

FCC SAR Test Report

FCC ID: QISBGO-L03

Project No. : 1608C212
Equipment : HUAWEI MediaPad T2 7.0 (MediaPad T2 7.0 for short)
Model Name : BGO-L03
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 : Aug.26, 2016
Date of Test : Aug.26, 2016~ Sep.08, 2016
Issued Date : Sep.12, 2016
Tested by : BTL Inc.



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REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCC SAR-1-1608C212	Original Issue.	Sep.12, 2016

1. GENERAL SUMMARY

Equipment	HUAWEI MediaPad T2 7.0 (MediaPad T2 7.0 for short)
Model Name	BGO-L03
Brand Name	HUAWEI
Manufacturer	Huawei Technologies Co., Ltd.
Address	Administration Building, Headquarters of Huawei Technologies Co., Ltd., Bantian, Longgang District, Shenzhen, 518129, P.R.C
Standard(s)	FCC 47CFR §2.1093 Radio frequency Radiation Exposure Evaluation: Portable Devices 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 KDB616217 D04 SAR for laptop and tablets v01r02 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 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 KDB648474 D04 Handset SAR v01r03

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.

The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCC SAR-1-1608C212) 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 v01r04,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(0mm) SAR-1g(W/kg)
PCE	GSM850	0.01	1.43
	GSM1900	0.01	1.22
	UMTS Band 2	0.01	1.24
	UMTS Band 4	0.01	1.15
	UMTS Band 5	0.02	1.37
	LTE Band 2	0.01	1.38
	LTE Band 4	0.02	1.06
	LTE Band 5	0.01	1.18
	LTE Band 7	0.01	1.35
	LTE Band 17	0.01	1.04
DTS	2.4G WLAN	1.08	1.43
Note : The highest SAR for head, body and simultaneous transmission exposure conditions are 1.08 W/kg, 1.43 W/kg, and 1.59 W/kg respectively.			

Note:

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/IEEE C95.1:1992, 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.

3.1.1 GENERAL DESCRIPTION OF EUT

Equipment	HUAWEI MediaPad T2 7.0 (MediaPad T2 7.0 for short)		
Model Name	BGO-L03		
S/N	MFQDU16719000051		
IMEI Code	004401727645794		
HW Version	SH1BAGO721LM		
SW Version	BGO-L03C331B002		
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
	FDD-LTE Band 2	1850~1910	1930~1990
	FDD-LTE Band 4	1710~1755	2110~2155
	FDD-LTE Band 5	824~849	869~894
	FDD-LTE Band 7	2500~2570	2620~2690
	FDD-LTE Band 17	704~716	734~746
	Bluetooth	2400 ~2483.5	
	WIFI	2412 ~2462	
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		
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 2/4/5/7/17)		
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)		
	18607-18900-19193(LTE Band 2 BW=1.4MHz)		
	18615-18900-19185(LTE Band 2 BW=3MHz)		
	18625-18900-19175(LTE Band 2 BW=5MHz)		
	18650-18900-19150(LTE Band 2 BW=10MHz)		
	18675-18900-19125(LTE Band 2 BW=15MHz)		
	18700-18900-19100(LTE Band 2 BW=20MHz)		
	19957-20175-20393(LTE Band 4 BW=1.4MHz)		
	19965-20175-20385(LTE Band 4 BW=3MHz)		
	19975-20175-20375(LTE Band 4 BW=5MHz)		
	20000-20175-20350(LTE Band 4 BW=10MHz)		
	20025-20175-20325(LTE Band 4 BW=15MHz)		
	20050-20175-20300(LTE Band 4 BW=20MHz)		

	20407-20525-20643(LTE Band 5 BW=1.4MHz)
	20415-20525-20635(LTE Band 5 BW=3MHz)
	20425-20525-20625(LTE Band 5 BW=5MHz)
	20450-20525-20600(LTE Band 5 BW=10MHz)
	20775-21100-21425(LTE Band 7 BW=5MHz)
	20800-21100-21400(LTE Band 7 BW=10MHz)
	20825-21100-21375(LTE Band 7 BW=15MHz)
	20850-21100-21350(LTE Band 7 BW=20MHz)
	23755-23790-23825 (LTE Band 17 BW=5MHz)
	23780-23790-23800 (LTE Band 17 BW=10MHz)
	1-6 -11 (2.4G WIFI 802.11b/g/n HT20)
Antenna Gain	BT/2.4G WiFi: -0.4dBi
	GSM850/ UMTS/LTE Band 5:-2.05dBi
	GSM1900/ UMTS/LTE Band 2:1.48 dBi
	LTE Band 7:-0.69 dBi
	UMTS/LTE Band 4:0.84 dBi
	LTE Band 17:-5.12 dBi
Other Information	
Battery	Battery Model: HB3G1
	Nominal Voltage:  +3.7
	Charging Voltage:  +4.2
	Rated capacity: 4000mAh
	Manufacturer: Harbin Coslight Power Co.,Ltd.
Earphone	Model name: 22040150
	Manufacturer :
	1. Goer Tek 2. Jiangxi LianchuangHongsheng Electronic Co., LTD. 3. BOLUO COUNTY QUANCHENG ELECTRONIC CO.,LTD

3.2 LABORATORY ENVIRONMENT

Temperature	Min. = 18°C, Max. = 25°C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5Ω
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.	

3.3 MAIN TEST INSTRUMENTS

Item	Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Interval
1	Data Acquisition Electronics	Speag	DAE4	1390	Sep. 18, 2015	1 Year
2	E-field Probe	Speag	EX3DV4	3932	Feb. 19, 2016	1 Year
3	System Validation Dipole	Speag	D750V3	1095	Sep. 30, 2015	3 Years
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 Test set	Agilent	E5515E	MY52111002	Sep. 09, 2015	1 Year
12 *	8960 Series 10 Wireless Com Test set	Agilent	E5515E	MY52111002	Sep. 04, 2016	1 Year
13	CMW500-Wideband Radio Communication Tester	RS	CMW500	152372	Mar. 27, 2016	1 Year
14	CMW500-Wideband Radio Communication Tester	RS	CMW500	153083	May 04, 2016	1 Year
15	Power Amplifier	Mini-Circuits	ZHL-42W+	QA1333003	N/A	N/A
16	ENA Network Analyzer	Agilent	E5071C	MY46102965	Mar. 27, 2016	1 Year
17	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Oct. 11, 2015	1 Year
18	P-series power meter	Agilent	N1911A	MY45100473	Oct. 26, 2015	1 Year
19	wideband power sensor	Agilent	N1921A	MY51100041	Oct. 26, 2015	1 Year
20	power Meter	Anritsu	ML2495A	1128009	Mar. 27, 2016	1 Year
21	Pulse Power Sensor	Anritsu	MA 2411B	1027500	Mar. 27, 2016	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. 16, 2016	1 Year

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

2.* These test equipments have been recalibrated between the test periods. All these test equipments were within the valid period when the tests were performed.

3.

1) Per KDB865664 D01 requirements for dipole calibration, the test laboratory has adopted three-year extended calibration interval. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

- a) There is no physical damage on the dipole;
- b) System check with specific dipole is within 10% of calibrated value;
- c) The most recent return-loss result , measured at least annually, deviates by no more than 20% from the previous measurement;
- d) The most recent measurement of the real or imaginary parts of the impedance, measured at least annually is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a short block performed before measuring liquid parameters.

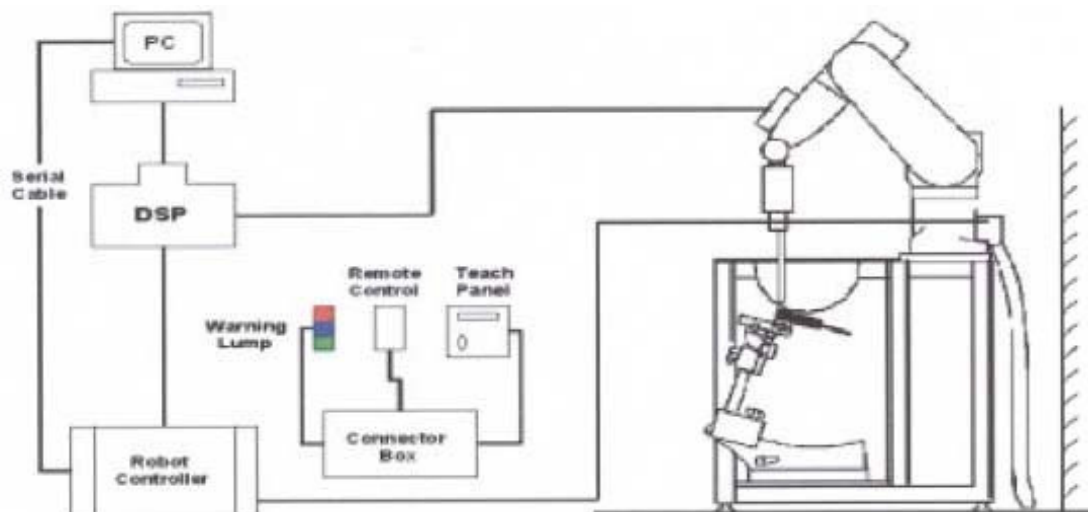
4.SAR MEASUREMENTS SYSTEM CONFIGURATION

4.1SAR 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. The DASY5 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-FIELD PROBE SYSTEM

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

4.2.1 EX3DV4 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 μ W/g to > 100 mW/g Linearity: ± 0.2 dB
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 $\pm 10\%$. The spherical isotropy was evaluated and found to be better than $\pm 0.25\text{dB}$. 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 below 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.

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

Where: Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

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

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

4.2.3 OTHER TEST EQUIPMENT

4.2.3.1. Device Holder for Transmitters

Construction: Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices (e.g., laptops, cameras, etc.) It is light weight and fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI4 and SAM v6.0 Phantoms.

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
Available	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
Available	Special



4.2.4 SCANNING PROCEDURE

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or Body) 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. $\pm 5\%$.

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 $\pm 0.1\text{mm}$). 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 $\pm 30^\circ$.)

- 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 ($\leq 2\text{GHz}$), 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: $\Delta x_{\text{zoom}}, \Delta y_{\text{zoom}} \leq 2\text{GHz} - \leq 8\text{mm}$, 2-4GHz - $\leq 5\text{ mm}$ and 4-6 GHz - $\leq 4\text{mm}$; $\Delta z_{\text{zoom}} \leq 3\text{GHz} - \leq 5\text{ mm}$, 3-4 GHz - $\leq 4\text{mm}$ and 4-6GHz - $\leq 2\text{mm}$ 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 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		
			$\Delta z_{Zoom}(n)$	$\Delta z_{Zoom}(1)^*$	$\Delta z_{Zoom}(n>1)^*$	
$\leq 2\text{GHz}$	$\leq 15\text{mm}$	$\leq 8\text{mm}$	$\leq 5\text{mm}$	$\leq 4\text{mm}$	$\leq 1.5^* \Delta z_{Zoom}(n-1)$	$\geq 30\text{mm}$
2-3GHz	$\leq 12\text{mm}$	$\leq 5\text{mm}$	$\leq 5\text{mm}$	$\leq 4\text{mm}$	$\leq 1.5^* \Delta z_{Zoom}(n-1)$	$\geq 30\text{mm}$
3-4GHz	$\leq 12\text{mm}$	$\leq 5\text{mm}$	$\leq 4\text{mm}$	$\leq 3\text{mm}$	$\leq 1.5^* \Delta z_{Zoom}(n-1)$	$\geq 28\text{mm}$
4-5GHz	$\leq 10\text{mm}$	$\leq 4\text{mm}$	$\leq 3\text{mm}$	$\leq 2.5\text{mm}$	$\leq 1.5^* \Delta z_{Zoom}(n-1)$	$\geq 25\text{mm}$
5-6GHz	$\leq 10\text{mm}$	$\leq 4\text{mm}$	$\leq 2\text{mm}$	$\leq 2\text{mm}$	$\leq 1.5^* \Delta z_{Zoom}(n-1)$	$\geq 22\text{mm}$

4.2.5 SPATIAL PEAK SAR EVALUATION

The spatial peak SAR - value for 1 and 10 g is evaluated after the Cube measurements have been done. The basis of the evaluation 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 compensate boundary effects on E-field probes.

4.2.6 DATA STORAGE AND EVALUATION

4.2.6.1 Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension “.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.

4.2.6.2 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:

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

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

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

a_{ij} = 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):

$$E_{\text{tot}} = (E_x^2 + E_y^2 + E_z^2)^{1/2}$$

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

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

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/cm³

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.

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

With P_{pwe} = equivalent power density of a plane wave in mW/cm²

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 if the dielectric parameters are within the tolerances of the specified target values. The measured conductivity and relative permittivity should be within $\pm 5\%$ of the target values.

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

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

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

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. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Targeted Conductivity (σ)	Targeted Permittivity (ϵ_r)	Deviation Conductivity (σ) (%)	Deviation Permittivity (ϵ_r) (%)	Date
Head	750	22.3	0.897	41.310	0.89	41.9	0.79	-1.41	Sep. 02, 2016
Head	835	22.7	0.875	42.270	0.90	41.5	-2.78	1.86	Aug. 30, 2016
Head	1750	22.4	1.334	40.780	1.37	40.1	-2.63	1.70	Sep. 01, 2016
Head	1900	22.3	1.453	39.720	1.40	40.0	3.79	-0.70	Aug. 27, 2016
Head	2450	22.1	1.838	38.930	1.80	39.2	2.11	-0.69	Sep. 08, 2016
Head	2600	22.3	1.993	37.830	1.96	39.0	1.68	-3.00	Aug. 31, 2016
Body	750	22.4	0.959	56.140	0.96	55.5	-0.10	1.15	Sep. 01, 2016
Body	835	22.4	0.981	57.260	0.97	55.2	1.13	3.73	Aug. 26, 2016
Body	1750	22.3	1.442	54.570	1.49	53.4	-3.22	2.19	Aug. 31, 2016
Body	1900	22.5	1.512	52.960	1.52	53.3	-0.53	-0.64	Aug. 29, 2016
Body	1900	22.1	1.522	52.760	1.52	53.3	0.13	-1.01	Sep. 08, 2016
Body	2450	22.1	1.948	53.240	1.95	52.7	-0.10	1.02	Sep. 08, 2016
Body	2600	22.5	2.166	52.540	2.16	52.5	0.28	0.08	Aug. 29, 2016

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

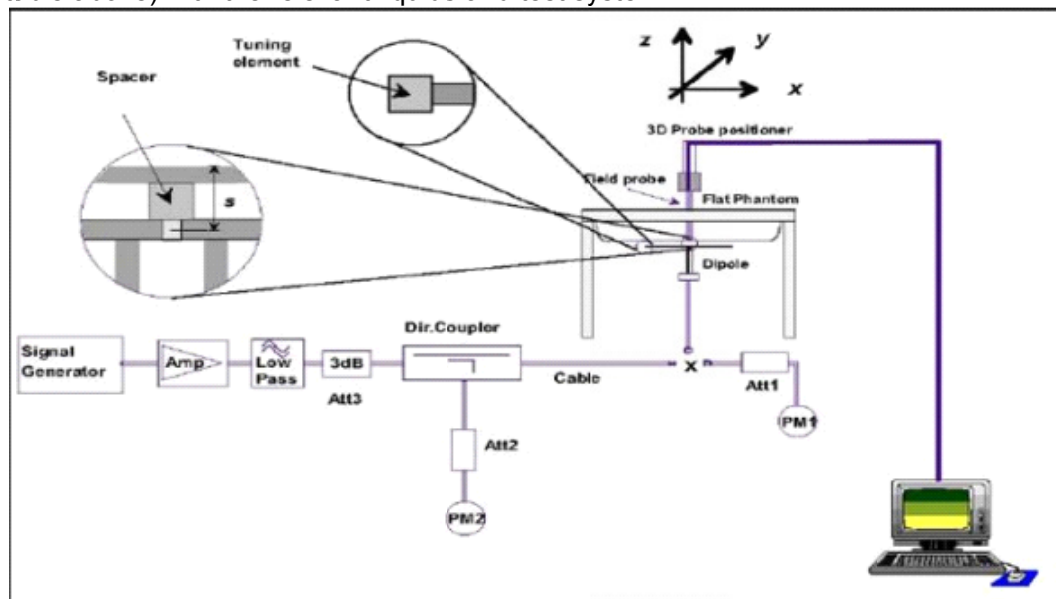
The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE P1528 (described above). The following table shows system check results for all frequency bands 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	Sep. 02, 2016	750	8.27	2.04	8.16	-1.33	1095
Head	Aug. 30, 2016	835	9.50	2.24	8.96	-5.68	1d158
Head	Sep. 01, 2016	1750	36.60	8.53	34.12	-6.78	1101
Head	Aug. 27, 2016	1900	39.70	9.68	38.72	-2.47	5d179
Head	Sep. 08, 2016	2450	52.00	13.40	53.60	3.08	919
Head	Aug. 31, 2016	2600	56.80	13.80	55.20	-2.82	1.067
Body	Sep. 01, 2016	750	8.65	2.14	8.56	-1.04	1095
Body	Aug. 26, 2016	835	9.52	2.32	9.28	-2.52	1d158
Body	Aug. 31, 2016	1750	35.70	8.67	34.68	-2.86	1101
Body	Aug. 29, 2016	1900	39.60	9.53	38.12	-3.74	5d179
Body	Sep. 08, 2016	1900	39.60	10.10	40.40	2.02	5d179
Body	Sep. 08, 2016	2450	51.10	12.40	49.60	-2.94	919
Body	Aug. 29, 2016	2600	54.10	13.00	52.00	-3.88	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.



