.282	-	-	-0.14	0.167	0.214
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Tilted	0mm	Ant1	Full	9400	1880	1	22.92	24.00	1.282	-	-	-0.01	0.119	0.153
	LTE Band 2	20M	QPSK	1	49	-	Right Cheek	0mm	Ant1	Full	18900	1880	1	23.05	24.00	1.245	-	-	0.11	0.124	0.154
	LTE Band 2	20M	QPSK	1	49	-	Right Tilted	0mm	Ant1	Full	18900	1880	1	23.05	24.00	1.245	-	-	-0.16	0.116	0.144
06	LTE Band 2	20M	QPSK	1	49	-	Left Cheek	0mm	Ant1	Full	18900	1880	1	23.05	24.00	1.245	-	-	-0.03	0.157	**0.195**
	LTE Band 2	20M	QPSK	1	49	-	Left Tilted	0mm	Ant1	Full	18900	1880	1	23.05	24.00	1.245	-	-	0.1	0.112	0.139
	LTE Band 2	20M	QPSK	50	0	-	Right Cheek	0mm	Ant1	Full	18900	1880	1	21.89	23.00	1.291	-	-	0.1	0.073	0.094
	LTE Band 2	20M	QPSK	50	0	-	Right Tilted	0mm	Ant1	Full	18900	1880	1	21.89	23.00	1.291	-	-	0.04	0.061	0.079
	LTE Band 2	20M	QPSK	50	0	-	Left Cheek	0mm	Ant1	Full	18900	1880	1	21.89	23.00	1.291	-	-	0.05	0.103	0.133
	LTE Band 2	20M	QPSK	50	0	-	Left Tilted	0mm	Ant1	Full	18900	1880	1	21.89	23.00	1.291	-	-	-0.13	0.045	0.058
2600MHz																					
	LTE Band 7	20M	QPSK	1	49	-	Right Cheek	0mm	Ant1	Full	20850	2510	1	22.92	24.00	1.282	-	-	-0.11	0.218	0.280
	LTE Band 7	20M	QPSK	1	49	-	Right Tilted	0mm	Ant1	Full	20850	2510	1	22.92	24.00	1.282	-	-	-0.13	0.179	0.230
07	LTE Band 7	20M	QPSK	1	49	-	Left Cheek	0mm	Ant1	Full	20850	2510	1	22.92	24.00	1.282	-	-	0.05	0.489	**0.627**
	LTE Band 7	20M	QPSK	1	49	-	Left Tilted	0mm	Ant1	Full	20850	2510	1	22.92	24.00	1.282	-	-	-0.08	0.303	0.389
	LTE Band 7	20M	QPSK	50	0	-	Right Cheek	0mm	Ant1	Full	20850	2510	1	21.97	23.00	1.268	-	-	0.15	0.117	0.148
	LTE Band 7	20M	QPSK	50	0	-	Right Tilted	0mm	Ant1	Full	20850	2510	1	21.97	23.00	1.268	-	-	-0.12	0.097	0.123
	LTE Band 7	20M	QPSK	50	0	-	Left Cheek	0mm	Ant1	Full	20850	2510	1	21.97	23.00	1.268	-	-	-0.1	0.215	0.273
	LTE Band 7	20M	QPSK	50	0	-	Left Tilted	0mm	Ant1	Full	20850	2510	1	21.97	23.00	1.268	-	-	-0.07	0.119	0.151
	LTE Band 38	20M	QPSK	1	49	-	Right Cheek	0mm	Ant1	Full	38000	2595	1	22.99	24.00	1.262	62.9	1.006	-0.11	0.151	0.192
	LTE Band 38	20M	QPSK	1	49	-	Right Tilted	0mm	Ant1	Full	38000	2595	1	22.99	24.00	1.262	62.9	1.006	0.03	0.124	0.157
08	LTE Band 38	20M	QPSK	1	49	-	Left Cheek	0mm	Ant1	Full	38000	2595	1	22.99	24.00	1.262	62.9	1.006	0.11	0.371	**0.471**
	LTE Band 38	20M	QPSK	1	49	-	Left Tilted	0mm	Ant1	Full	38000	2595	1	22.99	24.00	1.262	62.9	1.006	-0.11	0.181	0.230
	LTE Band 38	20M	QPSK	50	0	-	Right Cheek	0mm	Ant1	Full	38000	2595	1	22.51	23.00	1.119	62.9	1.006	-0.04	0.086	0.097

	LTE Band 38	20M	QPSK	50	0	-	Right Tilted	0mm	Ant1	Full	38000	2595	1	22.51	23.00	1.119	62.9	1.006	0.07	0.070	0.079
	LTE Band 38	20M	QPSK	50	0	-	Left Cheek	0mm	Ant1	Full	38000	2595	1	22.51	23.00	1.119	62.9	1.006	0.13	0.183	0.206
	LTE Band 38	20M	QPSK	50	0	-	Left Tilted	0mm	Ant1	Full	38000	2595	1	22.51	23.00	1.119	62.9	1.006	-0.04	0.100	0.113
	LTE Band 41	20M	QPSK	1	49	-	Right Cheek	0mm	Ant1	Full	40185	2549.5	1	23.19	24.00	1.205	62.9	1.006	0.02	0.161	0.195
	LTE Band 41	20M	QPSK	1	49	-	Right Tilted	0mm	Ant1	Full	40185	2549.5	1	23.19	24.00	1.205	62.9	1.006	0.03	0.129	0.156
09	LTE Band 41	20M	QPSK	1	49	-	Left Cheek	0mm	Ant1	Full	40185	2549.5	1	23.19	24.00	1.205	62.9	1.006	-0.11	0.348	**0.422**
	LTE Band 41	20M	QPSK	1	49	-	Left Tilted	0mm	Ant1	Full	40185	2549.5	1	23.19	24.00	1.205	62.9	1.006	0.02	0.175	0.212
	LTE Band 41	20M	QPSK	50	0	-	Right Cheek	0mm	Ant1	Full	40185	2549.5	1	22.68	23.00	1.076	62.9	1.006	0.03	0.095	0.103
	LTE Band 41	20M	QPSK	50	0	-	Right Tilted	0mm	Ant1	Full	40185	2549.5	1	22.68	23.00	1.076	62.9	1.006	-0.03	0.079	0.086
	LTE Band 41	20M	QPSK	50	0	-	Left Cheek	0mm	Ant1	Full	40185	2549.5	1	22.68	23.00	1.076	62.9	1.006	0.04	0.195	0.211
	LTE Band 41	20M	QPSK	50	0	-	Left Tilted	0mm	Ant1	Full	40185	2549.5	1	22.68	23.00	1.076	62.9	1.006	-0.02	0.105	0.114

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	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)
2450MHz																	
	Bluetooth	DH5 1Mbps	Right Cheek	0mm	Ant 3	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	0.05	0.040	0.060
	Bluetooth	DH5 1Mbps	Right Tilted	0mm	Ant 3	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	0.02	0.042	0.063
10	Bluetooth	DH5 1Mbps	Left Cheek	0mm	Ant 3	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	0.07	0.104	**0.156**
	Bluetooth	DH5 1Mbps	Left Tilted	0mm	Ant 3	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	0.1	0.095	0.142
	WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0mm	Ant 3	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	0.02	0.220	0.342
	WLAN2.4GHz	802.11b 1Mbps	Right Tilted	0mm	Ant 3	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	0.07	0.192	0.299
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 3	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	0.05	0.597	0.929
	WLAN2.4GHz	802.11b 1Mbps	Left Tilted	0mm	Ant 3	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	0.12	0.512	0.797
11	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 3	Full	1	2412	1	19.04	21.00	1.570	98.61	1.014	-0.07	0.690	**1.099**
	WLAN2.4GHz	802.11b 1Mbps	Left Cheek	0mm	Ant 3	Full	1	2412	2	19.04	21.00	1.570	98.61	1.014	-0.07	0.636	1.013
5000MHz																	
	WLAN5.3GHz	802.11n-HT40 MCS0	Right Cheek	0mm	Ant 3	Reduced	54	5270	1	17.15	18.50	1.365	96.3	1.038	0.05	0.427	0.605
	WLAN5.3GHz	802.11n-HT40 MCS0	Right Tilted	0mm	Ant 3	Reduced	54	5270	1	17.15	18.50	1.365	96.3	1.038	0.14	0.471	0.667
12	WLAN5.3GHz	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 3	Reduced	54	5270	1	17.15	18.50	1.365	96.3	1.038	-0.1	0.720	**1.020**
	WLAN5.3GHz	802.11n-HT40 MCS0	Left Tilted	0mm	Ant 3	Reduced	54	5270	1	17.15	18.50	1.365	96.3	1.038	0.08	0.718	1.017
	WLAN5.3GHz	802.11n-HT40 MCS0	Left Cheek	0mm	Ant 3	Reduced	62	5310	1	14.34	16.00	1.464	96.3	1.038	-0.08	0.455	0.692
	WLAN5.3GHz	802.11n-HT40 MCS0	Left Tilted	0mm	Ant 3	Reduced	62	5310	1	14.34	16.00	1.464	96.3	1.038	0.02	0.451	0.685
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Cheek	0mm	Ant 3	Reduced	122	5610	1	13.76	15.50	1.493	92.71	1.079	-0.11	0.240	0.387
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Tilted	0mm	Ant 3	Reduced	122	5610	1	13.76	15.50	1.493	92.71	1.079	0.03	0.335	0.540
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 3	Reduced	122	5610	1	13.76	15.50	1.493	92.71	1.079	-0.06	0.455	0.733
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Tilted	0mm	Ant 3	Reduced	122	5610	1	13.76	15.50	1.493	92.71	1.079	0.09	0.528	0.850
13	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Tilted	0mm	Ant 3	Reduced	138	5690	1	13.60	15.50	1.549	92.71	1.079	-0.01	0.681	**1.138**
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Tilted	0mm	Ant 3	Reduced	138	5690	2	13.60	15.50	1.549	92.71	1.079	-0.06	0.678	1.133
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Right Cheek	0mm	Ant 3	Reduced	155	5775	1	14.78	16.50	1.486	92.71	1.079	0.09	0.356	0.571
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Right Tilted	0mm	Ant 3	Reduced	155	5775	1	14.78	16.50	1.486	92.71	1.079	0.04	0.456	0.731
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Cheek	0mm	Ant 3	Reduced	155	5775	1	14.78	16.50	1.486	92.71	1.079	0.06	0.579	0.928
14	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Tilted	0mm	Ant 3	Reduced	155	5775	1	14.78	16.50	1.486	92.71	1.079	-0.03	0.702	**1.126**

15.2 Hotspot SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	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)
835MHz																					
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Front	5mm	Ant1	Reduced	189	836.4	1	30.37	31.50	1.297	-	-	0.03	0.340	0.441
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	Reduced	189	836.4	1	30.37	31.50	1.297	-	-	-0.16	0.845	1.096
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Left Side	5mm	Ant1	Reduced	189	836.4	1	30.37	31.50	1.297	-	-	-0.07	0.176	0.228
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Right Side	5mm	Ant1	Reduced	189	836.4	1	30.37	31.50	1.297	-	-	0.16	0.260	0.337
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Bottom Side	5mm	Ant1	Reduced	189	836.4	1	30.37	31.50	1.297	-	-	0.17	0.518	0.672
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	Reduced	128	824.2	1	30.27	31.50	1.327	-	-	-0.19	0.672	0.892
15	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	Reduced	251	848.8	1	30.29	31.50	1.321	-	-	-0.09	1.020	**1.348**
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	Reduced	251	848.8	2	30.29	31.50	1.321	-	-	0.14	1.000	1.321
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Front	5mm	Ant1	Full	4182	836.4	1	23.35	24.00	1.161	-	-	0.15	0.475	0.552
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	Full	4182	836.4	1	23.35	24.00	1.161	-	-	-0.12	0.918	1.066
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Left Side	5mm	Ant1	Full	4182	836.4	1	23.35	24.00	1.161	-	-	0.1	0.278	0.323
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Right Side	5mm	Ant1	Full	4182	836.4	1	23.35	24.00	1.161	-	-	-0.09	0.410	0.476
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Side	5mm	Ant1	Full	4182	836.4	1	23.35	24.00	1.161	-	-	0.03	0.755	0.877
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Side	5mm	Ant1	Full	4132	826.4	1	23.30	24.00	1.175	-	-	-0.18	0.619	0.727
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Bottom Side	5mm	Ant1	Full	4233	846.6	1	23.20	24.00	1.202	-	-	-0.15	0.803	0.965
16	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	Full	4132	826.4	1	23.30	24.00	1.175	-	-	-0.04	0.979	**1.150**
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	Full	4233	846.6	1	23.20	24.00	1.202	-	-	-0.1	0.915	1.100
	LTE Band 26	15M	QPSK	1	37	-	Front	5mm	Ant1	Full	26865	831.5	1	23.42	24.00	1.143	-	-	-0.09	0.491	0.561
17	LTE Band 26	15M	QPSK	1	37	-	Back	5mm	Ant1	Full	26865	831.5	1	23.42	24.00	1.143	-	-	-0.13	1.120	**1.280**
	LTE Band 26	15M	QPSK	1	37	-	Left Side	5mm	Ant1	Full	26865	831.5	1	23.42	24.00	1.143	-	-	0.08	0.295	0.337
	LTE Band 26	15M	QPSK	1	37	-	Right Side	5mm	Ant1	Full	26865	831.5	1	23.42	24.00	1.143	-	-	-0.09	0.405	0.463
	LTE Band 26	15M	QPSK	1	37	-	Bottom Side	5mm	Ant1	Full	26865	831.5	1	23.42	24.00	1.143	-	-	0.11	0.745	0.851
	LTE Band 26	15M	QPSK	36	0	-	Front	5mm	Ant1	Full	26865	831.5	1	22.23	23.00	1.194	-	-	-0.01	0.339	0.405
	LTE Band 26	15M	QPSK	36	0	-	Back	5mm	Ant1	Full	26865	831.5	1	22.23	23.00	1.194	-	-	-0.16	0.650	0.776
	LTE Band 26	15M	QPSK	36	0	-	Left Side	5mm	Ant1	Full	26865	831.5	1	22.23	23.00	1.194	-	-	-0.08	0.202	0.241
	LTE Band 26	15M	QPSK	36	0	-	Right Side	5mm	Ant1	Full	26865	831.5	1	22.23	23.00	1.194	-	-	-0.17	0.255	0.304
	LTE Band 26	15M	QPSK	36	0	-	Bottom Side	5mm	Ant1	Full	26865	831.5	1	22.23	23.00	1.194	-	-	0.03	0.489	0.584
	LTE Band 26	15M	QPSK	75	0	-	Back	5mm	Ant1	Full	26865	831.5	1	22.21	23.00	1.199	-	-	0.02	0.599	0.719
	LTE Band 26	15M	QPSK	75	0	-	Bottom Side	5mm	Ant1	Full	26865	831.5	1	22.21	23.00	1.199	-	-	-0.09	0.426	0.511
1900MHz																					
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Front	5mm	Ant1	Reduced	661	1880	1	25.45	26.50	1.274	-	-	-0.19	0.347	0.442
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	Reduced	661	1880	1	25.45	26.50	1.274	-	-	0.06	0.712	0.907
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Left Side	5mm	Ant1	Reduced	661	1880	1	25.45	26.50	1.274	-	-	-0.04	0.235	0.299
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Right Side	5mm	Ant1	Reduced	661	1880	1	25.45	26.50	1.274	-	-	-0.16	0.086	0.110
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Bottom Side	5mm	Ant1	Reduced	661	1880	1	25.45	26.50	1.274	-	-	0.17	0.909	1.158
18	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Bottom Side	5mm	Ant1	Reduced	512	1850.2	1	25.41	26.50	1.285	-	-	0.08	1.060	**1.362**
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Bottom Side	5mm	Ant1	Reduced	810	1909.8	1	25.38	26.50	1.294	-	-	-0.08	1.040	1.346
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	Reduced	512	1850.2	1	25.41	26.50	1.285	-	-	-0.05	0.885	1.137
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	Reduced	810	1909.8	1	25.38	26.50	1.294	-	-	-0.15	0.796	1.030
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Front	5mm	Ant1	Reduced	9400	1880	1	18.93	20.00	1.279	-	-	0.14	0.411	0.526
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	Reduced	9400	1880	1	18.93	20.00	1.279	-	-	0.07	0.879	1.125
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Left Side	5mm	Ant1	Reduced	9400	1880	1	18.93	20.00	1.279	-	-	0.02	0.297	0.380
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Right Side	5mm	Ant1	Reduced	9400	1880	1	18.93	20.00	1.279	-	-	-0.07	0.108	0.138
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	5mm	Ant1	Reduced	9400	1880	1	18.93	20.00	1.279	-	-	0.18	1.010	1.292
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	5mm	Ant1	Reduced	9262	1852.4	1	18.88	20.00	1.294	-	-	-0.05	1.000	1.294
19	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	5mm	Ant1	Reduced	9538	1907.6	1	18.91	20.00	1.285	-	-	-0.13	1.110	**1.427**
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	5mm	Ant1	Reduced	9538	1907.6	2	18.91	20.00	1.285	-	-	-0.03	0.965	1.240
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	Reduced	9262	1852.4	1	18.88	20.00	1.294	-	-	0.15	0.885	1.145
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	Reduced	9538	1907.6	1	18.91	20.00	1.285	-	-	0.16	0.978	1.257

	LTE Band 2	20M	QPSK	1	49	-	Front	5mm	Ant1	Reduced	18900	1880	1	19.58	20.50	1.236	-	-	-0.17	0.395	0.488
	LTE Band 2	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	18900	1880	1	19.58	20.50	1.236	-	-	0.17	0.851	1.052
	LTE Band 2	20M	QPSK	1	49	-	Left Side	5mm	Ant1	Reduced	18900	1880	1	19.58	20.50	1.236	-	-	-0.11	0.292	0.361
	LTE Band 2	20M	QPSK	1	49	-	Right Side	5mm	Ant1	Reduced	18900	1880	1	19.58	20.50	1.236	-	-	-0.18	0.098	0.121
	LTE Band 2	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	18900	1880	1	19.58	20.50	1.236	-	-	-0.06	1.020	1.261
	LTE Band 2	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	18700	1860	1	19.45	20.50	1.274	-	-	0.01	0.972	1.238
20	LTE Band 2	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	19100	1900	1	19.40	20.50	1.288	-	-	-0.04	0.985	**1.269**
	LTE Band 2	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	18700	1860	1	19.45	20.50	1.274	-	-	0.08	0.791	1.007
	LTE Band 2	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	19100	1900	1	19.40	20.50	1.288	-	-	0.16	0.875	1.127
	LTE Band 2	20M	QPSK	50	0	-	Front	5mm	Ant1	Reduced	18900	1880	1	19.55	20.50	1.245	-	-	0.16	0.380	0.473
	LTE Band 2	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	18900	1880	1	19.55	20.50	1.245	-	-	-0.1	0.795	0.989
	LTE Band 2	20M	QPSK	50	0	-	Left Side	5mm	Ant1	Reduced	18900	1880	1	19.55	20.50	1.245	-	-	-0.1	0.286	0.356
	LTE Band 2	20M	QPSK	50	0	-	Right Side	5mm	Ant1	Reduced	18900	1880	1	19.55	20.50	1.245	-	-	0.06	0.090	0.112
	LTE Band 2	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	18900	1880	1	19.55	20.50	1.245	-	-	0.15	0.930	1.157
	LTE Band 2	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	18700	1860	1	19.48	20.50	1.265	-	-	0.16	0.950	1.201
	LTE Band 2	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	19100	1900	1	19.42	20.50	1.282	-	-	0.1	0.969	1.243
	LTE Band 2	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	18700	1860	1	19.48	20.50	1.265	-	-	-0.17	0.782	0.989
	LTE Band 2	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	19100	1900	1	19.42	20.50	1.282	-	-	-0.05	0.823	1.055
	LTE Band 2	20M	QPSK	100	0	-	Back	5mm	Ant1	Reduced	18900	1880	1	19.54	20.50	1.247	-	-	0.17	0.803	1.002
	LTE Band 2	20M	QPSK	100	0	-	Bottom Side	5mm	Ant1	Reduced	18900	1880	1	19.54	20.50	1.247	-	-	-0.05	0.956	1.192
2600MHz																					
	LTE Band 7	20M	QPSK	1	49	-	Front	5mm	Ant1	Reduced	20850	2510	1	17.45	18.50	1.274	-	-	0.13	0.412	0.525
	LTE Band 7	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	20850	2510	1	17.45	18.50	1.274	-	-	0.18	0.639	0.814
	LTE Band 7	20M	QPSK	1	49	-	Left Side	5mm	Ant1	Reduced	20850	2510	1	17.45	18.50	1.274	-	-	0.12	0.288	0.367
	LTE Band 7	20M	QPSK	1	49	-	Right Side	5mm	Ant1	Reduced	20850	2510	1	17.45	18.50	1.274	-	-	-0.16	0.076	0.097
	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	20850	2510	1	17.45	18.50	1.274	-	-	0.09	0.785	1.000
	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	21100	2535	1	17.37	18.50	1.297	-	-	0.05	0.844	1.095
21	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	21350	2560	1	17.40	18.50	1.288	-	-	-0.03	1.060	**1.366**
	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	21350	2560	2	17.40	18.50	1.288	-	-	0.02	0.918	1.183
	LTE Band 7	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	21100	2535	1	17.37	18.50	1.297	-	-	0.01	1.030	1.336
	LTE Band 7	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	21350	2560	1	17.40	18.50	1.288	-	-	-0.17	0.822	1.059
	LTE Band 7	20M	QPSK	50	0	-	Front	5mm	Ant1	Reduced	20850	2510	1	17.41	18.50	1.285	-	-	0.04	0.403	0.518
	LTE Band 7	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	20850	2510	1	17.41	18.50	1.285	-	-	0.14	0.636	0.817
	LTE Band 7	20M	QPSK	50	0	-	Left Side	5mm	Ant1	Reduced	20850	2510	1	17.41	18.50	1.285	-	-	0.17	0.263	0.338
	LTE Band 7	20M	QPSK	50	0	-	Right Side	5mm	Ant1	Reduced	20850	2510	1	17.41	18.50	1.285	-	-	0.11	0.074	0.095
	LTE Band 7	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	20850	2510	1	17.41	18.50	1.285	-	-	-0.01	0.720	0.925
	LTE Band 7	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	21100	2535	1	17.34	18.50	1.306	-	-	0.18	0.819	1.070
	LTE Band 7	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	21350	2560	1	17.35	18.50	1.303	-	-	0.12	0.800	1.043
	LTE Band 7	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	21100	2535	1	17.34	18.50	1.306	-	-	0.05	0.708	0.925
	LTE Band 7	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	21350	2560	1	17.35	18.50	1.303	-	-	-0.01	0.717	0.934
	LTE Band 7	20M	QPSK	100	0	-	Back	5mm	Ant1	Reduced	20850	2510	1	17.36	18.50	1.300	-	-	-0.13	0.631	0.820
	LTE Band 7	20M	QPSK	100	0	-	Bottom Side	5mm	Ant1	Reduced	20850	2510	1	17.36	18.50	1.300	-	-	-0.07	0.785	1.021
	LTE Band 38	20M	QPSK	1	49	-	Front	5mm	Ant1	Reduced	38000	2595	1	20.00	21.00	1.259	62.9	1.006	0.03	0.580	0.735
	LTE Band 38	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	38000	2595	1	20.00	21.00	1.259	62.9	1.006	0.02	0.880	1.115
	LTE Band 38	20M	QPSK	1	49	-	Left Side	5mm	Ant1	Reduced	38000	2595	1	20.00	21.00	1.259	62.9	1.006	0.18	0.420	0.532
	LTE Band 38	20M	QPSK	1	49	-	Right Side	5mm	Ant1	Reduced	38000	2595	1	20.00	21.00	1.259	62.9	1.006	0.07	0.082	0.104
22	LTE Band 38	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	38000	2595	1	20.00	21.00	1.259	62.9	1.006	-0.03	0.904	**1.145**
	LTE Band 38	20M	QPSK	50	0	-	Front	5mm	Ant1	Reduced	38000	2595	1	19.94	21.00	1.276	62.9	1.006	0.07	0.471	0.605
	LTE Band 38	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	38000	2595	1	19.94	21.00	1.276	62.9	1.006	-0.11	0.597	0.767
	LTE Band 38	20M	QPSK	50	0	-	Left Side	5mm	Ant1	Reduced	38000	2595	1	19.94	21.00	1.276	62.9	1.006	-0.16	0.379	0.487
	LTE Band 38	20M	QPSK	50	0	-	Right Side	5mm	Ant1	Reduced	38000	2595	1	19.94	21.00	1.276	62.9	1.006	-0.17	0.076	0.098
	LTE Band 38	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	38000	2595	1	19.94	21.00	1.276	62.9	1.006	-0.18	0.819	1.052
	LTE Band 38	20M	QPSK	100	0	-	Back	5mm	Ant1	Reduced	38000	2595	1	19.87	21.00	1.297	62.9	1.006	0.05	0.625	0.816
	LTE Band 38	20M	QPSK	100	0	-	Bottom Side	5mm	Ant1	Reduced	38000	2595	1	19.87	21.00	1.297	62.9	1.006	-0.15	0.808	1.054
	LTE Band 41	20M	QPSK	1	49	-	Front	5mm	Ant1	Reduced	40185	2549.5	1	20.42	21.50	1.282	62.9	1.006	0.19	0.530	0.684
	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	40185	2549.5	1	20.42	21.50	1.282	62.9	1.006	0.19	0.975	1.258

