SAMSUNG ELECTRONICS Co., Ltd.,
Regulatory Compliance Group
IT R&D Center

416, Maetan-3dong,
Yeongtong-gu, Suwon-si,
Gyeonggi-do, Korea 443-742

TEST REPORT ON SAR

Model Tested:	**GT-I9023**
FCC ID (Requested):	**A3LGTI9023**
Job No:	**FH-286**
Report No:	**FH-286-S1**

- Abstract –

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

Prepared By

JO LEE - Test Engineer

Authorized By

JD JANG - Technical Manager

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1. GENERAL INFORMATION

Test Dates :	Dec.28, 2010 ~ Dec.29, 2010
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 :	850/1900 GSM/GPRS/EDGE/WCDMA/HSPA Phone with Bluetooth and WLAN
Model Number :	GT-I9023
Serial Number :	Identical prototype (S/N : # FH-286-B)
Tx Freq.Range :	824.2 ~ 848.8 MHz (GSM850)
	1850.20 ~ 1909.80 MHz (GSM1900)
	1712.4 ~ 1752.5 MHz (WCDMA1700)
	2400 ~ 2483.5 MHz (WLAN)
Rx Freq.Range :	869.2 ~ 893.8 MHz (GSM850)
	1930.20 ~ 1989.80 MHz (GSM1900)
	2112.4 ~ 2152.5 MHz (WCDMA1700)
	2400 ~ 2483.5 MHz (WLAN)
Antenna Manufacturer :	Either
	Model No.: GT-I9023
GPRS	Class 12
GSM Class	B
DTM Mode	N/A
Antenna Dimensions :	51.56mm*17.73mm*8.51mm
Separation distance between Main and Bluetooth antenna :	68mm

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).

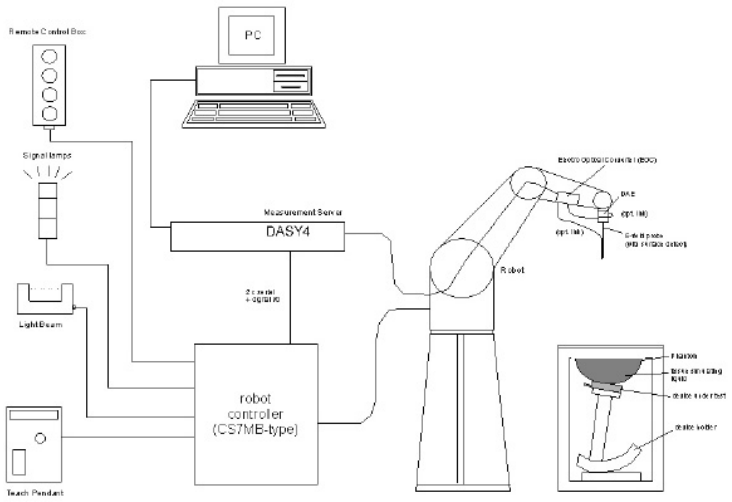


Figure 3.1 SAR Measurement System Setup

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.

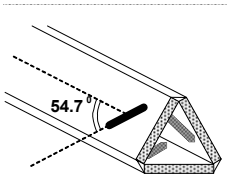
3.2 E-field Probe

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.

Figure

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)



Δ - BEAM

Figure 3.3 Triangular Probe Configuration

Calibration Basic Broad Band Calibration in air: 10-3000 MHz
Conversion Factors (CF) for HSL 900 and HSL 1800

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]

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Application	**[ES3DV3], [ES3DV2]** General dosimetry up to 5 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones	 [ET3DV6]
	[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	

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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.

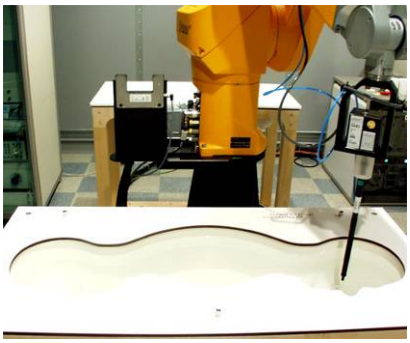

Figure 3.7 Simulated Tissue

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, 1800, 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 D1800V2: dipole length: 72 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	Parameters			
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	-25.8	3.3	51.6	0.1

D1900V2 S/N:5d082	Parameters			
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:708	Parameters			
Date of Cal	**Return loss (dB)**	**Deviation (%)**	**Impedance (Ω)**	**Deviation (Ω)**
2008.07.16	-30.2	0	53.1	0
2010.05.25	-27.1	10.3	53.5	0.4

D1800V2 S/N:2d105	Parameters			
Date of Cal	**Return loss (dB)**	**Deviation (%)**	**Impedance (Ω)**	**Deviation (Ω)**
2008.09.23	-30.8	0	49.8	0
2010.09.10	-29.9	0.02	49.5	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 EX3DV4	Nov.26, 2011	3537
SPEAG DAE4	Mar.17, 2011	686
SPEAG Validation Dipole D835V2	Mar.16, 2011	4d050
SPEAG Validation Dipole D1900V2	Jan.06, 2011	5d082
SPEAG Validation Dipole D1800V2	Aug.24, 2012	2d105
SPEAG Validation Dipole D2450V2	May.25, 2012	708
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
E9300B Power Sensor	Mar.03, 2011	MY41495533
BBS3Q7ECK Power Amp	Jan.12, 2011	1023
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.

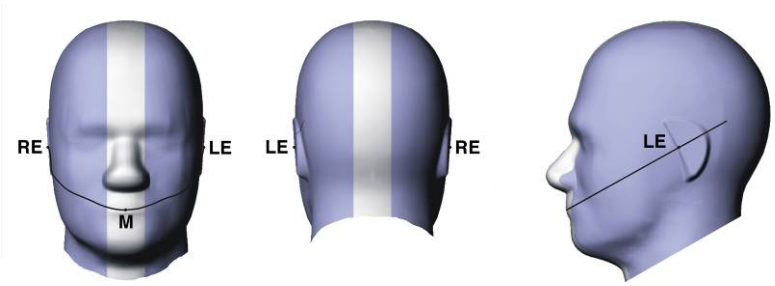

Figure 5.1 Front, back and side view of SAM

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.

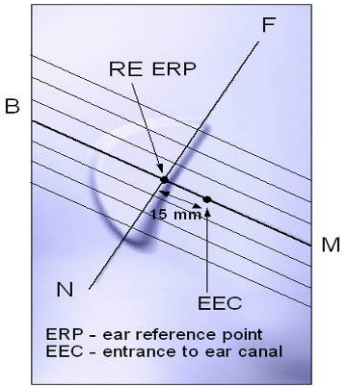

Figure 5.2 Close up side view

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

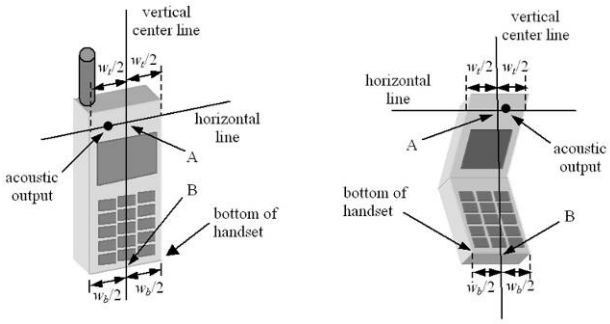

Figure 5.4 Handset vertical and horizontal reference lines

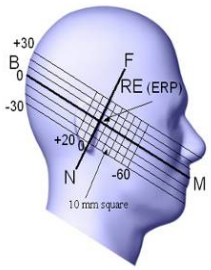

Figure 5.3 Side view of the phantom showing relevant markings

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

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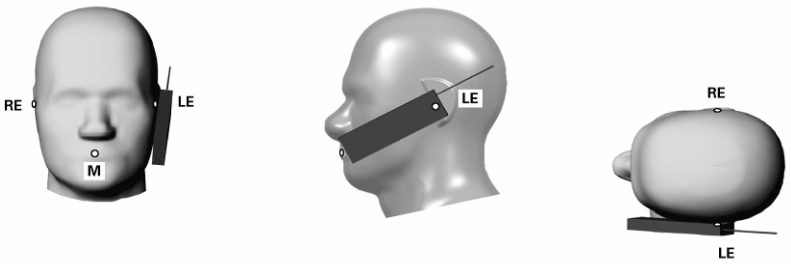

