FCC SAR Test Report

APPLICANT	:	**Hewlett-Packard Company**
EQUIPMENT	:	**Notebook PC**
BRAND NAME	:	**HP**
MODEL NAME	:	**HSTNN-W91C**
FCC ID	:	**B94HNW91CSWWH**
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 completely tested on Dec. 19, 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

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Testing Laboratory
1190

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA2N2103-01	Rev. 01	Initial issue of report	Jan. 02, 2013

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Hewlett-Packard Company, HSTNN-W91C**, are as follows.

<Highest Reported SAR>

Exposure Position	Frequency Band	Highest Reported 1g-SAR (W/kg)	Equipment Class	Highest Reported 1g-SAR (W/kg)
Body (0cm gap)	GPRS850	**1.45**	PCB	**1.50**
Body (0cm gap)	GPRS1900	**1.43**		
Body (0cm gap)	WCDMA Band V	**1.49**		
Body (0cm gap)	WCDMA Band IV	**1.48**		
Body (0cm gap)	WCDMA Band II	**1.5**		
Body (0cm gap)	CDMA 2000 BC0	**1.47**		
Body (0cm gap)	CDMA 2000 BC1	**1.48**		

Frequency Band	Equipment Class	Exposure Position	Highest Reported Simultaneous Transmission 1g-SAR (W/kg)
WCDMA V	PCB	Bottom Face (0 cm Gap)	1.51
WLAN2.4G Band	DTS		

Frequency Band	Equipment Class	Exposure Position	Highest Reported Simultaneous Transmission 1g-SAR (W/kg)
WCDMA V	PCB	Bottom Face (0 cm Gap)	1.53
Bluetooth	DSS		

Remark:
The highest simultaneous transmission reported SAR is scalar SAR summation per FCC KDB 690873 D01 v01r02. Simultaneous transmission SAR measurement is exempted according to the SPLSR analysis per KDB 447498 D01v05

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	Hewlett-Packard Company
Address	3000 Hanover Street, Palo Alto, California 94304, USA

2.3 Manufacturer

Company Name	Wistron Corporation
Address	21F., No. 88, Sec. 1, Xintai 5th Rd., Xizhi Dist., New Taipei City 22181, Taiwan (R. O. C.)

2.4 Application Details

Date of Start during the Test	Dec. 17, 2012
Date of End during the Test	Dec. 19, 2012

3. General Information

3.1 Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT	Notebook PC
Brand Name	HP
Model Name	HSTNN-W91C
FCC ID	B94HNW91CSWWH
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 WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz CDMA2000 BC0 : 824.70 MHz ~ 848.31 MHz CDMA2000 BC1 : 1851.25 MHz ~ 1908.75 MHz
Antenna Type	PIFA Antenna
Uplink Modulations	GPRS : GMSK EDGE : GMSK / 8PSK WCDMA (Rel 99) : QPSK HSDPA (Rel 6) : QPSK HSUPA (Rel 6) : QPSK CDMA2000 : QPSK
EUT Stage	Identical Prototype
Remark: 1. Voice call over circuit-switched domain of WWAN is not supported 2. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	

3.2 Maximum RF output power among production units

Band	GSM 850 average power (dBm)		GSM 1900 average power (dBm)	
Output Power Status	Normal	Reduced	Normal	Reduced
GPRS/EDGE (GMSK, 1 Tx slot)	33	29.9	30.8	26.3
GPRS/EDGE (GMSK, 2 Tx slots)	33	29.9	30.8	26.3
EDGE (8PSK, 1 Tx slot)	27.5	27.5	26.5	26.3
EDGE (8PSK, 2 Tx slots)	27.5	27.5	26.5	26.3

Band	WCDMA Band V average power (dBm)		WCDMA Band II average power (dBm)		WCDMA Band IV average power (dBm)	
Output Power Status	Normal	Reduced	Normal	Reduced	Normal	Reduced
RMC 12.2K	25.2	23.3	25.2	19.7	25.2	20.1
HSDPA Subtest-1	25.2	23.3	25.2	19.7	25.2	20.1
HSUPA Subtest-5	25.2	23.3	25.2	19.7	25.2	20.1

Remark: By design, HSPA RF output power will never exceed R99 maximum output power, detailed information is included in “tune-up procedure” exhibit

Band	CDMA BC0 average power (dBm)		CDMA BC1 average power (dBm)	
Output Power Status	Normal	Reduced	Normal	Reduced
1xRTT RC1 SO55	25	23.7	25	20.1
1xRTT RC3 SO55	25	23.7	25	20.1
1xRTT RC3 SO32	25	23.7	25	20.1
1xEV-DO Rev 0	25	23.7	25	20.1
1xEV-DO Rev A	25	23.7	25	20.1

3.3 Product Photos

Please refer to Appendix D.

3.4 Applied Standard

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 v05
- FCC KDB 616217 D04 v01
- FCC KDB 941225 D01 v02
- FCC KDB 941225 D03 v01

3.5 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.

3.6 Test Conditions

3.6.1 Ambient Condition

Ambient Temperature	20 to 24 ℃
Humidity	< 60 %

3.6.2 Test Configuration

For WWAN SAR testing, 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 WWAN output power during all tests. For Bottom-Face testing at 0cm separation, the proximity sensor will activate the power reduction and the maximum power is limited at the pre-defined level implemented in this device.

Target Power reduction applied for each wireless mode and orientation

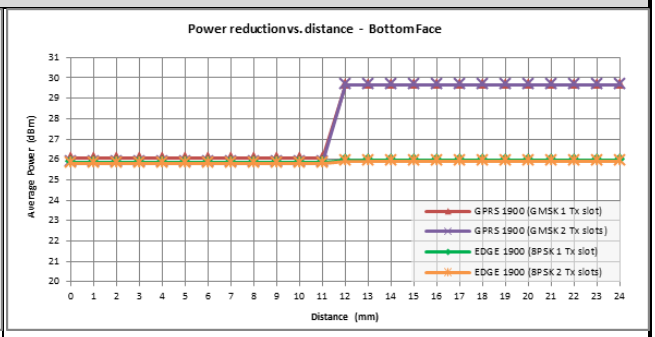
Exposure Position / wireless mode	Bottom Face(1)	Edge 1	Edge 2	Edge 3(2)	Edge 4(2)
GSM850 GPRS (GMSK 1 Tx slot) - CS1	3.1 dB	0dB	0dB	3.1 dB	3.1 dB
GSM850 GPRS (GMSK 2 Tx slot) - CS1	3.1dB	0dB	0dB	3.1 dB	3.1 dB
GSM850 EDGE (8PSK 1 Tx slot) - MCS5	0 dB	0 dB	0 dB	0 dB	0 dB
GSM850 EDGE (8PSK 2 Tx slot) - MCS5	0 dB	0 dB	0 dB	0dB	0dB
GSM1900 GPRS (GMSK 1 Tx slot) - CS1	4.5 dB	0 dB	0 dB	4.5dB	4.5 dB
GSM1900 GPRS (GMSK 2 Tx slot) - CS1	4.5 dB	0 dB	0 dB	4.5dB	4.5 dB
GSM1900 EDGE (8PSK 1 Tx slot) - MCS5	0.2 dB	0 dB	0dB	0.2dB	0.2 dB
GSM1900 EDGE (8PSK 2 Tx slot) - MCS5	0.2 dB	0 dB	0 dB	0.2dB	0.2 dB
WCDMA Band 5	1.9 dB	0 dB	0 dB	1.9 dB	1.9 dB
WCDMA Band 2	5.5 dB	0 dB	0 dB	5.5 dB	5.5 dB
WCDMA Band 4	5.1 dB	0 dB	0 dB	5.1 dB	5.1 dB
CDMA2000 BC0	1.3 dB	0 dB	0 dB	1.3 dB	1.3 dB
CDMA2000 BC1	4.9 dB	0 dB	0 dB	4.9 dB	4.9 dB

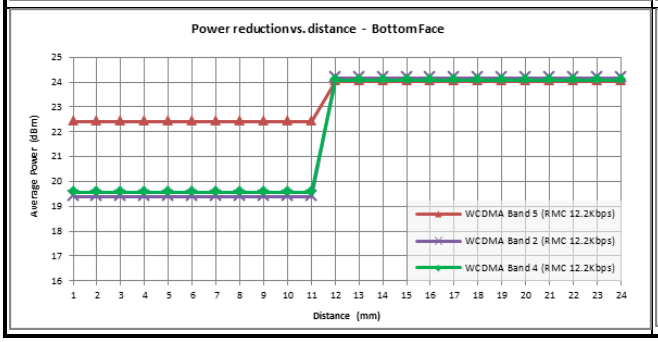
Remark:
1. (1): Reduced maximum limit applied by activation of proximity sensor.
2. (2): Reduced maximum limit applied by activation of screen orientation.
3. Power reduction is not applicable for WiFi and Bluetooth.

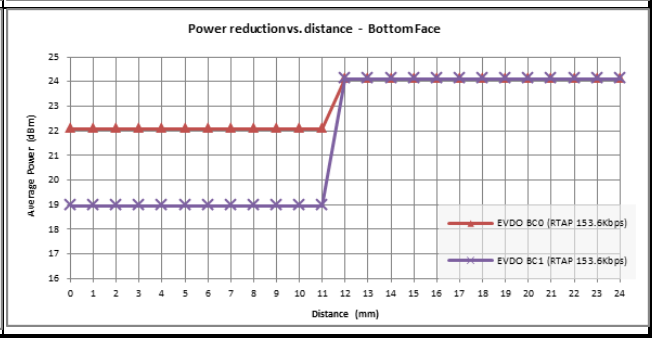
Measurement on EUT:

Band/Mode	Ch #	Measured power reduction (dBm)		Reduction Levels
		w/o power back-off	w/ power back-off	(dB)
GSM850 GPRS (GMSK 1 Tx slot) - CS1	189	31.38	28.09	3.29
GSM850 GPRS (GMSK 2 Tx slot) - CS1	189	31.22	28.19	3.03
GSM850 EDGE (8PSK 1 Tx slot) - MCS5	189	25.86	25.86	0
GSM850 EDGE (8PSK 2 Tx slot) - MCS5	189	25.79	25.79	0
GSM1900 GPRS (GMSK 1 Tx slot) - CS1	661	29.66	26.07	3.59
GSM1900 GPRS (GMSK 2 Tx slot) - CS1	661	29.63	25.86	3.77
GSM1900 EDGE (8PSK 1 Tx slot) - MCS5	661	25.96	25.96	0
GSM1900 EDGE (8PSK 2 Tx slot) - MCS5	661	25.91	25.91	0
WCDMA Band 5 (RMC 12.2Kbps)	4182	24.01	22.40	1.61
WCDMA Band 2 (RMC 12.2Kbps)	9400	24.15	19.39	4.76
WCDMA Band 4 (RMC 12.2Kbps)	1413	24.06	19.56	4.50
EVDO BC0 (RTAP 153.6Kbps)	384	24.09	22.07	2.02
EVDO BC1 (RTAP 153.6Kbps)	600	24.09	18.96	5.13

Proximity Sensor for Bottom Face detection







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

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

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

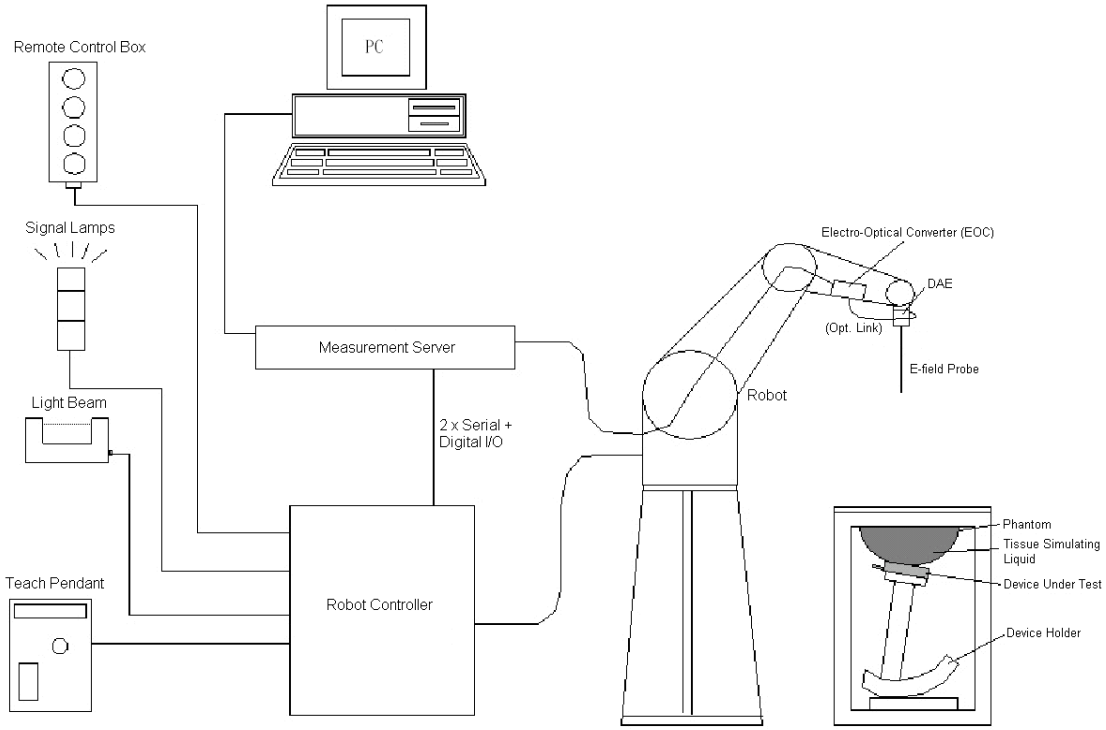


Fig 5.1 SPEAG DASY System Configurations

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

5.1.2 E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure. 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 5.3 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)

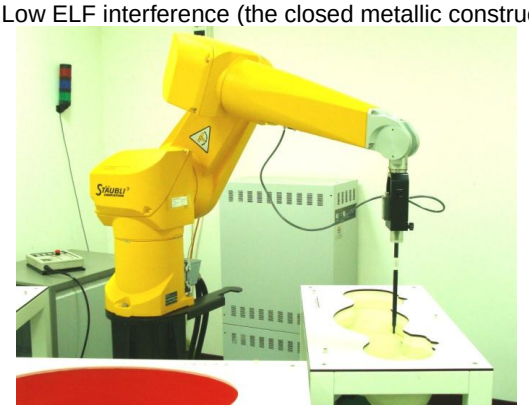


Fig 5.4 Photo of DASY4

Fig 5.5 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 5.6 Photo of Server for DASY4

Fig 5.7 Photo of Server for DASY5

5.5 Phantom

<SAM Twin Phantom>

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

Fig 5.8 Photo of SAM 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%)
Filling Volume	Approx. 30 liters
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm

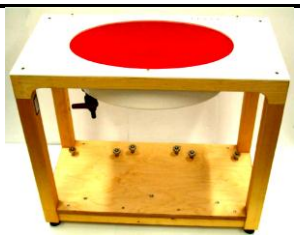


Fig 5.9 Photo of ELI4 Phantom

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 (ERP). 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 5.10 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.

