



A D T

FCC SAR Test Report

Report No. : SA121126C01
Applicant : ecom instruments GmbH
Address : Industriestrasse 2, Assamstadt, Germany
Product : MOBILE PHONE
FCC ID : XAM500041GR01
Brand : Sonim
Model No. : Sonim XP3410 IS (C21F010AB)
Standards : FCC 47 CFR Part 2 (2.1093) / IEEE C95.1:1991 / IEEE 1528:2003
FCC OET Bulletin 65 Supplement C (Edition 01-01)
KDB 648474 D01 v01r05
Date of Testing : Nov. 23, 2012 ~ Nov. 25, 2012

CERTIFICATION: The above equipment have been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., China Branch - Dongguan Lab**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's SAR characteristics under the conditions specified in this report. It should not be reproduced except in full, without the written approval of our laboratory. The client should not use it to claim product certification, approval, or endorsement by A2LA or any government agencies.

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No: 2951.01

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Release Control Record

Issue No.	Reason for Change	Date Issued
R01	Original release	Dec. 19, 2012



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1. Summary of Maximum SAR Value

Mode / Band	Test Position	SAR-1g (W/kg)
CDMA2000 BC0	Head	1.45
	Body Worn (1.5 cm Gap)	1.02
CDMA2000 BC1	Head	1.03
	Body Worn (1.5 cm Gap)	0.416
CDMA2000 BC10	Head	1.41
	Body Worn (1.5 cm Gap)	1.05
Bluetooth	Head	N/A
	Body Worn (1.5 cm Gap)	N/A

Note:

1. The SAR limit (**1.6 W/kg**) for general population/uncontrolled exposure is specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1991.
2. Since the Bluetooth maximum power is less than P_{Ref} , SAR testing for Bluetooth is not required.
3. The BT standalone SAR and WWAN simultaneous transmissions SAR were not required, because the maximum output power of Bluetooth is less than 60/f.



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2. Description of Equipment Under Test

EUT Type	MOBILE PHONE
FCC ID	XAM500041GR01
Brand Name	Sonim
Model Name	Sonim XP3410 IS (C21F010AB)
HW Version	A
SW Version	E346B_1200B06
Tx Frequency Bands (Unit: MHz)	CDMA BC0 : 824 ~ 849 CDMA BC1 : 1850 ~ 1910 CDMA BC10 : 817 ~ 823 Bluetooth : 2400 ~ 2483.5
Uplink Modulations	CDMA : QPSK Bluetooth : GFSK
Maximum AVG Conducted Power (Unit: dBm)	CDMA BC0 : 25.07 CDMA BC1 : 25.02 CDMA BC10 : 25.15 Bluetooth : -6.38
Antenna Type	Fixed Internal Antenna
EUT Stage	Identical Prototype

Note:

1. The above EUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.

List of Accessory:

Battery	Brand Name	ecom
	Model Name	Ex-BPC 41
	Power Rating	3.7Vdc, 1960mAh
	Type	Li-ion
Earphone	Brand Name	Sonim
	Model Name	ME-816B5-C
	Signal Line Type	1.0 meter non-shielded cable without ferrite core



3. SAR Measurement System

3.1 Definition of Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

$$SAR = \frac{d}{dt} \left(\frac{dW}{dm} \right) = \frac{d}{dt} \left(\frac{dW}{\rho dv} \right)$$

SAR is expressed in units of Watts per kilogram (W/kg)

SAR measurement can be related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

3.2 SPEAG DASY System

DASY system consists of high precision robot, probe alignment sensor, phantom, robot controller, controlled measurement server and near-field probe. The robot includes six axes that can move to the precision position of the DASY5 software defined. The DASY software can define the area that is detected by the probe. The robot is connected to controlled box. Controlled measurement server is connected to the controlled robot box. The DAE includes amplifier, signal multiplexing, AD converter, offset measurement and surface detection. It is connected to the Electro-optical coupler (ECO). The ECO performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC.

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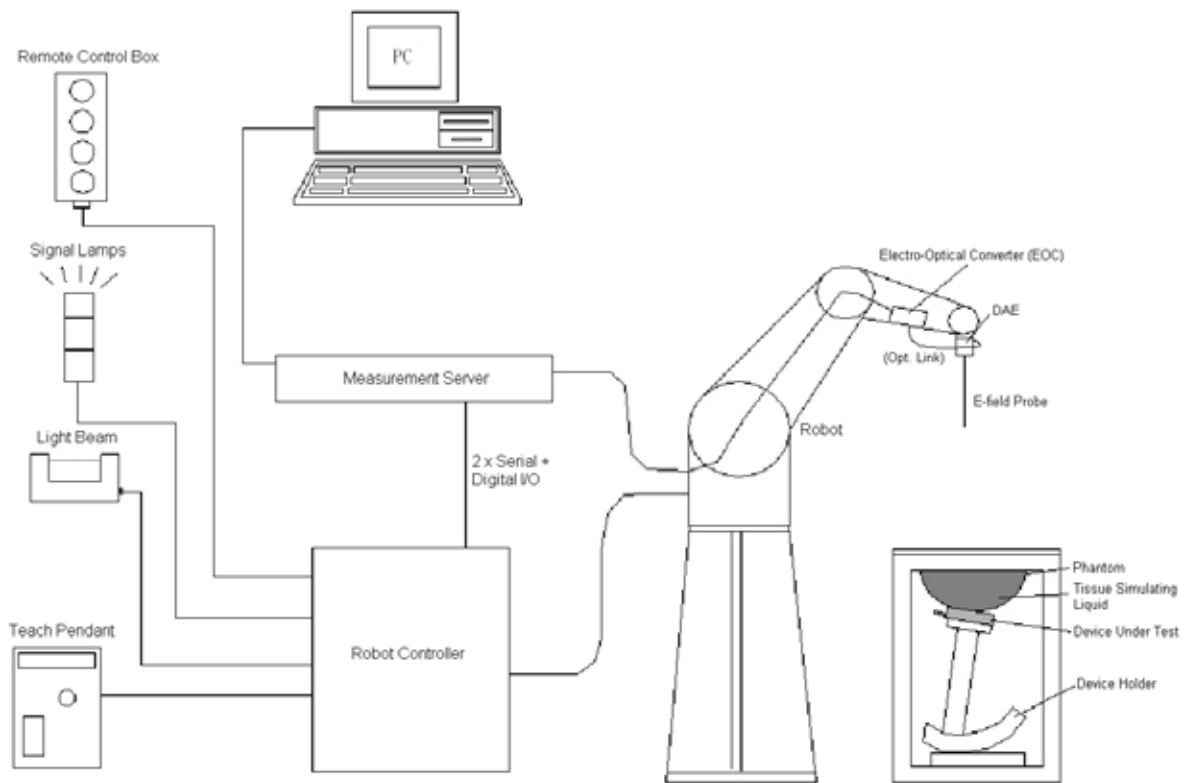


Fig-3.1 DASY System Setup

3.2.1 Robot

The DASY system uses the high precision robots from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ± 0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)





Fig-3.2 DASY5

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3.2.2 Probes

The SAR measurement is conducted with the dosimetric probe. The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency.

Model	EX3DV4	
Construction	Symmetrical design with triangular core. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).	
Frequency	10 MHz to 6 GHz Linearity: ± 0.2 dB	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 μ W/g to 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/g)	
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	


Model	ES3DV3	
Construction	Symmetrical design with triangular core. Interleaved sensors. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE).	
Frequency	10 MHz to 4 GHz Linearity: ± 0.2 dB	
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	5 μ W/g to 100 mW/g Linearity: ± 0.2 dB	
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm	

3.2.3 Data Acquisition Electronics (DAE)


Model	DAE3, DAE4	
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.	
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV, 400mV)	
Input Offset Voltage	< 5 μ V (with auto zero)	
Input Bias Current	< 50 fA	
Dimensions	60 x 60 x 68 mm	

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3.2.4 Phantoms

Model	Twin SAM	
Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.	
Material	Vinylester, glass fiber reinforced (VE-GF)	
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)	
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet	
Filling Volume	approx. 25 liters	

3.2.5 Device Holder

Model	Mounting Device	
Construction	In combination with the Twin SAM Phantom or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).	
Material	POM	

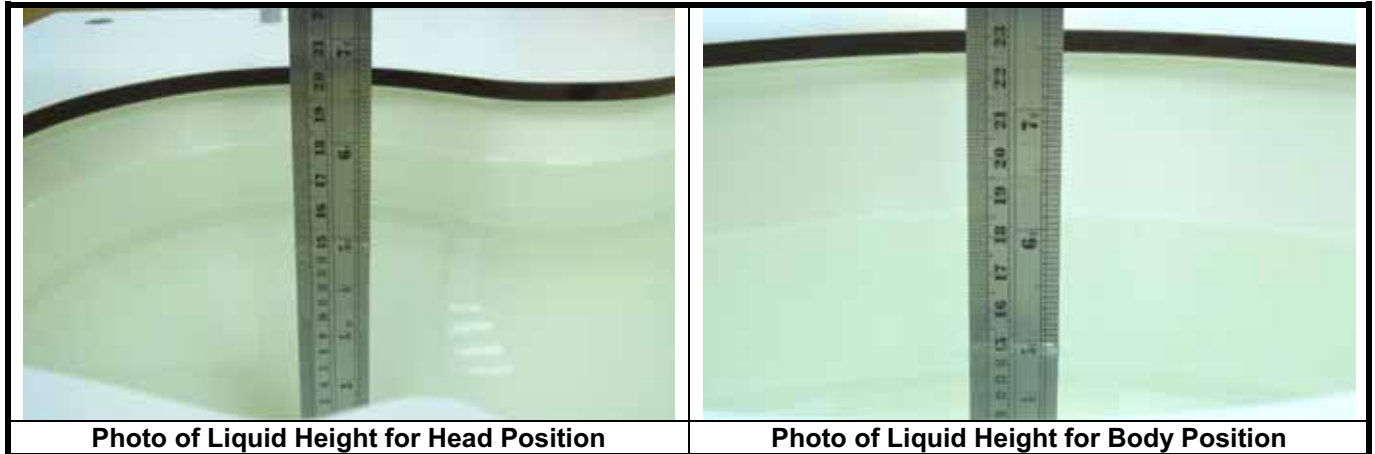
3.2.6 System Validation Dipoles

Model	D-Serial	
Construction	Symmetrical dipole with 1/4 balun. Enables measurement of feed point impedance with NWA. Matched for use near flat phantoms filled with tissue simulating solutions.	
Frequency	750 MHz to 5800 MHz	
Return Loss	> 20 dB	
Power Capability	> 100 W (f < 1GHz), > 40 W (f > 1GHz)	

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3.2.7 Tissue Simulating Liquids

For SAR measurement of the field distribution inside the phantom, the phantom must be filled with homogeneous tissue simulating liquid to a depth of at least 15 cm. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm. The nominal dielectric values of the tissue simulating liquids in the phantom and the tolerance of 5% are listed in Table-3.1.



The dielectric properties of the head tissue simulating liquids are defined in IEEE 1528 and FCC OET 65 Supplement C Appendix C. For the body tissue simulating liquids, the dielectric properties are defined in FCC OET 65 Supplement C Appendix C. The dielectric properties of the tissue simulating liquids were verified prior to the SAR evaluation using an SPEAG DAK-3.5 Dielectric Probe Kit and an Agilent Network Analyzer.

Table-3.1 Targets of Tissue Simulating Liquid

Frequency (MHz)	Target Permittivity	Range of $\pm 5\%$	Target Conductivity	Range of $\pm 5\%$
For Head				
835	41.5	39.4 ~ 43.6	0.90	0.86 ~ 0.95
1900	40.0	38.0 ~ 42.0	1.40	1.33 ~ 1.47
For Body				
835	55.2	52.4 ~ 58.0	0.97	0.92 ~ 1.02
1900	53.3	50.6 ~ 56.0	1.52	1.44 ~ 1.60

The following table gives the recipes for tissue simulating liquids.

Table-3.2 Recipes of Tissue Simulating Liquid

Tissue Type	Bactericide	DGBE	HEC	NaCl	Sucrose	Triton X-100	Water	Diethylene Glycol Mono-hexylether
H835	0.2	-	0.2	1.5	57.0	-	41.1	-
H1900	-	44.5	-	0.2	-	-	55.3	-
B835	0.2	-	0.2	0.9	48.5	-	50.2	-
B1900	-	29.5	-	0.3	-	-	70.2	-

3.3 SAR System Verification

The system check verifies that the system operates within its specifications. It is performed daily or before every SAR measurement. The system check uses normal SAR measurements in the flat section of the phantom with a matched dipole at a specified distance. The system verification setup is shown as below.

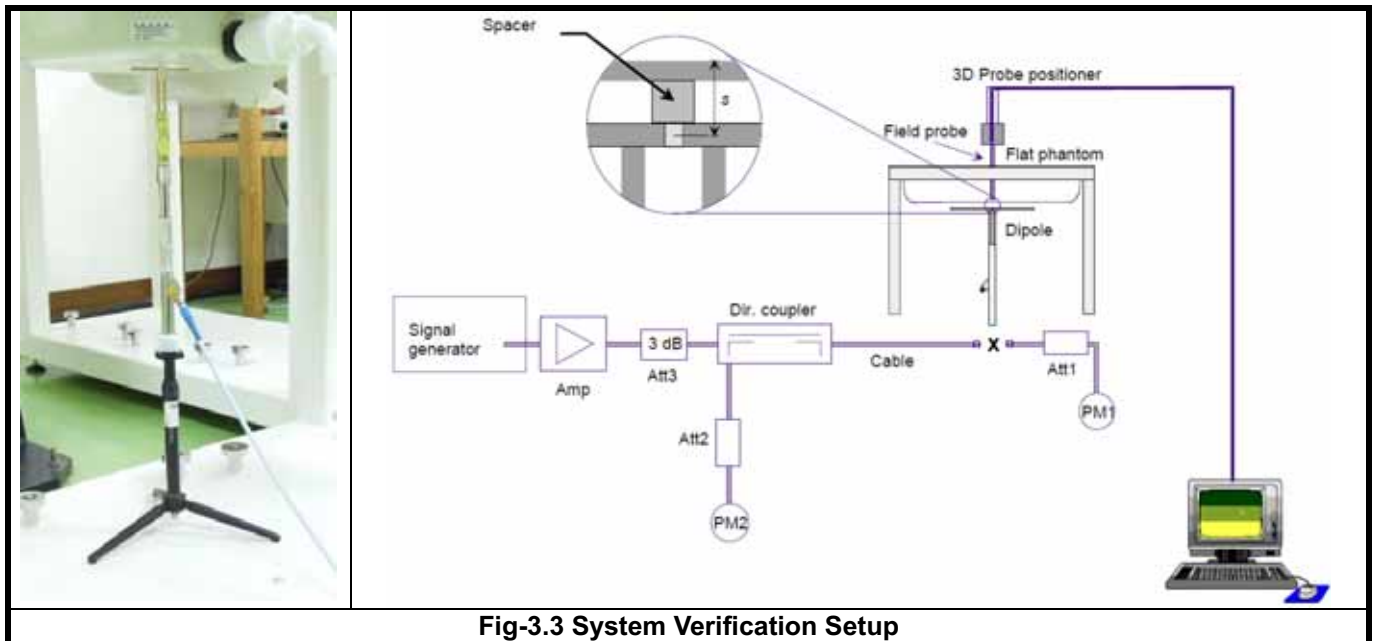


Fig-3.3 System Verification Setup

The validation dipole is placed beneath the flat phantom with the specific spacer in place. The distance spacer is touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The power meter PM1 measures the forward power at the location of the system check dipole connector. The signal generator is adjusted for the desired forward power (250 mW is used for 700 MHz to 3 GHz, 100 mW is used for 3.5 GHz to 6 GHz) 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.

After system check testing, the SAR result will be normalized to 1W forward input power and compared with the reference SAR value derived from validation dipole certificate report. The deviation of system check should be within 10 %.



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3.4 SAR Measurement Procedure

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

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

The SAR measurement procedures for each of test conditions are as follows:

- (a) Make EUT to transmit maximum output power
- (b) Measure conducted output power through RF cable
- (c) Place the EUT in the specific position of phantom
- (d) Perform SAR testing steps on the DASY system
- (e) Record the SAR value

3.4.1 Area & Zoom Scan Procedure

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan measures 5x5x7 points with step size 8, 8 and 5 mm for below 3 GHz, and 7x7x9 points with step size 4, 4 and 2.5 mm for above 5 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

3.4.2 Volume Scan Procedure

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

3.4.3 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drift more than 5%, the SAR will be retested.



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3.4.4 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

3.4.5 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.



4. SAR Measurement Evaluation

4.1 EUT Configuration and Setting

For WWAN SAR testing, the EUT was linked and controlled by base station emulator (Agilent E5515C). Communication between the EUT and the emulator was established by air link. The distance between the EUT and the communicating antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT. The EUT was set from the emulator to radiate maximum output power during SAR testing.

For CDMA, SAR is tested under 1xRTT mode using RC3 with the EUT configured to transmit at full rate using Loopback Service Option SO55 on head position, and RC3 with the EUT configured using TDSO/SO32, to transmit at full rate on FCH with all other code channels disabled on body position. SAR for RC1 is not required when the maximum power is less than 1/4 dB higher than RC3. SAR for multiple code channels (FCH+SCH_n) is not required when the maximum power is less than 1/4 dB higher than that measured with FCH only. SAR for EVDO Rev.0 is not required when the maximum power is less than 1/4 dB higher than RC3 (1xRTT). SAR for EVDO Rev.A is not required when the maximum power is less than Rev.0 or less than 1/4 dB higher than RC3. The steps for system simulator (Agilent E5515C) setup are as below.

1. Set the System ID and Network ID
2. Set the Cell Band and connecting Channel
3. Set the power control to All Up Bits
4. Press "Originate Call" button

4.2 EUT Testing Position

This EUT was tested in **Right Cheek, Right Tilted, Left Cheek, Left Tilted, Front Face of EUT with phantom 1.5 cm gap**, and **Rear Face of EUT with phantom 1.5 cm gap** positions as illustrated below:

1. Define two imaginary lines on the handset

- The vertical centerline passes through 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, and the midpoint of the width w_b of the bottom of the handset.
- The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.
- The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

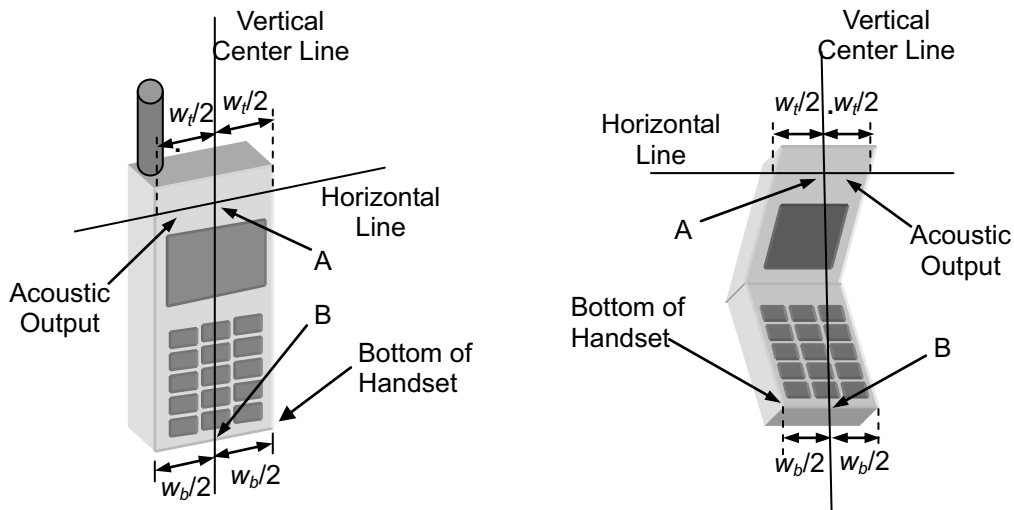


Fig-4.1 Illustration for Handset Vertical and Horizontal Reference Lines

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2. Cheek Position

- (a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.
- (b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig-4.2).

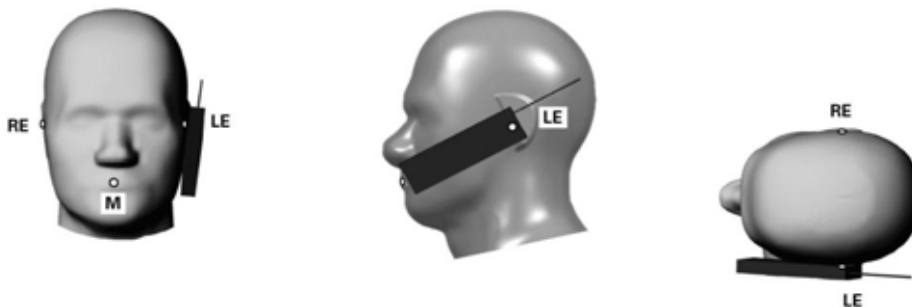


Fig-4.2 Illustration for Cheek Position

3. Tilted Position

- (a) To position the device in the "cheek" position described above.
- (b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see Fig-4.3).

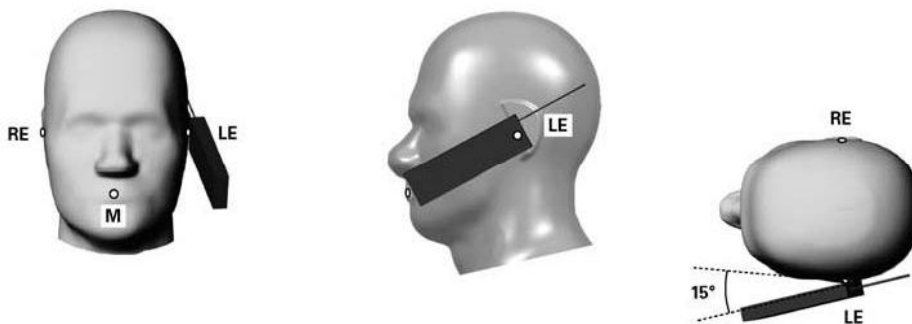


Fig-4.3 Illustration for Tilted Position

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4. Body Worn Position

- (a) To position the EUT parallel to the phantom surface.
- (b) To adjust the EUT parallel to the flat phantom.
- (c) To adjust the distance between the EUT surface and the flat phantom to 1.5 cm or holster surface and the flat phantom to 0 cm.

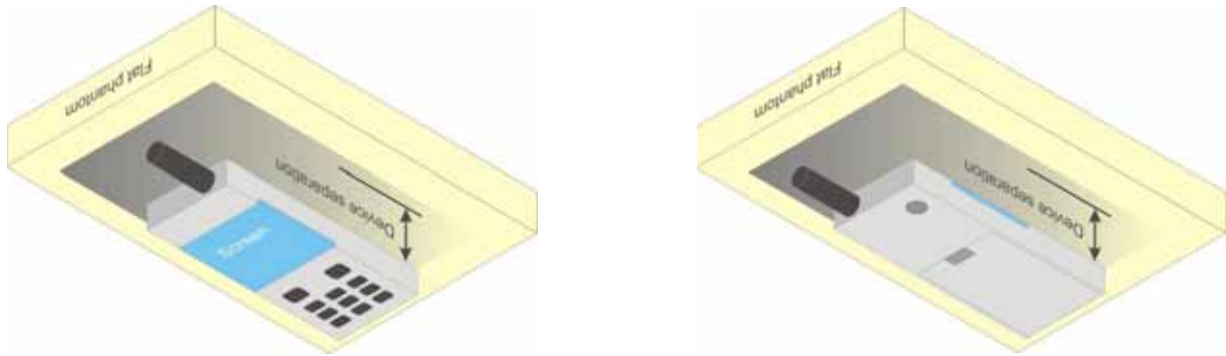


Fig-4.4 Illustration for Body Worn Position

4.3 Tissue Verification

The measuring results for tissue simulating liquid are shown as below.

Tissue Type	Frequency (MHz)	Liquid Temp. (°C)	Measured Conductivity (σ)	Measured Permittivity (ϵ_r)	Target Conductivity (σ)	Target Permittivity (ϵ_r)	Conductivity Deviation (%)	Permittivity Deviation (%)	Test Date
H835	835	20.8	0.89	40.764	0.90	41.5	-1.11	-1.77	Nov. 25, 2012
H1900	1900	20.8	1.458	40.123	1.40	40.0	4.14	0.31	Nov. 25, 2012
B835	835	20.6	0.976	54.343	0.97	55.2	-0.31	-1.55	Nov. 23, 2012
B1900	1900	20.6	1.579	52.477	1.52	53.3	3.88	-1.54	Nov. 23, 2012

Note:

The dielectric properties of the tissue simulating liquid must be measured within 24 hours before the SAR testing and within $\pm 5\%$ of the target values. Liquid temperature during the SAR testing must be within $\pm 2^\circ\text{C}$.

4.4 System Verification

The measuring results for system check are shown as below.

Test Date	Mode	Frequency (MHz)	1W Target SAR-1g (W/kg)	Measured SAR-1g (W/kg)	Normalized to 1W SAR-1g (W/kg)	Deviation (%)	Dipole S/N	Probe S/N	DAE S/N
Nov. 25, 2012	Head	835	9.35	2.46	9.84	5.24	4d139	3873	1341
Nov. 25, 2012	Head	1900	39.40	9.89	39.56	0.41	5d159	3873	1341
Nov. 23, 2012	Body	835	9.50	2.47	9.88	4.00	4d139	3873	1341
Nov. 23, 2012	Body	1900	40.30	10.6	42.40	5.21	5d159	3873	1341

Note:

Comparing to the reference SAR value provided by SPEAG, the validation data should be within its specification of 10 %. The result indicates the system check can meet the variation criterion and the plots can be referred to Appendix A of this report.



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4.5 Conducted Power Results

The measuring conducted power (Unit: dBm) are shown as below.

Band Channel	CDMA BC0			CDMA BC1		
	1013	384	777	25	600	1175
Frequency (MHz)	824.70	836.52	848.31	1851.25	1880.00	1908.75
1xRTT RC1+SO55	24.63	24.53	24.56	24.70	24.80	24.64
1xRTT RC3+SO55	25.05	24.85	24.70	24.79	24.92	24.85
1xRTT RC3+SO32(FCH)	25.07	25.02	24.92	24.91	25.02	24.98
1xRTT RC3+SO32(SCH)	24.89	24.84	24.74	24.76	24.86	24.80
1xEVDO Rev.0 RTAP 153.6	25.03	24.92	24.85	24.73	24.78	24.88
1xEVDO Rev.A RETAP 4096	25.01	24.96	24.86	24.82	24.91	24.85

Band Channel	CDMA BC10		
	476	580	684
Frequency (MHz)	817.9	820.5	823.1
1xRTT RC1+SO55	24.85	24.74	24.69
1xRTT RC3+SO55	25.07	25.01	24.98
1xRTT RC3+SO32(FCH)	25.15	25.12	25.10
1xRTT RC3+SO32(SCH)	25.01	24.94	24.89
1xEVDO Rev.0 RTAP 153.6	25.01	25.12	25.03
1xEVDO Rev.A RETAP 4096	25.05	25.00	24.97



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4.6 SAR Testing Results

4.6.1 SAR Results for Head

Plot No.	Band	Mode	Test Position	Channel	Power Drift (dB)	SAR-1g (W/kg)
1	CDMA BC0	RC3+SO55	Right Cheek	1013	0.01	1.45
2	CDMA BC0	RC3+SO55	Right Tilted	1013	-0.04	0.757
3	CDMA BC0	RC3+SO55	Left Cheek	1013	-0.04	1.4
4	CDMA BC0	RC3+SO55	Left Tilted	1013	0.00	0.762
5	CDMA BC0	RC3+SO55	Right Cheek	384	0.00	1.28
6	CDMA BC0	RC3+SO55	Right Cheek	777	-0.02	1.4
7	CDMA BC0	RC3+SO55	Left Cheek	384	0.02	1.24
8	CDMA BC0	RC3+SO55	Left Cheek	777	-0.09	1.32
19	CDMA BC1	RC3+SO55	Right Cheek	600	-0.03	0.47
20	CDMA BC1	RC3+SO55	Right Tilted	600	-0.05	0.222
21	CDMA BC1	RC3+SO55	Left Cheek	600	-0.02	0.838
22	CDMA BC1	RC3+SO55	Left Tilted	600	-0.07	0.328
23	CDMA BC1	RC3+SO55	Left Cheek	25	-0.11	0.876
24	CDMA BC1	RC3+SO55	Left Cheek	1175	-0.03	1.03
9	CDMA BC10	RC3+SO55	Right Cheek	476	0.04	1.41
10	CDMA BC10	RC3+SO55	Right Tilted	476	0.07	0.821
11	CDMA BC10	RC3+SO55	Left Cheek	476	0.04	1.37
12	CDMA BC10	RC3+SO55	Left Tilted	476	0.02	0.778
13	CDMA BC10	RC3+SO55	Right Cheek	580	-0.02	1.26
14	CDMA BC10	RC3+SO55	Right Cheek	684	0.00	1.32
15	CDMA BC10	RC3+SO55	Left Cheek	580	-0.10	1.25
16	CDMA BC10	RC3+SO55	Left Cheek	684	-0.04	1.29
17	CDMA BC10	RC3+SO55	Right Tilted	580	0.02	0.732
18	CDMA BC10	RC3+SO55	Right Tilted	684	0.08	0.749

4.6.2 SAR Results for Body

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Channel	Holster	Power Drift (dB)	SAR-1g (W/kg)
25	CDMA BC0	RC3+SO32 (FCH)	Front Face	1.5	1013	w/o	-0.03	0.874
26	CDMA BC0	RC3+SO32 (FCH)	Rear Face	1.5	1013	w/o	-0.06	0.947
27	CDMA BC0	RC3+SO32 (FCH)	Front Face	1.5	384	w/o	-0.08	0.907
28	CDMA BC0	RC3+SO32 (FCH)	Front Face	1.5	777	w/o	-0.06	0.846
29	CDMA BC0	RC3+SO32 (FCH)	Rear Face	1.5	384	w/o	-0.04	1.02
30	CDMA BC0	RC3+SO32 (FCH)	Rear Face	1.5	777	w/o	-0.05	0.953
31	CDMA BC0	RC3+SO32 (FCH)	Front Face	0	384	w/	-0.10	0.918
32	CDMA BC0	RC3+SO32 (FCH)	Front Face	0	1013	w/	-0.02	1.01
33	CDMA BC0	RC3+SO32 (FCH)	Front Face	0	777	w/	-0.04	0.878
43	CDMA BC1	RC3+SO32 (FCH)	Front Face	1.5	600	w/o	-0.10	0.377
44	CDMA BC1	RC3+SO32 (FCH)	Rear Face	1.5	600	w/o	-0.01	0.416
45	CDMA BC1	RC3+SO32 (FCH)	Front Face	0	600	w/	-0.04	0.265
34	CDMA BC10	RC3+SO32 (FCH)	Front Face	1.5	476	w/o	-0.03	0.977
35	CDMA BC10	RC3+SO32 (FCH)	Rear Face	1.5	476	w/o	-0.06	1.05
36	CDMA BC10	RC3+SO32 (FCH)	Front Face	1.5	580	w/o	0.03	0.882
37	CDMA BC10	RC3+SO32 (FCH)	Front Face	1.5	684	w/o	-0.07	1.03
38	CDMA BC10	RC3+SO32 (FCH)	Rear Face	1.5	580	w/o	0.00	0.979
39	CDMA BC10	RC3+SO32 (FCH)	Rear Face	1.5	684	w/o	0.06	1.03
40	CDMA BC10	RC3+SO32 (FCH)	Front Face	0	476	w/	0.00	0.983
41	CDMA BC10	RC3+SO32 (FCH)	Front Face	0	580	w/	0.04	0.92
42	CDMA BC10	RC3+SO32 (FCH)	Front Face	0	684	w/	0.00	0.969



FCC SAR Test Report

Note:

1. SAR is performed on the highest power channel. When the SAR value of highest power channel is less than 0.8 W/kg, SAR testing for optional channel is not required.
2. SAR for EVDO is not required when the maximum power in EVDO is less than 1/4 dB higher than RC3 (1xRTT).
3. The holster can only allow the EUT face to human body position.

