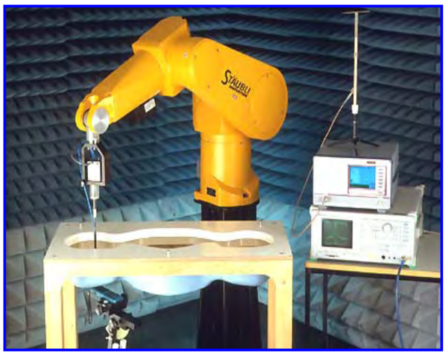
A Test Lab Techno Corp.

Changan Lab：No. 140 -1, Changan Street, Bade City, Taoyuan County, Taiwan R.O.C.

Tel：886-3-271-0188 / Fax：886-3-271-0190

SAR EVALUATION REPORT

Test Report No.	:	**1003FS19**
Applicant	:	**DIALOGUE INC**
Product Type	:	**Notebook**
FCC ID	:	**X8P-M2A1**
Trade Name	:	**M2**
Model Number	:	**M2A1**
Dates of Test	:	**Mar. 18 ~ 22, 2010**
Test Environment	:	**Ambient Temperature： 22 ±2˚C** **Relative Humidity：40 - 70 ％**
Test Specification	:	**Standard C95.1-2005** **IEEE Std. 1528-2003** **2.1093;FCC/OET Bulletin 65 Supplement C [July 2001]** **FCC KDB 648474 D01 SAR Handsets Multi Xmiter and Ant** **FCC KDB 648474 D02 SAR Polcy Handsts Multi Xmiter Ant** **FCC KDB 941225 D03 SAR Test Reduction GSM GPRS EDGE**
Max. SAR	:	**0.076 W/kg Body SAR**
Test Lab Location	:	**Chang-an Lab**



1. The test operations have to be performed with cautious behavior, the test results are as attached.
2. The test results are under chamber environment of A Test Lab Techno Corp. A Test Lab Techno Corp. does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples.
3. The measurement report has to be written approval of A Test Lab Techno Corp. It may only be reproduced or published in full. This report shall not be reproduced except in full, without the written approval of A Test Lab Techno Corp. The test results in the report only apply to the tested sample.

.

Sam Chuang	**20100402**	**Alex Wu**	**20100402**
Approve Signer		**Testing Engineer**	

Contents

1. Description of Equipment Under Test (EUT)

Applicant	:	DIALOGUE INC
Applicant Address	:	M4TH FL 20 LN 54 JHONGJHENG RD SINDIAN TAIPEI HSIEN, , 231, TW
Manufacturer	:	AOpen Information Product (Zhongshan) Inc.
Manufacturer Address	:	Zhongshan Torch High-tech Industrial Development Zone, Zhongshan City, Guangdong, China
Product Type	:	Notebook
FCC ID	:	X8P-M2A1
Trade Name	:	M2
Model Number	:	M2A1
Test Device	:	Production Unit
Device Class	:	GPRS/EGPRS Class B
Multi-slot Class	:	GPRS/EGPRS Class 10 (The maximum number of downlink is 4 and maximum number of is 2,total timeslots is 5.)
Tx Frequency	:	824.2 - 848.8 MHz (GSM/GPRS/EGPRS 850) 1850.2 - 1909.8 MHz (GSM/GPRS/EGPRS 1900) 1852.4 - 1907.6 MHz (WCDMA Band II(RMC12.2K) /HSDPA Band II /HSUPA Band II) 826.4 – 846.4 MHz (WCDMA Band V(RMC12.2K) /HSDPA Band V /HSUPA Band V) 2412 - 2462 MHz (WLAN 802.11b/802.11g) 2402 - 2480 MHz (Bluetooth 2.1 / Bluetooth EDR)
RF Conducted Power (Avg.)	:	0.200 W (23.01 dBm) GSM/GPRS/EGPRS 850 0.155 W (21.90 dBm) GSM/GPRS/EGPRS 1900 0.156 W (21.92 dBm) WCDMA Band II/HSDPA Band II /HSUPA Band II 0.151 W (21.80 dBm) WCDMA Band V/HSDPA Band V /HSUPA Band V 0.032 W (15.10 dBm) WLAN 802.11b/802.11g 0.0005 W (-2.93 dBm) Bluetooth 2.1 / Bluetooth EDR
Max. SAR Measurement	:	0.076 W/kg Body SAR
Antenna Type	:	PCB Antenna
Antenna Gain	:	-0.5 dBi (GSM/GPRS/EGPRS 850) 1.67 dBi (GSM/GPRS/EGPRS 1900) 1.67 dBi (WCDMA/HSDPA/HSUPA Band II) -0.5 dBi (WCDMA/HSDPA/HSUPA Band V) 0.83 dBi (WLAN 802.11b/802.11g) -4.67 dBi (Bluetooth 2.1 / Bluetooth EDR)
Device Category	:	Portable
RF Exposure Environment	:	General Population / Uncontrolled
Battery Option	:	Standard
Application Type	:	Certification

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment / general population exposure limits specified in Standard C95.1-2005 and had been tested in accordance with the measurement procedures specified in IEEE Std. 1528-2003.

2. Introduction

The A Test Lab Techno Corp. has performed measurements of the maximum potential exposure to the user of **DIALOGUE INC Trade Name：M2 Model(s)：M2A1.** The test procedures, as described in American National Standards, Institute C95.1 - 2005〔1〕, FCC/OET Bulletin 65 Supplement C [July 2001] were employed and they specify the maximum exposure limit of 1.6mW/g as averaged over any 1 gram of tissue for portable devices being used within 25cm between user and EUT in the uncontrolled environment. A description of the product and operating configuration, detailed summary of the test results, methodology and procedures used in the equipment used are included within this test report.

3. SAR Definition

Specific Absorption Rate (SAR) is defined as 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). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Figure 2).

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

Figure 2. SAR Mathematical Equation

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

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

Where：

σ = conductivity of the tissue (S/m)

ρ = mass density of the tissue (kg/m^3)

E = RMS electric field strength (V/m)

＊**Note**：

The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane〔2〕

4. SAR Measurement Setup

These measurements were performed with the automated near-field scanning system DASY4 from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision robot (working range greater than 0.9m) which positions the probes with a positional repeatability of better than ±0.02mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines (length = 300mm) to the data acquisition unit.

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Measurement Server is based on a PC/104 CPU board with a 400MHz intel ULV Celeron, 128MB chipdisk and 128MB RAM. The necessary circuits for communication with either the DAE4 (or DAE3) electronic box as well as the 16-bit AD-converter system for optical detection and digital I/O interface are contained on the DASY4 I/O-board, which is directly connected to the PC/104 bus of the CPU board. The PC consists of the Intel Core(TM)2 CPU @1.86GHz computer with Windows XP system and SAR Measurement Software DASY4, Post Processor SEMCAD, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection…etc. is connected to the Electro-optical converter (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the Measurement Server.

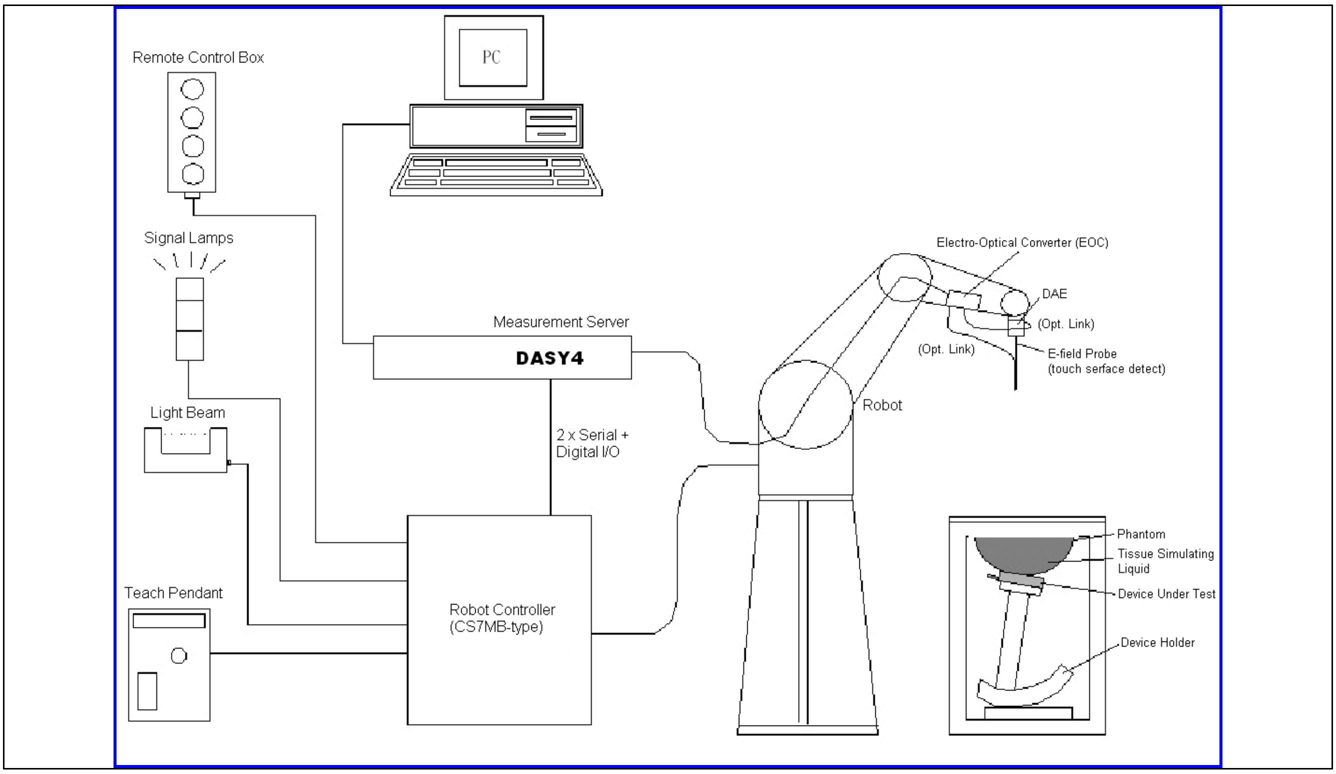


Figure 3. SAR Lab Test Measurement Setup

The DAE4 (or DAE3) 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 PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in〔3〕.

5. System Components

5.1 DASY4 E-Field Probe System

The SAR measurements were conducted with the dosimetric probe ES3DV3 or ET3DV6 (manufactured by SPEAG), designed in the classical triangular configuration〔3〕and optimized for dosimetric evaluation. The probes is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multi-fiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped when reaching the maximum.

5.1.1 E-Field Probe Specification

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.q., glycol)
Calibration	In air from 10 MHz to 6 GHz In brain and muscle simulating tissue at frequencies of 835MHz,1900MHz and 2450MHz (accuracy ±8%) Calibration for other liquids and frequencies upon request
Frequency	10 MHz to > 6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)
Directivity	±0.3 dB in brain tissue (rotation around probe axis) ±0.5 dB in brain tissue (rotation normal probe axis)
Dynamic Range	10 μW/g to > 100mW/g; Linearity: ±0.2dB
Surface Detection	±0.2 mm repeatability in air and clear liquids over diffuse reflecting surface
Dimensions	Overall length: 330mm Tip length: 20mm Body diameter: 12mm Tip diameter: 2.5mm Distance from probe tip to dipole centers: 1.0mm
Application	General dosimetry up to 6GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms

Figure 4. E-field Probe

Figure 5.
Probe setup on robot

5.1.2 E-Field Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure described in〔4〕with accuracy better than ±10%. The spherical isotropy was evaluated with the procedure described in〔5〕and found to be better than ±0.25dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested.

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

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

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

Where：

Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (head or body),

ΔT = Temperature increase due to RF exposure.

Or

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

Where：

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

5.2 Data Acquisition Electronic (DAE) System

Cell Controller

Processor：	Intel Core(TM)2 CPU
Clock Speed：	@ 1.86GHz
Operating System：	Windows XP Professional

Data Converter

Features：	Signal Amplifier, multiplexer, A/D converter, and control logic
Software：	DASY4 v4.7 (Build 80) & SEMCAD v1.8 (Build 186)
Connecting Lines：	Optical downlink for data and status info
	Optical uplink for commands and clock

5.3 Robot

Positioner：	Stäubli Unimation Corp. Robot Model: TX90XL
Repeatability：	±0.02 mm
No. of Axis：	6

5.4 Measurement Server

Processor：	PC/104 with a 400MHz intel ULV Celeron
I/O-board：	Link to DAE4(or DAE3)
	16-bit A/D converter for surface detection system
	Digital I/O interface
	Serial link to robot
	Direct emergency stop output for robot

5.5 Device Holder for Transmitters

In combination with the SAM Twin Phantom V4.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeat ably positioned according to the IEEE SCC34-SC2 and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, and flat phantom).

＊**Note**：A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produced infinite number of configurations〔6〕. To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Larger DUT cannot be tested using this device holder. Instead a support of bigger polystyrene cubes and thin polystyrene plates is used to position the DUT in all relevant positions to find and measure spots with maximum SAR values. Therefore those devices are normally only tested at the flat part of the SAM.

Figure 6. Device Holder

5.6 Phantom - SAM v4.0

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.

Figure 7. SAM Twin Phantom

Shell Thickness	2 ±0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	810x1000x500 mm (HxLxW)

Table 1. Specification of SAM v4.0

5.7 Data Storage and Evaluation

5.7.1 Data Storage

The DASY4 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 with the extension .DA4. 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.

5.7.2 Data Evaluation

The DASY4 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	Normi, ai0, ai1, ai2
	- Conversion factor	ConvFi
	- Diode compression point	dcpi
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 multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

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

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

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：

$$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$$

H-field probes：

$$H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$$

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

$Norm_i$ = sensor sensitivity of channel i (i = x, y, z)

μ V/(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

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

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

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

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

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

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.

The power flow density is calculated assuming the excitation field to be a free space field.

