TESTING
No. L2264

OET 65

TEST REPORT

Product Name	Vodafone Mobile Wi-Fi
Model	R206
FCC ID	QISR206
Client	Huawei Technologies Co., Ltd.
Manufacturer	Huawei Technologies Co., Ltd.
Date of issue	March 19, 2013

TA Technology (Shanghai) Co., Ltd.

GENERAL SUMMARY

Reference Standard(s)	**FCC 47CFR §2.1093** Radiofrequency Radiation Exposure Evaluation: Portable Devices **ANSI C95.1, 1992:** Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.(IEEE Std C95.1-1991) **SUPPLEMENT C Edition 01-01 to OET BULLETIN 65 Edition 97-01 June 2001 including DA 02-1438, published June 2002:** Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields Additional Information for Evaluation Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radio frequency Emissions. **RSS-102 Issue 4 March 2010:** Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands). **KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01** SAR Measurement Requirements for 100 MHz to 6 GHz **KDB 447498 D01 Mobile Portable RF Exposure v05:** Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies **KDB 941225 D01 SAR test for 3G devices v02:** SAR Measurement Procedures CDMA 20001x RTT, 1x Ev-Do, WCDMA, HSDPA/HSPA **KDB 941225 D03 SAR Test Reduction GSM/GPRS/EDGE v01:** Recommended SAR Test Reduction Procedures for GSM/GPRS/EDGE **KDB 941225 D06 Hot Spot SAR v01** SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
Conclusion	This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 7 of this test report are below limits specified in the relevant standards for the tested bands only. General Judgment: **Pass**
Comment	The test result only responds to the measured sample.

Approved by____________ **Revised by**____________ **Performed by**____________

Director SAR Manager SAR Engineer

TABLE OF CONTENT

1. General Information

1.1. Notes of the Test Report

TA Technology (Shanghai) Co., Ltd. has obtained the accreditation of China National Accreditation Service for Conformity Assessment (CNAS), and accreditation number: L2264.

TA Technology (Shanghai) Co., Ltd. guarantees the reliability of the data presented in this test report, which is the results of measurements and tests performed for the items under test on the date and under the conditions stated in this test report and is based on the knowledge and technical facilities available at TA Technology (Shanghai) Co., Ltd. at the time of execution of the test.

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If the electrical report is inconsistent with the printed one, it should be subject to the latter.

1.2. Testing Laboratory

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1.3. Applicant Information

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Postal Code:	518129
Country:	P.R. China

1.4. Manufacturer Information

Company:	Huawei Technologies Co., Ltd.
Address:	Administration Building, Headquarters of Huawei Techologies Co., Ltd., Bantian, Longgang District
City:	Shenzhen
Postal Code:	518129
Country:	P.R.China

1.5. Information of EUT

General Information

<table>
<tr><td>Device Type:</td><td colspan="3">Portable Device</td></tr>
<tr><td>Exposure Category:</td><td colspan="3">Uncontrolled Environment / General Population</td></tr>
<tr><td>State of Sample:</td><td colspan="3">Prototype Unit</td></tr>
<tr><td>IMEI:</td><td colspan="3">860566020000607</td></tr>
<tr><td>Hardware Version:</td><td colspan="3">CH1E5220SM</td></tr>
<tr><td>Software Version:</td><td colspan="3">21.143.05.00.11</td></tr>
<tr><td>Antenna Type:</td><td colspan="3">Internal Antenna</td></tr>
<tr><td colspan="4">Device Operating Configurations:</td></tr>
<tr><td>Operating Mode(s):</td><td colspan="3">GSM 850/ GSM 1900; (tested)
WIFI(802.11b/g/n HT20) (tested)
GSM 900/ GSM 1800; (untested)
UMTS Band I/VIII; (untested)</td></tr>
<tr><td>Test Modulation:</td><td colspan="3">(GSM)GMSK, (802.11b) DSSS,OFDM</td></tr>
<tr><td>Device Class:</td><td colspan="3">B</td></tr>
<tr><td rowspan="3">GPRS Multislot Class(12):</td><td colspan="2">Max Number of Timeslots in Uplink</td><td>4</td></tr>
<tr><td colspan="2">Max Number of Timeslots in Downlink</td><td>4</td></tr>
<tr><td colspan="2">Max Total Timeslot</td><td>5</td></tr>
<tr><td rowspan="3">EGPRS Multislot Class(12):</td><td colspan="2">Max Number of Timeslots in Uplink</td><td>4</td></tr>
<tr><td colspan="2">Max Number of Timeslots in Downlink</td><td>4</td></tr>
<tr><td colspan="2">Max Total Timeslot</td><td>5</td></tr>
<tr><td rowspan="2">Power Class:</td><td colspan="3">GSM 850: 4</td></tr>
<tr><td colspan="3">GSM 1900: 1</td></tr>
<tr><td rowspan="2">Power Level:</td><td colspan="3">GSM 850: tested with power level 5</td></tr>
<tr><td colspan="3">GSM 1900: tested with power level 0</td></tr>
<tr><td>Test Channel:
(Low - Middle - High)</td><td colspan="3">128 -190 - 251 (GSM 850) (tested)
512 - 661 - 810 (GSM 1900) (tested)
1-6-11 (802.11b) (tested)</td></tr>
<tr><td rowspan="4">Operating Frequency Range(s):</td><td>Mode</td><td>Tx (MHz)</td><td>Rx (MHz)</td></tr>
<tr><td>GSM 850</td><td>824.2 ~ 848.8</td><td>869.2 ~ 893.8</td></tr>
<tr><td>GSM 1900</td><td>1850.2 ~ 1909.8</td><td>1930.2 ~ 1989.8</td></tr>
<tr><td>WIFI</td><td>2412 ~ 2462</td><td>2412 ~ 2462</td></tr>
</table>

Auxiliary Equipment Details

AE1: Battery 1

Model:	HB5A2H
Manufacturer:	Huawei Technologies Co., Ltd.
S/N:	UNDCC04X15700423

AE2: Battery 2

Model:	HB5A2H
Manufacturer:	Huawei Technologies Co., Ltd.
S/N:	YACCC02215716392

Equipment under Test (EUT) has a GSM antenna that is used for Tx/Rx, the second is a WIFI antenna that is used for Tx/Rx, and the third is a diversity antenna that is used for Rx only. The detail about EUT and Lithium Battery is in chapter 1.5 of this report.

The sample undergoing test was selected by the Client.

Components list please refer to documents of the manufacturer.

1.6. The Maximum Reported SAR_{1g}

Hotspots Configuration

Mode	Test Position	Channel /Frequency(MHz)	Limit SAR_{1g} 1.6 W/kg	
			Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
2Txslots EGPRS850	Front Side	128/824.2	1.050	1.310
2Txslots GPRS1900	Front Side	810/1909.8	0.719	0.943
802.11b	Front Side	1/2412	0.220	0.237

1.7. Maximum Conducted Power of Each Tested Mode

Mode		Maximum Burst Conducted Power (dBm)	Maximum Average Power (dBm)
GSM 850	GPRS(GMSK), 2 Txslots	31.31	**25.29**
	EGPRS(GMSK), 2 Txslots	31.26	**25.24**
GSM 1900	GPRS(GMSK), 2 Txslots	28.16	**22.14**
	EGPRS(GMSK), 2 Txslots	28.11	**22.09**

Mode	Maximum Average Power (dBm)
802.11b	**14.87**

Note: The detail Power refers to Table 6 (Conducted Power Measurement Results).

1.8. Test Date

The test performed from February 27, 2013 to February 28, 2013.

2. SAR Measurements System Configuration

2.1. SAR Measurement Set-up

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

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- 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.
- A data acquisition electronic (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.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY5 measurement server.
- The DASY5 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003
- DASY5 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system.

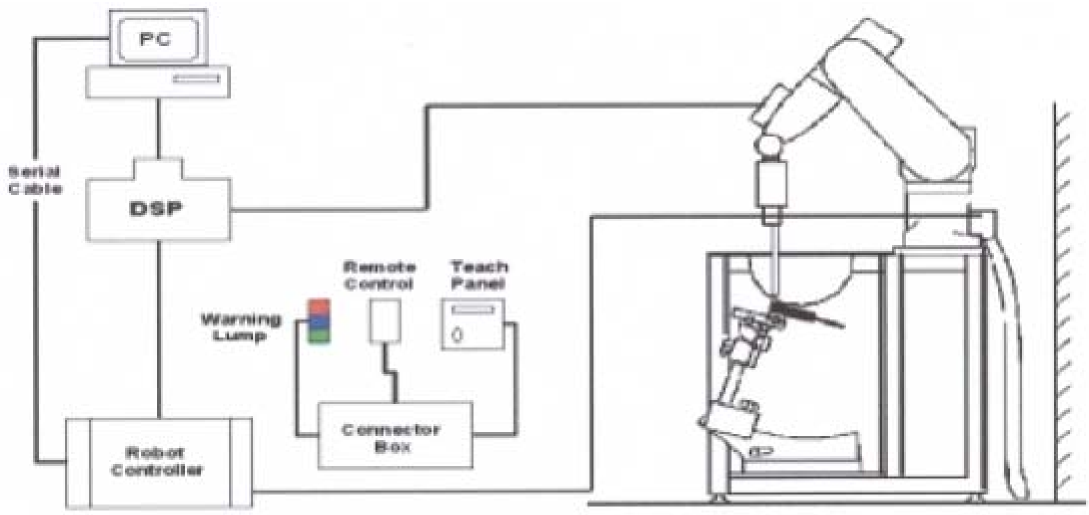


Figure 1. SAR Lab Test Measurement Set-up

2.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe ES3DV3 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

2.2.1. ES3DV3 Probe Specification

Construction: Symmetrical design with triangular core
Interleaved sensors
Built-in shielding against static charges
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)

Figure 2.ES3DV3 E-field Probe

Calibration: ISO/IEC 17025 calibration service available

Frequency: 10 MHz to 4 GHz
Linearity: ± 0.2 dB
(30 MHz to 4 GHz)

Directivity: ± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)

Dynamic Range: 5 μW/g to > 100 mW/g Linearity:
± 0.2dB

Dimensions: Overall length: 330 mm (Tip: 20 mm)
Tip diameter: 3.9 mm (Body: 12 mm)
Distance from probe tip to dipole centers: 2.0 mm

Application: General dosimetry up to 4 GHz
Dosimetry in strong gradient fields
Compliance tests of mobile phones

Figure 3. ES3DV3 E-field probe

2.2.2. E-field Probe Calibration

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

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz, and in a wave guide 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 then rotated 360 degrees.

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

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

Where: Δt = Exposure time (30 seconds),

C = Heat capacity of tissue (brain or muscle),

ΔT = Temperature increase due to RF exposure.

Or

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

Where:

σ = Simulated tissue conductivity,

ρ = Tissue density (kg/m3).

2.3. Other Test Equipment

2.3.1. Device Holder for Transmitters

Construction: Simple but effective and easy-to-use extension for Mounting Device that facilitates the testing of larger devices according to IEC 62209-2 (e.g., laptops, cameras, etc.) It is lightweight and fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin SAM, ELI4 and SAM v6.0 Phantoms.

Material: POM, Acrylic glass, Foam

2.3.2. Phantom

The Generic Twin Phantom is constructed of a fiberglass shell integrated in a wooden Figure. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. 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 the 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 in the robot.

Shell Thickness 2±0.1 mm
Filling Volume Approx. 20 liters
Dimensions 810 x 1000 x 500 mm (H x L x W) Aailable Special

Figure 4 Generic Twin Phantom

2.4. Scanning Procedure

The DASY5 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the DUT’s output power and should vary max. ± 5 %.

- The “surface check” measurement tests the optical surface detection system of the DASY5 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)

- Area Scan

The Area Scan is used as a fast scan in two dimensions to find the area of high field values

before running a detailed measurement around the hot spot. Before starting the area scan a grid spacing is set according to FCC KDB Publication 865664. During scan the distance of the probe to the phantom remains unchanged.
After finishing area scan, the field maxima within a range of 2 dB will be ascertained.

- Zoom Scan
  After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm.

- Spatial Peak Detection

The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses.The DASY5 system allows evaluations that combine measured data and robot positions, such as:
• maximum search
• extrapolation
• boundary correction
• peak search for averaged SAR
During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.
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. Several measurements at different distances are necessary for the extrapolation. Extrapolation routines require at least 10 measurement points in 3-D space.
They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

Table 1: Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm) $\Delta z_{zoom}(n)$	Minimum Zoom Scan Volume (mm) (x,y,z)
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≥ 22

2.5. Data Storage and Evaluation

2.5.1. Data Storage

The DASY5 software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE4". The 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 incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [mW/g], [mW/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

2.5.2. Data Evaluation by SEMCAD

The SEMCAD software 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, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	Dcp_i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	
	- Density	

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 DASY5 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:

$$V_i = U_i + U_i^2 \cdot c\,f / d\,c\,p_i$$

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: $$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

H-field probes: $$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$$

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

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

[mV/(V/m)^2] for E-field Probes

$ConvF$ = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

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

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

$$E_{tot} = (E_X^2 + E_Y^2 + E_Z^2)^{1/2}$$

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

$$SAR = (E_{tot})^2 \cdot \sigma / (\rho \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

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

. = conductivity in [mho/m] or [Siemens/m]

. = equivalent tissue density in g/cm^3

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field to be a free space field.

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

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

3. Laboratory Environment

Table 2: The Requirements of the Ambient Conditions

Temperature	Min. = 18°C, Max. = 25 °C
Relative humidity	Min. = 30%, Max. = 70%
Ground system resistance	< 0.5 Ω
Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.	

4. Tissue-equivalent Liquid

4.1. Tissue-equivalent Liquid Ingredients

The liquid is consisted of water, salt, Glycol, Sugar, Preventol and Cellulose. The liquid has previously been proven to be suited for worst-case. Table 3 shows the detail solution. It's satisfying the latest tissue dielectric parameters requirements proposed by the OET 65.

Table 3: Composition of the Body Tissue Equivalent Matter

MIXTURE%	FREQUENCY(Body) 835MHz
Water	52.5
Sugar	45
Salt	1.4
Preventol	0.1
Cellulose	1.0
Dielectric Parameters Target Value	f=835MHz ε=55.2 σ=0.97

MIXTURE%	FREQUENCY (Body) 1900MHz
Water	69.91
Glycol monobutyl	29.96
Salt	0.13
Dielectric Parameters Target Value	f=1900MHz ε=53.3 σ=1.52

MIXTURE%	FREQUENCY(Body) 2450MHz
Water	73.2
Glycol	26.7
Salt	0.1
Dielectric Parameters Target Value	f=2450MHz ε=52.70 σ=1.95

4.2. Tissue-equivalent Liquid Properties

Table 4: Dielectric Performance of Tissue Simulating Liquid

Frequency	Test Date	Temp ℃	Measured Dielectric Parameters		Target Dielectric Parameters		Limit (Within ±5%)	
			ε_r	σ(s/m)	ε_r	σ(s/m)	Dev ε_r(%)	Dev σ(%)
835MHz (body)	2013-2-27	21.5	55.89	0.99	55.20	0.97	1.25	2.06
1900MHz (body)	2013-2-28	21.5	52.56	1.52	53.30	1.52	-1.39	0
2450MHz (body)	2013-2-28	21.5	51.69	1.90	52.70	1.95	-1.92	-2.56

5. System Check

5.1. Description of System Check

The manufacturer calibrates the probes annually. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyzer. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system check results (dielectric parameters and SAR values) are given in the table 5.

System check results have to be equal or near the values determined during dipole calibration with the relevant liquids and test system (±10 %).

System check is performed regularly on all frequency bands where tests are performed with the DASY5 system.

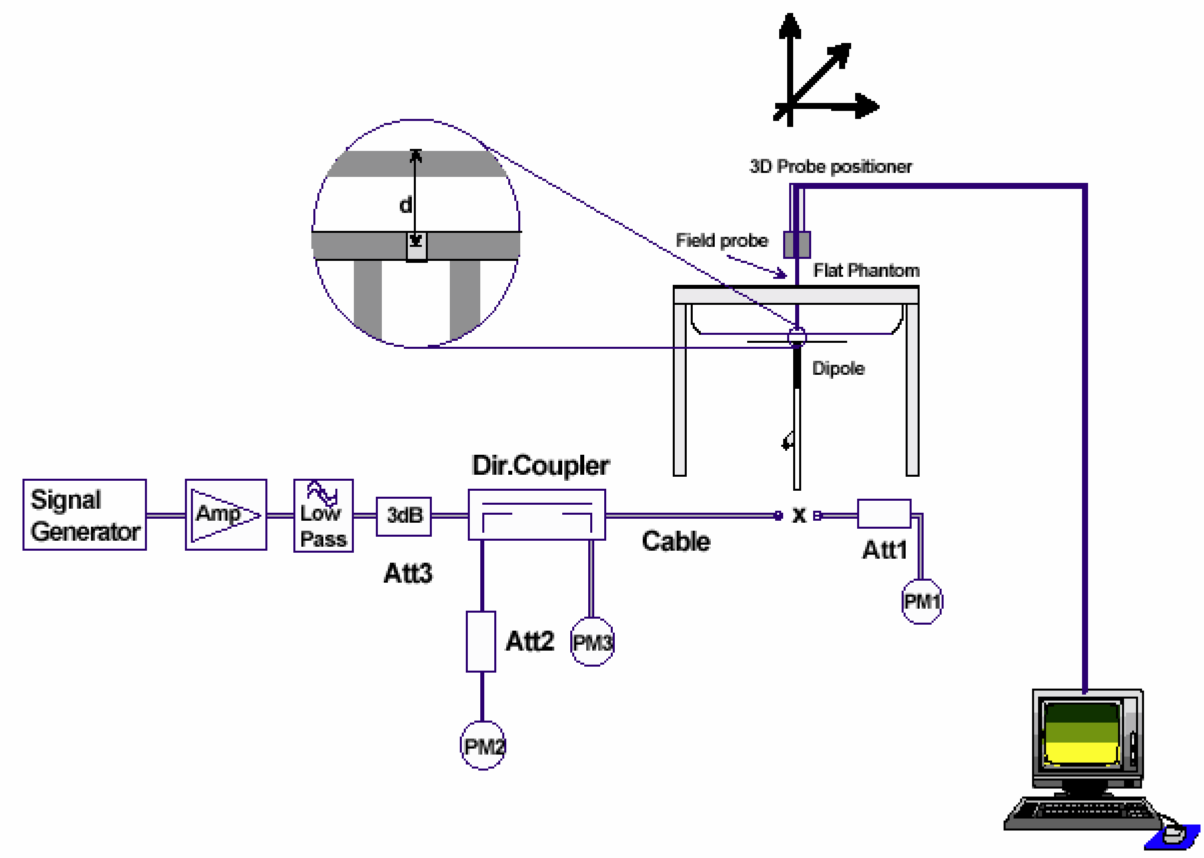


Figure 5. System Check Set-up

Justification for Extended SAR Dipole Calibrations

Usage of SAR dipoles calibrated less than 2 years ago but more than 1 year ago were confirmed in maintaining return loss (< - 20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 450824:

Dipole D835V2 SN: 4d020				
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/26/2011	-25.1	/	48.7	/
8/25/2012	-24.3	3.2%	50.6	1.9Ω

Dipole D1900V2 SN: 5d060				
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/31/2011	-21.3	/	47.3	/
8/30/2012	-20.9	1.9%	45.9	1.4Ω

Dipole D2450V2 SN: 786				
Body Liquid				
Date of Measurement	Return Loss(dB)	Δ %	Impedance (Ω)	ΔΩ
8/29/2011	-29.0	/	50.4	/
8/28/2012	-29.9	3.1%	52.1	1.7Ω

5.2. System Check Results

Table 5: System Check in Body Tissue Simulating Liquid

Frequency	**Test Date**	**Dielectric Parameters**		**Temp**	**250mW Measured SAR$_{1g}$**	**1W Normalized SAR$_{1g}$**	**1W Target SAR$_{1g}$**	**Limit (±10% Deviation)**
		ε_r	**σ(s/m)**	**(℃)**	**(W/kg)**			
835MHz	2013-2-27	55.89	0.99	21.5	2.50	10.00	9.46	5.7%
1900MHz	2013-2-28	52.56	1.52	21.5	10.50	42.00	41.70	0.7%
2450MHz	2013-2-28	51.69	1.90	21.5	12.90	51.60	51.70	-0.2%
Note：1. The graph results see ANNEX B. 2. Target Values used derive from the calibration certificate								

6. Operational Conditions during Test

6.1. General Description of Test Procedures

Connection to the EUT is established via air interface with E5515C, and the EUT is set to maximum output power by E5515C. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB.

6.2. Test Configuration

6.2.1. GSM Test Configuration

For the body SAR tests, a communication link is set up with a System Simulator (SS) by air link. The EUT is commanded to operate at maximum transmitting power.
Since the GPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5. Since the EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslot is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

According to specification 3GPP TS 51.010, the maximum power of the GSM can do the power reduction for the multi-slot. The allowed power reduction in the multi-slot configuration is as following:

GSM 850

GPRS（GMSK）:

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	1
3	3
4	4.5

EGPRS(8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	1
3	3
4	5

EGPRS(GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	1
3	3
4	4.5

GSM 1900

GPRS（GMSK）:

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	1.5
3	3.5
4	5.5

EGPRS(8PSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	0.5
3	3
4	5

EGPRS(GMSK):

Number of timeslots in uplink assignment	reduction of maximum output power, (dB)
1	0
2	1.5
3	3.5
4	5.5

6.2.2. WIFI Test Configuration

For WLAN SAR testing, WLAN engineering testing software installed on the DUT can provide continuous transmitting RF signal. The Tx power is set to 1400 for 802.11 b mode, set to 1100 for 802.11 g mode, set to 900 for 802.11 n mode by software. This RF signal utilized in SAR measurement has almost 100% duty cycle and its crest factor is 1.

For the 802.11b/g/n SAR tests, a communication link is set up with the test mode software for WIFI mode test. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate. Testing at higher data rates is not required when the maximum average output power is less than 0.25dB higher than those measured at the lowest data rate.

802.11b/g/n operating modes are tested independently according to the service requirements in each frequency band. 802.11b/g/n modes are tested on the maximum average output channel.

SAR is not required for 802.11g/n channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

6.3. Measurement Variability

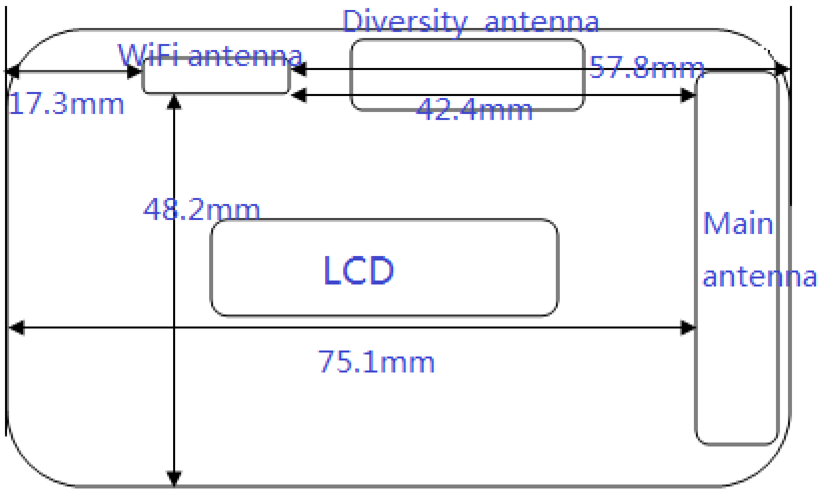
Per FCC KDB Publication 865664 D01v01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:
1) When the original highest measured SAR is ⩾ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ⩾ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ⩾ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

6.4. Test Positions

Based upon KDB941225 D06 V01 with a form factor 9.05 cm x 5.6 cm ⩾ 9 cm x 5 cm.
When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.