Test Engineer : Becon Wu



5. Calibration of Test Equipment

Equipment	Manufacturer	Model	SN	Cal. Date	Cal. Interval
System Validation Kit	SPEAG	D835V2	4d139	Aug. 07, 2012	Annual
System Validation Kit	SPEAG	D1900V2	5d159	Jul. 20, 2012	Annual
Dosimetric E-Field Probe	SPEAG	EX3DV4	3873	Aug. 06, 2012	Annual
Data Acquisition Electronics	SPEAG	DAE4	1341	Aug. 07, 2012	Annual
SAM Phantom	SPEAG	QD000P40CD	TP-1695	N/A	N/A
SAM Phantom	SPEAG	QD000P40CD	TP-1722	N/A	N/A
Radio Communication Tester	Agilent	E5515C	MY48360810	Feb. 15, 2012	Biennial
ENA Series Network Analyzer	Agilent	E5071C	MY46214638	Jun. 30, 2012	Annual
MXG Analog Signal Generator	Agilent	N5183A	MY50140980	Nov. 05, 2012	Annual
Power Meter	Agilent	N1914A	MY52180044	Aug. 24, 2012	Annual
Power Sensor	Agilent	E9304A	MY52050011	Aug. 23, 2012	Annual
EXA Spectrum Analyzer	Agilent	E7405A	MY45118807	May 14, 2012	Annual
Dielectric Assessment Kit	SPEAG	DAK-3.5	1076	Jul. 30, 2012	Annual
Thermometer	YFE	YF-160A	120100323	Sep. 03, 2012	Annual
Power Amplifier	TESEQ	CBA 1G-150	T44029	Dec. 28, 2011	Annual
Power Amplifier	TESEQ	CBA 3G-100	T44030	Dec. 28, 2011	Annual
Power Amplifier	TESEQ	CBA 6G-50	1041204	Dec. 28, 2011	Annual
Attenuator	Woken	00800A1G01L-03	N/A	Sep. 03, 2012	Annual



6. Measurement Uncertainty

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	C _i (1g)	Standard Uncertainty (1g)	V _i
Measurement System						
Probe Calibration	6.0	Normal	1	1	± 6.0 %	∞
Axial Isotropy	4.7	Rectangular	√3	0.7	± 1.9 %	∞
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	± 3.9 %	∞
Boundary Effects	1.0	Rectangular	√3	1	± 0.6 %	∞
Linearity	4.7	Rectangular	√3	1	± 2.7 %	∞
System Detection Limits	1.0	Rectangular	√3	1	± 0.6 %	∞
Readout Electronics	0.6	Normal	1	1	± 0.6 %	∞
Response Time	0.0	Rectangular	√3	1	± 0.0 %	∞
Integration Time	1.7	Rectangular	√3	1	± 1.0 %	∞
RF Ambient Noise	3.0	Rectangular	√3	1	± 1.7 %	∞
RF Ambient Reflections	3.0	Rectangular	√3	1	± 1.7 %	∞
Probe Positioner	0.5	Rectangular	√3	1	± 0.3 %	∞
Probe Positioning	2.9	Rectangular	√3	1	± 1.7 %	∞
Max. SAR Eval.	2.3	Rectangular	√3	1	± 1.3 %	∞
Test Sample Related						
Device Positioning	3.9	Normal	1	1	± 3.9 %	31
Device Holder	2.7	Normal	1	1	± 2.7 %	19
Power Drift	5.0	Rectangular	√3	1	± 2.9 %	∞
Phantom and Setup						
Phantom Uncertainty	4.0	Rectangular	√3	1	± 2.3 %	∞
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	± 1.8 %	∞
Liquid Conductivity (Meas.)	5.0	Normal	1	0.64	± 3.2 %	29
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	± 1.7 %	∞
Liquid Permittivity (Meas.)	5.0	Normal	1	0.6	± 3.0 %	29
Combined Standard Uncertainty					± 11.7 %	
Expanded Uncertainty (K=2)					± 23.4 %	

Uncertainty budget for frequency range 300 MHz to 3 GHz



7. Information on the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., China Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are accredited and approved according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

China Dongguan Lab:

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Tel: 86-769-8593-5656

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Email: service.dg@cn.bureauveritas.com

Web Site: www.adt.com.tw

The road map of all our labs can be found in our web site also.

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Appendix A. SAR Plots of System Verification

The plots for system verification are shown as follows.

System Check_H835_121125

DUT: Dipole:835 MHz; Type:D835V2; SN;4d139

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

Medium: H835_1125 Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.89 \text{ mho/m}$; $\epsilon_r = 40.764$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Maximum value of SAR (interpolated) = 3.01 W/kg

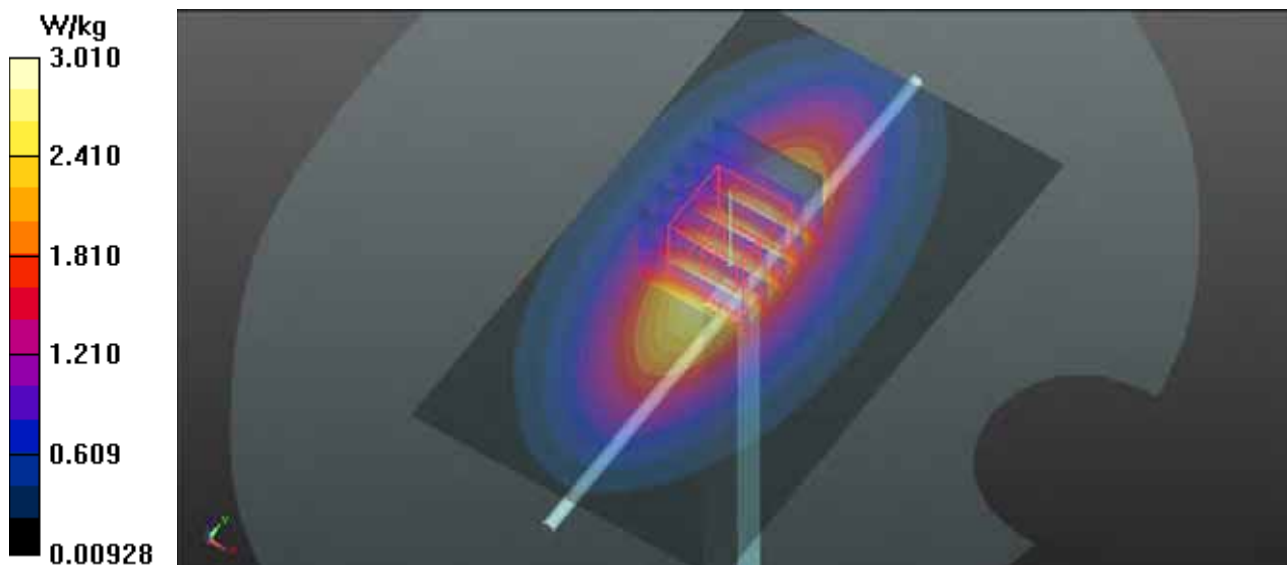
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 59.705 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 3.58 W/kg

SAR(1 g) = 2.46 W/kg; SAR(10 g) = 1.64 W/kg

Maximum value of SAR (measured) = 3.09 W/kg



System Check_H1900_121125

DUT: Dipole:1900 MHz; Type:D1900V2; SN:5d159

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

Medium: H1900_1125 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.458$ mho/m; $\epsilon_r = 40.123$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.9 °C ; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.74, 7.74, 7.74); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 14.5 W/kg

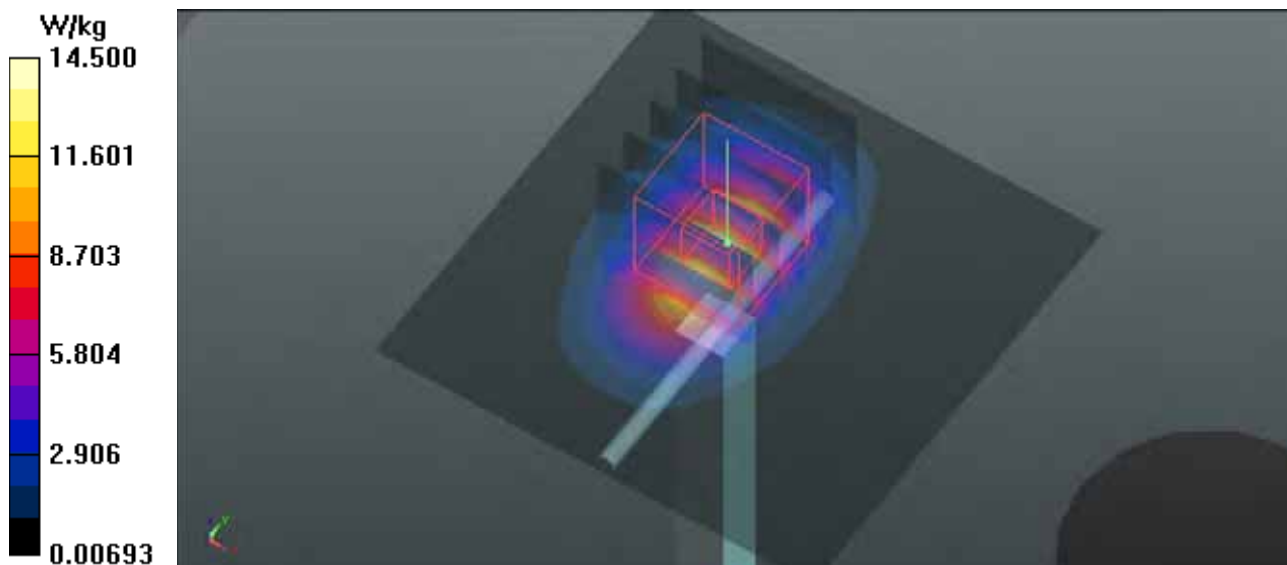
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 95.476 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 17.5 W/kg

SAR(1 g) = 9.89 W/kg; SAR(10 g) = 5.19 W/kg

Maximum value of SAR (measured) = 14.1 W/kg



System Check_B835_121123

DUT: Dipole:835 MHz; Type:D835V2; SN:4d139

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

Medium: B835_1123 Medium parameters used: $f = 835$ MHz; $\sigma = 0.976$ mho/m; $\epsilon_r = 54.343$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

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

Maximum value of SAR (interpolated) = 3.04 W/kg

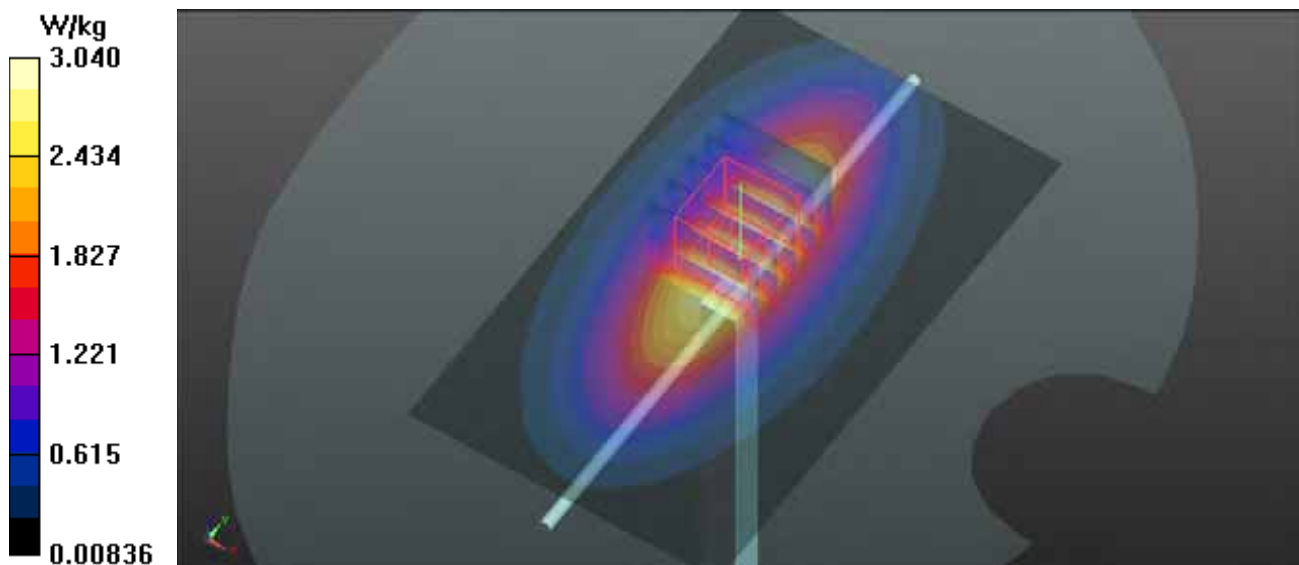
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 57.262 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 3.55 W/kg

SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.65 W/kg

Maximum value of SAR (measured) = 3.09 W/kg



System Check_B1900_121123

DUT: Dipole:1900MHz; Type:D1900V2; SN:5d159

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

Medium: B1900_1123 Medium parameters used: $f = 1900$ MHz; $\sigma = 1.579$ mho/m; $\epsilon_r = 52.477$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.7 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.33, 7.33, 7.33); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 15.0 W/kg

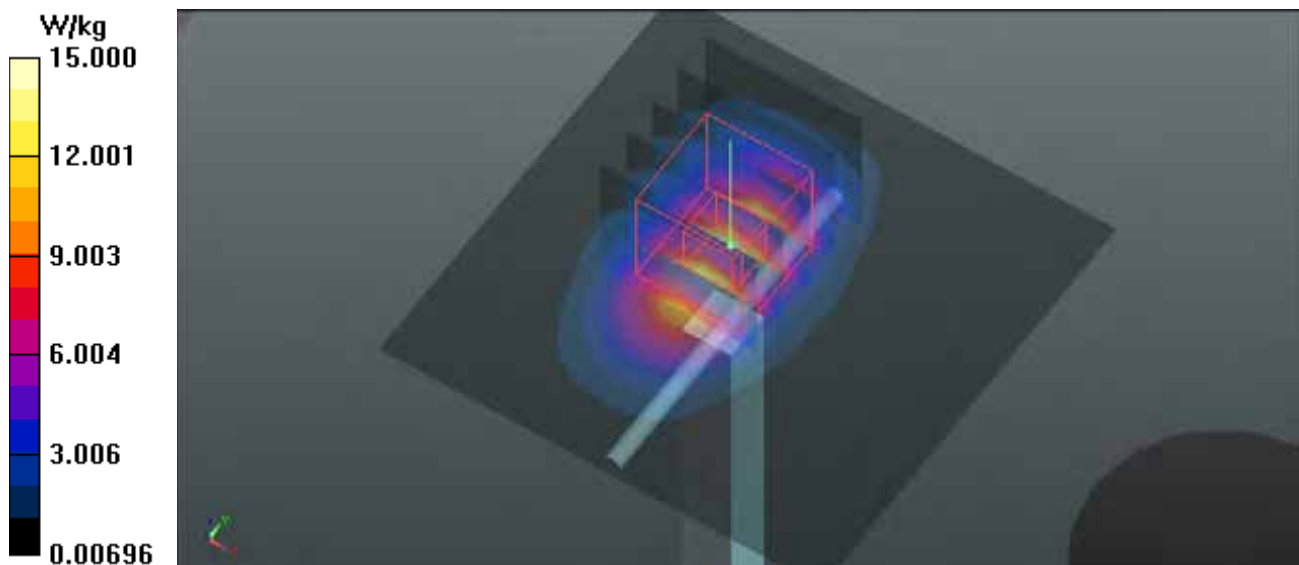
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 95.957 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 18.3 W/kg

SAR(1 g) = 10.6 W/kg; SAR(10 g) = 5.61 W/kg

Maximum value of SAR (measured) = 14.8 W/kg





Appendix B. SAR Plots of SAR Measurement

The plots for SAR measurement are shown as follows.

P01 CDMA2000 BC0_RC3+SO55_Right Cheek_Ch1013

DUT: 121010N015

Communication System: CDMA2000; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 825$ MHz; $\sigma = 0.88$ mho/m ; $\epsilon_r = 40.901$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch1013/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.66 W/kg

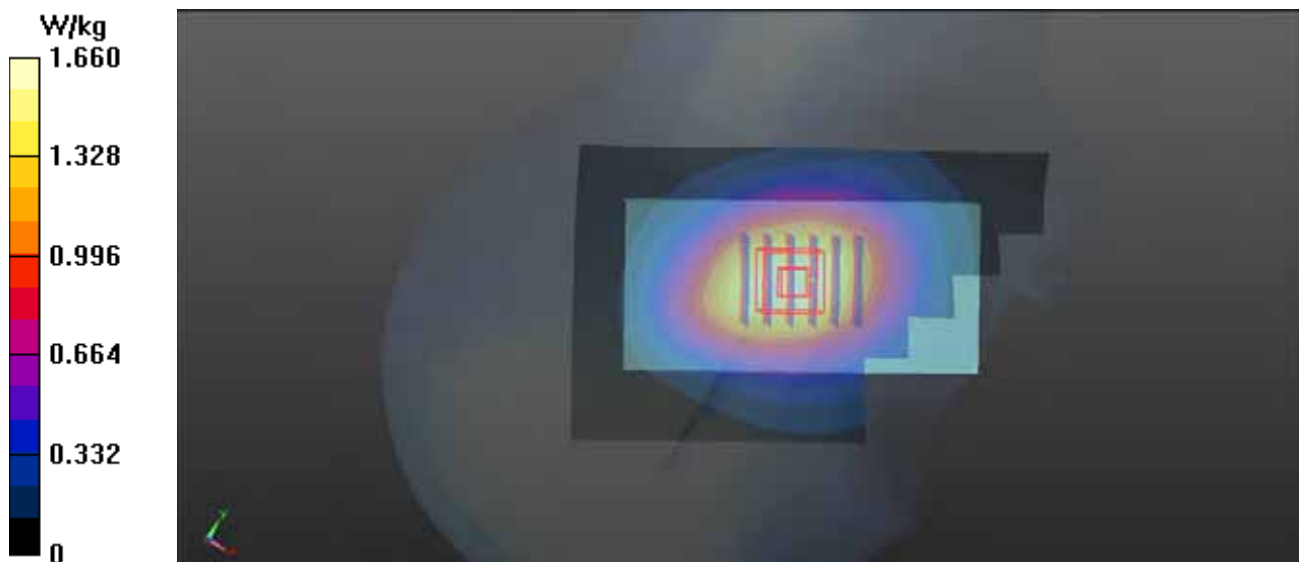
Ch1013/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.170 V/m; Power Drift = 0.01 dB

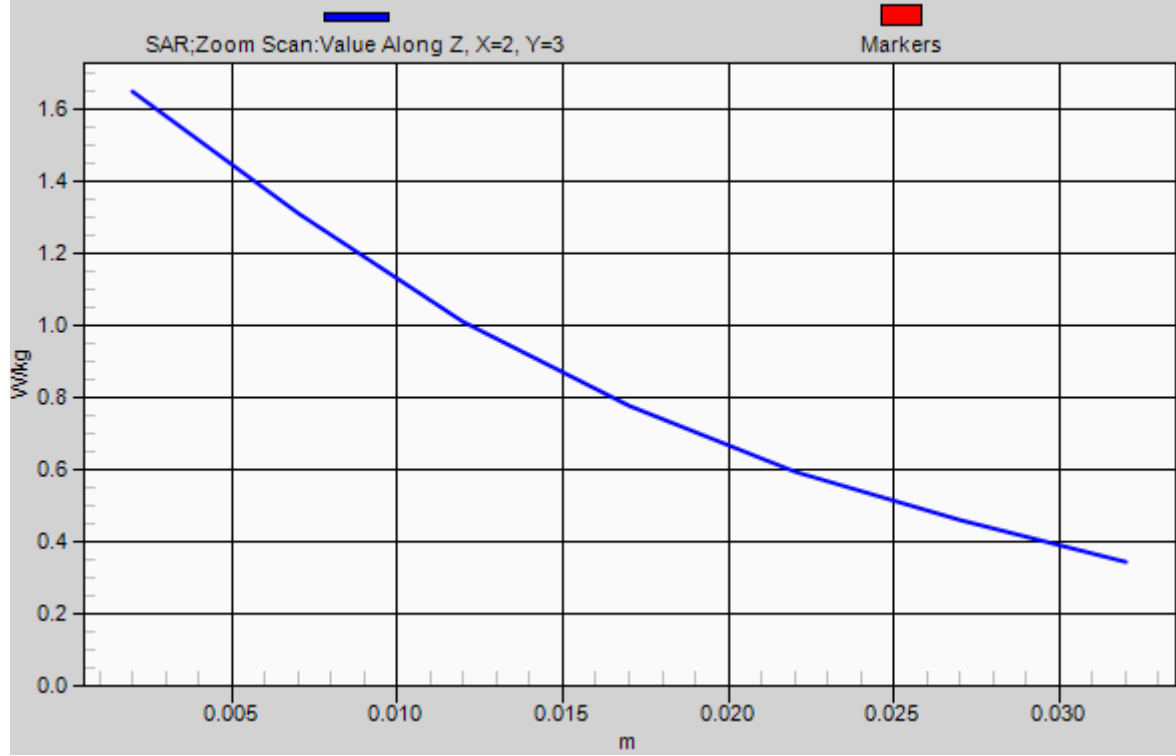
Peak SAR (extrapolated) = 1.81 W/kg

SAR(1 g) = 1.45 W/kg; SAR(10 g) = 1.08 W/kg

Maximum value of SAR (measured) = 1.65 W/kg



1g/10g Averaged SAR



P02 CDMA2000 BC0_RC3+SO55_Right Tilted_Ch1013

DUT: 121010N015

Communication System: CDMA2000; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 825$ MHz; $\sigma = 0.88$ mho/m ; $\epsilon_r = 40.901$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch1013/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.889 W/kg

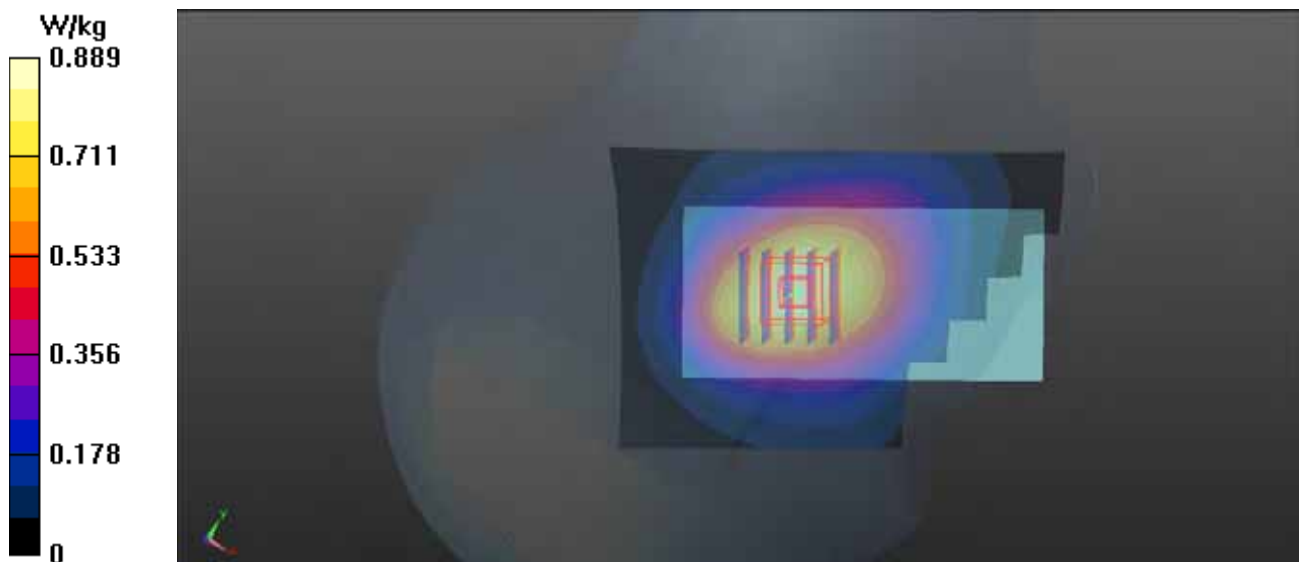
Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 22.016 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.965 W/kg

SAR(1 g) = 0.757 W/kg; SAR(10 g) = 0.558 W/kg

Maximum value of SAR (measured) = 0.884 W/kg



P03 CDMA2000 BC0_RC3+SO55_Left Cheek_Ch1013

DUT: 121010N015

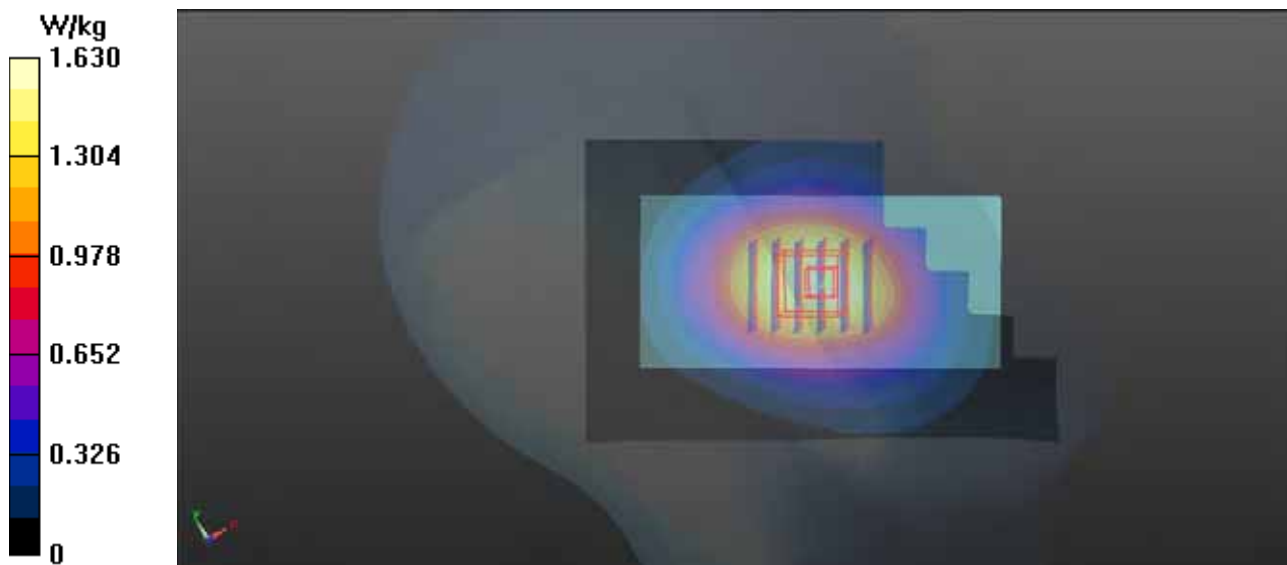
Communication System: CDMA2000; Frequency: 824.7 MHz; Duty Cycle: 1:1
Medium: H835_1125 Medium parameters used: $f = 825 \text{ MHz}$; $\sigma = 0.88 \text{ mho/m}$; $\epsilon_r = 40.901$; $\rho = 1000 \text{ kg/m}^3$
Ambient Temperature : 21.8 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch1013/Area Scan (71x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
Maximum value of SAR (interpolated) = 1.63 W/kg

