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TEST REPORT ON SAR

Model Tested: **GT-I5510T**

FCC ID (Requested): **A3LGTI5510T**

Job No: **FH-268**

Report No: **FH-268-S1**

- Abstract –

This document reports on SAR Tests carried out in accordance with FCC/OET Bulletin 65, Supplement C(July 2001).

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1. GENERAL INFORMATION

Test Dates :	Jan.09, 2011 ~ Jan.10, 2011
Manufacturer :	SAMSUNG ELECTRONICS Co., Ltd.
Address :	416 Maetan3-Dong, Suwon City, Korea
Test Standard :	§2.1093; FCC/OET Bulletin 65, Supplement C(July 2001)
FCC Classification :	Licensed Portable Transmitter Held to Ear (PCE)
Tested for :	FCC/TCB Certification

2. DESCRIPTION OF DEVICE

Test Sample :	Dual-Band GSM850/1900 and Single-Band WCDMA850 Phone with Bluetooth, WLAN and EDGE RX Only
Model Number :	GT-I5510T
Serial Number :	Identical prototype (S/N : # FH-268-A)
Tx Freq.Range :	824.2 ~ 848.8 MHz (GSM850) 1850.20 ~ 1909.80 MHz (GSM1900) 826.4 ~ 846.6 MHz (WCDMA850) 2412 ~ 2462 MHz (WLAN)
Rx Freq.Range :	869.2 ~ 893.8 MHz (GSM850) 1930.20 ~ 1989.80 MHz (GSM1900) 871.4 ~ 891.6 MHz (WCDMA850) 2412 ~ 2462 MHz (WLAN)
Antenna Manufacturer :	PULSE Model No.: PIFA
GPRS	Class 12
Antenna Dimensions :	48.10*18.21*6.25 (mm)
Separation distance between Main and Bluetooth antenna :	73.8 mm
GSM Device Class	B
DTM Mode	N/A

3. DESCRIPTION OF TEST EQUIPMENT

3.1 SAR Measurement Setup

Robotic System

Measurements are performed using the DASY4 (or DASY5) automated dosimetric assessment system. Which is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Stäubli), robot controller, measurement server, Samsung computer, near-field probe, probe alignment sensor, and the SAM twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Fig. 3.1).

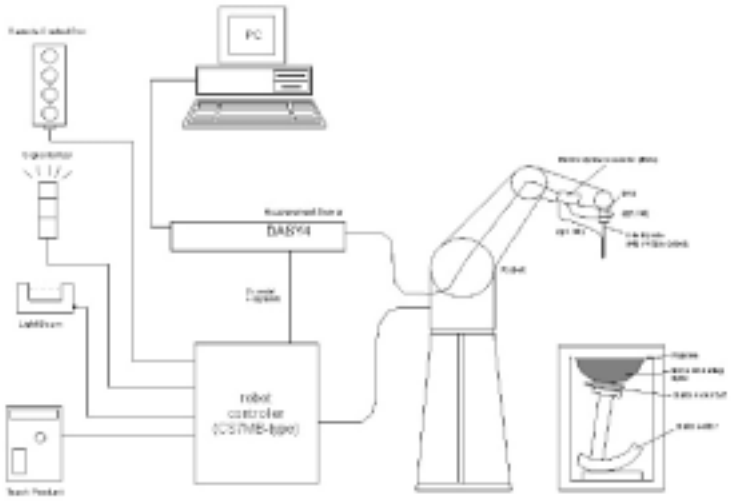


Figure 3.1 SAR Measurement System Setup

System Hardware

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and a remote control is used to drive the robot motors. The PC consists of the Samsung computer with Windows XP system and SAR Measurement Software DASY4 (or DASY5), LCD monitor, mouse and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the measurement server.

System Electronics

The DAE4(or DAE3) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, 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 and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

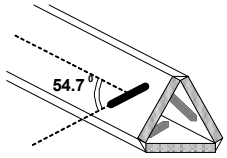
3.2 E-field Probe

Figure

The SAR measurement were conducted with the dosimetric probe ES3DV2, ES3DV3, EX3DV4 and ET3DV6, designed in the classical triangular configuration (see Fig.3.3) and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting (see Fig.3.2). The approach is stopped at reaching the maximum.

Probe Specifications

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air: 10-3000 MHz Conversion Factors (CF) for HSL 900 and HSL 1800



Δ - BEAM

Figure 3.3 Triangular Probe Configuration

Additional CF for other liquids and frequencies upon request

Frequency 10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)

Directivity **[ES3DV3], [ET3DV6]**

± 0.2 dB in HSL (rotation around probe axis)

± 0.3 dB in tissue material (rotation normal to probe axis)

[EX3DV4]

± 0.3 dB in HSL (rotation around probe axis)

± 0.5 dB in tissue material (rotation normal to probe axis)

Dynamic Range **[ES3DV3], [ET3DV6]**

5μW/g to > 100mW/g; Linearity: ± 0.2dB

[EX3DV4]

10 μW/g to > 100 mW/g; Linearity: ± 0.2 dB

Dimensions **[ES3DV3], [ES3DV2]**

Overall length: 330 mm (Tip: 20 mm)

Tip diameter: 3.9 mm (Body: 12 mm)

Distance from probe tip to dipole centers: 2.1 mm

[ES3DV3] ,[ES3DV2]

[EX3DV4]

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

[ET3DV6]

Overall length: 330mm

Tip length: 16mm

Body diameter: 12mm

Tip diameter: 6.8mm

Distance from probe tip to dipole centers: 2.7mm

[EX3DV4]

Application	**[ES3DV3], [ES3DV2]** General dosimetry up to 5 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones **[EX3DV4]** 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 %. **[ET3DV6]** General dosimetry up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms
Optical Surface Detection	**[ET3DV6]** ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces

[ET3DV6]

3.3 Phantom

SAM Twin Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. 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 the 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 in the robot. (See Figure 3.5)

Figure3.5 SAM Twin Phantom

SAM Twin Phantom Specification

Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-2003, EN 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid.
Shell Thickness	2 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Height: 810 mm; Length: 1000 mm; Width: 500 mm

Modular Flat Phantom

The Modular Flat Phantom V5.1 is constructed of a fiberglass shell integrated in a wooden table. Also It consists of three identical flat phantoms (modules) which can be installed and removed separately without emptying the liquid, as well as a wooden support.. It enables the dosimetric evaluation of body mounted usage at the flat phantom region. A cover prevents the 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 in the robot. (See Figure 3.6)

Figure 3.6 Modular Flat Phantom

Modular Flat Phantom Specification

Construction	The shell corresponds to the specifications of IEEE 1528-2003. It enables the dosimetric evaluation of body mounted usage above 800 MHz at the flat phantom region. A cover prevents evaporation of the liquid
Shell Thickness	2 ± 0.2 mm
Filling Volume	Approx. 10 liters
Dimension	Wooden support - Height: 810 mm; Length: 830 mm; Width: 500 mm Each Module - Height:190 mm; Length: 200 mm; width: 300 mm

3.4 Brain Simulating Mixture Characterization

The brain mixtures consist of a viscous gel using hydroxethylcellullose (HEC) gelling agent and saline solution (see Table 3.1). Preservation with a bactericide is added and visual inspection is made to make sure air bubbles are not trapped during the mixing process. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue.

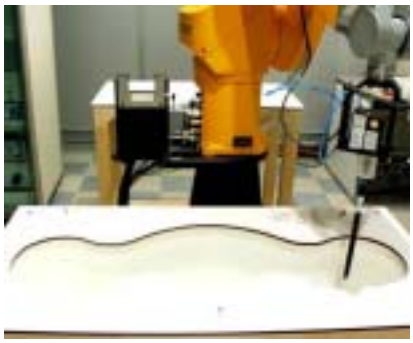


Figure 3.7 Simulated Tissue

Table 3.1 Composition of the Brain Tissue Equivalent Matter

INGREDIENTS	835MHz Brain	835MHz Muscle	1800MHz Brain	1800MHz Muscle	1900MHz Brain	1900MHz Muscle	2450MHz Brain	2450MHz Muscle
WATER	40.19%	50.75%	55.24%	69.04%	55.24%	70.23%	71.88%	73.4%
SUGAR	57.90%	48.21%	-	-	-	-	-	-
SALT	1.48%	0.94%	0.31%	2.72%	0.31%	0.29%	0.16%	0.06%
DGBE	-	-	44.45%	28.24%	44.45%	29.48%	7.99%	26.54%
Triton X-100	-	-	-	-	-	-	19.97%	-
BACTERIACIDE	0.18%	0.10%	-	-	-	-	-	-
HEC	0.25%	-	-	-	-	-	-	-
Dielectric Constant Target	41.5	55.2	40	53.3	40	53.3	39.2	52.7
Conductivity Target (S/m)	0.9	0.97	1.4	1.52	1.4	1.52	1.8	1.95

3.5 Device Holder for Transmitters

In combination with the Twin SAM Phantom V4.0, the Mounting Device (see Fig. 3.7) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately and repeatedly be positioned according to the EN 50360:2001 and FCC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Figure 3.8 Device Holder

*Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produced infinite number of configuration. To produce worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

3.6 Validation Dipole

The reference dipole should have a return loss better than –20 dB (measured in the setup) at the resonant frequency to reduce the uncertainty in the power measurement.

Frequency	835, 1900, 2450 MHz
Return Loss	< -20 dB at specified validation position
Dimensions	D835V2: dipole length: 161 mm; overall height: 330 mm D1900V2: dipole length: 68 mm; overall height: 300 mm D2450V2: dipole length: 51.8 mm; overall height: 300 mm

Note:

Usage of SAR dipoles calibrated less than 2 years ago but more than 1 year ago were confirmed in maintaining return loss (< -20dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibration in KDB 450824

D835V2 S/N:4d050	Paramaters			
Date of Cal	Return loss (dB)	Deviation (%)	Impedance (Ω)	Deviation (Ω)
2007.04.10	-30.8	0	52.3	0
2009.03.16	-26.7	13.3	51.5	-0.8
2010.10.19	-25.83	3.3	51.6	-0.2

D1900V2 S/N:5d082	Paramaters			
Date of Cal	Return loss (dB)	Deviation (%)	Impedance (Ω)	Deviation (Ω)
2009.03.17	-25.7	0	52.9	0
2010.10.25	-25.7	0	50.5	-2.4

D2450V2 S/N:807	Paramaters			
Date of Cal	Return loss (dB)	Deviation (%)	Impedance (Ω)	Deviation (Ω)
2008.06.09	-27.3	0	53.4	0
2010.02.04	-26.8	1.83	54.4	1.0

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3.7 Equipment Calibration

Table 3.2 Test Equipment Calibration

Type	Calibration Due Date	Serial No.
SPEAG E-Field Probe ES3DV2	May.25, 2011	3017
SPEAG E-Field Probe EX3DV4	Mar.22, 2011	3520
SPEAG DAE4	Mar.17, 2011	686
SPEAG Validation Dipole D835V2	Mar.16, 2011	4d050
SPEAG Validation Dipole D1900V2	Mar.17, 2011	5d082
SPEAG Validation Dipole D2450V2	Feb.04, 2012	807
Stäubli Robot TX90XL	Not Required	F06/546ZA1/A/01
SPEAG SAM Twin Phantom	Not Required	TP-1457
SPEAG SAM Twin Phantom	Not Required	TP-1425
E4438C Signal Generator	Feb.10, 2011	MY45094010
NRVD POWER METER	Mar.02, 2011	836416/028
NRV-Z53 POWER SENSOR	Mar.02, 2011	835324/001
NRV-Z53 POWER SENSOR	Mar.02, 2011	835324/006
E4419B Power Meter	Nov.30, 2011	GB43312299
E9300B Power Sensor	Mar.03, 2011	MY41495533
BBS3Q7ECK Power Amp	Dec.01, 2011	1024
HP-8753ES Network Analyzer	Apr.23, 2011	US39173712
HP85070C Dielectric Probe Kit	Not Required	US99360087
DASY5 S/W (ver 5.0)	Not Required	-
E4440A Spectrum Analyzer	Feb.11, 2011	MY46186167
Directional Coupler	May.28, 2011	18842
Base Station Simulator	Feb.08, 2011	GB43460148
Modular Phantom	Not Required	MP-1007

NOTE:
The E-field probe was calibrated by SPEAG, by temperature measurement procedure. Dipole Validation measurement is performed by Samsung Lab. before each test. (see § 7.2) The brain simulating material is calibrated by Samsung using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain-equivalent material. (see § 7.1)

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4. SAR MEASUREMENT PROCEDURE

The evaluation was performed using the following procedure.

STEP 1

The SAR measurement was taken at a selected spatial reference point to monitor power variations during testing. This fixed location point was measured and used as a reference value.

STEP 2

The SAR distribution at the exposed side of the head was measured at a distance of 3.9mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 20mm x 20mm. Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

STEP 3

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

The data at the surface was extrapolated, since the center of the dipoles is 2.7mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluated the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the “Not a knot” condition (in x, y, and z directions). The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

STEP 4

The SAR value at the same location as in step 1 was again measured.

(If the value changed by more than 5%, the evaluation is repeated.)

5. DESCRIPTION OF TEST POSITION

5.1 SAM Phantom Shape

Figure 5.1 shows the front, back and side views of SAM. The point “M” is the reference point for the center of mouth, “LE” is the left ear reference point (ERP), and “RE” is the right ERP. The ERPs are 15 mm posterior to the entrance to ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 5.2.

Figure 5.1 Front, back and side view of SAM

The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 5.3). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines should be marked on the external phantom shell to facilitate handset positioning. Posterior to the N-F line, the thickness of the phantom shell with the shape of an ear is a flat surface 6 mm thick at the ERPs.

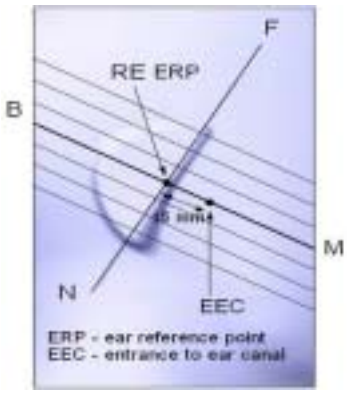

Figure 5.2 Close up side view

5.2 “cheek” Position

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the “test device reference point” located along the “vertical centerline” on the front of the device aligned to the “ear reference point” (see Fig. 5.4). The “test device reference point” was than located at the same level as the center of the ear reference point. The test device was positioned so that the “vertical centerline” was bisecting the front surface of the handset at it’s tip and bottom edges, positioning the “ear reference point” on the outer surface of the both the left and right head

phantoms on the ear reference point

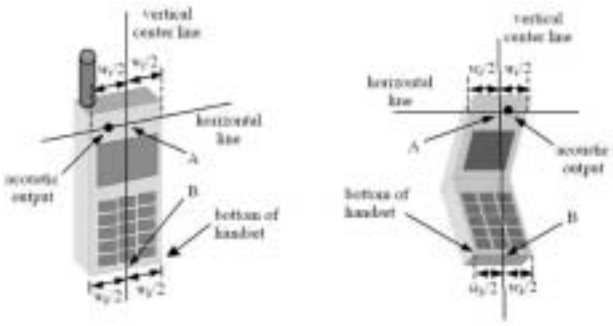

Figure 5.4 Handset vertical and horizontal reference lines

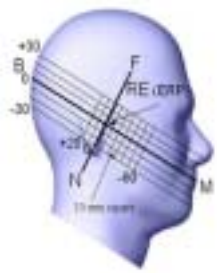

Figure 5.3 Side view of the phantom showing relevant markings

Step 1

The test device was positioned with the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 5.5), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom

.

Figure 5.5 Front, Side and Top View of Cheek/Touch Position

Step 2

The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.

Step 3

While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).

Step 4

Rotate the handset around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.

Step 5

While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear (cheek). See Figure 5.2.

5.3 “tilted” Position

With the test device aligned in the “cheek” position :

Step 1

Repeat steps 1 to 5 of 5.2 to place the device in the “Cheek/Touch Position”

Figure 5.6 Front, side and Top View of Ear/Tilt 15° Position

Step 2

While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degree.

Step 3

The phone was then rotated around the horizontal line by 15 degree.

Step 4

While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head. (In this position, point A was located on the

line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head.

5.4 Body Configurations for Single TX SAR considerations

5.4.1 SAR Test Configurations

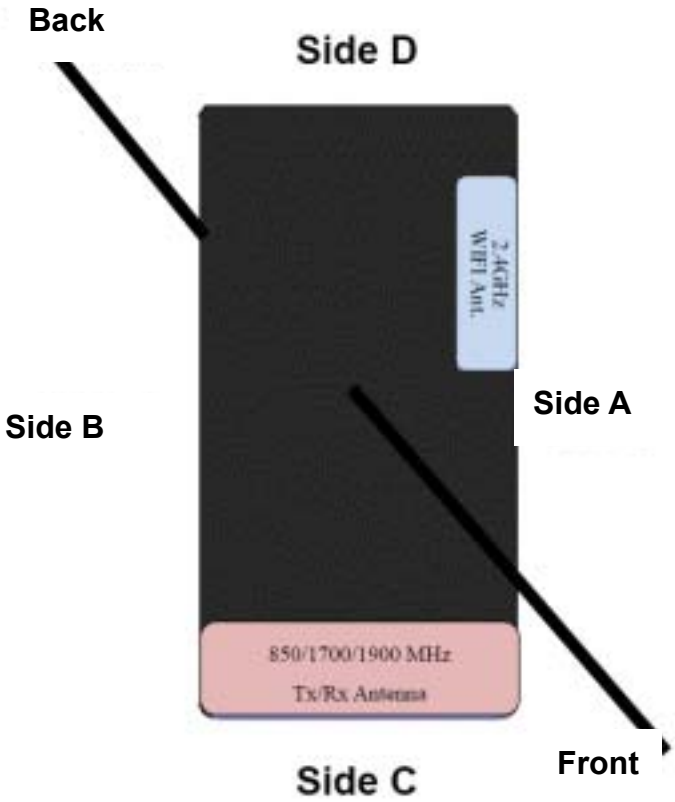

Figure 5.5 Identification of Sides for SAR Testing

Note : Per Oct 2010 TCB FCC Workshop, the edges with antennas within 2.5 cm are required to be evaluated for SAR. See Figure 5.1 distances of the actual device.

5.4.2 introduction

The following procedures adopted from “FCC SAR Considerations for cell Phones with Multiple Transmitters” v01r03 from May 2008 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g which may simultaneously transmit with the licensed transmitter. For this device, only WIFI can transmit simultaneously with the other transmitters

5.4.3 Transmit Antenna Separation Distances

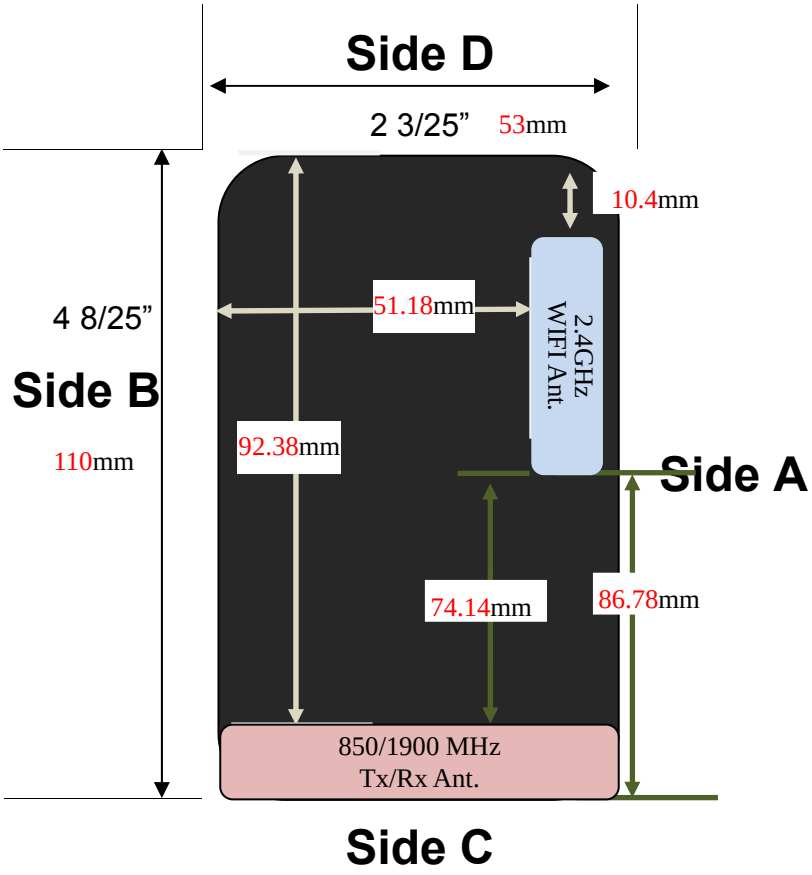

Figure 5.5 Antenna Locations, as viewed from back of device

Table 5.1 Mobile Hotspot Sides for SAR Testing

Mode	Back	Front	Side A (Right)	Side B (Left)	Side C (Bottom)	Side D (Top)
GRPS 850	Yes	Yes	Yes	Yes	Yes	No
GPRS 1900	Yes	Yes	Yes	Yes	Yes	No
WCDMA 850	Yes	Yes	Yes	Yes	Yes	No
WLAN	Yes	Yes	Yes	No	No	Yes

6. MEASUREMENT UNCERTAINTY

Table 6.1 Uncertainty Budget at 835MHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	c_i	Standard uncertainty (±%)	v_i^2 or v_{eff}
Measurement System						
Probe Calibration	11.00	normal	2.000	1	5.50	∞
Axial Isotropy	4.70	rectangular	1.732	0.7	1.90	∞
Hemispherical Isotropy	9.60	rectangular	1.732	0.7	3.88	∞
Linearity	4.70	rectangular	1.732	1	2.71	∞
System Detection Limits	0.25	rectangular	1.732	1	0.14	∞
Boundary effects	1.00	rectangular	1.732	1	0.58	∞
Readout electronics	0.30	normal	1.000	1	0.30	∞
Response time	0.80	rectangular	1.732	1	0.46	∞
RF ambient conditions	3.00	rectangular	1.732	1	1.73	∞
Integration time	1.73	rectangular	1.732	1	1.00	∞
Mechanical constrains of robot	1.50	rectangular	1.732	1	0.87	∞
Probe positioning	2.90	rectangular	1.732	1	1.67	∞
Extrapolation and integration	1.00	rectangular	1.732	1	0.58	∞
Test Sample Related						
Test Sample positioning	1.12	normal	1.000	1	1.12	14
Device holded uncertainty	3.44	normal	1.000	1	3.44	∞
Power Drift	5.00	rectangular	1.732	1	2.89	∞
Phantom and Setup						
Modular Phantom uncertainty	5.62	normal	1.000	1	5.62	2
Phantom uncertainty	4.00	rectangular	1.732	1	2.31	∞
Liquid conductivity (deviation from target)	5.00	rectangular	1.732	0.64	1.85	∞
Liquid conductivity (measurement error)	0.38	normal	1.000	0.64	0.24	∞
Liquid permittivity (deviation from target)	5.00	rectangular	1.732	0.6	1.73	∞
Liquid permittivity (measurement error)	5.44	normal	1.000	0.6	3.26	∞
Combined Standard Uncertainty		Normal	-	-	**11.84**	**172776**
Extended Standard Uncertainty(K=2.00)					**23.69**	**172776**

Table 6.2 Uncertainty Budget at 1900MHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	c_i	Standard uncertainty (±%)	v_i^2 or v_{eff}
Measurement System						
Probe Calibration	11.00	normal	2.000	1	5.50	∞
Axial Isotropy	4.70	rectangular	1.732	0.7	1.90	∞
Hemispherical Isotropy	9.60	rectangular	1.732	0.7	3.88	∞
Linearity	4.70	rectangular	1.732	1	2.71	∞
System Detection Limits	0.25	rectangular	1.732	1	0.14	∞
Boundary effects	1.00	rectangular	1.732	1	0.58	∞
Readout electronics	0.30	normal	1.000	1	0.30	∞
Response time	0.80	rectangular	1.732	1	0.46	∞
RF ambient conditions	3.00	rectangular	1.732	1	1.73	∞
Integration time	0.00	rectangular	1.732	1	0.00	∞
Mechanical constrains of robot	1.50	rectangular	1.732	1	0.87	∞
Probe positioning	2.90	rectangular	1.732	1	1.67	∞
Extrapolation and integration	1.00	rectangular	1.732	1	0.58	∞
Test Sample Related						
Test Sample positioning	1.50	normal	1.000	1	1.50	14
Device holded uncertainty	3.44	normal	1.000	1	3.44	∞
Power Drift	5.00	rectangular	1.732	1	2.89	∞
Phantom and Setup						
Modular Phantom uncertainty	6.02	normal	1.000	1	6.02	2
Phantom uncertainty	4.00	rectangular	1.732	1	2.31	∞
Liquid conductivity (deviation from target)	5.00	rectangular	1.732	0.64	1.85	∞
Liquid conductivity (measurement error)	1.84	normal	1.000	0.64	1.18	∞
Liquid permittivity (deviation from target)	5.00	rectangular	1.732	0.6	1.73	∞
Liquid permittivity (measurement error)	4.54	normal	1.000	0.6	2.73	∞
Combined Standard Uncertainty		Normal	-	-	**12.00**	**60176**
Extended Standard Uncertainty(K=2.00)					**24.00**	**60176**

Table 6.3 Uncertainty Budget at 2450MHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	c_i	Standard uncertainty (±%)	v_i^2 or v_{eff}
Measurement System						
Probe Calibration	11.00	normal	2.000	1	5.00	∞
Axial Isotropy	4.70	rectangular	1.732	0.7	1.90	∞
Hemispherical Isotropy	9.60	rectangular	1.732	0.7	3.88	∞
Linearity	4.70	rectangular	1.732	1	2.71	∞
System Detection Limits	0.25	rectangular	1.732	1	0.14	∞
Boundary effects	1.00	rectangular	1.732	1	0.58	∞
Readout electronics	0.30	normal	1.000	1	0.30	∞
Response time	0.80	rectangular	1.732	1	0.46	∞
RF ambient conditions	3.00	rectangular	1.732	1	1.73	∞
Integration time	0.00	rectangular	1.732	1	0.00	∞
Mechanical constrains of robot	1.50	rectangular	1.732	1	0.87	∞
Probe positioning	2.90	rectangular	1.732	1	1.67	∞
Extrapolation and integration	1.00	rectangular	1.732	1	0.58	∞
Test Sample Related						
Test Sample positioning	4.22	normal	1.000	1	4.22	14
Device holded uncertainty	3.44	normal	1.000	1	3.44	∞
Power Drift	5.00	rectangular	1.732	1	2.89	∞
Phantom and Setup						
Modular Phantom uncertainty	2.32	Normal	1.0001	1	2.32	2
Phantom uncertainty	4.00	rectangular	1.732	1	2.31	∞
Liquid conductivity (deviation from target)	5.00	rectangular	1.732	0.64	1.85	∞
Liquid conductivity (measurement error)	2.04	normal	1.000	0.64	1.30	∞
Liquid permittivity (deviation from target)	5.00	rectangular	1.732	0.6	1.73	∞
Liquid permittivity (measurement error)	4.27	normal	1.000	0.6	2.56	∞
Combined Standard Uncertainty		Normal	-	-	**11.32**	**728**
Extended Standard Uncertainty(K=2.00)					**22.64**	**728**

7. SYSTEM VERIFICATION

7.1 Tissue Verification

Table 7.1 MEASURED TISSUE PARAMETERS

	835MHz Head		835MHz Body		1900MHz Head		1900MHz Body		2450MHz Head		2450MHz Body	
	Target	Measured	Target	Measured	Target	Measured	Target	Measured	Target	Measured	Target	Measured
Date	Jan.10,2011		Jan.10,2011		Jan.10,2011		Jan.10,2011		Jan.09,2011		Jan.09,2011	
Liquid Temperature(°C)	22.1		21.9		22.1		22		22.2		21.9	
Dielectric Constant: å'	41.5	40.8	55.2	55.5	40	40.1	53.3	52.5	39.2	38.5	52.7	52.6
Conductivity:	0.9	0.89	0.97	0.99	1.4	1.42	1.52	1.55	1.8	1.85	1.95	1.98
Tissue Batch Number	835&900T4002B		835B2001H		1900F1002A		1900B2002D		2450MF1001V		2450B1001G	

The measured value must be within ±5% of the target value.

