SAR Test Report on

ZONDA ZMTH200

FCC ID: YAUZMTH200

Report Reference: SAR-RC001-2011

Date: May, 30, 2011

Test Laboratory:

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检 测
CNAS L4320

GLOBAL SYSTEM FOR MOBILE COMMUNICATIONS

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Department: MPT

Date: 2011-5-30

Signature: Cai Jing

Reviewed by:

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Date: 2011-5-30

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Registration number:	No. CNAS L4320

1.3 Details of applicant and manufacturer

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Manufacturer (if different from applicant)

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2 Object Under Test

2.1 General OUT Description

Model Name:	ZONDA
Type Number:	ZMTH200
Product Category:	GSM Mobile Phone
Serial Number:	353240040373891
HW version:	V1.0
SW version:	V2.0
High Voltage:	4.2 V
Nominal Voltage:	3.7 V
Low Voltage:	3.2 V

2.2 Identification of OUT

Item	Description	Manufacturer	Type	Serial Number	Remark
1	handset	TREND HARVEST E-TECH DEVELOPMENT LTD	ZMTH200	11B30040A00 64-0000	N.A
2	adapter	Shenzhenjianyang electronic Co.,ltd	JXT-A037-2	JXT-PR-WI-A037-2	N.A
3	battery	Shenzhen shi greatshine electronic technology Co.,ltd	534136	GSXS1012105 24136	N.A
4	earphone	Shenzhen jingkerui technology Co.,ltd	MIRCO5P	N.A	N.A

2.3 OUT Photographs


20cm
15cm
10cm
5cm
0cm
5cm
10cm
15cm

3 Standard

In USA the recent FCC exposure criteria [OET 65] are based upon the IEEE Standard C95.1 [IEEE C95.1]. The IEEE standard C95.a sets limits for human exposure to radio frequency electromagnetic in the frequency range 3 kHz to 300GHz.

3.1 Distinction between exposed population, duration of exposure and frequencies

The American standard [IEEE C95.1] distinguishes between controlled and uncontrolled environment. Controlled environments are locations where there is exposure that may be incurred by persons who are aware of the potential for exposure as a concomitant of employment or by other cognizant persons. Uncontrolled environments are locations where there is the exposure of individuals who have no knowledge or control of their exposure. The exposures may occur in living quarters or workplaces. For exposure in controlled environments higher field strengths are admissible. In addition the duration of exposure is considered.

Due to the influence of frequency on important parameters, as the penetration depth of the electromagnetic fields into the human body and the absorption capability of different tissues, the limits in general vary with frequency.

3.2 Distinction between Maximum Permissible Exposure and SAR Limits

The biological relevant parameter describing the effects of electromagnetic fields in the frequency range of interest is the specific absorption rate SAR (dimension: power/mass). It is a measure of the power absorbed per unit mass. The SAR may be spatially averaged over the total mass of an exposed body or its parts. The SAR is calculated from the R.M.S. electric filed strength E inside the human body, the conductivity σ and the mass density ρ of the biological tissue:

$$SAR = \sigma \frac{E^2}{\rho} = c \left. \frac{\partial T}{\partial t} \right|_{t \to 0+}$$

The specific absorption rate describes the initial rate of temperature rise $\partial T / \partial t$ as a function of the specific heat capacity c f the tissue. A limitation of the specific absorption rate perverts an excessive heating of the human body by electromagnetic energy.

As it is sometimes difficult to determine the SAR directly by measurement (e.g. whole body averaged SAR), the standard specifies more readily measurable maximum permissible exposures in terms of external electric E and magnetic field strength H and power density S, derived from the SAR limits. The limits for E, H and S have been fixed so that even under worst case conditions, the limits for the specific absorption rate SAR are not exceeded.

3.3 SAR limit

In this report the comparison between the American exposure limits and the measured data is made using the peak spatial-average SAR; the power level of the device under test guarantees that the whole body averaged SAR is not exceeded.

Having in mind a worst case consideration, the SAR limit is valid for uncontrolled environment and mobile respectively portable transmitters. According to table below the SAR values have to be averaged over a mass of 1g (SAR_{1g}) with the shape of a cube.

Relevant peak spatial-average SAR limit averaged over a mass of 1g.

Exposure limits	SAR(mw/g)	
	General Population/Uncontrolled Environment	Occupational/Controlled Exposure Environment
Spatial Average ANSI (Averaged over the whole body)	0.08	0.4
Spatial Peak ANSI (Averaged over any 1-g of tissue)	1.6	8.0
Spatial Peak ICNIRP/ANSI (hands/wrists/feet/ankles averaged over 10-g)	4.0	20.0
Localized SAR - ICNIRP - (Head and Trunk 10-g)	2.0	10.0

4 Test Requirements

IEEE has published a recommended practice for determining the peak spatial-average specific absorption rate (SAR) in the human body due to wireless communications devices [IEEE 1528-2003] for evaluation compliance of mobile phones with IEEE Standard C95.1 [IEEE C95.1]. The standard defines protocols of the measurement of the specific absorption rate (SAR) inside a simplified model of the head of users. It applies to mobile telecommunication equipment in the frequency range from 300 MHz to 3GHz intended to be operated while held next to the ear.

4.1 General requirements

The test shall be performed in a laboratory with an environment which avoids influence on SAR measurements by ambient EM sources and any reflection from the environment itself. The ambient temperature shall be in the range of 20°C to 24°C during the test.

4.2 Phantom requirements

The phantom is a simplified representation of the human anatomy and comprised of material with electrical properties similar to the corresponding tissues. The physical characteristics of the phantom model shall resemble the head and the neck of a user since the shape is a dominant parameter for exposure.

The shell of the phantom shall be made of low permittivity material and the thickness tolerance shall be ±0.2mm. Additionally the phantom shall enable to simulate both right and left hand operation of the device under test.

For the measurements the Specific Anthropomorphic Mannequin (SAM) which meet these requirements, shall be used.

4.3 Brain & Muscle Simulating Mixture Characterization

The brain and muscle mixtures consist of a viscous gel using hydroxethylcellullose (HEC) gelling agent and saline solution. Preservation with a bacteriacide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 have been incorporated in the following table. Other head and body tissue parameters that have not bee specified in P1528 are derived from the issue dielectric parameters computed from the 4-Cole-Cole equations.

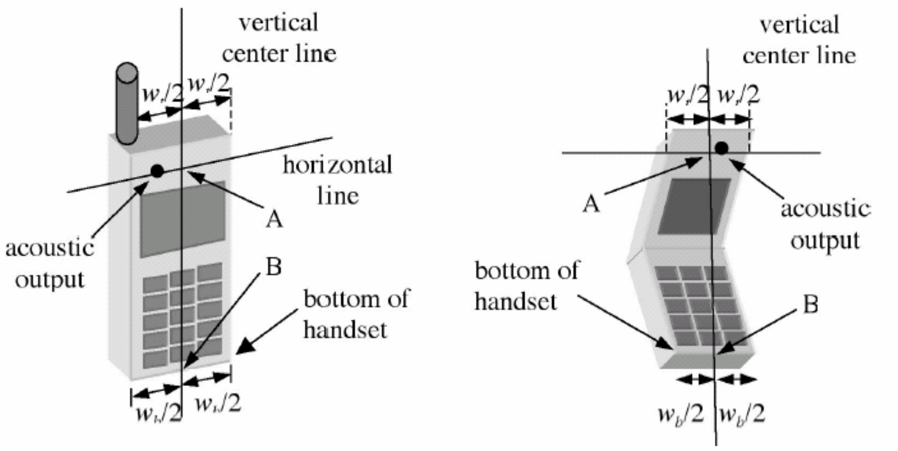
Composition of the Brain & Muscle Tissue Equivalent Matter

INGREDIENTS	SIMULATING TISSUE			
	835MHz Brain	835MHz Muscle	1900MHz Brain	1900MHz Muscle
Water	40.29	50.75	55.24	70.17
DGBE	0	0	44.45	29.44
Sugar	57.90	48.21	0	0
Salt	1.38	0.94	0.31	0.39
Cellulose	0.24	0.00	0	0
Preventol	0.18	0.10	0	0

4.4 Test positions

As it cannot be expected that the user will hold the mobile phone exactly in one well defined position, different operational conditions shall be tested, the IEEE standard requires two test positions. For an exact description helpful geometrical definitions are introduced and shown in the below figure.

There are two imaginary lines on the mobile, the vertical centerline and the horizontal line. The vertical centerline passes though two points on the front side of the handset: the midpoint of the width w_t of the handset at the level of the acoustic output (point A on the below figure), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The two lines intersect at point A.

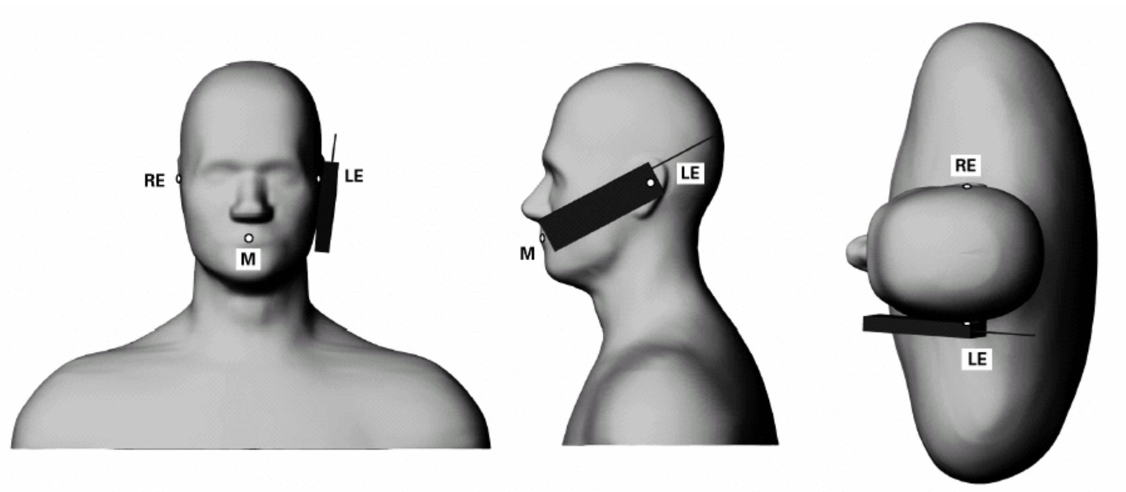


According to below the human head position is given by means of the following three reference points: auditory canal opening of both ears (RE and LE) and the center of the closed moth (M). The ear reference points are 15-17 mm above the entrance t the ear canal along the BM line (back-month), as shown in the below figure. The plane passing through the two ear canals and M is defined as the reference plane. The line NF (Neck-Front) perpendicular to the reference plane and passing through the RF (or LE) is called the reference pivoting line. Line BM is perpendicular to the NF line. With these definitions the test positions are given by:

- Cheek position:

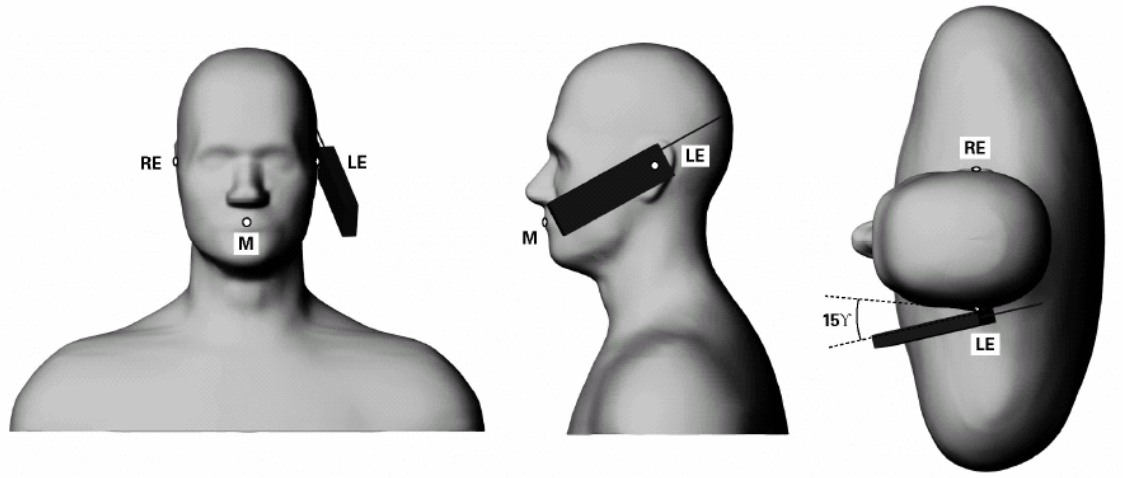
Position the handset close to the surface of phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom, such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom. Translate the handset towards the phantom along the line passing through RE and LE until the handset touches the ear. While maintaining the handset in this plane, rotate it around handset touches the ear. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to MB-NF including the line MB (called the reference plane). Rotate the phone around the vertical centerline until the phone (horizontal line) is symmetrical with respect to the line NF. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, rotate the handset about the line NF until any point any point on the handset is in contact with a phantom point below the ear.

The cheek position:



➢ Tilted position:

While maintaining the orientation of the phone, retract the phone parallel to the reference plane, which is far enough to enable a rotation of the phone by 15°. Rotate the phone around the horizontal line by 15°. While maintaining the orientation of the phone, move the phone parallel to the reference plane until any part of the phone touches the head. In this position, point A will be located on the line RE-LE.



➢ Body position:

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration .A device with a headset output are tested with a headset connected to the device.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented.

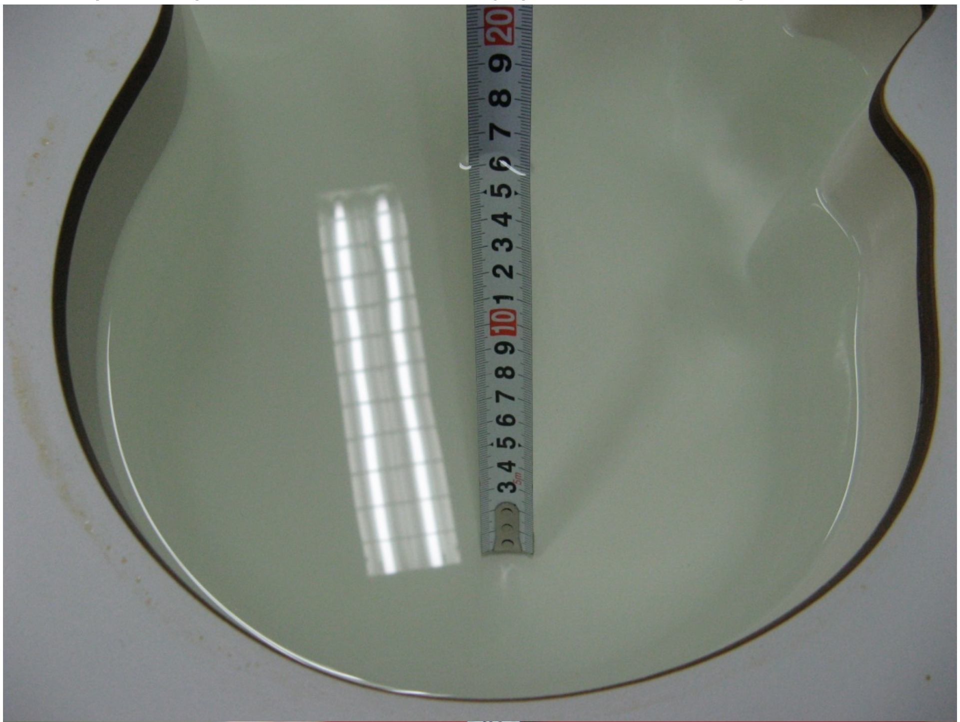
Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are test for SAR compliance with the front of the device positioned to face the flat phantom in brain fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

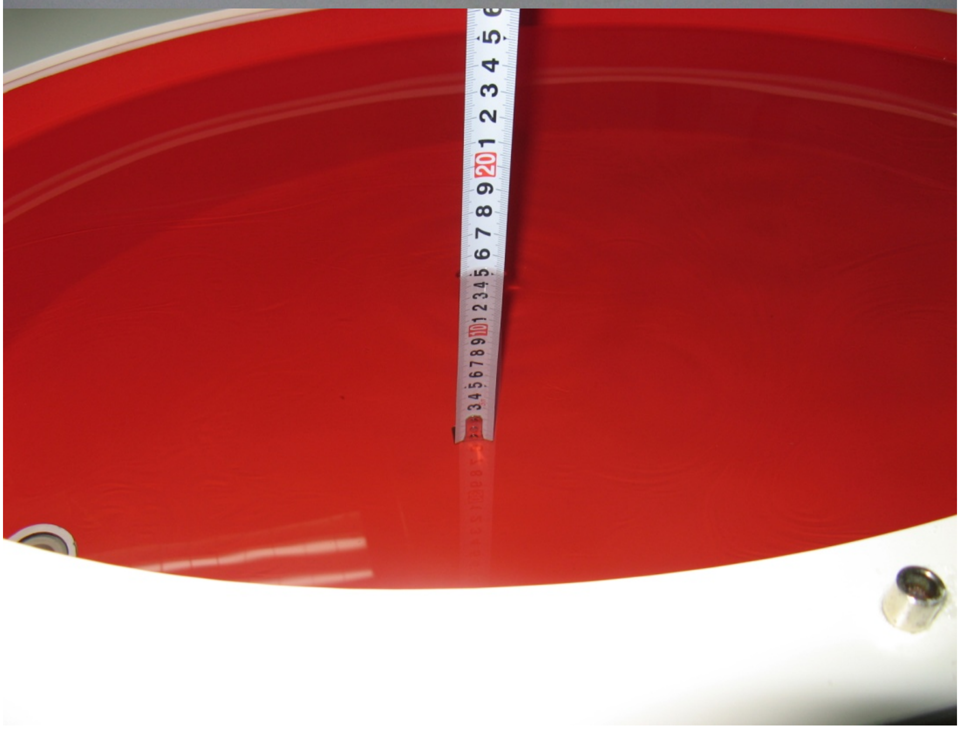
In all cases SAR measurements are performed to investigate the worst-case positioning. Worst-case positioning is then documented and used to perform Body SAR testing.

In this test case, a belt position maintained a distance of approximately 1.5 cm between the back of the device and the flat phantom. The device was placed under the flat section of the phantom and suspended. The device is not provided with belt- clip.

4.5 Liquid Depth

The liquid depth of head and body phantom is large than 15cm, as shown below:





5 Test Procedure

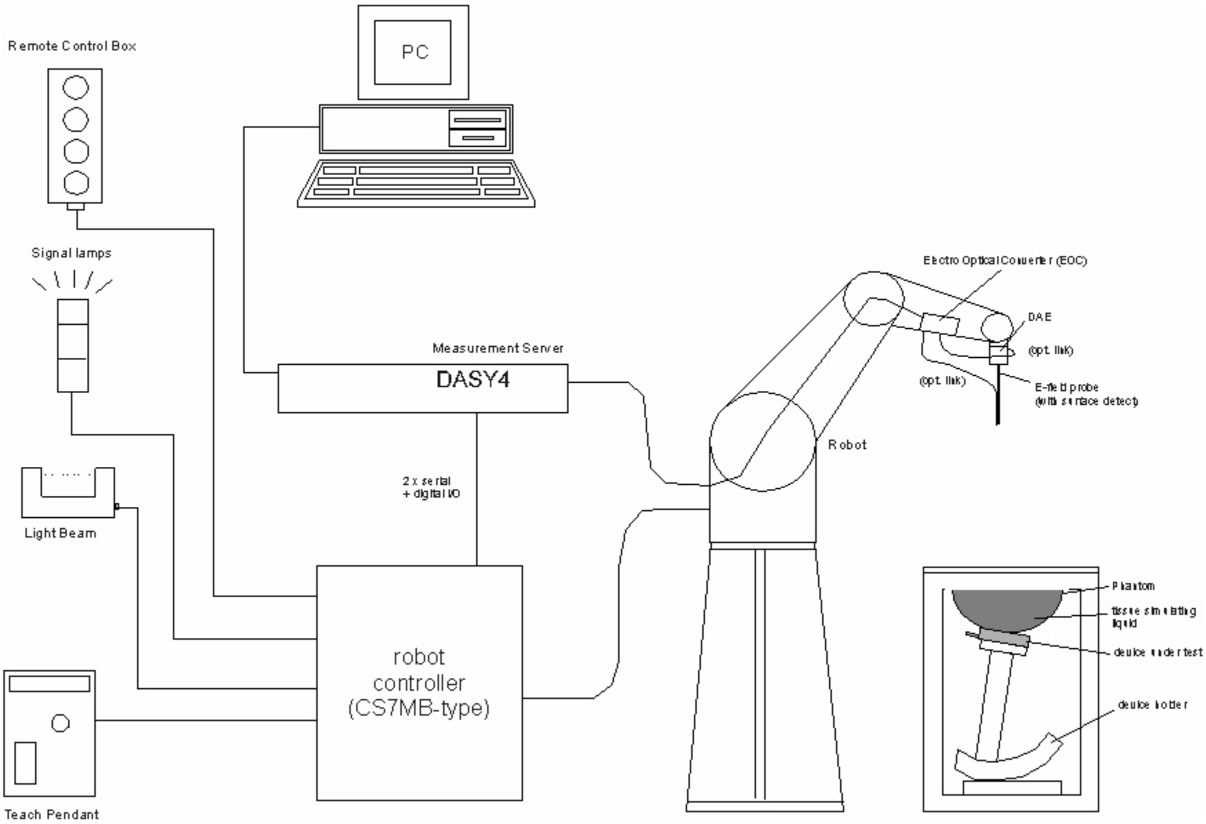
5.1 Test Equipment List

DASY is an abbreviation of "**D**osimetric **A**ssessment **Sy**stem" and describes a system that is able to determine the SAR distribution inside a phantom of a human being according to different standards. The DASY4 system consists of the following items:

TYPE	ITEM	S/N	CALIBRATION DATE	DUE DATE
CMU200	Wireless Communication Test Set	109172	2010-7-23	2011-7-23
ES3DV3	probe	3109	2010-8-25	2011-8-25
SD000D04 BC	DAE4	685	2010-8-19	2011-8-19
D835V2	dipole	4d038	2010-8-25	2011-8-25
D1900V2	dipole	5d072	2010-8-24	2011-8-24
D900V2	dipole	168	2010-8-23	2011-8-23
D1800V2	dipole	2d126	2010-8-24	2011-8-24
NRVD	Power Meter	835843/014	2011-1-12	2012-1-12
E4438C	Signal Generator	MY42082163	N.A	N.A
NRV-Z4	Power Sensor	100381	N.A	N.A
NRV-Z2	Power Sensor	100211	N.A	N.A
778D	Dual directional coupler	20040	N.A	N.A
E3640A	DC Power Supply	MY40008487	N.A	N.A
85070E	Probe kit	MY44300214	N.A	N.A
E5071B	Network Analyzer	MY42404001	2011-1-14	2012-1-14

5.2 Test System Setup

Tests are performed in setup according to the scheme below:



5.3 Measurement Procedure

The following steps are used for each test position:

1. 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.

2. The SAR distribution at the exposed side of the head was measured at a distance of 3.9mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm x 15mm.

3. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation. Around this point, a volume of 32mm x

32mm x 30mm (fine resolution volume scan, zoom scan) was assessed by measuring 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

a. The data at the surface was extrapolated, since the center of the dipoles is 2.7mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. 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.

b. 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 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

4. The SAR reference value, at the same location as procedure #1, was remeasured. If the value changed by more than 5%, the evaluation is repeated.

5.4 Test to be performed

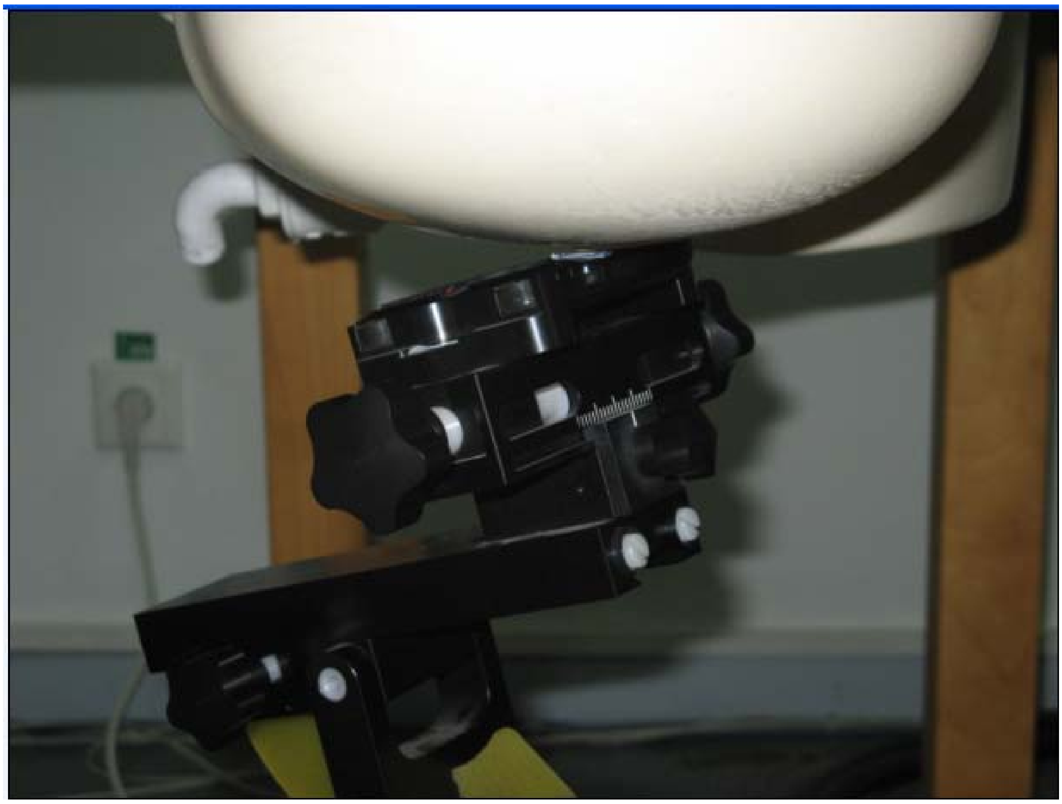
The SAR test shall be performed with both phone positions described above, on the left and right side of the phantom using the centre frequency of each available operating band and mode with the maximum peak power level. Then the configuration giving rise to the maximum mass-averaged SAR shall be used to test the low-end and the high-end frequencies for each transmitting band and mode respectively.

For devices with retractable antenna all of the tests described above shall be performed with the antenna fully extended and fully retracted. Other factors that may affect the exposure should also be tested. For example, optional antennas or optional battery packs which may significantly change the volume, lengths, flip open/closed, etc. of the device, or any other accessories which might have the potential to considerably increase the peak spatial-average SAR value.