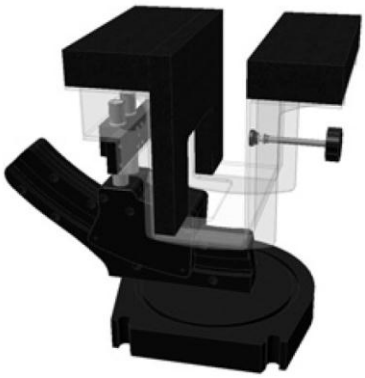


Fig 5.11 Laptop Extension Kit

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	835MHz System Validation Kit	D835V2	499	Mar. 22, 2010	Mar. 21, 2013
SPEAG	1750MHz System Validation Kit	D1750V2	1068	Jun. 20, 2012	Jun. 19, 2013
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Mar. 23, 2010	Mar. 22, 2013
SPEAG	Data Acquisition Electronics	DAE3	495	Apr. 23, 2012	Apr. 22, 2013
SPEAG	Dosimetric E-Field Probe	ET3DV6	1787	May. 29, 2012	May. 28, 2013
H.M.IRIS	Thermometer	TH-08	TM658	Nov. 13, 2012	Nov. 12, 2013
SPEAG	Device Holder	N/A	N/A	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. 02, 2012	Oct. 01, 2013
Anritsu	Radio Communication Analyzer	MT8820C	6201074414	Dec. 11, 2012	Dec. 10, 2014
Agilent	Wireless Communication Test Set	E5515C	MY48360820	Jan. 05, 2012	Jan. 04, 2014
Agilent	Dual Directional Coupler	778D	50422	Note 4	
Woken	Attenuator 1	WK0602-XX	N/A	Note 4	
PE	Attenuator 2	PE7005-10	N/A	Note 4	
PE	Attenuator 3	PE7005- 3	N/A	Note 4	
Agilent	Dielectric Probe Kit	85070D	US01440205	Note 5	
AR	Power Amplifier	5S1G4M2	0328767	Note 6	
R&S	Spectrum Analyzer	FSP	101131	Jul. 23, 2012	Jul. 22, 2013

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 865664 D01v01, 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.
4. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
5. The dielectric probe kit was calibrated via the network analyzer, with the specified procedure (calibrated in pure water) and calibration kit (standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by Agilent.
6. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have 24dBm to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it
7. Attenuator 1 insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.

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 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. 6.1.

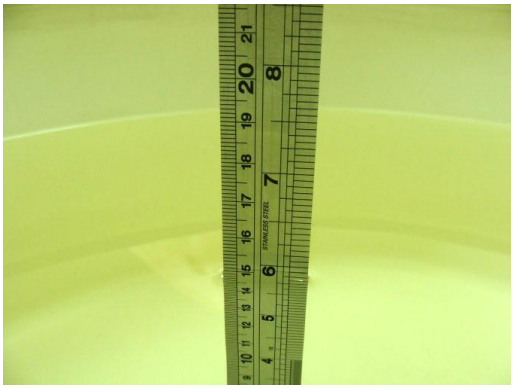


Fig 6.1 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ε_r)
For 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

Table 6.1 Recipes of Tissue Simulating Liquid

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.

The following table shows the measuring results for simulating liquid.

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	Body	21.4	0.963	54.541	0.97	55.2	-0.72	-1.27	±5	Dec. 17, 2012
835	Body	21.5	0.954	52.813	0.97	55.2	-0.72	-1.27	±5	Dec. 18, 2012
1750	Body	21.6	1.546	51.518	1.52	53.3	1.71	-3.34	±5	Dec. 19, 2012
1900	Body	21.6	1.521	53.218	1.52	53.3	0.07	-0.15	±5	Dec. 18, 2012

Table 6.2 Measuring Results for Simulating Liquid

7. SAR System Validation

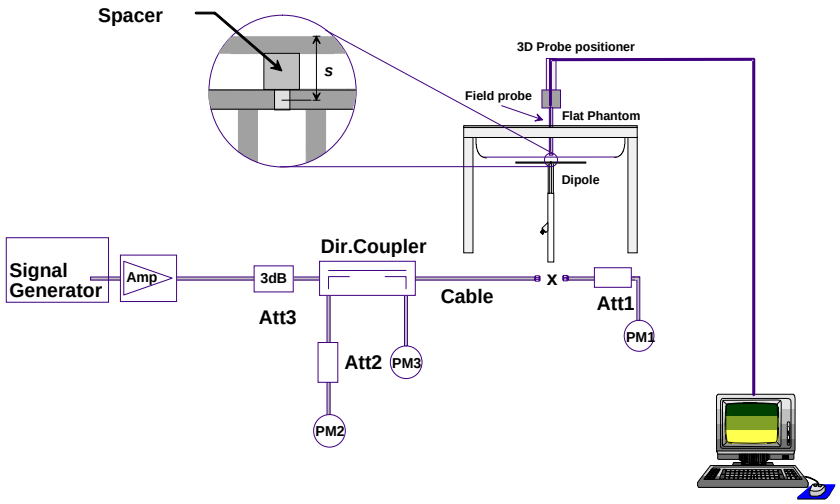
Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix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

7.1 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.

7.2 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:



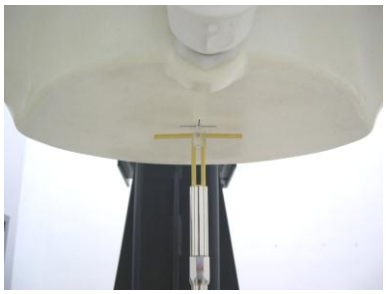


Fig 7.1 System Setup for System Evaluation

Fig 7.2 Photo of Dipole Setup

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

7.3 SAR System Verification Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Table 7.1 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.

Measurement Date	Frequency (MHz)	Liquid Type	Input power fed to dipole (mW)	Targeted SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	Normalized SAR_{1g} (W/kg)	Deviation (%)
Dec. 17, 2012	835	Body	250	9.82	2.34	9.36	-4.68
Dec. 18, 2012	835	Body	250	9.82	2.55	10.20	3.87
Dec. 19, 2012	1750	Body	250	36.8	9.81	39.24	6.63
Dec. 18, 2012	1900	Body	250	40	9.63	38.52	-3.70

Table 7.1 Target and Measurement SAR after Normalized

8. EUT Testing Position

This EUT was tested in three different positions. They are bottom-face of tablet PC, Edge3, and Edge4. In these positions, the surface of EUT is touching with phantom 0 cm, and additional 1 cm separation for bottom-face. Please refer to Appendix E for the test setup photos.

9. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

(a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
(b) Read the WWAN RF power level from the base station simulator.
(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
(b) Place the EUT in the positions as Appendix E demonstrates.
(c) Set scan area, grid size and other setting on the DASY software.
(d) Measure SAR results for the highest power channel on each testing position.
(e) Find out the largest SAR result on these testing positions of each band
(f) Measure SAR results for other channels in worst SAR testing position if the reported 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

9.1 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

9.2 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 is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.
Area scan and zoom scan resolution setting follows KDB 865664 D01v01 quoted below.

For any secondary peaks found in the area scan which are within 2 dB of the maximum peak and are not within this zoom scan, the zoom scan should be repeated.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.

* When zoom scan is required and the *reported* SAR from the area scan based *1-g SAR estimation* procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

9.3 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. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

9.4 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.

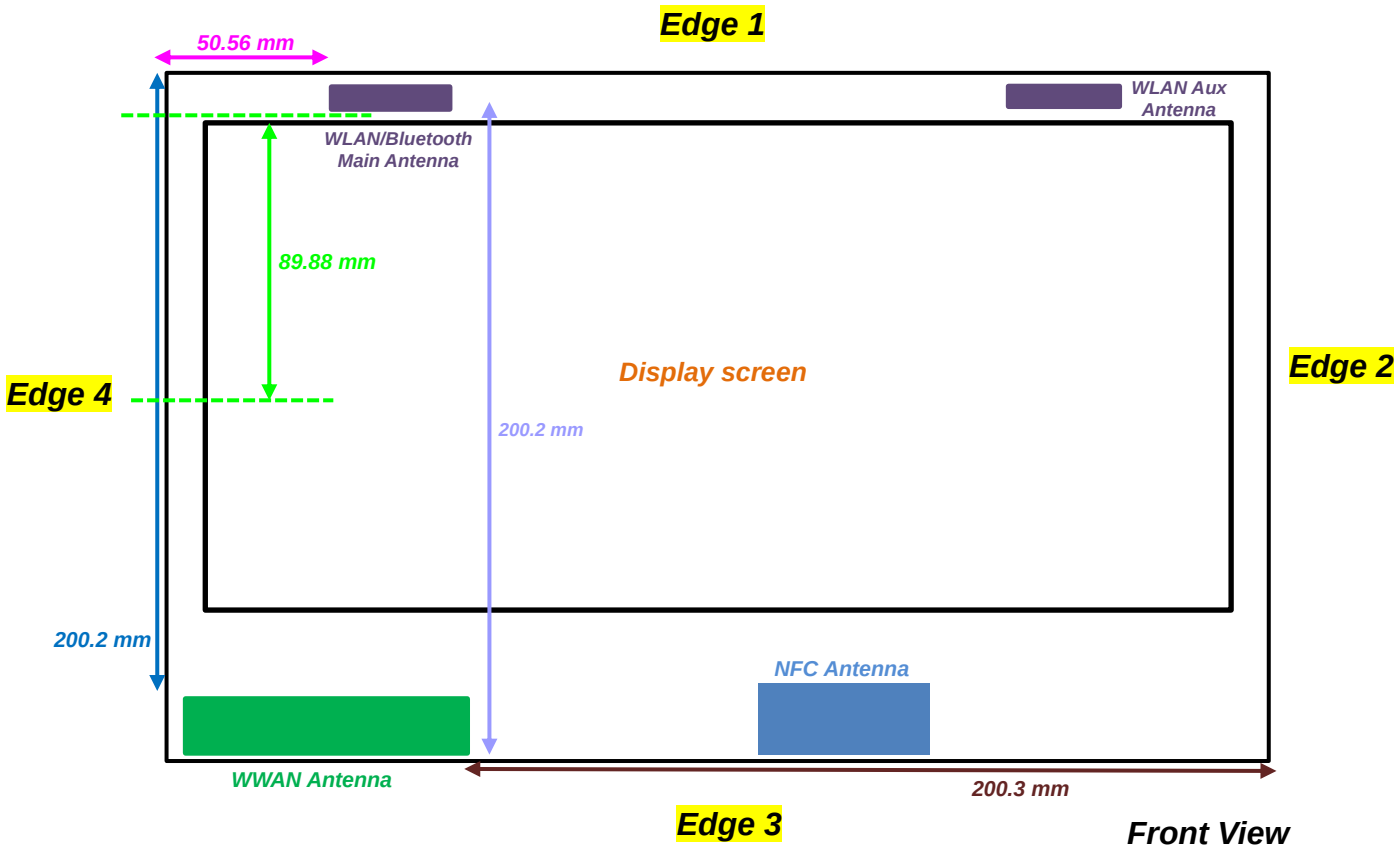
Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty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

9.5 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 drifts more than 5%, the SAR will be retested.

10. Exposure Positions Consideration

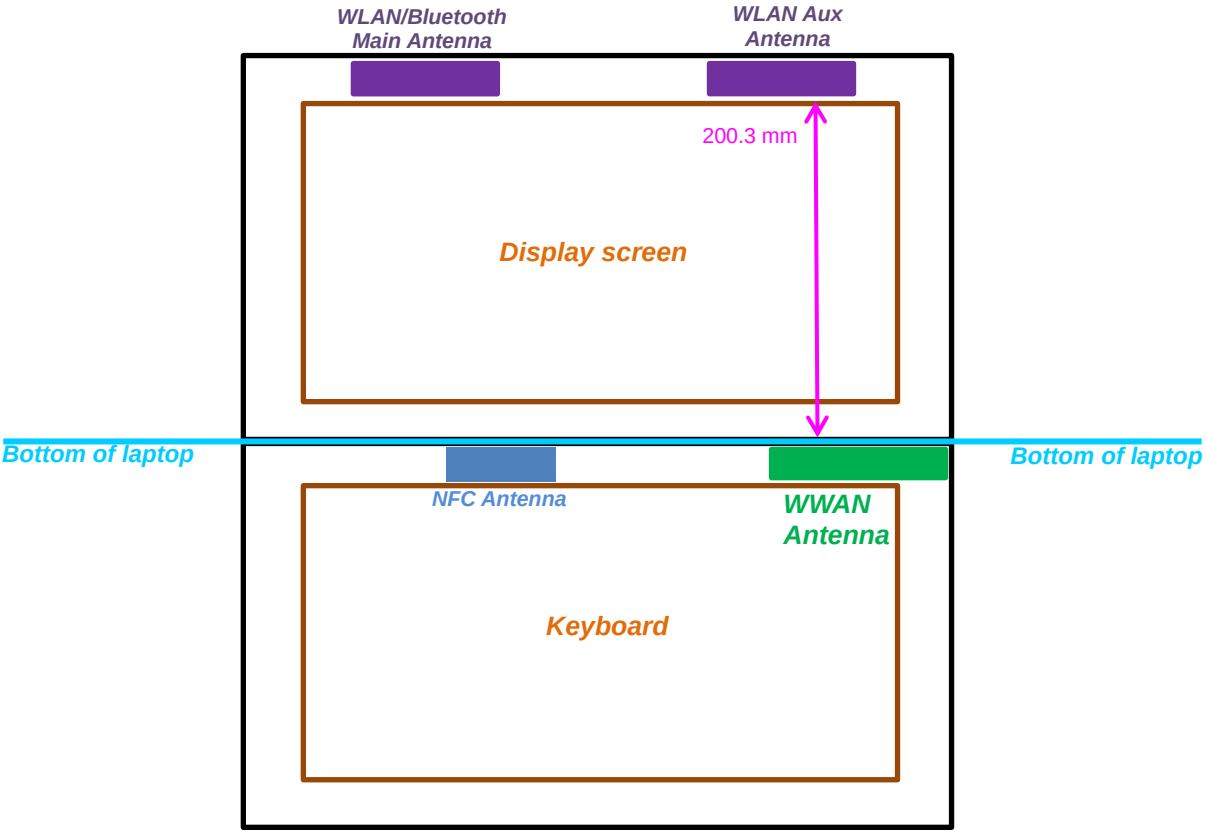
<Tablet PC>



Note:

1. The display screen can be fold onto the keypad and the device is in tablet mode
2. BT/WLAN main and WLAN aux antennas to back (bottom face) separation is 19mm.

