FCC SAR Test Report

FCC ID: YJYCLUE

Project No.	:	1602C039
Equipment	:	4G LTE Digital Mobile Telephone
Model Name	:	C630
Applicant	:	Shanghai Feixun Communication Co.,Ltd.
Address	:	No.3666,Sixian Rd.,Songjiang District,Shanghai,P.R.China

Date of Receipt	:	Feb. 19, 2016
Date of Test	:	Feb. 28, 2016 ~ Mar. 04, 2016
Issued Date	:	Mar. 11, 2016
Tested by	:	BTL Inc.

PREPARED BY : (Super Jiang/ Technical Engineer)

APPROVED BY : (Steven Lu / Technical Manager)

BTL INC.

No.3, Jinshagang 1st Road, Shixia, Dalang Town, Dongguan, Guangdong, China.

TEL: +86-769-8318-3000 FAX: +86-769-8319-6000

Testing Laboratory 2640

Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with the standards traceable to National Measurement Laboratory (**NML**), or National Institute of Standards and Technology (**NIST**) .

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

BTL's reports must not be used by the client to claim product endorsement by the authorities or any agency of the Government.

This report is the confidential property of the client. As a mutual protection to the clients, the public and **BTL-self**, extracts from the test report shall not be reproduced except in full with **BTL**'s authorized written approval.

BTL's laboratory quality assurance procedures are in compliance with the **ISO Guide17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

Limitation

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

Table of Contents Page

Table of Contents Page

REPORT ISSUED HISTORY

Issued No.	Description	Issued Date
BTL-FCC SAR-1-1602C039	Original Issue	Mar. 11, 2016

1. GENERAL SUMMARY

Equipment	4G LTE Digital Mobile Telephone
Brand Name	PHICOMM,FEIXUN
Model Name	C630
Manufacturer	Shanghai Feixun Communication Co.,Ltd.
Address	No.3666,Sixian Rd.,Songjiang District,Shanghai,P.R.China
Standard(s)	**ANSI Std C95.1-1992** Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.(IEEE Std C95.1-1991) **IEEE Std 1528-2013** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques **KDB941225 D01** 3G SAR Procedures v03r01 **KDB941225 D05** SAR for LTE Devices v02r05 **KDB941225 D06** Hotspot Mode V02r01 **KDB447498 D01** General RF Exposure Guidance v06 **KDB648474 D04** Handset SAR v01r03 **KDB248227 D01** 802. 11 Wi-Fi SAR v02r02 **KDB865664 D01** SAR measurement 100 MHz to 6 GHz v01r04 **KDB865664 D02** SAR Reporting v01r02 **KDB690783 D01** SAR Listings on Grants v01r03

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc.
The test data, data evaluation, and equipment configuration contained in our test report (Ref No. BTL-FCC SAR-1-1602C039) 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-worn(15mm) SAR-1g(W/kg)	Highest Hotspot(10mm) SAR-1g(W/kg)
PCE	GSM850	0.380	0.590	0.656
	GSM1900	0.165	0.353	1.027
	WCDMA Band 2	0.263	0.616	1.401
	WCDMA Band 5	0.304	0.520	0.529
	LTE Band 2	0.233	0.468	1.376
	LTE Band 4	0.456	0.678	1.296
	LTE Band 7	0.109	0.413	1.082
DTS	2.4G WLAN	0.097	0.009	0.020
The highest simultaneous SAR value is 1.401 W/kg per KDB690783 D01				

Note:

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

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 .

3.2 GENERAL DESCRIPTION OF EUT

Equipment	4G LTE Digital Mobile Telephone		
Model Name	C630		
IMEI Code	#1 867985021254432		
	#2 867985021254440		
S/N	A18J002UVT		
HW Version	V12		
SW Version	C630LwLA_0000_5.0_1.0T04_0202_SH		
Modulation	GSM(GMSK/8PSK),WCDMA(QPSK/16QAM),LTE(QPSK/16QAM), WiFi(DSSS/OFDM),BT(GFSK/ π /4-DQPSK/8-DPSK)		
Operation Frequency Range(s)	Band	TX (MHz)	RX (MHz)
	GSM850	824-849	869-894
	GSM1900	1850-1910	1930-1990
	WCDMA Band 2	1850-1910	1930-1990
	WCDMA Band 5	824-849	869-894
	LTE Band 2	1850-1910	1930-1990
	LTE Band 4	1710-1755	2110-2155
	LTE Band 7	2500-2570	2620-2690
	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	7		
Power Class:	4,tested with power level 5(GSM850)		
	1,tested with power level 0(GSM1900)		
	3, tested with power control "all 1"(WCDMA Band 2/5)		
	3, tested with power control "all Max" (LTE Band 2/4/7)		
Test Channels (low-mid-high):	128-190-251 (GSM850)		
	512-661-810 (GSM1900)		
	9262-9400-9538(WCDMA Band 2)		
	4132-4182-4233 (WCDMA 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)		
	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)		
	1-6 -11 (2.4G WIFI 802.11b/g/n HT20)		

Antenna Gain	BT/2.4G WiFi: -0.67dBi
	GSM850/ WCDMA Band 5: -0.47dBi
	GSM1900/WCDMA Band 2/LTE Band 2:3.36dBi
	LTE Band 7:3.25dBi
	LTE Band 4:3.75dBi
Other Information	
Battery	Model: BL-F33 Brand: PHICOMM Rated capacity: 2100mAh/8.0Wh Rated Voltage: 3.8V Manufacturer: VEKEN
Earphone	Brand: PHICOMM Model: 811001738 Manufacturer: WILLONGTECH

3.3 LABORATORY ENVIRONMENT

Temperature	Min. = 18ºC, Max. = 25ºC
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.	

3.4 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	3661	Apr. 24, 2016	1 Year
3	System Validation Dipole	Speag	D835V2	4d160	Sep. 30, 2015	1 Year
4	System Validation Dipole	Speag	D1750V2	1101	Sep. 22, 2015	1 Year
5	System Validation Dipole	Speag	D1900V2	5d179	Sep. 29, 2015	1 Year
6	System Validation Dipole	Speag	D2450V2	919	Sep. 28, 2015	1 Year
7	System Validation Dipole	Speag	D2600V2	1067	Sep. 28, 2015	1 Year
8	Twin Sam Phantom	Speag	Twin Sam Phantom V5.0	1784	N/A	N/A
9	Twin Sam Phantom	Speag	Twin Sam Phantom V5.0	1896	N/A	N/A
10	8960 Series 10 Wireless Com Test set	Agilent	E5515E	MY52112163	Sep. 09, 2015	1Year
11	CMW500-Wideband Radio Communication Tester	RS	CMW500	153083	May.06,2015	1 Year
12	Power Amplifier	Mini-Circuits	ZHL-42W+	QA1333003	Mar. 09, 2015	1 Year
13	Power Amplifier	Mini-Circuits	ZVE-8G+	520701341	Mar. 09, 2015	1 Year
14	ENA Network Analyzer	Agilent	E5071C	MY46102965	Mar. 29, 2015	1 Year
15	MXG Analog Signal Generator	Agilent	N5181A	MY49060710	Nov. 02, 2015	1 Year
16	P-series power meter	Agilent	N1911A	MY45100473	Mar. 29, 2015	1 Year
17	wideband power sensor	Agilent	N1921A	MY51100041	Mar. 29, 2015	1 Year
18	Power Meter	Anritsu	ML2487A	6K00004714	Mar. 16, 2015	1 Year
19	Power Meter Sensor	Anritsu	MA2491A	34138	Mar. 16, 2015	1 Year
20	Dielectric Assessment Kit	Speag	DAK-3.5	1226	Aug. 04, 2015	1 Year
21	Low pass filter	Mini-Circuits	SLP-2950+	M108294	Mar. 29, 2015	1 Year
22	Attenuator	Mini-Circuits	VAT-10+	31317-1	Mar. 29, 2015	1 Year
23	Attenuator	Mini-Circuits	VAT-10+	31317-2	Mar. 29, 2015	1 Year
24	Attenuator	MEB	300-affn-03	314	Mar. 29, 2015	1 Year
25	Dual directional coupler	Agilent	777D	50208	Mar. 29, 2015	1 Year

Remark: " N/A" denotes no model name, serial No. or calibration specified.
All calibration period of equipment list is one year.

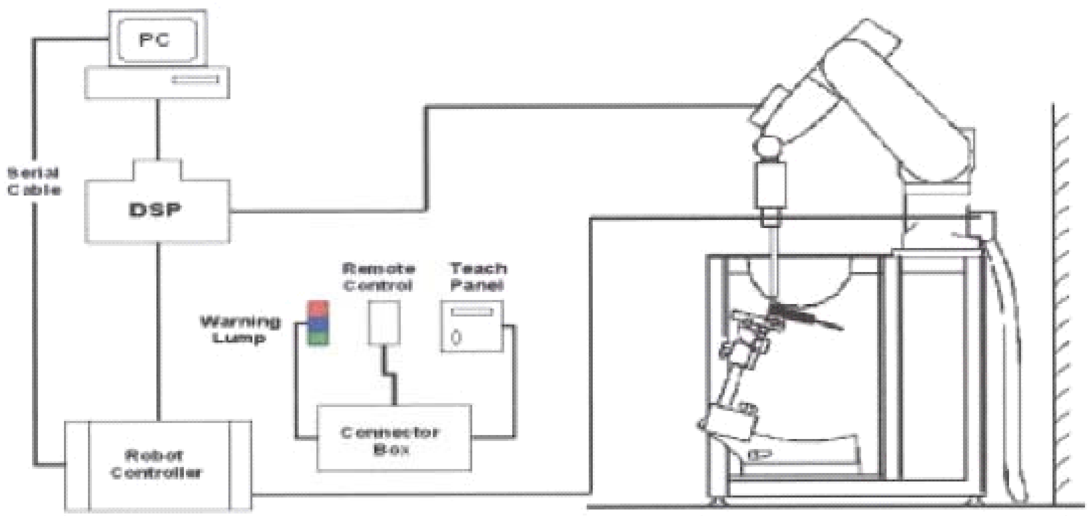
4.SAR MEASUREMENTS SYSTEM CONFIGURATION

4.1SAR MEASUREMENT SET-UP

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

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

4.1.1Test Setup Layout



4.2DASY5E-FIELDPROBESYSTEM

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

4.2.1EX3DV4 PROBE SPECIFICATION

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

EX3DV4 E-field Probe

4.2.2E-FIELD PROBE CALIBRATION

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

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

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

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

Where: Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

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

Where: σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m3).

