FCC SAR Test Report

APPLICANT	**:**	**Motorola Solutions, Inc.**
EQUIPMENT	**:**	**Enterprise Digital Assistant (EDA)**
BRAND NAME	**:**	**MOTOROLA**
MODEL NAME	**:**	**MC67NA**
FCC ID	**:**	**UZ7MC67NA**
STANDARD	**:**	**FCC 47 CFR Part 2 (2.1093)** **ANSI/IEEE C95.1-1992** **IEEE 1528-2003** **FCC OET Bulletin 65 Supplement C (Edition 01-01)**

The product was received on Jun. 19, 2012 and completely tested on Jul. 02, 2012. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai

Jones Tsai / Manager

ilac-MRA TAF Testing Laboratory 1190

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA221518-01	Rev. 01	Initial issue of report	Jul. 19, 2012

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Motorola Solutions, Inc. Enterprise Digital Assistant (EDA) MOTOROLA MC67NA** are as follows.

<Maximum Standalone SAR>

Band	Position	SAR_{1g} (W/kg)	Scaling SAR_{1g} (W/kg)
GSM850	Head	1.1	1.171
GSM1900	Head	0.483	0.594
WCDMA Band V	Head	1.12	1.298
WCDMA Band II	Head	1.25	1.267
WLAN2.4G	Head	0.427	0.481
WLAN5G	Head	0.903	1.004
GSM850	Body-worn (1.5 cm Gap)	1.05	1.259
GSM1900	Body-worn (1.5 cm Gap)	0.287	0.395
WCDMA Band V	Body-worn (1.5 cm Gap)	0.335	0.405
WCDMA Band II	Body-worn (1.5 cm Gap)	0.23	0.233
WLAN2.4G	Body-worn (1.5 cm Gap)	0.067	0.078
WLAN5G	Body-worn (1.5 cm Gap)	0.158	0.204
GSM850	Body-worn with Holster (0 cm Gap)	1.03	1.205
GSM1900	Body-worn with Holster (0 cm Gap)	0.228	0.32
WCDMA Band V	Body-worn with Holster (0 cm Gap)	0.296	0.344
WCDMA Band II	Body-worn with Holster (0 cm Gap)	0.195	0.198
WLAN2.4G	Body-worn with Holster (0 cm Gap)	0.086	0.099
WLAN5G	Body-worn with Holster (0 cm Gap)	0.074	0.097

<Maximum Simultaneous transmission SAR>

Band	Position	Multi Band SAR_{1g} (W/kg)
WCDMA Band V	Head	1.49
WLAN5G		

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2003 and FCC OET Bulletin 65 Supplement C (Edition 01-01).

2. Administration Data

2.1 Testing Laboratory

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978

2.2 Applicant

Company Name	Motorola Solutions, Inc.
Address	One Motorola Plaza, Holtsville, NY 11742-1300, U.S.A.

2.3 Manufacturer

Company Name	Motorola Solutions, Inc.
Address	One Motorola Plaza, Holtsville, NY 11742-1300, U.S.A.

2.4 Application Details

Date of Receipt of Application	Jun. 19, 2012
Date of Start during the Test	Jun. 19, 2012
Date of End during the Test	Jul. 02, 2012

3. General Information

3.1 Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT	Enterprise Digital Assistant (EDA)
Brand Name	MOTOROLA
Model Name	MC67NA
FCC ID	UZ7MC67NA
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/n: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5700 MHz; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz 802.11a/n: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5700 MHz; 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Maximum Average Output Power to Antenna	GSM850: 33.33 dBm GSM1900: 29.61 dBm WCDMA Band V: 23.86 dBm WCDMA Band II: 24.46 dBm 802.11b: 16.13 dBm 802.11g: 16.03 dBm 802.11n (BW 20MHz) (2.4GHz): 16.29 dBm 802.11a: 15.00 dBm 802.11n (BW 20MHz) (5GHz): 15.02 dBm Bluetooth: 3.91 dBm
Antenna Type	WWAN: Fixed Internal Antenna WLAN: Fixed Internal Antenna Bluetooth: Fixed Internal Antenna
HW Version	DV2
SW Version	01.21.0010 (RF Fusion Version : X_2.00.0.0.041E)
FW Version	2.28

Product Feature & Specification (cont.)	
Type of Modulation	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (Uplink) HSDPA: QPSK (Uplink) HSUPA: QPSK (Uplink) 802.11b: DSSS (BPSK / QPSK / CCK) 802.11a/g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth (1Mbps): GFSK Bluetooth EDR (2Mbps): π/4-DQPSK Bluetooth EDR (3Mbps): 8-DPSK
Dual Transfer Mode (DTM) Category	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Identical Prototype
Remark: 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description. 2. The DSD keypad PCB is the same as Numeric Keypad PCB, only difference is printed.	

Keypads	Cameras	Holsters
(1) Qwerty (2) Numeric (3) PIM	(1) With camera (2) Without camera	(2) Soft (3) Rigid

Note:
1. This device supports the option and combination of accessory listed as above.
2. The Rigid holster supports display-inward only, therefore only position Front available.

3.2 Product Photos

Please refer to Appendix D.

3.3 Applied Standards

The Specific Absorption Rate (SAR) testing specification, method and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2003
- FCC OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 447498 D01 v04
- FCC KDB 648474 D01 v01r05
- FCC KDB 941225 D01 v02
- FCC KDB 941225 D03 v01
- FCC KDB 248227 D01 v01r02

3.4 Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

3.5 Test Conditions

3.5.1. Ambient Condition

Ambient Temperature	20 to 24 ℃
Humidity	< 60 %

3.5.2. Test Configuration

The device was controlled by using a base station emulator. Communication between the device and the emulator was established by air link. The distance between the EUT and the 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 all tests.

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

For the complete description of the test plan reduction, please refer to "SAR Test Proposal" exhibit.

4. Specific Absorption Rate (SAR)

4.1 Introduction

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.

4.2 SAR Definition

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 (ρ). The equation description is as below:

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

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

SAR measurement can be either related to the temperature elevation in tissue by

$$\mathbf{SAR} = \mathbf{C}\left(\frac{\boldsymbol{\delta}\mathbf{T}}{\boldsymbol{\delta}\mathbf{t}}\right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

5. SAR Measurement System

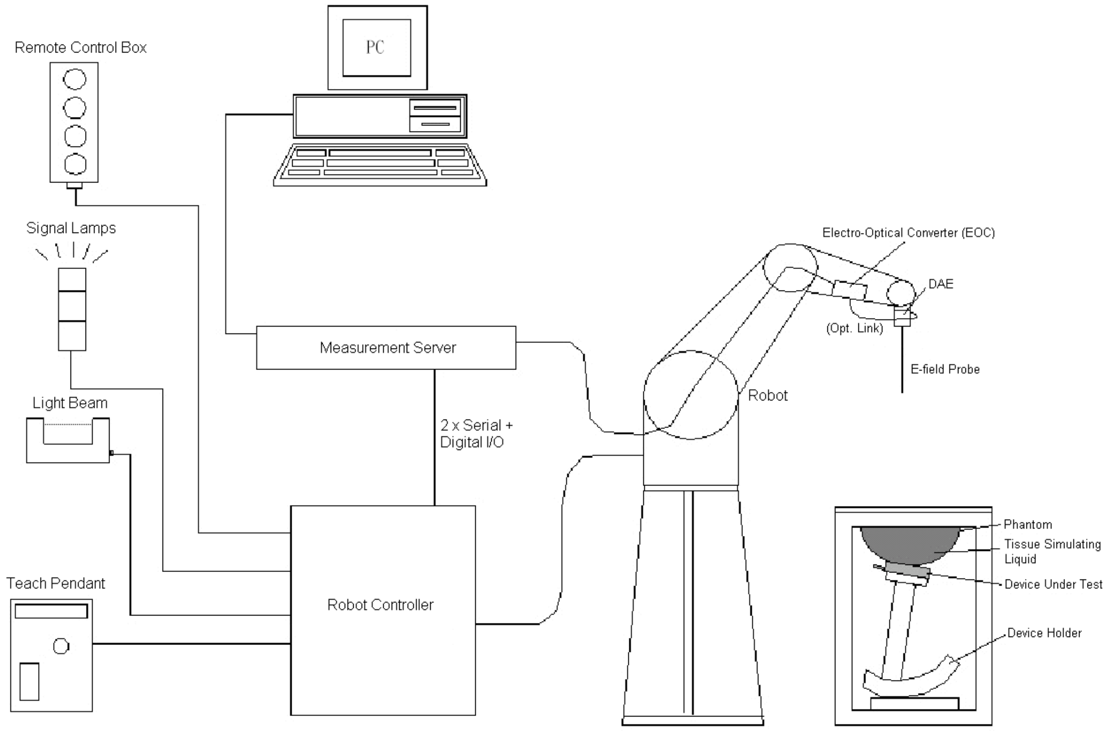


Fig 5.1 SPEAG DASY System Configurations

The DASY system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY software
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Some of the components are described in details in the following sub-sections.

5.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).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. This probe has a built in optical surface detection system to prevent from collision with phantom.

5.1.1. E-Field Probe Specification

<ET3DV6 / ET3DV6R Probe >

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz to 3 GHz; Linearity: ± 0.2 dB
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)
Dynamic Range	5 μW/g to 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 6.8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.7 mm

Fig 5.2 Photo of ET3DV6/ET3DV6R

<EX3DV4 / ES3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 μW/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 μW/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

Fig 5.3 Photo of EX3DV4/ES3DV4

5.1.2. E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy shall be evaluated and within ± 0.25 dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

5.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.
The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

Fig 5.4 Photo of DAE

5.3 Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90BL; DASY5: TX90XL) type 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 ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Fig 5.5 Photo of DASY4

Fig 5.6 Photo of DASY5

5.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY4: 166 MHz, Intel Pentium; DASY5: 400 MHz, Intel Celeron), chipdisk (DASY4: 32 MB; DASY5: 128 MB), RAM (DASY4: 64 MB, DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

Fig 5.7 Photo of Server for DASY4

Fig 5.8 Photo of Server for DASY5

5.5 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	 Fig 5.9 Photo of SAM Phantom
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, 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.

<ELI4 Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	 Fig 5.10 Photo of ELI4 Phantom
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

The ELI4 phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

5.6 Device Holder

<Device Holder for SAM Twin Phantom>

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY 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 DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε = 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.

Fig 5.11 Device Holder

<Laptop Extension Kit>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.

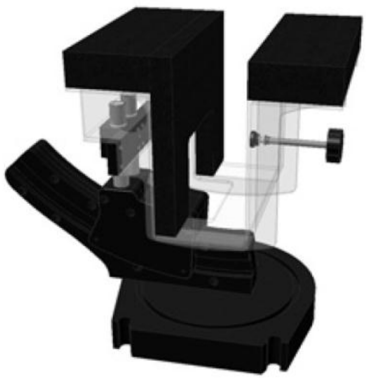


Fig 5.12 Laptop Extension Kit

5.7 Data Storage and Evaluation

5.7.1. Data Storage

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

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

5.7.2. Data Evaluation

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software：

Probe parameters：	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters：	- Frequency	f
	- Crest factor	cf
Media parameters：	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as：

$$\mathbf{V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}}$$

with V_i = compensated signal of channel i, (i = x, y, z)
U_i = input signal of channel i, (i = x, y, z)
cf = crest factor of exciting field (DASY parameter)
dcp_i = diode compression point (DASY parameter)

From the compensated input signals, the primary field data for each channel can be evaluated：

E-field Probes：$$\mathbf{E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}}$$

H-field Probes：$$\mathbf{H_i = \sqrt{V_i} \cdot \frac{a_{i0}+a_{i1}f+a_{i2}f^2}{f}}$$

with V_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$ = sensor sensitivity of channel i, (i = x, y, z), μV/(V/m)^2 for E-field Probes
ConvF = sensitivity enhancement in solution
a_{ij} = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
E_i = electric field strength of channel i in V/m
H_i = magnetic field strength of channel i in A/m

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

$$\mathbf{E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}}$$

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

$$\mathbf{SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}}$$

with SAR = local specific absorption rate in mW/g
E_{tot} = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

5.8 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Dosimetric E-Field Probe	ET3DV6	1787	May 29, 2012	May 28, 2013
SPEAG	Dosimetric E-Field Probe	EX3DV4	3819	Nov. 16, 2011	Nov. 15, 2012
SPEAG	835MHz System Validation Kit	D835V2	499	Mar. 22, 2010	Mar. 21, 2013
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Mar. 23, 2010	Mar. 22, 2013
SPEAG	2450MHz System Validation Kit	D2450V2	736	Jul. 25, 2011	Jul. 24, 2012
SPEAG	5GHz System Validation Kit	D5GHzV2	1006	Jan. 18, 2012	Jan. 17, 2013
SPEAG	Data Acquisition Electronics	DAE4	913	Dec. 23, 2011	Dec. 22, 2012
SPEAG	Data Acquisition Electronics	DAE4	1279	May 03, 2012	May 02, 2013
SPEAG	Device Holder	N/A	N/A	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1303	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1383	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1446	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1478	NCR	NCR
SPEAG	SAM Phantom	QD 000 P41 C	TP-1150	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 CD	TP-1644	NCR	NCR
SPEAG	SAM Phantom	SM 000 T01 DA	TP-1542	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BB	1026	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BA	1029	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 002 AA	TP-1127	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 002 AA	TP-1131	NCR	NCR
Agilent	Network Analyzer	E5071C	MY46101588	May 11, 2012	May 10, 2013
Agilent	ESG Vector Series Signal Generator	E4438C	MY49070755	Oct. 17, 2011	Oct. 16, 2012
Anritsu	Power Meter	ML2495A	0932001	Sep. 21, 2011	Sep. 20, 2012
Anritsu	Radio Communication Analyzer	MT8820C	6201074414	Dec. 21, 2011	Dec. 20, 2012
Agilent	Wireless Communication Test Set	E5515C	MY48360820	Jan. 05, 2012	Jan. 04, 2014
Agilent	Wireless Communication Test Set	E5515C	GB46311322	Mar. 23, 2011	Mar. 22, 2013
Agilent	Wireless Communication Test Set	E5515C	MY50264370	Apr. 19, 2011	Apr. 18, 2013
Agilent	Wireless Communication Test Set	E5515C	MY50266977	Nov. 13, 2011	Nov. 12, 2013
R&S	Universal Digital Radio communication Tester	CMU200	117995	Jul. 28, 2011	Jul. 27, 2012
R&S	Spectrum Analyzer	FSP7	101131	Jul. 29, 2011	Jul. 28, 2012

Table 5.1 Test Equipment List

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. Referring to KDB 450824 D02, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole D835V2, SN: 499, and D1900V2, SN: 5d041 can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

6. Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASY, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. 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, which is shown in Fig. 6.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 6.2.