Ch1013/Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 18.530 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 1.78 W/kg
SAR(1 g) = 1.4 W/kg; SAR(10 g) = 1.04 W/kg
Maximum value of SAR (measured) = 1.63 W/kg



P04 CDMA2000 BC0_RC3+SO55_Left Tilted_Ch1013

DUT: 121010N015

Communication System: CDMA2000; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 825$ MHz; $\sigma = 0.88$ mho/m ; $\epsilon_r = 40.901$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch1013/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.888 W/kg

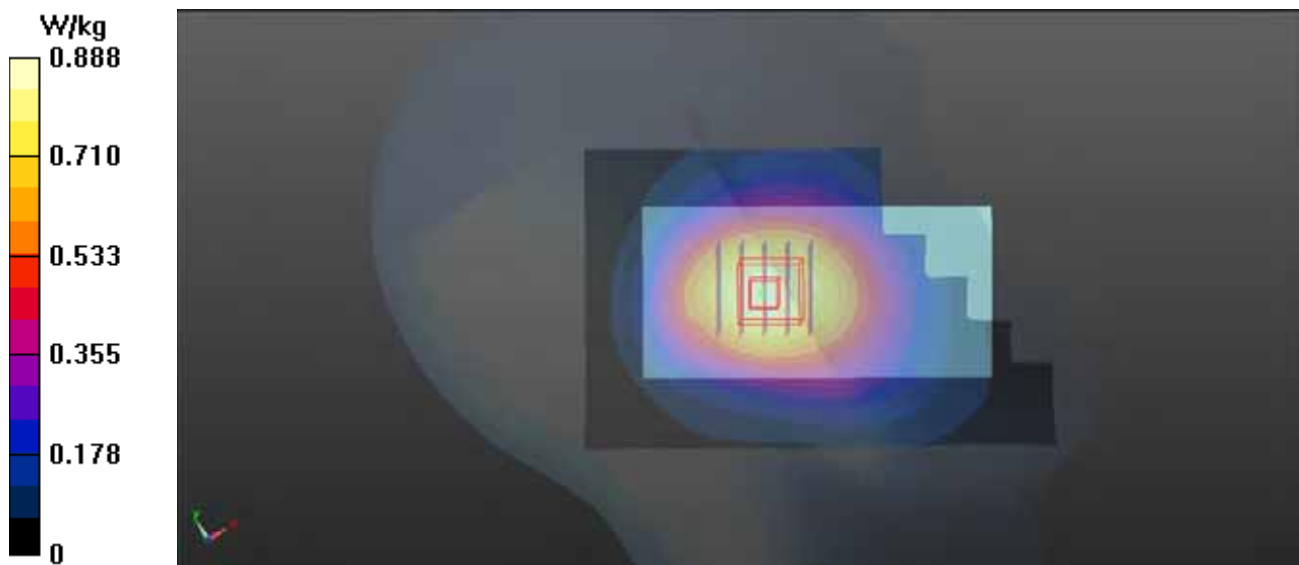
Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.428 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 0.980 W/kg

SAR(1 g) = 0.762 W/kg; SAR(10 g) = 0.565 W/kg

Maximum value of SAR (measured) = 0.890 W/kg



P05 CDMA2000 BC0_RC3+SO55_Right Cheek_Ch384

DUT: 121010N015

Communication System: CDMA2000; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 837$ MHz; $\sigma = 0.892$ mho/m; $\epsilon_r = 40.737$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch384/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.47 W/kg

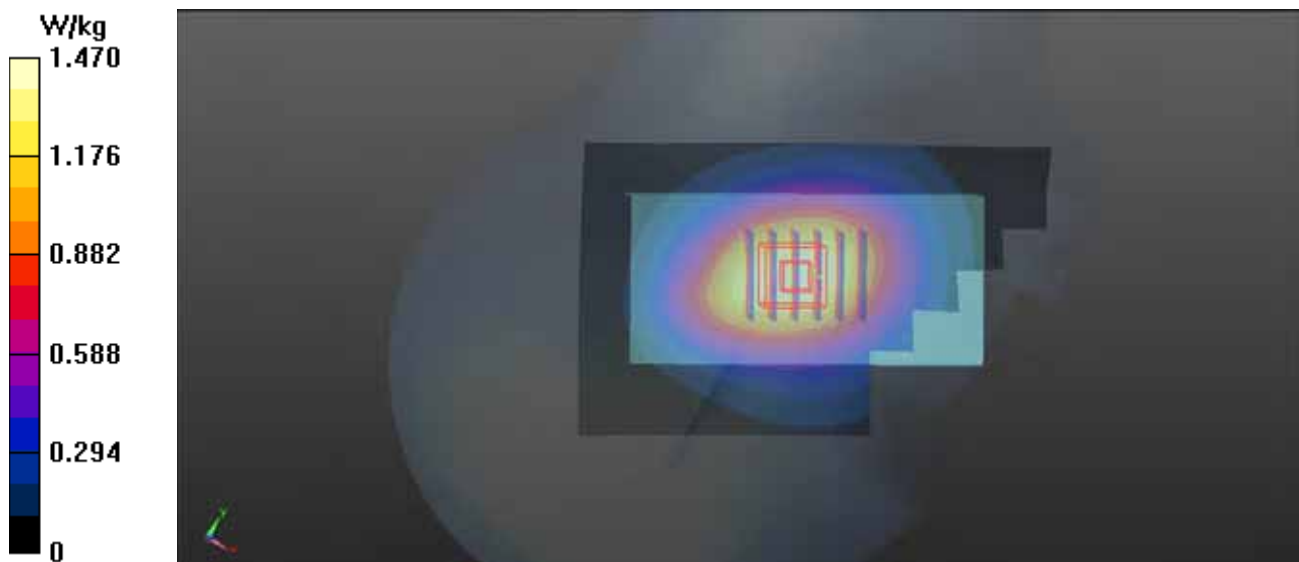
Ch384/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.331 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 1.60 W/kg

SAR(1 g) = 1.28 W/kg; SAR(10 g) = 0.950 W/kg

Maximum value of SAR (measured) = 1.45 W/kg



P06 CDMA2000 BC0_RC3+SO55_Right Cheek_Ch777

DUT: 121010N015

Communication System: CDMA2000; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 848.31 \text{ MHz}$; $\sigma = 0.903 \text{ mho/m}$; $\epsilon_r = 40.593$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch777/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.59 W/kg

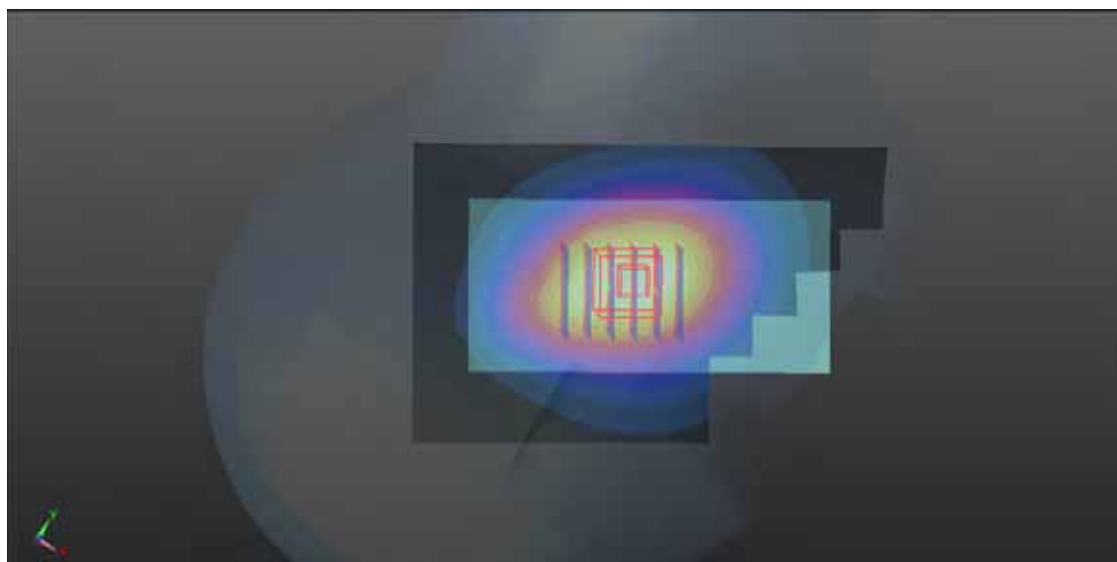
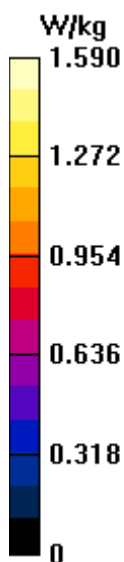
Ch777/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.877 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.75 W/kg

SAR(1 g) = 1.4 W/kg; SAR(10 g) = 1.04 W/kg

Maximum value of SAR (measured) = 1.59 W/kg



P07 CDMA2000 BC0_RC3+SO55_Left Cheek_Ch384

DUT: 121010N015

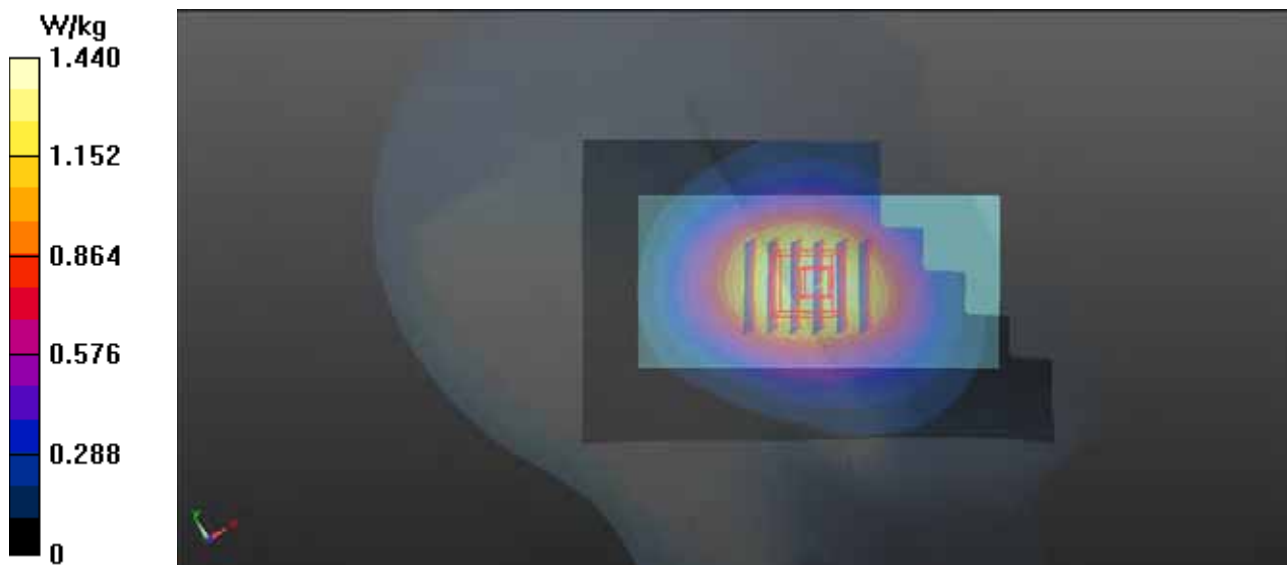
Communication System: CDMA2000; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: H835_1125 Medium parameters used: $f = 837$ MHz; $\sigma = 0.892$ mho/m; $\epsilon_r = 40.737$; $\rho = 1000$ kg/m³
Ambient Temperature : 21.8 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch384/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.44 W/kg

Ch384/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.663 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.58 W/kg
SAR(1 g) = 1.24 W/kg; SAR(10 g) = 0.921 W/kg
Maximum value of SAR (measured) = 1.44 W/kg



P08 CDMA2000 BC0_RC3+SO55_Left Cheek_Ch777

DUT: 121010N015

Communication System: CDMA2000; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 848.31 \text{ MHz}$; $\sigma = 0.903 \text{ mho/m}$; $\epsilon_r = 40.593$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : $21.8 \text{ }^\circ\text{C}$; Liquid Temperature : $20.8 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch777/Area Scan (71x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.53 W/kg

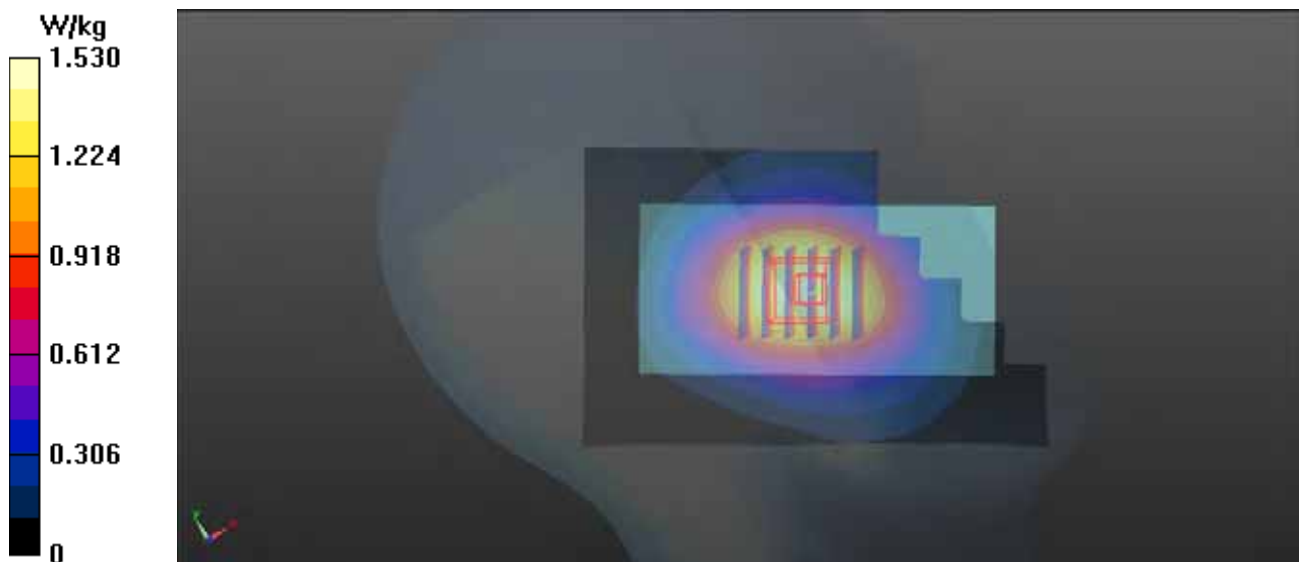
Ch777/Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.868 V/m ; Power Drift = -0.09 dB

Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 1.32 W/kg ; SAR(10 g) = 0.989 W/kg

Maximum value of SAR (measured) = 1.51 W/kg



P09 CDMA2000 BC10_RC3+SO55_Right Cheek_Ch476

DUT: 121010N015

Communication System: CDMA2000; Frequency: 817.9 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 818 \text{ MHz}$; $\sigma = 0.873 \text{ mho/m}$; $\epsilon_r = 40.993$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : $21.8 \text{ }^\circ\text{C}$; Liquid Temperature : $20.8 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch476/Area Scan (71x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.64 W/kg

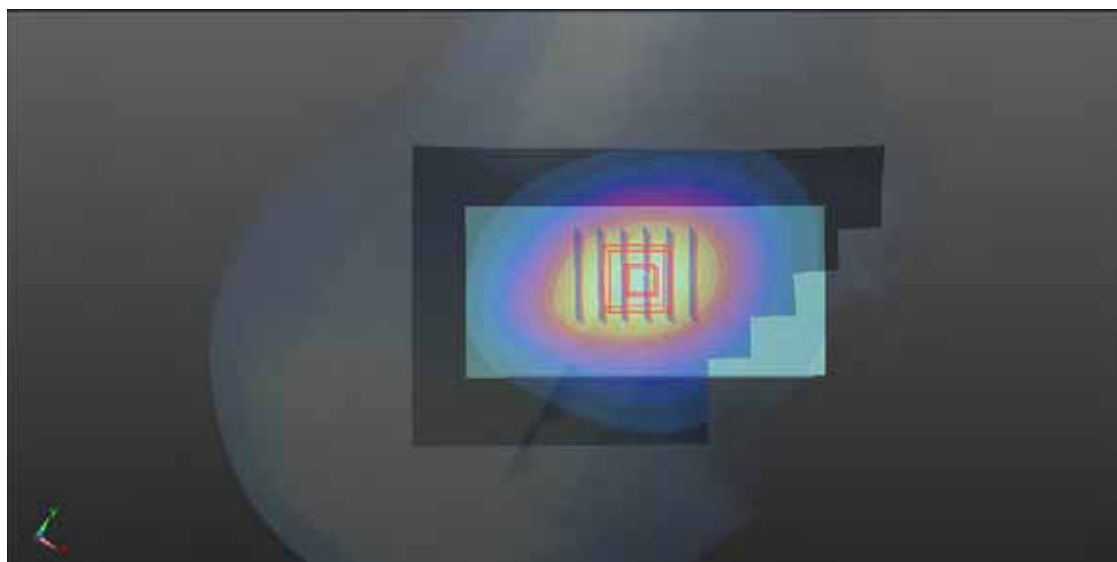
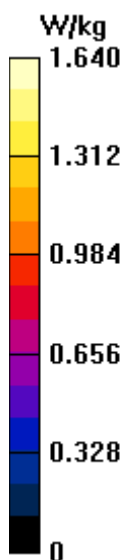
Ch476/Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 18.298 V/m ; Power Drift = 0.04 dB

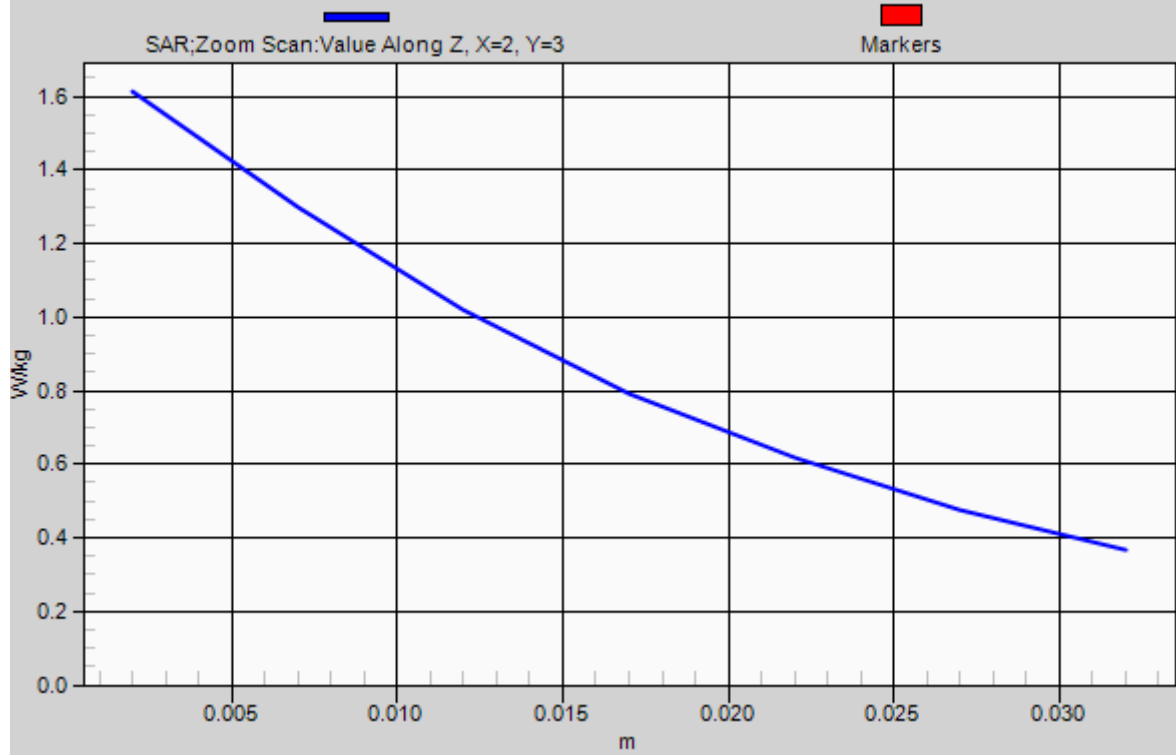
Peak SAR (extrapolated) = 1.75 W/kg

SAR(1 g) = 1.41 W/kg ; SAR(10 g) = 1.05 W/kg

Maximum value of SAR (measured) = 1.61 W/kg



1g/10g Averaged SAR



P10 CDMA2000 BC10_RC3+SO55_Right Tilted_Ch476

DUT: 121010N015

Communication System: CDMA2000; Frequency: 817.9 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 818 \text{ MHz}$; $\sigma = 0.873 \text{ mho/m}$; $\epsilon_r = 40.993$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 21.8 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch476/Area Scan (71x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.965 W/kg

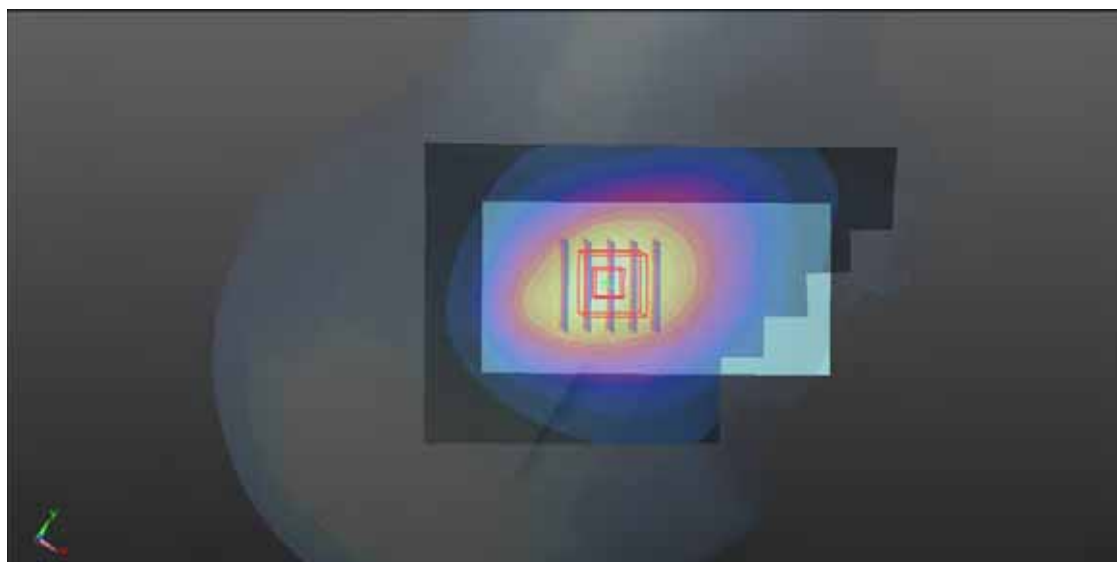
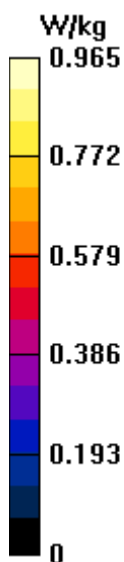
Ch476/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.236 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.04 W/kg

SAR(1 g) = 0.821 W/kg; SAR(10 g) = 0.608 W/kg

Maximum value of SAR (measured) = 0.953 W/kg



P11 CDMA2000 BC10_RC3+SO55_Left Cheek_Ch476

DUT: 121010N015

Communication System: CDMA2000; Frequency: 817.9 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 818 \text{ MHz}$; $\sigma = 0.873 \text{ mho/m}$; $\epsilon_r = 40.993$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : $21.8 \text{ }^\circ\text{C}$; Liquid Temperature : $20.8 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch476/Area Scan (71x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.60 W/kg

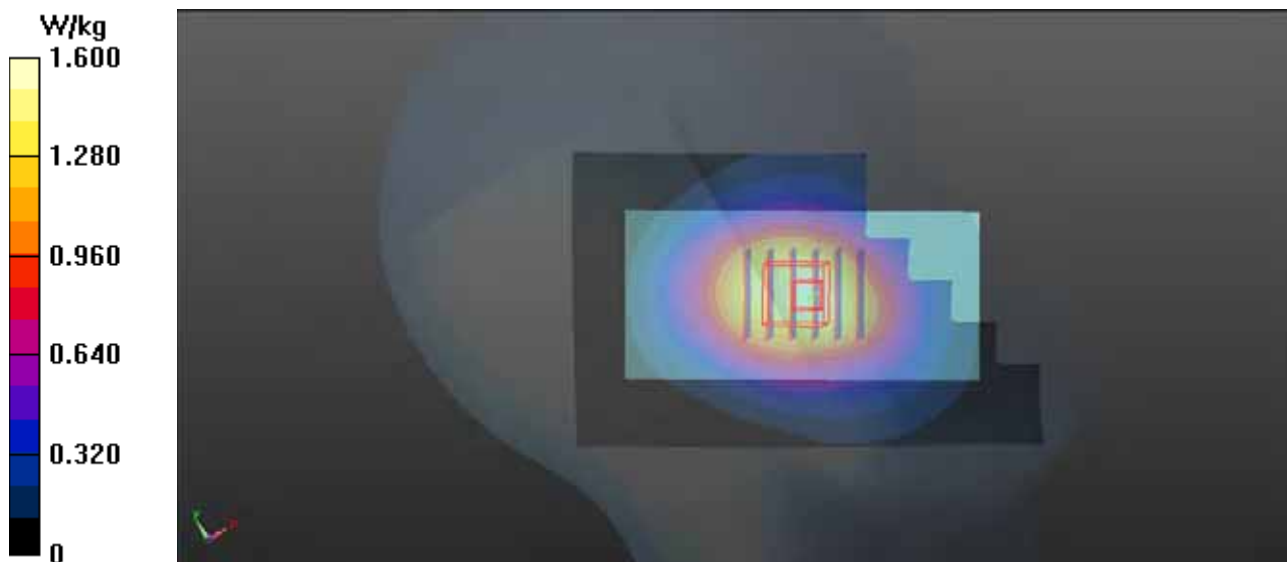
Ch476/Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 17.740 V/m ; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 1.73 W/kg

SAR(1 g) = 1.37 W/kg ; SAR(10 g) = 1.02 W/kg

Maximum value of SAR (measured) = 1.59 W/kg



P12 CDMA2000 BC10_RC3+SO55_Left Tilted_Ch476

DUT: 121010N015

Communication System: CDMA2000; Frequency: 817.9 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 818 \text{ MHz}$; $\sigma = 0.873 \text{ mho/m}$; $\epsilon_r = 40.993$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : $21.8 \text{ }^\circ\text{C}$; Liquid Temperature : $20.8 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch476/Area Scan (71x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 0.903 W/kg

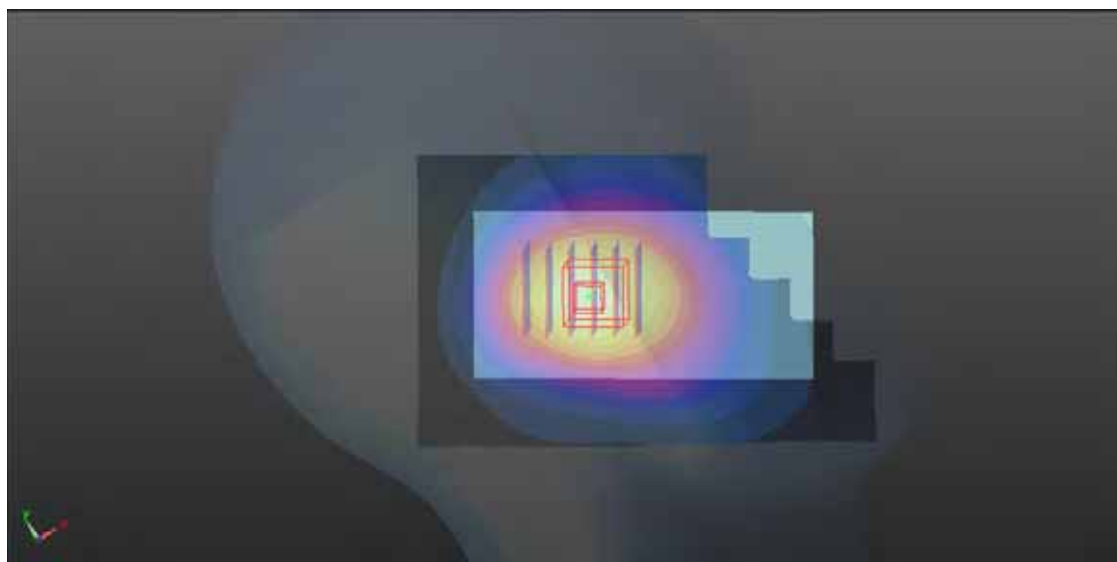
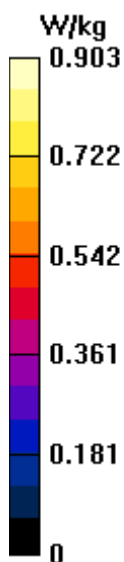
Ch476/Zoom Scan (5x6x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 21.478 V/m ; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.00 W/kg

