SAR Test Report

Report No.: AGC00639170404FH01

FCC ID	:	2AL95-AGMA8
APPLICATION PURPOSE	:	Original Equipment
PRODUCT DESIGNATION	:	4G Smart Phone
BRAND NAME	:	AGM
MODEL NAME	:	AGM A8
CLIENT	:	AGM Group Limited
DATE OF ISSUE	:	May 25,2017
STANDARD(S)	:	IEEE Std. 1528:2013 FCC 47CFR § 2.1093 IEEE/ANSI C95.1:2005
REPORT VERSION	:	V1.0

Attestation of Global Compliance(Shenzhen) Co., Ltd.

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Report Revise Record

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	May 25,2017	Valid	Original Report

Test Report Certification

Applicant Name	AGM Group Limited
Applicant Address	Level 5, Development Bank of Samoa Building, Beach Road, Apia, Samoa
Manufacturer Name	Shenzhen AIJIEMO Technology Limited Company
Manufacturer Address	4F BLDG B, HUAFENG INDUSTRIAL PAPK, GUSHU, XIXIANG, BAO`AN DISTRICT, SHENZHEN, CHINA
Product Designation	4G Smart Phone
Brand Name	AGM
Model Name	AGM A8
Different Description	N/A
EUT Voltage	DC3.7V by battery
Applicable Standard	IEEE Std. 1528:2013 FCC 47CFR § 2.1093 IEEE/ANSI C95.1:2005
Test Date	May 02,2017 to May 24,2017
Performed Location	Attestation of Global Compliance(Shenzhen) Co., Ltd. 2 F, Building 2, No.1-No.4, Chaxi Sanwei Technical Industrial Park, Gushu, Xixiang Street, Bao'an District, Shenzhen, China
Report Template	AGCRT-US-4G/SAR (2016-01-01)

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1. SUMMARY OF MAXIMUM SAR VALUE

The maximum results of Specific Absorption Rate (SAR) found during testing for EUT are as follows:

Frequency Band	Highest Reported 1g-SAR(W/Kg)		SAR Test Limit (W/Kg)
	Head	Body-worn	
GSM 850	0.403	0.658	1.6
PCS 1900	0.491	1.252	
UMTS Band II	0.262	0.440	
UMTS Band IV	0.410	0.698	
UMTS Band V	0.307	0.500	
LTE Band 2	0.330	1.135	
LTE Band 4	0.342	1.319	
LTE Band 12	0.171	0.348	
LTE Band 17	0.160	0.323	
WIFI 2.4G	0.226	0.260	
Simultaneous Reported SAR	1.579		
SAR Test Result	PASS		

This device is compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/Kg) specified in IEEE Std. 1528:2013; FCC 47CFR § 2.1093; IEEE/ANSI C95.1:2005 and the following specific FCC Test Procedures:

- KDB 447498 D01 General RF Exposure Guidance v06
- KDB 648474 D04 Handset SAR v01r03
- KDB 865664 D01 SAR Measurement 100MHz to 6GHz v01r04
- KDB 941225 D01 3G SAR Procedures v03r01
- KDB 941225 D06 Hotspot Mode v02r01
- KDB 248227 D01 802 11 Wi-Fi SAR v02r02
- KDB 941225 D05 SAR for LTE Devices v02r05

2. GENERAL INFORMATION

2.1. EUT Description

General Information	
Product Designation	4G Smart Phone
Test Model	AGM A8
Hardware Version	LA6622_MB_V1.00
Software Version	L1248.4.01.02.Q17
Device Category	Portable
RF Exposure Environment	Uncontrolled
Antenna Type	Internal
GSM and GPRS& EGPRS	
Support Band	☒GSM 850 ☒PCS 1900 ☒GSM 900 ☒DCS 1800
GPRS & EGPRS Type	Class B
GPRS & EGPRS Class	Class 33(1Tx+5Rx, 2Tx+4Rx, 3Tx+3Rx, 4Tx+2Rx)
TX Frequency Range	GSM 850 : 820-850MHz; PCS 1900: 1850-1910MHz;
RX Frequency Range	GSM 850 : 869~894MHz; PCS 1900: 1930~1990MHz
Release Version	R99
Type of modulation	GMSK for GSM/GPRS; GMSK & 8-PSK for EGPRS
Antenna Gain	GSM850: -0.9dBi; PCS1900: -1.5dBi
Max. Average Power	GSM850: 31.77dBm; PCS1900: 28.73dBm
WCDMA	
Support Band	☒UMTS FDD Band II ☒UMTS FDD Band V ☒UMTS FDD Band IV ☐UMTS FDD Band I ☐UMTS FDD Band III ☐UMTS FDD Band VIII
HS Type	HSPA(HSUPA/HSDPA)
TX Frequency Range	FDD Band II: 1850-1910MHz; FDD Band V: 820-850MHz Band IV: 1712.4-1752.6MHz
RX Frequency Range	FDD Band II: 1930-1990MHz; FDD Band V: 869-894MHz Band IV: 2112.4-5152.6MHz
Release Version	Rel-6
Type of modulation	HSDPA:QPSK/16QAM; HSUPA:BPSK; WCDMA:QPSK
Antenna Gain	Band II: -1.5dBii; Band IV: -0.7dBi; Band V: -0.9dBi
Max. Average Power	Band II: 21.54dBm; Band IV: 21.59dBm; Band V: 21.43dBm

EUT Description(Continue)

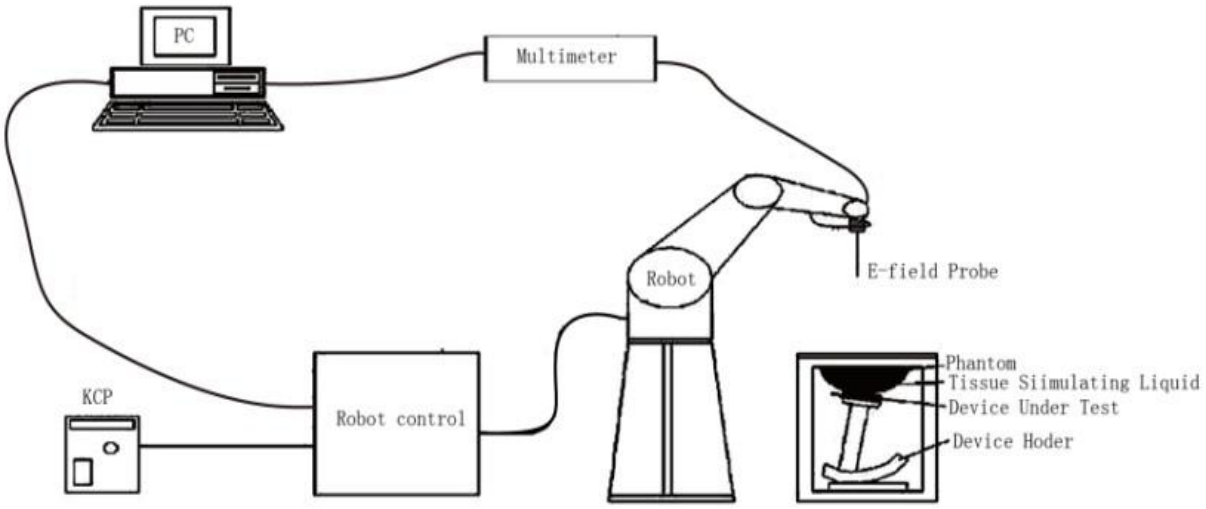
LTE	
Support Band	☒FDD Band 2 ☒FDD Band 4 ☐FDD Band 5 ☒FDD Band 12 ☒FDD Band 17 ☐FDD Band 25 ☐FDD Band 26 ☐TDD Band 41 (U.S. Bands) ☐FDD Band 1 ☐FDD Band 3 ☐FDD Band 7 ☐FDD Band 8 ☐FDD Band 20 ☐TDD Band 33 ☐TDD Band 34 ☐TDD Band 38 ☐FDD Band 40 ☐FDD Band 42 ☐FDD Band 43 (Non-U.S. Bands)
TX Frequency Range	Band 2: 1850-1909.9MHz; Band 4: 1710 -1754.9MHz; Band 12: 699 -715.9; Band 17: 704-716 MHz;
RX Frequency Range	Band 2: 1930-1989.9 MHz; Band 4: 2110 -2154.9MHz; Band 12: 729- 745.9 MHz; Band 17 734-746 MHz;
Release Version	Rel-8
Type of modulation	QPSK, 16QAM
Antenna gain:	-0.5dBi(LTE band 2),-0.7dBi(LTE band 4), -1.0dBi(LTE band 12), -1.0dBi(LTE band 17),
Diversity Antenna Gain	-0.7dBi(LTE band 2),-0.9dBi(LTE band 4), -1.3dBi(LTE band 12), -1.3dBi(LTE band 17),
Max. Average Power	Band 2: 23.59dBm; Band 4: 23.11dBm Band 12: 23.08dBm; Band 17: 23.25dBm
Bluetooth	
Bluetooth Version	☐V2.0 ☐V2.1 ☐V2.1+EDR ☒V3.0 ☐V3.0+HS ☒V4.0 ☐V4.1
Operation Frequency	2402~2480MHz
Type of modulation	☒GFSK ☒Π/4-DQPSK ☒8-DPSK
Peak Power	3.768dBm
Antenna Gain	1.19dBi
WIFI	
WIFI Specification	☐802.11a ☒802.11b ☒802.11g ☒802.11n(20) ☒802.11n(40)
Operation Frequency	2412~2472MHz
Avg. Burst Power	11b: 15.04dBm,11g: 13.36dBm,11n(20): 13.33dBm,11n(40): 11.32dBm
Antenna Gain	1.19dBi
Accessories	
Battery	Brand name: AGM Model No. : A8 Voltage and Capacitance: 3.7 V & 4050mAh
Adapter	Brand name: EAST SUN Model No. : DCS10-0501000F Input: AC 100-240V, 50/60Hz, 0.3A Output: DC 5V, 1000mA
Earphone	Brand name: N/A Model No. : N/A

Note:1.CMU200 can measure the average power and Peak power at the same time
2.The sample used for testing is end product.

Product	Type
	☒ Production unit ☐ Identical Prototype

3. SAR MEASUREMENT SYSTEM

3.1. The SATIMO system used for performing compliance tests consists of following items



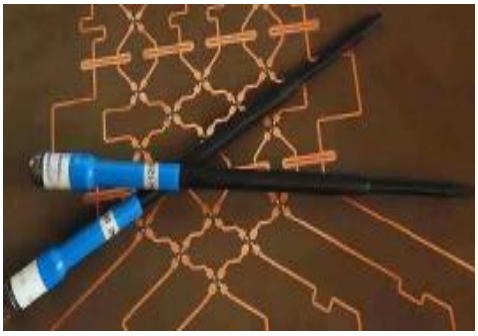
The COMOSAR system for performing compliance tests consists of the following items:

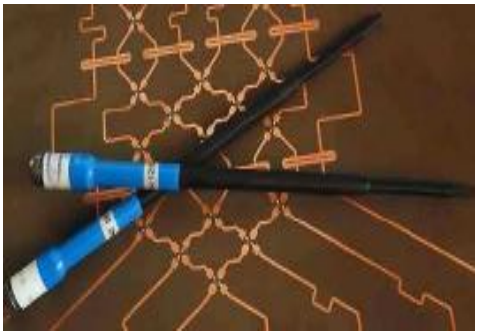
- The PC. It controls most of the bench devices and stores measurement data.A computer running WinXP and the Opensar software.
- The E-Field probe. The probe is a 3-axis system made of 3 distinct dipoles. Each dipole returns a voltage in function of the ambient electric field.
- The Keithley multimeter measures each probe dipole voltages.
- The SAM phantom simulates a human head. The measurement of the electric field is made inside the phantom.
- The liquids simulate the dielectric properties of the human head tissues.
- The network emulator controls the mobile phone under test.
- The validation dipoles are used to measure a reference SAR. They are used to periodically check the bench to make sure that there is no drift of the system characteristics over time.
- The phantom, the device holder and other accessories according to the targeted measurement.

3.2. COMOSAR E-Field Probe

The SAR measurement is conducted with the dosimetric probe manufactured by SATIMO. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. SATIMO conducts the probe calibration in compliance with international and national standards (e.g. IEEE 1528 and relevant KDB files.) The calibration data are in Appendix D.

Isotropic E-Field Probe Specification

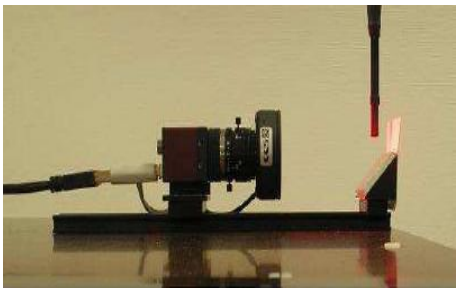
Model	SSE5	
Manufacture	MVG	
Identification No.	SN 14/16 EP308	
Frequency	0.3GHz-3.7GHz Linearity:±0.08dB(300MHz -3.7GHz)	
Dynamic Range	0.01W/Kg-100W/Kg Linearity:±0.08dB	
Dimensions	Overall length:330mm Length of individual dipoles:4.5mm Maximum external diameter:8mm Probe Tip external diameter:5mm Distance between dipoles/ probe extremity:2.7mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 3 GHz with precision of better 30%.	

Model	SSE5	
Manufacture	MVG	
Identification No.	SN 14/16 EP307	
Frequency	0.7GHz-3GHz Linearity:±0.05dB(700MHz-3GHz)	
Dynamic Range	0.01W/Kg-100W/Kg Linearity:±0.05dB	
Dimensions	Overall length:330mm Length of individual dipoles:4.5mm Maximum external diameter:8mm Probe Tip external diameter:5mm Distance between dipoles/ probe extremity:2.7mm	
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 3 GHz with precision of better 30%.	

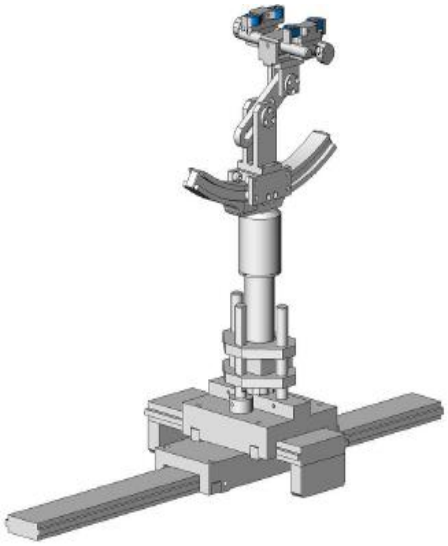
3.3. Robot

The COMOSAR system uses the KUKA robot from SATIMO SA (France).For the 6-axis controller COMOSAR system, the KUKA robot controller version from SATIMO is used. The XL robot series have many features that are important for our application: □ High precision (repeatability 0.02 mm) □ High reliability (industrial design) □ Jerk-free straight movements □ Low ELF interference (the closed metallic construction shields against motor control fields) □ 6-axis controller	

3.4. Video Positioning System

The video positioning system is used in OpenSAR to check the probe. Which is composed of a camera, LED, mirror and mechanical parts.The camera is piloted by the main computer with firewire link. During the process, the actual position of the probe tip with respect to the robot arm is measured, as well as the probe length and the horizontal probe offset. The software then corrects all movements, such that the robot coordinates are valid for the probe tip. The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.	

3.5. Device Holder

The COMOSAR device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (EPR). Thus the device needs no repositioning when changing the angles. The COMOSAR device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity εr =3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.	

3.6. SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas: □ Left head □ Right head □ Flat phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

4. SAR MEASUREMENT PROCEDURE

4.1. Specific Absorption Rate (SAR)

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

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

$$\mathrm{SAR} = \frac{\mathrm{d}}{\mathrm{d}t}\left(\frac{\mathrm{d}W}{\mathrm{d}m}\right) = \frac{\mathrm{d}}{\mathrm{d}t}\left(\frac{\mathrm{d}W}{\rho \mathrm{d}V}\right)$$

SAR is expressed in units of Watts per kilogram (W/Kg)
SAR can be obtained using either of the following equations:

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

$$\mathrm{SAR} = c_h \left.\frac{\mathrm{d}T}{\mathrm{d}t}\right|_{t=0}$$

Where

SAR	is the specific absorption rate in watts per kilogram;
E	is the r.m.s. value of the electric field strength in the tissue in volts per meter;
σ	is the conductivity of the tissue in siemens per metre;
ρ	is the density of the tissue in kilograms per cubic metre;
c_h	is the heat capacity of the tissue in joules per kilogram and Kelvin;
$\frac{dT}{dt} \mid t = 0$	is the initial time derivative of temperature in the tissue in kelvins per second

4.2. SAR Measurement Procedure

Step 1: Power Reference Measurement

The Power Reference Measurement and Power Drift Measurement are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface is 2.7mm This distance cannot be smaller than the distance os sensor calibration points to probe tip as `defined in the probe properties,

Step 2: Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in SATIMO software can find the maximum locations even in relatively coarse grids. When an Area Scan has measured all reachable points, it computes the field maximal found in the scanned area, within a range of the global maximum. The range (in db) is specified in the standards for compliance testing. For example, a 2db range is required in IEEE Standard 1528 and IEC62209 standards, whereby 3db is a requirement when compliance is assessed in accordance with the ARIB standard (Japan) If one Zoom Scan follows the Area Scan, then only the absolute maximum will be taken as reference. For cases where multiple maximum are detected, the number of Zoom Scan has to be increased accordingly.

Area Scan Parameters extracted from KDB 865664 D01 SAR Measurement 100MHz to 6GHz

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

Step 3: Zoom Scan

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

Zoom Scan Parameters extracted from KDB865664 d01 SAR Measurement 100MHz to 6GHz

Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details. * When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

Step 4: Power Drift Measurement

The Power Drift Measurement measures the field at the same location as the most recent power reference measurement within the same procedure, and with the same settings. The Power Drift Measurement gives the field difference in dB from the reading conducted within the same settings. This allows a user to monitor the power drift of the device under test within a batch process. The measurement procedure is the same as Step 1.

4.3. RF Exposure Conditions

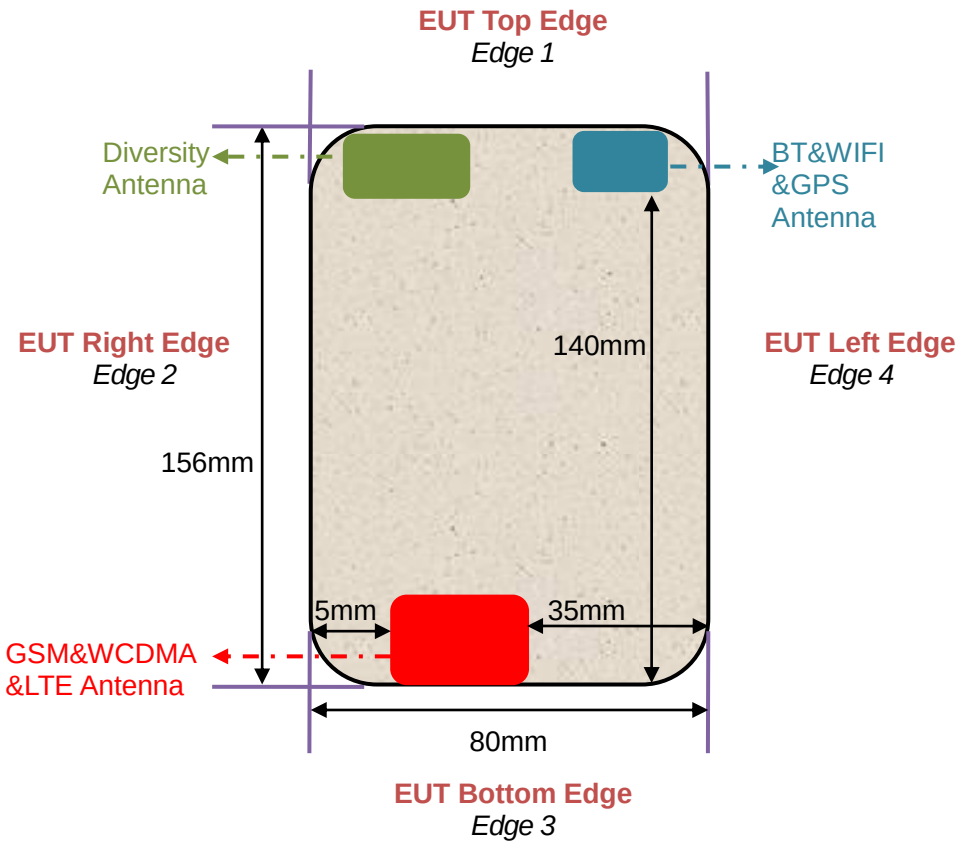
Test Configuration and setting:

The EUT is a model of GSM Portable Mobile Station (MS). It supports GSM/GPRS/EGPRS, WCDMA/HSPA, LTE, BT, WIFI, and support hot spot mode.

For WWAN SAR testing, the device was controlled by using a base station emulator. Communication between the device and the emulator were established by air link. The distance between the EUT and the antenna is larger than 50cm, and the output power radiated from the emulator antenna is at least 30db smaller than the output power of EUT.

For WLAN testing, the EUT is configured with the WLAN continuous TX tool through engineering command.

Antenna Location: (the back view)



For WWAN mode:

Test Configurations	Antenna to edges/surface	SAR required	Note
Head			
Left Touch		Yes	--
Left Tilt		Yes	--
Right Touch		Yes	--
Right Tilt		Yes	--
Body			
Back	<25mm	Yes	--
Front	<25mm	Yes	--
Hotspot			
Back	<25mm	Yes	--
Front	<25mm	Yes	--
Edge 1 (Top)	137mm	No	SAR is not required for the distance between the antenna and the edge is >25mm as per KDB 941225 D06 Hotspot SAR
Edge 2 (Right)	5mm	Yes	--
Edge 3 (Bottom)	6mm	Yes	--
Edge 4 (Left)	35mm	No	SAR is not required for the distance between the antenna and the edge is >25mm as per KDB 941225 D06 Hotspot SAR

For WLAN mode:

Test Configurations	Antenna to edges/surface	SAR required	Note
Head			
Left Touch		Yes	--
Left Tilt		Yes	--
Right Touch		Yes	--
Right Tilt		Yes	--
Body			
Back	<25mm	Yes	--
Front	<25mm	Yes	--
Hotspot			
Back	<25mm	Yes	--
Front	<25mm	Yes	--
Edge 1 (Top)	10mm	Yes	--
Edge 2 (Right)	48mm	No	SAR is not required for the distance between the antenna and the edge is >25mm as per KDB 941225 D06 Hotspot SAR
Edge 3 (Bottom)	140mm	No	SAR is not required for the distance between the antenna and the edge is >25mm as per KDB 941225 D06 Hotspot SAR
Edge 4 (Left)	12mm	Yes	--

5. TISSUE SIMULATING LIQUID

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15cm. For head SAR testing the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15cm For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15cm.The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in 5.2

5.1. The composition of the tissue simulating liquid

Ingredient (% Weight) / Frequency (MHz)	Water	Nacl	Polysorbate 20	DGBE	1,2 Propanediol	Triton X-100
750 Head	35	2	0.0	0.0	63	0.0
750 Body	55	1	0.0	0.0	44	0.0
835 Head	50.36	1.25	48.39	0.0	0.0	0.0
835 Body	54.00	1	0.0	15	0.0	30
1750 Head	52.64	0.36	0.0	47	0.0	0.0
1750 Body	70	1	0.0	9	0.0	20
1900 Head	54.9	0.18	0.0	44.92	0.0	0.0
1900 Body	70	1	0.0	9	0.0	20
2450 Head	71.88	0.16	0.0	7.99	0.0	19.97
2450 Body	70	1	0.0	9	0.0	20

5.2. Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in IEEE 1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in IEEE 1528.

Target Frequency (MHz)	head		body	
	εr	σ (S/m)	εr	σ (S/m)
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
750	**41.9**	**0.89**	**55.5**	**0.96**
835	**41.5**	**0.90**	**55.2**	**0.97**
900	41.5	0.97	55.0	1.05
915	41.5	1.01	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1750	**40.1**	**1.37**	**53.4**	**1.49**
1800 – 2000	**40.0**	**1.40**	**53.3**	**1.52**
2450	**39.2**	**1.80**	**52.7**	**1.95**
3000	38.5	2.40	52.0	2.73

(εr = relative permittivity, σ = conductivity and ρ = 1000 kg/m3

5.3. Tissue Calibration Result

The dielectric parameters of the liquids were verified prior to the SAR evaluation using SATIMO Dielectric Probe Kit and R&S Network Analyzer ZVL6.

Tissue Stimulant Measurement for 750MHz					
	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [°C]	Test time
		εr 41.9 (39.805-43.995)	δ[s/m] 0.89(0.8455-0.9345)		
Head	704	43.15	0.86	21.6	May 24,2017
	707.5	43.00	0.87		
	709	42.96	0.87		
	710	42.35	0.88		
	711	41.88	0.89		
	750	40.53	0.92		
Body	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr 55.5(52.725-58.275)	δ[s/m]0.96(0.912-1.008)		
	704	56.07	0.93	21.9	May 24,2017
	707.5	55.95	0.93		
	709	55.75	0.94		
	710	55.05	0.95		
	711	54.28	0.96		
	750	53.52	0.99		

Tissue Stimulant Measurement for 835MHz					
	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [°C]	Test time
		εr 41.5 (39.425-43.575)	δ[s/m] 0.90(0.855-0.945)		
Head	824.2	42.31	0.88	21.5	May 16,2017
	826.4	42.12	0.89		
	835	41.88	0.90		
	836.6	41.43	0.91		
	846.6	41.16	0.93		
	848.8	40.95	0.94		
Body	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr 55.20(52.44-57-96)	δ[s/m]0.97(0.9215-1.0185)		
	824.2	56.63	0.93	21.6	May 16,2017
	826.4	56.32	0.94		
	835	55.96	0.95		
	836.6	55.54	0.96		
	846.6	55.29	0.97		
	848.8	54.88	0.98		

Tissue Stimulant Measurement for 1750MHz					
Head	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [°C]	Test time
		εr 40.1 (38.095-42.105)	δ[s/m]1.37(1.3015-1.439)		
	1712.4	41.58	1.34	21.7	May 24,2017
	1732.6	40.96	1.36		
	1750	40.04	1.37		
	1752.6	39.88	1.39		
Body	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr 53.4(50.73-56.07)	δ[s/m] 1.49(1.4155-1.5645)		
	1712.4	55.08	1.45	21.6	May 24,2017
	1732.6	53.53	1.47		
	1750	52.64	1.48		
	1752.6	52.11	1.50		

Tissue Stimulant Measurement for 1750MHz					
Head	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [°C]	Test time
		εr 40.1 (38.095-42.105)	δ[s/m]1.37(1.3015-1.439)		
	1720	41.35	1.34	21.0	May 23,2017
	1732.5	41.06	1.35		
	1745	40.72	1.36		
	1750	40.31	1.37		
Body	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr 53.4(50.73-56.07)	δ[s/m] 1.49(1.4155-1.5645)		
	1720	54.58	1.45	20.9	May 23,2017
	1732.5	53.66	1.46		
	1745	53.12	1.47		
	1750	52.49	1.48		

Tissue Stimulant Measurement for 1900MHz					
Head	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [°C]	Test time
		εr40.00(38.00-42.00)	δ[s/m]1.40(1.33-1.47)		
	1850.2	41.25	1.35	20.7	May 04,2017
	1852.4	41.03	1.38		
	1880	40.11	1.40		
	1900	39.34	1.42		
	1907.6	38.89	1.43		
	1909.8	38.62	1.44		
Body	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr53.30(50.635-55.965)	δ[s/m]1.52(1.444-1.596)		
	1850.2	54.68	1.46	20.9	May 04,2017
	1852.4	53.93	1.47		
	1880	53.12	1.50		
	1900	52.85	1.51		
	1907.6	52.12	1.52		
	1909.8	51.67	1.53		

Tissue Stimulant Measurement for 1900MHz					
Head	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [°C]	Test time
		εr40.00(38.00-42.00)	δ[s/m]1.40(1.33-1.47)		
	1860	41.06	1.39	21.7	May 15,2017
	1880	40.17	1.41		
	1900	39.36	1.43		
Body	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr53.30(50.635-55.965)	δ[s/m]1.52(1.444-1.596)		
	1860	53.96	1.48	21.6	May 15,2017
	1880	53.15	1.51		
	1900	52.88	1.52		

Tissue Stimulant Measurement for 2450MHz					
Head	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [°C]	Test time
		εr39.2(37.24-41.16)	δ[s/m]1.80(1.71-1.89)		
	2412	40.72	1.74	21.2	May 02,2017
	2437	39.95	1.78		
	2450	39.38	1.80		
	2462	38.79	1.84		
Body	Fr. (MHz)	Dielectric Parameters (±5%)		Tissue Temp [oC]	Test time
		εr52.7(50.065-55.335)	δ[s/m]1.95(1.8525-2.0475)		
	2412	53.91	1.87	20.9	May 02,2017
	2437	53.06	1.91		
	2450	52.45	1.93		
	2462	51.78	1.96		

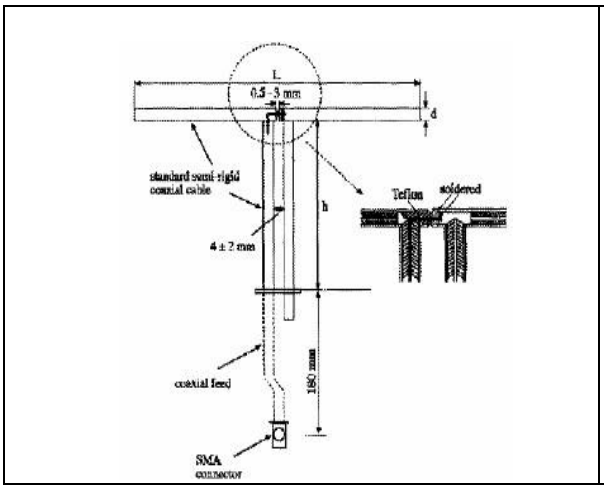
6. SAR SYSTEM CHECK PROCEDURE

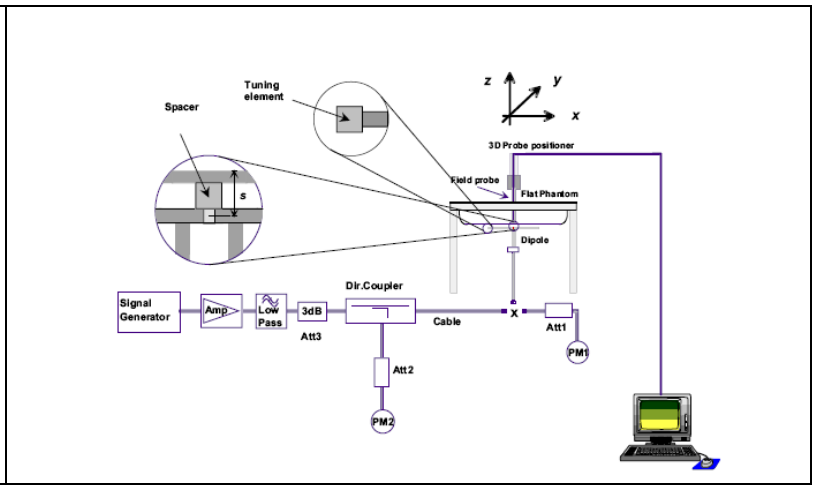
6.1. SAR System Check Procedures

SAR system check is required to confirm measurement accuracy, according to the tissue dielectric media, probe calibration points and other system operating parameters required for measuring the SAR of a test device. The system verification must be performed for each frequency band and within the valid range of each probe calibration point required for testing the device. The same SAR probe(s) and tissue-equivalent media combinations used with each specific SAR system for system verification must be used for device testing. When multiple probe calibration points are required to cover substantially large transmission bands, independent system verifications are required for each probe calibration point. A system verification must be performed before each series of SAR measurements using the same probe calibration point and tissue-equivalent medium. Additional system verification should be considered according to the conditions of the tissue-equivalent medium and measured tissue dielectric parameters, typically every three to four days when the liquid parameters are remeasured or sooner when marginal liquid parameters are used at the beginning of a series of measurements.

Each SATIMO system is equipped with one or more system check kits. These units, together with the predefined measurement procedures within the SATIMO software, enable the user to conduct the system check and system validation. System kit includes a dipole, and dipole device holder.

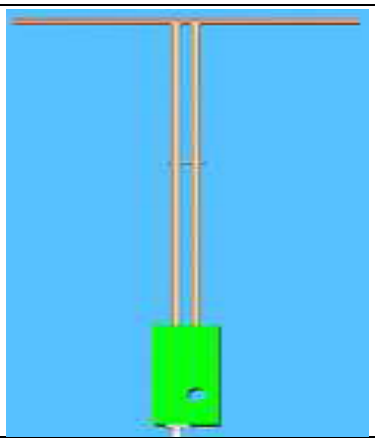
The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system check setup is shown as below.





6.2. SAR System Check

6.2.1. Dipoles



The dipoles used is based on the IEEE-1528 standard, and is complied with mechanical and electrical specifications in line with the requirements of IEEE. the table below provides details for the mechanical and electrical
Specifications for the dipoles.