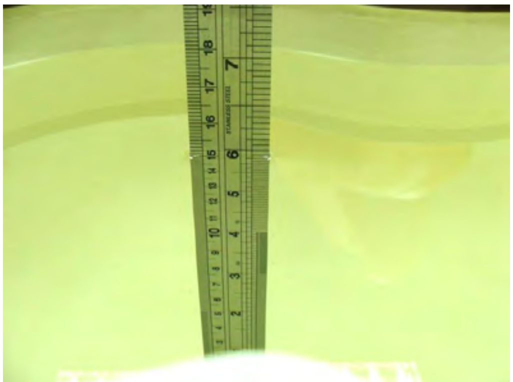


Fig 6.1 Photo of Liquid Height for Head SAR

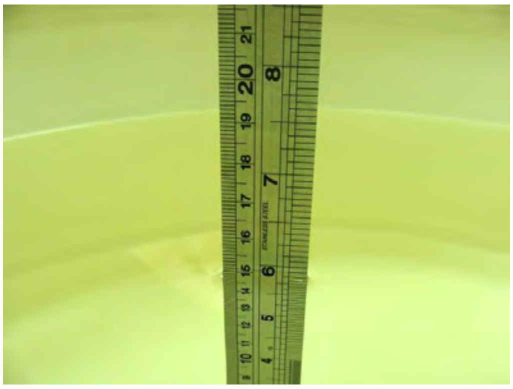


Fig 6.2 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ε_r)
For Head								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
For Body								
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7

Table 6.1 Recipes of Tissue Simulating Liquid

Simulating Liquid for 5G, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an Agilent 85070D Dielectric Probe Kit and an Agilent Network Analyzer.

<Standalone SAR liquid parameters>

Freq. (MHz)	Liquid Type	Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
835	Head	21.5	0.885	42	0.9	41.5	-1.67	1.20	±5	Jun. 19, 2012
835	Body	21.4	0.962	54.6	0.97	55.2	-0.82	-1.09	±5	Jun. 19, 2012
1900	Head	21.3	1.45	38.5	1.4	40	3.57	-3.75	±5	Jun. 19, 2012
1900	Head	21.5	1.43	39.2	1.4	40	2.14	-2.00	±5	Jun. 20, 2012
1900	Body	21.5	1.53	52	1.52	53.3	0.66	-2.44	±5	Jun. 20, 2012
2450	Head	21.4	1.83	39.4	1.8	39.2	1.67	0.51	±5	Jun. 28, 2012
2450	Body	21.4	2.02	53.9	1.95	52.7	3.59	2.28	±5	Jun. 28, 2012
5200	Head	21.5	4.81	35.5	4.66	36	3.22	-1.39	±5	Jun. 26, 2012
5200	Body	21.5	5.14	47.5	5.30	49.0	-3.02	-3.06	±5	Jun. 27, 2012
5200	Body	21.4	5.33	47.5	5.3	49	0.57	-3.06	±5	Jun. 29, 2012
5500	Head	21.5	5.14	35	4.96	35.6	3.63	-1.69	±5	Jun. 26, 2012
5500	Body	21.5	5.52	47	5.65	48.6	-2.30	-3.29	±5	Jun. 27, 2012
5500	Body	21.4	5.72	47	5.65	48.6	1.24	-3.29	±5	Jun. 29, 2012
5800	Head	21.5	5.42	34.3	5.27	35.3	2.85	-2.83	±5	Jun. 26, 2012
5800	Body	21.5	5.99	46.5	6.00	48.2	-0.17	-3.53	±5	Jun. 27, 2012
5800	Body	21.4	6.23	46.4	6	48.2	3.83	-3.73	±5	Jun. 29, 2012

<Volume Scan SAR liquid parameters >

Freq. (MHz)	Liquid Type	Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
835	Head	21.4	0.896	41.7	0.9	41.5	-0.44	0.48	±5	Jun. 30, 2012
835	Head	21.5	0.928	43	0.9	41.5	3.11	3.61	±5	Jul. 02, 2012
1900	Head	21.4	1.45	38.3	1.4	40	3.57	-4.25	±5	Jul. 02, 2012
5200	Head	21.3	4.78	35.3	4.66	36	2.58	-1.94	±5	Jun. 30, 2012
5500	Head	21.3	5.09	34.9	4.96	35.6	2.62	-1.97	±5	Jun. 30, 2012
5800	Head	21.3	5.37	34.3	5.27	35.3	1.90	-2.83	±5	Jun. 30, 2012

Table 6.2 Measuring Results for Simulating Liquid

7. Uncertainty Assessment

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience and knowledge of the behavior and properties of relevant materials and instruments, manufacture's specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in Table 7.1

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor[(a)]	1/k[(b)]	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Table 7.1 Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual "root-sum-squares" (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is showed in Table 7.2.

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.0	Normal	1	1	1	± 6.0 %	± 6.0 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.4	Rectangular	√3	1	1	± 0.2 %	± 0.2 %
Probe Positioning	2.9	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Max. SAR Eval.	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 11.0 %	± 10.8 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 22.0 %**	**± 21.5 %**

Table 7.2 Uncertainty Budget of DASY for frequency range 300 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.55	Normal	1	1	1	± 6.55 %	± 6.55 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Probe Positioning	9.9	Rectangular	√3	1	1	± 5.7 %	± 5.7 %
Max. SAR Eval.	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 12.8 %	± 12.6 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 25.6 %**	**± 25.2 %**

Table 7.3 Uncertainty Budget of DASY for frequency range 3 GHz to 6 GHz

8. SAR Measurement Evaluation

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

8.1 Purpose of System Performance check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

8.2 System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:

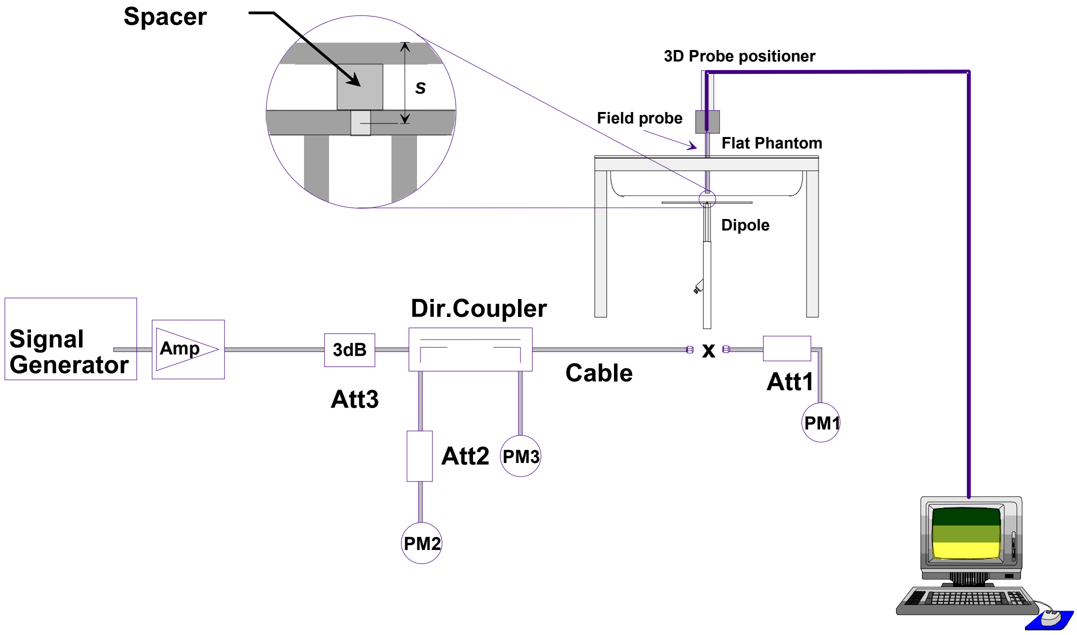


Fig 8.1 System Setup for System Evaluation

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. Calibrated Dipole

The output power on dipole port must be calibrated to 24 dBm (250 mW) before dipole is connected.

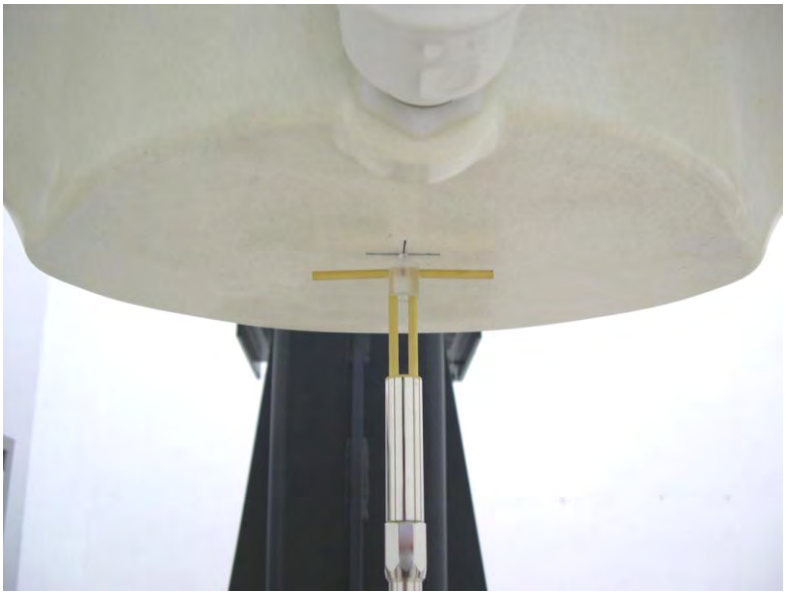


Fig 8.2 Photo of Dipole Setup

8.3 Validation Results

Comparing to the original SAR value provided by SPEAG, the validation data should be within its specification of 10 %. Table 8.1 shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

<Standalone SAR System check>

Measurement Date	Frequency (MHz)	Liquid Type	Targeted SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	Normalized SAR_{1g} (W/kg)	Deviation (%)
Jun. 19, 2012	835	Head	9.71	2.37	9.48	-2.37
Jun. 19, 2012	835	Body	9.82	2.6	10.40	5.91
Jun. 19, 2012	1900	Head	39.8	9.49	37.96	-4.62
Jun. 20, 2012	1900	Head	39.8	9.38	37.52	-5.73
Jun. 20, 2012	1900	Body	40	9.82	39.28	-1.80
Jun. 28, 2012	2450	Head	54.8	14.5	58.00	5.84
Jun. 28, 2012	2450	Body	52.3	12.2	48.80	-6.69
Jun. 26, 2012	5200	Head	79.2	21.2	84.80	7.07
Jun. 27, 2012	5200	Body	72.6	16.8	67.20	-7.44
Jun. 29, 2012	5200	Body	72.6	17.4	69.60	-4.13
Jun. 26, 2012	5500	Head	85.2	22.7	90.80	6.57
Jun. 27, 2012	5500	Body	78.8	18.6	74.40	-5.58
Jun. 29, 2012	5500	Body	78.8	18.4	73.60	-6.60
Jun. 26, 2012	5800	Head	79	21.3	85.20	7.85
Jun. 27, 2012	5800	Body	73.1	19.4	77.60	6.16
Jun. 29, 2012	5800	Body	73.1	17	68.00	-6.98

<Volume Scan SAR System check>

Measurement Date	Frequency (MHz)	Liquid Type	Targeted SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	Normalized SAR_{1g} (W/kg)	Deviation (%)
Jun. 30, 2012	835	Head	9.71	2.44	9.76	0.51
Jul. 02, 2012	835	Head	9.71	2.57	10.28	5.87
Jul. 02, 2012	1900	Head	39.8	10.2	40.80	2.51
Jun. 30, 2012	5200	Head	79.2	21.1	84.40	6.57
Jun. 30, 2012	5500	Head	85.2	22.4	89.60	5.16
Jun. 30, 2012	5800	Head	79	21.1	84.40	6.84

Table 8.1 Target and Measurement SAR after Normalized

9. EUT Testing Position

This EUT was tested in seven different positions. They are right cheek, right tilted, left cheek, left tilted, Front of the EUT with phantom 1.5 cm gap, and Back of the EUT with phantom 1.5 cm gap, Front of the EUT with holster with phantom 0 cm gap, as illustrated below:

9.1 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.

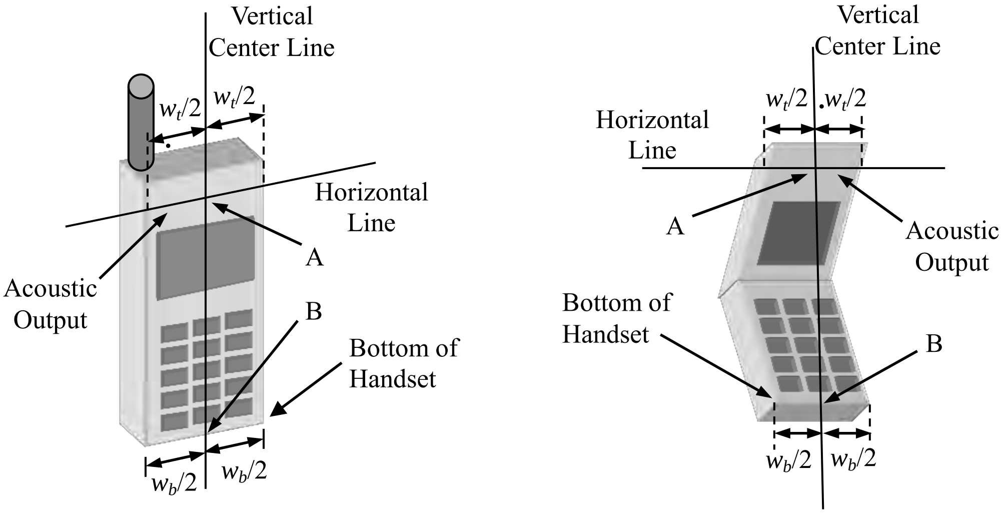


Fig 9.1 Illustration for Handset Vertical and Horizontal Reference Lines

9.2 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. 9.2).