4.2.3OTHER TEST EQUIPMENT

4.2.3.1. Device Holder for Transmitters

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

4.2.3.2 Phantom

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

4.2.4SCANNING PROCEDURE

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

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

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

- Area Scan

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

- Zoom Scan

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

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

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

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

4.2.5SPATIAL PEAK SAR EVALUATION

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

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

Extrapolation

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

Interpolation

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

Volume Averaging

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

Advanced Extrapolation

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

4.2.6DATA STORAGE AND EVALUATION

4.2.5.1Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE4". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

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

4.4.2 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:

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

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

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

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

ConvF = sensitivity enhancement in solution

aij = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

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

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

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

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

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

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

With SAR = local specific absorption rate in mW/g

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

= conductivity in [mho/m] or [Siemens/m]

= equivalent tissue density in g/cm^3

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

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

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

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

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

5. SYSTEM VERIFICATION PROCEDURE

5.1 TISSUE VERIFICATION

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

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

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

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

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

Tissue Verification									
Tissue Type	Frequency (MHz)	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Targeted Conductivity (σ)	Targeted Permittivity (εr)	Deviation Conductivity (σ) (%)	Deviation Permittivity (εr) (%)	Date
Head	835	22.3	0.892	41.550	0.90	41.5	-0.92	0.12	Feb. 29, 2016
Head	1750	22.2	1.387	41.440	1.37	40.1	1.24	3.34	Mar. 01, 2016
Head	1900	22.4	1.405	39.670	1.40	40.0	0.36	-0.82	Mar. 03, 2016
Head	2450	22.3	1.815	39.080	1.80	39.2	0.83	-0.31	Mar. 04, 2016
Head	2600	22.4	2.031	38.330	1.96	39.0	3.62	-1.72	Mar. 04, 2016
Body	835	22.5	0.995	56.080	0.97	55.2	2.57	1.59	Feb. 29, 2016
Body	1750	22.3	1.434	54.220	1.49	53.4	-3.76	1.54	Mar. 01, 2016
Body	1900	22.1	1.545	52.510	1.52	53.3	1.64	-1.48	Feb. 28, 2016
Body	1900	22.3	1.549	51.830	1.52	53.3	1.91	-2.76	Mar. 03, 2016
Body	2450	22.4	1.993	51.580	1.95	52.7	2.21	-2.13	Mar. 04, 2016
Body	2600	22.1	2.211	52.400	2.16	52.5	2.36	-0.19	Mar. 04, 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

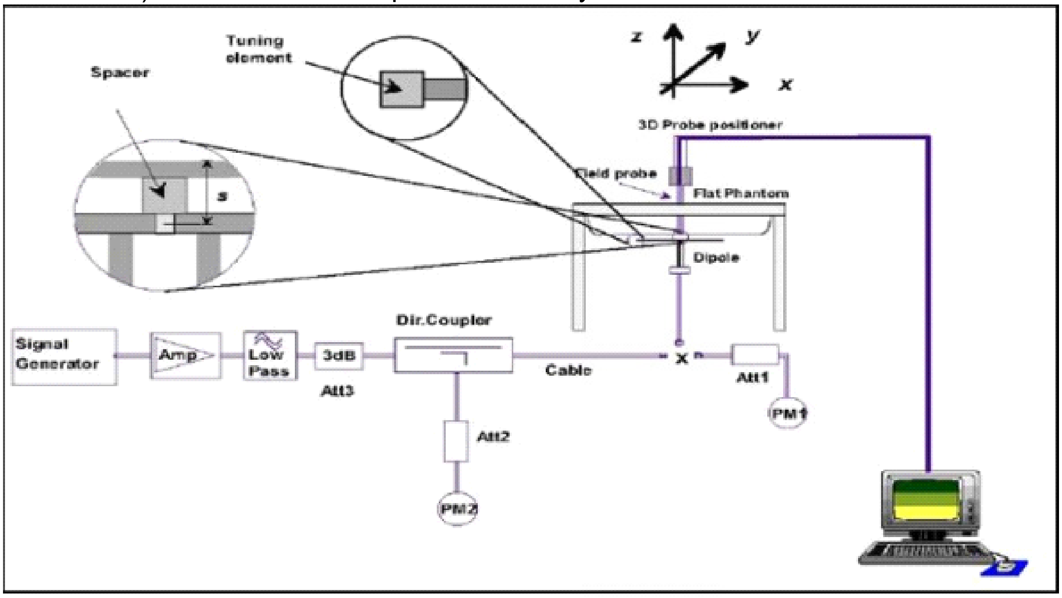
The system check is performed for verifying the accuracy of the complete measurement system and performance of the software. The system check is performed with tissue equivalent material according to IEEE P1528 (described above). The following table shows system check results for all frequency bands 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	Feb. 29, 2016	835	9.50	2.40	9.60	1.05	4d160
Head	Mar. 01, 2016	1750	36.60	9.24	36.96	0.98	1101
Head	Mar. 03, 2016	1900	39.70	9.89	39.56	-0.35	5d179
Head	Mar. 04, 2016	2450	52.00	12.82	51.28	-1.38	919
Head	Mar. 04, 2016	2600	56.80	14.13	56.52	-0.49	1067
Body	Feb. 29, 2016	835	9.52	2.41	9.64	1.26	4d160
Body	Mar. 01, 2016	1750	35.70	9.13	36.52	2.30	1101
Body	Feb. 28, 2016	1900	39.60	10.02	40.08	1.21	5d179
Body	Mar. 03, 2016	1900	39.60	10.06	40.24	1.62	5d179
Body	Mar. 04, 2016	2450	51.10	12.90	51.60	0.98	919
Body	Mar. 04, 2016	2600	54.10	13.80	55.20	2.03	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 8.2.

6.2SAR MEASUREMENT UNCERTAINTY

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.

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 8-PSK.

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	5.5
	2 TX slots	2	2	6
	3 TX slots	4	4	6.5
	4 TX slots	5.5	5.5	8
GSM1900	1 TX slot	0	0	5.5
	2 TX slots	2	2	7
	3 TX slots	4	4	8
	4 TX slots	5.5	5.5	9

7.1.2 WCDMA 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 3.4kbps SRB(signalling radio bearer) using the exposure configuration that results in the highest SAR in12.2kbps 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 12.2kbps RMC or the maximum SAR 12.2kbps 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 12.2kbps 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, ΔNACK, ΔCQI = 8. The variation of the β_c / β_d ratio causes a power reduction at sub-tests 2 - 4.

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

Note 1: ΔACK, ΔNACK and ΔCQI = 8 $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$
Note 2 : CM=1 for β_c/β_d = 12/15, β_{hs}/β_c = 24/15. For all other combinations of DPDCH,DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.
Note 3 : For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to β_c = 11/15 and β_d = 15/15

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

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

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

HSDPA UE category

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

4. HSUPA

SAR for Body exposure configurations is measured according to the "Body SAR Measurements" procedures of 3G device. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the primary mode and the adjusted SAR is ≤ 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 WCDMA Release 6 HSUPA

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs} (1)	β_{ec}	β_{ed}	β_{ec} (SF)	β_{ed} (code)	CM (2) (dB)	MPR (dB)	AG (4) Index	E-TFCI
1	11/15 (3)	15/15 (3)	64	11/15 (3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}:47/15 β_{ed2}:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (4)	15/15 (4)	64	15/15 (4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

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

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

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

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

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

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

HSUPA UE category

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

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

5. HSPA+

When the maximum average output power of each RF channel with (uplink) HSPA+ active is ≤¼ dB higher than that measured without HSPA+ using 12.2 kbps RMC, SAR evaluation for HSPA+ is not required.

Table Sub-test1 setup for release 7 HSPA+ with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

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

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

Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.

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

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

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
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2

3. A-MPR

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

4. LTE procedures for SAR testing

A) Largest channel bandwidth standalone SAR test requirements

i) QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

ii) QPSK with 50% RB allocation

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

iii) QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in i) and ii) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

iv) Higher order modulations

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

B) Other channel bandwidth standalone SAR test requirements

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

7.1.4 WIFI TEST CONFIGURATION

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

Mode	802.11b	802.11g	802.11n(20M)
Power Setting	15/15/14	12/13/12	10/11/10
Duty cycle	100%		
Crest factor	1		

For the 802.11b SAR tests, a communication link is set up with the test mode software for WiFi mode test. The Absolute Radio Frequency Channel Number(ARFCN) is allocated to 1 ,6 and 11 respectively in the case of 2450 MHz. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate.

7.1.4.1 2.4G SAR Test Requirements

✧ **802.11b DSSS SAR Test Requirements**

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

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

✧ **2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements**

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

1) When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
2) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

7.2 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 size of the mobile phone is142.69mm (length) X 72.49mm (width).

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

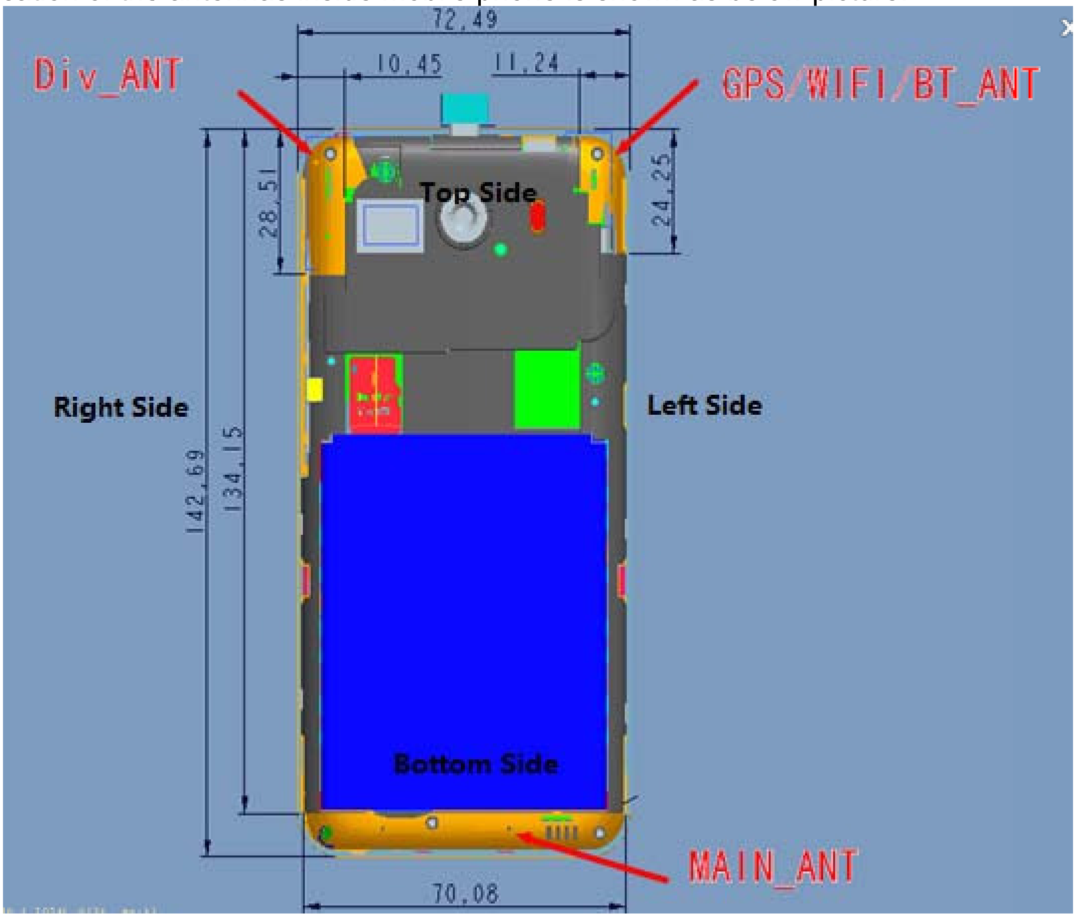


Table 7.2.2 Hotspot Side For SAR Testing

Mode	Exposure Condition	Front Side	Rear Side	Left Side	Right Side	Top Side	Bottom Side
GSM850/1900	Hotspot	Yes	Yes	Yes	Yes	No	Yes
WCDMA Band 2/5	Hotspot	Yes	Yes	Yes	Yes	No	Yes
LTE Band 2/4/7	Hotspot	Yes	Yes	Yes	Yes	No	Yes
2.4GWiFi	Hotspot	Yes	Yes	Yes	No	Yes	No

