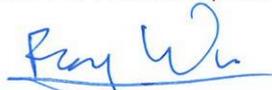


# FCC SAR Test Report

**Report No.** : SA120710C03  
**Applicant** : HTC Corporation  
**Address** : No. 23, Xinghua Rd., Taoyuan City, Taiwan  
**Product** : Smartphone  
**FCC ID** : NM8PM23300  
**Brand** : HTC  
**Model No.** : PM23300  
**Standards** : FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:1991 / IEEE 1528:2003  
 FCC OET Bulletin 65 Supplement C (Edition 01-01)  
 KDB 248227 D01 v01r02 / KDB 648474 D01 v01r05 / KDB 941225 D01 v02  
 KDB 941225 D03 v01 / KDB 941225 D05 v01 / KDB 941225 D06 v01  
**Date of Testing** : Jul. 23, 2012 ~ Jul. 26, 2012

**CERTIFICATION:** The above equipment have been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch - Taiwan HwaYa Lab**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample’s SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by TAF or any government agencies.

**Prepared By :**   
 Ivonne Wu / Senior Specialist  
**Approved By :**   
 Roy Wu / Manager



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.



## Table of Contents

Release Control Record .....	3
1. Summary of Maximum SAR Value .....	4
2. Description of Equipment Under Test .....	5
3. SAR Measurement System .....	7
3.1 Definition of Specific Absorption Rate (SAR).....	7
3.2 SPEAG DASY System .....	7
3.2.1 Robot.....	8
3.2.2 Probes.....	9
3.2.3 Data Acquisition Electronics (DAE) .....	9
3.2.4 Phantoms .....	10
3.2.5 Device Holder.....	11
3.2.6 System Validation Dipoles .....	11
3.2.7 Tissue Simulating Liquids.....	12
3.3 SAR System Verification .....	14
3.4 SAR Measurement Procedure .....	15
3.4.1 Area & Zoom Scan Procedure .....	15
3.4.2 Volume Scan Procedure.....	15
3.4.3 Power Drift Monitoring.....	15
3.4.4 Spatial Peak SAR Evaluation .....	16
3.4.5 SAR Averaged Methods .....	16
4. SAR Measurement Evaluation .....	17
4.1 EUT Configuration and Setting.....	17
4.2 EUT Testing Position .....	19
4.3 Tissue Verification .....	21
4.4 System Verification.....	22
4.5 Conducted Power Results.....	23
4.6 SAR Testing Results.....	29
4.6.1 SAR Results for Head .....	29
4.6.2 SAR Results for Body.....	32
4.6.3 Simultaneous Multi-band Transmission Evaluation .....	37
5. Calibration of Test Equipment.....	42
6. Measurement Uncertainty .....	43
7. Information on the Testing Laboratories.....	45
Appendix A. SAR Plots of System Verification	
Appendix B. SAR Plots of SAR Measurement	
Appendix C. Calibration Certificate for Probe and Dipole	
Appendix D. Photographs of EUT and Setup	



## Release Control Record

Issue No.	Reason for Change	Date Issued
R01	Original release	Aug. 08, 2012

**1. Summary of Maximum SAR Value**

Mode / Band	Test Position	SAR-1g (W/kg)
GSM850	Head	0.196
	Body Worn (1 cm Gap)	0.311
	Hotspot Mode (1 cm Gap)	0.317
GSM1900	Head	0.517
	Body Worn (1 cm Gap)	0.333
	Hotspot Mode (1 cm Gap)	0.358
WCDMA Band II	Head	0.781
	Body Worn (1 cm Gap)	0.653
	Hotspot Mode (1 cm Gap)	0.643
WCDMA Band V	Head	0.138
	Body Worn (1 cm Gap)	0.233
	Hotspot Mode (1 cm Gap)	0.236
LTE Band 2	Head	0.645
	Body Worn (1 cm Gap)	0.718
	Hotspot Mode (1 cm Gap)	0.719
LTE Band 4	Head	0.518
	Body Worn (1 cm Gap)	0.752
	Hotspot Mode (1 cm Gap)	0.784
LTE Band 5	Head	0.264
	Body Worn (1 cm Gap)	0.194
	Hotspot Mode (1 cm Gap)	0.226
LTE Band 17	Head	0.46
	Body Worn (1 cm Gap)	0.109
	Hotspot Mode (1 cm Gap)	0.176
WLAN 2.4GHz	Head	0.482
	Body Worn (1 cm Gap)	0.150
	Hotspot Mode (1 cm Gap)	0.159
WLAN 5GHz	Head	0.026
	Body Worn (1 cm Gap)	0.109
	Hotspot Mode (1 cm Gap)	0.096
Bluetooth	Head	N/A
	Body Worn (1 cm Gap)	N/A
	Hotspot Mode (1 cm Gap)	N/A

**Note:**

1. The SAR limit (**1.6 W/kg**) for general population/uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1991.
2. Since the Bluetooth maximum power is less than 60/f, SAR testing for Bluetooth is not required.

## 2. Description of Equipment Under Test

<b>EUT Type</b>	Smartphone
<b>FCC ID</b>	NM8PM23300
<b>Brand Name</b>	HTC
<b>Model Name</b>	PM23300
<b>Tx Frequency Bands (Unit: MHz)</b>	GSM850 : 824 ~ 849 GSM1900 : 1850 ~ 1910 WCDMA Band II : 1850 ~ 1910 WCDMA Band V : 824 ~ 849 LTE Band 2 : 1850 ~ 1910 LTE Band 4 : 1710 ~ 1755 LTE Band 5 : 824 ~ 849 LTE Band 17 : 704 ~ 716 WLAN : 2400 ~ 2483.5, 5150 ~ 5350, 5470 ~ 5725, 5725 ~ 5825 Bluetooth : 2400 ~ 2483.5
<b>Uplink Modulations</b>	GSM & GPRS : GMSK EDGE : 8PSK WCDMA : QPSK LTE : QPSK, 16QAM 802.11b : DSSS 802.11a/g/n : OFDM Bluetooth : GFSK
<b>Maximum AVG Conducted Power (Unit: dBm)</b>	GSM850 : 33.02 GSM1900 : 29.96 WCDMA Band II : 23.73 WCDMA Band V : 23.68 LTE Band 2 : 23.88 LTE Band 4 : 23.97 LTE Band 5 : 23.46 LTE Band 17 : 23.00 802.11b : 18.56 802.11g : 13.59 802.11n HT20 (2.4GHz) : 12.42 802.11n HT40 (2.4GHz) : 11.67 802.11a : 13.39 802.11n HT20 (5GHz) : 13.40 802.11n HT40 (5GHz) : 13.28
<b>Antenna Type</b>	Fixed Internal Antenna
<b>EUT Stage</b>	Production Unit

**Note:**

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.
2. This EUT does not support DTM capability.



# FCC SAR Test Report

The EUT is a data transmitter device that contains one WWAN transmitter. The WWAN and LTE cannot transmit simultaneously. Confirming the LTE transmitter follows 3GPP standards, is category 3, BW 5/10 MHz, band 2/4/5/17, and supports QPSK / 16QAM modulations. Tested per 3GPP 36.521 maximum transmit procedures for both QPSK / 16QAM.

**LTE Maximum Power Reduction in accordance with 3GPP 36.101:** Power Reduction in accordance to 3GPP is active all times during LTE operation.

Modulation	Channel bandwidth / Transmission bandwidth configuration (RB)		3GPP Requirement (dB)	LTE MPR Setting (dB)
	BW 5 MHz	BW 10 MHz		
QPSK	> 8	> 12	<= 1	1
16QAM	<= 8	<= 12	<= 1	1
16QAM	> 8	> 12	<= 2	2

**Note:**

1. MPR is according to the standard and implemented in the circuit (mandatory).
2. The LTE MPR is mandatory triggered / activated automatically when the EUT is in the LTE mode. Furthermore, during hotspot mode, the LTE MPR is still mandatory triggered / activated.
3. The LTE transmit power result expects to be within +/- 1.0 dB of the expected MPR target values.

In addition, the device is compliant with A-MPR requirements defined in 36.101 section 6.2.4 that may be required to meet 3GPP Adjacent Channel Leakage Ratio (“ACLR”) requirements. A-MPR was disabled for all FCC compliance testing.

### 3. SAR Measurement System

#### 3.1 Definition of Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in an 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 general population/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 a given density ( $\rho$ ). The equation description is as below:

$$\text{SAR} = \frac{d}{dt} \left( \frac{dW}{dm} \right) = \frac{d}{dt} \left( \frac{dW}{\rho dv} \right)$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be related to the electrical field in the tissue by

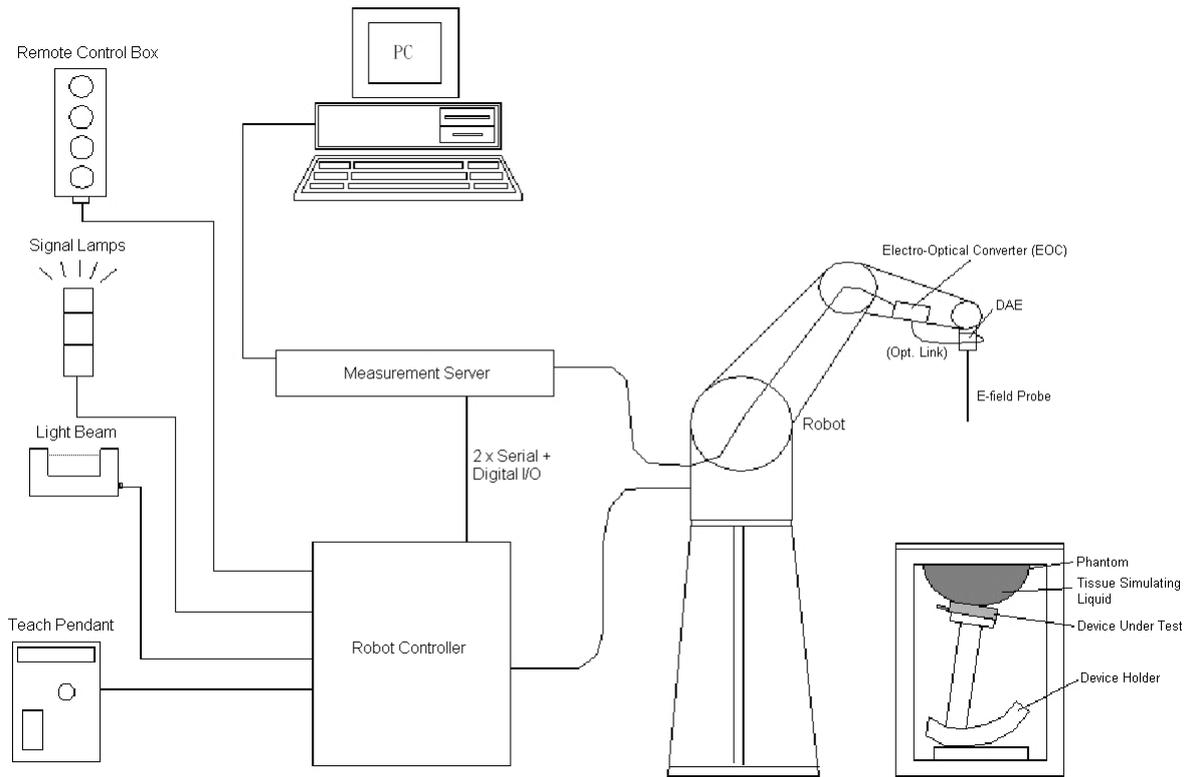
$$\text{SAR} = \frac{\sigma |E|^2}{\rho}$$

Where:  $\sigma$  is the conductivity of the tissue,  $\rho$  is the mass density of the tissue and E is the RMS electrical field strength.

#### 3.2 SPEAG DASY System

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY4/5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC.

# FCC SAR Test Report



**Fig-3.1 DASY System Setup**

## 3.2.1 Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB; DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability  $\pm 0.035$  mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)



**Fig-3.2 DASY4**



**Fig-3.3 DASY5**

# FCC SAR Test Report

## 3.2.2 Probes

The SAR measurement is conducted with the dosimetric probe. 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.