7.2 Test System Validation

Prior to assessment, the system is verified to the ±10% of the specification at 835MHz, 1900MHz and 2450MHz by using the system validation kit(s). (see Appendix E, Graphic Plot Attached)

Table 7.2 System Validation Results

System Validation Kit	Tissue	Targeted SAR_{1g} (mW/g)	Normalized SAR_{1g} (mW/g)	Measured SAR_{1g} (mW/g)	Deviation (%)	Date	Liquid Temperature(°C)	Ambient Temperature(°C)
4d050	835MHz Brain	9.49	9.6	2.4	1.16	Jan.10, 2011	22.1	22.5
5d082	1900MHz Brain	39.4	38.3	3.83	-2.79	Jan.10, 2011	22.1	22.6
807	2450MHz Brain	54.4	51.9	5.19	-4.59	Jan.09, 2011	22.2	22.6

*Validation was measured with adequate input power and normalized to 1W.

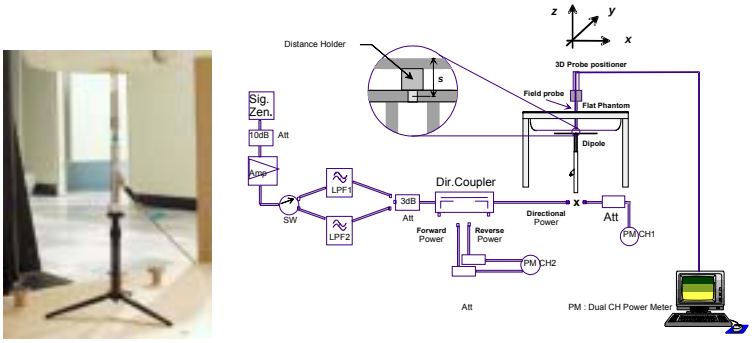

Figure 7.1 Dipole Validation Test Setup

8. SAR MEASUREMENT RESULTS

Procedures Used To Establish Test Signal

The handset was placed into simulated call mode using base station simulator. Such test signals offer a consistent means for testing SAR and are recommended for evaluating SAR. When test modes are not available or inappropriate for testing a handset, the actual transmission is activated through a base station simulator or similar equipment. See data pages for actual procedure used in measurement.

SAR Measurement Conditions for WCDMA

These procedures were followed according to FCC "SAR Measurement Procedures for 3G Devices", May 2006.

Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the ge neral descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR wit h TPC (transmit power control) set to all “1s”. Results for all applicable physical channel co nfigurations (DPCCH, DPDCHn and spreading codes) should be tabulated in the test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations should be clearly identified.

Head SAR Measurements

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than ¼ dB higher than that measured in 12.2kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4kbps SRB (signaling radio bearer) using the exposure configuration that results in the highest SAR for that RF channel in 12.2 RMC.

Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits configured to all “1s”. SAR for other spreading codes and multiple DPDCHn, when supported by the DUT, are not required when the maximum average outputs of each RF channel, for each spreading code and DPDCHn configuration, are less than ¼ dB higher than those measured in 12.2 RMC. Otherwise, SAR is measured on the maximum output channel with an applicable

RMC configuration for the corresponding spreading code or DPDCHn using the exposure configuration that results in the highest SAR with 12.2 RMC. When more than 2 DPDCHn are supported by the DUT, it may be necessary to configure the additional DPDCHn for the DUT using FTM(Factory Test Mode) with parameters similar to those used in 384 kbps and 768 kbps RMC.

Handsets with HSDPA

Body SAR is not required for handsets with HSDPA capabilities when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75% of the SAR limit. Otherwise, SAR is measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that results in the highest SAR in 12.2 kbps RMC for that RF channel.

Table 8.1 Max. Power Output Table for GT-I5510T

BAND	Channel	UMTS RF Conducted Power Table		
		HSDPA Inactive		HSDPA Active
		12.2 kbps RMC [dBm]	12.2 kbps AMR [dBm]	12.2 kbps RMC [dBm]
WCDMA 850	4132	22.65	22.63	22.64
	4183	22.38	22.37	22.34
	4233	22.7	22.67	22.68

Table 8.2 HSDPA Conducted Output Power

HSDPA	4132	4183	4233	MPR
Subtest1	22.01	21.81	21.92	0.0
Subtest2	21.97	21.73	21.86	0.0
Subtest3	21.44	21.24	21.3	0.5
Subtest4	21.42	21.29	21.31	0.5

HSDPA TX Power is changed for each subtest according to the specification in Infineon SP6160 solution. However, SP6160 does not support additional control of TX Power reduction from each subtest by a certain parameter change.

Per the manufacturer HSDPA TX Power may deviate from 3GPP for each subtest according to the specification in this chipset solution. However, this chipset does not support additional

control of TX Power reduction for each subtest by a certain parameter change. There, it is expected to observe more power reduction for some HSDPA subtests compared to the RMC power level due to the front-end designs, for purposes like battery saving features which are common. Although it does not strictly follow the MPR recommendation in 3GPP, the final power measured are still within 3GPP tolerance in section 5.2B in 3GPP TS34.12 and are expected results for this device.

Therefore, it's expected that there may be more power reduction than the 3GPP expected MPR used. The 3GPP recommends 0dB power reduction for Subtest 1 for example, but this chipset manufacturer implementation reduces more.

Device Test Conditions with GPRS

The handset is battery operated. Each SAR measurement was taken with a fully charged battery. In order to verify that the device was tested at full power, conducted output power measurements were performed before and after each SAR measurement to confirm the output power. If a conducted power deviation of more than 5% occurred, the test was repeated. And all Tx(1~4Tx) conducted power were also investigated for Body-Worn SAR Measurement

Table 8.3 GPRS Power Table for GT-I5510T

Band	Channel	Voice	1Tx	2Tx	3Tx	4Tx
850	128	32.32	32.29	32.3	30.01	27.94
	190	32.23	32.18	32.21	29.91	27.85
	251	32.14	32.09	32.12	29.82	27.77
1900	512	29.64	29.67	29.6	27.06	25.04
	661	29.77	29.67	29.72	27.16	25.17
	810	29.79	29.68	29.74	27.18	25.17

Table 8.4 802.11b Conducted Output Power

Freq [MHz]	Channel	Data Rate [Mbps]	Measured average power [dBm]	Measured Peak Power [dBm]
2412	1	1	12.17	14.54
		2	12.15	14.47
		5.5	12.18	14.47
		11	12.06	14.41
2437	6	1	13.62	15.92
		2	13.52	15.88
		5.5	13.60	15.24
		11	13.59	15.83
2462	11	1	14.55	16.71
		2	14.54	16.65
		5.5	**14.83**	16.27
		11	14.75	16.72

802.11n Conducted Output Power

Freq [MHz]	Channel	Data Rate [Mbps]	Measured Average Power [dBm]	Measured Peak Power [dBm]
2412	1	6	10.45	18.48
		9	10.43	18.44
		12	10.33	18.55
		18	10.39	17.94
		24	10.57	19.47
		36	10.63	19.42
		48	10.73	19.27
		54	9.69	18.71
2437	6	6	11.91	19.28
		9	12.19	19.42
		12	12.15	19.56
		18	12.21	19.26
		24	11.92	20.00
		36	12.29	20.24
		48	12.31	20.13
		54	11.30	19.81
2462	11	6	13.12	19.35
		9	13.13	19.37
		12	13.08	19.48
		18	13.16	19.16
		24	12.91	19.93
		36	13.36	20.51
		48	**13.41**	20.34
		54	12.33	19.91

802.11g Conducted Output Power

Freq [MHz]	Channel	MCS Index	Data Rate [Mbps]	Measured Average Power [dBm]	Measured Peak Power [dBm]
2412	1	6	6.5/7.2	8.75	16.67
		9	13/14.4	8.69	16.81
		12	19.5/21.7	8.76	16.85
		18	26/28.9	6.52	14.74
		24	39/43.3	8.46	16.89
		36	52/57.8	7.39	15.84
		48	58.5/65	6.11	14.84
		54	65/72.2	5.01	13.12
2437	6	6	6.5/7.2	10.01	17.67
		9	13/14.4	9.92	17.79
		12	19.5/21.7	10.04	17.87
		18	26/28.9	7.82	16.17
		24	39/43.3	9.78	18.15
		36	52/57.8	8.68	17.10
		48	58.5/65	7.36	16.24
		54	65/72.2	6.22	14.65
2462	11	6	6.5/7.2	10.81	17.66
		9	13/14.4	10.72	17.75
		12	19.5/21.7	**10.85**	17.84
		18	26/28.9	8.95	16.69
		24	39/43.3	10.82	18.12
		36	52/57.8	9.62	17.49
		48	58.5/65	8.57	16.72
		54	65/72.2	7.55	15.54

Simultaneous Transmission

Refer to the FCC OET document, 'SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas' (Feb 2008)

Table 8.5 Output Power Thresholds for Unlicensed Transmitters

	2.45	5.15 - 5.35	5.47 - 5.85	GHz
P Ref	**12**	**6**	**5**	**mW**
Device output power should be rounded to the nearest mW to compare with values specified in this table				

Device output power should be rounded to the nearest mW to compare with values specified in this table

Table 8.6 Summary of SAR Evaluation Requirements for Cell phones with Multiple Transmitters

	Individual Transmitter	**Simultaneous Transmission**
Licensed Transmitters	**<u>Routine evaluation required</u>**	**SAR not required:** **<u>Unlicensed only</u>** o when stand-alone 1-g SAR is not required and antenna is > 5 cm from other antennas **<u>Licensed & Unlicensed</u>** o when the sum of the 1-g SAR is <1.6 W/kg for all simultaneous transmitting antennas o when SAR to antenna separation ratio of simultaneous transmitting antenna pair is < 0.3 **SAR required:** **<u>Licensed & Unlicensed</u>** antenna pairs with SAR to antenna separation ratio ≥ 0.3; test is only required for the configuration that results in the highest SAR in standalone configuration for each wireless mode and exposure condition Note: simultaneous transmission exposure conditions for head and body can be different for different style phones; therefore, different test requirements may apply
Unlicensed Transmitters	**When there is no simultaneous transmission –** o output < 60/f: SAR not required o output ≥ 60/f: stand-alone SAR required **When there is simultaneous transmission –** **<u>Stand-alone SAR not required when</u>** O output ≤ 2.P_{Ref} and antenna is > 5.0 cm from other antennas O output ≤ PRef and antenna is ≥ 2.5 cm from other antennas O output ≤ PRef and antenna is < 2.5 cm from other antennas, each with either output power ≤ PRef or 1-g SAR < 1.2 W/kg **<u>Otherwise stand-alone SAR is required</u>** **When stand-alone SAR is required** o test SAR on highest output channel for each wireless mode and exposure condition o if SAR for highest output channel is > 50% of SAR limit, evaluate all channels according to normal procedures	

Conclusion

Based on the output power, antenna separation distance, and Body SAR, a stand-alone BT SAR test is not required. The summation of BT SAR and Licensed Transmitter SAR is 1.01 + 0 = 1.01, which is less than 1.6 W/Kg, therefore, a simultaneous SAR evaluation is not required. The summation of WLAN SAR and Licensed Transmitter SAR is 1.01 + 0.039 = 1.049, which is less than 1.6 W/Kg, Therefore, a simultaneous SAR evaluation is not required.

8.1 GSM850 Head SAR Results

Frequency		Mode	Conducted		Side	Test Position	Antenna Type	Battery	SAR Level (W/kg)
MHz	Ch		Start	End					
836.6	190	GSM850	32.23	32.24	Right	Cheek/Touch	Intenna	Standard	**0.111**
836.6	190	GSM850	32.23	32.23	Right	Ear/Tilt 15°	Intenna	Standard	0.092
836.6	190	GSM850	32.23	32.24	Left	Cheek/Touch	Intenna	Standard	0.102
836.6	190	GSM850	32.24	32.24	Left	Ear/Tilt 15°	Intenna	Standard	0.076
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**1.6W/kg (mW/g)** averaged over 1 gram			

NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].

2. All modes of operation were investigated, and the worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plot.
4. Liquid tissue depth is 15.2 ± 0.2cm
5. Battery is fully charged for all readings.
6. Test Configuration ☐ Manu. Test Codes ☒ Base Station Simulator
7. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

8.2 GPRS850 Body SAR Results(Without Holster)

Frequency		Mode	Conducted		Side	Slot	Spacing	Antenna Type	Battery	Test Position	SAR Level (W/kg)
MHz	Ch		Start	End							
836.6	190	GSM850	32.22	32.18	Back	2Tx	1 cm	Intenna	Standard	Body	**0.708**
836.6	190	GSM850	29.87	29.84	Back	3Tx	1 cm	Intenna	Standard	Body	0.627
836.6	190	GSM850	27.83	27.89	Back	4Tx	1 cm	Intenna	Standard	Body	0.515
836.6	190	GSM850	32.17	32.35	Front	2Tx	1 cm	Intenna	Standard	Body	0.314
836.6	190	GSM850	32.15	32.2	Side C	2Tx	1 cm	Intenna	Standard	Body	0.038
836.6	190	GSM850	32.17	32.12	Side B	2Tx	1 cm	Intenna	Standard	Body	0.249
836.6	190	GSM850	32.21	32.19	Side A	2Tx	1 cm	Intenna	Standard	Body	0.321
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**1.6W/kg (mW/g)** averaged over 1 gram					

NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plot.
4. Liquid tissue depth is 15.2 ± 0.2cm
5. Battery is fully charged for all readings.
6. Test Configuration ☐ With Holster ☒ Without Holster
   ☐ Manu. Test Codes ☒ Base Station Simulator
7. Justification for reduced test configurations: This model supports GPRS CLASS "12" (4Tx) and EDGE Rx only. So the burst power and timing period is more than 2dB higher in GPRS mode than in GSM850 mode. Hence, the GSM850 mode was not measured.
8. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
9. Side D edge was not tested because antenna distance was >2.5cm, per TCB workshop October 2010.

8.3 GSM1900 Head SAR Results

Frequency		Mode	Conducted		Side	Test Position	Antenna Type	Battery	SAR Level (W/kg)
MHz	Ch		Start	End					
1880	661	GSM1900	29.77	29.78	Right	Cheek/Touch	Intenna	Standard	0.257
1880	661	GSM1900	29.77	29.78	Right	Ear/Tilt 15°	Intenna	Standard	0.129
1880	661	GSM1900	29.76	29.77	Left	Cheek/Touch	Intenna	Standard	**0.379**
1880	661	GSM1900	29.77	29.77	Left	Ear/Tilt 15°	Intenna	Standard	0.136
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**1.6W/kg (mW/g)** averaged over 1 gram			

NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].

2. All modes of operation were investigated, and the worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plot.
4. Liquid tissue depth is 15.2 ± 0.2cm
5. Battery is fully charged for all readings.
6. Test Configuration ☐ Manu. Test Codes ☒ Base Station Simulator
7. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

8.4 GPRS1900 Body SAR Results(Without Holster)

Frequency		Mode	Conducted		Side	Slot	Spacing	Antenna Type	Battery	Test Position	SAR Level (W/kg)
MHz	Ch		Start	End							
1880	661	GSM1900	29.69	29.72	Back	2Tx	1 cm	Intenna	Standard	Body	1.000
1880	661	GSM1900	27.19	27.24	Back	3Tx	1 cm	Intenna	Standard	Body	0.813
1880	661	GSM1900	25.11	25.19	Back	4Tx	1 cm	Intenna	Standard	Body	0.667
1850.2	512	GSM1900	29.74	29.76	Back	2Tx	1 cm	Intenna	Standard	Body	**1.01**
1909.8	810	GSM1900	29.75	29.79	Back	2Tx	1 cm	Intenna	Standard	Body	0.973
1880	661	GSM1900	29.55	29.61	Front	2Tx	1 cm	Intenna	Standard	Body	0.382
1880	661	GSM1900	29.62	29.79	Side C	2Tx	1 cm	Intenna	Standard	Body	0.919
1850.2	512	GSM1900	29.66	29.82	Side C	2Tx	1 cm	Intenna	Standard	Body	0.811
1909.8	810	GSM1900	29.69	29.78	Side C	2Tx	1 cm	Intenna	Standard	Body	0.957
1880	661	GSM1900	29.73	29.83	Side B	2Tx	1 cm	Intenna	Standard	Body	0.160
1880	661	GSM1900	29.59	29.72	Side A	2Tx	1 cm	Intenna	Standard	Body	0.366
ANSI / IEEE C95.1 1992 – SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure / General Population**							**1.6W/kg (mW/g)** averaged over 1 gram				

NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plot.
4. Liquid tissue depth is 15.2 ± 0.2cm
5. Battery is fully charged for all readings.
6. Test Configuration ☐ With Holster ☒ Without Holster
   ☐ Manu. Test Codes ☒ Base Station Simulator
7. Justification for reduced test configurations: This model supports GPRS CLASS "12" (4Tx) and EDGE Rx only. So the burst power and timing period is more than 2dB higher in GPRS mode than in GSM1900 mode. Hence, the GSM1900 mode was not measured.
8. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
9. Side D edge was not tested because antenna distance was >2.5cm, per TCB workshop October 2010.

8.5 WCDMA850 Head SAR Results

Frequency		Mode	Conducted		Side	Test Position	Antenna Type	Battery	SAR Level (W/kg)
MHz	Ch		Start	End					
836.6	4183	WCDMA850	22.38	22.37	Right	Cheek/Touch	Intenna	Standard	**0.303**
836.6	4183	WCDMA850	22.38	22.38	Right	Ear/Tilt 15°	Intenna	Standard	0.243
836.6	4183	WCDMA850	22.38	22.37	Left	Cheek/Touch	Intenna	Standard	0.296
836.6	4183	WCDMA850	22.37	22.37	Left	Ear/Tilt 15°	Intenna	Standard	0.209
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**1.6W/kg (mW/g)** averaged over 1 gram			

NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plot.
4. Liquid tissue depth is 15.2 ± 0.2cm
5. Battery is fully charged for all readings.
6. Test Configuration ☐ Manu. Test Codes ☒ Base Station Simulator
7. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
8. WCDMA mode was tested under RMC 12.2kbps with HSDPA Inactive

8.6 WCDMA850 Body SAR Results(Without Holster)

Frequency		Mode	Conducted Power		Side	Spacing	Antenna Type	Battery	Bar	SAR Level (W/kg)
MHz	Ch		Start	End						
836.6	4183	WCDMA850	22.35	22.39	Back	1 cm	Intenna	Standard	Body	**0.743**
836.6	4183	WCDMA850	22.37	22.42	Front	1 cm	Intenna	Standard	Body	0.327
836.6	4183	WCDMA850	22.36	22.46	Side C	1 cm	Intenna	Standard	Body	0.048
836.6	4183	WCDMA850	22.42	22.47	Side B	1 cm	Intenna	Standard	Body	0.325
836.6	4183	WCDMA850	22.38	22.45	Side A	1 cm	Intenna	Standard	Body	0.398
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**1.6W/kg (mW/g)** averaged over 1 gram				

NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].

2. All modes of operation were investigated, and the worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plot.
4. Liquid tissue depth is 15.2 ± 0.2cm
5. Battery is fully charged for all readings.
6. Test Configuration ☐ With Holster ☒ Without Holster
   ☐ Manu. Test Codes ☒ Base Station Simulator
7. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
8. Side D edge was not tested because antenna distance was >2.5cm, per TCB workshop October 2010.
9. WCDMA mode was tested under RMC 12.2 kbps with HSPA Inactive.

8.7 WLAN Head SAR Results

Frequency		Mode	Conducted		Side	Test Position	Data Rate	Antenna Type	Battery	SAR Level (W/kg)
MHz	Ch		Start	End						
2462	11	WLAN	14.85	14.84	Right	Cheek/Touch	5.5	Intenna	Standard	**0.026**
2462	11	WLAN	14.82	14.82	Right	Ear/Tilt 15°	5.5	Intenna	Standard	0.014
2462	11	WLAN	14.83	14.81	Left	Cheek/Touch	5.5	Intenna	Standard	0.015
2462	11	WLAN	14.80	14.80	Left	Ear/Tilt 15°	5.5	Intenna	Standard	0.018
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population						**1.6W/kg (mW/g)** averaged over 1 gram				

NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plot.
4. Liquid tissue depth is 15.2 ± 0.2cm
5. Battery is fully charged for all readings.
6. Test Configuration ☒ Manu. Test Codes ☐ Base Station Simulator
7. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
8. Justification for reduced test configurations for WIFI channels per Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for each data rate was selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11b mode.
9. WLAN transmission was verified using a spectrum analyzer

8.8 WLAN Body SAR Results(Without Holster)

Frequency		Mode	Data Rate	Conducted		Side	Spacing	Antenna Type	Battery	Test Position	SAR Level (W/kg)
MHz	Ch			Start	End						
2462	11	802.11b	5.5Mbps	14.80	14.85	Back	1 cm	Intenna	Standard	Body	**0.039**
2462	11	802.11b	5.5Mbps	14.83	14.92	Front	1 cm	Intenna	Standard	Body	0.00776
2462	11	802.11b	5.5Mbps	14.81	14.84	Side D	1 cm	Intenna	Standard	Body	0.017
2462	11	802.11b	5.5Mbps	14.81	14.86	Side A	1 cm	Intenna	Standard	Body	0.022
ANSI / IEEE C95.1 1992 – SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population							**1.6W/kg (mW/g)** averaged over 1 gram				

NOTES:

1. The test data reported are the worst-case SAR value with the position set in a typical configuration. Test procedures used are according to FCC/OET Bulletin 65, Supp.C [July 2001].
2. All modes of operation were investigated, and the worst-case results are reported.
3. Tissue parameters and temperatures are listed on the SAR plot.
4. Liquid tissue depth is 15.2 ± 0.2cm
5. Battery is fully charged for all readings.
6. Test Configuration ☐ With Holster ☒ Without Holster
   ☒ Manu. Test Codes ☐ Base Station Simulator
7. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (July, 2001), if the SAR measured at the middle channel for each test configuration (left, right, cheek/touch, tilt/ear, extended and retracted) is least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
8. Justification for reduced test configurations for WIFI channels per Publication 248227 and April 2010 FCC/TCB Meeting Notes: Highest average RF output power channel for each data rate was selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n) were not investigated since the average output powers were not greater than 0.25 dB than that of the corresponding channel in the lowest data rate IEEE 802.11b mode.
9. Side B,C edge were not tested because antenna distance was >2.5cm, per TCB workshop October 2010.
10. WLAN transmission was verified using a spectrum analyzer.