<Laptop>



Antennas	Wireless Interface
WWAN Antenna (Tx/Rx)	GSM850 GSM1900 WCDMA Band V WCDMA Band IV WCDMA Band II CDMA BC0 CDMA BC1

<Full Power>

		WWAN Antenna						
Wireless Interface		GPRS850 Class 10	GPRS1900 Class 10	WCDMA Band 5	WCDMA Band 4	WCDMA Band 2	CDMA 2000 BC0	CDMA 2000 BC1
Tune-up Maximum power (dBm)		27	24.8	25.2	25.2	25.2	25	25
Tune-up Maximum rated power (mW)		501.19	302.00	331.13	331.13	331.13	316.23	316.23
Bottom Face	Test Separation Distance (mm)	5						
	SAR exclusion threshold (mW)	16	11	16	11	11	16	11
	SAR testing required?	YES	YES	YES	YES	YES	YES	YES
Edge 1	Test Separation Distance (mm)	200.2						
	SAR exclusion threshold (mW)	1012	1611	1010	1615	1611	999	1611
	SAR testing required?	NO	NO	NO	NO	NO	NO	NO
Edge 2	Test Separation Distance (mm)	200.3						
	SAR exclusion threshold (mW)	1013	1612	1011	1616	1612	1000	1612
	SAR testing required?	NO	NO	NO	NO	NO	NO	NO
Edge 3	Test Separation Distance (mm)	5						
	SAR exclusion threshold (mW)	16	11	16	11	11	11	11
	SAR testing required?	YES	YES	YES	YES	YES	YES	YES
Edge 4	Test Separation Distance (mm)	5						
	SAR exclusion threshold (mW)	16	11	16	11	11	11	11
	SAR testing required?	YES	YES	YES	YES	YES	YES	YES

Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
2. Per KDB 447498 D01v05, for larger devices, the *test separation distance* is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D01v05, standalone SAR test exclusion threshold is applied; If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold

4. Per KDB 447498 D01v05, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison

5. Per KDB 447498 D01v05, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
   a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz
6. For the bottom-face that proximity sensor power reduction is applied for SAR compliance, additional SAR testing at "sensor trigger distance – 1mm" with EUT transmitting full power in normal mode was performed.

11. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

Note:

1. Per KDB 447498 D01v05, the maximum output power channel is used for SAR testing and for further SAR test reduction.

GSM850 Burst Average Power (dBm)									
Channel	128	189	251	128	189	251	128	189	251
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8	824.2	836.4	848.8
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
GPRS (GMSK, 1 Tx slot) – CS1	31.56	31.38	31.32	28.12	28.09	27.94	3.44	3.29	3.38
GPRS (GMSK, 2 Tx slots) – CS1	31.37	31.22	31.17	28.04	28.19	27.96	3.33	3.03	3.21
EDGE (GMSK, 1 Tx slot) – MCS1	31.45	31.55	31.53	28.10	28.18	27.96	3.35	3.37	3.57
EDGE (GMSK, 2 Tx slots) – MCS1	31.31	31.20	31.16	27.93	28.04	27.80	3.38	3.16	3.36
EDGE (8PSK, 1 Tx slot) – MCS5	25.85	25.86	25.85	25.85	25.86	25.85	0	0	0
EDGE (8PSK, 2 Tx slots) – MCS5	25.80	25.79	25.81	25.80	25.79	25.81	0	0	0
GSM850 Frame-Average Power (dBm)									
Channel	128	189	251	128	189	251	128	189	251
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8	824.2	836.4	848.8
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
GPRS (GMSK, 1 Tx slot) – CS1	22.56	22.38	22.32	19.12	19.09	18.94	3.44	3.29	3.38
GPRS (GMSK, 2 Tx slots) – CS1	25.37	25.22	25.17	22.04	22.19	21.96	3.33	3.03	3.21
EDGE (GMSK, 1 Tx slot) – MCS1	22.45	22.55	22.53	19.10	19.18	18.96	3.35	3.37	3.57
EDGE (GMSK, 2 Tx slots) – MCS1	25.31	25.20	25.16	21.93	22.04	21.80	3.38	3.16	3.36
EDGE (8PSK, 1 Tx slot) – MCS5	16.85	16.86	16.85	16.85	16.86	16.85	0	0	0
EDGE (8PSK, 2 Tx slots) – MCS5	19.80	19.79	19.81	19.80	19.79	19.81	0	0	0

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method is shown as below:
Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 Db

Note:

1. Following KDB 941225 D03, for Body SAR testing, the EUT operating without power back-off was set in GPRS (2 Tx slots) and the EUT operating with power back-off was set in GPRS (2 Tx slots) due to its highest frame-average power.

GSM1900 Burst Average Power (dBm)									
Channel	512	661	810	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1850.2	1880	1909.8
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
GPRS (GMSK, 1 Tx slot) – CS1	29.92	29.66	29.23	26.23	26.07	25.67	3.69	3.59	3.56
GPRS (GMSK, 2 Tx slots) – CS1	29.84	29.63	29.11	26.07	25.86	25.48	3.77	3.77	3.63
EDGE (GMSK, 1 Tx slot) – MCS1	29.89	29.81	29.57	26.20	26.06	25.91	3.69	3.75	3.66
EDGE (GMSK, 2 Tx slots) – MCS1	29.74	29.61	29.38	26.06	25.90	25.70	3.68	3.71	3.68
EDGE (8PSK, 1 Tx slot) – MCS5	26.18	25.96	25.80	26.18	25.96	25.80	0.00	0.00	0.00
EDGE (8PSK, 2 Tx slots) – MCS5	26.13	25.91	25.67	26.13	25.91	25.67	0.00	0.00	0.00
GSM1900 Frame-Averaged Power (dBm)									
Channel	512	661	810	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880	1909.8	1850.2	1880	1909.8	1850.2	1880	1909.8
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
GPRS (GMSK, 1 Tx slot) – CS1	20.92	20.66	20.23	17.23	17.07	16.67	3.69	3.59	3.56
GPRS (GMSK, 2 Tx slots) – CS1	23.84	23.63	23.11	20.07	19.86	19.48	3.77	3.77	3.63
EDGE (GMSK, 1 Tx slot) – MCS1	20.89	20.81	20.57	17.20	17.06	16.91	3.69	3.75	3.66
EDGE (GMSK, 2 Tx slots) – MCS1	23.74	23.61	23.38	20.06	19.90	19.70	3.68	3.71	3.68
EDGE (8PSK, 1 Tx slot) – MCS5	17.18	16.96	16.80	17.18	16.96	16.80	0.00	0.00	0.00
EDGE (8PSK, 2 Tx slots) – MCS5	20.13	19.91	19.67	20.13	19.91	19.67	0.00	0.00	0.00

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method is shown as below:
Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Note:

1. Following KDB 941225 D03, for Body SAR testing, the EUT operating without power back-off was set in GPRS (2 Tx slots) and the EUT operating with power back-off was set in GPRS (2 Tx slots) due to its highest frame-average power.

<WCDMA Conducted Power>

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification. A summary of these settings are illustrated below:

HSDPA Setup Configuration:

a. The EUT was connected to Base Station referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set Gain Factors (β_c and β_d) and parameters were set according to each
   ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
   iii. Set RMC 12.2Kbps + HSDPA mode.
   iv. Set Cell Power = -86 dBm
   v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
   vi. Select HSDPA Uplink Parameters
   vii. Set Delta ACK, Delta NACK and Delta CQI = 8
   viii. Set Ack-Nack Repetition Factor to 3
   ix. Set CQI Feedback Cycle (k) to 4 ms
   x. Set CQI Repetition Factor to 2
   xi. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{HS} *(Note1, Note 2)*	CM (dB) *(Note 3)*	MPR (dB) *(Note 3)*
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 *(Note 4)*	15/15 *(Note 4)*	64	12/15 *(Note 4)*	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 30/15 with β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_c.

Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

Setup Configuration

HSUPA Setup Configuration:

a. The EUT was connected to Base Station referred to the Setup Configuration.
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting * :
   i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
   ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
   iii. Set Cell Power = -86 dBm
   iv. Set Channel Type = 12.2k + HSPA
   v. Set UE Target Power
   vi. Power Ctrl Mode= Alternating bits
   vii. Set and observe the E-TFCI
   viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
d. The transmitted maximum output power was recorded.

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.
Note 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

Setup Configuration

<WCDMA Conducted Power>

Note:

1. Applying the subtest setup in Table C.11.1.3 of 3GPP TS 34.121-1 V9.1.0 to Rel. 6 HSPA.
2. Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA output power is < 0.25dB higher than RMC, HSDPA/HSUPA SAR evaluation can be excluded.
3. By design, HSDPA/HSUPA RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procure exhibit.
4. It is expected by the manufacturer that MPR for some HSDPA/HSUPA subtests may differ from the specification of 3GPP, according to the chipset implementation in this model. The implementation and expected deviation are detailed in tune-up procedure exhibit.

WCDMA Band V Average power (dBm)										
Channel		4132	4182	4233	4132	4182	4233	4132	4182	4233
Frequency (MHz)		826.4	836.4	846.6	826.4	836.4	846.6	826.4	836.4	846.6
Mode		Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
3GPP Rel 99	RMC 12.2Kbps	24.02	24.01	24.06	22.45	22.40	**22.56**	1.57	1.61	1.50
3GPP Rel 6	HSDPA Subtest-1	23.40	23.53	23.56	22.00	22.11	22.03	1.40	1.42	1.53
3GPP Rel 6	HSDPA Subtest-2	23.26	23.35	23.45	21.97	22.02	21.99	1.29	1.33	1.46
3GPP Rel 6	HSDPA Subtest-3	23.02	23.08	23.14	21.54	21.66	21.59	1.48	1.42	1.55
3GPP Rel 6	HSDPA Subtest-4	22.91	22.95	23.08	21.53	21.52	21.50	1.38	1.43	1.58
3GPP Rel 6	HSUPA Subtest-1	23.43	23.63	23.35	21.63	21.58	21.78	1.80	2.05	1.57
3GPP Rel 6	HSUPA Subtest-2	22.32	22.29	22.38	20.60	20.50	20.63	1.72	1.79	1.75
3GPP Rel 6	HSUPA Subtest-3	22.24	22.36	22.31	20.59	20.50	20.61	1.65	1.86	1.70
3GPP Rel 6	HSUPA Subtest-4	22.68	22.60	22.66	21.01	20.91	21.05	1.67	1.69	1.61
3GPP Rel 6	HSUPA Subtest-5	23.34	23.53	23.31	21.90	21.88	21.95	1.44	1.65	1.36

WCDMA Band V MPR Results (dB)								
Channel		4132	4182	4233	4132	4182	4233	3GPP MPR
Subtests		Without Power Back-off			With Power Back-off			(dB)
3GPP Rel 6	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00	**0**
3GPP Rel 6	HSDPA Subtest-2	0.14	0.18	0.11	0.03	0.09	0.04	**0**
3GPP Rel 6	HSDPA Subtest-3	0.38	0.45	0.42	0.46	0.45	0.44	**≤ 0.5**
3GPP Rel 6	HSDPA Subtest-4	0.49	0.58	0.48	0.47	0.59	0.53	**≤ 0.5**
3GPP Rel 6	HSUPA Subtest-1	-0.09	-0.10	-0.04	0.27	0.30	0.17	**0**
3GPP Rel 6	HSUPA Subtest-2	1.02	1.24	0.93	1.30	1.38	1.32	**≤ 2**
3GPP Rel 6	HSUPA Subtest-3	1.10	1.17	1.00	1.31	1.38	1.34	**≤ 1**
3GPP Rel 6	HSUPA Subtest-4	0.66	0.93	0.65	0.89	0.97	0.90	**≤ 2**
3GPP Rel 6	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00	**0**

WCDMA Band II Average power (dBm)										
Channel		9262	9400	9538	9262	9400	9538	9262	9400	9538
Frequency (MHz)		1852.4	1880.0	1907.6	1852.4	1880.0	1907.6	1852.4	1880.0	1907.6
Mode		Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
3GPP Rel 99	RMC 12.2Kbps	24.12	24.15	23.86	19.38	19.39	19.16	4.74	4.76	4.7
3GPP Rel 6	HSDPA Subtest-1	23.70	23.76	23.49	18.77	19.19	18.74	4.93	4.57	4.75
3GPP Rel 6	HSDPA Subtest-2	23.58	23.60	23.43	18.56	18.98	18.54	5.02	4.62	4.89
3GPP Rel 6	HSDPA Subtest-3	23.17	23.25	23.06	18.39	18.80	18.46	4.78	4.45	4.6
3GPP Rel 6	HSDPA Subtest-4	23.08	23.13	23.01	18.27	18.62	18.32	4.81	4.51	4.69
3GPP Rel 6	HSUPA Subtest-1	23.23	23.55	23.49	18.57	18.86	18.80	4.66	4.69	4.69
3GPP Rel 6	HSUPA Subtest-2	22.28	22.55	22.46	17.45	17.67	17.61	4.83	4.88	4.85
3GPP Rel 6	HSUPA Subtest-3	22.33	22.70	22.59	17.78	18.02	17.96	4.55	4.68	4.63
3GPP Rel 6	HSUPA Subtest-4	22.65	22.94	22.81	17.43	17.56	17.50	5.22	5.38	5.31
3GPP Rel 6	HSUPA Subtest-5	23.38	23.68	23.53	18.43	18.57	18.50	4.95	5.11	5.03