6.SAR MEASUREMENT VARIABILITY AND UNCERTAINTY

6.1SAR MEASUREMENT VARIABILITY

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, 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 9.1.

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:

Number of timeslots in uplink assignment		Reduction of maximum output power (dB)		
Band	Time Slots	GPRS (GMSK)	EGPRS (GMSK)	EGPRS (8PSK)
GSM850	1 TX slot	0	0	0
	2 TX slots	2	2	0
	3 TX slots	4	4	2
	4 TX slots	5	5	4
GSM1900	1 TX slot	0	0	0
	2 TX slots	3	3	0
	3 TX slots	4	4	2
	4 TX slots	5	5	4

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 applying the required inner loop power control procedure 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 Head exposure configurations in voice mode is measured using a 12.2 kbps RMC with TPC bits configured to all "1s". SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than ¼ dB higher than that measured in 12.2 kbps RMC. Otherwise SAR is measured on the maximum output channel in 12.2 kbps AMR with 3.4 kbps SRB (signalling radio bearer) using the exposure configuration that results in the highest SAR in 12.2 kbps RMC for that RF channel.

(2). Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits configured to all "1s". SAR for other spreading codes and multiple DPDCHn, when supported by the EUT, are not required when the maximum average outputs of each RF channel, for each spreading code and DPDCHn configuration, are less than ¼ dB higher than those measured in 12.2 kbps RMC.

3. HSDPA

SAR for body exposure configurations is measured according to the "Body SAR Measurements" procedures of 3G device. In addition, body SAR is also measured for HSDPA when the maximum average outputs of each RF channel with HSDPA active is at ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC or the maximum SAR 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA.

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 ΔACK , $\Delta NACK$,

$\Delta CQI = 8$. The variation of the β_c / β_d ratio causes a power reduction at sub-tests 2 - 4.

Sub-test ^o	β_c ^o	β_d ^o	β_d (SF) ^o	β_c / β_d ^o	β_{hs} (1) ^o	CM(dB)(2) ^o	MPR (dB) ^o
1 ^o	2/15 ^o	15/15 ^o	64 ^o	2/15 ^o	4/15 ^o	0.0 ^o	0 ^o
2 ^o	12/15(3) ^o	15/15(3) ^o	64 ^o	12/15(3) ^o	24/15 ^o	1.0 ^o	0 ^o
3 ^o	15/15 ^o	8/15 ^o	64 ^o	15/8 ^o	30/15 ^o	1.5 ^o	0.5 ^o
4 ^o	15/15 ^o	4/15 ^o	64 ^o	15/4 ^o	30/15 ^o	1.5 ^o	0.5 ^o

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

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 $\beta_d = 15/15$

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 $\leq 1/4$ 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 primary mode and the adjusted SAR is $\leq 1.2W/kg$, SAR measurement is not required for the secondary mode.

Per KDB941225 D01v03r01, 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 UMTS Release 6 HSUPA

Sub-test ¹⁾	$\beta_c^{2)}$	$\beta_d^{3)}$	β_d (SF) ⁴⁾	$\beta_c/\beta_d^{5)}$	$\beta_{hs}^{(1)}$ ⁶⁾	$\beta_{ec}^{7)}$	$\beta_{ed}^{8)}$	β_e $c^{9)}$ (SF) ¹⁰⁾	$\beta_{ed}^{11)}$ (code) ¹²⁾	CM ⁽ 2) ¹³⁾ (dB) ¹⁴⁾	MP R ¹⁵⁾ (dB) ¹⁶⁾	AG ⁽⁴⁾ ¹⁷⁾ Inde x ¹⁸⁾	E- TFC I ¹⁹⁾
1 ²⁰⁾	11/15 ⁽³⁾ ²¹⁾	15/15 ⁽³⁾ ²²⁾	64 ²³⁾	11/15 ⁽³⁾ ²⁴⁾	22/15 ²⁵⁾	209/22 5 ²⁶⁾	1039/225 ²⁷⁾	4 ²⁸⁾	1 ²⁹⁾	1.0 ³⁰⁾	0.0 ³¹⁾	20 ³²⁾	75 ³³⁾
2 ³⁴⁾	6/15 ³⁵⁾	15/15 ³⁶⁾	64 ³⁷⁾	6/15 ³⁸⁾	12/15 ³⁹⁾	12/15 ⁴⁰⁾	94/75 ⁴¹⁾	4 ⁴²⁾	1 ⁴³⁾	3.0 ⁴⁴⁾	2.0 ⁴⁵⁾	12 ⁴⁶⁾	67 ⁴⁷⁾
3 ⁴⁸⁾	15/15 ⁴⁹⁾	9/15 ⁵⁰⁾	64 ⁵¹⁾	15/9 ⁵²⁾	30/15 ⁵³⁾	30/15 ⁵⁴⁾	$\beta_{ed1}:47/1$ 5 ⁵⁵⁾ $\beta_{ed2}:47/1$ 5 ⁵⁶⁾	4 ⁵⁷⁾	2 ⁵⁸⁾	2.0 ⁵⁹⁾	1.0 ⁶⁰⁾	15 ⁶¹⁾	92 ⁶²⁾
4 ⁶³⁾	2/15 ⁶⁴⁾	15/15 ⁶⁵⁾	64 ⁶⁶⁾	2/15 ⁶⁷⁾	4/15 ⁶⁸⁾	2/15 ⁶⁹⁾	56/75 ⁷⁰⁾	4 ⁷¹⁾	1 ⁷²⁾	3.0 ⁷³⁾	2.0 ⁷⁴⁾	17 ⁷⁵⁾	71 ⁷⁶⁾
5 ⁷⁷⁾	15/15 ⁽⁴⁾ ⁷⁸⁾	15/15 ⁽⁴⁾ ⁷⁹⁾	64 ⁸⁰⁾	15/15 ⁽⁴⁾ ⁸¹⁾	30/15 ⁸²⁾	24/15 ⁸³⁾	134/15 ⁸⁴⁾	4 ⁸⁵⁾	1 ⁸⁶⁾	1.0 ⁸⁷⁾	0.0 ⁸⁸⁾	21 ⁸⁹⁾	81 ⁹⁰⁾
Note 1: ΔACK , $\Delta NACK$ and $\Delta CQI = 8$ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c^{21)}$ 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 ²²⁾ 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 $\beta_d = 15/15$ ²³⁾ 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 $\beta_d = 15/15$ ²⁴⁾ 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 ²⁵⁾ Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value. ²⁶⁾													

HSUPA UE category

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Spreading 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).

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 v02r05. 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
64 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 $> \frac{1}{2}$ 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 $> \frac{1}{2}$ 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.

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

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.

✧ SAR Test Requirements for OFDM configurations

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, each standalone And frequency aggregated band is considered separately for SAR test reduction. In applying the initial test configuration and subsequent test configuration procedures, the 802.11 transmission configuration with the highest specified maximum output power and the channel within a test configuration with the highest measured maximum output power should be clearly distinguished to apply the procedures.

7.2 TEST POSITION

7.2.1 Head

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

7.2.2 Body

The overall diagonal dimension of the display section of a tablet is 21.1cm>20cm, per FCC KDB 616217, the back surface and edges of the tablet should be tested for SAR compliance with the Tablet touching the phantom. SAR evaluation for the front surface of tablet display screens are generally not necessary. The SAR Exclusion Threshold in KDB 447498 D01 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned adjacent the phantom and the edge containing the antenna positioned perpendicular to the phantom.

SAR test reduction and exclusion guidance

(1) The SAR exclusion threshold for distances < 50 mm is defined by the following equation:

$$\frac{(\text{max. power of channel, including tune-up tolerance, mW})}{(\text{min. test separation distance, mm})} \sqrt{\text{Frequency (GHz)}} \leq 3.0$$

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

(2) The SAR exclusion threshold for distances > 50 mm is defined by the following equation, as illustrated in KDB 447498 D01 Appendix B:

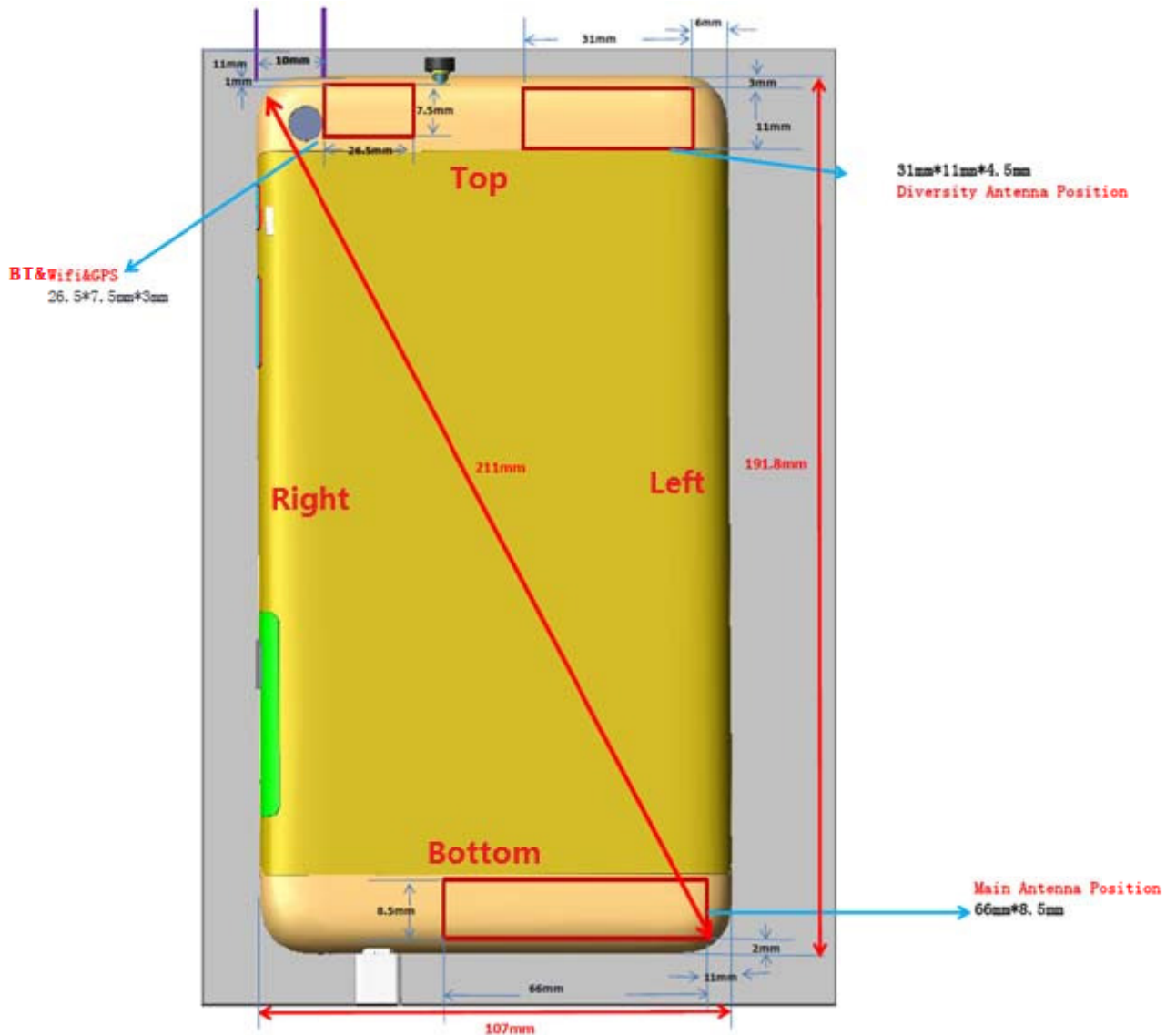
a) at 100 MHz to 1500 MHz

$$[\text{Power allowed at numeric Threshold at 50 mm in step 1}) + (\text{test separation distance} - 50 \text{ mm}) \cdot (f_{\text{(MHz)}}/150)] \text{ mW}$$

b) at > 1500 MHz and ≤ 6 GHz

$$[\text{Power allowed at numeric Threshold at 50 mm in step 1}) + (\text{test separation distance} - 50 \text{ mm}) \cdot 10] \text{ mW}$$

The location of the antenna inside EUT is as below.



Note:

1) Diversity antenna is used to improve the acceptance of performance of the main antenna, it does not have a transmitter function.

The distance <50mm

Mode	Position	Pmax (dBm) *	Pmax (mW)	Distance (mm)	f (GHz)	Calculation Result	SAR Exclusion threshold	Test Requirement (Yes/No)
BT	Rear/ Top	9.5	8.91	5	2.480	2.80	3	No
	Right	9.5	8.91	10	2.480	1.40	3	No
2.4GWiFi	Rear/ Top	18	63.10	5	2.462	19.80	3	Yes
	Right	18	63.10	10	2.462	9.90	3	Yes
GSM850	Rear/ Bottom	33	1995.26	5	0.8488	367.65	3	Yes
	Left	33	1995.26	11	0.8488	167.11	3	Yes
	Right	33	1995.26	30	0.8488	61.27	3	Yes
GSM1900	Rear/ Bottom	30	1000	5	1.9098	276.39	3	Yes
	Left	30	1000	11	1.9098	125.63	3	Yes
	Right	30	1000	30	1.9098	46.07	3	Yes
UMTS Band 2	Rear/ Bottom	23.5	223.87	5	1.9076	61.84	3	Yes
	Left	23.5	223.87	11	1.9076	28.11	3	Yes
	Right	23.5	223.87	30	1.9076	10.31	3	Yes
UMTS Band 4	Rear/ Bottom	23.5	223.87	5	1.7526	59.27	3	Yes
	Left	23.5	223.87	11	1.7526	26.94	3	Yes
	Right	23.5	223.87	30	1.7526	9.88	3	Yes
UMTS Band 5	Rear/ Bottom	24	251.19	5	0.8466	46.22	3	Yes
	Left	24	251.19	11	0.8466	21.01	3	Yes
	Right	24	251.19	30	0.8466	7.70	3	Yes
LTE Band 2	Rear/ Bottom	23.5	223.87	5	1.900	61.72	3	Yes
	Left	23.5	223.87	11	1.900	28.05	3	Yes
	Right	23.5	223.87	30	1.900	10.29	3	Yes
LTE Band 4	Rear/ Bottom	23.5	223.87	5	1.745	59.15	3	Yes
	Left	23.5	223.87	11	1.745	26.88	3	Yes
	Right	23.5	223.87	30	1.745	9.86	3	Yes

LTE Band 5	Rear/ Bottom	24	251.19	5	0.844	46.15	3	Yes
	Left	24	251.19	11	0.844	20.98	3	Yes
	Right	24	251.19	30	0.844	7.69	3	Yes
LTE Band 7	Rear/ Bottom	23	199.53	5	2.560	63.85	3	Yes
	Left	23	199.53	11	2.560	29.02	3	Yes
	Right	23	199.53	30	2.560	10.64	3	Yes
LTE Band 17	Rear/ Bottom	24	251.19	5	0.711	42.36	3	Yes
	Left	24	251.19	11	0.711	19.25	3	Yes
	Right	24	251.19	30	0.711	7.06	3	Yes

The distance >50mm

Mode	Position	f (GHz)	Power allowed at numeric Threshold at 50mm	Distance (mm)	P _{max} (dBm)*	P _{max} (mW)	SAR Exclusion Result (mW)	Test Requirement (Yes/No)
BT	Left	2.480	95.25	70.5	9.5	8.91	300.60	No
	Bottom	2.480	95.25	183.3	9.5	8.91	1428.60	No
2.4GWiFi	Left	2.462	95.60	70.5	18	63.10	300.60	No
	Bottom	2.462	95.60	183.3	18	63.10	1428.60	No
GSM850	Top	0.8488	162.81	181.3	33	1995.26	1475.81	No
GSM1900	Top	1.9098	108.54	181.3	30	1000	1421.54	No
UMTS Band 2	Top	1.9076	108.60	181.3	23.5	223.87	1421.60	No
UMTS Band 4	Top	1.7526	113.31	181.3	23.5	223.87	1426.31	No
UMTS Band 5	Top	0.8466	163.02	181.3	24	251.19	1476.02	No
LTE Band 2	Top	1.900	108.82	181.3	23.5	223.87	1421.82	No
LTE Band 4	Top	1.745	113.26	181.3	23.5	223.87	1426.26	No
LTE Band 5	Top	0.844	163.28	181.3	24	251.19	1476.28	No
LTE Band 7	Top	2.560	93.75	181.3	23	199.53	1406.75	No
LTE Band 17	Top	0.711	177.89	181.3	24	251.19	1490.89	No

Note: Even though the top side of main antenna qualifies for test exclusion, the estimated values were too conservative. The SAR measurements of top side were made.

