FCC SAR Test Report

FCC ID: ZLE-RG650U

Project No.	:	1810C073
Equipment	:	LTE SMARTPHONE
Test Model	:	RG650U
Series Model	:	N/A
Applicant	:	Power Idea Technology (Shenzhen) Co., Ltd.
Address	:	4th Floor, A Section ,Languang Science&technology Xinxi RD, Hi-Tech Industrial Park North, Nanshan, ShenZhen, China

Date of Receipt	:	Oct. 18, 2018
Date of Test	:	Dec. 18, 2018 ~ Dec. 22, 2018 Jan. 18, 2019
Issued Date	:	Feb. 12, 2019
Tested by	:	BTL Inc.

PREPARED BY : Rot . Liang (Rot Liang)

APPROVED BY : Steven Lu (Steven Lu)

BTL INC.

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Certificate #5123.02

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** shall have no liability for any declarations, inferences or generalizations drawn by the client or others from **BTL** issued reports.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

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REPORT ISSUED HISTORY

Report Version	Description	Issued Date
R00	Original Issue	Jan. 07, 2019
R01	Modified the comments of TCB.	Jan. 21, 2019
R02	Changed the FCC ID and applicant information.	Jan. 28, 2019
R03	Modified the comments of TCB.	Feb. 12, 2019

1. GENERAL SUMMARY

Equipment	LTE SMARTPHONE
Brand Name	RugGear
Test Model	RG650U
Series Model	N/A
Model difference(s)	N/A
Manufacturer	RUGGEAR LIMITED
Address	RM1301,13/F WING TUCK COMM CTR 177-183 WING LOK ST SHEUNG WAN HONG KONG
Standard(s)	**ANSI Std C95.1-1992** Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.(IEEE Std C95.1-1991) **IEEE Std 1528-2013** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques **KDB941225 D01** 3G SAR Procedures v03r01 **KDB941225 D05** SAR for LTE Devices v02r05 **KDB941225 D06** Hotspot Mode V02r01 **KDB447498 D01** General RF Exposure Guidance v06 **KDB648474 D04** Handset SAR v01r03 **KDB248227 D01** 802. 11 Wi-Fi SAR v02r02 **KDB865664 D01** SAR measurement 100 MHz to 6 GHz v01r04 **KDB865664 D02** SAR Reporting v01r02 **KDB690783 D01** SAR Listings on Grants v01r03

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCC SAR-1-1810C073) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of A2LA according to the ISO/IEC 17025 quality assessment standard and technical standard(s).

2. RF EMISSIONS MEASUREMENT

2.1 TEST FACILITY

The test facilities used to collect the test data in this report is **SAR room** at the location of No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.523792

2.2 MEASUREMENT UNCERTAINTY

Note: Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

3. GENERAL INFORMATION

3.1 STATEMENT OF COMPLIANCE

Mode	Highest Head Reported SAR-1g (W/kg)	Highest Hotspot Reported SAR-1g (W/kg)	Highest Product specific 10-g SAR (W/kg)
GSM850	0.28	0.42	-
GSM1900	0.02	0.46	-
UMTS B2	0.04	0.46	-
UMTS B4	0.07	1.09	-
UMTS B5	0.21	0.34	-
LTE B2	0.05	0.44	-
LTE B7	0.42	0.43	-
LTE B12	0.12	0.29	-
LTE B66	0.06	0.96	-
2.4G WLAN	0.34	0.07	-
5.2G WLAN	-	0.47	-
5.3G WLAN	1.10	-	0.67
5.6G WLAN	0.97	-	0.79
5.8G WLAN	0.72	0.55	-
Note: The highest reported SAR for head, hotspot, product specific 10-g and simultaneous transmission exposure conditions are 1.10W/kg, 1.09W/kg, 0.79W/kg and 1.51W/kg respectively.			

Note:

1)The device is in compliance with Specific Absorption Rate(SAR) for general population uncontrolled exposure limits according to the FCC rule §2.1093, the ANSI C95.1: 1992/IEEE C95.1:1991, the NCRP Report Number 86 for uncontrolled environment, and had been tested in accordance with the measurement methods and procedures specified in IEEE Std 1528-2013.

2) According to TCB workshop October, 2014 RF Exposure Procedures Update (Overlapping LTE Bands):
SAR for LTE B17 (Frequency range: 704-716 MHz) is covered by LTE B12 (Frequency range: 699-716MHz) due to similar frequency range, same maximum tune up limit and same maximum channel bandwidth.
SAR for LTE B4 (Frequency range: 1710-1755 MHz) is covered by LTE B66 (Frequency range: 1710-1780 MHz) due to similar frequency range, same maximum tune up limit and same maximum channel bandwidth.
Therefore, SAR tests for LTE B17 and LTE B4 are not required.

3.2 GENERAL DESCRIPTION OF EUT

Equipment	LTE SMARTPHONE		
Brand Name	RugGear		
Test Model	RG650U		
Series Model	N/A		
IMEI Code	IMEI 1	860624040000560	
	IMEI 2	860624040000578	
HW Version	V1.0		
SW Version	RG650_US_1.0.0.0.0_1		
Modulation	GSM(GMSK/8PSK), UMTS(QPSK/16QAM), LTE(QPSK/16QAM), WiFi(DSSS/OFDM), BT(GFSK/ π /4-DQPSK/8-DPSK)		
Operation Frequency Range(s)	Band	TX (MHz)	RX (MHz)
	GSM850	824-849	869-894
	GSM1900	1850-1910	1930-1990
	UMTS B2	1850-1910	1930-1990
	UMTS B4	1710-1755	2110-2155
	UMTS B5	824-849	869-894
	LTE B2	1850-1910	1930-1990
	LTE B4	1710-1755	2110-2155
	LTE B7	2500-2570	2620-2690
	LTE B12	699-716	729-746
	LTE B17	704-716	734-746
	LTE B66	1710-1780	2110-2180
	Bluetooth	2400-2483.5	
	2.4G WIFI	2400-2483.5	
	5.2G WIFI	5150-5250	
	5.3G WIFI	5250-5350	
	5.6G WIFI	5470-5725	
	5.8G WIFI	5725-5850	
GPRS/EDGE Multislot Class(12)	Max Number of Timeslots in Uplink:	4	
	Max Number of Timeslots in Downlink:	4	
	Max Total Timeslot:	5	
GSM Device class	Class B		
HSDPA UE Category	14		
HSUPA UE Category	6		
DC-HSDPA UE Category	24		
Power Class	4,tested with power level 5(GSM850)		
	1,tested with power level 0(GSM1900)		
	3, tested with power control “all 1”(UMTS B2/4/5)		
	3, tested with power control “all Max” (LTE B2/4/7/12/17/66)		

<table>
<tr><td rowspan="18">Test Channels
(low-mid-high)</td><td colspan="5">128-190-251 (GSM850)</td></tr>
<tr><td colspan="5">512-661-810 (GSM1900)</td></tr>
<tr><td colspan="5">9262-9400-9538(UMTS B2)</td></tr>
<tr><td colspan="5">1312-1413-1513 (UMTS B4)</td></tr>
<tr><td colspan="5">4132-4182-4233 (UMTS B5)</td></tr>
<tr><td colspan="5">18700-18900-19100(LTE B2 BW=20MHz)</td></tr>
<tr><td colspan="5">20050-20175-20300(LTE B4 BW=20MHz)</td></tr>
<tr><td colspan="5">20850-21100-21350(LTE B7 BW=20MHz)</td></tr>
<tr><td colspan="5">23060-23095-23130(LTE B12 BW=10MHz)</td></tr>
<tr><td colspan="5">23780-23790-23800(LTE B17 BW=10MHz)</td></tr>
<tr><td colspan="5">132072-132322-132572(LTE B66 BW=20MHz)</td></tr>
<tr><td colspan="5">0-39-79(BT)</td></tr>
<tr><td colspan="5">0-19-39(BLE)</td></tr>
<tr><td colspan="5">1-6-11 (2.4G WIFI 802.11b/g/n HT20)</td></tr>
<tr><td colspan="5">3-6-9 (2.4G WIFI 802.11n HT40)</td></tr>
<tr><td>5G WIFI</td><td>5.2G WIFI</td><td>5.3G WIFI</td><td>5.6G WIFI</td><td>5.8G WIFI</td></tr>
<tr><td>802.11a/
n HT20</td><td>36-40-44-48</td><td>52-56-60-64</td><td>100-104-108-
112-116-132-
136-140</td><td>149-153-157-
161-165</td></tr>
<tr><td>802.11n
HT40</td><td colspan="2">38-46</td><td>54-62</td><td>102-110-118-
126-134</td><td>151-159</td></tr>
<tr><td rowspan="15">Antenna Gain</td><td>Band</td><td colspan="2">Main Antenna (dBi)</td><td colspan="2">Wifi Ant (dBi)</td></tr>
<tr><td>GSM 900</td><td colspan="2">-1.5</td><td colspan="2">-</td></tr>
<tr><td>GSM 1900</td><td colspan="2">-2.2</td><td colspan="2">-</td></tr>
<tr><td>UMTS B2</td><td colspan="2">-2.2</td><td colspan="2">-</td></tr>
<tr><td>UMTS B4</td><td colspan="2">-2.1</td><td colspan="2">-</td></tr>
<tr><td>UMTS B5</td><td colspan="2">-1.5</td><td colspan="2">-</td></tr>
<tr><td>LTE B2</td><td colspan="2">-2.2</td><td colspan="2">-</td></tr>
<tr><td>LTE B4</td><td colspan="2">-2.1</td><td colspan="2">-</td></tr>
<tr><td>LTE B7</td><td colspan="2">-1.5</td><td colspan="2">-</td></tr>
<tr><td>LTE B12</td><td colspan="2">-1.8</td><td colspan="2">-</td></tr>
<tr><td>LTE B17</td><td colspan="2">-1.8</td><td colspan="2">-</td></tr>
<tr><td>LTE B66</td><td colspan="2">-2.5</td><td colspan="2">-</td></tr>
<tr><td>Bluetooth</td><td colspan="2">-</td><td colspan="2">0.2</td></tr>
<tr><td>2.4G WIFI</td><td colspan="2">-</td><td colspan="2">0.2</td></tr>
<tr><td>5G WIFI</td><td colspan="2">-</td><td colspan="2">0.8</td></tr>
<tr><td colspan="6">Other Information</td></tr>
<tr><td rowspan="4">Battery</td><td>Model</td><td colspan="4">BL420KP</td></tr>
<tr><td>Rated capacity</td><td colspan="4">4200mAh</td></tr>
<tr><td>Rated Voltage</td><td colspan="4">3.80V</td></tr>
<tr><td>Manufacturer</td><td colspan="4">SHENZHEN JIAYUANTONGDA TECHNOLOGY CO.,LTD.</td></tr>
</table>

3.3 LABORATORY ENVIRONMENT

Temperature	Min. = 18ºC, Max. = 25ºC
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

3.4 MAIN TEST INSTRUMENTS

Item	Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Interval
1	Data Acquisition Electronics	Speag	DAE4	1390	May 11, 2018	1 Year
2	E-field Probe	Speag	EX3DV4	7396	May 29, 2018	1 Year
3	E-field Probe	Speag	ES3DV3	3240	Mar. 28, 2018	1 Year
4	System Validation Dipole	Speag	D750V3	1095	Jun. 05, 2018	3 Years
5	System Validation Dipole	Speag	D835V2	4d160	Jun. 05, 2018	3 Years
6	System Validation Dipole	Speag	D1750V2	1101	Jun. 07, 2018	3 Years
7	System Validation Dipole	Speag	D1900V2	5d179	Jun. 07, 2018	3 Years
8	System Validation Dipole	Speag	D2450V2	919	Jun. 11, 2018	3 Years
9	System Validation Dipole	Speag	D2600V2	1067	Jun. 11, 2018	3 Years
10	System Validation Dipole	Speag	D5GHzV2	1160	Jun. 20, 2018	3 Years
11	Twin Sam Phantom	Speag	Twin Sam Phantom V5.0	1784	N/A	N/A
12	Twin Sam Phantom	Speag	Twin Sam Phantom V5.0	1896	N/A	N/A
13	8960 Series 10 Wireless Com Test set	Agilent	E5515E	MY52112163	Aug. 11, 2018	1 Year
14	CMW500-Wideband Radio Communication Tester	RS	CMW500	153883	Mar. 11, 2018	1Year
15	Power Amplifier	Mini-Circuits	ZHL-42W+	QA1333003	Mar. 09, 2018	1Year
16	Power Amplifier	Mini-Circuits	ZVE-8G+	520701341	Mar. 09, 2018	1Year
17	DC Source	Iteck	OT6154	M00157	Oct. 12, 2018	1Year
18	ENA Network Analyzer	Agilent	E5071C	MY46102965	Mar. 11, 2018	1 Year
19	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Aug. 11, 2018	1 Year
20	P-series power meter	Agilent	N1911A	MY45100473	Aug. 11, 2018	1 Year
21	wideband power sensor	Agilent	N1921A	MY51100041	Aug. 11, 2018	1 Year
22	Power Meter	Anritsu	ML2495A	1128009	Mar. 11, 2018	1 Year
23	Pulse Power Sensor	Anritsu	MA 2411B	1027500	Mar. 11, 2018	1 Year
24	Dielectric Assessment Kit	Speag	DAK-3.5	1226	N/A	N/A
25	Dual directional coupler	Woken	TS-PCC0M-05	107090019	Mar. 11, 2018	1 Year
26	coupler	Woken	0110A05601O-10	COM5BNW1A2	Mar. 11, 2018	1 Year
27	Digital Themometer	LKM	DTM3000	3519	Jul. 19, 2018	1 Year
28	Thermohygrometer	Parkoo	JR609	N/A	Aug. 23, 2018	1 Year

Note:
1: Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check source.
2: “N/A” denotes no model name, serial No. or calibration specified.
3:
1) Per KDB865664 D01 requirements for dipole calibration, the test laboratory has adopted three-year extended calibration interval. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.
a) There is no physical damage on the dipole;
b) System check with specific dipole is within 10% of calibrated value;
c) The most recent return-loss result , measured at least annually, deviates by no more than 20% from the previous measurement;
d) The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.
2) Network analyzer probe calibration against air, distilled water and a short block performed before measuring liquid parameters.

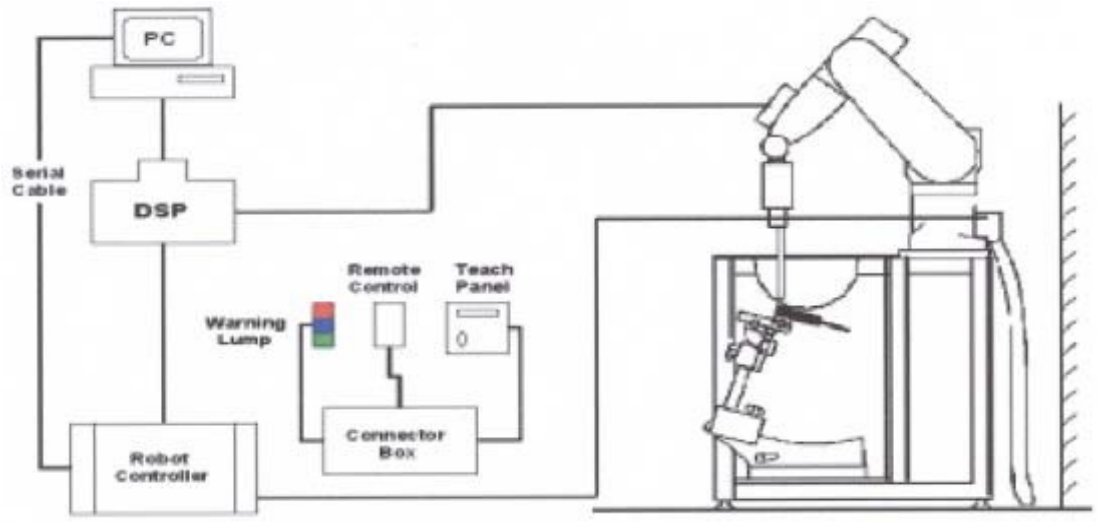
4. SAR MEASUREMENTS SYSTEM CONFIGURATION

4.1 SAR MEASUREMENT SET-UP

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

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
3. A data acquisition electronic (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.
4. A unit to operate the optical surface detector which is connected to the EOC.
5. The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
6. TheDASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows.
7. DASY5 software and SEMCAD data evaluation software.
8. Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
9. The generic twin phantom enabling the testing of left-hand and right-hand usage.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
12. System validation dipoles allowing to validate the proper functioning of the system.

4.1.1 TEST SETUP LAYOUT



4.2 DASY5 E-FIELD PROBE SYSTEM

The SAR measurements were conducted with the dosimetric probe EX3DV4 and ES3DV3 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

4.2.1 PROBE SPECIFICATION

EX3DV4

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.0 mm

ES3DV3

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available
Frequency	10 MHz to 4 GHz Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 µW/g to > 100 mW/g Linearity: ± 0.2dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 4 mm (Body: 12 mm) Distance from probe tip to dipole centers: 1.0 mm

E-field Probe

4.2.2 E-FIELD PROBE CALIBRATION

Each probe is calibrated according to a dosimetric assessment procedure with accuracy better than ±10%. The spherical isotropy was evaluated and found to be better than ± 0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C\frac{\Delta T}{\Delta t}$$

Where: Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

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

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m3).

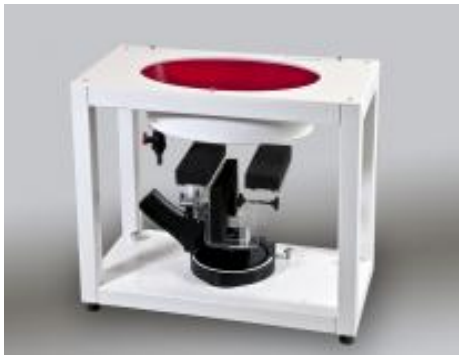
4.2.3 OTHER TEST EQUIPMENT

4.2.3.1. Device Holder for Transmitters

Construction: Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices (e.g., laptops, cameras, etc.) It is light weight and fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI4and SAM v6.0Phantoms.
Material: POM, Acrylic glass, Foam

4.2.3.2 Phantom

Model	ELI4 Phantom
Construction	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.
Shell Thickness	2±0.1 mm
Filling Volume	Approx. 30 liters
Dimensions	Length: 600 mm ; Width: 190mm Height: adjustable feet
Aailable	Special



Model	Twin SAM
Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.
Shell Thickness	2 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length:1000mm; Width: 500mm Height: adjustable feet
Aailable	Special

4.2.4 SCANNING PROCEDURE

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.

The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- Area Scan

The “area scan” measures the SAR above the DUT or verification dipole on a parallel plane to the surface. It is used to locate the approximate location of the peak SAR with 2D spline interpolation. The robot performs a stepped movement along one grid axis while the local electrical field strength is measured by the probe. The probe is touching the surface of the SAM during acquisition of measurement values. The standard scan uses large grid spacing for faster measurement. Standard grid spacing for head measurements is 15 mm in x- and y- dimension(≤2GHz)，12 mm in x- and y- dimension(2-4 GHz) and 10mm in x- and y- dimension(4-6GHz). If a finer resolution is needed, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result. For special applications where the standard scan method does not find the peak SAR within the grid, e.g. mobile phones with flip cover, the grid can be adapted in orientation.

