SAR TEST REPORT

(Mobile Phone)

REPORT NO.: SA110906C14A

MODEL NO.: PI39200

RECEIVED: Sep. 06, 2011

TESTED: Sep. 15 ~ Sep. 22, 2011

ISSUED: Sep. 28, 2011

APPLICANT: HTC Corporation

ADDRESS: 23, Xinghua Rd., Taoyuan 330, Taiwan, R.O.C.

ISSUED BY: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch

LAB ADDRESS: No. 47, 14th Ling, Chia Pau Tsuen, Lin Kou Hsiang, Taipei Hsien 244, Taiwan, R.O.C.

TEST LOCATION: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan Hsien 333, Taiwan, R.O.C.

TABLE OF CONTENTS

RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Sep. 28, 2011

1. CERTIFICATION

PRODUCT:	Smartphone
MODEL NO.:	PI39200
BRAND:	HTC
APPLICANT:	HTC Corporation
TESTED:	Sep. 15 ~ Sep. 22, 2011
STANDARDS:	**FCC Part 2 (Section 2.1093)** **FCC OET Bulletin 65, Supplement C (01-01)** **IEEE 1528:2003**

The above equipment have been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, 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.

PREPARED BY : Ivonne Wu , **DATE:** Sep. 28, 2011

Ivonne Wu / Senior Specialist

APPROVED BY : Gary Chang , **DATE:** Sep. 28, 2011

Gary Chang / Technical Manager

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

EUT	Smartphone
MODEL NO.	PI39200
CLASSIFICATION	Production Unit
UPLINK MODULATION TYPE	GSM: GMSK WCDMA: QPSK
TX FREQUENCY RANGE	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz
ANTENNA TYPE	Fixed Internal Antenna

NOTE:

1. The EUT's accessories list refers to Ext Pho_NM8PI39200.pdf.
2. The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or User's Manual.

2.2 SUMMARY OF PEAK SAR RESULTS

STANDALONE SAR		
Band	**Position**	**SAR_{1g} (W/kg)**
GSM850	**Head**	**0.196**
	Body (Body Worn, 1 cm Gap)	**0.958**
	Body (Hotspot, 1 cm Gap)	**0.958**
GSM1900	**Head**	**0.425**
	Body (Body Worn, 1 cm Gap)	**0.77**
	Body (Hotspot, 1 cm Gap)	**0.77**
WCDMA Band V	**Head**	**0.12**
	Body (Body Worn, 1 cm Gap)	**0.649**
	Body (Hotspot, 1 cm Gap)	**0.649**

2.3 TEST CONFIGURATION

The device was controlled by using a base station emulator. Communication between the device and the emulator was established by air link. The distance between the DUT and the 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 DUT. The DUT was set from the emulator to radiate maximum output power during all tests.

In general, the crest factor is 8.3 for GSM and GPRS/EDGE multi-slot class 8, 4 for GPRS/EDGE multi-slot class 10 and DTM multi-slot class 5 & 9, 2.67 for DTM multi-slot class 11, 2 for GPRS/EDGE multi-slot class 12, and 1 for WCDMA/HSDPA/HSUPA.

For GSM/GPRS/EDGE body SAR testing, the DUT was set in GPRS multi-slot class 12 with 4 uplink slots for GSM850 and GSM1900 due to maximum source-based time-averaged output power as following table:

Source-Based Time-Averaged Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
GSM (GMSK, 1 Uplink)	23.66	24.55	24.28	21.38	21.35	21.56
GPRS 8 (GMSK, 1 Uplink)	23.80	24.53	24.37	21.41	21.38	21.54
GPRS 10 (GMSK, 2 Uplink)	26.33	26.85	26.69	24.10	23.67	24.34
GPRS 12 (GMSK, 4 Uplink)	26.51	27.16	**27.26**	25.75	25.32	**26.26**
EDGE 8 (8PSK, 1 Uplink)	17.96	18.53	18.34	17.14	16.94	17.43
EDGE 10 (8PSK, 2 Uplink)	19.92	20.46	20.37	19.15	18.98	19.46
EDGE 12 (8PSK, 4 Uplink)	22.44	23.04	23.19	22.21	22.02	22.44

Note:
The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below:
Source based time averaged power = Maximum burst averaged power (1 Uplink) - 9 dB
Source based time averaged power = Maximum burst averaged power (2 Uplink) - 6 dB
Source based time averaged power = Maximum burst averaged power (4 Uplink) - 3 dB
The maximum burst averaged power can be referred to section 11.1 of this report.

The definition of MS DTM classes is noted in 3GPP TS 43.055 section 4.5.1.1 that the DTM multi-slot capabilities are independent from the currently defined 3GPP TS 45.002 multi-slot capabilities. Refer to annex B.1 of 3GPP TS 45.002, the MS supports the use of multiple timeslots it shall belong to a multi-slot class as defined below:

Table B.1

Multislot class	Maximum number of slots			Minimum number of slots				Type
	Rx	Tx	Sum	T_{ta}	T_{tb}	T_{ra}	T_{rb}	
1	1	1	2	3	2	4	2	1
2	2	1	3	3	2	3	1	1
3	2	2	3	3	2	3	1	1
4	3	1	4	3	1	3	1	1
5	**2**	**2**	**4**	**3**	**1**	**3**	**1**	**1**
6	3	2	4	3	1	3	1	1
7	3	3	4	3	1	3	1	1
8	4	1	5	3	1	2	1	1
9	**3**	**2**	**5**	**3**	**1**	**2**	**1**	**1**
10	4	2	5	3	1	2	1	1
11	**4**	**3**	**5**	**3**	**1**	**2**	**1**	**1**
12	4	4	5	2	1	2	1	1
13	3	3	NA	NA	a)	3	a)	2
14	4	4	NA	NA	a)	3	a)	2
15	5	5	NA	NA	a)	3	a)	2
16	6	6	NA	NA	a)	2	a)	2
17	7	7	NA	NA	a)	1	0	2
18	8	8	NA	NA	0	0	0	2
19	6	2	NA	3	b)	2	c)	1
20	6	3	NA	3	b)	2	c)	1
21	6	4	NA	3	b)	2	c)	1
22	6	4	NA	2	b)	2	c)	1
23	6	6	NA	2	b)	2	c)	1
24	8	2	NA	3	b)	2	c)	1
25	8	3	NA	3	b)	2	c)	1
26	8	4	NA	3	b)	2	c)	1
27	8	4	NA	2	b)	2	c)	1
28	8	6	NA	2	b)	2	c)	1
29	8	8	NA	2	b)	2	c)	1
30	5	1	6	2	1	1	1	1
31	5	2	6	2	1	1	1	1
32	5	3	6	2	1	1	1	1
33	5	4	6	2	1	1	1	1
34	5	5	6	2	1	1	1	1
35	5	1	6	2	1	1+to	1	1
36	5	2	6	2	1	1+to	1	1
37	5	3	6	2	1	1+to	1	1
38	5	4	6	2	1	1+to	1	1
39	5	5	6	2	1	1+to	1	1
40	6	1	7	1	1	1	to	1
41	6	2	7	1	1	1	to	1
42	6	3	7	1	1	1	to	1
43	6	4	7	1	1	1	to	1
44	6	5	7	1	1	1	to	1
45	6	6	7	1	1	1	to	1

Per KDB 941225 D04 requirement, the required test configuration for this device is as below:

1. This DUT supports class A Dual Transfer Mode (DTM).
2. This DUT supports (E)GPRS multi-slot class 12 (max. uplink : 4, max. downlink : 4, total timeslots : 5).
3. This DUT supports DTM multi-slot class 11 (max. uplink : 3 for 1 CS & 2 PS, max. downlink : 4, total timeslots : 5).
4. The measured maximum conducted power can be referred to section 11.1 of this report.
5. For DTM multi-slot class 11 link mode, the device was linked with system emulator (Agilent E5515C) and transmit maximum power on maximum number of Tx slots (one CS timeslot and two PS timeslots per frame).

For DTM SAR testing, the DUT was set in DTM multi-slot class 5 (GPRS mode, 2 uplink slots) for GSM850 and set in DTM multi-slot class 11 (GPRS mode, 3 uplink slots) for GSM1900 due to maximum source-based time-averaged output power as following table:

Source-Based Time-Averaged Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
DTM 5 (GPRS, 2 Uplink)	26.47	**26.95**	26.75	24.05	23.63	24.26
DTM 9 (GPRS, 2 Uplink)	26.24	26.74	26.60	23.93	23.56	24.23
DTM 11 (GPRS, 3 Uplink)	24.84	25.52	25.42	24.95	24.88	**25.16**
DTM 5 (EDGE, 2 Uplink)	19.74	20.30	20.17	19.39	19.10	19.66
DTM 9 (EDGE, 2 Uplink)	19.71	20.28	20.18	19.41	19.09	19.64
DTM 11 (EDGE, 3 Uplink)	21.43	21.98	21.86	21.20	20.93	21.52

Note:
The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below:
Source based time averaged power = Maximum burst averaged power (2 Uplink) - 6 dB
Source based time averaged power = Maximum burst averaged power (3 Uplink) - 4.26 dB
The maximum burst averaged power can be referred to section 11.1 of this report.

This device supports WiFi hotspot function, so body SAR was tested under 1 cm for the surfaces/slide edges where a transmitting antenna is within 2.5 cm from the edge.

The WWAN and WLAN antennas are located on bottom edge of the phone. Top edge for WWAN and WLAN SAR is not tested since the distance between these two antennas and top edge is > 2.5 cm.

2.4 GENERAL DESCRIPTION OF APPLIED STANDARDS

According to the specifications of the manufacturer, this product must comply with the requirements of the following standards:

FCC 47 CFR Part 2 (2.1093)

FCC OET Bulletin 65, Supplement C (01- 01)

IEEE 1528-2003

All test items have been performed and recorded as per the above standards.

2.5 GENERAL INOFRMATION OF THE SAR SYSTEM

DASY4/5 (**Software DASY52, Version 52.6**) 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 DASY4/5 software defined. The DASY4/5 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 form the optical into digital electric signal of the DAE and transfers data to the PC.

EX3DV4 ISOTROPIC E-FIELD PROBE

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 (30 MHz to 6 GHz)
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: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
APPLICATION	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.

NOTE

1. The Probe parameters have been calibrated by the SPEAG. Please reference “APPENDIX D” for the Calibration Certification Report.
2. For frequencies above 800MHz, calibration in a rectangular wave-guide is used, because wave-guide size is manageable.
3. For frequencies below 800MHz, temperature transfer calibration is used because the wave-guide size becomes relatively large.

TWIN SAM V4.0

CONSTRUCTION	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.
SHELL THICKNESS	2 ± 0.2 mm
FILLING VOLUME	Approx. 25 liters
DIMENSIONS	Height: 810 mm; Length: 1000 mm; Width: 500 mm

SYSTEM VALIDATION KITS:

CONSTRUCTION	Symmetrical dipole with l/4 balun Enables measurement of feedpoint impedance with NWA Matched for use near flat phantoms filled with brain simulating solutions Includes distance holder and tripod adaptor
CALIBRATION	Calibrated SAR value for specified position and input power at the flat phantom in brain simulating solutions
FREQUENCY	835, 1900
RETURN LOSS	> 20 dB at specified validation position
POWER CAPABILITY	> 100 W (f < 1GHz); > 40 W (f > 1GHz)
OPTIONS	Dipoles for other frequencies or solutions and other calibration conditions upon request

DEVICE HOLDER FOR SAM TWIN PHANTOM

CONSTRUCTION The device holder for the GSM900/DCS1800/PCS1900 GSM/GPRS/CDMA Mobile Phone device is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles. The holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivityε =3 and loss tangentδ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered. The device holder for the portable device makes up of the polyethylene foam. The dielectric parameters of material close to the dielectric parameters of the air.

DATA ACQUISITION ELECTRONICS

CONSTRUCTION The data acquisition electronics (DAE3) consists of a highly sensitive electrometer grade preamplifier with auto-zeroing, a channel and gain-switching multiplex, a fast 16 bit AD converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The mechanical probe is mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

2.6 TEST EQUIPMENT

FOR SAR MEASURENENT

NAME	BRAND	TYPE	SERIES NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Signal Generator	Agilent	E8257C	MY43320668	Dec. 27, 2010	Dec. 26, 2011
E-Field Probe	S & P	EX3DV4	3590	Feb. 25, 2011	Feb. 24, 2012
E-Field Probe	S & P	EX3DV4	3650	Jan. 24, 2011	Jan. 23, 2012
E-Field Probe	S & P	EX3DV4	3800	Aug. 05, 2011	Aug. 04, 2012
DAE	S & P	DAE4	1277	Jul. 29, 2011	Jul. 28, 2012
DAE	S & P	DAE4	861	Aug. 29, 2011	Aug. 28, 2012
Validation Dipole	S & P	D835V2	4d021	Mar. 23, 2011	Mar. 22, 2012
		D1900V2	5d022	Jan. 26, 2011	Jan. 25, 2012

NOTE: Before starting the measurement, all test equipment shall be warmed up for 30min.

FOR TISSUE PROPERTY

NAME	BRAND	TYPE	SERIES NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
Network Analyzer	Agilent	E8358A	US41480538	Dec. 30, 2010	Dec. 29, 2011
Dielectric Probe	Agilent	85070D	US01440176	NA	NA

NOTE:

1. Before starting, all test equipment shall be warmed up for 30min.
2. The tolerance (k=1) specified by Agilent for general dielectric measurements, deriving from inaccuracies in the calibration data, analyzer drift, and random errors, are usually ±2.5% and ±5% for measured permittivity and conductivity, respectively. However, the tolerances for the conductivity is smaller for material with large loss tangents, i.e., less than ±2.5% (k=1). It can be substantially smaller if more accurate methods are applied.

2.7 GENERAL DESCRIPTION OF THE SPATIAL PEAK SAR EVALUATION

The DASY4/5 post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the micro-volt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters:	- Frequency	F
	- Crest factor	Cf
Media parameters:	- Conductivity	ζ
	- Density	ρ

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \bullet \frac{cf}{dcp_i}$$

V_i	=compensated signal of channel i	(i = x, y, z)
U_i	=input signal of channel I	(i = x, y, z)
Cf	=crest factor of exciting field	(DASY parameter)
dcp_i	=diode compression point	(DASY parameter)

From the compensated input signals the primary field data for each channel can be evaluated:

$$\text{E-fieldprobes: } E_i = \sqrt{\frac{V_1}{Norm_i \cdot ConvF}}$$

$$\text{H-fieldprobes: } H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$$

V_i	=compensated signal of channel I	(i = x, y, z)
$Norm_i$	=sensor sensitivity of channel i μV/(V/m)2 for E-field Probes	(i = x, y, z)
ConvF	= sensitivity enhancement in solution	
a_{ij}	= sensor sensitivity factors for H-field probes	
F	= carrier frequency [GHz]	
E_i	= electric field strength of channel i in V/m	
H_i	= magnetic field strength of channel i in A/m	

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

$$E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}$$

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

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1'000}$$

SAR	= local specific absorption rate in mW/g
E_{tot}	= total field strength in V/m
ζ	= conductivity in [mho/m] or [Siemens/m]
ρ	= equivalent tissue density in g/cm3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid. 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 1 g and 10 g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

1. The extraction of the measured data (grid and values) from the Zoom Scan
2. The calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
3. The generation of a high-resolution mesh within the measured volume
4. The interpolation of all measured values from the measurement grid to the high-resolution grid
5. The extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
6. The calculation of the averaged SAR within masses of 1 g and 10 g.

The probe is calibrated at the center of the dipole sensors that is located 1 to 2.7mm away from the probe tip. During measurements, the probe stops shortly above the phantom surface, depending on the probe and the surface detecting system. Both distances are included as parameters in the probe configuration file. The software always knows exactly how far away the measured point is from the surface. As the probe cannot directly measure at the surface, the values between the deepest measured point and the surface must be extrapolated. The angle between the probe axis and the surface normal line is less than 30 degree.

In the Area Scan, the gradient of the interpolation function is evaluated to find all the extreme of the SAR distribution. The uncertainty on the locations of the extreme is less than 1/20 of the grid size. Only local maximum within -2 dB of the global maximum are searched and passed for the Cube Scan measurement. In the Cube Scan, the interpolation function is used to extrapolate the Peak SAR from the lowest measurement points to the inner phantom surface (the extrapolation distance). 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 5mm.

The maximum search is automatically performed after each area scan measurement. It is based on splines in two or three dimensions. The procedure can find the maximum for most SAR distributions even with relatively large grid spacing. After the area scanning measurement, the probe is automatically moved to a position at the interpolated maximum. The following scan can directly use this position for reference, e.g., for a finer resolution grid or the cube evaluations. The 1g and 10g peak evaluations are only available for the predefined cube 5 x 5 x 7 scans. The routines are verified and optimized for the grid dimensions used in these cube measurements. The measured volume of 32 x 32 x 30mm contains about 30g of tissue. The first procedure is an extrapolation (incl. boundary correction) to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume in a 1mm grid (42875 points). In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is the moved around until the highest averaged SAR is found. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

2.8 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.
1	Universal Radio Communication Tester	R&S	CMU200	101372

NO.	SIGNAL CABLE DESCRIPTION OF THE ABOVE SUPPORT UNITS
1	NA

NOTE: All power cords of the above support units are non shielded (1.8m).

3. DESCRIPTION OF TEST POSITION

3.1 DESCRIPTION OF TEST POSITION

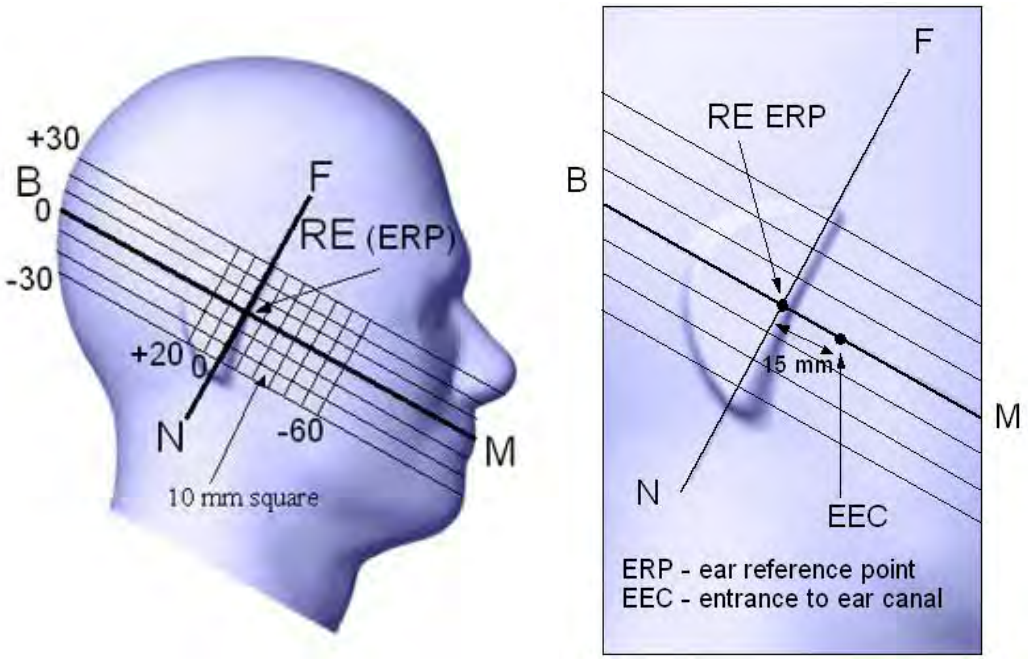


FIGURE 3.1

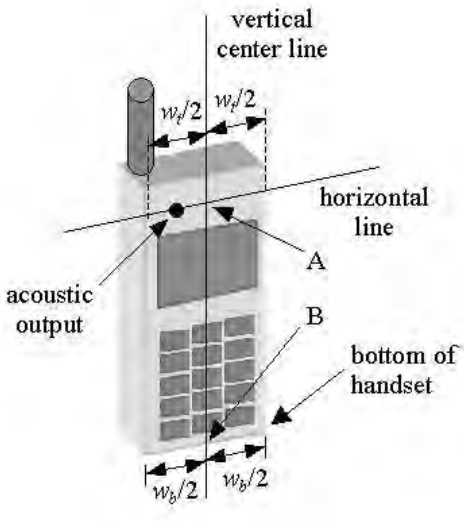


FIGURE 3.1a

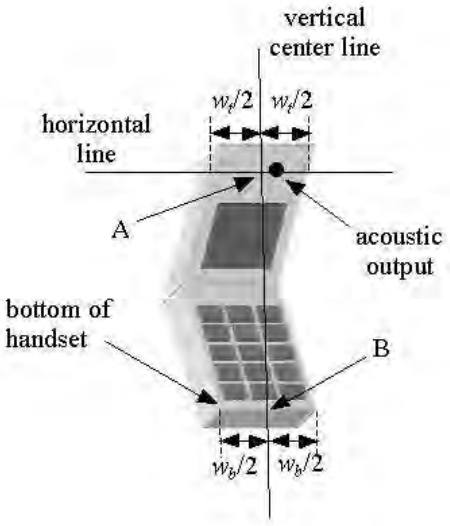
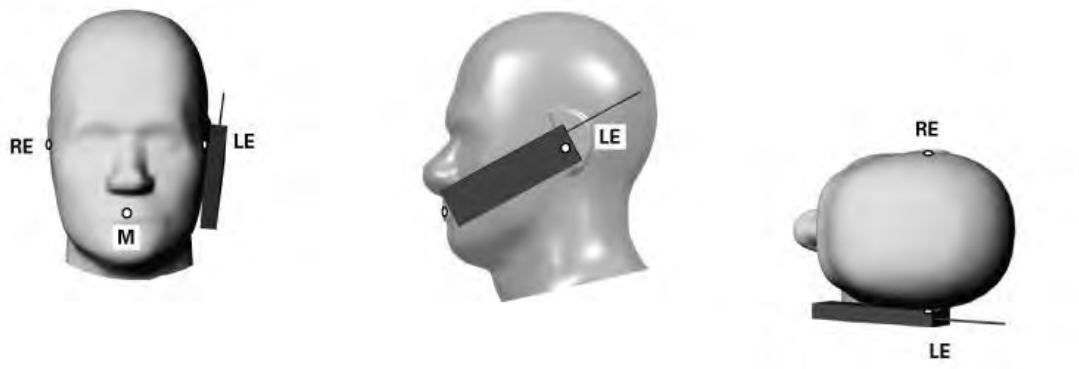


FIGURE 3.1b

3.1.1 TOUCH/CHEEK TEST POSITION

The head position in Figure 3.1, the ear reference points ERP are 15mm above entrance to ear canal along the B-M line. The line N-F (Neck-Front) is perpendicular to the B-M (Back Mouth) line. The handset device in Figure 3.1a and 3.1b, The vertical centerline pass through two points on the front side of handset: the midpoint of the width wt of the handset at the level of the acoustic output (point A) and the midpoint of the width Wb of the bottom of the handset (point B). The vertical centerline is perpendicular to the horizontal line and pass through the center of the acoustic output. The point A touches the ERP and the vertical centerline of the handset is parallel to the B-M line. While maintaining the point A contact with the ear(ERP), rotate the handset about the line NF until any point on handset is in contact with the cheek of the phantom



TOUCH/CHEEK POSITION FIGURE

3.1.2 TILT TEST POSITION

Adjust the device in the cheek position. While maintaining a point of the handset contact in the ear, move the bottom of the handset away from the mouth by an angle of 15 degrees.

TILT POSITION FIGURE

3.1.3 BODY-WORN CONFIGURATION

The handset device attached the belt clip or the holster. The keypad face of the handset is against with the bottom of the flat phantom face and the bottom of the keypad face contact to the bottom of the flat phantom.

When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only accessory that dictates the closest spacing to the body must be tested.

If the device supports WiFi hotspot function, the body SAR will test under 1 cm for the surfaces/slide edges where a transmitting antenna is within 2.5 cm from the edge.

4. RECIPES FOR TISSUE SIMULATING LIQUIDS

For the measurement of the field distribution inside the SAM phantom, the phantom must be filled with 25 litters of tissue simulation liquid.

The following ingredients are used：

- **WATER-** Deionized water (pure H20), resistivity _16 M - as basis for the liquid
- **SUGAR-** Refined sugar in crystals, as available in food shops - to reduce relative permittivity
- **SALT-** Pure NaCl - to increase conductivity
- **CELLULOSE-** Hydroxyethyl-cellulose, medium viscosity (75-125 mPa.s, 2% in water, 20_C),
  CAS # 54290 - to increase viscosity and to keep sugar in solution
- **PRESERVATIVE-** Preventol D-7 Bayer AG, D-51368 Leverkusen, CAS # 55965-84-9 - to prevent the spread of bacteria and molds
- **DGMBE-** Diethylenglycol-monobuthyl ether (DGMBE), Fluka Chemie GmbH, CAS # 112-34-5 - to reduce relative permittivity

THE RECIPES FOR 750MHZ SIMULATING LIQUID TABLE

INGREDIENT	HEADSIMULATING LIQUID 700MHz (HSL-700)	BODY SIMULATING LIQUID 700MHz (MSL-700)
Water	41%	52%
Sugar	57%	47%
Cellulose	0.3%	0%
Salt	1.5%	0.9%
Preventol	0.2%	0.1%

THE RECIPES FOR 835MHz SIMULATING LIQUID TABLE

INGREDIENT	HEAD SIMULATING LIQUID 835MHz (HSL-835)	MUSCLE SIMULATING LIQUID 835MHz (MSL-835)
Water	40.28%	50.07%
Cellulose	2.41%	NA
Salt	1.38%	0.94%
Preventtol D-7	0.18%	0.09%
Sugar	57.97%	48.2%
Dielectric Parameters at 22℃	f = 835MHz ε= 41.5 ± 5% ζ= 0.9 ± 5% S/m	f= 835MHz ε= 55.2 ± 5% ζ= 0.97 ± 5% S/m

THE RECIPES FOR 1900MHz SIMULATING LIQUID TABLE

INGREDIENT	HEAD SIMULATING LIQUID 1900MHz (HSL-1900)	MUSCLE SIMULATING LIQUID 1900MHz (MSL-1900)
Water	55.24%	70.16%
DGMBE	44.45%	29.44%
Salt	0.306%	00.39%
Dielectric Parameters at 22℃	f= 1900MHz ε= 40.0 ± 5% ζ= 1.40 ± 5% S/m	f= 1900MHz ε= 53.3 ± 5% ζ= 1.52 ± 5% S/m

Testing the liquids using the Agilent Network Analyzer E8358A and Agilent Dielectric Probe Kit 85070D.The testing procedure is following as

1. Turn Network Analyzer on and allow at least 30 min. warm up.
2. Mount dielectric probe kit so that interconnecting cable to Network Analyzer will not be moved during measurements or calibration.
3. Pour de-ionized water and measure water temperature (±1°).
4. Set water temperature in Agilent-Software (Calibration Setup).
5. Perform calibration.
6. Validate calibration with dielectric material of known properties (e.g. polished ceramic slab with >8mm thickness ε'=10.0, ε"=0.0). If measured parameters do not fit within tolerance, repeat calibration (±0.2 for ε': ±0.1 for ε").
7. Conductivity can be calculated from ε" by $\zeta = \omega \varepsilon_0 \varepsilon'' = \varepsilon''$ f [GHz] / 18.

8. Measure liquid shortly after calibration. Repeat calibration every hour.
9. Stir the liquid to be measured. Take a sample (~50ml) with a syringe from the center of the liquid container.
10. Pour the liquid into a small glass flask. Hold the syringe at the bottom of the flask to avoid air bubbles.
11. Put the dielectric probe in the glass flask. Check that there are no air bubbles in front of the opening in the dielectric probe kit.
12. Perform measurements.
13. Adjust medium parameters in DASY5 for the frequencies necessary for the measurements („Setup Config", select medium (e.g. Brain 900 MHz) and press „Option"-button.

Select the current medium for the frequency of the validation (e.g. Setup Medium Brain 900 MHz).

FOR SIMULATING LIQUID

Frequency (MHz)	Liquid Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (εr)	Date
835	Head	21.5	0.889	40.68	Sep. 15, 2011
835	Head	21.2	0.798	40.3	Sep. 17, 2011
835	Head	21.2	0.886	41.237	Sep. 22, 2011
835	Body	21.2	0.969	54.804	Sep. 15, 2011
835	Body	21.4	0.967	54.182	Sep. 16, 2011
835	Body	21.2	0.977	53.183	Sep. 22, 2011
1900	Head	21.2	1.423	40.851	Sep. 17, 2011
1900	Head	21.0	1.44	37.8	Sep. 22, 2011
1900	Body	21.2	1.534	51.604	Sep. 20, 2011

5. SYSTEM VALIDATION

The system validation was performed in the flat phantom with equipment listed in the following table. Since the SAR value is calculated from the measured electric field, dielectric constant and conductivity of the body tissue and the SAR is proportional to the square of the electric field. So, the SAR value will be also proportional to the RF power input to the system validation dipole under the same test environment. In our system validation test, 250mW RF input power was used.

5.1 TEST PROCEDURE

Before you start the system performance check, need only to tell the system with which components (probe, medium, and device) are performing the system performance check; the system will take care of all parameters. The dipole must be placed beneath the flat phantom section of the SAM Twin Phantom with the correct distance holder in place. The distance holder should touch the phantom surface with a light pressure at the reference marking (little cross) and be oriented parallel to the long side of the phantom. Accurate positioning is not necessary, since the system will search for the peak SAR location, except that the dipole arms should be parallel to the surface. The device holder for the EUT can be left in place but should be rotated away from the dipole.

1.The ”Power Reference Measurement” and ”Power Drift Measurement” jobs are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure. The indicated drift is mainly the variation of the amplifier output power. If it is too high (above ±0.1 dB), the system performance check should be repeated; some amplifiers have very high drift during warm-up. A stable amplifier gives drift results in the DASY system below ±0.02 dB.

2.The ”Surface Check” job tests the optical surface detection system of the DASY system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ±0.1mm). In that case it is better to abort the system performance check and stir the liquid.

3. The ”Area Scan” job measures the SAR above the dipole on a plane parallel to the surface. It is used to locate the approximate location of the peak SAR. The proposed scan uses large grid spacing for faster measurement; due to the symmetric field, the peak detection is reliable. If a finer graphic is desired, the grid spacing can be reduced. Grid spacing and orientation have no influence on the SAR result.

4. The ”Zoom Scan” job measures the field in a volume around the peak SAR value assessed in the previous ”Area Scan” job (for more information see the application note on SAR evaluation).

About the validation dipole positioning uncertainty, the constant and low loss dielectric spacer is used to establish the correct distance between the top surface of the dipole and the bottom surface of the phantom, the error component introduced by the uncertainty of the distance between the liquid (i.e., phantom shell) and the validation dipole in the DASY5 system is less than ±0.1mm.

$$SAR_{tolerance}[\%] = 100 \times (\frac{(a+d)^2}{a^2} - 1)$$

As the closest distance is 10mm, the resulting tolerance $SAR_{tolerance}$[%] is <2%.

5.2 VALIDATION RESULTS

Date	Frequency (MHz)	Targeted SAR (W/kg)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Deviation (%)
Sep. 15, 2011	835	9.65	2.27	9.08	-5.91
Sep. 17, 2011	835	9.65	2.59	10.36	7.36
Sep. 22, 2011	835	9.65	2.32	9.28	-3.83
Sep. 15, 2011	835	10.10	2.66	10.64	5.35
Sep. 16, 2011	835	10.10	2.40	9.60	-4.95
Sep. 22, 2011	835	10.10	2.34	9.36	-7.33
Sep. 17, 2011	1900	40.90	9.48	37.92	-7.29
Sep. 22, 2011	1900	40.90	9.55	38.20	-6.60
Sep. 20, 2011	1900	40.90	10.50	42.00	2.69

NOTE:

1. Comparing to the original SAR value provided by SPEAG, the validation data should be within its specification of 10 %. Above table shows the target SAR and measured SAR after normalized to 1W input power.

2. Please see Appendix for the photo of system validation test.

5.3 SYSTEM VALIDATION UNCERTAINTIES

In the table below, the system validation uncertainty with respect to the analytically assessed SAR value of a dipole source as given in the IEEE 1528 standard is given. This uncertainty is smaller than the expected uncertainty for mobile phone measurements due to the simplified setup and the symmetric field distribution.

Error Description	Tolerance (±%)	Probability Distribution	Divisor	(C_i)		Standard Uncertainty (±%)		(v_i)
				(1g)	(10g)	(1g)	(10g)	
Measurement System								
Probe Calibration	5.50	Normal	1	1	1	5.50	5.50	∞
Axial Isotropy	0.25	Rectangular	√3	0.7	0.7	0.10	0.10	∞
Hemispherical Isotropy	1.30	Rectangular	√3	0.7	0.7	0.53	0.53	∞
Boundary effects	1.00	Rectangular	√3	1	1	0.58	0.58	∞
Linearity	0.30	Rectangular	√3	1	1	0.17	0.17	∞
System Detection Limits	1.00	Rectangular	√3	1	1	0.58	0.58	∞
Readout Electronics	0.30	Normal	1	1	1	0.30	0.30	∞
Response Time	0.80	Rectangular	√3	1	1	0.46	0.46	∞
Integration Time	2.60	Rectangular	√3	1	1	1.50	1.50	∞
RF Ambient Noise	3.00	Rectangular	√3	1	1	1.73	1.73	9
RF Ambient Reflections	3.00	Rectangular	√3	1	1	1.73	1.73	9
Probe Positioner	0.40	Rectangular	√3	1	1	0.23	0.23	∞
Probe Positioning	2.90	Rectangular	√3	1	1	1.67	1.67	∞
Max. SAR Eval.	1.00	Rectangular	√3	1	1	0.58	0.58	∞
Test sample related								
Sample positioning	1.90	Normal	1	1	1	1.90	1.90	4
Device holder uncertainty	2.80	Normal	1	1	1	2.80	2.80	4
Output power variation-SAR drift measurement	4.50	Rectangular	√3	1	1	2.60	2.60	1
Dipole Related								
Dipole Axis to Liquid Distance	1.60	Rectangular	√3	1	1	0.92	0.92	4
Input Power Drift	4.30	Rectangular	√3	1	1	2.48	2.48	1
Phantom and Tissue parameters								
Phantom Uncertainty	4.00	Rectangular	√3	1	1	2.31	2.31	∞
Liquid Conductivity (target)	5.00	Rectangular	√3	0.64	0.43	1.85	1.24	∞
Liquid Conductivity (measurement)	4.12	Normal	1	0.64	0.43	2.64	1.77	9
Liquid Permittivity (target)	5.00	Rectangular	√3	0.6	0.49	1.73	1.41	∞
Liquid Permittivity (measurement)	4.32	Normal	1	0.6	0.49	2.59	2.12	9
Combined Standard Uncertainty						**9.68**	**9.20**	
Coverage Factor for 95%						**Kp=2**		
Expanded Uncertainty (K=2)						**19.35**	**18.41**	

6. TEST RESULTS

6.1 TEST PROCEDURES

The EUT makes a phone call to the communication simulator station. Establish the simulation communication configuration rather the actual communication. Then the EUT could continuous the transmission mode. Adjust the PCL of the base station could controlled the EUT to transmitted the maximum output power. The base station also could control the transmission channel. The SAR value was calculated via the 3D spline interpolation algorithm that has been implemented in the software of DASY5 SAR measurement system manufactured and calibrated by SPEAG. According to the IEEE 1528 / EN 50361, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

• Power reference measurement

• Verification of the power reference measurement

• Area scan

• Zoom scan

• Power reference measurement

In the zoom scan, the distance between the measurement point at the probe sensor location (geometric center behind the probe tip) and the phantom surface is 2.0 mm and maintained at a constant distance of ±1.0 mm during a zoom scan to determine peak SAR locations. The distance is 2mm between the first measurement point and the bottom surface of the phantom.

The measurement time is 0.5 s at each point of the zoom scan. The probe boundary effect compensation shall be applied during the SAR test. Because of the tip of the probe to the Phantom surface separated distances are longer than half a tip probe diameter.

In the area scan, the separation distance is 2mm between the each measurement point and the phantom surface. The scan size shall be included the transmission portion of the EUT. The measurement time is the same as the zoom scan. At last the reference power drift shall be less than ±5%.

6.2 MEASURED CONDUCTED POWER OF DUT

Band	GSM850			GSM1900		
Channel	128	189	251	512	661	810
Frequency (MHz)	824.2	836.4	848.8	1850.2	1880.0	1909.8
GSM (1 Uplink)	32.66	33.55	33.28	30.38	30.35	30.56
GPRS 8 (1 Uplink)	32.80	33.53	33.37	30.41	30.38	30.54
GPRS 10 (2 Uplink)	32.33	32.85	32.69	30.10	29.67	30.34
GPRS 12 (4 Uplink)	29.51	30.16	30.26	28.75	28.32	29.26
DTM 5 (GPRS, 2 Uplink)	32.47	32.95	32.75	30.05	29.63	30.26
DTM 9 (GPRS, 2 Uplink)	32.24	32.74	32.60	29.93	29.56	30.23
DTM 11 (GPRS, 3 Uplink)	29.10	29.78	29.68	29.21	29.14	29.42
EDGE 8 (1 Uplink)	26.96	27.53	27.34	26.14	25.94	26.43
EDGE 10 (2 Uplink)	25.92	26.46	26.37	25.15	24.98	25.46
EDGE 12 (4 Uplink)	25.44	26.04	26.19	25.21	25.02	25.44
DTM 5 (EDGE, 2 Uplink)	25.74	26.30	26.17	25.39	25.10	25.66
DTM 9 (EDGE, 2 Uplink)	25.71	26.28	26.18	25.41	25.09	25.64
DTM 11 (EDGE, 3 Uplink)	25.69	26.24	26.12	25.46	25.19	25.78

Band	WCDMA Band V		
Channel	4132	4182	4233
Frequency (MHz)	826.4	836.4	846.6
RMC 12.2K	23.29	23.84	23.10
HSDPA Subtest-1	23.11	23.69	22.99
HSDPA Subtest-2	21.29	21.87	21.36
HSDPA Subtest-3	20.07	20.66	19.96
HSDPA Subtest-4	19.83	20.54	19.90
HSUPA Subtest-1	22.48	23.57	22.32
HSUPA Subtest-2	21.60	21.88	21.64
HSUPA Subtest-3	21.72	21.92	21.75
HSUPA Subtest-4	21.91	22.18	21.78
HSUPA Subtest-5	23.08	23.74	23.13

6.3 MEASURED SAR RESULTS

<Head SAR>

Plot No.	Band	Mode	Test Position	Channel	DUT	Battery	SAR_{1g} (W/kg)
15	GSM850	GSM	Right Cheek	189	1	1	0.043
16	GSM850	GSM	Right Tilted	189	1	1	0.018
17	GSM850	GSM	Left Cheek	189	1	1	0.074
18	GSM850	GSM	Left Tilted	189	1	1	0.056
64	GSM850	GSM	Left Cheek	189	2	2	0.137
19	GSM850	DTM5	Left Cheek	189	2	2	**0.196**
50	GSM1900	GSM	Right Cheek	810	1	1	0.075
51	GSM1900	GSM	Right Tilted	810	1	1	0.041
52	GSM1900	GSM	Left Cheek	810	1	1	0.195
53	GSM1900	GSM	Left Tilted	810	1	1	0.094
54	GSM1900	GSM	Left Cheek	810	2	2	0.272
55	GSM1900	DTM5	Left Cheek	810	2	2	**0.425**
36	WCDMA V	RMC 12.2K	Right Cheek	4182	1	1	0.089
37	WCDMA V	RMC 12.2K	Right Tilted	4182	1	1	0.061
38	WCDMA V	RMC 12.2K	Left Cheek	4182	1	1	0.097
39	WCDMA V	RMC 12.2K	Left Tilted	4182	1	1	0.08
40	WCDMA V	RMC 12.2K	Left Cheek	4182	2	2	**0.12**

<Body SAR: Body Worn Mode>

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	DUT	Battery	Earphone	SAR_{1g} (W/kg)
96	GSM850	GPRS12	Front Face	1	251	1	1	w/o	0.309
97	GSM850	GPRS12	Rear Face	1	251	1	1	w/o	**0.958**
102	GSM850	GPRS12	Rear Face	1	251	2	2	w/o	0.752
103	GSM850	GPRS12	Rear Face	1	251	1	1	1	0.682
104	GSM850	GPRS12	Rear Face	1	251	1	1	2	0.72
85	GSM1900	GPRS12	Front Face	1	810	1	1	w/o	0.347
86	GSM1900	GPRS12	Rear Face	1	810	1	1	w/o	0.732
91	GSM1900	GPRS12	Rear Face	1	810	2	2	w/o	**0.77**
92	GSM1900	GPRS12	Rear Face	1	810	2	2	1	0.692
93	GSM1900	GPRS12	Rear Face	1	810	2	2	2	0.628
41	WCDMA V	RMC 12.2K	Front Face	1	4182	1	1	w/o	0.118
42	WCDMA V	RMC 12.2K	Rear Face	1	4182	1	1	w/o	0.5
47	WCDMA V	RMC 12.2K	Rear Face	1	4182	2	2	w/o	**0.649**
48	WCDMA V	RMC 12.2K	Rear Face	1	4182	2	2	1	0.514
49	WCDMA V	RMC 12.2K	Rear Face	1	4182	2	2	2	0.503

<Body SAR: Hotspot Mode>

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	DUT	Battery	Earphone	SAR_{1g} (W/kg)
96	GSM850	GPRS12	Front Face	1	251	1	1	w/o	0.309
97	GSM850	GPRS12	Rear Face	1	251	1	1	w/o	**0.958**
98	GSM850	GPRS12	Left Side	1	251	1	1	w/o	0.423
99	GSM850	GPRS12	Right Side	1	251	1	1	w/o	0.563
101	GSM850	GPRS12	Down Side	1	251	1	1	w/o	0.169
102	GSM850	GPRS12	Rear Face	1	251	2	2	w/o	0.752
103	GSM850	GPRS12	Rear Face	1	251	1	1	1	0.682
104	GSM850	GPRS12	Rear Face	1	251	1	1	2	0.72
85	GSM1900	GPRS12	Front Face	1	810	1	1	w/o	0.347
86	GSM1900	GPRS12	Rear Face	1	810	1	1	w/o	0.732
87	GSM1900	GPRS12	Left Side	1	810	1	1	w/o	0.102
88	GSM1900	GPRS12	Right Side	1	810	1	1	w/o	0.069
90	GSM1900	GPRS12	Down Side	1	810	1	1	w/o	0.041
91	GSM1900	GPRS12	Rear Face	1	810	2	2	w/o	**0.77**
92	GSM1900	GPRS12	Rear Face	1	810	2	2	1	0.692
93	GSM1900	GPRS12	Rear Face	1	810	2	2	2	0.628
41	WCDMA V	RMC 12.2K	Front Face	1	4182	1	1	w/o	0.118
42	WCDMA V	RMC 12.2K	Rear Face	1	4182	1	1	w/o	0.5
43	WCDMA V	RMC 12.2K	Left Side	1	4182	1	1	w/o	0.197
44	WCDMA V	RMC 12.2K	Right Side	1	4182	1	1	w/o	0.201
46	WCDMA V	RMC 12.2K	Down Side	1	4182	1	1	w/o	0.08
47	WCDMA V	RMC 12.2K	Rear Face	1	4182	2	2	w/o	**0.649**
48	WCDMA V	RMC 12.2K	Rear Face	1	4182	2	2	1	0.514
49	WCDMA V	RMC 12.2K	Rear Face	1	4182	2	2	2	0.503

Note:

1. The details of WLAN standalone SAR result can be referred to BVADT SAR report number SA110909C14A-1 dated Sep. 28, 2011.
2. The DUT configuration is listed as below.
   DUT1 : Phone + Photo Camera 1 + Video Camera 1
   DUT2 : Phone + Photo Camera 2 + Video Camera 2
3. The difference between battery 1 and battery 2 are brand name and manufacturer and their specifications are all the same.