8. POWER TEST RESULT

8.1 CONDUCTED 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)		33.00	32.31	32.44	32.56	23.81	23.12	23.25	23.37
GPRS/ EDGE (GMSK)	1 Tx Slot	33.00	32.31	32.44	32.58	23.81	23.12	23.25	23.39
	2 Tx Slots	31.00	30.25	30.33	30.37	24.87	24.12	24.20	24.24
	3 Tx Slots	29.00	28.49	28.51	28.50	24.58	24.07	24.09	24.08
	4 Tx Slots	28.00	26.62	26.63	26.65	24.82	23.44	23.45	23.47
EDGE (8PSK)	1 Tx Slot	28.50	26.59	26.73	26.60	19.31	17.40	17.54	17.41
	2 Tx Slots	28.50	26.52	26.61	26.51	22.37	20.39	20.48	20.38
	3 Tx Slots	26.50	24.71	24.80	24.58	22.08	20.29	20.38	20.16
	4 Tx Slots	24.50	22.57	22.62	22.60	21.32	19.39	19.44	19.42

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 D01v03r01, the bolded GPRS 2Tx mode was selected for SAR testing according to the highest frame –averaged output power table.

8.2 CONDUCTED POWER MEASUREMENTS OF GSM1900

GSM1900		Tune-up	Max Burst Average Power (dBm)			Tune-up	Max Frame Average Power (dBm)		
			512CH	661CH	810CH		512CH	661CH	810CH
			1850.2MHz	1880MHz	1909.8MHz		1850.2MHz	1880MHz	1909.8MHz
GSM (CS)		30.00	29.07	29.15	29.09	20.81	19.88	19.96	19.90
GPRS/EDGE (GMSK)	1 Tx Slot	30.00	29.07	29.15	29.09	20.81	19.88	19.96	19.90
	2 Tx Slots	27.00	26.73	26.84	26.87	20.87	20.60	20.71	20.74
	3 Tx Slots	26.00	25.18	25.33	25.37	21.58	20.76	20.91	20.95
	4 Tx Slots	25.00	23.59	23.73	23.78	21.82	20.41	20.55	20.60
EDGE (8PSK)	1 Tx Slot	27.50	25.56	25.86	25.89	18.31	16.37	16.67	16.70
	2 Tx Slots	27.50	25.53	25.81	25.70	21.37	19.40	19.68	19.57
	3 Tx Slots	25.50	23.78	23.86	23.94	21.08	19.36	19.44	19.52
	4 Tx Slots	23.50	21.75	21.66	21.67	20.32	18.57	18.48	18.49

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 D01v03r01, the bolded GPRS 4Tx mode was selected for SAR testing according to the highest frame –averaged output power table.

8.3 CONDUCTED POWER MEASUREMENTS OF UMTS1900 Band 2

UMTS1900 (Band 2)		Tune-up	SAR Conducted Power (dBm)		
			9262CH	9400CH	9538CH
			1852.4	1880	1907.6
WCDMA	12.2kbps RMC	23.50	22.67	22.54	22.66
	64kbps RMC	23.50	22.66	22.52	22.64
	144kbps RMC	23.50	22.68	22.53	22.65
	384kbps RMC	23.50	22.61	22.59	22.63
HSDPA	Subtest 1	23.50	22.54	22.31	22.47
	Subtest 2	23.50	22.36	22.14	22.13
	Subtest 3	22.50	21.98	21.72	21.81
	Subtest 4	22.50	22.00	21.70	21.87
HSUPA	Subtest 1	22.20	20.95	20.53	20.71
	Subtest 2	21.70	19.80	19.74	19.73
	Subtest 3	21.70	19.86	19.78	19.71
	Subtest 4	21.20	19.31	19.31	19.33
	Subtest 5	22.20	20.56	20.24	20.48

Note:

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

2) Note: Per KDB941225 D01v03r01, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode 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.

8.4 CONDUCTED POWER MEASUREMENTS OF UMTS1700 Band 4

UMTS 1700 (Band 4)		Tune-up	SAR Conducted Power (dBm)		
			1312CH	1413CH	1513CH
			1712.4	1732.6	1752.6
WCDMA	12.2kbps RMC	23.50	22.30	22.42	22.34
	64kbps RMC	23.50	22.29	22.35	22.32
	144kbps RMC	23.50	22.27	22.36	22.31
	384kbps RMC	23.50	22.28	22.37	22.35
HSDPA	Subtest 1	23.50	21.95	22.21	22.23
	Subtest 2	23.50	21.80	22.00	22.05
	Subtest 3	22.50	21.71	21.90	21.91
	Subtest 4	22.50	21.74	21.95	21.96
HSUPA	Subtest 1	22.20	20.88	21.15	21.06
	Subtest 2	21.70	19.77	19.85	19.73
	Subtest 3	21.70	19.71	19.82	19.75
	Subtest 4	21.20	19.23	19.65	19.53
	Subtest 5	22.20	20.54	20.78	20.35

Note:

1) The conducted power of UMTS Band 4 is measured with RMS detector.

2)Note: Per KDB941225 D01v03r01, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode 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.

8.5 CONDUCTED POWER MEASUREMENTS OF UMTS850 Band 5

UMTS 850 (Band 5)		Tune-up	SAR Conducted Power (dBm)		
			4132CH	4182CH	4233CH
			826.4	836.4	846.6
WCDMA	12.2kbps RMC	24.00	23.27	23.26	23.32
	64kbps RMC	24.00	23.25	23.24	23.30
	144kbps RMC	24.00	23.21	23.25	23.28
	384kbps RMC	24.00	23.26	23.23	23.26
HSDPA	Subtest 1	24.00	23.16	23.02	23.33
	Subtest 2	24.00	22.96	22.84	23.03
	Subtest 3	23.00	22.73	22.56	22.77
	Subtest 4	23.00	22.70	22.54	22.79
HSUPA	Subtest 1	22.70	21.53	21.42	21.65
	Subtest 2	21.70	20.24	20.06	20.22
	Subtest 3	21.20	20.32	20.13	20.25
	Subtest 4	21.20	20.08	19.96	20.06
	Subtest 5	22.20	20.97	20.97	21.12

Note:

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

2)Note: Per KDB941225 D01v03r01, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode 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.

8.6 CONDUCTED POWER MEASUREMENTS OF LTE Band 2

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					18607	18900	19193
					1850.7	1880	1909.3
1.4MHz	QPSK	1	0	23.50	22.79	22.75	22.50
		1	2	23.50	22.78	22.74	22.50
		1	5	23.50	22.79	22.76	22.47
		3	0	23.50	22.71	22.65	22.20
		3	1	23.50	22.63	22.63	22.22
		3	3	23.50	22.62	22.63	22.21
	16QAM	6	0	23.00	21.79	21.87	21.59
		1	0	23.00	21.95	21.80	21.52
		1	2	23.00	21.96	21.82	21.50
		1	5	23.00	21.94	21.71	21.58
		3	0	23.00	22.17	22.13	21.88
		3	1	23.00	22.14	22.22	21.89
		3	3	23.00	22.13	22.15	21.88
		6	0	22.00	20.90	20.03	20.40
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					18615	18900	19185
					1851.5	1880	1908.5
3MHz	QPSK	1	0	23.50	22.71	23.01	22.41
		1	7	23.50	22.73	22.91	22.51
		1	14	23.50	22.87	22.87	22.48
		8	0	23.00	21.96	22.03	21.74
		8	3	23.00	21.99	21.94	21.66
		8	7	23.00	22.03	21.87	21.69
		15	0	23.00	21.98	21.94	21.66
	16QAM	1	0	23.00	21.35	21.97	21.21
		1	7	23.00	21.42	21.88	21.17
		1	14	23.00	21.40	21.79	21.17
		8	0	22.00	20.98	20.24	20.49
		8	3	22.00	21.02	20.30	20.53
		8	7	22.00	21.07	20.38	20.56
		15	0	22.00	20.96	20.22	20.44

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					18625	18900	19175
					1852.5	1880	1907.5
5MHz	QPSK	1	0	23.50	22.90	22.70	22.63
		1	12	23.50	22.89	22.65	22.67
		1	24	23.50	22.99	22.63	22.65
		12	0	23.00	21.96	21.99	21.68
		12	6	23.00	21.96	21.96	21.60
		12	13	23.00	21.96	21.79	21.56
		25	0	23.00	21.88	21.95	21.71
	16QAM	1	0	23.00	21.70	21.62	21.87
		1	12	23.00	21.71	21.59	21.93
		1	24	23.00	21.82	21.50	21.98
		12	0	22.00	20.80	20.03	20.27
		12	6	22.00	20.98	20.28	20.43
		12	13	22.00	21.05	20.29	20.39
		25	0	22.00	20.78	20.08	20.22
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					18650	18900	19150
					1855	1880	1905
10MHz	QPSK	1	0	23.50	22.80	22.93	22.29
		1	24	23.50	22.91	22.92	22.26
		1	49	23.50	22.94	22.80	22.27
		25	0	23.00	22.13	22.01	21.79
		25	12	23.00	22.13	22.11	21.63
		25	25	23.00	22.30	21.99	21.76
		50	0	23.00	22.21	22.10	21.68
	16QAM	1	0	23.00	21.54	22.29	21.36
		1	24	23.00	21.66	22.22	21.30
		1	49	23.00	21.73	22.20	21.42
		25	0	22.00	21.19	20.05	20.79
		25	12	22.00	21.18	20.31	20.61
		25	25	22.00	21.12	20.53	20.62
		50	0	22.00	21.13	20.29	20.63

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					18675	18900	19125
					1857.5	1880	1902.5
15MHz	QPSK	1	0	23.50	22.83	22.98	22.37
		1	37	23.50	22.94	22.95	22.37
		1	74	23.50	22.76	22.79	22.48
		36	0	23.00	22.18	22.74	21.62
		36	19	23.00	22.30	22.08	21.76
		36	39	23.00	22.19	21.92	21.79
		75	0	23.00	22.31	22.03	21.76
	16QAM	1	0	23.00	21.62	22.32	22.02
		1	37	23.00	21.84	22.15	22.10
		1	74	23.00	21.61	22.10	21.98
		36	0	22.00	20.91	21.10	20.63
		36	19	22.00	21.06	20.34	20.37
		36	39	22.00	20.69	20.29	20.22
		75	0	22.00	20.83	20.09	20.34
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					18700	18900	19100
					1860	1880	1900
20MHz	QPSK	1	0	23.50	23.13	23.23	22.83
		1	50	23.50	23.13	22.53	22.62
		1	99	23.50	23.07	23.20	22.82
		50	0	23.00	22.32	22.40	21.97
		50	25	23.00	22.31	22.30	21.85
		50	50	23.00	22.21	22.20	21.96
		100	0	23.00	22.40	22.32	21.86
	16QAM	1	0	23.00	22.10	22.64	21.97
		1	50	23.00	22.15	21.83	21.78
		1	99	23.00	22.03	22.45	21.95
		50	0	22.00	21.07	20.28	20.60
		50	25	22.00	21.09	20.49	20.80
		50	50	22.00	20.83	20.60	20.45
		100	0	22.00	20.97	20.35	20.92

8.7 CONDUCTED POWER MEASUREMENTS OF LTE Band 4

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					19957	20175	20393
					1710.7	1732.5	1754.3
1.4MHz	QPSK	1	0	23.50	22.62	22.90	22.66
		1	2	23.50	22.61	22.93	22.66
		1	5	23.50	22.62	22.94	22.61
		3	0	23.50	22.67	22.84	22.61
		3	1	23.50	22.69	22.84	22.71
		3	3	23.50	22.68	22.84	22.66
		6	0	23.00	21.82	21.88	21.76
	16QAM	1	0	23.00	21.73	22.04	21.28
		1	2	23.00	21.71	21.88	21.30
		1	5	23.00	21.61	21.91	21.22
		3	0	23.00	21.99	21.96	21.74
		3	1	23.00	22.01	22.00	21.75
		3	3	23.00	22.01	21.98	21.72
		6	0	22.00	20.87	20.90	20.68
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					19965	20175	20385
					1711.5	1732.5	1753.5
3MHz	QPSK	1	0	23.50	22.54	22.89	22.61
		1	7	23.50	22.64	22.73	22.60
		1	14	23.50	22.69	22.79	22.58
		8	0	23.00	21.96	21.91	21.91
		8	3	23.00	21.94	21.86	21.89
		8	7	23.00	21.85	21.86	21.86
		15	0	23.00	21.94	21.89	21.90
	16QAM	1	0	23.00	21.54	22.02	21.42
		1	7	23.00	21.44	22.01	21.41
		1	14	23.00	21.38	22.01	21.41
		8	0	22.00	20.92	21.21	20.82
		8	3	22.00	20.92	21.37	20.73
		8	7	22.00	20.94	21.36	20.65
		15	0	22.00	20.86	21.09	20.64

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					19975	20175	20375
					1712.5	1732.5	1752.5
5MHz	QPSK	1	0	23.50	22.74	22.89	22.86
		1	12	23.50	22.86	22.81	22.73
		1	24	23.50	22.86	22.86	22.81
		12	0	23.00	21.93	21.99	21.92
		12	6	23.00	21.91	21.95	21.83
		12	13	23.00	21.86	21.88	21.89
		25	0	23.00	21.96	21.91	21.91
	16QAM	1	0	23.00	21.35	21.92	22.01
		1	12	23.00	21.37	21.83	21.95
		1	24	23.00	21.34	21.92	21.95
		12	0	22.00	20.75	21.13	20.85
		12	6	22.00	20.90	21.21	20.89
		12	13	22.00	20.76	21.29	20.71
		25	0	22.00	20.70	20.99	20.64
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20000	20175	20350
					1715	1732.5	1750
10MHz	QPSK	1	0	23.50	22.54	22.86	22.61
		1	24	23.50	22.57	22.87	22.60
		1	49	23.50	22.64	22.83	22.55
		25	0	23.00	21.95	21.94	21.97
		25	12	23.00	21.85	21.98	21.86
		25	25	23.00	21.96	21.93	21.92
		50	0	23.00	21.87	21.97	21.94
	16QAM	1	0	23.00	21.26	21.93	21.76
		1	24	23.00	21.24	21.94	21.87
		1	49	23.00	21.24	21.93	21.74
		25	0	22.00	20.80	21.16	21.22
		25	12	22.00	20.86	21.10	21.11
		25	25	22.00	20.97	21.20	20.94
		50	0	22.00	20.85	21.05	21.01

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20025	20175	20325
					1717.5	1732.5	1747.5
15MHz	QPSK	1	0	23.50	22.54	22.83	22.64
		1	37	23.50	22.56	22.79	22.62
		1	74	23.50	22.59	22.76	22.54
		36	0	23.00	21.88	22.76	21.94
		36	19	23.00	21.88	21.96	21.90
		36	39	23.00	21.93	21.99	21.87
		75	0	23.00	21.89	21.98	21.91
	16QAM	1	0	23.00	21.30	21.94	21.85
		1	37	23.00	21.31	21.98	21.93
		1	74	23.00	21.27	21.95	21.81
		36	0	22.00	21.41	21.45	20.83
		36	19	22.00	20.88	21.05	20.87
		36	39	22.00	20.86	20.89	20.65
		75	0	22.00	20.81	20.80	20.72
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20050	20175	20300
					1720	1732.5	1745
20MHz	QPSK	1	0	23.50	22.88	23.11	22.87
		1	50	23.50	22.84	22.92	22.86
		1	99	23.50	22.85	23.01	22.77
		50	0	23.00	21.95	22.03	21.94
		50	25	23.00	21.93	21.96	21.87
		50	50	23.00	21.92	22.00	21.93
		100	0	23.00	21.94	21.96	21.87
	16QAM	1	0	23.00	21.80	22.03	21.96
		1	50	23.00	21.91	21.82	21.90
		1	99	23.00	21.80	21.96	22.03
		50	0	22.00	20.63	20.79	20.76
		50	25	22.00	20.91	20.92	20.86
		50	50	22.00	20.62	20.66	20.57
		100	0	22.00	20.84	20.66	20.83

8.8 CONDUCTED POWER MEASUREMENTS OF LTE Band 5

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20407	20525	20643
					824.7	836.5	848.3
1.4MHz	QPSK	1	0	24.00	23.60	23.24	23.20
		1	2	24.00	23.62	23.21	23.24
		1	5	24.00	23.57	23.22	23.20
		3	0	24.00	23.49	23.25	23.31
		3	1	24.00	23.54	23.28	23.32
		3	3	24.00	23.42	23.28	23.30
		6	0	23.50	22.08	21.72	21.89
	16QAM	1	0	23.50	22.03	21.63	21.57
		1	2	23.50	21.92	21.62	21.52
		1	5	23.50	21.95	21.60	21.52
		3	0	23.50	22.41	22.05	22.09
		3	1	23.50	22.43	22.03	22.15
		3	3	23.50	22.44	22.03	22.17
		6	0	23.00	21.02	21.06	21.27
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20415	20525	20635
					825.5	836.5	847.5
3MHz	QPSK	1	0	24.00	23.49	23.47	23.47
		1	7	24.00	23.47	23.36	23.38
		1	14	24.00	23.58	23.28	23.40
		8	0	23.50	22.09	21.86	21.95
		8	3	23.50	22.14	21.71	21.92
		8	7	23.50	22.05	21.73	21.91
		15	0	23.50	22.13	21.85	21.94
	16QAM	1	0	23.50	21.54	21.60	21.60
		1	7	23.50	21.56	21.59	21.52
		1	14	23.50	21.58	21.62	21.56
		8	0	23.00	21.15	21.19	21.34
		8	3	23.00	21.21	21.57	21.30
		8	7	23.00	21.26	21.58	21.29
		15	0	23.00	21.15	21.13	21.24