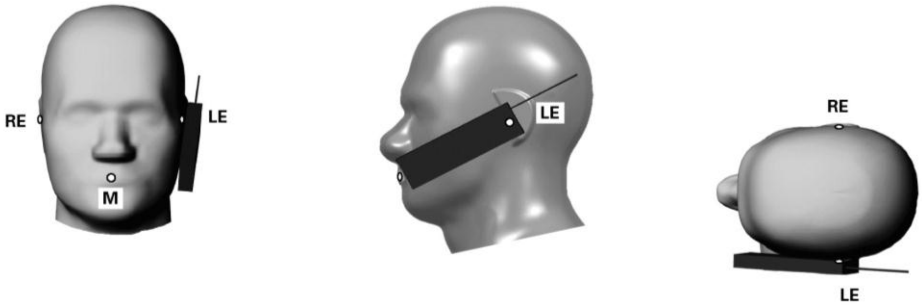


Fig 9.2 Illustration for Cheek Position

9.3 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. 9.3).

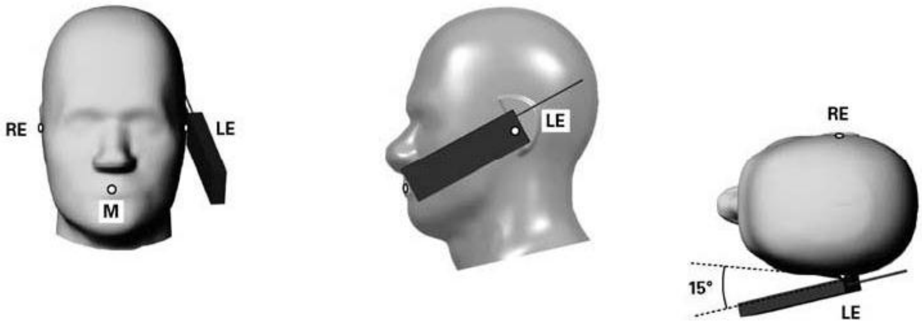


Fig 9.3 Illustration for Tilted Position

9.4 <u>Body Worn Position</u>

(a) To position the device parallel to the phantom surface with either keypad up or down.

(b) To adjust the device parallel to the flat phantom.

(c) To adjust the distance between the device surface and the flat phantom to 1.5 cm or holster surface and the flat phantom to 0 cm.

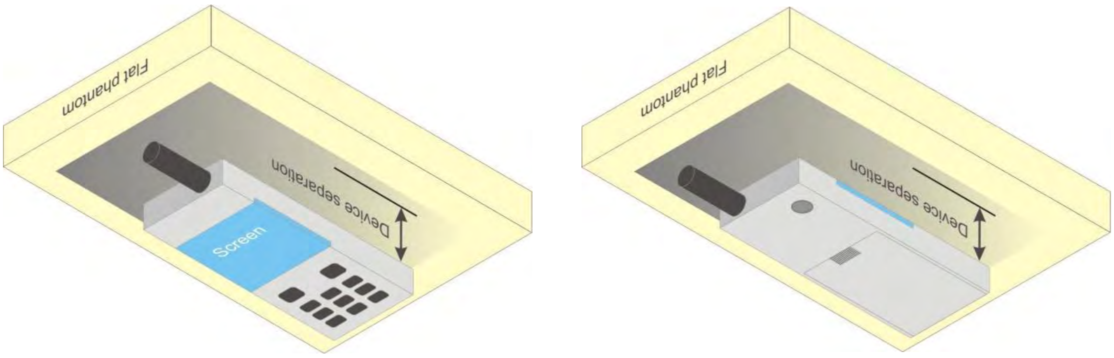


Fig 9.4 Illustration for Body Worn Position

<EUT Setup Photos>

Please refer to Appendix E for the test setup photos.

10. Measurement Procedures

The measurement procedures are as follows:

(a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the highest power channel.
(b) Keep EUT to radiate maximum output power or 100% duty factor (if applicable)
(c) Measure output power through RF cable and power meter.
(d) Place the EUT in the positions as Appendix E demonstrates.
(e) Set scan area, grid size and other setting on the DASY software.
(f) Measure SAR results for the highest power channel on each testing position.
(g) Find out the largest SAR result on these testing positions of each band
(h) Measure SAR results for other channels in worst SAR testing position if the SAR of highest power channel is larger than 0.8 W/kg

According to the 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

10.1 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 form 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

10.2 Area & Zoom Scan Procedures

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 300 MHz to 3 GHz, and 8x8x8 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

10.3 Volume Scan Procedures

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 (step-size is 4, 4 and 2.5 mm). When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

10.4 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.

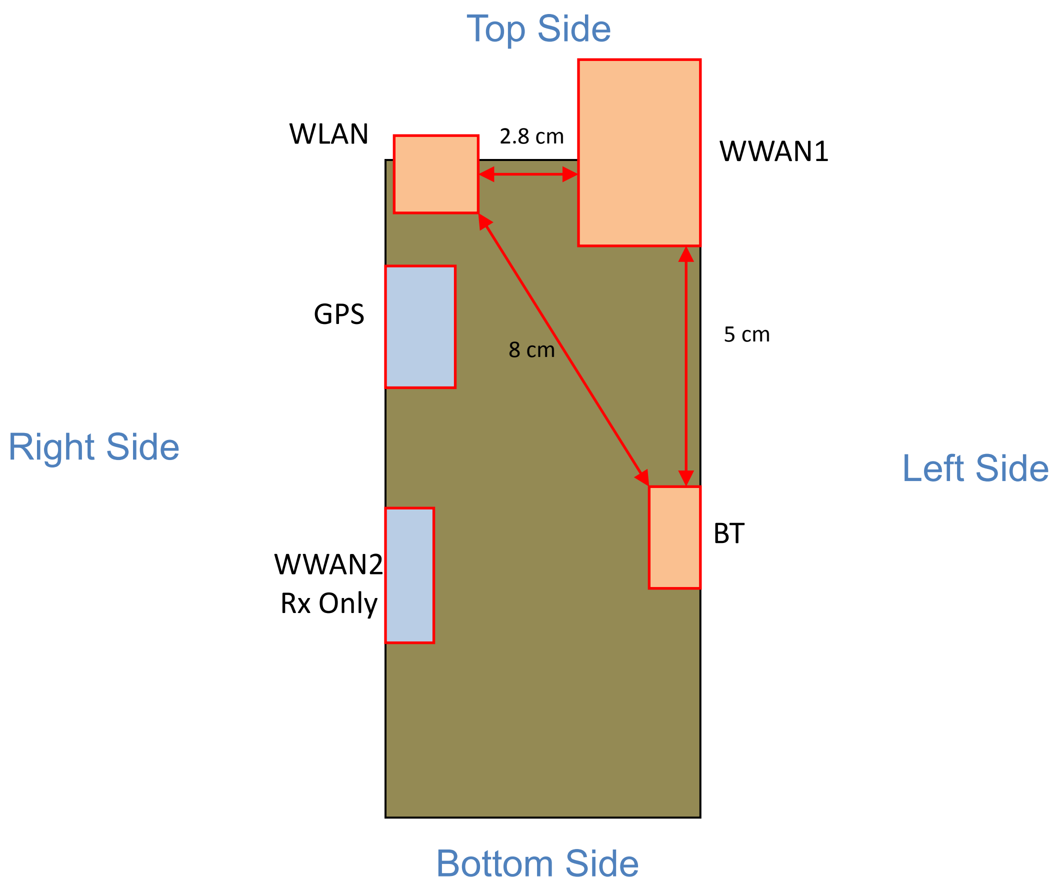
Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty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

10.5 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.

11. SAR Test Configurations

11.1 Exposure Positions Consideration



Back View

Antennas	Technology
WWAN1 (Tx/Rx)	GSM/GPRS/EDGE, Band 850+1900 WCDMA/HSPA, Band 850+1900
WWAN2 (Rx only)	GSM/GPRS/EDGE, Band 850+1900 WCDMA/HSPA, Band 850+1900
WLAN (Tx/Rx)	WLAN 2.4GHz/5GHz
BT (Tx/Rx)	Bluetooth
GPS (Rx only)	GPS receiving only

11.2 Simultaneous Transmitting Configurations

	Head			Body		
	Voice	Data	Simultaneous Transmitters	Voice	Data	Simultaneous Transmitters
GSM	Yes	No	802.11abgn	Yes	Yes	802.11abgn
GPRS	No	No	N/A	No	Yes Multi Slot Class12	802.11abgn
EGPRS	No	No	N/A	No	Yes Multi Slot Class12	802.11abgn
DTM	No	No	N/A	No	No	N/A
WCDMA (rel99)	Yes	No	802.11abgn	Yes	Yes	802.11abgn
HSPA(rel6)	No	No	N/A	No	Yes	802.11abgn
802.11abgn	Yes	No	GSM/WCDMA	Yes	Yes	GSM/GPRS/EGPRS/ WCDMA/HSPA

	Applicable Combination
Simultaneous Transmission	2G+WLAN
	2G+BT
	2G+WLAN+BT
	3G+WLAN
	3G+BT
	3G+WLAN+BT
	WLAN+BT

Note:

1. The GSM/GPRS/EDGE and UMTS share the same WWAN transmitting antenna, and GPRS/EDGE will not transmit simultaneously with UMTS.
2. 5 GHz and 2.4 GHz share the same antenna, and will not transmit simultaneously (the transmitting overlapping period will not exceed 30 seconds during AP searching/registration).
3. Per KDB 648474 D01, Bluetooth output power ≤ P_{Ref} and the distance to WWAN antenna ≥ 2.5cm, therefore, stand-alone SAR and simultaneous SAR are not required.
4. Per KDB 648474 D01, Bluetooth output power ≤ 60/f and the distance to WLAN antenna ≥ 5cm, therefore, stand-alone SAR and simultaneous SAR are not required.
5. The EUT do not support DTM function.

12. SAR Test Results

12.1 Conducted Power (Unit: dBm)

<GSM>

Burst Average Power						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM (1 Uplink)	33.18	33.15	33.23	29.60	29.57	29.60
GPRS 8 (1 Uplink) – CS1	33.20	33.18	33.27	29.60	29.58	29.61
GPRS 10 (2 Uplink) – CS1	33.06	33.03	33.15	29.46	29.42	29.46
GPRS 11 (3 Uplink) – CS1	33.07	32.99	33.06	29.35	29.27	29.25
GPRS 12 (4 Uplink) – CS1	32.74	32.71	32.82	29.11	29.03	29.05
EDGE 8 (GMSK, 1 Uplink) – MCS1	33.26	33.24	33.33	29.54	29.55	29.60
EDGE 10 (GMSK, 2 Uplink) – MCS1	33.11	33.09	33.20	29.43	29.39	29.42
EDGE 11 (GMSK, 3 Uplink) – MCS1	33.08	33.03	33.10	29.30	29.21	29.20
EDGE 12 (GMSK, 4 Uplink) – MCS1	32.67	32.65	32.75	29.08	29.01	29.03
EDGE 8 (8PSK, 1 Uplink) – MCS9	27.00	26.99	26.96	25.19	25.11	25.33
EDGE 10 (8PSK, 2 Uplink) – MCS9	26.90	26.87	26.84	25.08	24.96	25.20
EDGE 11 (8PSK, 3 Uplink) – MCS9	26.80	26.75	26.71	24.97	24.80	25.00
EDGE 12 (8PSK, 4 Uplink) – MCS9	26.63	26.61	26.56	24.76	24.62	24.83

Source-Based Time-Averaged Power						
Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM (1 Uplink)	24.18	24.15	24.23	20.60	20.57	20.60
GPRS 8 (1 Uplink) – CS1	24.20	24.18	24.27	20.60	20.58	20.61
GPRS 10 (2 Uplink) – CS1	27.06	27.03	27.15	23.46	23.42	23.46
GPRS 11 (3 Uplink) – CS1	28.81	28.73	28.80	25.09	25.01	24.99
GPRS 12 (4 Uplink) – CS1	29.74	29.71	29.82	26.11	26.03	26.05
EDGE 8 (GMSK, 1 Uplink) – MCS1	24.26	24.24	24.33	20.54	20.55	20.60
EDGE 10 (GMSK, 2 Uplink) – MCS1	27.11	27.09	27.20	23.43	23.39	23.42
EDGE 11 (GMSK, 3 Uplink) – MCS1	28.82	28.77	28.84	25.04	24.95	24.94
EDGE 12 (GMSK, 4 Uplink) – MCS1	29.67	29.65	29.75	26.08	26.01	26.03
EDGE 8 (8PSK, 1 Uplink) – MCS9	18.00	17.99	17.96	16.19	16.11	16.33
EDGE 10 (8PSK, 2 Uplink) – MCS9	20.90	20.87	20.84	19.08	18.96	19.20
EDGE 11 (8PSK, 3 Uplink) – MCS9	22.54	22.49	22.45	20.71	20.54	20.74
EDGE 12 (8PSK, 4 Uplink) – MCS9	23.63	23.61	23.56	21.76	21.62	21.83

Remark: The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots.
The calculated method are shown as below:
Source based time averaged power = Maximum burst averaged power (1 Uplink) - 9 dB
Source based time averaged power = Maximum burst averaged power (2 Uplink) - 6 dB
Source based time averaged power = Maximum burst averaged power (3 Uplink) - 4.26 dB
Source based time averaged power = Maximum burst averaged power (4 Uplink) - 3 dB

Note:

1. For Head SAR testing, GSM should be evaluated, therefore the EUT was set in GSM for GSM850 CH251 and set in GSM for GSM1900 CH512 due to its highest source-based time-average power.
2. For Body-worn SAR testing, GSM, GPRS, and EDGE should be evaluated; therefore the EUT was set in GPRS 12 for GSM850 CH251 and set in GPRS 12 for GSM1900 CH512 due to its highest source-based time-average power.
3. Per KDB 648474, the maximum output power channel is used for SAR testing and for further SAR test reduction.
4. WWAN VOIP is not supported.