6.4 SIMULTANEOUS TRANSMISSION EVALUATION

Position	GSM 850	GSM 1900	WCDMA Band V	802.11b/g	Max. SAR Summation
Right Cheek	0.043	0.075	**0.089**	**0.00742**	0.09642
Right Tilted	0.018	0.041	**0.061**	**0.027**	0.088
Left Cheek	0.196	**0.425**	0.12	**0.012**	0.437
Left Tilted	0.056	**0.094**	0.08	**0.02**	0.114
Front Face	0.309	**0.347**	0.118	**0.481**	0.828
Rear Face	**0.958**	0.77	0.649	**0.534**	1.492
Left Side	**0.423**	0.102	0.197	**0.011**	0.434
Right Side	**0.563**	0.069	0.201	**0.029**	0.592
Top Side	N/A	N/A	N/A	N/A	N/A
Down Side	**0.169**	0.041	0.08	**0.023**	0.192

Summary:

According to KDB 648474, the simultaneous transmission SAR for WWAN and WLAN was not required, because the SAR summation is less than 1.6 W/kg. The simultaneous transmission SAR for WWAN and BT was not required, because the output power of Bluetooth is less than P_{Ref} (10.8 dBm) and the closest separation distance of these antennas is less than 2.5 cm and the maximum SAR of WWAN is less than 1.2 W/kg.

6.5 SAR LIMITS

HUMAN EXPOSURE	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / controlled Exposure Environment)
Spatial Average (whole body)	0.08	0.4
Spatial Peak (averaged over 1 g)	**1.6**	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

NOTE: This limits accord to 47 CFR 2.1093 – Safety Limit.

7. INFORMATION ON THE TESTING LABORATORIES

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan 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.

Copies of accreditation certificates of our laboratories obtained from approval agencies can be downloaded from our web site: www.adt.com.tw/index.5.phtml. If you have any comments, please feel free to contact us at the following:

Linko EMC/RF Lab:
Tel: 886-2-26052180
Fax: 886-2-26051924

Hsin Chu EMC/RF Lab:
Tel: 886-3-5935343
Fax: 886-3-5935342

Hwa Ya EMC/RF/Safety/Telecom Lab:
Tel: 886-3-3183232
Fax: 886-3-3185050

Email: service.adt@tw.bureauveritas.com
Web Site: www.adt.com.tw

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

System Check_HSL835_110915

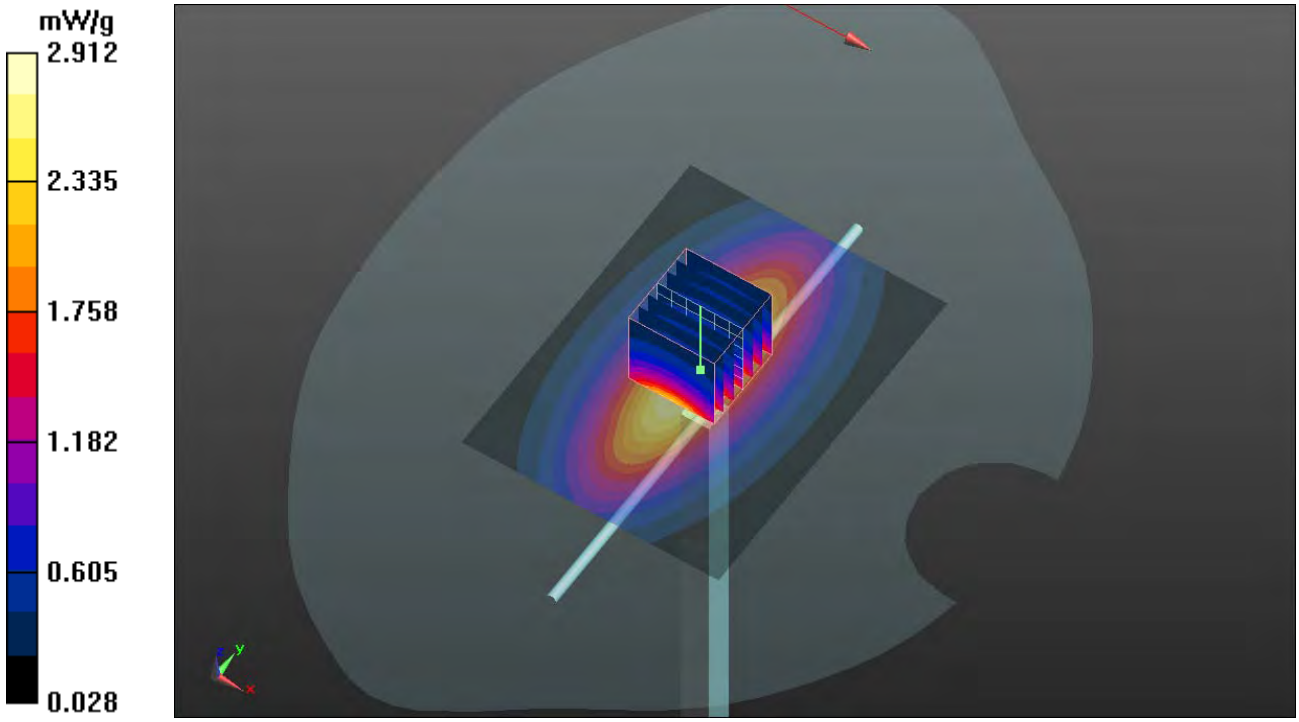
DUT: Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL850_110915 Medium parameters used: f = 835 MHz; σ = 0.889 mho/m; ε_r = 40.68; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(8.95, 8.95, 8.95); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2011/7/29
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.912 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.803 V/m; Power Drift = -0.0084 dB
Peak SAR (extrapolated) = 3.420 W/kg
SAR(1 g) = 2.27 mW/g; SAR(10 g) = 1.49 mW/g
Maximum value of SAR (measured) = 2.450 mW/g



SystemCheck_HSL835_110917

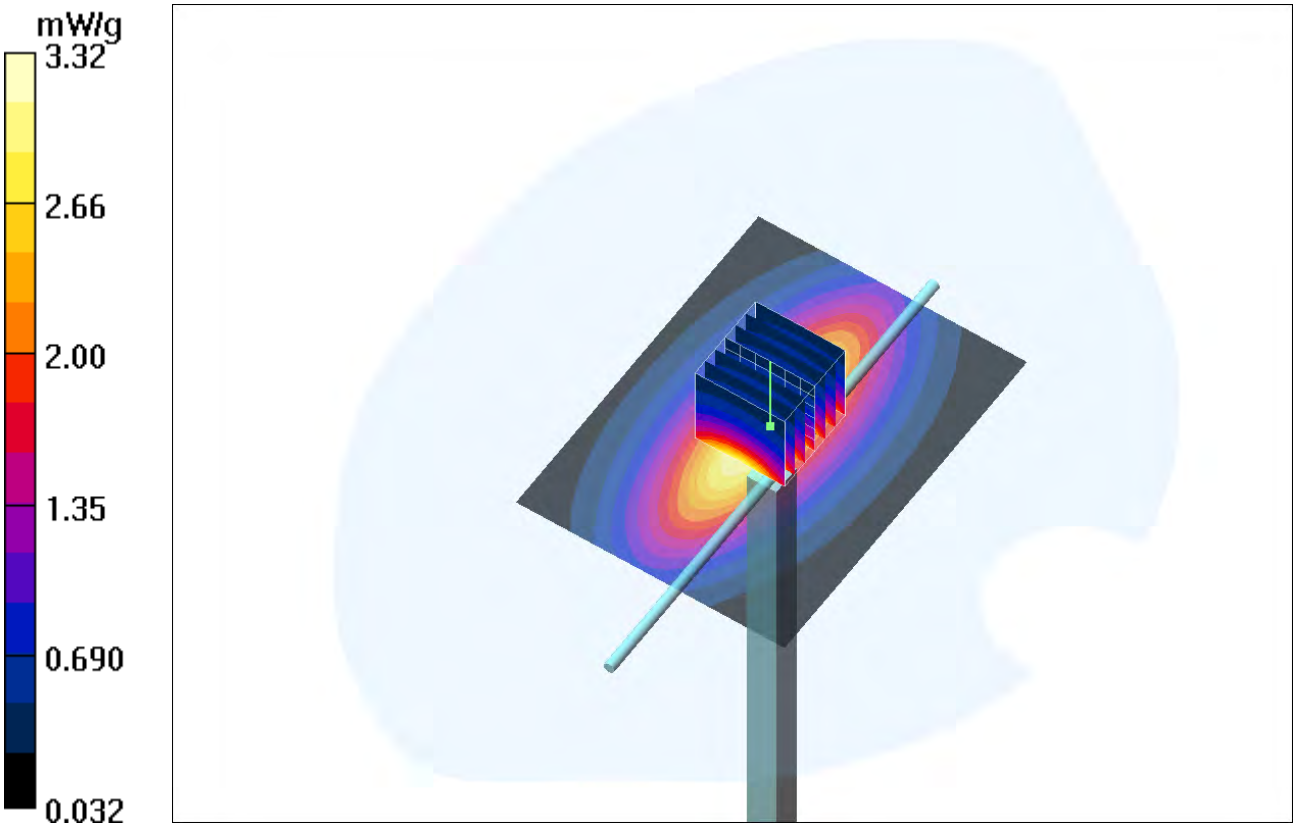
DUT: Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835_0917 Medium parameters used: f = 835 MHz; σ = 0.9 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2011/7/29
- Phantom: SAM Phantom_Front; Type: SAM V4.0; Serial: TP 1654
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=15mm, Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.32 mW/g

d=15mm, Pin=250mW/Zoom Scan(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 66.3 V/m; Power Drift = -0.102 dB
Peak SAR (extrapolated) = 3.92 W/kg
SAR(1 g) = 2.59 mW/g; SAR(10 g) = 1.69 mW/g
Maximum value of SAR (measured) = 3.30 mW/g



System Check_HSL835_110922

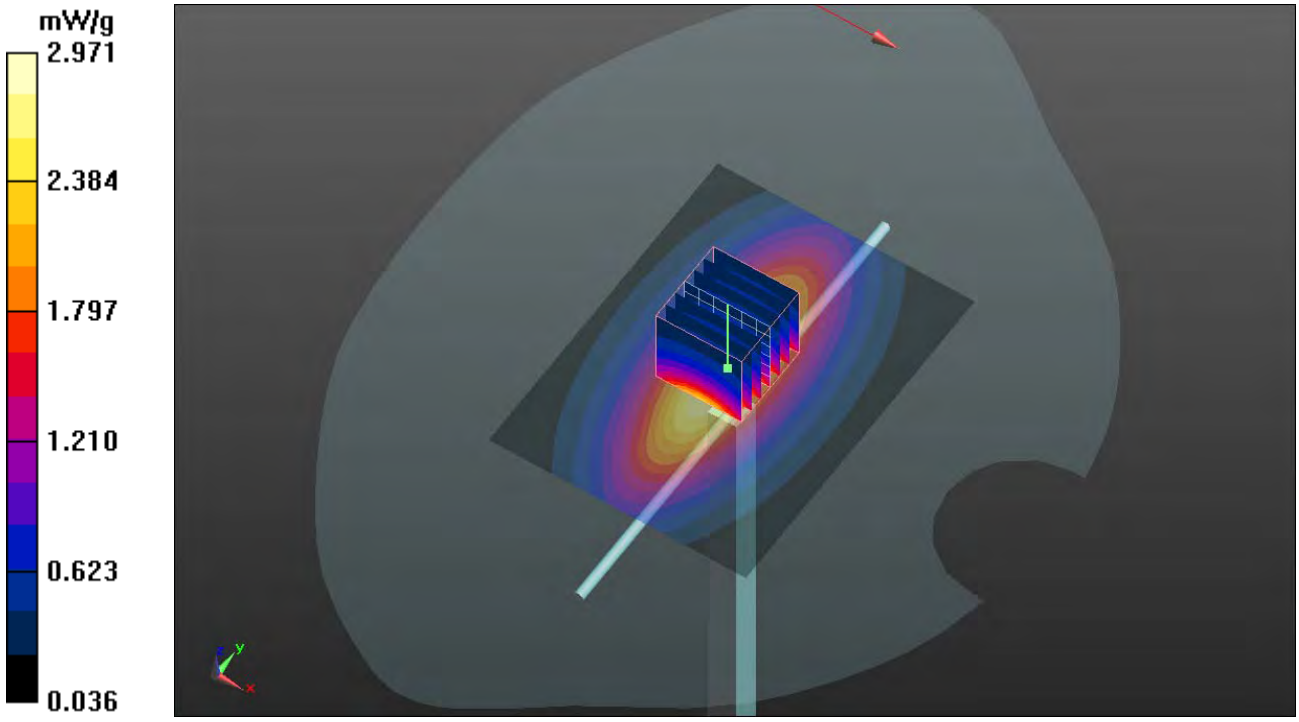
DUT: Dipole 835 MHz D835V2

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835_0922 Medium parameters used: f = 835 MHz; σ = 0.886 mho/m; ε_r = 41.237; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM with CRP; Type: SAM; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250 mW, dist=2.0mm /Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 2.971 mW/g

Pin=250 mW, dist=2.0mm /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.962 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.495 W/kg
SAR(1 g) = 2.32 mW/g; SAR(10 g) = 1.53 mW/g
Maximum value of SAR (measured) = 2.503 mW/g



System Check_MSL835_110915

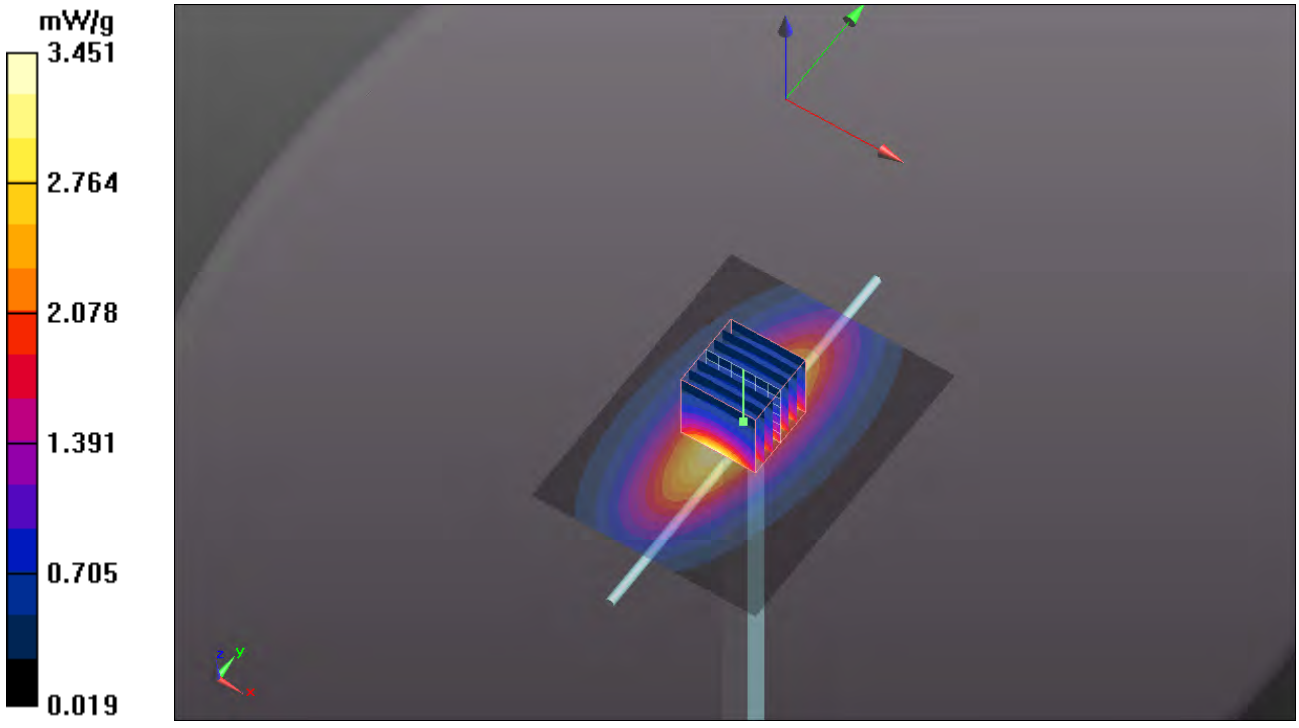
DUT: Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL850_110915 Medium parameters used: f = 835 MHz; σ = 0.969 mho/m; ε_r = 54.804; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(9.12, 9.12, 9.12); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: ELI v4.0; Type: QDOVA001BA; Serial: TP:1043
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250mW/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.451 mW/g

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 60.035 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 4.003 W/kg
SAR(1 g) = 2.66 mW/g; SAR(10 g) = 1.73 mW/g
Maximum value of SAR (measured) = 3.383 mW/g



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2011/9/16

System Check_MSL835_110916

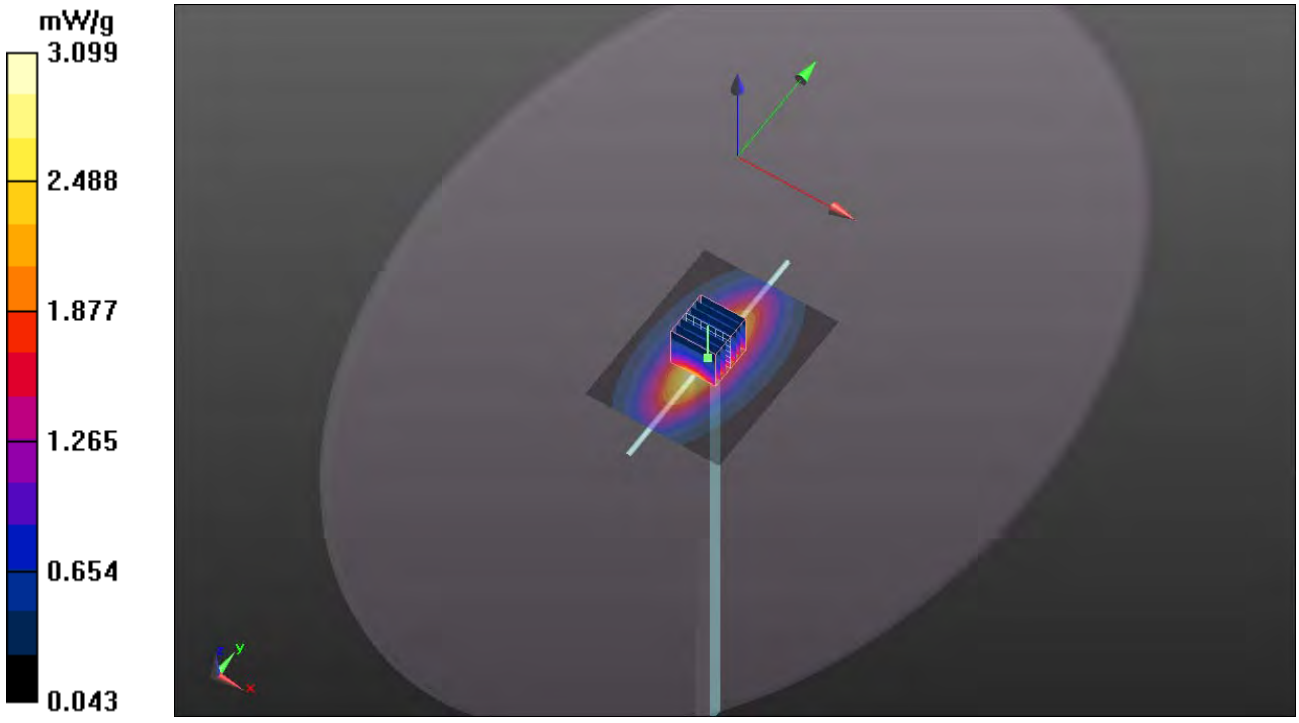
DUT: Dipole 835 MHz D835V2

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL850_0916 Medium parameters used: f = 835 MHz; σ = 0.967 mho/m; ε_r = 54.182; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(9.12, 9.12, 9.12); Calibrated: 2011/1/24
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2011/7/29
- Phantom: ELI v4.0; Type: QDOVA001BA; Serial: TP:1043
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250 mW, dist=2.0mm /Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.099 mW/g

Pin=250 mW, dist=2.0mm /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 36.322 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 3.597 W/kg
SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.57 mW/g
Maximum value of SAR (measured) = 2.590 mW/g



System Check_MSL835_110922

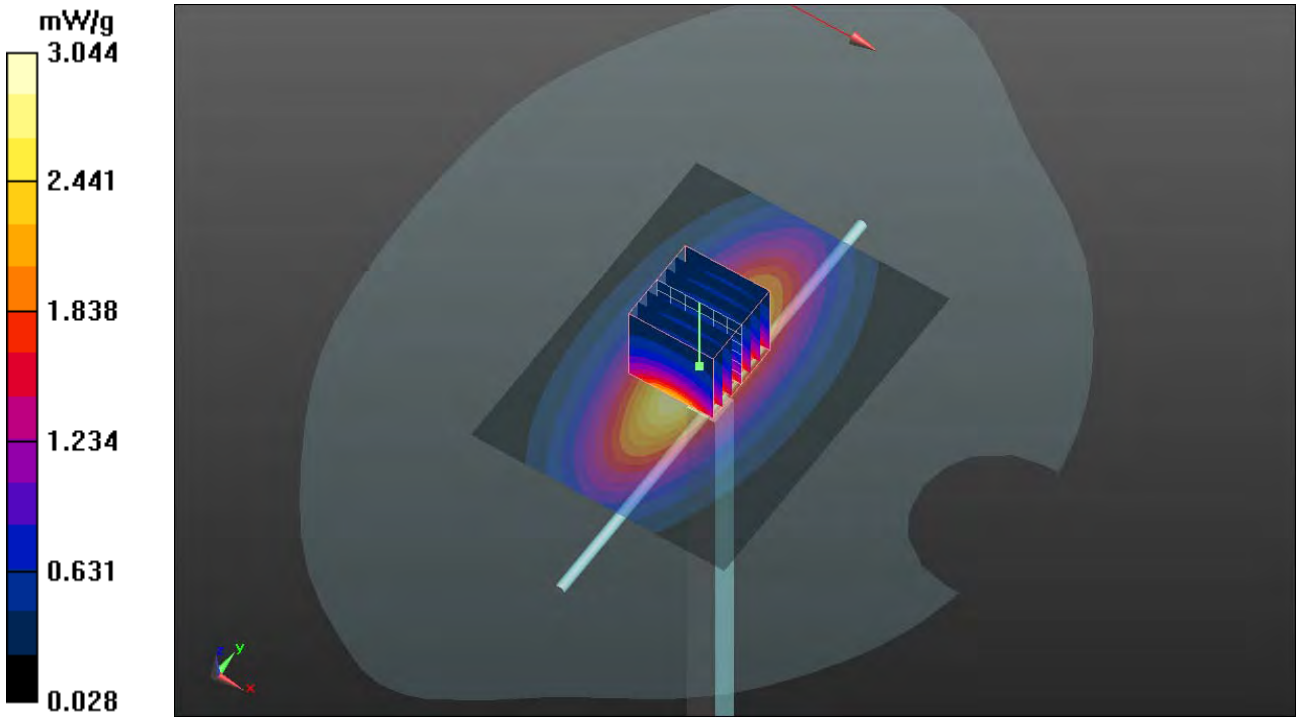
DUT: Dipole 835 MHz D835V2

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL850_0922 Medium parameters used: f = 835 MHz; σ = 0.977 mho/m; ε_r = 53.183; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250 mW, dist=2.0mm /Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 3.044 mW/g

Pin=250 mW, dist=2.0mm /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 50.519 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 3.413 W/kg
SAR(1 g) = 2.34 mW/g; SAR(10 g) = 1.54 mW/g
Maximum value of SAR (measured) = 2.528 mW/g



System Check_HSL1900_110917

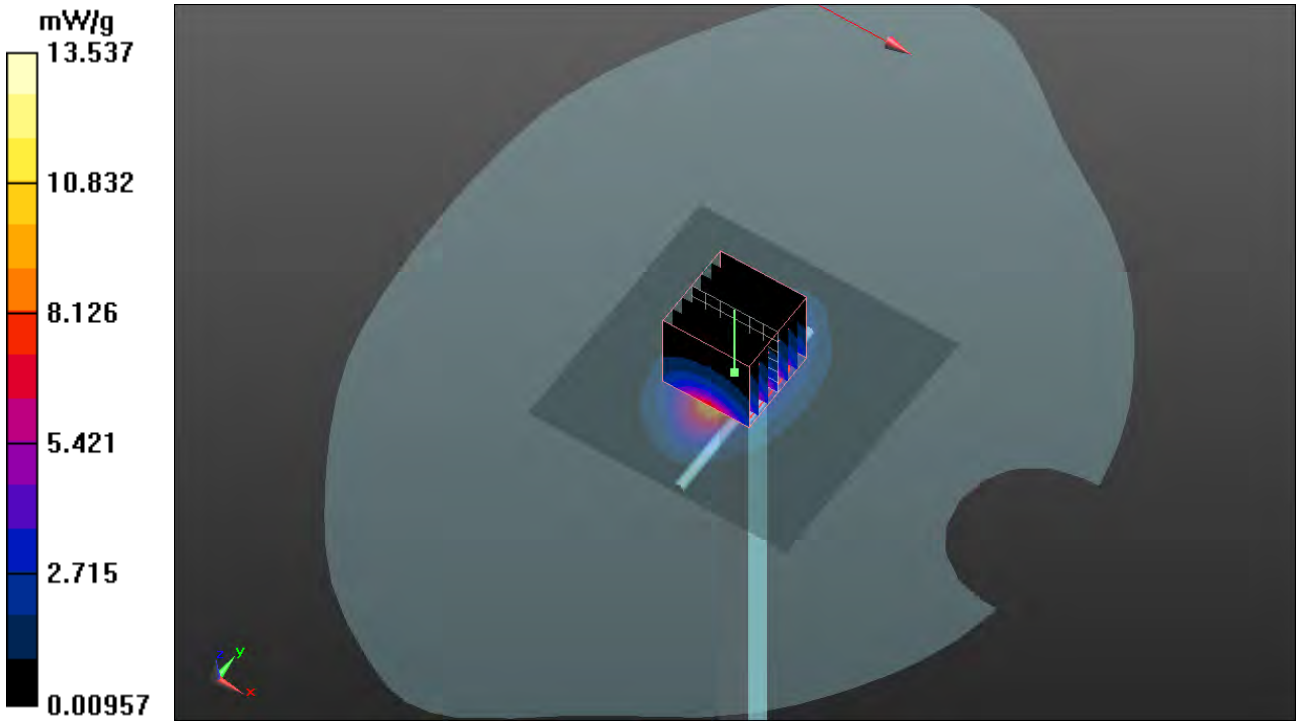
DUT: Dipole 1900 MHz D1900V2

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1900_0917 Medium parameters used: f = 1900 MHz; σ = 1.423 mho/m; ε_r = 40.851; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(7.57, 7.57, 7.57); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250 mW, dist=2.0mm /Area Scan (61x61x1): Measurement grid:
dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 13.537 mW/g

Pin=250 mW, dist=2.0mm /Zoom Scan (7x7x7)/Cube 0: Measurement grid:
dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.453 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 17.836 W/kg
SAR(1 g) = 9.48 mW/g; SAR(10 g) = 4.9 mW/g
Maximum value of SAR (measured) = 10.685 mW/g



System Check_HSL1900_110922

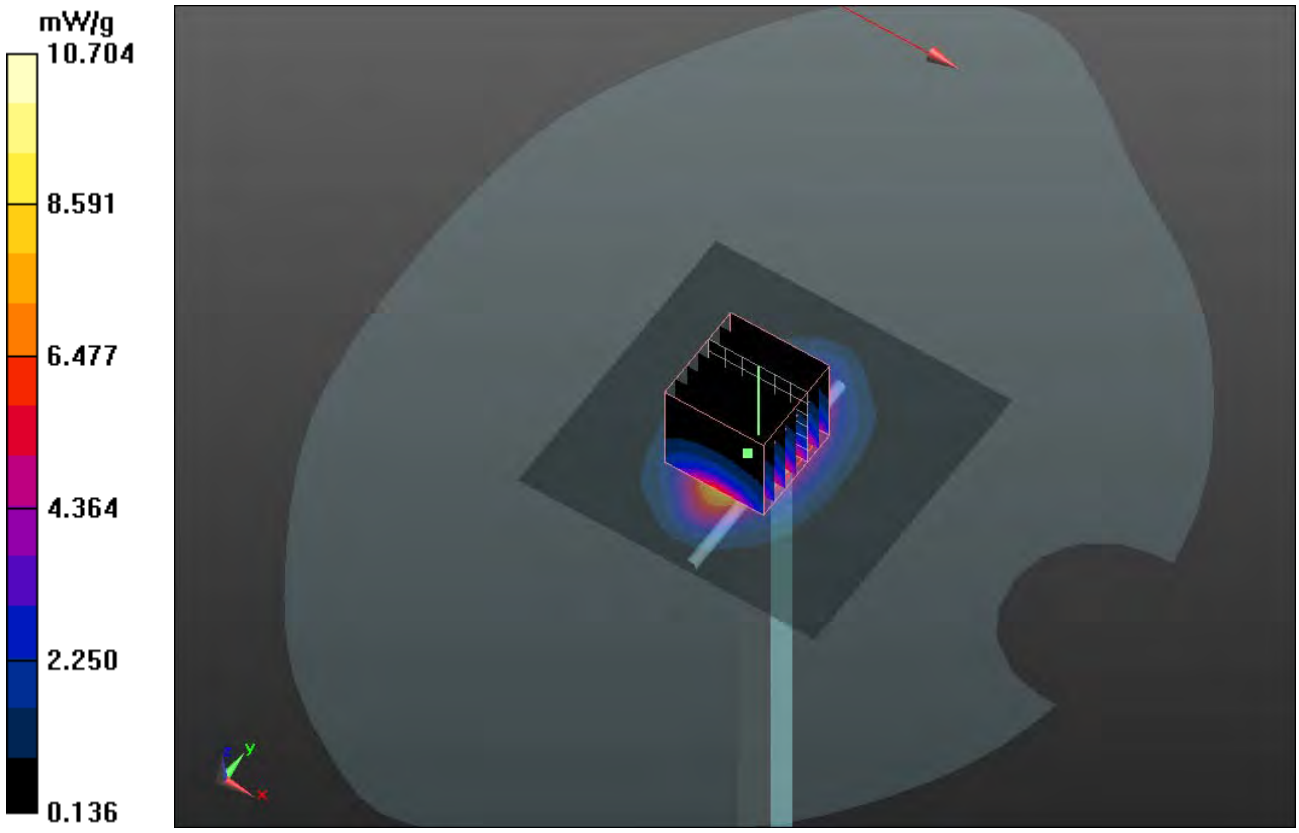
DUT: Dipole 1900 MHz D1900V2

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1900_0922 Medium parameters used: f = 1900 MHz; σ = 1.44 mho/m; ε_r = 37.8; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.45, 8.45, 8.45); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250 mW, dist=2.0mm /Area Scan (61x61x1): Measurement grid:
dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 14.464 mW/g

Pin=250 mW, dist=2.0mm /Zoom Scan (7x7x7)/Cube 0: Measurement grid:
dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.140 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 18.541 W/kg
SAR(1 g) = 9.55 mW/g; SAR(10 g) = 4.87 mW/g
Maximum value of SAR (measured) = 10.704 mW/g



System Check_MSL1900_110920

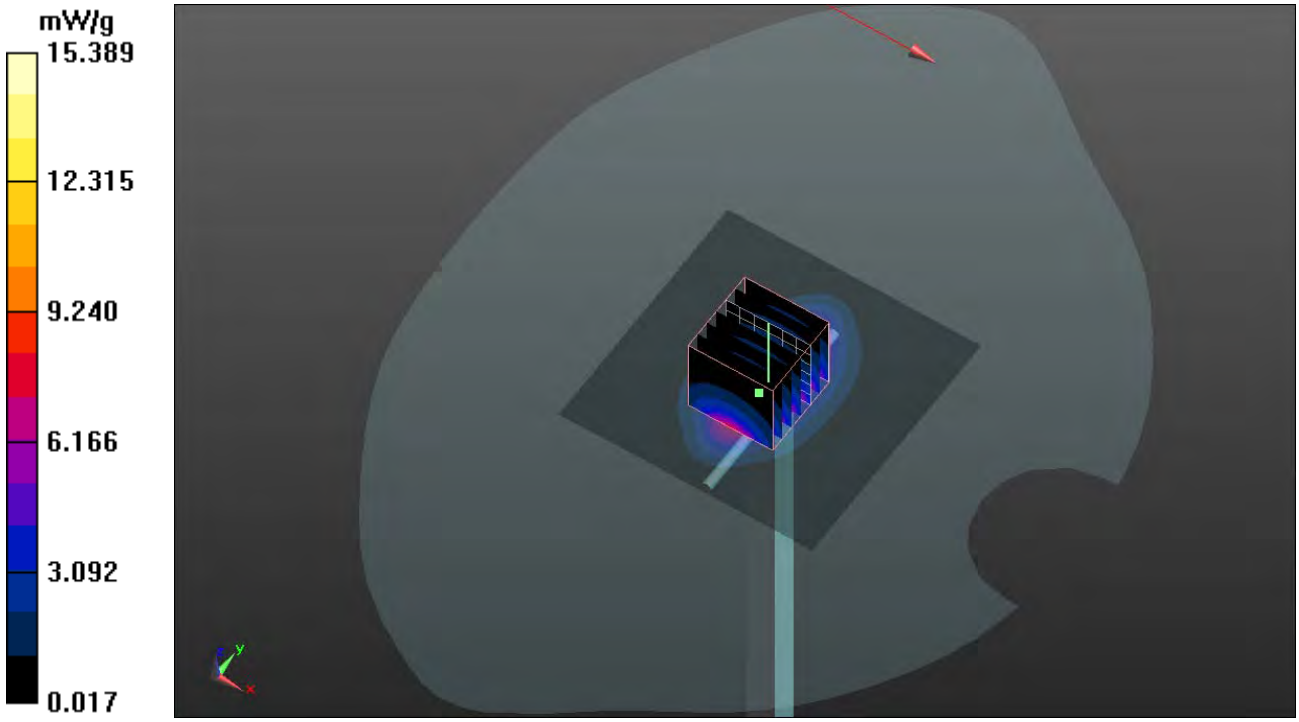
DUT: Dipole 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL1900_0920 Medium parameters used: f = 1900 MHz; σ = 1.534 mho/m; ε_r = 51.604; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.49, 8.49, 8.49); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1202
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 15.389 mW/g

Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.0 V/m; Power Drift = -0.0037 dB
Peak SAR (extrapolated) = 19.258 W/kg
SAR(1 g) = 10.5 mW/g; SAR(10 g) = 5.47 mW/g
Maximum value of SAR (measured) = 15.088 mW/g



P15 GSM850_Right Cheek_Ch189_Sample1_Battery1

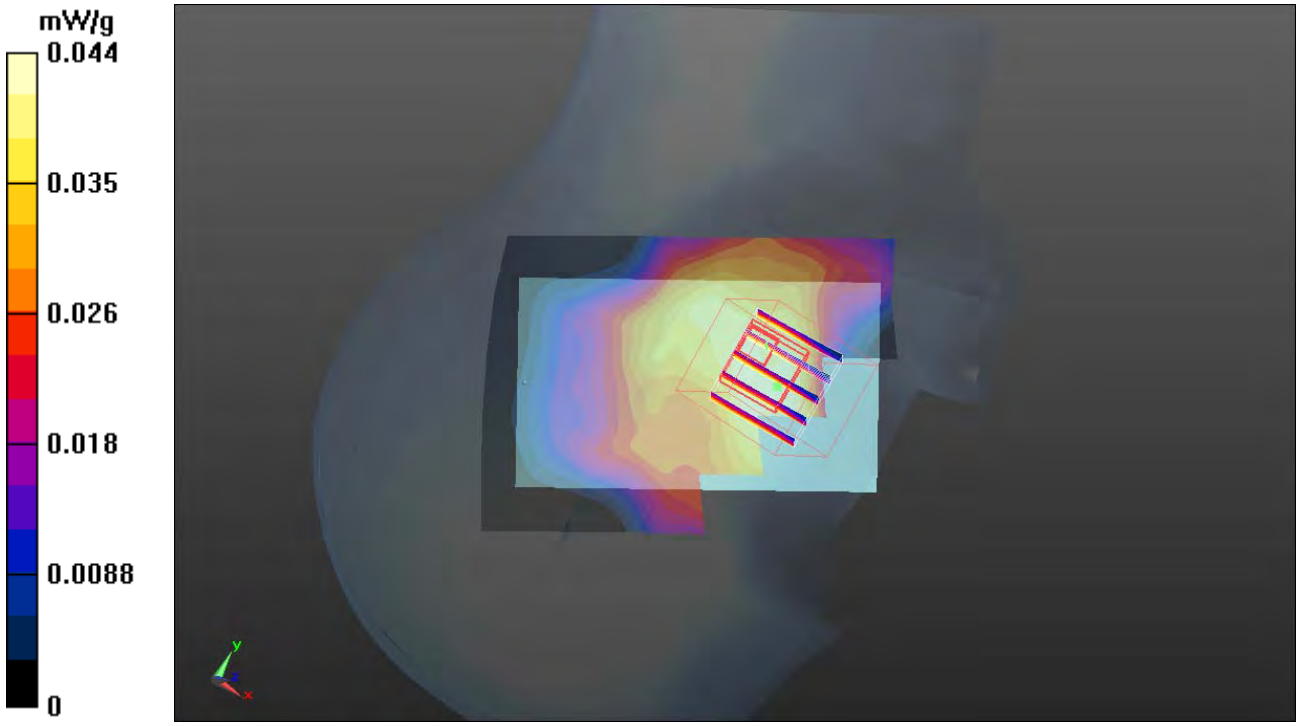
DUT: 110906C19

Communication System: GSM; Frequency: 836.4 MHz;Duty Cycle: 1:8.30042
Medium: HSL850_110915 Medium parameters used : f = 836.4 MHz; σ = 0.891 mho/m; ε_r = 40.686; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(8.95, 8.95, 8.95); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch189/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.044 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.440 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.051 W/kg
SAR(1 g) = 0.043 mW/g; SAR(10 g) = 0.032 mW/g
Maximum value of SAR (measured) = 0.049 mW/g



