Full SAR Test Report

Applicant Name: Verykool USA INC.
Applicant Address: 3636 Nobel Drive, Suite 325, San Diego, CA 92122 USA

The following samples were submitted and identified on behalf of the client as:

Sample Description	**Mobile Phone**
Model Number	**I121、I121C(Tested)**
Final Software Version	**SW_12518_32X16_GLOBAL_Y_B3_V001_M11_VERY COOL_POR_SPA**
Final Hardware Version	**12518-1-11**
Date Initial Sample Received	**09-26,2012**
Testing Start Date	**09-29,2012**
Testing End Date	**11-08,2012**

According to:

FCC 47CFR § 2.1093, IEEE Std C95.1-1992

IEEE1528-2003, OET Bulletin 65 Supplement C

Comments/ Conclusion:

The configuration tested complied to the certification requirements specified in this report.

Signed for on behalf of SGS

willam	David Lee
Prepared	**approved**

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Change History

Version	Change Contents	Author	Date
V1.0	First edition	willam_wang	10-09, 2012
V1.1	Second edition	Susie_Liu	11-08,2012

Remark: The V1.1 of the report had replaced the V1.0 which was invalid.

1. Report Overview

This report details the results of testing carried out on the samples listed in section 17, the results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
This report may only be reproduced and distributed in full. If the product in this test report is used in any configuration other than that detailed in the test report, the manufacturer must ensure the new configuration complies with all relevant standards and certification requirements. Any mention of SGS Shanghai EMC lab or testing done by SGS Shanghai EMC lab made in connection with the distribution or use of the tested product must be approved in writing by SGS Shanghai EMC lab.

2. Test Lab Declaration or Comments

None

3. Applicant Declaration or Comments

None

4. Full Test Report

A full test report contains, within the results section, all the applicable test cases from the certification requirements of the permanent reference documents of the listed certification bodies.

5. Partial Test Report

A partial test report contains within the results section a sub-set of all the applicable test cases from the certification requirements of the permanent reference documents of the listed certification bodies.

6. Measurement Uncertainty

Measurements and results are all in compliance with the standards listed in section 12 of this report. All measurements and results are recorded and maintained at the laboratory performing the tests and measurement uncertainties are taken into account when comparing measurements to pass/ fail criteria.

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A	b1	c	d	e = f(d,k)	g	i = cxg/e	k
Uncertainty Component	Section in P1528	Tol (%)	Prob . Dist.	Div.	Ci (1g)	1g ui (%)	Vi (Veff)
Probe calibration	E.2.1	6.3	N	1	1	6.0	∞
Axial isotropy	E.2.2	0.5	R	$\sqrt{3}$	$(1-c_p)^{1/2}$	0.20	∞
hemispherical isotropy	E.2.2	2.6	R	$\sqrt{3}$	$\sqrt{c_p}$	1.06	∞
Boundary effect	E.2.3	0.8	R	$\sqrt{3}$	1	0.46	∞
Linearity	E.2.4	0.6	R	$\sqrt{3}$	1	0.35	∞
System detection limit	E.2.5	0.25	R	$\sqrt{3}$	1	0.15	∞
Readout electronics	E.2.6	0.3	N	1	1	0.3	∞
Response time	E.2.7	0	R	$\sqrt{3}$	1	0	∞
Integration time	E.2.8	2.6	R	$\sqrt{3}$	1	1.5	∞
RF ambient Condition –Noise	E.6.1	3	R	$\sqrt{3}$	1	1.73	∞
RF ambient Condition - reflections	E.6.1	3	R	$\sqrt{3}$	1	1.73	∞
Probe positioning- mechanical tolerance	E.6.2	1.5	R	$\sqrt{3}$	1	0.87	∞
Probe positioning- with respect to phantom	E.6.3	2.9	R	$\sqrt{3}$	1	1.67	∞
Max. SAR evaluation	E.5.2	1	R	$\sqrt{3}$	1	0.58	∞
Test sample positioning	E.4.2	4	N	1	1	3.7	9
Device holder uncertainty	E.4.1	3.6	N	1	1	3.6	∞
Output power variation –SAR drift measurement	6.62	5	R	$\sqrt{3}$	1	2.89	∞
Phantom uncertainty (shape and thickness tolerances)	E.3.1	4	R	$\sqrt{3}$	1	2.31	∞
Liquid conductivity - deviation from target values	E.3.2	5	R	$\sqrt{3}$	0.64	1.85	∞
Liquid conductivity - measurement uncertainty	E.3.2	4	N	1	0.64	2.56	5
Liquid permittivity - deviation from target values	E.3.3	5	R	$\sqrt{3}$	0.6	1.73	∞
Liquid permittivity - measurement uncertainty	E.3.3	4	N	1	0.6	2.40	5
Combined standard uncertainty				RSS		10.43	430
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		20.86	

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7. Testing Environment

Normal Temperature	+20 to +24 ℃
Relative Humidity	35 to 60 %

8. Primary Test Laboratory

Name:	SGS-CSTC Standards Technical Services(Shanghai) Co., Ltd
Address:	No.588, West Jindu Road, Songjiang District, Shanghai, China 201612
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Fax:	+86 (0) 21 6191 5678
Internet:	http://www.cn.sgs.com
Contact:	Mr. David.Lee
Email:	David-jc.lee@sgs.com

9. Details of Applicant

Name:	Verykool USA INC.
Address:	3636 Nobel Drive, Suite 325, San Diego, CA 92122 USA
Telephone:	/
Fax:	/
Contact:	/
Email:	/

10. Details of Manufacturer

Name:	Wingtech Group
Address:	1-3f Yinfeng Mansion,No.5097,Luosha Road,Luohu District,Shenzhen China
Telephone:	13609614817
Fax:	/
Contact:	/
Email:	/

11. Other testing Locations

Name:	**Not Required**
Address:	--
Telephone:	--
Contact:	--
Email:	--

12. Referenced Documents

The Equipment under Test (EUT) has been tested at SGS's (own or subcontracted) laboratories according to

FCC 47CFR § 2.1093, IEEE Std C95.1-2005, IEEE1528-2003, OET Bulletin 65 Supplement C,

The following table summarizes the specific reference documents such as harmonized standards or test specifications which were used for testing as SGS's (own or subcontracted) laboratories.

Identity	Document Title	Version
FCC 47CFR § 2.1093	Radiofrequency radiation exposure evaluation: portable devices	2001
IEEE Std C95.1-1991	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.	1991
IEEE1528-2003	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques	2003
OET Bulletin 65 Supplement C	Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions	2001
KDB 447498 D01	Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies	--
KDB 648474 D01	SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas	--

Human Exposure	**Uncontrolled Environment General Population**
Spatial Peak SAR	1.60 W/kg (averaged over a mass of 1g)

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Table 12-1 RF Exposure Limits

Notes:

Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.

13. Primary Laboratory Accreditation Details

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L0599)**

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing. Date of expiry: 2014-07-26.

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14. Test Equipment Information

14.1 SPEAG DASY4

Test Platform	SPEAG DASY4 Professional
Location	SGS SH Lab #8
Manufacture	SPEAG
Description	SAR Test System (Frequency range 300MHz-3GHz) 835, 900, 1800, 1900, 2000, 2450 frequency band HAC Extension
Software Reference	DASY4: V4.7 Build 80 SEMCAD: V1.8 Build 186
Hardware Reference	

Equipment	Model	Serial Number	Calibration Date	Due date of calibration
Robot	RX90L	F03/5V32A1/A01	n/a	n/a
Phantom	SAM 12	TP-1283	n/a	n/a
DAE	DAE3	569	2011-11-16	2012-11-15
E-Field Probe	ES3DV3	3088	2011-11-23	2012-11-22
Validation Kits	D835V2	4d105	2011-11-11	2012-11-10
Validation Kits	D1900V2	5d028	2011-11-10	2012-11-09
Agilent Network Analyzer	E5071B	MY42100549	2011-11-01	2012-10-31
RF Bi-Directional Coupler	ZABDC20-252H	n/a	2012-05-18	2013-05-17
Agilent Signal Generator	E4438C	14438CATO-19719	2011-11-01	2012-10-31
Mini-Circuits Preamplifier	ZHL-42	D041905	2011-11-01	2012-10-31
Agilent Power Meter	E4416A	GB41292095	2011-11-01	2012-10-31
Agilent Power Sensor	8481H	MY41091234	2011-11-01	2012-10-31
R&S Power Sensor	NRP-Z92	100025	2012-04-13	2013-04-12
R&S Universal Radio Communication Tester	CMU200	103633	2011-11-01	2012-10-31

14.2 The SAR Measurement System

A photograph of the SAR measurement System is given in Fig. 15-1.

This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (Speag Dasy 4 professional system). A Model ES3DV3 3088 E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-stimulant.

The DASY4 system for performing compliance tests consists of the following items:

A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software. An arm extension is for accommodation the data acquisition electronics (DAE).

A dissymmetric 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.

Data acquisition electronics (DAE) which performs the signal amplification signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.

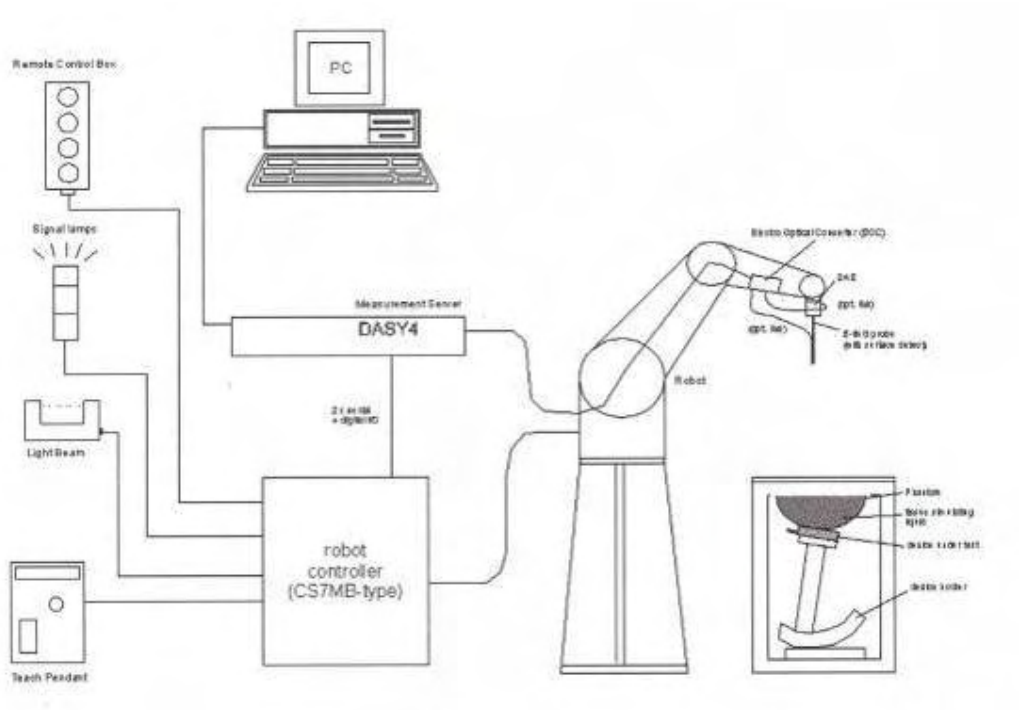

Fig. 15-1 SAR System Configuration

- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 2000.
- DASY4 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand, right-hand and BodyWorn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

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14.3 Isotropic E-field Probe ES3DV3

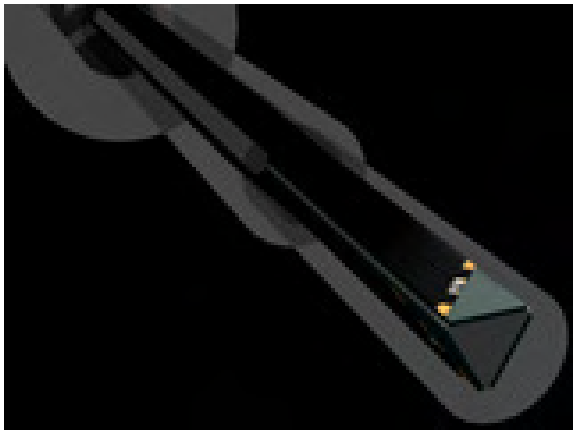

Fig. 15-2 E-field Probe

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 900 and HSL 1810 Additional CF for other liquids and frequencies upon request
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: ± 0.2 dB
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

14.4 SAM Twin Phantom

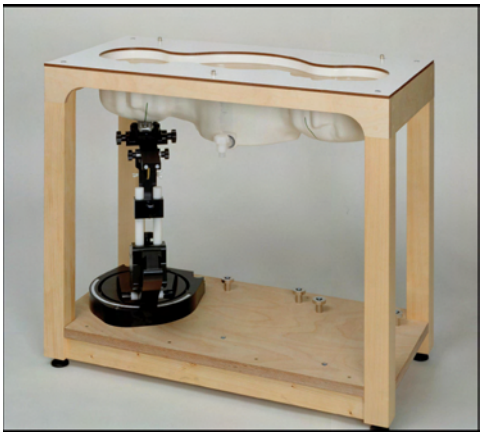

Fig. 15-3 SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm). It has three measurement areas:

• Left hand

• Right hand

• Flat phantom

A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on the cover are possible.

On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

Phantom specification:

Description	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.
Shell Thickness	2+0.2mm, Center ear point: 6+0.2mm
Filling Volume	Approx.25 liters
Dimensions	Length: 1000mm, Width: 500mm, Height: 850mm

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14.5 Device Holder for Transmitters

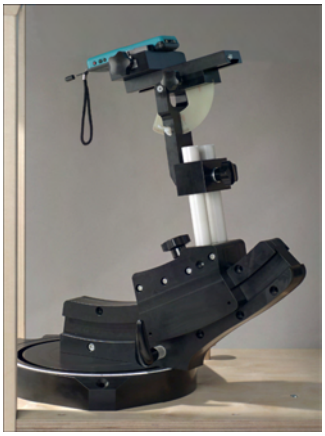

Fig. 15-4 Device Holder for Transmitters

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

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centers for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity "=3 and loss tangent _=0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

15. Detailed Test Results

15.1 Summary of Results

15.1.1 Measurement of RF conducted Power (dBm)

Mode		GSM		GPRS			
Slot (Uplink)		GMSK		1		2	
/		Max burst	averaged	Max burst	averaged	Max burst	averaged
Band	Channel	GMSK					
850	128	32.74	23.55	32.65	23.46	32.55	26.37
	190	32.58	23.39	32.67	23.48	32.52	26.34
	251	32.51	23.32	32.65	23.46	32.46	26.28
1900	512	30.24	21.05	30.58	21.39	30.52	24.34
	661	30.07	20.88	30.54	21.35	30.32	24.14
	810	29.86	20.67	30.28	21.09	30.01	23.83

15.1.2 Measurement of SAR average value

GSM 850

Band	EUT Position	Mode	Test Configuration	Averaged SAR over 1g (W/kg)			SAR limit 1g (W/kg))	Verdict
				CH128	CH190	CH251		
				824.2MHz	836.6MHz	848.8MHz		
GSM850	Left	GSM	Cheek	0.185	0.103	0.071	1.6	Passed
			Tilt	--	0.048	--	1.6	Passed
	Right		Cheek	--	0.087	--	1.6	Passed
			Tilt	--	0.043	--	1.6	Passed
	Body Worn	GSM	Front of EUT facing phantom	--	0.049	--	1.6	Passed
			Rear of EUT facing phantom	0.109	0.088	0.066	1.6	Passed
		Worst case with GPRS 2ts		0.148	--	--	1.6	Passed

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GSM 1900

Band	EUT Position	Mode	Test Configuration	Averaged SAR over 1g (W/kg)			SAR limit 1g (W/kg))	Verdict
				CH512	CH661	CH810		
				1850.2MHz	1880MHz	1909.8MHz		
GSM1900	Left	GSM	Cheek	--	0.222	--	1.6	Passed
			Tilt	--	0.061	--	1.6	Passed
	Right		Cheek	0.296	0.276	0.271	1.6	Passed
			Tilt	--	0.074	--	1.6	Passed
	Body Worn	GSM	Front of EUT facing phantom	--	0.116	--	1.6	Passed
			Rear of EUT facing phantom	0.215	0.209	0.201	1.6	Passed
		Worst case with GPRS 4ts		0.221	--	--	1.6	Passed

15.2 Maximum Results

The maximum measured SAR values for Head configuration and BodyWorn configuration are given in section 16.2.1and 16.2.2.

15.2.1 Head Configuration

Frequency Band	EUT Position	Conducted Power (dBm)	SAR, Averaged over 1g (W/kg)	Power Drift (dB)	SAR limit (W/kg)	Verdict
GSM 850	Left Cheek Low	23.55	0.185	0.272	1.6	Passed
GSM 1900	Right Cheek Low	21.05	0.296	-0.233	1.6	Passed

15.2.2 BodyWorn Configuration

Frequency Band	EUT Position	Conducted Power (dBm)	SAR, Averaged over 1g (W/kg)	Power Drift (dB)	SAR limit (W/kg)	Verdict
GSM 850	GPRS 2TS/Back of EUT facing phantom/ Low	26.37	0.148	0.239	1.6	Passed
GSM 1900	GPRS 2TS/Back of EUT facing phantom /Low	24.34	0.221	-0.208	1.6	Passed

According to table 15.2.1and 15.2.2, the max SAR value of GSM mode is 0.296w/kg .

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15.2.3 Maximum Drift

Maximum Drift during measurement	**0.272dB**

15.2.4 Measurement Uncertainty

Extended Uncertainty (k=2) 95%	**20.86%**

15.3 Operation Configurations

16.3.1

The EUT is controlled by using a radio communication tester (CMU200) with air link, and the EUT is set to maximum output power by CMU200 during WCDMA/GSM Mode tests.

1. Testing Head SAR at GSM/WCDMA mode for all bands with Left Cheek/Tilt and Right Cheek/Tilt conditions.

2. Testing Body SAR at GSM/WCDMA mode for all bands by separating 1.5 cm from the EUT (both front and rear) to flat phantom.

3. Head and Body SAR with accessories should be done at worstcase to identify maximum SAR value.

4. Testing Body SAR at WCDMA mode for all bands. HSDPA, HSUPA modes are selectively confirmed

5. Test reduction has been adopted according to conducted output power and produced SAR level:

Low and High channel SAR are optional if SAR value produced in the middle channel is 3dB lower than the applicable SAR limit;

In GPRS mode, the multislot configuration which produces highest SAR value is regard as the worst case to be measured, other multislot configurations are selectively confirmed;

6. The (max.cube) labeling indicates that during the grid scanning an additional peak was found which within 2dB of the highest peak

7. Head SAR for GSM should be tested in GPRS/EGPRS modes, if EUT support DTM.

8. WCDMA was tested in 12.2kbps RMC Mode and HSDPA was tested in subtest 1, HSUPA was tested in subtest 5.

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15.4 Measurement procedure

Step 1: Power reference measurement

The SAR measurement was taken at a selected spatial reference point to monitor power variations during testing. This fixed location point was measured and used as a reference value.

Step 2: *Area scan*

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 10mm*10mm.Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: *Zoom scan*

Around this point, a volume of 30mm*30mm*30mm (fine resolution volume scan, zoom scan) was assessed by measuring 7*7*7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the center of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification) the extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points (10*10*10) were interpolated to calculate the average. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Power reference measurement (drift)

The SAR value at the same location as in step 1 was again measured. (If the value changed by more than 5%, the evaluation should be done repeatedly)

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15.5 Detailed Test Results

16.5.1 GSM 850-Left-Cheek-Middle

Date/Time: 2012-9-29 17:38:26

Test Laboratory: SGS-GSM

I121C GSM 850 Left Cheek Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GSM Mode; Frequency: 836.6 MHz;Duty Cycle: 1:8.3

Medium: HSL850_Head Medium parameters used: f = 836.6 MHz; σ = 0.879 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.09, 6.09, 6.09); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.108 mW/g

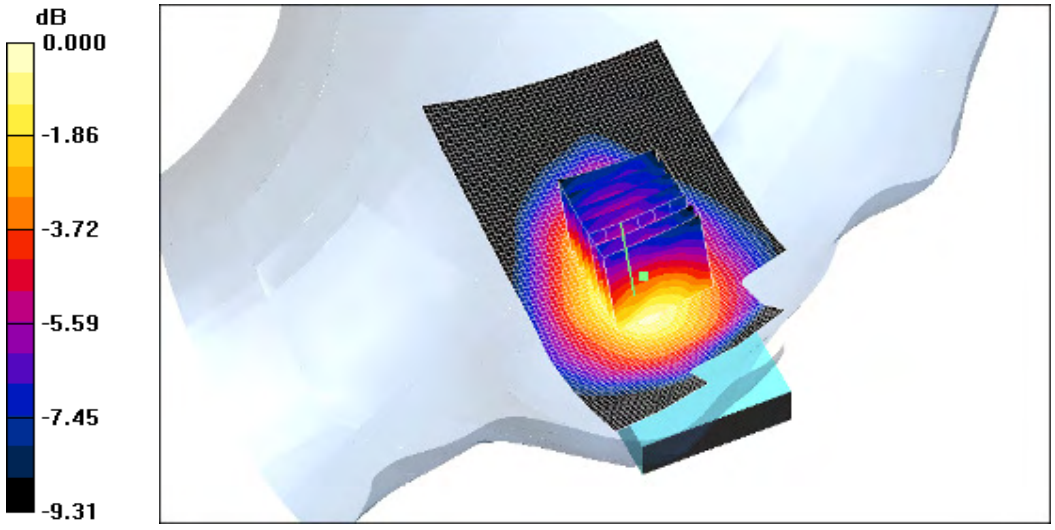
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 2.34 V/m; Power Drift = 0.190 dB

Peak SAR (extrapolated) = 0.122 W/kg

SAR(1 g) = 0.103 mW/g; SAR(10 g) = 0.075 mW/g

Maximum value of SAR (measured) = 0.114 mW/g



0 dB = 0.114mW/g

16.5.2 GSM 850-Left-Tilt-Middle

Date/Time: 2012-9-29 18:47:18

Test Laboratory: SGS-GSM

I121C GSM 850 Left Tilt Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GSM Mode; Frequency: 836.6 MHz;Duty Cycle: 1:8.3

Medium: HSL850_Head Medium parameters used: f = 836.6 MHz; σ = 0.879 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.09, 6.09, 6.09); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.053 mW/g

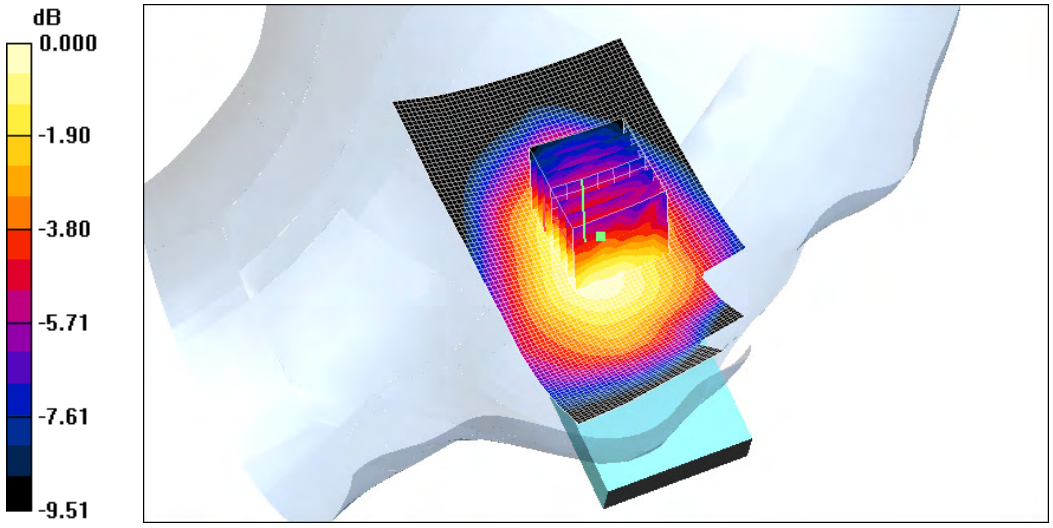
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 3.60 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.054 W/kg

SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.036 mW/g

Maximum value of SAR (measured) = 0.053 mW/g



0 dB = 0.053mW/g

16.5.3 GSM 850-Right-Cheek-Middle

Date/Time: 2012-9-29 16:49:08

Test Laboratory: SGS-GSM

I121C GSM 850 Right Cheek Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GSM Mode; Frequency: 836.6 MHz;Duty Cycle: 1:8.3

Medium: HSL850_Head Medium parameters used: f = 836.6 MHz; σ = 0.879 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.09, 6.09, 6.09); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.098 mW/g

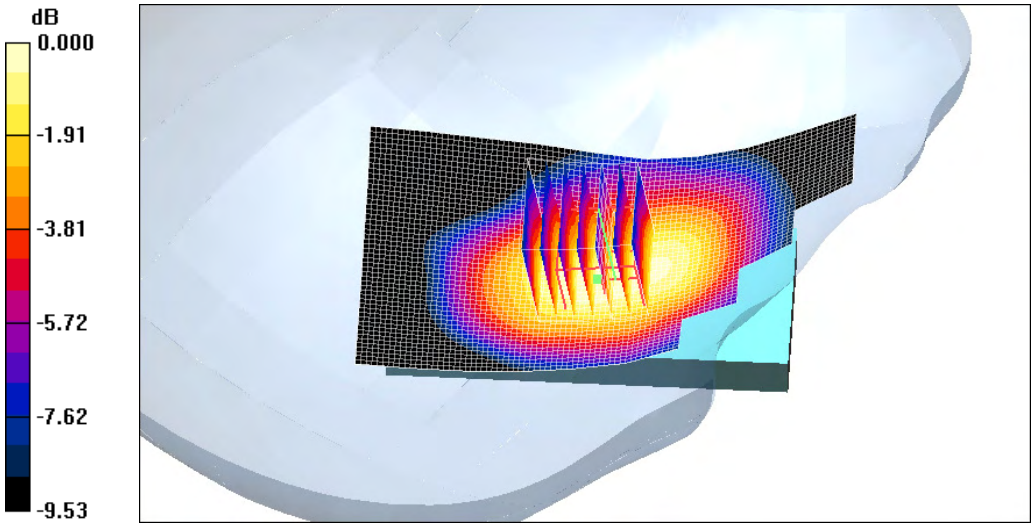
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 2.95 V/m; Power Drift = -0.039 dB

Peak SAR (extrapolated) = 0.124 W/kg

SAR(1 g) = 0.087 mW/g; SAR(10 g) = 0.063 mW/g

Maximum value of SAR (measured) = 0.095 mW/g



0 dB = 0.095mW/g

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16.5.4 GSM 850-Right-Tilt-Middle

Date/Time: 2012-9-29 17:16:37

Test Laboratory: SGS-GSM

I121C GSM 850 Right Tilt Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GSM Mode; Frequency: 836.6 MHz;Duty Cycle: 1:8.3

Medium: HSL850_Head Medium parameters used: f = 836.6 MHz; σ = 0.879 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.09, 6.09, 6.09); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.046 mW/g

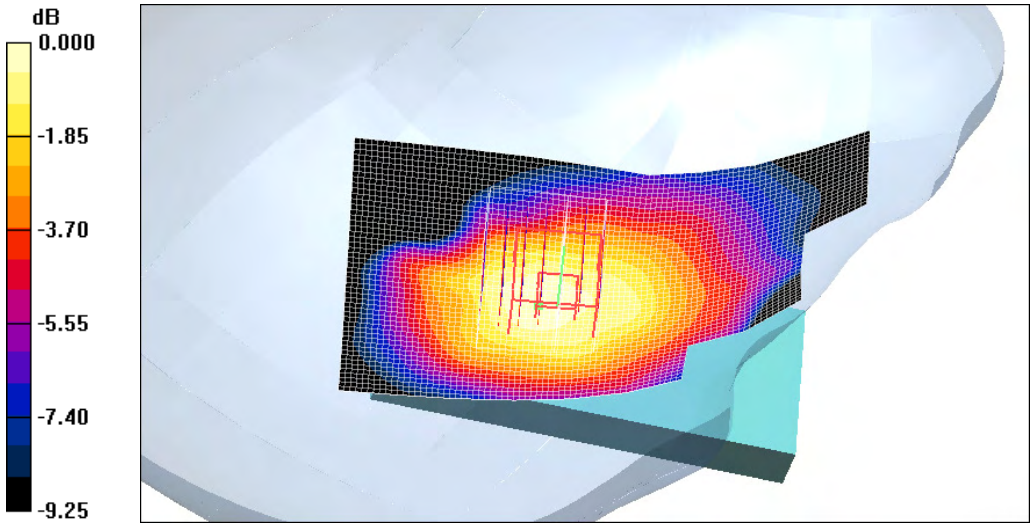
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 3.63 V/m; Power Drift = -0.158 dB

Peak SAR (extrapolated) = 0.049 W/kg

SAR(1 g) = 0.043 mW/g; SAR(10 g) = 0.033 mW/g

Maximum value of SAR (measured) = 0.047 mW/g



0 dB = 0.047mW/g

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16.5.5 GSM 850-Left-Cheek-High

Date/Time: 2012-9-29 18:00:59

Test Laboratory: SGS-GSM

I121C GSM 850 Left Cheek High

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GSM Mode; Frequency: 848.8 MHz;Duty Cycle: 1:8.3

Medium: HSL850_Head Medium parameters used: f = 848.8 MHz; σ = 0.89 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.09, 6.09, 6.09); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek High/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

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

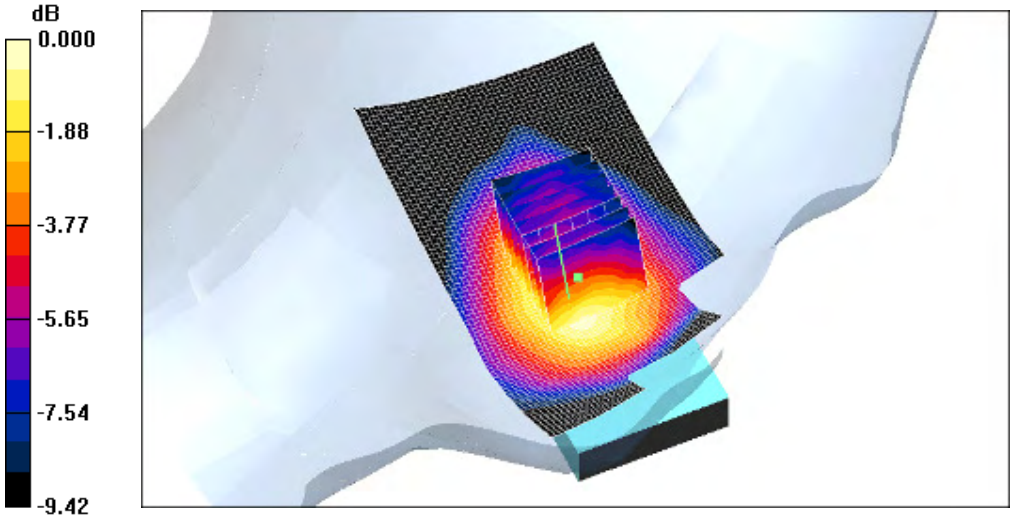
Cheek High/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 2.43 V/m; Power Drift = 0.119 dB

Peak SAR (extrapolated) = 0.085 W/kg

SAR(1 g) = 0.071 mW/g; SAR(10 g) = 0.052 mW/g

Maximum value of SAR (measured) = 0.078 mW/g



0 dB = 0.078mW/g

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16.5.6 GSM 850-Left-Cheek-Low

Date/Time: 2012-9-29 18:23:04

Test Laboratory: SGS-GSM

I121C GSM 850 Left Cheek Low

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GSM Mode; Frequency: 824.2 MHz;Duty Cycle: 1:8.3

Medium: HSL850_Head Medium parameters used: f = 824.2 MHz; σ = 0.868 mho/m; ε_r = 41.6; ρ = 1000 kg/m^3

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.09, 6.09, 6.09); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Low/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.195 mW/g

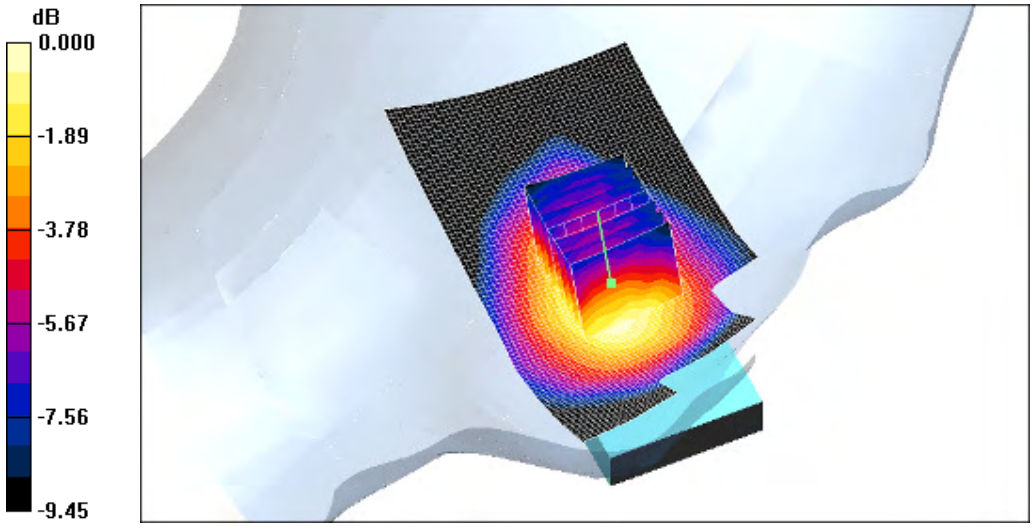
Cheek Low/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 3.61 V/m; Power Drift = 0.272 dB

Peak SAR (extrapolated) = 0.221 W/kg

SAR(1 g) = 0.185 mW/g; SAR(10 g) = 0.136 mW/g

Maximum value of SAR (measured) = 0.202 mW/g



0 dB = 0.202mW/g

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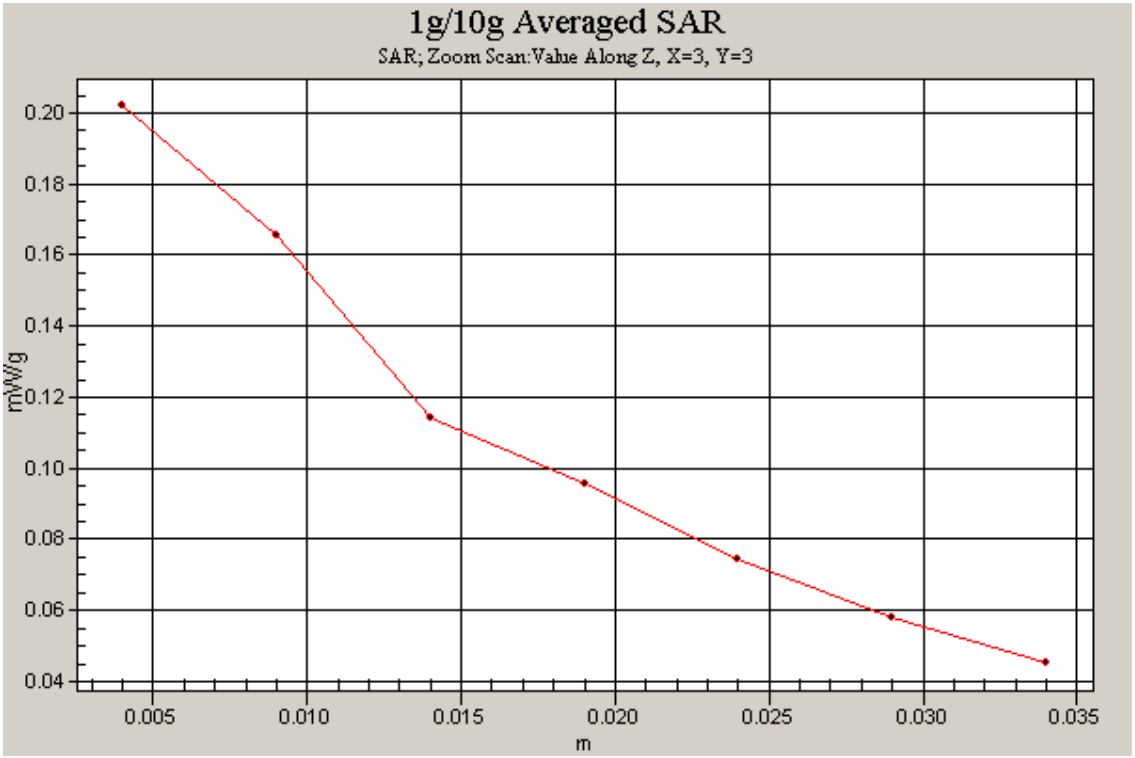

