

Full SAR Test Report

Applicant Name: Queclink Wireless Solutions Co., Ltd

Applicant Address: Room 501, Building 9, No 99 ,TianZhou Road ,Shanghai ,China

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

Sample Description	GPS Locator
Brand Name	Queclink
Model Number	CP100
Final Hardware Version Tested	1.01
Final Software Version Tested	CP100R00A01M256_SPANSION
FCC ID	YQD-CP100
Date Initial Sample Received	03-22,2011
Testing Start Date	04-21,2011
Testing End Date	04-27,2011

According to:

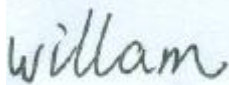
FCC 47CFR § 2.1093, IEEE Std C95.1-2005

IEEE1528-2003, OET Bulletin 65 Supplement C

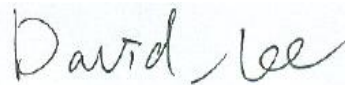
Comments/ Conclusion:

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

Signed for on behalf of SGS



Prepared



approved

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SHEMC

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Change History

Version	Change Contents	Author	Date
V1.0	First edition	Willam Wang	04-29, 2011

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.

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	6.3	∞
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		10.71	430
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		21.43	

7. Testing Environment

Normal Temperature	+20 to +24 °C
Relative Humidity	35 to 60 %

8. Primary Test Laboratory

Name:	EMC Laboratory SGS-CSTC Standards Technical Services(Shanghai) Co., Ltd
Address:	9F, 3 rd Building, No.889, Yishan Rd, Xuhui District, Shanghai, China 200233
Telephone:	+86 (0) 21 6107 2777
Fax:	+86 (0) 21 5450 0149
Internet:	http://www.cn.sgs.com
Contact:	Mr. David Lee
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9. Details of Applicant

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Address:	Room 501, Building 9, No 99 ,TianZhou Road ,Shanghai ,China
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Fax	+86 21 54451990
Contact:	Johnson Jiang
Email:	johnson.jiang@queclink.com

10. Details of Manufacturer

Name:	Queclink Wireless Solutions Co., Ltd
Address:	Room 501, Building 9, No 99 ,TianZhou Road ,Shanghai ,China
Telephone:	+86 21 51082965
Fax	+86 21 54451990
Contact:	Johnson Jiang
Email:	johnson.jiang@queclink.com

11. Other testing Locations

Name:	Not Required
Address:	--
Telephone:	--
Contact:	--
Fax	--
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, RSS-102

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 C95.1-2005	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.	2005
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 248227 D01	SAR Measurement Procedures for 802.11a/b/g Transmitters	-
KDB941225 D06	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities	-

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

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



14. SGS Shanghai EMC lab, Personnel

SGS EMC Shanghai Project Management Team and list of approved Testers for SGS EMC Shanghai.

Surname	Forename	Initials
CAI	CAI	CAICAI
Xu	Jim	JimXu
Pan	Tino	Tino
Hailiang	Cai	HAILIANG
Nie	Neo	Neo
Xu	Jesse	Jesse
Wang	Willam	Willam
Lee	David	David
Liu	Magi	Magi

Version 2011-01-01

15. Test Equipment Information

15.1 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	2010-11-22	2011-11-21
E-Field Probe	ES3DV3	3088	2010-11-23	2011-11-22
Validation Kits	D835V2	4d070	2010-11-19	2011-11-18
Validation Kits	D1900V2	5d028	2010-11-25	2011-11-24
Validation Kits	D2450V2	733	2010-11-25	2011-11-24
Agilent Network Analyzer	E5071B	MY42100549	2010-11-24	2011-11-23
RF Bi-Directional Coupler	ZABDC20-252H	n/a	2010-05-21	2011-05-20
Agilent Signal Generator	E4438C	14438CATO-19719	2010-11-01	2011-10-31
Mini-Circuits Preamplifier	ZHL-42	D041905	2010-11-01	2011-10-31
Agilent Power Meter	E4416A	GB41292095	2010-11-01	2011-10-31
Agilent Power Sensor	8481H	MY41091234	2010-11-01	2011-10-31
R&S Power Sensor	NRP-Z92	100025	2011-04-12	2012-04-11
R&S Universal Radio Communication Tester	CMU200	103633	2010-11-01	2011-10-31

15.2 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 $SAR = \sigma (|E|^2) / \rho$ where σ and ρ are the conductivity and mass density of the tissue-simulant.

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 dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

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.

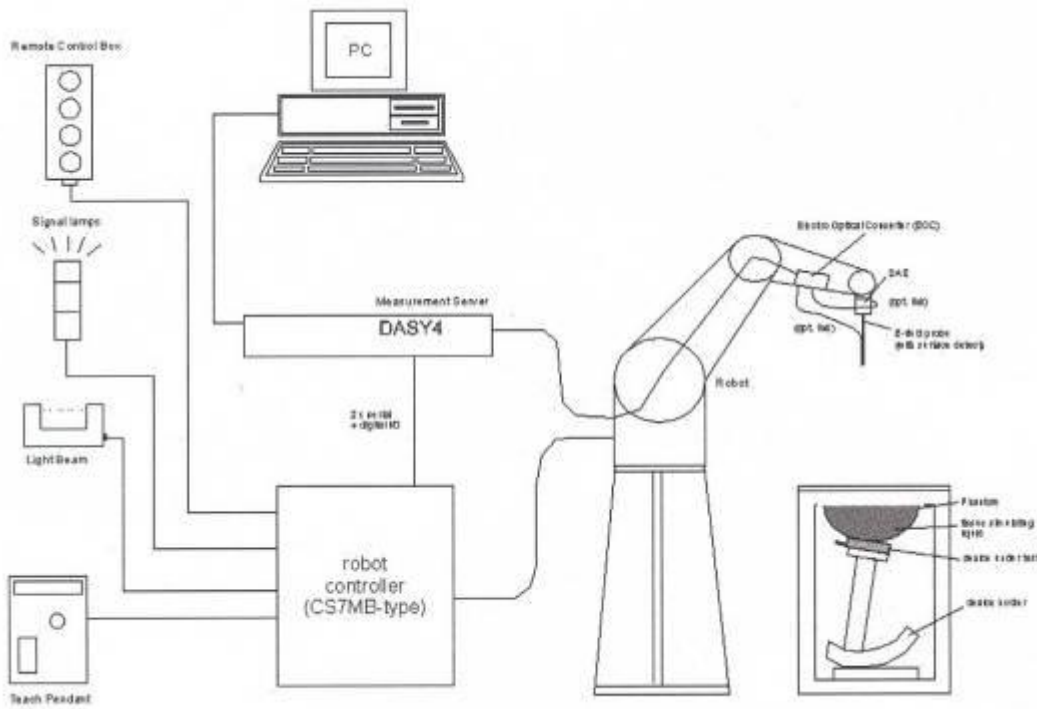


Fig. 15-1 SAR System Configuration

- Y 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.
- Y A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- Y A computer operating Windows 2000.

- Y DAS4 software.
- Y Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- Y The SAM twin phantom enabling testing left-hand, right-hand and BodyWorn usage.
- Y The device holder for handheld mobile phones.
- Y Tissue simulating liquid mixed according to the given recipes.
- Y Validation dipole kits allowing to validating the proper functioning of the system

15.3 Isotropic E-field Probe ES3DV3

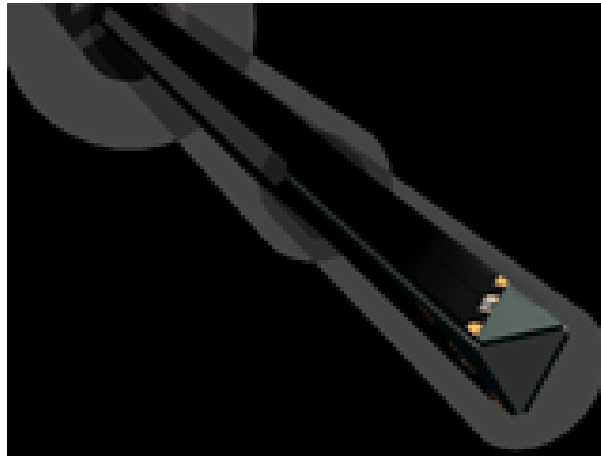


Fig. 15-2 E-field Probe

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 μ W/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

15.4 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

15.5 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 $\pm 0.5\text{mm}$ would produce a SAR uncertainty of $\pm 20\%$. 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 $\epsilon = 3$ and loss tangent $\tan \delta = 0.02$. 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.

16. Detailed Test Results

16.1 Summary of Results

16.1.1 Measurement of RF conducted Power

Unit:dBm

Mode			WLAN
Band	Data rate	Channel	Average power
802.11b	1Mbps	1	4.46
		6	4.44
		11	4.47
802.11g	6Mbps	1	3.15
		6	3.18
		11	3.16

Mode		GPRS							
Slot (Uplink)		1		2		3		4	
/		Max burst	averaged	Max burst	averaged	Max burst	averaged	Max burst	averaged
Band	Channel	GMSK							
850	128	31.9	22.7	30.4	24.2	29.3	24.9	28.2	25.0
	190	32.0	22.8	30.4	24.2	29.3	24.9	28.2	25.0
	251	32.0	22.8	30.4	24.2	29.3	24.9	28.2	25.0
1900	512	29.3	20.1	28.3	22.1	27.2	22.8	26.1	22.9
	661	29.4	20.2	28.4	22.2	27.3	22.9	26.2	23.0
	810	29.6	20.4	28.6	22.4	27.6	23.2	26.6	23.4

16.1.2 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		
GSM 850	Body Worn	GPRS 1TS	Rear of EUT facing phantom	--	0.150	--	1.6	Passed
		GPRS 2TS	Rear of EUT facing phantom	--	0.206	--	1.6	Passed
		GPRS 3TS	Rear of EUT facing phantom	--	0.229	--	1.6	Passed
		GPRS 4TS	Rear of EUT facing phantom	--	0.241	--	1.6	Passed
		GPRS 4TS	Front of EUT facing phantom	0.395	0.345	0.435	1.6	Passed
		GPRS 4TS	Top of EUT facing phantom	--	0.259	--	1.6	Passed
		GPRS 4TS	Bottom of EUT facing phantom	--	0.022	--	1.6	Passed
		GPRS 4TS	Left of EUT facing phantom	--	0.065	--	1.6	Passed
		GPRS 4TS	Right of EUT facing phantom	--	0.086	--	1.6	Passed

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		
GSM 1900	Body Worn	GPRS 1TS	Rear of EUT facing phantom	--	0.172	--	1.6	Passed
		GPRS 2TS	Rear of EUT facing phantom	--	0.259	--	1.6	Passed
		GPRS 3TS	Rear of EUT facing phantom	--	0.319	--	1.6	Passed
		GPRS 4TS	Rear of EUT facing phantom	--	0.334	--	1.6	Passed
		GPRS 4TS	Front of EUT facing phantom	0.694	0.675	0.640	1.6	Passed
		GPRS 4TS	Top of EUT facing phantom	--	0.187	--	1.6	Passed
		GPRS 4TS	Bottom of EUT facing phantom	--	0.024	--	1.6	Passed
		GPRS 4TS	Left of EUT facing phantom	--	0.548	--	1.6	Passed
		GPRS 4TS	Right of EUT facing phantom	--	0.212	--	1.6	Passed

WIFI

Band	EUT Position	Mode	Test Configuration	Averaged SAR over 1g (W/kg)			SAR limit 1g (W/kg)	Verdict
				CH1	CH6	CH11		
				2412MHz	2437MHz	2462MHz		
WLAN	Body Worn	802.11b	Rear of EUT facing phantom	--	0.296	--	1.6	Passed
			Front of EUT facing phantom	0.404	0.499	0.584	1.6	Passed
			Top of EUT facing phantom	--	0.061	--	1.6	Passed
			Bottom of EUT facing phantom	--	0.428	--	1.6	Passed
			Left of EUT facing phantom	--	0.281	--	1.6	Passed
			Right of EUT facing phantom	--	0.206	--	1.6	Passed
	Worst case of 802.11b in 802.11g	Front of EUT facing phantom	--	--	0.499	1.6	Passed	

16.2 Maximum Results

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

16.2.1 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	Front of EUT facing phantom/GPRS4TS/High	28.2	0.435	-0.015	1.6	Passed
GSM 1900	Front of EUT facing phantom/GPRS4TS/Low	26.1	0.694	0.103	1.6	Passed
WIFI	Front of EUT facing phantom/802.11b/High	4.47	0.584	-0.015	1.6	Passed

16.2.2 Maximum Drift

Maximum Drift during measurement	0.335
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16.2.3 Measurement Uncertainty

Extended Uncertainty (k=2) 95%	21.43%
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16.3 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 GPRS Mode tests.

The tests in the band of GSM850, PCS1900 are performed in the GPRS mode.

1. Testing Body SAR at GPRS mode for all bands by separating 0cm from the EUT to flat phantom.
2. 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/EGPRS mode, the multislot configuration which produces highest SAR value is regard as the worst case to be measured, other multislot configurations are selectively confirmed;

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

16.3.2

The EUT is measured using chipset based test mode software to ensure the results are consistent and reliable, during the 802.11b/g mode tests.

1. The 802.11b mode is tested at 1,6,11 channels.
2. According to KDB 248227 the 802.11g mode is checked at worst case of 802.11b mode.
3. According to KDB 248227 the EUT is at the lowest data rate during test.
4. 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;

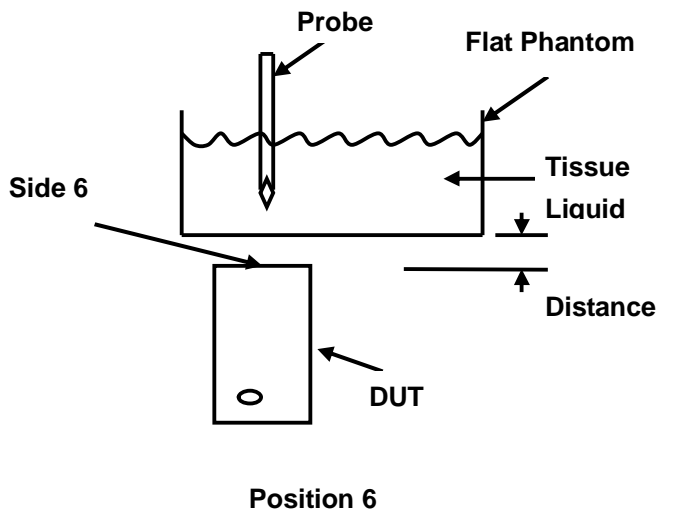
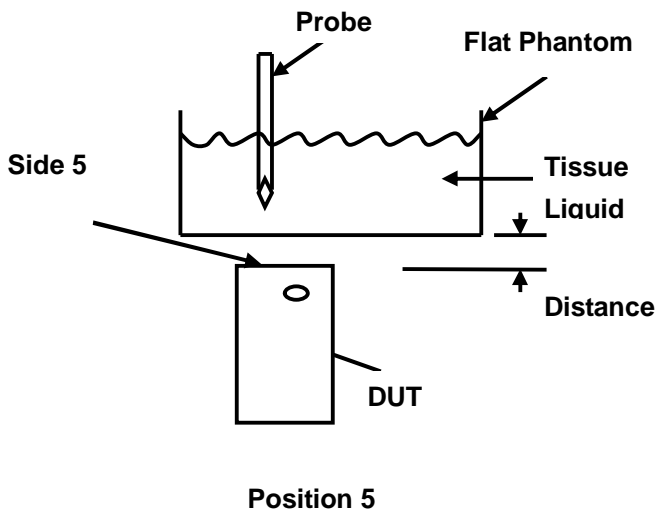
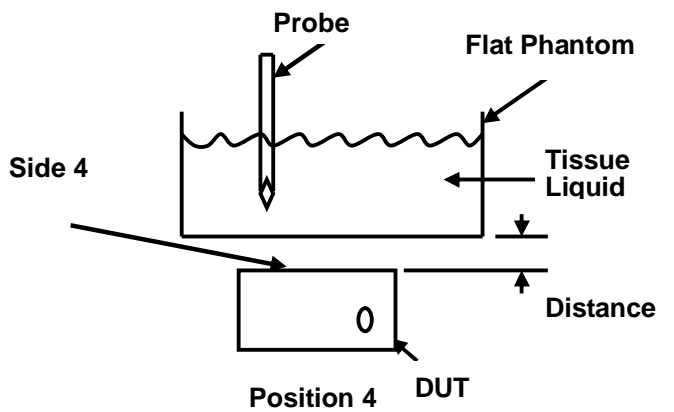
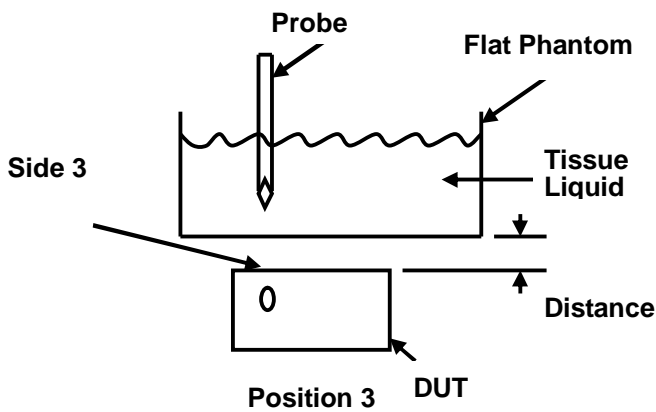
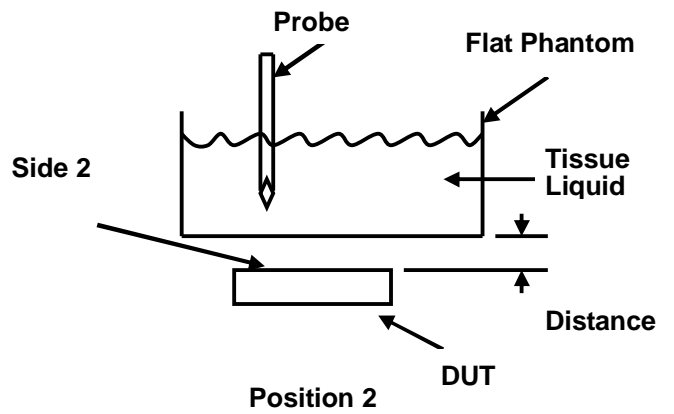
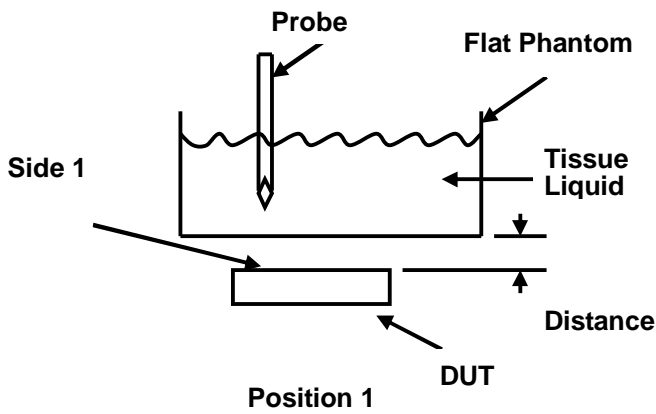
5. The (max. cube) labeling indicates that during the grid scanning an additional peak was found which within 2dB of the highest peak

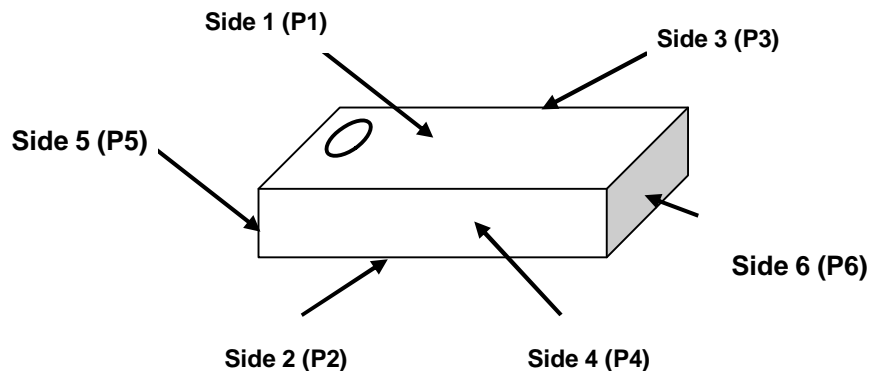
16.3.3

Except for transmissions during network hand-offs with a maximum hand-off duration less than 30secs, transmitters are considered to be transmitting simultaneously when there is overlapping transmission. For this product, simultaneous SAR measurement is not applicable because the network hand-off is less than 30seconds. The time required for network hand off from GSM to Wifi is 8 seconds for CP100.