P16 GSM850_Right Tilted_Ch189_Sample1_Battery1

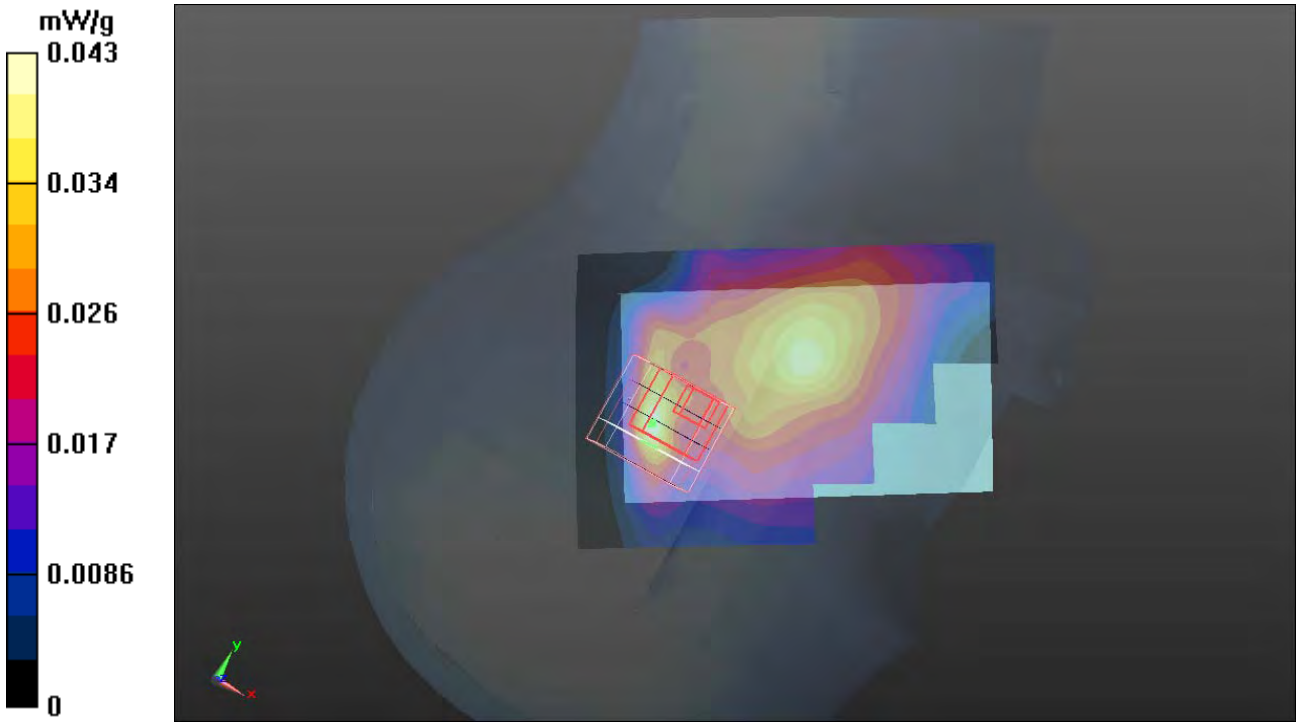
DUT: 110906C19

Communication System: GSM; Frequency: 836.4 MHz;Duty Cycle: 1:8.30042
Medium: HSL850_110915 Medium parameters used : f = 836.4 MHz; σ = 0.891 mho/m; ε_r = 40.686; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(8.95, 8.95, 8.95); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch189/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.043 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.187 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.044 W/kg
SAR(1 g) = 0.018 mW/g; SAR(10 g) = 0.00818 mW/g
Maximum value of SAR (measured) = 0.029 mW/g



P17 GSM850_Left Cheek_Ch189_Sample1_Battery1

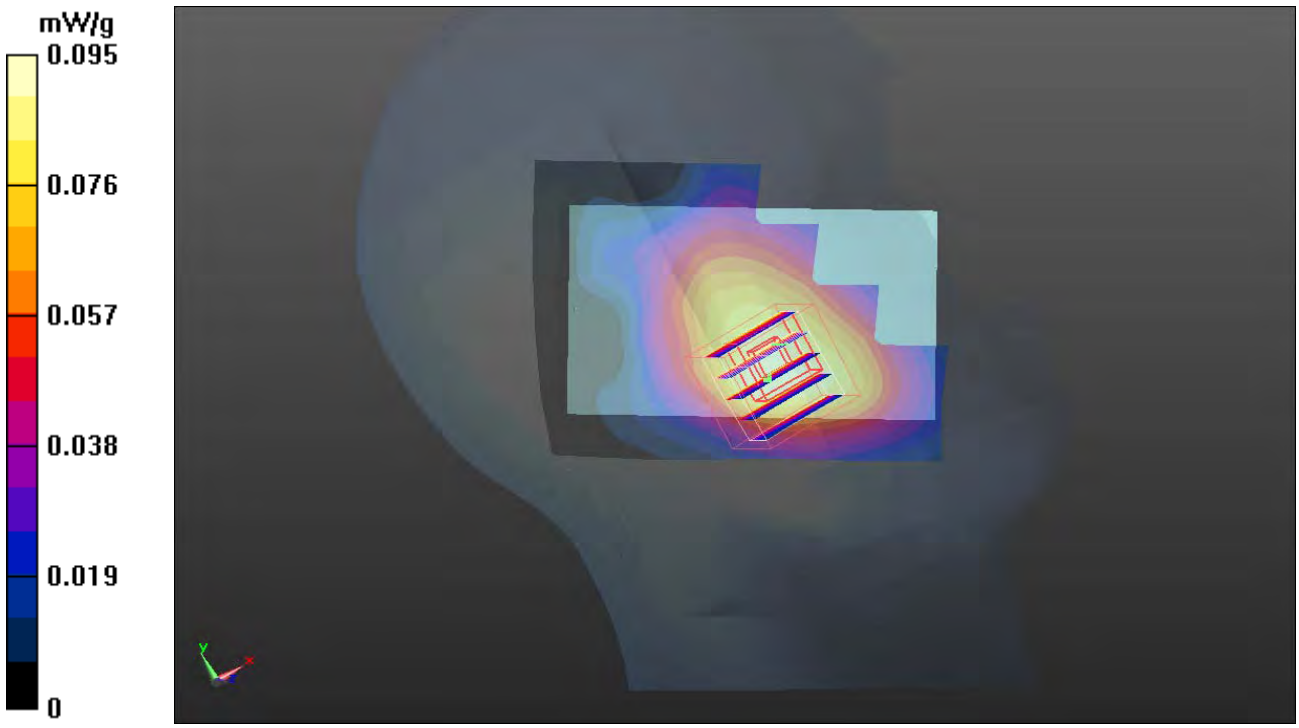
DUT: 110906C19

Communication System: GSM; Frequency: 836.4 MHz;Duty Cycle: 1:8.30042
Medium: HSL850_110915 Medium parameters used : f = 836.4 MHz; σ = 0.891 mho/m; ε_r = 40.686; ρ = 1000 kg/m^3
Ambient Temperature：22.8 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(8.95, 8.95, 8.95); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch189/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.095 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.659 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.097 W/kg
SAR(1 g) = 0.074 mW/g; SAR(10 g) = 0.057 mW/g
Maximum value of SAR (measured) = 0.085 mW/g



P18 GSM850_Left Tilted_Ch189_Sample1_Battery1

DUT: 110906C19

Communication System: GSM; Frequency: 836.4 MHz;Duty Cycle: 1:8.30042
Medium: HSL850_110915 Medium parameters used : f = 836.4 MHz; σ = 0.891 mho/m; ε_r = 40.686; ρ = 1000 kg/m^3
Ambient Temperature：21.9 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(8.95, 8.95, 8.95); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch189/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.062 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.353 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.069 W/kg
SAR(1 g) = 0.056 mW/g; SAR(10 g) = 0.044 mW/g
Maximum value of SAR (measured) = 0.062 mW/g

Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2011/9/17

P64 GSM850_Left Cheek_Ch189_Sample2_Battery2

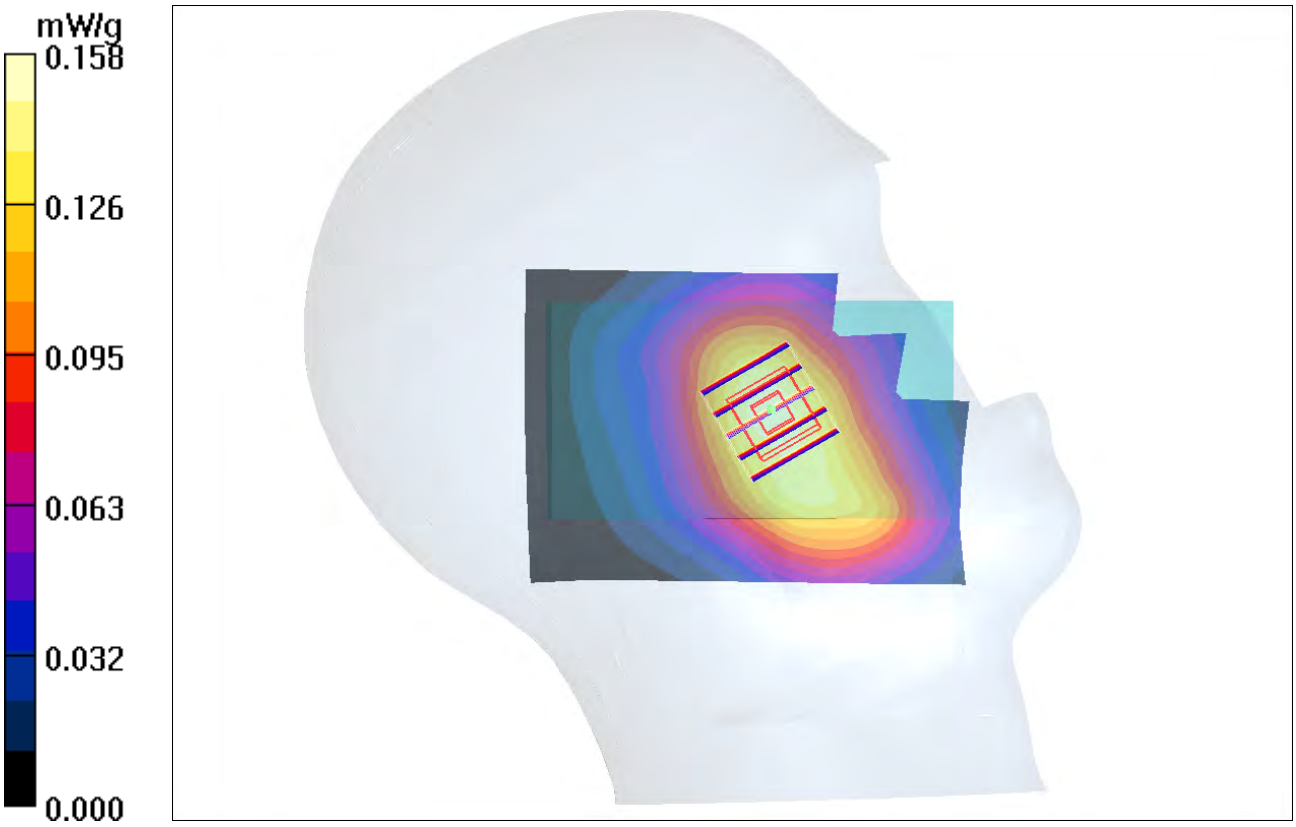
DUT: 110906C19

Communication System: GSM850; Frequency: 836.4 MHz;Duty Cycle: 1:8.3
Medium: HSL835_0917 Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.901 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2011/7/29
- Phantom: SAM Phantom_Front; Type: SAM V4.0; Serial: TP 1654
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch189/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.158 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.37 V/m; Power Drift = 0.026 dB
Peak SAR (extrapolated) = 0.173 W/kg
SAR(1 g) = 0.137 mW/g; SAR(10 g) = 0.104 mW/g
Maximum value of SAR (measured) = 0.158 mW/g



P19 GSM850_DTM5_Left Cheek_Ch189_Sample2_Battery2

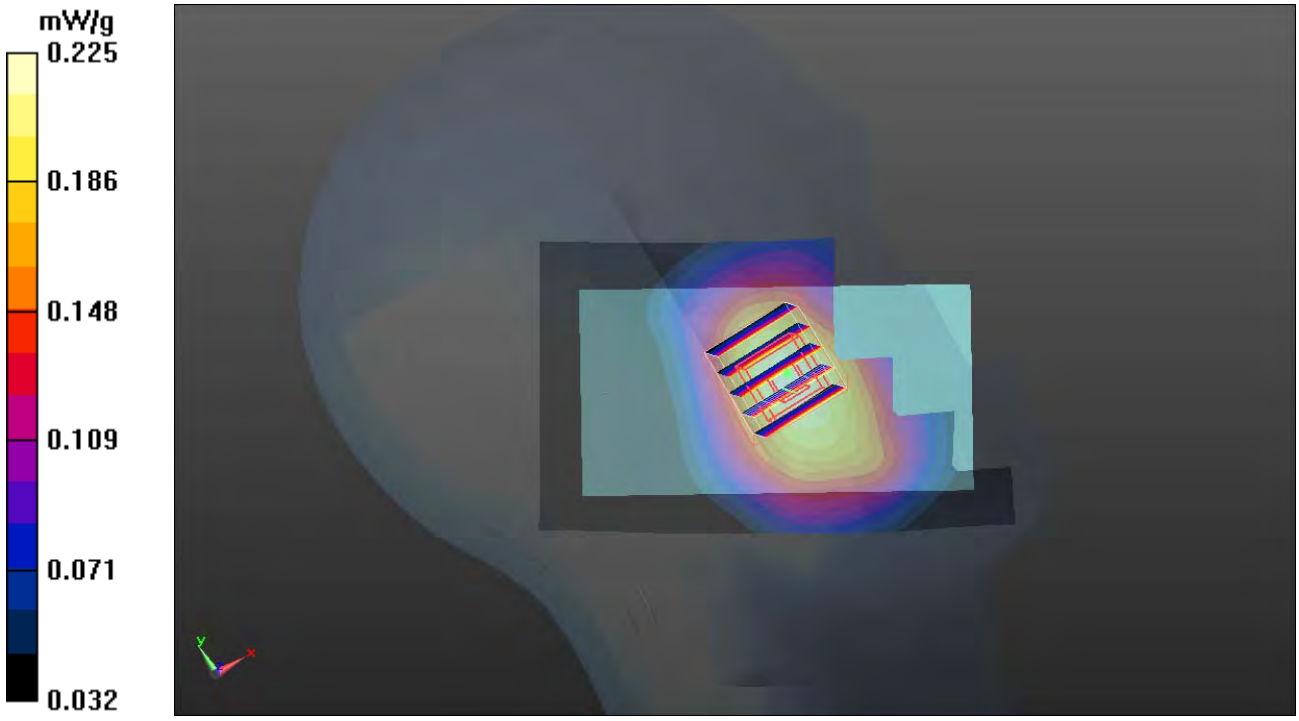
DUT: 110906C19

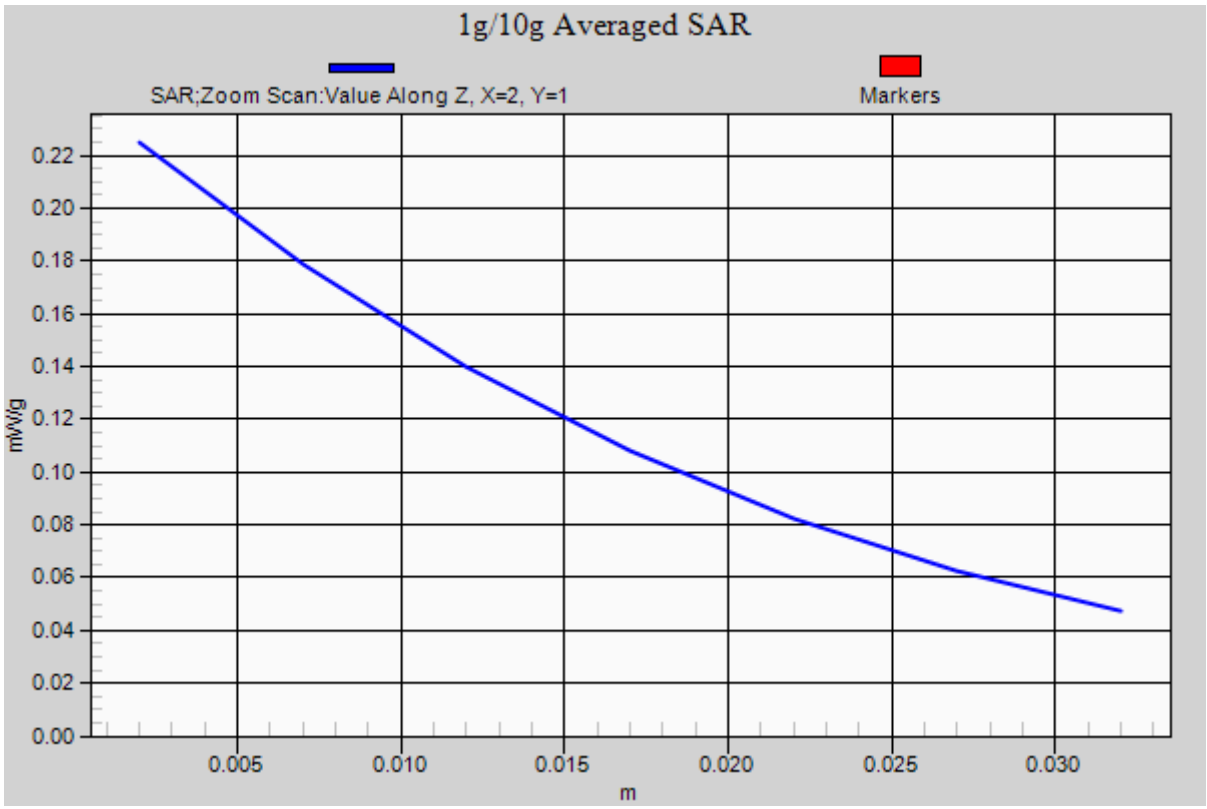
Communication System: Generic GSM; Frequency: 836.4 MHz;Duty Cycle: 1:4.00037
Medium: HSL835_0922 Medium parameters used: f = 837 MHz; σ = 0.887 mho/m; ε_r = 41.185; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Front; Type: SAM; Serial: TP-1485
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch189/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.222 mW/g

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.367 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.245 W/kg
SAR(1 g) = 0.196 mW/g; SAR(10 g) = 0.147 mW/g
Maximum value of SAR (measured) = 0.225 mW/g




1g/10g Averaged SAR
SAR;Zoom Scan:Value Along Z, X=2, Y=1
Markers
mW/g
0.22
0.20
0.18
0.16
0.14
0.12
0.10
0.08
0.06
0.04
0.02
0.00
0.005
0.010
0.015
0.020
0.025
0.030
m

P50 GSM1900_Right Cheek_Ch810_Sample1_Battery1

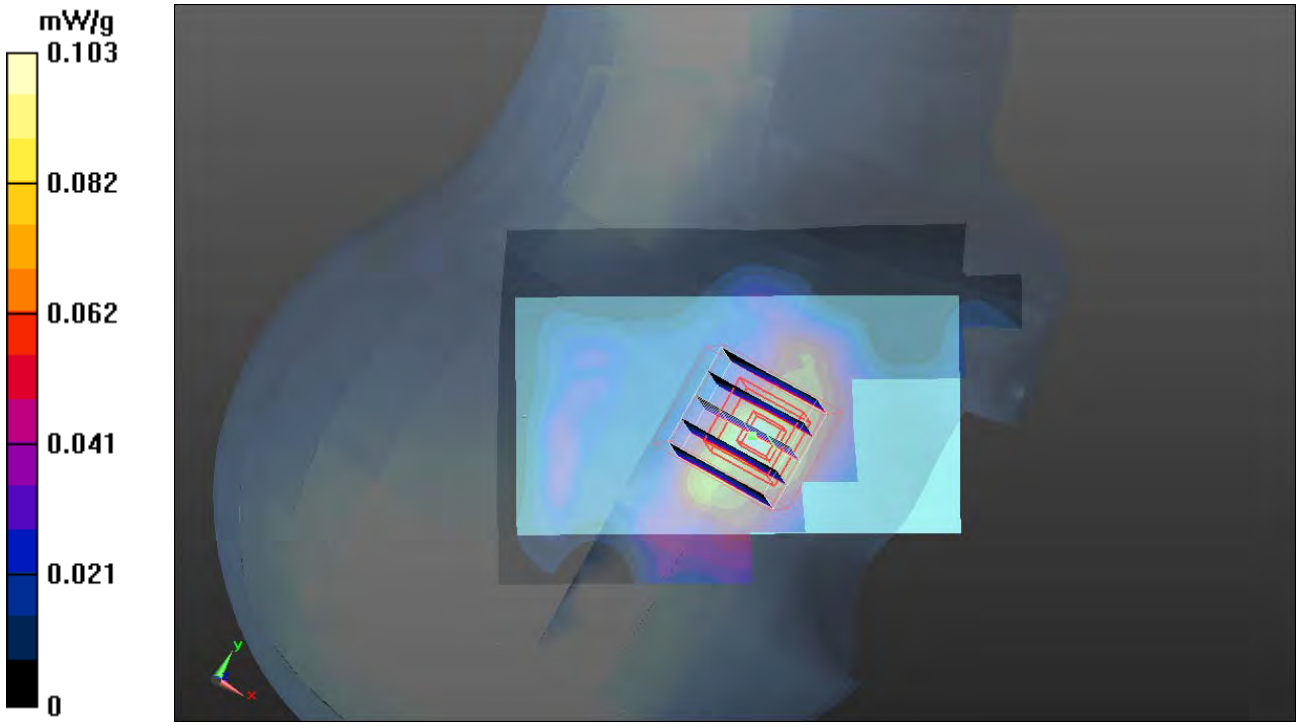
DUT: 110906C19

Communication System: GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium: HSL1900_0917 Medium parameters used: f = 1910 MHz; σ = 1.434 mho/m; ε_r = 40.808; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(7.57, 7.57, 7.57); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.103 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.579 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.123 W/kg
SAR(1 g) = 0.075 mW/g; SAR(10 g) = 0.045 mW/g
Maximum value of SAR (measured) = 0.101 mW/g



P51 GSM1900_Right Tilted_Ch810_Sample1_Battery1

DUT: 110906C19

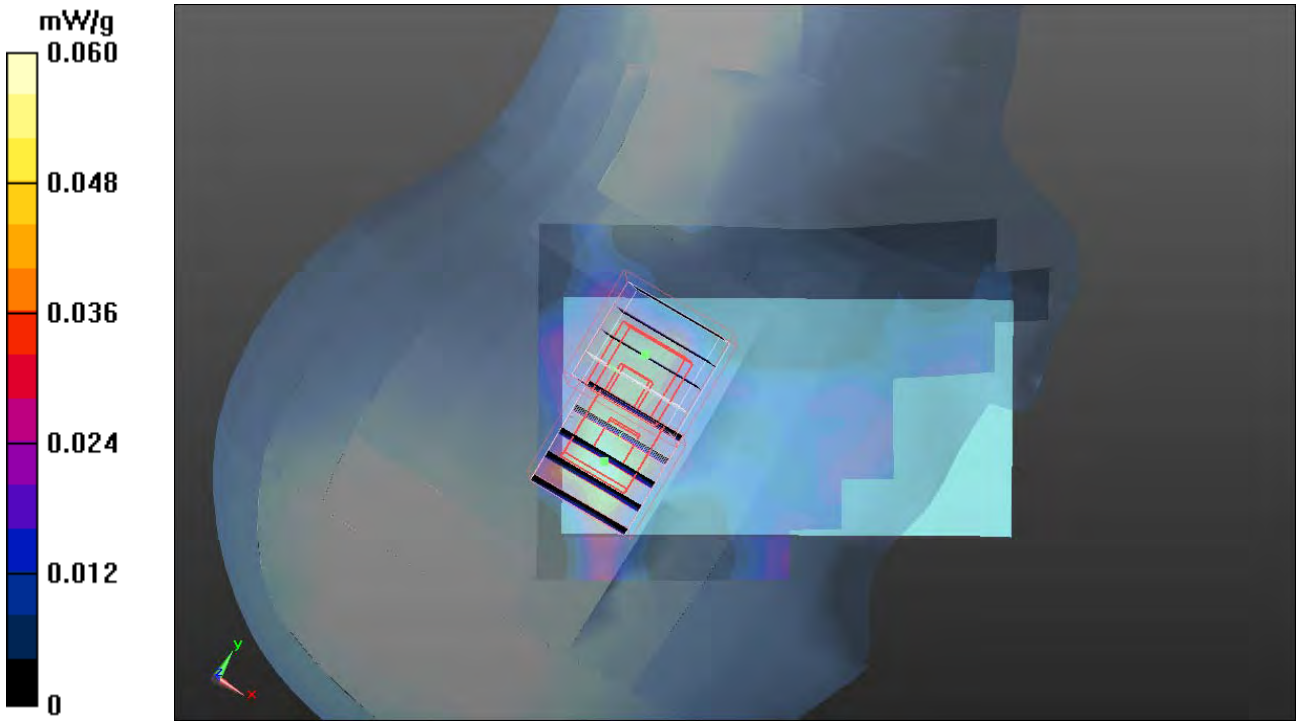
Communication System: GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium: HSL1900_0917 Medium parameters used: f = 1910 MHz; σ = 1.434 mho/m; ε_r = 40.808; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(7.57, 7.57, 7.57); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.060 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.909 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.073 W/kg
SAR(1 g) = 0.041 mW/g; SAR(10 g) = 0.018 mW/g
Maximum value of SAR (measured) = 0.063 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.909 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.055 W/kg
SAR(1 g) = 0.032 mW/g; SAR(10 g) = 0.014 mW/g
Maximum value of SAR (measured) = 0.042 mW/g



P52 GSM1900_Left Cheek_Ch810_Sample1_Battery1

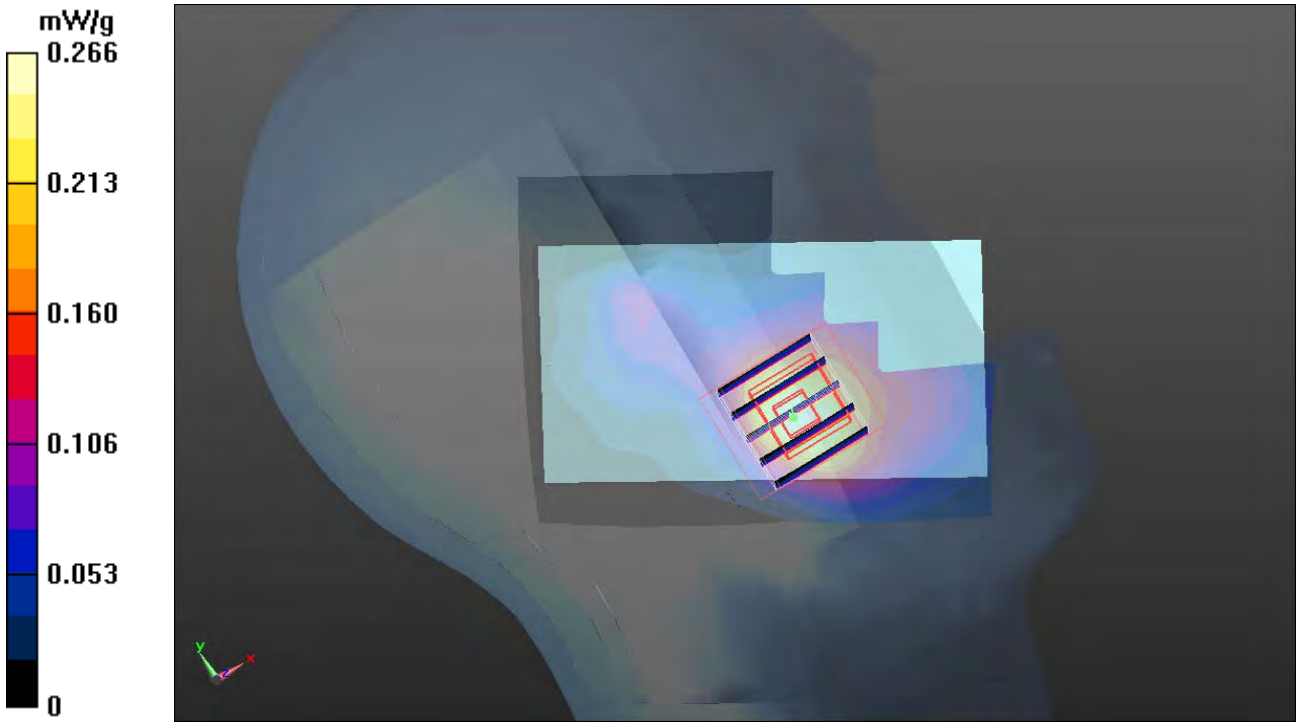
DUT: 110906C19

Communication System: GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium: HSL1900_0917 Medium parameters used: f = 1910 MHz; σ = 1.434 mho/m; ε_r = 40.808; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(7.57, 7.57, 7.57); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.266 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.732 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.312 W/kg
SAR(1 g) = 0.195 mW/g; SAR(10 g) = 0.119 mW/g
Maximum value of SAR (measured) = 0.253 mW/g



P53 GSM1900_Left Tilted_Ch810_Sample1_Battery1

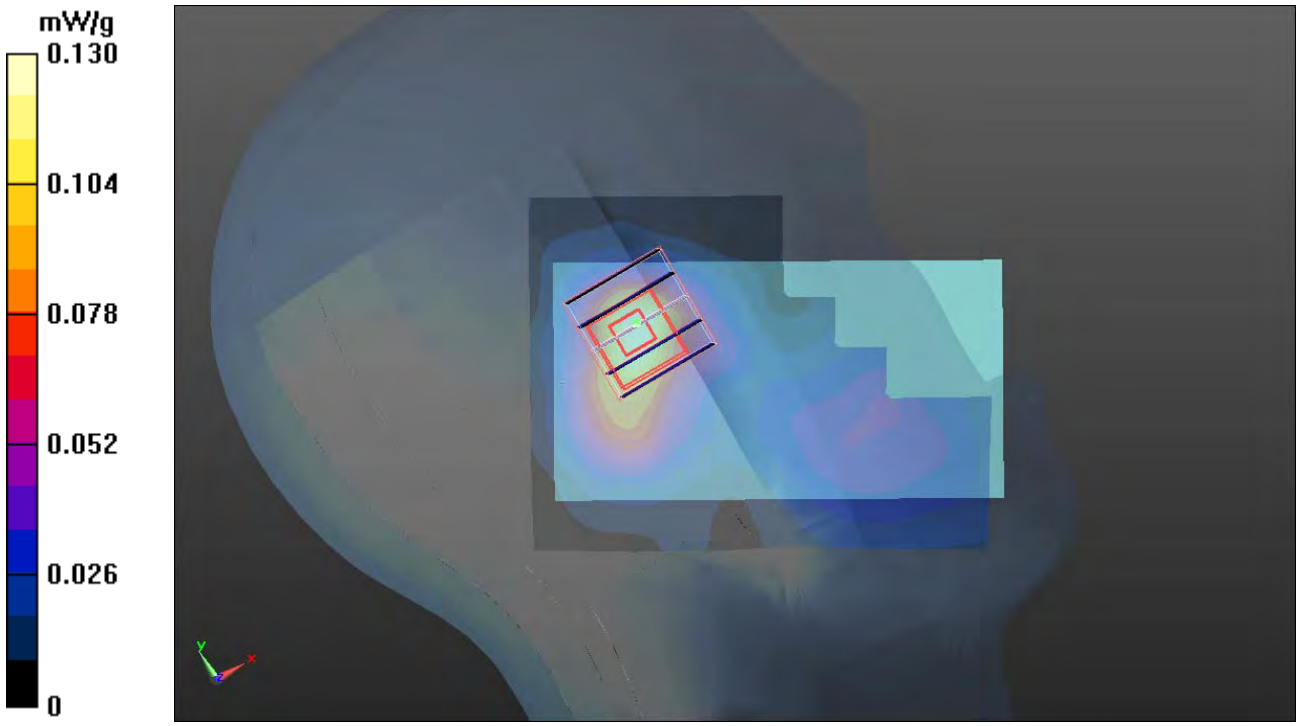
DUT: 110906C19

Communication System: GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium: HSL1900_0917 Medium parameters used: f = 1910 MHz; σ = 1.434 mho/m; ε_r = 40.808; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(7.57, 7.57, 7.57); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.130 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.021 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.148 W/kg
SAR(1 g) = 0.094 mW/g; SAR(10 g) = 0.056 mW/g
Maximum value of SAR (measured) = 0.120 mW/g



P54 GSM1900_Left Cheek_Ch810_Sample2_Battery2

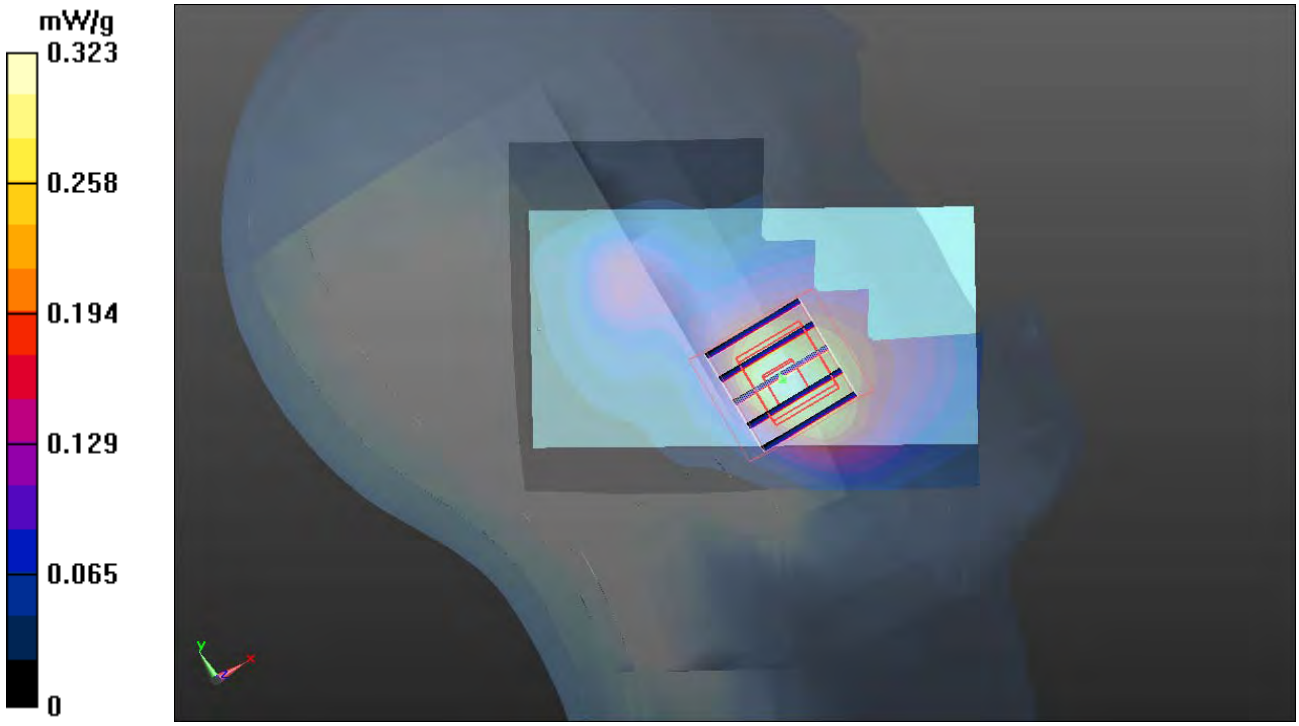
DUT: 110906C19

Communication System: GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8.30042
Medium: HSL1900_0917 Medium parameters used: f = 1910 MHz; σ = 1.434 mho/m; ε_r = 40.808; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(7.57, 7.57, 7.57); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: SAM with CRP v5.0 Front; Type: QD000P40CD; Serial: TP:1653
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.323 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.216 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.433 W/kg
SAR(1 g) = 0.272 mW/g; SAR(10 g) = 0.166 mW/g
Maximum value of SAR (measured) = 0.346 mW/g



P55 GSM1900_Left Cheek_DTM11_Ch810_Sample2_Battery2

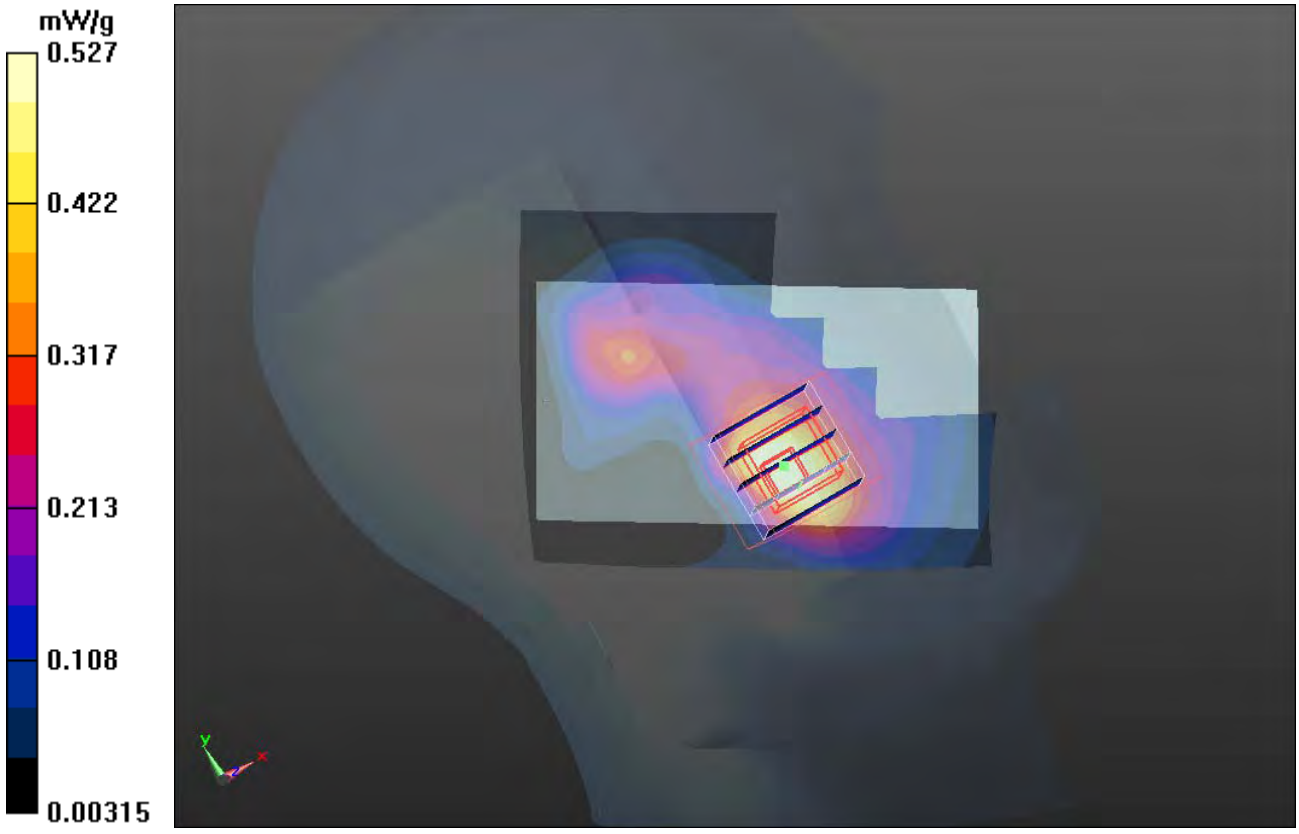
DUT: 110906C19

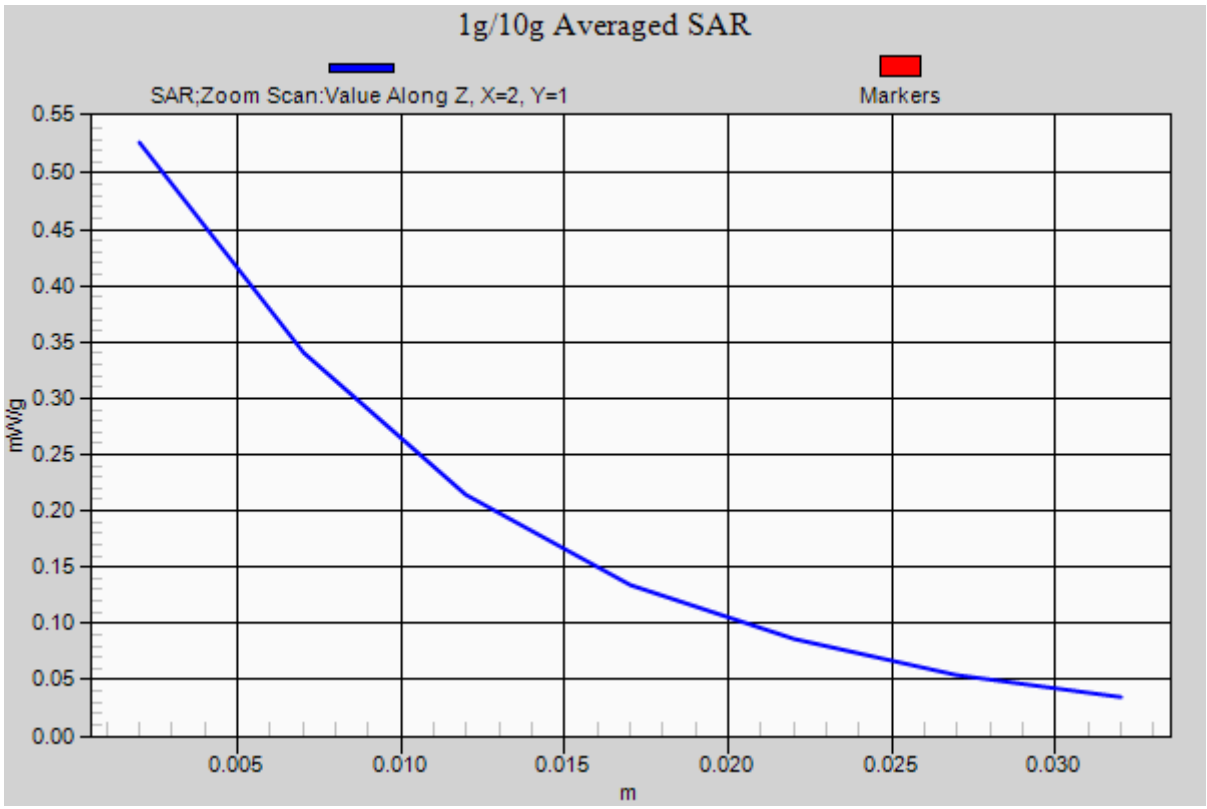
Communication System: GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:2.66686
Medium: HSL1900_0922 Medium parameters used: f = 1910 MHz; σ = 1.45 mho/m; ε_r = 37.776; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.0 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.45, 8.45, 8.45); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (71x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.600 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.398 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.665 W/kg
SAR(1 g) = 0.425 mW/g; SAR(10 g) = 0.256 mW/g
Maximum value of SAR (measured) = 0.527 mW/g