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

8.TEST RESULT

8.1CONDUCTED POWER RESULTS

8.1.1CONDUCTED POWER MEASUREMENTS OF GSM850

GSM850		Tune-up	Max Burst Average Power (dBm)			Tune-up	Max Frame Average Power (dBm)		
			128CH	190CH	251CH		128CH	190CH	251CH
			824.2MHz	836.6MHz	848.8MHz		824.2MHz	836.6MHz	848.8MHz
GSM (CS)		33.50	32.42	32.43	32.40	24.31	23.23	23.24	23.21
GPRS/ EDGE (GMSK)	1 Tx Slot	33.50	32.41	32.39	32.39	24.31	23.22	23.20	23.20
	2 Tx Slots	31.50	30.43	30.45	30.42	25.37	24.30	**24.32**	24.29
	3 Tx Slots	29.50	28.58	28.56	28.28	25.08	24.16	24.14	23.86
	4 Tx Slots	28.00	26.49	26.47	26.39	24.82	23.31	23.29	23.21
EDGE (8PSK)	1 Tx Slot	28.00	26.53	26.39	26.37	18.81	17.34	17.20	17.18
	2 Tx Slots	27.50	26.45	26.35	26.31	21.37	20.32	20.22	20.18
	3 Tx Slots	27.00	26.36	26.27	26.22	22.58	21.94	21.85	21.80
	4 Tx Slots	25.50	24.76	24.72	24.68	22.32	21.58	21.54	21.50

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 GPRS2Tx mode was selected for SAR testing according to the highest frame –averaged output power table.
4) The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:
Frame-averaged power=10 x log(Burst-averaged power mW x Slot used/8)

8.1.2CONDUCTED POWER MEASUREMENTS OF GSM1900

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)		30.50	29.33	29.35	29.31	21.31	20.14	20.16	20.12
GPRS /EDGE (GMSK)	1 Tx Slot	30.50	29.24	29.33	29.37	21.31	20.05	20.14	20.18
	2 Tx Slots	28.50	27.31	27.34	27.25	22.37	21.18	**21.21**	21.12
	3 Tx Slots	26.50	25.21	25.15	25.38	22.08	20.79	20.73	20.96
	4 Tx Slots	25.00	23.17	23.24	23.19	21.82	19.99	20.06	20.01
EDGE (8PSK)	1 Tx Slot	25.00	23.84	23.72	23.74	15.81	14.65	14.53	14.55
	2 Tx Slots	23.50	22.27	22.17	22.19	17.37	16.14	16.04	16.06
	3 Tx Slots	22.50	21.05	21.10	21.07	18.08	16.63	16.68	16.65
	4 Tx Slots	21.50	20.68	20.69	20.67	18.32	17.50	17.51	17.49

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 2Tx mode was selected for SAR testing according to the highest frame –averaged output power table.
4) The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:
Frame-averaged power=10 x log(Burst-averaged power mW x Slot used/8)

8.1.3CONDUCTED POWER MEASUREMENTS OF WCDMA1900 Band 2

WCDMA1900 (Band 2)		Tune-up	SAR Conducted Power (dBm)		
			9262CH	9400CH	9538CH
			1852.4	1880	1907.6
WCDMA	12.2kbps RMC	22.50	21.93	21.97	21.87
	64kbps RMC	22.50	21.91	21.85	21.84
	144kbps RMC	22.50	21.89	21.83	21.86
	384kbps RMC	22.50	21.87	21.82	21.85
HSDPA	Subtest 1	22.00	20.92	20.97	20.89
	Subtest 2	22.00	20.93	20.86	20.81
	Subtest 3	22.00	20.42	20.31	20.30
	Subtest 4	22.00	20.35	20.24	20.29
HSUPA	Subtest 1	22.00	20.95	20.57	20.44
	Subtest 2	21.00	19.63	19.32	19.31
	Subtest 3	21.00	19.08	19.05	19.68
	Subtest 4	22.00	20.48	20.37	20.81
	Subtest 5	22.00	20.93	20.86	20.84
HSPA+	Subtest-1(UL 16QAM)	22.00	20.96	20.81	20.82

Note:
1) The conducted power of WCDMA 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 ≤¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

8.1.4CONDUCTED POWER MEASUREMENTS OF WCDMA850 Band 5

WCDMA 850 (Band 5)		Tune-up	SAR Conducted Power (dBm)		
			4132CH	4182CH	4233CH
			826.4	836.4	846.6
WCDMA	12.2kbps RMC	24.00	22.96	23.03	22.73
	64kbps RMC	24.00	22.95	23.02	22.70
	144kbps RMC	24.00	22.97	23.01	22.67
	384kbps RMC	24.00	22.95	22.98	23.02
HSDPA	Subtest 1	23.00	21.80	22.05	21.81
	Subtest 2	23.00	21.82	22.10	21.80
	Subtest 3	23.00	21.33	21.46	21.43
	Subtest 4	23.00	21.33	21.53	21.31
HSUPA	Subtest 1	23.00	21.41	22.03	21.56
	Subtest 2	22.00	20.49	20.66	21.02
	Subtest 3	22.00	20.59	21.07	20.49
	Subtest 4	23.00	21.45	21.54	21.71
	Subtest 5	23.00	21.96	22.05	21.84
HSPA+	Subtest-1(UL 16QAM)	23.00	21.72	22.02	22.05

Note:
1) The conducted power of WCDMA 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 ≤¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

8.1.6CONDUCTED POWER MEASUREMENTS OF LTE Band 2

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low 18607 1850.7	Mid 18900 1880	High 19193 1909.3	3GPP MPR
1.4MHz	QPSK	1	0	22.00	21.12	21.20	21.10	0
		1	2	22.00	21.25	21.29	21.30	0
		1	5	22.00	21.07	21.26	21.10	0
		3	0	22.00	21.08	21.15	21.25	0
		3	1	22.00	21.27	21.25	21.26	0
		3	3	22.00	21.41	21.39	21.35	0
		6	0	21.00	20.17	20.34	20.25	1
	16QAM	1	0	21.00	20.94	20.36	20.50	1
		1	2	21.00	20.72	20.41	20.62	1
		1	5	21.00	20.61	20.32	20.47	1
		3	0	21.00	20.56	20.17	20.12	1
		3	1	21.00	20.44	20.32	20.15	1
		3	3	21.00	20.47	20.53	20.13	1
		6	0	20.00	19.53	19.46	19.22	2
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low 18615 1851.5	Mid 18900 1880	High 19185 1908.5	3GPP MPR
3MHz	QPSK	1	0	22.00	21.43	21.31	21.34	0
		1	7	22.00	21.44	21.40	21.31	0
		1	14	22.00	21.38	21.43	21.26	0
		8	0	21.00	20.23	20.29	20.30	1
		8	3	21.00	20.25	20.22	20.24	1
		8	7	21.00	20.21	20.24	20.26	1
		15	0	21.00	20.14	20.21	20.37	1
	16QAM	1	0	21.00	20.65	20.78	20.56	1
		1	7	21.00	20.56	20.87	20.68	1
		1	14	21.00	20.70	20.80	20.51	1
		8	0	20.00	19.46	19.44	19.34	2
		8	3	20.00	19.08	19.49	19.26	2
		8	7	20.00	19.11	19.44	19.30	2
		15	0	20.00	19.11	19.46	19.21	2

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low 18625 1852.5	Mid 18900 1880	High 19175 1907.5	3GPP MPR
5MHz	QPSK	1	0	22.00	21.07	21.13	21.25	0
		1	12	22.00	21.06	21.21	21.23	0
		1	24	22.00	21.24	21.21	21.34	0
		12	0	21.00	20.22	20.28	20.29	1
		12	6	21.00	20.22	20.24	20.26	1
		12	13	21.00	20.26	20.28	20.20	1
		25	0	21.00	20.27	20.25	20.28	1
	16QAM	1	0	21.00	19.66	20.62	20.58	1
		1	12	21.00	19.55	19.90	19.97	1
		1	24	21.00	20.19	20.47	19.99	1
		12	0	20.00	19.09	19.22	19.11	2
		12	6	20.00	19.09	19.08	19.01	2
		12	13	20.00	19.22	19.07	19.25	2
		25	0	20.00	19.16	19.24	19.49	2
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low 18650 1855	Mid 18900 1880	High 19150 1905	3GPP MPR
10MHz	QPSK	1	0	22.00	21.39	21.39	21.42	0
		1	24	22.00	21.38	21.29	21.37	0
		1	49	22.00	21.38	21.30	21.41	0
		25	0	21.00	20.24	20.25	20.26	1
		25	12	21.00	20.30	20.26	20.30	1
		25	25	21.00	20.26	20.35	20.31	1
		50	0	21.00	20.26	20.22	20.20	1
	16QAM	1	0	21.00	20.71	20.85	20.62	1
		1	24	21.00	20.64	20.84	20.52	1
		1	49	21.00	20.67	20.76	20.54	1
		25	0	20.00	19.31	19.27	19.56	2
		25	12	20.00	19.31	19.30	19.44	2
		25	25	20.00	19.27	19.51	19.38	2
		50	0	20.00	19.18	19.26	19.34	2