16.3.4

Test positions of EUT (the distance between the EUT and the phantom is 5mm for all the six sides)





16.4 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)

16.5 Detailed Test Results

16.5.1 GSM 850+GPRS 1TS Back Side Middle

Date/Time: 2011-4-21 9:18:27

Test Laboratory: SGS-GSM

CP100 GPRS 850 1TS Bodyworn distance 5mm Back Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(1up); Frequency: 836.6 MHz;Duty Cycle: 1:8.3

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; σ = 0.944 mho/m; ϵ_r = 55.8; ρ = 1000 kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.98, 5.98, 5.98); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.173 mW/g

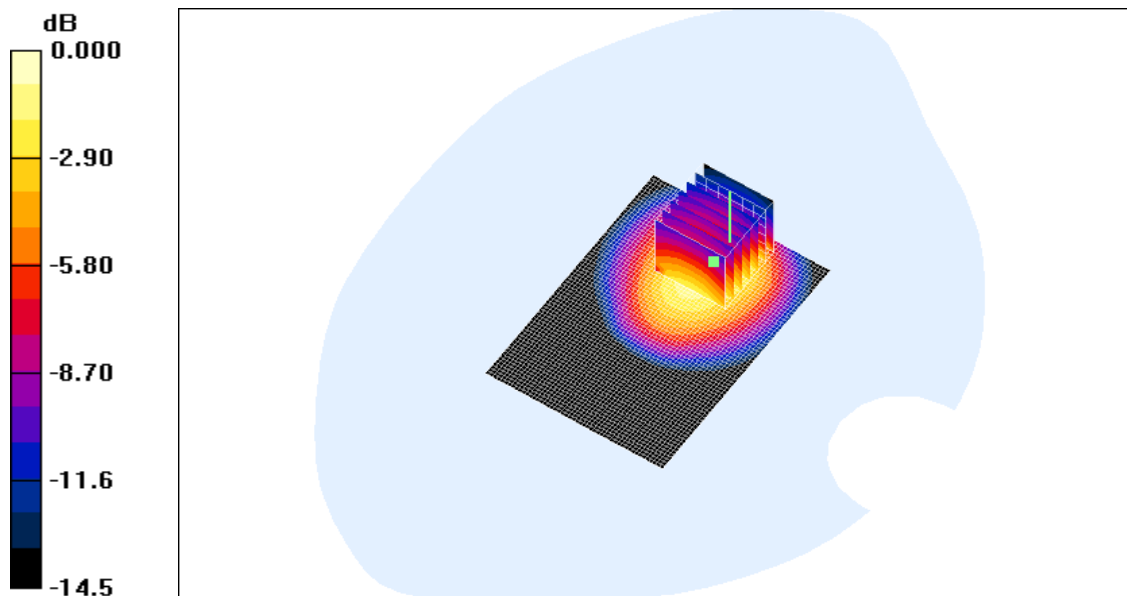
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 8.34 V/m; Power Drift = -0.079 dB

Peak SAR (extrapolated) = 0.313 W/kg

SAR(1 g) = 0.150 mW/g; SAR(10 g) = 0.090 mW/g

Maximum value of SAR (measured) = 0.168 mW/g



0 dB = 0.168mW/g

SHEMC

16.5.2 GSM 850+GPRS 2TS Back Side Middle

Date/Time: 2011-4-21 9:39:17

Test Laboratory: SGS-GSM

CP100 GPRS 850 2TS Bodyworn distance 5mm Back Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(2up); Frequency: 836.6 MHz;Duty Cycle: 1:4.15

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; $\sigma = 0.944$ mho/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.98, 5.98, 5.98); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

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

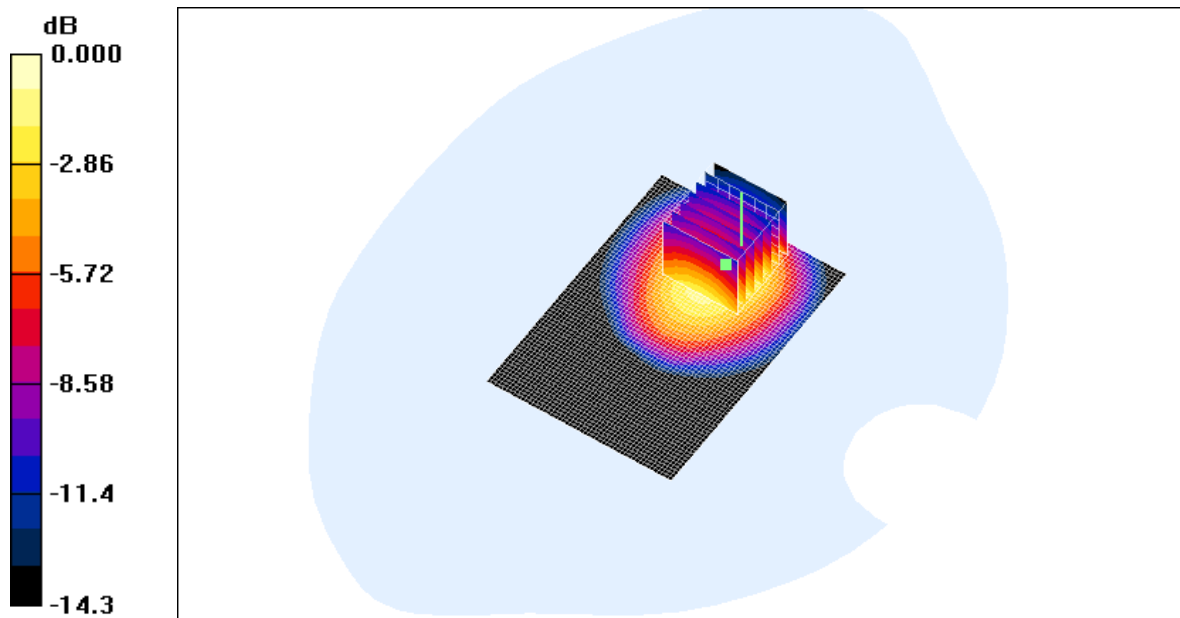
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 9.63 V/m; Power Drift = 0.030 dB

Peak SAR (extrapolated) = 0.418 W/kg

SAR(1 g) = 0.206 mW/g; SAR(10 g) = 0.124 mW/g

Maximum value of SAR (measured) = 0.229 mW/g



0 dB = 0.229mW/g

16.5.3 GSM 850+GPRS 3TS Back Side Middle

Date/Time: 2011-4-21 14:08:25

Test Laboratory: SGS-GSM

CP100 GPRS 850 3TS Bodyworn distance 5mm Back Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(3UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.77

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; $\sigma = 0.944$ mho/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.98, 5.98, 5.98); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.296 mW/g

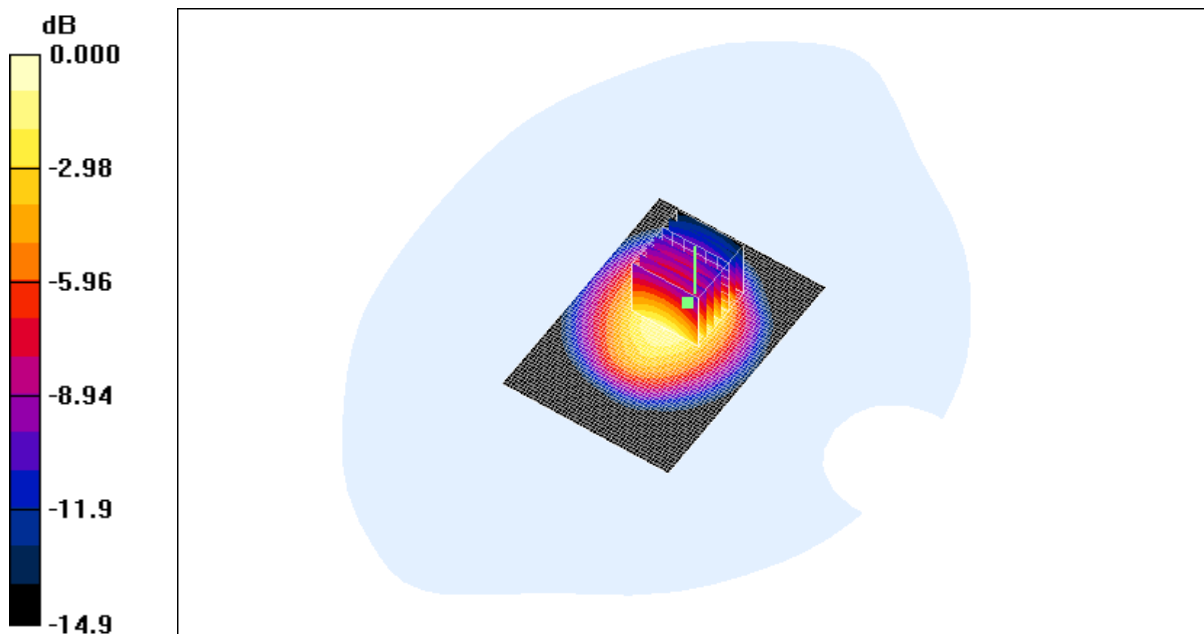
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 14.3 V/m; Power Drift = 0.002 dB

Peak SAR (extrapolated) = 0.488 W/kg

SAR(1 g) = 0.229 mW/g; SAR(10 g) = 0.138 mW/g

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



0 dB = 0.246mW/g

16.5.4 GSM 850+GPRS 4TS Back Side Middle

Date/Time: 2011-4-21 14:27:01

Test Laboratory: SGS-GSM

CP100 GPRS 850 4TS Bodyworn distance 5mm Back Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(4UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; $\sigma = 0.944$ mho/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.98, 5.98, 5.98); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.307 mW/g

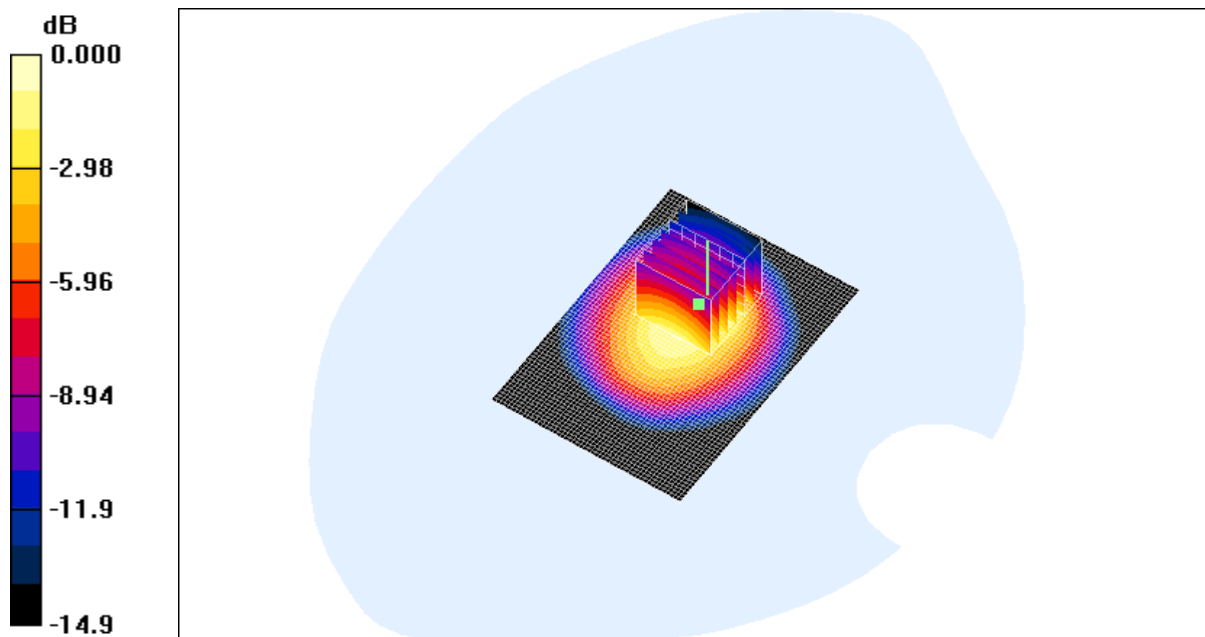
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 14.6 V/m; Power Drift = -0.013 dB

Peak SAR (extrapolated) = 0.509 W/kg

SAR(1 g) = 0.241 mW/g; SAR(10 g) = 0.145 mW/g

Maximum value of SAR (measured) = 0.258 mW/g



0 dB = 0.258mW/g

16.5.5 GSM 850+GPRS 4TS Front Side Middle

Date/Time: 2011-4-21 14:49:25

Test Laboratory: SGS-GSM

CP100 GPRS 850 4TS Bodyworn distance 5mm Front Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(4UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; $\sigma = 0.944$ mho/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.68, 5.68, 5.68); Calibrated: 2009-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.468 mW/g

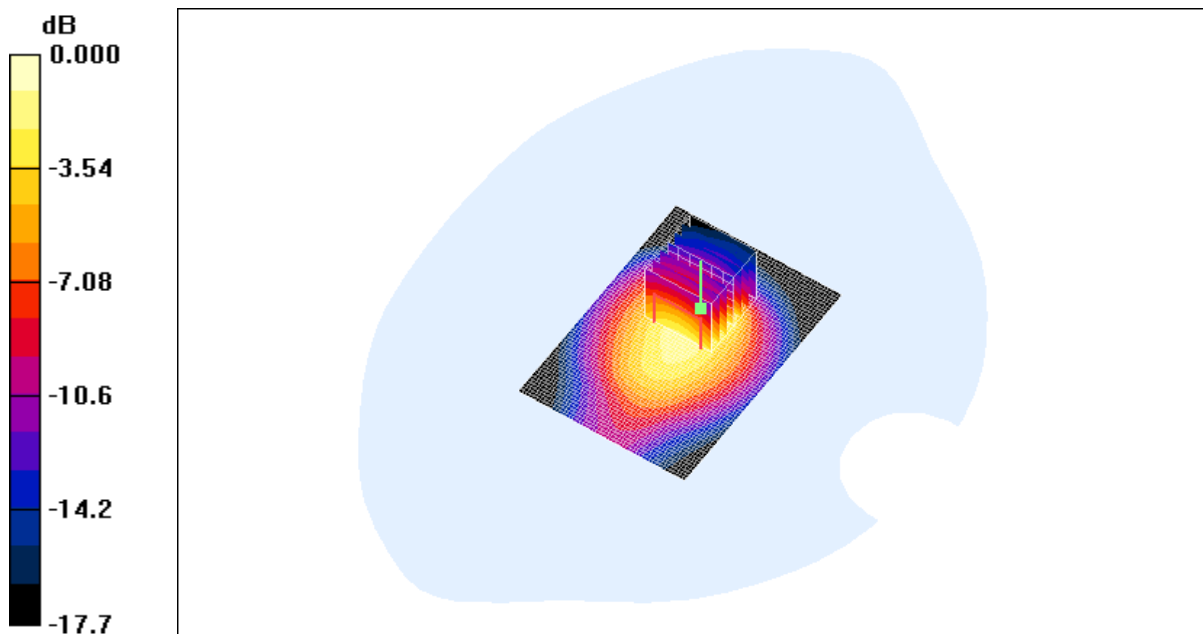
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 16.8 V/m; Power Drift = 0.073 dB

Peak SAR (extrapolated) = 0.850 W/kg

SAR(1 g) = 0.345 mW/g; SAR(10 g) = 0.184 mW/g

Maximum value of SAR (measured) = 0.396 mW/g



0 dB = 0.396mW/g

16.5.6 GSM 850+GPRS 4TS Top Side Middle

Date/Time: 2011-4-21 15:56:38

Test Laboratory: SGS-GSM

CP100 GPRS 850 4TS Bodyworn distance 5mm Top Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(4UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; $\sigma = 0.944$ mho/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.98, 5.98, 5.98); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x51x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.316 mW/g

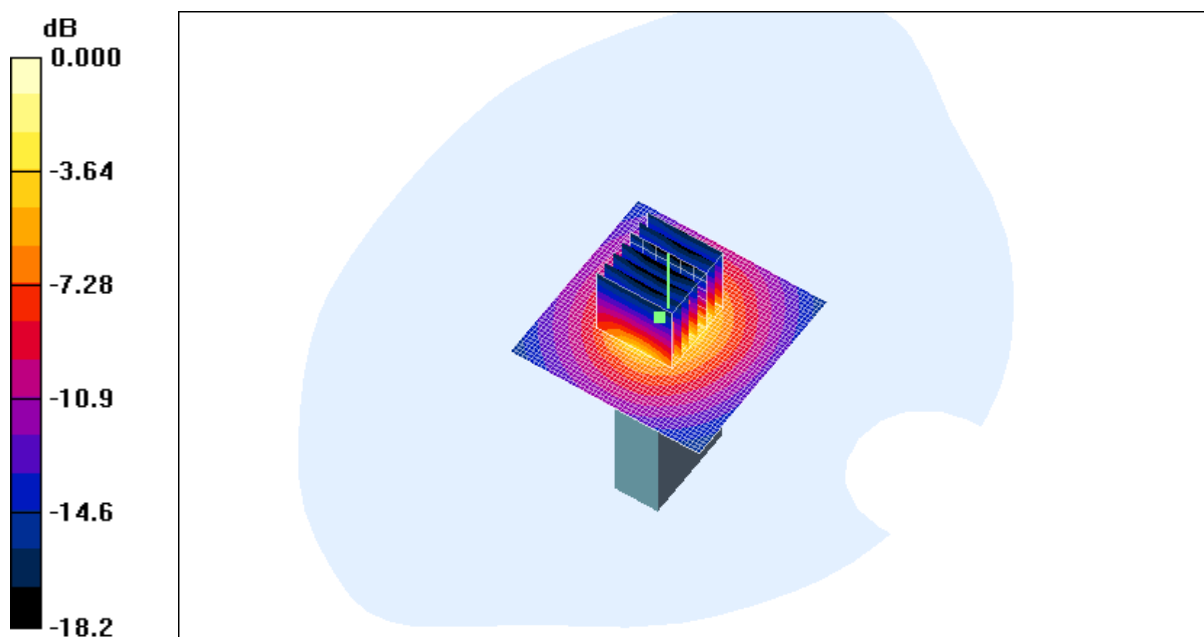
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 14.0 V/m; Power Drift = 0.054 dB

Peak SAR (extrapolated) = 0.889 W/kg

SAR(1 g) = 0.259 mW/g; SAR(10 g) = 0.109 mW/g

Maximum value of SAR (measured) = 0.301 mW/g



0 dB = 0.301mW/g

16.5.7 GSM 850+GPRS 4TS Bottom Side Middle

Date/Time: 2011-4-21 16:18:11

Test Laboratory: SGS-GSM

CP100 GPRS 850 4TS Bodyworn distance 5mm Bottom Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(4UP); Frequency: 836.6 MHz;Duty Cycle: 1:2.075

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; $\sigma = 0.944$ mho/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.98, 5.98, 5.98); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x51x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.020 mW/g

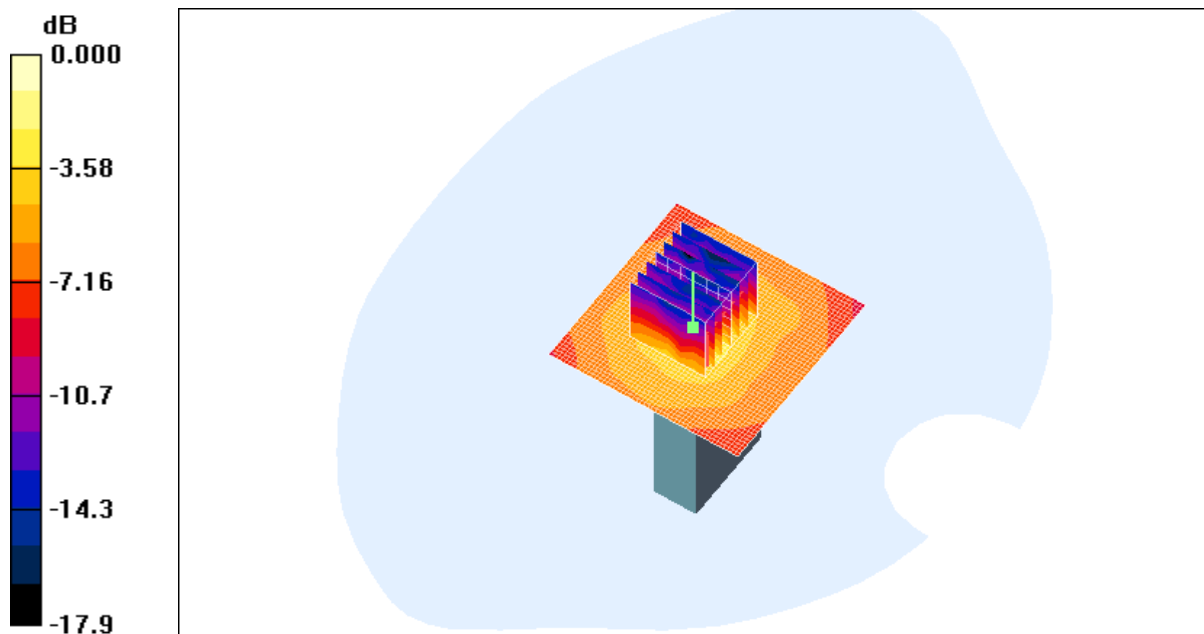
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 5.09 V/m; Power Drift = -0.263 dB

Peak SAR (extrapolated) = 0.062 W/kg

SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.010 mW/g

Maximum value of SAR (measured) = 0.025 mW/g



0 dB = 0.025mW/g

16.5.8 GSM 850+GPRS 4TS Left Side Middle

Date/Time: 2011-4-21 15:12:58

Test Laboratory: SGS-GSM

CP100 GPRS 850 4TS Bodyworn distance 5mm Left Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(4UP); Frequency: 836.6 MHz;Duty Cycle: 1:2.075

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; $\sigma = 0.944$ mho/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.98, 5.98, 5.98); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.074 mW/g

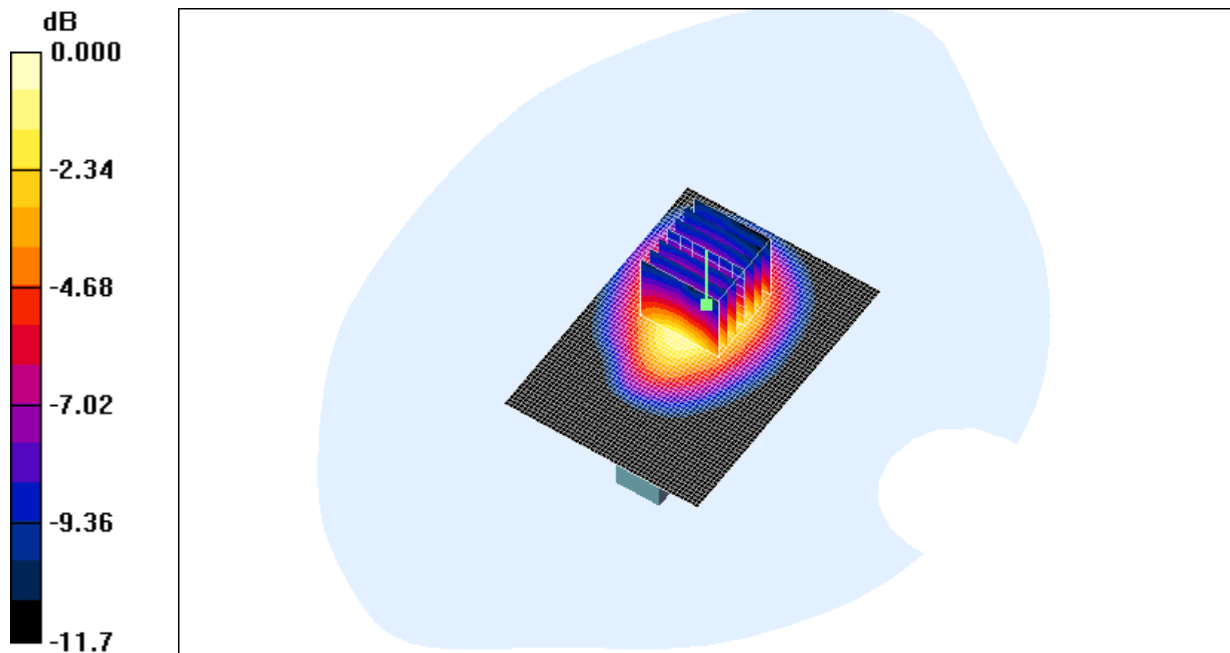
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 7.39 V/m; Power Drift = 0.036 dB

Peak SAR (extrapolated) = 0.104 W/kg

SAR(1 g) = 0.065 mW/g; SAR(10 g) = 0.041 mW/g

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



0 dB = 0.070mW/g

16.5.9 GSM 850+GPRS 4TS Right Side Middle

Date/Time: 2011-4-21 15:34:20

Test Laboratory: SGS-GSM

CP100 GPRS 850 4TS Bodyworn distance 5mm Right Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(4UP); Frequency: 836.6 MHz; Duty Cycle: 1:2.075

Medium: HSL835_Body Medium parameters used: f = 836.6 MHz; $\sigma = 0.944$ mho/m; $\epsilon_r = 55.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.98, 5.98, 5.98); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.096 mW/g

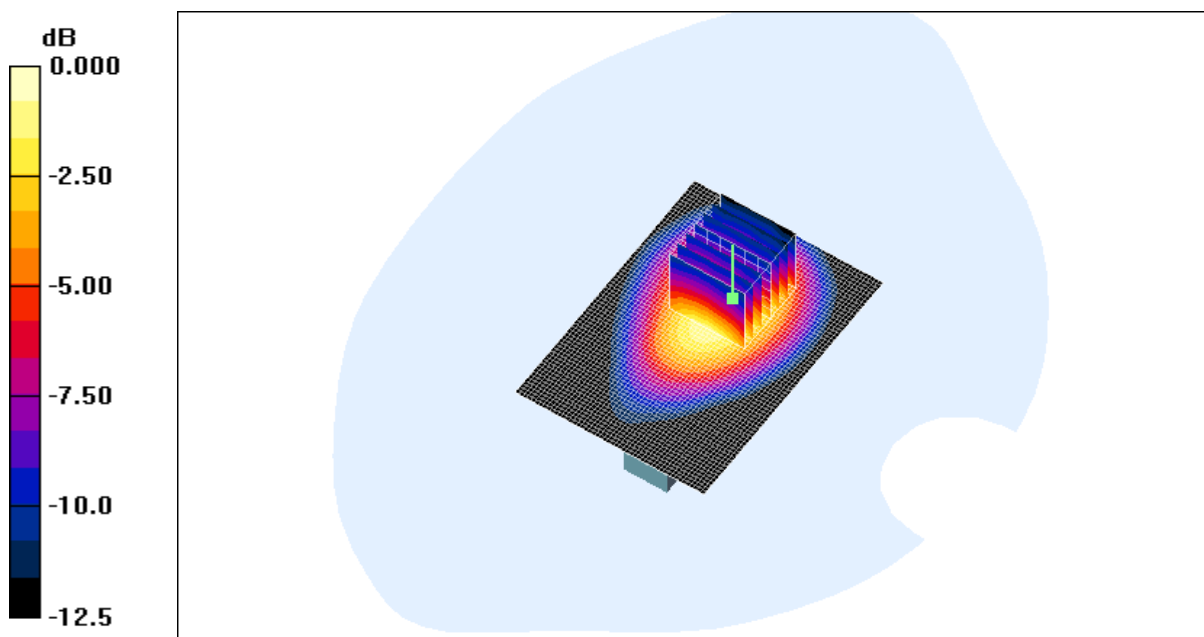
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 8.84 V/m; Power Drift = 0.077 dB