9. CONCLUSION

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

The highest reported SAR values are as follows:
GSM850: Head: 0.111W/Kg : Body-worn: 0.708W/Kg
GSM1900: Head: 0.379W/Kg : Body-worn: 1.01W/Kg
WCDMA850: Head: 0.303W/Kg : Body-worn: 0.743W/Kg
WLAN: Head: 0.026W/Kg : Body-worn: 0.039W/Kg

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APPENDIX A

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (p). It is also defined as the rate of RF energy absorption pet unit mass at a point in an absorbing body (see Fig. A.1).

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{pdv}\right)$$

Figure A.1 SAR Mathematical Equation

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

$$SAR = \sigma E^2 / p$$

Where :

σ = conductivity of the tissue-simulant material (S/m)
p = mass density of the tissue-simulant material (kg/m^3)
E = Total RMS electric field strength (V/m)

Note: The primary factors that control rate or energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

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APPENDIX B

Probe Calibration Process

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure described in **K. Pokovic, T.Schmid, N. Kuster, *Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies*, ICECOM97, Oct. 1997, pp. 120-124** with an accuracy better than +/-10%. The spherical isotropy was evaluated with the procedure described in **K. Pokovic, T.Schmid, N. Kuster, *E-field Probe with improved isotropy in brain simulating liquids*, Proceedings of the ELMAR, Zadar, June 23-25, 1996, pp. 172-175** and found to be better than +/-0.25dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies bellow 1 GHz (see Fig. B.1), and in a waveguide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

Temperature Assessment

E-field temperature correlation calibration is performed in a flat phantom flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe (see Fig. B.2).

$$\text{SAR} = C\frac{\Delta T}{\Delta t}$$

where:

Δt = exposure time (30 seconds)

C = heat capacity of tissue (brain or muscle).

ΔT = temperature increase due to RF exposure.

SAR is proportional to ΔT/ Δt, the initial rate of tissue heating, before thermal diffusion takes place. Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E-field;

$$\text{SAR} = \frac{|E|^2 \cdot \sigma}{p}$$

where:

σ = simulated tissue conductivity

p = Tissue density (1.25 g/cm^3 for brain tissue)

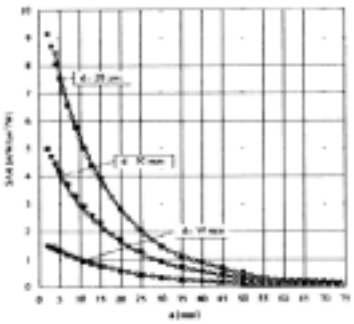


Figure B.1. E-Field and Temperature measurements at 900MHz

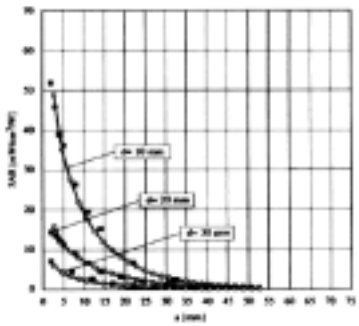


Figure B.2. E-Field and temperature measurements at 1.9GHz

APPENDIX C

ANSI/IEEE C95.1 – 2005 RF EXPOSURE LIMITS

Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is the exposure that may be incurred by persons who are aware of the potential for exposure,(i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table C.1 Safety Limits for Partial Body Exposure

	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)
SPATIAL PEAK SAR[1] Brain	1.60	8.00
SPATIAL PEAK SAR[2] Whole Body	0.08	0.40
SPATIAL PEAK SAR[3] Hands,Feet,Ankles, Wrists	4.00	20.00

[1] The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as tissue volume in the shape of a cube) and over the appropriate averaging time.
[2] The Spatial Average value of the SAR averaged over the whole body.
[3] The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

APPENDIX D

The Validation Measurements

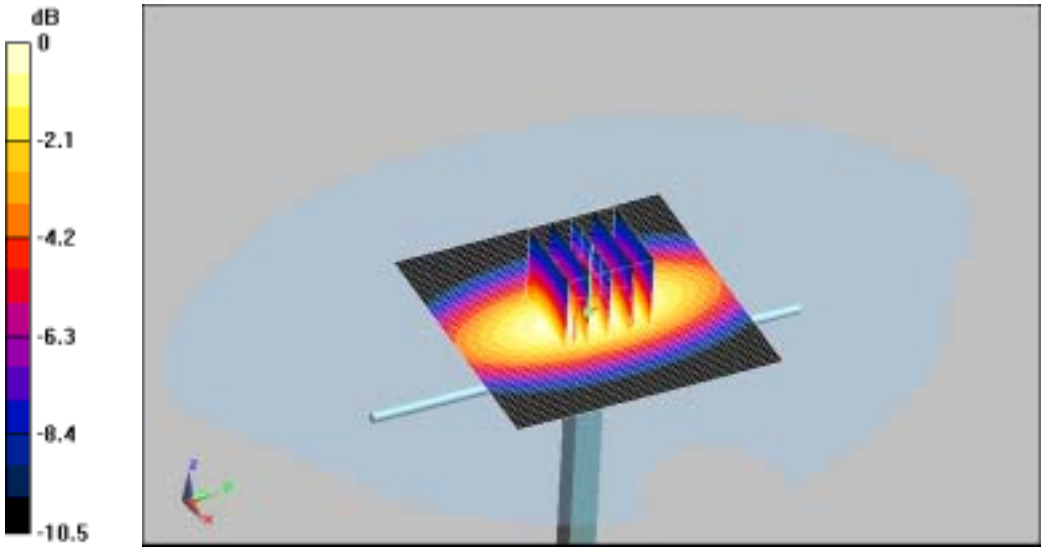
DUT: Dipole 835 MHz; Serial: 4d050
Program Name: 835MHz Dipole Validation 2011.01.10
Procedure Name: 835MHz @ 250mW
Meas. Ambient Temp(celsius)-22.5;Tissue Temp(celsius)-22.1;Test Date-10/Jan/2010

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

835MHz @ 250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 2.55 mW/g

835MHz @ 250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.6 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 3.53 W/kg
SAR(1 g) = 2.4 mW/g; SAR(10 g) = 1.57 mW/g
Maximum value of SAR (measured) = 2.59 mW/g



0 dB = 2.59mW/g

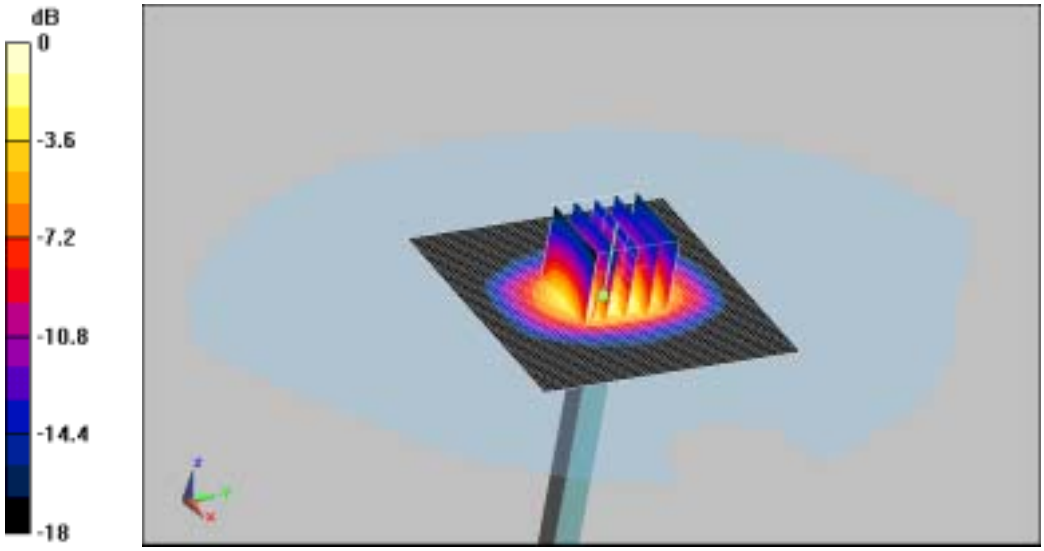
DUT: Dipole 1900 MHz; Serial: 5d082
Program Name: 1900MHz Dipole Validation 2011.01.10
Procedure Name: 1900MHz @ 100mW
Meas. Ambient Temp(celsius)-22.6;Tissue Temp(celsius)-22.1;Test Date-10/Jan/2010

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.42 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.85, 4.85, 4.85); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1425
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

1900MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 5.09 mW/g

1900MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 56.4 V/m; Power Drift = -0.109 dB
Peak SAR (extrapolated) = 7.01 W/kg
SAR(1 g) = 3.83 mW/g; SAR(10 g) = 1.99 mW/g
Maximum value of SAR (measured) = 4.29 mW/g



0 dB = 4.29mW/g

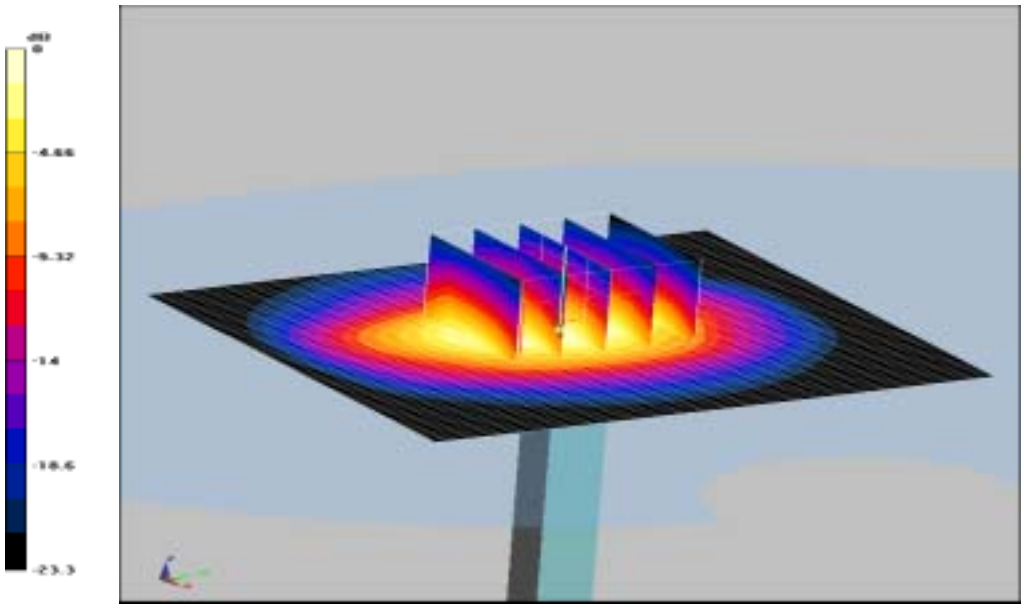
DUT: Dipole 2450 MHz; Serial: D2450V2 - SN:807
Program Name: 2450MHz Dipole Validation 2011.01.09
Procedure Name: 2450MHz @ 100mW
Meas. Ambient Temp(celsius)-22.6;Tissue Temp(celsius)-22.2;Test Date-09/Jan/2010

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.85 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1248
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

2450MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 8.39 mW/g

2450MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.9 V/m; Power Drift = 0.678 dB
Peak SAR (extrapolated) = 11.5 W/kg
SAR(1 g) = 5.19 mW/g; SAR(10 g) = 2.48 mW/g
Maximum value of SAR (measured) = 5.64 mW/g



0 dB = 5.64mW/g

APPENDIX E

Plots of The SAR Measurements

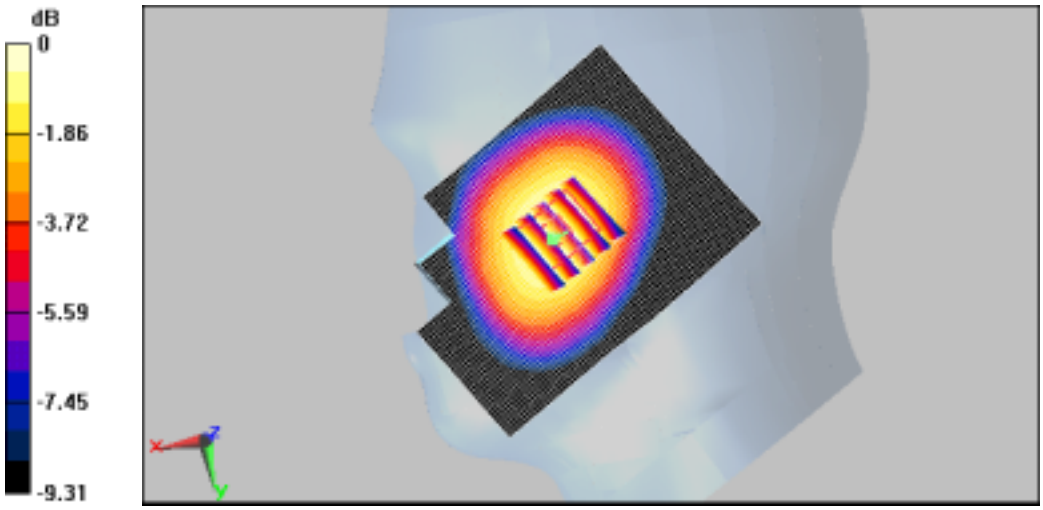
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GSM850 Right (Job No. : FH-268)
Procedure Name: Cheek , Ch.190, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek , Ch.190, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.119 mW/g

Cheek , Ch.190, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.3 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 0.136 W/kg
SAR(1 g) = 0.111 mW/g; SAR(10 g) = 0.084 mW/g
Maximum value of SAR (measured) = 0.116 mW/g



0 dB = 0.116mW/g

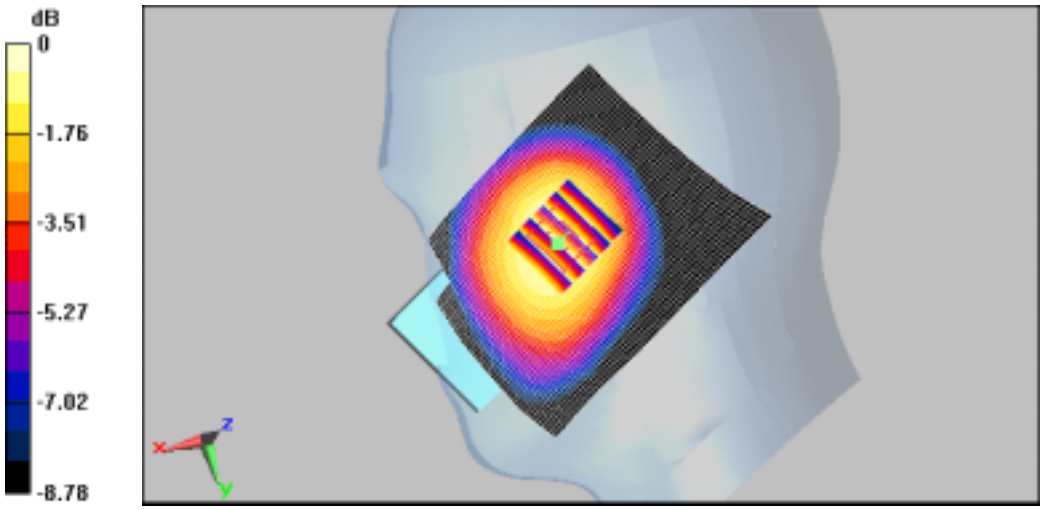
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GSM850 Right (Job No. : FH-268)
Procedure Name: Tilt, Ch.190, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Tilt, Ch.190, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.099 mW/g

Tilt, Ch.190, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.52 V/m; Power Drift = -0.136 dB
Peak SAR (extrapolated) = 0.113 W/kg
SAR(1 g) = 0.092 mW/g; SAR(10 g) = 0.069 mW/g
Maximum value of SAR (measured) = 0.096 mW/g



0 dB = 0.096mW/g

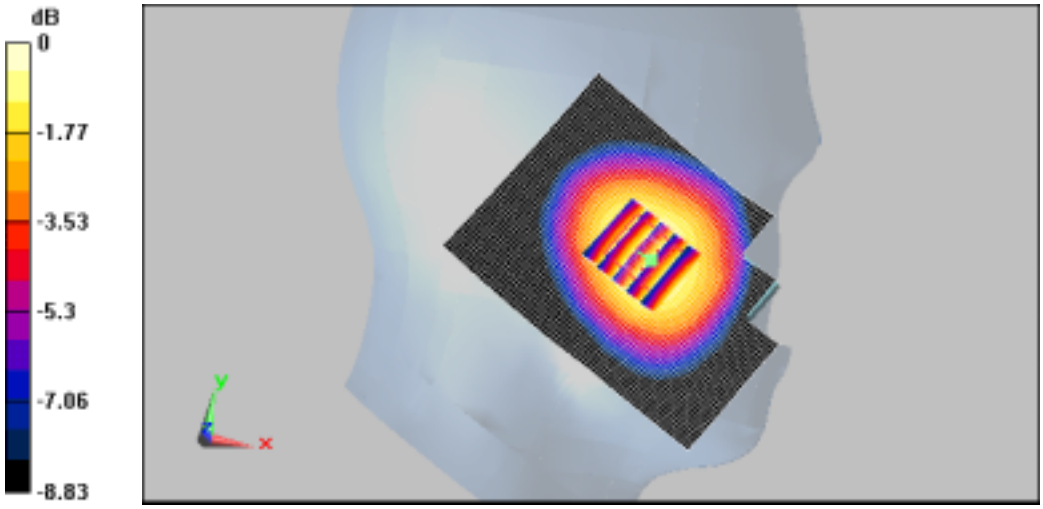
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GSM850 Left (Job No. : FH-268)
Procedure Name: Cheek, Ch.190, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek, Ch.190, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.111 mW/g

Cheek, Ch.190, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.8 V/m; Power Drift = 0.074 dB
Peak SAR (extrapolated) = 0.124 W/kg
SAR(1 g) = 0.102 mW/g; SAR(10 g) = 0.077 mW/g
Maximum value of SAR (measured) = 0.108 mW/g



0 dB = 0.108mW/g

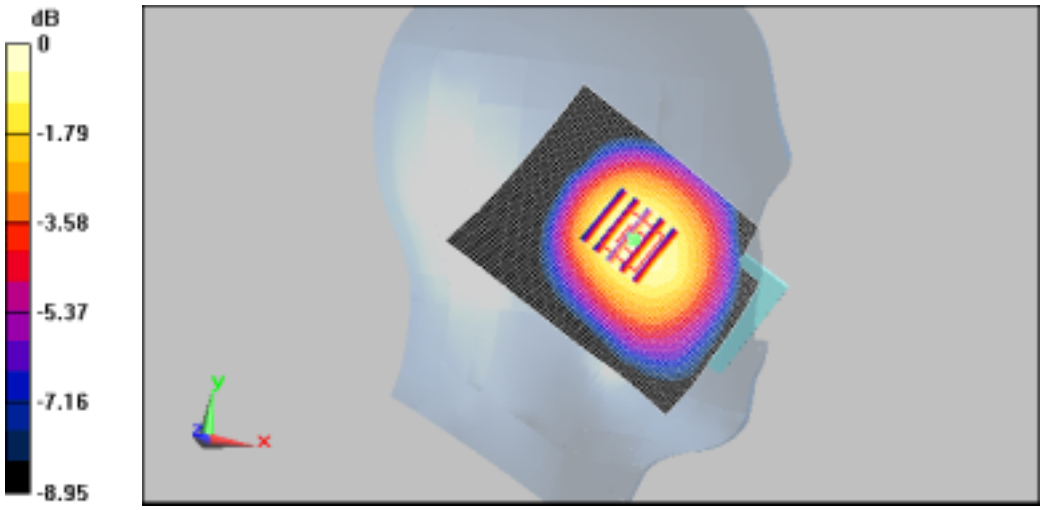
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GSM850 Left (Job No. : FH-268)
Procedure Name: Tilt, Ch.190, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Tilt, Ch.190, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.082 mW/g

Tilt, Ch.190, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.83 V/m; Power Drift = 0.145 dB
Peak SAR (extrapolated) = 0.094 W/kg
SAR(1 g) = 0.076 mW/g; SAR(10 g) = 0.057 mW/g
Maximum value of SAR (measured) = 0.081 mW/g



0 dB = 0.081mW/g

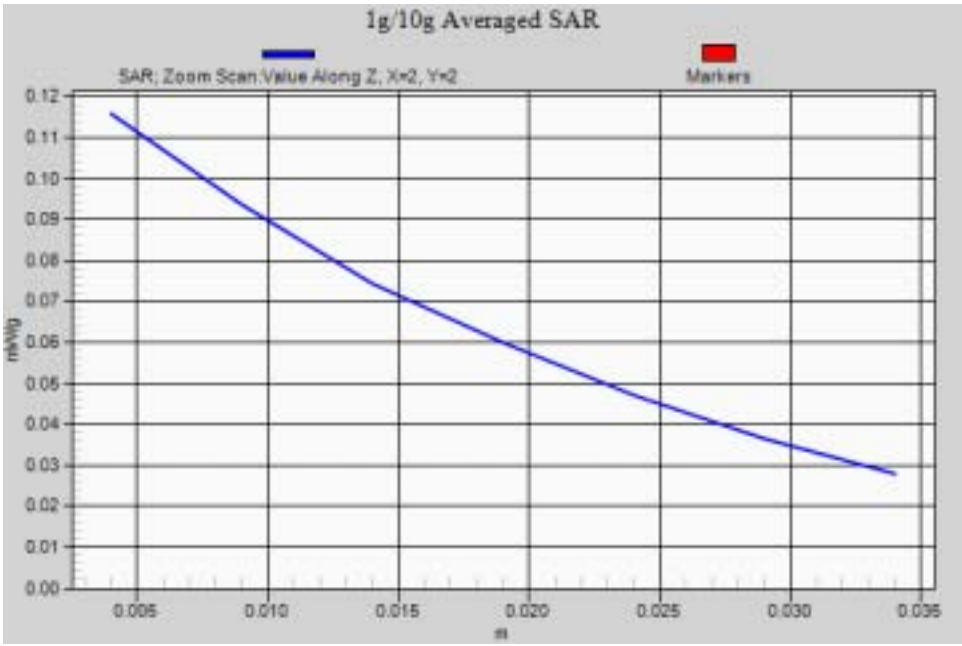
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GSM850 Right (Job No. : FH-268)
Procedure Name: Cheek , Ch.190, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek , Ch.190, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.119 mW/g

Cheek , Ch.190, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.3 V/m; Power Drift = -0.044 dB
Peak SAR (extrapolated) = 0.136 W/kg
SAR(1 g) = 0.111 mW/g; SAR(10 g) = 0.084 mW/g
Maximum value of SAR (measured) = 0.116 mW/g



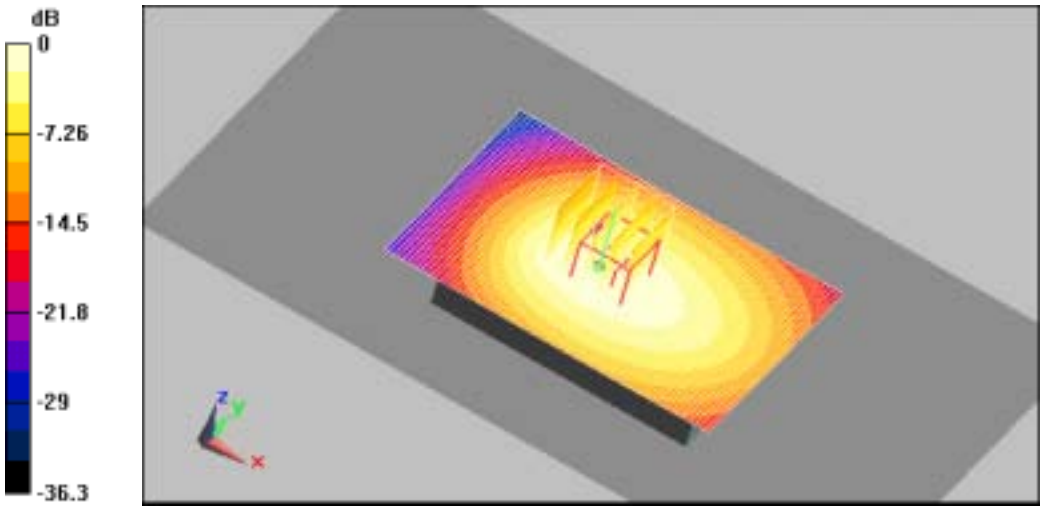
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.815 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.9 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 0.974 W/kg
SAR(1 g) = 0.708 mW/g; SAR(10 g) = 0.498 mW/g
Maximum value of SAR (measured) = 0.748 mW/g