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low 18675 1857.5	Mid 18900 1880	High 19125 1902.5	3GPP MPR
15MHz	QPSK	1	0	22.00	21.27	21.36	21.38	0
		1	37	22.00	21.08	21.44	21.37	0
		1	74	22.00	21.33	21.35	21.40	0
		36	0	21.00	20.20	20.35	20.28	1
		36	19	21.00	20.24	20.27	20.20	1
		36	39	21.00	20.24	20.34	20.33	1
		75	0	21.00	20.18	20.22	20.20	1
	16QAM	1	0	21.00	20.44	20.11	20.26	1
		1	37	21.00	20.18	20.80	20.98	1
		1	74	21.00	20.08	20.02	20.31	1
		36	0	20.00	19.30	19.41	19.42	2
		36	19	20.00	19.27	19.36	19.38	2
		36	39	20.00	19.31	19.51	19.43	2
		75	0	20.00	19.21	19.37	19.32	2
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low 18700 1860	Mid 18900 1880	High 19100 1900	3GPP MPR
20MHz	QPSK	1	0	22.00	21.37	21.48	21.42	0
		1	50	22.00	21.23	21.32	21.15	0
		1	99	22.00	21.11	21.20	21.26	0
		50	0	21.00	20.34	20.37	20.28	1
		50	25	21.00	20.29	20.35	20.23	1
		50	50	21.00	20.32	20.30	20.28	1
		100	0	21.00	20.26	20.28	20.33	1
	16QAM	1	0	21.00	20.21	20.68	20.23	1
		1	50	21.00	20.97	19.37	20.21	1
		1	99	21.00	20.45	20.48	20.09	1
		50	0	20.00	19.38	19.33	19.41	2
		50	25	20.00	19.33	19.29	19.35	2
		50	50	20.00	19.37	19.34	19.38	2
		100	0	20.00	19.31	19.31	19.31	2

8.1.7CONDUCTED POWER MEASUREMENTS OF LTE Band 4

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High	3GPP MPR
					19957	20175	20393	
					1710.7	1732.5	1754.3	
1.4MHz	QPSK	1	0	24.00	23.17	23.41	23.18	0
		1	2	24.00	23.13	23.47	23.33	0
		1	5	24.00	23.25	23.18	23.34	0
		3	0	23.00	22.14	22.24	22.33	1
		3	1	23.00	22.34	22.25	22.32	1
		3	3	23.00	22.31	22.33	22.26	1
		6	0	23.00	22.14	22.30	22.32	1
	16QAM	1	0	23.00	22.77	22.81	21.54	1
		1	2	23.00	22.52	22.79	21.58	1
		1	5	23.00	22.88	22.74	21.53	1
		3	0	23.00	22.40	22.18	21.97	1
		3	1	23.00	22.37	22.13	21.94	1
		3	3	23.00	22.39	22.37	21.96	1
		6	0	22.00	21.21	20.85	21.31	2
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High	3GPP MPR
					19965	20175	20385	
					1711.5	1732.5	1753.5	
3MHz	QPSK	1	0	24.00	23.28	23.33	23.32	0
		1	7	24.00	23.38	23.26	23.26	0
		1	14	24.00	23.50	23.25	23.36	0
		8	0	23.00	22.08	22.24	22.36	1
		8	3	23.00	22.19	22.13	22.31	1
		8	7	23.00	22.17	22.27	22.28	1
		15	0	23.00	22.21	22.16	22.32	1
	16QAM	1	0	23.00	22.54	22.94	22.56	1
		1	7	23.00	22.03	22.98	22.67	1
		1	14	23.00	22.58	22.75	22.61	1
		8	0	22.00	21.02	21.35	21.26	2
		8	3	22.00	20.98	21.25	21.23	2
		8	7	22.00	20.99	21.19	21.19	2
		15	0	22.00	21.12	21.23	21.16	2

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High	3GPP MPR
					19975	20175	20375	
					1712.5	1732.5	1752.5	
5MHz	QPSK	1	0	24.00	23.24	23.15	23.36	0
		1	12	24.00	22.97	23.11	23.26	0
		1	24	24.00	23.23	23.05	23.38	0
		12	0	23.00	22.09	22.32	22.23	1
		12	6	23.00	22.16	22.10	22.32	1
		12	13	23.00	22.22	22.12	22.34	1
		25	0	23.00	22.21	22.17	22.28	1
	16QAM	1	0	23.00	22.21	22.37	22.58	1
		1	12	23.00	21.69	22.12	22.01	1
		1	24	23.00	22.22	22.26	22.54	1
		12	0	22.00	20.92	21.08	21.07	2
		12	6	22.00	20.96	20.96	21.11	2
		12	13	22.00	21.06	20.99	21.07	2
		25	0	22.00	21.10	21.34	21.32	2
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High	3GPP MPR
					20000	20175	20350	
					1715	1732.5	1750	
10MHz	QPSK	1	0	24.00	23.47	23.41	23.43	0
		1	24	24.00	23.42	23.19	23.34	0
		1	49	24.00	23.34	23.17	23.53	0
		25	0	23.00	22.22	22.25	22.26	1
		25	12	23.00	22.13	22.17	22.26	1
		25	25	23.00	22.15	22.23	22.38	1
		50	0	23.00	22.19	22.18	22.28	1
	16QAM	1	0	23.00	22.36	22.82	22.58	1
		1	24	23.00	22.25	22.73	22.45	1
		1	49	23.00	22.23	22.79	22.55	1
		25	0	22.00	21.19	21.01	21.24	2
		25	12	22.00	21.12	21.29	21.22	2
		25	25	22.00	21.15	21.15	21.32	2
		50	0	22.00	20.97	21.21	21.17	2

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High	3GPP MPR
					20025	20175	20325	
					1717.5	1732.5	1747.5	
15MHz	QPSK	1	0	24.00	23.50	23.42	23.21	0
		1	37	24.00	23.47	23.21	23.01	0
		1	74	24.00	23.32	23.23	23.41	0
		36	0	23.00	22.30	22.22	22.23	1
		36	19	23.00	22.18	22.26	22.16	1
		36	39	23.00	22.20	22.18	22.15	1
		75	0	23.00	22.26	22.22	22.19	1
	16QAM	1	0	23.00	22.72	22.73	22.99	1
		1	37	23.00	22.22	22.32	22.99	1
		1	74	23.00	22.66	22.86	22.61	1
		36	0	22.00	21.17	21.12	21.05	2
		36	19	22.00	21.15	20.96	20.99	2
		36	39	22.00	21.05	21.32	21.05	2
		75	0	22.00	21.05	21.26	21.25	2
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High	3GPP MPR
					20050	20175	20300	
					1720	1732.5	1745	
20MHz	QPSK	1	0	24.00	23.37	23.47	23.48	0
		1	50	24.00	23.58	23.62	23.52	0
		1	99	24.00	23.16	23.30	23.28	0
		50	0	23.00	22.34	22.35	22.28	1
		50	25	23.00	22.20	22.18	22.19	1
		50	50	23.00	22.12	22.28	22.27	1
		100	0	23.00	22.22	22.24	22.18	1
	16QAM	1	0	23.00	22.57	22.28	22.45	1
		1	50	23.00	22.15	21.13	22.51	1
		1	99	22.00	21.95	21.75	21.61	2
		50	0	22.00	21.13	21.13	21.11	2
		50	25	22.00	21.08	21.10	21.11	2
		50	50	22.00	21.13	21.10	21.28	2
		100	0	22.00	21.15	21.14	21.17	2

8.1.8CONDUCTED POWER MEASUREMENTS OF LTE Band 7

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low 20775 2502.5	Mid 21100 2535	High 21425 2567.5	3GPP MPR
5MHz	QPSK	1	0	22.00	21.51	21.46	21.39	0
		1	12	22.00	21.31	21.47	21.52	0
		1	24	22.00	21.43	21.34	21.43	0
		12	0	21.00	20.56	20.53	20.53	1
		12	6	21.00	20.45	20.47	20.51	1
		12	13	21.00	20.48	20.54	20.54	1
		25	0	21.00	20.52	20.49	20.54	1
	16QAM	1	0	21.00	20.52	20.48	20.04	1
		1	12	21.00	19.97	20.17	19.92	1
		1	24	21.00	20.39	20.84	20.28	1
		12	0	20.00	19.43	19.34	19.35	2
		12	6	20.00	19.32	19.29	19.52	2
		12	13	20.00	19.23	19.44	19.43	2
		25	0	20.00	19.50	19.45	19.69	2
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low 20800 2505	Mid 21100 2535	High 21400 2565	3GPP MPR
10MHz	QPSK	1	0	22.00	21.78	21.61	21.74	0
		1	24	22.00	21.68	21.63	21.65	0
		1	49	22.00	21.65	21.58	21.64	0
		25	0	21.00	20.53	20.55	20.59	1
		25	12	21.00	20.41	20.47	20.52	1
		25	25	21.00	20.51	20.56	20.51	1
		50	0	21.00	20.46	20.47	20.58	1
	16QAM	1	0	21.00	20.51	20.93	20.72	1
		1	24	21.00	20.56	20.77	20.40	1
		1	49	21.00	20.89	20.69	20.72	1
		25	0	20.00	19.46	19.38	19.61	2
		25	12	20.00	19.42	19.32	19.35	2
		25	25	20.00	19.49	19.53	19.44	2
		50	0	20.00	19.50	19.51	19.51	2

Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High	3GPP MPR
					20825	21100	21375	
					2507.5	2535	2562.5	
15MHz	QPSK	1	0	22.00	21.92	21.87	21.90	0
		1	37	22.00	21.60	21.48	21.59	0
		1	74	22.00	21.57	21.63	21.69	0
		36	0	21.00	20.65	20.66	20.55	1
		36	19	21.00	20.59	20.53	20.42	1
		36	39	21.00	20.71	20.46	20.48	1
		75	0	21.00	20.56	20.47	20.53	1
	16QAM	1	0	21.00	20.15	20.16	20.93	1
		1	37	21.00	20.65	20.48	20.40	1
		1	74	21.00	20.93	20.98	20.97	1
		36	0	21.00	19.63	19.69	19.65	1
		36	19	20.00	19.66	19.46	19.42	2
		36	39	20.00	19.64	19.58	19.60	2
		75	0	20.00	19.60	19.47	19.57	2
Bandwidth	Modulation	RB size	RB offset	Tune-up	Low	Mid	High	3GPP MPR
					20850	21100	21350	
					2510	2535	2560	
20MHz	QPSK	1	0	22.00	21.94	21.89	21.95	0
		1	50	22.00	21.72	21.38	21.40	0
		1	99	22.00	21.55	21.49	21.39	0
		50	0	21.00	20.74	20.78	20.66	1
		50	25	21.00	20.65	20.49	20.40	1
		50	50	21.00	20.51	20.49	20.37	1
		100	0	21.00	20.55	20.40	20.44	1
	16QAM	1	0	21.00	20.80	20.81	20.65	1
		1	50	21.00	20.63	20.42	20.57	1
		1	99	21.00	20.55	20.39	20.78	1
		50	0	20.00	19.52	19.64	19.59	2
		50	25	20.00	19.60	19.53	19.35	2
		50	50	20.00	19.46	19.61	19.40	2
		100	0	20.00	19.58	19.57	19.55	2

8.1.10 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	15.00	15.00	13.88	Yes
	6	2437		15.00	15.00	13.58	Yes
	11	2462		14.00	15.00	13.73	Yes
802.11g	1	2412	6	12.00	13.00	Not Required	No
	6	2437		13.00	13.00	Not Required	No
	11	2462		12.00	13.00	Not Required	No
802.11n HT20	1	2412	6.5	10.00	12.00	Not Required	No
	6	2437		11.00	12.00	Not Required	No
	11	2462		10.00	12.00	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.