Figure 5.5 Front, Side and Top View of Cheek/Touch Position

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”

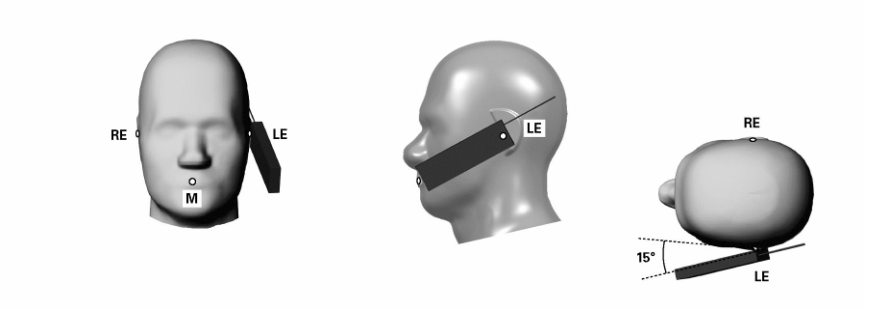

Figure 5.6 Front, side and Top View of Ear/Tilt 15° Position

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

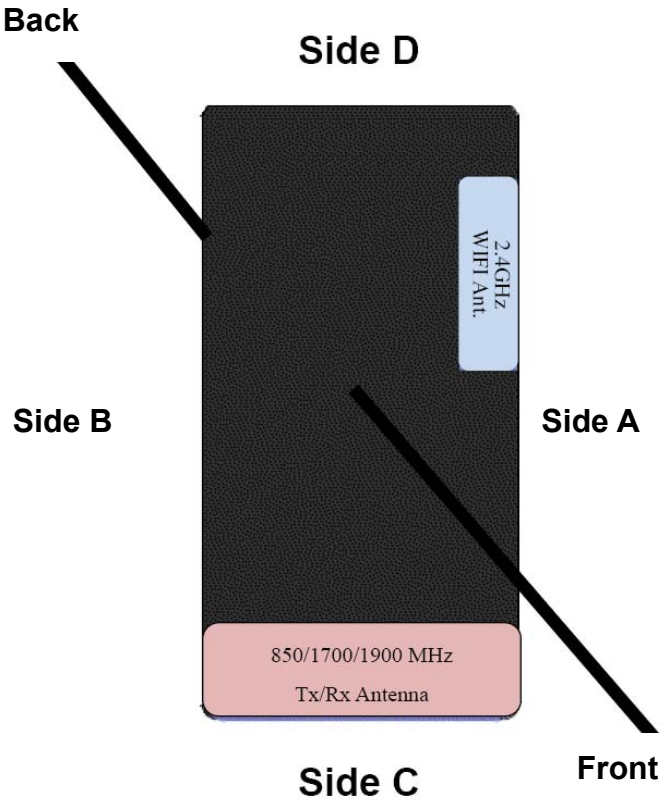

Figure 5.7 Identification of Sides for SAR Testing

Note : Per Oct 2010 TCB FCC Workshop, the edges with antennas within 2.5 cm are required to be evaluated for SAR. See Figure 5.7 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

