FCC SAR Test Report

FCC ID: QISATU-LX3

Project No.	:	1712C199
Equipment	:	Smart Phone
Model Name	:	ATU-LX3
Applicant	:	Huawei Technologies Co.,Ltd.
Address	:	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C

Date of Receipt	:	Jan.12, 2018
Date of Test	:	Jan. 20, 2018 ~ Feb. 11, 2018
Issued Date	:	Feb. 11, 2018
Tested by	:	BTL Inc.

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Testing Laboratory 2640

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REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCC SAR-1-1712C199	Original Issue	Feb. 11, 2018

1. GENERAL SUMMARY

Equipment	Smart Phone
Brand Name	HUAWEI
Model Name	ATU-LX3
Model difference	N/A
Manufacturer	Huawei Technologies Co.,Ltd.
Address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Factory	Huawei Technologies Co.,Ltd.
Address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
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 **KDB616217 D04** SAR for laptop and tablets v01r02

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-1-1712C199) were obtained utilizing the test procedures, test instruments, test sites that has been accredited by the Authority of TAF according to the ISO-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, Dong Guan, 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

Equipment Class	Mode	Highest Head SAR-1g (W/kg)	Highest Body-worn(15mm) SAR-1g(W/kg)*	Highest Hotspot(10mm) SAR-1g(W/kg)	Highest Body Sensor off SAR-1g (W/kg)	Highest product specific 10-g SAR (W/kg)**
PCE	GSM850	0.29	0.48	0.41	-	-
	GSM1900	0.13	0.16	0.39	0.24	-
	UMTS Band 2	0.31	0.40	0.65	0.51	1.07
	UMTS Band 4	0.23	0.39	0.64	0.66	1.47
	UMTS Band 5	0.31	0.50	0.52	-	-
	LTE Band 2	0.28	0.27	0.38	0.36	-
	LTE Band 4	0.18	0.29	0.64	0.37	-
	LTE Band 5	0.24	0.37	0.39	-	-
	LTE Band 7	0.08	0.28	0.52	0.55	-
DTS	2.4G WLAN	0.49	0.06	0.24	-	-
	BT	0.08	-	-	-	-
	The highest simultaneous SAR_{1g} value is 0.78 W/kg per KDB690783 D01					

Note:

1)* For body-worn operation, this device has been tested and meets FCC RF exposure guidelines when used with any accessory that contains no metal and that positions the handset a minimum of 15mm from the body. Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

2)**For product specific 10-g SAR operation, this device has been tested and meets the10-g SAR limits of 4.0 W/kg for general population/ uncontrolled exposure limits according to the ANSI C95.1:1992/IEEE C95.1:1991.

3)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 .

3.2 PRODUCT FUNCTION AND INTENDED USE

ATU-LX3 is subscriber equipment in the GSM/UMTS/LTE system.
The GSM frequency band includes GSM850 and GSM900 and DCS1800 and PCS1900. but only GSM850/1900 test data included in this report.

The UMTS frequency band is band 1 and band 2 and band 4 and band 5 and Band 7 ,but only band 2 and Band 4 and Band 5 test data included in this report.

The LTE frequency band is Band 2 band 4 and band 5 and band 7 and Band 28 , But only Band 2 and band 4 and band 5 and band 7 test data included in this report.

The Mobile Phone implements such functions as RF signal receiving/transmitting, LTE/UMTS and GSM/GPRS/EDGE protocol processing, voice, video MMS service, GPS and Wi-Fi etc. Externally it provides micro SD card interface, earphone port (to provide voice service) and USIM card interface. Different versions of the software, the phone may support single SIM card or double SIM card.It also provides Bluetooth module to synchronize data between a PC and the phone, or to use the built-in modem of the phone to access the Internet with a PC, or to exchange data with other Bluetooth devices.

3.3 GENERAL DESCRIPTION OF EUT

Equipment	Smart Phone		
Model Name	ATU-LX3		
IMEI Code	Sample 1	IMEI 1: 867265030055900	
		IMEI 2: 867265030055918	
	Sample 2	IMEI 1: 867265030055124	
		IMEI 2: 867265030055132	
	Sample 3	IMEI 1: 867265030052121	
		IMEI 2: 867265030052139	
S/N	Sample 1: PJC9X17C14G00354		
	Sample 2: PJC9X17C14G00315		
	Sample 3: PJC9X17C14G00165		
HW Version	HL1ATUM		
SW Version	ATU-LX3 8.0.1.44(SP1C900)		
Modulation	GSM(GMSK/8PSK),UMTS(QPSK),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 Band 2	1850-1910	1930-1990
	UMTS Band 4	1710-1755	2110-2155
	UMTS Band 5	824-849	869-894
	LTE Band 2	1850-1910	1930-1990
	LTE Band 4	1710-1755	2110-2155
	LTE Band 5	824-849	869-894
	LTE Band 7	2500-2570	2620-2690
	Bluetooth	2400 -2483.5	
	2.4GWIFI	2400 -2483.5	
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 Band 2/4/5)
	3, tested with power control “all Max” (LTE Band 2/4/5/7)
Test Channels (low-mid-high):	128-190-251 (GSM850)
	512-661-810 (GSM1900)
	9262-9400-9538(UMTS Band 2)
	1312-1413-1513 (UMTS Band 4)
	4132-4182-4233 (UMTS Band 5)
	18700-18900-19100(LTE Band 2 BW=20MHz)
	20050-20175-20300(LTE Band 4 BW=20MHz)
	20450-20525-20600(LTE Band 5 BW=10MHz)
	20850-21100-21350(LTE Band 7 BW=20MHz)
	1-6 -11 (2.4G WIFI 802.11b/g/n HT20)
	3-6 - 9 (2.4G WIFI 802.11n HT40)
Other Information	
Battery	Huawei Technologies Co., Ltd. Battery Model: HB366481ECW-11 Rated capacity: 2900mAh Nominal Voltage: ⎓ + 3.82V Charging Voltage: ⎓ + 4.35V 1. SCUD(Fujian)Electronics Co., Ltd. 2. Sunwoda Electronic Co., Ltd. 3. Huizhou Desay Battery Co., Ltd.
With Earphone(Yes/No)	Yes

3.4 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.	

3.5 MAIN TEST INSTRUMENTS

Item	Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Interval
1	Data Acquisition Electronics	Speag	DAE4	1390	Sep. 15, 2017	1 Year
2	E-field Probe	Speag	EX3DV4	7396	May. 25, 2017	1 Year
3	Electro Optical Converter	Speag	ECO90	1151	N/A	N/A
4	System Validation Dipole	Speag	D835V2	4d160	Sep. 30, 2015	3 Years
5	System Validation Dipole	Speag	D1750V2	1101	Sep. 22, 2015	3 Years
6	System Validation Dipole	Speag	D1900V2	5d179	Sep. 29, 2015	3 Years
7	System Validation Dipole	Speag	D2450V2	919	Sep. 28, 2015	3 Years
8	System Validation Dipole	Speag	D2600V2	1067	Sep. 28, 2015	3 Years
9	Twin Sam Phantom	Speag	Twin Sam Phantom V5.0	1784	N/A	N/A
10	Twin Sam Phantom	Speag	Twin Sam Phantom V5.0	1896	N/A	N/A
11	8960 Series 10 Wireless Com T est set	Agilent	E5515E	MY52112163	Aug. 20, 2017	1 Year
12	CMW500-Wideband Radio Communication Tester	RS	CMW500	152372	Mar. 26, 2017	1Year
13	CMW500-Wideband Radio Communication Tester	RS	CMW500	153883	May. 03, 2017	1Year
14	Power Amplifier	Mini-Circuits	ZHL-42W+	QA1333003	N/A	N/A
15	Power Amplifier	Mini-Circuits	ZVE-8G+	520701341	N/A	N/A
16	ENA Network Analyzer	Agilent	E5071C	MY46102965	Mar. 26, 2017	1 Year
17	MXG Analog Signal Generator	Agilent	N5181A	MY49060477	Jun. 30, 2017	1 Year
18	P-series power meter	Agilent	N1911A	MY45100473	Aug. 20, 2017	1 Year
19	wideband power sensor	Agilent	N1921A	MY51100041	Aug. 20, 2017	1 Year
20	power Meter	Anritsu	ML2495A	1128009	Mar. 26, 2017	1 Year
21	Pulse Power Sensor	Anritsu	MA 2411B	1027500	Mar. 26, 2017	1 Year
22	Dielectric Assessment Kit	Speag	DAK-3.5	1226	N/A	N/A
23	Dual directional coupler	Woken	TS-PCC0M-05	107090019	Mar. 09, 2017	1 Year
24	EXA Specturm Analgler	KEYSIGHT	N9010A	MY56880488	2017/3/9	1 Year

Note 1:" N/A" denotes no model name, serial No. or calibration specified.

2: 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.

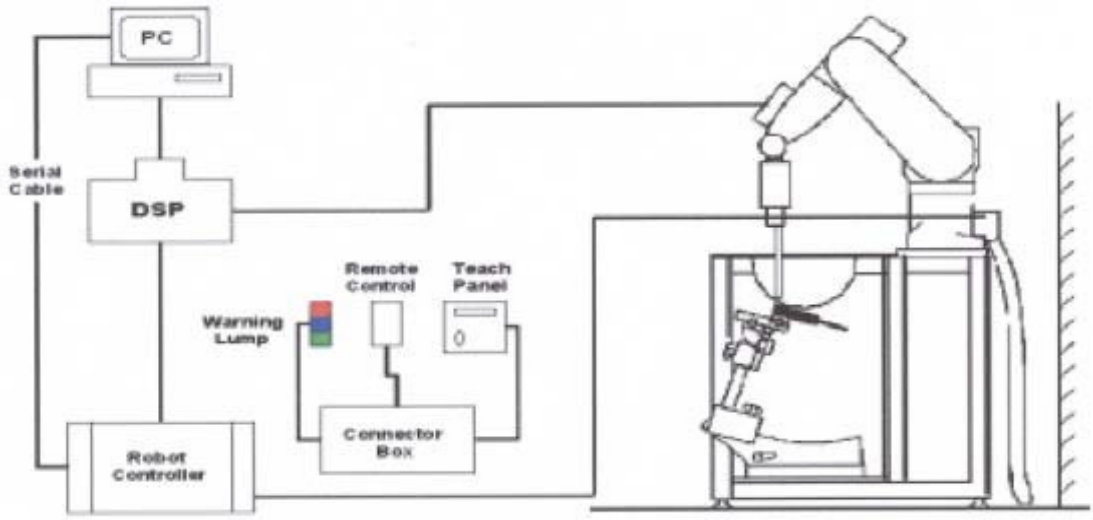
4.SAR MEASUREMENTS SYSTEM CONFIGURATION

4.1SAR 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
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.

4.1.1Test Setup Layout



4.2 DASY5E-FIELDPROBESYSTEM

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

4.2.1EX3DV4 PROBE SPECIFICATION

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

EX3DV4 E-field Probe

4.2.2E-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).

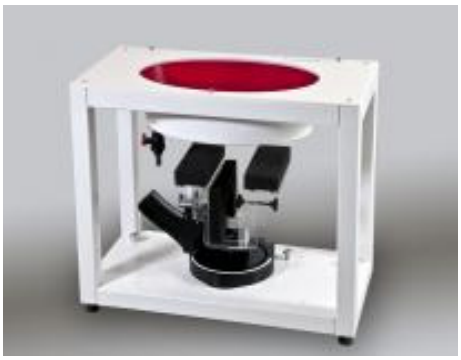
4.2.3OTHER TEST EQUIPMENT

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

4.2.4SCANNING 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

4.2.5SPATIAL 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 are 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, Computermathematik, 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, Computermathematik, 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 compansate boundary effects on E-field probes.

4.2.6DATA STORAGE AND EVALUATION

4.2.5.1Data 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 ".DAE4". 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 dielectic 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 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	-

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
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	-

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	835	22.4	0.889	42.994	0.90	41.5	-1.22	3.60	Jan. 20, 2018
Head	1750	22.5	1.352	39.276	1.37	40.1	-1.31	-2.06	Jan. 21, 2018
Head	1900	22.4	1.423	39.098	1.40	40.0	1.64	-2.25	Jan. 20, 2018
Head	2450	22.5	1.865	39.160	1.80	39.2	3.63	-0.10	Jan. 21, 2018
Head	2450	22.3	1.877	39.169	1.80	39.2	4.28	-0.08	Feb. 11, 2018
Head	2600	22.5	2.024	38.632	1.96	39.0	3.27	-0.94	Jan. 21, 2018
Body	835	22.3	0.973	54.159	0.97	55.2	0.31	-1.89	Jan. 22, 2018
Body	1750	22.4	1.497	52.571	1.49	53.4	0.50	-1.55	Jan. 24, 2018
Body	1900	22.6	1.552	51.952	1.52	53.3	2.11	-2.53	Jan. 23, 2018
Body	2450	22.5	1.997	51.664	1.95	52.7	2.39	-1.97	Jan. 21, 2018
Body	2600	22.5	2.203	52.267	2.16	52.5	1.97	-0.44	Jan. 25, 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

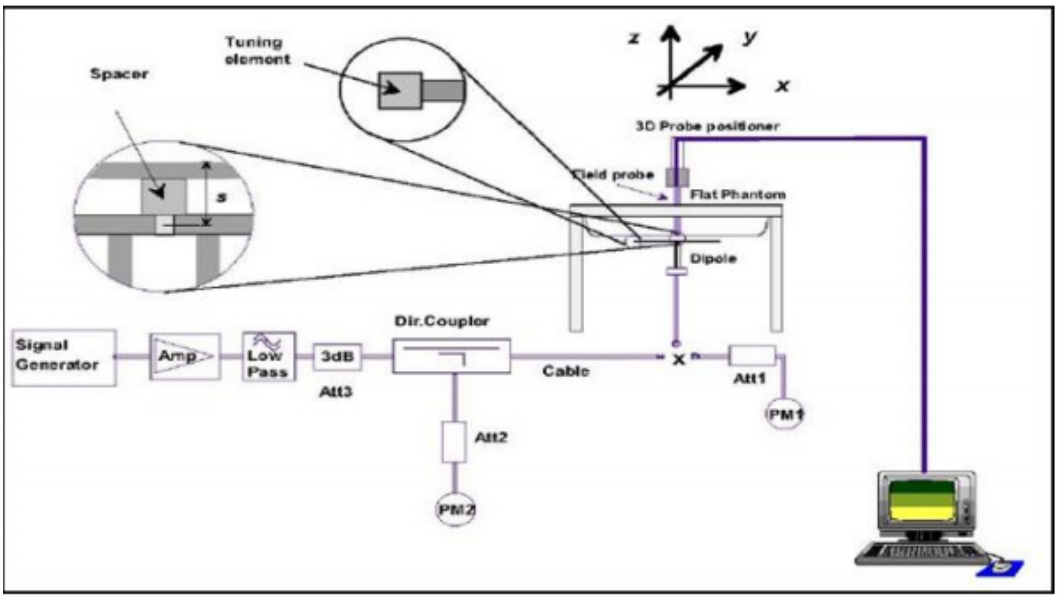
The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE P1528 (described above). The following table shows system check results for all frequency bands and tissue liquids used during the tests.

System Check	Date	Frequency (MHz)	Targeted SAR-1g (W/kg)	Measured SAR-1g (W/kg)	normalized SAR-1g (W/kg)	Deviation (%)	Dipole S/N
Head	Jan. 20, 2018	835	9.50	2.29	9.16	-3.58	4d160
Head	Jan. 21, 2018	1750	36.60	9.34	37.36	2.08	1101
Head	Jan. 20, 2018	1900	39.70	9.99	39.96	0.65	5d179
Head	Jan. 21, 2018	2450	52.00	13.30	53.20	2.31	919
Head	Feb. 11, 2018	2450	52.00	13.50	54.00	3.85	919
Head	Jan. 21, 2018	2600	56.80	13.50	54.00	-4.93	1067
Body	Jan. 22, 2018	835	9.52	2.33	9.32	-2.10	4d160
Body	Jan. 24, 2018	1750	35.70	9.10	36.40	1.96	1101
Body	Jan. 23, 2018	1900	39.60	9.85	39.40	-0.51	5d179
Body	Jan. 21, 2018	2450	51.10	12.90	51.60	0.98	919
Body	Jan. 25, 2018	2600	54.10	13.60	54.40	0.55	1067

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 plexiglass 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 5GHz) or 100mW(above 5GHz). 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

6.1SAR 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 SAR 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:

1) Full Power

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	7.5
	2 TX slots	3	3	10.0
	3 TX slots	5	5	12.5
	4 TX slots	6	6	13.5
GSM1900	1 TX slot	0.0	0.0	5.5
	2 TX slots	3.5	3.5	8.5
	3 TX slots	5.5	5.5	10.5
	4 TX slots	6.5	6.5	11.5

2) sensor on

Number of timeslots in uplink assignment		Reduction of maximum output power (dB)		
Band	Time Slots	GPRS (GMSK)	EGPRS (GMSK)	EGPRS (8PSK)
GSM1900	1 TX slot	0.0	0.0	5.5
	2 TX slots	3.5	3.5	8.5
	3 TX slots	5.5	5.5	10.5
	4 TX slots	6.5	6.5	11.5

3) Hotspot on

Number of timeslots in uplink assignment		Reduction of maximum output power (dB)		
Band	Time Slots	GPRS (GMSK)	EGPRS (GMSK)	EGPRS (8PSK)
GSM1900	1 TX slot	0.0	0.0	5.5
	2 TX slots	3.5	3.5	8.5
	3 TX slots	5.5	5.5	10.5
	4 TX slots	6.5	6.5	11.5

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 △ACK, △NACK, △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: △ACK, △NACK and △CQI = 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_c (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.

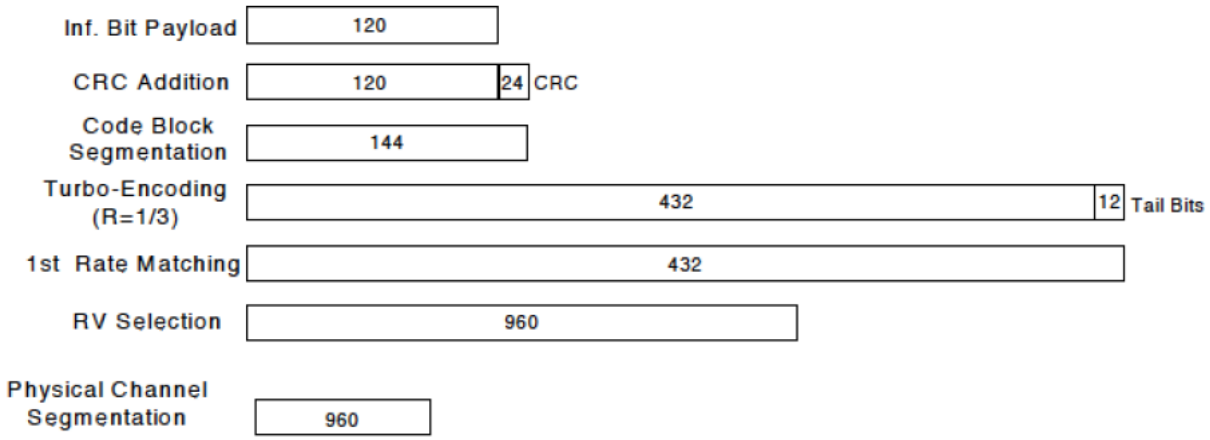


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

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 Signalling 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			

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 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.

7.2 PROXIMITY SENSOR POWER REDUCTION INFORMATION

7.2.1 General proximity sensor implementation description

This device uses a proximity sensor that share the same metallic electrode as the transmitting antenna to facilitate triggering in typical user interactivity with the device.

Due to the operating configurations and exposure conditions required by the device, the proximity sensor is used to indicate when the UE is held close to a user's body exposure condition. It utilizes the proximity sensor to reduce the output power in specific wireless and operating modes to ensure SAR compliance for the following scenarios: To reduce the output power of main antennas during body operating configurations.

7.2.2 Antennas and sensor placement details

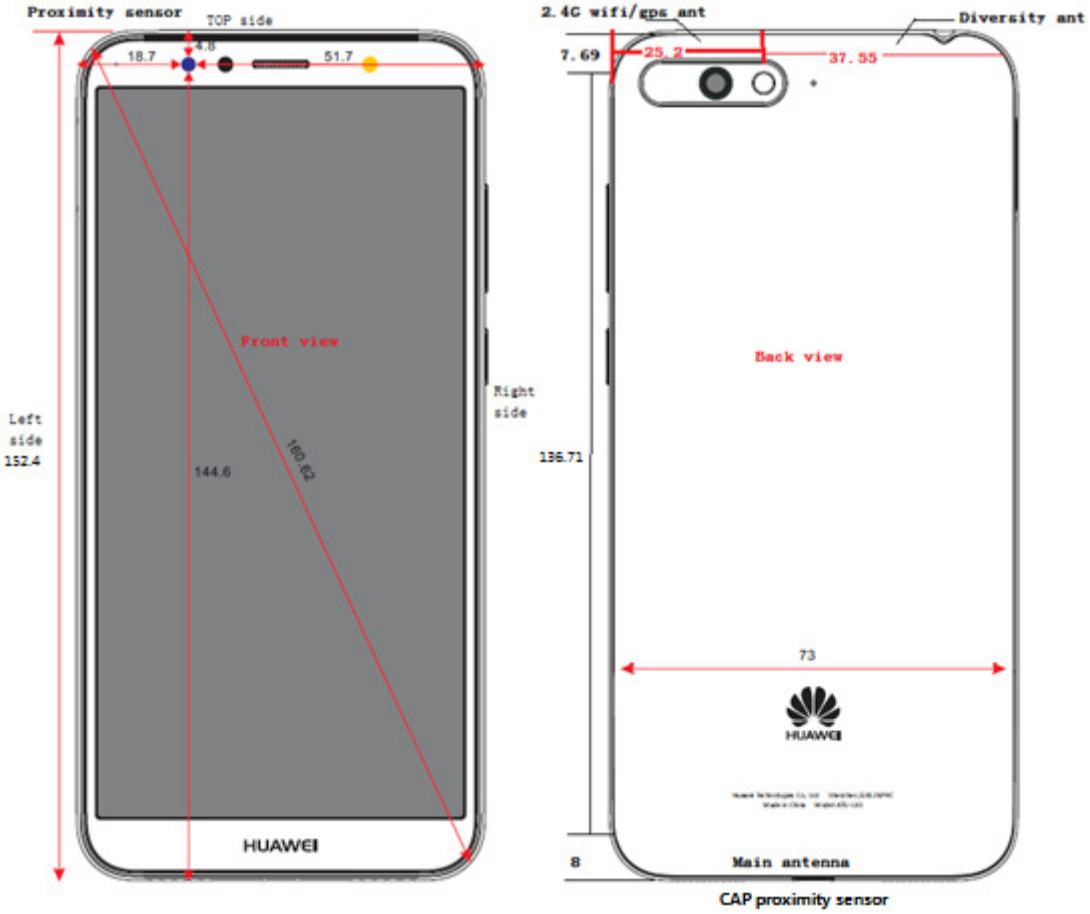


Figure 1: The location of the antennas

Note: 1. The Div Antenna and GPS Antenna does not have the transmit function.