SAR(1 g) = 0.778 W/kg ; SAR(10 g) = 0.577 W/kg

Maximum value of SAR (measured) = 0.911 W/kg



P13 CDMA2000 BC10_RC3+SO55_Right Cheek_Ch580

DUT: 121010N015

Communication System: CDMA2000; Frequency: 820.5 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 820.5$ MHz; $\sigma = 0.875$ mho/m; $\epsilon_r = 40.961$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch580/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.46 W/kg

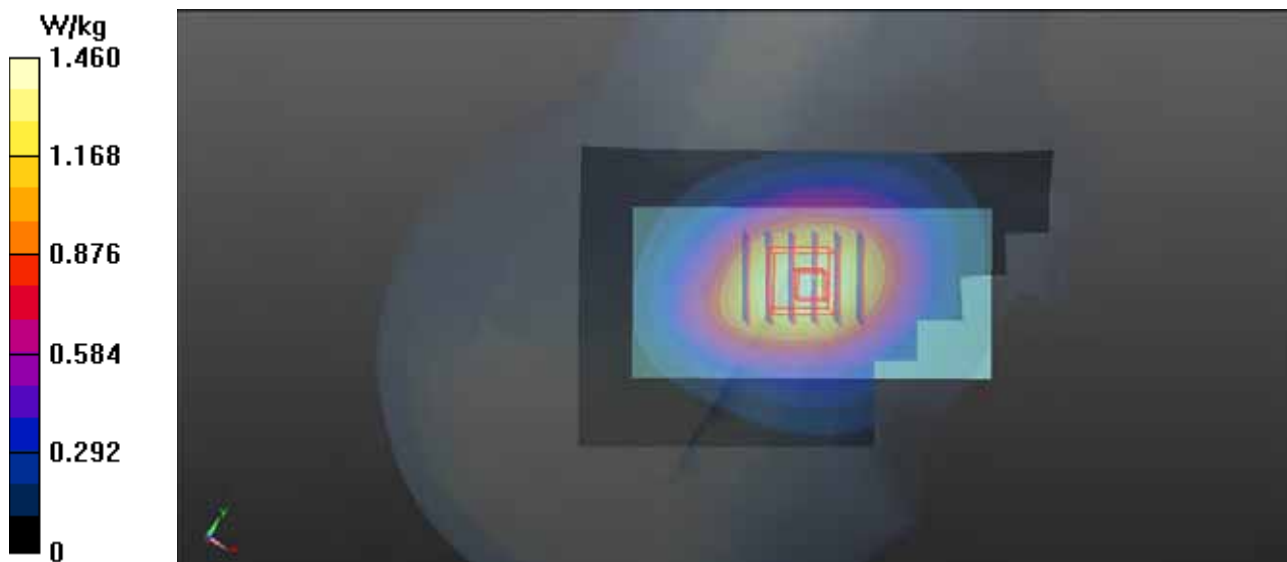
Ch580/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 17.746 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.57 W/kg

SAR(1 g) = 1.26 W/kg; SAR(10 g) = 0.941 W/kg

Maximum value of SAR (measured) = 1.44 W/kg



P14 CDMA2000 BC10_RC3+SO55_Right Cheek_Ch684

DUT: 121010N015

Communication System: CDMA2000; Frequency: 823.1 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 823.1$ MHz; $\sigma = 0.878$ mho/m; $\epsilon_r = 40.925$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch684/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.53 W/kg

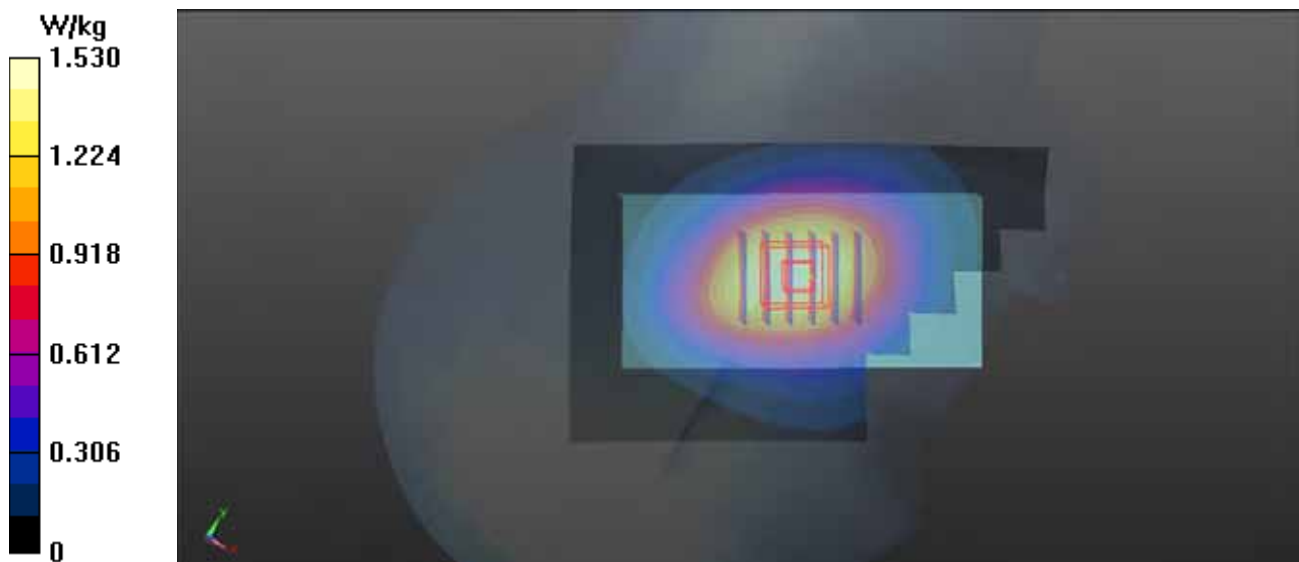
Ch684/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.141 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 1.64 W/kg

SAR(1 g) = 1.32 W/kg; SAR(10 g) = 0.988 W/kg

Maximum value of SAR (measured) = 1.51 W/kg



P15 CDMA2000 BC10_RC3+SO55_Left Cheek_Ch580

DUT: 121010N015

Communication System: CDMA2000; Frequency: 820.5 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 820.5$ MHz; $\sigma = 0.875$ mho/m; $\epsilon_r = 40.961$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch580/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.44 W/kg

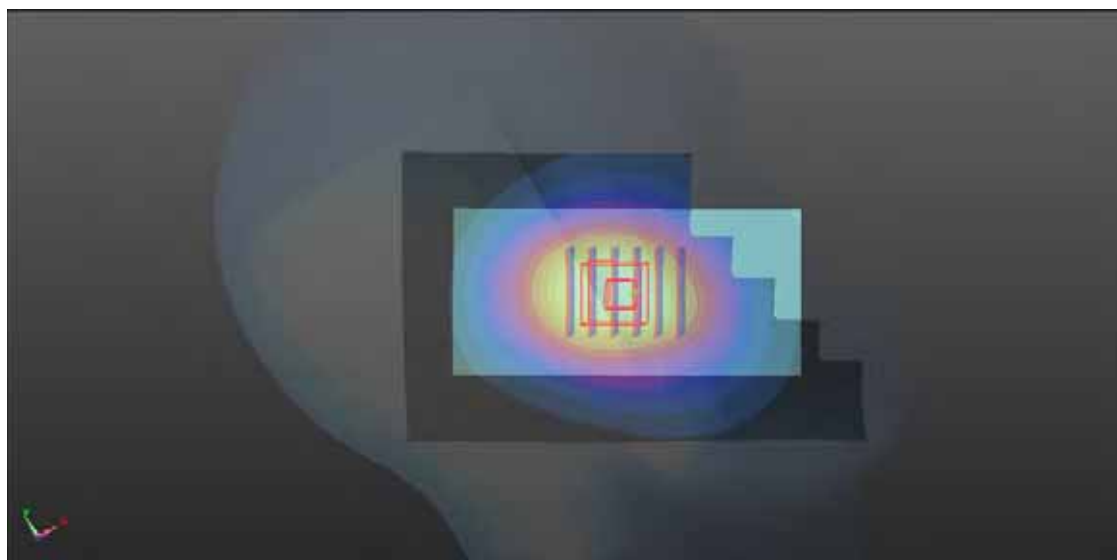
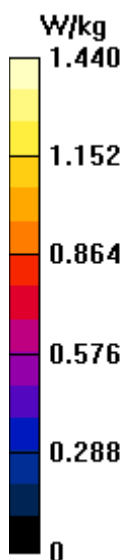
Ch580/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.154 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 1.56 W/kg

SAR(1 g) = 1.25 W/kg; SAR(10 g) = 0.935 W/kg

Maximum value of SAR (measured) = 1.43 W/kg



P16 CDMA2000 BC10_RC3+SO55_Left Cheek_Ch684

DUT: 121010N015

Communication System: CDMA2000; Frequency: 823.1 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 823.1$ MHz; $\sigma = 0.878$ mho/m; $\epsilon_r = 40.925$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch684/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.48 W/kg

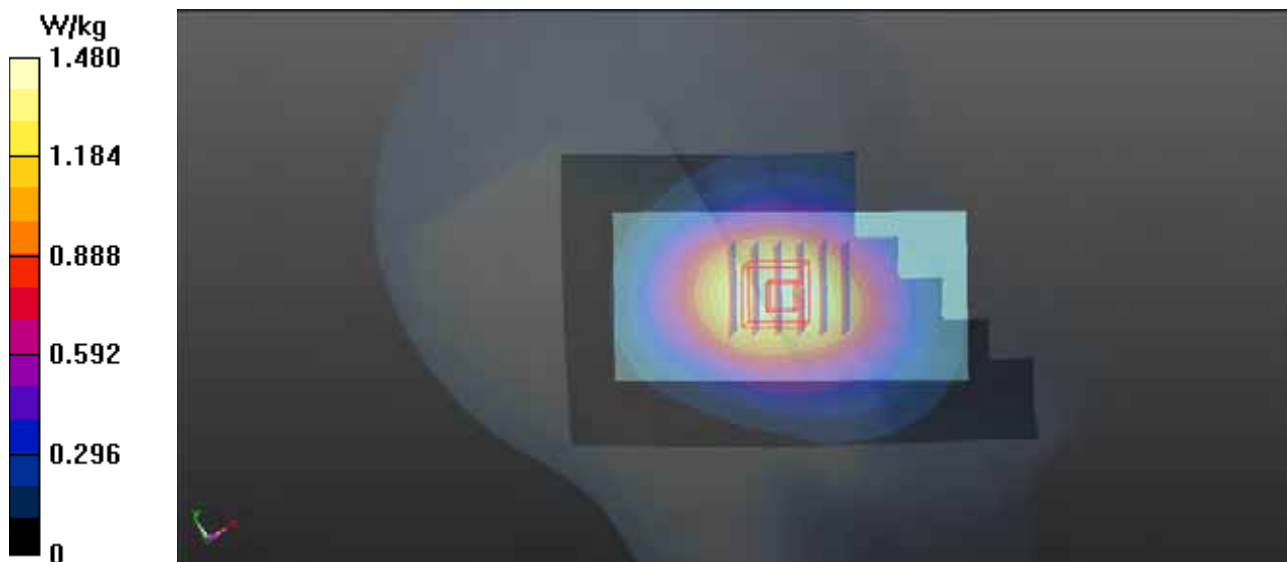
Ch684/Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 19.522 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.62 W/kg

SAR(1 g) = 1.29 W/kg; SAR(10 g) = 0.970 W/kg

Maximum value of SAR (measured) = 1.48 W/kg



P17 CDMA2000 BC10_RC3+SO55_Right Tilted_Ch580

DUT: 121010N015

Communication System: CDMA2000; Frequency: 820.5 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 820.5$ MHz; $\sigma = 0.875$ mho/m; $\epsilon_r = 40.961$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch580/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.857 W/kg

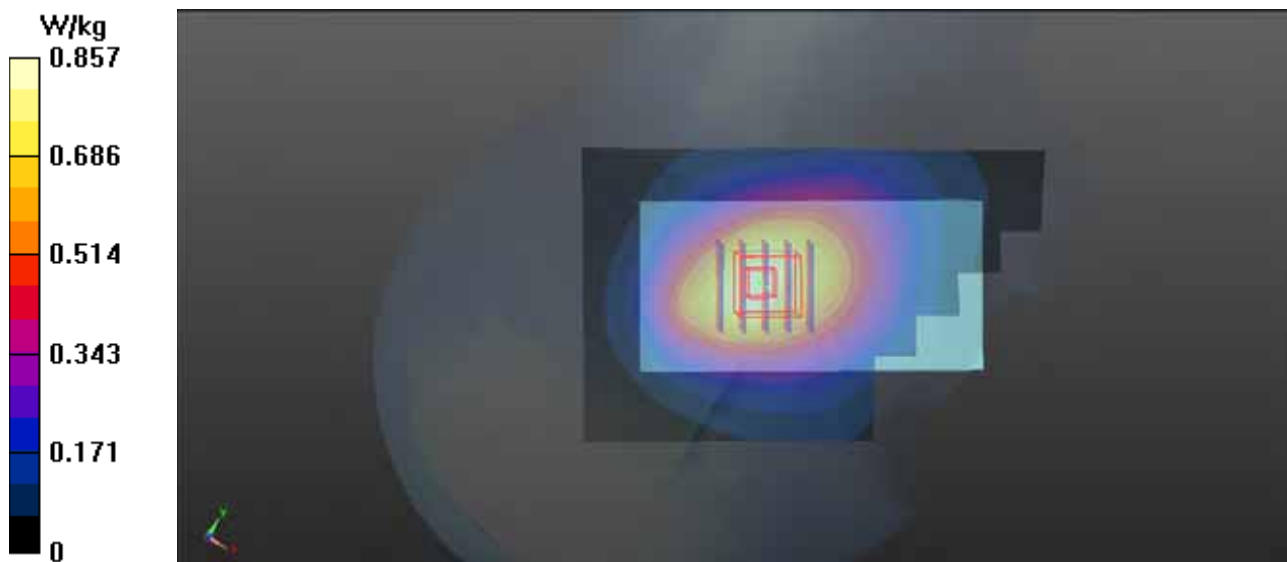
Ch580/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.114 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.937 W/kg

SAR(1 g) = 0.732 W/kg; SAR(10 g) = 0.541 W/kg

Maximum value of SAR (measured) = 0.853 W/kg



P18 CDMA2000 BC10_RC3+SO55_Right Tilted_Ch684

DUT: 121010N015

Communication System: CDMA2000; Frequency: 823.1 MHz; Duty Cycle: 1:1

Medium: H835_1125 Medium parameters used: $f = 823.1$ MHz; $\sigma = 0.878$ mho/m; $\epsilon_r = 40.925$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.13, 9.13, 9.13); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch684/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.874 W/kg

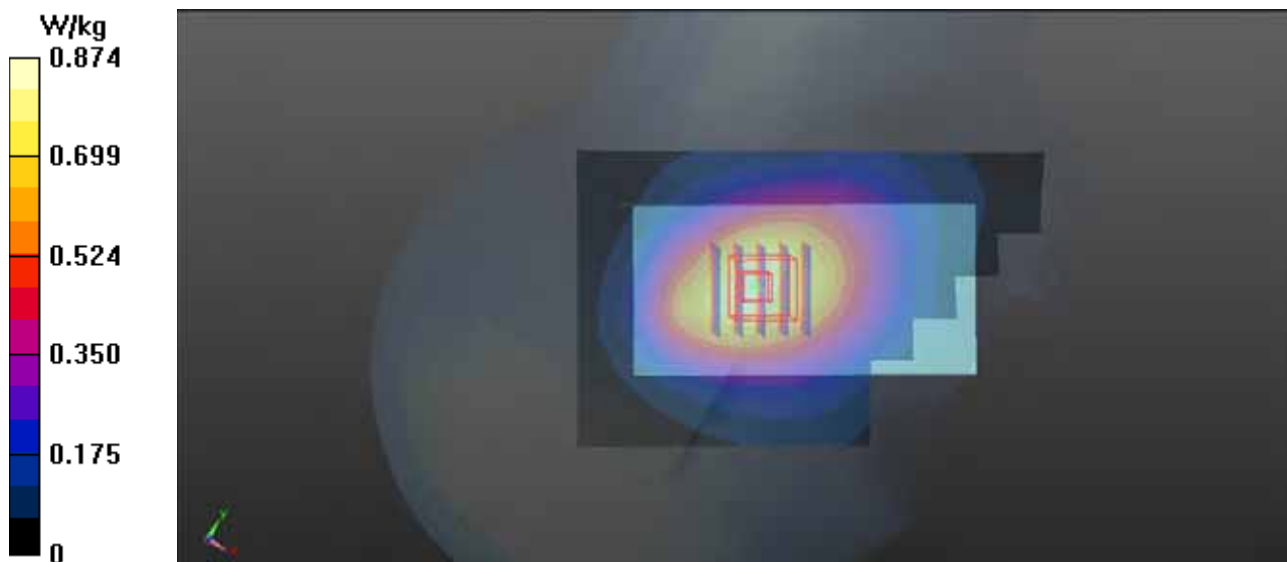
Ch684/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 20.185 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.961 W/kg

SAR(1 g) = 0.749 W/kg; SAR(10 g) = 0.552 W/kg

Maximum value of SAR (measured) = 0.876 W/kg



P19 CDMA2000 BC1_RC3+SO55_Right Cheek_Ch600

DUT: 121010N015

Communication System: CDMA2000; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: H1900_1125 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.438$ mho/m; $\epsilon_r = 40.21$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.9 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.74, 7.74, 7.74); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch600/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.615 W/kg

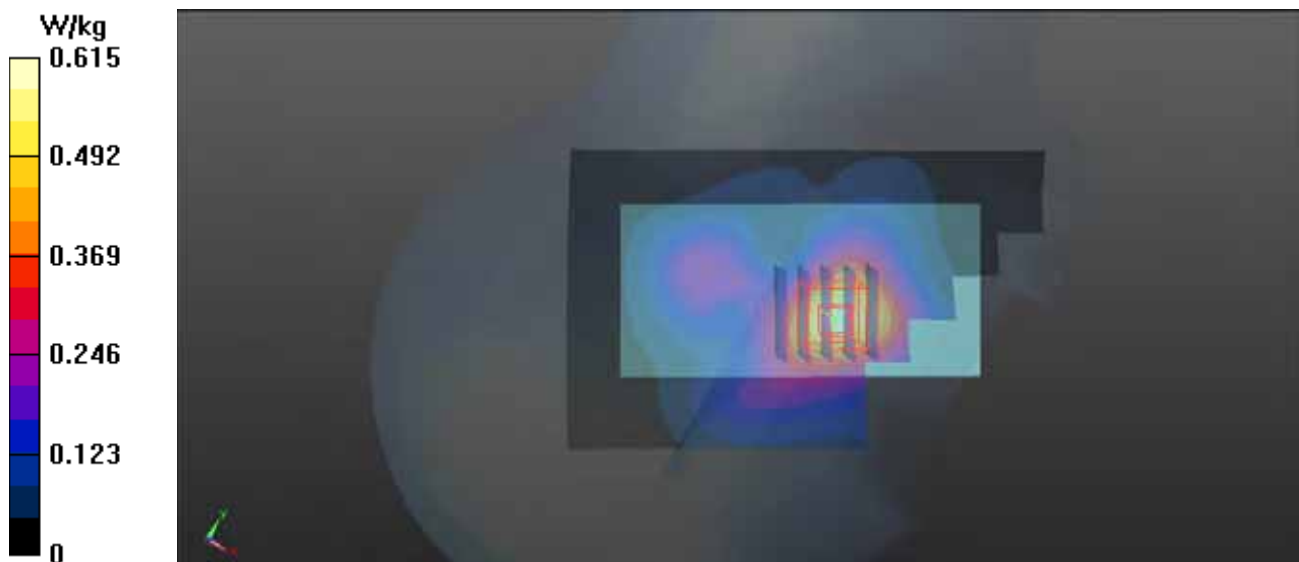
Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.916 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.695 W/kg

SAR(1 g) = 0.470 W/kg; SAR(10 g) = 0.292 W/kg

Maximum value of SAR (measured) = 0.597 W/kg



P20 CDMA2000 BC1_RC3+SO55_Right Tilted_Ch600

DUT: 121010N015

Communication System: CDMA2000; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: H1900_1125 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.438$ mho/m; $\epsilon_r = 40.21$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.9 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.74, 7.74, 7.74); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch600/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.299 W/kg

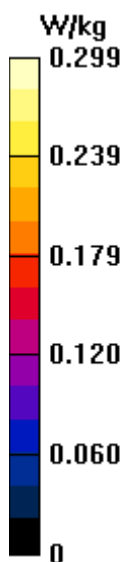
Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.822 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 0.317 W/kg

SAR(1 g) = 0.222 W/kg; SAR(10 g) = 0.139 W/kg

Maximum value of SAR (measured) = 0.271 W/kg



P21 CDMA2000 BC1_RC3+SO55_Left Cheek_Ch600

DUT: 121010N015

Communication System: CDMA2000; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: H1900_1125 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.438$ mho/m; $\epsilon_r = 40.21$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.9 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.74, 7.74, 7.74); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch600/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.07 W/kg

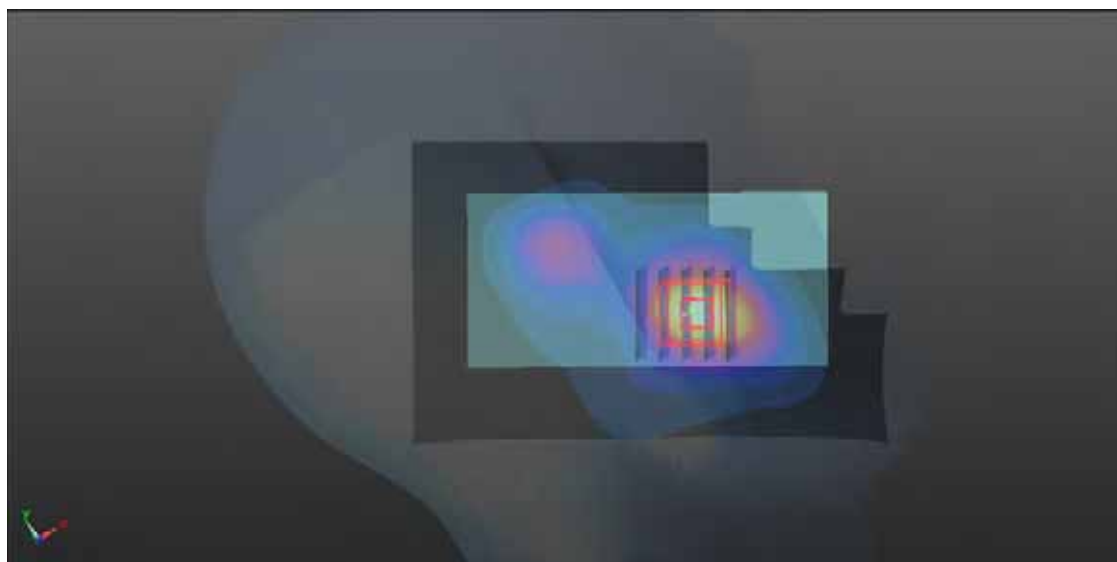
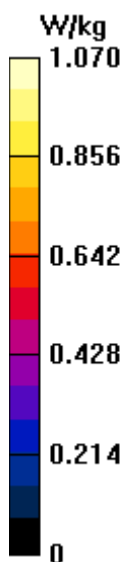
Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.704 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.29 W/kg

SAR(1 g) = 0.838 W/kg; SAR(10 g) = 0.493 W/kg

Maximum value of SAR (measured) = 1.09 W/kg



P22 CDMA2000 BC1_RC3+SO55_Left Tilted_Ch600

DUT: 121010N015

Communication System: CDMA2000; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: H1900_1125 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.438$ mho/m; $\epsilon_r = 40.21$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.9 °C ; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.74, 7.74, 7.74); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch600/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.441 W/kg

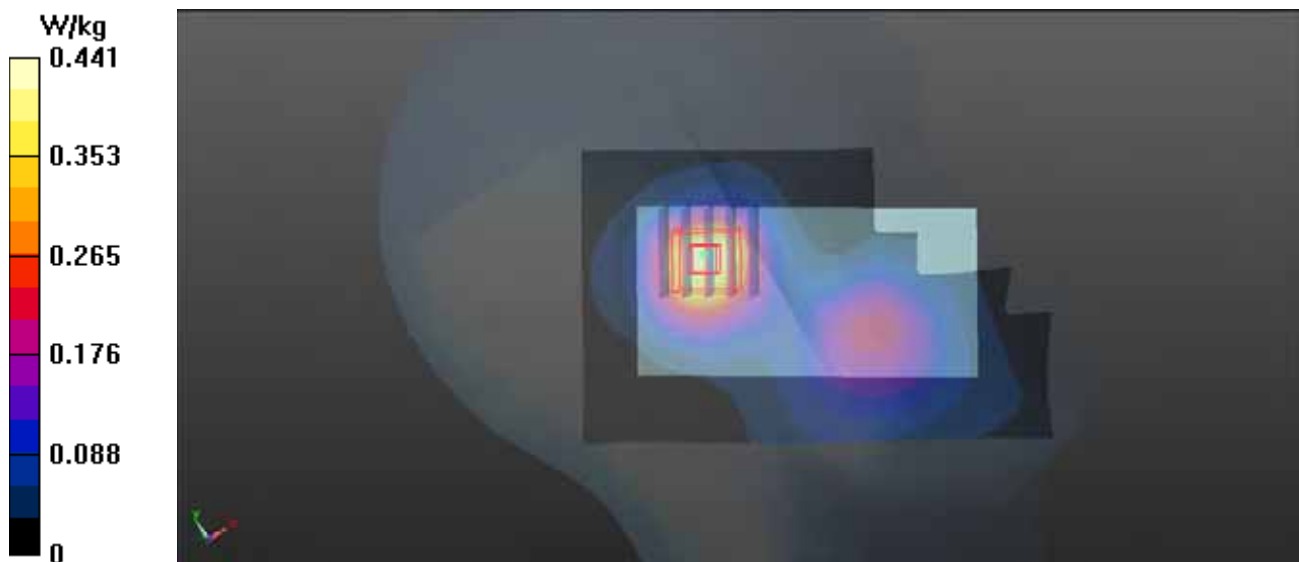
Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.419 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 0.481 W/kg

SAR(1 g) = 0.328 W/kg; SAR(10 g) = 0.200 W/kg

Maximum value of SAR (measured) = 0.413 W/kg



P23 CDMA2000 BC1_RC3+SO55_Left Cheek_Ch25

DUT: 121010N015

Communication System: CDMA2000; Frequency: 1851.25 MHz; Duty Cycle: 1:1

Medium: H1900_1125 Medium parameters used: $f = 1851.25$ MHz; $\sigma = 1.409$ mho/m; $\epsilon_r = 40.363$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.9 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.74, 7.74, 7.74); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch25/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.12 W/kg

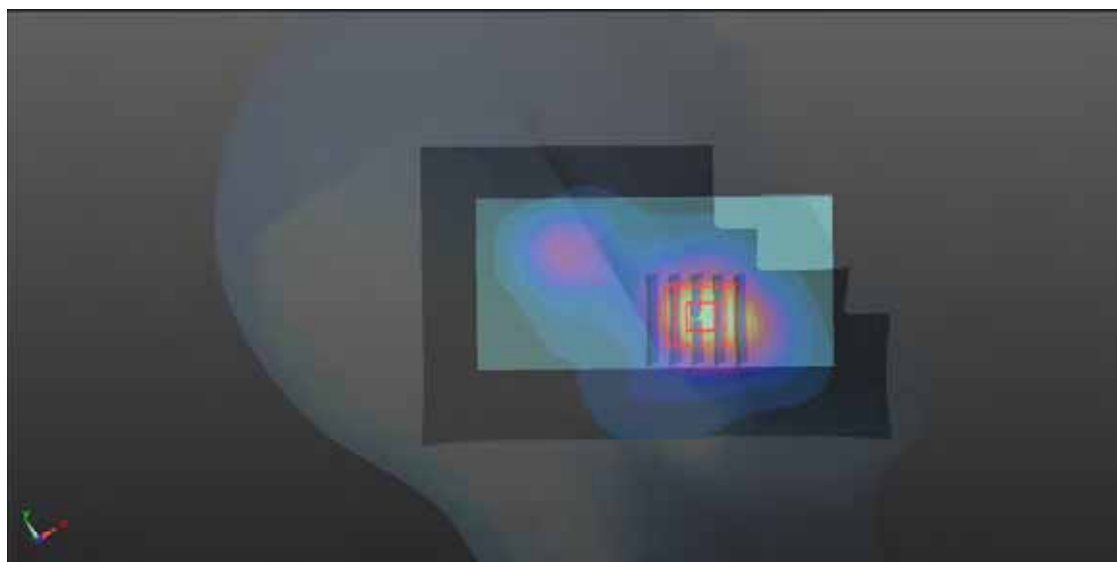
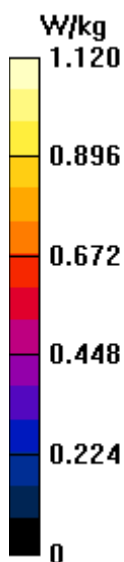
Ch25/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.112 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.876 W/kg; SAR(10 g) = 0.522 W/kg