<UMTS>

Band	WCDMA Band V			WCDMA Band II		
Channel	4132	4182	4233	9262	9400	9538
Frequency (MHz)	826.4	836.4	846.6	1852.4	1880.0	1907.6
AMR	23.66	23.74	23.50	24.37	24.39	24.38
RMC 12.2K	23.81	23.86	23.58	24.43	24.46	24.44
HSDPA Subtest-1	23.68	23.74	23.48	24.41	24.44	24.43
HSDPA Subtest-2	23.56	23.67	23.52	24.42	24.42	24.43
HSDPA Subtest-3	23.17	23.18	23.00	23.92	24.01	24.09
HSDPA Subtest-4	23.05	23.17	23.02	24.01	23.98	24.11
HSUPA Subtest-1	22.69	23.30	23.08	23.52	24.19	24.16
HSUPA Subtest-2	21.63	22.06	21.80	22.77	22.69	22.67
HSUPA Subtest-3	22.28	22.39	22.10	22.90	22.87	23.23
HSUPA Subtest-4	21.98	22.21	21.91	22.90	22.87	22.85
HSUPA Subtest-5	23.35	22.92	22.61	23.45	24.41	24.27

MPR							
3GPP Requirement		WCDMA band V			WCDMA band II		
0	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00
0	HSDPA Subtest-2	0.12	0.07	-0.04	-0.01	0.02	0.00
0.5	HSDPA Subtest-3	0.51	0.56	0.48	0.49	0.43	0.34
0.5	HSDPA Subtest-4	0.63	0.57	0.46	0.40	0.46	0.32
0	HSUPA Subtest-1	0.66	-0.38	-0.47	-0.07	0.22	0.11
2	HSUPA Subtest-2	1.72	0.86	0.81	0.68	1.72	1.60
1	HSUPA Subtest-3	1.07	0.53	0.51	0.55	1.54	1.04
2	HSUPA Subtest-4	1.37	0.71	0.70	0.55	1.54	1.42
0	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00

Note:

1. For Head SAR, per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If AMR 12.2kbps power is < 1/4 dB higher than RMC, SAR tests with AMR 12.2kbps can be excluded.
2. For Body-worn SAR, per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSPDA subset-1 and HSUPA subset-5 output power is < 1/4 dB higher than RMC, HSDPA and HSUPA SAR evaluation can be excluded.
3. EUT is declared to follow the MPR of 3GPP Table 5.2B.1 specification, and the specification will set during the production. Since there is tolerance in measuring 3G output power, the difference between the measured value and the specification is treated as tolerance. According to KDB 941225 D02 v02, 1)b), the MPR implementation information is provided here.
4. For SAR testing, WCDMA V and WCDMA II should be evaluated, therefore the EUT was set in WCDMA V CH4182 and set in WCDMA II CH9400 due to its highest average power

<WLAN 2.4GHz>

WLAN 2.4G 802.11b Average Power (dBm)						
Power vs Channel			Power vs Data Rate			
Channel	Frequency (MHz)	Data Rate (bps) 1M	Channel	Data Rate (bps) 2M	5.5M	11M
CH 01	2412	15.22	CH 11	15.72	15.82	15.87
CH 06	2437	16.01				
CH 11	2462	**16.13**				

WLAN 2.4G 802.11g Average Power (dBm)										
Power vs Channel			Power vs Data Rate							
Channel	Frequency (MHz)	Data Rate (bps) 6M	Channel	Data Rate (bps) 9M	12M	18M	24M	36M	48M	54M
CH 01	2412	13.11	CH 06	16.02	16.00	15.99	15.97	15.90	15.89	15.86
CH 06	2437	**16.03**								
CH 11	2462	14.02								

WLAN 2.4G 802.11n (BW 20MHz) Average Power (dBm)										
Power vs Channel			Power vs Data Rate							
Channel	Frequency (MHz)	Data Rate (bps) MCS0	Channel	Data Rate (bps) MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412	15.33	CH 06	16.27	16.25	16.21	16.28	16.20	16.16	16.23
CH 06	2437	**16.29**								
CH 11	2462	12.48								

Note:

1. Per KDB 248227, choose the highest output power channel to test SAR and determine further SAR exclusion
2. Per KDB 248227, 11g and 11n average output power is less than 1/4 dB higher than 11b mode, thus the SAR can be excluded.
3. For each frequency band, testing at higher data rates and higher order modulations is not requirement when the maximum average output power for each of these configurations is less than 1/4 dB higher than those measured at the lowest data rate.

<WLAN 5GHz>

WLAN 5G 802.11a Average Power (dBm)										
Power vs Channel			Power vs Data Rate							
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)						
		6M		9M	12M	18M	24M	36M	48M	54M
CH 36	5180	11.81	CH 44	11.82	11.84	11.84	11.84	11.83	11.72	11.53
CH 40	5200	11.37								
CH 44	5220	**11.85**								
CH 48	5240	11.81								
CH 52	5260	**13.29**	CH 52	13.25	13.28	13.17	13.28	13.28	13.28	13.27
CH 56	5280	12.71								
CH 60	5300	13.05								
CH 64	5320	13.14								
CH 100	5500	12.78	CH 140	13.60	13.59	13.58	13.64	13.00	13.76	13.73
CH 104	5520	13.02								
CH 108	5540	12.89								
CH 112	5560	12.85								
CH 116	5580	12.59								
CH 132	5660	12.92								
CH 136	5680	12.93								
CH 140	5700	**13.78**								
CH 149	5745	14.72	CH 161	14.96	14.94	14.92	14.87	14.90	14.88	14.86
CH 153	5765	14.88								
CH 157	5785	14.36								
CH 161	5805	**15.00**								
CH 165	5825	14.28								

WLAN 5G 802.11n (BW 20M) Average Power (dBm)										
Power vs Channel			Power vs Data Rate							
Channel	Frequency (MHz)	Data Rate (bps)	Channel	Data Rate (bps)						
		MCS0		MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 36	5180	11.32	CH 48	11.41	11.41	11.46	11.47	11.44	11.45	11.47
CH 40	5200	11.21								
CH 44	5220	11.32								
CH 48	5240	**11.48**								
CH 52	5260	**13.31**	CH 52	13.28	13.28	13.29	13.3	13.3	13.28	13.28
CH 56	5280	12.89								
CH 60	5300	12.85								
CH 64	5320	12.41								
CH 100	5500	12.78	CH 116	12.78	12.81	12.81	12.8	12.81	12.8	12.8
CH 104	5520	12.31								
CH 108	5540	12.31								
CH 112	5560	12.23								
CH 116	5580	**12.82**								
CH 132	5660	10.65								
CH 136	5680	10.53								
CH 140	5700	11.03								
CH 149	5745	**15.02**	CH 149	14.71	14.69	14.56	14.61	14.45	14.5	14.52
CH 153	5765	14.59								
CH 157	5785	15.01								
CH 161	5805	14.89								
CH 165	5825	14.99								

Note:

1. Per KDB 248227, choose the highest output power channel to test SAR and determine further SAR exclusion
2. Per KDB 248227, 11n(20M) 5180 MHz ~ 5240MHz output power is less than 1/4 dB higher than 11a 5180 MHz ~ 5240MHz mode, thus the SAR can be excluded. therefore the EUT was set in 11a CH44 due to its highest average power
3. Per KDB 248227, 11n(20M) 5260 MHz ~ 5320MHz output power is less than 1/4 dB higher than 11a 5260 MHz ~ 5320 MHz, thus the SAR can be excluded. therefore the EUT was set in 11a CH52 due to its highest average power
4. Per KDB 248227, 11n(20M) 5500 MHz ~ 5700MHz output power is less than 1/4 dB higher than 11a 5500 MHz ~ 5700 MHz, thus the SAR can be excluded. therefore the EUT was set in 11a CH140 due to its highest average power
5. Per KDB 248227, 11n(20M) 5745 MHz ~ 5825MHz output power is less than 1/4 dB higher than 11a 5745 MHz ~ 5825 MHz, thus the SAR can be excluded. therefore the EUT was set in 11a CH161 due to its highest average power
6. EUT will not operating in the exclusion band 5600~5650 MHz, therefore those channels will not be considered in SAR test evaluation.
7. For each frequency band, testing at higher data rates and higher order modulations is not requirement when the maximum average output power for each of these configurations is less than 1/4 dB higher than those measured at the lowest data rate.

<Bluetooth>

Band	Bluetooth		
Channel	0	39	78
Frequency	2402	2441	2480
Average Power	3.74	3.91	3.73

12.2 Test Records for Head SAR Test

Definition of each configuration code summary here.

Keypads	Cameras	Holsters
(1) Qwerty (2) Numeric (3) PIM	(1) With camera (2) Without camera	(2) Soft (3) Rigid

<WWAN>

Plot No.	Band	Mode	Test Position	Ch.	Conducted Power	Keypad	Camera	Tune-up limit	SAR_{1g} (W/kg)	SAR_{10g} (W/kg)	Scaling factor	$Scaled_{1g}$ SAR
1	GSM850	GSM	Right Cheek	251	33.23	1	1	33.5	1.08	0.735	1.064	1.149
2	GSM850	GSM	Right Tilted	251	33.23	1	1	33.5	1.07	0.641	1.064	1.139
3	GSM850	GSM	Left Cheek	251	33.23	1	1	33.5	0.943	0.698	1.064	1.003
4	GSM850	GSM	Left Tilted	251	33.23	1	1	33.5	0.978	0.68	1.064	1.041
27	GSM850	GSM	Right Tilted	251	33.23	2	1	33.5	0.905	0.564	1.064	0.963
28	GSM850	GSM	Right Tilted	251	33.23	3	1	33.5	0.905	0.561	1.064	0.963
46	GSM850	GSM	Right Tilted	251	33.23	1	2	33.5	1.1	0.665	1.064	**1.171**
47	GSM850	GSM	Right Tilted	128	33.18	1	2	33.5	1.01	0.631	1.076	1.087
48	GSM850	GSM	Right Tilted	189	33.15	1	2	33.5	1.04	0.636	1.084	1.127
9	GSM1900	GSM	Right Cheek	512	29.6	1	1	30.5	0.343	0.201	1.230	0.422
10	GSM1900	GSM	Right Tilted	512	29.6	1	1	30.5	0.413	0.238	1.230	0.508
11	GSM1900	GSM	Left Cheek	512	29.6	1	1	30.5	0.211	0.138	1.230	0.260
12	GSM1900	GSM	Left Tilted	512	29.6	1	1	30.5	0.244	0.156	1.230	0.300
25	GSM1900	GSM	Right Tilted	512	29.6	2	1	30.5	0.423	0.242	1.230	0.520
26	GSM1900	GSM	Right Tilted	512	29.6	3	1	30.5	0.431	0.247	1.230	0.530
78	GSM1900	GSM	Right Tilted	512	29.6	1	2	30.5	0.483	0.268	1.230	**0.594**
79	GSM1900	GSM	Right Tilted	661	29.57	1	2	30.5	0.393	0.223	1.239	0.487
80	GSM1900	GSM	Right Tilted	810	29.6	1	2	30.5	0.429	0.242	1.230	0.528
5	WCDMA V	RMC 12.2K	Right Cheek	4182	23.86	1	1	24.5	1.04	0.724	1.159	1.205
6	WCDMA V	RMC 12.2K	Right Tilted	4182	23.86	1	1	24.5	1.12	0.672	1.159	**1.298**
7	WCDMA V	RMC 12.2K	Left Cheek	4182	23.86	1	1	24.5	0.946	0.698	1.159	1.096
8	WCDMA V	RMC 12.2K	Left Tilted	4182	23.86	1	1	24.5	0.85	0.599	1.159	0.985
29	WCDMA V	RMC 12.2K	Right Tilted	4182	23.86	2	1	24.5	0.982	0.619	1.159	1.138
30	WCDMA V	RMC 12.2K	Right Tilted	4182	23.86	3	1	24.5	0.963	0.596	1.159	1.116
49	WCDMA V	RMC 12.2K	Right Tilted	4182	23.86	1	2	24.5	0.993	0.638	1.159	1.151
50	WCDMA V	RMC 12.2K	Right Tilted	4132	23.81	1	2	24.5	0.965	0.628	1.172	1.131
51	WCDMA V	RMC 12.2K	Right Tilted	4233	23.58	1	2	24.5	0.975	0.625	1.236	1.205
19	WCDMA II	RMC 12.2K	Right Cheek	9400	24.46	1	1	24.5	0.93	0.542	1.009	0.939
20	WCDMA II	RMC 12.2K	Right Tilted	9400	24.46	1	1	24.5	1.19	0.673	1.009	1.201
21	WCDMA II	RMC 12.2K	Left Cheek	9400	24.46	1	1	24.5	0.642	0.411	1.009	0.648
22	WCDMA II	RMC 12.2K	Left Tilted	9400	24.46	1	1	24.5	0.718	0.449	1.009	0.725
23	WCDMA II	RMC 12.2K	Right Tilted	9400	24.46	2	1	24.5	1.18	0.674	1.009	1.191
24	WCDMA II	RMC 12.2K	Right Tilted	9400	24.46	3	1	24.5	1.14	0.647	1.009	1.151
77	WCDMA II	RMC 12.2K	Right Tilted	9400	24.46	1	2	24.5	1.19	0.678	1.009	1.201
81	WCDMA II	RMC 12.2K	Right Tilted	9262	24.43	1	2	24.5	1.06	0.61	1.016	1.077
82	WCDMA II	RMC 12.2K	Right Tilted	9538	24.44	1	2	24.5	1.25	0.704	1.014	**1.267**