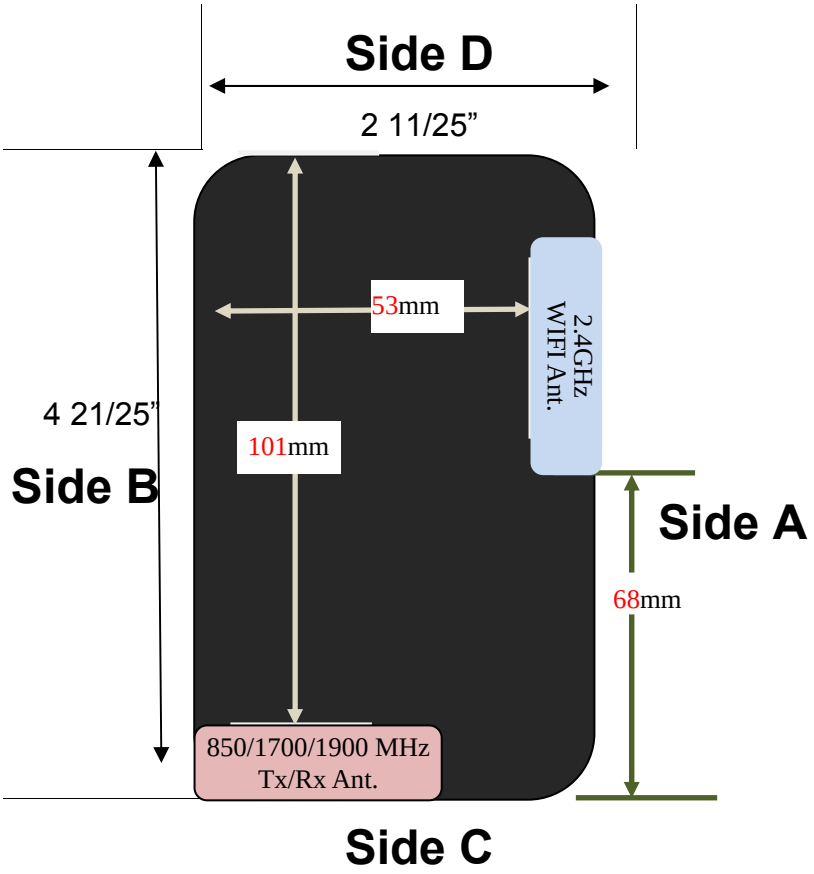

Figure 5.8 Antenna Locations, as viewed from back of device

Mode	Back	Front	Side A	Side B	Side C	Side D
GRPS 850	Yes	Yes	Yes	Yes	Yes	No
GPRS 1900	Yes	Yes	Yes	Yes	Yes	No
WCDMA 1700	Yes	Yes	Yes	Yes	Yes	No
WLAN	Yes	Yes	Yes	No	No	Yes

Table 5.1 Mobile Hotspot Sides for SAR Testing

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 1800MHz

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	7.55	rectangular	1.732	0.7	4.36	∞
Hemispherical Isotropy	1.00	rectangular	1.732	0.7	0.40	∞
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	0.80	∞
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	2.38	normal	1.000	1	2.38	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	5.81	normal	1.000	1	5.81	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)	1.82	normal	1.000	0.64	1.17	∞
Liquid permittivity (deviation from target)	5.00	rectangular	1.732	0.6	1.73	∞
Liquid permittivity (measurement error)	4.73	normal	1.000	0.6	2.84	∞
Combined Standard Uncertainty		Normal	-	-	**12.10**	**9306**
Extended Standard Uncertainty(K=2.00)					**24.21**	**9306**

Table 6.3 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 6.4 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		1750MHz Head		1750MHz Body		2450MHz Head		2450MHz Body	
	Target	Measured	Target	Measured	Target	Measured	Target	Measured	Target	Measured	Target	Measured	Target	Measured	Target	Measured
Date	Dec.28,2010		Dec.28,2010		Dec.28,2010		Dec.28,2010		Dec.29,2010		Dec.29,2010		Dec.29,2010		Dec.29,2010	
Liquid Temperature(° C)	22.0		21.9		22.0		22.2		22.1		22.2		22.1		22.1	
Dielectric Constant: ä'	41.5	41.1	55.2	56.6	40	40	53.3	51.8	40.1	39.4	53.43	51.9	39.2	39.9	52.7	52.2
Conductivity:	0.9	0.88	0.97	0.99	1.4	1.4	1.52	1.48	1.37	1.38	1.49	1.44	1.8	1.8	1.95	1.99
Tissue Batch Number	835B900T4002B		835B2001F		1900F4001N		1900B2002D		1800M3001G		1800B2001G		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 835/1800/1900/2450 MHz by using the system validation kit(s). (see Appendix E, Graphic Plot Attached)

Table 7.2 System Validation Results

System Validation Kit	Tissue	Input Power(mW)	Targeted SAR_{1g} (mW/g)	Measured SAR_{1g} (mW/g)	Normalized to 1W	Deviation (%)	Date	Liquid Temperature(°C)	Ambient Temperature(°C)
4d050	835MHz Brain	250mW	9.49	2.24	8.96	-5.58%	Dec.28, 2010	22.0	22.4
2d105	1800MHz Brain	250mW	39.1	9.63	38.52	-1.48%	Dec.29, 2010	22.4	22.1
5d082	1900MHz Brain	250mW	39.4	9.54	38.16	-3.15%	Dec.28, 2010	22.0	22.4
708	2450MHz	100mW	52.1	5.57	55.7	6.91%	Dec.29, 2010	22.1	22.4

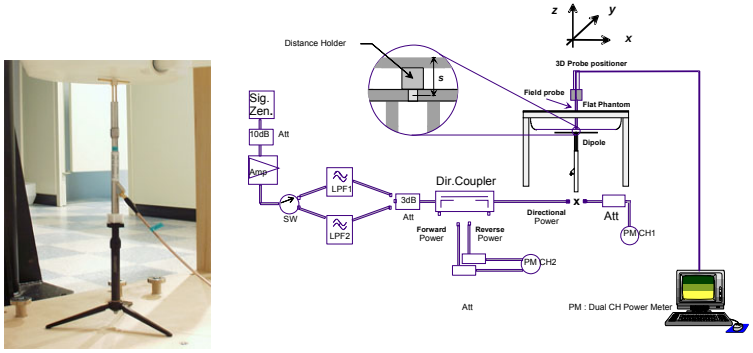

Figure 7.1 Dipole Validation Test Setup

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 all “1s”.

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 UMTS RF Conducted Output Power

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]
AWS	1312	22.01	21.93	21.82
	1412	21.99	21.91	21.76
	1862	21.99	21.99	21.74

Table 8.2 HSDPA/HSUPA Conducted Output Power

HSDPA	1312	1412	1862	MPR
Subtest1	21.82	21.76	21.74	0.0
Subtest2	21.07	20.97	21.04	0.0
Subtest3	21.08	20.98	21.01	0.5
Subtest4	20.84	20.92	20.76	0.5
HSUPA	1312	1412	1862	MPR
Subtest1	20.65	20.85	20.4	0
Subtest2	19.02	18.91	18.79	1
Subtest3	19.71	19.62	19.45	2
Subtest4	19.28	19.09	19.03	1
Subtest5	20.83	20.94	20.72	0

HSDPA and HSUPA 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 and HSUPA 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 and HSUPA 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/EDGE Power Table for GT-I9023

BAND	Channel	RF Conducted Power Table								
		Voice	GPRS Data				EDGE Data			
			1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot	1 Tx Slot	2 Tx Slot	3 Tx Slot	4 Tx Slot
GSM1900	512	29.42	29.13	29.15	26.14	24.28	26.03	26.17	25.96	24.14
	661	29.6	29.31	29.31	26.3	24.46	26.57	26.35	25.51	24.57
	810	29.44	29.17	29.16	26.18	24.38	26.29	26.49	25.4	24.61
GSM850	128	32	31.81	31.81	28.26	26.67	26.68	26.47	26.08	24.89
	190	31.97	31.79	31.78	28.32	26.68	26.23	26.88	26.19	24.88
	251	31.97	31.77	31.76	28.3	26.65	26.74	26.71	25.84	24.66

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	17.11	19.81
		2	17.09	19.73
		5.5	17.02	19.71
		11	17.07	19.66
2437	6	1	17.08	19.78
		2	17.07	19.74
		5.5	17.1	19.71
		11	17.05	19.72
2462	11	1	17.05	19.82
		2	17.08	19.76
		5.5	17.02	19.78
		11	17.02	19.72

802.11n Conducted Output Power

Freq [MHz]	Channel	Data Rate [Mbps]	Measured Average Power [dBm]	Measured Peak Power [dBm]
2412	1	6	14.03	21.11
		9	13.93	20.97
		12	13.92	21.05
		18	13.86	21.09
		24	13.78	20.94
		36	13.72	20.92
		48	13.86	21.04
		54	13.65	21.03
2437	6	6	14.06	21.17
		9	14.02	21.05
		12	14.02	21.15
		18	13.94	21.02
		24	13.85	20.95
		36	13.88	20.91
		48	13.92	20.94
		54	13.74	20.95
2462	11	6	14.11	21.24
		9	14.08	21.13
		12	14.03	21.22
		18	14.02	21.04
		24	14.05	21.07
		36	13.97	20.96
		48	13.93	20.91
		54	13.83	20.96