Maximum value of SAR (measured) = 1.13 W/kg



P24 CDMA2000 BC1_RC3+SO55_Left Cheek_Ch1175

DUT: 121010N015

Communication System: CDMA2000; Frequency: 1908.75 MHz; Duty Cycle: 1:1

Medium: H1900_1125 Medium parameters used: $f = 1909$ MHz; $\sigma = 1.467$ mho/m; $\epsilon_r = 40.087$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.9 °C; Liquid Temperature : 20.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.74, 7.74, 7.74); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch1175/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.34 W/kg

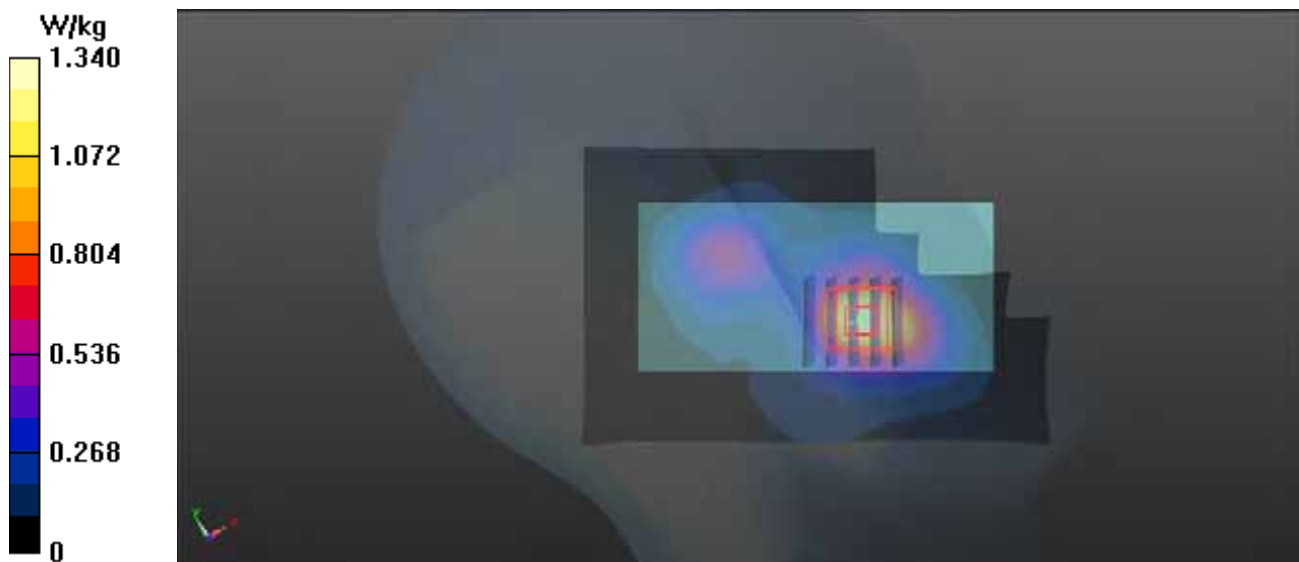
Ch1175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.367 V/m; Power Drift = -0.03 dB

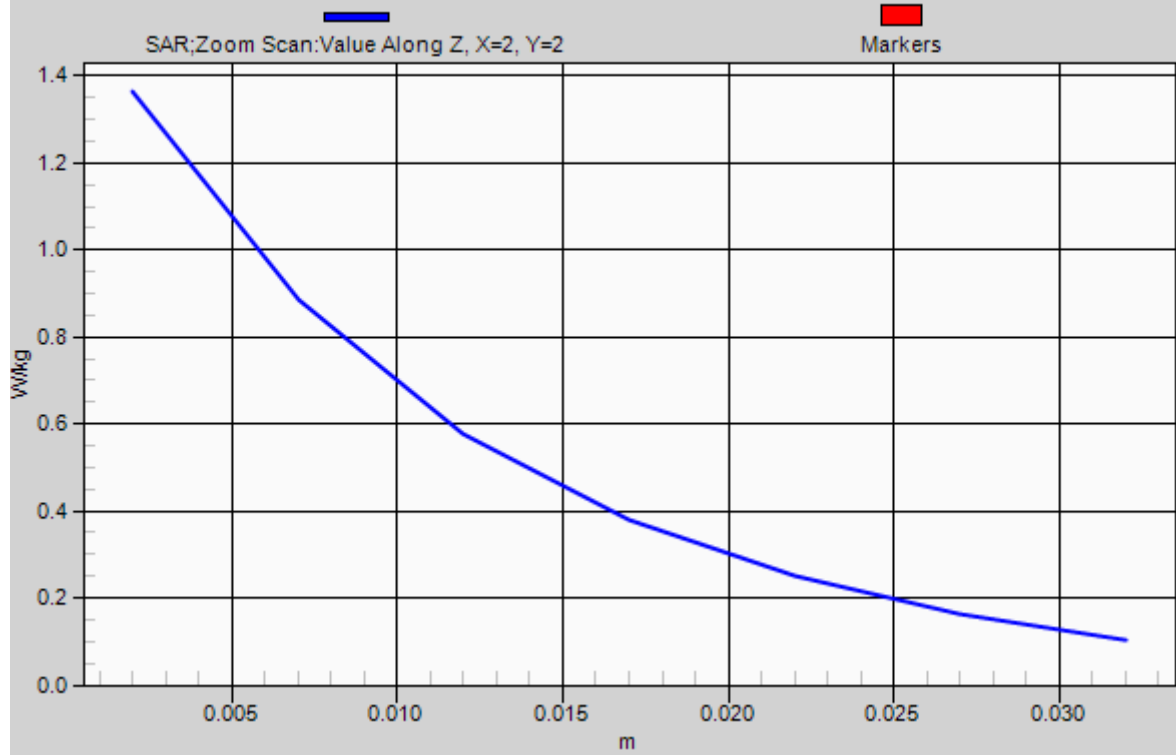
Peak SAR (extrapolated) = 1.61 W/kg

SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.601 W/kg

Maximum value of SAR (measured) = 1.36 W/kg



1g/10g Averaged SAR



P25 CDMA2000 BC0_RC3+SO32(+ F-SCH)_Front Face_1.5cm_Ch1013_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 825$ MHz; $\sigma = 0.966$ mho/m; $\epsilon_r = 54.462$; $\rho =$

1000 kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch1013/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.01 W/kg

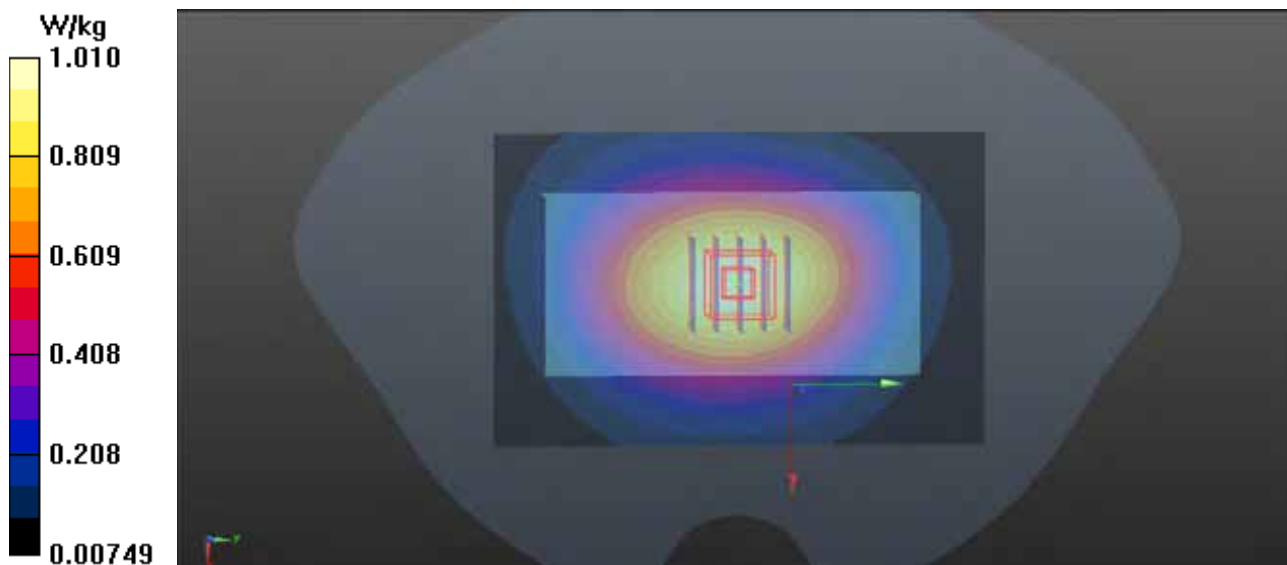
Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 30.833 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.874 W/kg; SAR(10 g) = 0.655 W/kg

Maximum value of SAR (measured) = 1.01 W/kg



P26 CDMA2000 BC0_RC3+SO32(+ F-SCH)_Rear Face_1.5cm_Ch1013_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 824.7 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 825 \text{ MHz}$; $\sigma = 0.966 \text{ mho/m}$; $\epsilon_r = 54.462$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch1013/Area Scan (71x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.11 W/kg

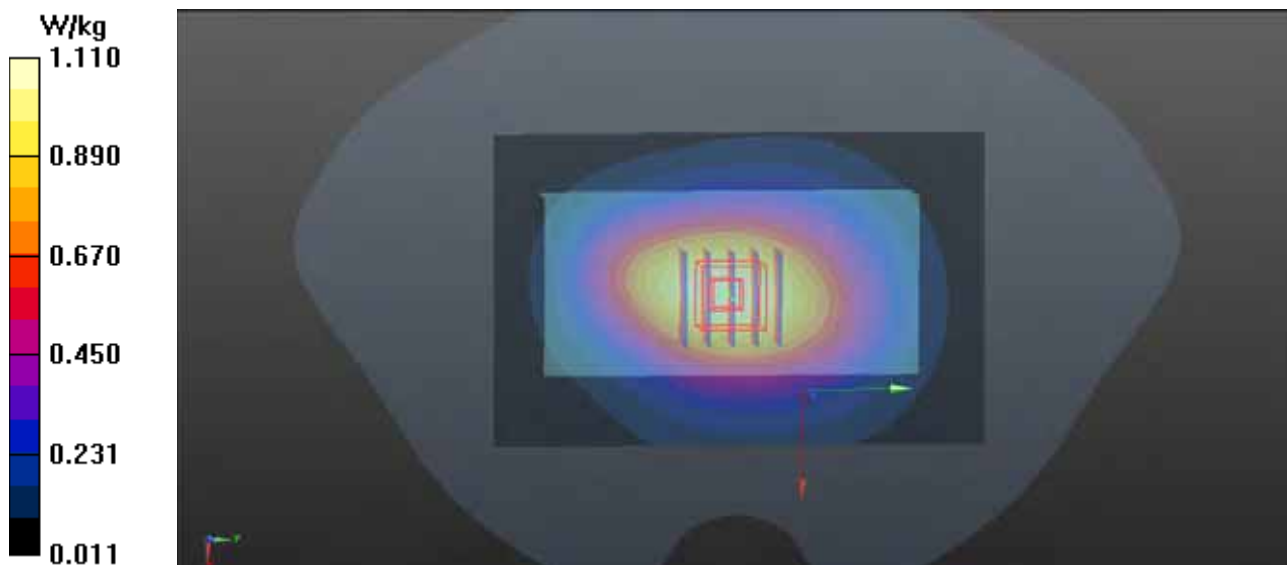
Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 32.376 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.21 W/kg

SAR(1 g) = 0.947 W/kg; SAR(10 g) = 0.698 W/kg

Maximum value of SAR (measured) = 1.11 W/kg



P27 CDMA2000 BC0_RC3+SO32(+ F-SCH)_Front Face_1.5cm_Ch384_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 837$ MHz; $\sigma = 0.979$ mho/m; $\epsilon_r = 54.321$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch384/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.06 W/kg

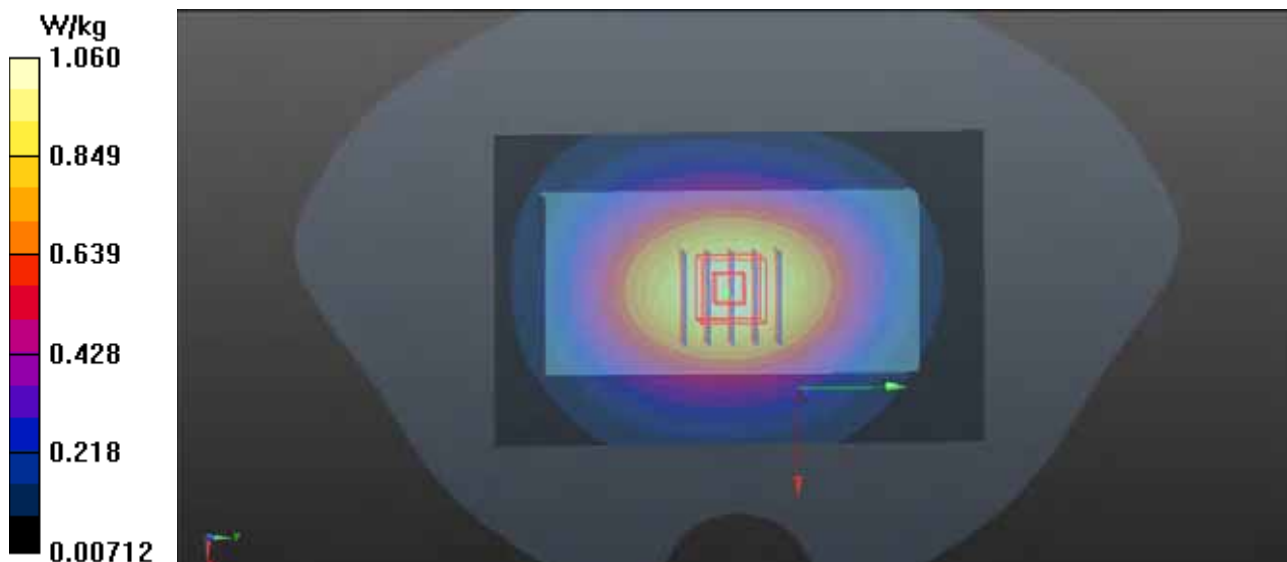
Ch384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 31.543 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 1.16 W/kg

SAR(1 g) = 0.907 W/kg; SAR(10 g) = 0.674 W/kg

Maximum value of SAR (measured) = 1.05 W/kg



P28 CDMA2000 BC0_RC3+SO32(+ F-SCH)_Front Face_1.5cm_Ch777_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 848.31$ MHz; $\sigma = 0.99$ mho/m; $\epsilon_r = 54.193$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch777/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.989 W/kg

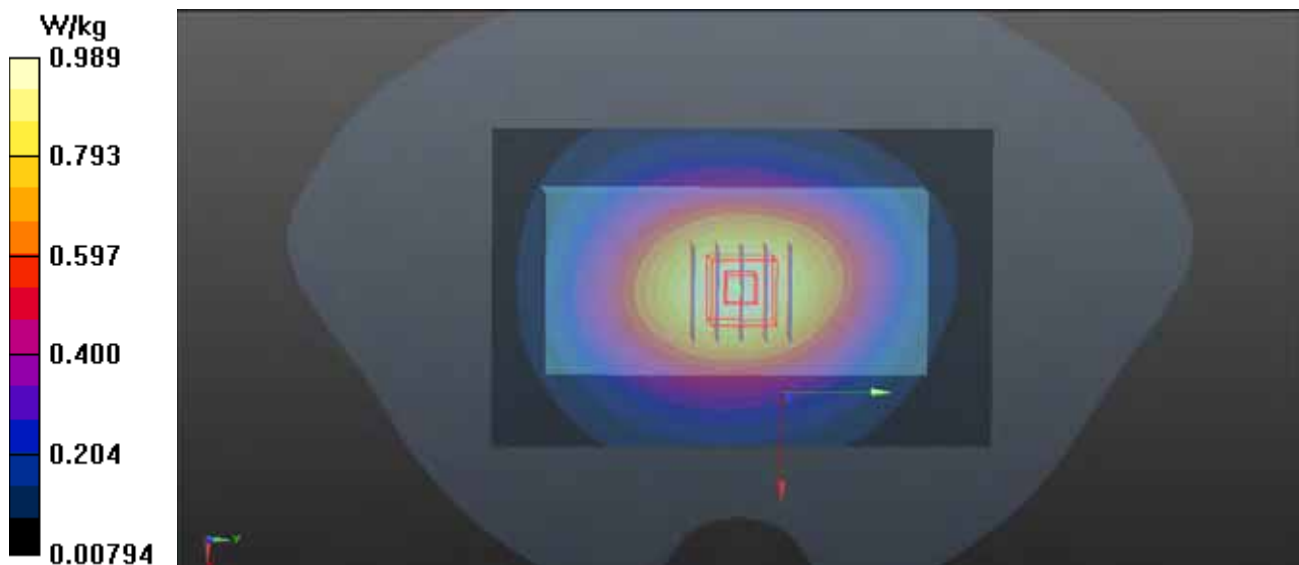
Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 30.528 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.09 W/kg

SAR(1 g) = 0.846 W/kg; SAR(10 g) = 0.629 W/kg

Maximum value of SAR (measured) = 0.987 W/kg



P29 CDMA2000 BC0_RC3+SO32(+ F-SCH)_Rear Face_1.5cm_Ch384_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 836.52 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 837$ MHz; $\sigma = 0.979$ mho/m; $\epsilon_r = 54.321$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch384/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.18 W/kg

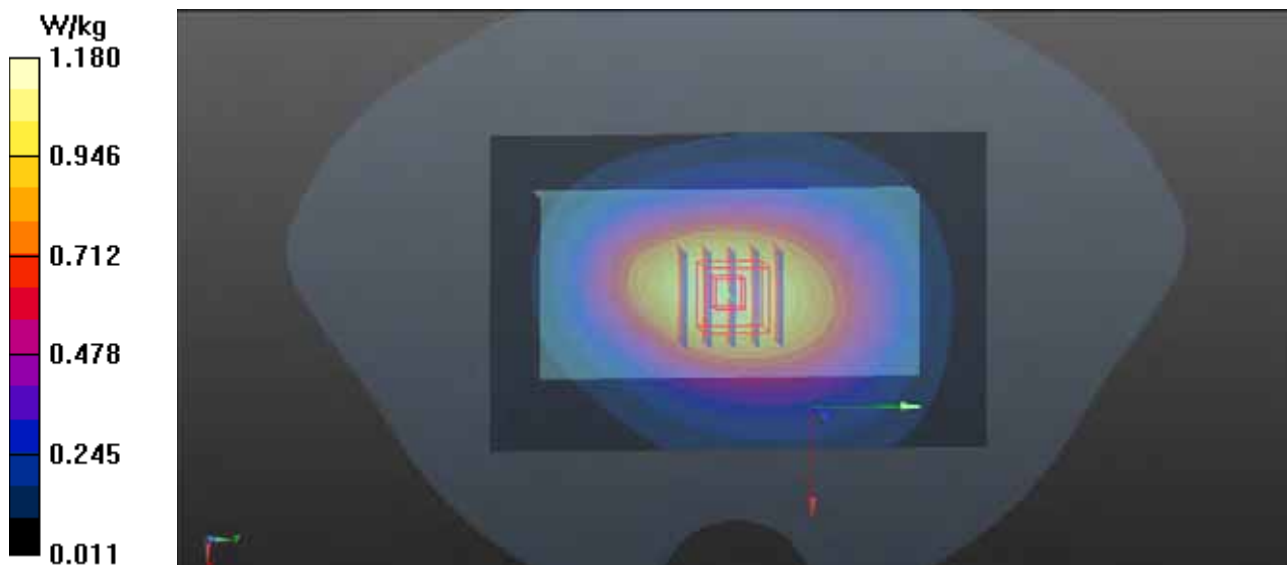
Ch384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 33.539 V/m; Power Drift = -0.04 dB

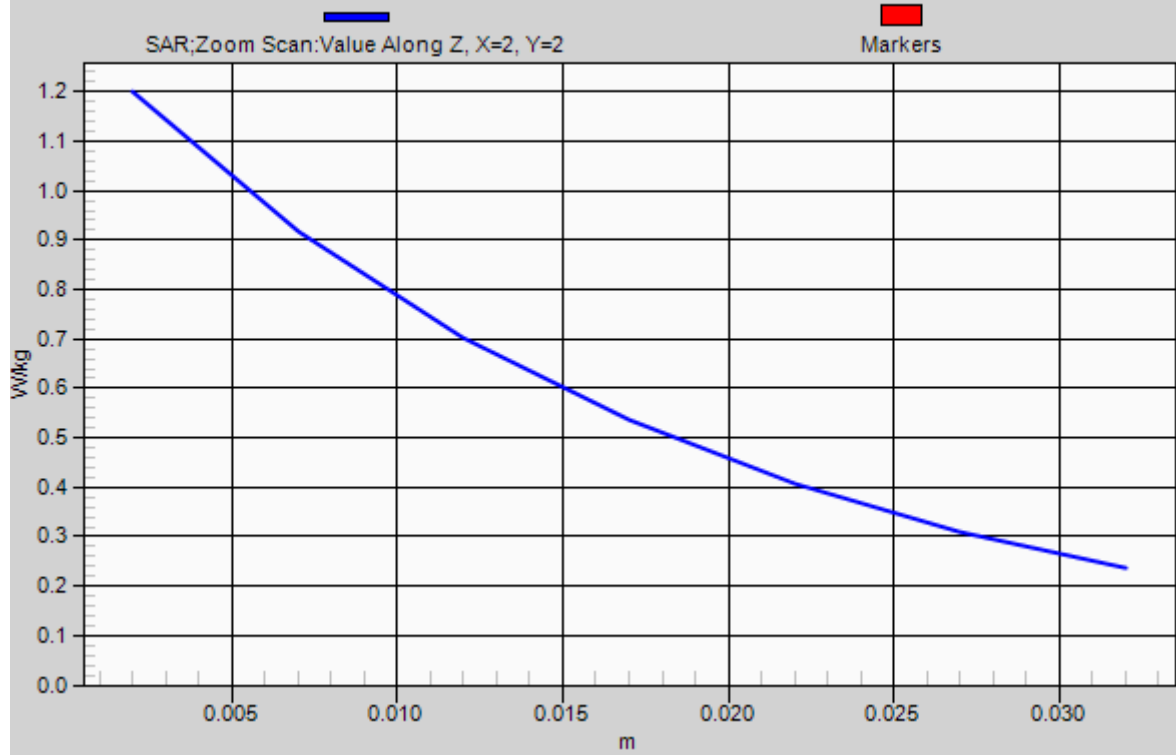
Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.743 W/kg

Maximum value of SAR (measured) = 1.20 W/kg



1g/10g Averaged SAR



P30 CDMA2000 BC0_RC3+SO32(+ F-SCH)_Rear Face_1.5cm_Ch777_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 848.31 \text{ MHz}$; $\sigma = 0.99 \text{ mho/m}$; $\epsilon_r = 54.193$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch777/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.13 W/kg

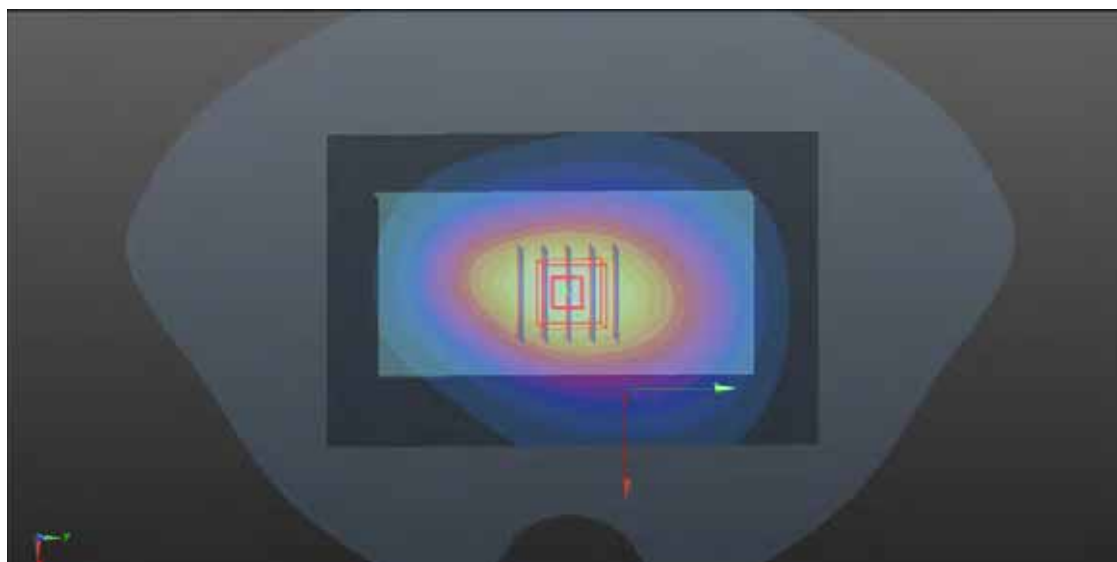
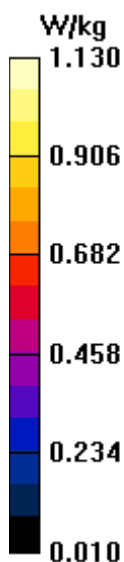
Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 32.586 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 1.23 W/kg

SAR(1 g) = 0.953 W/kg; SAR(10 g) = 0.697 W/kg

Maximum value of SAR (measured) = 1.11 W/kg



P31 CDMA2000 BC0_RC3+SO32(+ F-SCH)_Front Face_0cm_Ch384_Earphone_Holster

DUT: 121010N015

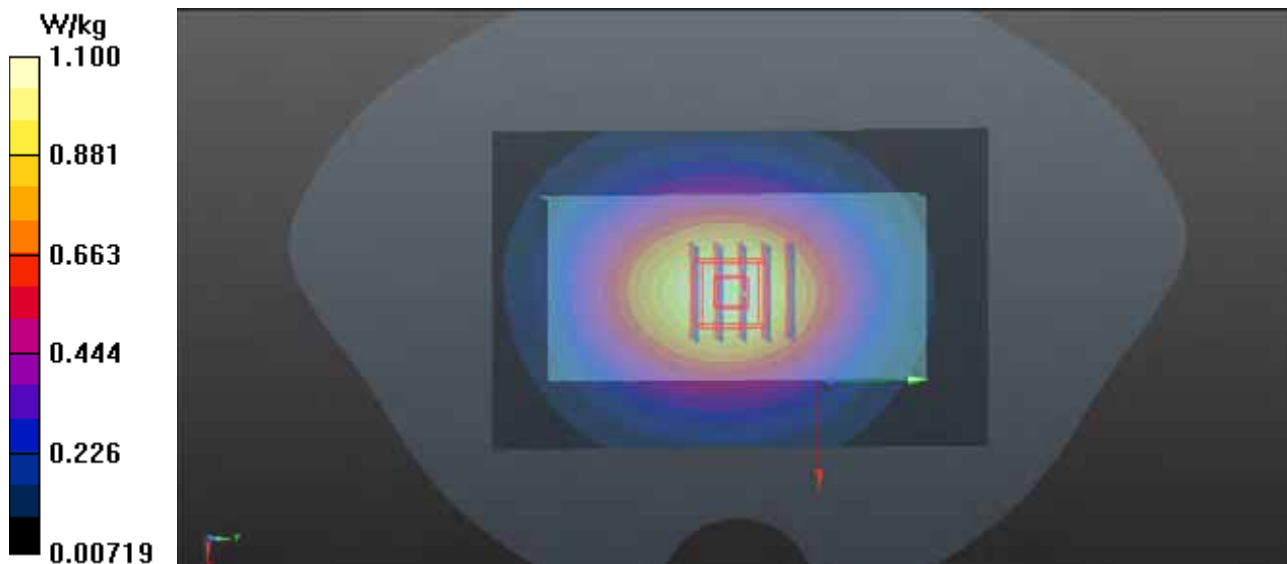
Communication System: CDMA2000; Frequency: 836.52 MHz; Duty Cycle: 1:1
Medium: B835_1123 Medium parameters used: $f = 837$ MHz; $\sigma = 0.979$ mho/m; $\epsilon_r = 54.321$; $\rho = 1000$ kg/m³
Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch384/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.10 W/kg

Ch384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.787 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.918 W/kg; SAR(10 g) = 0.678 W/kg
Maximum value of SAR (measured) = 1.07 W/kg