0 dB = 0.748mW/g

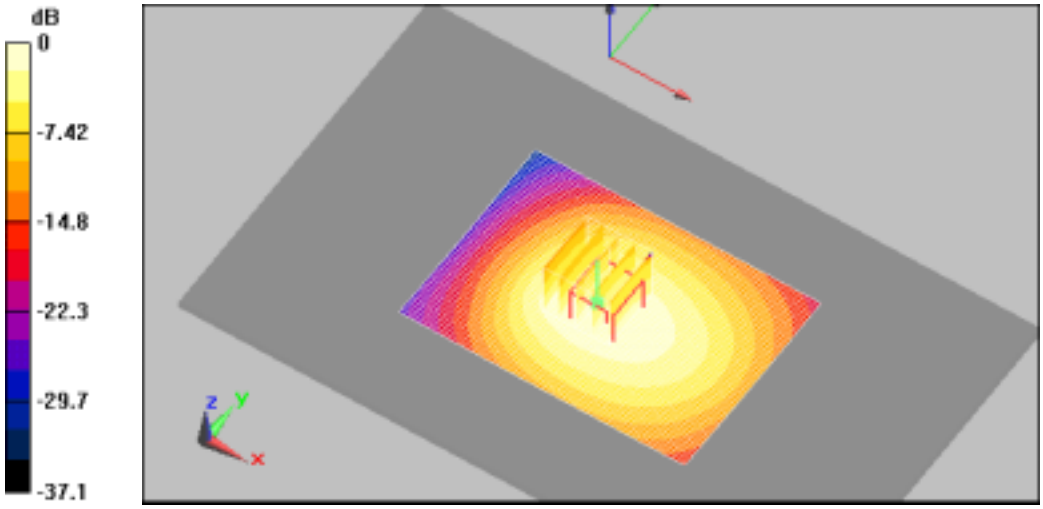
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard Back 3Tx
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:2.77
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard Back 3Tx/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.719 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard Back 3Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 26.6 V/m; Power Drift = -0.096 dB
Peak SAR (extrapolated) = 0.865 W/kg
SAR(1 g) = 0.627 mW/g; SAR(10 g) = 0.441 mW/g
Maximum value of SAR (measured) = 0.662 mW/g



0 dB = 0.662mW/g

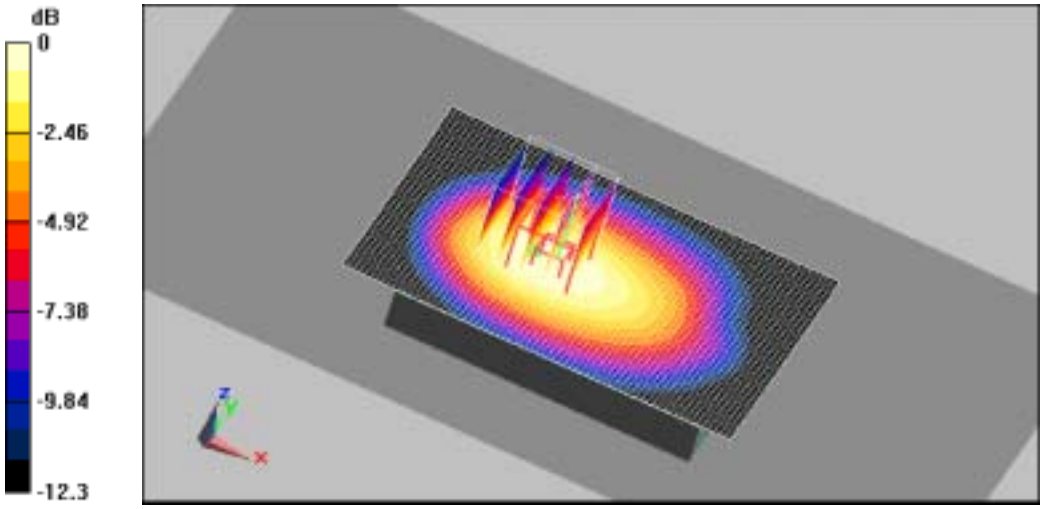
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard Back 4Tx
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:2.075
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard Back 4Tx/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.576 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard Back 4Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.7 V/m; Power Drift = -0.102 dB
Peak SAR (extrapolated) = 0.702 W/kg
SAR(1 g) = 0.515 mW/g; SAR(10 g) = 0.361 mW/g
Maximum value of SAR (measured) = 0.544 mW/g



0 dB = 0.544mW/g

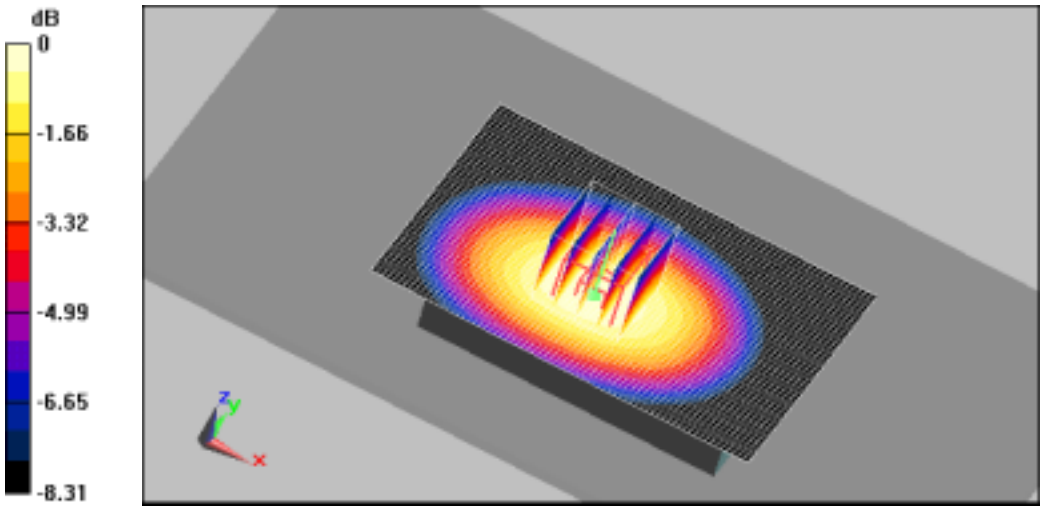
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard Front
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard Front/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.333 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.9 V/m; Power Drift = 0.00381 dB
Peak SAR (extrapolated) = 0.381 W/kg
SAR(1 g) = 0.314 mW/g; SAR(10 g) = 0.236 mW/g
Maximum value of SAR (measured) = 0.331 mW/g



0 dB = 0.331mW/g

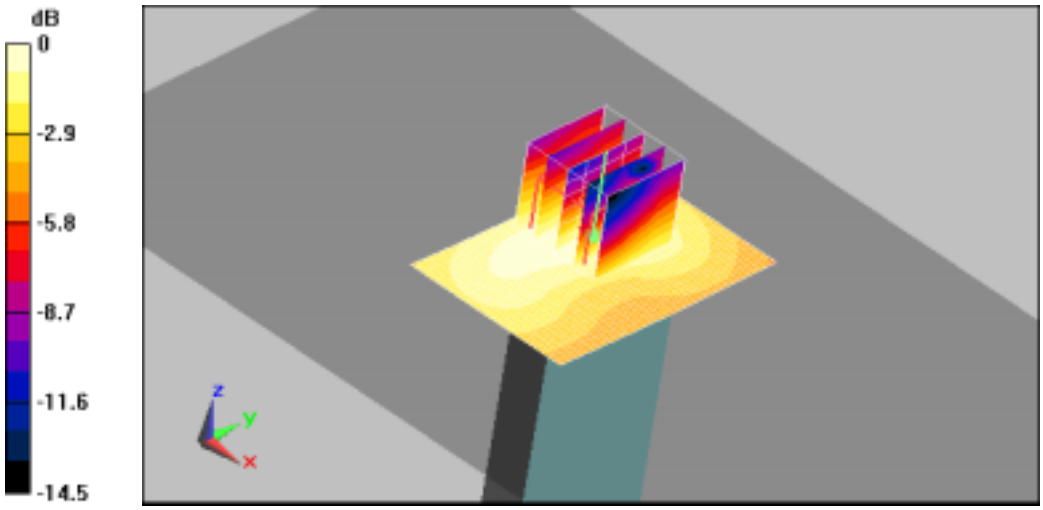
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard, Bottom
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard, Bottom/Area Scan (61x41x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.040 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard, Bottom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.65 V/m; Power Drift = 0.188 dB
Peak SAR (extrapolated) = 0.057 W/kg
SAR(1 g) = 0.038 mW/g; SAR(10 g) = 0.025 mW/g
Maximum value of SAR (measured) = 0.041 mW/g



0 dB = 0.041mW/g

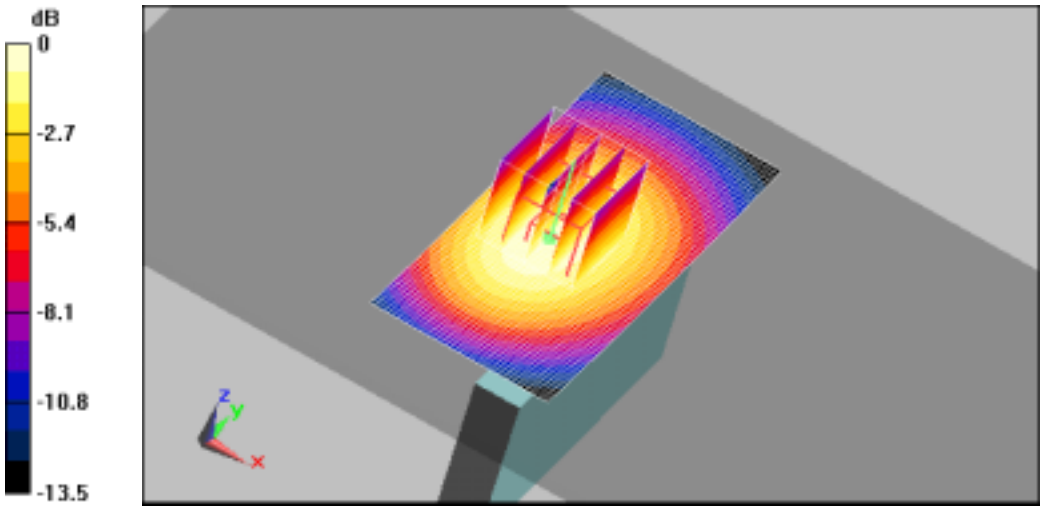
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard, Left
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard, Left/Area Scan (71x41x1): Measurement grid: dx=20mm, dy=15mm
Maximum value of SAR (interpolated) = 0.262 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard, Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.9 V/m; Power Drift = -0.156 dB
Peak SAR (extrapolated) = 0.345 W/kg
SAR(1 g) = 0.249 mW/g; SAR(10 g) = 0.173 mW/g
Maximum value of SAR (measured) = 0.267 mW/g



0 dB = 0.267mW/g

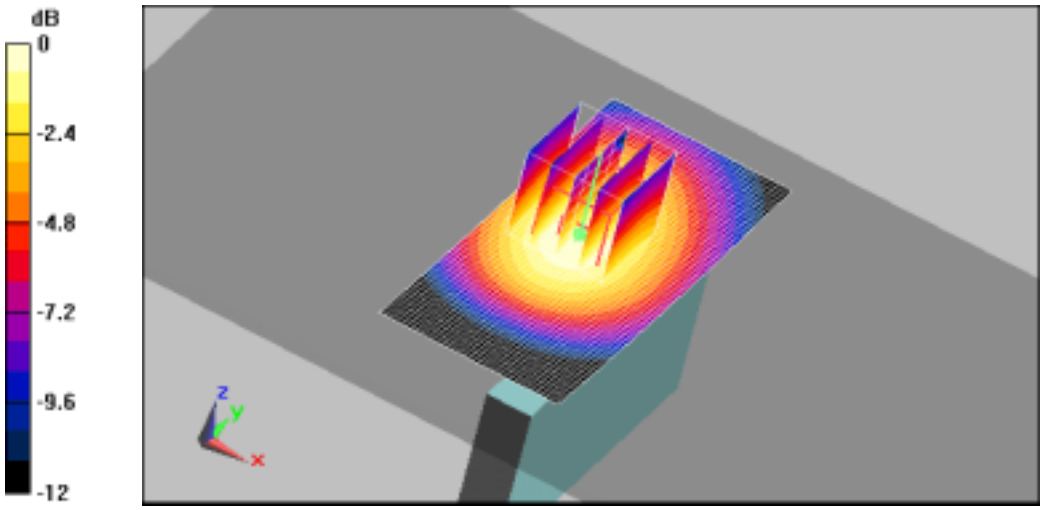
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard, Right
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard, Right/Area Scan (71x41x1): Measurement grid: dx=20mm, dy=15mm
Maximum value of SAR (interpolated) = 0.341 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard, Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.4 V/m; Power Drift = -0.177 dB
Peak SAR (extrapolated) = 0.447 W/kg
SAR(1 g) = 0.321 mW/g; SAR(10 g) = 0.223 mW/g
Maximum value of SAR (measured) = 0.343 mW/g



0 dB = 0.343mW/g

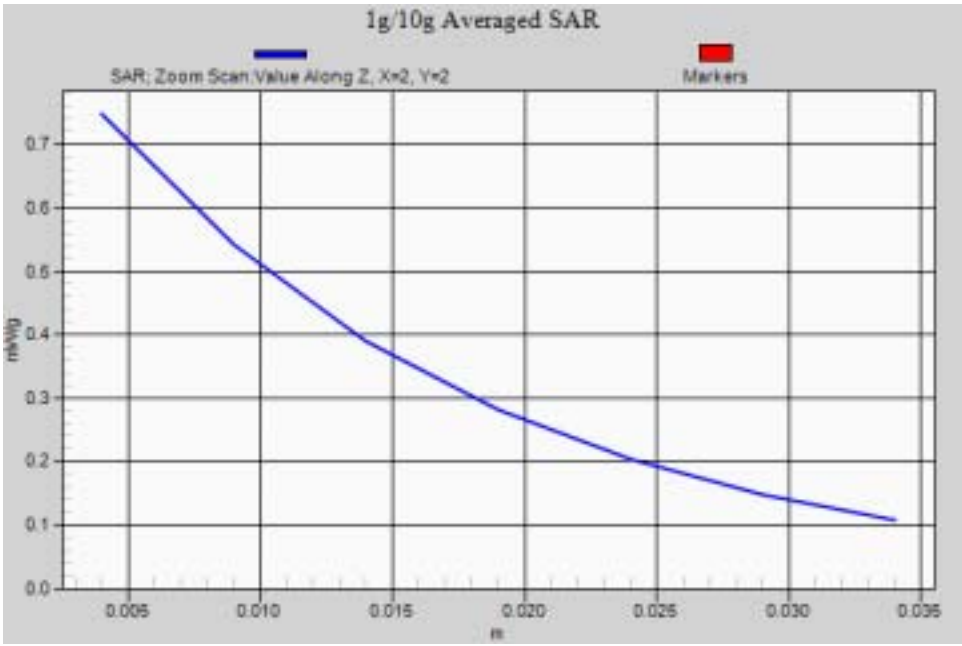
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.815 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.9 V/m; Power Drift = -0.046 dB
Peak SAR (extrapolated) = 0.974 W/kg
SAR(1 g) = 0.708 mW/g; SAR(10 g) = 0.498 mW/g
Maximum value of SAR (measured) = 0.748 mW/g



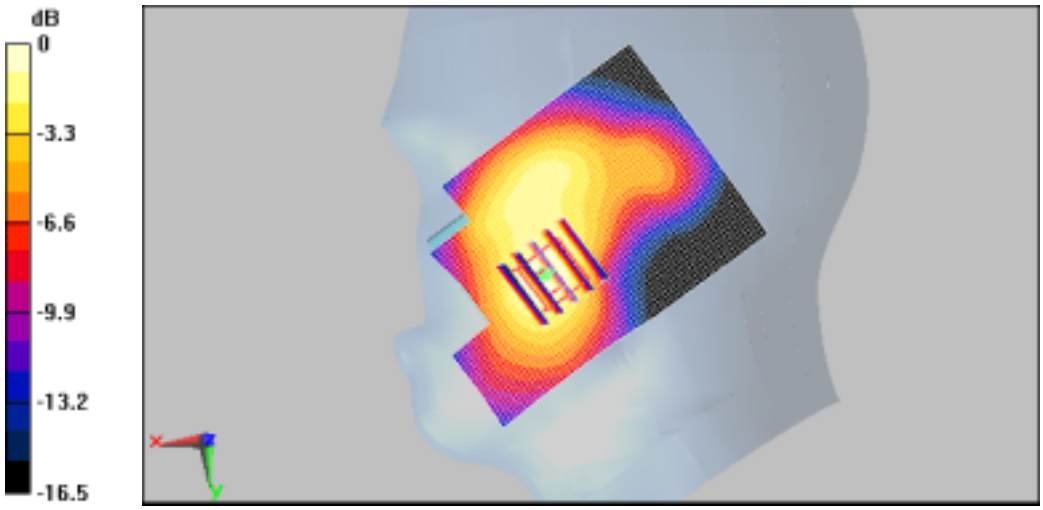
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GSM1900 Right (Job No. : FH-268)
Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.85, 4.85, 4.85); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1425
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.276 mW/g

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.8 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 0.411 W/kg
SAR(1 g) = 0.257 mW/g; SAR(10 g) = 0.150 mW/g
Maximum value of SAR (measured) = 0.277 mW/g



0 dB = 0.277mW/g

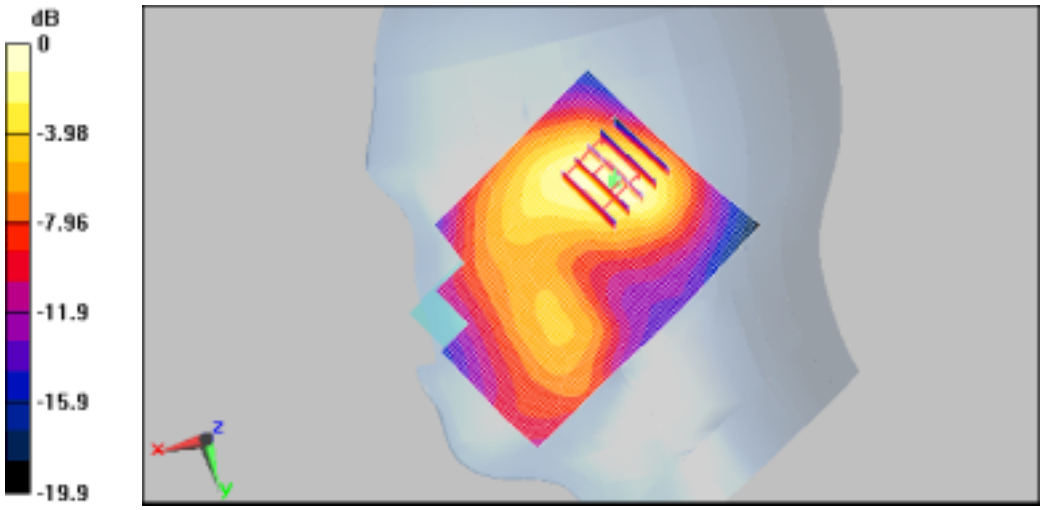
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GSM1900 Right (Job No. : FH-268)
Procedure Name: Tilt, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.85, 4.85, 4.85); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1425
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.145 mW/g

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.27 V/m; Power Drift = -0.00369 dB
Peak SAR (extrapolated) = 0.206 W/kg
SAR(1 g) = 0.129 mW/g; SAR(10 g) = 0.075 mW/g
Maximum value of SAR (measured) = 0.142 mW/g



0 dB = 0.142mW/g

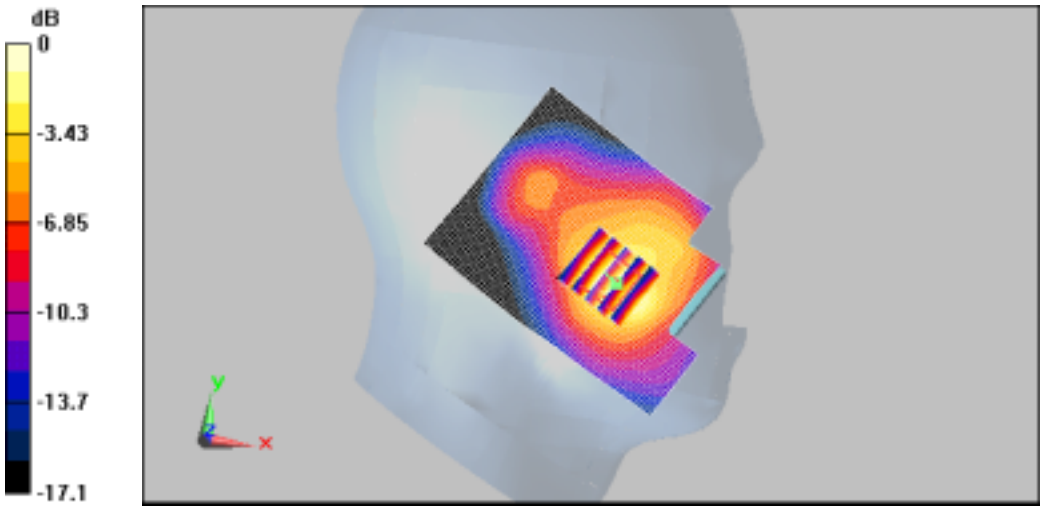
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GSM1900 Left (Job No. : FH-268)
Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.85, 4.85, 4.85); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1425
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.429 mW/g

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.2 V/m; Power Drift = 0.105 dB
Peak SAR (extrapolated) = 0.608 W/kg
SAR(1 g) = 0.379 mW/g; SAR(10 g) = 0.217 mW/g
Maximum value of SAR (measured) = 0.396 mW/g



0 dB = 0.396mW/g

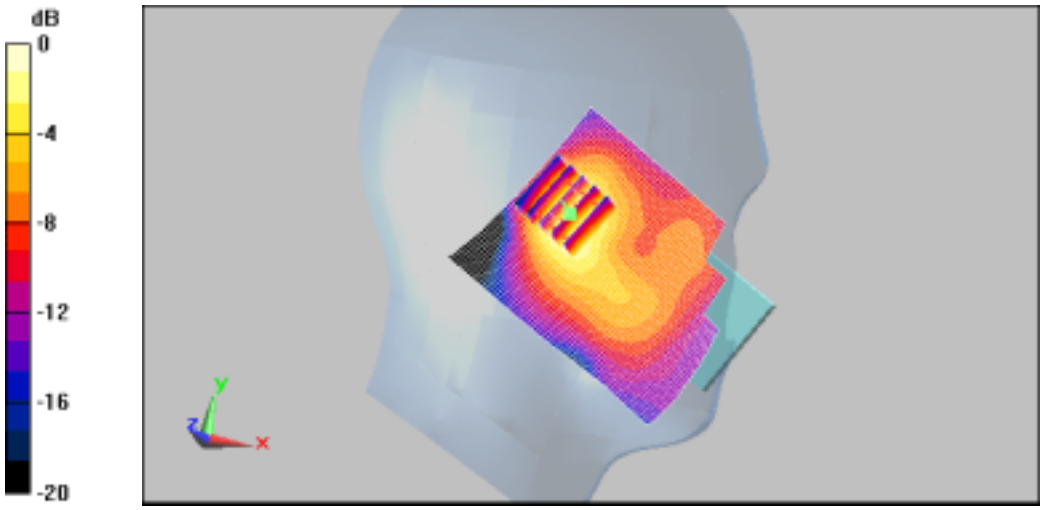
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GSM1900 Left (Job No. : FH-268)
Procedure Name: Tilt, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.85, 4.85, 4.85); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1425
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.145 mW/g

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.44 V/m; Power Drift = 0.063 dB
Peak SAR (extrapolated) = 0.224 W/kg
SAR(1 g) = 0.136 mW/g; SAR(10 g) = 0.076 mW/g
Maximum value of SAR (measured) = 0.151 mW/g



0 dB = 0.151mW/g

DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GSM1900 Left (Job No. : FH-268)
Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.42 mho/m; ε_r = 40.1; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.85, 4.85, 4.85); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #2; Type: SAM; Serial: TP-1425
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.429 mW/g

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.2 V/m; Power Drift = 0.105 dB
Peak SAR (extrapolated) = 0.608 W/kg
SAR(1 g) = 0.379 mW/g; SAR(10 g) = 0.217 mW/g
Maximum value of SAR (measured) = 0.396 mW/g

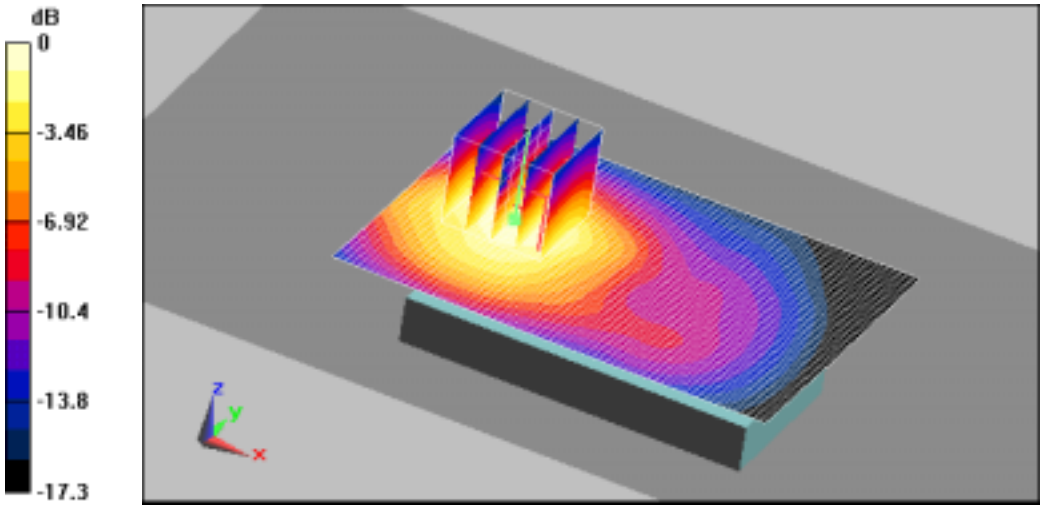
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.661, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.25 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.7 V/m; Power Drift = -0.115 dB
Peak SAR (extrapolated) = 1.62 W/kg
SAR(1 g) = 1.000 mW/g; SAR(10 g) = 0.572 mW/g
Maximum value of SAR (measured) = 1.09 mW/g