2. The proximity sensor and main antenna use same metallic electrode, so the location is same.

	Antenna/Sensor-to- DUT sides separation distances					
Tx Antenna	**Front side**	**Back side**	**Left side**	**Right side**	**Top side**	**Bottom side**
Main 2G&3G&4G Antenna	NA	NA	NA	NA	144.4mm	NA
2.4G WiFi Antenna	NA	NA	37.55mm	NA	NA	144.71mm
sensor	NA	NA	NA	NA	144.4mm	NA
Diversity antenna and GPS antenna	Only receive signal, so it was not figured out in the following pictures					

7.2.3 Proximity sensor clarification

The proximity sensor is triggered by capacitance changes due to objects in the vicinity of the sensing element.
Capacitive proximity sensor share a metallic electrode with the GSM、WCDMA and LTE antenna radiator. The metallic electrode and sar sensor chip works as a sensor.

The proximity sensor or the power reduction cannot be intentionally or unintentionally turned-off by the user.

The expected capacitance trigger values are programmed in each device for each power back-off stage.

Capacitance trigger value is C1

When a certain object or human body approaches the DUT, if the measured capacitance is lower than C1, proximity sensor is not triggered. If the measured capacitance is equal to C1 or higher than C1, the power back-off is triggered.

Power Reduction operation table

The tablet use Qualcomm platform, which have some special NVs for SAR related max power back off, These NVs are used to set a new max power limit based proximity information and call configuration. When human body is in proximity and is detected by sensor, a new max power limit is set using the values stored in the NV. If Base station requests the higher output power above the limit, the power control algorithm inside modem chip will limit the power up to the preset power limit. If base station requests a lower output power less than the limit, the out power is controlled by base station.

Main Antenna，IR sensor off					
Band	Sensor Trigger Distance	Hotspot on +capacitive sensor onPower reduction(dB)	Hotspot off +capacitive sensor onPower reduction(dB)	Hotspot on +capacitive sensor off Power reduction(dB)	Other conditions
GSM1900	Front side: 14mm	2.5	3	2.5	0
	Back side: 23mm				
	Bottom side: 16mm				
UMTS Band2	Front side: 14mm	2.5	3.5	2.5	0
	Back side: 23mm				
	Bottom side: 16mm				
UMTS Band4	Front side: 14mm	3	3	3	0
	Back side: 23mm				
	Bottom side: 16mm				
LTE Band 2	Front side: 14mm	1.5	3	1.5	0
	Back side: 23mm				
	Bottom side: 16mm				
LTE Band 5	Front side: 14mm	3	3	3	0
	Back side: 23mm				
	Bottom side: 16mm				
LTE Band7	Front side: 14mm	3	3	3	0
	Back side: 23mm				
	Bottom side: 16mm				

Note:
1) Since the capacitive proximity sensor triggering distance for the front=14mm ; back=23mm ; bottom=16mm , a conservative distance of Front Side 13mm was requried for addtional SAR test at maximum power level with sensor off. a conservative distance of Bottom Side 15mm was requried for addtional SAR test at maximum power level with sensor off. a conservative distance of Back Side 22mm was requried for addtional SAR test at maximum power level with sensor off.

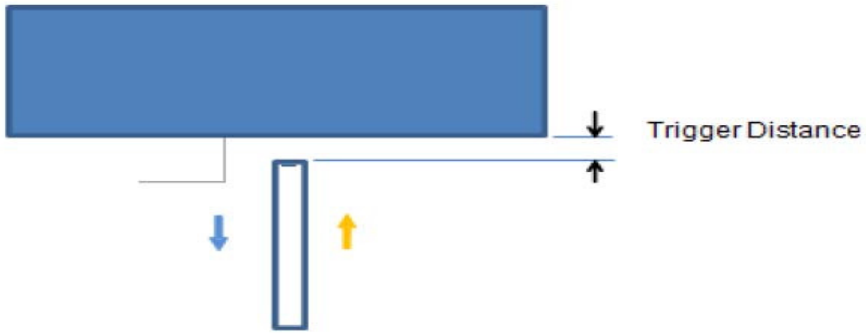
2) SAR tests with proximity sensor power reduction are only required for the sidesof frequency bands in the table above. For the other sides or other frequency bands of the device, SAR is still tested at the maximum power level with sensor off.

3) IR sensor only operates with Receiver simultaneously on Voice mode (for GSM and UMTS) or VoLTE mode. When the mobile operates on data mode or on voice mode with headset insert or speaker on, the IR sensor will turn off. The IR sensor operates only on held-to-ear mode, which means the IR sensor will not affect the body SAR scenario.

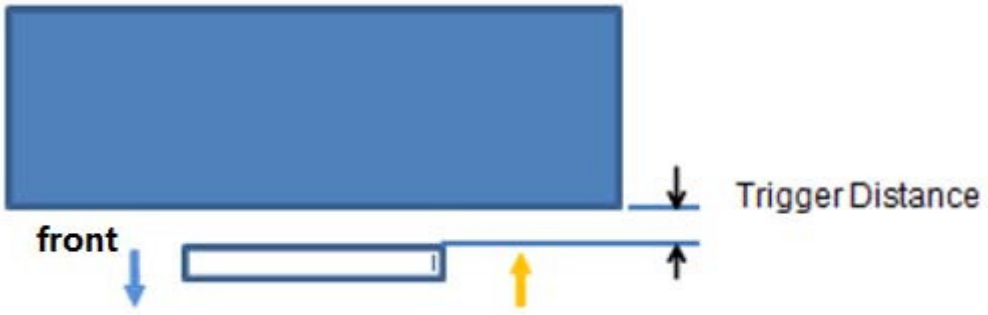
7.2.4 Proximity sensor coverage, distance and angle

7.2.4.1 Procedures for determining proximity sensor triggering distances (Per KDB616217 § 6.2)

Per FCC KDB 616217 D04v01, the device was tested by the test lab to determine the proximity sensor triggering distances for the back side and bottom side and front side of the device. To ensure all production units are compliant, the smallest separation distance determined by the sensor triggering minus 1 mm, must be used as the test separation distance for SAR testing. These SAR tests are included in addition to the SAR tests for the device touching the SAR phantom with reduced power.



Picture: Proximity sensor triggering distances assessment (Bottom side)



Picture: Proximity sensor triggering distances assessment (Front side)

Picture: Proximity sensor triggering distances assessment (Back side)

Table: Summary of Trigger Distances

Band	Trigger distance – Bottom side		Trigger distance –back side		Trigger distance –Front side	
	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving from phantom	Moving toward phantom	Moving toward phantom
GSM 1900	**16mm**	**16mm**	**23mm**	**23mm**	**14mm**	**14mm**
UMTS Band 2	**16mm**	**16mm**	**23mm**	**23mm**	**14mm**	**14mm**
UMTS Band 4	**16mm**	**16mm**	**23mm**	**23mm**	**14mm**	**14mm**
LTE Band 2	**16mm**	**16mm**	**23mm**	**23mm**	**14mm**	**14mm**
LTE Band 4	**16mm**	**16mm**	**23mm**	**23mm**	**14mm**	**14mm**
LTE Band 7	**16mm**	**16mm**	**23mm**	**23mm**	**14mm**	**14mm**

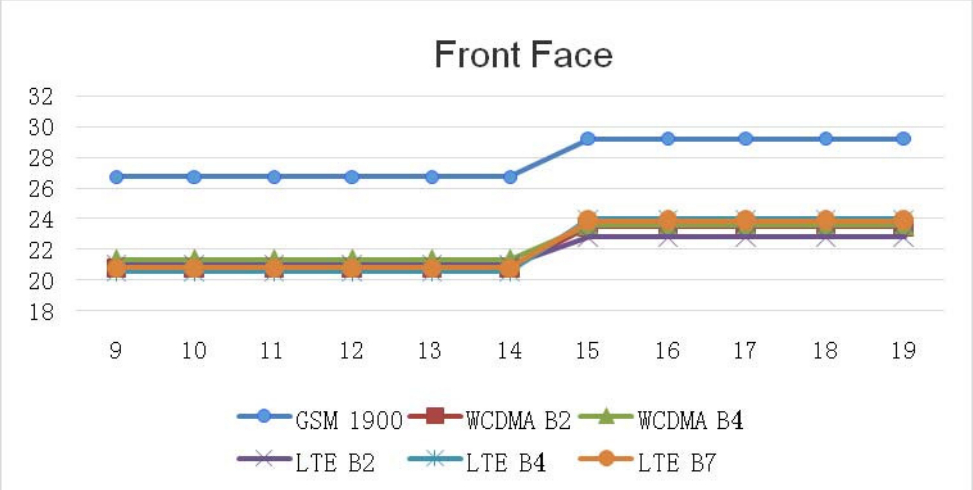
7.2.4.2 Procedures for determining antenna and proximity sensor coverage (Per KDB616217 § 6.3)

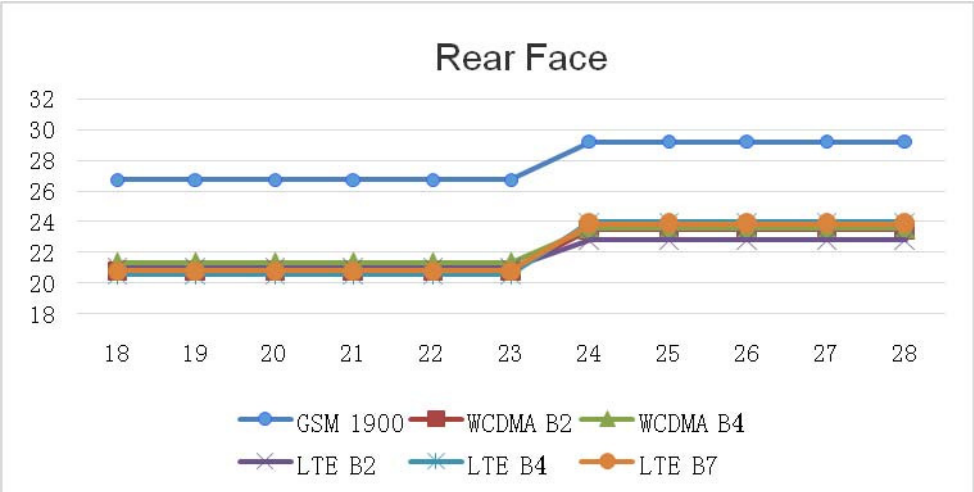
The proximity sensor and main antenna use same metallic electrode, so there is no spatial offset.

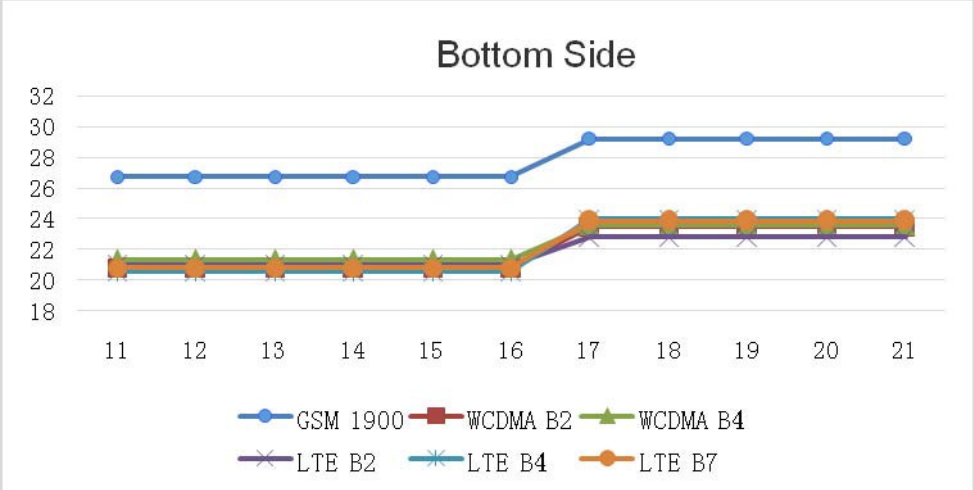
mode	distance(mm)										
	Front Face										
	Sensor on						Sensor off				
	9	10	11	12	13	14	15	16	17	18	19
GSM 1900	26.75	26.75	26.75	26.75	26.75	26.75	29.22	29.22	29.22	29.22	29.22
WCDMA B2	20.8	20.8	20.8	20.8	20.8	20.8	23.48	23.48	23.48	23.48	23.48
WCDMA B4	21.34	21.34	21.34	21.34	21.34	21.34	23.58	23.58	23.58	23.58	23.58
LTE B2	20.96	20.96	20.96	20.96	20.96	20.96	22.8	22.8	22.8	22.8	22.8
LTE B4	20.55	20.55	20.55	20.55	20.55	20.55	23.97	23.97	23.97	23.97	23.97
LTE B7	20.81	20.81	20.81	20.81	20.81	20.81	23.85	23.85	23.85	23.85	23.85

mode	distance(mm)										
	Rear Face										
	Sensor on						Sensor off				
	18	19	20	21	22	23	24	25	26	27	28
GSM 1900	26.75	26.75	26.75	26.75	26.75	26.75	29.22	29.22	29.22	29.22	29.22
WCDMA B2	20.8	20.8	20.8	20.8	20.8	20.8	23.48	23.48	23.48	23.48	23.48
WCDMA B4	21.34	21.34	21.34	21.34	21.34	21.34	23.58	23.58	23.58	23.58	23.58
LTE B2	20.96	20.96	20.96	20.96	20.96	20.96	22.8	22.8	22.8	22.8	22.8
LTE B4	20.55	20.55	20.55	20.55	20.55	20.55	23.97	23.97	23.97	23.97	23.97
LTE B7	20.81	20.81	20.81	20.81	20.81	20.81	23.85	23.85	23.85	23.85	23.85

mode	distance(mm)										
	Bottom Side										
	Sensor on						Sensor off				
	11	12	13	14	15	16	17	18	19	20	21
GSM 1900	26.75	26.75	26.75	26.75	26.75	26.75	29.22	29.22	29.22	29.22	29.22
WCDMA B2	20.8	20.8	20.8	20.8	20.8	20.8	23.48	23.48	23.48	23.48	23.48
WCDMA B4	21.34	21.34	21.34	21.34	21.34	21.34	23.58	23.58	23.58	23.58	23.58
LTE B2	20.96	20.96	20.96	20.96	20.96	20.96	22.8	22.8	22.8	22.8	22.8
LTE B4	20.55	20.55	20.55	20.55	20.55	20.55	23.97	23.97	23.97	23.97	23.97
LTE B7	20.81	20.81	20.81	20.81	20.81	20.81	23.85	23.85	23.85	23.85	23.85



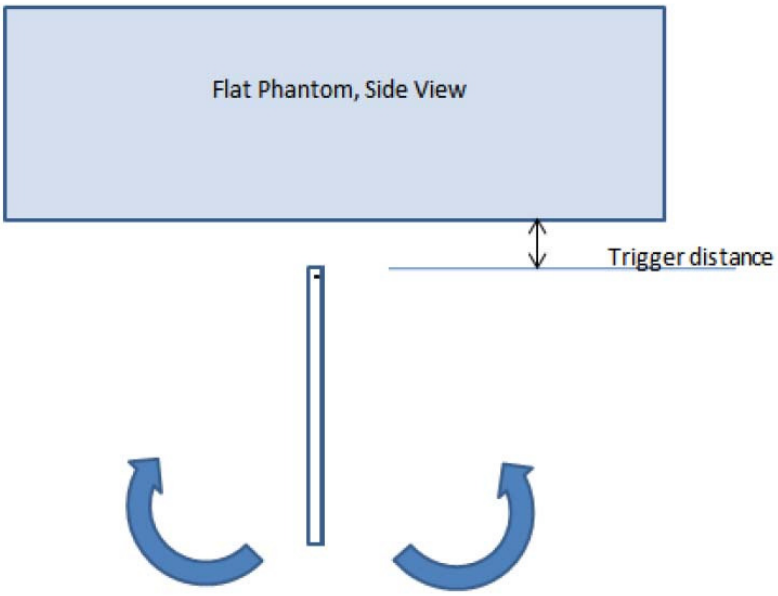




7.2.4.3 Procedures for determining device tilt angle influences to proximity sensor triggering (Per KDB616217 § 6.4)

Per FCC KDB 616217 D04v01, the DUT was positioned directly below the flat phantom at the minimum measured trigger distance with each applicable edge parallel to the base of the flat phantom for each band.

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



Picture: Proximity sensor tilts angle assessment

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

Band(MHz)	Minimum trigger distance at which power reduction was maintained over ±45°	Sensor Power Reduction Status										
		-45°	-35°	-25°	-15°	-5°	0°	5°	15°	25°	35°	45°
GSM 1900	16mm	on	on	on	on	on	on	on	on	on	on	on
UMTS B2	16mm	on	on	on	on	on	on	on	on	on	on	on
UMTS B4	16mm	on	on	on	on	on	on	on	on	on	on	on
LTE B2	16mm	on	on	on	on	on	on	on	on	on	on	on
LTE B4	16mm	on	on	on	on	on	on	on	on	on	on	on
LTE B7	16mm	on	on	on	on	on	on	on	on	on	on	on

7.2.4.4 Summary SAR test Plan for Proximity sensor power reduction

For Body SAR compliance, the device uses proximity sensor power reduction for some frequency bands of Main antenna and test positions.

1）To ensure all production units are compliant, the smallest separation distance determined by the sensor triggering and sensor coverage for normal and tilt positions for each applicable side triggering conditions, minus 1 mm, is used as the test separation distance for SAR testing.

2）SAR tests with proximity sensor power reduction are only required for the sides of frequency bands in the table above. For the other sides or other frequency bands of the device, SAR is still tested at the maximum power level with sensor off.

7.3 IR proximity sensor working

7.3.1 General proximity sensor implementation description

This device uses an infrared proximity sensor to facilitate triggering in typical user interactivity with the device.

Due to the operating configurations and exposure conditions required by the device, the proximity sensor is used to indicate when the phone is held close to a user's ear exposure condition or when the phone is used in body front side scenario exposure condition. It utilizes the proximity sensor to reduce the output power of Wi-Fi antenna when Wi-Fi and 2G&3G&4G main antenna voice mode transmit simultaneously in held-to-ear scenario or body front side scenario.

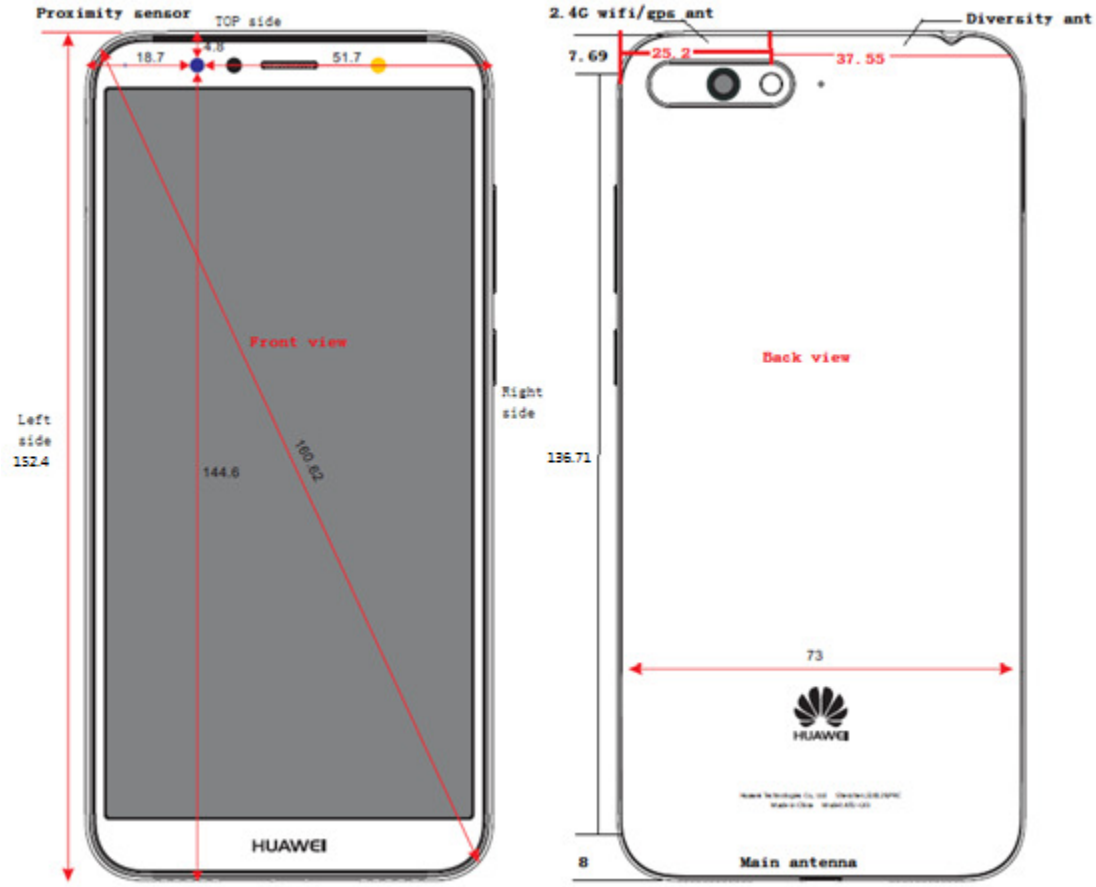
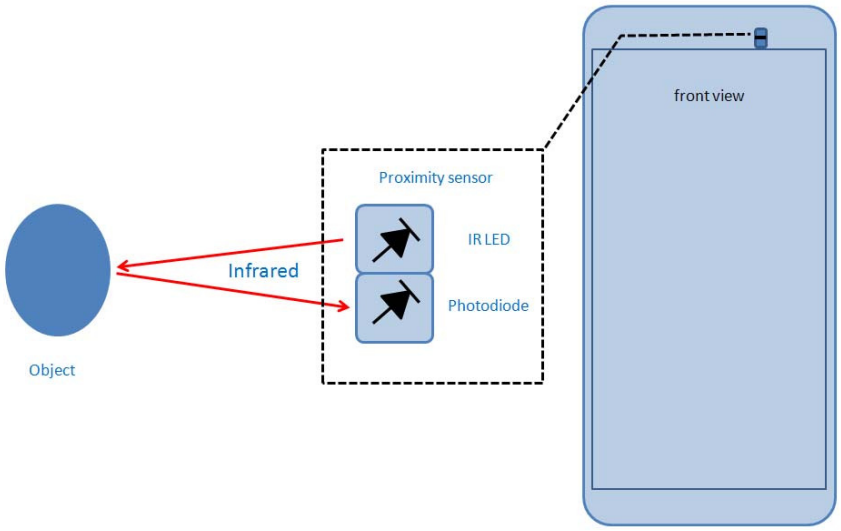


Figure1&2: The location of the antennas and the IR proximity sensor

Note: The device has one GSM&UMTS&LTE main antenna and one WiFi 2.4G/BT antenna.