<WLAN>

Plot No.	Band	Mode	Test Position	Ch.	Conducted Power	Keypad	Camera	Tune-up limit	SAR_{1g} (W/kg)	SAR_{10g} (W/kg)	Scaling factor	$Scaled_{1g}$ SAR
135	WLAN2.4G	802.11b	Right Cheek	11	16.13	1	1	16.49	0.243	0.125	1.112	0.270
136	WLAN2.4G	802.11b	Right Tilted	11	16.13	1	1	16.49	0.258	0.132	1.112	0.287
137	WLAN2.4G	802.11b	Left Cheek	11	16.13	1	1	16.49	0.399	0.2	1.112	0.444
138	WLAN2.4G	802.11b	Left Tilted	11	16.13	1	1	16.49	0.411	0.199	1.112	0.457
139	WLAN2.4G	802.11b	Left Tilted	11	16.13	2	1	16.49	0.387	0.19	1.112	0.430
140	WLAN2.4G	802.11b	Left Tilted	11	16.13	3	1	16.49	0.408	0.199	1.112	0.454
141	WLAN2.4G	802.11b	Left Tilted	11	16.03	1	2	16.49	0.412	0.2	1.112	0.458
142	WLAN2.4G	802.11b	Left Tilted	1	15.22	1	2	16.49	0.359	0.178	1.340	0.481
143	WLAN2.4G	802.11b	Left Tilted	6	16.01	1	2	16.49	0.427	0.211	1.117	0.477
151	WLAN2.4G	802.11b	Right Tilted	1	15.22	1	2	16.49	0.24	0.13	1.340	0.322
152	WLAN2.4G	802.11b	Right Tilted	6	16.01	1	2	16.49	0.271	0.14	1.117	0.303
153	WLAN2.4G	802.11b	Right Tilted	11	16.13	1	2	16.49	0.251	0.129	1.112	0.279
89	WLAN5G	802.11a	Right Cheek	44	11.85	1	1	12.01	0.288	0.101	1.038	0.299
90	WLAN5G	802.11a	Right Tilted	44	11.85	1	1	12.01	0.39	0.14	1.038	0.405
91	WLAN5G	802.11a	Left Cheek	44	11.85	1	1	12.01	0.229	0.091	1.038	0.238
92	WLAN5G	802.11a	Left Tilted	44	11.85	1	1	12.01	0.301	0.122	1.038	0.312
93	WLAN5G	802.11a	Right Tilted	44	11.85	2	1	12.01	0.394	0.153	1.038	0.409
94	WLAN5G	802.11a	Right Tilted	44	11.85	3	1	12.01	0.397	0.149	1.038	0.412
95	WLAN5G	802.11a	Right Tilted	44	11.85	1	2	12.01	0.41	0.153	1.038	0.425
96	WLAN5G	802.11a	Right Tilted	36	11.81	1	2	12.01	0.402	0.152	1.047	0.421
97	WLAN5G	802.11a	Right Cheek	52	13.29	1	1	13.37	0.42	0.152	1.019	0.428
98	WLAN5G	802.11a	Right Tilted	52	13.29	1	1	13.37	0.556	0.21	1.019	0.566
99	WLAN5G	802.11a	Left Cheek	52	13.29	1	1	13.37	0.318	0.127	1.019	0.324
100	WLAN5G	802.11a	Left Tilted	52	13.29	1	1	13.37	0.407	0.163	1.019	0.415
101	WLAN5G	802.11a	Right Tilted	52	13.29	2	1	13.37	0.633	0.248	1.019	0.645
102	WLAN5G	802.11a	Right Tilted	52	13.29	3	1	13.37	0.621	0.24	1.019	0.633
103	WLAN5G	802.11a	Right Tilted	52	13.29	1	2	13.37	0.649	0.25	1.019	0.661
104	WLAN5G	802.11a	Right Tilted	64	13.14	1	2	13.37	0.586	0.223	1.054	0.618
129	WLAN5G	802.11a	Right Cheek	140	13.78	1	1	13.78	0.582	0.183	1.000	0.582
130	WLAN5G	802.11a	Right Tilted	140	13.78	1	1	13.78	0.666	0.229	1.000	0.666
131	WLAN5G	802.11a	Left Cheek	140	13.78	1	1	13.78	0.468	0.166	1.000	0.468
132	WLAN5G	802.11a	Left Tilted	140	13.78	1	1	13.78	0.474	0.173	1.000	0.474
133	WLAN5G	802.11a	Right Tilted	140	13.78	2	1	13.78	0.665	0.227	1.000	0.665
134	WLAN5G	802.11a	Right Tilted	140	13.78	3	1	13.78	0.589	0.204	1.000	0.589
159	WLAN5G	802.11a	Right Tilted	140	13.78	1	2	13.78	0.692	0.226	1.000	0.692
160	WLAN5G	802.11a	Right Tilted	104	13.02	1	2	13.78	0.702	0.244	1.191	0.836
161	WLAN5G	802.11a	Right Tilted	116	12.59	1	2	13.78	0.763	0.259	1.315	1.004
105	WLAN5G	802.11a	Right Cheek	161	15	1	1	15.19	0.821	0.256	1.045	0.858
106	WLAN5G	802.11a	Right Tilted	161	15	1	1	15.19	0.844	0.267	1.045	0.882
107	WLAN5G	802.11a	Left Cheek	161	15	1	1	15.19	0.639	0.215	1.045	0.668
108	WLAN5G	802.11a	Left Tilted	161	15	1	1	15.19	0.63	0.228	1.045	0.658
109	WLAN5G	802.11a	Right Tilted	161	15	2	1	15.19	0.768	0.249	1.045	0.802
110	WLAN5G	802.11a	Right Tilted	161	15	3	1	15.19	0.768	0.25	1.045	0.802
111	WLAN5G	802.11a	Right Tilted	161	15	1	2	15.19	0.903	0.277	1.045	0.943
112	WLAN5G	802.11a	Right Tilted	149	14.72	1	2	15.19	0.901	0.289	1.045	0.941

12.3 Test Records for Body-worn SAR Test

<WWAN>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Conducted Power	Keypad	Camera	Holster	Tune-up limit	SAR_{1g} (W/kg)	SAR_{10g} (W/kg)	Scaling factor	$Scaled_{1g}$ SAR
13	GSM850	GPRS12	Front	1.5	251	32.82	1	1	-	33.5	1.03	0.777	1.169	1.205
14	GSM850	GPRS12	Back	1.5	251	32.82	1	1	-	33.5	0.721	0.535	1.169	0.843
33	GSM850	GPRS12	Front	1.5	251	32.82	2	1	-	33.5	1.02	0.773	1.169	1.193
34	GSM850	GPRS12	Front	1.5	251	32.82	3	1	-	33.5	0.98	0.743	1.169	1.146
61	GSM850	GPRS12	Front	1.5	251	32.82	1	2	-	33.5	1.05	0.799	1.169	1.228
62	GSM850	GPRS12	Front	1.5	128	32.74	1	2	-	33.5	0.95	0.719	1.191	1.132
63	GSM850	GPRS12	Front	1.5	189	32.71	1	2	-	33.5	1.05	0.798	1.199	**1.259**
64	GSM850	GPRS12	Front	0	251	32.82	1	2	Soft	33.5	1.03	0.778	1.169	1.205
65	GSM850	GPRS12	Front	0	128	32.74	1	2	Soft	33.5	0.888	0.679	1.191	1.058
66	GSM850	GPRS12	Front	0	189	32.71	1	2	Soft	33.5	0.874	0.666	1.199	1.048
67	GSM850	GPRS12	Front	0	251	32.82	1	2	Rigid	33.5	0.706	0.503	1.169	0.826
68	GSM850	GPRS12	Front	0	128	32.74	1	2	Rigid	33.5	0.637	0.459	1.191	0.759
69	GSM850	GPRS12	Front	0	189	32.71	1	2	Rigid	33.5	0.702	0.503	1.199	0.842
17	GSM1900	GPRS12	Front	1.5	512	29.11	1	1	-	30.5	0.279	0.18	1.377	0.384
18	GSM1900	GPRS12	Back	1.5	512	29.11	1	1	-	30.5	0.268	0.175	1.377	0.369
35	GSM1900	GPRS12	Front	1.5	512	29.11	2	1	-	30.5	0.28	0.19	1.377	0.386
36	GSM1900	GPRS12	Front	1.5	512	29.11	3	1	-	30.5	0.283	0.186	1.377	0.390
37	GSM1900	GPRS12	Front	1.5	512	29.11	1	2	-	30.5	0.287	0.194	1.377	**0.395**
38	GSM1900	GPRS12	Front	1.5	661	29.03	1	2	-	30.5	0.265	0.176	1.403	0.372
39	GSM1900	GPRS12	Front	1.5	810	29.05	1	2	-	30.5	0.214	0.141	1.396	0.299
40	GSM1900	GPRS12	Front	0	512	29.11	1	2	Soft	30.5	0.218	0.149	1.377	0.300
41	GSM1900	GPRS12	Front	0	661	29.03	1	2	Soft	30.5	0.228	0.142	1.403	0.320
42	GSM1900	GPRS12	Front	0	810	29.05	1	2	Soft	30.5	0.185	0.122	1.396	0.258
43	GSM1900	GPRS12	Front	0	512	29.11	1	2	Rigid	30.5	0.225	0.14	1.377	0.310
44	GSM1900	GPRS12	Front	0	661	29.03	1	2	Rigid	30.5	0.211	0.131	1.403	0.296
45	GSM1900	GPRS12	Front	0	810	29.05	1	2	Rigid	30.5	0.178	0.111	1.396	0.249

<WWAN>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Conducted Power	Keypad	Camera	Holster	Tune-up limit	SAR_{1g} (W/kg)	SAR_{10g} (W/kg)	Scaling factor	$Scaled_{1g}$ SAR
15	WCDMA V	RMC12.2K	Front	1.5	4182	23.86	1	1	-	24.5	0.309	0.233	1.159	0.358
16	WCDMA V	RMC12.2K	Back	1.5	4182	23.86	1	1	-	24.5	0.268	0.203	1.159	0.311
31	WCDMA V	RMC12.2K	Front	1.5	4182	23.86	2	1	-	24.5	0.326	0.248	1.159	0.378
32	WCDMA V	RMC12.2K	Front	1.5	4182	23.86	3	1	-	24.5	0.318	0.242	1.159	0.368
52	WCDMA V	RMC12.2K	Front	1.5	4182	23.86	1	2	-	24.5	0.335	0.257	1.159	0.388
53	WCDMA V	RMC12.2K	Front	1.5	4132	23.81	1	2	-	24.5	0.308	0.235	1.172	0.361
54	WCDMA V	RMC12.2K	Front	1.5	4233	23.58	1	2	-	24.5	0.328	0.251	1.236	**0.405**
55	WCDMA V	RMC12.2K	Front	0	4182	23.86	1	2	Soft	24.5	0.296	0.225	1.159	0.343
56	WCDMA V	RMC12.2K	Front	0	4132	23.81	1	2	Soft	24.5	0.258	0.197	1.172	0.302
57	WCDMA V	RMC12.2K	Front	0	4233	23.58	1	2	Soft	24.5	0.278	0.211	1.236	0.344
58	WCDMA V	RMC12.2K	Front	0	4182	23.86	1	2	Rigid	24.5	0.239	0.174	1.159	0.277
59	WCDMA V	RMC12.2K	Front	0	4132	23.81	1	2	Rigid	24.5	0.218	0.159	1.172	0.256
60	WCDMA V	RMC12.2K	Front	0	4233	23.58	1	2	Rigid	24.5	0.226	0.163	1.236	0.279
70	WCDMA II	RMC12.2K	Front	1.5	9400	24.46	1	1	-	24.5	0.195	0.13	1.009	0.197
71	WCDMA II	RMC12.2K	Back	1.5	9400	24.46	1	1	-	24.5	0.194	0.126	1.009	0.196
72	WCDMA II	RMC12.2K	Front	1.5	9400	24.46	2	1	-	24.5	0.191	0.126	1.009	0.193
73	WCDMA II	RMC12.2K	Front	1.5	9400	24.46	3	1	-	24.5	0.195	0.129	1.009	0.197
74	WCDMA II	RMC12.2K	Front	1.5	9400	24.46	1	2	-	24.5	0.205	0.136	1.009	0.207
83	WCDMA II	RMC12.2K	Front	1.5	9262	24.43	1	2	-	24.5	0.189	0.128	1.016	0.192
84	WCDMA II	RMC12.2K	Front	1.5	9538	24.44	1	2	-	24.5	0.23	0.151	1.014	**0.233**
75	WCDMA II	RMC12.2K	Front	0	9400	24.46	1	2	Soft	24.5	0.183	0.12	1.009	0.185
85	WCDMA II	RMC12.2K	Front	0	9262	24.43	1	2	Soft	24.5	0.145	0.096	1.016	0.147
86	WCDMA II	RMC12.2K	Front	0	9538	24.44	1	2	Soft	24.5	0.173	0.115	1.014	0.175
76	WCDMA II	RMC12.2K	Front	0	9400	24.46	1	2	Rigid	24.5	0.184	0.114	1.009	0.186
87	WCDMA II	RMC12.2K	Front	0	9262	24.43	1	2	Rigid	24.5	0.195	0.12	1.016	0.198
88	WCDMA II	RMC12.2K	Front	0	9538	24.44	1	2	Rigid	24.5	0.186	0.114	1.014	0.189