The location of the antennas inside EUT is shown in ANNEX I:



The EUT is tested at the following 6 test positions:

- Test Position 1: The back side of the EUT towards the bottom of the flat phantom. The distance between the back side of the EUT and the bottom of the flat phantom is 10mm. (ANNEX I Picture 6)
- Test Position 2: The front side of the EUT towards the bottom of the flat phantom. The distance between the front side of the EUT and the bottom of the flat phantom is 10mm. (ANNEX I Picture 7)
- Test Position 3: The left edge of the EUT towards the bottom of the flat phantom. The distance between the left edge of the EUT and the bottom of the flat phantom is 10mm. (ANNEX I Picture 8)
- Test Position 4: The right edge of the EUT towards the bottom of the flat phantom. The distance between the right edge of the EUT and the bottom of the flat phantom is 10mm. (ANNEX I Picture 9)
- Test Position 5: The top edge of the EUT towards the bottom of the flat phantom. The distance between the top edge of the EUT and the bottom of the flat phantom is 10mm. (ANNEX I Picture 10）
- Test Position 6: The bottom edge of the EUT towards the bottom of the flat phantom. The distance between the bottom edge of the EUT and the bottom of the flat phantom is 10mm. (ANNEX I Picture 11)

7. Test Results

7.1. Conducted Power Results

Table 6: Conducted Power Measurement Results

GSM 850		Burst Conducted Power(dBm)				Average power(dBm)		
		Channel 128	Channel 190	Channel 251		Channel 128	Channel 190	Channel 251
GPRS (GMSK)	1Txslot	32.1	32.19	32.27	-9.03dB	23.07	23.16	23.24
	2Txslots	31.13	31.23	31.31	-6.02dB	**25.11**	**25.21**	**25.29**
	3Txslots	29.14	29.25	29.34	-4.26dB	24.88	24.99	25.08
	4Txslots	27.18	27.28	27.37	-3.01dB	24.17	24.27	24.36
EGPRS (GMSK)	1Txslot	32.07	32.22	32.25	-9.03dB	23.04	23.19	23.22
	2Txslots	31.04	31.16	31.26	-6.02dB	**25.02**	**25.14**	**25.24**
	3Txslots	29.03	29.17	29.29	-4.26dB	24.77	24.91	25.03
	4Txslots	27.22	27.32	27.25	-3.01dB	24.21	24.31	24.24
EGPRS (8PSK)	1Txslot	25.19	25.34	25.18	9.03	16.16	16.31	16.15
	2Txslots	24.66	24.64	24.56	6.02	**18.64**	**18.62**	**18.54**
	3Txslots	22.56	22.49	22.43	4.26	18.30	18.23	18.17
	4Txslots	20.45	20.38	20.35	3.01	17.44	17.37	17.34
GSM 1900		**Burst Conducted Power(dBm)**				**Average power(dBm)**		
		Channel 512	Channel 661	Channel 810		Channel 512	Channel 661	Channel 810
GPRS (GMSK)	1Txslot	29.66	29.42	29.3	-9.03dB	20.63	20.39	20.27
	2Txslots	28.16	27.98	27.82	-6.02dB	**22.14**	**21.96**	**21.8**
	3Txslots	26.2	26.04	25.88	-4.26dB	21.94	21.78	21.62
	4Txslots	24.16	24.02	23.89	-3.01dB	21.15	21.01	20.88
EGPRS (GMSK)	1Txslot	29.69	29.37	29.36	-9.03dB	20.66	20.34	20.33
	2Txslots	28.11	28.06	27.91	-6.02dB	**22.09**	**22.04**	**21.89**
	3Txslots	26.23	26.09	25.95	-4.26dB	21.97	21.83	21.69
	4Txslots	24.19	24.08	23.87	-3.01dB	21.18	21.07	20.86
EGPRS (8PSK)	1Txslot	24.51	24.58	24.19	9.03	15.48	15.55	15.16
	2Txslots	23.85	23.82	23.8	6.02	**17.83**	**17.80**	**17.78**
	3Txslots	21.51	21.56	21.53	4.26	17.25	17.30	17.27
	4Txslots	19.32	19.28	19.21	3.01	16.31	16.27	16.20

Note:

1) Division Factors

To average the power, the division factor is as follows:

1Txslot = 1 transmit time slot out of 8 time slots
=> conducted power divided by (8/1) => -9.03 dB
2Txslots = 2 transmit time slots out of 8 time slots
=> conducted power divided by (8/2) => -6.02 dB
3Txslots = 3 transmit time slots out of 8 time slots
=> conducted power divided by (8/3) => -4.26 dB
4Txslots = 4 transmit time slots out of 8 time slots
=> conducted power divided by (8/4) => -3.01 dB

2) Average power numbers

The maximum power numbers are marks in bold.

WIFI Mode	Channel	Data rate (Mbps)	AV Power (dBm)	Peak Power (dBm)
11b	1	1	14.67	18.13
		2	14.82	18.46
		5.5	14.81	18.17
		11	14.87	21.73
	6	1	14.26	17.82
		2	14.52	18.23
		5.5	14.52	17.79
		11	14.55	21.37
	11	1	13.92	17.89
		2	14.14	18.21
		5.5	14.15	17.85
		11	14.16	21.24
11g	1	6	11.97	20.53
		9	11.97	20.48
		12	11.89	21.05
		18	11.87	20.86
		24	11.97	21.29
		36	11.9	21.25
		48	11.95	21.23
		54	11.88	21.38
	6	6	11.62	20.44
		9	11.63	20.55
		12	11.59	20.83
		18	11.62	20.66
		24	11.58	21.15

		36	11.61	21.21
		48	11.55	21.04
		54	11.53	21.26
	11	6	11.31	20.83
		9	11.28	20.42
		12	11.25	21.01
		18	11.18	20.79
		24	11.26	21.27
		36	11.27	21.19
		48	11.19	21.16
		54	11.24	21.33
11n HT20	1	6.5	10.01	18.44
		13	9.92	18.88
		19.5	9.94	18.83
		26	10.05	19.01
		39	9.92	19.12
		52	9.91	19.05
		58.5	10.02	19.22
		65	10.04	19.26
	6	6.5	9.52	18.28
		13	9.55	18.82
		19.5	9.54	18.71
		26	9.48	18.95
		39	9.54	18.89
		52	9.47	18.99
		58.5	9.45	19.08
		65	9.46	19.14
	11	6.5	9.25	18.31
		13	9.17	18.79
		19.5	9.21	18.82
		26	9.19	18.99
		39	9.18	19.05
		52	9.19	18.93
		58.5	9.21	19.06
		65	9.19	19.13

7.2. Standalone SAR Test Exclusion Considerations

Per FCC KDB 447498 D01v05, the SAR exclusion threshold for distances <50mm is defined by the following equation:

$$\frac{\textbf{(max. power of channel, including tune-up tolerance, mW)}}{\textbf{(min. test separation distance, mm)}} * \sqrt{\textbf{Frequency (GHz)}} \leqslant \textbf{3.0}$$

Based on the above equation, WiFi SAR was required;
Body Evaluation = $[10^{(15/10)}/10]*(2.437^{1/2}) = 4.9 > 3.0$

7.3. SAR Test Results

7.3.1. GSM 850 (GPRS/EGPRS)

Table 7: SAR Values [GSM 850 (GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ± 0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Body with GPRS (Battery 1, Distance 10mm)										
Test Position 1	251/848.8	2Txslots	1:4.15	32	31.31	-0.075	0.633	1.17	0.742	Figure 9
	190/836.6	2Txslots	1:4.15	32	31.23	-0.090	0.732	1.19	0.874	Figure 10
	128/824.2	2Txslots	1:4.15	32	31.13	-0.047	0.81	1.22	0.990	Figure 11
Test Position 2	251/848.8	2Txslots	1:4.15	32	31.31	-0.147	0.824	1.17	0.966	Figure 12
	190/836.6	2Txslots	1:4.15	32	31.23	-0.032	0.935	1.19	1.116	Figure 13
	128/824.2	2Txslots	1:4.15	32	31.13	-0.036	1.06	1.22	1.295	Figure 14
Test Position 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 4	190/836.6	2Txslots	1:4.15	32	31.23	-0.148	0.092	1.19	0.109	Figure 15
Test Position 5	190/836.6	2Txslots	1:4.15	32	31.23	0.044	0.226	1.19	0.270	Figure 16
Test Position 6	190/836.6	2Txslots	1:4.15	32	31.23	-0.055	0.273	1.19	0.326	Figure 17
Worst Case Position of GPRS with EGPRS (GMSK, Battery 1, Distance 10mm)										
Test Position 2	128/824.2	2Txslots	1:4.15	32	31.04	-0.167	1.05	1.25	1.310	Figure18
Test Position of Body with Battery 2(Distance 10mm)										
Test Position 2	128/824.2	2Txslots	1:4.15	32	31.04	-0.124	1.04	1.25	1.297	Figure 19
SAR Measurement Variability Results(Distance 10mm)										
Test Position 2	128/824.2	2Txslots	1:4.15	32	31.04	-0.100	1.03	1.25	1.285	Figure 20

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. WWAN antenna is located at Right edge; antenna-to- Left edge distance is more than 2.5 cm (see ANNEX I). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
4. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.
5. When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

Table 8: SAR Measurement Variability Results [GSM 850 (GPRS/EGPRS)]

Test Position	Timeslots	Channel/ Frequency (MHz)	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	3rd Repeated SAR (1g)
Test Position 2	2Txslots	128/824.2	1.06	1.03	1.03	NA	NA

Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was preformed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

7.3.2. GSM 1900 (GPRS/EGPRS)

Table 9: SAR Values [GSM 1900 (GPRS/EGPRS)]

Test Position	Channel/ Frequency (MHz)	Time slot	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit SAR_{1g} 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of Body with GPRS (Battery 1, Distance 10mm)										
Test Position 1	661/1880	2Txslots	1:4.15	29	27.98	0.123	0.621	1.26	0.785	Figure 21
Test Position 2	810/1909.8	2Txslots	1:4.15	29	27.82	0.070	0.719	1.31	0.943	Figure 22
	661/1880	2Txslots	1:4.15	29	27.98	0.088	0.697	1.26	0.882	Figure 23
	512/1850.2	2Txslots	1:4.15	29	28.16	-0.011	0.68	1.21	0.825	Figure 24
Test Position 3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 4	661/1880	2Txslots	1:4.15	29	27.98	-0.062	0.2	1.26	0.253	Figure 25
Test Position 5	661/1880	2Txslots	1:4.15	29	27.98	0.076	0.234	1.26	0.296	Figure 26
Test Position 6	661/1880	2Txslots	1:4.15	29	27.98	-0.116	0.134	1.26	0.169	Figure 27
Worst Case Position of GPRS with EGPRS (GMSK, Battery 1, Distance 10mm)										
Test Position 2	810/1909.8	2Txslots	1:4.15	29	27.91	0.017	0.714	1.29	0.918	Figure 28
Test Position of Body with Battery 2(Distance 10mm)										
Test Position 2	810/1909.8	2Txslots	1:4.15	29	27.82	0.027	0.715	1.31	0.938	Figure 29

Note: 1.The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
3. WWAN antenna is located at Right edge; antenna-to- Left edge distance is more than 2.5 cm (see ANNEX I). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.
4. When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.
5. When multiple slots are used, SAR should be tested to account for the maximum source-based time-averaged output power.

7.3.3. WIFI

Table 10: SAR Values [WIFI (802.11b/g/n HT20)]

Test Position	Channel/ Frequency (MHz)	Mode	Duty Cycle	Maximum Allowed Power (dBm)	Conducted Power (dBm)	Drift ±0.21dB	Limit of SAR 1.6 W/kg			
						Drift (dB)	Measured SAR_{1g} (W/kg)	Scaling Factor	Reported SAR_{1g} (W/kg)	Graph Results
Test Position of 802.11b (Battery 1, Distance 10mm)										
Test Position 1	1/2412	DSS	1:1	15	14.67	-0.038	0.125	1.08	0.135	Figure 30
Test Position 2	1/2412	DSS	1:1	15	14.67	-0.046	0.220	1.08	0.237	Figure 31
Test Position 3	1/2412	DSS	1:1	15	14.67	-0.024	0.071	1.08	0.076	Figure 32
Test Position 4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position 5	1/2412	DSS	1:1	15	14.67	0.125	0.107	1.08	0.115	Figure 33
Test Position 6	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Test Position of Body with Battery 2(Distance 10mm)										
Test Position 2	1/2412	DSS	1:1	15	14.67	-0.043	0.215	1.08	0.232	Figure 34

Note: 1. The value with blue color is the maximum SAR Value of each test band.

2. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

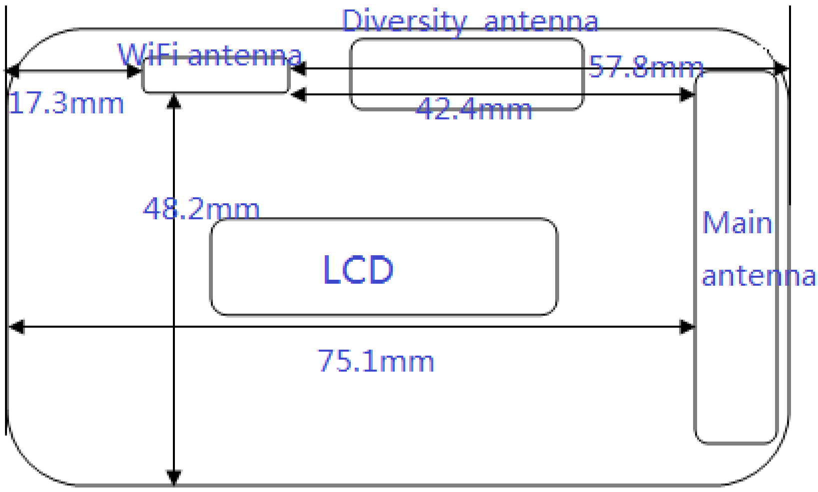
3. WLAN antenna is located at Top edge near to Left edge; antenna-to- Bottom/Right edge distance is more than 2.5 cm (see ANNEX I). Based upon KDB941225 D06, when the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.

4. KDB 248227-SAR is not required for 802.11g/n channels when the maximum average output power is less than ¼ dB higher than measured on the corresponding 802.11b channels.

7.4. Simultaneous Transmission Conditions

Air-Interface	Band (MHz)	Type	SimultaneousTransmissions	Voice Over Digital Transport (Data)
GSM	850	DT	Yes WIFI	NA
	1900	DT		
WIFI	2450	DT	Yes GPRS,EGPRS	NA
Note: DT Digital Transport				

The location of the antennas inside EUT is shown in ANNEX I:



Estimated SAR

(1) for test separation distances ≤ 50 mm

When standalone SAR is not required to be measured per FCC KDB 447498 D01v05 4.3.2 2), the following equation must be used to estimate the standalone 1g SAR for simultaneous transmission assessment involving that transmitter for test separation distances ≤ 50 mm.

$$\textbf{Estimated SAR}=\frac{\text{(max. power of channel, including tune-up tolerance, mW)}}{\text{(min. test separation distance, mm)}} * \frac{\sqrt{f\,(GHz)}}{7.5}$$

(2) for test separation distances >50 mm

0.4 W/kg for 1-g SAR

Body Estimated $SAR_{Max.WIFI.\ Test\ Position\ 4}$ ≤ 0.4W/kg

Body Estimated $SAR_{Max.WIFI.\ Test\ Position\ 6}$ ≤ 0.4W/kg

Body Estimated $SAR_{Max.GSM850.\ Test\ Position\ 3}$ ≤ 0.4W/kg

Body Estimated $SAR_{Max.GSM1900.\ Test\ Position\ 3}$ ≤ 0.4W/kg

GSM &WIFI Mode

Reported SAR_{1g}(W/kg) / Test Position	GSM 850	GSM 1900	WIFI	MAX. Σ SAR_{1g}
Test Position 1	**0.990**	0.785	**0.135**	1.125
Test Position 2	**1.310**	0.943	**0.237**	1.547
Test Position 3	**≤0.400**	≤0.400	**0.076**	0.476
Test Position 4	0.109	**0.253**	**≤0.400**	0.653
Test Position 5	0.270	**0.296**	**0.115**	0.411
Test Position 6	**0.326**	0.169	**≤0.400**	0.726
Note: 1.The value with blue color is the maximum ΣSAR_{1g} Value. 2. MAX. ΣSAR_{1g} = Reported $SAR_{Max.WIFI}$ + Reported $SAR_{Max.GSM}$				

MAX. ΣSAR_{1g} = 1.547 W/kg <1.6 W/kg, So the Simultaneous SAR are not required for WIFI and GSM antenna.

8. 700MHz to 3GHz Measurement Uncertainty

No.	source	Type	Uncertainty Value (%)	Probability Distribution	k	c_i	Standard ncertainty u_i' (%)	Degree of freedom V_{eff} or v_i
1	System repetivity	A	0.5	N	1	1	0.5	9
Measurement system								
2	-probe calibration	B	6.0	N	1	1	6.0	∞
3	-axial isotropy of the probe	B	4.7	R	$\sqrt{3}$	$\sqrt{0.5}$	1.9	∞
4	- Hemispherical isotropy of the probe	B	9.4	R	$\sqrt{3}$	$\sqrt{0.5}$	3.9	∞
6	-boundary effect	B	1.9	R	$\sqrt{3}$	1	1.1	∞
7	-probe linearity	B	4.7	R	$\sqrt{3}$	1	2.7	∞
8	- System detection limits	B	1.0	R	$\sqrt{3}$	1	0.6	∞
9	-readout Electronics	B	1.0	N	1	1	1.0	∞
10	-response time	B	0	R	$\sqrt{3}$	1	0	∞
11	-integration time	B	4.32	R	$\sqrt{3}$	1	2.5	∞
12	-noise	B	0	R	$\sqrt{3}$	1	0	∞
13	-RF Ambient Conditions	B	3	R	$\sqrt{3}$	1	1.73	∞
14	-Probe Positioner Mechanical Tolerance	B	0.4	R	$\sqrt{3}$	1	0.2	∞
15	-Probe Positioning with respect to Phantom Shell	B	2.9	R	$\sqrt{3}$	1	1.7	∞
16	-Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation	B	3.9	R	$\sqrt{3}$	1	2.3	∞
Test sample Related								
17	-Test Sample Positioning	A	2.9	N	1	1	2.9	71
18	-Device Holder Uncertainty	A	4.1	N	1	1	4.1	5
19	-Output Power Variation - SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.9	∞
Physical parameter								
20	-phantom	B	4.0	R	$\sqrt{3}$	1	2.3	∞
21	-liquid conductivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.64	1.8	∞

22	-liquid conductivity (measurement uncertainty)	B	2.5	N	1	0.64	1.6	9
23	-liquid permittivity (deviation from target)	B	5.0	R	$\sqrt{3}$	0.6	1.7	∞
24	-liquid permittivity (measurement uncertainty)	B	2.5	N	1	0.6	1.5	9
Combined standard uncertainty		$u_c^{'} = \sqrt{\sum_{i=1}^{24} c_i^2 u_i^2}$					11.50	
Expanded uncertainty (confidence interval of 95 %)		$u_e = 2u_c$		N	k=2		23.00	

9. Main Test Instruments

Table 11: List of Main Instruments

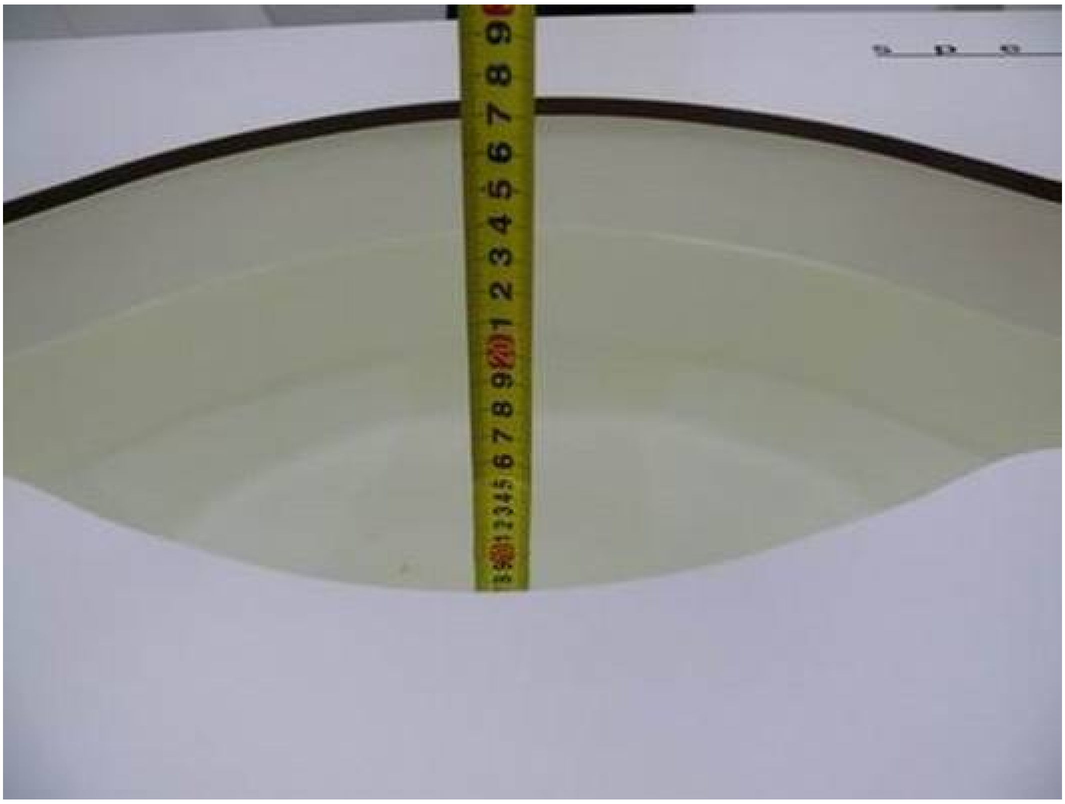
No.	Name	Type	Serial Number	Calibration Date	Valid Period
01	Network analyzer	Agilent 8753E	US37390326	September 11, 2012	One year
02	Dielectric Probe Kit	Agilent 85070E	US44020115	No Calibration Requested	
03	Power meter	Agilent E4417A	GB41291714	March 11, 2012	One year
04	Power sensor	Agilent N8481H	MY50350004	September 24, 2012	One year
05	Power sensor	E9327A	US40441622	January 2, 2013	One year
06	Signal Generator	HP 8341B	2730A00804	September 10, 2012	One year
07	Dual directional coupler	778D-012	50519	March 26, 2012	One year
08	Dual directional coupler	777D	50146	March 26, 2012	One year
09	Amplifier	IXA-020	0401	No Calibration Requested	
10	BTS	E5515C	MY48360988	December 1, 2012	One year
11	E-field Probe	ES3DV3	3189	June 22, 2012	One year
12	DAE	DAE4	1317	January 25, 2013	One year
13	Validation Kit 835MHz	D835V2	4d020	August 26, 2011	Two years
14	Validation Kit 1900MHz	D1900V2	5d060	August 31, 2011	Two years
15	Validation Kit 2450MHz	D2450V2	786	August 29, 2011	Two years
16	Temperature Probe	JM222	AA1009129	March 15, 2012	One year
17	Hygrothermograph	WS-1	64591	September 27, 2012	One year

*****END OF REPORT *****

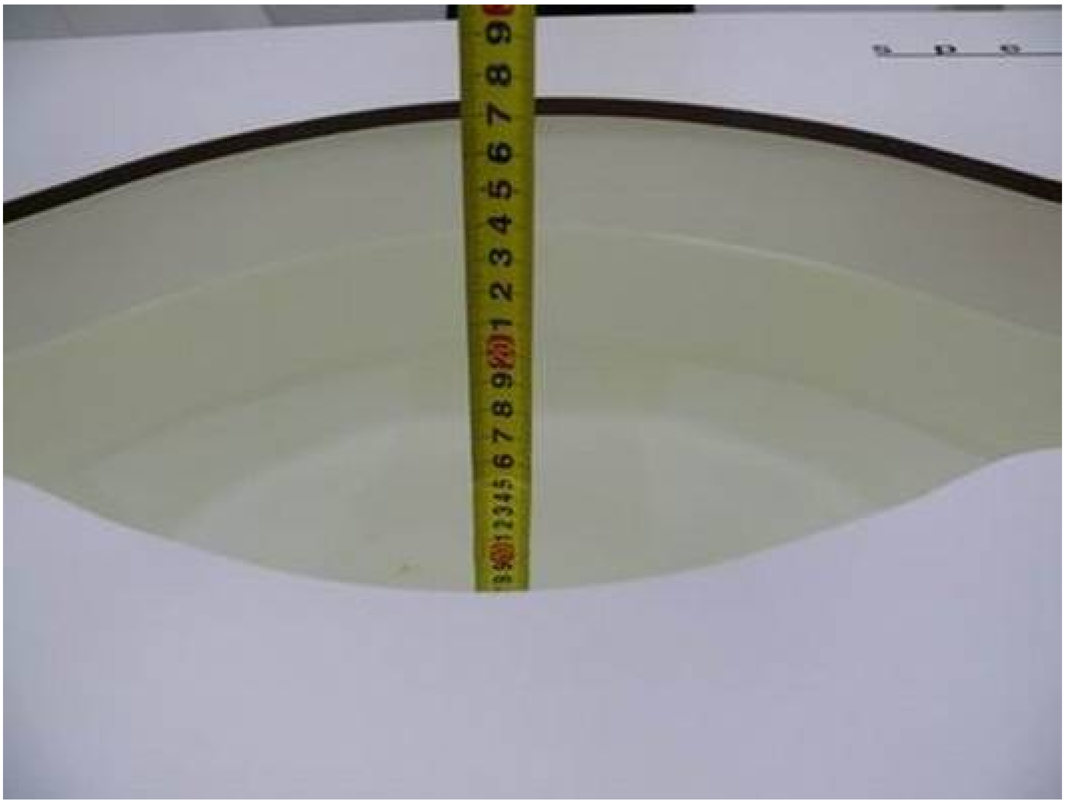
ANNEX A: Test Layout

Picture 1: Specific Absorption Rate Test Layout

Picture 2: Liquid depth in the Flat Phantom (835 MHz, 15.4cm depth)



Picture 3: Liquid depth in the Flat Phantom (1900 MHz, 15.2cm depth)



Picture 4: Liquid depth in the flat Phantom (2450 MHz, 15.3cm depth)

ANNEX B: System Check Results

System Performance Check at 835 MHz

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Date/Time: 2/27/2013 12:45:37 PM

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 55.89; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=15mm, Pin=250mW/Area Scan (41x121x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 2.61 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 52.09 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 3.48 W/kg