1g/10g Averaged SAR
SAR;Zoom Scan:Value Along Z, X=2, Y=1
Markers
0.55
0.50
0.45
0.40
0.35
0.30
0.25
0.20
0.15
0.10
0.05
0.00
W/kg
0.005
0.010
0.015
0.020
0.025
0.030
m

Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2011/9/17

P36 WCDMA V_Right Cheek_Ch4182_Sample1_Battery1

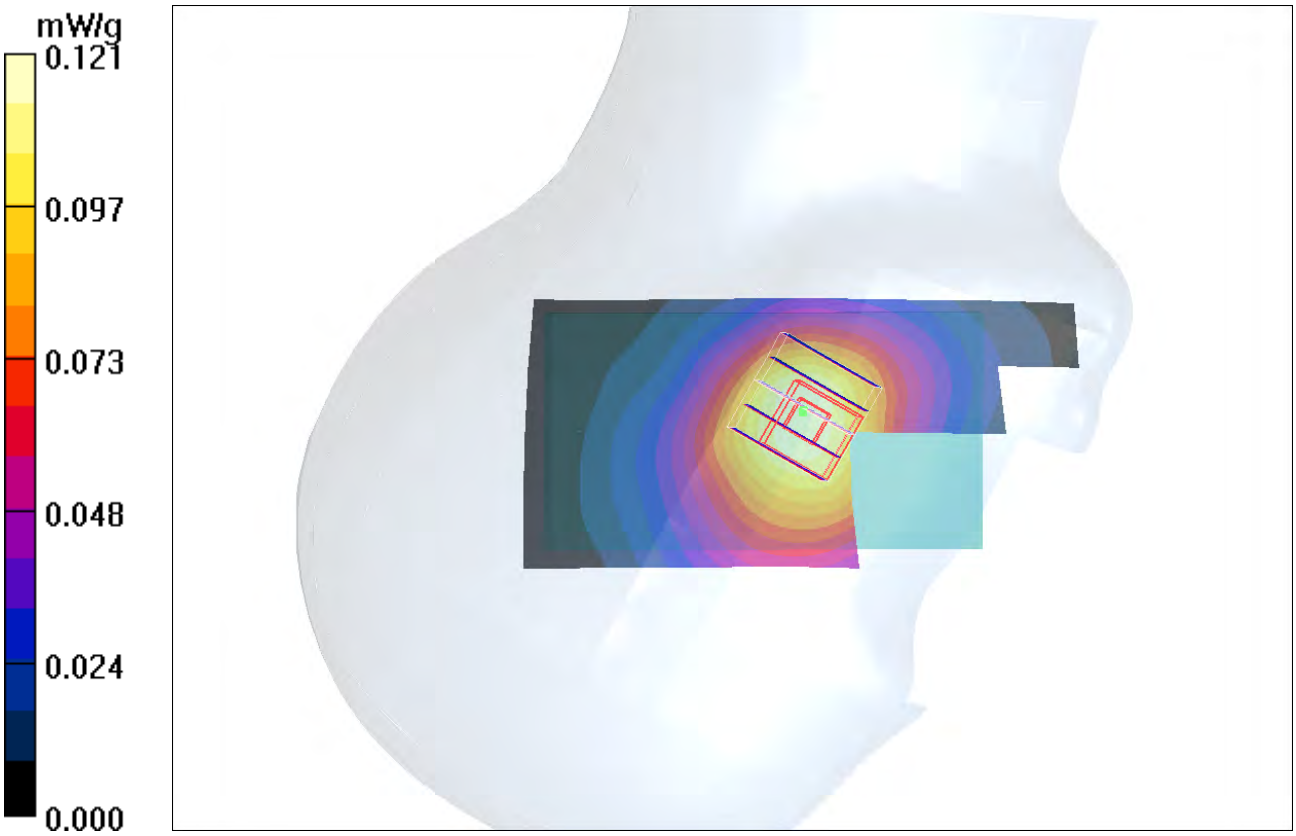
DUT: 110906C19

Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL835_0917 Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.901 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃； Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2011/7/29
- Phantom: SAM Phantom_Front; Type: SAM V4.0; Serial: TP 1654
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch4182/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.121 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.94 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.110 W/kg
SAR(1 g) = 0.089 mW/g; SAR(10 g) = 0.069 mW/g
Maximum value of SAR (measured) = 0.100 mW/g



P37 WCDMA V_Right Tilted_Ch4182_Sample1_Battery1

DUT: 110906C19

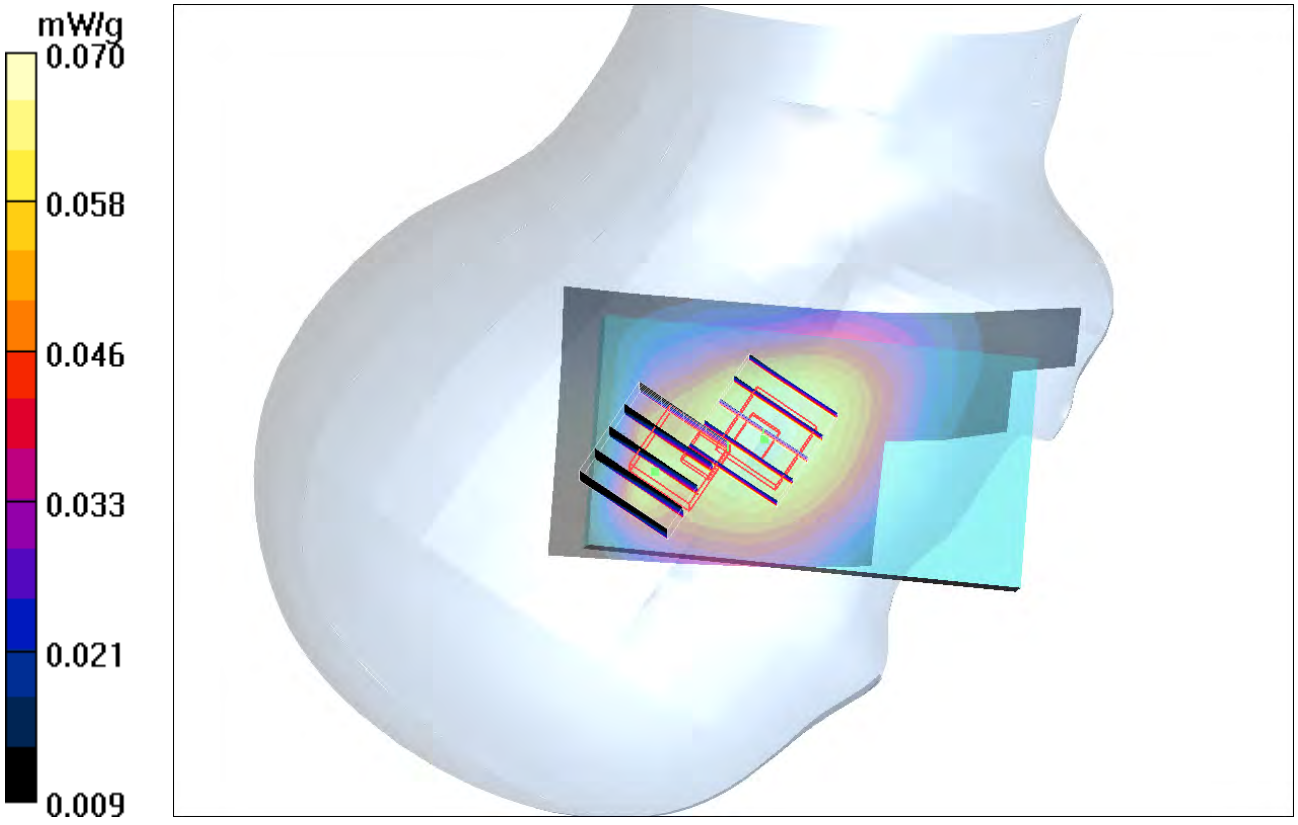
Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL835_0917 Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.901 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2011/7/29
- Phantom: SAM Phantom_Front; Type: SAM V4.0; Serial: TP 1654
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch4182/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.069 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.22 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 0.077 W/kg
SAR(1 g) = 0.061 mW/g; SAR(10 g) = 0.047 mW/g
Maximum value of SAR (measured) = 0.070 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.22 V/m; Power Drift = -0.060 dB
Peak SAR (extrapolated) = 0.074 W/kg
SAR(1 g) = 0.052 mW/g; SAR(10 g) = 0.033 mW/g
Maximum value of SAR (measured) = 0.067 mW/g



P38 WCDMA V_Left Cheek_Ch4182_Sample1_Battery1

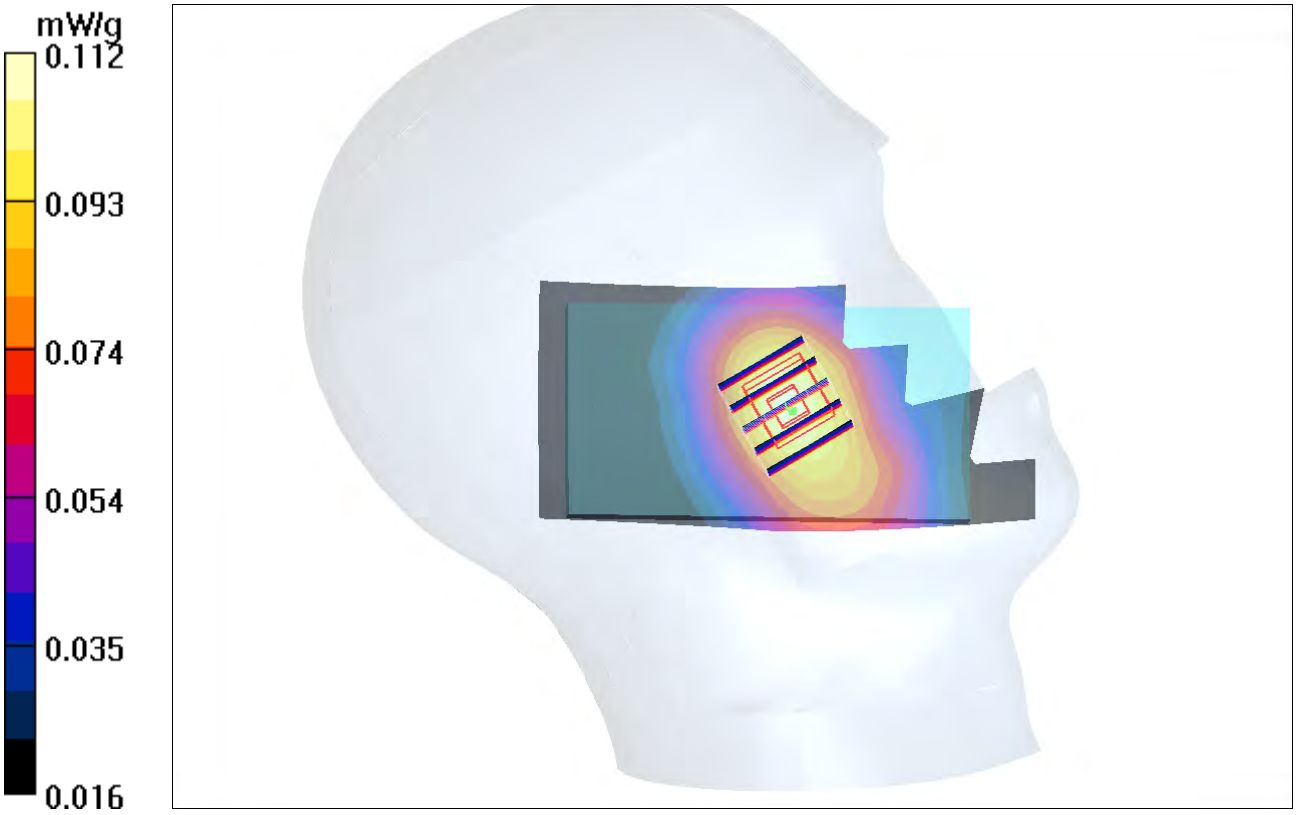
DUT: 110906C19

Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL835_0917 Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.901 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2011/7/29
- Phantom: SAM Phantom_Front; Type: SAM V4.0; Serial: TP 1654
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch4182/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.108 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.45 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 0.122 W/kg
SAR(1 g) = 0.097 mW/g; SAR(10 g) = 0.073 mW/g
Maximum value of SAR (measured) = 0.112 mW/g



P39 WCDMA V_Left Tilted_Ch4182_Sample1_Battery1

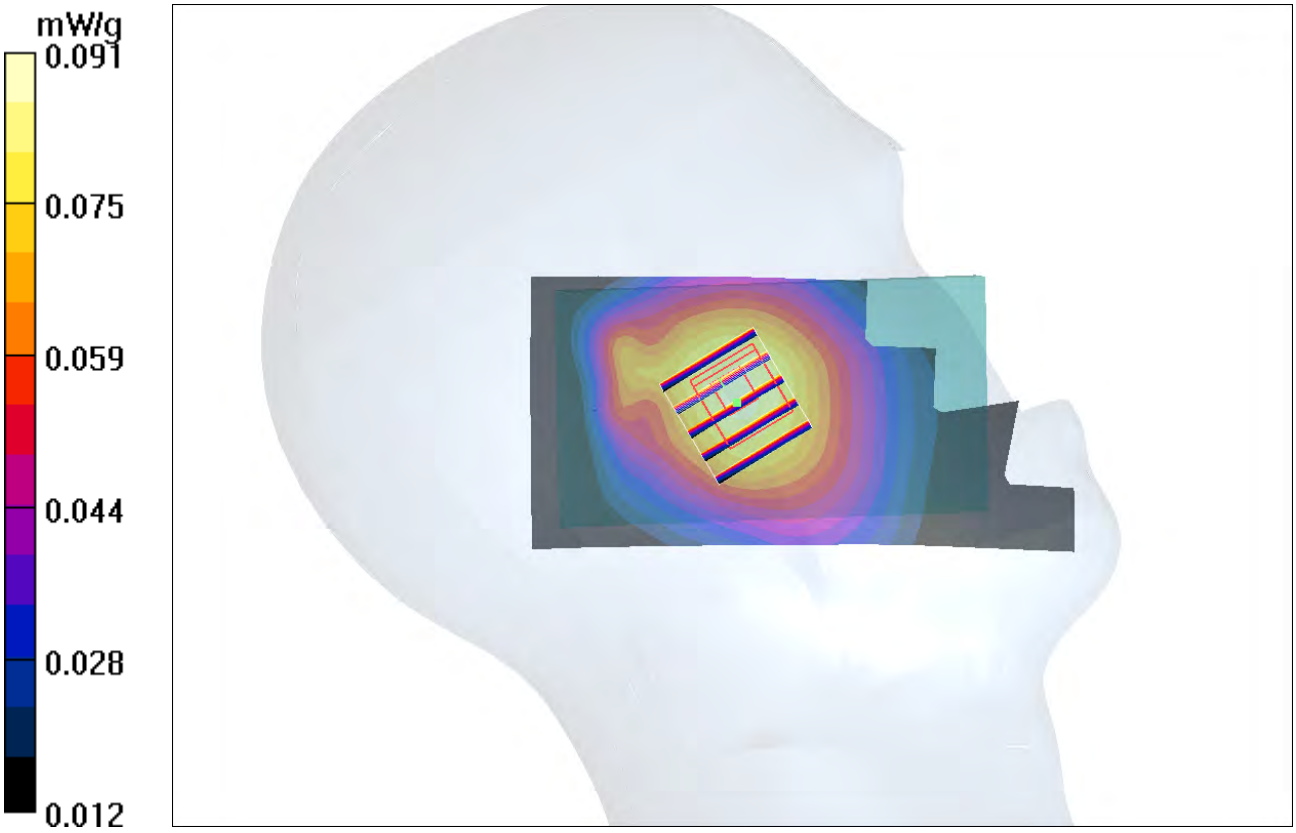
DUT: 110906C19

Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL835_0917 Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.901 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2011/7/29
- Phantom: SAM Phantom_Front; Type: SAM V4.0; Serial: TP 1654
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch4182/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.088 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.28 V/m; Power Drift = 0.152 dB
Peak SAR (extrapolated) = 0.101 W/kg
SAR(1 g) = 0.080 mW/g; SAR(10 g) = 0.062 mW/g
Maximum value of SAR (measured) = 0.091 mW/g



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2011/9/17

P40 WCDMA V_Left Cheek_Ch4182_Sample2_Battery2

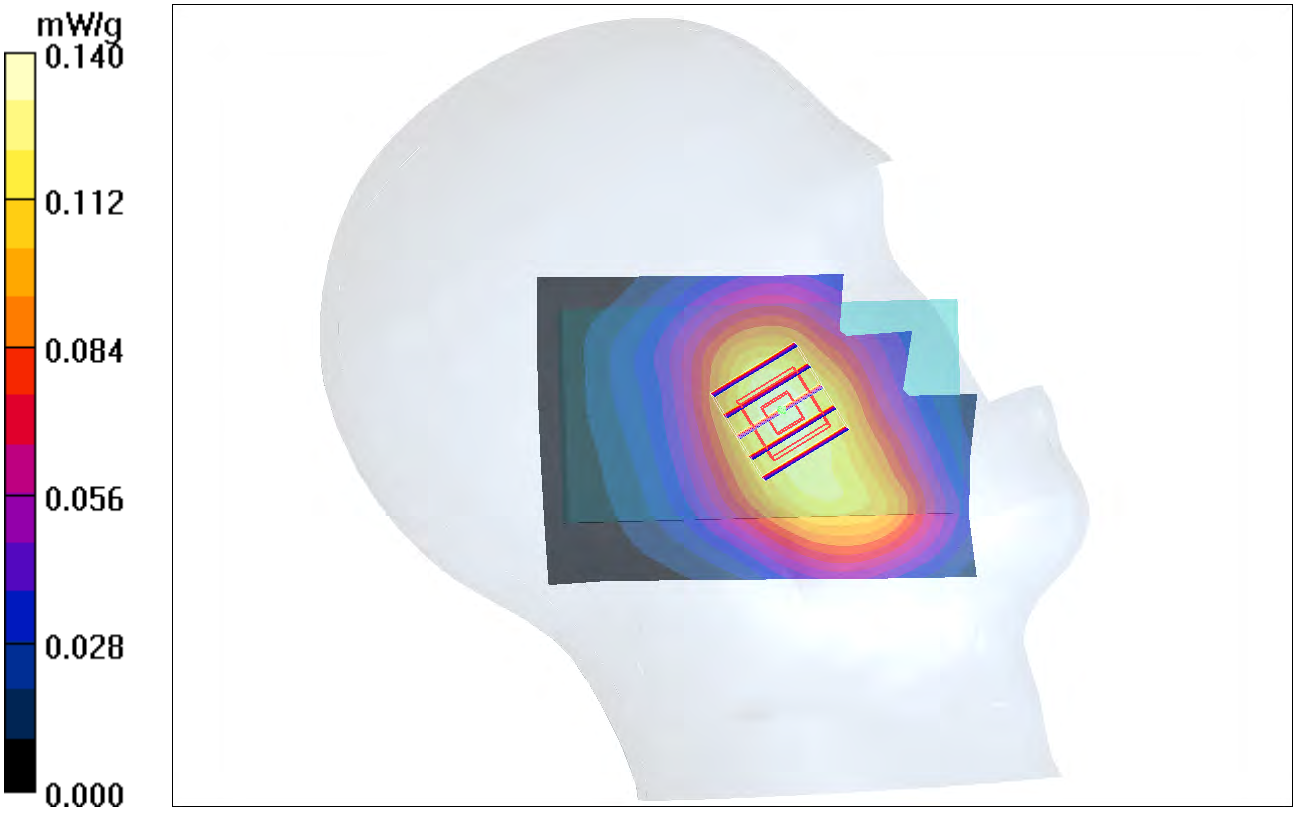
DUT: 110906C19

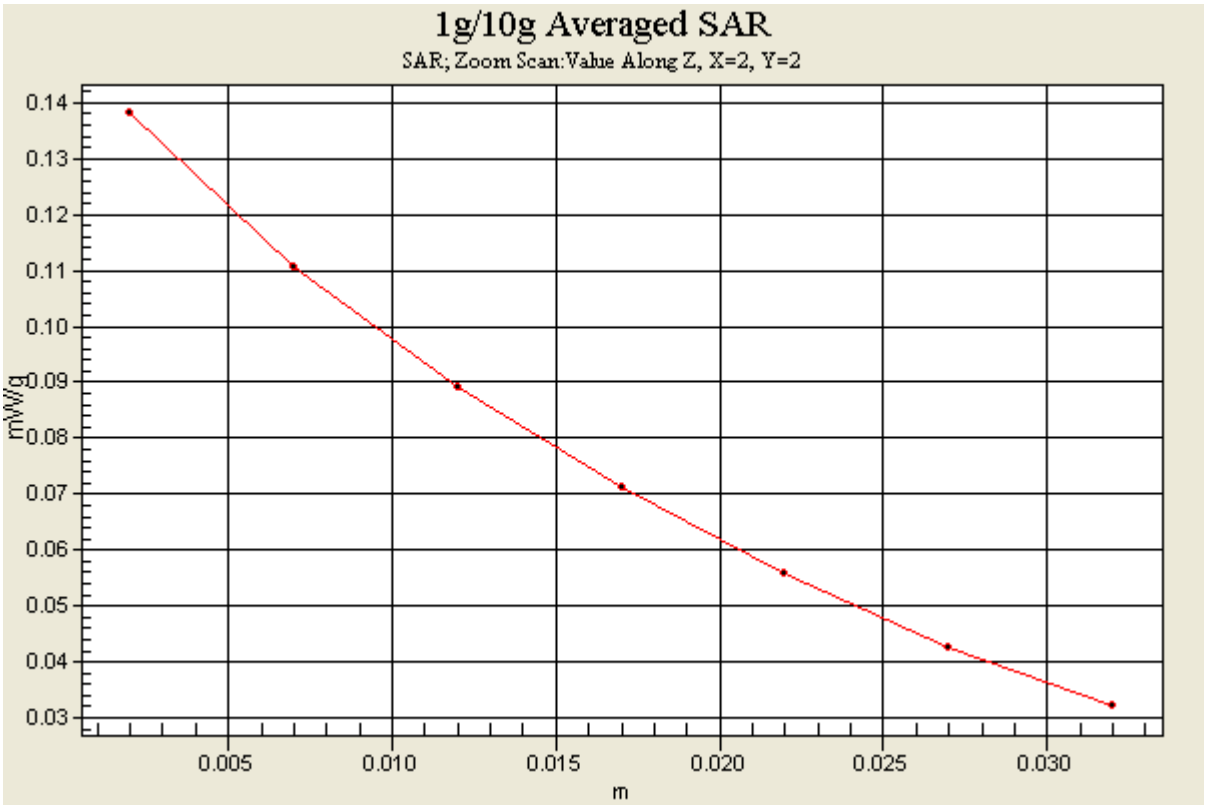
Communication System: WCDMA850; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: HSL835_0917 Medium parameters used (interpolated): f = 836.4 MHz; σ = 0.901 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 2011/7/29
- Phantom: SAM Phantom_Front; Type: SAM V4.0; Serial: TP 1654
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch4182/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.140 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.26 V/m; Power Drift = -0.134 dB
Peak SAR (extrapolated) = 0.151 W/kg
SAR(1 g) = 0.120 mW/g; SAR(10 g) = 0.092 mW/g
Maximum value of SAR (measured) = 0.138 mW/g




1g/10g Averaged SAR
SAR; Zoom Scan:Value Along Z, X=2, Y=2
mW/g
0.14
0.13
0.12
0.11
0.10
0.09
0.08
0.07
0.06
0.05
0.04
0.03
0.005
0.010
0.015
0.020
0.025
0.030
m

P96 GSM850_GPRS12_Front Face_1cm_Ch251_Sample1_Battery1

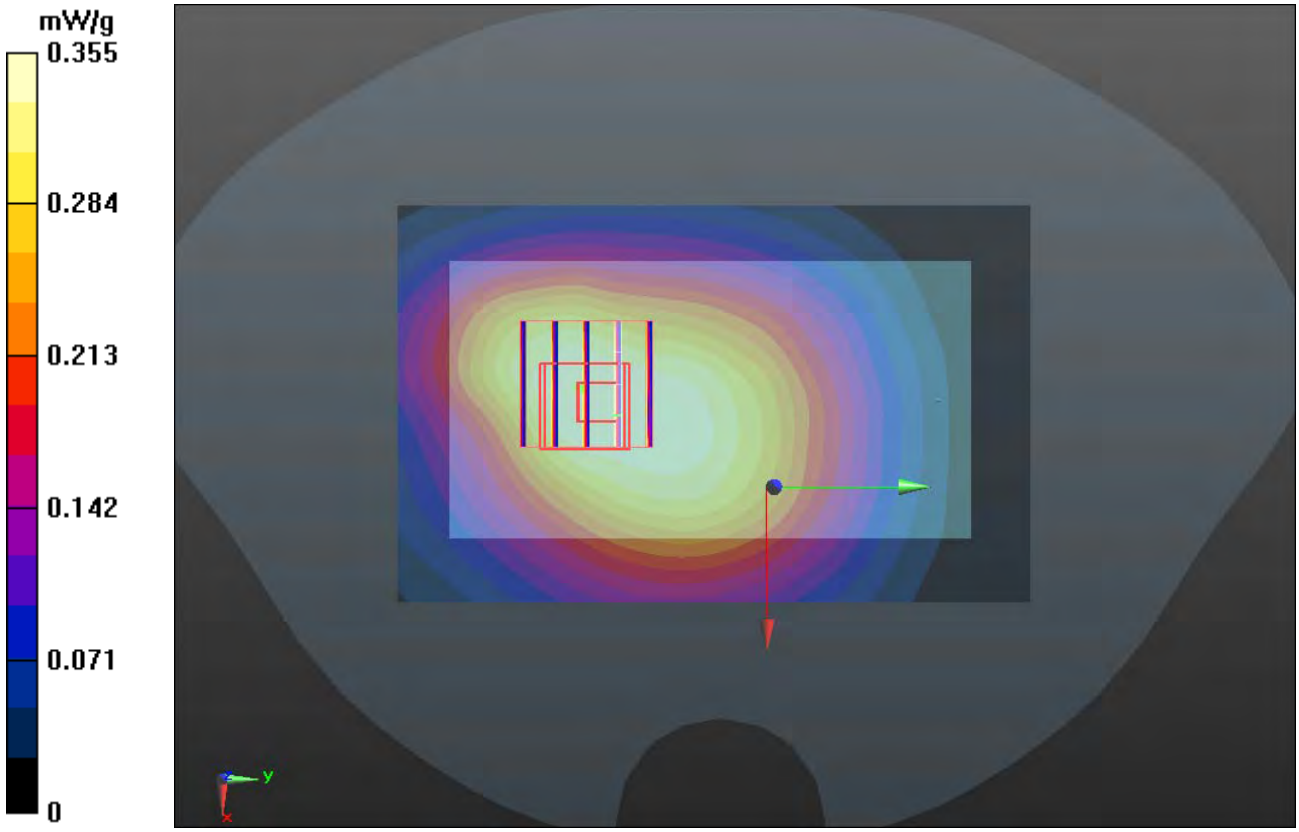
DUT: 110906C19

Communication System: Generic GSM; Frequency: 848.6 MHz;Duty Cycle: 1:2
Medium: MSL850_0922 Medium parameters used: f = 849 MHz; σ = 0.991 mho/m; ε_r = 53.022; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch251/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.367 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.574 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.391 W/kg
SAR(1 g) = 0.309 mW/g; SAR(10 g) = 0.226 mW/g
Maximum value of SAR (measured) = 0.355 mW/g



P97 GSM850_GPRS12_Rear Face_1cm_Ch251_Sample1_Battery1

DUT: 110906C19

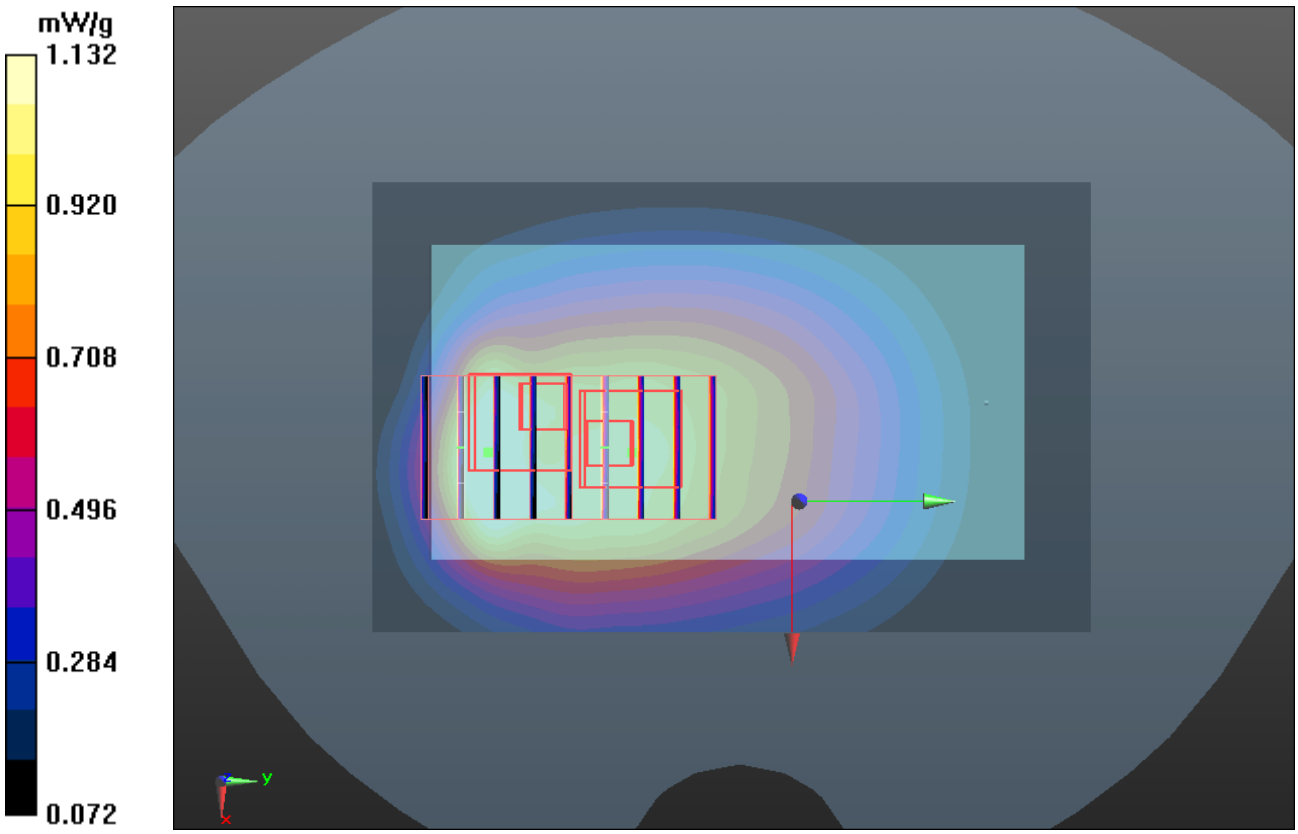
Communication System: Generic GSM; Frequency: 848.6 MHz;Duty Cycle: 1:2
Medium: MSL850_0922 Medium parameters used: f = 849 MHz; σ = 0.991 mho/m; ε_r = 53.022; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.2 ℃

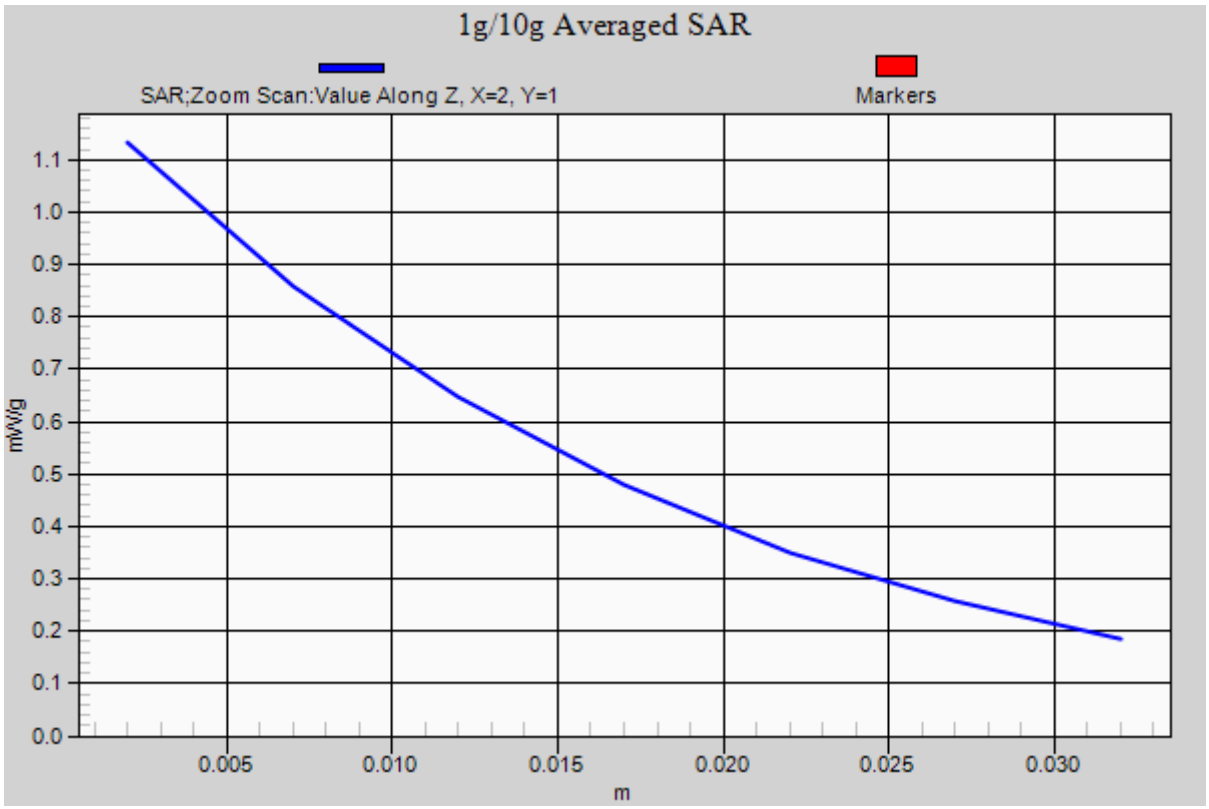
DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch251/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.401 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.587 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.265 W/kg
SAR(1 g) = 0.958 mW/g; SAR(10 g) = 0.707 mW/g
Maximum value of SAR (measured) = 1.132 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.587 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.385 W/kg
SAR(1 g) = 0.776 mW/g; SAR(10 g) = 0.505 mW/g
Maximum value of SAR (measured) = 1.106 mW/g


mW/g
1.132
0.920
0.708
0.496
0.284
0.072
y
x


1g/10g Averaged SAR
SAR;Zoom Scan:Value Along Z, X=2, Y=1
Markers
mW/g
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.005
0.010
0.015
0.020
0.025
0.030
m

P98 GSM850_GPRS12_Left Side_1cm_Ch251_Sample1_Battery1

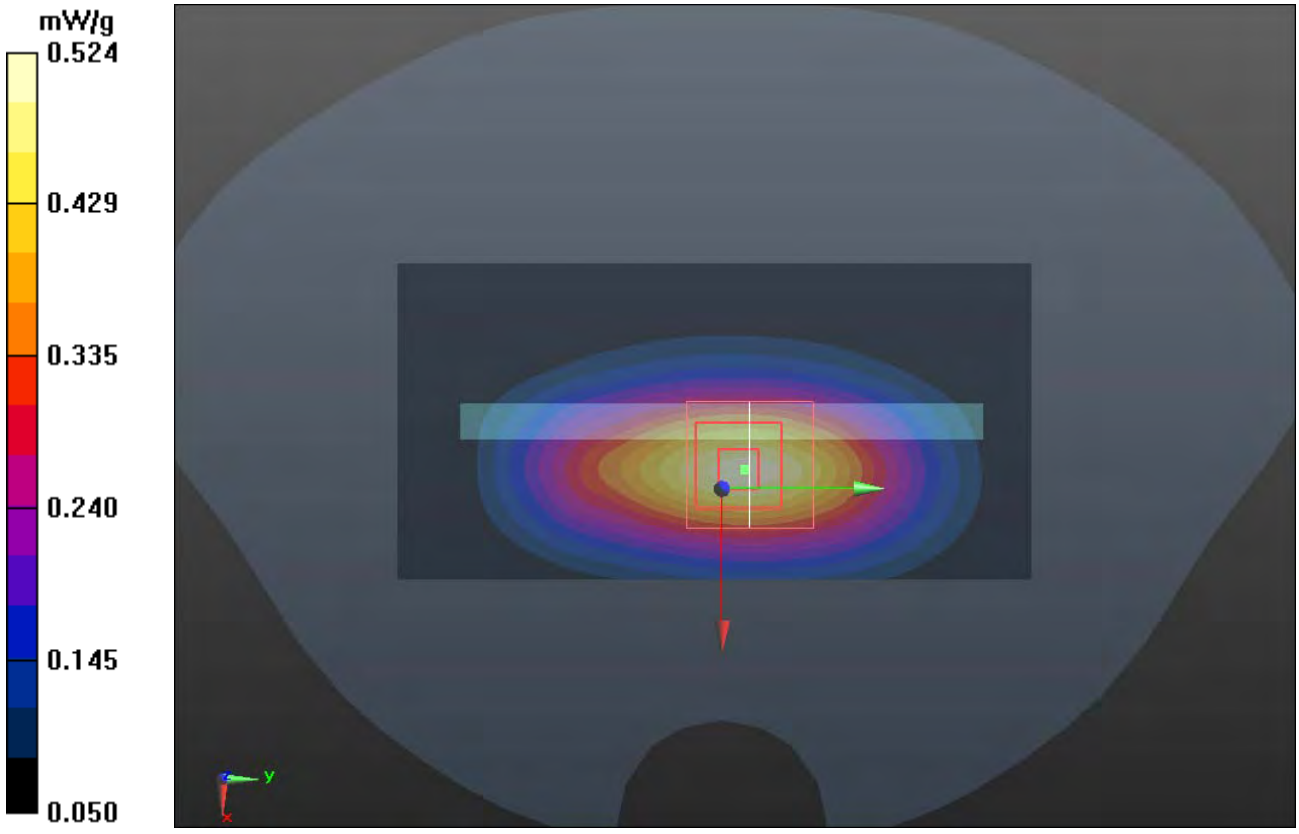
DUT: 110906C19

Communication System: Generic GSM; Frequency: 848.6 MHz;Duty Cycle: 1:2
Medium: MSL850_0922 Medium parameters used: f = 849 MHz; σ = 0.991 mho/m; ε_r = 53.022; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch251/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.510 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.440 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.610 W/kg
SAR(1 g) = 0.423 mW/g; SAR(10 g) = 0.283 mW/g
Maximum value of SAR (measured) = 0.524 mW/g