0 dB = 1.09mW/g

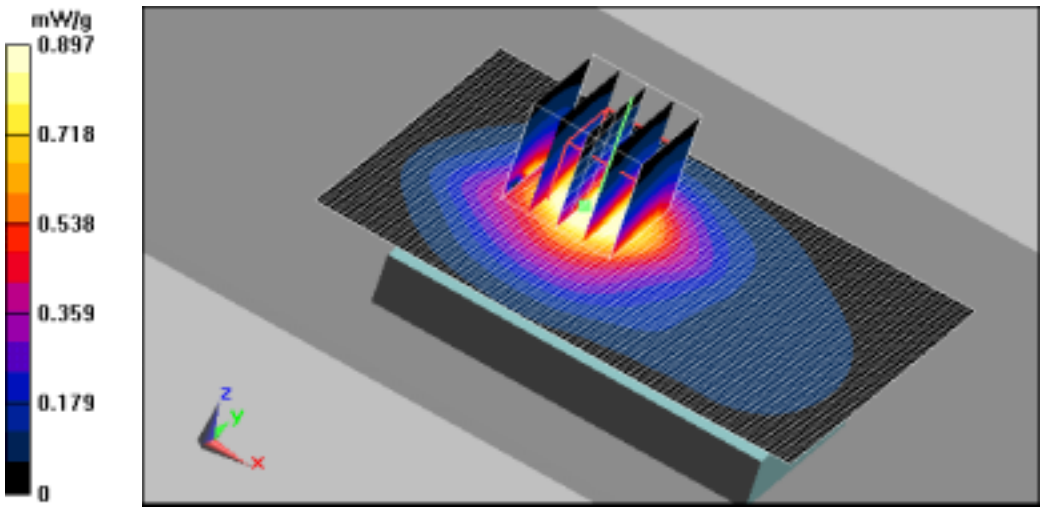
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Back 3Tx
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:2.77
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.661, Ant.Intenna, Bat.Standard Back 3Tx/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.04 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Back 3Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.1 V/m; Power Drift = -0.096 dB
Peak SAR (extrapolated) = 1.37 W/kg
SAR(1 g) = 0.813 mW/g; SAR(10 g) = 0.469 mW/g
Maximum value of SAR (measured) = 0.897 mW/g



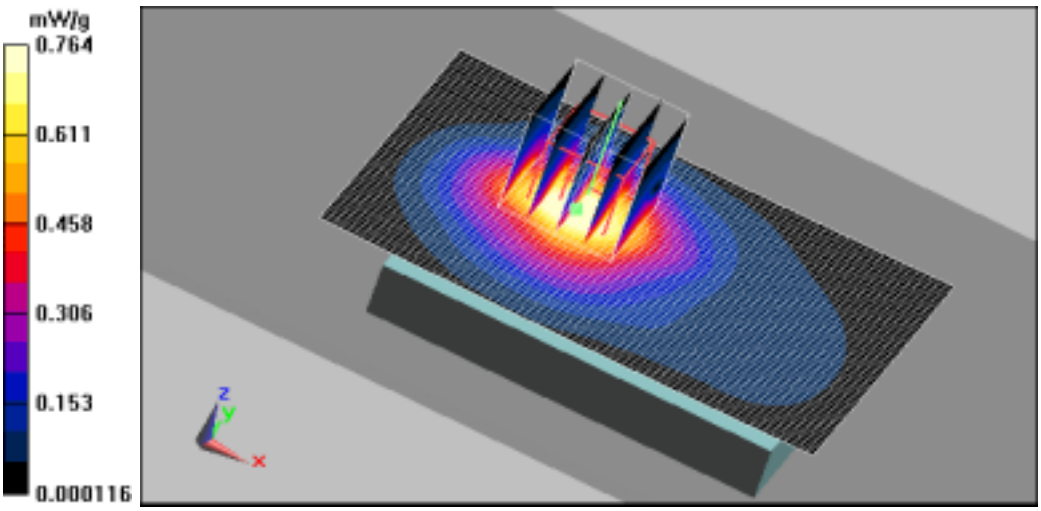
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Back 4Tx
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:2.075
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.661, Ant.Intenna, Bat.Standard Back 4Tx/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.848 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Back 4Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = -0.090 dB
Peak SAR (extrapolated) = 1.05 W/kg
SAR(1 g) = 0.667 mW/g; SAR(10 g) = 0.385 mW/g
Maximum value of SAR (measured) = 0.764 mW/g



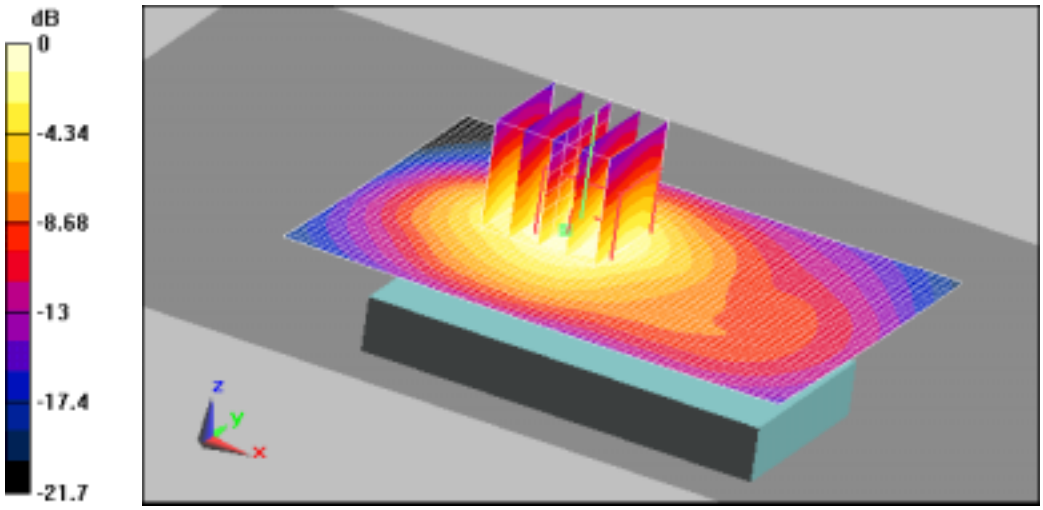
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.512, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1850.2 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.512, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.3 mW/g

Body, Ch.512, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.5 V/m; Power Drift = -0.114 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.563 mW/g
Maximum value of SAR (measured) = 1.21 mW/g



0 dB = 1.21mW/g

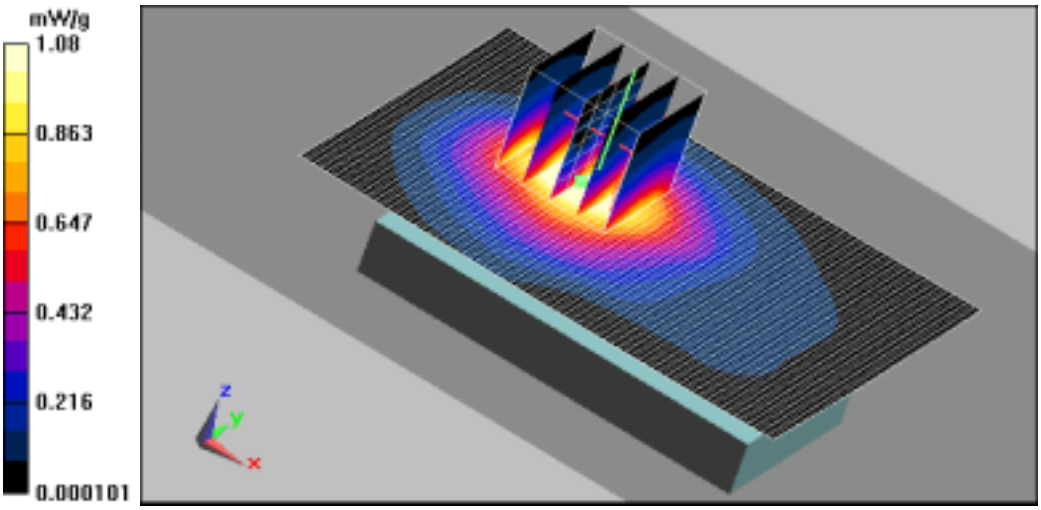
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.810, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1909.8 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1909.8 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.810, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.27 mW/g

Body, Ch.810, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.9 V/m; Power Drift = 0.193 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 0.973 mW/g; SAR(10 g) = 0.567 mW/g
Maximum value of SAR (measured) = 1.08 mW/g



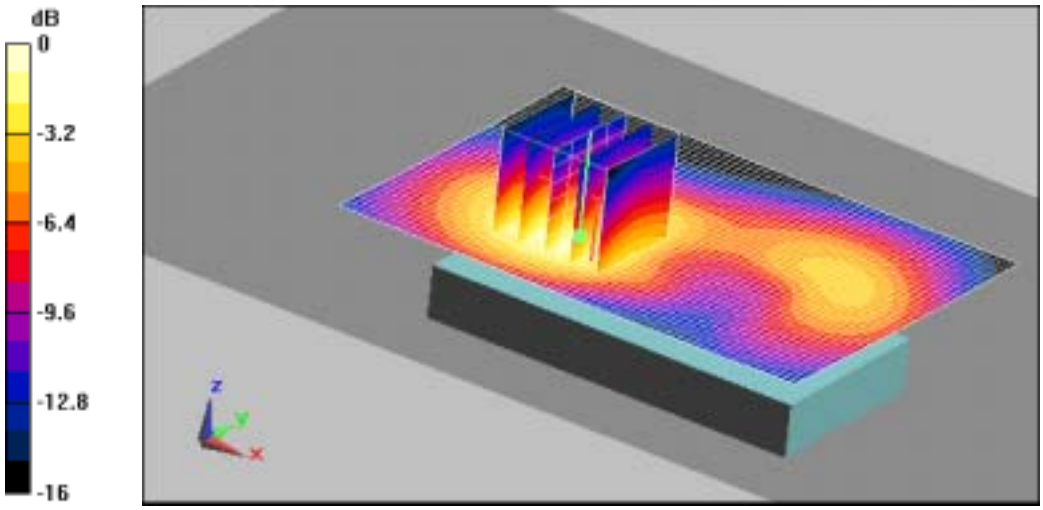
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Front
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.661, Ant.Intenna, Bat.Standard Front/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.399 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.76 V/m; Power Drift = -0.163 dB
Peak SAR (extrapolated) = 0.572 W/kg
SAR(1 g) = 0.382 mW/g; SAR(10 g) = 0.228 mW/g
Maximum value of SAR (measured) = 0.416 mW/g



0 dB = 0.416mW/g

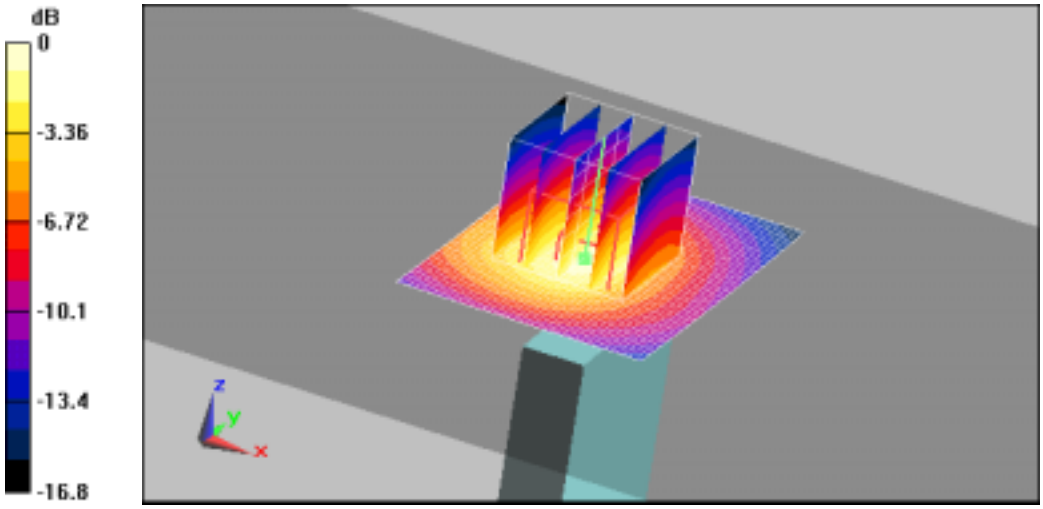
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, Bottom
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.661, Ant.Intenna, Bat.Standard, Bottom/Area Scan (61x41x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.06 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard, Bottom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.1 V/m; Power Drift = -0.048 dB
Peak SAR (extrapolated) = 1.38 W/kg
SAR(1 g) = 0.919 mW/g; SAR(10 g) = 0.521 mW/g
Maximum value of SAR (measured) = 1.05 mW/g



0 dB = 1.05mW/g

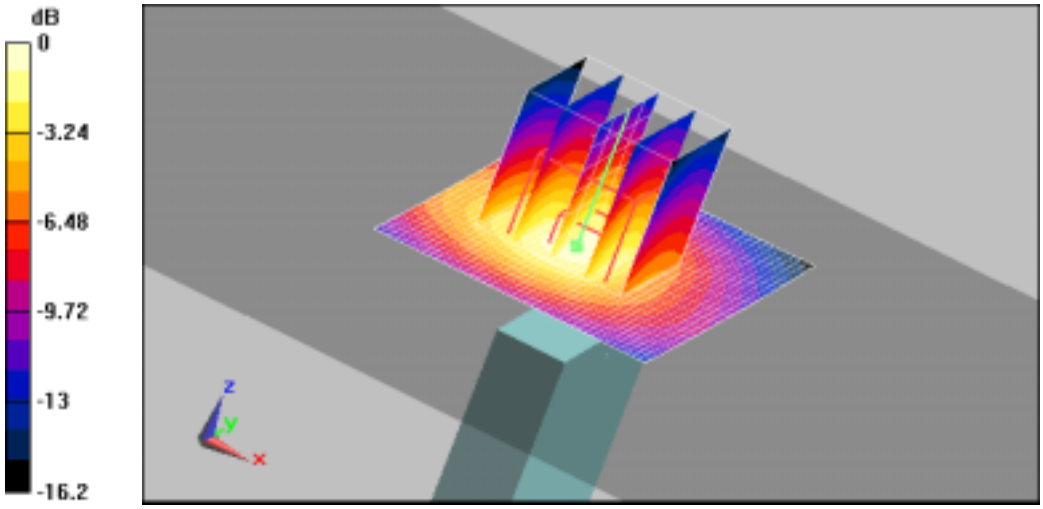
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.512, Ant.Intenna, Bat.Standard, Bottom
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1850.2 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.512, Ant.Intenna, Bat.Standard, Bottom/Area Scan (61x41x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.949 mW/g

Body, Ch.512, Ant.Intenna, Bat.Standard, Bottom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.811 mW/g; SAR(10 g) = 0.468 mW/g
Maximum value of SAR (measured) = 0.922 mW/g



0 dB = 0.922mW/g

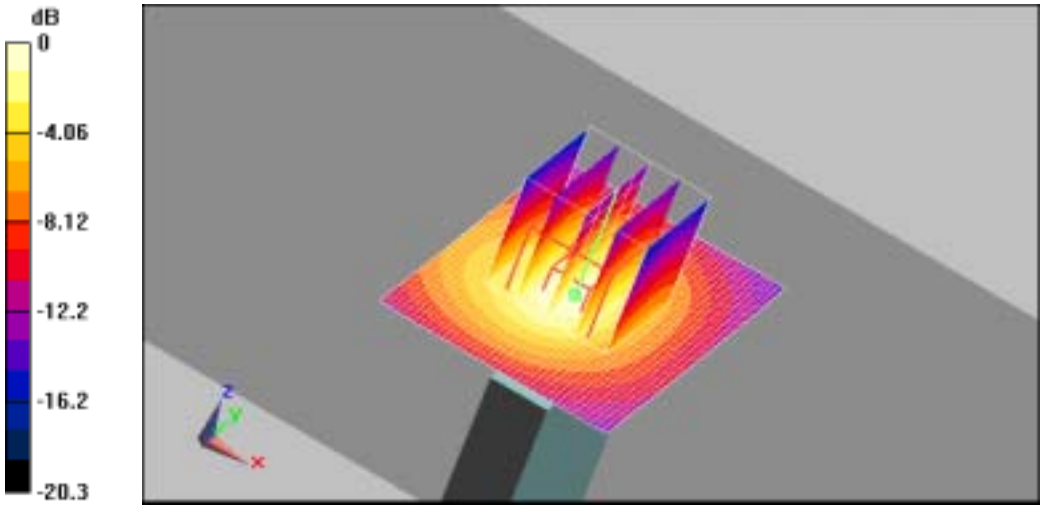
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.810, Ant.Intenna, Bat.Standard, Bottom
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1909.8 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1909.8 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.810, Ant.Intenna, Bat.Standard, Bottom/Area Scan (61x41x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.07 mW/g

Body, Ch.810, Ant.Intenna, Bat.Standard, Bottom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.2 V/m; Power Drift = -0.191 dB
Peak SAR (extrapolated) = 1.5 W/kg
SAR(1 g) = 0.957 mW/g; SAR(10 g) = 0.517 mW/g
Maximum value of SAR (measured) = 1.06 mW/g



0 dB = 1.06mW/g

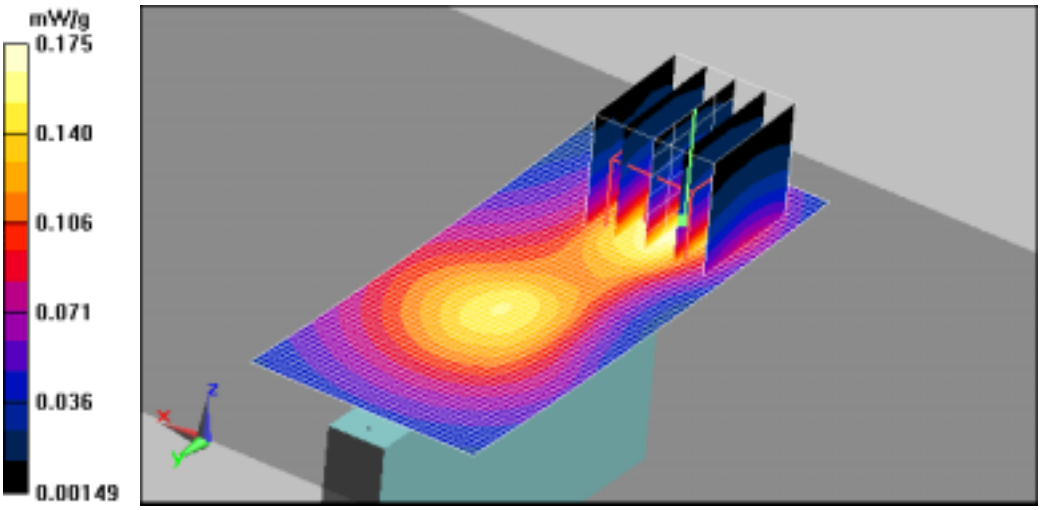
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, Left
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.661, Ant.Intenna, Bat.Standard, Left/Area Scan (71x41x1): Measurement grid: dx=20mm, dy=15mm
Maximum value of SAR (interpolated) = 0.185 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard, Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.02 V/m; Power Drift = 0.088 dB
Peak SAR (extrapolated) = 0.234 W/kg
SAR(1 g) = 0.160 mW/g; SAR(10 g) = 0.099 mW/g
Maximum value of SAR (measured) = 0.175 mW/g



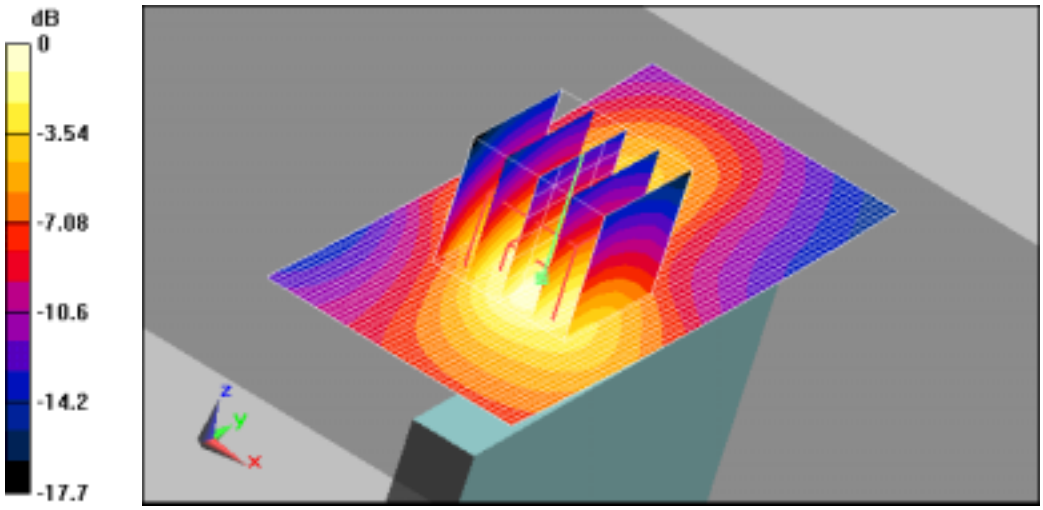
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, Right
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.661, Ant.Intenna, Bat.Standard, Right/Area Scan (71x41x1): Measurement grid: dx=20mm, dy=15mm
Maximum value of SAR (interpolated) = 0.388 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard, Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.94 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 0.578 W/kg
SAR(1 g) = 0.366 mW/g; SAR(10 g) = 0.206 mW/g
Maximum value of SAR (measured) = 0.408 mW/g



0 dB = 0.408mW/g

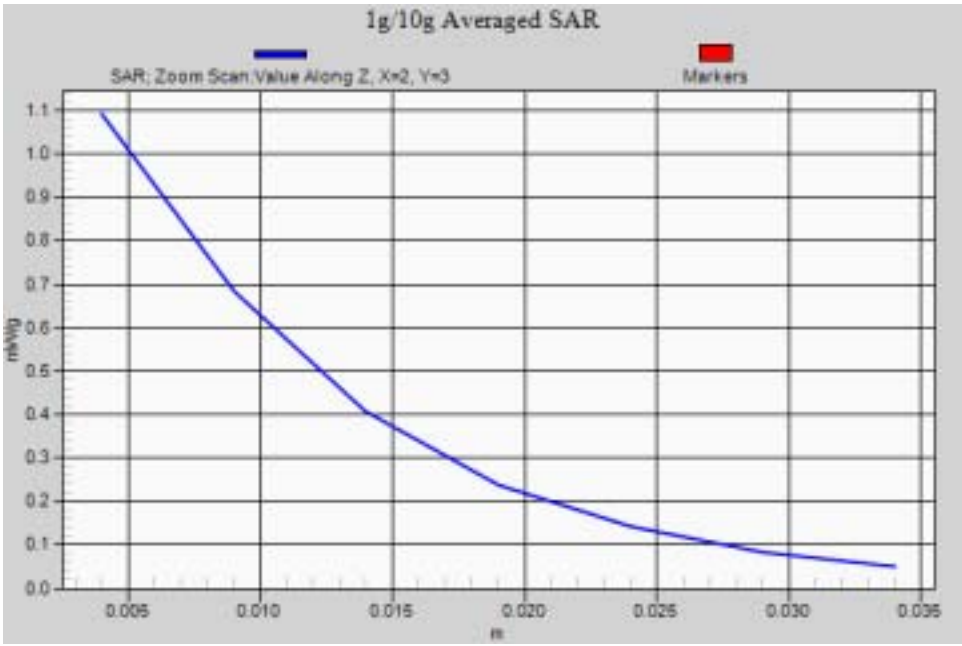
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T GPRS1900 Body (Job No. : FH-268)
Procedure Name: Body, Ch.512, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-22.0;Test Date-10/Jan/2011

Communication System: Body GPRS ; Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1850.2 MHz; σ = 1.55 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(4.43, 4.43, 4.43); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.512, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.3 mW/g

Body, Ch.512, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.5 V/m; Power Drift = -0.114 dB
Peak SAR (extrapolated) = 1.33 W/kg
SAR(1 g) = 1.01 mW/g; SAR(10 g) = 0.563 mW/g
Maximum value of SAR (measured) = 1.21 mW/g



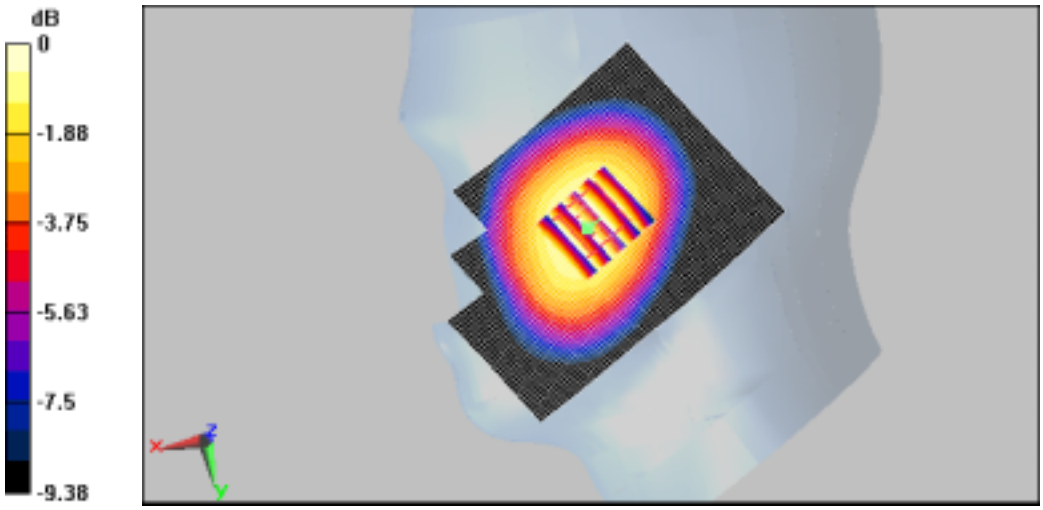
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Right(Job No. : FH-268)
Procedure Name: Cheek , Ch.4183, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek , Ch.4183, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.323 mW/g