P32 CDMA2000 BC0_RC3+SO32(+ F-SCH)_Front Face_0cm_Ch1013_Earphone_Holster

DUT: 121010N015

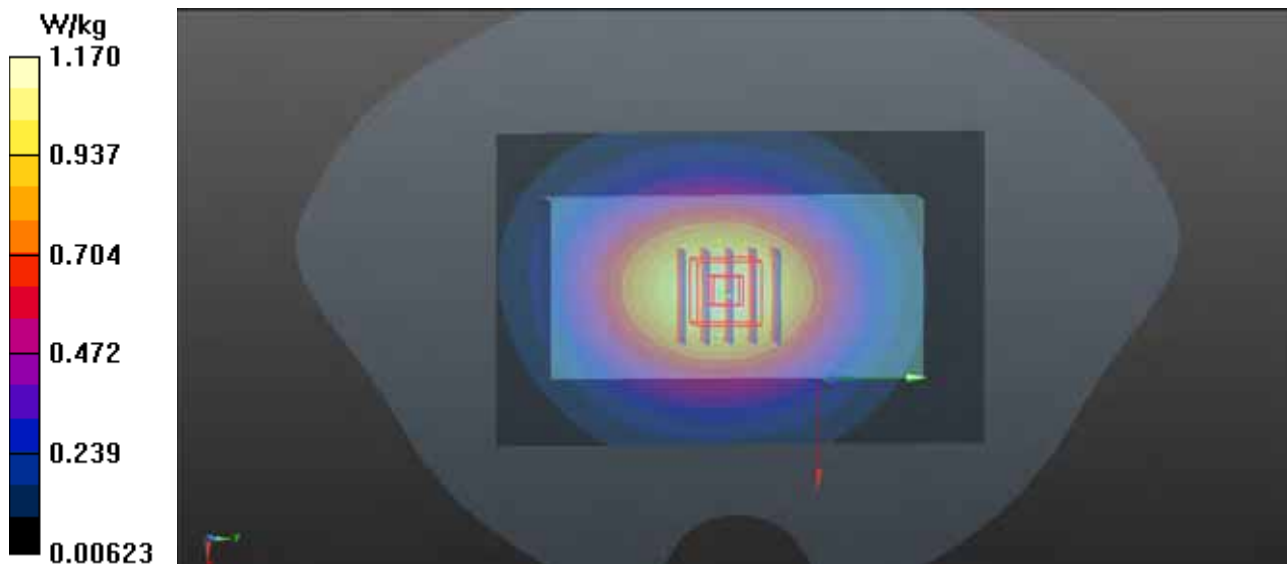
Communication System: CDMA2000; Frequency: 824.7 MHz; Duty Cycle: 1:1
Medium: B835_1123 Medium parameters used: $f = 825$ MHz; $\sigma = 0.966$ mho/m; $\epsilon_r = 54.462$; $\rho = 1000$ kg/m³
Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch1013/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.17 W/kg

Ch1013/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.227 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 1.01 W/kg; SAR(10 g) = 0.745 W/kg
Maximum value of SAR (measured) = 1.17 W/kg



P33 CDMA2000 BC0_RC3+SO32(+ F-SCH)_Front Face_0cm_Ch777_Earphone_Holster

DUT: 121010N015

Communication System: CDMA2000; Frequency: 848.31 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 848.31$ MHz; $\sigma = 0.99$ mho/m; $\epsilon_r = 54.193$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch777/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.04 W/kg

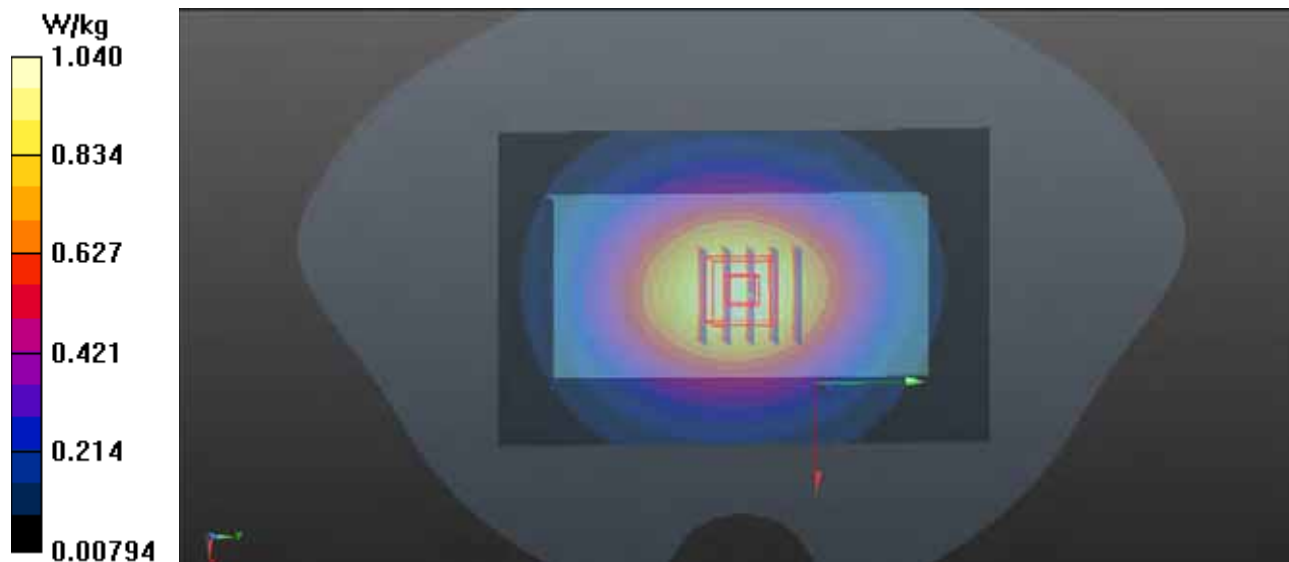
Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 30.896 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 1.13 W/kg

SAR(1 g) = 0.878 W/kg; SAR(10 g) = 0.648 W/kg

Maximum value of SAR (measured) = 1.03 W/kg



P34 CDMA2000 BC10_RC3+SO32(+ F-SCH)_Front Face_1.5cm_Ch476_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 817.9 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 818 \text{ MHz}$; $\sigma = 0.958 \text{ mho/m}$; $\epsilon_r = 54.542$; $\rho =$

1000 kg/m^3

Ambient Temperature : $21.8 \text{ }^\circ\text{C}$; Liquid Temperature : $20.6 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch476/Area Scan (71x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.15 W/kg

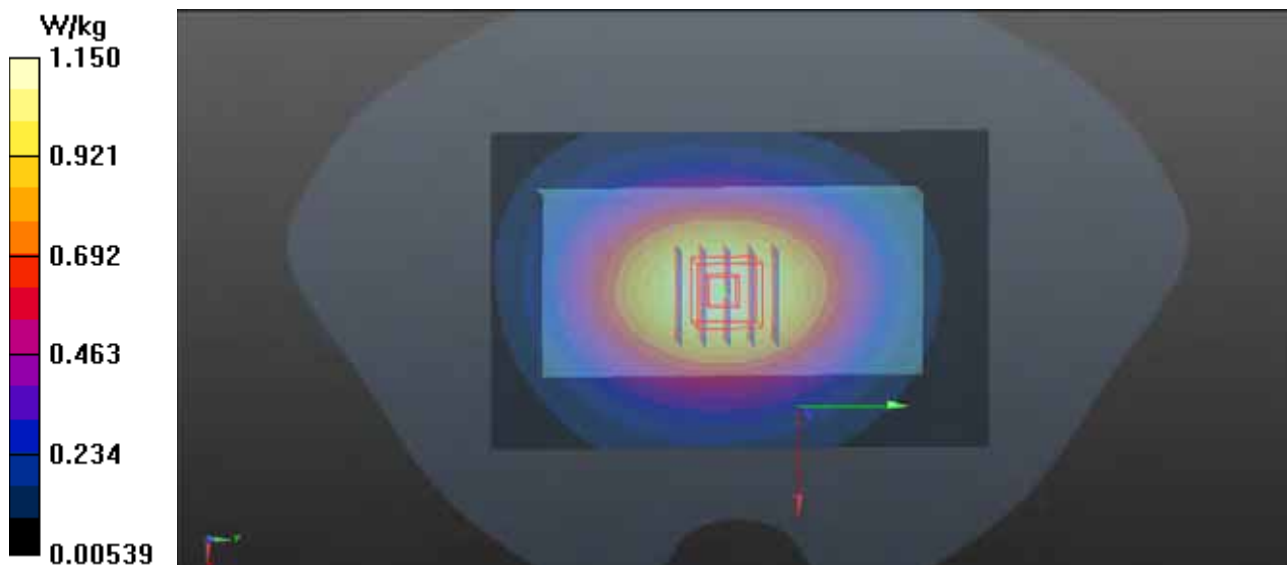
Ch476/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 32.861 V/m ; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 1.25 W/kg

SAR(1 g) = 0.977 W/kg ; SAR(10 g) = 0.729 W/kg

Maximum value of SAR (measured) = 1.14 W/kg



P35 CDMA2000 BC10_RC3+SO32(+ F-SCH)_Rear Face_1.5cm_Ch476_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 817.9 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 818 \text{ MHz}$; $\sigma = 0.958 \text{ mho/m}$; $\epsilon_r = 54.542$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch476/Area Scan (71x111x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (interpolated) = 1.25 W/kg

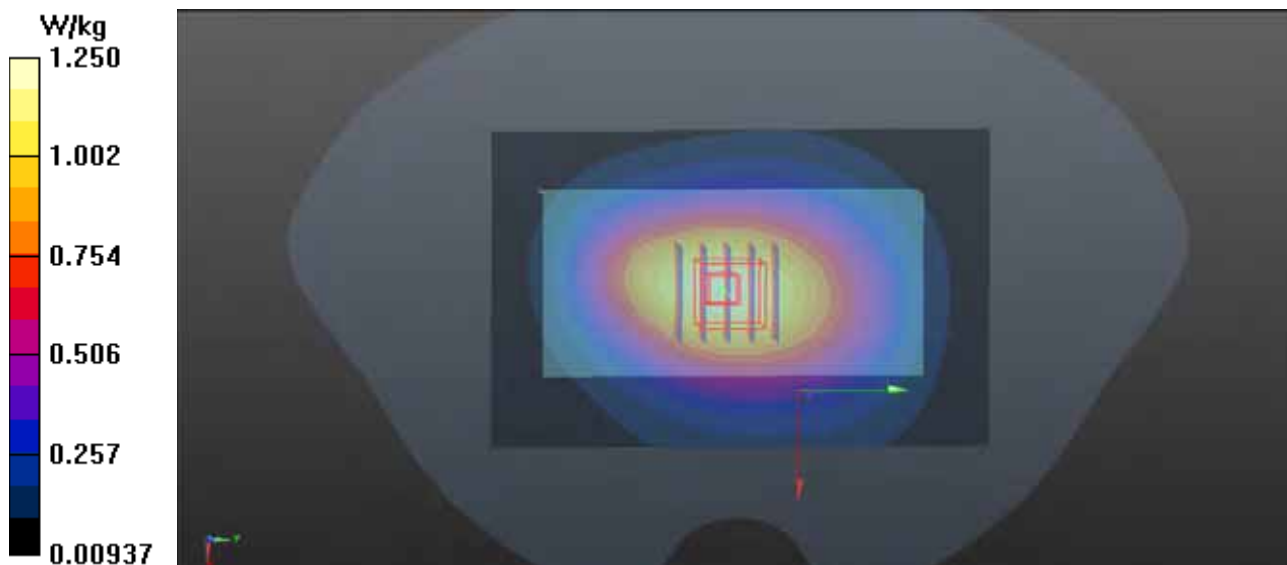
Ch476/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 34.228 V/m; Power Drift = -0.06 dB

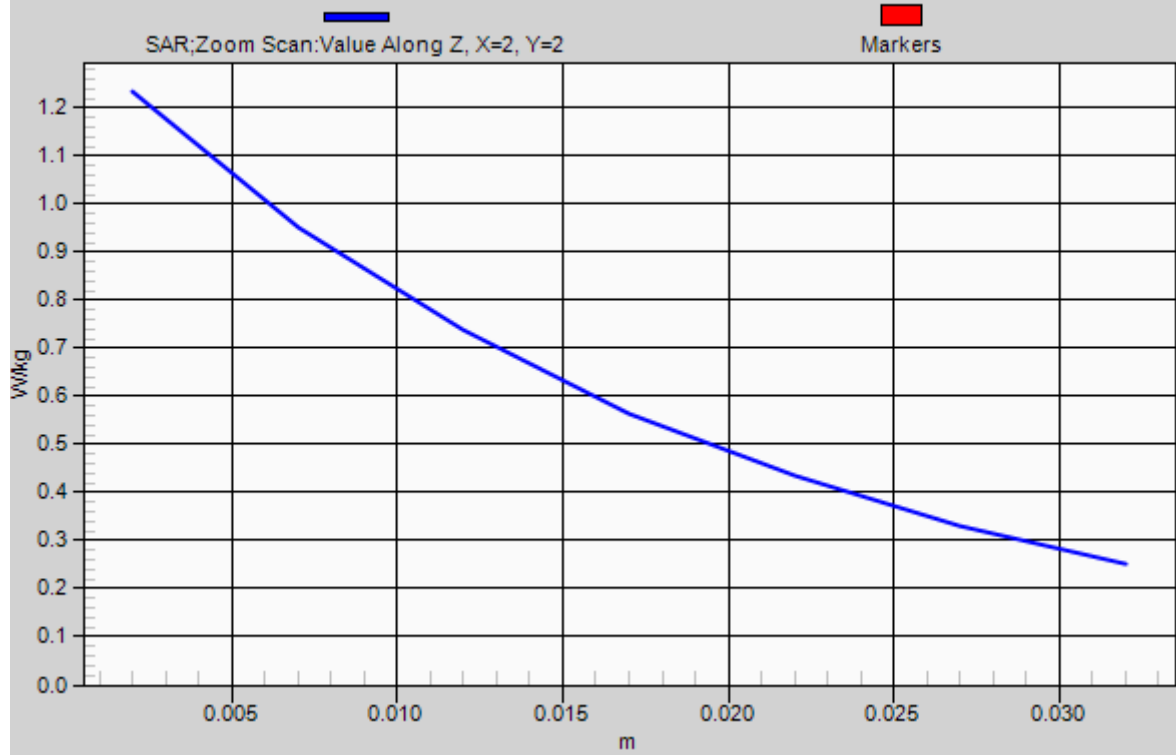
Peak SAR (extrapolated) = 1.36 W/kg

SAR(1 g) = 1.05 W/kg; SAR(10 g) = 0.775 W/kg

Maximum value of SAR (measured) = 1.23 W/kg



1g/10g Averaged SAR



P36 CDMA2000 BC10_RC3+SO32(+ F-SCH)_Front Face_1.5cm_Ch580_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 820.5 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 820.5$ MHz; $\sigma = 0.961$ mho/m; $\epsilon_r = 54.514$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch580/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.03 W/kg

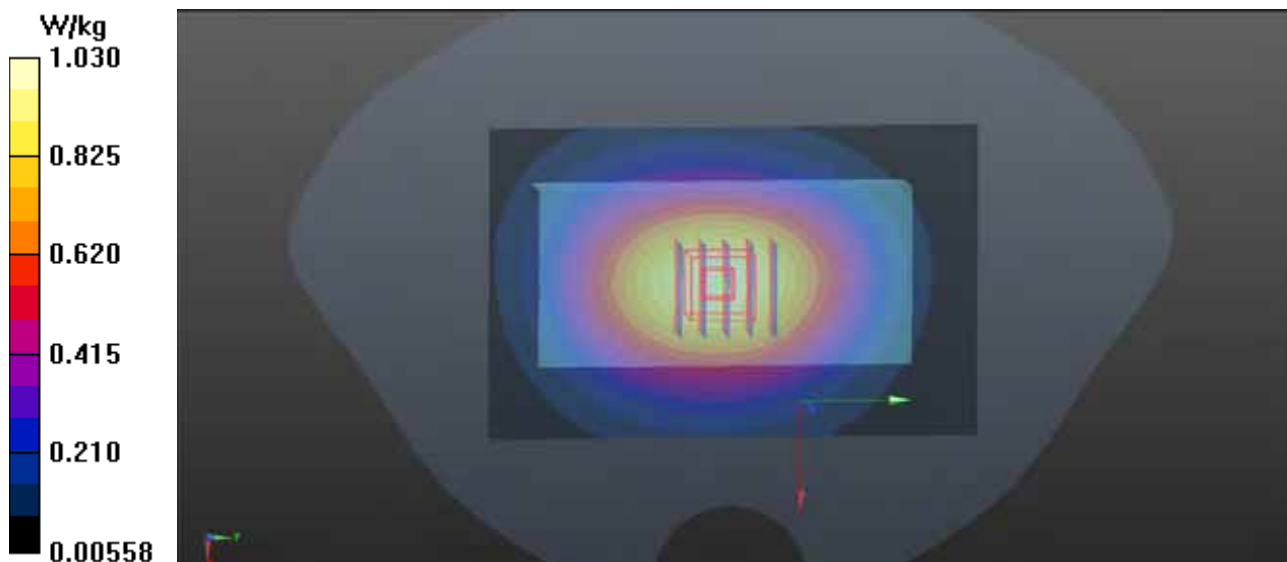
Ch580/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 30.915 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.12 W/kg

SAR(1 g) = 0.882 W/kg; SAR(10 g) = 0.659 W/kg

Maximum value of SAR (measured) = 1.02 W/kg



P37 CDMA2000 BC10_RC3+SO32(+ F-SCH)_Front Face_1.5cm_Ch684_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 823.1 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 823.1$ MHz; $\sigma = 0.964$ mho/m; $\epsilon_r = 54.483$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch684/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.18 W/kg

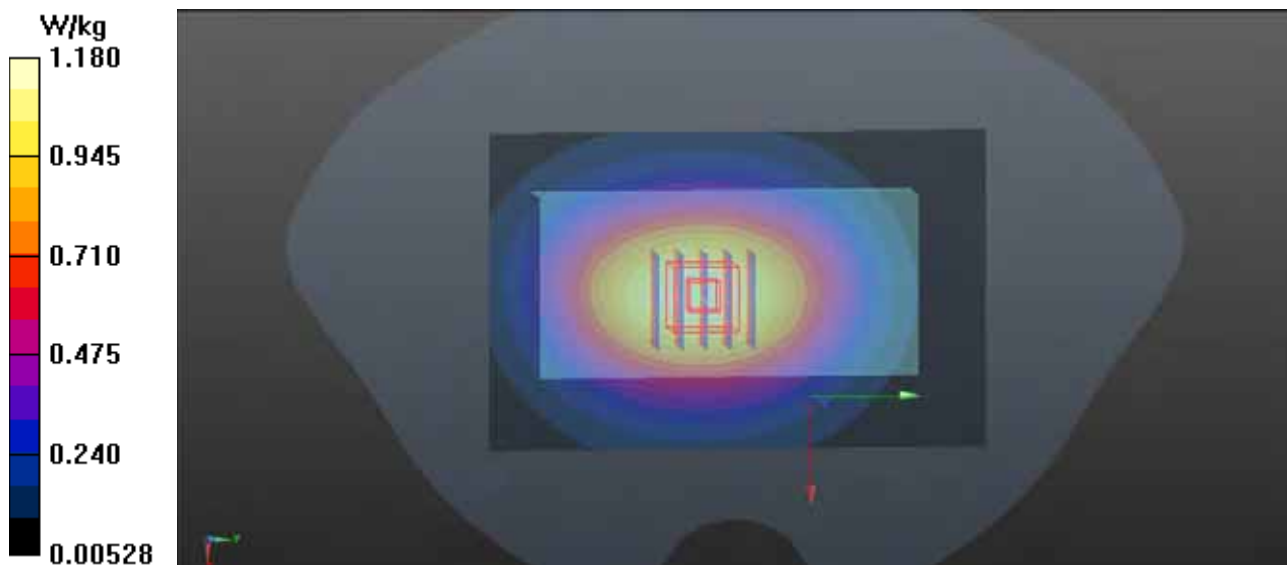
Ch684/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 32.630 V/m; Power Drift = -0.07 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.762 W/kg

Maximum value of SAR (measured) = 1.19 W/kg



P38 CDMA2000 BC10_RC3+SO32(+ F-SCH)_Rear Face_1.5cm_Ch580_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 820.5 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 820.5$ MHz; $\sigma = 0.961$ mho/m; $\epsilon_r = 54.514$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch580/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.16 W/kg

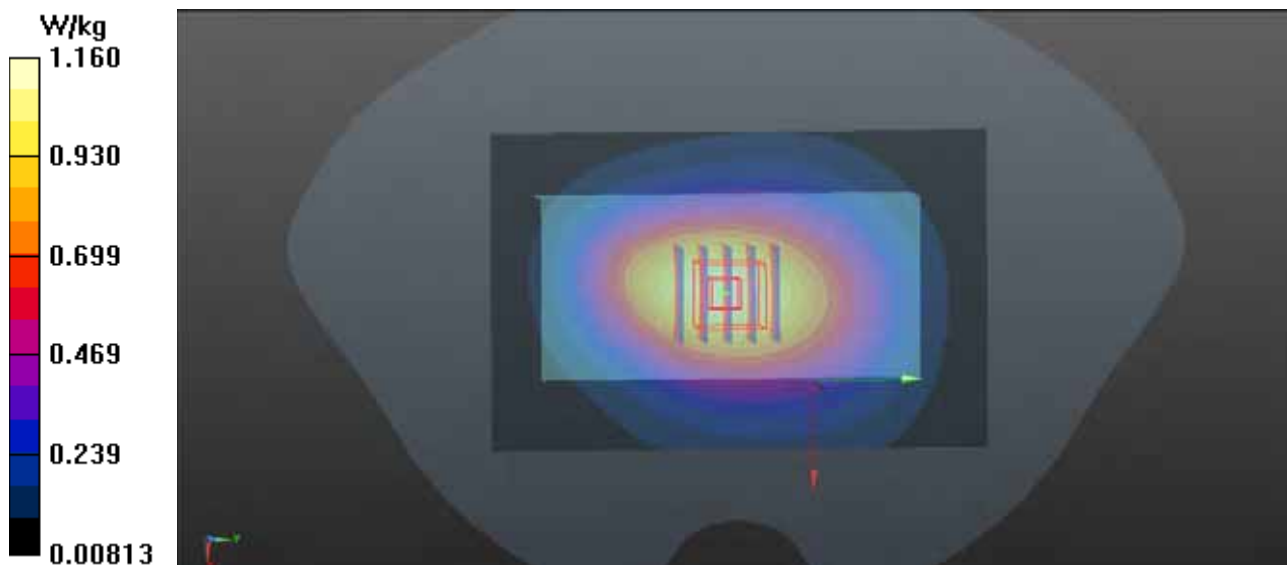
Ch580/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 32.769 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 1.25 W/kg

SAR(1 g) = 0.979 W/kg; SAR(10 g) = 0.719 W/kg

Maximum value of SAR (measured) = 1.14 W/kg



P39 CDMA2000 BC10_RC3+SO32(+ F-SCH)_Rear Face_1.5cm_Ch684_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 823.1 MHz; Duty Cycle: 1:1

Medium: B835_1123 Medium parameters used: $f = 823.1$ MHz; $\sigma = 0.964$ mho/m; $\epsilon_r = 54.483$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.8 °C; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch684/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 1.20 W/kg

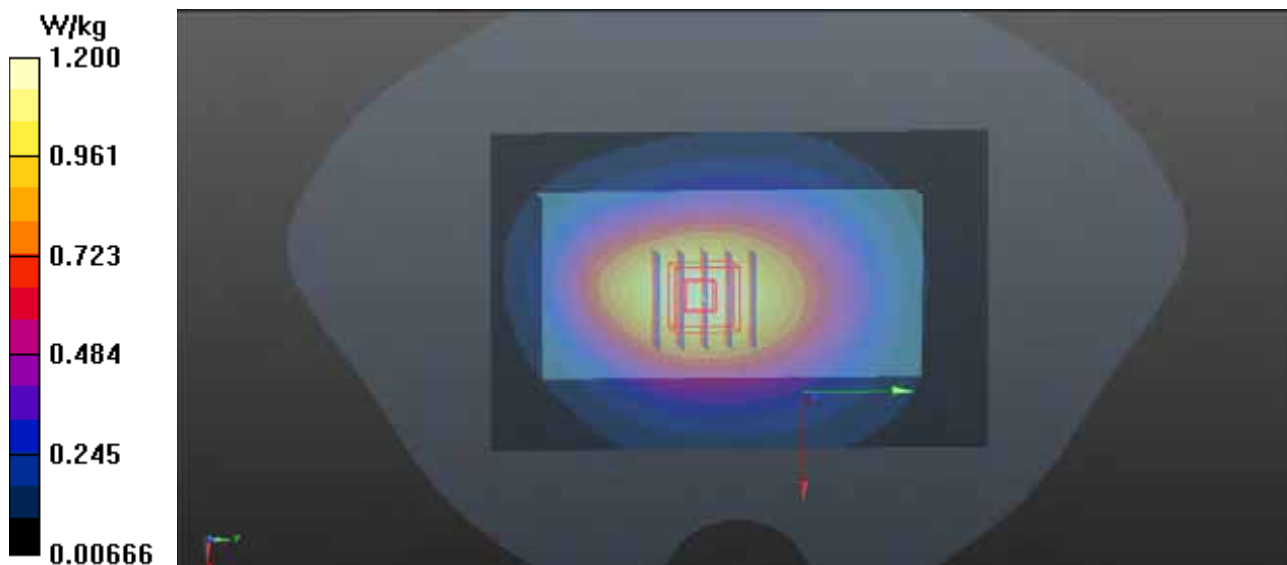
Ch684/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 32.312 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 1.03 W/kg; SAR(10 g) = 0.754 W/kg

Maximum value of SAR (measured) = 1.20 W/kg



P40 CDMA2000 BC10_RC3+SO32(+ F-SCH)_Front Face_0cm_Ch476_Earphone_Holster

DUT: 121010N015

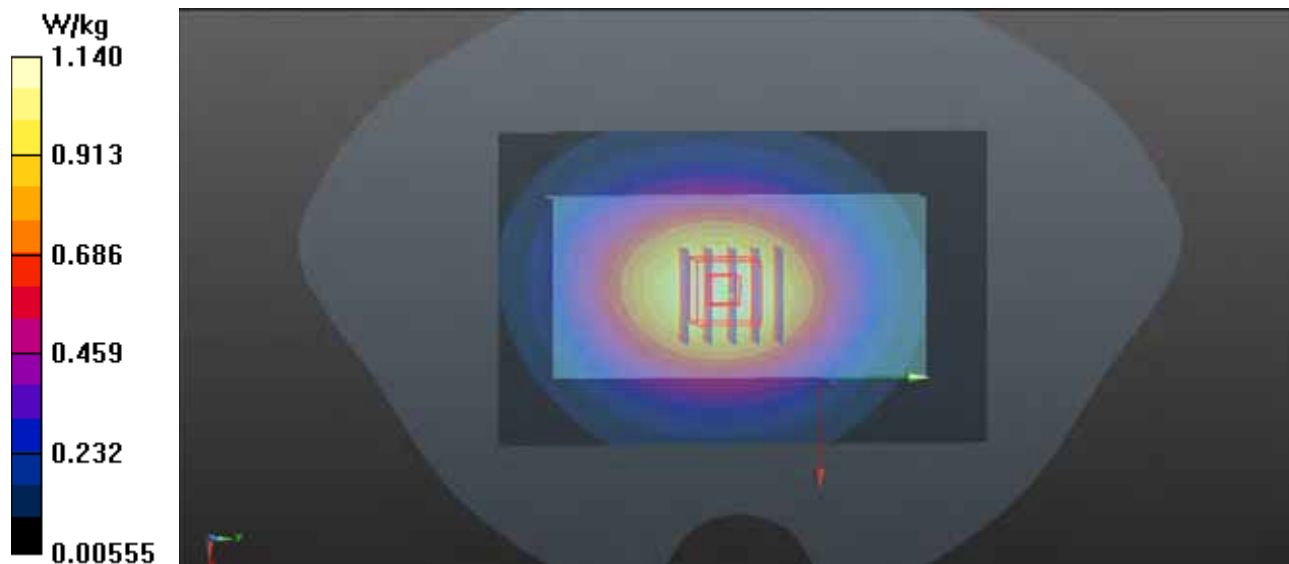
Communication System: CDMA2000; Frequency: 817.9 MHz; Duty Cycle: 1:1
Medium: B835_1123 Medium parameters used: $f = 818$ MHz; $\sigma = 0.958$ mho/m; $\epsilon_r = 54.542$; $\rho = 1000$ kg/m³
Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch476/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.14 W/kg

Ch476/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.677 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.983 W/kg; SAR(10 g) = 0.729 W/kg
Maximum value of SAR (measured) = 1.15 W/kg