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20425	20525	20625
					826.5	836.5	846.5
5MHz	QPSK	1	0	24.00	23.61	23.28	23.50
		1	12	24.00	23.66	23.27	23.40
		1	24	24.00	23.65	23.23	23.46
		12	0	23.50	22.08	21.73	21.96
		12	6	23.50	22.10	21.74	21.88
		12	13	23.50	22.09	21.66	21.76
		25	0	23.50	22.10	21.72	21.88
	16QAM	1	0	23.50	22.00	21.54	22.21
		1	12	23.50	22.02	21.51	22.16
		1	24	23.50	21.99	21.51	22.09
		12	0	23.00	21.02	21.08	21.29
		12	6	23.00	21.22	21.20	21.34
		12	13	23.00	21.14	21.51	21.22
		25	0	23.00	21.05	21.03	21.14
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20450	20525	20600
					829	836.5	844
10MHz	QPSK	1	0	24.00	23.59	23.76	23.44
		1	24	24.00	23.56	23.46	23.41
		1	49	24.00	23.56	23.61	23.35
		25	0	23.50	22.29	22.03	22.15
		25	12	23.50	22.27	21.91	22.14
		25	25	23.50	22.25	21.92	22.07
		50	0	23.50	22.19	21.99	22.17
	16QAM	1	0	23.50	21.77	22.34	21.60
		1	24	23.50	21.77	22.11	21.64
		1	49	23.50	21.74	22.26	21.52
		25	0	23.00	21.08	21.22	21.70
		25	12	23.00	21.19	21.22	21.60
		25	25	23.00	21.42	21.52	21.51
		50	0	23.00	21.18	21.16	21.56

8.9 CONDUCTED POWER MEASUREMENTS OF LTE Band 7

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20775	21100	21425
					2502.5	2535	2567.5
5MHz	QPSK	1	0	23.00	22.32	22.02	21.92
		1	12	23.00	21.85	21.88	21.69
		1	24	23.00	22.17	22.26	22.00
		12	0	22.50	21.69	21.35	21.28
		12	6	22.50	21.71	21.51	21.32
		12	13	22.50	21.47	21.55	21.22
		25	0	22.50	21.58	21.42	21.21
	16QAM	1	0	22.50	22.29	21.91	21.87
		1	12	22.50	21.90	21.81	21.62
		1	24	22.50	22.04	22.09	21.97
		12	0	22.00	20.62	20.37	20.26
		12	6	22.00	20.62	20.51	20.30
		12	13	22.00	20.39	20.43	20.20
		25	0	22.00	20.45	20.23	20.10
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20800	21100	21400
					2505	2535	2565
10MHz	QPSK	1	0	23.00	21.77	22.21	22.08
		1	24	23.00	21.80	22.17	22.00
		1	49	23.00	21.86	22.25	22.10
		25	0	22.50	21.30	21.37	21.51
		25	12	22.50	21.31	21.44	21.60
		25	25	22.50	21.41	21.37	21.56
		50	0	22.50	21.30	21.46	21.53
	16QAM	1	0	22.50	21.18	21.77	21.41
		1	24	22.50	21.03	21.76	21.35
		1	49	22.50	21.17	21.71	21.30
		25	0	22.00	21.02	21.50	20.91
		25	12	22.00	20.90	21.39	21.00
		25	25	22.00	20.78	21.33	20.97
		50	0	22.00	20.88	21.40	20.89

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20825	21100	21375
					2507.5	2535	2562.5
15MHz	QPSK	1	0	23.00	22.20	22.20	22.30
		1	37	23.00	22.09	22.15	22.27
		1	74	23.00	22.12	22.13	22.26
		36	0	22.50	21.34	21.52	21.59
		36	19	22.50	21.38	21.40	21.54
		36	39	22.50	21.35	21.47	21.53
		75	0	22.50	21.32	21.45	21.51
	16QAM	1	0	22.50	21.12	21.32	21.62
		1	37	22.50	21.01	21.30	21.62
		1	74	22.50	21.06	21.20	21.59
		36	0	22.00	20.79	21.37	20.83
		36	19	22.00	20.85	21.43	20.90
		36	39	22.00	20.91	21.35	20.78
		75	0	22.00	20.69	21.28	20.70
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					20850	21100	21350
					2510	2535	2560
20MHz	QPSK	1	0	23.00	22.12	22.29	22.26
		1	50	23.00	22.32	22.44	22.31
		1	99	23.00	22.29	22.33	22.29
		50	0	22.50	21.57	21.63	21.62
		50	25	22.50	21.42	21.49	21.59
		50	50	22.50	21.54	21.56	21.63
		100	0	22.50	21.49	21.57	21.57
	16QAM	1	0	22.50	21.19	21.88	21.56
		1	50	22.50	21.21	21.82	21.58
		1	99	22.50	21.38	21.88	21.57
		50	0	22.00	20.77	20.90	20.24
		50	25	22.00	20.68	21.40	20.42
		50	50	22.00	20.33	21.12	20.68
		100	0	22.00	20.71	21.24	20.36

8.10 CONDUCTED POWER MEASUREMENTS OF LTE Band 17

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					23755	23790	23825
					706.5	710	713.5
5MHz	QPSK	1	0	24.00	23.47	23.31	23.28
		1	12	24.00	23.44	23.32	23.39
		1	24	24.00	23.46	23.25	23.46
		12	0	23.50	21.91	21.79	21.82
		12	6	23.50	21.91	21.78	21.86
		12	13	23.50	21.94	21.80	21.94
		25	0	23.50	21.98	21.87	22.00
	16QAM	1	0	23.50	21.56	21.74	22.15
		1	12	23.50	21.53	21.75	22.16
		1	24	23.50	21.51	21.76	22.24
		12	0	23.00	21.52	21.26	21.06
		12	6	23.00	21.64	21.32	21.39
		12	13	23.00	21.32	21.17	21.45
		25	0	23.00	21.45	21.08	21.12
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High
					23780	23790	23800
					709	710	711
10MHz	QPSK	1	0	24.00	23.24	23.25	23.21
		1	24	24.00	23.31	23.48	23.25
		1	49	24.00	23.30	23.36	23.24
		25	0	23.50	22.05	22.06	22.05
		25	12	23.50	22.04	22.04	22.00
		25	25	23.50	21.95	22.03	21.99
		50	0	23.50	21.87	21.96	22.01
	16QAM	1	0	23.50	21.58	21.87	21.60
		1	24	23.50	21.52	21.79	21.58
		1	49	23.50	21.59	21.88	21.58
		25	0	23.00	21.15	21.16	21.21
		25	12	23.00	21.12	21.14	21.21
		25	25	23.00	21.15	21.11	21.28
		50	0	23.00	21.12	21.18	21.25

8.11 CONDUCTED POWER MEASUREMENTS OF WiFi 2.4G

Mode	Channel	Frequency (MHz)	Data Rate (Mbps)	Power Setting	Tune-up	Average Power (dBm)	SAR Test (Yes/No)
802.11b	1	2412	1	16	18	17.36	Yes
	6	2437		16	18	16.75	Yes
	11	2462		16	18	16.45	Yes
802.11g	1	2412	6	14	16	Not Required	No
	6	2437		14	16	Not Required	No
	11	2462		14	16	Not Required	No
802.11n HT20	1	2412	6.5	13	15	Not Required	No
	6	2437		13	15	Not Required	No
	11	2462		13	15	Not Required	No

Note:

- 1) The Average conducted power of WiFi is measured with RMS detector.
- 2) Per KDB248227, 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.

8.13 Conducted power measurements of BT

BT	Tune Up	Average Conducted Power (dBm)		
		DH5	2DH5	3DH5
CH0	9.5	9.08	9.20	8.84
CH39	9.5	9.05	8.99	8.81
CH78	9.5	8.93	9.11	8.74

BT	Tune Up	Average Conducted Power (dBm)		
		CH0	CH19	CH39
BLE	9.5	7.73	8.25	6.92

Note:

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

9 .SAR TEST RESULTS

General Notes:

- 1) Per KDB447498 D01v06, all measurement SAR results are scaled to the maximum tune-up tolerance limit to demonstrate compliant.
- 2) Per KDB447498 D01v06, 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 $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel must be used.
- 3) Per KDB865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/Kg; if the deviation among the repeated measurement is $\leq 20\%$, and the measured SAR < 1.45 W/Kg, only one repeated measurement is required.
- 4) Per KDB648474 D04v01r03, SAR is evaluated without a headset connected to the device. When the standalone reported Body SAR is ≤ 1.2 W/kg, no additional SAR evaluations using a headset are required.
- 5) Per KDB865664 D02v01r02, 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 D04v01r03, Body accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for Body SAR.
- 2) Per KDB941225 D01v03r01, 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.

WCDMA Notes:

Per KDB941225 D01v03r01, When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode 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 v02r05. 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.

9.1 SAR MEASUREMENT RESULT

9.1.1 SAR MEASUREMENT RESULT OF HEAD

1. Head SAR test results of GSM&UMTS

Test No.	Band	Mode	CH	Test Position	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T01	GSM 850	GSM	190	Right Cheek	33.00	32.44	0.07	0.009	0.010
T02	GSM 850	GSM	190	Right Tilted	33.00	32.44	0.02	0.008	0.009
T03	GSM 850	GSM	190	Left Cheek	33.00	32.44	0.09	0.004	0.005
T04	GSM 850	GSM	190	Left Tilted	33.00	32.44	0.01	0.005	0.006
T10	GSM 1900	GSM	661	Right Cheek	30.00	29.15	0.00	0.003	0.004
T11	GSM 1900	GSM	661	Right Tilted	30.00	29.15	0.00	0.000	<0.001
T12	GSM 1900	GSM	661	Left Cheek	30.00	29.15	0.09	0.004	0.005
T13	GSM 1900	GSM	661	Left Tilted	30.00	29.15	0.00	0.000	<0.001
T20	UMTS B2	RMC12.2K	9400	Right Cheek	23.50	22.54	-0.05	0.008	0.010
T21	UMTS B2	RMC12.2K	9400	Right Tilted	23.50	22.54	-0.07	0.002	0.002
T22	UMTS B2	RMC12.2K	9400	Left Cheek	23.50	22.54	-0.08	0.009	0.011
T23	UMTS B2	RMC12.2K	9400	Left Tilted	23.50	22.54	0.01	0.001	0.001
T30	UMTS B4	RMC12.2K	1413	Right Cheek	23.50	22.42	0.00	0.000	<0.001
T31	UMTS B4	RMC12.2K	1413	Right Tilted	23.50	22.42	0.00	0.000	<0.001
T32	UMTS B4	RMC12.2K	1413	Left Cheek	23.50	22.42	0.00	0.004	0.005
T33	UMTS B4	RMC12.2K	1413	Left Tilted	23.50	22.42	0.00	0.000	<0.001
T40	UMTS B5	RMC12.2K	4182	Right Cheek	24.00	23.26	-0.03	0.017	0.020
T41	UMTS B5	RMC12.2K	4182	Right Tilted	24.00	23.26	-0.08	0.010	0.012
T42	UMTS B5	RMC12.2K	4182	Left Cheek	24.00	23.26	0.06	0.007	0.008
T43	UMTS B5	RMC12.2K	4182	Left Tilted	24.00	23.26	0.03	0.008	0.009

2. Head SAR test results of LTE

Test No.	Band	Mode	CH	RB	Offset	Test Position	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T140	LTE B2	QPSK20M	18900	1	0	Right Cheek	23.50	23.23	0.01	0.007	0.007
T141	LTE B2	QPSK20M	18900	1	0	Right Tilted	23.50	23.23	0.06	0.003	0.003
T142	LTE B2	QPSK20M	18900	1	0	Left Cheek	23.50	23.23	0.09	0.013	0.014
T143	LTE B2	QPSK20M	18900	1	0	Left Tilted	23.50	23.23	0.07	0.001	0.001
T144	LTE B2	QPSK20M	18900	50	0	Right Cheek	23.00	22.40	0.00	0.003	0.003
T145	LTE B2	QPSK20M	18900	50	0	Right Tilted	23.00	22.40	0.03	0.000	<0.001
T146	LTE B2	QPSK20M	18900	50	0	Left Cheek	23.00	22.40	0.09	0.009	0.010
T147	LTE B2	QPSK20M	18900	50	0	Left Tilted	23.00	22.40	0.07	0.000	<0.001
T160	LTE B4	QPSK20M	20175	1	0	Right Cheek	23.50	23.11	0.09	0.011	0.011
T161	LTE B4	QPSK20M	20175	1	0	Right Tilted	23.50	23.11	0.09	0.010	0.011
T162	LTE B4	QPSK20M	20175	1	0	Left Cheek	23.50	23.11	0.09	0.019	0.020
T163	LTE B4	QPSK20M	20175	1	0	Left Tilted	23.50	23.11	0.01	0.003	0.003
T164	LTE B4	QPSK20M	20175	50	0	Right Cheek	23.00	22.03	0.09	0.008	0.010
T165	LTE B4	QPSK20M	20175	50	0	Right Tilted	23.00	22.03	0.09	0.007	0.009
T166	LTE B4	QPSK20M	20175	50	0	Left Cheek	23.00	22.03	0.09	0.015	0.019
T167	LTE B4	QPSK20M	20175	50	0	Left Tilted	23.00	22.03	0.02	0.001	0.001
T180	LTE B5	QPSK10M	20525	1	0	Right Cheek	24.00	23.76	0.01	0.008	0.009
T181	LTE B5	QPSK10M	20525	1	0	Right Tilted	24.00	23.76	0.03	0.007	0.008
T182	LTE B5	QPSK10M	20525	1	0	Left Cheek	24.00	23.76	0.09	0.005	0.005
T183	LTE B5	QPSK10M	20525	1	0	Left Tilted	24.00	23.76	0.05	0.005	0.005
T184	LTE B5	QPSK10M	20450	25	0	Right Cheek	23.50	22.29	0.00	0.006	0.008
T185	LTE B5	QPSK10M	20450	25	0	Right Tilted	23.50	22.29	0.04	0.004	0.006
T186	LTE B5	QPSK10M	20450	25	0	Left Cheek	23.50	22.29	0.00	0.003	0.004
T187	LTE B5	QPSK10M	20450	25	0	Left Tilted	23.50	22.29	0.07	0.004	0.005
T200	LTE B7	QPSK20M	21100	1	50	Right Cheek	23.00	22.44	0.09	0.004	0.004
T201	LTE B7	QPSK20M	21100	1	50	Right Tilted	23.00	22.44	0.00	0.001	0.001
T202	LTE B7	QPSK20M	21100	1	50	Left Cheek	23.00	22.44	0.00	0.005	0.006
T203	LTE B7	QPSK20M	21100	1	50	Left Tilted	23.00	22.44	0.00	0.000	<0.001
T204	LTE B7	QPSK20M	21100	50	0	Right Cheek	22.50	21.63	0.00	0.000	<0.001
T205	LTE B7	QPSK20M	21100	50	0	Right Tilted	22.50	21.63	0.00	0.000	<0.001
T206	LTE B7	QPSK20M	21100	50	0	Left Cheek	22.50	21.63	0.00	0.004	0.005
T207	LTE B7	QPSK20M	21100	50	0	Left Tilted	22.50	21.63	0.00	0.000	<0.001
T220	LTE B17	QPSK10M	23790	1	24	Right Cheek	24.00	23.48	0.09	0.005	0.006
T221	LTE B17	QPSK10M	23790	1	24	Right Tilted	24.00	23.48	0.07	0.003	0.004
T222	LTE B17	QPSK10M	23790	1	24	Left Cheek	24.00	23.48	-0.09	0.002	0.003
T223	LTE B17	QPSK10M	23790	1	24	Left Tilted	24.00	23.48	0.06	0.003	0.003
T224	LTE B17	QPSK10M	23790	25	0	Right Cheek	23.50	22.06	0.00	0.004	0.006
T225	LTE B17	QPSK10M	23790	25	0	Right Tilted	23.50	22.06	0.05	0.000	<0.001
T226	LTE B17	QPSK10M	23790	25	0	Left Cheek	23.50	22.06	0.08	0.002	0.003
T227	LTE B17	QPSK10M	23790	25	0	Left Tilted	23.50	22.06	0.09	0.001	0.001

3. Head SAR test results of WiFi

Test No.	Band	CH	Test Position	Data Rate	Power Setting	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T390	802.11b	1	Right Cheek	1	16	18	17.36	0.03	0.441	0.511
T391	802.11b	1	Right Tilted	1	16	18	17.36	-0.06	0.411	0.476
T392	802.11b	1	Left Cheek	1	16	18	17.36	-0.08	0.930	1.078
T393	802.11b	1	Left Tilted	1	16	18	17.36	0.07	0.867	1.005
T394	802.11b	6	Left Cheek	1	16	18	16.75	0.02	0.640	0.853
T396	802.11b	6	Left Tilted	1	16	18	16.75	0.03	0.597	0.796
T392	802.11b	1	Left Cheek (1st Repeated)	1	16	18	17.36	-0.08	0.921	1.067

Note:

1) Per KDB248227, 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.

2) Per KDB248227D01, 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.

9.1.2 SAR MEASUREMENT RESULT OF BODY

1. Body SAR test results of GSM&UMTS

Test No.	Band	Mode	CH	Test Position With 0cm	Earphone	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T50	GSM 850	GPRS 2TX	190	Rear Face	-	31.00	30.33	0.09	1.160	1.353
T51	GSM 850	GPRS 2TX	190	Left Side	-	31.00	30.33	0.04	0.056	0.065
T52	GSM 850	GPRS 2TX	190	Right Side	-	31.00	30.33	-0.03	0.203	0.237
T53	GSM 850	GPRS 2TX	190	Top Side	-	31.00	30.33	0.00	0.000	<0.001
T54	GSM 850	GPRS 2TX	190	Bottom Side	-	31.00	30.33	-0.03	0.621	0.725
T55	GSM 850	GPRS 2TX	128	Rear Face	-	31.00	30.25	0.01	1.180	1.402
T56	GSM 850	GPRS 2TX	251	Rear Face	-	31.00	30.37	0.09	1.240	1.434
T57	GSM 850	GSM	251	Rear Face	1	33.00	32.56	-0.02	1.030	1.140
T58	GSM 850	GSM	251	Rear Face	2	33.00	32.56	0.04	0.995	1.101
T59	GSM 850	GSM	251	Rear Face	3	33.00	32.56	0.01	1.030	1.140
T60	GSM 850	GPRS 2TX	251	Rear Face (1st Repeated)	-	31.00	30.37	0.05	1.210	1.399
T70	GSM 1900	GPRS 4TX	661	Rear Face	-	25.00	23.73	0.07	0.885	1.186
T71	GSM 1900	GPRS 4TX	661	Left Side	-	25.00	23.73	-0.05	0.148	0.198
T72	GSM 1900	GPRS 4TX	661	Right Side	-	25.00	23.73	0.02	0.044	0.059
T73	GSM 1900	GPRS 4TX	661	Top Side	-	25.00	23.73	0.00	0.000	<0.001
T74	GSM 1900	GPRS 4TX	661	Bottom Side	-	25.00	23.73	0.04	0.372	0.498
T75	GSM 1900	GPRS 4TX	512	Rear Face	-	25.00	23.59	-0.02	0.782	1.082
T76	GSM 1900	GPRS 4TX	810	Rear Face	-	25.00	23.78	0.09	0.919	1.217
T77	GSM 1900	GSM	810	Rear Face	1	30.00	29.09	0.06	0.647	0.798
T78	GSM 1900	GSM	810	Rear Face	2	30.00	29.09	0.01	0.644	0.794
T79	GSM 1900	GSM	810	Rear Face	3	30.00	29.09	0.02	0.663	0.818
T80	GSM 1900	GPRS 4TX	810	Rear Face (1st Repeated)	-	25.00	23.78	0.05	0.913	1.209
T90	UMTS B2	RMC12.2K	9400	Rear Face	-	23.50	22.54	0.09	0.915	1.141
T91	UMTS B2	RMC12.2K	9400	Left Side	-	23.50	22.54	0.09	0.148	0.185
T92	UMTS B2	RMC12.2K	9400	Right Side	-	23.50	22.54	0.05	0.049	0.061
T93	UMTS B2	RMC12.2K	9400	Top Side	-	23.5	22.54	0.00	0.000	<0.001
T94	UMTS B2	RMC12.2K	9400	Bottom Side	-	23.50	22.54	-0.03	0.546	0.681
T95	UMTS B2	RMC12.2K	9262	Rear Face	-	23.50	22.67	0.09	1.020	1.235
T96	UMTS B2	RMC12.2K	9538	Rear Face	-	23.50	22.66	-0.06	0.906	1.099
T97	UMTS B2	RMC12.2K	9262	Rear Face	1	23.50	22.67	0.08	0.956	1.157
T98	UMTS B2	RMC12.2K	9262	Rear Face	2	23.50	22.67	0.09	1.020	1.235
T99	UMTS B2	RMC12.2K	9262	Rear Face	3	23.50	22.67	-0.03	0.988	1.196
T100	UMTS B2	RMC12.2K	9262	Rear Face (1st Repeated)	-	23.50	22.67	-0.07	1.010	1.223
T101	UMTS B4	RMC12.2K	1413	Rear Face	-	23.50	22.42	0.09	0.896	1.149
T102	UMTS B4	RMC12.2K	1413	Left Side	-	23.50	22.42	-0.05	0.181	0.232
T103	UMTS B4	RMC12.2K	1413	Right Side	-	23.50	22.42	0.09	0.038	0.049
T104	UMTS B4	RMC12.2K	1413	Top Side	-	23.50	22.42	0.00	0.000	<0.001

T105	UMTS B4	RMC12.2K	1413	Bottom Side	-	23.50	22.42	0.06	0.487	0.624
T106	UMTS B4	RMC12.2K	1312	Rear Face	-	23.50	22.30	0.07	0.864	1.139
T107	UMTS B4	RMC12.2K	1513	Rear Face	-	23.50	22.34	-0.04	0.871	1.138
T108	UMTS B4	RMC12.2K	1413	Rear Face (1st Repeated)	-	23.50	22.43	0.03	0.868	1.111
T111	UMTS B5	RMC12.2K	4182	Rear Face	-	24.00	23.26	0.07	0.998	1.183
T112	UMTS B5	RMC12.2K	4182	Left Side	-	24.00	23.26	0.01	0.079	0.094
T113	UMTS B5	RMC12.2K	4182	Right Side	-	24.00	23.26	-0.03	0.043	0.051
T114	UMTS B5	RMC12.2K	4182	Top Side	-	24.00	23.26	0.00	0.000	<0.001
T115	UMTS B5	RMC12.2K	4182	Bottom Side	-	24.00	23.26	0.02	0.388	0.460
T116	UMTS B5	RMC12.2K	4132	Rear Face	-	24.00	23.27	0.01	1.160	1.372
T117	UMTS B5	RMC12.2K	4233	Rear Face	-	24.00	23.32	0.09	1.080	1.263
T118	UMTS B5	RMC12.2K	4132	Rear Face	1	24.00	23.27	0.05	1.110	1.313
T119	UMTS B5	RMC12.2K	4132	Rear Face	2	24.00	23.27	0.04	1.060	1.254
T120	UMTS B5	RMC12.2K	4132	Rear Face	3	24.00	23.27	0.05	1.110	1.313
T121	UMTS B5	RMC12.2K	4132	Rear Face (1st Repeated)	-	24.00	23.27	-0.01	1.140	1.349

2. Body SAR test results of LTE

Test No.	Band	Mode	CH	RB	Offset	Test Position With 0cm	Earphone	Tune up	Measured	Drift (dB)	SAR Value (W/kg)1-g	Reported SAR
T240	LTE B2	QPSK20M	18900	1	0	Rear Face	-	23.50	23.23	0.00	1.030	1.096
T241	LTE B2	QPSK20M	18900	1	0	Left Side	-	23.50	23.23	0.04	0.129	0.137
T242	LTE B2	QPSK20M	18900	1	0	Right Side	-	23.50	23.23	-0.06	0.041	0.044
T243	LTE B2	QPSK20M	18900	1	0	Top Side	-	23.50	23.23	0.00	0.000	<0.001
T244	LTE B2	QPSK20M	18900	1	0	Bottom Side	-	23.50	23.23	0.05	0.564	0.600
T245	LTE B2	QPSK20M	18900	50	0	Rear Face	-	23.00	22.40	0.09	0.707	0.812
T246	LTE B2	QPSK20M	18900	50	0	Left Side	-	23.00	22.40	0.07	0.103	0.118
T247	LTE B2	QPSK20M	18900	50	0	Right Side	-	23.00	22.40	0.05	0.036	0.041
T248	LTE B2	QPSK20M	18900	50	0	Top Side	-	23	22.4	0.00	0.000	<0.001
T249	LTE B2	QPSK20M	18900	50	0	Bottom Side	-	23.00	22.40	-0.09	0.287	0.330
T250	LTE B2	QPSK20M	18700	1	0	Rear Face	-	23.50	23.13	0.09	1.260	1.372
T251	LTE B2	QPSK20M	19100	1	0	Rear Face	-	23.50	22.83	0.09	1.160	1.353
T252	LTE B2	QPSK20M	18700	50	0	Rear Face	-	23.00	22.32	0.08	0.846	0.989
T253	LTE B2	QPSK20M	19100	50	0	Rear Face	-	23.00	21.97	0.03	0.740	0.938
T254	LTE B2	QPSK20M	18700	100	0	Rear Face	-	23.00	22.40	-0.04	0.819	0.940
T255	LTE B2	QPSK20M	18700	1	0	Rear Face	1	23.50	23.13	-0.08	1.134	1.235
T256	LTE B2	QPSK20M	18700	1	0	Rear Face	2	23.50	23.13	0.09	1.270	1.383
T257	LTE B2	QPSK20M	18700	1	0	Rear Face	3	23.50	23.13	-0.01	1.240	1.350
T258	LTE B2	QPSK20M	18700	1	0	Rear Face (1st Repeated)	2	23.50	23.13	0.01	1.250	1.361
T270	LTE B4	QPSK20M	20175	1	0	Rear Face	-	23.50	23.11	0.03	0.799	0.874
T271	LTE B4	QPSK20M	20175	1	0	Left Side	-	23.50	23.11	0.07	0.157	0.172
T272	LTE B4	QPSK20M	20175	1	0	Right Side	-	23.50	23.11	-0.06	0.031	0.034
T273	LTE B4	QPSK20M	20175	1	0	Top Side	-	23.50	23.11	0.00	0.000	<0.001
T274	LTE B4	QPSK20M	20175	1	0	Bottom Side	-	23.50	23.11	0.04	0.318	0.348
T275	LTE B4	QPSK20M	20175	50	0	Rear Face	-	23.00	22.03	0.05	0.681	0.851
T276	LTE B4	QPSK20M	20175	50	0	Left Side	-	23.00	22.03	-0.02	0.116	0.145
T277	LTE B4	QPSK20M	20175	50	0	Right Side	-	23.00	22.03	0.05	0.025	0.031
T278	LTE B4	QPSK20M	20175	50	0	Top Side	-	23.00	22.03	0.00	0.000	<0.001
T279	LTE B4	QPSK20M	20175	50	0	Bottom Side	-	23.00	22.03	0.04	0.248	0.310
T280	LTE B4	QPSK20M	20050	1	0	Rear Face	-	23.50	22.88	-0.06	0.748	0.863
T281	LTE B4	QPSK20M	20300	1	0	Rear Face	-	23.50	22.87	0.01	0.914	1.057
T282	LTE B4	QPSK20M	20050	50	0	Rear Face	-	23.00	21.95	0.02	0.615	0.783
T283	LTE B4	QPSK20M	20300	50	0	Rear Face	-	23.00	21.94	0.07	0.749	0.956
T284	LTE B4	QPSK20M	20175	100	0	Rear Face	-	23.00	21.96	-0.02	0.641	0.814
T285	LTE B4	QPSK20M	20300	1	0	Rear Face (1st Repeated)	-	23.5	22.87	0.03	0.911	1.053
T300	LTE B5	QPSK10M	20525	1	0	Rear Face	-	24.00	23.76	-0.05	0.854	0.903

T301	LTE B5	QPSK10M	20525	1	0	Left Side	-	24.00	23.76	-0.04	0.051	0.054
T302	LTE B5	QPSK10M	20525	1	0	Right Side	-	24.00	23.76	0.02	0.163	0.172
T303	LTE B5	QPSK10M	20525	1	0	Top Side	-	24.00	23.76	0.00	0.000	<0.001
T304	LTE B5	QPSK10M	20525	1	0	Bottom Side	-	24.00	23.76	0.02	0.292	0.309
T305	LTE B5	QPSK10M	20450	25	0	Rear Face	-	23.50	22.29	-0.02	0.641	0.847
T306	LTE B5	QPSK10M	20450	25	0	Left Side	-	23.50	22.29	0.03	0.042	0.055
T307	LTE B5	QPSK10M	20450	25	0	Right Side	-	23.50	22.29	0.02	0.086	0.114
T308	LTE B5	QPSK10M	20450	25	0	Top Side	-	23.5	22.29	0.00	0.000	<0.001
T309	LTE B5	QPSK10M	20450	25	0	Bottom Side	-	23.50	22.29	-0.01	0.307	0.406
T310	LTE B5	QPSK10M	20450	1	0	Rear Face	-	24.00	23.59	0.04	1.070	1.176
T311	LTE B5	QPSK10M	20600	1	0	Rear Face	-	24.00	23.44	0.00	0.999	1.136
T312	LTE B5	QPSK10M	20525	25	0	Rear Face	-	23.50	22.03	0.09	0.711	0.997
T313	LTE B5	QPSK10M	20600	25	0	Rear Face	-	23.50	22.15	-0.04	0.813	1.109
T314	LTE B5	QPSK10M	20450	50	0	Rear Face	-	23.50	22.19	0.02	0.697	0.942
T315	LTE B5	QPSK10M	20450	1	0	Rear Face (1st Repeated)	-	24.00	23.59	0.03	0.982	1.079
T330	LTE B7	QPSK20M	21100	1	50	Rear Face	-	23.00	22.44	0.02	1.190	1.354
T331	LTE B7	QPSK20M	21100	1	50	Left Side	-	23.00	22.44	-0.03	0.155	0.176
T332	LTE B7	QPSK20M	21100	1	50	Right Side	-	23.00	22.44	0.01	0.079	0.090
T333	LTE B7	QPSK20M	21100	1	50	Top Side	-	23.00	22.44	0.00	0.000	<0.001
T334	LTE B7	QPSK20M	21100	1	50	Bottom Side	-	23.00	22.44	0.07	0.693	0.788
T335	LTE B7	QPSK20M	21100	50	0	Rear Face	-	22.50	21.63	-0.02	0.951	1.162
T336	LTE B7	QPSK20M	21100	50	0	Left Side	-	22.50	21.63	0.06	0.124	0.152
T337	LTE B7	QPSK20M	21100	50	0	Right Side	-	22.50	21.63	-0.04	0.070	0.086
T338	LTE B7	QPSK20M	21100	50	0	Top Side	-	22.50	21.63	0.00	0.000	<0.001
T339	LTE B7	QPSK20M	21100	50	0	Bottom Side	-	22.50	21.63	0.02	0.573	0.700
T340	LTE B7	QPSK20M	20850	1	50	Rear Face	-	23.00	22.32	-0.01	1.130	1.322
T341	LTE B7	QPSK20M	21350	1	50	Rear Face	-	23.00	22.31	0.03	1.070	1.254
T344	LTE B7	QPSK20M	20850	50	0	Rear Face	-	22.50	21.57	0.07	0.926	1.147
T345	LTE B7	QPSK20M	21350	50	0	Rear Face	-	22.50	21.64	-0.06	0.834	1.017
T346	LTE B7	QPSK20M	21100	100	0	Rear Face	-	22.50	21.57	0.05	0.900	1.115
T347	LTE B7	QPSK20M	21100	1	50	Rear Face	1	23.00	22.44	0.08	1.110	1.263
T348	LTE B7	QPSK20M	21100	1	50	Rear Face	2	23.00	22.44	-0.01	1.100	1.251
T349	LTE B7	QPSK20M	21100	1	50	Rear Face	3	23.00	22.44	0.01	1.030	1.172
T350	LTE B7	QPSK20M	21100	1	50	Rear Face (1st Repeated)	-	23.00	22.44	0.02	1.080	1.229
T360	LTE B17	QPSK10M	23790	1	24	Rear Face	-	24.00	23.48	0.02	0.926	1.044
T361	LTE B17	QPSK10M	23790	1	24	Left Side	-	24.00	23.48	0.05	0.055	0.062
T362	LTE B17	QPSK10M	23790	1	24	Right Side	-	24.00	23.48	-0.01	0.037	0.042
T363	LTE B17	QPSK10M	23790	1	24	Top Side	-	24.00	23.48	0.00	0.000	<0.001
T364	LTE B17	QPSK10M	23790	1	24	Bottom Side	-	24.00	23.48	0.03	0.278	0.313
T365	LTE B17	QPSK10M	23790	25	0	Rear Face	-	23.50	22.06	0.05	0.621	0.865

T366	LTE B17	QPSK10M	23790	25	0	Left Side	-	23.50	22.06	0.06	0.036	0.050
T367	LTE B17	QPSK10M	23790	25	0	Right Side	-	23.50	22.06	0.01	0.016	0.022
T368	LTE B17	QPSK10M	23790	25	0	Top Side	-	23.50	22.06	0.00	0.000	<0.001
T369	LTE B17	QPSK10M	23790	25	0	Bottom Side	-	23.50	22.06	-0.06	0.169	0.235
T370	LTE B17	QPSK10M	23780	1	24	Rear Face	-	24.00	23.31	0.05	0.885	1.037
T371	LTE B17	QPSK10M	23800	1	24	Rear Face	-	24.00	23.25	0.04	0.910	1.082
T372	LTE B17	QPSK10M	23780	25	0	Rear Face	-	23.50	22.05	0.07	0.598	0.835
T373	LTE B17	QPSK10M	23800	25	0	Rear Face	-	23.50	22.05	-0.02	0.618	0.863
T374	LTE B17	QPSK10M	23800	50	0	Rear Face	-	23.50	22.01	0.01	0.623	0.878
T375	LTE B17	QPSK10M	23790	1	24	Rear Face (1st Repeated)	-	24.00	23.48	0.03	0.917	1.034

3. Body SAR test results of WIFI

Test No.	Band	CH	Test Position With 0cm	Data Rate	Power Setting	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T410	802.11b	1	Rear Face	1	16	18.00	17.36	0.00	0.929	1.077
T411	802.11b	1	Right Side	1	16	18.00	17.36	0.09	0.110	0.127
T412	802.11b	1	Top Side	1	16	18.00	17.36	-0.03	1.230	1.425
T413	802.11b	6	Top Side	1	16	18.00	16.75	-0.01	0.905	1.207
T414	802.11b	11	Top Side	1	16	18.00	16.45	0.06	0.761	1.087
T415	802.11b	6	Rear Face	1	16	18.00	16.75	0.07	0.337	0.449
T412	802.11b	1	Top Side (1st Repeated)	1	16	18.00	17.36	0.02	1.210	1.402

Note:

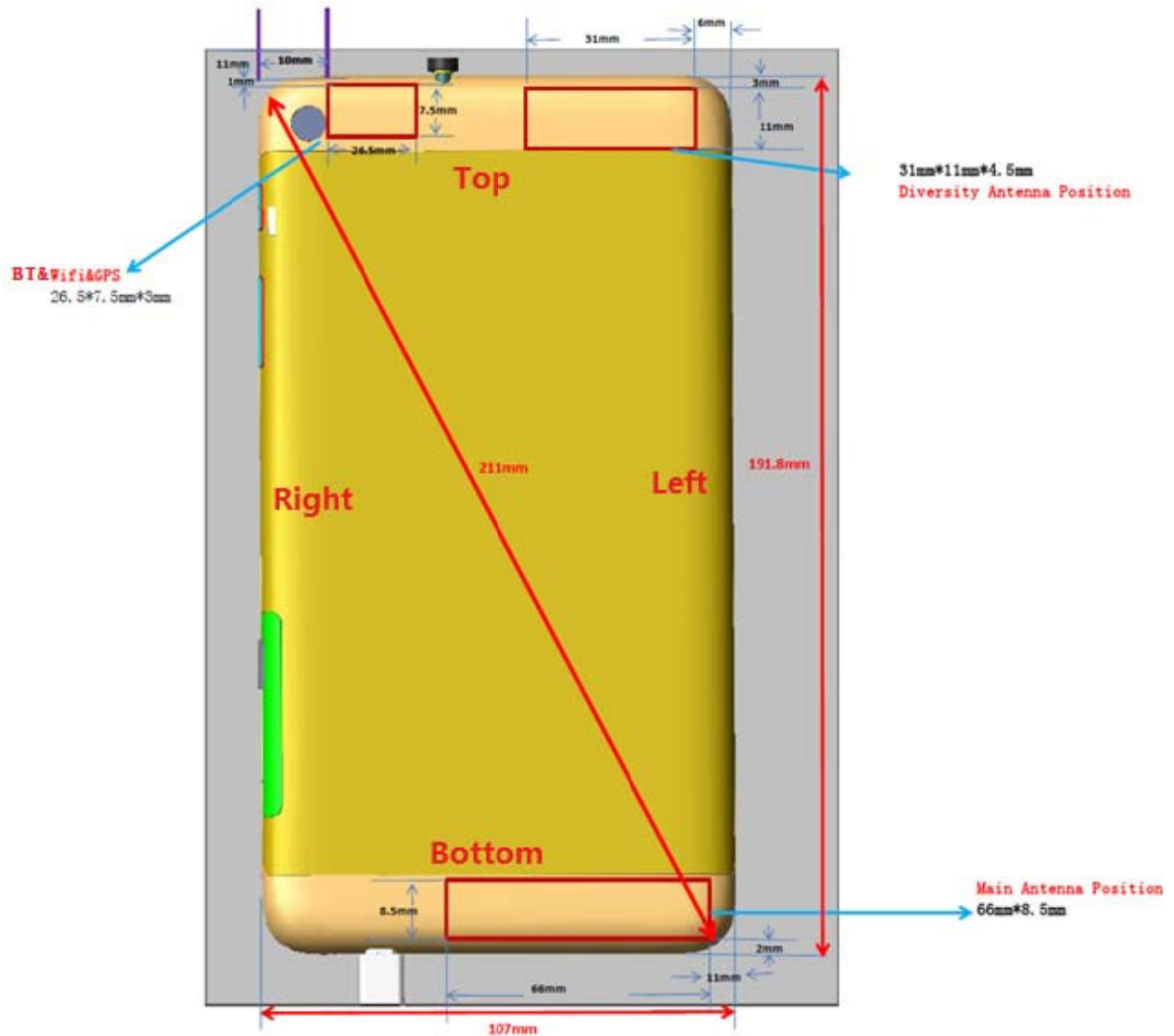
1) Per KDB248227, for WiFi 2.4GHz, the highest measured maximum output power Channel for DSSS modes(802.11b)was selected for SAR measurement.SAR for OFDM modes(2.4GHz 802.11g/n) was not required When the highest reported SAR for DSSS is adjusted by the ratio of OFDM modes(802.11g/n)to DSSS modes(802.11b)specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

2) Per KDB248227D01, 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.

10. 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 447498D01 General RF Exposure Guidance.

The location of the antennas is shown as below picture:



Note:

1) Diversity antenna is used to improve the acceptance of performance of the main antenna, it does not have a transmitter function.

11. ESTIMATED SAR CALCULATION

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:

(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 standalone 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.

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

Estimated SAR calculation

Mode	Position	P _{max} (dBm)*	P _{max} (mW)	Distance (mm)	f (GHz)	X	Estimated SAR (W/Kg)*
BT	Rear /Top/Right	9.5	8.91	5	2.480	7.5	0.374
	Left	-	-	70.5	-	-	0.4
	Bottom	-	-	183.3	-	-	0.4
2.4G WiFi	Left	-	-	70.5	-	-	0.4
	Bottom	-	-	183.3	-	-	0.4

12. SIMULTANEOUS TRANSMISSION

Per KDB 447498D01v06, 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.	Configuration	Head	Body
1	GSM (Voice)+ WiFi 2.4G	Yes	Yes
2	GPRS/EDGE (DATA)+ WiFi 2.4G	N/A	Yes
3	GSM(Voice)+BT	N/A	Yes
4	GPRS/EDGE(DATA)+BT	N/A	Yes
5	UMTS(Voice)+ WiFi 2.4G	Yes	Yes
6	UMTS(DATA)+ WiFi 2.4G	N/A	Yes
7	UMTS(Voice)+BT	N/A	Yes
8	UMTS(DATA)+BT	N/A	Yes
9	LTE(DATA)+ WiFi 2.4G	Yes*	Yes
10	LTE(DATA)+BT	N/A	Yes

Note:

- i)* VOIP 3rd party applications may possibly be installed and used by the end user.
- ii) Wi-Fi and Bluetooth share the same antenna and can't transmit simultaneously.
- iii) 2G&3G<E 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 BT and therefore were not considered for simultaneous transmission.

13. SAR SUMMATION SCENARIO

About BT/2.4G WiFi and GSM/UMTS/LTE antenna

Test Position Reported SAR _{1g}	Head				Body					
	Right Cheek	Right Tilted	Left Cheek	Left Tilted	Front	Rear	Left	Right	Top	Bottom
GSM850	0.010	0.009	0.005	0.006	-	1.434	0.065	0.237	<0.001	0.725
GSM1900	0.004	<0.001	0.005	<0.001	-	1.217	0.198	0.059	<0.001	0.498
UMTS B2	0.010	0.002	0.011	0.001	-	1.235	0.185	0.061	<0.001	0.681
UMTS B4	<0.001	<0.001	0.005	<0.001	-	1.149	0.232	0.049	<0.001	0.624
UMTS B5	0.020	0.012	0.008	0.009	-	1.372	0.094	0.051	<0.001	0.460
LTE B2	0.007	0.003	0.014	0.001	-	1.383	0.137	0.044	<0.001	0.600
LTE B4	0.011	0.011	0.020	0.003	-	1.057	0.172	0.034	<0.001	0.348
LTE B5	0.009	0.008	0.005	0.005	-	1.176	0.055	0.172	<0.001	0.406
LTE B7	0.004	0.001	0.006	<0.001	-	1.354	0.176	0.090	<0.001	0.788
LTE B17	0.006	0.004	0.003	0.003	-	1.082	0.062	0.042	<0.001	0.313
BT	-	-	-	-	-	0.374	0.400	0.374	0.374	0.400
WiFi 2.4G	0.511	0.476	1.078	1.005	-	1.077	0.400	0.127	1.425	0.400
MAX Σ SAR _{1g}	0.531	0.488	1.098	1.014	-	2.511	0.632	0.611	<1.426	1.188

Reported SAR _{1g} Test Position	GSM850	GSM1900	UMTS B2	UMTS B4	UMTS B5	LTE B2	LTE B4	LTE B5	LTE B7	LTE B17	2.4G WiFi	MAX Σ SAR _{1g}
	0	00	B2	B4	B5	B2	B4	B5	B7	B17	WiFi	Σ SAR _{1g}
Rear	1.434	/	/	/	/	/	/	/	/	/	1.077	2.511
	/	1.217	/	/	/	/	/	/	/	/	1.077	2.294
	/	/	1.235	/	/	/	/	/	/	/	1.077	2.312
	/	/	/	1.149	/	/	/	/	/	/	1.077	2.226
	/	/	/	/	1.372	/	/	/	/	/	1.077	2.449
	/	/	/	/	/	1.383	/	/	/	/	1.077	2.460
	/	/	/	/	/	/	1.057	/	/	/	1.077	2.134
	/	/	/	/	/	/	/	1.176	/	/	1.077	2.253
	/	/	/	/	/	/	/	/	1.354	/	1.077	2.431
	/	/	/	/	/	/	/	/	/	1.082	1.077	2.159

Reported SAR _{1g} Test Position	GSM85 0	GSM19 00	UMTS B2	UMTS B4	UMTS B5	LTE B2	LTE B4	LTE B5	LTE B7	LTE B17	BT	MAX Σ SAR _{1g}
Rear	1.434	/	/	/	/	/	/	/	/	/	0.374	1.808
	/	1.217	/	/	/	/	/	/	/	/	0.374	1.591
	/	/	1.235	/	/	/	/	/	/	/	0.374	1.609
	/	/	/	1.149	/	/	/	/	/	/	0.374	1.523
	/	/	/	/	1.372	/	/	/	/	/	0.374	1.746
	/	/	/	/	/	1.383	/	/	/	/	0.374	1.757
	/	/	/	/	/	/	1.057	/	/	/	0.374	1.431
	/	/	/	/	/	/	/	1.176	/	/	0.374	1.550
	/	/	/	/	/	/	/	/	1.354	/	0.374	1.728
	/	/	/	/	/	/	/	/	/	1.082	0.374	1.456

Note: 1) MAX. Σ SAR_{1g} < 1.6 W/Kg, the SAR to peak location separation ratio should not be considered, otherwise, see section 13.1 for more information.

2) The highest simultaneous SAR value=1.591 W/Kg, per KDB690783 D01

13.1 SIMULTANEOUS TRANSMISSION CONCLUSION

According to KDB447498 D01v06, When the sum of SAR is larger than limit, SAR test exclusion is determined by the SAR to peak location separation ratio (SPLSR). When the SAR to peak location ratio for each pair of antennas is ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion. When 10-g SAR applies, the ratio must be ≤ 0.10 .

When SAR is measured for both antennas in the pair the peak location separation distance is computed by the following formula:

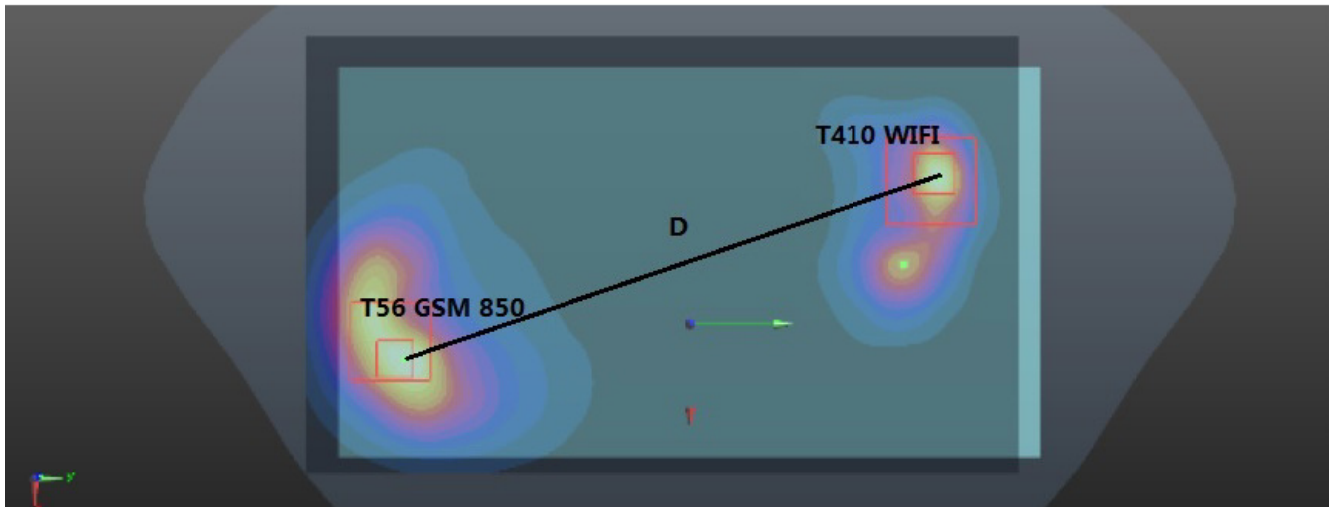
$$\text{Distance}_{\text{Tx1-Tx2}} = R_i = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2 + (z_1 - z_2)^2}$$

$$\text{SPLS Ratio} = (\text{SAR}_1 + \text{SAR}_2)^{1.5} / R_i$$

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

1) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with GSM850 and 2.4GWiFi.

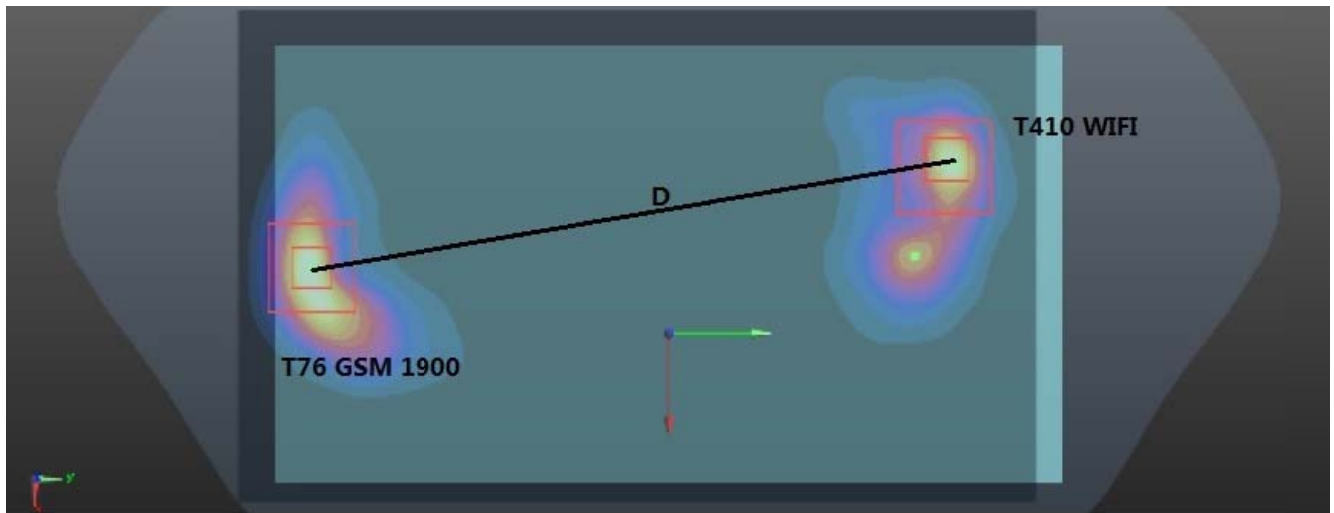
The Peak SAR location is as below:



Mode	Reported SAR _{1g}	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
GSM850	1.434	1.390	0.0095	-0.078	-0.204	161.9	0.025	0.04	No
2.4GWiFi	1.077	1.150	-0.0418	0.0756	-0.204				

2) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with GSM1900 and 2.4GWiFi.

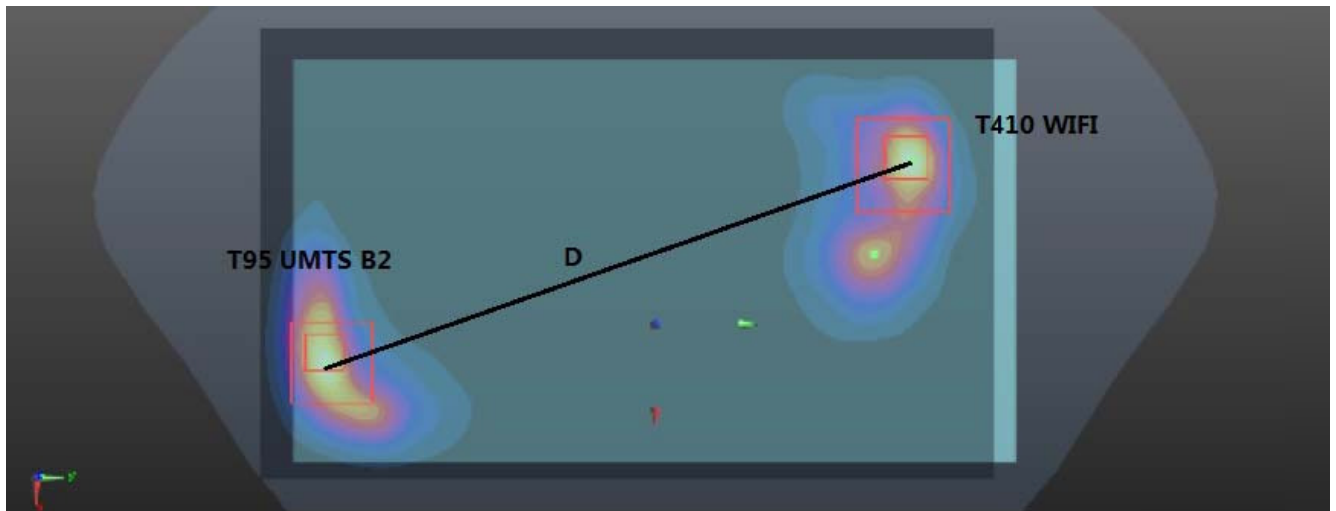
The Peak SAR location is as below:



Mode	Reported SAR _{1g}	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
GSM1900	1.217	1.190	-0.016	-0.087	-0.204	164.6	0.021	0.04	No
2.4GWiFi	1.077	1.150	-0.0418	0.0756	-0.204				

3) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with UMTS B2 and 2.4GWiFi.

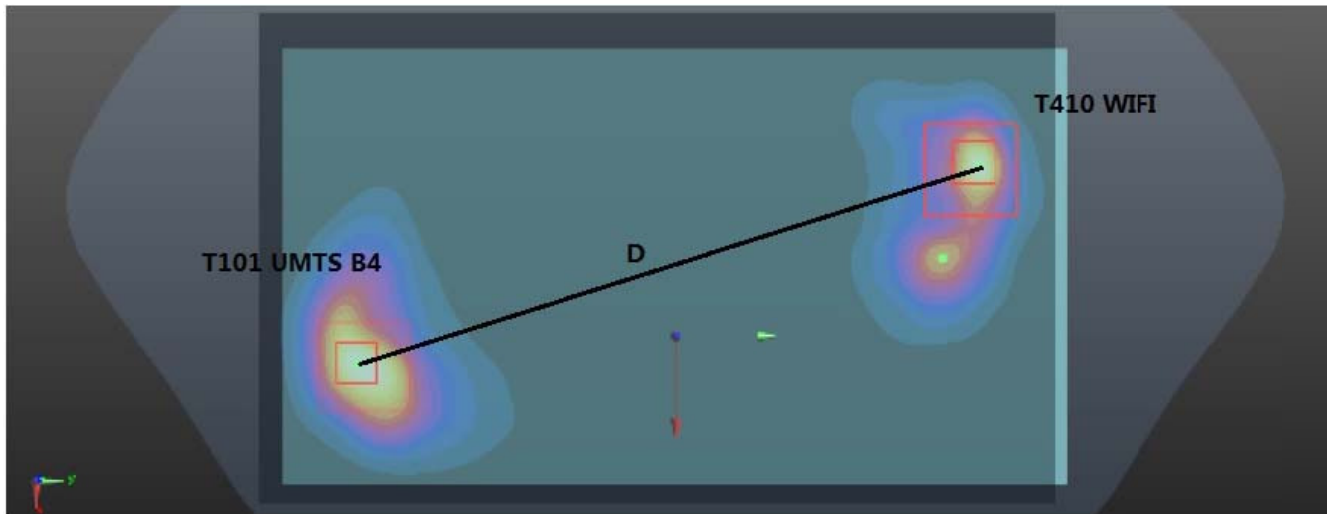
The Peak SAR location is as below:



Mode	Reported SAR _{1g}	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
UMTS B2	1.235	1.240	0.003	-0.087	-0.204	168.7	0.021	0.04	No
2.4GWiFi	1.077	1.150	-0.0418	0.0756	-0.204				

4) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with UMTS B4 and 2.4GWiFi.

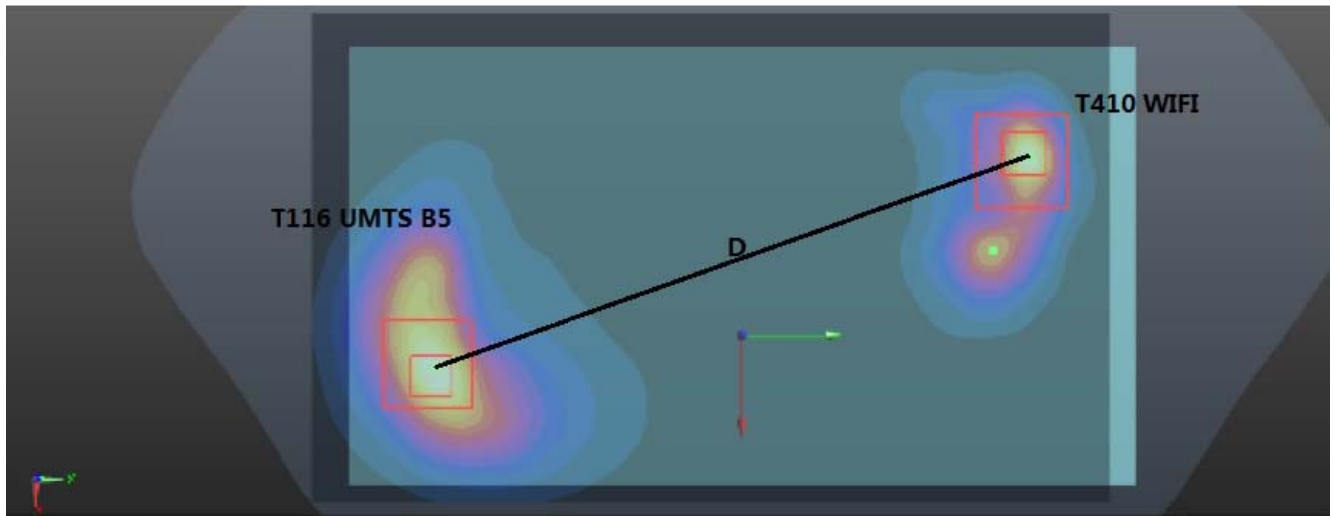
The Peak SAR location is as below:



Mode	Reported SAR _{1g}	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
UMTS B4	1.149	1.010	0.0065	-0.078	-0.203	161.0	0.021	0.04	No
2.4GWiFi	1.077	1.150	-0.0418	0.0756	-0.204				

5) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with UMTS B5 and 2.4GWiFi.

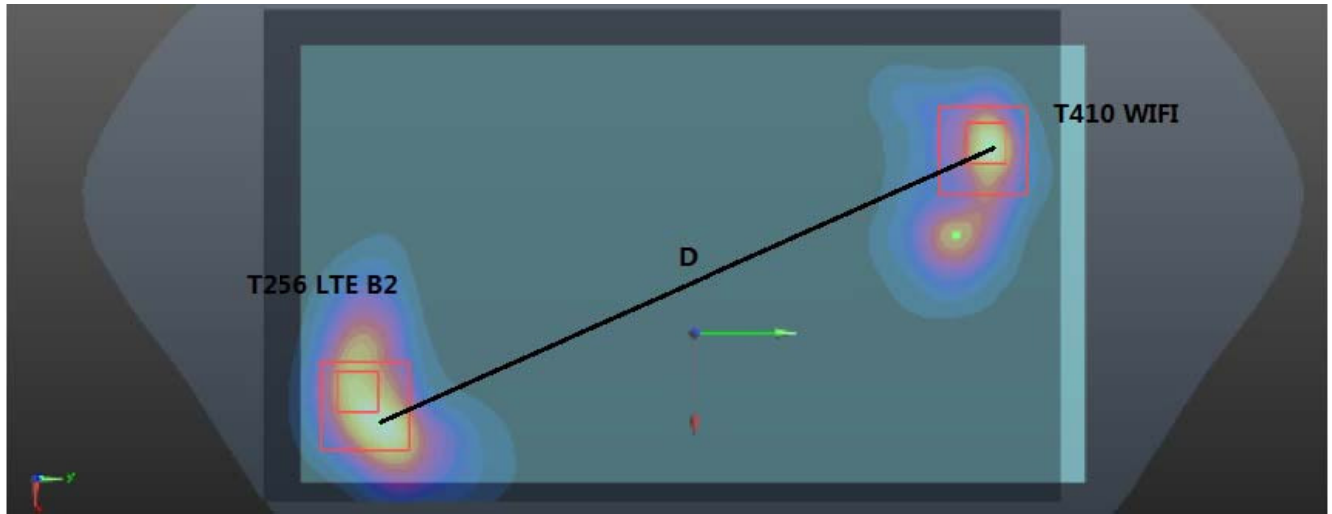
The Peak SAR location is as below:



Mode	Reported SAR _{1g}	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
UMTS B5	1.372	1.300	0.008	-0.075	-0.204	158.6	0.024	0.04	No
2.4GWiFi	1.077	1.150	-0.0418	0.0756	-0.204				

6) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with LTE B2 and 2.4GWiFi.

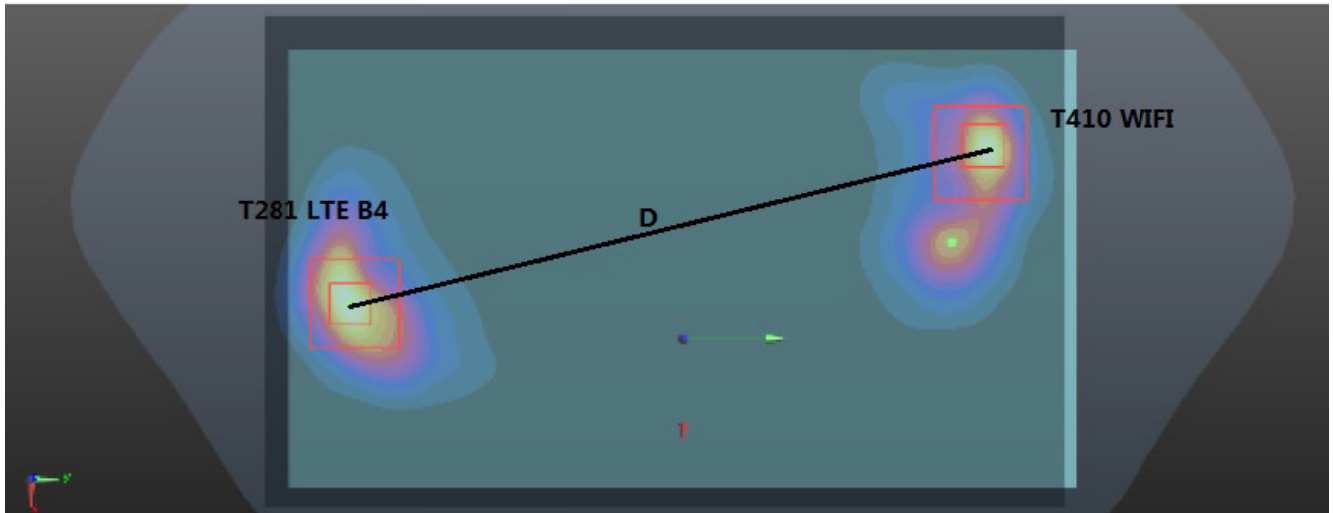
The Peak SAR location is as below:



Mode	Reported SAR _{1g}	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
LTE B2	1.383	1.380	0.0135	-0.0845	-0.203	169.4	0.023	0.04	No
2.4GWiFi	1.077	1.150	-0.0418	0.0756	-0.204				

7) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with LTE B4 and 2.4GWiFi.

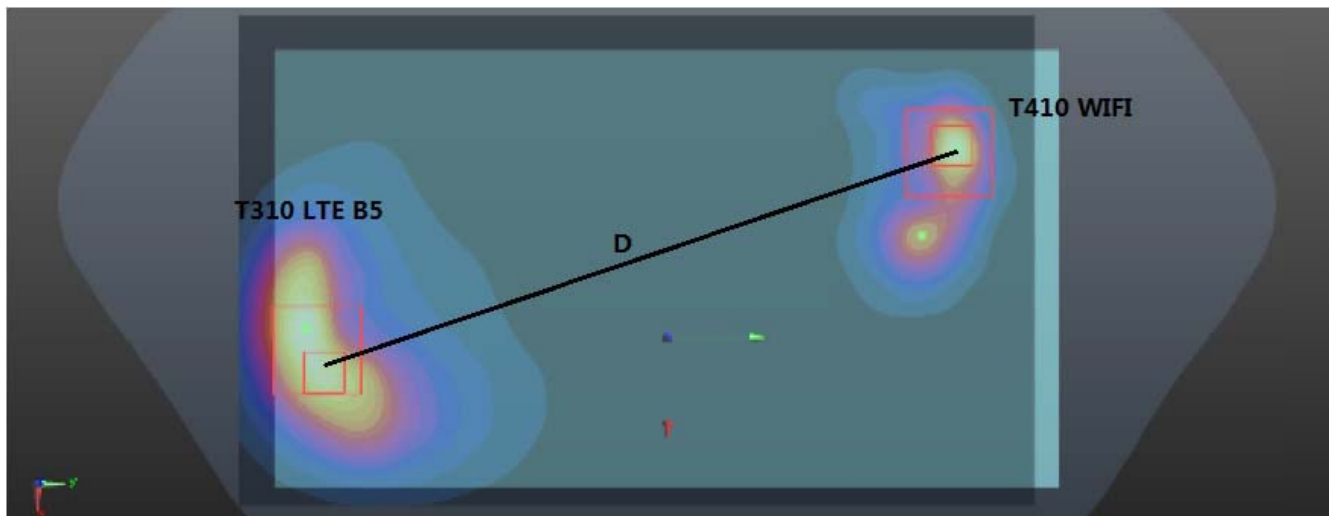
The Peak SAR location is as below:



Mode	Reported SAR _{1g}	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
LTE B4	1.057	1.030	-0.0085	-0.081	-0.203	160.1	0.019	0.04	No
2.4GWiFi	1.077	1.150	-0.0418	0.0756	-0.204				

8) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with LTE B5 and 2.4GWiFi.

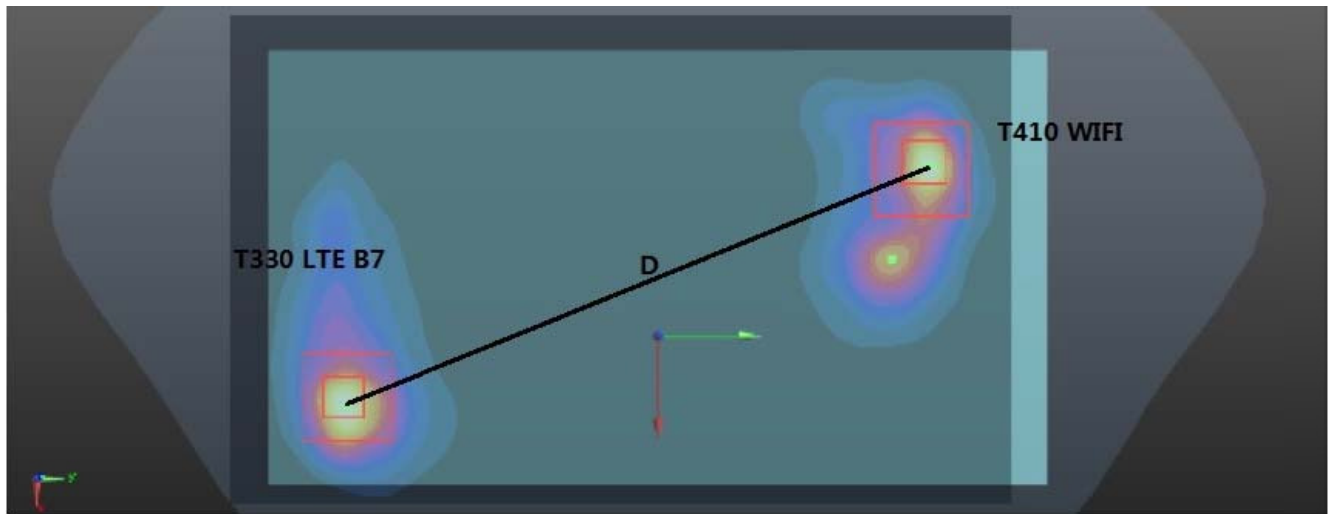
The Peak SAR location is as below:



Mode	Reported SAR _{1g}	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
LTE B5	1.176	1.240	-0.0025	-0.0885	-0.204	168.7	0.020	0.04	No
2.4GWiFi	1.077	1.150	-0.0418	0.0756	-0.204				

9) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with LTE B7 and 2.4GWiFi.