<b>Model</b>	EX3DV4	
<b>Construction</b>	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).	
<b>Frequency</b>	10 MHz to 6 GHz Linearity: $\pm 0.2$ dB	
<b>Directivity</b>	$\pm 0.3$ dB in HSL (rotation around probe axis) $\pm 0.5$ dB in tissue material (rotation normal to probe axis)	
<b>Dynamic Range</b>	10 $\mu$ W/g to 100 mW/g Linearity: $\pm 0.2$ dB (noise: typically $< 1$ $\mu$ W/g)	
<b>Dimensions</b>	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

<b>Model</b>	ES3DV3	
<b>Construction</b>	Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).	
<b>Frequency</b>	10 MHz to 4 GHz Linearity: $\pm 0.2$ dB	
<b>Directivity</b>	$\pm 0.2$ dB in HSL (rotation around probe axis) $\pm 0.3$ dB in tissue material (rotation normal to probe axis)	
<b>Dynamic Range</b>	5 $\mu$ W/g to 100 mW/g Linearity: $\pm 0.2$ dB	
<b>Dimensions</b>	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm	

## 3.2.3 Data Acquisition Electronics (DAE)

<b>Model</b>	DAE3, DAE4	
<b>Construction</b>	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.	
<b>Measurement Range</b>	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)	
<b>Input Offset Voltage</b>	$< 5$ $\mu$ V (with auto zero)	
<b>Input Bias Current</b>	$< 50$ fA	
<b>Dimensions</b>	60 x 60 x 68 mm	

# FCC SAR Test Report

## 3.2.4 Phantoms

<b>Model</b>	Twin SAM	
<b>Construction</b>	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.	
<b>Material</b>	Vinylester, glass fiber reinforced (VE-GF)	
<b>Shell Thickness</b>	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
<b>Dimensions</b>	Length: 1000 mm Width: 500 mm Height: adjustable feet	
<b>Filling Volume</b>	approx. 25 liters	

<b>Model</b>	ELI	
<b>Construction</b>	Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.	
<b>Material</b>	Vinylester, glass fiber reinforced (VE-GF)	
<b>Shell Thickness</b>	2.0 ± 0.2 mm (bottom plate)	
<b>Dimensions</b>	Major axis: 600 mm Minor axis: 400 mm	
<b>Filling Volume</b>	approx. 30 liters	

# FCC SAR Test Report

## 3.2.5 Device Holder

<b>Model</b>	Mounting Device	
<b>Construction</b>	In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).	
<b>Material</b>	POM	

<b>Model</b>	Laptop Extensions Kit	
<b>Construction</b>	Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.). It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner.	
<b>Material</b>	POM, Acrylic glass, Foam	

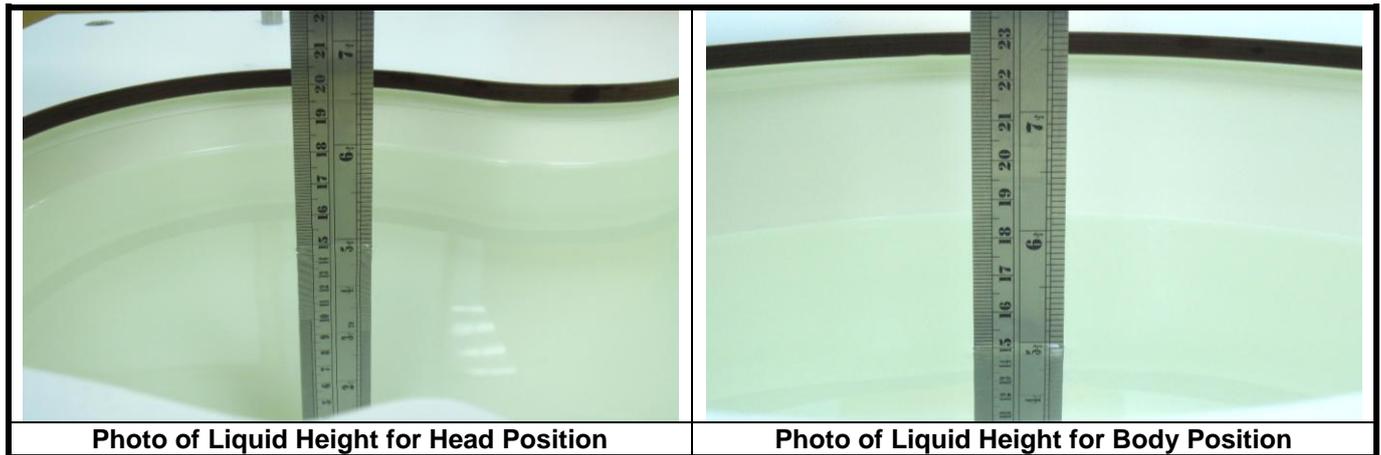
## 3.2.6 System Validation Dipoles

<b>Model</b>	D-Serial	
<b>Construction</b>	Symmetrical dipole with 1/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.	
<b>Frequency</b>	750 MHz to 5800 MHz	
<b>Return Loss</b>	> 20 dB	
<b>Power Capability</b>	> 100 W (f < 1GHz), > 40 W (f > 1GHz)	

# FCC SAR Test Report

## 3.2.7 Tissue Simulating Liquids

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 15 cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in Table-3.1.



The dielectric properties of the head tissue simulating liquids are defined in IEEE 1528 and FCC OET 65 Supplement C Appendix C. For the body tissue simulating liquids, the dielectric properties are defined in FCC OET 65 Supplement C Appendix C. The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using an Agilent 85070D Dielectric Probe Kit and an Agilent Network Analyzer.

**Table-3.1 Targets of Tissue Simulating Liquid**

Frequency (MHz)	Target Permittivity	Range of $\pm 5\%$	Target Conductivity	Range of $\pm 5\%$
<b>For Head</b>				
750	41.9	39.8 ~ 44.0	0.89	0.85 ~ 0.93
835	41.5	39.4 ~ 43.6	0.90	0.86 ~ 0.95
1750	40.1	38.1 ~ 42.1	1.37	1.30 ~ 1.44
1900	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
2450	39.2	37.2 ~ 41.2	1.80	1.71 ~ 1.89
5200	36.0	34.2 ~ 37.8	4.66	4.43 ~ 4.89
5300	35.9	34.1 ~ 37.7	4.76	4.52 ~ 5.00
5500	35.6	33.8 ~ 37.4	4.96	4.71 ~ 5.21
5600	35.5	33.7 ~ 37.3	5.07	4.82 ~ 5.32
5800	35.3	33.5 ~ 37.1	5.27	5.01 ~ 5.53
<b>For Body</b>				
750	55.5	52.7 ~ 58.3	0.96	0.91 ~ 1.01
835	55.2	52.4 ~ 58.0	0.97	0.92 ~ 1.02
1750	53.4	50.7 ~ 56.1	1.49	1.42 ~ 1.56
1900	53.3	50.6 ~ 56.0	1.52	1.44 ~ 1.60
2450	52.7	50.1 ~ 55.3	1.95	1.85 ~ 2.05
5200	49.0	46.6 ~ 51.5	5.30	5.04 ~ 5.57
5300	48.9	46.5 ~ 51.3	5.42	5.15 ~ 5.69
5500	48.6	46.2 ~ 51.0	5.65	5.37 ~ 5.93
5600	48.5	46.1 ~ 50.9	5.77	5.48 ~ 6.06
5800	48.2	45.8 ~ 50.6	6.00	5.70 ~ 6.30



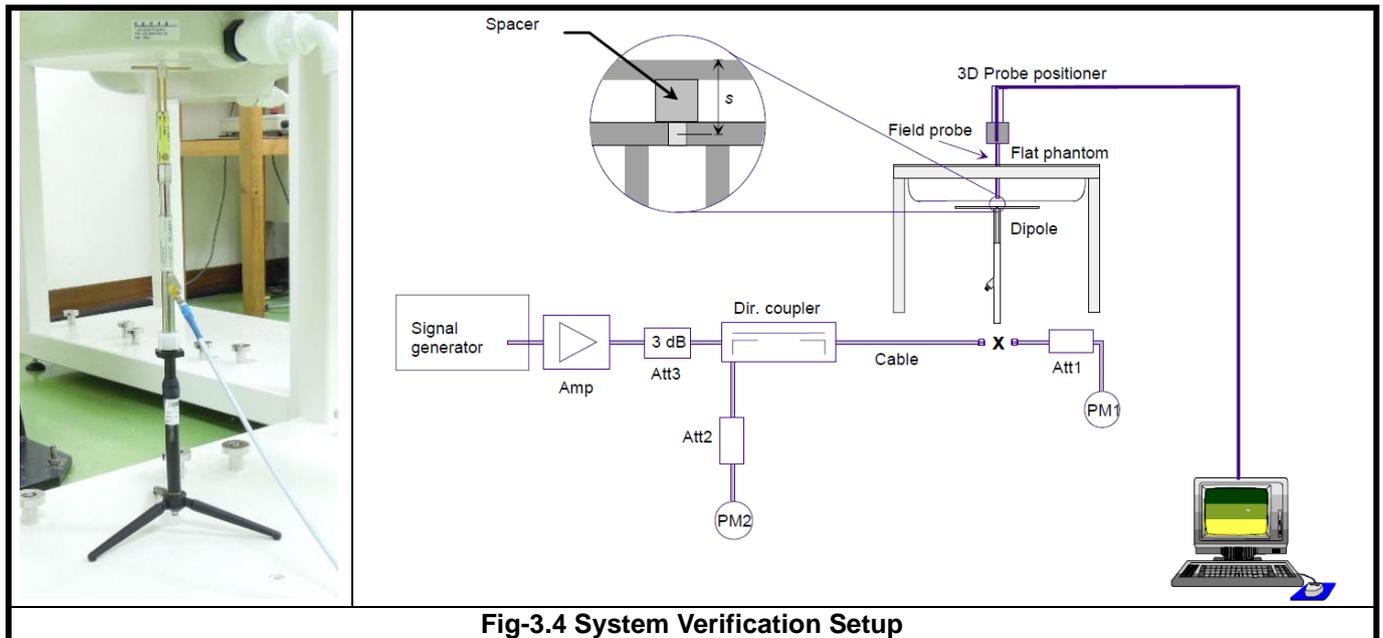
The following table gives the recipes for tissue simulating liquids.

**Table-3.2 Recipes of Tissue Simulating Liquid**

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
H750	0.2	-	0.2	1.5	56.0	-	42.1	-
H835	0.2	-	0.2	1.5	57.0	-	41.1	-
H1750	-	47.0	-	0.4	-	-	52.6	-
H1900	-	44.5	-	0.2	-	-	55.3	-
H2450	-	45.0	-	0.1	-	-	54.9	-
H5G	-	-	-	-	-	17.2	65.5	17.3
B750	0.2	-	0.2	0.8	48.8	-	50.0	-
B835	0.2	-	0.2	0.9	48.5	-	50.2	-
B1750	-	31.0	-	0.2	-	-	68.8	-
B1900	-	29.5	-	0.3	-	-	70.2	-
B2450	-	31.4	-	0.1	-	-	68.5	-
B5G	-	-	-	-	-	10.7	78.6	10.7

### 3.3 SAR System Verification

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



**Fig-3.4 System Verification Setup**

The validation dipole is placed beneath the flat phantom with the specific spacer in place. The distance spacer is touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The power meter PM1 measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power (250 mW is used for 700 MHz to 3 GHz, 100 mW is used for 3.5 GHz to 6 GHz) at the dipole connector and the power meter PM2 is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2.

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.

## FCC SAR Test Report

### **3.4 SAR Measurement Procedure**

According to the SAR test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

The SAR measurement procedures for each of test conditions are as follows:

- (a) Make EUT to transmit maximum output power
- (b) Measure conducted output power through RF cable
- (c) Place the EUT in the specific position of phantom
- (d) Perform SAR testing steps on the DASY system
- (e) Record the SAR value

#### **3.4.1 Area & Zoom Scan Procedure**

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan measures 5x5x7 points with step size 8, 8 and 5 mm for below 3 GHz, and 7x7x9 points with step size 4, 4 and 2.5 mm for above 5 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

#### **3.4.2 Volume Scan Procedure**

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

#### **3.4.3 Power Drift Monitoring**

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drift more than 5%, the SAR will be retested.

## FCC SAR Test Report

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### 3.4.4 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

### 3.4.5 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

## **4. SAR Measurement Evaluation**

### **4.1 EUT Configuration and Setting**

For WWAN SAR testing, the EUT was linked and controlled by base station emulator (Agilent E5515C is used for GSM/WCDMA, and Anritsu MT8820C is used for LTE). Communication between the EUT and the emulator was established by air link. The distance between the EUT and the communicating antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during SAR testing.

For GSM850, the power control level is set to 5. For GPRS850 (GMSK, CS1), the power control level is set to 5. For EDGE850 (GMSK: MCS1, 8PSK:MCS9), the power control level is set to 8. For GSM1900, the power control level is set to 0. For GPRS1900 (GMSK, CS1), the power control level is set to 0. For EDGE1900 (GMSK: MCS1, 8PSK:MCS9), the power control level is set to 2. Head SAR is tested under GSM link mode. Body SAR is tested under maximum source-based time-average power mode of GPRS/EDGE.

For WCDMA, head and body SAR is tested under 12.2k RMC mode with power control set all up bits. SAR for AMR is not required since its power is less than 1/4 dB higher than RMC. SAR for HSDPA/HSUPA is not required since its power is less than 1/4 dB higher than RMC without HSDPA/HSUPA.

For LTE, set the related parameters of operating band, channel bandwidth, uplink channel number, modulation type, and RB in base station simulator. When the EUT has registered and communicated to base station simulator, set the simulator to make EUT transmitting the maximum radiated power. The steps for system simulator (Anritsu MT8820C) setup are as below.