P41 CDMA2000 BC10_RC3+SO32(+ F-SCH)_Front Face_0cm_Ch580_Earphone_Holster

DUT: 121010N015

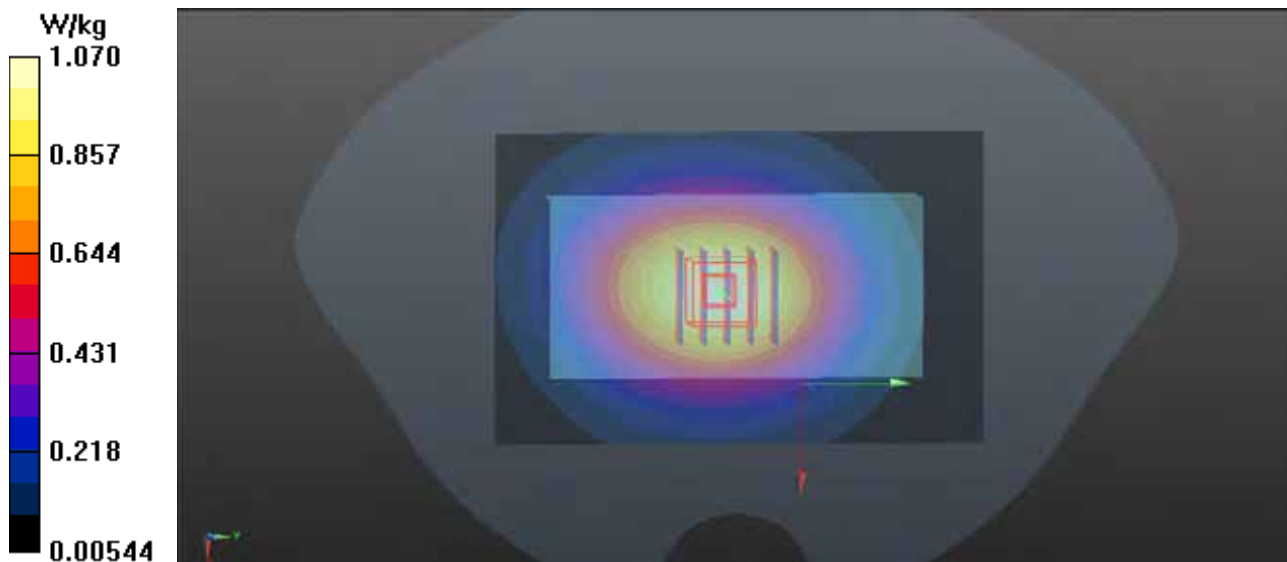
Communication System: CDMA2000; Frequency: 817.9 MHz; Duty Cycle: 1:1
Medium: B835_1123 Medium parameters used: $f = 818$ MHz; $\sigma = 0.958$ mho/m; $\epsilon_r = 54.542$; $\rho = 1000$ kg/m³
Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch580/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.07 W/kg

Ch580/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.590 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.920 W/kg; SAR(10 g) = 0.684 W/kg
Maximum value of SAR (measured) = 1.06 W/kg



P42 CDMA2000 BC10_RC3+SO32(+ F-SCH)_Front Face_0cm_Ch684_Earphone_Holster

DUT: 121010N015

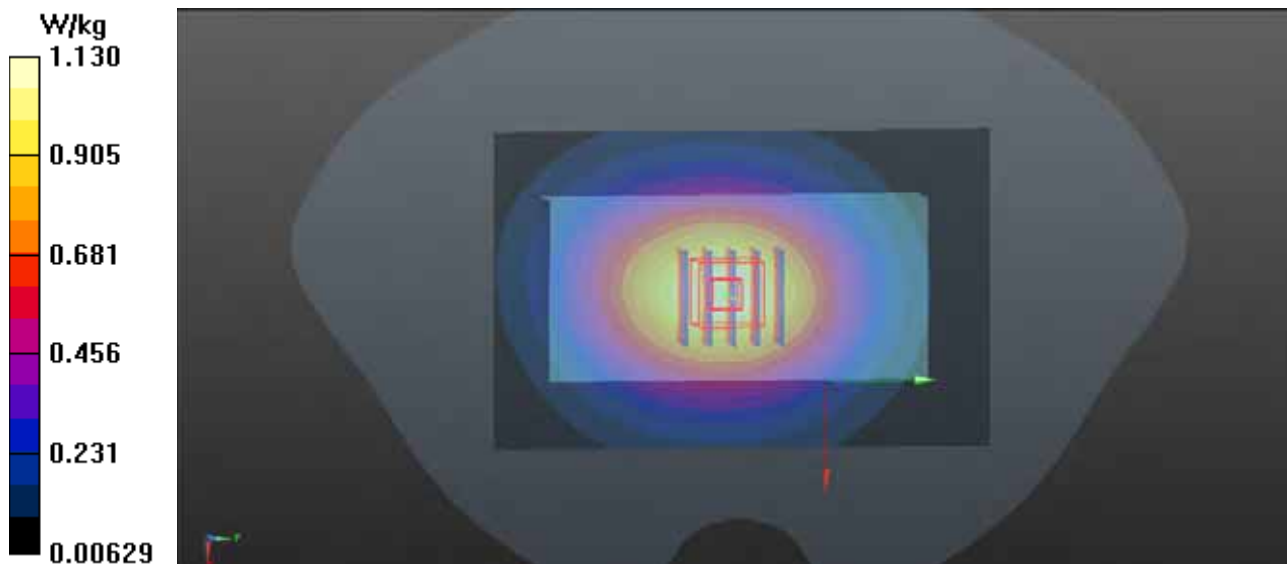
Communication System: CDMA2000; Frequency: 823.1 MHz; Duty Cycle: 1:1
Medium: B835_1123 Medium parameters used: $f = 823.1$ MHz; $\sigma = 0.964$ mho/m; $\epsilon_r = 54.483$; $\rho = 1000$ kg/m³
Ambient Temperature : 21.8 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(9.23, 9.23, 9.23); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Front Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1695
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch684/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.13 W/kg

Ch684/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.464 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 1.25 W/kg
SAR(1 g) = 0.969 W/kg; SAR(10 g) = 0.719 W/kg
Maximum value of SAR (measured) = 1.13 W/kg



P43 CDMA2000 BC1_RC3+SO32(+ F-SCH)_Front Face_1.5cm_Ch600_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: B1900_1123 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.555$ mho/m; $\epsilon_r = 52.54$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.7 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.33, 7.33, 7.33); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch600/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.494 W/kg

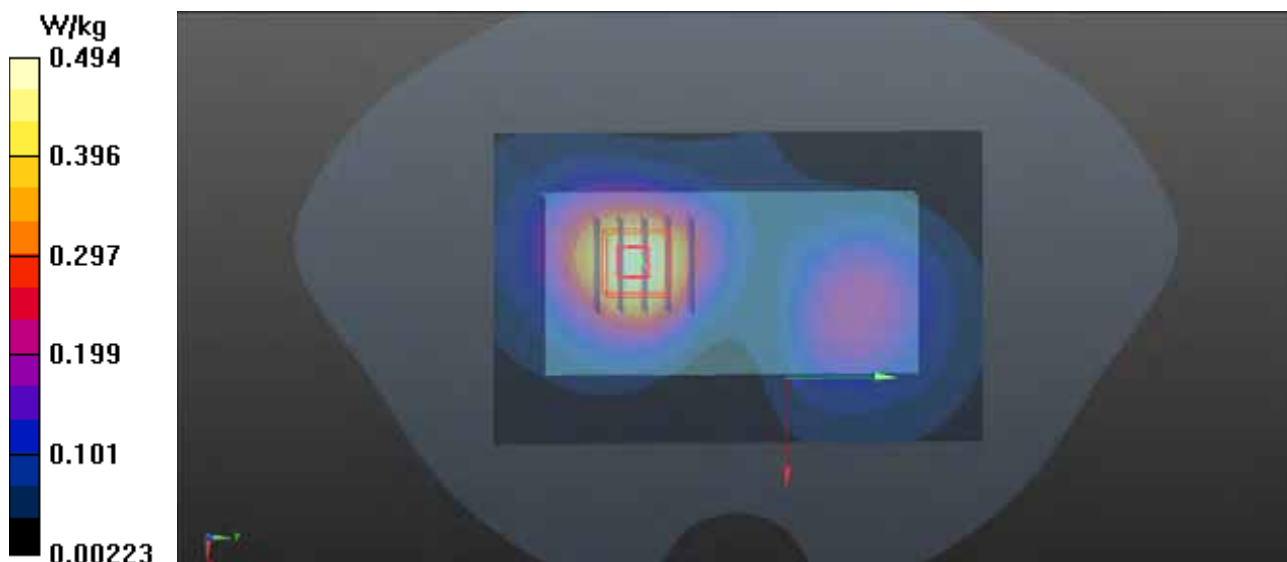
Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 6.308 V/m; Power Drift = -0.10 dB

Peak SAR (extrapolated) = 0.574 W/kg

SAR(1 g) = 0.377 W/kg; SAR(10 g) = 0.236 W/kg

Maximum value of SAR (measured) = 0.477 W/kg



P44 CDMA2000 BC1_RC3+SO32(+ F-SCH)_Rear Face_1.5cm_Ch600_Earphone

DUT: 121010N015

Communication System: CDMA2000; Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: B1900_1123 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.555$ mho/m; $\epsilon_r = 52.54$; $\rho = 1000$ kg/m³

Ambient Temperature : 21.7 °C ; Liquid Temperature : 20.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.33, 7.33, 7.33); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch600/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (interpolated) = 0.561 W/kg

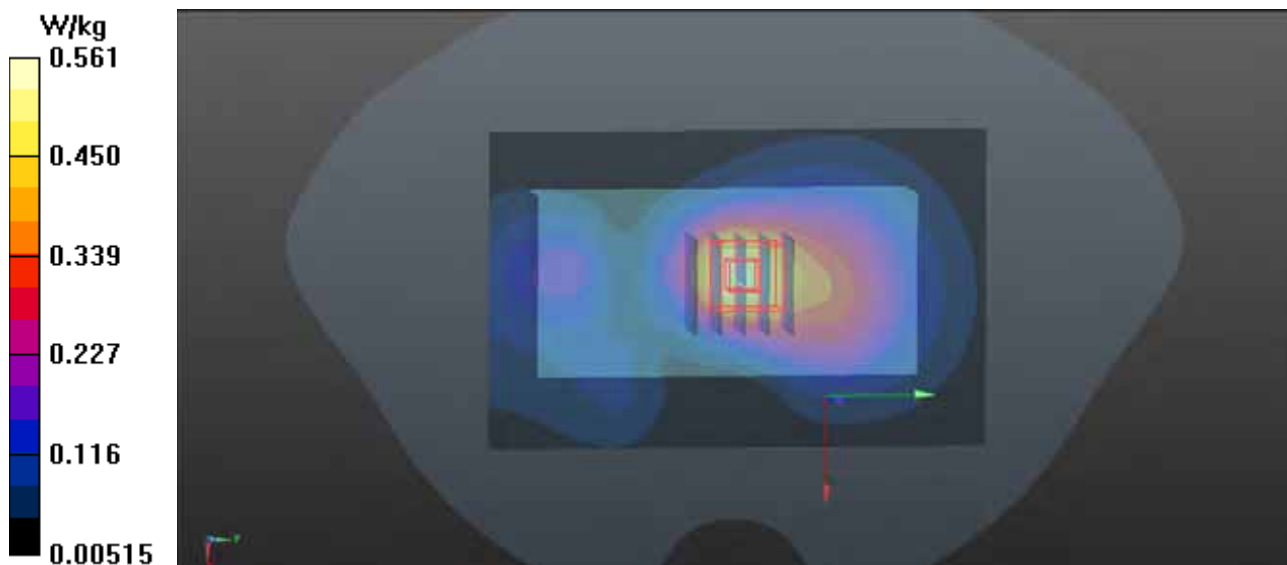
Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 16.789 V/m; Power Drift = -0.01 dB

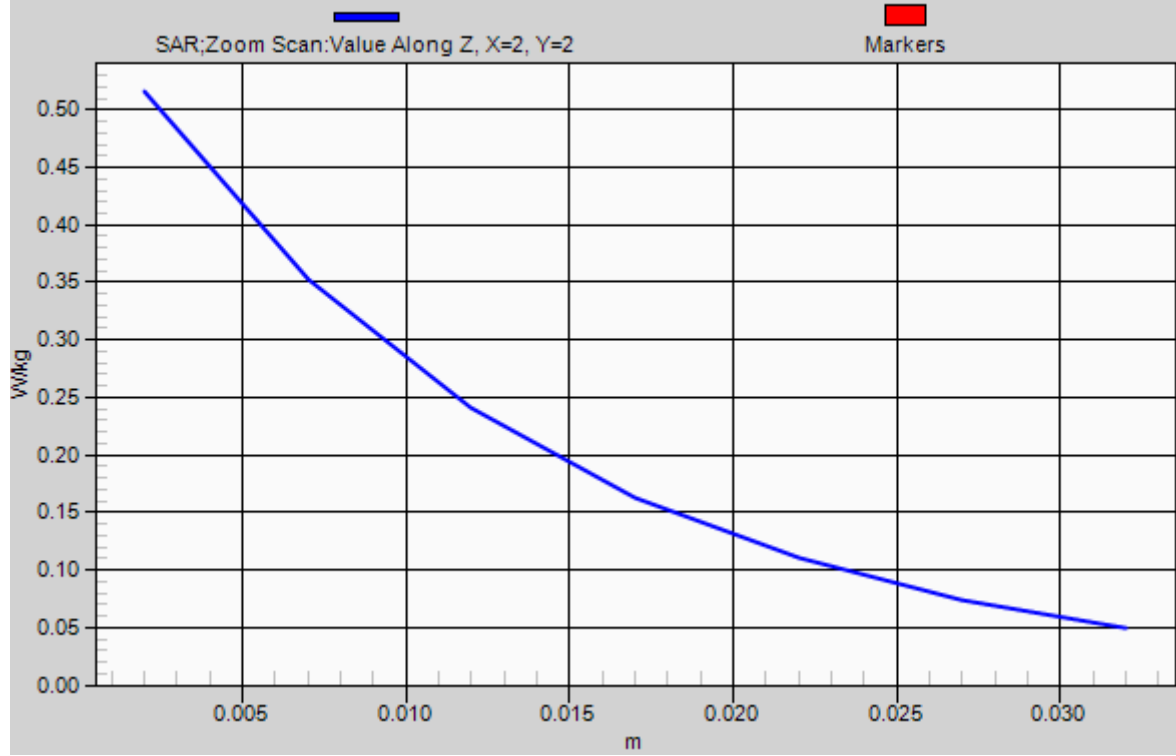
Peak SAR (extrapolated) = 0.621 W/kg

SAR(1 g) = 0.416 W/kg; SAR(10 g) = 0.263 W/kg

Maximum value of SAR (measured) = 0.516 W/kg



1g/10g Averaged SAR



P45 CDMA2000 BC1_RC3+SO32(+ F-SCH)_Front Face_0cm_Ch600_Earphone_Holster

DUT: 121010N015

Communication System: CDMA2000; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: B1900_1123 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.555$ mho/m; $\epsilon_r = 52.54$; $\rho = 1000$ kg/m³
Ambient Temperature : 21.7 °C ; Liquid Temperature : 20.6 °C

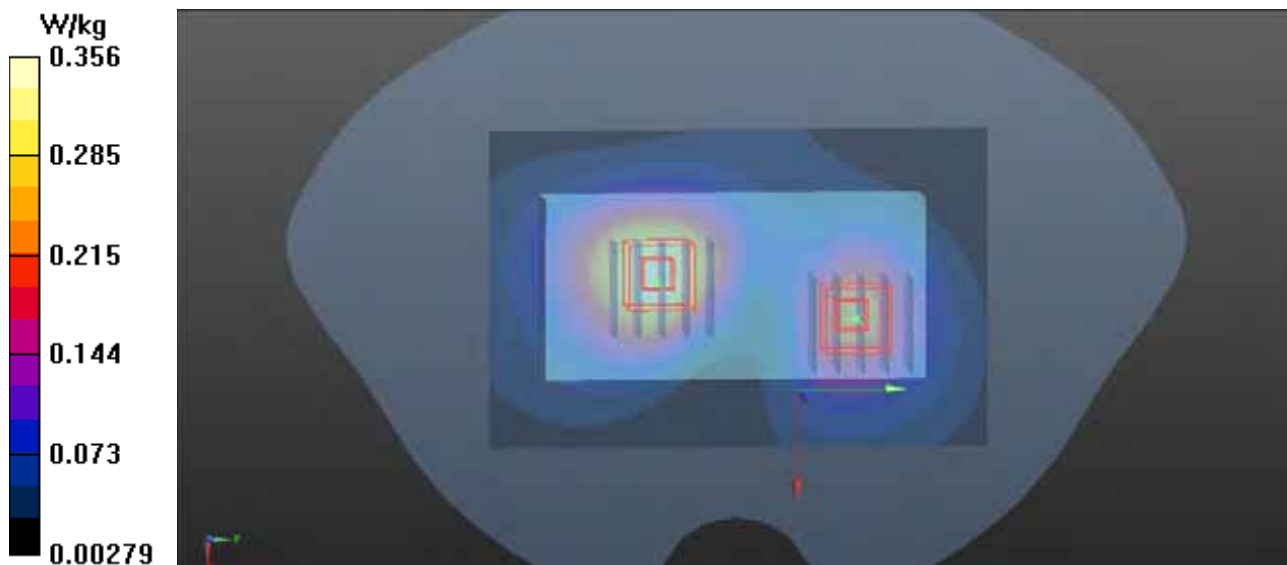
DASY5 Configuration:

- Probe: EX3DV4 - SN3873; ConvF(7.33, 7.33, 7.33); Calibrated: 2012/08/06;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1341; Calibrated: 2012/08/07
- Phantom: Right Phantom with CRP v5.0; Type: QD000P40CD; Serial: TP:1722
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Ch600/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.356 W/kg

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.849 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.403 W/kg
SAR(1 g) = 0.265 W/kg; SAR(10 g) = 0.168 W/kg
Maximum value of SAR (measured) = 0.334 W/kg

Ch600/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.849 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.253 W/kg
SAR(1 g) = 0.174 W/kg; SAR(10 g) = 0.112 W/kg
Maximum value of SAR (measured) = 0.215 W/kg





Appendix C. Calibration Certificate for Probe and Dipole

The SPEAG calibration certificates are shown as follows.



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 **B.V. ADT (Auden)**

Certificate No: **D835V2-4d139_Aug12**

CALIBRATION CERTIFICATE

Object **D835V2 - SN: 4d139**

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

Calibration date: **August 07, 2012**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13

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

Calibrated by: **Israe El-Naouq** Name: **Israe El-Naouq** Function: **Laboratory Technician**

Approved by: **Katja Pokovic** Name: **Katja Pokovic** Function: **Technical Manager**

Signature: 


Issued: August 7, 2012

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



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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- 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
- 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
- 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:

- 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.

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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.3 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.34 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	9.35 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.53 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	6.12 mW / g ± 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.3 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.43 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	9.50 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	6.29 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.3 Ω - 2.6 j Ω
Return Loss	- 29.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.3 Ω - 4.1 j Ω
Return Loss	- 27.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.392 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 22, 2011

DASY5 Validation Report for Head TSL

Date: 07.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d139

Communication System: CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.9$ mho/m; $\epsilon_r = 41.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.07, 6.07, 6.07); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.2(961); SEMCAD X 14.6.6(6816)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm 2/Zoom Scan (7x7x7)/Cube 0:

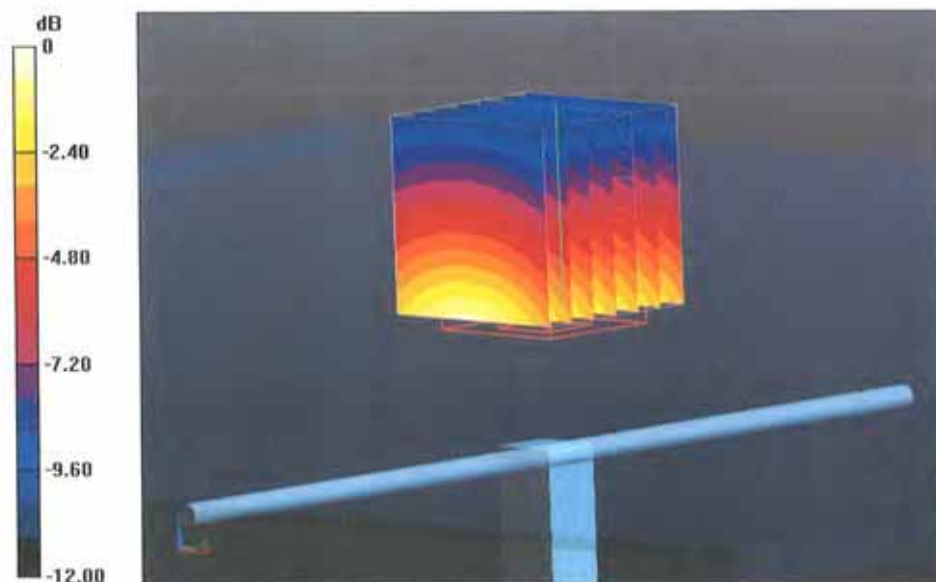
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 56.648 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.447 mW/g

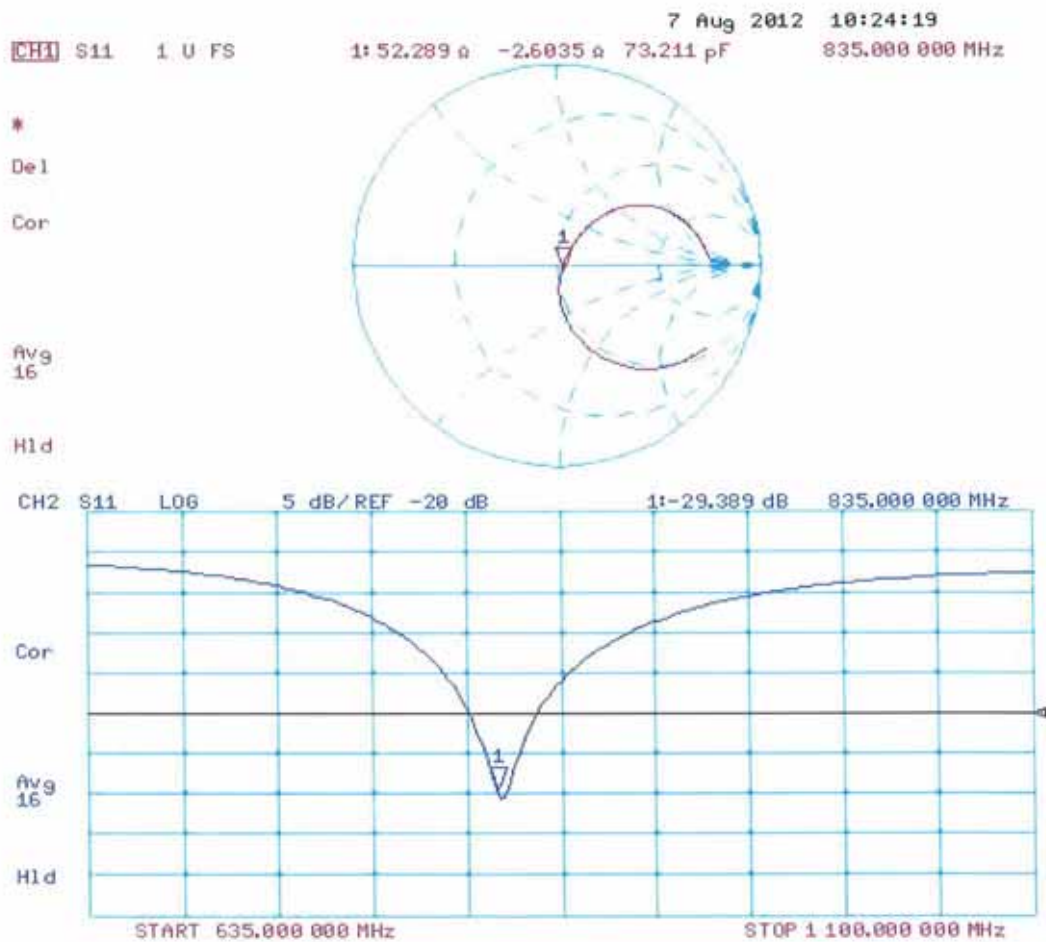
SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.53 mW/g

Maximum value of SAR (measured) = 2.71 W/kg



0 dB = 2.71 W/kg = 8.66 dB W/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 06.08.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d139

Communication System: CW; Frequency: 835 MHz

Medium parameters used: $f = 835$ MHz; $\sigma = 0.99$ mho/m; $\epsilon_r = 53.3$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.02, 6.02, 6.02); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.2(961); SEMCAD X 14.6.6(6816)

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

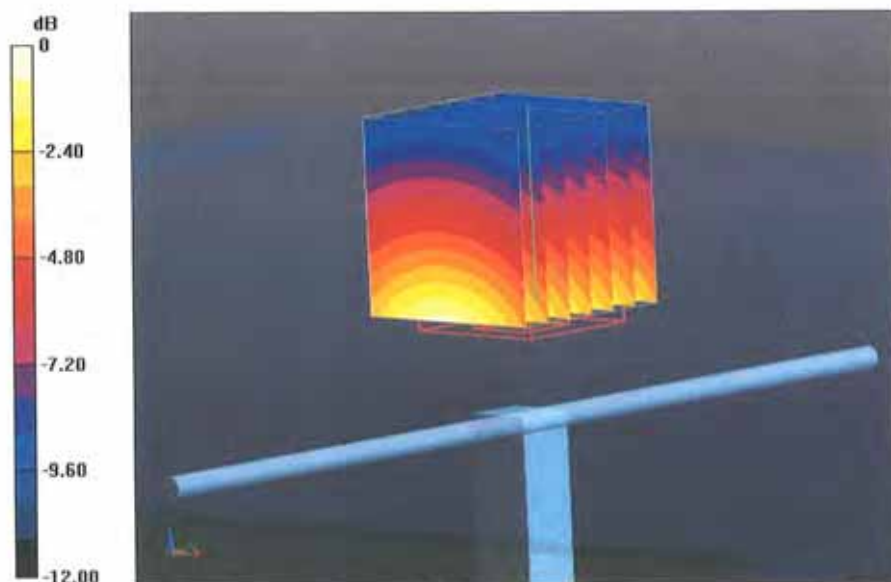
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.412 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 3.539 mW/g

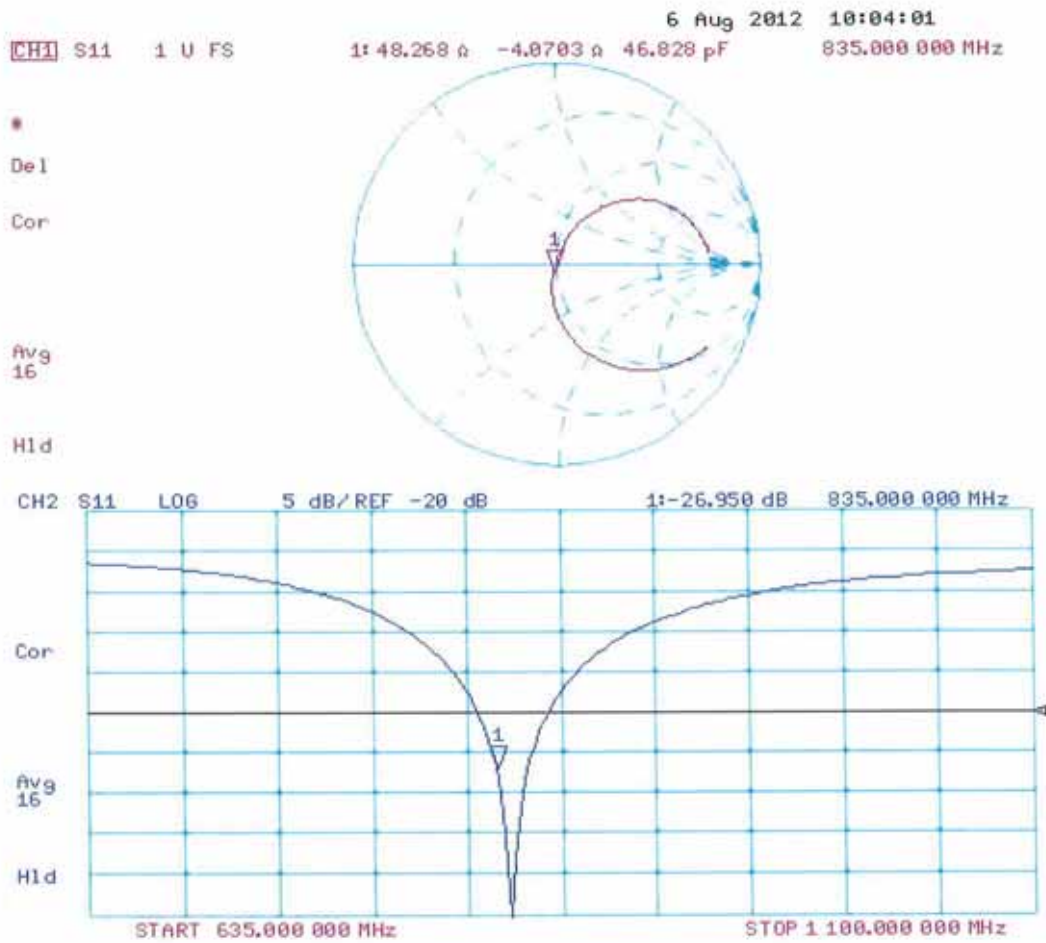
SAR(1 g) = 2.43 mW/g; SAR(10 g) = 1.6 mW/g

Maximum value of SAR (measured) = 2.83 W/kg



0 dB = 2.83 W/kg = 9.04 dB W/kg

Impedance Measurement Plot for Body TSL





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Accreditation No.: **SCS 108**

Client **B.V. ADT (Auden)**

Certificate No: **D1900V2-5d159_Jul12**

CALIBRATION CERTIFICATE

Object **D1900V2 - SN: 5d159**

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

Calibration date: **July 20, 2012**

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

All calibrations have been conducted in the closed laboratory facility: environment temperature $(22 \pm 3)^\circ\text{C}$ and humidity $< 70\%$.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	05-Oct-11 (No. 217-01451)	Oct-12
Power sensor HP 8481A	US37292783	05-Oct-11 (No. 217-01451)	Oct-12
Reference 20 dB Attenuator	SN: 5058 (20k)	27-Mar-12 (No. 217-01530)	Apr-13
Type-N mismatch combination	SN: 5047.2 / 06327	27-Mar-12 (No. 217-01533)	Apr-13
Reference Probe ES3DV3	SN: 3205	30-Dec-11 (No. ES3-3205_Dec11)	Dec-12
DAE4	SN: 601	27-Jun-12 (No. DAE4-601_Jun12)	Jun-13
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-11)	In house check: Oct-13
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-11)	In house check: Oct-13
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

Calibrated by: **Dimce Iliev** Name: **Dimce Iliev** Function: **Laboratory Technician**

Signature

Approved by: **Katja Pokovic** Name: **Katja Pokovic** Function: **Technical Manager**

Issued: July 20, 2012

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



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Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

- 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
- 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
- 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:

- 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.