	LTE Band 41	20M	QPSK	1	49	-	Left Side	5mm	Ant1	Reduced	40185	2549.5	1	20.42	21.50	1.282	62.9	1.006	0.19	0.342	0.441
	LTE Band 41	20M	QPSK	1	49	-	Right Side	5mm	Ant1	Reduced	40185	2549.5	1	20.42	21.50	1.282	62.9	1.006	0.08	0.109	0.141
23	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	40185	2549.5	1	20.42	21.50	1.282	62.9	1.006	-0.14	1.020	**1.316**
	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	39750	2506	1	20.13	21.50	1.371	62.9	1.006	0.03	0.806	1.112
	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	40620	2593	1	20.30	21.50	1.318	62.9	1.006	0.09	0.856	1.135
	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	41055	2636.5	1	19.94	21.50	1.432	62.9	1.006	-0.06	0.783	1.128
	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	5mm	Ant1	Reduced	41490	2680	1	19.95	21.50	1.429	62.9	1.006	-0.06	0.775	1.114
	LTE Band 41	20M	QPSK	1	49	-	Front	5mm	Ant1	Reduced	39750	2506	1	20.13	21.50	1.371	62.9	1.006	0.06	0.422	0.582
	LTE Band 41	20M	QPSK	1	49	-	Front	5mm	Ant1	Reduced	40620	2593	1	20.30	21.50	1.318	62.9	1.006	0.08	0.450	0.597
	LTE Band 41	20M	QPSK	1	49	-	Front	5mm	Ant1	Reduced	41055	2636.5	1	19.94	21.50	1.432	62.9	1.006	-0.11	0.393	0.566
	LTE Band 41	20M	QPSK	1	49	-	Front	5mm	Ant1	Reduced	41490	2680	1	19.95	21.50	1.429	62.9	1.006	-0.02	0.412	0.592
	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	39750	2506	1	20.13	21.50	1.371	62.9	1.006	0.05	0.676	0.932
	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	40620	2593	1	20.30	21.50	1.318	62.9	1.006	0.11	0.689	0.914
	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	41055	2636.5	1	19.94	21.50	1.432	62.9	1.006	-0.16	0.612	0.882
	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	Reduced	41490	2680	1	19.95	21.50	1.429	62.9	1.006	0.11	0.634	0.911
	LTE Band 41	20M	QPSK	50	0	-	Front	5mm	Ant1	Reduced	40185	2549.5	1	20.34	21.50	1.306	62.9	1.006	0.03	0.500	0.657
	LTE Band 41	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	40185	2549.5	1	20.34	21.50	1.306	62.9	1.006	-0.03	0.757	0.995
	LTE Band 41	20M	QPSK	50	0	-	Left Side	5mm	Ant1	Reduced	40185	2549.5	1	20.34	21.50	1.306	62.9	1.006	-0.11	0.352	0.463
	LTE Band 41	20M	QPSK	50	0	-	Right Side	5mm	Ant1	Reduced	40185	2549.5	1	20.34	21.50	1.306	62.9	1.006	-0.13	0.109	0.143
	LTE Band 41	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	40185	2549.5	1	20.34	21.50	1.306	62.9	1.006	-0.18	0.901	1.184
	LTE Band 41	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	39750	2506	1	20.15	21.50	1.365	62.9	1.006	-0.09	0.776	1.065
	LTE Band 41	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	40620	2593	1	20.30	21.50	1.318	62.9	1.006	0.15	0.854	1.133
	LTE Band 41	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	41055	2636.5	1	20.15	21.50	1.365	62.9	1.006	-0.07	0.785	1.078
	LTE Band 41	20M	QPSK	50	0	-	Bottom Side	5mm	Ant1	Reduced	41490	2680	1	19.95	21.50	1.429	62.9	1.006	-0.08	0.735	1.057
	LTE Band 41	20M	QPSK	50	0	-	Front	5mm	Ant1	Reduced	39750	2506	1	20.15	21.50	1.365	62.9	1.006	0.04	0.410	0.563
	LTE Band 41	20M	QPSK	50	0	-	Front	5mm	Ant1	Reduced	40620	2593	1	20.30	21.50	1.318	62.9	1.006	-0.11	0.424	0.562
	LTE Band 41	20M	QPSK	50	0	-	Front	5mm	Ant1	Reduced	41055	2636.5	1	20.15	21.50	1.365	62.9	1.006	-0.03	0.352	0.483
	LTE Band 41	20M	QPSK	50	0	-	Front	5mm	Ant1	Reduced	41490	2680	1	19.95	21.50	1.429	62.9	1.006	-0.07	0.339	0.487
	LTE Band 41	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	39750	2506	1	20.15	21.50	1.365	62.9	1.006	0.14	0.697	0.957
	LTE Band 41	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	40620	2593	1	20.30	21.50	1.318	62.9	1.006	0.11	0.691	0.916
	LTE Band 41	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	41055	2636.5	1	20.15	21.50	1.365	62.9	1.006	-0.06	0.607	0.833
	LTE Band 41	20M	QPSK	50	0	-	Back	5mm	Ant1	Reduced	41490	2680	1	19.95	21.50	1.429	62.9	1.006	-0.02	0.622	0.894
	LTE Band 41	20M	QPSK	100	0	-	Front	5mm	Ant1	Reduced	40185	2549.5	1	20.28	21.50	1.324	62.9	1.006	0.06	0.584	0.778
	LTE Band 41	20M	QPSK	100	0	-	Back	5mm	Ant1	Reduced	40185	2549.5	1	20.28	21.50	1.324	62.9	1.006	-0.01	0.704	0.938
	LTE Band 41	20M	QPSK	100	0	-	Bottom Side	5mm	Ant1	Reduced	40185	2549.5	1	20.28	21.50	1.324	62.9	1.006	-0.15	0.919	1.224

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	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)
2450MHz																	
	Bluetooth	DH5 1Mbps	Front	5mm	Ant 3	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	-0.04	0.061	0.091
24	Bluetooth	DH5 1Mbps	Back	5mm	Ant 3	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	-0.18	0.131	**0.196**
	Bluetooth	DH5 1Mbps	Left Side	5mm	Ant 3	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	0.06	0.003	0.004
	Bluetooth	DH5 1Mbps	Right Side	5mm	Ant 3	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	0.1	0.033	0.049
	Bluetooth	DH5 1Mbps	Top Side	5mm	Ant 3	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	0.04	0.028	0.042
	WLAN2.4GHz	802.11b 1Mbps	Front	5mm	Ant 3	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	-0.07	0.265	0.412
	WLAN2.4GHz	802.11b 1Mbps	Back	5mm	Ant 3	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	0.02	0.568	0.884
	WLAN2.4GHz	802.11b 1Mbps	Left Side	5mm	Ant 3	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	0.09	0.000	0.000
	WLAN2.4GHz	802.11b 1Mbps	Right Side	5mm	Ant 3	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	-0.04	0.169	0.263
	WLAN2.4GHz	802.11b 1Mbps	Top Side	5mm	Ant 3	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	0.16	0.187	0.291
25	WLAN2.4GHz	802.11b 1Mbps	Back	5mm	Ant 3	Full	1	2412	1	19.04	21.00	1.570	98.61	1.014	0.02	0.637	**1.014**
5000MHz																	
	WLAN5.2GHz	802.11n-HT40 MCS0	Front	5mm	Ant 3	Reduced	46	5230	1	16.90	18.50	1.445	96.3	1.038	-0.13	0.436	0.654
	WLAN5.2GHz	802.11n-HT40 MCS0	Back	5mm	Ant 3	Reduced	46	5230	1	16.90	18.50	1.445	96.3	1.038	-0.09	0.591	0.887
	WLAN5.2GHz	802.11n-HT40 MCS0	Left Side	5mm	Ant 3	Reduced	46	5230	1	16.90	18.50	1.445	96.3	1.038	0.15	0.029	0.044
26	WLAN5.2GHz	802.11n-HT40 MCS0	Right Side	5mm	Ant 3	Reduced	46	5230	1	16.90	18.50	1.445	96.3	1.038	0.11	0.740	**1.110**
	WLAN5.2GHz	802.11n-HT40 MCS0	Right Side	5mm	Ant 3	Reduced	46	5230	2	16.90	18.50	1.445	96.3	1.038	-0.09	0.561	0.842
	WLAN5.2GHz	802.11n-HT40 MCS0	Top Side	5mm	Ant 3	Reduced	46	5230	1	16.90	18.50	1.445	96.3	1.038	0.11	0.648	0.972
	WLAN5.2GHz	802.11n-HT40 MCS0	Back	5mm	Ant 3	Reduced	38	5190	1	13.29	15.00	1.483	96.3	1.038	-0.05	0.269	0.414
	WLAN5.2GHz	802.11n-HT40 MCS0	Right Side	5mm	Ant 3	Reduced	38	5190	1	13.29	15.00	1.483	96.3	1.038	0.14	0.337	0.519
	WLAN5.2GHz	802.11n-HT40 MCS0	Top Side	5mm	Ant 3	Reduced	38	5190	1	13.29	15.00	1.483	96.3	1.038	-0.05	0.268	0.412
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 3	Reduced	155	5775	1	15.33	17.00	1.469	92.71	1.079	-0.04	0.273	0.433
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 3	Reduced	155	5775	1	15.33	17.00	1.469	92.71	1.079	0.04	0.256	0.406
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Left Side	5mm	Ant 3	Reduced	155	5775	1	15.33	17.00	1.469	92.71	1.079	0.02	0.010	0.016
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Right Side	5mm	Ant 3	Reduced	155	5775	1	15.33	17.00	1.469	92.71	1.079	0.04	0.385	0.610
27	WLAN5.8GHz	802.11ac-VHT80 MCS0	Top Side	5mm	Ant 3	Reduced	155	5775	1	15.33	17.00	1.469	92.71	1.079	0.06	0.621	**0.984**