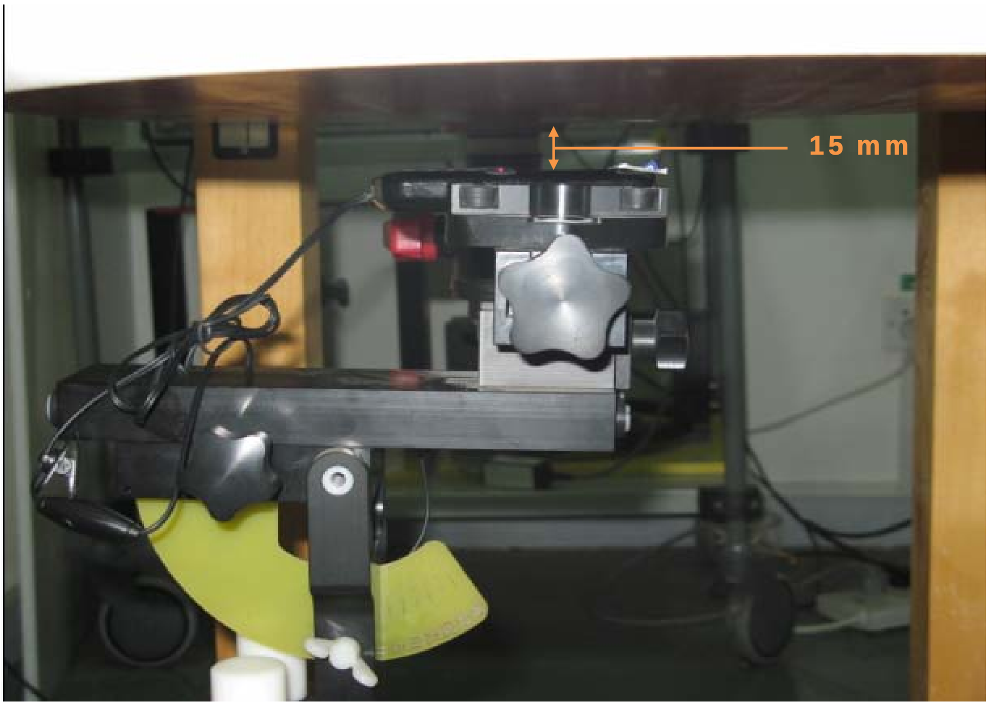
5.5 Test positions for device under test

Cheek position to the head phantom

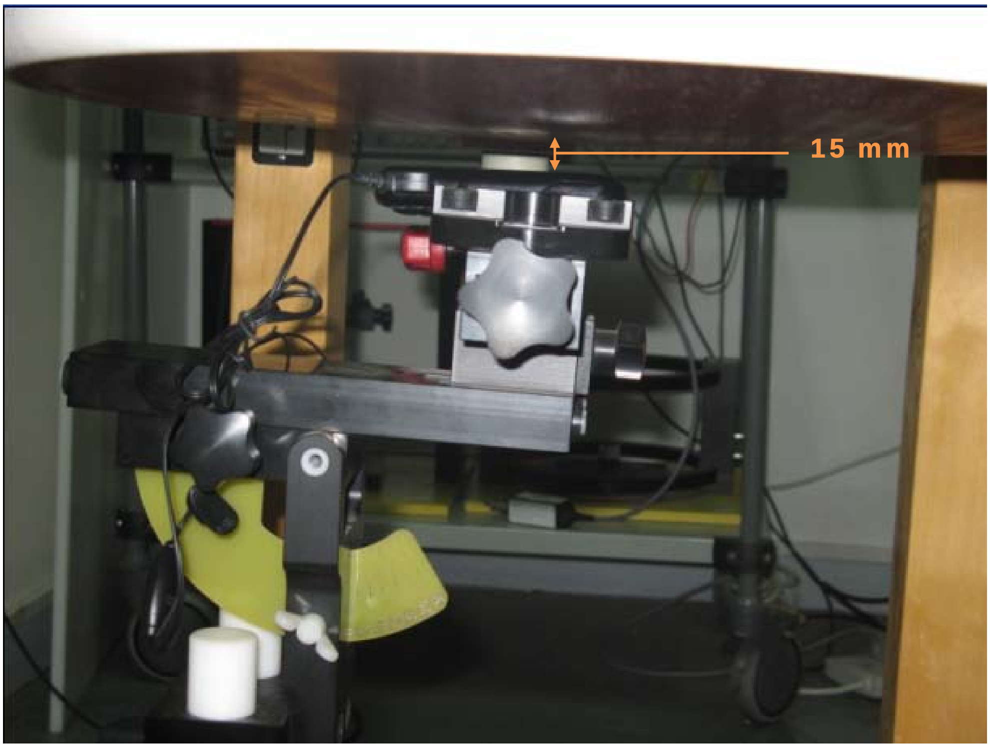
Tilt position to the head phantom



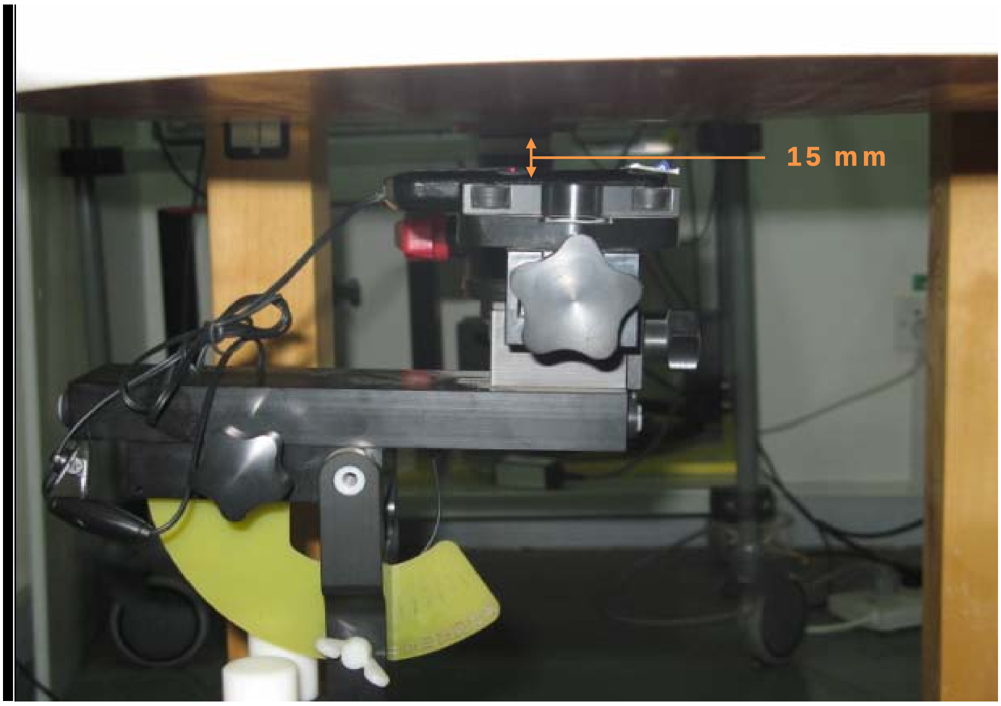
Front side to the flat phantom



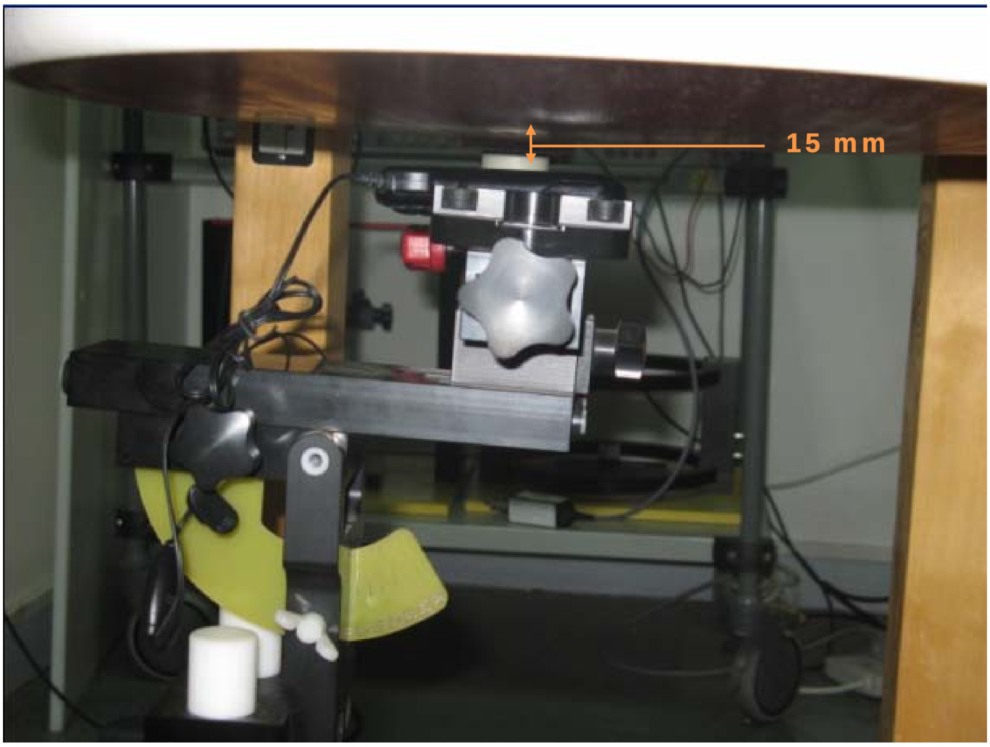
Back side to the flat phantom



Front side to the flat phantom with headset



Back side to the flat phantom with headset



5.6 Test environment

	Ambient humidity (%)	Ambient temperature (°C)	Liquid temperature (°C)
standard	30~~70	20~~25	20~~24
Date: 2011-5-22	30	23.6	22.2

5.7 Liquid parameters

Prior to conducting SAR measurements, the relative permittivity ε_r, and the conductivity σ of the tissue simulating liquids were measured with the Dielectric Probe Kit. These values of the tissue simulate are shown in the table below. The recommended limits for kkll permittivity and minimum conductivity are also shown.

Date: 2011-05-22

Frequency	Tissue Type	Type	Dielectric Parameters	
			permittivity	conductivity
835MHz	Head	Target	41.50	0.900
		±5% window	39.425~43.975	0.855~0.945
		Measured	41.72	0.8992

Date: 2011-05-22

Frequency	Tissue Type	Type	Dielectric Parameters	
			permittivity	conductivity
1900MHz	Head	Target	40.00	1.400
		±5% window	38.000~42.000	1.330~1.470
		Measured	38.67	1.34

Date: 2011-05-22

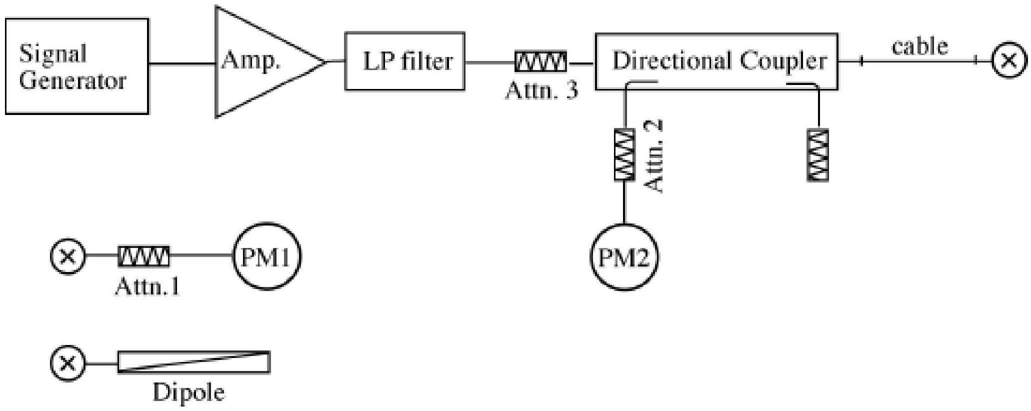
Frequency	Tissue Type	Type	Dielectric Parameters	
			permittivity	conductivity
835MHz	Body	Target	55.2	0.97
		±5% window	52.440~57.960	0.922~1.019
		Measured	56.05	0.9595

Date: 2011-05-22

1900MHz	Body	Target	53.3	1.52
		±5% window	50.635~55.965	1.444~1.596
		Measured	51.46	1.561

5.8 System performance check

A system check measurement was made following the determination of the dielectric parameters of the tissue simulating liquids using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. For power setup, please see the following pictures:



The figure shows the recommended setup. The PM1 (incl. Att1) measures the forward power at the location of the system performance check dipole connector. The signal generator is adjusted for the desired forward power at the dipole connector and the power meter PM2 is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. The system checking results are given in the table below. Please see Annex B for detailed report.

Date:	Tissue	Input Power (mW)	Targeted SAR(1g) (mW/g)	Measured SAR(1g) (mW/g)	Normalized to 1W SAR(1g) (mW/g)	Deviation (%) (<±10%)
5/22/2011	835MHz Head	250	9.6	2.57	10.28	7.1
5/22/2011	1900MHZ Head	250	40.4	10.3	41.2	1.9
5/22/2011	835 MHZ Body	250	10.32	2.34	9.36	-9.3
5/22/2011	1900MHZ Body	250	42	10.2	40.8	-0.3

5.9 Conducted power

The conducted power has been compensated with cable loss and connector loss.
The DUT don’t support GRPS and EGPRS mode.

	Conducted Power					
GSM850 GSM ONLY	Channel 128		Channel 190		Channel 251	
	824.20MHz		836.6MHz		848.80MHz	
	before	after	before	after	before	after
	31.3	31.3	31.3	31.3	31.3	31.3
	Conducted Power					
GSM1900 GSM ONLY	Channel 512		Channel 661		Channel 810	
	1850.2MHz		1880.0MHz		1909.8MHz	
	before	after	before	after	before	after
	28.2	28.2	28.2	28.2	28.2	28.2

6 SAR test results and evaluation

6.1 Measurement Result

The device should be tested on the left and right side of the head phantom in the “Cheek/Touch” and “Ear/Tilt” positions. When applicable, each configuration should be tested with the antenna in its fully extended and fully retracted positions. These test configurations should be tested at the high, middle and low frequency channels of each operating mode; for example, AMPS, CDMA, and TDMA.

The DUT don’t support GPRS and EGPRS mode, so for body SAR, the setup is GSM mode with headset.

6.1.1 Head SAR test results

GSM850

Test configuration	Test position	SAR$_{1g}$ [W/kg] / Power Drift [dB]		
		Channel 128 [low] 824.20 MHz	Channel 190 [Mid] 836.60 MHz	Channel 251 [high] 848.80 MHz
Left side of Head	Cheek	/	0.552 / -0.024	/
	Tilted	/	0.335 / -0.009	/
Right side of Head	Cheek	0.326 / 0.006	**0.565 / -0.122**	0.814 / -0.009
	Tilted	/	0.352 / 0.000	/

PCS1900

Test configuration	Test position	SAR$_{1g}$ [W/kg] / Power Drift [dB]		
		Channel 512 [low] 1850.2 MHz	Channel 661 [Mid] 1880.0 MHz	Channel 810 [high] 1909.8 MHz
Left side of Head	Cheek	/	0.343 / -0.054	/
	Tilted	/	0.343 / 0.102	/
Right side of Head	Cheek	0.569 / 0.030	**0.596 / -0.125**	0.406 / 0.013
	Tilted	/	0.508 / -0.060	/

6.1.2 Body SAR test results

GSM850 data

Test configuration	Test position	SAR_{1g} [W/kg] / Power Drift [dB]		
		Channel 128 [low] 824.20 MHz	Channel 190 [Mid] 836.60 MHz	Channel 251 [high] 848.80 MHz
Front side	15 mm	/	0.132 / -0.053	/
Back side	15 mm	0.367 / 0.135	**0.365 / -0.174**	0.435 / -0.102

PCS1900 data

Test configuration	Test position	SAR_{1g} [W/kg] / Power Drift [dB]		
		Channel 512 [low] 1850.2 MHz	Channel 661 [Mid] 1880.0 MHz	Channel 810 [high] 1909.8 MHz
Front side	15mm	/	0.122 / -0.057	/
Back side	15 mm	0.237 / 0.024	**0.235 / 0.027**	0.210 / -0.078

6.2 Summary and comparison to the limit

All test results are passed the uncontrolled SAR limit of 1.6W/kg.

7 Reports of DASY4 system

7.1 Detailed Measurement Report

7.1.1 head SAR of GSM 850

Test position: Right tilt, Channel: middle

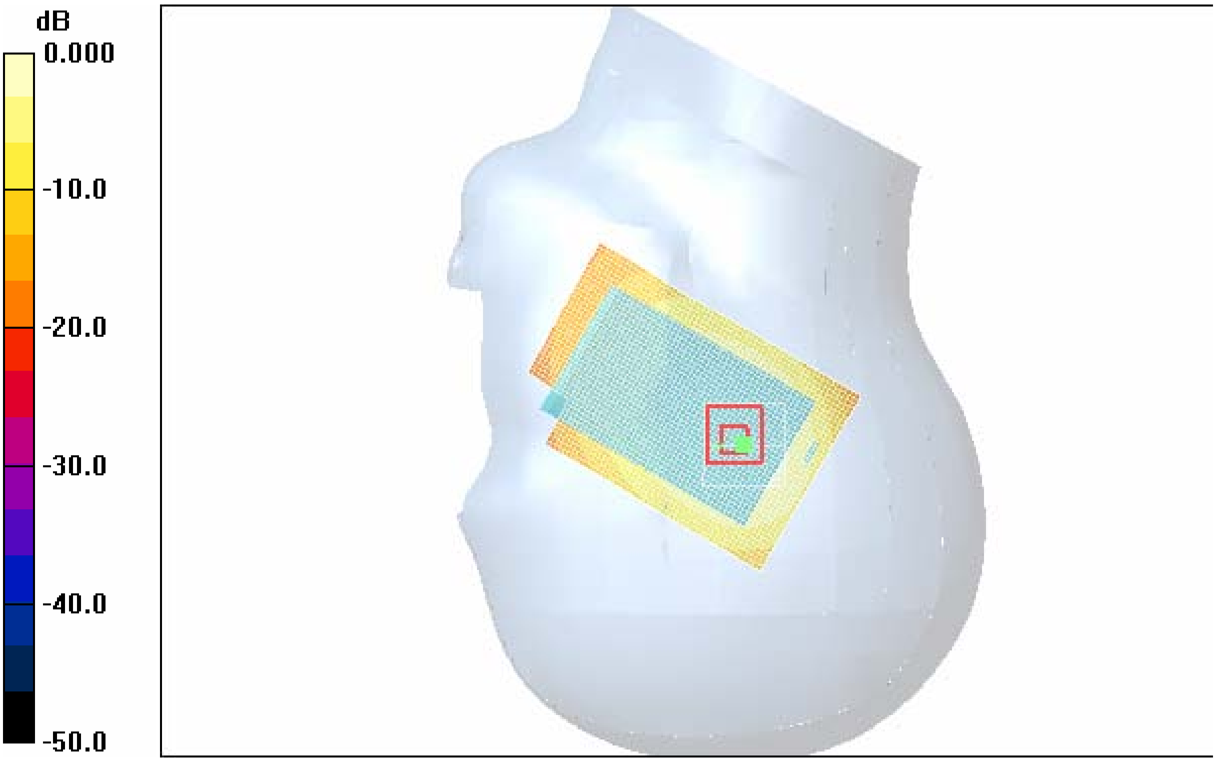
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.72, 5.72, 5.72); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.8 V/m; Power Drift = 0.000 dB
Peak SAR (extrapolated) = 0.484 W/kg
SAR(1 g) = 0.352 mW/g; SAR(10 g) = 0.245 mW/g

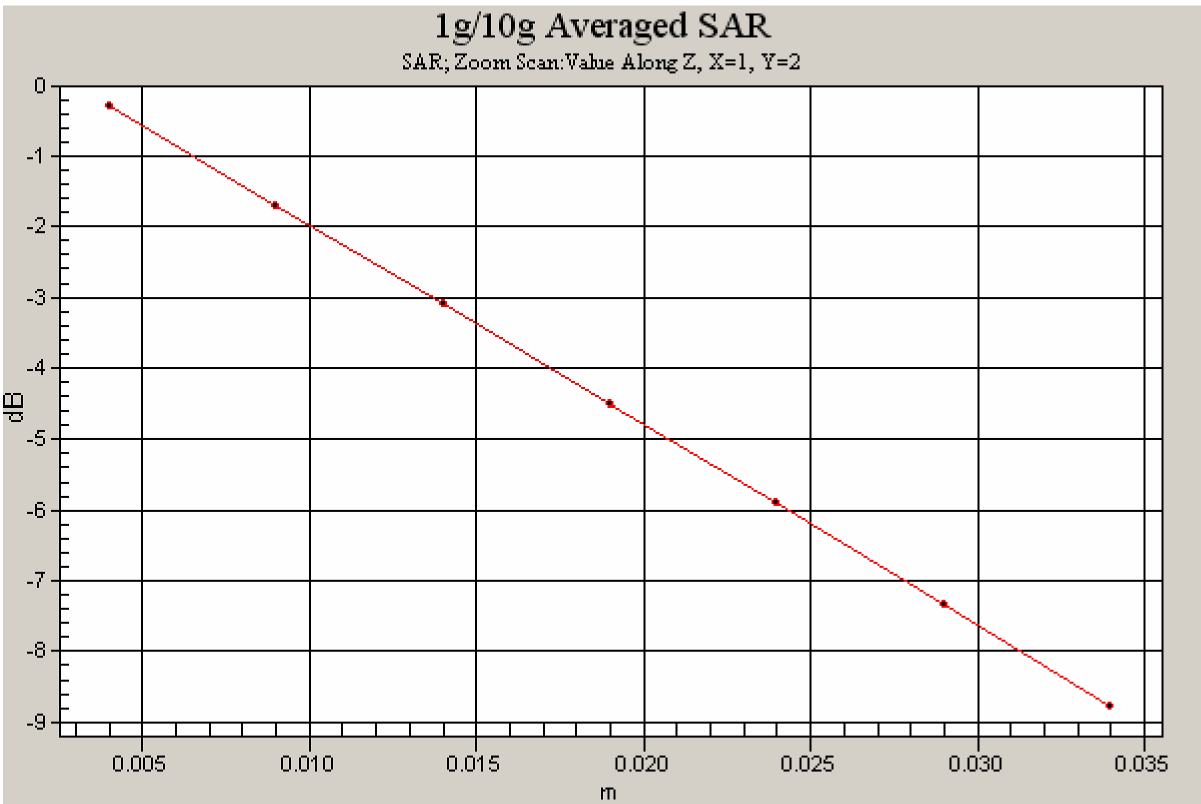
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.370 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.396 mW/g


dB
0.000
-10.0
-20.0
-30.0
-40.0
-50.0

0 dB = 0.396mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=1, Y=2
dB
m
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
0.005
0.010
0.015
0.020
0.025
0.030
0.035

Test position: Right cheek, Channel: middle

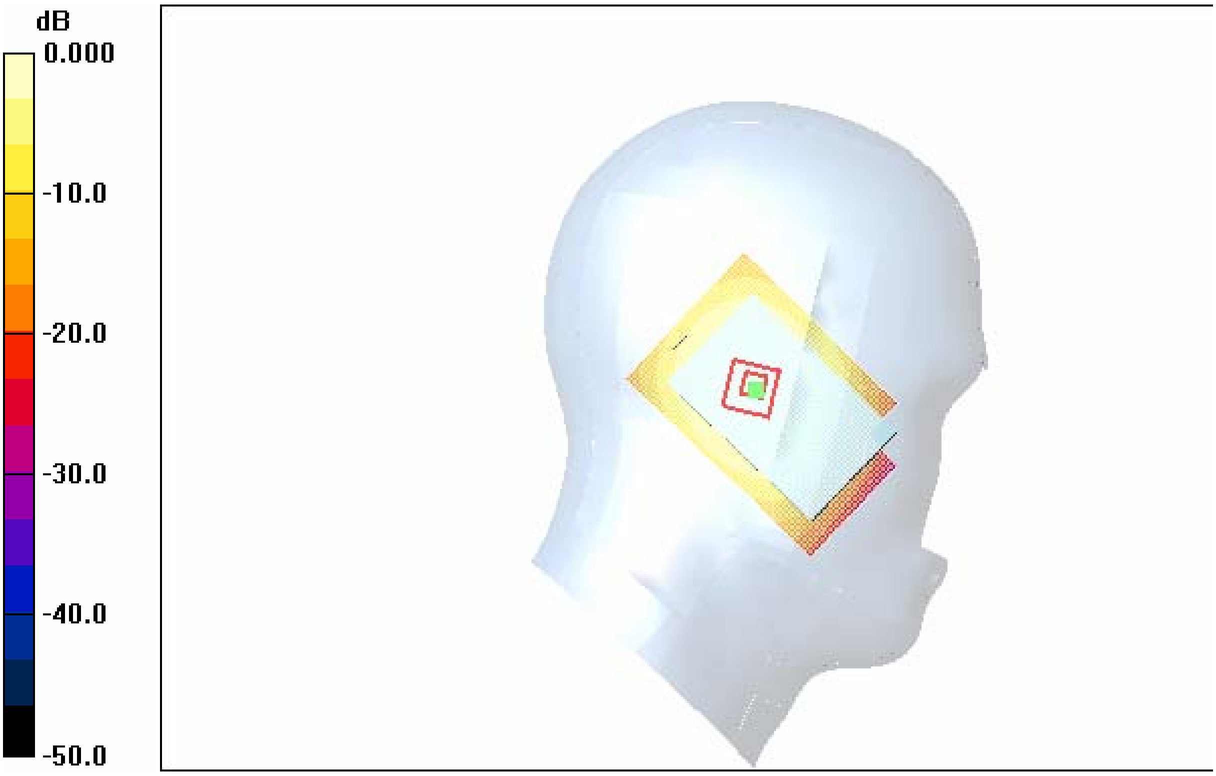
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.72, 5.72, 5.72); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.5 V/m; Power Drift = -0.122 dB
Peak SAR (extrapolated) = 0.757 W/kg
SAR(1 g) = 0.565 mW/g; SAR(10 g) = 0.400 mW/g