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%.

Measurement Conditions

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

DASY Version	DASY5	V52.8.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.9 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.76 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	39.4 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.13 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	20.6 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	52.6 ± 6 %	1.52 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.1 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	40.3 mW / g ± 17.0 % (k=2)

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.36 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	21.4 mW / g ± 16.5 % (k=2)

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5 Ω + 5.4 j Ω
Return Loss	- 24.7 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.5 Ω + 6.3 j Ω
Return Loss	- 23.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.198 ns
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After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.

No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 20, 2011

DASY5 Validation Report for Head TSL

Date: 20.07.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d159

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.38$ mho/m; $\epsilon_r = 39.9$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

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

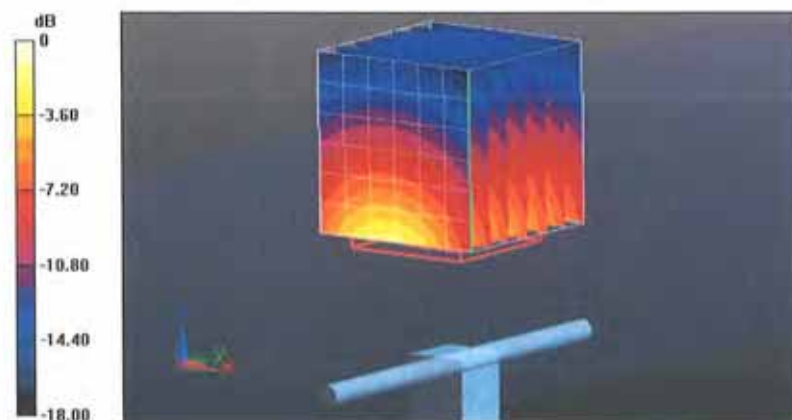
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 96.989 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 17.399 mW/g

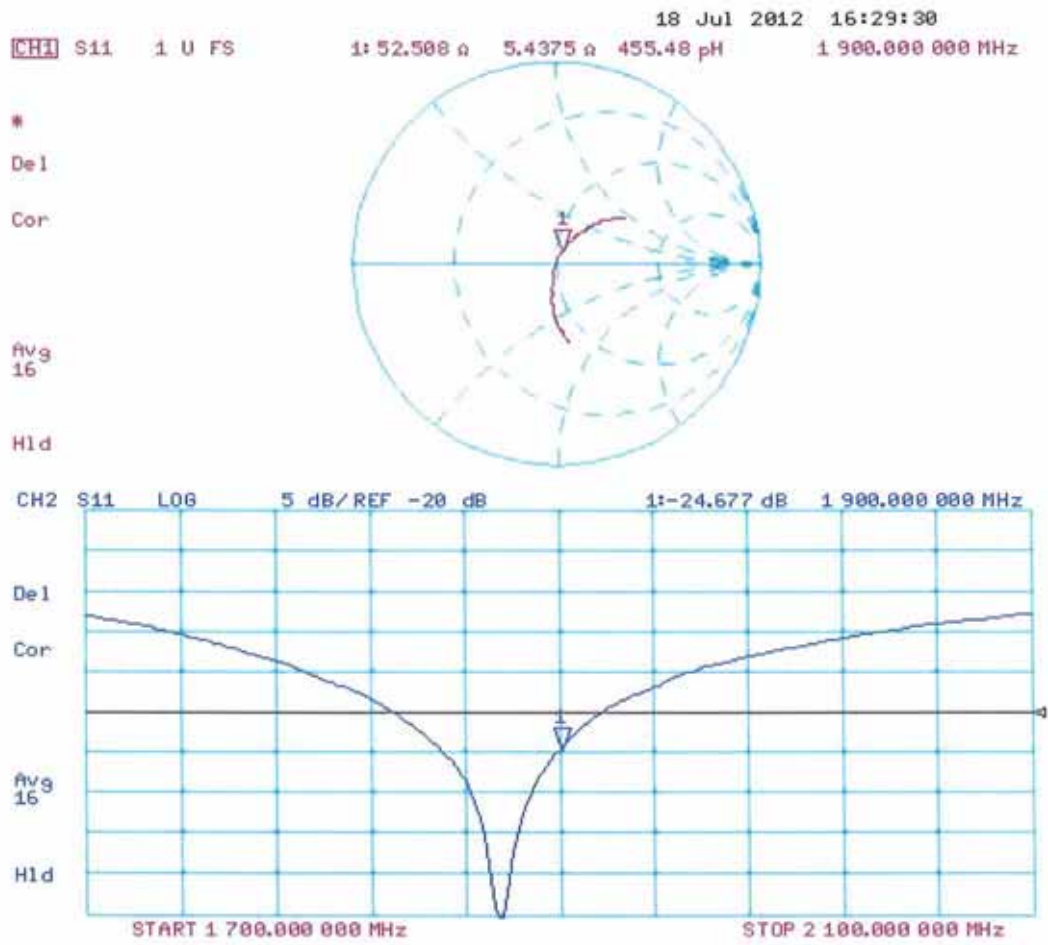
SAR(1 g) = 9.76 mW/g; SAR(10 g) = 5.13 mW/g

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



0 dB = 12.2 mW/g = 21.73 dB mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 20.07.2012

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d159

Communication System: CW; Frequency: 1900 MHz

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.52$ mho/m; $\epsilon_r = 52.6$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

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

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.1(838); SEMCAD X 14.6.5(6469)

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

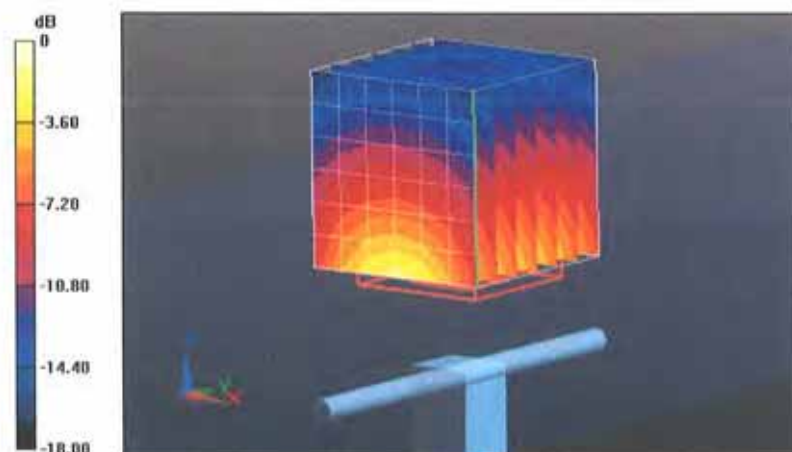
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.799 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 17.619 mW/g

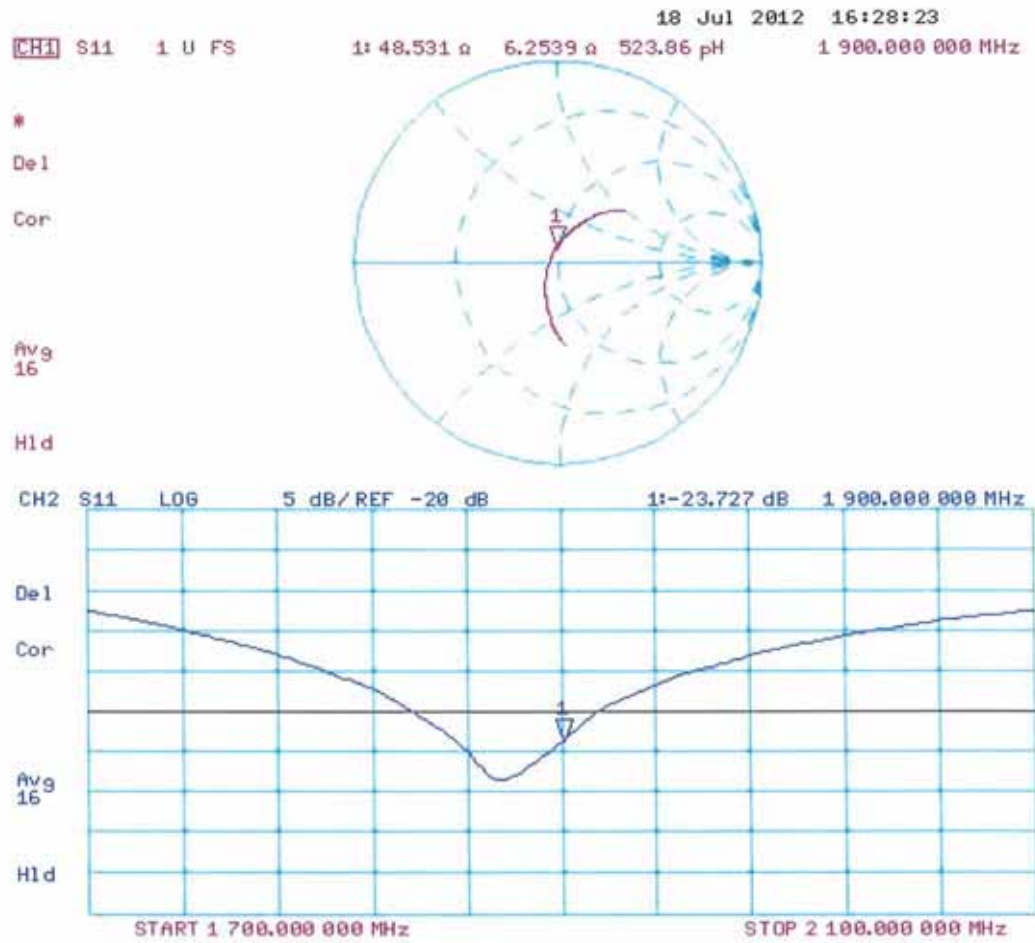
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.36 mW/g

Maximum value of SAR (measured) = 12.8 mW/g



0 dB = 12.8 mW/g = 22.14 dB mW/g

Impedance Measurement Plot for Body TSL





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Accreditation No.: **SCS 108**

Client **B.V. ADT (Auden)**

Certificate No: **EX3-3873_Aug12**

CALIBRATION CERTIFICATE

Object **EX3DV4 - SN:3873**

Calibration procedure(s) **QA CAL-01.v8, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v4
Calibration procedure for dosimetric E-field probes**

Calibration date: **August 6, 2012**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	29-Mar-12 (No. 217-01508)	Apr-13
Power sensor E4412A	MY41498087	29-Mar-12 (No. 217-01508)	Apr-13
Reference 3 dB Attenuator	SN: S5054 (3c)	27-Mar-12 (No. 217-01531)	Apr-13
Reference 20 dB Attenuator	SN: S5086 (20b)	27-Mar-12 (No. 217-01529)	Apr-13
Reference 30 dB Attenuator	SN: S5129 (30b)	27-Mar-12 (No. 217-01532)	Apr-13
Reference Probe ES3DV2	SN: 3013	29-Dec-11 (No. ES3-3013_Dec11)	Dec-12
DAE4	SN: 660	20-Jun-12 (No. DAE4-660_Jun12)	Jun-13
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-11)	In house check: Apr-13
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-11)	In house check: Oct-12

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: August 6, 2012

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Glossary:

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

Calibration is Performed According to the Following Standards:

- 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
- IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * frequency_response (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- PAR**: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; VR_{x,y,z}**: A, B, C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe EX3DV4

SN:3873

Manufactured: March 13, 2012
Calibrated: August 6, 2012

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3873

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu\text{V}/(\text{V}/\text{m})^2$) ^A	0.37	0.46	0.49	± 10.1 %
DCP (mV) ^B	101.5	96.8	96.5	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc ^E (k=2)
0	CW	0.00	X	0.00	0.00	1.00	141.3	±4.6 %
			Y	0.00	0.00	1.00	149.4	
			Z	0.00	0.00	1.00	153.9	

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

^A The uncertainties of NormX,Y,Z do not affect the E²-field uncertainty inside TSL (see Pages 5 and 6).

^B Numerical linearization parameter: uncertainty not required.

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3873

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	9.50	9.50	9.50	0.47	0.77	± 12.0 %
835	41.5	0.90	9.13	9.13	9.13	0.31	0.97	± 12.0 %
900	41.5	0.97	9.01	9.01	9.01	0.39	0.85	± 12.0 %
1750	40.1	1.37	8.04	8.04	8.04	0.65	0.77	± 12.0 %
1900	40.0	1.40	7.74	7.74	7.74	0.34	1.03	± 12.0 %
2450	39.2	1.80	6.91	6.91	6.91	0.28	1.04	± 12.0 %
5200	36.0	4.66	4.92	4.92	4.92	0.30	1.80	± 13.1 %
5300	35.9	4.76	4.59	4.59	4.59	0.35	1.80	± 13.1 %
5500	35.6	4.96	4.64	4.64	4.64	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.23	4.23	4.23	0.45	1.80	± 13.1 %
5800	35.3	5.27	4.38	4.38	4.38	0.40	1.80	± 13.1 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3873

Calibration Parameter Determined in Body Tissue Simulating Media

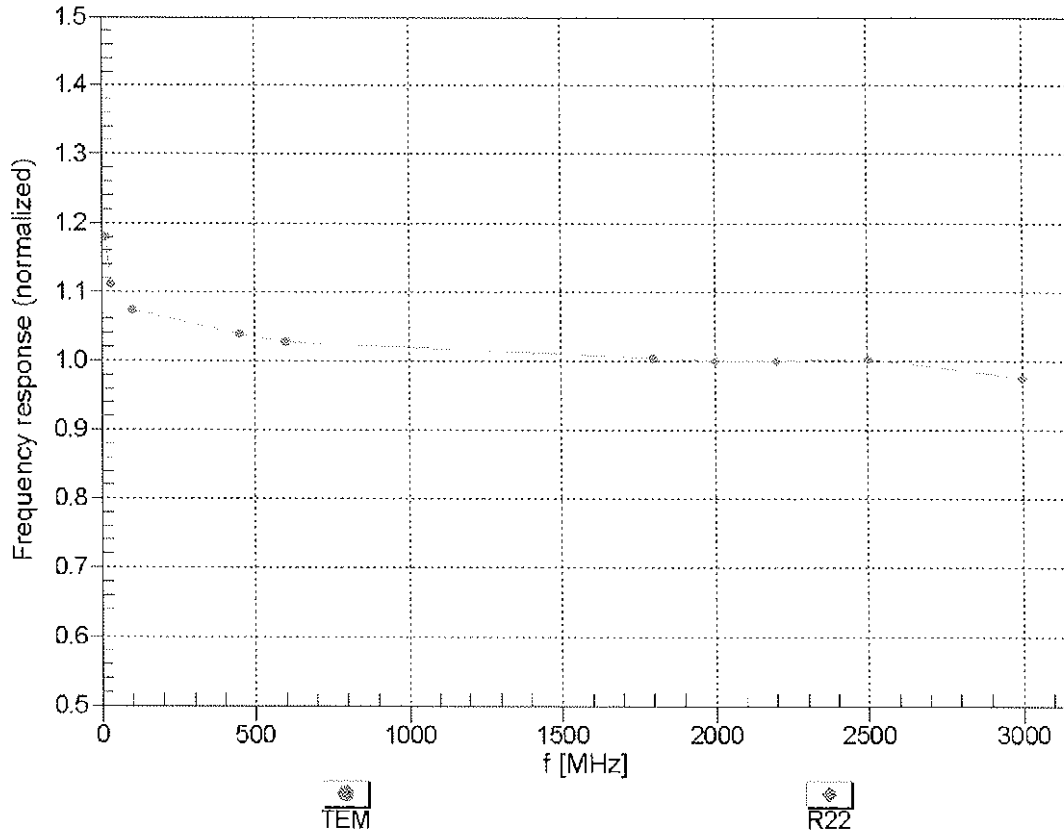
f (MHz) ^C	Relative Permittivity ^F	Conductivity (S/m) ^F	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	9.43	9.43	9.43	0.35	0.96	± 12.0 %
835	55.2	0.97	9.23	9.23	9.23	0.22	1.30	± 12.0 %
900	55.0	1.05	9.23	9.23	9.23	0.39	0.86	± 12.0 %
1750	53.4	1.49	7.68	7.68	7.68	0.32	0.96	± 12.0 %
1900	53.3	1.52	7.33	7.33	7.33	0.27	1.07	± 12.0 %
2450	52.7	1.95	6.96	6.96	6.96	0.78	0.58	± 12.0 %
5200	49.0	5.30	4.31	4.31	4.31	0.48	1.90	± 13.1 %
5300	48.9	5.42	4.18	4.18	4.18	0.45	1.90	± 13.1 %
5500	48.6	5.65	3.82	3.82	3.82	0.50	1.90	± 13.1 %
5600	48.5	5.77	3.80	3.80	3.80	0.45	1.90	± 13.1 %
5800	48.2	6.00	3.87	3.87	3.87	0.55	1.90	± 13.1 %

^C Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

Frequency Response of E-Field

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

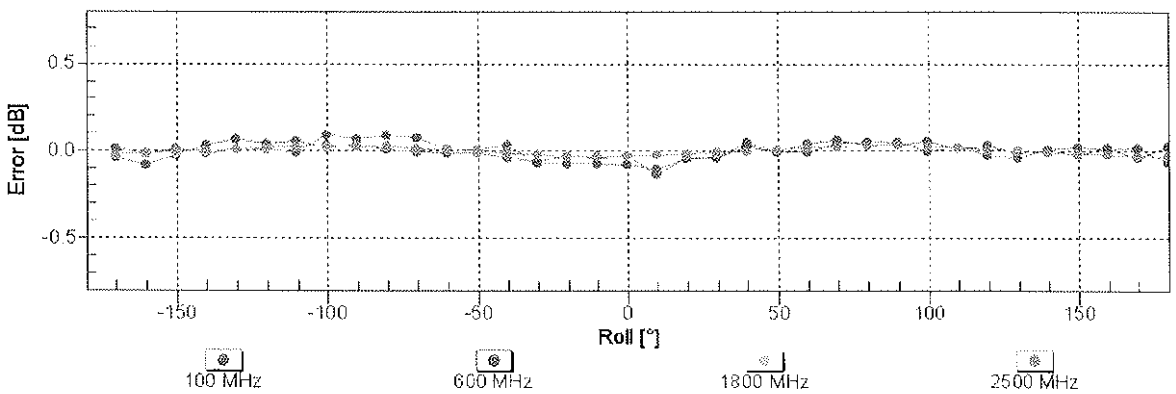
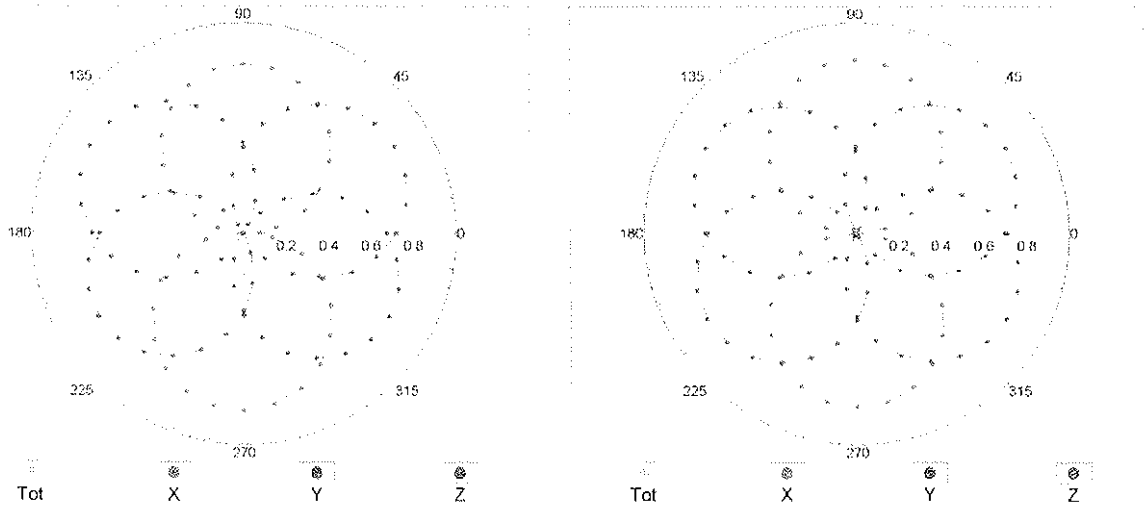


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ (k=2)

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

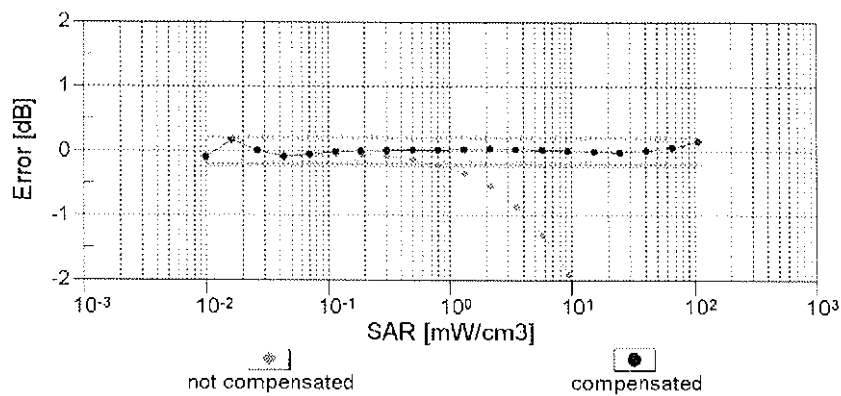
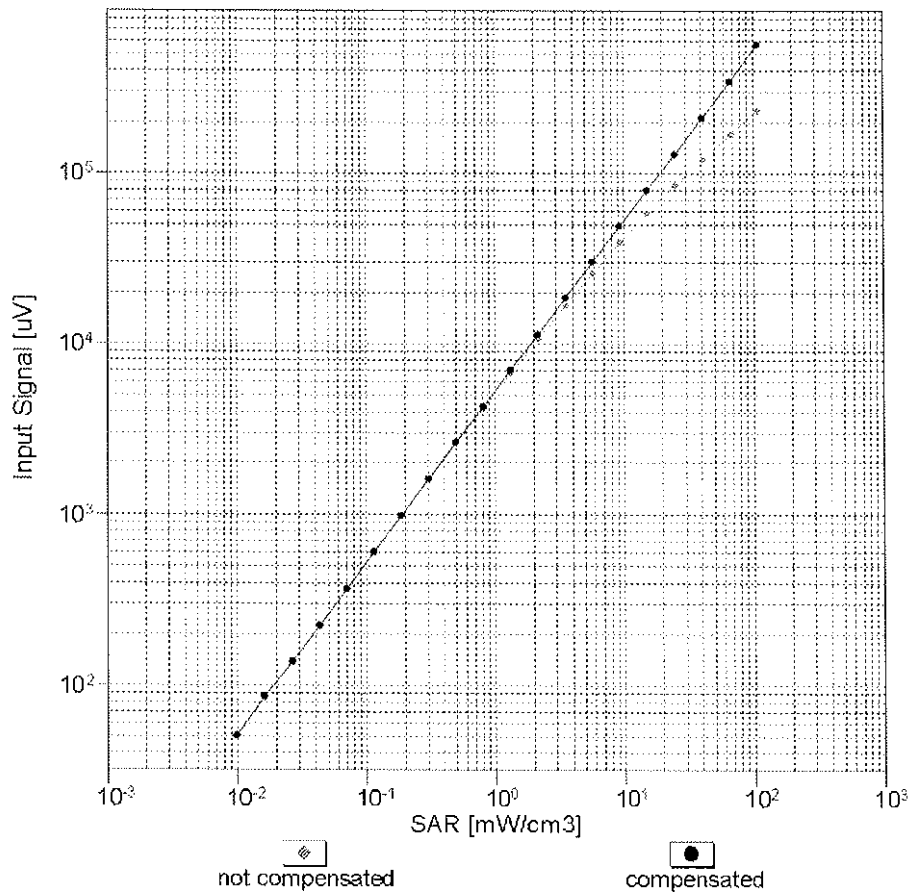
f=600 MHz,TEM

f=1800 MHz,R22



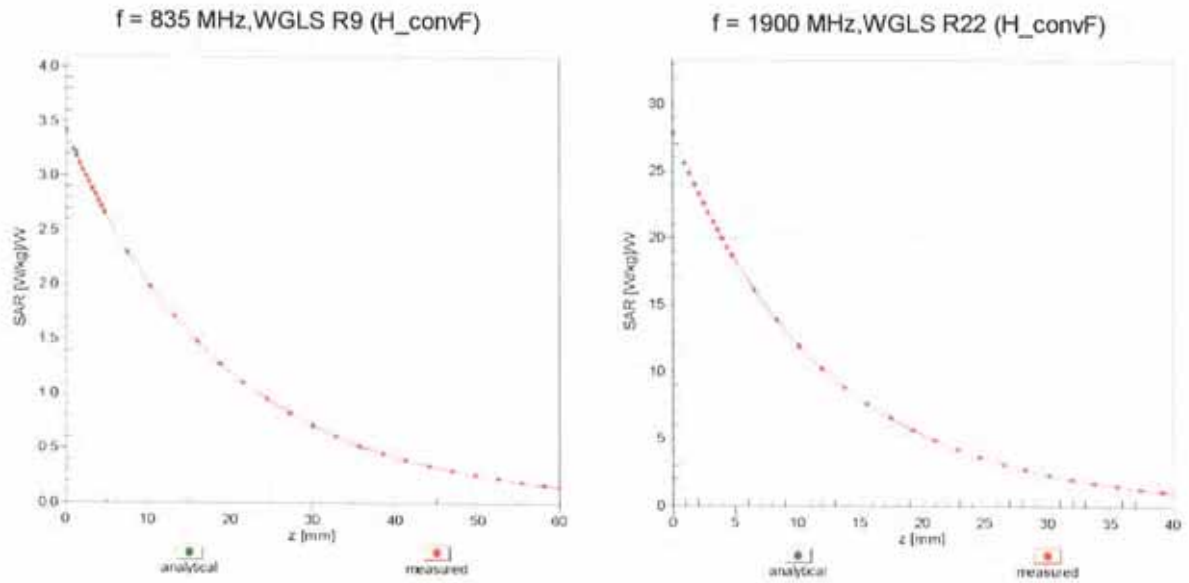
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ (k=2)

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



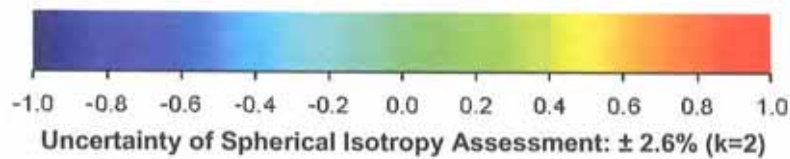
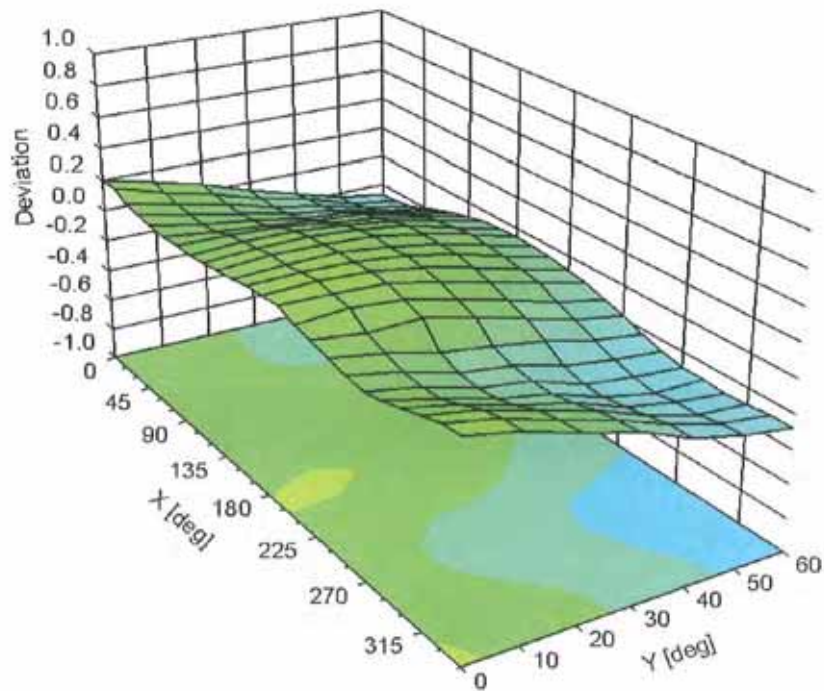
Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3873

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	19.6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm