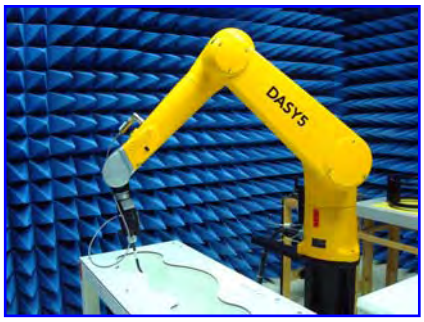
A Test Lab Techno Corp.

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.	:	1207FS13
Applicant	:	AAEON Technology. Inc.
Product Type	:	Rugged Tablet Computer
Trade Name	:	AAEON
Model Number	:	xxxRTC-700y-TAxx-WBGz-xxxx
Date of Received	:	May 30, 2012
Dates of Test	:	Jun. 02 ~ Jul. 05, 2012
Date of Issued	:	Jul. 12, 2012
Test Environment	:	Ambient Temperature： 22 ±2 ° C
		Relative Humidity：40 - 70 %
Standard	:	ANSI/IEEE C95.1-1999
		IEEE Std. 1528-2003
		47 CFR Part §2.1093;
		FCC/OET Bulletin 65 Supplement C [July 2001]
Max. SAR	:	1.510 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.

Approved By : Yung-Tan Tsai (Yung Tan Tsai)

Tested By : Bill Hu (Bill Hu)

Contents

1. Description of Equipment under Test (EUT) 3
2. Introduction 4
   2.1 SAR Definition 4
3. SAR Measurement Setup 5
   3.1 DASY5 E-Field Probe System 6
   3.2 Data Acquisition Electronic (DAE) System 9
   3.3 Robot 9
   3.4 Measurement Server 9
   3.5 Device Holder 10
   3.6 Phantom - SAM v4.0 10
   3.7 Oval Flat Phantom - ELI 4.0 11
   3.8 Data Storage and Evaluation 11
4. Tissue Simulating Liquids 14
   4.1 Ingredients 15
   4.2 Recipes 15
   4.3 Liquid Confirmation 16
5. SAR Testing with RF Transmitters 19
   5.1 SAR Testing with HSDPA Transmitters 19
   5.2 SAR Testing with 802.11 Transmitters 22
   5.3 Conducted Power 23
   5.4 Simultaneous Transmitting Evaluate 27
6. System Performance Check 31
   6.1 Symmetric Dipoles for System Verification 31
   6.2 Verification 32
7. Test Equipment List 37
8. Measurement Uncertainty 38
9. Measurement Procedure 40
   9.1 Spatial Peak SAR Evaluation 40
   9.2 Area & Zoom Scan Procedures 41
   9.3 Volume Scan Procedures 41
   9.4 SAR Averaged Methods 41
   9.5 Power Drift Monitoring 41
10. SAR Test Results Summary 42
   10.1 Body SAR 42
   10.2 Std. C95.1-1999 RF Exposure Limit 48
11. Conclusion 49
12. References 49

Appendix A - System Performance Check 50
Appendix B - SAR Measurement Data 57
Appendix C - Calibration 103

1. Description of Equipment under Test (EUT)

Applicant	AAEON Technology. Inc.	
Applicant Address	5F, No. 135, Lane 235, Pao Chiao Rd.,Taiwan, ROC	
Manufacture	AAEON Technology. Inc.	
Manufacture Address	5F, No. 135, Lane 235, Pao Chiao Rd.,Taiwan, ROC	
Product Type	Rugged Tablet Computer	
Trade Name	AAEON	
Model Number	xxxRTC-700y-TAxx-WBGz-xxxx (x is for marketing purpose) 1. xxx=TF-(TF: Toxic Free) or blank 2. xx=SD (S: sunlight readable, D: Digitizer) or blank 3. xxxx=SW revision, ex: 1110=rev1, x:0~9 (y=R or A(R:Virgo,A:Aries)) (z is blank or H,blank means without 3G function; H means with 3G function)	
FCC ID	OHBRTC700RAWBGH	
RF Function	WCDMA(RMC 12.2K) / HSDPA / HSUPA / HSPA+ (QPSK) Band II WCDMA(RMC 12.2K) / HSDPA / HSUPA / HSPA+ (QPSK) Band V IEEE 802.11b / 802.11g / draft 802.11n 2.4GHz Standard-20MHz Bluetooth 2.1	
Tx Frequency	Band	Operate Frequency (MHz)
	WCDMA (RMC 12.2K) / HSDPA / HSUPA / HSPA+ (QPSK) Band II	1852.4 - 1907.6
	WCDMA (RMC 12.2K) / HSDPA / HSUPA / HSPA+ (QPSK) Band V	826.4 - 846.4
	IEEE 802.11b / 802.11g	2412 - 2462
	draft 802.11n 2.4GHz Standard-20MHz	2412 - 2462
	Bluetooth 2.1	2402 - 2480
RF Conducted Power (Avg.)	Band	Power (W / dBm)
	WCDMA (RMC 12.2K) / HSDPA / HSUPA / HSPA+ (QPSK) Band II	0.216 / 23.35
	WCDMA (RMC 12.2K) / HSDPA / HSUPA / HSPA+ (QPSK) Band V	0.215 / 23.32
	IEEE 802.11b	0.025 / 13.95
	IEEE 802.11g	0.020 / 13.06
	draft 802.11n 2.4GHz Standard-20MHz	0.016 / 11.98
	Bluetooth 2.1	0.003 / 4.87
Max. SAR Measurement	1.510 W/kg Body SAR	
Antenna Type	PCB Type	
Device Category	Mobile Device	
RF Exposure Environment	General Population / Uncontrolled	
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 C95.1-1999 / RSS-102 Issue 4 (March 2010) 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 **AAEON Technology. Inc. Trade Name：AAEON Model(s)：xxxRTC-700y-TAxx-WBGz-xxxx**. The test procedures, as described in American National Standards, Institute C95.1-1999〔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 20cm 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.

2.1 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)

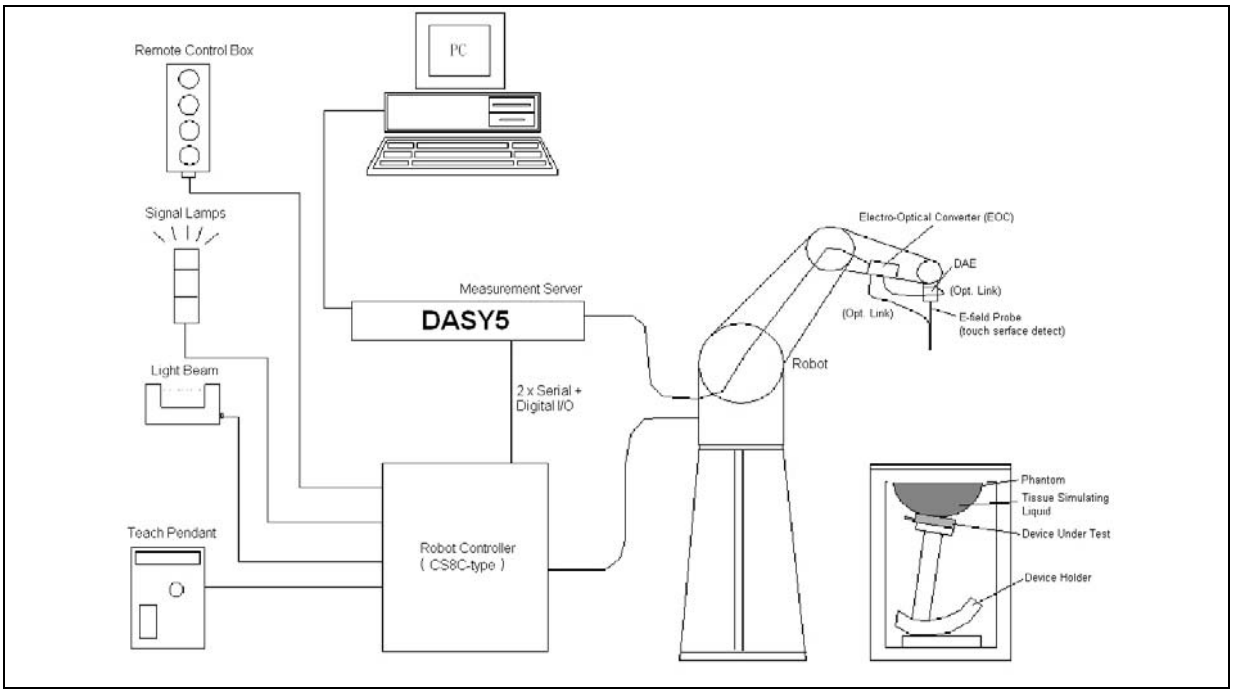
ρ = mass density of the tissue (kg/m^3)

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〕

3. SAR Measurement Setup



The DASY5 system for performing compliance tests consists of the following items:

1. A standard high precision 6-axis robot (Stäubli TX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
2. A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
3. A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
4. The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
5. A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
6. A computer operating Windows 2000 or Windows XP.
7. DASY5 software.
8. Remote controls with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
9. The SAM twin phantom enabling testing left-hand and right-hand usage.
10. The device holder for handheld mobile phones.
11. Tissue simulating liquid mixed according to the given recipes.
12. Validation dipole kits allowing validating the proper functioning of the system.

3.1 DASY5 E-Field Probe System

The SAR measurements were conducted with the dosimetric probe EX3DV3 (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 DASY5 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.

3.1.1 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	±0.2 dB (30 MHz to 4 GHz) for EX3DV3
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
Dimensions	Overall length: 337mm
	Tip length: 20mm
	Body diameter: 12mm
	Tip diameter: 3.9mm for EX3DV3
	Distance from probe tip to dipole centers: 2.0mm for EX3DV3
Application	General dosimetry up to 6GHz
	Compliance tests of mobile phones
	Fast automatic scanning in arbitrary phantoms

Figure 3. E-field Probe

Figure 4. Probe setup on robot

3.1.2 E-Field Probe Calibration process

Dosimetric Assessment Procedure

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm^2) using an RF Signal generator, TEM cell, and RF Power Meter.

Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if the frequency is below 1 GHz and in a waveguide or other methodologies above 1 GHz 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 rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/cm^2.

Temperature Assessment

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

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

Where：

Δt = Exposure time (30 seconds),

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

ΔT = Temperature increase due to RF exposure.

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

Where：

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m^3).

3.2 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：	DASY5 v5.0 (Build 125) & SEMCAD X Version 13.4 Build 125
Connecting Lines：	Optical downlink for data and status info
	Optical uplink for commands and clock

3.3 Robot

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

3.4 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

3.5 Device Holder

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.

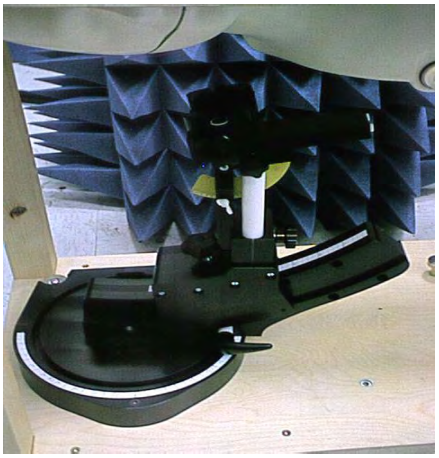


Figure 5. Device Holder

3.6 Phantom - SAM v4.0

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 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.

Shell Thickness	2 ±0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	1000x500 mm (LxW)

Table 1. Specification of SAM v4.0

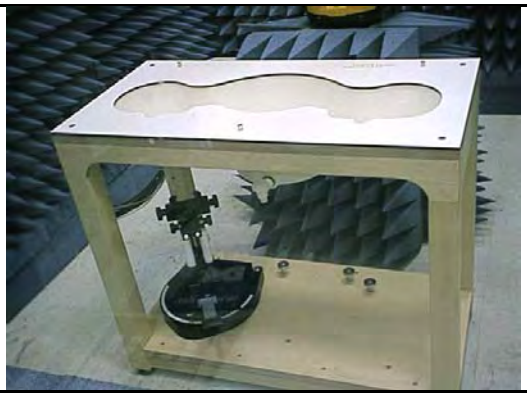


Figure 6. SAM Twin Phantom

3.7 Oval Flat Phantom - ELI 4.0

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (Oval Flat) phantom defined in IEEE 1528-2003, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of wireless portable device 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.

Shell Thickness	2 ±0.2 mm
Filling Volume	Approx. 30 liters
Dimensions	190×600×400 mm (H×L×W)

Table 2. Specification of ELI 4.0

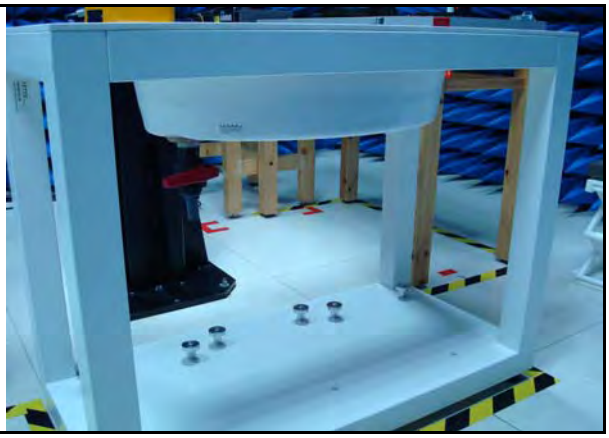


Figure 7. Oval Flat Phantom

3.8 Data Storage and Evaluation

3.8.1 Data Storage

The DASY5 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 DA5 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.

3.8.2 Data Evaluation

The DASY5 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

4. 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 specified 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

4.1 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

4.2 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 εand ±5% for σ.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Salt: 99$^+$% Pure Sodium Chloride Sugar: 98$^+$% Pure Sucrose

Water: De-ionized, 16 MΩ $^+$ resistivity HEC: Hydroxyethyl Cellulose

DGBE: 99$^+$% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

Triton X-100 (ultra pure): Polyethylene glycol mono [4-(1,1, 3, 3-tetramethylbutyl)phenyl]ether

4.3 Liquid Confirmation

4.3.1 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	55.20	55.11	-0.16%	± 5	06/03/2012
			σ	0.97	0.98	1.03%	± 5	
	835MHz	22.0	εr	55.20	55.06	-0.25%	± 5	
			σ	0.97	0.99	2.06%	± 5	
	850MHz	22.0	εr	55.20	54.99	-0.38%	± 5	
			σ	0.97	1.01	4.12%	± 5	
835MHz Body	820MHz	22.0	εr	55.20	55.11	-0.16%	± 5	06/25/2012
			σ	0.97	0.98	1.03%	± 5	
	835MHz	22.0	εr	55.20	55.06	-0.25%	± 5	
			σ	0.97	0.99	2.06%	± 5	
	850MHz	22.0	εr	55.20	54.99	-0.38%	± 5	
			σ	0.97	1.01	4.12%	± 5	
1900MHz Body	1850MHz	22.0	εr	53.30	51.46	-3.45%	± 5	06/02/2012
			σ	1.52	1.45	-4.61%	± 5	
	1900MHz	22.0	εr	53.30	51.32	-3.71%	± 5	
			σ	1.52	1.50	-1.32%	± 5	
	1930MHz	22.0	εr	53.30	51.22	-3.90%	± 5	
			σ	1.52	1.53	0.66%	± 5	
1900MHz Body	1850MHz	22.0	εr	53.30	51.46	-3.45%	± 5	06/19/2012
			σ	1.52	1.45	-4.61%	± 5	
	1900MHz	22.0	εr	53.30	51.32	-3.71%	± 5	
			σ	1.52	1.50	-1.32%	± 5	
	1930MHz	22.0	εr	53.30	51.22	-3.90%	± 5	
			σ	1.52	1.53	0.66%	± 5	
1900MHz Body	1850MHz	22.0	εr	53.30	51.46	-3.45%	± 5	06/25/2012
			σ	1.52	1.45	-4.61%	± 5	
	1900MHz	22.0	εr	53.30	51.32	-3.71%	± 5	
			σ	1.52	1.50	-1.32%	± 5	
	1930MHz	22.0	εr	53.30	51.22	-3.90%	± 5	
			σ	1.52	1.53	0.66%	± 5	

Table 4. Measured Tissue dielectric parameters for body phantoms

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
2450MHz Body	2400MHz	22.0	εr	52.70	52.15	-1.04%	± 5	06/04/2012
			σ	1.95	1.89	-3.08%	± 5	
	2450MHz	22.0	εr	52.70	51.91	-1.50%	± 5	
			σ	1.95	1.96	0.51%	± 5	
	2500MHz	22.0	εr	52.70	51.85	-1.61%	± 5	
			σ	1.95	2.02	3.59%	± 5	
2450MHz Body	2400MHz	22.0	εr	52.70	52.15	-1.04%	± 5	07/05/2012
			σ	1.95	1.89	-3.08%	± 5	
	2450MHz	22.0	εr	52.70	51.91	-1.50%	± 5	
			σ	1.95	1.96	0.51%	± 5	
	2500MHz	22.0	εr	52.70	51.85	-1.61%	± 5	
			σ	1.95	2.02	3.59%	± 5	

Table 5. Measured Tissue dielectric parameters for body phantoms

Liquid parameter for measured frequency							
Body	Frequency	Measured Value		Target Value		Deviation (%)	
		σ	εr	σ	εr	σ	εr
WCDMA / HSDPA / HSUPA / HSPA+ Band II	1852.4 MHz	1.450	51.5	1.520	53.300	-4.60526	-3.37711
	1880.0 MHz	1.480	51.4	1.520	53.300	-2.63158	-3.56473
	1907.6 MHz	1.510	51.3	1.520	53.300	-0.65789	-3.75235
WCDMA Band V	836.6 MHz	0.993	55.1	0.972	55.194	2.160494	-0.17031
WLAN 2.4GHz	2412 MHz	1.900	52.0	1.914	52.751	-0.73145	-1.42367
	2437 MHz	1.930	51.8	1.938	52.717	-0.4128	-1.73948
	2462 MHz	1.990	52.0	1.967	52.685	1.169293	-1.30018
Bluetooth	2441 MHz	1.940	51.9	1.941	52.712	-0.05152	-1.54045

4.3.2 Liquid Depth

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

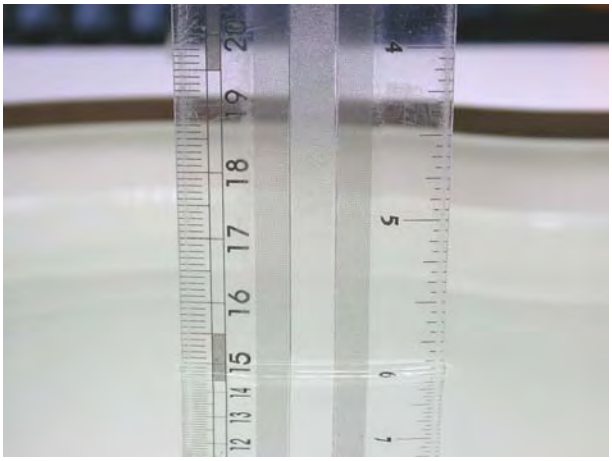


Figure 8. Head-Tissue-Simulating-Liquid

Figure 9. Body-Tissue-Simulating-Liquid

5. SAR Testing with RF Transmitters

5.1 SAR Testing with HSDPA Transmitters

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 6. 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: ΔACK, ΔNACK and ΔCQI = 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 7. Setup for Release 6 HSPA / Release 7 HSPA+

5.2 SAR Testing with 802.11 Transmitters

Normal network operating configurations are not suitable for measuring the SAR of 802.11 b/g transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable.

5.2.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters. The test frequencies should correspond to actual channel frequencies defined

for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

5.2.2 Frequency Channel Configurations

802.11 a/b/g and 4.9 GHz operating modes are tested independently according to the service requirements in each frequency band. 802.11 b/g modes are tested on channels 1, 6 and 11. 802.11a is tested for UNII operations on channels 36 and 48 in the 5.15-5.25 GHz band; channels 52 and 64 in the 5.25-5.35 GHz band; channels 104, 116, 124 and 136 in the 5.470-5.725 GHz band; and channels 149 and 161 in the 5.8 GHz band. When 5.8 GHz §15.247 is also available, channels 149, 157 and 165 should be tested instead of the UNII channels. 4.9 GHz is tested on channels 1, 10 and 5 or 6, whichever has the higher output power, for 5 MHz channels; channels 11, 15 and 19 for 10 MHz channels; and channels 21 and 25 for 20 MHz channels. These are referred to as the “default test channels”. 802.11g mode was evaluated only if the output power was 0.25 dB higher than the 802.11b mode.

802.11 Test Channels per FCC Requirement

Mode	GHz	Channel	Turbo Channel	Default Test “Channels”			
				§15.247		UNII	
				802.11b	802.11g		
802.11 b/g	2412	1		✓	▽		
	2437	6	6	✓	▽		
	2462	11		✓	▽		

5.3 Conducted Power

Band	Modulation	Sub-test	CH	Frequency (MHz)	RF Conducted Output Power (dBm)
					Average
WCDMA Band II	RMC12.2K	---	Lowest	1852.4	23.24
			Middle	1880.0	**23.35**
			Highest	1907.6	23.24
HSDPA Band II	QPSK	1	Lowest	1852.4	23.22
			Middle	1880.0	23.21
			Highest	1907.6	23.20
		2	Lowest	1852.4	23.20
			Middle	1880.0	23.20
			Highest	1907.6	23.21
		3	Lowest	1852.4	22.75
			Middle	1880.0	22.68
			Highest	1907.6	22.70
		4	Lowest	1852.4	22.72
			Middle	1880.0	22.68
			Highest	1907.6	22.69
HSUPA Band II		1	Lowest	1852.4	22.36
			Middle	1880.0	22.60
			Highest	1907.6	22.30
		2	Lowest	1852.4	20.37
			Middle	1880.0	20.57
			Highest	1907.6	20.26
		3	Lowest	1852.4	21.34
			Middle	1880.0	21.59
			Highest	1907.6	21.31
		4	Lowest	1852.4	20.32
			Middle	1880.0	20.57
			Highest	1907.6	20.29
		5	Lowest	1852.4	22.33
			Middle	1880.0	22.55
			Highest	1907.6	22.25
HSPA+ (QPSK) Band II		1	Lowest	1852.4	21.50
			Middle	1880.0	21.84
			Highest	1907.6	21.37
		2	Lowest	1852.4	19.51
			Middle	1880.0	19.81
			Highest	1907.6	19.33
		3	Lowest	1852.4	20.48
			Middle	1880.0	20.83
			Highest	1907.6	20.38
		4	Lowest	1852.4	19.46
			Middle	1880.0	19.81
			Highest	1907.6	19.36
		5	Lowest	1852.4	21.47
			Middle	1880.0	21.79
			Highest	1907.6	21.32

Band	Modulation	Sub-test	CH	Frequency (MHz)	RF Conducted Output Power (dBm)
					Average
WCDMA Band V	RMC12.2K	---	Lowest	826.4	23.27
			Middle	836.6	**23.32**
			Highest	846.4	23.23
HSDPA Band V	QPSK	1	Lowest	826.4	23.15
			Middle	836.6	23.25
			Highest	846.4	23.23
		2	Lowest	826.4	23.13
			Middle	836.6	23.21
			Highest	846.4	23.22
		3	Lowest	826.4	22.64
			Middle	836.6	22.73
			Highest	846.4	22.72
		4	Lowest	826.4	22.63
			Middle	836.6	22.74
			Highest	846.4	22.71
HSUPA Band V		1	Lowest	826.4	22.88
			Middle	836.6	22.00
			Highest	846.4	22.90
		2	Lowest	826.4	20.86
			Middle	836.6	19.98
			Highest	846.4	20.87
		3	Lowest	826.4	21.84
			Middle	836.6	20.98
			Highest	846.4	21.88
		4	Lowest	826.4	20.84
			Middle	836.6	19.98
			Highest	846.4	20.90
		5	Lowest	826.4	22.84
			Middle	836.6	21.95
			Highest	846.4	22.86
HSPA+ (QPSK) Band V		1	Lowest	826.4	22.50
			Middle	836.6	20.68
			Highest	846.4	22.58
		2	Lowest	826.4	20.48
			Middle	836.6	18.66
			Highest	846.4	20.55
		3	Lowest	826.4	21.46
			Middle	836.6	19.66
			Highest	846.4	21.56
		4	Lowest	826.4	20.46
			Middle	836.6	18.66
			Highest	846.4	20.58
		5	Lowest	826.4	22.46
			Middle	836.6	20.63
			Highest	846.4	22.54

Band	Data Rate	CH	Frequency (MHz)	RF Conducted Output Power (dBm)
				Average
IEEE 802.11b	1 M	1	2412.0	12.90
		6	2437.0	**13.95**
		11	2462.0	13.11
	2 M	1	2412.0	13.13
		6	2437.0	13.78
		11	2462.0	13.14
	5.5 M	1	2412.0	12.81
		6	2437.0	13.69
		11	2462.0	12.72
	11 M	1	2412.0	12.46
		6	2437.0	12.82
		11	2462.0	12.29
IEEE 802.11g	6 M	1	2412.0	12.56
		6	2437.0	**13.06**
		11	2462.0	12.86
	9 M	1	2412.0	12.19
		6	2437.0	12.87
		11	2462.0	13.05
	12 M	1	2412.0	12.06
		6	2437.0	12.43
		11	2462.0	12.55
	18 M	1	2412.0	11.40
		6	2437.0	11.96
		11	2462.0	11.88
	24 M	1	2412.0	11.09
		6	2437.0	11.52
		11	2462.0	11.52
	36 M	1	2412.0	10.28
		6	2437.0	10.93
		11	2462.0	11.17
	48 M	1	2412.0	9.56
		6	2437.0	10.30
		11	2462.0	10.43
	54 M	1	2412.0	9.43
		6	2437.0	10.04
		11	2462.0	10.14

Band	Data Rate	CH	Frequency (MHz)	RF Conducted Output Power (dBm)
				Average
Draft 802.11n_HT20 (2.4 GHz)	6.5 M	1	2412.0	10.97
		6	2437.0	**11.98**
		11	2462.0	11.72
	13.0 M	1	2412.0	10.68
		6	2437.0	11.36
		11	2462.0	11.25
	19.5 M	1	2412.0	10.12
		6	2437.0	10.97
		11	2462.0	10.90
	26.0 M	1	2412.0	9.65
		6	2437.0	10.23
		11	2462.0	10.55
	39.0 M	1	2412.0	9.16
		6	2437.0	9.57
		11	2462.0	9.90
	52.0 M	1	2412.0	8.39
		6	2437.0	8.98
		11	2462.0	9.17
	58.5 M	1	2412.0	8.23
		6	2437.0	9.04
		11	2462.0	8.83
	65.0 M	1	2412.0	7.80
		6	2437.0	8.42
		11	2462.0	8.70
Bluetooth 2.1	---	00	2402.0	4.36
		39	2441.0	**4.87**
		78	2480.0	4.81

5.4 Simultaneous Transmitting Evaluate

RF Conducted Power		
Band	dBm	W
WCDMA (RMC 12.2K) / HSDPA / HSUPA / HSPA+ (QPSK) Band II	23.35	0.216
WCDMA (RMC 12.2K) / HSDPA / HSUPA / HSPA+ (QPSK) Band V	23.32	0.215
IEEE 802.11b	13.95	0.025
IEEE 802.11g	13.06	0.020
draft 802.11n 2.4GHz Standard-20MHz	11.98	0.016
Bluetooth 2.1	4.87	0.003

Antenna Distance	
Antenna Account	Distance (cm)
Bluetooth to WLAN	0
Bluetooth to WWAN (License)	0.87
WLAN to WWAN (License)	0.87

BT and WWAN and WLAN simultaneously SAR Description

(1) Antenna Distance

1a. Bluetooth & WWAN 0 cm

1b. Bluetooth & WLAN 0.87 cm

1c. WWAN & WLAN 0.87 cm

(2) WLAN/ Bluetooth –Use the same antenna, then antenna separation distance greater than <5cm

Max sum of WLAN and Bluetooth is 1.46+0.12 =1.58 <1.6 mW/g. Therefore Simultaneous SAR is not required.

(3) WWAN/ Bluetooth –with antenna separation distance greater than <5cm

Max sum of WWAN and Bluetooth is 1.51+0.097 =1.607 >1.6 mW/g, SPLSR =(1.51+0.097)/7.7=0.21 <0.3. Therefore Simultaneous SAR is not required.

(4) WLAN/WWAN –Will not be used simultaneously.

Therefore Simultaneous SAR is not required.

(5) WCDMA Band V / WCDMA Band II / HSDPA Band II / HSUPA Band II / HSPA+ Band II / 802.11b / g / n / BT Stand-alone SAR is required due to routine evaluation requirements.

(6) Highest Simultaneous SAR Evaluation:

Body SAR：∑SAR= WWAN + Bluetooth =1.607 mW/g >SAR limit: 1.6mW/g

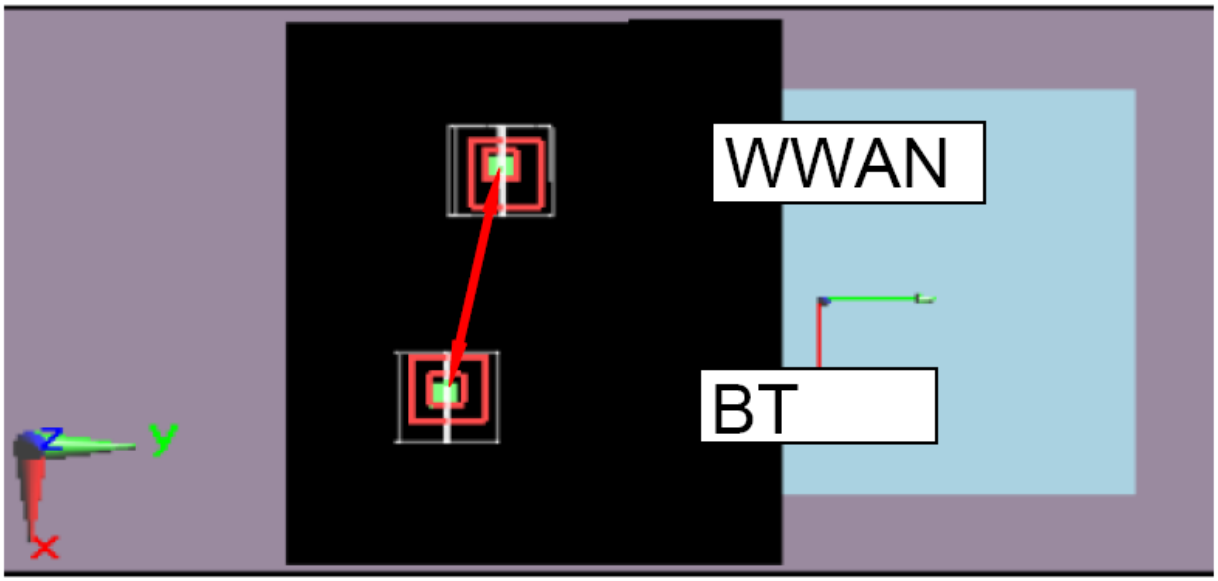
SPLSR =(1.51+0.097)/7.7=0.21 <0.3. Therefore Simultaneous SAR is not required.

(7) The distance of peak to peak location for evaluation as below:

WWAN: Flat_WCDMA Band II CH9400_Back Surface to phantom 0mm			
Value of SAR	X_2	Y_2	Z_2
Max.	m	m	m
1.78	-0.0405	-0.0855	-0.181
BT: Flat_BT CH39_Back Surface to phantom 0mm			
Value of SAR	X_1	Y_1	Z_1
Max.	m	m	m
0.13	0.0345	-0.102	-0.179

Distance calculation
DASY stores the individual coordinates of each measurement point, whereby the center coordinate (x=0, y=0) is always the Grid Reference Point as set in the Phantom properties within DASY setup pane. As long as the same phantom section is used the distance between two hot spots can be calculated with the Pythagoras' theorem. E.g. Antenna 1 has X1, Y1, Z1 and Antenna 2 has X2, Y2, Z2 as the hot spot coordinates. The closest distance between them is $d = \sqrt[2]{(X1 - X2)^2 + (Y1 - Y2)^2 + (Z1 - Z2)^2}$

Distance	Calculation
0.077 m	d=SQRT((0.0345-0.0405)^2+(-0.102-(-0.0855))^2+(-0.179-(-0.181))^2)
7.7 cm	



Note:

1. Simultaneous Transmitting Summary, please find the table 8 as below.
2. Simultaneous Transmission Summation of SAR, please find the table 9 as below.
   2.1 For (Edge Top. Edge Right) mode, that WWAN antenna to (Edge Top .Edge Right) >5cm, therefore the WWAN Stand-alone SAR is not required
   2.2 For (Edge Bottom. Edge Right) mode, that WLAN antenna to (Edge Bottom .Edge Right)>5cm, therefore the WLAN Stand-alone SAR is not required
   2.3 The diagonal diameter is greater than 20cm, can not put it into pocket ,Therefore the LCD side SAR can be avoided. Therefore the LCD side (Front Surface) SAR is not required

Table 8. Simultaneous Transmitting Summary

Simultaneous Transmitting	802.11b	802.11g	802.11n	Bluetooth
WCDMA/HSDPA/HSUPA/HSPA+ Band V				V
WCDMA/HSDPA/HSUPA/HSPA+ Band II				V
Bluetooth	V	V	V	

Table 9.

Back Surface					
The sum of the 1-g SAR					
Simult Tx	Configuration	WCDMA Band II SAR mW/g	BT SAR mW/g	∑ SAR mW/g	∑ SAR
Body SAR	Flat	1.51	0.097	1.607	>1.6
Simult Tx	Configuration	WCDMA Band V SAR mW/g	BT SAR mW/g	∑ SAR mW/g	∑ SAR
Body SAR	Flat	0.547	0.097	0.644	<1.6
Simult Tx	Configuration	WLAN SAR mW/g	BT SAR mW/g	∑ SAR mW/g	∑ SAR
Body SAR	Flat	0.752	0.097	0.849	<1.6
Edge Left					
The sum of the 1-g SAR					
Simult Tx	Configuration	WCDMA Band II SAR mW/g	BT SAR mW/g	∑ SAR mW/g	∑ SAR
Body SAR	Flat	1.01	0.12	1.13	<1.6
Simult Tx	Configuration	WCDMA Band V SAR mW/g	BT SAR mW/g	∑ SAR mW/g	∑ SAR
Body SAR	Flat	0.754	0.12	0.874	<1.6
Simult Tx	Configuration	WLAN SAR mW/g	BT SAR mW/g	∑ SAR mW/g	∑ SAR
Body SAR	Flat	1.46	0.12	1.58	<1.6
Edge Top					
The sum of the 1-g SAR					
Simult Tx	Configuration	WLAN SAR mW/g	BT SAR mW/g	∑ SAR mW/g	∑ SAR
Body SAR	Flat	0.099	0.011	0.11	<1.6

6. System Performance Check

6.1 Symmetric Dipoles for System Verification

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 and 2450 MHz
Return Loss	> 20 dB at specified verification 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 161 mm; overall height 340 mm D1900V2: dipole length 67.7 mm; overall height 300 mm D2450V2: dipole length 51.5 mm; overall height 300 mm

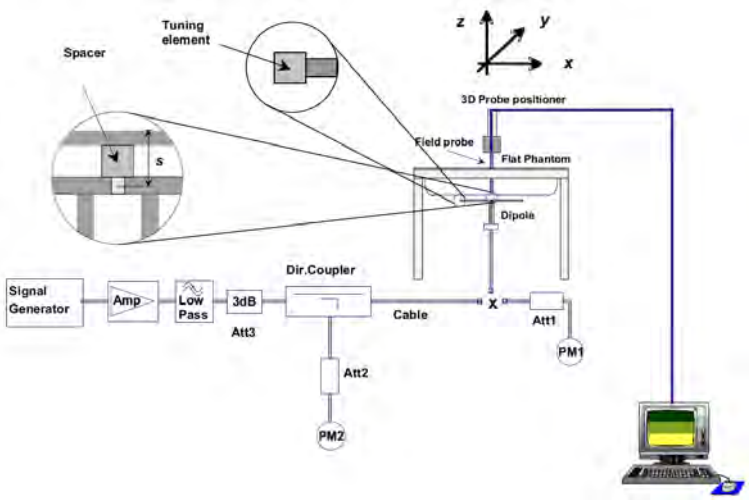


Figure 10. System Verification Setup Diagram

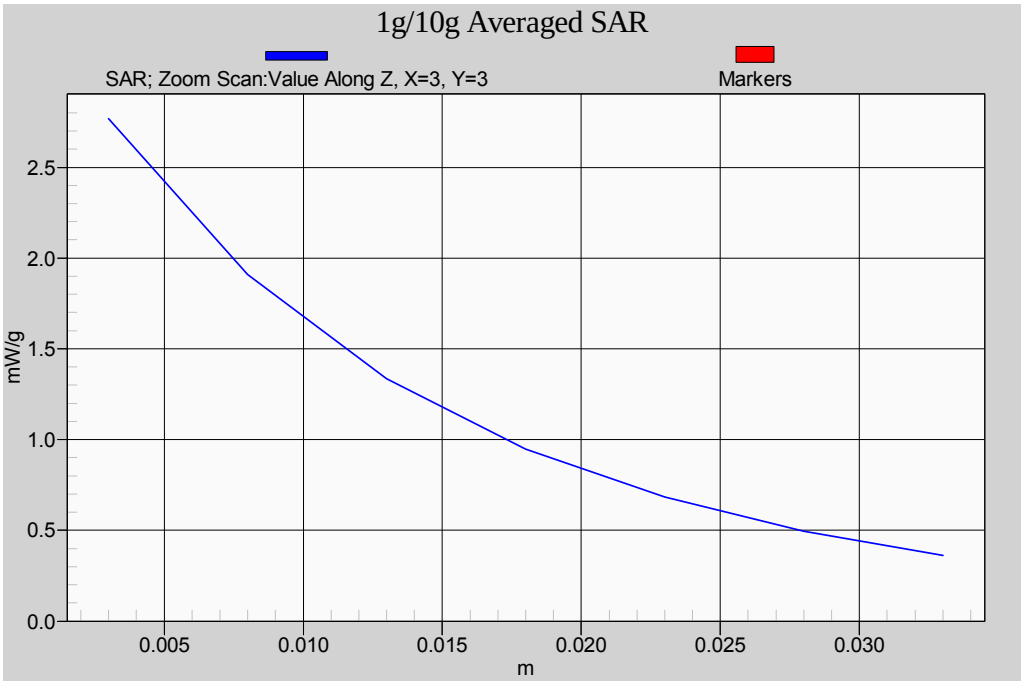
Figure 11. Validation Kit

6.2 Verification

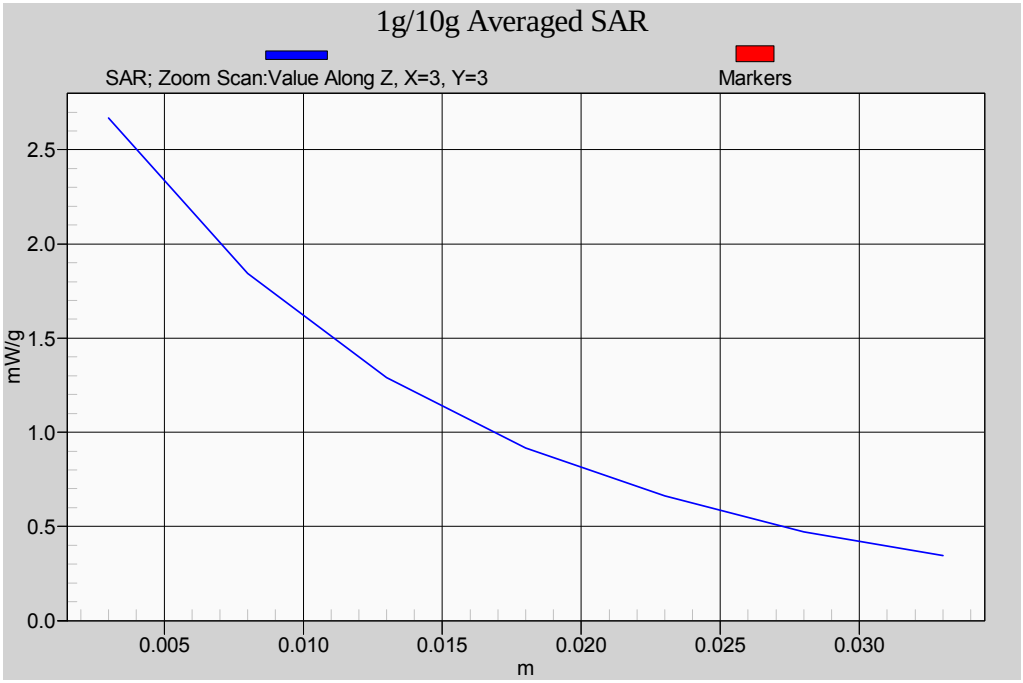
Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of ± 7%. The verification was performed at 835, 1900 and 2450MHz.

Validation kit		Mixture Type	SAR_{1g} [mW/g]		SAR_{10g} [mW/g]		Date of Calibration
D835V2-SN4d082		Body	9.43		6.22		07/19/2011
D1900V2-SN5d111		Body	40.90		21.50		07/22/2011
D2450V2-SN712		Body	49.90		23.60		02/23/2012
Frequency (MHz)	Power (dBm)	SAR_{1g} (mW/g)	SAR_{10g} (mW/g)	Drift (dB)	Difference percentage		Date
					1g	10g	
835 (Body)	250mW	2.38	1.58	0.011	1.0 %	1.6 %	06/03/2012
	Normalize to 1 Watt	9.52	6.32				
835 (Body)	250mW	2.29	1.52	0.012	-2.9 %	-2.3 %	06/25/2012
	Normalize to 1 Watt	9.16	6.08				
1900 (Body)	250mW	10.1	5.38	0.017	-1.2 %	0.1 %	06/02/2012
	Normalize to 1 Watt	40.4	21.52				
1900 (Body)	250mW	10.1	5.25	0.007	-1.2 %	-2.3 %	06/19/2012
	Normalize to 1 Watt	40.4	21				
1900 (Body)	250mW	10.1	5.26	0.030	-1.2 %	-2.1 %	06/25/2012
	Normalize to 1 Watt	40.4	21.04				
2450 (Body)	250mW	12.6	5.88	0.024	1.0 %	-0.3 %	06/04/2012
	Normalize to 1 Watt	50.4	23.52				
2450 (Body)	250mW	12.9	5.96	0.0390	3.4 %	1.0 %	07/05/2012
	Normalize to 1 Watt	51.6	23.84				

Z-axis Plot of System Performance Check

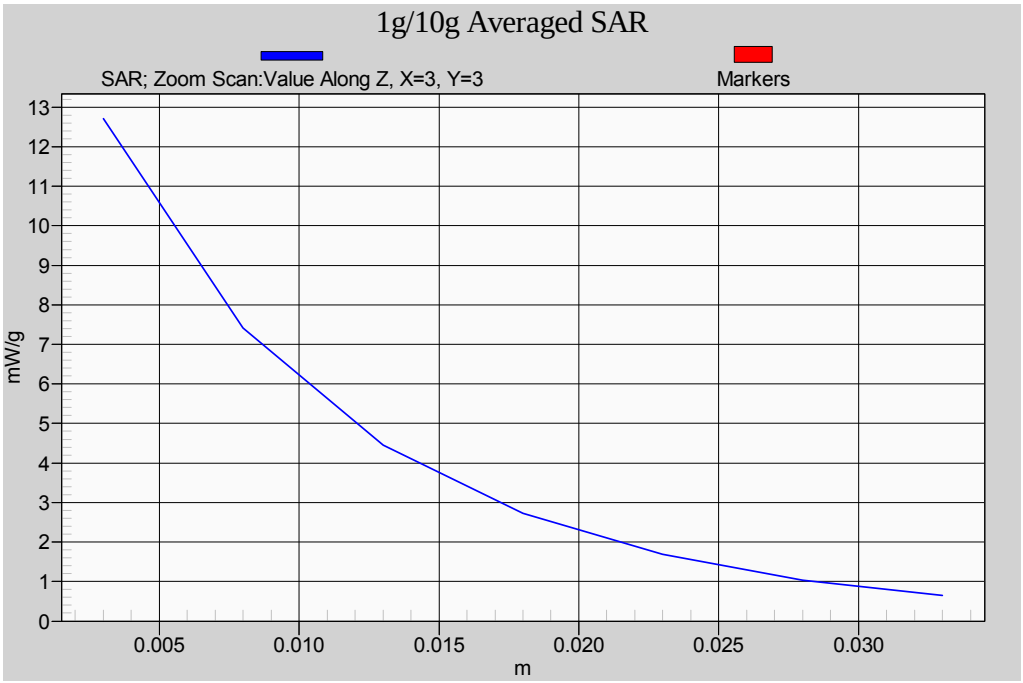


Body-Tissue-Simulating-Liquid 835MHz (06/03/2012)

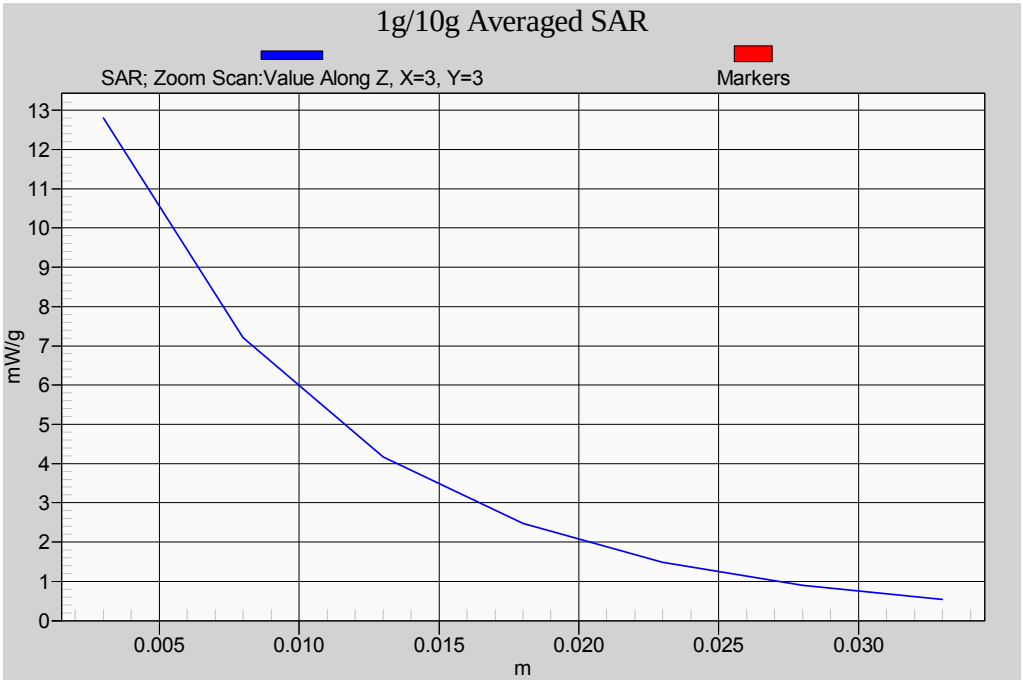


Body-Tissue-Simulating-Liquid 835MHz (06/25/2012)

Z-axis Plot of System Performance Check

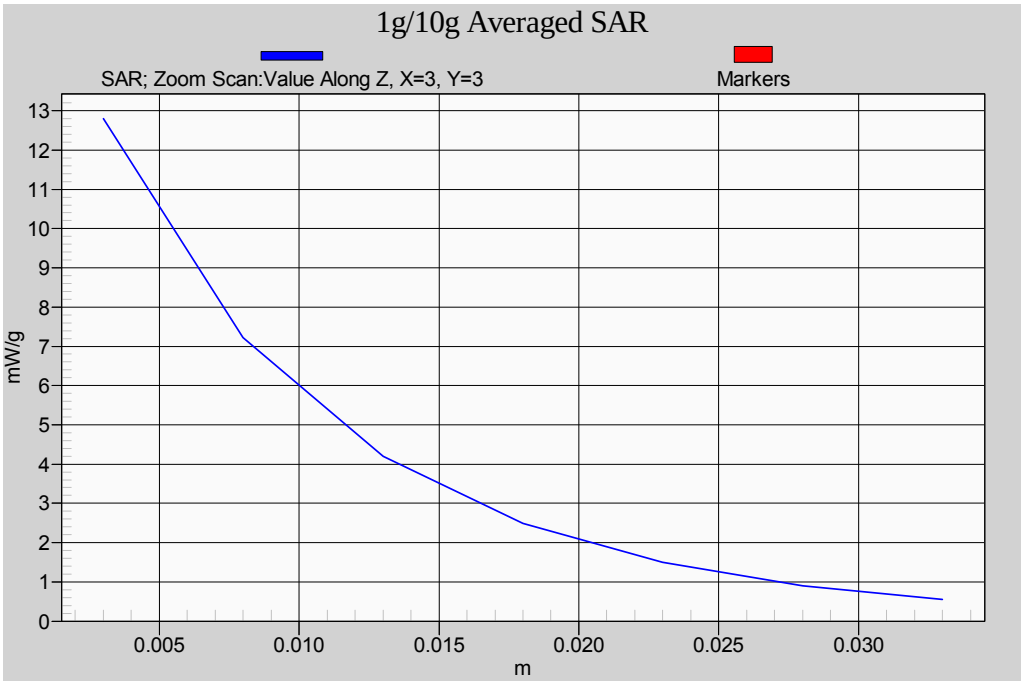


Body-Tissue-Simulating-Liquid 1900MHz (06/02/2012)

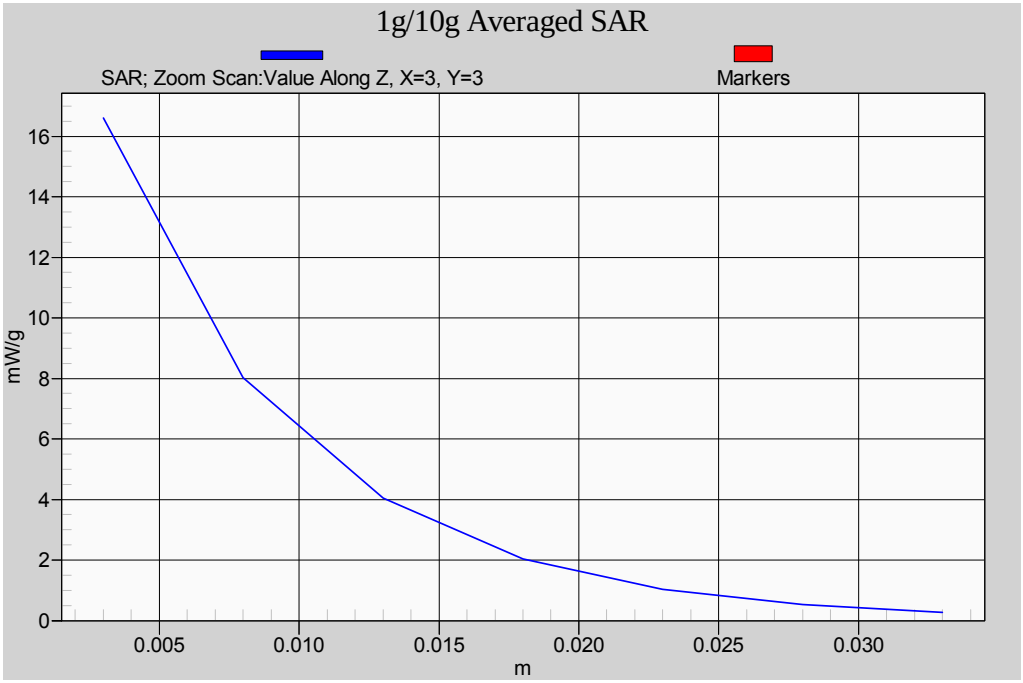


Body-Tissue-Simulating-Liquid 1900MHz (06/19/2012)

Z-axis Plot of System Performance Check

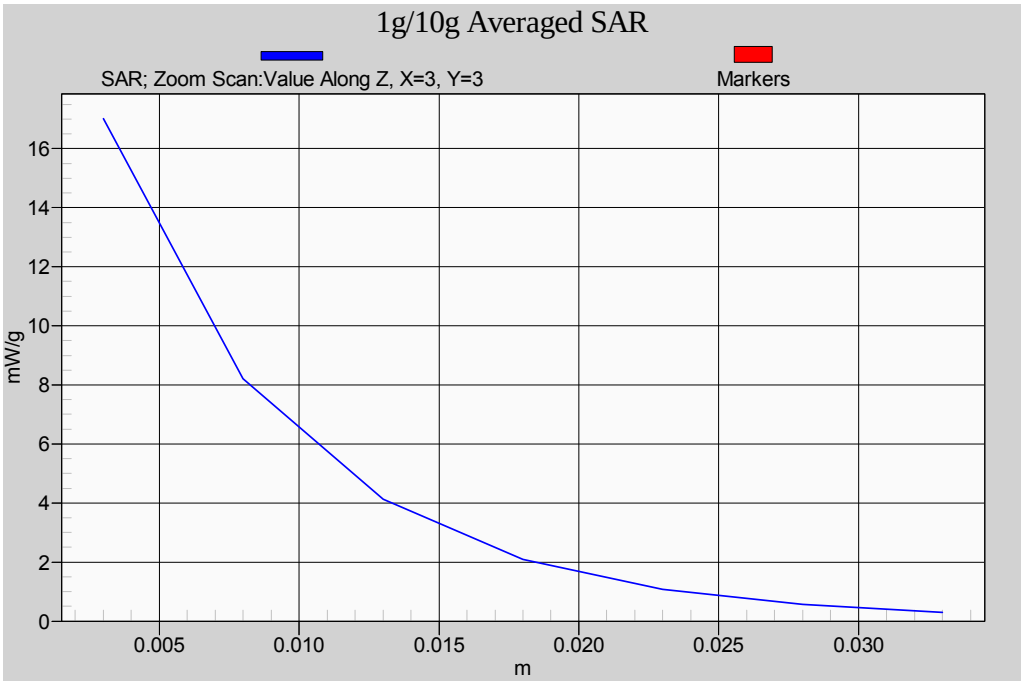


Body-Tissue-Simulating-Liquid 1900MHz (06/25/2012)



Body-Tissue-Simulating-Liquid 2450MHz (06/04/2012)

Z-axis Plot of System Performance Check



Body-Tissue-Simulating-Liquid 2450MHz (07/05/2012)

7. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Dosimetric E-Field Probe	EX3DV3	3519	02/21/2012	02/21/2013
SPEAG	835MHz System Validation Kit	D835V2	4d082	07/19/2011	07/19/2012
SPEAG	1900MHz System Validation Kit	D1900V2	5d111	07/22/2011	07/22/2012
SPEAG	2450MHz System Validation Kit	D2450V2	712	02/23/2012	02/23/2013
SPEAG	Data Acquisition Electronics	DAE4	779	01/23/2012	01/23/2013
SPEAG	Measurement Server	SE UMS 011 AA	1025	NCR	
SPEAG	Device Holder	N/A	N/A	NCR	
SPEAG	Phantom	ELI 4.0	1036	NCR	
SPEAG	Robot	Staubli TX90XL	F07/564ZA1/C/01	NCR	
SPEAG	Software	DASY5 V5.0 Build 125	N/A	NCR	
SPEAG	Software	SEMCAD V13.4 Build 125	N/A	NCR	
Agilent	Dielectric Probe Kit	85070C	US99360094	NCR	
Agilent	ENA Series Network Analyzer	E5071B	MY42404655	04/05/2012	04/05/2014
R&S	Power Sensor	NRP-Z22	100179	05/16/2012	05/16/2013
Agilent	MXG Vector Signal Generator	N5182A	MY47420962	05/24/2011	05/24/2013
Agilent	Dual Directional Coupler	778D	50334	NCR	
Mini-Circuits	Power Amplifier	ZHL-42W-SMA	D111103#5	NCR	
Mini-Circuits	Power Amplifier	ZVE-8G-SMA	D042005 671800514	NCR	
Aisi	Attenuator	IEAT 3dB	N/A	NCR	

Table 10. Test Equipment List

8. 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 ±19.62 %〔8〕. The frequency range of the measurement uncertainty is 750 ~ 5800MHz ±10.1 %

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.

Item	Uncertainty Component	Uncertainty Value	Prob. Dist	Div.	c_i (1g)	c_i (10g)	Std. Unc. (1-g)	Std. Unc. (10-g)	v_i or V_{eff}
Measurement System									
u1	Probe Calibration (k=1)	±5.05%	Normal	1	1	1	±5.05%	±5.05%	∞
u2	Probe Isotropy	±7.6%	Rectangular	$\sqrt{3}$	0.7	0.7	±3.1%	±3.1%	∞
u3	Boundary Effect	±1.0%	Rectangular	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
u4	Linearity	±4.7%	Rectangular	$\sqrt{3}$	1	1	±2.7%	±2.7%	∞
u5	System Detection Limit	±1.0%	Rectangular	$\sqrt{3}$	1	1	±0.58%	±0.58%	∞
u6	Readout Electronics	±0.3%	Normal	1	1	1	±0.3%	±0.3%	∞
u7	Response Time	±0.8%	Rectangular	$\sqrt{3}$	1	1	±0.5%	±0.5%	∞
u8	Integration Time	±2.6%	Rectangular	$\sqrt{3}$	1	1	±1.5%	±1.5%	∞
u9	RF Ambient Conditions	±0%	Rectangular	$\sqrt{3}$	1	1	±0%	±0%	∞
u10	RF Ambient Reflections	±0%	Rectangular	$\sqrt{3}$	1	1	±0%	±0%	∞
u11	Probe Positioner Mechanical Tolerance	±0.4%	Rectangular	$\sqrt{3}$	1	1	±0.2%	±0.2%	∞
u12	Probe Positioning with respect to Phantom Shell	±2.9%	Rectangular	$\sqrt{3}$	1	1	±1.7%	±1.7%	∞
u13	Extrapolation, interpolation and integration Algorithms for Max. SAR Evaluation	±1.0%	Rectangular	$\sqrt{3}$	1	1	±0.6%	±0.6%	∞
Test sample Related									
u14	Test sample Positioning	±3.6%	Normal	1	1	1	±3.6%	±3.6%	89
u15	Device Holder Uncertainty	±3.5%	Normal	1	1	1	±3.5%	±3.5%	5
u16	Output Power Variation - SAR drift measurement	±5.0%	Rectangular	$\sqrt{3}$	1	1	±2.9%	±2.9%	∞
Phantom and Tissue Parameters									
u17	Phantom Uncertainty (shape and thickness tolerances)	±4.0%	Rectangular	$\sqrt{3}$	1	1	±2.3%	±2.3%	∞
u18	Liquid Conductivity - deviation from target values	±5.0%	Rectangular	$\sqrt{3}$	0.64	0.43	±1.8%	±1.2%	∞
u19	Liquid Conductivity - measurement uncertainty	±1.93%	Normal	1	0.64	0.43	±1.24%	±0.83%	69
u20	Liquid Permittivity - deviation from target values	±5.0%	Rectangular	$\sqrt{3}$	0.6	0.49	±1.7%	±1.4%	∞
u21	Liquid Permittivity - measurement uncertainty	±1.4%	Normal	1	0.6	0.49	±0.84%	±1.69%	69
Combined standard uncertainty			RSS				±9.81%	±9.62%	313
Expanded uncertainty (95% CONFIDENCE LEVEL)			k=2				±19.62%	±19.24%	

Table 11. Uncertainty Budget of DASY

9. Measurement Procedure

The measurement procedures are as follows:

1. For WLAN function, engineering testing software installed on Notebook can provide continuous transmitting signal.
2. Measure output power through RF cable and power meter
3. Set scan area, grid size and other setting on the DASY software
4. Find out the largest SAR result on these testing positions of each band
5. Measure SAR results for other channels in worst SAR testing position if the SAR of highest power channel is larger than 0.8 W/kg

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

1. Power reference measurement
2. Area scan
3. Zoom scan
4. 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

1. Extraction of the measured data (grid and values) from the Zoom Scan
2. Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. Generation of a high-resolution mesh within the measured volume
4. Interpolation of all measured values form the measurement grid to the high-resolution grid
5. Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. 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 measures 7x7x9 points with step size 5, 5 and 3 mm for 300 MHz to 3 GHz, and 7x7x9 points with step size 5, 5 and 3 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

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 DUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing (step-size is 4, 4 and 2.5 mm). When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

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 DUT 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 DUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drift more than 5%, the SAR will be retested.

10. SAR Test Results Summary

10.1 Body SAR

Measurement Results _ Model: TF-RTC-700R-TA-WBG-1110									
Band	Frequency		Power (dBm)	Phantom Position	Spacing (mm)	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
	CH	MHz							
WCDMA Band II	9262	1852.4	23.24	Flat	0	---	1.500	0.13000	Back Surface to Phantom
	9262	1852.4	23.24	Flat	0	---	1.340	0.02400	Edge Bottom to phantom
	9262	1852.4	23.24	Flat	0	---	1.010	0.01200	Edge Left to phantom
	9400	1880.0	23.35	Flat	0	---	**1.510**	0.16100	Back Surface to Phantom
	9400	1880.0	23.35	Flat	0	---	1.290	0.00317	Edge Bottom to phantom
	9400	1880.0	23.35	Flat	0	---	0.887	0.03300	Edge Left to phantom
	9538	1907.6	23.24	Flat	0	---	1.470	0.13700	Back Surface to Phantom
	9538	1907.6	23.24	Flat	0	---	1.250	0.00234	Edge Bottom to phantom
	9538	1907.6	23.24	Flat	0	---	0.822	0.07000	Edge Left to phantom
HSDPA Band II Subtest 1	9262	1852.4	23.22	Flat	0	---	1.350	0.04800	Back Surface to Phantom
	9262	1852.4	23.22	Flat	0	---	1.260	0.08500	Edge Bottom to phantom
	9400	1880.0	23.21	Flat	0	---	**1.370**	0.10600	Back Surface to Phantom
	9400	1880.0	23.21	Flat	0	---	1.230	0.00096	Edge Bottom to phantom
	9538	1907.6	23.20	Flat	0	---	1.360	0.12700	Back Surface to Phantom
	9538	1907.6	23.20	Flat	0	---	1.180	-0.00324	Edge Bottom to phantom
Std. C95.1-1999 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Measurement Results _ Model: TF-RTC-700R-TA-WBG-1110									
Band	Frequency		Power (dBm)	Phantom Position	Spacing (mm)	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
	CH	MHz							
HSUPA Band II Subtest 1	9262	1852.4	22.36	Flat	0	---	1.080	0.12000	Back Surface to Phantom
	9262	1852.4	22.36	Flat	0	---	0.950	0.02900	Edge Bottom to phantom
	9400	1880.0	22.60	Flat	0	---	**1.330**	0.15700	Back Surface to Phantom
	9400	1880.0	22.60	Flat	0	---	0.915	0.00169	Edge Bottom to phantom
	9538	1907.6	22.30	Flat	0	---	1.260	0.10100	Back Surface to Phantom
	9538	1907.6	22.30	Flat	0	---	0.603	0.06200	Edge Bottom to phantom
HSPA+ Band II Subtest 1	9262	1852.4	21.50	Flat	0	---	0.989	-0.16200	Back Surface to Phantom
	9262	1852.4	21.50	Flat	0	---	0.733	0.06200	Edge Bottom to phantom
	9400	1880.0	21.84	Flat	0	---	**1.140**	0.16100	Back Surface to Phantom
	9400	1880.0	21.84	Flat	0	---	0.796	0.03200	Edge Bottom to phantom
	9538	1907.6	21.37	Flat	0	---	1.060	0.03800	Back Surface to Phantom
	9538	1907.6	21.37	Flat	0	---	0.734	0.02100	Edge Bottom to phantom
WCDMA Band V	4183	836.6	23.32	Flat	0	---	0.547	0.19200	Back Surface to Phantom
	4183	836.6	23.32	Flat	0	---	0.278	-0.01000	Edge Bottom to phantom
	4183	836.6	23.32	Flat	0	---	**0.754**	-0.04400	Edge Left to phantom
Std. C95.1-1999 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Measurement Results _ Model: TF-RTC-700R-TA-WBG-1110									
Band	Frequency		Power (dBm)	Phantom Position	Spacing (mm)	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
	CH	MHz							
IEEE 802.11b Rate 1M	1	2412.0	12.90	Flat	0	---	1.340	0.14300	Edge Left to phantom
	6	2437.0	13.95	Flat	0	---	0.752	-0.00011	Back Surface to phantom
	6	2437.0	13.95	Flat	0	---	0.099	0.10900	Edge Top to phantom
	6	2437.0	13.95	Flat	0	---	1.360	-0.05200	Edge Left to phantom
	11	2462.0	13.11	Flat	0	---	**1.460**	0.00428	Edge Left to phantom
Bluetooth 2.1	39	2441	4.87	Flat	0	---	0.097	-0.06300	Back Surface to phantom
	39	2441	4.87	Flat	0	---	0.011	-0.05400	Edge Top to phantom
	39	2441	4.87	Flat	0	---	**0.120**	0.06300	Edge Left to phantom
Std. C95.1-1999 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Measurement Results _ Model: TF-RTC-700A-TA-WBGH-1110									
Band	Frequency		Power (dBm)	Phantom Position	Spacing (mm)	Accessory	SAR_{1g} [mW/g]	Power Drift (dB)	Remark
	CH	MHz							
WCDMA Band II	9400	1880.0	23.35	Flat	0	---	**1.490**	-0.04700	Back Surface to Phantom
HSDPA Band II _ Subtest 1	9400	1880.0	23.21	Flat	0	---	1.240	0.10300	Back Surface to Phantom
HSUPA Band II _ Subtest 1	9400	1880.0	22.60	Flat	0	---	1.130	0.07400	Back Surface to Phantom
HSPA+ Band II _ Subtest 1	9400	1880.0	21.84	Flat	0	---	0.852	-0.00515	Back Surface to Phantom
WCDMA Band V	4183	836.6	23.32	Flat	0	---	0.582	-0.05300	Edge Left to phantom
IEEE 802.11b Rate 1M	11	2462.0	13.11	Flat	0	---	1.240	0.10600	Edge Left to phantom
Bluetooth	39	2441	4.87	Flat	0	---	0.111	-0.09000	Edge Left to phantom
Std. C95.1-1999 - Safety Limit Spatial Peak Uncontrolled Exposure/General Population						1.6 W/kg (mW/g) Averaged over 1 gram			

Notes:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used were according to FCC/OET Bulletin 65, Supplement C [June 2001], IEEE1528-2003 and RSS-102.
2. All modes of operation were investigated, and worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plots.
4. Batteries are fully charged for all readings.
5. If the Channel's SAR 1g of maximum conducted power is > 0.8 mW/g, low, middle and high channel are supposed to be tested.
6. If the conducted power of (802.11g and 802.11n) are higher than 802.11b 0.25dB, (802.11g and 802.11n) are supposed to be tested.
7. HSDPA & HSUPA power are not more than WCDMA 0.25dB and the SAR value of WCDMA <1.2 mW/g , therefore HSDPA & HSUPA&(HSPA+ QPSK) Stand-alone SAR is not required.
8. HSDPA & HSUPA power are not more than WCDMA BII (Edge Left)0.25dB and the SAR value of WCDMA BII(Edge Left)<1.2 mW/g, therefore HSDPA & HSUPA&(HSPA+ QPSK) Stand-alone SAR is not required.
9. For (Edge Top. Edge Right) mode, that WWAN antenna to (Edge Top .Edge Right) >5cm, therefore the WWAN Stand-alone SAR is not required.
10. For (Edge Bottom. Edge Right) mode, that WLAN antenna to (Edge Bottom .Edge Right)>5cm, therefore the WLAN Stand-alone SAR is not required.
11. The diagonal diameter is greater than 20cm,can not put it into pocket ,Therefore the LCD side SAR can be avoided. Therefore the LCD side (Front Surface) SAR is not required
12. For model: TF-RTC-700A-TA-WBGH-1110A , spot check from SAR worst case of model: TF-RTC-700R-TA-WBG-1110 conditions.

f	Measured Value		Target Value		Δ εr(%)	Δσ(%)	For 1g		ΔSAR 1-g(%)	Original SAR	Correction SAR
	Permittivity	conductivity	Permittivity	conductivity	Permittivity	conductivity	cε	cσ		Worst Case	Worst Case
1852.4	51.5	1.450	53.300	1.520	-3.377	-4.605	-0.226	0.6032	-2.014	---	---
1880.0	51.4	1.480	53.300	1.520	-3.565	-2.632	-0.226	0.5980	-0.767	---	---
1907.6	51.3	1.510	53.300	1.520	-3.752	-0.658	-0.226	0.5926	0.459	1.470	1.477
836.6	55.1	0.993	55.194	0.972	-0.170	2.160	-0.219	0.7530	1.664	0.754	0.767
2412	52.0	1.900	52.751	1.914	-1.424	-0.731	-0.225	0.4885	-0.037	---	---
2437	51.8	1.930	52.717	1.938	-1.739	-0.413	-0.225	0.4831	0.192	1.360	1.363
2462	52.0	1.990	52.685	1.967	-1.300	1.169	-0.225	0.4776	0.851	1.460	1.472
2441	51.9	1.940	52.712	1.941	-1.540	-0.052	-0.225	0.4822	0.322	0.120	0.120

SAR Correction Formula	
SAR 1-g	$c_\varepsilon = -7{,}854\times10^{-4} f^3 + 9{,}402\times10^{-3} f^2 - 2{,}742\times10^{-2} f - 0{,}202\,6$ $c_\sigma = 9{,}804\times10^{-3} f^3 - 8{,}661\times10^{-2} f^2 + 2{,}981\times10^{-2} f + 0{,}782\,9$

10.2 Std. C95.1-1999 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 12. 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 **AAEON Technology. Inc. Trade Name：AAEON Model(s)：xxxRTC-700y-TAxx-WBGz-xxxx** is below the maximum recommended level of 1.6 W/kg (mW/g).

12. References

[1] Std. C95.1-1999, "*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. Pokovi ć, 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. Pokovi ć, 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.

[11] RSS-102, Issue 4 (March 2010), Radio Standards Specification 102.

[12] KDB248227 D01 SAR meas for 802 11 a b g v01r02.

[13] KDB 648474 D01 SAR Handsets Multi Xmiter and Ant v01r05

[14] KDB 941225 D01 SAR Test for 3G Devices 3G-SAR

[15] KDB 941225 D03 SAR Test Reduction GSM GPRS EDGE

[16] KDB 941225 D04 SAR for GSM E GPRS Dual Xfer Mode v01

[17] KDB 941225 D06 Hot Spot SAR v01

Appendix A - System Performance Check

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 10:50:35 AM

System Performance Check at 835MHz_20120603_Body

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

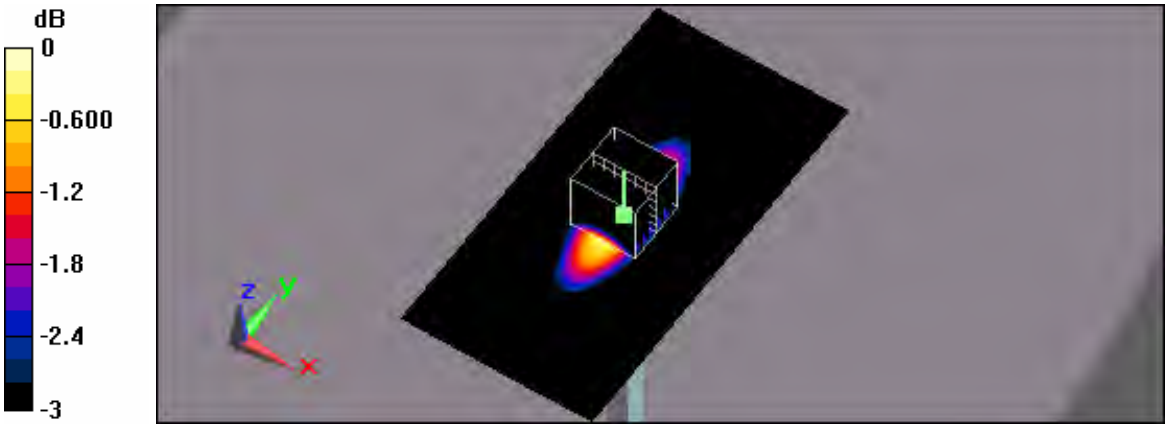
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(10.36, 10.36, 10.36); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

System Performance Check at 835MHz/Area Scan (61x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.77 mW/g

System Performance Check at 835MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.4 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 3.46 W/kg
SAR(1 g) = 2.38 mW/g; SAR(10 g) = 1.58 mW/g
Maximum value of SAR (measured) = 2.77 mW/g



0 dB = 2.77mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/25/2012 4:12:37 PM

System Performance Check at 835MHz_20120625_Body

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

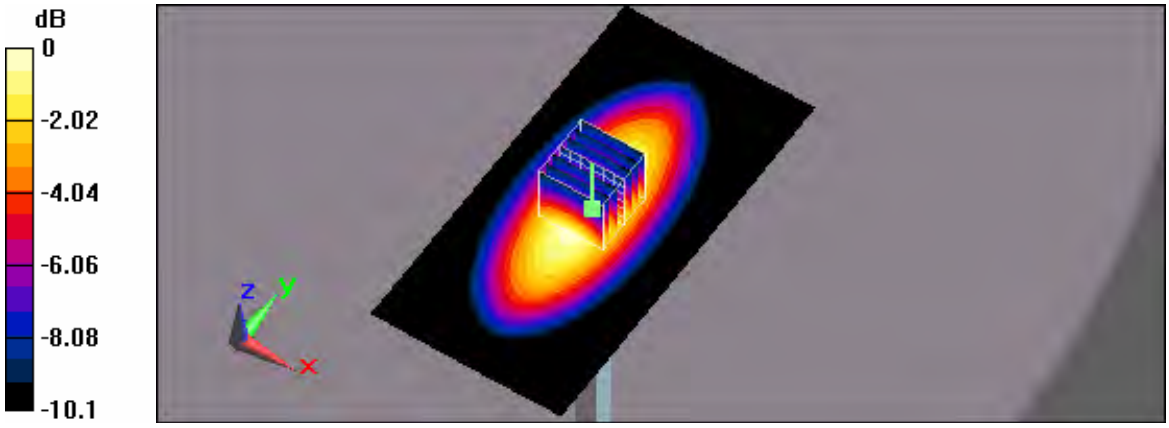
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(10.36, 10.36, 10.36); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

System Performance Check at 835MHz/Area Scan (61x121x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.66 mW/g

System Performance Check at 835MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.1 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 3.33 W/kg
SAR(1 g) = 2.29 mW/g; SAR(10 g) = 1.52 mW/g
Maximum value of SAR (measured) = 2.67 mW/g



0 dB = 2.67mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 10:56:13 AM

System Performance Check at 1900MHz_20120602_Body

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

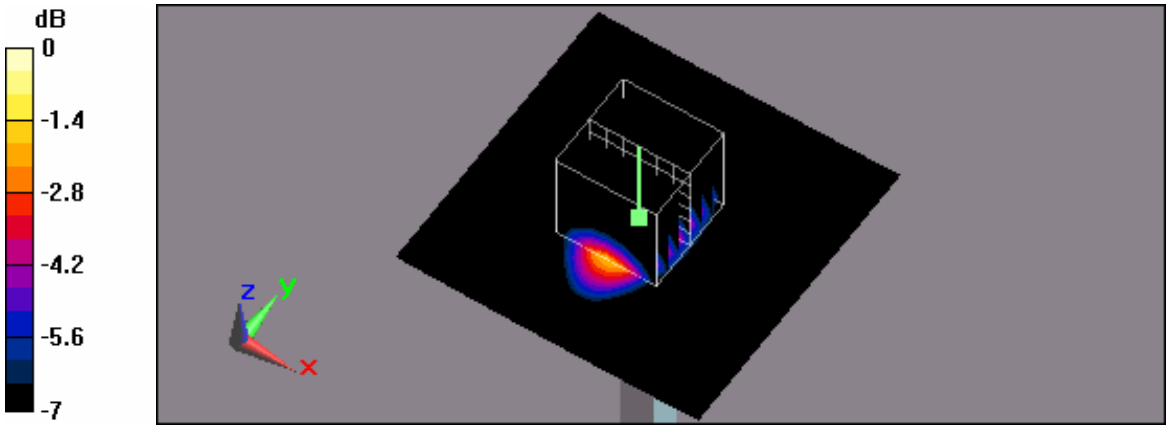
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.5 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

System Performance Check at 1900MHz/Area Scan (61x61x1):
Measurement grid: dx=15mm, dy=15mm
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 = 92.4 V/m; Power Drift = 0.017 dB
Peak SAR (extrapolated) = 17.8 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.38 mW/g
Maximum value of SAR (measured) = 12.7 mW/g



0 dB = 12.7mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/19/2012 6:13:01 PM

System Performance Check at 1900MHz_20120619_Body

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

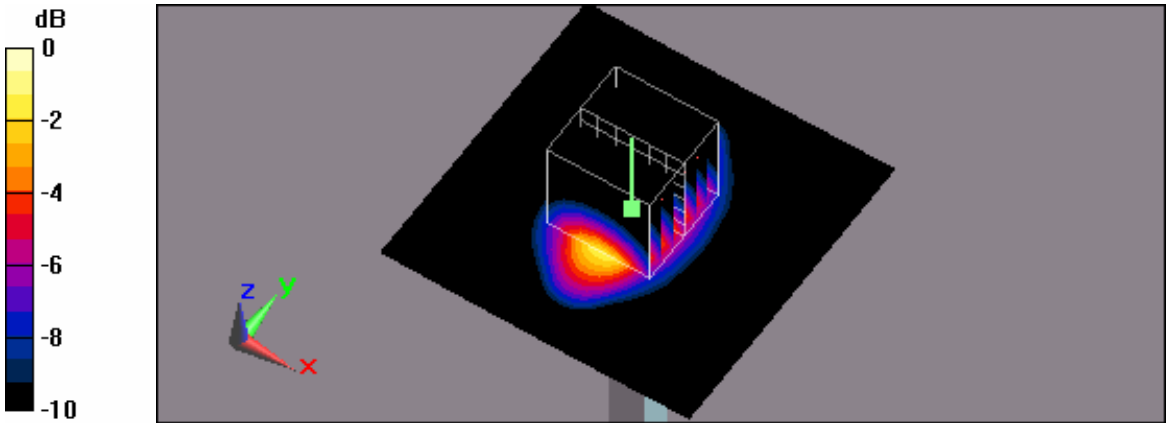
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.5 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

System Performance Check at 1900MHz/Area Scan (61x61x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.8 mW/g

System Performance Check at 1900MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.6 V/m; Power Drift = 0.007 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.25 mW/g
Maximum value of SAR (measured) = 12.8 mW/g



0 dB = 12.8mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/25/2012 1:41:14 PM

System Performance Check at 1900MHz_20120625_Body

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

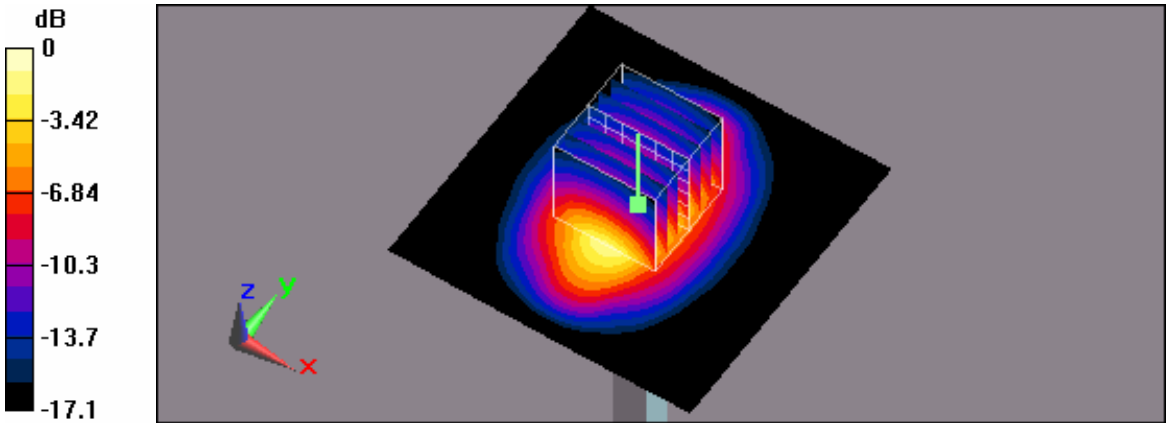
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.5 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

System Performance Check at 1900MHz/Area Scan (61x61x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.8 mW/g

System Performance Check at 1900MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.2 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.26 mW/g
Maximum value of SAR (measured) = 12.8 mW/g



0 dB = 12.8mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/4/2012 7:34:32 PM

System Performance Check at 2450MHz_20120604_Body

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

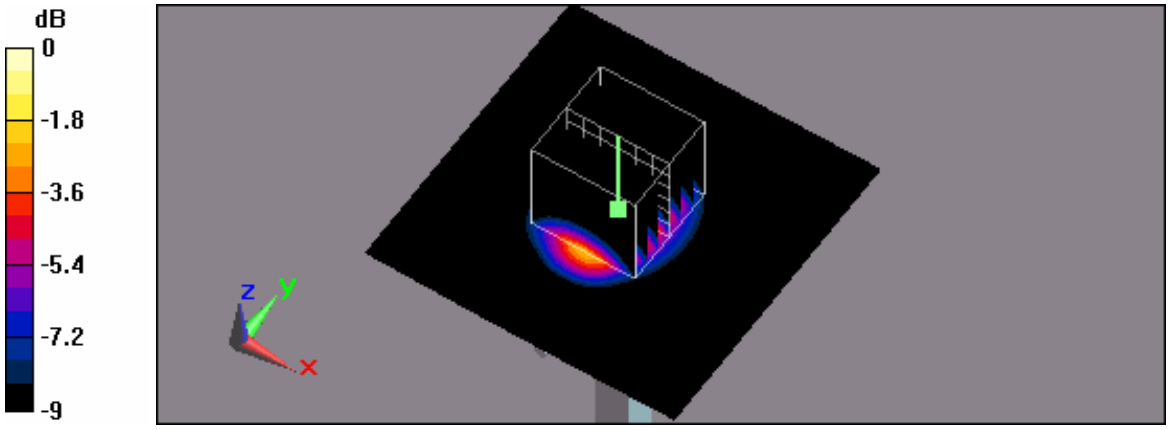
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.96 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

System Performance Check at 2450MHz/Area Scan (61x61x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 16.5 mW/g

System Performance Check at 2450MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.5 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 26.5 W/kg
SAR(1 g) = 12.6 mW/g; SAR(10 g) = 5.88 mW/g
Maximum value of SAR (measured) = 16.6 mW/g



0 dB = 16.6mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 7/5/2012 2:32:44 PM

System Performance Check at 2450MHz_20120705_Body

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

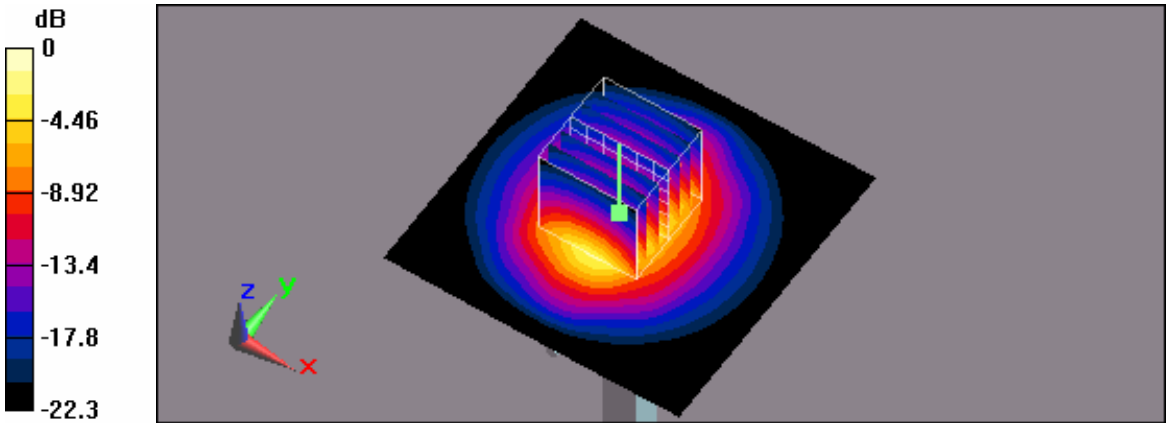
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.96 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

System Performance Check at 2450MHz/Area Scan (61x61x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 17 mW/g

System Performance Check at 2450MHz/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.3 V/m; Power Drift = 0.039 dB
Peak SAR (extrapolated) = 27.3 W/kg
SAR(1 g) = 12.9 mW/g; SAR(10 g) = 5.96 mW/g
Maximum value of SAR (measured) = 17 mW/g



0 dB = 17mW/g

Appendix B - SAR Measurement Data

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 1:56:48 PM

Flat_WCDMA Band II CH9262_Back Surface to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

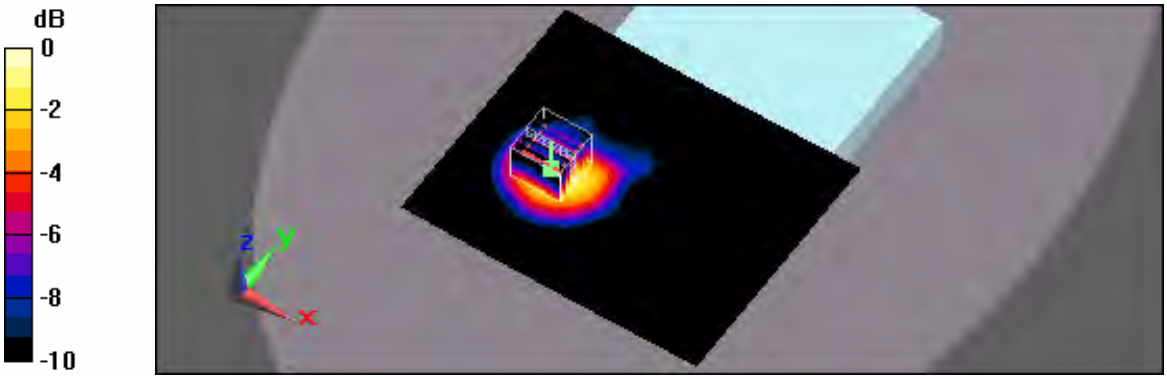
Communication System: WCDMA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.45 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.89 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.53 V/m; Power Drift = 0.130 dB
Peak SAR (extrapolated) = 2.25 W/kg
SAR(1 g) = 1.5 mW/g; SAR(10 g) = 0.906 mW/g
Maximum value of SAR (measured) = 1.78 mW/g



0 dB = 1.78mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 6:35:17 PM

Flat_WCDMA Band II CH9262_Edge Bottom to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

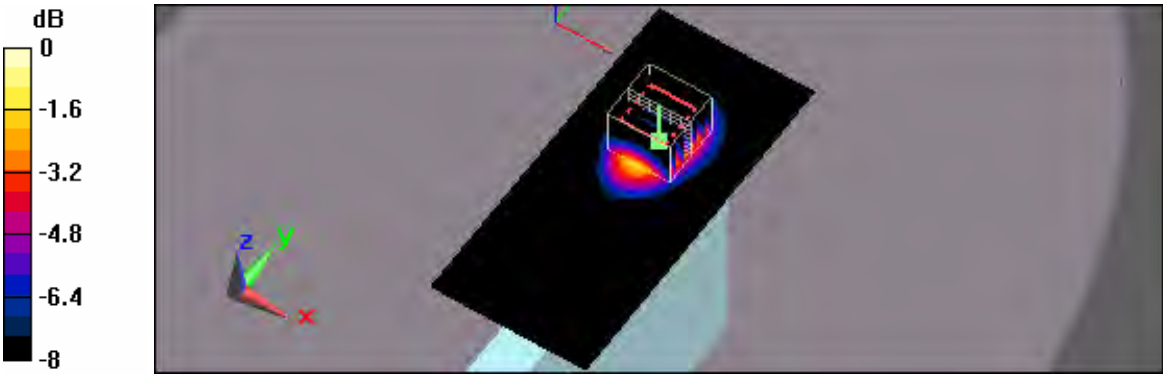
Communication System: WCDMA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.45 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.76 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.4 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 2.19 W/kg
SAR(1 g) = 1.34 mW/g; SAR(10 g) = 0.750 mW/g
Maximum value of SAR (measured) = 1.63 mW/g



0 dB = 1.63mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 8:11:19 PM

Flat_WCDMA Band II CH9262_Edge Left to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

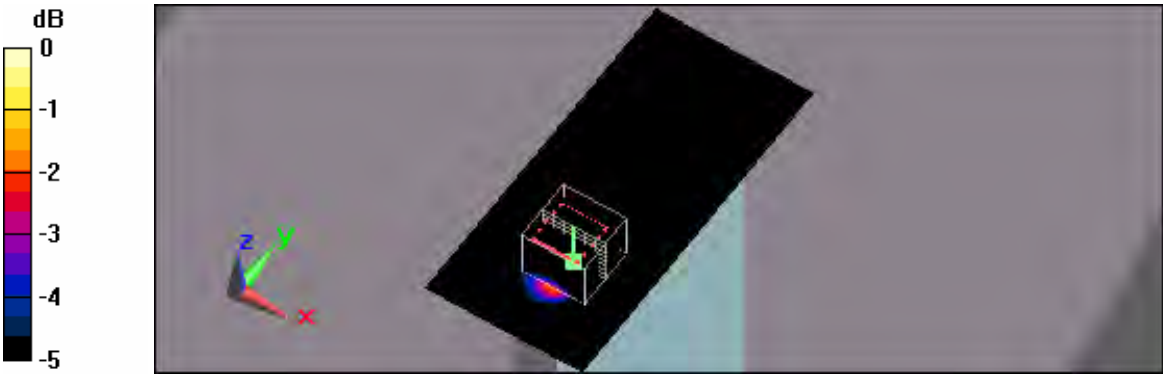
Communication System: WCDMA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.45 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.45 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.5 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 1.92 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.507 mW/g
Maximum value of SAR (measured) = 1.3 mW/g



0 dB = 1.3mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 1:24:43 PM

Flat_WCDMA Band II CH9400_Back Surface to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

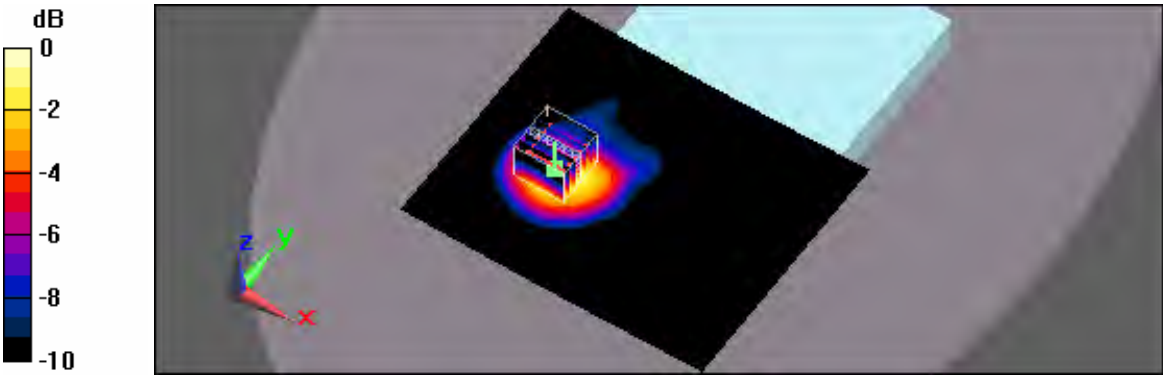
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

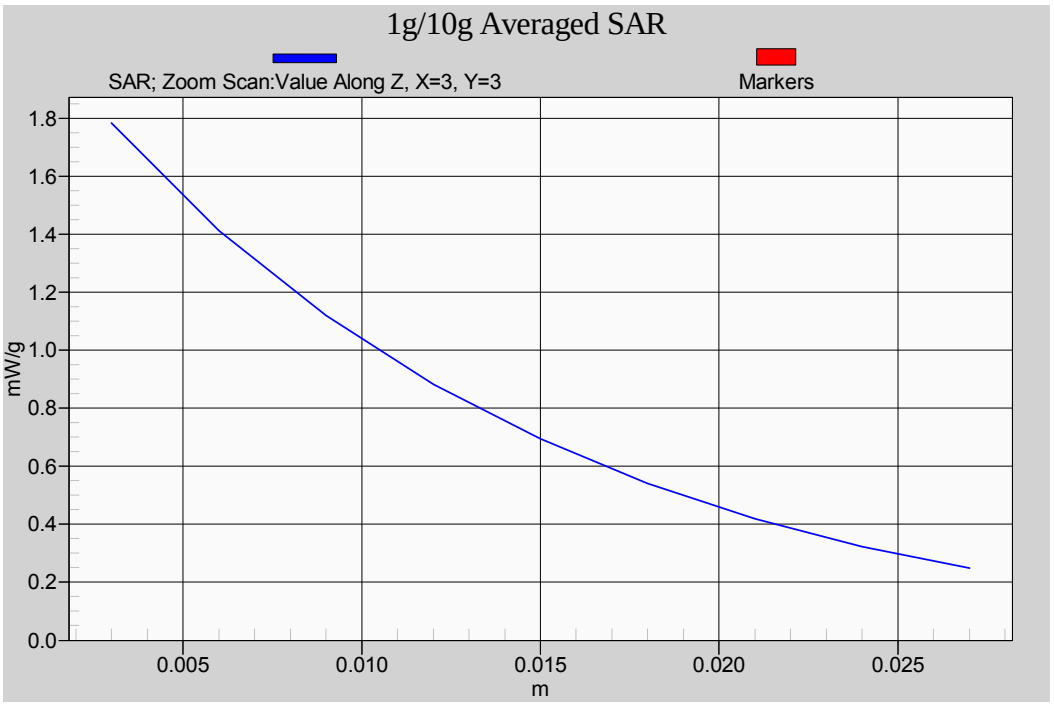
- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.88 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 5.05 V/m; Power Drift = 0.161 dB
Peak SAR (extrapolated) = 2.29 W/kg
SAR(1 g) = 1.51 mW/g; SAR(10 g) = 0.907 mW/g
Maximum value of SAR (measured) = 1.78 mW/g



0 dB = 1.78mW/g



Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 6:07:35 PM

Flat_WCDMA Band II CH9400_Edge Bottom to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

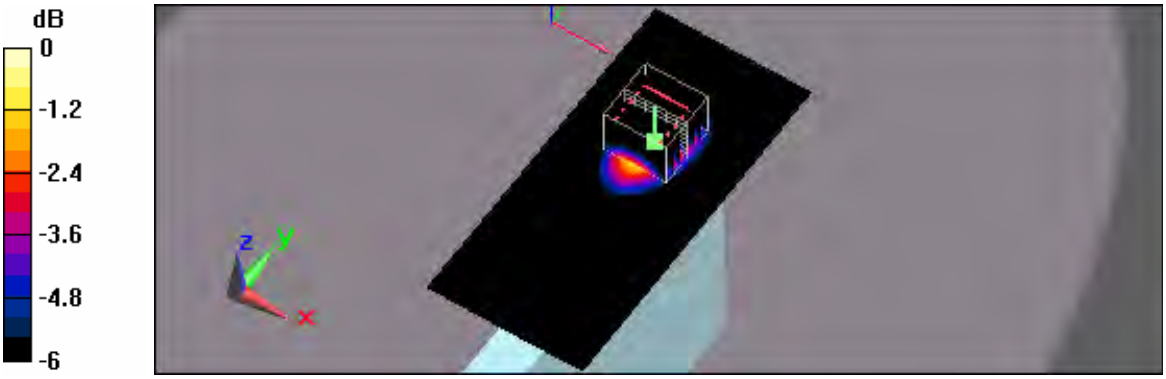
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.64 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 14.4 V/m; Power Drift = 0.00317 dB
Peak SAR (extrapolated) = 2.1 W/kg
SAR(1 g) = 1.29 mW/g; SAR(10 g) = 0.719 mW/g
Maximum value of SAR (measured) = 1.56 mW/g



0 dB = 1.56mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 7:42:19 PM

Flat_WCDMA Band II CH9400_Edge Left to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

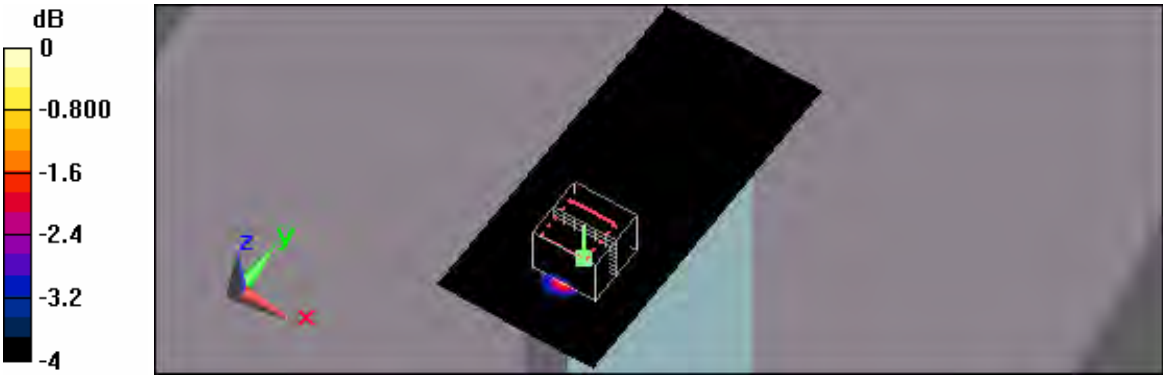
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.28 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.5 V/m; Power Drift = 0.033 dB
Peak SAR (extrapolated) = 1.68 W/kg
SAR(1 g) = 0.887 mW/g; SAR(10 g) = 0.451 mW/g
Maximum value of SAR (measured) = 1.15 mW/g



0 dB = 1.15mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 2:29:39 PM

Flat_WCDMA Band II CH9538_Back Surface to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

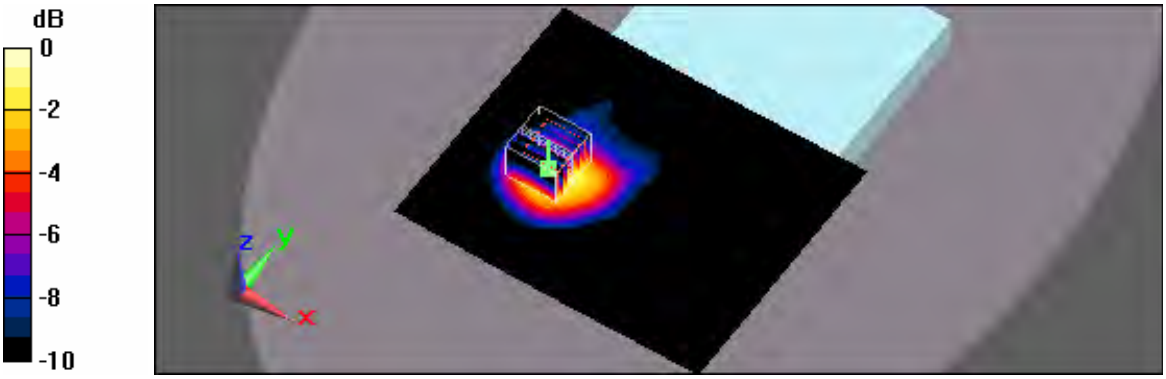
Communication System: WCDMA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.51 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.84 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 5.37 V/m; Power Drift = 0.137 dB
Peak SAR (extrapolated) = 2.27 W/kg
SAR(1 g) = 1.47 mW/g; SAR(10 g) = 0.874 mW/g
Maximum value of SAR (measured) = 1.75 mW/g



0 dB = 1.75mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 7:07:31 PM

Flat_WCDMA Band II CH9538_Edge Bottom to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

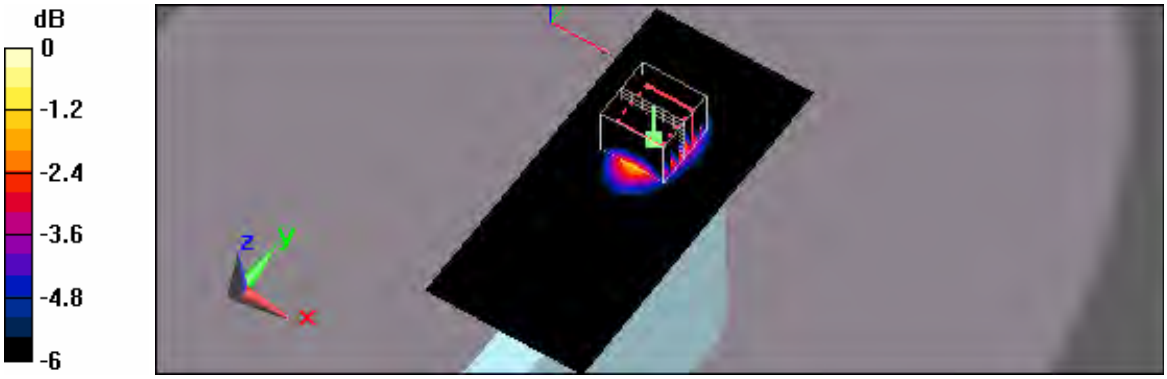
Communication System: WCDMA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.51 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.64 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.2 V/m; Power Drift = 0.00234 dB
Peak SAR (extrapolated) = 2.05 W/kg
SAR(1 g) = 1.25 mW/g; SAR(10 g) = 0.697 mW/g
Maximum value of SAR (measured) = 1.54 mW/g



0 dB = 1.54mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 8:39:15 PM

Flat_WCDMA Band II CH9538_Edge Left to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

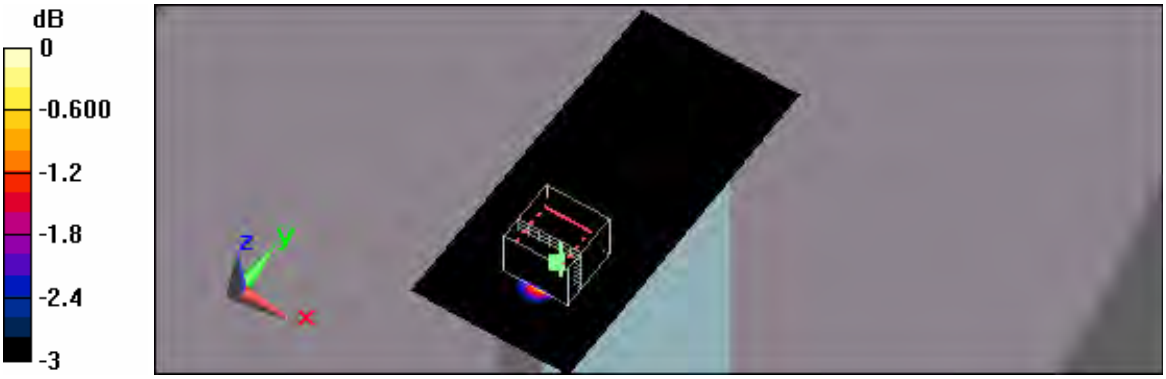
Communication System: WCDMA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.51 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.18 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.7 V/m; Power Drift = 0.070 dB
Peak SAR (extrapolated) = 1.56 W/kg
SAR(1 g) = 0.822 mW/g; SAR(10 g) = 0.422 mW/g
Maximum value of SAR (measured) = 1 mW/g



0 dB = 1mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 12:15:41 AM

Flat_HSDPA Band II CH9262_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

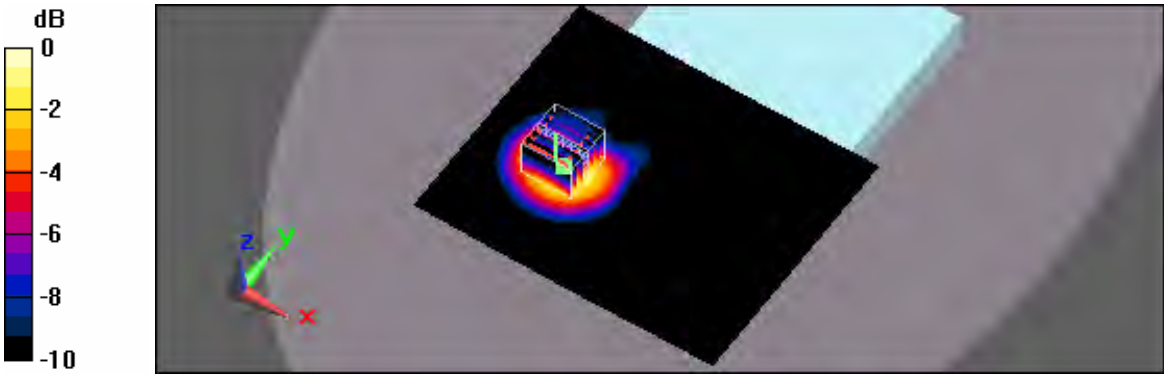
Communication System: HSDPA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.45 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.58 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.69 V/m; Power Drift = 0.048 dB
Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 1.35 mW/g; SAR(10 g) = 0.818 mW/g
Maximum value of SAR (measured) = 1.61 mW/g



0 dB = 1.61mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 2:04:44 AM

Flat_HSDPA Band II CH9262_Edge Bottom to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

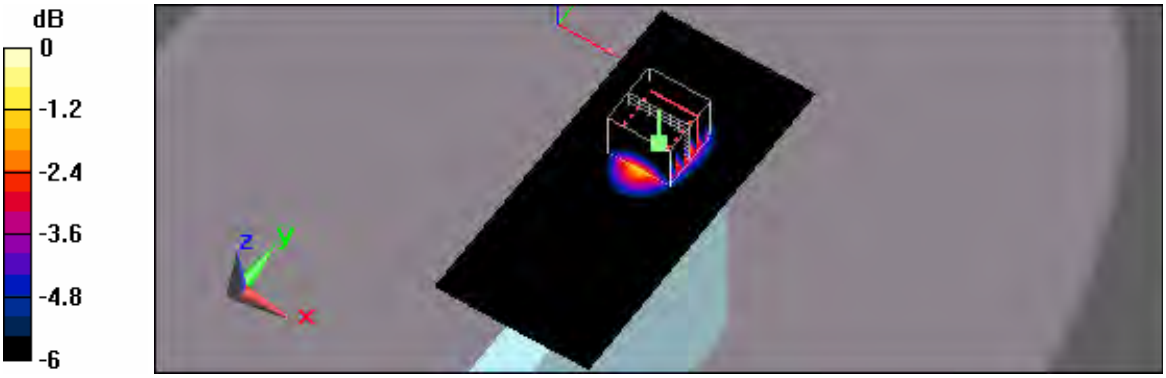
Communication System: HSDPA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.45 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.64 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.6 V/m; Power Drift = 0.085 dB
Peak SAR (extrapolated) = 2.02 W/kg
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.721 mW/g
Maximum value of SAR (measured) = 1.53 mW/g



0 dB = 1.53mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/2/2012 11:38:41 PM

Flat_HSDPA Band II CH9400_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

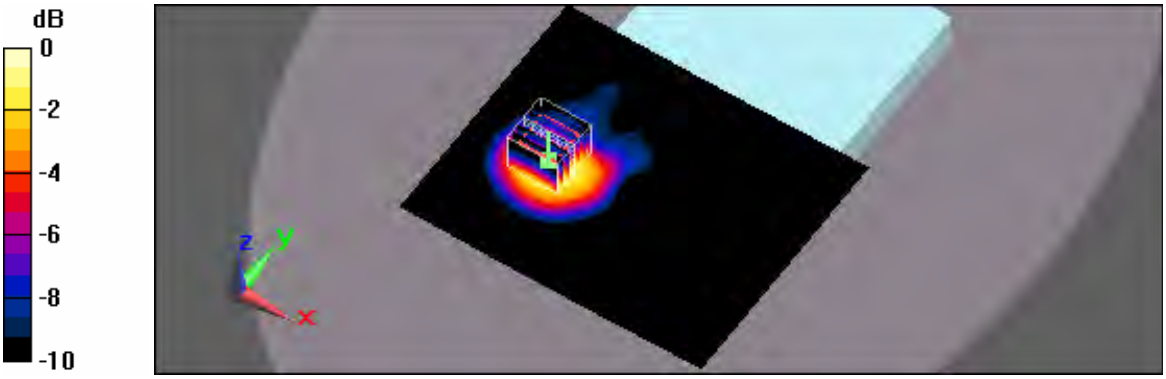
Communication System: HSDPA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.61 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.84 V/m; Power Drift = 0.106 dB
Peak SAR (extrapolated) = 2.08 W/kg
SAR(1 g) = 1.37 mW/g; SAR(10 g) = 0.829 mW/g
Maximum value of SAR (measured) = 1.61 mW/g



0 dB = 1.61mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 1:36:33 AM

Flat_HSDPA Band II CH9400_Edge Bottom to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

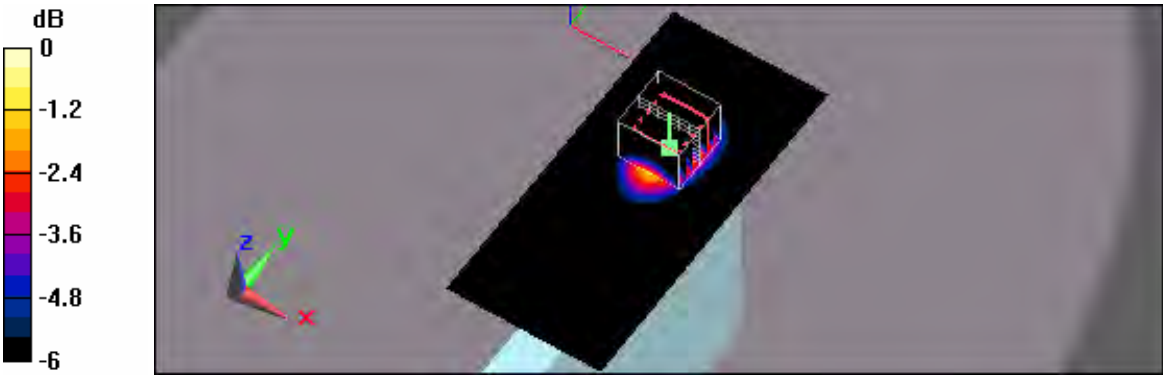
Communication System: HSDPA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.62 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 14.7 V/m; Power Drift = 0.000961 dB
Peak SAR (extrapolated) = 1.98 W/kg
SAR(1 g) = 1.23 mW/g; SAR(10 g) = 0.694 mW/g
Maximum value of SAR (measured) = 1.5 mW/g



0 dB = 1.5mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 12:55:16 AM

Flat_HSDPA Band II CH9538_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

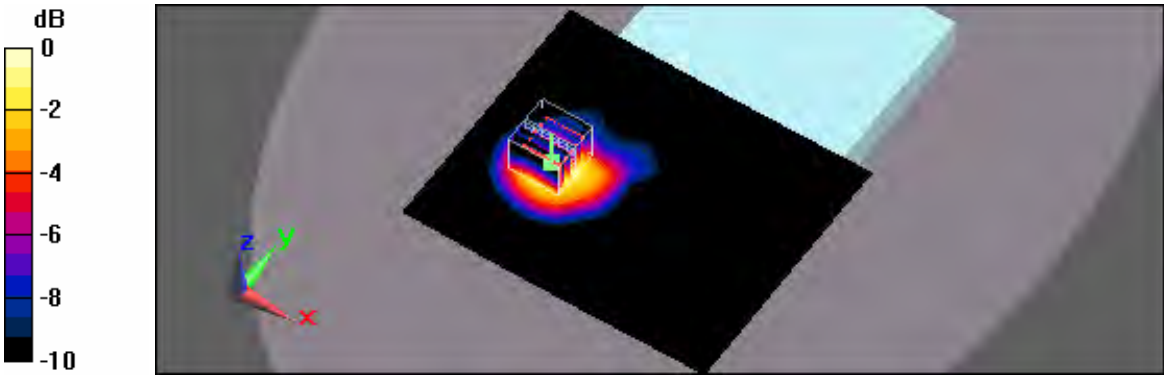
Communication System: HSDPA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.51 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.69 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.28 V/m; Power Drift = 0.127 dB
Peak SAR (extrapolated) = 2.11 W/kg
SAR(1 g) = 1.36 mW/g; SAR(10 g) = 0.820 mW/g
Maximum value of SAR (measured) = 1.63 mW/g



0 dB = 1.63mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 2:32:50 AM

Flat_HSDPA Band II CH9538_Edge Bottom to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

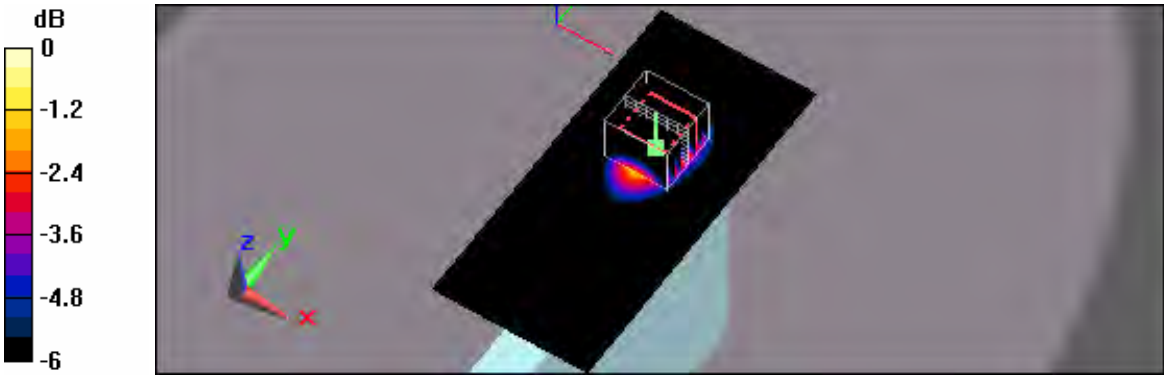
Communication System: HSDPA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.51 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.51 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.1 V/m; Power Drift = -0.00324 dB
Peak SAR (extrapolated) = 1.97 W/kg
SAR(1 g) = 1.18 mW/g; SAR(10 g) = 0.660 mW/g
Maximum value of SAR (measured) = 1.49 mW/g



0 dB = 1.49mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 5:45:41 AM

Flat_HSUPA Band II CH9262_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

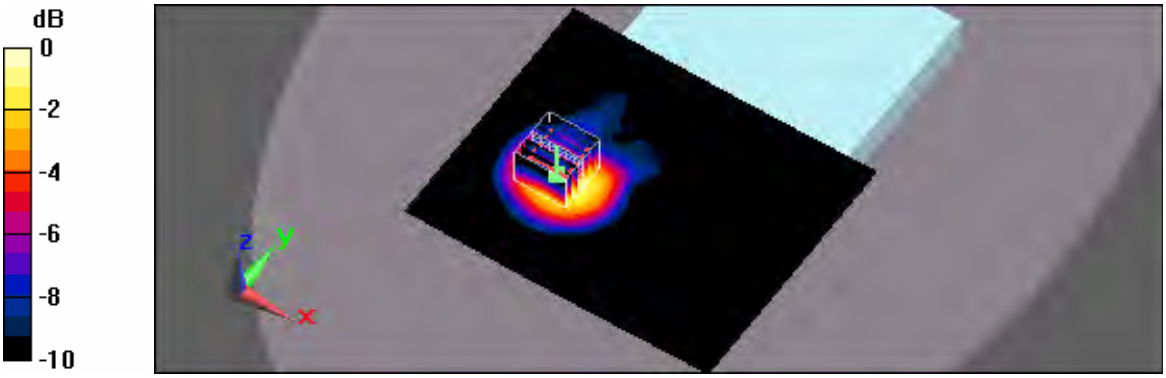
Communication System: HSUPA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.45 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.35 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.76 V/m; Power Drift = 0.120 dB
Peak SAR (extrapolated) = 1.62 W/kg
SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.659 mW/g
Maximum value of SAR (measured) = 1.28 mW/g



0 dB = 1.28mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 8:52:30 AM

Flat_HSUPA Band II CH9262_Edge Bottom to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

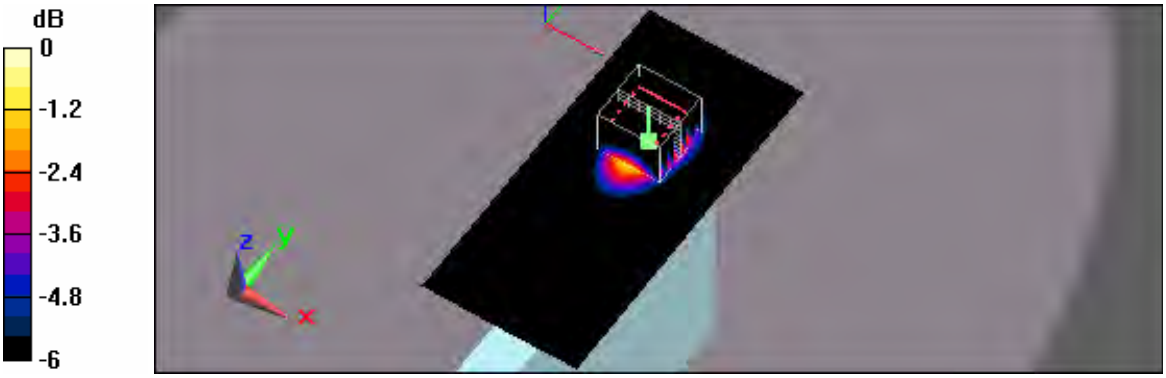
Communication System: HSUPA Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.45 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.23 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13 V/m; Power Drift = 0.029 dB
Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 0.950 mW/g; SAR(10 g) = 0.540 mW/g
Maximum value of SAR (measured) = 1.15 mW/g



0 dB = 1.15mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 6:52:45 AM

Flat_HSUPA Band II CH9400_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

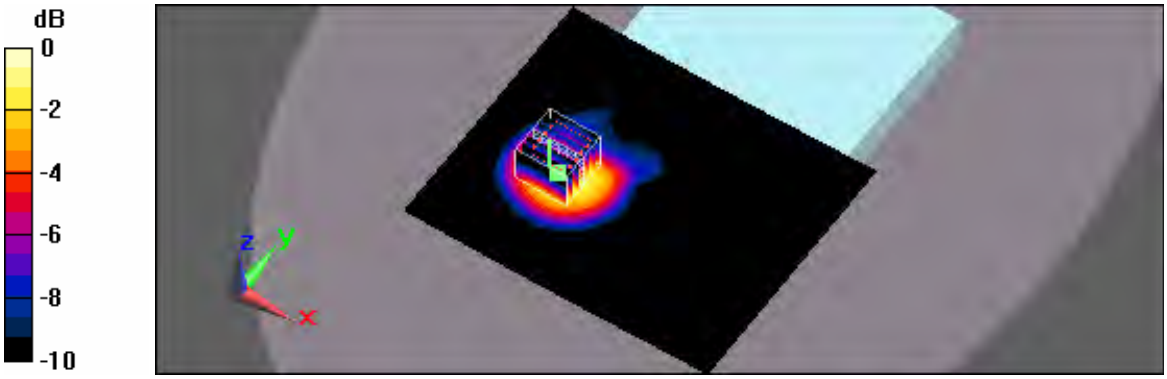
Communication System: HSUPA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.67 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.23 V/m; Power Drift = 0.157 dB
Peak SAR (extrapolated) = 1.99 W/kg
SAR(1 g) = 1.33 mW/g; SAR(10 g) = 0.805 mW/g
Maximum value of SAR (measured) = 1.57 mW/g



0 dB = 1.57mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 8:27:16 AM

Flat_HSUPA Band II CH9400_Edge Bottom to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

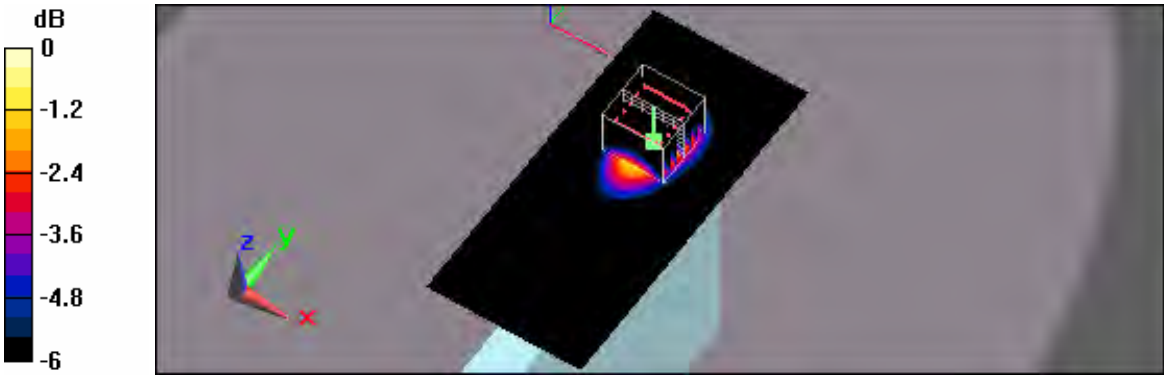
Communication System: HSUPA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.23 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 13.9 V/m; Power Drift = 0.00169 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.915 mW/g; SAR(10 g) = 0.518 mW/g
Maximum value of SAR (measured) = 1.11 mW/g



0 dB = 1.11mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 6:18:49 AM

Flat_HSUPA Band II CH9538_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

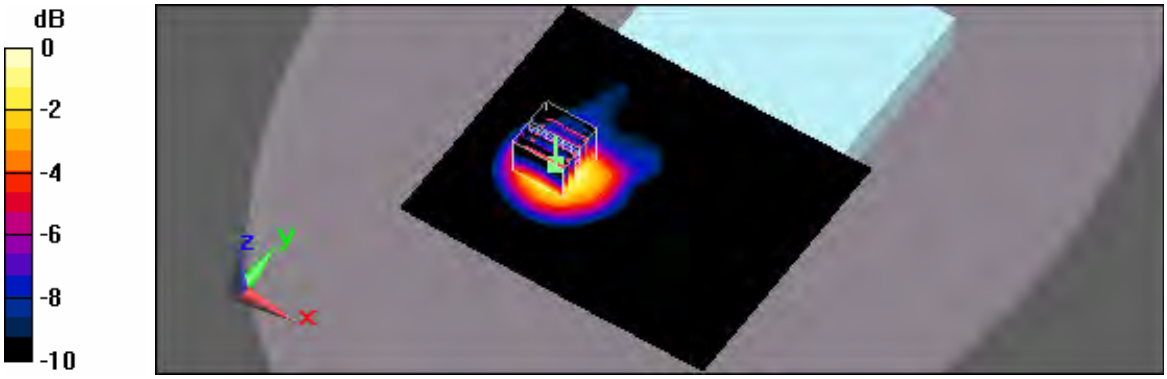
Communication System: HSUPA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.51 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.57 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.64 V/m; Power Drift = 0.101 dB
Peak SAR (extrapolated) = 1.89 W/kg
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.756 mW/g
Maximum value of SAR (measured) = 1.48 mW/g



0 dB = 1.48mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 9:17:45 AM

Flat_HSUPA Band II CH9538_Edge Bottom to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

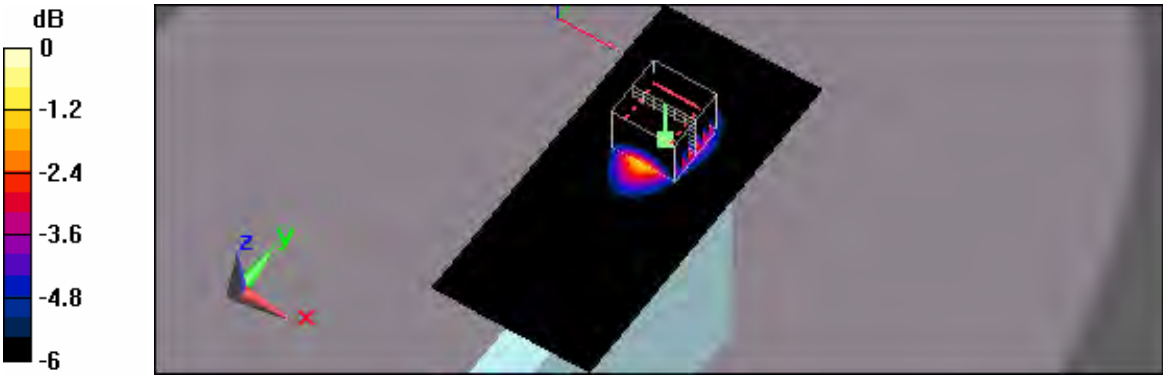
Communication System: HSUPA Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.51 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.785 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 9.81 V/m; Power Drift = 0.062 dB
Peak SAR (extrapolated) = 0.977 W/kg
SAR(1 g) = 0.603 mW/g; SAR(10 g) = 0.340 mW/g
Maximum value of SAR (measured) = 0.736 mW/g



0 dB = 0.736mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/20/2012 11:18:08 AM

Flat_HSPA+ Band II CH9262_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

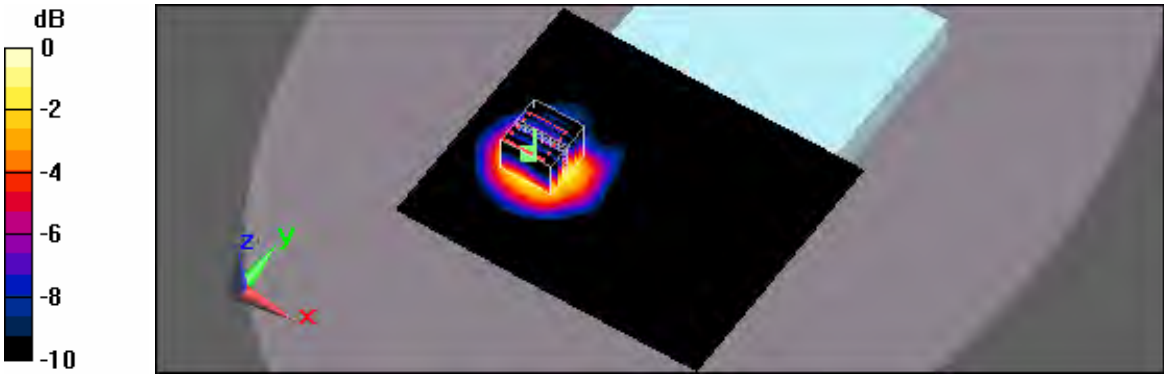
Communication System: HSPA+ Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.45 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.31 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.04 V/m; Power Drift = -0.162 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.989 mW/g; SAR(10 g) = 0.576 mW/g
Maximum value of SAR (measured) = 1.19 mW/g



0 dB = 1.19mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/20/2012 3:12:01 PM

Flat_HSPA+ Band II CH9262_Edge Bottom to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

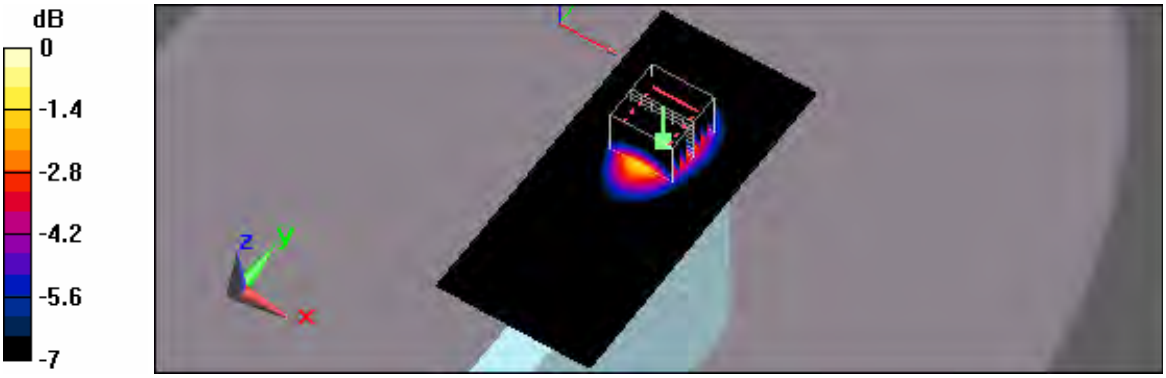
Communication System: HSPA+ Band II; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.45 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.962 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 11 V/m; Power Drift = 0.062 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.733 mW/g; SAR(10 g) = 0.404 mW/g
Maximum value of SAR (measured) = 0.902 mW/g



0 dB = 0.902mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/20/2012 1:47:02 PM

Flat_HSPA+ Band II CH9400_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

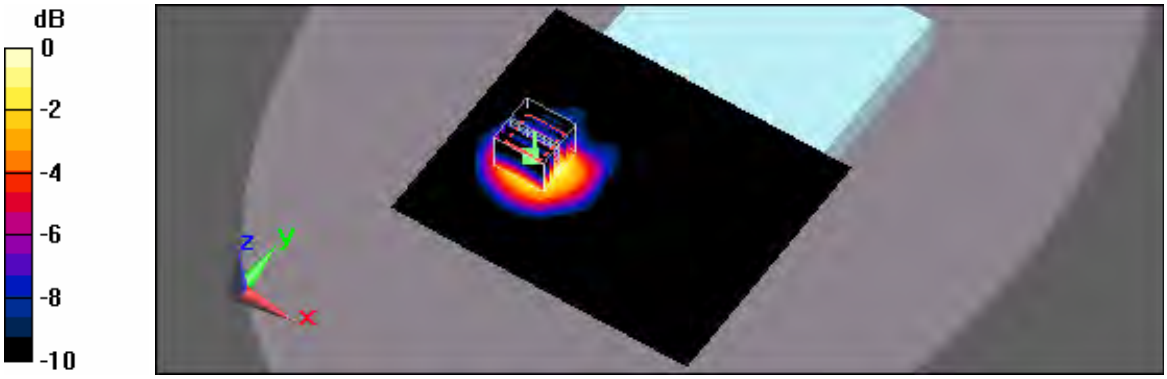
Communication System: HSPA+ Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.39 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.52 V/m; Power Drift = 0.161 dB
Peak SAR (extrapolated) = 1.78 W/kg
SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.661 mW/g
Maximum value of SAR (measured) = 1.36 mW/g



0 dB = 1.36mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/20/2012 2:23:20 PM

Flat_HSPA+ Band II CH9400_Edge Bottom to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

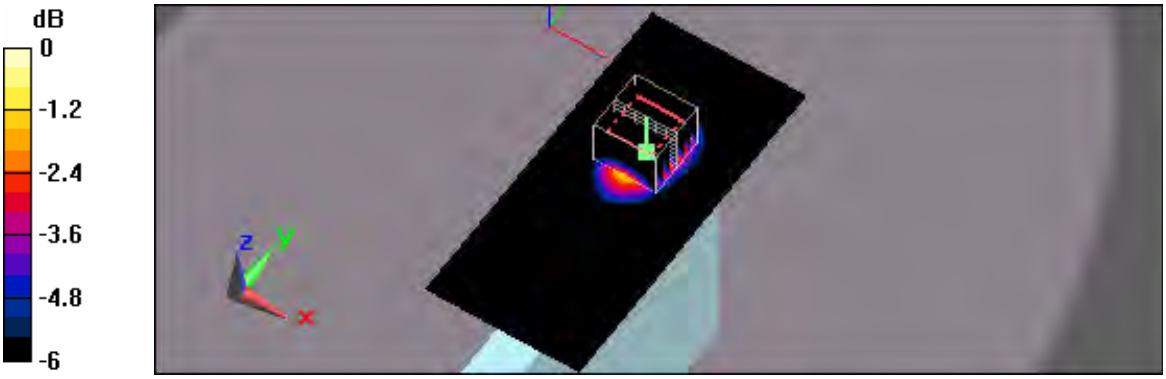
Communication System: HSPA+ Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.04 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 11.1 V/m; Power Drift = 0.032 dB
Peak SAR (extrapolated) = 1.34 W/kg
SAR(1 g) = 0.796 mW/g; SAR(10 g) = 0.435 mW/g
Maximum value of SAR (measured) = 0.987 mW/g



0 dB = 0.987mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/20/2012 4:08:41 PM

Flat_HSPA+ Band II CH9538_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

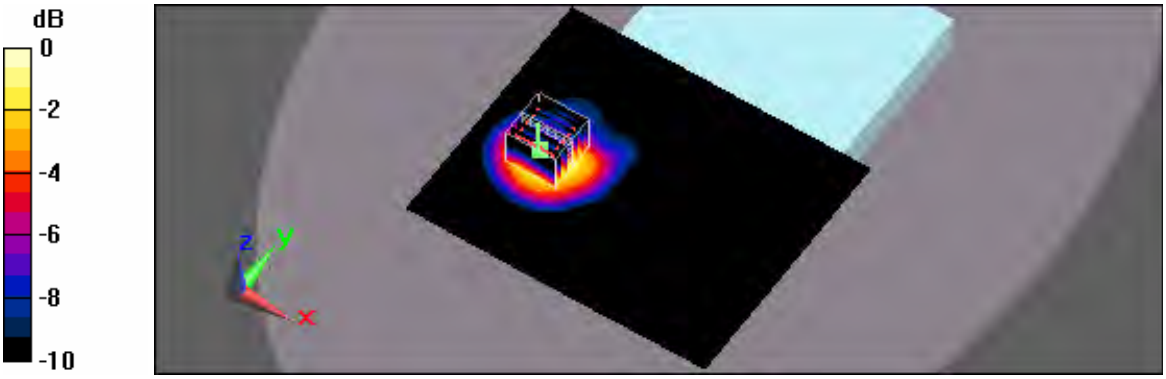
Communication System: HSPA+ Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.51 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.36 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 2.61 V/m; Power Drift = 0.038 dB
Peak SAR (extrapolated) = 1.66 W/kg
SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.616 mW/g
Maximum value of SAR (measured) = 1.28 mW/g



0 dB = 1.28mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/20/2012 3:38:09 PM

Flat_HSPA+ Band II CH9538_Edge Bottom to phantom 0mm_Sub-Test1

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

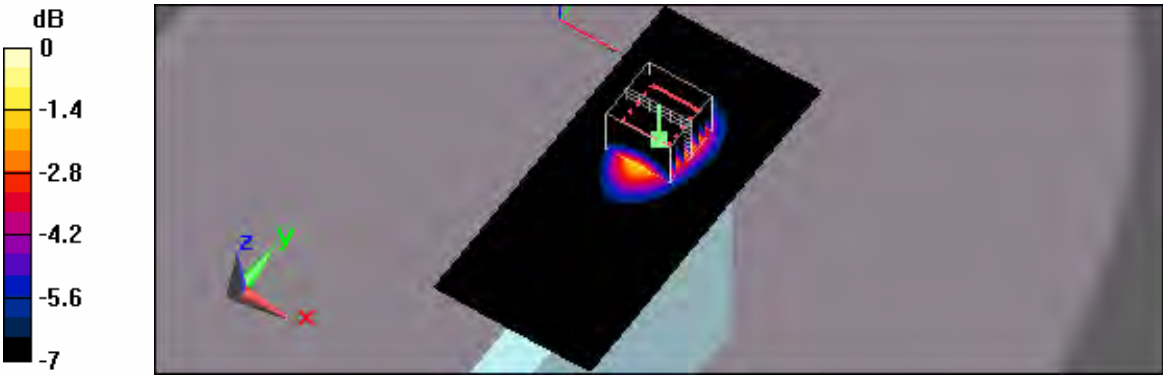
Communication System: HSPA+ Band II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.51 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.976 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 10.7 V/m; Power Drift = 0.021 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.734 mW/g; SAR(10 g) = 0.399 mW/g
Maximum value of SAR (measured) = 0.913 mW/g



0 dB = 0.913mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 11:57:03 AM

Flat_WCDMA Band V CH4183_Back Surface to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

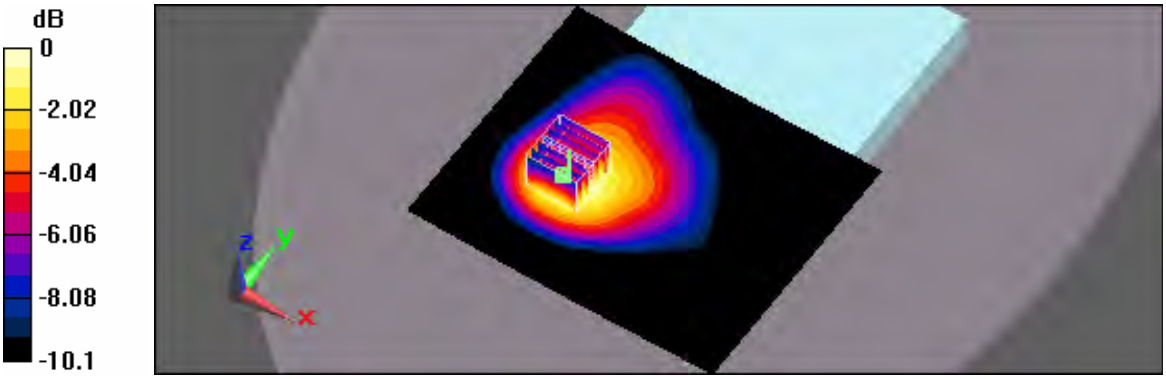
Communication System: WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.993 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(10.36, 10.36, 10.36); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.651 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 5.09 V/m; Power Drift = 0.192 dB
Peak SAR (extrapolated) = 0.766 W/kg
SAR(1 g) = 0.547 mW/g; SAR(10 g) = 0.372 mW/g
Maximum value of SAR (measured) = 0.634 mW/g



0 dB = 0.634mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 12:32:40 PM

Flat_WCDMA Band V CH4183_Edge Bottom to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

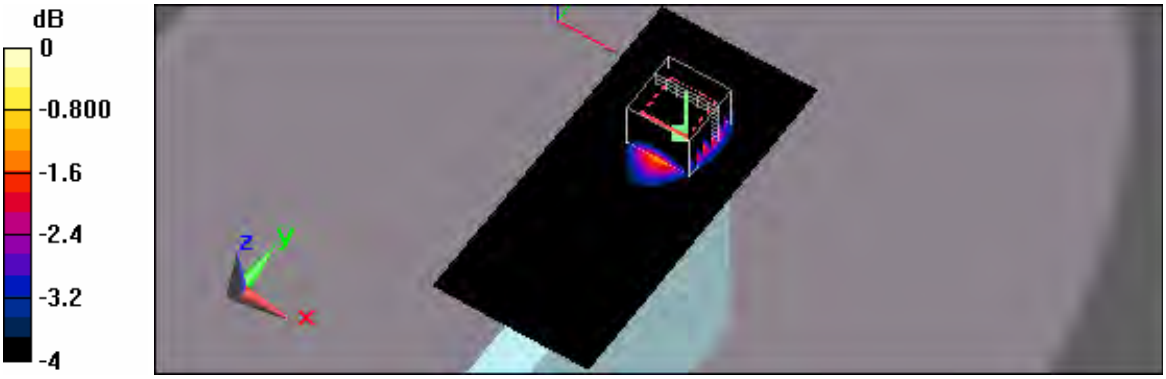
Communication System: WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.993 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(10.36, 10.36, 10.36); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.334 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 9.98 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 0.422 W/kg
SAR(1 g) = 0.278 mW/g; SAR(10 g) = 0.172 mW/g
Maximum value of SAR (measured) = 0.328 mW/g



0 dB = 0.328mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/3/2012 1:02:06 PM

Flat_WCDMA Band V CH4183_Edge Left to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

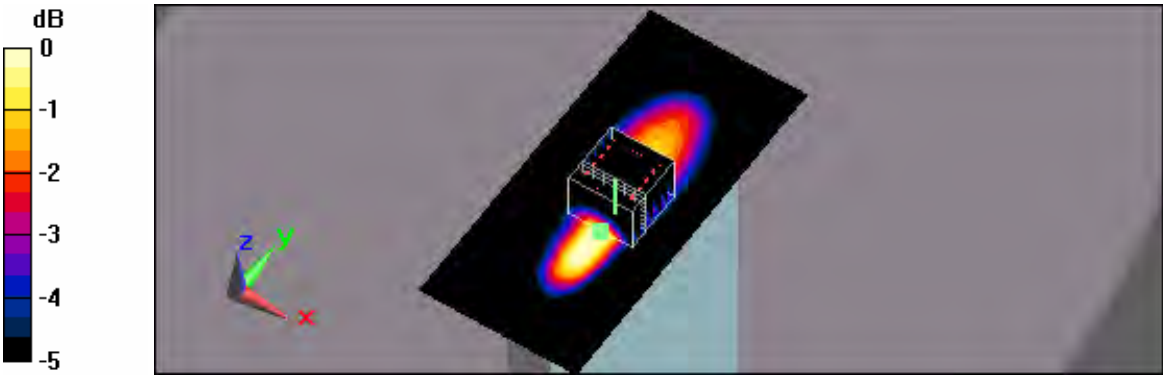
Communication System: WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.993 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(10.36, 10.36, 10.36); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.953 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 30 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.754 mW/g; SAR(10 g) = 0.468 mW/g
Maximum value of SAR (measured) = 0.917 mW/g



0 dB = 0.917mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/4/2012 9:43:43 PM

Flat_802.11b CH1_Edge Left to phantom 0mm_1M

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

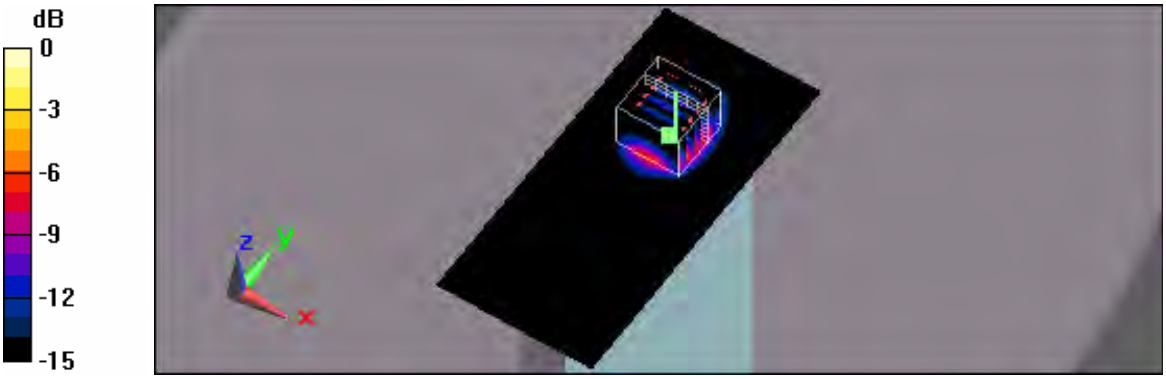
Communication System: IEEE 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.9 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.19 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.14 V/m; Power Drift = 0.143 dB
Peak SAR (extrapolated) = 3.09 W/kg
SAR(1 g) = 1.34 mW/g; SAR(10 g) = 0.544 mW/g
Maximum value of SAR (measured) = 1.81 mW/g



0 dB = 1.81mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/4/2012 11:45:15 PM

Flat_802.11b CH6_Back Surface to phantom 0mm_1M

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

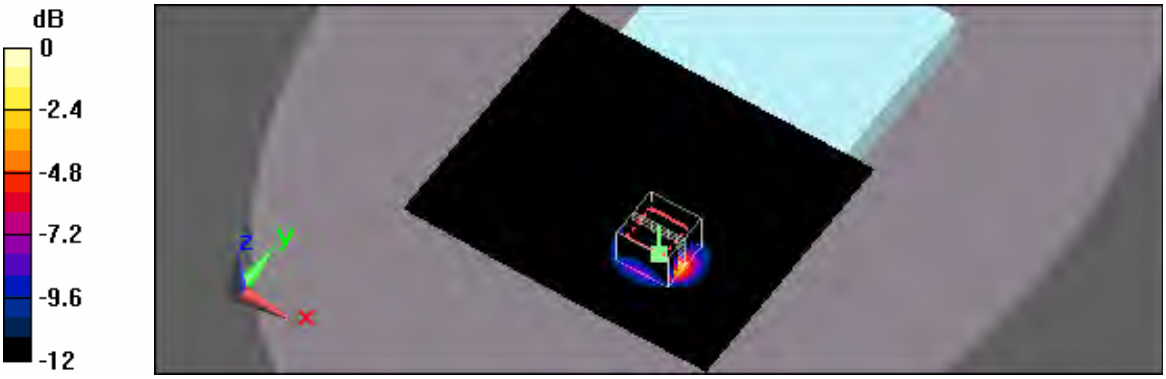
Communication System: IEEE 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.93 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.966 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 1.41 V/m; Power Drift = -0.00011 dB
Peak SAR (extrapolated) = 1.7 W/kg
SAR(1 g) = 0.752 mW/g; SAR(10 g) = 0.321 mW/g
Maximum value of SAR (measured) = 1.01 mW/g



0 dB = 1.01mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/4/2012 11:13:23 PM

Flat_802.11b CH6_Edge Top to phantom 0mm_1M

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

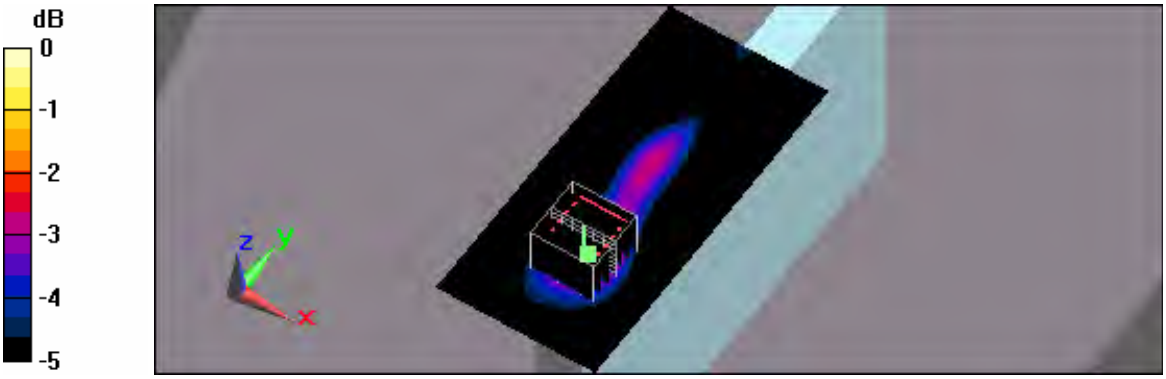
Communication System: IEEE 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.93 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.111 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.23 V/m; Power Drift = 0.109 dB
Peak SAR (extrapolated) = 0.212 W/kg
SAR(1 g) = 0.099 mW/g; SAR(10 g) = 0.048 mW/g
Maximum value of SAR (measured) = 0.127 mW/g



0 dB = 0.127mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/4/2012 9:16:55 PM

Flat_802.11b CH6_Edge Left to phantom 0mm_1M

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

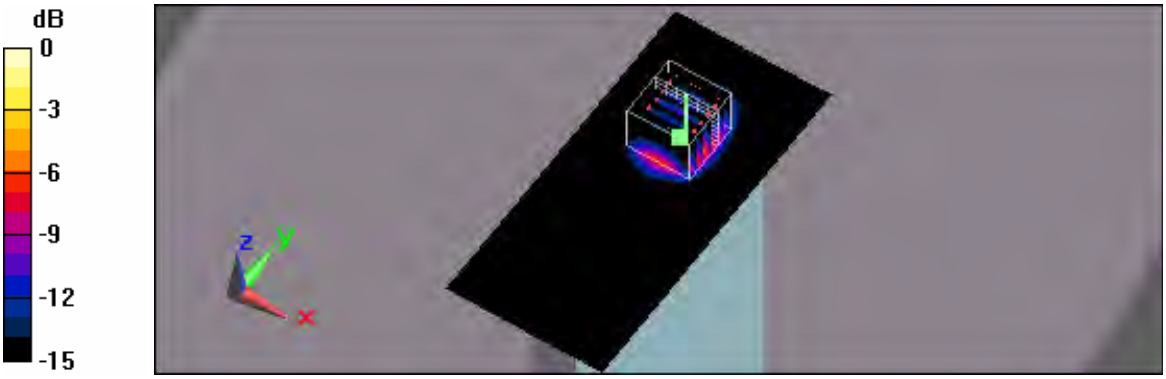
Communication System: IEEE 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.93 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.22 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.12 V/m; Power Drift = -0.052 dB
Peak SAR (extrapolated) = 3.29 W/kg
SAR(1 g) = 1.36 mW/g; SAR(10 g) = 0.547 mW/g
Maximum value of SAR (measured) = 1.88 mW/g



0 dB = 1.88mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/4/2012 10:10:01 PM

Flat_802.11b CH11_Edge Left to phantom 0mm_1M

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

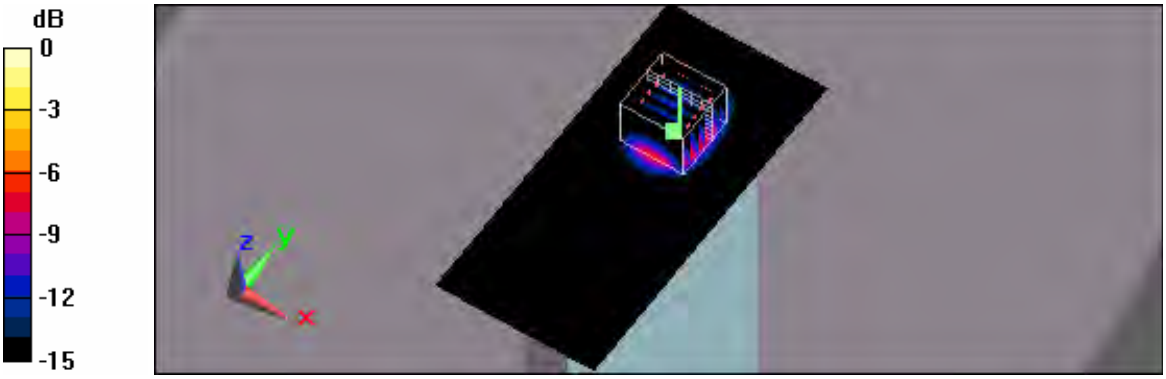
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.99 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.29 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 3.12 V/m; Power Drift = 0.00428 dB
Peak SAR (extrapolated) = 3.65 W/kg
SAR(1 g) = 1.46 mW/g; SAR(10 g) = 0.582 mW/g
Maximum value of SAR (measured) = 2.03 mW/g



0 dB = 2.03mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 7/5/2012 8:07:21 PM

Flat_BT CH39_Back Surface to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

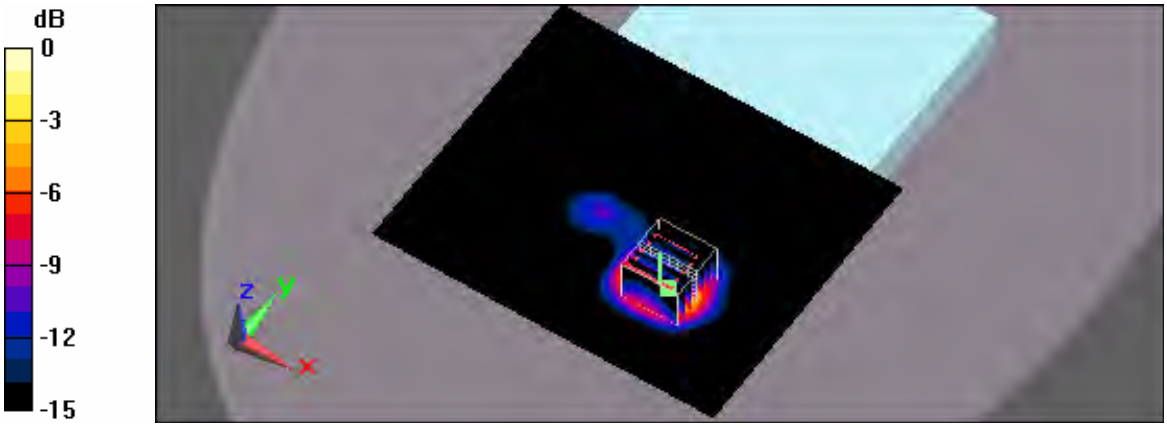
Communication System: Bluetooth; Frequency: 2441 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2441 MHz; σ = 1.94 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.133 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 0.725 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 0.224 W/kg
SAR(1 g) = 0.097 mW/g; SAR(10 g) = 0.042 mW/g
Maximum value of SAR (measured) = 0.130 mW/g



0 dB = 0.130mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 7/5/2012 8:45:08 PM

Flat_BT CH39_Edge Top to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

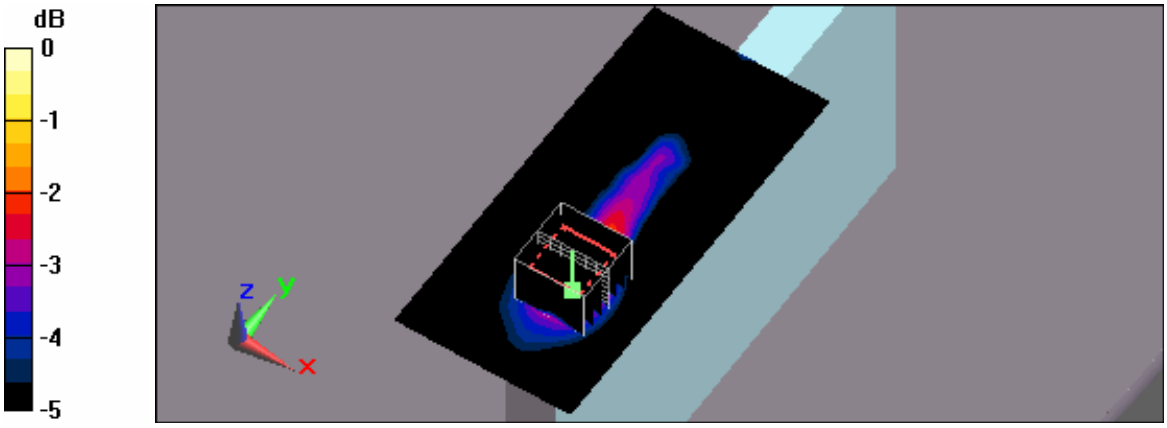
Communication System: Bluetooth; Frequency: 2441 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2441 MHz; σ = 1.94 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.013 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 1.52 V/m; Power Drift = -0.054 dB
Peak SAR (extrapolated) = 0.024 W/kg
SAR(1 g) = 0.011 mW/g; SAR(10 g) = 0.0052 mW/g
Maximum value of SAR (measured) = 0.014 mW/g



0 dB = 0.014mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 7/5/2012 7:13:43 PM

Flat_BT CH39_Edge Left to phantom 0mm

DUT: TF-RTC-700R-TA-WBG-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

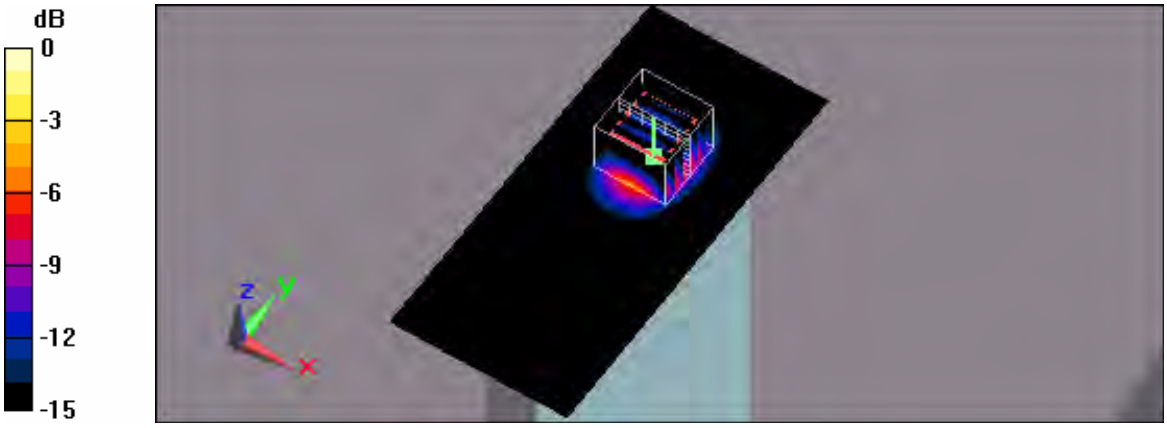
Communication System: Bluetooth; Frequency: 2441 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2441 MHz; σ = 1.94 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.271 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 1.41 V/m; Power Drift = 0.063 dB
Peak SAR (extrapolated) = 0.384 W/kg
SAR(1 g) = 0.12 mW/g; SAR(10 g) = 0.064 mW/g
Maximum value of SAR (measured) = 0.221 mW/g



0 dB = 0.221mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/25/2012 2:17:06 PM

Flat_WCDMA Band II CH9400_Back Surface to phantom 0mm

DUT: TF-RTC-700A-TA-WBGH-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

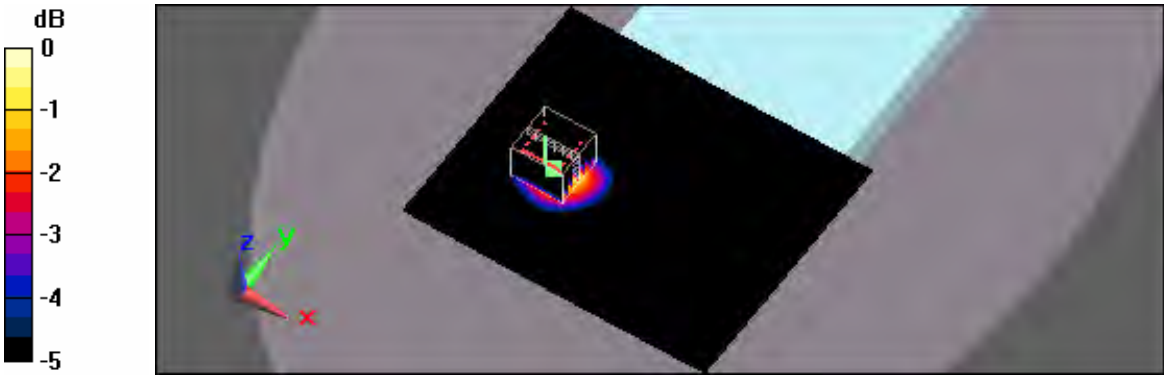
Communication System: WCDMA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.83 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.48 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 2.32 W/kg
SAR(1 g) = 1.49 mW/g; SAR(10 g) = 0.877 mW/g
Maximum value of SAR (measured) = 1.76 mW/g



0 dB = 1.76mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/25/2012 4:54:28 PM

Flat_WCDMA Band V CH4183_Edge Left to phantom 0mm

DUT: TF-RTC-700A-TA-WBGH-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

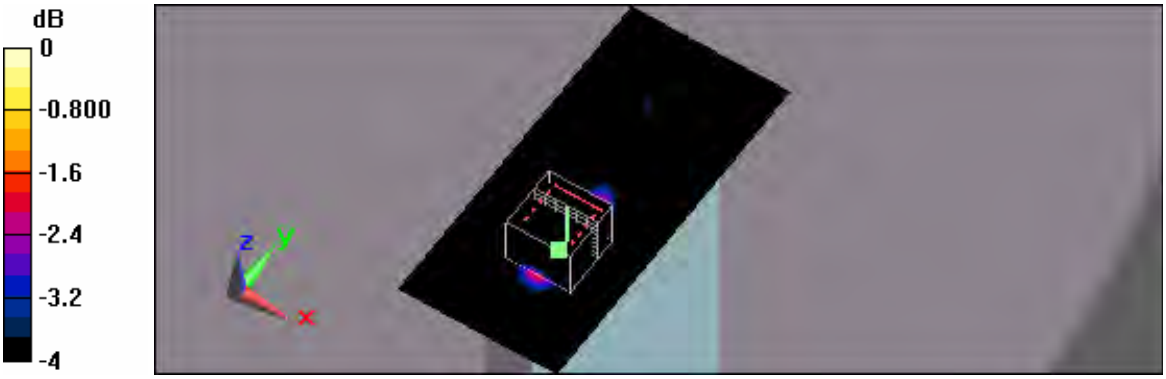
Communication System: WCDMA Band V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 837 MHz; σ = 0.993 mho/m; ε_r = 55.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(10.36, 10.36, 10.36); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.730 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 19.9 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.582 mW/g; SAR(10 g) = 0.315 mW/g
Maximum value of SAR (measured) = 0.739 mW/g



0 dB = 0.739mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/25/2012 6:51:53 PM

Flat_HSDPA Band II CH9400_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700A-TA-WBGH-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

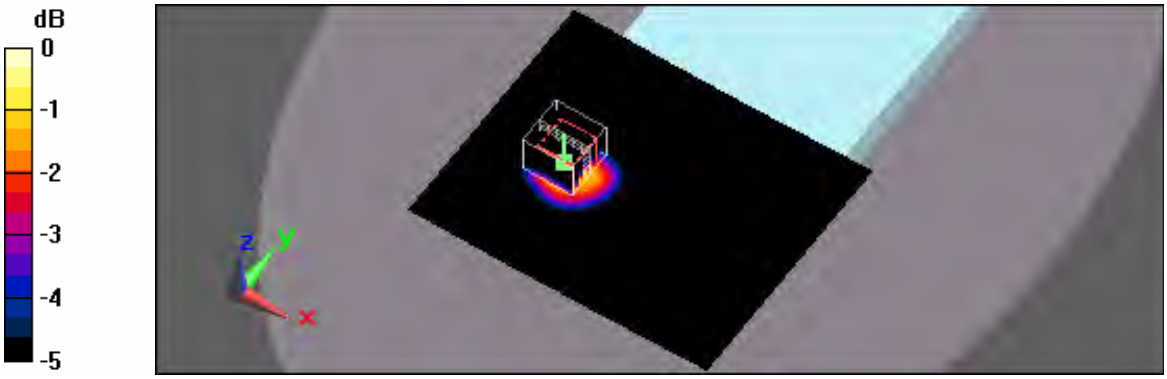
Communication System: HSDPA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.51 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.73 V/m; Power Drift = 0.103 dB
Peak SAR (extrapolated) = 1.88 W/kg
SAR(1 g) = 1.24 mW/g; SAR(10 g) = 0.739 mW/g
Maximum value of SAR (measured) = 1.47 mW/g



0 dB = 1.47mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/25/2012 8:27:53 PM

Flat_HSUPA Band II CH9400_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700A-TA-WBGH-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

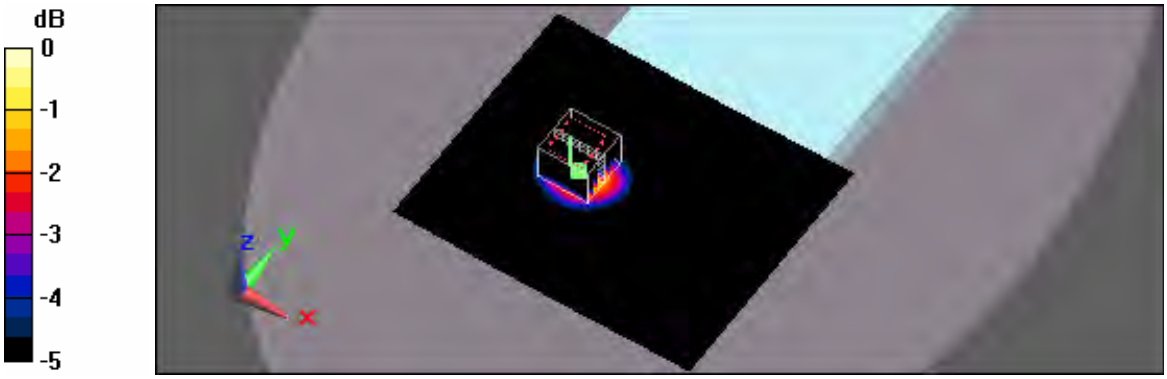
Communication System: HSUPA Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.36 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 6.44 V/m; Power Drift = 0.074 dB
Peak SAR (extrapolated) = 1.71 W/kg
SAR(1 g) = 1.13 mW/g; SAR(10 g) = 0.670 mW/g
Maximum value of SAR (measured) = 1.35 mW/g



0 dB = 1.35mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 6/26/2012 12:28:43 AM

Flat_HSPA+ Band II CH9400_Back Surface to phantom 0mm_Sub-Test1

DUT: TF-RTC-700A-TA-WBGH-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

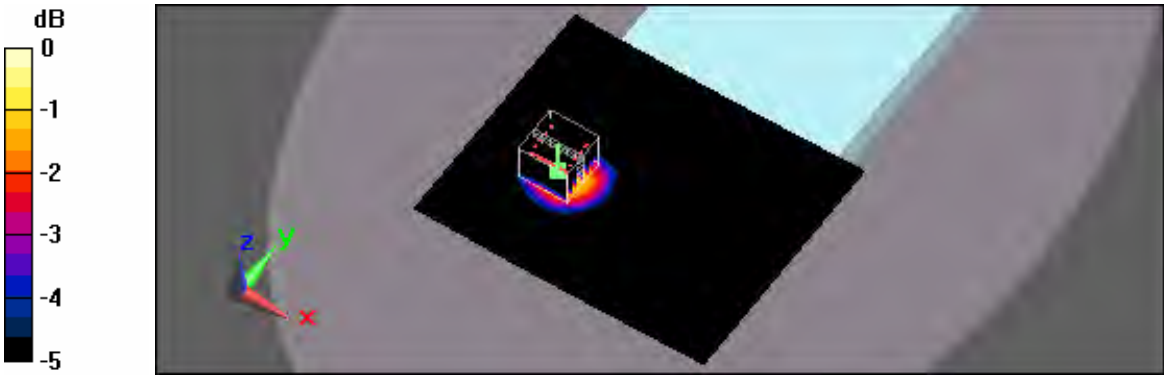
Communication System: HSPA+ Band II; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(9.04, 9.04, 9.04); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (121x101x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.05 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.39 V/m; Power Drift = -0.00515 dB
Peak SAR (extrapolated) = 1.31 W/kg
SAR(1 g) = 0.852 mW/g; SAR(10 g) = 0.508 mW/g
Maximum value of SAR (measured) = 1.02 mW/g



0 dB = 1.02mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 7/5/2012 3:03:06 PM

Flat_802.11b CH11_Edge Left to phantom 0mm_1M

DUT: TF-RTC-700A-TA-WBGH-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

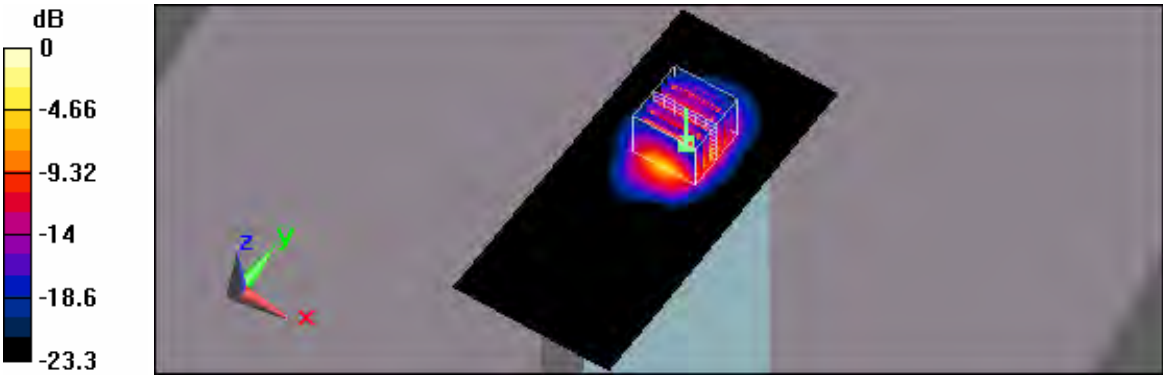
Communication System: IEEE 802.11b; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.99 mho/m; ε_r = 52; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.33 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 4.69 V/m; Power Drift = 0.106 dB
Peak SAR (extrapolated) = 2.83 W/kg
SAR(1 g) = 1.24 mW/g; SAR(10 g) = 0.496 mW/g
Maximum value of SAR (measured) = 1.73 mW/g



0 dB = 1.73mW/g

Test Laboratory: A Test Lab Techno Corp.
Date/Time: 7/5/2012 4:01:51 PM

Flat_BT CH39_Edge Left to phantom 0mm

DUT: TF-RTC-700A-TA-WBGH-1110; Type: Rugged Tablet Computer; FCC ID: OHBRTC700RAWBGH

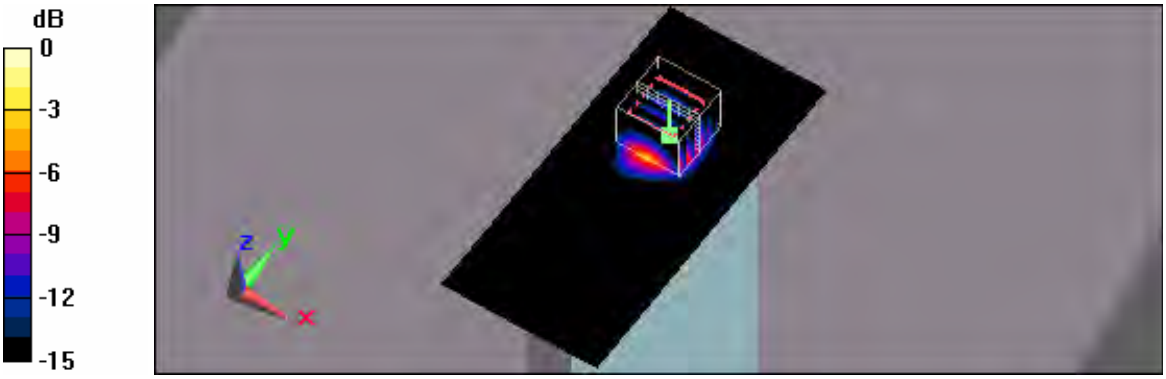
Communication System: Bluetooth; Frequency: 2441 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2441 MHz; σ = 1.94 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC)

DASY5 Configuration:

- Area Scan setting - Find Secondary Maximum Within:2.0dB and with a peak SAR value greater than 0.5 W/Kg
- Probe: EX3DV3 - SN3519; ConvF(8.22, 8.22, 8.22); Calibrated: 2/21/2012
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn779; Calibrated: 1/23/2012
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:1133
- Measurement SW: DASY5, V5.0 Build 125;SEMCAD X Version 13.4 Build 125

Flat/Area Scan (51x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.254 mW/g

Flat/Zoom Scan (7x7x9)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=3mm
Reference Value = 1.33 V/m; Power Drift = -0.090 dB
Peak SAR (extrapolated) = 0.361 W/kg
SAR(1 g) = 0.111 mW/g; SAR(10 g) = 0.063 mW/g
Maximum value of SAR (measured) = 0.218 mW/g



0 dB = 0.218mW/g

Appendix C - Calibration

All of the instruments Calibration information are listed below.

- Dipole _ D835V2 SN:4d082 Calibration No.D835V2-4d082_Jul11
- Dipole _ D1900V2 SN:5d111 Calibration No.D1900V2-5d111_Jul11
- Dipole _ D2450V2 SN:712 Calibration No.D2450V2-712_Feb12
- Probe _ EX3DV3 SN:3519 Calibration No.EX3-3519_Feb12
- DAE _ DAE4 SN:779 Calibration No.DAE4-779_Jan12

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client ATL (Auden)

Certificate No: D835V2-4d082_Jul11

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d082
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 19, 2011

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 19, 2011

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.0 ± 6 %	0.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.28 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.25 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.50 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.07 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.8 ± 6 %	0.98 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.39 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.43 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.57 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.22 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.4 Ω - 7.0 jΩ
Return Loss	- 23.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.1 Ω - 8.8 jΩ
Return Loss	- 20.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.389 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 17, 2008

DASY5 Validation Report for Head TSL

Date: 18.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

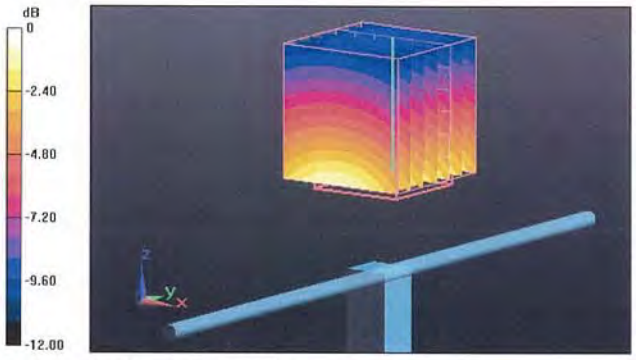
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.88 mho/m; ε_r = 41; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

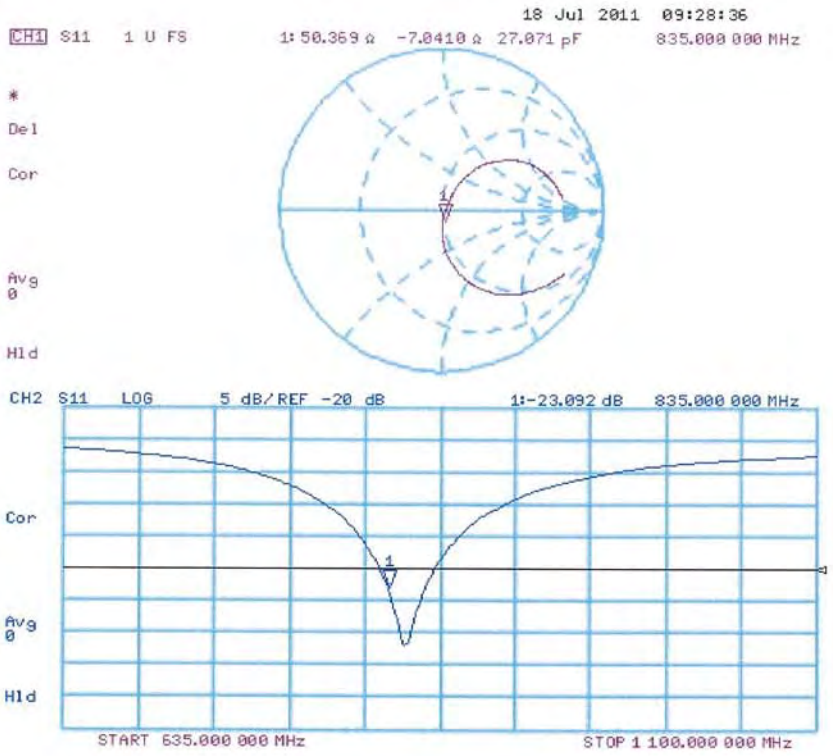
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.745 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.357 W/kg
SAR(1 g) = 2.28 mW/g; SAR(10 g) = 1.5 mW/g
Maximum value of SAR (measured) = 2.657 mW/g



0 dB = 2.660mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 19.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

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

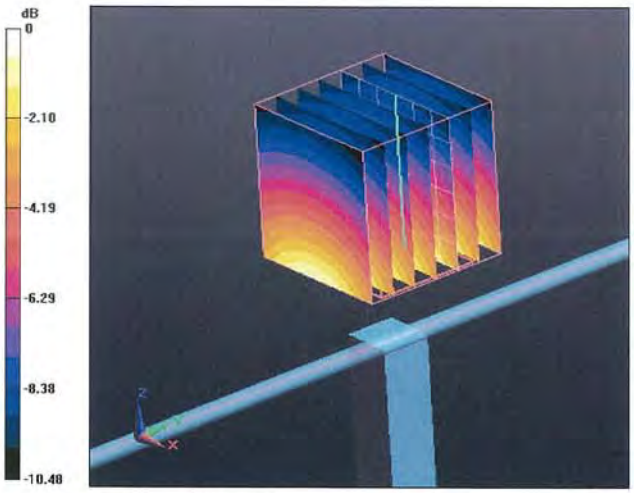
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.98 mho/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

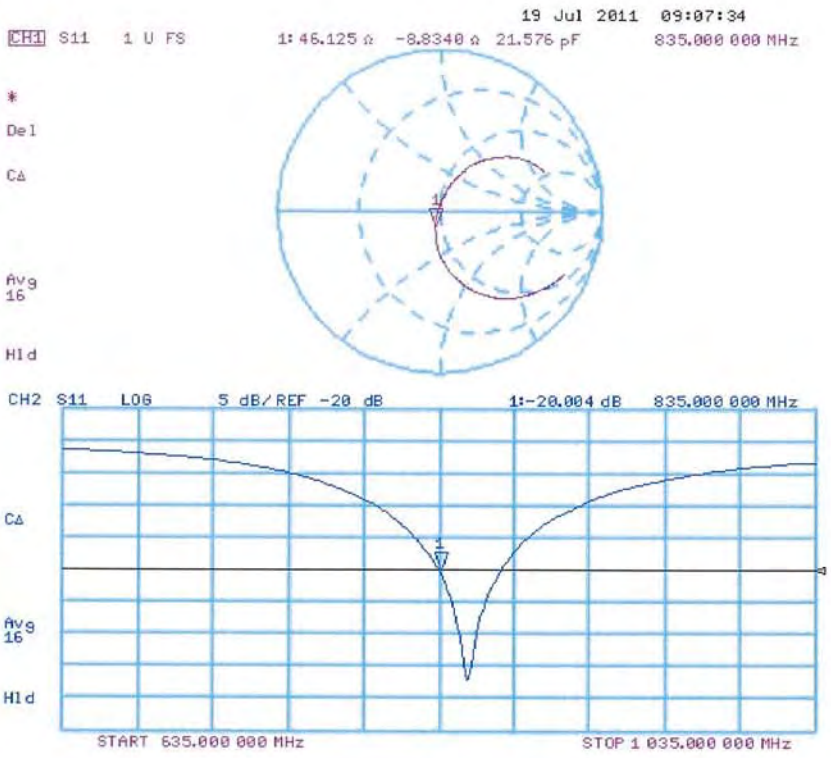
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.883 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 3.464 W/kg
SAR(1 g) = 2.39 mW/g; SAR(10 g) = 1.57 mW/g
Maximum value of SAR (measured) = 2.762 mW/g



0 dB = 2.760mW/g

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **ATL (Auden)**

Certificate No: **D1900V2-5d111_Jul11**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d111
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 22, 2011

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Dimce Iliev	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 22, 2011

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.1 ± 6 %	1.42 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.9 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.25 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.8 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.3 ± 6 %	1.53 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**40.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.39 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.3 Ω + 6.7 jΩ
Return Loss	- 23.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.9 Ω + 6.6 jΩ
Return Loss	- 21.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.201 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 28, 2008

DASY5 Validation Report for Head TSL

Date: 20.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d111

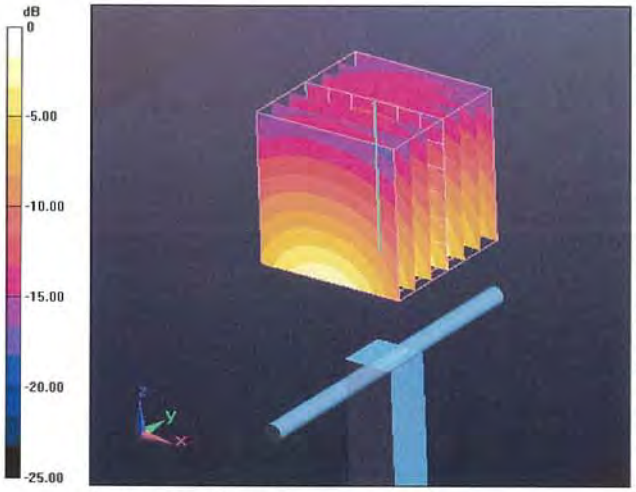
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

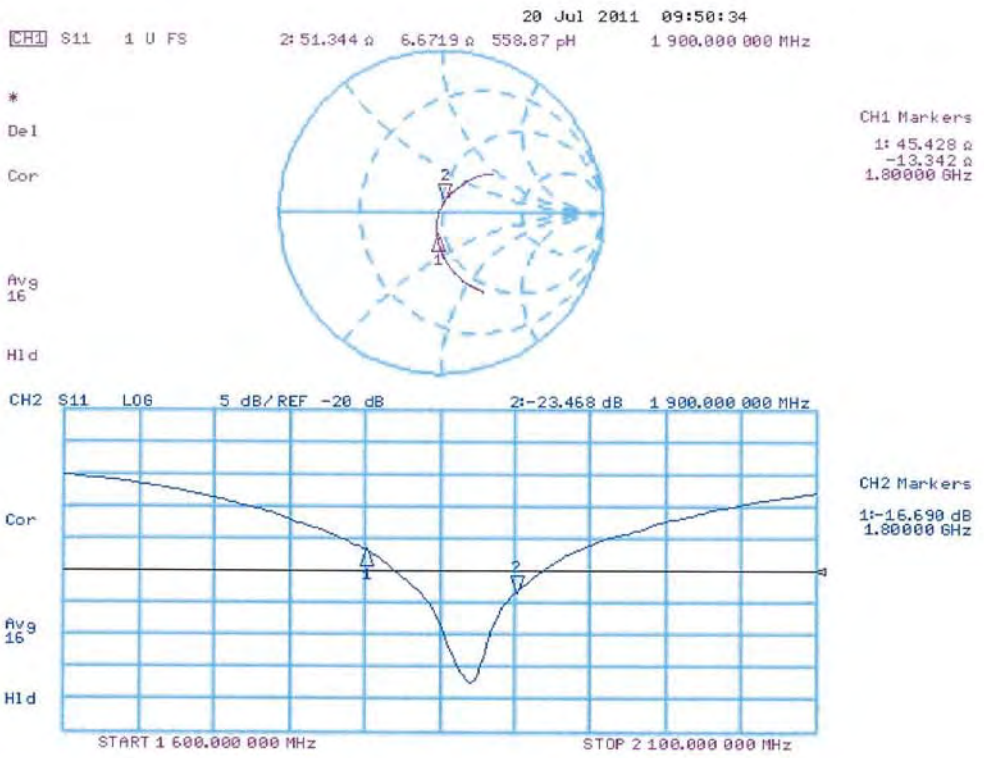
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.068 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 18.391 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.25 mW/g
Maximum value of SAR (measured) = 12.667 mW/g



0 dB = 12.670mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 22.07.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d111

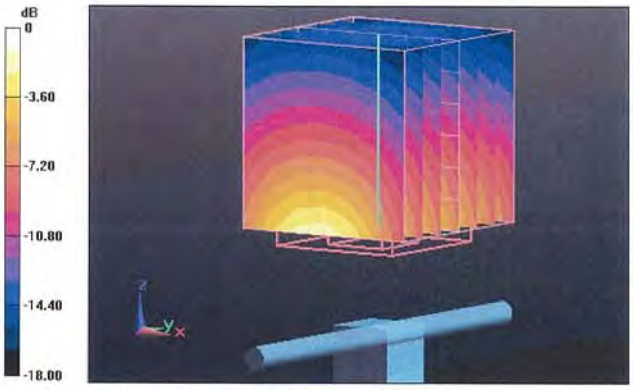
Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

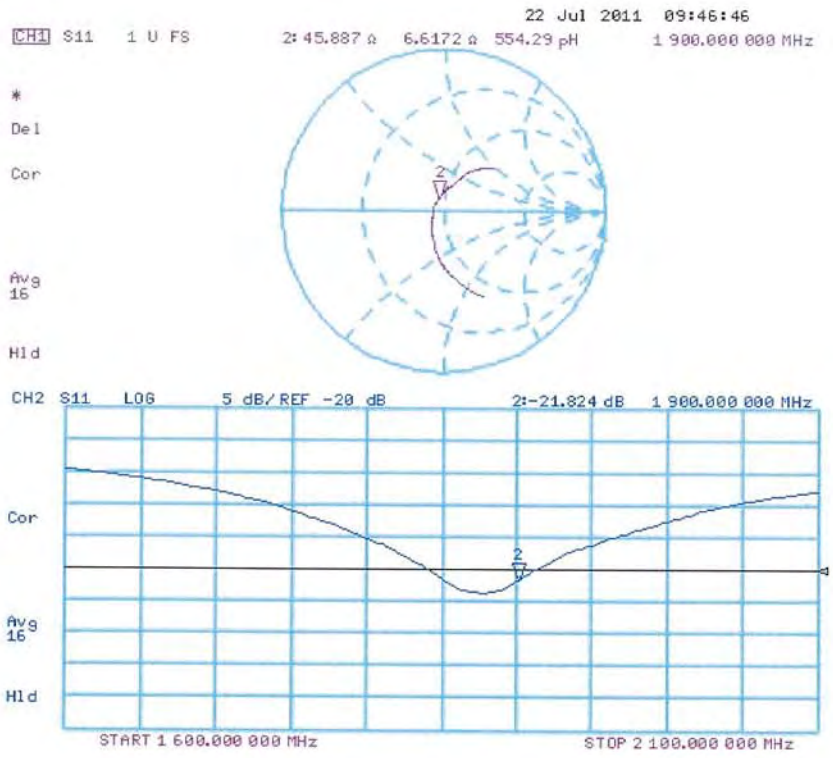
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.720 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 18.122 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.39 mW/g
Maximum value of SAR (measured) = 12.882 mW/g



0 dB = 12.880mW/g

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client ATL (Auden)

Certificate No: D2450V2-712_Feb12

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 712
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	February 23, 2012

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	04-Jul-11 (No. DAE4-601_Jul11)	Jul-12

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	i.V.
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 23, 2012

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.9 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**53.5 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.26 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**24.8 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.3 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.7 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**49.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.95 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**23.6 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	55.0 Ω + 2.5 jΩ
Return Loss	- 25.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	51.7 Ω + 4.9 jΩ
Return Loss	- 25.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.144 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 05, 2002

DASY5 Validation Report for Head TSL

Date: 23.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

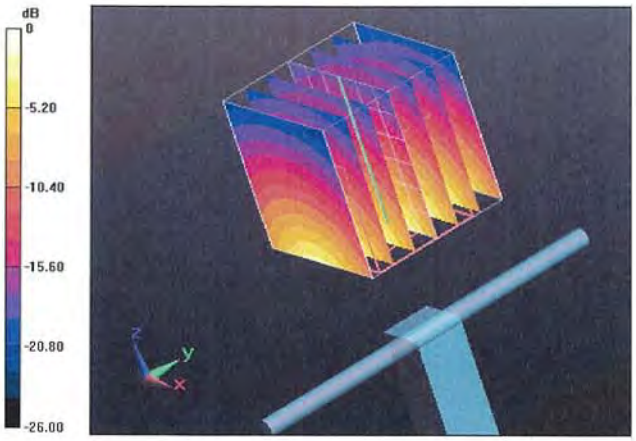
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 mho/m; ε_r = 38.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

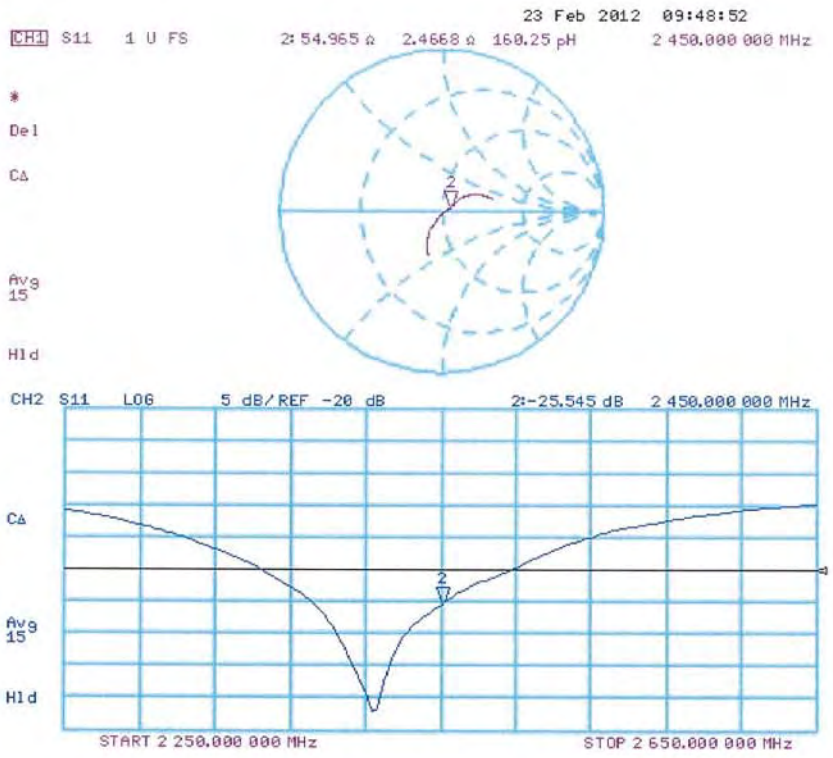
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.1 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 28.3820
SAR(1 g) = 13.6 mW/g; SAR(10 g) = 6.26 mW/g
Maximum value of SAR (measured) = 17.534 mW/g



0 dB = 17.530mW/g = 24.88 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 23.02.2012

Test Laboratory: SPEAG, Zurich, Switzerland

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

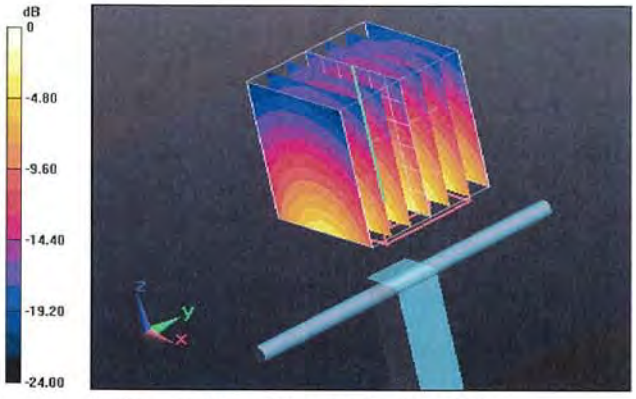
Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.02 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.0(692); SEMCAD X 14.6.4(4989)

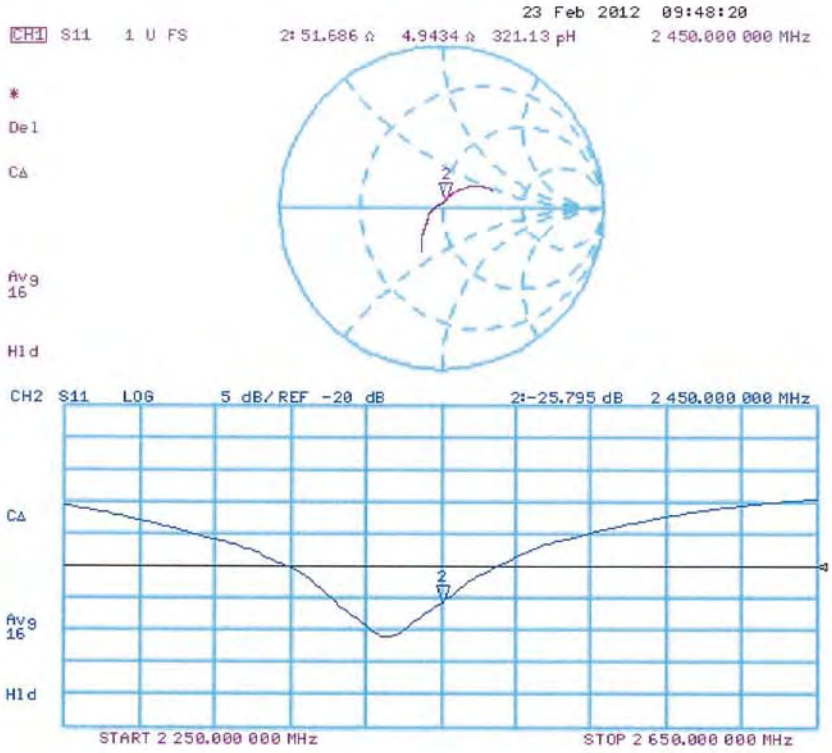
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.094 V/m; Power Drift = 0.0032 dB
Peak SAR (extrapolated) = 26.0450
SAR(1 g) = 12.7 mW/g; SAR(10 g) = 5.95 mW/g
Maximum value of SAR (measured) = 16.700 mW/g



0 dB = 16.700mW/g = 24.45 dB mW/g

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client ATL (Auden)

Certificate No: EX3-3519_Feb12

CALIBRATION CERTIFICATE

Object	EX3DV3 - SN:3519
Calibration procedure(s)	QA CAL-01.v8, QA CAL-12.v7, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4 Calibration procedure for dosimetric E-field probes
Calibration date:	February 21, 2012

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 21, 2012

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe EX3DV3

SN:3519

Manufactured: March 8, 2004
Calibrated: February 21, 2012

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV3 - SN:3519

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.81	0.70	0.72	± 10.1 %
DCP (mV)[B]	102.5	100.6	101.7	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	120.7	±1.9 %
			Y	0.00	0.00	1.00	136.5	
			Z	0.00	0.00	1.00	108.9	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV3 - SN:3519

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	43.5	0.87	10.74	10.74	10.74	0.10	1.00	± 13.4 %
750	41.9	0.89	10.59	10.59	10.59	0.22	1.15	± 12.0 %
835	41.5	0.90	10.13	10.13	10.13	0.21	1.25	± 12.0 %
900	41.5	0.97	9.99	9.99	9.99	0.31	0.93	± 12.0 %
1750	40.1	1.37	9.40	9.40	9.40	0.64	0.63	± 12.0 %
1810	40.0	1.40	9.17	9.17	9.17	0.52	0.76	± 12.0 %
1900	40.0	1.40	9.04	9.04	9.04	0.35	0.85	± 12.0 %
2000	40.0	1.40	8.93	8.93	8.93	0.46	0.76	± 12.0 %
2450	39.2	1.80	7.82	7.82	7.82	0.36	0.83	± 12.0 %
5200	36.0	4.66	5.06	5.06	5.06	0.35	1.80	± 13.1 %
5300	35.9	4.76	4.82	4.82	4.82	0.38	1.80	± 13.1 %
5500	35.6	4.96	4.67	4.67	4.67	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.36	4.36	4.36	0.45	1.80	± 13.1 %
5800	35.3	5.27	4.31	4.31	4.31	0.42	1.80	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

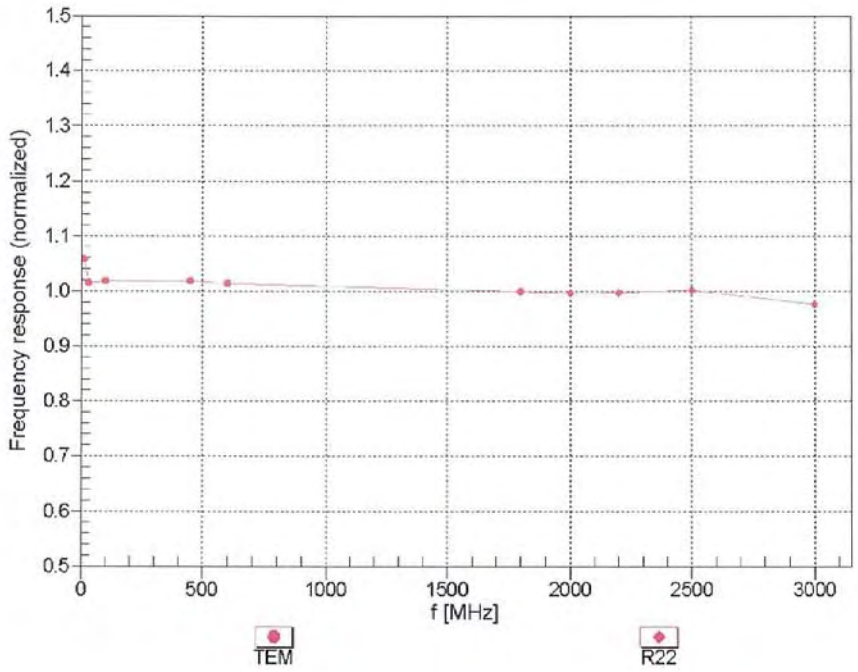
DASY/EASY - Parameters of Probe: EX3DV3 - SN:3519

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
450	56.7	0.94	11.71	11.71	11.71	0.02	1.00	± 13.4 %
750	55.5	0.96	10.53	10.53	10.53	0.18	1.49	± 12.0 %
835	55.2	0.97	10.36	10.36	10.36	0.23	1.22	± 12.0 %
900	55.0	1.05	10.27	10.27	10.27	0.21	1.34	± 12.0 %
1750	53.4	1.49	9.70	9.70	9.70	0.41	0.92	± 12.0 %
1810	53.3	1.52	9.41	9.41	9.41	0.32	0.96	± 12.0 %
1900	53.3	1.52	9.04	9.04	9.04	0.37	0.91	± 12.0 %
2000	53.3	1.52	9.06	9.06	9.06	0.44	0.80	± 12.0 %
2300	52.9	1.81	8.56	8.56	8.56	0.39	0.84	± 12.0 %
2450	52.7	1.95	8.22	8.22	8.22	0.76	0.54	± 12.0 %
2600	52.5	2.16	7.82	7.82	7.82	0.80	0.50	± 12.0 %
3500	51.3	3.31	7.01	7.01	7.01	0.37	1.18	± 13.1 %
5200	49.0	5.30	4.38	4.38	4.38	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.13	4.13	4.13	0.55	1.90	± 13.1 %
5500	48.6	5.65	3.92	3.92	3.92	0.55	1.90	± 13.1 %
5600	48.5	5.77	3.61	3.61	3.61	0.60	1.90	± 13.1 %
5800	48.2	6.00	3.88	3.88	3.88	0.60	1.90	± 13.1 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

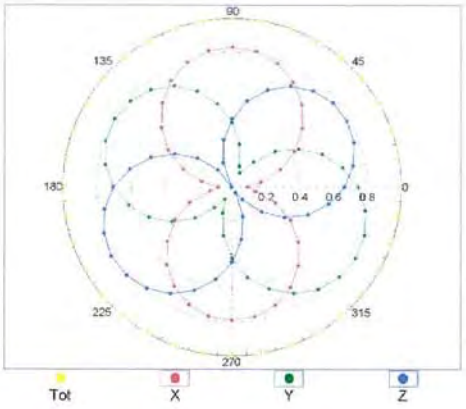
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



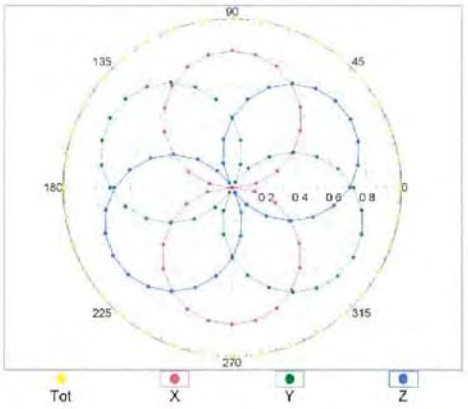
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

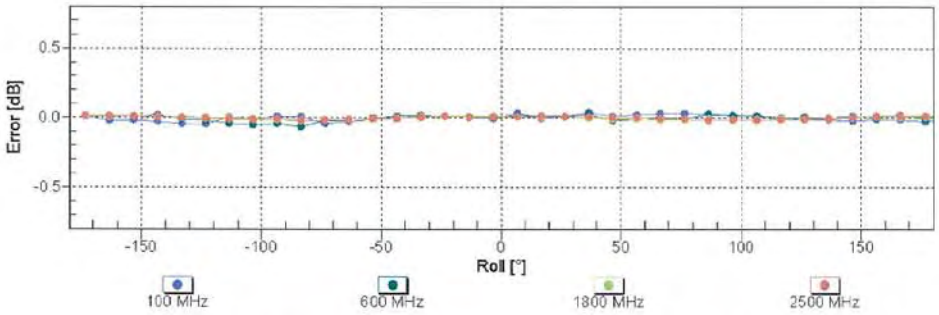
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



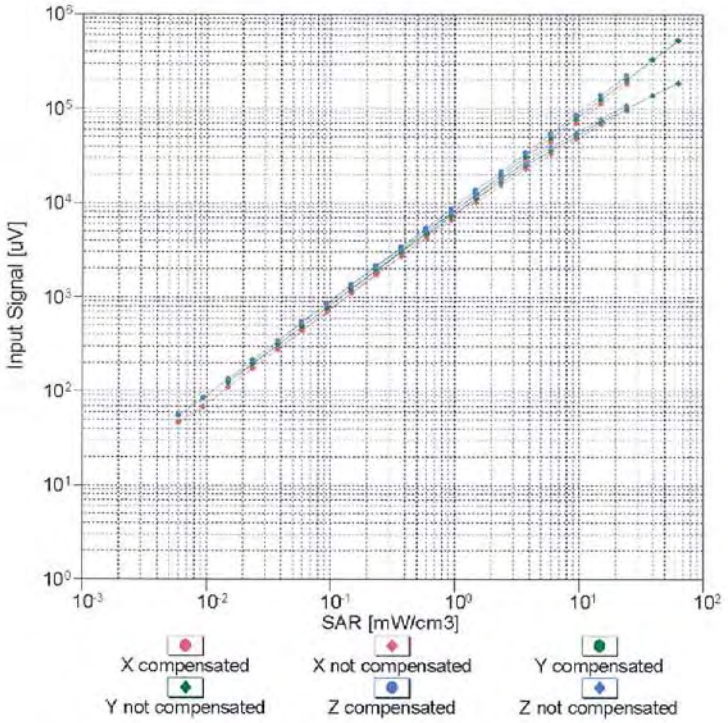
f=1800 MHz,R22

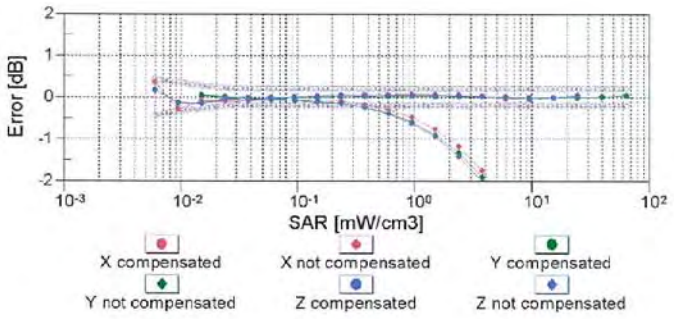




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f = 900 MHz)

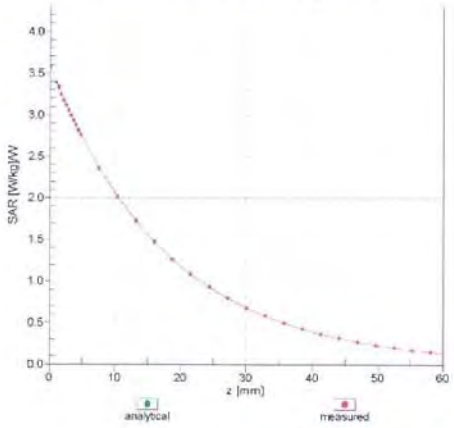




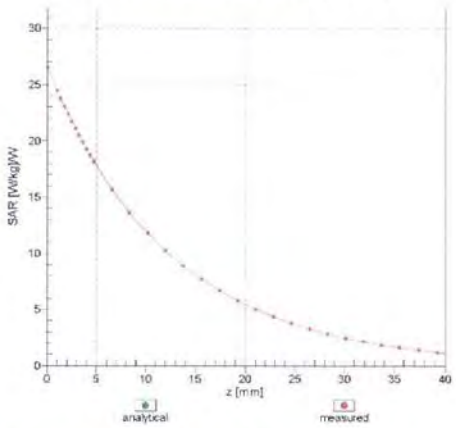
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

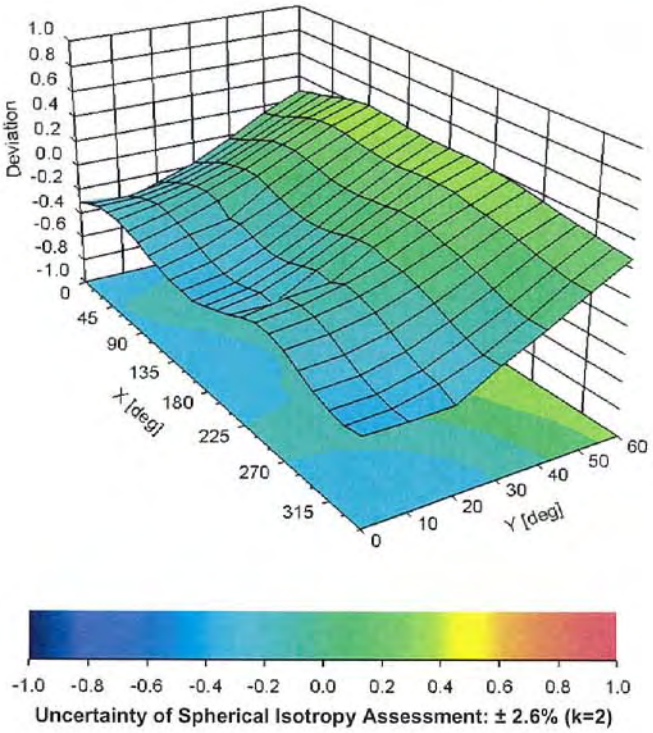


f = 1810 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV3 - SN:3519

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client ATL (Auden)

Certificate No: DAE4-779_Jan12

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 779
Calibration procedure(s)	QA CAL-06.v24 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	January 23, 2012

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-11 (No:11450)	Sep-12
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V2.1	SE UWS 053 AA 1001	05-Jan-12 (in house check)	In house check: Jan-13

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Technician	
Approved by:	Fin Bomholt	R&D Director	

Issued: January 23, 2012

Glossary

DAE	data acquisition electronics
Connector angle	information used in DASY system to align probe sensor X to the robot coordinate system.

Methods Applied and Interpretation of Parameters

- *DC Voltage Measurement:* Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The following parameters as documented in the Appendix contain technical information as a result from the performance test and require no uncertainty.
  - *DC Voltage Measurement Linearity:* Verification of the Linearity at +10% and -10% of the nominal calibration voltage. Influence of offset voltage is included in this measurement.
  - *Common mode sensitivity:* Influence of a positive or negative common mode voltage on the differential measurement.
  - *Channel separation:* Influence of a voltage on the neighbor channels not subject to an input voltage.
  - *AD Converter Values with inputs shorted:* Values on the internal AD converter corresponding to zero input voltage
  - *Input Offset Measurement*: Output voltage and statistical results over a large number of zero voltage measurements.
  - *Input Offset Current:* Typical value for information; Maximum channel input offset current, not considering the input resistance.
  - *Input resistance:* Typical value for information: DAE input resistance at the connector, during internal auto-zeroing and during measurement.
  - *Low Battery Alarm Voltage:* Typical value for information. Below this voltage, a battery alarm signal is generated.
  - *Power consumption:* Typical value for information. Supply currents in various operating modes.

DC Voltage Measurement

A/D - Converter Resolution nominal

High Range:	1LSB =	6.1μV ,	full range =	-100...+300 mV
Low Range:	1LSB =	61nV ,	full range =	-1.....+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

Calibration Factors	X	Y	Z
High Range	404.578 ± 0.1% (k=2)	403.737 ± 0.1% (k=2)	403.961 ± 0.1% (k=2)
Low Range	3.96952 ± 0.7% (k=2)	3.97827 ± 0.7% (k=2)	3.99341 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	156.5 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	199992.36	-2.42	-0.00
Channel X	+ Input	20002.90	2.80	0.01
Channel X	- Input	-19995.39	5.40	-0.03
Channel Y	+ Input	199995.92	1.48	0.00
Channel Y	+ Input	20002.78	2.85	0.01
Channel Y	- Input	-19998.45	2.56	-0.01
Channel Z	+ Input	199992.89	-1.72	-0.00
Channel Z	+ Input	19998.87	-1.11	-0.01
Channel Z	- Input	-20000.07	0.90	-0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	1998.52	-1.94	-0.10
Channel X	+ Input	200.77	-0.18	-0.09
Channel X	- Input	-199.69	-0.83	0.42
Channel Y	+ Input	1999.48	-0.80	-0.04
Channel Y	+ Input	200.34	-0.55	-0.27
Channel Y	- Input	-198.10	0.97	-0.49
Channel Z	+ Input	1998.95	-1.37	-0.07
Channel Z	+ Input	199.48	-1.44	-0.71
Channel Z	- Input	-199.41	-0.31	0.16

2. Common mode sensitivity

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-4.09	-4.76
	- 200	6.36	4.04
Channel Y	200	14.06	13.41
	- 200	-14.67	-14.92
Channel Z	200	3.23	1.98
	- 200	-5.02	-4.73

3. Channel separation

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	-1.52	-1.21
Channel Y	200	12.10	-	-1.51
Channel Z	200	0.25	12.60	-

4. AD-Converter Values with inputs shorted

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

	High Range (LSB)	Low Range (LSB)
Channel X	15627	16393
Channel Y	15845	15908
Channel Z	16157	16150

5. Input Offset Measurement

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec
Input 10MΩ

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-1.27	-2.39	-0.17	0.45
Channel Y	0.05	-1.36	2.93	0.64
Channel Z	-1.16	-2.45	-0.25	0.41

6. Input Offset Current

Nominal Input circuitry offset current on all channels: <25fA

7. Input Resistance (Typical values for information)

	Zeroing (kOhm)	Measuring (MOhm)
Channel X	200	200
Channel Y	200	200
Channel Z	200	200

8. Low Battery Alarm Voltage (Typical values for information)

Typical values	Alarm Level (VDC)
Supply (+ Vcc)	+7.9
Supply (- Vcc)	-7.6

9. Power Consumption (Typical values for information)

Typical values	Switched off (mA)	Stand by (mA)	Transmitting (mA)
Supply (+ Vcc)	+0.01	+6	+14
Supply (- Vcc)	–0.01	-8	-9