15.3 Body Worn Accessory SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Headset	Power Reduction	Ch.	Freq. (MHz)	Sample	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)
835MHz																						
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Front	5mm	Ant1	-	Reduced	189	836.4	1	30.37	31.50	1.297	-	-	0.03	0.340	0.441
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	-	Reduced	189	836.4	1	30.37	31.50	1.297	-	-	-0.16	0.845	1.096
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	-	Reduced	128	824.2	1	30.27	31.50	1.327	-	-	-0.19	0.672	0.892
28	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	-	Reduced	251	848.8	1	30.29	31.50	1.321	-	-	0.13	1.020	**1.348**
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	-	Reduced	251	848.8	2	30.29	31.50	1.321	-	-	0.14	1.000	1.321
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	Headset	Reduced	251	848.8	1	30.29	31.50	1.321	-	-	0.03	0.980	1.295
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Front	11mm	Ant1	-	Full	189	836.4	1	30.86	32.00	1.300	-	-	0.09	0.207	0.269
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	15mm	Ant1	-	Full	251	848.8	1	30.76	32.00	1.330	-	-	0.01	0.345	0.459
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Front	5mm	Ant1	-	Full	4182	836.4	1	23.35	24.00	1.161	-	-	0.15	0.475	0.552
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	-	Full	4182	836.4	1	23.35	24.00	1.161	-	-	-0.12	0.918	1.066
29	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	-	Full	4132	826.4	1	23.30	24.00	1.175	-	-	-0.16	0.979	**1.150**
	WCDMA V	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	-	Full	4233	846.6	1	23.20	24.00	1.202	-	-	-0.1	0.915	1.100
	LTE Band 26	15M	QPSK	1	37	-	Front	5mm	Ant1	-	Full	26865	831.5	1	23.42	24.00	1.143	-	-	-0.09	0.491	0.561
30	LTE Band 26	15M	QPSK	1	37	-	Back	5mm	Ant1	-	Full	26865	831.5	1	23.42	24.00	1.143	-	-	-0.14	1.120	**1.280**
	LTE Band 26	15M	QPSK	1	37	-	Back	5mm	Ant1	Headset	Full	26865	831.5	1	23.42	24.00	1.143	-	-	-0.07	0.887	1.014
	LTE Band 26	15M	QPSK	36	0	-	Front	5mm	Ant1	-	Full	26865	831.5	1	22.23	23.00	1.194	-	-	-0.01	0.339	0.405
	LTE Band 26	15M	QPSK	36	0	-	Back	5mm	Ant1	-	Full	26865	831.5	1	22.23	23.00	1.194	-	-	-0.16	0.665	0.794
	LTE Band 26	15M	QPSK	75	0	-	Back	5mm	Ant1	-	Full	26865	831.5	1	22.21	23.00	1.199	-	-	0.02	0.599	0.719
1900MHz																						
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Front	5mm	Ant1	-	Reduced	661	1880	1	25.45	26.50	1.274	-	-	-0.19	0.347	0.442
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	-	Reduced	661	1880	1	25.45	26.50	1.274	-	-	0.06	0.712	0.907
31	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	-	Reduced	512	1850.2	1	25.41	26.50	1.285	-	-	-0.05	0.885	**1.137**
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	5mm	Ant1	-	Reduced	810	1909.8	1	25.38	26.50	1.294	-	-	-0.15	0.796	1.030
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Front	11mm	Ant1	-	Full	661	1880	1	27.44	28.50	1.276	-	-	0	0.200	0.255
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	15mm	Ant1	-	Full	512	1850.2	1	27.40	28.50	1.288	-	-	-0.15	0.240	0.309
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Front	5mm	Ant1	-	Reduced	9400	1880	1	18.93	20.00	1.279	-	-	0.14	0.411	0.526
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	-	Reduced	9400	1880	1	18.93	20.00	1.279	-	-	0.07	0.879	1.125
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	-	Reduced	9262	1852.4	1	18.88	20.00	1.294	-	-	0.15	0.885	1.145
32	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	-	Reduced	9538	1907.6	1	18.91	20.00	1.285	-	-	0.16	0.978	**1.257**
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	-	Reduced	9538	1907.6	2	18.91	20.00	1.285	-	-	-0.13	0.952	1.224
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	5mm	Ant1	Headset	Reduced	9538	1907.6	1	18.91	20.00	1.285	-	-	0.09	0.741	0.952
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Front	11mm	Ant1	-	Full	9400	1880	1	22.92	24.00	1.282	-	-	0.01	0.369	0.473
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	15mm	Ant1	-	Full	9538	1907.6	1	22.90	24.00	1.288	-	-	-0.08	0.446	0.575
	LTE Band 2	20M	QPSK	1	49	-	Front	5mm	Ant1	-	Reduced	18900	1880	1	19.58	20.50	1.236	-	-	-0.17	0.395	0.488
	LTE Band 2	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	18900	1880	1	19.58	20.50	1.236	-	-	0.17	0.851	1.052
	LTE Band 2	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	18700	1860	1	19.45	20.50	1.274	-	-	0.08	0.791	1.007
33	LTE Band 2	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	19100	1900	1	19.40	20.50	1.288	-	-	0.16	0.875	**1.127**
	LTE Band 2	20M	QPSK	1	49	-	Front	11mm	Ant1	-	Full	18900	1880	1	23.05	24.00	1.245	-	-	-0.1	0.309	0.385
	LTE Band 2	20M	QPSK	1	49	-	Back	15mm	Ant1	-	Full	19100	1900	1	22.86	24.00	1.300	-	-	0.07	0.376	0.489
	LTE Band 2	20M	QPSK	50	0	-	Front	5mm	Ant1	-	Reduced	18900	1880	1	19.55	20.50	1.245	-	-	0.16	0.380	0.473
	LTE Band 2	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	18900	1880	1	19.55	20.50	1.245	-	-	-0.1	0.795	0.989
	LTE Band 2	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	18700	1860	1	19.48	20.50	1.265	-	-	-0.17	0.782	0.989
	LTE Band 2	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	19100	1900	1	19.42	20.50	1.282	-	-	-0.05	0.823	1.055
	LTE Band 2	20M	QPSK	100	0	-	Back	5mm	Ant1	-	Reduced	18900	1880	1	19.54	20.50	1.247	-	-	0.17	0.803	1.002
2600MHz																						
	LTE Band 7	20M	QPSK	1	49	-	Front	5mm	Ant1	-	Reduced	20850	2510	1	17.45	18.50	1.274	-	-	0.13	0.412	0.525
	LTE Band 7	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	20850	2510	1	17.45	18.50	1.274	-	-	0.18	0.639	0.814
34	LTE Band 7	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	21100	2535	1	17.37	18.50	1.297	-	-	0.01	1.030	**1.336**
	LTE Band 7	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	21100	2535	2	17.37	18.50	1.297	-	-	0.01	0.905	1.174

	LTE Band 7	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	21350	2560	1	17.40	18.50	1.288	-	-	-0.17	0.822	1.059
	LTE Band 7	20M	QPSK	1	49	-	Back	5mm	Ant1	Headset	Reduced	21100	2535	1	17.37	18.50	1.297	-	-	0.03	0.799	1.036
	LTE Band 7	20M	QPSK	1	49	-	Front	11mm	Ant1	-	Full	20850	2510	1	22.92	24.00	1.282	-	-	-0.06	0.431	0.553
	LTE Band 7	20M	QPSK	1	49	-	Back	15mm	Ant1	-	Full	21100	2535	1	22.85	24.00	1.303	-	-	0.12	0.542	0.706
	LTE Band 7	20M	QPSK	50	0	-	Front	5mm	Ant1	-	Reduced	20850	2510	1	17.41	18.50	1.285	-	-	0.04	0.403	0.518
	LTE Band 7	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	20850	2510	1	17.41	18.50	1.285	-	-	0.14	0.636	0.817
	LTE Band 7	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	21100	2535	1	17.34	18.50	1.306	-	-	0.05	0.708	0.925
	LTE Band 7	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	21350	2560	1	17.35	18.50	1.303	-	-	-0.01	0.717	0.934
	LTE Band 7	20M	QPSK	100	0	-	Back	5mm	Ant1	-	Reduced	20850	2510	1	17.36	18.50	1.300	-	-	-0.13	0.631	0.820
	LTE Band 38	20M	QPSK	1	49	-	Front	5mm	Ant1	-	Reduced	38000	2595	1	20.00	21.00	1.259	62.9	1.006	0.03	0.580	0.735
35	LTE Band 38	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	38000	2595	1	20.00	21.00	1.259	62.9	1.006	0.02	0.880	**1.115**
	LTE Band 38	20M	QPSK	1	49	-	Front	11mm	Ant1	-	Full	38000	2595	1	22.99	24.00	1.262	62.9	1.006	-0.11	0.375	0.476
	LTE Band 38	20M	QPSK	1	49	-	Back	15mm	Ant1	-	Full	38000	2595	1	22.99	24.00	1.262	62.9	1.006	0.07	0.315	0.400
	LTE Band 38	20M	QPSK	50	0	-	Front	5mm	Ant1	-	Reduced	38000	2595	1	19.94	21.00	1.276	62.9	1.006	0.07	0.471	0.605
	LTE Band 38	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	38000	2595	1	19.94	21.00	1.276	62.9	1.006	-0.11	0.597	0.767
	LTE Band 38	20M	QPSK	100	0	-	Back	5mm	Ant1	-	Reduced	38000	2595	1	19.87	21.00	1.297	62.9	1.006	0.05	0.625	0.816
	LTE Band 41	20M	QPSK	1	49	-	Front	5mm	Ant1	-	Reduced	40185	2549.5	1	20.42	21.50	1.282	62.9	1.006	0.19	0.530	0.684
36	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	40185	2549.5	1	20.42	21.50	1.282	62.9	1.006	0.19	0.975	**1.258**
	LTE Band 41	20M	QPSK	1	49	-	Front	5mm	Ant1	-	Reduced	39750	2506	1	20.13	21.50	1.371	62.9	1.006	0.06	0.422	0.582
	LTE Band 41	20M	QPSK	1	49	-	Front	5mm	Ant1	-	Reduced	40620	2593	1	20.30	21.50	1.318	62.9	1.006	0.08	0.450	0.597
	LTE Band 41	20M	QPSK	1	49	-	Front	5mm	Ant1	-	Reduced	41055	2636.5	1	19.94	21.50	1.432	62.9	1.006	-0.11	0.393	0.566
	LTE Band 41	20M	QPSK	1	49	-	Front	5mm	Ant1	-	Reduced	41490	2680	1	19.95	21.50	1.429	62.9	1.006	-0.02	0.412	0.592
	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	39750	2506	1	20.13	21.50	1.371	62.9	1.006	0.05	0.676	0.932
	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	40620	2593	1	20.30	21.50	1.318	62.9	1.006	0.11	0.689	0.914
	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	41055	2636.5	1	19.94	21.50	1.432	62.9	1.006	-0.16	0.612	0.882
	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	-	Reduced	41490	2680	1	19.95	21.50	1.429	62.9	1.006	0.11	0.634	0.911
	LTE Band 41	20M	QPSK	1	49	-	Back	5mm	Ant1	Headset	Reduced	40185	2549.5	1	20.42	21.50	1.282	62.9	1.006	0.11	0.554	0.715
	LTE Band 41	20M	QPSK	1	49	-	Front	11mm	Ant1	-	Full	40185	2549.5	1	23.19	24.00	1.205	62.9	1.006	-0.11	0.389	0.472
	LTE Band 41	20M	QPSK	1	49	-	Back	15mm	Ant1	-	Full	40185	2549.5	1	23.19	24.00	1.205	62.9	1.006	0.07	0.385	0.467
	LTE Band 41	20M	QPSK	50	0	-	Front	5mm	Ant1	-	Reduced	40185	2549.5	1	20.34	21.50	1.306	62.9	1.006	0.03	0.500	0.657
	LTE Band 41	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	40185	2549.5	1	20.34	21.50	1.306	62.9	1.006	-0.03	0.757	0.995
	LTE Band 41	20M	QPSK	50	0	-	Front	5mm	Ant1	-	Reduced	39750	2506	1	20.15	21.50	1.365	62.9	1.006	0.04	0.410	0.563
	LTE Band 41	20M	QPSK	50	0	-	Front	5mm	Ant1	-	Reduced	40620	2593	1	20.30	21.50	1.318	62.9	1.006	-0.11	0.424	0.562
	LTE Band 41	20M	QPSK	50	0	-	Front	5mm	Ant1	-	Reduced	41055	2636.5	1	20.15	21.50	1.365	62.9	1.006	-0.03	0.352	0.483
	LTE Band 41	20M	QPSK	50	0	-	Front	5mm	Ant1	-	Reduced	41490	2680	1	19.95	21.50	1.429	62.9	1.006	-0.07	0.339	0.487
	LTE Band 41	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	39750	2506	1	20.15	21.50	1.365	62.9	1.006	0.14	0.697	0.957
	LTE Band 41	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	40620	2593	1	20.30	21.50	1.318	62.9	1.006	0.11	0.691	0.916
	LTE Band 41	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	41055	2636.5	1	20.15	21.50	1.365	62.9	1.006	-0.06	0.607	0.833
	LTE Band 41	20M	QPSK	50	0	-	Back	5mm	Ant1	-	Reduced	41490	2680	1	19.95	21.50	1.429	62.9	1.006	-0.02	0.622	0.894
	LTE Band 41	20M	QPSK	100	0	-	Front	5mm	Ant1	-	Reduced	40185	2549.5	1	20.28	21.50	1.324	62.9	1.006	0.06	0.584	0.778
	LTE Band 41	20M	QPSK	100	0	-	Back	5mm	Ant1	-	Reduced	40185	2549.5	1	20.28	21.50	1.324	62.9	1.006	-0.01	0.704	0.938

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Headset	Power Reduction	Ch.	Freq. (MHz)	Sample	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)
2450MHz																		
	Bluetooth	DH5 1Mbps	Front	5mm	Ant 3	-	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	-0.04	0.061	0.091
37	Bluetooth	DH5 1Mbps	Back	5mm	Ant 3	-	Full	39	2441	1	12.90	13.50	1.147	76.68	1.304	-0.18	0.131	**0.196**
	WLAN2.4GHz	802.11b 1Mbps	Front	5mm	Ant 3	-	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	-0.07	0.265	0.412
	WLAN2.4GHz	802.11b 1Mbps	Back	5mm	Ant 3	-	Full	6	2437	1	19.14	21.00	1.534	98.61	1.014	0.02	0.568	0.884
38	WLAN2.4GHz	802.11b 1Mbps	Back	5mm	Ant 3	-	Full	1	2412	1	19.04	21.00	1.570	98.61	1.014	0.02	0.637	**1.014**
5000MHz																		
	WLAN5.3GHz	802.11n-HT40 MCS0	Front	5mm	Ant 3	-	Full	54	5270	1	18.18	19.50	1.354	96.3	1.038	0.11	0.542	0.762
39	WLAN5.3GHz	802.11n-HT40 MCS0	Back	5mm	Ant 3	-	Full	54	5270	1	18.18	19.50	1.354	96.3	1.038	-0.15	0.593	**0.833**
	WLAN5.3GHz	802.11n-HT40 MCS0	Back	5mm	Ant 3	-	Full	54	5270	2	18.18	19.50	1.354	96.3	1.038	0.01	0.575	0.808
	WLAN5.3GHz	802.11n-HT40 MCS0	Back	5mm	Ant 3	-	Full	62	5310	1	14.34	16.00	1.464	96.3	1.038	0.09	0.210	0.319
40	WLAN5.5GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 3	-	Full	122	5610	1	17.76	19.50	1.493	92.71	1.079	0.01	0.466	**0.751**
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 3	-	Full	122	5610	1	17.76	19.50	1.493	92.71	1.079	0.11	0.373	0.601
41	WLAN5.8GHz	802.11ac-VHT80 MCS0	Front	5mm	Ant 3	-	Full	155	5775	1	17.81	19.50	1.476	92.71	1.079	-0.14	0.353	**0.562**
	WLAN5.8GHz	802.11ac-VHT80 MCS0	Back	5mm	Ant 3	-	Full	155	5775	1	17.81	19.50	1.476	92.71	1.079	-0.15	0.332	0.529

15.4 Product Specific SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
835MHz																					
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	0mm	Ant1	Full	189	836.4	1	30.86	32.00	1.300	-	-	-0.01	2.180	2.834
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	0mm	Ant1	Full	128	824.2	1	30.77	32.00	1.327	-	-	-0.01	2.330	3.093
42	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	0mm	Ant1	Full	251	848.8	1	30.76	32.00	1.330	-	-	-0.06	2.410	**3.206**
	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	0mm	Ant1	Full	251	848.8	2	30.76	32.00	1.330	-	-	0.02	2.050	2.727
43	LTE Band 26	15M	QPSK	1	37	-	Back	0mm	Ant1	Full	26865	831.5	1	23.42	24.00	1.143	-	-	-0.07	1.630	**1.863**
	LTE Band 26	15M	QPSK	36	0	-	Back	0mm	Ant1	Full	26865	831.5	1	22.23	23.00	1.194	-	-	-0.16	0.920	1.098
1900MHz																					
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	0mm	Ant1	Reduced	661	1880	1	26.96	28.00	1.271	-	-	-0.19	1.910	2.427
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	0mm	Ant1	Reduced	512	1850.2	1	26.94	28.00	1.276	-	-	0.1	1.950	2.489
44	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	0mm	Ant1	Reduced	810	1909.8	1	26.87	28.00	1.297	-	-	0.06	2.220	**2.880**
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Bottom Side	0mm	Ant1	Reduced	661	1880	1	26.96	28.00	1.271	-	-	0.01	1.410	1.792
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Back	17mm	Ant1	Full	810	1909.8	1	27.42	28.50	1.282	-	-	-0.03	0.118	0.151
	GSM1900	-	-	-	-	GPRS(2 Tx slots)	Bottom Side	15mm	Ant1	Full	661	1880	1	27.44	28.50	1.276	-	-	0.05	0.224	0.286
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Front	0mm	Ant1	Reduced	9400	1880	1	20.45	21.50	1.274	-	-	0.02	0.985	1.254
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	0mm	Ant1	Reduced	9400	1880	1	20.45	21.50	1.274	-	-	-0.03	2.140	2.725
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	0mm	Ant1	Reduced	9262	1852.4	1	20.39	21.50	1.291	-	-	-0.14	2.220	2.867
45	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	0mm	Ant1	Reduced	9538	1907.6	1	20.43	21.50	1.279	-	-	0.03	2.610	**3.339**
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	0mm	Ant1	Reduced	9538	1907.6	2	20.43	21.50	1.279	-	-	0.13	2.370	3.032
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	0mm	Ant1	Reduced	9400	1880	1	20.45	21.50	1.274	-	-	0.11	1.650	2.101
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	0mm	Ant1	Reduced	9262	1852.4	1	20.39	21.50	1.291	-	-	-0.01	1.760	2.273
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	0mm	Ant1	Reduced	9538	1907.6	1	20.43	21.50	1.279	-	-	0.08	1.666	2.131
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Front	11mm	Ant1	Full	9400	1880	1	22.92	24.00	1.282	-	-	0.03	0.230	0.295
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	17mm	Ant1	Full	9538	1907.6	1	22.90	24.00	1.288	-	-	0.09	0.217	0.280
	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	15mm	Ant1	Full	9262	1852.4	1	22.88	24.00	1.294	-	-	0.05	0.386	0.500
	LTE Band 2	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	18900	1880	1	21.09	22.00	1.233	-	-	0.17	2.020	2.491
	LTE Band 2	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	18700	1860	1	20.98	22.00	1.265	-	-	-0.02	2.100	2.656
46	LTE Band 2	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	19100	1900	1	20.92	22.00	1.282	-	-	-0.05	2.230	**2.860**
	LTE Band 2	20M	QPSK	1	49	-	Bottom Side	0mm	Ant1	Reduced	18900	1880	1	21.09	22.00	1.233	-	-	0.03	1.560	1.924
	LTE Band 2	20M	QPSK	1	49	-	Back	17mm	Ant1	Full	19100	1900	1	22.86	24.00	1.300	-	-	0.05	0.187	0.243
	LTE Band 2	20M	QPSK	1	49	-	Bottom Side	15mm	Ant1	Full	18900	1880	1	23.05	24.00	1.245	-	-	-0.08	0.312	0.388
	LTE Band 2	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	18900	1880	1	21.05	22.00	1.245	-	-	0.04	1.870	2.327
	LTE Band 2	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	18700	1860	1	21.02	22.00	1.253	-	-	0.16	1.820	2.281
	LTE Band 2	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	19100	1900	1	20.98	22.00	1.265	-	-	0.12	1.870	2.365
	LTE Band 2	20M	QPSK	50	0	-	Bottom Side	0mm	Ant1	Reduced	18900	1880	1	21.05	22.00	1.245	-	-	0.14	1.440	1.792
	LTE Band 2	20M	QPSK	100	0	-	Back	0mm	Ant1	Reduced	18900	1880	1	21.03	22.00	1.250	-	-	-0.1	1.790	2.238
2600MHz																					
	LTE Band 7	20M	QPSK	1	49	-	Front	0mm	Ant1	Reduced	20850	2510	1	21.20	22.00	1.202	-	-	-0.17	1.070	1.286
	LTE Band 7	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	20850	2510	1	21.20	22.00	1.202	-	-	-0.01	2.100	2.525
	LTE Band 7	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	21100	2535	1	21.09	22.00	1.233	-	-	-0.01	2.190	2.700
47	LTE Band 7	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	21350	2560	1	21.15	22.00	1.216	-	-	-0.11	2.950	**3.588**
	LTE Band 7	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	21350	2560	2	21.15	22.00	1.216	-	-	0.06	2.720	3.308
	LTE Band 7	20M	QPSK	1	49	-	Left Side	0mm	Ant1	Full	20850	2510	1	22.92	24.00	1.282	-	-	-0.17	1.220	1.564
	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	0mm	Ant1	Reduced	20850	2510	1	21.20	22.00	1.202	-	-	0.13	1.720	2.068
	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	0mm	Ant1	Reduced	21100	2535	1	21.09	22.00	1.233	-	-	0.05	1.830	2.257
	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	0mm	Ant1	Reduced	21350	2560	1	21.15	22.00	1.216	-	-	-0.01	1.820	2.213
	LTE Band 7	20M	QPSK	1	49	-	Front	11mm	Ant1	Full	20850	2510	1	22.92	24.00	1.282	-	-	0.06	0.272	0.349
	LTE Band 7	20M	QPSK	1	49	-	Back	17mm	Ant1	Full	21350	2560	1	22.88	24.00	1.294	-	-	0.01	0.207	0.268
	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	15mm	Ant1	Full	21100	2535	1	22.85	24.00	1.303	-	-	0.05	0.348	0.454
	LTE Band 7	20M	QPSK	50	0	-	Front	0mm	Ant1	Reduced	20850	2510	1	21.19	22.00	1.205	-	-	-0.17	0.989	1.192

	LTE Band 7	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	20850	2510	1	21.19	22.00	1.205	-	-	0.18	1.790	2.157
	LTE Band 7	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	21100	2535	1	21.13	22.00	1.222	-	-	0.15	1.900	2.321
	LTE Band 7	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	21350	2560	1	21.07	22.00	1.239	-	-	-0.06	2.350	2.911
	LTE Band 7	20M	QPSK	50	0	-	Left Side	0mm	Ant1	Full	20850	2510	1	21.97	23.00	1.268	-	-	0.03	1.010	1.280
	LTE Band 7	20M	QPSK	50	0	-	Bottom Side	0mm	Ant1	Reduced	20850	2510	1	21.19	22.00	1.205	-	-	0.02	1.510	1.820
	LTE Band 7	20M	QPSK	100	0	-	Back	0mm	Ant1	Reduced	20850	2510	1	21.11	22.00	1.227	-	-	-0.16	1.700	2.087
	LTE Band 7	20M	QPSK	100	0	-	Bottom Side	0mm	Ant1	Reduced	20850	2510	1	21.11	22.00	1.227	-	-	-0.08	1.340	1.645
	LTE Band 38	20M	QPSK	1	49	-	Front	0mm	Ant1	Full	38000	2595	1	22.99	24.00	1.262	62.9	1.006	-0.06	1.050	1.333
48	LTE Band 38	20M	QPSK	1	49	-	Back	0mm	Ant1	Full	38000	2595	1	22.99	24.00	1.262	62.9	1.006	-0.06	2.440	**3.097**
	LTE Band 38	20M	QPSK	1	49	-	Bottom Side	0mm	Ant1	Full	38000	2595	1	22.99	24.00	1.262	62.9	1.006	-0.07	1.760	2.234
	LTE Band 38	20M	QPSK	50	0	-	Front	0mm	Ant1	Full	38000	2595	1	22.51	23.00	1.119	62.9	1.006	-0.06	0.626	0.705
	LTE Band 38	20M	QPSK	50	0	-	Back	0mm	Ant1	Full	38000	2595	1	22.51	23.00	1.119	62.9	1.006	-0.11	1.880	2.117
	LTE Band 38	20M	QPSK	50	0	-	Bottom Side	0mm	Ant1	Full	38000	2595	1	22.51	23.00	1.119	62.9	1.006	-0.18	1.430	1.610
	LTE Band 38	20M	QPSK	100	0	-	Back	0mm	Ant1	Full	38000	2595	1	22.45	23.00	1.135	62.9	1.006	0.12	1.480	1.690
	LTE Band 38	20M	QPSK	100	0	-	Bottom Side	0mm	Ant1	Full	38000	2595	1	22.45	23.00	1.135	62.9	1.006	0.08	1.090	1.245
	LTE Band 41	20M	QPSK	1	49	-	Front	0mm	Ant1	Reduced	40185	2549.5	1	22.62	23.50	1.225	62.9	1.006	-0.06	1.190	1.466
	LTE Band 41	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	40185	2549.5	1	22.62	23.50	1.225	62.9	1.006	0.19	2.300	2.834
	LTE Band 41	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	39750	2506	1	22.40	23.50	1.288	62.9	1.006	0.06	2.190	2.838
	LTE Band 41	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	40620	2593	1	22.33	23.50	1.309	62.9	1.006	-0.03	2.350	3.095
	LTE Band 41	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	41055	2636.5	1	22.41	23.50	1.285	62.9	1.006	0.18	2.330	3.013
49	LTE Band 41	20M	QPSK	1	49	-	Back	0mm	Ant1	Reduced	41490	2680	1	22.52	23.50	1.253	62.9	1.006	0.06	2.820	**3.555**
	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	0mm	Ant1	Reduced	40185	2549.5	1	22.62	23.50	1.225	62.9	1.006	-0.04	1.690	2.082
	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	0mm	Ant1	Reduced	39750	2506	1	22.40	23.50	1.288	62.9	1.006	0.02	1.500	1.944
	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	0mm	Ant1	Reduced	40620	2593	1	22.33	23.50	1.309	62.9	1.006	-0.05	1.680	2.213
	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	0mm	Ant1	Reduced	41055	2636.5	1	22.41	23.50	1.285	62.9	1.006	0.14	1.710	2.211
	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	0mm	Ant1	Reduced	41490	2680	1	22.52	23.50	1.253	62.9	1.006	-0.14	1.530	1.929
	LTE Band 41	20M	QPSK	1	49	-	Front	11mm	Ant1	Full	40185	2549.5	1	23.19	24.00	1.205	62.9	1.590	0.06	0.315	0.604
	LTE Band 41	20M	QPSK	1	49	-	Back	17mm	Ant1	Full	41490	2680	1	23.01	24.00	1.256	62.9	1.590	0.01	0.245	0.489
	LTE Band 41	20M	QPSK	1	49	-	Bottom Side	15mm	Ant1	Full	40620	2593	1	23.08	24.00	1.236	62.9	1.590	0.05	0.377	0.741
	LTE Band 41	20M	QPSK	50	0	-	Front	0mm	Ant1	Reduced	40185	2549.5	1	22.09	22.50	1.099	62.9	1.006	-0.1	0.928	1.026
	LTE Band 41	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	40185	2549.5	1	22.09	22.50	1.099	62.9	1.006	0.15	1.580	1.747
	LTE Band 41	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	39750	2506	1	22.01	22.50	1.119	62.9	1.006	0.02	1.230	1.385
	LTE Band 41	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	40620	2593	1	22.02	22.50	1.117	62.9	1.006	0.06	1.210	1.360
	LTE Band 41	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	41055	2636.5	1	21.96	22.50	1.132	62.9	1.006	-0.11	1.350	1.538
	LTE Band 41	20M	QPSK	50	0	-	Back	0mm	Ant1	Reduced	41490	2680	1	21.92	22.50	1.143	62.9	1.006	-0.05	1.450	1.667
	LTE Band 41	20M	QPSK	50	0	-	Bottom Side	0mm	Ant1	Reduced	40185	2549.5	1	22.09	22.50	1.099	62.9	1.006	0.02	1.060	1.172
	LTE Band 41	20M	QPSK	100	0	-	Back	0mm	Ant1	Reduced	40185	2549.5	1	22.04	22.50	1.112	62.9	1.006	0.05	1.520	1.700
	LTE Band 41	20M	QPSK	100	0	-	Bottom Side	0mm	Ant1	Reduced	40185	2549.5	1	22.04	22.50	1.112	62.9	1.006	-0.1	1.110	1.241

Plot No.	Band	Mode	Test Position	Gap (mm)	Antenna	Power Reduction	Ch.	Freq. (MHz)	Sample	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
5000MHz																	
	WLAN5.2GHz	802.11n-HT40 MCS0	Right Side	0mm	Ant 3	Full	46	5230	1	17.90	19.50	1.444	96.3	1.038	-0.09	0.976	1.463
50	WLAN5.2GHz	802.11n-HT40 MCS0	Top Side	0mm	Ant 3	Full	46	5230	1	17.90	19.50	1.444	96.3	1.038	0.04	1.090	**1.634**
	WLAN5.2GHz	802.11n-HT40 MCS0	Top Side	0mm	Ant 3	Full	46	5230	2	17.90	19.50	1.444	96.3	1.038	0.02	0.980	1.469
	WLAN5.3GHz	802.11n-HT40 MCS0	Front	0mm	Ant 3	Full	54	5270	1	18.18	19.50	1.354	96.3	1.038	0.03	0.658	0.925
	WLAN5.3GHz	802.11n-HT40 MCS0	Back	0mm	Ant 3	Full	54	5270	1	18.18	19.50	1.354	96.3	1.038	-0.15	0.509	0.715
	WLAN5.3GHz	802.11n-HT40 MCS0	Left Side	0mm	Ant 3	Full	54	5270	1	18.18	19.50	1.354	96.3	1.038	-0.1	0.021	0.030
	WLAN5.3GHz	802.11n-HT40 MCS0	Right Side	0mm	Ant 3	Full	54	5270	1	18.18	19.50	1.354	96.3	1.038	0.08	1.000	1.405
51	WLAN5.3GHz	802.11n-HT40 MCS0	Top Side	0mm	Ant 3	Full	54	5270	1	18.18	19.50	1.354	96.3	1.038	0.06	1.010	**1.420**
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Front	0mm	Ant 3	Full	122	5610	1	17.76	19.50	1.493	92.71	1.079	0.03	0.532	0.857
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Back	0mm	Ant 3	Full	122	5610	1	17.76	19.50	1.493	92.71	1.079	-0.07	0.300	0.483
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Left Side	0mm	Ant 3	Full	122	5610	1	17.76	19.50	1.493	92.71	1.079	0.02	0.019	0.031
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Right Side	0mm	Ant 3	Full	122	5610	1	17.76	19.50	1.493	92.71	1.079	-0.15	0.885	1.426
52	WLAN5.5GHz	802.11ac-VHT80 MCS0	Top Side	0mm	Ant 3	Full	122	5610	1	17.76	19.50	1.493	92.71	1.079	-0.05	0.889	**1.432**
	WLAN5.5GHz	802.11ac-VHT80 MCS0	Top Side	0mm	Ant 3	Full	122	5610	2	17.76	19.50	1.493	92.71	1.079	0.09	0.836	1.347
53	WLAN5.8GHz	802.11ac-VHT80 MCS0	Top Side	0mm	Ant 3	Full	155	5775	1	17.81	19.50	1.476	92.71	1.079	-0.13	0.852	**1.357**

15.5 Repeated SAR Measurement

<1g>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 26	15M	QPSK	1	37	-	Back	5mm	Full	26865	831.5	23.42	24.00	1.143	-0.13	1.120	1	1.280
2nd	LTE Band 26	15M	QPSK	1	37	-	Back	5mm	Full	26865	831.5	23.42	24.00	1.143	0.03	1.060	1.057	1.211
1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	5mm	Reduced	9538	1907.6	18.91	20.00	1.285	-0.13	1.110	1	1.427
2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Bottom Side	5mm	Reduced	9538	1907.6	18.91	20.00	1.285	0.02	1.020	1.088	1.311
1st	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	5mm	Reduced	21350	2560	17.40	18.50	1.288	-0.03	1.060	1	1.366
2nd	LTE Band 7	20M	QPSK	1	49	-	Bottom Side	5mm	Reduced	21350	2560	17.40	18.50	1.288	0.11	1.010	1.050	1.301

<10g>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Mode	Test Position	Gap (mm)	Power Reduction	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	0mm	Full	251	848.8	30.76	32.00	1.330	-0.06	2.410	1	3.206
2nd	GSM850	-	-	-	-	GPRS(2 Tx slots)	Back	0mm	Full	251	848.8	30.76	32.00	1.330	0.02	2.330	1.034	3.100
1st	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	0mm	Reduced	9538	1907.6	20.43	21.50	1.279	0.03	2.610	1	3.339
2nd	WCDMA II	-	-	-	-	RMC 12.2Kbps	Back	0mm	Reduced	9538	1907.6	20.43	21.50	1.279	0.05	2.450	1.065	3.134
1st	LTE Band 7	20M	QPSK	1	49	-	Back	0mm	Reduced	21350	2560	21.15	22.00	1.216	-0.11	2.950	1	3.588
2nd	LTE Band 7	20M	QPSK	1	49	-	Back	0mm	Reduced	21350	2560	21.15	22.00	1.216	-0.1	2.870	1.028	3.490

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR <1.45W/kg, only one repeated measurement is required.
3. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The ratio is the difference in percentage between original and repeated *measured SAR*.
5. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

16. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Portable Handset			
		Head	Body-worn	Hotspot	Product specific 10g SAR
1.	WWAN + WLAN2.4GHz	Yes	Yes	Yes	Yes
2.	WWAN + WLAN5GHz	Yes	Yes	Yes	Yes
3.	WWAN + Bluetooth	Yes	Yes	Yes	Yes

General Note:

1. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
2. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
3. This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
4. This device 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WLAN Direct (GC/GO), and 5.3GHz / 5.5GHz supports WLAN Direct (GC only).
5. WIFI 5.3/5.5GHz has no hotspot function.
6. The worst case 5 GHz WLAN SAR for each configuration was used for SAR summation.
7. WLAN 2.4GHz and Bluetooth share the same antenna so can't transmit simultaneously.
8. According to the EUT characteristic, WLAN 5GHz and Bluetooth can't transmit simultaneously.
9. The maximum SAR summation is calculated based on the same configuration and test position.
10. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
    i) 1g Scalar SAR summation < 1.6W/kg and 10g Scalar SAR summation < 4.0W/kg.
    ii) SPLSR = (SAR1 + SAR2)^1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
    iii) If SPLSR ≤ 0.04 for 1g SAR and SPLSR≤ 0.10 for 10g SAR, simultaneously transmission SAR measurement is not necessary.
    iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg and 10g SAR < 4.0W/kg.
    v) The SPLSR calculated results please refer to section 16.5.

16.1 Head Exposure Conditions

WWAN Band	Exposure Position	1	3	6	9	1+3	1+6	1+9	Case No
		WWAN	WLAN2.4GHz Ant 3	WLAN5GHz Ant 3	Bluetooth Ant 3	Summed	Summed	Summed	
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
GSM850 Ant1	Right Cheek	0.260	0.342	0.605	0.060	0.60	0.87	0.32	
	Right Tilted	0.117	0.299	0.731	0.063	0.42	0.85	0.18	
	Left Cheek	0.213	1.099	1.020	0.156	1.31	1.23	0.37	
	Left Tilted	0.086	0.797	1.138	0.142	0.88	1.22	0.23	
GSM1900 Ant1	Right Cheek	0.115	0.342	0.605	0.060	0.46	0.72	0.18	
	Right Tilted	0.098	0.299	0.731	0.063	0.40	0.83	0.16	
	Left Cheek	0.179	1.099	1.020	0.156	1.28	1.20	0.34	
	Left Tilted	0.079	0.797	1.138	0.142	0.88	1.22	0.22	
WCDMA II Ant1	Right Cheek	0.172	0.342	0.605	0.060	0.51	0.78	0.23	
	Right Tilted	0.154	0.299	0.731	0.063	0.45	0.89	0.22	
	Left Cheek	0.230	1.099	1.020	0.156	1.33	1.25	0.39	
	Left Tilted	0.153	0.797	1.138	0.142	0.95	1.29	0.30	
WCDMA V Ant1	Right Cheek	0.287	0.342	0.605	0.060	0.63	0.89	0.35	
	Right Tilted	0.134	0.299	0.731	0.063	0.43	0.87	0.20	
	Left Cheek	0.253	1.099	1.020	0.156	1.35	1.27	0.41	
	Left Tilted	0.127	0.797	1.138	0.142	0.92	1.27	0.27	
LTE Band 2 Ant1	Right Cheek	0.154	0.342	0.605	0.060	0.50	0.76	0.21	
	Right Tilted	0.144	0.299	0.731	0.063	0.44	0.88	0.21	
	Left Cheek	0.195	1.099	1.020	0.156	1.29	1.22	0.35	
	Left Tilted	0.139	0.797	1.138	0.142	0.94	1.28	0.28	
LTE Band 26 Ant1	Right Cheek	0.270	0.342	0.605	0.060	0.61	0.88	0.33	
	Right Tilted	0.138	0.299	0.731	0.063	0.44	0.87	0.20	
	Left Cheek	0.232	1.099	1.020	0.156	1.33	1.25	0.39	
	Left Tilted	0.117	0.797	1.138	0.142	0.91	1.26	0.26	
LTE Band 7 Ant1	Right Cheek	0.280	0.342	0.605	0.060	0.62	0.89	0.34	
	Right Tilted	0.230	0.299	0.731	0.063	0.53	0.96	0.29	
	Left Cheek	0.627	1.099	1.020	0.156	**1.73**	**1.65**	0.78	**Cass 1/2**
	Left Tilted	0.389	0.797	1.138	0.142	1.19	1.53	0.53	
LTE Band 38 Ant1	Right Cheek	0.192	0.342	0.605	0.060	0.53	0.80	0.25	
	Right Tilted	0.157	0.299	0.731	0.063	0.46	0.89	0.22	
	Left Cheek	0.471	1.099	1.020	0.156	**1.57**	1.49	0.63	
	Left Tilted	0.230	0.797	1.138	0.142	1.03	1.37	0.37	
LTE Band 41 Ant1	Right Cheek	0.195	0.342	0.605	0.060	0.54	0.80	0.26	
	Right Tilted	0.156	0.299	0.731	0.063	0.46	0.89	0.22	
	Left Cheek	0.422	1.099	1.020	0.156	1.52	1.44	0.58	
	Left Tilted	0.212	0.797	1.138	0.142	1.01	1.35	0.35	