<WLAN>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Conducted Power	Keypad	Camera	Holster	Tune-up limit	SAR_{1g} (W/kg)	SAR_{10g} (W/kg)	Scaling factor	$Scaled_{1g}$ SAR
144	WLAN2.4G	802.11b	Front	1.5	11	16.03	1	1	-	16.49	0.062	0.034	1.112	0.069
145	WLAN2.4G	802.11b	Back	1.5	11	16.03	1	1	-	16.49	0.044	0.026	1.112	0.049
146	WLAN2.4G	802.11b	Front	1.5	11	16.03	2	1	-	16.49	0.059	0.033	1.112	0.061
147	WLAN2.4G	802.11b	Front	1.5	11	16.03	3	1	-	16.49	0.058	0.033	1.112	0.064
148	WLAN2.4G	802.11b	Front	1.5	11	16.03	1	2	-	16.49	0.066	0.037	1.112	0.073
149	WLAN2.4G	802.11b	Front	1.5	1	15.22	1	2	-	16.49	0.058	0.033	1.340	0.078
150	WLAN2.4G	802.11b	Front	1.5	6	16.01	1	2	-	16.49	0.067	0.038	1.117	0.075
154	WLAN2.4G	802.11b	Front	0	6	16.01	1	2	Soft	16.49	0.068	0.03	1.117	0.076
155	WLAN2.4G	802.11b	Front	0	1	15.22	1	2	Soft	16.49	0.072	0.026	1.340	0.096
156	WLAN2.4G	802.11b	Front	0	11	16.03	1	2	Soft	16.49	0.086	0.037	1.112	0.096
157	WLAN2.4G	802.11b	Front	0	6	16.01	1	2	Rigid	16.49	0.081	0.021	1.117	0.090
158	WLAN2.4G	802.11b	Front	0	1	15.22	1	2	Rigid	16.49	0.074	0.028	1.340	**0.099**
189	WLAN2.4G	802.11b	Front	0	11	16.03	1	2	Rigid	16.49	0.081	0.023	1.112	0.090
113	WLAN5G	802.11a	Front	1.5	44	11.85	1	1	-	12.01	0.048	0.019	1.038	0.050
114	WLAN5G	802.11a	Back	1.5	44	11.85	1	1	-	12.01	0.028	0.01	1.038	0.029
122	WLAN5G	802.11a	Front	1.5	44	11.85	2	1	-	12.01	0.03	0.011	1.038	0.031
119	WLAN5G	802.11a	Front	1.5	44	11.85	3	1	-	12.01	0.039	0.016	1.038	0.040
162	WLAN5G	802.11a	Front	1.5	44	11.85	1	2	-	12.01	0.062	0.025	1.038	0.064
165	WLAN5G	802.11a	Front	1.5	36	11.81	1	2	-	12.01	0.063	0.025	1.047	0.066
171	WLAN5G	802.11a	Front	0	44	11.85	1	2	Soft	12.01	0.039	0.015	1.038	0.040
172	WLAN5G	802.11a	Front	0	36	11.81	1	2	Soft	12.01	0.03	0.012	1.047	0.031
173	WLAN5G	802.11a	Front	0	44	11.85	1	2	Rigid	12.01	0.027	0.00922	1.038	0.028
174	WLAN5G	802.11a	Front	0	36	11.81	1	2	Rigid	12.01	0.031	0.012	1.047	0.032
115	WLAN5G	802.11a	Front	1.5	52	13.29	1	1	-	13.37	0.086	0.033	1.019	0.088
116	WLAN5G	802.11a	Back	1.5	52	13.29	1	1	-	13.37	0.068	0.027	1.019	0.069
123	WLAN5G	802.11a	Front	1.5	52	13.29	2	1	-	13.37	0.077	0.031	1.019	0.078
120	WLAN5G	802.11a	Front	1.5	52	13.29	3	1	-	13.37	0.072	0.03	1.019	0.073
166	WLAN5G	802.11a	Front	1.5	52	13.29	1	2	-	13.37	0.099	0.041	1.019	0.101
167	WLAN5G	802.11a	Front	1.5	64	13.14	1	2	-	13.37	0.095	0.038	1.054	0.100
175	WLAN5G	802.11a	Front	0	52	13.29	1	2	Soft	13.37	0.061	0.025	1.019	0.062
176	WLAN5G	802.11a	Front	0	64	13.14	1	2	Soft	13.37	0.059	0.023	1.054	0.062
177	WLAN5G	802.11a	Front	0	52	13.29	1	2	Rigid	13.37	0.052	0.02	1.019	0.053
178	WLAN5G	802.11a	Front	0	64	13.14	1	2	Rigid	13.37	0.054	0.022	1.054	0.057

<WLAN>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Conducted Power	Keypad	Camera	Holster	Tune-up limit	SAR_{1g} (W/kg)	SAR_{10g} (W/kg)	Scaling factor	$Scaled_{1g}$ SAR
125	WLAN5G	802.11a	Front	1.5	140	13.78	1	1	-	13.78	0.105	0.043	1.000	0.105
126	WLAN5G	802.11a	Back	1.5	140	13.78	1	1	-	13.78	0.095	0.036	1.000	0.095
127	WLAN5G	802.11a	Front	1.5	140	13.78	2	1	-	13.78	0.102	0.042	1.000	0.102
128	WLAN5G	802.11a	Front	1.5	140	13.78	3	1	-	13.78	0.095	0.038	1.000	0.095
168	WLAN5G	802.11a	Front	1.5	140	13.78	1	2	-	13.78	0.109	0.045	1.000	0.109
169	WLAN5G	802.11a	Front	1.5	104	13.02	1	2	-	13.78	0.127	0.053	1.191	0.151
170	WLAN5G	802.11a	Front	1.5	116	12.59	1	2	-	13.78	0.155	0.066	1.315	**0.204**
179	WLAN5G	802.11a	Front	0	140	13.78	1	2	Soft	13.78	0.049	0.018	1.000	0.049
180	WLAN5G	802.11a	Front	0	104	13.02	1	2	Soft	13.78	0.051	0.018	1.191	0.061
181	WLAN5G	802.11a	Front	0	116	12.59	1	2	Soft	13.78	0.073	0.031	1.315	0.096
182	WLAN5G	802.11a	Front	0	140	13.78	1	2	Rigid	13.78	0.05	0.02	1.000	0.050
183	WLAN5G	802.11a	Front	0	104	13.02	1	2	Rigid	13.78	0.066	0.027	1.191	0.079
184	WLAN5G	802.11a	Front	0	116	12.59	1	2	Rigid	13.78	0.074	0.031	1.315	0.097
117	WLAN5G	802.11a	Front	1.5	161	15	1	1	-	15.19	0.154	0.064	1.045	0.161
118	WLAN5G	802.11a	Back	1.5	161	15	1	1	-	15.19	0.151	0.058	1.045	0.158
124	WLAN5G	802.11a	Front	1.5	161	15	2	1	-	15.19	0.125	0.052	1.045	0.131
121	WLAN5G	802.11a	Front	1.5	161	15	3	1	-	15.19	0.135	0.056	1.045	0.141
163	WLAN5G	802.11a	Front	1.5	161	15	1	2	-	15.19	0.158	**0.065**	1.045	0.165
164	WLAN5G	802.11a	Front	1.5	149	14.72	1	2	-	15.19	0.155	0.065	1.114	0.173
185	WLAN5G	802.11a	Front	0	161	15	1	2	Soft	15.19	0.053	0.021	1.045	0.055
186	WLAN5G	802.11a	Front	0	149	14.72	1	2	Soft	15.19	0.05	0.019	1.114	0.056
187	WLAN5G	802.11a	Front	0	161	15	1	2	Rigid	15.19	0.062	0.024	1.045	0.065
188	WLAN5G	802.11a	Front	0	149	14.72	1	2	Rigid	15.19	0.063	0.025	1.114	0.070

12.4 Simultaneous Multi-band Transmission Analysis

Refering to Simultaneous Transmitting Configurations

	Head			Body		
	Voice	Data	Simultaneous Transmitters	Voice	Data	Simultaneous Transmitters
GSM	Yes	No	802.11abgn	Yes	Yes	802.11abgn
GPRS	No	No	N/A	No	Yes Multi Slot Class12	802.11abgn
EGPRS	No	No	N/A	No	Yes Multi Slot Class12	802.11abgn
DTM	No	No	N/A	No	No	N/A
WCDMA (rel99)	Yes	No	802.11abgn	Yes	Yes	802.11abgn
HSPA(rel6)	No	No	N/A	No	Yes	802.11abgn
802.11abgn	Yes	No	GSM/WCDMA	Yes	Yes	GSM/GPRS/EGPRS/ WCDMA/HSPA

Note:
1. Available test positions and configurations for simultaneous transmission analysis are based on the testing reduction scheme.
2. The maximum SAR summation is calculated with the same configuration and test position.

<Simultaneously transmission - Head>

Position	WLAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Right Cheek (Keypad 1 & Camera 1)	WLAN2.4G	CH1		-	-	**-**
		CH6		-	-	**-**
		CH11	0.243	16.03	16.49	**0.270**
	WLAN5.2G	CH36	-	-	-	**-**
		CH44	0.288	11.85	12.01	0.299
	WLAN5.3G	CH52	0.42	13.29	13.37	**0.428**
		CH64				
	WLAN5.5G	CH104				
		CH116				
		CH140	0.582	13.78	13.78	**0.582**
	WLAN5.8G	CH149				
		CH161	0.821	15	15.19	**0.858**

Position	WWAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Right Cheek (Keypad 1 & Camera 1)	GSM 850	F1	-	-	-	**-**
		F2	-	-	-	**-**
		F3	1.08	33.23	33.5	**1.149**
	GSM 1900	F1	0.343	29.60	30.5	**0.422**
		F2	-	-	-	**-**
		F3	-	-	-	**-**
	WCDMA Band V	F1	-	-	-	**-**
		F2	1.04	23.86	24.5	**1.205**
		F3	-	-	-	**-**
	WCDMA Band II	F1	-	-	-	**-**
		F2	0.93	24.46	24.5	**0.939**
		F3	-	-	-	**-**

<Simultaneously transmission – Head (continue)>

Right Cheek Keypad 1 Camera 1	**WLAN**	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR	-	-	0.270		0.299	0.428				0.582		0.858
GSM850 F1	-												
GSM850 F2	-												
GSM850 F3	1.149			1.419		1.448	1.577				1.731		2.007
WCDMA850 F1	-												
WCDMA850 F2	1.205			1.475		1.504	1.633				1.787		2.063
WCDMA850 F3	-												
GSM1900 F1	0.422			0.692		0.721	0.85				1.004		1.28
GSM1900 F2	-												
GSM1900 F3	-												
WCDMA1900 F1	-												
WCDMA1900 F2	0.939			1.209		1.238	1.367				1.521		1.797
WCDMA1900 F3	-												

Note:

1. F1, F2, and F3 represent the channel of low, middle, high, respectively.
2. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device. SAR summation is based on scaled SAR value to represent the worst conditions of all production units.
3. Simultaneous SAR measurement will be performed directly for those summations > 1.6W/kg here.
4. Referring to part 15C and part 15E report average power, the test samples are divided into sample A and sample B, while SAR testing is performed by the sample B.
5. Considering the difference between two samples, we chose the tune-up limit according to the higher power of each band among sample A & B, to calculate scaling SAR in the worst condition.

<Simultaneously transmission - Head>

Position	WLAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Right Tilted (Keypad 1 & Camera 2)	WLAN2.4G	CH1	0.24	15.22	16.49	**0.322**
		CH6	0.271	16.01	16.49	**0.303**
		CH11	0.251	16.03	16.49	**0.279**
	WLAN5.2G	CH36	0.402	11.81	12.01	**0.421**
		CH44	0.41	11.85	12.01	**0.425**
	WLAN5.3G	CH52	0.649	13.29	13.37	**0.661**
		CH64	0.586	13.14	13.37	**0.618**
	WLAN5.5G	CH104	0.702	13.02	13.78	**0.836**
		CH116	0.763	12.59	13.78	**1.004**
		CH140	0.692	13.78	13.78	**0.692**
	WLAN5.8G	CH149	0.901	15	15.19	**0.941**
		CH161	0.903	15	15.19	**0.943**

Position	WWAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Right Tilted (Keypad 1 & Camera 2)	GSM 850	F1	1.01	33.18	33.5	**1.087**
		F2	1.04	33.15	33.5	**1.127**
		F3	1.1	33.23	33.5	**1.171**
	GSM 1900	F1	0.483	29.60	30.5	**0.594**
		F2	0.393	29.57	30.5	**0.487**
		F3	0.429	29.60	30.5	**0.528**
	WCDMA Band V	F1	0.965	23.81	24.5	**1.131**
		F2	0.993	23.86	24.5	**1.151**
		F3	0.975	23.58	24.5	**1.205**
	WCDMA Band II	F1	1.06	24.43	24.5	**1.077**
		F2	1.19	24.46	24.5	**1.201**
		F3	1.25	24.44	24.5	**1.267**

<Simultaneously transmission – Head (continue)>

Right Tilted Keypad 1 Camera 2	WLAN	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR	0.322	0.303	0.279	0.421	0.425	0.661	0.618	0.836	1.004	0.692	0.941	0.943
GSM850 F1	1.087	1.422	1.39	1.366	1.508	1.512	1.748	1.705	1.923	2.091	1.779	2.028	2.03
GSM850 F2	1.127	1.462	1.43	1.406	1.548	1.552	1.788	1.745	1.963	2.131	1.819	2.068	2.07
GSM850 F3	1.171	1.506	1.474	1.45	1.592	1.596	1.832	1.789	2.007	2.175	1.863	2.112	2.114
WCDMA850 F1	1.131	1.466	1.434	1.41	1.552	1.556	1.792	1.749	1.967	2.135	1.823	2.072	2.074
WCDMA850 F2	1.151	1.486	1.454	1.43	1.572	1.576	1.812	1.769	1.987	2.155	1.843	2.092	2.094
WCDMA850 F3	1.205	1.54	1.508	1.484	1.626	1.63	1.866	1.823	2.041	2.209	1.897	2.146	2.148
GSM1900 F1	0.594	0.929	0.897	0.873	1.015	1.019	1.255	1.212	1.43	1.598	1.286	1.535	1.537
GSM1900 F2	0.487	0.822	0.79	0.766	0.908	0.912	1.148	1.105	1.323	1.491	1.179	1.428	1.43
GSM1900 F3	0.528	0.863	0.831	0.807	0.949	0.953	1.189	1.146	1.364	1.532	1.22	1.469	1.471
WCDMA1900 F1	1.077	1.412	1.38	1.356	1.498	1.502	1.738	1.695	1.913	2.081	1.769	2.018	2.02
WCDMA1900 F2	1.201	1.536	1.504	1.48	1.622	1.626	1.862	1.819	2.037	2.205	1.893	2.142	2.144
WCDMA1900 F3	1.267	1.589	1.57	1.546	1.688	1.692	1.928	1.885	2.103	2.271	1.959	2.208	2.21

Note:

1. F1, F2, and F3 represent the channel of low, middle, high, respectively.
2. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device. SAR summation is based on scaled SAR value to represent the worst conditions of all production units.
3. According to testing reduction scheme, we use the worst condition among all configurations, to assess the multi-band SAR, therefore right-tiled (Keypad 1 & Camera 2) test results are chosen here.
4. Simultaneous SAR measurement will be performed directly for those summations > 1.6W/kg here.
5. Referring to part 15C and part 15E report average power, the test samples are divided into sample A and sample B, while SAR testing is performed by the sample B.
6. Considering the difference between two samples, we chose the tune-up limit according to the higher power of each band among sample A & B, to calculate scaling SAR in the worst condition.

