FCC SAR TEST REPORT

(Mobile Phone)

REPORT NO.: SA110705C18C-2

MODEL NO.: PH98100

FCC ID: NM8PH98100

RECEIVED: Aug. 23, 2011

TESTED: Sep. 03 ~ Sep. 05, 2011

ISSUED: Sep. 15, 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

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Testing Laboratory
2021

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RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
Original release	NA	Sep. 15, 2011

1. CERTIFICATION

PRODUCT: Smartphone
MODEL NO.: PH98100
FCC ID: NM8PH98100
BRAND: HTC
APPLICANT: HTC Corporation
TESTED: Sep. 03 ~ Sep. 05, 2011
STANDARDS: **FCC Part 2 (Section 2.1093)**
FCC OET Bulletin 65 Supplement C (01-01)
IEEE 1528-2003

This report is issued as a supplementary report of **SA110705C18-1** for a new inductive cover. This report shall be used by combining with its original report. 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. 15, 2011
Ivonne Wu / Senior Specialist

APPROVED BY : Gary Chang , **DATE:** Sep. 15, 2011
Gary Chang / Technical Manager

Note: Only the test mode of worst case according to the original report was performed for this addendum. Other testing data refers to original report.

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

EUT	Smartphone
MODEL NO.	PH98100
FCC ID	NM8PH98100
CLASSIFICATION	Portable device, Prototype
UPLINK MODULATION TYPE	CDMA2000 : QPSK, OQPSK, HPSK LTE : QPSK, 16QAM
TX FREQUENCY RANGE	CDMA BC0 : 824.7 MHz ~ 848.31 MHz CDMA BC1 : 1851.25 MHz ~ 1908.75 MHz LTE Band 13 : 777 MHz ~ 787 MHz
ANTENNA TYPE	Fixed internal antenna
DATA CABLE	Refer to Note as below
I/O PORTS	Refer to user's manual
ACCESSORY DEVICES	Refer to Note as below

NOTE:

1. The EUT were powered by the following adapters, battery & accessories:

NO.	PRODUCT	BRAND	MODEL	DESCRIPTION
1	Power Adapter	hTC	TC U250	I/P: 100-240Vac, 50-60Hz, 200mA O/P: 5Vdc, 1A Manufacturer: Emerson
2			TC U250	I/P: 100-240Vac, 50-60Hz, 200mA O/P: 5Vdc, 1A Manufacturer: Delta
3	Battery 1	hTC	BH98100, BTR6425B	Rating: 3.8Vdc, 1620mAh, 6.15Whr
4	Extend Battery 2	hTC	BG05200, BTE6425B	Rating: 3.7Vdc, 2750mAh, 10.17Whr
5	USB cable	hTC	DC T500	1.25m shielded cable without core
6	Earphone	hTC	RC E160	1.25m shielded cable without core
7	beats earphone	hTC	RC E180	1.30m shielded cable without core

2. This is a supplementary report of SA110705C18-1. This report shall be combined together with its original report.
3. This report is prepared for FCC class II permissive change. Difference compared with the original report is adding inductive cover (Part Number: BR C700). Therefore, only the testing was performed for this addendum according to original worst case mode.
4. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or User's Manual.

2.2 SUMMARY OF PEAK SAR RESULTS

STANDALONE SAR			
Band		Position	SAR_{1g} (W/kg)
Ant-1 (1xRTT)	CDMA2000 BC0	Head	0.517
		Body (Body Worn)	0.541
		Body (Hotspot)	0.541
	CDMA2000 BC1	Head	0.718
		Body (Body Worn)	0.746
		Body (Hotspot)	0.746
Ant-2 (EVDO)	CDMA2000 BC0	Head	0.38
		Body (Body Worn)	0.437
		Body (Hotspot)	0.491
	CDMA2000 BC1	Head	0.48
		Body (Body Worn)	0.165
		Body (Hotspot)	0.412
Ant-3 (LTE)	LTE Band 13	Head	0.745
		Body (Body Worn)	0.329
		Body (Hotspot)	0.589

2.3 TEST CONFIGURATION

The EUT is a dual transmitter Simultaneous Voice and Data device that contains two independent WWAN transmitters with the capabilities listed in Table 2.1. The first transmitter supports a CDMA2000 1x call (e.g. voice, SMS) and the second transmitter supports a CDMA2000 EVDO or LTE data call. A simultaneous CDMA 1x voice and CDMA EVDO data connection is referred to as "SVDO" while a simultaneous CDMA 1x voice and LTE data connection is referred to as "SVLTE". The transmitters are independent in respect to the RF chains as each transmitter has dedicated RF circuitry (PA, RF filtering) and a unique transmit antenna. The device also contains an additional antenna associated with receiver diversity or unlicensed transmitters. The LTE UL MIMO configuration is 1x2 (1 UL antenna and 2 DL RX antennas).

Although the RF circuits are independent for both transmitters, the chipset solution incorporated SVDO/SVLTE implementation does include electrical connections between the voice and data transmitters such that the device can coordinate the transmit power of both transmitters. That said, the transmitters operate independently in the sense that they independently support voice or data connection without interaction between the modems or signaling from the WWAN network.

Table 2.1 EUT Technology Support

Mode	WWAN Technology	Supported Frequency Band(s) (MHz)	Channel BW (MHz)
Voice	CDMA2000 1x	Band Class 0: 824-848 Band Class I: 1850-1910	1.23 MHz 1.25 MHz
Data	CDMA2000 1xEvDO Rev.A	Band Class 0: 824-848 Band Class I: 1850-1910	1.23 MHz 1.25 MHz
Data	LTE	Band 13 (Upper 700 MHz): 777-787	10 MHz
Data	802.11a/b/g/n	2.45 GHz / 5GHz	40 MHz max

Table 2.2 Definition of Antennas

Antenna	Antenna Use	Technologies	TX Bands
1	Voice 1x TX/ RX+ LTE diversity (RX only)	1x	850/1900
2	EVDO Data TX/RX	EVDO	850/1900
3	LTE Data TX/RX	LTE	700
4	WLAN/BT	802.11 + Bluetooth	2400 MHz / 5GHz

Confirming the LTE transmitter follows 3GPP standards, is category 3, BW 10MHz, Band 13, and supports QPSK / 16QAM modulations. Tested per 3GPP 36.521 maximum transmit procedures for both QPSK / 16QAM.

Table 2.3 Simultaneous Transmission Possibilities

Simultaneous TX Combination	Configuration	Head SAR	Body SAR
1	CDMA850 Voice + DO850 Data + WLAN/BT	Yes	Body-Worn: Yes Hotspot: Yes
2	CDMA850 Voice + DO1900 Data + WLAN/BT	Yes	Body-Worn: Yes Hotspot: Yes
3	CDMA850 Voice + LTE700 Data + WLAN/BT	Yes	Body-Worn: Yes Hotspot: Yes
4	CDMA1900 Voice + DO850 Data + WLAN/BT	Yes	Body-Worn: Yes Hotspot: Yes
5	CDMA1900 Voice + DO1900 Data + WLAN/BT	Yes	Body-Worn: Yes Hotspot: Yes
6	CDMA1900 Voice + LTE700 Data + WLAN/BT	Yes	Body-Worn: Yes Hotspot: Yes
7	CDMA850 Voice + DO850 Data	Yes	Body-Worn: Yes Hotspot: No
8	CDMA850 Voice + DO1900 Data	Yes	Body-Worn: Yes Hotspot: No
9	CDMA850 Voice + LTE700 Data	Yes	Body-Worn: Yes Hotspot: No
10	CDMA1900 Voice + DO850 Data	Yes	Body-Worn: Yes Hotspot: No
11	CDMA1900 Voice + DO1900 Data	Yes	Body-Worn: Yes Hotspot: No
12	CDMA1900 Voice + LTE700 Data	Yes	Body-Worn: Yes Hotspot: No
13	CDMA850 Voice + WLAN/BT	Yes	Body-Worn: Yes Hotspot: No
14	CDMA1900 Voice + WLAN/BT	Yes	Body-Worn: Yes Hotspot: No
15	DO850 Data + WLAN/BT	No	Body-Worn: Yes Hotspot: Yes
16	DO1900 Data + WLAN/BT	No	Body-Worn: Yes Hotspot: Yes
17	LTE700 Data + WLAN/BT	No	Body-Worn: Yes Hotspot: Yes

LTE Maximum Power Reduction in accordance with 3GPP 36.101: Power reduction in accordance to 3GPP is active all times during LTE operation.

Modulation	Channel bandwidth / Transmission bandwidth configuration (RB)	MPR (dB)
	10MHz	
QPSK	> 12	1
16QAM	<=12	1
16QAM	> 12	2

Note: MPR is according to the standard and implemented in the circuit (mandatory).

In addition, the device is compliant with A-MPR requirements defined in 36.101 section 6.2.4 that may be required to meet 3GPP Adjacent Channel Leakage Ratio (“ACLR”) requirements. A-MPR was disabled for all FCC compliance testing.

1. In the SVDO modes, CDMA 1x and EV DO can transmit at maximum power level simultaneously.
2. In the SVLTE modes, CDMA 1x and LTE can transmit at maximum power level simultaneously.

SAR measurements were tested under maximum power level for CDMA 1x, CDMA EVDO and LTE technologies.

The WLAN and BT cannot transmit simultaneously, so there is no co-location test requirement for WLAN and BT.

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.

For WWAN SAR testing, the DUT is in CDMA2000 or LTE link mode, and the crest factor is 1.

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.

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

FCC KDB 648474 D01 v01r05

FCC KDB 941225 D01 v02

FCC KDB 941225 D05 v01

FCC KDB 941225 D06 v01

For inductive charging battery cover, we have got the FCC suggestion and comment under KDB 309699.

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

2.5 GENERAL INOFRMATION OF THE SAR SYSTEM

DASY4 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 software defined. The DASY4 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 μW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μW/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.

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	750, 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 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 permittivity ε =3 and loss tangent δ =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

ITEM	NAME	BRAND	TYPE	SERIES NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
1	SAM Phantom	S & P	QD000 P40 CA	TP-1485	NA	NA
2	Signal Generator	Agilent	E8257C	MY43320668	Dec. 27, 2010	Dec. 26, 2011
3	E-Field Probe	S & P	EX3DV4	3800	Aug. 05, 2011	Aug. 04, 2012
4	DAE	S & P	DAE3	510	Oct. 04, 2010	Oct. 03, 2011
5	Robot Positioner	Staubli Unimation	NA	NA	NA	NA
6	Validation Dipole	S & P	D750V3	1013	May 25, 2011	May 24, 2012
7			D835V2	4d021	Mar. 23, 2011	Mar. 22, 2012
8			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

ITEM	NAME	BRAND	TYPE	SERIES NO.	DATE OF CALIBRATION	DUE DATE OF CALIBRATION
1	Network Analyzer	Agilent	E8358A	US41480538	Dec. 30, 2010	Dec. 29, 2011
2	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 DASY5 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	σ
	- 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
σ	= 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 5x5x7 points with step size 8, 8 and 5 mm for 300 MHz to 3 GHz, and 7x7x9 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The routines are verified and optimized for the grid dimensions used in these cube measurements. 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. In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is 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

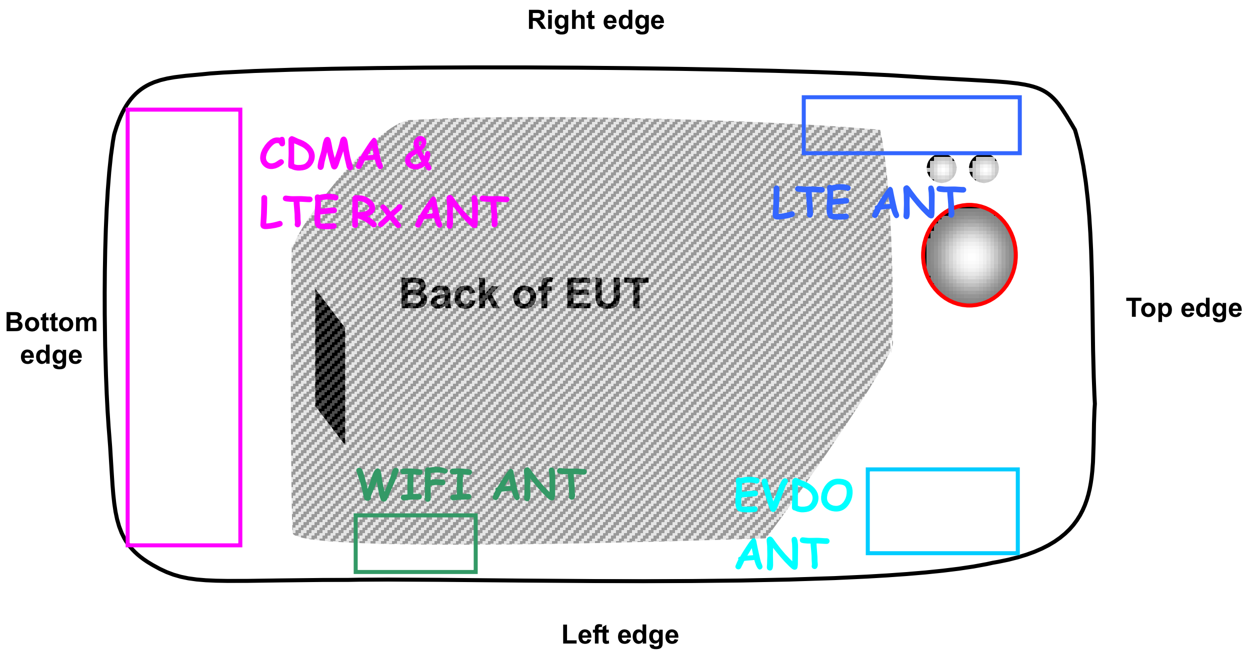
The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

NO.	PRODUCT	BRAND	MODEL NO.	SERIAL NO.
1	Universal Radio Communication Tester	R&S	CMU200	101372
2	Universal Radio Communication Tester	Anritsu	MT8820C	N/A

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 ANTENNA LOCATION



<Evaluation for Hotspot SAR>

CDMA mode:

Top side is not tested since the distance between antenna and top edge is > 2.5 cm.

EVDO mode:

Right edge and bottom edge are not tested since the distance between antenna and right edge and bottom edge are > 2.5 cm.

LTE mode:

Left edge and bottom edge are not tested since the distance between antenna and left edge and bottom edge are > 2.5 cm.

4. DESCRIPTION OF TEST POSITION

4.1 DESCRIPTION OF TEST POSITION

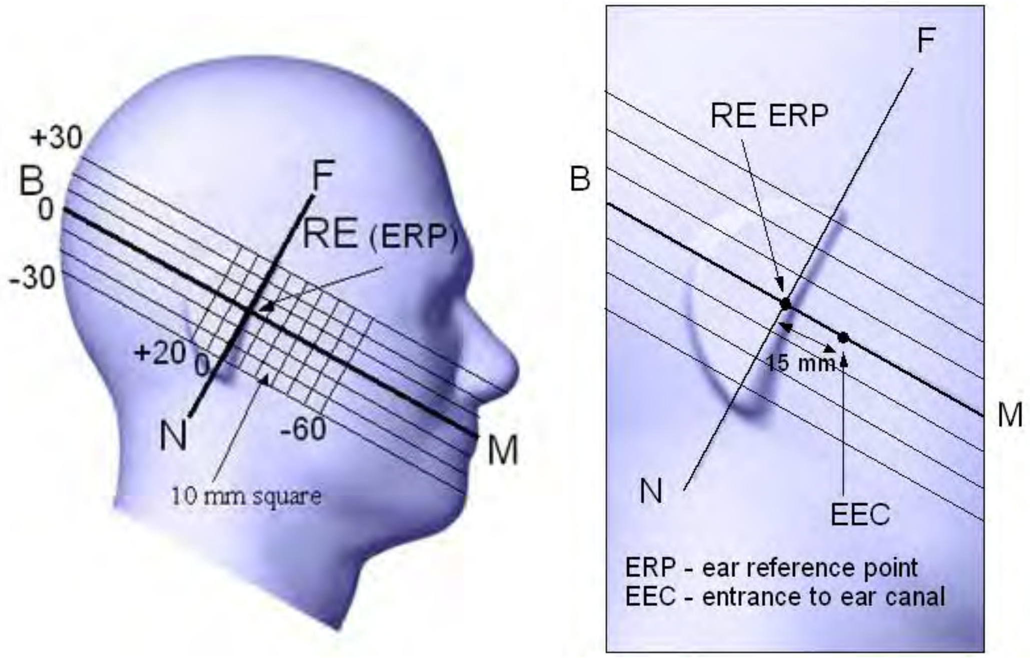


FIGURE 3.1

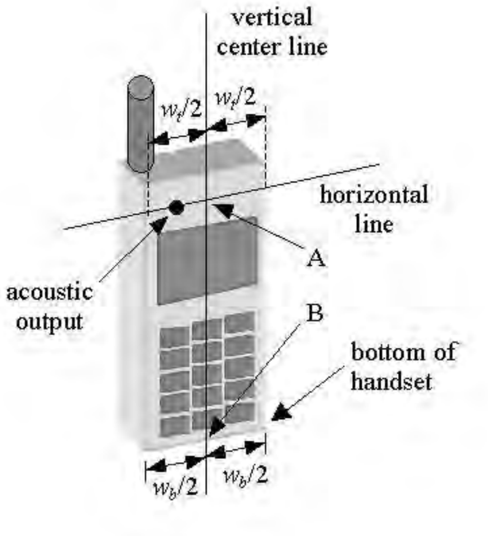


FIGURE 3.1a

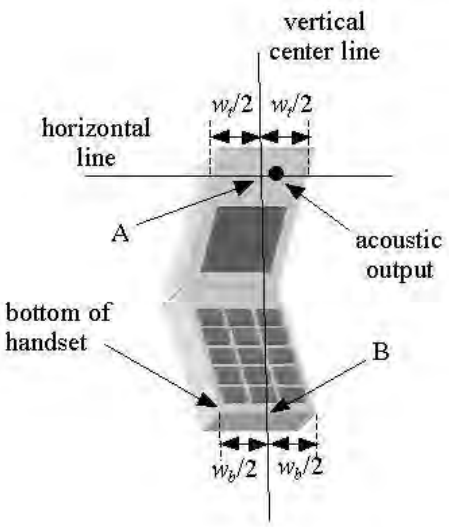


FIGURE 3.1b

4.1.1 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

4.1.2 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

4.1.3 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.

5. 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 750MHz (HSL-750)	BODY SIMULATING LIQUID 750MHz (MSL-750)
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% σ= 0.9 ± 5% S/m	f= 835MHz ε= 55.2 ± 5% σ= 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% σ= 1.40 ± 5% S/m	f= 1900MHz ε= 53.3 ± 5% σ= 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 $\sigma = \omega \varepsilon_0 \varepsilon'' = \varepsilon''$ 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. (℃)	Measured Conductivity (σ)	Target Conductivity / Deviation	Measured Permittivity (εr)	Target Permittivity / Deviation	Date
750	Head	21.2	0.869	0.89 / -2.4 %	40.8	41.9 / -2.6 %	Sep. 03, 2011
750	Head	21.1	0.869	0.89 / -2.4 %	40.9	41.9 / -2.4 %	Sep. 05, 2011
750	Body	21.3	0.980	0.96 / 2.1 %	55.6	55.5 / 0.2 %	Sep. 03, 2011
835	Head	22.2	0.900	0.90 / 0.0 %	40.3	41.5 / -2.9 %	Sep. 03, 2011
835	Body	21.3	0.963	0.97 / -0.7 %	54.6	55.2 / -1.1 %	Sep. 03, 2011
1900	Head	21.2	1.44	1.40 / 2.9 %	40.6	40.0 / 1.5 %	Sep. 03, 2011
1900	Head	21.0	1.39	1.40 / -0.7 %	40.3	40.0 / 0.8 %	Sep. 04, 2011
1900	Body	21.1	1.54	1.52 / 1.3 %	54.1	53.3 / 1.5 %	Sep. 04, 2011

6. 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.

6.1 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.

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

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

6.2 VALIDATION RESULTS

Date	Frequency (MHz)	Targeted SAR (W/kg)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Deviation (%)
Sep. 03, 2011	750	8.39	2.04	8.16	-2.74
Sep. 05, 2011	750	8.39	2.10	8.40	0.12
Sep. 03, 2011	750	8.93	2.31	9.24	3.47
Sep. 03, 2011	835	9.65	2.58	10.32	6.94
Sep. 03, 2011	835	10.10	2.44	9.76	-3.37
Sep. 03, 2011	1900	40.90	10.60	42.40	3.67
Sep. 04, 2011	1900	40.90	10.20	40.80	-0.24
Sep. 04, 2011	1900	40.90	10.30	41.20	0.73

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.

6.3 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	$\sqrt{3}$	0.7	0.7	0.10	0.10	∞
Hemispherical Isotropy	1.30	Rectangular	$\sqrt{3}$	0.7	0.7	0.53	0.53	∞
Boundary effects	1.00	Rectangular	$\sqrt{3}$	1	1	0.58	0.58	∞
Linearity	0.30	Rectangular	$\sqrt{3}$	1	1	0.17	0.17	∞
System Detection Limits	1.00	Rectangular	$\sqrt{3}$	1	1	0.58	0.58	∞
Readout Electronics	0.30	Normal	1	1	1	0.30	0.30	∞
Response Time	0.80	Rectangular	$\sqrt{3}$	1	1	0.46	0.46	∞
Integration Time	2.60	Rectangular	$\sqrt{3}$	1	1	1.50	1.50	∞
RF Ambient Noise	3.00	Rectangular	$\sqrt{3}$	1	1	1.73	1.73	9
RF Ambient Reflections	3.00	Rectangular	$\sqrt{3}$	1	1	1.73	1.73	9
Probe Positioner	0.40	Rectangular	$\sqrt{3}$	1	1	0.23	0.23	∞
Probe Positioning	2.90	Rectangular	$\sqrt{3}$	1	1	1.67	1.67	∞
Max. SAR Eval.	1.00	Rectangular	$\sqrt{3}$	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	$\sqrt{3}$	1	1	2.60	2.60	1
Dipole Related								
Dipole Axis to Liquid Distance	1.60	Rectangular	$\sqrt{3}$	1	1	0.92	0.92	4
Input Power Drift	4.30	Rectangular	$\sqrt{3}$	1	1	2.48	2.48	1
Phantom and Tissue parameters								
Phantom Uncertainty	4.00	Rectangular	$\sqrt{3}$	1	1	2.31	2.31	∞
Liquid Conductivity (target)	5.00	Rectangular	$\sqrt{3}$	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	$\sqrt{3}$	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**	

7. TEST RESULTS

7.1 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, 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%.

7.2 MEASURED SAR RESULTS

<Head SAR>

Plot No.	Band	Mode	Test Position	Channel	Ant Status	Battery	SAR_{1g} (W/kg)
1	CDMA2000 BC0	RC3+SO55	Left Cheek	384	1(Voice)	1	0.517
2	CDMA2000 BC0	RTAP 153.6	Right Cheek	777	2(Data)	1	0.38
19	CDMA2000 BC0	RTAP 153.6	Left Cheek	777	2(Data)	1	0.247
31	CDMA2000 BC1	RC3+SO55	Right Cheek	600	1(Voice)	1	0.718
20	CDMA2000 BC1	RC3+SO55	Left Cheek	600	1(Voice)	1	0.351
11	CDMA2000 BC1	RTAP 153.6	Right Cheek	600	2(Data)	1	0.48
22	LTE Band 13	QPSK	Left Cheek	23230	3(Data)	1	0.745
5	LTE Band 13	16QAM	Left Tilted	23230	3(Data)	1	0.471

<Body SAR: Body Worn Mode>

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Ant Status	Battery	SAR_{1g} (W/kg)
3	CDMA2000 BC0	RC3+SO32	Back Face	1.0	384	1(Voice)	1	0.541
9	CDMA2000 BC0	RTAP 153.6	Back Face	1.0	777	2(Data)	1	0.437
26	CDMA2000 BC1	RC3+SO32	Front Face	1.0	600	1(Voice)	1	0.746
14	CDMA2000 BC1	RTAP 153.6	Back Face	1.0	600	1(Voice)	1	0.165
7	LTE Band 13	QPSK	Back Face	1.0	23230	3(Data)	1	0.329
8	LTE Band 13	16QAM	Back Face	1.0	23230	3(Data)	1	0.323

<Body SAR: Hotspot Mode>

Plot No.	Band	Mode	Test Position	Separation Distance (cm)	Ch.	Ant Status	Battery	SAR_{1g} (W/kg)
3	CDMA2000 BC0	RC3+SO32	Back Face	1.0	384	1(Voice)	1	0.541
4	CDMA2000 BC0	RTAP 153.6	Left Edge	1.0	777	2(Data)	1	0.491
9	CDMA2000 BC0	RTAP 153.6	Back Face	1.0	777	2(Data)	1	0.437
26	CDMA2000 BC1	RC3+SO32	Front Face	1.0	600	1(Voice)	1	0.746
21	CDMA2000 BC1	RC3+SO32	Left Edge	1.0	600	1(Voice)	1	0.172
13	CDMA2000 BC1	RTAP 153.6	Left Edge	1.0	600	2(Data)	1	0.412
14	CDMA2000 BC1	RTAP 153.6	Back Face	1.0	600	2(Data)	1	0.165
6	LTE Band 13	QPSK	Right Edge	1.0	23230	3(Data)	1	0.589
7	LTE Band 13	QPSK	Back Face	1.0	23230	3(Data)	1	0.329
8	LTE Band 13	16QAM	Back Face	1.0	23230	3(Data)	1	0.323

Note:

1. The details of WLAN standalone SAR result can be referred to BVADT SAR report number SA110705C18C-3 dated Sep. 15, 2011.
2. Only the testing was performed for this addendum according to original worst case mode.
3. The worst modes were tested on battery 1 and the inductive cover.