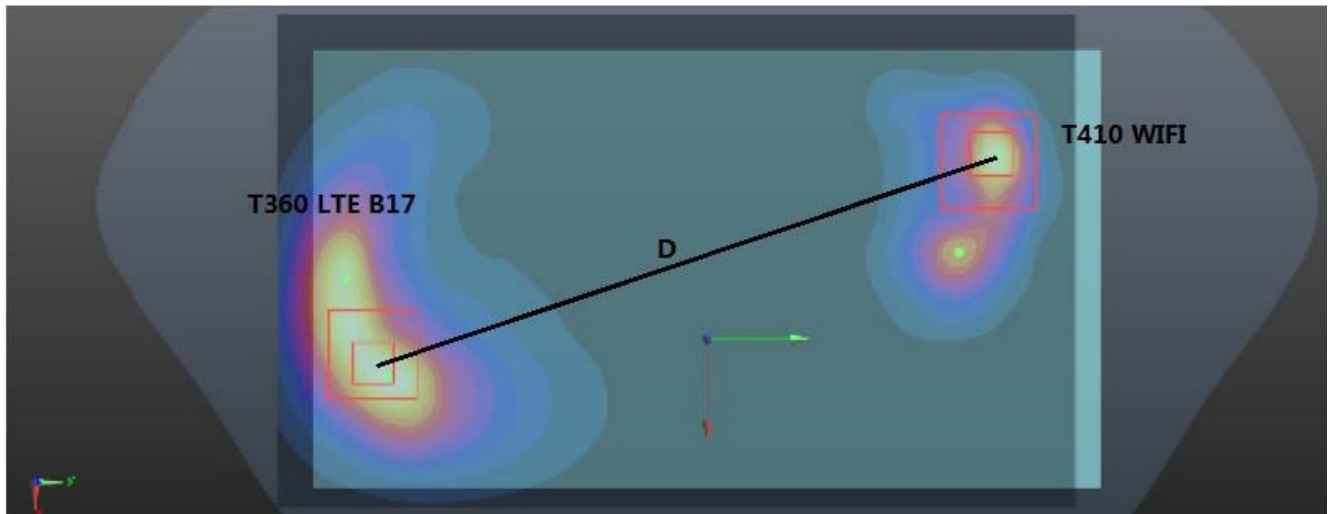
The Peak SAR location is as below:



Mode	Reported SAR _{1g}	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
LTE B7	1.354	1.450	0.017	-0.0762	-0.203	162.8	0.023	0.04	No
2.4GWiFi	1.077	1.150	-0.0418	0.0756	-0.204				

10) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with LTE B17 and 2.4GWiFi.

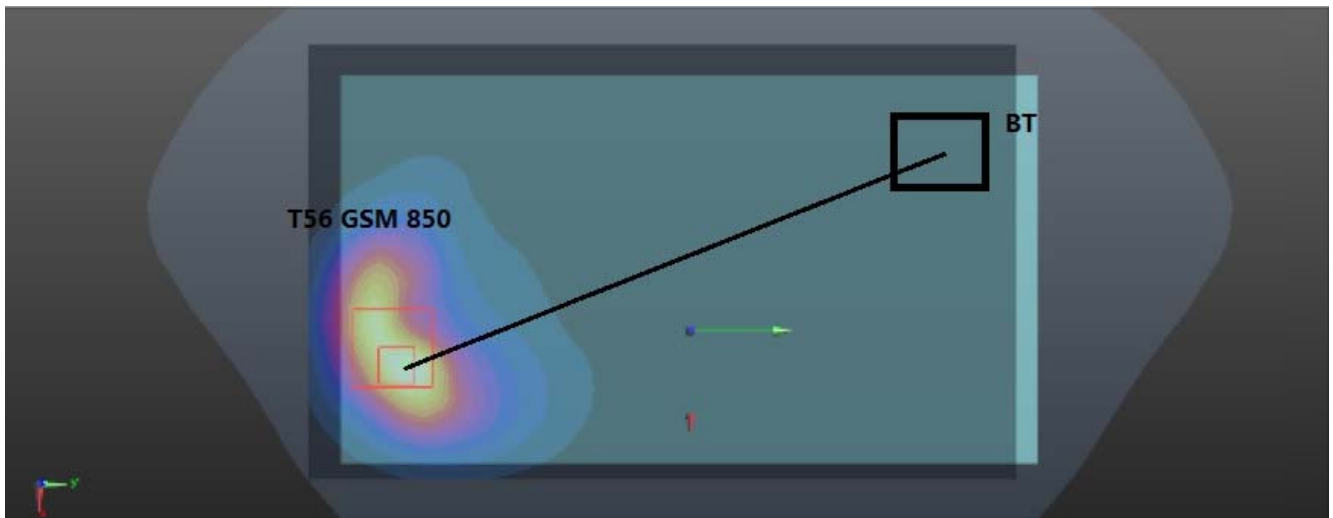
The Peak SAR location is as below:



Mode	Reported SAR _{1g}	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
LTE B17	1.082	1.050	-0.0065	-0.086	-0.203	165.4	0.019	0.04	No
2.4GWiFi	1.077	1.150	-0.0418	0.0756	-0.204				

11) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with GSM850 and BT.

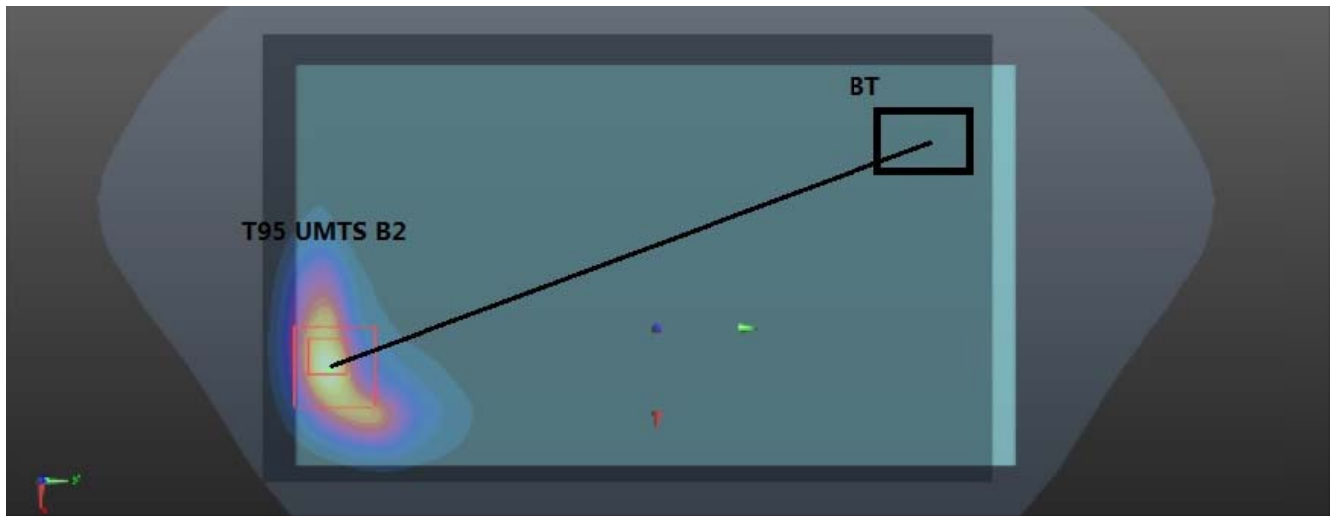
The Peak SAR location is as below:



Mode	Reported or Estimated SAR	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
GSM850	1.434	1.390	0.0095	-0.078	-0.204	167.1	0.015	0.04	No
BT	0.374	/	-0.017	0.087	-0.204				

12) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with UMTS B2 and BT.

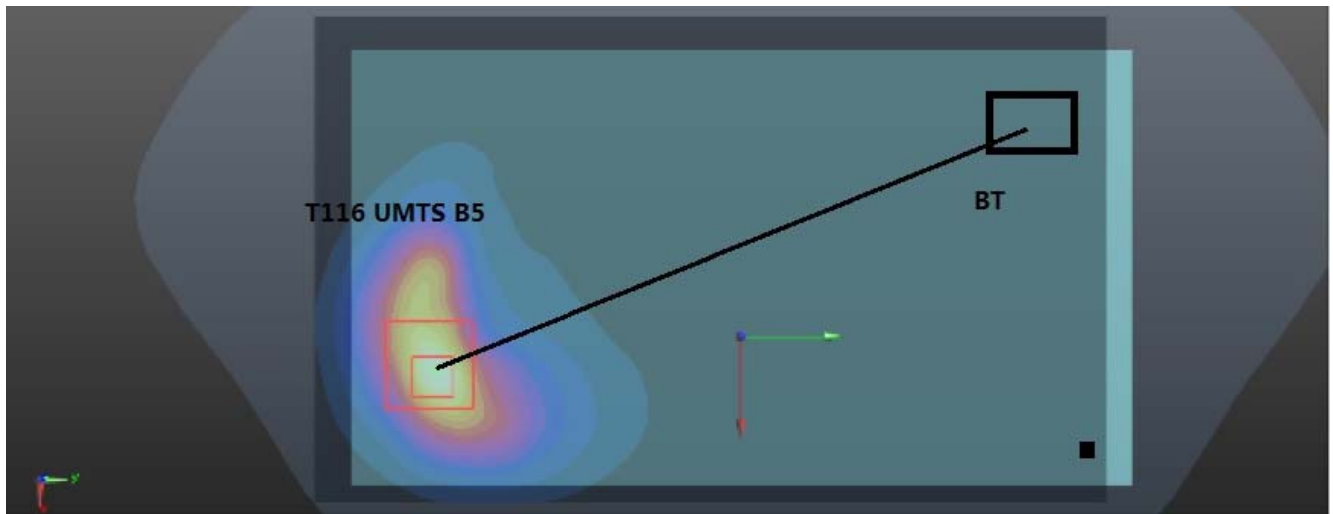
The Peak SAR location is as below:



Mode	Reported or Estimated SAR	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
UMTSB2	1.235	1.240	0.003	-0.087	-0.204	175.1	0.012	0.04	No
BT	0.374	/	-0.017	0.087	-0.204				

13) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with UMTS B5 and BT.

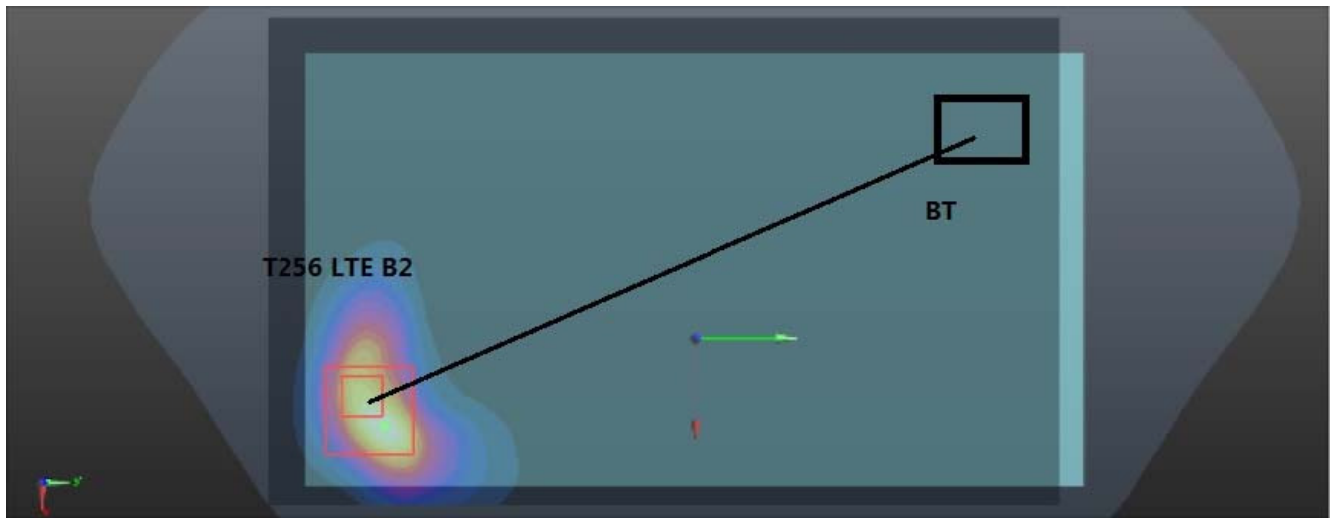
The Peak SAR location is as below:



Mode	Reported or Estimated SAR	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
UMTS B5	1.372	1.300	0.008	-0.075	-0.204	163.9	0.014	0.04	No
BT	0.374	/	-0.017	0.087	-0.204				

14) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with LTE B2 and BT.

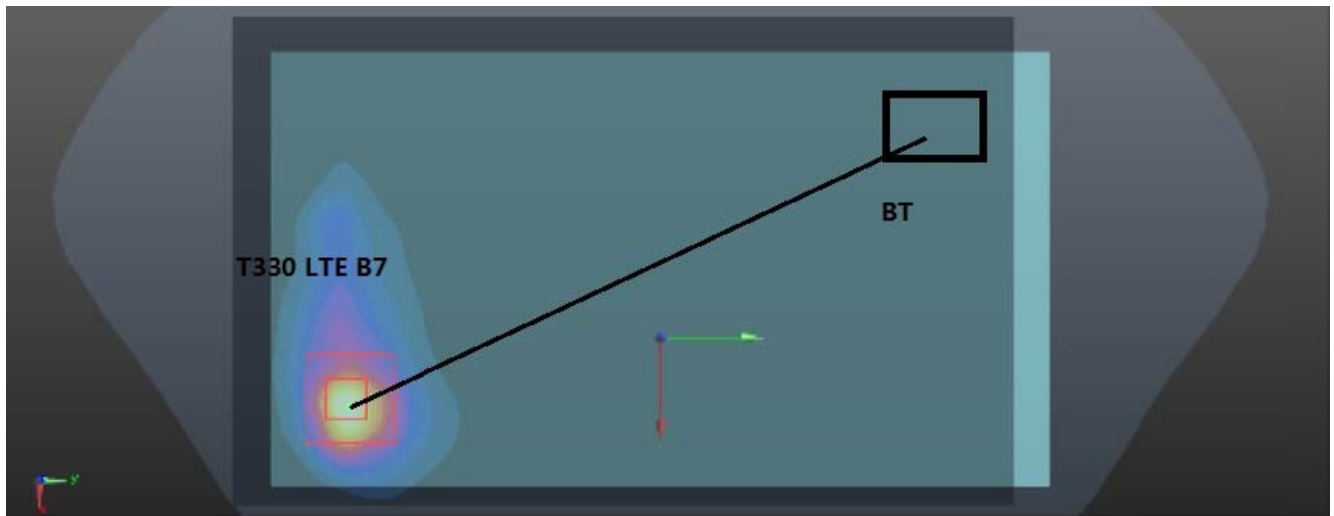
The Peak SAR location is as below:



Mode	Reported or Estimated SAR	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
LTE B2	1.383	1.380	0.0135	-0.0845	-0.203	174.2	0.013	0.04	No
BT	0.374	/	-0.017	0.087	-0.204				

15) The sum of aggregate 1g SAR was above 1.6 W/Kg for Rear Face configuration with LTE B7 and BT.

The Peak SAR location is as below:



Mode	Reported or Estimated SAR	Peak SAR _{1g}	X	Y	Z	D(mm)	SPLSR	Ratio Limit	Simultaneous SAR
	mW/g	mW/g	m	m	m				
LTE B7	1.354	1.450	0.017	-0.0762	-0.203	166.7	0.014	0.04	No
BT	0.374	/	-0.017	0.087	-0.204				

APPENDIX

1. Test Layout

Specific Absorption Rate Test Layout



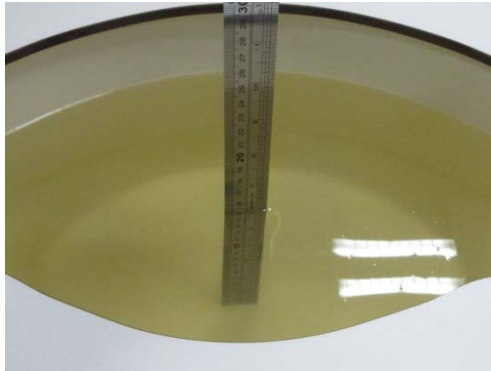
Liquid depth in the flat Phantom ($\geq 15\text{cm}$ depth)

Body(750MHz) 15.6cm

Head(750MHz) 15.6cm



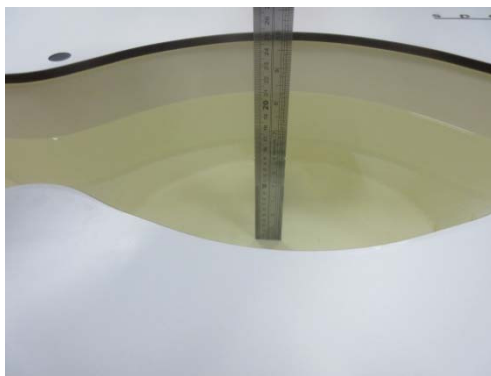
Body(835MHz) 15.5cm



Head(835MHz) 15.9cm



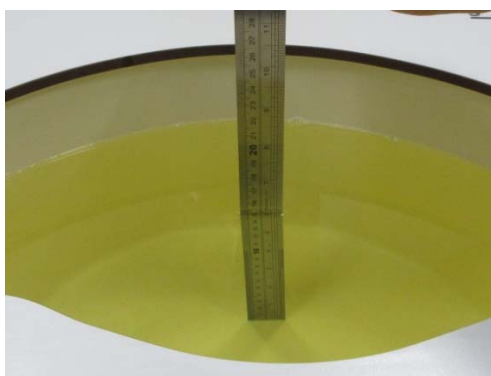
Body(1750MHz) 15.4cm



Head(1750MHz) 15.9cm



Body(1900MHz~2600 MHz) 15.5cm Head (1900MHz~2600 MHz) 15.1cm



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.)