Peak SAR (extrapolated) = 0.147 W/kg

SAR(1 g) = 0.086 mW/g; SAR(10 g) = 0.052 mW/g

Maximum value of SAR (measured) = 0.094 mW/g



0 dB = 0.094mW/g

16.5.10 GSM 850+GPRS 4TS Front Side High

Date/Time: 2011-4-21 16:39:11

Test Laboratory: SGS-GSM

CP100 GPRS 850 4TS Bodyworn distance 5mm Front Side High

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(4UP); Frequency: 848.8 MHz; Duty Cycle: 1:2.075

Medium: HSL835_Body Medium parameters used: f = 848.8 MHz; $\sigma = 0.954$ mho/m; $\epsilon_r = 55.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.68, 5.68, 5.68); Calibrated: 2009-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

High/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.607 mW/g

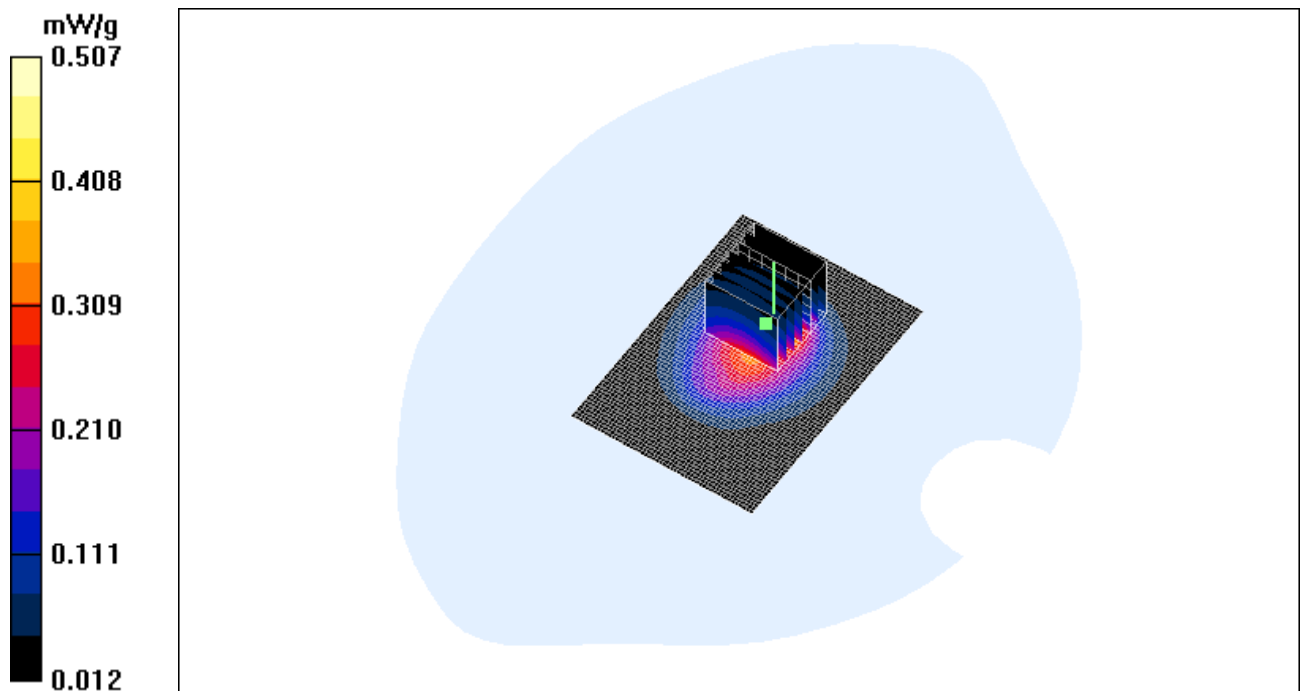
High/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

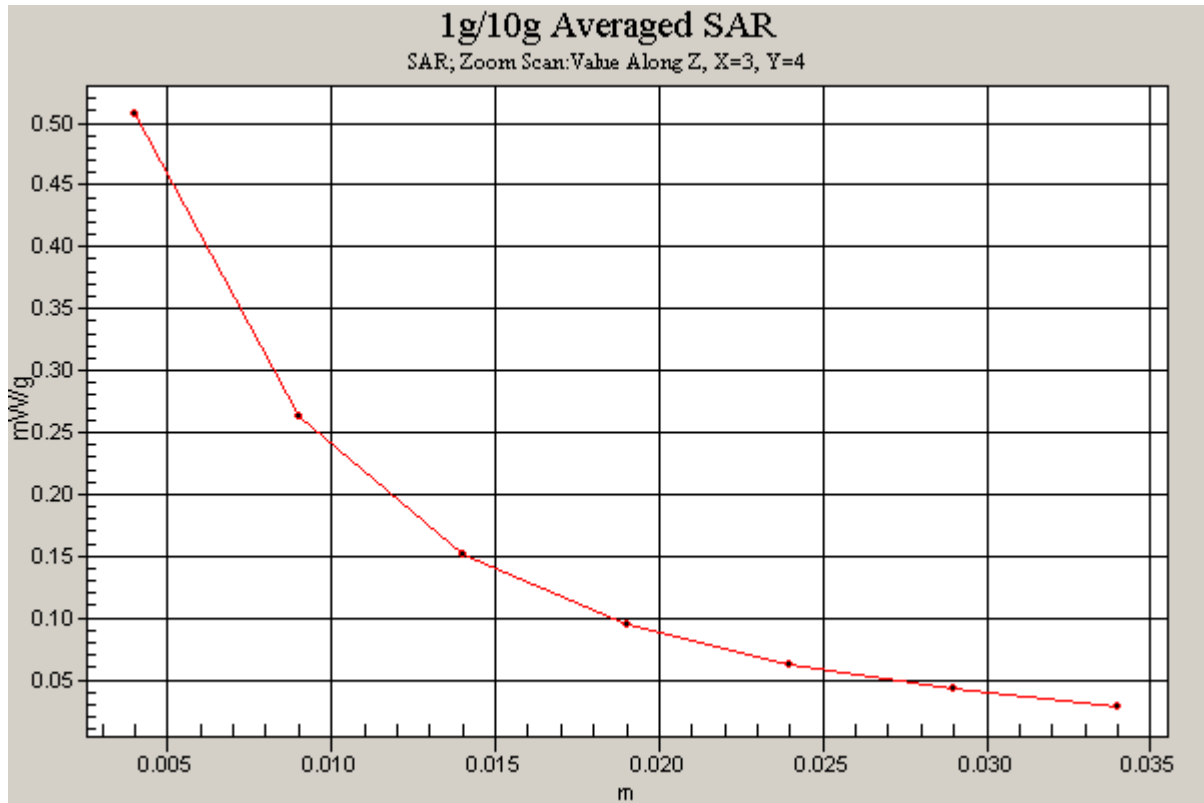
Reference Value = 18.2 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.435 mW/g; SAR(10 g) = 0.229 mW/g

Maximum value of SAR (measured) = 0.507 mW/g





16.5.11 GSM 850+GPRS 4TS Front Side Low

Date/Time: 2011-4-21 17:03:14

Test Laboratory: SGS-GSM

CP100 GPRS 850 4TS Bodyworn distance 5mm Front Side Low

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: GSM850-GPRS Mode(4UP); Frequency: 824.2 MHz; Duty Cycle: 1:2.075

Medium: HSL835_Body Medium parameters used: f = 824.2 MHz; $\sigma = 0.931$ mho/m; $\epsilon_r = 56$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.68, 5.68, 5.68); Calibrated: 2009-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Low/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.540 mW/g

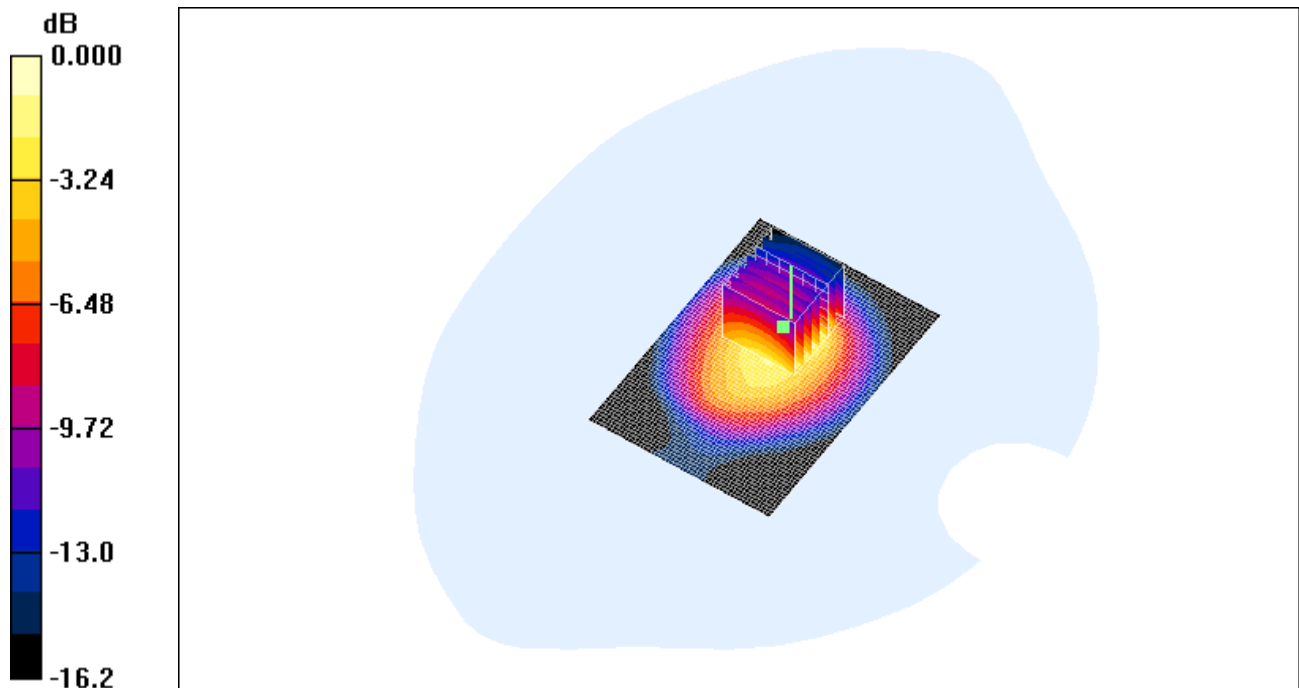
Low/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 17.2 V/m; Power Drift = 0.083 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.395 mW/g; SAR(10 g) = 0.206 mW/g

Maximum value of SAR (measured) = 0.452 mW/g



0 dB = 0.452mW/g

16.5.12 GSM 1900+GPRS 1TS Back Side Middle

Date/Time: 2011-4-25 10:10:26

Test Laboratory: SGS-GSM

CP100 GPRS 1900 1TS Bodyworn distance 5mm Back Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

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

Medium: HSL1900-Body Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.251 mW/g

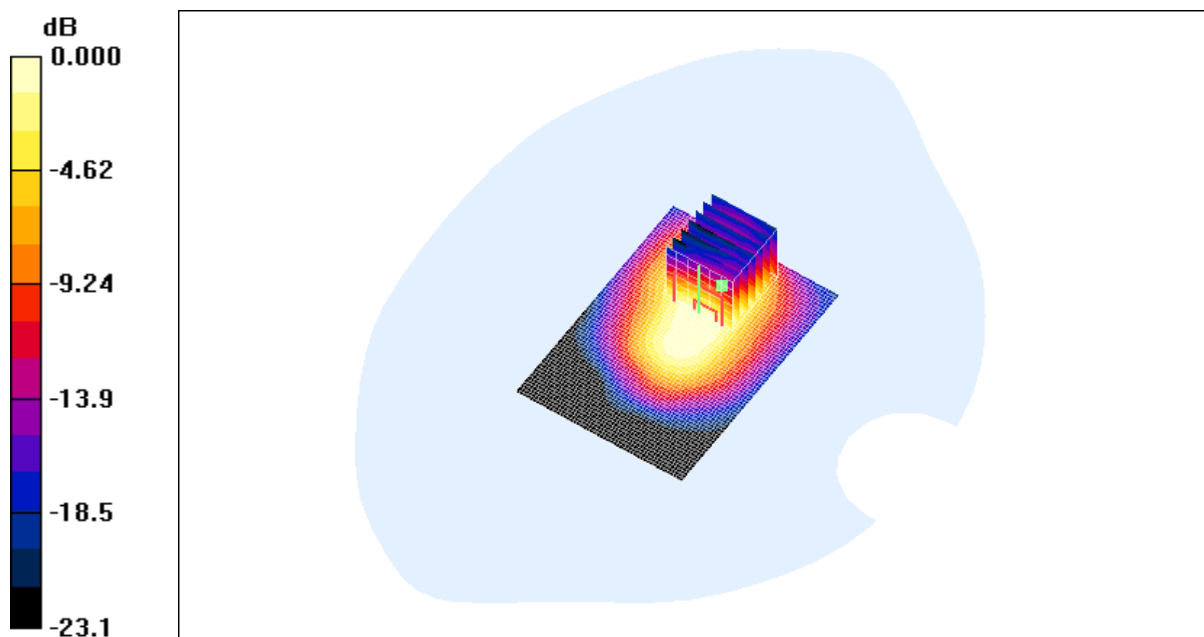
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 10.5 V/m; Power Drift = 0.023 dB

Peak SAR (extrapolated) = 0.330 W/kg

SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.085 mW/g

Maximum value of SAR (measured) = 0.209 mW/g



0 dB = 0.209mW/g

16.5.13 GSM 1900+GPRS 2TS Back Side Middle

Date/Time: 2011-4-25 9:45:02

Test Laboratory: SGS-GSM

CP100 GPRS 1900 2TS Bodyworn distance 5mm Back Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: PCS1900-GPRS Mode(2 ts); Frequency: 1880 MHz;Duty Cycle: 1:4.15

Medium: HSL1900-Body Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$**

Maximum value of SAR (interpolated) = 0.378 mW/g

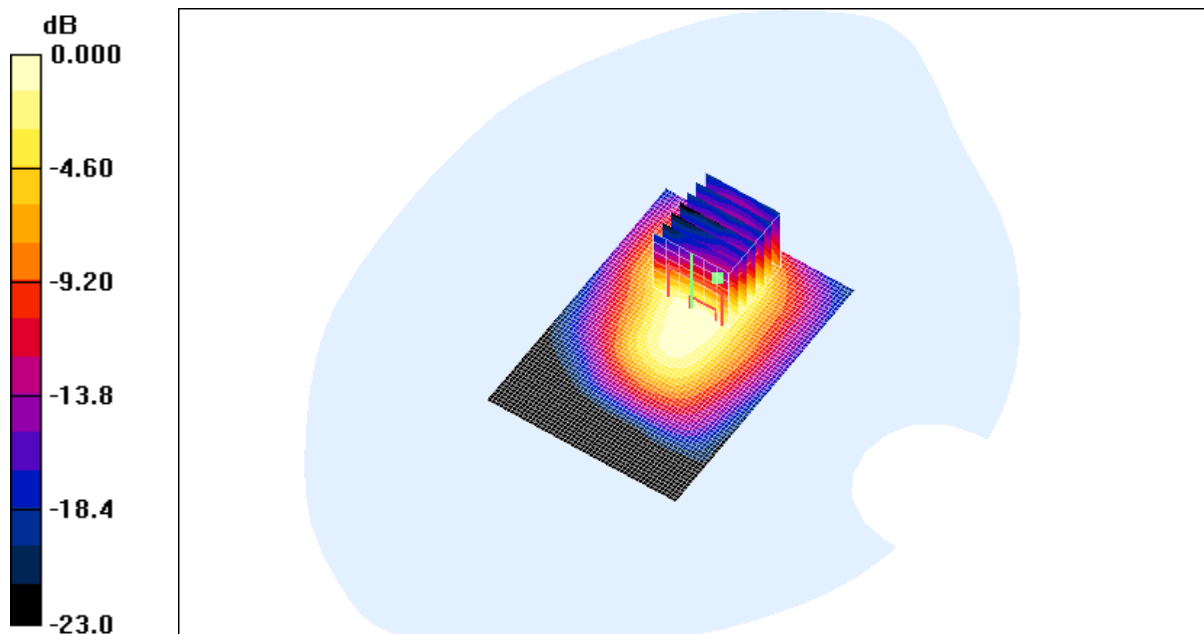
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$**

Reference Value = 13.5 V/m; Power Drift = 0.195 dB

Peak SAR (extrapolated) = 0.506 W/kg

SAR(1 g) = 0.259 mW/g; SAR(10 g) = 0.130 mW/g

Maximum value of SAR (measured) = 0.316 mW/g



0 dB = 0.316mW/g

16.5.14 GSM 1900+GPRS 3TS Back Side Middle

Date/Time: 2011-4-25 10:35:37

Test Laboratory: SGS-GSM

CP100 GPRS 1900 3TS Bodyworn distance 5mm Back Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: PCS1900-GPRS Mode; Frequency: 1880 MHz; Duty Cycle: 1:2.77

Medium: HSL1900-Body Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.483 mW/g

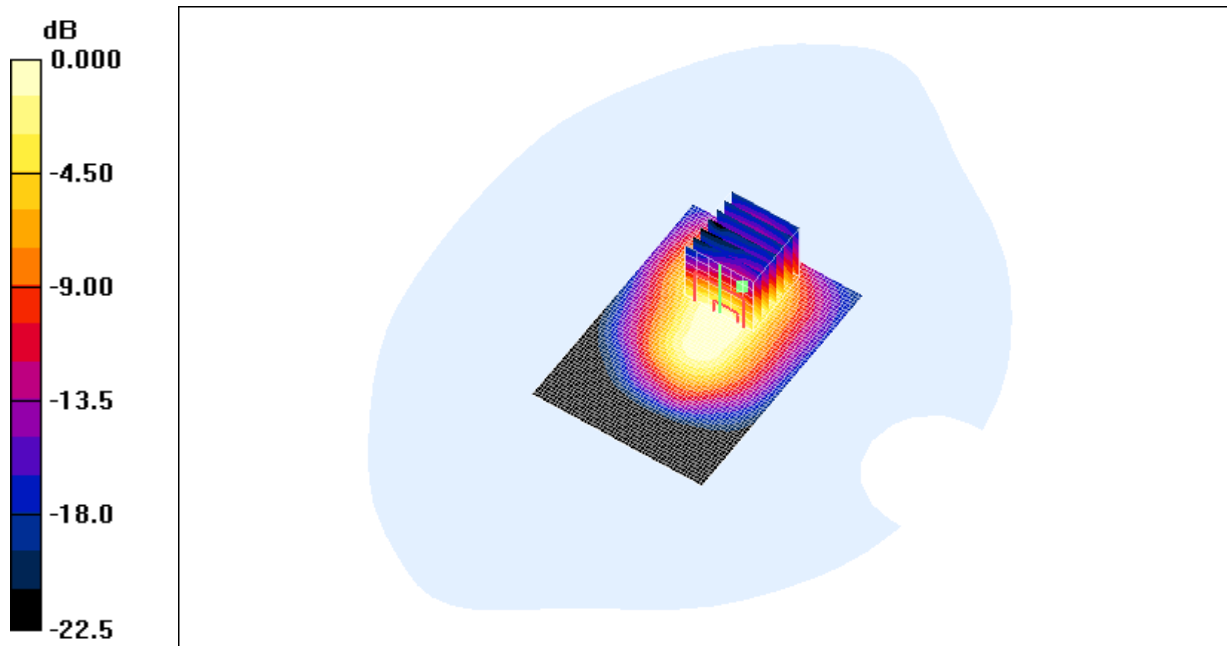
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 15.8 V/m; Power Drift = -0.030 dB

Peak SAR (extrapolated) = 0.615 W/kg

SAR(1 g) = 0.319 mW/g; SAR(10 g) = 0.157 mW/g

Maximum value of SAR (measured) = 0.388 mW/g



0 dB = 0.388mW/g

16.5.15 GSM 1900+GPRS 4TS Back Side Middle

Date/Time: 2011-4-25 11:03:21

Test Laboratory: SGS-GSM

CP100 GPRS 1900 4TS Bodyworn distance 5mm Back Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: PCS1900-GPRS Mode; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium: HSL1900-Body Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$**

Maximum value of SAR (interpolated) = 0.489 mW/g

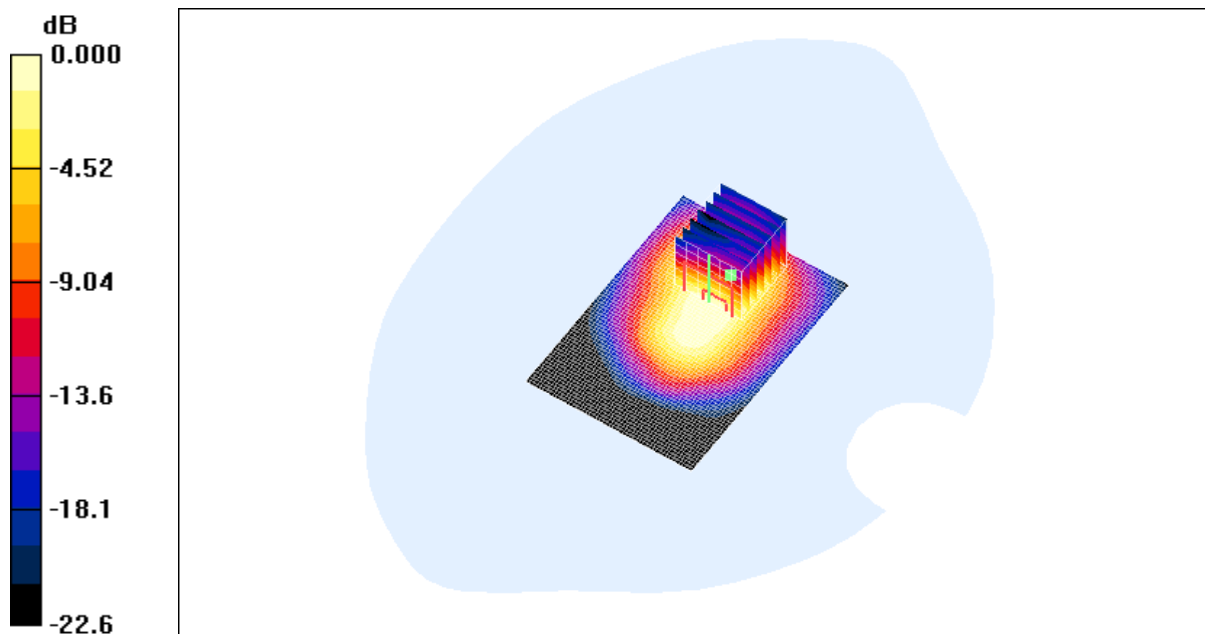
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$**

Reference Value = 16.0 V/m; Power Drift = 0.031 dB

Peak SAR (extrapolated) = 0.657 W/kg

SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.164 mW/g

Maximum value of SAR (measured) = 0.407 mW/g



0 dB = 0.407mW/g

16.5.16 GSM 1900+GPRS 4TS Front Side Middle

Date/Time: 2011-4-25 13:10:09

Test Laboratory: SGS-GSM

CP100 GPRS 1900 4TS Bodyworn distance 5mm Front Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: PCS1900-GPRS Mode; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium: HSL1900-Body Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 1.03 mW/g

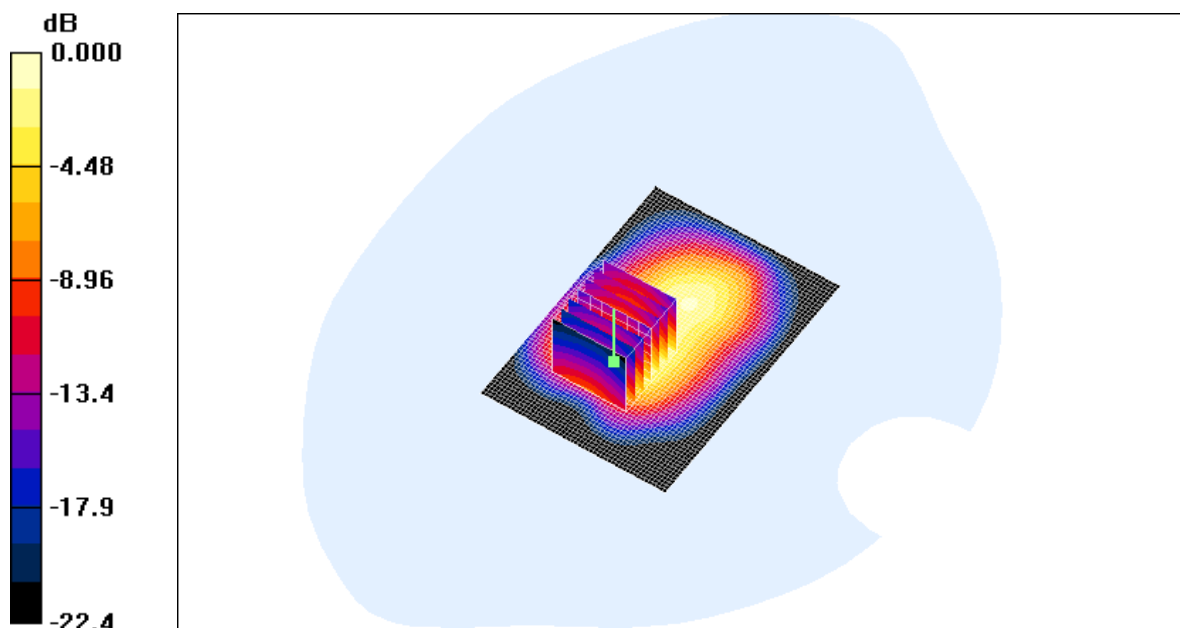
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 15.9 V/m; Power Drift = -0.026 dB

Peak SAR (extrapolated) = 1.27 W/kg

SAR(1 g) = 0.675 mW/g; SAR(10 g) = 0.355 mW/g

Maximum value of SAR (measured) = 0.760 mW/g



0 dB = 0.760mW/g

16.5.17 GSM 1900+GPRS 4TS Top Side Middle

Date/Time: 2011-4-25 17:11:21

Test Laboratory: SGS-GSM

CP100 GPRS 1900 4TS Bodyworn distance 5mm Top Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: PCS1900-GPRS Mode; Frequency: 1880 MHz;Duty Cycle: 1:2.075

Medium: HSL1900-Body Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x61x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.229 mW/g

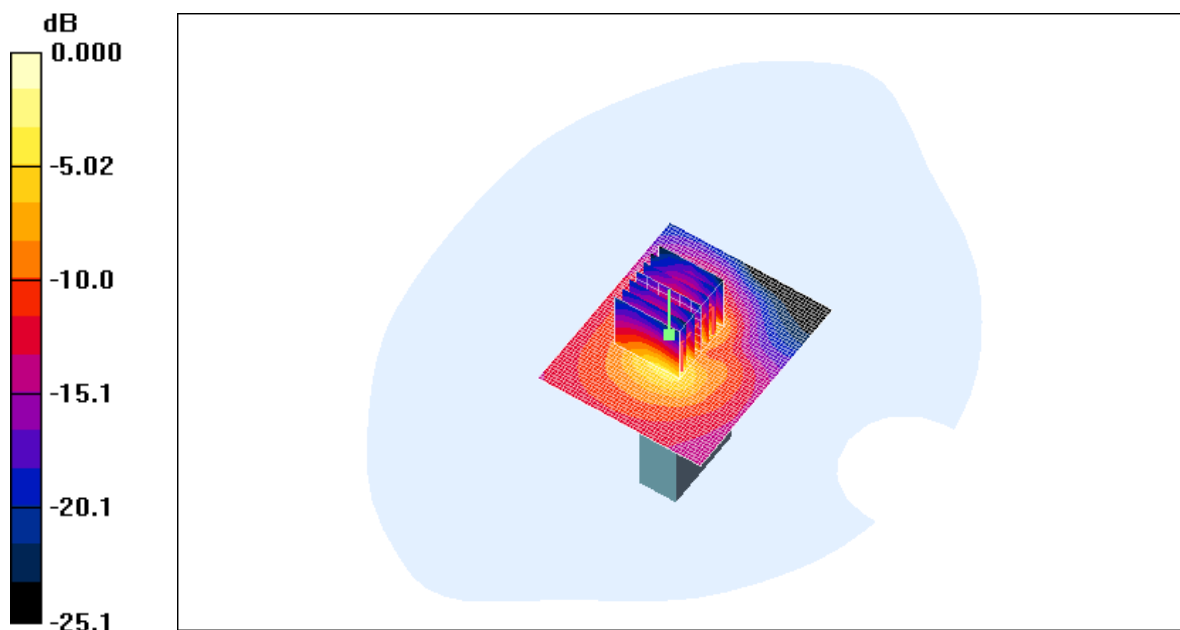
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 9.41 V/m; Power Drift = -0.028 dB

Peak SAR (extrapolated) = 0.420 W/kg

SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.075 mW/g

Maximum value of SAR (measured) = 0.231 mW/g



0 dB = 0.231mW/g

16.5.18 GSM 1900+GPRS 4TS Bottom Side Middle

Date/Time: 2011-4-25 17:34:39

Test Laboratory: SGS-GSM

CP100 GPRS 1900 4TS Bodyworn distance 5mm Bottom Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: PCS1900-GPRS Mode; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium: HSL1900-Body Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.52 \text{ mho/m}$; $\epsilon_r = 53.6$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x61x1): **Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$**

Maximum value of SAR (interpolated) = 0.025 mW/g

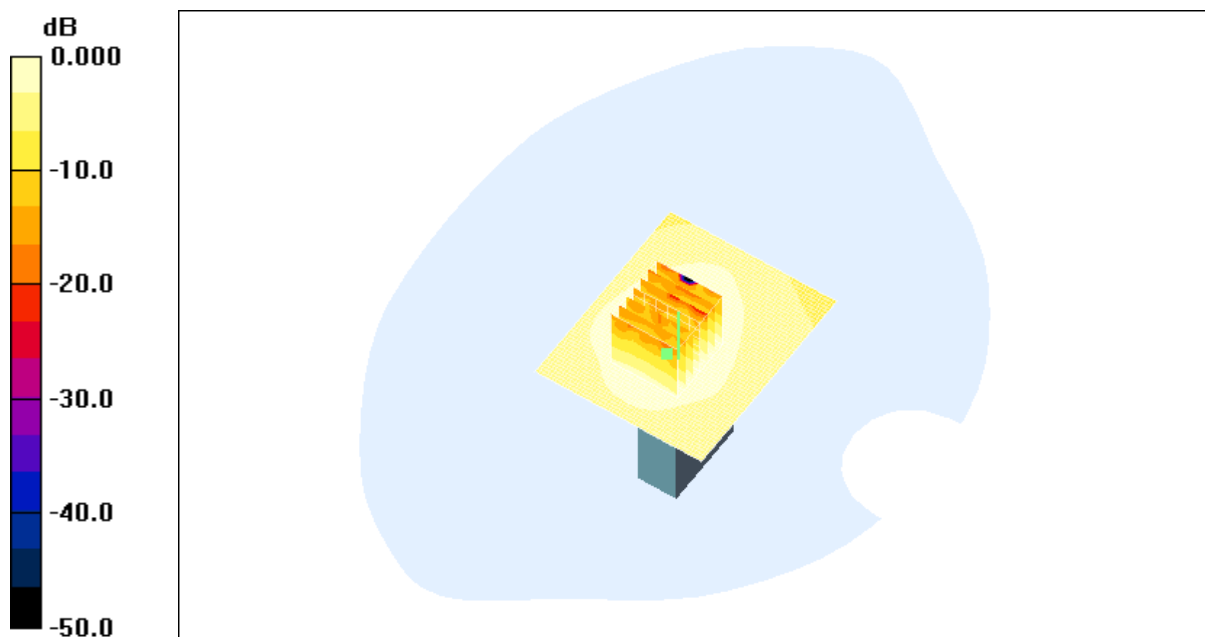
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$**

Reference Value = 4.13 V/m; Power Drift = 0.335 dB

Peak SAR (extrapolated) = 0.044 W/kg

SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.014 mW/g

Maximum value of SAR (measured) = 0.026 mW/g



0 dB = 0.026mW/g

16.5.19 GSM 1900+GPRS 4TS Left Side Middle

Date/Time: 2011-4-25 13:53:11

Test Laboratory: SGS-GSM

CP100 GPRS 1900 4TS Bodyworn distance 5mm Left Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: PCS1900-GPRS Mode; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium: HSL1900-Body Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.703 mW/g

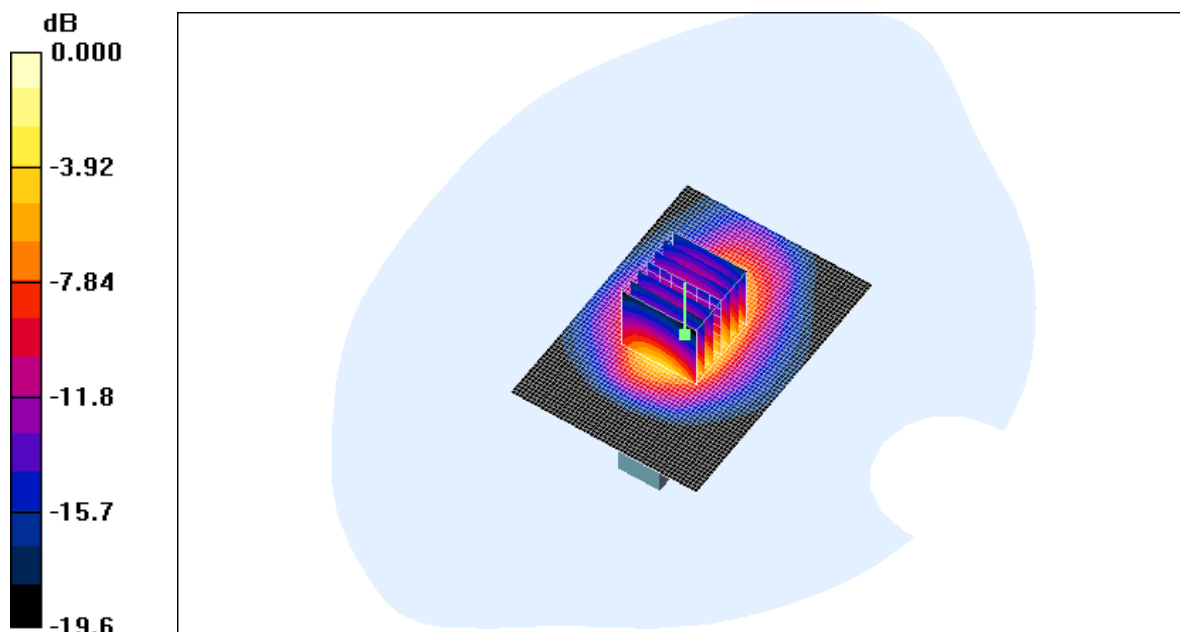
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 19.9 V/m; Power Drift = -0.081 dB

Peak SAR (extrapolated) = 0.981 W/kg

SAR(1 g) = 0.548 mW/g; SAR(10 g) = 0.279 mW/g

Maximum value of SAR (measured) = 0.616 mW/g



0 dB = 0.616mW/g

16.5.20 GSM 1900+GPRS 4TS Right Side Middle

Date/Time: 2011-4-25 14:19:23

Test Laboratory: SGS-GSM

CP100 GPRS 1900 4TS Bodyworn distance 5mm Right Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: PCS1900-GPRS Mode; Frequency: 1880 MHz; Duty Cycle: 1:2.075

Medium: HSL1900-Body Medium parameters used: $f = 1880$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

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

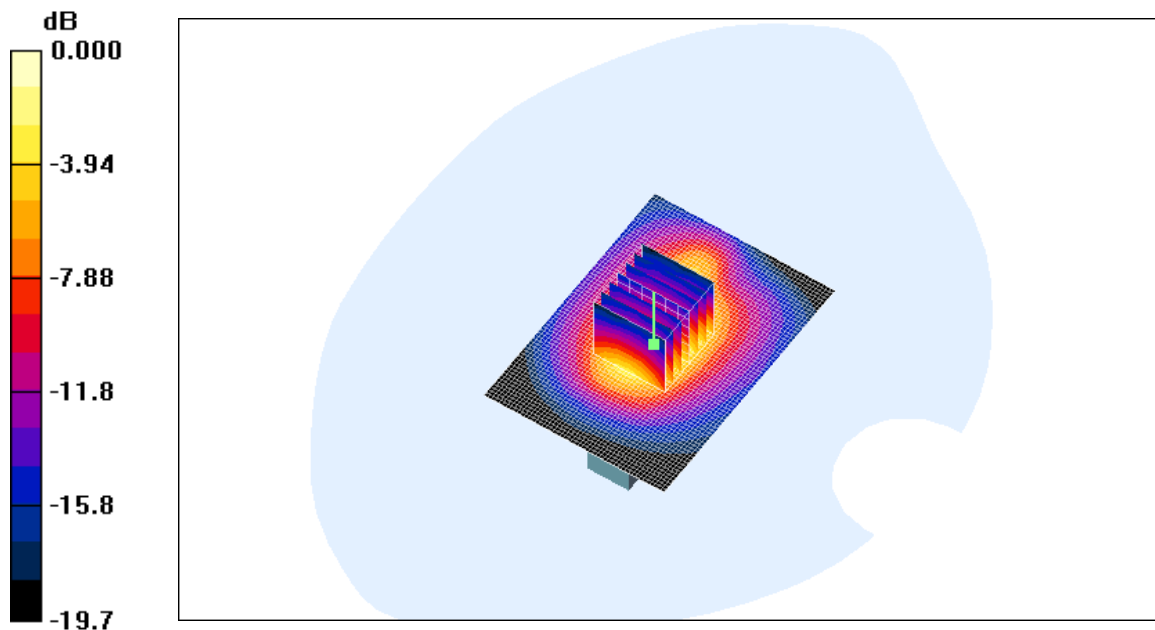
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 12.9 V/m; Power Drift = 0.029 dB

Peak SAR (extrapolated) = 0.373 W/kg

SAR(1 g) = 0.212 mW/g; SAR(10 g) = 0.109 mW/g

Maximum value of SAR (measured) = 0.238 mW/g



0 dB = 0.238mW/g

16.5.21 GSM 1900+GPRS 4TS Front Side High

Date/Time: 2011-4-25 15:58:31

Test Laboratory: SGS-GSM

CP100 GPRS 1900 4TS Bodyworn distance 5mm Front Side High

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: PCS1900-GPRS Mode; Frequency: 1909.8 MHz; Duty Cycle: 1:2.075

Medium: HSL1900-Body Medium parameters used: $f = 1909.8 \text{ MHz}$; $\sigma = 1.55 \text{ mho/m}$; $\epsilon_r = 53.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

High/Area Scan (51x71x1): **Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$**

Maximum value of SAR (interpolated) = 0.750 mW/g

High/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$**

Reference Value = 15.4 V/m; Power Drift = 0.091 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.640 mW/g; SAR(10 g) = 0.330 mW/g

Maximum value of SAR (measured) = 0.700 mW/g

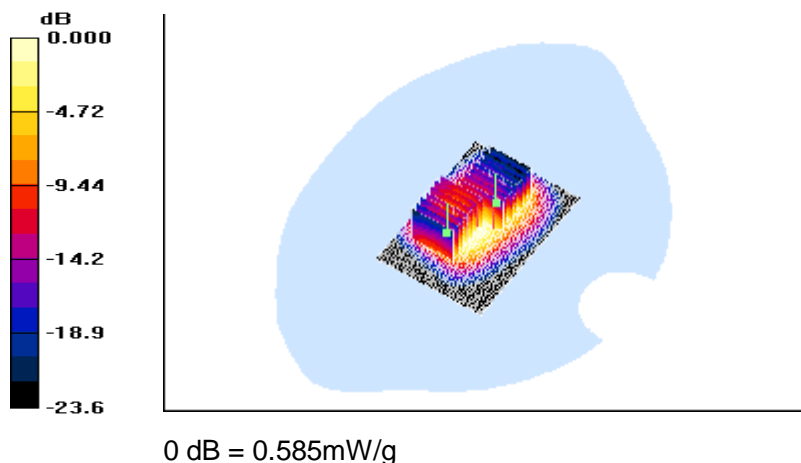
High/Zoom Scan (7x7x7)/Cube 1: **Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$**

Reference Value = 15.4 V/m; Power Drift = 0.091 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.521 mW/g; SAR(10 g) = 0.268 mW/g

Maximum value of SAR (measured) = 0.585 mW/g



16.5.22 GSM 1900+GPRS 4TS Front Side Low

Date/Time: 2011-4-25 16:44:22

Test Laboratory: SGS-GSM

CP100 GPRS 1900 4TS Bodyworn distance 5mm Front Side Low

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: PCS1900-GPRS Mode; Frequency: 1850.2 MHz; Duty Cycle: 1:2.075

Medium: HSL1900-Body Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.49$ mho/m; $\epsilon_r = 53.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Low/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

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

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

Reference Value = 17.6 V/m; Power Drift = 0.103 dB

Peak SAR (extrapolated) = 1.19 W/kg

SAR(1 g) = 0.694 mW/g; SAR(10 g) = 0.377 mW/g

Maximum value of SAR (measured) = 0.765 mW/g

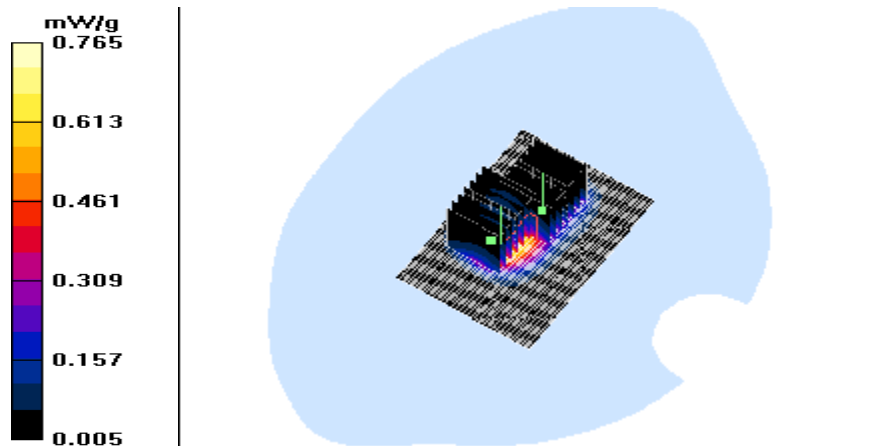
Low/Zoom Scan (7x7x7)/Cube 1: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

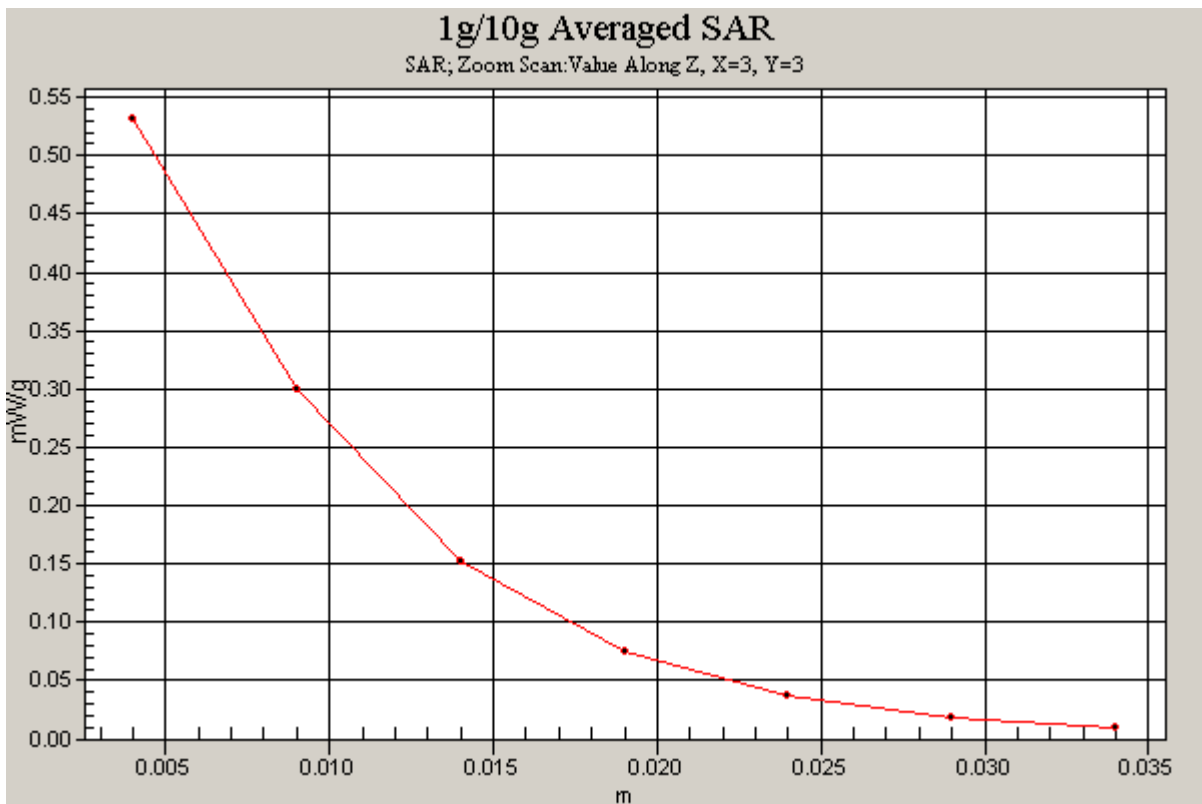
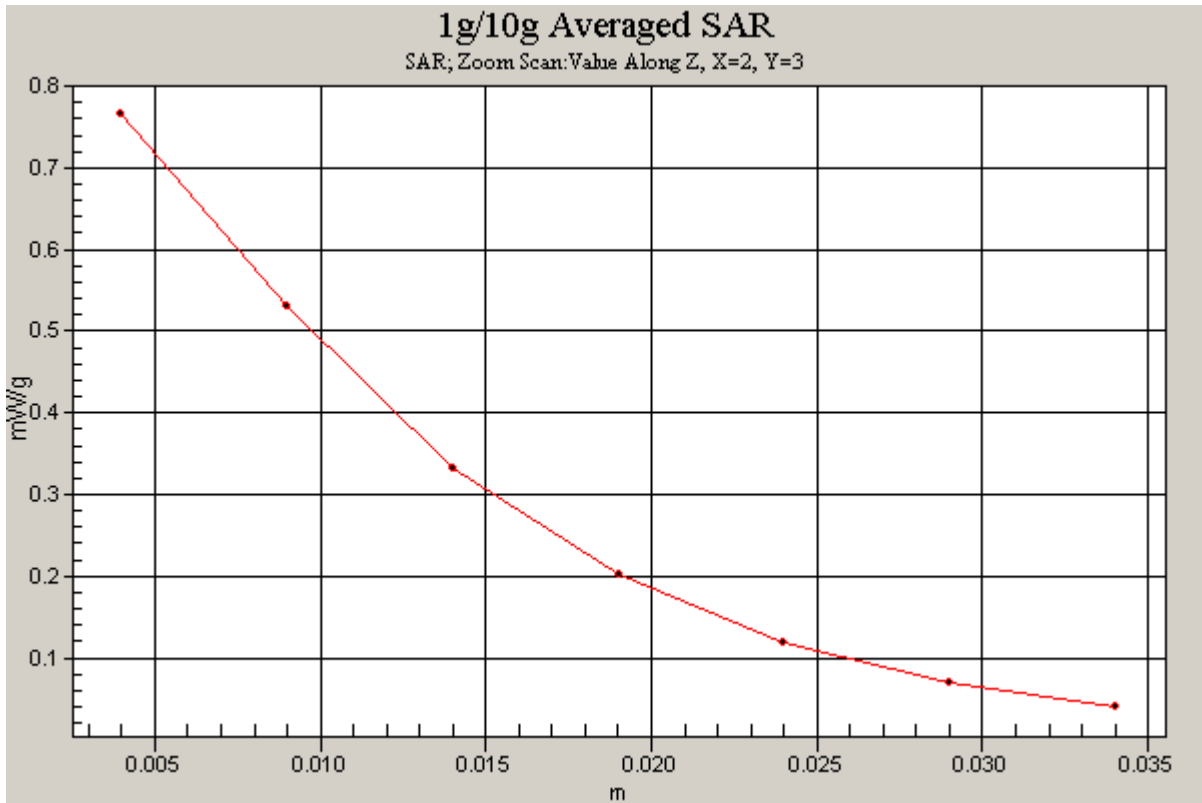
Reference Value = 17.6 V/m; Power Drift = 0.103 dB

Peak SAR (extrapolated) = 0.907 W/kg

SAR(1 g) = 0.464 mW/g; SAR(10 g) = 0.268 mW/g

Maximum value of SAR (measured) = 0.532 mW/g





16.5.23 802.11b- BackSide-Middle

Date/Time: 2011-4-27 9:13:29

Test Laboratory: SGS-GSM

CP100 Wifi 2450MHz Bodyworn distance 5mm Back Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: WiFi(2450); Frequency: 2437 MHz;Duty Cycle: 1:1

Medium: HSL2450-Body Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.34, 4.34, 4.34); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.369 mW/g

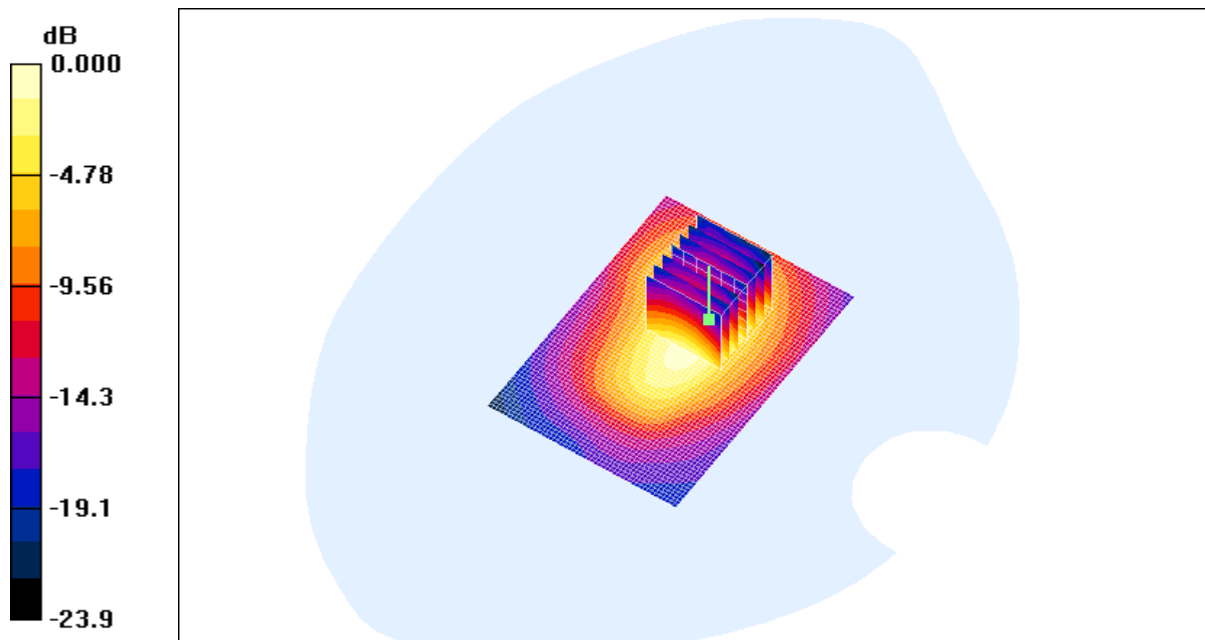
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 11.3 V/m; Power Drift = -0.171 dB

Peak SAR (extrapolated) = 0.546 W/kg

SAR(1 g) = 0.296 mW/g; SAR(10 g) = 0.152 mW/g

Maximum value of SAR (measured) = 0.328 mW/g



0 dB = 0.328mW/g

SHEMC

16.5.24 802.11b-FrontSide-Middle

Date/Time: 2011-4-26 14:30:46

Test Laboratory: SGS-GSM

CP100 Wifi 2450MHz Bodyworn distance 5mm Front Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: WiFi(2450); Frequency: 2437 MHz;Duty Cycle: 1:1

Medium: HSL2450-Body Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.34, 4.34, 4.34); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.633 mW/g

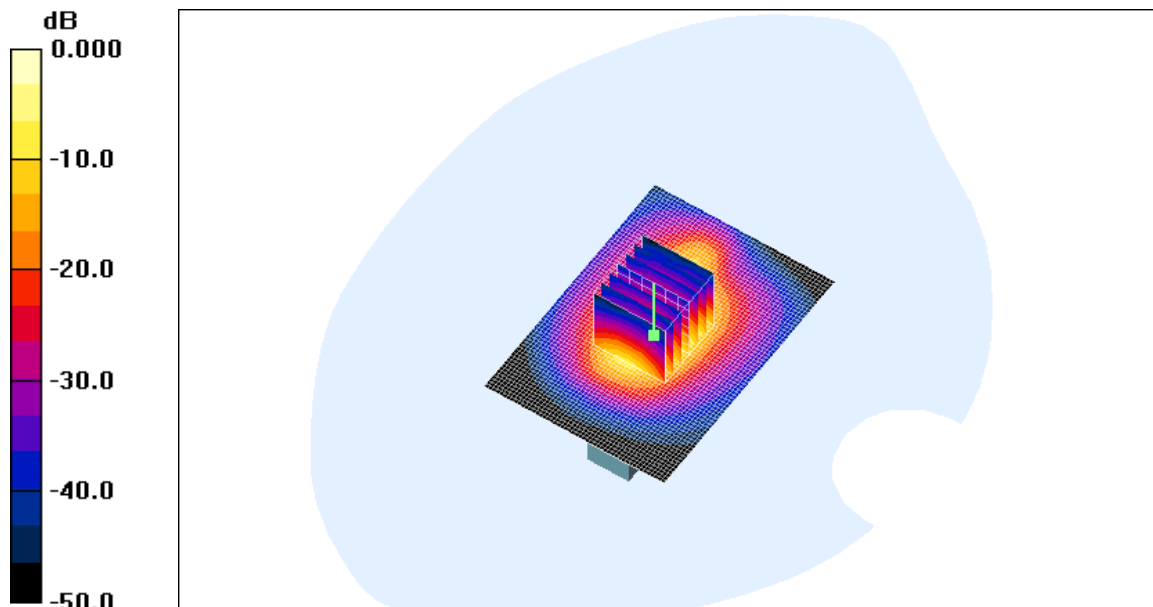
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 12.8 V/m; Power Drift = -0.005 dB

Peak SAR (extrapolated) = 1.60 W/kg

SAR(1 g) = 0.499 mW/g; SAR(10 g) = 0.240 mW/g

Maximum value of SAR (measured) = 0.516 mW/g



0 dB = 0.516mW/g

16.5.25 802.11b-TopSide-Middle

Date/Time: 2011-4-26 17:02:18

Test Laboratory: SGS-GSM

CP100 Wifi 2450MHz Bodyworn distance 5mm Top Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: WiFi(2450); Frequency: 2437 MHz;Duty Cycle: 1:1

Medium: HSL2450-Body Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.34, 4.34, 4.34); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x51x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.071 mW/g

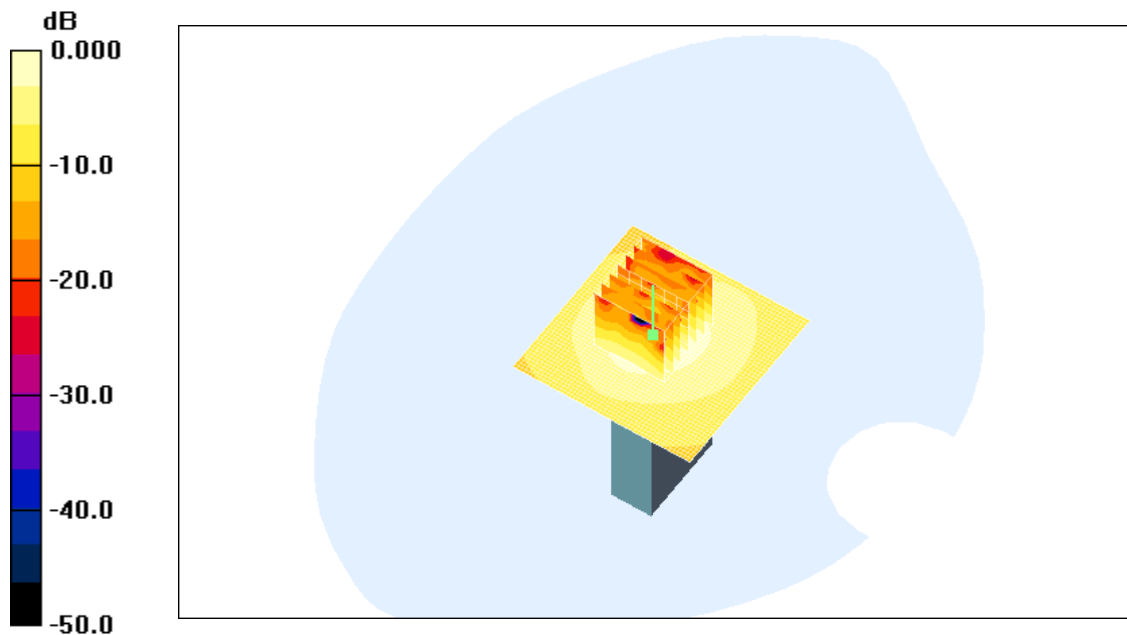
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 5.96 V/m; Power Drift = -0.104 dB

Peak SAR (extrapolated) = 0.114 W/kg

SAR(1 g) = 0.061 mW/g; SAR(10 g) = 0.031 mW/g

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



0 dB = 0.069mW/g

16.5.26 802.11b-BottomSide-Middle

Date/Time: 2011-4-26 15:54:41

Test Laboratory: SGS-GSM

CP100 Wifi 2450MHz Bodyworn distance 5mm Bottom Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: WiFi(2450); Frequency: 2437 MHz;Duty Cycle: 1:1

Medium: HSL2450-Body Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.34, 4.34, 4.34); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x61x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.560 mW/g

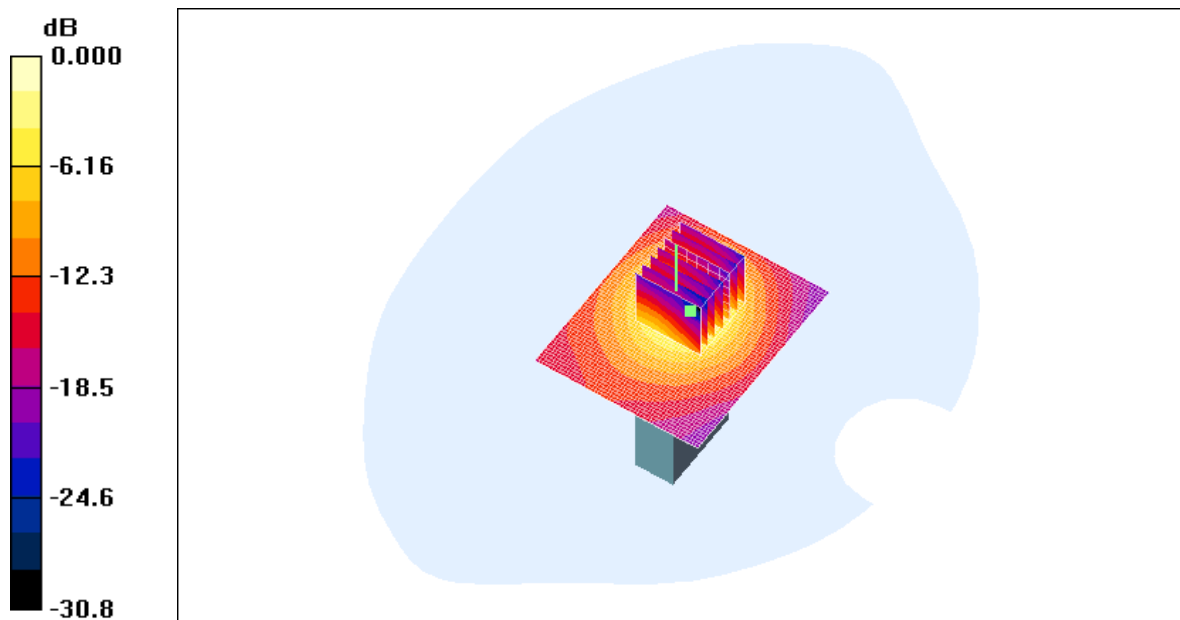
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 14.8 V/m; Power Drift = -0.195 dB

Peak SAR (extrapolated) = 0.866 W/kg

SAR(1 g) = 0.428 mW/g; SAR(10 g) = 0.190 mW/g

Maximum value of SAR (measured) = 0.482 mW/g



0 dB = 0.482mW/g

16.5.27 802.11b-LeftSide-Middle

Date/Time: 2011-4-27 8:45:12

Test Laboratory: SGS-GSM

CP100 Wifi 2450MHz Bodyworn distance 5mm Left Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: WiFi(2450); Frequency: 2437 MHz;Duty Cycle: 1:1

Medium: HSL2450-Body Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.34, 4.34, 4.34); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

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

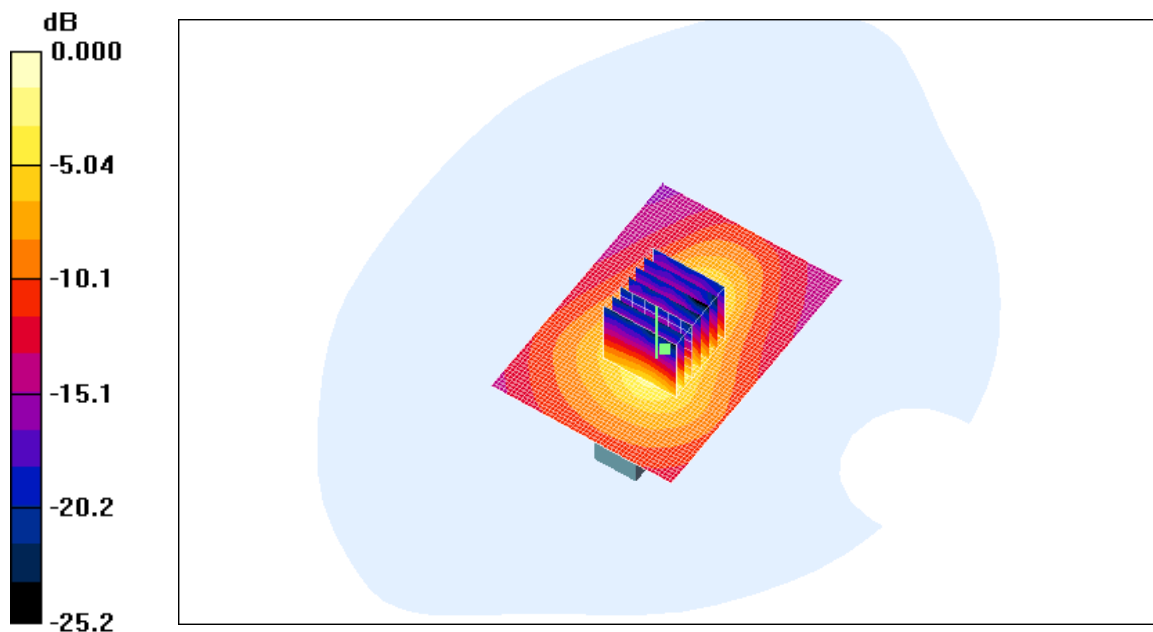
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 10.5 V/m; Power Drift = 0.265 dB

Peak SAR (extrapolated) = 0.676 W/kg

SAR(1 g) = 0.281 mW/g; SAR(10 g) = 0.120 mW/g

Maximum value of SAR (measured) = 0.317 mW/g



0 dB = 0.317mW/g

16.5.28 802.11b-RightSide-Middle

Date/Time: 2011-4-27 8:19:51

Test Laboratory: SGS-GSM

CP100 Wifi 2450MHz Bodyworn distance 5mm Right Side Middle

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: WiFi(2450); Frequency: 2437 MHz;Duty Cycle: 1:1

Medium: HSL2450-Body Medium parameters used: $f = 2437$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.34, 4.34, 4.34); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Middle/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.254 mW/g

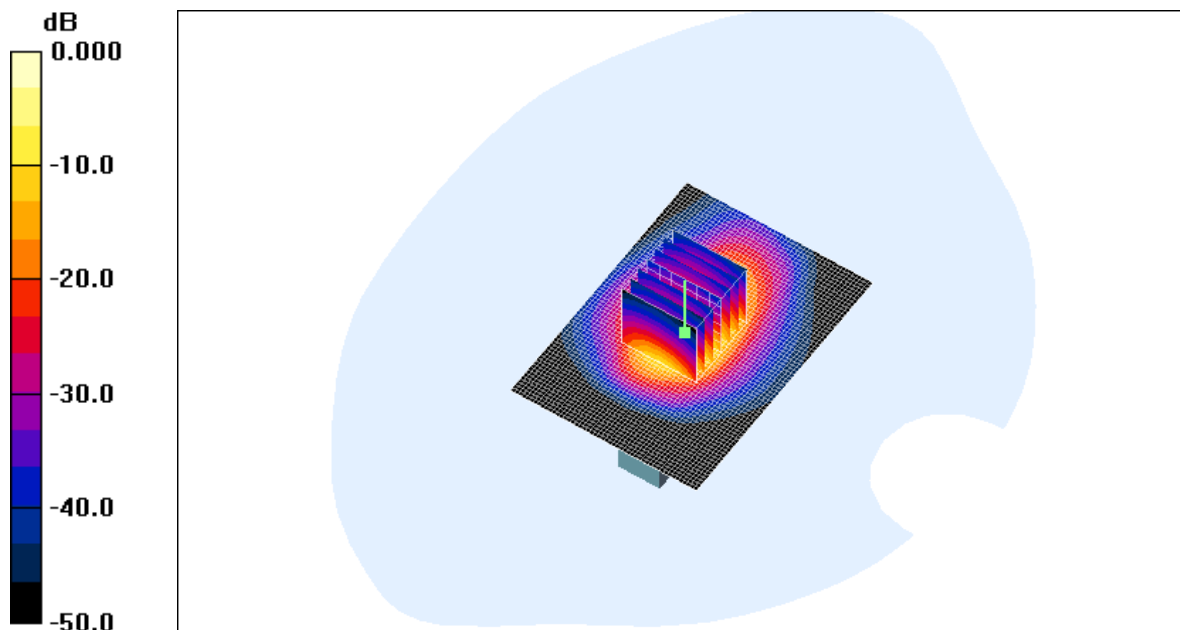
Middle/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 11.5 V/m; Power Drift = -0.217 dB

Peak SAR (extrapolated) = 0.483 W/kg

SAR(1 g) = 0.206 mW/g; SAR(10 g) = 0.105 mW/g

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



0 dB = 0.234mW/g

16.5.29 802.11b-FrontSide-High

Date/Time: 2011-4-27 9:44:22

Test Laboratory: SGS-GSM

CP100 Wifi 2450MHz Bodyworn distance 5mm Front Side High

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: WiFi(2450); Frequency: 2462 MHz;Duty Cycle: 1:1

Medium: HSL2450-Body Medium parameters used: $f = 2462$ MHz; $\sigma = 1.99$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.2, 4.2, 4.2); Calibrated: 2009-11-19
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

High/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.817 mW/g

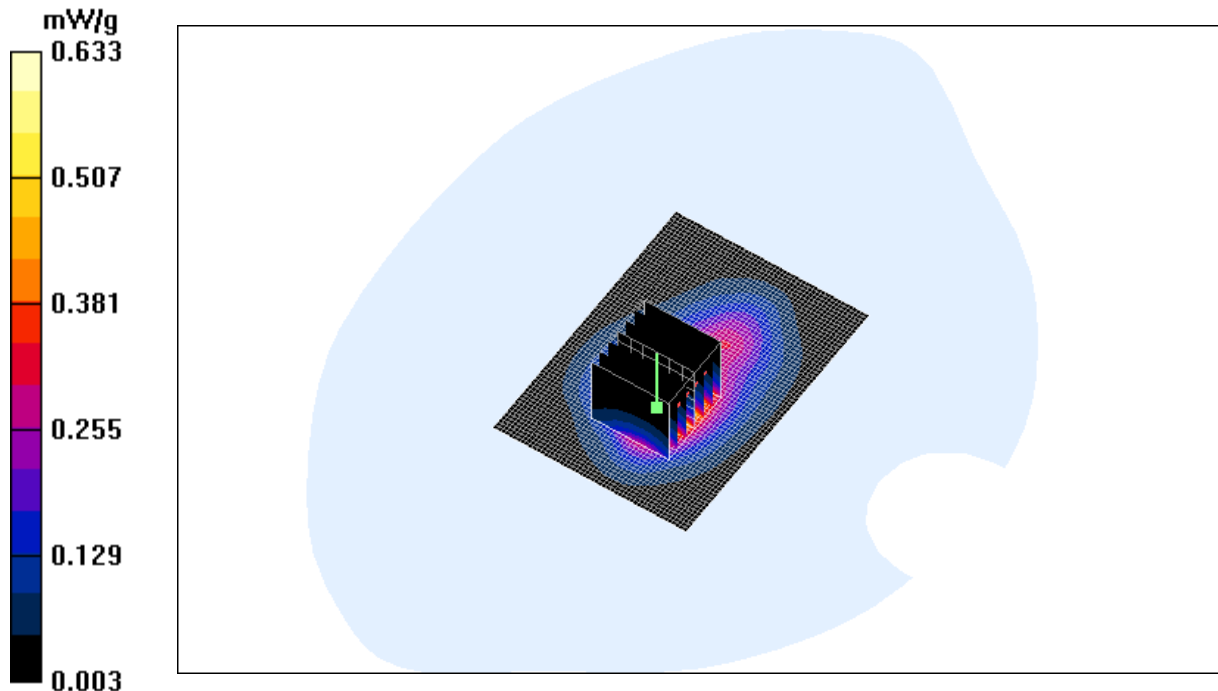
High/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

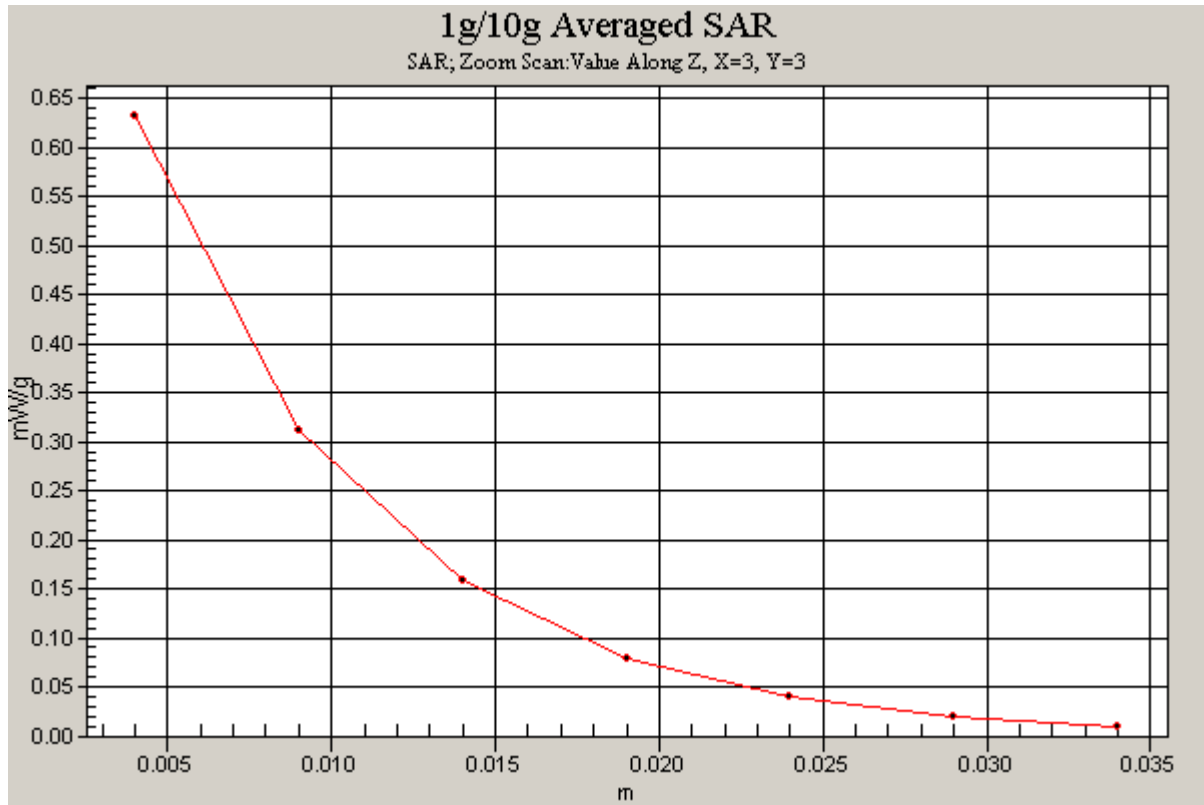
Reference Value = 13.5 V/m; Power Drift = -0.015 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.584 mW/g; SAR(10 g) = 0.293 mW/g

Maximum value of SAR (measured) = 0.633 mW/g





16.5.30 802.11b-FrontSide-Low

Date/Time: 2011-4-27 10:08:07

Test Laboratory: SGS-GSM

CP100 Wifi 2450MHz Bodyworn distance 5mm Front Side Low

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: WiFi(2450); Frequency: 2412 MHz;Duty Cycle: 1:1

Medium: HSL2450-Body Medium parameters used: f = 2412 MHz; $\sigma = 1.93$ mho/m; $\epsilon_r = 52$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.34, 4.34, 4.34); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Low/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.560 mW/g

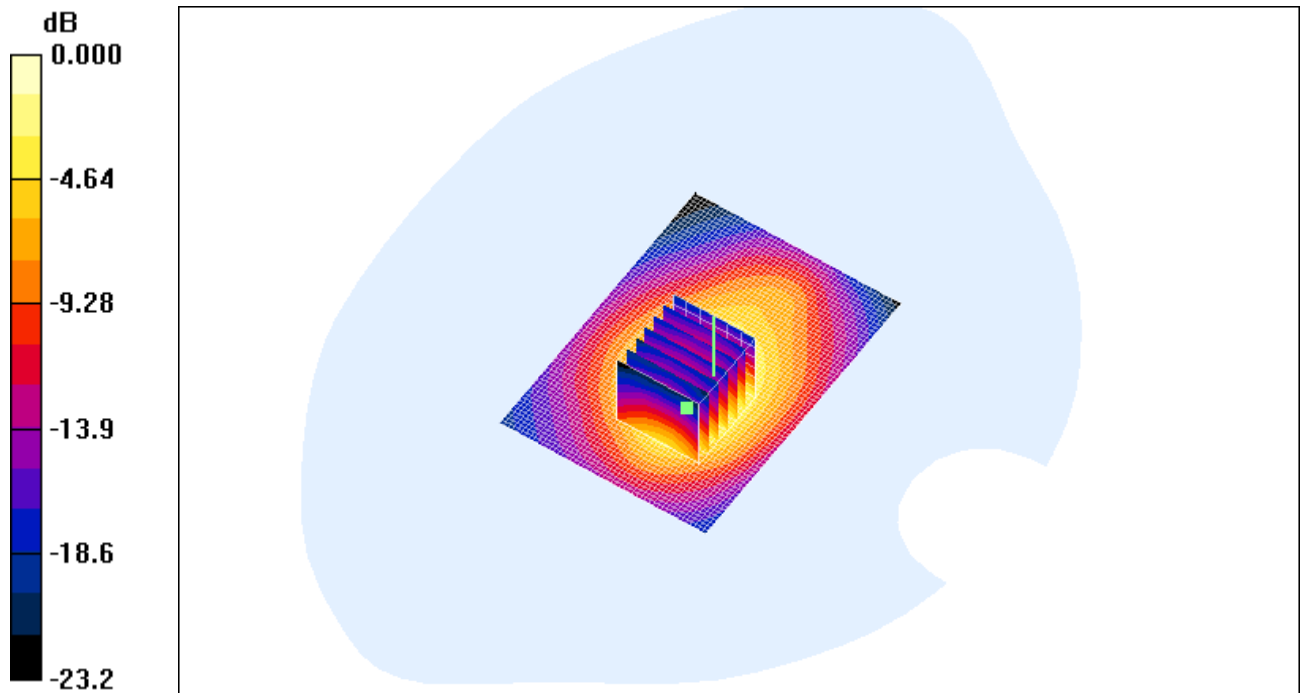
Low/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 15.2 V/m; Power Drift = -0.069 dB

Peak SAR (extrapolated) = 0.887 W/kg

SAR(1 g) = 0.404 mW/g; SAR(10 g) = 0.215 mW/g

Maximum value of SAR (measured) = 0.485 mW/g



0 dB = 0.485mW/g

16.5.31 802.11g-FrontSide-High

Date/Time: 2011-4-27 10:31:36

Test Laboratory: SGS-GSM

CP100 802.11g Bodyworn distance 5mm Front Side High

DUT: CP100; Type: GSM/WIFI; Serial: 35946403700019278

Communication System: WiFi(2450); Frequency: 2462 MHz;Duty Cycle: 1:1

Medium: HSL2450-Body Medium parameters used: $f = 2462$ MHz; $\sigma = 1.99$ mho/m; $\epsilon_r = 51.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.34, 4.34, 4.34); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP-1283
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

High/Area Scan (51x71x1): **Measurement grid: dx=15mm, dy=15mm**

Maximum value of SAR (interpolated) = 0.598 mW/g

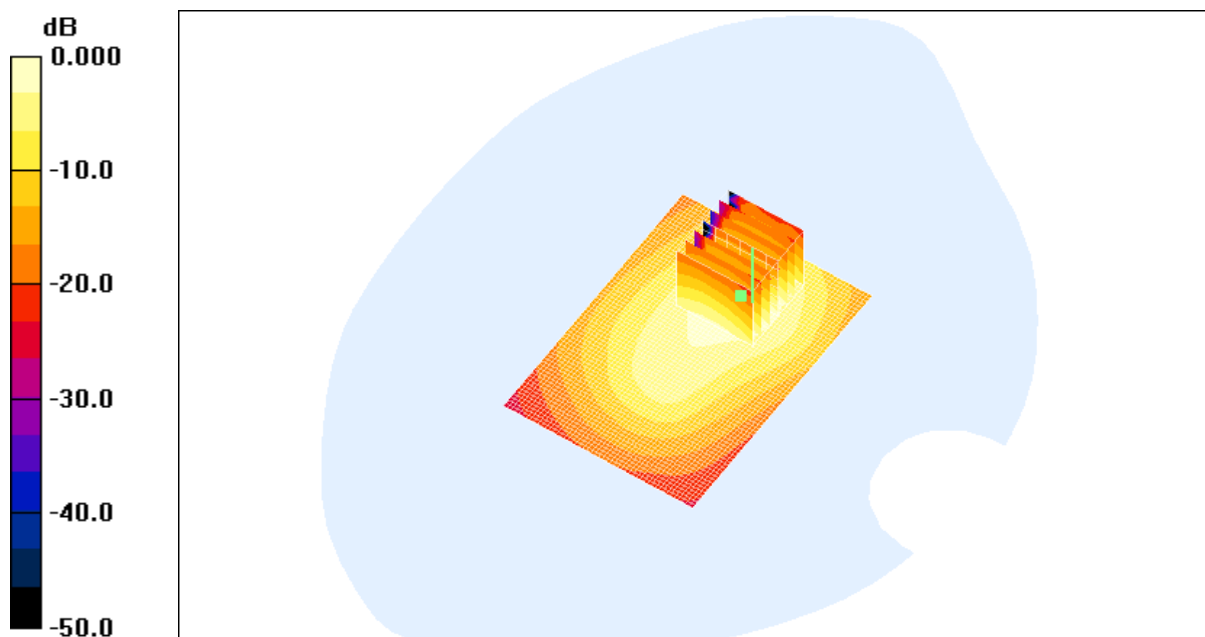
High/Zoom Scan (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 10.9 V/m; Power Drift = 0.297 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.499 mW/g; SAR(10 g) = 0.250 mW/g

Maximum value of SAR (measured) = 0.559 mW/g



0 dB = 0.559mW/g

17. Identification of Samples

Product Name	GPS Locator	
Mode Name	CP100	
Brand Name	Queclink	
Final Hardware Version	1.01	
Final Software Version	CP100R00A01M256_SPANSI ON	
Product Definition	Production Unit	
Antenna Type	Inner antenna	
Device Type	Portable	
Limit Type	General Population/Uncontrolled	
WLAN Frequency Bands	802.11b	Tx/Rx: 2.412~2.472GHz
	802.11g	Tx/Rx: 2.412~2.472GHz
GSM Frequency Bands	GSM850	Tx: 824~849MHz
		Rx: 869~894MHz
	PCS1900	Tx:1850~1910MHz
		Rx:1930~1990MHz
Modulation Mode	GMSK/QPSK	
GSM / GPRS Power Class	GSM850	4
	PCS1900	1
GPRS Multislot class	12	
IMEI	35946403700019278	
Date of receipt	03-22,2011	
Date of Testing Start	04-21,2011	
Date of Testing End	04-27,2011	

18. Photographs of EUT



Fig.18-1 Front View



Fig.18-2 Back View

Annex A Photographs of Test Setup

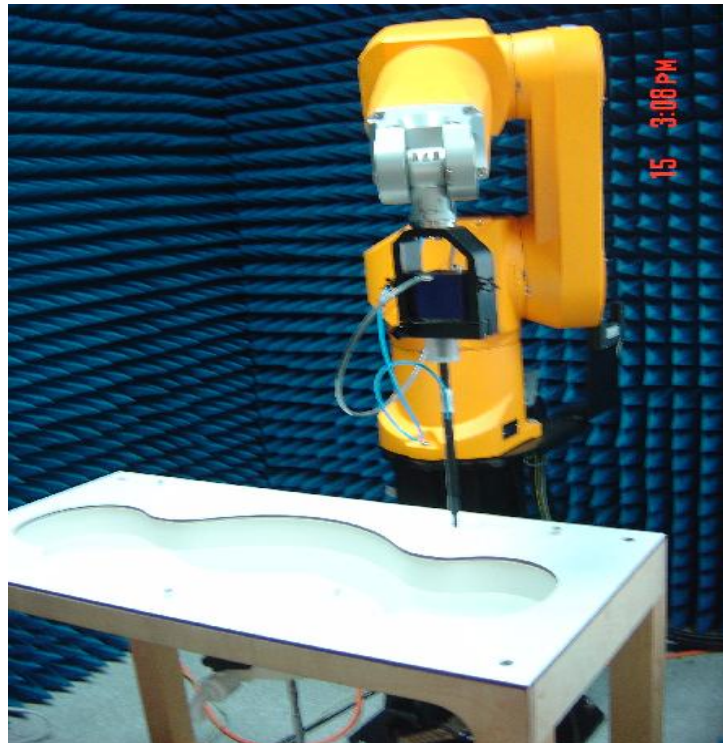


Fig.A-1 Photograph of the SAR measurement System

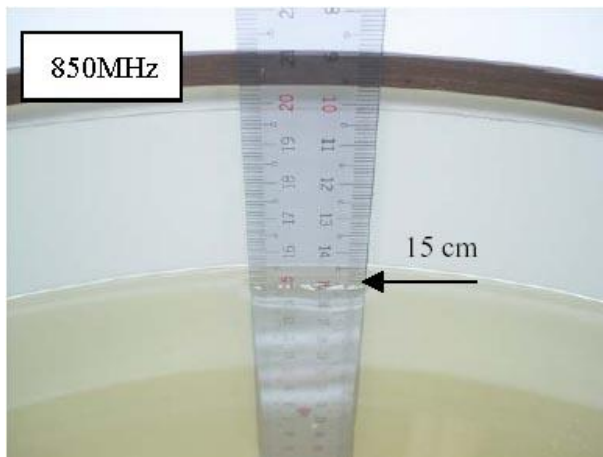


Fig.A-2a Photograph of the Tissue Simulant
Liquid depth 15cm for Body Worn

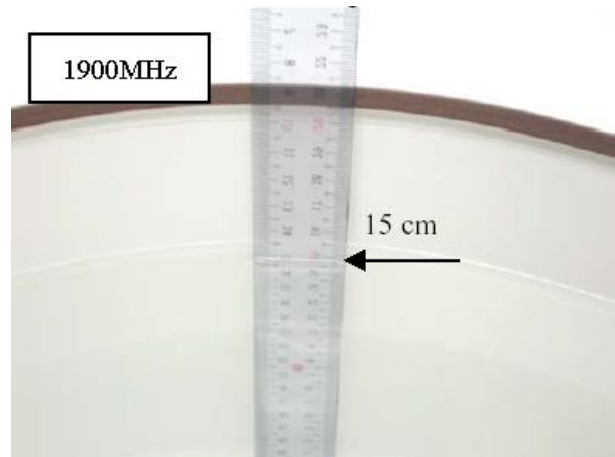
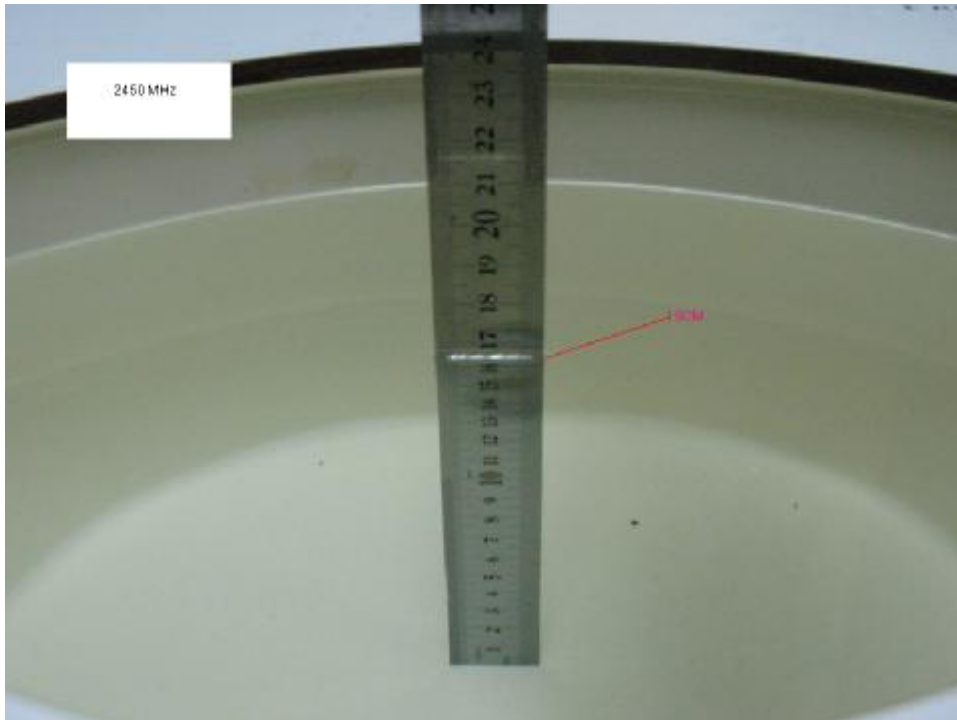


Fig.A-2b Photograph of the Tissue Simulant
Liquid depth 15cm for Body Worn



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



Fig.A-3a Photograph of Back side of the EUT status



Fig.A-3b Photograph of Front side of the EUT status



Fig.A-3c Photograph of Left side of the EUT status



Fig.A-3d Photograph of Right side of the EUT status



Fig.A-3e Photograph of Top side of the EUT status



Fig.A-3f Photograph of Bottom side of the EUT status

Annex B Tissue Simulant Liquid

Annex B.1 Recipes for Tissue Simulant Liquid

The following 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 MW ⁺ resistivity					HEC: Hydroxyethyl Cellulose			
DGBE: 99 ⁺ % Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]								

Table B-1 Recipe of Tissue Simulat Liquid

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°C.

Frequency (MHz)	Tissue Type	Limit/Measured	Permittivity (ρ)	Conductivity (σ)	Temp (°C)
835	Body	Recommended Limit	55.2±5% (52.44~57.96)	0.97±5% (0.922~1.02)	22±2
		Measured, 04-21,2011	55.8	0.942	21.5
1900	Body	Recommended Limit	53.3±5% (50.64~55.97)	1.52±5% (1.44~1.60)	22±2
		Measured, 04-25,2011	53.6	1.54	21.5
2450	Body	Recommended Limit	52.7±5% (50.07~55.34)	1.95±5% (1.85~2.05)	22±2
		Measured, 04-26,2011	51.9	1.98	21.5

Table B-2 Measurement result of Tissue electric parameters

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°C, 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.

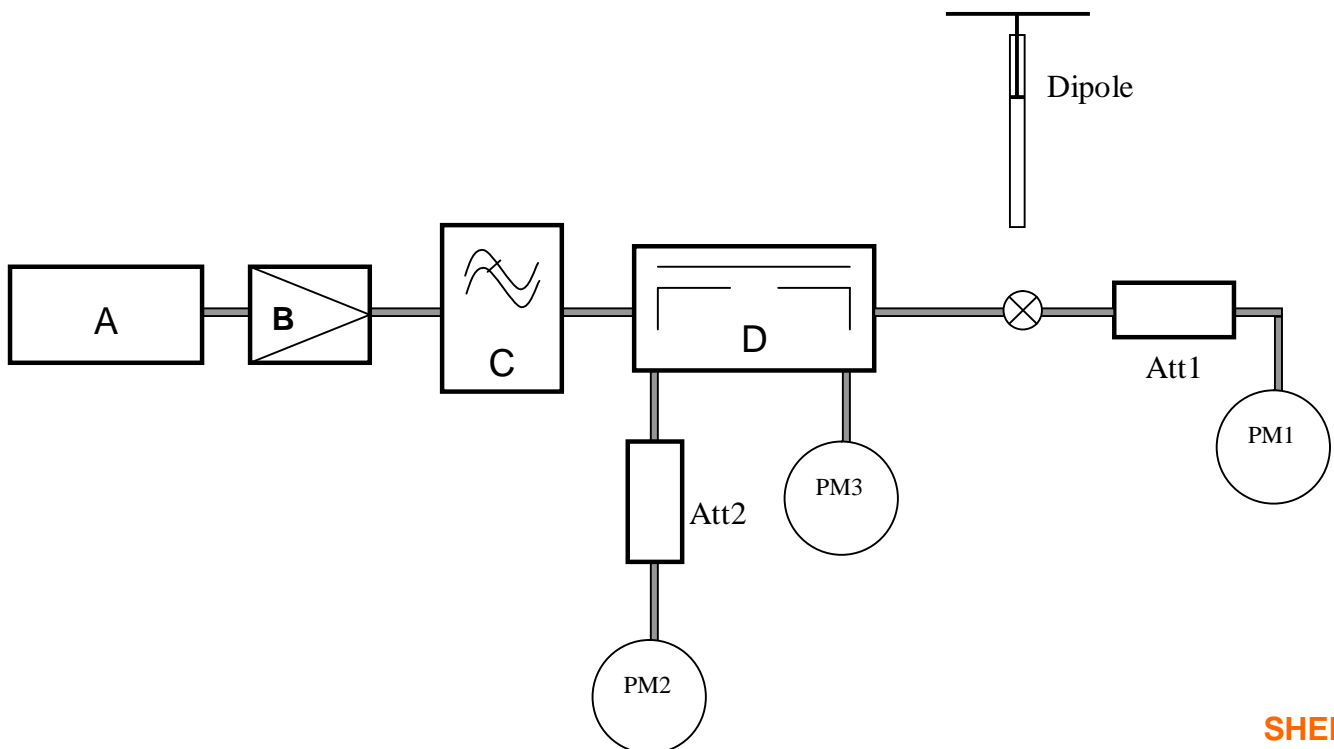


Fig. C-1 the microwave circuit arrangement used for SAR system verification

- 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

Validation Kit	Frequency (MHz)	Tissue Type	Limit/Measurement		
			Condition	Recommended/Measured	1g
D835V2	835	Body	Normalized to 1mW(for nominal Head TSL parameters)	Recommended Limit	10.12±10% (9.11~11.13)
			Normalized to 1W(for nominal Head TSL parameters)	-	9.88
			250mW input power	Measured, 04-21, 2011	2.47
D1900V2	1900	Body	Normalized to 1mW(for nominal Head TSL parameters)	Recommended Limit	40.4±10% (36.36-44.44)
			Normalized to 1W(for nominal Head TSL parameters)	-	40.8
			250mW input power	Measured, 04-25, 2011	10.2
D2450V2	2450	Body	Normalized to 1mW(for nominal Head TSL parameters)	Recommended Limit	50.4±10% (45.36-55.44)
			Normalized to 1W(for nominal Head TSL parameters)	-	52.8
			250mW input power	Measured, 04-26, 2011	13.2

Table C-1 SAR System Validation Result

System Validation for 835MHz-Body

Date/Time: 2011-4-21 8:29:53

Test Laboratory: SGS-GSM

System Performance Check at 835MHz

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: $f = 835 \text{ MHz}$; $\sigma = 0.942 \text{ mho/m}$; $\epsilon_r = 55.8$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(5.98, 5.98, 5.98); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- 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) = 2.67 mW/g

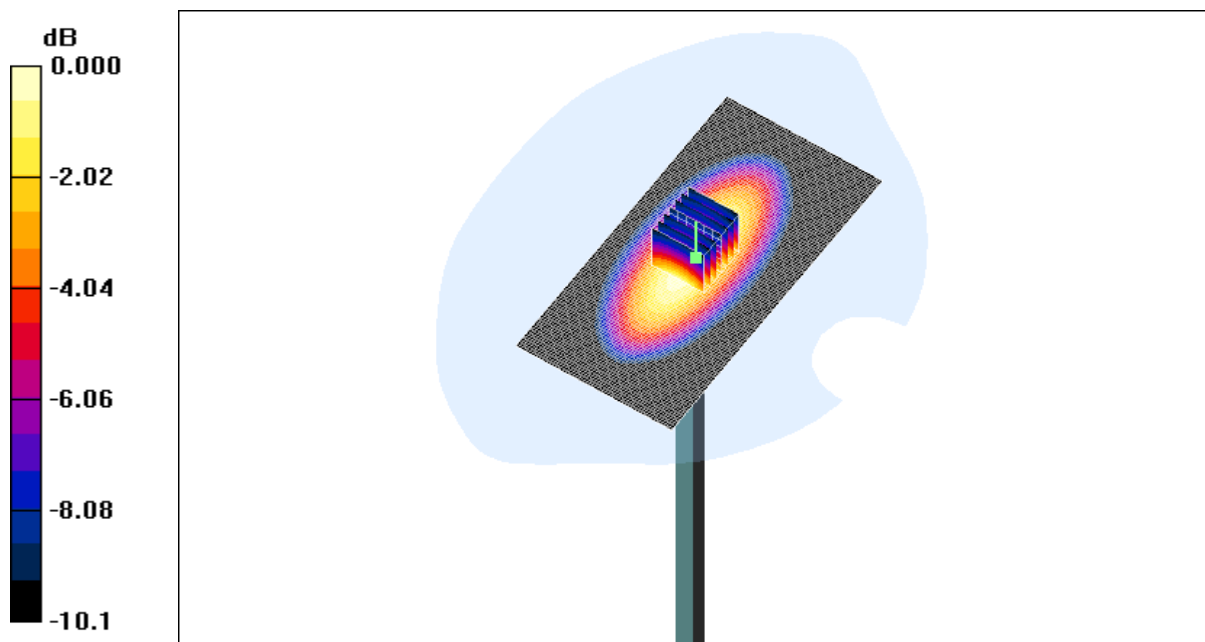
d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 58.1 V/m; Power Drift = -0.141 dB

Peak SAR (extrapolated) = 3.68 W/kg

SAR(1 g) = 2.47 mW/g; SAR(10 g) = 1.62 mW/g

Maximum value of SAR (measured) = 2.66 mW/g



0 dB = 2.66mW/g

SHEMC

System Validation for 1900MHz-Body

Date/Time: 2011-4-25 9:01:35

Test Laboratory: SGS-GSM

System Performance Check at 1900 MHz

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; $\sigma = 1.54$ mho/m; $\epsilon_r = 53.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.6, 4.6, 4.6); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- 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) = 12.8 mW/g

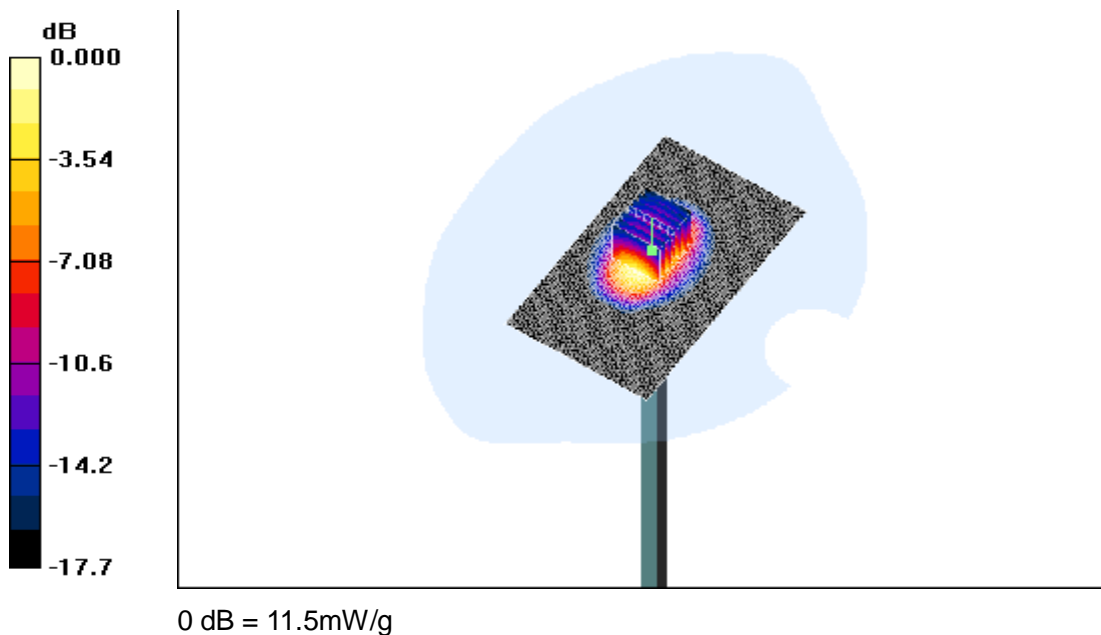
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 88.7 V/m; Power Drift = -0.112 dB

Peak SAR (extrapolated) = 18.3 W/kg

SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.24 mW/g

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



SHEMC

System Validation for 2450MHz-Body

Date/Time: 2011-4-26 13:25:25

Test Laboratory: SGS-GSM

System Performance Check at 2450MHz

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:733

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

Medium: HSL2450-Body Medium parameters used: $f = 2450$ MHz; $\sigma = 1.98$ mho/m; $\epsilon_r = 51.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY4 Configuration:

- Probe: ES3DV3 - SN3088; ConvF(4.34, 4.34, 4.34); Calibrated: 2010-11-23
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn569; Calibrated: 2010-11-22
- 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) = 16.4 mW/g

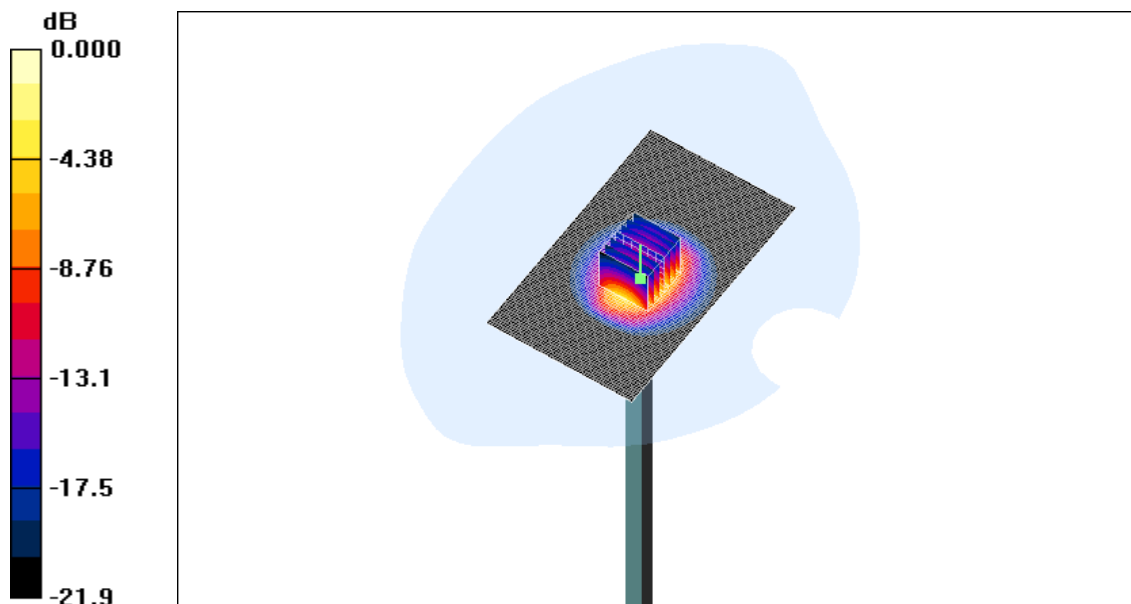
d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: **Measurement grid: dx=5mm, dy=5mm, dz=5mm**

Reference Value = 51.7 V/m; Power Drift = -0.021 dB

Peak SAR (extrapolated) = 28.1 W/kg

SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.02 mW/g

Maximum value of SAR (measured) = 15.1 mW/g



0 dB = 15.1mW/g

SHEMC

Annex D Description of Test Position

Annex D.1 SAM Phantom Shape

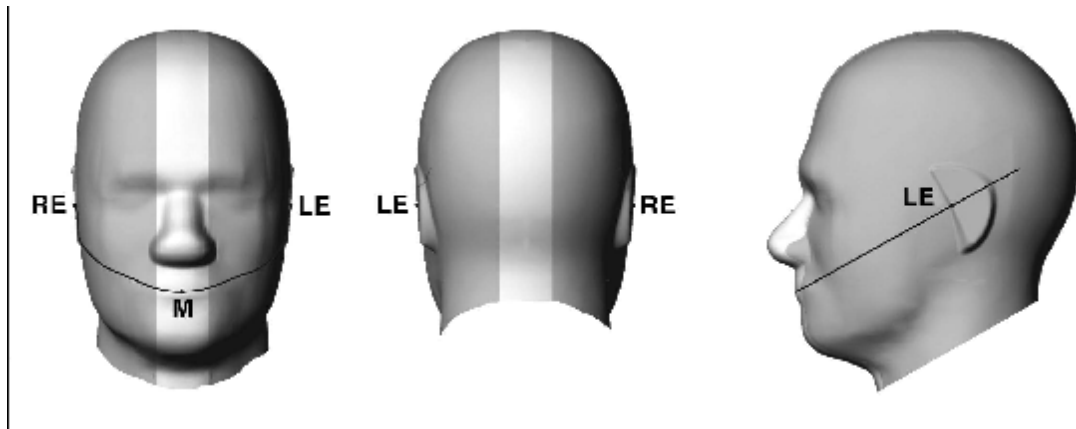


Figure D-1 front, back, and side views of SAM (model for the phantom shell). Full-head model is for illustration purposes only-procedures in this recommended practice are intended primarily for the phantom setup of Figure D-2. Note: The center strip including the nose region has a different thickness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

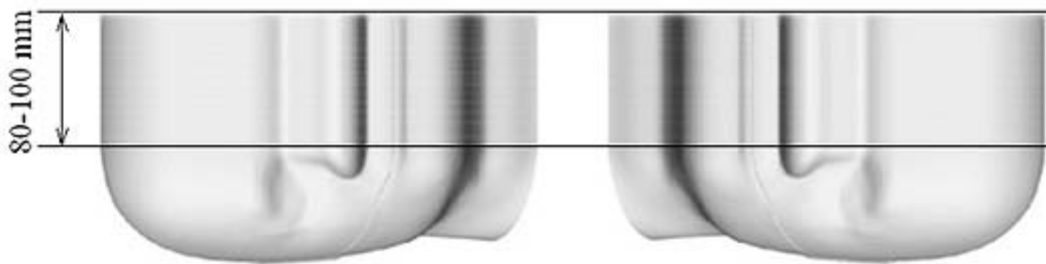


Figure D-2 Sagittally bisected phantom with extended perimeter (shown placed on its side as used for SAR measurements)

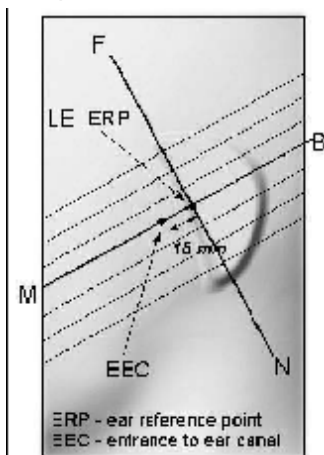


Figure D-3 Close-up side view of phantom showing the ear region, N-F and B-M lines, and seven cross-sectional plane locations

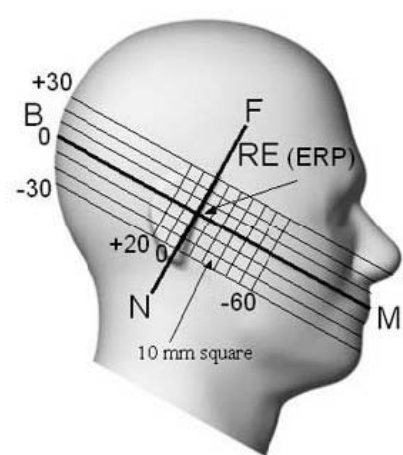


Figure D-4 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

Annex D.2 EUT constructions

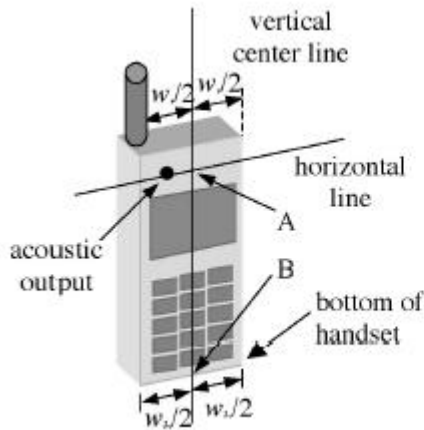


Figure D-5a Handset vertical and horizontal reference lines-“fixed case”

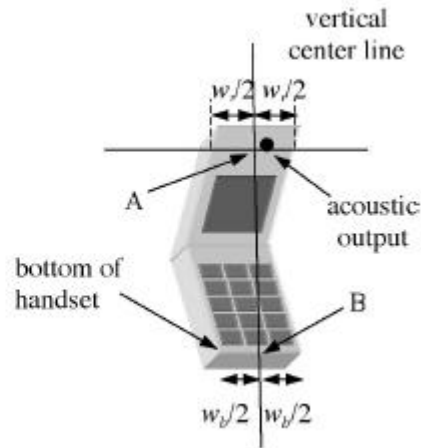


Figure D-5b Handset vertical and horizontal reference lines-“clam-shell case”

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.

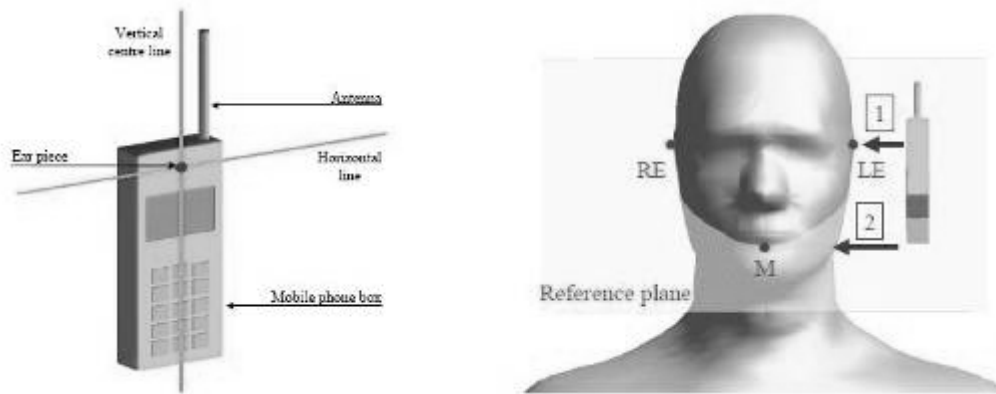


Figure D-6 Definition of the reference lines and points, on the phone and on the phantom and initial position

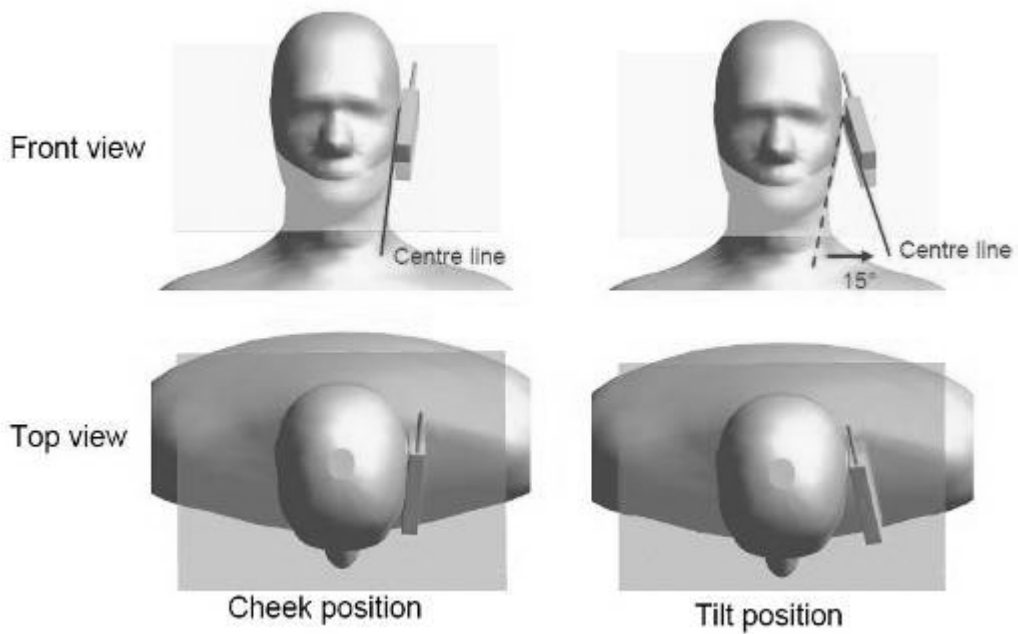


Figure D-7 “Cheek” and “tilt” positions of the mobile phone on the left side

Annex E Calibration certificate

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Accreditation No.: SCS 108

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Multilateral Agreement for the recognition of calibration certificates

Client: **SGS-CH (Auden)**

Certificate No: **ES3-3088_Nov10**

CALIBRATION CERTIFICATE

Object: **ES3DV3 - SN.3088**

Calibration procedure(s): **QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes**

Calibration date: **November 23, 2010**

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	GB41292874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41496057	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5254 (30)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5266 (30b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAB4	SN: 069	20-Apr-10 (No. DAB4-060_Apr10)	Apr-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642101780	4-Aug-09 (in house check Oct-09)	in house check: Oct-11
Network Analyzer HP 8753E	US37360955	18-Oct-01 (in house check Oct-10)	in house check: Oct-11

Calibrated by:	Name: Jeton Kasrali	Function: Laboratory Technician	Signature:
Approved by:	Name: Katja Pekovic	Function: Technical Manager	Signature:

Issued: November 23, 2010

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Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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., $\theta = 0$ 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:

- NORM_{x,y,z}: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z} = NORM_{x,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.
- DCP_{x,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.
- Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z; A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,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.

ES3DV3 SN:3088

November 23, 2010

Probe ES3DV3

SN:3088

Manufactured:	July 20, 2005
Last calibrated:	November 19, 2009
Recalibrated:	November 23, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system)

Certificate No: ES3-3088_Nov10

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ES3DV3 SN:3088

November 23, 2010

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

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm $(\mu V/(V/m)^2)^{\wedge}$	1.32	1.27	1.26	$\pm 10.1\%$
DCP (mV) ^g	100.0	99.9	100.2	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc ^f (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	156.3	$\pm 3.4\%$
			Y	0.00	0.00	1.00	152.0	
			Z	0.00	0.00	1.00	147.1	

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%.

[^] The uncertainties of Norm X, Y, Z do not affect the E-field uncertainty inside TSL (see Pages 5 and 6).

^g Numerical inversion parameter, uncertainty not required.

^f Uncertainty is determined using the maximum deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

ES3DV3 SN:3088

November 23, 2010

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

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz] ¹⁾	Permittivity	Conductivity	Coeff X	Coeff Y	Coeff Z	Alpha	Depth Unc. (k=2)
835	± 50 / ± 100	41.5 ± 5%	0.90 ± 5%	6.07	6.07	6.07	0.09	1.03 ± 11.0%
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	5.97	5.97	5.97	0.09	1.02 ± 11.0%
1610	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	5.23	5.23	5.23	0.59	1.38 ± 11.0%
1900	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	5.14	5.14	5.14	0.51	1.51 ± 11.0%
2000	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	5.07	5.07	5.07	0.51	1.54 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.56	4.56	4.56	0.45	1.70 ± 11.0%

¹⁾ The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RMS of the Coeff uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ES3DV3 SN:3088

November 23, 2010

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

Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz] ^①	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc. (k=2)
835	± 50 / ± 100	55.2 ± 5%	0.87 ± 5%	5.98	5.98	5.98	0.88	1.13 ± 11.0%
890	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	5.85	5.85	5.85	0.76	1.19 ± 11.0%
1610	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.92	4.92	4.92	0.26	3.77 ± 11.0%
1900	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.60	4.60	4.60	0.28	2.78 ± 11.0%
2000	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.76	4.76	4.76	0.26	4.62 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.34	4.34	4.34	0.44	1.96 ± 11.0%

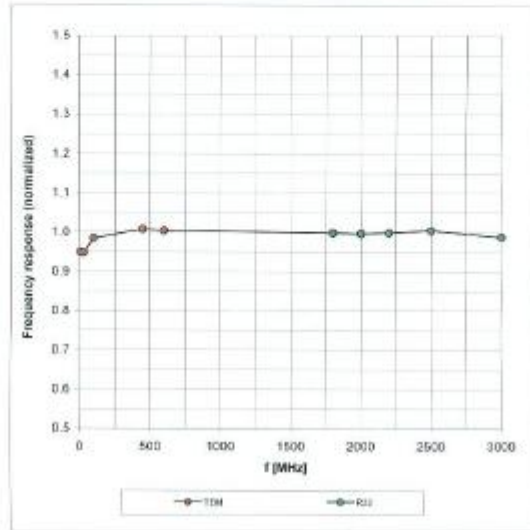
^① The validity of ± 100 MHz only applies for DASY v4 A and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

ES3DV3 SN:3088

November 23, 2010

Frequency Response of E-Field

(TEM-Cell:ifl110 EXX, Waveguide: R22)

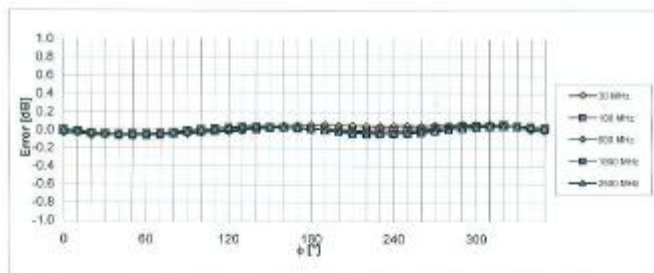
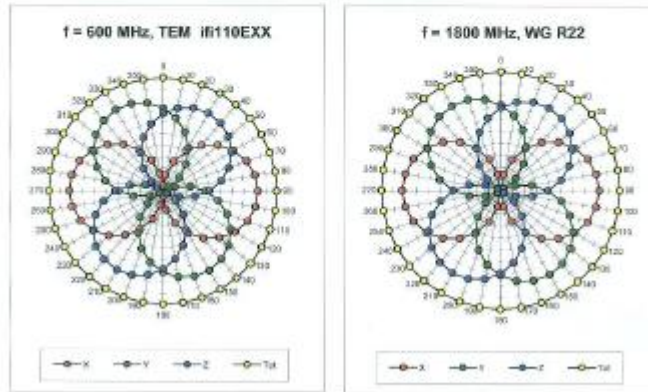


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

ES3DV3 SN:3088

November 23, 2010

Receiving Pattern (ϕ), $\theta = 0^\circ$



Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

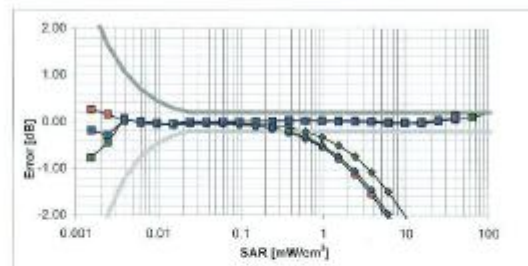
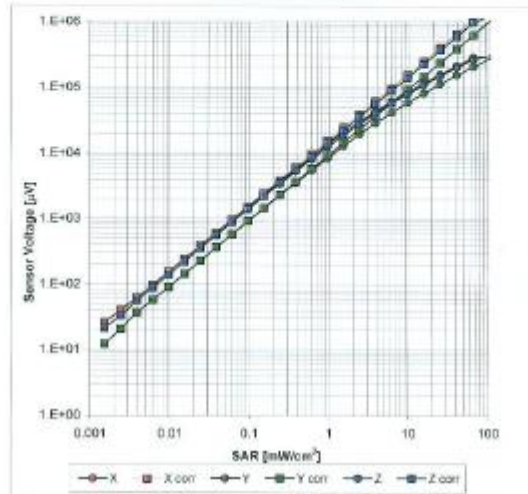
Certificate No: ES3-3088_Nov10