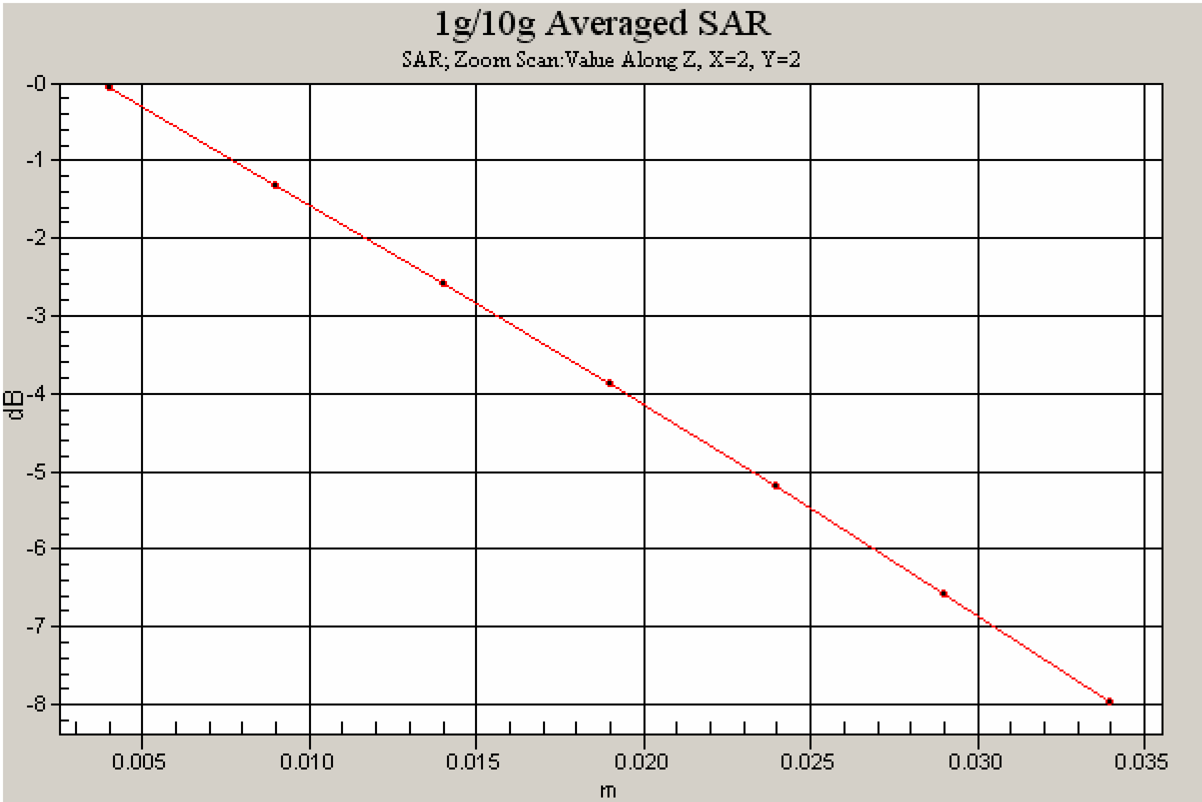
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.600 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.610 mW/g


dB
0.000
-10.0
-20.0
-30.0
-40.0
-50.0

0 dB = 0.610mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
dB
m
-0
-1
-2
-3
-4
-5
-6
-7
-8
0.005
0.010
0.015
0.020
0.025
0.030
0.035

Test position: Left tilt, Channel: middle

DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.72, 5.72, 5.72); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

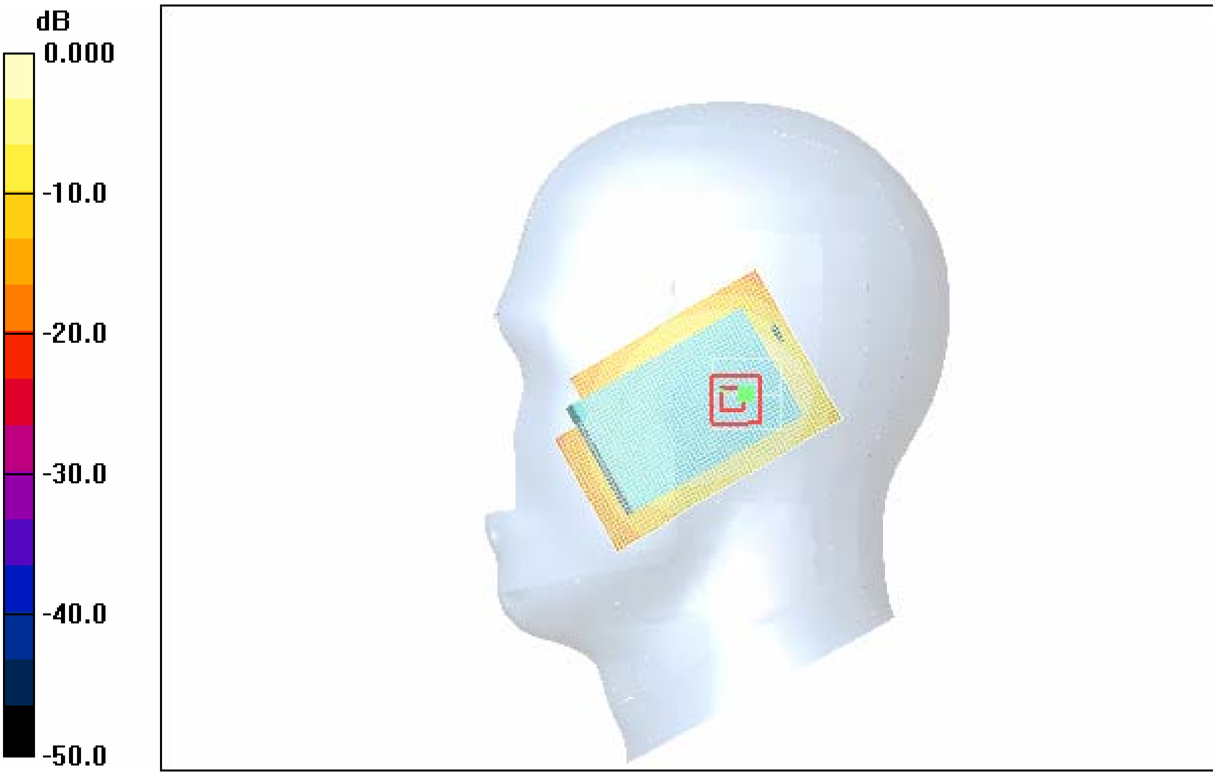
mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.5 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 0.434 W/kg
SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.238 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

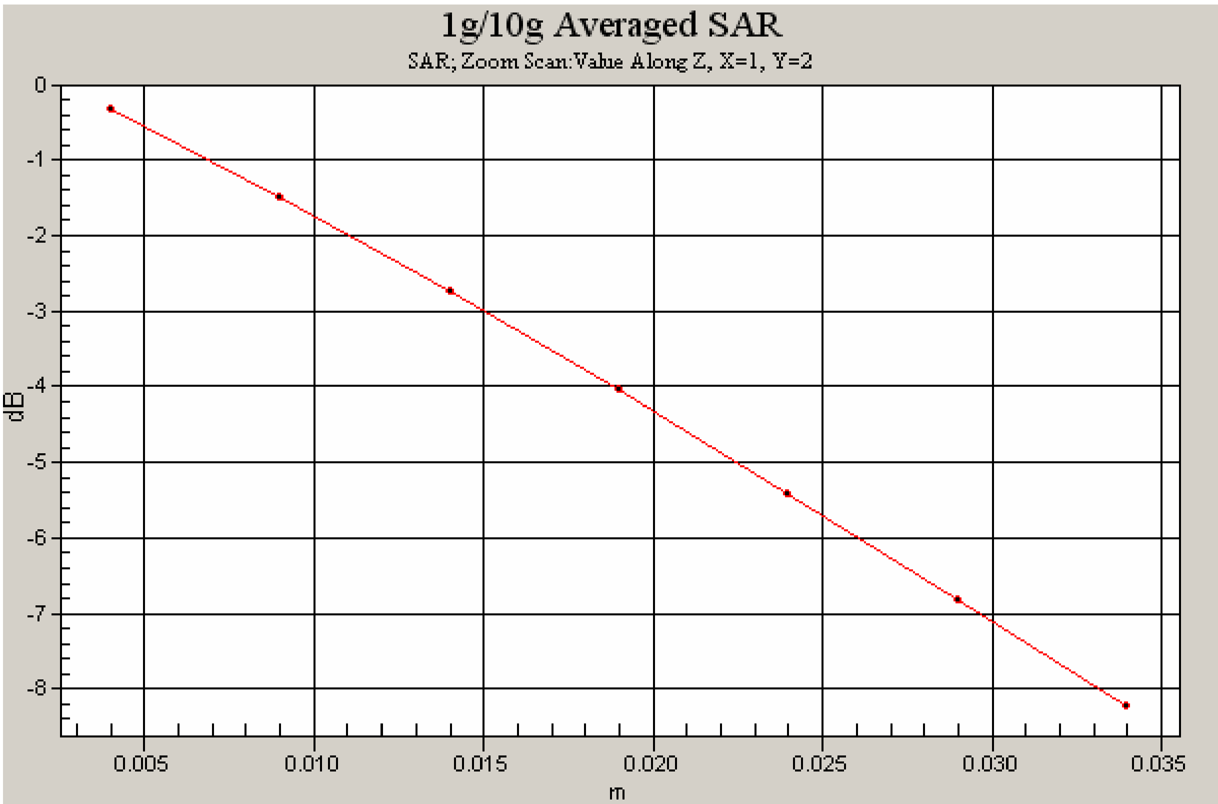
Maximum value of SAR (measured) = 0.353 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.381 mW/g


dB
0.000
-10.0
-20.0
-30.0
-40.0
-50.0

0 dB = 0.381mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=1, Y=2
dB
m
0
-1
-2
-3
-4
-5
-6
-7
-8
0.005
0.010
0.015
0.020
0.025
0.030
0.035

Test position: Left cheek, Channel: middle

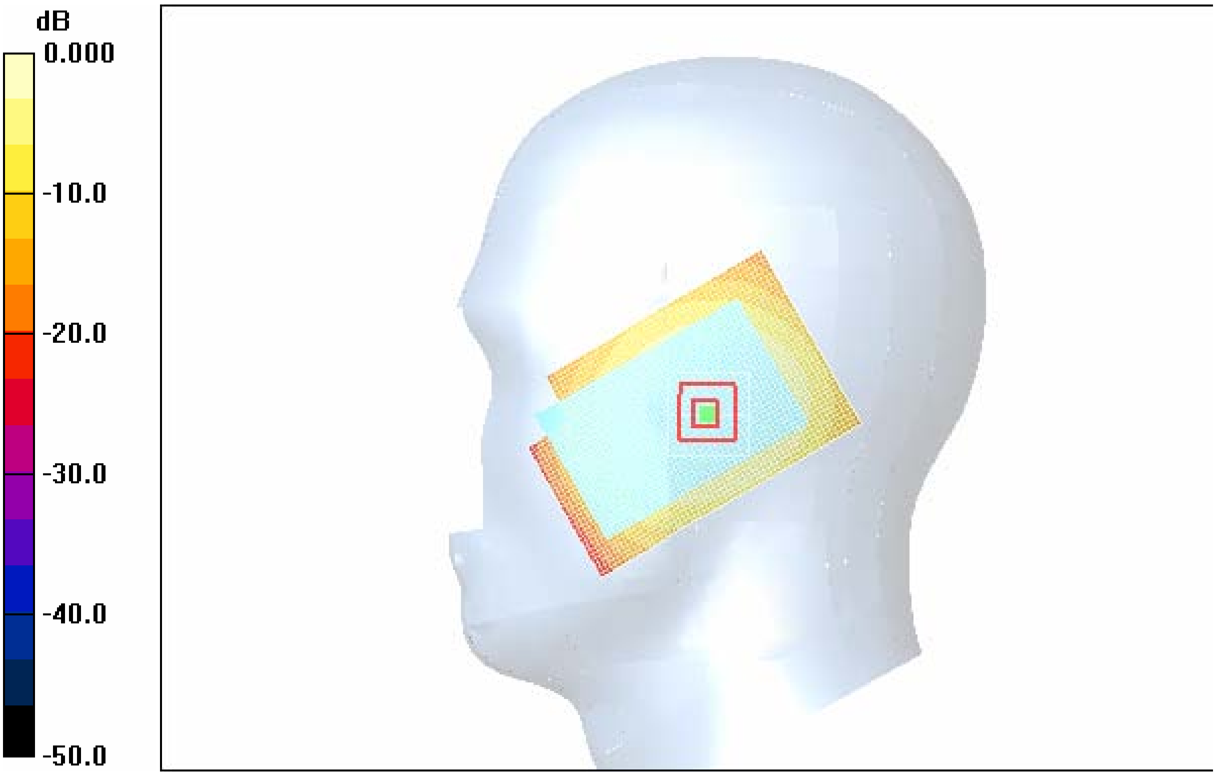
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.72, 5.72, 5.72); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.6 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 0.711 W/kg
SAR(1 g) = 0.552 mW/g; SAR(10 g) = 0.396 mW/g

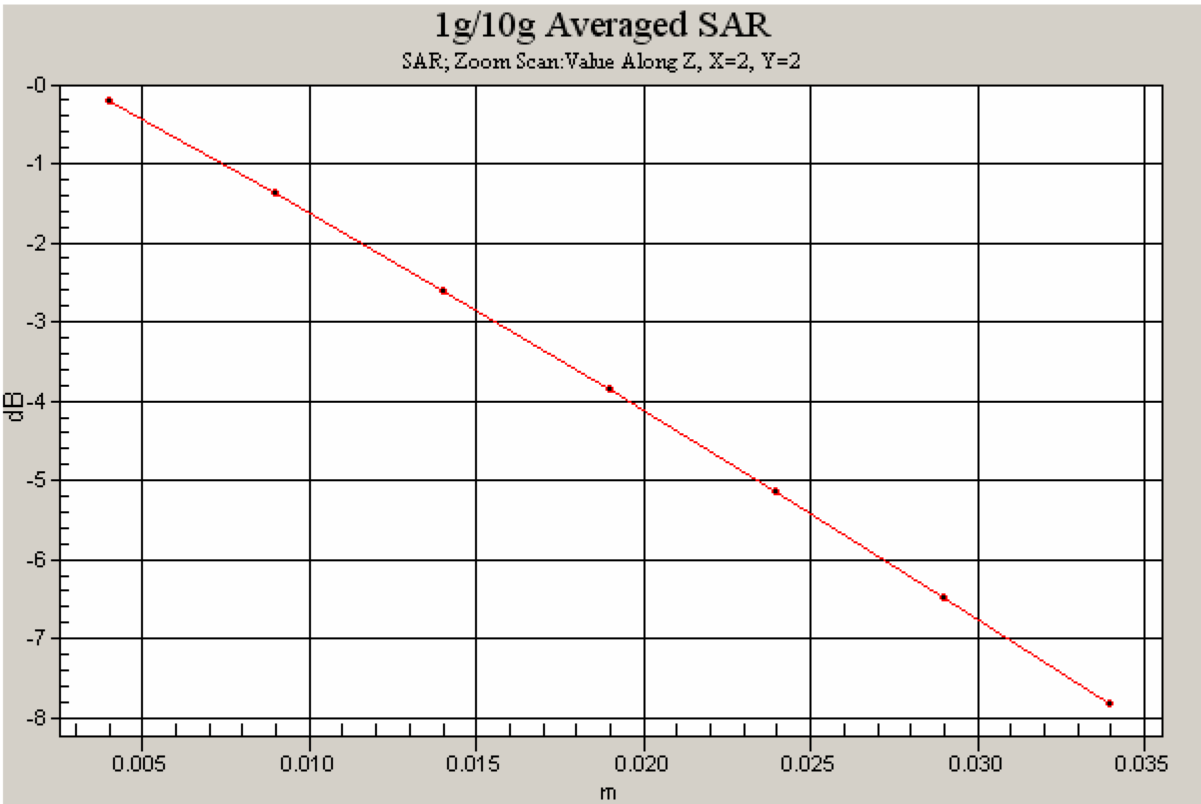
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.584 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.615 mW/g


dB
0.000
-10.0
-20.0
-30.0
-40.0
-50.0

0 dB = 0.615mW/g

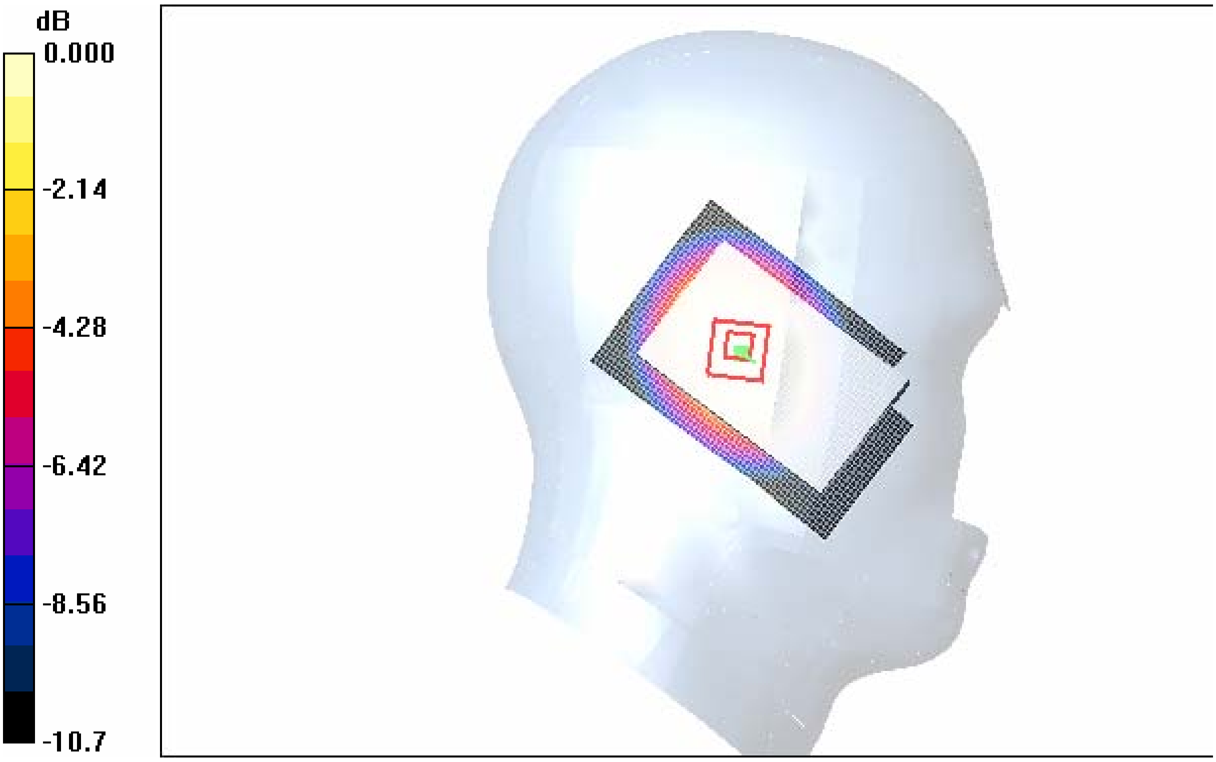

1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
dB
-0
-1
-2
-3
-4
-5
-6
-7
-8
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Test position: Right cheek, Channel: low

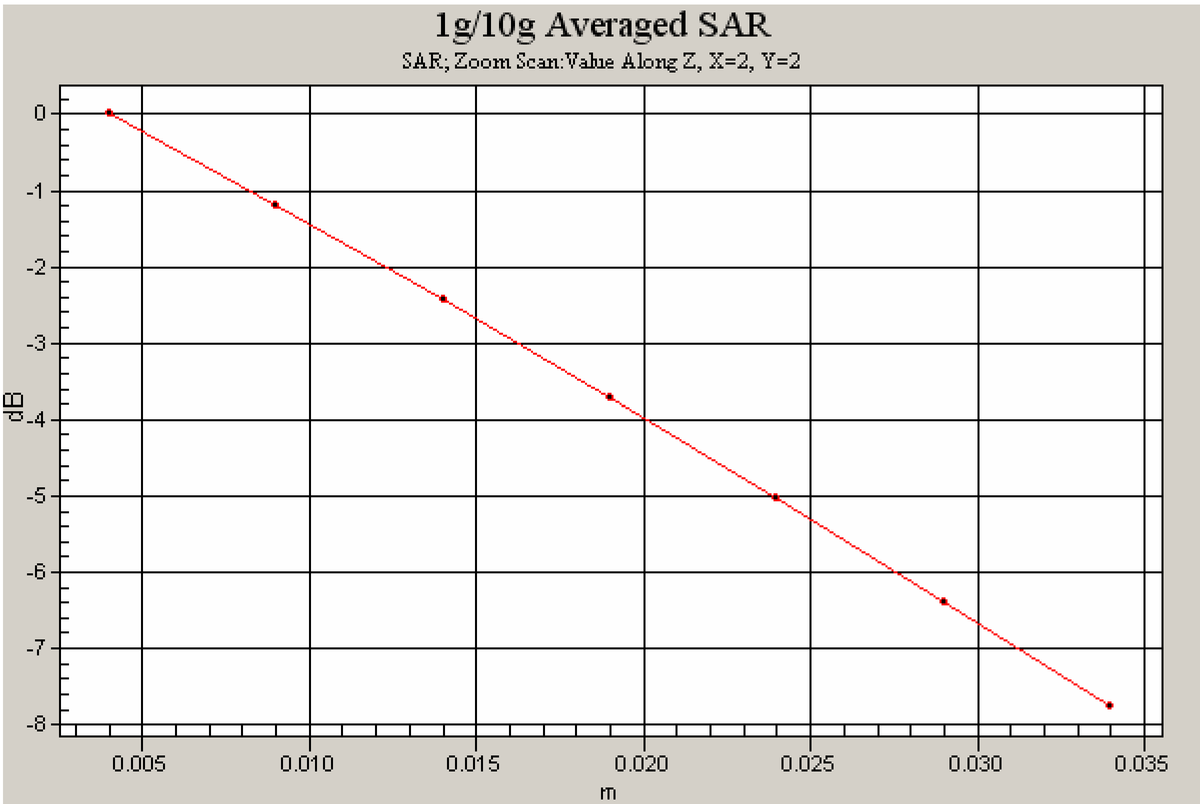
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.72, 5.72, 5.72); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

low/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.354 mW/g

low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.0 V/m; Power Drift = 0.006 dB
Peak SAR (extrapolated) = 0.436 W/kg
SAR(1 g) = 0.326 mW/g; SAR(10 g) = 0.231 mW/g
Maximum value of SAR (measured) = 0.343 mW/g


dB
0.000
-2.14
-4.28
-6.42
-8.56
-10.7

0 dB = 0.343mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
0
-1
-2
-3
-4
-5
-6
-7
-8
dB
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Test position: Right cheek, Channel: high

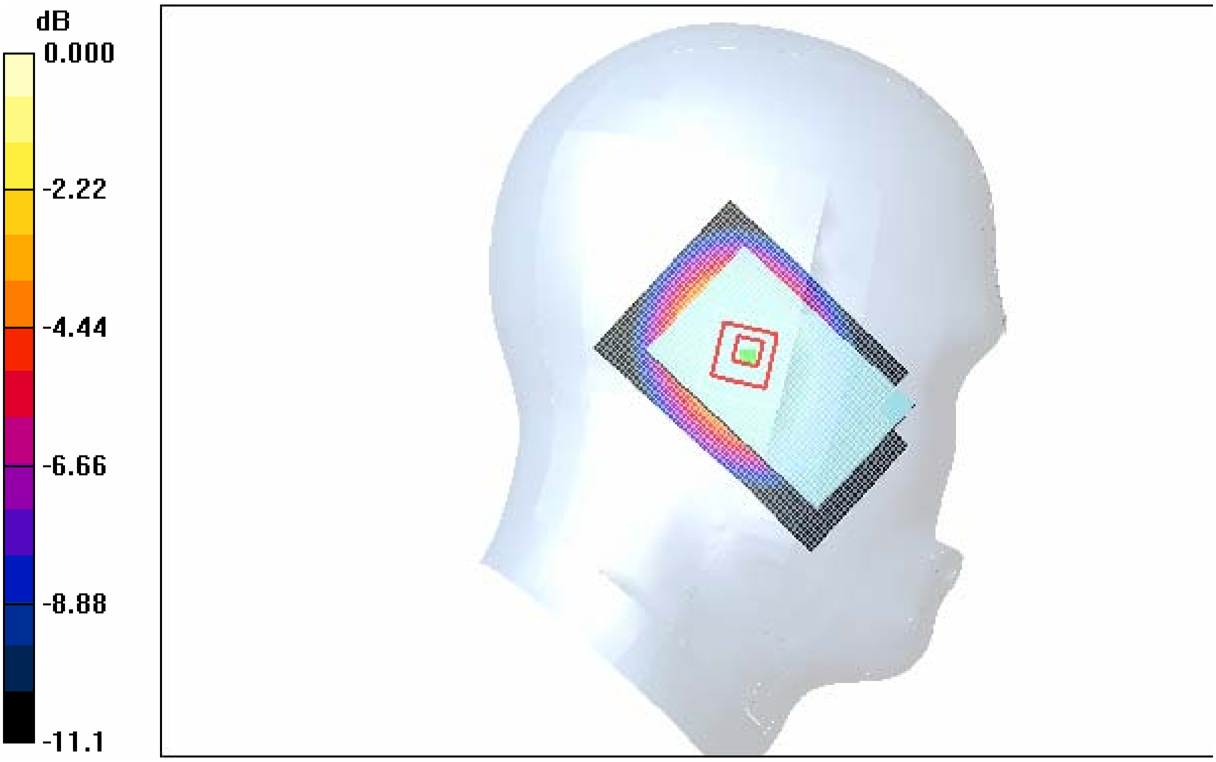
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.72, 5.72, 5.72); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

high/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

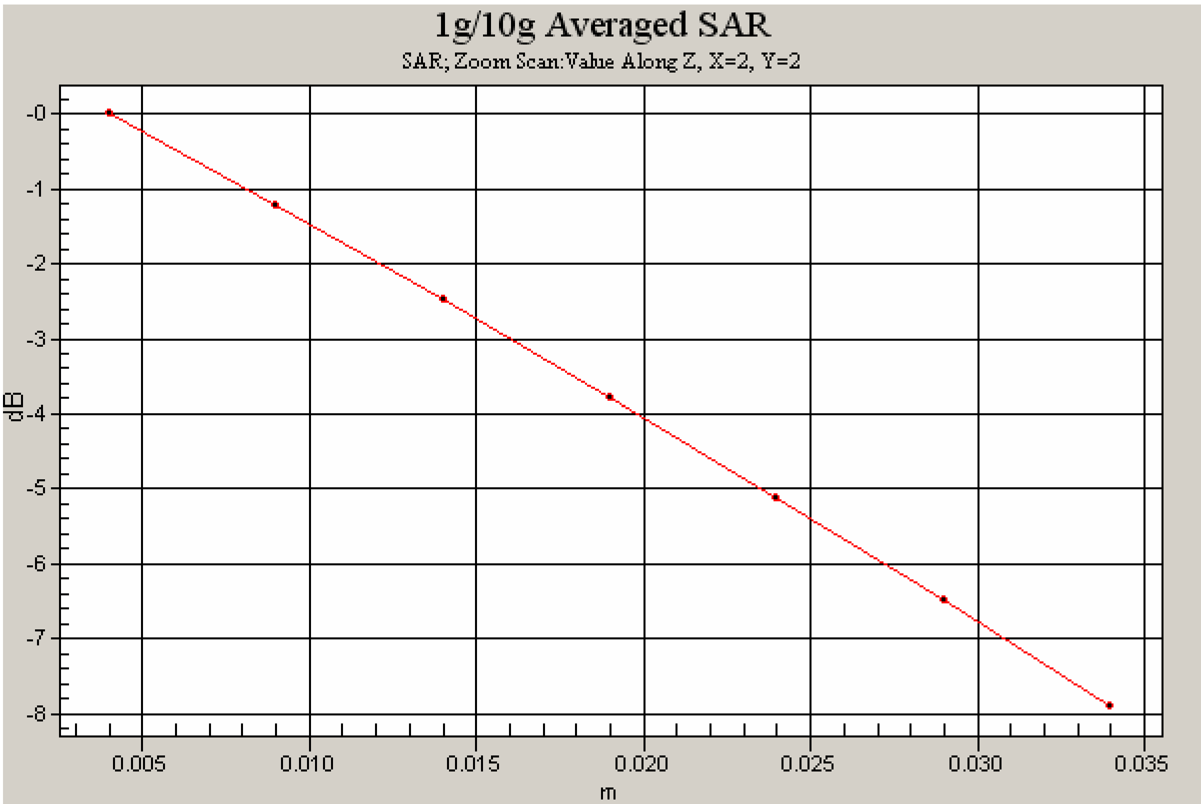
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.879 mW/g

high/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.2 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.814 mW/g; SAR(10 g) = 0.573 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.863 mW/g


dB
0.000
-2.22
-4.44
-6.66
-8.88
-11.1

0 dB = 0.863mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
dB
-0
-1
-2
-3
-4
-5
-6
-7
-8
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