16.2 Hotspot Exposure Conditions

WWAN Band	Exposure Position	1	3	6	9	1+3	1+6	1+9	Case No
		WWAN	WLAN2.4GHz Ant 3	WLAN5GHz Ant 3	Bluetooth Ant 3	Summed	Summed	Summed	
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
GSM850 Ant1	Front	0.441	0.412	0.654	0.091	0.85	1.10	0.53	
	Back	1.348	1.014	0.887	0.196	**2.36**	**2.24**	**1.54**	**Cass 3/4**
	Left side	0.228		0.044	0.004	0.23	0.27	0.23	
	Right side	0.337	0.263	1.110	0.049	0.60	1.45	0.39	
	Top side		0.291	0.984	0.042	0.29	0.98	0.04	
	Bottom side	0.672				0.67	0.67	0.67	
GSM1900 Ant1	Front	0.442	0.412	0.654	0.091	0.85	1.10	0.53	
	Back	1.137	1.014	0.887	0.196	**2.15**	**2.02**	1.33	**Cass 5/6**
	Left side	0.299		0.044	0.004	0.30	0.34	0.30	
	Right side	0.110	0.263	1.110	0.049	0.37	1.22	0.16	
	Top side		0.291	0.984	0.042	0.29	0.98	0.04	
	Bottom side	1.362				1.36	1.36	1.36	
WCDMA II Ant1	Front	0.526	0.412	0.654	0.091	0.94	1.18	0.62	
	Back	1.257	1.014	0.887	0.196	**2.27**	**2.14**	1.45	**Cass 7/8**
	Left side	0.380		0.044	0.004	0.38	0.42	0.38	
	Right side	0.138	0.263	1.110	0.049	0.40	1.25	0.19	
	Top side		0.291	0.984	0.042	0.29	0.98	0.04	
	Bottom side	1.427				1.43	1.43	1.43	
WCDMA V Ant1	Front	0.552	0.412	0.654	0.091	0.96	1.21	0.64	
	Back	1.150	1.014	0.887	0.196	**2.16**	**2.04**	1.35	**Cass 9/10**
	Left side	0.323		0.044	0.004	0.32	0.37	0.33	
	Right side	0.476	0.263	1.110	0.049	0.74	**1.59**	0.53	
	Top side		0.291	0.984	0.042	0.29	0.98	0.04	
	Bottom side	0.965				0.97	0.97	0.97	
LTE Band 2 Ant1	Front	0.488	0.412	0.654	0.091	0.90	1.14	0.58	
	Back	1.127	1.014	0.887	0.196	**2.14**	**2.01**	1.32	**Cass 11/12**
	Left side	0.361		0.044	0.004	0.36	0.41	0.37	
	Right side	0.121	0.263	1.110	0.049	0.38	1.23	0.17	
	Top side		0.291	0.984	0.042	0.29	0.98	0.04	
	Bottom side	1.269				1.27	1.27	1.27	
LTE Band 26 Ant1	Front	0.561	0.412	0.654	0.091	0.97	1.22	0.65	
	Back	1.280	1.014	0.887	0.196	**2.29**	**2.17**	1.48	**Cass 13/14**
	Left side	0.337		0.044	0.004	0.34	0.38	0.34	
	Right side	0.463	0.263	1.110	0.049	0.73	1.57	0.51	
	Top side		0.291	0.984	0.042	0.29	0.98	0.04	
	Bottom side	0.851				0.85	0.85	0.85	
LTE Band 7 Ant1	Front	0.525	0.412	0.654	0.091	0.94	1.18	0.62	
	Back	1.336	1.014	0.887	0.196	**2.35**	**2.22**	1.53	**Cass 15/16**
	Left side	0.367		0.044	0.004	0.37	0.41	0.37	
	Right side	0.097	0.263	1.110	0.049	0.36	1.21	0.15	
	Top side		0.291	0.984	0.042	0.29	0.98	0.04	
	Bottom side	1.366				1.37	1.37	1.37	
LTE Band 38 Ant1	Front	0.735	0.412	0.654	0.091	1.15	1.39	0.83	
	Back	1.115	1.014	0.887	0.196	**2.13**	**2.00**	1.31	**Cass 17/18**
	Left side	0.532		0.044	0.004	0.53	0.58	0.54	
	Right side	0.104	0.263	1.110	0.049	0.37	1.21	0.15	
	Top side		0.291	0.984	0.042	0.29	0.98	0.04	
	Bottom side	1.145				1.15	1.15	1.15	
LTE Band 41	Front	0.778	0.412	0.654	0.091	1.19	1.43	0.87	

Ant1	Back	1.258	1.014	0.887	0.196	**2.27**	**2.15**	1.45	**Cass 19/20**
	Left side	0.463		0.044	0.004	0.46	0.51	0.47	
	Right side	0.143	0.263	1.110	0.049	0.41	1.25	0.19	
	Top side		0.291	0.984	0.042	0.29	0.98	0.04	
	Bottom side	1.316				1.32	1.32	1.32	

16.3 Body-Worn Accessory Exposure Conditions

WWAN Band	Exposure Position	1	3	6	9	1+3	1+6	1+9	Case No
		WWAN	WLAN2.4GHz Ant 3	WLAN5GHz Ant 3	Bluetooth Ant 3	Summed	Summed	Summed	
		1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	
GSM850 Ant1	Front	0.441	0.412	0.762	0.091	0.85	1.20	0.53	
	Back	1.348	1.014	0.833	0.196	**2.36**	**2.18**	1.54	**Cass 3/21**
	Front with Headset					0.00	0.00	0.00	
	Back with Headset	1.295				1.30	1.30	1.30	
GSM1900 Ant1	Front	0.442	0.412	0.762	0.091	0.85	1.20	0.53	
	Back	1.137	1.014	0.833	0.196	**2.15**	**1.97**	1.33	**Cass 5/22**
	Front with Headset					0.00	0.00	0.00	
	Back with Headset					0.00	0.00	0.00	
WCDMA II Ant1	Front	0.526	0.412	0.762	0.091	0.94	1.29	0.62	
	Back	1.257	1.014	0.833	0.196	**2.27**	**2.09**	1.45	**Cass 7/23**
	Front with Headset					0.00	0.00	0.00	
	Back with Headset	0.952				0.95	0.95	0.95	
WCDMA V Ant1	Front	0.552	0.412	0.762	0.091	0.96	1.31	0.64	
	Back	1.150	1.014	0.833	0.196	**2.16**	**1.98**	1.35	**Cass 9/24**
	Front with Headset					0.00	0.00	0.00	
	Back with Headset					0.00	0.00	0.00	
LTE Band 2 Ant1	Front	0.488	0.412	0.762	0.091	0.90	1.25	0.58	
	Back	1.127	1.014	0.833	0.196	**2.14**	**1.96**	1.32	**Cass 11/25**
	Front with Headset					0.00	0.00	0.00	
	Back with Headset					0.00	0.00	0.00	
LTE Band 26 Ant1	Front	0.561	0.412	0.762	0.091	0.97	1.32	0.65	
	Back	1.280	1.014	0.833	0.196	**2.29**	**2.11**	1.48	**Cass 13/26**
	Front with Headset					0.00	0.00	0.00	
	Back with Headset	1.014				1.01	1.01	1.01	
LTE Band 7 Ant1	Front	0.553	0.412	0.762	0.091	0.97	1.32	0.64	
	Back	1.336	1.014	0.833	0.196	**2.35**	**2.17**	1.53	**Cass 15/27**
	Front with Headset					0.00	0.00	0.00	
	Back with Headset	1.036				1.04	1.04	1.04	
LTE Band 38 Ant1	Front	0.735	0.412	0.762	0.091	1.15	1.50	0.83	
	Back	1.115	1.014	0.833	0.196	**2.13**	**1.95**	1.31	**Cass 17/28**
	Front with Headset					0.00	0.00	0.00	
	Back with Headset					0.00	0.00	0.00	
LTE Band 41 Ant1	Front	0.778	0.412	0.762	0.091	1.19	1.54	0.87	
	Back	1.258	1.014	0.833	0.196	**2.27**	**2.09**	1.45	**Cass 19/29**
	Front with Headset					0.00	0.00	0.00	
	Back with Headset	0.715				0.72	0.72	0.72	

16.4 Product Specific Exposure Conditions

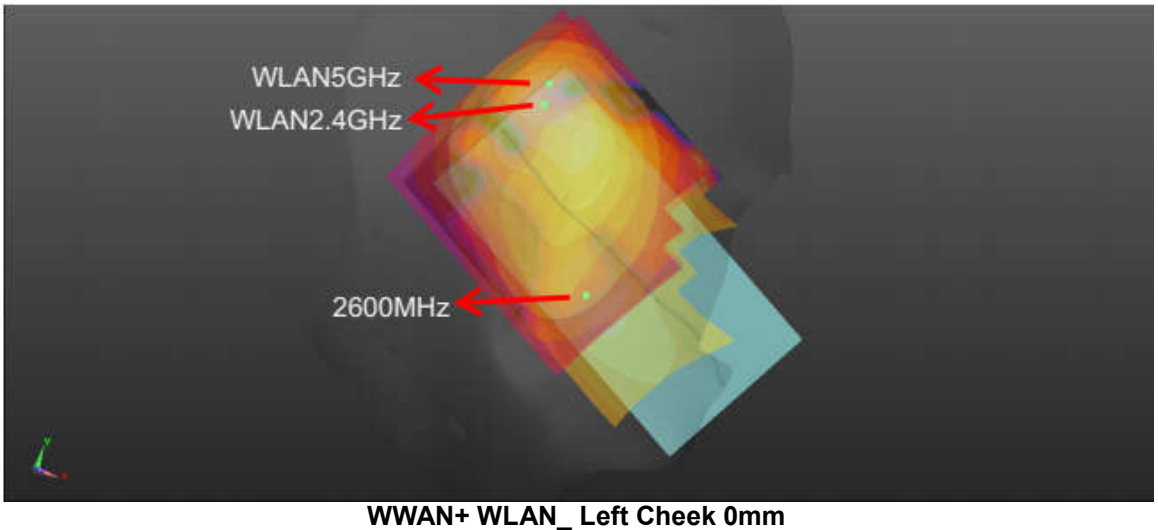
WWAN Band	Exposure Position	1	6	1+6	Case No
		WWAN	WLAN5GHz Ant 3	Summed	
		10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	
GSM850 Ant1	Front		0.925	0.93	
	Back	3.206	0.715	**3.92**	
	Left side		0.031	0.03	
	Right side		1.463	1.46	
	Top side		1.634	1.63	
	Bottom side			0.00	
GSM1900 Ant1	Front		0.925	0.93	
	Back	2.880	0.715	3.60	
	Left side		0.031	0.03	
	Right side		1.463	1.46	
	Top side		1.634	1.63	
	Bottom side	1.792		1.79	
WCDMA II Ant1	Front	1.254	0.925	2.18	
	Back	3.339	0.715	**4.05**	**Cass 30**
	Left side		0.031	0.03	
	Right side		1.463	1.46	
	Top side		1.634	1.63	
	Bottom side	2.273		2.27	
WCDMA V Ant1	Front		0.925	0.93	
	Back		0.715	0.72	
	Left side		0.031	0.03	
	Right side		1.463	1.46	
	Top side		1.634	1.63	
	Bottom side			0.00	
LTE Band 2 Ant1	Front		0.925	0.93	
	Back	2.860	0.715	3.58	
	Left side		0.031	0.03	
	Right side		1.463	1.46	
	Top side		1.634	1.63	
	Bottom side	1.924		1.92	
LTE Band 26 Ant1	Front		0.925	0.93	
	Back	1.863	0.715	2.58	
	Left side		0.031	0.03	
	Right side		1.463	1.46	
	Top side		1.634	1.63	
	Bottom side			0.00	
LTE Band 7 Ant1	Front	1.286	0.925	2.21	
	Back	3.588	0.715	**4.30**	**Cass 31**
	Left side	1.564	0.031	1.60	
	Right side		1.463	1.46	
	Top side		1.634	1.63	
	Bottom side	2.257		2.26	
LTE Band 38 Ant1	Front	1.333	0.925	2.26	
	Back	3.097	0.715	3.81	
	Left side		0.031	0.03	
	Right side		1.463	1.46	
	Top side		1.634	1.63	
	Bottom side	2.234		2.23	
LTE Band 41 Ant1	Front	1.466	0.925	2.39	

	Back	3.555	0.715	**4.27**	**Cass 32**
	Left side		0.031	0.03	
	Right side		1.463	1.46	
	Top side		1.634	1.63	
	Bottom side	2.213		2.21	