SAR(1 g) = 2.5 mW/g; SAR(10 g) = 1.65 mW/g

Maximum value of SAR (measured) = 2.69 mW/g

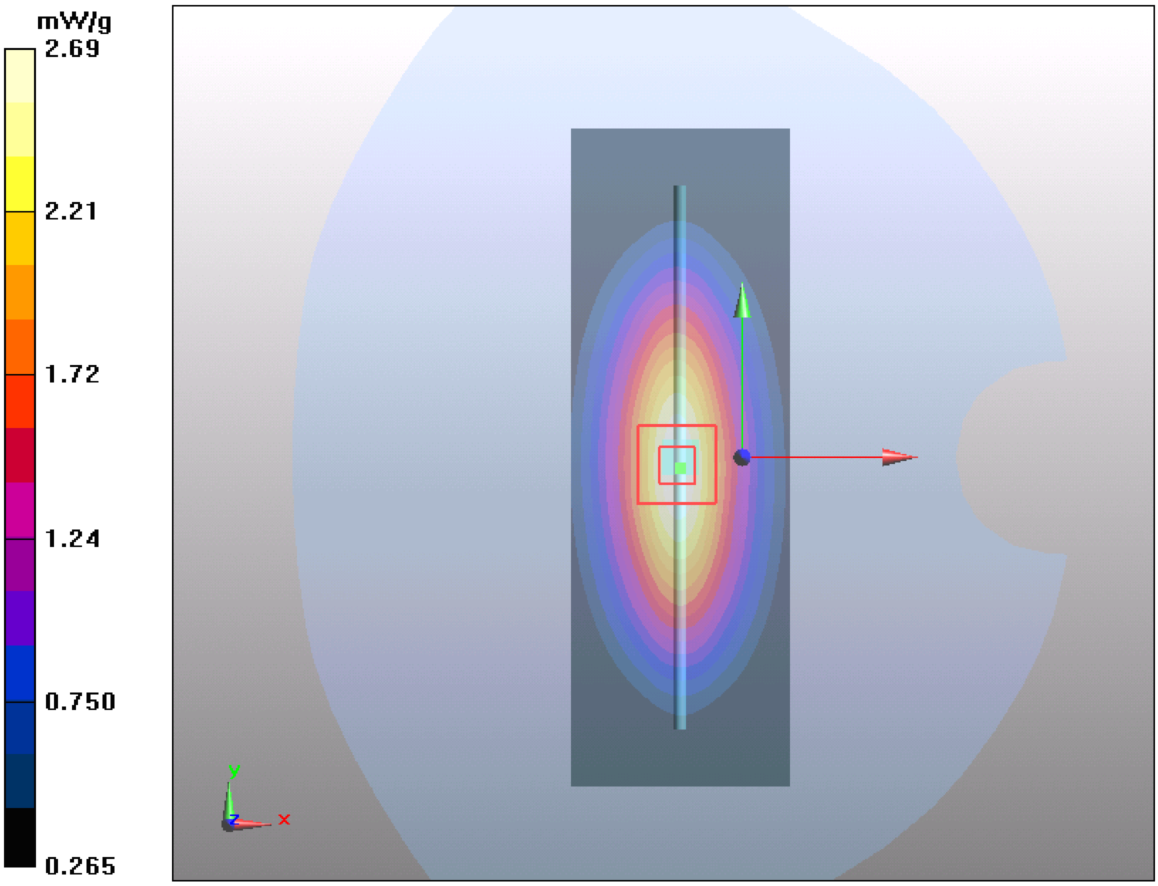


Figure 6 System Performance Check 835MHz 250mW

System Performance Check at 1900 MHz

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Date/Time: 2/28/2013 9:21:01 AM

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 52.56; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 11.8 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 83.1 V/m; Power Drift = 0.056 dB

Peak SAR (extrapolated) = 18.1 W/kg

SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.48 mW/g

Maximum value of SAR (measured) = 11.8 mW/g

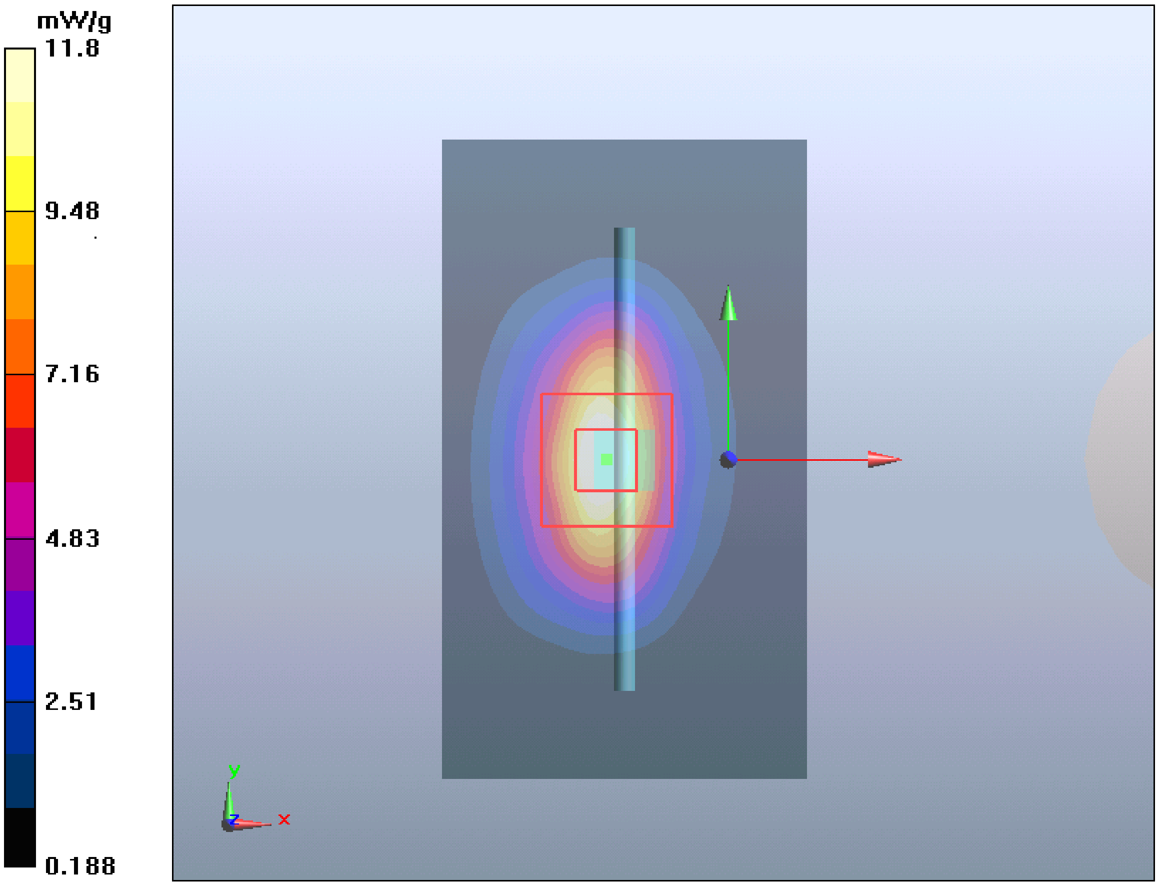


Figure 7 System Performance Check 1900MHz 250mW

System Performance Check at 2450 MHz Body TSL

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 786

Date/Time: 2/28/2013 2:02:59 PM

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2450 MHz; σ = 1.90 mho/m; ε_r = 51.69; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(3.96, 3.96, 3.96); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

d=10mm, Pin=250mW/Area Scan (41x71x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 16 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 81.2 V/m; Power Drift = 0.076 dB

Peak SAR (extrapolated) = 25.4 W/kg

SAR(1 g) = 12.9 mW/g; SAR(10 g) = 6.13 mW/g

Maximum value of SAR (measured) = 14.9 mW/g

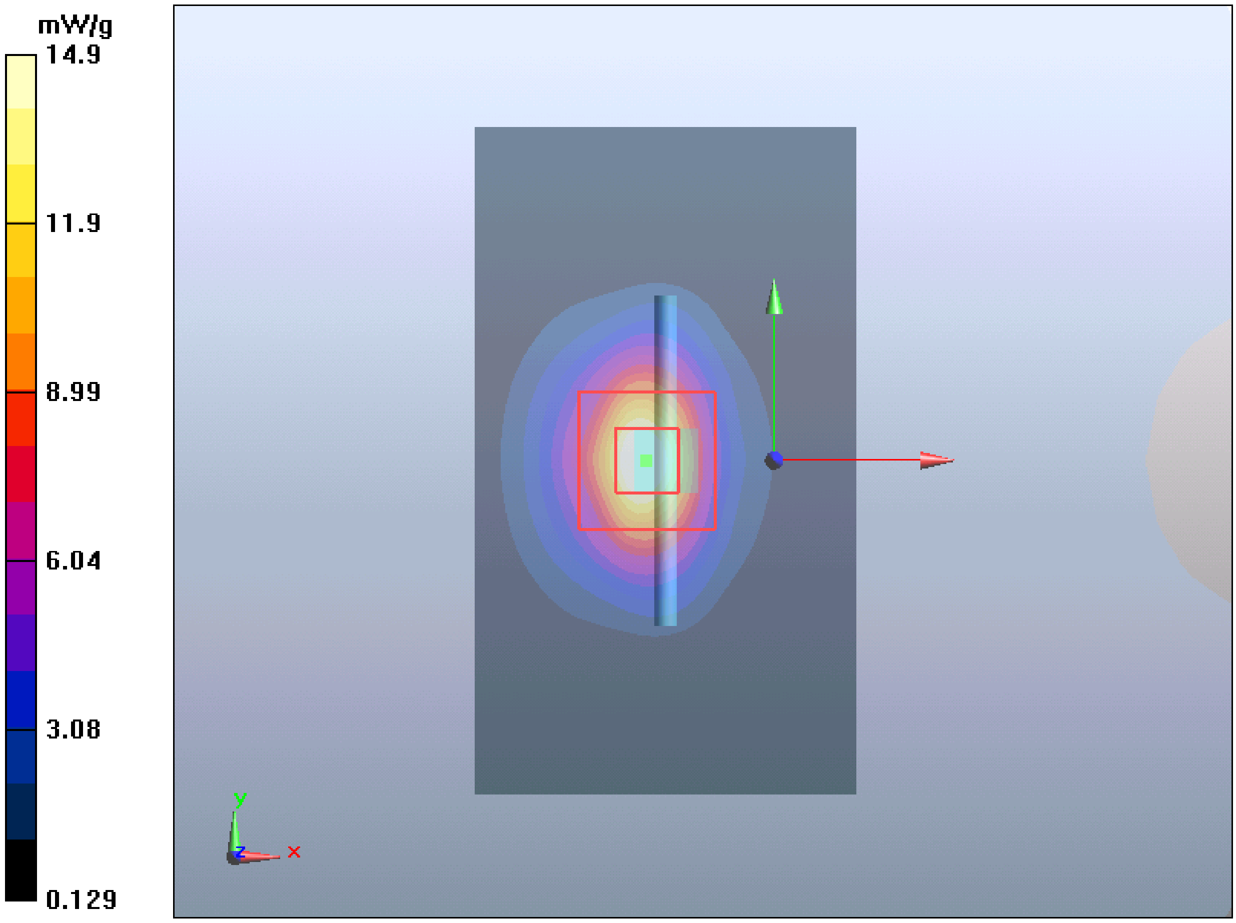


Figure 8 System Performance Check 2450MHz 250mW

ANNEX C: Graph Results

GSM 850 GPRS (2TXslots) Test Position 1 High(Battery 1)

Date/Time: 2/27/2013 5:09:12 PM

Communication System: GPRS 2TX ; Frequency: 848.8 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 849 MHz; σ = 1.01 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 1 High/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.679 mW/g

Test Position 1 High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 22.8 V/m; Power Drift = -0.075 dB

Peak SAR (extrapolated) = 0.883 W/kg

SAR(1 g) = 0.633 mW/g; SAR(10 g) = 0.432 mW/g

Maximum value of SAR (measured) = 0.675 mW/g

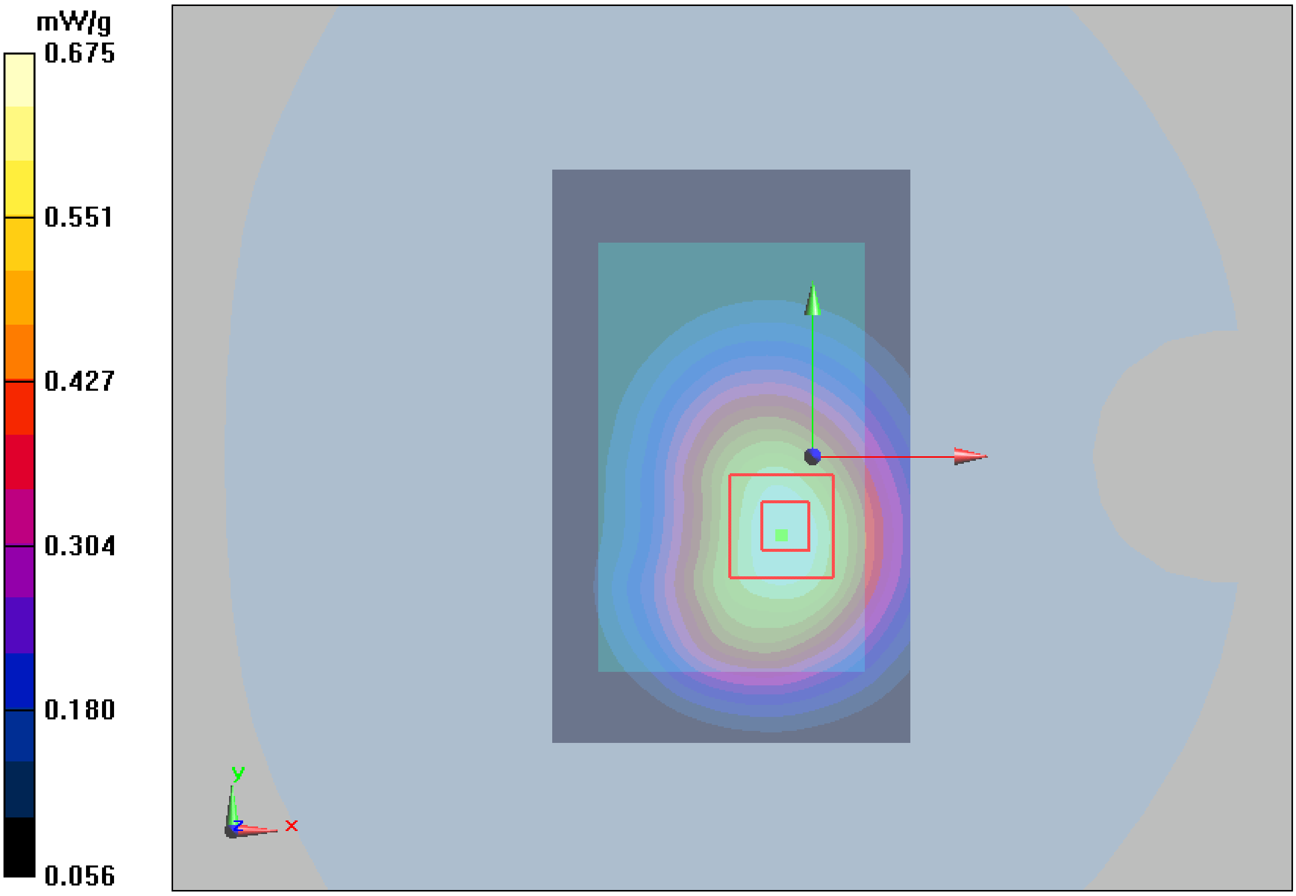


Figure 9 GSM 850 GPRS (2TXslots) Test Position 1 Channel 251

GSM 850 GPRS (2TXslots) Test Position 1 Middle(Battery 1)

Date/Time: 2/27/2013 4:48:26 PM

Communication System: GPRS 2TX ; Frequency: 836.6 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 1 Middle/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.781 mW/g

Test Position 1 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.4 V/m; Power Drift = -0.090 dB

Peak SAR (extrapolated) = 1.03 W/kg

SAR(1 g) = 0.732 mW/g; SAR(10 g) = 0.498 mW/g

Maximum value of SAR (measured) = 0.781 mW/g

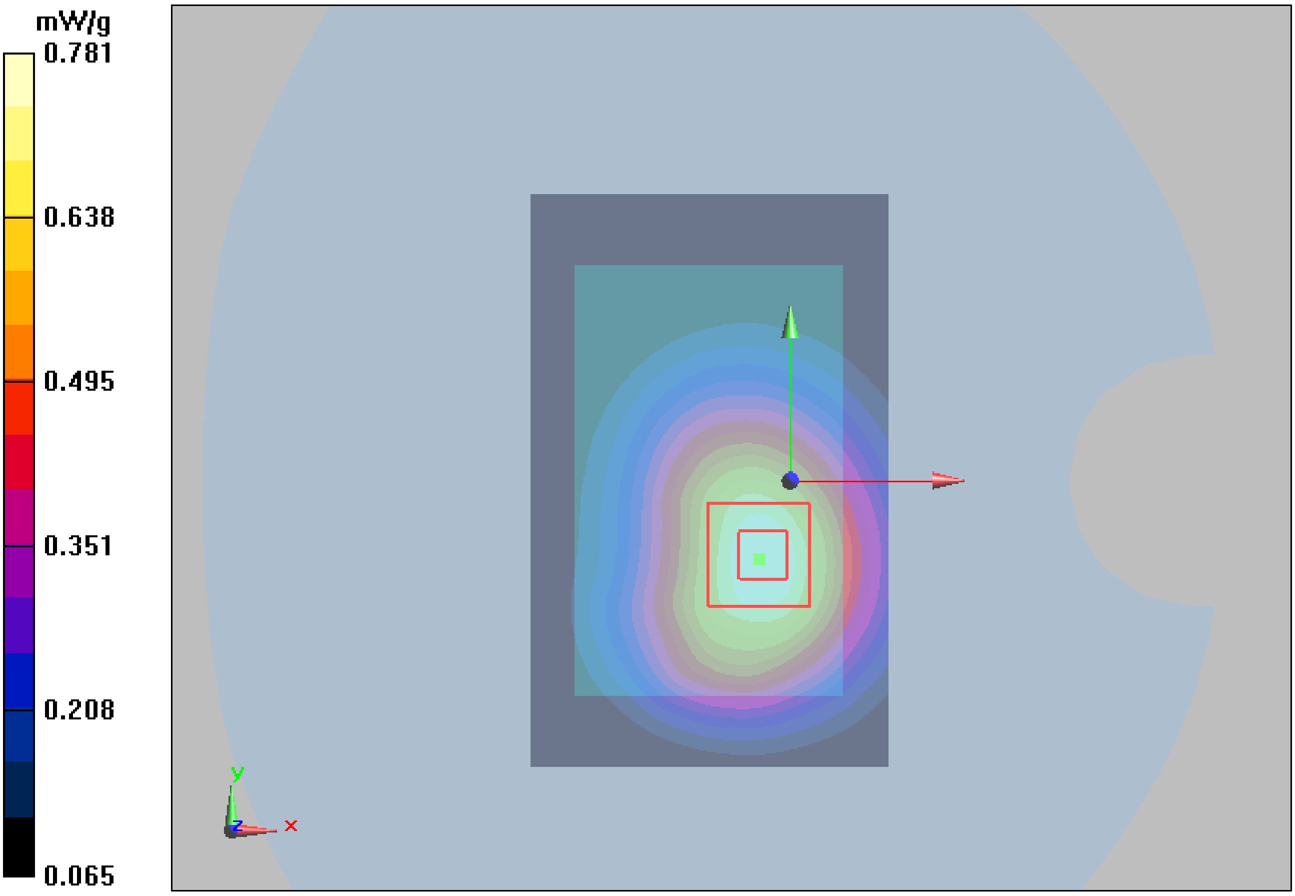


Figure 10 GSM 850 GPRS (2TXslots) Test Position 1 Channel 190

GSM 850 GPRS (2TXslots) Test Position 1 Low(Battery 1)

Date/Time: 2/27/2013 5:24:06 PM

Communication System: GPRS 2TX ; Frequency: 824.2 MHz;Duty Cycle: 1:4.14954

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.978 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 1 Low/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.865 mW/g

Test Position 1 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 25.8 V/m; Power Drift = -0.047 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.810 mW/g; SAR(10 g) = 0.555 mW/g

Maximum value of SAR (measured) = 0.863 mW/g

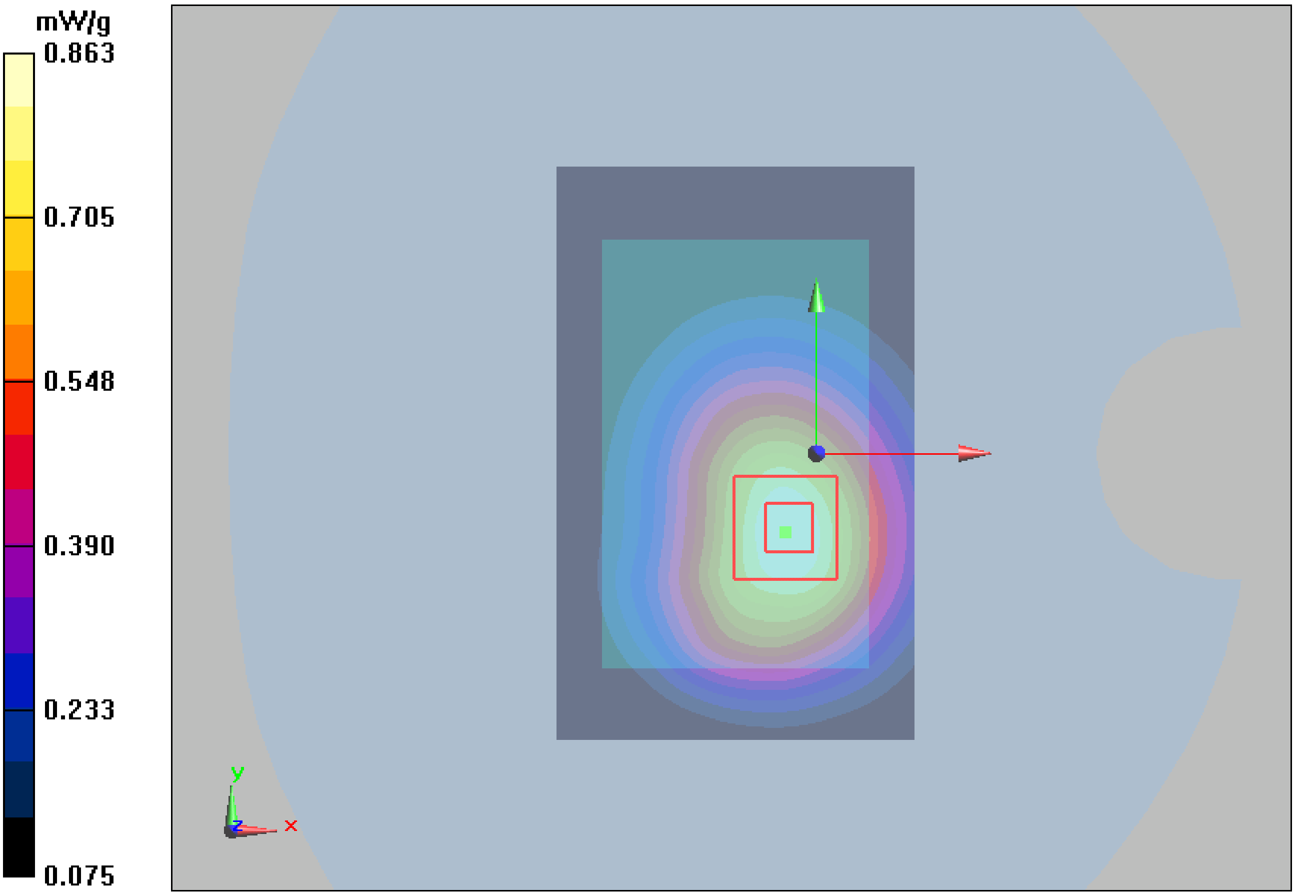


Figure 11 GSM 850 GPRS (2TXslots) Test Position 1 Channel 128

GSM 850 GPRS (2TXslots) Test Position 2 High(Battery 1)

Date/Time: 2/27/2013 2:56:49 PM

Communication System: GPRS 2TX ; Frequency: 848.8 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 849 MHz; σ = 1.01 mho/m; ε_r = 55.7; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 High/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.896 mW/g

Test Position 2 High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 24.1 V/m; Power Drift = -0.147 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.824 mW/g; SAR(10 g) = 0.554 mW/g

Maximum value of SAR (measured) = 0.876 mW/g

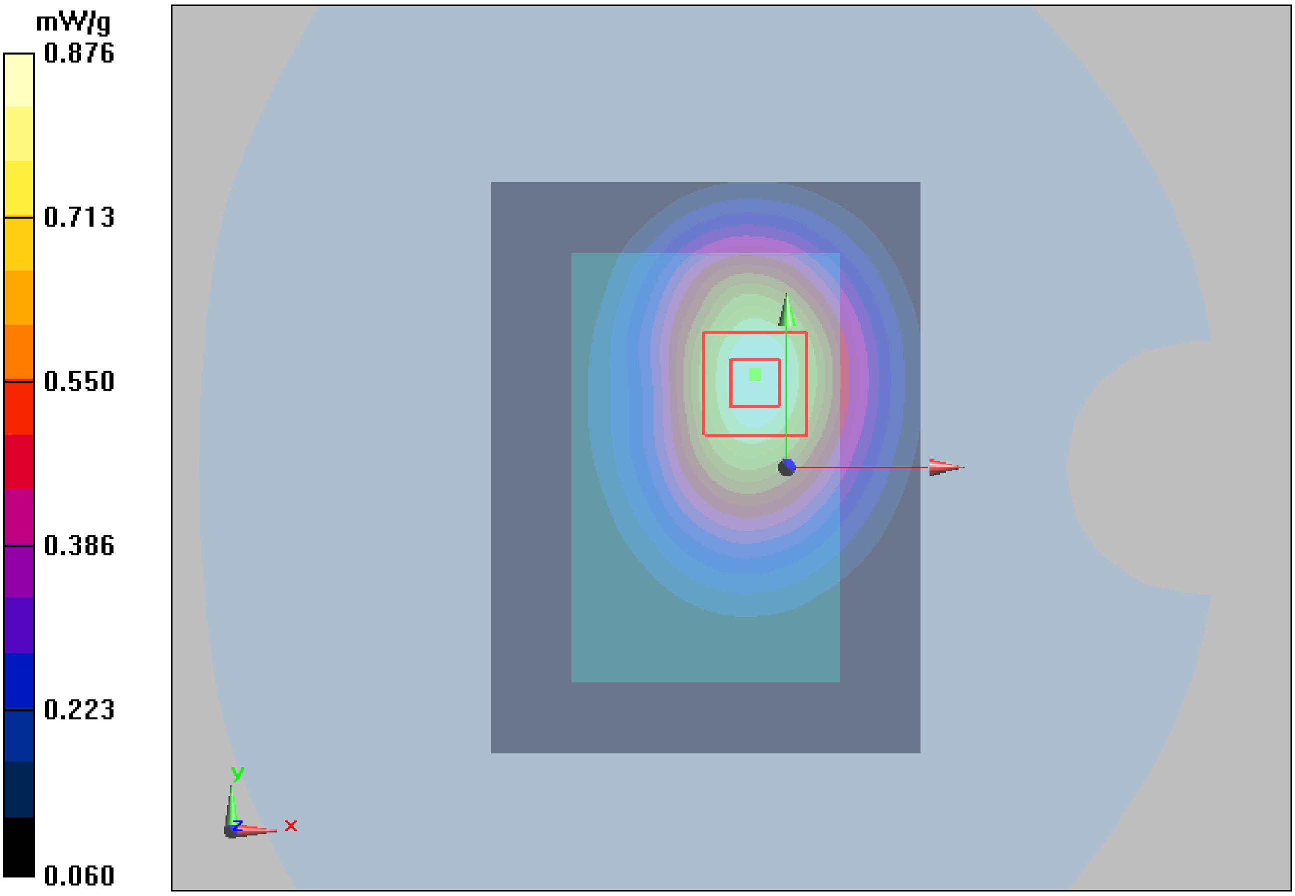


Figure 12 GSM 850 GPRS (2TXslots) Test Position 2 Channel 251

GSM 850 GPRS (2TXslots) Test Position 2 Middle(Battery 1)