Cheek , Ch.4183, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.3 V/m; Power Drift = 0.084 dB
Peak SAR (extrapolated) = 0.374 W/kg
SAR(1 g) = 0.303 mW/g; SAR(10 g) = 0.232 mW/g
Maximum value of SAR (measured) = 0.317 mW/g



0 dB = 0.317mW/g

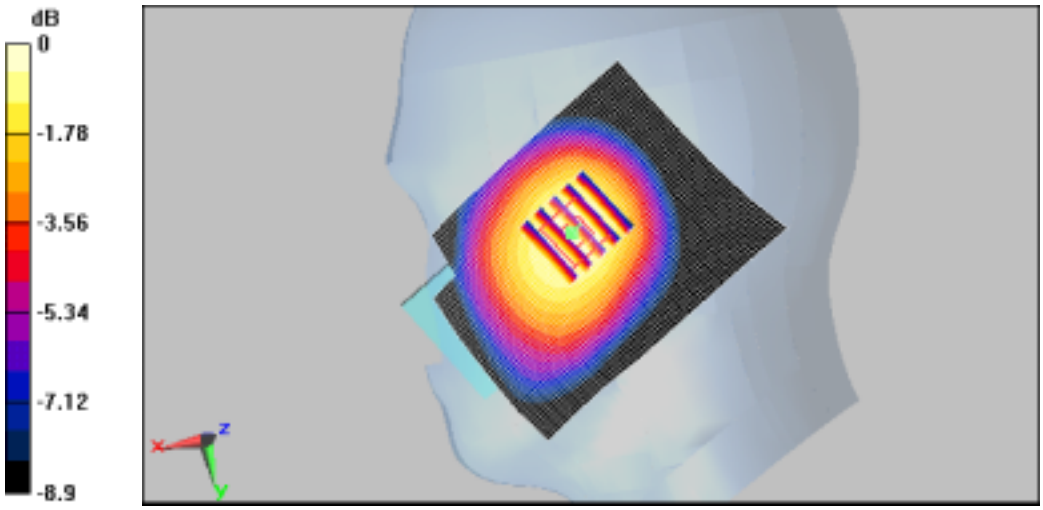
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Right(Job No. : FH-268)
Procedure Name: Tilt, Ch.4183, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Tilt, Ch.4183, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.261 mW/g

Tilt, Ch.4183, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.1 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 0.302 W/kg
SAR(1 g) = 0.243 mW/g; SAR(10 g) = 0.183 mW/g
Maximum value of SAR (measured) = 0.257 mW/g



0 dB = 0.257mW/g

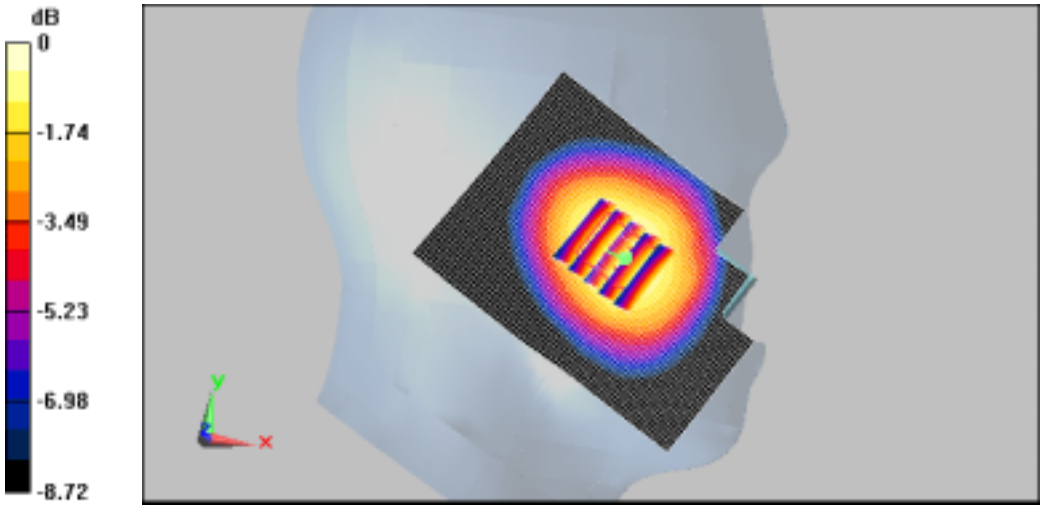
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Left (Job No. : FH-268)
Procedure Name: Cheek , Ch.4183, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek , Ch.4183, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.323 mW/g

Cheek , Ch.4183, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.4 V/m; Power Drift = 0.084 dB
Peak SAR (extrapolated) = 0.358 W/kg
SAR(1 g) = 0.296 mW/g; SAR(10 g) = 0.225 mW/g
Maximum value of SAR (measured) = 0.312 mW/g



0 dB = 0.312mW/g

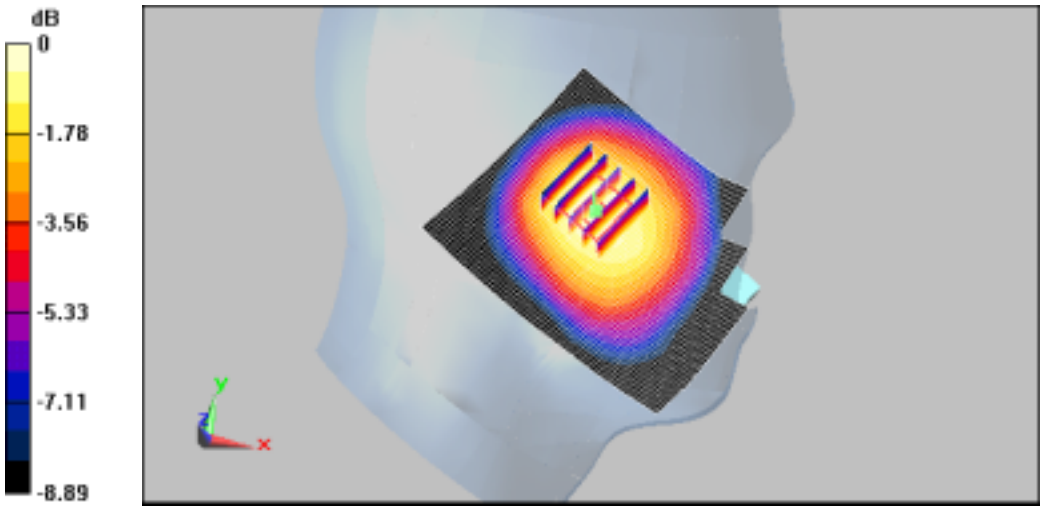
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Left (Job No. : FH-268)
Procedure Name: Tilt, Ch.4183, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Tilt, Ch.4183, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.221 mW/g

Tilt, Ch.4183, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.79 V/m; Power Drift = -0.091 dB
Peak SAR (extrapolated) = 0.260 W/kg
SAR(1 g) = 0.209 mW/g; SAR(10 g) = 0.157 mW/g
Maximum value of SAR (measured) = 0.221 mW/g



0 dB = 0.221mW/g

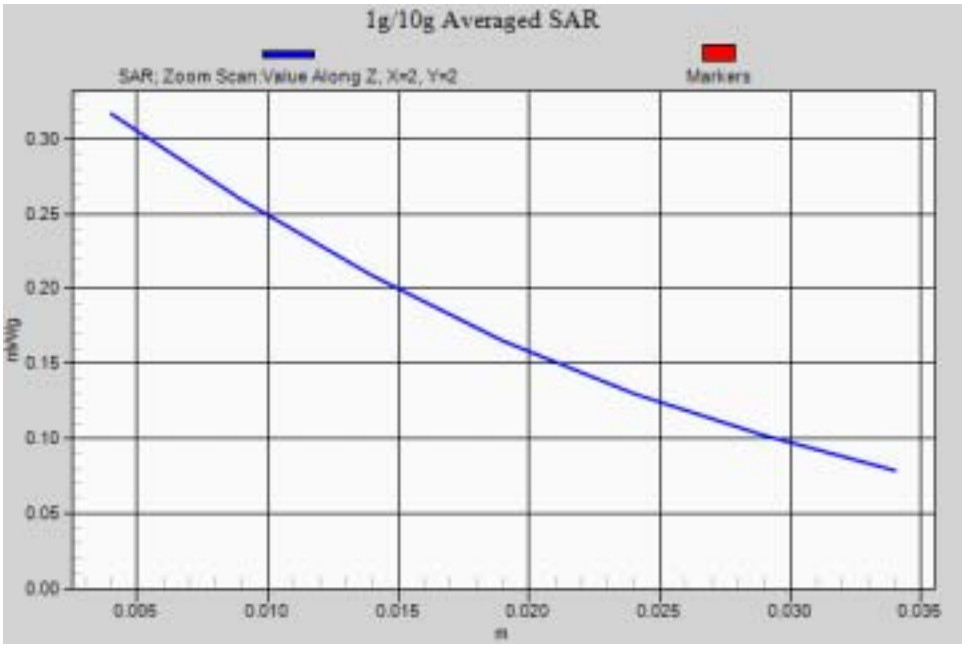
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Right(Job No. : FH-268)
Procedure Name: Cheek , Ch.4183, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-22.1;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.89 mho/m; ε_r = 40.8; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.07, 6.07, 6.07); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek , Ch.4183, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.323 mW/g

Cheek , Ch.4183, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.3 V/m; Power Drift = 0.084 dB
Peak SAR (extrapolated) = 0.374 W/kg
SAR(1 g) = 0.303 mW/g; SAR(10 g) = 0.232 mW/g
Maximum value of SAR (measured) = 0.317 mW/g



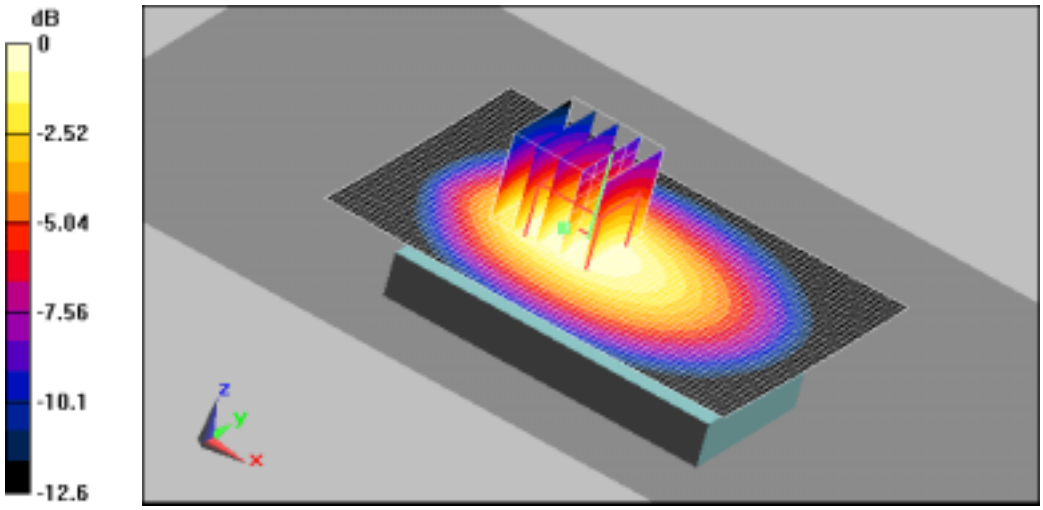
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.4183, Ant.Intenna, Bat.Standard, Back
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.4183, Ant.Intenna, Bat.Standard, Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.839 mW/g

Body, Ch.4183, Ant.Intenna, Bat.Standard, Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.9 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.743 mW/g; SAR(10 g) = 0.516 mW/g
Maximum value of SAR (measured) = 0.786 mW/g



0 dB = 0.786mW/g

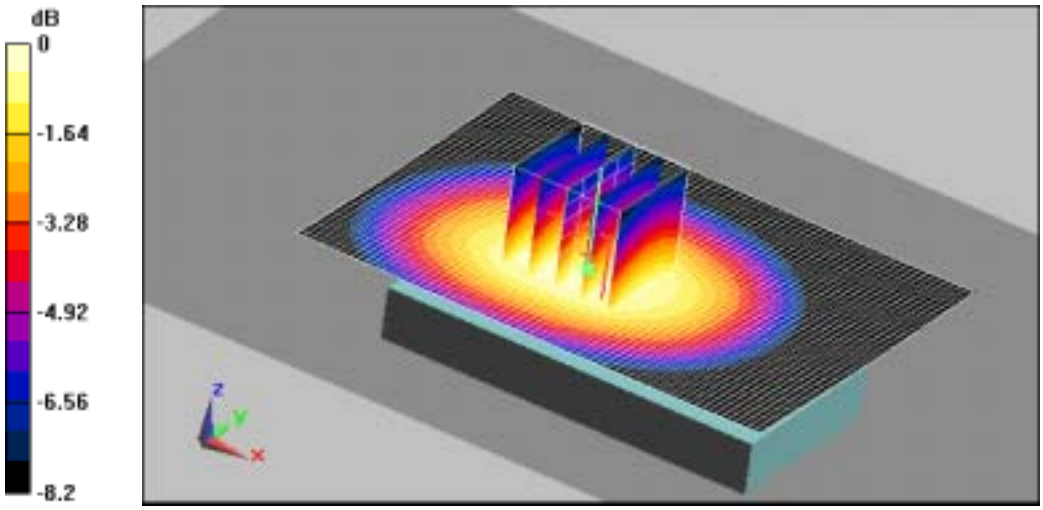
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.4183, Ant.Intenna, Bat.Standard, Front
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.4183, Ant.Intenna, Bat.Standard, Front/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.340 mW/g

Body, Ch.4183, Ant.Intenna, Bat.Standard, Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.2 V/m; Power Drift = -0.041 dB
Peak SAR (extrapolated) = 0.402 W/kg
SAR(1 g) = 0.327 mW/g; SAR(10 g) = 0.247 mW/g
Maximum value of SAR (measured) = 0.344 mW/g



0 dB = 0.344mW/g

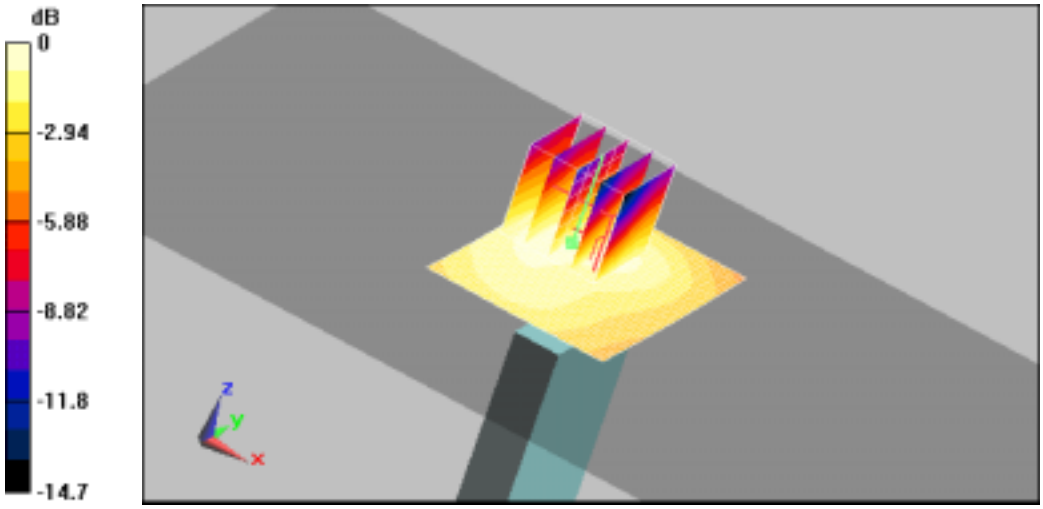
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.4183, Ant.Intenna, Bat.Standard, Bottom
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.4183, Ant.Intenna, Bat.Standard, Bottom/Area Scan (61x41x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.051 mW/g

Body, Ch.4183, Ant.Intenna, Bat.Standard, Bottom/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.82 V/m; Power Drift = -0.014 dB
Peak SAR (extrapolated) = 0.070 W/kg
SAR(1 g) = 0.048 mW/g; SAR(10 g) = 0.032 mW/g
Maximum value of SAR (measured) = 0.051 mW/g



0 dB = 0.051mW/g

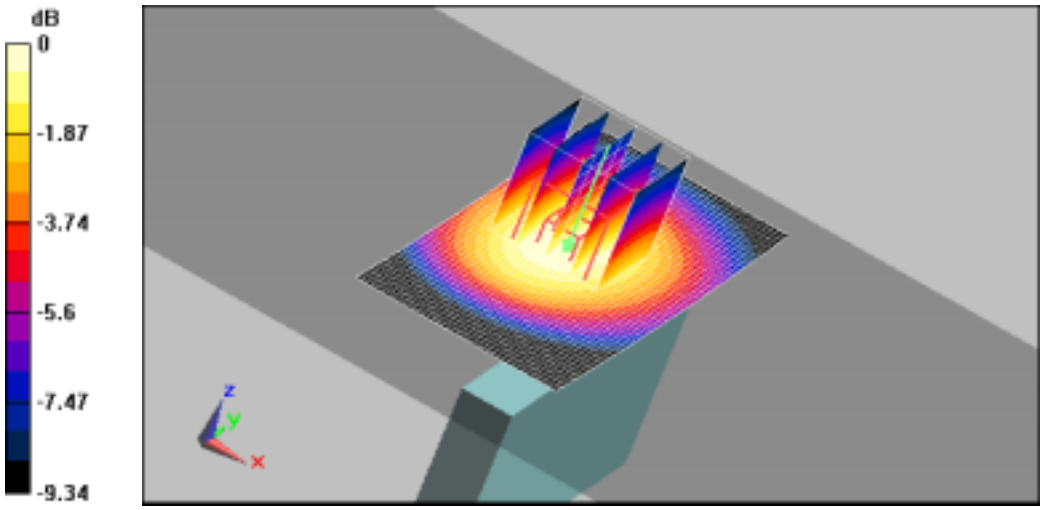
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.4183, Ant.Intenna, Bat.Standard, Left
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.4183, Ant.Intenna, Bat.Standard, Left/Area Scan (71x41x1): Measurement grid: dx=20mm, dy=15mm
Maximum value of SAR (interpolated) = 0.346 mW/g

Body, Ch.4183, Ant.Intenna, Bat.Standard, Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.9 V/m; Power Drift = -0.082 dB
Peak SAR (extrapolated) = 0.441 W/kg
SAR(1 g) = 0.325 mW/g; SAR(10 g) = 0.229 mW/g
Maximum value of SAR (measured) = 0.347 mW/g



0 dB = 0.347mW/g

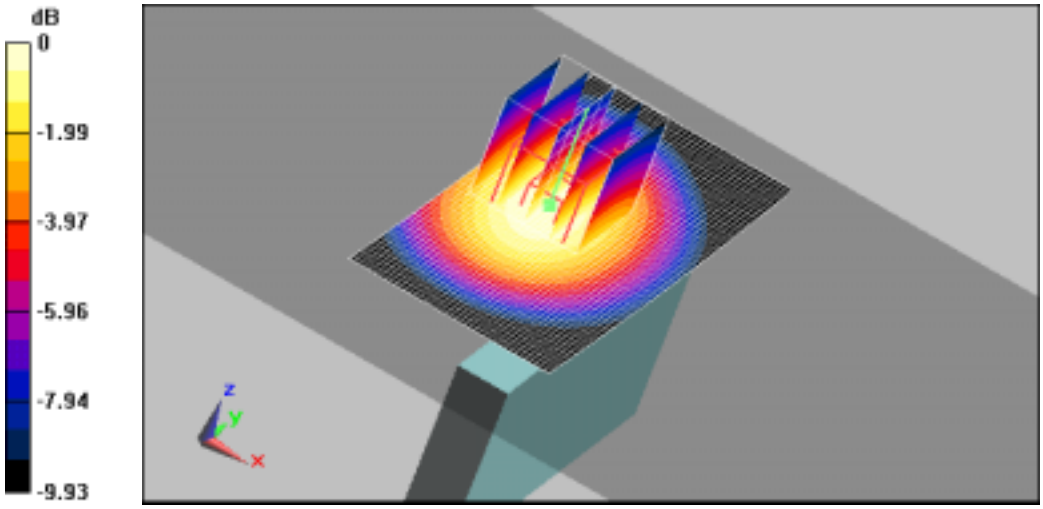
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.4183, Ant.Intenna, Bat.Standard, Right
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.4183, Ant.Intenna, Bat.Standard, Right/Area Scan (71x41x1): Measurement grid: dx=20mm, dy=15mm
Maximum value of SAR (interpolated) = 0.433 mW/g

Body, Ch.4183, Ant.Intenna, Bat.Standard, Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.8 V/m; Power Drift = -0.195 dB
Peak SAR (extrapolated) = 0.546 W/kg
SAR(1 g) = 0.398 mW/g; SAR(10 g) = 0.276 mW/g
Maximum value of SAR (measured) = 0.427 mW/g



0 dB = 0.427mW/g

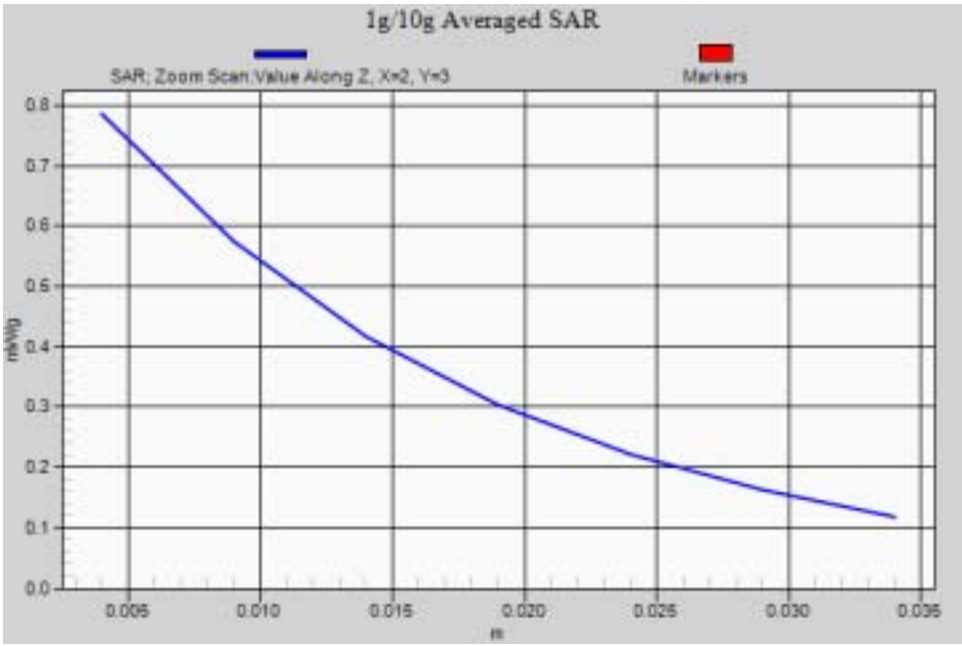
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WCDMA850 Body (Job No. : FH-268)
Procedure Name: Body, Ch.4183, Ant.Intenna, Bat.Standard, Back
Meas. Ambient Temp(celsius)-22.2,Tissue Temp(celsius)-21.9;Test Date-10/Jan/2011

Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: ES3DV2 - SN3017; ConvF(6.03, 6.03, 6.03); Calibrated: 2010-05-25
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1007
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.4183, Ant.Intenna, Bat.Standard, Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.839 mW/g

Body, Ch.4183, Ant.Intenna, Bat.Standard, Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.9 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.743 mW/g; SAR(10 g) = 0.516 mW/g
Maximum value of SAR (measured) = 0.786 mW/g



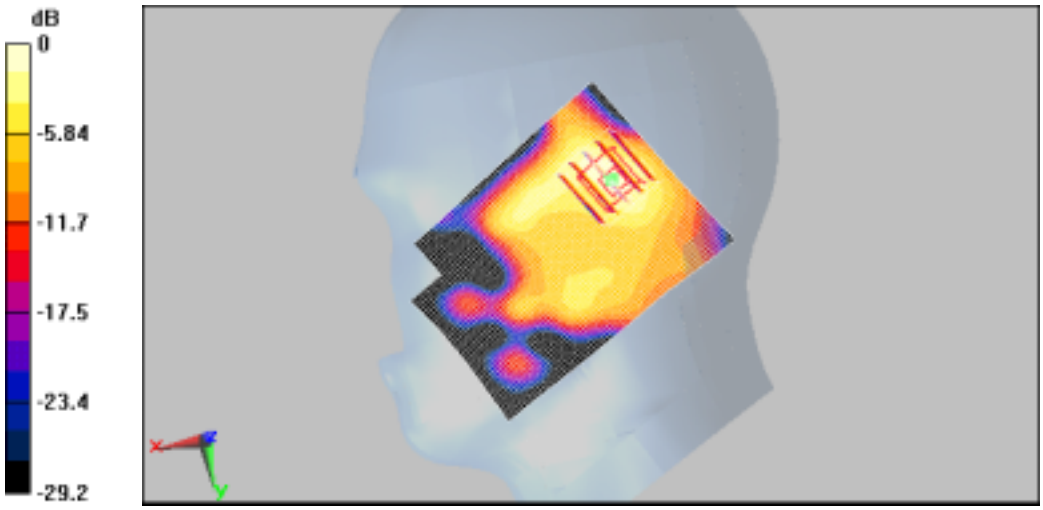
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WLAN Right (Job.: FH-268)
Procedure Name: Cheek, Ch.11, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.2;Test Date-09/Jan/2011