P99 GSM850_GPRS12_Right Side_1cm_Ch251_Sample1_Battery1

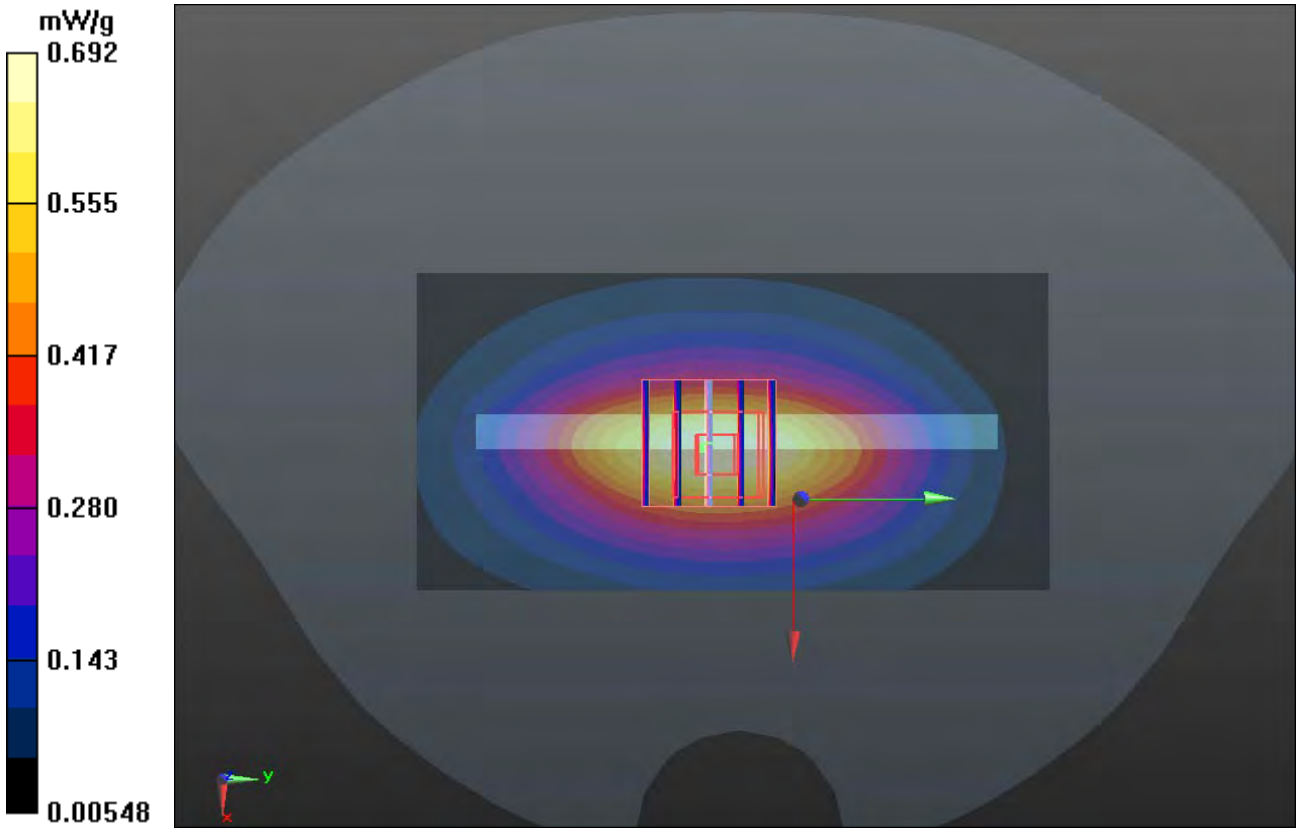
DUT: 110906C19

Communication System: Generic GSM; Frequency: 848.6 MHz;Duty Cycle: 1:2
Medium: MSL850_0922 Medium parameters used: f = 849 MHz; σ = 0.991 mho/m; ε_r = 53.022; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch251/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.690 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.825 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.812 W/kg
SAR(1 g) = 0.563 mW/g; SAR(10 g) = 0.383 mW/g
Maximum value of SAR (measured) = 0.692 mW/g



P101 GSM850_ GPRS12_Down Side_1cm_Ch251_Sample1_Battery1

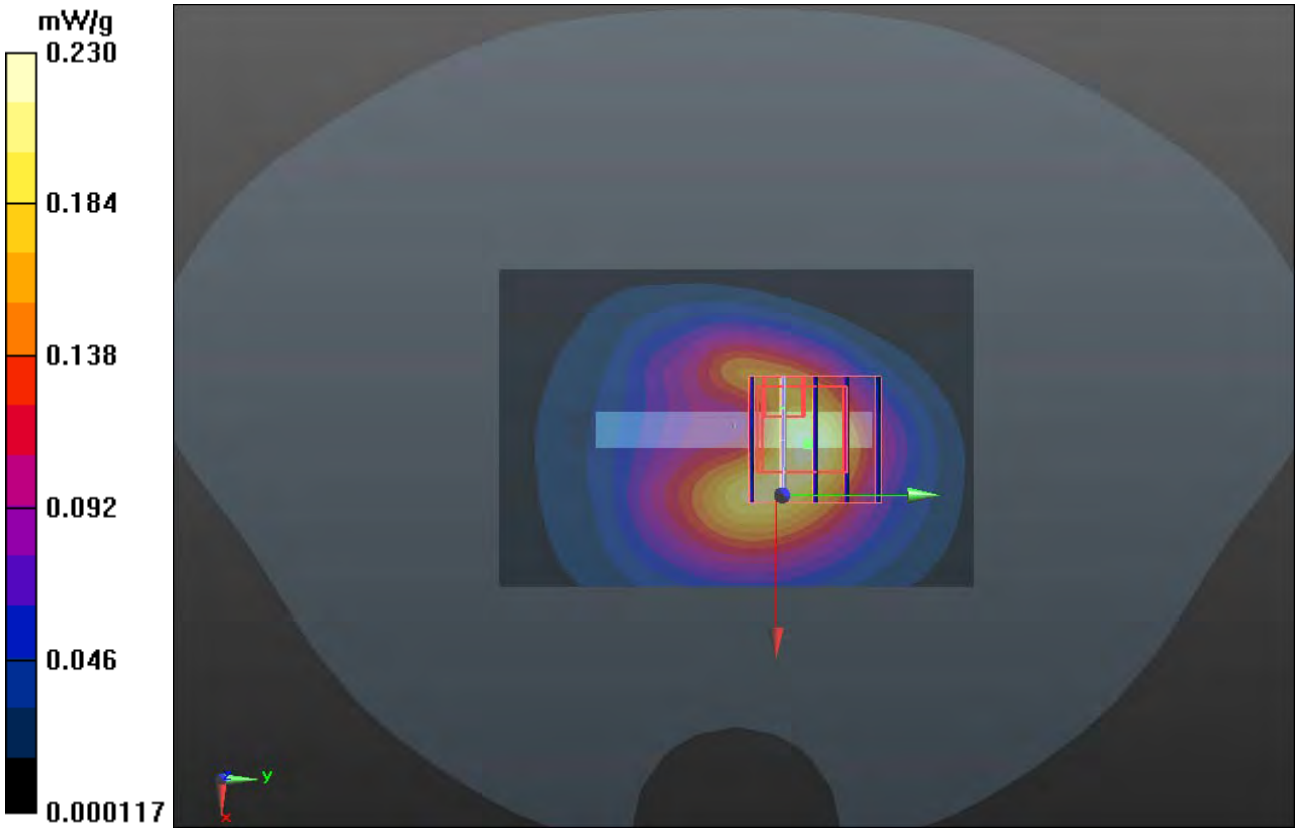
DUT: 110906C19

Communication System: Generic GSM; Frequency: 848.6 MHz;Duty Cycle: 1:2
Medium: MSL850_0922 Medium parameters used: f = 849 MHz; σ = 0.991 mho/m; ε_r = 53.022; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch251/Area Scan (41x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.222 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.367 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.289 W/kg
SAR(1 g) = 0.169 mW/g; SAR(10 g) = 0.101 mW/g
Maximum value of SAR (measured) = 0.230 mW/g



P102 GSM850_GPRS12_Rear Face_1cm_Ch251_Sample2_Battery2

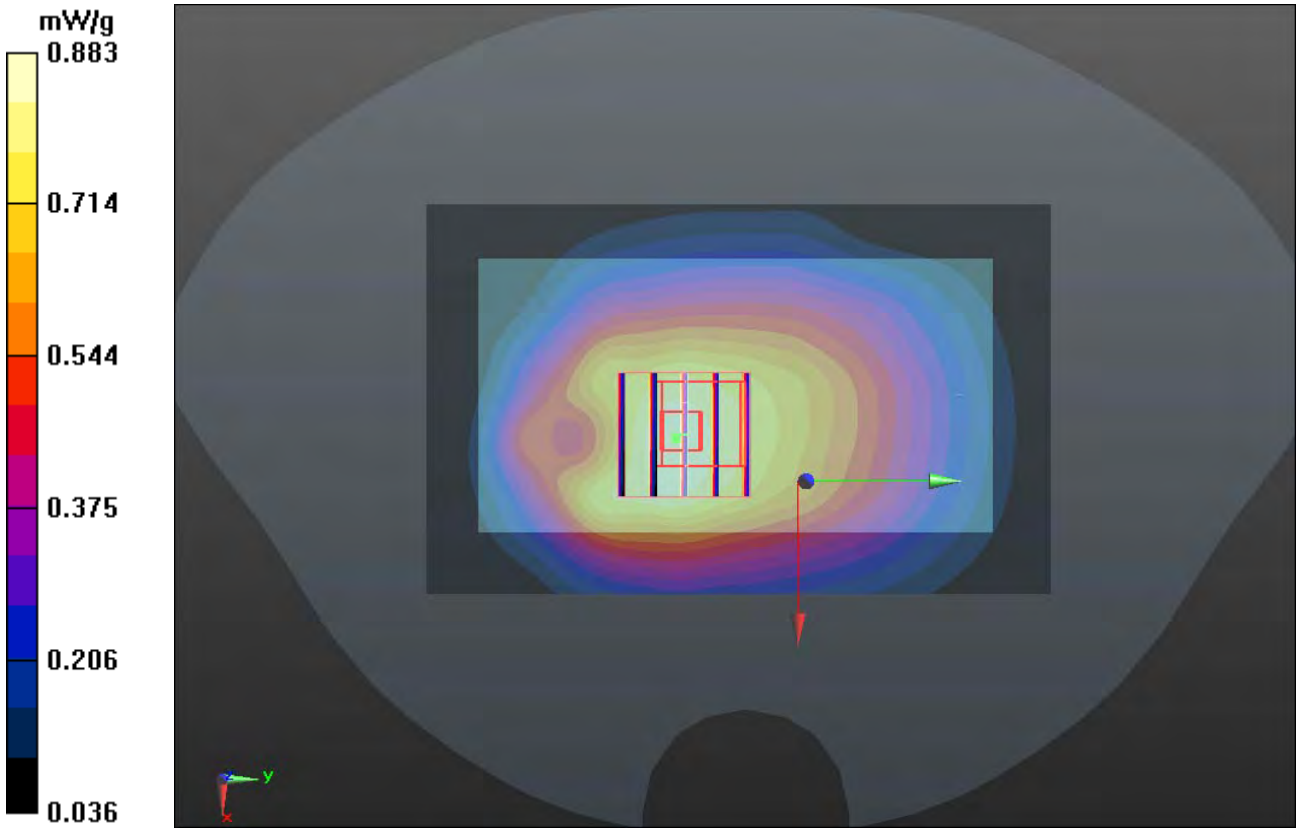
DUT: 110906C19

Communication System: Generic GSM; Frequency: 848.6 MHz;Duty Cycle: 1:2
Medium: MSL850_0922 Medium parameters used: f = 849 MHz; σ = 0.991 mho/m; ε_r = 53.022; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch251/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.905 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.588 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.010 W/kg
SAR(1 g) = 0.752 mW/g; SAR(10 g) = 0.555 mW/g
Maximum value of SAR (measured) = 0.883 mW/g



P103 GSM850_GPRS12_Rear Face_1cm_Ch251_Sample1_Battery1_Earphone1

DUT: 110906C19

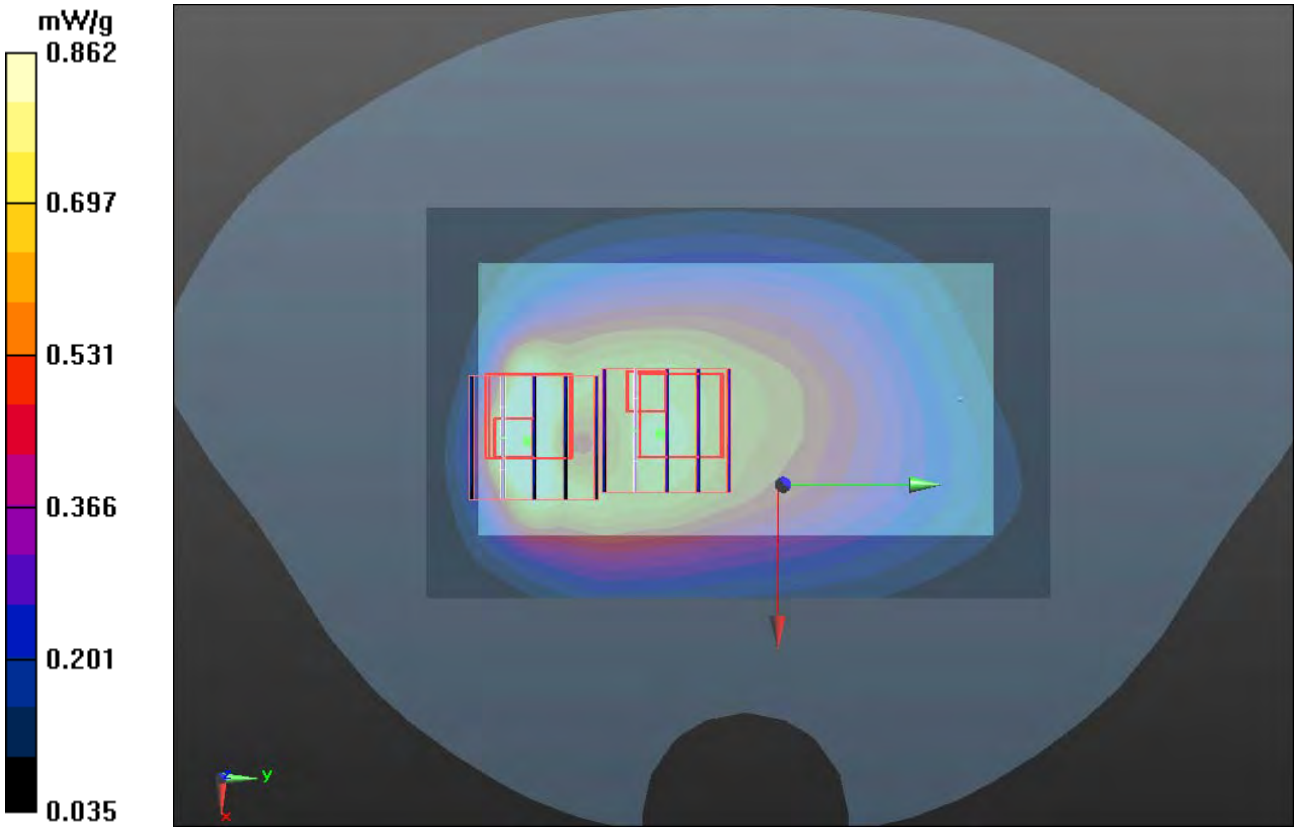
Communication System: Generic GSM; Frequency: 848.6 MHz;Duty Cycle: 1:2
Medium: MSL850_0922 Medium parameters used: f = 849 MHz; σ = 0.991 mho/m; ε_r = 53.022; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch251/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.272 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.154 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 1.337 W/kg
SAR(1 g) = 0.682 mW/g; SAR(10 g) = 0.507 mW/g
Maximum value of SAR (measured) = 0.862 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.154 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 1.281 W/kg
SAR(1 g) = 0.676 mW/g; SAR(10 g) = 0.372 mW/g
Maximum value of SAR (measured) = 0.905 mW/g



P104 GSM850_GPRS12_Rear Face_1cm_Ch251_Sample1_Battery1_Earphone2

DUT: 110906C19

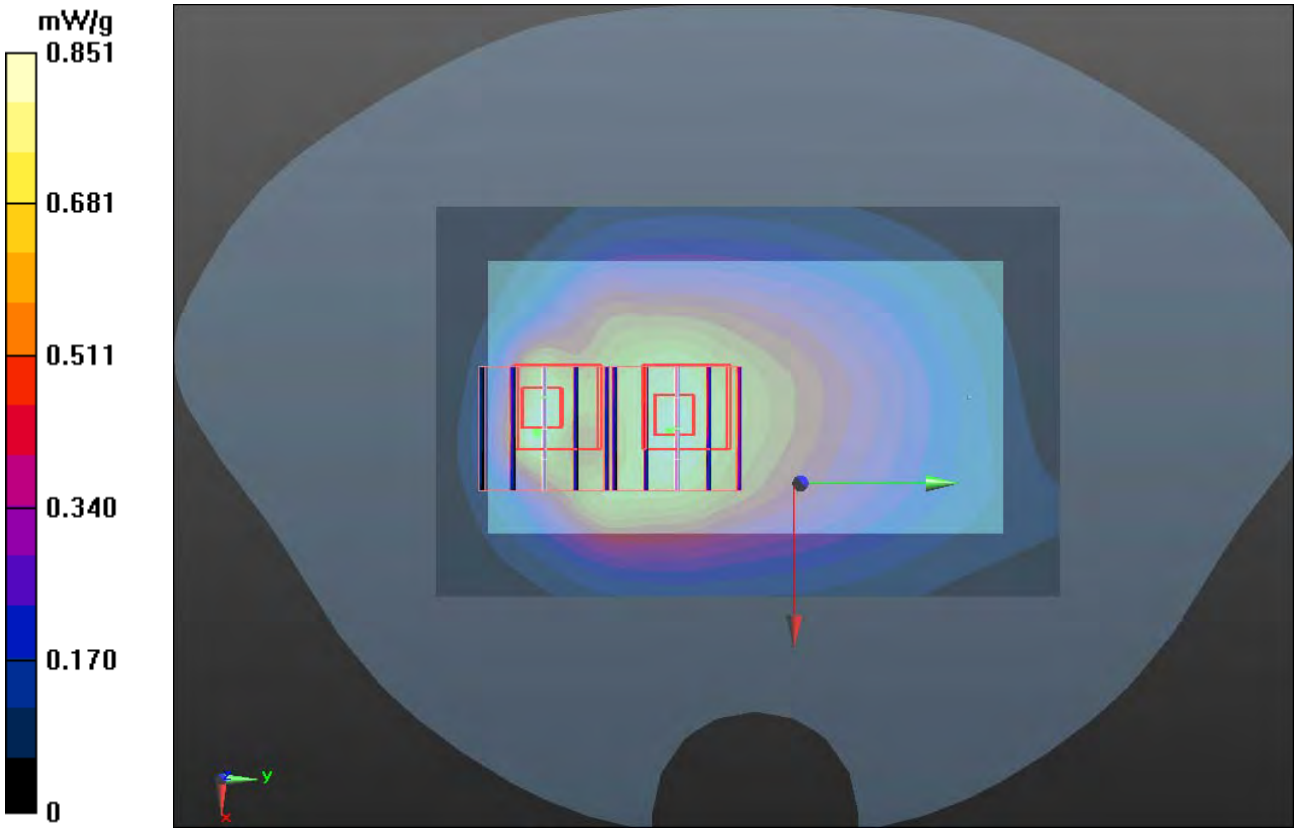
Communication System: Generic GSM; Frequency: 848.6 MHz;Duty Cycle: 1:2
Medium: MSL850_0922 Medium parameters used: f = 849 MHz; σ = 0.991 mho/m; ε_r = 53.022; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch251/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.851 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.514 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.992 W/kg
SAR(1 g) = 0.720 mW/g; SAR(10 g) = 0.496 mW/g
Maximum value of SAR (measured) = 0.851 mW/g

Ch251/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.514 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.300 W/kg
SAR(1 g) = 0.695 mW/g; SAR(10 g) = 0.382 mW/g
Maximum value of SAR (measured) = 1.024 mW/g



P85 GSM1900_GPRS12_Front Face_1cm_Ch810_Sample1_Battery1

DUT: 110906C19

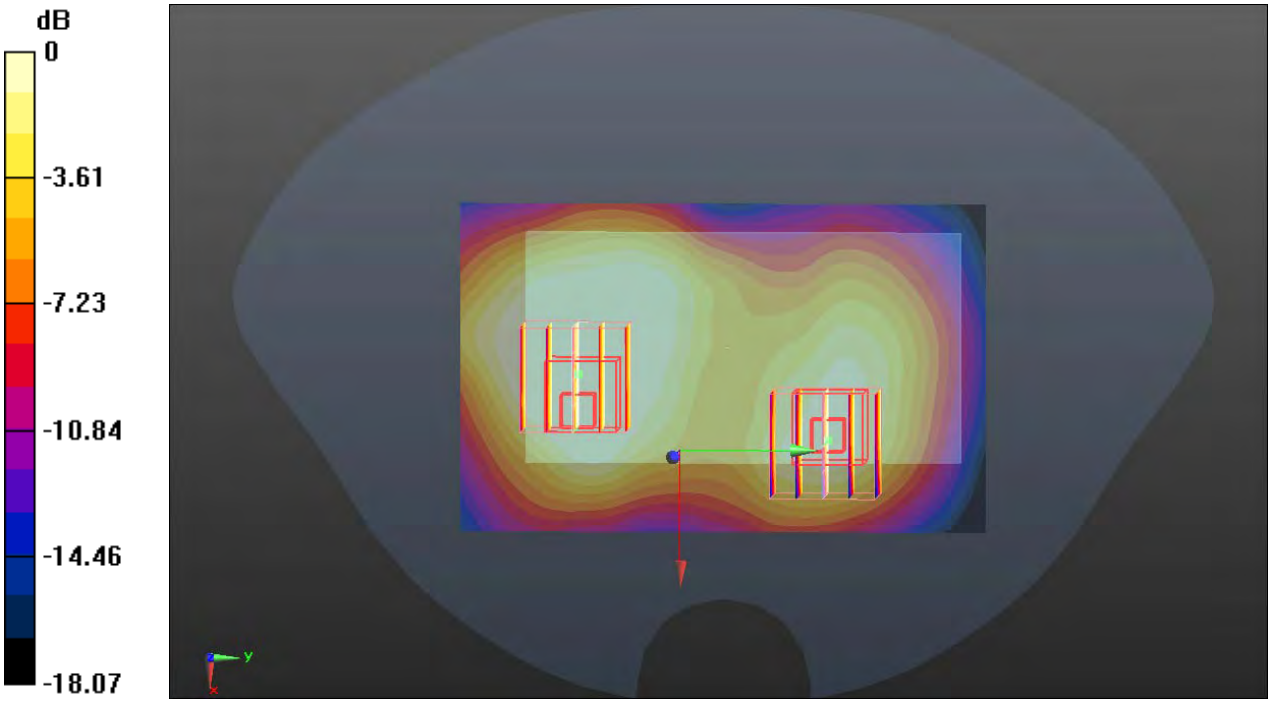
Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:1.99986
Medium: MSL1900_0920 Medium parameters used: f = 1910 MHz; σ = 1.545 mho/m; ε_r = 51.552; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.49, 8.49, 8.49); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM; Serial: 1202
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.472 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.316 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.521 W/kg
SAR(1 g) = 0.347 mW/g; SAR(10 g) = 0.225 mW/g
Maximum value of SAR (measured) = 0.435 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.316 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.396 W/kg
SAR(1 g) = 0.259 mW/g; SAR(10 g) = 0.162 mW/g
Maximum value of SAR (measured) = 0.332 mW/g



0 dB = 0.330mW/g

P86 GSM1900_GPRS12_Rear Face_1cm_Ch810_Sample1_Battery1

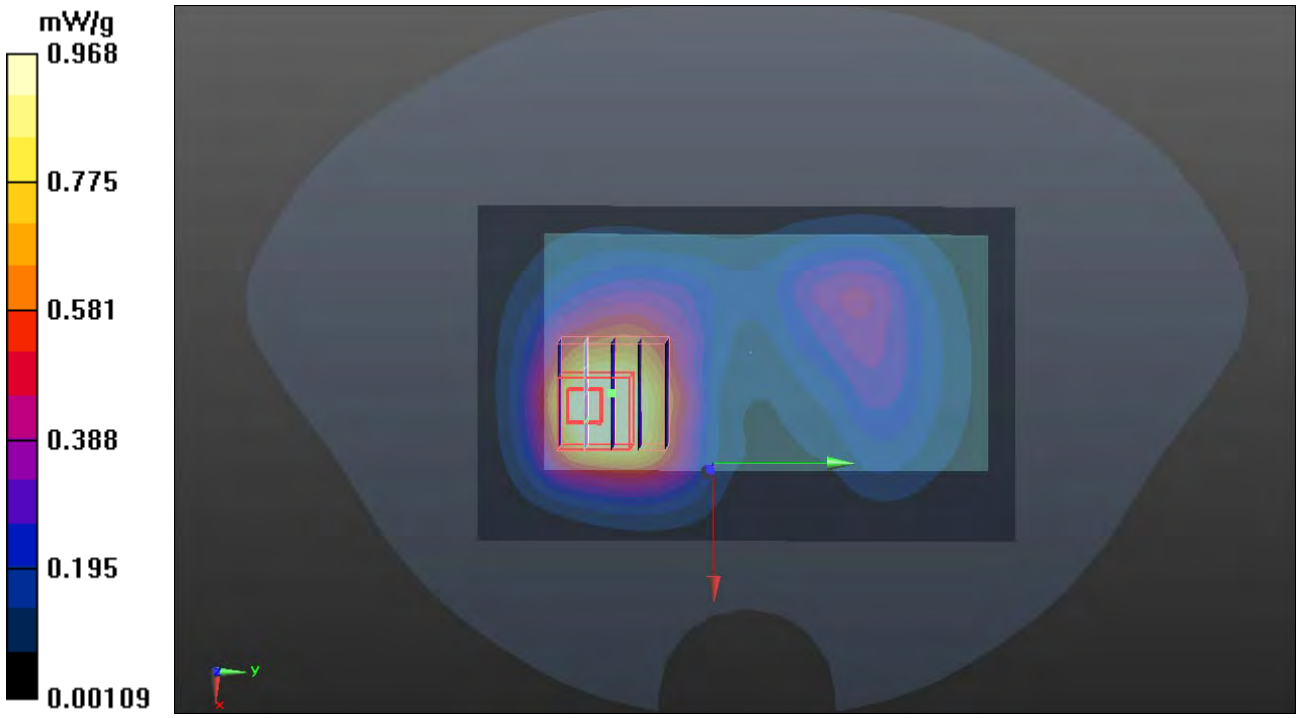
DUT: 110906C19

Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:1.99986
Medium: MSL1900_0920 Medium parameters used: f = 1910 MHz; σ = 1.545 mho/m; ε_r = 51.552; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.49, 8.49, 8.49); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM; Serial: 1202
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.968 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.365 V/m; Power Drift = -0.33 dB
Peak SAR (extrapolated) = 1.208 W/kg
SAR(1 g) = 0.732 mW/g; SAR(10 g) = 0.444 mW/g
Maximum value of SAR (measured) = 0.944 mW/g



P87 GSM1900_GPRS12_Left Side_1cm_Ch810_Sample1_Battery1

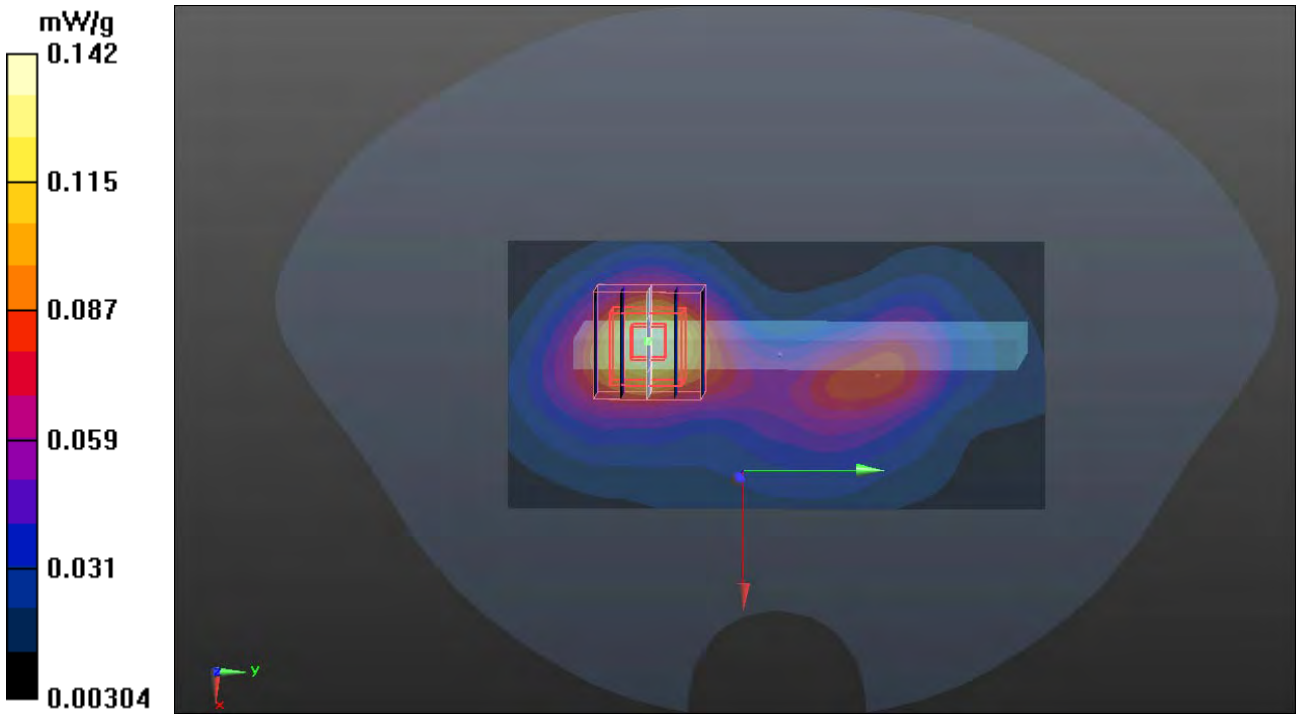
DUT: 110906C19

Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:1.99986
Medium: MSL1900_0920 Medium parameters used: f = 1910 MHz; σ = 1.545 mho/m; ε_r = 51.552; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.49, 8.49, 8.49); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM; Serial: 1202
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.142 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.762 V/m; Power Drift = 0.33 dB
Peak SAR (extrapolated) = 0.173 W/kg
SAR(1 g) = 0.102 mW/g; SAR(10 g) = 0.059 mW/g
Maximum value of SAR (measured) = 0.139 mW/g



P88 GSM1900_GPRS12_Right Side_1cm_Ch810_Sample1_Battery1

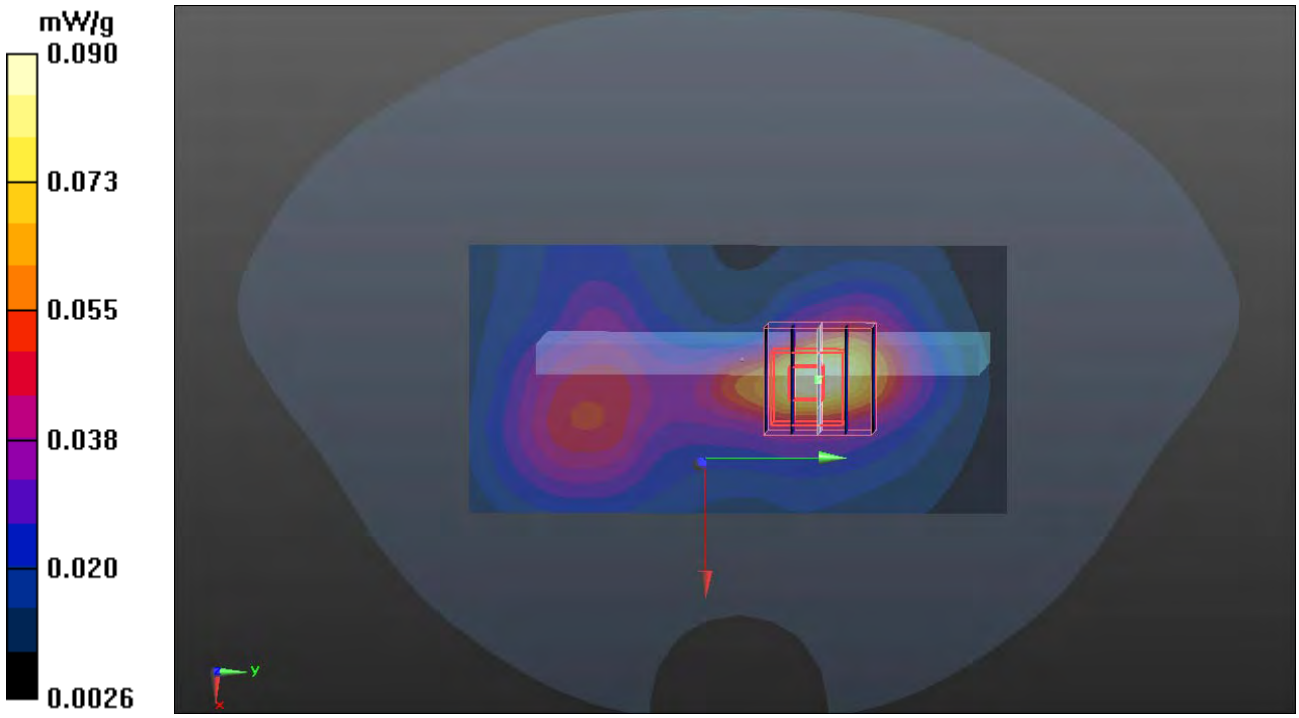
DUT: 110906C19

Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:1.99986
Medium: MSL1900_0920 Medium parameters used: f = 1910 MHz; σ = 1.545 mho/m; ε_r = 51.552; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.49, 8.49, 8.49); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM; Serial: 1202
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (41x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.090 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.933 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.120 W/kg
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.038 mW/g
Maximum value of SAR (measured) = 0.094 mW/g



P90 GSM1900_GPRS12_Down Side_1cm_Ch810_Sample1_Battery1

DUT: 110906C19

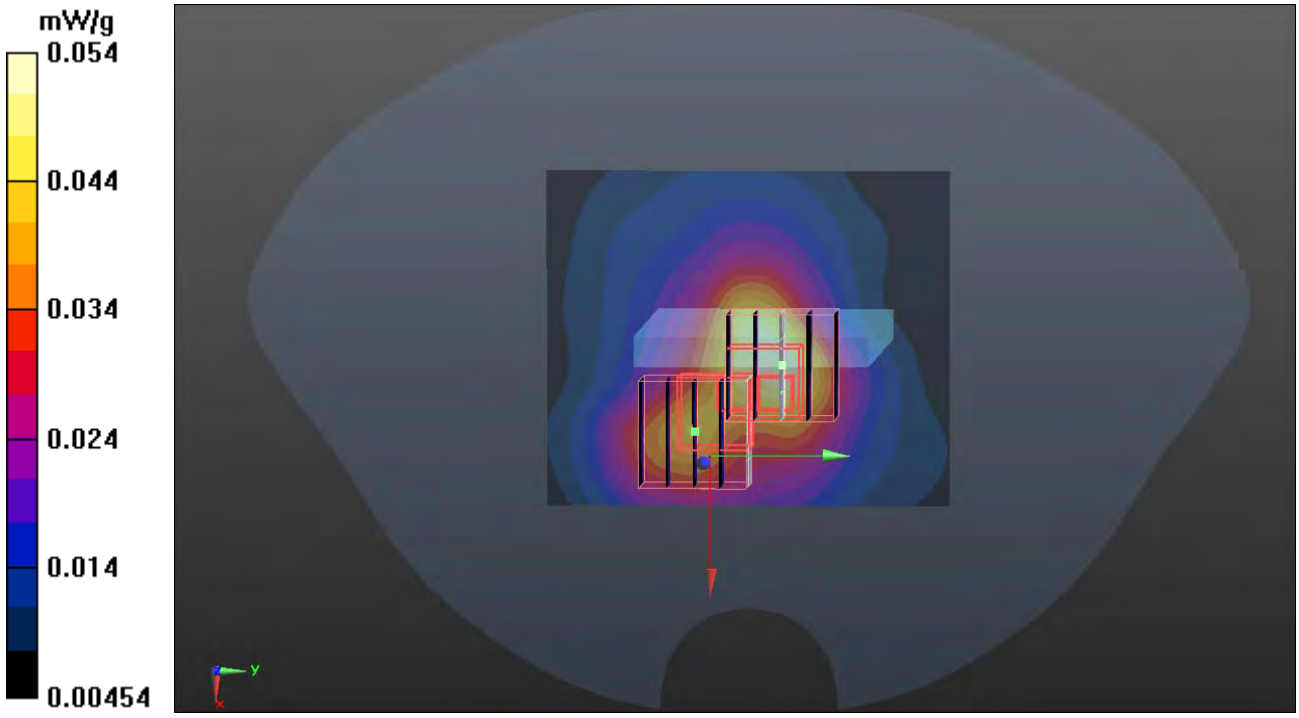
Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:1.99986
Medium: MSL1900_0920 Medium parameters used: f = 1910 MHz; σ = 1.545 mho/m; ε_r = 51.552; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.49, 8.49, 8.49); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM; Serial: 1202
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (51x61x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.054 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.101 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.066 W/kg
SAR(1 g) = 0.041 mW/g; SAR(10 g) = 0.025 mW/g
Maximum value of SAR (measured) = 0.055 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.101 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.072 W/kg
SAR(1 g) = 0.041 mW/g; SAR(10 g) = 0.021 mW/g