7.3 SIMULTANEOUS TRANSMISSION EVALUATION

The worst case of volume scan SAR is shown as below.

Table 7.1 Worst Case of Volume Scan SAR Measurement Results from Original Report

Plot No.	Band	Mode	Test Position	Ch.	Ant Status	Battery	Standalone SAR_{1g} (W/kg)	Volume SAR_{1g} (W/kg)	Multi Band SAR_{1g}(W/kg)
179	CDMA2000 BC0	RTAP 153.6	Left Edge	777	2(Data)	1	1.12	1.29	1.4
180	CDMA2000 BC1	RC3+SO32	Left Edge	600	1(Voice)	1	0.242	0.265	
181	802.11b	-	Left Edge	6	4	1	0.596	0.526	

The verified data for worst case of volume scan SAR is shown as below.

Table 7.2 Verified Test Data for Worst Case of Volume Scan SAR Condition

Plot No.	Band	Mode	Test Position	Ch.	Ant Status	Battery	Standalone SAR_{1g} (W/kg)	Volume SAR_{1g} (W/kg)	Multi Band SAR_{1g}(W/kg)
4	CDMA2000 BC0	RTAP 153.6	Left Edge	777	2(Data)	1	0.491	-	-
21	CDMA2000 BC1	RC3+SO32	Left Edge	600	1(Voice)	1	0.172	-	
16	802.11b	-	Left Edge	6	4	1	0.546	-	

Summary: Because all the verified data are smaller than the original data, and the SAR summation of the verified data is less than 1.6W/kg, simultaneous SAR is not required.

7.4 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.

8. 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.

Date: 2011/9/3

System Check_HSL750_110903

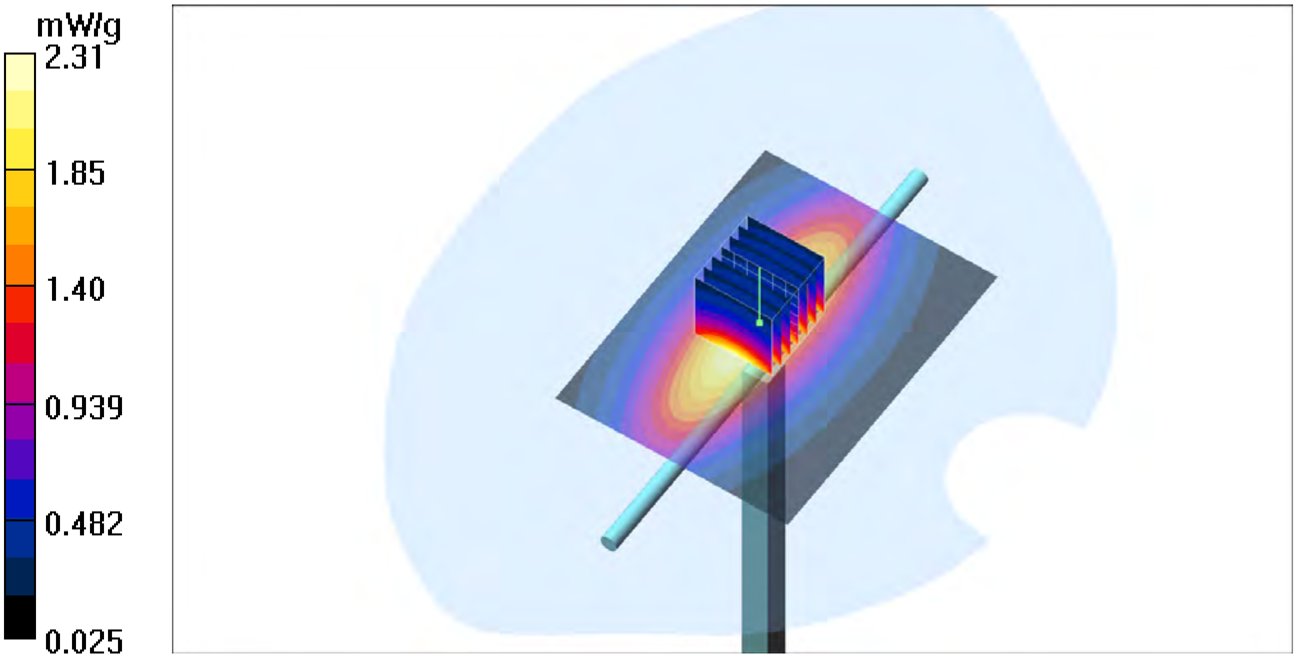
DUT: Dipole 750 MHz

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: HSL750_0903 Medium parameters used: f = 750.076 MHz; σ = 0.859 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(9.02, 9.02, 9.02); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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) = 2.31 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.2 V/m; Power Drift = -0.086 dB
Peak SAR (extrapolated) = 3.05 W/kg
SAR(1 g) = 2.04 mW/g; SAR(10 g) = 1.36 mW/g
Maximum value of SAR (measured) = 2.37 mW/g



Date: 2011/9/5

System Check_HSL750_110905

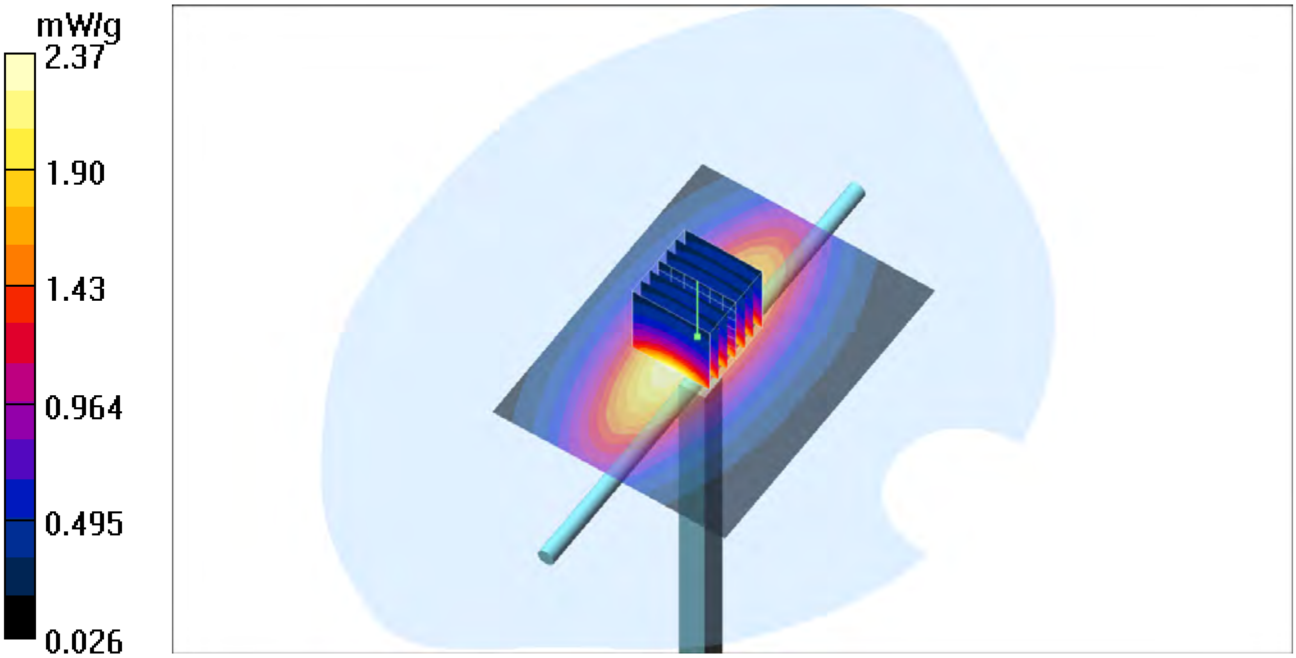
DUT: Dipole 750 MHz

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: HSL750_0905 Medium parameters used: f = 750 MHz; σ = 0.859 mho/m; ε_r = 40.9; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; Liquid Temperature：21.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(9.02, 9.02, 9.02); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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) = 2.37 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.5 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 3.13 W/kg
SAR(1 g) = 2.1 mW/g; SAR(10 g) = 1.39 mW/g
Maximum value of SAR (measured) = 2.44 mW/g



Date: 2011/9/3

System Check_MSL750_110903

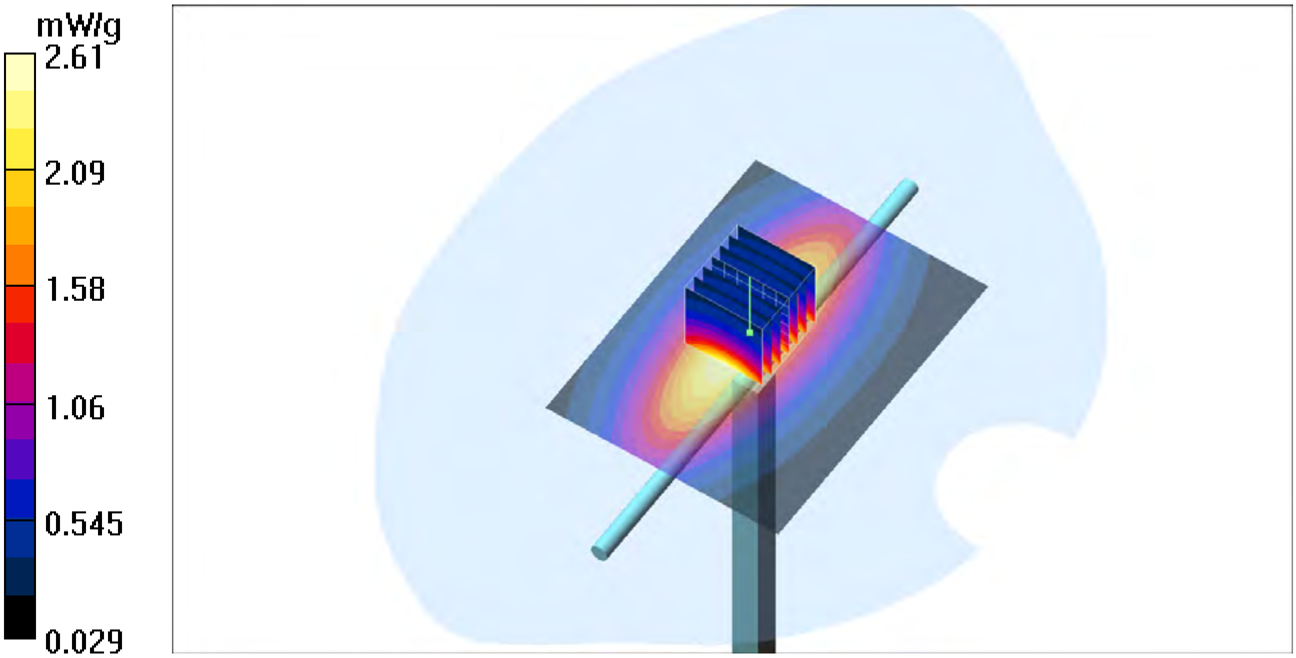
DUT: Dipole 750 MHz

Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium: MSL750_0903 Medium parameters used: f = 750 MHz; σ = 0.98 mho/m; ε_r = 55.6; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(9.34, 9.34, 9.34); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Front; Type: SAM V4.0; Serial: TP 1652
- 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) = 2.61 mW/g

d=15mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.3 V/m; Power Drift = -0.076 dB
Peak SAR (extrapolated) = 3.40 W/kg
SAR(1 g) = 2.31 mW/g; SAR(10 g) = 1.54 mW/g
Maximum value of SAR (measured) = 2.68 mW/g



Date: 2011/9/3

SystemCheck_HSL835_110903

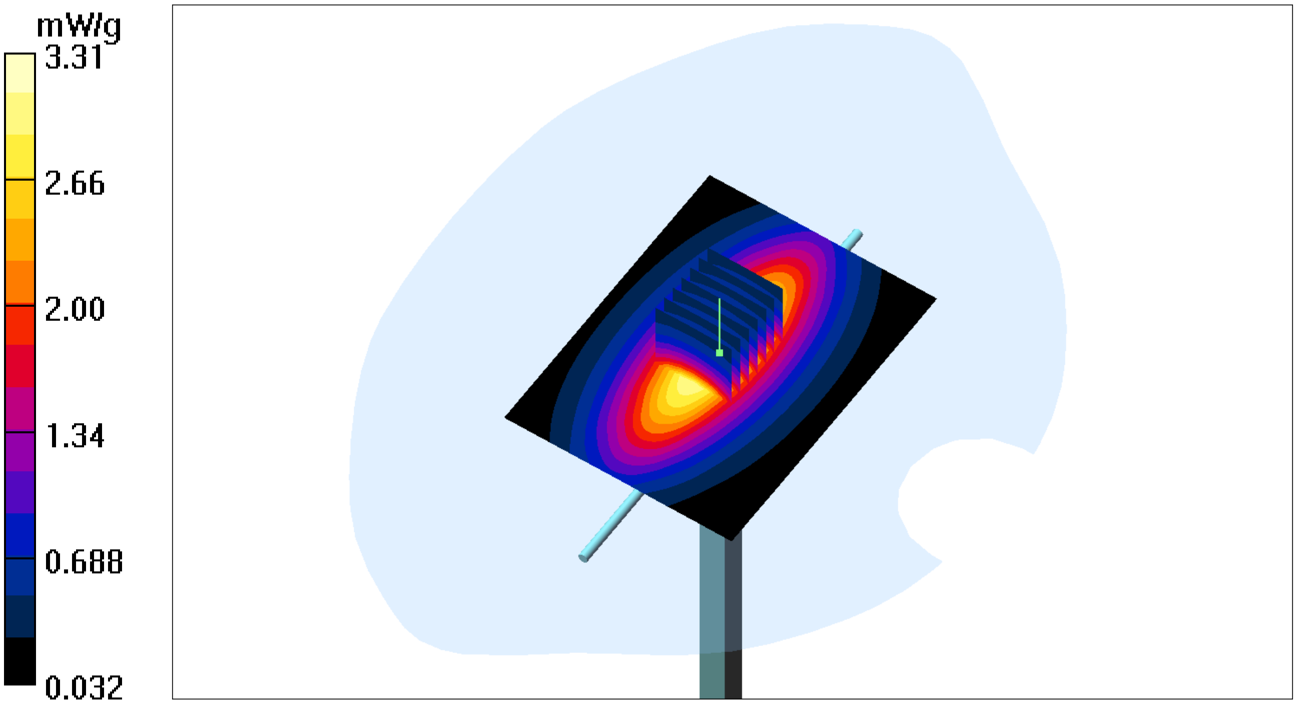
DUT: Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: HSL835_0903 Medium parameters used: f = 835 MHz; σ = 0.900 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃; Liquid Temperature：22.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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) = 3.31 mW/g

d=15mm, Pin=250mW/Zoom Scan(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 66.2 V/m; Power Drift = -0.102 dB
Peak SAR (extrapolated) = 3.90 W/kg
SAR(1 g) = 2.58 mW/g; SAR(10 g) = 1.68 mW/g
Maximum value of SAR (measured) = 3.29 mW/g



Date: 2011/9/3

SystemCheck_MSL835_110903

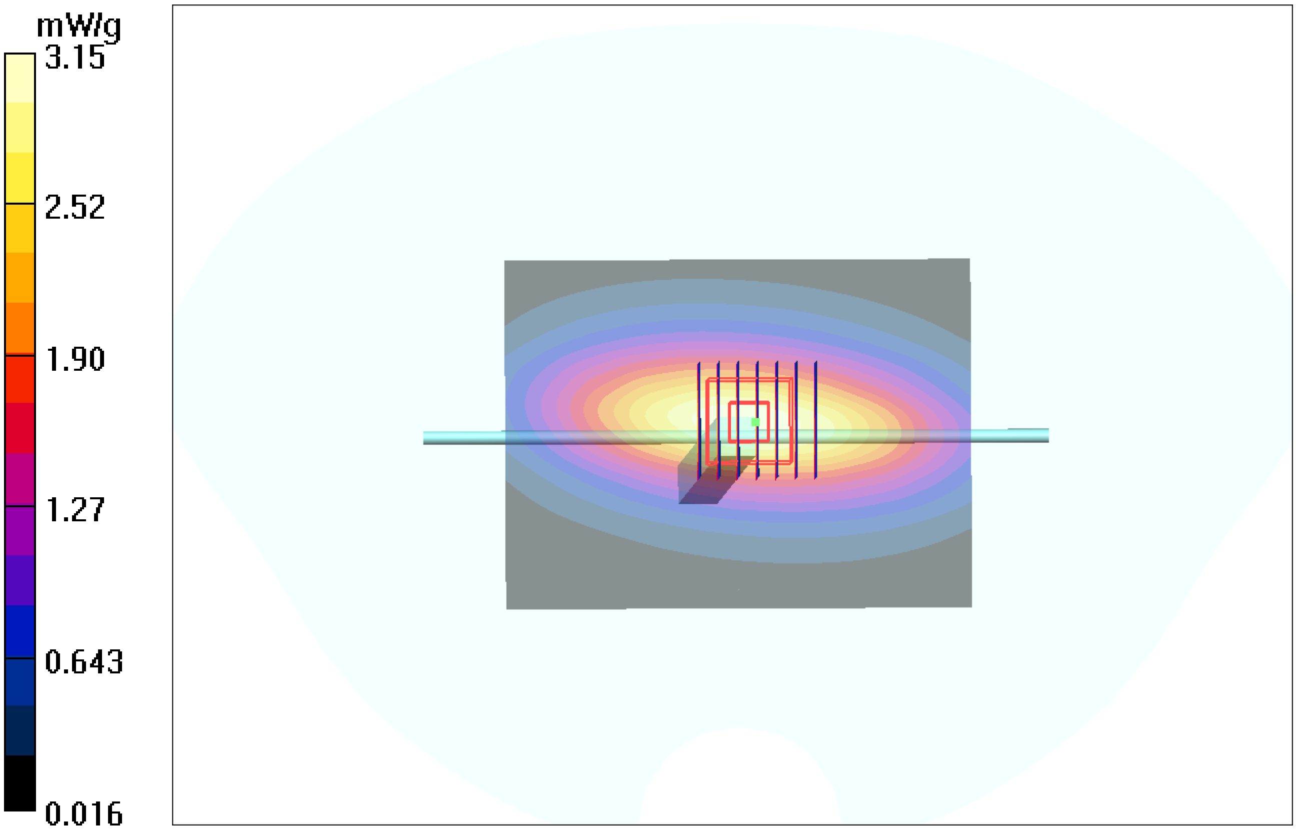
DUT: Dipole 835 MHz

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium: MSL835_0903 Medium parameters used: f = 835 MHz; σ = 0.963 mho/m; ε_r = 54.6; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM 12; Type: SAM V4.0; Serial: TP 1652
- 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) = 3.15 mW/g

d=15mm, Pin=250mW/Zoom Scan(7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.9 V/m; Power Drift = -0.074 dB
Peak SAR (extrapolated) = 3.62 W/kg
SAR(1 g) = 2.44 mW/g; SAR(10 g) = 1.6 mW/g
Maximum value of SAR (measured) = 3.09 mW/g



Date: 2011/9/3

System Check_HSL1900_110903

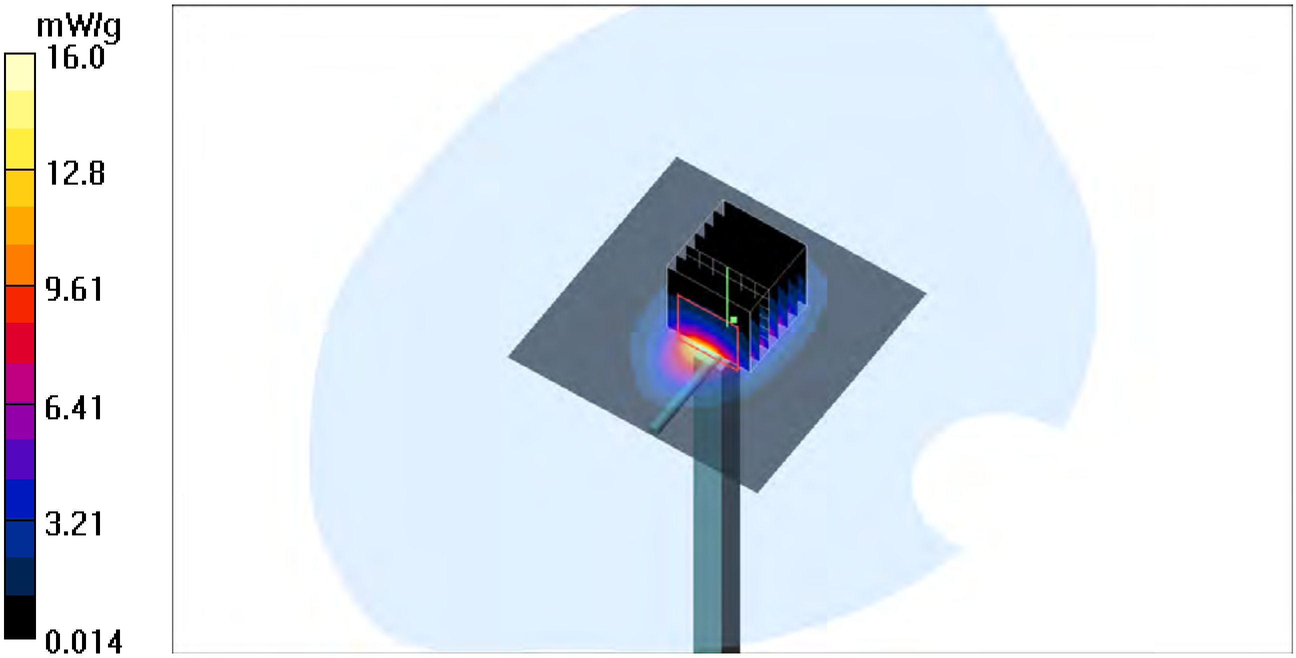
DUT: Dipole 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1900_0903 Medium parameters used: f = 1900 MHz; σ = 1.44 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(7.46, 7.46, 7.46); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 16.0 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.5 V/m; Power Drift = -0.032 dB
Peak SAR (extrapolated) = 20.3 W/kg
SAR(1 g) = 10.6 mW/g; SAR(10 g) = 5.35 mW/g
Maximum value of SAR (measured) = 15.5 mW/g



Date: 2011/9/4

System Check_HSL1900_110904

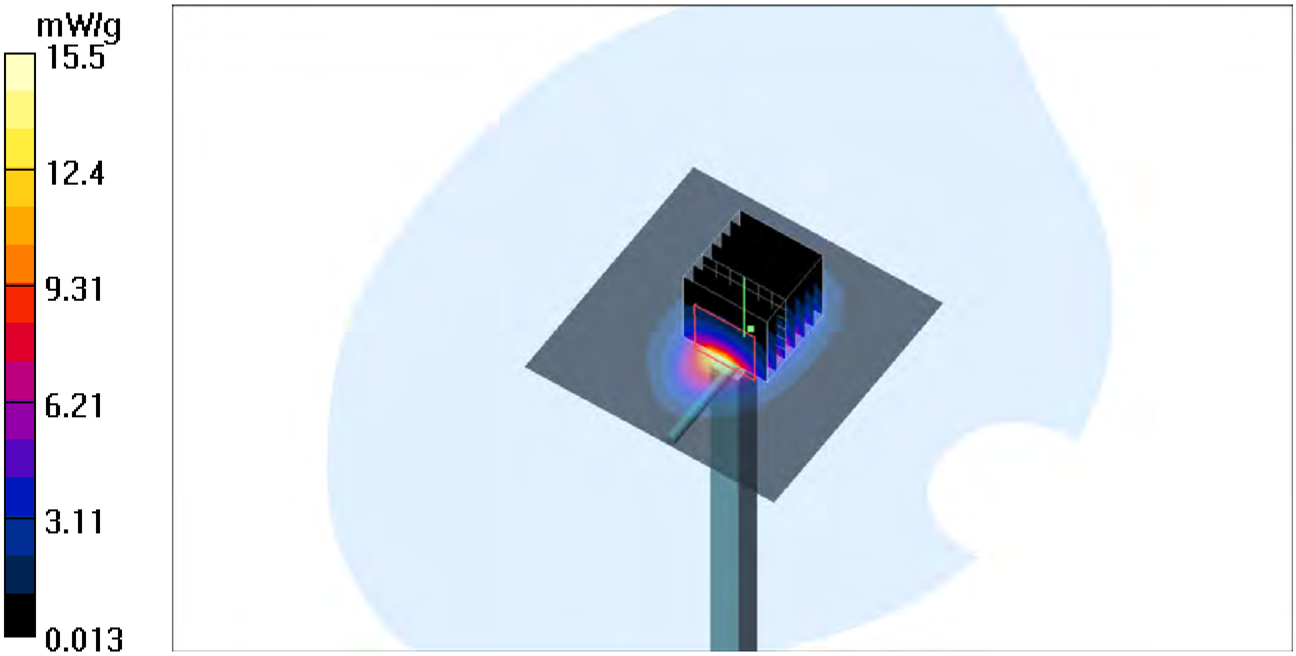
DUT: Dipole 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL1900_0904 Medium parameters used: f = 1900 MHz; σ = 1.39 mho/m; ε_r = 40.3; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃; Liquid Temperature：21.0 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(7.46, 7.46, 7.46); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 15.5 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.5 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 19.6 W/kg
SAR(1 g) = 10.2 mW/g; SAR(10 g) = 5.16 mW/g
Maximum value of SAR (measured) = 15.0 mW/g



Date: 2011/9/4

System Check_MSL1900_110904

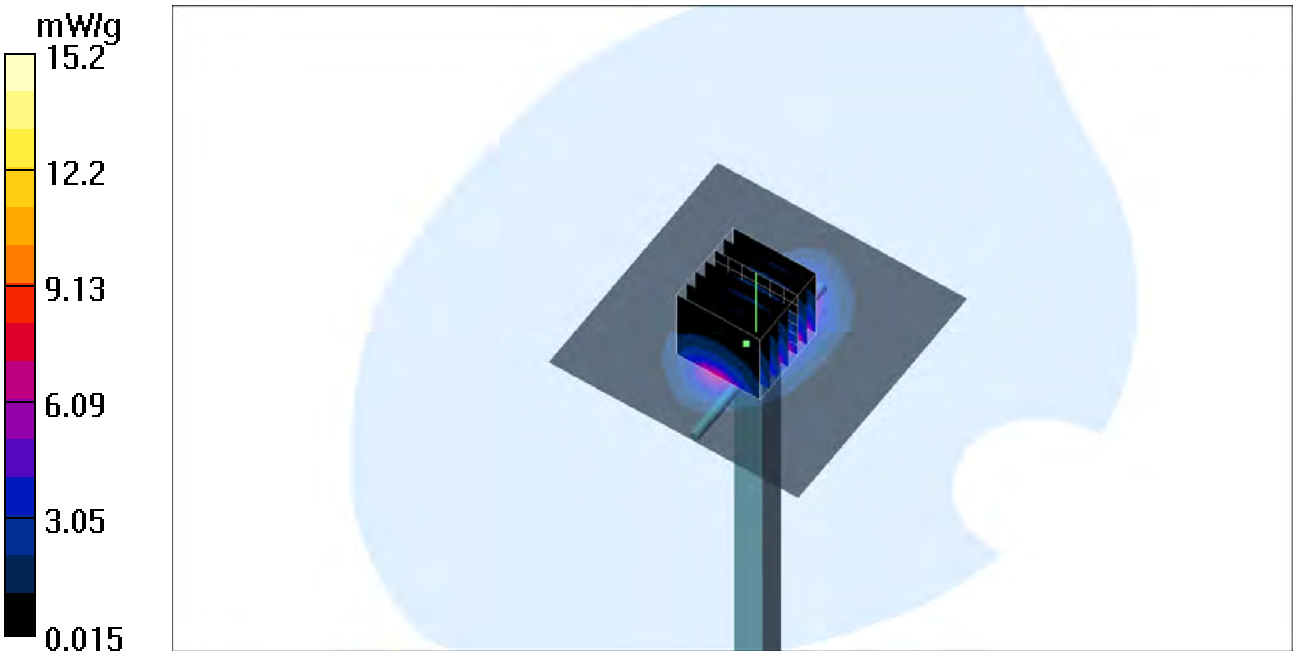
DUT: Dipole 1900 MHz

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: MSL1900_0904 Medium parameters used: f = 1900 MHz; σ = 1.54 mho/m; ε_r = 54.1; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃; Liquid Temperature：21.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(6.97, 6.97, 6.97); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

d=10mm, Pin=250mW/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 15.2 mW/g

d=10mm, Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 100.2 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 19.2 W/kg
SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.29 mW/g
Maximum value of SAR (measured) = 15.0 mW/g



Date: 2011/9/3

P22 LTE750_1RB _Left Cheek_Ch23230_Battery1

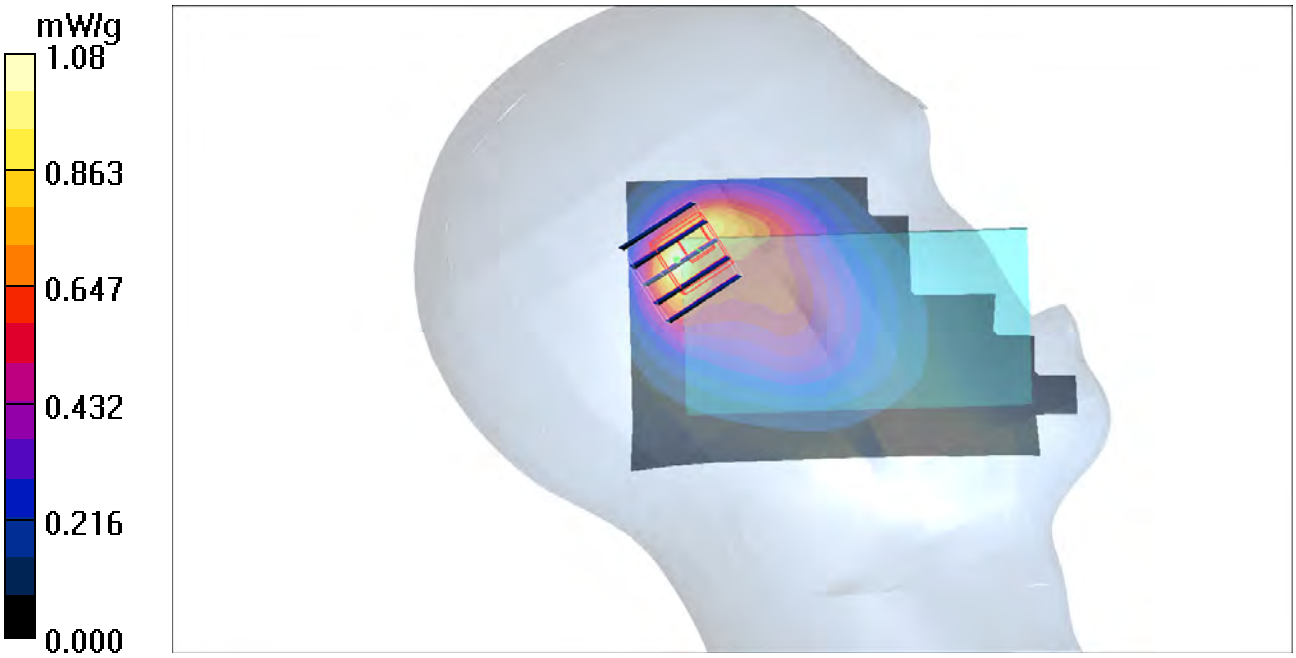
DUT: 110823C21

Communication System: LTE band13 (750); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: HSL750_0903 Medium parameters used: f = 782.237 MHz; σ = 0.899 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(9.02, 9.02, 9.02); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch23230/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.08 mW/g

Ch23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.8 V/m; Power Drift = -0.165 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.745 mW/g; SAR(10 g) = 0.403 mW/g
Maximum value of SAR (measured) = 1.14 mW/g



Date: 2011/9/3

P22 LTE750_1RB _Left Cheek_Ch23230_Battery1_2D

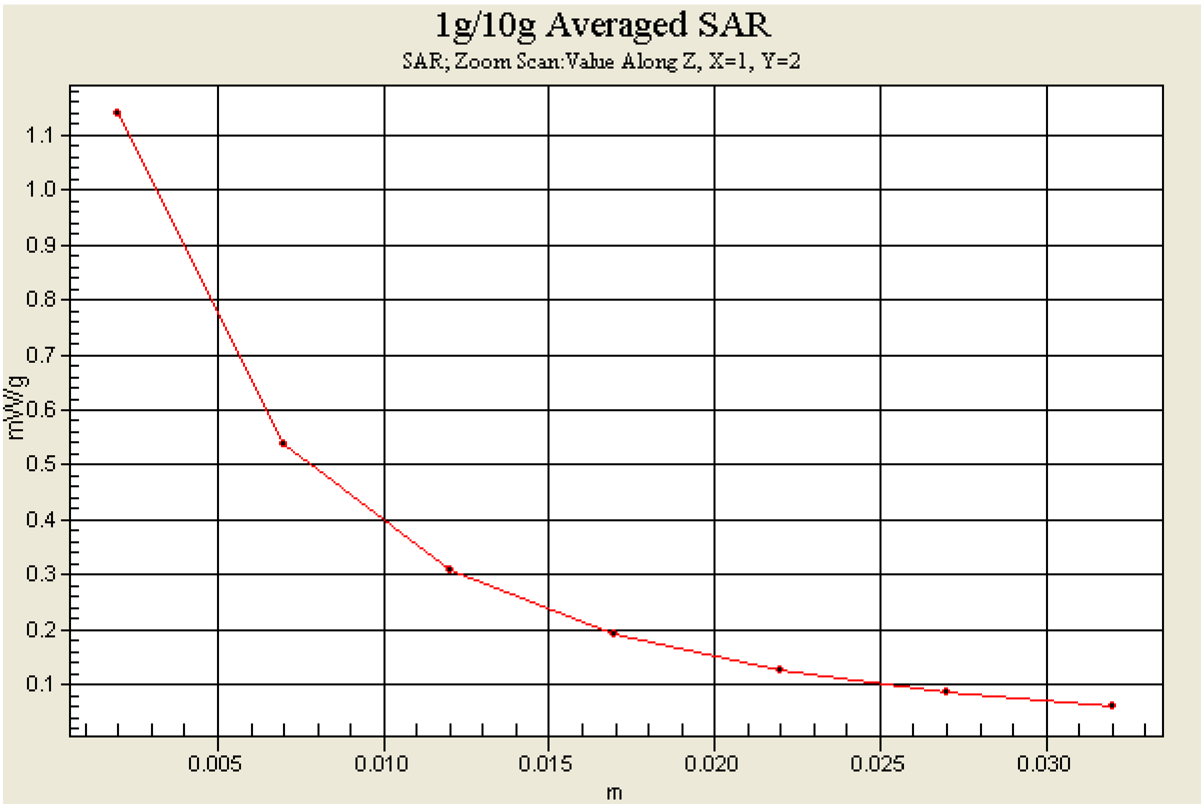
DUT: 110823C21

Communication System: LTE band13 (750); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: HSL750_0903 Medium parameters used: f = 782.237 MHz; σ = 0.899 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(9.02, 9.02, 9.02); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch23230/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.08 mW/g

Ch23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.8 V/m; Power Drift = -0.165 dB
Peak SAR (extrapolated) = 1.54 W/kg
SAR(1 g) = 0.745 mW/g; SAR(10 g) = 0.403 mW/g
Maximum value of SAR (measured) = 1.14 mW/g



Date: 2011/9/5

P05 LTE750_1RB _Left Tilted_Ch23230_Battery1

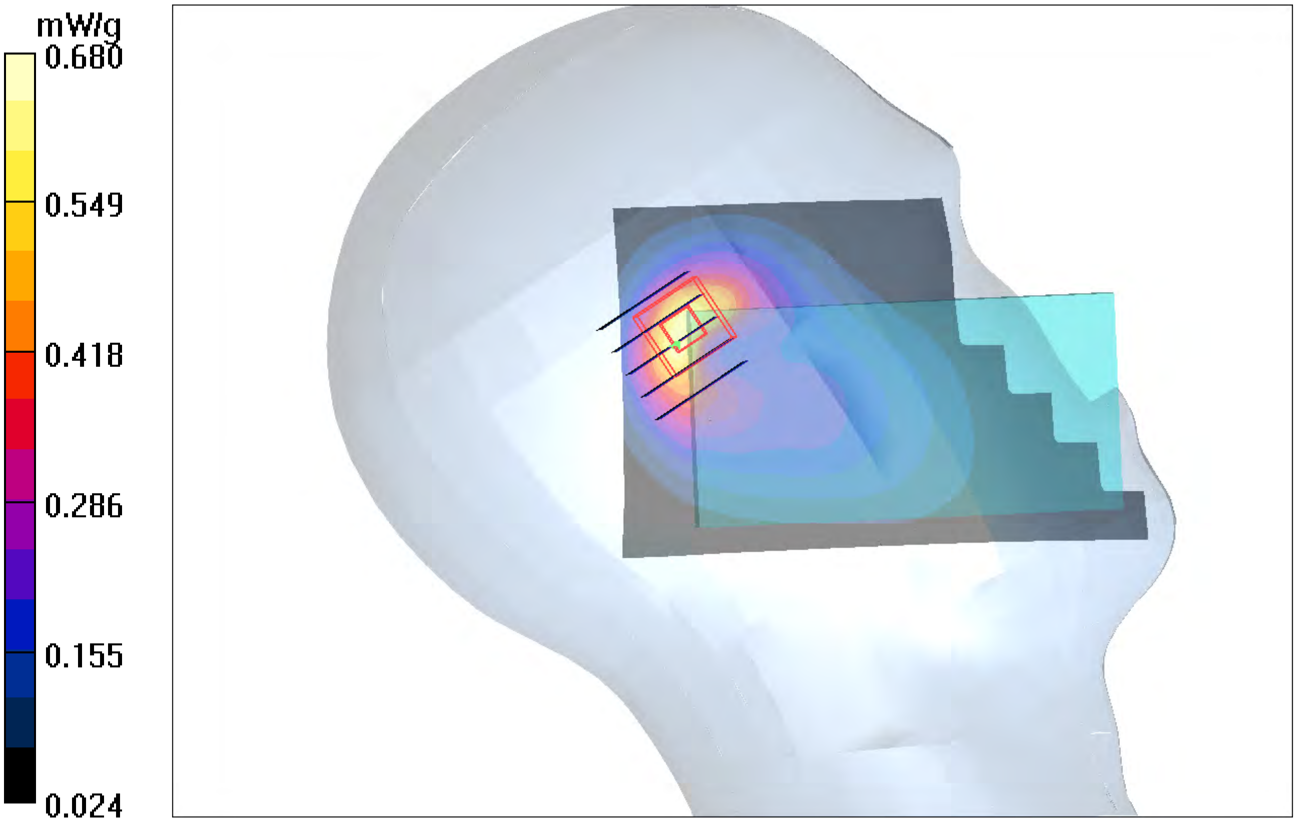
DUT: 110823C21

Communication System: LTE band13 (750); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: HSL750_0905 Medium parameters used: f = 782.237 MHz; σ = 0.9 mho/m; ε_r = 40.5; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(9.02, 9.02, 9.02); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch23230/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.621 mW/g

Ch23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.9 V/m; Power Drift = 0.147 dB
Peak SAR (extrapolated) = 0.933 W/kg
SAR(1 g) = 0.471 mW/g; SAR(10 g) = 0.260 mW/g
Maximum value of SAR (measured) = 0.680 mW/g



Date: 2011/9/3

P06 LTE750_1RB_Right Edge_Ch23230_Battery1

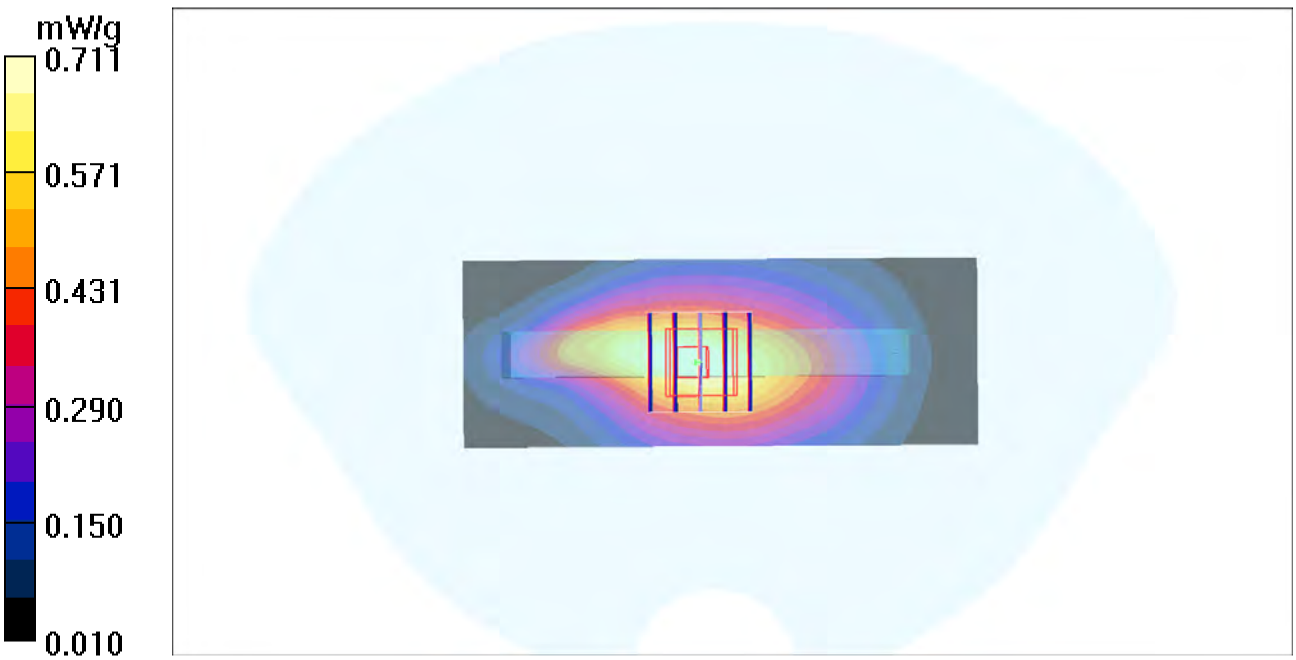
DUT: 110823C21

Communication System: LTE band13 (750); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: MSL750_0903 Medium parameters used : f = 782 MHz; σ = 1 mho/m; ε_r = 55.4; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(9.34, 9.34, 9.34); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch23230/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.711 mW/g

Ch23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.5 V/m; Power Drift = 0.125 dB
Peak SAR (extrapolated) = 0.841 W/kg
SAR(1 g) = 0.589 mW/g; SAR(10 g) = 0.409 mW/g
Maximum value of SAR (measured) = 0.727 mW/g



Date: 2011/9/3

P06 LTE750_1RB_Right Edge_Ch23230_Battery1_2D

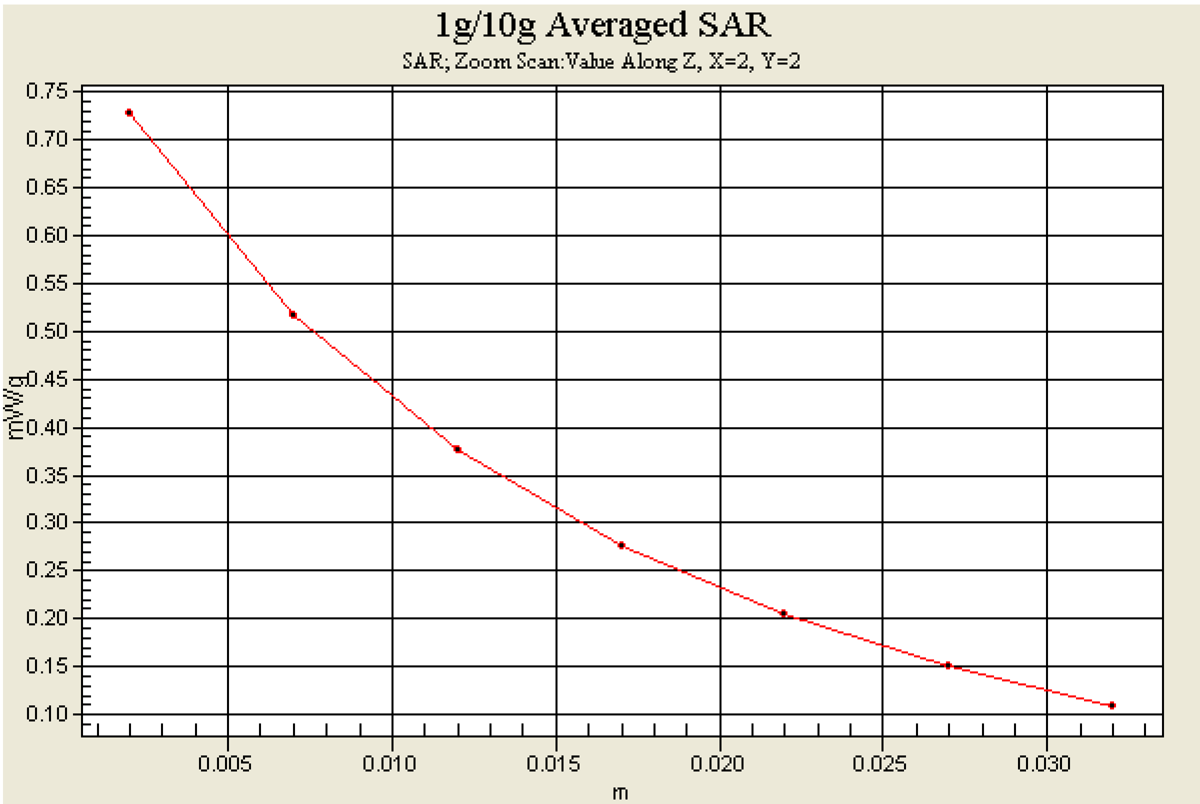
DUT: 110823C21

Communication System: LTE band13 (750); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: MSL750_0903 Medium parameters used : f = 782 MHz; σ = 1 mho/m; ε_r = 55.4; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(9.34, 9.34, 9.34); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch23230/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.711 mW/g

Ch23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.5 V/m; Power Drift = 0.125 dB
Peak SAR (extrapolated) = 0.841 W/kg
SAR(1 g) = 0.589 mW/g; SAR(10 g) = 0.409 mW/g
Maximum value of SAR (measured) = 0.727 mW/g



Date: 2011/9/3

P07 LTE750_1RB_Back Face_Ch23230_Battery1

DUT: 110823C21

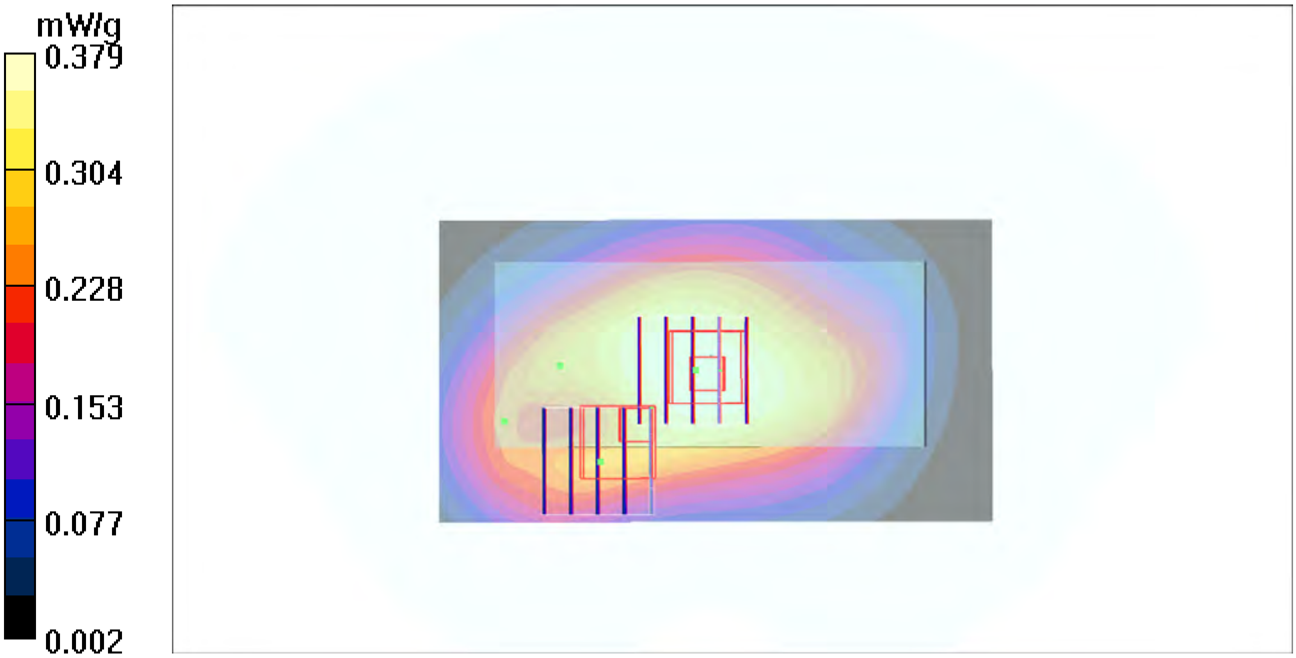
Communication System: LTE band13 (750); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: MSL750_0903 Medium parameters used : f = 782 MHz; σ = 1 mho/m; ε_r = 55.4; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(9.34, 9.34, 9.34); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch23230/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.379 mW/g

Ch23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.7 V/m; Power Drift = 0.178 dB
Peak SAR (extrapolated) = 0.420 W/kg
SAR(1 g) = 0.329 mW/g; SAR(10 g) = 0.252 mW/g
Maximum value of SAR (measured) = 0.379 mW/g

Ch23230/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.7 V/m; Power Drift = 0.178 dB
Peak SAR (extrapolated) = 0.398 W/kg
SAR(1 g) = 0.279 mW/g; SAR(10 g) = 0.191 mW/g
Maximum value of SAR (measured) = 0.355 mW/g