Antenna and sensor distances (front view，unit:mm)						
Antenna	**Front side**	**Back side**	**Left side**	**Right side**	**Top side**	**Bottom side**
Main Antenna	0	0	0	0	144.4	0
2.4G WiFi Antenna	0	0	37.55	0	0	144.71
IR Proximity Sensor	0	0	18.7	51.7	4.8	144.6
The IR proximity sensor locates on the front face of the device and detects objects approaching only from the front side						

7.3.2 Proximity sensor clarifications



Figue3: The picture of the proximity sensor

7.3.2.1 Description of proximity sensor Techniques

As figure 3 shows, proximity detection is accomplished by photodiode measuring the amount of IR energy, from the internal IR LED, reflected off an object to determine its distance. As the sensor locates on the front side of the device, it only detects the front face approaching, like held-to-ear or body mode.

The device uses proximity sensor to detect the presence of nearby objects without any physical contact. When the device is under voice mode and the sensor finds the objects close enough and meet some other conditions at the same time, it will do the power reduction. When the call is off or sensor is not working on during the call, the power recovers as usual. The proximity sensor or the power reduction cannot be intentionally or unintentionally turned-off by the users.

7.3.2.2 Power Reduction operation table

The device uses HIMS platform, which offers SAR back off mechanism through reducing a fixed level WiFi power to meet complicated SAR scenarios. This fixed level WiFi power reducing mechanism will set a Max Tx-power that is different with Max Tx-power in NVs dynamically, while complicated SAR scenarios are triggered. IR proximity sensor only works in voice mode, like GSM, WCDMA and LTE. When head is in proximity and is detected by sensor as users take voice services like above, SAR back off for WiFi will be applied immediately. If Base station requests the higher output power above the limit, the power control algorithm inside modem chip will limit the power up to the preset power limit. If base station requests a lower output power less than the limit, the out power is controlled by base station. And the out power will below or equal as min. More details information followings:

2G&3G&4G antenna + WiFi antenna simultaneous transmission			
Band/Mode	Power Reduction Level Amount (dB)		
	2G&3G&4G Antenna(Voice) + WiFi +IR Sensor on	VO-WiFi（Voice） + IR Sensor on	Other scenarios
WIFI2.4G	4.5	4.5	0

In user actual scenarios, while proximity sensor is triggered in voice mode, dynamical WiFi power reducing mechanism will set a lower WiFi Tx-power to make SAR back off immediately. Then if proximity sensor is away, WiFi proximity sensor power reducing mechanism will recover WiFi Tx-power that sets in NVs, now WiFi out power recovery to normal.

WiFi sensor power reducing mechanism need detect the WiFi connect state to make sure if it is necessary to set WiFi Tx-power back-off. In test lab environment, the Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools per KDB248227. As Wi-Fi works in non signaling mode, so the reducing mechanism can not detect WiFi connect state. In order to validate the power change before and after sensor power reduction in WiFi non signaling mode, a specific external test software and chipset based internal test modes are used in sensor triggering power measurement validationtests.
In the sensor triggering power measurementtests, chipset based internal test modes enable proximity sensor logic in WiFi non signaling mode by the following steps:

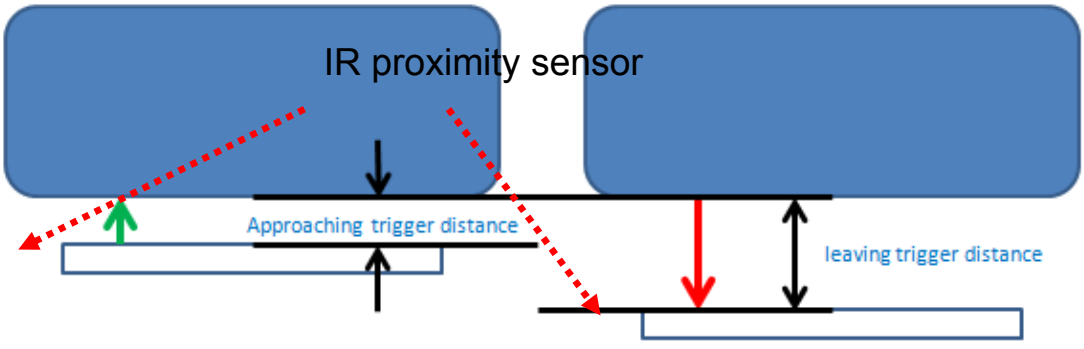
1) The first step,push the files into test device and restar the phone
2) The second step, send continuous non signaling frames from the test phone，make a call and cover the proximity sensor, then test the power

In the sensor triggering power measurement tests, WiFi power controlling logic for WiFi non signaling mode is the same as WiFi signaling mode. The Specific external test software and chipset based internal test modes only make sure that proximity sensor logic can be triggered in WiFi non signaling mode, and do not modify any settings in the phone. It can be ensured that the unmodified settings in production units, including maximum output power, amplifier gain and other RF performance or tuning parameters, are used for SAR measurement per KDB248227.

7.3.3 proximity sensor coverage, distance and angle

7.3.3.1 Procedures for determining proximity sensor triggering distances

The procedure per KDB 616217 D04§6.2is used to determine the triggering distances. As the proximity sensor locates on the front face of the device and detects objects approaching only from the front side,so triggering distance only need to be checked for the front side of Wi-Fi band when Wi-Fi and 2G&3G&4G main antenna voice mode transmit simultaneously.



Picture: Proximity sensor triggering distances assessment (Front side)

the DUT is moved towards from the flat phantom:

Distance between phantom to DUT in mm	45	40	35	30	25	20	15
Condition of Sensor in the front side of the device(under voice mode)	off	off	off	off	off	on	on

the DUT is moved away from the flat phantom:

Distance between phantom to DUT in mm	75	70	65	60	55	50	45
Condition of Sensor in the front side of the device(under voice mode)	off	off	off	off	off	on	on

Conclusion: The Proximity sensor triggering distance is N mm (about 20-50mm), so it can be ensured that the proximity sensor Power reduction is valid for the Head and body front side exposure condition.

7.3.3.2Procedures for determining antenna and proximity sensor coverage

As the proximity sensor locates on the front face of the device and detects objects approaching only from the front side, so triggering distance only need to be checked for the front side of Wi-Fi band when Wi-Fi and 2G&3G&4G main antenna voice mode transmit simultaneously.

7.3.3.3Procedures for determining device tilt angle influences to proximity sensor triggering

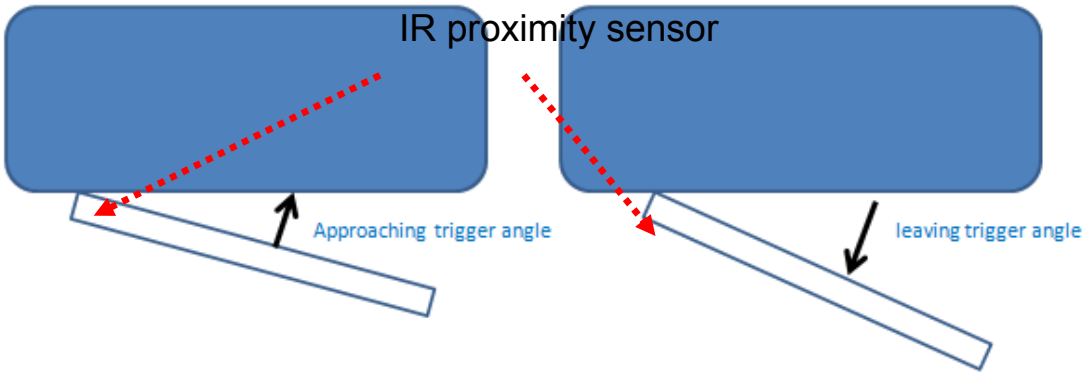
The following procedure is used to determine the triggering angle. Distance need to be check when device under voice mode so that sensor is working.

1）For Body exposure condition, as the proximity sensor triggering power reduction is only applicable for the front side, so tilt angle influences for the other edges does not need to be assessed.

2) For Head exposure condition, device tilt angle influences to proximity sensor triggering is determined as below:

Firstly, the DUT was positioned directly touch the SAM phantom (Left&Right hand touch cheek position) for each band. Rotate the DUT around the ear reference point of the phantom in 5° increments until the DUT is 15° or more away from the touch cheek position at 0°

Then the DUT is positioned at 15° or more away from the touch cheek position and moved towards the phantom in 5°increments until the DUT directly touch the SAM phantom at 0°(Left & Right hand touch cheek position).



The DUT is moved towards and away from SAM phantom.

angle between phantom to DUT in degree	0	5	10	15	20	25	30
Condition of Sensor	on	on	on	on	on	on	on

Based on the validation results above, angle tilt coverage can ensure that the proximity sensor is triggered for all the Head test positions(Left/Right Hand Touched cheek, Left/Right Hand tiled 15 °)

7.3.4 Summary SAR test Plan for Proximity sensor power reduction

To sum up, as the device uses proximity sensor triggering power reduction when Wi-Fi antenna transmits simultaneously with main antenna(Voice mode) in held-to-ear scenarios or body front face scenario, therefore:

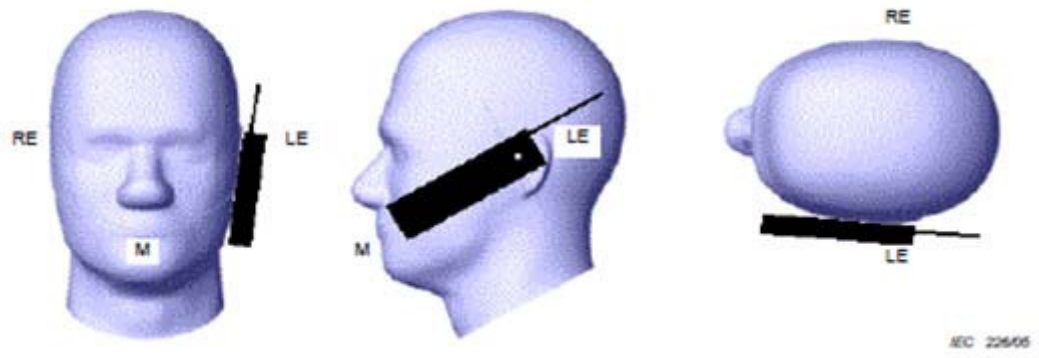
1) For Head SAR compliance: The standalone SAR compliance still uses the standalone SAR results tested at the maximum output power level without any power reduction.AdditionalHead SAR for Wi-Fi antenna is evaluated at reduced power levels when 2G&3G&4G antenna in voice mode and Wi-Fi antennas transmit simultaneously.

2) For Body/**Product Specific 10-g** SAR compliance, the standalone SAR compliance still uses the standalone SAR results tested at the maximum output power level without any power reduction.

7.4 TEST POSITION

7.4.1 Head test configuration

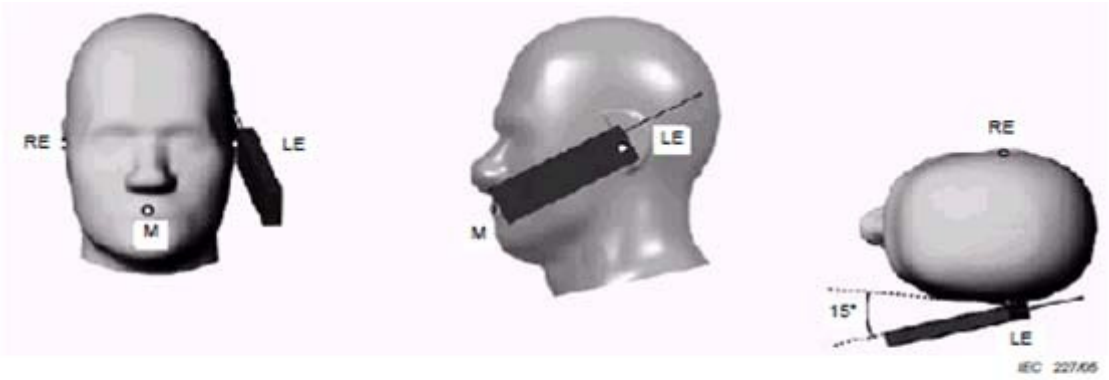
Measurements were made in “cheek” and “tilt” positions on both the left hand and right hand sides of the phantom.



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.

7.4.2 Body-worn test configuration

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. The distance between the device and the phantom was kept 15mm.

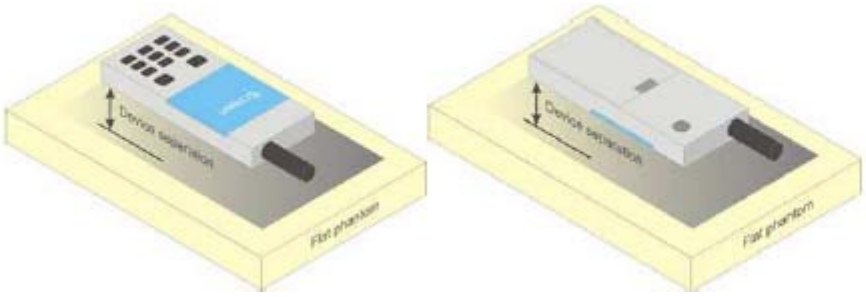


Figure 3 Test positions for body-worn device

7.4.3 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.

7.4.4 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 size of the mobile phone is 158mm (length)X 76.5mm (width), the length of the diagonal is169mm .

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

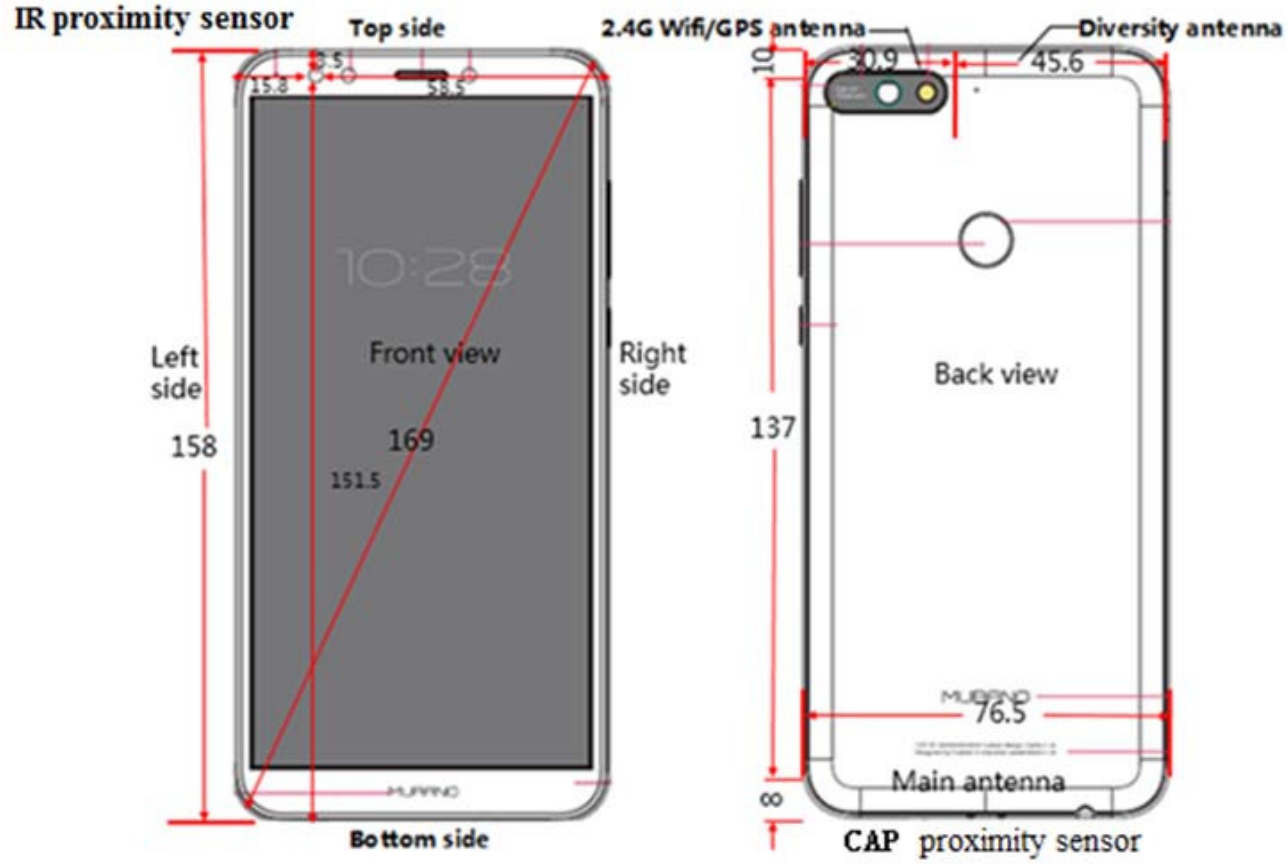


Table 7.2.2 Sides For Hotspot and product specific 10-g SAR Testing

Mode	Front Side	Rear Side	Left Side	Right Side	Top Side	Bottom Side
GSM850/1900	YES	YES	YES	YES	NO	YES
UMTS Band 2/4/5	YES	YES	YES	YES	NO	YES
LTE Band 2/4/5/7	YES	YES	YES	YES	NO	YES
2.4GWiFi	YES	YES	NO	YES	YES	NO

Note: Per KDB 941225 D06, particular DUT edges were not required to be evaluated for Hotspot SAR if the antenna-to-edge distance is greater than 2.5cm.

8.TEST RESULT

8.1CONDUCTED POWER RESULTS

8.1.1CONDUCTED POWER MEASUREMENTS OF GSM850

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)		**34.00**	32.34	**32.37**	32.38	**24.81**	23.15	**23.18**	23.19
GPRS/ EDGE (GMSK)	1 Tx Slot	34.00	32.34	32.37	32.38	24.81	23.15	23.18	23.19
	2 Tx Slots	**31.00**	29.13	**29.14**	29.15	**24.87**	23.00	**23.01**	23.02
	3 Tx Slots	29.00	27.32	27.27	27.25	24.58	22.90	22.85	22.83
	4 Tx Slots	28.00	26.22	26.21	26.21	24.82	23.04	23.03	23.03
EDGE (8PSK)	1 Tx Slot	26.50	24.67	24.60	24.56	17.31	15.48	15.41	15.37
	2 Tx Slots	24.00	22.46	22.51	22.53	17.87	16.33	16.38	16.40
	3 Tx Slots	21.50	20.38	20.37	20.41	17.08	15.96	15.95	15.99
	4 Tx Slots	20.50	19.41	19.45	19.38	17.32	16.23	16.27	16.20

Note:
1) The conducted power of GSM850 is 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) Per KDB941225 D01, the bolded GPRS 2Tx mode was selected for SAR testing according to the highest frame –averaged output power table.
4) 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)

8.1.2CONDUCTED POWER MEASUREMENTS OF GSM1900

1）Conducted power measurement results of GSM1900 (Hotspot off and capacitive sensor off)

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)		**31.00**	29.65	**29.08**	29.23	**21.81**	20.46	**19.89**	20.04
GPRS /EDGE (GMSK)	**1 Tx Slot**	**31.00**	29.65	**29.22**	29.23	**21.81**	20.46	**20.03**	20.04
	2 Tx Slots	27.50	26.71	26.34	26.25	21.37	20.58	20.21	20.12
	3 Tx Slots	25.50	25.24	24.74	24.53	21.08	20.82	20.32	20.11
	4 Tx Slots	24.50	24.42	23.60	23.75	21.32	21.24	20.42	20.57
EDGE (8PSK)	1 Tx Slot	25.50	23.87	23.71	23.73	16.31	14.68	14.52	14.54
	2 Tx Slots	22.50	22.37	21.72	21.81	16.37	16.24	15.59	15.68
	3 Tx Slots	20.50	19.82	19.71	19.62	16.08	15.40	15.29	15.20
	4 Tx Slots	19.50	18.95	18.85	18.87	16.32	15.77	15.67	15.69

Note:
1) The conducted power of GSM1900 is 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) Per KDB941225 D01, the bolded GPRS 1Tx mode was selected for SAR testing according to the highest frame –averaged output power table.
4) 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)

2) Conducted power measurement results of GSM1900 (Hotspot off and capacitive sensor on)

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)		**28.00**	27.05	**26.75**	26.84	**18.81**	17.86	**17.56**	17.65
GPRS /EDGE (GMSK)	**1 Tx Slot**	**28.00**	27.05	**26.75**	26.84	**18.81**	17.86	**17.56**	17.65
	2 Tx Slots	24.50	24.12	23.65	23.74	18.37	17.99	17.52	17.61
	3 Tx Slots	22.50	22.10	21.52	21.61	18.08	17.68	17.10	17.19
	4 Tx Slots	21.50	20.37	19.63	19.78	18.32	17.19	16.45	16.60
EDGE (8PSK)	1 Tx Slot	22.50	22.30	21.77	21.76	13.31	13.11	12.58	12.57
	2 Tx Slots	19.50	18.84	18.69	18.72	13.37	12.71	12.56	12.59
	3 Tx Slots	17.50	16.74	16.63	16.64	13.08	12.32	12.21	12.22
	4 Tx Slots	16.50	14.91	14.83	14.84	13.32	11.73	11.65	11.66

Note:
1) The conducted power of GSM1900 is 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) Per KDB941225 D01, the bolded GPRS 1Tx mode was selected for SAR testing according to the highest frame –averaged output power table.
4) 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)

3) Conducted power measurement results of GSM1900 (Hotspot on)

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)		**28.50**	28.40	**27.87**	27.84	**19.31**	19.21	**18.68**	18.65
GPRS /EDGE (GMSK)	**1 Tx Slot**	**28.50**	28.40	**27.87**	27.84	**19.31**	19.21	**18.68**	18.65
	2 Tx Slots	25.00	24.89	24.90	24.70	18.87	18.76	18.77	18.57
	3 Tx Slots	23.00	22.68	22.64	22.63	18.58	18.26	18.22	18.21
	4 Tx Slots	22.00	21.49	20.58	20.83	18.82	18.31	17.40	17.65
EDGE (8PSK)	1 Tx Slot	23.00	22.98	21.75	21.87	13.81	13.79	12.56	12.68
	2 Tx Slots	20.00	19.56	19.62	19.45	13.87	13.43	13.49	13.32
	3 Tx Slots	18.00	17.81	17.83	17.65	13.58	13.39	13.41	13.23
	4 Tx Slots	17.00	15.81	15.72	15.76	13.82	12.63	12.54	12.58

Note:
1) The conducted power of GSM1900 is 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) Per KDB941225 D01, the bolded GPRS 1Tx mode was selected for SAR testing according to the highest frame –averaged output power table.
4) 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)

8.1.3CONDUCTED POWER MEASUREMENTS OF UMTS Band 2

1）Conducted power measurement results of UMTS Band 2 (Hotspot off and capacitive sensor off)

UMTS Band 2		Tune-up	SAR Conducted Power (dBm)		
			9262CH	9400CH	9538CH
			1852.4	1880	1907.6
WCDMA	AMR Voice	24.50	23.44	23.48	23.47
	12.2kbps RMC	**24.50**	23.44	**23.48**	23.47
	64kbps RMC	24.50	23.38	23.45	23.47
	144kbps RMC	24.50	23.37	23.47	23.47
	384kbps RMC	24.50	23.37	23.46	23.45
HSDPA	Subtest 1	23.50	22.34	22.41	22.47
	Subtest 2	23.50	22.39	22.47	22.48
	Subtest 3	23.00	21.86	22.03	21.98
	Subtest 4	23.00	21.87	21.93	22.00
HSUPA	Subtest 1	23.00	21.94	21.51	21.95
	Subtest 2	22.50	21.14	20.96	21.02
	Subtest 3	22.00	20.78	20.98	20.83
	Subtest 4	23.00	21.86	21.84	21.88
	Subtest 5	23.50	22.22	22.35	22.38
DC-HSDPA	Subtest 1	23.50	22.34	22.41	22.47
	Subtest 2	23.50	22.39	22.47	22.48
	Subtest 3	23.50	21.86	22.03	21.98
	Subtest 4	23.50	21.87	21.93	22.00

Note:
1) The conducted power of UMTS Band 2 is 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.