8.1.11 CONDUCTED POWER MEASUREMENTS OF BT

BT MHz	Tune Up	Average Conducted Power (dBm)		
		DH5	2DH5	3DH5
CH0	6.00	2.89	3.12	4.57
CH39	6.00	4.02	3.87	4.93
CH78	6.00	3.60	3.64	3.79

BT MHz	Tune Up	Average Conducted Power (dBm)		
		CH0	CH19	CH39
BT (4.0)	4.00	3.79	1.42	0.81

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

8.2SAR 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 > ½ 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 ≥0.8W/Kg; if the deviation among the repeated measurement is ≤20%,and the measured SAR <1.45W/Kg, only one repeated measurement is required.
4) Per KDB941225 D06v02r01, the DUT Dimension is bigger than 9 cm x 5 cm, so 10mm is chosen as the test separation distance for Hotspot mode. When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
5) Per KDB648474 D04v01r03, SAR is evaluated without a headset connected to the device. When the standalone reported body-worn SAR is ≤1.2 W/kg, no additional SAR evaluations using a headset are required.
6) Per KDB865664 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-worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn 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 ≤¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode.

LTE notes:

1) The LTE test configurations are determined according to KDB941225 D05 SAR for LTE Devices 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.

8.2.1SAR MEASUREMENT RESULT OF HEAD

1. Head SAR test results of GSM&WCDMA

Test No.	Band	Mode	CH	Test Position	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T01	GSM850	GSM	190	Right Cheek	33.5	32.43	0.02	0.333	0.426
T02	GSM850	GSM	190	Right Tilted	33.5	32.43	0.03	0.225	0.288
T03	GSM850	GSM	190	Left Cheek	33.5	32.43	0.05	0.272	0.348
T04	GSM850	GSM	190	Left Tilted	33.5	32.43	-0.04	0.219	0.280
T05	GSM1900	GSM	661	Right Cheek	30.5	29.35	0.06	0.132	0.172
T06	GSM1900	GSM	661	Right Tilted	30.5	29.35	0.06	0.050	0.065
T07	GSM1900	GSM	661	Left Cheek	30.5	29.35	0.05	0.142	0.185
T08	GSM1900	GSM	661	Left Tilted	30.5	29.35	-0.01	0.058	0.076
T09	WCDMA B2	RMC12.2K	9400	Right Cheek	22.5	21.97	0.03	0.218	0.246
T10	WCDMA B2	RMC12.2K	9400	Right Tilted	22.5	21.97	0.05	0.072	0.081
T11	WCDMA B2	RMC12.2K	9400	Left Cheek	22.5	21.97	-0.08	0.233	0.263
T12	WCDMA B2	RMC12.2K	9400	Left Tilted	22.5	21.97	-0.02	0.060	0.068
T13	WCDMA B5	RMC12.2K	4182	Right Cheek	24	23.03	0.05	0.273	0.341
T14	WCDMA B5	RMC12.2K	4182	Right Tilted	24	23.03	0.01	0.185	0.231
T15	WCDMA B5	RMC12.2K	4182	Left Cheek	24	23.03	-0.04	0.217	0.271
T16	WCDMA B5	RMC12.2K	4182	Left Tilted	24	23.03	0.03	0.159	0.199

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
T101	LTE B2	QPSK20M	18900	1	0	Right Cheek	22	21.48	0.06	0.201	0.227
T102	LTE B2	QPSK20M	18900	1	0	Right Tilted	22	21.48	0.05	0.064	0.072
T103	LTE B2	QPSK20M	18900	1	0	Left Cheek	22	21.48	-0.08	0.207	0.233
T104	LTE B2	QPSK20M	18900	1	0	Left Tilted	22	21.48	-0.03	0.080	0.090
T105	LTE B2	QPSK20M	18900	50	0	Right Cheek	21	20.37	0.01	0.153	0.177
T106	LTE B2	QPSK20M	18900	50	0	Right Tilted	21	20.37	0.07	0.045	0.052
T107	LTE B2	QPSK20M	18900	50	0	Left Cheek	21	20.37	-0.04	0.168	0.194
T108	LTE B2	QPSK20M	18900	50	0	Left Tilted	21	20.37	0.08	0.062	0.072
T111	LTE B4	QPSK20M	20175	1	50	Right Cheek	24	23.62	0.04	0.418	0.456
T112	LTE B4	QPSK20M	20175	1	50	Right Tilted	24	23.62	0.02	0.238	0.260
T113	LTE B4	QPSK20M	20175	1	50	Left Cheek	24	23.62	-0.07	0.327	0.357
T114	LTE B4	QPSK20M	20175	1	50	Left Tilted	24	23.62	0.05	0.186	0.203
T115	LTE B4	QPSK20M	20175	50	0	Right Cheek	23	22.35	0.06	0.330	0.383
T116	LTE B4	QPSK20M	20175	50	0	Right Tilted	23	22.35	-0.03	0.176	0.204
T117	LTE B4	QPSK20M	20175	50	0	Left Cheek	23	22.35	0.07	0.282	0.328
T118	LTE B4	QPSK20M	20175	50	0	Left Tilted	23	22.35	-0.06	0.171	0.199
T121	LTE B7	QPSK20M	21350	1	0	Right Cheek	22	21.95	0.09	0.096	0.097
T122	LTE B7	QPSK20M	21350	1	0	Right Tilted	22	21.95	0.02	0.040	0.040
T123	LTE B7	QPSK20M	21350	1	0	Left Cheek	22	21.95	0.09	0.060	0.061
T124	LTE B7	QPSK20M	21350	1	0	Left Tilted	22	21.95	0.07	0.023	0.023
T125	LTE B7	QPSK20M	21100	50	0	Right Cheek	21	20.78	0.03	0.063	0.066
T126	LTE B7	QPSK20M	21100	50	0	Right Tilted	21	20.78	-0.09	0.024	0.025
T127	LTE B7	QPSK20M	21100	50	0	Left Cheek	21	20.78	0.05	0.059	0.062
T128	LTE B7	QPSK20M	21100	50	0	Left Tilted	21	20.78	0.05	0.011	0.012

3. Head SAR test results of WIFI

Test No.	Band	CH	Test Position	Tune up	Measured	Drift(dB)	Peak SAR of Area Scan(W/kg)	SAR Value (W/kg)1-g	Reported SAR
T220	802.11b	1	Right Cheek	15	13.88	0.04	0.085	**0.075**	0.097
T221	802.11b	1	Right Tilted	15	13.88	0.06	0.077	0.074	0.096
T222	802.11b	1	Left Cheek	15	13.88	0.06	0.030	0.027	0.035
T223	802.11b	1	Left Tilted	15	13.88	0.09	0.027	0.024	0.031

8.2.2SAR MEASUREMENT RESULT OF BODY-WORN

1. Body-worn SAR test results of GSM&WCDMA

Test No.	Band	Mode	CH	Test Position	Separation Distance(cm)	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T17	GSM850	GSM	190	Front Face	1.5	33.5	32.43	0.01	0.408	0.522
T18	GSM850	GSM	190	Rear Face	1.5	33.5	32.43	0.02	0.461	0.590
T24	GSM1900	GSM	661	Front Face	1.5	30.5	29.35	0.06	0.271	0.353
T25	GSM1900	GSM	661	Rear Face	1.5	30.5	29.35	0.02	0.249	0.324
T33	WCDMA B2	RMC12.2K	9400	Front Face	1.5	22.5	21.97	0.04	0.455	0.514
T34	WCDMA B2	RMC12.2K	9400	Rear Face	1.5	22.5	21.97	0.09	0.486	0.549
T47	WCDMA B5	RMC12.2K	4182	Front Face	1.5	24	23.03	0.01	0.343	0.429
T48	WCDMA B5	RMC12.2K	4182	Rear Face	1.5	24	23.03	0.01	0.416	0.520

2. Body-worn SAR test results of LTE

Test No.	Band	Mode	CH	RB	Offset	Test Position	Separation Distance(cm)	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T140	LTE B2	QPSK20M	18900	1	0	Front Face	1.5	22	21.48	0	**0.415**	0.468
T141	LTE B2	QPSK20M	18900	1	0	Rear Face	1.5	22	21.48	-0.03	0.410	0.462
T142	LTE B2	QPSK20M	18900	50	0	Front Face	1.5	21	20.37	0.02	0.326	0.377
T143	LTE B2	QPSK20M	18900	50	0	Rear Face	1.5	21	20.37	0.05	0.306	0.354
T170	LTE B4	QPSK20M	20175	1	50	Front Face	1.5	24	23.62	0.04	**0.621**	0.678
T171	LTE B4	QPSK20M	20175	1	50	Rear Face	1.5	24	23.62	-0.05	0.516	0.563
T172	LTE B4	QPSK20M	20175	50	0	Front Face	1.5	23	22.35	0.06	0.481	0.559
T173	LTE B4	QPSK20M	20175	50	0	Rear Face	1.5	23	22.35	0.02	0.363	0.422
T198	LTE B7	QPKS20M	21350	1	0	Front Face	1.5	22	21.95	0.02	0.316	0.320
T199	LTE B7	QPKS20M	21350	1	0	Rear Face	1.5	22	21.95	0.08	**0.408**	0.413
T200	LTE B7	QPKS20M	21100	50	0	Front Face	1.5	21	20.78	0.05	0.190	0.200
T201	LTE B7	QPKS20M	21100	50	0	Rear Face	1.5	21	20.78	0.08	0.285	0.300

3. Body-worn SAR test results of WIFI

Test No.	Band	CH	Test Position	Separation Distance(cm)	Tune up	Measured	Drift(dB)	Peak SAR of Area Scan(W/kg)	SAR Value (W/kg)1-g	Reported SAR
T224	802.11b	1	Front Face	1.5	15	13.88	-0.07	0.004	0.005	0.006
T225	802.11b	1	Rear Face	1.5	15	13.88	0.01	0.008	**0.007**	0.009