<Simultaneously transmission - Head>

Position	WLAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Left Cheek (Keypad 1 & Camera 1)	WLAN2.4G	CH1				
		CH6				
		CH11	0.399	16.03	16.49	**0.444**
	WLAN5.2G	CH36				
		CH44	0.229	11.85	12.01	**0.238**
	WLAN5.3G	CH52	0.318	13.29	13.37	**0.324**
		CH64				
	WLAN5.5G	CH104				
		CH116				
		CH140	0.468	13.78	13.78	**0.468**
	WLAN5.8G	CH149				
		CH161	0.639	15	15.19	**0.668**

Position	WWAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Left Cheek (Keypad 1 & Camera 1)	GSM 850	F1	-	-	-	-
		F2	-	-	-	-
		F3	0.943	33.23	33.5	**1.003**
	GSM 1900	F1	0.211	29.60	30.5	**0.260**
		F2	-	-	-	-
		F3	-	-	-	-
	WCDMA Band V	F1	-	-	-	-
		F2	0.946	23.86	24.5	**1.096**
		F3	-	-	-	-
	WCDMA Band II	F1	-	-	-	-
		F2	0.642	24.46	24.5	**0.648**
		F3	-	-	-	-

<Simultaneously transmission – Head (continue)>

Left Cheek Keypad 1 Camera 1	WLAN	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR			0.444		0.238	0.324				0.468		0.668
GSM850 F1	-												
GSM850 F2	-												
GSM850 F3	1.003			1.447		1.241	1.327				1.471		1.671
WCDMA850 F1	-												
WCDMA850 F2	1.096			1.54		1.334	1.42				1.564		1.764
WCDMA850 F3	-												
GSM1900 F1	0.26			0.704		0.498	0.584				0.728		0.928
GSM1900 F2	-												
GSM1900 F3	-												
WCDMA1900 F1	-												
WCDMA1900 F2	0.648			1.092		0.886	0.972				1.116		1.316
WCDMA1900 F3	-												

Note:

1. F1, F2, and F3 represent the channel of low, middle, high, respectively.
2. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device. SAR summation is based on scaled SAR value to represent the worst conditions of all production units.
3. Simultaneous SAR measurement will be performed directly for those summations > 1.6W/kg here.
4. Referring to part 15C and part 15E report average power, the test samples are divided into sample A and sample B, while SAR testing is performed by the sample B.
5. Considering the difference between two samples, we chose the tune-up limit according to the higher power of each band among sample A & B, to calculate scaling SAR in the worst condition.

<Simultaneously transmission - Head>

Position	WLAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Left Tilted (Keypad 1 & Camera 1)	WLAN2.4G	CH1				
		CH6				
		CH11	0.411	16.03	16.49	**0.457**
	WLAN5.2G	CH36				
		CH44	0.301	11.85	12.01	**0.312**
	WLAN5.3G	CH52	0.407	13.29	13.37	**0.415**
		CH64				
	WLAN5.5G	CH104				
		CH116				
		CH140	0.474	13.78	13.78	**0.474**
	WLAN5.8G	CH149				
		CH161	0.63	15	15.19	**0.658**

Position	WWAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Left Tilted (Keypad 1 & Camera 1)	GSM 850	F1	-	-	-	**-**
		F2	-	-	-	**-**
		F3	0.978	33.23	33.5	**1.041**
	GSM 1900	F1	0.244	29.60	30.5	**0.3**
		F2	-	-	-	**-**
		F3	-	-	-	**-**
	WCDMA Band V	F1	-	-	-	**-**
		F2	0.85	23.86	24.5	**0.985**
		F3	-	-	-	**-**
	WCDMA Band II	F1	-	-	-	**-**
		F2	0.718	24.46	24.5	**0.725**
		F3	-	-	-	**-**

<Simultaneously transmission – Head (continue)>

Left Tilted Keypad 1 Camera 1	**WLAN**	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR	-	-	0.457	-	0.312	0.415	-	-	-	0.474	-	0.658
GSM850 F1	-												
GSM850 F2	-												
GSM850 F3	1.041			1.498		1.353	1.456				1.515		1.699
WCDMA850 F1	-												
WCDMA850 F2	0.985			1.442		1.297	1.4				1.459		1.643
WCDMA850 F3	-												
GSM1900 F1	0.3			0.757		0.612	0.715				0.774		0.958
GSM1900 F2	-												
GSM1900 F3	-												
WCDMA1900 F1	-												
WCDMA1900 F2	0.725			1.182		1.037	1.14				1.199		1.383
WCDMA1900 F3	-												

Note:

1. F1, F2, and F3 represent the channel of low, middle, high, respectively.
2. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device. SAR summation is based on scaled SAR value to represent the worst conditions of all production units.
3. Simultaneous SAR measurement will be performed directly for those summations > 1.6W/kg here.
4. Referring to part 15C and part 15E report average power, the test samples are divided into sample A and sample B, while SAR testing is performed by the sample B.
5. Considering the difference between two samples, we chose the tune-up limit according to the higher power of each band among sample A & B, to calculate scaling SAR in the worst condition.

<Simultaneously transmission - Body>

Position	WLAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Front (Keypad 1 & Camera 2)	WLAN2.4G	CH1	0.058	15.22	16.49	**0.078**
		CH6	0.067	16.01	16.49	**0.075**
		CH11	0.066	16.03	16.49	**0.073**
	WLAN5.2G	CH36	0.063	11.81	12.01	**0.066**
		CH44	0.062	11.85	12.01	**0.064**
	WLAN5.3G	CH52	0.099	13.29	13.37	**0.101**
		CH64	0.095	13.14	13.37	**0.100**
	WLAN5.5G	CH104	0.127	13.02	13.78	**0.151**
		CH116	0.155	12.59	13.78	**0.204**
		CH140	0.109	13.78	13.78	**0.109**
	WLAN5.8G	CH149	0.155	14.72	15.19	**0.173**
		CH161	0.158	15	15.19	**0.165**

Position	WWAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Front (Keypad 1 & Camera 2)	GSM 850	F1	0.95	32.74	33.5	**1.132**
		F2	1.05	32.71	33.5	**1.259**
		F3	1.05	32.82	33.5	**1.228**
	GSM 1900	F1	0.287	29.11	30.5	**0.395**
		F2	0.265	29.03	30.5	**0.372**
		F3	0.214	29.05	30.5	**0.299**
	WCDMA Band V	F1	0.308	23.81	24.5	**0.361**
		F2	0.335	23.86	24.5	**0.388**
		F3	0.328	23.58	24.5	**0.405**
	WCDMA Band II	F1	0.189	24.43	24.5	**0.192**
		F2	0.205	24.46	24.5	**0.207**
		F3	0.23	24.44	24.5	**0.233**

<Simultaneously transmission – Body (continue)>

Front Keypad 1 Camera 2	WLAN	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR	0.078	0.075	0.073	0.066	0.064	0.101	0.100	0.151	0.204	0.109	0.173	0.165
GSM850 F1	1.132	1.21	1.207	1.205	1.198	1.196	1.233	1.232	1.283	1.336	1.241	1.305	1.297
GSM850 F2	1.259	1.337	1.334	1.332	1.325	1.323	1.36	1.359	1.41	1.463	1.368	1.432	1.424
GSM850 F3	1.228	1.306	1.303	1.301	1.294	1.292	1.329	1.328	1.379	1.432	1.337	1.401	1.393
WCDMA850 F1	0.361	0.439	0.436	0.434	0.427	0.425	0.462	0.461	0.512	0.565	0.47	0.534	0.526
WCDMA850 F2	0.388	0.466	0.463	0.461	0.454	0.452	0.489	0.488	0.539	0.592	0.497	0.561	0.553
WCDMA850 F3	0.405	0.483	0.48	0.478	0.471	0.469	0.506	0.505	0.556	0.609	0.514	0.578	0.57
GSM1900 F1	0.395	0.473	0.47	0.468	0.461	0.459	0.496	0.495	0.546	0.599	0.504	0.568	0.56
GSM1900 F2	0.372	0.45	0.447	0.445	0.438	0.436	0.473	0.472	0.523	0.576	0.481	0.545	0.537
GSM1900 F3	0.299	0.377	0.374	0.372	0.365	0.363	0.4	0.399	0.45	0.503	0.408	0.472	0.464
WCDMA1900 F1	0.192	0.27	0.267	0.265	0.258	0.256	0.293	0.292	0.343	0.396	0.301	0.365	0.357
WCDMA1900 F2	0.207	0.285	0.282	0.28	0.273	0.271	0.308	0.307	0.358	0.411	0.316	0.38	0.372
WCDMA1900 F3	0.233	0.311	0.308	0.306	0.299	0.297	0.334	0.333	0.384	0.437	0.342	0.406	0.398

Note:

1. F1, F2, and F3 represent the channel of low, middle, high, respectively.
2. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device. SAR summation is based on scaled SAR value to represent the worst conditions of all production units.
3. According to testing reduction scheme, we use the worst condition among all configurations, to assess the multi-band SAR, therefore front (Keypad 1 & Camera 2) test results are chosen here.
4. Referring to part 15C and part 15E report average power, the test samples are divided into sample A and sample B, while SAR testing is performed by the sample B.
5. Considering the difference between two samples, we chose the tune-up limit according to the higher power of each band among sample A & B, to calculate scaling SAR in the worst condition.
6. Summation < 1.6, simultaneous transmission is complied. Those tables don't include summation >1.6.

<Simultaneously transmission - Body>

Position	WLAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Front (Keypad 1 & Camera 2 Soft Holster)	WLAN2.4G	CH1	0.072	15.22	16.49	**0.096**
		CH6	0.068	16.01	16.49	**0.076**
		CH11	0.086	16.03	16.49	**0.096**
	WLAN5.2G	CH36	0.03	11.81	12.01	**0.031**
		CH44	0.039	11.85	12.01	**0.040**
	WLAN5.3G	CH52	0.061	13.29	13.37	**0.062**
		CH64	0.059	13.14	13.37	**0.062**
	WLAN5.5G	CH104	0.051	13.02	13.78	**0.061**
		CH116	0.073	12.59	13.78	**0.096**
		CH140	0.049	13.78	13.78	**0.049**
	WLAN5.8G	CH149	0.05	14.72	15.19	**0.056**
		CH161	0.053	15	15.19	**0.055**

Position	WWAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Front (Keypad 1 & Camera 2 Soft Holster)	GSM 850	F1	0.888	32.74	33.5	**1.058**
		F2	0.874	32.71	33.5	**1.048**
		F3	1.03	32.82	33.5	**1.205**
	GSM 1900	F1	0.218	29.11	30.5	**0.3**
		F2	0.228	29.03	30.5	**0.32**
		F3	0.185	29.05	30.5	**0.258**
	WCDMA Band V	F1	0.258	23.81	24.5	**0.302**
		F2	0.296	23.86	24.5	**0.343**
		F3	0.278	23.58	24.5	**0.344**
	WCDMA Band II	F1	0.145	24.43	24.5	**0.147**
		F2	0.183	24.46	24.5	**0.185**
		F3	0.173	24.44	24.5	**0.175**

<Simultaneously transmission – Body (continue)>

Front Keypad 1 Camera 2 Soft Holster	**WLAN**	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR	0.096	0.076	0.096	0.031	0.040	0.062	0.062	0.061	0.096	0.049	0.056	0.055
GSM850 F1	1.058	1.154	1.134	1.154	1.089	1.098	1.12	1.12	1.119	1.154	1.107	1.114	1.113
GSM850 F2	1.048	1.144	1.124	1.144	1.079	1.088	1.11	1.11	1.109	1.144	1.097	1.104	1.103
GSM850 F3	1.205	1.301	1.281	1.301	1.236	1.245	1.267	1.267	1.266	1.301	1.254	1.261	1.26
WCDMA850 F1	0.302	0.398	0.378	0.398	0.333	0.342	0.364	0.364	0.363	0.398	0.351	0.358	0.357
WCDMA850 F2	0.343	0.439	0.419	0.439	0.374	0.383	0.405	0.405	0.404	0.439	0.392	0.399	0.398
WCDMA850 F3	0.344	0.44	0.42	0.44	0.375	0.384	0.406	0.406	0.405	0.44	0.393	0.4	0.399
GSM1900 F1	0.3	0.396	0.376	0.396	0.331	0.34	0.362	0.362	0.361	0.396	0.349	0.356	0.355
GSM1900 F2	0.32	0.416	0.396	0.416	0.351	0.36	0.382	0.382	0.381	0.416	0.369	0.376	0.375
GSM1900 F3	0.258	0.354	0.334	0.354	0.289	0.298	0.32	0.32	0.319	0.354	0.307	0.314	0.313
WCDMA1900 F1	0.147	0.243	0.223	0.243	0.178	0.187	0.209	0.209	0.208	0.243	0.196	0.203	0.202
WCDMA1900 F2	0.185	0.281	0.261	0.281	0.216	0.225	0.247	0.247	0.246	0.281	0.234	0.241	0.24
WCDMA1900 F3	0.175	0.271	0.251	0.271	0.206	0.215	0.237	0.237	0.236	0.271	0.224	0.231	0.23

Note:

1. F1, F2, and F3 represent the channel of low, middle, high, respectively.
2. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device. SAR summation is based on scaled SAR value to represent the worst conditions of all production units.
3. According to testing reduction scheme, we use the worst condition among all configurations, to assess the multi-band SAR, therefore front (Keypad 1 & Camera 2) test results are chosen here.
4. Referring to part 15C and part 15E report average power, the test samples are divided into sample A and sample B, while SAR testing is performed by the sample B.
5. Considering the difference between two samples, we chose the tune-up limit according to the higher power of each band among sample A & B, to calculate scaling SAR in the worst condition.
6. Summation < 1.6, simultaneous transmission is complied. Those tables don't include summation >1.6.