2) Conducted power measurement results of UMTS Band 2 (Hotspot off and capacitive sensor on)

UMTS Band 2		Tune-up	SAR Conducted Power (dBm)		
			9262CH	9400CH	9538CH
			1852.4	1880	1907.6
WCDMA	AMR Voice	21.00	20.79	20.80	20.82
	12.2kbps RMC	**21.00**	20.79	**20.80**	20.82
	64kbps RMC	21.00	20.70	20.80	20.81
	144kbps RMC	21.00	20.77	20.79	20.89
	384kbps RMC	21.00	20.80	20.78	20.88
HSDPA	Subtest 1	20.00	19.75	19.77	19.81
	Subtest 2	20.00	19.73	19.82	19.87
	Subtest 3	19.50	19.33	19.35	19.47
	Subtest 4	19.50	19.25	19.34	19.48
HSUPA	Subtest 1	19.50	19.45	19.27	19.48
	Subtest 2	19.00	17.95	18.13	18.62
	Subtest 3	18.50	18.02	18.32	18.47
	Subtest 4	19.50	18.56	18.72	19.06
	Subtest 5	20.00	19.66	19.68	19.81
DC-HSDPA	Subtest 1	20.00	19.75	19.77	19.81
	Subtest 2	20.00	19.73	19.82	19.87
	Subtest 3	20.00	19.33	19.35	19.47
	Subtest 4	20.00	19.25	19.34	19.48

Note:
1) The conducted power of UMTS Band 2 is 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) Conducted power measurement results of UMTS Band 2 (Hotspot on)

UMTS Band 2		Tune-up	SAR Conducted Power (dBm)		
			9262CH	9400CH	9538CH
			1852.4	1880	1907.6
WCDMA	AMR Voice	22.00	21.34	21.40	21.37
	12.2kbps RMC	**22.00**	21.34	**21.40**	21.37
	64kbps RMC	22.00	21.33	21.39	21.38
	144kbps RMC	22.00	21.34	21.40	21.37
	384kbps RMC	22.00	21.34	21.40	21.36
HSDPA	Subtest 1	21.00	20.42	20.37	20.39
	Subtest 2	21.00	20.48	20.45	20.45
	Subtest 3	20.50	19.83	19.87	19.91
	Subtest 4	20.50	19.81	19.85	19.89
HSUPA	Subtest 1	20.50	19.67	20.27	19.54
	Subtest 2	20.00	19.92	19.35	19.41
	Subtest 3	19.50	18.58	19.41	19.36
	Subtest 4	20.50	20.34	19.95	20.06
	Subtest 5	21.00	20.38	20.17	20.15
DC-HSDPA	Subtest 1	21.00	20.42	20.37	20.39
	Subtest 2	21.00	20.48	20.45	20.45
	Subtest 3	21.00	19.83	19.87	19.91
	Subtest 4	21.00	19.81	19.85	19.89

Note:
1) The conducted power of UMTS Band 2 is 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.

8.1.4CONDUCTED POWER MEASUREMENTS OF UMTS Band 4

1）Conducted power measurement results of UMTS Band 4 (Hotspot off and capacitive sensor off)

UMTS Band 4		Tune-up	SAR Conducted Power (dBm)		
			1312CH	1413CH	1513CH
			1712.4	1732.6	1752.6
WCDMA	AMR Voice	24.50	23.47	23.58	23.68
	12.2kbps RMC	**24.50**	23.47	**23.58**	23.68
	64kbps RMC	24.50	23.37	23.47	23.65
	144kbps RMC	24.50	23.37	23.47	23.55
	384kbps RMC	24.50	23.45	23.47	23.65
HSDPA	Subtest 1	23.50	22.50	22.56	22.71
	Subtest 2	23.50	22.46	22.57	22.86
	Subtest 3	23.00	21.87	22.07	22.17
	Subtest 4	23.00	21.96	22.07	22.17
HSUPA	Subtest 1	23.00	21.75	21.93	21.74
	Subtest 2	22.50	21.45	21.38	21.68
	Subtest 3	22.00	20.85	20.84	21.21
	Subtest 4	23.00	22.03	22.05	22.23
	Subtest 5	23.50	22.46	22.23	22.56
DC-HSDPA	Subtest 1	23.50	22.50	22.56	22.71
	Subtest 2	23.50	22.46	22.57	22.86
	Subtest 3	23.50	21.87	22.07	22.17
	Subtest 4	23.50	21.96	22.07	22.17

Note:
1) The conducted power of UMTS Band 4 is 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.

2）Conducted power measurement results of UMTS Band 4(Hotspot on or capacitive sensor on)

UMTS Band 4		Tune-up	SAR Conducted Power (dBm)		
			1312CH	1413CH	1513CH
			1712.4	1732.6	1752.6
WCDMA	AMR Voice	21.50	21.21	21.34	21.44
	12.2kbps RMC	**21.50**	21.21	**21.34**	21.44
	64kbps RMC	21.50	21.18	21.32	21.27
	144kbps RMC	21.50	21.27	21.31	21.42
	384kbps RMC	21.50	21.28	21.30	21.32
HSDPA	Subtest 1	20.50	20.40	20.29	20.38
	Subtest 2	20.50	20.24	20.28	20.31
	Subtest 3	20.00	19.68	19.80	19.83
	Subtest 4	20.00	19.67	19.72	19.80
HSUPA	Subtest 1	20.00	19.44	19.31	19.72
	Subtest 2	19.50	18.74	18.42	18.87
	Subtest 3	19.00	18.11	18.24	18.87
	Subtest 4	20.00	19.38	19.46	19.60
	Subtest 5	21.50	19.93	19.88	20.07
DC-HSDPA	Subtest 1	20.50	20.40	20.29	20.38
	Subtest 2	20.50	20.24	20.28	20.31
	Subtest 3	20.50	19.68	19.80	19.83
	Subtest 4	20.50	19.67	19.72	19.80

Note:
1) The conducted power of UMTS Band 4 is 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.

8.1.5CONDUCTED POWER MEASUREMENTS OF UMTS Band 5

UMTS Band 5		Tune-up	SAR Conducted Power (dBm)		
			4132CH	4182CH	4233CH
			826.4	836.4	846.6
WCDMA	AMR Voice	25.00	23.99	24.01	23.97
	12.2kbps RMC	**25.00**	23.99	**24.01**	23.97
	64kbps RMC	25.00	23.90	23.93	23.92
	144kbps RMC	25.00	23.94	23.89	23.79
	384kbps RMC	25.00	23.88	23.91	23.88
HSDPA	Subtest 1	24.00	22.88	22.95	22.93
	Subtest 2	24.00	22.91	22.95	22.94
	Subtest 3	23.50	22.39	22.43	22.42
	Subtest 4	23.50	22.42	22.68	22.47
HSUPA	Subtest 1	24.00	22.10	22.27	22.21
	Subtest 2	23.00	21.88	21.93	21.91
	Subtest 3	23.00	21.65	21.23	21.31
	Subtest 4	23.50	22.18	22.23	21.68
	Subtest 5	24.00	22.52	22.62	22.64
DC-HSDPA	Subtest 1	24.00	22.88	22.95	22.93
	Subtest 2	24.00	22.91	22.95	22.94
	Subtest 3	24.00	22.39	22.43	22.42
	Subtest 4	24.00	22.42	22.68	22.47

Note:
1) The conducted power of UMTS Band 5 is measured with RMS detector.
2) 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.

8.1.6CONDUCTED POWER MEASUREMENTS OF LTE Band 2

1) Conducted power measurement results of LTE Band 2 (Hotspot off and capacitive sensor off)

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18607	18900	19193
					1850.7	1880	1909.3
					MHz	MHz	MHz
2 / 1.4M	QPSK	1	0	24.00	23.62	23.60	23.39
		1	2	24.00	23.68	23.63	23.40
		1	5	24.00	23.66	23.59	23.29
		3	0	24.00	23.54	23.62	23.37
		3	1	24.00	23.68	23.75	23.75
		3	3	24.00	23.70	23.85	23.62
		6	0	23.00	22.69	22.83	22.56
	16QAM	1	0	23.00	22.38	22.79	22.54
		1	2	23.00	22.62	22.92	22.81
		1	5	23.00	22.59	22.81	22.50
		3	0	23.00	22.58	22.55	22.42
		3	1	23.00	22.62	22.58	22.39
		3	3	23.00	22.54	22.58	22.76
		6	0	22.00	21.86	21.50	21.78
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18615	18900	19185
					1851.5	1880	1908.5
					MHz	MHz	MHz
2 / 3M	QPSK	1	0	24.00	23.74	23.72	23.71
		1	7	24.00	23.86	23.70	23.77
		1	14	24.00	23.84	23.58	23.67
		8	0	23.00	22.76	22.71	22.70
		8	3	23.00	22.73	22.73	22.61
		8	7	23.00	22.70	22.82	22.56
		15	0	23.00	22.70	22.80	22.69
	16QAM	1	0	23.00	22.64	22.25	22.52
		1	7	23.00	22.70	22.24	22.82
		1	14	23.00	22.57	22.09	22.31
		8	0	22.00	21.79	21.72	21.54
		8	3	22.00	21.76	21.71	21.37
		8	7	22.00	21.74	21.64	21.32
		15	0	22.00	21.56	21.60	21.53

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18625	18900	19175
					1852.5	1880	1907.5
					MHz	MHz	MHz
2 / 5M	QPSK	1	0	24.00	23.62	23.61	23.48
		1	12	24.00	23.82	23.65	23.47
		1	24	24.00	23.89	23.55	23.56
		12	0	23.00	22.74	22.86	22.75
		12	6	23.00	22.81	22.80	22.74
		12	13	23.00	22.93	22.90	22.68
		25	0	23.00	22.81	22.88	22.70
	16QAM	1	0	23.00	22.17	22.74	22.47
		1	12	23.00	22.10	22.39	22.55
		1	24	23.00	22.26	22.30	22.55
		12	0	22.00	21.81	21.75	21.74
		12	6	22.00	21.78	21.78	21.64
		12	13	22.00	21.81	21.78	21.59
		25	0	22.00	21.90	21.83	21.77
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18650	18900	19150
					1855	1880	1905
					MHz	MHz	MHz
2 / 10M	QPSK	1	0	24.00	23.83	23.77	23.52
		1	24	24.00	23.61	23.77	23.44
		1	49	24.00	23.80	23.28	23.35
		25	0	23.00	22.57	22.76	22.58
		25	12	23.00	22.65	22.72	22.57
		25	25	23.00	22.55	22.66	22.49
		50	0	23.00	22.60	22.72	22.53
	16QAM	1	0	23.00	22.49	22.80	22.67
		1	24	23.00	22.76	22.90	22.50
		1	49	23.00	22.78	21.75	22.54
		25	0	22.00	21.44	21.77	21.70
		25	12	22.00	21.55	21.82	21.69
		25	25	22.00	21.46	21.67	21.60
		50	0	22.00	21.47	21.60	21.56

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18675	18900	19125
					1857.5	1880	1902.5
					MHz	MHz	MHz
2 / 15M	QPSK	1	0	24.00	23.74	23.73	23.41
		1	37	24.00	23.74	23.57	23.35
		1	74	24.00	23.76	23.39	23.31
		36	0	23.00	22.61	22.79	22.65
		36	19	23.00	22.58	22.73	22.54
		36	39	23.00	22.49	22.54	22.41
		75	0	23.00	22.47	22.61	22.58
	16QAM	1	0	23.00	22.71	22.31	22.76
		1	37	23.00	22.66	22.15	22.75
		1	74	23.00	22.42	21.91	22.81
		36	0	22.00	21.49	21.91	21.67
		36	19	22.00	21.66	21.75	21.55
		36	39	22.00	21.58	21.55	21.38
		75	0	22.00	21.55	21.72	21.61
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18700	18900	19100
					1860	1880	1900
					MHz	MHz	MHz
2 / 20M	QPSK	1	0	24.00	23.60	23.78	23.56
		1	50	24.00	**23.87**	**22.80**	**23.91**
		1	99	24.00	23.61	23.57	23.53
		50	0	23.00	22.80	22.82	22.88
		50	25	23.00	22.88	22.87	**22.89**
		50	50	23.00	22.75	22.81	22.67
		100	0	23.00	22.77	22.86	22.77
	16QAM	1	0	23.00	22.42	22.63	22.53
		1	50	23.00	22.90	21.78	22.82
		1	99	23.00	22.39	22.32	22.67
		50	0	22.00	21.84	21.95	21.92
		50	25	22.00	21.86	21.88	21.87
		50	50	22.00	21.78	21.73	21.58
		100	0	22.00	21.82	21.95	21.71

2) Conducted power measurement results of LTE Band 2 (Hotspot off and capacitive sensor on)

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18607	18900	19193
					1850.7	1880	1909.3
					MHz	MHz	MHz
2 / 1.4M	QPSK	1	0	21.00	20.57	20.70	20.30
		1	2	21.00	20.55	20.87	20.54
		1	5	21.00	20.42	20.72	20.56
		3	0	21.00	20.79	20.81	20.60
		3	1	21.00	20.84	20.85	20.52
		3	3	21.00	20.93	20.82	20.45
		6	0	21.00	20.91	20.82	20.48
	16QAM	1	0	21.00	19.97	20.21	20.61
		1	2	21.00	20.09	20.21	20.32
		1	5	21.00	20.29	20.24	20.21
		3	0	21.00	20.65	20.59	20.29
		3	1	21.00	20.59	20.52	20.32
		3	3	21.00	20.55	20.46	20.29
		6	0	21.00	20.60	20.53	20.37
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18615	18900	19185
					1851.5	1880	1908.5
					MHz	MHz	MHz
2 / 3M	QPSK	1	0	21.00	20.71	20.86	20.54
		1	7	21.00	20.87	20.94	20.58
		1	14	21.00	20.80	20.78	20.51
		8	0	21.00	20.60	20.78	20.59
		8	3	21.00	20.67	20.72	20.46
		8	7	21.00	20.69	20.70	20.48
		15	0	21.00	20.64	20.69	20.53
	16QAM	1	0	21.00	20.02	20.03	19.87
		1	7	21.00	20.26	20.13	20.01
		1	14	21.00	19.88	19.97	19.73
		8	0	21.00	20.67	20.54	20.30
		8	3	21.00	20.75	20.64	20.43
		8	7	21.00	20.77	20.65	20.45
		15	0	21.00	20.60	20.64	20.31

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18625	18900	19175
					1852.5	1880	1907.5
					MHz	MHz	MHz
2 / 5M	QPSK	1	0	21.00	20.63	20.64	20.55
		1	12	21.00	20.85	20.83	20.54
		1	24	21.00	20.79	20.66	20.38
		12	0	21.00	20.66	20.70	20.56
		12	6	21.00	20.68	20.65	20.56
		12	13	21.00	20.71	20.53	20.42
		25	0	21.00	20.63	20.61	20.44
	16QAM	1	0	21.00	19.97	20.82	19.85
		1	12	21.00	20.28	20.20	19.96
		1	24	21.00	20.24	19.94	19.84
		12	0	21.00	20.28	20.33	20.24
		12	6	21.00	20.51	20.49	20.31
		12	13	21.00	20.55	20.57	20.13
		25	0	21.00	20.56	20.65	20.36
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18650	18900	19150
					1855	1880	1905
					MHz	MHz	MHz
2 / 10M	QPSK	1	0	21.00	20.82	20.73	20.70
		1	24	21.00	20.96	20.93	20.73
		1	49	21.00	20.69	20.51	20.46
		25	0	21.00	20.78	20.80	20.82
		25	12	21.00	20.87	20.68	20.72
		25	25	21.00	20.81	20.52	20.40
		50	0	21.00	20.65	20.70	20.61
	16QAM	1	0	21.00	20.35	20.76	20.15
		1	24	21.00	20.33	20.41	20.18
		1	49	21.00	20.14	20.02	19.78
		25	0	21.00	20.72	20.69	20.66
		25	12	21.00	20.85	20.88	20.66
		25	25	21.00	20.81	20.62	20.37
		50	0	21.00	20.78	20.64	20.52

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18675	18900	19125
					1857.5	1880	1902.5
					MHz	MHz	MHz
2 / 15M	QPSK	1	0	21.00	20.67	20.76	20.78
		1	37	21.00	20.82	20.77	20.86
		1	74	21.00	20.80	20.61	20.59
		36	0	21.00	20.85	20.83	20.82
		36	19	21.00	20.89	20.68	20.77
		36	39	21.00	20.59	20.55	20.41
		75	0	21.00	20.60	20.64	20.67
	16QAM	1	0	21.00	20.26	20.01	20.82
		1	37	21.00	20.86	20.27	20.15
		1	74	21.00	20.15	20.13	19.45
		36	0	21.00	20.66	20.59	20.62
		36	19	21.00	20.78	20.76	20.63
		36	39	21.00	20.67	20.49	20.47
		75	0	21.00	20.58	20.62	20.67
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18700	18900	19100
					1860	1880	1900
					MHz	MHz	MHz
2 / 20M	QPSK	1	0	21.00	20.67	20.92	20.74
		1	50	21.00	**20.99**	20.96	20.91
		1	99	21.00	20.75	20.68	20.46
		50	0	21.00	20.79	20.63	20.81
		50	25	21.00	**20.83**	20.72	20.73
		50	50	21.00	20.62	20.60	20.46
		100	0	21.00	20.60	20.75	20.58
	16QAM	1	0	21.00	20.74	20.18	20.19
		1	50	21.00	20.26	20.76	20.37
		1	99	21.00	20.12	20.01	19.79
		50	0	21.00	20.58	20.63	20.51
		50	25	21.00	20.84	20.64	20.52
		50	50	21.00	20.74	20.54	20.39
		100	0	21.00	20.60	20.57	20.58

3) Conducted power measurement results of LTE Band 2 (Hotspot on)

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18607	18900	19193
					1850.7	1880	1909.3
					MHz	MHz	MHz
2 / 1.4M	QPSK	1	0	22.50	21.28	21.40	21.31
		1	2	22.50	21.46	21.45	21.35
		1	5	22.50	21.32	21.41	21.26
		3	0	22.50	21.34	21.40	21.42
		3	1	22.50	21.43	21.45	21.46
		3	3	22.50	21.53	21.45	21.46
		6	0	22.50	21.38	21.42	21.34
	16QAM	1	0	22.50	21.31	21.22	21.34
		1	2	22.50	21.42	21.25	21.45
		1	5	22.50	21.24	21.22	21.42
		3	0	22.50	21.17	20.96	21.46
		3	1	22.50	21.37	20.99	21.51
		3	3	22.50	21.39	20.90	21.52
		6	0	22.50	21.45	21.34	21.75
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18615	18900	19185
					1851.5	1880	1908.5
					MHz	MHz	MHz
2 / 3M	QPSK	1	0	22.50	21.30	21.39	21.22
		1	7	22.50	21.53	21.42	21.33
		1	14	22.50	21.34	21.28	21.21
		8	0	22.50	21.21	21.35	21.32
		8	3	22.50	21.27	21.36	21.33
		8	7	22.50	21.25	21.36	21.28
		15	0	22.50	21.24	21.34	21.31
	16QAM	1	0	22.50	21.25	21.74	21.23
		1	7	22.50	21.42	21.01	21.32
		1	14	22.50	21.27	20.86	21.18
		8	0	22.50	21.26	21.42	21.23
		8	3	22.50	21.32	21.52	21.14
		8	7	22.50	21.29	21.42	21.18
		15	0	22.50	21.27	21.39	21.03

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18625	18900	19175
					1852.5	1880	1907.5
					MHz	MHz	MHz
2 / 5M	QPSK	1	0	22.50	21.43	21.28	21.37
		1	12	22.50	21.52	21.32	21.43
		1	24	22.50	21.53	21.19	21.35
		12	0	22.50	21.33	21.44	21.48
		12	6	22.50	21.40	21.38	21.46
		12	13	22.50	21.43	21.48	21.41
		25	0	22.50	21.40	21.46	21.40
	16QAM	1	0	22.50	20.85	21.21	20.96
		1	12	22.50	20.86	21.06	20.93
		1	24	22.50	20.89	20.94	20.84
		12	0	22.50	21.43	21.40	21.31
		12	6	22.50	21.50	21.43	21.39
		12	13	22.50	21.53	21.44	21.33
		25	0	22.50	21.57	21.43	21.35
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18650	18900	19150
					1855	1880	1905
					MHz	MHz	MHz
2 / 10M	QPSK	1	0	22.50	21.51	21.36	21.42
		1	24	22.50	21.72	21.68	21.55
		1	49	22.50	21.40	21.17	21.29
		25	0	22.50	21.33	21.43	21.30
		25	12	22.50	21.34	21.41	21.26
		25	25	22.50	21.25	21.36	21.17
		50	0	22.50	21.31	21.39	21.28
	16QAM	1	0	22.50	21.37	21.70	21.17
		1	24	22.50	21.61	21.85	21.43
		1	49	22.50	21.45	21.69	21.01
		25	0	22.50	21.30	21.62	21.50
		25	12	22.50	21.26	21.61	21.57
		25	25	22.50	21.17	21.45	21.30
		50	0	22.50	21.34	21.38	21.24

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18675	18900	19125
					1857.5	1880	1902.5
					MHz	MHz	MHz
2 / 15M	QPSK	1	0	22.50	21.60	21.28	21.25
		1	37	22.50	21.53	21.36	21.13
		1	74	22.50	21.55	21.06	21.10
		36	0	22.50	21.32	21.06	21.35
		36	19	22.50	21.40	21.43	21.27
		36	39	22.50	21.33	21.25	21.25
		75	0	22.50	21.28	21.33	21.30
	16QAM	1	0	22.50	21.43	21.75	21.35
		1	37	22.50	21.76	21.65	21.78
		1	74	22.50	21.40	21.54	21.25
		36	0	22.50	21.27	21.54	21.47
		36	19	22.50	21.37	21.37	21.22
		36	39	22.50	21.29	21.20	21.06
		75	0	22.50	21.16	21.41	21.30
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					18700	18900	19100
					1860	1880	1900
					MHz	MHz	MHz
2 / 20M	QPSK	1	0	22.50	21.23	21.57	21.37
		1	50	22.50	**21.46**	**21.64**	**21.85**
		1	99	22.50	21.31	21.45	21.27
		50	0	22.50	21.48	21.57	21.59
		50	25	22.50	21.56	21.62	**21.62**
		50	50	22.50	21.44	21.48	21.37
		100	0	22.50	21.45	21.52	21.41
	16QAM	1	0	22.50	21.08	21.51	21.28
		1	50	22.50	21.20	21.55	21.52
		1	99	22.50	20.96	21.20	21.38
		50	0	22.50	21.42	21.55	21.61
		50	25	22.50	21.65	21.53	21.55
		50	50	22.50	21.55	21.39	21.38
		100	0	22.50	21.49	21.58	21.44