8.2.3SAR MEASUREMENT RESULT OF HOTSPOT

1. Hotspot SAR test results of GSM&WCDMA

Test No.	Band	Mode	CH	Test Position	Separation Distance(cm)	Tune up	Measured	Drift(dB)	SAR Value (W/kg)1-g	Reported SAR
T19	GSM850	GPRS 2TX	190	Front Face	1	31.5	30.45	0.00	0.412	0.525
T20	GSM850	GPRS 2TX	190	Rear Face	1	31.5	30.45	0.05	**0.515**	0.656
T21	GSM850	GPRS 2TX	190	Left Side	1	31.5	30.45	0.03	0.292	0.372
T22	GSM850	GPRS 2TX	190	Right Side	1	31.5	30.45	-0.04	0.392	0.499
T23	GSM850	GPRS 2TX	190	Bottom Side	1	31.5	30.45	0.07	0.171	0.218
T26	GSM1900	GPRS 2TX	661	Front Face	1	28.5	27.34	0.04	0.724	0.946
T27	GSM1900	GPRS 2TX	661	Rear Face	1	28.5	27.34	0.01	0.660	0.862
T28	GSM1900	GPRS 2TX	661	Left Side	1	28.5	27.34	-0.03	0.115	0.150
T29	GSM1900	GPRS 2TX	661	Right Side	1	28.5	27.34	0.02	0.133	0.174
T30	GSM1900	GPRS 2TX	661	Bottom Side	1	28.5	27.34	0.06	0.777	1.015
T240	GSM1900	GPRS 2TX	512	Front Face	1	28.5	27.31	0.05	0.730	0.960
T241	GSM1900	GPRS 2TX	810	Front Face	1	28.5	27.25	0.02	0.702	0.936
T242	GSM1900	GPRS 2TX	512	Rear Face	1	28.5	27.31	0.03	0.683	0.898
T243	GSM1900	GPRS 2TX	810	Rear Face	1	28.5	27.25	0.05	0.654	0.872
T31	GSM1900	GPRS 2TX	512	Bottom Side	1	28.5	27.31	-0.08	**0.781**	1.027
T32	GSM1900	GPRS 2TX	810	Bottom Side	1	28.5	27.25	0.05	0.734	0.979
T35	WCDMA B2	RMC12.2K	9400	Front Face	1	22.5	21.97	0.01	1.010	1.141
T36	WCDMA B2	RMC12.2K	9400	Rear Face	1	22.5	21.97	0.04	1.000	1.130
T37	WCDMA B2	RMC12.2K	9400	Left Side	1	22.5	21.97	0.02	0.095	0.107
T38	WCDMA B2	RMC12.2K	9400	Right Side	1	22.5	21.97	0.06	0.130	0.147
T39	WCDMA B2	RMC12.2K	9400	Bottom Side	1	22.5	21.97	-0.03	**1.240**	1.401
T40	WCDMA B2	RMC12.2K	9262	Front Face	1	22.5	21.93	0.07	1.110	1.266
T41	WCDMA B2	RMC12.2K	9538	Front Face	1	22.5	21.87	0.03	0.918	1.061
T42	WCDMA B2	RMC12.2K	9262	Rear Face	1	22.5	21.93	-0.05	1.050	1.197

T43	WCDMA B2	RMC12.2K	9538	Rear Face	1	22.5	21.87	-0.02	0.958	1.108
T44	WCDMA B2	RMC12.2K	9262	Bottom Side	1	22.5	21.93	0.05	1.120	1.277
T45	WCDMA B2	RMC12.2K	9538	Bottom Side	1	22.5	21.87	0.08	1.070	1.237
T46	WCDMA B2	RMC12.2K	9400	Bottom Side (1st Repeated)	1	22.5	21.97	0.05	1.200	1.356
T49	WCDMA B5	RMC12.2K	4182	Front Face	1	24	23.03	0.06	0.349	0.436
T50	WCDMA B5	RMC12.2K	4182	Rear Face	1	24	23.03	-0.08	0.423	0.529
T51	WCDMA B5	RMC12.2K	4182	Left Side	1	24	23.03	-0.02	0.163	0.204
T52	WCDMA B5	RMC12.2K	4182	Right Side	1	24	23.03	0.01	0.243	0.304
T53	WCDMA B5	RMC12.2K	4182	Bottom Side	1	24	23.03	0.04	0.167	0.209

2. Hotspot SAR test results of LTE

Test No.	Band	Mode	CH	RB	Offset	Test Position	Separation Distance(cm)	Tune up	Measured	Drift (dB)	SAR Value (W/kg)1-g	Reported SAR
T146	LTE B2	QPSK20M	18900	1	0	Front Face	1	22	21.48	0.01	0.975	1.099
T147	LTE B2	QPSK20M	18900	1	0	Rear Face	1	22	21.48	-0.03	0.820	0.924
T148	LTE B2	QPSK20M	18900	1	0	Left Side	1	22	21.48	0.05	0.121	0.136
T149	LTE B2	QPSK20M	18900	1	0	Right Side	1	22	21.48	0.03	0.147	0.166
T150	LTE B2	QPSK20M	18900	1	0	Bottom Side	1	22	21.48	0.00	1.170	1.319
T151	LTE B2	QPSK20M	18900	50	0	Front Face	1	21	20.37	0.02	0.685	0.792
T152	LTE B2	QPSK20M	18900	50	0	Rear Face	1	21	20.37	0.05	0.581	0.672
T153	LTE B2	QPSK20M	18900	50	0	Left Side	1	21	20.37	-0.03	0.102	0.118
T154	LTE B2	QPSK20M	18900	50	0	Right Side	1	21	20.37	0.06	0.119	0.138
T155	LTE B2	QPSK20M	18900	50	0	Bottom Side	1	21	20.37	0.03	0.787	0.910
T156	LTE B2	QPSK20M	18700	1	0	Front Face	1	22	21.37	0.07	1.070	1.237
T157	LTE B2	QPSK20M	19100	1	0	Front Face	1	22	21.42	0.02	0.945	1.080
T158	LTE B2	QPSK20M	18700	1	0	Rear Face	1	22	21.37	0.04	0.802	0.927
T159	LTE B2	QPSK20M	19100	1	0	Rear Face	1	22	21.42	-0.06	0.836	0.955
T160	LTE B2	QPSK20M	18700	1	0	Bottom Side	1	22	21.37	-0.07	**1.190**	1.376
T161	LTE B2	QPSK20M	19100	1	0	Bottom Side	1	22	21.42	0.03	1.180	1.349
T164	LTE B2	QPSK20M	18700	50	0	Bottom Side	1	21	20.34	-0.05	0.852	0.992
T165	LTE B2	QPSK20M	19100	50	0	Bottom Side	1	21	20.28	0.07	0.774	0.914
T166	LTE B2	QPSK20M	19100	100	0	Front Face	1	21	20.33	0.04	0.625	0.729
T167	LTE B2	QPSK20M	19100	100	0	Rear Face	1	21	20.33	0.02	0.600	0.700
T168	LTE B2	QPSK20M	19100	100	0	Bottom Side	1	21	20.33	-0.03	0.699	0.816
T169	LTE B2	QPSK20M	18700	1	0	Bottom Side (1st Repeated)	1	22	21.37	0.05	1.160	1.341
T174	LTE B4	QPSK20M	20175	1	50	Front Face	1	24	23.62	0.02	1.050	1.146
T175	LTE B4	QPSK20M	20175	1	50	Rear Face	1	24	23.62	0.07	0.814	0.888
T176	LTE B4	QPSK20M	20175	1	50	Left Side	1	24	23.62	0.04	0.258	0.282
T177	LTE B4	QPSK20M	20175	1	50	Right Side	1	24	23.62	0.05	0.209	0.228
T178	LTE B4	QPSK20M	20175	1	50	Bottom Side	1	24	23.62	-0.04	1.110	1.211
T179	LTE B4	QPSK20M	20175	50	0	Front Face	1	23	22.35	0.01	0.891	1.035
T180	LTE B4	QPSK20M	20175	50	0	Rear Face	1	23	22.35	0.03	0.657	0.763
T181	LTE B4	QPSK20M	20175	50	0	Left Side	1	23	22.35	0.06	0.209	0.243
T182	LTE B4	QPSK20M	20175	50	0	Right Side	1	23	22.35	-0.02	0.175	0.203
T183	LTE B4	QPSK20M	20175	50	0	Bottom Side	1	23	22.35	-0.02	0.893	1.037
T184	LTE B4	QPSK20M	20050	1	50	Front Face	1	24	23.58	-0.04	1.060	1.168
T185	LTE B4	QPSK20M	20300	1	50	Front Face	1	24	23.52	0.09	**1.160**	1.296
T186	LTE B4	QPSK20M	20050	1	50	Rear Face	1	24	23.58	0.02	0.860	0.947
T187	LTE B4	QPSK20M	20300	1	50	Rear Face	1	24	23.52	-0.01	0.921	1.029
T188	LTE B4	QPSK20M	20050	1	50	Bottom Side	1	24	23.58	-0.02	1.020	1.124
T189	LTE B4	QPSK20M	20300	1	50	Bottom Side	1	24	23.52	-0.01	1.150	1.284
T190	LTE B4	QPSK20M	20050	50	0	Front Face	1	23	22.34	-0.05	0.865	1.007

T191	LTE B4	QPSK20M	20300	50	0	Front Face	1	23	22.28	0.07	0.916	1.081
T192	LTE B4	QPSK20M	20050	50	0	Bottom Side	1	23	22.34	-0.08	0.909	1.058
T193	LTE B4	QPSK20M	20300	50	0	Bottom Side	1	23	22.28	0.06	0.977	1.153
T194	LTE B4	QPSK20M	20175	100	0	Front Face	1	23	22.24	-0.04	0.856	1.020
T195	LTE B4	QPSK20M	20175	100	0	Rear Face	1	23	22.24	0.03	0.622	0.741
T196	LTE B4	QPSK20M	20175	100	0	Bottom Side	1	23	22.24	0.05	0.889	1.059
T197	LTE B4	QPSK20M	20300	1	50	Front Face (1st Repeated)	1	24	23.52	0.04	1.120	1.251
T202	LTE B7	QPSK20M	21350	1	0	Front Face	1	22	21.95	0.03	0.663	0.671
T203	LTE B7	QPSK20M	21350	1	0	Rear Face	1	22	21.95	0.05	0.940	0.951
T204	LTE B7	QPSK20M	21350	1	0	Left Side	1	22	21.95	-0.02	0.035	0.035
T205	LTE B7	QPSK20M	21350	1	0	Right Side	1	22	21.95	0.06	0.040	0.040
T206	LTE B7	QPSK20M	21350	1	0	Bottom Side	1	22	21.95	0.04	1.070	1.082
T207	LTE B7	QPSK20M	21100	50	0	Front Face	1	21	20.78	-0.06	0.476	0.501
T208	LTE B7	QPSK20M	21100	50	0	Rear Face	1	21	20.78	0.01	0.631	0.664
T209	LTE B7	QPSK20M	21100	50	0	Left Side	1	21	20.78	0.08	0.041	0.043
T210	LTE B7	QPSK20M	21100	50	0	Right Side	1	21	20.78	-0.07	0.030	0.032
T211	LTE B7	QPSK20M	21100	50	0	Bottom Side	1	21	20.78	0.00	0.739	0.777
T212	LTE B7	QPSK20M	20850	1	0	Rear Face	1	22	21.94	0.05	0.716	0.726
T213	LTE B7	QPSK20M	21100	1	0	Rear Face	1	22	21.89	0.02	0.837	0.858
T214	LTE B7	QPSK20M	20850	1	0	Bottom Side	1	22	21.94	0.06	0.829	0.841
T215	LTE B7	QPSK20M	21100	1	0	Bottom Side	1	22	21.89	-0.01	0.974	0.999
T216	LTE B7	QPSK20M	20850	100	0	Rear Face	1	21	20.55	-0.01	0.513	0.569
T217	LTE B7	QPSK20M	20850	100	0	Bottom Side	1	21	20.55	0.02	0.492	0.546
T218	LTE B7	QPSK20M	21350	1	0	Bottom Side (1st Repeated)	1	22	21.95	-0.05	1.040	1.052