.<Simultaneously transmission - Body>

Position	WLAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Front (Keypad 1 & Camera 2 Rigid Holster)	WLAN2.4G	CH1	0.074	15.22	16.49	**0.099**
		CH6	0.081	16.01	16.49	**0.090**
		CH11	0.081	16.03	16.49	**0.090**
	WLAN5.2G	CH36	0.031	11.81	12.01	**0.032**
		CH44	0.027	11.85	12.01	**0.028**
	WLAN5.3G	CH52	0.052	13.29	13.37	**0.053**
		CH64	0.054	13.14	13.37	**0.057**
	WLAN5.5G	CH104	0.066	13.02	13.78	**0.079**
		CH116	0.074	12.59	13.78	**0.097**
		CH140	0.05	13.78	13.78	**0.050**
	WLAN5.8G	CH149	0.063	14.72	15.19	**0.070**
		CH161	0.062	15	15.19	**0.065**

Position	WWAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Front (Keypad 1 & Camera 2 Rigid Holster)	GSM 850	F1	0.637	32.74	33.5	**0.759**
		F2	0.702	32.71	33.5	**0.842**
		F3	0.706	32.82	33.5	**0.826**
	GSM 1900	F1	0.225	29.11	30.5	**0.310**
		F2	0.211	29.03	30.5	**0.296**
		F3	0.178	29.05	30.5	**0.249**
	WCDMA Band V	F1	0.218	23.81	24.5	**0.256**
		F2	0.239	23.86	24.5	**0.277**
		F3	0.226	23.58	24.5	**0.279**
	WCDMA Band II	F1	0.195	24.43	24.5	**0.198**
		F2	0.184	24.46	24.5	**0.186**
		F3	0.186	24.44	24.5	**0.189**

<Simultaneously transmission – Body (continue)>

Front Keypad 1 Camera 2 Rigid Holster	WLAN	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR	0.099	0.090	0.090	0.032	0.028	0.053	0.057	0.079	0.097	0.050	0.070	0.065
GSM850 F1	0.759	0.858	0.849	0.849	0.791	0.787	0.812	0.816	0.838	0.856	0.809	0.829	0.824
GSM850 F2	0.842	0.941	0.932	0.932	0.874	0.87	0.895	0.899	0.921	0.939	0.892	0.912	0.907
GSM850 F3	0.826	0.925	0.916	0.916	0.858	0.854	0.879	0.883	0.905	0.923	0.876	0.896	0.891
WCDMA850 F1	0.256	0.355	0.346	0.346	0.288	0.284	0.309	0.313	0.335	0.353	0.306	0.326	0.321
WCDMA850 F2	0.277	0.376	0.367	0.367	0.309	0.305	0.33	0.334	0.356	0.374	0.327	0.347	0.342
WCDMA850 F3	0.279	0.378	0.369	0.369	0.311	0.307	0.332	0.336	0.358	0.376	0.329	0.349	0.344
GSM1900 F1	0.31	0.409	0.4	0.4	0.342	0.338	0.363	0.367	0.389	0.407	0.36	0.38	0.375
GSM1900 F2	0.296	0.395	0.386	0.386	0.328	0.324	0.349	0.353	0.375	0.393	0.346	0.366	0.361
GSM1900 F3	0.249	0.348	0.339	0.339	0.281	0.277	0.302	0.306	0.328	0.346	0.299	0.319	0.314
WCDMA1900 F1	0.198	0.297	0.288	0.288	0.23	0.226	0.251	0.255	0.277	0.295	0.248	0.268	0.263
WCDMA1900 F2	0.186	0.285	0.276	0.276	0.218	0.214	0.239	0.243	0.265	0.283	0.236	0.256	0.251
WCDMA1900 F3	0.189	0.288	0.279	0.279	0.221	0.217	0.242	0.246	0.268	0.286	0.239	0.259	0.254

Note:

1. F1, F2, and F3 represent the channel of low, middle, high, respectively.
2. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device. SAR summation is based on scaled SAR value to represent the worst conditions of all production units.
3. According to testing reduction scheme, we use the worst condition among all configurations, to assess the multi-band SAR, therefore front (Keypad 1 & Camera 2) test results are chosen here.
4. Referring to part 15C and part 15E report average power, the test samples are divided into sample A and sample B, while SAR testing is performed by the sample B.
5. Considering the difference between two samples, we chose the tune-up limit according to the higher power of each band among sample A & B, to calculate scaling SAR in the worst condition.
6. Summation < 1.6, simultaneous transmission is complied. Those tables don’t include summation >1.6.

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<Simultaneously transmission - Body>

Position	WLAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Back (Keypad 1 & Camera 1)	WLAN2.4G	CH1				
		CH6				
		CH11	0.044	16.03	16.49	**0.049**
	WLAN5.2G	CH36				
		CH44	0.028	11.85	12.01	**0.029**
	WLAN5.3G	CH52	0.068	13.29	13.37	**0.069**
		CH64				
	WLAN5.5G	CH104				
		CH116				
		CH140	0.095	13.78	13.78	**0.095**
	WLAN5.8G	CH149				
		CH161	0.151	15	15.19	**0.158**

Position	WWAN			Conducted Power	Tune-Up Limit	Scaled 1g SAR
Back (Keypad 1 & Camera 1)	GSM 850	F1				
		F2				
		F3	0.721	32.82	33.5	**0.843**
	GSM 1900	F1	0.268	29.11	30.5	**0.369**
		F2				
		F3				
	WCDMA Band V	F1				
		F2	0.268	23.86	24.5	**0.311**
		F3				
	WCDMA Band II	F1				
		F2	0.194	24.46	24.5	**0.196**
		F3				

<Simultaneously transmission – Body (continue)>

Back Keypad 1 Camera 1	**WLAN**	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR			0.049		0.029	0.069				0.095		0.158
GSM850 F1													
GSM850 F2													
GSM850 F3	0.843			0.892		0.872	0.912				0.938		1.001
WCDMA850 F1													
WCDMA850 F2	0.311			0.36		0.34	0.38				0.406		0.469
WCDMA850 F3													
GSM1900 F1	0.369			0.418		0.398	0.438				0.464		0.527
GSM1900 F2													
GSM1900 F3													
WCDMA1900 F1													
WCDMA1900 F2	0.196			0.245		0.225	0.265				0.291		0.354
WCDMA1900 F3													

Note:

1. F1, F2, and F3 represent the channel of low, middle, high, respectively.
2. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device. SAR summation is based on scaled SAR value to represent the worst conditions of all production units.
3. Referring to part 15C and part 15E report average power, the test samples are divided into sample A and sample B, while SAR testing is performed by the sample B.
4. Considering the difference between two samples, we chose the tune-up limit according to the higher power of each band among sample A & B, to calculate scaling SAR in the worst condition.
5. Summation < 1.6, simultaneous transmission is complied. Those tables don’t include summation >1.6.

12.5 Simultaneous Transmission SAR Evaluation

<Volume Scan Standalone SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Conducted Power (dBm)	Tune-up Limit (dBm)	Keypad	Camera	SAR_{1g} (W/kg)	Scaling Factor	Scaled 1g SAR
190	GSM850	GSM	Right Cheek	-	251	33.23	33.5	1	1	0.998	1.064	1.062
191	WCDMA V	RMC12.2K	Right Cheek	-	4182	23.86	24.5	1	1	1.11	1.159	1.286
192	WCDMA II	RMC12.2K	Right Cheek	-	9400	24.46	24.5	1	1	0.998	1.009	1.007
194	WLAN5G	802.11a	Right Cheek	-	140	13.78	13.78	1	1	0.671	1.000	0.671
195	WLAN5G	802.11a	Right Cheek	-	161	15	15.19	1	1	0.743	1.045	0.776
221	WLAN5G	802.11a	Right Cheek	-	52	13.29	13.37	1	1	0.387	1.019	0.394
196	GSM850	GSM	Left Cheek	-	251	33.23	33.5	1	1	0.899	1.064	0.957
197	WCDMA V	RMC12.2K	Left Cheek	-	4182	23.86	24.5	1	1	0.942	1.159	1.092
198	WLAN5G	802.11a	Left Cheek	-	161	15	15.19	1	1	0.562	1.045	0.587
199	GSM850	GSM	Left Tilted	-	251	33.23	33.5	1	1	0.841	1.064	0.895
220	WCDMA V	RMC12.2K	Left Tilted	-	4182	23.86	24.5	1	1	0.878	1.159	1.017
200	WLAN5G	802.11a	Left Tilted	-	161	15	15.19	1	1	0.59	1.045	0.616
201	GSM850	GSM	Right Tilted	-	251	33.23	33.5	1	2	0.989	1.064	1.052
202	GSM850	GSM	Right Tilted	-	128	33.18	33.5	1	2	0.973	1.076	1.047
203	GSM850	GSM	Right Tilted	-	189	33.15	33.5	1	2	1.01	1.084	1.095
219	WCDMA V	RMC12.2K	Right Tilted	-	4182	23.86	24.5	1	2	0.999	1.159	1.158
205	WCDMA V	RMC12.2K	Right Tilted	-	4132	23.81	24.5	1	2	1.01	1.172	1.184
206	WCDMA V	RMC12.2K	Right Tilted	-	4233	23.58	24.5	1	2	1.05	1.236	1.298
207	WCDMA II	RMC12.2K	Right Tilted	-	9400	24.46	24.5	1	2	1.17	1.009	1.181
208	WCDMA II	RMC12.2K	Right Tilted	-	9262	24.43	24.5	1	2	1.05	1.016	1.067
209	WCDMA II	RMC12.2K	Right Tilted	-	9538	24.44	24.5	1	2	1.23	1.014	1.247
210	WLAN5G	802.11a	Right Tilted	-	44	11.85	12.01	1	2	0.421	1.038	0.437
211	WLAN5G	802.11a	Right Tilted	-	36	11.81	12.01	1	2	0.362	1.047	0.379
212	WLAN5G	802.11a	Right Tilted	-	52	13.29	13.37	1	2	0.653	1.019	0.665
213	WLAN5G	802.11a	Right Tilted	-	64	13.14	13.37	1	2	0.595	1.054	0.627
214	WLAN5G	802.11a	Right Tilted	-	140	13.78	13.78	1	2	0.629	1.000	0.629
215	WLAN5G	802.11a	Right Tilted	-	104	13.02	13.78	1	2	0.689	1.191	0.821
216	WLAN5G	802.11a	Right Tilted	-	116	12.59	13.78	1	2	0.818	1.315	1.076
217	WLAN5G	802.11a	Right Tilted	-	161	15	15.19	1	2	0.851	1.045	0.889
218	WLAN5G	802.11a	Right Tilted	-	149	15	15.19	1	2	0.839	1.045	0.877

Note:

1. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device.
2. Combined volume scan procedure are based on the scaled 1g SAR value, results summary as following tables:
3. Referring to part 15C and part 15E report average power, the test samples are divided into sample A and sample B, while SAR testing is performed by the sample B.
4. Considering the difference between two samples, we chose the tune-up limit according to the higher power of each band among sample A & B, to calculate scaling SAR in the worst condition.

<Volume Scan Combined Results (Consider Scaling)>

Right Cheek Keypad 1 Camera 1	**WLAN**	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR	-	-	-	-	-	0.394	-	-	-	0.671	-	0.776
GSM850 F1	-												
GSM850 F2	-												
GSM850 F3	1.062										1.2		1.16
WCDMA850 F1	-												
WCDMA850 F2	1.286						1.35				1.38		1.37
WCDMA850 F3	-												
GSM1900 F1	-												
GSM1900 F2	-												
GSM1900 F3	-												
WCDMA1900 F1	-												
WCDMA1900 F2	1.007												1.24
WCDMA1900 F3	-												

Right Tilted Keypad 1 Camera 2	**WLAN**	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR	-	-	-	0.379	0.437	0.665	0.627	0.821	1.076	0.629	0.877	0.889
GSM850 F1	1.047						1.2	1.18	1.21	1.24	1.18	1.26	1.25
GSM850 F2	1.095						1.23	1.21	1.25	1.28	1.22	1.3	1.3
GSM850 F3	1.052						1.2	1.18	1.21	1.25	1.18	1.26	1.26
WCDMA850 F1	1.184						1.31	1.3	1.3	1.34	1.29	1.36	1.36
WCDMA850 F2	1.158						1.32	1.3	1.38	1.47r	1.34	1.47	1.46
WCDMA850 F3	1.298				1.36	1.39	1.45	1.43	1.44	1.47	1.42	1.49	1.48
GSM1900 F1	-												
GSM1900 F2	-												
GSM1900 F3	-												
WCDMA1900 F1	1.067						1.2	1.19	1.17	1.2	1.13	1.19	1.16
WCDMA1900 F2	1.181				1.22	1.26	1.32	1.31	1.29	1.32	1.25	1.31	1.28
WCDMA1900 F3	1.247				1.29	1.32	1.38	1.37	1.35	1.37	1.31	1.36	1.33

Left Cheek Keypad 1 Camera 1	**WLAN**	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR	-	-	-	-	-	-	-	-	-	-	-	0.587
GSM850 F1	-												
GSM850 F2	-												
GSM850 F3	0.957												1.09
WCDMA850 F1	-												
WCDMA850 F2	1.092												1.21
WCDMA850 F3	-												
GSM1900 F1	-												
GSM1900 F2	-												
GSM1900 F3	-												
WCDMA1900 F1	-												
WCDMA1900 F2	-												
WCDMA1900 F3	-												

<Volume Scan Combined Results (Consider Scaling)>

Left Tilted Keypad 1 Camera 1	WLAN	2.412 b Ch1	2.437 b Ch6	2.462 b Ch11	5.18 a Ch36	5.22 a Ch44	5.26 a Ch52	5.32 a Ch64	5.52 a Ch104	5.58 a Ch116	5.70 a Ch140	5.745 a Ch149	5.825 a Ch161
WAN	1g SAR	-	-	-	-	-	-	-	-	-	-	-	0.616
GSM850 F1	-												
GSM850 F2	-												
GSM850 F3	0.895												1.22
WCDMA850 F1	-												
WCDMA850 F2	1.017												1.31
WCDMA850 F3	-												
GSM1900 F1	-												
GSM1900 F2	-												
GSM1900 F3	-												
WCDMA1900 F1	-												
WCDMA1900 F2	-												
WCDMA1900 F3	-												

Note: 1. The combined volume scan results < 1.6 W/kg, which indicates that the EUT complies with the FCC RF exposure requirement in the worst.

2. During multi-band SAR combination the SAR scaling factors were also input to account for conducted power difference compared to tune-up limit

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13. References

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[4] FCC OET Bulletin 65 (Edition 97-01) Supplement C (Edition 01-01), “Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields”, June 2001

[5] SPEAG DASY System Handbook

[6] FCC KDB 248227 D01 v01r02, “SAR Measurement Procedures for 802.11 a/b/g Transmitters”, May 2007

[7] FCC KDB 447498 D01 v04, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, November 2009

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[12] FCC KDB 941225 D04 v01, “Evaluating SAR for GSM/(E)GPRS Dual Transfer Mode”, January 27 2010

[13] FCC KDB 941225 D06 v01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", April 2011

[14] FCC KDB 388624 D02, "Permit But Ask List", December 2011.

Appendix A. Plots of System Performance Check

The plots are shown as follows.

Appendix B. Plots of SAR Measurement

The plots are shown as follows.

Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.