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

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

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

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

6. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Dosimetric E-Field Probe	ES3DV3	3632	Jan. 26, 2010	Jan. 26, 2011
SPEAG	835MHz System Validation Kit	D835V2	4d082	Jul. 13, 2009	Jul. 13, 2010
SPEAG	1900MHz System Validation Kit	D1900V2	5d111	Jul. 14, 2009	Jul. 14, 2010
SPEAG	2450MHz System Validation Kit	D2450V2	712	Feb. 19, 2010	Feb.19, 2011
SPEAG	Data Acquisition Electronics	DAE3	393	Aug. 24, 2009	Aug. 24, 2010
SPEAG	Device Holder	N/A	N/A	NCR	NCR
SPEAG	Phantom	SAM V4.0	TP-1150	NCR	NCR
SPEAG	Robot	Staubli TX90XL	F07/564ZA1/C/01	NCR	NCR
SPEAG	Software	DASY4 V4.7 Build 80	N/A	NCR	NCR
SPEAG	Software	SEMCAD X V1.8 Build 186	N/A	NCR	NCR
SPEAG	Measurement Server	SE UMS 011 AA	1025	NCR	NCR
R&S	Wireless Communication Test Set	CMU200	109369	Jul. 29, 2009	Jul. 29, 2010
Agilent	Wireless Communication Test Set	E5515C	GB47020167	May 25, 2009	May 25, 2010
Agilent	ENA Series Network Analyzer	E5071B	MY42402996	Nov. 04, 2009	Nov. 04, 2010
Agilent	Dielectric Probe Kit	85070C	US99360094	NCR	NCR
R&S	Power Sensor	NRP-Z22	100179	May 17, 2009	May 17, 2010
Agilent	Signal Generator	E8257D	MY44320425	NCR	NCR
Agilent	Dual Directional Coupler	778D	50334	NCR	NCR
Mini-Circuits	Power Amplifier	ZHL-42W-SMA	D111103#5	NCR	NCR
Mini-Circuits	Power Amplifier	ZVE-8G-SMA	D042005 671800514	NCR	NCR

Table 2. Test Equipment List

7. *Tissue Simulating Liquids*

The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the tissue.

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an 85070C Dielectric Probe Kit and an E5071B Network Analyzer.

IEEE SCC-34/SC-2 in 1528 recommended Tissue Dielectric Parameters

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in 1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in human head. Other head and body tissue parameters that have not been s

pecified in 1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equation and extrapolated according to the head parameter specified in 1528.

Target Frequency	Head		Body	
(MHz)	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800 - 2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00
(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)				

Table 3. Tissue dielectric parameters for head and body phantoms

7.1 Ingredients

The following ingredients are used:

- Water: deionized water (pure H_20), resistivity ≥ 16 M Ω -as basis for the liquid
- Sugar: refied white sugar (typically 99.7 % sucrose, available as crystal sugar in food shops) -to reduce relative permittivity
- Salt: pure NaCl -to increase conductivity
- Cellulose: Hydroxyethyl-cellulose, medium viscosity (75-125 mPa.s, 2% in water, 20° C), CAS # 54290 -to increase viscosity and to keep sugar in solution.
- Preservative: Preventol D-7 Bayer AG, D-51368 Leverkusen, CAS # 55965-84-9 -to prevent the spread of bacteria and molds
- DGBE: Diethylenglycol-monobuthyl ether (DGBE), Fluka Chemie GmbH, CAS # 112-34-5 -to reduce relative permittivity

7.2 Recipes

The following tables give the recipes for tissue simulating liquids to be used in different frequency bands.

Note: The goal dielectric parameters (at 22 ℃) must be achieved within a tolerance of ±5% for ε and ±5% for σ.

Liquid type	MSL 900-B	
Ingredient	Weight (g)	Weight (%)
Water	633.91	50.75
Sugar	602.12	50.75
Cellulose	-	0.00
Salt	11.76	0.94
Preventol	1.20	0.10
Total amount	1,249.00	100.00
Goal dielectric parameters		
Frequency [MHz]	835	900
Relative Permittivity	55.2	55.0
Conductivity [S/m]	0.97	1.05

Liquid type	MSL 1800-B	
Ingredient	Weight (g)	Weight (%)
Water	701.66	70.17
DGBE	294.42	29.44
Salt	3.92	0.39
Total amount	1,000.00	100.00
Goal dielectric parameters		
Frequency [MHz]	1800	1900
Relative Permittivity	53.3	53.3
Conductivity [S/m]	1.52	1.52

Liquid type	MSL 1950-A	
Ingredient	Weight (g)	Weight (%)
Water	697.94	69.79
DGBE	300.03	30.00
Salt	2.03	0.20
Total amount	1,000.00	100.00
Goal dielectric parameters		
Frequency [MHz]	1950	2000
Relative Permittivity	53.3	53.3
Conductivity [S/m]	1.52	1.52

Liquid type	MSL 2450-B	
Ingredient	Weight (g)	Weight (%)
Water	686.35	68.64
DGBE	313.65	31.37
Salt	-	0.00
Total amount	1,000.00	100.00
Goal dielectric parameters		
Frequency [MHz]	2450	
Relative Permittivity	52.7	
Conductivity [S/m]	1.95	

7.3 Liquid Confirmation

7.3.1 Parameters

Liquid Verify								
Ambient Temperature： 22 ± 2 °C；Relative Humidity：40 -70%								
Liquid Type	**Frequency**	**Temp (°C)**	**Parameters**	**Target Value**	**Measured Value**	**Deviation (%)**	**Limit (%)**	**Measured Date**
835MHz Body	820MHz	22.0	**εr**	55.2	53.3	**-3.44 %**	± 5	Mar. 18, 2010
			σ	0.97	0.981	**1.13 %**	± 5	
	835MHz	22.0	**εr**	55.2	53.3	**-3.44 %**	± 5	Mar. 18, 2010
			σ	0.97	0.998	**2.89 %**	± 5	
	850MHz	22.0	**εr**	55.2	53.2	**-3.62 %**	± 5	Mar. 18, 2010
			σ	0.97	1.015	**4.64 %**	± 5	
1900MHz Body	1850MHz	22.0	**εr**	53.3	51.7	**-3.00 %**	± 5	Mar. 19, 2010
			σ	1.52	1.40	**-7.89 %**	± 5	
	1900MHz	22.0	**εr**	53.3	51.6	**-3.19 %**	± 5	Mar. 19, 2010
			σ	1.52	1.50	**-1.32 %**	± 5	
	1950MHz	22.0	**εr**	53.3	51.4	**-3.56 %**	± 5	Mar. 19, 2010
			σ	1.52	1.60	**5.26 %**	± 5	
2450MHz Body	2400MHz	22.0	**εr**	52.7	50.5	**-4.17 %**	± 5	Mar. 21, 2010
			σ	1.95	1.90	**-2.56 %**	± 5	
	2450MHz	22.0	**εr**	52.7	50.2	**-4.74 %**	± 5	Mar. 21, 2010
			σ	1.95	1.92	**-1.54 %**	± 5	
	2500MHz	22.0	**εr**	52.7	50.2	**-4.74 %**	± 5	Mar. 21, 2010
			σ	1.95	2.00	**2.56 %**	± 5	

Table 4. Measured Tissue dielectric parameters for head and body phantoms - 2

7.3.2 Liquid Depth

The liquid level was during measurement 15cm ±0.5cm.

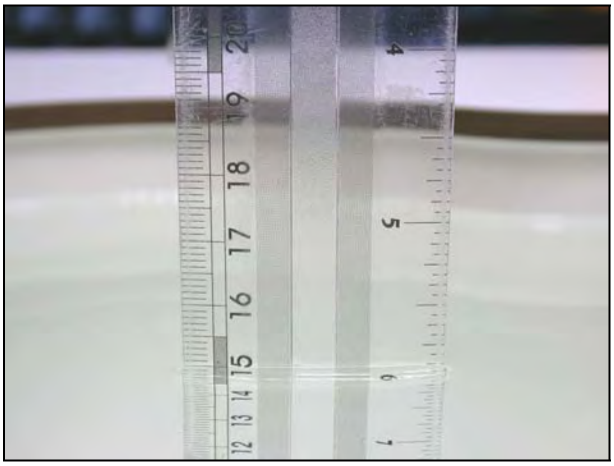


Figure 8. Head-Tissue-Simulating-Liquid

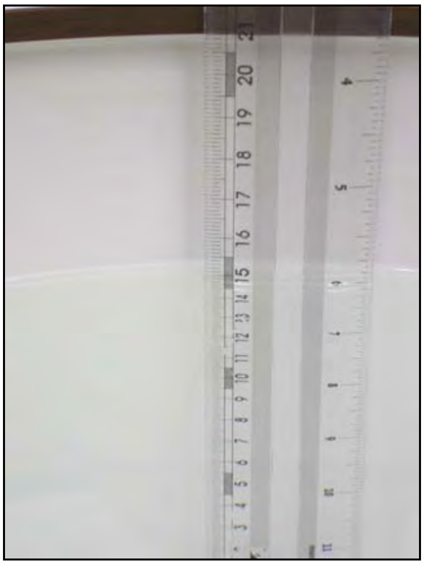


Figure 9. Body-Tissue-Simulating-Liquid

8. Measurement Process

8.1 Device and Test Conditions

The Test Device was provided by **DIALOGUE INC** for this evaluation. The spatial peak SAR values were assessed for the lowest, middle and highest channels defined by **GSM/GPRS/EGPRS 850** (#128=824.2MHz, #190=836.6MHz, #251=848.8MHz), **GSM/GPRS/EGPRS 1900** (#512=1850.2MHz, #661=1880.0MHz, #810=1909.8MHz), **WCDMA / HSDPA / HSUPA Band V** (#4132=826.4 MHz, #4183=836.6MHz, #4233=846.4MHz) systems, **WCDMA / HSDPA / HSUPA Band II**(#9262=1852.4 MHz, #9400=1880.0MHz, #9538=1907.6MHz) systems,**WLAN 802.11b / 802.11g** (#1=2412MHz, #6=2437MHz, #11=2462MHz) and **Bluetooth** (#0=2402MHz, #39=2441MHz, #78=2480MHz) systems.

HSDPA Date Devices setup for SAR Measurement.

HSDPA should be configured according to the UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors(βc, βd), and HS-DPCCH power offset parameters (ΔACK, ΔNACK, ΔCQI) should be set according to values indicated in the Table below.[32] The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.[33]

Sub-test	βc	βd	βd (SF)	βc/βd	βhs(1,2)	CM (dB)(3)	MRP (dB)(3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15(4)	15/15(4)	64	12/15(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} = 8 ⇔ Ahs = βhs/βc = 30/15 ⇔ βhs= 30/15 *βc
2. For theHS-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 βhs = 30/15 *βc and Δ_{CQI} = 24/15 with βhs = 24/15*βc
3. CM = 1 for βc/βd =12/15, βhs/βc=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.
4. For subtest 2 the βc/βd ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to βc = 11/15 and βd = 15/15.

Table 5. Setup for Release 5 HSDPA

HSPA Date Devices setup for SAR Measurement.

The following procedures are applicable to HSPA (HSUPA/HSDPA) data devices operating under 3GPP Release 6. Body exposure conditions generally apply to these devices, including handsets and data modems operating in various electronic devices. HSUPA operates in conjunction with WCDMA and HSDPA. SAR is initially measured in WCDMA test configurations without HSPA. The default test configuration is to establish a radio link between the DUT and a communication test set to configure a 12.2 kbps RMC (reference measurement channel) in Test Loop Mode 1. SAR for HSPA is selectively measured with HS-DPCCH, EDPCCH and E-DPDCH, all enabled, along with a 12.2 kbps RMC using the highest SAR configuration in WCDMA with 12.2 kbps RMC only. An FRC is configured according to HSDPCCH Sub-test 1 using H-set 1 and QPSK. HSPA is configured according to E-DCH Subtest 5 requirements. SAR for other HSPA sub-test configurations is also confirmed selectively according to output power, exposure conditions and E-DCH UE Category. Maximum output power is verified according to procedures in applicable versions of 3GPP TS 34.121 and SAR must be measured according to these maximum output conditions. The UE Categories for HSDPCCH and HSPA should be clearly identified in the SAR report. The following procedures are applicable only if Maximum Power Reduction (MPR) is implemented according to Cubic Metric (CM) requirements.

When voice transmission and head exposure conditions are applicable to a WCDMA/HSPA data device, head exposure is measured according to the 'Head SAR Measurements' procedures in the 'WCDMA Handsets' section of this document. SAR for body exposure configurations are measured according to the 'Body SAR Measurements' procedures in the 'WCDMA Handsets' section of this document. In addition, body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least ¼ dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA. When VOIP is applicable for head exposure, SAR is not required when the maximum output of each RF channel with HSPA is less than ¼ dB higher than that measured using 12.2 kbps RMC; otherwise, the same HSPA configuration used for body measurements should be used to test for head exposure.

Due to inner loop power control requirements in HSPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSPA should be configured according to the β values indicated below as well as other applicable procedures described in the 'WCDMA Handset' and 'Release 5 HSDPA Data Devices' sections of this document.

The highest body SAR measured in Antenna Extended & Retracted configurations on a channel in 12.2 kbps RMC. The possible channels are the High, Middle & Low channel. Contact the FCC Laboratory for test and approval requirements if the maximum output power measured in E-DCH Sub-test 2 - 4 is higher than Sub-test 5.

Sub-test	βc	βd	βd (SF)	βc/βd	βhs(1)	βec	βed	Bed (SF)	Bed (codes)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	βed1: 47/15 βed2: 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: ∆ACK, ∆NACK and ∆CQI = 8 ⇔ Ahs = βhs/βc = 30/15 ⇔ βhs= 30/15 *βc.

Note 2: CM = 1 for βc/βd =12/15, βhs/βc=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 βc/βd ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to βc = 10/15 and βd = 15/15.

Note 4: For subtest 5 the βc/βd ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to βc = 14/15 and βd = 15/15.

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

Note 6: βed can not be set directly; it is set by Absolute Grant Value.

Table 6. Setup for Release 6 HSPA

Usage:	Operates with a normal mode by client (GSM/GPRS/EGPRS850/GSM/GPRS/EGPRS1900/ WCDMA/HSDPA/HSUPA) Operates with a test mode by client (802.11b/802.11g)
Simulating human Head/Body:	Head & Body
EUT Battery:	Fully-charged with Li-ion batteries.
Comment:	The SAR test mode is chosen by the max conducted power.