3. Hotspot SAR test results of WIFI

Test No.	Band	CH	Test Position	Separation Distance(cm)	Tune up	Measured	Drift(dB)	Peak SAR of Area Scan(W/kg)	SAR Value (W/kg)1-g	Reported SAR
T226	802.11b	1	Front Face	1	15	13.88	0.09	0.013	0.012	0.016
T227	802.11b	1	Rear Face	1	15	13.88	0.01	0.019	**0.016**	**0.020**
T228	802.11b	1	Left Side	1	15	13.88	0.02	0.012	0.011	0.014
T229	802.11b	1	Top Side	1	15	13.88	0.06	0.011	0.008	0.010
T230	802.11b	1	Bottom Side	1	15	13.88	0.03	0.000	0.000	0.000

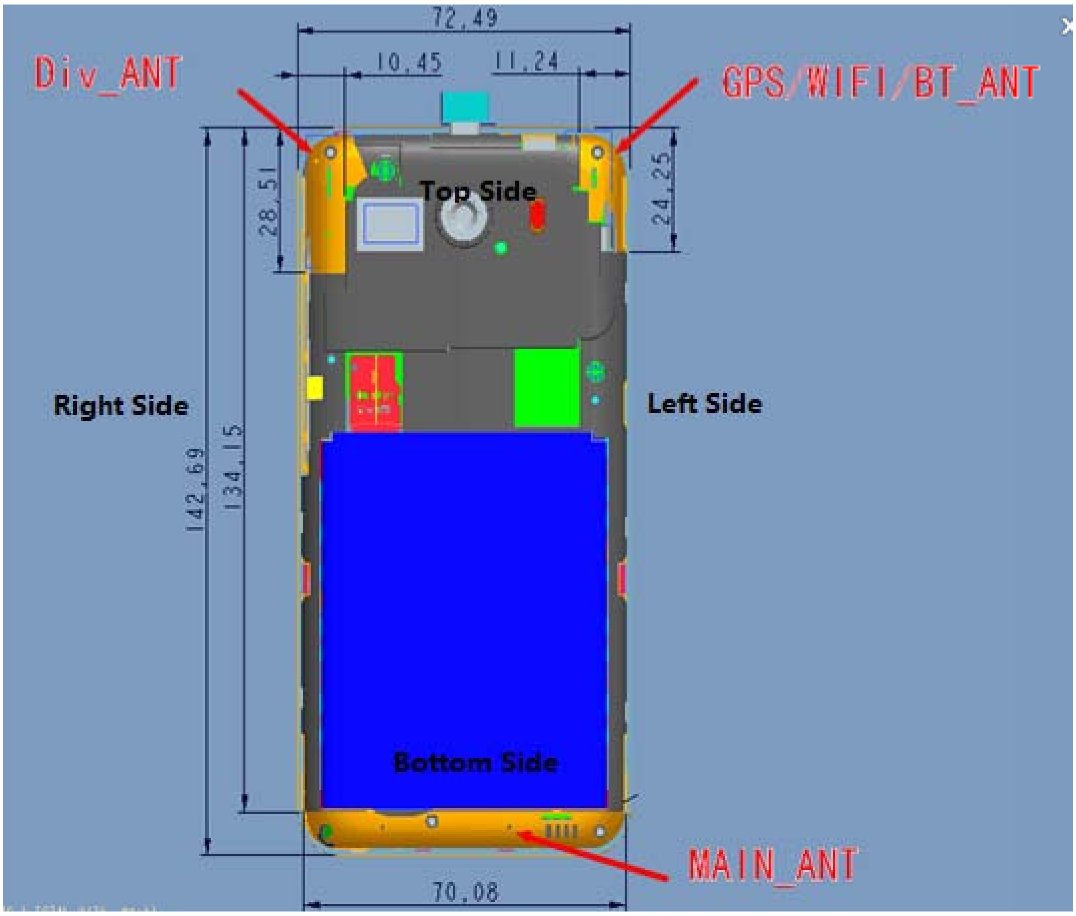
Note: Per KDB248227D01, the highest SAR measured for the initial test position or initial test configuration should be used to determine SAR test exclusion according to the sum of 1-g SAR and SAR peak to location ratio provisions in KDB 447498. In addition, a test lab may also choose to perform standalone 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.

8.3 MULTIPLE TRANSMITTER EVALUATION

The following tables list information which is relevant for the decision if a simultaneous transmit evaluation is necessary according to FCC KDB 447498D01 General RF Exposure Guidance v06.

The size of the mobile phone is 142.69mm (length) X 72.49mm (width).

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



Note:

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

8.3.1STAND-ALONE SAR TEST EXCLUSION

Per FCC KDB 447498D01v06, the 1-g SAR and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance,mm)][√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where:

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

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

Standalone SAR test exclusion for BT

Mode	Position	P_{max} (dBm)*	P_{max} (mW)	Distance (mm)	f (GHz)	Calculation Result	SAR Exclusion threshold	SAR test exclusion
BT	Body-Worn	6	3.98	15	2.48	0.42	3	Yes

Note:

1)* - maximum possible output power declared by manufacturer

2) Held to ear configurations are not applicable to Bluetooth for this device.

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

(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] •

[√ f(GHz)/x] W/kg for test separation distances≤50 mm,where x = 7.5 for 1-g SAR and x = 18.75 for 10-g SAR.
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion

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

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

Estimated SAR calculation

Mode	Position	P_{max} (dBm)*	P_{max} (mW)	Distance (mm)	f (GHz)	X	Estimated SAR (W/Kg)*
BT	Front	6	3.98	15	2.48	7.5	0.056
	Rear	6	3.98	15	2.48	7.5	0.056
GSM850/ 1900	Top Side			> 50			0.4
WCDMA Band 2/5	Top Side			> 50			0.4
LTE Band 2/4/7	Top Side			> 50			0.4
2.4GWiFi	Right Side			> 50			0.4

Note: * - maximum possible output power declared by manufacturer

8.3.2STAND-ALONE SAR TEST EXCLUSION

Per FCC 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-worn	Hotspot
1	GSM (Voice) + WiFi 2.4G	Yes	Yes	N/A
2	GPRS/EDGE (DATA) + WiFi 2.4G	N/A	N/A	Yes
3	GSM(Voice) +BT	N/A	Yes	N/A
4	GPRS/EDGE(DATA)+BT	N/A	N/A	N/A
5	WCDMA(Voice)+WiFi 2.4G	Yes	Yes	N/A
6	WCDMA(DATA)+WiFi 2.4G	N/A	Yes	Yes
7	WCDMA(Voice)+BT	N/A	Yes	N/A
8	WCDMA(DATA)+BT	N/A	Yes	N/A
9	LTE(DATA)+WiFi 2.4G	Yes*	Yes*	Yes
10	LTE(DATA)+BT	N/A	Yes*	N/A

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

8.3.3 SAR SUMMATION SCENARIO

About BT/ WiFi and GSM/WCDMA/LTE antenna

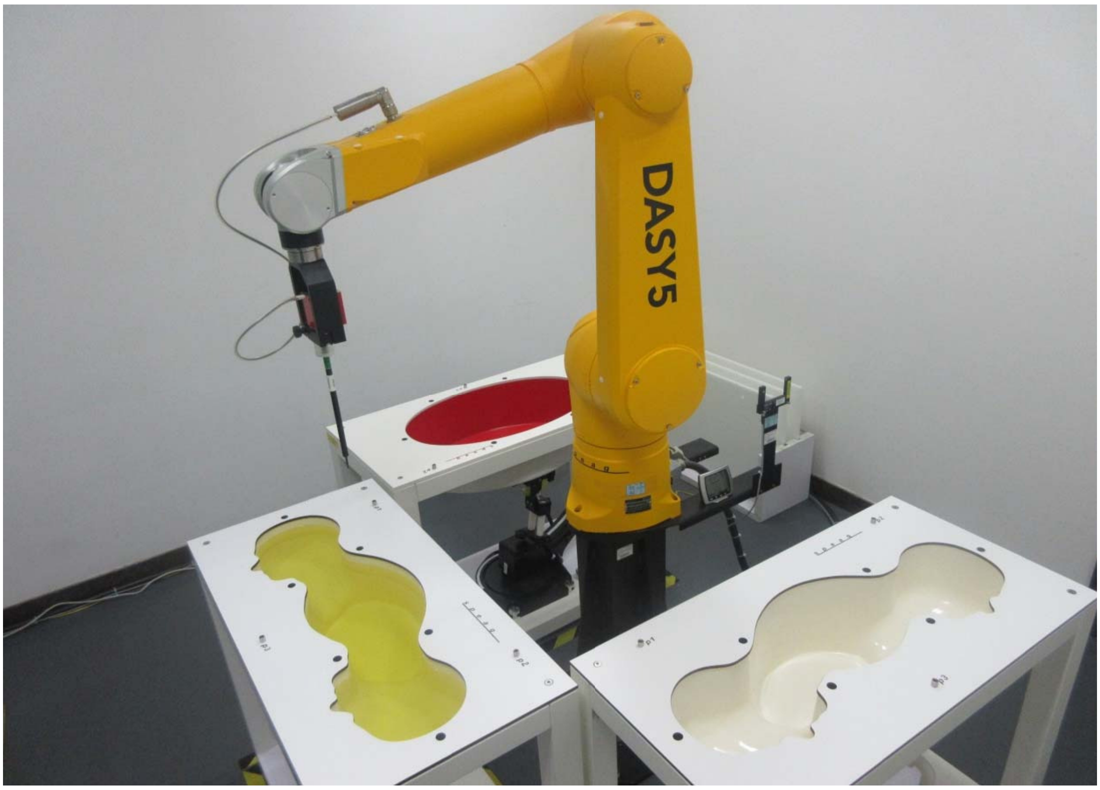
Test Position / Reported SAR_{1g}	Head				Body-Worn		Hotspot					
	Right Cheek	Right Tilted	Left Cheek	Left Tilted	Front	Rear	Front	Rear	Left	Right	Top	Bottom
GSM850	0.426	0.288	0.348	0.280	0.522	0.590	0.525	0.656	0.372	0.499	0.400	0.218
GSM1900	0.153	0.058	0.165	0.067	0.353	0.324	0.960	0.898	0.150	0.174	0.400	1.027
WCDMA B2	0.246	0.081	0.263	0.068	0.514	0.549	1.266	1.197	0.107	0.147	0.400	1.401
WCDMA B5	0.341	0.231	0.271	0.199	0.429	0.520	0.436	0.529	0.204	0.304	0.400	0.209
LTE B2	0.227	0.072	0.233	0.090	0.468	0.462	1.237	0.955	0.136	0.166	0.400	1.376
LTE B4	0.456	0.260	0.357	0.203	0.678	0.563	1.296	1.029	0.282	0.228	0.400	1.284
LTE B7	0.097	0.040	0.062	0.023	0.320	0.413	0.671	0.951	0.043	0.040	0.400	1.082
BT	-	-	-	-	0.056	0.056	-	-	-	-	-	-
WiFi 2.4G	0.097	0.096	0.035	0.031	0.006	0.009	0.016	0.020	0.014	0.400	0.010	0.000
MAX∑SAR1g	**0.553**	**0.384**	**0.392**	**0.311**	**0.684**	**0.599**	**1.312**	**1.217**	**0.386**	**0.899**	**0.410**	**1.401**