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.85 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek, Ch.11, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.029 mW/g

Cheek, Ch.11, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.46 V/m; Power Drift = 0.055 dB
Peak SAR (extrapolated) = 0.052 W/kg
SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.013 mW/g
Maximum value of SAR (measured) = 0.028 mW/g



0 dB = 0.028mW/g

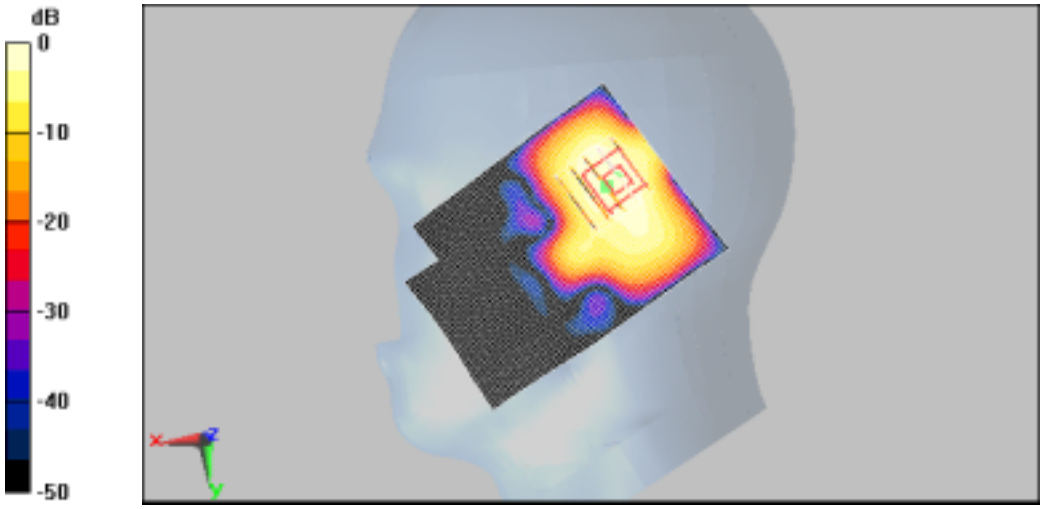
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WLAN Right (Job.: FH-268)
Procedure Name: Tilted, Ch.11, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.2;Test Date-09/Jan/2011

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.85 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Tilted, Ch.11, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.024 mW/g

Tilted, Ch.11, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.51 V/m; Power Drift = 0.135 dB
Peak SAR (extrapolated) = 0.026 W/kg
SAR(1 g) = 0.014 mW/g; SAR(10 g) = 0.00636 mW/g
Maximum value of SAR (measured) = 0.017 mW/g



0 dB = 0.017mW/g

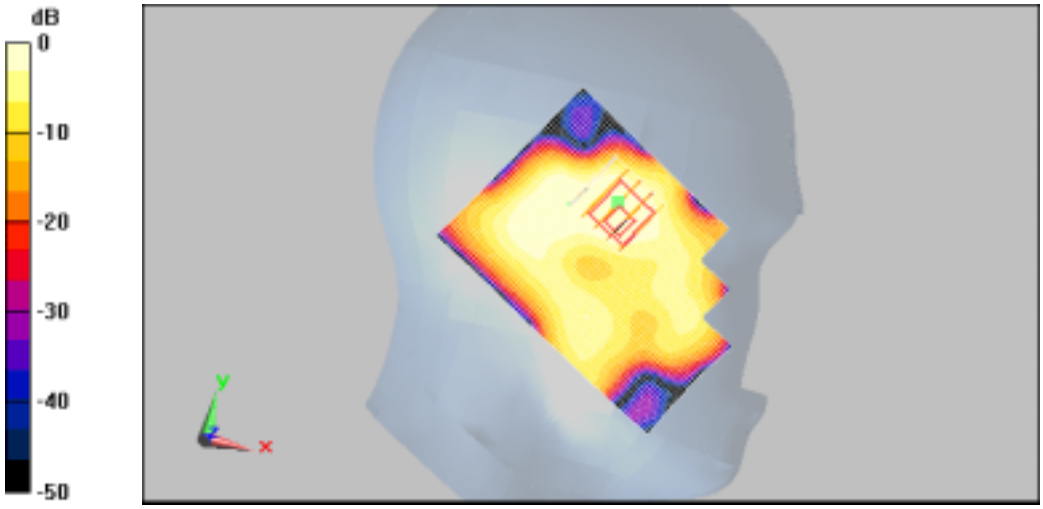
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WLAN Left (Job No. : FH-268)
Procedure Name: Cheek, Ch.11, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.2;Test Date-09/Jan/2011

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.85 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek, Ch.11, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.030 mW/g

Cheek, Ch.11, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.54 V/m; Power Drift = 0.093 dB
Peak SAR (extrapolated) = 0.060 W/kg
SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00741 mW/g
Maximum value of SAR (measured) = 0.017 mW/g



0 dB = 0.017mW/g

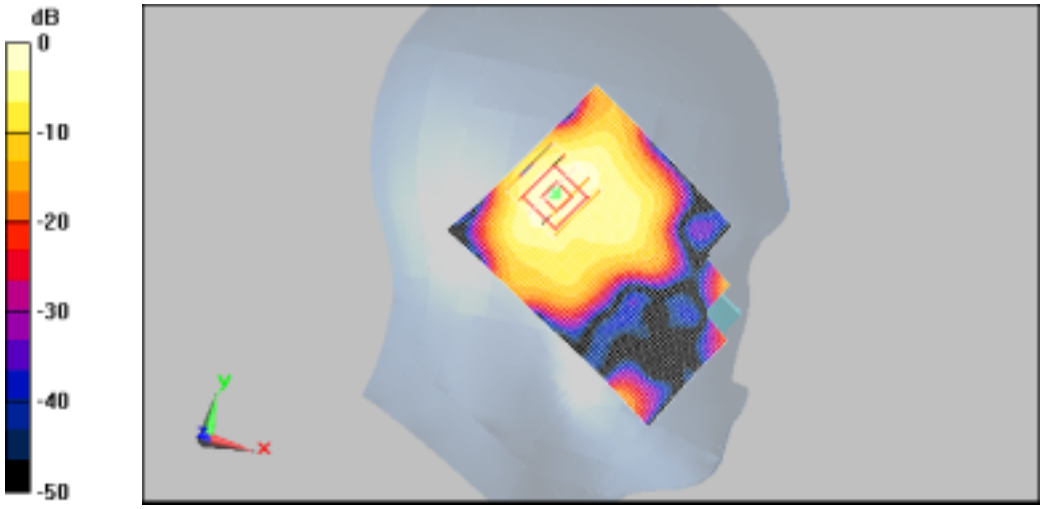
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WLAN Left (Job No. : FH-268)
Procedure Name: Tilted, Ch.11, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.2;Test Date-09/Jan/2011

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.85 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Tilted, Ch.11, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.022 mW/g

Tilted, Ch.11, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.68 V/m; Power Drift = -0.057 dB
Peak SAR (extrapolated) = 0.039 W/kg
SAR(1 g) = 0.018 mW/g; SAR(10 g) = 0.00832 mW/g
Maximum value of SAR (measured) = 0.021 mW/g



0 dB = 0.021mW/g

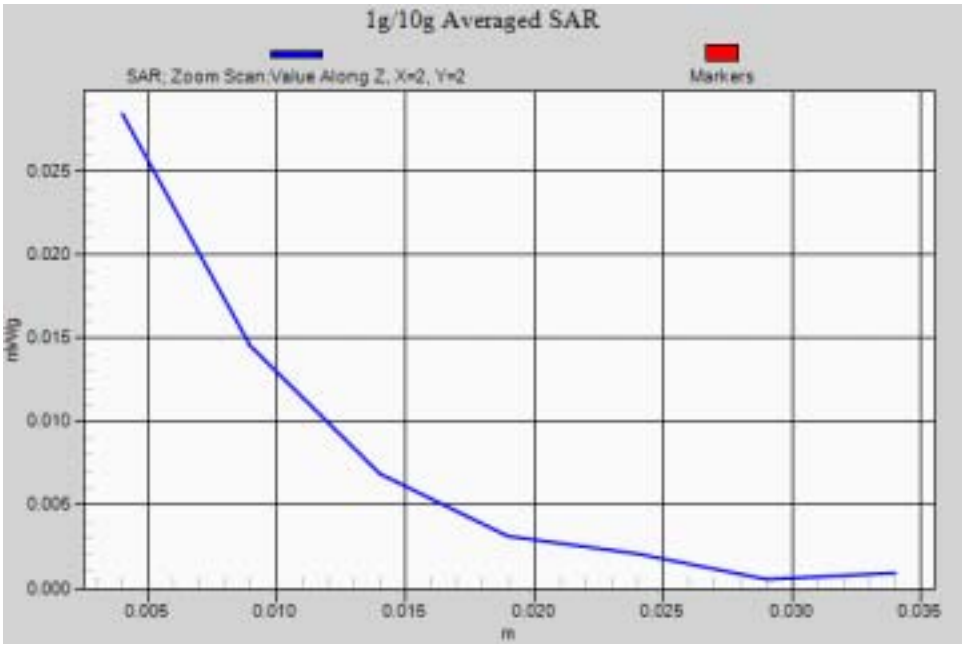
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WLAN Right (Job.: FH-268)
Procedure Name: Cheek, Ch.11, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.6,Tissue Temp(celsius)-22.2;Test Date-09/Jan/2011

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.85 mho/m; ε_r = 38.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.45, 7.45, 7.45); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: SAM PHANTOM #1; Type: SAM; Serial: TP-1457
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Cheek, Ch.11, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.029 mW/g

Cheek, Ch.11, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.46 V/m; Power Drift = 0.055 dB
Peak SAR (extrapolated) = 0.052 W/kg
SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.013 mW/g
Maximum value of SAR (measured) = 0.028 mW/g



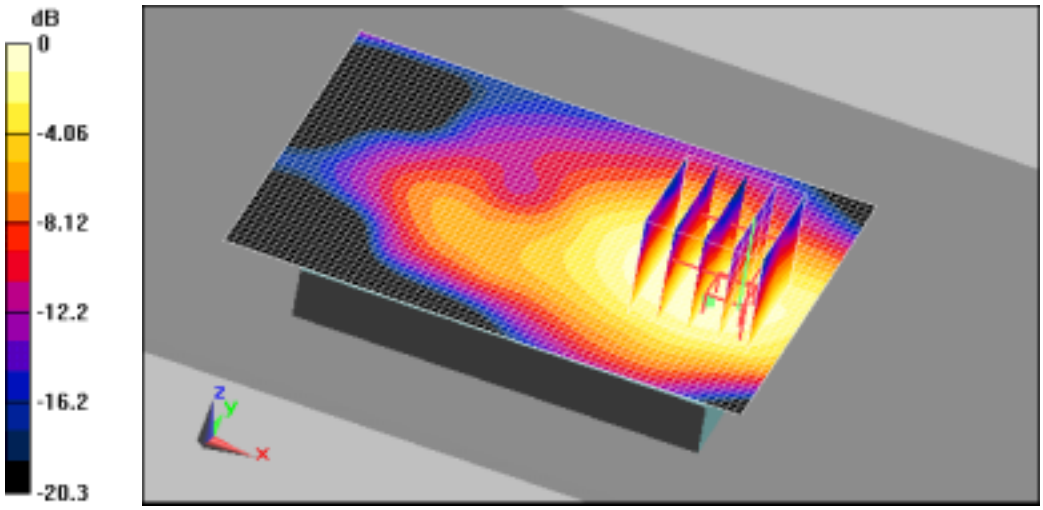
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WLAN Body (Job No. : FH-268)
Procedure Name: Body, Ch.11, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-09/Jan/2011

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.98 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.69, 7.69, 7.69); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.11, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.044 mW/g

Body, Ch.11, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.51 V/m; Power Drift = 0.090 dB
Peak SAR (extrapolated) = 0.066 W/kg
SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.023 mW/g
Maximum value of SAR (measured) = 0.043 mW/g



0 dB = 0.043mW/g

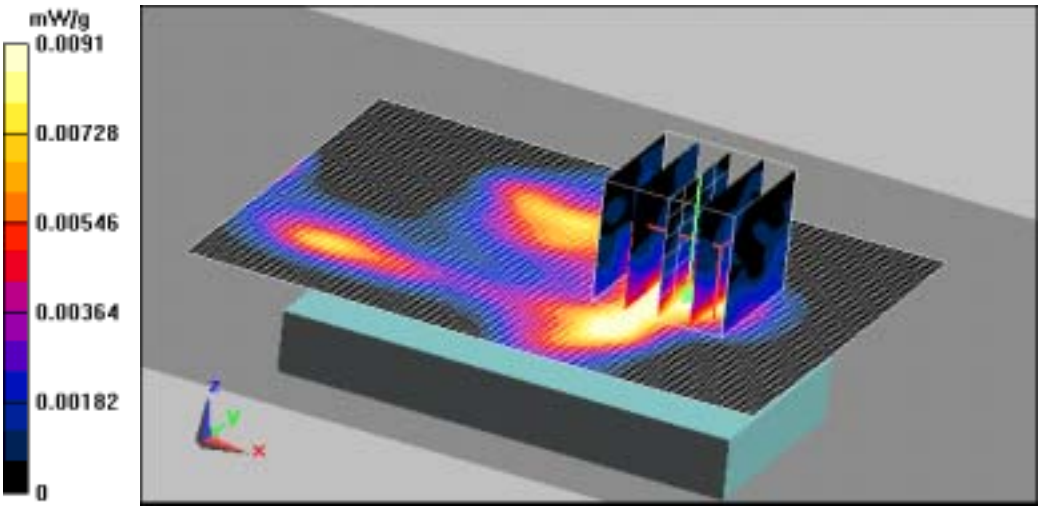
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WLAN Body (Job No. : FH-268)
Procedure Name: Body, Ch.11, Ant.Intenna, Bat.Standard Front
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-09/Jan/2011

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.98 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.69, 7.69, 7.69); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.11, Ant.Intenna, Bat.Standard Front/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.011 mW/g

Body, Ch.11, Ant.Intenna, Bat.Standard Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.49 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 0.015 W/kg
SAR(1 g) = 0.00776 mW/g; SAR(10 g) = 0.00388 mW/g
Maximum value of SAR (measured) = 0.0091 mW/g



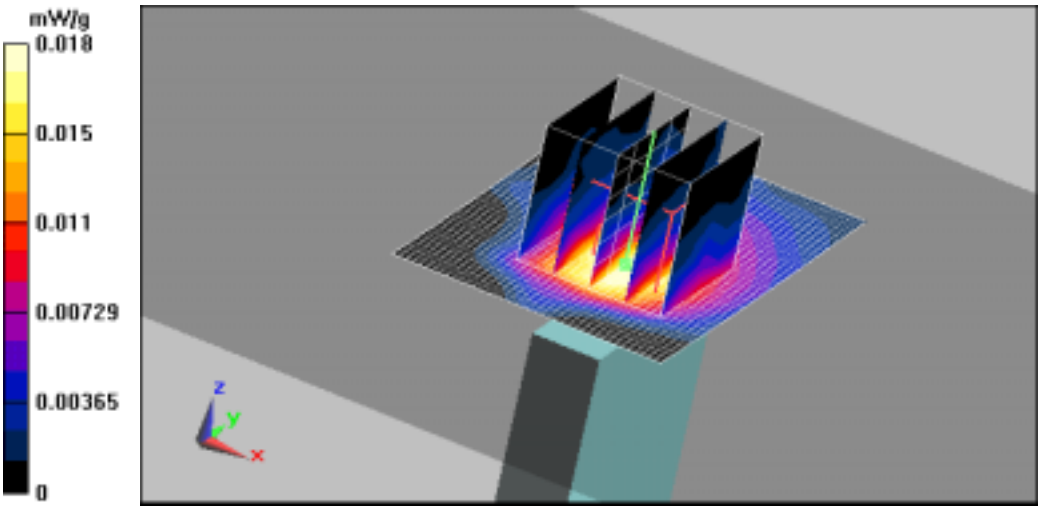
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WLAN Body (Job No. : FH-268)
Procedure Name: Body, Ch.11, Ant.Intenna, Bat.Standard Top
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-09/Jan/2011

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.98 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.69, 7.69, 7.69); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.11, Ant.Intenna, Bat.Standard Top/Area Scan (61x41x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.020 mW/g

Body, Ch.11, Ant.Intenna, Bat.Standard Top/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.75 V/m; Power Drift = 0.00933 dB
Peak SAR (extrapolated) = 0.034 W/kg
SAR(1 g) = 0.017 mW/g; SAR(10 g) = 0.00932 mW/g
Maximum value of SAR (measured) = 0.018 mW/g



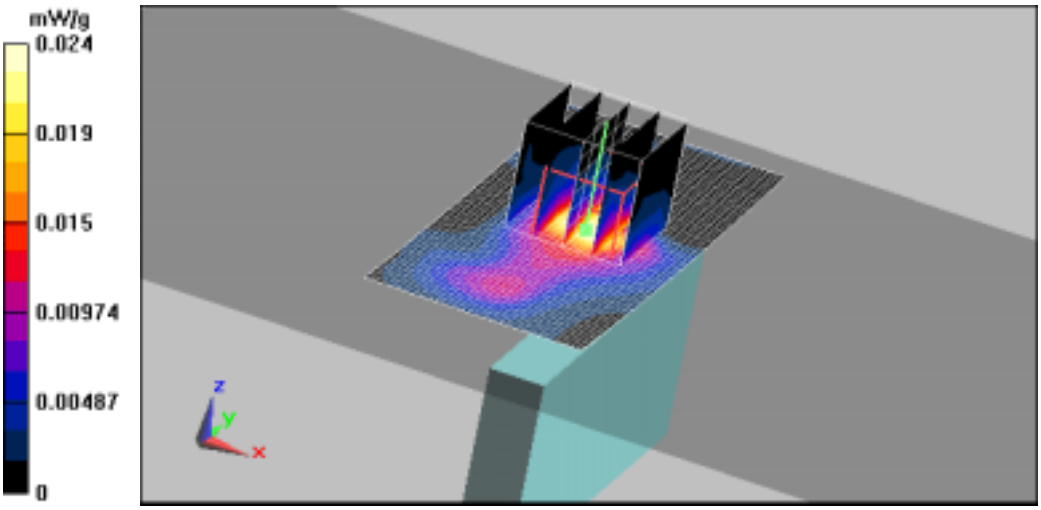
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WLAN Body (Job No. : FH-268)
Procedure Name: Body, Ch.11, Ant.Intenna, Bat.Standard Right
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-09/Jan/2011

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.98 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.69, 7.69, 7.69); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.11, Ant.Intenna, Bat.Standard Right/Area Scan (71x41x1): Measurement grid: dx=20mm, dy=15mm
Maximum value of SAR (interpolated) = 0.027 mW/g

Body, Ch.11, Ant.Intenna, Bat.Standard Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.88 V/m; Power Drift = 0.119 dB
Peak SAR (extrapolated) = 0.046 W/kg
SAR(1 g) = 0.022 mW/g; SAR(10 g) = 0.011 mW/g
Maximum value of SAR (measured) = 0.024 mW/g



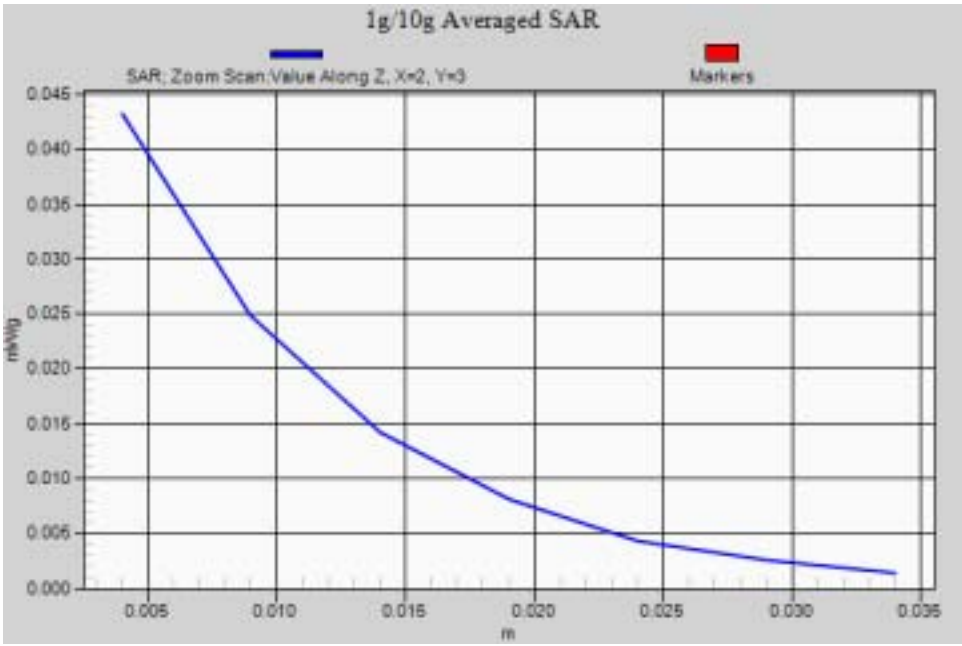
DUT: GT-I5510T; Serial: FH-268-A
Program Name: GT-I5510T WLAN Body (Job No. : FH-268)
Procedure Name: Body, Ch.11, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.3,Tissue Temp(celsius)-21.9;Test Date-09/Jan/2011

Communication System: WLAN; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 1.98 mho/m; ε_r = 52.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3520; ConvF(7.69, 7.69, 7.69); Calibrated: 2010-03-22
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.11, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.044 mW/g

Body, Ch.11, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.51 V/m; Power Drift = 0.090 dB
Peak SAR (extrapolated) = 0.066 W/kg
SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.023 mW/g
Maximum value of SAR (measured) = 0.043 mW/g



APPENDIX F

Probe Calibration

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 **Samsung (Dymstec)**

Certificate No: ES3-3017_May10

CALIBRATION CERTIFICATE

Object	ES3DV2 - SN:3017
Calibration procedure(s)	QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	May 25, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11

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

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

Issued: May 25, 2010

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

O.K to Use
2010.6.9 (Deputy)

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 effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 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 ES3DV2

SN:3017

Manufactured:	December 5, 2002
Last calibrated:	July 22, 2009
Recalibrated:	May 25, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ES3DV2 SN:3017

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.63	1.68	1.80	± 10.1%
DCP (mV)[B]	99.2	93.2	92.3	

Modulation Calibration Parameters

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

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

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

[B] Numerical linearization parameter: uncertainty not required.