7.1.2 head SAR of GSM 1900

Test position: Right tilt, Channel: middle

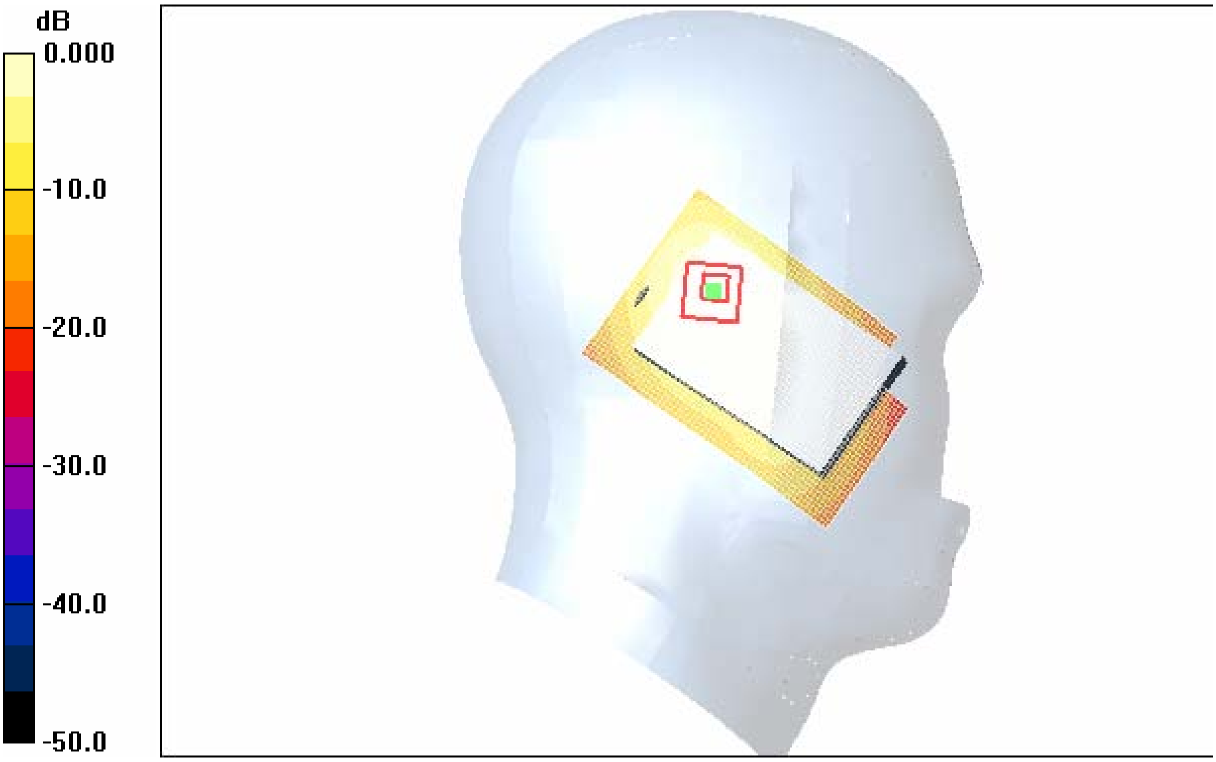
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.88, 4.88, 4.88); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.0 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 0.896 W/kg
SAR(1 g) = 0.508 mW/g; SAR(10 g) = 0.273 mW/g

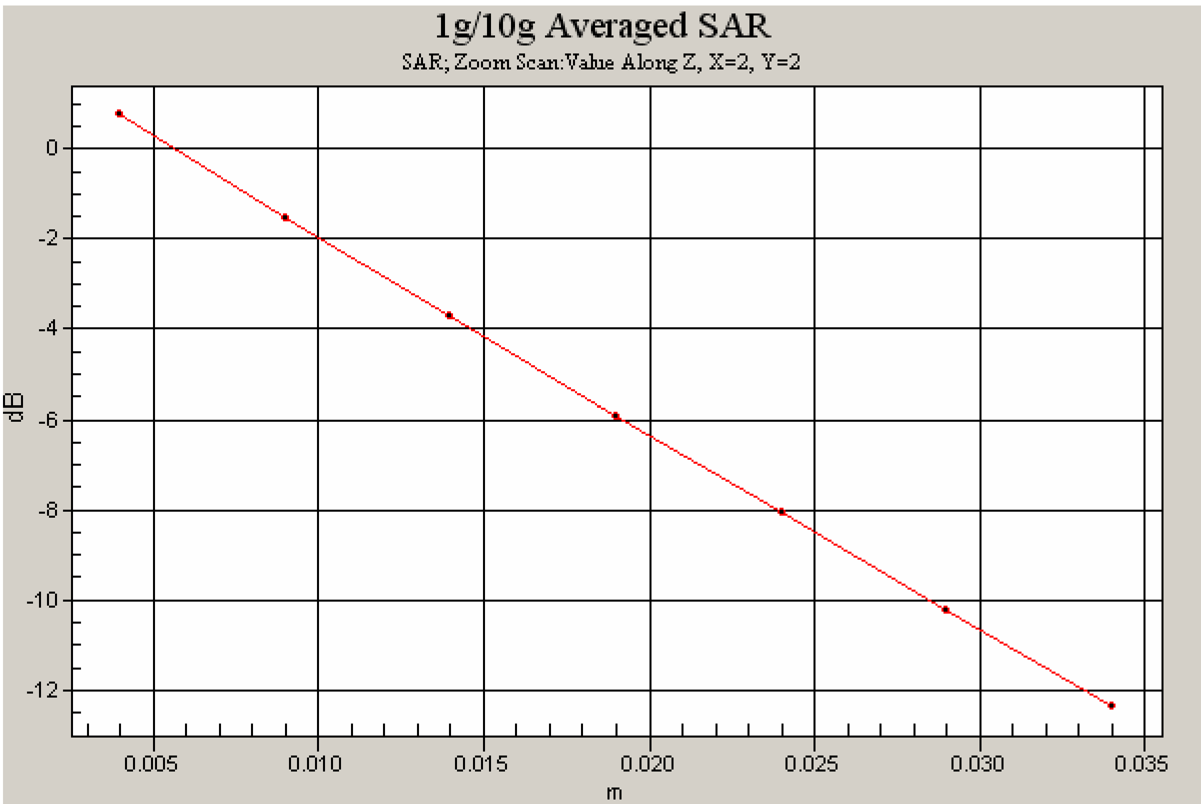
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.574 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.483 mW/g


dB
0.000
-10.0
-20.0
-30.0
-40.0
-50.0

0 dB = 0.483mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
0
-2
-4
-6
-8
-10
-12
dB
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Test position: Right cheek, Channel: middle

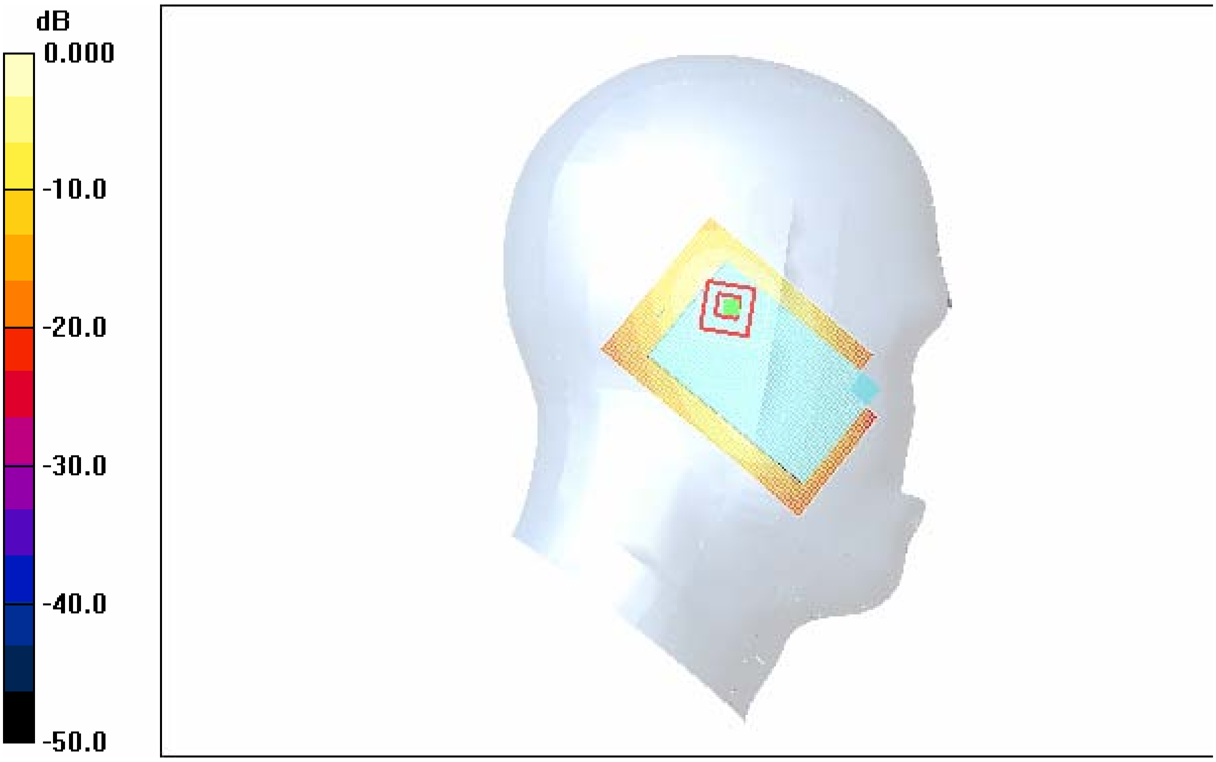
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.88, 4.88, 4.88); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.8 V/m; Power Drift = -0.125 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.596 mW/g; SAR(10 g) = 0.312 mW/g

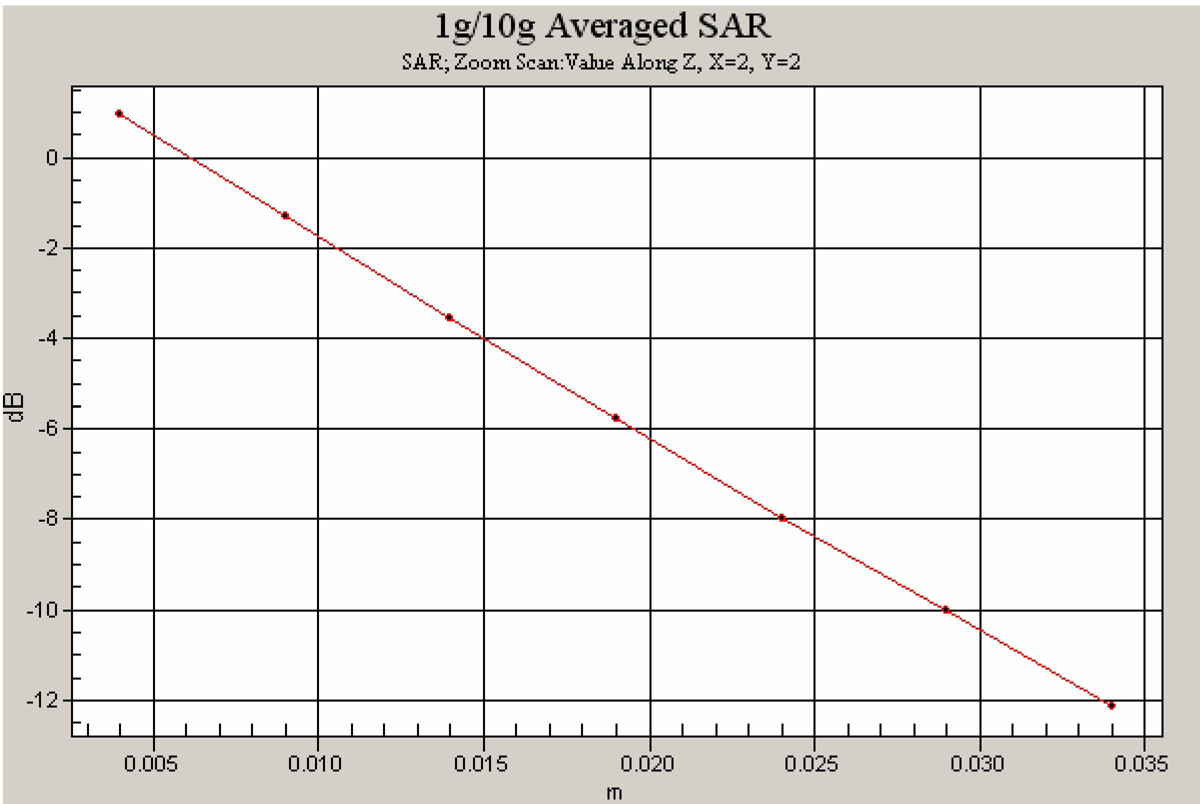
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.670 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.539 mW/g


dB
0.000
-10.0
-20.0
-30.0
-40.0
-50.0

0 dB = 0.539mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
dB
0
-2
-4
-6
-8
-10
-12
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Test position: Left tilt, Channel: middle

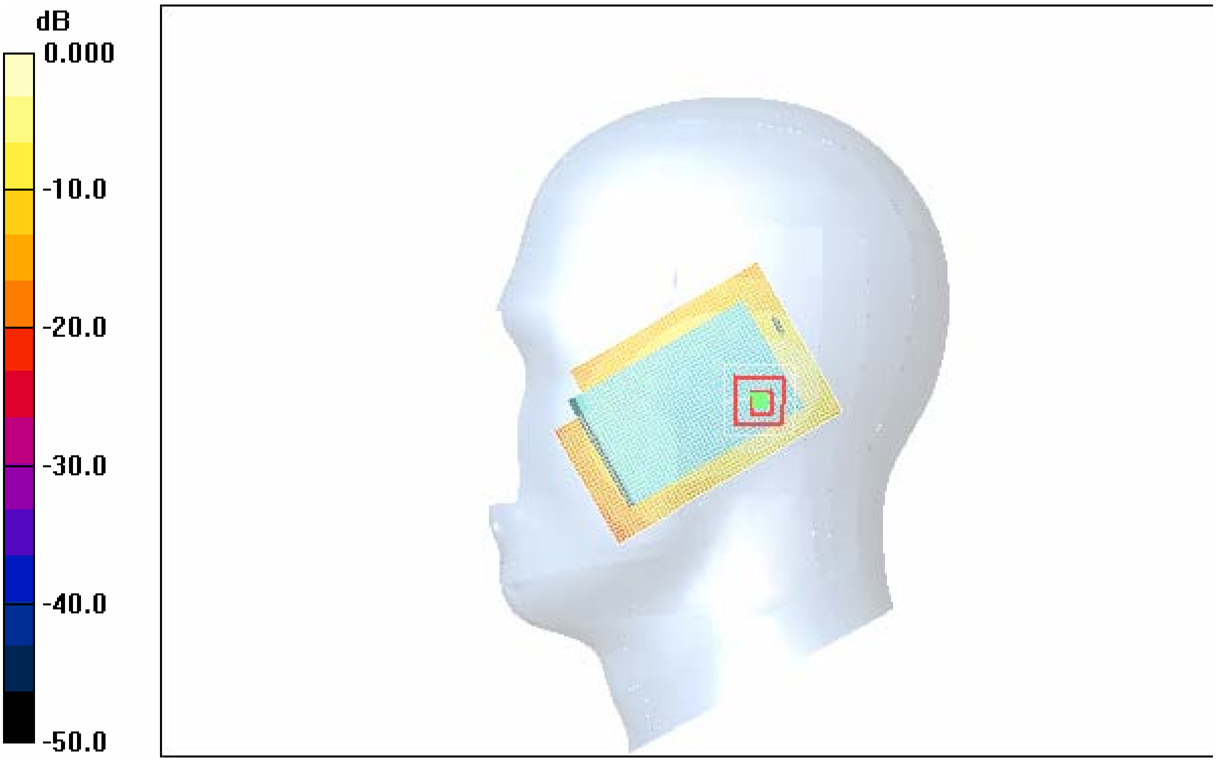
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.88, 4.88, 4.88); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.9 V/m; Power Drift = 0.102 dB
Peak SAR (extrapolated) = 0.578 W/kg
SAR(1 g) = 0.343 mW/g; SAR(10 g) = 0.195 mW/g

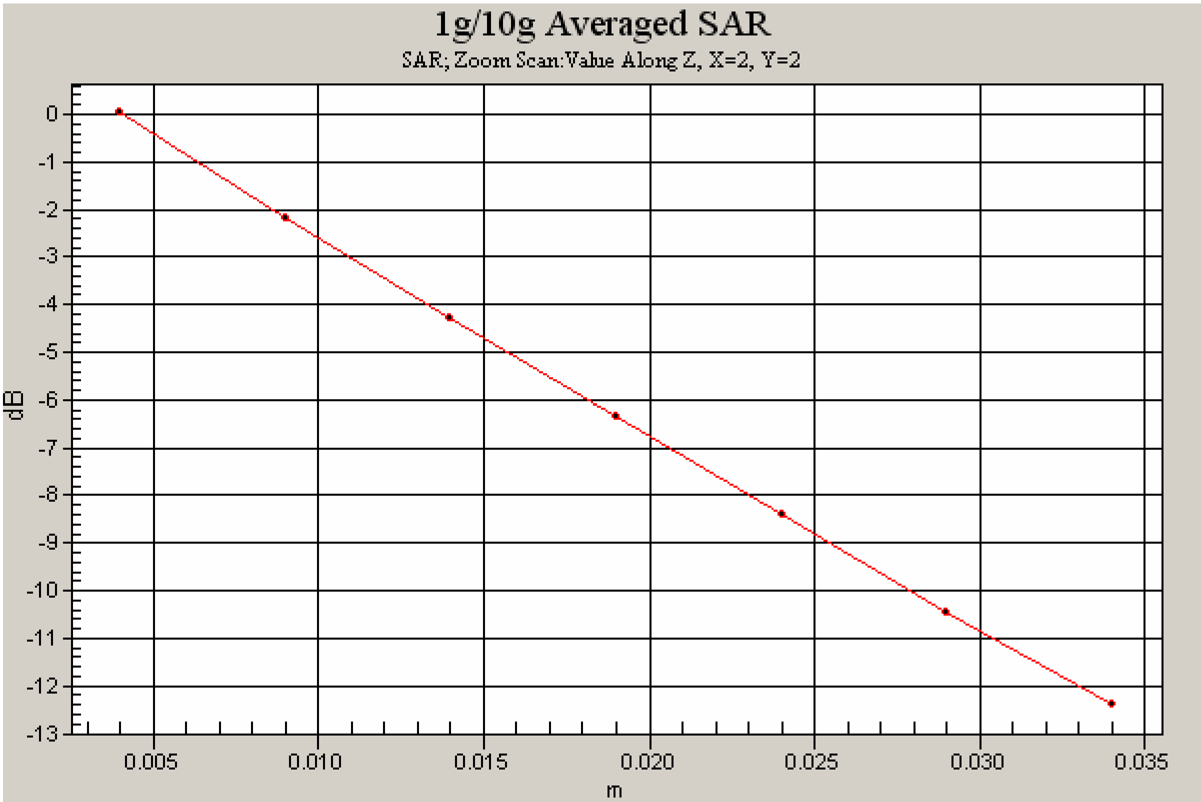
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.381 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.379 mW/g


dB
0.000
-10.0
-20.0
-30.0
-40.0
-50.0

0 dB = 0.379mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
dB
m
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
0.005
0.010
0.015
0.020
0.025
0.030
0.035

Test position: Left cheek, Channel: middle

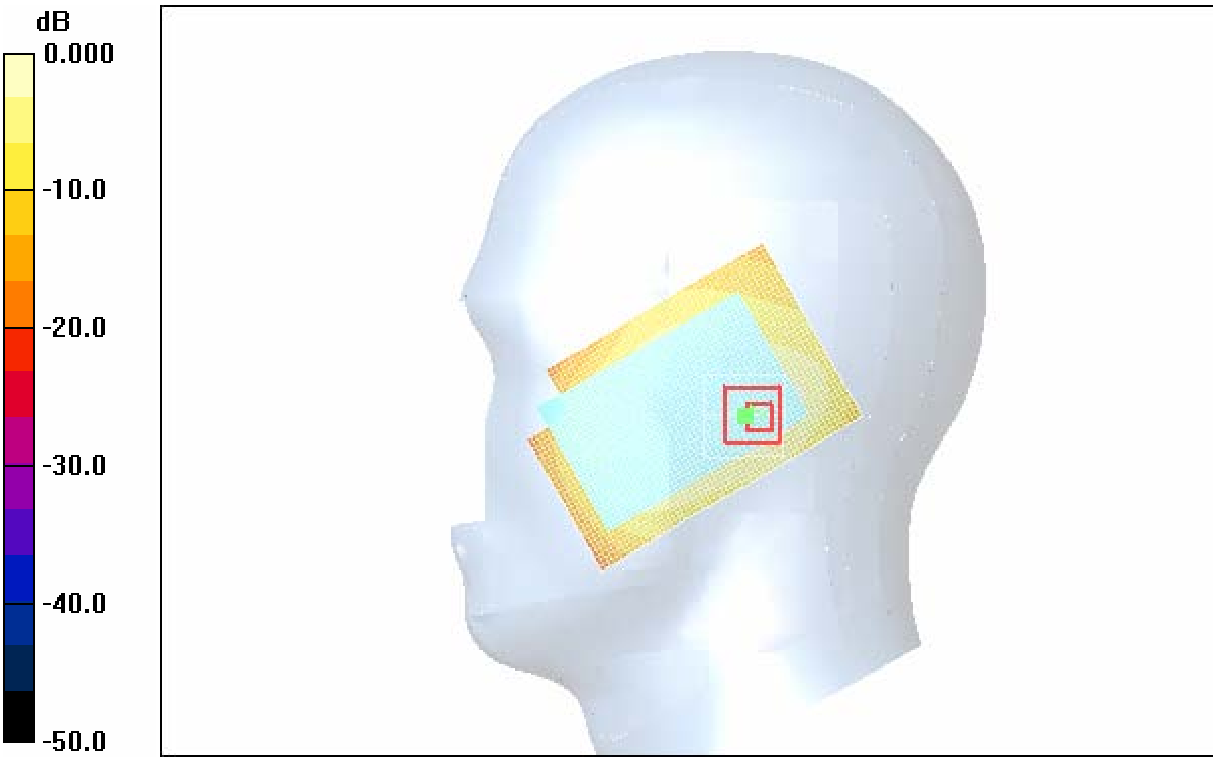
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.88, 4.88, 4.88); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.4 V/m; Power Drift = -0.054 dB
Peak SAR (extrapolated) = 0.582 W/kg
SAR(1 g) = 0.343 mW/g; SAR(10 g) = 0.196 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.377 mW/g

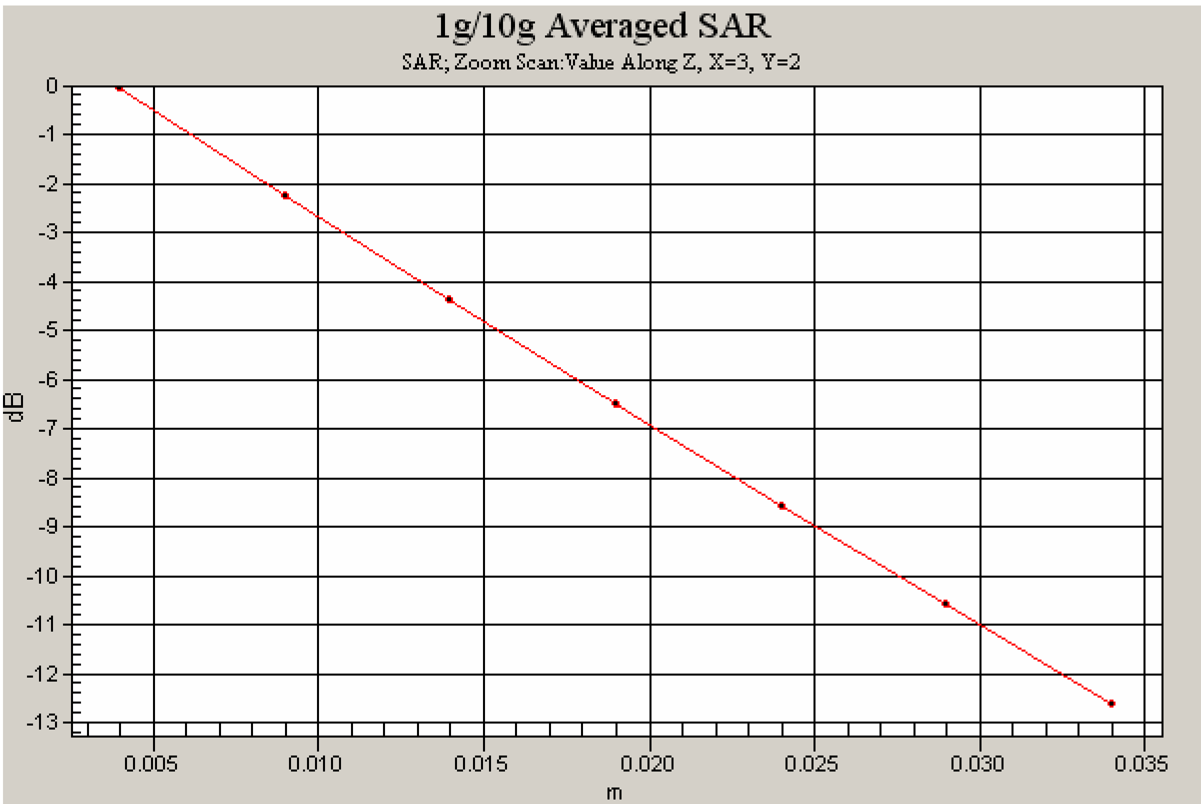
mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.381 mW/g



dB
0.000
-10.0
-20.0
-30.0
-40.0
-50.0

0 dB = 0.381mW/g



1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=2
dB
m
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
-12
-13
0.005
0.010
0.015
0.020
0.025
0.030
0.035

Test position: Right cheek, Channel: low

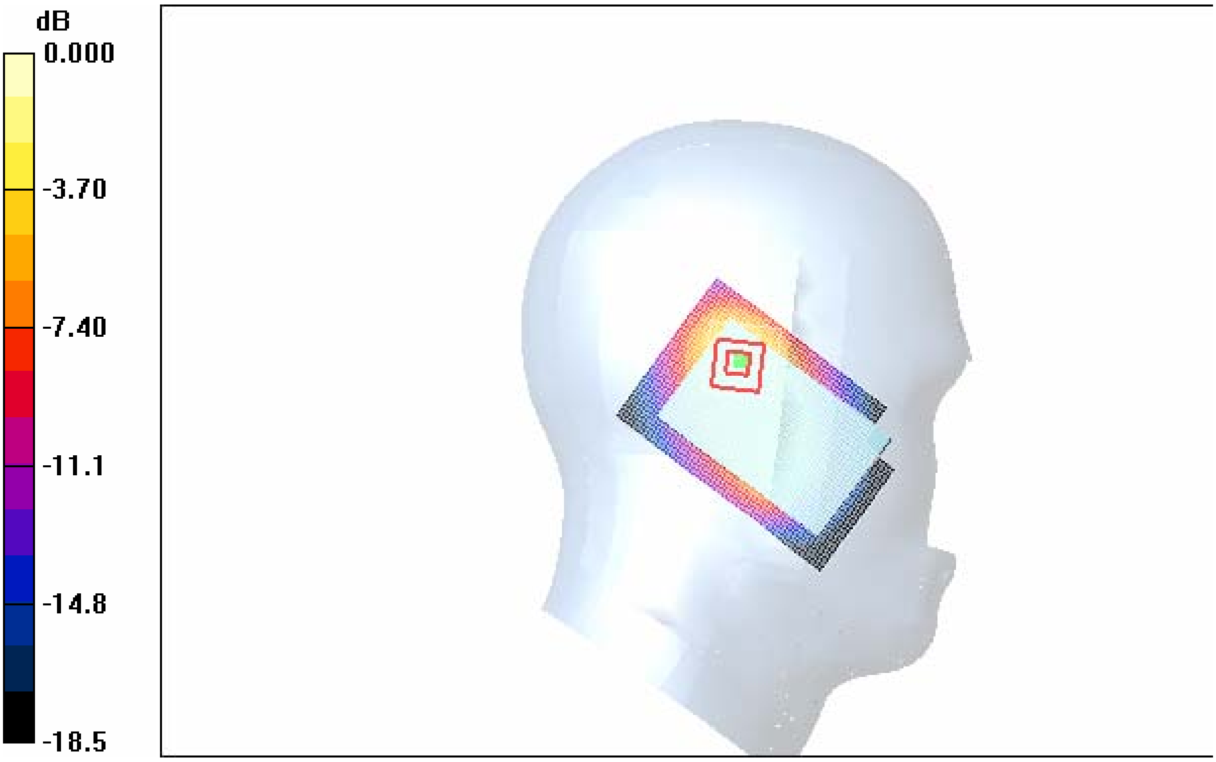
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.88, 4.88, 4.88); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

low/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

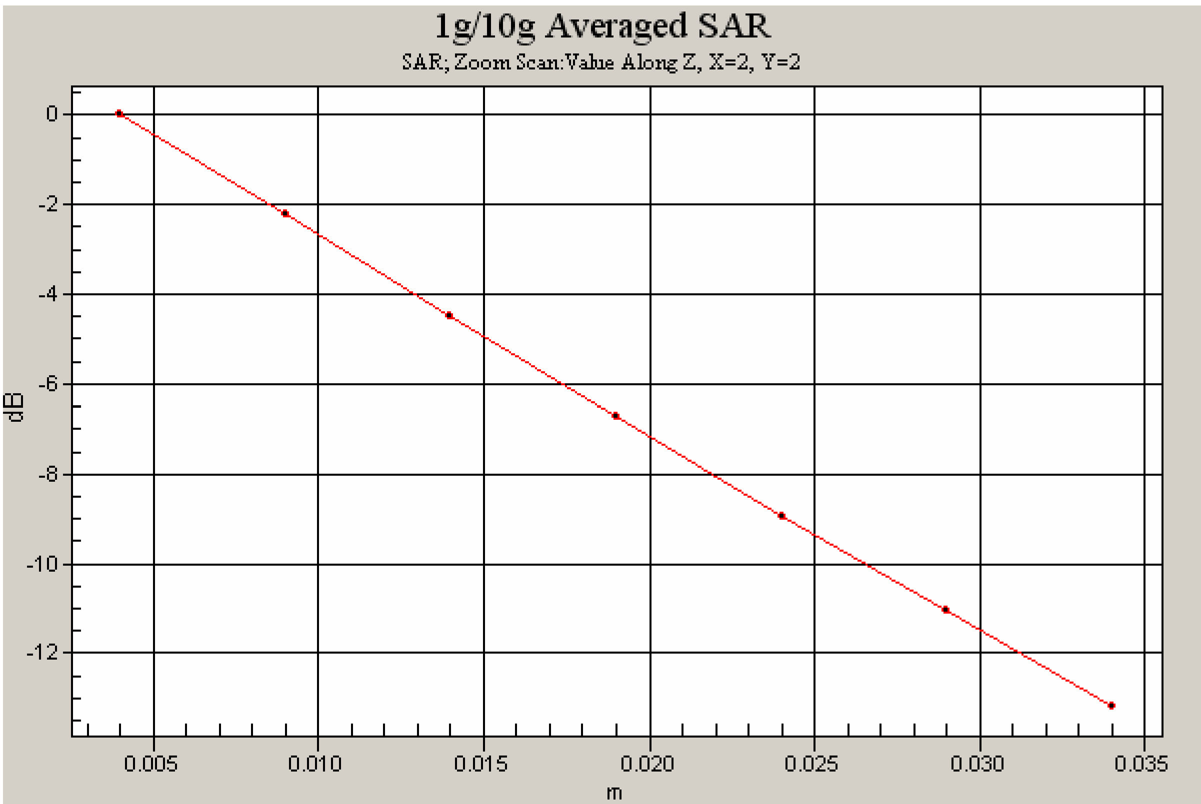
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.529 mW/g

low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.0 V/m; Power Drift = 0.030 dB
Peak SAR (extrapolated) = 1.00 W/kg
SAR(1 g) = 0.569 mW/g; SAR(10 g) = 0.301 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.638 mW/g


dB
0.000
-3.70
-7.40
-11.1
-14.8
-18.5

0 dB = 0.638mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
dB
0
-2
-4
-6
-8
-10
-12
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Test position: Right cheek, Channel: high

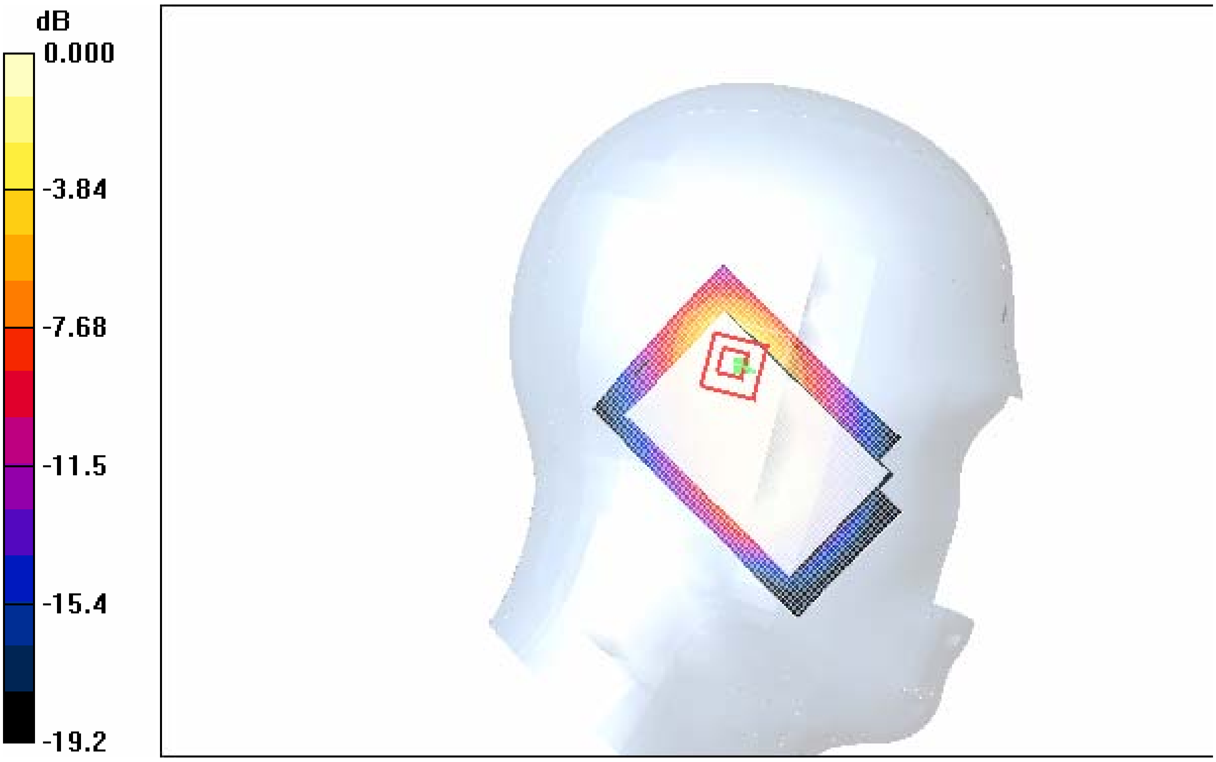
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.88, 4.88, 4.88); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

high/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

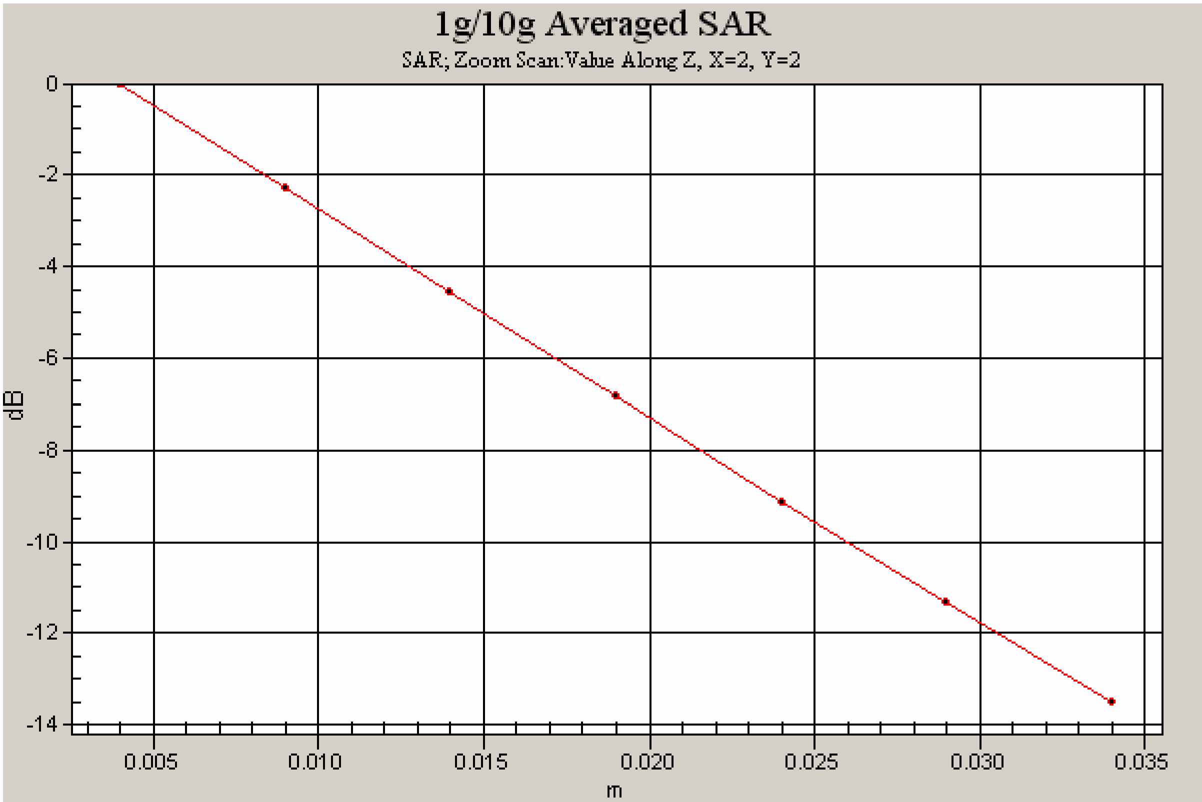
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.382 mW/g

high/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.2 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 0.742 W/kg
SAR(1 g) = 0.406 mW/g; SAR(10 g) = 0.209 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.455 mW/g


dB
0.000
-3.84
-7.68
-11.5
-15.4
-19.2

0 dB = 0.455mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
dB
0
-2
-4
-6
-8
-10
-12
-14
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

7.1.3 body SAR of GSM 850

Test position: Front, Channel: middle

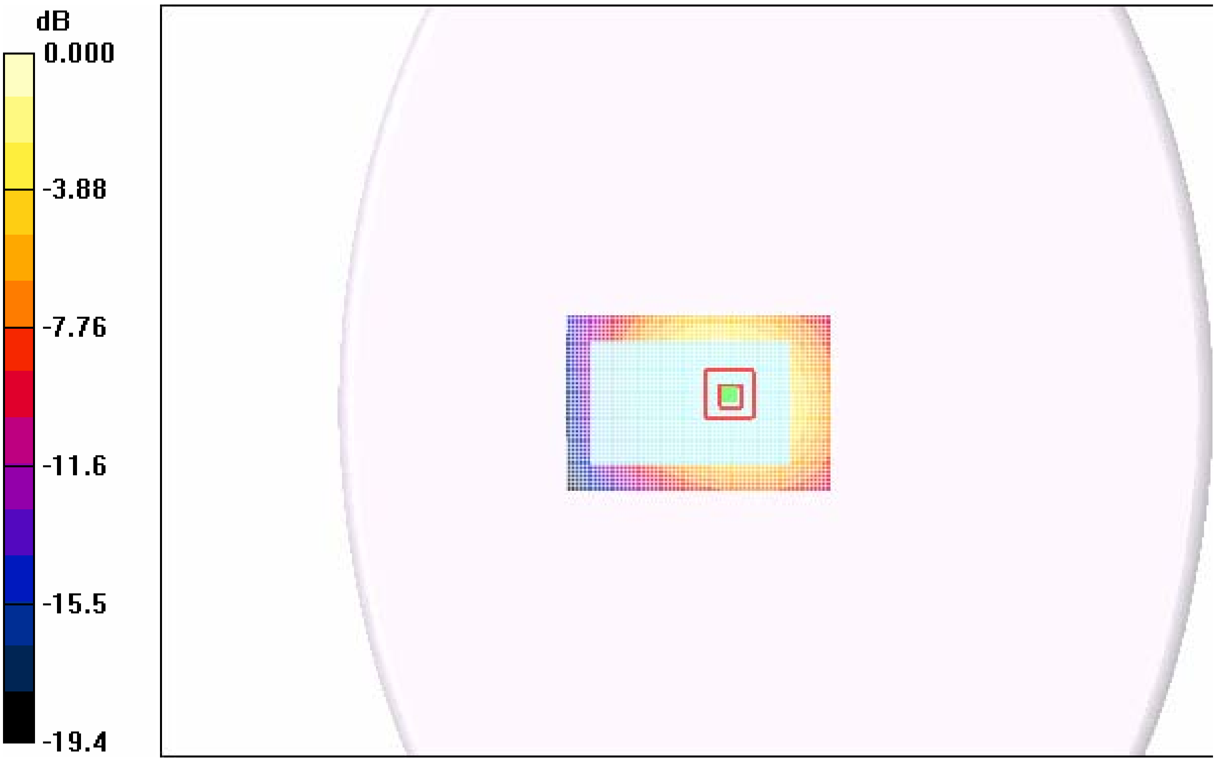
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.7, 5.7, 5.7); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.7 V/m; Power Drift = -0.053 dB
Peak SAR (extrapolated) = 0.171 W/kg
SAR(1 g) = 0.132 mW/g; SAR(10 g) = 0.095 mW/g

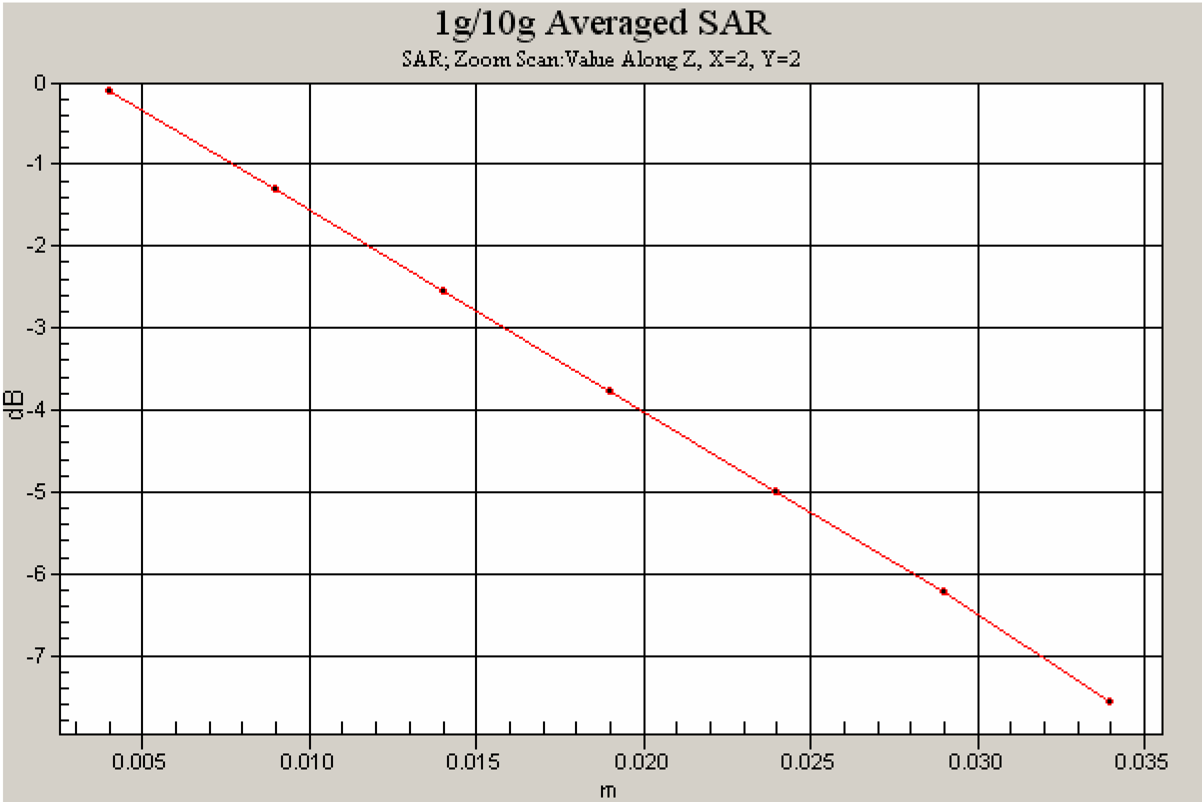
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.139 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.143 mW/g


dB
0.000
-3.88
-7.76
-11.6
-15.5
-19.4

0 dB = 0.143mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
dB
m
0
-1
-2
-3
-4
-5
-6
-7
0.005
0.010
0.015
0.020
0.025
0.030
0.035

Test position: Back, Channel: middle

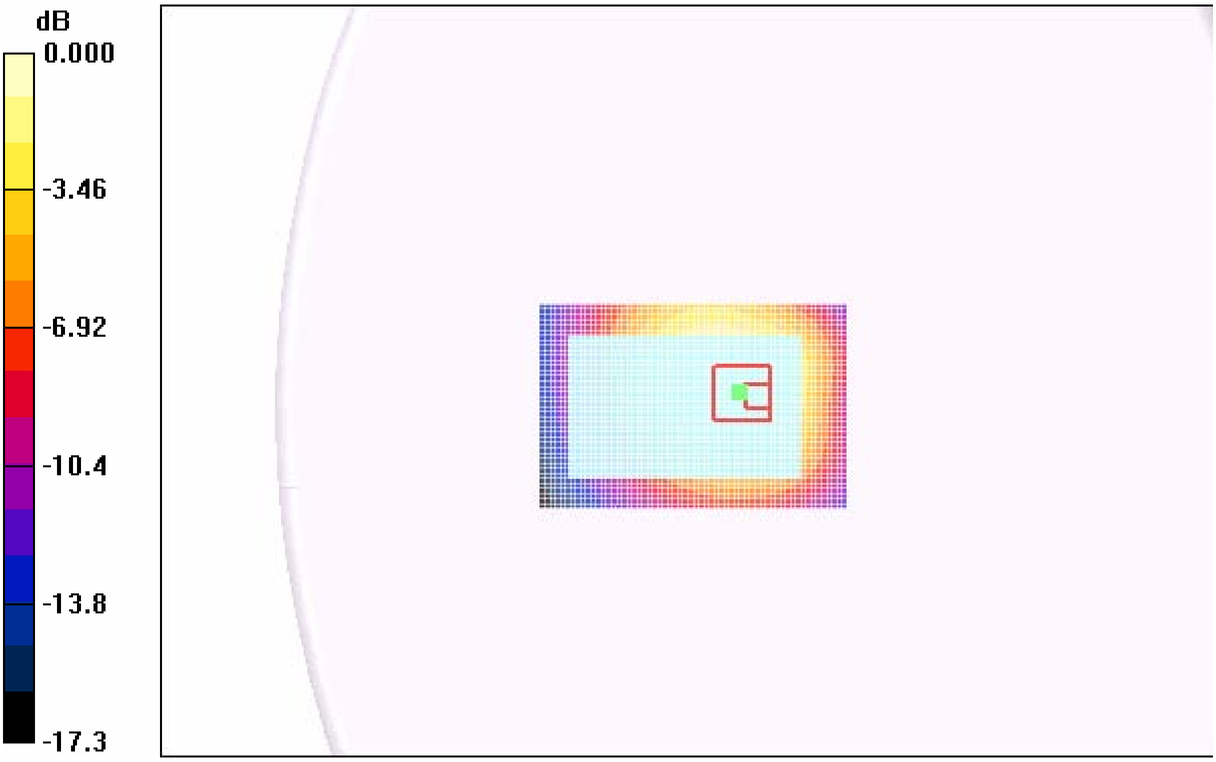
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.7, 5.7, 5.7); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.7 V/m; Power Drift = -0.174 dB
Peak SAR (extrapolated) = 0.510 W/kg
SAR(1 g) = 0.365 mW/g; SAR(10 g) = 0.256 mW/g

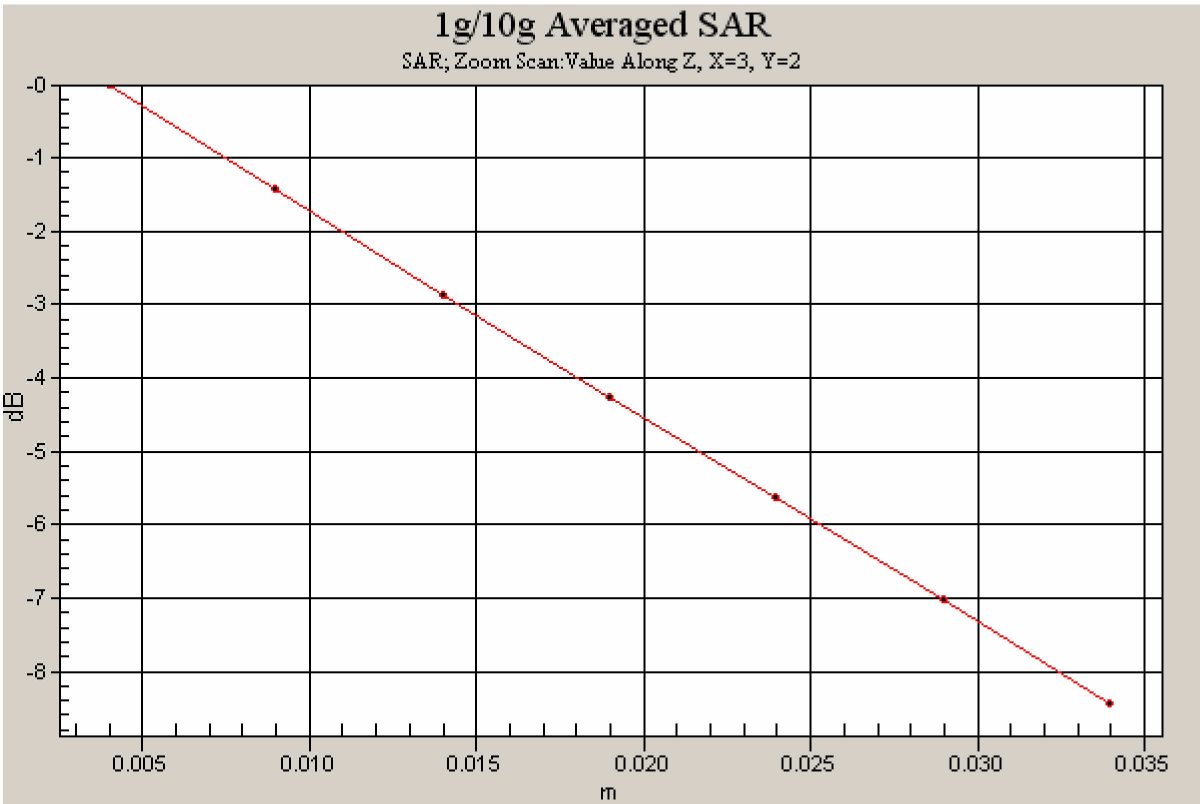
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.390 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.391 mW/g


dB
0.000
-3.46
-6.92
-10.4
-13.8
-17.3

0 dB = 0.391mW/g

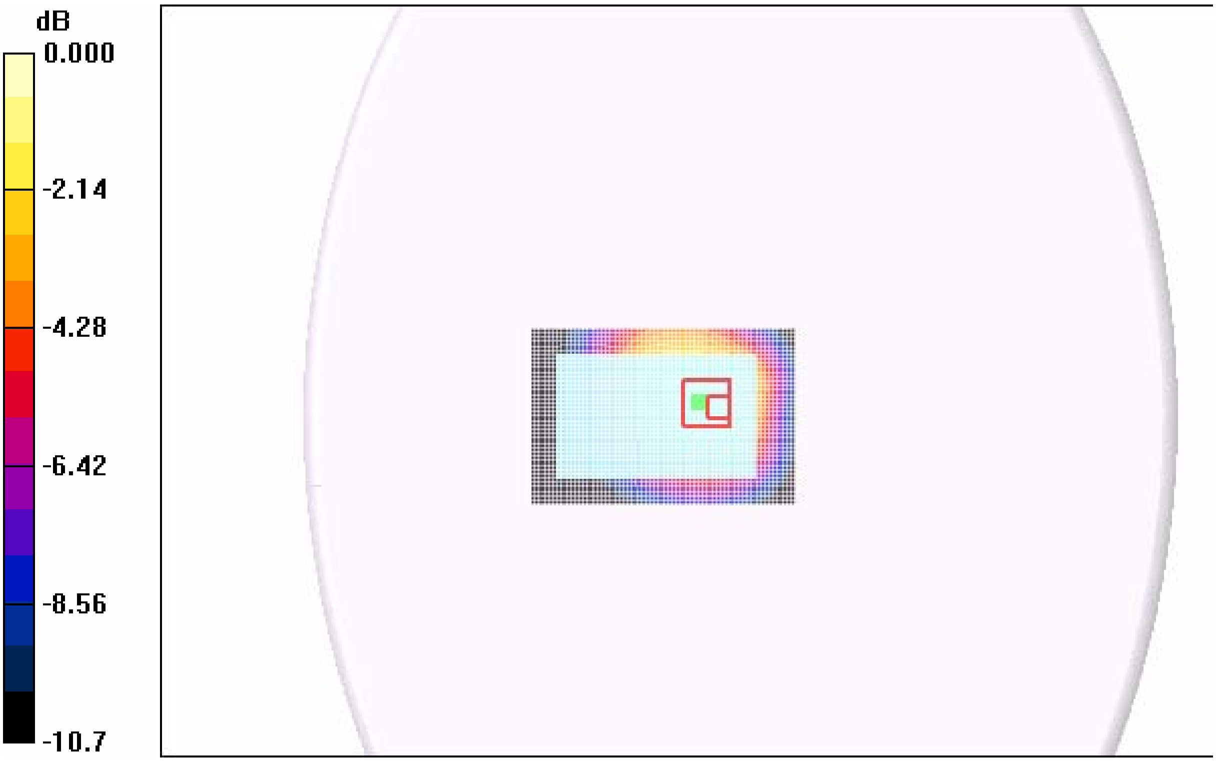

1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=2
dB
-0
-1
-2
-3
-4
-5
-6
-7
-8
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Test position: Back, Channel: low