Date: 2011/9/3

P08 LTE750_1RB_Back Face_Ch23230_Battery1

DUT: 110823C21

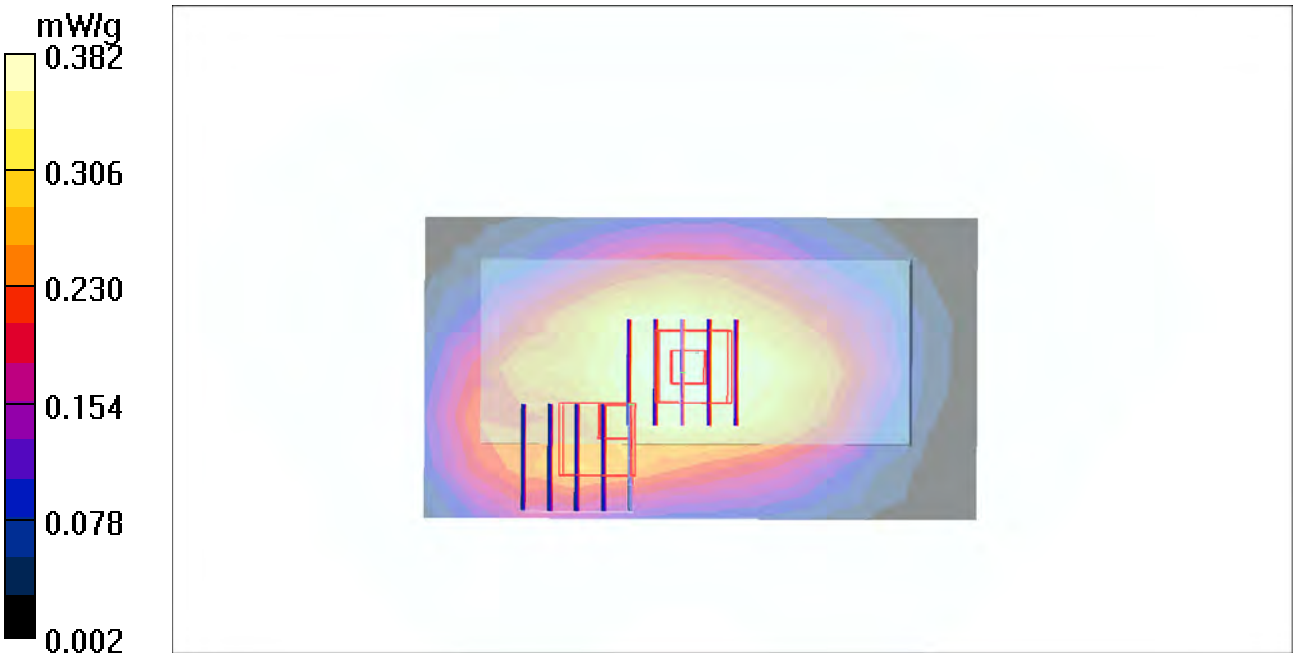
Communication System: LTE band13 (750); Frequency: 782 MHz;Duty Cycle: 1:1
Medium: MSL750_0903 Medium parameters used : f = 782 MHz; σ = 1 mho/m; ε_r = 55.4; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(9.34, 9.34, 9.34); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch23230/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.382 mW/g

Ch23230/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.8 V/m; Power Drift = -0.098 dB
Peak SAR (extrapolated) = 0.413 W/kg
SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.247 mW/g
Maximum value of SAR (measured) = 0.373 mW/g

Ch23230/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.8 V/m; Power Drift = -0.098 dB
Peak SAR (extrapolated) = 0.372 W/kg
SAR(1 g) = 0.260 mW/g; SAR(10 g) = 0.181 mW/g
Maximum value of SAR (measured) = 0.331 mW/g



Date: 2011/9/3

P01 CDMA2000 BC0_RC3_SO55_Left Cheek_Ch384_Battery1

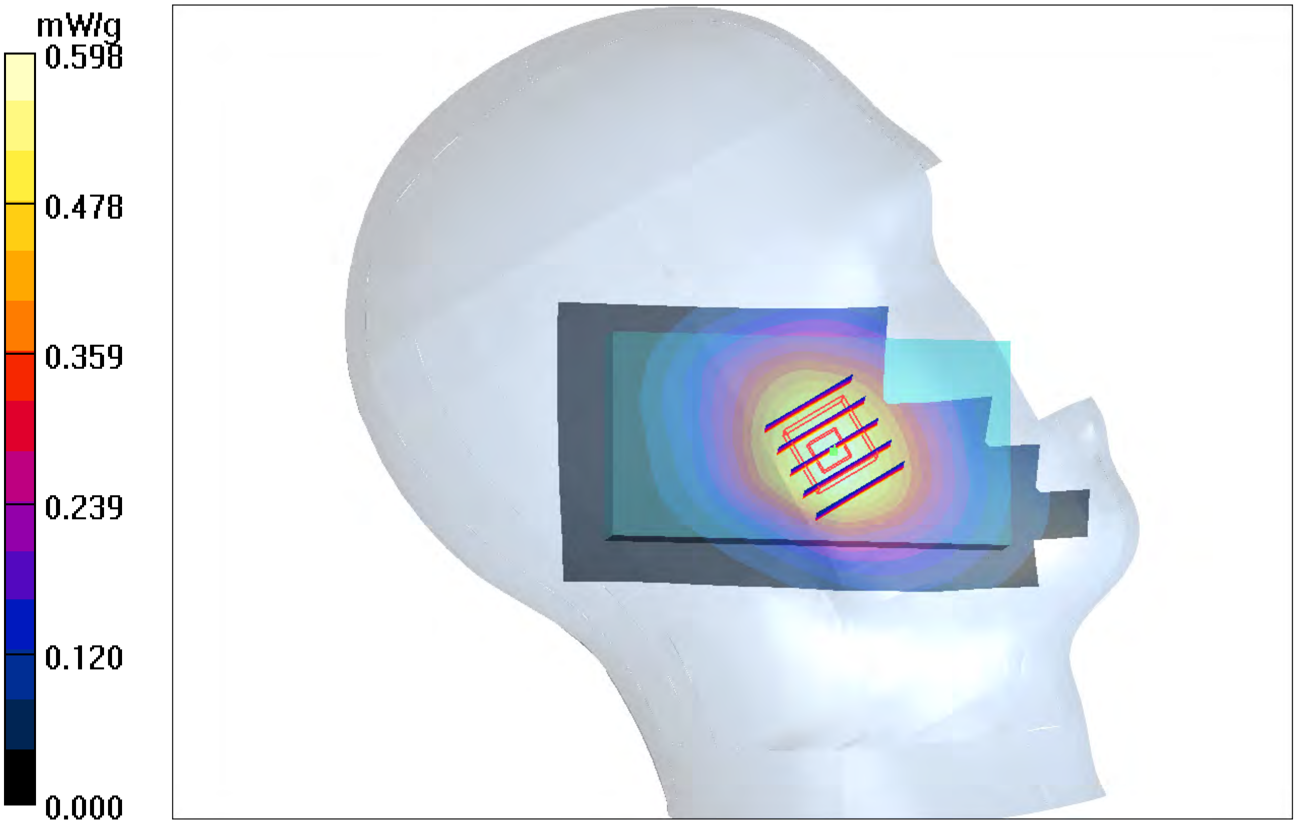
DUT: 110823C21

Communication System: CDMA850; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: HSL835_0903 Medium parameters used: f = 837 MHz; σ = 0.902 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch384/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.598 mW/g

Ch384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.31 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 0.649 W/kg
SAR(1 g) = 0.517 mW/g; SAR(10 g) = 0.387 mW/g
Maximum value of SAR (measured) = 0.592 mW/g



Date: 2011/9/3

P01 CDMA2000 BC0_RC3_SO55_Left Cheek_Ch384_Battery1_2D

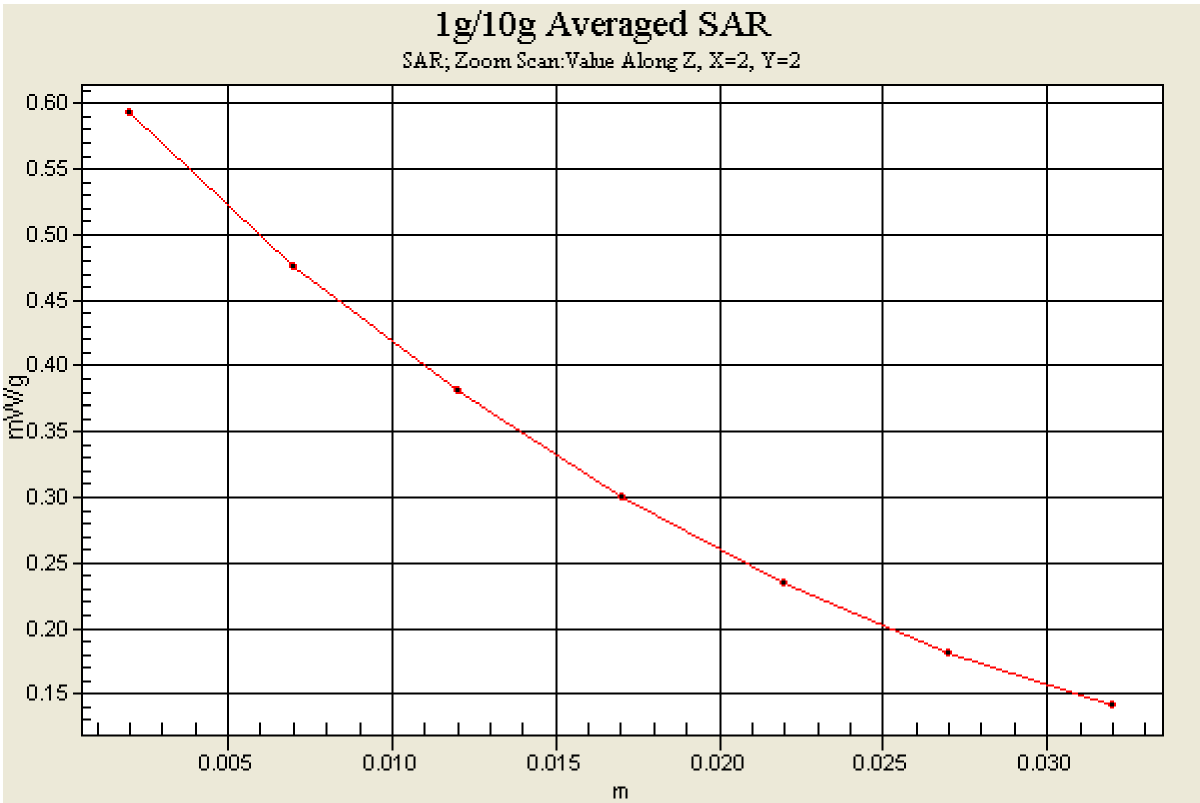
DUT: 110823C21

Communication System: CDMA850; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: HSL835_0903 Medium parameters used: f = 837 MHz; σ = 0.902 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch384/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.598 mW/g

Ch384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.31 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 0.649 W/kg
SAR(1 g) = 0.517 mW/g; SAR(10 g) = 0.387 mW/g
Maximum value of SAR (measured) = 0.592 mW/g



Date: 2011/9/3

P02 CDMA2000 BC0_RTAP153.6_Right Cheek_Ch777_Battery1

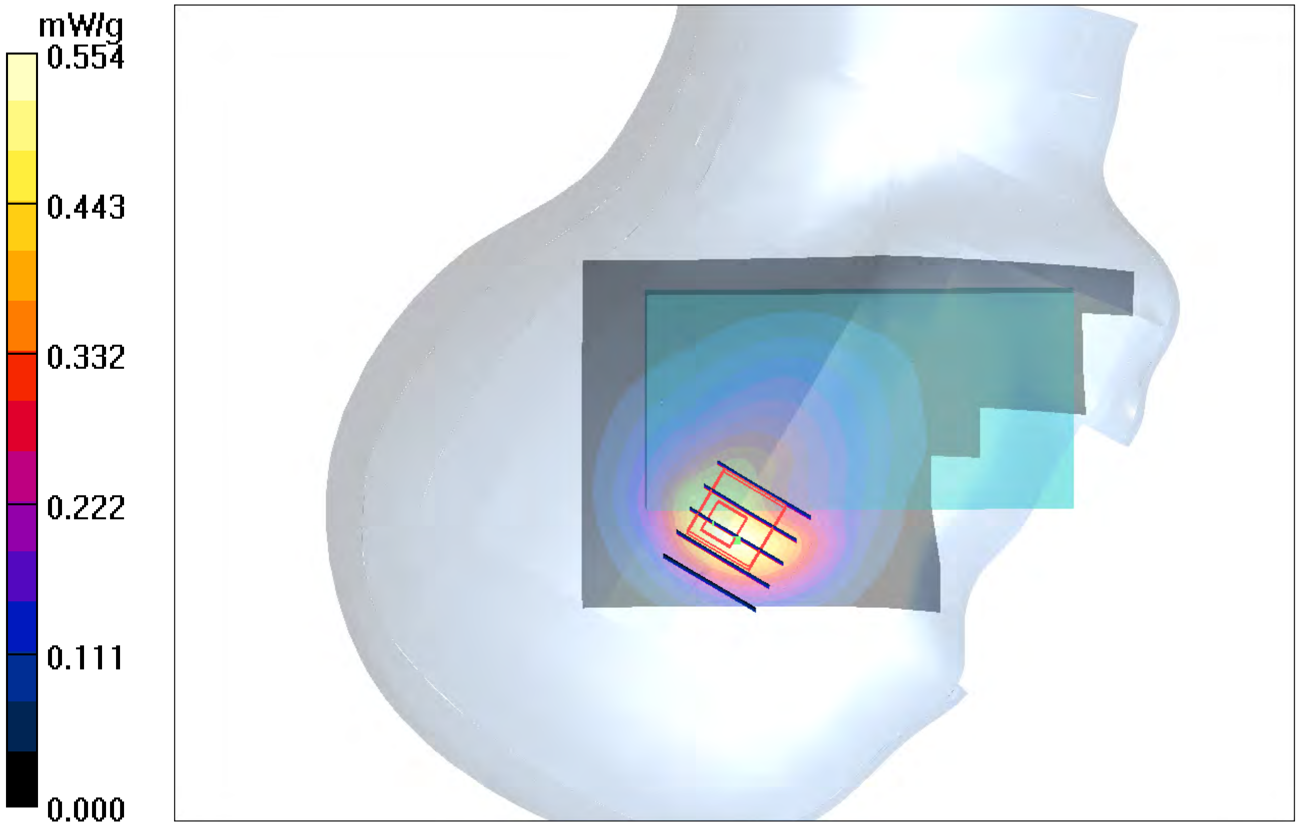
DUT: 110823C21

Communication System: CDMA850; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: HSL835_0903 Medium parameters used : f = 848.31 MHz; σ = 0.912 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch777/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.554 mW/g

Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.088 dB
Peak SAR (extrapolated) = 0.648 W/kg
SAR(1 g) = 0.380 mW/g; SAR(10 g) = 0.239 mW/g
Maximum value of SAR (measured) = 0.509 mW/g



Date: 2011/9/3

P02 CDMA2000 BC0_RTAP153.6_Right Cheek_Ch777_Battery1_2D

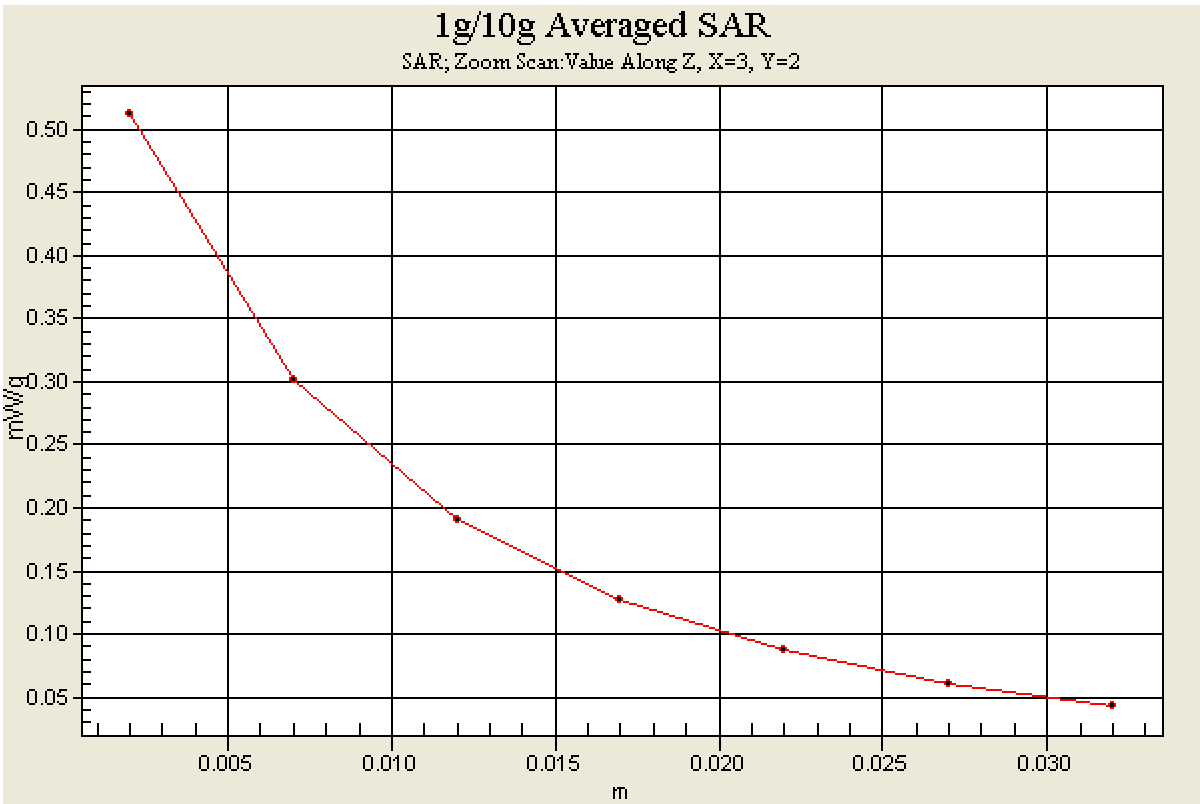
DUT: 110823C21

Communication System: CDMA850; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: HSL835_0903 Medium parameters used : f = 848.31 MHz; σ = 0.912mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch777/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.554 mW/g

Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.188 dB
Peak SAR (extrapolated) = 0.648 W/kg
SAR(1 g) = 0.380 mW/g; SAR(10 g) = 0.239 mW/g
Maximum value of SAR (measured) = 0.509 mW/g



Date: 2011/9/3

P19 CDMA2000 BC0_RTAP153.6_Left Cheek_Ch777_Battery1

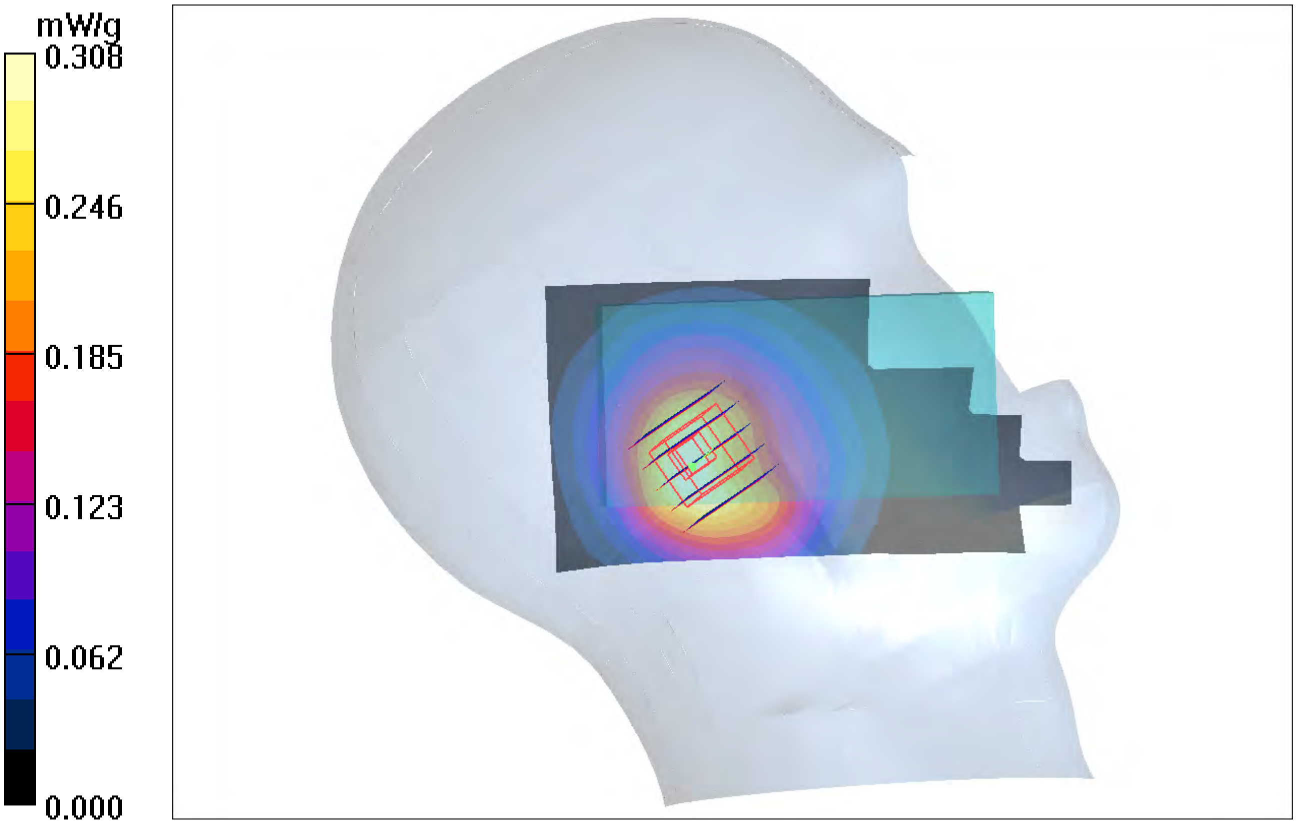
DUT: 110823C21

Communication System: CDMA850; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: HSL835_0903 Medium parameters used : f = 848.31 MHz; σ = 0.912 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; Liquid Temperature：22.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.7, 8.7, 8.7); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch777/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.308 mW/g

Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.9 V/m; Power Drift = 0.029 dB
Peak SAR (extrapolated) = 0.363 W/kg
SAR(1 g) = 0.247 mW/g; SAR(10 g) = 0.168 mW/g
Maximum value of SAR (measured) = 0.305 mW/g



Date: 2011/9/3

P10 CDMA2000 BC1_RC3_SO55_Right Cheek_Ch600_Battery1

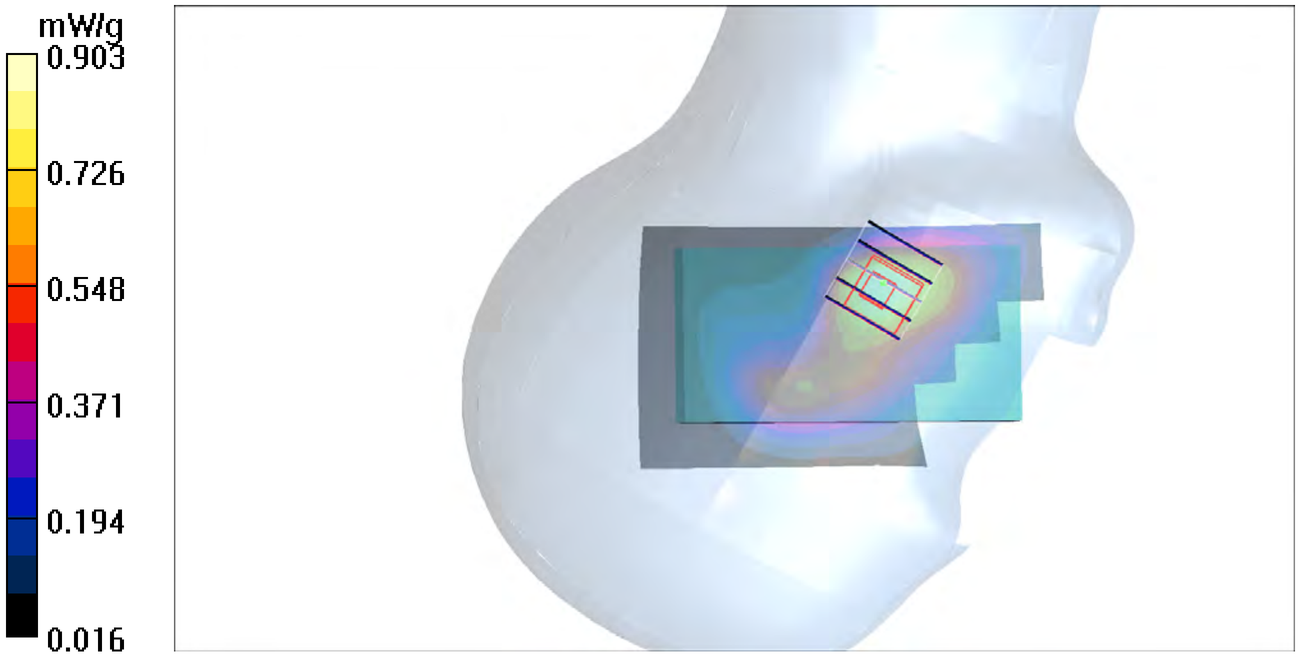
DUT: 110823C21

Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL1900_0903 Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.2 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(7.46, 7.46, 7.46); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch600/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.979 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.03 V/m; Power Drift = -0.178 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.718 mW/g; SAR(10 g) = 0.452 mW/g
Maximum value of SAR (measured) = 0.903 mW/g