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

DASY/EASY - Parameters of Probe: ES3DV2 SN:3017

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
750	± 50 / ± 100	41.9 ± 5%	0.89 ± 5%	6.39	6.39	6.39	0.35	1.46 ± 11.0%
850	± 50 / ± 100	41.5 ± 5%	0.92 ± 5%	6.07	6.07	6.07	0.38	1.41 ± 11.0%
1750	± 50 / ± 100	40.1 ± 5%	1.37 ± 5%	5.08	5.08	5.08	0.27	1.84 ± 11.0%
1900	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.85	4.85	4.85	0.26	2.07 ± 11.0%
2600	± 50 / ± 100	39.0 ± 5%	1.96 ± 5%	4.05	4.05	4.05	0.31	2.07 ± 11.0%

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

DASY/EASY - Parameters of Probe: ES3DV2 SN:3017

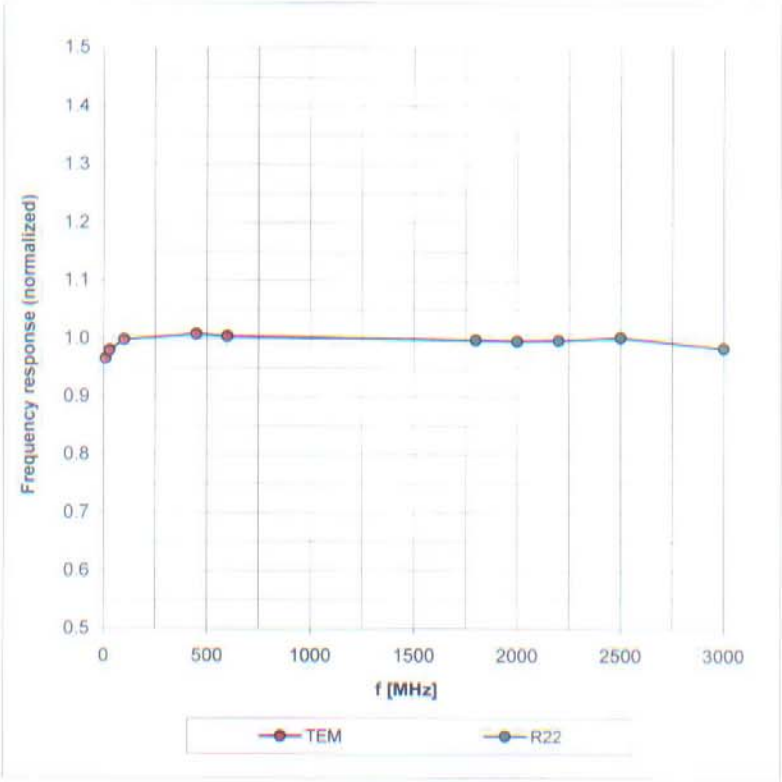
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
750	± 50 / ± 100	55.5 ± 5%	0.96 ± 5%	6.20	6.20	6.20	0.45	1.36 ± 11.0%
850	± 50 / ± 100	55.2 ± 5%	0.99 ± 5%	6.03	6.03	6.03	0.40	1.50 ± 11.0%
1750	± 50 / ± 100	53.4 ± 5%	1.49 ± 5%	4.69	4.69	4.69	0.25	2.76 ± 11.0%
1900	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.43	4.43	4.43	0.21	4.63 ± 11.0%
2600	± 50 / ± 100	52.5 ± 5%	2.16 ± 5%	3.77	3.77	3.77	0.64	1.09 ± 11.0%

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

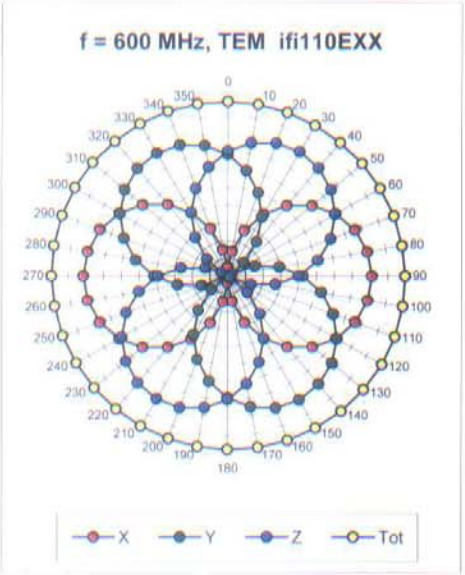
Frequency Response of E-Field

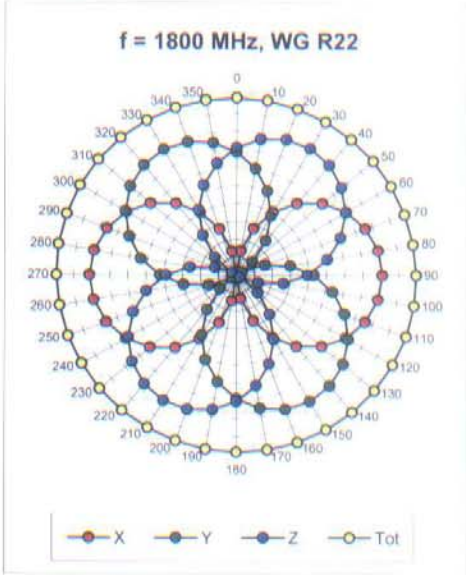
(TEM-Cell:ifi110 EXX, Waveguide: R22)

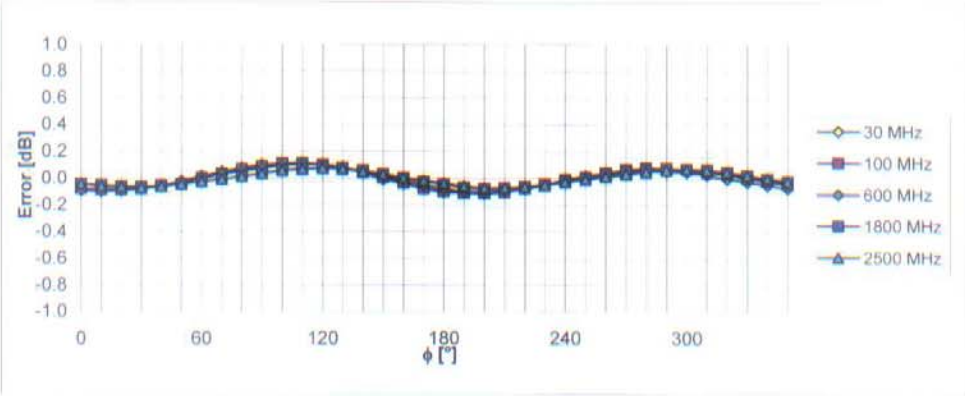


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



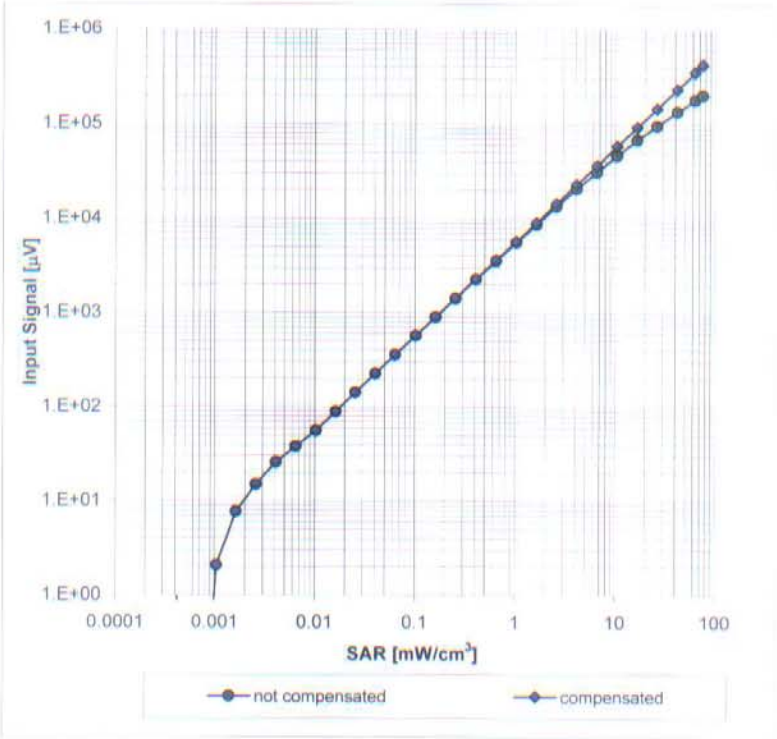


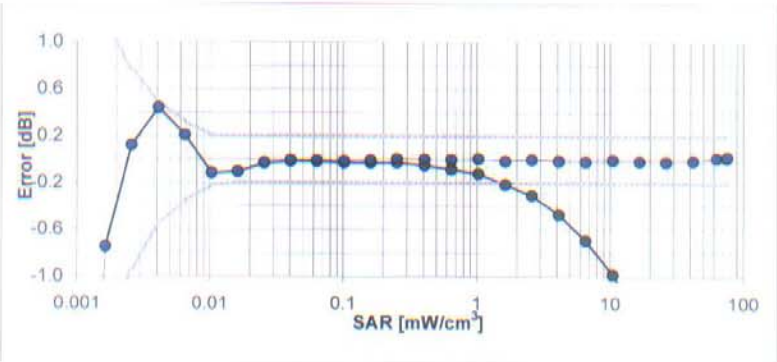


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

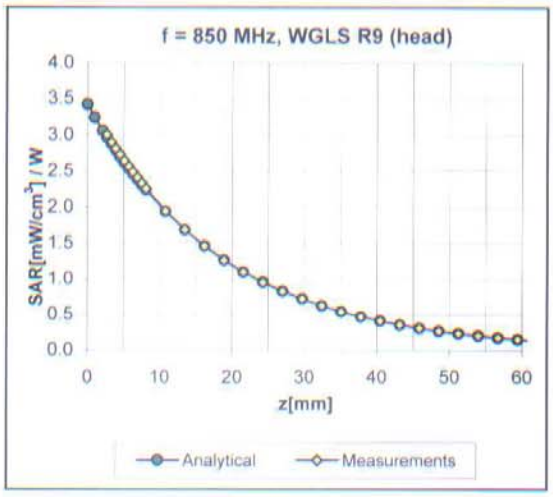
(Waveguide R22, f = 1800 MHz)

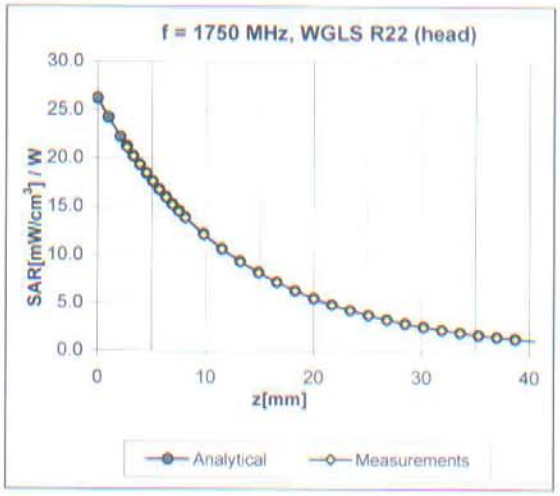




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

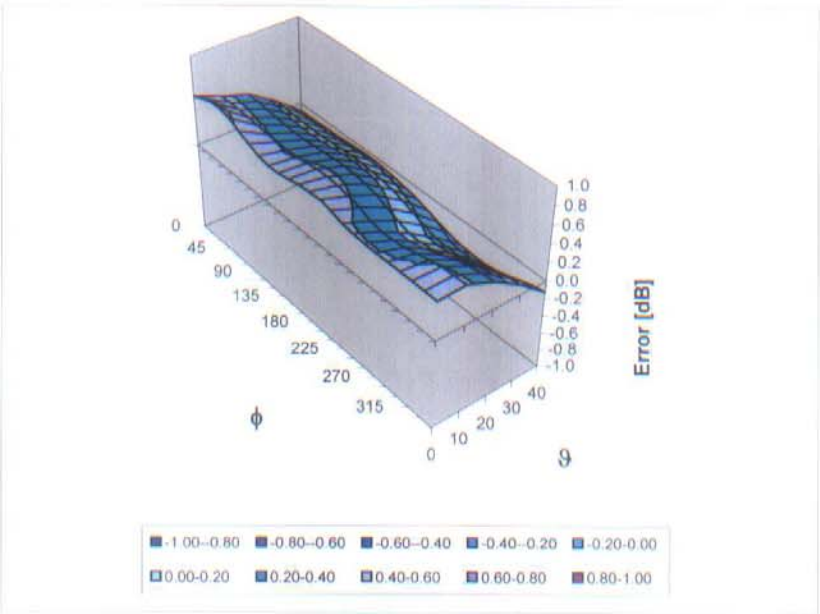
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4.0 mm
Probe Tip to Sensor X Calibration Point	2.1 mm
Probe Tip to Sensor Y Calibration Point	2.1 mm
Probe Tip to Sensor Z Calibration Point	2.1 mm
Recommended Measurement Distance from Surface	3 mm

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

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
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 **Samsung (Dymstec)**

Certificate No: EX3-3520_Mar10

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3520
Calibration procedure(s)	QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2 Calibration procedure for dosimetric E-field probes
Calibration date:	March 22, 2010

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41495277	1-Apr-09 (No. 217-01030)	Apr-10
Power sensor E4412A	MY41498087	1-Apr-09 (No. 217-01030)	Apr-10
Reference 3 dB Attenuator	SN: S5054 (3c)	31-Mar-09 (No. 217-01026)	Mar-10
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-09 (No. 217-01028)	Mar-10
Reference 30 dB Attenuator	SN: S5129 (30b)	31-Mar-09 (No. 217-01027)	Mar-10
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	29-Sep-09 (No. DAE4-660_Sep09)	Sep-10

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

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

Issued: March 25, 2010

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

o.k. to use
2010.4.6

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 effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 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:3520

Manufactured:	March 8, 2004
Last calibrated:	March 17, 2009
Recalibrated:	March 22, 2010

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: EX3DV4 SN:3520

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.73	0.70	0.60	± 10.1%
DCP (mV)[B]	91.7	92.4	96.0	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300	± 1.5%
			Y	0.00	0.00	1.00	300	
			Z	0.00	0.00	1.00	300	

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

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

[B] Numerical linearization parameter: uncertainty not required.

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

DASY - Parameters of Probe: EX3DV4 SN:3520

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	9.75	9.75	9.75	0.46	0.74	± 11.0%
1750	± 50 / ± 100	40.1 ± 5%	1.37 ± 5%	8.54	8.54	8.54	0.35	0.73	± 11.0%
1900	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	8.26	8.26	8.26	0.39	0.69	± 11.0%
2000	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	8.15	8.15	8.15	0.44	0.65	± 11.0%
2300	± 50 / ± 100	39.5 ± 5%	1.67 ± 5%	7.87	7.87	7.87	0.35	0.80	± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	7.45	7.45	7.45	0.27	0.94	± 11.0%

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

DASY - Parameters of Probe: EX3DV4 SN:3520

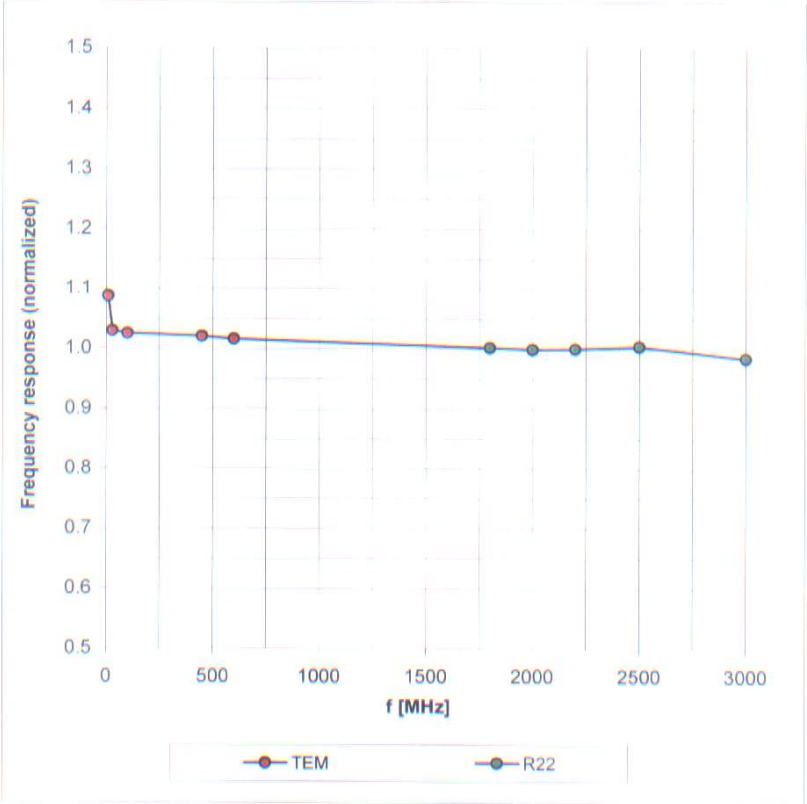
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	9.72	9.72	9.72	0.65	0.66	± 11.0%
1750	± 50 / ± 100	53.4 ± 5%	1.49 ± 5%	8.30	8.30	8.30	0.32	0.87	± 11.0%
1900	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	8.02	8.02	8.02	0.31	0.88	± 11.0%
2000	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	8.03	8.03	8.03	0.25	1.05	± 11.0%
2300	± 50 / ± 100	52.8 ± 5%	1.85 ± 5%	7.89	7.89	7.89	0.21	1.20	± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	7.69	7.69	7.69	0.23	0.99	± 11.0%
2600	± 50 / ± 100	52.5 ± 5%	2.16 ± 5%	7.47	7.47	7.47	0.30	0.85	± 11.0%

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

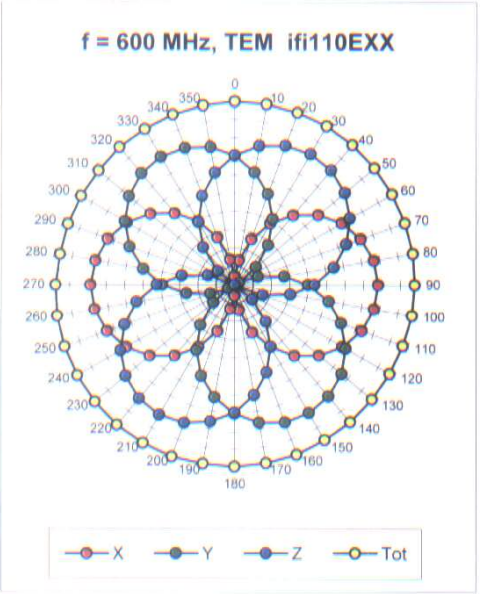
Frequency Response of E-Field

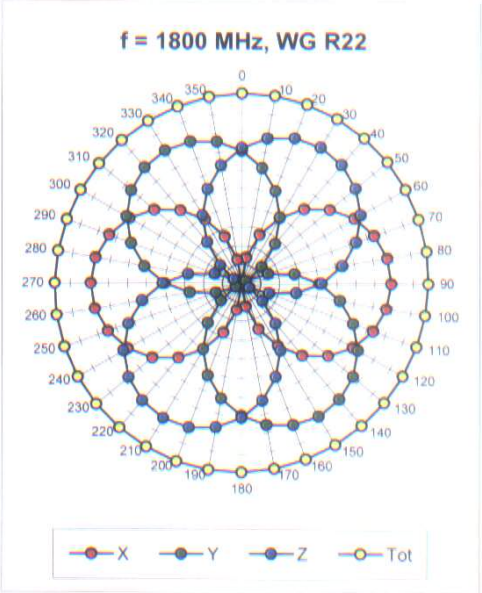
(TEM-Cell:ifi110 EXX, Waveguide: R22)

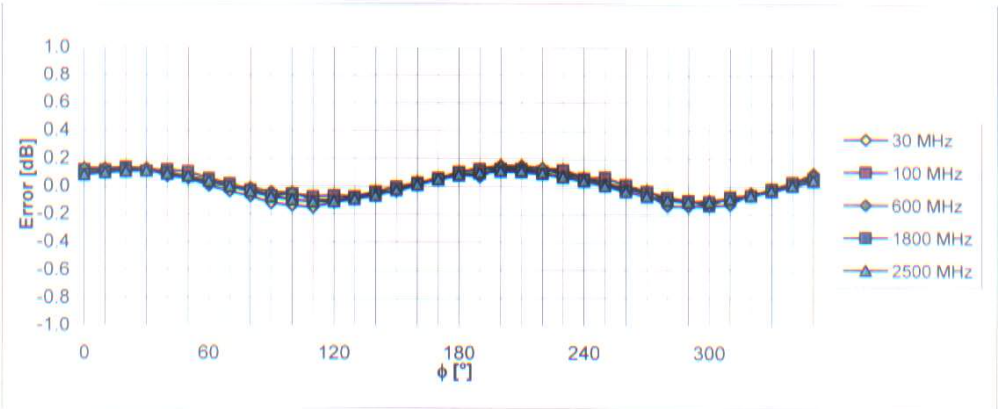


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



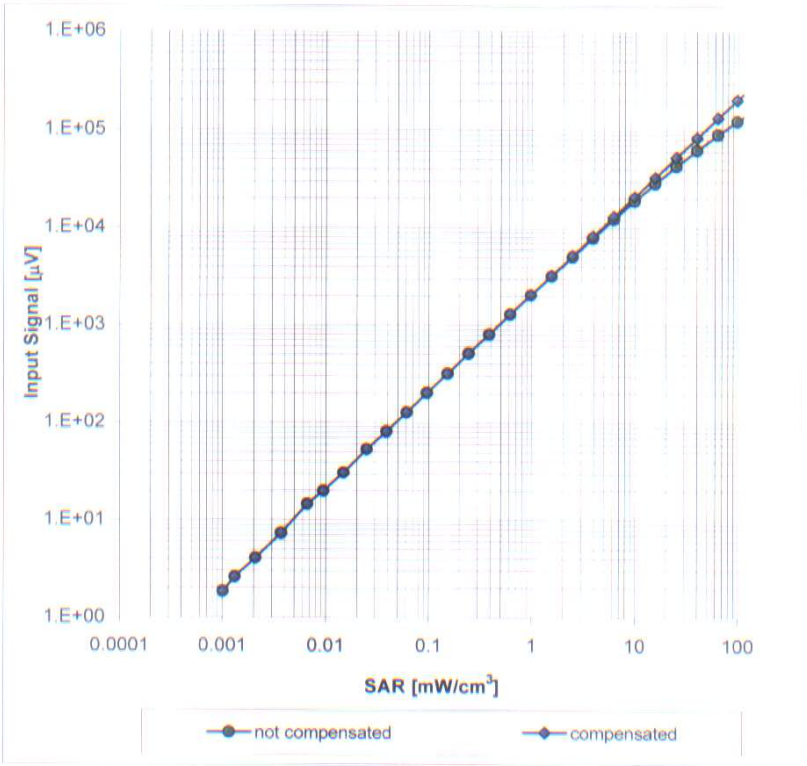


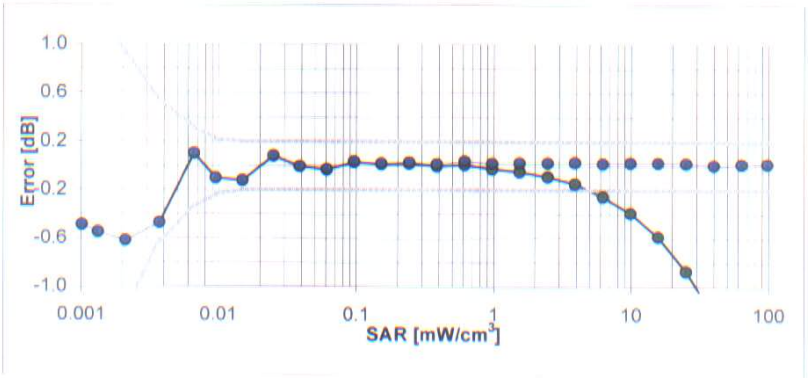


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

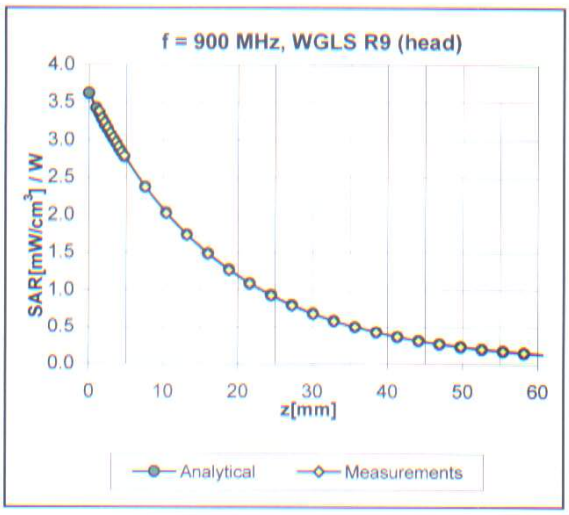
(Waveguide R22, f = 1800 MHz)

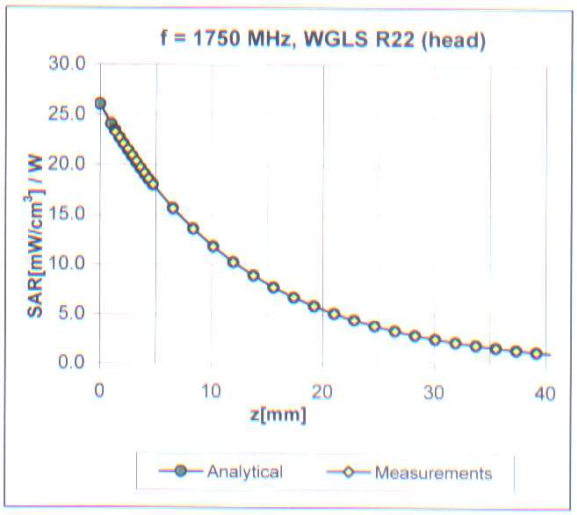




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

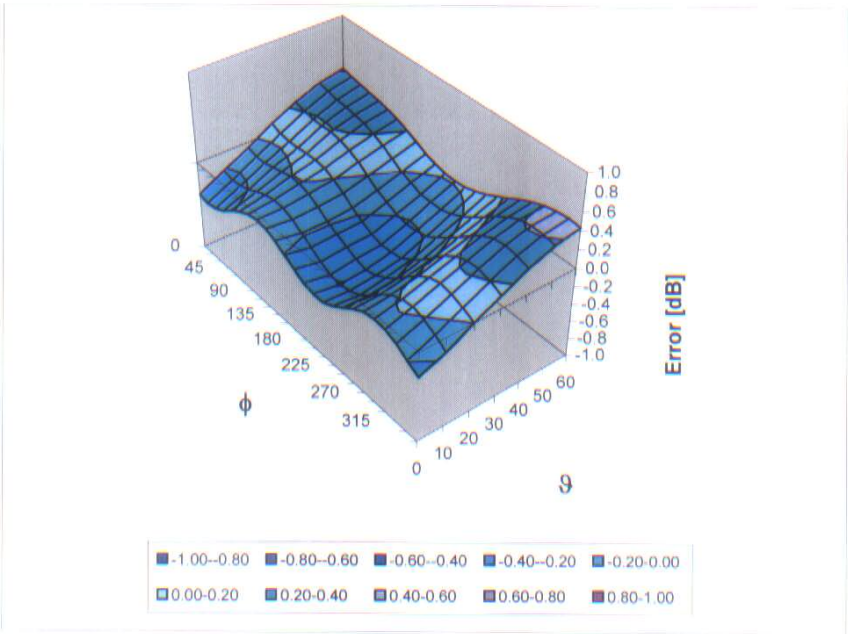
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Other Probe Parameters

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