Date/Time: 2/27/2013 2:40:55 PM

Communication System: GPRS 2TX ; Frequency: 836.6 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 Middle/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.01 mW/g

Test Position 2 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 26.1 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.935 mW/g; SAR(10 g) = 0.630 mW/g

Maximum value of SAR (measured) = 0.993 mW/g

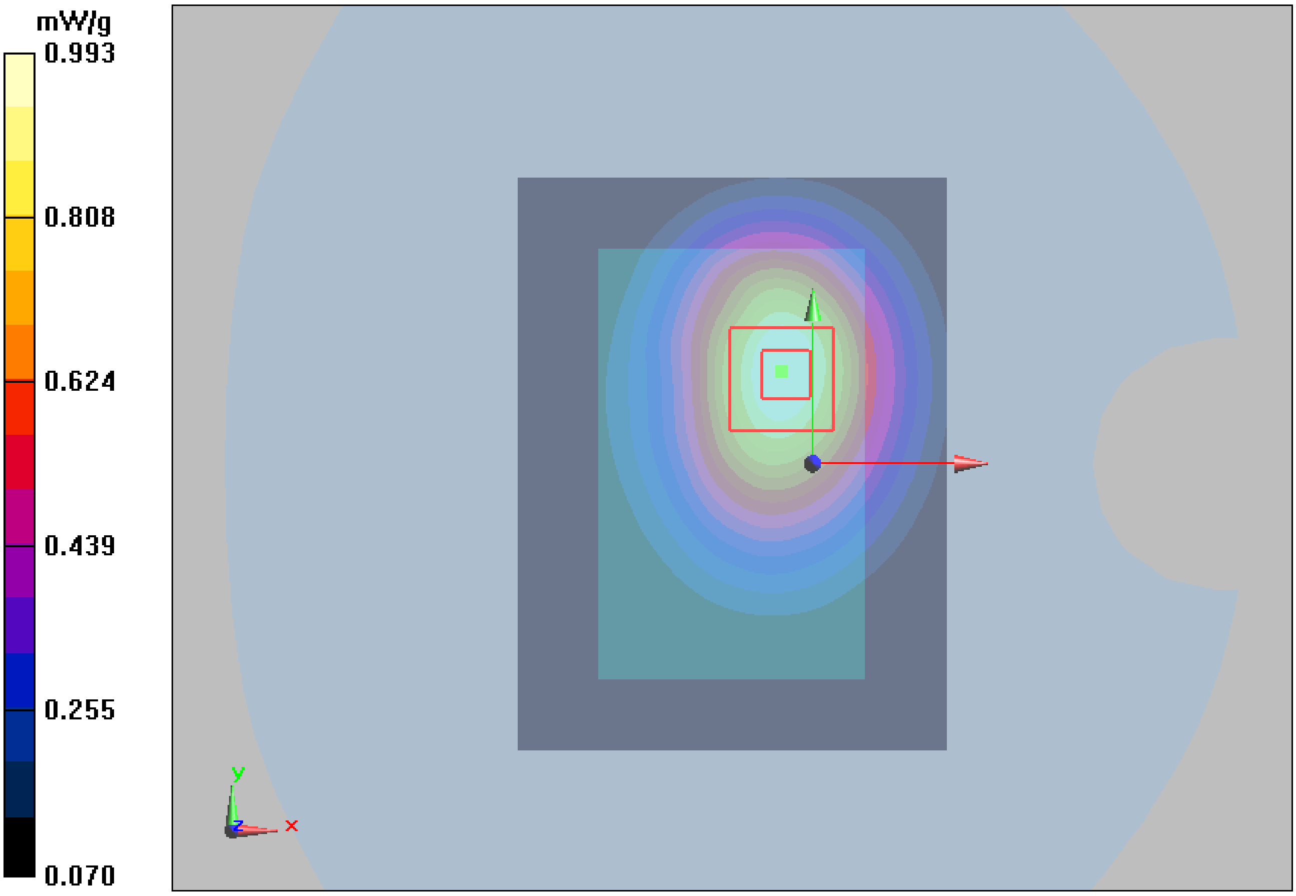


Figure 13 GSM 850 GPRS (2TXslots) Test Position 2 Channel 190

GSM 850 GPRS (2TXslots) Test Position 2 Low(Battery 1)

Date/Time: 2/27/2013 3:12:17 PM

Communication System: GPRS 2TX ; Frequency: 824.2 MHz;Duty Cycle: 1:4.14954

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.978 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 Low/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.15 mW/g

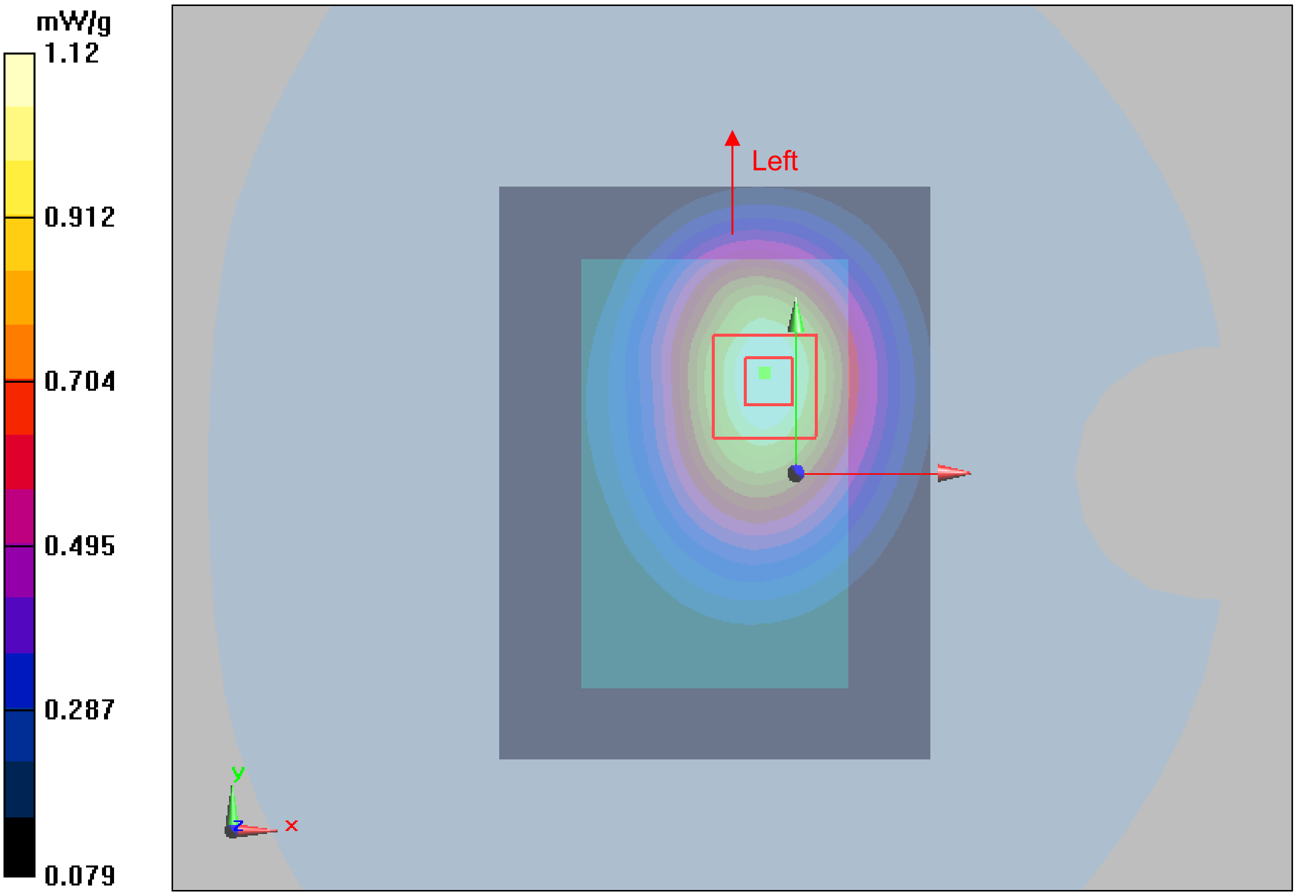
Test Position 2 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.4 V/m; Power Drift = -0.036 dB

Peak SAR (extrapolated) = 1.45 W/kg

SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.714 mW/g

Maximum value of SAR (measured) = 1.12 mW/g



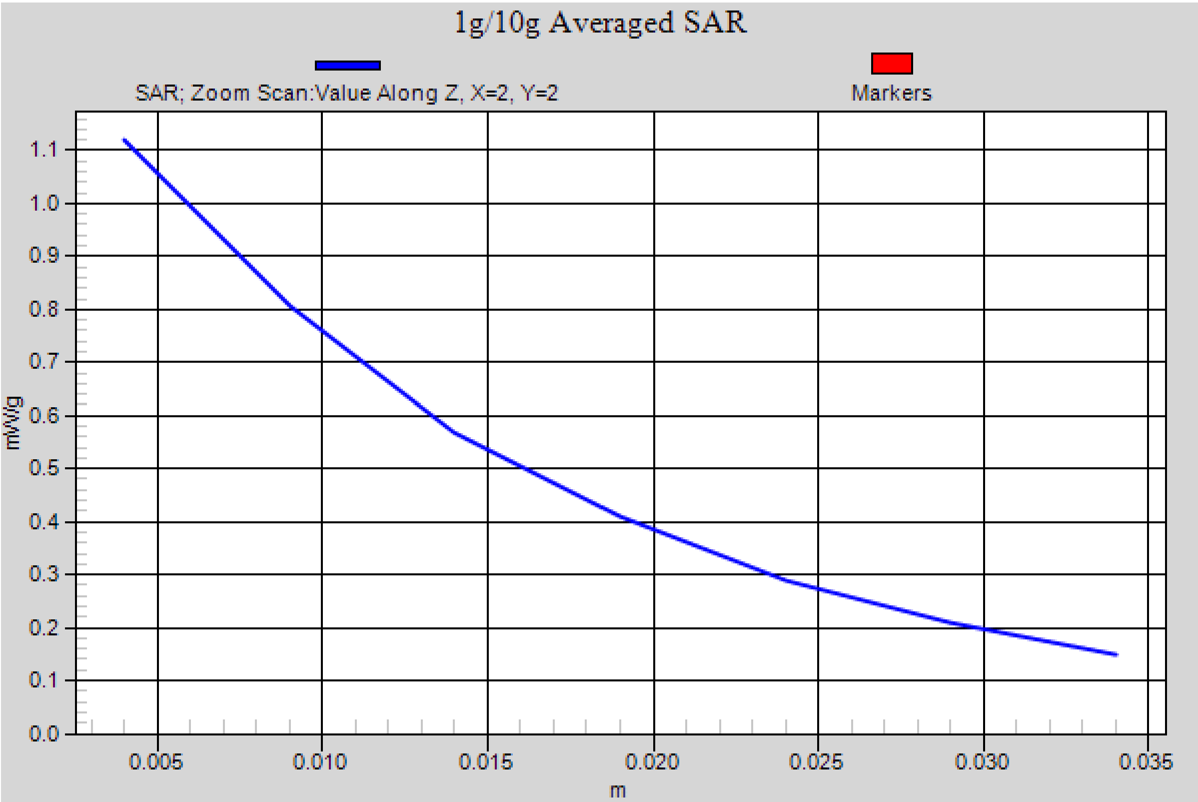


Figure 14 GSM 850 GPRS (2TXslots) Test Position 2 Channel 128

GSM 850 GPRS (2TXslots) Test Position 4 Middle(Battery 1)

Date/Time: 2/28/2013 9:49:11 AM

Communication System: GPRS 2TX ; Frequency: 836.6 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 4 Middle/Area Scan (31x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.099 mW/g

Test Position 4 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.2 V/m; Power Drift = -0.148 dB

Peak SAR (extrapolated) = 0.155 W/kg

SAR(1 g) = 0.092 mW/g; SAR(10 g) = 0.057 mW/g

Maximum value of SAR (measured) = 0.099 mW/g

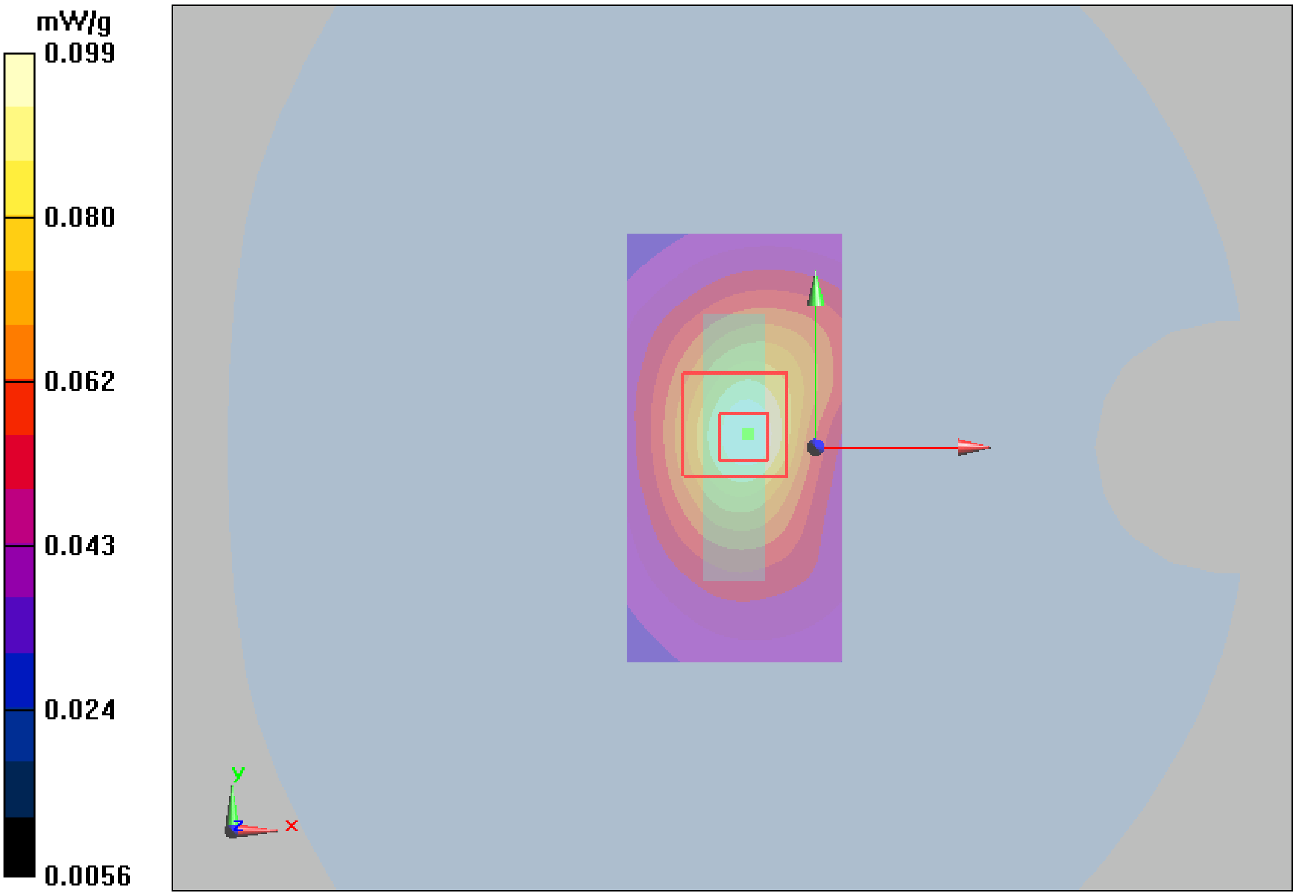


Figure 15 GSM 850 GPRS (2TXslots) Test Position 4 Channel 190

GSM 850 GPRS (2TXslots) Test Position 5 Middle(Battery 1)

Date/Time: 2/28/2013 10:04:15 AM

Communication System: GPRS 2TX ; Frequency: 836.6 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 5 Middle/Area Scan (31x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.244 mW/g

Test Position 5 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13.5 V/m; Power Drift = 0.044 dB

Peak SAR (extrapolated) = 0.302 W/kg

SAR(1 g) = 0.226 mW/g; SAR(10 g) = 0.160 mW/g

Maximum value of SAR (measured) = 0.240 mW/g

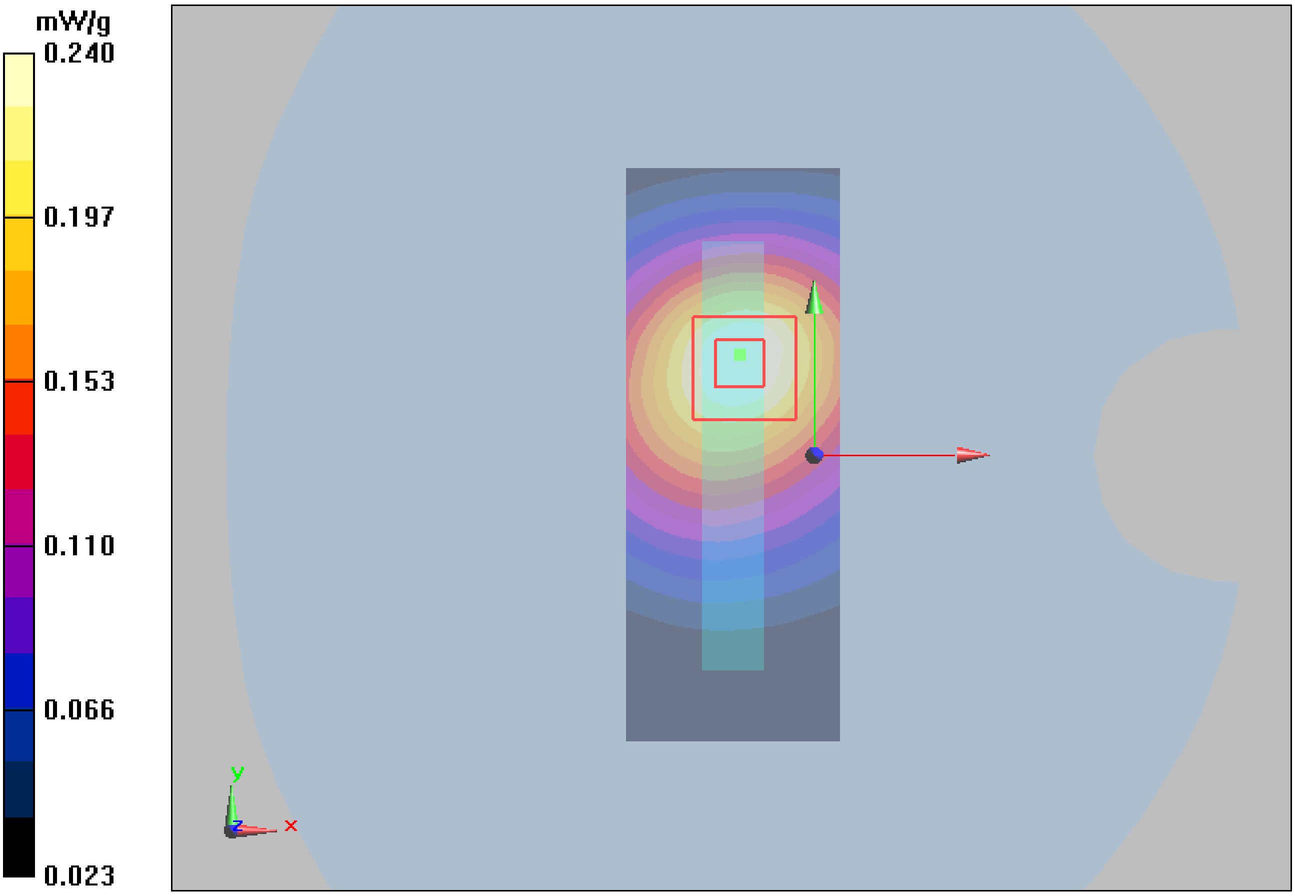


Figure 16 GSM 850 GPRS (2TXslots) Test Position 5 Channel 190

GSM 850 GPRS (2TXslots) Test Position 6 Middle(Battery 1)

Date/Time: 2/28/2013 10:17:56 AM

Communication System: GPRS 2TX ; Frequency: 836.6 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 837 MHz; σ = 0.992 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 6 Middle/Area Scan (31x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.294 mW/g

Test Position 6 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.9 V/m; Power Drift = -0.055 dB

Peak SAR (extrapolated) = 0.390 W/kg

SAR(1 g) = 0.273 mW/g; SAR(10 g) = 0.183 mW/g

Maximum value of SAR (measured) = 0.291 mW/g

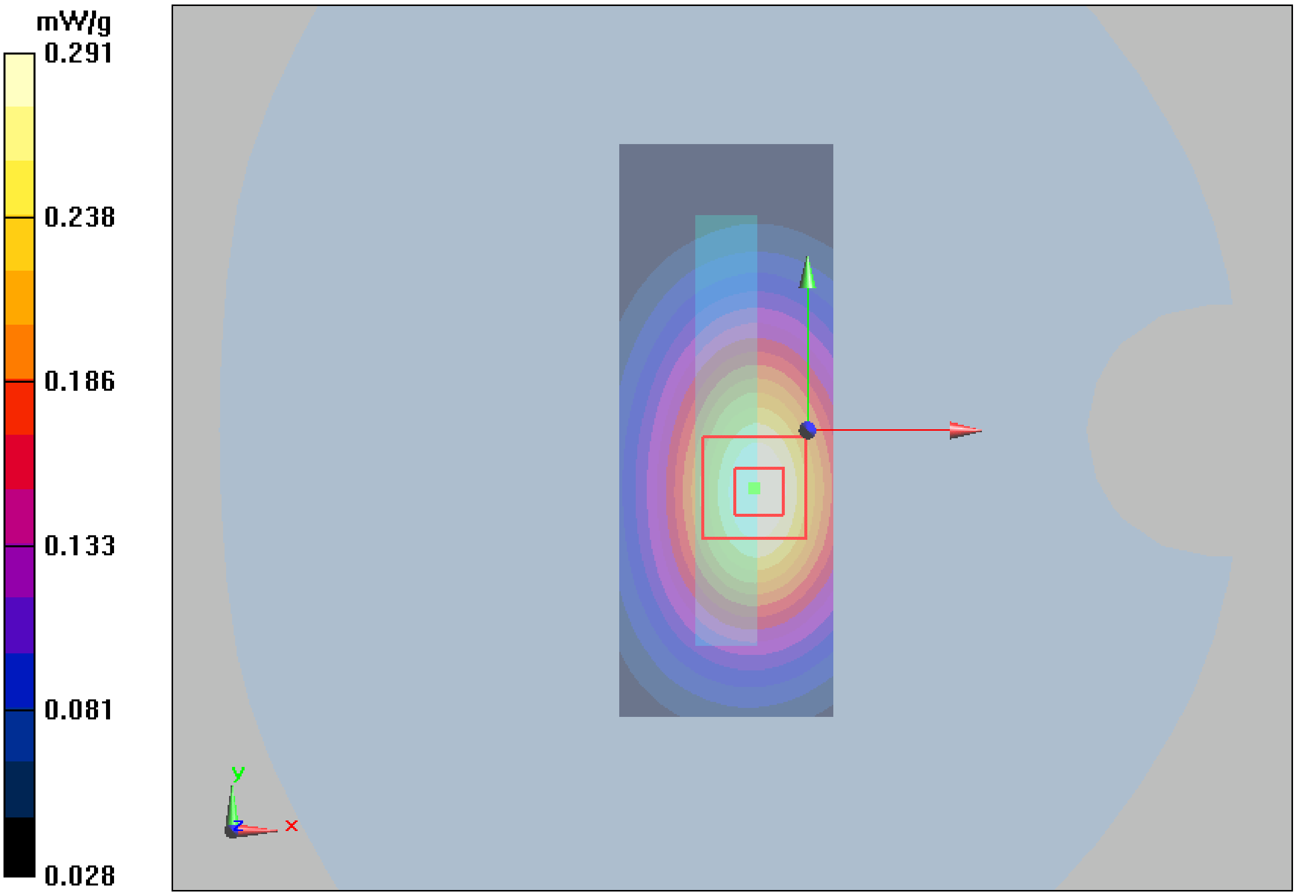


Figure 17 GSM 850 GPRS (2TXslots) Test Position 6 Channel 190

GSM 850 EGPRS (2TXslots) Test Position 2 Low(Battery 1)

Date/Time: 2/27/2013 4:14:32 PM

Communication System: EGPRS 2TX; Frequency: 824.2 MHz;Duty Cycle: 1:4.14954

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.978 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 Low/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.14 mW/g

Test Position 2 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.4 V/m; Power Drift = -0.167 dB

Peak SAR (extrapolated) = 1.46 W/kg

SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.705 mW/g

Maximum value of SAR (measured) = 1.11 mW/g

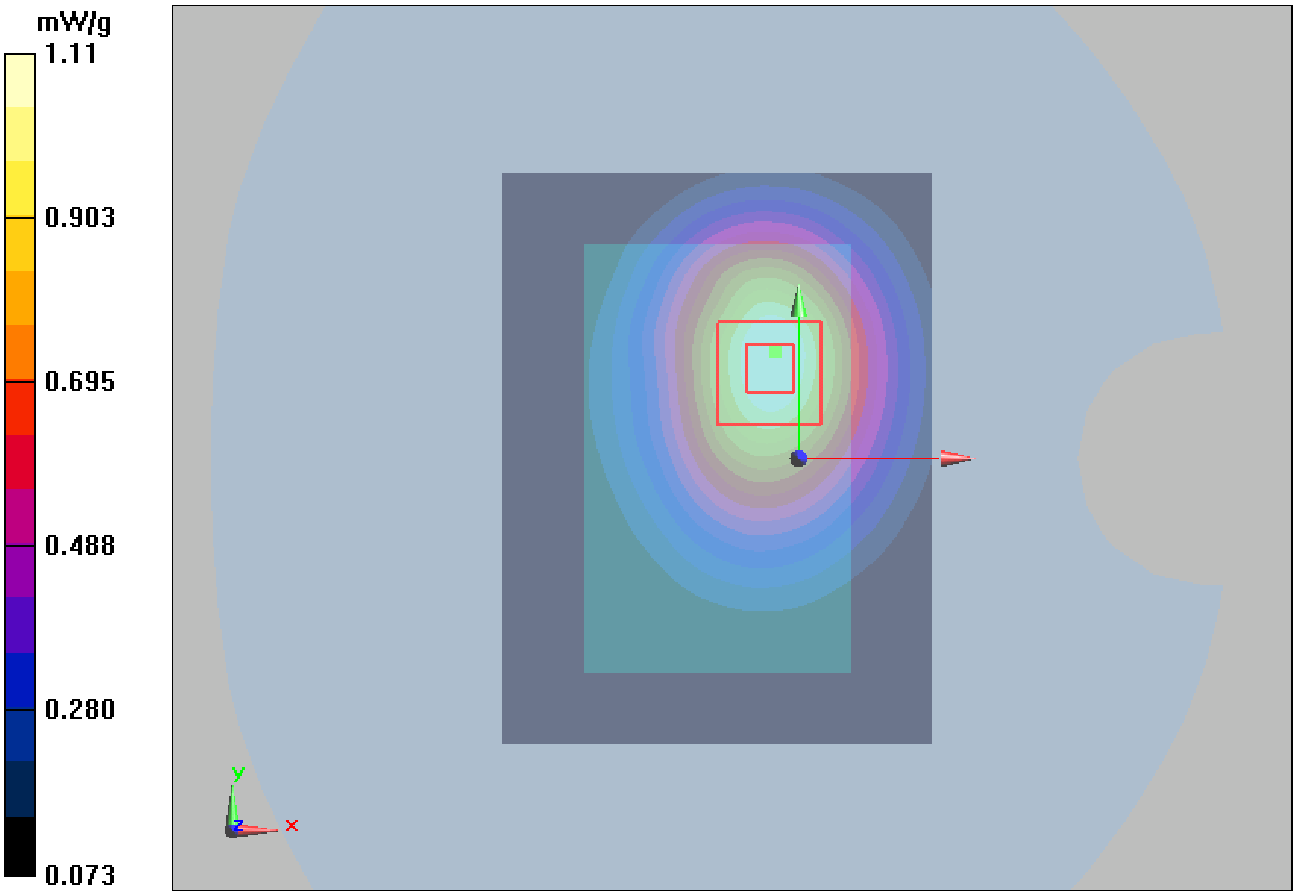


Figure 18 GSM 850 EGPRS (2TXslots) Test Position 2 Channel 128

GSM 850 GPRS (2TXslots) Test Position 2 Low(Battery 2)

Date/Time: 2/27/2013 4:31:32 PM

Communication System: GPRS 2TX ; Frequency: 824.2 MHz;Duty Cycle: 1:4.14954

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.978 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 Low/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.13 mW/g

Test Position 2 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.1 V/m; Power Drift = -0.124 dB

Peak SAR (extrapolated) = 1.45 W/kg

SAR(1 g) = 1.04 mW/g; SAR(10 g) = 0.705 mW/g

Maximum value of SAR (measured) = 1.12 mW/g

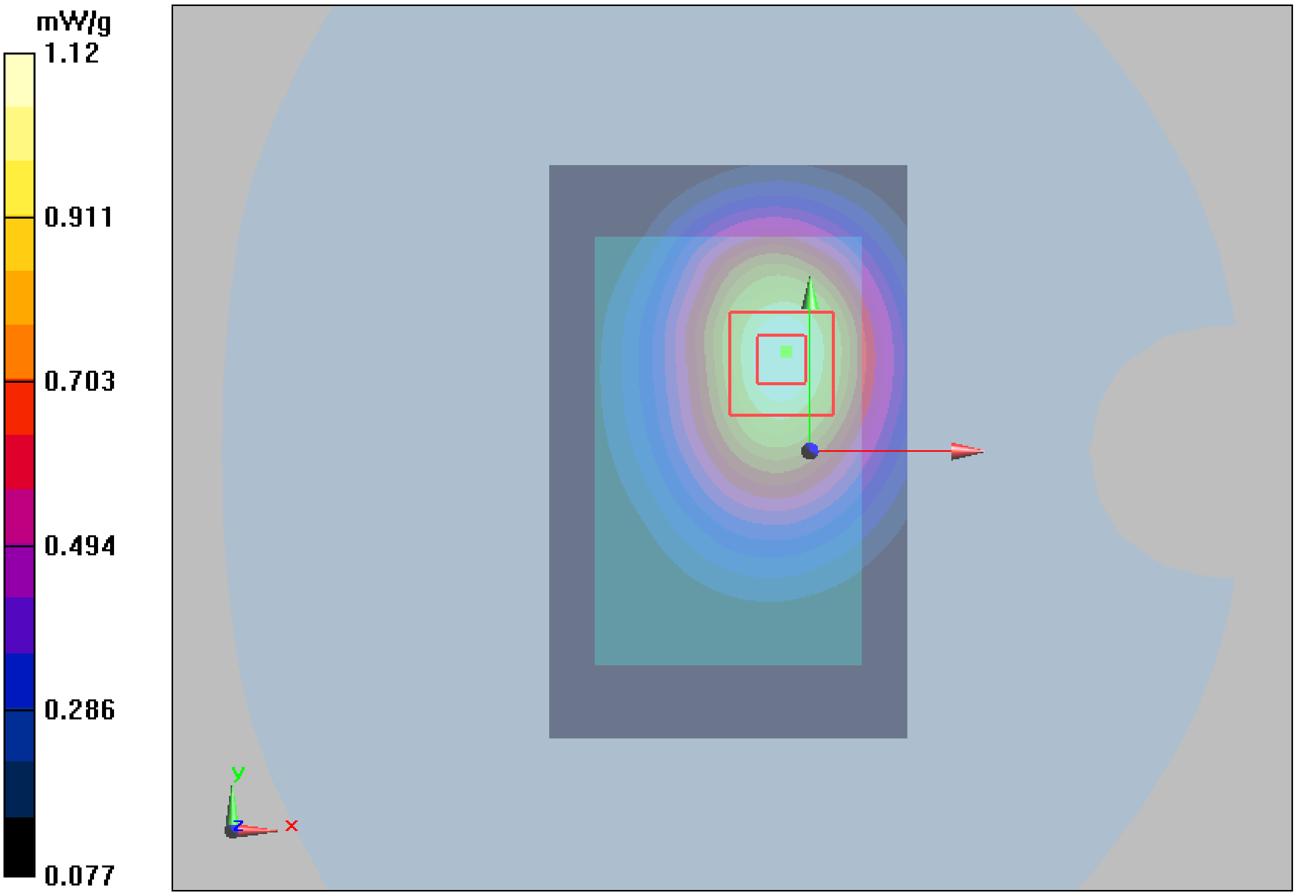


Figure 19 GSM 850 GPRS (2TXslots) Test Position 2 Channel 128

GSM 850 GPRS (2TXslots) Test Position 2 Low(Battery 1, 1st Repeated SAR)

Date/Time: 2/27/2013 3:29:30 PM

Communication System: GPRS 2TX ; Frequency: 824.2 MHz;Duty Cycle: 1:4.14954

Medium parameters used (interpolated): f = 824.2 MHz; σ = 0.978 mho/m; ε_r = 55.9; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(5.81, 5.81, 5.81); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM1; Type: SAM; Serial: TP-1534

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 Low/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.1 mW/g

Test Position 2 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 27.3 V/m; Power Drift = -0.100 dB

Peak SAR (extrapolated) = 1.43 W/kg

SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.693 mW/g

Maximum value of SAR (measured) = 1.09 mW/g

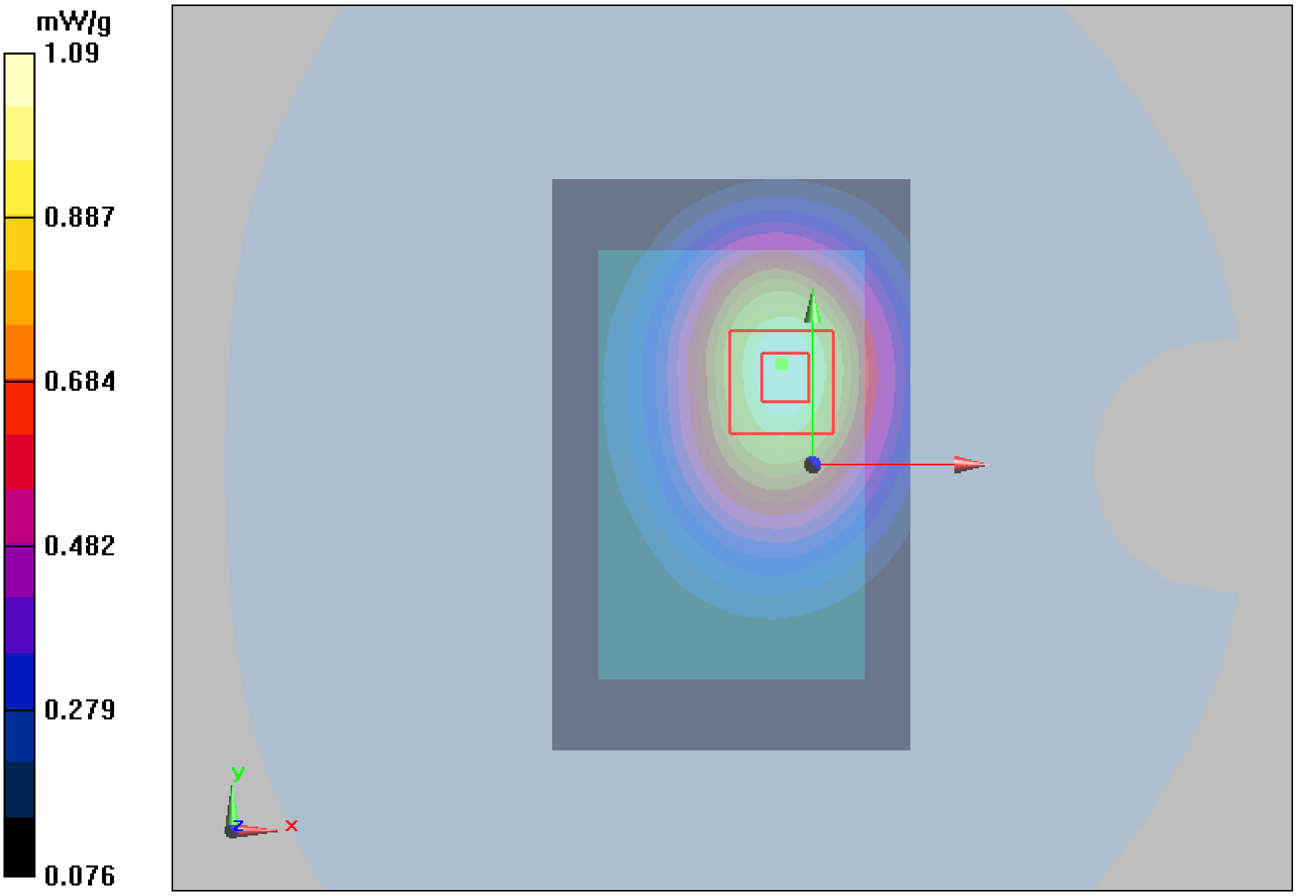


Figure 20 GSM 850 GPRS (2TXslots) Test Position 2 Channel 128

GSM 1900 GPRS (2TXslots) Test Position 1 Middle(Battery 1)

Date/Time: 2/28/2013 11:40:59 AM

Communication System: GPRS 2TX ; Frequency: 1880 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 1 Middle/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.683 mW/g

Test Position 1 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.8 V/m; Power Drift = 0.123 dB

Peak SAR (extrapolated) = 0.926 W/kg

SAR(1 g) = 0.621 mW/g; SAR(10 g) = 0.395 mW/g

Maximum value of SAR (measured) = 0.669 mW/g

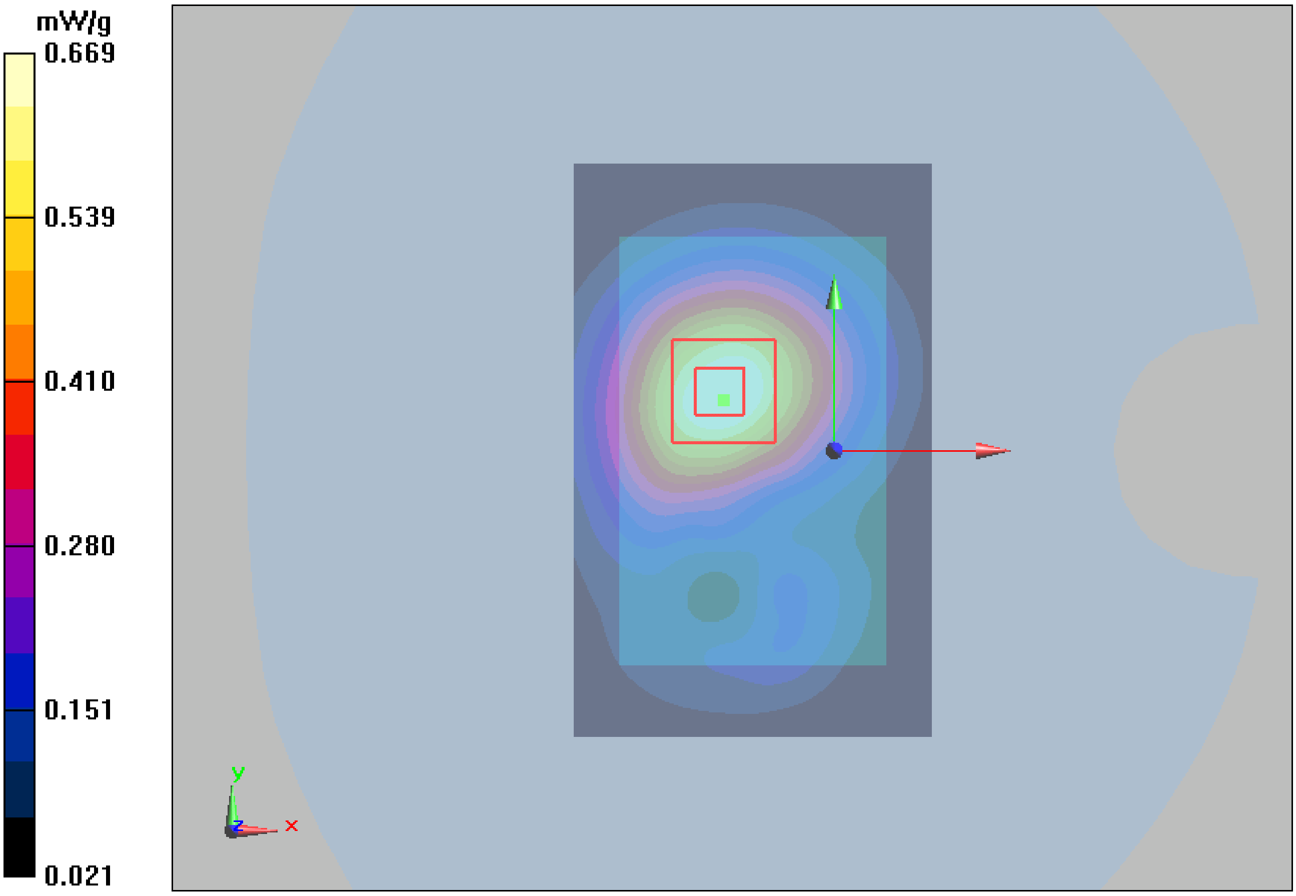


Figure 21 GSM 1900 GPRS (2TXslots) Test Position 1 Channel 661

GSM 1900 GPRS (2TXslots) Test Position 2 High(Battery 1)

Date/Time: 2/28/2013 12:11:02 PM

Communication System: GPRS 2TX ; Frequency: 1909.8 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 1910 MHz; σ = 1.53 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 High/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.798 mW/g

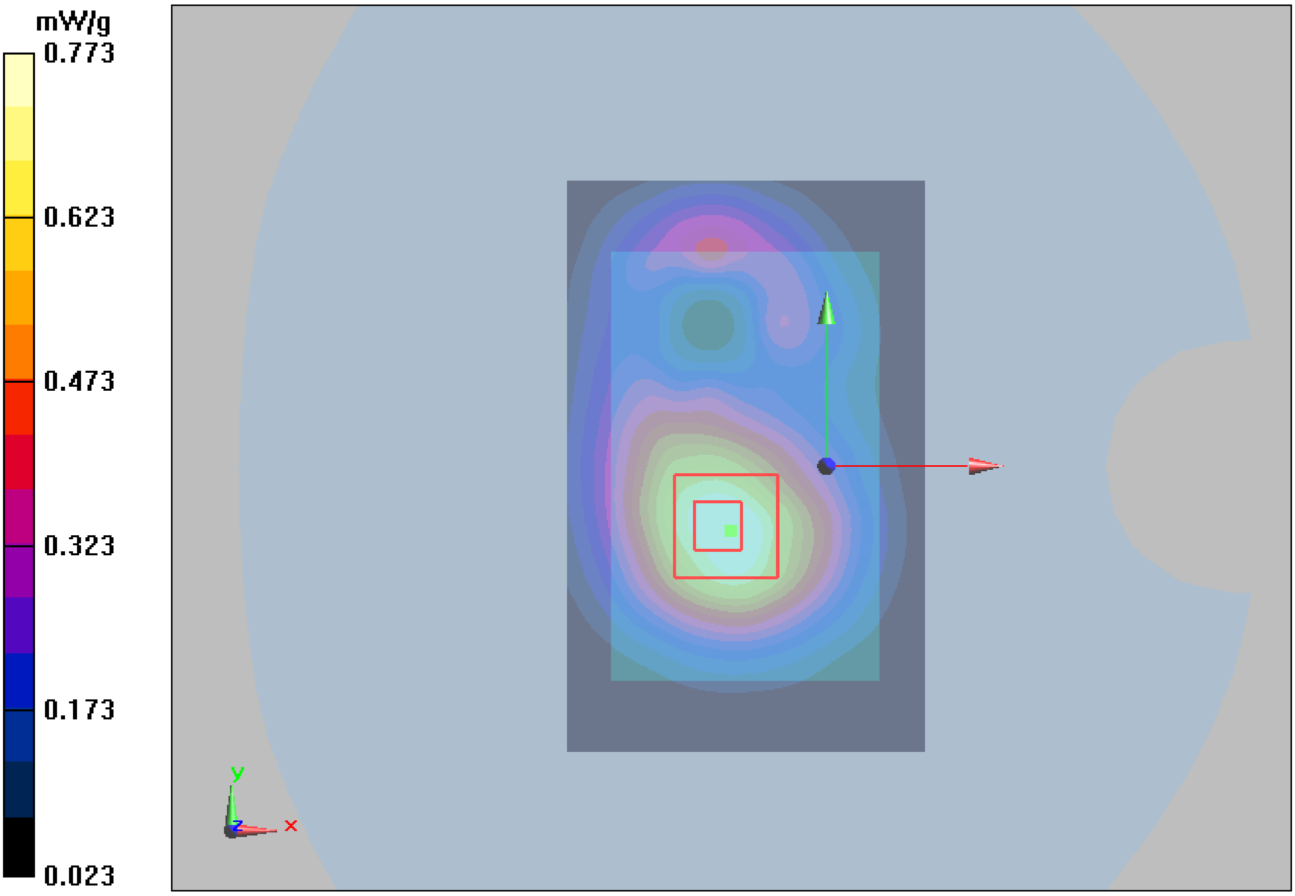
Test Position 2 High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.3 V/m; Power Drift = 0.070 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.719 mW/g; SAR(10 g) = 0.451 mW/g

Maximum value of SAR (measured) = 0.773 mW/g



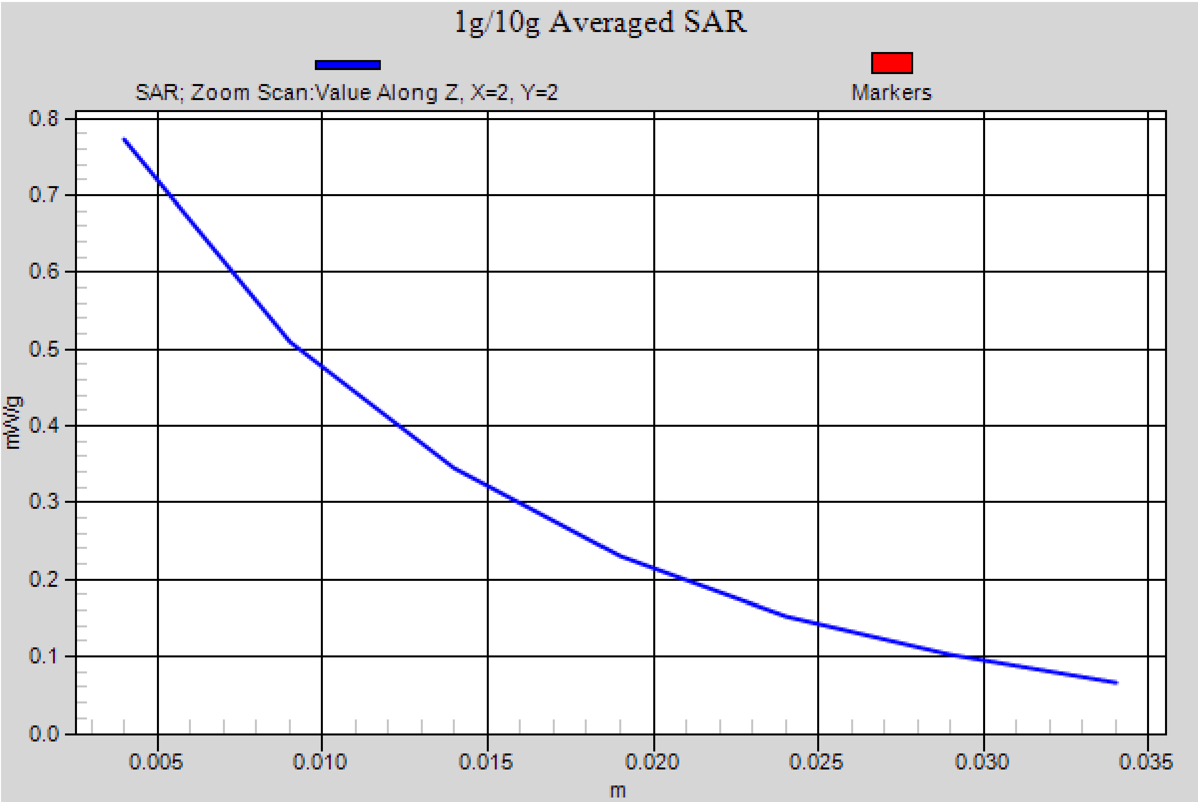


Figure 22 GSM 1900 GPRS (2TXslots) Test Position 2 Channel 810

GSM 1900 GPRS (2TXslots) Test Position 2 Middle(Battery 1)

Date/Time: 2/28/2013 11:56:28 AM

Communication System: GPRS 2TX ; Frequency: 1880 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 Middle/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.779 mW/g

Test Position 2 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.9 V/m; Power Drift = 0.088 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.697 mW/g; SAR(10 g) = 0.446 mW/g

Maximum value of SAR (measured) = 0.746 mW/g

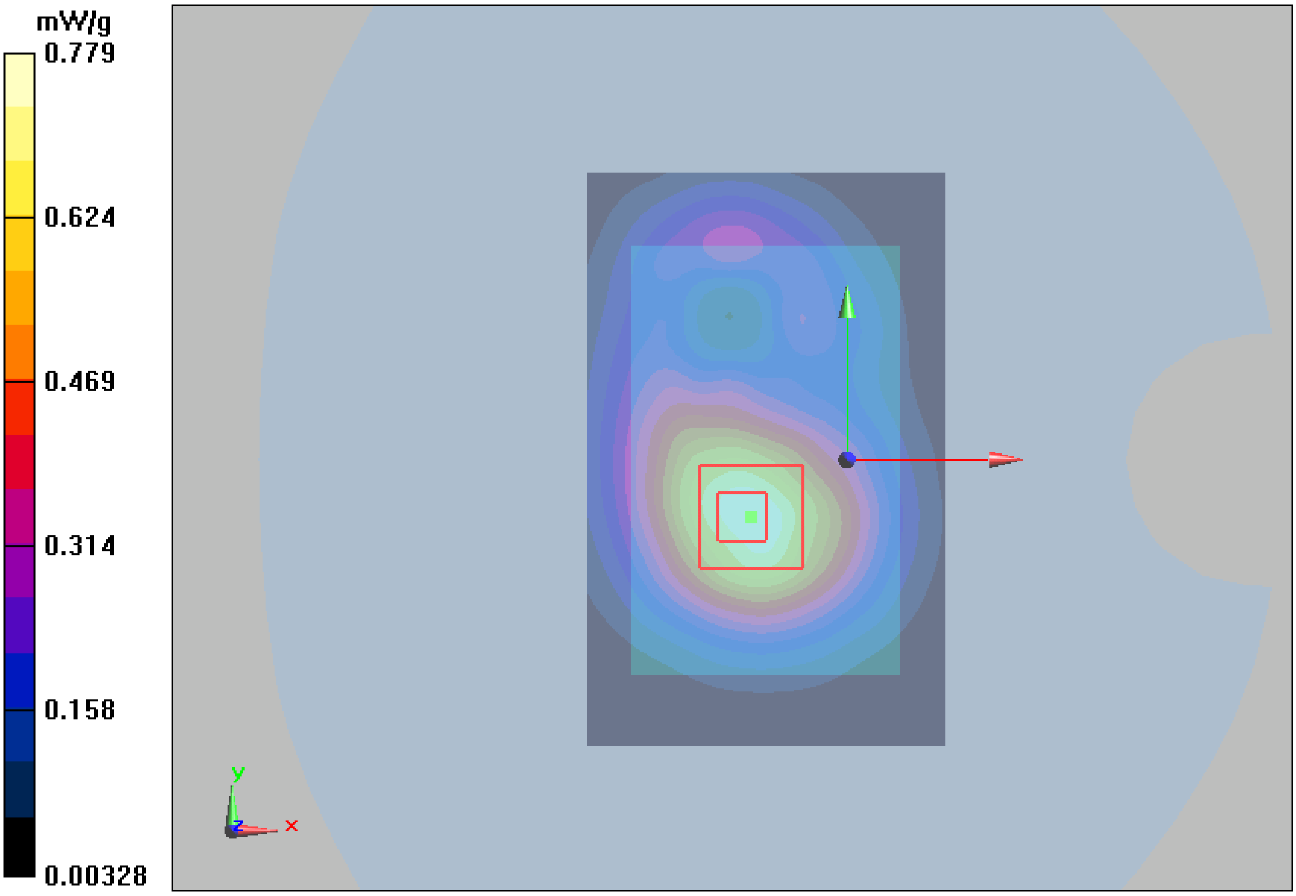


Figure 23 GSM 1900 GPRS (2TXslots) Test Position 2 Channel 661

GSM 1900 GPRS (2TXslots) Test Position 2 Low(Battery 1)

Date/Time: 2/28/2013 12:25:57 PM

Communication System: GPRS 2TX ; Frequency: 1850.2 MHz;Duty Cycle: 1:4.14954

Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.47 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 Low/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.763 mW/g

Test Position 2 Low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.5 V/m; Power Drift = -0.011 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.680 mW/g; SAR(10 g) = 0.441 mW/g

Maximum value of SAR (measured) = 0.729 mW/g

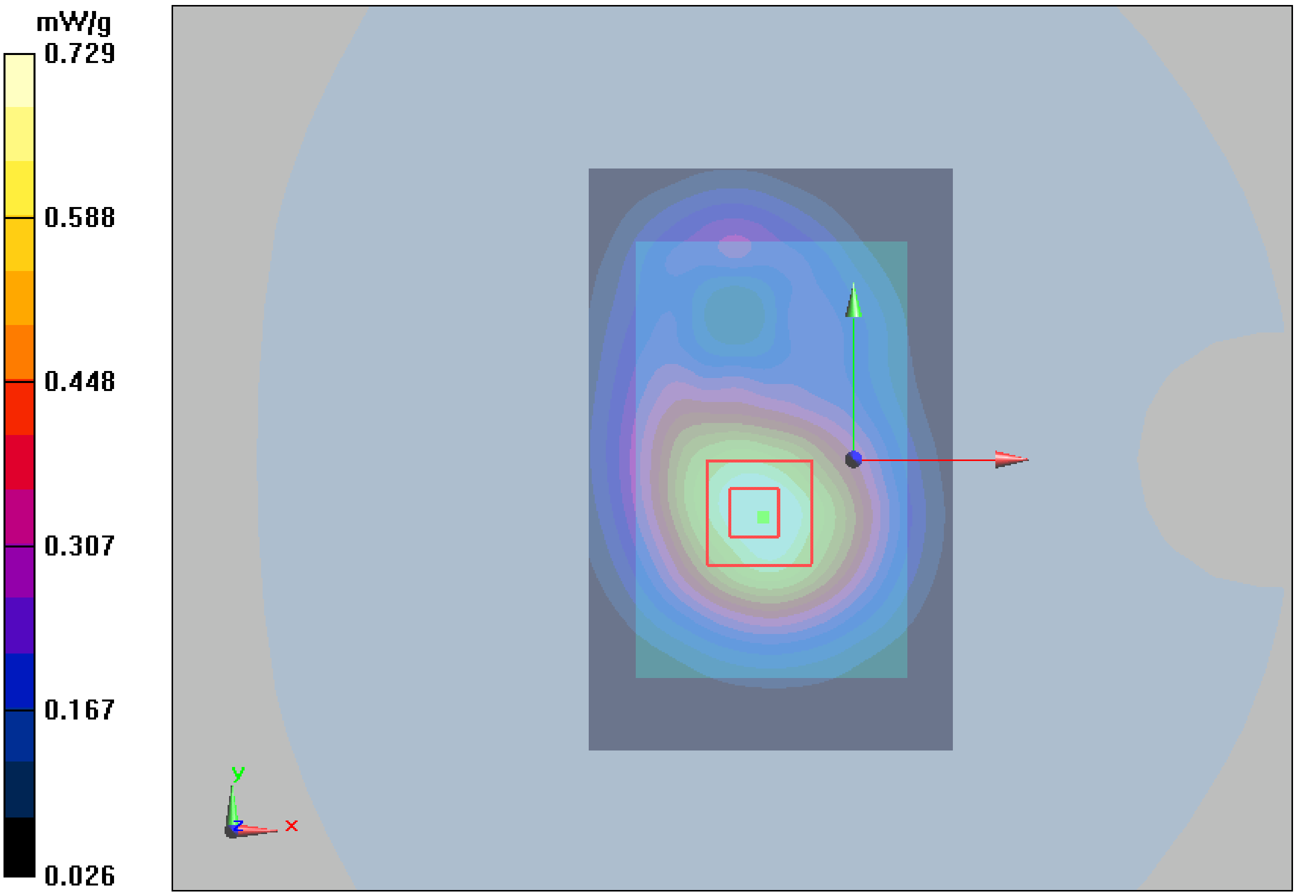


Figure 24 GSM 1900 GPRS (2TXslots) Test Position 2 Channel 512

GSM 1900 GPRS (2TXslots) Test Position 4 Middle(Battery 1)

Date/Time: 2/28/2013 11:27:37 AM

Communication System: GPRS 2TX ; Frequency: 1880 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 4 Middle/Area Scan (31x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.208 mW/g

Test Position 4 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12 V/m; Power Drift = -0.062 dB

Peak SAR (extrapolated) = 0.371 W/kg

SAR(1 g) = 0.200 mW/g; SAR(10 g) = 0.099 mW/g

Maximum value of SAR (measured) = 0.223 mW/g

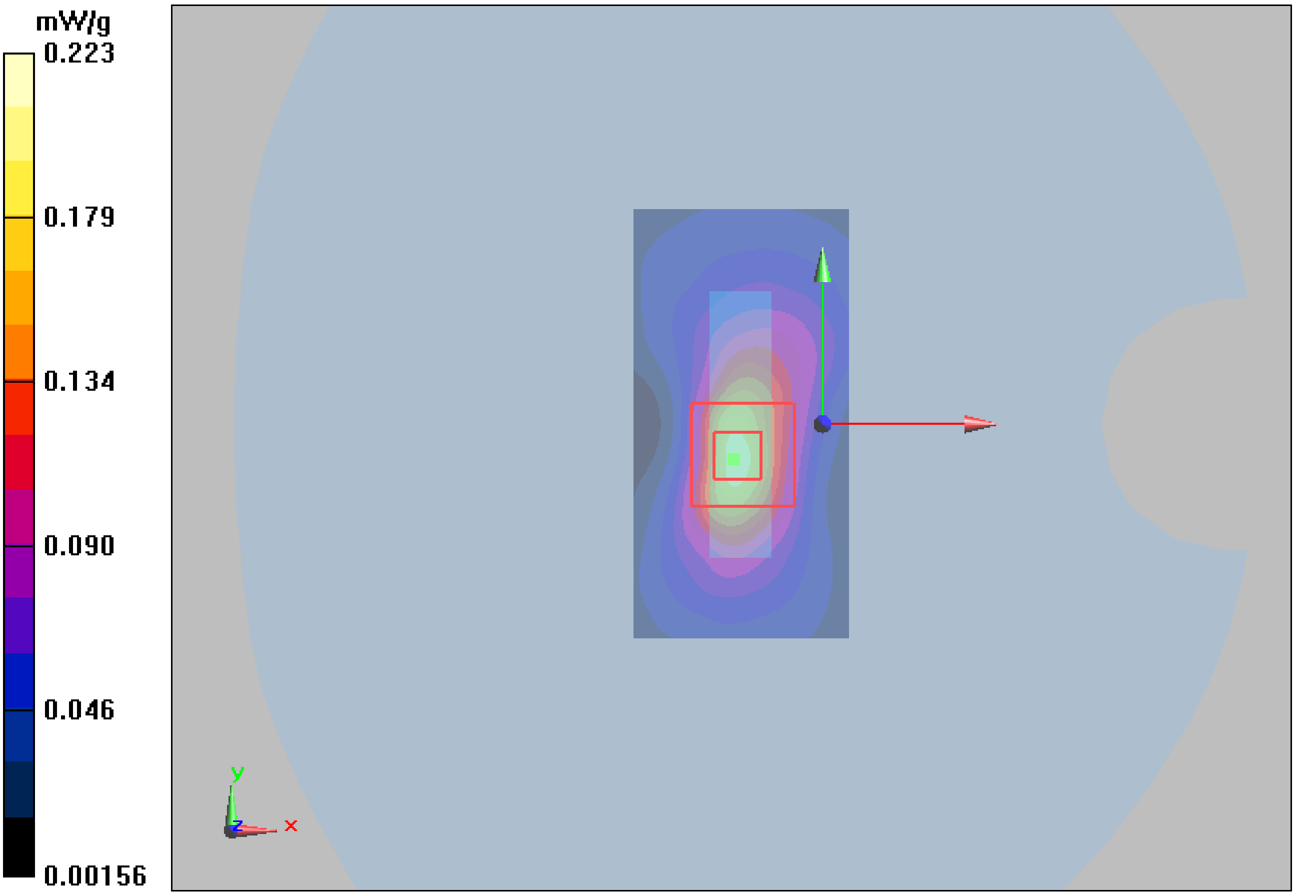


Figure 25 GSM 1900 GPRS (2TXslots) Test Position 4 Channel 661

GSM 1900 GPRS (2TXslots) Test Position 5 Middle(Battery 1)

Date/Time: 2/28/2013 11:13:47 AM

Communication System: GPRS 2TX ; Frequency: 1880 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 5 Middle/Area Scan (31x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.255 mW/g

Test Position 5 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 13 V/m; Power Drift = 0.076 dB

Peak SAR (extrapolated) = 0.360 W/kg

SAR(1 g) = 0.234 mW/g; SAR(10 g) = 0.147 mW/g

Maximum value of SAR (measured) = 0.252 mW/g

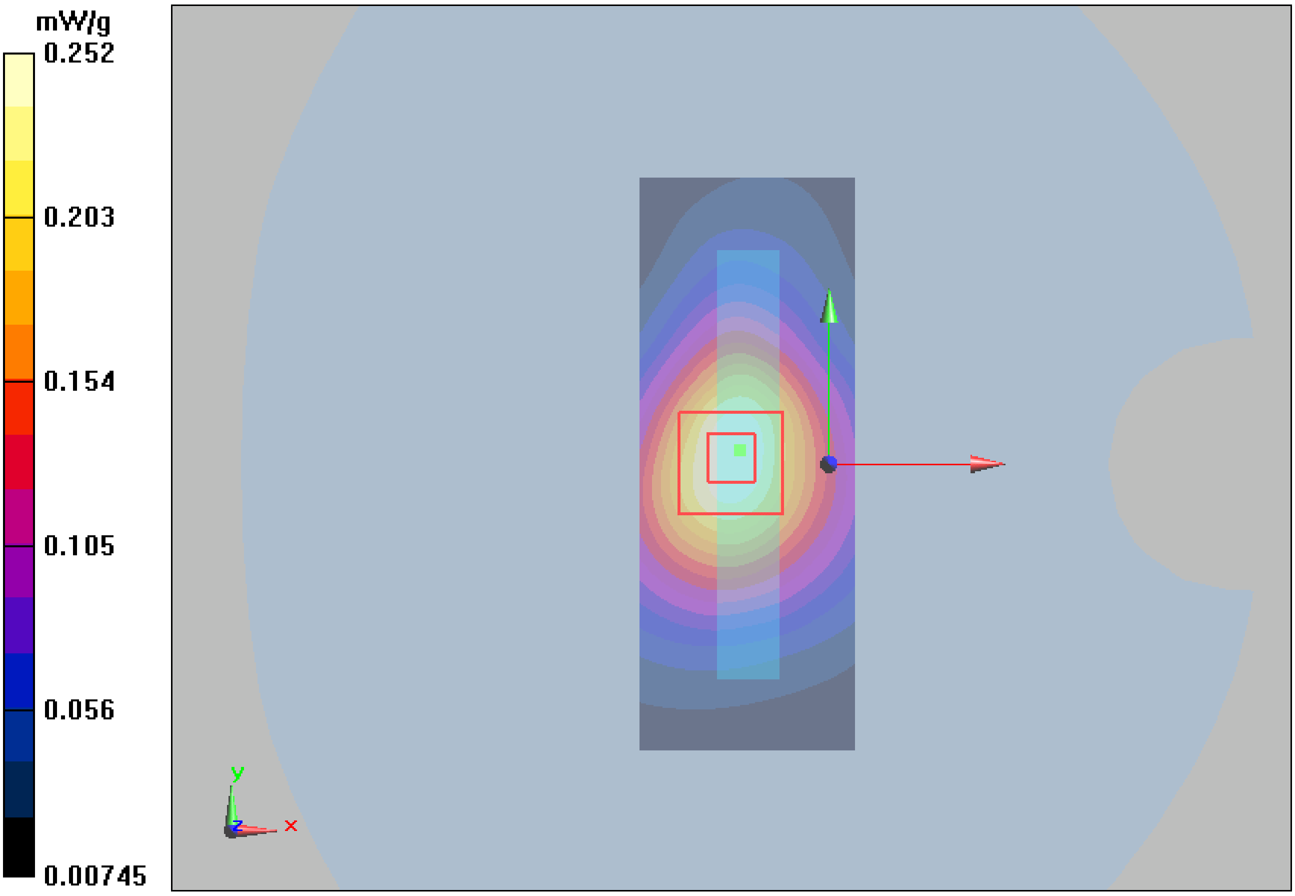


Figure 26 GSM 1900 GPRS (2TXslots) Test Position 5 Channel 661

GSM 1900 GPRS (2TXslots) Test Position 6 Middle(Battery 1)

Date/Time: 2/28/2013 10:59:00 AM

Communication System: GPRS 2TX ; Frequency: 1880 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 1880 MHz; σ = 1.5 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 6 Middle/Area Scan (31x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.150 mW/g

Test Position 6 Middle/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 8.89 V/m; Power Drift = -0.116 dB

Peak SAR (extrapolated) = 0.222 W/kg

SAR(1 g) = 0.134 mW/g; SAR(10 g) = 0.080 mW/g

Maximum value of SAR (measured) = 0.147 mW/g

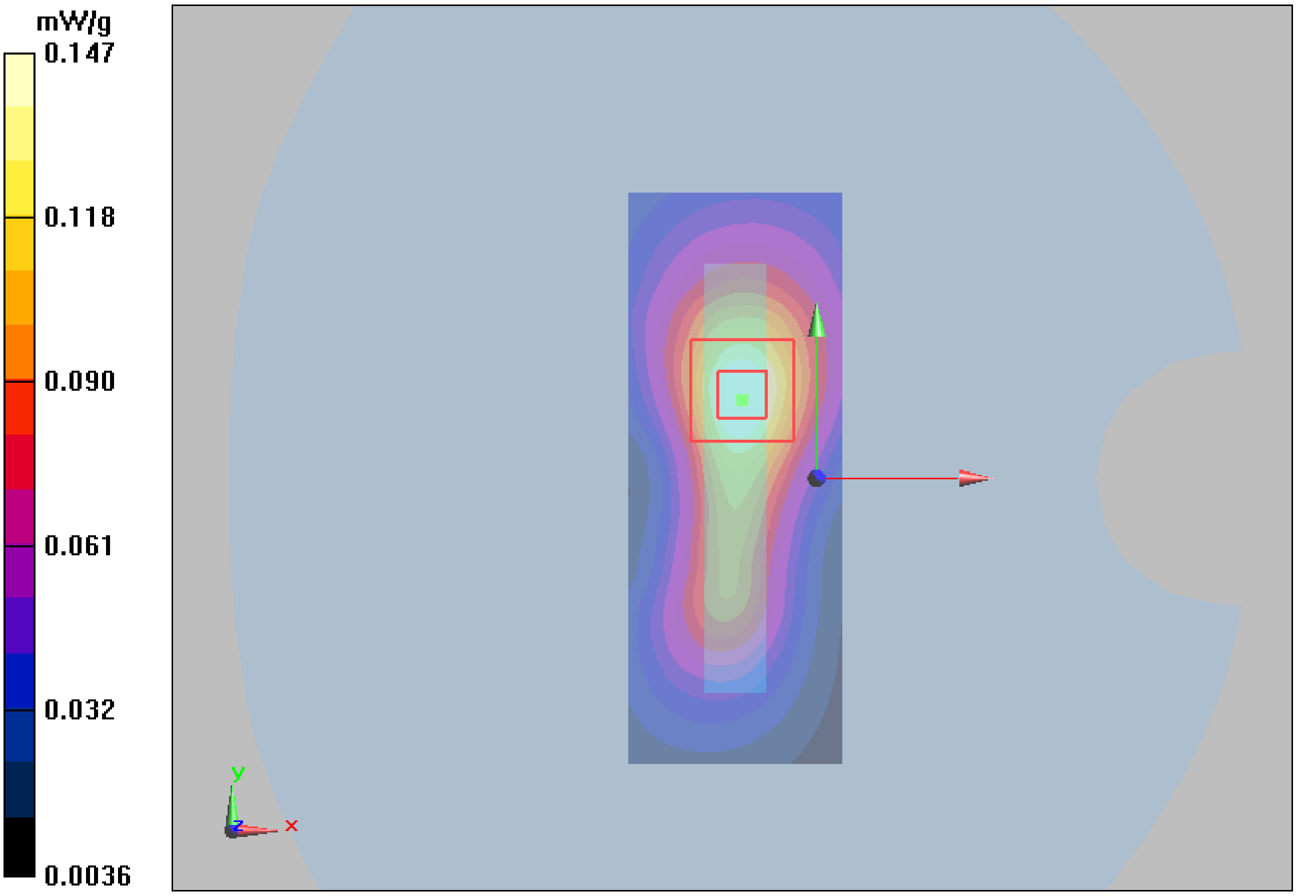


Figure 27 GSM 1900 GPRS (2TXslots) Test Position 6 Channel 661

GSM 1900 EGPRS (2TXslots) Test Position 2 High(Battery 1)

Date/Time: 2/28/2013 12:42:26 PM

Communication System: EGPRS 2TX; Frequency: 1909.8 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 1910 MHz; σ = 1.53 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 High/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.798 mW/g

Test Position 2 High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.4 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.714 mW/g; SAR(10 g) = 0.450 mW/g

Maximum value of SAR (measured) = 0.763 mW/g

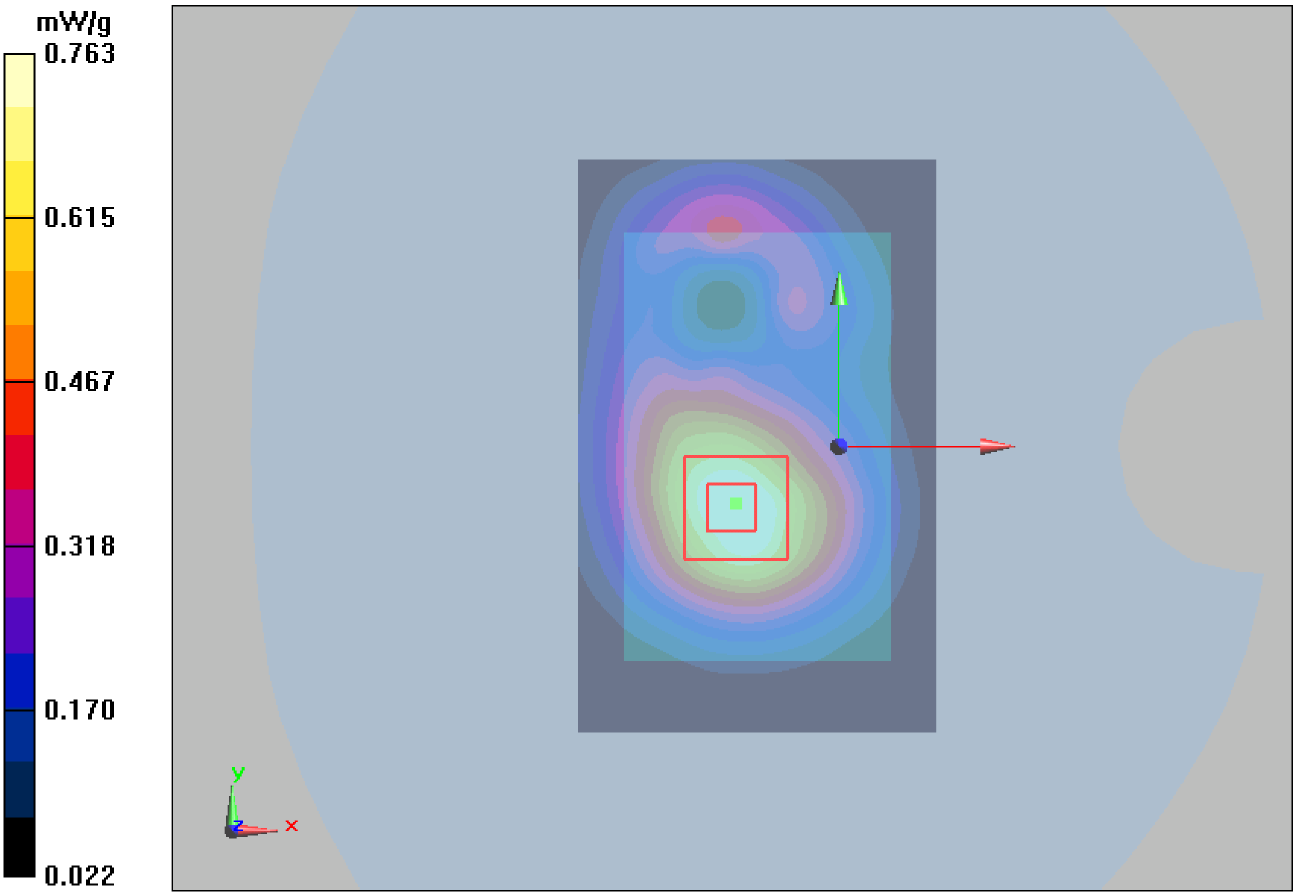


Figure 28 GSM 1900 EGPRS (2TXslots) Test Position 2 Channel 810

GSM 1900 GPRS (2TXslots) Test Position 2 High(Battery 2)

Date/Time: 2/28/2013 12:57:28 PM

Communication System: GPRS 2TX ; Frequency: 1909.8 MHz;Duty Cycle: 1:4.14954

Medium parameters used: f = 1910 MHz; σ = 1.53 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(4.36, 4.36, 4.36); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 High/Area Scan (51x81x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.799 mW/g

Test Position 2 High/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.3 V/m; Power Drift = 0.027 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.715 mW/g; SAR(10 g) = 0.452 mW/g

Maximum value of SAR (measured) = 0.767 mW/g

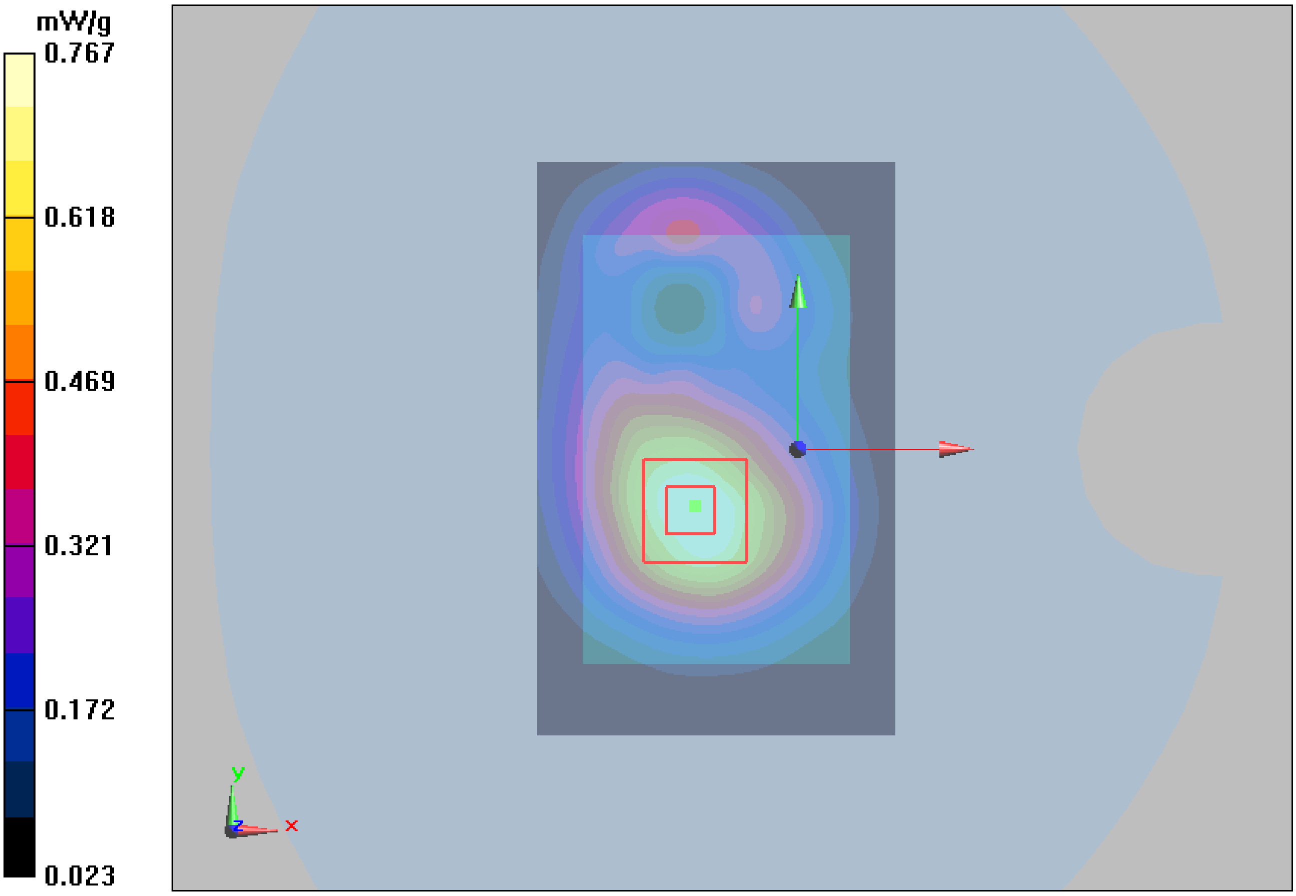


Figure 29 GSM 1900 GPRS (2TXslots) Test Position 2 Channel 810

802.11b Test Position 1 Low(Battery 1)

Date/Time: 2/28/2013 4:02:29 PM

Communication System: 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.85 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(3.96, 3.96, 3.96); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 1 Low/Area Scan (61x91x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.135 mW/g

Test Position 1 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.74 V/m; Power Drift = -0.038 dB

Peak SAR (extrapolated) = 0.257 W/kg

SAR(1 g) = 0.125 mW/g; SAR(10 g) = 0.068 mW/g

Maximum value of SAR (measured) = 0.134 mW/g

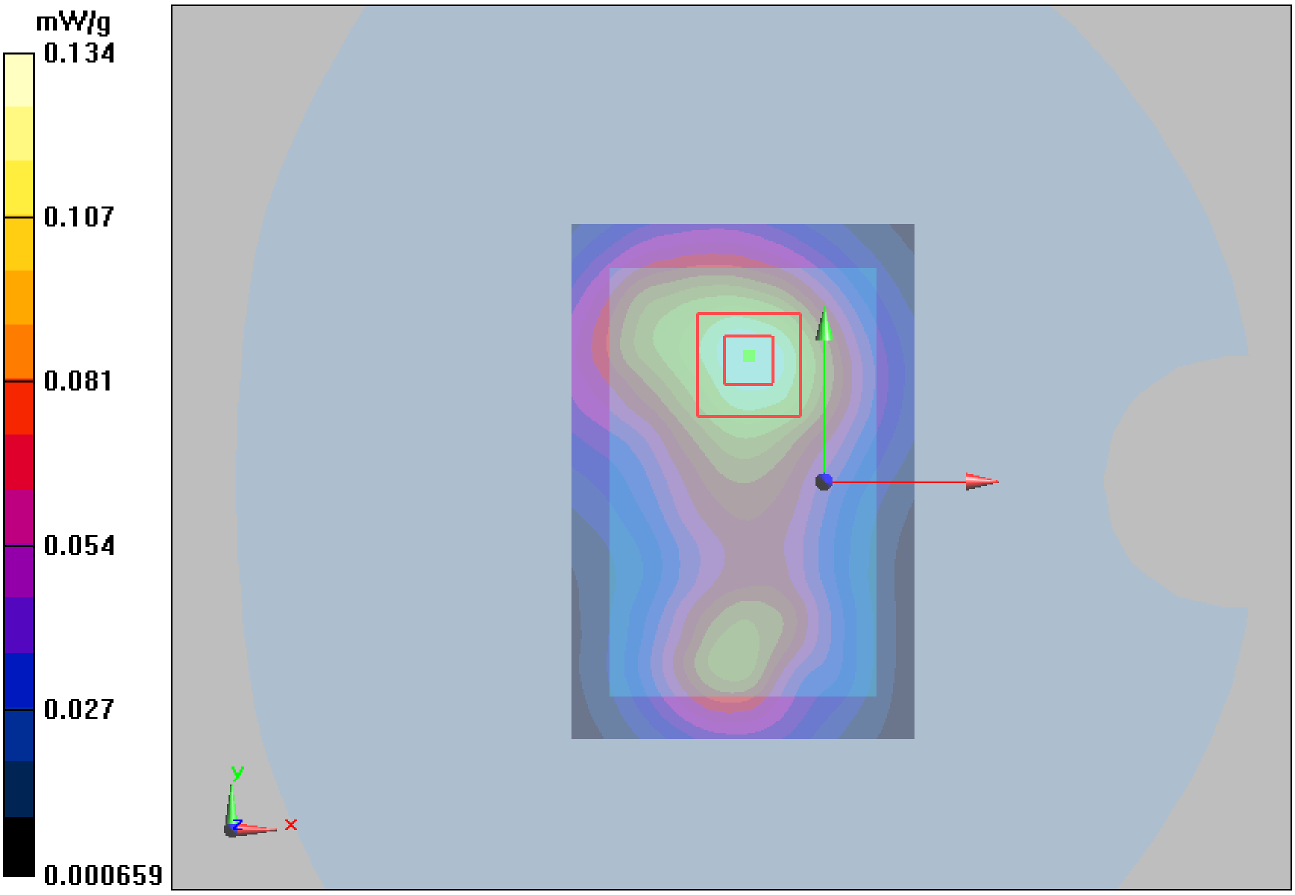


Figure 30 802.11b Test Position 1 Channel 1

802.11b Test Position 2 Low(Battery 1)

Date/Time: 2/28/2013 3:38:16 PM

Communication System: 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.85 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(3.96, 3.96, 3.96); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 Low /Area Scan (61x91x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.257 mW/g

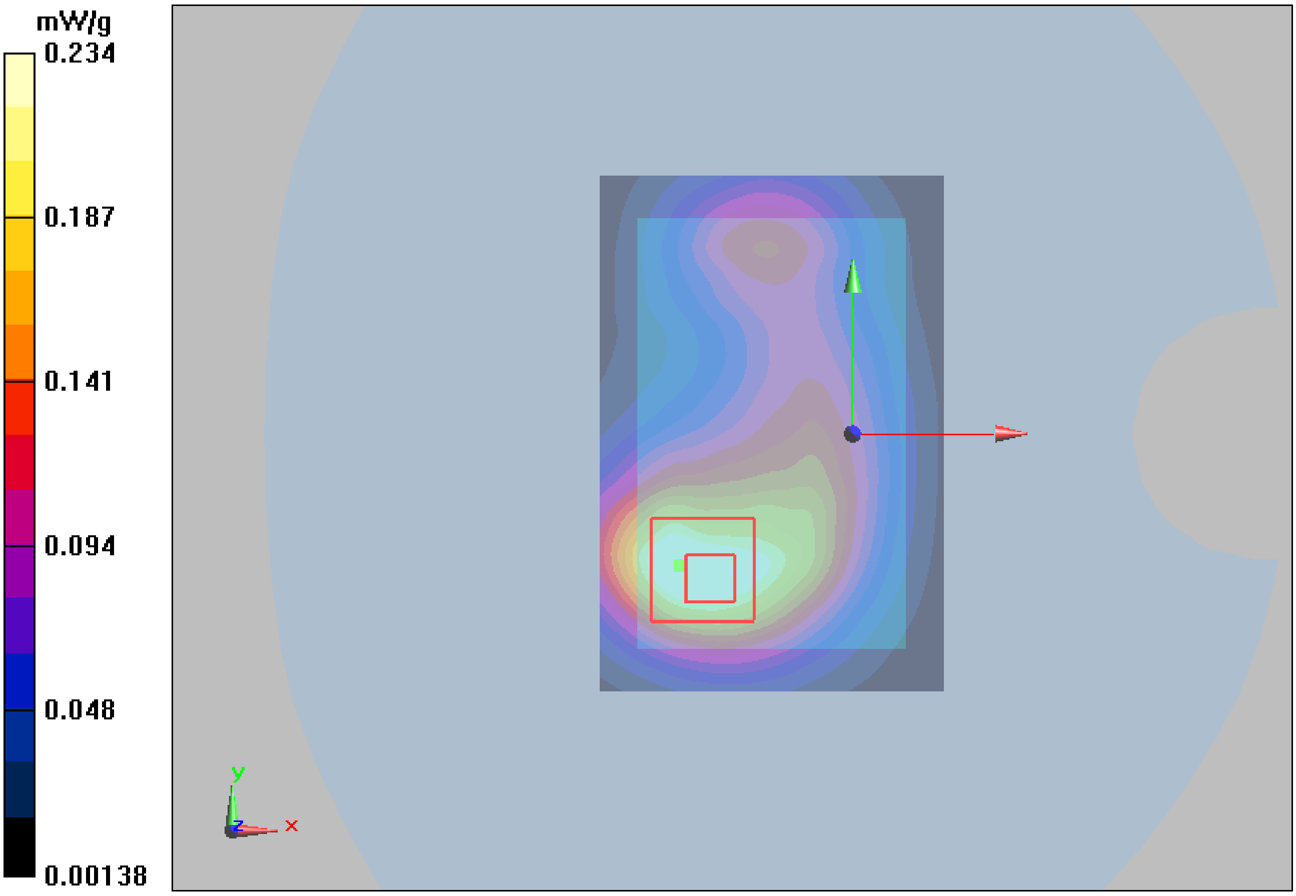
Test Position 2 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.22 V/m; Power Drift = -0.046 dB

Peak SAR (extrapolated) = 0.459 W/kg

SAR(1 g) = 0.220 mW/g; SAR(10 g) = 0.116 mW/g

Maximum value of SAR (measured) = 0.234 mW/g



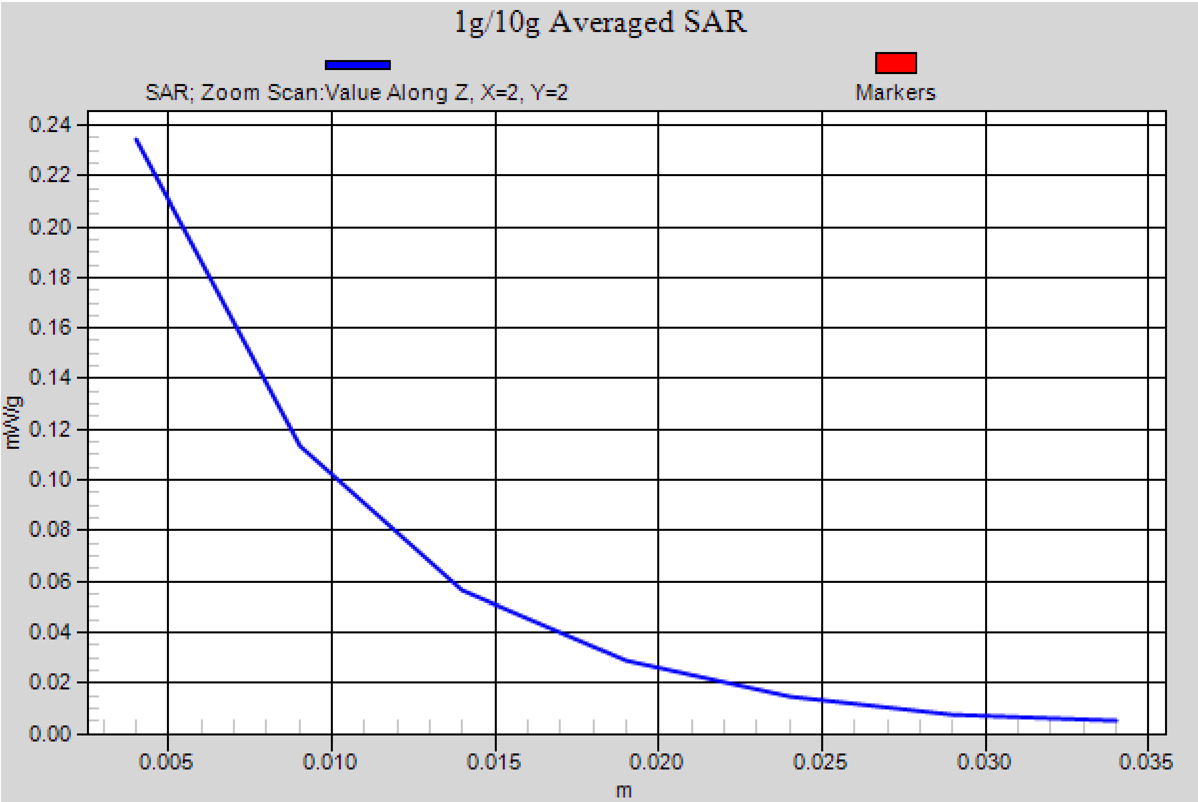


Figure 31 802.11b Test Position 2 Channel 1

802.11b Test Position 3 Low(Battery 1)

Date/Time: 2/28/2013 4:50:30 PM

Communication System: 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.85 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(3.96, 3.96, 3.96); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 3 Low/Area Scan (41x91x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.076 mW/g

Test Position 3 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.08 V/m; Power Drift = -0.024 dB

Peak SAR (extrapolated) = 0.148 W/kg

SAR(1 g) = 0.071 mW/g; SAR(10 g) = 0.037 mW/g

Maximum value of SAR (measured) = 0.075 mW/g

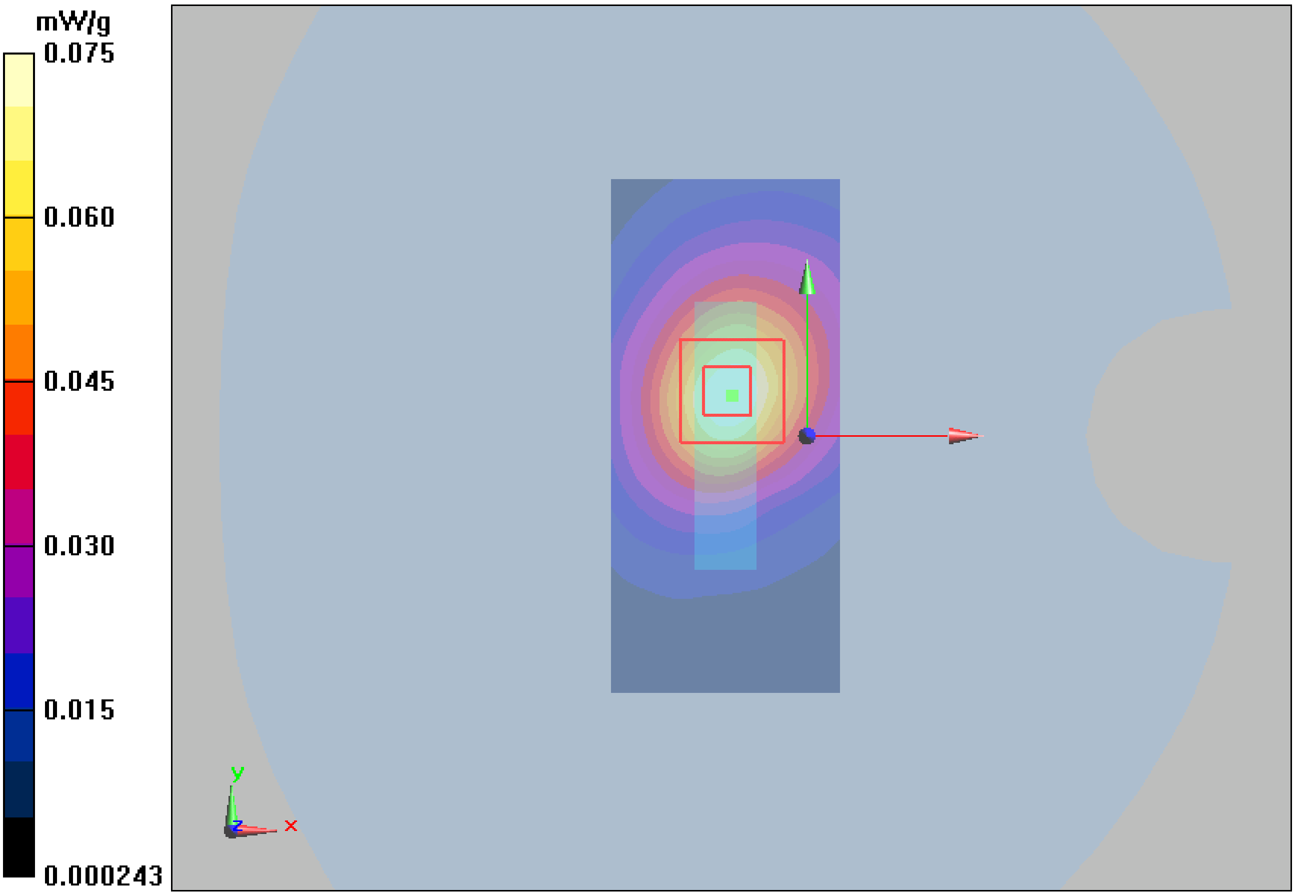


Figure 32 802.11b Test Position 3 Channel 1

802.11b Test Position 5 Low(Battery 1)

Date/Time: 2/28/2013 4:27:43 PM

Communication System: 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.85 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(3.96, 3.96, 3.96); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 5 Low/Area Scan (41x91x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.113 mW/g

Test Position 5 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.78 V/m; Power Drift = 0.125 dB

Peak SAR (extrapolated) = 0.232 W/kg

SAR(1 g) = 0.107 mW/g; SAR(10 g) = 0.054 mW/g

Maximum value of SAR (measured) = 0.117 mW/g

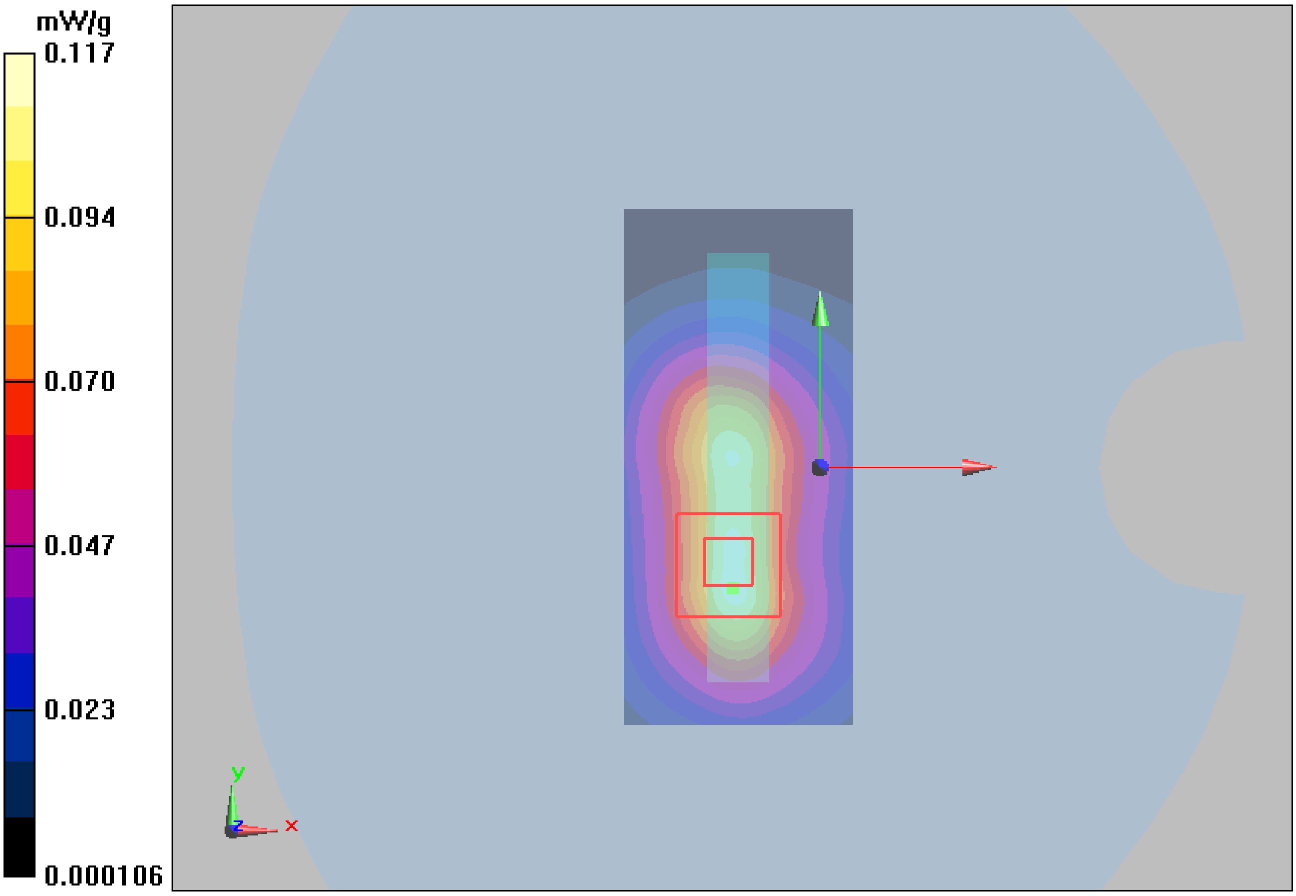


Figure 33 802.11b Test Position 5 Channel 1

802.11b Test Position 2 Low(Battery 2)

Date/Time: 2/28/2013 5:14:24 PM

Communication System: 802.11b; Frequency: 2412 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2412 MHz; σ = 1.85 mho/m; ε_r = 51.7; ρ = 1000 kg/m^3

Ambient Temperature:22.3 ℃ Liquid Temperature: 21.5℃

Phantom section: Flat Section

DASY5 Configuration:

Probe: ES3DV3 - SN3189; ConvF(3.96, 3.96, 3.96); Calibrated: 6/22/2012

Electronics: DAE4 Sn1317; Calibrated: 1/25/2013

Sensor-Surface: 4mm (Mechanical Surface Detection)

Phantom: SAM2; Type: SAM; Serial: TP-1524

Measurement SW: DASY5, V5.2 Build 162; SEMCAD X Version 14.0 Build 59

Test Position 2 Low/Area Scan (61x91x1): Measurement grid: dx=12mm, dy=12mm

Maximum value of SAR (interpolated) = 0.235 mW/g

Test Position 2 Low/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 7.69 V/m; Power Drift = -0.043 dB

Peak SAR (extrapolated) = 0.463 W/kg

SAR(1 g) = 0.215 mW/g; SAR(10 g) = 0.113 mW/g

Maximum value of SAR (measured) = 0.241 mW/g

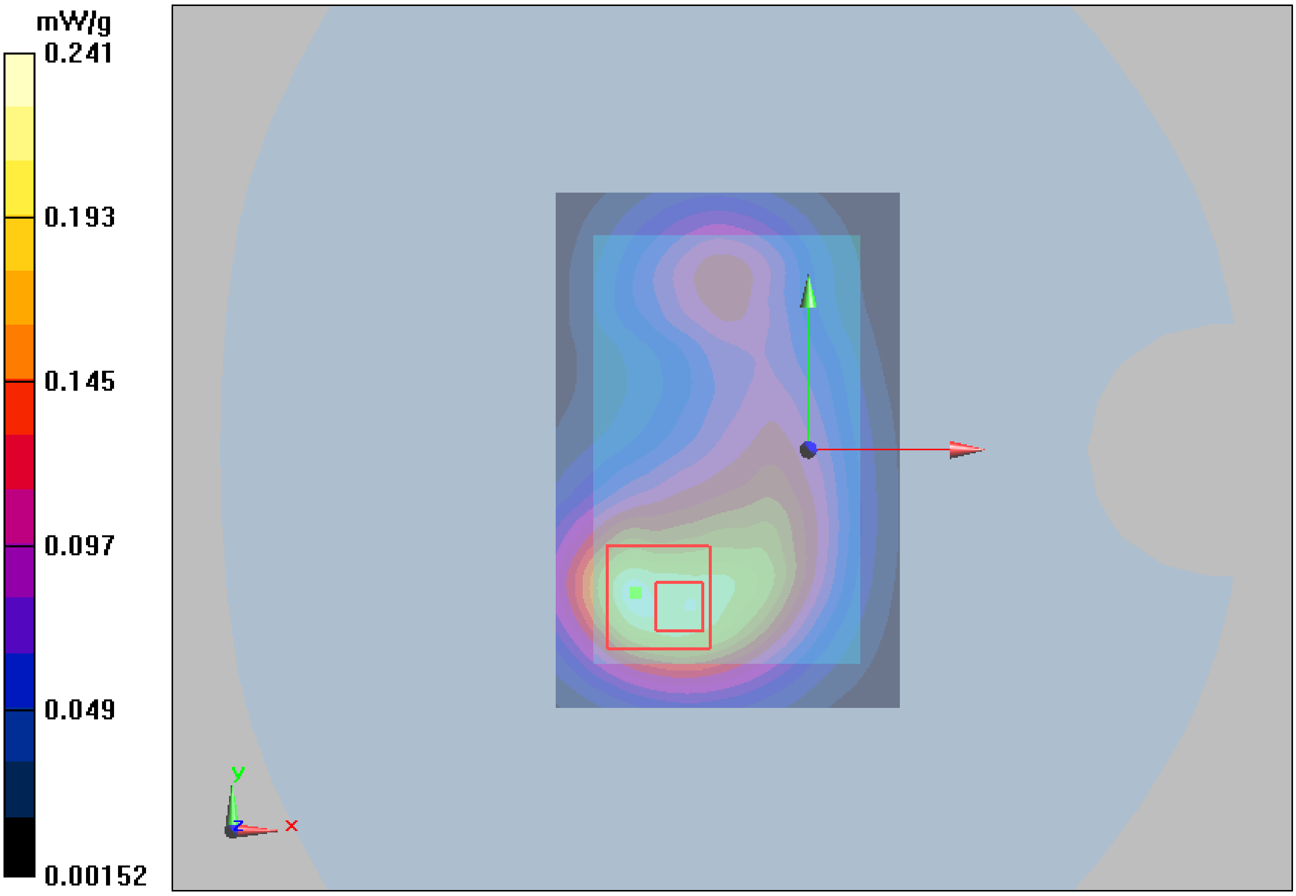


Figure 34 802.11b Test Position 2 Channel 1

ANNEX D: Probe Calibration Certificate

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
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 **TA-Shanghai (Auden)**

Certificate No: **ES3-3189_Jun12**

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3189

Calibration procedure(s): QA CAL-01.v8, QA CAL-12.v7, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes

Calibration date: June 22, 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	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	10-Jan-12 (No. DAE4-660_Jan12)	Jan-13
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: June 22, 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) Accreditation No.: **SCS 108**
The Swiss Accreditation Service is one of the signatories to the EA
Multilateral Agreement for the recognition of calibration certificates

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., ϑ = 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 ϑ = 0 (f ≤ 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 ≤ 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 ES3DV3

SN:3189

Manufactured: March 25, 2008
Calibrated: June 22, 2012

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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3189

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.32	1.35	1.05	± 10.1 %
DCP (mV)[B]	99.5	100.6	100.2	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
0	CW	0.00	X	0.00	0.00	1.00	160.3	±3.8 %
			Y	0.00	0.00	1.00	164.9	
			Z	0.00	0.00	1.00	182.0	

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: ES3DV3 - SN:3189

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)
300	45.3	0.87	6.83	6.83	6.83	0.25	1.06	± 13.4 %
450	43.5	0.87	6.37	6.37	6.37	0.14	1.67	± 13.4 %
835	41.5	0.90	5.81	5.81	5.81	0.63	1.24	± 12.0 %
1750	40.1	1.37	4.90	4.90	4.90	0.80	1.14	± 12.0 %
1900	40.0	1.40	4.69	4.69	4.69	0.62	1.31	± 12.0 %
2450	39.2	1.80	4.14	4.14	4.14	0.65	1.36	± 12.0 %

[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.