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ES3DV3 SN:3088

November 23, 2010

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



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

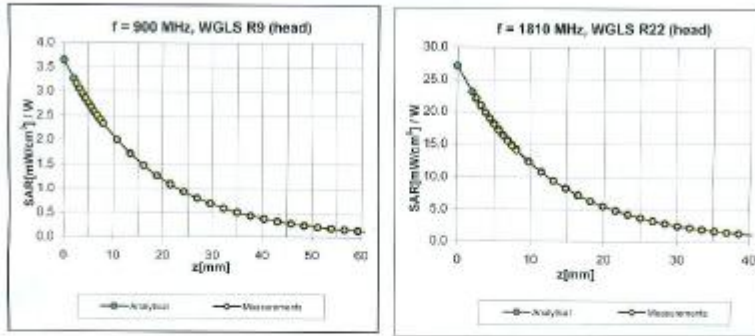
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ES3DV3 SN:3088

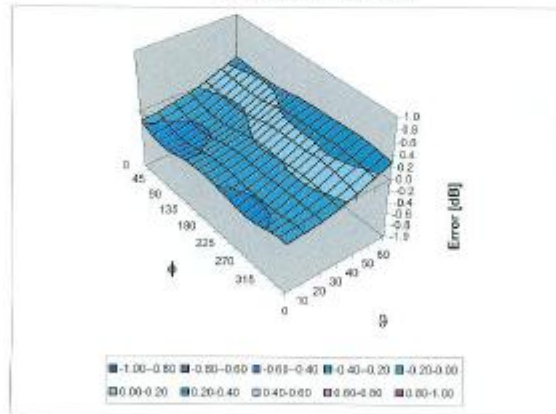
November 23, 2010

Conversion Factor Assessment



Deviation from Isotropy in HSL

Error (ϕ , θ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ (k=2)

Certificate No: ES3-3088_Nov10

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ES3DV3 SN:3088

November 23, 2010

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

Certificate No. ES3-3088_Nov10

Page 11 of 11

Annex E.2 DAE Calibration certification

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Accreditation No.: SCS 108

Client: **SGS-CH (Auden)**

Certificate No.: **DAE3-569_Nov10**

CALIBRATION CERTIFICATE

Object: **DAE3 - SD 000 D03_AA - SN: 569**

Calibration procedure(s): **QA CAL-06.v22
Calibration procedure for the data acquisition electronics (DAE)**

Calibration date: **November 22, 2010**

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 (MATE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0610278	28-Sep-10 (No:10376)	Sep-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Calibrator Box V1.1	BE UMS 006 AB 1004	07-Jun-10 (in house check)	In house check: Jun-11

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

Issued: November 22, 2010

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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 = 6.1 μ V, full range = -100...+300 mV

Low Range: 1LSB = 81nV, full range = -1...+3mV

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

Calibration Factors	X	Y	Z
High Range	402.938 \pm 0.1% (k=2)	403.345 \pm 0.1% (k=2)	403.529 \pm 0.1% (k=2)
Low Range	3.92800 \pm 0.7% (k=2)	3.95637 \pm 0.7% (k=2)	3.94644 \pm 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	263.0 \pm 1 °
---	-----------------

Appendix
1. DC Voltage Linearity

High Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	199997.6	0.39	0.00
Channel X - Input	19998.27	-1.73	-0.01
Channel X - Input	-20000.54	-0.84	0.00
Channel Y + Input	199999.9	2.71	0.00
Channel Y + Input	20000.26	0.06	0.00
Channel Y - Input	-19999.11	0.59	-0.00
Channel Z + Input	199999.2	3.34	0.00
Channel Z + Input	19994.29	-5.81	-0.03
Channel Z - Input	-20000.54	-0.74	0.00

Low Range	Reading (μV)	Difference (μV)	Error (%)
Channel X + Input	2000.6	0.76	0.04
Channel X + Input	199.37	-0.23	-0.11
Channel X - Input	-200.61	-0.71	0.35
Channel Y + Input	2000.0	-0.01	-0.00
Channel Y + Input	198.53	-1.37	-0.69
Channel Y - Input	-202.14	-1.84	0.92
Channel Z + Input	2000.6	0.24	0.01
Channel Z + Input	198.39	-1.51	-0.76
Channel Z - Input	-201.69	-1.99	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	-0.51	-2.10
	-200	2.92	2.01
Channel Y	200	4.53	4.19
	-200	-8.17	-6.12
Channel Z	200	-14.00	-14.37
	-200	12.62	12.51

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	-	2.31	-2.14
Channel Y	200	2.21	-	3.30
Channel Z	200	0.63	-0.46	-

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	16227	16350
Channel Y	16586	16231
Channel Z	15827	18157

5. Input Offset Measurement

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

Input 10M Ω

	Average (μ V)	min. Offset (μ V)	max. Offset (μ V)	Std. Deviation (μ V)
Channel X	0.17	-1.94	1.97	0.67
Channel Y	-0.86	-2.25	1.36	0.69
Channel Z	-1.20	-2.36	0.46	0.57

6. Input Offset Current

Nominal input circuitry offset current on all channels: <20fA

7. Input Resistance (Typical values for information)

	Zeroing (k Ω m)	Measuring (M Ω m)
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

Annex E.1 Dipole Calibration certification

D835V2

Calibration Laboratory of
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Accreditation No.: SCS 108

Client SGS-CH (Auden)

Certificate No: D835V2-4d070_Nov10

CALIBRATION CERTIFICATE

Object: **DB35V2 - SN: 4d070**

Calibration procedure(s): **QA CAL-05.v7
Calibration procedure for dipole validation kits**

Calibration date: **November 19, 2010**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01206)	Oct-11
Power sensor HP 8451A	US37292783	06-Oct-10 (No. 217-01256)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8451A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S BMT-06	100005	4-Aug-09 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390685 64206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: November 22, 2010

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Certificate No: D835V2-4d070_Nov10

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Accreditation No.: SCS 108

Glossary:

TSL tissue simulating liquid
 CorivF 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	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
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	41.5 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	****	****

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	260 mW input power	2.37 mW / g
SAR normalized	normalized to 1W	9.48 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.56 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 mW / g
SAR normalized	normalized to 1W	6.16 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.20 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	54.2 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.53 mW / g
SAR normalized	normalized to 1W	10.1 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	9.92 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.65 mW / g
SAR normalized	normalized to 1W	6.60 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	6.51 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.4 Ω - 2.7 jΩ
Return Loss	- 29.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.0 Ω - 3.9 jΩ
Return Loss	- 27.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.394 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	November 08, 2007

DASY5 Validation Report for Head TSL

Date/Time: 18.11.2010 11:02:35

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL900

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 41.5$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement

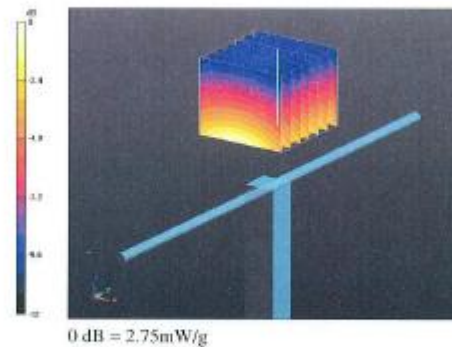
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 57.2 V/m; Power Drift = 0.025 dB

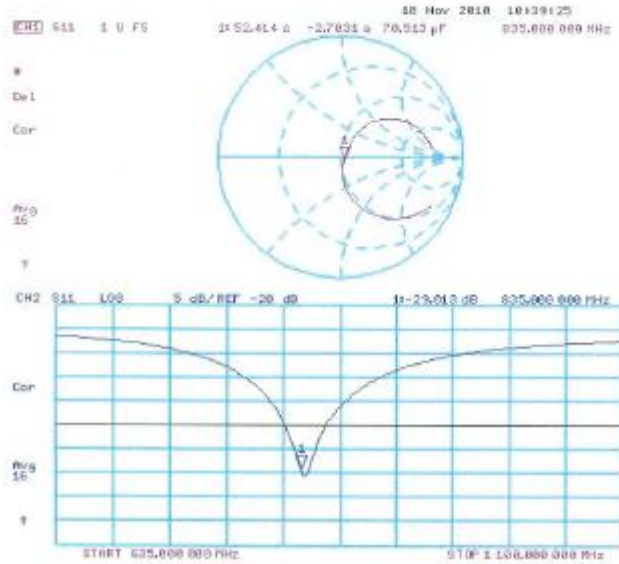
Peak SAR (extrapolated) = 3.56 W/kg

SAR(1 g) = 2.37 mW/g; SAR(10 g) = 1.54 mW/g

Maximum value of SAR (measured) = 2.75 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 19.11.2010 13:25:58

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: MSL900

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54.2$; $\rho = 1000 \text{ kg/m}^3$

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement

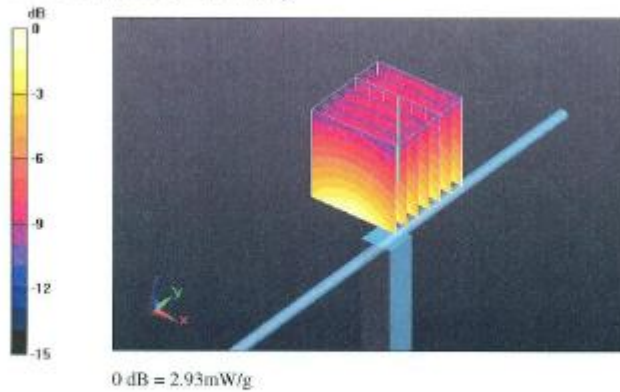
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.1 V/m; Power Drift = -0.000422 dB

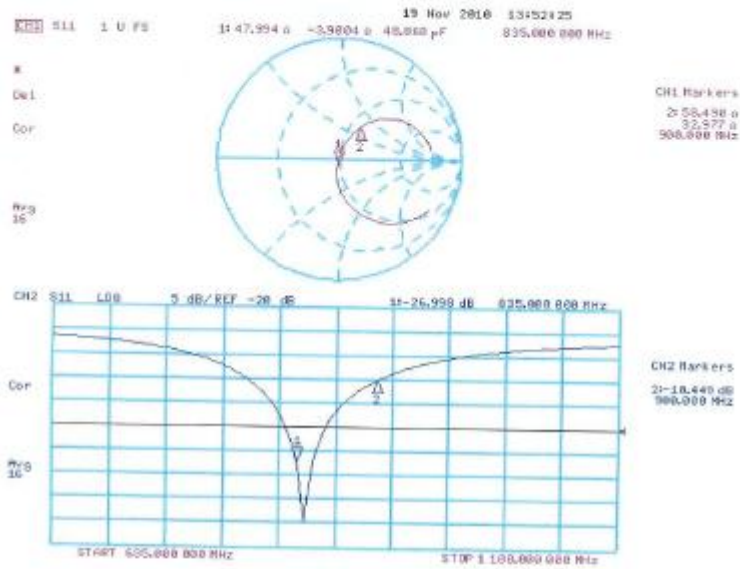
Peak SAR (extrapolated) = 3.73 W/kg

SAR(1 g) = 2.53 mW/g; SAR(10 g) = 1.65 mW/g

Maximum value of SAR (measured) = 2.93 mW/g



Impedance Measurement Plot for Body TSL



D1900V2

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Accreditation No.: SCS 108

Client: **SGS-CH (Auden)**

Certificate No.: **D1900V2-5d028_Nov10**

CALIBRATION CERTIFICATE

Object: **D1900V2 - SN: 5d028**

Calibration procedure(s): **QA CAL-05.v7
Calibration procedure for dipole validation kits**

Calibration date: **November 25, 2010**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP B481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE#	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP B481A	MY41092317	18-Oct-09 (in house check Oct-09)	in house check: Oct-11
RF generator R&S SMT-06	100009	4-Aug-09 (in house check Oct-09)	in house check: Oct-11
Network Analyzer HP 8753E	US37390585 54206	18-Oct-01 (in house check Oct-10)	in house check: Oct-11

Calibrated by:	Name	Function	Signature
	Dimitry Rev	Laboratory Technician	<i>D. Rev</i>
Approved by:	Kerja Pokovic	Technical Manager	<i>K. Pokovic</i>

Issued: November 25, 2010

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Certificate No.: D1900V2-5d028_Nov10

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Accreditation No.: SCS 108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
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	39.3 ± 6 %	1.40 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C	---	---

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR normalized	normalized to 1W	40.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	40.3 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.26 mW / g
SAR normalized	normalized to 1W	21.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	21.0 mW / g ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.8 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature during test	(22.0 ± 0.2) °C	-----	-----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR normalized	normalized to 1W	40.4 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	40.3 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.30 mW / g
SAR normalized	normalized to 1W	21.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.2 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.3 Ω + 5.8 jΩ
Return Loss	-24.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.3 Ω + 6.7 jΩ
Return Loss	-22.6 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

DASY5 Validation Report for Head TSL

Date/Time: 25.11.2010 12:33:59

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: HSL U12 BB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.4$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement

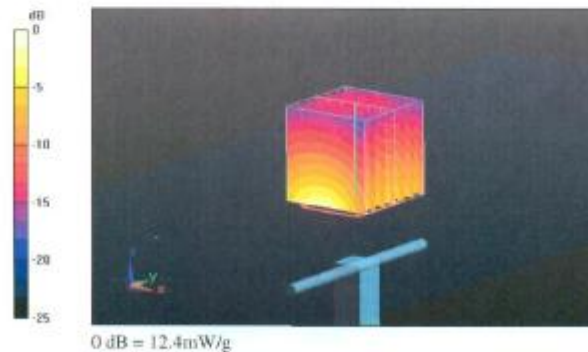
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 97.6 V/m; Power Drift = 0.035 dB

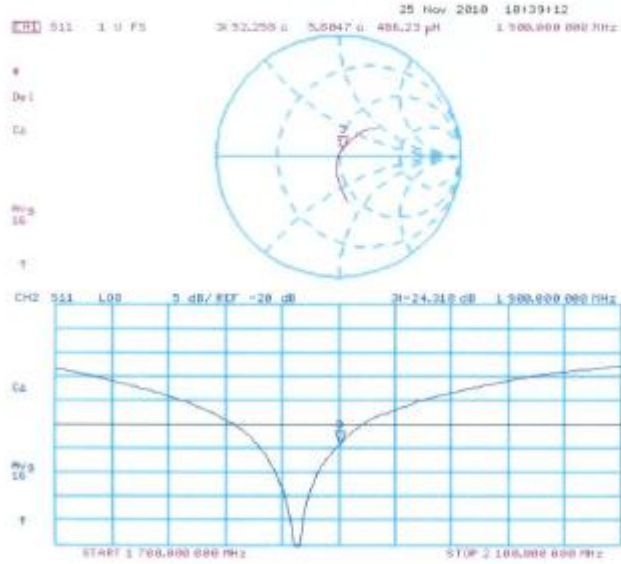
Peak SAR (extrapolated) = 18.6 W/kg

SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.26 mW/g

Maximum value of SAR (measured) = 12.4 mW/g



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 24.11.2010 12:05:53

Test Laboratory: SPEAG, Zurich, Switzerland

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

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

Medium: MSL U12 BB

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.8$; $\rho = 1000$ kg/m³

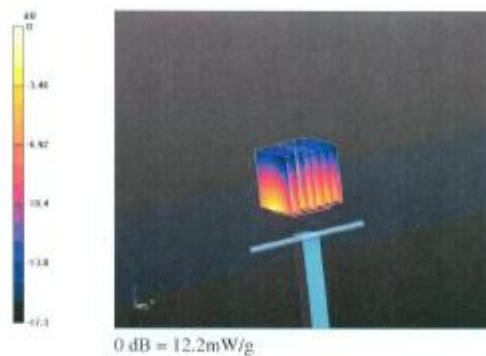
Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

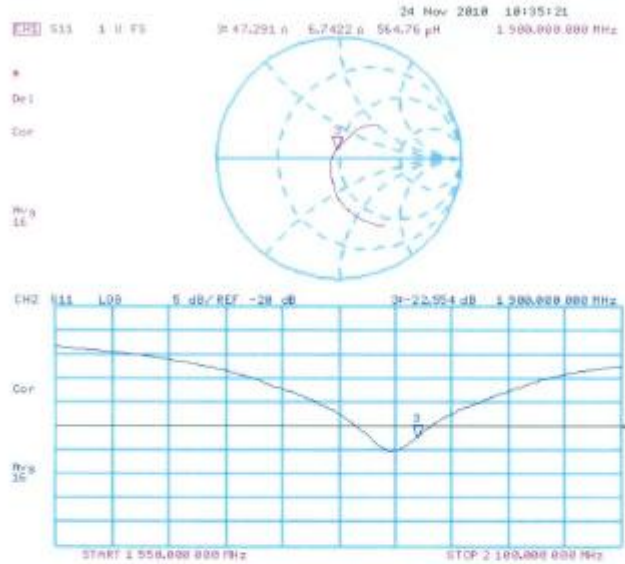
DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 94.8 V/m; Power Drift = 0.033 dB
 Peak SAR (extrapolated) = 17.2 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.3 mW/g
 Maximum value of SAR (measured) = 12.2 mW/g



Impedance Measurement Plot for Body TSL



D2450V2

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Accreditation No.: SCS 108

Client: SGS-CH (Auden)

Certificate No.: D2450V2-733_Nov10

CALIBRATION CERTIFICATE

Object: D2450V2 - SN: 733

Calibration procedure(s): QA CAL-05.v7
Calibration procedure for dipole validation kits

Calibration date: November 25, 2010

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 (MATE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37400704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292793	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01156)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	16-Jun-10 (No. DAE4-601_Jun10)	Jun-11
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41002317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37305585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

Calibrated by:	Name	Function	Signature
	Dimitri Slav	Laboratory Technician	
Approved by:	Name	Function	Signature
	Katja Pokovic	Technical Manager	

Issued: November 25, 2010

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Certificate No.: D2450V2-733_Nov10

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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

- d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.8 ± 8 %	1.72 mho/m ± 6 %
Head TSL temperature during test	(21.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm ³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.2 mW / g
SAR normalized	normalized to 1W	52.8 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	53.6 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.18 mW / g
SAR normalized	normalized to 1W	24.7 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	24.9 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	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.3 ± 6 %	1.92 mho/m ± 6 %
Body TSL temperature during test	(21.8 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm ³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.6 mW / g
SAR normalized	normalized to 1W	50.4 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	50.7 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.82 mW / g
SAR normalized	normalized to 1W	23.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	23.3 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.7 Ω + 1.9 jΩ
Return Loss	- 26.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.2 Ω + 3.7 jΩ
Return Loss	- 28.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.149 ns
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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 07, 2008

DASY5 Validation Report for Head TSL

Date/Time: 25.11.2010 14:35:03

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:733

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

Medium: HSL U12 BB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.72$ mho/m; $\epsilon_r = 38.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvR4.53; 4.53; 4.53; Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAB4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW/d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement

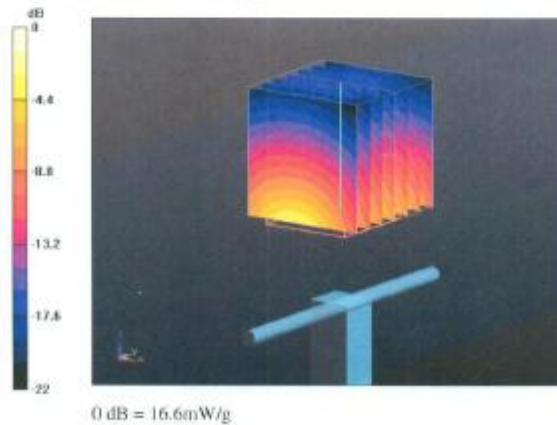
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 102.0 V/m; Power Drift = 0.057 dB

Peak SAR (extrapolated) = 26.9 W/kg

SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.18 mW/g

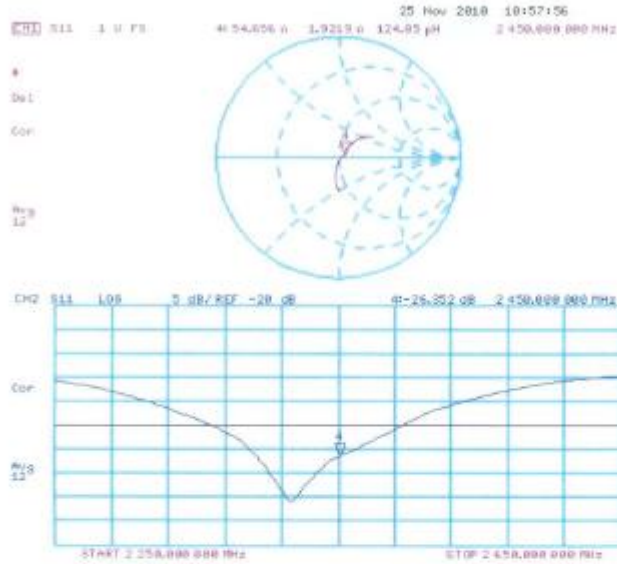
Maximum value of SAR (measured) = 16.6 mW/g



Certificate No: D2450V2-733_Nov10

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Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 24.11.2010 13:56:51

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:733

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

Medium: MSL U12 BB

Medium parameters used: $f = 2450$ MHz; $\sigma = 1.92$ mho/m; $\epsilon_r = 52.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7)/Cube 0: Measurement

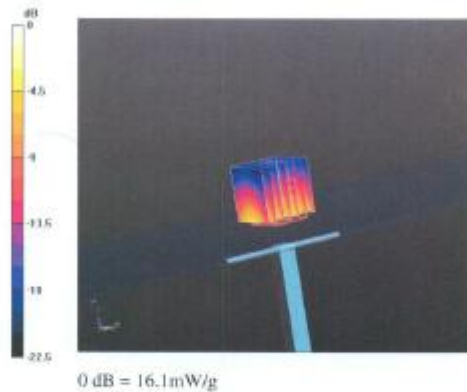
grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.8 V/m; Power Drift = 0.027 dB

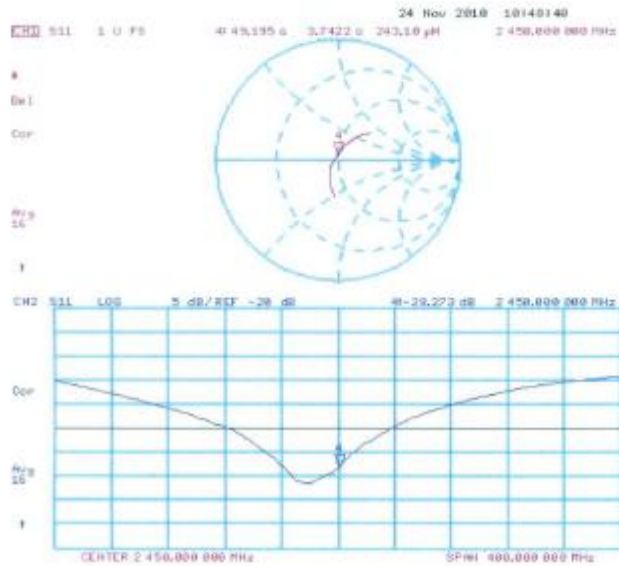
Peak SAR (extrapolated) = 26.7 W/kg

SAR(1 g) = 12.6 mW/g; SAR(10 g) = 5.82 mW/g

Maximum value of SAR (measured) = 16.1 mW/g



Impedance Measurement Plot for Body TSL



END OF REPORT