- Zoom Scan

A “zoom scan” measures the field in a volume around the 2D peak SAR value acquired in the previous “coarse” scan. This is a fine grid with maximum scan spatial resolution: Δx_{zoom}, Δy_{zoom}≤ 2GHz -≤8mm, 2-4GHz -≤5 mm and 4-6 GHz-≤4mm; Δz_{zoom}≤3GHz -≤5 mm, 3-4 GHz-≤4mm and 4-6GHz-≤2mm where the robot additionally moves the probe along the z-axis away from the bottom of the Phantom. DASY is also able to perform repeated zoom scans if more than 1 peak is found during area scan. In this document, the evaluated peak 1g and 10g averaged SAR values are shown in the 2D-graphics in Appendix B. Test results relevant for the specified standard (see chapter 1.4.) are shown in table form form in chapter 7.2.

A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 2 mm steps. This measurement shows the continuity of the liquid and can - depending in the field strength – also show the liquid depth.

The following table summarizes the area scan and zoom scan resolutions per FCC KDB 865664D01:

Frequency	Maximun Area Scan resolution (Δx_{area}, Δy_{area})	Maximun Zoom Scan spatial resolution (Δx_{Zoom}, Δy_{Zoom})	Maximun Zoom Scan spatial resolution			Minimum zoom scan volume (x,y,z)
			Uniform Grid	Graded Grad		
			$\Delta z_{Zoom}(n)$	$\Delta z_{Zoom}(1)$*	$\Delta z_{Zoom}(n>1)$*	
≤2GHz	≤15mm	≤8mm	≤5mm	≤4mm	≤1.5*Δz_{Zoom}(n-1)	≥30mm
2-3GHz	≤12mm	≤5mm	≤5mm	≤4mm	≤1.5*Δz_{Zoom}(n-1)	≥30mm
3-4GHz	≤12mm	≤5mm	≤4mm	≤3mm	≤1.5*Δz_{Zoom}(n-1)	≥28mm
4-5GHz	≤10mm	≤4mm	≤3mm	≤2.5mm	≤1.5*Δz_{Zoom}(n-1)	≥25mm
5-6GHz	≤10mm	≤4mm	≤2mm	≤2mm	≤1.5*Δz_{Zoom}(n-1)	≥22mm

4.2.5 SPATIAL PEAK SAR EVALUATION

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation is the SAR values measured at the points of the fine cube grid consisting of 5 x 5 x 7 points (with 8mm horizontal resolution) or 7 x 7 x 7 points (with 5mm horizontal resolution) or 8 x 8 x 7 points (with 4mm horizontal resolution). The algorithm that finds the maximal averaged volume is separated into three different stages.

- The data between the dipole center of the probe and the surface of the phantom are extrapolated. This data cannot be measured since the center of the dipole is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is about 1 mm (see probe calibration sheet). The extrapolated data from a cube measurement can be visualized by selecting “Graph Evaluated”.
- The maximum interpolated value is searched with a straight-forward algorithm. Around this maximum the SAR - values averaged over the spatial volumes (1g or 10 g) are computed using the 3d-spline interpolation algorithm. If the volume cannot be evaluated (i.e., if a part of the grid was cut off by the boundary of the measurement area) the evaluation will be started on the corners of the bottom plane of the cube.
- All neighboring volumes are evaluated until no neighboring volume with a higher average value is found.

Extrapolation

The extrapolation is based on a least square algorithm [W. Gander, Computer mathematic, p.168-180]. Through the points in the first 3 cm along the z-axis, polynomials of order four are calculated. These polynomials are then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from each other.

Interpolation

The interpolation of the points is done with a 3d-Spline. The 3d-Spline is composed of three one-dimensional splines with the "Not a knot"-condition [W. Gander, Computer mathematic, p.141-150] (x, y and z -direction) [Numerical Recipes in C, Second Edition, p.123ff].

Volume Averaging

At First the size of the cube is calculated. Then the volume is integrated with the trapezoidal algorithm. 8000 points (20x20x20) are interpolated to calculate the average.

Advanced Extrapolation

DASY5 uses the advanced extrapolation option which is able to compensate boundary effects on E-field probes.

4.2.6 DATA STORAGE AND EVALUATION

4.2.5.1 Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension “DAE”. The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

4.2.7 DATA EVALUATION BY SEMCAD

The SEMCAD software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	Sensitivity	Normi, a_{i0}, a_{i1}, a_{i2}
	Conversion factor	$ConvF_i$
	Diode compression point	Dcp_i
Device parameters:	Frequency	f
	Crest factor	cf
Media parameters:	Conductivity	
	Density	

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY5 components. In the direct measuring mode of the multi meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

With V_i = compensated signal of channel i (i = x, y, z)

U_i = input signal of channel i (i = x, y, z)

cf = crest factor of exciting field (DASY parameter)

dcp_i = diode compression point (DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

E-field probes: $E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$

H-field probes: $H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$

With V_i = compensated signal of channel i (i = x, y, z)

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)
[mV/(V/m)^2] for E-field Probes

ConvF = sensitivity enhancement in solution

aij = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_X^2 + E_Y^2 + E_Z^2)^{1/2}$$

The primary field data are used to calculate the derived field units.

$$SAR = (E_{tot})^2 \cdot \sigma / (\rho \cdot 1000)$$

With SAR = local specific absorption rate in mW/g

E_{tot} = total field strength in V/m
= conductivity in [mho/m] or [Siemens/m]
= equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = E_{tot}^2 / 3770 \text{ or } P_{pwe} = H_{tot}^2 \cdot 37.7$$

With P_{pwe} = equivalent power density of a plane wave in mW/cm^2

E_{tot} = total field strength in V/m

H_{tot} = total magnetic field strength in A/m

5. SYSTEM VERIFICATION PROCEDURE

5.1 TISSUE VERIFICATION

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the dielectric parameter are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within ± 5% of the target values.

The following materials are used for producing the tissue-equivalent materials.

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
Head 750	0.2	-	0.2	1.5	56.0	-	42.1	-
Head 835	0.2	-	0.2	1.5	57.0	-	41.1	-
Head 1750	-	47.0	-	0.4	-	-	52.6	-
Head 1900	-	44.5	-	0.2	-	-	55.3	-
Head 2450	-	45.0	-	0.1	-	-	54.9	-
Head 2600	-	45.1	-	0.1	-	-	54.8	-
Head 5G	-	-	-	-	-	17.2	65.5	17.3

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
Body 750	0.2	-	0.2	0.8	48.8	-	50.0	-
Body 835	0.2	-	0.2	0.9	48.5	-	50.2	-
Body 1750	-	31.0	-	0.2	-	-	68.8	-
Body 1900	-	29.5	-	0.3	-	-	70.2	-
Body 2450	-	31.4	-	0.1	-	-	68.5	-
Body 2600	-	31.8	-	0.1	-	-	68.1	-
Body 5G	-	-	-	-	-	10.7	78.6	10.7

Salt: 99+% Pure Sodium Chloride; Sugar: 98+% Pure Sucrose; Water: De-ionized, 16M + resistivity
HEC: Hydroxyethyl Cellulose; DGBE: 99+% Di(ethylene glycol) butyl ether,[2-(2-butoxyethoxy)ethanol]
Triton X-100(ultra pure): Polyethylene glycol mono [4-(1,1,3,3-tetramethylbutyl)phenyl]ether

Tissue Verification									
Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Targeted Conductivity (σ)	Targeted Permittivity (εr)	Deviation Conductivity (σ) (%)	Deviation Permittivity (εr) (%)	Date
Head	750	22.5	0.908	40.492	0.89	41.9	2.02	-3.36	Dec. 18, 2018
Head	835	22.4	0.913	42.535	0.90	41.5	1.44	2.49	Dec. 18, 2018
Head	1750	22.5	1.348	38.858	1.37	40.1	-1.61	-3.10	Dec. 18, 2018
Head	1900	22.2	1.447	38.505	1.40	40.0	3.36	-3.74	Dec. 19, 2018
Head	2450	22.4	1.786	40.406	1.80	39.2	-0.78	3.08	Dec. 22, 2018
Head	2600	22.6	2.024	38.632	1.96	39.0	3.27	-0.94	Dec. 18, 2018
Head	5300	22.3	4.926	35.427	4.76	35.9	3.49	-1.32	Dec. 22, 2018
Head	5500	22.3	5.150	35.024	4.96	35.6	3.83	-1.62	Dec. 22, 2018
Head	5600	22.3	5.253	34.836	5.07	35.5	3.61	-1.87	Dec. 22, 2018
Head	5800	22.3	5.467	34.539	5.27	35.3	3.74	-2.16	Dec. 22, 2018
Body	750	22.3	0.968	55.194	0.96	55.5	0.83	-0.55	Dec. 19, 2018
Body	835	22.3	0.961	57.004	0.97	55.2	-0.93	3.27	Dec. 19, 2018
Body	1750	22.4	1.525	51.578	1.49	53.4	2.35	-3.41	Dec. 20, 2018
Body	1900	22.1	1.511	51.054	1.52	53.3	-0.59	-4.21	Dec. 21, 2018
Body	2450	22.5	1.982	51.426	1.95	52.7	1.64	-2.42	Dec. 22, 2018
Body	2600	22.6	2.211	51.160	2.16	52.5	2.36	-2.55	Dec. 20, 2018
Body	5200	22.5	5.366	47.841	5.30	49.0	1.25	-2.37	Jan. 18, 2019
Body	5300	22.5	5.508	47.617	5.42	48.9	1.62	-2.62	Jan. 18, 2019
Body	5500	22.5	5.781	47.182	5.65	48.6	2.32	-2.92	Jan. 18, 2019
Body	5600	22.5	5.915	46.988	5.77	48.5	2.51	-3.12	Jan. 18, 2019
Body	5800	22.5	6.163	46.419	6.00	48.2	2.72	-3.70	Dec. 22, 2018

Note:
1)The dielectric parameters of the tissue-equivalent liquid should be measured under similar ambient conditions and within 2 °C of the conditions expected during the SAR evaluation to satisfy protocol requirements.
2)KDB 865664 was ensured to be applied for probe calibration frequencies greater than or equal to 50MHz of the EUT frequencies.
3)The above measured tissue parameters were used in the DASY software to perform interpolation via the DASY software to determine actual dielectric parameters at the test frequencies. The SAR test plots may slightly differ from the table above since the DASY rounds to three significant digits.

5.2 SYSTEM CHECK

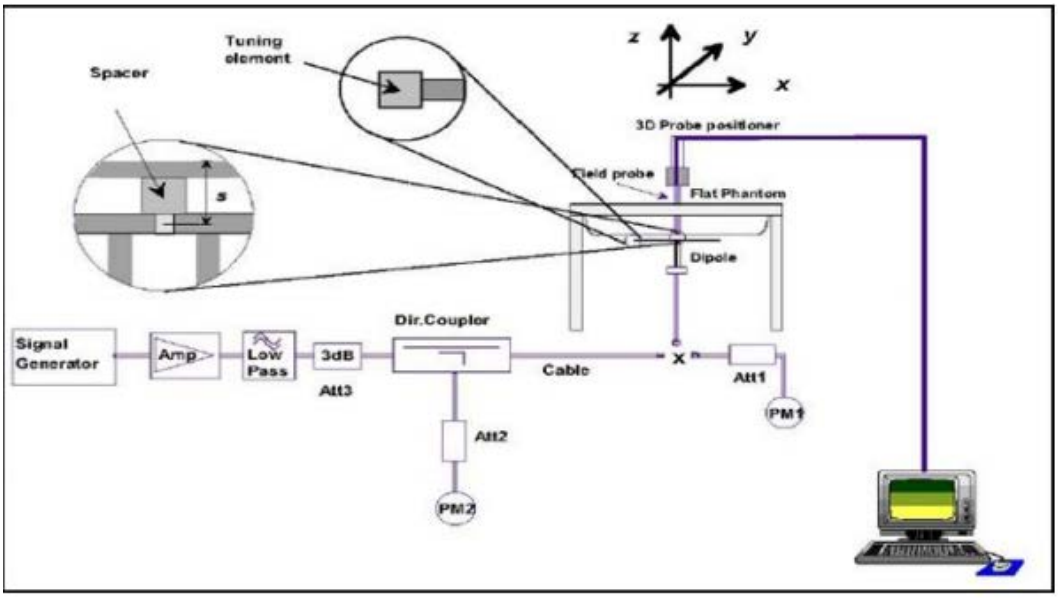
The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE Std 1528 (described above). The following table shows system check results for all frequency bands and tissue liquids used during the tests.

System Check	Date	Frequency (MHz)	Targeted SAR (W/kg) 10g	Measured SAR (W/kg) 10g	normalized SAR (W/kg) 10g	Deviation (%) 10g	Dipole S/N
Head	Dec. 18, 2018	750	8.47	2.13	8.52	0.59	1095
Head	Dec. 18, 2018	835	9.23	2.40	9.60	4.01	4d160
Head	Dec. 18, 2018	1750	37.00	8.91	35.64	-3.68	1101
Head	Dec. 19, 2018	1900	39.50	9.79	39.16	-0.86	5d179
Head	Dec. 22, 2018	2450	52.10	12.90	51.60	-0.96	919
Head	Dec. 18, 2018	2600	56.10	14.10	56.40	0.53	1067
Head	Dec. 22, 2018	5300	76.80	7.72	77.20	0.52	1160
Head	Dec. 22, 2018	5500	80.80	7.89	78.90	-2.35	1160
Head	Dec. 22, 2018	5600	78.60	7.62	76.20	-3.05	1160
Head	Dec. 22, 2018	5800	77.90	7.75	77.50	-0.51	1160
Body	Dec. 19, 2018	750	8.51	2.19	8.76	2.94	1095
Body	Dec. 19, 2018	835	9.53	2.27	9.08	-4.72	4d160
Body	Dec. 20, 2018	1750	37.40	9.42	37.68	0.75	1101
Body	Dec. 21, 2018	1900	39.80	9.46	37.84	-4.92	5d179
Body	Dec. 22, 2018	2450	50.80	12.80	51.20	0.79	919
Body	Dec. 20, 2018	2600	55.20	14.00	56.00	1.45	1067
Body	Jan. 18, 2019	5200	69.80	6.88	68.80	-1.43	1160
Body	Jan. 18, 2019	5300	72.30	7.05	70.50	-2.49	1160
Body	Jan. 18, 2019	5500	76.20	7.71	77.10	1.18	1160
Body	Jan. 18, 2019	5600	77.70	8.15	81.50	4.89	1160
Body	Dec. 22, 2018	5800	76.60	7.61	76.10	-0.65	1160

5.3 SYSTEM CHECK PROCEDURE

The system check is performed by using a system check dipole which is positioned parallel to the planar part of the SAM phantom at the reference point. The distance of the dipole to the SAM phantom is determined by a Plexiglas's spacer. The dipole is connected to the signal source consisting of signal generator and amplifier via a directional coupler, N-connector cable and adaption to SMA. It is fed with a power of 250 mW(below 3GHz) or 100mW(3-6GHz). To adjust this power a power meter is used.
The power sensor is connected to the cable before the system check to measure the power at this point and do adjustments at the signal generator. At the outputs of the directional coupler both return loss as well as forward power are controlled during the system check to make sure that emitted power at the dipole is kept constant. This can also be checked by the power drift measurement after the test.

System check results have to be equal or near the values determined during dipole calibration (target SAR in table above) with the relevant liquids and test system (±10 %).



6. SAR MEASUREMENT VARIABILITY AND UNCERTAINTY

6.1 SAR MEASUREMENT VARIABILITY

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

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.

The detailed repeated measurement results are shown in Section 8.2.

7. OPERATIONAL CONDITIONS DURING TEST

7.1 TEST CONFIGURATION

7.1.1 GSM TEST CONFIGURATION

SAR tests for GSM850 and GSM1900, a communication link is set up with a base station by air link. Using 8960 Series the power lever is set to “5”and “0” in SAR of GSM850 and GSM1900. The tests in the band of GSM850 and GSM1900 are performed in the mode of GPRS/EGPRS function. Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. The EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink, and at most 4 timeslots in downlink, the maximum total timeslot is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8PSK.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot.

The allowed power reduction in the multi-slot configuration is as following:

Number of timeslots in uplink assignment		Reduction of maximum output power (dB)		
Band	Time Slots	GPRS (GMSK)	EGPRS (GMSK)	EGPRS (8PSK)
GSM850	1 TX slot	0.0	0.0	6.4
	2 TX slots	3.0	3.0	9.4
	3 TX slots	4.8	4.8	11.2
	4 TX slots	6.0	6.0	12.4
GSM1900	1 TX slot	0.0	0.0	4.3
	2 TX slots	3.0	3.0	7.3
	3 TX slots	4.8	4.8	9.1
	4 TX slots	6.0	6.0	10.3

7.1.2 UMTS TEST CONFIGURATION

1. Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the procedures description in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1s” for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Result for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA)
Should be tabulated in the SAR report .All configuration that are not supported by the DUT or cannot be measured due to technical or equipment limitation should be clearly identified.

2. WCDMA

(1).Head SAR Measurements
SAR for next to ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all “1s”. The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR with 3.4kbps SRB(signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure.

(2).Body SAR Measurements
SAR for body-worn accessory is measured using the 12.2 kbps RMC with the TPC bits configured to all “1s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by handset with 12.2 kbps RMC as the primary mode.

3. HSDPA

SAR for body exposure configurations is measured according to the “Body SAR Measurements” procedures of 3G device. 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 or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

Per KDB941225 D01, the 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSDPA using the HSDPA body SAR procedures for the highest reported SAR body exposure configuration in 12.2 kbps RMC.

HSDPA should be configured according to UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HAPRQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. The β_c and β_d gain factors for DPCCH and DPDCH were set according to the values in the below table, β_{hs} for HS-DPCCH is set automatically to the correct value when Δ ACK, Δ NACK, Δ CQI = 8. The variation of the β_c /β_d ratio causes a power reduction at sub-tests 2 - 4.

Sub-test	β_c	β_d	β_d (SF)	β_c /β_d	β_{hs} (1)	CM(dB)(2)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	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: ΔACK, ΔNACK and ΔCQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$
Note 2 : CM=1 for β_c/β_d= 12/15, β_{hs}/β_c = 24/15. For all other combinations of DPDCH,DPCCH 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 3 : 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

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Settings of required H-Set 1 QPSK acc. to 3GPP 34.121

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI"s
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

HSDPA UE category

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	Maximum HS-DSCH Transport Block Bits/HS-DSCH TTI	Total Soft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

4. HSUPA

SAR for Body exposure configurations is measured according to the “Body SAR Measurements” procedures of 3G device. 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 or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2W/kg, SAR measurement is not required for the secondary mode.

Per KDB941225 D01, the 3G SAR test reduction procedures is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for HSPA using the HSPA body SAR procedures for the highest reported body exposure SAR configuration in 12.2 kbps RMC.

Due to inner loop power control requirements in HSUPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSDPA should be configured according to the values indicated below as well as other applicable procedures described in the “WCDMA Handset“ and „Release 5 HSDPA Data Device” sections of 3G device.

Subtests for WCDMA Release 6 HSUPA

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}(1)	β_{ec}	β_{ed}	β_{ec} (SF)	β_{ed} (code)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	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	β_{ed1}:47/15 β_{ed2}:47/15	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(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ ACK, Δ NACK and Δ CQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$

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

Note 3 : For subtest 1 the 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 $\beta_c = 10/15$ and $\beta_d = 15/15$

Note 4 : For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$

Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g

Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

HSUPA UE category

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Speading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.UE categories 1 to 6 support QPSK only. UE category 7 supports QPSK and 16QAM.(TS25.306-7.3.0).

5. DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel.5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a Second serving HS-DSCH cell are required to perform the power measurement and for the results to be acceptable.

The following tests were completed according to procedures in section 7.3.13 of 3GPP TS 34.108 v9.5.0. A summary of these settings are illustrated below:

Downlink Physical Channels are set as per 3GPP TS34.121-1 v9.0.0 E.5.0
Levels for HSDPA connection setup

Parameter During Connection setup	Unit	Value
P-CPICH_Ec/Ior	dB	-10
P-CCPCH and SCH_Ec/Ior	dB	-12
PICH _Ec/Ior	dB	-15
HS-PDSCH	dB	off
HS-SCCH_1	dB	off
DPCH_Ec/Ior	dB	-5
OCNS_Ec/Ior	dB	-3.1

Call is set up as per 3GPP TS34.108 v9.5.0 sub clause 7.3.13
The configurations of the fixed reference channels for HSDPA RF tests are described in 3GPP TS 34.121, annex C for FDD and 3GPP TS 34.122.
The measurements were performed with a Fixed Reference Channel (FRC) H-Set 12 with QPSK

Parameter	Value
Nominal average inf. bit rate	60 kbit/s
Inter-TTI Distance	1 TTI"s
Number of HARQ Processes	6 Processes
Information Bit Payload	120 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	960 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	3200 SMLs
Coding Rate	0.15
Number of Physical Channel Codes	1

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 above.
2.Maximum number of transmission is limited to 1,i.e.,retransmission is not allowed. The redundancy and constellation version 0 shall be used.

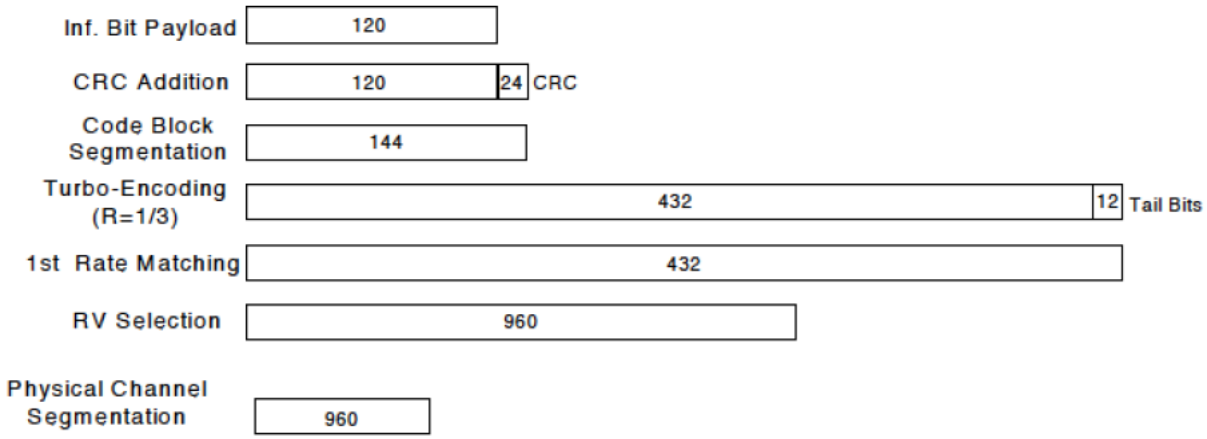


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

The following 4 Sub-tests for HSDPA were completed according to Release 5 procedures. A summary of subtest settings are illustrated below:

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	CM(dB)(2)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	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 = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$
Note 2: CM=1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH 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 3: 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 $\beta_c = 11/15$ and $\beta_d = 15/15$

Up commands are set continuously to set the UE to Max power.

Note:
1.The Dual Carriers transmission only applies to HSDPA physical channels
2.The Dual Carriers belong to the same Node and are on adjacent carriers.
3.The Dual Carriers do not support MIMO to serve UEs configured for dual cell operation
4.The Dual Carriers operate in the same frequency band .
5.The device doesn't support the modulation of 16QAM in uplink but 64QAM in downlink for DC-HSDPA mode.
6.The device doesn’t support carrier aggregation for it just can operate in Release 8.

7.1.3 LTE TEST CONFIGURATION

SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices. The CMW500 Wide Band Radio Communication Tester was used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR test were performed with the same number of RB and RB offsets transmitting on all TTI frames(Maximum TTI)

1. Spectrum Plots for RB configurations

A properly configured base station simulator was used for LTE output power measurements and SAR testing. Therefore, spectrum plots for RB configurations were not required to be included in this report.

2. MPR

When MPR is implemented permanently within the UE, regardless of network requirements, only those RB configurations allowed by 3GPP for the channel bandwidth and modulation combinations may be tested with MPR active. Configurations with RB allocations less than the RB thresholds required by 3GPP must be tested without MPR.
The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101:

Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3

Modulation	Channel bandwidth / Transmission bandwidth (N_{RB})						MPR (dB)
	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

3. A-MPR

A-MPR(Additional MPR) has been disabled for all SAR tests by using Network Signaling Value of "NS_01"on the base station simulator.

4. LTE procedures for SAR testing

A) Largest channel bandwidth standalone SAR test requirements

i) QPSK with 1 RB allocation

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. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

ii) QPSK with 50% RB allocation

The procedures required for 1 RB allocation in i) are applied to measure the SAR for QPSK with 50% RB allocation

iii) QPSK with 100% RB allocation

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 in i) and ii) 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.

iv) Higher order modulations

For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

B) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

7.1.4 WIFI TEST CONFIGURATION

For WLAN SAR testing, WLAN engineering testing software installed on the DUT can provide continuous transmitting RF signal.

2.4G

Mode	802.11b	802.11g	802.11n HT20	802.11n HT40
Duty cycle	100%			
Crest factor	1			

5G

Mode	802.11a	802.11n HT20	802.11n HT40
Duty cycle	100%		
Crest factor	1		

For WiFi SAR testing, a communication link is set up with the test mode software for WiFi mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. The RF signal utilized in SAR measurement has 100% duty cycle and its crest factor is 1. The test procedures in KDB 248227 D01 are applied.

7.1.4.1 WLAN 2.4G SAR Test Requirements

802.11b DSSS SAR Test Requirements

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

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

2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied. SAR is not required for the following 2.4 GHz OFDM conditions.

1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
2) 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.

7.1.4.2 WLAN 5G SAR Test Requirements

✧ **U-NII-1 and U-NII-2A Band**

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, both bands are tested independently for SAR. When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, both bands are tested independently for SAR.

✧ **U-NII-2C, U-NII-3 Bands**

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

Unless band gap channels are permanently disabled, they must be considered for SAR testing.

To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz may be grouped with the 5.8 GHz channels in U-NII-3 or §15.247 band to enable two SAR probe calibration frequency points to cover the bands, including the band gap channels.11 When band gap channels are supported and the bands are not aggregated for SAR testing, band gap channels must be considered independently in each band according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

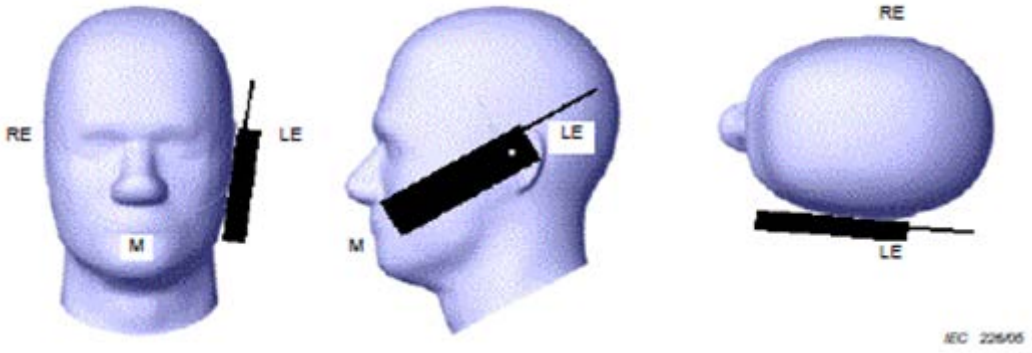
7.2 GENERAL DESCRIPTION OF TEST PROCEDURES

Connection to the EUT is established via air interface with Agilent 8960 & RS CMW500, and the EUT is set to maximum output power by Agilent 8960 & RS CMW500. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. The antenna connected to the output of the base station simulator shall be placed at least 50cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30dB.

7.3 TEST POSITION

7.3.1 HEAD TEST CONFIGURATION

Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.

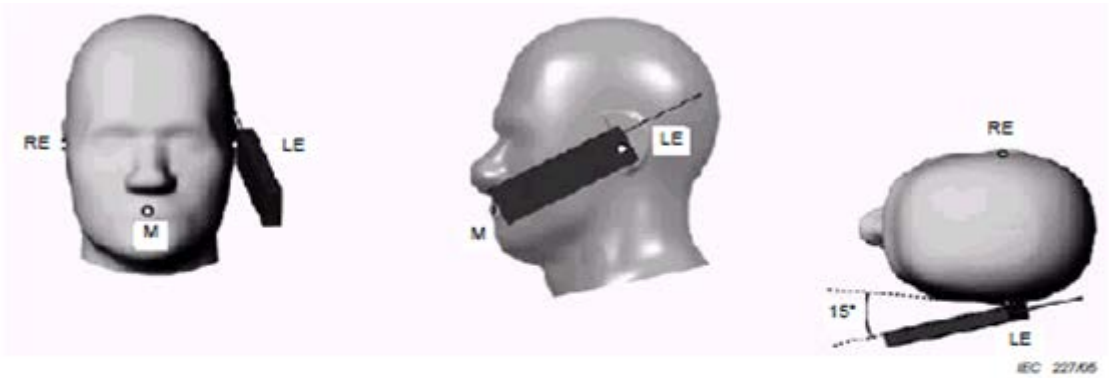


Key

M	Mouth reference point
LE	Left ear reference point (ERP)
RE	Right ear reference point (ERP)

Figure 1 Cheek position of the wireless device on the left side of SAM

Note1: Cheek position of the wireless device on Right side of SAM also is similar to the left side represented above.



Key

M	Mouth reference point
LE	Left ear reference point (ERP)
RE	Right ear reference point (ERP)

Figure 2 Tilt position of the wireless device on the left side of SAM

Note2: Tilt position of the wireless device on Right side of SAM also is similar to the left side represented above.

7.3.2 HOTSPOT TEST CONFIGURATION

Per FCC KDB 941225D06, the SAR test separation distance for hotspot mode is determined according to device form factor. When the overall length and width of a device is > 9cm×5cm, a test separation distance of 10mm is required for hotspot mode SAR measurements. A test separation distance of 5mm or less is required for smaller devices. Hotspot mode SAR is measured for all edges and surfaces of the device with a transmitting antenna located within 25mm from that surface or edge; for the data modes, wireless technologies and frequency bands supporting hotspot mode. The SAR results are used to determine simultaneous transmission SAR test exclusion for hotspot mode; otherwise, simultaneous transmission SAR measurement is required.

7.3.3 PRODUCT SPECIFIC 10-G SAR TEST CONFIGURATION

Per KDB 648474 D04, for smart phones with a display diagonal dimension > 15.0cm or an overall diagonal dimension > 16.0cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the device is marketed as “Phablet”.
The UMPC mini-tablets procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25mm from that surface or edge, in direct contact with a flat phantom, for product specific 10-g SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, product specific 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2W/kg; 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.

The length of the overall diagonal dimension of the EUT is 162mm > 160mm.

The location of the antenna inside EUT is as below:

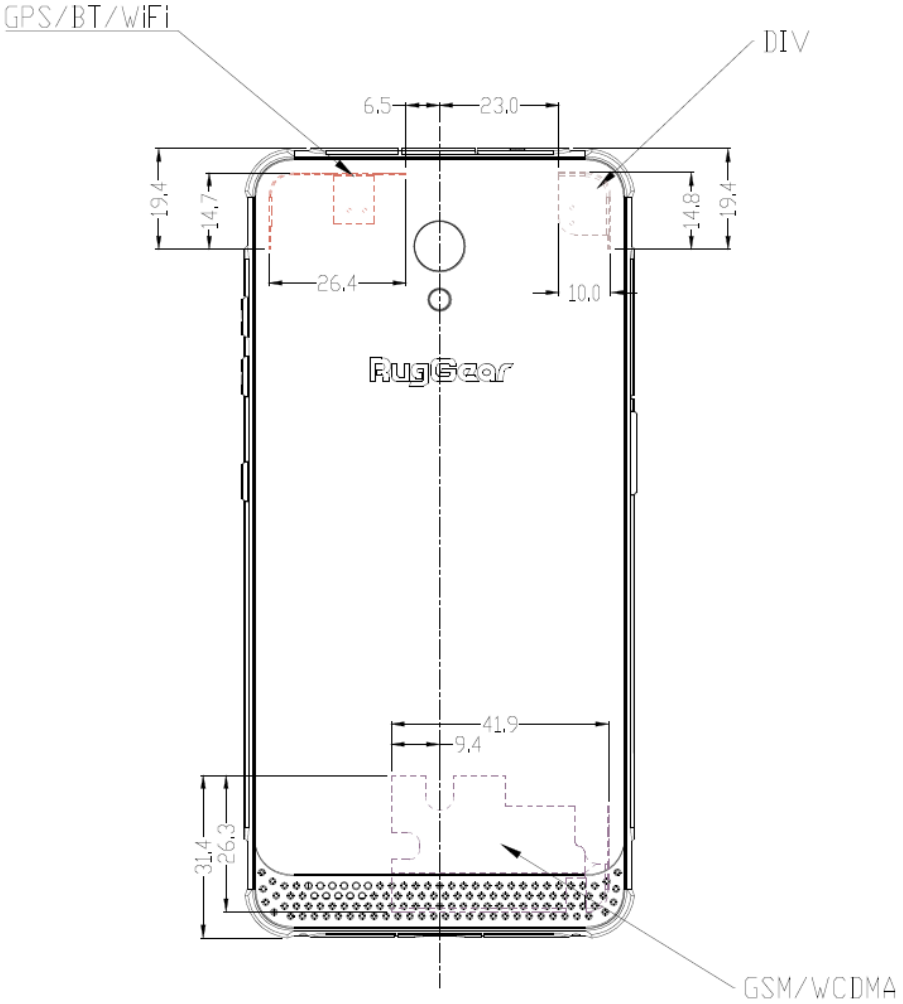


Figure 4: The location of the antennas

Note: The Div Antenna does not have the transmit function.

Sides For Hotspot and Porduct Specific 10-g SAR Testing

Antenna	Front	Rear	Left	Right	Top	Bottom
2G&3G&4G Ant	Yes	Yes	Yes	Yes	No	Yes
GPS/BT/WiFi Ant	Yes	Yes	Yes	Yes	Yes	No

Note: The distance of the positions to edge which more than 25mm are not required to test.

8. TEST RESULT

8.1 CONDUCTED POWER RESULTS

8.1.1 CONDUCTED POWER MEASUREMENTS OF GSM

GSM850		Tune-up	Max Burst Average Power (dBm)			Tune-up	Max Frame Average Power (dBm)		
			128CH	190CH	251CH		128CH	190CH	251CH
			824.2MHz	836.6MHz	848.8MHz		824.2MHz	836.6MHz	848.8MHz
GSM (CS)		33.50	31.82	**31.80**	31.80	24.31	22.63	**22.61**	22.61
GPRS/EDGE (GMSK)	1 Tx Slot	33.50	31.94	31.93	31.92	24.31	22.75	22.74	22.73
	2 Tx Slot	32.00	31.12	**31.13**	31.14	25.87	24.99	**25.00**	25.01
	3 Tx Slot	30.00	29.38	29.36	29.35	25.58	24.96	24.94	24.93
	4 Tx Slot	29.00	28.18	28.21	28.22	25.82	25.00	25.03	25.04
EDGE (8PSK)	1 Tx Slot	27.50	27.15	26.89	26.84	18.31	17.96	17.70	17.65
	2 Tx Slot	26.50	26.16	25.91	26.04	20.37	20.03	19.78	19.91
	3 Tx Slot	25.00	24.38	24.14	24.01	20.58	19.96	19.72	19.59
	4 Tx Slot	23.50	22.50	22.53	22.74	20.32	19.32	19.35	19.56
GSM1900		Tune-up	Max Burst Average Power (dBm)			Tune-up	Max Frame Average Power (dBm)		
			512CH	661CH	810CH		512CH	661CH	810CH
			1850.2MHz	1880MHz	1909.8MHz		1850.2MHz	1880MHz	1909.8MHz
GSM (CS)		30.00	29.13	**29.14**	29.17	20.81	19.94	**19.95**	19.98
GPRS/EDGE (GMSK)	1 Tx Slot	30.00	29.06	29.18	29.21	20.81	19.87	19.99	20.02
	2 Tx Slot	29.00	28.12	**28.23**	28.30	22.87	21.99	**22.10**	22.17
	3 Tx Slot	27.00	26.20	26.28	26.34	22.58	21.78	21.86	21.92
	4 Tx Slot	25.50	25.07	25.19	25.26	22.32	21.89	22.01	22.08
EDGE (8PSK)	1 Tx Slot	27.00	25.62	25.56	25.31	17.81	16.43	16.37	16.12
	2 Tx Slot	25.50	23.51	23.74	23.84	19.37	17.38	17.61	17.71
	3 Tx Slot	23.50	22.14	22.01	21.77	19.08	17.72	17.59	17.35
	4 Tx Slot	22.00	20.32	20.66	20.74	18.82	17.14	17.48	17.56

Note:
1) The conducted power of GSM850 and GSM1900 are measured with RMS detector.
2) Frame-averaged output power was calculated from the measured burst-averaged output power by converting the slot powers into linear units and calculating the energy over 8 time slots.
3) The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:
Frame-averaged power=10 x log(Burst-averaged power mW x Slot used/8).
4) The tested channel results are marks in bold.

8.1.2 CONDUCTED POWER MEASUREMENTS OF UMTS

Band	UMTS B2			
Tx Channel	Max. Tune-up Power	9262	9400	9538
Frequency		1852.4MHz	1880MHz	1907.6MHz
AMR Voice	24.00	22.20	22.28	22.24
RMC 12.2K	24.00	22.20	**22.28**	22.24
RMC 64K	24.00	22.14	22.18	22.17
RMC 144K	24.00	22.17	22.26	22.16
RMC 384K	24.00	22.00	22.14	22.06
HSDPA Subtest-1	23.00	21.12	21.25	21.27
HSDPA Subtest-2	23.00	21.06	21.21	21.09
HSDPA Subtest-3	22.00	20.73	20.84	20.69
HSDPA Subtest-4	22.00	20.55	20.70	20.77
HSUPA Subtest-1	21.00	19.65	19.66	19.69
HSUPA Subtest-2	21.00	19.34	19.41	19.29
HSUPA Subtest-3	22.00	20.33	20.43	20.37
HSUPA Subtest-4	21.50	19.86	19.81	19.78
HSUPA Subtest-5	22.00	20.33	20.36	20.45
DC-HSDPA Subtest-1	23.00	21.12	21.25	21.27
DC-HSDPA Subtest-2	23.00	21.06	21.21	21.09
DC-HSDPA Subtest-3	22.00	20.73	20.84	20.69
DC-HSDPA Subtest-4	22.00	20.55	20.70	20.77
HSPA+ Subtest-1	21.50	20.02	19.83	19.87

Band	UMTS B4			
Tx Channel	Max. Tune-up Power	1312	1413	1513
Frequency		1712.4MHz	1732.6MHz	1752.6MHz
AMR Voice	24.00	22.45	22.43	22.24
RMC 12.2K	24.00	**22.45**	**22.43**	**22.24**
RMC 64K	24.00	22.39	22.46	22.29
RMC 144K	24.00	22.43	22.39	22.31
RMC 384K	24.00	22.32	22.45	22.22
HSDPA Subtest-1	23.00	21.42	21.50	21.18
HSDPA Subtest-2	23.00	21.38	21.41	21.31
HSDPA Subtest-3	22.00	21.05	21.01	20.77
HSDPA Subtest-4	22.00	20.99	21.10	20.88
HSUPA Subtest-1	21.00	19.88	19.98	19.83
HSUPA Subtest-2	21.00	19.67	19.72	19.72
HSUPA Subtest-3	22.00	20.60	20.77	20.59
HSUPA Subtest-4	21.50	20.11	20.19	20.04
HSUPA Subtest-5	22.00	20.62	20.71	20.62
DC-HSDPA Subtest-1	23.00	21.42	21.50	21.18
DC-HSDPA Subtest-2	23.00	21.38	21.41	21.31
DC-HSDPA Subtest-3	22.00	21.05	21.01	20.77
DC-HSDPA Subtest-4	22.00	20.99	21.10	20.88
HSPA+ Subtest-1	21.50	20.32	20.14	20.17

Band	UMTS B5			
Tx Channel	Max. Tune-up Power	4132	4182	4233
Frequency		826.4	836.4	846.6
AMR Voice	24.00	22.14	22.13	22.34
RMC 12.2K	24.00	22.14	**22.13**	22.34
RMC 64K	24.00	22.11	22.21	22.31
RMC 144K	24.00	22.20	22.17	22.32
RMC 384K	24.00	22.19	22.25	22.32
HSDPA Subtest-1	23.00	21.32	21.35	21.42
HSDPA Subtest-2	23.00	21.25	21.21	21.39
HSDPA Subtest-3	22.00	20.72	20.78	20.94
HSDPA Subtest-4	22.00	20.89	20.81	20.94
HSUPA Subtest-1	21.00	19.67	19.84	19.74
HSUPA Subtest-2	21.00	19.38	19.42	19.36
HSUPA Subtest-3	22.00	20.51	20.47	20.48
HSUPA Subtest-4	21.50	19.97	19.89	19.94
HSUPA Subtest-5	22.00	20.31	20.41	20.53
DC-HSDPA Subtest-1	23.00	21.32	21.35	21.42
DC-HSDPA Subtest-2	23.00	21.25	21.21	21.39
DC-HSDPA Subtest-3	22.00	20.72	20.78	20.94
DC-HSDPA Subtest-4	22.00	20.89	20.81	20.94
HSPA+ Subtest-1	21.50	20.24	20.33	20.51

Note:
1) The conducted power of UMTS B2, B4 and B5 are measured with RMS detector.
2) Note: Per KDB941225 D01, 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 or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.
3) The tested channel results are marks in bold.

8.1.3 CONDUCTED POWER MEASUREMENTS OF LTE

1) Conducted power measurements of LTE B2

Band / BW	Modulation	RB Size/Offset	Tune-up	CH18607	CH18900	CH19193	Band / BW	Modulation	RB Size/Offset	Tune-up	CH18615	CH18900	CH19185
				1850.7MHz	1880MHz	1909.3MHz					1851.5MHz	1880MHz	1908.5MHz
2 / 1.4M	QPSK	1/0	24.00	22.27	22.26	22.14	2 / 3M	QPSK	1/0	24.00	22.35	22.32	22.21
		1/2	24.00	22.41	22.38	22.28			1/7	24.00	22.46	22.45	22.34
		1/5	24.00	22.26	22.27	22.16			1/14	24.00	22.31	22.34	22.23
		3/0	24.00	22.35	22.34	22.15			8/0	23.00	21.43	21.36	21.29
		3/1	24.00	22.40	22.39	22.21			8/3	23.00	21.46	21.41	21.35
		3/3	24.00	22.42	22.33	22.24			8/7	23.00	21.41	21.36	21.34
		6/0	23.00	21.47	21.41	21.37			15/0	23.00	21.41	21.34	21.28
	16QAM	1/0	23.00	21.43	21.41	21.50		16QAM	1/0	23.00	21.77	21.40	21.13
		1/2	23.00	21.47	21.53	21.56			1/7	23.00	21.82	21.52	21.21
		1/5	23.00	21.39	21.42	21.44			1/14	23.00	21.69	21.33	21.05
		3/0	23.00	21.61	21.42	21.39			8/0	22.00	20.48	20.37	20.34
		3/1	23.00	21.66	21.45	21.39			8/3	22.00	20.50	20.43	20.39
		3/3	23.00	21.65	21.44	21.36			8/7	22.00	20.44	20.37	20.34
		6/0	22.00	20.64	20.52	20.20			15/0	22.00	20.40	20.31	20.26
Band / BW	Modulation	RB Size/Offset	Tune-up	CH18625	CH18900	CH19175	Band / BW	Modulation	RB Size/Offset	Tune-up	CH18650	CH18900	CH19150
				1852.5MHz	1880MHz	1907.5MHz					1855MHz	1880MHz	1905MHz
2 / 5M	QPSK	1/0	24.00	22.38	22.24	22.20	2 / 10M	QPSK	1/0	24.00	22.41	22.31	22.16
		1/12	24.00	22.41	22.31	22.30			1/24	24.00	22.44	22.48	22.33
		1/24	24.00	22.34	22.22	22.19			1/49	24.00	22.33	22.38	22.22
		12/0	23.00	21.33	21.39	21.36			25/0	23.00	21.35	21.52	21.50
		12/6	23.00	21.42	21.42	21.33			25/12	23.00	21.43	21.47	21.30
		12/13	23.00	21.44	21.41	21.32			25/25	23.00	21.56	21.48	21.31
		25/0	23.00	21.44	21.43	21.36			50/0	23.00	21.46	21.51	21.43
	16QAM	1/0	23.00	21.51	21.81	21.31		16QAM	1/0	23.00	21.36	21.73	21.12
		1/12	23.00	21.50	21.88	21.33			1/24	23.00	21.31	21.86	21.37
		1/24	23.00	21.40	21.80	21.21			1/49	23.00	21.10	21.73	21.12
		12/0	22.00	20.40	20.47	20.37			25/0	22.00	20.31	20.53	20.54
		12/6	22.00	20.52	20.56	20.37			25/12	22.00	20.39	20.48	20.35
		12/13	22.00	20.51	20.52	20.37			25/25	22.00	20.50	20.49	20.35
		25/0	22.00	20.43	20.47	20.25			50/0	22.00	20.37	20.48	20.41
Band / BW	Modulation	RB Size/Offset	Tune-up	CH18675	CH18900	CH19125	Band / BW	Modulation	RB Size/Offset	Tune-up	CH18700	CH18900	CH19100
				1857.5MHz	1880MHz	1902.5MHz					1860MHz	1880MHz	1900MHz
2 / 15M	QPSK	1/0	24.00	22.30	22.24	22.28	2 / 20M	QPSK	1/0	24.00	22.17	22.04	22.04
		1/37	24.00	22.34	22.35	22.26			1/50	24.00	**22.49**	22.13	22.37
		1/74	24.00	22.23	22.24	22.27			1/99	24.00	22.04	22.04	22.02
		36/0	23.00	21.35	22.24	21.49			50/0	23.00	21.09	21.62	21.18
		36/19	23.00	21.50	21.47	21.42			50/25	23.00	**21.47**	21.45	21.28
		36/39	23.00	21.54	21.46	21.31			50/50	23.00	21.23	21.43	21.03
		75/0	23.00	21.48	21.55	21.44			100/0	23.00	21.18	21.54	21.12
	16QAM	1/0	23.00	21.27	21.59	21.34		16QAM	1/0	23.00	21.66	21.42	21.34
		1/37	23.00	21.14	21.73	21.50			1/50	23.00	21.83	21.13	21.56
		1/74	23.00	21.02	21.55	21.34			1/99	23.00	21.49	21.42	21.27
		36/0	22.00	20.29	21.55	20.31			50/0	22.00	20.06	20.56	20.07
		36/19	22.00	20.39	20.48	20.29			50/25	22.00	20.25	20.45	20.20
		36/39	22.00	20.38	20.51	20.23			50/50	22.00	20.13	20.48	20.42
		75/0	22.00	20.35	20.49	20.29			100/0	22.00	20.13	20.49	20.04

Note: The tested channel results are marks in bold.

2) Conducted power measurements of LTE B4

Band / BW	Modulation	RB Size/Offset	Tune-up	CH19957	CH20175	CH20393	Band / BW	Modulation	RB Size/Offset	Tune-up	CH19965	CH20175	CH20385
				1710.7MHz	1732.5MHz	1754.3MHz					1711.5MHz	1732.5MHz	1753.5MHz
4 / 1.4M	QPSK	1/0	24.00	22.92	22.77	22.32	4 / 3M	QPSK	1/0	24.00	22.58	22.58	22.53
		1/2	24.00	23.08	22.94	22.44			1/7	24.00	22.76	22.74	22.65
		1/5	24.00	22.90	22.78	22.31			1/14	24.00	22.61	22.59	22.45
		3/0	24.00	22.99	22.85	22.32			8/0	23.00	21.73	21.63	21.61
		3/1	24.00	23.06	22.89	22.38			8/3	23.00	21.77	21.66	21.63
		3/3	24.00	23.02	22.59	22.37			8/7	23.00	21.67	21.60	21.59
		6/0	23.00	22.17	21.66	21.53			15/0	23.00	21.70	21.61	21.59
	16QAM	1/0	23.00	21.62	21.59	21.82		16QAM	1/0	23.00	21.63	21.95	21.64
		1/2	23.00	21.71	21.69	21.92			1/7	23.00	21.76	22.12	21.77
		1/5	23.00	21.62	21.56	21.82			1/14	23.00	21.61	21.97	21.54
		3/0	23.00	21.83	21.57	21.70			8/0	22.00	20.80	20.68	20.61
		3/1	23.00	21.88	21.61	21.76			8/3	22.00	20.83	20.70	20.65
		3/3	23.00	21.87	21.58	21.72			8/7	22.00	20.77	20.66	20.58
		6/0	22.00	20.82	20.67	20.42			15/0	22.00	20.72	20.61	20.51
Band / BW	**Modulation**	**RB Size/Offset**	**Tune-up**	**CH19975**	**CH20175**	**CH20375**	**Band / BW**	**Modulation**	**RB Size/Offset**	**Tune-up**	**CH20000**	**CH20175**	**CH20350**
				1712.5MHz	**1732.5MHz**	**1752.5MHz**					**1715MHz**	**1732.5MHz**	**1750MHz**
4 / 5M	QPSK	1/0	24.00	22.61	22.48	22.52	4 / 10M	QPSK	1/0	24.00	22.56	22.59	22.45
		1/12	24.00	22.74	22.54	22.63			1/24	24.00	22.78	22.75	22.67
		1/24	24.00	22.60	22.43	22.49			1/49	24.00	22.58	22.51	22.46
		12/0	23.00	21.70	21.60	21.63			25/0	23.00	21.80	21.61	21.64
		12/6	23.00	21.71	21.64	21.66			25/12	23.00	21.74	21.66	21.65
		12/13	23.00	21.67	21.66	21.61			25/25	23.00	21.73	21.73	21.56
		25/0	23.00	21.68	21.62	21.60			50/0	23.00	21.74	21.66	21.66
	16QAM	1/0	23.00	21.79	22.03	21.61		16QAM	1/0	23.00	21.62	21.97	21.53
		1/12	23.00	21.90	22.12	21.76			1/24	23.00	21.77	22.09	21.75
		1/24	23.00	21.73	22.02	21.59			1/49	23.00	21.57	21.91	21.55
		12/0	22.00	20.77	20.72	20.63			25/0	22.00	20.81	20.62	20.72
		12/6	22.00	20.80	20.77	20.68			25/12	22.00	20.73	20.70	20.70
		12/13	22.00	20.78	20.78	20.63			25/25	22.00	20.73	20.71	20.61
		25/0	22.00	20.67	20.66	20.50			50/0	22.00	20.74	20.68	20.62
Band / BW	**Modulation**	**RB Size/Offset**	**Tune-up**	**CH20025**	**CH20175**	**CH20325**	**Band / BW**	**Modulation**	**RB Size/Offset**	**Tune-up**	**CH20050**	**CH20175**	**CH20300**
				1717.5MHz	**1732.5MHz**	**1747.5MHz**					**1720MHz**	**1732.5MHz**	**1745MHz**
4 / 15M	QPSK	1/0	24.00	22.56	22.57	22.45	4 / 20M	QPSK	1/0	24.00	22.62	22.55	22.45
		1/37	24.00	22.65	22.63	22.60			1/50	24.00	23.09	22.40	22.88
		1/74	24.00	22.48	22.43	22.44			1/99	24.00	22.53	22.41	22.46
		36/0	23.00	21.79	22.43	21.65			50/0	23.00	21.89	21.65	21.64
		36/19	23.00	21.77	21.70	21.66			50/25	23.00	21.92	21.75	21.70
		36/39	23.00	21.78	21.70	21.62			50/50	23.00	21.90	21.81	21.61
		75/0	23.00	21.83	21.70	21.66			100/0	23.00	21.87	21.75	21.62
	16QAM	1/0	23.00	21.55	21.94	21.83		16QAM	1/0	23.00	22.09	21.98	21.78
		1/37	23.00	21.66	21.99	21.97			1/50	23.00	22.50	21.28	22.16
		1/74	23.00	21.51	21.76	21.85			1/99	23.00	22.00	21.81	21.75
		36/0	22.00	20.78	21.76	20.57			50/0	22.00	20.87	20.67	20.58
		36/19	22.00	20.75	20.73	20.60			50/25	22.00	20.88	20.75	20.62
		36/39	22.00	20.77	20.75	20.55			50/50	22.00	20.92	20.75	20.55
		75/0	22.00	20.77	20.65	20.59			100/0	22.00	20.89	20.69	20.58

3) Conducted power measurements of LTE B7

Band / BW	Modulation	RB Size/Offset	Tune-up	CH20775	CH21100	CH21425	Band / BW	Modulation	RB Size/Offset	Tune-up	CH20800	CH21100	CH21400
				2502.5MHz	2535MHz	2567.5MHz					2505MHz	2535MHz	2565MHz
7 / 5M	QPSK	1/0	24.00	22.67	22.82	23.43	7 / 10M	QPSK	1/0	24.00	22.79	22.87	23.39
		1/12	24.00	22.79	22.96	23.64			1/24	24.00	22.83	22.73	23.65
		1/24	24.00	22.65	22.87	22.92			1/49	24.00	22.79	22.64	22.72
		12/0	23.00	21.76	21.85	22.48			25/0	23.00	21.83	21.96	22.43
		12/6	23.00	21.79	21.94	22.52			25/12	23.00	21.82	21.95	22.49
		12/13	23.00	21.76	21.91	22.47			25/25	23.00	21.87	21.96	22.46
		25/0	23.00	21.78	21.90	22.46			50/0	23.00	21.88	22.00	22.41
	16QAM	1/0	23.00	21.68	21.89	22.71		16QAM	1/0	23.00	21.58	22.15	22.20
		1/12	23.00	21.77	22.00	22.89			1/24	23.00	21.70	22.29	22.44
		1/24	23.00	21.66	21.93	22.77			1/49	23.00	21.56	22.20	22.29
		12/0	22.00	20.78	20.95	21.57			25/0	22.00	20.77	20.99	21.41
		12/6	22.00	20.81	21.02	21.57			25/12	22.00	20.78	20.95	21.48
		12/13	22.00	20.81	21.01	21.55			25/25	22.00	20.82	20.99	21.41
		25/0	22.00	20.68	20.90	21.43			50/0	22.00	20.82	21.00	21.35
Band / BW	Modulation	RB Size/Offset	Tune-up	CH20825	CH21100	CH21375	Band / BW	Modulation	RB Size/Offset	Tune-up	CH20850	CH21100	CH21350
				2507.5MHz	2535MHz	2562.5MHz					2510MHz	2535MHz	2560MHz
7 / 15M	QPSK	1/0	24.00	22.61	22.80	23.38	7 / 20M	QPSK	1/0	24.00	22.20	22.55	23.06
		1/37	24.00	22.88	22.49	23.64			1/50	24.00	22.96	22.36	**23.68**
		1/74	24.00	22.72	22.49	22.73			1/99	24.00	22.54	22.38	22.73
		36/0	23.00	21.97	22.13	22.56			50/0	23.00	21.75	21.99	22.26
		36/19	23.00	21.99	22.11	22.66			50/25	23.00	21.82	22.00	**22.42**
		36/39	23.00	22.03	22.15	22.69			50/50	23.00	21.91	21.95	22.34
		75/0	23.00	22.03	22.18	22.65			100/0	23.00	21.80	21.95	22.31
	16QAM	1/0	23.00	21.52	22.05	22.36		16QAM	1/0	23.00	21.76	22.00	22.17
		1/37	23.00	21.59	22.18	22.54			1/50	23.00	22.15	22.48	22.70
		1/74	23.00	21.50	22.10	22.47			1/99	23.00	21.81	22.14	22.38
		36/0	22.00	20.81	21.07	21.35			50/0	22.00	20.64	20.96	21.13
		36/19	22.00	20.85	21.03	21.42			50/25	22.00	20.76	20.98	21.30
		36/39	22.00	20.87	21.05	21.45			50/50	22.00	20.83	20.92	21.28
		75/0	22.00	20.84	21.04	21.41			100/0	22.00	20.75	20.93	21.19

Note: The tested channel results are marks in bold.

4) Conducted power measurements of LTE B12

Band / BW	Modulation	RB Size/Offset	Tune-up	CH23017	CH23095	CH23173	Band / BW	Modulation	RB Size/Offset	Tune-up	CH23025	CH23095	CH23165
				699.7MHz	707.5MHz	715.3MHz					700.5MHz	707.5MHz	714.5MHz
12 / 1.4M	QPSK	1/0	24.50	23.17	22.97	23.14	12 / 3M	QPSK	1/0	24.50	23.21	23.17	23.16
		1/2	24.50	23.28	23.11	23.25			1/7	24.50	23.27	23.31	23.30
		1/5	24.50	23.15	23.02	23.16			1/14	24.50	23.15	23.18	23.17
		3/0	24.50	22.96	23.04	23.16			8/0	23.50	22.29	22.19	22.25
		3/1	24.50	23.09	23.14	23.18			8/3	23.50	22.27	22.27	22.21
		3/3	24.50	23.07	23.11	23.16			8/7	23.50	22.14	22.26	22.21
		6/0	23.50	22.27	22.22	22.15			15/0	23.50	22.18	22.16	22.21
	16QAM	1/0	23.50	21.87	22.09	22.04		16QAM	1/0	23.50	21.72	21.97	21.73
		1/2	23.50	21.95	22.13	22.09			1/7	23.50	21.57	22.07	21.86
		1/5	23.50	21.96	22.04	21.95			1/14	23.50	21.53	21.87	21.61
		3/0	23.50	22.07	22.06	21.92			8/0	22.50	20.71	20.67	20.79
		3/1	23.50	22.17	21.96	21.93			8/3	22.50	20.76	20.73	20.79
		3/3	23.50	22.20	21.82	21.89			8/7	22.50	20.67	20.69	20.75
		6/0	22.50	21.20	21.07	20.57			15/0	22.50	20.63	20.60	20.71
Band / BW	Modulation	RB Size/Offset	Tune-up	CH23035	CH23095	CH23155	Band / BW	Modulation	RB Size/Offset	Tune-up	CH23060	CH23095	CH23130
				701.5MHz	707.5MHz	713.5MHz					704MHz	707.5MHz	711MHz
12 / 5M	QPSK	1/0	24.50	23.32	23.18	23.14	12 / 10M	QPSK	1/0	24.50	**23.41**	22.98	22.85
		1/12	24.50	23.37	23.25	23.32			1/24	24.50	23.35	23.11	23.01
		1/24	24.50	23.30	23.19	23.24			1/49	24.50	23.09	22.89	22.93
		12/0	23.50	22.44	22.08	22.46			25/0	23.50	**22.54**	21.88	21.69
		12/6	23.50	22.36	22.27	22.28			25/12	23.50	22.10	22.02	21.93
		12/13	23.50	22.27	22.40	22.13			25/25	23.50	22.49	22.00	21.66
		25/0	23.50	22.39	22.29	22.15			50/0	23.50	22.45	22.00	21.75
	16QAM	1/0	23.50	21.67	22.22	21.64		16QAM	1/0	23.50	21.65	22.34	21.91
		1/12	23.50	21.90	22.18	21.88			1/24	23.50	22.03	22.34	21.95
		1/24	23.50	21.90	22.03	21.77			1/49	23.50	21.71	22.19	21.95
		12/0	22.50	20.99	20.68	21.08			25/0	22.50	21.32	20.86	20.70
		12/6	22.50	20.90	20.88	20.93			25/12	22.50	21.07	21.00	20.94
		12/13	22.50	20.85	20.99	20.88			25/25	22.50	21.45	20.95	20.69
		25/0	22.50	20.81	20.78	20.88			50/0	22.50	21.31	20.97	20.70

Note: The tested channel results are marks in bold.

5) Conducted power measurements of LTE B17

Band / BW	Modulation	RB Size/Offset	Tune-up	CH23755	CH23790	CH23825	Band / BW	Modulation	RB Size/Offset	Tune-up	CH23780	CH23790	CH23800
				706.5MHz	710MHz	713.5MHz					709MHz	710MHz	711MHz
17 / 5M	QPSK	1/0	24.50	22.98	22.96	22.86	17 / 10M	QPSK	1/0	24.50	23.00	23.00	22.97
		1/12	24.50	23.08	23.05	23.04			1/24	24.50	23.11	23.18	23.07
		1/24	24.50	22.87	22.94	22.97			1/49	24.50	22.96	23.08	23.02
		12/0	23.50	21.97	21.78	22.28			25/0	23.50	21.74	21.65	21.77
		12/6	23.50	22.12	21.94	22.13			25/12	23.50	22.01	21.94	22.00
		12/13	23.50	22.25	21.91	22.12			25/25	23.50	21.71	21.65	21.77
		25/0	23.50	22.16	21.78	22.23			50/0	23.50	21.77	21.69	21.83
	16QAM	1/0	23.50	22.13	22.32	21.89		16QAM	1/0	23.50	21.96	22.35	21.99
		1/12	23.50	22.16	22.38	22.14			1/24	23.50	21.88	22.32	22.00
		1/24	23.50	21.94	22.39	21.99			1/49	23.50	21.94	22.41	22.00
		12/0	22.50	21.06	20.85	21.35			25/0	22.50	20.71	20.63	20.78
		12/6	22.50	21.16	21.03	21.20			25/12	22.50	20.95	20.92	21.02
		12/13	22.50	21.29	21.01	21.20			25/25	22.50	20.68	20.65	20.81
		25/0	22.50	21.19	20.79	21.16			50/0	22.50	20.70	20.64	20.78

6) Conducted power measurements of LTE B66

Band / BW	Modulation	RB Size/Offset	Tune-up	CH131979 1710.7 MHz	CH132322 1745 MHz	CH132665 1779.3 MHz	Band / BW	Modulation	RB Size/Offset	Tune-up	CH131987 1711.5 MHz	CH132322 1745 MHz	CH132657 1778.5 MHz
66 / 1.4M	QPSK	1/0	24.00	22.86	22.96	22.78	66 / 3M	QPSK	1/0	24.00	22.92	23.01	22.85
		1/2	24.00	23.00	23.12	22.96			1/7	24.00	23.09	23.15	22.94
		1/5	24.00	22.87	22.96	22.78			1/14	24.00	22.87	23.00	22.81
		3/0	24.00	22.93	23.03	22.87			8/0	23.00	22.01	22.10	21.93
		3/1	24.00	22.99	23.10	22.93			8/3	23.00	22.04	22.14	21.97
		3/3	24.00	22.93	23.04	22.87			8/7	23.00	21.97	22.10	21.92
		6/0	23.00	22.03	22.17	21.99			15/0	23.00	21.98	22.11	21.94
	16QAM	1/0	23.00	22.31	22.18	21.58		16QAM	1/0	23.00	22.35	22.25	21.68
		1/2	23.00	22.46	22.37	21.73			1/7	23.00	22.56	22.46	21.87
		1/5	23.00	22.25	22.21	21.55			1/14	23.00	22.30	22.19	21.55
		3/0	23.00	21.92	21.87	21.24			8/0	22.00	20.97	20.90	20.30
		3/1	23.00	22.12	21.95	21.41			8/3	22.00	21.01	20.91	20.31
		3/3	23.00	21.94	21.88	21.25			8/7	22.00	20.91	20.85	20.28
		6/0	22.00	21.07	20.99	20.35			15/0	22.00	20.93	20.88	20.30
Band / BW	Modulation	RB Size/Offset	Tune-up	CH131997 1712.5 MHz	CH132322 1745 MHz	CH132647 1777.5 MHz	Band / BW	Modulation	RB Size/Offset	Tune-up	CH132022 1715 MHz	CH132322 1745 MHz	CH132622 1775 MHz
66 / 5M	QPSK	1/0	24.00	22.82	22.93	22.79	66 / 10M	QPSK	1/0	24.00	23.24	22.83	22.44
		1/12	24.00	23.06	23.16	23.13			1/24	24.00	23.24	22.95	22.43
		1/24	24.00	22.77	22.87	22.69			1/49	24.00	23.22	22.62	22.05
		12/0	23.00	21.98	22.10	21.97			25/0	23.00	22.47	21.91	21.49
		12/6	23.00	22.11	22.15	22.00			25/12	23.00	22.42	21.93	21.42
		12/13	23.00	21.95	22.08	21.92			25/25	23.00	22.37	21.88	21.39
		25/0	23.00	22.01	22.12	21.15			50/0	23.00	22.47	21.94	21.53
	16QAM	1/0	23.00	22.21	22.16	21.66		16QAM	1/0	23.00	22.34	22.28	21.92
		1/12	23.00	22.55	22.51	21.92			1/24	23.00	22.47	22.39	21.97
		1/24	23.00	22.19	22.08	21.48			1/49	23.00	22.32	22.10	21.53
		12/0	22.00	20.84	20.79	20.26			25/0	22.00	21.02	20.89	20.48
		12/6	22.00	20.93	20.85	20.33			25/12	22.00	20.96	20.88	20.41
		12/13	22.00	20.80	20.78	20.21			25/25	22.00	20.91	20.82	20.38
		25/0	22.00	20.83	20.83	20.27			50/0	22.00	20.95	20.91	20.43

Band / BW	Modulation	RB Size/Offset	Tune-up	CH132047 1717.5 MHz	CH132322 1745 MHz	CH132597 1772.5 MHz	Band / BW	Modulation	RB Size/Offset	Tune-up	CH132072 1720 MHz	CH132322 1745 MHz	CH132572 1770 MHz
66 / 15M	QPSK	1/0	24.00	22.78	22.83	22.47	66 / 20M	QPSK	1/0	24.00	22.83	22.62	22.53
		1/37	24.00	23.32	23.07	22.68			1/50	24.00	**23.25**	**22.90**	**22.70**
		1/74	24.00	22.72	22.58	21.97			1/99	24.00	22.72	22.42	22.24
		36/0	23.00	22.04	21.94	21.61			50/0	23.00	22.26	21.92	22.08
		36/19	23.00	21.98	21.91	21.54			50/25	23.00	**22.28**	21.97	21.81
		36/39	23.00	21.94	21.85	21.36			50/50	23.00	22.15	21.78	21.71
		75/0	23.00	21.97	21.89	21.54			100/0	23.00	**22.17**	21.80	21.85
	16QAM	1/0	23.00	22.28	22.26	22.05		16QAM	1/0	23.00	22.38	22.13	22.10
		1/37	23.00	22.62	22.51	22.03			1/50	23.00	22.70	22.32	22.25
		1/74	23.00	22.25	22.05	21.44			1/99	23.00	22.35	21.81	21.48
		36/0	22.00	20.94	20.88	20.58			50/0	22.00	21.17	20.82	21.00
		36/19	22.00	20.91	20.90	20.48			50/25	22.00	21.14	20.85	20.80
		36/39	22.00	20.84	20.77	20.37			50/50	22.00	21.08	20.75	20.63
		75/0	22.00	20.92	20.83	20.47			100/0	22.00	21.07	20.70	20.77

Note: The tested channel results are marks in bold.

8.1.4 CONDUCTED POWER MEASUREMENTS OF WIFI 2.4G

Mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune up	Average Power(dBm)	SAR Test (Yes/No)
802.11b	1	2412	1	9.50	7.74	No
	6	2437		9.50	7.91	No
	11	2462		9.50	**9.33**	Yes
802.11g	1	2412	6	13.50	13.03	No
	6	2437		13.50	12.93	No
	11	2462		13.50	12.75	No
802.11n HT20	1	2412	6.5	11.50	11.29	No
	6	2437		13.50	12.91	No
	11	2462		13.50	12.73	No
802.11n HT40	3	2422	13.5	11.00	10.51	No
	6	2437		12.50	12.15	No
	9	2452		12.50	11.68	No

Note:

1) The Average conducted power of WiFi 2.4G is measured with RMS detector.

2) Per KDB248227 D01, for WiFi 2.4GHz, the highest measured maximum output power Channel for DSSS modes (802.11b) was selected for SAR measurement. SAR for OFDM modes (2.4GHz 802.11g/n) was not required When the highest reported SAR for DSSS is adjusted by the ratio of OFDM modes (802.11g/n) to DSSS modes (802.11b) specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
   For 802.11g/n: adjusted SAR=13.50dBm/9.50dBm*0.335W/kg=0.476W/kg < 1.2 W/kg.

3) The tested channel results are marks in bold.

8.1.5 CONDUCTED POWER MEASUREMENTS OF WIFI 5G

Band	Mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune-up	Average Power(dBm)	SAR Test (Yes/No)
5.2G	802.11a	36	5180	6	9.00	8.32	No
		40	5200		12.00	**11.62**	Yes
		44	5220		12.00	11.57	No
		48	5240		12.00	11.46	No
	802.11n HT20	36	5180	MCS0	8.00	7.77	No
		40	5200		12.00	11.55	No
		44	5220		12.00	11.49	No
		48	5240		12.00	11.40	No
	802.11n HT40	38	5190	MCS0	3.00	2.11	No
		46	5230		12.00	10.62	No
5.3G	802.11a	52	5260	6	12.00	11.20	No
		56	5280		12.00	**11.51**	Yes
		60	5300		12.00	10.98	No
		64	5320		9.00	8.51	No
	802.11n HT20	52	5260	MCS0	12.00	11.12	No
		56	5280		12.00	11.02	No
		60	5300		12.00	10.74	No
		64	5320		9.00	8.46	No
	802.11n HT40	54	5270	MCS0	11.00	10.05	No
		62	5310		3.00	2.25	No
5.6G	802.11a	100	5500	6	10.00	9.77	No
		104	5520		10.00	**9.97**	Yes
		108	5540		10.00	9.84	No
		112	5560		10.00	9.85	No
		116	5580		10.00	9.91	No
		132	5660		10.00	9.84	No
		136	5680		10.00	9.81	No
		140	5700		10.00	9.19	No
	802.11n HT20	100	5500	MCS0	10.00	9.81	No
		104	5520		10.00	9.79	No
		108	5540		10.00	9.76	No
		112	5560		10.00	9.81	No
		116	5580		10.00	9.96	No
		132	5660		10.00	9.75	No
		136	5680		10.00	9.59	No
		140	5700		10.00	9.22	No
	802.11n HT40	102	5510	MCS0	6.00	5.79	No
		110	5550		9.50	9.23	No
		118	5590		9.50	9.38	No
		126	5630		9.50	9.28	No
		134	5670		9.50	9.21	No

Band	Mode	Channel	Frequency (MHz)	Data Rate(Mbps)	Tune-up	Average Power(dBm)	SAR Test (Yes/No)
5.8G	802.11a	149	5745	6	11.00	**10.65**	Yes
		153	5765		11.00	10.38	No
		157	5785		11.00	10.31	No
		161	5805		11.00	10.17	No
		165	5825		11.00	9.98	No
	802.11n HT20	149	5745	MCS0	11.00	10.21	No
		153	5765		11.00	10.15	No
		157	5785		11.00	10.22	No
		161	5805		11.00	10.12	No
		165	5825		11.00	9.88	No
	802.11n HT40	151	5755	MCS0	10.50	10.23	No
		159	5795		10.50	9.83	No

Note:

1) The Average conducted power of WiFi 5G is measured with RMS detector.

2) The tested channel results are marks in bold.

8.1.6 CONDUCTED POWER MEASUREMENTS OF BT

BT	Tune up	Average Conducted Power(dBm)			SAR Test (Yes/No)
		CH0	CH39	CH78	
		2402MHz	2441MHz	2480MHz	
DH5	2.00	1.77	1.75	1.55	No
2DH5	2.00	1.73	1.72	1.52	No
3DH5	2.00	1.77	1.70	1.58	No

BT	Tune up	Average Conducted Power(dBm)			SAR Test (Yes/No)
		CH0	CH19	CH39	
		2402MHz	2441MHz	2480MHz	
BLE(1M)	2.00	1.96	1.95	1.76	No

Note: The conducted power of BT is measured with RMS detector.

8.2 SAR TEST RESULTS

General Notes:

1) Per KDB447498 D01, all measurement SAR results are scaled to the maximum tune-up tolerance limit to demonstrate compliant.
2) Per KDB447498 D01, 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. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.
3) Per KDB865664 D01,for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8W/kg; if the deviation among the repeated measurement is ≤ 20%,and the measured SAR <1.45W/kg, only one repeated measurement is required.
4) Per KDB941225 D06, the DUT Dimension is bigger than 9 cm x 5 cm, so 10mm is chosen as the test separation distance for Hotspot mode. When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
5) Per KDB648474 D04, SAR is evaluated without a headset connected to the device. When the standalone reported body-worn SAR is ≤ 1.2 W/kg, no additional SAR evaluations using a headset are required.
6) Per KDB865664 D02, SAR plot is only required for the highest measured SAR in each exposure configuration, wireless mode and frequency band combination; Plots are also required when the measured SAR is > 1.5 W/kg, or > 7.0 W/kg for occupational exposure. The published RF exposure KDB procedures may require additional plots; for example, to support SAR to peak location separation ratio test exclusion and/or volume scan post-processing.

GSM Notes:

1) Per KDB648474 D04, body-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2) Per KDB941225 D01, SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data 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.

UMTS Notes:

Per KDB941225 D01, 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 or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

LTE notes:

1) The LTE test configurations are determined according to KDB941225 D05 SAR for LTE Devices. The general test procedures used for SAR testing can be found in Section 7.1.3.
2) A-MPR was disabled for all SAR test by setting NS_01 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames(maximum TTI)

WLAN Notes:

1. For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB Publication 248227 for 2.4GHz WIFI single transmission chain operations, the highest measured maximum output power Channel for DSSS was selected for SAR measurement. SAR for OFDM modes(2.4GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 7.1.4 for more information.

8.2.1 SAR MEASUREMENT RESULT OF HEAD

1. Head SAR test results of GSM

Test No.	Band	Mode	Channel	Test Position	SIM	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Reported 1g SAR
T01	GSM 850	GSM	190	Right Cheek	1	33.5	31.8	-0.08	**0.190**	**0.144**	**0.281**
T02	GSM 850	GSM	190	Right Tilted	1	33.5	31.8	0.03	0.117	0.083	0.173
T03	GSM 850	GSM	190	Left Cheek	1	33.5	31.8	0.04	0.104	0.080	0.154
T04	GSM 850	GSM	190	Left Tilted	1	33.5	31.8	0.07	0.075	0.055	0.111
T05	GSM 850	GSM	190	Right Cheek	2	33.5	31.8	0	0.183	0.139	0.271
T07	GSM 1900	GSM	661	Right Cheek	1	30	29.14	0	0.007	0.004	0.008
T08	GSM 1900	GSM	661	Right Tilted	1	30	29.14	0	0.010	0.006	0.012
T09	GSM 1900	GSM	661	Left Cheek	1	30	29.14	0	**0.017**	**0.010**	**0.021**
T10	GSM 1900	GSM	661	Left Tilted	1	30	29.14	0.05	0.006	0.003	0.007
T11	GSM 1900	GSM	661	Left Cheek	2	30	29.14	0.03	0.012	0.007	0.015

Note: The value with boldface is the maximum SAR Value of each test band.

2. Head SAR test results of UMTS

Test No.	Band	Mode	Channel	Test Position	SIM	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Reported 1g SAR
T13	UMTS B2	RMC12.2K	9400	Right Cheek	1	24	22.28	0.07	0.006	0.003	0.009
T14	UMTS B2	RMC12.2K	9400	Right Tilted	1	24	22.28	-0.04	0.011	0.006	0.016
T15	UMTS B2	RMC12.2K	9400	Left Cheek	1	24	22.28	0	**0.027**	**0.015**	**0.040**
T16	UMTS B2	RMC12.2K	9400	Left Tilted	1	24	22.28	0.02	0.008	0.004	0.011
T17	UMTS B2	RMC12.2K	9400	Left Cheek	2	24	22.28	0.03	0.023	0.013	0.034
T19	UMTS B4	RMC12.2K	1413	Right Cheek	1	24	22.22	-0.06	0.028	0.016	0.042
T20	UMTS B4	RMC12.2K	1413	Right Tilted	1	24	22.22	0	0.029	0.017	0.044
T21	UMTS B4	RMC12.2K	1413	Left Cheek	1	24	22.22	0.06	**0.044**	**0.027**	**0.066**
T22	UMTS B4	RMC12.2K	1413	Left Tilted	1	24	22.22	0.06	0.031	0.019	0.047
T23	UMTS B4	RMC12.2K	1413	Left Cheek	2	24	22.22	0.02	0.037	0.023	0.056
T25	UMTS B5	RMC12.2K	4182	Right Cheek	1	24	22.13	0.06	**0.135**	**0.102**	**0.208**
T26	UMTS B5	RMC12.2K	4182	Right Tilted	1	24	22.13	0.09	0.066	0.051	0.102
T27	UMTS B5	RMC12.2K	4182	Left Cheek	1	24	22.13	0.08	0.101	0.078	0.155
T28	UMTS B5	RMC12.2K	4182	Left Tilted	1	24	22.13	-0.02	0.074	0.053	0.114
T29	UMTS B5	RMC12.2K	4182	Right Cheek	2	24	22.13	0.06	0.121	0.091	0.186

Note: The value with boldface is the maximum SAR Value of each test band.