Date: 2011/9/3

P10 CDMA2000 BC1_RC3_SO55_Right Cheek_Ch600_Battery1

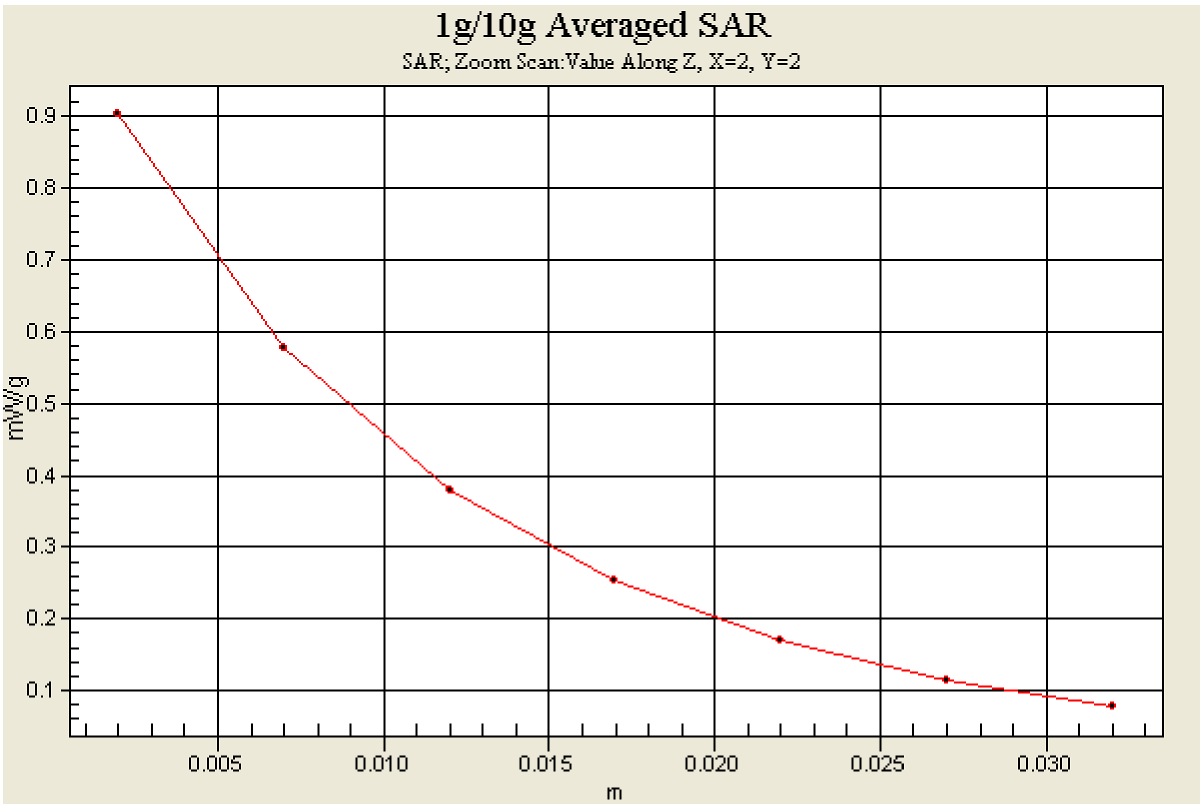
DUT: 110823C21

Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL1900_0903 Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(7.46, 7.46, 7.46); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch600/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.979 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.03 V/m; Power Drift = -0.178 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.718 mW/g; SAR(10 g) = 0.452 mW/g
Maximum value of SAR (measured) = 0.903 mW/g



Date: 2011/9/4

P20 CDMA2000 BC1_RC3_SO55_Left Cheek_Ch600_Battery1

DUT: 110823C21

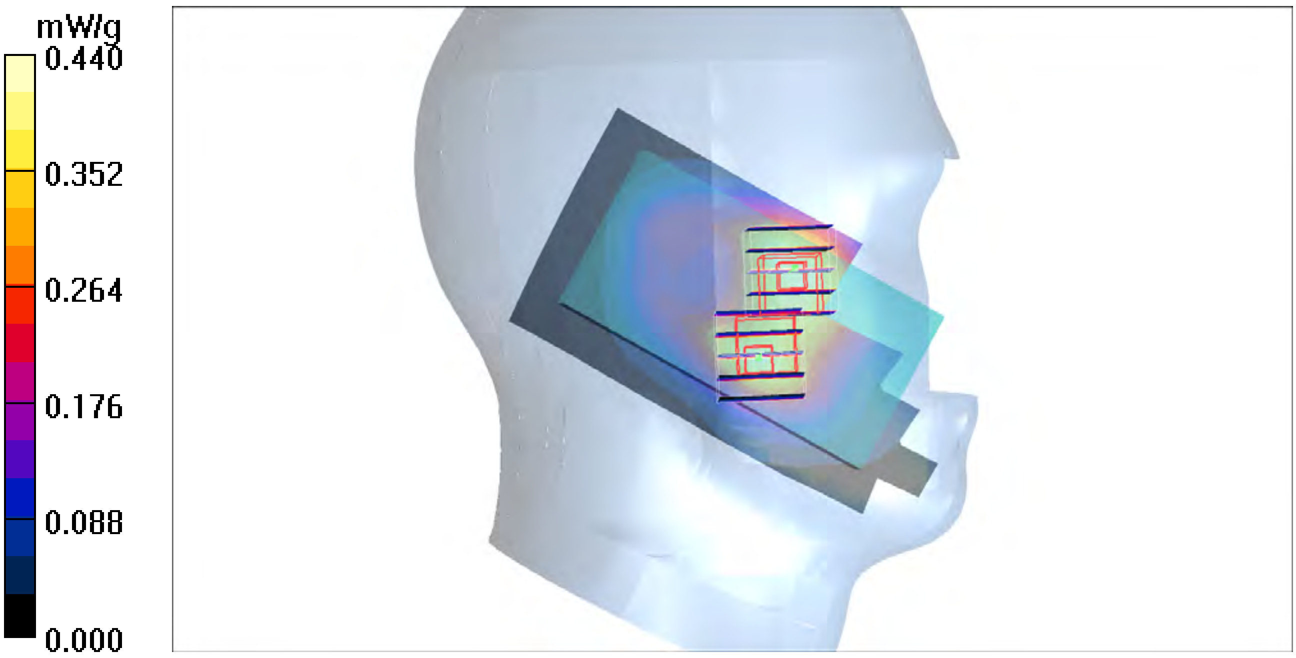
Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL1900_0904 Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃; Liquid Temperature：21.0 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(7.46, 7.46, 7.46); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch600/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.440 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.61 V/m; Power Drift = -0.077 dB
Peak SAR (extrapolated) = 0.524 W/kg
SAR(1 g) = 0.351 mW/g; SAR(10 g) = 0.230 mW/g
Maximum value of SAR (measured) = 0.443 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.61 V/m; Power Drift = -0.077 dB
Peak SAR (extrapolated) = 0.469 W/kg
SAR(1 g) = 0.322 mW/g; SAR(10 g) = 0.215 mW/g
Maximum value of SAR (measured) = 0.397 mW/g



Date: 2011/9/4

P11 CDMA2000 BC1_RTAP153.6_Right Cheek_Ch600_Battery1

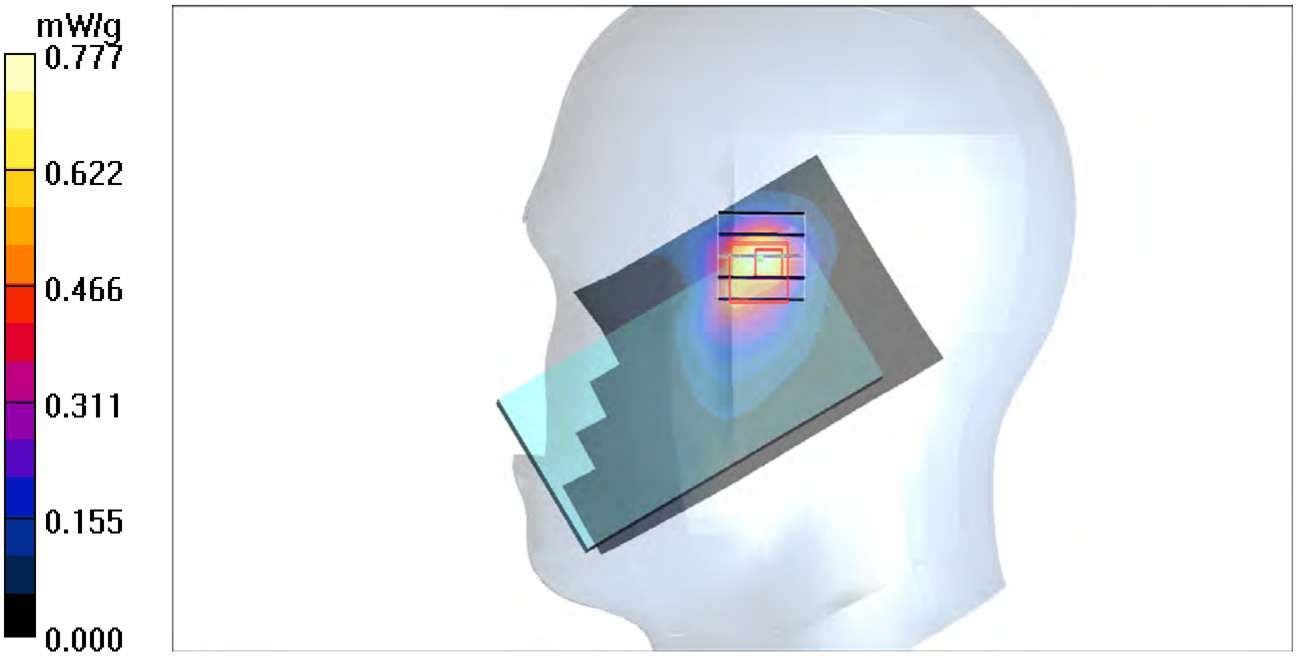
DUT: 110823C21

Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL1900_0904 Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.0 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(7.46, 7.46, 7.46); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch600/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.777 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.78 V/m; Power Drift = 0.095 dB
Peak SAR (extrapolated) = 0.859 W/kg
SAR(1 g) = 0.480 mW/g; SAR(10 g) = 0.278 mW/g
Maximum value of SAR (measured) = 0.655 mW/g



Date: 2011/9/4

P11 CDMA2000 BC1_RTAP153.6_Right Cheek_Ch600_Battery1_2D

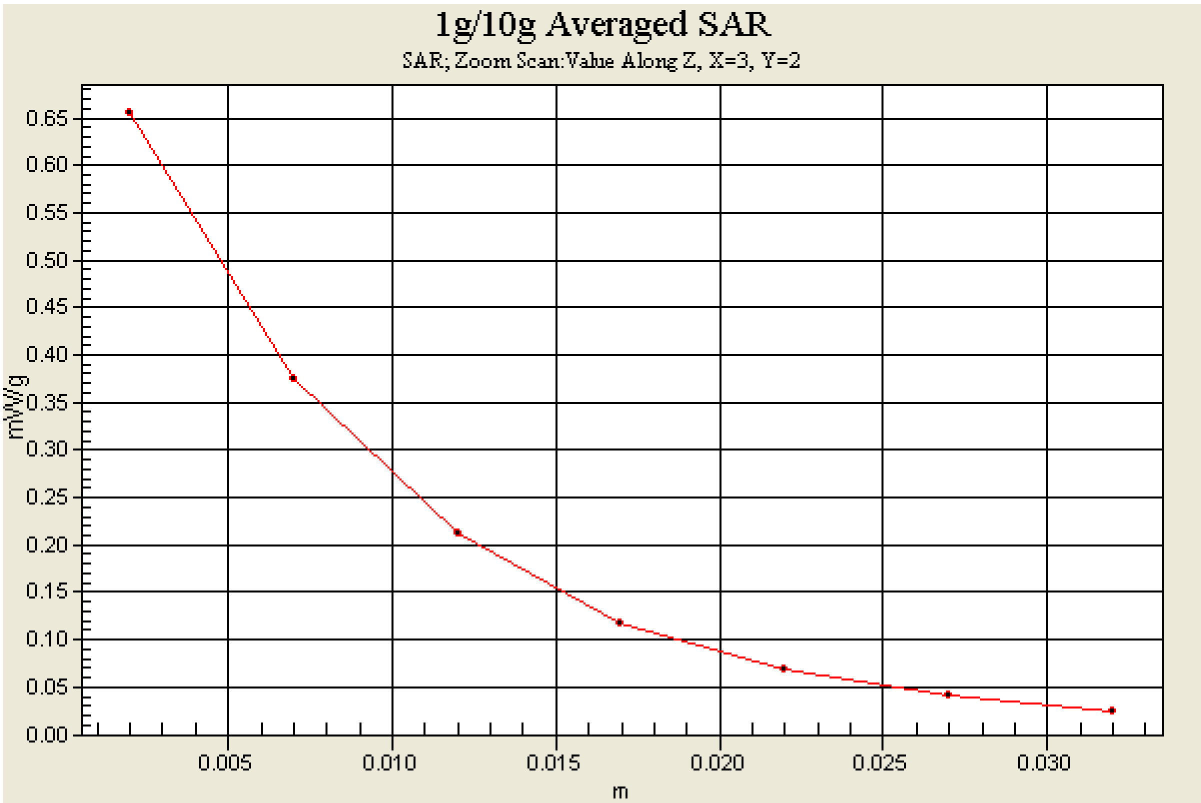
DUT: 110823C21

Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: HSL1900_0904 Medium parameters used: f = 1880 MHz; σ = 1.38 mho/m; ε_r = 40.6; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.0 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(7.46, 7.46, 7.46); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch600/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.777 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.78 V/m; Power Drift = 0.095 dB
Peak SAR (extrapolated) = 0.859 W/kg
SAR(1 g) = 0.480 mW/g; SAR(10 g) = 0.278 mW/g
Maximum value of SAR (measured) = 0.655 mW/g



Date: 2011/9/3

P03 CDMA2000 BC0_RC3_SO32_Rear Face_Ch384_Battery1

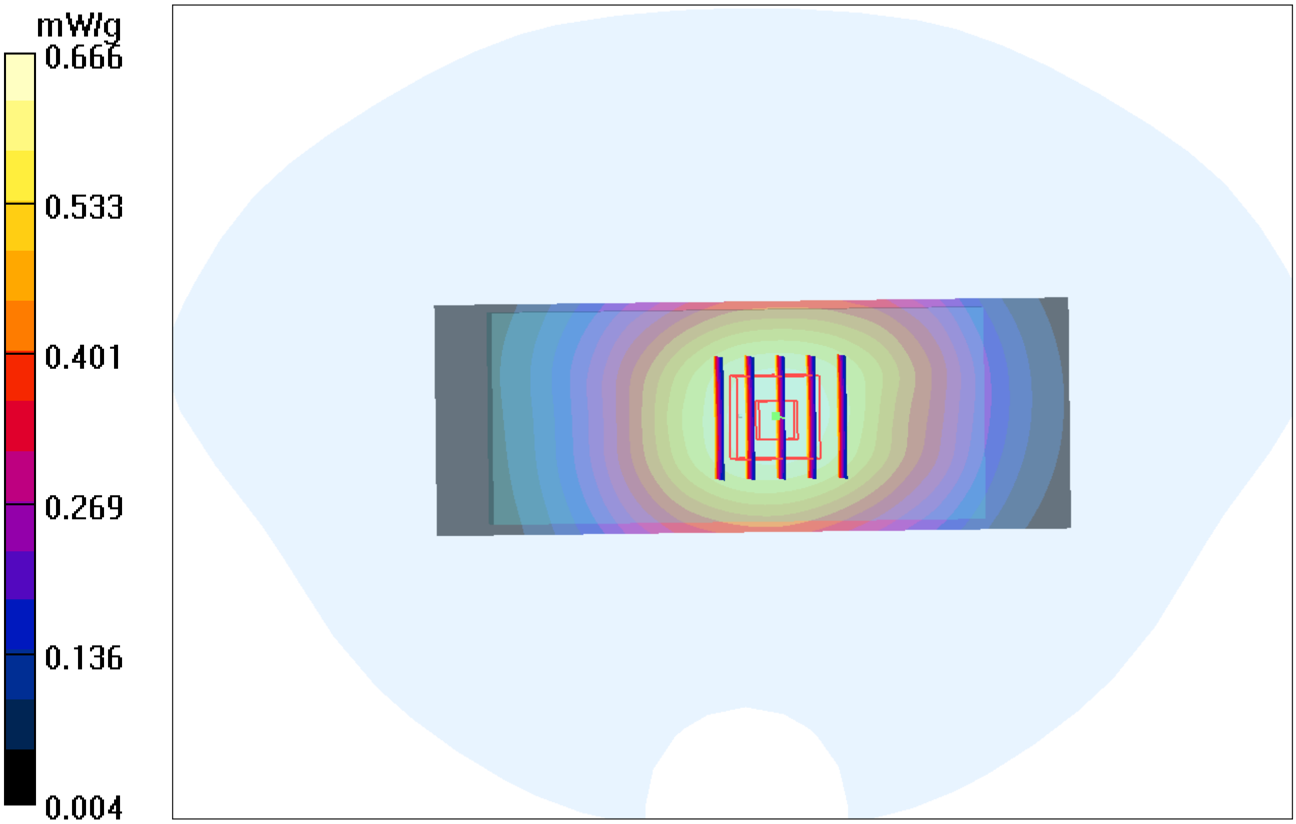
DUT: 110823C21

Communication System: CDMA850; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: MSL835_0903 Medium parameters used: f = 837 MHz; σ = 0.965 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Fornt; Type: SAM V4.0; Serial: TP 1654
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch384/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.666 mW/g

Ch384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.6 V/m; Power Drift = -0.093 dB
Peak SAR (extrapolated) = 0.684 W/kg
SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.412 mW/g
Maximum value of SAR (measured) = 0.622 mW/g



Date: 2011/9/3

P03 CDMA2000 BC0_RC3_SO32_Rear Face_Ch384_Battery1_2D

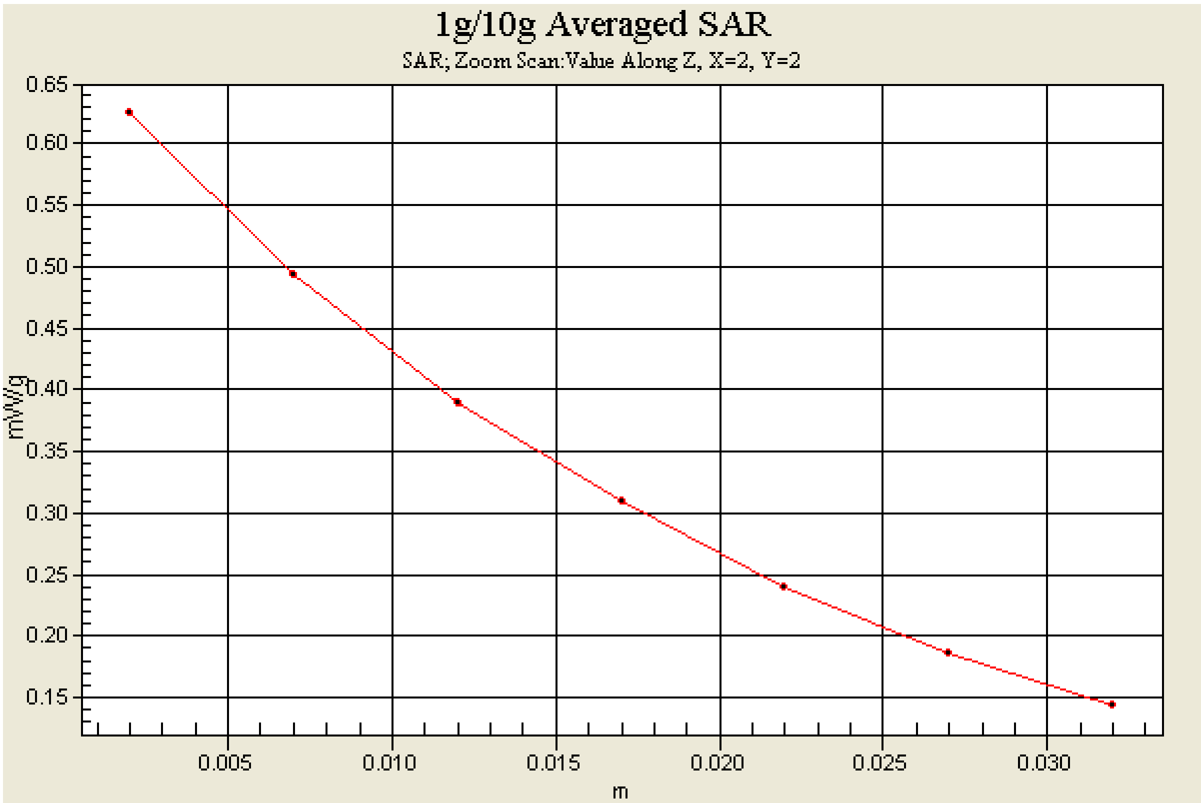
DUT: 110823C21

Communication System: CDMA850; Frequency: 836.52 MHz;Duty Cycle: 1:1
Medium: MSL835_0903 Medium parameters used: f = 837 MHz; σ = 0.965 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch384/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.666 mW/g

Ch384/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.6 V/m; Power Drift = -0.193 dB
Peak SAR (extrapolated) = 0.684 W/kg
SAR(1 g) = 0.541 mW/g; SAR(10 g) = 0.412 mW/g
Maximum value of SAR (measured) = 0.622 mW/g



Date: 2011/9/3

P04 CDMA2000 BC0_RTAP153.6_Left Edge_Ch777_Battery1

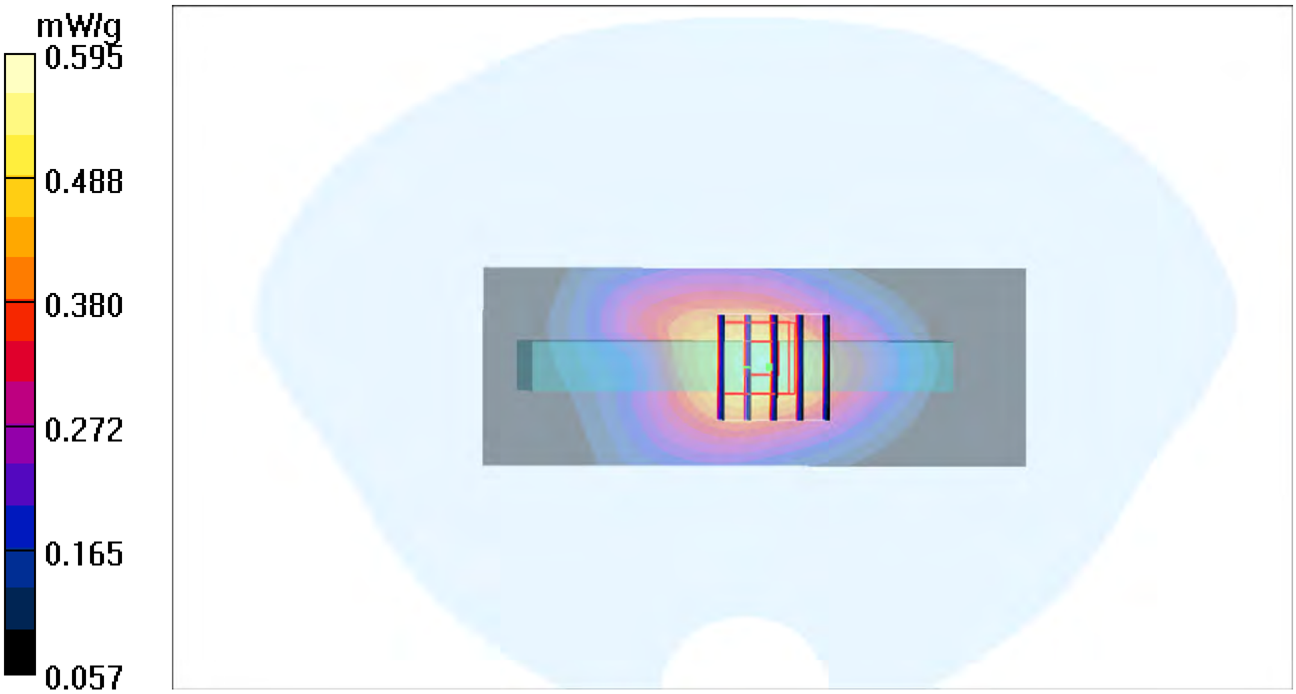
DUT: 110823C21

Communication System: CDMA850; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: MSL835_0903 Medium parameters used : f = 848.31 MHz; σ = 0.976 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch777/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.575 mW/g

Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.9 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 0.724 W/kg
SAR(1 g) = 0.491 mW/g; SAR(10 g) = 0.332 mW/g
Maximum value of SAR (measured) = 0.595 mW/g



P04 CDMA2000 BC0_RTAP153.6_Left Edge_Ch777_Battery1_2D

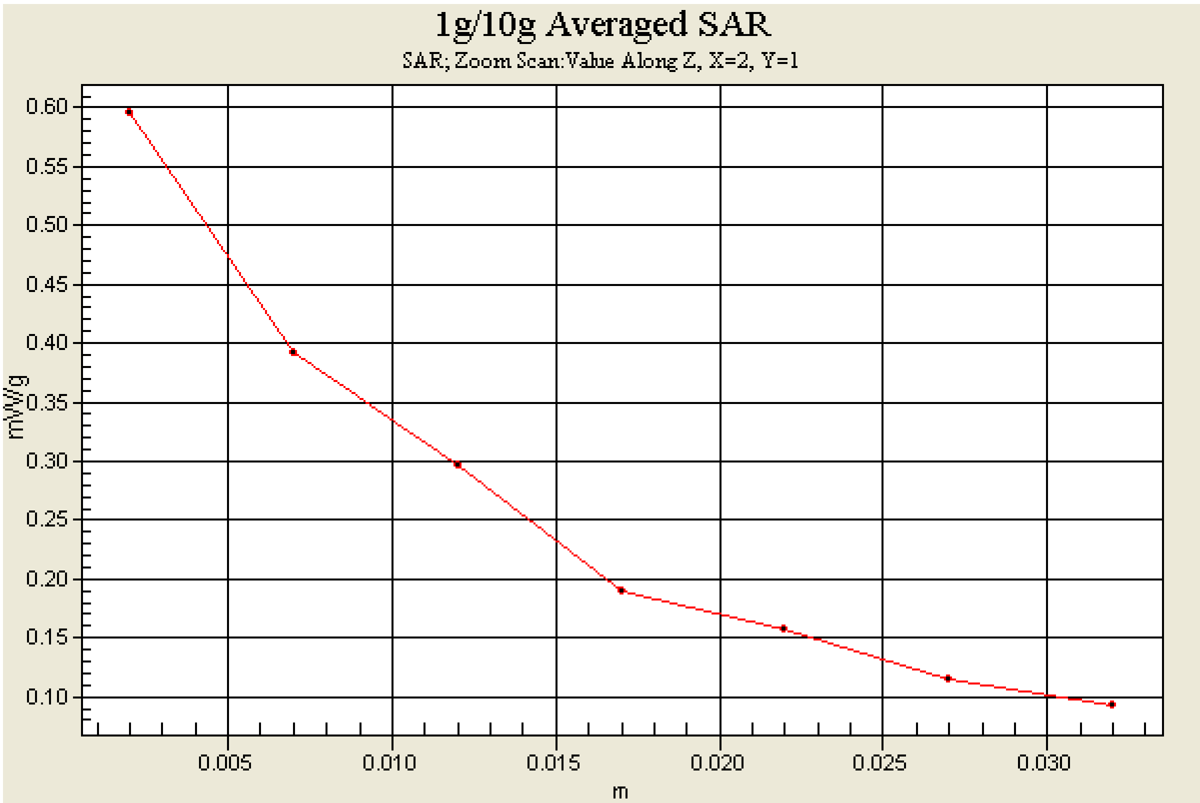
DUT: 110823C21

Communication System: CDMA850; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: MSL835_0903 Medium parameters used : f = 848.31 MHz; $\sigma = 0.976$ mho/m; $\varepsilon_r = 54.4$; $\rho = 1000$ kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch777/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.575 mW/g

Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.9 V/m; Power Drift = -0.066 dB
Peak SAR (extrapolated) = 0.724 W/kg
SAR(1 g) = 0.491 mW/g; SAR(10 g) = 0.332 mW/g
Maximum value of SAR (measured) = 0.595 mW/g



Date: 2011/9/3

P09 CDMA2000 BC0_RTAP153.6_Back Face_Ch777_Battery1

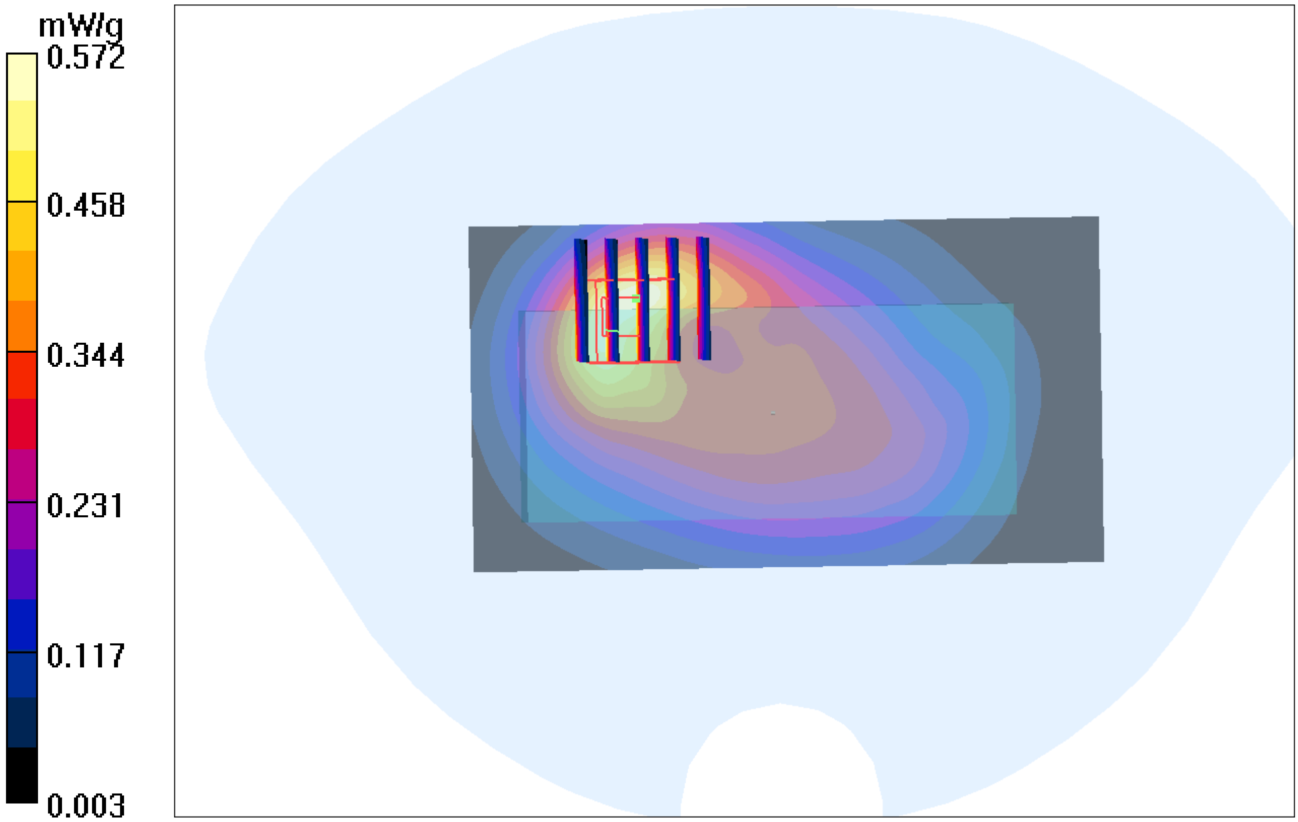
DUT: 110823C21

Communication System: CDMA850; Frequency: 848.31 MHz;Duty Cycle: 1:1
Medium: MSL835_0903 Medium parameters used :f = 848.31 MHz; σ = 0.976 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.3 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(8.94, 8.94, 8.94); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- 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

Ch777/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.572 mW/g

Ch777/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.7 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 0.671 W/kg
SAR(1 g) = 0.437 mW/g; SAR(10 g) = 0.287 mW/g
Maximum value of SAR (measured) = 0.550 mW/g



Date: 2011/9/4

P13 CDMA2000 BC1_RTAP 153.6_Left Edge_1cm__Ch600_Battery1

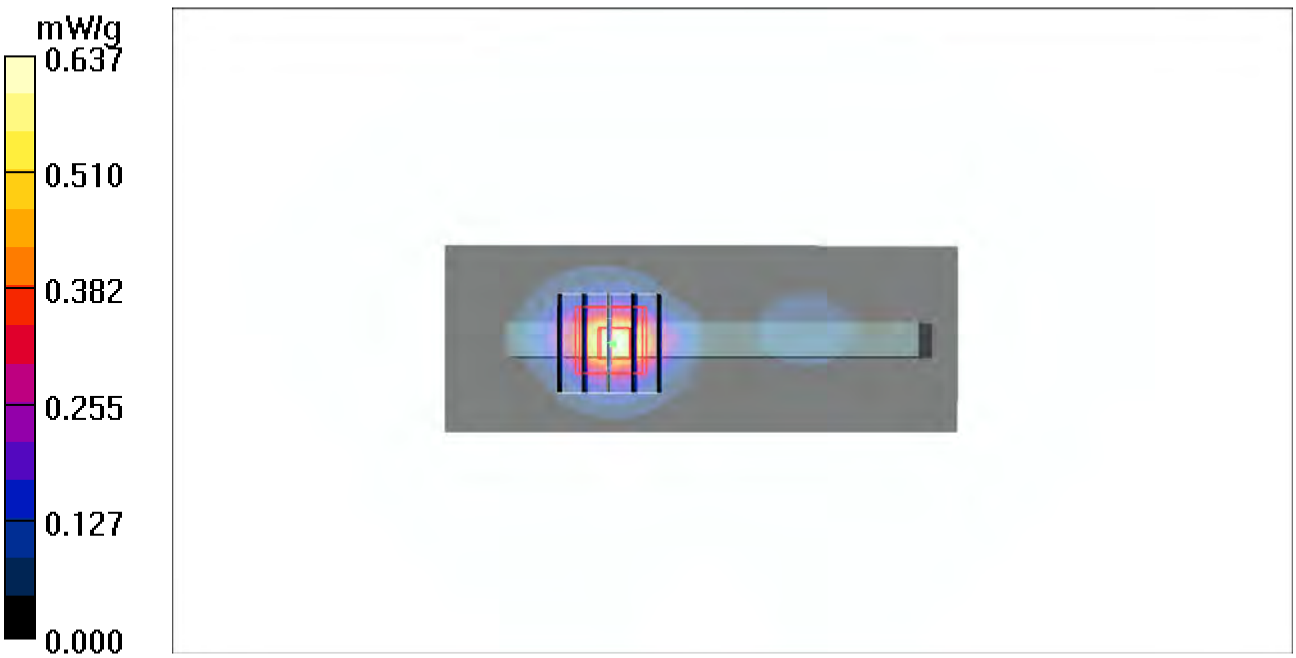
DUT: 110823C21

Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900_0904 Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(6.97, 6.97, 6.97); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch600/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.637 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.72 V/m; Power Drift = 0.158 dB
Peak SAR (extrapolated) = 0.772 W/kg
SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.207 mW/g
Maximum value of SAR (measured) = 0.597 mW/g



Date: 2011/9/4

P13 CDMA2000 BC1_RTAP 153.6_Left Edge_1cm_Ch600_Battery1_2D

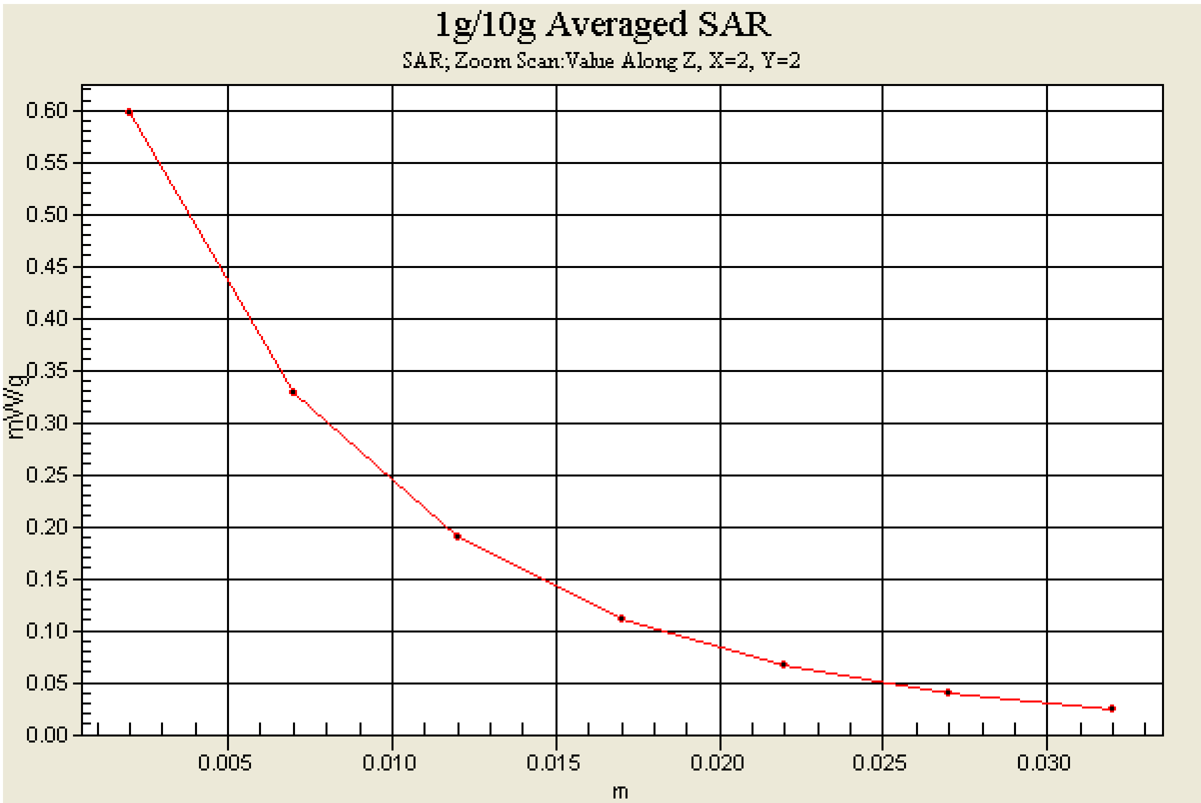
DUT: 110823C21

Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900_0904 Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(6.97, 6.97, 6.97); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch600/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.637 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.72 V/m; Power Drift = 0.158 dB
Peak SAR (extrapolated) = 0.772 W/kg
SAR(1 g) = 0.412 mW/g; SAR(10 g) = 0.207 mW/g
Maximum value of SAR (measured) = 0.597 mW/g



Date: 2011/9/4

P14 CDMA2000 BC1_RTAP 153.6_Back Face_1cm_Ch600_Battery1

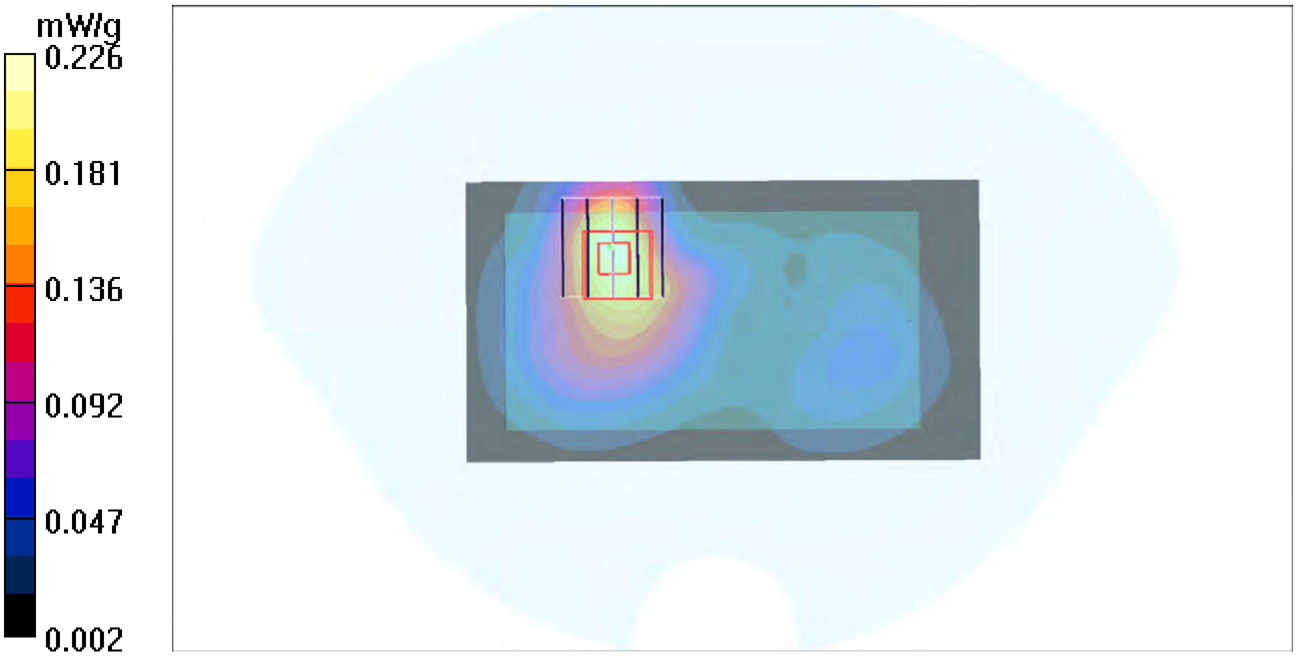
DUT: 110823C21

Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900_0904 Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(6.97, 6.97, 6.97); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch600/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.226 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.54 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.274 W/kg
SAR(1 g) = 0.165 mW/g; SAR(10 g) = 0.099 mW/g
Maximum value of SAR (measured) = 0.222 mW/g



Date: 2011/9/4

P21 CDMA2000 BC1_RTAP 153.6_Left Edge_1cm__Ch600_Battery1

DUT: 110823C21

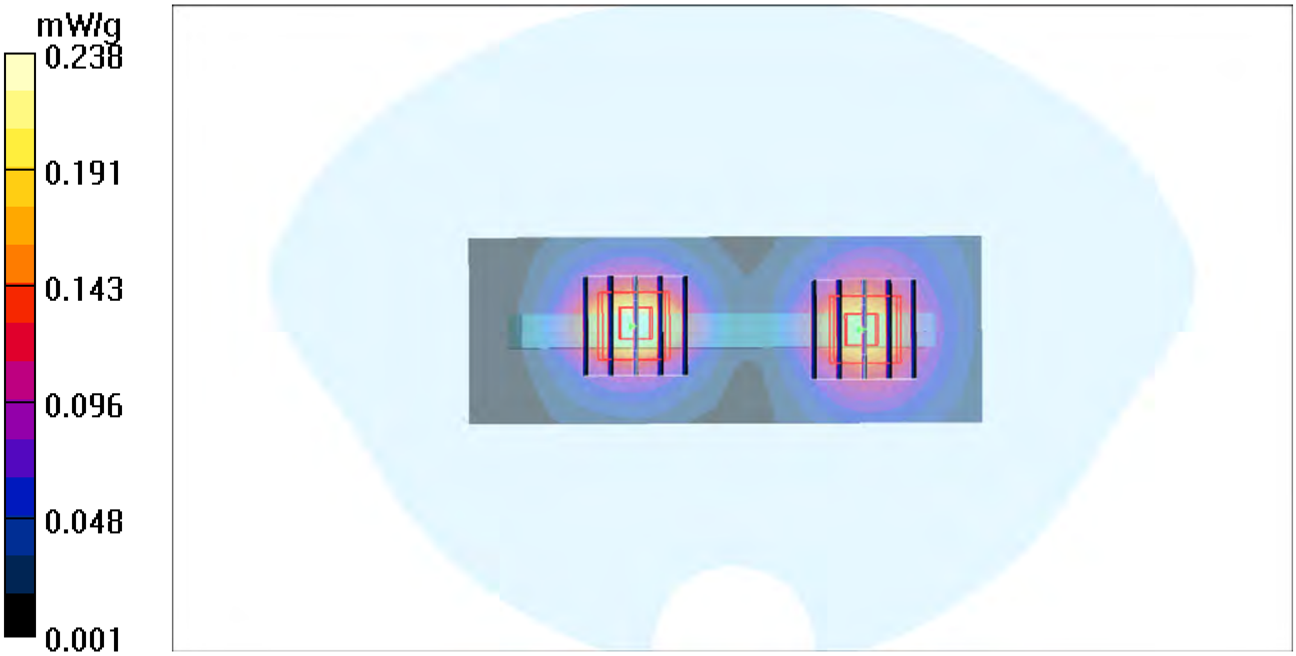
Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900_0904 Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Ambient Temperature：22.1 ℃; Liquid Temperature：21.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(6.97, 6.97, 6.97); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch600/Area Scan (41x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.238 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.82 V/m; Power Drift = 0.124 dB
Peak SAR (extrapolated) = 0.283 W/kg
SAR(1 g) = 0.172 mW/g; SAR(10 g) = 0.099 mW/g
Maximum value of SAR (measured) = 0.230 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.82 V/m; Power Drift = 0.124 dB
Peak SAR (extrapolated) = 0.258 W/kg
SAR(1 g) = 0.159 mW/g; SAR(10 g) = 0.094 mW/g
Maximum value of SAR (measured) = 0.212 mW/g



Date: 2011/9/4

P26 CDMA2000 BC1_RC3_SO32_Front Face_1cm_Ch600_Battery1

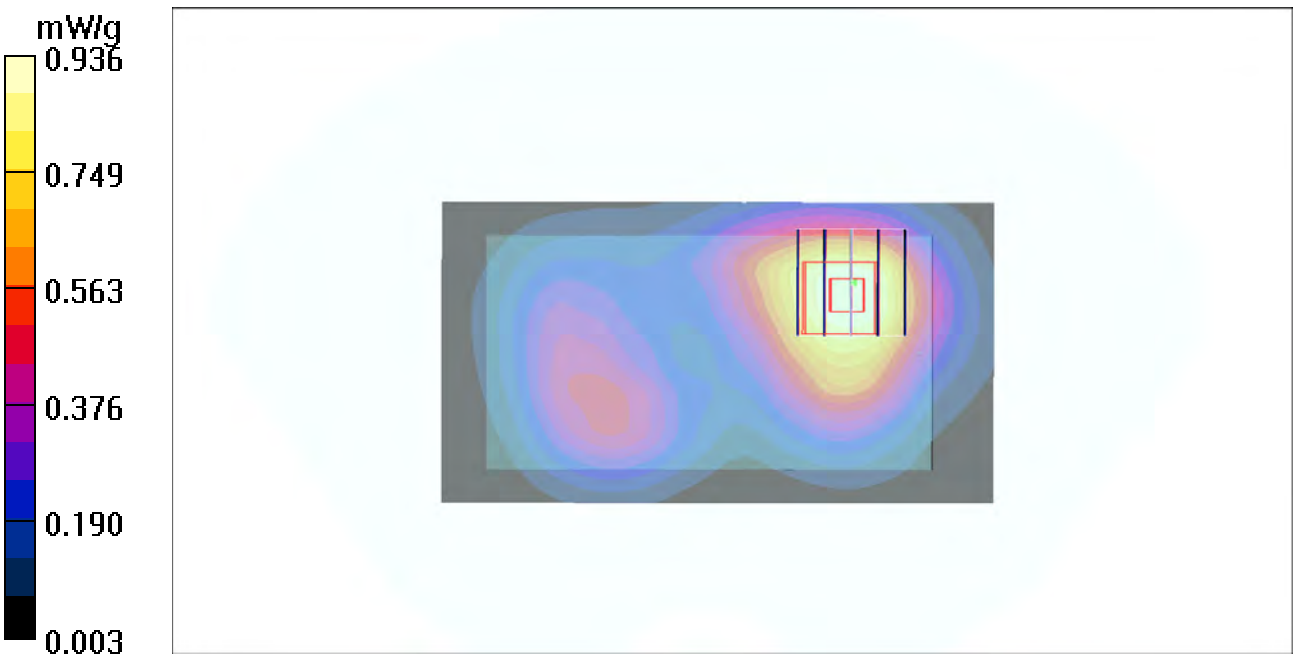
DUT: 110823C21

Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900_0904 Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(6.97, 6.97, 6.97); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Ch600/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.936 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = 0.139 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.746 mW/g; SAR(10 g) = 0.476 mW/g
Maximum value of SAR (measured) = 0.946 mW/g



Date: 2011/9/4

P26 CDMA2000 BC1_RC3_SO32_Front Face_1cm_Ch600_Battery1_2D

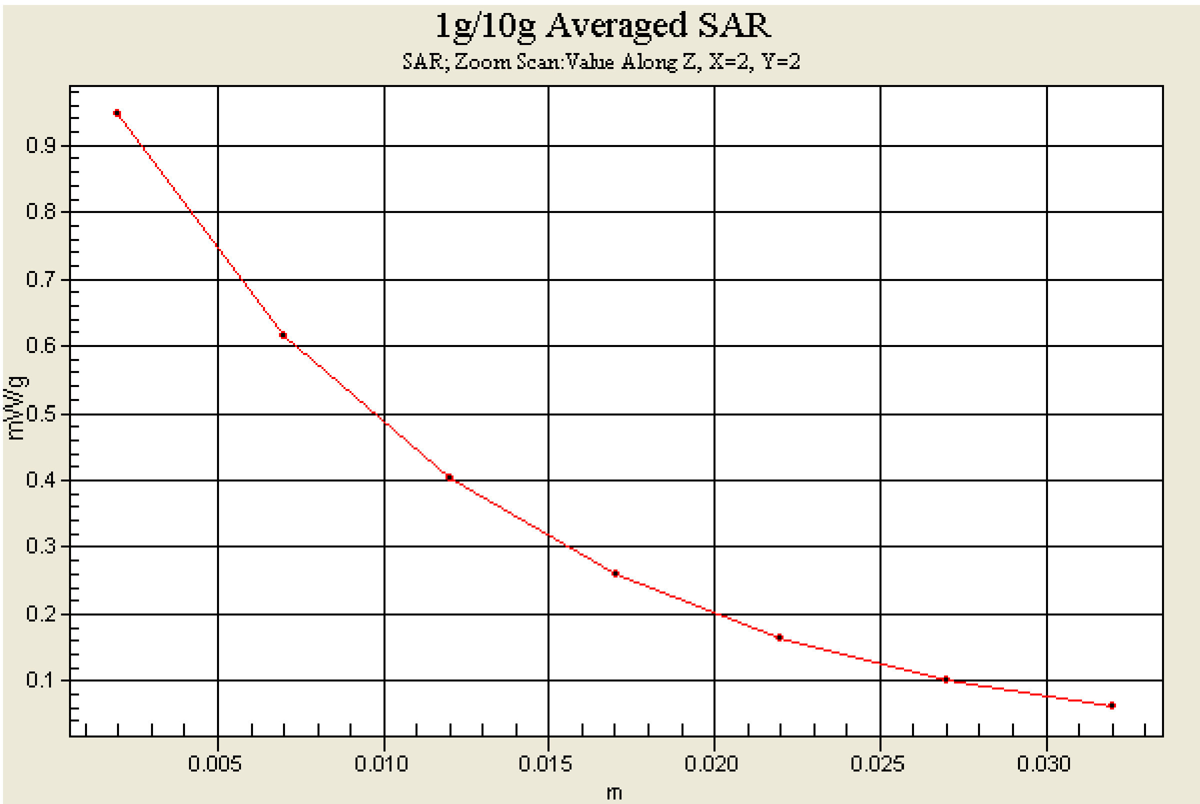
DUT: 110823C21

Communication System: CDMA1900; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL1900_0904 Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 54.2; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.1 ℃

DASY4 Configuration:
- Probe: EX3DV4 - SN3800; ConvF(6.97, 6.97, 6.97); Calibrated: 2011/8/5
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn510; Calibrated: 2010/10/4
- Phantom: SAM Phantom_Left; Type: SAM V4.0; Serial: TP 1652
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

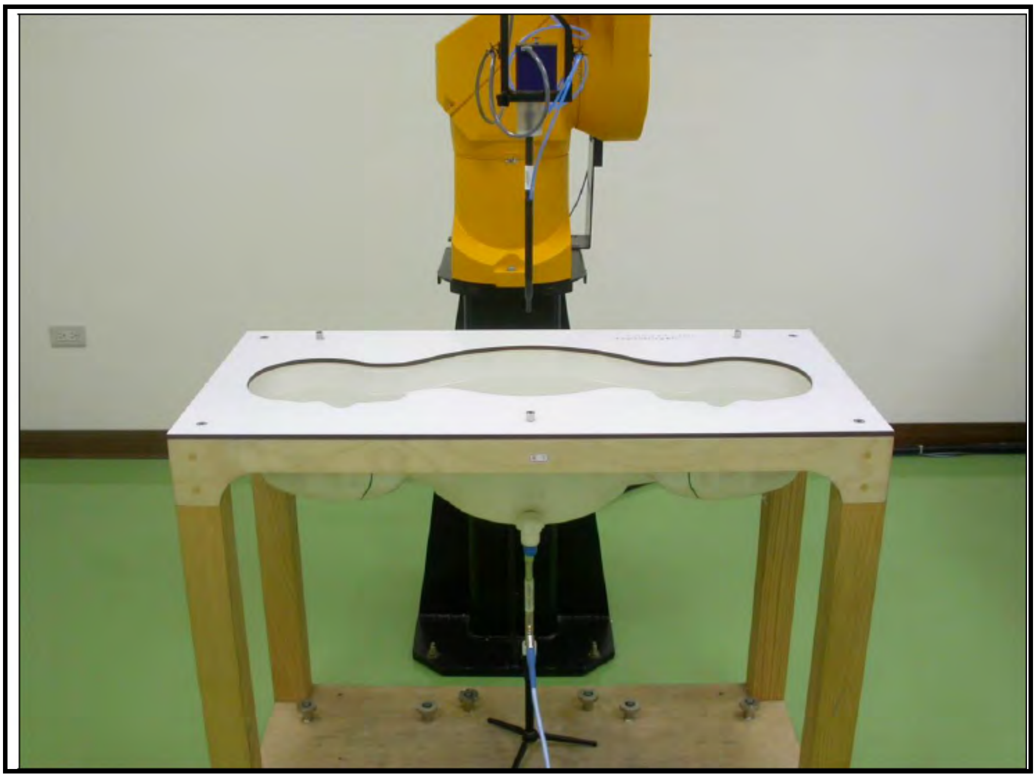
Ch600/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.936 mW/g

Ch600/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = 0.139 dB
Peak SAR (extrapolated) = 1.14 W/kg
SAR(1 g) = 0.746 mW/g; SAR(10 g) = 0.476 mW/g
Maximum value of SAR (measured) = 0.946 mW/g



APPENDIX B: BV ADT SAR MEASUREMENT SYSTEM

APPENDIX C: PHOTOGRAPHS OF SYSTEM VALIDATION



APPENDIX D: SYSTEM CERTIFICATE & CALIBRATION

D1: SAM PHANTOM

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland, Phone +41 1 245 97 00, Fax +41 1 245 97 79

Certificate of conformity / First Article Inspection

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

Tests

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

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards	Liquid type HSL 1800 and others according to the standard.	Pre-series, First article

Standards

[1] CENELEC EN 50361
[2] IEEE P1528-200x draft 6.5
[3] IEC PT 62209 draft 0.9
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

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

Date 28.02.2002

Signature / Stamp

F. Bomholt

Schmid & Partner Engineering AG
Zeughausstrasse 43, CH-8004 Zurich
Tel. +41 1 245 97 00, Fax +41 1 245 97 79

Valentin Kolga

D2: 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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe 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 (µV/(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

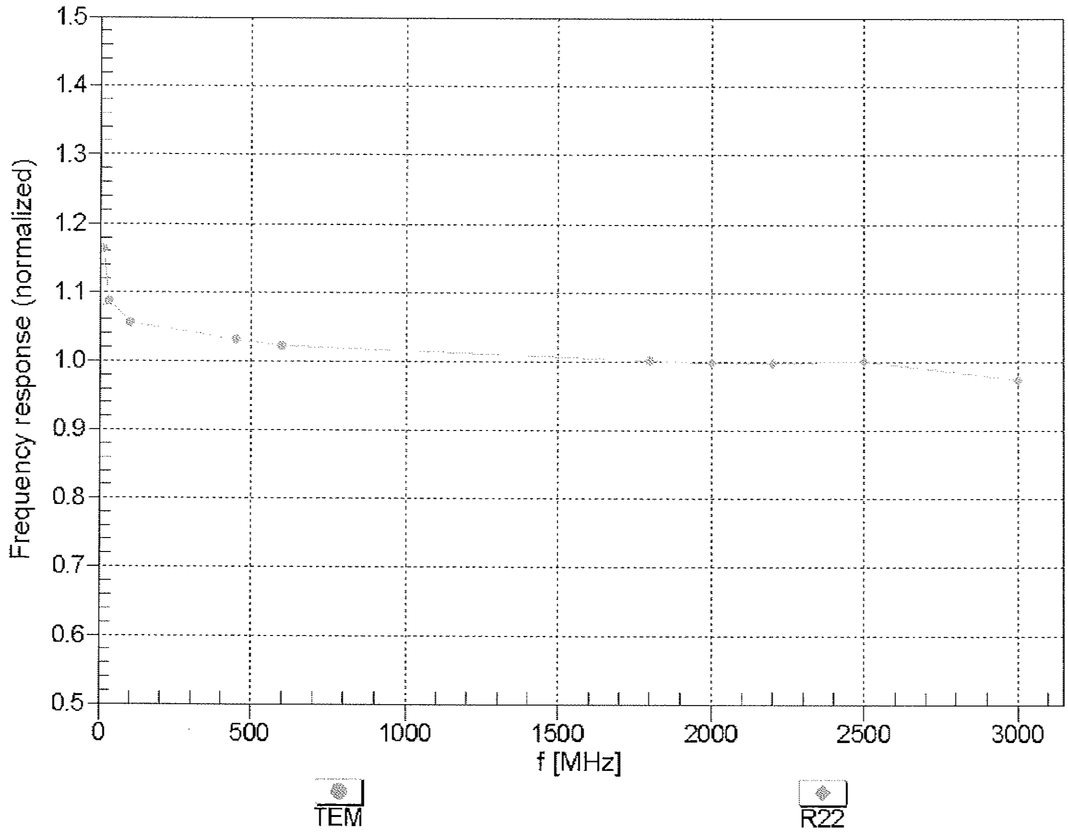
Calibration Parameter Determined in Body Tissue Simulating Media

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.

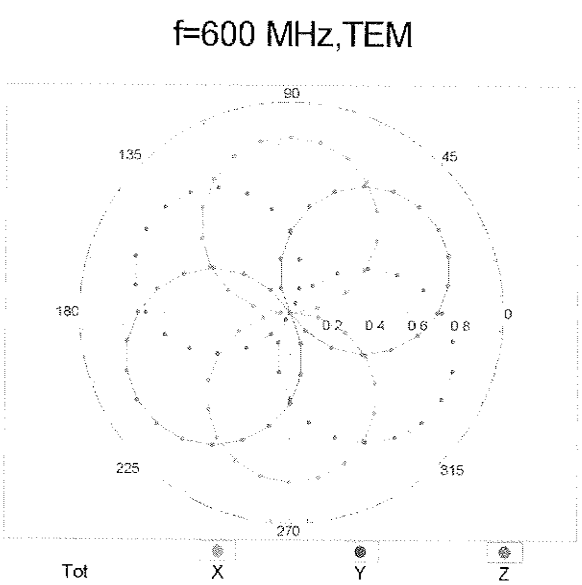
Frequency Response of E-Field

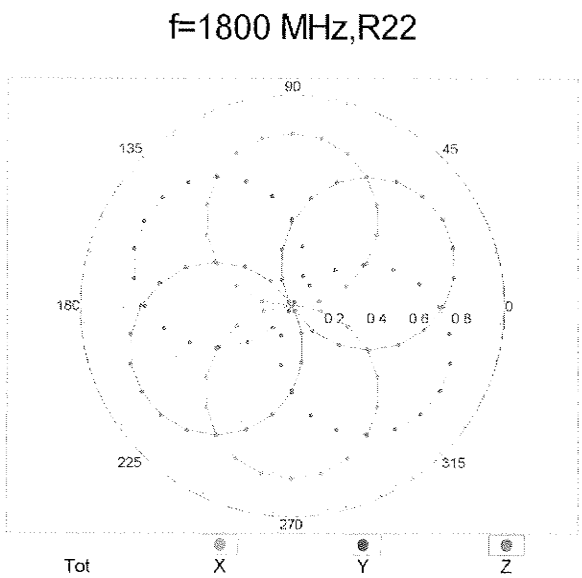
(TEM-Cell:ifi110 EXX, Waveguide: R22)

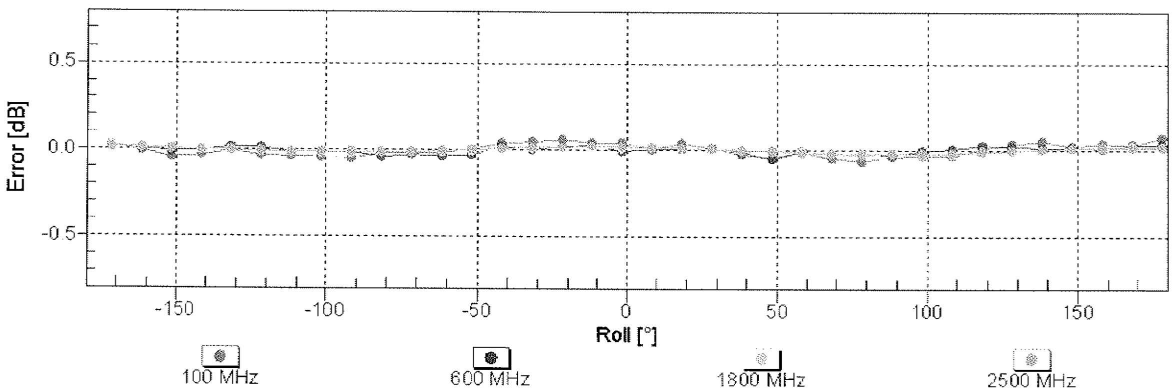


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°

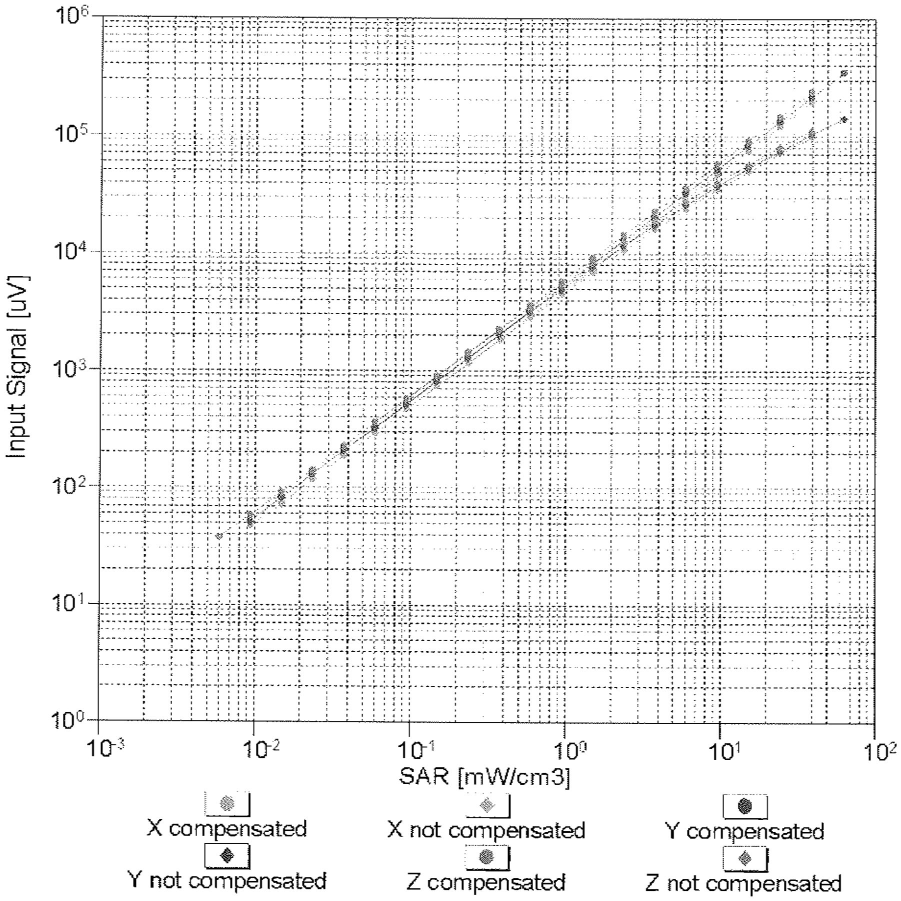


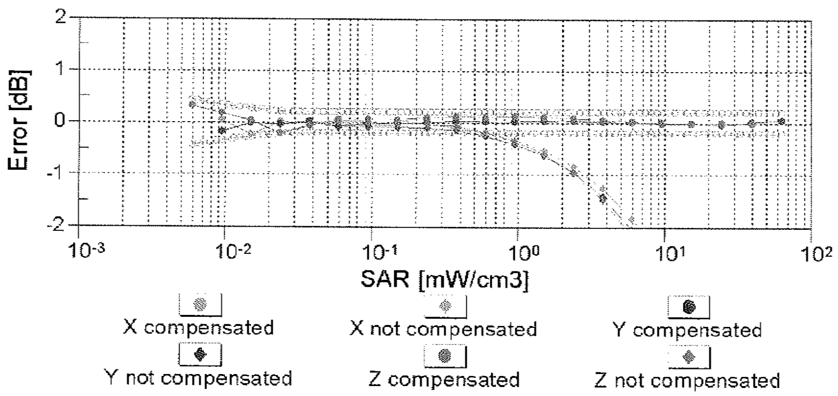




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

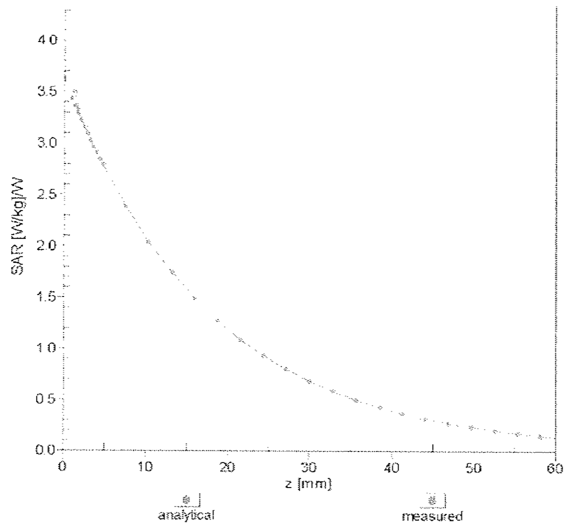




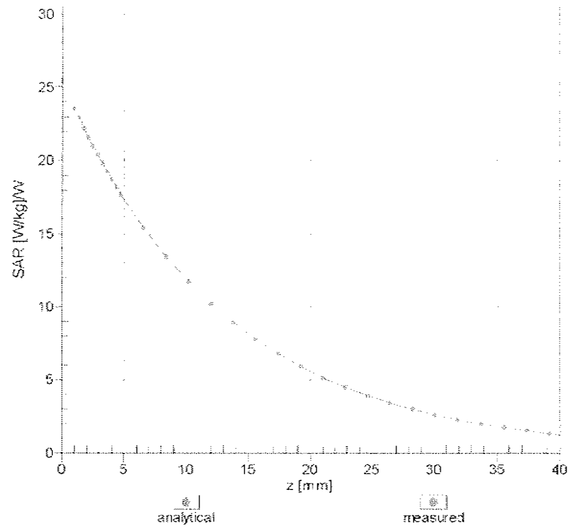
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

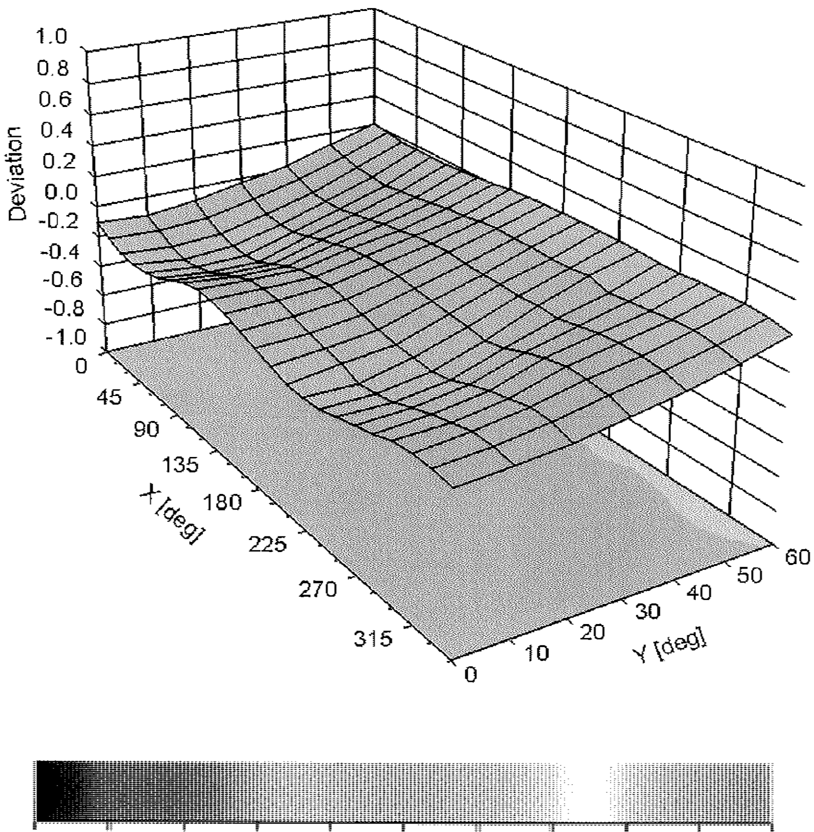


f = 1750 MHz,WGLS R22 (H_convF)



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

D3: 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
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 **ADT (Auden)**

Certificate No: DAE3-510_Oct10

CALIBRATION CERTIFICATE

Object	DAE3 - SD 000 D03 AA - SN: 510
Calibration procedure(s)	QA CAL-06.v22 Calibration procedure for the data acquisition electronics (DAE)
Calibration date:	October 4, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
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	07-Jun-10 (in house check)	In house check: Jun-11

	Name	Function	Signature
Calibrated by:	Dominique Steffen	Technician	[signature]
Approved by:	Fin Bomholt	R&D Director	F. Bomholt [signature]

Issued: October 4, 2010

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	404.204 ± 0.1% (k=2)	404.261 ± 0.1% (k=2)	404.619 ± 0.1% (k=2)
Low Range	3.97841 ± 0.7% (k=2)	3.96431 ± 0.7% (k=2)	3.98318 ± 0.7% (k=2)

Connector Angle

Connector Angle to be used in DASY system	280.0 ° ± 1 °

Appendix

1. DC Voltage Linearity

High Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	200002.6	1.33	0.00
Channel X	+ Input	20001.52	1.72	0.01
Channel X	- Input	-19997.99	1.81	-0.01
Channel Y	+ Input	200010.4	0.89	0.00
Channel Y	+ Input	20000.89	1.39	0.01
Channel Y	- Input	-19998.10	1.60	-0.01
Channel Z	+ Input	200007.2	-1.37	-0.00
Channel Z	+ Input	19998.21	-1.29	-0.01
Channel Z	- Input	-20001.73	-2.13	0.01

Low Range		Reading (μV)	Difference (μV)	Error (%)
Channel X	+ Input	2000.1	0.23	0.01
Channel X	+ Input	200.27	0.27	0.13
Channel X	- Input	-199.76	0.04	-0.02
Channel Y	+ Input	2000.8	0.66	0.03
Channel Y	+ Input	199.56	-0.44	-0.22
Channel Y	- Input	-200.06	-0.16	0.08
Channel Z	+ Input	1999.4	-0.75	-0.04
Channel Z	+ Input	199.53	-0.57	-0.28
Channel Z	- Input	-201.06	-1.16	0.58

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	17.87	16.44
	- 200	-15.36	-17.11
Channel Y	200	14.99	14.97
	- 200	-16.63	-16.47
Channel Z	200	-8.65	-8.74
	- 200	7.23	7.63

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	-	4.37	-3.14
Channel Y	200	6.07	-	3.36
Channel Z	200	3.03	-0.24	-

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	15639
Channel Y	16112	16210
Channel Z	16121	16322

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	0.61	0.06	2.59	0.30
Channel Y	1.72	-0.56	3.01	0.39
Channel Z	-1.94	-2.73	-0.59	0.30

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

D4: SYSTEM VALIDATION DIPOLE

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

S Schweizerischer Kalibrierdienst
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Swiss Calibration Service

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Accreditation No.: **SCS 108**

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

Certificate No: **D750V3-1013_May11**

CALIBRATION CERTIFICATE

Object: D750V3 - SN:1013

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

Calibration date: May 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 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: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Type-N mismatch combination	SN: 5047.2 / 06327	29-Mar-11 (No. 217-01371)	Apr-12
Reference Probe ES3DV3	SN: 3205	29-Apr-11 (No. ES3-3205_Apr11)	Apr-12
DAE4	SN: 601	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:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: May 25, 2011

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

Measurement Conditions

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

DASY Version	DASY5	V52.6.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	42.3 ± 6 %	0.91 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.13 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**8.39 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.39 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**5.49 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	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.8 ± 6 %	0.96 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.23 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**8.93 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.47 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**5.88 mW / g ± 16.5 % (k=2)**

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.9 Ω - 1.4 jΩ
Return Loss	- 30.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.5 Ω - 3.4 jΩ
Return Loss	- 28.5 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.037 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	March 22, 2010

DASY5 Validation Report for Head TSL

Date: 25.05.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1013

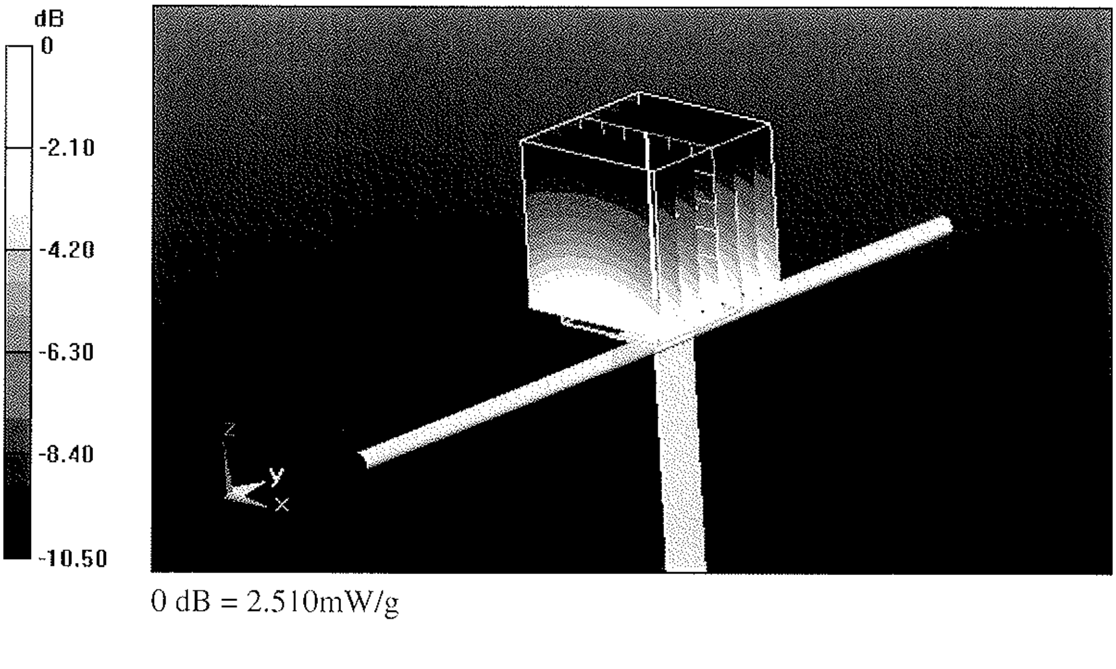
Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: HSL750
Medium parameters used: f = 750 MHz; σ = 0.91 mho/m; ε_r = 42.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.33, 6.33, 6.33); Calibrated: 29.04.2011
- 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)