P91 GSM1900_GPRS12_Rear Face_1cm_Ch810_Sample2_Battery2

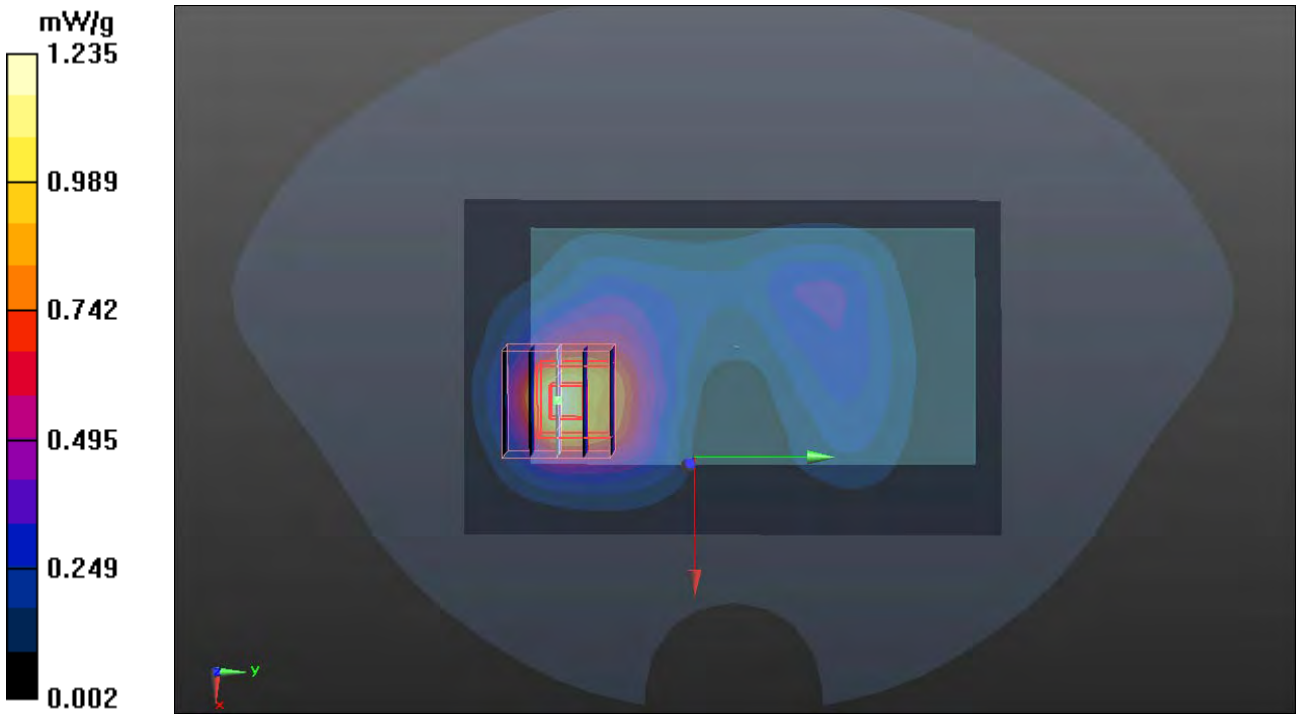
DUT: 110906C19

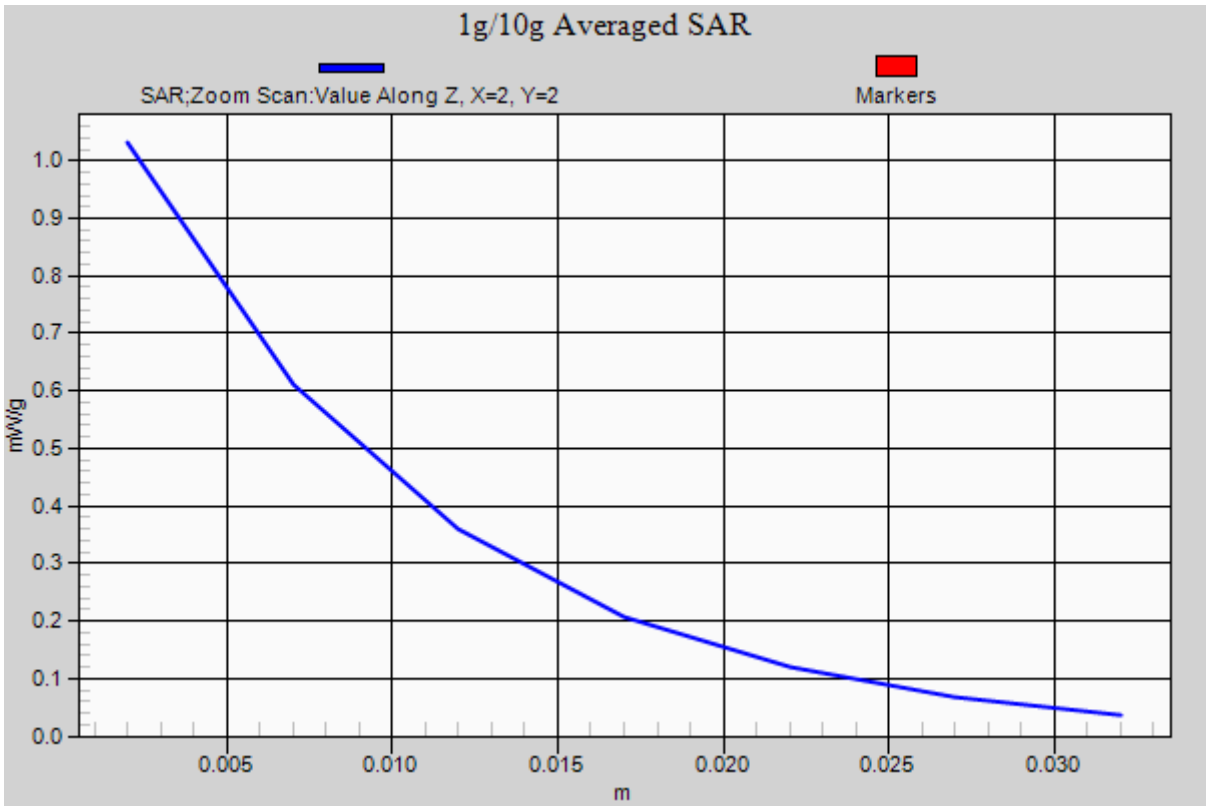
Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:1.99986
Medium: MSL1900_0920 Medium parameters used: f = 1910 MHz; σ = 1.545 mho/m; ε_r = 51.552; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.49, 8.49, 8.49); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM; Serial: 1202
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.235 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.709 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 1.347 W/kg
SAR(1 g) = 0.770 mW/g; SAR(10 g) = 0.445 mW/g
Maximum value of SAR (measured) = 1.031 mW/g




1g/10g Averaged SAR
SAR;Zoom Scan:Value Along Z, X=2, Y=2
Markers
mW/g
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.005
0.010
0.015
0.020
0.025
0.030
m

P92 GSM1900_GPRS12_Rear Face_1cm_Ch810_Sample2_Battery2_Earphone1

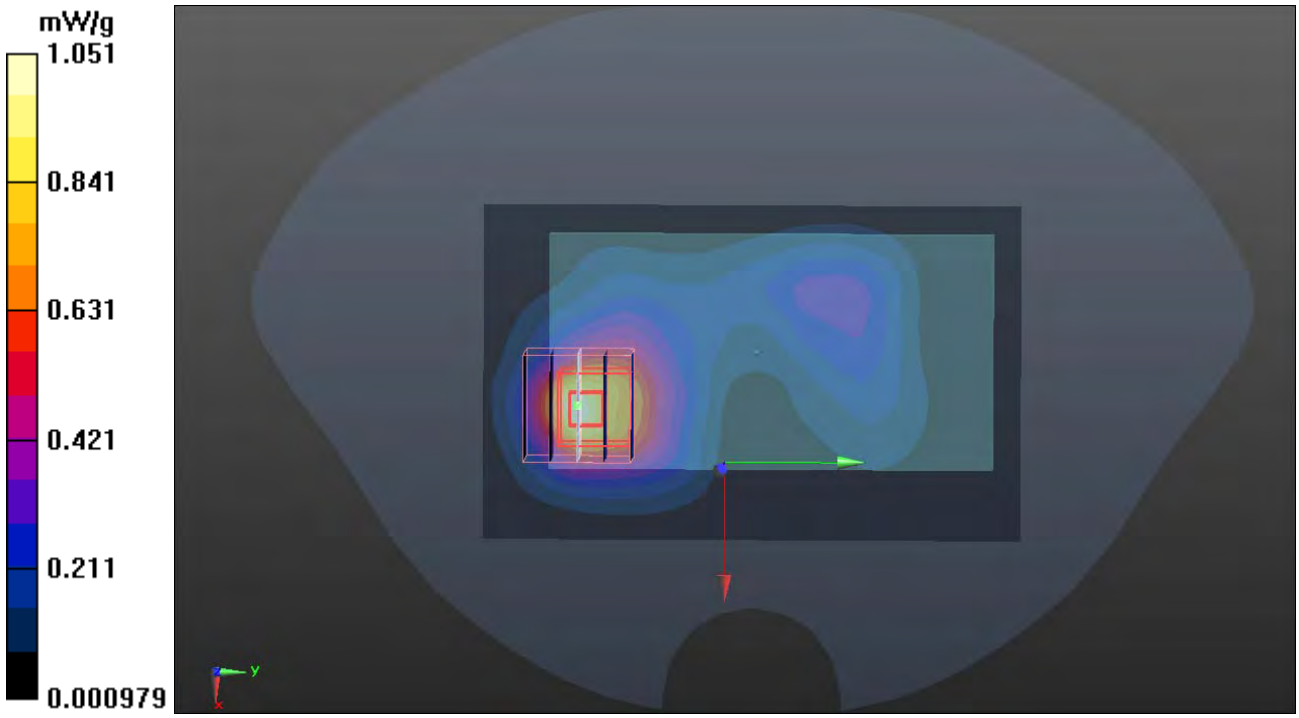
DUT: 110906C19

Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:1.99986
Medium: MSL1900_0920 Medium parameters used: f = 1910 MHz; σ = 1.545 mho/m; ε_r = 51.552; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.49, 8.49, 8.49); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM; Serial: 1202
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.051 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.298 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 1.218 W/kg
SAR(1 g) = 0.692 mW/g; SAR(10 g) = 0.398 mW/g
Maximum value of SAR (measured) = 0.924 mW/g



Test Laboratory: Bureau Veritas ADT SAR/HAC Testing Lab Date: 2011/9/20

P93 GSM1900_GPRS12_Rear Face_1cm_Ch810_Sample2_Battery2_Earphone2

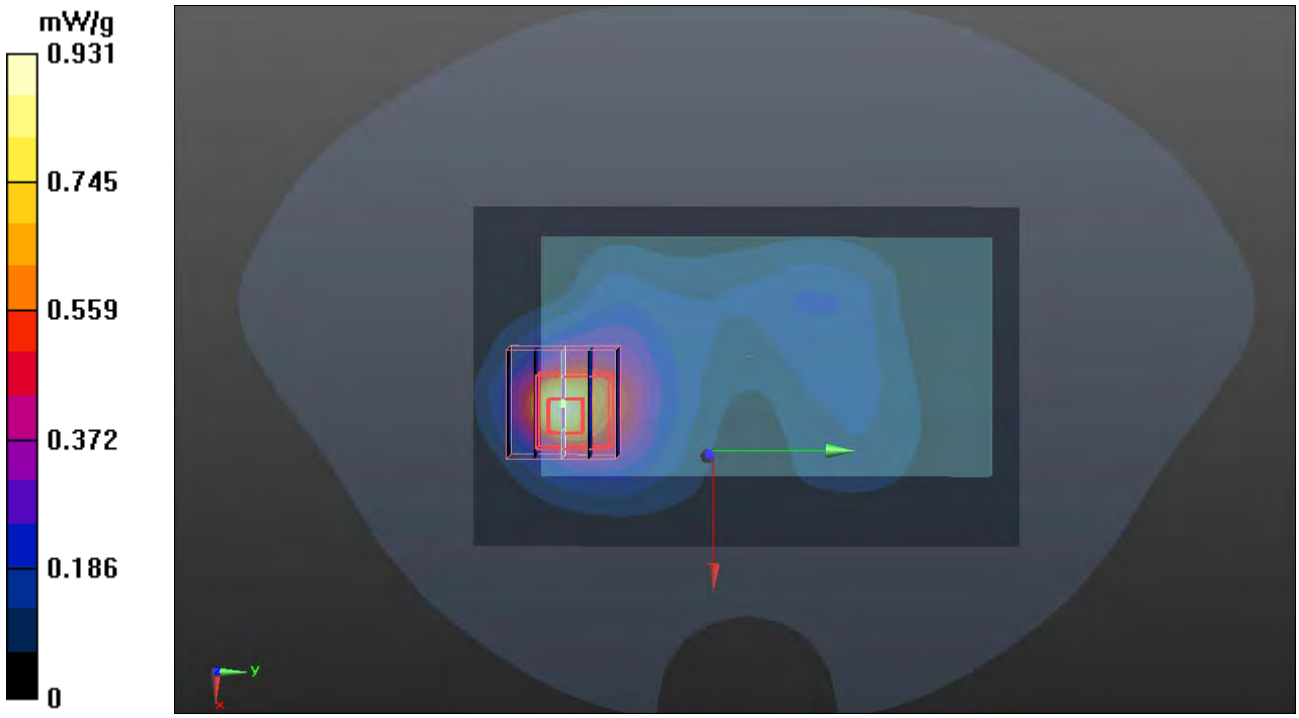
DUT: 110906C19

Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:1.99986
Medium: MSL1900_0920 Medium parameters used: f = 1910 MHz; σ = 1.545 mho/m; ε_r = 51.552; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3590; ConvF(8.49, 8.49, 8.49); Calibrated: 2011/2/25
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn861; Calibrated: 2011/8/29
- Phantom: SAM Phantom_Left; Type: SAM; Serial: 1202
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch810/Area Scan (51x81x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.931 mW/g

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.231 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.204 W/kg
SAR(1 g) = 0.628 mW/g; SAR(10 g) = 0.328 mW/g
Maximum value of SAR (measured) = 0.874 mW/g



P41 WCDMA V_RMC 12.2k_Front Face_1cm_Ch4182_Sample1_Battery1

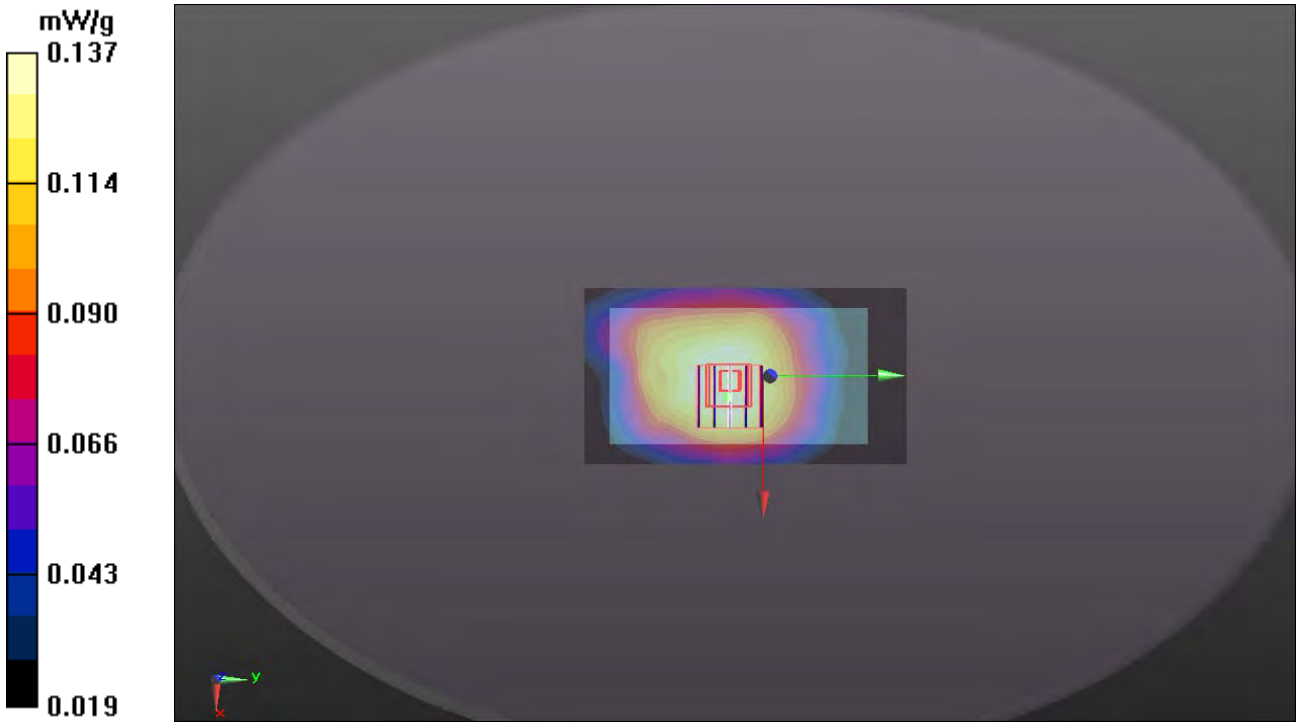
DUT: 110906C14

Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL850_0916 Medium parameters used: f = 836.4 MHz; σ = 0.969 mho/m;
ε_r = 54.172; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(9.12, 9.12, 9.12); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: ELI v4.0; Type: QDOVA001BA; Serial: TP:1043
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch4182/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.144 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.173 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.151 W/kg
SAR(1 g) = 0.118 mW/g; SAR(10 g) = 0.091 mW/g
Maximum value of SAR (measured) = 0.137 mW/g



P42 WCDMA V_RMC 12.2k_Rear Face_1cm_Ch4182_Sample1_Battery1

DUT: 110906C14

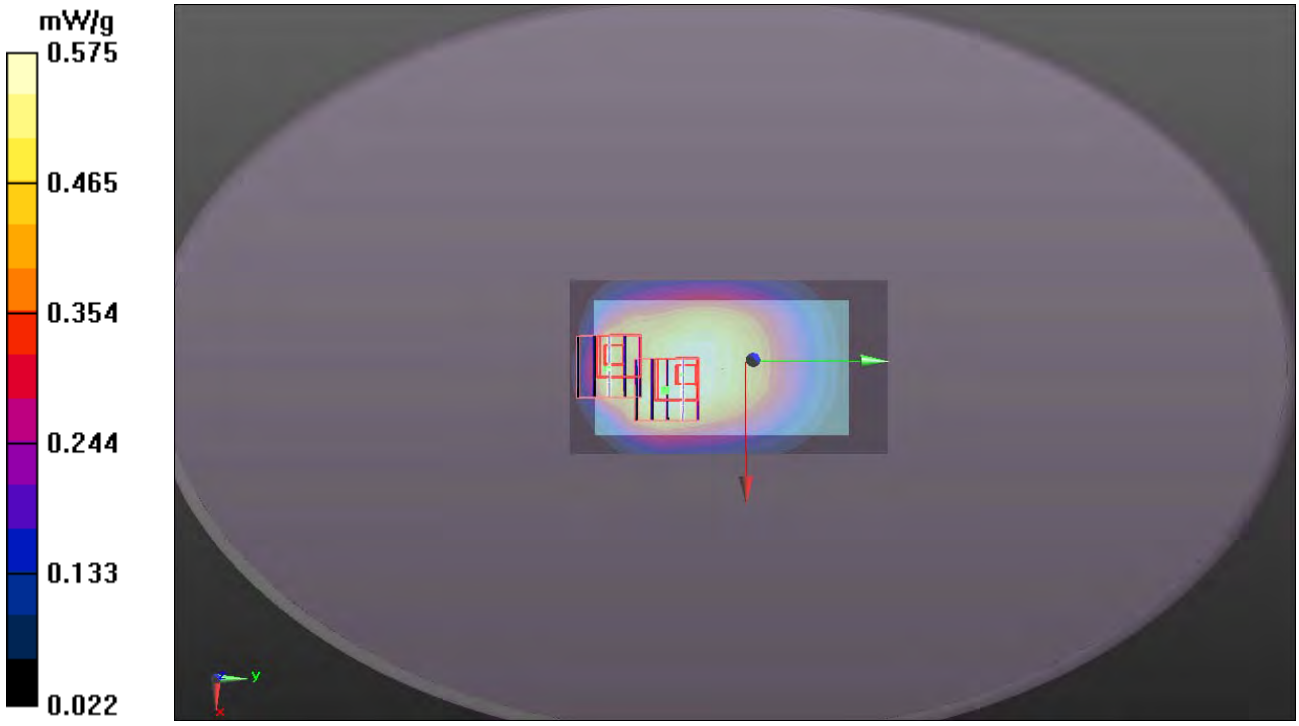
Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL850_0916 Medium parameters used: f = 836.4 MHz; σ = 0.969 mho/m;
ε_r = 54.172; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(9.12, 9.12, 9.12); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: ELI v4.0; Type: QDOVA001BA; Serial: TP:1043
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch4182/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.591 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.986 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.668 W/kg
SAR(1 g) = 0.500 mW/g; SAR(10 g) = 0.359 mW/g
Maximum value of SAR (measured) = 0.575 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.986 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.626 W/kg
SAR(1 g) = 0.384 mW/g; SAR(10 g) = 0.260 mW/g
Maximum value of SAR (measured) = 0.509 mW/g



P43 WCDMA V_RMC 12.2k_Left Side_1cm_Ch4182_Sample1_Battery1

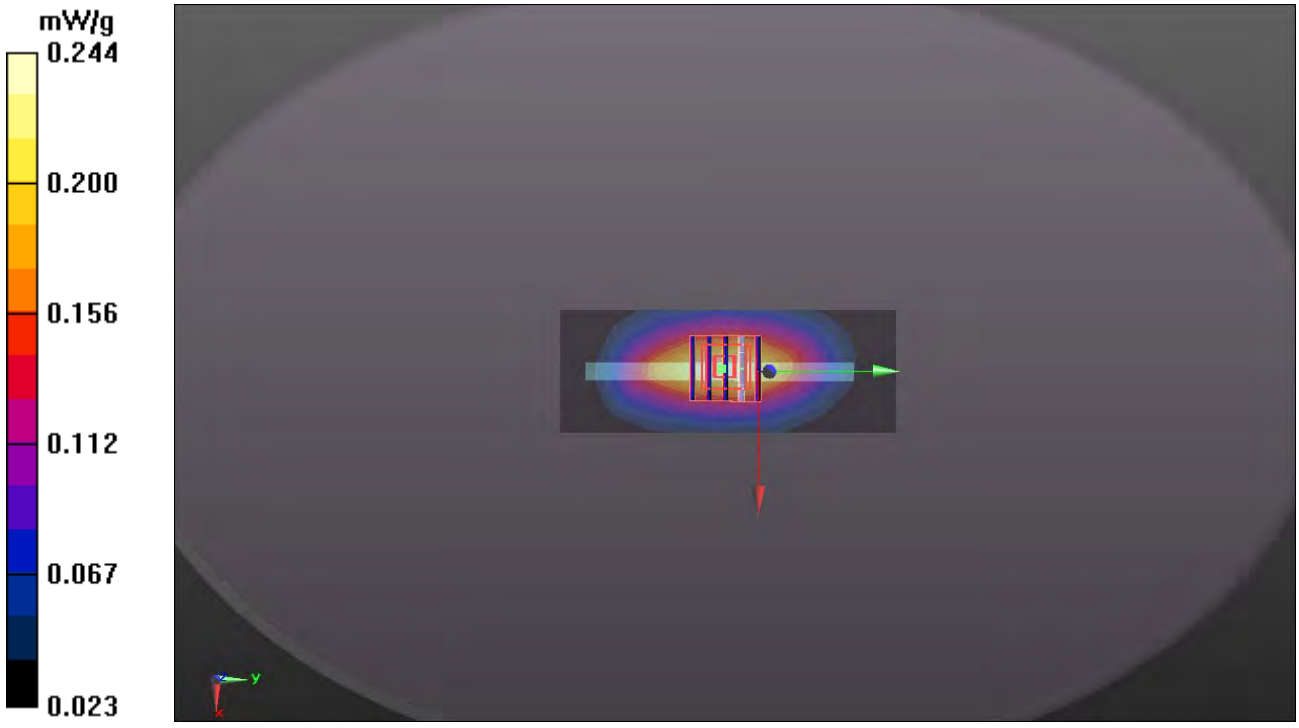
DUT: 110906C14

Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL850_0916 Medium parameters used: f = 836.4 MHz; σ = 0.969 mho/m;
ε_r = 54.172; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(9.12, 9.12, 9.12); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: ELI v4.0; Type: QDOVA001BA; Serial: TP:1043
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch4182/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.248 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.733 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.285 W/kg
SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.134 mW/g
Maximum value of SAR (measured) = 0.244 mW/g



P44 WCDMA V_RMC 12.2k_Right Side_1cm_Ch4182_Sample1_Battery1

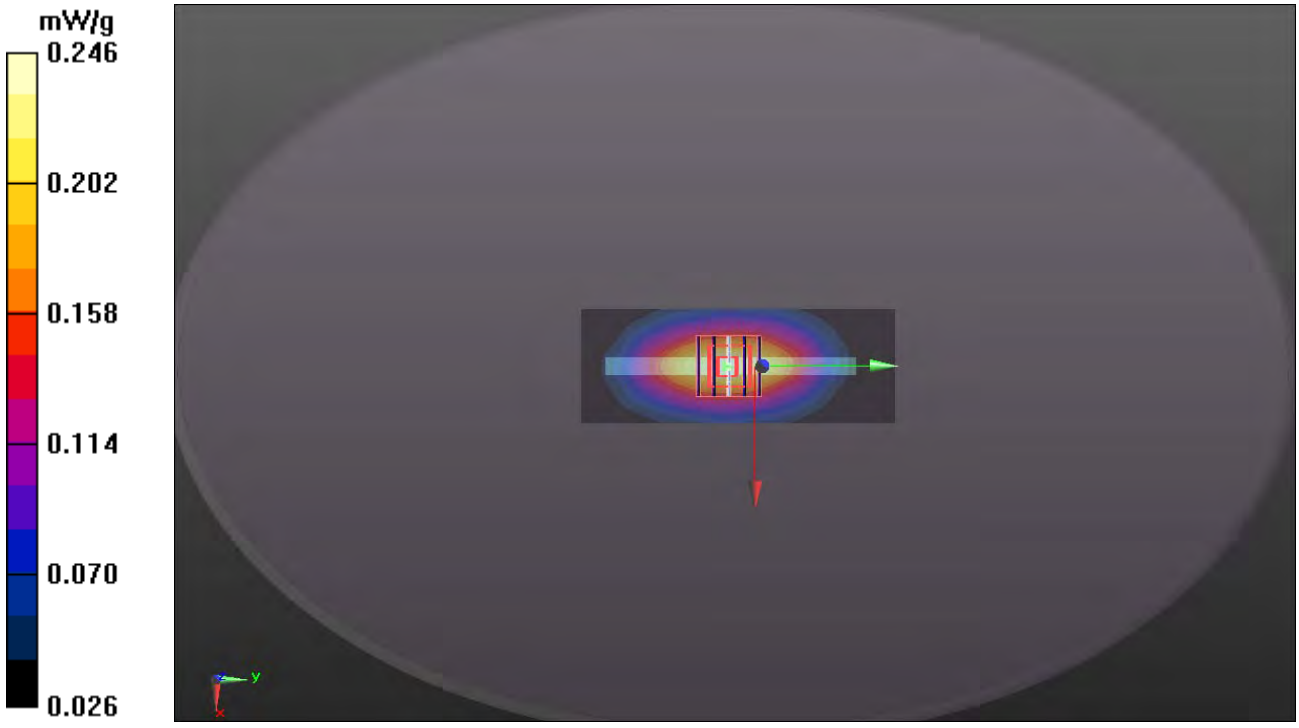
DUT: 110906C14

Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL850_0916 Medium parameters used: f = 836.4 MHz; σ = 0.969 mho/m; ε_r = 54.172; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(9.12, 9.12, 9.12); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: ELI v4.0; Type: QDOVA001BA; Serial: TP:1043
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch4182/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.249 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.998 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.287 W/kg
SAR(1 g) = 0.201 mW/g; SAR(10 g) = 0.139 mW/g
Maximum value of SAR (measured) = 0.246 mW/g



P46 WCDMA V_RMC 12.2k_Down Side_1cm_Ch4182_Sample1_Battery1

DUT: 110906C14

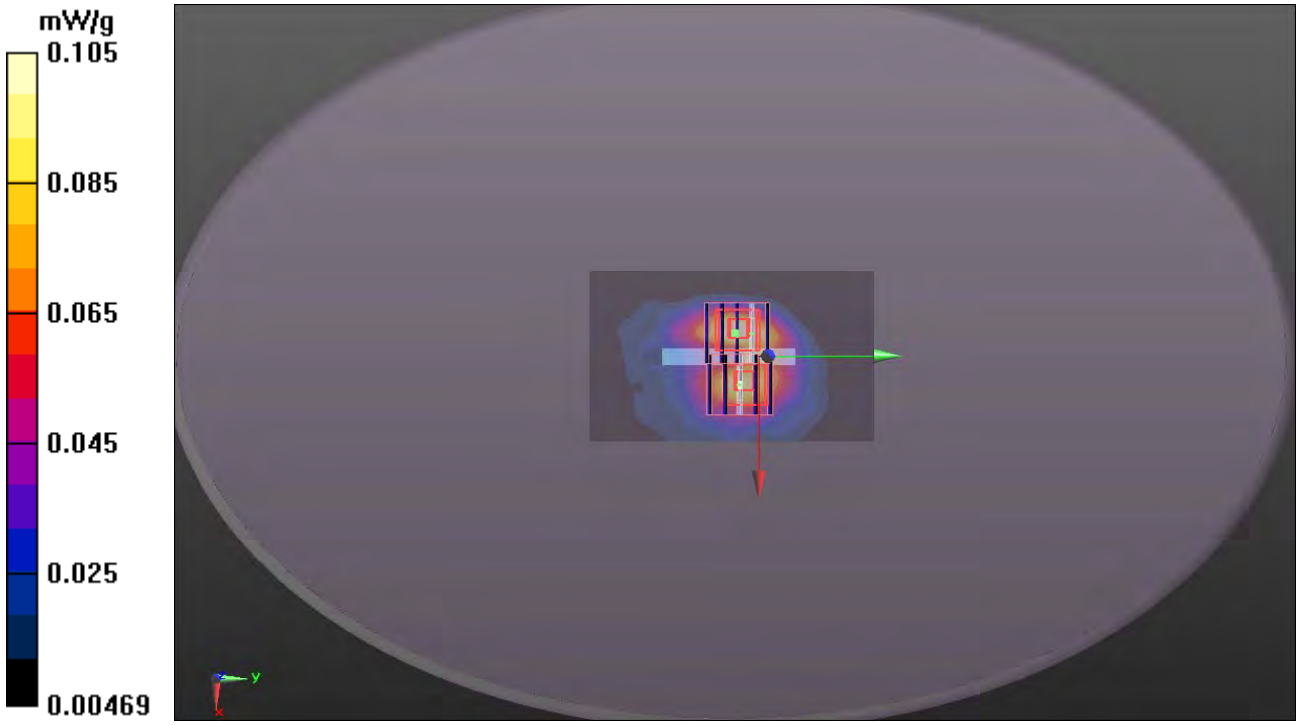
Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL850_0916 Medium parameters used: f = 836.4 MHz; σ = 0.969 mho/m; ε_r = 54.172; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(9.12, 9.12, 9.12); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: ELI v4.0; Type: QDOVA001BA; Serial: TP:1043
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch4182/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.118 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.568 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.139 W/kg
SAR(1 g) = 0.080 mW/g; SAR(10 g) = 0.048 mW/g
Maximum value of SAR (measured) = 0.105 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.568 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.139 W/kg
SAR(1 g) = 0.079 mW/g; SAR(10 g) = 0.044 mW/g
Maximum value of SAR (measured) = 0.111 mW/g



P47 WCDMA V_RMC 12.2k_Rear Face _1cm_Ch4182_Sample2_Battery2

DUT: 110906C14

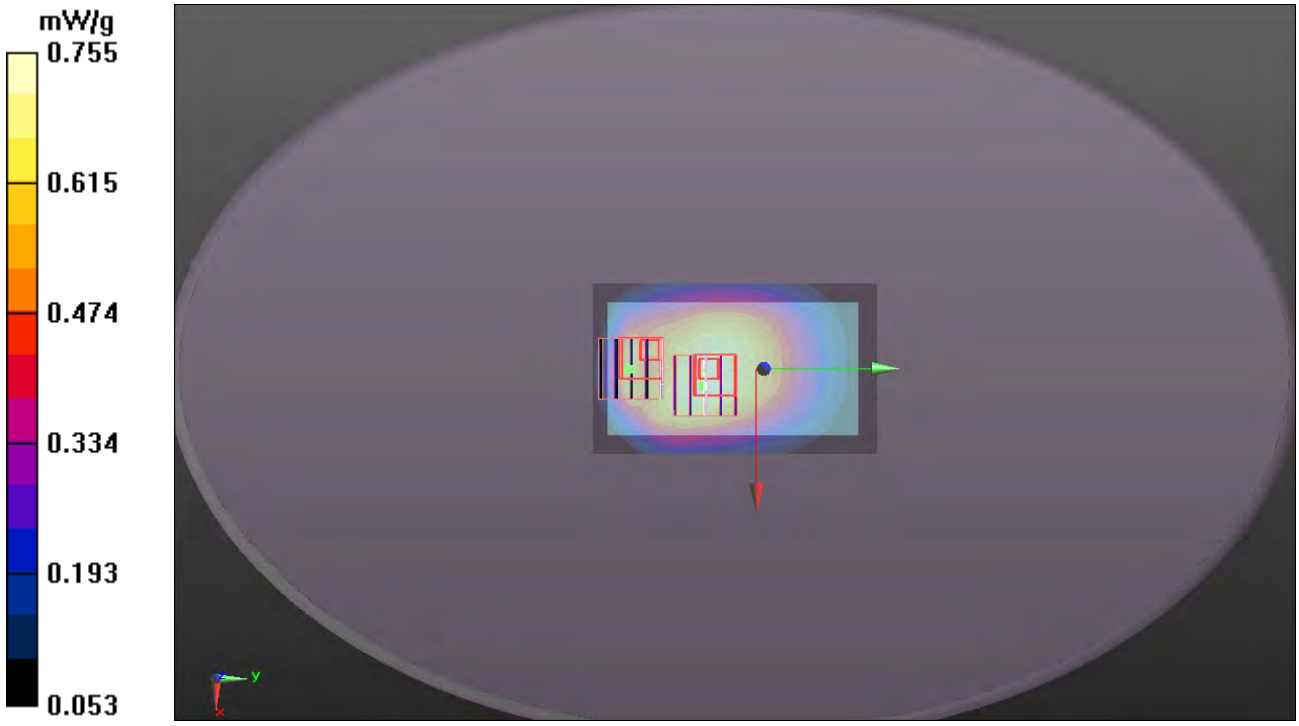
Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL850_0916 Medium parameters used: f = 836.4 MHz; σ = 0.969 mho/m; ε_r = 54.172; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.4 ℃

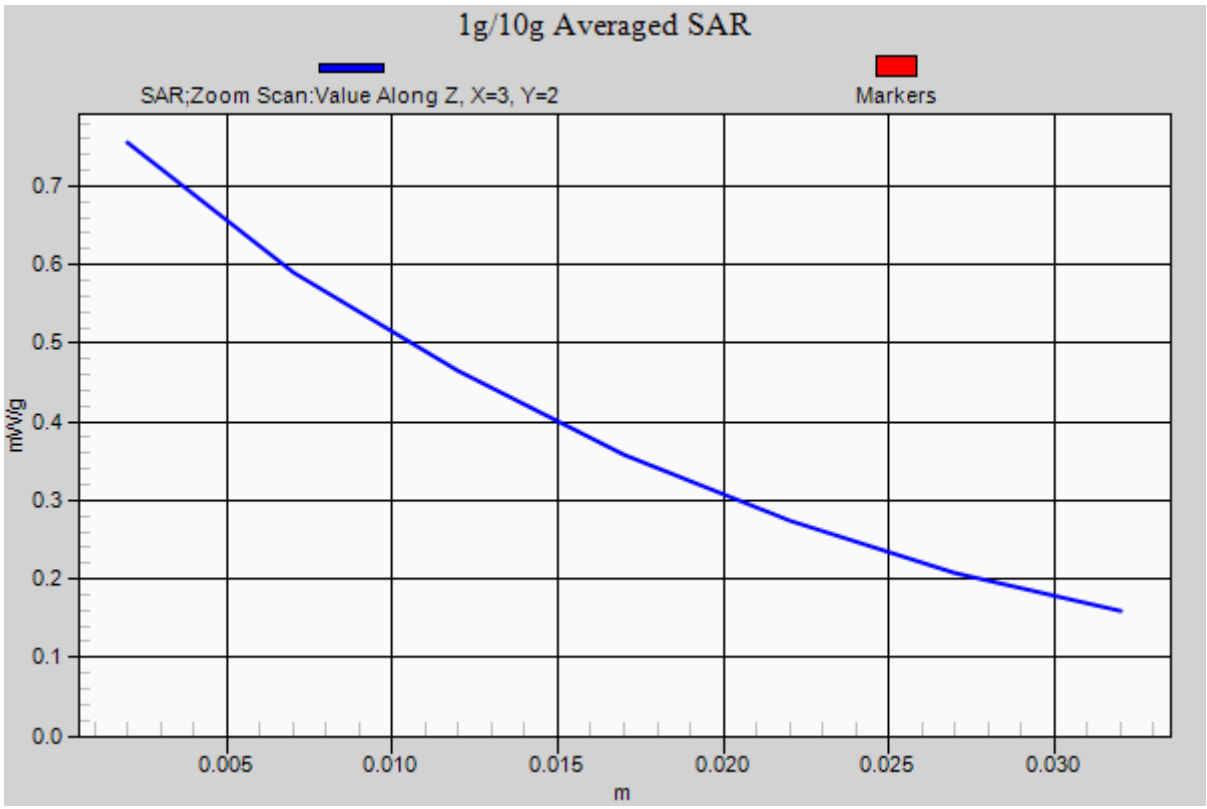
DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(9.12, 9.12, 9.12); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: ELI v4.0; Type: QDOVA001BA; Serial: TP:1043
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch4182/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.732 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.193 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.831 W/kg
SAR(1 g) = 0.649 mW/g; SAR(10 g) = 0.493 mW/g
Maximum value of SAR (measured) = 0.755 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.193 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.760 W/kg
SAR(1 g) = 0.458 mW/g; SAR(10 g) = 0.323 mW/g
Maximum value of SAR (measured) = 0.621 mW/g




1g/10g Averaged SAR
SAR;Zoom Scan:Value Along Z, X=3, Y=2
Markers
mW/g
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
0.005
0.010
0.015
0.020
0.025
0.030
m

P48 WCDMA V_RMC 12.2k_Rear Face_1cm_Ch4182_Sample2_Battery2_Earphone1

DUT: 110906C14

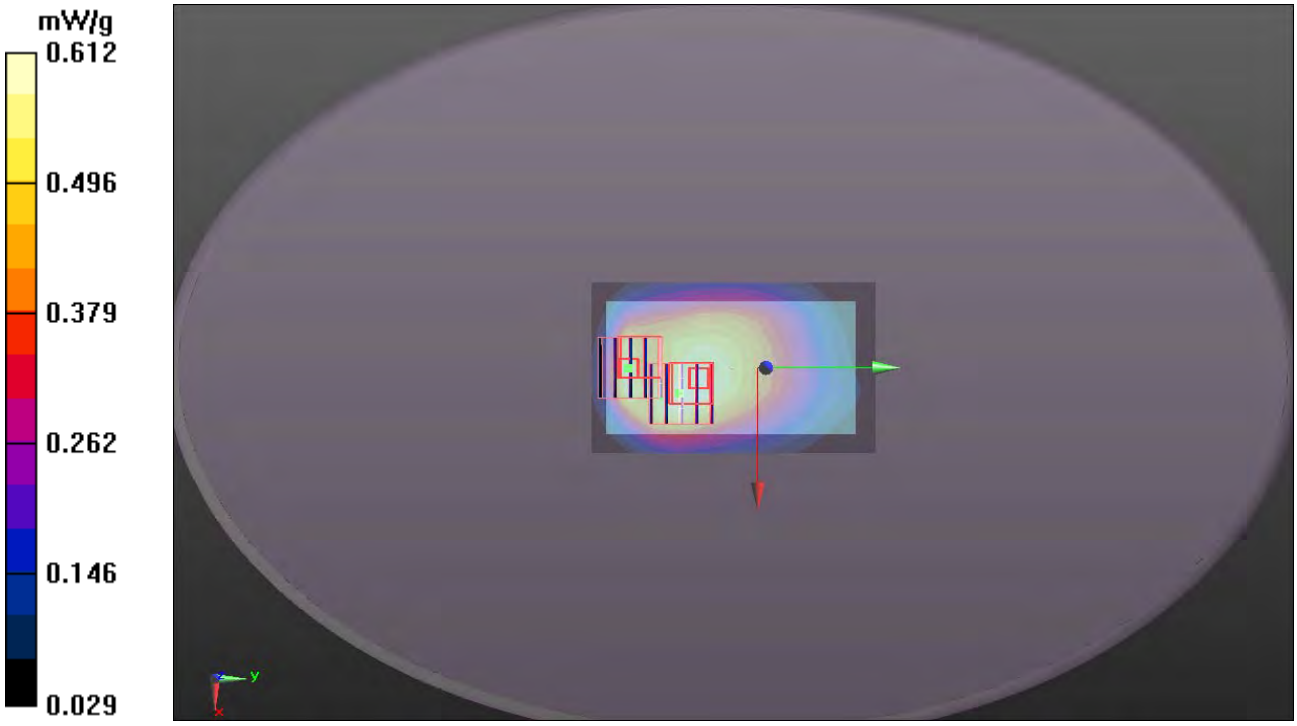
Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL850_0916 Medium parameters used: f = 836.4 MHz; σ = 0.969 mho/m; ε_r = 54.172; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(9.12, 9.12, 9.12); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: ELI v4.0; Type: QDOVA001BA; Serial: TP:1043
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

Ch4182/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.626 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.771 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.739 W/kg
SAR(1 g) = 0.514 mW/g; SAR(10 g) = 0.372 mW/g
Maximum value of SAR (measured) = 0.612 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.771 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.713 W/kg
SAR(1 g) = 0.403 mW/g; SAR(10 g) = 0.281 mW/g
Maximum value of SAR (measured) = 0.578 mW/g