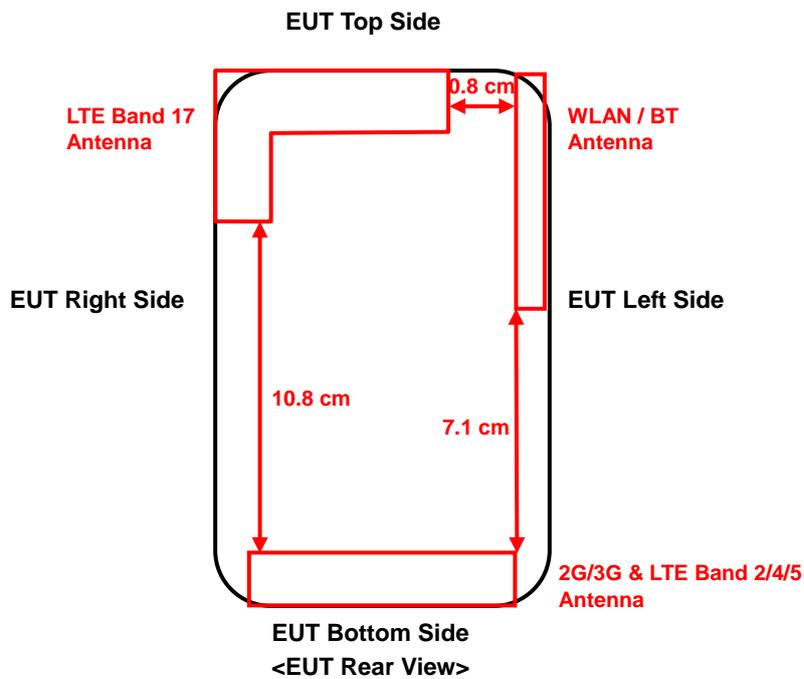
1. Press the "Std" button to select "LTE 22.20S" function
2. Choose the "Screen Select" item to "Fundamental Measurement"
3. Enter the "Common" item
4. Set the Operating Band
5. Set the Channel Bandwidth
6. Set the UL Channel & Frequency
7. Set the Modulation
8. Set the RB number and RB shift
9. Press "Start Call" button when EUT register to the system simulator
10. Set the TX-1 Max. Power to make the EUT transmit maximum output power

For WLAN SAR testing, the EUT has installed WLAN engineering testing software which can provide continuous transmitting RF signal. This RF signal utilized in SAR measurement has almost 100% duty cycle. The data rates for WLAN SAR testing were set in 1 Mbps for 802.11b, and MCS0 for 802.11n due to the highest RF output power.

The simultaneous transmission possibilities are listed as below.

Simultaneous Tx Combination	Configuration	Head (Voice / VoIP)	Body Worn (Voice / VoIP)	Hotspot (Data)
1	GSM850 (GSM/GPRS/EDGE) + WLAN/BT	V	V	V
2	GSM1900 (GSM/GPRS/EDGE) + WLAN/BT	V	V	V
3	WCDMA Band II + WLAN/BT	V	V	V
4	WCDMA Band V + WLAN/BT	V	V	V
5	LTE Band 2 + WLAN/BT	V	V	V
6	LTE Band 4 + WLAN/BT	V	V	V
7	LTE Band 5 + WLAN/BT	V	V	V
8	LTE Band 17 + WLAN/BT	V	V	V

**<Antenna Location>**



This device supports WiFi hotspot function, so body SAR was tested under 1 cm for the surfaces / slide edges where a transmitting antenna is within 2.5 cm from the edge. Since the SAR is required for antenna located within 2.5 cm from edge, SAR testing for each antenna is listed as below.

**2G/3G & LTE 2/4/5 Antenna :** Front Face, Rear Face, Left Side, Right Side, Bottom Side

**LTE 17 Antenna :** Front Face, Rear Face, Left Side, Right Side, Top Side

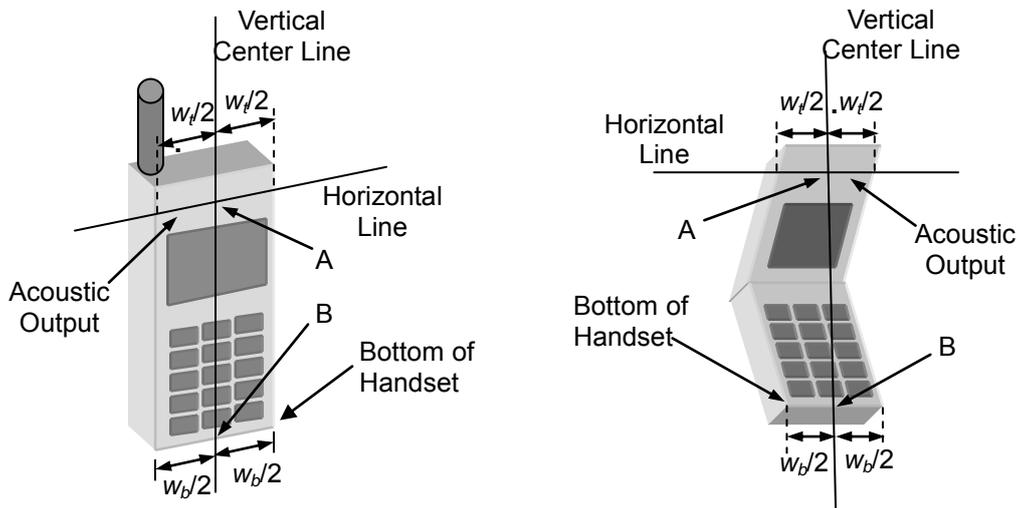
**WLAN/Bluetooth Antenna :** Front Face, Rear Face, Left Side, Top Side

## 4.2 EUT Testing Position

This EUT was tested in **Right Cheek, Right Tilted, Left Cheek, Left Tilted, Front Face, Rear Face, Right Side, Left Side, Top Side** and **Bottom Side** positions as illustrated below:

### 1. Define two imaginary lines on the handset

- (a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width  $w_t$  of the handset at the level of the acoustic output, and the midpoint of the width  $w_b$  of the bottom of the handset.
- (b) 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.
- (c) 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 parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

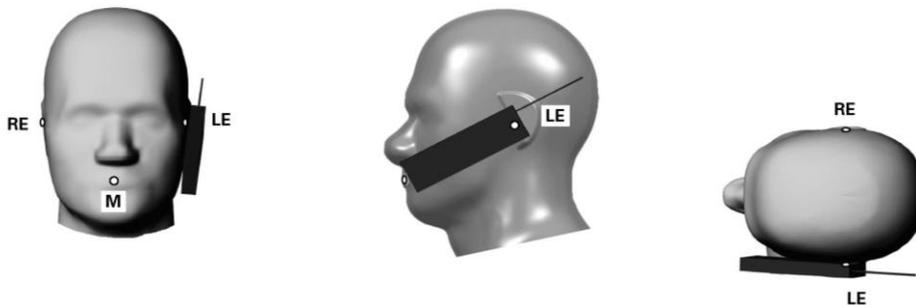


**Fig-4.1 Illustration for Handset Vertical and Horizontal Reference Lines**

# FCC SAR Test Report

## 2. Cheek Position

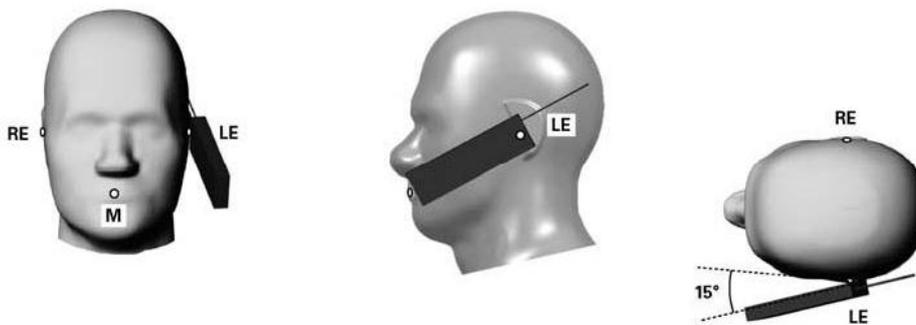
- (a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three 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.
- (b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the 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 (see Fig-4.2).



**Fig-4.2 Illustration for Cheek Position**

## 3. Tilted Position

- (a) To position the device in the “cheek” position described above.
- (b) While maintaining the device 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 contact with the ear is lost (see Fig-4.3).

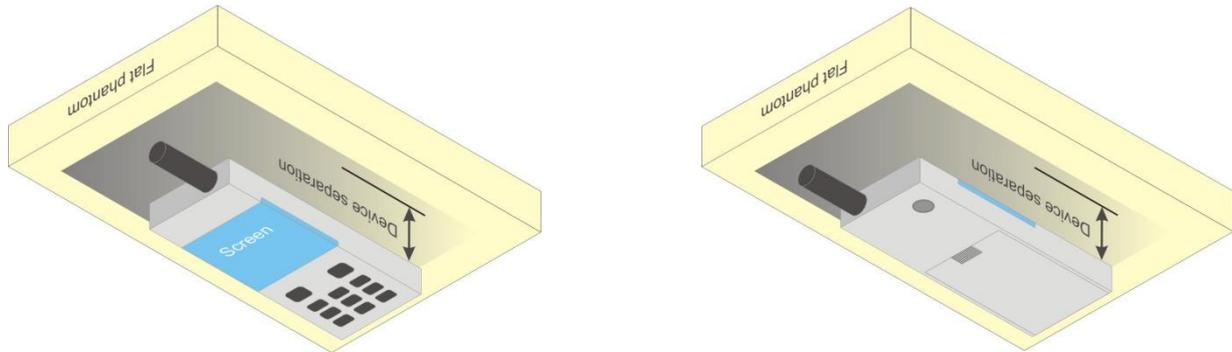


**Fig-4.3 Illustration for Tilted Position**

# FCC SAR Test Report

## 4. Body Worn Position

- (a) To position the EUT parallel to the phantom surface.
- (b) To adjust the EUT parallel to the flat phantom.
- (c) To adjust the distance between the EUT surface and the flat phantom to 1 cm.



**Fig-4.4 Illustration for Body Worn Position**

## 4.3 Tissue Verification

The measuring results for tissue simulating liquid are shown as below.

Tissue Type	Frequency (MHz)	Liquid Temp. (°C)	Measured Conductivity ( $\sigma$ )	Measured Permittivity ( $\epsilon_r$ )	Target Conductivity ( $\sigma$ )	Target Permittivity ( $\epsilon_r$ )	Conductivity Deviation (%)	Permittivity Deviation (%)	Test Date
H750	750	21.3	0.896	40.30	0.89	41.9	0.67	-3.82	Jul. 24, 2012
H835	835	21.3	0.897	42.80	0.90	41.5	-0.33	3.13	Jul. 24, 2012
H835	835	20.2	0.918	42.883	0.90	41.5	2.00	3.33	Jul. 24, 2012
H1750	1750	21.1	1.34	41.40	1.37	40.1	-2.19	3.24	Jul. 26, 2012
H1900	1900	20.3	1.441	39.728	1.40	40.0	2.93	-0.68	Jul. 24, 2012
H1900	1900	21.2	1.44	39.70	1.40	40.0	2.86	-0.75	Jul. 25, 2012
H2450	2450	21.3	1.79	40.105	1.80	39.2	-0.56	2.31	Jul. 26, 2012
H5G	5200	20.8	4.687	37.001	4.66	36.0	0.58	2.78	Jul. 25, 2012
H5G	5500	20.8	5.064	36.369	4.96	35.6	2.10	2.16	Jul. 25, 2012
H5G	5800	20.8	5.422	35.687	5.27	35.3	2.88	1.10	Jul. 25, 2012
B750	750	20.3	0.976	56.20	0.96	55.5	1.67	1.26	Jul. 25, 2012
B835	835	20.5	0.98	55.935	0.97	55.2	1.03	1.33	Jul. 24, 2012
B835	835	20.6	0.98	55.80	0.97	55.2	1.03	1.09	Jul. 25, 2012
B1750	1750	21.4	1.47	53.80	1.49	53.4	-1.34	0.75	Jul. 24, 2012
B1900	1900	21.1	1.545	52.799	1.52	53.3	1.64	-0.94	Jul. 23, 2012
B1900	1900	21.3	1.55	52.80	1.52	53.3	1.97	-0.94	Jul. 23, 2012
B2450	2450	20.5	2.01	52.98	1.95	52.7	3.08	0.53	Jul. 24, 2012
B5G	5200	20.4	5.266	49.165	5.30	49.0	-0.64	0.34	Jul. 25, 2012
B5G	5500	20.4	5.712	48.682	5.65	48.6	1.10	0.17	Jul. 25, 2012
B5G	5800	20.4	6.128	47.929	6.00	48.2	2.13	-0.56	Jul. 25, 2012

**Note:**

The dielectric properties of the tissue simulating liquid must be measured within 24 hours before the SAR testing and within  $\pm 5\%$  of the target values. Liquid temperature during the SAR testing must be within  $\pm 2^\circ\text{C}$ .



### 4.4 System Verification

The measuring results for system check are shown as below.