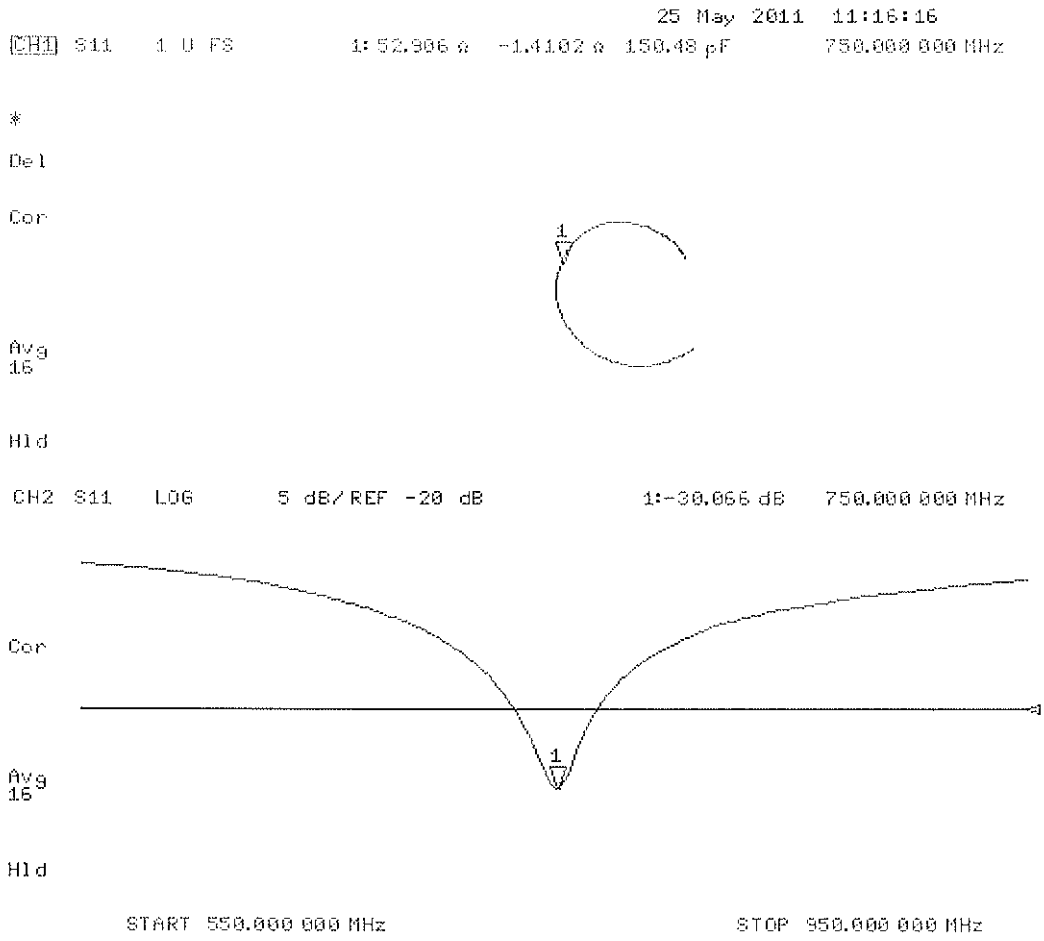
Dipole Calibration for Head Tissue/Pin=250mW; dip=15mm; dist=3.0mm/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.548 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.252 W/kg
SAR(1 g) = 2.13 mW/g; SAR(10 g) = 1.39 mW/g
Maximum value of SAR (measured) = 2.505 mW/g



0 dB = 2.510mW/g

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 25.05.2011

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1013

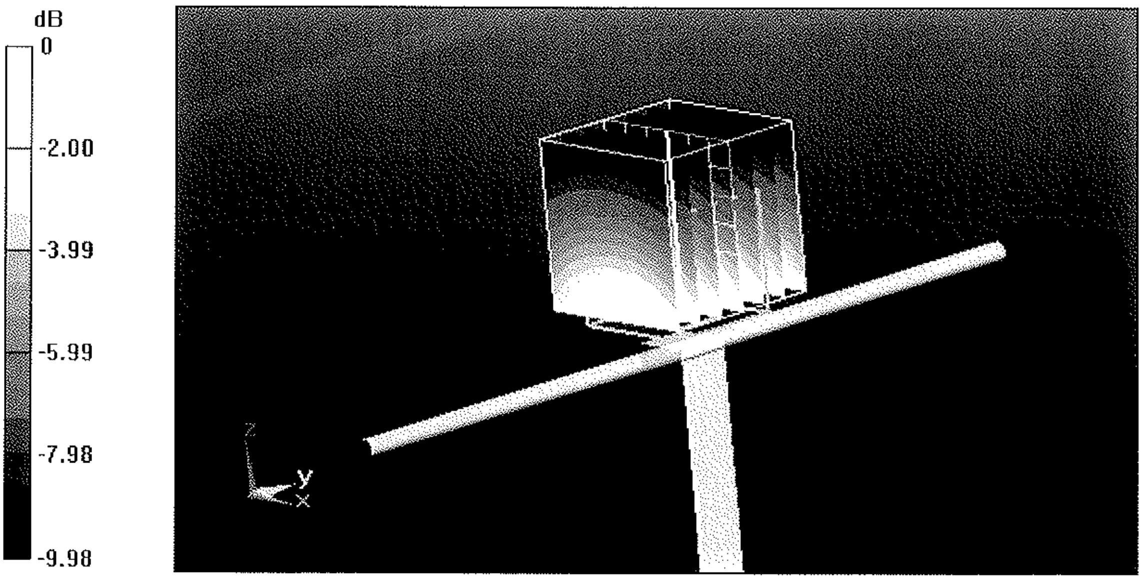
Communication System: CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: MSL750
Medium parameters used: f = 750 MHz; σ = 0.96 mho/m; ε_r = 55.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.12, 6.12, 6.12); Calibrated: 29.04.2011
- 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)

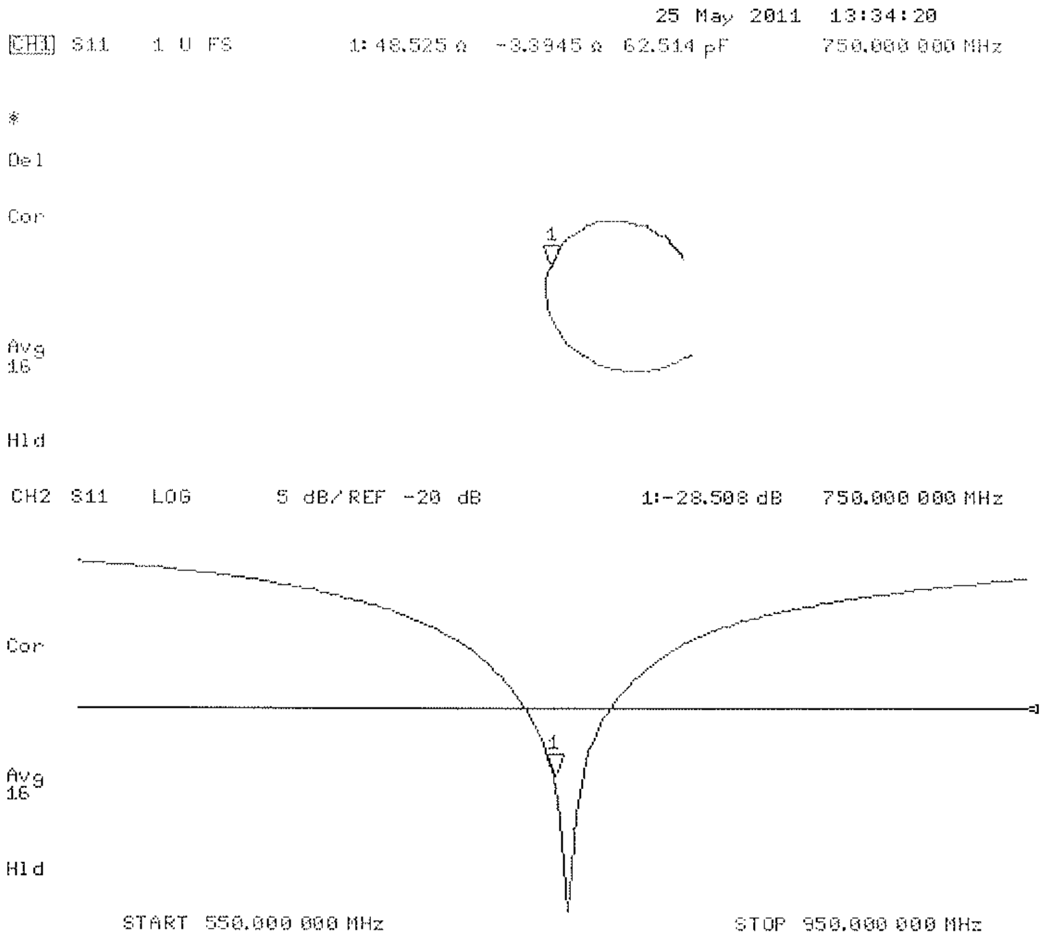
Dipole Calibration for Body Tissue/Pin=250mW; dip=15mm; dist=3.0mm/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.178 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 3.333 W/kg
SAR(1 g) = 2.23 mW/g; SAR(10 g) = 1.47 mW/g
Maximum value of SAR (measured) = 2.598 mW/g



0 dB = 2.600mW/g

Impedance Measurement Plot for Body TSL



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

Accreditation No.: **SCS 108**

Client **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	D. Iliev
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 23, 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	V52.6.2
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

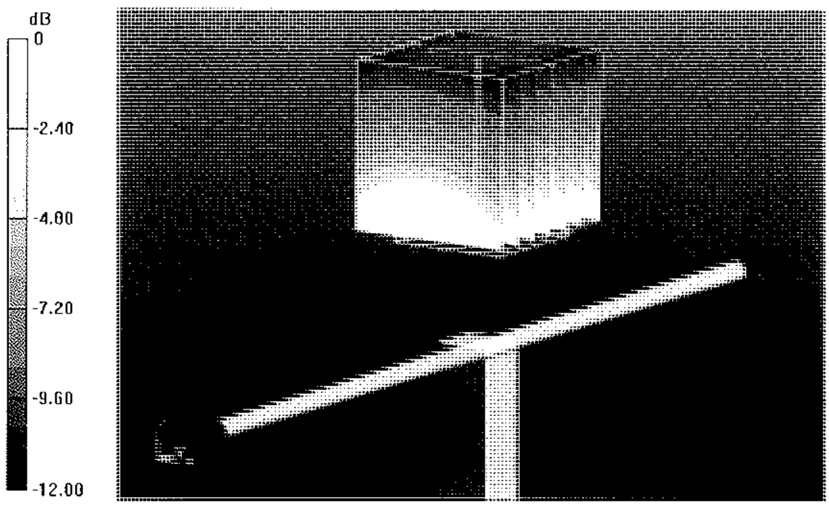
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d021

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:

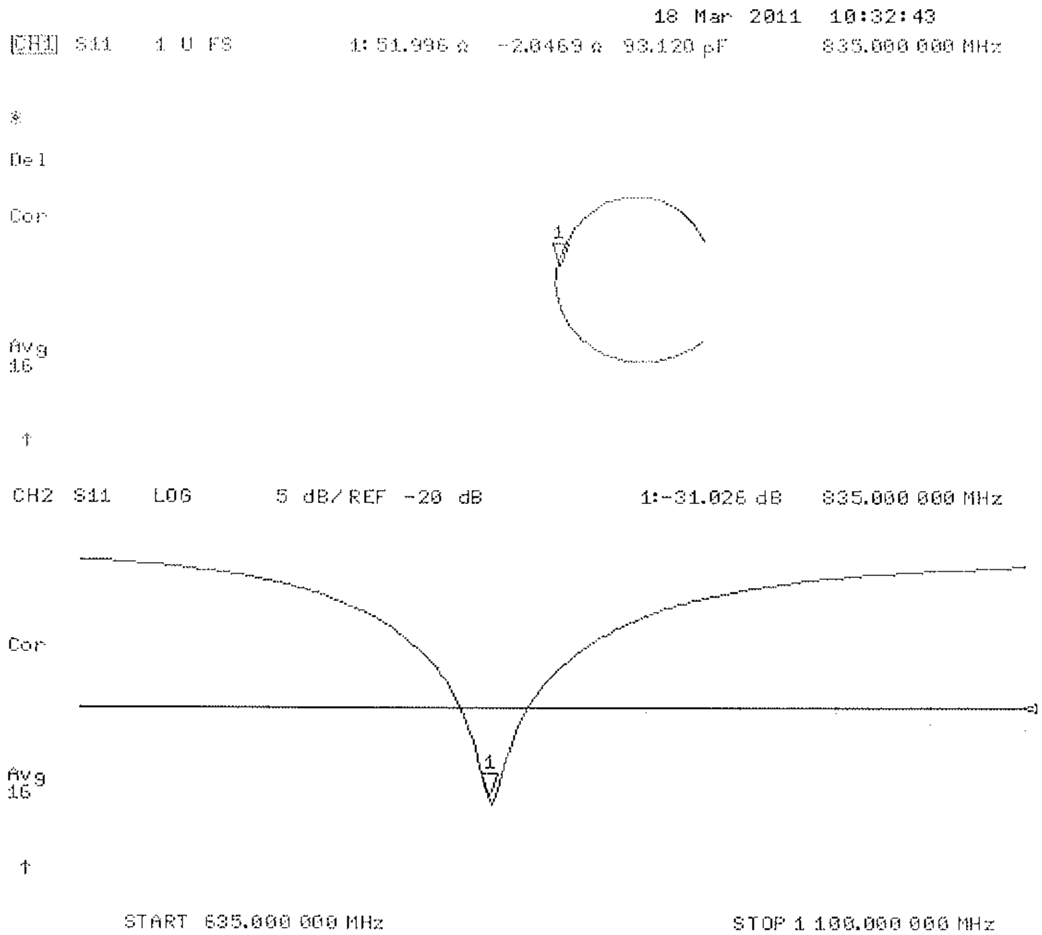
- Probe: ES3DV3 - SN3205; ConvF(6.03, 6.03, 6.03); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing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

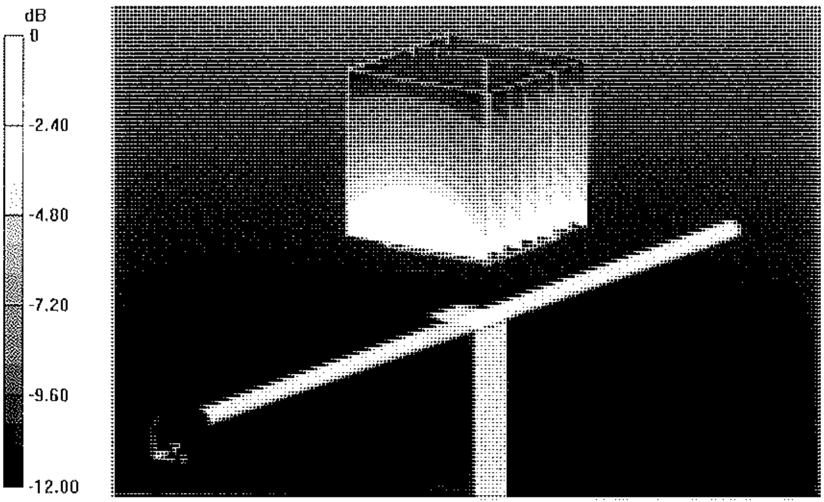
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d021

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

DASY5 Configuration:

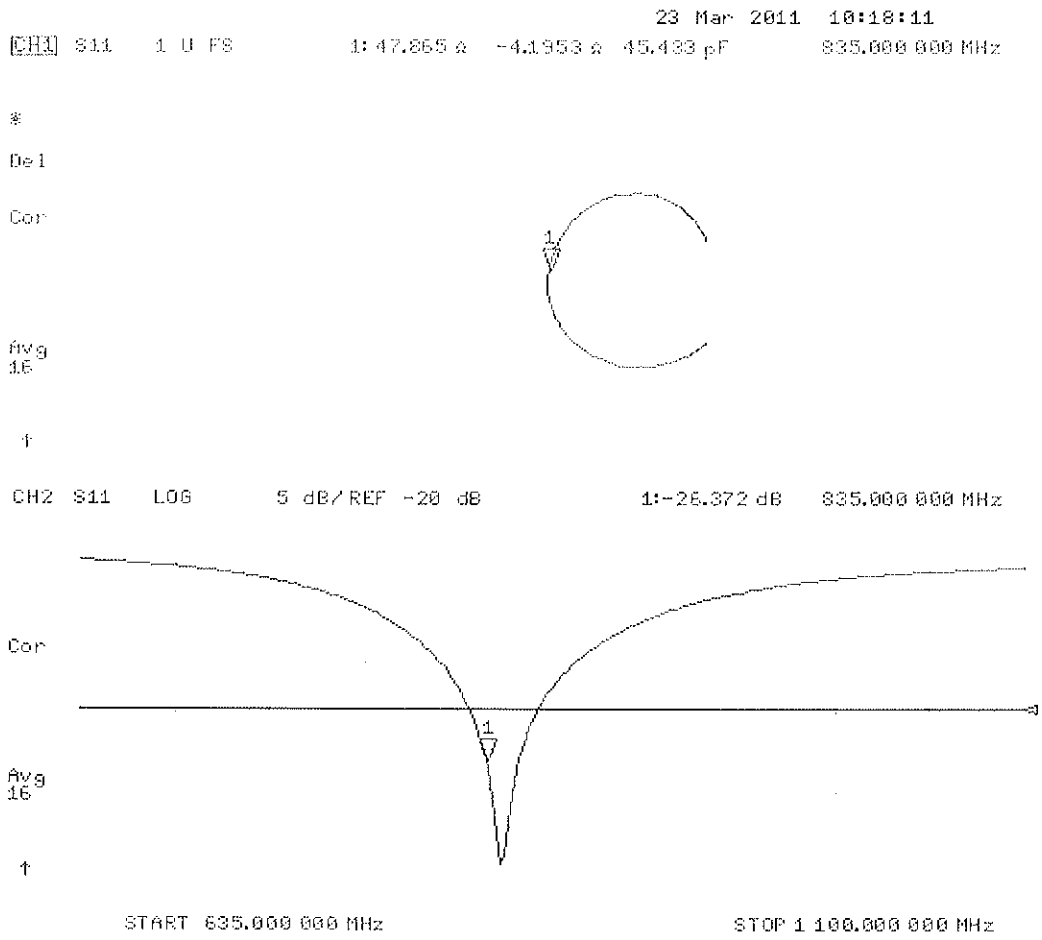
- Probe: ES3DV3 - SN3205; ConvF(5.86, 5.86, 5.86); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- Measurement SW: DASY52, V52.6.2 Build (424)
- Postprocessing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



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S Swiss Calibration Service

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

Accreditation No.: **SCS 108**

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	D. Iliev
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 27, 2011

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

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

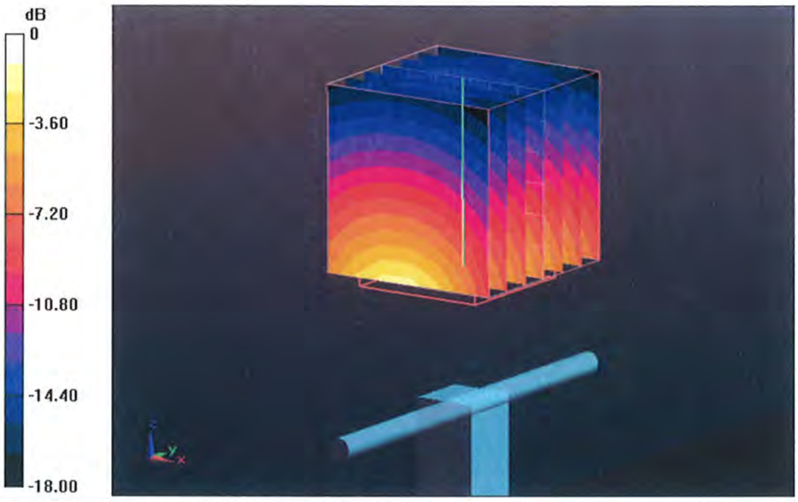
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d022

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:

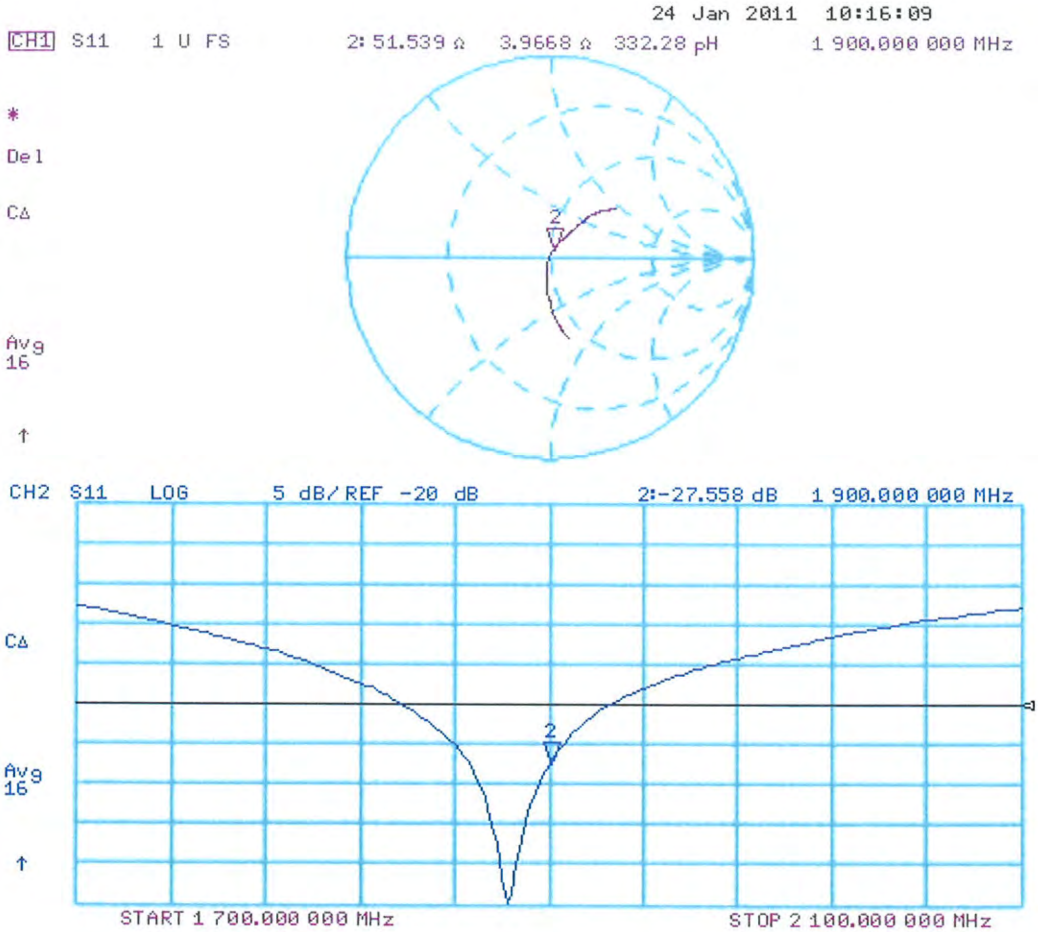
- Probe: ES3DV3 - SN3205; ConvF(5.09, 5.09, 5.09); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.6.1 Build (408)
- Postprocessing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

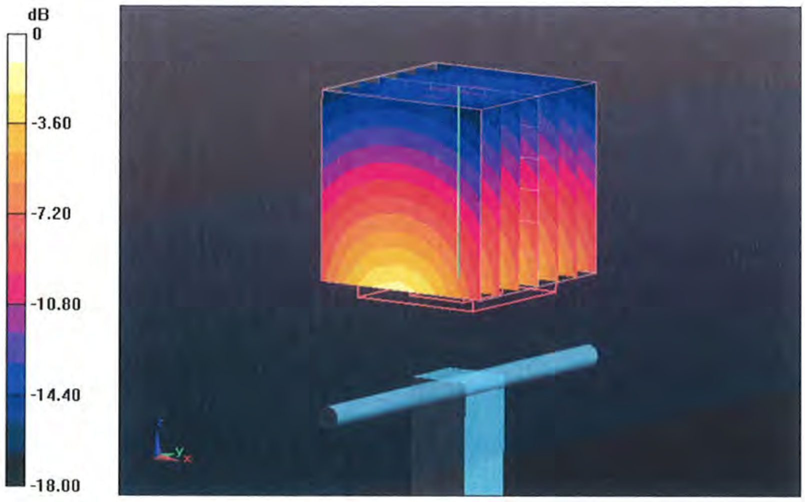
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d022

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