MAX. $\sum SAR_{1g}$=1.401W/Kg<1.6 W/Kg, so the SAR to peak location separation ratio should not be considered.

APPENDIX

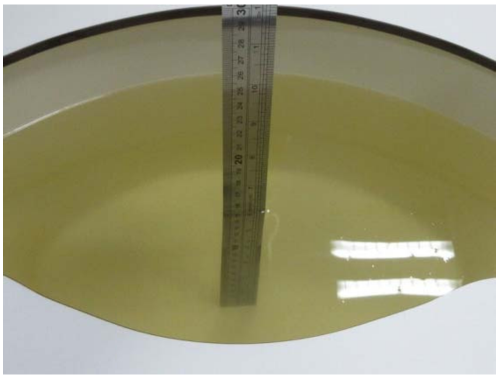
1. Test Layout

Specific Absorption Rate Test Layout



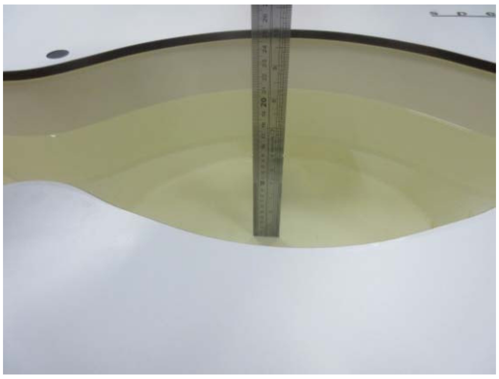
Liquid depth in the flat Phantom (≥15cm depth)

Body(835MHz) 15.5cm



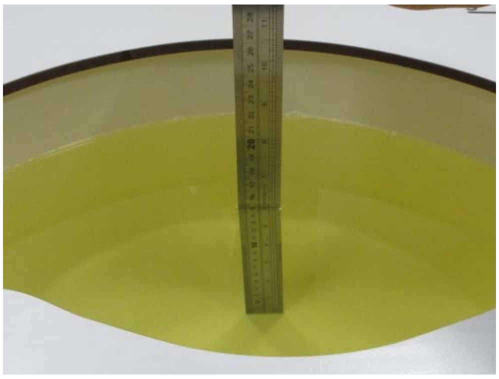
Head(835MHz) 15.9cm

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

The plots for system verification with largest deviation for each SAR system combination are shown as follows.

Appendix B. SAR Plots of SAR Measurement

The SAR plots for highest measured SAR in each exposure configuration, wireless mode and frequency band combination are shown as follows.

Appendix C. Calibration Certificate for Probe and Dipole

The SPEAG calibration certificates are shown as follows.

Appendix D. Photographs of the Test Set-Up

Photo 1: Right Cheek	Photo 2: Right Tilted
	
Photo 3: Left Cheek	Photo 4: Left Tilted

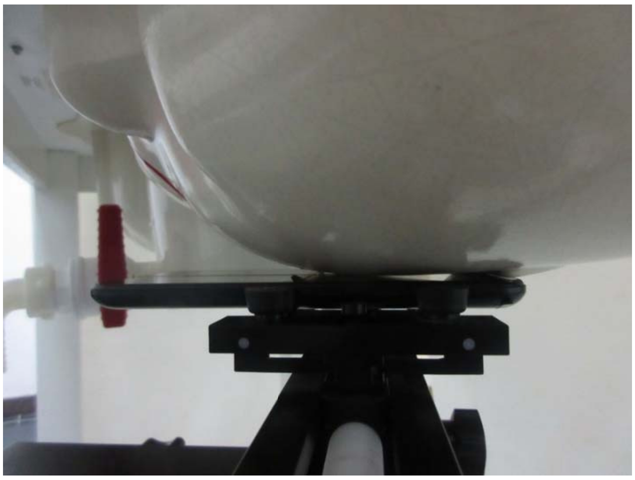
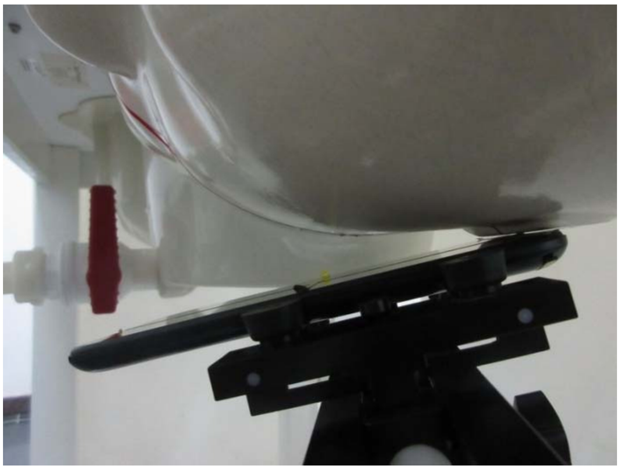

	

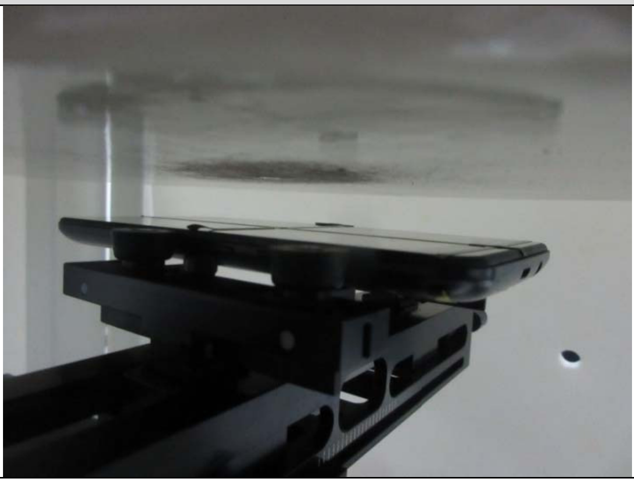
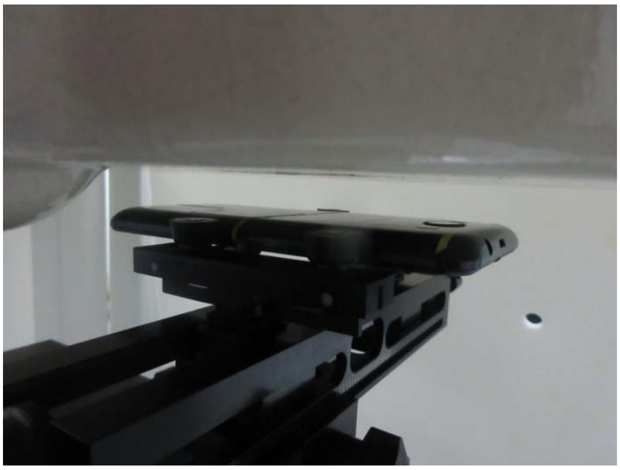
Photo 5: Front Face_15mm	Photo 6: Rear Face_15mm
	

Photo 7: Front Face_10mm	Photo 8: Rear Face_10mm

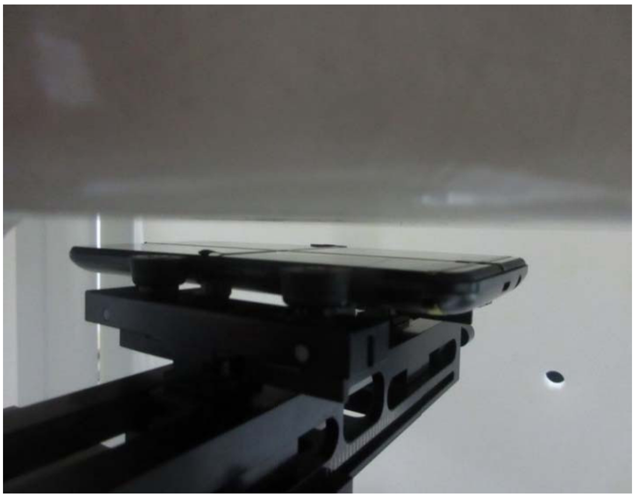
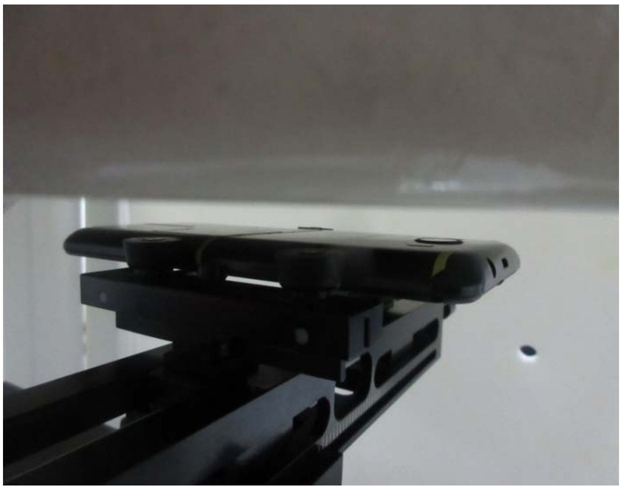

	

Photo 9: Left Side _10mm	Photo 10: Right Side_10mm
	
Photo 9: Top Side_10mm	Photo 10: Bottom Side_10mm