Frequency	L (mm)	h (mm)	d (mm)
750MHz	176	100	6.35
835MHz	161.0	89.8	3.6
1800MHz	71.6	41.7	3.6
1900MHz	68	39.5	3.6
2450MHz	51.5	30.4	3.6

6.2.2. System Check Result

System Performance Check at 750MHz&835MHz &1800MHz &1900MHz &2450MHz for Head								
Validation Kit: SN47/14 DIP 0G750-340& SN29/15 DIP 0G835-383& SN29/15 DIP 1G800-387&SN 29/15 DIP 1G900-389& SN 29/15DIP 2G450-393								
Frequency [MHz]	Target Value(W/Kg)		Reference Result (± 10%)		Tested Value(W/Kg)		Tissue Temp. [°C]	Test time
	1g	10g	1g	10g	1g	10g		
750	8.55	5.62	7.695-9.405	5.058-6.182	9.09	6.03	21.6	May 24,2017
835	10.04	6.43	9.036-11.044	5.787 -7.073	9.59	5.89	21.5	May 16,2017
1800	37.43	19.88	33.687-41.173	17.892-21.868	37.87	19.83	21.7	May 24,2017
1800	37.43	19.88	33.687-41.173	17.892-21.868	37.54	20.07	21.0	May 23,2017
1900	41.44	21.33	37.296-45.584	19.197-23.463	37.77	20.77	20.7	May 04,2017
1900	41.44	21.33	37.296-45.584	19.197-23.463	39.37	20.69	21.7	May 15,2017
2450	54.53	24.30	49.077-59.983	21.87-26.730	52.16	24.45	21.2	May 02,2017
System Performance Check at 750MHz & 835MHz &1800MHz &1900MHz &2450MHz for Body								
Frequency [MHz]	Target Value(W/Kg)		Reference Result (± 10%)		Tested Value(W/Kg)		Tissue Temp. [°C]	Test time
	1g	10g	1g	10g	1g	10g		
750	8.78	5.86	7.902-9.658	5.274-6.446	9.36	5.75	21.9	May 24,2017
835	9.85	6.45	8.865-10.835	5.805-7.095	9.83	6.04	21.6	May 16,2017
1800	36.53	19.80	32.877-40.183	17.82-21.780	36.43	18.95	21.6	May 24,2017
1800	36.53	19.80	32.877-40.183	17.82-21.780	35.75	19.13	20.9	May 23,2017
1900	39.38	20.86	35.442-43.318	18.774-22.946	36.88	20.32	20.9	May 04,2017
1900	39.38	20.86	35.442-43.318	18.774-22.946	37.24	19.58	21.6	May 15,2017
2450	49.92	23.16	44.928-54.912	20.844-25.476	49.86	23.32	20.9	May 02,2017

Note:
(1) We use a CW signal of 18dBm for system check, and then all SAR value are normalized to 1W forward power. The result must be within ±10% of target value.

7. EUT TEST POSITION

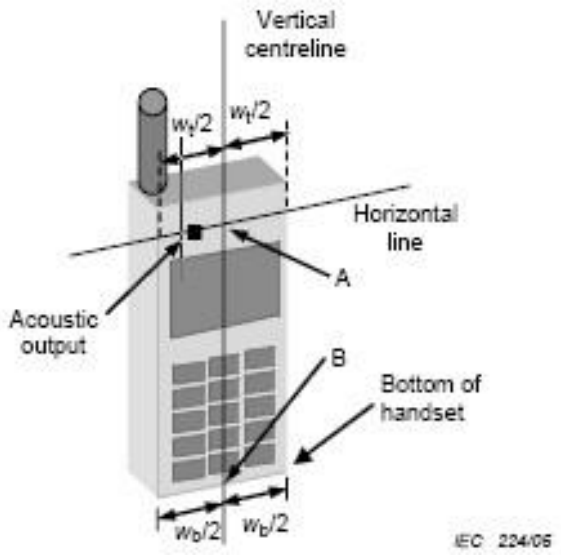
This EUT was tested in **Right Cheek, Right Tilted, Left Cheek, Left Tilted, Body back, Body front and 4 edges.**

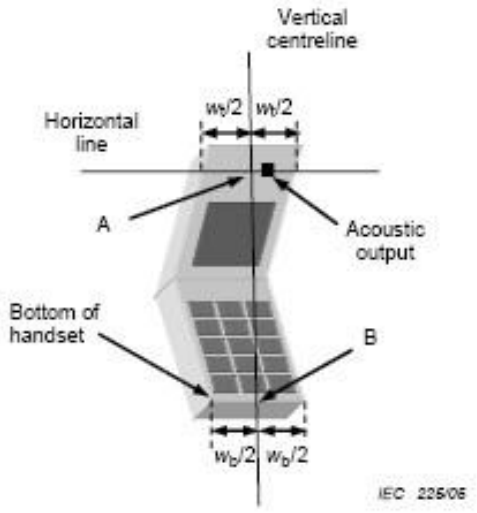
7.1. Define Two Imaginary Lines on the Handset

(1)The vertical centerline passes through two points on the front side of the handset the midpoint of the width wt of the handset at the level of the acoustic output, and the midpoint of the width wb of the handset.

(2)The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

(3)The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.





7.2. Cheek Position

(1) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center picec in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(2) To move the device towards the phantom with the ear piece aligned with the the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost

7.3. Tilt Position

(1) To position the device in the “cheek” position described above.

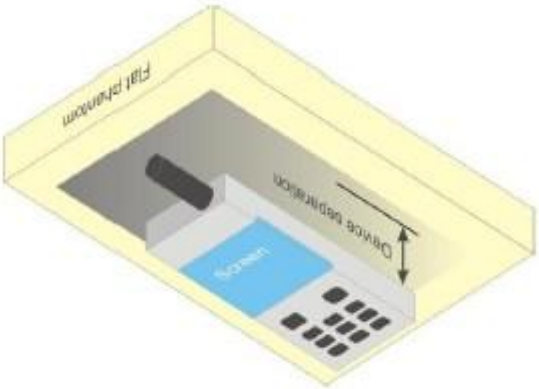
(2) While maintaining the device in the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until with the ear is lost.

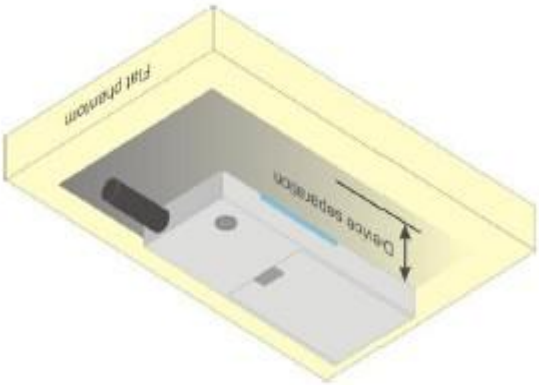
7.4. Body Worn Position

(1) To position the EUT parallel to the phantom surface.

(2) To adjust the EUT parallel to the flat phantom.

(3) To adjust the distance between the EUT surface and the flat phantom to **5mm.**





8. SAR EXPOSURE LIMITS

SAR assessments have been made in line with the requirements of IEEE-1528, and comply with ANSI/IEEE C95.1-2005 “Uncontrolled Environments” limits. These limits apply to a location which is deemed as “Uncontrolled Environment” which can be described as a situation where the general public may be exposed to an RF source with no prior knowledge or control over their exposure.

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

Type Exposure	Uncontrolled Environment Limit (W/kg)
Spatial Peak SAR (1g cube tissue for brain or body)	1.60
Spatial Average SAR (Whole body)	0.08
Spatial Peak SAR (Limbs)	4.0

9. TEST EQUIPMENT LIST

Equipment description	Manufacturer/ Model	Identification No.	Current calibration date	Next calibration date
SAR Probe	MVG	SN 14/16 EP308	12/05/2016	12/04/2017
SAR Probe	MVG	SN 14/16 EP307	07/05/2016	07/04/2017
TISSUE Probe	SATIMO	SN 23/16 OCPG 75	07/05/2016	07/04/2017
Phantom	SATIMO	SN_4511_SAM90	Validated. No cal required.	Validated. No cal required.
Liquid	SATIMO	-	Validated. No cal required.	Validated. No cal required.
Comm Tester	Agilent-8960	GB46310822	03/02/2017	03/01/2018
Comm Tester	R&S- CMW500	S/N121209	07/18/2016	07/17/2017
Multimeter	Keithley 2000	1188656	03/02/2017	03/01/2018
Dipole	SATIMO SID750	SN47/14 DIP 0G750-340	12/03/2014	12/02/2017
Dipole	SATIMO SID835	SN29/15 DIP 0G835-383	07/05/2016	07/04/2019
Dipole	SATIMO SID1800	SN29/15 DIP 1G800-387	07/05/2016	07/04/2019
Dipole	SATIMO SID1900	SN 29/15 DIP 1G900-389	07/05/2016	07/04/2019
Dipole	SATIMO SID2450	SN29/15 DIP 2G450-393	07/05/2016	07/04/2019
Signal Generator	Agilent-E4438C	US41461365	03/02/2017	03/01/2018
Vector Analyzer	Agilent / E4440A	US40420298	07/02/2016	07/01/2017
Network Analyzer	Rhode & Schwarz ZVL6	SN100132	03/02/2017	03/01/2018
Attenuator	Warison /WATT-6SR1211	N/A	N/A	N/A
Attenuator	Mini-circuits / VAT-10+	N/A	N/A	N/A
Amplifier	EM30180	SN060552	03/02/2017	03/01/2018
Directional Couple	Werlatone/ C5571-10	SN99463	07/02/2016	07/01/2017
Directional Couple	Werlatone/ C6026-10	SN99482	07/02/2016	07/01/2017
Power Sensor	NRP-Z21	1137.6000.02	10/10/2016	10/09/2017
Power Sensor	NRP-Z23	US38261498	03/02/2017	03/01/2018
Power Viewer	R&S	V2.3.1.0	N/A	N/A

Note: Per KDB 865664 Dipole SAR Validation, AGC Lab has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:
1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss is within 20% of calibrated measurement;
4. Impedance is within 5Ω of calibrated measurement.

10. MEASUREMENT UNCERTAINTY

Per KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz, when the highest measured 1-g SAR within a frequency band is< 1.5 W/Kg, the extensive SAR measurement uncertainty analysis described in IEEE 1528-2013 is not required in SAR reports submitted for equipment approval.

11. CONDUCTED POWER MEASUREMENT

GSM BAND

Mode	Frequency(MHz)	Avg. Burst Power(dBm)	Duty cycle Factor(dBm)	Frame Power(dBm)
Maximum Power <1>				
GSM 850	824.2	31.71	-9	22.71
	836.6	31.59	-9	22.59
	848.8	**31.77**	-9	22.77
GPRS 850 （1 Slot）	824.2	31.43	-9	22.43
	836.6	31.41	-9	22.41
	848.8	31.19	-9	22.19
GPRS 850 （2 Slot）	824.2	28.59	-6	22.59
	836.6	28.29	-6	22.29
	848.8	28.60	-6	**22.60**
GPRS 850 （3 Slot）	824.2	26.45	-4.26	22.19
	836.6	26.49	-4.26	22.23
	848.8	26.57	-4.26	22.31
GPRS 850 （4 Slot）	824.2	25.21	-3	22.21
	836.6	25.05	-3	22.05
	848.8	25.36	-3	22.36
EGPRS 850 （1 Slot）	824.2	25.37	-9	16.37
	836.6	25.29	-9	16.29
	848.8	25.39	-9	16.39
EGPRS 850 （2 Slot）	824.2	22.26	-6	16.26
	836.6	22.27	-6	16.27
	848.8	22.34	-6	16.34
EGPRS 850 （3 Slot）	824.2	21.14	-4.26	16.88
	836.6	21.22	-4.26	16.96
	848.8	21.19	-4.26	16.93
EGPRS 850 （4 Slot）	824.2	20.13	-3	17.13
	836.6	20.08	-3	17.08
	848.8	20.07	-3	17.07

Mode	Frequency(MHz)	Avg. Burst Power(dBm)	Duty cycle Factor(dBm)	Frame Power(dBm)
Maximum Power <2>				
GSM 850	824.2	31.25	-9	22.25
	836.6	31.36	-9	22.36
	848.8	31.69	-9	22.69
GPRS 850 （1 Slot）	824.2	31.25	-9	22.25
	836.6	31.30	-9	22.30
	848.8	31.05	-9	22.05
GPRS 850 （2 Slot）	824.2	28.36	-6	22.36
	836.6	28.26	-6	22.26
	848.8	28.52	-6	22.52
GPRS 850 （3 Slot）	824.2	26.41	-4.26	22.15
	836.6	26.42	-4.26	22.16
	848.8	26.50	-4.26	22.24
GPRS 850 （4 Slot）	824.2	25.15	-3	22.15
	836.6	25.02	-3	22.02
	848.8	25.25	-3	22.25

GSM BAND CONTINUE

Mode	Frequency(MHz)	Avg. Burst Power(dBm)	Duty cycle Factor(dBm)	Frame Power(dBm)
Maximum Power <1>				
PCS1900	1850.2	28.23	-9	19.23
	1880	28.25	-9	19.25
	1909.8	**28.73**	-9	19.73
GPRS1900 （1 Slot）	1850.2	28.36	-9	19.36
	1880	28.29	-9	19.29
	1909.8	28.38	-9	19.38
GPRS1900 （2 Slot）	1850.2	24.80	-6	18.80
	1880	25.23	-6	19.23
	1909.8	25.64	-6	**19.64**
GPRS1900 （3 Slot）	1850.2	23.84	-4.26	19.58
	1880	23.69	-4.26	19.43
	1909.8	23.41	-4.26	19.15
GPRS1900 （4 Slot）	1850.2	22.11	-3	19.11
	1880	22.08	-3	19.08
	1909.8	22.14	-3	19.14
EGPRS1900 （1 Slot）	1850.2	24.23	-9	15.23
	1880	24.53	-9	15.53
	1909.8	24.85	-9	15.85
EGPRS1900 （2 Slot）	1850.2	21.47	-6	15.47
	1880	21.54	-6	15.54
	1909.8	21.81	-6	15.81
EGPRS1900 （3 Slot）	1850.2	21.68	-4.26	17.42
	1880	21.44	-4.26	17.18
	1909.8	21.82	-4.26	17.56
EGPRS1900 （4 Slot）	1850.2	20.71	-3	17.71
	1880	20.64	-3	17.64
	1909.8	20.75	-3	17.75

Mode	Frequency(MHz)	Avg. Burst Power(dBm)	Duty cycle Factor(dBm)	Frame Power(dBm)
Maximum Power <2>				
PCS1900	1850.2	28.15	-9	19.15
	1880	28.23	-9	19.23
	1909.8	28.67	-9	19.67
GPRS1900 （1 Slot）	1850.2	28.15	-9	19.15
	1880	28.05	-9	19.05
	1909.8	28.21	-9	19.21
GPRS1900 （2 Slot）	1850.2	24.74	-6	18.74
	1880	25.05	-6	19.05
	1909.8	25.12	-6	19.12
GPRS1900 （3 Slot）	1850.2	23.33	-4.26	19.07
	1880	23.25	-4.26	18.99
	1909.8	23.15	-4.26	18.89
GPRS1900 （4 Slot）	1850.2	22.05	-3	19.05
	1880	22.01	-3	19.01
	1909.8	22.09	-3	19.09

Note 1:
The Frame Power (Source-based time-averaged Power) is scaled the maximum burst average power based on time slots. The calculated methods are show as following:
Frame Power = Max burst power (1 Up Slot) – 9 dB
Frame Power = Max burst power (2 Up Slot) – 6 dB
Frame Power = Max burst power (3 Up Slot) – 4.26 dB
Frame Power = Max burst power (4 Up Slot) – 3 dB
Note 2:
SAR is not required for GPRS (1 Slot) Mode because its output power is less than of Voice Mode

UMTS BAND
HSDPA Setup Configuration:

·The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.

·The RF path losses were compensated into the measurements.

·A call was established between EUT and Based Station with following setting:

(1) Set Gain Factors(βc and βd) parameters set according to each

(2) Set RMC 12.2Kbps+HSDPA mode.

(3) Set Cell Power=-86dBm

(4) Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)

(5) Select HSDPA Uplink Parameters

(6) Set Delta ACK, Delta NACK and Delta CQI=8

(7) Set Ack - Nack Repetition Factor to 3

(8) Set CQI Feedback Cycle (k) to 4ms

(9) Set CQI Repetition Factor to 2

(10) Power Ctrl Mode=All Up bits

·The transmitted maximum output power was recorded.