Test Date	Mode	Frequency (MHz)	1W Target SAR-1g (W/kg)	Measured SAR-1g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
Jul. 24, 2012	Head	750	8.44	2.20	8.80	4.27	1013	3590	861
Jul. 24, 2012	Head	835	9.46	2.35	9.40	-0.63	4d021	3590	861
Jul. 24, 2012	Head	835	9.46	2.26	9.04	-4.44	4d021	3820	579
Jul. 26, 2012	Head	1750	36.60	9.16	36.64	0.11	1055	3590	861
Jul. 24, 2012	Head	1900	38.90	9.01	36.04	-7.35	5d036	3820	579
Jul. 25, 2012	Head	1900	38.90	10.00	40.00	2.83	5d036	3590	861
Jul. 26, 2012	Head	2450	52.90	13.00	52.00	-1.70	737	3650	910
Jul. 25, 2012	Head	5200	79.60	7.74	77.40	-2.76	1018	3650	910
Jul. 25, 2012	Head	5500	84.70	8.82	88.20	4.13	1018	3650	910
Jul. 25, 2012	Head	5800	78.60	8.31	83.10	5.73	1018	3650	910
Jul. 25, 2012	Body	750	8.76	2.12	8.48	-3.20	1013	3590	861
Jul. 24, 2012	Body	835	9.60	2.25	9.00	-6.25	4d021	3820	579
Jul. 25, 2012	Body	835	9.60	2.35	9.40	-2.08	4d021	3590	861
Jul. 24, 2012	Body	1750	38.00	9.39	37.56	-1.16	1055	3590	861
Jul. 23, 2012	Body	1900	38.90	9.63	38.52	-0.98	5d036	3820	579
Jul. 23, 2012	Body	1900	38.90	9.44	37.76	-2.93	5d036	3590	861
Jul. 24, 2012	Body	2450	50.00	12.70	50.80	1.60	737	3820	579
Jul. 25, 2012	Body	5200	72.70	7.48	74.80	2.89	1018	3820	579
Jul. 25, 2012	Body	5500	78.30	8.33	83.30	6.39	1018	3820	579
Jul. 25, 2012	Body	5800	73.40	7.45	74.50	1.50	1018	3820	579

**Note:**

Comparing to the reference SAR value provided by SPEAG, the validation data should be within its specification of 10 %. The result indicates the system check can meet the variation criterion and the plots can be referred to Appendix A of this report.



# FCC SAR Test Report

## 4.5 Conducted Power Results

The measuring conducted power (Unit: dBm) are shown as below.

Band	GSM850			GSM1900		
	Channel	128	189	251	512	661
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
<b>Maximum Burst-Averaged Output Power</b>						
GSM (GMSK, 1 Uplink)	33.01	<b>33.02</b>	32.98	29.77	29.93	<b>29.96</b>
GPRS 8 (GMSK, 1 Uplink)	32.96	33.00	32.92	29.72	29.82	29.88
GPRS 10 (GMSK, 2 Uplink)	30.55	30.60	30.43	28.83	28.93	28.95
EDGE 8 (GMSK, 1 Uplink)	32.87	32.86	32.81	29.71	29.83	29.86
EDGE 10 (GMSK, 2 Uplink)	30.50	30.56	30.40	28.82	28.91	28.92
EDGE 8 (8PSK, 1 Uplink)	27.52	27.31	27.22	26.90	26.88	26.84
EDGE 10 (8PSK, 2 Uplink)	27.53	27.36	27.20	26.97	26.95	26.82
<b>Maximum Frame-Averaged Output Power</b>						
GSM (GMSK, 1 Uplink)	24.01	24.02	23.98	20.77	20.93	20.96
GPRS 8 (GMSK, 1 Uplink)	23.96	24.00	23.92	20.72	20.82	20.88
GPRS 10 (GMSK, 2 Uplink)	24.55	<b>24.60</b>	24.43	22.83	22.93	<b>22.95</b>
EDGE 8 (GMSK, 1 Uplink)	23.87	23.86	23.81	20.71	20.83	20.86
EDGE 10 (GMSK, 2 Uplink)	24.50	24.56	24.40	22.82	22.91	22.92
EDGE 8 (8PSK, 1 Uplink)	18.52	18.31	18.22	17.90	17.88	17.84
EDGE 10 (8PSK, 2 Uplink)	21.53	21.36	21.20	20.97	20.95	20.82

**Note:**

- SAR testing for GSM/GPRS/EDGE was performed on the maximum frame-averaged power mode.
- The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:  

$$\text{Frame-averaged power} = 10 \times \log (\text{Burst-averaged power mW} \times \text{Slot used} / 8)$$

Band	Channel	MPR	WCDMA Band II			WCDMA Band V		
			9262	9400	9538	4132	4182	4233
Frequency (MHz)	1852.4	1880.0	1907.6	826.4	836.4	846.6		
RMC 12.2K	-	<b>23.73</b>	23.64	23.56	23.61	<b>23.68</b>	23.52	
HSDPA Subtest-1	0	22.69	22.81	22.57	22.69	22.81	22.61	
HSDPA Subtest-2	0	22.60	22.72	22.64	22.68	22.71	22.60	
HSDPA Subtest-3	0.5	22.24	22.28	22.28	22.35	22.36	22.32	
HSDPA Subtest-4	0.5	22.19	22.23	22.11	22.25	22.35	22.21	
HSUPA Subtest-1	0	22.49	22.31	22.25	22.51	22.64	22.37	
HSUPA Subtest-2	2	20.42	20.12	20.09	20.33	20.45	20.32	
HSUPA Subtest-3	1	21.51	21.43	21.37	21.66	21.83	21.54	
HSUPA Subtest-4	2	20.49	20.39	20.26	20.62	20.78	20.52	
HSUPA Subtest-5	0	22.43	22.26	22.18	22.49	22.56	22.31	
<b>Actual Reduced Power</b>								
RMC 12.2K	-	-	-	-	-	-	-	
HSDPA Subtest-1	0	0.00	0.00	0.00	0.00	0.00	0.00	
HSDPA Subtest-2	0	0.09	0.09	-0.07	0.01	0.10	0.01	
HSDPA Subtest-3	0.5	0.45	0.53	0.29	0.34	0.45	0.29	
HSDPA Subtest-4	0.5	0.50	0.58	0.46	0.44	0.46	0.40	
HSUPA Subtest-1	0	0.00	0.00	0.00	0.00	0.00	0.00	
HSUPA Subtest-2	2	2.07	2.19	2.16	2.18	2.19	2.05	
HSUPA Subtest-3	1	0.98	0.88	0.88	0.85	0.81	0.83	
HSUPA Subtest-4	2	2.00	1.92	1.99	1.89	1.86	1.85	
HSUPA Subtest-5	0	0.06	0.05	0.07	0.02	0.08	0.06	



FCC SAR Test Report

A D T

LTE Band 2										
BW	Modulation	CH	Frequency (MHz)	RB	RB Offset	Target Power	MPR	Expected Power	Measured Power	Actual Reduced Power
5 MHz	QPSK	18625	1852.5	1	0	23.9	0	23.9	<b>23.78</b>	0.12
		18900	1880	1	0	23.9	0	23.9	23.71	0.19
		19175	1907.5	1	0	23.9	0	23.9	23.71	0.19
		18625	1852.5	1	24	23.9	0	23.9	23.71	0.19
		18900	1880	1	24	23.9	0	23.9	23.72	0.18
		19175	1907.5	1	24	23.9	0	23.9	23.73	0.17
		18625	1852.5	12	6	23.9	1	22.9	22.73	1.17
		18900	1880	12	6	23.9	1	22.9	22.74	1.16
		19175	1907.5	12	6	23.9	1	22.9	22.71	1.19
		18625	1852.5	25	0	23.9	1	22.9	22.80	1.10
	18900	1880	25	0	23.9	1	22.9	22.75	1.15	
	19175	1907.5	25	0	23.9	1	22.9	22.71	1.19	
	16QAM	18625	1852.5	1	0	23.9	1	22.9	22.73	1.17
		18900	1880	1	0	23.9	1	22.9	<b>22.80</b>	1.10
		19175	1907.5	1	0	23.9	1	22.9	22.71	1.19
		18625	1852.5	1	24	23.9	1	22.9	22.71	1.19
		18900	1880	1	24	23.9	1	22.9	22.77	1.13
		19175	1907.5	1	24	23.9	1	22.9	22.71	1.19
		18625	1852.5	12	6	23.9	2	21.9	21.74	2.16
		18900	1880	12	6	23.9	2	21.9	21.73	2.17
19175		1907.5	12	6	23.9	2	21.9	21.78	2.12	
18625		1852.5	25	0	23.9	2	21.9	21.77	2.13	
18900	1880	25	0	23.9	2	21.9	21.71	2.19		
19175	1907.5	25	0	23.9	2	21.9	21.71	2.19		
10 MHz	QPSK	18650	1855	1	0	23.9	0	23.9	23.73	0.17
		18900	1880	1	0	23.9	0	23.9	23.72	0.18
		19150	1905	1	0	23.9	0	23.9	23.71	0.19
		18650	1855	1	49	23.9	0	23.9	<b>23.88</b>	0.02
		18900	1880	1	49	23.9	0	23.9	23.76	0.14
		19150	1905	1	49	23.9	0	23.9	23.75	0.15
		18650	1855	25	12	23.9	1	22.9	22.75	1.15
		18900	1880	25	12	23.9	1	22.9	22.74	1.16
		19150	1905	25	12	23.9	1	22.9	22.73	1.17
		18650	1855	50	0	23.9	1	22.9	22.75	1.15
	18900	1880	50	0	23.9	1	22.9	22.72	1.18	
	19150	1905	50	0	23.9	1	22.9	22.71	1.19	
	16QAM	18650	1855	1	0	23.9	1	22.9	22.72	1.18
		18900	1880	1	0	23.9	1	22.9	<b>22.75</b>	1.15
		19150	1905	1	0	23.9	1	22.9	22.71	1.19
		18650	1855	1	49	23.9	1	22.9	22.74	1.16
		18900	1880	1	49	23.9	1	22.9	22.71	1.19
		19150	1905	1	49	23.9	1	22.9	22.74	1.16
		18650	1855	25	12	23.9	2	21.9	21.79	2.11
		18900	1880	25	12	23.9	2	21.9	21.72	2.18
19150		1905	25	12	23.9	2	21.9	21.71	2.19	
18650		1855	50	0	23.9	2	21.9	21.78	2.12	
18900	1880	50	0	23.9	2	21.9	21.74	2.16		
19150	1905	50	0	23.9	2	21.9	21.72	2.18		



FCC SAR Test Report

A D T

LTE Band 4										
BW	Modulation	CH	Frequency (MHz)	RB	RB Offset	Target Power	MPR	Expected Power	Measured Power	Actual Reduced Power
5 MHz	QPSK	19975	1712.5	1	0	24	0	24	23.90	0.10
		20175	1732.5	1	0	24	0	24	<b>23.91</b>	0.09
		20375	1752.5	1	0	24	0	24	23.86	0.14
		19975	1712.5	1	24	24	0	24	23.83	0.17
		20175	1732.5	1	24	24	0	24	23.84	0.16
		20375	1752.5	1	24	24	0	24	23.81	0.19
		19975	1712.5	12	6	24	1	23	22.82	1.18
		20175	1732.5	12	6	24	1	23	23.00	1.00
		20375	1752.5	12	6	24	1	23	22.81	1.19
		19975	1712.5	25	0	24	1	23	22.82	1.18
	20175	1732.5	25	0	24	1	23	22.84	1.16	
	20375	1752.5	25	0	24	1	23	22.83	1.17	
	16QAM	19975	1712.5	1	0	24	1	23	22.93	1.07
		20175	1732.5	1	0	24	1	23	<b>22.93</b>	1.07
		20375	1752.5	1	0	24	1	23	22.84	1.16
		19975	1712.5	1	24	24	1	23	22.90	1.10
		20175	1732.5	1	24	24	1	23	22.84	1.16
		20375	1752.5	1	24	24	1	23	22.82	1.18
		19975	1712.5	12	6	24	2	22	21.90	2.10
		20175	1732.5	12	6	24	2	22	21.99	2.01
20375		1752.5	12	6	24	2	22	21.87	2.13	
19975		1712.5	25	0	24	2	22	21.82	2.18	
20175	1732.5	25	0	24	2	22	21.81	2.19		
20375	1752.5	25	0	24	2	22	21.81	2.19		
10 MHz	QPSK	20000	1715	1	0	24	0	24	23.93	0.07
		20175	1732.5	1	0	24	0	24	<b>23.97</b>	0.03
		20350	1750	1	0	24	0	24	23.87	0.13
		20000	1715	1	49	24	0	24	23.81	0.19
		20175	1732.5	1	49	24	0	24	23.97	0.03
		20350	1750	1	49	24	0	24	23.80	0.20
		20000	1715	25	12	24	1	23	22.84	1.16
		20175	1732.5	25	12	24	1	23	22.91	1.09
		20350	1750	25	12	24	1	23	22.81	1.19
		20000	1715	50	0	24	1	23	22.84	1.16
	20175	1732.5	50	0	24	1	23	22.85	1.15	
	20350	1750	50	0	24	1	23	22.89	1.11	
	16QAM	20000	1715	1	0	24	1	23	22.91	1.09
		20175	1732.5	1	0	24	1	23	<b>23.05</b>	0.95
		20350	1750	1	0	24	1	23	22.83	1.17
		20000	1715	1	49	24	1	23	22.93	1.07
		20175	1732.5	1	49	24	1	23	22.87	1.13
		20350	1750	1	49	24	1	23	22.82	1.18
		20000	1715	25	12	24	2	22	21.83	2.17
		20175	1732.5	25	12	24	2	22	21.81	2.19
20350		1750	25	12	24	2	22	21.81	2.19	
20000		1715	50	0	24	2	22	21.85	2.15	
20175	1732.5	50	0	24	2	22	21.95	2.05		
20350	1750	50	0	24	2	22	21.84	2.16		