3. Head SAR test results of LTE

Test No.	Band	Mode	Channel	RB	offset	Test Position	SIM	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Reported 1g SAR
T31	LTE B2	QPSK20M	18700	1	50	Right Cheek	1	24	22.49	-0.11	0.014	0.009	0.020
T32	LTE B2	QPSK20M	18700	1	50	Right Tilted	1	24	22.49	0.17	0.013	0.008	0.018
T33	LTE B2	QPSK20M	18700	1	50	Left Cheek	1	24	22.49	0	**0.034**	**0.021**	**0.049**
T34	LTE B2	QPSK20M	18700	1	50	Left Tilted	1	24	22.49	0.01	0.025	0.015	0.035
T35	LTE B2	QPSK20M	18700	50	25	Right Cheek	1	23	21.47	-0.03	0.013	0.007	0.018
T36	LTE B2	QPSK20M	18700	50	25	Right Tilted	1	23	21.47	0.08	0.011	0.006	0.016
T37	LTE B2	QPSK20M	18700	50	25	Left Cheek	1	23	21.47	0.09	0.023	0.013	0.032
T38	LTE B2	QPSK20M	18700	50	25	Left Tilted	1	23	21.47	0.12	0.017	0.010	0.024
T39	LTE B2	QPSK20M	18700	1	50	Left Cheek	2	24	22.49	0.02	0.027	0.015	0.038
T41	LTE B7	QPSK20M	21350	1	50	Right Cheek	1	24	23.68	0.09	0.311	0.166	0.335
T42	LTE B7	QPSK20M	21350	1	50	Right Tilted	1	24	23.68	0.12	0.210	0.119	0.226
T43	LTE B7	QPSK20M	21350	1	50	Left Cheek	1	24	23.68	-0.02	**0.391**	**0.200**	**0.421**
T44	LTE B7	QPSK20M	21350	1	50	Left Tilted	1	24	23.68	0.07	0.161	0.094	0.173
T45	LTE B7	QPSK20M	21350	50	25	Right Cheek	1	23	22.42	-0.05	0.179	0.106	0.205
T46	LTE B7	QPSK20M	21350	50	25	Right Tilted	1	23	22.42	0.12	0.108	0.065	0.123
T47	LTE B7	QPSK20M	21350	50	25	Left Cheek	1	23	22.42	0.08	0.270	0.143	0.309
T48	LTE B7	QPSK20M	21350	50	25	Left Tilted	1	23	22.42	0.14	0.086	0.053	0.098
T49	LTE B7	QPSK20M	21350	1	50	Left Cheek	2	24	23.68	-0.06	0.330	0.169	0.355
T51	LTE B12	QPSK10M	23060	1	0	Right Cheek	1	24.5	23.41	0.09	0.080	0.062	0.103
T52	LTE B12	QPSK10M	23060	1	0	Right Tilted	1	24.5	23.41	0.11	0.074	0.058	0.095
T53	LTE B12	QPSK10M	23060	1	0	Left Cheek	1	24.5	23.41	0.07	0.086	0.066	0.111
T54	LTE B12	QPSK10M	23060	1	0	Left Tilted	1	24.5	23.41	-0.06	0.083	0.063	0.107
T55	LTE B12	QPSK10M	23060	25	0	Right Cheek	1	23.5	22.54	0.13	0.068	0.052	0.085
T56	LTE B12	QPSK10M	23060	25	0	Right Tilted	1	23.5	22.54	0.16	0.065	0.051	0.081
T57	LTE B12	QPSK10M	23060	25	0	Left Cheek	1	23.5	22.54	0.01	0.074	0.057	0.092
T58	LTE B12	QPSK10M	23060	25	0	Left Tilted	1	23.5	22.54	0.05	0.065	0.049	0.081
T59	LTE B12	QPSK10M	23060	1	0	Left Cheek	2	24.5	23.41	-0.09	**0.090**	**0.070**	**0.115**
T61	LTE B66	QPSK20M	132072	1	50	Right Cheek	1	24	23.25	-0.08	0.043	0.028	0.051
T62	LTE B66	QPSK20M	132072	1	50	Right Tilted	1	24	23.25	0.04	0.035	0.022	0.042
T63	LTE B66	QPSK20M	132072	1	50	Left Cheek	1	24	23.25	0.07	**0.051**	**0.032**	**0.061**
T64	LTE B66	QPSK20M	132072	1	50	Left Tilted	1	24	23.25	0.02	0.040	0.024	0.048
T65	LTE B66	QPSK20M	132072	50	25	Right Cheek	1	23	22.28	0.05	0.029	0.017	0.034
T66	LTE B66	QPSK20M	132072	50	25	Right Tilted	1	23	22.28	0	0.028	0.017	0.033
T67	LTE B66	QPSK20M	132072	50	25	Left Cheek	1	23	22.28	0.07	0.041	0.026	0.049
T68	LTE B66	QPSK20M	132072	50	25	Left Tilted	1	23	22.28	0.09	0.032	0.019	0.038
T69	LTE B66	QPSK20M	132072	1	50	Left Cheek	2	24	23.25	-0.13	0.045	0.029	0.053

Note: The value with boldface is the maximum SAR Value of each test band.

4. Head SAR test results of WIFI

Test No.	Band	Channel	Test Position	Data Rate	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Reported 1g SAR
T70	802.11b	11	Right Cheek	1	9.5	9.33	0.08	0.182	0.066	0.189
T71	802.11b	11	Right Tilted	1	9.5	9.33	0.15	0.155	0.062	0.161
T72	802.11b	11	Left Cheek	1	9.5	9.33	0.06	0.294	0.116	0.306
T73	802.11b	11	Left Tilted	1	9.5	9.33	-0.01	**0.322**	**0.114**	**0.335**
T74	802.11a	56	Right Cheek	6	12	11.51	-0.11	0.644	0.202	0.721
T75	802.11a	56	Right Tilted	6	12	11.51	0.04	0.812	0.281	0.909
T76	802.11a	56	Left Cheek	6	12	11.51	0.18	0.765	0.252	0.856
T77	802.11a	56	Left Tilted	6	12	11.51	0.08	**0.986**	**0.343**	**1.104**
T78	802.11a	52	Left Tilted	6	12	11.2	-0.07	0.911	0.321	1.095
T79	802.11a	56	Left Tilted (Repeated)	6	12	11.51	0.05	0.973	0.338	1.089
T82	802.11a	104	Right Cheek	6	10	9.97	-0.01	0.692	0.237	0.697
T83	802.11a	104	Right Tilted	6	10	9.97	0.13	0.794	0.263	0.800
T84	802.11a	104	Left Cheek	6	10	9.97	0.06	0.797	0.277	0.803
T85	802.11a	104	Left Tilted	6	10	9.97	0.01	**0.967**	**0.340**	**0.974**
T86	802.11a	112	Left Tilted	6	10	9.85	-0.09	0.874	0.303	0.905
T87	802.11a	104	Left Tilted (Repeated)	6	10	9.97	0.05	0.959	0.335	0.966
T93	802.11a	149	Right Cheek	6	11	10.65	-0.12	0.556	0.195	0.603
T94	802.11a	149	Right Tilted	6	11	10.65	0.08	0.604	0.209	0.655
T95	802.11a	149	Left Cheek	6	11	10.65	0.04	0.443	0.155	0.480
T96	802.11a	149	Left Tilted	6	11	10.65	0.02	**0.661**	**0.237**	**0.716**

Note: The value with boldface is the maximum SAR Value of each test band.

8.2.2 SAR MEASUREMENT RESULT OF HOTSPOT

1. Hotspot SAR test results of GSM

Test No.	Band	Mode	Channel	Test Position	Separation Distance (cm)	SIM	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Reported 1g SAR
T105	GSM 850	GPRS 2TX	190	Front Face	1	1	32	31.13	0.08	0.143	0.107	0.175
T106	GSM 850	GPRS 2TX	190	Rear Face	1	1	32	31.13	0.05	**0.345**	**0.266**	**0.422**
T107	GSM 850	GPRS 2TX	190	Left Side	1	1	32	31.13	-0.12	0.117	0.081	0.143
T108	GSM 850	GPRS 2TX	190	Bottom Side	1	1	32	31.13	0.04	0.092	0.065	0.112
T109	GSM 850	GPRS 2TX	190	Rear Face	1	2	32	31.13	0.07	0.333	0.261	0.407
T115	GSM 1900	GPRS 2TX	661	Front Face	1	1	29	28.23	0.05	0.058	0.034	0.069
T116	GSM 1900	GPRS 2TX	661	Rear Face	1	1	29	28.23	-0.14	**0.388**	**0.198**	**0.463**
T117	GSM 1900	GPRS 2TX	661	Left Side	1	1	29	28.23	0.08	0.029	0.018	0.035
T118	GSM 1900	GPRS 2TX	661	Bottom Side	1	1	29	28.23	0.01	0.157	0.085	0.187
T119	GSM 1900	GPRS 2TX	661	Rear Face	1	2	29	28.23	0.13	0.383	0.202	0.457

Note: The value with boldface is the maximum SAR Value of each test band.

2. Hotspot SAR test results of UMTS

Test No.	Band	Mode	Channel	Test Position	Separation Distance (cm)	SIM	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Reported 1g SAR
T125	UMTS B2	RMC12.2K	9400	Front Face	1	1	24	22.28	-0.14	0.045	0.024	0.067
T126	UMTS B2	RMC12.2K	9400	Rear Face	1	1	24	22.28	0.05	0.305	0.144	0.453
T127	UMTS B2	RMC12.2K	9400	Left Side	1	1	24	22.28	0.12	0.025	0.015	0.037
T128	UMTS B2	RMC12.2K	9400	Bottom Side	1	1	24	22.28	0.07	0.122	0.064	0.181
T129	UMTS B2	RMC12.2K	9400	Rear Face	1	2	24	22.28	-0.01	**0.307**	**0.156**	**0.456**
T135	UMTS B4	RMC12.2K	1413	Front Face	1	1	24	22.43	0.01	0.095	0.052	0.136
T136	UMTS B4	RMC12.2K	1413	Rear Face	1	1	24	22.43	0.14	0.758	0.374	1.088
T137	UMTS B4	RMC12.2K	1413	Left Side	1	1	24	22.43	-0.07	0.056	0.035	0.080
T138	UMTS B4	RMC12.2K	1413	Bottom Side	1	1	24	22.43	0.04	0.305	0.158	0.438
T139	UMTS B4	RMC12.2K	1312	Rear Face	1	1	24	22.45	-0.15	**0.763**	**0.378**	**1.090**
T140	UMTS B4	RMC12.2K	1513	Rear Face	1	1	24	22.24	0.13	0.706	0.347	1.059
T254	UMTS B4	RMC12.2K	1312	Rear Face	1	2	24	22.45	0.14	0.705	0.355	1.007
T145	UMTS B5	RMC12.2K	4182	Front Face	1	1	24	22.13	-0.01	0.102	0.072	0.157
T146	UMTS B5	RMC12.2K	4182	Rear Face	1	1	24	22.13	0.03	0.216	0.164	0.332
T147	UMTS B5	RMC12.2K	4182	Left Side	1	1	24	22.13	-0.03	0.083	0.056	0.127
T148	UMTS B5	RMC12.2K	4182	Bottom Side	1	1	24	22.13	-0.01	0.043	0.028	0.066
T149	UMTS B5	RMC12.2K	4182	Rear Face	1	2	24	22.13	0.13	**0.221**	**0.171**	**0.340**

Note: The value with boldface is the maximum SAR Value of each test band.

3. Hotspot SAR test results of LTE

Test No.	Band	Mode	Channel	RB	offset	Test Position	Separation Distance (cm)	SIM	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Reported 1g SAR
T157	LTE B2	QPSK20M	18700	1	50	Front Face	1	1	24	22.49	0.01	0.050	0.028	0.071
T158	LTE B2	QPSK20M	18700	1	50	Rear Face	1	1	24	22.49	0.07	**0.313**	**0.157**	**0.443**
T159	LTE B2	QPSK20M	18700	1	50	Left Side	1	1	24	22.49	-0.09	0.031	0.017	0.044
T160	LTE B2	QPSK20M	18700	1	50	Bottom Side	1	1	24	22.49	0.13	0.150	0.080	0.212
T161	LTE B2	QPSK20M	18700	50	25	Front Face	1	1	23	21.47	0.06	0.053	0.026	0.075
T162	LTE B2	QPSK20M	18700	50	25	Rear Face	1	1	23	21.47	0.14	0.234	0.117	0.333
T163	LTE B2	QPSK20M	18700	50	25	Left Side	1	1	23	21.47	-0.05	0.024	0.013	0.034
T164	LTE B2	QPSK20M	18700	50	25	Bottom Side	1	1	23	21.47	0.11	0.112	0.059	0.159
T165	LTE B2	QPSK20M	18700	1	50	Rear Face	1	2	24	22.49	-0.07	0.301	0.149	0.426
T173	LTE B7	QPSK20M	21350	1	50	Front Face	1	1	24	23.68	0.01	0.310	0.163	0.334
T174	LTE B7	QPSK20M	21350	1	50	Rear Face	1	1	24	23.68	-0.08	**0.402**	**0.203**	**0.433**
T175	LTE B7	QPSK20M	21350	1	50	Left Side	1	1	24	23.68	-0.06	0.311	0.162	0.335
T176	LTE B7	QPSK20M	21350	1	50	Bottom Side	1	1	24	23.68	0.12	0.085	0.055	0.091
T177	LTE B7	QPSK20M	21350	50	25	Front Face	1	1	23	22.42	0.08	0.246	0.128	0.281
T178	LTE B7	QPSK20M	21350	50	25	Rear Face	1	1	23	22.42	0.15	0.315	0.161	0.360
T179	LTE B7	QPSK20M	21350	50	25	Left Side	1	1	23	22.42	0.13	0.222	0.118	0.254
T180	LTE B7	QPSK20M	21350	50	25	Bottom Side	1	1	23	22.42	-0.11	0.062	0.033	0.071
T181	LTE B7	QPSK20M	21350	1	50	Rear Face	1	2	24	23.68	0.07	0.392	0.192	0.422
T189	LTE B12	QPSK10M	23060	1	0	Front Face	1	1	24.5	23.41	0.12	0.075	0.058	0.096
T190	LTE B12	QPSK10M	23060	1	0	Rear Face	1	1	24.5	23.41	-0.07	**0.226**	**0.171**	**0.290**
T191	LTE B12	QPSK10M	23060	1	0	Left Side	1	1	24.5	23.41	0.01	0.161	0.109	0.207
T192	LTE B12	QPSK10M	23060	1	0	Bottom Side	1	1	24.5	23.41	0.05	0.026	0.014	0.033
T193	LTE B12	QPSK10M	23060	25	0	Front Face	1	1	23.5	22.54	-0.08	0.068	0.051	0.085
T194	LTE B12	QPSK10M	23060	25	0	Rear Face	1	1	23.5	22.54	0.04	0.178	0.135	0.222
T195	LTE B12	QPSK10M	23060	25	0	Left Side	1	1	23.5	22.54	0.12	0.096	0.071	0.120
T196	LTE B12	QPSK10M	23060	25	0	Bottom Side	1	1	23.5	22.54	0.07	0.018	0.008	0.022
T197	LTE B12	QPSK10M	23060	1	0	Rear Face	1	2	24.5	23.41	0.16	0.223	0.168	0.287
T205	LTE B66	QPSK20M	132072	1	50	Front Face	1	1	24	23.25	0.07	0.098	0.056	0.116
T206	LTE B66	QPSK20M	132072	1	50	Rear Face	1	1	24	23.25	-0.14	**0.804**	**0.403**	**0.956**
T207	LTE B66	QPSK20M	132072	1	50	Left Side	1	1	24	23.25	0.01	0.077	0.049	0.092
T208	LTE B66	QPSK20M	132072	1	50	Bottom Side	1	1	24	23.25	0.14	0.341	0.183	0.405
T209	LTE B66	QPSK20M	132072	50	25	Front Face	1	1	23	22.28	0.09	0.081	0.047	0.096
T210	LTE B66	QPSK20M	132072	50	25	Rear Face	1	1	23	22.28	-0.05	0.625	0.315	0.738
T211	LTE B66	QPSK20M	132072	50	25	Left Side	1	1	23	22.28	0.06	0.054	0.033	0.064
T212	LTE B66	QPSK20M	132072	50	25	Bottom Side	1	1	23	22.28	-0.04	0.255	0.136	0.301
T213	LTE B66	QPSK20M	132322	1	50	Rear Face	1	1	24	22.9	0.05	0.738	0.364	0.951
T215	LTE B66	QPSK20M	132572	1	50	Rear Face	1	1	24	22.7	0.09	0.671	0.334	0.905
T216	LTE B66	QPSK20M	132072	100	0	Rear Face	1	1	23	22.17	0.17	0.670	0.332	0.811
T217	LTE B66	QPSK20M	132072	1	50	Rear Face (Repeated)	1	1	24	23.25	0.03	0.796	0.399	0.946

Note: The value with boldface is the maximum SAR Value of each test band.

4. Hotspot SAR test results of WIFI

Test No.	Band	Channel	Test Position	Separation Distance (cm)	Data Rate	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Reported 1g SAR
T224	802.11b	11	Front Face	1	1	9.5	9.33	0.06	**0.064**	**0.027**	**0.067**
T225	802.11b	11	Rear Face	1	1	9.5	9.33	0.01	0.016	0.007	0.017
T226	802.11b	11	Right Side	1	1	9.5	9.33	0	0.004	0.002	0.004
T227	802.11b	11	Top Side	1	1	9.5	9.33	0.08	0.053	0.021	0.055
T232	802.11a	40	Front Face	1	6	12	11.62	0.07	0.183	0.072	0.200
T233	802.11a	40	Rear Face	1	6	12	11.62	0	0.343	0.134	0.374
T234	802.11a	40	Right Side	1	6	12	11.62	0.02	0.142	0.057	0.155
T235	802.11a	40	Top Side	1	6	12	11.62	0.08	**0.428**	**0.164**	**0.467**
T250	802.11a	149	Front Face	1	6	11	10.65	-0.04	0.214	0.065	0.232
T251	802.11a	149	Rear Face	1	6	11	10.65	0	**0.507**	**0.188**	**0.550**
T252	802.11a	149	Right Side	1	6	11	10.65	0.08	0.337	0.120	0.365
T253	802.11a	149	Top Side	1	6	11	10.65	0.13	0.423	0.152	0.459

Note: 1. The value with boldface is the maximum SAR Value of each test band.

2. Per KDB248227 D01, the highest SAR measured for the initial test position or initial test configuration should be used to determine SAR test exclusion according to the sum of 1-g SAR and SAR peak to location ratio provisions in KDB 447498. In addition, a test lab may also choose to perform standalone SAR measurements for test positions and 802.11 configurations that are not required by the initial test position or initial test configuration procedures and apply the results to determine simultaneous transmission SAR test exclusion, according to sum of 1-g and SAR peak to location ratio requirements to reduce the number of simultaneous transmission SAR measurements.

3. Because 5.3G and 5.6G do not support hotspot mode, there is no need to test hotspot mode of 5.3G and 5.6G. Per KDB 648474 D04, product specific 10-g SAR needs to be tested of 5.3G and 5.6G.The test data please see section 8.2.3.

8.2.3 SAR TEST EXCLUSION OF PRODUCT SPECIFIC 10-G SAR

Per KDB648474D04, when hotspot mode applies, product specific 10-g 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:

Test No.	Band	Mode	Channel	Test Position	Separation Distance (cm)	SIM	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	Reported 1g SAR	product specific 10-g SAR Exclusion
T105	GSM 850	GPRS 2TX	190	Front Face	1	1	32	31.13	0.08	0.143	0.175	Yes
T106	GSM 850	GPRS 2TX	190	Rear Face	1	1	32	31.13	0.05	**0.345**	**0.422**	Yes
T107	GSM 850	GPRS 2TX	190	Left Side	1	1	32	31.13	-0.12	0.117	0.143	Yes
T108	GSM 850	GPRS 2TX	190	Bottom Side	1	1	32	31.13	0.04	0.092	0.112	Yes
T109	GSM 850	GPRS 2TX	190	Rear Face	1	2	32	31.13	0.07	0.333	0.407	Yes
T115	GSM 1900	GPRS 2TX	661	Front Face	1	1	29	28.23	0.05	0.058	0.069	Yes
T116	GSM 1900	GPRS 2TX	661	Rear Face	1	1	29	28.23	-0.14	**0.388**	**0.463**	Yes
T117	GSM 1900	GPRS 2TX	661	Left Side	1	1	29	28.23	0.08	0.029	0.035	Yes
T118	GSM 1900	GPRS 2TX	661	Bottom Side	1	1	29	28.23	0.01	0.157	0.187	Yes
T119	GSM 1900	GPRS 2TX	661	Rear Face	1	2	29	28.23	0.13	0.383	0.457	Yes

Test No.	Band	Mode	Channel	Test Position	Separation Distance (cm)	SIM	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	Reported 1g SAR	product specific 10-g SAR Exclusion
T125	UMTS B2	RMC12.2K	9400	Front Face	1	1	24	22.28	-0.14	0.045	0.067	Yes
T126	UMTS B2	RMC12.2K	9400	Rear Face	1	1	24	22.28	0.05	0.305	0.453	Yes
T127	UMTS B2	RMC12.2K	9400	Left Side	1	1	24	22.28	0.12	0.025	0.037	Yes
T128	UMTS B2	RMC12.2K	9400	Bottom Side	1	1	24	22.28	0.07	0.122	0.181	Yes
T129	UMTS B2	RMC12.2K	9400	Rear Face	1	2	24	22.28	-0.01	**0.307**	**0.456**	Yes
T135	UMTS B4	RMC12.2K	1413	Front Face	1	1	24	22.43	0.01	0.095	0.136	Yes
T136	UMTS B4	RMC12.2K	1413	Rear Face	1	1	24	22.43	0.14	0.758	1.088	Yes
T137	UMTS B4	RMC12.2K	1413	Left Side	1	1	24	22.43	-0.07	0.056	0.080	Yes
T138	UMTS B4	RMC12.2K	1413	Bottom Side	1	1	24	22.43	0.04	0.305	0.438	Yes
T139	UMTS B4	RMC12.2K	1312	Rear Face	1	1	24	22.45	-0.15	**0.763**	**1.090**	Yes
T140	UMTS B4	RMC12.2K	1513	Rear Face	1	1	24	22.24	0.13	0.706	1.059	Yes
T254	UMTS B4	RMC12.2K	1312	Rear Face	1	2	24	22.45	0.14	0.705	1.007	Yes
T145	UMTS B5	RMC12.2K	4182	Front Face	1	1	24	22.13	-0.01	0.102	0.157	Yes
T146	UMTS B5	RMC12.2K	4182	Rear Face	1	1	24	22.13	0.03	0.216	0.332	Yes
T147	UMTS B5	RMC12.2K	4182	Left Side	1	1	24	22.13	-0.03	0.083	0.127	Yes
T148	UMTS B5	RMC12.2K	4182	Bottom Side	1	1	24	22.13	-0.01	0.043	0.066	Yes
T149	UMTS B5	RMC12.2K	4182	Rear Face	1	2	24	22.13	0.13	**0.221**	**0.340**	Yes

Test No.	Band	Mode	Channel	RB	offset	Test Position	Separation Distance (cm)	SIM	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	Reported 1g SAR	product specific 10-g SAR Exclusion
T157	LTE B2	QPSK20M	18700	1	50	Front Face	1	1	24	22.49	0.01	0.050	0.071	Yes
T158	LTE B2	QPSK20M	18700	1	50	Rear Face	1	1	24	22.49	0.07	**0.313**	**0.443**	Yes
T159	LTE B2	QPSK20M	18700	1	50	Left Side	1	1	24	22.49	-0.09	0.031	0.044	Yes
T160	LTE B2	QPSK20M	18700	1	50	Bottom Side	1	1	24	22.49	0.13	0.150	0.212	Yes
T161	LTE B2	QPSK20M	18700	50	25	Front Face	1	1	23	21.47	0.06	0.053	0.075	Yes
T162	LTE B2	QPSK20M	18700	50	25	Rear Face	1	1	23	21.47	0.14	0.234	0.333	Yes
T163	LTE B2	QPSK20M	18700	50	25	Left Side	1	1	23	21.47	-0.05	0.024	0.034	Yes
T164	LTE B2	QPSK20M	18700	50	25	Bottom Side	1	1	23	21.47	0.11	0.112	0.159	Yes
T165	LTE B2	QPSK20M	18700	1	50	Rear Face	1	2	24	22.49	-0.07	0.301	0.426	Yes
T173	LTE B7	QPSK20M	21350	1	50	Front Face	1	1	24	23.68	0.01	0.310	0.334	Yes
T174	LTE B7	QPSK20M	21350	1	50	Rear Face	1	1	24	23.68	-0.08	**0.402**	**0.433**	Yes
T175	LTE B7	QPSK20M	21350	1	50	Left Side	1	1	24	23.68	-0.06	0.311	0.335	Yes
T176	LTE B7	QPSK20M	21350	1	50	Bottom Side	1	1	24	23.68	0.12	0.085	0.091	Yes
T177	LTE B7	QPSK20M	21350	50	25	Front Face	1	1	23	22.42	0.08	0.246	0.281	Yes
T178	LTE B7	QPSK20M	21350	50	25	Rear Face	1	1	23	22.42	0.15	0.315	0.360	Yes
T179	LTE B7	QPSK20M	21350	50	25	Left Side	1	1	23	22.42	0.13	0.222	0.254	Yes
T180	LTE B7	QPSK20M	21350	50	25	Bottom Side	1	1	23	22.42	-0.11	0.062	0.071	Yes
T181	LTE B7	QPSK20M	21350	1	50	Rear Face	1	2	24	23.68	0.07	0.392	0.422	Yes
T189	LTE B12	QPSK10M	23060	1	0	Front Face	1	1	24.5	23.41	0.12	0.075	0.096	Yes
T190	LTE B12	QPSK10M	23060	1	0	Rear Face	1	1	24.5	23.41	-0.07	**0.226**	**0.290**	Yes
T191	LTE B12	QPSK10M	23060	1	0	Left Side	1	1	24.5	23.41	0.01	0.161	0.207	Yes
T192	LTE B12	QPSK10M	23060	1	0	Bottom Side	1	1	24.5	23.41	0.05	0.026	0.033	Yes
T193	LTE B12	QPSK10M	23060	25	0	Front Face	1	1	23.5	22.54	-0.08	0.068	0.085	Yes
T194	LTE B12	QPSK10M	23060	25	0	Rear Face	1	1	23.5	22.54	0.04	0.178	0.222	Yes
T195	LTE B12	QPSK10M	23060	25	0	Left Side	1	1	23.5	22.54	0.12	0.096	0.120	Yes
T196	LTE B12	QPSK10M	23060	25	0	Bottom Side	1	1	23.5	22.54	0.07	0.018	0.022	Yes
T197	LTE B12	QPSK10M	23060	1	0	Rear Face	1	2	24.5	23.41	0.16	0.223	0.287	Yes
T205	LTE B66	QPSK20M	132072	1	50	Front Face	1	1	24	23.25	0.07	0.098	0.116	Yes
T206	LTE B66	QPSK20M	132072	1	50	Rear Face	1	1	24	23.25	-0.14	**0.804**	**0.956**	Yes
T207	LTE B66	QPSK20M	132072	1	50	Left Side	1	1	24	23.25	0.01	0.077	0.092	Yes
T208	LTE B66	QPSK20M	132072	1	50	Bottom Side	1	1	24	23.25	0.14	0.341	0.405	Yes
T209	LTE B66	QPSK20M	132072	50	25	Front Face	1	1	23	22.28	0.09	0.081	0.096	Yes
T210	LTE B66	QPSK20M	132072	50	25	Rear Face	1	1	23	22.28	-0.05	0.625	0.738	Yes
T211	LTE B66	QPSK20M	132072	50	25	Left Side	1	1	23	22.28	0.06	0.054	0.064	Yes
T212	LTE B66	QPSK20M	132072	50	25	Bottom Side	1	1	23	22.28	-0.04	0.255	0.301	Yes
T213	LTE B66	QPSK20M	132237	1	50	Rear Face	1	1	24	23.18	0.08	0.772	0.932	Yes
T214	LTE B66	QPSK20M	132407	1	50	Rear Face	1	1	24	23.01	-0.02	0.750	0.942	Yes
T215	LTE B66	QPSK20M	132572	1	50	Rear Face	1	1	24	22.7	0.09	0.671	0.905	Yes
T216	LTE B66	QPSK20M	132072	100	0	Rear Face	1	1	23	22.17	0.17	0.670	0.811	Yes
T217	LTE B66	QPSK20M	132072	1	50	Rear Face (Repeated)	1	1	24	23.25	0.03	0.796	0.946	Yes

Test No.	Band	Channel	Test Position	Separation Distance (cm)	Data Rate	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	Reported 1g SAR	product specific 10-g SAR Exclusion
T224	802.11b	11	Front Face	1	1	9.5	9.33	0.06	**0.064**	**0.067**	Yes
T225	802.11b	11	Rear Face	1	1	9.5	9.33	0.01	0.016	0.017	Yes
T226	802.11b	11	Right Side	1	1	9.5	9.33	0	0.004	0.004	Yes
T227	802.11b	11	Top Side	1	1	9.5	9.33	0.08	0.053	0.055	Yes
T232	802.11a	40	Front Face	1	6	12	11.62	0.07	0.183	0.200	Yes
T233	802.11a	40	Rear Face	1	6	12	11.62	0	0.343	0.374	Yes
T234	802.11a	40	Right Side	1	6	12	11.62	0.02	0.142	0.155	Yes
T235	802.11a	40	Top Side	1	6	12	11.62	0.08	**0.428**	**0.467**	Yes
T250	802.11a	149	Front Face	1	6	11	10.65	-0.04	0.214	0.232	Yes
T251	802.11a	149	Rear Face	1	6	11	10.65	0	**0.507**	**0.550**	Yes
T252	802.11a	149	Right Side	1	6	11	10.65	0.08	0.337	0.365	Yes
T253	802.11a	149	Top Side	1	6	11	10.65	0.13	0.423	0.459	Yes

Product specific 10-g SAR test results of 5G WIFI

Test No.	Band	Channel	Test Position	Separation Distance (cm)	Data Rate	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Reported 10g SAR
T236	802.11a	56	Front Face	0	6	12	11.51	0.06	1.57	0.484	0.542
T237	802.11a	56	Rear Face	0	6	12	11.51	0	1.81	0.519	0.581
T238	802.11a	56	Right Side	0	6	12	11.51	0.01	0.456	0.152	0.170
T239	802.11a	56	Top Side	0	6	12	11.51	0.01	**1.97**	**0.599**	**0.671**
T242	802.11a	104	Front Face	0	6	10	9.97	0.03	1.56	0.461	0.464
T243	802.11a	104	Rear Face	0	6	10	9.97	0	2.6	0.703	0.708
T244	802.11a	104	Right Side	0	6	10	9.97	0.05	0.673	0.227	0.229
T245	802.11a	104	Top Side	0	6	10	9.97	0.06	**2.92**	**0.788**	**0.793**

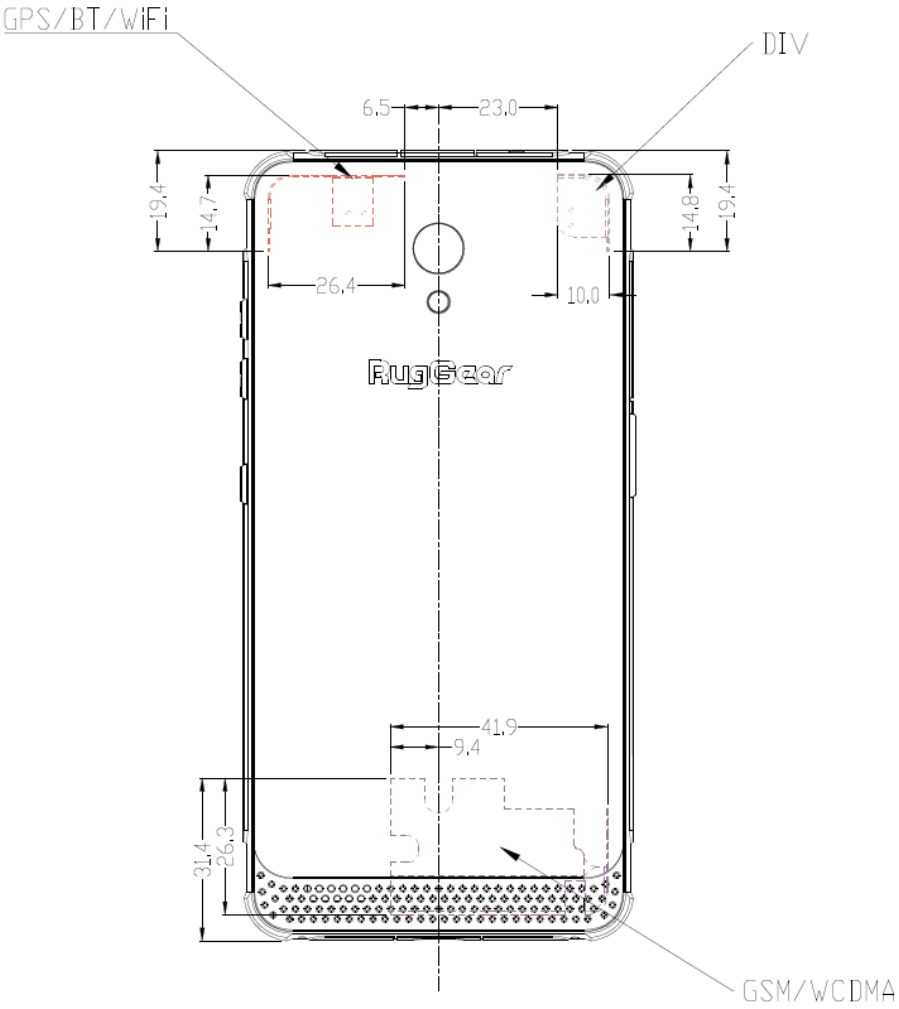
Note: The value with boldface is the maximum SAR Value of each test band.

8.3 MULTIPLE TRANSMITTER EVALUATION

The following tables list information which is relevant for the decision if a simultaneous transmit evaluation is necessary according to FCC KDB 447498 D01 General RF Exposure Guidance.

The length of the overall diagonal dimension of the EUT is 162mm > 160mm.

The location of the antennas inside EUT is shown as below picture:



8.3.1 STAND-ALONE SAR TEST EXCLUSION

Per FCC KDB 447498 D01, the 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance,mm)][√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for product specific 10-g SAR, where:

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Standalone SAR test exclusion for BT

Mode	Position	P_{max} (dBm) *	P_{max} (mW)	Distance (mm)	f (GHz)	Calculation Result	SAR Exclusion threshold	SAR test exclusion
BT	Head	2.0	1.58	5	2.48	0.50	3	Yes
BT	Hotspot	2.0	1.58	10	2.48	0.25	3	Yes

Note: 1)* - maximum possible output power declared by manufacturer
2) Held to ear configurations are not applicable to Bluetooth for this device.

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

1) (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√ f(GHz)/x] W/kg for test separation distances ≤ 50 mm, where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.

When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

According to KDB 447498 D01, when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standslone SAR was estimated according to following formula to result in substantially conservative SAR values of ≤ 0.4W/kg to determine simultaneous transmission SAR test exclusion.

$$\text{Estimated SAR} = \frac{\text{Max. Tune up Power}_{(mW)}}{\text{Min. Test Separation Distance}_{(mm)}} \times \frac{\sqrt{f_{(GHz)}}}{7.5}$$

2) 0.4W/kg for 1-g SAR, when the test separation distances is > 50mm.

Estimated SAR calculation

Mode	Position	P_{max} (dBm)*	P_{max} (mW)	Distance (mm)	f (GHz)	X	Estimated SAR (W/kg)*
BT	Head	2.0	1.58	5	2.48	7.5	0.067
BT	Hotspot	2.0	1.58	10	2.48	7.5	0.033

Note: * - maximum possible output power declared by manufacturer

8.3.2 SIMULTANEOUS TRANSMISSION CONDITIONS

Per FCC KDB 447498 D01, SAR compliance for simultaneous transmission must be considered when the maximum duration of overlapping transmissions, including network hand-offs, is greater than 30 seconds. This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis.

The Simultaneous Transmission Possibilities of this device are as below:

NO.	Simultaneous Tx Combination	Head	Hotspot (10mm)
1	GSM+ WiFi 2.4G	Yes	Yes
2	UMTS+ WiFi 2.4G	Yes	Yes
3	LTE+ WiFi 2.4G	Yes	Yes
4	GSM+ WiFi 5G	Yes	Yes
5	UMTS+ WiFi 5G	Yes	Yes
6	LTE+ WiFi 5G	Yes	Yes
7	GSM+ BT	Yes	Yes
8	UMTS+ BT	Yes	Yes
9	LTE+ BT	Yes	Yes

Note: 2G&3G&4G share the same antenna and can't transmit simultaneously.