WCDMA Band II MPR Results (dB)								
Channel		9262	9400	9538	9262	9400	9538	3GPP MPR
Subtests		Without Power Back-off			With Power Back-off			(dB)
3GPP Rel 6	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00	**0**
3GPP Rel 6	HSDPA Subtest-2	0.12	0.16	0.06	0.21	0.21	0.20	**0**
3GPP Rel 6	HSDPA Subtest-3	0.53	0.51	0.43	0.38	0.39	0.28	**≤ 0.5**
3GPP Rel 6	HSDPA Subtest-4	0.62	0.63	0.48	0.50	0.57	0.42	**≤ 0.5**
3GPP Rel 6	HSUPA Subtest-1	0.15	0.13	0.04	-0.14	-0.29	-0.30	**0**
3GPP Rel 6	HSUPA Subtest-2	1.10	1.13	1.07	0.98	0.90	0.89	**≤ 2**
3GPP Rel 6	HSUPA Subtest-3	1.05	0.98	0.94	0.65	0.55	0.54	**≤ 1**
3GPP Rel 6	HSUPA Subtest-4	0.73	0.74	0.72	1.00	1.01	1.00	**≤ 2**
3GPP Rel 6	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00	**0**

Band		WCDMA Band IV Average power (dBm)								
Channel		1312	1413	1513	1312	1413	1513	1312	1413	1513
Frequency (MHz)		1712.4	1732.6	1752.6	1712.4	1732.6	1752.6	1712.4	1732.6	1752.6
Mode		Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
3GPP Rel 99	RMC 12.2Kbps	24.07	24.06	24.06	19.53	19.56	19.46	4.54	4.50	4.60
3GPP Rel 6	HSDPA Subtest-1	23.50	23.38	23.31	19.01	19.02	18.96	4.49	4.36	4.35
3GPP Rel 6	HSDPA Subtest-2	23.44	23.33	23.23	18.93	18.98	18.90	4.51	4.35	4.33
3GPP Rel 6	HSDPA Subtest-3	23.08	22.93	22.87	18.42	18.49	18.34	4.66	4.44	4.53
3GPP Rel 6	HSDPA Subtest-4	22.99	22.86	22.79	18.37	18.46	18.35	4.62	4.40	4.44
3GPP Rel 6	HSUPA Subtest-1	23.58	23.63	23.51	18.86	18.81	18.95	4.72	4.82	4.56
3GPP Rel 6	HSUPA Subtest-2	22.21	22.26	22.23	17.50	17.46	17.53	4.71	4.80	4.70
3GPP Rel 6	HSUPA Subtest-3	22.48	22.55	22.41	17.53	17.48	17.60	4.95	5.07	4.81
3GPP Rel 6	HSUPA Subtest-4	22.62	22.68	22.59	17.96	17.87	17.99	4.66	4.81	4.60
3GPP Rel 6	HSUPA Subtest-5	23.71	23.77	23.68	19.03	18.98	19.08	4.68	4.79	4.60

Band		WCDMA Band IV MPR Results (dB)						
Channel		1312	1413	1513	1312	1413	1513	3GPP MPR
Subtests		Without Power Back-off			With Power Back-off			(dB)
3GPP Rel 6	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00	**0**
3GPP Rel 6	HSDPA Subtest-2	0.06	0.05	0.08	0.08	0.04	0.06	**0**
3GPP Rel 6	HSDPA Subtest-3	0.42	0.45	0.44	0.59	0.53	0.62	**≤ 0.5**
3GPP Rel 6	HSDPA Subtest-4	0.51	0.52	0.52	0.64	0.56	0.61	**≤ 0.5**
3GPP Rel 6	HSUPA Subtest-1	0.13	0.14	0.17	0.17	0.17	0.13	**0**
3GPP Rel 6	HSUPA Subtest-2	1.50	1.51	1.45	1.53	1.52	1.55	**≤ 2**
3GPP Rel 6	HSUPA Subtest-3	1.23	1.22	1.27	1.50	1.50	1.48	**≤ 1**
3GPP Rel 6	HSUPA Subtest-4	1.09	1.09	1.09	1.07	1.11	1.09	**≤ 2**
3GPP Rel 6	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00	**0**

<CDMA2000 Conducted Power>

Note:

1. Referring to KDB 941225 D01, the data device SAR is tested with Ev-Do Rev 0 (RTAP 153.6kbps). If 1xRTT and Ev-Do Rev A (RETAP 4096 bits) power is less than 1/4dB higher than Re v0, SAR tests with those settings are not necessary.

Band	CDMA2000 BC0								
Channel	1013	384	777	1013	384	777	1013	384	777
Frequency (MHz)	824.70	836.52	848.31	824.70	836.52	848.31	824.70	836.52	848.31
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
1xRTT RC1 SO55	24.14	24.17	24.11	22.18	22.08	22.03	1.96	2.09	2.08
1xRTT RC3 SO55	24.12	24.13	24.10	22.15	22.10	22.05	1.97	2.03	2.05
1xRTT RC3 SO32(+ F-SCH)	24.13	24.12	24.09	22.13	22.07	22.06	2.00	2.05	2.03
1xRTT RC3 SO32(+SCH)	24.10	24.13	24.08	22.15	22.09	22.03	1.95	2.04	2.05
1xEv-Do RTAP 153.6kbps	24.16	24.09	24.15	22.17	22.07	22.06	1.99	2.02	2.09
1xEv-Do RETAP 4096bits	24.14	24.10	24.14	22.14	22.11	22.05	2.00	1.99	2.09

Band	CDMA2000 BC1								
Channel	25	600	1175	25	600	1175	25	600	1175
Frequency (MHz)	1851.25	1880.00	1908.75	1851.25	1880.00	1908.75	1851.25	1880.00	1908.75
Mode	Without Power Back-off			With Power Back-off			Pwr. Reduction (dB)		
1xRTT RC1+SO55	24.20	24.05	23.96	19.16	19.10	19.07	5.04	4.95	4.89
1xRTT RC3+SO55	24.16	24.02	23.87	19.14	19.13	19.08	5.02	4.89	4.79
1xRTT RC3+SO32 (FCH)	24.15	24.03	23.86	19.14	19.09	19.12	5.01	4.94	4.74
1xRTT RC3+SO32 (FCH+SCH)	24.15	24.05	23.89	19.12	19.12	19.11	5.03	4.93	4.78
1xEVDO RTAP 153.6kbps	24.19	24.09	24.04	18.92	18.96	18.93	5.27	5.13	5.11
1xEVDO RETAP 4096bits	24.18	24.08	23.96	19.05	18.86	18.98	5.13	5.22	4.98

12. SAR Test Results

<Note>

1. Per KDB 447498 D01v05, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   Reported SAR(W/kg)= Measured SAR(W/kg) Scaling Factor*
2. Per KDB 447498 D01v05, for each exposure position, if the highest output channel reported SAR <0.8W/kg, other channels SAR testing are not necessary
3. For the exposure positions that proximity sensor power reduction is applied for SAR compliance, additional SAR testing with EUT transmitting full power in normal mode was performed; in this report, it is 1cm for bottom face

12.1 Test Records for Body SAR Test

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Back-off	Burst Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measure SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
Tablet mode													
13	GSM850	GPRS (2 Tx slots)	Bottom Face	1cm	128	824.2	OFF	31.37	33	1.455	-0.04	0.592	0.862
14	GSM850	GPRS (2 Tx slots)	Bottom Face	1cm	189	836.4	OFF	31.22	33	1.507	0.17	0.624	0.940
15	GSM850	GPRS (2 Tx slots)	Bottom Face	1cm	251	848.8	OFF	31.17	33	1.524	-0.1	0.697	1.062
1	GSM850	GPRS (2 Tx slots)	Bottom Face	0cm	189	836.4	ON	28.19	29.9	1.483	0.14	0.953	1.413
2	GSM850	GPRS (2 Tx slots)	Bottom Face	0cm	128	824.2	ON	28.04	29.9	1.535	-0.02	0.895	1.373
3	**GSM850**	**GPRS (2 Tx slots)**	**Bottom Face**	**0cm**	**251**	**848.8**	**ON**	**27.96**	**29.9**	**1.563**	**0.07**	**0.925**	**1.446**
4	GSM850	GPRS (2 Tx slots)	Edge 3	0cm	189	836.4	ON	28.19	29.9	1.483	0.168	0.812	1.204
5	GSM850	GPRS (2 Tx slots)	Edge 3	0cm	128	824.2	ON	28.04	29.9	1.535	0.153	0.713	1.094
6	GSM850	GPRS (2 Tx slots)	Edge 3	0cm	251	848.8	ON	27.96	29.9	1.563	-0.01	0.842	1.316
7	GSM850	GPRS (2 Tx slots)	Edge 4	0cm	189	836.4	ON	28.19	29.9	1.483	0.142	0.557	0.826
8	GSM850	GPRS (2 Tx slots)	Edge 4	0cm	128	824.2	ON	28.04	29.9	1.535	0.02	0.569	0.873
9	GSM850	GPRS (2 Tx slots)	Edge 4	0cm	251	848.8	ON	27.96	29.9	1.563	-0.131	0.511	0.799
Laptop mode													
10	GSM850	GPRS (2 Tx slots)	Bottom	0cm	189	836.4	ON	28.19	29.9	1.483	-0.02	0.838	1.242
11	GSM850	GPRS (2 Tx slots)	Bottom	0cm	128	824.2	ON	28.04	29.9	1.535	-0.07	0.794	1.218
12	GSM850	GPRS (2 Tx slots)	Bottom	0cm	251	848.8	ON	27.96	29.9	1.563	0.128	0.886	1.385

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Back-off	Burst Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measure SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
Tablet mode													
84	GSM1900	GPRS (2 Tx slots)	Bottom Face	1cm	512	1850.2	OFF	29.84	30.8	1.247	-0.02	0.581	0.725
71	GSM1900	GPRS (2 Tx slots)	Bottom Face	0cm	512	1850.2	ON	26.07	26.3	1.054	-0.08	0.913	0.963
72	GSM1900	GPRS (2 Tx slots)	Bottom Face	0cm	661	1880	ON	25.86	26.3	1.107	-0.02	0.797	0.882
73	GSM1900	GPRS (2 Tx slots)	Bottom Face	0cm	810	1909.8	ON	25.48	26.3	1.208	0.09	0.631	0.762
74	GSM1900	GPRS (2 Tx slots)	Edge 3	0cm	512	1850.2	ON	26.07	26.3	1.054	0.05	1.01	1.065
75	GSM1900	GPRS (2 Tx slots)	Edge 3	0cm	661	1880	ON	25.86	26.3	1.107	0.01	0.824	0.912
76	GSM1900	GPRS (2 Tx slots)	Edge 3	0cm	810	1909.8	ON	25.48	26.3	1.208	0.08	0.69	0.833
77	**GSM1900**	**GPRS (2 Tx slots)**	**Edge 4**	**0cm**	**512**	**1850.2**	**ON**	**26.07**	**26.3**	**1.054**	**-0.16**	**1.36**	**1.434**
78	GSM1900	GPRS (2 Tx slots)	Edge 4	0cm	661	1880	ON	25.86	26.3	1.107	0.01	1.24	1.372
79	GSM1900	GPRS (2 Tx slots)	Edge 4	0cm	810	1909.8	ON	25.48	26.3	1.208	-0.08	1.14	1.377
Laptop mode													
80	GSM1900	GPRS (2 Tx slots)	Bottom	0cm	512	1850.2	ON	26.07	26.3	1.054	-0.02	0.88	0.928
81	GSM1900	GPRS (2 Tx slots)	Bottom	0cm	661	1880	ON	25.86	26.3	1.107	-0.05	0.771	0.853
82	GSM1900	GPRS (2 Tx slots)	Bottom	0cm	810	1909.8	ON	25.48	26.3	1.208	0.12	0.611	0.738

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Back-off	Burst Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measure SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
Tablet mode													
44	WCDMA V	RMC12.2Kbps	Bottom Face	1cm	4233	846.6	OFF	24.06	25.2	1.300	-0.01	0.489	0.636
16	WCDMA V	RMC12.2Kbps	Bottom Face	0cm	4233	846.6	ON	22.56	23.3	1.186	0.02	1.17	1.387
17	WCDMA V	RMC12.2Kbps	Bottom Face	0cm	4132	826.4	ON	22.45	23.3	1.216	0.08	1.13	1.374
18	**WCDMA V**	**RMC12.2K**bps	**Bottom Face**	**0cm**	**4182**	**836.4**	**ON**	**22.4**	**23.3**	**1.230**	**-0.138**	**1.21**	**1.489**
28	WCDMA V	HSDPA subtest 1	Bottom Face	0cm	4233	846.6	ON	22.03	23.3	1.340	-0.02	0.821	1.100
29	WCDMA V	HSDPA subtest 1	Bottom Face	0cm	4132	826.4	ON	22	23.3	1.349	0	0.774	1.044
30	WCDMA V	HSDPA subtest 1	Bottom Face	0cm	4182	836.4	ON	22.11	23.3	1.315	-0.03	0.83	1.092
31	WCDMA V	HSUPA subtest 5	Bottom Face	0cm	4233	846.6	ON	21.95	23.3	1.365	-0.02	0.989	1.350
32	WCDMA V	HSUPA subtest 5	Bottom Face	0cm	4132	826.4	ON	21.9	23.3	1.380	0.01	0.757	1.045
33	WCDMA V	HSUPA subtest 5	Bottom Face	0cm	4182	836.4	ON	21.88	23.3	1.387	-0.03	0.967	1.341
19	WCDMA V	RMC12.2Kbps	Edge 3	0cm	4233	846.6	ON	22.56	23.3	1.186	-0.04	1.15	1.364
20	WCDMA V	RMC12.2Kbps	Edge 3	0cm	4132	826.4	ON	22.45	23.3	1.216	-0.05	1.01	1.228
21	WCDMA V	RMC12.2Kbps	Edge 3	0cm	4182	836.4	ON	22.4	23.3	1.230	-0.01	0.98	1.206
34	WCDMA V	RMC12.2Kbps	Edge 4	0cm	4233	846.6	ON	22.56	23.3	1.186	0.15	0.671	0.796
Laptop mode													
35	WCDMA V	RMC12.2Kbps	Bottom	0cm	4233	846.6	ON	22.56	23.3	1.186	-0.03	1.01	1.198
36	WCDMA V	RMC12.2Kbps	Bottom	0cm	4132	826.4	ON	22.45	23.3	1.216	0.01	0.95	1.155
37	WCDMA V	RMC12.2Kbps	Bottom	0cm	4182	836.4	ON	22.4	23.3	1.230	0	0.982	1.208

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Back-off	Burst Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measure SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
Tablet mode													
119	WCDMA IV	RMC12.2Kbps	Bottom Face	1cm	1312	1712.4	OFF	24.07	25.2	1.297	-0.07	0.56	0.726
105	WCDMA IV	RMC12.2Kbps	Bottom Face	0cm	1413	1732.6	ON	19.56	20.1	1.132	-0.01	0.69	0.781
106	WCDMA IV	RMC12.2Kbps	Edge 3	0cm	1413	1732.6	ON	19.56	20.1	1.132	0.09	0.895	1.013
107	WCDMA IV	RMC12.2Kbps	Edge 3	0cm	1312	1712.4	ON	19.53	20.1	1.140	-0.1	0.952	1.086
108	WCDMA IV	RMC12.2Kbps	Edge 3	0cm	1513	1752.6	ON	19.46	20.1	1.159	0.07	0.837	0.970
109	**WCDMA IV**	RMC12.2Kbps	**Edge 4**	**0cm**	**1413**	**1732.6**	**ON**	**19.56**	**20.1**	**1.132**	**-0.02**	**1.31**	**1.483**
110	WCDMA IV	RMC12.2Kbps	Edge 4	0cm	1312	1712.4	ON	19.53	20.1	1.140	0.12	1.22	1.391
111	WCDMA IV	RMC12.2Kbps	Edge 4	0cm	1513	1752.6	ON	19.46	20.1	1.159	0.01	1.18	1.367
112	WCDMA IV	HSDPA subtest 1	Edge 4	0cm	1413	1732.6	ON	19.02	20.1	1.282	0.01	1.13	1.449
113	WCDMA IV	HSDPA subtest 1	Edge 4	0cm	1312	1712.4	ON	19.01	20.1	1.285	0.01	1.1	1.414
114	WCDMA IV	HSDPA subtest 1	Edge 4	0cm	1513	1752.6	ON	18.96	20.1	1.300	0.01	1.06	1.378
115	WCDMA IV	HSUPA subtest 5	Edge 4	0cm	1413	1732.6	ON	18.98	20.1	1.294	-0.03	0.932	1.206
116	WCDMA IV	HSUPA subtest 5	Edge 4	0cm	1312	1712.4	ON	19.03	20.1	1.279	-0.01	1.06	1.356
117	WCDMA IV	HSUPA subtest 5	Edge 4	0cm	1513	1752.6	ON	19.08	20.1	1.265	-0.02	1.05	1.328
Laptop mode													
118	WCDMA IV	RMC12.2Kbps	Bottom	0cm	1413	1732.6	ON	19.56	20.1	1.132	0.07	0.839	0.950
121	WCDMA IV	RMC12.2Kbps	Bottom	0cm	1312	1712.4	ON	19.53	20.1	1.140	0.01	0.807	0.920
122	WCDMA IV	RMC12.2Kbps	Bottom	0cm	1513	1752.6	ON	19.46	20.1	1.159	-0.04	0.71	0.823

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Back-off	Burst Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measure SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
Tablet mode													
104	WCDMA II	RMC12.2Kbps	Bottom Face	1cm	9400	1880	OFF	24.15	25.2	1.274	0.02	0.543	0.692
85	WCDMA II	RMC12.2Kbps	Bottom Face	0cm	9400	1880	ON	19.39	19.7	1.074	0.11	0.672	0.722
88	WCDMA II	RMC12.2Kbps	Edge 3	0cm	9400	1880	ON	19.39	19.7	1.074	-0.07	0.779	0.837
89	WCDMA II	RMC12.2Kbps	Edge 3	0cm	9262	1852.4	ON	19.38	19.7	1.076	-0.07	0.675	0.727
90	WCDMA II	RMC12.2Kbps	Edge 3	0cm	9538	1907.6	ON	19.16	19.7	1.132	-0.06	0.751	0.850
91	WCDMA II	RMC12.2Kbps	Edge 4	0cm	9400	1880	ON	19.39	19.7	1.074	0.001	1.22	1.310
92	WCDMA II	RMC12.2Kbps	Edge 4	0cm	9262	1852.4	ON	19.38	19.7	1.076	0.03	1.05	1.130
93	WCDMA II	RMC12.2Kbps	Edge 4	0cm	9538	1907.6	ON	19.16	19.7	1.132	-0.13	1.19	1.348
94	WCDMA II	HSDPA subtest 1	Edge 4	0cm	9400	1880	ON	19.19	19.7	1.125	-0.143	1.21	1.361
95	WCDMA II	HSDPA subtest 1	Edge 4	0cm	9262	1852.4	ON	18.77	19.7	1.239	-0.001	1.06	1.313
96	**WCDMA II**	**HSDPA subtest 1**	**Edge 4**	**0cm**	**9538**	**1907.6**	**ON**	**18.74**	**19.7**	**1.247**	**0.138**	**1.2**	**1.497**
97	WCDMA II	HSUPA subtest 5	Edge 4	0cm	9400	1880	ON	18.57	19.7	1.297	-0.05	0.918	1.191
98	WCDMA II	HSUPA subtest 5	Edge 4	0cm	9262	1852.4	ON	18.43	19.7	1.340	-0.08	0.857	1.148
99	WCDMA II	HSUPA subtest 5	Edge 4	0cm	9538	1907.6	ON	18.5	19.7	1.318	-0.03	0.975	1.285
Laptop mode													
101	WCDMA II	RMC12.2Kbps	Bottom	0cm	9400	1880	ON	19.39	19.7	1.074	-0.02	0.672	0.722
102	WCDMA II	RMC12.2Kbps	Bottom	0cm	9262	1852.4	ON	19.38	19.7	1.076	0.04	0.594	0.639
103	WCDMA II	RMC12.2Kbps	Bottom	0cm	9538	1907.6	ON	19.16	19.7	1.132	-0.01	0.728	0.824

Note:

1. For Body SAR, per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA output power is < 0.25dB higher than RMC, or *Reported* SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA SAR evaluation can be excluded.
2. If *Reported* SAR with RMC 12.2kbps setting is > 1.2W/kg, HSDPA subtest-1 and HSUPA subtest-5 SAR is additionally tested at that exposure position.

<CDMA2000>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Back-off	Burst Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measure SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
Tablet mode													
60	CDMA2000 BC0	RTAP 153.6	Bottom Face	1cm	1013	824.7	OFF	24.16	25	1.213	-0.02	0.481	0.584
46	CDMA2000 BC0	RTAP 153.6	Bottom Face	0cm	1013	824.7	ON	22.17	23.7	1.422	-0.14	0.922	1.311
47	CDMA2000 BC0	RTAP 153.6	Bottom Face	0cm	384	836.52	ON	22.07	23.7	1.455	0.146	0.984	1.432
48	CDMA2000 BC0	RTAP 153.6	Bottom Face	0cm	777	848.31	ON	22.06	23.7	1.459	-0.169	0.905	1.320
49	CDMA2000 BC0	RTAP 153.6	Edge 3	0cm	1013	824.7	ON	22.17	23.7	1.422	-0.06	0.845	1.202
50	CDMA2000 BC0	RTAP 153.6	Edge 3	0cm	384	836.52	ON	22.07	23.7	1.455	0.04	0.85	1.237
51	CDMA2000 BC0	RTAP 153.6	Edge 3	0cm	777	848.31	ON	22.06	23.7	1.459	0.18	0.989	1.443
52	CDMA2000 BC0	RTAP 153.6	Edge 4	0cm	1013	824.7	ON	22.17	23.7	1.422	0.12	0.645	0.917
53	CDMA2000 BC0	RTAP 153.6	Edge 4	0cm	384	836.52	ON	22.07	23.7	1.455	-0.02	0.703	1.023
54	CDMA2000 BC0	RTAP 153.6	Edge 4	0cm	777	848.31	ON	22.06	23.7	1.459	0.04	0.601	0.877
Laptop mode													
55	CDMA2000 BC0	RTAP 153.6	Bottom	0cm	1013	824.7	ON	22.17	23.7	1.422	0.01	0.955	1.358
56	CDMA2000 BC0	RTAP 153.6	Bottom	0cm	384	836.52	ON	22.07	23.7	1.455	0.01	1	1.455
58	**CDMA2000 BC0**	**RTAP 153.6**	**Bottom**	**0cm**	**777**	**848.31**	**ON**	**22.06**	**23.7**	**1.459**	**0**	**1.01**	**1.473**

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Back-off	Burst Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measure SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
Tablet mode													
70	CDMA2000 BC1	RTAP 153.6	Bottom Face	1cm	25	1851.25	OFF	24.19	25	1.205	0.04	0.477	0.575
61	CDMA2000 BC1	RTAP 153.6	Bottom Face	0cm	600	1880	ON	18.96	20.1	1.300	0.04	0.610	0.793
62	CDMA2000 BC1	RTAP 153.6	Edge 3	0cm	600	1880	ON	18.96	20.1	1.300	0.18	0.787	1.023
63	CDMA2000 BC1	RTAP 153.6	Edge 3	0cm	25	1851.25	ON	18.92	20.1	1.312	-0.11	0.562	0.737
64	CDMA2000 BC1	RTAP 153.6	Edge 3	0cm	1175	1908.75	ON	18.93	20.1	1.309	0.08	0.673	0.881
65	CDMA2000 BC1	RTAP 153.6	Edge 4	0cm	600	1880	ON	18.96	20.1	1.300	-0.04	0.988	1.285
66	CDMA2000 BC1	RTAP 153.6	Edge 4	0cm	25	1851.25	ON	18.92	20.1	1.312	-0.15	1.07	1.404
67	**CDMA2000 BC1**	**RTAP 153.6**	**Edge 4**	**0cm**	**1175**	**1908.75**	**ON**	**18.93**	**20.1**	**1.309**	**-0.06**	**1.13**	**1.479**
Laptop mode													
69	CDMA2000 BC1	RTAP 153.6	Bottom	0cm	600	1880	ON	18.96	20.1	1.300	-0.13	0.607	0.789

12.2 Repeated SAR Measurement

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Back-off	Burst Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measure SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
3	GSM850	GPRS (2 Tx slots)	Bottom Face	0cm	251	848.8	ON	27.96	29.9	1.563	0.07	0.925	1.446
57	GSM850	GPRS (2 Tx slots)	Bottom Face	0cm	251	848.8	ON	27.96	29.9	1.563	-0.17	0.914	1.429
77	GSM1900	GPRS (2 Tx slots)	Edge 4	0cm	512	1850.2	ON	26.07	26.3	1.054	-0.16	1.36	1.434
83	GSM1900	GPRS (2 Tx slots)	Edge 4	0cm	512	1850.2	ON	26.07	26.3	1.054	-0.11	1.32	1.392
18	WCDMA V	RMC12.2Kbps	Bottom Face	0cm	4182	836.4	ON	22.4	23.3	1.230	-0.138	1.21	1.489
45	WCDMA V	RMC12.2Kbps	Bottom Face	0cm	4182	836.4	ON	22.4	23.3	1.230	-0.13	1.19	1.464
109	WCDMA IV	RMC12.2Kbps	Edge 4	0cm	1413	1732.6	ON	19.56	20.1	1.132	-0.02	1.31	1.483
120	WCDMA IV	RMC12.2Kbps	Edge 4	0cm	1413	1732.6	ON	19.56	20.1	1.132	-0.08	1.26	1.427
96	WCDMA II	HSDPA subtest 1	Edge 4	0cm	9538	1907.6	ON	18.74	19.7	1.247	0.138	1.2	1.497
100	WCDMA II	HSDPA subtest 1	Edge 4	0cm	9538	1907.6	ON	18.74	19.7	1.247	-0.09	1.16	1.447
58	CDMA2000 BC0	RTAP 153.6	Bottom	0cm	777	848.31	ON	22.06	23.7	1.459	0	1.01	1.473
59	CDMA2000 BC0	RTAP 153.6	Bottom	0cm	777	848.31	ON	22.06	23.7	1.459	0.11	0.991	1.446
67	CDMA2000 BC1	RTAP 153.6	Edge 4	0cm	1175	1908.75	ON	18.93	20.1	1.309	-0.06	1.13	1.479
68	CDMA2000 BC1	RTAP 153.6	Edge 4	0cm	1175	1908.75	ON	18.93	20.1	1.309	-0.04	1.11	1.453

Note:

1. Per KDB 865664 D01v01, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8 W/kg
2. Per KDB 865664 D01v01, if the deviation among the repeated measurement is ≤ 20% and the measured SAR < 1.45 W/kg, only one repeated measurement is required.
3. The deviation is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

12.3 Highest SAR Plot

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Power Back-off	Burst Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measure SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
3	GSM850	GPRS (2 Tx slots)	Bottom Face	0cm	251	848.8	ON	27.96	29.9	1.563	0.07	0.925	1.446
77	GSM1900	GPRS (2 Tx slots)	Edge 4	0cm	512	1850.2	ON	26.07	26.3	1.054	-0.16	1.36	1.434
18	WCDMA V	RMC12.2Kbps	Bottom Face	0cm	4182	836.4	ON	22.4	23.3	1.230	-0.138	1.21	1.489
109	WCDMA IV	RMC12.2Kbps	Edge 4	0cm	1413	1732.6	ON	19.56	20.1	1.132	-0.02	1.31	1.483
96	WCDMA II	HSDPA subtest-1	Edge 4	0cm	9538	1907.6	ON	18.74	19.7	1.247	0.138	1.2	1.497
58	CDMA2000 BC0	RTAP 153.6	Bottom	0cm	777	848.31	ON	22.06	23.7	1.459	0	1.01	1.473
67	CDMA2000 BC1	RTAP 153.6	Edge 4	0cm	1175	1908.75	ON	18.93	20.1	1.309	-0.06	1.13	1.479

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/17

#03_GSM850_GPRS (2 Tx slots)_Bottom Face_0cm_Ch251

DUT: 2N2103-01

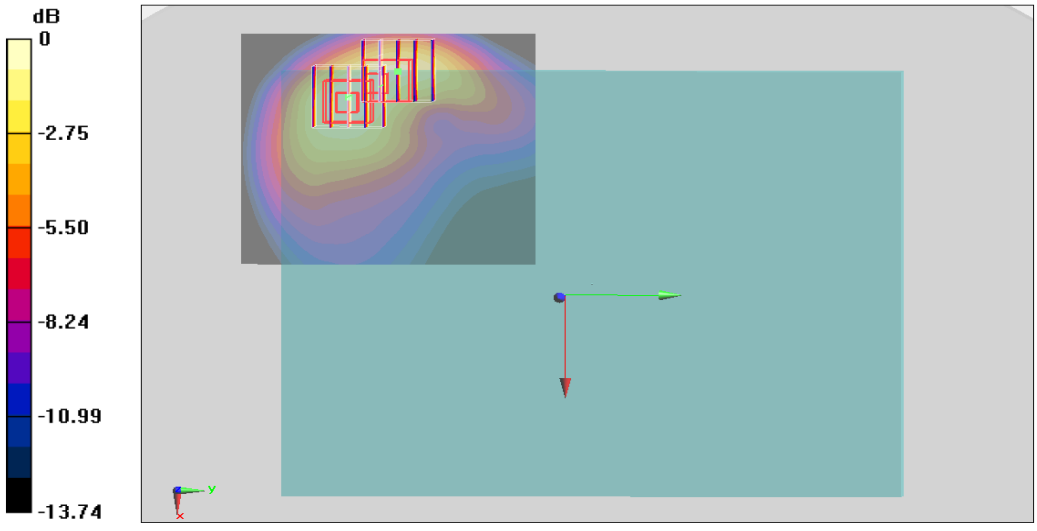
Communication System: GSM850; Frequency: 848.8 MHz;Duty Cycle: 1:4
Medium: MSL_850_121217 Medium parameters used: f = 849 MHz; σ = 0.976 mho/m; ε_r = 54.414; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.08, 6.08, 6.08); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1127
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch251/Area Scan (81x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.00 mW/g

Configuration/Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.097 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.423 mW/g
SAR(1 g) = 0.925 mW/g; SAR(10 g) = 0.588 mW/g
Maximum value of SAR (measured) = 0.994 mW/g

Configuration/Ch251/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.097 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.398 mW/g
SAR(1 g) = 0.880 mW/g; SAR(10 g) = 0.518 mW/g
Maximum value of SAR (measured) = 0.951 mW/g



0 dB = 0.951 mW/g = -0.44 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/18

#77_GSM1900_GPRS (2 Tx slots)_Edge 4_0cm_Ch512

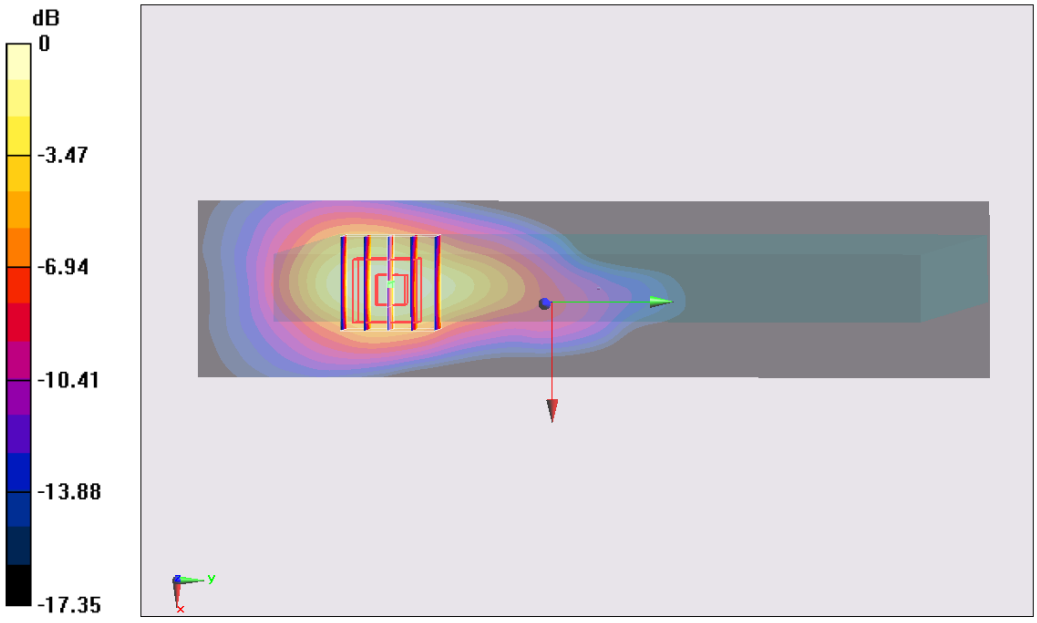
DUT: 2N2103-01

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900_121218 Medium parameters used : f = 1850.2 MHz; σ = 1.481 mho/m; ε_r = 53.436; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.58, 4.58, 4.58); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI v5.0 Left; Type: QDOVA002AA; Serial: TP:1131
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch512/Area Scan (41x181x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.52 mW/g

Configuration/Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.447 V/m; Power Drift = -0.160 dB
Peak SAR (extrapolated) = 2.088 mW/g
SAR(1 g) = 1.36 mW/g; SAR(10 g) = 0.750 mW/g
Maximum value of SAR (measured) = 1.51 mW/g



0 dB = 1.51 mW/g = 3.58 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/17

#18_WCDMA V_RMC12.2K_Bottom Face_0cm_Ch4182

DUT: 2N2103-01

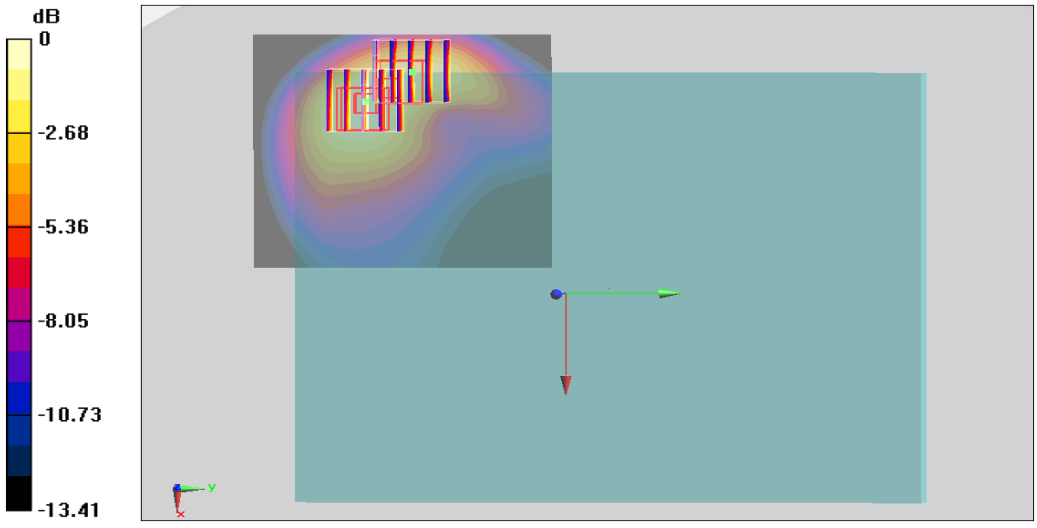
Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL_850_121217 Medium parameters used : f = 836.4 MHz; σ = 0.964 mho/m; ε_r = 54.526; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.08, 6.08, 6.08); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1127
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch4182/Area Scan (81x91x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.30 mW/g

Configuration/Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.879 V/m; Power Drift = -0.138 dB
Peak SAR (extrapolated) = 1.867 mW/g
SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.773 mW/g
Maximum value of SAR (measured) = 1.32 mW/g

Configuration/Ch4182/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 39.879 V/m; Power Drift = -0.138 dB
Peak SAR (extrapolated) = 1.853 mW/g
SAR(1 g) = 1.1 mW/g; SAR(10 g) = 0.651 mW/g
Maximum value of SAR (measured) = 1.23 mW/g



0 dB = 1.23 mW/g = 1.80 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/19

#109_WCDMA IV_RMC12.2K_Edge 4_0cm_Ch1413

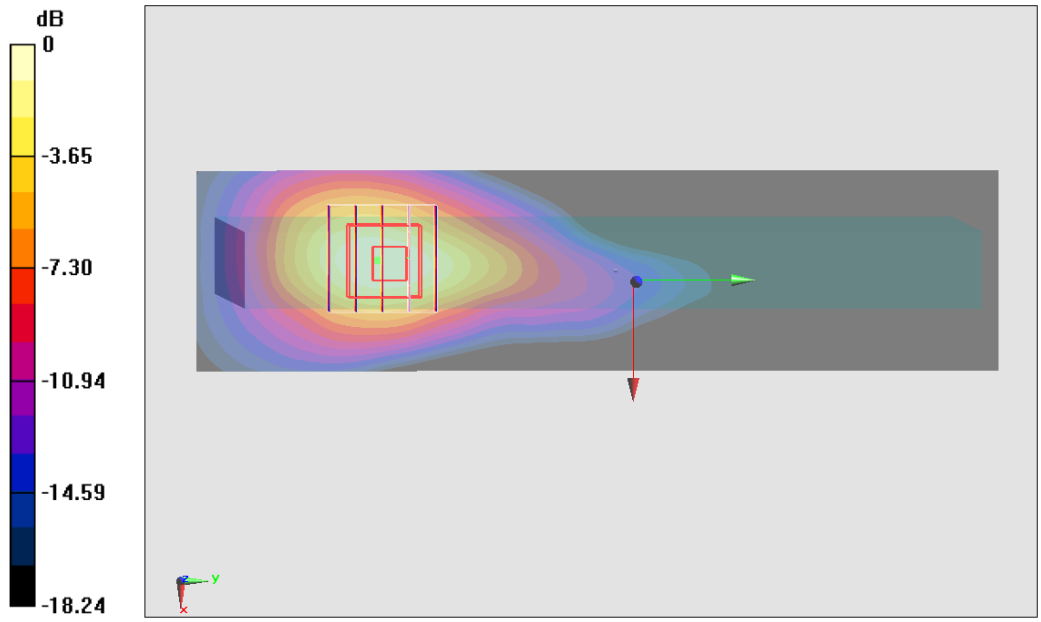
DUT: 2N2103-01

Communication System: WCDMA; Frequency: 1732.6 MHz;Duty Cycle: 1:1
Medium: MSL_1750_121219 Medium parameters used: f = 1733 MHz; σ = 1.528 mho/m; ε_r = 51.559; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.81, 4.81, 4.81); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1127
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch1413/Area Scan (41x161x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.61 mW/g

Configuration/Ch1413/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.462 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.981 mW/g
SAR(1 g) = 1.31 mW/g; SAR(10 g) = 0.726 mW/g
Maximum value of SAR (measured) = 1.49 mW/g



0 dB = 1.49 mW/g = 3.46 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/18

#96_WCDMA II_HSDPA_Edge 4_0cm_Ch9538

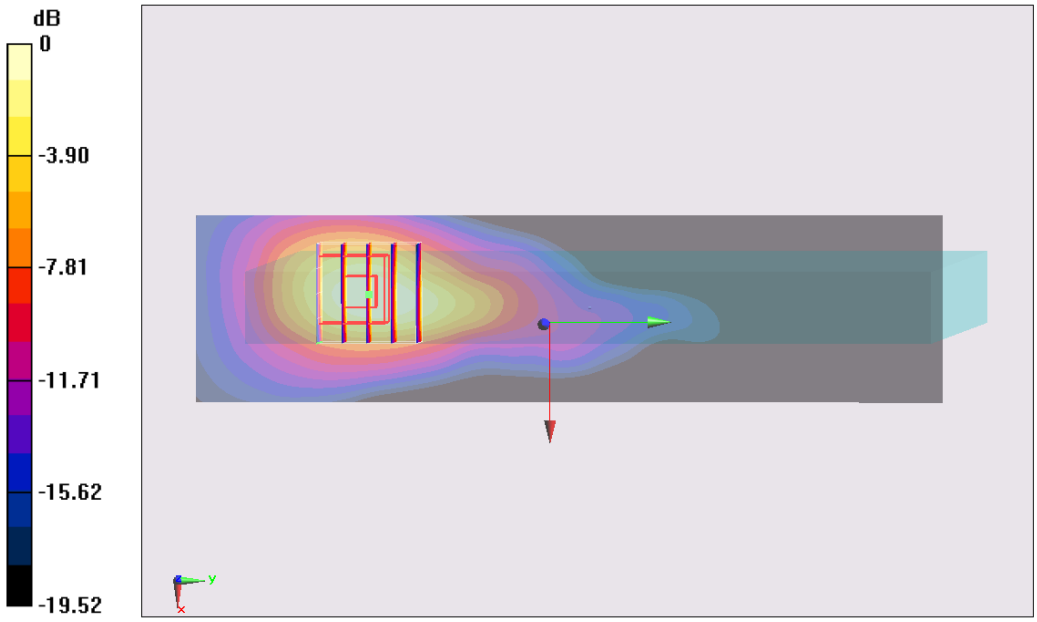
DUT: 2N2103-01

Communication System: WCDMA; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium: MSL_1900_121218 Medium parameters used: f = 1908 MHz; σ = 1.529 mho/m; ε_r = 53.178; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.58, 4.58, 4.58); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI v5.0 Left; Type: QDOVA002AA; Serial: TP:1131
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch9538/Area Scan (41x161x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.49 mW/g

Configuration/Ch9538/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.257 V/m; Power Drift = 0.138 dB
Peak SAR (extrapolated) = 1.883 mW/g
SAR(1 g) = 1.2 mW/g; SAR(10 g) = 0.635 mW/g
Maximum value of SAR (measured) = 1.43 mW/g



0 dB = 1.43 mW/g = 3.11 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/18

#58_CDMA2000 BC0_RTAP 153.6_Bottom_0cm_Ch777

DUT: 2N2103-01

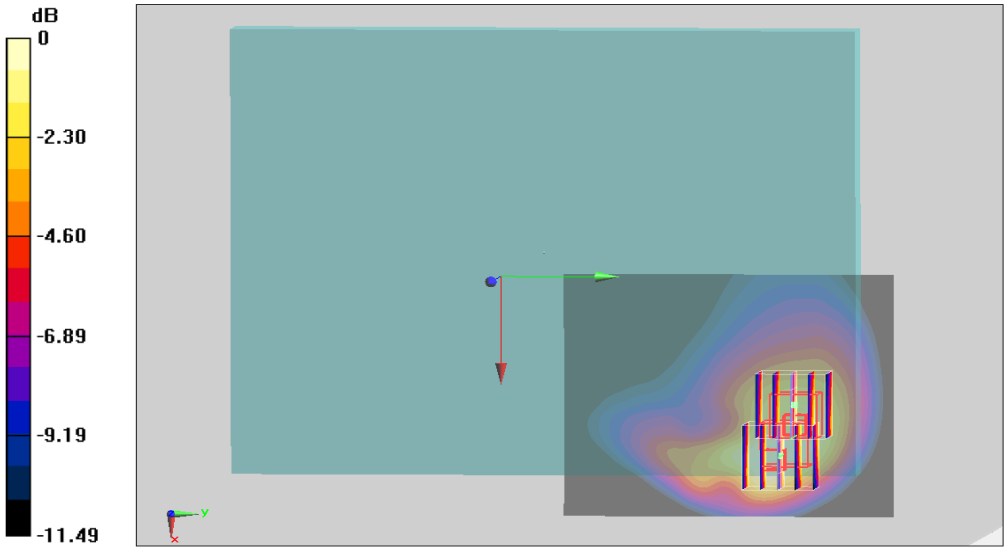
Communication System: CDMA ; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: MSL_850_121218 Medium parameters used: f = 848.31 MHz; σ = 0.967 mho/m; ε_r = 52.673; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.08, 6.08, 6.08); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI v4.0; Type: QDOVA001BB; Serial: TP:1127
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch777/Area Scan (81x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.12 mW/g

Configuration/Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.171 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.615 mW/g
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.633 mW/g
Maximum value of SAR (measured) = 1.10 mW/g

Configuration/Ch777/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 35.171 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.543 mW/g
SAR(1 g) = 0.896 mW/g; SAR(10 g) = 0.567 mW/g
Maximum value of SAR (measured) = 1.02 mW/g



0 dB = 1.02 mW/g = 0.17 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/18

#67_CDMA2000 BC1_RTAP 153.6_Edge 4_0cm_Ch1175

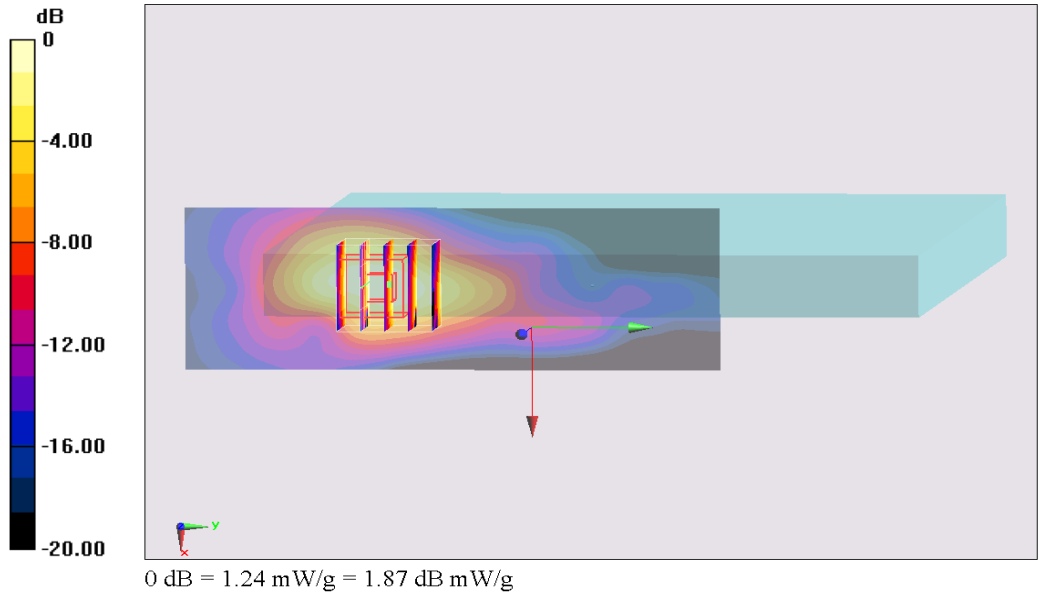
DUT: 2N2103-01

Communication System: CDMA ; Frequency: 1908.75 MHz;Duty Cycle: 1:1
Medium: MSL_1900_121218 Medium parameters used: f = 1909 MHz; σ = 1.53 mho/m; ε_r = 53.173; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.58, 4.58, 4.58); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: ELI v5.0 Left; Type: QDOVA002AA; Serial: TP:1131
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch1175/Area Scan (41x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.26 mW/g

Configuration/Ch1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.373 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.687 mW/g
SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.621 mW/g
Maximum value of SAR (measured) = 1.24 mW/g



0 dB = 1.24 mW/g = 1.87 dB mW/g

12.4 Simultaneous Transmission SAR Analysis and Measurements

No.	Applicable Simultaneous Transmission Combination
1.	WWAN(data)+WLAN(router)
2.	WWAN(data) + BT

Note:

1. WLAN module FCC ID: PD96235ANH is also integrated into this host, and C2PC filing was granted on 2012/12/18. WLAN and Bluetooth power and SAR test data is referred to SGS FCC SAR Report, Report No: ES2012B0011, available on FCC website.
2. By design, WLAN 5GHz frequency band does not support mobile hotspot operation
3. The Scaled SAR summation is calculated based on the same configuration and test position.
4. WLAN/BT main antenna and WLAN aux antenna are both more than 20cm to the edge3 exposure position, and MPE is estimated for simultaneous transmission consideration at edge3
5. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v05 based on the formula below.
   i) (*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)]·[$\sqrt{}$f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm; where *x* = 7.5 for 1-g SAR, and *x* = 18.75 for 10-g SAR.
   ii) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the *test separation distances* is > 50 mm.

Bluetooth maximum RF power is 6dBm, and the estimated SAR is listed below

Exposure Position	Bottom Face	Bottom Face	Edge 4
Test separation	0 mm	10 mm	0 mm
Antenna to user distance	19 mm	29 mm	50.56 mm
Estimated SAR (W/kg)	0.044W/kg	0.029 W/kg	0.017 W/kg

In this report, 50mm separation is applied to conservatively estimate SAR value for separation distance > 50mm

WLAN 2.4GHz maximum rated RF power is 16.5dBm, and the estimated SAR for edge4 is also listed below

Exposure Position	Edge 4
Test separation	0 mm
Antenna to user distance	50.56 mm
Estimated SAR (W/kg)	0.193 W/kg

In this report, 50mm separation is applied to conservatively estimate SAR value for WLAN Main antenna , WLAN Aux antenna and MIMO mode

6. The distance between WLAN antenna and edge3 is 20.02 cm.
7. MPE limit for general population in 1.5GHz-100GHz is 1 mW/cm^2
8. Per KDB 447498 D01v05, The [Σ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [Σ of MPE ratios] is ≤ 1.0, simultaneous transmission of mixed mobile and portable exposure conditions is compliant, for WWAN and WLAN in Edge3 exposure position.
9. Per KDB 447498 D01v05, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*), and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where (x_1, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan
   If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary
   iii) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg

<Tablet PC mode>

WWAN + WLAN Main Antenna (DTS)

Position	WWAN Band	Plot No	Max. Reported SAR (W/kg)	WLAN-DTS Max. Reported SAR (W/kg)	Sum WWAN + WLAN (W/kg)	SPLSR ≤ 0.04	Case No
Bottom Face At 0cm	GSM850	3	1.446	0.00955	**1.46**		
	GSM1900	71	0.963	0.00955	**0.97**		
	WCDMA V	18	1.489	0.00955	**1.50**		
	WCDMA IV	105	0.781	0.00955	**0.79**		
	WCDMA II	87	0.77	0.00955	**0.78**		
	CDMA BC0	47	1.432	0.00955	**1.44**		
	CDMA BC01	61	0.793	0.00955	**0.80**		
Edge3 At 0cm	GSM850	6	1.316		**1.32**		
	GSM1900	74	1.065		**1.07**		
	WCDMA V	19	1.364		**1.36**		
	WCDMA IV	107	1.086		**1.09**		
	WCDMA II	90	0.85		**0.85**		
	CDMA BC0	51	1.443		**1.44**		
	CDMA BC01	62	1.023		**1.02**		
Edge4 At 0cm	GSM850	8	0.873	0.193	**1.07**		
	GSM1900	77	1.434	0.193	**1.63**	**0.013**	**#1**
	WCDMA V	34	0.796	0.193	**0.99**		
	WCDMA IV	109	1.483	0.193	**1.68**	**0.014**	**#2**
	WCDMA II	96	1.497	0.193	**1.69**	**0.014**	**#3**
	CDMA BC0	53	1.023	0.193	**1.22**		
	CDMA BC01	67	1.479	0.193	**1.67**	**0.013**	**#4**
Bottom Face At 1 cm	GSM850	15	1.062	0.00955	**1.07**		
	GSM1900	84	0.725	0.00955	**0.73**		
	WCDMA V	44	0.636	0.00955	**0.65**		
	WCDMA IV	119	0.726	0.00955	**0.74**		
	WCDMA II	104	0.692	0.00955	**0.70**		
	CDMA BC0	60	0.584	0.00955	**0.59**		
	CDMA BC01	70	0.575	0.00955	**0.58**		

Position	WWAN Band	Plot No	Max. Reported SAR (W/kg)	Reported SAR / 1.6	WLAN maximum rated power (dBm)	WLAN antenna gain (dBi)	MPE estimation (mW/cm^2)	MPE estimation / MPE limit	Summation (1)
Edge3 (0 cm separation)	GSM850	6	1.316	0.823	16.5	3.2	0.02	0.02	**0.843**
	GSM1900	74	1.065	0.666	16.5	3.2	0.02	0.02	**0.686**
	WCDMA V	19	1.364	0.853	16.5	3.2	0.02	0.02	**0.873**
	WCDMA IV	107	1.086	0.679	16.5	3.2	0.02	0.02	**0.699**
	WCDMA II	90	0.85	0.531	16.5	3.2	0.02	0.02	**0.551**
	CDMA BC0	51	1.443	0.902	16.5	3.2	0.02	0.02	**0.922**
	CDMA BC1	62	1.023	0.639	16.5	3.2	0.02	0.02	**0.659**

Note:

1. Per KDB 447498 D01v05, The [Σ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [Σ of MPE ratios] is ≤ 1.0, simultaneous transmission of mixed mobile and portable exposure conditions is compliant.

<Tablet PC mode>
WWAN + WLAN Aux Antenna (DTS)

Position	WWAN Band	Plot No	Max. Reported SAR (W/kg)	WLAN-DTS Max. Reported SAR (W/kg)	Sum WWAN + WLAN (W/kg)	SPLSR ≤ 0.04	Case No
Bottom Face At 0cm	GSM850	3	1.446	0.015	**1.46**		
	GSM1900	71	0.963	0.015	**0.98**		
	WCDMA V	18	1.489	0.015	**1.50**		
	WCDMA IV	105	0.781	0.015	**0.80**		
	WCDMA II	87	0.77	0.015	**0.79**		
	CDMA BC0	47	1.432	0.015	**1.45**		
	CDMA BC01	61	0.793	0.015	**0.81**		
Edge3 At 0cm	GSM850	6	1.316		**1.32**		
	GSM1900	74	1.065		**1.07**		
	WCDMA V	19	1.364		**1.36**		
	WCDMA IV	107	1.086		**1.09**		
	WCDMA II	90	0.85		**0.85**		
	CDMA BC0	51	1.443		**1.44**		
	CDMA BC01	62	1.023		**1.02**		
Edge4 At 0cm	GSM850	8	0.873	0.193	**1.07**		
	GSM1900	77	1.434	0.193	**1.63**	**0.013**	**#1**
	WCDMA V	34	0.796	0.193	**0.99**		
	WCDMA IV	109	1.483	0.193	**1.68**	**0.014**	**#2**
	WCDMA II	96	1.497	0.193	**1.69**	**0.014**	**#3**
	CDMA BC0	53	1.023	0.193	**1.22**		
	CDMA BC01	67	1.479	0.193	**1.67**	**0.013**	**#4**
Bottom Face At 1 cm	GSM850	15	1.062	0.015	**1.08**		
	GSM1900	84	0.725	0.015	**0.74**		
	WCDMA V	44	0.636	0.015	**0.65**		
	WCDMA IV	119	0.726	0.015	**0.74**		
	WCDMA II	104	0.692	0.015	**0.71**		
	CDMA BC0	60	0.584	0.015	**0.60**		
	CDMA BC01	70	0.575	0.015	**0.59**		

Position	WWAN Band	Plot No	Max. Reported SAR (W/kg)	Reported SAR / 1.6	WLAN-DTS WLAN maximum rated power (dBm)	WLAN antenna gain (dBi)	MPE estimation (mW/cm^2)	MPE estimation / MPE limit	Summation (1)
Edge3 (0 cm separation)	GSM850	6	1.316	0.823	16.5	3.2	0.02	0.02	**0.843**
	GSM1900	74	1.065	0.666	16.5	3.2	0.02	0.02	**0.686**
	WCDMA V	19	1.364	0.853	16.5	3.2	0.02	0.02	**0.873**
	WCDMA IV	107	1.086	0.679	16.5	3.2	0.02	0.02	**0.699**
	WCDMA II	90	0.85	0.531	16.5	3.2	0.02	0.02	**0.551**
	CDMA BC0	51	1.443	0.902	16.5	3.2	0.02	0.02	**0.922**
	CDMA BC1	62	1.023	0.639	16.5	3.2	0.02	0.02	**0.659**

Note:

1. Per KDB 447498 D01v05, The [Σ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [Σ of MPE ratios] is ≤ 1.0, simultaneous transmission of mixed mobile and portable exposure conditions is compliant.

<Tablet PC mode>
WWAN + WLAN MIMO Antenna (DTS)

Position	WWAN			WLAN-DTS	Sum	SPLSR	Case No
	WWAN Band	Plot No	Max. Reported SAR (W/kg)	Max. WLAN SAR (W/kg)	WWAN + WLAN (W/kg)	≤ 0.04	
Bottom Face At 0cm	GSM850	3	1.446	0.0254	**1.47**		
	GSM1900	71	0.963	0.0254	**0.99**		
	WCDMA V	18	1.489	0.0254	**1.51**		
	WCDMA IV	105	0.781	0.0254	**0.81**		
	WCDMA II	87	0.77	0.0254	**0.80**		
	CDMA BC0	47	1.432	0.0254	**1.46**		
	CDMA BC01	61	0.793	0.0254	**0.82**		
Edge3 At 0cm	GSM850	6	1.316		**1.32**		
	GSM1900	74	1.065		**1.07**		
	WCDMA V	19	1.364		**1.36**		
	WCDMA IV	107	1.086		**1.09**		
	WCDMA II	90	0.85		**0.85**		
	CDMA BC0	51	1.443		**1.44**		
	CDMA BC01	62	1.023		**1.02**		
Edge4 At 0cm	GSM850	8	0.873	0.193	**1.07**		
	GSM1900	77	1.434	0.193	**1.63**	**0.013**	**#1**
	WCDMA V	34	0.796	0.193	**0.99**		
	WCDMA IV	109	1.483	0.193	**1.68**	**0.014**	**#2**
	WCDMA II	96	1.497	0.193	**1.69**	**0.014**	**#3**
	CDMA BC0	53	1.023	0.193	**1.22**		
	CDMA BC01	67	1.479	0.193	**1.67**	**0.013**	**#4**
Bottom Face At 1 cm	GSM850	15	1.062	0.0254	**1.09**		
	GSM1900	84	0.725	0.0254	**0.75**		
	WCDMA V	44	0.636	0.0254	**0.66**		
	WCDMA IV	119	0.726	0.0254	**0.75**		
	WCDMA II	104	0.692	0.0254	**0.72**		
	CDMA BC0	60	0.584	0.0254	**0.61**		
	CDMA BC01	70	0.575	0.0254	**0.60**		

Position	WWAN				WLAN-DTS				Summation (1)
	WWAN Band	Plot No	Max. Reported SAR (W/kg)	Reported SAR / 1.6	WLAN maximum rated power (dBm)	WLAN antenna gain (dBi)	MPE estimation (mW/cm^2)	MPE estimation / MPE limit	
Edge3 (0 cm separation)	GSM850	6	1.316	0.823	16.5	3.2	0.02	0.02	**0.843**
	GSM1900	74	1.065	0.666	16.5	3.2	0.02	0.02	**0.686**
	WCDMA V	19	1.364	0.853	16.5	3.2	0.02	0.02	**0.873**
	WCDMA IV	107	1.086	0.679	16.5	3.2	0.02	0.02	**0.699**
	WCDMA II	90	0.85	0.531	16.5	3.2	0.02	0.02	**0.551**
	CDMA BC0	51	1.443	0.902	16.5	3.2	0.02	0.02	**0.922**
	CDMA BC1	62	1.023	0.639	16.5	3.2	0.02	0.02	**0.659**

Note:
1. Per KDB 447498 D01v05, The [Σ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [Σ of MPE ratios] is ≤ 1.0, simultaneous transmission of mixed mobile and portable exposure conditions is compliant.

<Tablet PC mode>

WWAN + Bluetooth(DSS)

Position	WWAN			Bluetooth-DSS	Sum	SPLSR ≤ 0.04	Case No
	WWAN Band	Plot No	Max. Reported SAR (W/kg)	Max. BT SAR (W/kg)	WWAN + Bluetooth (W/kg)		
Bottom Face At 0cm	GSM850	3	1.446	0.044	**1.49**		
	GSM1900	71	0.963	0.044	**1.01**		
	WCDMA V	18	1.489	0.044	**1.53**		
	WCDMA IV	105	0.781	0.044	**0.83**		
	WCDMA II	87	0.77	0.044	**0.81**		
	CDMA BC0	47	1.432	0.044	**1.48**		
	CDMA BC01	61	0.793	0.044	**0.84**		
Edge3 At 0cm	GSM850	6	1.316		**1.32**		
	GSM1900	74	1.065		**1.07**		
	WCDMA V	19	1.364		**1.36**		
	WCDMA IV	107	1.086		**1.09**		
	WCDMA II	90	0.85		**0.85**		
	CDMA BC0	51	1.443		**1.44**		
	CDMA BC01	62	1.023		**1.02**		
Edge4 At 0cm	GSM850	8	0.873	0.017	**0.89**		
	GSM1900	77	1.434	0.017	**1.45**		
	WCDMA V	34	0.796	0.017	**0.81**		
	WCDMA IV	109	1.483	0.017	**1.50**		
	WCDMA II	96	1.497	0.017	**1.51**		
	CDMA BC0	53	1.023	0.017	**1.04**		
	CDMA BC01	67	1.479	0.017	**1.50**		
Bottom Face At 1 cm	GSM850	15	1.062	0.029	**1.09**		
	GSM1900	84	0.725	0.029	**0.75**		
	WCDMA V	44	0.636	0.029	**0.67**		
	WCDMA IV	119	0.726	0.029	**0.76**		
	WCDMA II	104	0.692	0.029	**0.72**		
	CDMA BC0	60	0.584	0.029	**0.61**		
	CDMA BC01	70	0.575	0.029	**0.60**		

Position	WWAN				Bluetooth-DSS				Summation (1)
	WWAN Band	Plot No	Max. Reported SAR (W/kg)	Reported SAR / 1.6	BT maximum rated power (dBm)	BT antenna gain (dBi)	MPE estimation (mW/cm^2)	MPE estimation / MPE limit	
Edge3 (0 cm separation)	GSM850	6	1.316	0.823	6	3.2	0.0017	0.0017	**0.824**
	GSM1900	74	1.065	0.666	6	3.2	0.0017	0.0017	**0.667**
	WCDMA V	19	1.364	0.853	6	3.2	0.0017	0.0017	**0.854**
	WCDMA IV	107	1.086	0.679	6	3.2	0.0017	0.0017	**0.680**
	WCDMA II	90	0.85	0.531	6	3.2	0.0017	0.0017	**0.533**
	CDMA BC0	51	1.443	0.902	6	3.2	0.0017	0.0017	**0.904**
	CDMA BC1	62	1.023	0.639	6	3.2	0.0017	0.0017	**0.641**

Note:

1. Per KDB 447498 D01v05, The [Σ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [Σ of MPE ratios] is ≤ 1.0, simultaneous transmission of mixed mobile and portable exposure conditions is compliant.

<Laptop mode>

WWAN + WLAN 2.4GHz

Position	WWAN				WLAN-DTS				Summation (3)
	WWAN Band	Plot No	Max. Reported SAR (W/kg)	Reported SAR / 1.6	WLAN maximum rated power (dBm)	WLAN antenna gain (dBi)	(1)MPE estimation (mW/cm^2)	MPE estimation / MPE limit(2)	
Bottom (0 cm gap)	GSM850	12	1.385	0.866	16.5	3.2	0.02	0.02	**0.886**
	GSM1900	80	0.928	0.580	16.5	3.2	0.02	0.02	**0.600**
	WCDMA V	37	1.208	0.755	16.5	3.2	0.02	0.02	**0.775**
	WCDMA IV	118	0.95	0.594	16.5	3.2	0.02	0.02	**0.614**
	WCDMA II	103	0.824	0.515	16.5	3.2	0.02	0.02	**0.535**
	CDMA BC0	58	1.473	0.921	16.5	3.2	0.02	0.02	**0.941**
	CDMA BC1	69	0.789	0.493	16.5	3.2	0.02	0.02	**0.513**

WWAN + Bluetooth (DSS)

Position	WWAN				Bluetooth-DSS				Summation (3)
	WWAN Band	Plot No	Max. Reported SAR (W/kg)	Reported SAR / 1.6	BT maximum rated power (dBm)	BT antenna gain (dBi)	(1)MPE estimation (mW/cm^2)	MPE estimation / MPE limit(2)	
Bottom (0 cm gap)	GSM850	12	1.385	0.866	6	3.2	0.0017	0.0017	**0.883**
	GSM1900	80	0.928	0.580	6	3.2	0.0017	0.0017	**0.597**
	WCDMA V	37	1.208	0.755	6	3.2	0.0017	0.0017	**0.772**
	WCDMA IV	118	0.95	0.594	6	3.2	0.0017	0.0017	**0.611**
	WCDMA II	103	0.824	0.515	6	3.2	0.0017	0.0017	**0.532**
	CDMA BC0	58	1.473	0.921	6	3.2	0.0017	0.0017	**0.938**
	CDMA BC1	69	0.789	0.493	6	3.2	0.0017	0.0017	**0.510**

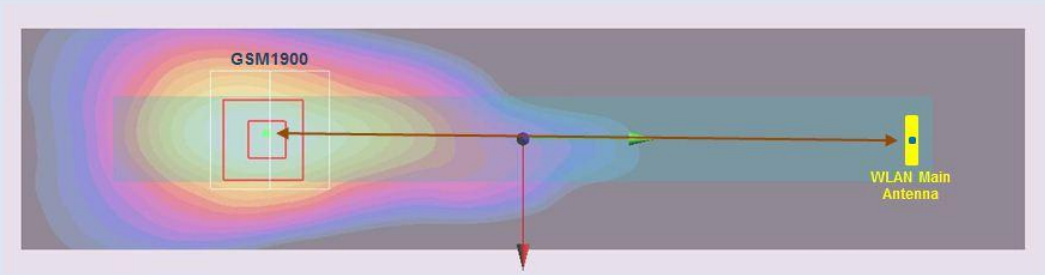
Note:

1. In WLAN module C2PC filing, bottom face SAR in laptop mode was not performed due to larger than 20cm separation distance. MPE estimation is at 20cm separation distance.
2. MPE limit for general population in 1.5GHz-100GHz is 1 mW/cm^2
3. Per KDB 447498 D01v05, The [Σ of (the highest measured or estimated SAR for each standalone antenna configuration, adjusted for maximum tune-up tolerance) / 1.6 W/kg] + [Σ of MPE ratios] is ≤ 1.0, simultaneous transmission of mixed mobile and portable exposure conditions is compliant.

12.5 Simultaneous analysis - SPLSR calculation

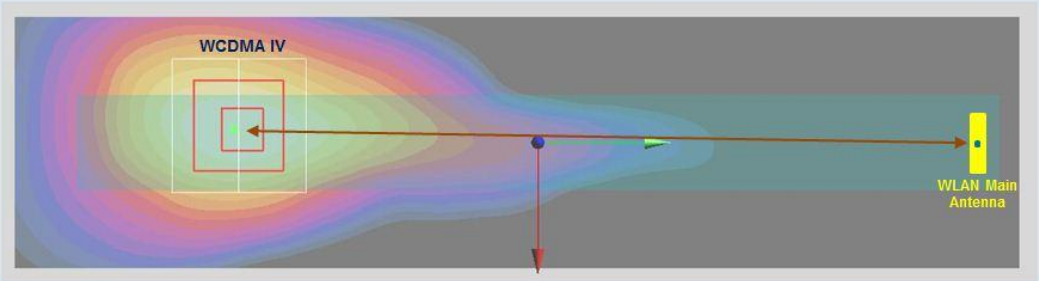
Case 1

Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
77	GSM1900	Edge4	1.434	0	-0.0025	-0.068	-0.178	157.0	1.63	0.013	Not required
WLAN2.4GHz Main Antenna			0.193	0	0	0.089	-0.177				

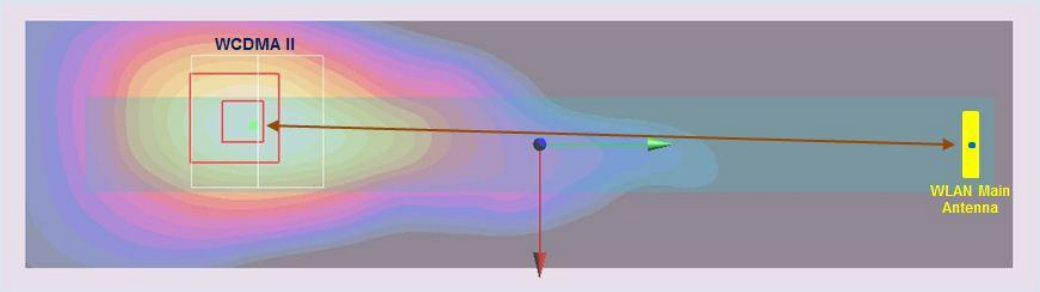


Case 2

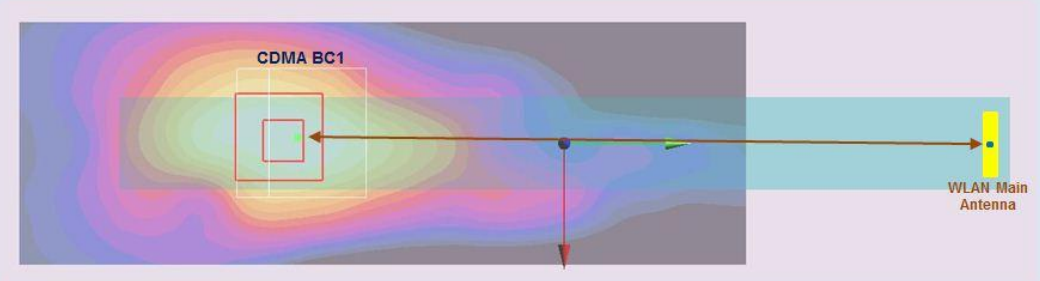
Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
109	WCDMA IV	Edge4	1.483	0	-0.004	-0.0715	-0.179	160.6	1.68	0.014	Not required
WLAN2.4GHz Main Antenna			0.193	0	0	0.089	-0.177				



Case 3											
Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
96	WCDMA II	Edge4	1.497	0	-0.0055	-0.0685	-0.178	157.6	1.69	0.014	Not required
WLAN2.4G Ant Main			0.193	0	0	0.089	-0.177				



Case 4											
Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
67	CDMA BC1	Edge4	1.479	0	-0.0025	-0.073	-0.178	162.0	1.67	0.013	Not required
WLAN2.4G Ant Main			0.193	0	0	0.089	-0.177				



Remark:
For edge4 SAR testing, EUT was placed under the flat phantom with the geometric center of device at the middle of the phantom, i.e. with the coordinate x=0, y=0.
WWAN zoom SAR peak position coordinates were extracted from the SAR measurement software. WLAN antenna is 8.9 cm to the middle of edge4, illustrated in page27; for the purpose of separation calculation, the WLAN antenna coordinate was set to x=0, y= -0.089 (m).

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13. 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 12.1

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 12.1 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 shown in the following tables:

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

14. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, December 2003

[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 447498 D01 v05, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, October 2012

[7] FCC KDB 616217 D04 v01, “SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers”, October 2012

[8] FCC KDB 941225 D01 v02, “SAR Measurement Procedures for 3G Devices – CDMA 2000 / Ev-Do / WCDMA / HSDPA / HSPA”, October 2007

[9] FCC KDB 941225 D03 v01, “Recommended SAR Test Reduction Procedures for GSM / GPRS / EDGE”, December 2008