# FCC SAR Test Report

LTE Band 5										
BW	Modulation	CH	Frequency (MHz)	RB	RB Offset	Target Power	MPR	Expected Power	Measured Power	Actual Reduced Power
5 MHz	QPSK	20425	826.5	1	0	23.5	0	23.5	23.34	0.16
		20525	836.5	1	0	23.5	0	23.5	23.36	0.14
		20625	846.5	1	0	23.5	0	23.5	<b>23.37</b>	0.13
		20425	826.5	1	24	23.5	0	23.5	23.32	0.18
		20525	836.5	1	24	23.5	0	23.5	23.33	0.17
		20625	846.5	1	24	23.5	0	23.5	23.35	0.15
		20425	826.5	12	6	23.5	1	22.5	22.41	1.09
		20525	836.5	12	6	23.5	1	22.5	22.45	1.05
		20625	846.5	12	6	23.5	1	22.5	22.39	1.11
		20425	826.5	25	0	23.5	1	22.5	22.31	1.19
	20525	836.5	25	0	23.5	1	22.5	22.31	1.19	
	20625	846.5	25	0	23.5	1	22.5	22.33	1.17	
	16QAM	20425	826.5	1	0	23.5	1	22.5	22.32	1.18
		20525	836.5	1	0	23.5	1	22.5	22.31	1.19
		20625	846.5	1	0	23.5	1	22.5	<b>22.43</b>	1.07
		20425	826.5	1	24	23.5	1	22.5	22.31	1.19
		20525	836.5	1	24	23.5	1	22.5	22.34	1.16
		20625	846.5	1	24	23.5	1	22.5	22.36	1.14
		20425	826.5	12	6	23.5	2	21.5	21.34	2.16
		20525	836.5	12	6	23.5	2	21.5	21.40	2.10
20625		846.5	12	6	23.5	2	21.5	21.43	2.07	
20425		826.5	25	0	23.5	2	21.5	21.32	2.18	
10 MHz	QPSK	20450	829	1	0	23.5	0	23.5	23.33	0.17
		20525	836.5	1	0	23.5	0	23.5	23.37	0.13
		20600	844	1	0	23.5	0	23.5	<b>23.46</b>	0.04
		20450	829	1	49	23.5	0	23.5	23.31	0.19
		20525	836.5	1	49	23.5	0	23.5	23.32	0.18
		20600	844	1	49	23.5	0	23.5	23.35	0.15
		20450	829	25	12	23.5	1	22.5	22.31	1.19
		20525	836.5	25	12	23.5	1	22.5	22.34	1.16
		20600	844	25	12	23.5	1	22.5	22.38	1.12
		20450	829	50	0	23.5	1	22.5	22.31	1.19
	20525	836.5	50	0	23.5	1	22.5	22.32	1.18	
	20600	844	50	0	23.5	1	22.5	22.34	1.16	
	16QAM	20450	829	1	0	23.5	1	22.5	22.32	1.18
		20525	836.5	1	0	23.5	1	22.5	22.34	1.16
		20600	844	1	0	23.5	1	22.5	<b>22.39</b>	1.11
		20450	829	1	49	23.5	1	22.5	22.32	1.18
		20525	836.5	1	49	23.5	1	22.5	22.36	1.14
		20600	844	1	49	23.5	1	22.5	22.35	1.15
		20450	829	25	12	23.5	2	21.5	21.31	2.19
		20525	836.5	25	12	23.5	2	21.5	21.32	2.18
20600		844	25	12	23.5	2	21.5	21.35	2.15	
20450		829	50	0	23.5	2	21.5	21.35	2.15	
20525	836.5	50	0	23.5	2	21.5	21.36	2.14		
20600	844	50	0	23.5	2	21.5	21.39	2.11		



FCC SAR Test Report

A D T

LTE Band 17										
BW	Modulation	CH	Frequency (MHz)	RB	RB Offset	Target Power	MPR	Expected Power	Measured Power	Actual Reduced Power
5 MHz	QPSK	23755	706.5	1	0	23	0	23	<b>22.92</b>	0.08
		23790	710	1	0	23	0	23	22.87	0.13
		23825	713.5	1	0	23	0	23	22.82	0.18
		23755	706.5	1	24	23	0	23	22.82	0.18
		23790	710	1	24	23	0	23	22.85	0.15
		23825	713.5	1	24	23	0	23	22.81	0.19
		23755	706.5	12	6	23	1	22	21.87	1.13
		23790	710	12	6	23	1	22	21.83	1.17
		23825	713.5	12	6	23	1	22	21.82	1.18
		23755	706.5	25	0	23	1	22	21.89	1.11
	23790	710	25	0	23	1	22	21.81	1.19	
	23825	713.5	25	0	23	1	22	21.81	1.19	
	16QAM	23755	706.5	1	0	23	1	22	21.88	1.12
		23790	710	1	0	23	1	22	21.84	1.16
		23825	713.5	1	0	23	1	22	21.86	1.14
		23755	706.5	1	24	23	1	22	<b>21.90</b>	1.10
		23790	710	1	24	23	1	22	21.90	1.10
		23825	713.5	1	24	23	1	22	21.82	1.18
		23755	706.5	12	6	23	2	21	20.87	2.13
		23790	710	12	6	23	2	21	20.84	2.16
23825		713.5	12	6	23	2	21	20.82	2.18	
23755		706.5	25	0	23	2	21	20.88	2.12	
10 MHz	QPSK	23780	709	1	0	23	0	23	<b>23.00</b>	0.00
		23790	710	1	0	23	0	23	22.87	0.13
		23800	711	1	0	23	0	23	22.92	0.08
		23780	709	1	49	23	0	23	22.95	0.05
		23790	710	1	49	23	0	23	22.85	0.15
		23800	711	1	49	23	0	23	22.81	0.19
		23780	709	25	12	23	1	22	21.98	1.02
		23790	710	25	12	23	1	22	21.95	1.05
		23800	711	25	12	23	1	22	21.89	1.11
		23780	709	50	0	23	1	22	21.82	1.18
	23790	710	50	0	23	1	22	21.82	1.18	
	23800	711	50	0	23	1	22	21.81	1.19	
	16QAM	23780	709	1	0	23	1	22	<b>21.98</b>	1.02
		23790	710	1	0	23	1	22	21.83	1.17
		23800	711	1	0	23	1	22	21.87	1.13
		23780	709	1	49	23	1	22	21.93	1.07
		23790	710	1	49	23	1	22	21.84	1.16
		23800	711	1	49	23	1	22	21.81	1.19
		23780	709	25	12	23	2	21	20.96	2.04
		23790	710	25	12	23	2	21	21.02	1.98
23800		711	25	12	23	2	21	20.94	2.06	
23780		709	50	0	23	2	21	20.82	2.18	
23790	710	50	0	23	2	21	20.83	2.17		
23800	711	50	0	23	2	21	20.81	2.19		



# FCC SAR Test Report

Band	802.11b			802.11g		
Channel	1	6	11	1	6	11
Frequency (MHz)	2412	2437	2462	2412	2437	2462
Average Power	18.03	18.43	18.56	13.24	13.59	13.51

Band	802.11n (HT20)			802.11n (HT40)		
Channel	1	6	11	3	6	9
Frequency (MHz)	2412	2437	2462	2422	2437	2452
Average Power	12.42	11.76	11.66	11.52	11.67	11.66

Band	802.11a							
Channel	36	40	44	48	52	56	60	64
Frequency (MHz)	5180	5200	5220	5240	5260	5280	5300	5320
Average Power	12.97	13.08	13.17	13.28	13.02	13.14	13.27	13.39

Band	802.11a							
Channel	100	104	108	112	116	132	136	140
Frequency (MHz)	5500	5520	5540	5560	5580	5660	5680	5700
Average Power	13.06	13.12	13.14	13.14	13.14	12.84	12.72	12.58

Band	802.11a							
Channel	149	153	157	161	-	-	-	-
Frequency (MHz)	5745	5765	5785	5805	-	-	-	-
Average Power	13.00	12.89	12.78	12.68	-	-	-	-

Band	802.11n (HT20)							
Channel	36	40	44	48	52	56	60	64
Frequency (MHz)	5180	5200	5220	5240	5260	5280	5300	5320
Average Power	13.02	13.10	13.21	13.33	13.07	13.15	13.34	13.40

Band	802.11n (HT20)							
Channel	100	104	108	112	116	132	136	140
Frequency (MHz)	5500	5520	5540	5560	5580	5660	5680	5700
Average Power	13.10	13.13	13.17	13.17	13.18	12.87	12.74	12.62

Band	802.11n (HT20)							
Channel	149	153	157	161	-	-	-	-
Frequency (MHz)	5745	5765	5785	5805	-	-	-	-
Average Power	13.01	12.90	12.75	12.70	-	-	-	-

Band	802.11n (HT40)							
Channel	38	46	54	62	102	134	151	159
Frequency (MHz)	5190	5230	5270	5310	5510	5670	5755	5795
Average Power	13.01	13.17	13.05	13.28	13.08	12.78	13.02	12.74



# FCC SAR Test Report

## 4.6 SAR Testing Results

### 4.6.1 SAR Results for Head

Plot No.	Band	Mode	Test Position	Channel	SAR-1g (W/kg)
1	GSM850	GPRS10	Right Cheek	189	0.111
17	GSM850	GPRS10	Right Tilted	189	0.090
3	GSM850	GPRS10	Left Cheek	189	<b>0.196</b>
4	GSM850	GPRS10	Left Tilted	189	0.120
5	GSM1900	GPRS10	Right Cheek	810	<b>0.517</b>
6	GSM1900	GPRS10	Right Tilted	810	0.122
7	GSM1900	GPRS10	Left Cheek	810	0.347
8	GSM1900	GPRS10	Left Tilted	810	0.124
13	WCDMA Band II	RMC12.2K	Right Cheek	9262	<b>0.781</b>
14	WCDMA Band II	RMC12.2K	Right Tilted	9262	0.197
15	WCDMA Band II	RMC12.2K	Left Cheek	9262	0.465
16	WCDMA Band II	RMC12.2K	Left Tilted	9262	0.223
9	WCDMA Band V	RMC12.2K	Right Cheek	4182	0.109
10	WCDMA Band V	RMC12.2K	Right Tilted	4182	0.077
11	WCDMA Band V	RMC12.2K	Left Cheek	4182	<b>0.138</b>
12	WCDMA Band V	RMC12.2K	Left Tilted	4182	0.090
101	802.11b	-	Right Cheek	11	<b>0.482</b>
102	802.11b	-	Right Tilted	11	0.426
103	802.11b	-	Left Cheek	11	0.353
104	802.11b	-	Left Tilted	11	0.322
105	802.11n	HT20	Right Cheek	48	<b>0.026</b>
106	802.11n	HT20	Right Tilted	48	0.022
107	802.11n	HT20	Left Cheek	48	0.018
108	802.11n	HT20	Left Tilted	48	0.016
109	802.11n	HT20	Right Cheek	64	0.020
110	802.11n	HT20	Right Tilted	64	0.017
111	802.11n	HT20	Left Cheek	64	0.018
112	802.11n	HT20	Left Tilted	64	0.019
113	802.11n	HT20	Right Cheek	116	0.00299
114	802.11n	HT20	Right Tilted	116	0.015
115	802.11n	HT20	Left Cheek	116	0.023
116	802.11n	HT20	Left Tilted	116	0.015
117	802.11n	HT40	Right Cheek	151	0.021
118	802.11n	HT40	Right Tilted	151	0.018
119	802.11n	HT40	Left Cheek	151	0.022
120	802.11n	HT40	Left Tilted	151	0.020