Band	Mode	CH	Frequency (MHz)	Average Conducted power (dBm)		Worst
				before	After	
GSM850	----	Lowest	824.2	22.52	22.50	☐
		Middle	836.6	22.59	22.57	☐
		Highest	848.8	22.53	22.51	☐
GPRS 850	4Down1Up	Lowest	824.2	22.57	22.56	☐
		Middle	836.6	22.61	22.59	☐
		Highest	848.8	22.56	22.54	☐
	3Down2Up	Lowest	824.2	23.00	22.98	☐
		Middle	836.6	23.01	22.99	■
		Highest	848.8	22.99	22.95	☐
	2Down3Up	Lowest	824.2	22.73	22.71	☐
		Middle	836.6	22.77	22.75	☐
		Highest	848.8	22.72	22.67	☐
	1Down4Up	Lowest	824.2	22.00	21.08	☐
		Middle	836.6	22.05	22.03	☐
		Highest	848.8	21.98	21.95	☐
EGPRS 850	4Down1Up	Lowest	824.2	17.13	17.11	☐
		Middle	836.6	16.93	16.91	☐
		Highest	848.8	17.10	17.08	☐
	3Down2Up	Lowest	824.2	19.05	19.02	☐
		Middle	836.6	18.86	18.84	☐
		Highest	848.8	19.02	19.00	☐
	2Down3Up	Lowest	824.2	18.76	18.74	☐
		Middle	836.6	18.57	18.56	☐
		Highest	848.8	18.75	18.73	☐
	1Down4Up	Lowest	824.2	18.76	18.74	☐
		Middle	836.6	19.07	19.05	☐
		Highest	848.8	18.76	18.73	☐

Band	Mode / Sub-test	CH	Frequency (MHz)	Average Conducted power (dBm)		Worst
				before	After	
PCS1900	----	Lowest	1850.2	19.62	19.59	☐
		Middle	1880.0	19.54	19.52	☐
		Highest	1909.8	19.64	19.61	☐
GPRS 1900	4Down1Up	Lowest	1850.2	19.62	19.60	☐
		Middle	1880.0	19.56	19.54	☐
		Highest	1909.8	19.65	19.61	☐
	3Down2Up	Lowest	1850.2	20.95	20.92	☐
		Middle	1880.0	20.91	20.88	☐
		Highest	1909.8	20.97	20.95	☐
	2Down3Up	Lowest	1850.2	21.63	21.60	☐
		Middle	1880.0	21.59	21.56	☐
		Highest	1909.8	21.64	21.62	☐
	1Down4Up	Lowest	1850.2	21.90	21.87	■
		Middle	1880.0	21.82	21.80	☐
		Highest	1909.8	21.88	21.83	☐
EGPRS 1900	4Down1Up	Lowest	1850.2	16.11	16.09	☐
		Middle	1880.0	15.83	15.81	☐
		Highest	1909.8	15.88	15.85	☐
	3Down2Up	Lowest	1850.2	18.00	17.98	☐
		Middle	1880.0	17.69	17.64	☐
		Highest	1909.8	18.05	18.02	☐
	2Down3Up	Lowest	1850.2	17.71	17.68	☐
		Middle	1880.0	17.38	17.36	☐
		Highest	1909.8	17.67	17.65	☐
	1Down4Up	Lowest	1850.2	17.93	17.91	☐
		Middle	1880.0	17.63	17.60	☐
		Highest	1909.8	17.66	17.64	☐
WCDMA II	---	Lowest	1852.4	21.52	21.49	☐
		Middle	1880.0	21.92	21.90	■
		Highest	1907.6	21.46	21.43	☐
HSDPA II	1	Lowest	1852.4	21.49	21.45	☐
		Middle	1880.0	21.73	21.71	■
		Highest	1907.6	21.32	21.30	☐
	2	Lowest	1852.4	21.44	21.41	☐
		Middle	1880.0	21.71	21.69	☐
		Highest	1907.6	21.27	21.25	☐
	3	Lowest	1852.4	20.94	20.91	☐
		Middle	1880.0	21.20	21.19	☐
		Highest	1907.6	20.83	20.81	☐
	4	Lowest	1852.4	20.91	20.89	☐
		Middle	1880.0	21.19	21.16	☐
		Highest	1907.6	20.89	20.85	☐

Band	Mode / Sub-test	CH	Frequency (MHz)	Average Conducted power (dBm)		Worst
HSUPA II	1	Lowest	1852.4	20.70	20.68	☐
		Middle	1880.0	20.68	20.64	☐
		Highest	1907.6	20.06	20.02	☐
	2	Lowest	1852.4	18.54	18.51	☐
		Middle	1880.0	18.52	18.50	☐
		Highest	1907.6	18.11	18.08	☐
	3	Lowest	1852.4	19.70	19.67	☐
		Middle	1880.0	19.87	19.82	☐
		Highest	1907.6	19.15	19.12	☐
	4	Lowest	1852.4	18.90	18.87	☐
		Middle	1880.0	18.84	18.81	☐
		Highest	1907.6	18.25	18.23	☐
	5	Lowest	1852.4	20.56	20.54	☐
		Middle	1880.0	20.78	20.76	■
		Highest	1907.6	20.15	20.12	☐
WCDMA V	---	Lowest	826.4	21.80	21.78	■
		Middle	836.6	21.76	21.74	☐
		Highest	846.4	21.51	21.49	☐
HSDPA V	1	Lowest	826.4	21.55	21.52	☐
		Middle	836.6	21.64	21.61	■
		Highest	846.4	21.34	21.32	☐
	2	Lowest	826.4	21.50	21.47	☐
		Middle	836.6	21.56	21.53	☐
		Highest	846.4	21.33	21.30	☐
	3	Lowest	826.4	21.08	21.04	☐
		Middle	836.6	21.05	21.01	☐
		Highest	846.4	20.79	20.75	☐
	4	Lowest	826.4	21.03	21.01	☐
		Middle	836.6	21.00	20.98	☐
		Highest	846.4	20.78	20.75	☐
HSUPA V	1	Lowest	826.4	20.96	20.94	☐
		Middle	836.6	21.00	20.98	☐
		Highest	846.4	21.32	21.31	■
	2	Lowest	826.4	19.17	19.15	☐
		Middle	836.6	19.28	19.25	☐
		Highest	846.4	19.20	19.18	☐
	3	Lowest	826.4	19.85	19.81	☐
		Middle	836.6	19.90	19.87	☐
		Highest	846.4	20.21	20.18	☐
	4	Lowest	826.4	19.15	19.13	☐
		Middle	836.6	19.18	19.15	☐
		Highest	846.4	19.13	19.12	☐
	5	Lowest	826.4	21.15	21.11	☐
		Middle	836.6	21.10	21.07	☐
		Highest	846.4	21.20	21.18	☐

Band	Data Rate	CH	Frequency (MHz)	Average Conducted power (dBm)		Worst
				before	After	
802.11b	1M	Lowest	2412	14.87	14.85	☐
		Middle	2437	14.97	14.93	☐
		Highest	2462	14.57	14.54	☐
	2M	Lowest	2412	15.00	14.98	☐
		Middle	2437	14.90	14.87	☐
		Highest	2462	14.53	14.51	☐
	5.5M	Lowest	2412	15.10	15.08	■
		Middle	2437	15.07	15.03	☐
		Highest	2462	14.60	14.58	☐
	11M	Lowest	2412	15.04	15.01	☐
		Middle	2437	15.00	14.98	☐
		Highest	2462	14.53	14.51	☐
802.11g	6M	Lowest	2412	11.71	11.69	☐
		Middle	2437	12.02	12.00	☐
		Highest	2462	12.08	12.04	☐
	9M	Lowest	2412	11.74	11.71	☐
		Middle	2437	12.04	12.03	☐
		Highest	2462	12.07	12.04	☐
	12M	Lowest	2412	11.74	11.72	☐
		Middle	2437	12.03	12.01	☐
		Highest	2462	12.10	12.07	☐
	18M	Lowest	2412	11.33	11.31	☐
		Middle	2437	12.05	12.02	☐
		Highest	2462	12.09	12.06	☐
	24M	Lowest	2412	11.78	11.75	☐
		Middle	2437	12.06	12.04	☐
		Highest	2462	12.08	12.06	☐
	36M	Lowest	2412	11.78	11.74	☐
		Middle	2437	12.05	12.03	☐
		Highest	2462	12.14	12.10	☐
	48M	Lowest	2412	11.75	11.72	☐
		Middle	2437	12.01	12.00	☐
		Highest	2462	12.08	12.05	☐
	54M	Lowest	2412	11.81	11.78	☐
		Middle	2437	12.04	12.01	☐
		Highest	2462	12.13	12.12	☐
Bluetooth	---	Lowest	2402	-2.93	-2.91	■
		Middle	2441	-4.56	-4.52	☐
		Highest	2480	-4.59	-4.55	☐

8.2 Simultaneous Transmitting Evaluate

RF Conducted Power:

0.200 W	(23.01 dBm)	GSM/GPRS/EGPRS 850
0.155 W	(21.90 dBm)	GSM/GPRS/EGPRS 1900
0.151 W	(21.80 dBm)	WCDMA Band V/HSDPA Band V/HSUPA Band V
0.156 W	(21.92 dBm)	WCDMA Band II/HSDPA Band II /HSUPA Band II
0.032 W	(15.10 dBm)	WLAN 802.11b
0.016 W	(12.14 dBm)	WLAN 802.11g
0.0005 W	(-2.93 dBm)	Bluetooth 2.1 / Bluetooth EDR

BT and GSM and WLAN simultaneously SAR Description

BT Antenna and WLAN Antenna	32.2cm
BT Antenna and GSM/GPRS/EGPRS850/GSM/GPRS/EGPRS1900 (License) Antenna	.29.6 cm
WLAN Antenna and GSM/GPRS/EGPRS850/GSM/GPRS/EGPRS1900 (License) Antenna	29.6 cm

(1) Antenna Distance
  1a.BT & GPRS 29.6 cm > 2.5 cm
  1b.BT & WLAN 32.2 cm > 2.5 cm

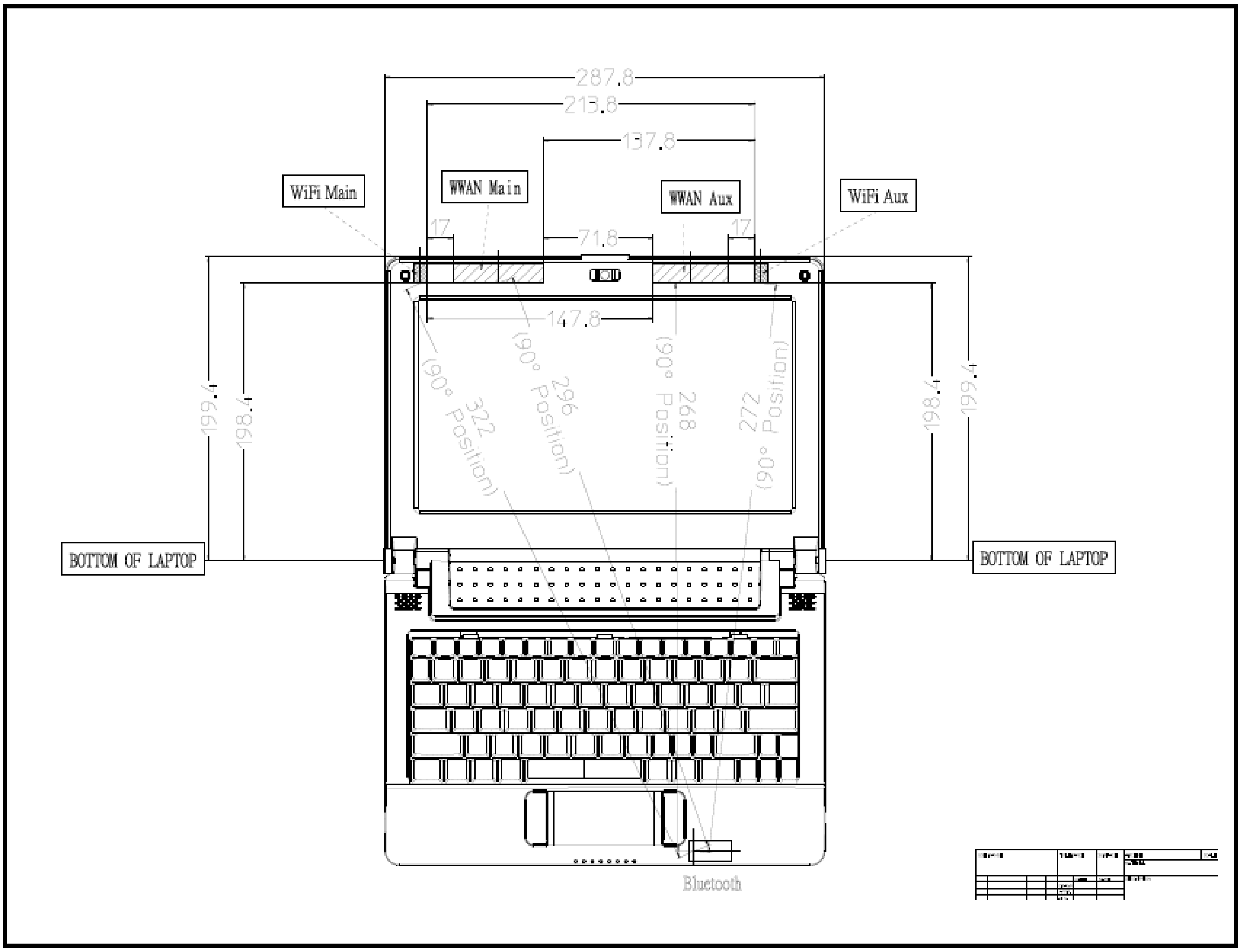
(2) BT Power <Pref and antenna-to-antenna is >2.5 cm. ~ BT Stand alone SAR is not required.

(3) WLAN > 2*Pref and antenna-to-antenna < 5.0 cm. ~ WLAN Stand alone SAR is required.

(4) Cell/PCS Stand alone SAR is required due to routine evaluation requirements.

(5) WLAN Stand alone SAR and License Device Stand alone SAR
  0.066+0.076 = 0.142mW/g <1.6mW/g

(6) 802.11g Average power is 12.14 dBm which is not over than 0.25dB of 802.11b.