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16.5.7 GSM 850-BodyWorn-Front-Middle

Date/Time: 2012-9-30 8:43:52

Test Laboratory: SGS-GSM

I121C GSM 850 BodyWron Front Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GSM Mode; Frequency: 836.6 MHz;Duty Cycle: 1:8.3

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.5; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.13, 6.13, 6.13); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Front Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.055 mW/g

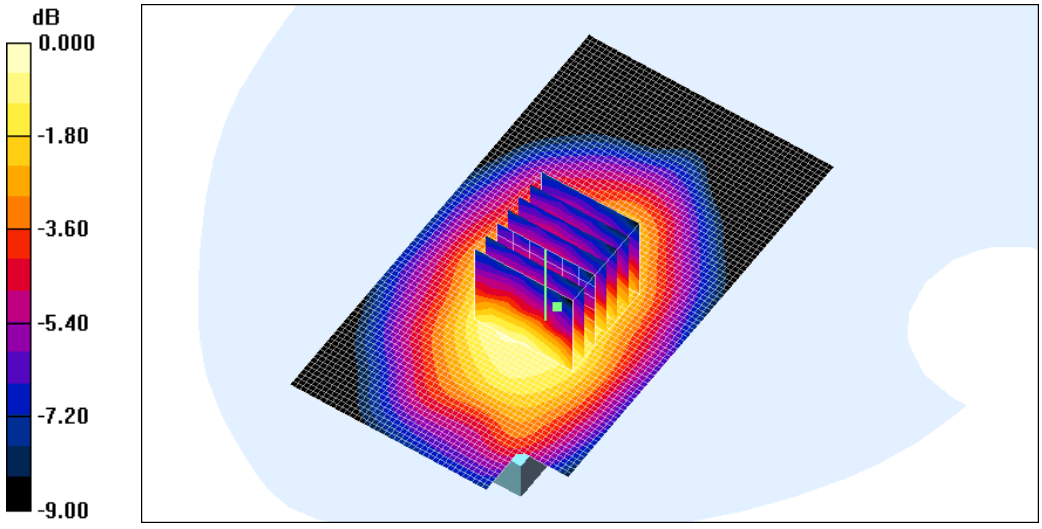
Front Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 1.78 V/m; Power Drift = 0.24 dB

Peak SAR (extrapolated) = 0.057 W/kg

SAR(1 g) = 0.049 mW/g; SAR(10 g) = 0.037 mW/g

Maximum value of SAR (measured) = 0.054 mW/g



0 dB = 0.054mW/g

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16.5.8 GSM 850-BodyWorn-Back-Middle

Date/Time: 2012-9-30 9:04:33

Test Laboratory: SGS-GSM

I121C GSM 850 BodyWron Back Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GSM Mode; Frequency: 836.6 MHz;Duty Cycle: 1:8.3

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.5; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.13, 6.13, 6.13); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.097 mW/g

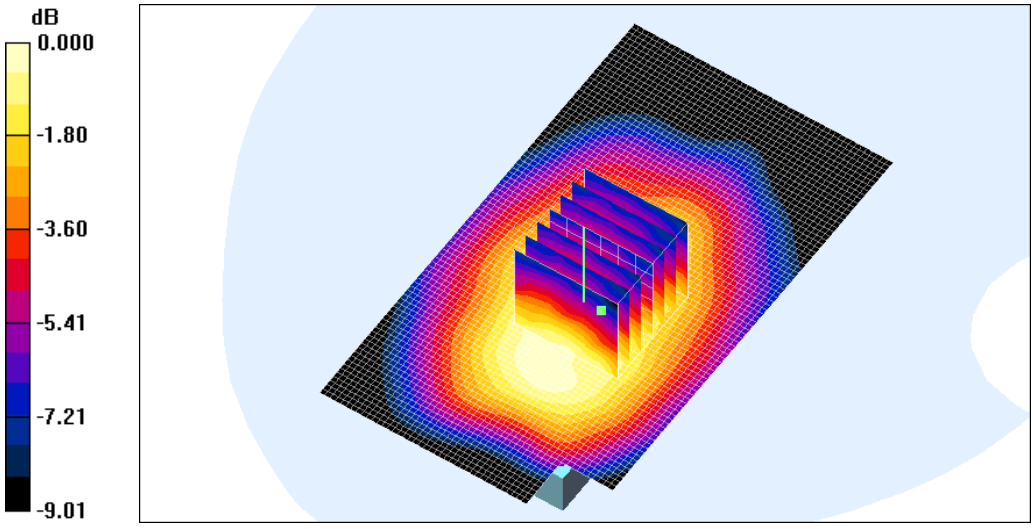
Back Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 3.36 V/m; Power Drift = 0.262 dB

Peak SAR (extrapolated) = 0.101 W/kg

SAR(1 g) = 0.088 mW/g; SAR(10 g) = 0.067 mW/g

Maximum value of SAR (measured) = 0.097 mW/g



0 dB = 0.097mW/g

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16.5.9 GSM 850-BodyWorn-Back-High

Date/Time: 2012-9-30 9:25:19

Test Laboratory: SGS-GSM

I121C GSM 850 BodyWron Back High

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GSM Mode; Frequency: 848.8 MHz;Duty Cycle: 1:8.3

Medium: HSL835_Body Medium parameters used: f = 848.8 MHz; σ = 1 mho/m; ε_r = 56.4; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.13, 6.13, 6.13); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back High/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.073 mW/g

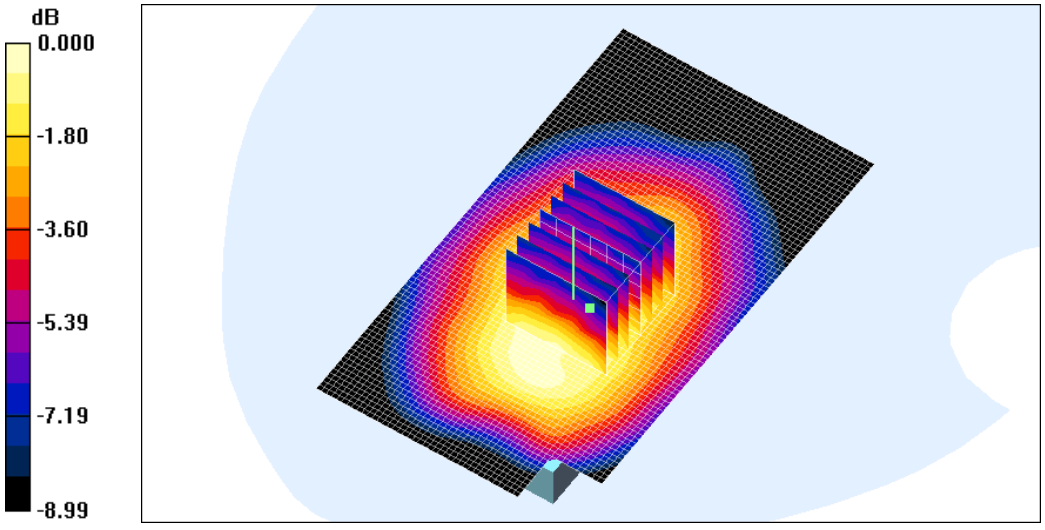
Back High/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 2.96 V/m; Power Drift = 0.102 dB

Peak SAR (extrapolated) = 0.075 W/kg

SAR(1 g) = 0.066 mW/g; SAR(10 g) = 0.050 mW/g

Maximum value of SAR (measured) = 0.072 mW/g



0 dB = 0.072mW/g

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16.5.10 GSM 850-BodyWorn-Back-Low

Date/Time: 2012-9-30 9:46:07

Test Laboratory: SGS-GSM

I121C GSM 850 BodyWron Back Low

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GSM Mode; Frequency: 824.2 MHz;Duty Cycle: 1:8.3

Medium: HSL835_Body Medium parameters used: f = 824.2 MHz; σ = 0.978 mho/m; ε_r = 56.6; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.13, 6.13, 6.13); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back High/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

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

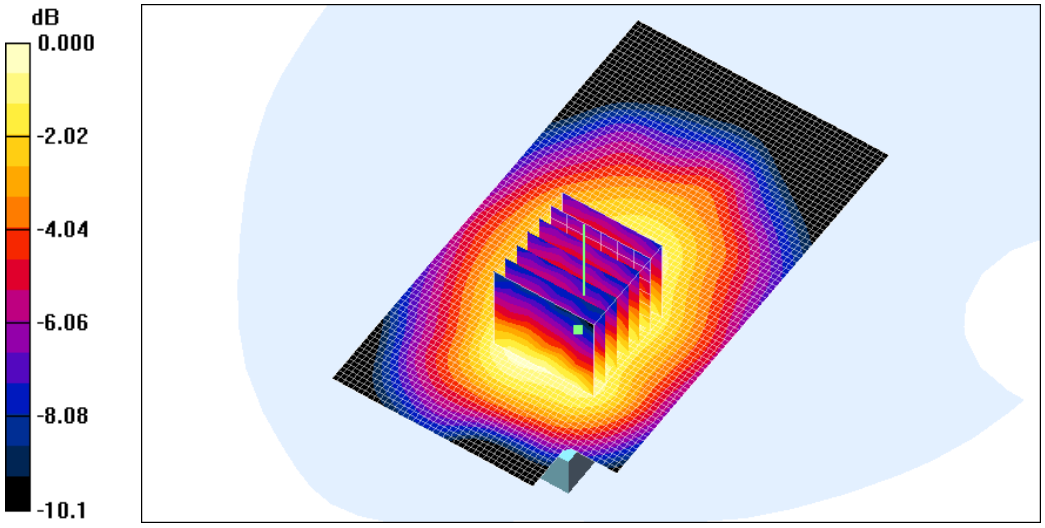
Back High/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 3.79 V/m; Power Drift = 0.050 dB

Peak SAR (extrapolated) = 0.125 W/kg

SAR(1 g) = 0.109 mW/g; SAR(10 g) = 0.083 mW/g

Maximum value of SAR (measured) = 0.120 mW/g



0 dB = 0.120mW/g

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16.5.11 GSM 850+GPRS 2TS-BodyWorn-Back-Low

Date/Time: 2012-9-30 10:12:37

Test Laboratory: SGS-GSM

I121C GSM 850 BodyWron GPRS 2TS Back Low

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: GSM850-GPRS Mode(2UP); Frequency: 824.2 MHz;Duty Cycle: 1:4.15

Medium: HSL835_Body Medium parameters used: f = 824.2 MHz; σ = 0.978 mho/m; ε_r = 56.6; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.13, 6.13, 6.13); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back Low/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.163 mW/g

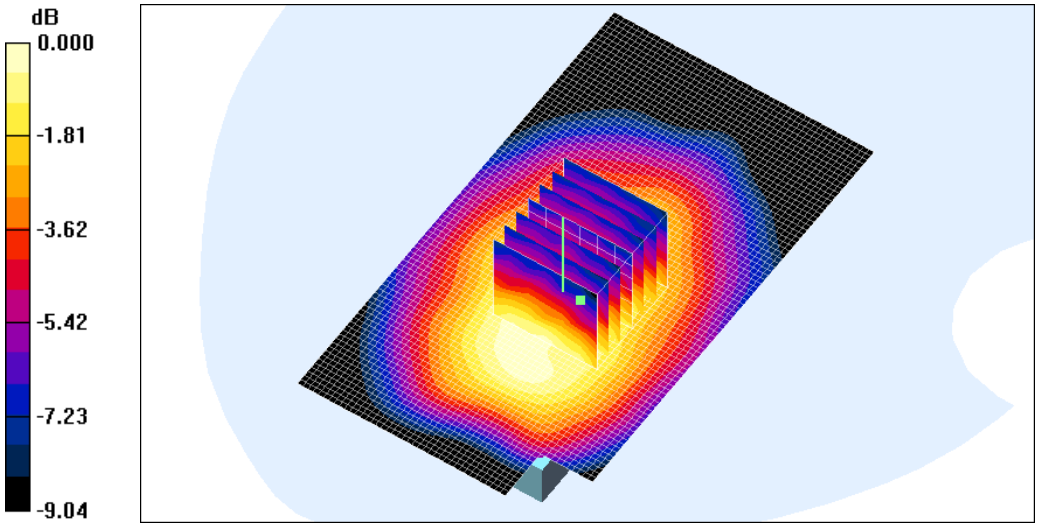
Back Low/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 4.39 V/m; Power Drift = 0.239 dB

Peak SAR (extrapolated) = 0.165 W/kg

SAR(1 g) = 0.148 mW/g; SAR(10 g) = 0.113 mW/g

Maximum value of SAR (measured) = 0.164 mW/g



0 dB = 0.164mW/g

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16.5.12 GSM 1900-Left-Cheek-Middle

Date/Time: 2012-9-30 14:55:15

Test Laboratory: SGS-GSM

I121C GSM 1900 Left Cheek Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium: HSL1900-Head Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.05, 5.05, 5.05); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.272 mW/g

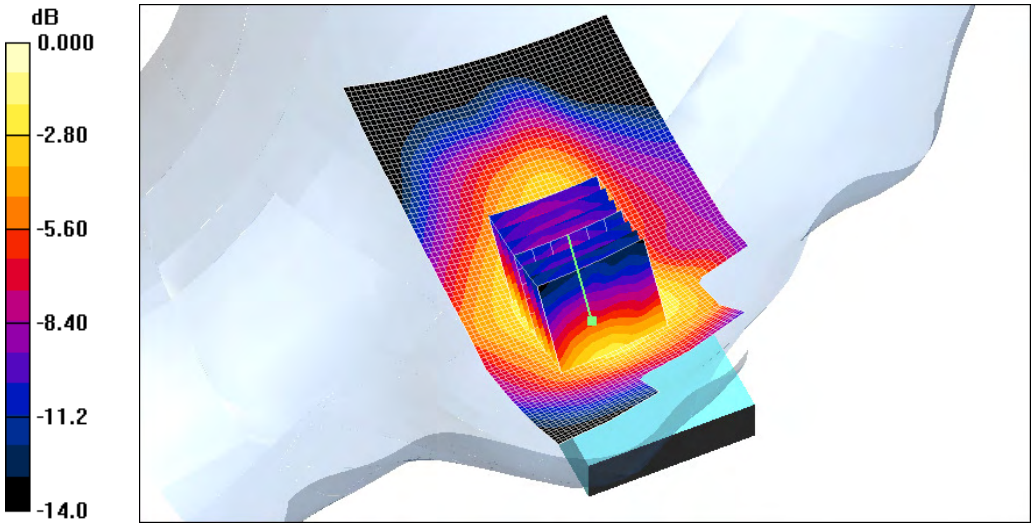
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 2.96 V/m; Power Drift = 0.19 dB

Peak SAR (extrapolated) = 0.321 W/kg

SAR(1 g) = 0.222 mW/g; SAR(10 g) = 0.140 mW/g

Maximum value of SAR (measured) = 0.247 mW/g



0 dB = 0.247mW/g

16.5.13 GSM 1900-Left-Tilt-Middle

Date/Time: 2012-9-30 15:20:12

Test Laboratory: SGS-GSM

I121C GSM 1900 Left Tilt Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium: HSL1900-Head Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

Phantom section: Left Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.05, 5.05, 5.05); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.070 mW/g

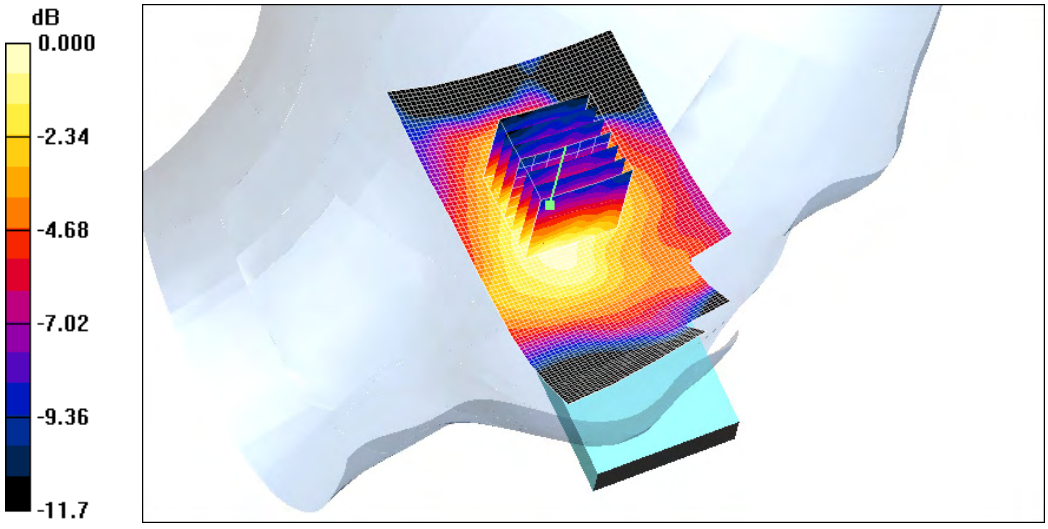
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 4.01 V/m; Power Drift = -0.217 dB

Peak SAR (extrapolated) = 0.084 W/kg

SAR(1 g) = 0.061 mW/g; SAR(10 g) = 0.042 mW/g

Maximum value of SAR (measured) = 0.069 mW/g



0 dB = 0.069mW/g

16.5.14 GSM 1900-Right-Cheek-Middle

Date/Time: 2012-9-30 15:45:05

Test Laboratory: SGS-GSM

I121C GSM 1900 Right Cheek Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium: HSL1900-Head Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.05, 5.05, 5.05); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.312 mW/g