P49 WCDMA V_RMC 12.2k_Rear Face_1cm_Ch4182_Sample2_Battery2_Earphone2

DUT: 110906C14

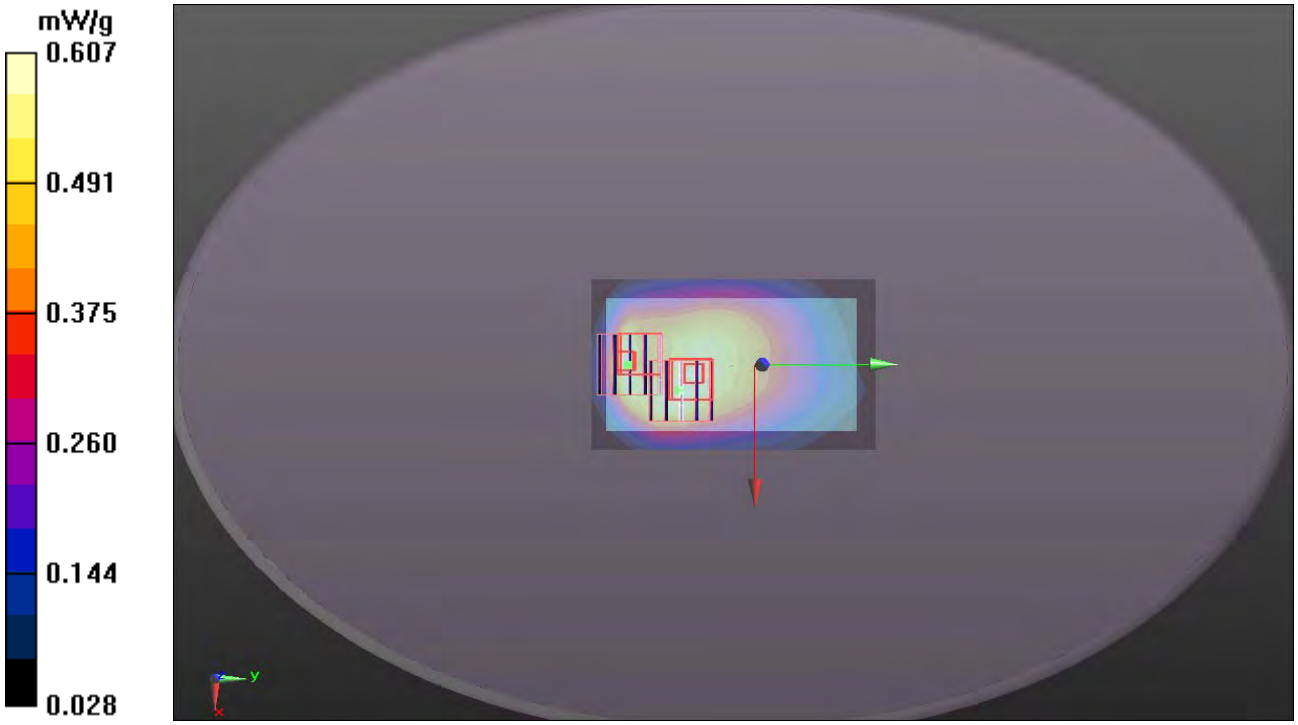
Communication System: WCDMA; Frequency: 836.4 MHz;Duty Cycle: 1:1
Medium: MSL850_0916 Medium parameters used: f = 836.4 MHz; σ = 0.969 mho/m; ε_r = 54.172; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3650; ConvF(9.12, 9.12, 9.12); Calibrated: 1/24/2011
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1277; Calibrated: 7/29/2011
- Phantom: ELI v4.0; Type: QDOVA001BA; Serial: TP:1043
- Measurement SW: DASY52, Version 52.6 (2); SEMCAD X Version 14.4.5 (3634)

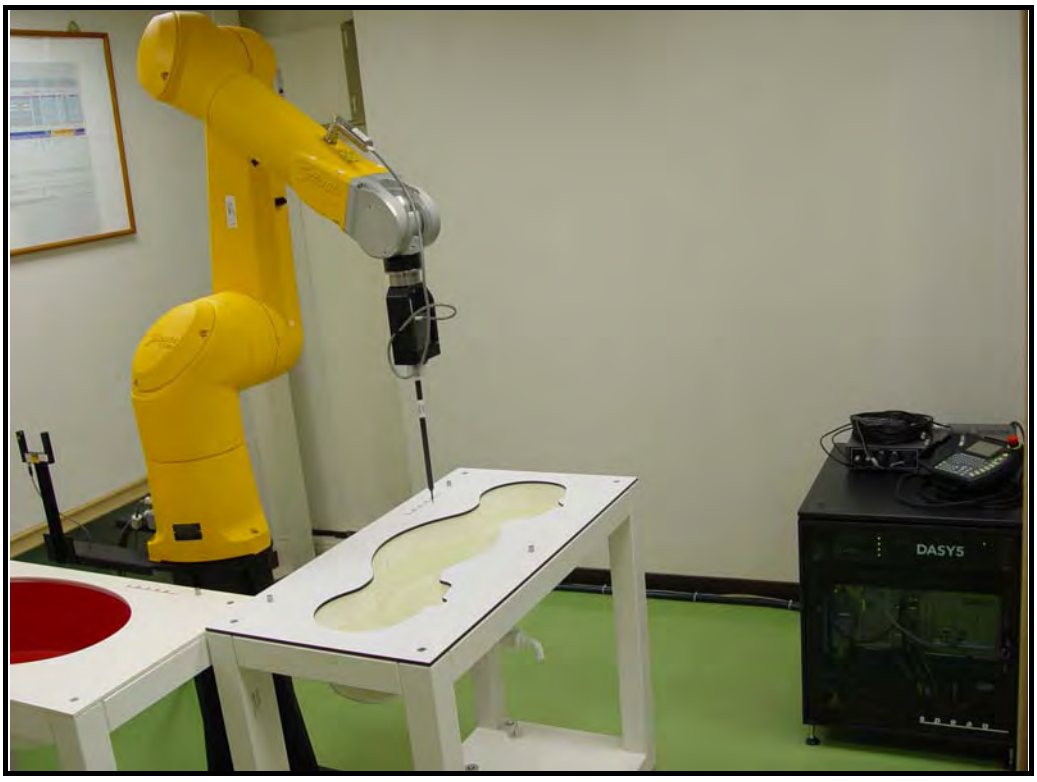
Ch4182/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.616 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.189 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.722 W/kg
SAR(1 g) = 0.503 mW/g; SAR(10 g) = 0.364 mW/g
Maximum value of SAR (measured) = 0.607 mW/g

Ch4182/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.189 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.752 W/kg
SAR(1 g) = 0.397 mW/g; SAR(10 g) = 0.276 mW/g
Maximum value of SAR (measured) = 0.593 mW/g



APPENDIX B: BV ADT SAR MEASUREMENT SYSTEM



APPENDIX C: PHOTOGRAPHS OF SYSTEM VALIDATION

APPENDIX D: SYSTEM CERTIFICATE & CALIBRATION

D1: DOSIMETRIC E-FIELD PROBE

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

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

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

Accreditation No.: SCS 108

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

Certificate No: EX3-3800_Aug11

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3800

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

Calibration date: August 5, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	3-May-11 (No. DAE4-654_May11)	May-12
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Fin Bomholt	R&D Director	

Issued: August 8, 2011

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

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

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

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3800

Manufactured: April 5, 2011
Calibrated: August 5, 2011

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3800

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.42	0.58	0.55	± 10.1 %
DCP (mV)[B]	100.6	96.7	98.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	102.6	±3.0 %
			Y	0.00	0.00	1.00	124.9	
			Z	0.00	0.00	1.00	120.1	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3800

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	9.02	9.02	9.02	0.15	1.41	± 12.0 %
835	41.5	0.90	8.70	8.70	8.70	0.24	1.03	± 12.0 %
900	41.5	0.97	8.51	8.51	8.51	0.13	1.52	± 12.0 %
1640	40.3	1.29	7.95	7.95	7.95	0.15	1.37	± 12.0 %
1750	40.1	1.37	7.79	7.79	7.79	0.13	1.56	± 12.0 %
1900	40.0	1.40	7.46	7.46	7.46	0.45	0.76	± 12.0 %
2450	39.2	1.80	6.71	6.71	6.71	0.32	0.89	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

DASY/EASY - Parameters of Probe: EX3DV4- SN:3800

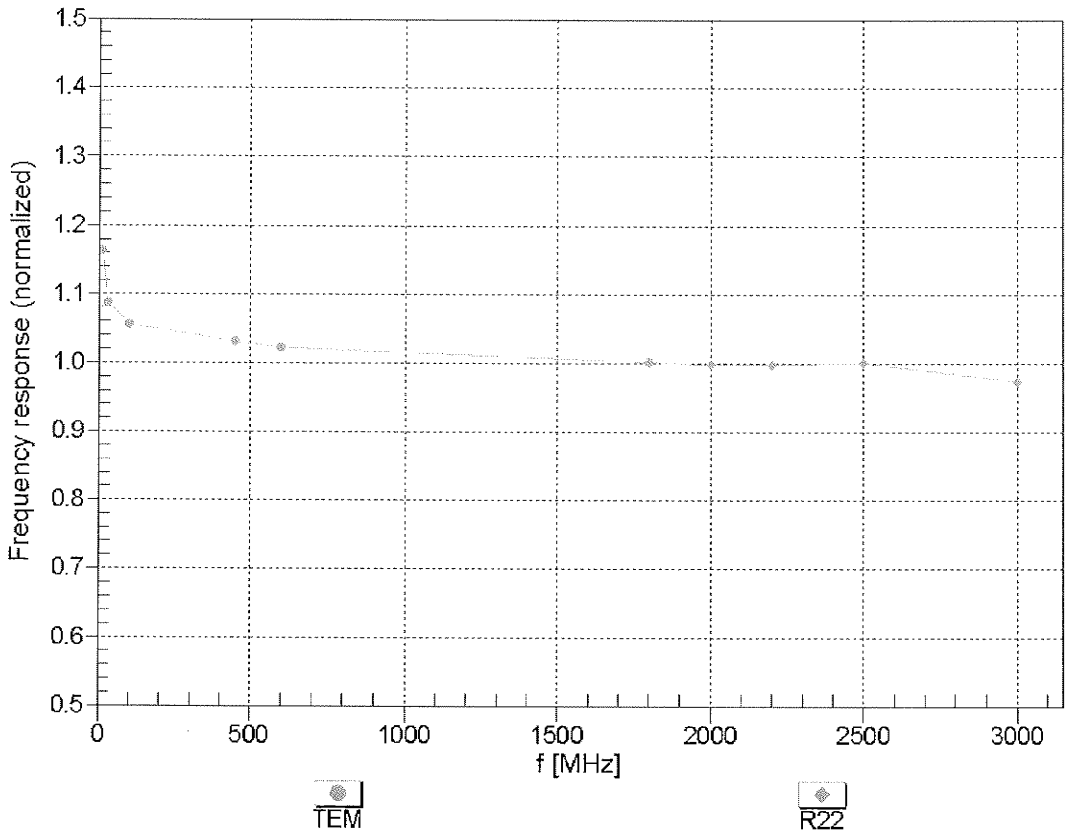
Calibration Parameter Determined in Body Tissue Simulating Media

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	9.34	9.34	9.34	0.10	2.61	± 12.0 %
835	55.2	0.97	8.94	8.94	8.94	0.11	2.46	± 12.0 %
900	55.0	1.05	8.67	8.67	8.67	0.13	2.08	± 12.0 %
1640	53.8	1.40	8.07	8.07	8.07	0.16	1.57	± 12.0 %
1750	53.4	1.49	7.43	7.43	7.43	0.15	1.76	± 12.0 %
1900	53.3	1.52	6.97	6.97	6.97	0.13	1.56	± 12.0 %
2450	52.7	1.95	6.75	6.75	6.75	0.80	0.53	± 12.0 %

[C] Frequency validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

Frequency Response of E-Field

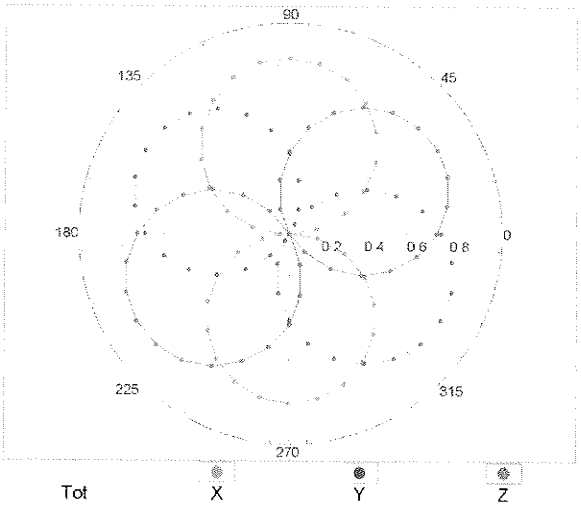
(TEM-Cell:ifi110 EXX, Waveguide: R22)



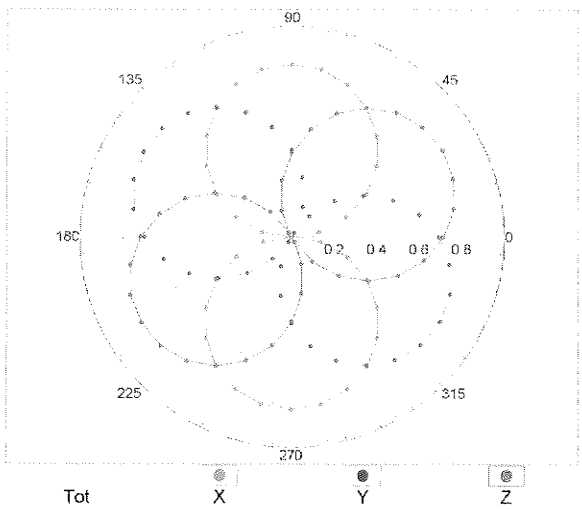
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

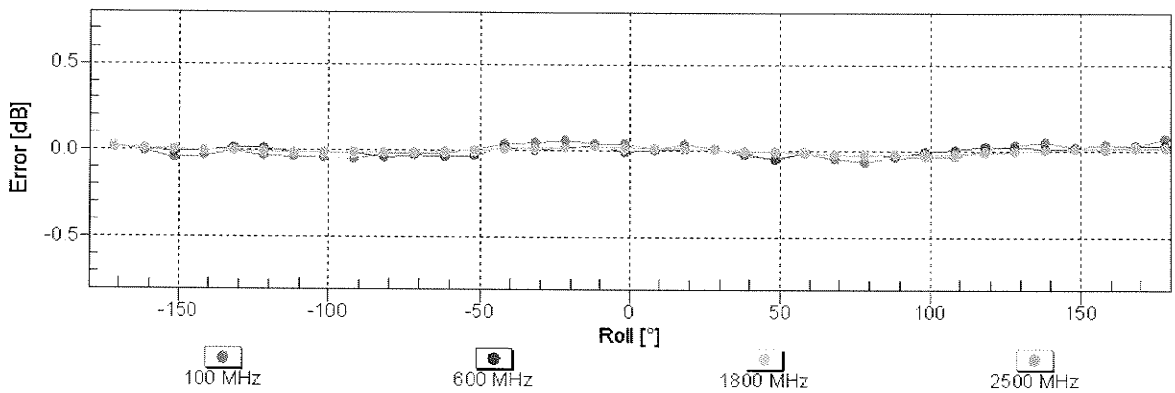
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



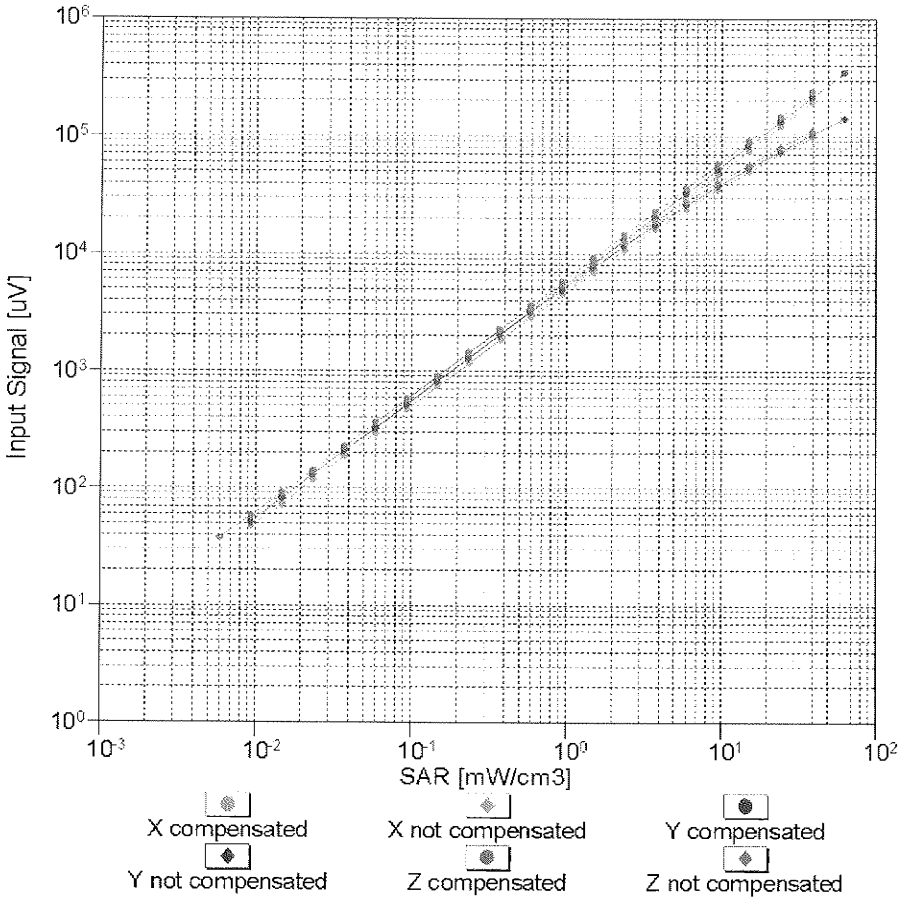
f=1800 MHz,R22

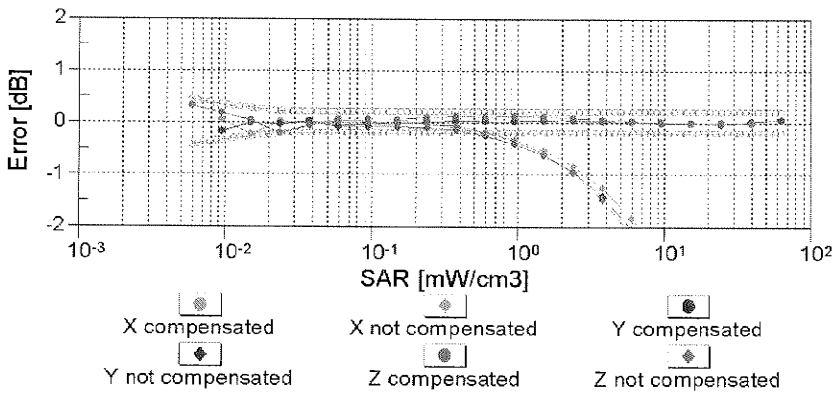




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

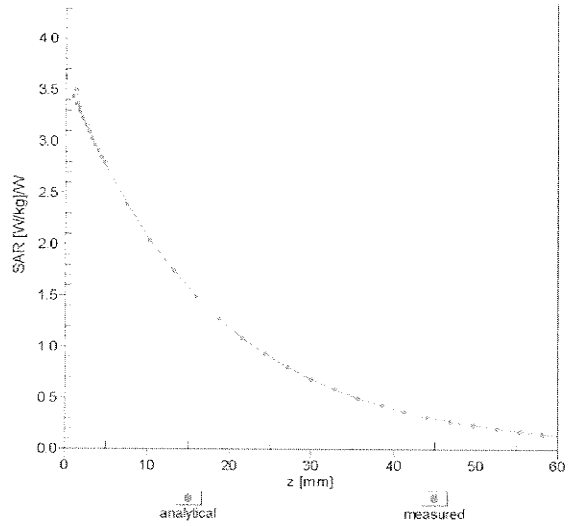




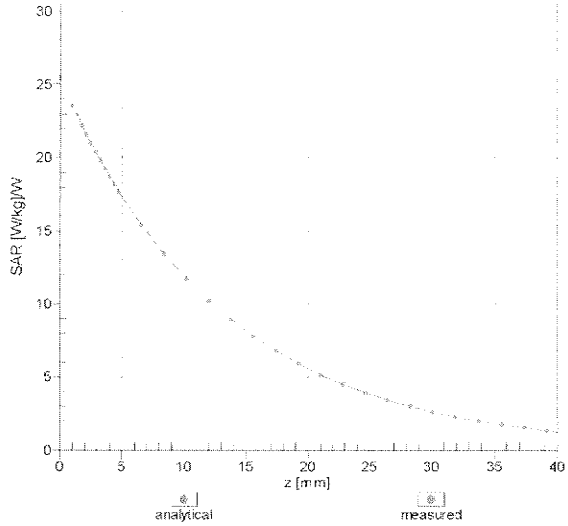
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

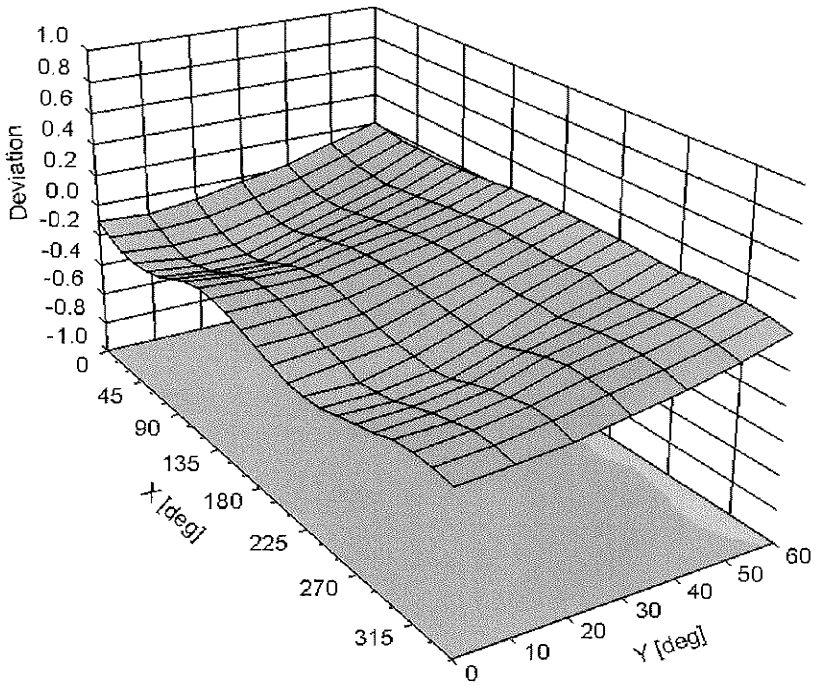


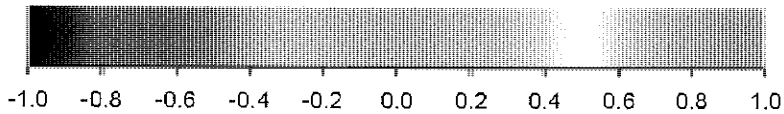
f = 1750 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3800

Other Probe Parameters

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

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

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

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

Accreditation No.: **SCS 108**

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

Certificate No: **EX3-3650_Jan11**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3650
Calibration procedure(s)	QA CAL-01.v7, QA CAL-14.v3, QA CAL-23.v4 and QA CAL-25.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	January 24, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11

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

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Fin Bomholt	R&D Director	

Issued: January 25, 2011

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

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

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3650

Manufactured:	March 18, 2008
Last calibrated:	July 5, 2008
Recalibrated:	January 24, 2011

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 SN:3650

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.45	0.40	0.49	± 10.1%
DCP (mV)[B]	93.4	96.5	95.5	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	137.0	± 3.4 %
			Y	0.00	0.00	1.00	141.2	
			Z	0.00	0.00	1.00	144.7	

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

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

[B] Numerical linearization parameter: uncertainty not required.

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

DASY/EASY - Parameters of Probe: EX3DV4 SN:3650

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
750	± 50 / ± 100	41.9 ± 5%	0.89 ± 5%	9.46	9.46	9.46	0.43	0.72 ± 11.0%
835	± 50 / ± 100	41.5 ± 5%	0.90 ± 5%	8.95	8.95	8.95	0.55	0.67 ± 11.0%
1450	± 50 / ± 100	40.5 ± 5%	1.20 ± 5%	8.86	8.86	8.86	0.78	0.64 ± 11.0%
1750	± 50 / ± 100	40.1 ± 5%	1.37 ± 5%	8.17	8.17	8.17	0.75	0.60 ± 11.0%
1950	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	7.57	7.57	7.57	0.57	0.66 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	7.10	7.10	7.10	0.36	0.88 ± 11.0%
2600	± 50 / ± 100	39.0 ± 5%	1.96 ± 5%	6.93	6.93	6.93	0.38	0.88 ± 11.0%
5200	± 50 / ± 100	36.0 ± 5%	4.66 ± 5%	4.69	4.69	4.69	0.40	1.80 ± 13.1%
5300	± 50 / ± 100	35.9 ± 5%	4.76 ± 5%	4.33	4.33	4.33	0.45	1.80 ± 13.1%
5500	± 50 / ± 100	35.6 ± 5%	4.96 ± 5%	4.42	4.42	4.42	0.45	1.80 ± 13.1%
5600	± 50 / ± 100	35.5 ± 5%	5.07 ± 5%	3.96	3.96	3.96	0.60	1.80 ± 13.1%
5800	± 50 / ± 100	35.3 ± 5%	5.27 ± 5%	4.27	4.27	4.27	0.45	1.80 ± 13.1%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

DASY/EASY - Parameters of Probe: EX3DV4 SN:3650

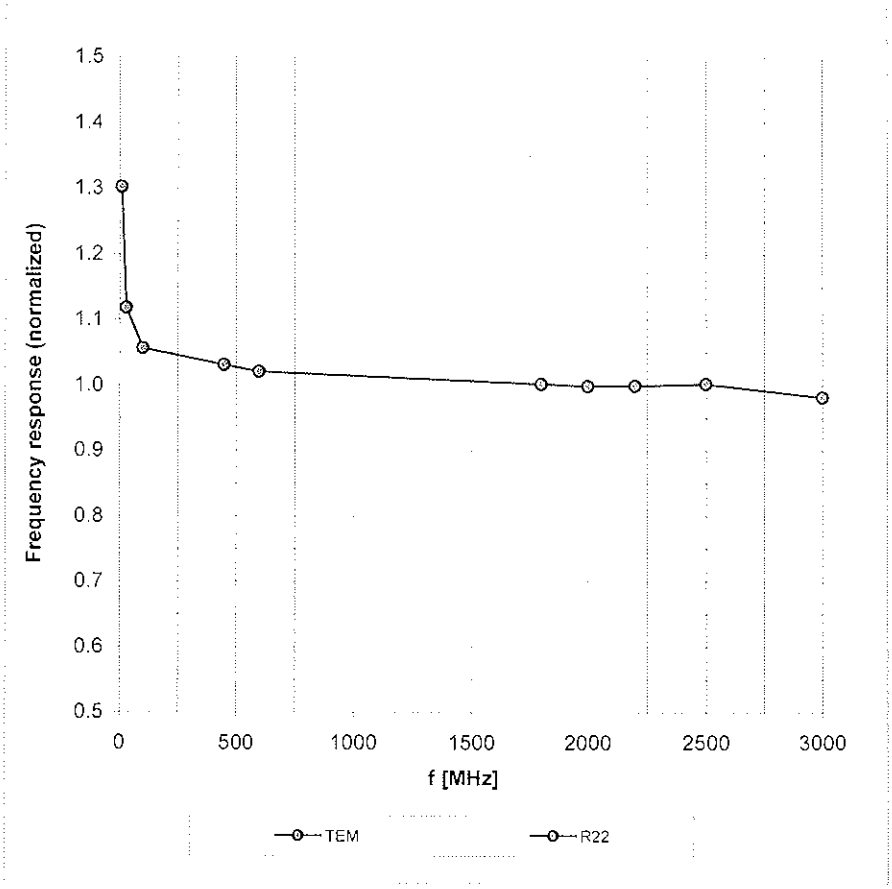
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
750	± 50 / ± 100	55.5 ± 5%	0.96 ± 5%	9.25	9.25	9.25	0.53	0.71	± 11.0%
835	± 50 / ± 100	55.2 ± 5%	0.97 ± 5%	9.12	9.12	9.12	0.36	0.88	± 11.0%
1450	± 50 / ± 100	54.0 ± 5%	1.30 ± 5%	7.97	7.97	7.97	0.71	0.63	± 11.0%
1750	± 50 / ± 100	53.4 ± 5%	1.49 ± 5%	7.46	7.46	7.46	0.78	0.61	± 11.0%
1950	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	7.52	7.52	7.52	0.79	0.59	± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	7.05	7.05	7.05	0.54	0.74	± 11.0%
2600	± 50 / ± 100	52.5 ± 5%	2.16 ± 5%	6.92	6.92	6.92	0.45	0.80	± 11.0%
5200	± 50 / ± 100	49.0 ± 5%	5.30 ± 5%	4.25	4.25	4.25	0.50	1.90	± 13.1%
5300	± 50 / ± 100	48.9 ± 5%	5.42 ± 5%	3.96	3.96	3.96	0.50	1.90	± 13.1%
5500	± 50 / ± 100	48.6 ± 5%	5.65 ± 5%	3.76	3.76	3.76	0.55	1.90	± 13.1%
5600	± 50 / ± 100	48.5 ± 5%	5.77 ± 5%	3.55	3.55	3.55	0.58	1.90	± 13.1%
5800	± 50 / ± 100	48.2 ± 5%	6.00 ± 5%	3.86	3.86	3.86	0.60	1.90	± 13.1%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Frequency Response of E-Field

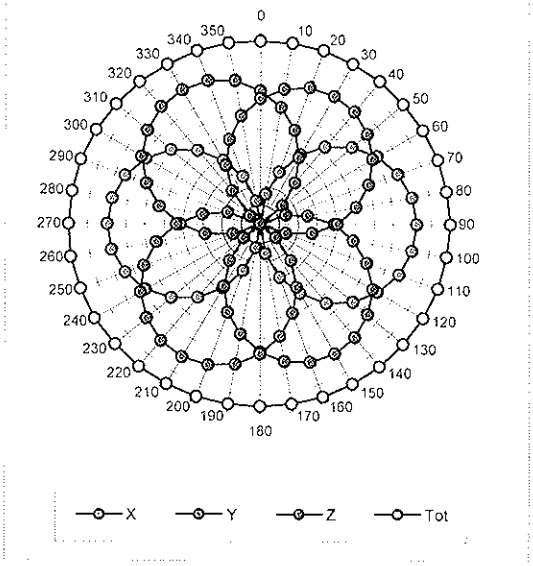
(TEM-Cell:ifi110 EXX, Waveguide: R22)



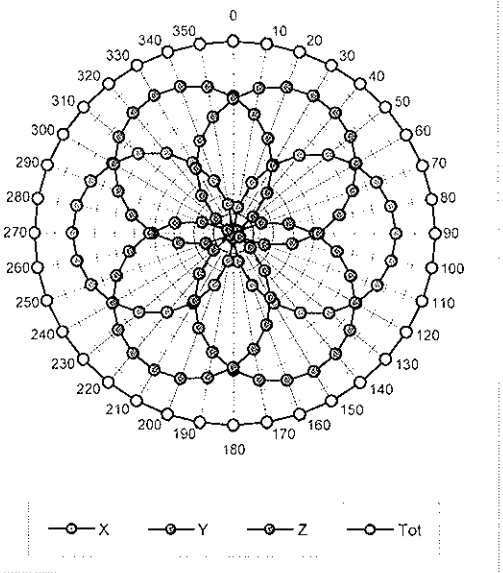
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

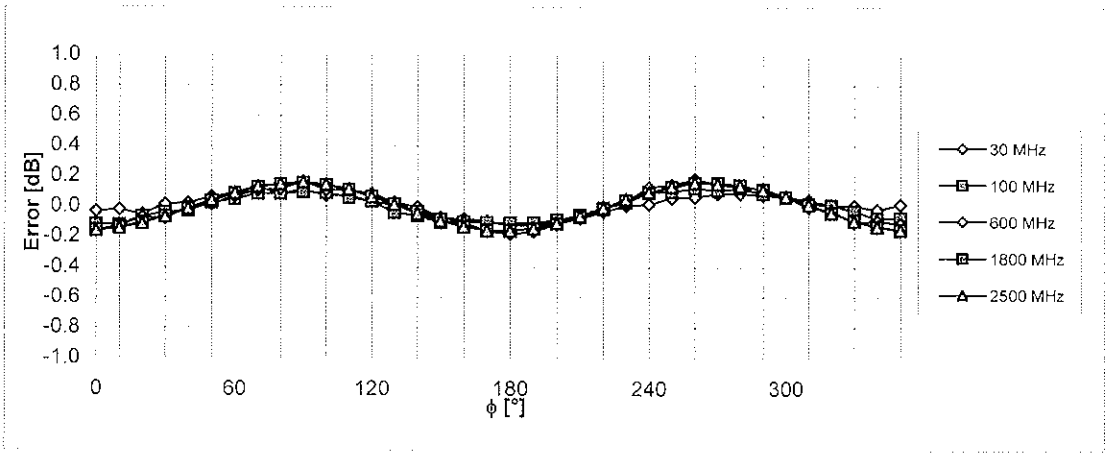
Receiving Pattern (ϕ), ϑ = 0°

f = 600 MHz, TEM ifi110EXX



f = 1800 MHz, WG R22

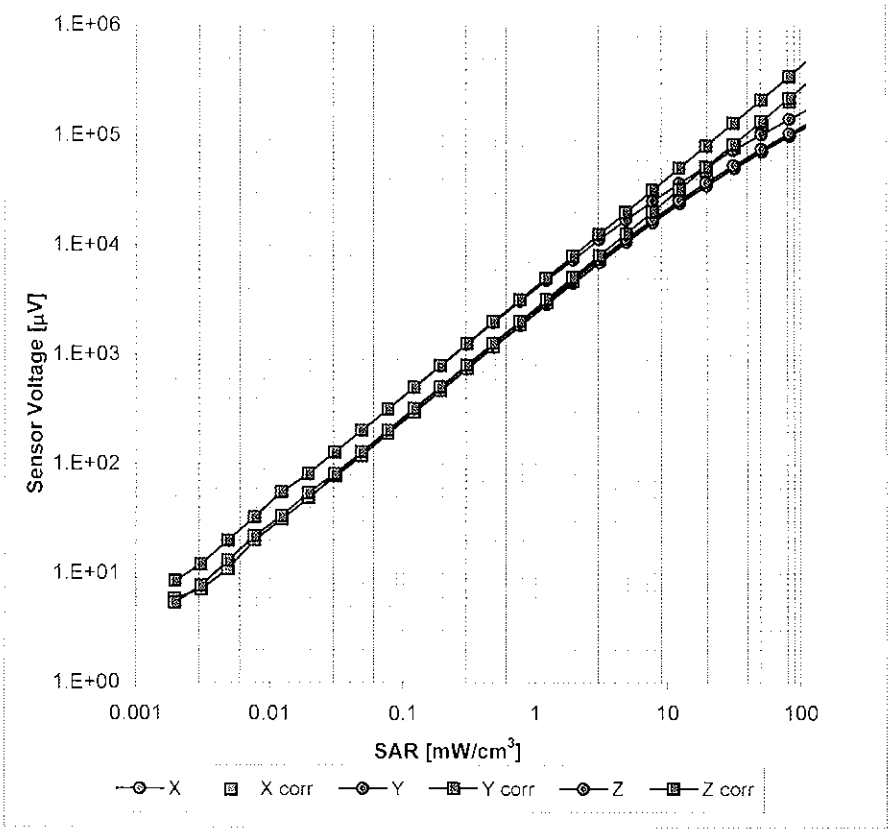


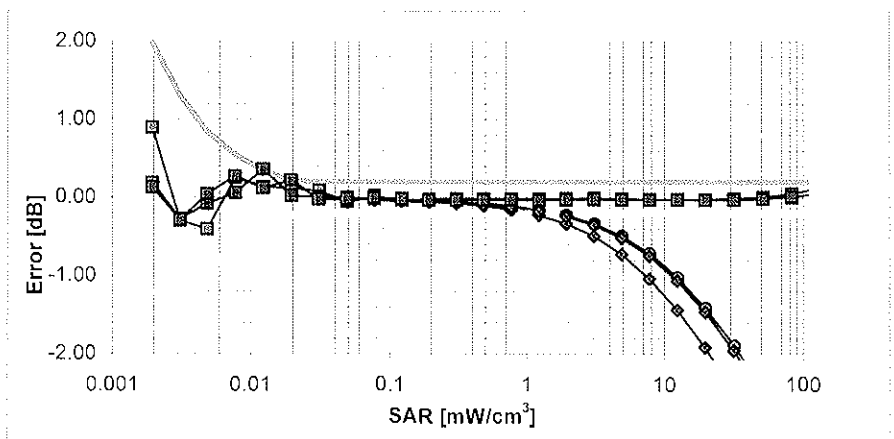


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

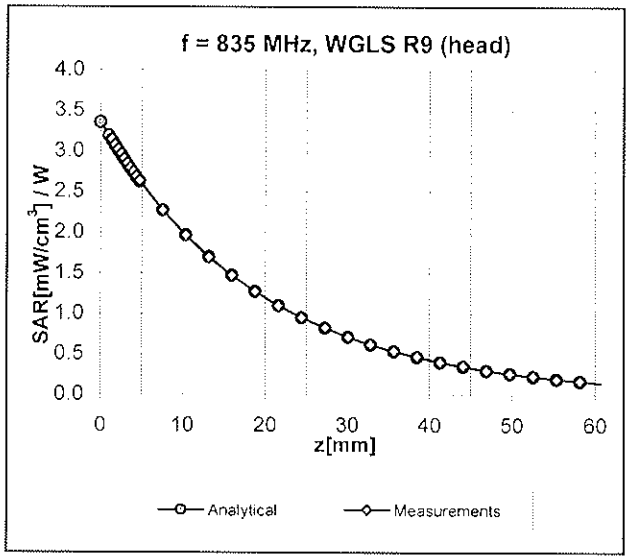
(TEM cell, f = 900 MHz)

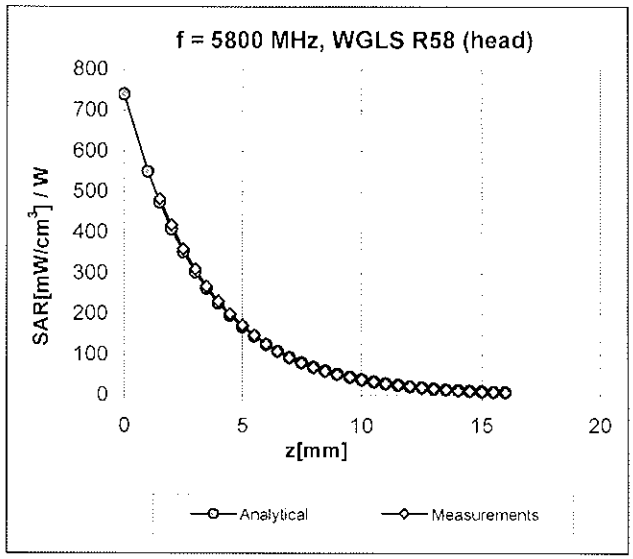




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

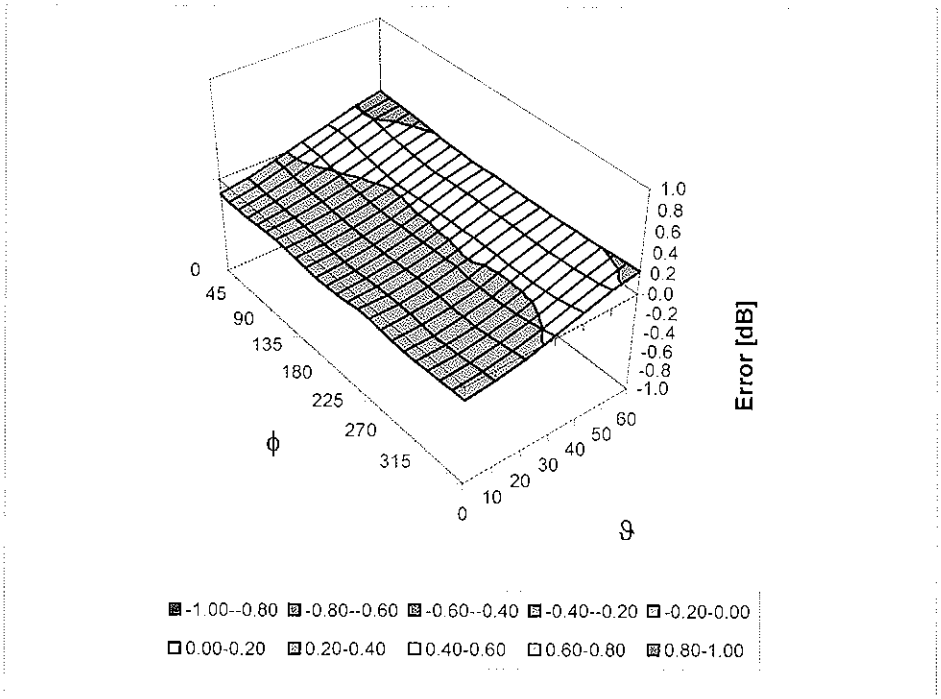
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Other Probe Parameters

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

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

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

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

Accreditation No.: SCS 108

Client **BV ADT (Auden)**

Certificate No: EX3-3590_Feb11

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3590

Calibration procedure(s): QA CAL-01.v7, QA CAL-14.v3, QA CAL-23.v4, QA CAL-25.v3
Calibration procedure for dosimetric E-field probes

Calibration date: February 25, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	01-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	01-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	23-Apr-10 (No. DAE4-654_Apr10)	Apr-11
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: February 25, 2011

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

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

Accredited by the Swiss Accreditation Service (SAS) Accreditation No.: **SCS 108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3590

Manufactured: March 23, 2009
Calibrated: February 25, 2011

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3590

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.51	0.48	0.51	± 10.1 %
DCP (mV)[B]	94.6	95.5	92.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	119.0	±2.7 %
			Y	0.00	0.00	1.00	141.4	
			Z	0.00	0.00	1.00	115.0	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3590

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	41.5	0.90	10.21	10.21	10.21	0.56	0.68	± 12.0 %
1640	40.3	1.29	9.25	9.25	9.25	0.68	0.60	± 12.0 %
1750	40.1	1.37	9.03	9.03	9.03	0.79	0.58	± 12.0 %
1950	40.0	1.40	8.45	8.45	8.45	0.55	0.66	± 12.0 %
2300	39.5	1.67	8.14	8.14	8.14	0.40	0.80	± 12.0 %
2450	39.2	1.80	7.73	7.73	7.73	0.29	1.00	± 12.0 %
2600	39.0	1.96	7.53	7.53	7.53	0.28	1.06	± 12.0 %
3500	37.9	2.91	7.55	7.55	7.55	0.36	1.03	± 13.1 %
5200	36.0	4.66	5.51	5.51	5.51	0.30	1.80	± 13.1 %
5300	35.9	4.76	5.17	5.17	5.17	0.30	1.80	± 13.1 %
5500	35.6	4.96	5.00	5.00	5.00	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.52	4.52	4.52	0.50	1.80	± 13.1 %
5800	35.3	5.27	4.53	4.53	4.53	0.50	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:3590

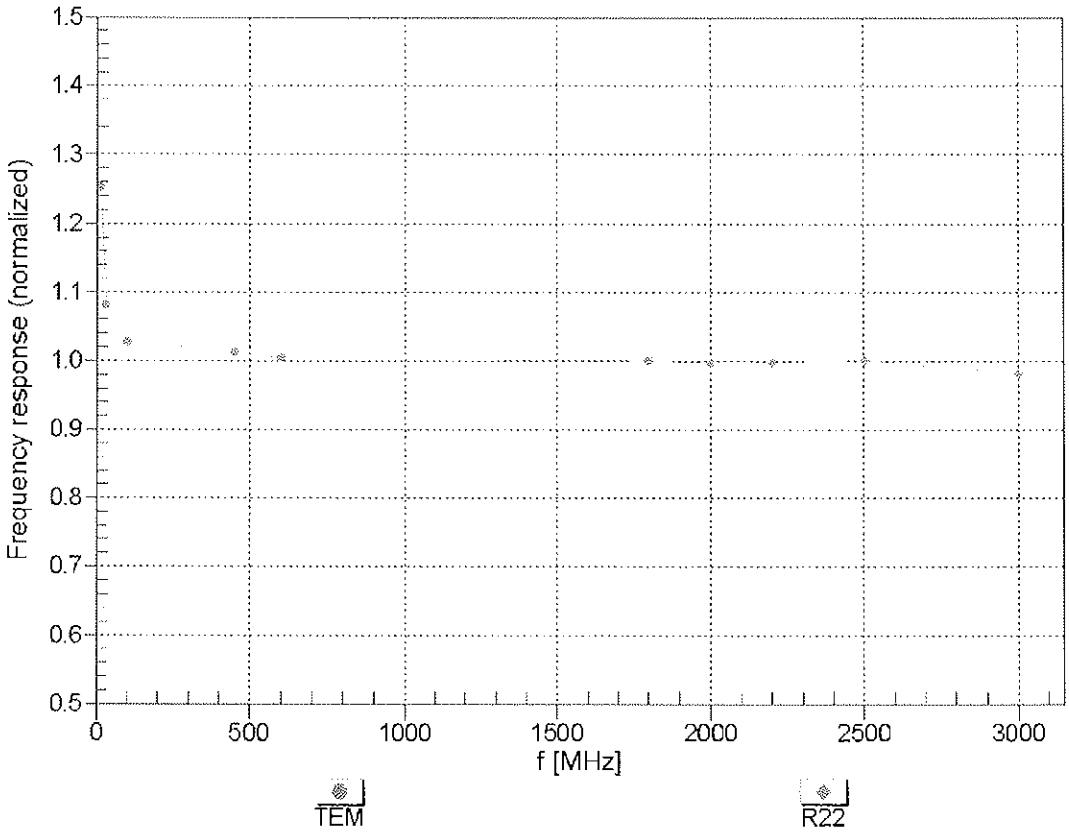
Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
835	55.2	0.97	10.32	10.32	10.32	0.38	0.82	± 12.0 %
1640	53.8	1.40	9.72	9.72	9.72	0.51	0.79	± 12.0 %
1750	53.4	1.49	8.77	8.77	8.77	0.37	0.92	± 12.0 %
1950	53.3	1.52	8.49	8.49	8.49	0.60	0.67	± 12.0 %
2300	52.9	1.81	8.08	8.08	8.08	0.30	1.00	± 12.0 %
2450	52.7	1.95	7.91	7.91	7.91	0.42	0.82	± 12.0 %
2600	52.5	2.16	7.78	7.78	7.78	0.25	1.17	± 12.0 %
3500	51.3	3.31	7.14	7.14	7.14	0.43	0.96	± 13.1 %
5200	49.0	5.30	4.81	4.81	4.81	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.56	4.56	4.56	0.50	1.90	± 13.1 %
5500	48.6	5.65	4.32	4.32	4.32	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.01	4.01	4.01	0.60	1.90	± 13.1 %
5800	48.2	6.00	4.55	4.55	4.55	0.50	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

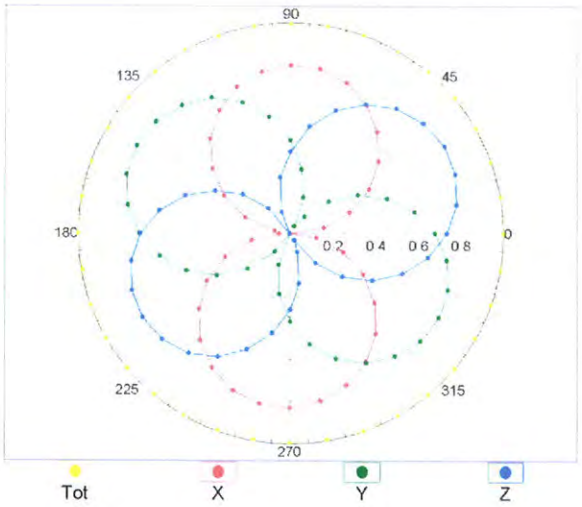
(TEM-Cell:ifi110 EXX, Waveguide: R22)



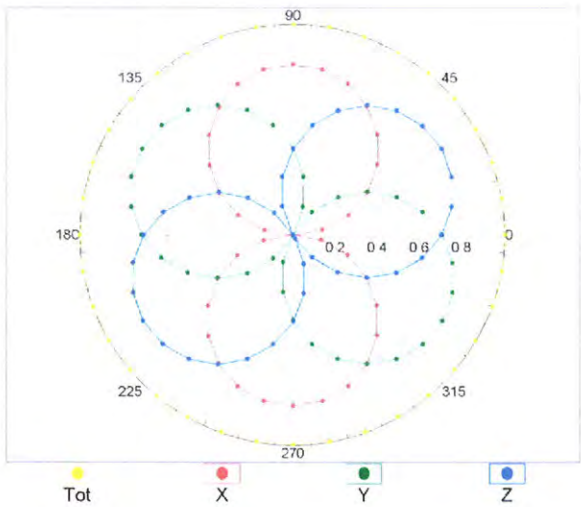
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

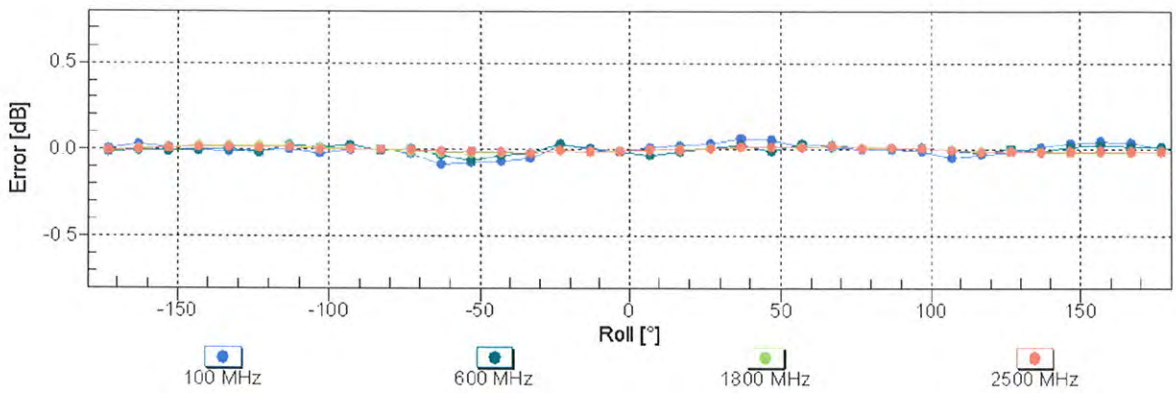
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



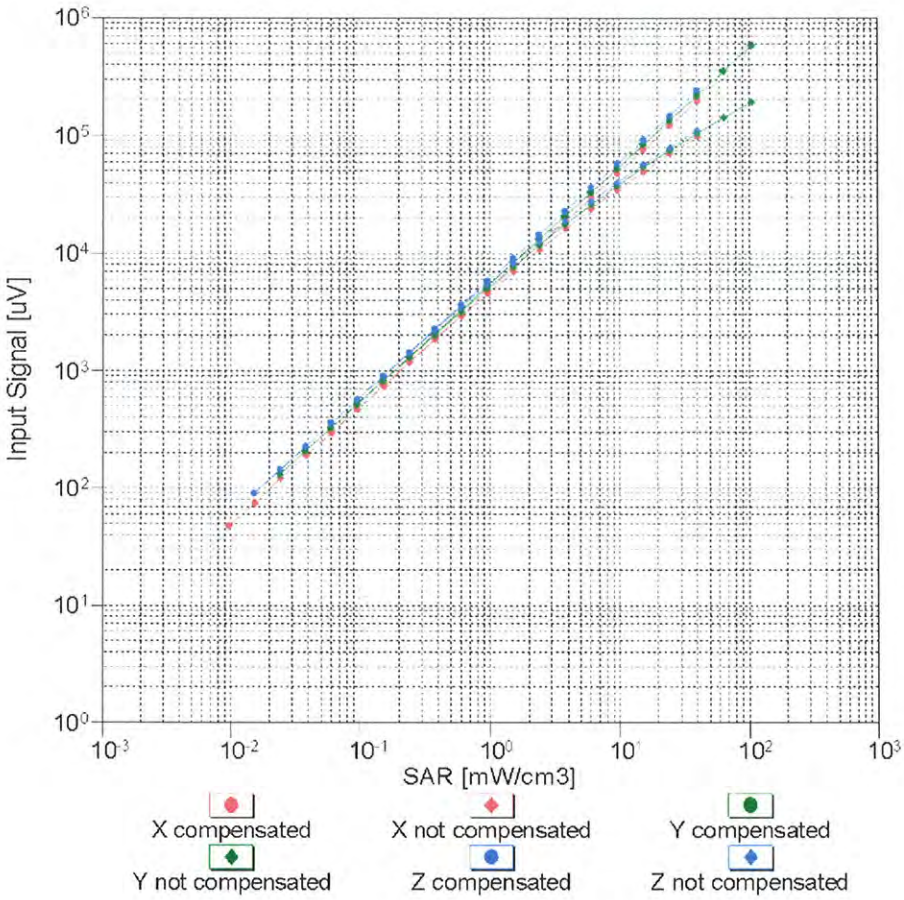
f=1800 MHz,R22

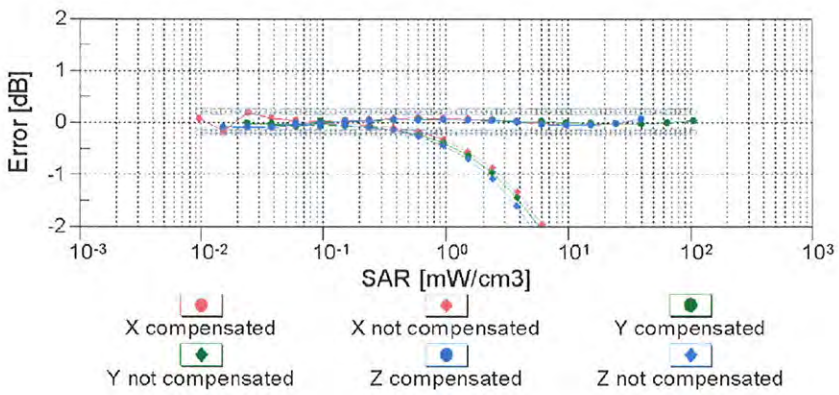




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

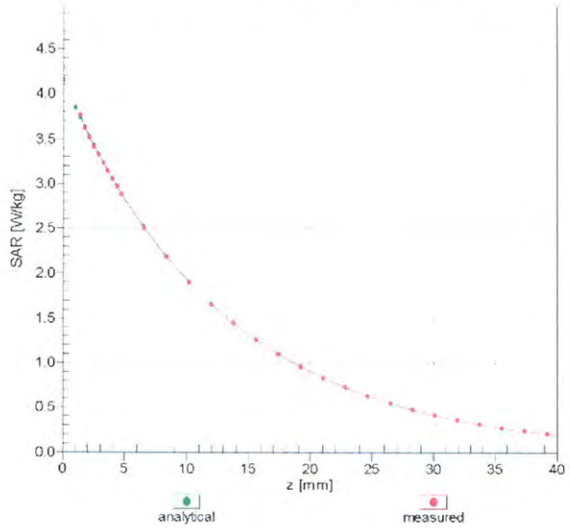




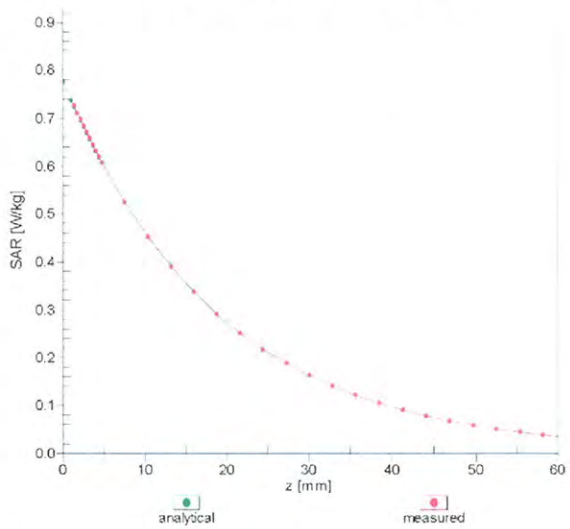
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 1750 MHz,WGLS R22 (H_convF)

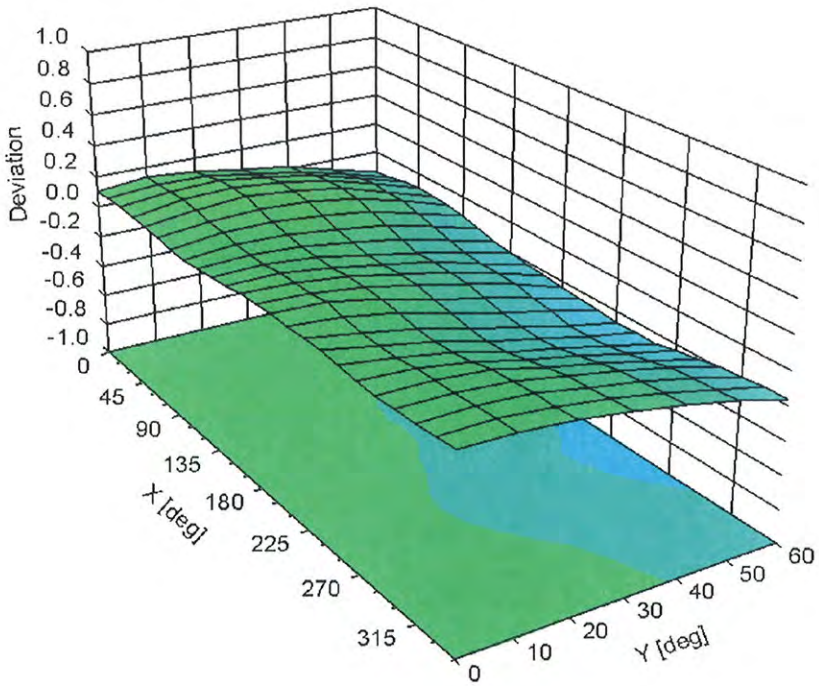


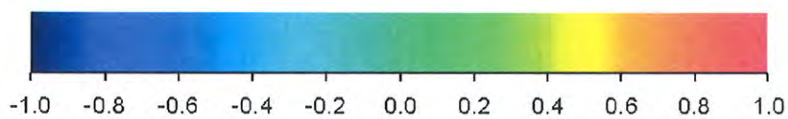
f = 835 MHz,WGLS R9 (H_convF)



Deviation from Isotropy in Air

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3590

Other Probe Parameters

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

D2: DAE

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

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

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

Accreditation No.: SCS 108

Client B.V. ADT (Auden)

Certificate No: DAE4-861_Aug11

CALIBRATION CERTIFICATE

Object: DAE4 - SD 000 D04 BJ - SN: 861

Calibration procedure(s): QA CAL-06.v23
Calibration procedure for the data acquisition electronics (DAE)

Calibration date: August 29, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-10 (No:10376)	Sep-11
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	08-Jun-11 (in house check)	In house check: Jun-12

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

Issued: August 29, 2011

Glossary

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

Methods Applied and Interpretation of Parameters

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

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	404.369 ± 0.1% (k=2)	404.758 ± 0.1% (k=2)	405.720 ± 0.1% (k=2)
Low Range	4.01191 ± 0.7% (k=2)	4.00807 ± 0.7% (k=2)	4.02061 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	126.0 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200003.7	2.18	0.00
Channel X	+ Input	19998.70	-2.10	-0.01
Channel X	- Input	-20000.72	-0.82	0.00
Channel Y	+ Input	200003.3	3.09	0.00
Channel Y	+ Input	19997.06	-2.54	-0.01
Channel Y	- Input	-20001.61	-1.81	0.01
Channel Z	+ Input	200001.0	1.32	0.00
Channel Z	+ Input	19998.31	-1.39	-0.01
Channel Z	- Input	-20000.55	-0.75	0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.2	0.12	0.01
Channel X	+ Input	200.25	0.05	0.02
Channel X	- Input	-198.30	1.80	-0.90
Channel Y	+ Input	2000.4	0.44	0.02
Channel Y	+ Input	198.69	-1.21	-0.60
Channel Y	- Input	-200.48	-0.48	0.24
Channel Z	+ Input	2000.1	0.13	0.01
Channel Z	+ Input	199.88	-0.22	-0.11
Channel Z	- Input	-201.71	-1.81	0.91

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	5.00	3.52
	- 200	-2.54	-4.10
Channel Y	200	0.95	1.43
	- 200	-2.77	-2.63
Channel Z	200	-9.47	-9.71
	- 200	7.61	7.59

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	4.12	-0.79
Channel Y	200	2.04	-	4.95
Channel Z	200	1.95	-0.33	-

4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	15976	16003
Channel Y	16064	16134
Channel Z	16042	16211

5. Input Offset Measurement

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

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-0.28	-2.06	1.31	0.64
Channel Y	-0.44	-1.89	2.45	0.60
Channel Z	-1.18	-2.63	1.47	0.74

6. Input Offset Current

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

7. Input Resistance (Typical values for information)

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

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

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

9. Power Consumption (Typical values for information)

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

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

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

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

Accreditation No.: SCS 108

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

Certificate No: DAE4-1277_Jul11

CALIBRATION CERTIFICATE

Object	DAE4 - SD 000 D04 BJ - SN: 1277
Calibration procedure(s)	QA CAL-06.v23 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	July 29, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Keithley Multimeter Type 2001	SN: 0810278	28-Sep-10 (No:10376)	Sep-11
Secondary Standards	**ID #**	**Check Date (in house)**	**Scheduled Check**
Calibrator Box V1.1	SE UMS 006 AB 1004	08-Jun-11 (in house check)	In house check: Jun-12

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

Issued: July 29, 2011

Glossary

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

Methods Applied and Interpretation of Parameters

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

DC Voltage Measurement

A/D - Converter Resolution nominal

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

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

Calibration Factors	X	Y	Z
High Range	405.508 ± 0.1% (k=2)	404.400 ± 0.1% (k=2)	405.608 ± 0.1% (k=2)
Low Range	4.01150 ± 0.7% (k=2)	3.99808 ± 0.7% (k=2)	3.94735 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	330.0 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200012.2	2.59	0.00
Channel X	+ Input	20000.02	0.32	0.00
Channel X	- Input	-19998.75	1.75	-0.01
Channel Y	+ Input	200009.4	0.74	0.00
Channel Y	+ Input	19995.02	-4.58	-0.02
Channel Y	- Input	-19999.88	-0.28	0.00
Channel Z	+ Input	200008.7	0.85	0.00
Channel Z	+ Input	19996.89	-2.51	-0.01
Channel Z	- Input	-20000.25	-0.85	0.00

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	1999.6	-0.36	-0.02
Channel X	+ Input	199.94	-0.06	-0.03
Channel X	- Input	-199.60	0.40	-0.20
Channel Y	+ Input	1999.8	-0.36	-0.02
Channel Y	+ Input	199.31	-0.49	-0.25
Channel Y	- Input	-200.76	-0.76	0.38
Channel Z	+ Input	2000.3	0.49	0.02
Channel Z	+ Input	198.51	-1.49	-0.74
Channel Z	- Input	-201.32	-1.42	0.71

2. Common mode sensitivity

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

	Common mode Input Voltage (mV)	High Range Average Reading (μV)	Low Range Average Reading (μV)
Channel X	200	-20.60	-22.40
	- 200	24.24	22.26
Channel Y	200	-12.18	-11.78
	- 200	10.76	10.25
Channel Z	200	1.85	2.01
	- 200	-4.45	-4.31

3. Channel separation

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

	Input Voltage (mV)	Channel X (μV)	Channel Y (μV)	Channel Z (μV)
Channel X	200	-	2.54	-1.13
Channel Y	200	2.90	-	5.32
Channel Z	200	1.19	-0.48	-

4. AD-Converter Values with inputs shorted

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

	High Range (LSB)	Low Range (LSB)
Channel X	15917	15565
Channel Y	16322	15815
Channel Z	16119	16292

5. Input Offset Measurement

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

	Average (μV)	min. Offset (μV)	max. Offset (μV)	Std. Deviation (μV)
Channel X	-1.37	-2.71	0.38	0.58
Channel Y	-2.06	-3.89	-0.52	0.56
Channel Z	-2.20	-3.36	-0.62	0.50

6. Input Offset Current

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

7. Input Resistance (Typical values for information)

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

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

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

9. Power Consumption (Typical values for information)

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

D3: SYSTEM VALIDATION DIPOLE

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

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

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

Accreditation No.: **SCS 108**

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

Certificate No: **D835V2-4d021_Mar11**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 4d021
Calibration procedure(s)	QA CAL-05.v8 Calibration procedure for dipole validation kits
Calibration date:	March 23, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: March 23, 2011

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

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

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V4.9	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.0 ± 6 %	0.89 mho/m ± 6 %
Head TSL temperature during test	(21.8 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.40 mW / g
SAR normalized	normalized to 1W	9.60 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**9.65 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.57 mW / g
SAR normalized	normalized to 1W	6.28 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**6.31 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	0.99 mho/m ± 6 %
Body TSL temperature during test	(21.7 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.56 mW / g
SAR normalized	normalized to 1W	10.2 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**10.1 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.68 mW / g
SAR normalized	normalized to 1W	6.72 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**6.63 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.0 Ω - 2.0 jΩ
Return Loss	- 31.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.9 Ω - 4.2 jΩ
Return Loss	- 26.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.393 ns

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

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

Design Modification by End User

The dipole has been modified with Teflon Rings (TR) placed within identified markings close to the end of each dipole arm. Calibration has been performed with TR attached to the dipole.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	April 22, 2004

DASY5 Validation Report for Head TSL

Date/Time: 18.03.2011 11:51:13

Test Laboratory: SPEAG, Zurich, Switzerland

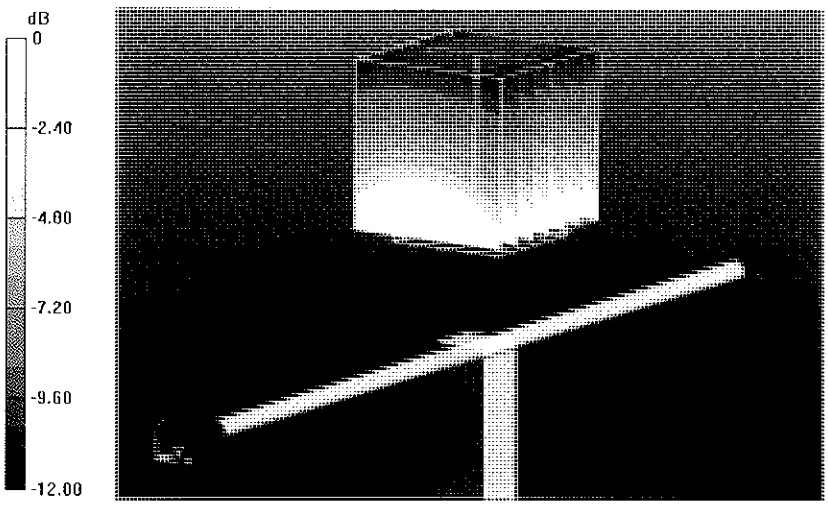
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d021

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: HSL900
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

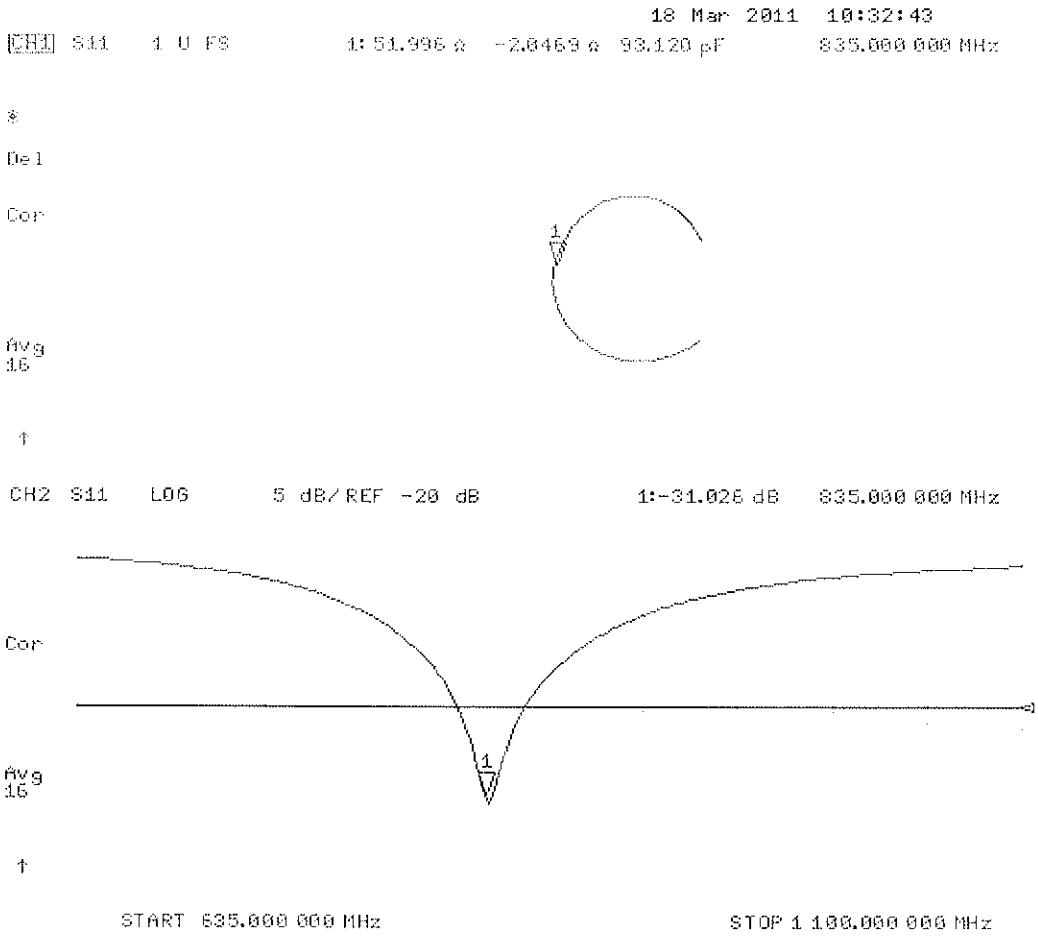
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.571 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.583 W/kg
SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.57 mW/g
Maximum value of SAR (measured) = 2.792 mW/g



0 dB = 2.790mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date/Time: 23.03.2011 10:45:49

Test Laboratory: SPEAG, Zurich, Switzerland

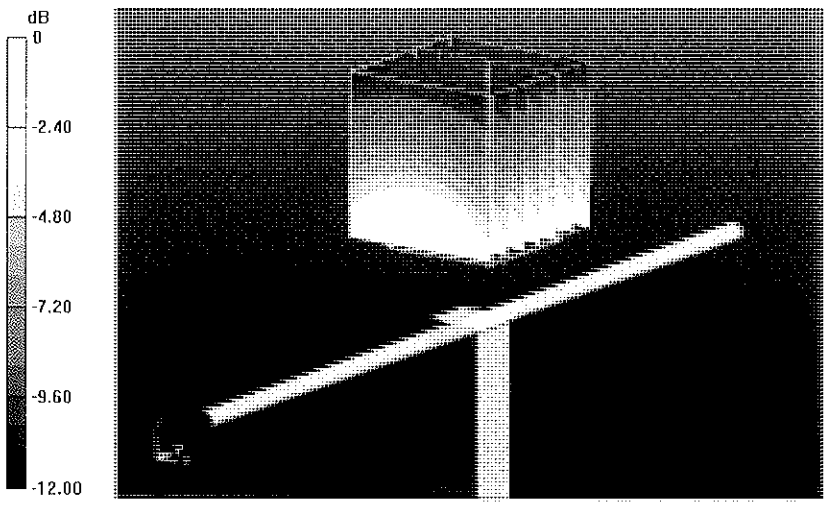
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d021

Communication System: CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: MSL900
Medium parameters used: f = 835 MHz; σ = 0.99 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

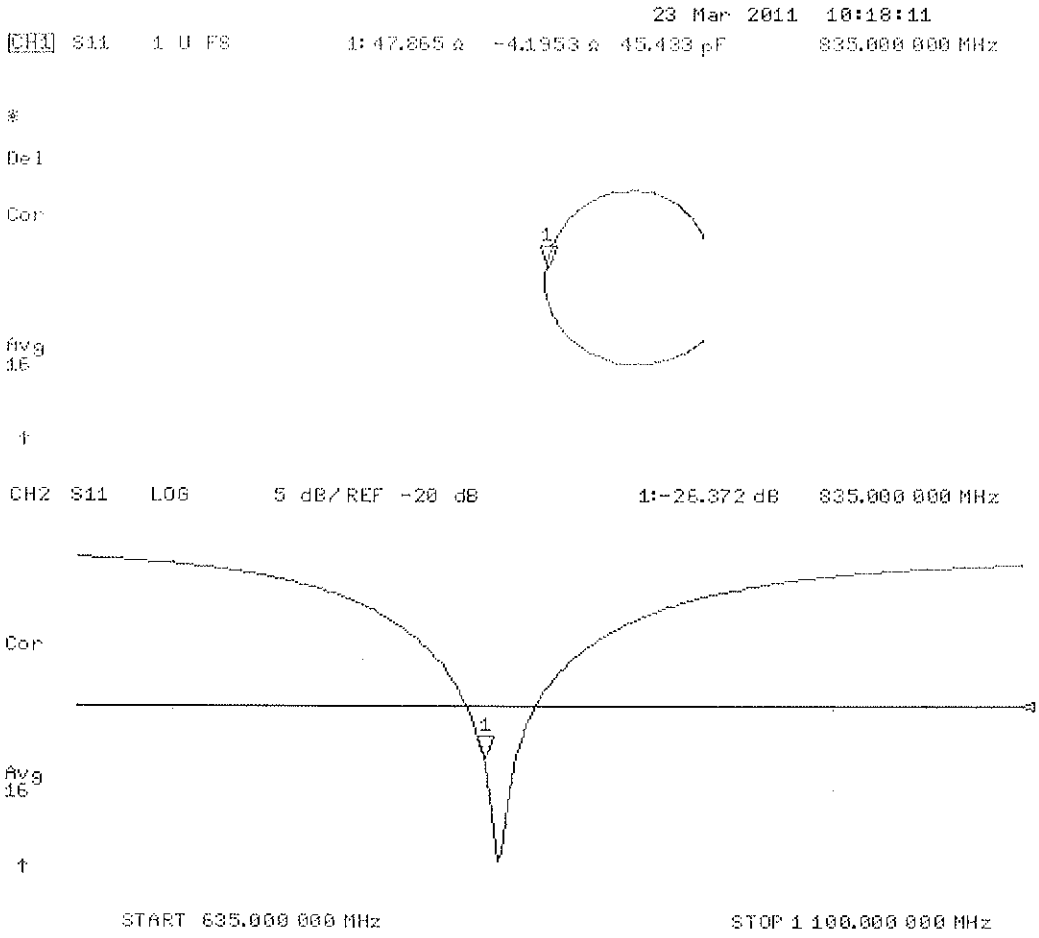
- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing SW: SEMCAD X, V14.4.4 Build (2829)

Pin=250 mW /d=15mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.615 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.794 W/kg
SAR(1 g) = 2.56 mW/g; SAR(10 g) = 1.68 mW/g
Maximum value of SAR (measured) = 2.981 mW/g



0 dB = 2.980mW/g

Impedance Measurement Plot for Body TSL



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

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

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

Accreditation No.: SCS 108

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

Certificate No: D1900V2-5d022_Jan11

CALIBRATION CERTIFICATE

Object: D1900V2 - SN: 5d022

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

Calibration date: January 26, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-10 (No. 217-01266)	Oct-11
Power sensor HP 8481A	US37292783	06-Oct-10 (No. 217-01266)	Oct-11
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: January 27, 2011

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.5 ± 6 %	1.43 mho/m ± 6 %
Head TSL temperature during test	(20.5 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.4 mW / g
SAR normalized	normalized to 1W	41.6 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**40.9 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.37 mW / g
SAR normalized	normalized to 1W	21.5 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**21.3 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.9 ± 6 %	1.56 mho/m ± 6 %
Body TSL temperature during test	(20.8 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.4 mW / g
SAR normalized	normalized to 1W	41.6 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**40.9 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.48 mW / g
SAR normalized	normalized to 1W	21.9 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**21.7 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.5 Ω + 4.0 jΩ
Return Loss	- 27.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.2 Ω + 4.0 jΩ
Return Loss	- 24.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.193 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 29, 2002

DASY5 Validation Report for Head TSL

Date/Time: 24.01.2011 11:20:43

Test Laboratory: SPEAG, Zurich, Switzerland

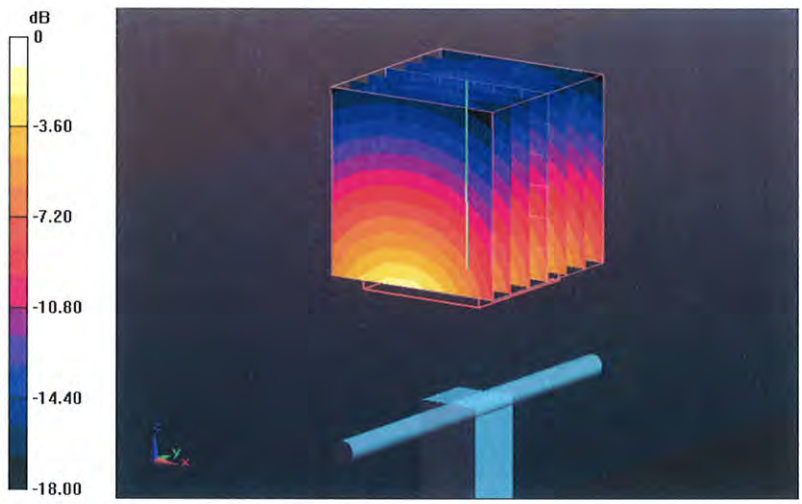
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d022

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

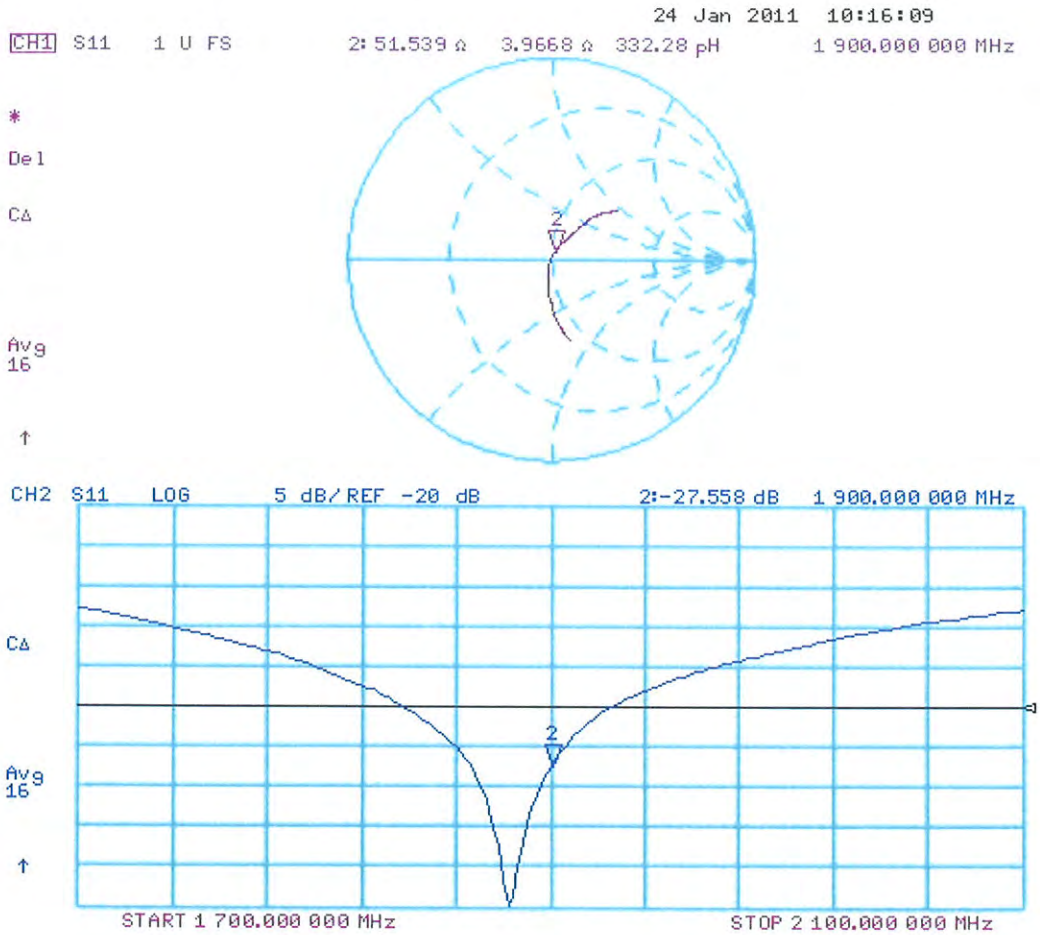
- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.002 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 19.131 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.37 mW/g
Maximum value of SAR (measured) = 12.963 mW/g



0 dB = 12.960mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date/Time: 26.01.2011 12:06:07

Test Laboratory: SPEAG, Zurich, Switzerland

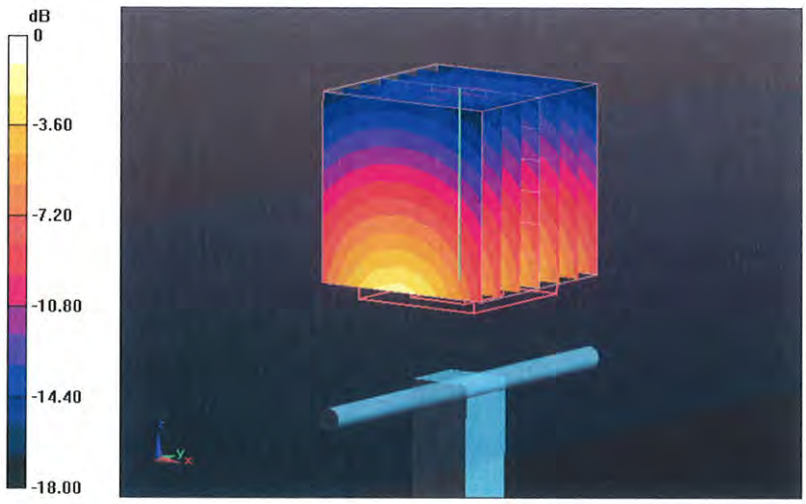
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d022

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: MSL U12 BB
Medium parameters used: f = 1900 MHz; σ = 1.56 mho/m; ε_r = 53.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.59, 4.59, 4.59); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing SW: SEMCAD X, V14.4.2 Build (2595)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.936 V/m; Power Drift = -0.0021 dB
Peak SAR (extrapolated) = 17.774 W/kg
SAR(1 g) = 10.4 mW/g; SAR(10 g) = 5.48 mW/g
Maximum value of SAR (measured) = 13.186 mW/g



0 dB = 13.190mW/g

Impedance Measurement Plot for Body TSL