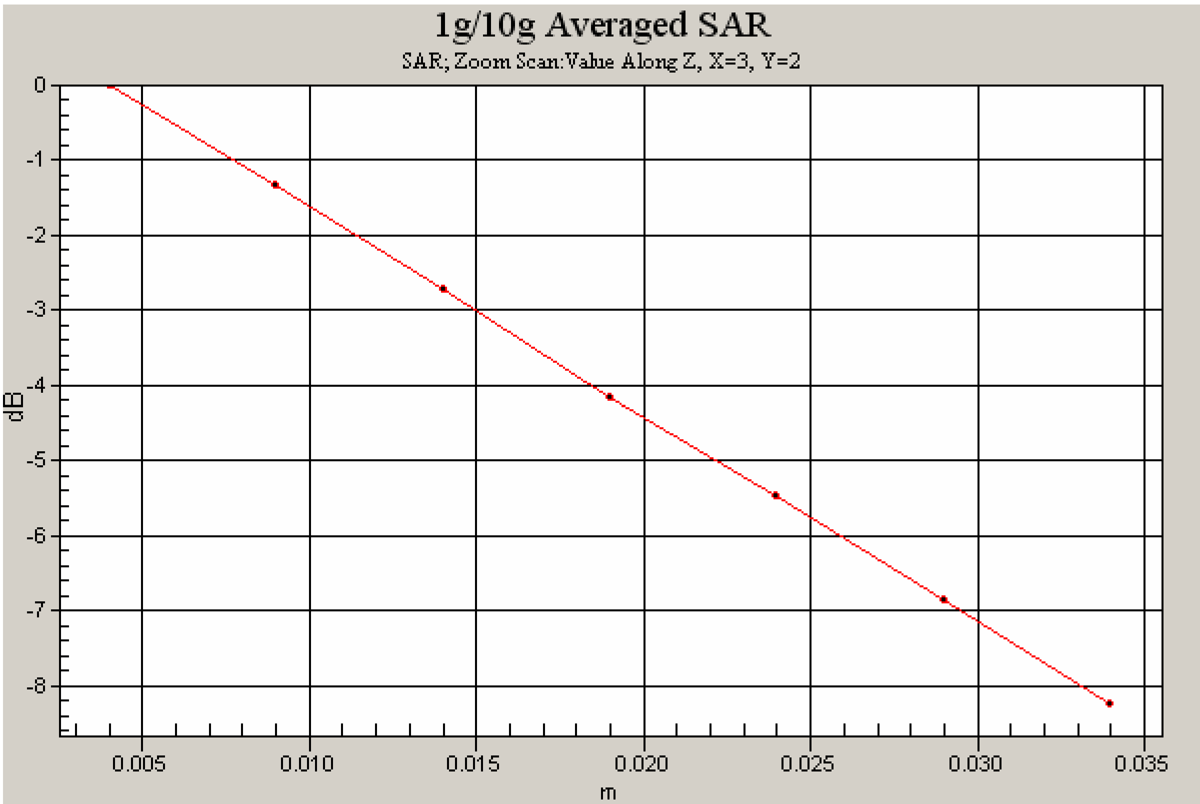
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.7, 5.7, 5.7); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

low/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.381 mW/g

low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.3 V/m; Power Drift = 0.135 dB
Peak SAR (extrapolated) = 0.514 W/kg
SAR(1 g) = 0.367 mW/g; SAR(10 g) = 0.257 mW/g
Maximum value of SAR (measured) = 0.390 mW/g


dB
0.000
-2.14
-4.28
-6.42
-8.56
-10.7

0 dB = 0.390mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=2
dB
0
-1
-2
-3
-4
-5
-6
-7
-8
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

Test position: Back, Channel: high

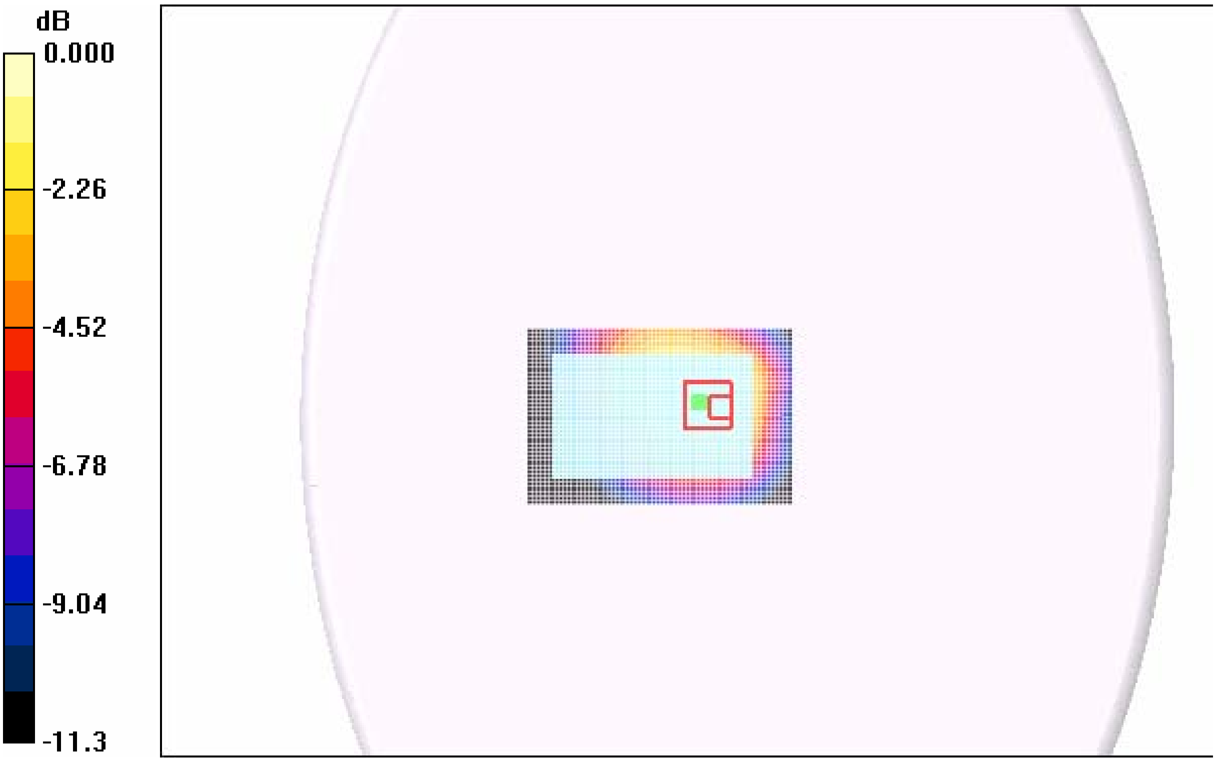
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.7, 5.7, 5.7); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

high/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

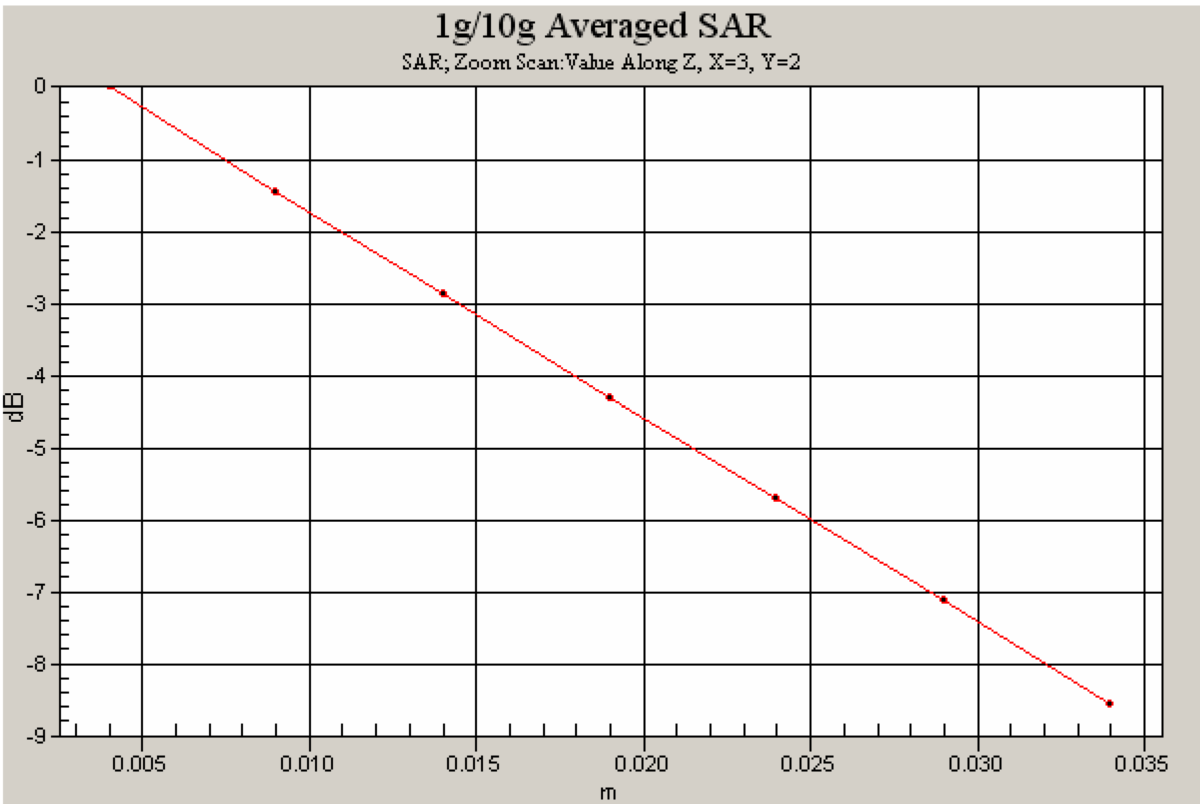
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.478 mW/g

high/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.6 V/m; Power Drift = -0.102 dB
Peak SAR (extrapolated) = 0.624 W/kg
SAR(1 g) = 0.435 mW/g; SAR(10 g) = 0.298 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.466 mW/g


dB
0.000
-2.26
-4.52
-6.78
-9.04
-11.3

0 dB = 0.466mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=3, Y=2
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
dB
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

7.1.4 Body SAR of GSM 1900

Test position: Front, Channel: mid

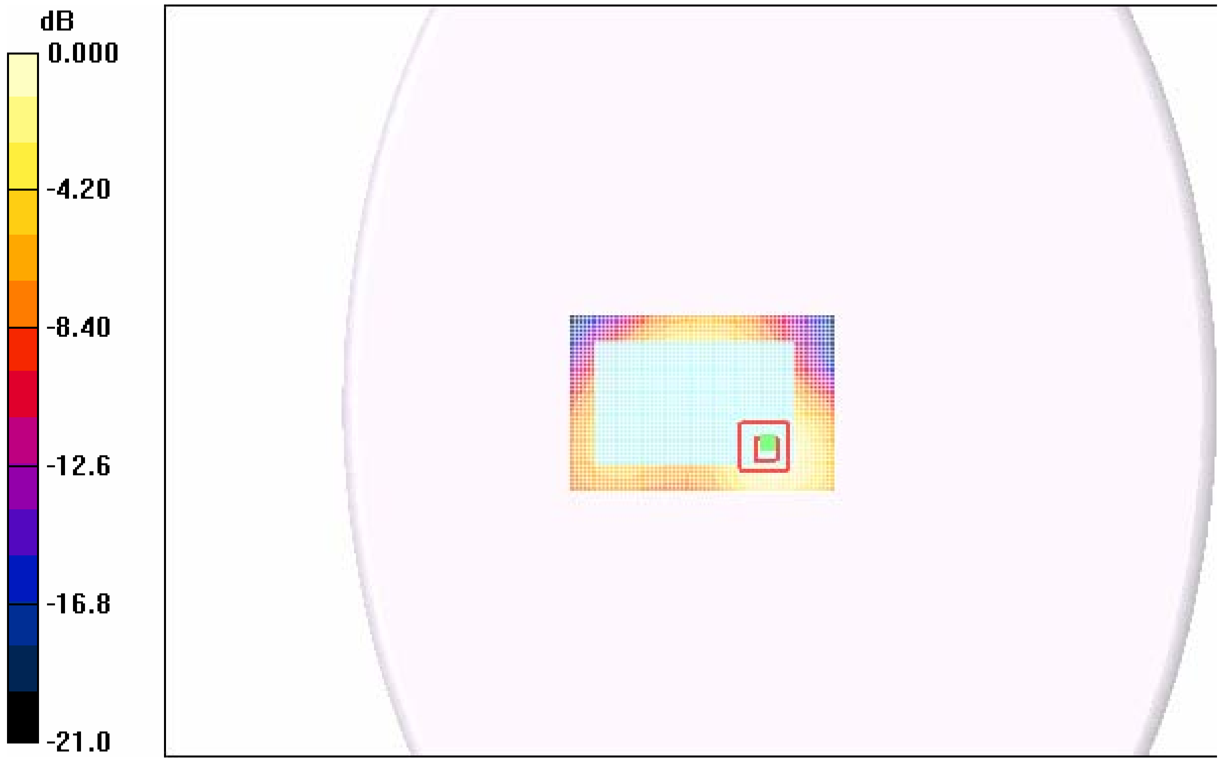
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.7, 4.7, 4.7); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.85 V/m; Power Drift = -0.057 dB
Peak SAR (extrapolated) = 0.187 W/kg
SAR(1 g) = 0.122 mW/g; SAR(10 g) = 0.075 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.131 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.130 mW/g



0 dB = 0.130mW/g

Test position: Back, Channel: mid

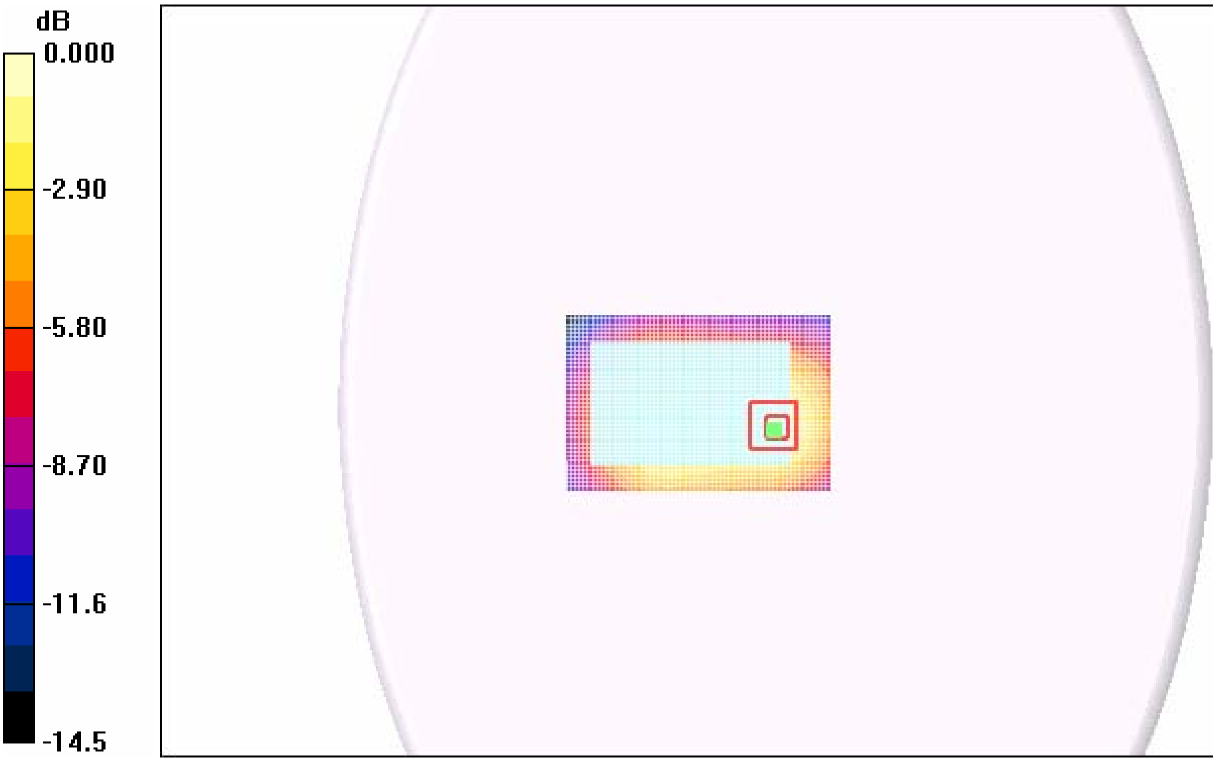
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.7, 4.7, 4.7); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

mid/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.3 V/m; Power Drift = 0.027 dB
Peak SAR (extrapolated) = 0.363 W/kg
SAR(1 g) = 0.235 mW/g; SAR(10 g) = 0.147 mW/g

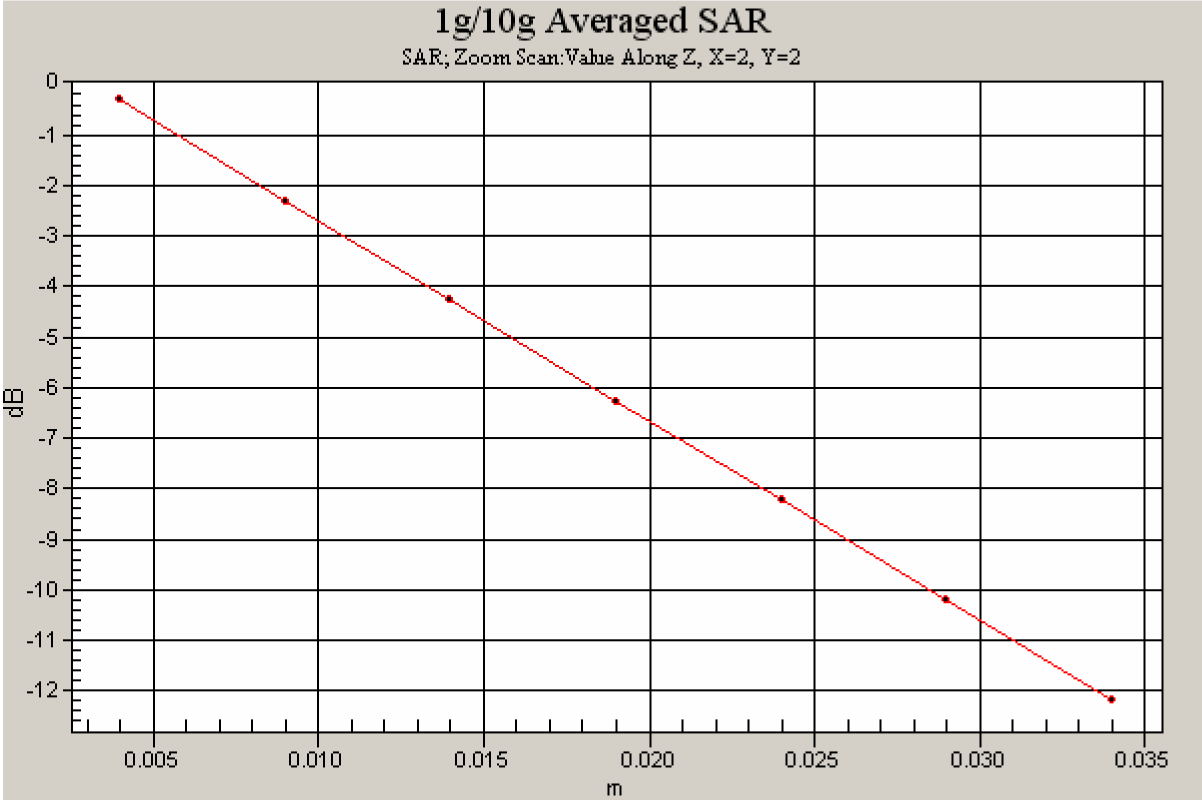
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.250 mW/g

mid/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.273 mW/g



0 dB = 0.273mW/g



Test position: Back, Channel: low

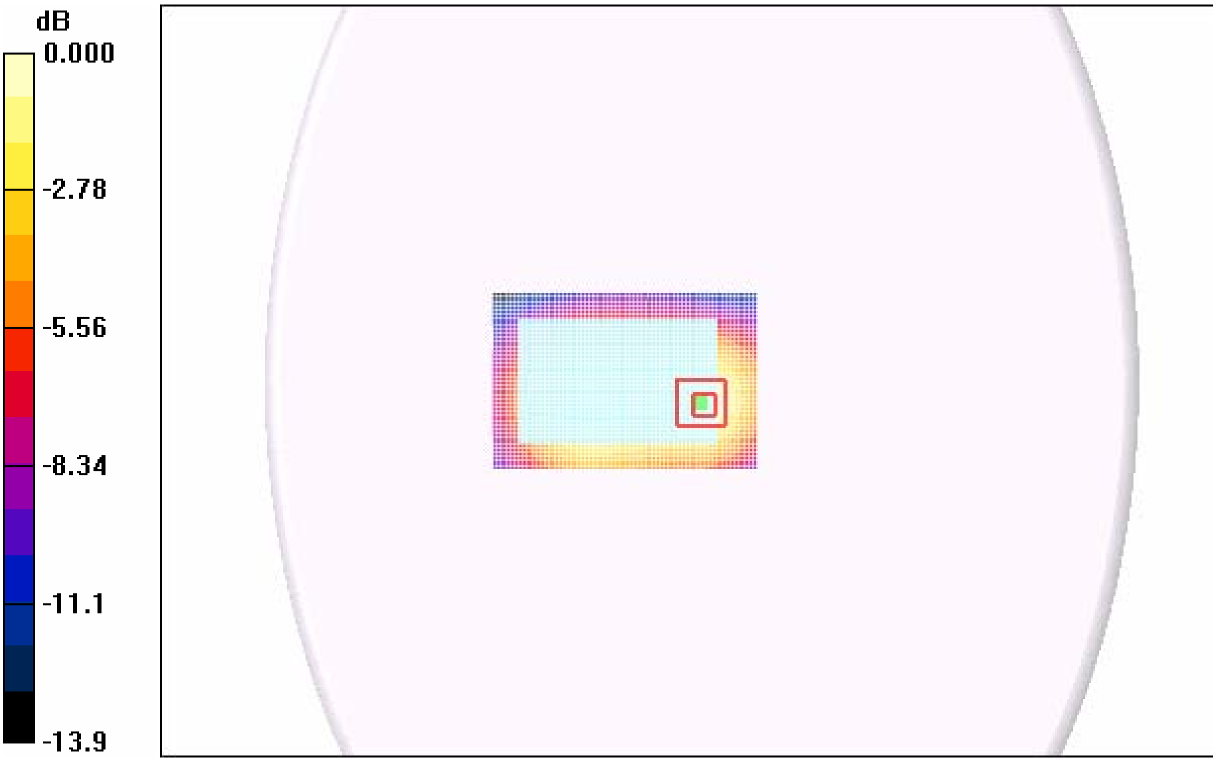
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.7, 4.7, 4.7); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

low/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

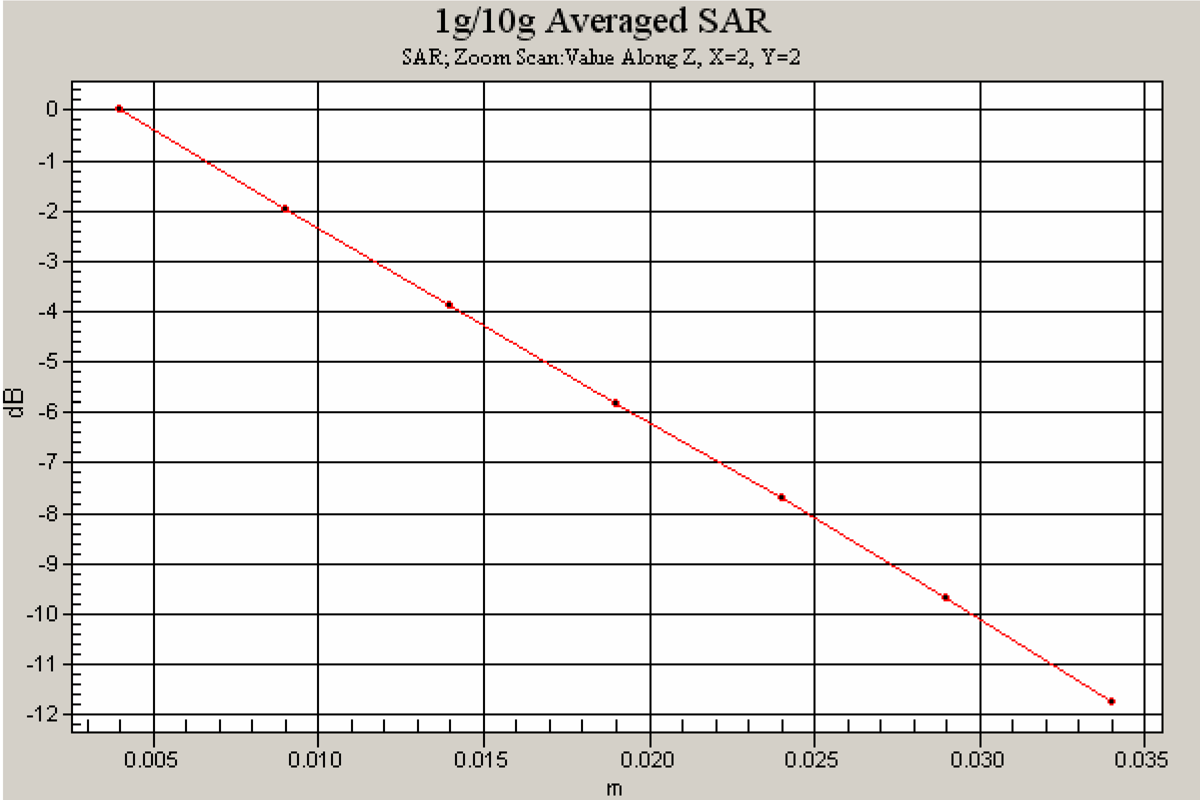
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.276 mW/g

low/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.6 V/m; Power Drift = 0.024 dB
Peak SAR (extrapolated) = 0.363 W/kg
SAR(1 g) = 0.237 mW/g; SAR(10 g) = 0.148 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.253 mW/g