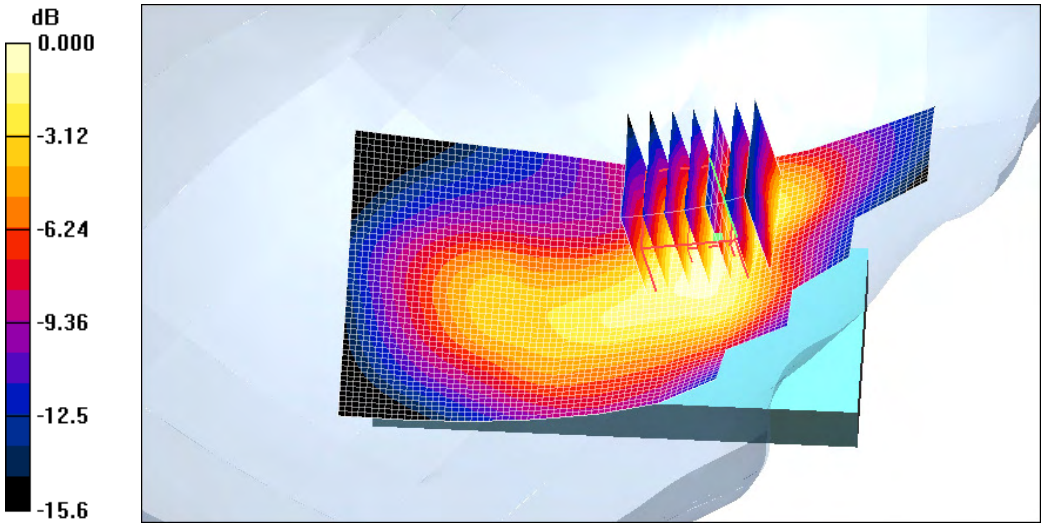
Cheek Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 5.20 V/m; Power Drift = -0.016 dB

Peak SAR (extrapolated) = 0.398 W/kg

SAR(1 g) = 0.276 mW/g; SAR(10 g) = 0.158 mW/g

Maximum value of SAR (measured) = 0.305 mW/g



0 dB = 0.305mW/g

16.5.15 GSM 1900-Right-Tilt-Middle

Date/Time: 2012-9-30 19:43:10

Test Laboratory: SGS-GSM

I121C GSM 1900 Right Tilt Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium: HSL1900-Head Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.05, 5.05, 5.05); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.081 mW/g

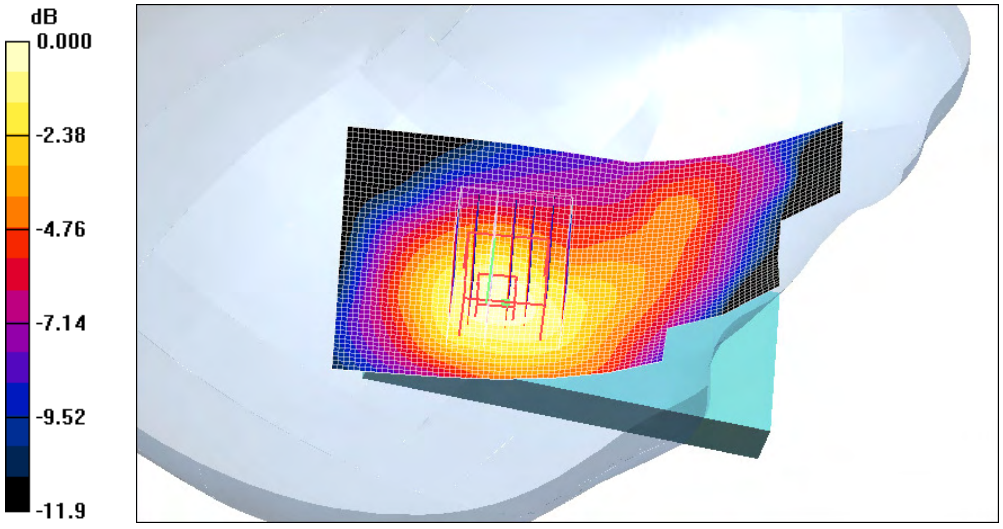
Tilt Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 3.96 V/m; Power Drift = -0.240 dB

Peak SAR (extrapolated) = 0.109 W/kg

SAR(1 g) = 0.074 mW/g; SAR(10 g) = 0.048 mW/g

Maximum value of SAR (measured) = 0.082 mW/g



0 dB = 0.082mW/g

16.5.16 GSM 1900-Right-Cheek-High

Date/Time: 2012-9-30 16:12:47

Test Laboratory: SGS-GSM

I121C GSM 1900 Right Cheek High

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GSM Mode; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3

Medium: HSL1900-Head Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.45 mho/m; ε_r = 41; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.05, 5.05, 5.05); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek High/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.039 mW/g

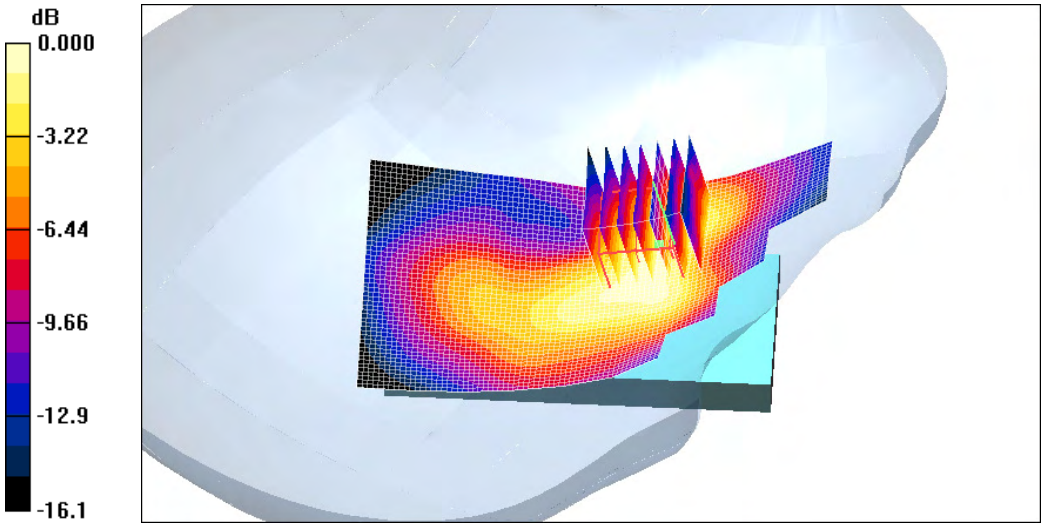
Cheek High/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 5.27 V/m; Power Drift = -0.265 dB

Peak SAR (extrapolated) = 0.391 W/kg

SAR(1 g) = 0.271 mW/g; SAR(10 g) = 0.161 mW/g

Maximum value of SAR (measured) = 0.302 mW/g



0 dB = 0.302mW/g

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16.5.17 GSM 1900-Right-Cheek-Low

Date/Time: 2012-9-30 19:18:59

Test Laboratory: SGS-GSM

I121C GSM 1900 Right Cheek Low

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GSM Mode; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3

Medium: HSL1900-Head Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.39 mho/m; ε_r = 41.3; ρ = 1000 kg/m^3

Phantom section: Right Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.05, 5.05, 5.05); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek Low/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.350 mW/g

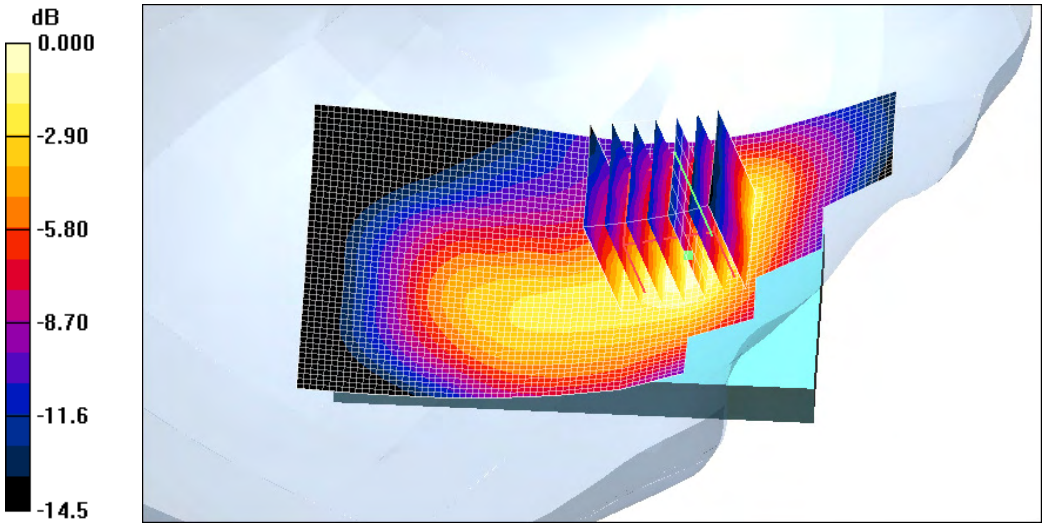
Cheek Low/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 3.63 V/m; Power Drift = -0.233 dB

Peak SAR (extrapolated) = 0.474 W/kg

SAR(1 g) = 0.296 mW/g; SAR(10 g) = 0.172 mW/g

Maximum value of SAR (measured) = 0.343 mW/g



0 dB = 0.343mW/g

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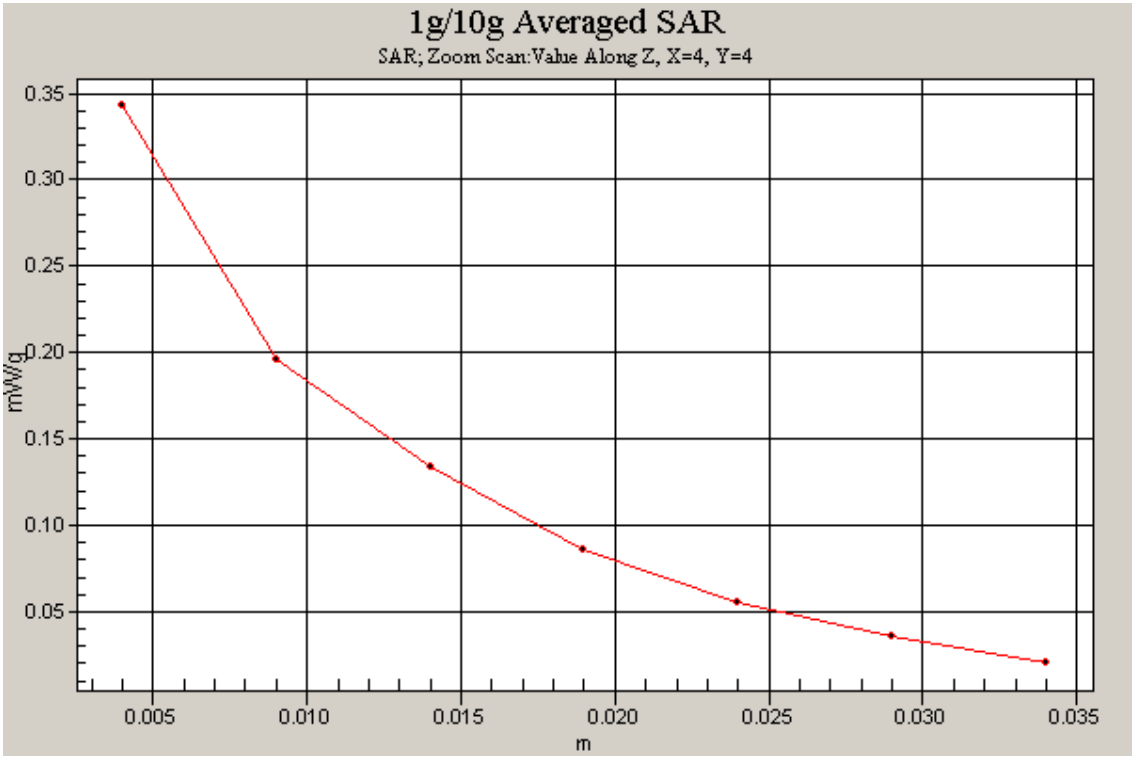

1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=4, Y=4
mW/g
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

16.5.18 GSM 1900-BodyWorn-Front-Middle

Date/Time: 2012-9-30 12:54:07

Test Laboratory: SGS-GSM

I121C GSM 1900 BodyWron Front Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium: HSL1900-Body Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 50.1; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.8, 4.8, 4.8); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Front Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

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

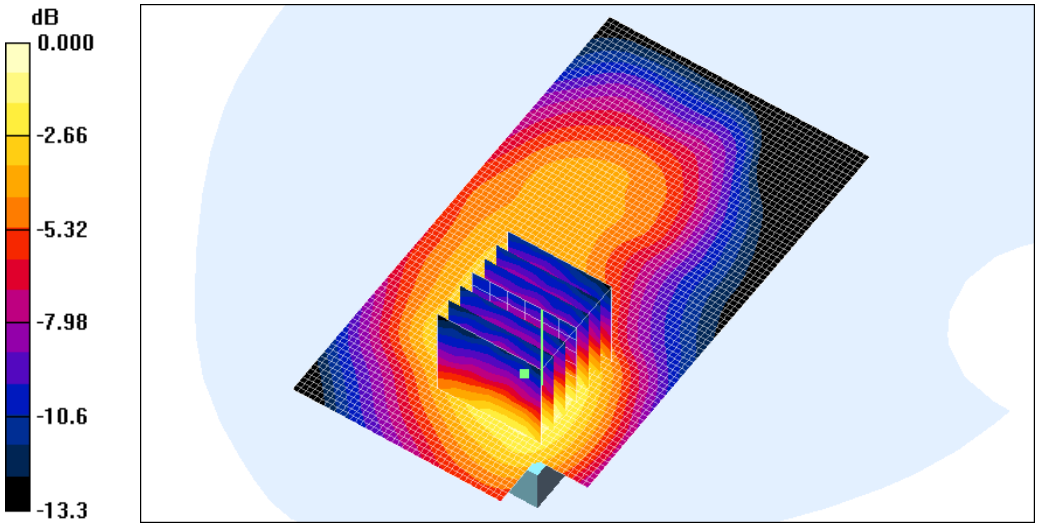
Front Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 3.09 V/m; Power Drift = 0.212 dB

Peak SAR (extrapolated) = 0.156 W/kg

SAR(1 g) = 0.116 mW/g; SAR(10 g) = 0.073 mW/g

Maximum value of SAR (measured) = 0.130 mW/g



0 dB = 0.130mW/g

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16.5.19 GSM 1900-BodyWorn-Back-Middle

Date/Time: 2012-9-30 13:15:48

Test Laboratory: SGS-GSM

I121C GSM 1900 BodyWron Back Middle

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GSM Mode; Frequency: 1880 MHz;Duty Cycle: 1:8.3

Medium: HSL1900-Body Medium parameters used: f = 1880 MHz; σ = 1.58 mho/m; ε_r = 50.1; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.8, 4.8, 4.8); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back Middle/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.246 mW/g

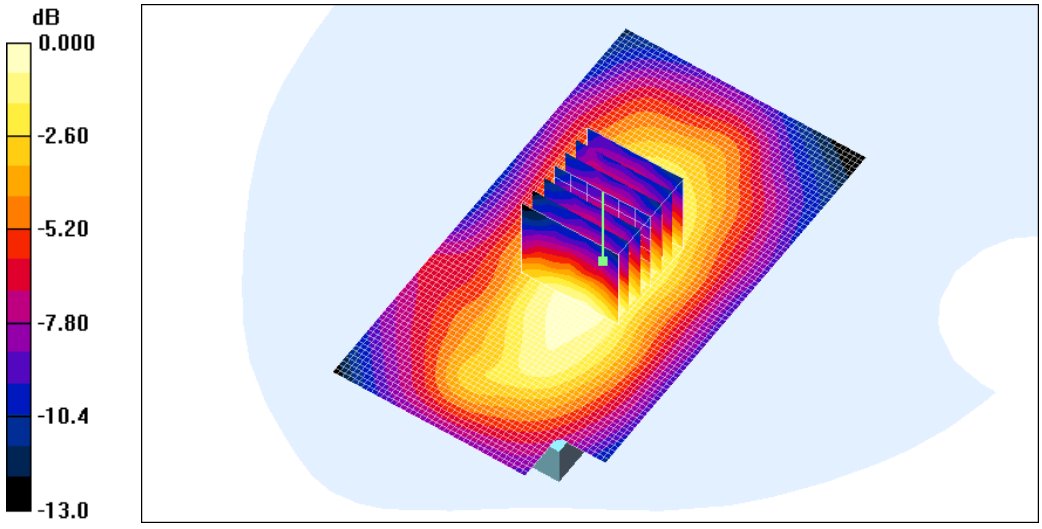
Back Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 7.03 V/m; Power Drift = -0.194 dB

Peak SAR (extrapolated) = 0.258 W/kg

SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.141 mW/g

Maximum value of SAR (measured) = 0.237 mW/g



0 dB = 0.237mW/g

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16.5.20 GSM 1900-BodyWorn-Back-High

Date/Time: 2012-9-30 14:25:18

Test Laboratory: SGS-GSM

I121C GSM 1900 BodyWron Back High

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GSM Mode; Frequency: 1909.8 MHz;Duty Cycle: 1:8.3

Medium: HSL1900-Body Medium parameters used (interpolated): f = 1909.8 MHz; σ = 1.61 mho/m; ε_r = 50; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.8, 4.8, 4.8); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back High/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.236 mW/g

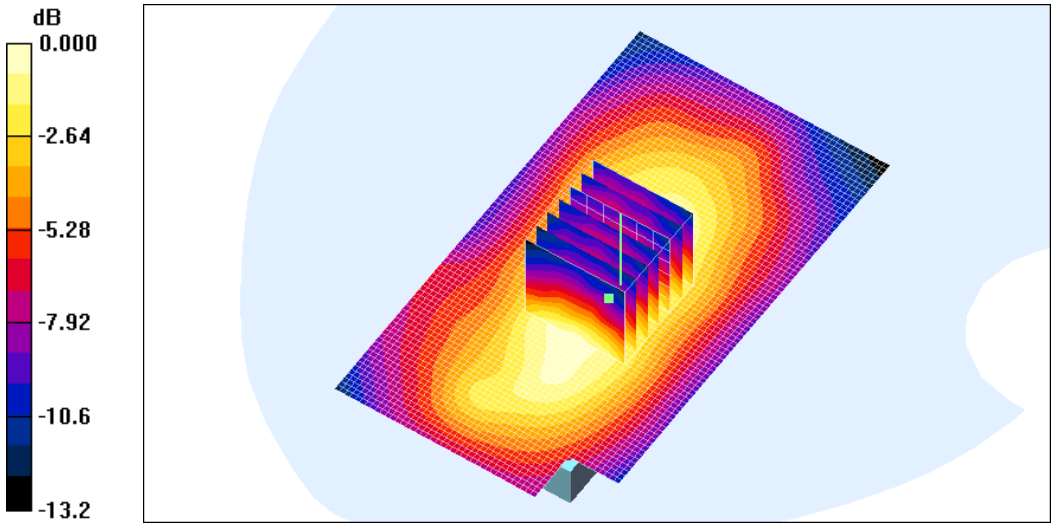
Back High/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 6.53 V/m; Power Drift = -0.098 dB

Peak SAR (extrapolated) = 0.242 W/kg

SAR(1 g) = 0.201 mW/g; SAR(10 g) = 0.136 mW/g

Maximum value of SAR (measured) = 0.227 mW/g



0 dB = 0.227mW/g

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16.5.21 GSM 1900-BodyWorn-Back-Low

Date/Time: 2012-9-30 13:58:05

Test Laboratory: SGS-GSM

I121C GSM 1900 BodyWron Back Low

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GSM Mode; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3

Medium: HSL1900-Body Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.55 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.8, 4.8, 4.8); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back Low/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.242 mW/g

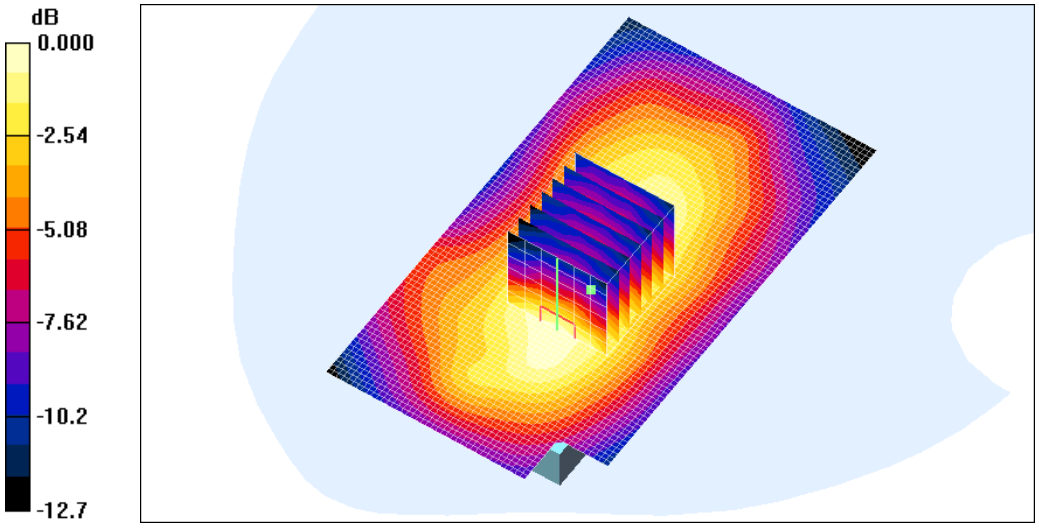
Back Low/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 7.36 V/m; Power Drift = -0.032 dB

Peak SAR (extrapolated) = 0.281 W/kg

SAR(1 g) = 0.215 mW/g; SAR(10 g) = 0.142 mW/g

Maximum value of SAR (measured) = 0.247 mW/g



0 dB = 0.247mW/g

16.5.22 GSM 1900+GPRS 2TS-BodyWorn-Back-Low

Date/Time: 2012-9-30 13:36:52

Test Laboratory: SGS-GSM

I121C GSM 1900 BodyWron GPRS 2TS Back Low

DUT: I121C; Type: GSM; Serial: 35722304999093

Communication System: PCS1900-GPRS Mode(2 ts); Frequency: 1850.2 MHz;Duty Cycle: 1:4.15

Medium: HSL1900-Body Medium parameters used (interpolated): f = 1850.2 MHz; σ = 1.55 mho/m; ε_r = 50.2; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.8, 4.8, 4.8); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Back Low/Area Scan (51x91x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.262 mW/g

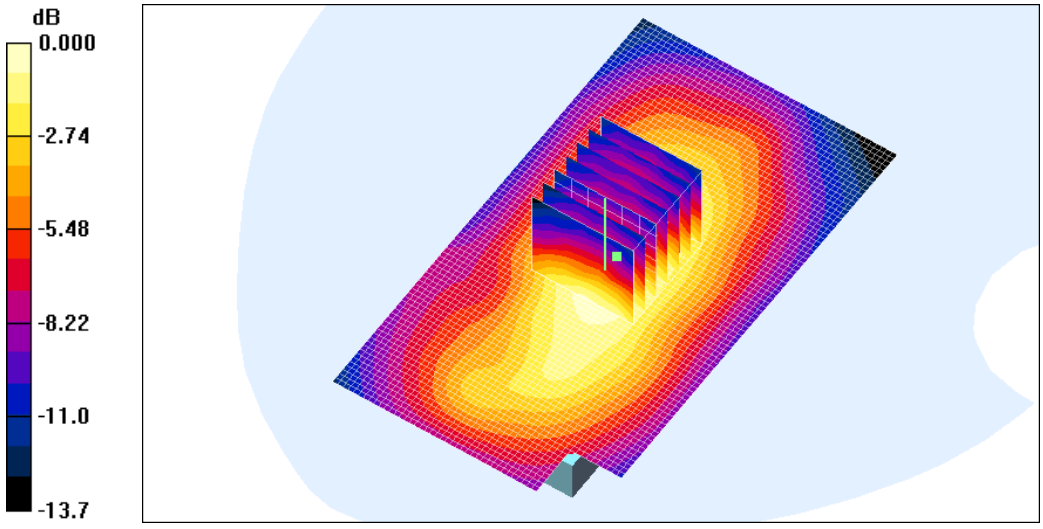
Back Low/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 6.59 V/m; Power Drift = -0.208 dB

Peak SAR (extrapolated) = 0.273 W/kg

SAR(1 g) = 0.221 mW/g; SAR(10 g) = 0.147 mW/g

Maximum value of SAR (measured) = 0.248 mW/g



0 dB = 0.248mW/g

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16. Identification of Samples

Device Type	Portable	
Product Name	Mobile Phone	
Mode Name	I121, I121C(Tested)	
Brand Name	Verykool	
Final Hardware Version	12518-1-11	
Final Software Version	SW_12518_32X16_GLOBAL_Y_B3_V001_M11_VERYCOOL_POR_SPA	
Battery Type	Li-ion Battery	
	3.7V/650mAh	
Antenna Type	Inner antenna	
GSM Frequency Bands	GSM850	Tx: 824~849MHz
		Rx: 869~894MHz
	PCS1900	Tx:1850~1910MHz
		Rx:1930~1990MHz
Modulation Mode	GMSK	
GSM / GPRS/EGPRS Power Class	GSM850	4
	PCS1900	1
GPRS Multislot class	10	
EGPRS Multislot class	Not supported	
IMEI	35722304999093	
Date of receipt	09-26,2012	
Date of Testing Start	09-29,2012	
Date of Testing End	09-30,2012	

17. Photographs of EUT

Fig.18-1 Front Side of EUT

Fig.18-2 Back Side of EUT

Fig.18-3 Battery Front View

Fig.18-4 Battery Back View

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Annex A Photographs of Test Setup

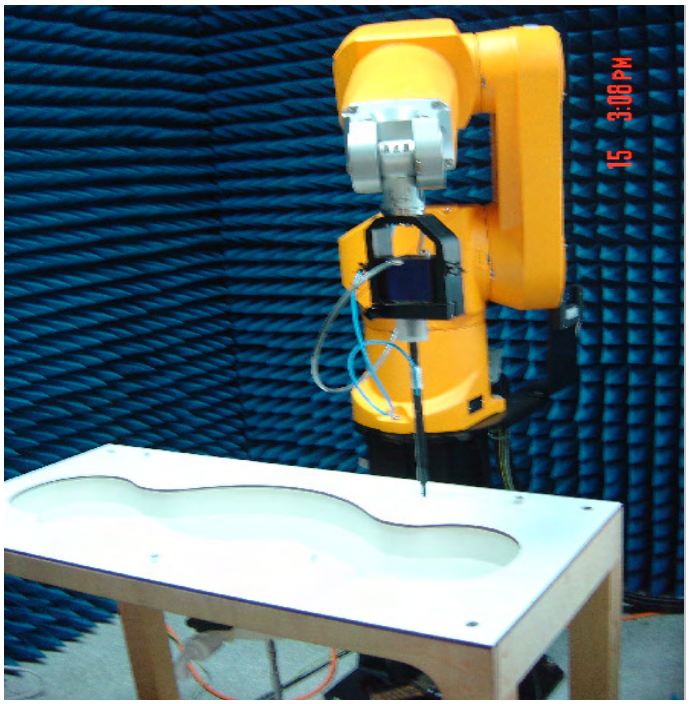

Fig.A-1 Photograph of the SAR measurement System

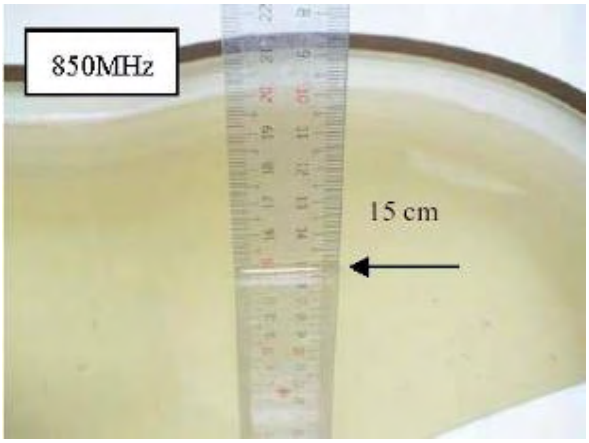

Fig.A-2a Photograph of the Tissue Simulant Liquid depth 15cm for Head

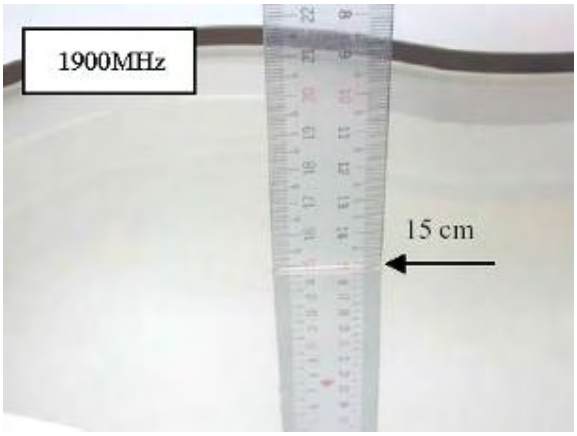

Fig.A-2b Photograph of the Tissue Simulant Liquid depth 15cm for Head

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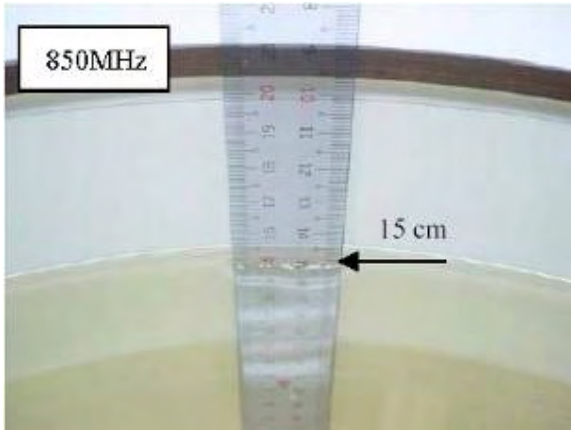

Fig.A-2a Photograph of the Tissue Simulant Liquid depth 15cm for Body Worn

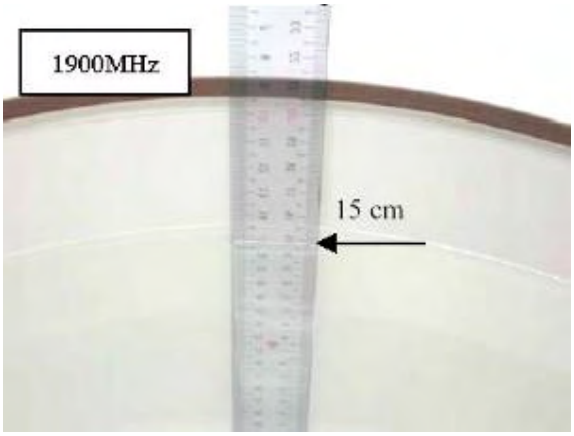

Fig.A-2b Photograph of the Tissue Simulant Liquid depth 15cm for Body Worn

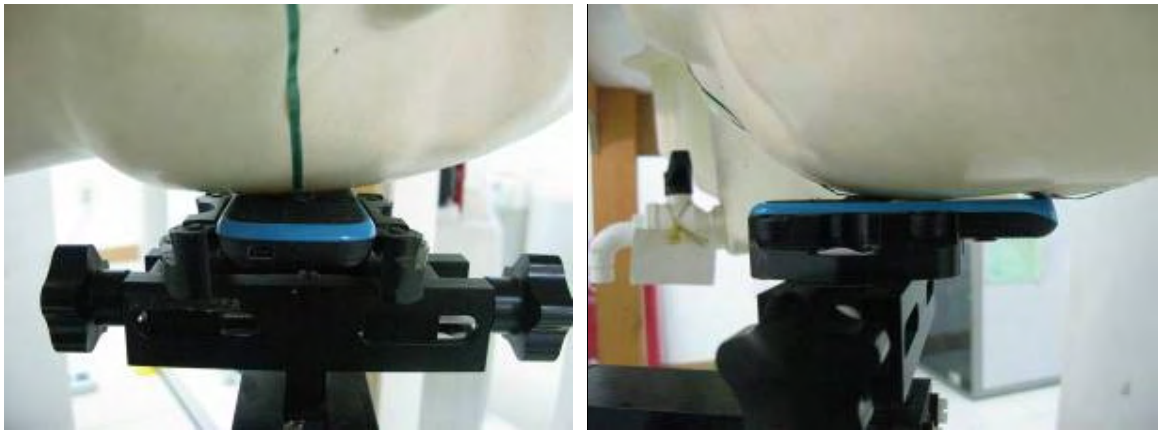

Fig.A-3a Photograph of the Left Hand Side Cheek status

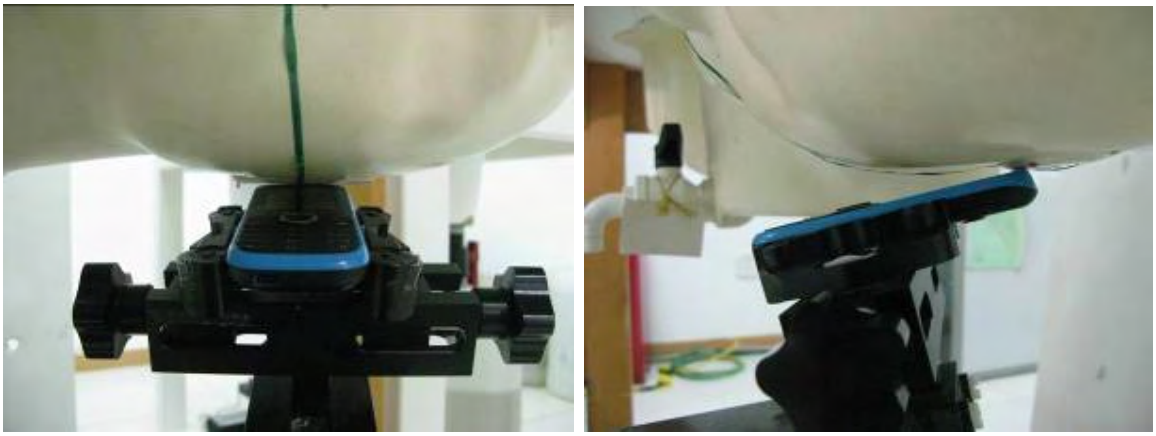

Fig.A-3b Photograph of the Left Hand Side Tilted status

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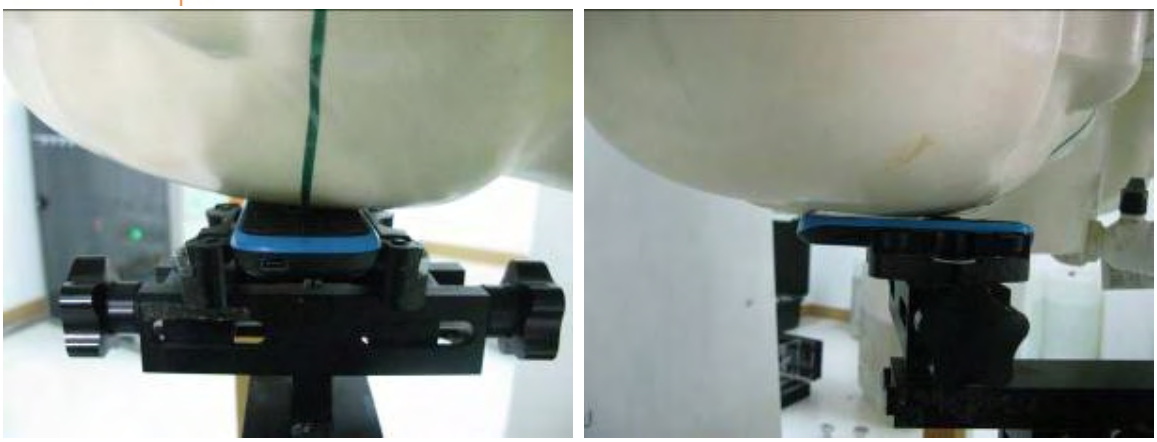

Fig.A-3c Photograph of the Right Hand Side Cheek status

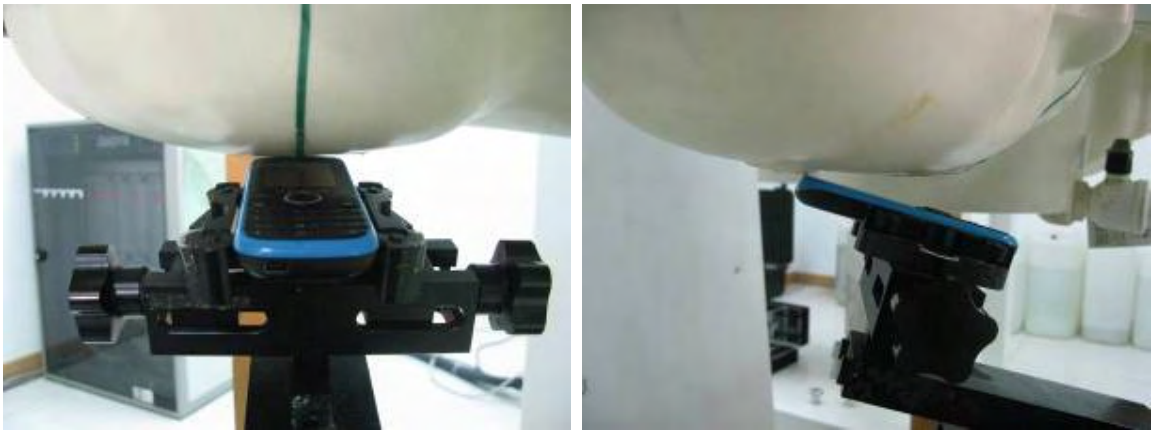

Fig.A-3d Photograph of the Right Hand Side Tilted status

Fig.A-3e Photograph of the Body Worn status-front

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Fig.A-3f Photograph of the Body Worn status-rear

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Annex B Tissue Simulant Liquid

Annex B.1 Recipes for Tissue Simulant Liquid

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

Frequency (MHz)	835		900		1800-2000		2450	
Tissue Type	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**
Ingredient (% by weight)								
Water	40.30	50.75	40.30	50.75	55.24	70.17	62.7	73.26
Salt (NaCl)	1.38	0.94	1.38	0.94	0.31	0.39	0.5	0.04
Sucrose	57.90	48.21	57.90	48.21	0	0	0	0
HEC	0.24	0	0.24	0	0	0	0	0
Bactericide	0.18	0.10	0.10	0.10	0	0	0	0
DGBE	0	0	0	0	44.45	29.44	36.8	26.7
Measurement dielectric parameters								
Dielectric Constant	41.9	55.0	41.1	54.5	39.2	53.2	39.8	52.5
Conductivity (S/m)	0.93	0.97	1.04	1.06	1.45	1.59	1.88	1.78
Target values								
Dielectric Constant	41.5	55.2	41.5	55.0	40.0	53.3	39.2	52.7
Conductivity (S/m)	0.90	0.97	0.97	1.05	1.40	1.52	1.80	1.95
Salt: 99^{+}% Pure Sodium Chloride					Sucrose: 98^{+}% Pure Sucrose			
Water: De-ionized, 16 M $^{+}$ resistivity					HEC: Hydroxyethyl Cellulose			
DGBE: 99^{+}% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]								

Table B-1 Recipe of Tissue Simulat Liquid

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Annex B.2 Measurement for Tissue Simulant Liquid

The dielectric properties for this Tissue Simulant Liquids were measured by using the Agilent Model 85070D Dielectric Probe (rates frequency band 200 MHz to 20 GHz) in conjunction with Agilent E5071B Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in Table 1.For the SAR measurement given in this report. The temperature variation of the Tissue Simulant Liquids was 22±2℃.

Frequency (MHz)	Tissue Type	Limit/Measured	Permittivity (ρ)	Conductivity (σ)	Temp (℃)
835	Head	Target value	41.5±5% (39.43~43.58)	0.90±5% (0.855~0.945)	22±2
		Measured, 09-29,2012	41.5	0.878	21.4
835	Body	Target value	55.2±5% (52.44~57.96)	0.97±5% (0.922~1.02)	22±2
		Measured, 09-30,2012	56.5	0.988	21.5
1900	Head	Target value	40.0±5% (38.0~42.0)	1.40±5% (1.33~1.47)	22±2
		Measured, 09-30,2012	41.1	1.44	21.3
1900	Body	Target value	53.3±5% (50.64~55.97)	1.52±5% (1.44~1.60)	22±2
		Measured, 09-30,2012	50	1.56	21.6

Table B-2 Measurement result of Tissue electric parameters

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Annex C SAR System Validation

The microwave circuit arrangement for system verification is sketched in Fig. C-1. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. These tests were done at 835&1900MHz. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the table C-1 (A power level of 250mw was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range 22℃, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.

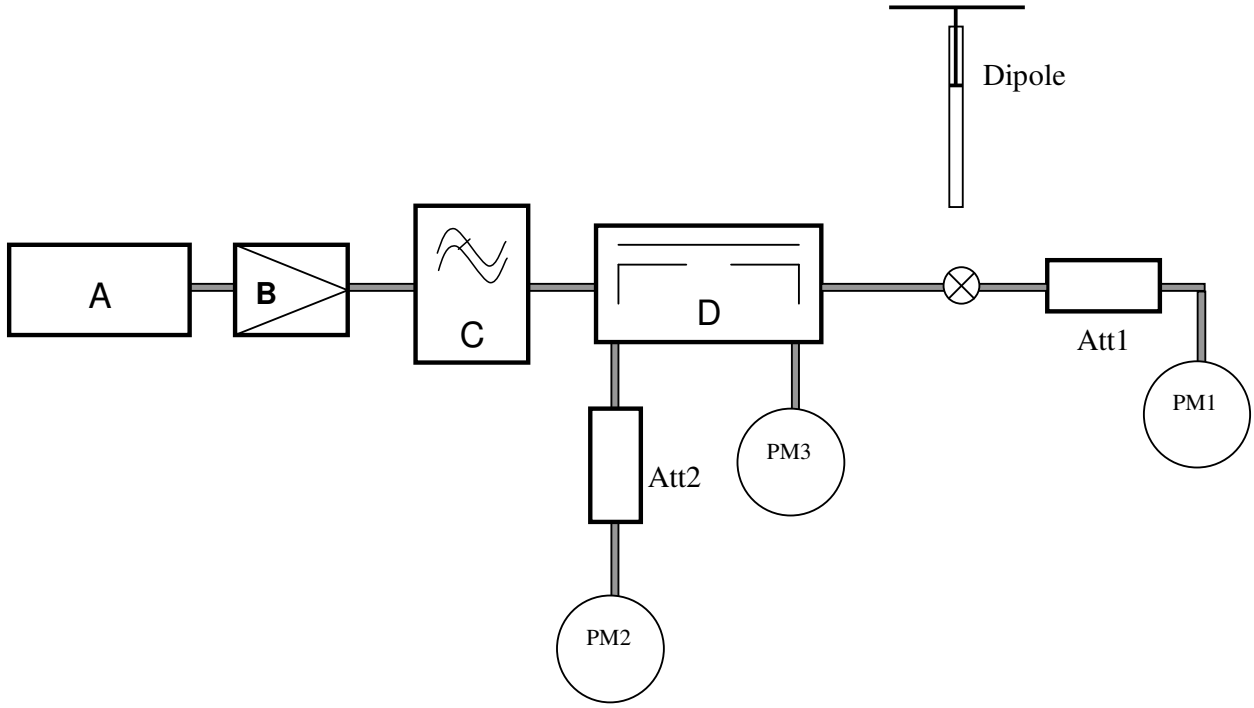

Fig. C-1 the microwave circuit arrangement used for SAR system verification

A. Agilent E4438C Signal Generator

B. Mini-Circuit ZHL-42 Preamplifier

C. Mini-Circuit VLF-2500+ Low Pass Filter

D. Mini-Circuits ZABDC20-252H-N+ Bi-DIR Coupling

PM1. Power Sensor NRP-Z92

PM2. Agilent Model E4416A Power Meter

PM3. Power Sensor NRP-Z92

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Validation Kit	Frequency (MHz)	Tissue Type	Limit/Measurement		
			Condition	Target value/Measured	1g
D835V2	835	Head	Calibration data	Target value	2.34
			Nomalized to 1W(for nominal Head TSL parameters)		9.36
			250mW input power	Measured, 09-29, 2012	**2.34**
			Nomalized to 1W(for nominal Head TSL parameters)		**9.36**
D835V2	835	Body	Calibration data	Target value	2.43
			Nomalized to 1W(for nominal Head TSL parameters)		9.50
			250mW input power	Measured, 09-30, 2012	**2.43**
			Nomalized to 1W(for nominal Head TSL parameters)		**9.72**
D1900V2	1900	Head	Calibration data	Target value	10.1
			Nomalized to 1W(for nominal Head TSL parameters)		39.9
			250mW input power	Measured, 09-30, 2012	**10.3**
			Nomalized to 1W(for nominal Head TSL parameters)		**41.2**
D1900V2	1900	Body	Calibration data	Target value	10.6
			Nomalized to 1W(for nominal Head TSL parameters)		41.4
			250mW input power	Measured, 09-30, 2012	**10.6**
			Nomalized to 1W(for nominal Head TSL parameters)		**42.4**

Table C-1 SAR System Validation Result

System Validation for 835MHz-Head

Date/Time: 2012-9-29 16:06:22

Test Laboratory: SGS-GSM

System Performance Check at 835MHz Head

DUT: Dipole 835MHz; Type: D835V2; Serial: D835V2 - SN:4d070

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

Medium: HSL900_Head Medium parameters used: f = 835 MHz; σ = 0.878 mho/m; ε_r = 41.5; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.09, 6.09, 6.09); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=15mm, Pin=250mW/Area Scan (61x121x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 2.51 mW/g

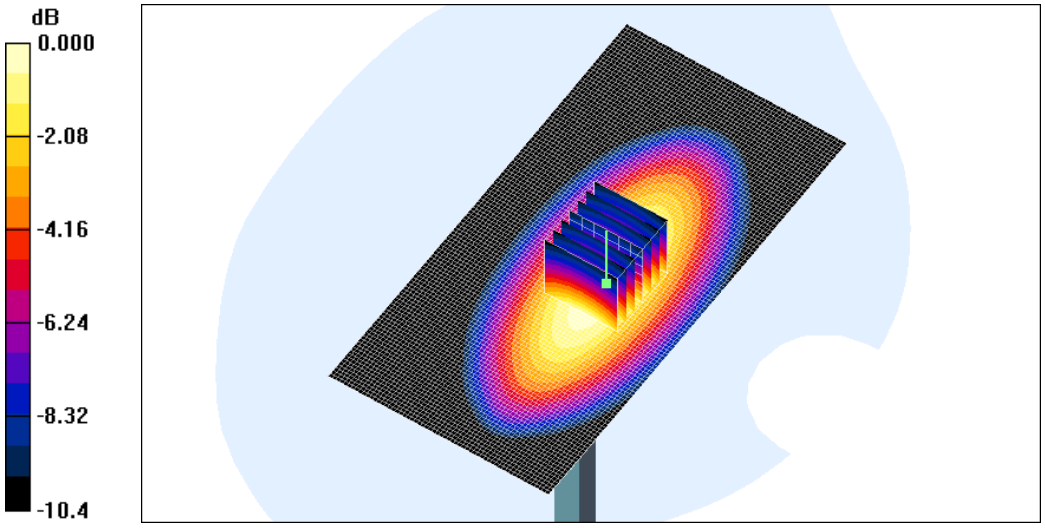
d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 41.0 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 3.57 W/kg

SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.52 mW/g

Maximum value of SAR (measured) = 2.51 mW/g



0 dB = 2.51mW/g

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System Validation for 835MHz-Body

Date/Time: 2012-9-30 8:06:03

Test Laboratory: SGS-GSM

System Performance Check at 835MHz Body

DUT: Dipole 835MHz; Type: D835V2; Serial: D835V2 - SN:4d070

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

Medium: HSL835_Body Medium parameters used: f = 835 MHz; σ = 0.988 mho/m; ε_r = 56.5; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(6.13, 6.13, 6.13); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=15mm, Pin=250mW 2/Area Scan (61x121x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 2.60 mW/g

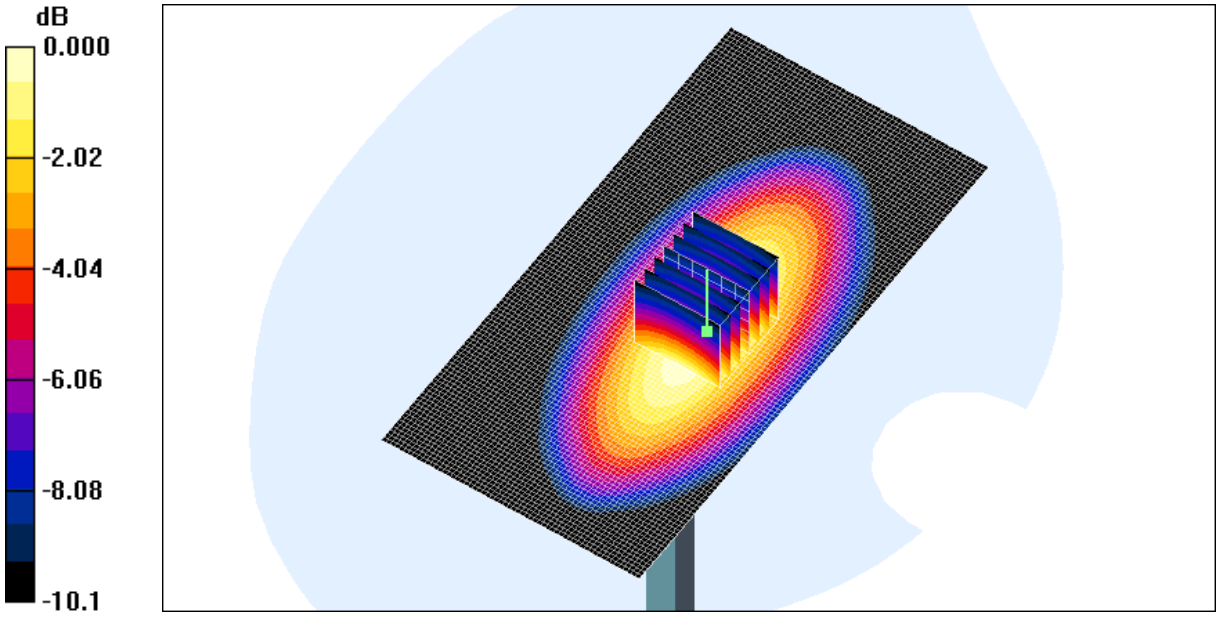
d=15mm, Pin=250mW /Zoom Scan (7x7x7) (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 51.7 V/m; Power Drift = 0.017 dB

Peak SAR (extrapolated) = 3.67 W/kg

SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.59 mW/g

Maximum value of SAR (measured) = 2.62 mW/g



0 dB = 2.62mW/g

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System Validation for 1900MHz-Head

Date/Time: 2012-9-30 14:13:17

Test Laboratory: SGS-GSM

System Performance Check at 1900 MHz Head

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d028

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

Medium: HSL1900-Head Medium parameters used: f = 1900 MHz; σ = 1.44 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.05, 5.05, 5.05); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (61x101x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 12.2 mW/g

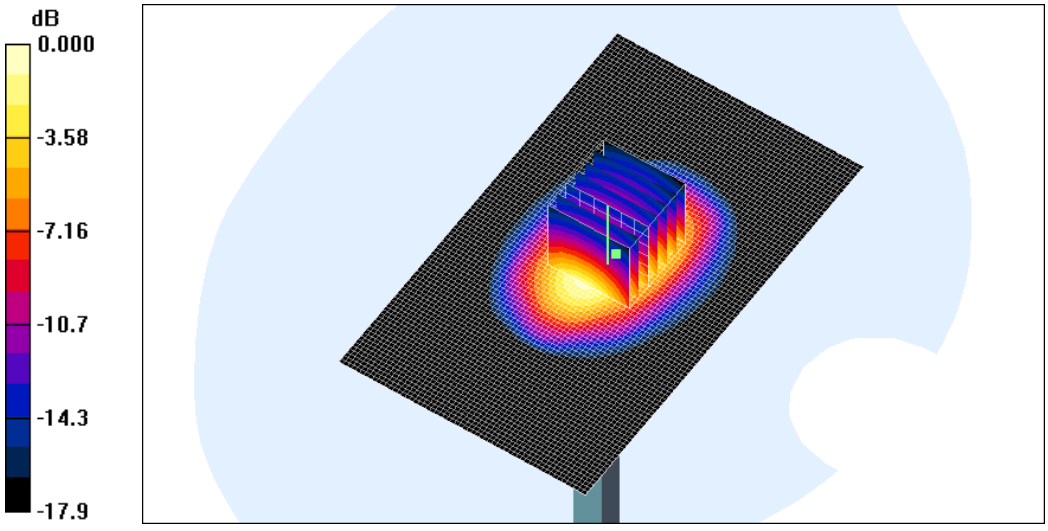
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 80.3 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 19.5 W/kg

SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.29 mW/g

Maximum value of SAR (measured) = 11.5 mW/g



0 dB = 11.5mW/g

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System Validation for 1900MHz-Body

Date/Time: 2012-9-30 11:40:24

Test Laboratory: SGS-GSM

System Performance Check at 1900 MHz Body

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d028

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

Medium: HSL1900-Body Medium parameters used: f = 1900 MHz; σ = 1.56 mho/m; ε_r = 50; ρ = 1000 kg/m^3

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.8, 4.8, 4.8); Calibrated: 2011-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2011-11-16
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (61x101x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 12.7 mW/g

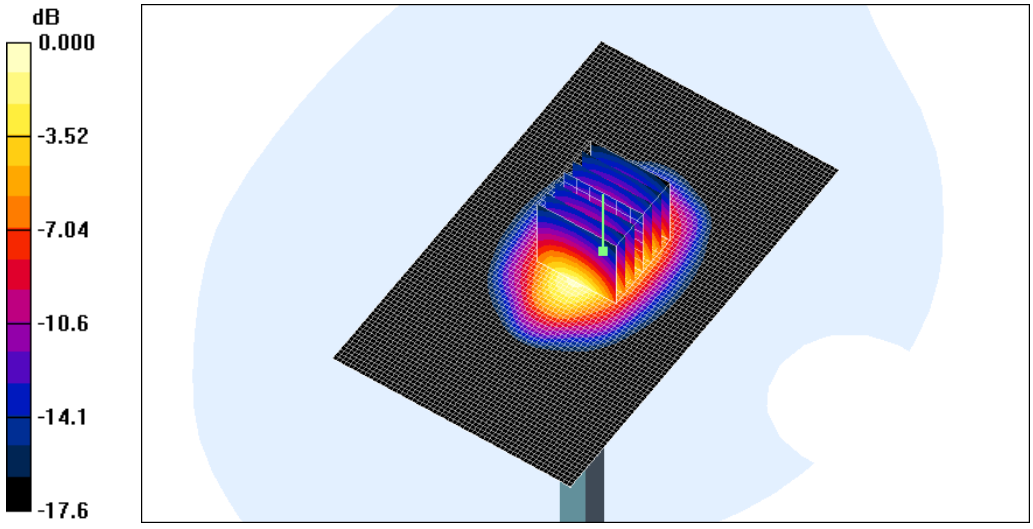
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 76.0 V/m; Power Drift = 0.012 dB

Peak SAR (extrapolated) = 19.6 W/kg

SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.43 mW/g

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



0 dB = 11.8mW/g

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Annex D Description of Test Position

Annex D.1 SAM Phantom Shape

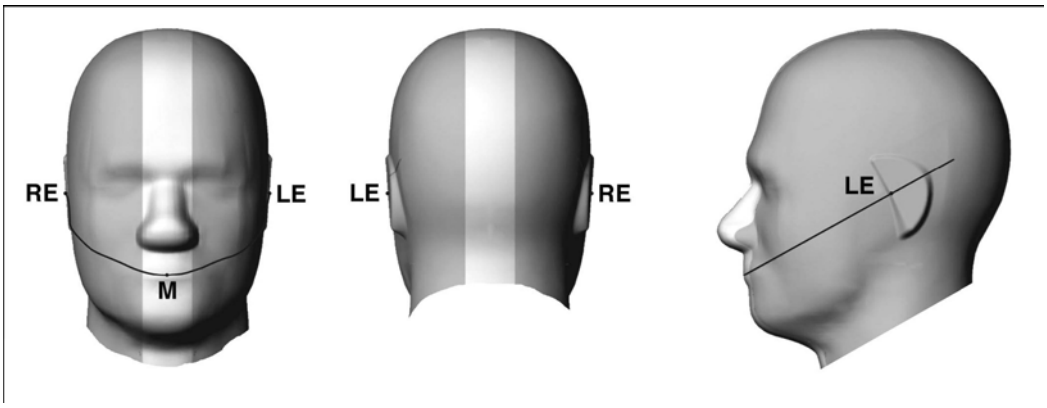

Figure D-1 front, back, and side views of SAM (model for the phantom shell). Full-head model is for illustration purposes only-procedures in this recommended practice are intended primarily for the phantom setup of Figure D-2. Note: The center strip including the nose region has a different thickness tolerance.

Figure D-2 Sagittally bisected phantom with extended perimeter (shown placed on its side as used for SAR measurements)

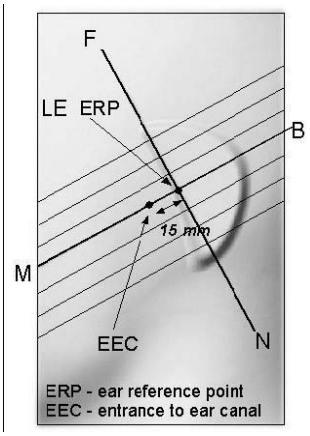

Figure D-3 Close-up side view of phantom showing the ear region, N-F and B-M lines, and seven cross-sectional plane locations

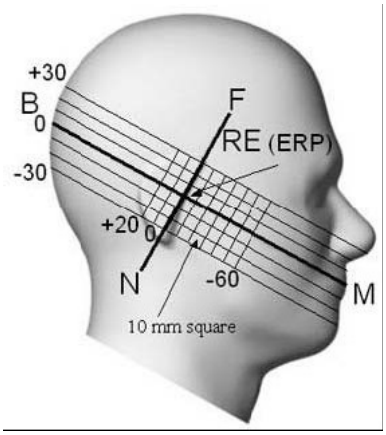

Figure D-4 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

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Annex D.2 EUT constructions

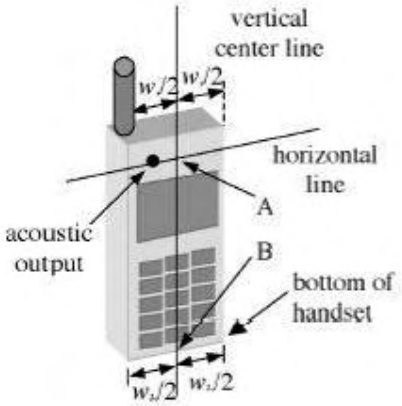

Figure D-5a Handset vertical and horizontal reference lines-"fixed case"

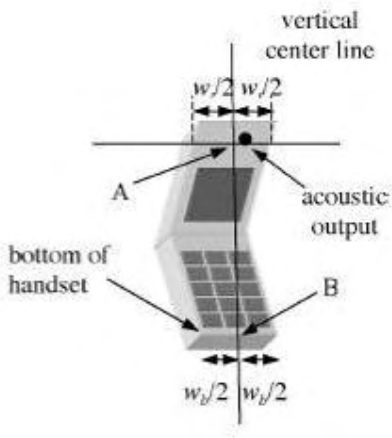

Figure D-5b Handset vertical and horizontal reference lines-"clam-shell case"

Annex D.3 Definition of the "cheek" position

a) Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom ("initial position" see Figure 1-7). While maintaining the device in this plane, align the vertical centre line with the reference plane containing the three ear and mouth reference points (M, RE and LE) and align the centre of the ear piece with the line RE-LE;

b) Translate the mobile phone box towards the phantom with the ear piece aligned with the line LE-RE until the phone touches the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the box until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

Annex D.4 Definition of the "tilted" position

a) Position the device in the "cheek" position described above;

b) While maintaining the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.

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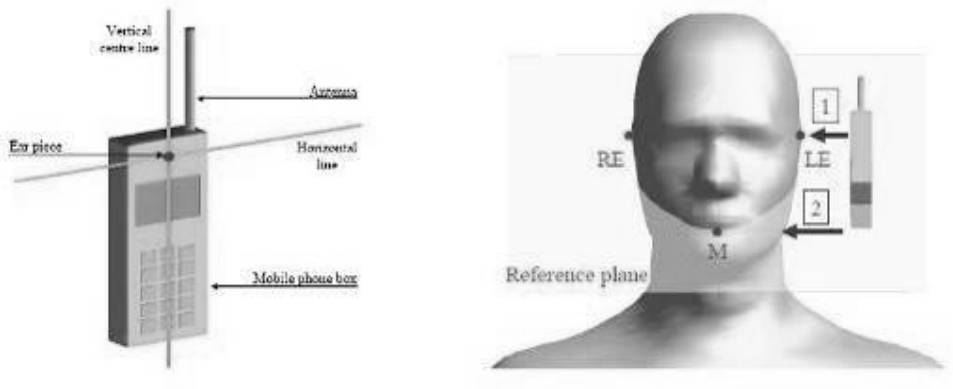

Figure D-6 Definition of the reference lines and points, on the phone and on the phantom and initial position

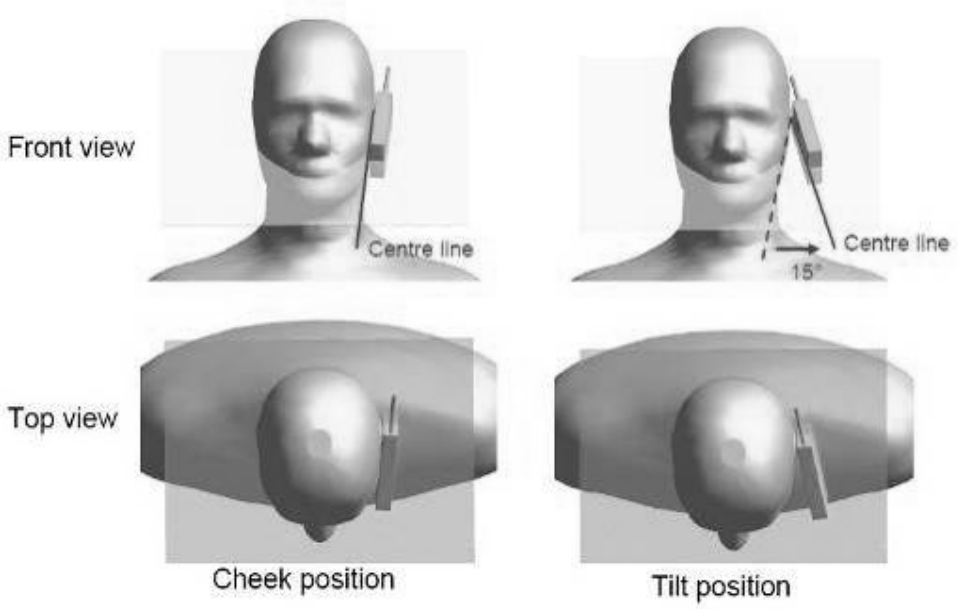

Figure D-7 "Cheek" and "tilt" positions of the mobile phone on the left side

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Annex E Calibration certificate

Annex E.1 Probe Calibration certificate

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

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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 SGS-SH (Auden)

Certificate No: ES3-3088_Nov11

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3088

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

Calibration date: November 23, 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 E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: November 23, 2011

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

Certificate No: ES3-3088_Nov11 Page 1 of 11

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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) **Accreditation No.: SCS 108**
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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:3088

Manufactured: July 20, 2005
Calibrated: November 23, 2011

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

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DASY/EASY - Parameters of Probe: ES3DV3 - SN:3088

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm (μV/(V/m)^2)^A	1.29	1.27	1.20	± 10.1 %
DCP (mV)^B	95.8	94.9	95.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc^E (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	147.7	±2.5 %
			Y	0.00	0.00	1.00	112.2	
			Z	0.00	0.00	1.00	138.9	

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

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

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DASY/EASY - Parameters of Probe: ES3DV3 - SN:3088

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)
835	41.5	0.90	6.09	6.09	6.09	0.80	1.00	± 12.0 %
900	41.5	0.97	5.96	5.96	5.96	0.80	1.22	± 12.0 %
1810	40.0	1.40	5.13	5.13	5.13	0.80	1.26	± 12.0 %
1900	40.0	1.40	5.05	5.05	5.05	0.80	1.23	± 12.0 %
1950	40.0	1.40	4.90	4.90	4.90	0.80	1.24	± 12.0 %
2450	39.2	1.80	4.41	4.41	4.41	0.80	1.26	± 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.

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DASY/EASY - Parameters of Probe: ES3DV3- SN:3088

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)
835	55.2	0.97	6.13	6.13	6.13	0.80	1.00	± 12.0 %
1900	53.3	1.52	4.80	4.80	4.80	0.80	1.31	± 12.0 %
2450	52.7	1.95	4.35	4.35	4.35	0.80	1.22	± 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.

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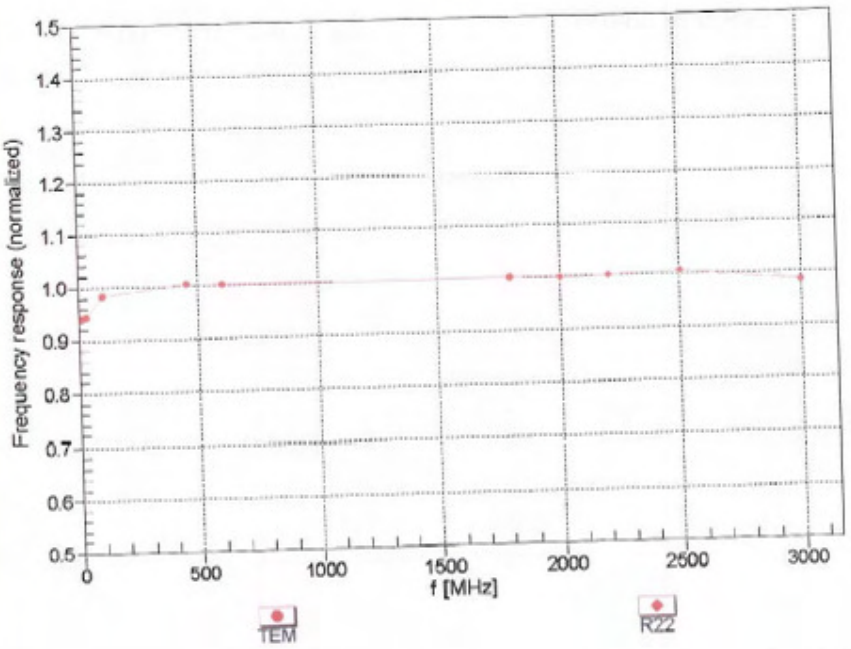
ES3DV3– SN:3088

November 23, 2011

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

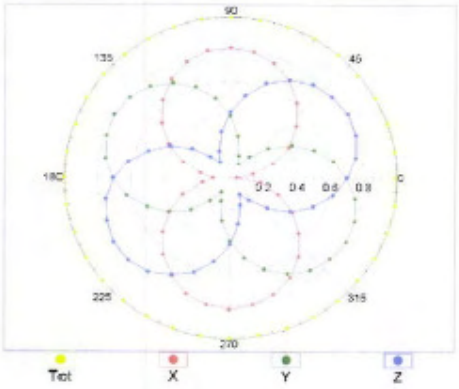


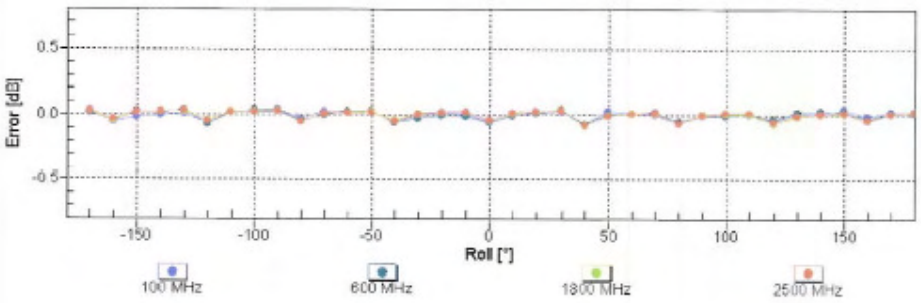
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

f=1800 MHz,R22





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

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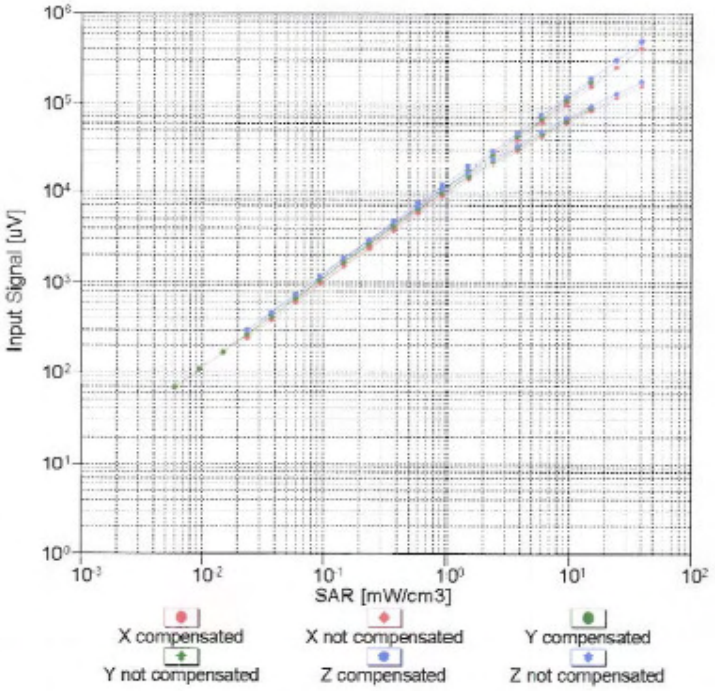
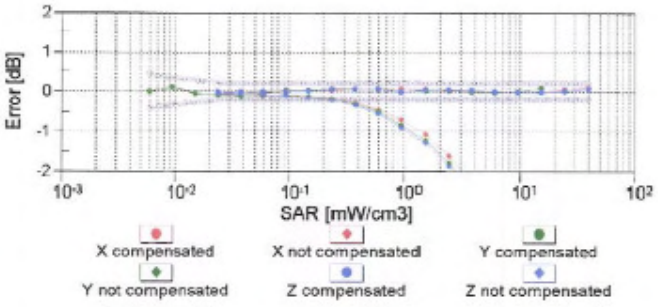
ES3DV3– SN:3088 November 23, 2011

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





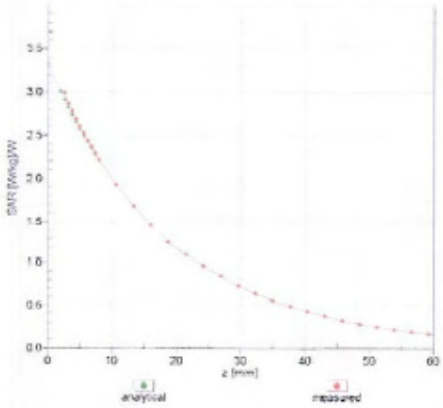
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

MC

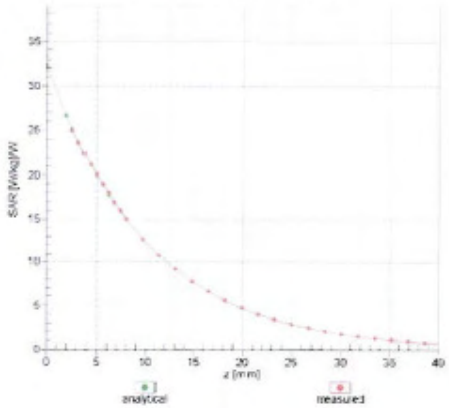
ES3DV3– SN:3088 November 23, 2011

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

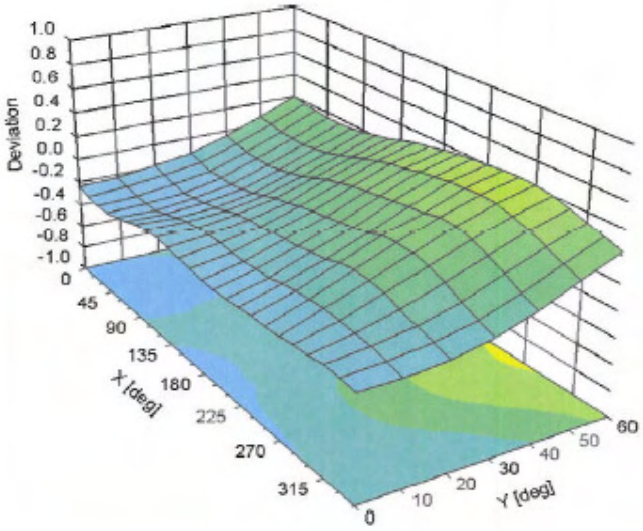


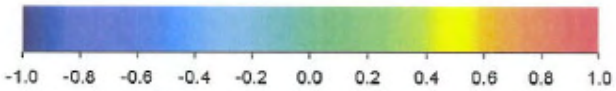
f = 2450 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3088

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	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

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Annex E.2 DAE Calibration certification

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Accreditation No.: SCS 108

Client: SGS - SH (Auden)

Certificate No: DAE3-569_Nov11

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 569
Calibration procedure(s)	QA CAL-06.v23 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	November 16, 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
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-11 (No:11450)	Sep-12
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	08-Jun-11 (in house check)	In house check: Jun-12

	Name	Function	Signature
Calibrated by:	Andrea Guntli	Technician	
Approved by:	Fin Bomholt	R&D Director	

Issued: November 16, 2011

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Certificate No: DAE3-569_Nov11 Page 1 of 5

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Accreditation No.: SCS 108

Glossary

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

Methods Applied and Interpretation of Parameters

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

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	402.918 ± 0.1% (k=2)	403.325 ± 0.1% (k=2)	403.506 ± 0.1% (k=2)
Low Range	3.94257 ± 0.7% (k=2)	3.94078 ± 0.7% (k=2)	3.92857 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	263.0 ° ± 1 °

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Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200007.5	1.98	0.00
Channel X	+ Input	19999.63	-1.17	-0.01
Channel X	- Input	-19997.26	2.24	-0.01
Channel Y	+ Input	200006.9	2.80	0.00
Channel Y	+ Input	20001.35	1.55	0.01
Channel Y	- Input	-19997.50	2.70	-0.01
Channel Z	+ Input	200004.2	0.86	0.00
Channel Z	+ Input	19994.71	-4.99	-0.02
Channel Z	- Input	-20001.67	-1.57	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	1999.4	-0.60	-0.03
Channel X	+ Input	200.87	1.07	0.53
Channel X	- Input	-199.13	0.77	-0.39
Channel Y	+ Input	2000.1	0.21	0.01
Channel Y	+ Input	200.59	0.59	0.29
Channel Y	- Input	-201.62	-1.72	0.86
Channel Z	+ Input	2000.1	0.03	0.00
Channel Z	+ Input	198.40	-1.60	-0.80
Channel Z	- Input	-201.77	-1.97	0.99

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-0.68	-2.49
	- 200	3.05	1.36
Channel Y	200	5.33	4.90
	- 200	-6.28	-6.47
Channel Z	200	-13.18	-13.80
	- 200	11.54	11.47

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.33	-0.60
Channel Y	200	2.89	-	1.02
Channel Z	200	3.15	0.34	-

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4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	16177	17130
Channel Y	16550	16855
Channel Z	15783	17570

5. Input Offset Measurement

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

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-0.10	-1.63	1.64	0.67
Channel Y	-0.72	-2.14	0.76	0.67
Channel Z	-1.16	-2.30	0.64	0.50

6. Input Offset Current

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

7. Input Resistance (Typical values for information)

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

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

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

9. Power Consumption (Typical values for information)

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

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Annex E.3 Dipole Calibration certification

D835V2

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

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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: SGS-SH (Auden)

Certificate No: D835V2-4d105_Nov11

CALIBRATION CERTIFICATE

Object: D835V2 - SN: 4d105

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: November 11, 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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	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-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: November 11, 2011

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

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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.

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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	41.4 ± 6 %	0.90 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	2.34 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.36 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.12 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	53.3 ± 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	2.43 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.50 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.25 mW / g ± 16.5 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.1 Ω - 3.6 jΩ
Return Loss	- 27.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.0 Ω - 5.1 jΩ
Return Loss	- 25.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.396 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	May 26, 2010

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DASY5 Validation Report for Head TSL

Date: 11.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

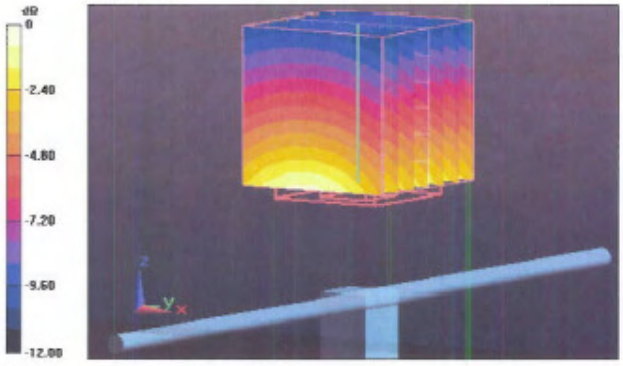
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d105

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

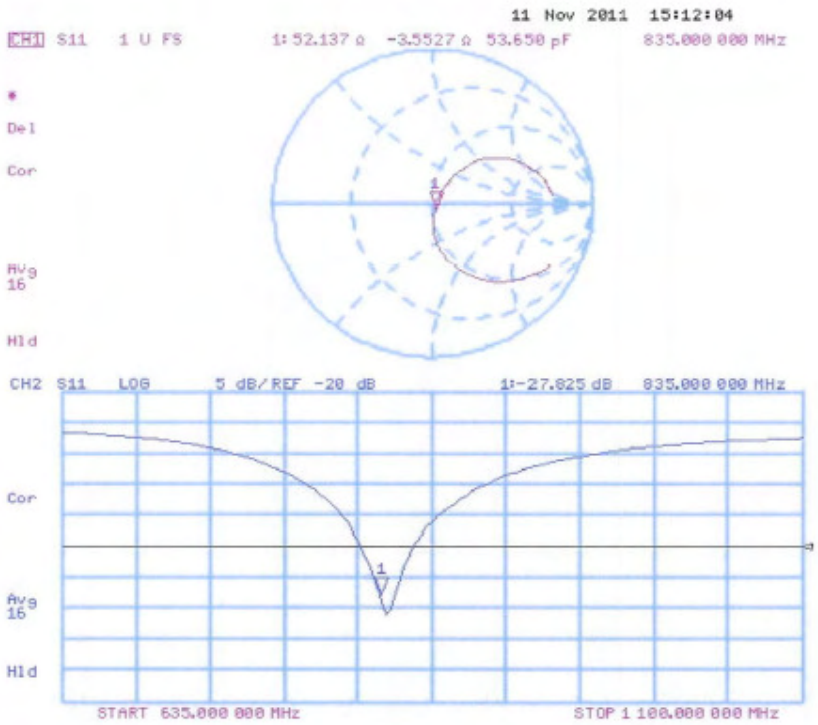
- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

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 = 56.666 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.442 W/kg
SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.53 mW/g
Maximum value of SAR (measured) = 2.708 mW/g



0 dB = 2.710mW/g

Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 11.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

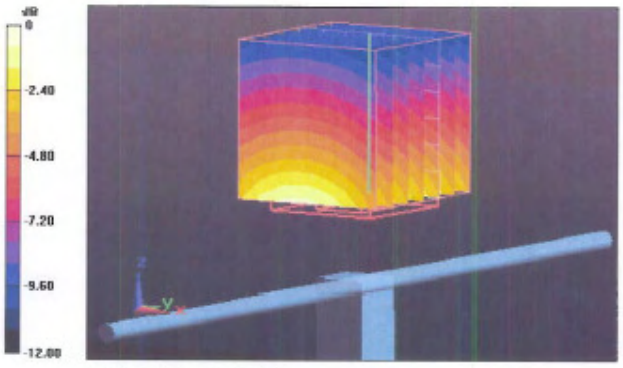
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d105

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 53.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

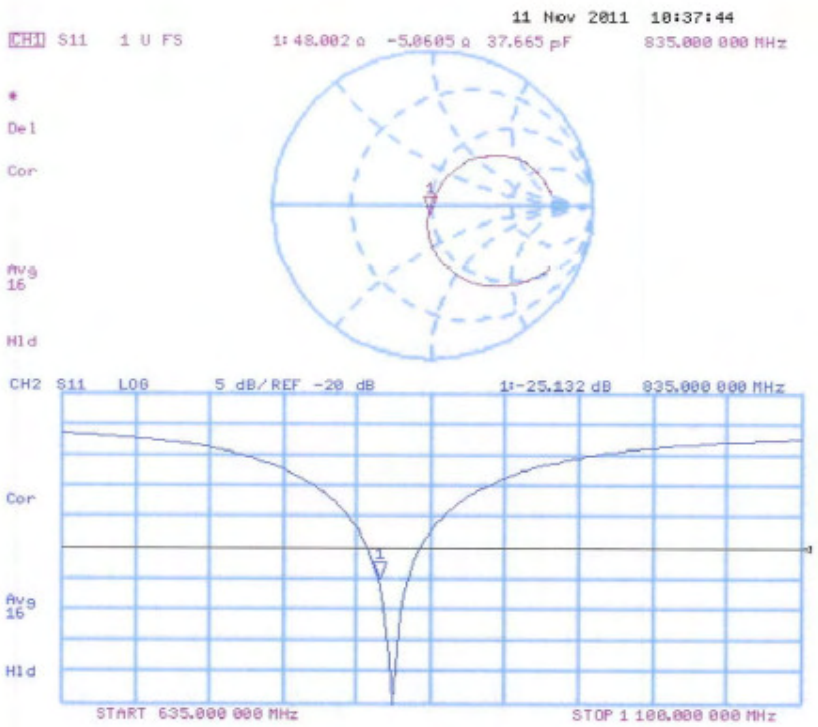
- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

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 = 55.161 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.527 W/kg
SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.6 mW/g
Maximum value of SAR (measured) = 2.801 mW/g



0 dB = 2.800mW/g

Impedance Measurement Plot for Body TSL



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D1900V2

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Accredited by the Swiss Accreditation Service (SAS)
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Accreditation No.: SCS 108

Client: SGS-SH (Auden)

Certificate No: D1900V2-5d028_Nov11

CALIBRATION CERTIFICATE

Object: D1900V2 - SN: 5d028

Calibration procedure(s): QA CAL-05.v8
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: November 10, 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	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5086 (20g)	29-Mar-11 (No. 217-01368)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	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-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

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

Issued: November 10, 2011

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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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	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 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**39.9 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.26 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.9 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	54.2 ± 6 %	1.59 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (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	**41.4 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.54 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.9 mW / g ± 16.5 % (k=2)**

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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.3 Ω + 5.8 jΩ
Return Loss	- 24.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.4 Ω + 6.4 jΩ
Return Loss	- 23.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.200 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 17, 2002

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DASY5 Validation Report for Head TSL

Date: 10.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

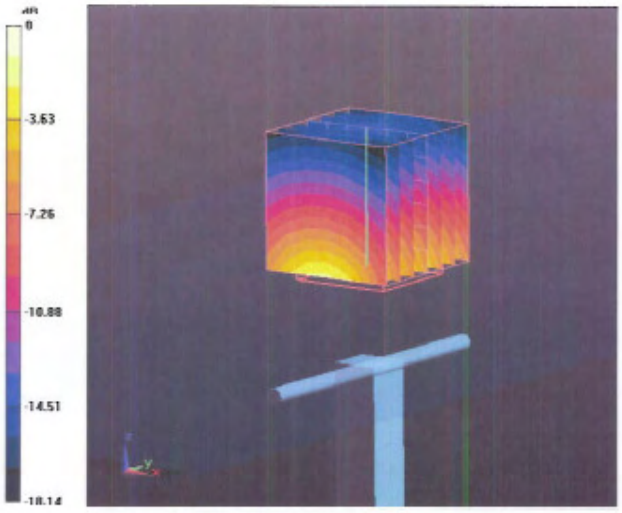
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d028

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 = 98.632 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 18.531 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.26 mW/g
Maximum value of SAR (measured) = 12.753 mW/g



0 dB = 12.750mW/g

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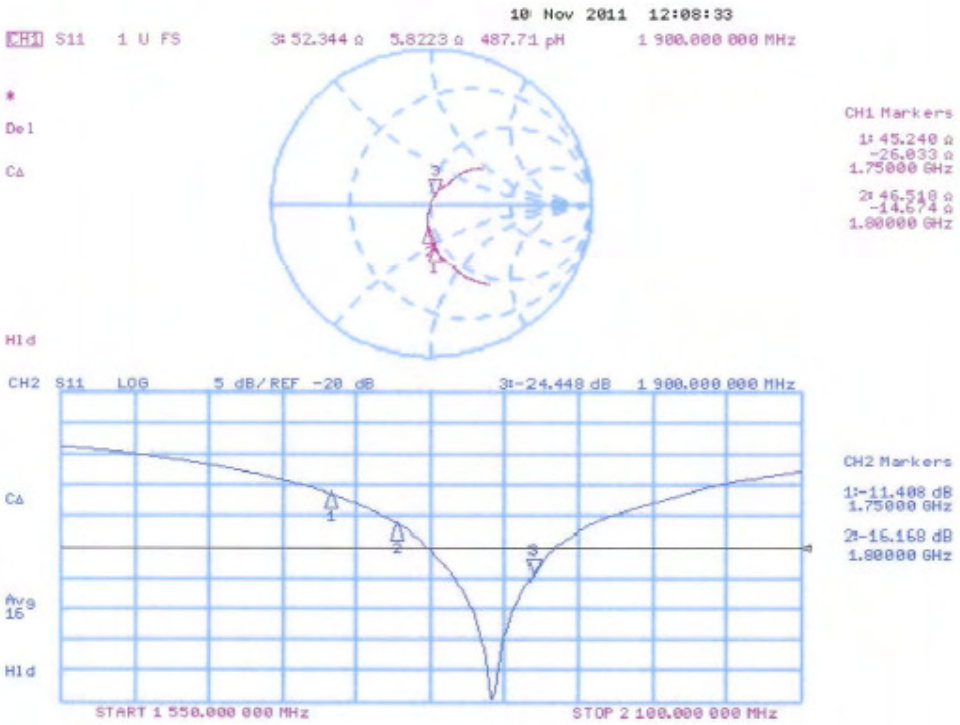
Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 10.11.2011

Test Laboratory: SPEAG, Zurich, Switzerland

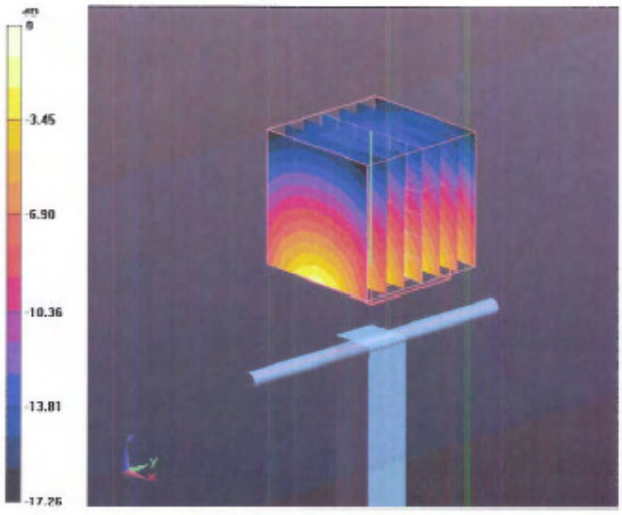
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d028

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.59 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

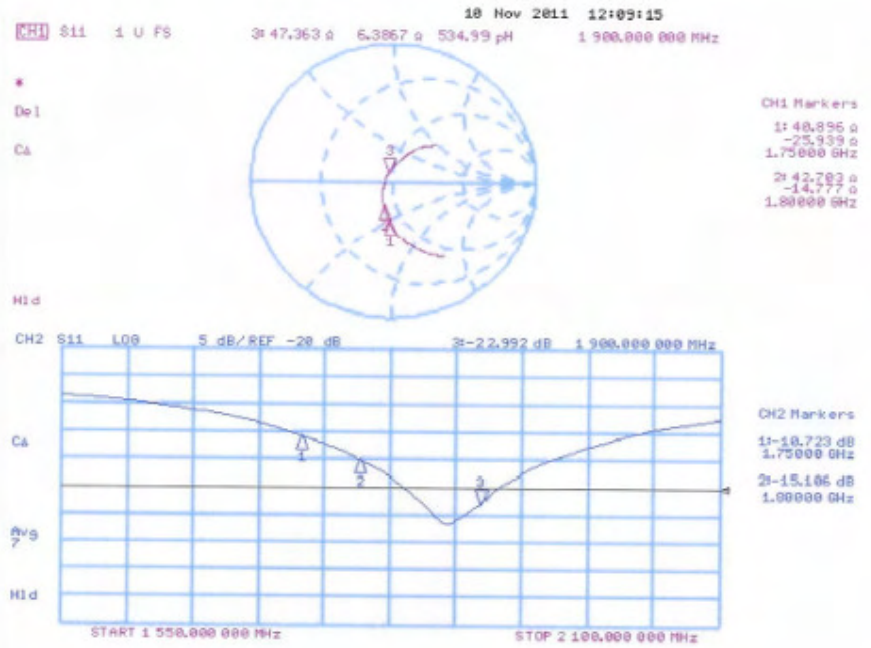
- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 29.04.2011
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.07.2011
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.6.2(482); SEMCAD X 14.4.5(3634)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.757 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 18.957 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.54 mW/g
Maximum value of SAR (measured) = 13.554 mW/g



0 dB = 13.550mW/g

Impedance Measurement Plot for Body TSL



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END OF REPORT