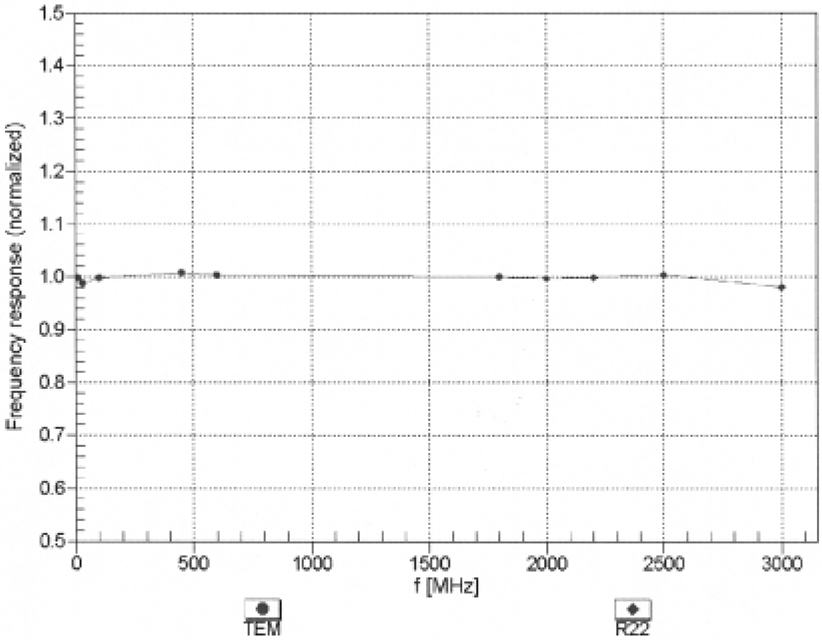
DASY/EASY - Parameters of Probe: ES3DV3 - SN:3189

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)
300	58.2	0.92	6.53	6.53	6.53	0.23	1.90	± 13.4 %
450	56.7	0.94	6.73	6.73	6.73	0.10	1.00	± 13.4 %
835	55.2	0.97	5.81	5.81	5.81	0.54	1.33	± 12.0 %
1750	53.4	1.49	4.65	4.65	4.65	0.67	1.38	± 12.0 %
1900	53.3	1.52	4.36	4.36	4.36	0.62	1.40	± 12.0 %
2450	52.7	1.95	3.96	3.96	3.96	0.64	0.99	± 12.0 %

[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.

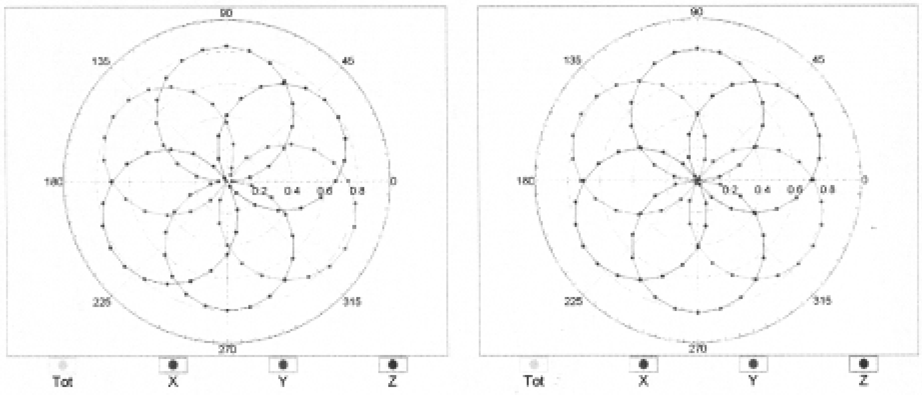
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)

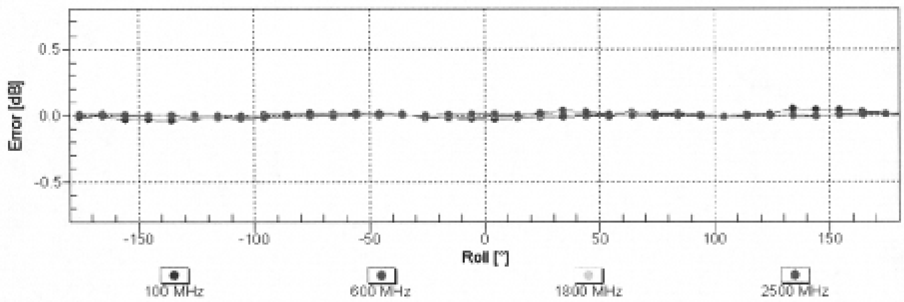


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM f=1800 MHz,R22

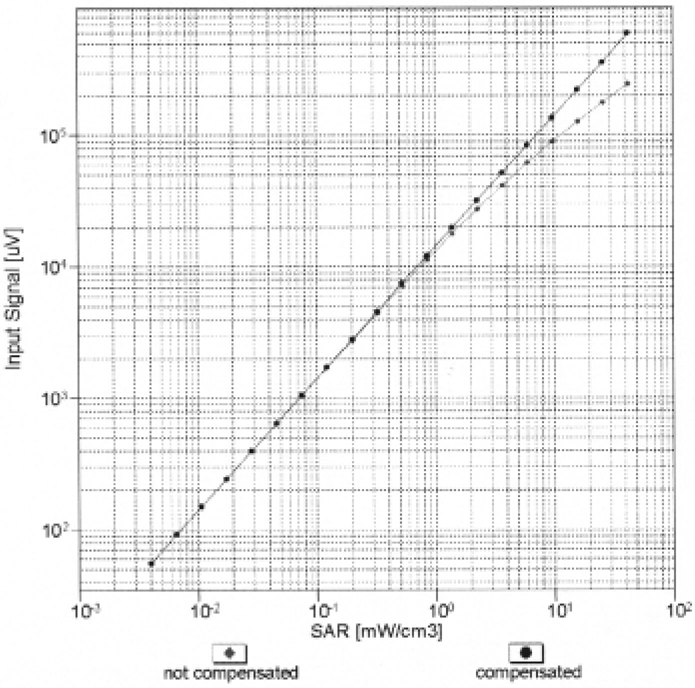


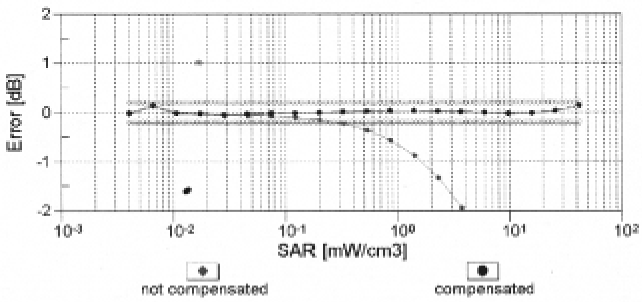


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

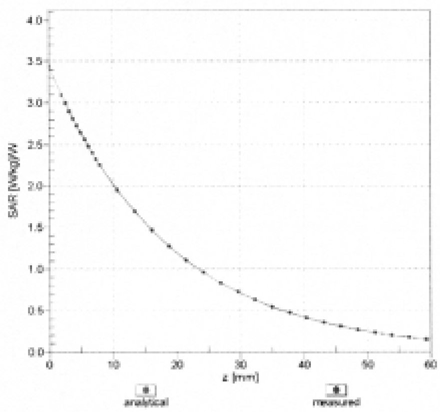
(TEM cell , f = 900 MHz)

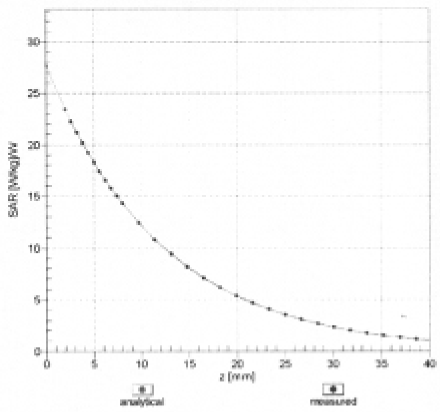




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

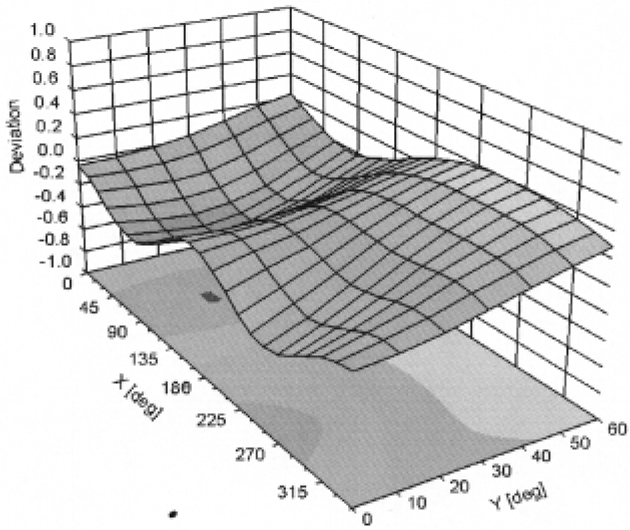
Conversion Factor Assessment





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: ES3DV3 - SN:3189

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	54.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

ANNEX E: D835V2 Dipole Calibration Certificate

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 **TA-Shanghai (Auden)**

Certificate No: **D835V2-4d020_Aug11**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d020
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 26, 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:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 26, 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	41.1 ± 6 %	0.89 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	2.32 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.34 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.52 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.11 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	53.4 ± 6 %	0.99 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	2.42 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.46 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.59 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.26 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω - 3.1 jΩ
Return Loss	- 27.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.7 Ω - 5.4 jΩ
Return Loss	- 25.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.391 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	April 22, 2004

DASY5 Validation Report for Head TSL

Date: 25.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

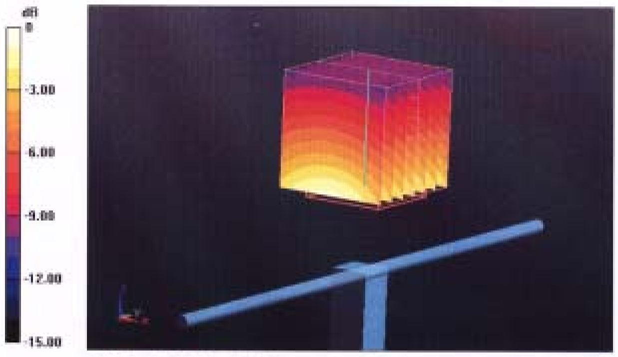
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; $\sigma = 0.89$ mho/m; $\varepsilon_r = 41.1$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

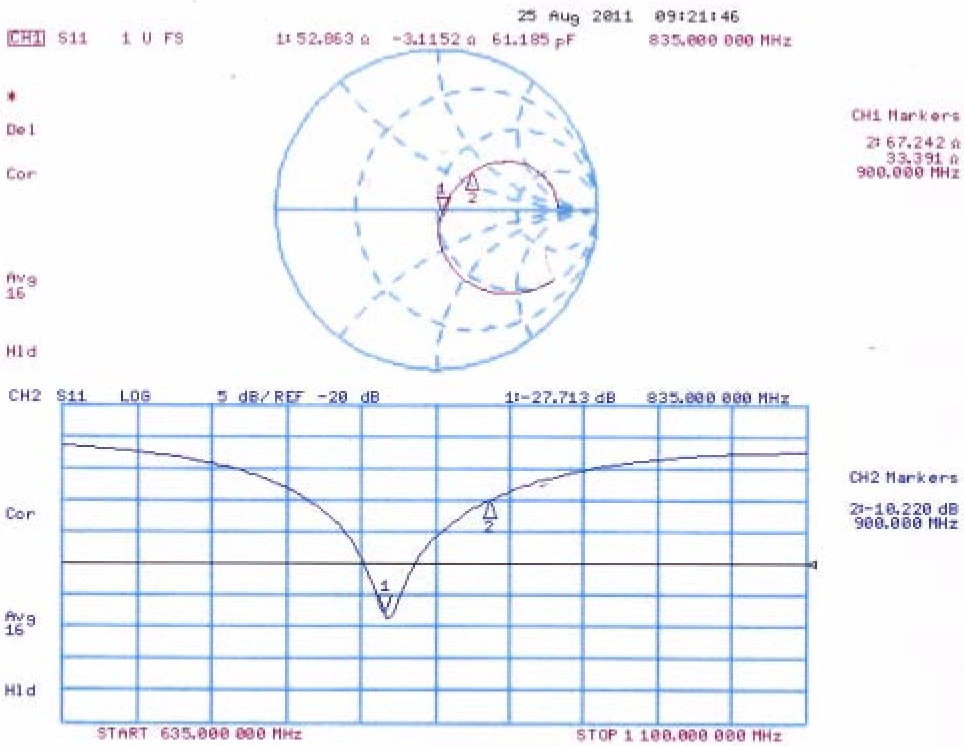
- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

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 = 56.930 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.421 W/kg
SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.52 mW/g
Maximum value of SAR (measured) = 2.708 mW/g



0 dB = 2.710mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 26.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

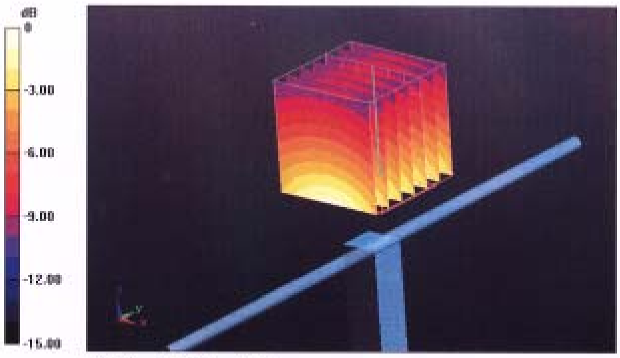
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d020

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

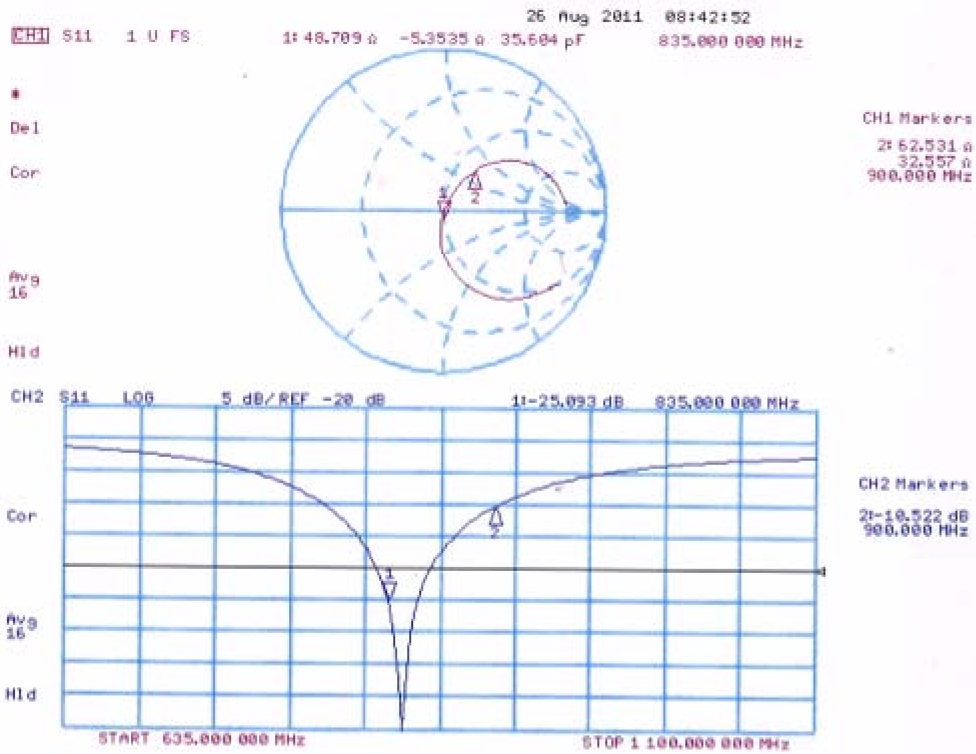
- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

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 = 55.406 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.509 W/kg
SAR(1 g) = 2.42 mW/g; SAR(10 g) = 1.59 mW/g
Maximum value of SAR (measured) = 2.827 mW/g



0 dB = 2.830mW/g

Impedance Measurement Plot for Body TSL



ANNEX F: D1900V2 Dipole Calibration Certificate

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 108**

Client **TA-Shanghai (Auden)**

Certificate No: **D1900V2-5d060_Aug11**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d060
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 31, 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	D. Iliev
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 31, 2011

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

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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	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	39.5 ± 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	10.2 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**40.3 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.30 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**21.1 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	53.9 ± 6 %	1.57 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	10.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**41.7 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.55 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.0 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.6 Ω + 7.5 jΩ
Return Loss	- 22.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.3 Ω + 7.9 jΩ
Return Loss	- 21.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.194 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	December 10, 2004

DASY5 Validation Report for Head TSL

Date: 30.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

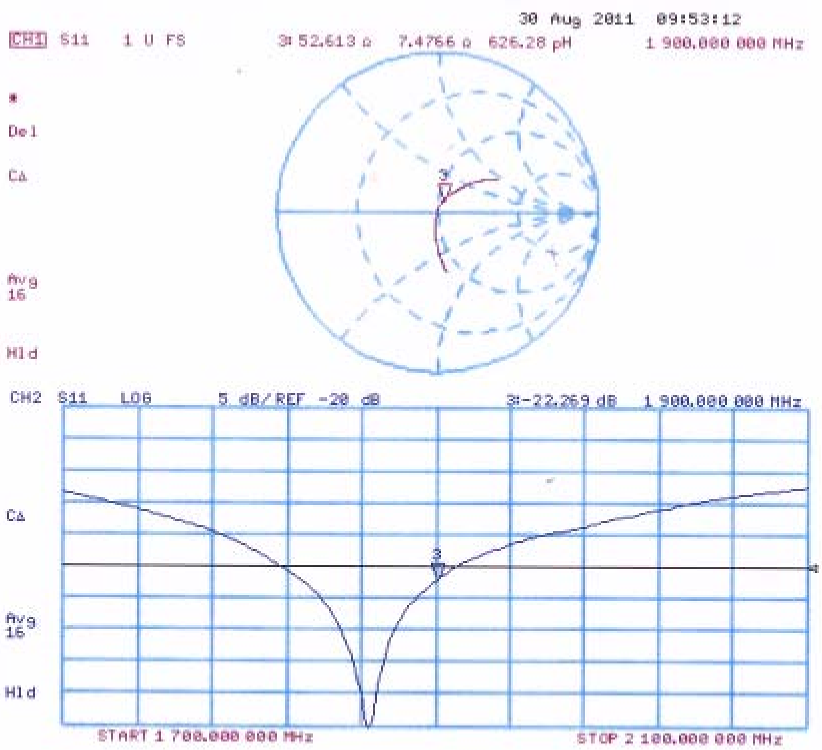
DASY52 Configuration:

- 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 = 97.636 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 18.535 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.3 mW/g
Maximum value of SAR (measured) = 12.600 mW/g

0 dB = 12.600mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 31.08.2011

Test Laboratory: SPEAG, Zurich, Switzerland

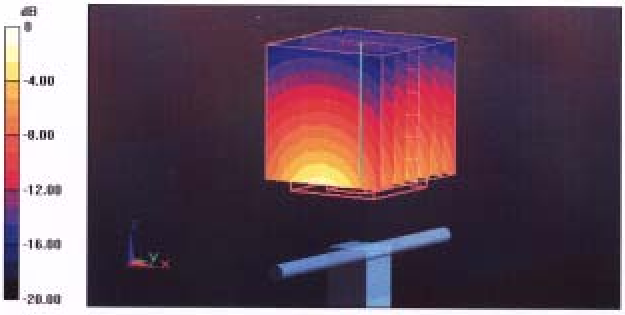
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d060

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; $\sigma = 1.57$ mho/m; $\varepsilon_r = 53.9$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

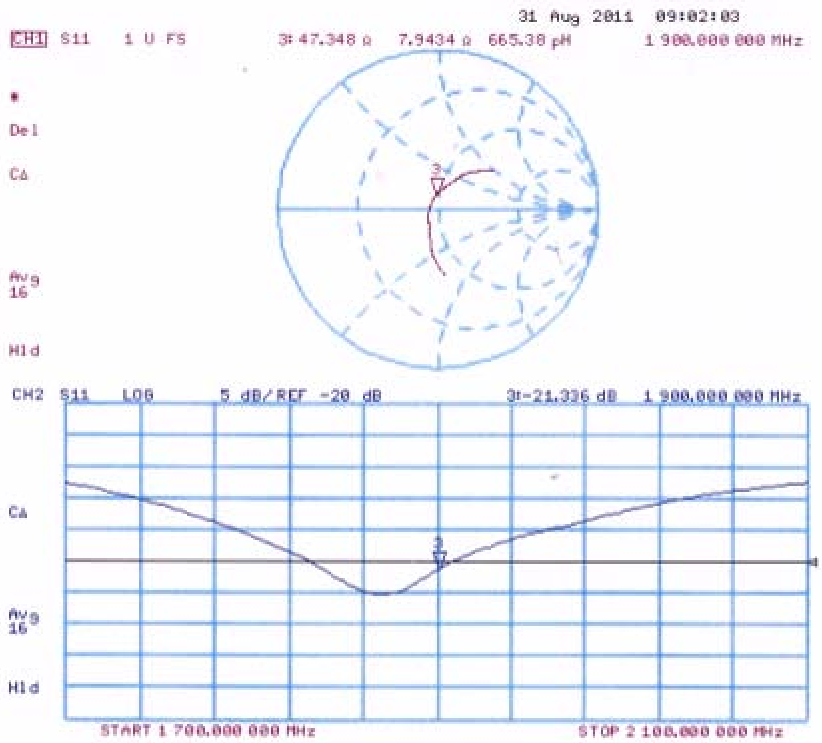
- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

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 = 96.435 V/m; Power Drift = -0.0099 dB
Peak SAR (extrapolated) = 18.663 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.55 mW/g
Maximum value of SAR (measured) = 13.397 mW/g



0 dB = 13.400mW/g

Impedance Measurement Plot for Body TSL



ANNEX G: D2450V2 Dipole Calibration Certificate

Calibration Laboratory of
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Accreditation No.: **SCS 108**

Client **TA-Shanghai (Auden)**

Certificate No: **D2450V2-786_Aug11**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 786
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 29, 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	D. Iliev
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 29, 2011

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

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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.