0 dB = 0.253mW/g



Test position: Back, Channel: high

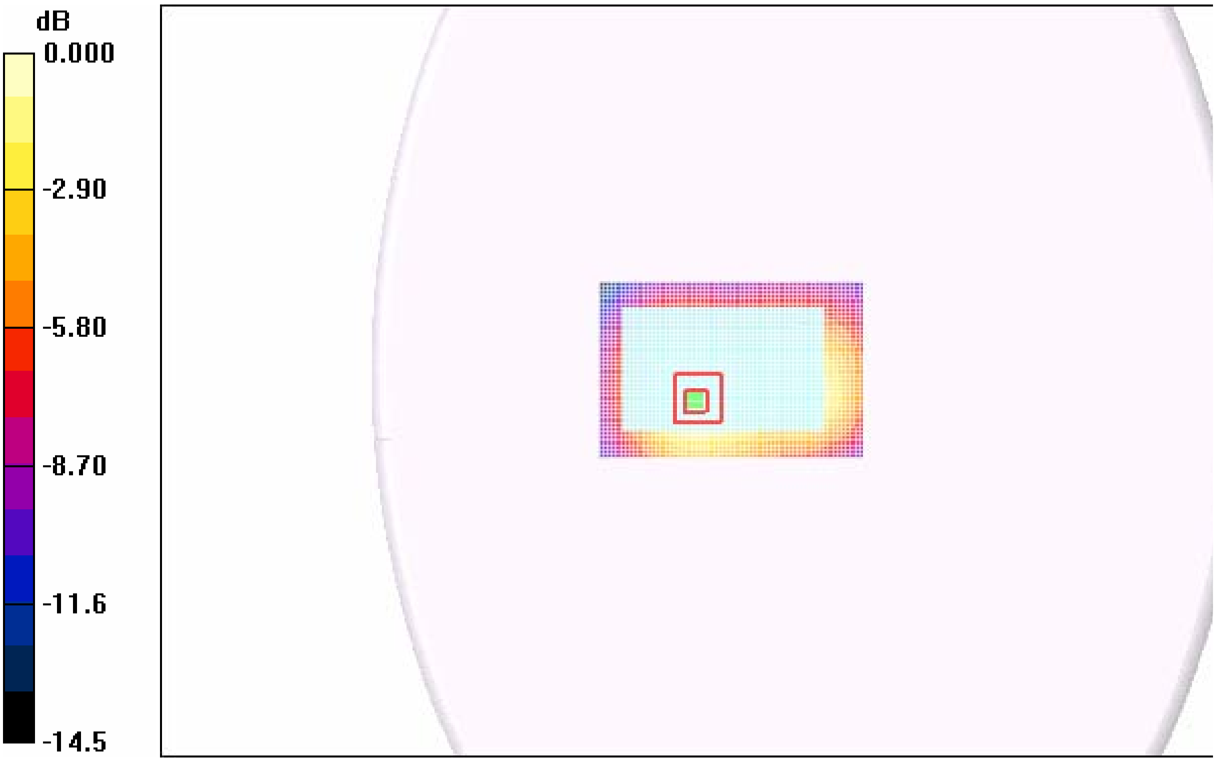
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.7, 4.7, 4.7); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

high/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm

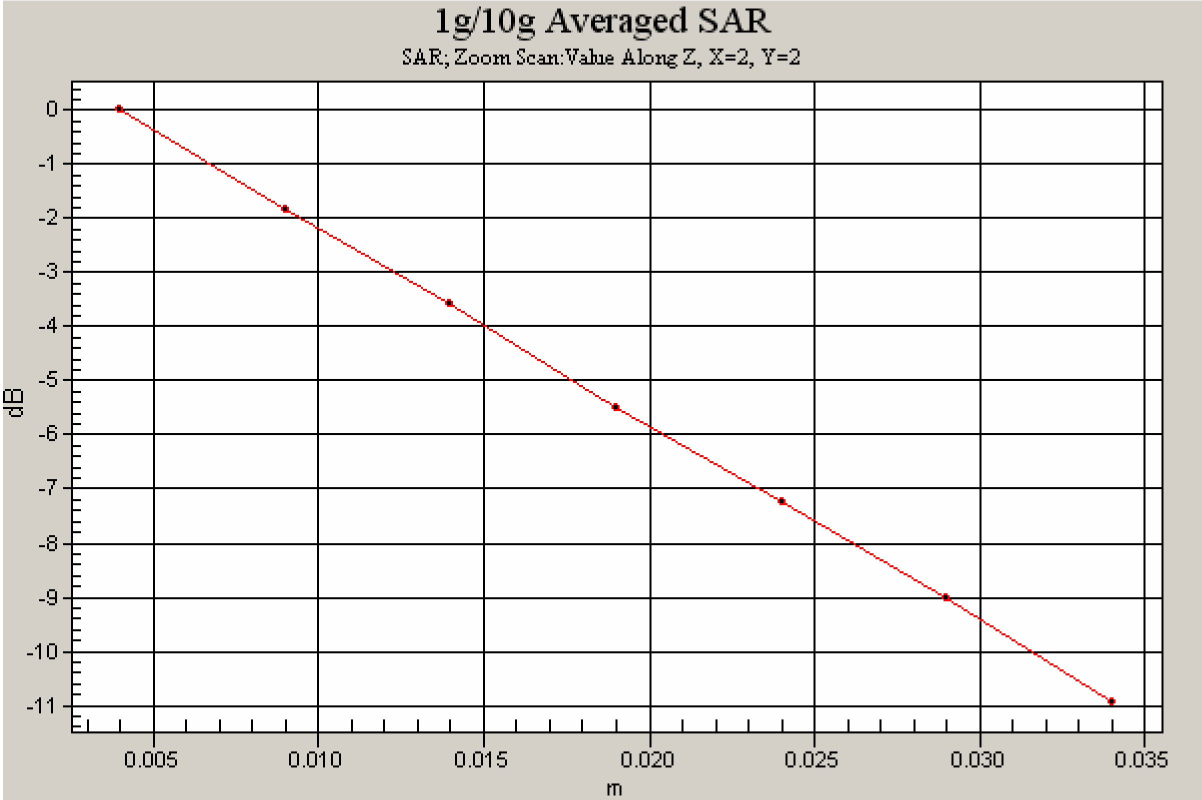
Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 0.232 mW/g

high/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.1 V/m; Power Drift = -0.078 dB
Peak SAR (extrapolated) = 0.312 W/kg
SAR(1 g) = 0.210 mW/g; SAR(10 g) = 0.135 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 0.226 mW/g



0 dB = 0.226mW/g


1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
dB
0
-1
-2
-3
-4
-5
-6
-7
-8
-9
-10
-11
0.005
0.010
0.015
0.020
0.025
0.030
0.035
m

7.2 System performance check report

File Name: Systemcheck HSL835 20110522.da4

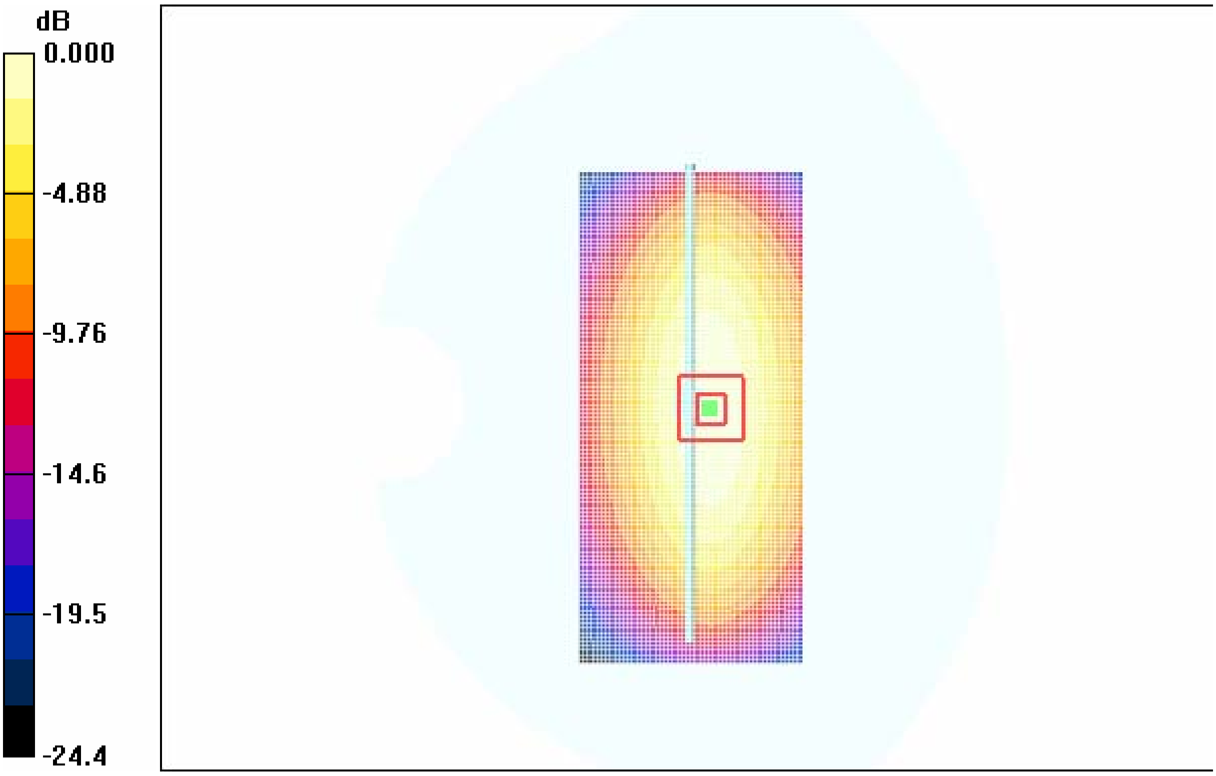
DUT: Dipole 835 MHz;

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.911 mho/m; ε_r = 41.6; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:32; Ambient temperature: 21.5; Liquid temperature: 20.5;
Phantom section: Flat Section ;Phantom: SAM with Front;Type: QD 000 P40 CA

DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.72, 5.72, 5.72); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM900/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 51.8 V/m; Power Drift = -0.087 dB
Peak SAR (extrapolated) = 3.89 W/kg
SAR(1 g) = 2.57 mW/g; SAR(10 g) = 1.67 mW/g
Maximum value of SAR (measured) = 2.76 mW/g

GSM900/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.83 mW/g



0 dB = 2.83mW/g

File Name: Systemcheck HSL1900 20110522.da4

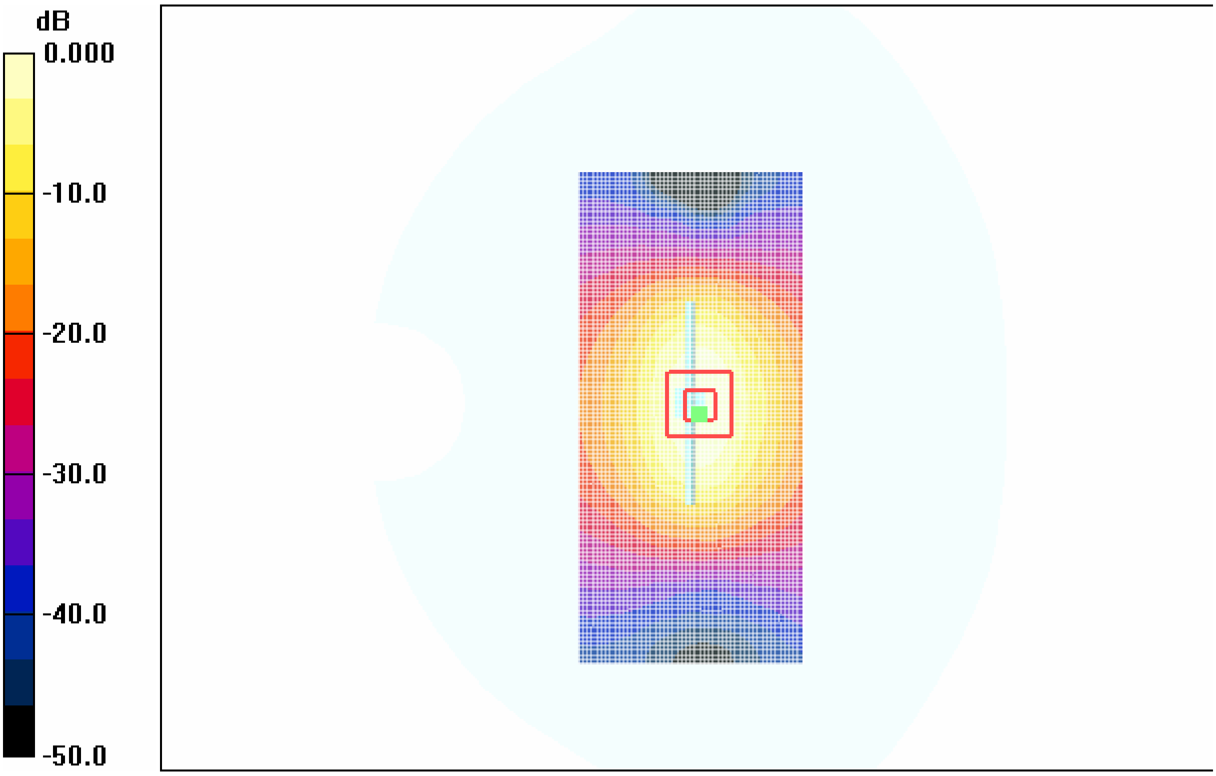
DUT: Dipole 1900 MHz;

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.46 mho/m; ε_r = 38.6; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:30; Ambient temperature: 22.4; Liquid temperature: 20.8;
Phantom section: Flat Section ;Phantom: SAM with Right;Type: QD 000 P40 CA

DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.88, 4.88, 4.88); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

1900/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.9 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.39 mW/g
Maximum value of SAR (measured) = 11.5 mW/g

1900/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.3 mW/g



0 dB = 12.3mW/g

File Name: Systemcheck MSL850 20110522.da4

DUT: Dipole 835 MHz;

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): f = 835 MHz; σ = 0.93 mho/m; ε_r = 53.5; ρ = 1000 kg/m^3 ;
Medium Notes: Ambient humidity:30; Ambient temperature: 24; Liquid temperature: 22.2;
Phantom section: Flat Section ;Phantom: Flat Phantom ELI4.0;Type: QDOVA001BA

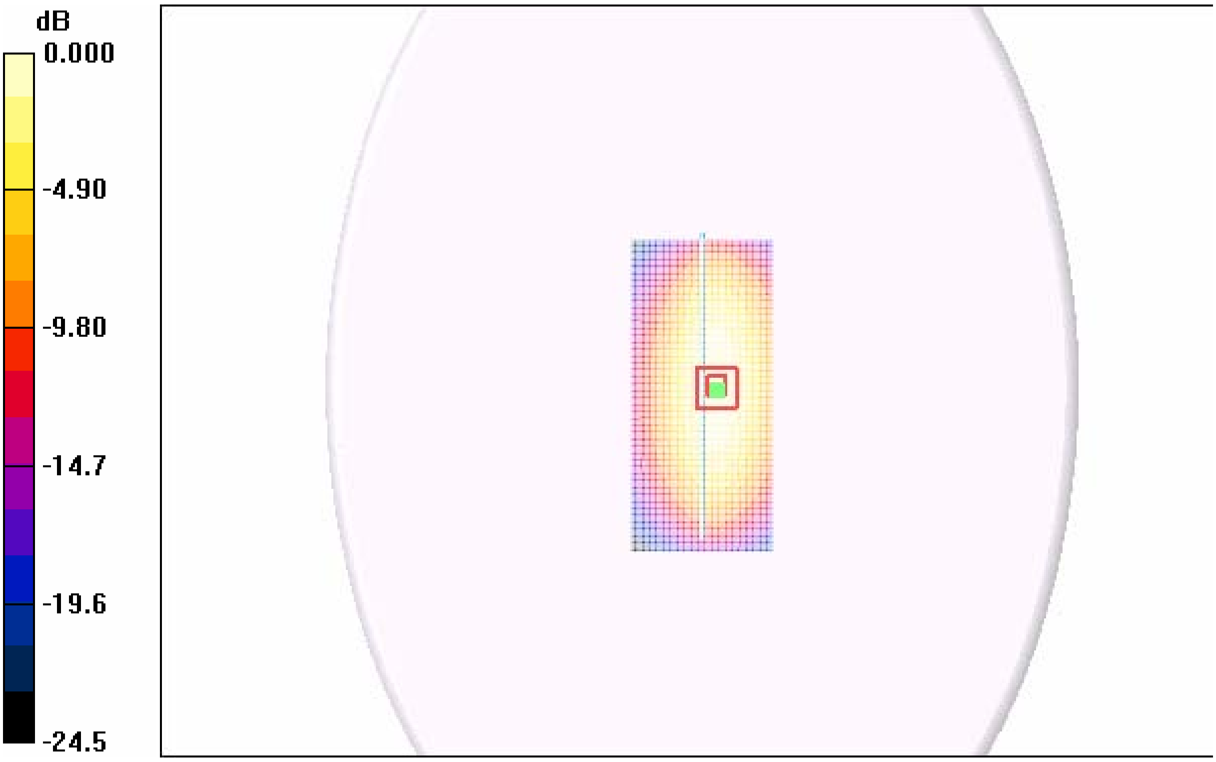
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(5.7, 5.7, 5.7); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

GSM850/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 49.9 V/m; Power Drift = -0.142 dB
Peak SAR (extrapolated) = 3.50 W/kg
SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.53 mW/g

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (measured) = 2.53 mW/g

GSM850/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.
Maximum value of SAR (interpolated) = 2.52 mW/g

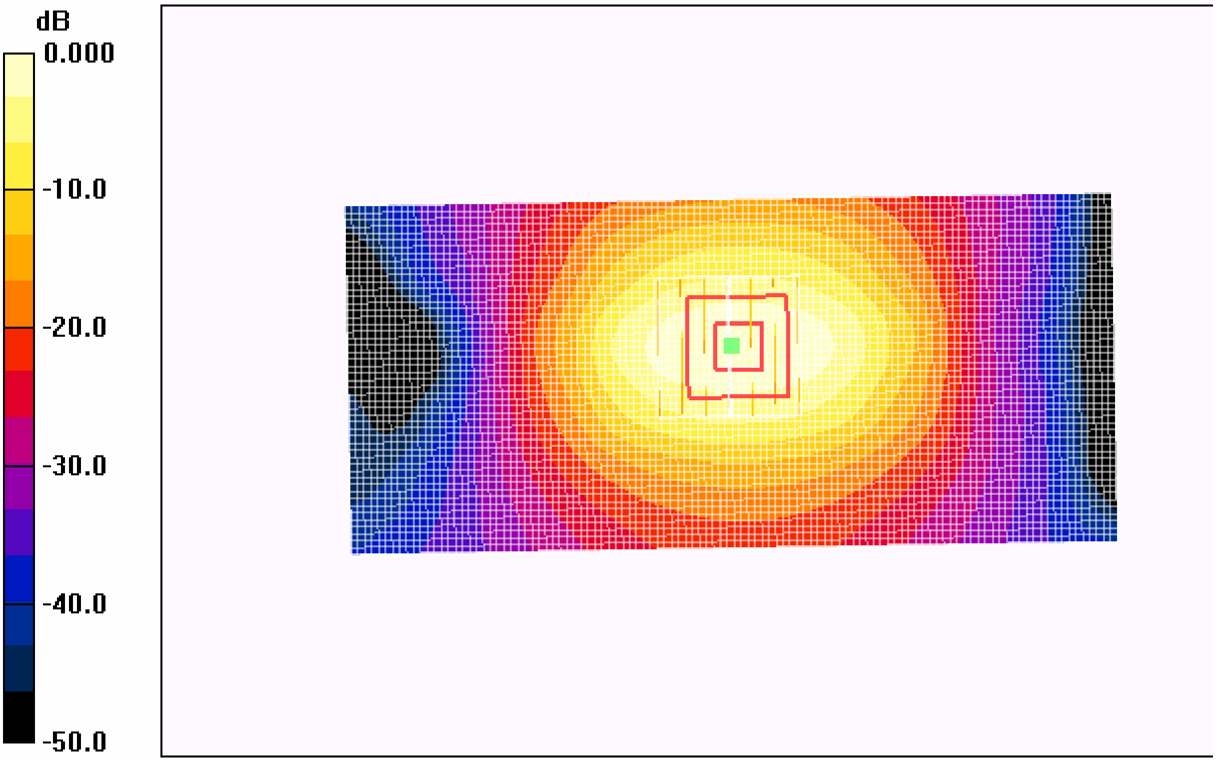


0 dB = 2.52mW/g

DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.7, 4.7, 4.7); Calibrated: 2010-8-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 2010-8-19
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 171

1900/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 79.8 V/m; Power Drift = -0.204 dB
Peak SAR (extrapolated) = 18.3 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.37 mW/g
Maximum value of SAR (measured) = 11.6 mW/g

1900/Area Scan (51x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 12.5 mW/g



0 dB = 12.5mW/g

8 Uncertainty budget

It includes the uncertainty budget suggested by the [IEEE P1528] and determined by Schmid & Partner Engineering AG. **The expanded uncertainty (K=2) is assessed to be ±22.0%.**

Error Source	Type	Uncertainty Value (%)	Probability Distribution	ci	Standard Uncertainty (%) $u_i^{'}$ (%)	Degree of freedom Veff or vi
System repetivity	A	0.5	N	1	1.5	4
Measurement system						
—probe calibration	B	5.9	N	1	5.9	∞
—axial isotropy of the probe	B	4.7	R	0.7	1.9	∞
—hemisphere isotropy of the probe	B	9.6	R	0.7	3.9	
—probe linearity	B	4.7	R	1	2.7	∞
—detection limit	B	1.0	R	1	0.6	∞
—boundary effect	B	1.0	R	1	0.6	∞
—Readout Electronics	B	0.3	N	1	0.3	∞
—response time	B	0.8	N	1	0.8	∞
—Noise	B	0	N	1	0	∞
—Integration Time	B	2.6	N	1	2.6	∞
Mechanical constraints						
—Scanning System	B	0.4	R	1	0.2	∞
—Phantom Shell	B	4.0	R	1	2.3	∞
—Probe Positioning	B	2.9	R	1	1.7	∞
—Device Positioning	B	2.0	N	1	2.9	145
Physical Parameters						
—liquid conductivity (deviation from target)	B	5.0	R	0.5	1.4	∞
—liquid	B	4.3	R	0.	1.2	∞

conductivity(measurement error)				5		
—liquid permittivity(deviation from target)	B	5.0	R	0.5	1.4	∞
—liquid permittivity(measurement error)	B	4.3	R	0.5	1.2	∞
—Power Drift	B	5.0	R	1	2.9	∞
—RF Ambient Conditions	B	3.0	R	1	1.7	∞
Post-Processing						
—Extrap. and Integration	B	1.0	R	1	0.6	∞
—Combined Std. Uncertainty					11.0	∞
Expanded STD Uncertainty					22.0	∞

9 Reference Document

[1] Federal Communications Commission: Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields, Supplement C (Edition 01-01) to OET Bulletin 65 (Edition 97-01), FCC, 2001.

[2] IEEE Std C95.1-1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, Inst. of Electrical and Electronics Engineer, Inc., 1999.

[3] IEEE Std 1528-2003: IEEE Recommended Practice for Determining the Peak Spatial-Average Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques. 1528-2003, December 19, 2003.the Institute of Electrical and Electronics Engineers.

[4] Schmid & Partner Engineering AG, DASY4 Manual, February 2004 17-5

SAR Test Report Annex on

ZONDA ZMTH200

FCC ID: YAUZMTH200

Report Reference: SAR-RC001-2011

Date: May, 30, 2011

Test Laboratory:

Beijing 7 layers Huarui Communications Technology Co., Ltd.
No.11 Yue Tan Nan Street, Xi Cheng District
Beijing 100045
China P.R.

Note:
The following test results relate only to the devices specified in this document. This report shall not be reproduced in parts without the written approval of the test laboratory.

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Fax: +86 010 68050370
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Chairman of the Board:
Mr. Yang Zemin
Vice Chairman of Board:
Dr. Hans-Jürgen Meckelburg

Appendix A: Dipole Certification

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

ilac-MRA

SWISS CALIBRATION

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

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

Accreditation No.: **SCS 108**

Client **Flextronics (Auden)**

Certificate No: **D835V2-4d038_Aug10**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d038
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	August 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-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
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 8481A	MY41092317	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	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

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

Issued: August 25, 2010

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Certificate No: D835V2-4d038_Aug10 Page 1 of 9

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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 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	41.4 ± 6 %	0.90 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	250 mW input power	2.40 mW / g
SAR normalized	normalized to 1W	9.60 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.59 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 mW / g
SAR normalized	normalized to 1W	6.28 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.28 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	54.8 ± 6 %	1.01 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	2.58 mW / g
SAR normalized	normalized to 1W	10.3 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**9.99 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.69 mW / g
SAR normalized	normalized to 1W	6.76 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.60 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.5 Ω - 2.4 jΩ
Return Loss	- 31.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.4 Ω - 4.7 jΩ
Return Loss	- 25.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.396 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 20, 2005

DASY5 Validation Report for Head TSL

Date/Time: 25.08.2010 12:15:45

Test Laboratory: SPEAG, Zurich, Switzerland

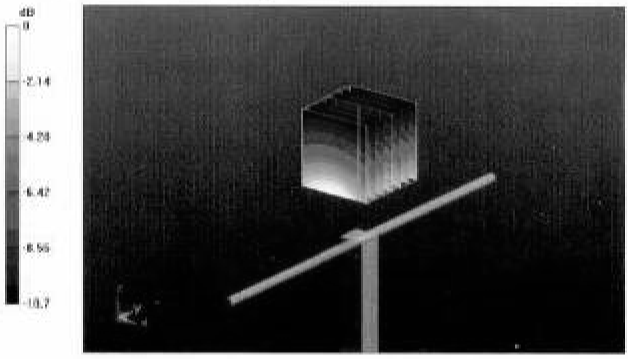
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d038

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 41.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

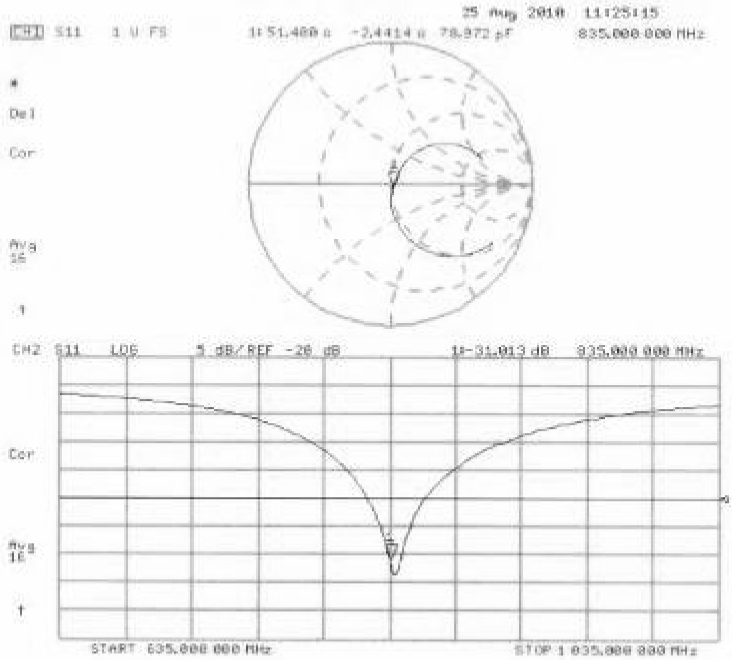
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
-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

Head/d=15mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.3 V/m; Power Drift = 0.025 dB
Peak SAR (extrapolated) = 3.62 W/kg
SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.57 mW/g
Maximum value of SAR (measured) = 2.79 mW/g



0 dB = 2.79mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body

Date/Time: 25.08.2010 14:20:27

Test Laboratory: SPEAG, Zurich, Switzerland

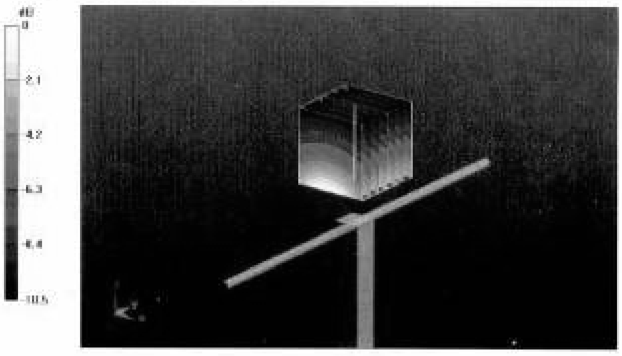
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d038

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; σ = 1.01 mho/m; ε_r = 54.8; ρ = 1000 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)

Body/d=15mm, Pin250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.3 V/m; Power Drift = 0.029 dB
Peak SAR (extrapolated) = 3.81 W/kg
SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.69 mW/g
Maximum value of SAR (measured) = 3 mW/g



0 dB = 3mW/g

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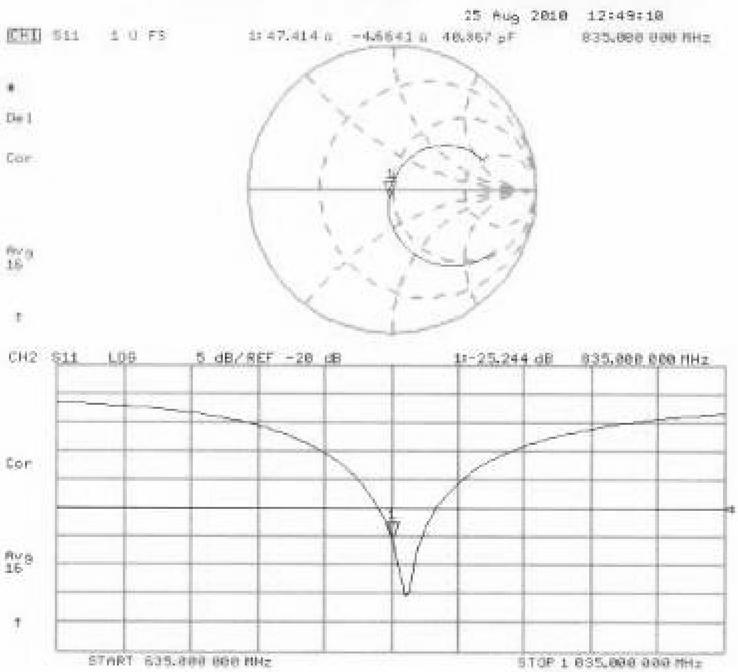
Impedance Measurement Plot for Body TSL



Certificate No: D835V2-4d038_Aug10 Page 9 of 9

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Accreditation No.: **SCS 108**

Client **Flextronics (Auden)**

Certificate No: **D1900V2-5d072_Aug10**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN: 5d072
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	August 24, 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-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
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 8481A	MY41092317	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	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

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

Issued: August 24, 2010

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Certificate No: D1900V2-5d072_Aug10 Page 1 of 9

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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	39.7 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature during test	(21.7 ± 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	**39.9 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.26 mW / g
SAR normalized	normalized to 1W	21.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**20.9 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.9 ± 6 %	1.53 mho/m ± 6 %
Body TSL temperature during test	(21.9 ± 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	10.5 mW / g
SAR normalized	normalized to 1W	42.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**41.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.65 mW / g
SAR normalized	normalized to 1W	22.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**22.5 mW / g ± 16.5 % (k=2)**

Certificate No: D1900V2-5d072_Aug10 Page 4 of 9

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.9 Ω + 4.0 jΩ
Return Loss	- 27.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.0 Ω + 4.6 jΩ
Return Loss	- 24.8 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	January 24, 2006

DASY5 Validation Report for Head TSL

Date/Time: 24.08.2010 13:59:09

Test Laboratory: SPEAG, Zurich, Switzerland

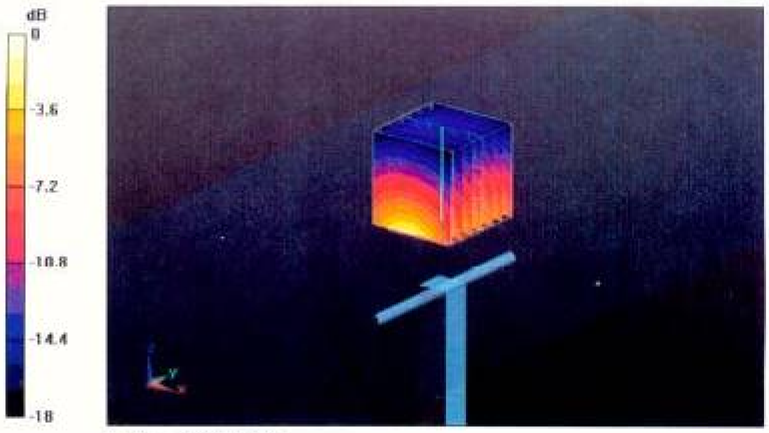
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d072

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 1900 MHz; σ = 1.43 mho/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

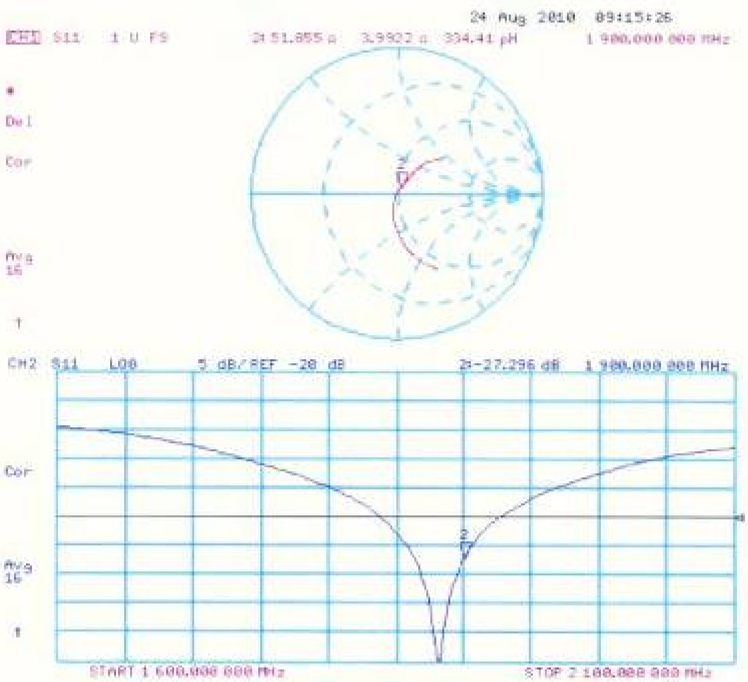
- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (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 = 97.4 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 18.5 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.26 mW/g
Maximum value of SAR (measured) = 12.7 mW/g



0 dB = 12.7mW/g

Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-5d072_Aug10 Page 7 of 9

DASY5 Validation Report for Body

Date/Time: 17.08.2010 16:19:00

Test Laboratory: SPEAG, Zurich, Switzerland

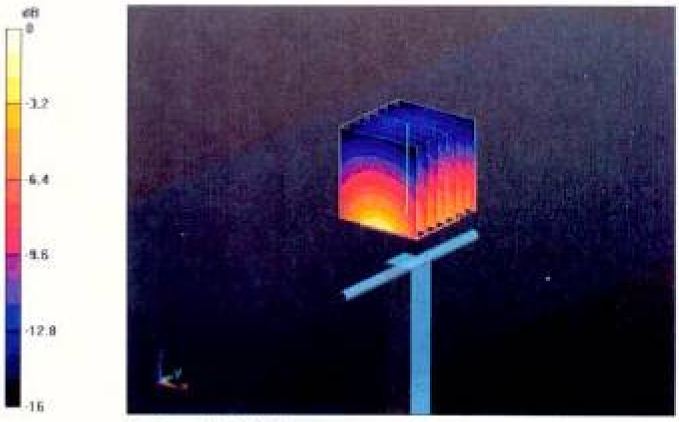
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d072

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL U11 BB
Medium parameters used: f = 1900 MHz; σ = 1.53 mho/m; ε_r = 52.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

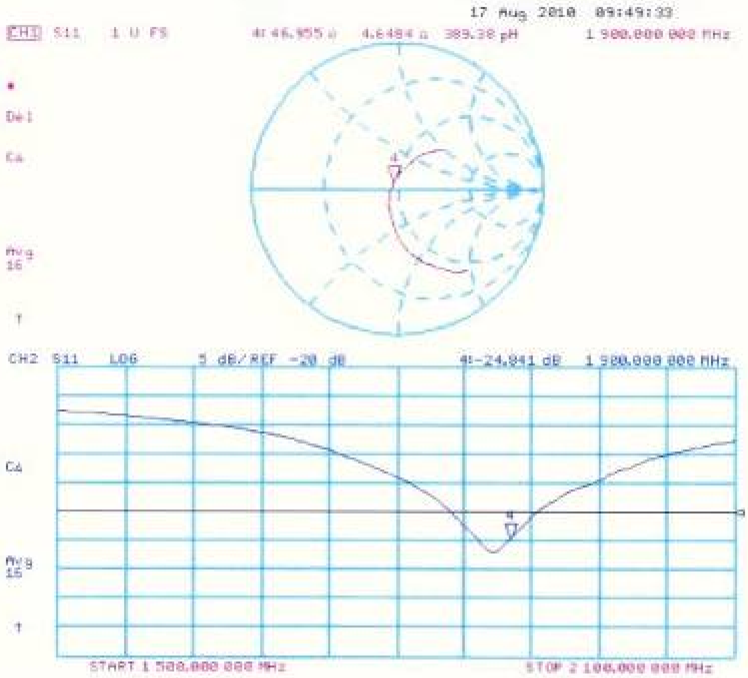
- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- 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 = 97.8 V/m; Power Drift = -0.00484 dB
Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.65 mW/g
Maximum value of SAR (measured) = 13.2 mW/g



0 dB = 13.2mW/g

Impedance Measurement Plot for Body TSL



Certificate No: D1900V2-5d072_Aug10 Page 9 of 9

Appendix B: Probe Certification

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Accreditation No.: **SCS 108**

Client **Flextronics (Auden)**

Certificate No: **ES3-3109_Nov10**

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3109
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 (Additional Conversion Factors)

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	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
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: November 23, 2010

Certificate No: ES3-3109_Nov10 Page 1 of 8

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe ES3DV3

SN:3109
Additional Conversion Factors

Manufactured:	September 20, 2005
Last calibrated:	August 25, 2010
Recalibrated:	November 23, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV3 SN:3109

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.22	1.33	1.30	± 10.1%
DCP (mV)[B]	96.9	95.2	92.5	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300.0	± 1.5%
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).

[B] Numerical linearization parameter: uncertainty not required.

[E] Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 SN:3109

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
1950	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.74	4.74	4.74	0.54	1.41 ± 11.0%

[C] The validity of ± 100 MHz only applies for DASY v4.4 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.

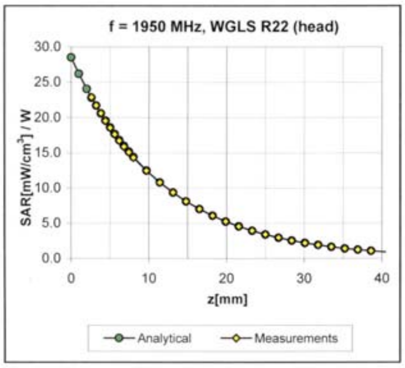
DASY/EASY - Parameters of Probe: ES3DV3 SN:3109

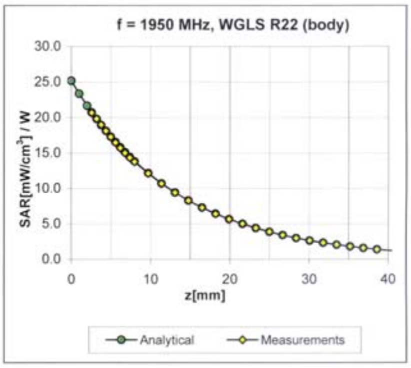
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
1950	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.69	4.69	4.69	0.33	2.18	± 11.0%

[C] The validity of ± 100 MHz only applies for DASY v4.4 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.

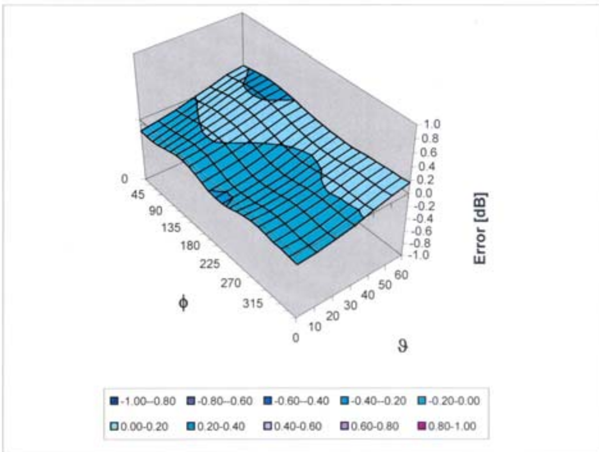
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

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	4.0 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

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

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

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Accreditation No.: **SCS 108**

Client **Flextronics (Auden)**

Certificate No: **ES3-3109_Aug10**

CALIBRATION CERTIFICATE

Object	ES3DV3 - SN:3109
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:	August 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 E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	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
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

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

Issued: August 25, 2010

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

Probe ES3DV3

SN:3109

Manufactured:	September 20, 2005
Last calibrated:	February 16, 2009
Recalibrated:	August 25, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Calibration Laboratory of
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Glossary:

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NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
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Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

DASY/EASY - Parameters of Probe: ES3DV3 SN:3109

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.22	1.33	1.30	± 10.1%
DCP (mV)[B]	96.9	95.2	92.5	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300.0	± 1.5%
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

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

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).

[B] Numerical linearization parameter: uncertainty not required.

[E] Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ES3DV3 SN:3109

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	5.72	5.72	5.72	0.98	1.05 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.88	4.88	4.88	0.52	1.42 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.24	4.24	4.24	0.43	1.76 ± 11.0%

[C] The validity of ± 100 MHz only applies for DASY v4.4 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.

DASY/EASY - Parameters of Probe: ES3DV3 SN:3109

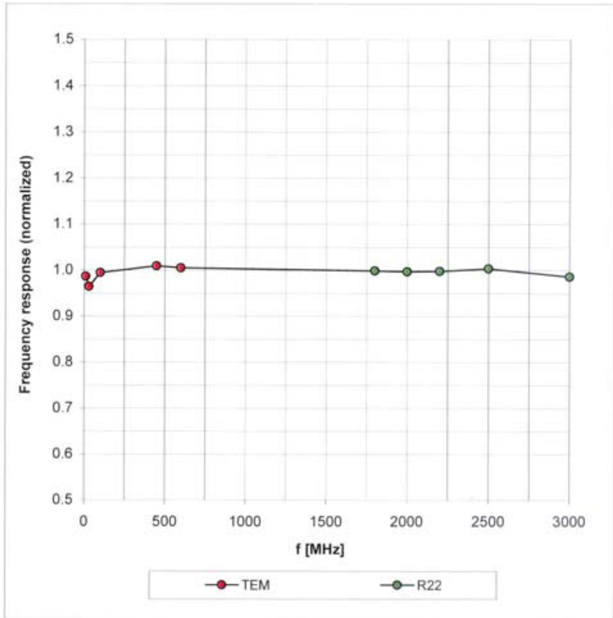
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	5.70	5.70	5.70	0.84	1.11 ± 11.0%
1810	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.70	4.70	4.70	0.35	2.12 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.26	4.26	4.26	0.55	1.47 ± 11.0%

[C] The validity of ± 100 MHz only applies for DASY v4.4 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.

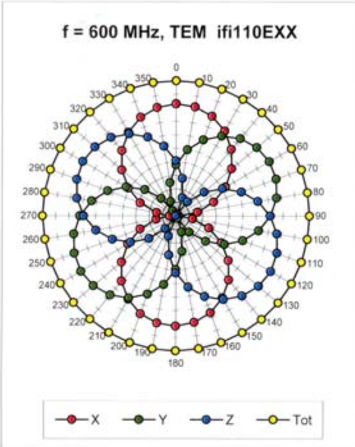
Frequency Response of E-Field

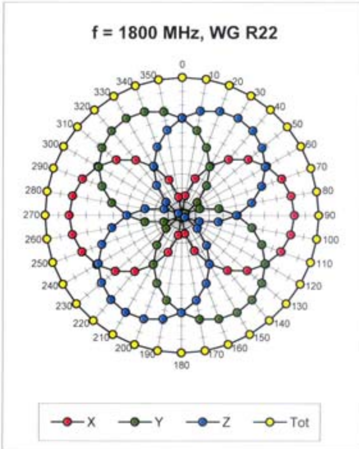
(TEM-Cell:ifi110 EXX, Waveguide: R22)

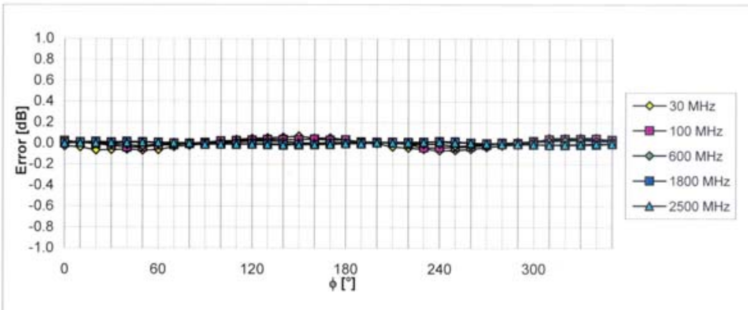


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), $\vartheta = 0°$



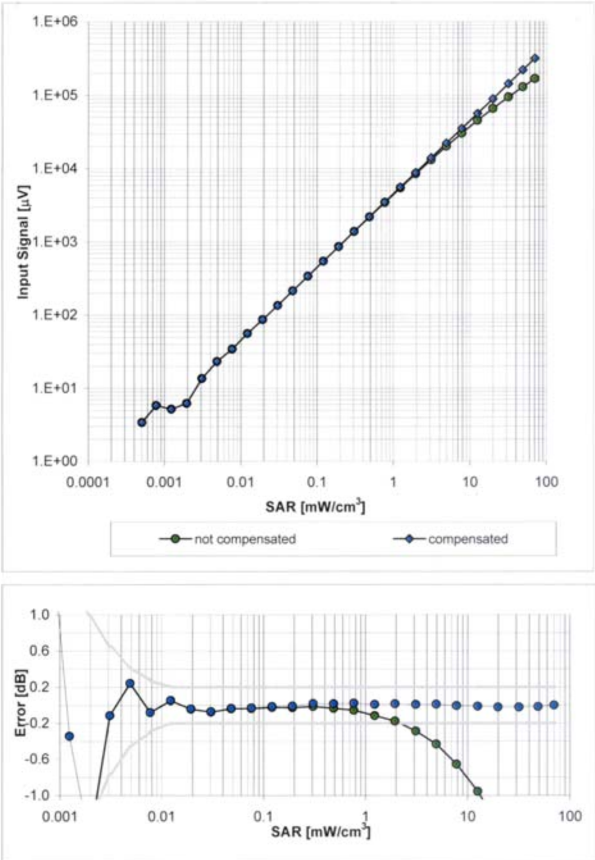




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

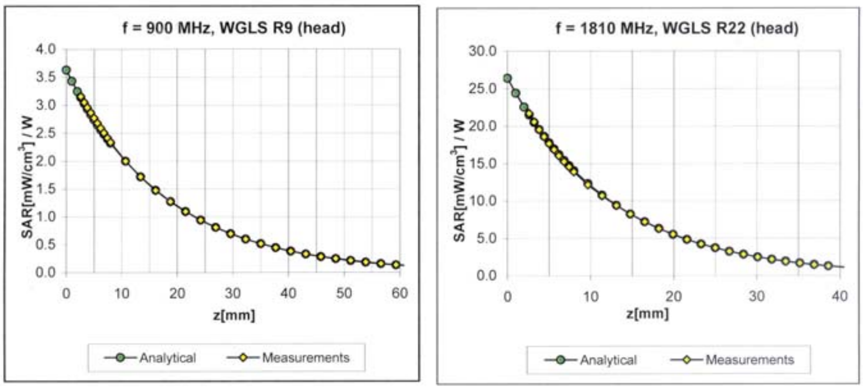
Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)



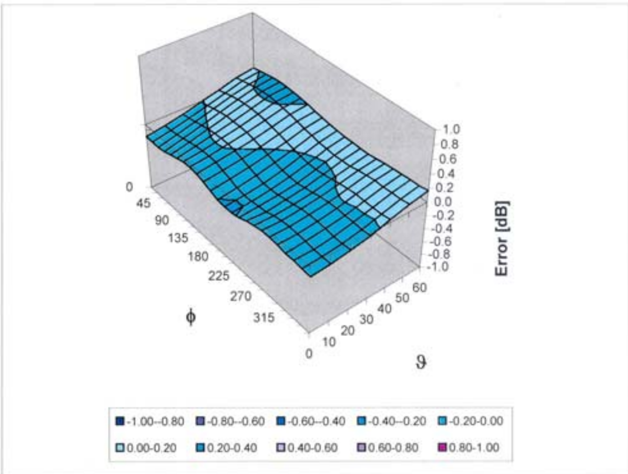
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

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	4.0 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

Appendix C: Phantom Conformity

Schmid & Partner Engineering AG

s p e a g

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 CA
Series No	TP-1150 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

The series production process used allows the limitation to test of first articles.
Complete tests were made on the pre-series Type No. QD 000 P40 AA, Serial No. TP-1001 and on the series first article Type No. QD 000 P40 BA, Serial No. TP-1006. Certain parameters have been retested using further series units (called samples).

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas; 6mm +/- 0.2mm at ERP	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions	DEGMBE based simulating liquids	Pre-series, First article, Samples

Standards

[1] CENELEC EN 50361
[2] IEEE Std 1528-200x Draft CD 1.1 (Dec 02)
[3] IEC 62209/CD (Nov 02)
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

Based on the sample tests above, we certify that this item is in compliance with the uncertainty requirements of SAR measurements specified in standard [1] and draft standards [2] and [3].

Date 5.5.2003

Signature / Stamp

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Phone +41 1 245 9700, Fax +41 1 245 9779
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Certificate of Conformity / First Article Inspection

Item	Oval Flat Phantom ELI 4.0
Type No	QD OVA 001 B
Series No	1003 and higher
Manufacturer	SPEAG Zeughausstrasse 43 CH-8004 Zürich Switzerland

Tests
Complete tests were made on the prototype units QD OVA 001 AA 1001, QD OVA 001 AB 1002, pre-series units QD OVA 001 BA 1003-1005 as well as on the series units QD OVA 001 BB, 1006 ff.

Test	Requirement	Details	Units tested
Dimensions	Compliant with the standard IEC 62209 – 2 [1] requirements	Dimensions of bottom for 300 MHz – 6 GHz: longitudinal = 600 mm (max. dimension) width= 400 mm (min dimension) depth= 190 mm Shape: ellipse	Prototypes, Samples
Material thickness	Compliant with the standard IEC 62209 – 2 [1] requirements	Bottom plate: 2.0mm +/- 0.2mm	Prototypes, All items
Material parameters	Dielectric parameters for required frequencies	300 MHz – 6 GHz Rel. permittivity = 4 +/-1, Loss tangent ≤ 0.05	Material sample
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions. Observe Technical Note for material compatibility.	DEGMBE based simulating liquids	Equivalent phantoms, Material sample
Sagging	Compliant with the requirements according to the standard. Sagging of the flat section when filled with tissue simulating liquid	< 1% typical < 0.8% if filled with 155mm of HSL900 and without DUT below	Prototypes, Sample testing

Standards

[1] IEC 62209 – 2, Draft Version 0.9, "Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation and Procedures
Part 2: Procedure to determine the Specific Absorption Rate (SAR) for ... including accessories and multiple transmitters", December 2004

Conformity
Based on the sample tests above, we certify that this item is in compliance with the standard [1].

Date 07.07.2005

Signature / Stamp

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Certificate of conformity / First Article Inspection

Item	SAM Twin Phantom V4.0
Type No	QD 000 P40 CA
Series No	TP-1150 and higher
Manufacturer / Origin	Untersee Composites Hauptstr. 69 CH-8559 Fruthwilen Switzerland

Tests

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Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas; 6mm +/- 0.2mm at ERP	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
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