8.1.7CONDUCTED POWER MEASUREMENTS OF LTE Band 4

1）Conducted power measurement results of LTE Band 4 (Hotspot off and capacitive sensor off)

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					19957	20175	20393
					1710.7	1732.5	1754.3
					MHz	MHz	MHz
4 / 1.4M	QPSK	1	0	24.00	23.60	23.36	23.29
		1	2	24.00	23.63	23.60	23.35
		1	5	24.00	23.58	23.46	23.22
		3	0	24.00	23.51	23.54	23.45
		3	1	24.00	23.71	23.58	23.63
		3	3	24.00	23.73	23.59	23.68
		6	0	23.00	22.56	22.53	22.47
	16QAM	1	0	23.00	22.51	22.78	22.48
		1	2	23.00	22.74	22.79	22.59
		1	5	23.00	22.51	22.67	22.53
		3	0	23.00	22.61	22.51	22.76
		3	1	23.00	22.55	22.54	22.86
		3	3	23.00	22.37	22.45	22.76
		6	0	22.00	21.59	21.24	21.53
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					19965	20175	20385
					1711.5	1732.5	1753.5
					MHz	MHz	MHz
4 / 3M	QPSK	1	0	24.00	23.93	23.59	23.38
		1	7	24.00	23.95	23.81	23.63
		1	14	24.00	23.47	23.75	23.59
		8	0	23.00	22.61	22.65	22.50
		8	3	23.00	22.66	22.60	22.54
		8	7	23.00	22.54	22.68	22.52
		15	0	23.00	22.63	22.66	22.51
	16QAM	1	0	23.00	22.71	22.96	22.45
		1	7	23.00	22.61	22.87	22.58
		1	14	23.00	22.59	22.81	22.53
		8	0	22.00	21.52	21.61	21.72
		8	3	22.00	21.45	21.75	21.77
		8	7	22.00	21.34	21.73	21.74
		15	0	22.00	21.54	21.59	21.65

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					19975	20175	20375
					1712.5	1732.5	1752.5
					MHz	MHz	MHz
4 / 5M	QPSK	1	0	24.00	23.55	23.44	23.46
		1	12	24.00	23.63	23.25	23.59
		1	24	24.00	23.48	23.16	23.58
		12	0	23.00	22.66	22.61	22.64
		12	6	23.00	22.71	22.66	22.69
		12	13	23.00	22.74	22.66	22.68
		25	0	23.00	22.71	22.63	22.65
	16QAM	1	0	23.00	22.03	22.60	22.31
		1	12	23.00	22.12	22.81	22.26
		1	24	23.00	21.98	22.71	22.29
		12	0	22.00	21.63	21.54	21.46
		12	6	22.00	21.59	21.60	21.50
		12	13	22.00	21.71	21.51	21.50
		25	0	22.00	21.71	21.58	21.38
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20000	20175	20350
					1715	1732.5	1750
					MHz	MHz	MHz
4 / 10M	QPSK	1	0	24.00	23.83	23.62	23.61
		1	24	24.00	23.78	23.94	23.77
		1	49	24.00	23.76	23.54	23.51
		25	0	23.00	22.84	22.69	22.65
		25	12	23.00	22.77	22.68	22.74
		25	25	23.00	22.54	22.57	22.60
		50	0	23.00	22.66	22.54	22.63
	16QAM	1	0	23.00	22.56	22.97	22.39
		1	24	23.00	22.94	22.96	22.72
		1	49	23.00	22.67	22.97	22.76
		25	0	22.00	21.73	21.79	21.91
		25	12	22.00	21.67	21.52	21.91
		25	25	22.00	21.43	21.67	21.68
		50	0	22.00	21.59	21.61	21.65

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20025	20175	20325
					1717.5	1732.5	1747.5
					MHz	MHz	MHz
4 / 15M	QPSK	1	0	24.00	23.93	23.44	23.47
		1	37	24.00	23.68	23.55	23.54
		1	74	24.00	23.77	23.26	23.59
		36	0	23.00	22.72	22.91	22.57
		36	19	23.00	22.64	22.60	22.60
		36	39	23.00	22.58	22.53	22.54
		75	0	23.00	22.59	22.47	22.63
	16QAM	1	0	23.00	22.79	22.12	22.70
		1	37	23.00	22.95	22.34	22.95
		1	74	23.00	22.81	21.86	22.69
		36	0	22.00	21.68	21.86	21.60
		36	19	22.00	21.61	21.55	21.65
		36	39	22.00	21.55	21.48	21.40
		75	0	22.00	21.58	21.51	21.63
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20050	20175	20300
					1720	1732.5	1745
					MHz	MHz	MHz
4 / 20M	QPSK	1	0	24.00	23.29	23.60	23.58
		1	50	24.00	**23.55**	**22.72**	**23.97**
		1	99	24.00	23.32	23.71	23.43
		50	0	23.00	22.66	22.67	22.72
		50	25	23.00	22.75	22.72	**22.76**
		50	50	23.00	22.61	22.52	22.57
		100	0	23.00	22.64	22.56	22.73
	16QAM	1	0	23.00	22.66	22.68	22.51
		1	50	23.00	22.58	21.71	22.28
		1	99	23.00	22.23	22.12	22.56
		50	0	22.00	21.70	21.69	21.77
		50	25	22.00	21.82	21.72	21.55
		50	50	22.00	21.71	21.44	21.43
		100	0	22.00	21.67	21.53	21.59

2) Conducted power measurement results of LTE Band 4 (Hotspot on or capacitive sensor on)

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					19957	20175	20393
					1710.7	1732.5	1754.3
					MHz	MHz	MHz
4 / 1.4M	QPSK	1	0	21.00	20.53	20.41	20.28
		1	2	21.00	20.59	20.53	20.43
		1	5	21.00	20.56	20.42	20.39
		3	0	21.00	20.42	20.25	20.26
		3	1	21.00	20.47	20.42	20.30
		3	3	21.00	20.44	20.33	20.37
		6	0	21.00	20.45	20.28	20.28
	16QAM	1	0	21.00	20.02	20.04	19.82
		1	2	21.00	20.09	20.12	19.92
		1	5	21.00	19.94	19.92	19.94
		3	0	21.00	20.08	20.25	20.15
		3	1	21.00	20.30	20.55	20.20
		3	3	21.00	20.26	20.52	20.65
		6	0	21.00	20.08	20.09	20.28
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					19965	20175	20385
					1711.5	1732.5	1753.5
					MHz	MHz	MHz
4 / 3M	QPSK	1	0	21.00	20.42	20.57	20.03
		1	7	21.00	20.52	20.49	20.19
		1	14	21.00	20.43	20.39	20.23
		8	0	21.00	20.46	20.35	20.23
		8	3	21.00	20.50	20.38	20.25
		8	7	21.00	20.37	20.39	20.13
		15	0	21.00	20.47	20.36	20.14
	16QAM	1	0	21.00	19.84	20.44	20.02
		1	7	21.00	19.98	20.41	19.88
		1	14	21.00	19.91	20.35	19.84
		8	0	21.00	20.48	20.41	20.03
		8	3	21.00	20.58	20.47	20.07
		8	7	21.00	20.49	20.50	20.17
		15	0	21.00	20.23	20.42	20.26

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					19975	20175	20375
					1712.5	1732.5	1752.5
					MHz	MHz	MHz
4 / 5M	QPSK	1	0	21.00	20.29	20.32	20.13
		1	12	21.00	20.48	20.51	20.41
		1	24	21.00	20.37	20.43	20.35
		12	0	21.00	20.44	20.41	20.14
		12	6	21.00	20.34	20.45	20.16
		12	13	21.00	20.32	20.35	20.21
		25	0	21.00	20.30	20.32	20.22
	16QAM	1	0	21.00	19.61	19.91	20.30
		1	12	21.00	19.96	19.97	20.27
		1	24	21.00	19.88	19.94	19.66
		12	0	21.00	20.17	20.05	20.29
		12	6	21.00	20.13	20.22	20.22
		12	13	21.00	20.11	20.09	20.18
		25	0	21.00	20.37	20.35	20.18
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20000	20175	20350
					1715	1732.5	1750
					MHz	MHz	MHz
4 / 10M	QPSK	1	0	21.00	20.43	20.44	20.33
		1	24	21.00	20.57	20.63	20.64
		1	49	21.00	20.28	20.27	20.38
		25	0	21.00	20.49	20.48	20.36
		25	12	21.00	20.46	20.47	20.18
		25	25	21.00	20.38	20.30	20.07
		50	0	21.00	20.43	20.33	20.16
	16QAM	1	0	21.00	20.14	20.75	19.70
		1	24	21.00	19.75	19.85	20.31
		1	49	21.00	19.89	19.34	19.81
		25	0	21.00	20.54	20.31	20.21
		25	12	21.00	20.43	20.33	20.22
		25	25	21.00	20.23	20.24	20.10
		50	0	21.00	20.39	20.27	20.19

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20025	20175	20325
					1717.5	1732.5	1747.5
					MHz	MHz	MHz
4 / 15M	QPSK	1	0	21.00	20.51	20.39	20.51
		1	37	21.00	20.62	20.47	20.53
		1	74	21.00	20.46	20.33	20.21
		36	0	21.00	20.46	20.56	20.38
		36	19	21.00	20.43	20.36	20.18
		36	39	21.00	20.27	20.05	20.18
		75	0	21.00	20.27	20.45	20.15
	16QAM	1	0	21.00	19.95	20.59	20.58
		1	37	21.00	20.08	20.52	19.99
		1	74	21.00	19.49	19.76	19.84
		36	0	21.00	20.32	20.35	20.35
		36	19	21.00	20.49	20.44	20.33
		36	39	21.00	20.32	20.19	20.08
		75	0	21.00	20.32	20.29	20.18
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20050	20175	20300
					1720	1732.5	1745
					MHz	MHz	MHz
4 / 20M	QPSK	1	0	21.00	20.48	20.59	20.52
		1	50	21.00	**20.66**	**20.76**	**20.55**
		1	99	21.00	20.26	20.22	20.23
		50	0	21.00	20.28	20.45	20.47
		50	25	21.00	20.49	**20.52**	20.27
		50	50	21.00	20.41	20.27	20.01
		100	0	21.00	20.42	20.35	20.34
	16QAM	1	0	21.00	19.83	20.03	20.21
		1	50	21.00	19.88	20.61	20.24
		1	99	21.00	19.83	19.75	19.73
		50	0	21.00	20.28	20.37	20.47
		50	25	21.00	20.47	20.44	20.40
		50	50	21.00	20.36	20.31	20.16
		100	0	21.00	20.36	20.49	20.27

8.1.8CONDUCTED POWER MEASUREMENTS OF LTE Band 5

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20407	20525	20643
					824.7	836.5	848.3
					MHz	MHz	MHz
5 / 1.4M	QPSK	1	0	24.50	23.77	23.71	23.71
		1	2	24.50	23.78	23.81	23.81
		1	5	24.50	23.81	23.74	23.60
		3	0	24.50	23.58	23.79	23.78
		3	1	24.50	23.85	23.84	23.96
		3	3	24.50	23.88	23.75	23.91
		6	0	23.50	22.77	22.78	22.81
	16QAM	1	0	23.50	22.60	22.98	22.71
		1	2	23.50	22.79	22.37	22.80
		1	5	23.50	22.69	22.31	22.78
		3	0	23.50	22.73	22.05	23.06
		3	1	23.50	22.70	22.08	23.05
		3	3	23.50	22.73	22.07	23.00
		6	0	22.50	21.73	21.43	21.79
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20415	20525	20635
					825.5	836.5	847.5
					MHz	MHz	MHz
5 / 3M	QPSK	1	0	24.50	23.71	23.80	23.77
		1	7	24.50	23.94	23.83	23.82
		1	14	24.50	23.79	23.89	23.60
		8	0	23.50	22.70	22.93	22.88
		8	3	23.50	22.76	22.82	22.87
		8	7	23.50	22.69	22.75	22.80
		15	0	23.50	22.72	22.79	22.79
	16QAM	1	0	23.50	22.65	22.36	22.83
		1	7	23.50	22.74	22.55	22.83
		1	14	23.50	22.68	22.35	22.74
		8	0	22.50	21.59	21.79	21.98
		8	3	22.50	21.75	21.78	21.74
		8	7	22.50	21.68	21.78	21.79
		15	0	22.50	21.62	21.70	21.64

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20425	20525	20625
					826.5	836.5	846.5
					MHz	MHz	MHz
5 / 5M	QPSK	1	0	24.50	23.59	23.52	23.68
		1	12	24.50	23.79	23.55	23.99
		1	24	24.50	23.72	23.42	23.63
		12	0	23.50	22.74	22.73	22.81
		12	6	23.50	22.76	22.73	22.79
		12	13	23.50	22.78	22.74	22.71
		25	0	23.50	22.67	22.77	22.80
	16QAM	1	0	23.50	21.99	22.23	22.32
		1	12	23.50	22.29	22.26	22.41
		1	24	23.50	22.22	22.23	22.13
		12	0	22.50	21.60	21.52	21.61
		12	6	22.50	21.71	21.61	21.54
		12	13	22.50	21.75	21.56	21.46
		25	0	22.50	21.76	21.66	21.55
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20450	20525	20600
					829	836.5	844
					MHz	MHz	MHz
5 / 10M	QPSK	1	0	24.50	23.77	23.80	23.68
		1	24	24.50	**24.19**	**24.10**	**24.04**
		1	49	24.50	23.87	23.60	23.73
		25	0	23.50	22.75	22.77	22.68
		25	12	23.50	**22.79**	22.78	22.75
		25	25	23.50	22.75	22.72	22.73
		50	0	23.50	22.76	22.78	22.68
	16QAM	1	0	23.50	22.57	22.40	22.52
		1	24	23.50	22.84	23.03	22.77
		1	49	23.50	22.80	22.57	22.80
		25	0	22.50	21.66	21.86	21.82
		25	12	22.50	21.73	21.88	21.90
		25	25	22.50	21.64	21.74	21.71
		50	0	22.50	21.72	21.73	21.58

8.1.9CONDUCTED POWER MEASUREMENTS OF LTE BAND 7

1）Conducted power measurement results of LTE Band 7 (Hotspot off and capacitive sensor off)

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20775	21100	21425
					2502.5	2535	2567.5
					MHz	MHz	MHz
7 / 5M	QPSK	1	0	24.00	23.38	23.31	23.13
		1	12	24.00	23.50	23.43	23.20
		1	24	24.00	23.56	23.36	23.17
		12	0	23.00	22.51	22.40	22.37
		12	6	23.00	22.56	22.48	22.40
		12	13	23.00	22.58	22.48	22.34
		25	0	23.00	22.48	22.45	22.35
	16QAM	1	0	23.00	21.86	22.08	21.81
		1	12	23.00	21.98	22.24	21.95
		1	24	23.00	21.77	22.24	21.87
		12	0	22.00	21.41	21.20	21.36
		12	6	22.00	21.46	21.17	21.31
		12	13	22.00	21.48	21.16	21.33
		25	0	22.00	21.53	21.27	21.18
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20800	21100	21400
					2505	2535	2565
					MHz	MHz	MHz
7 / 10M	QPSK	1	0	24.00	23.54	23.42	23.31
		1	24	24.00	23.83	23.61	23.49
		1	49	24.00	23.44	23.32	23.54
		25	0	23.00	22.49	22.44	22.38
		25	12	23.00	22.67	22.43	22.40
		25	25	23.00	22.47	22.45	22.30
		50	0	23.00	22.52	22.41	22.34
	16QAM	1	0	23.00	22.64	22.32	22.36
		1	24	23.00	22.52	22.34	22.49
		1	49	23.00	22.48	22.10	22.15
		25	0	22.00	21.44	21.53	21.53
		25	12	22.00	21.53	21.40	21.44
		25	25	22.00	21.33	21.54	21.30
		50	0	22.00	21.45	21.47	21.27

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20825	21100	21375
					2507.5	2535	2562.5
					MHz	MHz	MHz
7 / 15M	QPSK	1	0	24.00	23.70	23.28	23.21
		1	37	24.00	23.44	23.43	23.37
		1	74	24.00	23.55	23.22	23.24
		36	0	23.00	22.58	22.43	22.27
		36	19	23.00	22.52	22.45	22.33
		36	39	23.00	22.41	22.33	22.36
		75	0	23.00	22.40	22.42	22.39
	16QAM	1	0	23.00	22.78	22.10	22.72
		1	37	23.00	22.93	22.27	22.90
		1	74	23.00	22.38	22.66	22.34
		36	0	22.00	21.33	21.44	21.30
		36	19	22.00	21.28	21.42	21.29
		36	39	22.00	21.26	21.30	21.15
		75	0	22.00	21.35	21.29	21.29
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20850	21100	21350
					2510	2535	2560
					MHz	MHz	MHz
7 / 20M	QPSK	1	0	24.00	23.32	23.59	23.14
		1	50	24.00	**23.38**	**23.85**	**23.45**
		1	99	24.00	23.11	23.72	23.08
		50	0	23.00	22.45	22.52	22.35
		50	25	23.00	22.55	**22.56**	22.39
		50	50	23.00	22.42	22.41	22.27
		100	0	23.00	22.48	22.48	22.31
	16QAM	1	0	23.00	22.10	21.94	22.29
		1	50	23.00	22.22	22.32	22.24
		1	99	23.00	21.77	22.08	21.73
		50	0	22.00	21.36	21.45	21.25
		50	25	22.00	21.39	21.47	21.35
		50	50	22.00	21.31	21.30	21.16
		100	0	22.00	21.39	21.45	21.24

2) Conducted power measurement results of LTE Band 7 (Hotspot on or capacitive sensor on)

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20775	21100	21425
					2502.5	2535	2567.5
					MHz	MHz	MHz
7 / 5M	QPSK	1	0	21.00	20.33	20.35	20.41
		1	12	21.00	20.67	20.63	20.63
		1	24	21.00	20.29	20.50	20.48
		12	0	21.00	20.51	20.48	20.49
		12	6	21.00	20.80	20.15	20.54
		12	13	21.00	20.40	20.43	20.38
		25	0	21.00	20.50	20.53	20.45
	16QAM	1	0	21.00	20.26	19.95	19.79
		1	12	21.00	20.58	20.16	20.04
		1	24	21.00	19.97	19.96	19.85
		12	0	21.00	20.57	20.14	20.18
		12	6	21.00	20.64	20.42	20.38
		12	13	21.00	20.56	20.17	20.31
		25	0	21.00	20.42	20.35	20.41
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20800	21100	21400
					2505	2535	2565
					MHz	MHz	MHz
7 / 10M	QPSK	1	0	21.00	20.59	20.49	20.51
		1	24	21.00	20.82	20.60	20.69
		1	49	21.00	20.51	20.52	20.57
		25	0	21.00	20.58	20.54	20.64
		25	12	21.00	20.67	20.52	20.62
		25	25	21.00	20.60	20.44	20.47
		50	0	21.00	20.54	20.58	20.49
	16QAM	1	0	21.00	19.78	19.77	19.99
		1	24	21.00	20.71	20.29	20.05
		1	49	21.00	20.08	19.92	19.98
		25	0	21.00	20.43	20.46	20.51
		25	12	21.00	20.49	20.55	20.62
		25	25	21.00	20.37	20.46	20.57
		50	0	21.00	20.59	20.50	20.54

Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20825	21100	21375
					2507.5	2535	2562.5
					MHz	MHz	MHz
7 / 15M	QPSK	1	0	21.00	20.57	20.74	20.63
		1	37	21.00	20.86	20.82	20.85
		1	74	21.00	20.67	20.60	20.62
		36	0	21.00	20.62	20.53	20.60
		36	19	21.00	20.64	20.63	20.57
		36	39	21.00	20.49	20.49	20.58
		75	0	21.00	20.66	20.52	20.55
	16QAM	1	0	21.00	20.02	19.73	20.03
		1	37	21.00	20.17	19.97	20.21
		1	74	21.00	20.12	19.63	19.79
		36	0	21.00	20.54	20.44	20.38
		36	19	21.00	20.58	20.56	20.64
		36	39	21.00	20.46	20.52	20.54
		75	0	21.00	20.52	20.52	20.51
Band / BW	Modulation	RB Sizet	RB Offset	Max. Tune-up Power	Low CH	Mid CH	High CH
					20850	21100	21350
					2510	2535	2560
					MHz	MHz	MHz
7 / 20M	QPSK	1	0	21.00	20.51	20.67	20.44
		1	50	21.00	**20.81**	**20.81**	**20.88**
		1	99	21.00	20.51	20.47	20.58
		50	0	21.00	**20.69**	20.57	20.59
		50	25	21.00	20.56	20.66	20.51
		50	50	21.00	20.47	20.48	20.48
		100	0	21.00	20.49	20.60	20.51
	16QAM	1	0	21.00	20.17	19.61	19.91
		1	50	21.00	20.64	20.12	19.98
		1	99	21.00	20.05	19.63	20.06
		50	0	21.00	20.50	20.30	20.80
		50	25	21.00	20.53	20.50	20.64
		50	50	21.00	20.42	20.52	20.58
		100	0	21.00	20.45	20.52	20.49

8.1.10CONDUCTED POWER MEASUREMENTS OF WiFi 2.4G

1) Full Power measurement result for Sensor Off

Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Power Setting	Tune up	Average Power(dBm)	SAR Test(Yes/No)
802.11b	1	2412	1	17.5	18.50	17.67	No
	6	2437		17.5	**18.50**	**17.87**	Yes
	11	2462		17.5	18.50	17.36	No
802.11g	1	2412	6	14.5	15.50	Not Required	No
	6	2437		17.0	18.00	Not Required	No
	11	2462		17.0	18.00	Not Required	No
802.11n HT20	1	2412	6.5	14.5	15.50	Not Required	No
	6	2437		15.0	16.00	Not Required	No
	11	2462		15.0	16.00	Not Required	No
802.11n HT40	3	2422	13.5	14.5	15.50	Not Required	No
	6	2437		14.5	15.50	Not Required	No
	9	2452		14.5	15.50	Not Required	No

2) Full Power measurement result for Sensor On

Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Power Setting	Tune up	Average Power(dBm)	SAR Test(Yes/No)
802.11b	1	2412	1	13.0	14.00	13.27	No
	6	2437		13.0	**14.00**	**13.52**	Yes
	11	2462		13.0	14.00	12.79	No
802.11g	1	2412	6	13.0	14.00	12.18	No
	6	2437		13.0	14.00	12.85	No
	11	2462		13.0	14.00	12.47	No
802.11n HT20	1	2412	6.5	13.0	14.00	12.13	No
	6	2437		13.0	14.00	12.87	No
	11	2462		13.0	14.00	12.09	No
802.11n HT40	3	2422	13.5	13.0	14.00	12.08	No
	6	2437		13.0	14.00	12.11	No
	9	**2452**		13.0	14.00	12.58	No

Note:

1) The Average conducted power of WiFi 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.

8.1.11CONDUCTED POWER MEASUREMENTS OF BT

BT	Tune Up	Average Conducted Power (dBm)		
		CH0	CH39	CH78
DH5	10.00	9.69	9.71	8.59
2DH5	10.00	8.35	8.37	7.13
3DH5	10.00	8.34	8.04	6.82

BT	Tune Up	Average Conducted Power (dBm)		
		CH0	CH19	CH39
BLE	3.00	-1.06	-0.97	-1.92

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

8.2SAR 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.

8.2.1SAR MEASUREMENT RESULT OF HEAD

1. Head SAR test results of GSM

Test No.	Band	Mode	Channel	Test Position	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T01	GSM 850	GSM	190	Right Cheek	1	1	34	32.37	0.03	0.161	0.124	0.234
T02	GSM 850	GSM	190	Right Tilted	1	1	34	32.37	0.05	0.128	0.105	0.186
T03	GSM 850	GSM	190	Left Cheek	1	1	34	32.37	0.08	**0.199**	0.151	**0.290**
T04	GSM 850	GSM	190	Left Tilted	1	1	34	32.37	-0.06	0.102	0.085	0.148
T05	GSM 850	GSM	190	Left Cheek	2	1	34	32.37	0.02	0.190	0.145	0.277
T06	GSM 850	GSM	190	Left Cheek	1	2	34	32.37	0.01	0.182	0.140	0.265
T07	GSM 850	GSM	190	Left Cheek	1	3	34	32.37	0	0.182	0.139	0.265
T10	GSM 1900	GSM	661	Right Cheek	1	1	31	29.22	-0.03	0.079	0.049	0.119
T11	GSM 1900	GSM	661	Right Tilted	1	1	31	29.22	0.03	0.045	0.038	0.068
T12	GSM 1900	GSM	661	Left Cheek	1	1	31	29.22	0.01	0.058	0.048	0.087
T13	GSM 1900	GSM	661	Left Tilted	1	1	31	29.22	0.02	0.037	0.030	0.056
T14	GSM 1900	GSM	661	Right Cheek	2	1	31	29.22	-0.08	0.061	0.050	0.092
T15	GSM 1900	GSM	661	Right Cheek	1	2	31	29.22	0	**0.084**	0.053	**0.127**
T16	GSM 1900	GSM	661	Right Cheek	1	3	31	29.22	0.15	0.073	0.051	0.110

2. Head SAR test results of UMTS

Test No.	Band	Mode	Channel	Test Position	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T20	UMTS B2	RMC12.2K	9400	Right Cheek	1	1	24.5	23.48	0	0.225	0.144	0.285
T21	UMTS B2	RMC12.2K	9400	Right Tilted	1	1	24.5	23.48	0.03	0.141	0.091	0.178
T22	UMTS B2	RMC12.2K	9400	Left Cheek	1	1	24.5	23.48	0.01	0.160	0.107	0.202
T23	UMTS B2	RMC12.2K	9400	Left Tilted	1	1	24.5	23.48	-0.06	0.097	0.065	0.123
T24	UMTS B2	RMC12.2K	9400	Right Cheek	2	1	24.5	23.48	0.01	0.228	0.149	0.288
T25	UMTS B2	RMC12.2K	9400	Right Cheek	2	2	24.5	23.48	0.05	**0.243**	0.156	**0.307**
T26	UMTS B2	RMC12.2K	9400	Right Cheek	2	3	24.5	23.48	0.02	0.197	0.130	0.249
T30	UMTS B4	RMC12.2K	1413	Right Cheek	1	1	24.5	23.58	0.08	0.080	0.053	0.099
T31	UMTS B4	RMC12.2K	1413	Right Tilted	1	1	24.5	23.58	-0.06	0.101	0.064	0.125
T32	UMTS B4	RMC12.2K	1413	Left Cheek	1	1	24.5	23.58	0.01	0.144	0.091	0.178
T33	UMTS B4	RMC12.2K	1413	Left Tilted	1	1	24.5	23.58	0.04	0.103	0.064	0.127
T34	UMTS B4	RMC12.2K	1413	Left Cheek	2	1	24.5	23.58	-0.03	0.157	0.096	0.194
T35	UMTS B4	RMC12.2K	1413	Left Cheek	2	2	24.5	23.58	0.04	0.153	0.091	0.189
T36	UMTS B4	RMC12.2K	1413	Left Cheek	2	3	24.5	23.58	0.19	**0.186**	0.115	**0.230**
T40	UMTS B5	RMC12.2K	4182	Right Cheek	1	1	25	24.01	0.05	0.226	0.177	0.284
T41	UMTS B5	RMC12.2K	4182	Right Tilted	1	1	25	24.01	-0.02	0.174	0.014	0.219
T42	UMTS B5	RMC12.2K	4182	Left Cheek	1	1	25	24.01	-0.15	0.234	0.189	0.294
T43	UMTS B5	RMC12.2K	4182	Left Tilted	1	1	25	24.01	0.09	0.167	0.139	0.210
T44	UMTS B5	RMC12.2K	4182	Left Cheek	2	1	25	24.01	-0.1	**0.250**	0.192	**0.314**
T45	UMTS B5	RMC12.2K	4182	Left Cheek	2	2	25	24.01	0.03	0.230	0.180	0.289
T46	UMTS B5	RMC12.2K	4182	Left Cheek	2	3	25	24.01	0.01	0.245	0.190	0.308

3. Head SAR test results of LTE B2

Test No.	Band	Mode	Channel	RB	offset	Test Position	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T51	LTE B2	QPSK20M	19100	1	50	Right Cheek	1	1	24	23.91	-0.05	**0.276**	0.173	**0.282**
T52	LTE B2	QPSK20M	19100	1	50	Right Tilted	1	1	24	23.91	0.03	0.151	0.099	0.154
T53	LTE B2	QPSK20M	19100	1	50	Left Cheek	1	1	24	23.91	0.06	0.190	0.124	0.194
T54	LTE B2	QPSK20M	19100	1	50	Left Tilted	1	1	24	23.91	0.01	0.163	0.103	0.166
T55	LTE B2	QPSK20M	19100	50	25	Right Cheek	1	1	23	22.89	-0.05	0.221	0.137	0.226
T56	LTE B2	QPSK20M	19100	50	25	Right Tilted	1	1	23	22.89	0.09	0.118	0.078	0.121
T57	LTE B2	QPSK20M	19100	50	25	Left Cheek	1	1	23	22.89	0.07	0.143	0.094	0.147
T58	LTE B2	QPSK20M	19100	50	25	Left Tilted	1	1	23	22.89	-0.02	0.130	0.081	0.133
T59	LTE B2	QPSK20M	19100	1	50	Right Cheek	2	1	24	23.91	0.01	0.239	0.151	0.244
T60	LTE B2	QPSK20M	19100	1	50	Right Cheek	1	2	24	23.91	0.06	0.268	0.171	0.273
T61	LTE B2	QPSK20M	19100	1	50	Right Cheek	1	3	24	23.91	0.02	0.238	0.151	0.243

4. Head SAR test results of LTE B4

Test No.	Band	Mode	Channel	RB	offset	Test Position	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T71	LTE B4	QPSK20M	20300	1	50	Right Cheek	1	1	24	23.97	0.03	0.097	0.057	0.098
T72	LTE B4	QPSK20M	20300	1	50	Right Tilted	1	1	24	23.97	0.01	0.109	0.064	0.110
T73	LTE B4	QPSK20M	20300	1	50	Left Cheek	1	1	24	23.97	-0.08	**0.176**	0.102	**0.177**
T74	LTE B4	QPSK20M	20300	1	50	Left Tilted	1	1	24	23.97	-0.06	0.106	0.064	0.107
T75	LTE B4	QPSK20M	20300	50	25	Right Cheek	1	1	23	22.76	0.03	0.081	0.047	0.086
T76	LTE B4	QPSK20M	20300	50	25	Right Tilted	1	1	23	22.76	0.07	0.092	0.054	0.097
T77	LTE B4	QPSK20M	20300	50	25	Left Cheek	1	1	23	22.76	0.01	0.133	0.078	0.141
T78	LTE B4	QPSK20M	20300	50	25	Left Tilted	1	1	23	22.76	-0.05	0.104	0.059	0.110
T79	LTE B4	QPSK20M	20300	1	50	Left Cheek	2	1	24	23.97	0.02	0.156	0.091	0.157
T80	LTE B4	QPSK20M	20300	1	50	Left Cheek	1	2	24	23.97	0.06	0.154	0.090	0.155
T81	LTE B4	QPSK20M	20300	1	50	Left Cheek	1	3	24	23.97	0.07	0.154	0.090	0.155

5. Head SAR test results of LTE B5

Test No.	Band	Mode	Channel	RB	offset	Test Position	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T91	LTE B5	QPSK10M	20450	1	24	Right Cheek	1	1	24.5	24.19	-0.07	**0.226**	0.173	**0.243**
T92	LTE B5	QPSK10M	20450	1	24	Right Tilted	1	1	24.5	24.19	0.14	0.157	0.130	0.169
T93	LTE B5	QPSK10M	20450	1	24	Left Cheek	1	1	24.5	24.19	0.06	0.221	0.170	0.237
T94	LTE B5	QPSK10M	20450	1	24	Left Tilted	1	1	24.5	24.19	-0.03	0.157	0.129	0.169
T95	LTE B5	QPSK10M	20450	25	12	Right Cheek	1	1	23.5	22.79	-0.07	0.170	0.133	0.200
T96	LTE B5	QPSK10M	20450	25	12	Right Tilted	1	1	23.5	22.79	0.01	0.138	0.114	0.163
T97	LTE B5	QPSK10M	20450	25	12	Left Cheek	1	1	23.5	22.79	0.05	0.194	0.148	0.229
T98	LTE B5	QPSK10M	20450	25	12	Left Tilted	1	1	23.5	22.79	0.01	0.120	0.097	0.141
T99	LTE B5	QPSK10M	20450	1	24	Right Cheek	2	1	24.5	24.19	0	0.225	0.173	0.242
T100	LTE B5	QPSK10M	20450	1	24	Right Cheek	1	2	24.5	24.19	0.06	0.208	0.160	0.223
T101	LTE B5	QPSK10M	20450	1	24	Right Cheek	1	3	24.5	24.19	0.01	0.218	0.167	0.234

6. Head SAR test results of LTE B7

Test No.	Band	Mode	Channel	RB	offset	Test Position	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T111	LTE B7	QPSK20M	21100	1	50	Right Cheek	1	1	24	23.85	0.05	0.044	0.026	0.046
T112	LTE B7	QPSK20M	21100	1	50	Right Tilted	1	1	24	23.85	0.03	0.033	0.015	0.034
T113	LTE B7	QPSK20M	21100	1	50	Left Cheek	1	1	24	23.85	0.06	**0.079**	0.034	**0.082**
T114	LTE B7	QPSK20M	21100	1	50	Left Tilted	1	1	24	23.85	0.07	0.021	0.011	0.022
T115	LTE B7	QPSK20M	21100	50	25	Right Cheek	1	1	23	22.56	0	0.031	0.020	0.034
T116	LTE B7	QPSK20M	21100	50	25	Right Tilted	1	1	23	22.56	0	0.000	0.000	0.000
T117	LTE B7	QPSK20M	21100	50	25	Left Cheek	1	1	23	22.56	0.02	0.064	0.034	0.071
T118	LTE B7	QPSK20M	21100	50	25	Left Tilted	1	1	23	22.56	0	0.017	0.009	0.019
T119	LTE B7	QPSK20M	21100	1	50	Left Cheek	2	1	24	23.85	0.08	0.067	0.029	0.069
T120	LTE B7	QPSK20M	21100	1	50	Left Cheek	1	2	24	23.85	-0.03	0.072	0.031	0.075
T121	LTE B7	QPSK20M	21100	1	50	Left Cheek	1	3	24	23.85	-0.05	0.078	0.032	0.081

7. Head SAR test results of WIFI

Test No.	Band	Channel	Test Position	Battery	Data Rate	Power Setting	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T150	802.11b	6	Right Cheek	1	1	13	14.00	13.52	0.06	0.176	0.076	0.197
T151	802.11b	6	Right Tilted	1	1	13	14.00	13.52	0.01	0.274	0.107	0.306
T152	802.11b	6	Left Cheek	1	1	13	14.00	13.52	-0.03	0.300	0.115	0.335
T153	802.11b	6	Left Tilted	1	1	13	14.00	13.52	-0.04	0.365	0.149	0.408
T156	802.11b	6	Left Tilted	2	1	13	14.00	13.52	0.05	0.308	0.117	0.344
T157	802.11b	6	Left Tilted	3	1	13	14.00	13.52	-0.01	**0.437**	0.176	**0.488**

8. Head SAR test results of BT

Test No.	Band	Channel	Test Position	Battery	Data Rate	Power Setting	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T600	BT DH5	39	Right Cheek	1	1	-	10.00	9.71	0.04	0.039	0.019	0.042
T601	BT DH5	39	Right Tilted	1	1	-	10.00	9.71	0.01	0.048	0.020	0.051
T602	BT DH5	39	Left Cheek	1	1	-	10.00	9.71	0.07	0.065	0.026	0.069
T603	BT DH5	39	Left Tilted	1	1	-	10.00	9.71	-0.02	**0.076**	0.030	**0.081**
T606	BT DH5	39	Left Tilted	2	1	-	10.00	9.71	0.03	0.071	0.029	0.076
T607	BT DH5	39	Left Tilted	3	1	-	10.00	9.71	0.02	0.067	0.028	0.072

8.2.2SAR MEASUREMENT RESULT OF BODY-WORN

1. Body-worn SAR test results of GSM

Test No.	Band	Mode	Channel	Test Position (with 15mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T161	GSM 850	GSM	190	Front Face	-	1	1	34	32.37	0.02	0.254	0.206	0.370
T162	GSM 850	GSM	190	Rear Face	-	1	1	34	32.37	-0.03	**0.331**	0.259	**0.482**
T165	GSM 850	GSM	190	Rear Face	-	2	1	34	32.37	0.03	0.320	0.255	0.466
T166	GSM 850	GSM	190	Rear Face	-	1	2	34	32.37	0.14	0.310	0.253	0.451
T167	GSM 850	GSM	190	Rear Face	-	1	3	34	32.37	-0.02	0.325	0.261	0.473
T191	GSM 1900	GSM	661	Front Face	-	1	1	31	29.22	0.03	0.094	0.050	0.142
T192	GSM 1900	GSM	661	Rear Face	on	1	1	28	26.75	0.01	0.082	0.045	0.109
T195	GSM 1900	GSM	661	Front Face	-	2	1	31	29.22	0.05	0.100	0.052	0.151
T196	GSM 1900	GSM	661	Front Face	-	2	2	31	29.22	0.07	**0.108**	0.059	**0.163**
T197	GSM 1900	GSM	661	Front Face	-	2	3	31	29.22	-0.02	0.094	0.049	0.142

2. Body-worn SAR test results of UMTS

Test No.	Band	Mode	Channel	Test Position (with 15mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T230	UMTS B2	RMC12.2K	9400	Front Face	-	1	1	24.5	23.48	-0.08	**0.315**	0.176	**0.398**
T231	UMTS B2	RMC12.2K	9400	Rear Face	on	1	1	21	20.8	0	0.145	0.078	0.152
T234	UMTS B2	RMC12.2K	9400	Front Face	-	2	1	24.5	23.48	0.02	0.296	0.170	0.374
T235	UMTS B2	RMC12.2K	9400	Front Face	-	1	2	24.5	23.48	0.01	0.252	0.161	0.319
T236	UMTS B2	RMC12.2K	9400	Front Face	-	1	3	24.5	23.48	0.09	0.246	0.156	0.311
T260	UMTS B4	RMC12.2K	1413	Front Face	-	1	1	24.5	23.58	-0.03	0.298	0.183	0.368
T261	UMTS B4	RMC12.2K	1413	Rear Face	on	1	1	21.5	21.34	0.02	0.164	0.105	0.170
T264	UMTS B4	RMC12.2K	1413	Front Face	-	2	1	24.5	23.58	-0.01	**0.316**	0.184	**0.391**
T265	UMTS B4	RMC12.2K	1413	Front Face	-	2	2	24.5	23.58	0.08	0.303	0.182	0.374
T266	UMTS B4	RMC12.2K	1413	Front Face	-	2	3	24.5	23.58	0.01	0.290	0.179	0.358
T290	UMTS B5	RMC12.2K	4182	Front Face	-	1	1	25	24.01	0	0.306	0.201	0.384
T291	UMTS B5	RMC12.2K	4182	Rear Face	-	1	1	25	24.01	0.01	**0.399**	0.310	**0.501**
T294	UMTS B5	RMC12.2K	4182	Rear Face	-	2	1	25	24.01	0.08	0.375	0.267	0.471
T295	UMTS B5	RMC12.2K	4182	Rear Face	-	1	2	25	24.01	0.01	0.386	0.284	0.485
T296	UMTS B5	RMC12.2K	4182	Rear Face	-	1	3	25	24.01	0.05	0.390	0.262	0.490

3. Body-worn SAR test results of LTE B2

Test No.	Band	Mode	CH	RB	offset	Test Position (with 15mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T311	LTE B2	QPSK20M	19100	1	50	Front Face	-	1	1	24	23.91	0.03	0.217	0.129	0.221
T312	LTE B2	QPSK20M	18700	1	50	Rear Face	on	1	1	21	20.99	0.01	0.113	0.066	0.113
T313	LTE B2	QPSK20M	19100	50	25	Front Face	-	1	1	23	22.89	-0.06	0.127	0.077	0.130
T314	LTE B2	QPSK20M	18700	50	25	Rear Face	on	1	1	21	20.83	0.05	0.115	0.068	0.120
T317	LTE B2	QPSK20M	19100	1	50	Front Face	-	2	1	24	23.91	0.04	0.238	0.136	0.243
T318	LTE B2	QPSK20M	19100	1	50	Front Face	-	2	2	24	23.91	-0.12	0.231	0.128	0.236
T319	LTE B2	QPSK20M	19100	1	50	Front Face	-	2	3	24	23.91	-0.16	**0.267**	0.147	**0.272**

4. Body-worn SAR test results of LTE B4

Test No.	Band	Mode	CH	RB	offset	Test Position (with 15mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T371	LTE B4	QPSK20M	20300	1	50	Front Face	-	1	1	24	23.97	-0.08	**0.286**	0.168	**0.288**
T372	LTE B4	QPSK20M	20175	1	50	Rear Face	on	1	1	21	20.76	-0.01	0.223	0.127	0.236
T373	LTE B4	QPSK20M	20300	50	25	Front Face	-	1	1	23	22.76	0.08	0.182	0.108	0.192
T374	LTE B4	QPSK20M	20175	50	25	Rear Face	on	1	1	21	20.52	0	0.195	0.106	0.218
T377	LTE B4	QPSK20M	20300	1	50	Front Face	-	2	1	24	23.97	0.07	0.267	0.159	0.269
T378	LTE B4	QPSK20M	20300	1	50	Front Face	-	1	2	24	23.97	-0.06	0.221	0.132	0.223
T379	LTE B4	QPSK20M	20300	1	50	Front Face	-	1	3	24	23.97	0.04	0.229	0.146	0.231

5. Body-worn SAR test results of LTE B5

Test No.	Band	Mode	CH	RB	offset	Test Position (with 15mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T431	LTE B5	QPSK10M	20450	1	24	Front Face	-	1	1	24.5	24.19	0.01	0.262	0.203	0.281
T432	LTE B5	QPSK10M	20450	1	24	Rear Face	-	1	1	24.5	24.19	0.06	0.329	0.251	0.353
T433	LTE B5	QPSK10M	20450	25	12	Front Face	-	1	1	23.5	22.79	0.02	0.155	0.123	0.183
T434	LTE B5	QPSK10M	20450	25	12	Rear Face	-	1	1	23.5	22.79	-0.08	0.210	0.159	0.248
T435	LTE B5	QPSK10M	20450	1	24	Rear Face	-	2	1	24.5	24.19	-0.04	**0.343**	0.267	**0.368**
T436	LTE B5	QPSK10M	20450	1	24	Rear Face	-	2	2	24.5	24.19	0.04	0.331	0.259	0.355
T437	LTE B5	QPSK10M	20450	1	24	Rear Face	-	2	3	24.5	24.19	0.01	0.314	0.238	0.337

6. Body-worn SAR test results of LTE B7

Test No.	Band	Mode	CH	RB	offset	Test Position (with 15mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T461	LTE B7	QPKS20M	21100	1	50	Front Face	-	1	1	24	23.85	0.06	0.242	0.114	0.251
T462	LTE B7	QPKS20M	21350	1	50	Rear Face	on	1	1	21	20.88	0.01	0.221	0.096	0.227
T463	LTE B7	QPKS20M	21100	50	25	Front Face	-	1	1	23	22.56	0.05	0.160	0.075	0.177
T464	LTE B7	QPKS20M	20850	50	0	Rear Face	on	1	1	21	20.69	-0.05	0.214	0.093	0.230
T467	LTE B7	QPKS20M	21100	1	50	Front Face	-	2	1	24	23.85	-0.01	**0.271**	0.132	**0.281**
T468	LTE B7	QPKS20M	21100	1	50	Front Face	-	2	2	24	23.85	0.04	0.252	0.120	0.261
T469	LTE B7	QPKS20M	21100	1	50	Front Face	-	2	3	24	23.85	0	0.249	0.124	0.258

7. Body-worn SAR test results of WIFI

Test No.	Band	Channel	Test Position (with 15mm)	Battery	Data Rate	Power Setting	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T531	802.11b	6	Front Face	1	1	17.5	18.50	17.87	0.03	0.050	0.030	0.058
T532	802.11b	6	Rear Face	1	1	17.5	18.50	17.87	0.04	0.049	0.028	0.057
T535	802.11b	6	Front Face	2	1	17.5	18.50	17.87	0.01	0.045	0.027	0.052
T536	802.11b	6	Front Face	3	1	17.5	18.50	17.87	0.08	**0.055**	0.032	**0.064**