287.8
213.8
137.8
WiFi Main
WWAN Main
WWAN Aux
WiFi Aux
17
71.8
17
147.8
199.4
198.4
(90° Position)
322
(90° 296 Position)
(90° Position) 268
272 Position)
(90°
198.4
199.4
BOTTOM OF LAPTOP
BOTTOM OF LAPTOP
Bluetooth

8.3 System Performance Check

8.3.1 Symmetric Dipoles for System Validation

Construction	Symmetrical dipole with l/4 balun enables measurement of feed point impedance with NWA matched for use near flat phantoms filled with head simulating solutions Includes distance holder and tripod adaptor Calibration Calibrated SAR value for specified position and input power at the flat phantom in head simulating solutions.
Frequency	835, 1900, 2450 MHz
Return Loss	> 20 dB at specified validation position
Power Capability	> 100 W (f < 1GHz); > 40 W (f > 1GHz)
Options	Dipoles for other frequencies or solutions and other calibration conditions are available upon request
Dimensions	D835V2：dipole length 150 mm; overall height 330 mm D1900V2：dipole length 62 mm; overall height 300 mm D2450V2：dipole length 51.5 mm; overall height 300 mm

Figure 10. Validation Kit

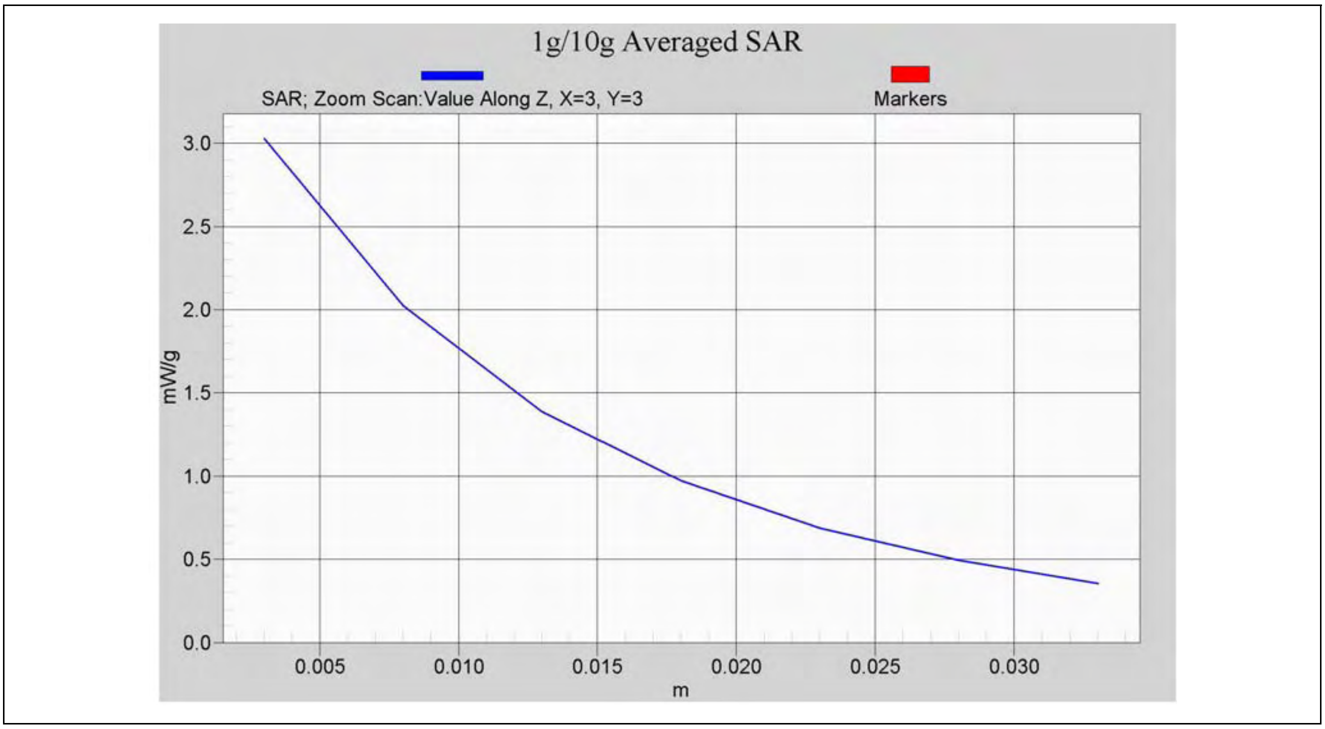
8.3.2 Validation

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of ± 7%. The validation was performed at 835MHz, 1900MHz and 2450MHz.

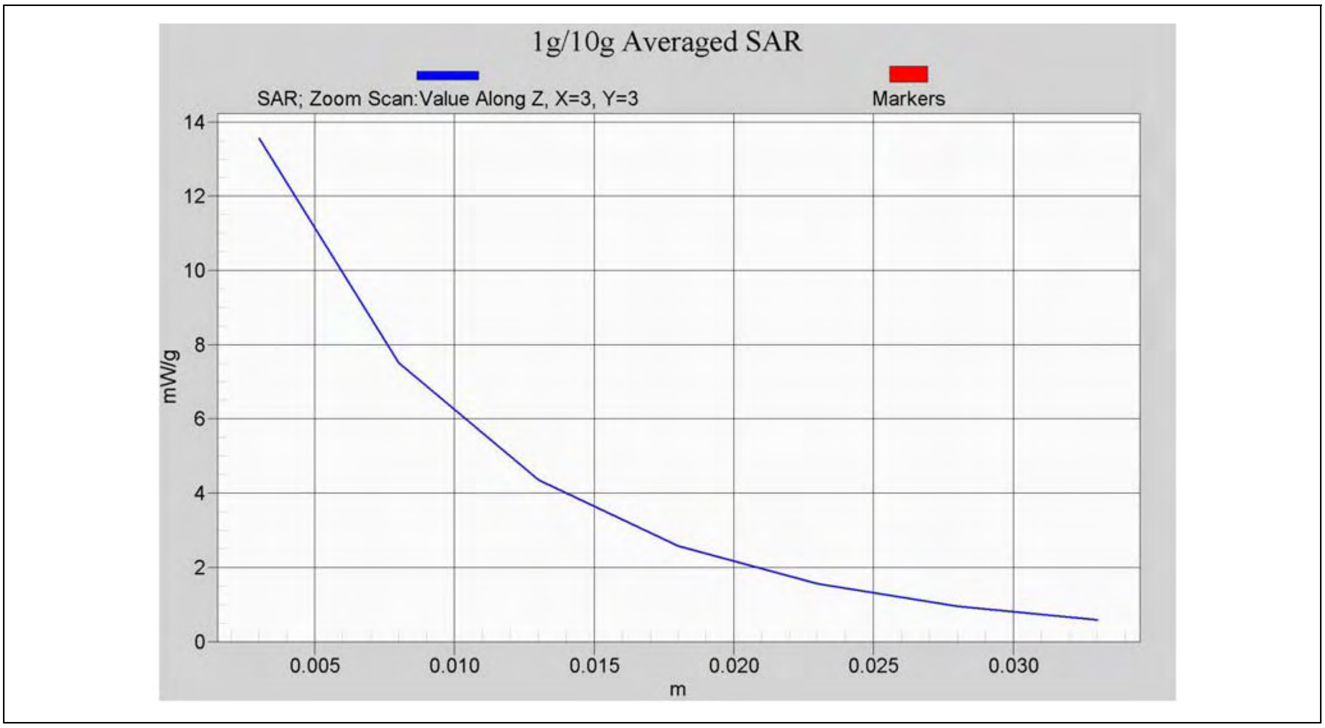
Validation kit	Mixture Type	SAR_{1g} [mW/g]	SAR_{10g} [mW/g]	Date of Calibration
D835V2-SN4d082	Body	10.24	6.72	Jul. 13, 2009
D1900V2-SN5d111	Body	42.80	22.44	Jul. 14, 2009
D2450V2-SN712	Body	52.00	23.88	Feb. 17, 2010

Frequency (MHz)	Power (dBm)	SAR_{1g} (mW/g)	SAR_{10g} (mW/g)	Drift (dB)	Difference percentage		Date
					1g	10g	
835 (Body)	250mW	2.58	1.69	**0.003**	**0.8 %**	**0.6 %**	**Mar. 18, 2010**
	Normalize to 1 Watt	**10.32**	**6.76**				
1900 (Body)	250mW	10.6	5.49	**0.048**	**-0.9 %**	**-2.1%**	**Mar. 19, 2010**
	Normalize to 1 Watt	**42.4**	**21.96**				
2450 (Body)	250mW	12.8	5.89	**-0.001**	**-1.5 %**	**-1.3 %**	**Mar. 22, 2010**
	Normalize to 1 Watt	**51.2**	**23.56**				

Z-axis Plot of System Performance Check

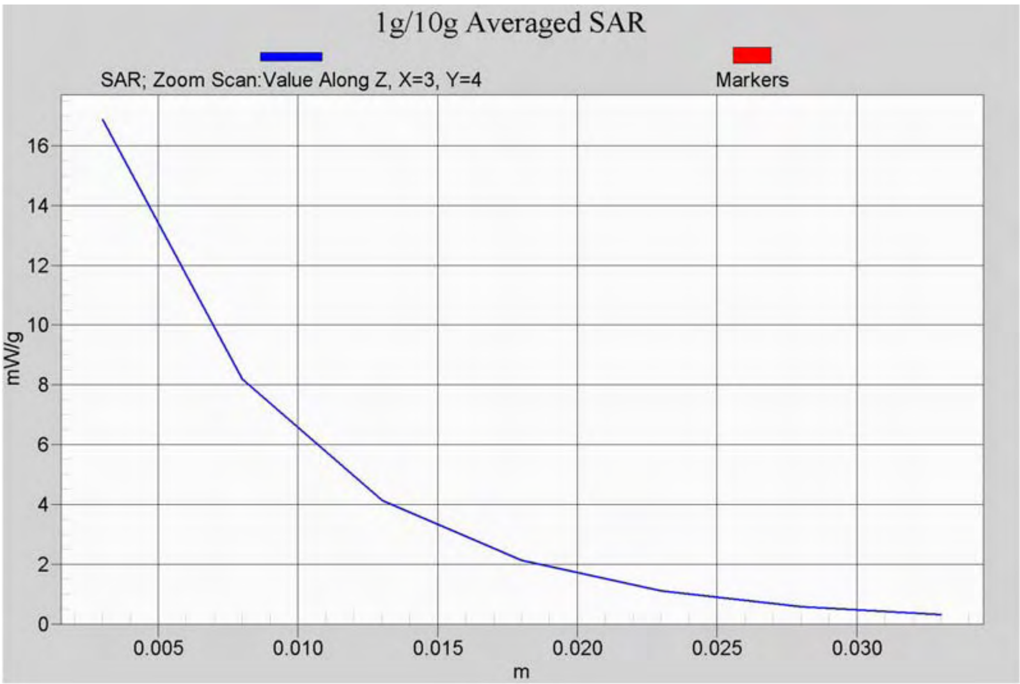


Body-Tissue-Simulating-Liquid 835MHz



Body-Tissue-Simulating-Liquid 1900MHz

Z-axis Plot of System Performance Check



Body-Tissue-Simulating-Liquid 2450MHz

8.4 Dosimetric Assessment Setup

8.4.1 Body Test Position

Body - Worn Configuration

Body - Worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device.

Body - Worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. A separation distance of 15 mm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances.
For this test：

□ The EUT is placed into the holster/belt clip and the holster is positioned against the surface of the phantom in a normal operating position.

■ Since this EUT doesn’t supply any body-worn accessory to the end user, for **GSM/GPRS/EGPRS850 / GSM/GPRS/EGPRS1900 / WCDMA Band II(RMC 12.2K) / WCDMA Band V(RMC 12.2K) / HSDPA Band II / HSDPA Band V / HSUPA Band II / HSUPA Band V WLAN 802.11b / WLAN 802.11g** the distance of **15 mm** was tested to confirm the necessary “minimum SAR separation distance”.
(＊Note：This distance includes the 2 mm phantom shell thickness.)

8.4.2 Measurement Procedures

The evaluation was performed with the following procedures：

Surface Check： A surface checks job gathers data used with optical surface detection. It determines the distance from the phantom surface where the reflection from the optical detector has its peak. Any following measurement jobs using optical surface detection will then rely on this value. The surface check performs its search a specified number of times, so that the repeatability can be verified. The probe tip distance is 1.3mm to phantom inner surface during scans.

Reference： The reference job measures the field at a specified reference position, at 4 mm from the selected section's grid reference point.

Area Scan： The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a finer measurement around the hot spot. The sophisticated interpolation routines can find the maximum locations even in relatively coarse grids. When an area scan has measured all reachable points, it computes the field maxima found in the scanned area, within a range of the global maximum. Any following zoom scan within the same procedure will then perform fine scans around these maxima. The area covered the entire dimension of the EUT and the horizontal grid spacing was 15 mm × 15 mm.

Zoom Scan： Zoom scans are used to assess the highest averaged SAR for cubic averaging volumes with 1 g and 10 g of simulated tissue. The zoom scan measures 7 x 7 x 9 points in a 30 x 30 x 24 mm cube whose base faces are centered around the maxima returned from a preceding area scan within the same procedure.

Drift： The drift job measures the field at the same location as the most recent reference job within the same procedure, with the same settings. The drift measurement gives the field difference in dB from the last reference measurement. Several drift measurements are possible for each reference measurement. This allows monitoring of the power drift of the device in the batch process. If the value changed by more than 5%, the evaluation was repeated.

8.5 Spatial Peak SAR Evaluation

The DASY4 software includes all numerical procedures necessary to evaluate the spatial peak SAR values. Based on the Draft: SCC-34, SC-2, WG-2 - Computational Dosimetry, IEEE P1529/D0.0 (Draft Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) Associated with the Use of Wireless Handsets - Computational Techniques), a new algorithm has been implemented. The spatial-peak SAR can be computed over any required mass.

The base for the evaluation is a "cube" measurement in a volume of $(32\times32\times30)mm^3$ ($5\times5\times7$ points). 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. If the 10g cube or both cubes are not entirely inside the measured volumes, the system issues a warning regarding the evaluated spatial peak values within the Postprocessing engine (SEMCAD). This means that if the measured volume is shifted, higher values might be possible. To get the correct values you can use a finer measurement grid for the area scan. In complicated field distributions, a large grid spacing for the area scan might miss some details and give an incorrectly interpolated peak location.
The entire evaluation of the spatial peak values is performed within the Postprocessing 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 three stages:

Interpolation and Extrapolation

The probe is calibrated at the center of the dipole sensors which is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated.

In DASY4, the choice of the coordinate system defining the location of the measurement points has no influence on the uncertainty of the interpolation, Maxima Search and SAR extrapolation routines. The interpolation, Maxima Search and extrapolation routines are all based on the modified Quadratic Shepard's method [7].

9. Measurement Uncertainty

Measurement uncertainties in SAR measurements are difficult to quantify due to several variables including biological, physiological, and environmental. However, we estimate the measurement uncertainties in SAR to be less than ±21.9 %〔8〕.

According to Std. C95.3〔9〕, the overall uncertainties are difficult to assess and will vary with the type of meter and usage situation. However, accuracy's of ±1 to 3 dB can be expected in practice, with greater uncertainties in near-field situations and at higher frequencies (shorter wavelengths), or areas where large reflecting objects are present. Under optimum measurement conditions, SAR measurement uncertainties of at least ±2dB can be expected.

According to CENELEC〔10〕, typical worst-case uncertainty of field measurements is ±5 dB. For well-defined modulation characteristics the uncertainty can be reduced to ±3 dB.

Error Description	Uncertainty value	Prob. Dist.	Div.	(*ci*) 1g	(*ci*) 10g	Std. Unc. (1g)	Std. Unc. (10g)	(*vi*) *veff*
Measurement System								
Probe Calibration	± 5.9 %	N	1	1	1	± 5.9 %	± 5.9 %	
Axial Isotropy	± 4.7 %	R		0.7	0.7	± 1.9 %	± 1.9 %	∞
Hemispherical Isotropy	± 9.6 %	R	$\sqrt{3}$	0.7	0.7	± 3.9 %	± 3.9 %	∞
Boundary Effects	± 1.0 %	R	$\sqrt{3}$	1	1	± 0.6 %	± 0.6 %	∞
Linearity	± 4.7 %	R	$\sqrt{3}$	1	1	± 2.7 %	± 2.7 %	∞
System Detection Limits	± 1.0 %	R	$\sqrt{3}$	1	1	± 0.6 %	± 0.6 %	∞
Readout Electronics	± 0.3 %	N	1	1	1	± 0.3 %	± 0.3 %	∞
Response Time	± 0.8 %	R	$\sqrt{3}$	1	1	± 0.5 %	± 0.5 %	∞
Integration Time	± 2.6 %	R	$\sqrt{3}$	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Noise	± 3.0 %	R	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Reflections	± 3.0 %	R	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.4 %	R	$\sqrt{3}$	1	1	± 0.2 %	± 0.2 %	∞
Probe Positioning	± 2.9 %	R	$\sqrt{3}$	1	1	± 1.7 %	± 1.7 %	∞
Max. SAR Eval.	± 1.0 %	R	$\sqrt{3}$	1	1	± 0.6 %	± 0.6 %	∞
Test Sample Related								
Device Positioning	± 2.9 %	N	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6 %	N	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0 %	R	$\sqrt{3}$	1	1	± 2.9 %	± 2.9 %	∞
Phantom and Setup								
Phantom Uncertainty	± 4.0 %	R	$\sqrt{3}$	1	1	± 2.3 %	2.3 %	∞
Liquid Conductivity (target)	± 5.0 %	R	$\sqrt{3}$	0.64	0.43	± 1.8 %	1.2 %	∞
Liquid Conductivity (meas.)	± 2.5 %	N	1	0.64	0.43	± 1.6 %	1.1 %	∞
Liquid Permittivity (target)	± 5.0 %	R	$\sqrt{3}$	0.6	0.49	± 1.7 %	1.4 %	∞
Liquid Permittivity (meas.)	± 2.5 %	N	1	0.6	0.49	± 1.5 %	1.2 %	∞
Combined Std. Uncertainty						**± 10.9 %**	**± 10.7 %**	387
Expanded STD Uncertainty						**± 21.9 %**	**± 21.4 %**	

Table 7. Uncertainty Budget of DASY

10. SAR Test Results Summary

10.1 GSM / GPRS / EGPRS 850 - Body SAR (LCD Open 90_0mm separation to Phantom)

Ambient :

Temperature (℃) : **22 ± 2** Relative HUMIDITY (%) : **40-70**

Liquid :

Mixture Type : **MSL835** Liquid Temperature (℃) : **22.0**

Depth of liquid (cm) : **15**

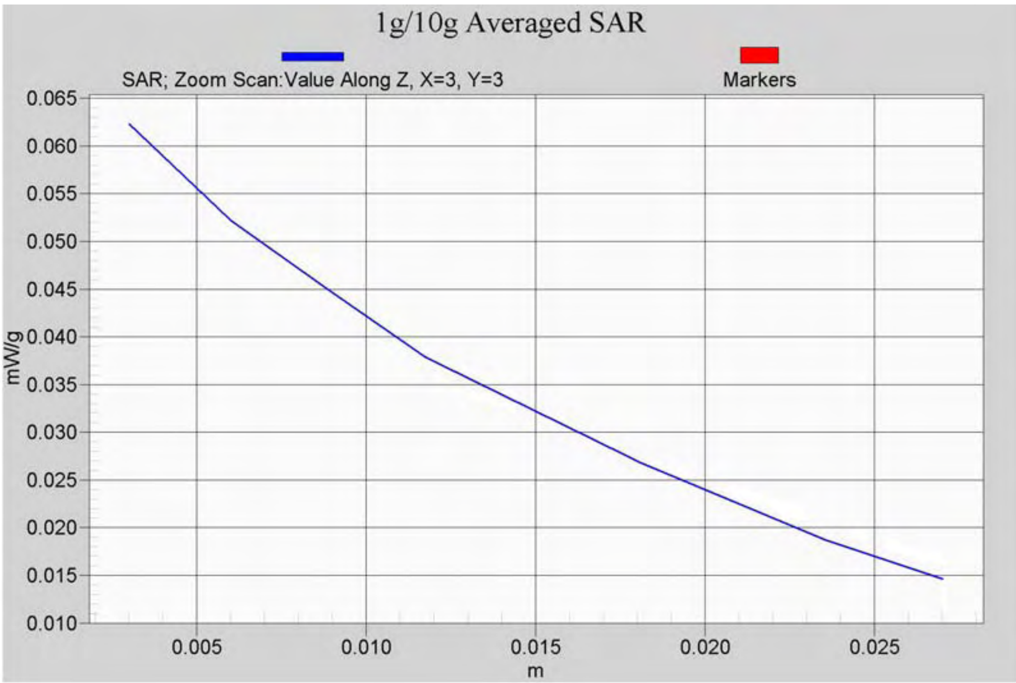
Measurement :

Duty Cycle : **1:4.2** Probe S/N : **3632**

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
836.6	190	GPRS 850	23.01	Flat	PCB	N/A	0.056	0.148	3Down2Up
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Detail results see Appendix B.

Z-axis Plot of SAR Measurement



Z-axis Plot of Flat GPRS850 CH 190

10.2 PCS / GPRS/ EGPRS 1900 - Body SAR
(LCD Open 90_0mm separation to Phantom)

Ambient：

Temperature (℃)： 22 ± 2 Relative HUMIDITY (%)： 40-70

Liquid：

Mixture Type： MSL1900 Liquid Temperature (℃)： 22.0

Depth of liquid (cm)： 15

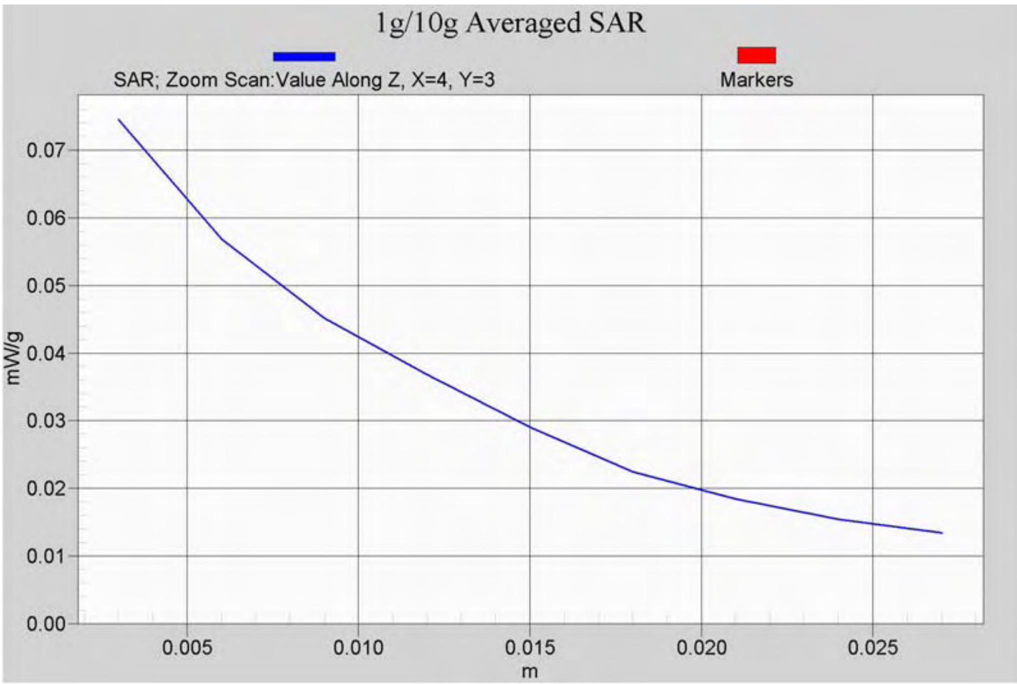
Measurement：

Duty Cycle： 1:2.1 Probe S/N： 3632

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
1909.8	512	GPRS 1900	21.90	Flat	PCB	N/A	0.065	-0.035	1Down4Up
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Detail results see Appendix B.

Z-axis Plot of SAR Measurement



Z-axis Plot of Flat GPRS 1900 CH 512

10.3 WCDMA Band II (RMC 12.2K) - Body SAR (LCD Open 90_0mm separation to Phantom)

Ambient：

Temperature (℃)： 22 ± 2 | Relative HUMIDITY (%)： 40-70

Liquid：

Mixture Type： MSL1900 | Liquid Temperature (℃)： 22.0

Depth of liquid (cm)： 15

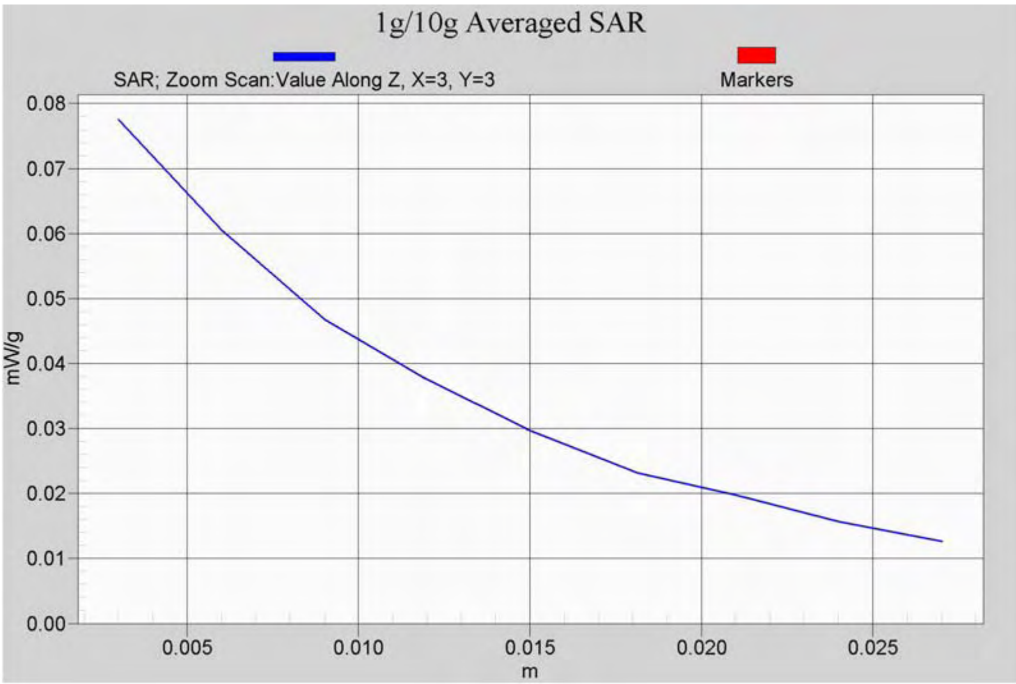
Measurement：

Duty Cycle： 1:1 | Probe S/N： 3632

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
1852.4	9400	WCDMA Band II	21.92	Flat	PCB	N/A	0.066	-0.163	----
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Detail results see Appendix B.

Z-axis Plot of SAR Measurement



Z-axis Plot of Flat WCDMA Band II CH 9400

10.4 WCDMA Band V (RMC 12.2K) - Body SAR (LCD Open 90_0mm separation to Phantom)

Ambient：

Temperature (℃)： **22 ± 2** Relative HUMIDITY (%)： **40-70**

Liquid：

Mixture Type： **MSL835** Liquid Temperature (℃)： **22.0**

Depth of liquid (cm)： **15**

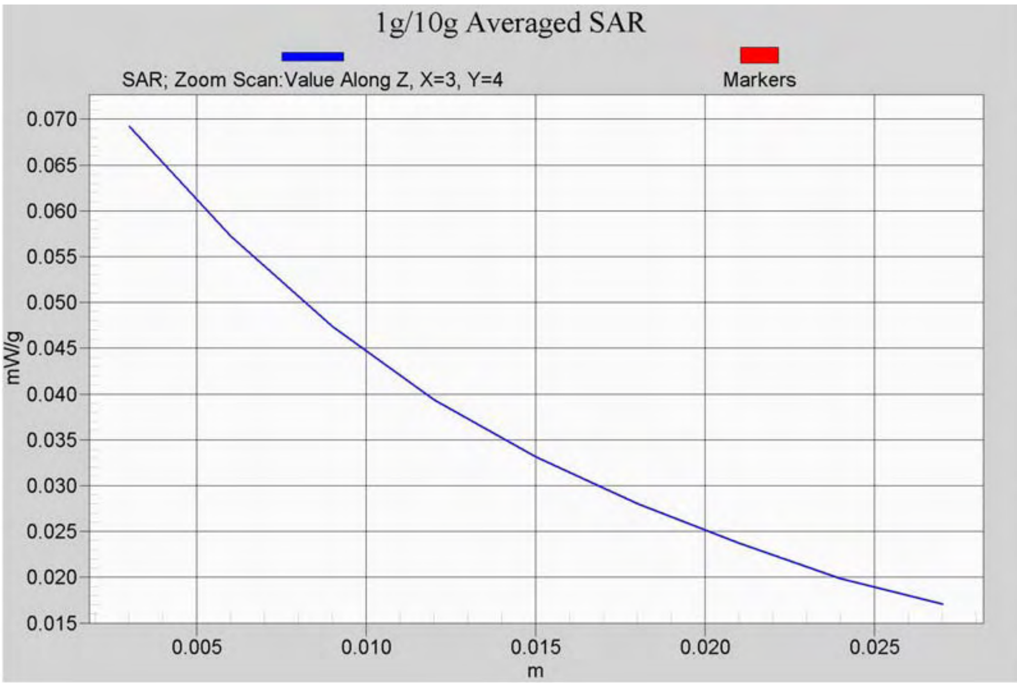
Measurement：

Duty Cycle： **1:1** Probe S/N： **3632**

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
826.4	4132	WCDMA Band V	24.09	Flat	PCB	N/A	0.061	-0.182	----
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Detail results see Appendix B.

Z-axis Plot of SAR Measurement



Z-axis Plot of Flat WCDMA Band V CH 4132

10.5 HSDPA Band II - Body SAR (LCD Open 90_0mm separation to Phantom)

Ambient：

Temperature (℃)： **22 ± 2** Relative HUMIDITY (%)： **40-70**

Liquid：

Mixture Type： **MSL1900** Liquid Temperature (℃)： **22.0**

Depth of liquid (cm)： **15**

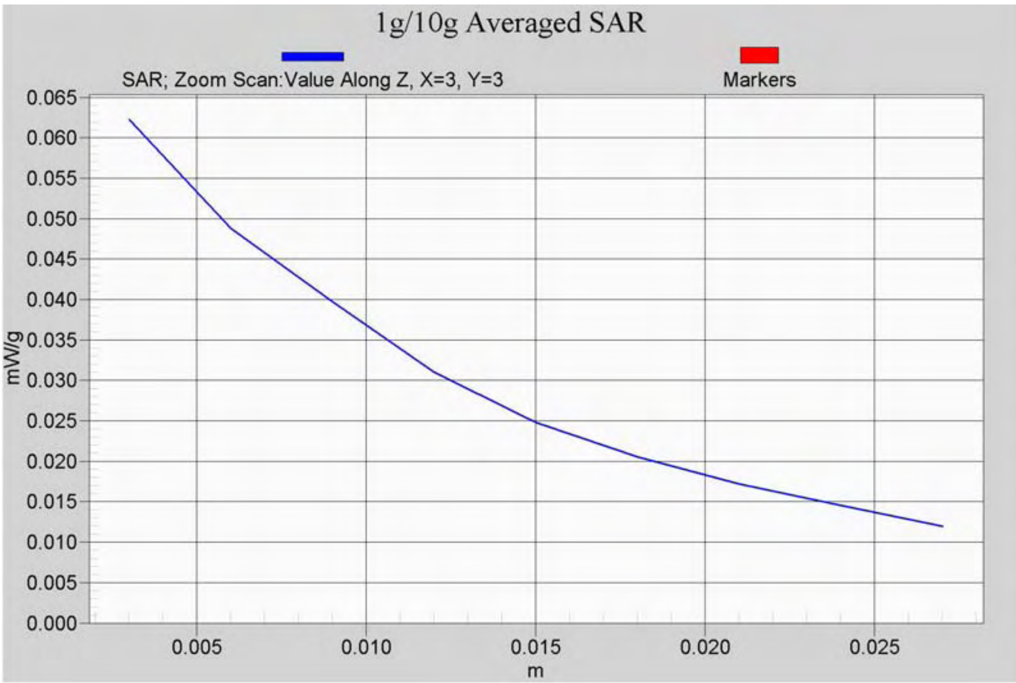
Measurement：

Duty Cycle： **1:1** Probe S/N： **3632**

Frequency MHz	CH	Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
1852.4	9400	HSDPA Band II	21.73	Flat	PCB	N/A	0.053	0.145	Sub-test 1
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Detail results see Appendix B.

Z-axis Plot of SAR Measurement



Z-axis Plot of Flat HSDPA Band II CH 9400

10.6 HSDPA Band V - Body SAR (LCD Open 90_0mm separation to Phantom)

Ambient：

Temperature (℃)： 22 ± 2 Relative HUMIDITY (%)： 40-70

Liquid：

Mixture Type： MSL835 Liquid Temperature (℃) ： 22.0

Depth of liquid (cm)： 15

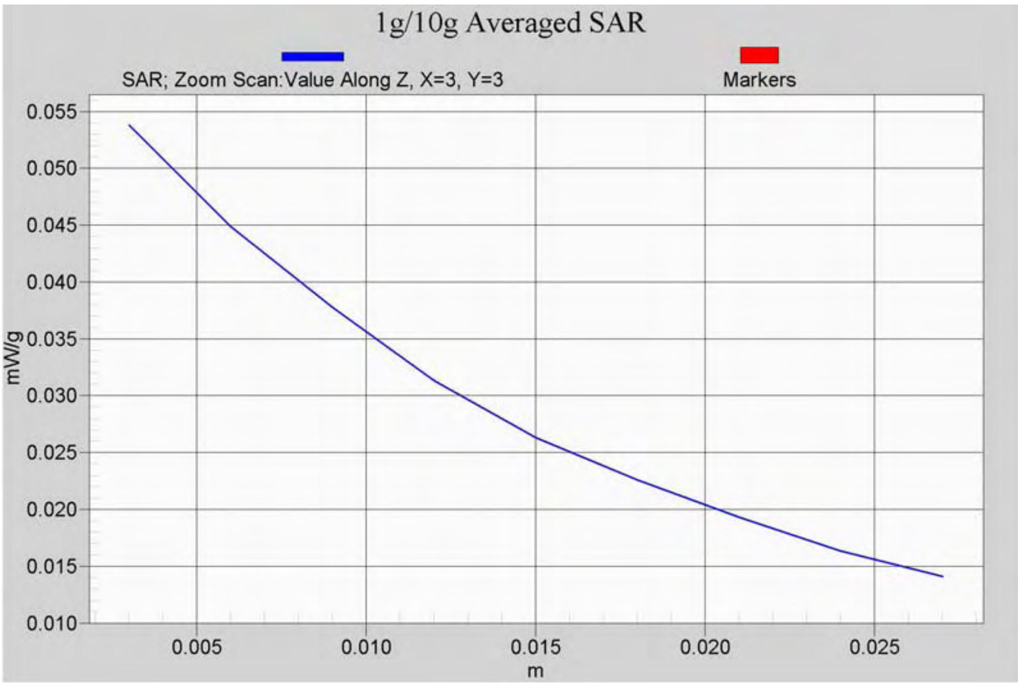
Measurement：

Duty Cycle： 1:1 Probe S/N： 3632

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
836.6	4183	HSDPA Band V	21.64	Flat	PCB	N/A	0.047	0.158	Sub-test 1
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Detail results see Appendix B.

Z-axis Plot of SAR Measurement



Z-axis Plot of Flat HSDPA Band V CH 4183

10.7 HSUPA Band II - Body SAR (LCD Open 90_0mm separation to Phantom)

Ambient：

Temperature (℃)： **22 ± 2** Relative HUMIDITY (%)： **40-70**

Liquid：

Mixture Type： **MSL1900** Liquid Temperature (℃)： **22.0**

Depth of liquid (cm)： **15**

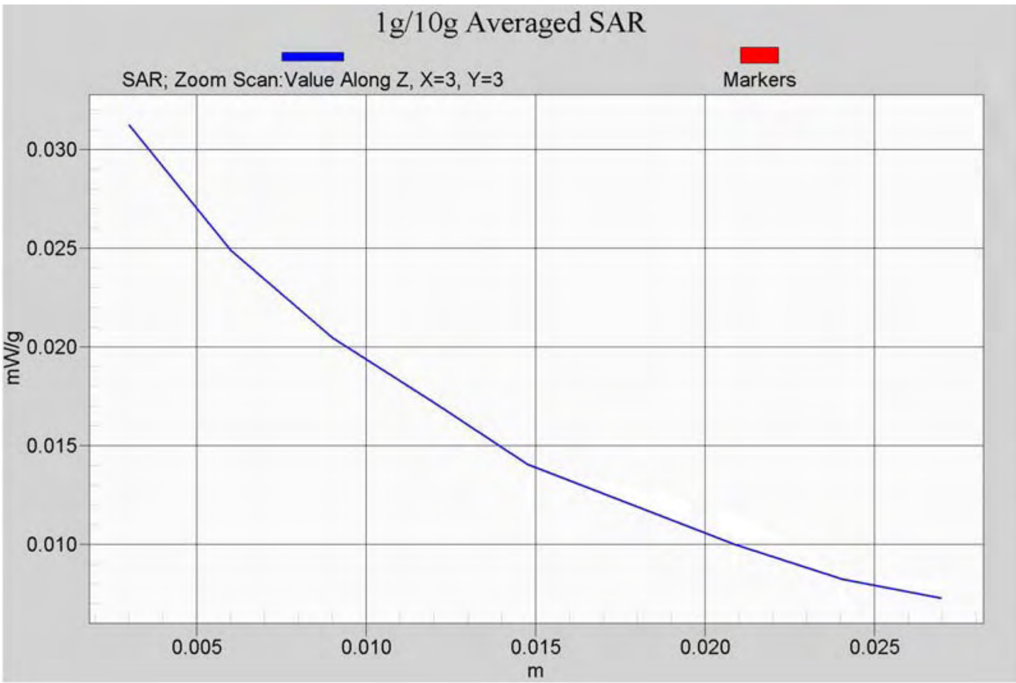
Measurement：

Duty Cycle： **1:1** Probe S/N： **3632**

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
1852.4	9400	HSUPA Band II	21.73	Flat	PCB	N/A	0.027	-0.137	Sub-test 5
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Detail results see Appendix B.

Z-axis Plot of SAR Measurement



Z-axis Plot of Flat HSUPA Band II CH 9400

10.8 HSUPA Band V - Body SAR (LCD Open 90_0mm separation to Phantom)

Ambient：

Temperature (℃)：	22 ± 2	Relative HUMIDITY (%)：	40-70

Liquid：

Mixture Type：	MSL835	Liquid Temperature (℃)：	22.0
		Depth of liquid (cm)：	15

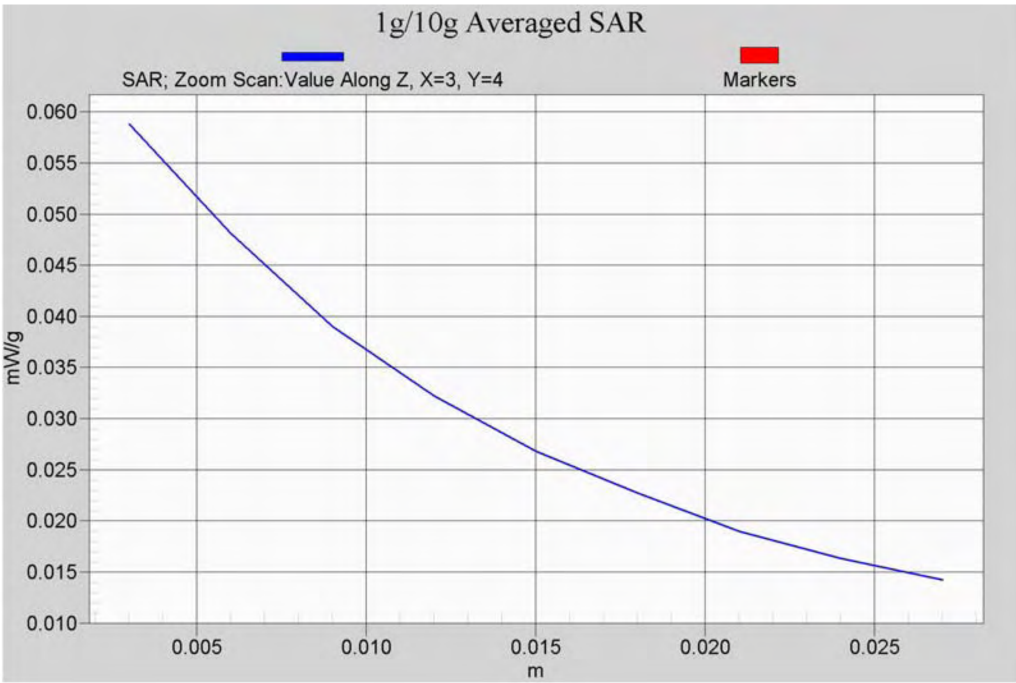
Measurement：

Duty Cycle：	1:1	Probe S/N：	3632

Frequency		Band	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR1g [mW/g]	Power Drift (dB)	Remark
MHz	CH								
846.4	4233	HSUPA Band V	21.32	Flat	PCB	N/A	0.051	0.168	Sub-test 1
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Detail results see Appendix B.

Z-axis Plot of SAR Measurement



Z-axis Plot of Flat HSUPA Band V CH 4233

10.9 WLAN 802.11b - Body SAR (LCD Open 90_0mm separation to Phantom)

Ambient：

Temperature (℃)：22 ± 2 Relative HUMIDITY (%)：40-70

Liquid：

Mixture Type：MSL2450 Liquid Temperature (℃)：22.0

Depth of liquid (cm)：15

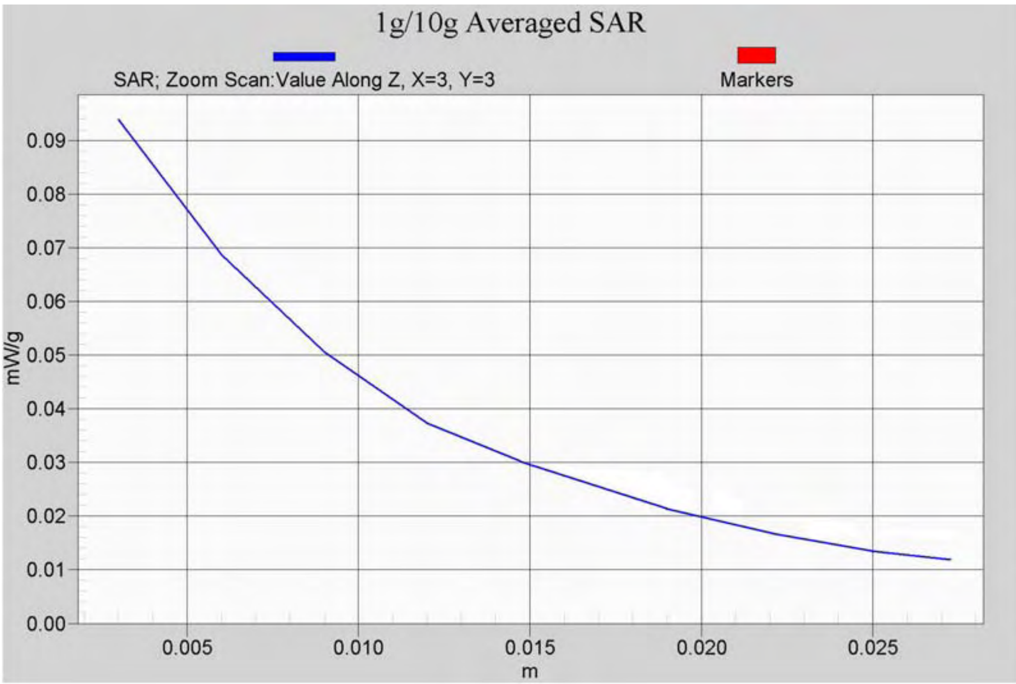
Measurement：

Duty Cycle：1:1 Probe S/N：3632

Frequency		Rate	Power (dBm)	Phantom Position	Antenna Position	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
MHz	CH								
2412	1	5.5M	15.10	Flat	PCB	N/A	0.076	-0.124	----
Std. C95.1-2005 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Detail results see Appendix B.

Z-axis Plot of SAR Measurement



Z-axis Plot of Flat WLAN 802.11b CH 1 (Rate 5.5M)

10.10 Std. C95.1-2005 RF Exposure Limit

Human Exposure	Population Uncontrolled Exposure (W/kg) or (mW/g)	Occupational Controlled Exposure (W/kg) or (mW/g)
Spatial Peak SAR* (head)	1.60	8.00
Spatial Peak SAR** (Whole Body)	0.08	0.40
Spatial Peak SAR*** (Partial-Body)	1.60	8.00
Spatial Peak SAR**** (Hands / Feet / Ankle / Wrist)	4.00	20.00

Table 8. Safety Limits for Partial Body Exposure

Notes：

* The Spatial Peak value of the SAR averaged over any 1 gram of tissue.
(defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

** The Spatial Average value of the SAR averaged over the whole – body.

*** The Spatial Average value of the SAR averaged over the partial – body.

**** The Spatial Peak value of the SAR averaged over any 10 grams of tissue.
(defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

***Population / Uncontrolled Environments*：** are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

***Occupational / Controlled Environments*：** are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

11. Conclusion

The SAR test values found for the portable mobile phone **DIALOGUE INC Trade Name：M2 Model(s)：M2A1** is below the maximum recommended level of 1.6 W/kg (mW/g).

12. References

[1] Std. C95.1-2005, "*American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300KHz to 100GHz",* New York.

[2] NCRP, National Council on Radiation Protection and Measurements, "*Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields"*, NCRP report NO. 86, 1986.

[3] T. Schmid, O. Egger, and N. Kuster, "*Automatic E-field scanning system for dosimetric assessments*", IEEE Transactions on Microwave Theory and Techniques, vol. 44, pp, 105-113, Jan. 1996.

[4] K. Poković, T. Schmid, and N. Kuster, "*Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequency*", in ICECOM'97, Dubrovnik, October 15-17, 1997, pp.120-124.

[5] K. Poković, T. Schmid, and N. Kuster, "*E-field probe with improved isotropy in brain simulating liquids*", in Proceedings of the ELMAR, Zadar, Croatia, 23-25 June, 1996, pp.172-175.

[6] N. Kuster, and Q. Balzano, "*Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz"*, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[7] Robert J. Renka, "*Multivariate Interpolation Of Large Sets Of Scattered Data*", University of North Texas ACM Transactions on Mathematical Software, vol. 14, no. 2, June 1988 , pp. 139-148.

[8] N. Kuster, R. Kastle, T. Schmid, *Dosimetric evaluation of mobile communications equipment with known precision*, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[9] Std. C95.3-1991, "*IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave,* New York: IEEE, Aug. 1992.

[10] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), *Human Exposure to Electromagnetic Fields High-frequency*: 10KHz-300GHz, Jan. 1995.

Appendix A - System Performance Check

See following Attached Pages for System Performance Check.

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/18 AM 10:34:04

System Performance Check at 835MHz_20100318_Body

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d082

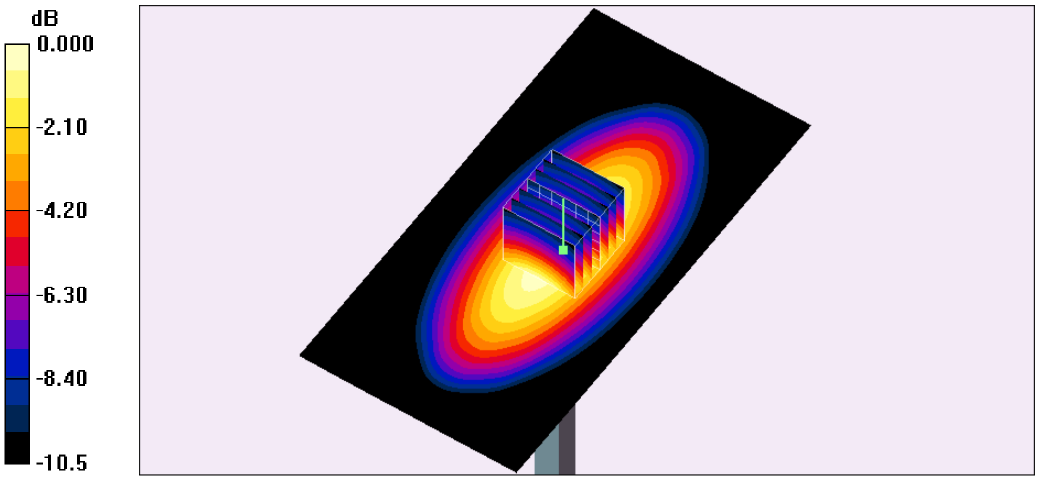
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.998 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3632; ConvF(9.17, 9.17, 9.17); Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 835MHz/Area Scan (61x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.00 mW/g

System Performance Check at 835MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.9 V/m; Power Drift = 0.003 dB
Peak SAR (extrapolated) = 3.89 W/kg
SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.69 mW/g
Maximum value of SAR (measured) = 3.03 mW/g



0 dB = 3.03mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/19 AM 08:06:34

System Performance Check at 1900MHz_20100319_Body

DUT: Dipole D1900V2_SN5d111; Type: D1900V2; Serial: D1900V2 - SN:5d111

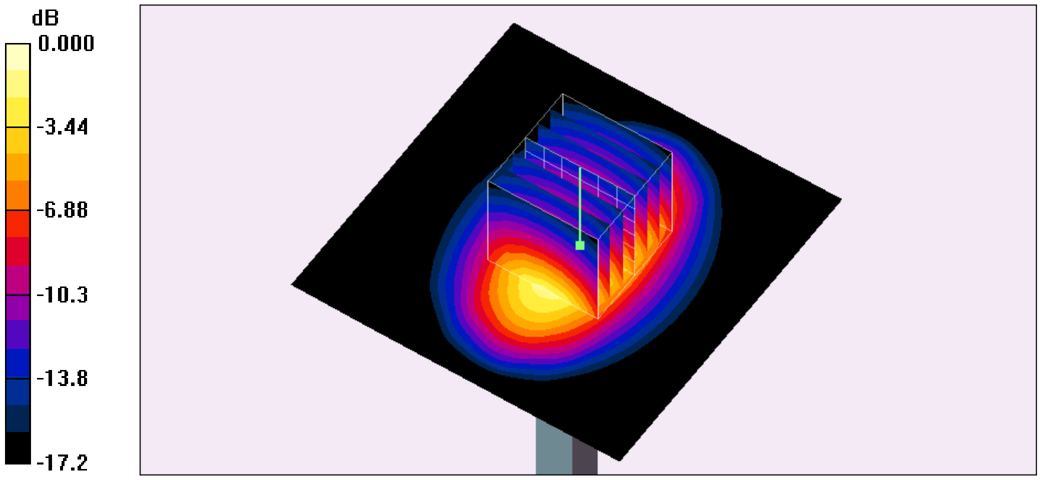
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.5 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3632; ConvF(7.57, 7.57, 7.57); Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 1900MHz/Area Scan (91x91x1):
Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 12.7 mW/g

System Performance Check at 1900MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 87.3 V/m; Power Drift = 0.048 dB
Peak SAR (extrapolated) = 19.7 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.49 mW/g
Maximum value of SAR (measured) = 13.6 mW/g



0 dB = 13.6mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/22 AM 05:00:46

System Performance Check at 2450MHz_20100322_Body

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:712

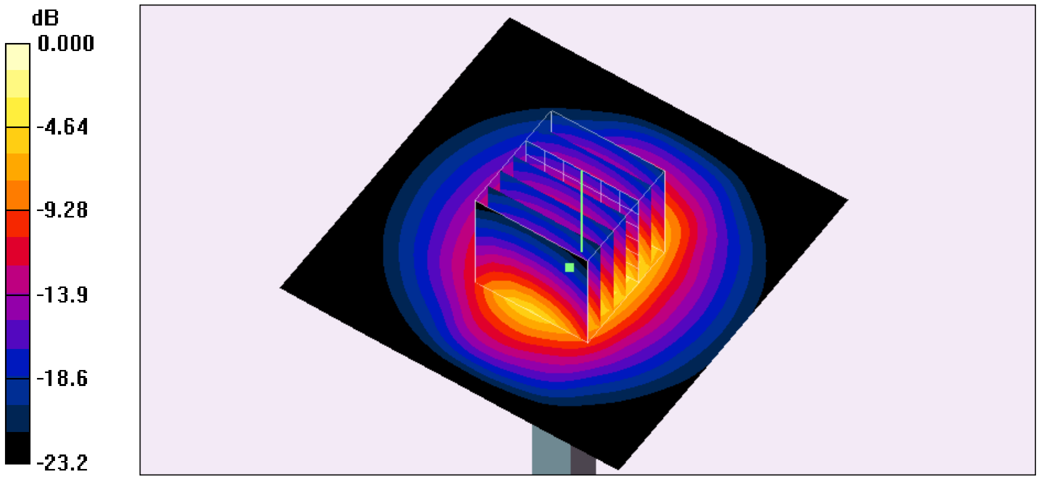
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.92 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV3 - SN3519; ConvF(8.1, 8.1, 8.1); Calibrated: 2010/2/23
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

System Performance Check at 2450MHz/Area Scan (61x61x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 17.5 mW/g

System Performance Check at 2450MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 86.3 V/m; Power Drift = -0.001 dB
Peak SAR (extrapolated) = 26.9 W/kg
SAR(1 g) = 12.8 mW/g; SAR(10 g) = 5.89 mW/g
Maximum value of SAR (measured) = 16.9 mW/g



0 dB = 16.9mW/g

Appendix B - SAR Measurement Data

See following Attached Pages for SAR Measurement Data.

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/18 PM 01:38:19

Flat_GPRS850 CH190_3Down2Up_LCD Open 90_0mm

DUT: M2A1; Type: Notebook; FCC ID:X8P-M2A1

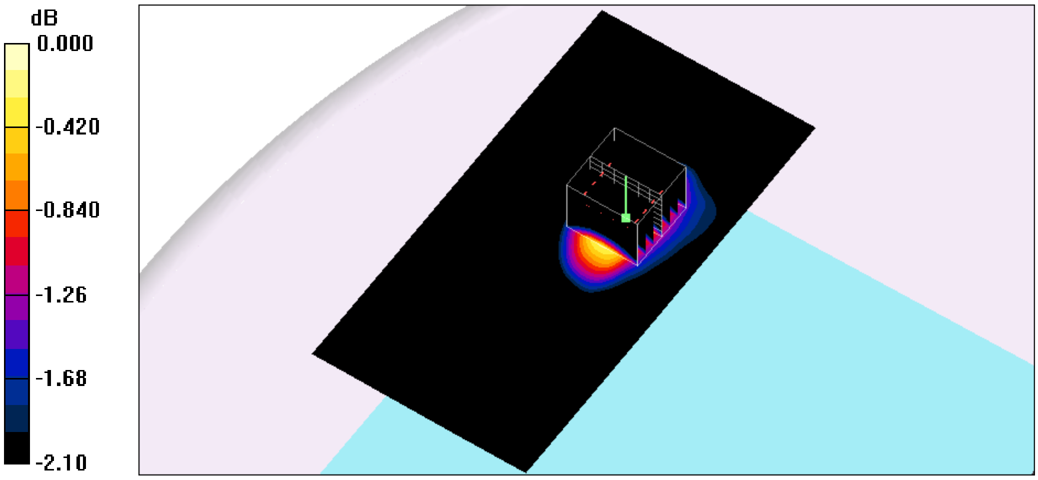
Communication System: GPRS 850 (3Down, 2Up); Frequency: 836.6 MHz;Duty Cycle: 1:4.2
Medium parameters used: f = 837 MHz; σ = 1 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3632; ConvF(9.17, 9.17, 9.17); Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (61x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.063 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.39 V/m; Power Drift = 0.148 dB
Peak SAR (extrapolated) = 0.074 W/kg
SAR(1 g) = 0.056 mW/g; SAR(10 g) = 0.040 mW/g
Maximum value of SAR (measured) = 0.062 mW/g



0 dB = 0.062mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/19 AM 10:33:51

Flat_GPRS PCS CH512_1Down4Up_LCD Open 90_0mm

DUT: M2A1; Type: Notebook; FCC ID:X8P-M2A1

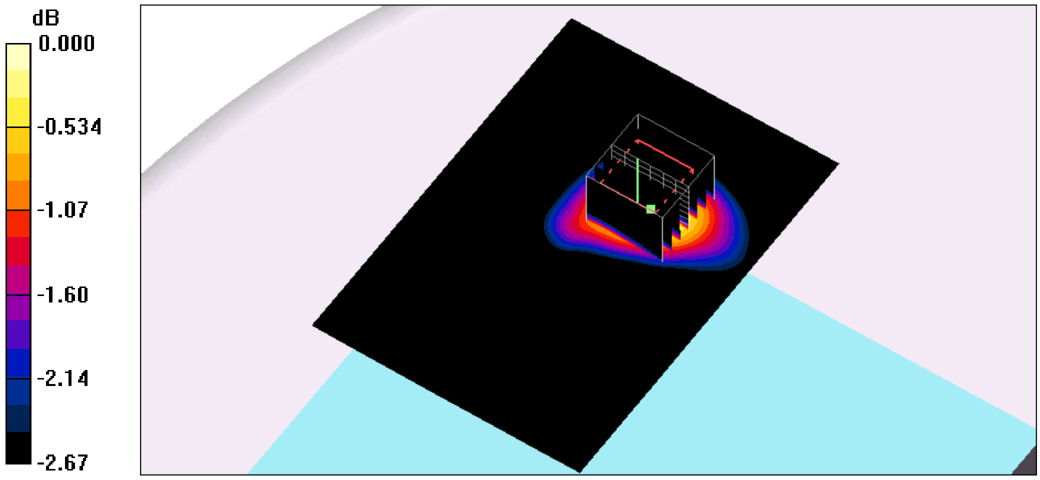
Communication System: GPRS PCS (1Down,4Up); Frequency: 1850.2 MHz;Duty Cycle: 1:2.1
Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.45 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3632; ConvF(7.57, 7.57, 7.57); Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (71x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.076 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.33 V/m; Power Drift = -0.035 dB
Peak SAR (extrapolated) = 0.098 W/kg
SAR(1 g) = 0.065 mW/g; SAR(10 g) = 0.043 mW/g
Maximum value of SAR (measured) = 0.075 mW/g



0 dB = 0.075mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/19 AM 11:34:51

Flat_WCDMA Band II CH9400_LCD Open 90_0mm

DUT: M2A1; Type: Notebook; FCC ID:X8P-M2A1

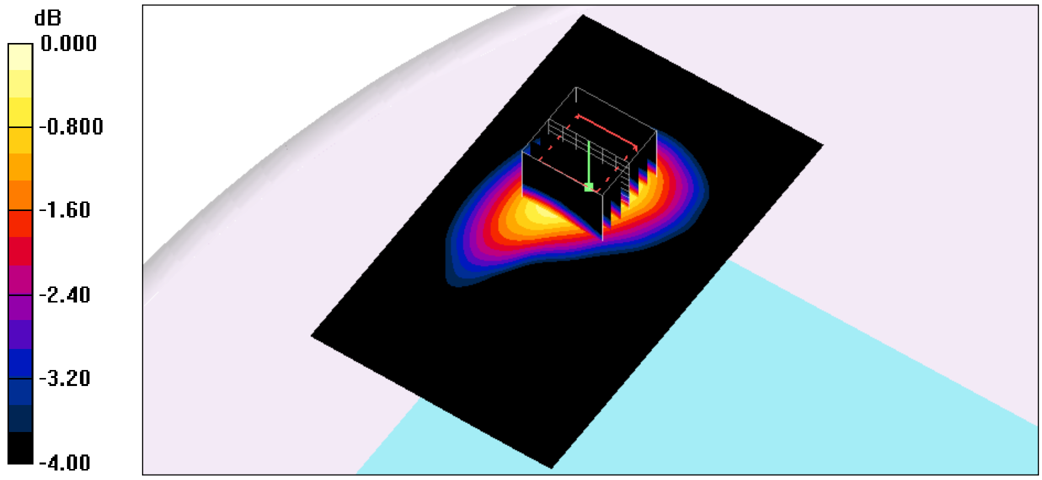
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3632; ConvF(7.57, 7.57, 7.57); Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (61x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.078 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.05 V/m; Power Drift = -0.163 dB
Peak SAR (extrapolated) = 0.100 W/kg
SAR(1 g) = 0.066 mW/g; SAR(10 g) = 0.043 mW/g
Maximum value of SAR (measured) = 0.078 mW/g



0 dB = 0.078mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/18 PM 02:21:43

Flat_WCDMA Band V CH4132_LCD Open 90_0mm

DUT: M2A1; Type: Notebook; FCC ID:8P-M2A1

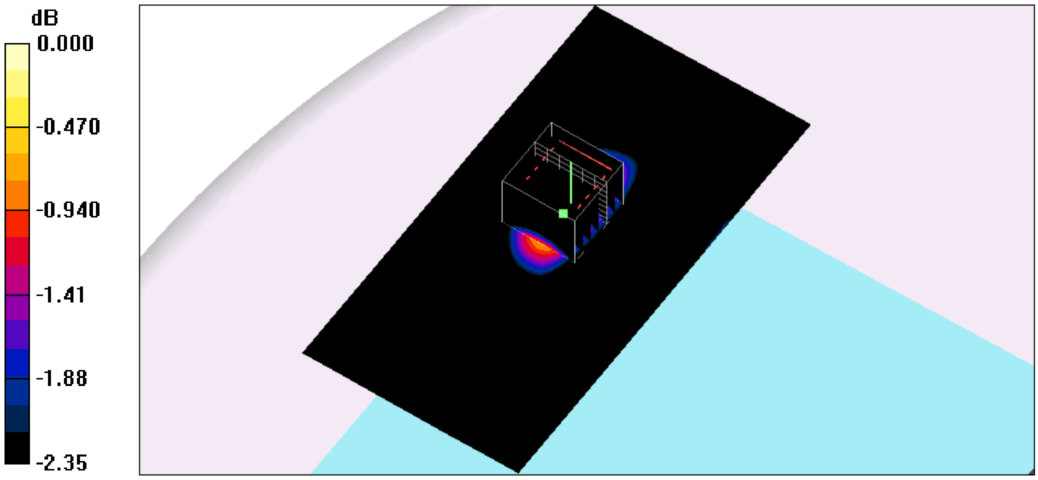
Communication System: WCDMA Band V; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 826.4 MHz; σ = 0.988 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3632; ConvF(9.17, 9.17, 9.17); Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (61x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.068 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.70 V/m; Power Drift = -0.182 dB
Peak SAR (extrapolated) = 0.083 W/kg
SAR(1 g) = 0.061 mW/g; SAR(10 g) = 0.042 mW/g
Maximum value of SAR (measured) = 0.069 mW/g



0 dB = 0.069mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/19 PM 01:51:55

Flat_WCDMA HSDPA Band II CH9400_LCD Open 90_0mm_Sub-test1

DUT: M2A1; Type: Notebook; FCC ID:8P-M2A1

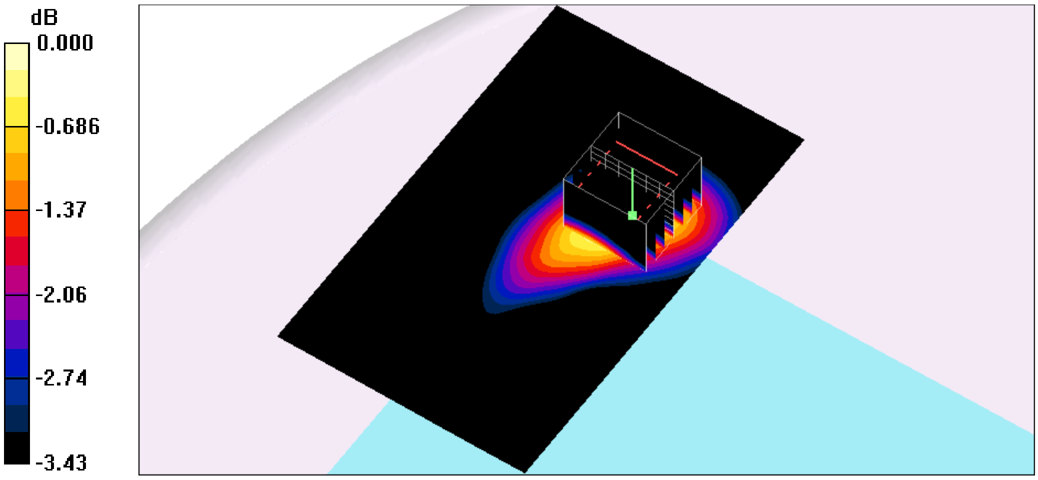
Communication System: WCDMA HSDPA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3632; ConvF(7.57, 7.57, 7.57); Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (61x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.061 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.08 V/m; Power Drift = 0.145 dB
Peak SAR (extrapolated) = 0.081 W/kg
SAR(1 g) = 0.053 mW/g; SAR(10 g) = 0.035 mW/g
Maximum value of SAR (measured) = 0.062 mW/g



0 dB = 0.062mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/18 PM 04:51:06

Flat_WCDMA HSDPA Band V CH4183_LCD Open 90_0mm_Sub-test1

DUT: M2A1; Type: Notebook; FCC ID:8P-M2A1

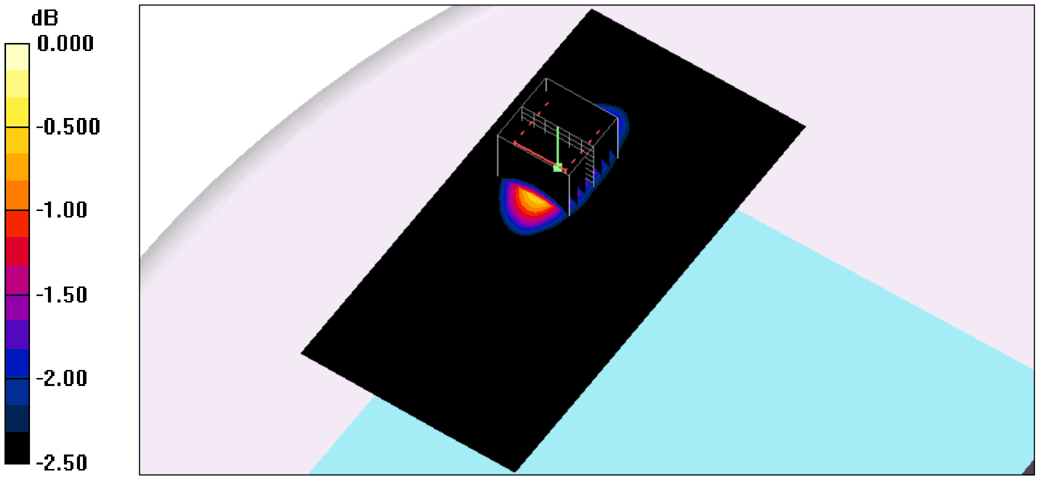
Communication System: WCDMA HSDPA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 1 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3632; ConvF(9.17, 9.17, 9.17); Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (61x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.054 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.88 V/m; Power Drift = 0.158 dB
Peak SAR (extrapolated) = 0.066 W/kg
SAR(1 g) = 0.047 mW/g; SAR(10 g) = 0.033 mW/g
Maximum value of SAR (measured) = 0.054 mW/g



0 dB = 0.054mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/19 PM 02:22:52

Flat_WCDMA HSUPA Band II CH9400_LCD Open 90_0mm_Sub-test5

DUT: M2A1; Type: Notebook; FCC ID:8P-M2A1

Communication System: WCDMA HSUPA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

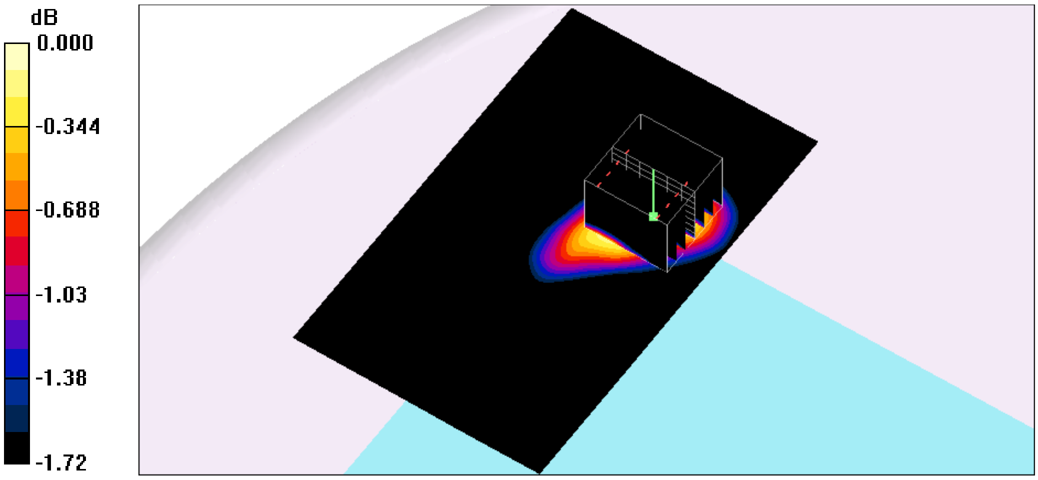
- Probe: EX3DV4 - SN3632; ConvF(7.57, 7.57, 7.57); Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (61x101x1):

Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.033 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 1.97 V/m; Power Drift = -0.137 dB
Peak SAR (extrapolated) = 0.041 W/kg
SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.019 mW/g
Maximum value of SAR (measured) = 0.031 mW/g



0 dB = 0.031mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/18 PM 04:08:47

Flat_WCDMA HSUPA Band V CH4233_LCD Open 90_0mm_Sub-test1

DUT: M2A1; Type: Notebook; FCC ID:8P-M2A1

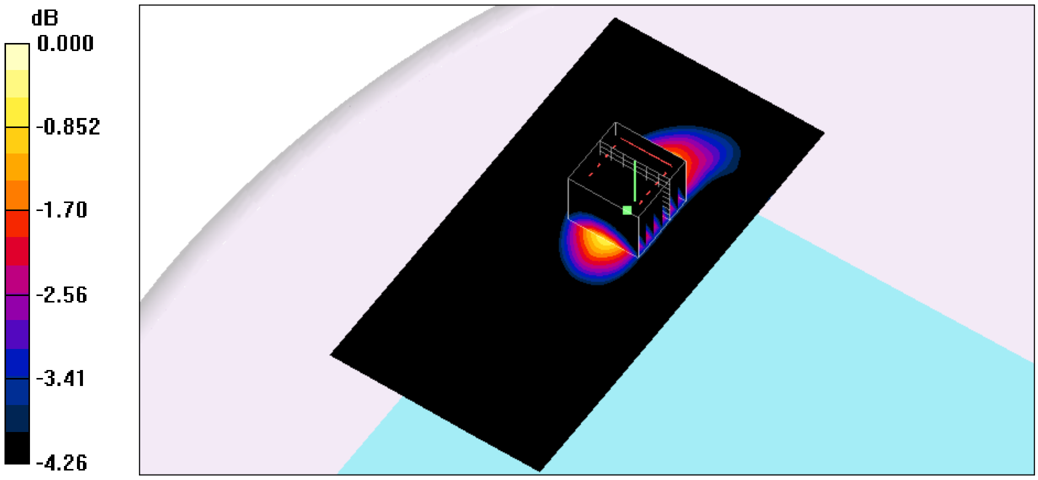
Communication System: WCDMA HSUPA Band V; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 847 MHz; σ = 1.01 mho/m; ε_r = 53.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV4 - SN3632; ConvF(9.17, 9.17, 9.17); Calibrated: 2010/1/26
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (61x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.060 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.28 V/m; Power Drift = 0.168 dB
Peak SAR (extrapolated) = 0.073 W/kg
SAR(1 g) = 0.051 mW/g; SAR(10 g) = 0.034 mW/g
Maximum value of SAR (measured) = 0.059 mW/g



0 dB = 0.059mW/g

Test Laboratory: A Test Lab Techno Corp.

Date/Time: 2010/3/22 PM 01:22:11

Flat_802.11b CH1_5.5M_LCD Open 90_0mm

DUT: M2A1; Type: Notebook; FCC ID:8P-M2A1

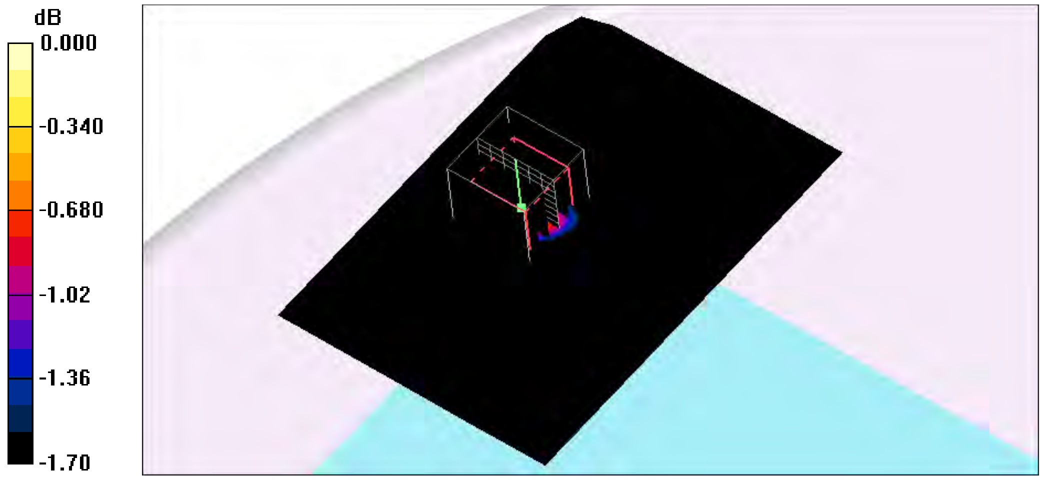
Communication System: IEEE 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.87 mho/m; ε_r = 50.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

- Probe: EX3DV3 - SN3519; ConvF(8.1, 8.1, 8.1); Calibrated: 2010/2/23
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn393; Calibrated: 2009/8/24
- Phantom: ELI 4.0; Type: QDOVA001BA; Serial: 1003
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Flat/Area Scan (71x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.092 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.87 V/m; Power Drift = -0.124 dB
Peak SAR (extrapolated) = 0.129 W/kg
SAR(1 g) = 0.076 mW/g; SAR(10 g) = 0.045 mW/g
Maximum value of SAR (measured) = 0.094 mW/g



0 dB = 0.094mW/g