# FCC SAR Test Report

A D T

Plot No.	Band	Mode	Test Position	Channel	RB	Offset	SAR-1g (W/kg)
201	LTE Band 2	QPSK_10M	Right Cheek	18650	25	12	0.524
205	LTE Band 2	QPSK_10M	Right Cheek	18650	1	0	0.633
209	LTE Band 2	QPSK_10M	Right Cheek	18650	1	49	<b>0.645</b>
202	LTE Band 2	QPSK_10M	Right Tilted	18650	25	12	0.139
206	LTE Band 2	QPSK_10M	Right Tilted	18650	1	0	0.165
210	LTE Band 2	QPSK_10M	Right Tilted	18650	1	49	0.185
203	LTE Band 2	QPSK_10M	Left Cheek	18650	25	12	0.392
207	LTE Band 2	QPSK_10M	Left Cheek	18650	1	0	0.467
211	LTE Band 2	QPSK_10M	Left Cheek	18650	1	49	0.49
204	LTE Band 2	QPSK_10M	Left Tilted	18650	25	12	0.135
208	LTE Band 2	QPSK_10M	Left Tilted	18650	1	0	0.167
212	LTE Band 2	QPSK_10M	Left Tilted	18650	1	49	0.174
213	LTE Band 2	16QAM_10M	Right Cheek	18650	25	12	0.379
214	LTE Band 2	16QAM_10M	Right Cheek	18650	1	0	0.456
215	LTE Band 2	16QAM_10M	Right Cheek	18650	1	49	0.48
216	LTE Band 4	QPSK_10M	Right Cheek	20175	25	12	0.395
220	LTE Band 4	QPSK_10M	Right Cheek	20175	1	0	<b>0.518</b>
224	LTE Band 4	QPSK_10M	Right Cheek	20175	1	49	0.493
217	LTE Band 4	QPSK_10M	Right Tilted	20175	25	12	0.088
221	LTE Band 4	QPSK_10M	Right Tilted	20175	1	0	0.111
225	LTE Band 4	QPSK_10M	Right Tilted	20175	1	49	0.118
218	LTE Band 4	QPSK_10M	Left Cheek	20175	25	12	0.337
222	LTE Band 4	QPSK_10M	Left Cheek	20175	1	0	0.442
226	LTE Band 4	QPSK_10M	Left Cheek	20175	1	49	0.402
219	LTE Band 4	QPSK_10M	Left Tilted	20175	25	12	0.078
223	LTE Band 4	QPSK_10M	Left Tilted	20175	1	0	0.097
227	LTE Band 4	QPSK_10M	Left Tilted	20175	1	49	0.105
228	LTE Band 4	16QAM_10M	Right Cheek	20175	25	12	0.284
229	LTE Band 4	16QAM_10M	Right Cheek	20175	1	0	0.36
230	LTE Band 4	16QAM_10M	Right Cheek	20175	1	49	0.358
231	LTE Band 5	QPSK_10M	Right Cheek	20600	25	12	0.136
235	LTE Band 5	QPSK_10M	Right Cheek	20600	1	0	0.229
239	LTE Band 5	QPSK_10M	Right Cheek	20600	1	49	0.215
232	LTE Band 5	QPSK_10M	Right Tilted	20600	25	12	0.094
236	LTE Band 5	QPSK_10M	Right Tilted	20600	1	0	0.148
240	LTE Band 5	QPSK_10M	Right Tilted	20600	1	49	0.151
233	LTE Band 5	QPSK_10M	Left Cheek	20600	25	12	0.203
237	LTE Band 5	QPSK_10M	Left Cheek	20600	1	0	<b>0.264</b>
241	LTE Band 5	QPSK_10M	Left Cheek	20600	1	49	0.244
234	LTE Band 5	QPSK_10M	Left Tilted	20600	25	12	0.089
238	LTE Band 5	QPSK_10M	Left Tilted	20600	1	0	0.12
242	LTE Band 5	QPSK_10M	Left Tilted	20600	1	49	0.104
243	LTE Band 5	16QAM_10M	Left Cheek	20600	25	12	0.129
244	LTE Band 5	16QAM_10M	Left Cheek	20600	1	0	0.174
245	LTE Band 5	16QAM_10M	Left Cheek	20600	1	49	0.139



## FCC SAR Test Report

A D T

Plot No.	Band	Mode	Test Position	Channel	RB	Offset	SAR-1g (W/kg)
246	LTE Band 17	QPSK_10M	Right Cheek	23780	25	12	0.271
250	LTE Band 17	QPSK_10M	Right Cheek	23780	1	0	0.37
254	LTE Band 17	QPSK_10M	Right Cheek	23780	1	49	0.34
247	LTE Band 17	QPSK_10M	Right Tilted	23780	25	12	0.269
251	LTE Band 17	QPSK_10M	Right Tilted	23780	1	0	0.375
255	LTE Band 17	QPSK_10M	Right Tilted	23780	1	49	0.324
248	LTE Band 17	QPSK_10M	Left Cheek	23780	25	12	0.333
252	LTE Band 17	QPSK_10M	Left Cheek	23780	1	0	<b>0.46</b>
256	LTE Band 17	QPSK_10M	Left Cheek	23780	1	49	0.418
249	LTE Band 17	QPSK_10M	Left Tilted	23780	25	12	0.296
253	LTE Band 17	QPSK_10M	Left Tilted	23780	1	0	0.418
257	LTE Band 17	QPSK_10M	Left Tilted	23780	1	49	0.381
258	LTE Band 17	16QAM_10M	Left Cheek	23780	25	12	0.282
259	LTE Band 17	16QAM_10M	Left Cheek	23780	1	0	0.388
260	LTE Band 17	16QAM_10M	Left Cheek	23780	1	49	0.35

### Note:

1. According to KDB 941225, the SAR testing for 100% RB is not required since the maximum SAR of 50% RB is less than 1.45 W/kg.
2. According to KDB 941225, the SAR testing was performed on largest channel bandwidth, and SAR for other channel bandwidths is not required since the maximum power of smaller channel bandwidth is within 1/2 dB higher or lower of measured for the largest channel bandwidth and maximum SAR of largest channel bandwidth is less than 1.45 W/kg.
3. This device does not support VoLTE. Since GPRS/EDGE, LTE and WLAN of this device supports VOIP capability through 3<sup>rd</sup> party apps software, we have evaluated data mode for head SAR.
4. SAR testing for 802.11g/n is not required because its maximum power is less than 1/4 dB higher than 802.11b.
5. SAR testing for WLAN 5G is performed on the maximum power mode.

# FCC SAR Test Report

## 4.6.2 SAR Results for Body

### <Body Worn Mode>

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Channel	SAR-1g (W/kg)
46	GSM850	GPRS10	Front Face	1	189	0.154
47	GSM850	GPRS10	Rear Face	1	189	<b>0.311</b>
54	GSM1900	GPRS10	Front Face	1	810	0.298
55	GSM1900	GPRS10	Rear Face	1	810	<b>0.333</b>
72	WCDMA Band II	RMC12.2K	Front Face	1	9262	<b>0.653</b>
73	WCDMA Band II	RMC12.2K	Rear Face	1	9262	0.565
62	WCDMA Band V	RMC12.2K	Front Face	1	4182	0.108
63	WCDMA Band V	RMC12.2K	Rear Face	1	4182	<b>0.233</b>
156	802.11b	-	Front Face	1	11	0.106
157	802.11b	-	Rear Face	1	11	<b>0.150</b>
163	802.11n	HT20	Front Face	1	48	0.013
164	802.11n	HT20	Rear Face	1	48	0.070
165	802.11n	HT20	Front Face	1	64	0.028
166	802.11n	HT20	Rear Face	1	64	0.065
167	802.11n	HT20	Front Face	1	116	0.034
168	802.11n	HT20	Rear Face	1	116	0.071
174	802.11n	HT40	Front Face	1	151	0.038
175	802.11n	HT40	Rear Face	1	151	<b>0.109</b>



# FCC SAR Test Report

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Channel	RB	Offset	SAR-1g (W/kg)
282	LTE Band 2	QPSK_10M	Front Face	1	18650	25	12	0.581
284	LTE Band 2	QPSK_10M	Front Face	1	18650	1	0	0.692
286	LTE Band 2	QPSK_10M	Front Face	1	18650	1	49	<b>0.718</b>
283	LTE Band 2	QPSK_10M	Rear Face	1	18650	25	12	0.553
285	LTE Band 2	QPSK_10M	Rear Face	1	18650	1	0	0.614
287	LTE Band 2	QPSK_10M	Rear Face	1	18650	1	49	0.682
288	LTE Band 2	16QAM_10M	Front Face	1	18650	25	12	0.507
289	LTE Band 2	16QAM_10M	Front Face	1	18650	1	0	0.627
290	LTE Band 2	16QAM_10M	Front Face	1	18650	1	49	0.648
309	LTE Band 4	QPSK_10M	Front Face	1	20175	25	12	0.533
311	LTE Band 4	QPSK_10M	Front Face	1	20175	1	0	0.691
313	LTE Band 4	QPSK_10M	Front Face	1	20175	1	49	0.664
310	LTE Band 4	QPSK_10M	Rear Face	1	20175	25	12	0.592
312	LTE Band 4	QPSK_10M	Rear Face	1	20175	1	0	<b>0.752</b>
314	LTE Band 4	QPSK_10M	Rear Face	1	20175	1	49	0.707
315	LTE Band 4	16QAM_10M	Rear Face	1	20175	25	12	0.456
316	LTE Band 4	16QAM_10M	Rear Face	1	20175	1	0	0.586
317	LTE Band 4	16QAM_10M	Rear Face	1	20175	1	49	0.566
336	LTE Band 5	QPSK_10M	Front Face	1	20600	25	12	0.08
338	LTE Band 5	QPSK_10M	Front Face	1	20600	1	0	0.112
340	LTE Band 5	QPSK_10M	Front Face	1	20600	1	49	0.092
337	LTE Band 5	QPSK_10M	Rear Face	1	20600	25	12	0.13
339	LTE Band 5	QPSK_10M	Rear Face	1	20600	1	0	<b>0.194</b>
341	LTE Band 5	QPSK_10M	Rear Face	1	20600	1	49	0.187
342	LTE Band 5	16QAM_10M	Rear Face	1	20600	25	12	0.099
343	LTE Band 5	16QAM_10M	Rear Face	1	20600	1	0	0.151
344	LTE Band 5	16QAM_10M	Rear Face	1	20600	1	49	0.108
363	LTE Band 17	QPSK_10M	Front Face	1	23780	25	12	0.07
365	LTE Band 17	QPSK_10M	Front Face	1	23780	1	0	0.096
367	LTE Band 17	QPSK_10M	Front Face	1	23780	1	49	0.091
364	LTE Band 17	QPSK_10M	Rear Face	1	23780	25	12	0.078
366	LTE Band 17	QPSK_10M	Rear Face	1	23780	1	0	<b>0.109</b>
368	LTE Band 17	QPSK_10M	Rear Face	1	23780	1	49	0.101
369	LTE Band 17	16QAM_10M	Rear Face	1	23780	25	12	0.063
370	LTE Band 17	16QAM_10M	Rear Face	1	23780	1	0	0.087
371	LTE Band 17	16QAM_10M	Rear Face	1	23780	1	49	0.081

**Note:**

1. According to KDB 941225, the SAR testing for 100% RB is not required since the maximum SAR of 50% RB is less than 1.45 W/kg.
2. According to KDB 941225, the SAR testing was performed on largest channel bandwidth, and SAR for other channel bandwidths is not required since the maximum power of smaller channel bandwidth is within 1/2 dB higher or lower of measured for the largest channel bandwidth and maximum SAR of largest channel bandwidth is less than 1.45 W/kg.
3. This device does not support VoLTE. Since GPRS/EDGE, LTE and WLAN of this device supports VOIP capability through 3<sup>rd</sup> party apps software, we have evaluated data mode for head SAR.
4. SAR testing for 802.11g/n is not required because its maximum power is less than 1/4 dB higher than 802.11b.
5. SAR testing for WLAN 5G is performed on the maximum power mode.



# FCC SAR Test Report

A D T

## <Hotspot Mode>

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Channel	SAR-1g (W/kg)
40	GSM850	GPRS10	Front Face	1	189	0.161
41	GSM850	GPRS10	Rear Face	1	189	<b>0.317</b>
42	GSM850	GPRS10	Left Side	1	189	0.155
43	GSM850	GPRS10	Right Side	1	189	0.130
45	GSM850	GPRS10	Bottom Side	1	189	0.090
48	GSM1900	GPRS10	Front Face	1	810	<b>0.358</b>
49	GSM1900	GPRS10	Rear Face	1	810	0.334
50	GSM1900	GPRS10	Left Side	1	810	0.05
51	GSM1900	GPRS10	Right Side	1	810	0.256
53	GSM1900	GPRS10	Bottom Side	1	810	0.204
64	WCDMA Band II	RMC12.2K	Front Face	1	9262	<b>0.643</b>
65	WCDMA Band II	RMC12.2K	Rear Face	1	9262	0.615
66	WCDMA Band II	RMC12.2K	Left Side	1	9262	0.064
67	WCDMA Band II	RMC12.2K	Right Side	1	9262	0.347
69	WCDMA Band II	RMC12.2K	Bottom Side	1	9262	0.304
56	WCDMA Band V	RMC12.2K	Front Face	1	4182	0.115
57	WCDMA Band V	RMC12.2K	Rear Face	1	4182	<b>0.236</b>
58	WCDMA Band V	RMC12.2K	Left Side	1	4182	0.104
59	WCDMA Band V	RMC12.2K	Right Side	1	4182	0.102
61	WCDMA Band V	RMC12.2K	Bottom Side	1	4182	0.075
151	802.11b	-	Front Face	1	11	<b>0.159</b>
152	802.11b	-	Rear Face	1	11	0.139
153	802.11b	-	Left Side	1	11	0.060
155	802.11b	-	Top Side	1	11	0.099
158	802.11n	HT20	Front Face	1	48	0.069
159	802.11n	HT20	Rear Face	1	48	0.054
160	802.11n	HT20	Left Side	1	48	0.013
162	802.11n	HT20	Top Side	1	48	0.013
169	802.11n	HT40	Front Face	1	151	0.079
170	802.11n	HT40	Rear Face	1	151	<b>0.096</b>
171	802.11n	HT40	Left Side	1	151	0.016
173	802.11n	HT40	Top Side	1	151	0.00863