8.2.3SAR MEASUREMENT RESULT OF HOTSPOT

1. Hotspot SAR test results of GSM

Test No.	Band	Mode	Channel	Test Position (with 10mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T171	GSM 850	GPRS2TX	190	Front Face	-	1	1	31	29.14	0.02	0.160	0.125	0.246
T172	GSM 850	GPRS2TX	190	Rear Face	-	1	1	31	29.14	-0.07	**0.268**	0.206	**0.411**
T173	GSM 850	GPRS2TX	190	Left Side	-	1	1	31	29.14	0.03	0.135	0.099	0.207
T174	GSM 850	GPRS2TX	190	Right Side	-	1	1	31	29.14	0.05	0.116	0.083	0.178
T175	GSM 850	GPRS2TX	190	Bottom Side	-	1	1	31	29.14	-0.06	0.002	0.001	0.003
T178	GSM 850	GPRS2TX	190	Rear Face	-	2	1	31	29.14	0.06	0.254	0.198	0.390
T179	GSM 850	GPRS2TX	190	Rear Face	-	1	2	31	29.14	-0.08	0.244	0.194	0.374
T180	GSM 850	GPRS2TX	190	Rear Face	-	1	3	31	29.14	0.01	0.254	0.186	0.390
T201	GSM 1900	GPRS1TX	661	Front Face	on	1	1	28	26.75	0.06	0.251	0.131	0.335
T202	GSM 1900	GPRS1TX	661	Rear Face	on	1	1	28	26.75	0.05	0.213	0.116	0.284
T203	GSM 1900	GPRS1TX	661	Left Side	-	1	1	28.5	27.87	0.01	0.187	0.105	0.216
T204	GSM 1900	GPRS1TX	661	Right Side	-	1	1	28.5	27.87	-0.03	0.167	0.099	0.193
T205	GSM 1900	GPRS1TX	661	Bottom Side	on	1	1	28	26.75	0.06	**0.291**	0.152	**0.388**
T208	GSM 1900	GPRS1TX	661	Bottom Side	on	2	1	28	26.75	0.01	0.213	0.116	0.284
T209	GSM 1900	GPRS1TX	661	Bottom Side	on	1	2	28	26.75	0.05	0.290	0.143	0.387
T210	GSM 1900	GPRS1TX	661	Bottom Side	on	1	3	28	26.75	-0.01	0.284	0.150	0.379

2. Hotspot SAR test results of UMTS

Test No.	Band	Mode	Channel	Test Position (with 10mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T240	UMTS B2	RMC12.2K	9400	Front Face	on	1	1	21	20.8	-0.02	0.567	0.293	0.594
T241	UMTS B2	RMC12.2K	9400	Rear Face	on	1	1	21	20.8	0.14	0.550	0.282	0.576
T242	UMTS B2	RMC12.2K	9400	Left Side	-	1	1	22	21.4	0.08	0.188	0.110	0.216
T243	UMTS B2	RMC12.2K	9400	Right Side	-	1	1	22	21.4	0.04	0.195	0.116	0.224
T244	UMTS B2	RMC12.2K	9400	Bottom Side	on	1	1	21	20.8	0.09	**0.620**	0.325	**0.649**
T245	UMTS B2	RMC12.2K	9400	Bottom Side	on	2	1	21	20.8	0.03	0.610	0.293	0.639
T246	UMTS B2	RMC12.2K	9400	Bottom Side	on	1	2	21	20.8	0.06	0.612	0.319	0.641
T247	UMTS B2	RMC12.2K	9400	Bottom Side	on	1	3	21	20.8	0.07	0.592	0.312	0.620
T270	UMTS B4	RMC12.2K	1413	Front Face	on	1	1	21.5	21.34	-0.03	0.281	0.151	0.292
T271	UMTS B4	RMC12.2K	1413	Rear Face	on	1	1	21.5	21.34	-0.09	0.451	0.248	0.468
T272	UMTS B4	RMC12.2K	1413	Left Side	-	1	1	21.5	21.34	0.05	0.166	0.089	0.172
T273	UMTS B4	RMC12.2K	1413	Right Side	-	1	1	21.5	21.34	0.01	0.101	0.057	0.105
T274	UMTS B4	RMC12.2K	1413	Bottom Side	on	1	1	21.5	21.34	-0.03	0.552	0.270	0.573
T277	UMTS B4	RMC12.2K	1413	Bottom Side	on	2	1	21.5	21.34	0.05	0.606	0.288	0.629
T278	UMTS B4	RMC12.2K	1413	Bottom Side	on	2	2	21.5	21.34	0.01	0.563	0.273	0.584
T279	UMTS B4	RMC12.2K	1413	Bottom Side	on	2	3	21.5	21.34	0.02	**0.613**	0.318	**0.636**
T300	UMTS B5	RMC12.2K	4182	Front Face	-	1	1	25	24.01	-0.03	0.265	0.211	0.333
T301	UMTS B5	RMC12.2K	4182	Rear Face	-	1	1	25	24.01	-0.07	0.380	0.304	0.477
T302	UMTS B5	RMC12.2K	4182	Left Side	-	1	1	25	24.01	0.03	0.186	0.139	0.234
T303	UMTS B5	RMC12.2K	4182	Right Side	-	1	1	25	24.01	0.05	0.141	0.106	0.177
T304	UMTS B5	RMC12.2K	4182	Bottom Side	-	1	1	25	24.01	0.1	0.006	0.002	0.008
T307	UMTS B5	RMC12.2K	4182	Rear Face	-	2	1	25	24.01	-0.01	**0.417**	0.329	**0.524**
T308	UMTS B5	RMC12.2K	4182	Rear Face	-	2	2	25	24.01	0.02	0.392	0.311	0.492
T309	UMTS B5	RMC12.2K	4182	Rear Face	-	2	3	25	24.01	-0.18	0.403	0.317	0.506

3. Hotspot SAR test results of LTE B2

Test No.	Band	Mode	CH	RB	offset	Test Position (with 10mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T331	LTE B2	QPSK20M	19100	1	50	Front Face	on	1	1	21	20.99	0.03	0.260	0.151	0.261
T332	LTE B2	QPSK20M	19100	1	50	Rear Face	on	1	1	21	20.99	0.05	0.280	0.157	0.281
T333	LTE B2	QPSK20M	19100	1	50	Left Side	-	1	1	22.5	21.85	0.01	0.164	0.094	0.190
T334	LTE B2	QPSK20M	19100	1	50	Right Side	-	1	1	22.5	21.85	-0.06	0.171	0.102	0.198
T335	LTE B2	QPSK20M	19100	1	50	Bottom Side	on	1	1	21	20.99	0.05	0.224	0.112	0.225
T336	LTE B2	QPSK20M	19100	50	25	Front Face	on	1	1	21	20.99	0.07	0.218	0.121	0.219
T337	LTE B2	QPSK20M	19100	50	25	Rear Face	on	1	1	21	20.99	-0.03	0.208	0.116	0.208
T338	LTE B2	QPSK20M	19100	50	25	Left Side	-	1	1	22.5	21.62	0.05	0.103	0.056	0.126
T339	LTE B2	QPSK20M	19100	50	25	Right Side	-	1	1	22.5	21.62	0.04	0.112	0.067	0.137
T340	LTE B2	QPSK20M	19100	50	25	Bottom Side	on	1	1	21	20.83	-0.07	0.183	0.094	0.190
T343	LTE B2	QPSK20M	19100	1	50	Rear Face	on	2	1	21	20.99	-0.11	0.367	0.182	0.368
T344	LTE B2	QPSK20M	19100	1	50	Rear Face	on	2	2	21	20.99	0.07	**0.378**	0.197	**0.379**
T345	LTE B2	QPSK20M	19100	1	50	Rear Face	on	2	3	21	20.99	0.02	0.356	0.178	0.357

4. Hotspot SAR test results of LTE B4

Test No.	Band	Mode	CH	RB	offset	Test Position (with 10mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T391	LTE B4	QPSK20M	20175	1	50	Front Face	on	1	1	21	20.76	-0.05	0.427	0.220	0.451
T392	LTE B4	QPSK20M	20175	1	50	Rear Face	on	1	1	21	20.76	0.01	0.515	0.270	0.544
T393	LTE B4	QPSK20M	20175	1	50	Left Side	-	1	1	21	20.76	0.06	0.190	0.102	0.201
T394	LTE B4	QPSK20M	20175	1	50	Right Side	-	1	1	21	20.76	0.07	0.073	0.039	0.077
T395	LTE B4	QPSK20M	20175	1	50	Bottom Side	on	1	1	21	20.76	0.09	0.563	0.287	0.595
T396	LTE B4	QPSK20M	20175	50	25	Front Face	on	1	1	21	20.52	-0.12	0.417	0.215	0.466
T397	LTE B4	QPSK20M	20175	50	25	Rear Face	on	1	1	21	20.52	0.03	0.497	0.260	0.555
T398	LTE B4	QPSK20M	20175	50	25	Left Side	-	1	1	21	20.52	0.08	0.133	0.070	0.149
T399	LTE B4	QPSK20M	20175	50	25	Right Side	-	1	1	21	20.52	0.01	0.042	0.017	0.047
T400	LTE B4	QPSK20M	20175	50	25	Bottom Side	on	1	1	21	20.52	0.07	**0.571**	0.303	**0.638**
T403	LTE B4	QPSK20M	20175	50	25	Bottom Side	on	2	1	21	20.52	-0.03	0.521	0.250	0.582
T404	LTE B4	QPSK20M	20175	50	25	Bottom Side	on	1	2	21	20.52	0.12	0.533	0.271	0.595
T405	LTE B4	QPSK20M	20175	50	25	Bottom Side	on	1	3	21	20.52	0.02	0.540	0.267	0.603

5. Hotspot SAR test results of LTE B5

Test No.	Band	Mode	CH	RB	offset	Test Position (with 10mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T441	LTE B5	QPSK10M	20450	1	24	Front Face	-	1	1	24.5	24.19	0.05	0.247	0.197	0.265
T442	LTE B5	QPSK10M	20450	1	24	Rear Face	-	1	1	24.5	24.19	-0.01	**0.361**	0.285	**0.388**
T443	LTE B5	QPSK10M	20450	1	24	Left Side	-	1	1	24.5	24.19	0.06	0.184	0.138	0.198
T444	LTE B5	QPSK10M	20450	1	24	Right Side	-	1	1	24.5	24.19	-0.05	0.194	0.146	0.208
T445	LTE B5	QPSK10M	20450	1	24	Bottom Side	-	1	1	24.5	24.19	0.01	0.005	0.003	0.005
T446	LTE B5	QPSK10M	20450	25	12	Front Face	-	1	1	23.5	22.79	0.08	0.146	0.116	0.172
T447	LTE B5	QPSK10M	20450	25	12	Rear Face	-	1	1	23.5	22.79	-0.07	0.212	0.168	0.250
T448	LTE B5	QPSK10M	20450	25	12	Left Side	-	1	1	23.5	22.79	0.05	0.117	0.085	0.138
T449	LTE B5	QPSK10M	20450	25	12	Right Side	-	1	1	23.5	22.79	0.03	0.107	0.082	0.126
T450	LTE B5	QPSK10M	20450	25	12	Bottom Side	-	1	1	23.5	22.79	-0.02	0.005	0.002	0.006
T453	LTE B5	QPSK10M	20450	1	24	Rear Face	-	2	1	24.5	24.19	0.01	0.357	0.282	0.383
T454	LTE B5	QPSK10M	20450	1	24	Rear Face	-	1	2	24.5	24.19	0	0.337	0.265	0.362
T455	LTE B5	QPSK10M	20450	1	24	Rear Face	-	1	3	24.5	24.19	0.02	0.327	0.258	0.351

6. Hotspot SAR test results of LTE B7

Test No.	Band	Mode	CH	RB	offset	Test Position (with 10mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T481	LTE B7	QPSK20M	21350	1	50	Front Face	on	1	1	21	20.88	0.05	0.287	0.133	0.295
T482	LTE B7	QPSK20M	21350	1	50	Rear Face	on	1	1	21	20.88	0.01	0.354	0.156	0.364
T483	LTE B7	QPSK20M	21350	1	50	Left Side	-	1	1	21	20.88	-0.03	0.155	0.086	0.159
T484	LTE B7	QPSK20M	21350	1	50	Right Side	-	1	1	21	20.88	0.05	0.072	0.041	0.074
T485	LTE B7	QPSK20M	21350	1	50	Bottom Side	on	1	1	21	20.88	0.07	**0.487**	0.211	0.501
T486	LTE B7	QPSK20M	20850	50	0	Front Face	on	1	1	21	20.69	0.07	0.264	0.125	0.284
T487	LTE B7	QPSK20M	20850	50	0	Rear Face	on	1	1	21	20.69	0.05	0.332	0.147	0.357
T488	LTE B7	QPSK20M	20850	50	0	Left Side	-	1	1	21	20.69	0	0.092	0.050	0.099
T489	LTE B7	QPSK20M	20850	50	0	Right Side	-	1	1	21	20.69	0.01	0.052	0.025	0.056
T490	LTE B7	QPSK20M	20850	50	0	Bottom Side	on	1	1	21	20.69	0.16	0.485	0.212	**0.521**
T493	LTE B7	QPSK20M	20850	50	0	Bottom Side	on	2	1	21	20.69	0.11	0.436	0.205	0.468
T494	LTE B7	QPSK20M	20850	50	0	Bottom Side	on	1	2	21	20.69	-0.06	0.446	0.205	0.479
T495	LTE B7	QPSK20M	20850	50	0	Bottom Side	on	1	3	21	20.69	0.01	0.406	0.190	0.436

Note: According to 201610 FCC TCB workshop RF exposure slides, when the highest reported SAR of an antenna is ＞1.2W/kg, holder perturbation verification is required for each antenna, using the highest SAR configuration among all applicable frequency bands.

7. Hotspot SAR test results of WIFI

Test No.	Band	Channel	Test Position (with 10mm)	Battery	Data Rate	Power Setting	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T541	802.11b	6	Front Face	1	1	17.5	18.50	17.87	-0.15	0.161	0.067	0.186
T542	802.11b	6	Rear Face	1	1	17.5	18.50	17.87	0.06	0.153	0.061	0.177
T543	802.11b	6	Right Side	1	1	17.5	18.50	17.87	0.01	0.071	0.025	0.082
T544	802.11b	6	Top Side	1	1	17.5	18.50	17.87	-0.09	**0.210**	0.084	**0.243**
T547	802.11b	6	Top Side	2	1	17.5	18.50	17.87	-0.08	0.151	0.058	0.175
T548	802.11b	6	Top Side	3	1	17.5	18.50	17.87	0.03	0.184	0.075	0.213

Note: 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.

8.2.4SAR MEASUREMENT RESULT OF SENSOR OFF(N-1)

1. Sensor off(N-1) SAR test results of GSM & UMTS

Test No.	Band	Mode	Channel	Test Position	Separation Distance (cm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T221	GSM 1900	GPRS1TX	661	Front Face	1.3	off	1	1	31	29.22	0.05	0.125	0.066	0.188
T222	GSM 1900	GPRS1TX	661	Rear Face	2.2	off	1	1	31	29.22	-0.03	0.039	0.021	0.059
T223	GSM 1900	GPRS1TX	661	Bottom Side	1.5	off	1	1	31	29.22	-0.01	**0.159**	0.09	**0.240**
T224	GSM 1900	GPRS1TX	661	Bottom Side	1.5	off	2	1	31	29.22	0.02	0.154	0.081	0.232
T225	GSM 1900	GPRS1TX	661	Bottom Side	1.5	off	1	2	31	29.22	0.01	0.132	0.064	0.199
T226	GSM 1900	GPRS1TX	661	Bottom Side	1.5	off	1	3	31	29.22	0.08	0.147	0.074	0.221
T250	UMTS B2	RMC12.2K	9400	Front Face	1.3	off	1	1	24.5	23.48	-0.06	**0.405**	0.227	**0.512**
T251	UMTS B2	RMC12.2K	9400	Rear Face	2.2	off	1	1	24.5	23.48	0.02	0.125	0.068	0.158
T252	UMTS B2	RMC12.2K	9400	Bottom Side	1.5	off	1	1	24.5	23.48	0.05	0.372	0.212	0.470
T255	UMTS B2	RMC12.2K	9400	Front Face	1.3	off	2	1	24.5	23.48	-0.12	0.398	0.22	0.503
T256	UMTS B2	RMC12.2K	9400	Front Face	1.3	off	1	2	24.5	23.48	0.03	0.401	0.219	0.507
T257	UMTS B2	RMC12.2K	9400	Front Face	1.3	off	1	3	24.5	23.48	0.01	0.394	0.222	0.498
T280	UMTS B4	RMC12.2K	1413	Front Face	1.3	off	1	1	24.5	23.58	-0.02	0.384	0.216	0.475
T281	UMTS B4	RMC12.2K	1413	Rear Face	2.2	off	1	1	24.5	23.58	0	0.219	0.128	0.271
T282	UMTS B4	RMC12.2K	1413	Bottom Side	1.5	off	1	1	24.5	23.58	0.14	**0.535**	0.306	**0.661**
T285	UMTS B4	RMC12.2K	1413	Bottom Side	1.5	off	2	1	24.5	23.58	0.01	0.488	0.293	0.603
T286	UMTS B4	RMC12.2K	1413	Bottom Side	1.5	off	1	2	24.5	23.58	0.05	0.502	0.285	0.620
T287	UMTS B4	RMC12.2K	1413	Bottom Side	1.5	off	1	3	24.5	23.58	-0.03	0.501	0.294	0.619

2. Sensor off(N-1) SAR test results of LTE

Test No.	Band	Mode	CH	RB	offset	Test Position	Separation Distance (cm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 1g SAR
T351	LTE B2	QPSK20M	19100	1	50	Front Face	1.3	off	1	1	24	23.91	0.05	0.314	0.168	0.320
T352	LTE B2	QPSK20M	19100	1	50	Rear Face	2.2	off	1	1	24	23.91	0.01	0.108	0.061	0.110
T353	LTE B2	QPSK20M	19100	1	50	Bottom Side	1.5	off	1	1	24	23.91	0.06	0.219	0.108	0.223
T354	LTE B2	QPSK20M	19100	50	25	Front Face	1.3	off	1	1	23	22.89	0	0.210	0.113	0.215
T355	LTE B2	QPSK20M	19100	50	25	Rear Face	2.2	off	1	1	23	22.89	0.06	0.072	0.040	0.074
T356	LTE B2	QPSK20M	19100	50	25	Bottom Side	1.5	off	1	1	23	22.89	0.08	0.192	0.092	0.197
T359	LTE B2	QPSK20M	19100	1	50	Front Face	1.3	off	2	1	24	23.91	-0.01	0.347	0.179	0.354
T360	LTE B2	QPSK20M	19100	1	50	Front Face	1.3	off	2	2	24	23.91	0.05	0.339	0.183	0.346
T361	LTE B2	QPSK20M	19100	1	50	Front Face	1.3	off	2	3	24	23.91	-0.08	**0.348**	0.190	**0.355**
T411	LTE B4	QPSK20M	20300	1	50	Front Face	1.3	off	1	1	24	23.97	-0.04	**0.365**	0.204	**0.368**
T412	LTE B4	QPSK20M	20300	1	50	Rear Face	2.2	off	1	1	24	23.97	0.05	0.180	0.106	0.181
T413	LTE B4	QPSK20M	20300	1	50	Bottom Side	1.5	off	1	1	24	23.97	0.12	0.331	0.188	0.333
T414	LTE B4	QPSK20M	20300	50	25	Front Face	1.3	off	1	1	23	22.76	0.08	0.322	0.165	0.340
T415	LTE B4	QPSK20M	20300	50	25	Rear Face	2.2	off	1	1	23	22.76	-0.06	0.106	0.063	0.112
T416	LTE B4	QPSK20M	20300	50	25	Bottom Side	1.5	off	1	1	23	22.76	0.08	0.333	0.185	0.352
T419	LTE B4	QPSK20M	20300	1	50	Front Face	1.3	off	2	1	24	23.97	-0.03	0.345	0.187	0.348
T420	LTE B4	QPSK20M	20300	1	50	Front Face	1.3	off	1	2	24	23.97	0.04	0.354	0.179	0.357
T421	LTE B4	QPSK20M	20300	1	50	Front Face	1.3	off	1	3	24	23.97	0.16	0.351	0.188	0.354
T501	LTE B7	QPKS20M	21100	1	50	Front Face	1.3	off	1	1	24	23.85	0.02	0.383	0.176	0.397
T502	LTE B7	QPKS20M	21100	1	50	Rear Face	2.2	off	1	1	24	23.85	0.01	0.189	0.092	0.196
T503	LTE B7	QPKS20M	21100	1	50	Bottom Side	1.5	off	1	1	24	23.85	0.02	**0.528**	0.257	**0.547**
T504	LTE B7	QPKS20M	21100	50	25	Front Face	1.3	off	1	1	23	22.56	-0.08	0.230	0.106	0.255
T505	LTE B7	QPKS20M	21100	50	25	Rear Face	2.2	off	1	1	23	22.56	0.04	0.116	0.055	0.128
T506	LTE B7	QPKS20M	21100	50	25	Bottom Side	1.5	off	1	1	23	22.56	0.01	0.322	0.149	0.356
T509	LTE B7	QPKS20M	21100	1	50	Bottom Side	1.5	off	2	1	24	23.85	0.06	0.507	0.244	0.525
T510	LTE B7	QPKS20M	21100	1	50	Bottom Side	1.5	off	1	2	24	23.85	-0.07	0.456	0.221	0.473
T511	LTE B7	QPKS20M	21100	1	50	Bottom Side	1.5	off	1	3	24	23.85	0.01	0.469	0.218	0.486

8.2.5SAR MEASUREMENT RESULT 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 (with 10mm)	Sensor	SIM	Battery	Tune up(Full power)	Conducted Power (dBm)	Power Drift	SAR 1g	Scaled SAR1g (W/kg)	product specific 10-g SAR Exclusion
T201	GSM 1900	GPRS1TX	661	Front Face	on	1	1	31	26.75	0.06	0.251	0.668	Yes
T202	GSM 1900	GPRS1TX	661	Rear Face	on	1	1	31	26.75	0.05	0.213	0.567	Yes
T203	GSM 1900	GPRS1TX	661	Left Side	-	1	1	31	27.87	0.01	0.187	0.384	Yes
T204	GSM 1900	GPRS1TX	661	Right Side	-	1	1	31	27.87	-0.03	0.167	0.343	Yes
T205	GSM 1900	GPRS1TX	661	Bottom Side	on	1	1	31	26.75	0.06	0.291	0.774	Yes
T208	GSM 1900	GPRS1TX	661	Bottom Side	on	2	1	31	26.75	0.01	0.213	0.567	Yes
T209	GSM 1900	GPRS1TX	661	Bottom Side	on	1	2	31	26.75	0.05	0.290	0.772	Yes
T210	GSM 1900	GPRS1TX	661	Bottom Side	on	1	3	31	26.75	-0.01	0.284	0.756	Yes
T240	UMTS B2	RMC12.2K	9400	Front Face	on	1	1	24.5	20.8	-0.02	0.567	1.329	No
T241	UMTS B2	RMC12.2K	9400	Rear Face	on	1	1	24.5	20.8	0.14	0.550	1.289	No
T242	UMTS B2	RMC12.2K	9400	Left Side	-	1	1	24.5	21.4	0.08	0.188	0.384	Yes
T243	UMTS B2	RMC12.2K	9400	Right Side	-	1	1	24.5	21.4	0.04	0.195	0.398	Yes
T244	UMTS B2	RMC12.2K	9400	Bottom Side	on	1	1	24.5	20.8	0.09	0.620	1.453	No
T245	UMTS B2	RMC12.2K	9400	Bottom Side	on	2	1	24.5	20.8	0.03	0.610	1.430	No
T246	UMTS B2	RMC12.2K	9400	Bottom Side	on	1	2	24.5	20.8	0.06	0.612	1.435	No
T247	UMTS B2	RMC12.2K	9400	Bottom Side	on	1	3	24.5	20.8	0.07	0.592	1.388	No
T270	UMTS B4	RMC12.2K	1413	Front Face	on	1	1	24.5	21.34	-0.03	0.281	0.582	Yes
T271	UMTS B4	RMC12.2K	1413	Rear Face	on	1	1	24.5	21.34	-0.09	0.451	0.934	Yes
T272	UMTS B4	RMC12.2K	1413	Left Side	-	1	1	24.5	21.34	0.05	0.166	0.344	Yes
T273	UMTS B4	RMC12.2K	1413	Right Side	-	1	1	24.5	21.34	0.01	0.101	0.209	Yes
T274	UMTS B4	RMC12.2K	1413	Bottom Side	on	1	1	24.5	21.34	-0.03	0.552	1.143	Yes
T277	UMTS B4	RMC12.2K	1413	Bottom Side	on	2	1	24.5	21.34	0.05	0.606	1.255	No
T278	UMTS B4	RMC12.2K	1413	Bottom Side	on	2	2	24.5	21.34	0.01	0.563	1.165	Yes
T279	UMTS B4	RMC12.2K	1413	Bottom Side	on	2	3	24.5	21.34	0.02	0.613	1.269	No