Table C.10.2.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	βc (Note5)	βd	βd (SF)	βc/βd	βHS (Note1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15(Note 4)	15/15(Note 4)	64	12/15(Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: ΔACK, ΔNACK and ΔCQI = 30/15 with β_{hs} = 30/15 * β_c .
Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, ΔACK and ΔNACK = 30/15 with β_{hs} = 30/15 * β_c , and ΔCQI = 24/15 with β_{hs} = 24/15 * β_c .
Note 3: CM = 1 for βc/βd =12/15, □ hs/□ c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.
Note 4: For subtest 2 the □ c/□ 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 □ c = 11/15 and □ d = 15/15.

HSUPA Setup Configuration:

· The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.

· The RF path losses were compensated into the measurements.

· A call was established between EUT and Base Station with following setting * :

(1) Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK

(2) Set the Gain Factors (βc and βd) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121

(3) Set Cell Power = -86 dBm

(4) Set Channel Type = 12.2k + HSPA

(5) Set UE Target Power

(6) Power Ctrl Mode= Alternating bits

(7) Set and observe the E-TFCI

(8) Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI

· The transmitted maximum output power was recorded.

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

Sub-test	βc	βd	βd (SF)	βc/βd	βHS (Note 1)	βec	βed (Note 4) (Note 5)	βed (SF)	βed (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	βed1: 47/15 βed2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

Note 1: For sub-test 1 to 4, ΔACK, ΔNACK and ΔCQI = 30/15 with β_{hs} = 30/15 * β_c . For sub-test 5, ΔACK, ΔNACK and ΔCQI = 5/15 with β_{hs} = 5/15 * β_c .

Note 2: CM = 1 for βc/βd =12/15, □ hs/□ 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 □ c/□ 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 □ c = 10/15 and □ d = 15/15.

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

Note 5: βed cannot be set directly; it is set by Absolute Grant Value.

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

UMTS BAND II

Mode	Frequency (MHz)	Avg. Burst Power (dBm)
WCDMA 1900 RMC	1852.4	21.32
	1880	**21.54**
	1907.6	21.44
WCDMA 1900 AMR	1852.4	20.56
	1880	20.58
	1907.6	20.51
HSDPA Subtest 1	1852.4	20.47
	1880	20.75
	1907.6	20.28
HSDPA Subtest 2	1852.4	20.78
	1880	20.65
	1907.6	20.69
HSDPA Subtest 3	1852.4	20.24
	1880	20.11
	1907.6	20.45
HSDPA Subtest 4	1852.4	20.25
	1880	20.24
	1907.6	20.33
HSUPA Subtest 1	1852.4	20.32
	1880	20.27
	1907.6	20.32
HSUPA Subtest 2	1852.4	20.44
	1880	20.29
	1907.6	20.40
HSUPA Subtest 3	1852.4	20.44
	1880	20.31
	1907.6	20.46
HSUPA Subtest 4	1852.4	20.17
	1880	20.21
	1907.6	20.29
HSUPA Subtest 5	1852.4	20.12
	1880	20.21
	1907.6	20.44

UMTS BAND IV

Mode	Frequency (MHz)	Avg. Burst Power (dBm)
WCDMA 1700 RMC	1712.4	21.11
	1732.6	21.35
	1752.6	**21.59**
WCDMA 1700 AMR	1712.4	21.02
	1732.6	21.42
	1752.6	21.34
HSDPA Subtest 1	1712.4	20.45
	1732.6	20.38
	1752.6	20.33
HSDPA Subtest 2	1712.4	20.18
	1732.6	20.21
	1752.6	20.33
HSDPA Subtest 3	1712.4	20.00
	1732.6	20.06
	1752.6	20.33
HSDPA Subtest 4	1712.4	20.23
	1732.6	20.08
	1752.6	20.24
HSUPA Subtest 1	1712.4	20.23
	1732.6	20.11
	1752.6	20.05
HSUPA Subtest 2	1712.4	20.28
	1732.6	20.19
	1752.6	19.96
HSUPA Subtest 3	1712.4	20.07
	1732.6	20.04
	1752.6	20.16
HSUPA Subtest 4	1712.4	20.11
	1732.6	19.99
	1752.6	19.92
HSUPA Subtest 5	1712.4	20.41
	1732.6	20.09
	1752.6	20.03

UMTS BAND V

Mode	Frequency (MHz)	Avg. Burst Power (dBm)
WCDMA 850 RMC	826.4	21.40
	836.6	21.26
	846.6	**21.43**
WCDMA 850 AMR	826.4	21.23
	836.6	21.13
	846.6	21.22
HSDPA Subtest 1	826.4	20.32
	836.6	20.42
	846.6	20.53
HSDPA Subtest 2	826.4	20.11
	836.6	20.11
	846.6	20.42
HSDPA Subtest 3	826.4	20.01
	836.6	19.95
	846.6	20.21
HSDPA Subtest 4	826.4	20.11
	836.6	20.08
	846.6	20.05
HSUPA Subtest 1	826.4	20.00
	836.6	20.03
	846.6	20.11
HSUPA Subtest 2	826.4	20.21
	836.6	20.03
	846.6	20.02
HSUPA Subtest 3	826.4	20.26
	836.6	20.31
	846.6	20.17
HSUPA Subtest 4	826.4	20.22
	836.6	19.94
	846.6	20.09
HSUPA Subtest 5	826.4	20.19
	836.6	20.14
	846.6	20.11

According to 3GPP 25.101 sub-clause 6.2.2 , the maximum output power is allowed to be reduced by following the table.

Table 6.1aA: UE maximum output power with HS-DPCCH and E-DCH

UE Transmit Channel Configuration	CM(db)	MPR(db)
For all combinations of ,DPDCH,DPCCH HS-DPDCH,E-DPDCH and E-DPCCH	0≤ CM≤3.5	MAX(CM-1,0)
Note: CM=1 for β_c/β_d=12/15, β_{hs}/β_c=24/15.For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.		

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensation for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

LTE Band

Conducted Power of LTE Band II(dBm)							
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 18607**	**Channel 18900**	**Channel 19193**
1.4MHz	QPSK	1	0	0	22.22	22.42	22.61
			3	0	22.75	22.52	22.39
			5	0	22.85	22.88	22.42
		3	0	0	22.68	22.56	22.98
			2	0	22.31	22.16	22.67
			3	0	22.41	22.23	22.43
		6	0	1	22.63	22.76	22.46
	16QAM	1	0	1	22.43	**23.59**	22.78
			3	1	22.24	22.89	22.59
			5	1	21.94	22.52	22.31
		3	0	1	22.99	22.31	22.13
			2	1	22.84	22.35	22.05
			3	1	22.94	22.25	22.43
		6	0	2	22.20	22.71	22.15
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 18615**	**Channel 18900**	**Channel 19185**
3MHz	QPSK	1	0	0	22.81	22.30	22.94
			7	0	23.17	22.67	23.01
			14	0	22.85	22.63	22.30
		8	0	1	22.75	22.10	22.29
			4	1	22.70	22.26	22.43
			7	1	22.31	22.25	22.32
		15	0	1	22.80	22.02	22.45
	16QAM	1	0	1	22.18	22.73	22.26
			7	1	22.89	22.99	**23.25**
			14	1	22.69	22.93	22.20
		8	0	2	22.32	22.28	23.01
			4	2	22.07	22.25	23.06
			7	2	22.39	22.38	22.91
		15	0	2	22.96	22.71	22.23

Conducted Power of LTE Band II(dBm)							
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 18625**	**Channel 18900**	**Channel 19175**
5MHz	QPSK	1	0	0	22.91	22.58	23.15
			13	0	22.30	22.35	22.26
			24	0	**23.22**	22.63	22.57
		12	0	1	22.25	23.00	22.97
			6	1	22.09	22.80	21.96
			13	1	22.93	22.92	22.33
		25	0	1	22.37	22.50	22.04
	16QAM	1	0	1	22.32	22.70	22.54
			13	1	22.99	22.96	22.06
			24	1	23.17	22.57	22.29
		12	0	2	23.11	22.88	22.76
			6	2	22.91	22.88	22.45
			13	2	23.01	22.00	22.28
		25	0	2	22.99	22.96	22.77
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 18650**	**Channel 18900**	**Channel 19150**
10MHz	QPSK	1	0	0	22.93	22.80	22.72
			25	0	22.51	22.34	22.24
			49	0	22.65	23.12	22.58
		25	0	1	22.40	22.85	22.59
			13	1	22.48	22.89	23.20
			25	1	22.81	22.71	23.18
		50	0	1	23.13	22.35	23.10
	16QAM	1	0	1	22.85	23.04	22.11
			25	1	22.54	22.17	23.06
			49	1	22.80	22.80	22.55
		25	0	2	21.87	22.91	23.03
			13	2	22.52	22.67	22.73
			25	2	21.90	22.64	22.92
		50	0	2	21.94	22.92	22.53

Conducted Power of LTE Band II(dBm)							
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 18675**	**Channel 18900**	**Channel 19125**
15MHz	QPSK	1	0	0	22.34	22.86	22.64
			38	0	22.73	22.47	22.77
			74	0	22.39	22.68	21.95
		36	0	1	22.15	22.94	23.04
			18	1	22.71	22.74	22.82
			39	1	22.78	22.47	22.51
		75	0	1	22.92	22.28	22.12
	16QAM	1	0	1	22.42	22.41	22.66
			38	1	22.74	22.15	22.86
			74	1	22.82	22.50	22.54
		36	0	2	22.40	22.33	22.94
			18	2	22.01	22.17	22.26
			39	2	21.74	22.66	22.56
		75	0	2	22.03	22.32	22.59
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 18700**	**Channel 18900**	**Channel 19100**
20MHz	QPSK	1	0	0	22.10	22.56	22.37
			50	0	22.87	**22.87**	22.32
			99	0	22.67	22.55	22.35
		50	0	1	22.43	22.39	22.87
			25	1	**23.10**	22.78	23.01
			50	1	22.82	22.38	22.52
		100	0	1	22.53	22.39	22.47
	16QAM	1	0	1	22.24	22.90	22.67
			50	1	22.96	22.21	22.60
			99	1	22.85	22.43	22.62
		50	0	2	22.63	22.53	22.90
			25	2	22.44	23.09	22.49
			50	2	22.26	22.38	22.37
		100	0	2	**23.18**	22.57	22.37

Conducted Power of LTE Band IV(dBm)							
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 19957**	**Channel 20175**	**Channel 20393**
1.4MHz	QPSK	1	0	0	22.29	22.70	22.42
			3	0	22.21	21.97	22.46
			5	0	22.17	22.34	22.03
		3	0	0	22.22	22.71	22.19
			2	0	22.15	22.26	22.62
			3	0	22.79	22.55	22.32
		6	0	1	22.45	22.24	22.69
	16QAM	1	0	1	22.15	22.72	22.18
			3	1	22.60	22.10	22.52
			5	1	22.53	22.70	22.08
		3	0	1	22.76	21.98	22.61
			2	1	21.96	22.33	22.68
			3	1	23.03	22.41	22.28
		6	0	2	22.87	22.73	22.33
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 19965**	**Channel 20175**	**Channel 20385**
3MHz	QPSK	1	0	0	22.34	22.77	22.06
			7	0	22.82	22.74	22.40
			14	0	22.62	22.54	22.78
		8	0	1	22.57	22.28	22.76
			4	1	22.49	23.02	22.94
			7	1	22.08	22.52	23.08
		15	0	1	22.98	22.75	22.68
	16QAM	1	0	1	22.50	22.70	22.82
			7	1	22.66	23.09	22.42
			14	1	22.36	22.80	22.27
		8	0	2	22.46	22.49	23.09
			4	2	22.18	22.55	22.40
			7	2	22.29	22.66	22.50
		15	0	2	22.25	22.68	22.12

Conducted Power of LTE Band IV(dBm)							
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 19975**	**Channel 20175**	**Channel 20375**
5MHz	QPSK	1	0	0	**23.07**	22.02	22.08
			13	0	22.21	22.27	22.89
			24	0	22.34	21.95	22.56
		12	0	1	22.59	22.91	22.83
			6	1	22.58	22.90	23.07
			13	1	22.71	22.94	22.42
		25	0	1	22.50	22.82	22.71
	16QAM	1	0	1	22.82	22.47	22.22
			13	1	22.90	21.92	22.47
			24	1	22.42	22.52	22.42
		12	0	2	22.09	22.26	22.04
			6	2	22.38	22.17	22.29
			13	2	22.28	22.38	22.74
		25	0	2	22.48	22.12	22.61
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 20000**	**Channel 20175**	**Channel 20350**
10MHz	QPSK	1	0	0	22.77	22.70	22.57
			25	0	22.02	22.92	21.86
			49	0	22.96	22.87	22.33
		25	0	1	22.85	22.73	22.02
			13	1	22.20	22.53	23.01
			25	1	22.64	22.68	22.12
		50	0	1	23.02	22.41	22.13
	16QAM	1	0	1	21.97	22.62	22.05
			25	1	22.19	**23.11**	22.20
			49	1	22.89	21.97	22.19
		25	0	2	22.93	22.55	22.73
			13	2	22.01	22.77	22.91
			25	2	22.10	22.60	22.97
		50	0	2	22.88	22.66	22.58

Conducted Power of LTE Band IV(dBm)							
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 20025**	**Channel 20175**	**Channel 20325**
15MHz	QPSK	1	0	0	22.41	22.89	22.88
			38	0	22.56	**23.04**	21.97
			74	0	22.78	22.57	22.83
		36	0	1	22.39	22.61	22.95
			18	1	22.32	22.81	22.96
			39	1	22.36	22.52	22.48
		75	0	1	22.67	22.60	22.02
	16QAM	1	0	1	22.58	22.11	23.01
			38	1	22.34	22.71	22.09
			74	1	22.86	22.62	22.16
		36	0	2	22.51	22.86	**23.10**
			18	2	23.01	22.11	22.36
			39	2	22.96	22.65	22.61
		75	0	2	21.87	22.64	22.24
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 20050**	**Channel 20175**	**Channel 20300**
20MHz	QPSK	1	0	0	22.41	22.16	**22.93**
			50	0	22.16	22.60	22.70
			99	0	22.67	22.11	22.62
		50	0	1	22.15	22.87	22.46
			25	1	22.55	22.51	22.62
			50	1	22.03	22.82	22.47
		100	0	1	21.92	22.85	22.38
	16QAM	1	0	1	22.44	22.77	22.29
			50	1	22.56	22.94	**23.09**
			99	1	22.21	22.06	22.85
		50	0	2	22.33	22.12	22.58
			25	2	22.91	22.39	22.54
			50	2	22.10	22.53	22.62
		100	0	2	22.10	22.96	22.66

Conducted Power of LTE Band XII(dBm)							
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 23017**	**Channel 23095**	**Channel 23173**
1.4MHz	QPSK	1	0	0	22.49	22.16	22.62
			3	0	**23.00**	22.00	22.14
			5	0	22.93	22.10	22.72
		3	0	0	22.26	22.96	22.53
			2	0	22.19	22.33	22.07
			3	0	22.23	22.23	22.36
		6	0	1	21.64	22.20	22.13
	16QAM	1	0	1	22.67	21.95	22.33
			3	1	23.00	22.51	22.02
			5	1	22.89	22.61	22.49
		3	0	1	22.94	22.46	22.91
			2	1	22.39	21.95	22.66
			3	1	22.15	22.70	22.08
		6	0	2	22.00	22.19	21.98
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 23025**	**Channel 23095**	**Channel 23165**
3MHz	QPSK	1	0	0	22.16	22.56	22.58
			7	0	22.98	22.61	21.97
			14	0	22.39	22.70	22.84
		8	0	1	22.70	22.48	22.38
			4	1	21.83	22.39	22.85
			7	1	22.68	22.13	22.63
		15	0	1	22.11	22.01	21.82
	16QAM	1	0	1	22.17	22.70	22.84
			7	1	22.43	22.76	22.97
			14	1	22.26	22.55	22.68
		8	0	2	22.66	22.31	22.32
			4	2	22.49	22.67	21.92
			7	2	**23.01**	22.96	22.83
		15	0	2	22.61	22.15	22.35

Conducted Power of LTE Band XII(dBm)							
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 23035**	**Channel 23095**	**Channel 23155**
5MHz	QPSK	1	0	0	22.59	22.12	22.53
			13	0	22.22	22.22	22.60
			24	0	22.30	22.71	22.84
		12	0	1	22.25	22.25	22.77
			6	1	22.33	**23.08**	22.59
			13	1	22.10	22.61	22.02
		25	0	1	22.31	22.10	22.66
	16QAM	1	0	1	22.22	22.04	22.96
			13	1	22.18	22.89	22.21
			24	1	22.20	22.54	21.95
		12	0	2	21.91	22.34	22.81
			6	2	22.27	22.95	22.36
			13	2	22.54	22.57	21.93
		25	0	2	21.85	22.55	22.56
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 23060**	**Channel 23095**	**Channel 23130**
10MHz	QPSK	1	0	0	22.63	22.03	22.22
			25	0	**22.95**	22.79	22.27
			49	0	22.90	21.99	22.44
		25	0	1	22.86	22.23	22.17
			13	1	22.33	22.01	22.13
			25	1	**23.02**	22.80	22.30
		50	0	1	22.21	21.79	21.96
	16QAM	1	0	1	22.42	22.25	22.59
			25	1	22.39	22.55	22.92
			49	1	22.74	22.83	22.87
		25	0	2	22.46	22.12	22.43
			13	2	21.92	22.81	22.35
			25	2	22.71	22.26	21.98
		50	0	2	21.87	22.12	22.10

Conducted Power of LTE Band XVII(dBm)							
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 23755**	**Channel 23790**	**Channel 23825**
5MHz	QPSK	1	0	0	22.46	22.40	22.25
			13	0	22.51	22.12	22.44
			24	0	22.08	22.83	22.61
		12	0	1	22.29	22.40	22.40
			6	1	22.35	22.53	22.28
			13	1	21.75	22.13	22.19
		25	0	1	22.28	22.35	22.23
	16QAM	1	0	1	22.72	22.67	22.24
			13	1	**23.25**	22.58	22.57
			24	1	22.42	22.77	22.29
		12	0	2	22.41	22.22	21.74
			6	2	22.24	22.31	22.08
			13	2	22.59	22.22	22.61
		25	0	2	22.64	22.03	22.70
Bandwidth	**Modulation**	**RB size**	**RB offset**	**Target MPR**	**Channel 23780**	**Channel 23790**	**Channel 23800**
10MHz	QPSK	1	0	0	22.24	22.34	22.22
			25	0	22.56	22.74	22.60
			49	0	22.39	22.15	**23.05**
		25	0	1	22.78	21.91	22.43
			13	1	22.20	22.78	22.14
			25	1	**23.05**	21.86	22.00
		50	0	1	22.43	22.67	21.92
	16QAM	1	0	1	22.89	22.12	22.23
			25	1	22.34	22.97	22.26
			49	1	22.12	22.83	21.90
		25	0	2	22.68	22.16	22.23
			13	2	22.40	22.64	22.05
			25	2	22.45	22.62	22.27
		50	0	2	22.19	22.95	22.69

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.
UE Power Class: 3 (23 +/- 2dBm). 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 6.2.3.3-1 of the 3GPP TS36.101.

Table 6.2.3.3-1 Maximum Power Reduction (MPR) for Power class3

Modulation	**Maximum Power Reduction (MPR) for Power[RB]**						MPR(dB)
	1.4MHz	3MHz	5MHz	10MHz	15MHz	20MHz	
QPSK	＞5	＞4	＞8	＞12	＞16	＞18	≤1
16QAM	≤5	≤4	≤8	≤12	≤16	≤18	≤1
16QAM	＞5	＞4	＞8	＞12	＞16	＞18	≤2

The allowed A-MPR values specified below in Table 6.2.4.3-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signaling Value of “NS_01”.3

Table 6.2.4.3-1: Additional Maximum Power Reduction (A-MPR) / Spectrum Emission requirements

Network Signaling value	Requirements (sub-clause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.2-1	1.4,3,5,10,15,20	Table 5.4.2-1	N/A
NS_03	6.6.2.2.3.1	2,4,10, 23, 25,35,36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.3.2	41	5	>6	≤1
			10, 15, 20	Table 6.2.4.3-4	
NS_05	6.6.3.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.4.2-1	N/A
NS_07	6.6.2.2.3.3 6.6.3.3.3.2	13	10	Table 6.2.4.3-2	Table 6.2.4.3-2
NS_08	6.6.3.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4.3-3	Table 6.2.4.3-3
NS_11	6.6.2.2.1 6.6.3.3.13	231	1.4, 3, 5, 10,15,20	Table 6.2.4.3-5	Table 6.2.4.3-5
NS_12	6.6.3.3.5	26	1.4, 3, 5	Table 6.2.4.3-6	Table 6.2.4.3-6
NS_13	6.6.3.3.6	26	5	Table 6.2.4.3-7	Table 6.2.4.3-7
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4.3-8	Table 6.2.4.3-8
NS_15	6.6.3.3.8	26	1.4, 3, 5, 10, 15	Table 6.2.4.3-9 Table 6.2.4.3-10	Table 6.2.4.3-9, Table 6.2.4.3-10
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4.3-11, Table 6.2.4.3-12, Table 6.2.4.3-13	
NS_17	6.6.3.3.10	28	5, 10	Table 5.4.2-1	N/A
	6.6.3.3.11	28	5	≥ 2	≤ 1
NS_18			10, 15, 20	≥ 1	≤ 4
NS_19			10, 15, 20	Table 6.2.4.3-15	Table 6.2.4.3-15
NS_20			5, 10, 15, 20	Table 6.2.4.3-14	Table 6.2.4.3-14
…					
NS_20	-	-	-	-	-

WIFI

Mode	Data Rate (Mbps)	Channel	Frequency(MHz)	Avg. Burst Power(dBm)
802.11b	1	01	2412	**15.04**
		06	2437	14.47
		11	2462	13.96
802.11g	6	01	2412	13.00
		06	2437	13.36
		11	2462	11.78
802.11n(20)	6.5	01	2412	12.73
		06	2437	13.33
		11	2462	11.81
802.11n(40)	13.5	03	2422	10.17
		06	2437	11.32
		09	2452	9.88

Bluetooth_V3.0

Modulation	Channel	Frequency(MHz)	Peak Power (dBm)
GFSK	0	2402	3.720
	39	2441	3.139
	78	2480	**3.768**
π /4-DQPSK	0	2402	3.081
	39	2441	2.433
	78	2480	2.855
8-DPSK	0	2402	3.045
	39	2441	2.455
	78	2480	2.684

Bluetooth_V4.0

Modulation	Channel	Frequency(MHz)	Peak Power (dBm)
GFSK	0	2402	-2.313
	19	2440	-3.492
	39	2480	-4.970

12. TEST RESULTS

12.1. SAR Test Results Summary

12.1.1. Test position and configuration

Head SAR was performed with the device configured in the positions according to IEEE 1528-2013, Body-worn SAR was performed with the device 5mm from the phantom, and 4 Edges SAR was performed with the device 10mm from the phantom.

12.1.2. Operation Mode

1. Per KDB 447498 D01 v06 ,for each exposure position, if the highest 1-g SAR is ≤ 0.8 W/kg, testing for low and high channel is optional.
2. Per KDB 865664 D01 v01r04,for each frequency band, if the measured SAR is ≥0.8W/Kg, testing for repeated SAR measurement is required , that the highest measured SAR is only to be tested. When the SAR results are near the limit, the following procedures are required for each device to verify these types of SAR measurement related variation concerns by repeating the highest measured SAR configuration in each frequency band.
   (1) When the original highest measured SAR is ≥0.8W/Kg, repeat that measurement once.
   (2) 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.
   (3) Perform a third repeated measurement only if the original, first and second repeated measurement is ≥1.5 W/Kg and ratio of largest to smallest SAR for the original, first and second measurement is ≥ 1.20.
3. Body-worn exposure conditions are intended to voice call operations, therefore GSM voice call mode is selected to be test.
4. Per KDB 648474 D04 v01r03,when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤1.2W/Kg, SAR testing with a headset connected is not required.
5. Per KDB 248227 D01v02r02,for 2.4GHz 802.11g/n SAR testing is not required when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤1.2W/kg.
6. Per KDB 941225 D06 V02r01, When the same wireless mode transmission configurations for voice and data are required for SAR measurements, the more conservative configuration with a smaller separation distance should be tested for the overlapping SAR configurations.
7. Maximum Scaling SAR in order to calculate the Maximum SAR values to test under the standard Peak Power, Calculation method is as follows:
   Maximum Scaling SAR =tested SAR (Max.) ×[maximum turn-up power (mw)/ maximum measurement output power(mw)]

8. Proximity sensor, just for avoiding the wrong operation in the phone screen when call, and has no influence on output power or SAR result

8. Per KDB 941225 D05v02r03, start with the largest channel bandwidth and measure SAR for QPSK with 1RB allocation using the RB offset and required test channel combination with highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
9. Per KDB 941125 D05v02r03, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
10. Per KDB 941125 D05v02r03. 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

1RB allocation and the highest reported SAR is >1.45 W/Kg, the remaining required test channels must also be tested.

11. Per KDB 941125 D05v02r03. 16QAM output power for each RB allocation configuration is not 1/2 dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤1.45W/Kg, Per KDB 941225 D05v02r02, 16QAM SAR testing is not required.
12. Per KDB 941125 D05v02r03. Smaller bandwidth output power for each RB allocation configuration is >not 1/2 dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤1.45W/Kg. Per KDB 941125 D05v02r03, smaller bandwidth SAR testing is not required.

12.1.3. Test Result

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 54.8					
Product: 4G Smart Phone									
Test Mode: GSM850 with GMSK modulation									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
SIM 1 Card									
Left Cheek	voice	190	836.6	-0.23	**0.179**	31.80	31.59	**0.188**	1.6
Left Tilt	voice	190	836.6	1.22	0.127	31.80	31.59	0.133	1.6
Right Cheek	voice	190	836.6	-0.02	0.157	31.80	31.59	0.165	1.6
Right Tilt	voice	190	836.6	0.23	0.129	31.80	31.59	0.135	1.6
Body back	voice	190	836.6	1.36	**0.313**	31.80	31.59	**0.329**	1.6
Body front	voice	190	836.6	-0.25	0.197	31.80	31.59	0.207	1.6
Left Cheek	GPRS-2 slot	190	836.6	-0.23	0.372	28.60	28.29	0.400	1.6
Left Tilt	GPRS-2 slot	190	836.6	1.22	0.356	28.60	28.29	0.382	1.6
Right Cheek	GPRS-2 slot	190	836.6	0.02	**0.375**	28.60	28.29	**0.403**	1.6
Right Tilt	GPRS-2 slot	190	836.6	-0.23	0.331	28.60	28.29	0.355	1.6
Body back	GPRS-2 slot	190	836.6	1.22	**0.613**	28.60	28.29	**0.658**	1.6
Body front	GPRS-2 slot	190	836.6	-0.02	0.473	28.60	28.29	0.508	1.6
Edge 2(Right)	GPRS-2 slot	190	836.6	1.66	0.533	28.60	28.29	0.572	1.6
Edge 3(Bottom)	GPRS-2 slot	190	836.6	-0.02	0.097	28.60	28.29	0.104	1.6
Edge 4(Left)	GPRS-2 slot	190	836.6	0.23	0.603	28.60	28.29	0.648	1.6
SIM 2 Card									
Right Cheek	GPRS-2 slot	190	836.6	0.23	0.361	28.60	28.26	0.390	1.6
Body back	GPRS-2 slot	190	836.6	-1.55	0.567	28.60	28.26	0.613	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 10mm of all above table.

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 59.7					
Product: 4G Smart Phone									
Test Mode: PCS1900 with GMSK modulation									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
SIM 1 Card									
Left Cheek	voice	661	1880.0	-0.23	0.361	28.73	28.25	0.403	1.6
Left Tilt	voice	661	1880.0	1.66	0.112	28.73	28.25	0.125	1.6
Right Cheek	voice	661	1880.0	0.02	**0.440**	28.73	28.25	**0.491**	1.6
Right Tilt	voice	661	1880.0	-0.23	0.104	28.73	28.25	0.116	1.6
Body back	voice	512	1850.2	0.23	1.105	28.73	28.23	1.240	1.6
Body back	voice	661	1880.0	1.66	**1.121**	28.73	28.25	**1.252**	1.6
Body back	voice	810	1909.8	-0.02	1.114	28.73	28.73	1.114	1.6
Body front	voice	661	1880.0	0.23	0.463	28.73	28.25	0.517	1.6
Body back+Ear.	voice	661	1880.0	-0.15	0.981	28.73	28.25	1.096	1.6
Left Cheek	GPRS-2 slot	661	1880.0	1.52	0.319	25.64	25.23	0.351	1.6
Left Tilt	GPRS-2 slot	661	1880.0	-0.02	0.103	25.64	25.23	0.113	1.6
Right Cheek	GPRS-2 slot	661	1880.0	1.06	**0.374**	25.64	25.23	**0.411**	1.6
Right Tilt	GPRS-2 slot	661	1880.0	-0.96	0.097	25.64	25.23	0.107	1.6
Body back	GPRS-2 slot	512	1850.2	-0.23	1.030	25.64	24.80	**1.250**	1.6
Body back	GPRS-2 slot	661	1880.0	1.55	1.037	25.64	25.23	1.140	1.6
Body back	GPRS-2 slot	810	1909.8	-0.15	**1.043**	25.64	25.64	1.043	1.6
Body front	GPRS-2 slot	661	1880.0	0.23	0.523	25.64	25.23	0.575	1.6
Edge 2(Right)	GPRS-2 slot	661	1880.0	0.53	0.238	25.64	25.23	0.262	1.6
Edge 3(Bottom)	GPRS-2 slot	661	1880.0	-0.23	0.629	25.64	25.23	0.691	1.6
Edge 4(Left)	GPRS-2 slot	661	1880.0	-0.56	0.156	25.64	25.23	0.171	1.6
Body back+Ear.	GPRS-2 slot	661	1880.0	0.31	0.937	25.64	25.23	1.030	1.6
SIM 2 Card									
Right Cheek	voice	661	1880.0	-0.52	0.424	28.73	28.23	0.476	1.6
Body back	voice	661	1880.0	-0.23	0.993	28.73	28.23	1.114	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 10mm of all above table.

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 59.7					
Product: 4G Smart Phone									
Test Mode: WCDMA Band II with QPSK modulation									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
Left Cheek	RMC 12.2kbps	9400	1880	-0.52	0.234	22.00	21.54	0.260	1.6
Left Tilt	RMC 12.2kbps	9400	1880	0.02	0.054	22.00	21.54	0.060	1.6
Right Cheek	RMC 12.2kbps	9400	1880	-1.32	**0.236**	22.00	21.54	**0.262**	1.6
Right Tilt	RMC 12.2kbps	9400	1880	0.02	0.102	22.00	21.54	0.113	1.6
Body back	RMC 12.2kbps	9400	1880	0.26	**0.396**	22.00	21.54	**0.440**	1.6
Body front	RMC 12.2kbps	9400	1880	-0.23	0.242	22.00	21.54	0.269	1.6
Edge 2(Right)	RMC 12.2kbps	9400	1880	1.52	0.179	22.00	21.54	0.199	1.6
Edge 3(Bottom)	RMC 12.2kbps	9400	1880	-0.09	0.285	22.00	21.54	0.317	1.6
Edge 4(Left)	RMC 12.2kbps	9400	1880	0.41	0.110	22.00	21.54	0.122	1.6

Note:
・When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
・The test separation for body back and body front is 5mm of all above table.
・The test separation for 4 Edges is 10mm of all above table.

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 54.6					
Product: 4G Smart Phone									
Test Mode: WCDMA Band IV with QPSK modulation									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
Left Cheek	RMC 12.2kbps	8662	1732.6	-0.23	0.298	21.60	21.35	0.316	1.6
Left Tilt	RMC 12.2kbps	8662	1732.6	1.52	0.053	21.60	21.35	0.056	1.6
Right Cheek	RMC 12.2kbps	8662	1732.6	-0.20	**0.387**	21.60	21.35	**0.410**	1.6
Right Tilt	RMC 12.2kbps	8662	1732.6	0.23	0.126	21.60	21.35	0.133	1.6
Body back	RMC 12.2kbps	8662	1732.6	-1.66	**0.659**	21.60	21.35	**0.698**	1.6
Body front	RMC 12.2kbps	8662	1732.6	0.23	0.363	21.60	21.35	0.385	1.6
Edge 2(Right)	RMC 12.2kbps	8662	1732.6	-1.44	0.141	21.60	21.35	0.149	1.6
Edge 3(Bottom)	RMC 12.2kbps	8662	1732.6	0.23	0.310	21.60	21.35	0.328	1.6
Edge 4(Left)	RMC 12.2kbps	8662	1732.6	0.53	0.082	21.60	21.35	0.087	1.6

Note:
・When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
・The test separation for body back and body front is 5mm of all above table.
・The test separation for 4 Edges is 10mm of all above table.

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 54.8					
Product: 4G Smart Phone									
Test Mode: WCDMA Band V with QPSK modulation									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
Left Cheek	RMC 12.2kbps	4183	836.6	-0.10	**0.259**	22.00	21.26	**0.307**	1.6
Left Tilt	RMC 12.2kbps	4183	836.6	0.02	0.156	22.00	21.26	0.185	1.6
Right Cheek	RMC 12.2kbps	4183	836.6	-1.23	0.216	22.00	21.26	0.256	1.6
Right Tilt	RMC 12.2kbps	4183	836.6	0.02	0.179	22.00	21.26	0.212	1.6
Body back	RMC 12.2kbps	4183	836.6	0.52	0.359	22.00	21.26	0.426	1.6
Body front	RMC 12.2kbps	4183	836.6	-0.23	0.285	22.00	21.26	0.338	1.6
Edge 2(Right)	RMC 12.2kbps	4183	836.6	1.66	0.309	22.00	21.26	0.366	1.6
Edge 3(Bottom)	RMC 12.2kbps	4183	836.6	-0.02	0.061	22.00	21.26	0.072	1.6
Edge 4(Left)	RMC 12.2kbps	4183	836.6	-0.32	**0.422**	22.00	21.26	**0.500**	1.6

Note:
・When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
・The test separation for body back and body front is 5mm of all above table.
・The test separation for 4 Edges is 10mm of all above table.

SAR MEASUREMENT													
Depth of Liquid (cm):>15						Relative Humidity (%): 55.8							
Product: 4G Smart Phone													
Test Mode: LTE Band II													
BM MHz	**MOD**	**Position**	**Test Mode**		**Ch.**	**Freq. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
			UL RB Allocation	**UL RB START**								
20	**QPSK**	Left Cheek	1	50	18900	1880	-0.23	0.225	23.59	22.87	0.266	1.6
		Left Tilt	1	50	18900	1880	0.23	0.075	23.59	22.87	0.089	1.6
		Right Cheek	1	50	18900	1880	-1.00	**0.280**	23.59	22.87	**0.330**	1.6
		Right Tilt	1	50	18900	1880	0.23	0.077	23.59	22.87	0.091	1.6
		Body back	1	50	18700	1860	1.23	0.851	23.59	22.87	1.004	1.6
		Body back	1	50	18900	1880	-0.02	**0.861**	23.59	22.87	1.016	1.6
		Body back	1	50	19100	1900	0.23	0.847	23.59	22.32	**1.135**	1.6
		Body front	1	50	18900	1880	1.20	0.494	23.59	22.87	0.583	1.6
		Edge 2(Right)	1	50	18900	1880	-0.02	0.227	23.59	22.87	0.268	1.6
		Edge 3(Bottom)	1	50	18900	1880	-0.32	0.227	23.59	22.87	0.268	1.6
		Edge 4(Left)	1	50	18900	1880	-1.52	0.511	23.59	22.87	0.603	1.6

Note:
・When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
・The test separation for body back and body front is 5mm of all above table.
・The test separation for 4 Edges is 10mm of all above table.

SAR MEASUREMENT													
Depth of Liquid (cm):>15						Relative Humidity (%): 55.4							
Product: 4G Smart Phone													
Test Mode: LTE Band IV													
BM MHz	**MOD**	**Position**	**Test Mode**		**Ch.**	**Freq. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tuneup Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
			UL RB Allocation	**UL RB START**								
20	**QPSK**	Left Cheek	1	0	20300	1745	-0.02	0.257	23.11	22.93	0.268	1.6
		Left Tilt	1	0	20300	1745	1.33	0.083	23.11	22.93	0.087	1.6
		Right Cheek	1	0	20300	1745	0.02	**0.328**	23.11	22.93	**0.342**	1.6
		Right Tilt	1	0	20300	1745	-0.23	0.072	23.11	22.93	0.075	1.6
		Body back	1	0	20050	1720	1.23	0.900	23.11	22.41	1.057	1.6
		Body back	1	0	20175	1732.5	0.02	**1.060**	23.11	22.16	**1.319**	1.6
		Body back	1	0	20300	1745	-0.52	0.929	23.11	22.93	0.968	1.6
		Body front	1	0	20300	1745	0.23	0.600	23.11	22.93	0.625	1.6
		Edge 2(Right)	1	0	20300	1745	1.33	0.219	23.11	22.93	0.228	1.6
		Edge 3(Bottom)	1	0	20300	1745	-0.02	0.446	23.11	22.93	0.465	1.6
		Edge 4(Left)	1	0	20300	1745	0.23	0.136	23.11	22.93	0.142	1.6
		Body back+Ear.	1	0	20300	1745	-1.52	0.869	23.11	22.93	0.906	1.6

Note:
・When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
・The test separation for body back and body front is 5mm of all above table.
・The test separation for 4 Edges is 10mm of all above table.

SAR MEASUREMENT													
Depth of Liquid (cm):>15						Relative Humidity (%): 55.4							
Product: 4G Smart Phone													
Test Mode: LTE Band XII													
BM MHz	**MOD**	**Position**	**Test Mode**		**Ch.**	**Freq. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tuneup Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
			UL RB Allocation	**UL RB START**								
10	**QPSK**	Left Cheek	1	25	23060	704	-0.23	**0.163**	23.15	22.95	**0.171**	1.6
		Left Tilt	1	25	23060	704	1.55	0.113	23.15	22.95	0.118	1.6
		Right Cheek	1	25	23060	704	-0.02	0.147	23.15	22.95	0.154	1.6
		Right Tilt	1	25	23060	704	0.23	0.117	23.15	22.95	0.123	1.6
		Body back	1	25	23060	704	1.63	0.288	23.15	22.95	0.302	1.6
		Body front	1	25	23060	704	-0.02	0.224	23.15	22.95	0.235	1.6
		Edge 2(Right)	1	25	23060	704	0.23	0.192	23.15	22.95	0.201	1.6
		Edge 3(Bottom)	1	25	23060	704	-1.52	0.045	23.15	22.95	0.047	1.6
		Edge 4(Left)	1	25	23060	704	-0.36	**0.332**	23.15	22.95	**0.348**	1.6

Note:
· When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
·The test separation for body back and body front is 5mm of all above table.
·The test separation for 4 Edges is 10mm of all above table.

SAR MEASUREMENT													
Depth of Liquid (cm):>15						Relative Humidity (%): 55.4							
Product: 4G Smart Phone													
Test Mode: LTE Band XVII													
BM MHz	**MOD**	**Position**	**Test Mode**		**Ch.**	**Freq. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tuneup Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
			UL RB Allocation	**UL RB START**								
10	**QPSK**	Left Cheek	1	49	23800	711	-0.83	0.123	23.25	23.05	0.129	1.6
		Left Tilt	1	49	23800	711	-1.52	**0.153**	23.25	23.05	**0.160**	1.6
		Right Cheek	1	49	23800	711	-0.32	0.149	23.25	23.05	0.156	1.6
		Right Tilt	1	49	23800	711	0.63	0.124	23.25	23.05	0.130	1.6
		Body back	1	49	23800	711	1.39	0.261	23.25	23.05	0.273	1.6
		Body front	1	49	23800	711	0.62	0.217	23.25	23.05	0.227	1.6
		Edge 2(Right)	1	49	23800	711	-0.32	**0.308**	23.25	23.05	**0.323**	1.6
		Edge 3(Bottom)	1	49	23800	711	-0.62	0.046	23.25	23.05	0.048	1.6
		Edge 4(Left)	1	49	23800	711	-1.35	0.229	23.25	23.05	0.240	1.6

Note:
・When the 1-g Reported SAR is ≤ 0.8 W/kg, testing for low and high channel is optional. Refer to KDB 447498.
・The test separation for body back and body front is 5mm of all above table.
・The test separation for 4 Edges is 10mm of all above table.

SAR MEASUREMENT									
Depth of Liquid (cm):>15				Relative Humidity (%): 56.9					
Product: 4G Smart Phone									
Test Mode:802.11b									
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**SAR (1g) (W/kg)**	**Max. Tune-up Power (dBm)**	**Meas. output Power (dBm)**	**Scaled SAR (W/Kg)**	**Limit (W/kg)**
Left Cheek	DTS	01	2412	-0.23	0.207	15.04	15.04	0.207	1.6
Left Tilt	DTS	01	2412	1.22	**0.226**	15.04	15.04	**0.226**	1.6
Right Cheek	DTS	01	2412	0.02	0.210	15.04	15.04	0.210	1.6
Right Tilt	DTS	01	2412	-0.23	0.205	15.04	15.04	0.205	1.6
Body back	DTS	01	2412	1.23	**0.260**	15.04	15.04	**0.260**	1.6
Body front	DTS	01	2412	1.60	0.089	15.04	15.04	0.089	1.6
Edge 1 (Top)	DTS	01	2412	-0.23	0.157	15.04	15.04	0.157	1.6
Edge 2(Right)	DTS	01	2412	1.23	0.028	15.04	15.04	0.028	1.6
Edge 4(Left)	DTS	01	2412	-0.02	0.083	15.04	15.04	0.083	1.6

Note:
- According to KDB248227, SAR is not required for 802.11n HT20/HT40 channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11a/b channels.
- All of above “DTS” means data transmitters.
- The test separation for body back and body front is 5mm of all above table.
- The test separation for 4 Edges is 10mm of all above table.

Repeated SAR										
Product: 4G Smart Phone										
Test Mode: PCS1900										
Position	**Mode**	**Ch.**	**Fr. (MHz)**	**Power Drift (<±5%)**	**Once SAR (1g) (W/kg)**	**Power Drift (<±5%)**	**Twice SAR (1g) (W/kg)**	**Power Drift (<±5%)**	**Third SAR (1g) (W/kg)**	**Limit W/kg**
Body back	voice	661	1880	0.23	1.069	--	--	--	--	1.6
Body back	QPSK	18900	1880	-1.22	0.829	--	--	--	--	1.6
Body back	QPSK	20175	1732.5	0.03	0.886	--	--	--	--	1.6

Simultaneous Multi-band Transmission Evaluation:

Application Simultaneous Transmission information:

NO	Simultaneous state	Portable Handset		
		Head	Body-worn	Hotspot
1	GSM(voice)+WLAN 2.4GHz (data)	Yes	Yes	-
2	WCDMA(voice)+WLAN 2.4GHz (data)	Yes	Yes	-
3	GSM(voice)+Bluetooth(data)	-	Yes	-
4	WCDMA(voice)+Bluetooth(data)	-	Yes	-
5	GSM (Data) + Bluetooth(data)	-	Yes	
6	GSM (Data) + WLAN 2.4GHz (data)	Yes	Yes	Yes
7	WCDMA (Data) + Bluetooth(data)	--	Yes	
8	WCDMA (Data) + WLAN 2.4GHz (data)	Yes	Yes	Yes
9	LTE + Bluetooth(data)	--	Yes	
10	LTE + WLAN 2.4GHz (data)	Yes	Yes	Yes

NOTE:

1. WIFI and BT share the same antenna, and cannot transmit simultaneously.
2. Simultaneous with every transmitter must be the same test position.
3. KDB 447498 D01, BT SAR is excluded as below table.
4. KDB 447498 D01, for handsets the test separation distance is determined by the smallest distance between the outer surface of the device and the user; which is 0mm for head SAR and 5mm for body-worn SAR.
5. According to KDB 447498 D01 4.3.1, Standalone SAR test exclusion is as follow:
   For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:
   [(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[30], where
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation[31]
   - The result is rounded to one decimal place for comparison
   - The values 3.0 and 7.5 are referred to as numeric thresholds in step b) below

   The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.
6. If the test separation distance is <5mm, 5mm is used for excluded SAR calculation.
7. According to KDB 447498 D01 4.3.2, simultaneous transmission SAR test exclusion is as follow:
   (1) Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.
   (2) Any transmitters and antennas should be considered when calculating simultaneous mode.
   (3) For mobile phone and PC, it's the sum of all transmitters and antennas at the same mode with same position in each applicable exposure condition
   (4)When the standalone SAR test exclusion of section 4.3.2 is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to det
   (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.

8. When the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR to peak location separation ratio. The simultaneous transmitting antennas in each operating mode and exposure condition combination must be considered one pair at a time to determine the SAR to peak location separation ratio to qualify for test exclusion. The ratio is determined by (SAR1 + SAR2)1.5/Ri, rounded to two decimal digits, and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion.

Estimated SAR		Max Power including Tune-up Tolerance		Separation Distance (mm)	Estimated SAR (W/kg)
		dBm	mW		
BT	Head	4	2.512	0	0.105
	Body	4	2.512	5	0.105
				10	0.053

Sum of the SAR for GSM 850 &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		GSM 850	WI-Fi DTS Band	Bluetooth		
Head (voice)	Left Touch	0.188	0.207		0.395	No
	Left Tilt	0.133	0.226		0.359	No
	Right Touch	0.165	0.210		0.375	No
	Right Tilt	0.135	0.205		0.340	No
Body-worn (voice)	Rear	0.329	0.260		0.589	No
		0.329		0.105	0.434	No
	Front	0.207	0.089		0.296	No
		0.207		0.105	0.312	No
Head (Data)	Left Touch	0.400	0.207		0.607	No
	Left Tilt	0.382	0.226		0.608	No
	Right Touch	0.403	0.210		0.613	No
	Right Tilt	0.355	0.205		0.560	No
Body-worn (Data)	Rear	0.658		0.105	0.763	No
		0.658	0.260		0.918	No
	Front	0.508		0.105	0.613	No
		0.508	0.089		0.597	No
	Edge 2	0.572	0.028		0.600	No
	Edge 4	0.648	0.083		0.731	No
	Edge 2	0.572		0.053	0.625	No
	Edge 4	0.648		0.053	0.701	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.

·SPLSR mean is “The SAR to Peak Location Separation Ratio “

Sum of the SAR for GSM 1900 &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		PCS 1900	WI-Fi DTS Band	Bluetooth		
Head (voice)	Left Touch	0.403	0.207		0.610	No
	Left Tilt	0.125	0.226		0.351	No
	Right Touch	0.491	0.210		0.701	No
	Right Tilt	0.116	0.205		0.321	No
Body-worn (voice)	Rear	1.252	0.260		**1.512**	No
		1.252		0.105	1.357	No
	Front	0.517	0.089		0.606	No
		0.517		0.105	0.622	No
Head (Data)	Left Touch	0.351	0.207		0.558	No
	Left Tilt	0.113	0.226		0.339	No
	Right Touch	0.411	0.210		0.621	No
	Right Tilt	0.107	0.205		0.312	No
Body-worn (Data)	Rear	1.250		0.105	1.355	No
		1.250	0.260		1.510	No
	Front	0.575		0.105	0.680	No
		0.575	0.089		0.664	No
Body-worn (Hotspot)	Edge 2	0.262	0.028		0.290	No
	Edge 4	0.171	0.083		0.254	No
	Edge 2	0.262		0.053	0.315	No
	Edge 4	0.171		0.053	0.224	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.
·SPLSR mean is “The SAR to Peak Location Separation Ratio “

Sum of the SAR for WCDMA Band II &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		WCDMA Band II	Wi-Fi DTS Band	Bluetooth		
Head	Left Touch	0.260	0.207		0.467	No
	Left Tilt	0.060	0.226		0.286	No
	Right Touch	0.262	0.210		0.472	No
	Right Tilt	0.113	0.205		0.318	No
Body-worn	Rear	0.440	0.260		0.700	No
	Front	0.269	0.089		0.358	No
	Edge 2	0.199	0.028		0.227	No
	Edge 4	0.122	0.083		0.205	No
	Rear	0.440		0.105	0.545	No
	Front	0.269		0.105	0.374	No
	Edge 2	0.199		0.053	0.252	No
	Edge 4	0.122		0.053	0.175	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.

·SPLSR mean is “The SAR to Peak Location Separation Ratio “

Sum of the SAR for WCDMA Band IV &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		WCDMA Band IV	Wi-Fi DTS Band	Bluetooth		
Head	Left Touch	0.316	0.207		0.523	No
	Left Tilt	0.056	0.226		0.282	No
	Right Touch	0.410	0.210		0.620	No
	Right Tilt	0.133	0.205		0.338	No
Body-worn	Rear	0.698	0.260		0.958	No
	Front	0.385	0.089		0.474	No
	Edge 2	0.149	0.028		0.177	No
	Edge 4	0.087	0.083		0.170	No
	Rear	0.698		0.105	0.803	No
	Front	0.385		0.105	0.490	No
	Edge 2	0.149		0.053	0.202	No
	Edge 4	0.087		0.053	0.140	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.

·SPLSR mean is “The SAR to Peak Location Separation Ratio “

Sum of the SAR for WCDMA Band V &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		WCDMA Band V	Wi-Fi DTS Band	Bluetooth		
Head	Left Touch	0.307	0.207		0.514	No
	Left Tilt	0.185	0.226		0.411	No
	Right Touch	0.256	0.210		0.466	No
	Right Tilt	0.212	0.205		0.417	No
Body-worn	Rear	0.426	0.260		0.686	No
	Front	0.338	0.089		0.427	No
	Edge 2	0.366	0.028		0.394	No
	Edge 4	0.500	0.083		0.583	No
	Rear	0.426		0.105	0.531	No
	Front	0.338		0.105	0.443	No
	Edge 2	0.366		0.053	0.419	No
	Edge 4	0.500		0.053	0.553	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.

·SPLSR mean is “The SAR to Peak Location Separation Ratio “

Sum of the SAR for LTE Band II &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		LTE Band II	Wi-Fi DTS Band	Bluetooth		
Head	Left Touch	0.266	0.207		0.473	No
	Left Tilt	0.089	0.226		0.315	No
	Right Touch	0.330	0.210		0.540	No
	Right Tilt	0.091	0.205		0.296	No
Body-worn	Rear	1.135	0.260		1.395	No
	Front	0.583	0.089		0.672	No
	Edge 2	0.268	0.028		0.296	No
	Edge 4	0.603	0.083		0.686	No
	Rear	1.135		0.105	1.240	No
	Front	0.583		0.105	0.688	No
	Edge 2	0.268		0.053	0.321	No
	Edge 4	0.603		0.053	0.656	No

Sum of the SAR for LTE Band IV &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		LTE Band IV	Wi-Fi DTS Band	Bluetooth		
Head	Left Touch	0.268	0.207		0.475	No
	Left Tilt	0.087	0.226		0.313	No
	Right Touch	0.342	0.210		0.552	No
	Right Tilt	0.075	0.205		0.280	No
Body-worn	Rear	1.319	0.260		**1.579**	No
	Front	0.625	0.089		0.714	No
	Edge 2	0.228	0.028		0.256	No
	Edge 4	0.142	0.083		0.225	No
	Rear	1.319		0.105	1.424	No
	Front	0.625		0.105	0.730	No
	Edge 2	0.228		0.053	0.281	No
	Edge 4	0.142		0.053	0.195	No

Note:

·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.
·SPLSR mean is “The SAR to Peak Location Separation Ratio “

Sum of the SAR for LTE Band XII &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		LTE Band XII	Wi-Fi DTS Band	Bluetooth		
Head	Left Touch	0.171	0.207		0.378	No
	Left Tilt	0.118	0.226		0.344	No
	Right Touch	0.154	0.210		0.364	No
	Right Tilt	0.123	0.205		0.328	No
Body-worn	Rear	0.302	0.260		0.562	No
	Front	0.235	0.089		0.324	No
	Edge 2	0.201	0.028		0.229	No
	Edge 4	0.348	0.083		0.431	No
	Rear	0.302		0.105	0.407	No
	Front	0.235		0.105	0.340	No
	Edge 2	0.201		0.053	0.254	No
	Edge 4	0.348		0.053	0.401	No

Sum of the SAR for LTE Band XVII &Wi-Fi & BT:

RF Exposure Conditions	Test Position	Simultaneous Transmission Scenario			Σ1-g SAR (W/Kg)	SPLSR (Yes/No)
		LTE Band XVII	Wi-Fi DTS Band	Bluetooth		
Head	Left Touch	0.129	0.207		0.336	No
	Left Tilt	0.160	0.226		0.386	No
	Right Touch	0.156	0.210		0.366	No
	Right Tilt	0.130	0.205		0.335	No
Body-worn	Rear	0.273	0.260		0.533	No
	Front	0.227	0.089		0.316	No
	Edge 2	0.323	0.028		0.351	No
	Edge 4	0.240	0.083		0.323	No
	Rear	0.273		0.105	0.378	No
	Front	0.227		0.105	0.332	No
	Edge 2	0.323		0.053	0.376	No
	Edge 4	0.240		0.053	0.293	No

Note:

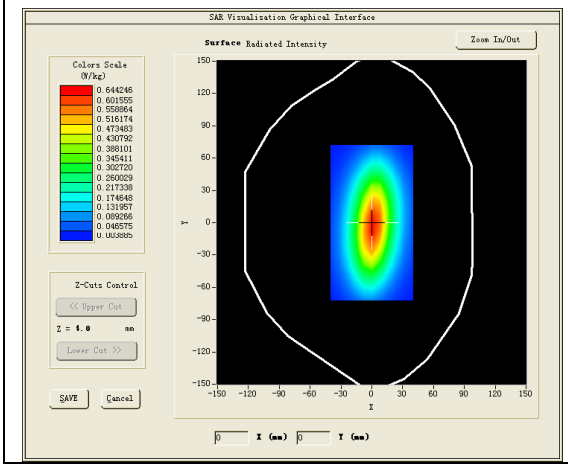
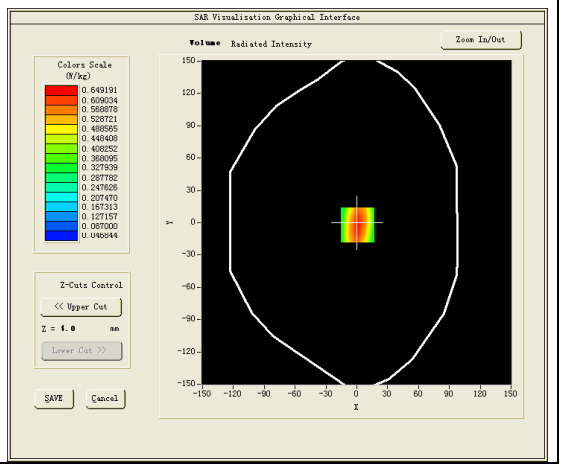
·According to KDB 447498 D01 General RF Exposure Guidance, when the simultaneous transmission SAR is less than1.6 W/Kg, SPLSR assessment is not required.
·SPLSR mean is “The SAR to Peak Location Separation Ratio “

APPENDIX A. SAR SYSTEM CHECK DATA

Test Laboratory: AGC Lab **Date: May 24,2017**
System Check Head 750 MHz
DUT: Dipole 750 MHz Type: SID 750
Communication System CW; Communication System Band: D750 (750.0 MHz); Duty Cycle: 1:1; Conv.F=5.11
Frequency: 750 MHz; Medium parameters used: f = 750 MHz; σ=0.92 mho/m; εr =40.53; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):22.7, Liquid temperature (℃): 21.6

SATIMO Configuration:
- Probe: SSE5; Calibrated: 12/05/2016; Serial No.: SN 14/16 EP308
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

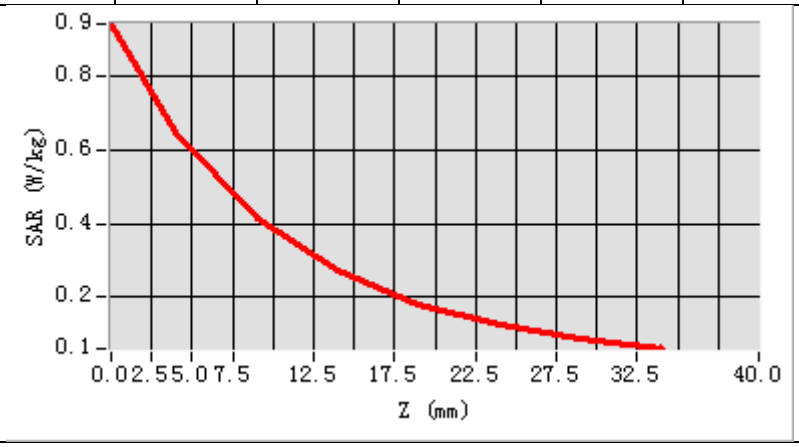
Configuration/System Check 750MHz Head/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 750MHz Head/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

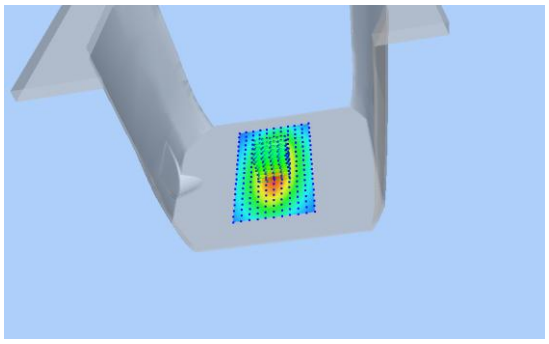
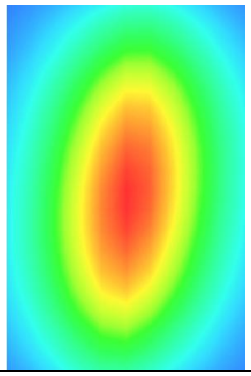
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-2.00
SAR Peak: 0.93 W/kg

SAR 10g (W/Kg)	0.380417
SAR 1g (W/Kg)	0.573622

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.9394	0.6492	0.4113	0.2723	0.1836	0.1263	0.0881

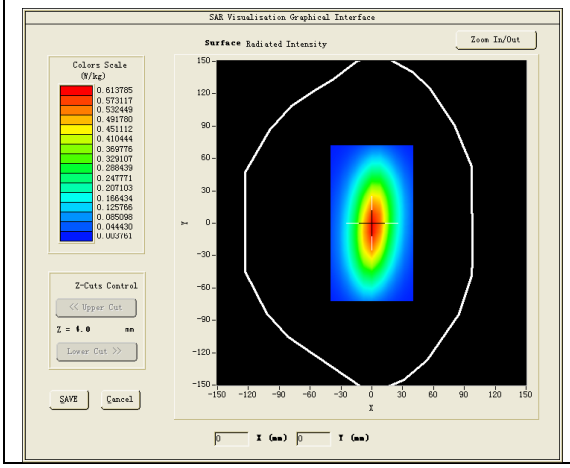
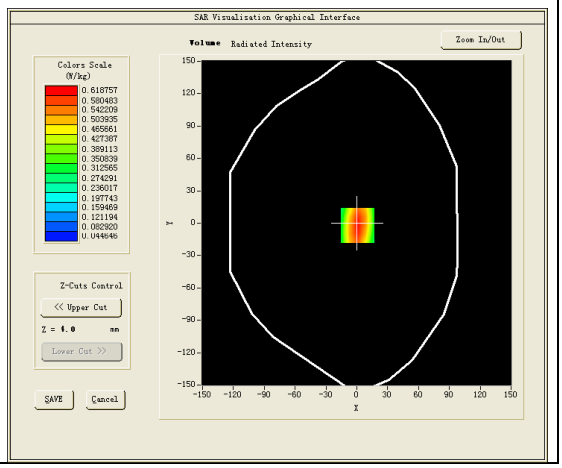


3D screen shot	Hot spot position
	

Test Laboratory: AGC Lab **Date: May 24,2017**
System Check Body 750 MHz
DUT: Dipole 750 MHz Type: SID 750
Communication System CW; Communication System Band: D750 (750.0 MHz); Duty Cycle: 1:1; Conv.F=5.30
Frequency: 750 MHz; Medium parameters used: f = 750 MHz; σ=0.99 mho/m; εr =53.52; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):22.7, Liquid temperature (℃): 21.9

SATIMO Configuration:
- Probe: SSE5; Calibrated: 12/05/2016; Serial No.: SN 14/16 EP308
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

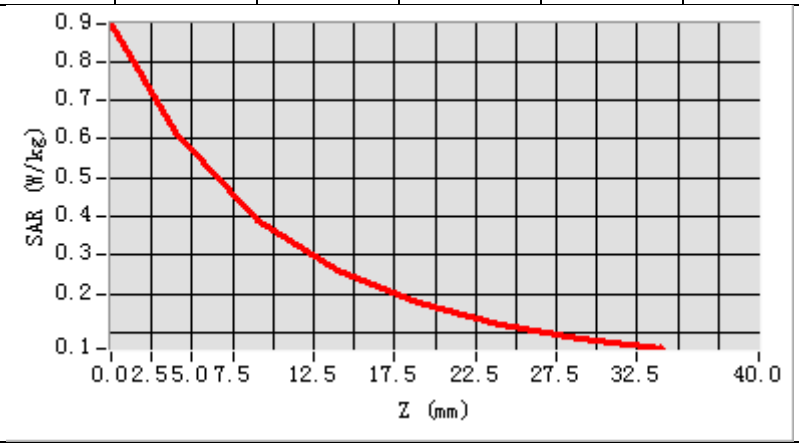
Configuration/System Check 750MHz Body/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 750MHz Body/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

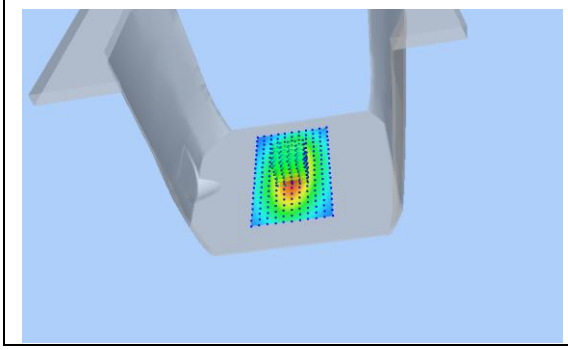
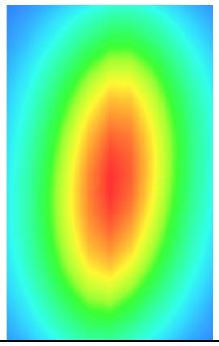
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-2.00
SAR Peak: 0.89 W/kg

SAR 10g (W/Kg)	0.362635
SAR 1g (W/Kg)	0.590678

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.8963	0.6188	0.3918	0.2597	0.1753	0.1202	0.0838

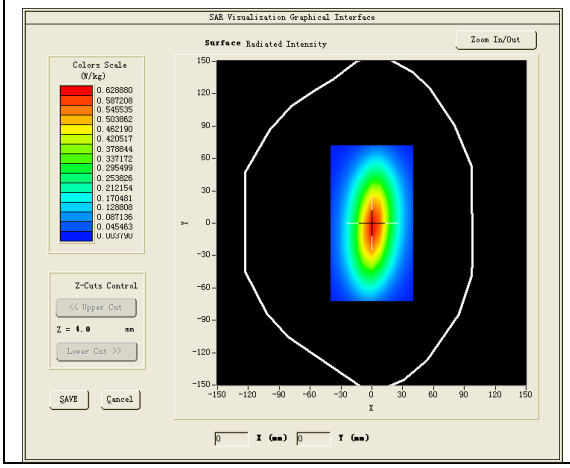
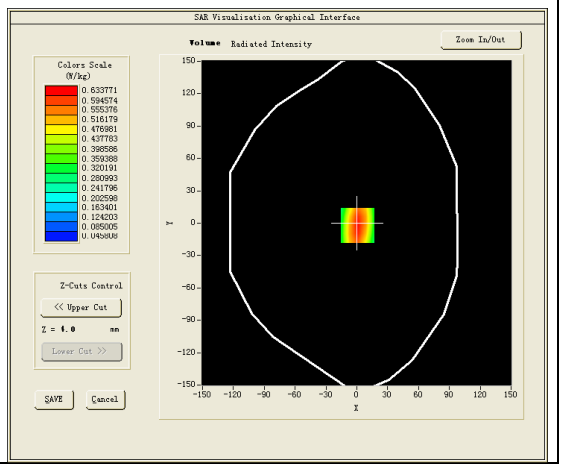


3D screen shot	Hot spot position
	

Test Laboratory: AGC Lab **Date: May 16,2017**
System Check Head 835 MHz
DUT: Dipole 835 MHz Type: SID 835
Communication System CW; Communication System Band: D835 (835.0 MHz); Duty Cycle: 1:1; Conv.F=5.72
Frequency: 835 MHz; Medium parameters used: f = 835 MHz; σ=0.90 mho/m; εr =41.88; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):22.6, Liquid temperature (℃): 21.5

SATIMO Configuration:
- Probe: SSE5; Calibrated: 12/05/2016; Serial No.: SN 14/16 EP308
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

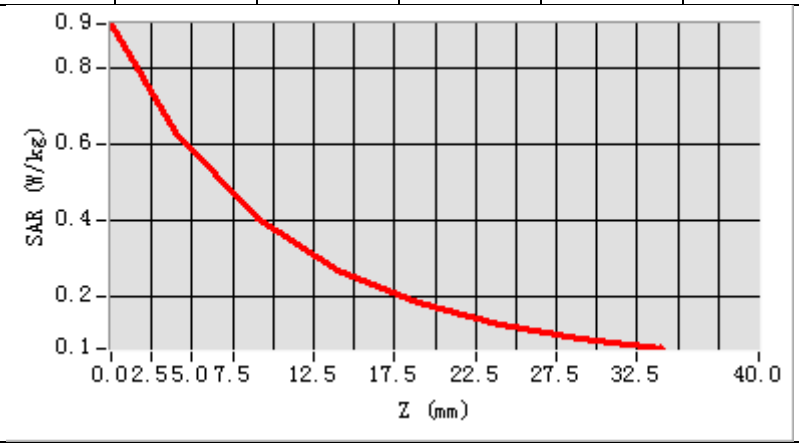
Configuration/System Check 835MHz Head/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 835MHz Head/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

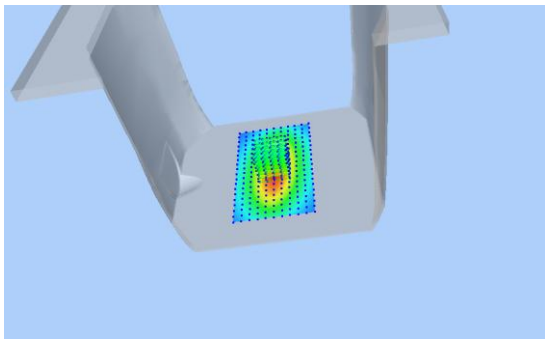
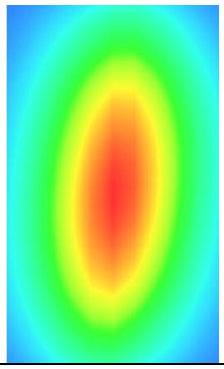
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-2.00
SAR Peak: 0.91 W/kg

SAR 10g (W/Kg)	0.371447
SAR 1g (W/Kg)	0.604911

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.9174	0.6338	0.4017	0.2657	0.1796	0.1233	0.0859

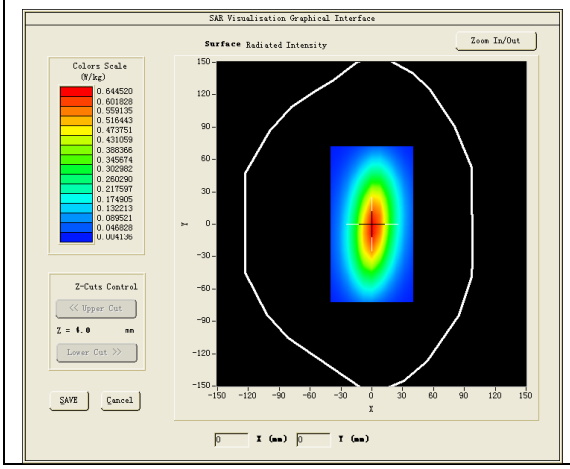
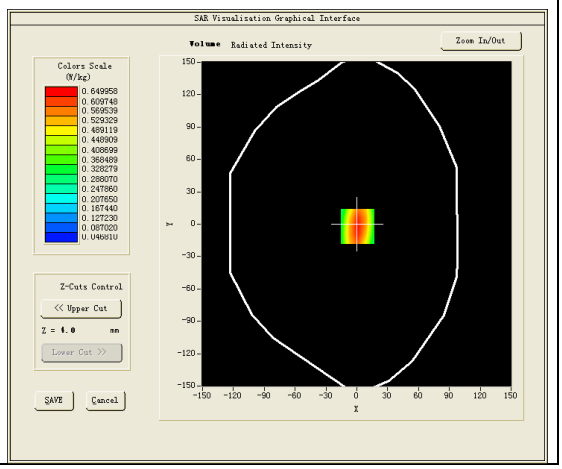


3D screen shot	Hot spot position
	

Test Laboratory: AGC Lab **Date: May 16,2017**
System Check Body 835 MHz
DUT: Dipole 835 MHz Type: SID 835
Communication System CW; Communication System Band: D835 (835.0 MHz); Duty Cycle: 1:1; Conv.F=5.94
Frequency: 835 MHz; Medium parameters used: f = 835 MHz; σ=0.95 mho/m; εr =55.96; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃):22.6, Liquid temperature (℃): 21.6

SATIMO Configuration:
- Probe: SSE5; Calibrated: 12/05/2016; Serial No.: SN 14/16 EP308
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

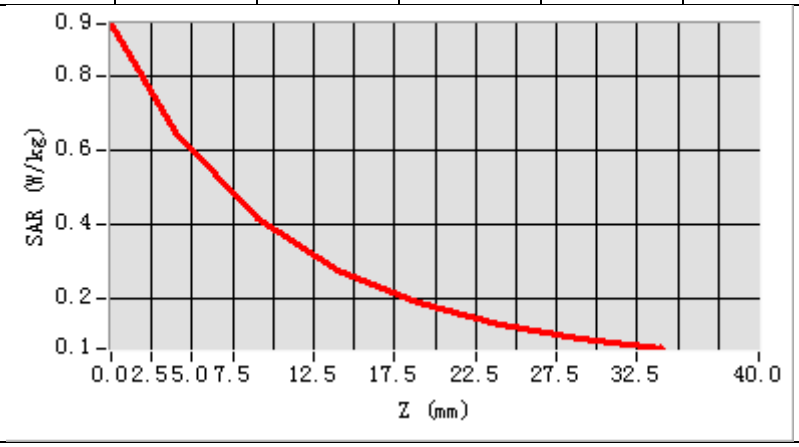
Configuration/System Check 835MHz Body/Area Scan: Measurement grid: dx=8mm, dy=8mm
Configuration/System Check 835MHz Body/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

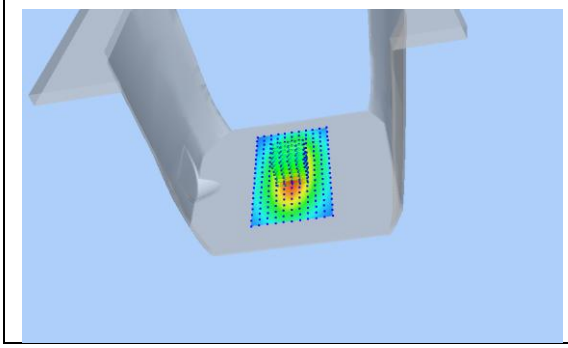
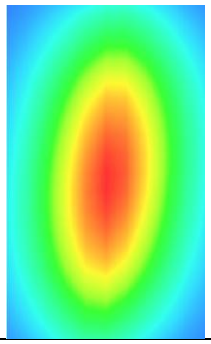
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-2.00
SAR Peak: 0.93 W/kg

SAR 10g (W/Kg)	0.380792
SAR 1g (W/Kg)	0.620302

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	0.9407	0.6500	0.4119	0.2725	0.1838	0.1265	0.0879

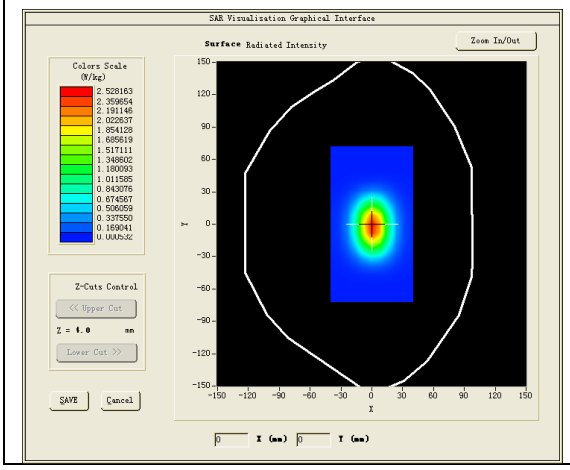
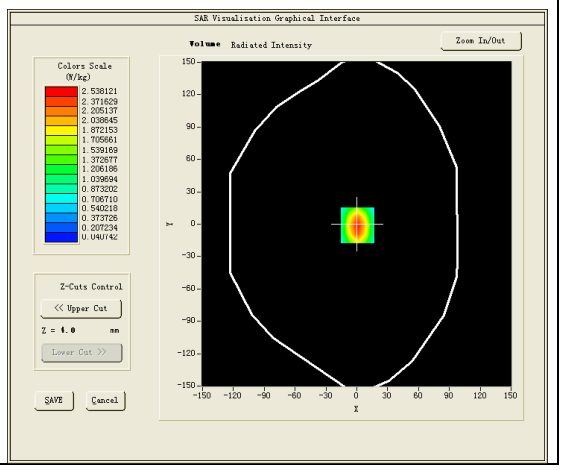


3D screen shot	Hot spot position
	

Test Laboratory: AGC Lab **Date: May 24,2017**
System Check Head 1750MHz
DUT: Dipole 1800 MHz; Type: SID 1800
Communication System: CW; Communication System Band: D1700 (1750.0 MHz); Duty Cycle:1:1; Conv.F=4.98
Frequency: 1750 MHz; Medium parameters used: f = 1750MHz; σ=1.37 mho/m; εr =40.04; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃): 22.5, Liquid temperature (℃): 21.7

SATIMO Configuration:
- Probe: SSE5; Calibrated: 12/05/2016; Serial No.: SN 14/16 EP308
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

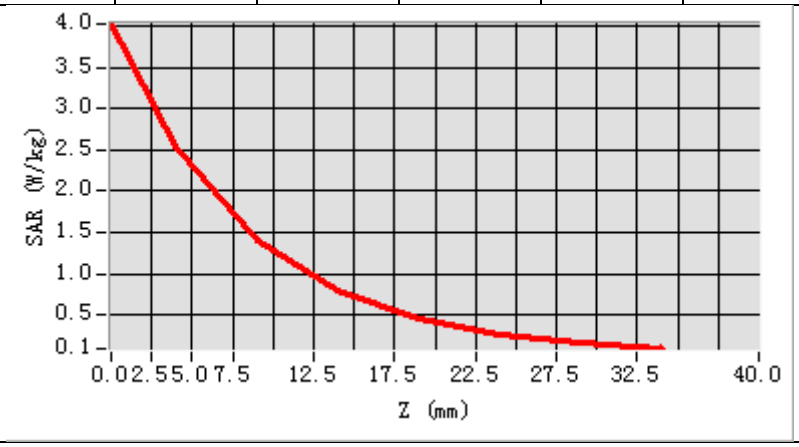
Configuration/System Check 1750MHz Head/Area Scan: Measurement grid: dx=8mm,dy=8mm
Configuration/System Check 1750MHz Head/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

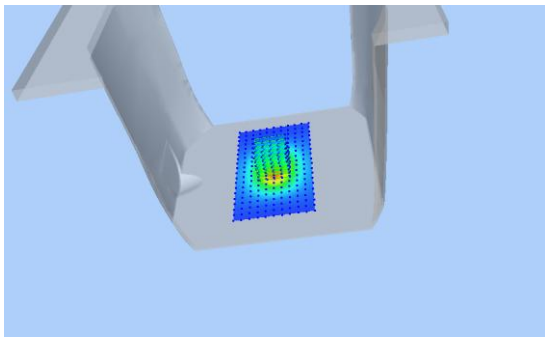
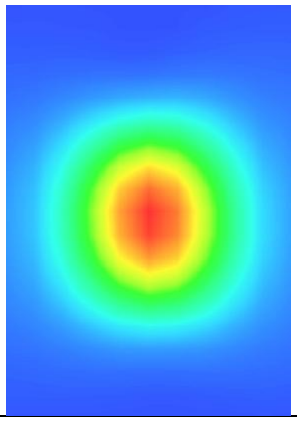
SURFACE SAR	VOLUME SAR
	

Maximum location: X=1.00, Y=-1.00
SAR Peak: 4.01 W/kg

SAR 10g (W/Kg)	1.251337
SAR 1g (W/Kg)	2.389653

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	4.0252	2.5381	1.3903	0.7908	0.4519	0.2620	0.1525

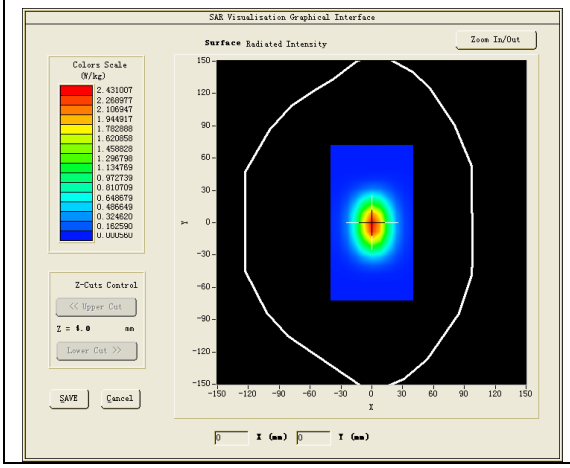
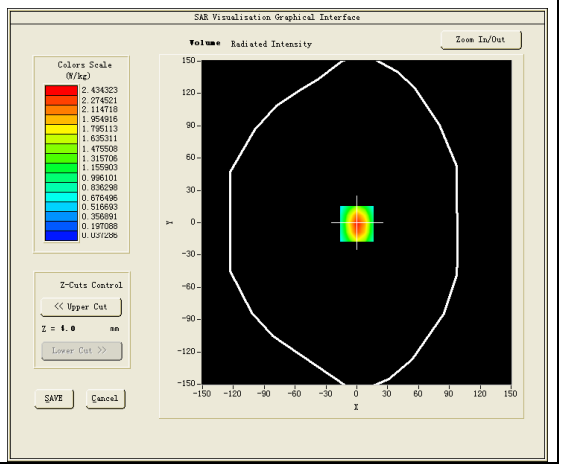


3D screen shot	Hot spot position
	

Test Laboratory: AGC Lab **Date: May 24,2017**
System Check Body 1750MHz
DUT: Dipole 1800 MHz; Type: SID 1800
Communication System: CW; Communication System Band: D1700 (1750.0 MHz); Duty Cycle:1:1; Conv.F=5.08
Frequency: 1750MHz; Medium parameters used: f = 1750MHz; σ=1.48mho/m; εr =52.64; ρ= 1000 kg/m³ ;
Phantom section: Flat Section; Input Power=18dBm
Ambient temperature (℃): 22.5, Liquid temperature (℃): 21.6

SATIMO Configuration:
- Probe: SSE5; Calibrated: 12/05/2016; Serial No.: SN 14/16 EP308
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Phantom: SAM twin phantom
- Measurement SW: OpenSAR V4_02_32

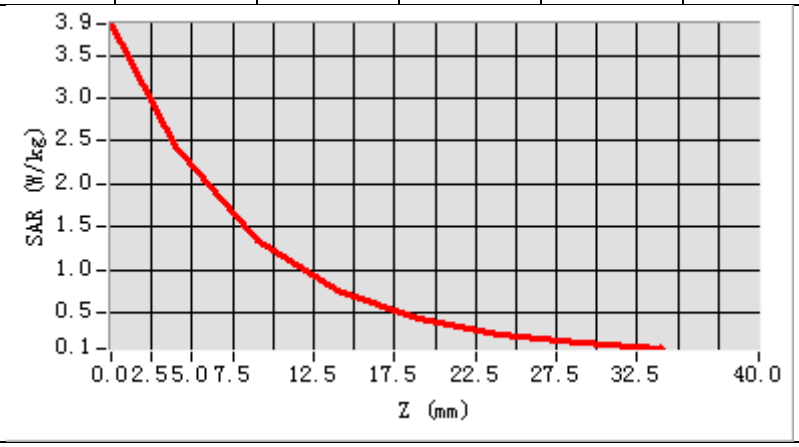
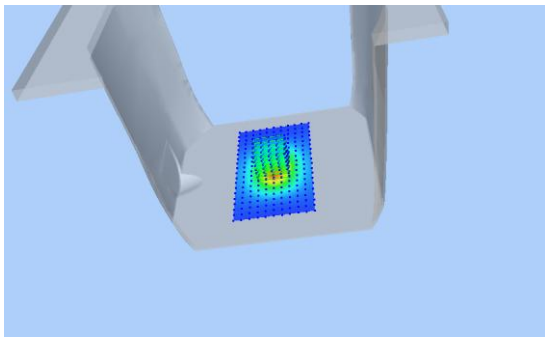
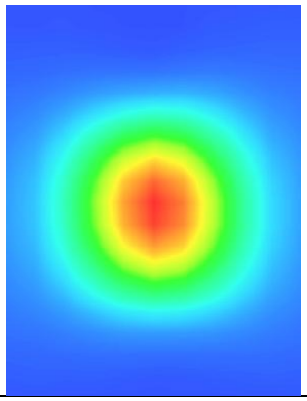
Configuration/System Check 1750MHz Body/Area Scan: Measurement grid: dx=8mm,dy=8mm
Configuration/System Check 1750MHz Body/Zoom Scan: Measurement grid: dx=8mm,dy=8mm, dz=5mm

SURFACE SAR	VOLUME SAR
	

Maximum location: X=2.00, Y=-0.00
SAR Peak: 3.91 W/kg

SAR 10g (W/Kg)	1.195763
SAR 1g (W/Kg)	2.298832

Z (mm)	0.00	4.00	9.00	14.00	19.00	24.00	29.00
SAR (W/Kg)	3.8620	2.4349	1.3336	0.7574	0.4325	0.2514	0.1459



3D screen shot	Hot spot position