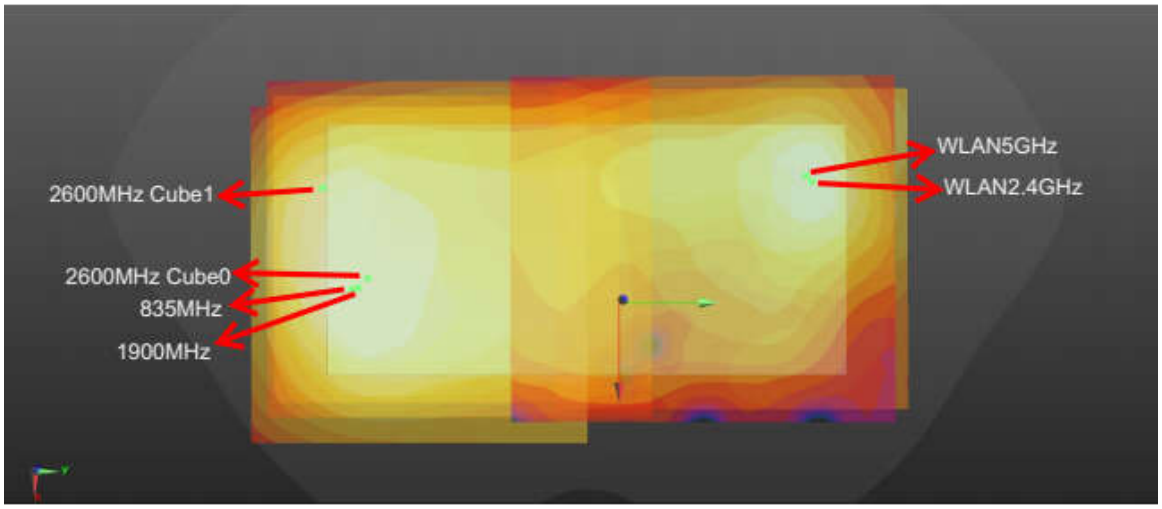
16.5 SPLSR Evaluation and Analysis

General Note:

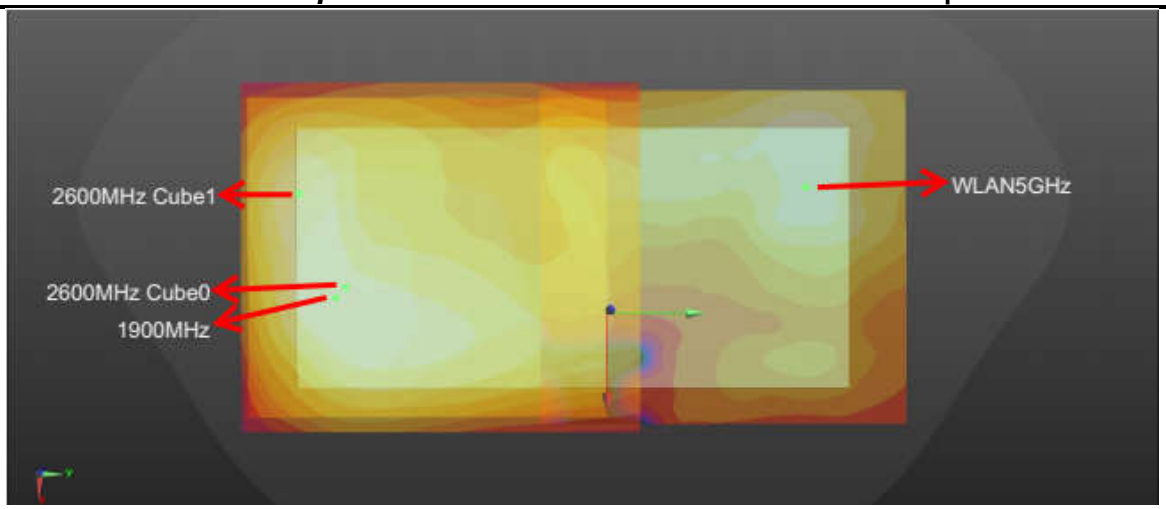
1. When standalone SAR is measured for both antennas in the pair, the peak location separation distance is computed by the square root of [(x1−x2)2 + (y1−y2)2 + (z1−z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates in the area scans or extrapolated peak SAR locations in the zoom scans, as appropriate.
2. SPLSR = (SAR1 + SAR2)1.5 / (min. separation distance, mm). If SPLSR ≤ 0.04 for 1g SAR and SPLSR ≤ 0.10 for 10g SAR, simultaneously transmission SAR measurement is not necessary.
3. The SAR values of Cube 0 and Cube 1 at below tables are different, so selected a larger SAR value forconservative evaluation respectively.



WWAN+ WLAN_ Left Cheek 0mm



WWAN+ WLAN_ Back 5mm



WWAN+ WLAN _Back 0mm

For Head:

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 1	LTE Band 7	Left Cheek	0.627	0mm	0.0624	0.25	-0.173	83.7	1.73	0.03	Not required
	WLAN2.4GHz		1.099	0mm	0.0295	0.327	-0.174				
Case 2	LTE Band 7	Left Cheek	0.627	0mm	0.0624	0.25	-0.173	95.6	1.65	0.02	Not required
	WLAN5GHz		1.020	0mm	0.0207	0.336	-0.173				

For Hotspot:

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 3	GSM850	Back	1.348	5mm	-0.034	-0.076	-0.206	145.1	2.36	0.03	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 4	GSM850	Back	1.348	5mm	-0.034	-0.076	-0.206	151.6	2.24	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				
Case 5	GSM1900	Back	1.137	5mm	-0.0005	-0.0735	-0.206	149.6	2.15	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 6	GSM1900	Back	1.137	5mm	-0.0005	-0.0735	-0.206	155.6	2.02	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				
Case 7	WCDMA II	Back	1.257	5mm	-0.011	-0.067	-0.206	140.3	2.27	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 8	WCDMA II	Back	1.257	5mm	-0.011	-0.067	-0.206	146.5	2.14	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				

	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case 9	WCDMA V	Back	1.15	5mm	-0.0365	-0.0855	-0.206	154.3	2.16	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 10	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA V	Back	1.15	5mm	-0.0365	-0.0855	-0.206	160.8	2.04	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				
Case 11	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 2	Back	1.127	5mm	-0.014	-0.065	-0.207	137.6	2.14	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 12	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 2	Back	1.127	5mm	-0.014	-0.065	-0.207	143.8	2.01	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				
Case 13	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 26	Back	1.28	5mm	-0.0335	-0.083	-0.206	152.1	2.29	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 14	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 26	Back	1.28	5mm	-0.0335	-0.083	-0.206	158.6	2.17	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				
Case 15	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 7	Back	1.336	5mm	-0.0184	-0.0758	-0.206	147.2	2.35	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 16	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 7	Back	1.336	5mm	-0.0184	-0.0758	-0.206	153.5	2.22	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				
Case 17	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 38 Cube 0	Back	1.115	5mm	-0.0276	-0.0828	-0.206	152.5	2.13	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
	LTE Band 38 Cube 1	Back	1.115	5mm	-0.0002	-0.077	-0.206	153.0	2.13	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 18	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 38 Cube 0	Back	1.115	5mm	-0.0276	-0.0828	-0.206	159.0	2.00	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				
	LTE Band 38 Cube 1	Back	1.115	5mm	-0.0002	-0.077	-0.206	159.0	2.00	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				
Case 19	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 41 Cube 0	Back	1.258	5mm	-0.029	-0.084	-0.206	153.6	2.27	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
	LTE Band 41 Cube 1	Back	1.258	5mm	-0.0038	-0.0792	-0.206	154.0	2.27	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 20	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 41 Cube 0	Back	1.258	5mm	-0.029	-0.084	-0.206	160.0	2.15	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				
	LTE Band 41 Cube 1	Back	1.258	5mm	-0.0038	-0.0792	-0.206	160.1	2.15	0.02	Not required
	WLAN5GHz		0.887	5mm	-0.047	0.075	-0.207				

For Body Worn:

	Band	Position	SAR (W/kg)	Gap	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				(mm)	X	Y	Z				
Case 3	GSM850	Back	1.348	5mm	-0.034	-0.076	-0.206	145.1	2.36	0.03	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 21	GSM850	Back	1.348	5mm	-0.034	-0.076	-0.206	153.6	2.18	0.02	Not required
	WLAN5GHz		0.833	5mm	-0.048	0.077	-0.207				
Case 5	GSM1900	Back	1.137	5mm	-0.0005	-0.0735	-0.206	149.6	2.15	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 22	GSM1900	Back	1.137	5mm	-0.0005	-0.0735	-0.206	157.8	1.97	0.02	Not required
	WLAN5GHz		0.833	5mm	-0.048	0.077	-0.207				
Case 7	WCDMA II	Back	1.257	5mm	-0.011	-0.067	-0.206	140.3	2.27	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 23	WCDMA II	Back	1.257	5mm	-0.011	-0.067	-0.206	148.7	2.09	0.02	Not required
	WLAN5GHz		0.833	5mm	-0.048	0.077	-0.207				
Case 9	WCDMA V	Back	1.15	5mm	-0.0365	-0.0855	-0.206	154.3	2.16	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 24	WCDMA V	Back	1.15	5mm	-0.0365	-0.0855	-0.206	162.9	1.98	0.02	Not required
	WLAN5GHz		0.833	5mm	-0.048	0.077	-0.207				
Case 11	LTE Band 2	Back	1.127	5mm	-0.014	-0.065	-0.207	137.6	2.14	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 25	LTE Band 2	Back	1.127	5mm	-0.014	-0.065	-0.207	146.0	1.96	0.02	Not required
	WLAN5GHz		0.833	5mm	-0.048	0.077	-0.207				
Case 13	LTE Band 26	Back	1.28	5mm	-0.0335	-0.083	-0.206	152.1	2.29	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 26	LTE Band 26	Back	1.28	5mm	-0.0335	-0.083	-0.206	160.7	2.11	0.02	Not required
	WLAN5GHz		0.833	5mm	-0.048	0.077	-0.207				
Case 15	LTE Band 7	Back	1.336	5mm	-0.0184	-0.0758	-0.206	147.2	2.35	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 27	Band	Position	SAR (W/kg)	Gap	SAR peak location (m)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
				(mm)	X	Y	Z				

	LTE Band 7	Back	1.336	5mm	-0.0184	-0.0758	-0.206	155.6	2.17	0.02	Not required
	WLAN5GHz		0.833	5mm	-0.048	0.077	-0.207				
Case 17	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 38 Cube 0	Back	1.115	5mm	-0.0276	-0.0828	-0.206	152.5	2.13	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
	LTE Band 38 Cube 1	Back	1.115	5mm	-0.0002	-0.077	-0.206	153.0	2.13	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 28	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 38 Cube 0	Back	1.115	5mm	-0.0276	-0.0828	-0.206	161.1	1.95	0.02	Not required
	WLAN5GHz		0.833	5mm	-0.048	0.077	-0.207				
	LTE Band 38 Cube 1	Back	1.115	5mm	-0.0002	-0.077	-0.206	161.3	1.95	0.02	Not required
	WLAN5GHz		0.833	5mm	-0.048	0.077	-0.207				
Case 19	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 41 Cube 0	Back	1.258	5mm	-0.029	-0.084	-0.206	153.6	2.27	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
	LTE Band 41 Cube 1	Back	1.258	5mm	-0.0038	-0.0792	-0.206	154.0	2.27	0.02	Not required
	WLAN2.4GHz		1.014	5mm	-0.0478	0.0684	-0.207				
Case 29	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 41 Cube 0	Back	1.258	5mm	-0.029	-0.084	-0.206	162.1	2.09	0.02	Not required
	WLAN5GHz Cube 1		0.833	5mm	-0.048	0.077	-0.207				
	LTE Band 41	Back	1.258	5mm	-0.0038	-0.0792	-0.206	162.3	2.09	0.02	Not required
	WLAN5GHz		0.833	5mm	-0.048	0.077	-0.207				

For 10g SAR:

Case 30	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA II	Back	3.339	0mm	0.0075	-0.081	-0.206	163.7	4.05	0.05	Not required
	WLAN5GHz		0.715	0mm	-0.045	0.074	-0.207				
Case 31	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 7 Cube 0	Back	3.588	0mm	-0.0026	-0.0832	-0.206	162.8	4.30	0.05	Not required
	WLAN5GHz		0.715	0mm	-0.045	0.074	-0.207				
	LTE Band 7 Cube 1	Back	3.588	0mm	-0.0276	-0.0856	-0.206	160.5	4.30	0.06	Not required
	WLAN5GHz		0.715	0mm	-0.045	0.074	-0.207				
Case 32	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 41 Cube 0	Back	3.55	0mm	-0.0122	-0.0844	-0.206	161.8	4.27	0.05	Not required
	WLAN5GHz		0.715	0mm	-0.045	0.074	-0.207				
	LTE Band 41 Cube 1	Back	3.55	0mm	-0.0396	-0.0868	-0.206	160.9	4.27	0.05	Not required
	WLAN5GHz		0.715	0mm	-0.045	0.074	-0.207				

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17. Uncertainty Assessment

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

18. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[6] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.

[7] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[8] FCC KDB 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, Oct 2015.

[9] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

[10] FCC KDB 616217 D04 v01r02, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, Oct 2015

[11] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

[12] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015

[13] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.

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