# FCC SAR Test Report

A D T

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Channel	RB	Offset	SAR-1g (W/kg)
261	LTE Band 2	QPSK_10M	Front Face	1	18650	25	12	0.585
267	LTE Band 2	QPSK_10M	Front Face	1	18650	1	0	0.694
273	LTE Band 2	QPSK_10M	Front Face	1	18650	1	49	<b>0.719</b>
262	LTE Band 2	QPSK_10M	Rear Face	1	18650	25	12	0.581
268	LTE Band 2	QPSK_10M	Rear Face	1	18650	1	0	0.663
274	LTE Band 2	QPSK_10M	Rear Face	1	18650	1	49	0.588
263	LTE Band 2	QPSK_10M	Left Side	1	18650	25	12	0.058
269	LTE Band 2	QPSK_10M	Left Side	1	18650	1	0	0.072
275	LTE Band 2	QPSK_10M	Left Side	1	18650	1	49	0.076
264	LTE Band 2	QPSK_10M	Right Side	1	18650	25	12	0.349
270	LTE Band 2	QPSK_10M	Right Side	1	18650	1	0	0.422
276	LTE Band 2	QPSK_10M	Right Side	1	18650	1	49	0.439
266	LTE Band 2	QPSK_10M	Bottom Side	1	18650	25	12	0.392
272	LTE Band 2	QPSK_10M	Bottom Side	1	18650	1	0	0.479
278	LTE Band 2	QPSK_10M	Bottom Side	1	18650	1	49	0.486
279	LTE Band 2	16QAM_10M	Front Face	1	18650	25	12	0.431
280	LTE Band 2	16QAM_10M	Front Face	1	18650	1	0	0.528
281	LTE Band 2	16QAM_10M	Front Face	1	18650	1	49	0.544
291	LTE Band 4	QPSK_10M	Front Face	1	20175	25	12	0.542
296	LTE Band 4	QPSK_10M	Front Face	1	20175	1	0	0.7
301	LTE Band 4	QPSK_10M	Front Face	1	20175	1	49	0.684
292	LTE Band 4	QPSK_10M	Rear Face	1	20175	25	12	0.623
297	LTE Band 4	QPSK_10M	Rear Face	1	20175	1	0	<b>0.784</b>
302	LTE Band 4	QPSK_10M	Rear Face	1	20175	1	49	0.737
293	LTE Band 4	QPSK_10M	Left Side	1	20175	25	12	0.039
298	LTE Band 4	QPSK_10M	Left Side	1	20175	1	0	0.049
303	LTE Band 4	QPSK_10M	Left Side	1	20175	1	49	0.046
294	LTE Band 4	QPSK_10M	Right Side	1	20175	25	12	0.26
299	LTE Band 4	QPSK_10M	Right Side	1	20175	1	0	0.33
304	LTE Band 4	QPSK_10M	Right Side	1	20175	1	49	0.315
295	LTE Band 4	QPSK_10M	Bottom Side	1	20175	25	12	0.385
300	LTE Band 4	QPSK_10M	Bottom Side	1	20175	1	0	0.489
305	LTE Band 4	QPSK_10M	Bottom Side	1	20175	1	49	0.476
306	LTE Band 4	16QAM_10M	Rear Face	1	20175	25	12	0.478
307	LTE Band 4	16QAM_10M	Rear Face	1	20175	1	0	0.604
308	LTE Band 4	16QAM_10M	Rear Face	1	20175	1	49	0.573



# FCC SAR Test Report

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Channel	RB	Offset	SAR-1g (W/kg)
318	LTE Band 5	QPSK_10M	Front Face	1	20600	25	12	0.093
323	LTE Band 5	QPSK_10M	Front Face	1	20600	1	0	0.124
328	LTE Band 5	QPSK_10M	Front Face	1	20600	1	49	0.106
319	LTE Band 5	QPSK_10M	Rear Face	1	20600	25	12	0.154
324	LTE Band 5	QPSK_10M	Rear Face	1	20600	1	0	<b>0.226</b>
329	LTE Band 5	QPSK_10M	Rear Face	1	20600	1	49	0.177
320	LTE Band 5	QPSK_10M	Left Side	1	20600	25	12	0.099
325	LTE Band 5	QPSK_10M	Left Side	1	20600	1	0	0.134
330	LTE Band 5	QPSK_10M	Left Side	1	20600	1	49	0.122
321	LTE Band 5	QPSK_10M	Right Side	1	20600	25	12	0.045
326	LTE Band 5	QPSK_10M	Right Side	1	20600	1	0	0.073
331	LTE Band 5	QPSK_10M	Right Side	1	20600	1	49	0.068
322	LTE Band 5	QPSK_10M	Bottom Side	1	20600	25	12	0.053
327	LTE Band 5	QPSK_10M	Bottom Side	1	20600	1	0	0.074
332	LTE Band 5	QPSK_10M	Bottom Side	1	20600	1	49	0.063
333	LTE Band 5	16QAM_10M	Rear Face	1	20600	25	12	0.113
334	LTE Band 5	16QAM_10M	Rear Face	1	20600	1	0	0.17
335	LTE Band 5	16QAM_10M	Rear Face	1	20600	1	49	0.124
345	LTE Band 17	QPSK_10M	Front Face	1	23780	25	12	0.108
350	LTE Band 17	QPSK_10M	Front Face	1	23780	1	0	0.153
355	LTE Band 17	QPSK_10M	Front Face	1	23780	1	49	0.141
346	LTE Band 17	QPSK_10M	Rear Face	1	23780	25	12	0.112
351	LTE Band 17	QPSK_10M	Rear Face	1	23780	1	0	0.157
356	LTE Band 17	QPSK_10M	Rear Face	1	23780	1	49	0.145
347	LTE Band 17	QPSK_10M	Left Side	1	23780	25	12	0.045
352	LTE Band 17	QPSK_10M	Left Side	1	23780	1	0	0.062
357	LTE Band 17	QPSK_10M	Left Side	1	23780	1	49	0.057
348	LTE Band 17	QPSK_10M	Right Side	1	23780	25	12	0.07
353	LTE Band 17	QPSK_10M	Right Side	1	23780	1	0	0.092
358	LTE Band 17	QPSK_10M	Right Side	1	23780	1	49	0.09
349	LTE Band 17	QPSK_10M	Top	1	23780	25	12	0.081
354	LTE Band 17	QPSK_10M	Top	1	23780	1	0	0.111
359	LTE Band 17	QPSK_10M	Top	1	23780	1	49	0.107
360	LTE Band 17	16QAM_10M	Rear Face	1	23780	25	12	0.135
361	LTE Band 17	16QAM_10M	Rear Face	1	23780	1	0	<b>0.176</b>
362	LTE Band 17	16QAM_10M	Rear Face	1	23780	1	49	0.17

**Note:**

1. According to KDB 941225, the SAR testing for 100% RB is not required since the maximum SAR of 50% RB is less than 1.45 W/kg.
2. According to KDB 941225, the SAR testing was performed on largest channel bandwidth, and SAR for other channel bandwidths is not required since the maximum power of smaller channel bandwidth is within 1/2 dB higher or lower of measured for the largest channel bandwidth and maximum SAR of largest channel bandwidth is less than 1.45 W/kg.
3. SAR testing for 802.11g/n is not required because its maximum power is less than 1/4 dB higher than 802.11b.
4. Only WLAN 5G band 1 and 4 (5.15~5.25 and 5.725~5.825 GHz) support wireless hotspot mode.
5. SAR testing for WLAN 5G is performed on the maximum power mode.

**Test Engineer :** Eli Hsu, Morrison Huang, and Match Tsui



# FCC SAR Test Report

## 4.6.3 Simultaneous Multi-band Transmission Evaluation

No.	Conditions (SAR1 + SAR2)	Mode	Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR
1	GSM850 + WLAN 2.4G	Head	Right Cheek	0.111	0.482	0.593	-
			Right Tilted	0.090	0.426	0.516	-
			Left Cheek	0.196	0.353	0.549	-
			Left Tilted	0.120	0.322	0.442	-
		Body-Worn	Front Face	0.154	0.106	0.26	-
			Rear Face	0.311	0.150	0.461	-
		Hotspot	Front Face	0.161	0.159	0.32	-
			Rear Face	0.317	0.139	0.456	-
			Left Side	0.155	0.060	0.215	-
			Right Side	0.130	0	0.13	-
			Top Side	0	0.099	0.099	-
			Bottom Side	0.090	0	0.09	-
	GSM850 + WLAN 5G	Head	Right Cheek	0.111	0.026	0.137	-
			Right Tilted	0.090	0.022	0.112	-
			Left Cheek	0.196	0.023	0.219	-
			Left Tilted	0.120	0.020	0.14	-
		Body-Worn	Front Face	0.154	0.038	0.192	-
			Rear Face	0.311	0.109	0.42	-
		Hotspot	Front Face	0.161	0.079	0.24	-
			Rear Face	0.317	0.096	0.413	-
Left Side			0.155	0.016	0.171	-	
Right Side			0.130	0	0.13	-	
Top Side			0	0.013	0.013	-	
Bottom Side			0.090	0	0.09	-	
2	GSM1900 + WLAN 2.4G	Head	Right Cheek	0.517	0.482	0.999	-
			Right Tilted	0.122	0.426	0.548	-
			Left Cheek	0.347	0.353	0.7	-
			Left Tilted	0.124	0.322	0.446	-
		Body-Worn	Front Face	0.298	0.106	0.404	-
			Rear Face	0.333	0.150	0.483	-
		Hotspot	Front Face	0.358	0.159	0.517	-
			Rear Face	0.334	0.139	0.473	-
			Left Side	0.05	0.060	0.11	-
			Right Side	0.256	0	0.256	-
			Top Side	0	0.099	0.099	-
			Bottom Side	0.204	0	0.204	-
	GSM1900 + WLAN 5G	Head	Right Cheek	0.517	0.026	0.543	-
			Right Tilted	0.122	0.022	0.144	-
			Left Cheek	0.347	0.023	0.37	-
			Left Tilted	0.124	0.020	0.144	-
		Body-Worn	Front Face	0.298	0.038	0.336	-
			Rear Face	0.333	0.109	0.442	-
		Hotspot	Front Face	0.358	0.079	0.437	-
			Rear Face	0.334	0.096	0.43	-
Left Side	0.05		0.016	0.066	-		
Right Side	0.256		0	0.256	-		
Top Side	0	0.013	0.013	-			
Bottom Side	0.204	0	0.204	-			



FCC SAR Test Report

No.	Conditions (SAR1 + SAR2)	Mode	Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR
3	WCDMA II + WLAN 2.4G	Head	Right Cheek	0.781	0.482	1.263	-
			Right Tilted	0.197	0.426	0.623	-
			Left Cheek	0.465	0.353	0.818	-
			Left Tilted	0.223	0.322	0.545	-
		Body-Worn	Front Face	0.653	0.106	0.759	-
			Rear Face	0.565	0.150	0.715	-
		Hotspot	Front Face	0.643	0.159	0.802	-
			Rear Face	0.615	0.139	0.754	-
			Left Side	0.064	0.060	0.124	-
			Right Side	0.347	0	0.347	-
			Top Side	0	0.099	0.099	-
			Bottom Side	0.304	0	0.304	-
	WCDMA II + WLAN 5G	Head	Right Cheek	0.781	0.026	0.807	-
			Right Tilted	0.197	0.022	0.219	-
			Left Cheek	0.465	0.023	0.488	-
			Left Tilted	0.223	0.020	0.243	-
		Body-Worn	Front Face	0.653	0.038	0.691	-
			Rear Face	0.565	0.109	0.674	-
		Hotspot	Front Face	0.643	0.079	0.722	-
			Rear Face	0.615	0.096	0.711	-
Left Side			0.064	0.016	0.08	-	
Right Side			0.347	0	0.347	-	
Top Side			0	0.013	0.013	-	
Bottom Side			0.304	0	0.304	-	
4	WCDMA V + WLAN 2.4G	Head	Right Cheek	0.109	0.482	0.591	-
			Right Tilted	0.077	0.426	0.503	-
			Left Cheek	0.138	0.353	0.491	-
			Left Tilted	0.090	0.322	0.412	-
		Body-Worn	Front Face	0.108	0.106	0.214	-
			Rear Face	0.233	0.150	0.383	-
		Hotspot	Front Face	0.115	0.159	0.274	-
			Rear Face	0.236	0.139	0.375	-
			Left Side	0.104	0.060	0.164	-
			Right Side	0.102	0	0.102	-
			Top Side	0	0.099	0.099	-
			Bottom Side	0.075	0	0.075	-
	WCDMA V + WLAN 5G	Head	Right Cheek	0.109	0.026	0.135	-
			Right Tilted	0.077	0.022	0.099	-
			Left Cheek	0.138	0.023	0.161	-
			Left Tilted	0.090	0.020	0.11	-
		Body-Worn	Front Face	0.108	0.038	0.146	-
			Rear Face	0.233	0.109	0.342	-
		Hotspot	Front Face	0.115	0.079	0.194	-
			Rear Face	0.236	0.096	0.332	-
Left Side	0.104		0.016	0.12	-		
Right Side	0.102		0	0.102	-		
Top Side	0	0.013	0.013	-			
Bottom Side	0.075	0	0.075	-			