Test No.	Band	Mode	CH	RB	offset	Test Position (with 10mm)	Sensor	SIM	Battery	Tune up(Full power)	Conducted Power (dBm)	Power Drift	SAR 1g	Scaled SAR1g (W/kg)	product specific 10-g SAR Exclusion
T331	LTE B2	QPSK20M	19100	1	50	Front Face	on	1	1	24	20.99	0.03	0.260	0.520	Yes
T332	LTE B2	QPSK20M	19100	1	50	Rear Face	on	1	1	24	20.99	0.05	0.280	0.560	Yes
T333	LTE B2	QPSK20M	19100	1	50	Left Side	-	1	1	24	21.85	0.01	0.164	0.269	Yes
T334	LTE B2	QPSK20M	19100	1	50	Right Side	-	1	1	24	21.85	-0.06	0.171	0.280	Yes
T335	LTE B2	QPSK20M	19100	1	50	Bottom Side	on	1	1	24	20.99	0.05	0.224	0.448	Yes
T336	LTE B2	QPSK20M	19100	50	25	Front Face	on	1	1	23	20.99	0.07	0.218	0.346	Yes
T337	LTE B2	QPSK20M	19100	50	25	Rear Face	on	1	1	23	20.99	-0.03	0.208	0.330	Yes
T338	LTE B2	QPSK20M	19100	50	25	Left Side	-	1	1	23	21.62	0.05	0.103	0.142	Yes
T339	LTE B2	QPSK20M	19100	50	25	Right Side	-	1	1	23	21.62	0.04	0.112	0.154	Yes
T340	LTE B2	QPSK20M	19100	50	25	Bottom Side	on	1	1	23	20.83	-0.07	0.183	0.302	Yes
T343	LTE B2	QPSK20M	19100	1	50	Rear Face	on	2	1	24	20.99	-0.11	0.367	0.734	Yes
T344	LTE B2	QPSK20M	19100	1	50	Rear Face	on	2	2	24	20.99	0.07	0.378	0.756	Yes
T345	LTE B2	QPSK20M	19100	1	50	Rear Face	on	2	3	24	20.99	0.02	0.356	0.712	Yes
T391	LTE B4	QPSK20M	20175	1	50	Front Face	on	1	1	24	20.76	-0.05	0.427	0.900	Yes
T392	LTE B4	QPSK20M	20175	1	50	Rear Face	on	1	1	24	20.76	0.01	0.515	1.086	Yes
T393	LTE B4	QPSK20M	20175	1	50	Left Side	-	1	1	24	20.76	0.06	0.190	0.401	Yes
T394	LTE B4	QPSK20M	20175	1	50	Right Side	-	1	1	24	20.76	0.07	0.073	0.154	Yes
T395	LTE B4	QPSK20M	20175	1	50	Bottom Side	on	1	1	24	20.76	0.09	0.563	1.187	Yes
T396	LTE B4	QPSK20M	20175	50	25	Front Face	on	1	1	23	20.52	-0.12	0.417	0.738	Yes
T397	LTE B4	QPSK20M	20175	50	25	Rear Face	on	1	1	23	20.52	0.03	0.497	0.880	Yes
T398	LTE B4	QPSK20M	20175	50	25	Left Side	-	1	1	23	20.52	0.08	0.133	0.235	Yes
T399	LTE B4	QPSK20M	20175	50	25	Right Side	-	1	1	23	20.52	0.01	0.042	0.074	Yes
T400	LTE B4	QPSK20M	20175	50	25	Bottom Side	on	1	1	23	20.52	0.07	0.571	1.011	Yes
T403	LTE B4	QPSK20M	20175	50	25	Bottom Side	on	2	1	23	20.52	-0.03	0.521	0.922	Yes
T404	LTE B4	QPSK20M	20175	50	25	Bottom Side	on	1	2	23	20.52	0.12	0.533	0.943	Yes
T405	LTE B4	QPSK20M	20175	50	25	Bottom Side	on	1	3	23	20.52	0.02	0.540	0.956	Yes

Test No.	Band	Mode	CH	RB	offset	Test Position (with 10mm)	Sensor	SIM	Battery	Tune up(Full power)	Conducted Power (dBm)	Power Drift	SAR 1g	Scaled SAR1g (W/kg)	product specific 10-g SAR Exclusion
T481	LTE B7	QPSK20M	21350	1	50	Front Face	on	1	1	24	20.88	0.05	0.287	0.589	Yes
T482	LTE B7	QPSK20M	21350	1	50	Rear Face	on	1	1	24	20.88	0.01	0.354	0.726	Yes
T483	LTE B7	QPSK20M	21350	1	50	Left Side	-	1	1	24	20.88	-0.03	0.155	0.318	Yes
T484	LTE B7	QPSK20M	21350	1	50	Right Side	-	1	1	24	20.88	0.05	0.072	0.148	Yes
T485	LTE B7	QPSK20M	21350	1	50	Bottom Side	on	1	1	24	20.88	0.07	0.487	0.999	Yes
T486	LTE B7	QPSK20M	20850	50	0	Front Face	on	1	1	23	20.69	0.07	0.264	0.449	Yes
T487	LTE B7	QPSK20M	20850	50	0	Rear Face	on	1	1	23	20.69	0.05	0.332	0.565	Yes
T488	LTE B7	QPSK20M	20850	50	0	Left Side	-	1	1	23	20.69	0	0.092	0.157	Yes
T489	LTE B7	QPSK20M	20850	50	0	Right Side	-	1	1	23	20.69	0.01	0.052	0.089	Yes
T490	LTE B7	QPSK20M	20850	50	0	Bottom Side	on	1	1	23	20.69	0.16	0.485	0.826	Yes
T493	LTE B7	QPSK20M	20850	50	0	Bottom Side	on	2	1	23	20.69	0.11	0.436	0.742	Yes
T494	LTE B7	QPSK20M	20850	50	0	Bottom Side	on	1	2	23	20.69	-0.06	0.446	0.759	Yes
T495	LTE B7	QPSK20M	20850	50	0	Bottom Side	on	1	3	23	20.69	0.01	0.406	0.691	Yes

Test No.	Band	Channel	Test Position (with 10mm)	Battery	Data Rate	Power Setting	Tune up(Full power)	Conducted Power (dBm)	Power Drift	SAR 1g	Scaled SAR1g (W/kg)	product specific 10-g SAR Exclusion
T541	802.11b	6	Front Face	1	1	17.5	18.50	17.87	-0.15	0.161	0.186	Yes
T542	802.11b	6	Rear Face	1	1	17.5	18.50	17.87	0.06	0.153	0.177	Yes
T543	802.11b	6	Right Side	1	1	17.5	18.50	17.87	0.01	0.071	0.082	Yes
T544	802.11b	6	Top Side	1	1	17.5	18.50	17.87	-0.09	0.210	0.243	Yes
T547	802.11b	6	Top Side	2	1	17.5	18.50	17.87	-0.08	0.151	0.175	Yes
T548	802.11b	6	Top Side	3	1	17.5	18.50	17.87	0.03	0.184	0.213	Yes

1. Product specific 10-g SAR test results of UMTS B2& UMTS B4

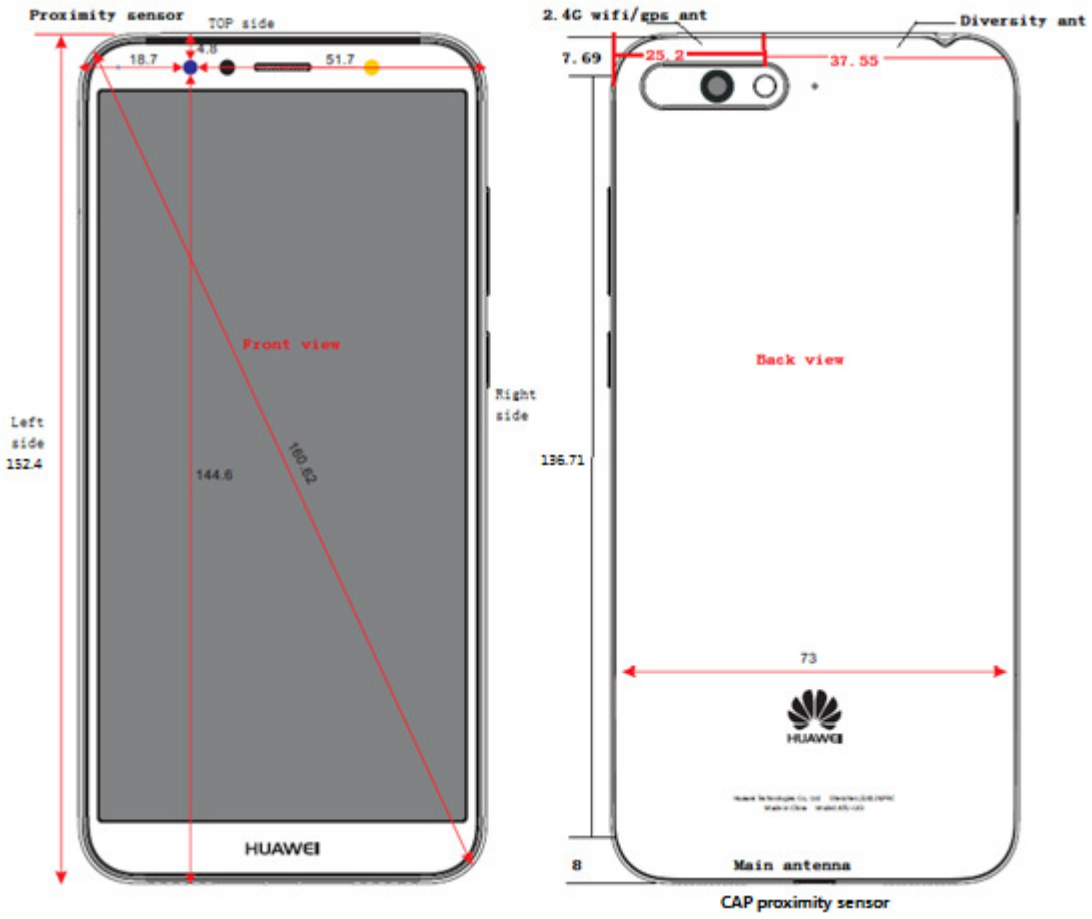
Test No.	Band	Mode	CH	Test Position (with 0mm)	Sensor	SIM	Battery	Maximum Tune-up (dBm)	Conducted Power (dBm)	Power Drift	SAR 1g	SAR 10g	Scaled 10g SAR
T551	UMTS B2	RMC12.2K	9400	Front Face	on	1	1	21	20.8	0.05	2.25	0.994	1.041
T552	UMTS B2	RMC12.2K	9400	Rear Face	on	1	1	21	20.8	-0.07	2.34	1.010	1.058
T553	UMTS B2	RMC12.2K	9400	Bottom Side	on	1	1	21	20.8	0.01	2.23	0.968	1.014
T554	UMTS B2	RMC12.2K	9400	Rear Face	on	2	1	21	20.8	-0.17	2.39	**1.020**	**1.068**
T555	UMTS B2	RMC12.2K	9400	Rear Face	on	2	2	21	20.8	0.03	2.36	1.000	1.047
T556	UMTS B2	RMC12.2K	9400	Rear Face	on	2	3	21	20.8	0.05	2.31	0.998	1.045
T561	UMTS B4	RMC12.2K	1413	Bottom Side	on	1	1	21.5	21.34	0.02	3.33	**1.420**	**1.473**
T562	UMTS B4	RMC12.2K	1413	Bottom Side	on	2	1	21.5	21.34	0.03	3.21	1.370	1.421
T563	UMTS B4	RMC12.2K	1413	Bottom Side	on	1	2	21.5	21.34	0.01	3.15	1.340	1.390
T564	UMTS B4	RMC12.2K	1413	Bottom Side	on	1	3	21.5	21.34	-0.02	3.21	1.320	1.370

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 diagonal of the mobile phone is 160.62mm.

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



Note: 1. The Div Antenna and GPS Antenna does not have the transmit function.
2. The equipment under test(EUT) is a Dual-SIM-Card Mobile Phone. SIM1 and SIM2 both support 2G/3G/LTE.

8.3.1STAND-ALONE SAR TEST EXCLUSION

1. 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

Position		P_{max} (dBm)*	P_{max} (mW)	Distance (mm)	f (GHz)	Calculation Result	SAR Exclusion threshold	SAR test exclusion
Body-Worn		10	10	15	2.48	1.05	3	Yes
Head		10	10	5	2.48	3.15	3	No
product specific 10-g SAR	Front /Rear	10	10	5	2.48	3.15	7.5	Yes

Note:

1)* - maximum possible output power declared by manufacturer

2.For 100 MHz to 6 GHz and test separation distances > 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following (also illustrated in Appendix B):32
1) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)·(f(MHz)/150)]} mW, for 100 MHz to 1500 MHz
2) {[Power allowed at numeric threshold for 50 mm in step a)] + [(test separation distance – 50 mm)·10]} mW, for > 1500 MHz and ≤ 6 GHz

Standalone SAR test exclusion for BT

Position		f(GHz)	Power allowed at numeric Threshold at 50mm	Distance(mm)	Pmax (dBm)*	Pmax (mW)	SAR Exclusion Result	Test Requirement (Yes/No)
product specific 10-g SAR	Bottom	2.480	95.25	144.4	10	10	1039.25	No

.

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) for test separation distances≤50mm

(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) for test separation distances≥50mm

0.4W/Kg for 1g SAR

Estimated SAR calculation for BT

Position		P_{max} (dBm)*	P_{max} (mW)	Distance (mm)	f (GHz)	X	Estimated SAR (W/kg)*
Body-Worn		11	12.59	15	2.48	7.5	0.140
product specific 10-g SAR	Front /Rear	11	12.59	5	2.48	18.75	0.168
	Bottom Side			> 50			0.4

Note: * - maximum possible output power declared by manufacturer

8.3.2STAND-ALONE SAR TEST EXCLUSION

Per FCC KDB 447498D01, 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	Body-worn	Hotspot	Product Specific 10-g (0mm)
1	GSM Voice(Main ant) + BT	Yes	Yes	NA	Yes
2	GSM DATA(Main ant) + BT	N/A	Yes	NA	Yes
3	GSM Voice(Main ant) + WiFi	Yes	Yes	NA	Yes
4	GSM DATA(Main ant) + WiFi	N/A	Yes	Yes	Yes
5	UMTS Voice(Main ant) + BT	Yes	Yes	NA	Yes
6	UMTS Data(Main ant) + BT	N/A	Yes	NA	Yes
7	UMTS Voice(Main ant) + WiFi	Yes	Yes	NA	Yes
8	UMTS Data (Main ant) + WiFi	Yes*	Yes	Yes	Yes
9	LTE(Main ant) + WiFi	Yes*	Yes*	Yes	Yes
10	LTE(Main ant) + BT	Yes*	Yes*	NA	Yes

Note:
i)* VOIP 3rd party applications may possibly be installed and used by the end user.
ii) Wi-Fi 2.4G and Bluetooth share the same antenna and can't transmit simultaneously.
iii) 2G&3G&4G share the same antenna and can't transmit simultaneously.
iv) The device does not support DTM function.
v) Held to ear configurations are not applicable to Bluetooth and therefore were not considered for simultaneous transmission.
vi) The device supports VoLTE function.

8.3.3 SAR SUMMATION SCENARIO

About BT/ WiFi and GSM/UMTS/LTE antenna

Test Position / Reported SAR	Head (1-g SAR)				Body-Worn (1-g SAR)		Hotspot(1-g SAR)						product specific 10-g SAR		
	Right Cheek	Right Tilted	Left Cheek	Left Tilted	Front	Rear	Front	Rear	Left	Right	Top	Bottom	Front	Rear	Bottom
GSM850	0.234	0.186	0.290	0.148	0.370	0.482	0.246	0.411	0.207	0.178	-	0.003	-	-	-
GSM1900	0.127	0.068	0.087	0.056	0.163	0.109	0.335	0.284	0.216	0.193	-	0.388	-	-	-
UMTS B2	0.307	0.178	0.202	0.123	0.398	0.152	0.594	0.576	0.242	0.251	-	0.649	1.041	1.068	1.014
UMTS B4	0.099	0.125	0.230	0.127	0.391	0.170	0.292	0.468	0.172	0.105	-	0.636	-	-	1.473
UMTS B5	0.284	0.219	0.314	0.210	0.384	0.501	0.333	0.524	0.234	0.177	-	0.008	-	-	-
LTE B2	0.282	0.154	0.194	0.166	0.272	0.120	0.261	0.379	0.216	0.224	-	0.225	-	-	-
LTE B4	0.098	0.110	0.177	0.110	0.288	0.236	0.466	0.555	0.201	0.077	-	0.638	-	-	-
LTE B5	0.243	0.169	0.237	0.169	0.281	0.368	0.265	0.388	0.198	0.208	-	0.006	-	-	-
LTE B7	0.046	0.034	0.082	0.022	0.281	0.230	0.295	0.364	0.159	0.074	-	0.521	-	-	-
WiFi 2.4G	0.197	0.306	0.335	0.488	0.064	0.057	0.186	0.177	-	0.082	0.243	-	-	-	-
BT	0.042	0.051	0.069	0.081	0.140	0.140	-	-	-	-	-	-	0.168	0.168	0.400
SUM MAX	0.504	0.525	0.649	0.698	0.538	0.641	**0.780**	0.753	0.242	0.333	0.243	0.649	1.209	1.236	**1.873**

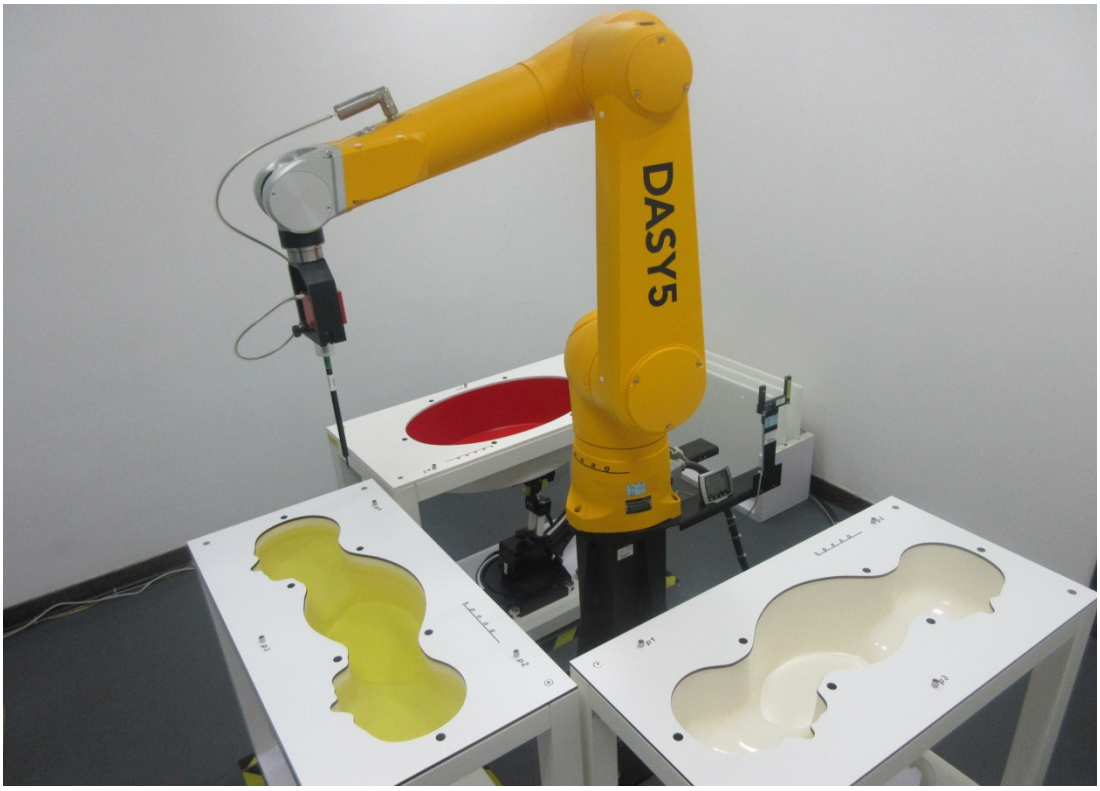
Note: 1.MAX. $\sum SAR_{1g}$ =0.780W/Kg<1.6 W/Kg, so the SAR to peak location separation ratio should not be considered.

2. MAX. $\sum SAR_{10g}$ =1.873W/Kg <4 W/Kg, so the SAR to peak location separation ratio should not be considered.

APPENDIX

1. Test Layout

Specific Absorption Rate Test Layout

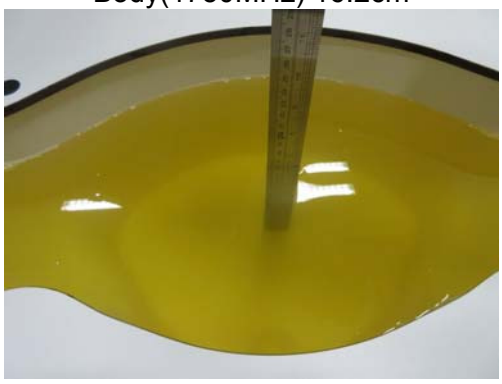


Liquid depth in the flat Phantom (≥15cm depth)

Body(835MHz) 15.8cm

Head(835MHz) 15.8cm

Body(1750MHz) 16.2cm



Head(1750MHz) 15.4cm

Body(1900MHz~3800 MHz) 15.7cm

Head (1900MHz~3800MHz) 15.6cm

Appendix A. SAR Plots of System Verification

(Pls See Appendix A.)

Appendix B. SAR Plots of SAR Measurement

(Pls See Appendix B.)

Appendix C. Calibration Certificate for Probe and Dipole

(Pls See Appendix C.)

Appendix D. Photographs of the Test Set-Up

(Pls See Appendix D.)

End