8.3.3 SAR SUMMATION SCENARIO

Position	Head				Hotspot					
	Right Cheek	Right Tilted	Left Cheek	Left Tilted	Front Face（1cm）	Rear Face（1cm）	Left Side（1cm）	Right Side（1cm）	Top Side（1cm）	Bottom Side（1cm）
GSM 850	0.281	0.173	0.154	0.111	0.175	0.422	0.143	-	-	0.112
GSM 1900	0.008	0.012	0.021	0.007	0.069	0.463	0.035	-	-	0.187
UMTS B2	0.009	0.016	0.040	0.011	0.067	0.456	0.037	-	-	0.181
UMTS B4	0.042	0.044	0.066	0.047	0.136	1.090	0.080	-	-	0.438
UMTS B5	0.208	0.102	0.155	0.114	0.157	0.340	0.127	-	-	0.066
LTE B2	0.020	0.018	0.049	0.035	0.075	0.443	0.044	-	-	0.212
LTE B7	0.335	0.226	0.421	0.173	0.334	0.433	0.335	-	-	0.091
LTE B12	0.103	0.095	0.115	0.107	0.096	0.290	0.207	-	-	0.033
LTE B66	0.051	0.042	0.061	0.048	0.116	0.956	0.092	-	-	0.405
2.4G WIFI	0.189	0.161	0.306	0.335	0.067	0.017	-	0.004	0.055	-
5.2G WIFI	-	-	-	-	0.200	0.374	-	0.155	0.467	-
5.3G WIFI	0.721	0.909	0.856	1.104	-	-	-	-	-	-
5.6G WIFI	0.697	0.800	0.803	0.974	-	-	-	-	-	-
5.8G WIFI	0.603	0.655	0.480	0.716	0.232	0.550	-	0.365	0.459	-
Bluetooth	0.067	0.067	0.067	0.067	0.033	0.118	-	0.033	0.033	-
Max. SAR Summation For 2/3/4G and Wifi	**1.056**	**1.135**	**1.277**	**1.277**	**0.588**	**1.640**	**0.335**	**0.365**	**0.467**	**0.438**
Max. SAR Summation For 2/3/4G and BT	**0.401**	**0.293**	**0.487**	**0.240**	**0.367**	**1.208**	**0.335**	**0.033**	**0.033**	**0.438**

Note:
1. For main antenna and WiFi, MAX. $\sum SAR_{1g}$ =1.640W/Kg >1.6W/Kg, so the SAR to peak location separation ratio should be considered.
2. For main antenna and BT, MAX. $\sum SAR_{1g}$ =1.208W/Kg <1.6W/Kg, so the SAR to peak location separation ratio should not be considered.

Reported SAR_{1g} / Test Position	GSM 850	GSM 1900	UMTS B2	UMTS B4	UMTS B5	LTE B2	LTE B7	LTE B12	LTE B66	2.4G WiFi	MAX $\sum SAR_{1g}$
Rear Face (1cm) (Hotspot)	0.422	/	/	/	/	/	/	/	/	0.017	0.439
	/	0.463	/	/	/	/	/	/	/	0.017	0.480
	/	/	0.456	/	/	/	/	/	/	0.017	0.473
	/	/	/	1.090	/	/	/	/	/	0.017	1.107
	/	/	/	/	0.340	/	/	/	/	0.017	0.357
	/	/	/	/	/	0.443	/	/	/	0.017	0.460
	/	/	/	/	/	/	0.433	/	/	0.017	0.450
	/	/	/	/	/	/	/	0.290	/	0.017	0.307
	/	/	/	/	/	/	/	/	0.956	0.017	0.973

Reported SAR_{1g} / Test Position	GSM 850	GSM 1900	UMTS B2	UMTS B4	UMTS B5	LTE B2	LTE B7	LTE B12	LTE B66	5.2G WiFi	MAX $\sum SAR_{1g}$
Rear Face (1cm) (Hotspot)	0.422	/	/	/	/	/	/	/	/	0.374	0.796
	/	0.463	/	/	/	/	/	/	/	0.374	0.837
	/	/	0.456	/	/	/	/	/	/	0.374	0.830
	/	/	/	1.090	/	/	/	/	/	0.374	1.464
	/	/	/	/	0.340	/	/	/	/	0.374	0.714
	/	/	/	/	/	0.443	/	/	/	0.374	0.817
	/	/	/	/	/	/	0.433	/	/	0.374	0.807
	/	/	/	/	/	/	/	0.290	/	0.374	0.664
	/	/	/	/	/	/	/	/	0.956	0.374	1.33

Reported SAR_{1g} / Test Position	GSM 850	GSM 1900	UMTS B2	UMTS B4	UMTS B5	LTE B2	LTE B7	LTE B12	LTE B66	5.3G WiFi	MAX $\sum SAR_{1g}$
Rear Face (1cm) (Hotspot)	0.422	/	/	/	/	/	/	/	/	/	0.422
	/	0.463	/	/	/	/	/	/	/	/	0.463
	/	/	0.456	/	/	/	/	/	/	/	0.456
	/	/	/	1.090	/	/	/	/	/	/	1.090
	/	/	/	/	0.340	/	/	/	/	/	0.340
	/	/	/	/	/	0.443	/	/	/	/	0.443
	/	/	/	/	/	/	0.433	/	/	/	0.433
	/	/	/	/	/	/	/	0.290	/	/	0.290
	/	/	/	/	/	/	/	/	0.956	/	0.956

Reported SAR_{1g} / Test Position	GSM 850	GSM 1900	UMTS B2	UMTS B4	UMTS B5	LTE B2	LTE B7	LTE B12	LTE B66	5.6G WiFi	MAX $\sum SAR_{1g}$
Rear Face (1cm) (Hotspot)	0.422	/	/	/	/	/	/	/	/	/	0.422
	/	0.463	/	/	/	/	/	/	/	/	0.463
	/	/	0.456	/	/	/	/	/	/	/	0.456
	/	/	/	1.090	/	/	/	/	/	/	1.090
	/	/	/	/	0.340	/	/	/	/	/	0.340
	/	/	/	/	/	0.443	/	/	/	/	0.443
	/	/	/	/	/	/	0.433	/	/	/	0.433
	/	/	/	/	/	/	/	0.290	/	/	0.290
	/	/	/	/	/	/	/	/	0.956	/	0.956

Reported SAR_{1g} / Test Position	GSM 850	GSM 1900	UMTS B2	UMTS B4	UMTS B5	LTE B2	LTE B7	LTE B12	LTE B66	5.8G WiFi	MAX $\sum SAR_{1g}$
Rear Face (1cm) (Hotspot)	0.422	/	/	/	/	/	/	/	/	0.550	0.972
	/	0.463	/	/	/	/	/	/	/	0.550	1.013
	/	/	0.456	/	/	/	/	/	/	0.550	1.006
	/	/	/	1.090	/	/	/	/	/	0.550	**1.640**
	/	/	/	/	0.340	/	/	/	/	0.550	0.890
	/	/	/	/	/	0.443	/	/	/	0.550	0.993
	/	/	/	/	/	/	0.433	/	/	0.550	0.983
	/	/	/	/	/	/	/	0.290	/	0.550	0.840
	/	/	/	/	/	/	/	/	0.956	0.550	1.506

Note:
1) MAX. $\sum SAR_{1g}$<1.6 W/Kg, the SAR to peak location separation ratio should not be considered, otherwise, see section 8.3.4 for more information.
2) The highest simultaneous SAR value=1.506W/Kg, per KDB690783 D01.

8.3.4 SIMULTANEOUS TRANSMISSION CONLCUSION

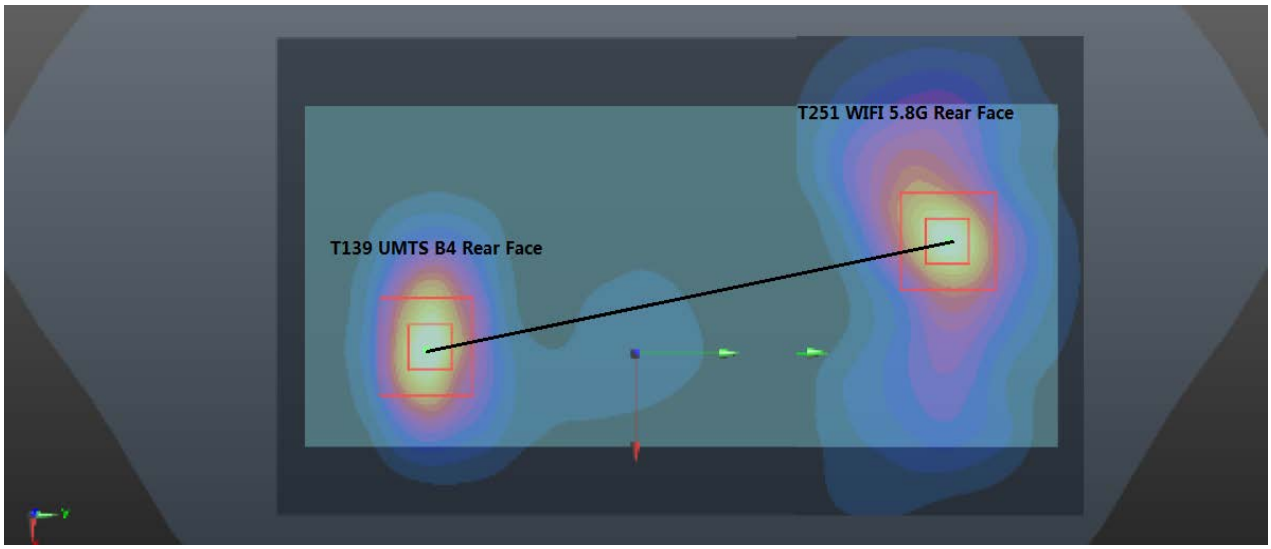
According to KDB447498 D01, When the sum of SAR is larger than limit, SAR test exclusion is determined by the SAR to peak location separation ratio(SPLSR).When the SAR to peak location ratio for each pair of antennas is 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. When 10-g SAR applies, the ratio must be ≤ 0.10.
When SAR is measured for both antennas in the pair the peak location separation distance is computed by the following formula:

$$\text{Distance}_{\text{Tx1-Tx2}} = R_i = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

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

When standalone test exclusion applies, SAR is estimated; the peak location is assumed to be at the feed-point or geometric center of the antenna. Due to curvatures on the SAM phantom, when SAR is estimated for one of the antennas in an antenna pair, the measured peak SAR location should be translated onto the test device to determine the peak location separation for the antenna pair. The ERP location on the phantom is aligned with the ERP location on the handset, with 6mm separation in the z coordinate due to the ear spacer. A measured peak location can be translated onto the handset, with respect to the ERP location, by ignoring the 6 mm offset in the z coordinate. The assumed peak location of the antenna with estimated SAR can also be determined with respect to the ERP location on the handset. The peak location separation distance is estimated by the x and y coordinated of the peaks, referenced to the ERP location. While flat phantoms are not expected to have these issues, the same peak translation approach should be applied to determine peak location separation.

1) The sum of aggregate 1g SAR was above 1.6 W/kg for Rear Face configuration with UMTS B4 and WiFi 5.8G.
The Peak SAR location is as below:

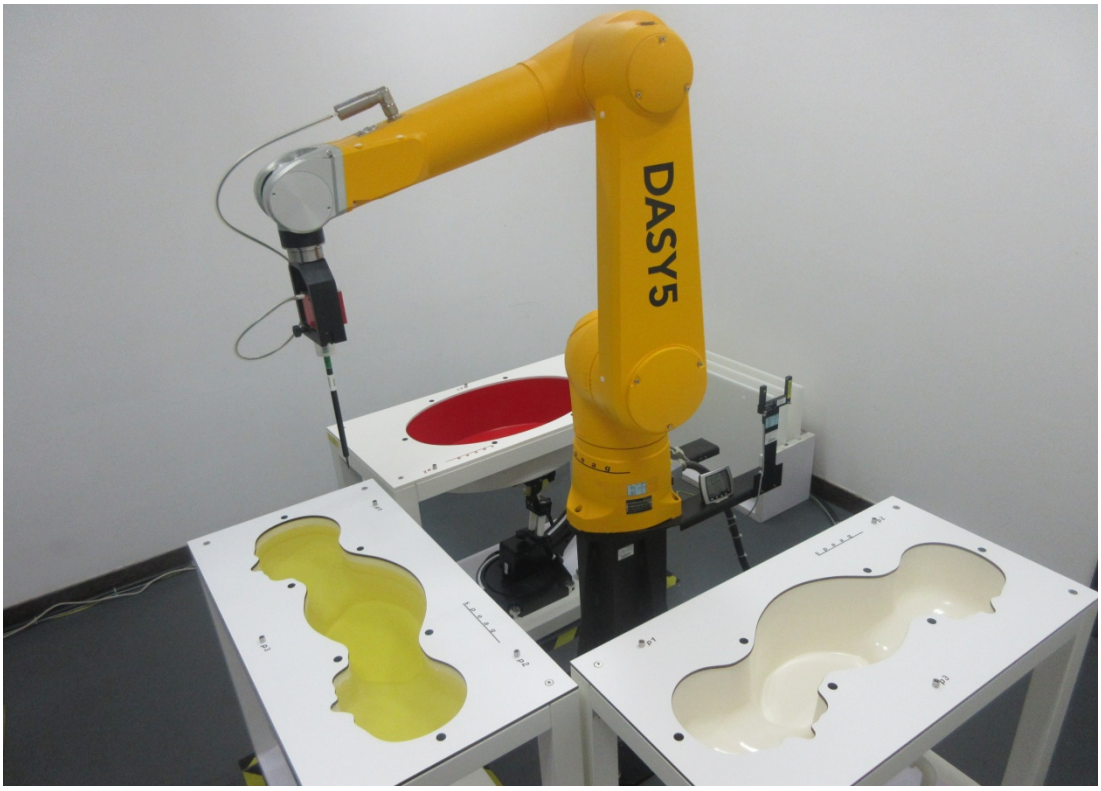


Mode	Reported SAR_{1g}	Peak SAR_{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
UMTS B4	1.090	0.86	-0.0005	-0.048	-0.204	101.9	0.021	0.04	No
WiFi 5.8G	0.550	1.09	-0.0245	0.051	-0.205				

APPENDIX

1. Test Layout

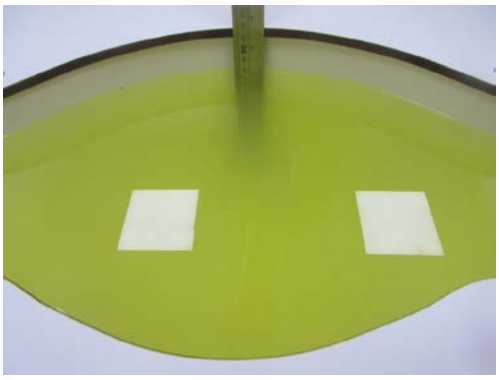
Specific Absorption Rate Test Layout



Liquid depth in the flat Phantom (≥15cm depth)

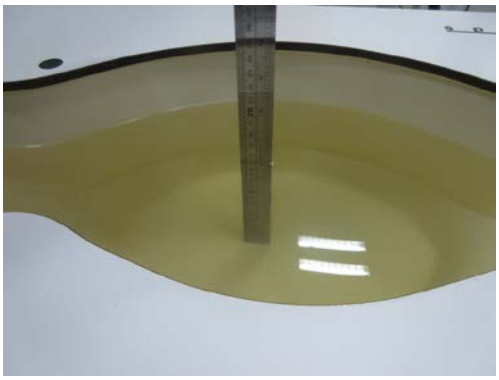
Head 750MHz_15.4cm

Body 750MHz_17.7cm



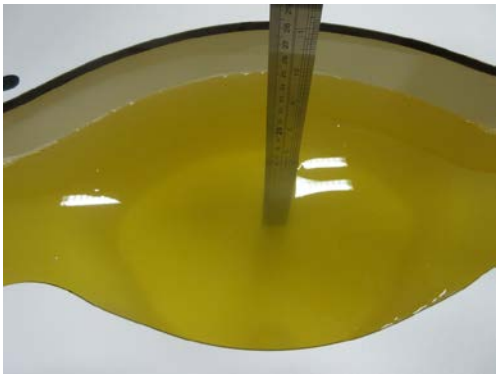
Head 835MHz~900MHz_15.7cm

Body 835MHz~900MHz_15.7cm

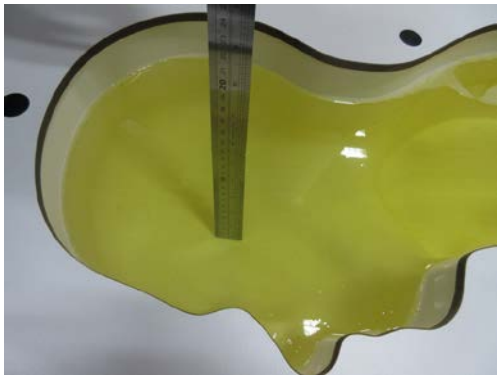


Head 1750MHz_15.1cm

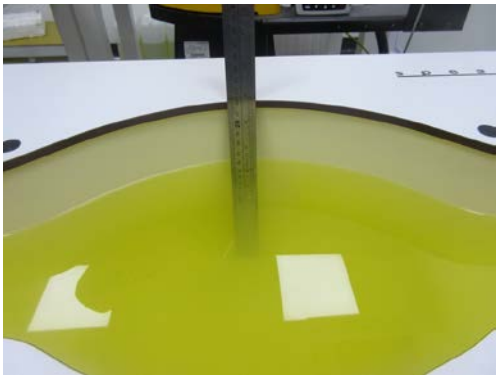
Body 1750MHz_16.6cm



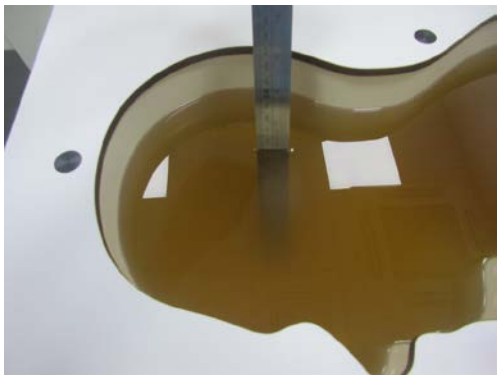
Head 1900MHz~2700MHz_15.9cm



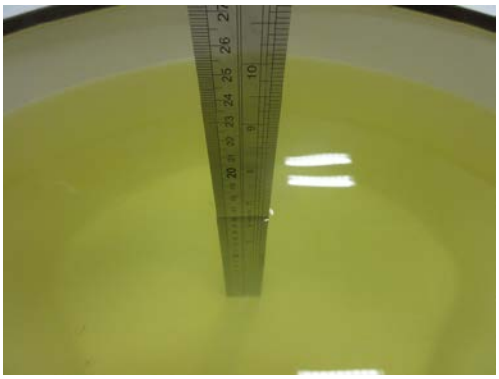
Body 1900MHz~2700MHz_15.3cm



Head 5GHz_15.5cm



Body 5GHz_16.1cm



Appendix A. SAR Plots of System Verification

(Pls See BTL-FCC SAR-1-1810C073_Appendix A.)

Appendix B. SAR Plots of SAR Measurement

(Pls See BTL-FCC SAR-1-1810C073_Appendix B.)

Appendix C. Calibration Certificate for Probe and Dipole

(Pls See BTL-FCC SAR-1-1810C073_Appendix C.)

Appendix D. Photographs of the Test Set-Up

(Pls See BTL-FCC SAR-1-1810C073_Appendix D.)

End of Test Report