FCC SAR Test Report

No.	Conditions (SAR1 + SAR2)	Mode	Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR
5	LTE 2 + WLAN 2.4G	Head	Right Cheek	0.645	0.482	1.127	-
			Right Tilted	0.185	0.426	0.611	-
			Left Cheek	0.49	0.353	0.843	-
			Left Tilted	0.174	0.322	0.496	-
		Body-Worn	Front Face	0.718	0.106	0.824	-
			Rear Face	0.682	0.150	0.832	-
		Hotspot	Front Face	0.719	0.159	0.878	-
			Rear Face	0.663	0.139	0.802	-
			Left Side	0.076	0.060	0.136	-
			Right Side	0.439	0	0.439	-
			Top Side	0	0.099	0.099	-
			Bottom Side	0.486	0	0.486	-
	LTE 2 + WLAN 5G	Head	Right Cheek	0.645	0.026	0.671	-
			Right Tilted	0.185	0.022	0.207	-
			Left Cheek	0.49	0.023	0.513	-
			Left Tilted	0.174	0.020	0.194	-
		Body-Worn	Front Face	0.718	0.038	0.756	-
			Rear Face	0.682	0.109	0.791	-
		Hotspot	Front Face	0.719	0.079	0.798	-
			Rear Face	0.663	0.096	0.759	-
Left Side			0.076	0.016	0.092	-	
Right Side			0.439	0	0.439	-	
Top Side			0	0.013	0.013	-	
Bottom Side			0.486	0	0.486	-	
6	LTE 4 + WLAN 2.4G	Head	Right Cheek	0.518	0.482	1	-
			Right Tilted	0.118	0.426	0.544	-
			Left Cheek	0.442	0.353	0.795	-
			Left Tilted	0.105	0.322	0.427	-
		Body-Worn	Front Face	0.691	0.106	0.797	-
			Rear Face	0.752	0.150	0.902	-
		Hotspot	Front Face	0.7	0.159	0.859	-
			Rear Face	0.784	0.139	0.923	-
			Left Side	0.049	0.060	0.109	-
			Right Side	0.33	0	0.33	-
			Top Side	0	0.099	0.099	-
			Bottom Side	0.489	0	0.489	-
	LTE 4 + WLAN 5G	Head	Right Cheek	0.518	0.026	0.544	-
			Right Tilted	0.118	0.022	0.14	-
			Left Cheek	0.442	0.023	0.465	-
			Left Tilted	0.105	0.020	0.125	-
		Body-Worn	Front Face	0.691	0.038	0.729	-
			Rear Face	0.752	0.109	0.861	-
		Hotspot	Front Face	0.7	0.079	0.779	-
			Rear Face	0.784	0.096	0.88	-
Left Side	0.049		0.016	0.065	-		
Right Side	0.33		0	0.33	-		
Top Side	0	0.013	0.013	-			
Bottom Side	0.489	0	0.489	-			



# FCC SAR Test Report

No.	Conditions (SAR1 + SAR2)	Mode	Position	Max. SAR1	Max. SAR2	SAR Summation	SPLSR
7	LTE 5 + WLAN 2.4G	Head	Right Cheek	0.229	0.482	0.711	-
			Right Tilted	0.151	0.426	0.577	-
			Left Cheek	0.264	0.353	0.617	-
			Left Tilted	0.12	0.322	0.442	-
		Body-Worn	Front Face	0.112	0.106	0.218	-
			Rear Face	0.194	0.150	0.344	-
		Hotspot	Front Face	0.124	0.159	0.283	-
			Rear Face	0.226	0.139	0.365	-
			Left Side	0.134	0.060	0.194	-
			Right Side	0.073	0	0.073	-
			Top Side	0	0.099	0.099	-
			Bottom Side	0.074	0	0.074	-
	LTE 5 + WLAN 5G	Head	Right Cheek	0.229	0.026	0.255	-
			Right Tilted	0.151	0.022	0.173	-
			Left Cheek	0.264	0.023	0.287	-
			Left Tilted	0.12	0.020	0.14	-
		Body-Worn	Front Face	0.112	0.038	0.15	-
			Rear Face	0.194	0.109	0.303	-
		Hotspot	Front Face	0.124	0.079	0.203	-
			Rear Face	0.226	0.096	0.322	-
Left Side			0.134	0.016	0.15	-	
Right Side			0.073	0	0.073	-	
Top Side			0	0.013	0.013	-	
Bottom Side			0.074	0	0.074	-	
8	LTE 17 + WLAN 2.4G	Head	Right Cheek	0.37	0.482	0.852	-
			Right Tilted	0.375	0.426	0.801	-
			Left Cheek	0.46	0.353	0.813	-
			Left Tilted	0.418	0.322	0.74	-
		Body-Worn	Front Face	0.096	0.106	0.202	-
			Rear Face	0.109	0.150	0.259	-
		Hotspot	Front Face	0.153	0.159	0.312	-
			Rear Face	0.176	0.139	0.315	-
			Left Side	0.062	0.060	0.122	-
			Right Side	0.092	0	0.092	-
			Top Side	0.111	0.099	0.21	-
			Bottom Side	0	0	0	-
	LTE 17 + WLAN 5G	Head	Right Cheek	0.37	0.026	0.396	-
			Right Tilted	0.375	0.022	0.397	-
			Left Cheek	0.46	0.023	0.483	-
			Left Tilted	0.418	0.020	0.438	-
		Body-Worn	Front Face	0.096	0.038	0.134	-
			Rear Face	0.109	0.109	0.218	-
		Hotspot	Front Face	0.153	0.079	0.232	-
			Rear Face	0.176	0.096	0.272	-
Left Side	0.062		0.016	0.078	-		
Right Side	0.092		0	0.092	-		
Top Side	0.111	0.013	0.124	-			
Bottom Side	0	0	0	-			

**Note:**

1. The maximum SAR summation is calculated based on the same configuration and test position.



## FCC SAR Test Report

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### Summary:

According to KDB 648474, the simultaneous transmission SAR for WWAN and WLAN was not required, because the SAR summation is less than 1.6 W/kg. The BT standalone SAR and WWAN/BT simultaneous transmission SAR were not required, because the maximum output power of Bluetooth is less than  $P_{Ref}$  (10.8 dBm) and the closest separation distance of these antennas is larger than 2.5 cm, and maximum WWAN SAR is less than 1.2 W/kg.



## 5. Calibration of Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Kit	SPEAG	D750V3	1013	Apr. 25, 2012	Annual
System Validation Kit	SPEAG	D835V2	4d021	Apr. 20, 2012	Annual
System Validation Kit	SPEAG	D1750V2	1055	Aug. 09, 2011	Annual
System Validation Kit	SPEAG	D1900V2	5d036	Jan. 26, 2012	Annual
System Validation Kit	SPEAG	D2450V2	737	Jan. 24, 2012	Annual
System Validation Kit	SPEAG	D5GHzV2	1018	Jan. 18, 2012	Annual
Dosimetric E-Field Probe	SPEAG	EX3DV4	3590	Feb. 23, 2012	Annual
Dosimetric E-Field Probe	SPEAG	EX3DV4	3650	Oct. 26, 2011	Annual
Dosimetric E-Field Probe	SPEAG	EX3DV4	3820	Dec. 16, 2011	Annual
Data Acquisition Electronics	SPEAG	DAE3	579	Apr. 27, 2012	Annual
Data Acquisition Electronics	SPEAG	DAE4	861	Aug. 29, 2011	Annual
Data Acquisition Electronics	SPEAG	DAE4	910	Dec. 07, 2011	Annual
SAM Phantom	SPEAG	QD000P40CD	TP-1652	N/A	N/A
SAM Phantom	SPEAG	QD000P40CD	TP-1654	N/A	N/A
SAM Phantom	SPEAG	QD000P40CD	TP-1653	N/A	N/A
ELI Phantom	SPEAG	QDOVA001B	TP-1043	N/A	N/A
Radio Communication Tester	Agilent	E5515C	MY50266628	Sep. 26, 2011	Biennial
Radio Communication Analyzer	Anritsu	MT8820C	6201010284	Aug. 01, 2011	Biennial
ENA Series Network Analyzer	Agilent	E5071C	MY46214281	May 14, 2012	Annual
MXG Analog Signal Generator	Agilent	N5181A	MY50143868	May 06, 2012	Annual
Power Meter	Anritsu	ML2495A	1218009	May 07, 2012	Annual
Power Sensor	Anritsu	MA2411B	1207252	May 07, 2012	Annual
EXA Spectrum Analyzer	Agilent	N9010A	MY52100136	Apr. 23, 2012	Annual
Dielectric Probe Kit	Agilent	85070D	E2-020018	May 14, 2012	Annual
Thermometer	YFE	YF-160A	110600361	Feb. 21, 2012	Annual
Directional Coupler	Woken	0110A056020-10	11122702	Apr. 19, 2012	Annual
Power Amplifier	AR	5S1G4	0339656	Apr. 23, 2012	Annual
Power Amplifier	Mini-Circuit	ZVE-8G	001000422	Apr. 23, 2012	Annual
Attenuator	Woken	00800A1G01L-03	N/A	Apr. 19, 2012	Annual

## 6. Measurement Uncertainty

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	C <sub>i</sub> (1g)	Standard Uncertainty (1g)	V <sub>i</sub>
<b>Measurement System</b>						
Probe Calibration	6.0	Normal	1	1	± 6.0 %	∞
Axial Isotropy	4.7	Rectangular	√3	0.7	± 1.9 %	∞
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	± 3.9 %	∞
Boundary Effects	1.0	Rectangular	√3	1	± 0.6 %	∞
Linearity	4.7	Rectangular	√3	1	± 2.7 %	∞
System Detection Limits	1.0	Rectangular	√3	1	± 0.6 %	∞
Readout Electronics	0.6	Normal	1	1	± 0.6 %	∞
Response Time	0.0	Rectangular	√3	1	± 0.0 %	∞
Integration Time	1.7	Rectangular	√3	1	± 1.0 %	∞
RF Ambient Noise	3.0	Rectangular	√3	1	± 1.7 %	∞
RF Ambient Reflections	3.0	Rectangular	√3	1	± 1.7 %	∞
Probe Positioner	0.5	Rectangular	√3	1	± 0.3 %	∞
Probe Positioning	2.9	Rectangular	√3	1	± 1.7 %	∞
Max. SAR Eval.	2.3	Rectangular	√3	1	± 1.3 %	∞
<b>Test Sample Related</b>						
Device Positioning	3.9	Normal	1	1	± 3.9 %	31
Device Holder	2.7	Normal	1	1	± 2.7 %	19
Power Drift	5.0	Rectangular	√3	1	± 2.9 %	∞
<b>Phantom and Setup</b>						
Phantom Uncertainty	4.0	Rectangular	√3	1	± 2.3 %	∞
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	± 1.8 %	∞
Liquid Conductivity (Meas.)	5.0	Normal	1	0.64	± 3.2 %	29
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	± 1.7 %	∞
Liquid Permittivity (Meas.)	5.0	Normal	1	0.6	± 3.0 %	29
<b>Combined Standard Uncertainty</b>					± 11.7 %	
<b>Expanded Uncertainty (K=2)</b>					<b>± 23.4 %</b>	

Uncertainty budget for frequency range 300 MHz to 3 GHz



# FCC SAR Test Report

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Standard Uncertainty (1g)	Vi
<b>Measurement System</b>						
Probe Calibration	6.55	Normal	1	1	± 6.55 %	∞
Axial Isotropy	4.7	Rectangular	√3	0.7	± 1.9 %	∞
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	± 3.9 %	∞
Boundary Effects	2.0	Rectangular	√3	1	± 1.2 %	∞
Linearity	4.7	Rectangular	√3	1	± 2.7 %	∞
System Detection Limits	1.0	Rectangular	√3	1	± 0.6 %	∞
Readout Electronics	0.3	Normal	1	1	± 0.3 %	∞
Response Time	0.8	Rectangular	√3	1	± 0.5 %	∞
Integration Time	2.6	Rectangular	√3	1	± 1.5 %	∞
RF Ambient Noise	3.0	Rectangular	√3	1	± 1.7 %	∞
RF Ambient Reflections	3.0	Rectangular	√3	1	± 1.7 %	∞
Probe Positioner	0.8	Rectangular	√3	1	± 0.5 %	∞
Probe Positioning	9.9	Rectangular	√3	1	± 5.7 %	∞
Max. SAR Eval.	4.0	Rectangular	√3	1	± 2.3 %	∞
<b>Test Sample Related</b>						
Device Positioning	3.9	Normal	1	1	± 3.9 %	31
Device Holder	2.7	Normal	1	1	± 2.7 %	19
Power Drift	5.0	Rectangular	√3	1	± 2.9 %	∞
<b>Phantom and Setup</b>						
Phantom Uncertainty	4.0	Rectangular	√3	1	± 2.3 %	∞
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	± 1.8 %	∞
Liquid Conductivity (Meas.)	5.0	Normal	1	0.64	± 3.2 %	30
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	± 1.7 %	∞
Liquid Permittivity (Meas.)	5.0	Normal	1	0.6	± 3.0 %	30
<b>Combined Standard Uncertainty</b>					± 13.4 %	
<b>Expanded Uncertainty (K=2)</b>					<b>± 26.8 %</b>	

Uncertainty budget for frequency range 3 GHz to 6 GHz



## **7. Information on the Testing Laboratories**

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

Copies of accreditation and authorization certificates of our laboratories obtained from approval agencies can be downloaded from our web site. If you have any comments, please feel free to contact us at the following:

**Taiwan HwaYa EMC/RF/Safety/Telecom Lab:**

Add: No. 19, Hwa Ya 2nd Rd, Wen Hwa Vil., Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

Tel: 886-3-318-3232

Fax: 886-3-327-0892

**Taiwan LinKo EMC/RF Lab:**

Add: No. 47, 14th Ling, Chia Pau Vil., Linkou Dist., New Taipei City 244, Taiwan, R.O.C.

Tel: 886-2-2605-2180

Fax: 886-2-2605-1924

**Taiwan HsinChu EMC/RF Lab:**

Add: No. 81-1, Lu Liao Keng, 9<sup>th</sup> Ling, Wu Lung Vil., Chiung Lin Township, Hsinchu County 307, Taiwan, R.O.C.

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**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.adt.com.tw](http://www.adt.com.tw)

The road map of all our labs can be found in our web site also.

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