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	11.83	18.92
		9	13/14.4	11.78	19.03
		12	19.5/21.7	11.79	19.01
		18	26/28.9	11.68	18.89
		24	39/43.3	11.72	18.92
		36	52/57.8	11.68	18.91
		48	58.5/65	11.64	18.73
		54	65/72.2	11.57	18.79
2437	6	6	6.5/7.2	11.78	19.03
		9	13/14.4	11.72	18.96
		12	19.5/21.7	11.86	19.21
		18	26/28.9	12.01	19.19
		24	39/43.3	11.64	18.89
		36	52/57.8	11.79	18.83
		48	58.5/65	11.72	18.92
		54	65/72.2	11.67	18.91
2462	11	6	6.5/7.2	11.98	19.32
		9	13/14.4	12.03	19.34
		12	19.5/21.7	11.92	19.24
		18	26/28.9	11.72	18.92
		24	39/43.3	11.71	19.12
		36	52/57.8	11.86	19.07
		48	58.5/65	11.82	19.07
		54	65/72.2	11.75	18.98

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 6.3 Summary of SAR Evaluation Requirements for Cell phones with Multiple Transmitters

	Individual Transmitter	Simultaneous Transmission
Licensed Transmitters	**Routine evaluation required**	**SAR not required:** **Unlicensed only** o when stand-alone 1-g SAR is not required and antenna is > 5 cm from other antennas **Licensed & Unlicensed** 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:** **Licensed & Unlicensed** 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 –** **Stand-alone SAR not required when** 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 **Otherwise stand-alone SAR is required** **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 0.829 + 0 = 0.829, 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 0.829+0.335=1.164, 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	32.09	32.13	Right	Cheek/Touch	Intenna	Standard	0.053
836.6	190	GSM850	32.14	31.98	Right	Ear/Tilt 15°	Intenna	Standard	0.039
836.6	190	GSM850	32.01	32.05	Left	Cheek/Touch	Intenna	Standard	**0.069**
836.6	190	GSM850	32.04	32.08	Left	Ear/Tilt 15°	Intenna	Standard	0.045
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

Frequency		Mode	Conducted		Side	Slots	Spacing	Antenna Type	Battery	Test Position	SAR Level (W/kg)
MHz	Ch		Start	End							
836.6	190	GSM850	31.68	31.77	Back	2Tx	1cm	Intenna	Standard	Body	**0.306**
836.6	190	GSM850	28.20	28.31	Back	3Tx	1cm	Intenna	Standard	Body	0.223
836.6	190	GSM850	26.69	26.68	Back	4Tx	1cm	Intenna	Standard	Body	0.213
836.6	190	GSM850	31.81	31.76	Front	2Tx	1cm	Intenna	Standard	Body	0.192
836.6	190	GSM850	31.72	31.81	Side A	2Tx	1cm	Intenna	Standard	Body	0.233
836.6	190	GSM850	31.80	31.84	Side B	2Tx	1cm	Intenna	Standard	Body	0.192
836.6	190	GSM850	31.74	31.66	Side C	2Tx	1cm	Intenna	Standard	Body	0.054
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. So the burst power and timing period is more than 2dB higher in GPRS mode than in GSM850 and EDGE mode. Hence, the GSM850 and EDGE 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	29.5	29.59	Right	Cheek/Touch	Intenna	Standard	**0.316**
1880	661	GSM1900	29.42	29.53	Right	Ear/Tilt 15°	Intenna	Standard	0.136
1880	661	GSM1900	29.52	29.61	Left	Cheek/Touch	Intenna	Standard	0.314
1880	661	GSM1900	29.48	29.64	Left	Ear/Tilt 15°	Intenna	Standard	0.117
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

Frequency		Mode	Conducted		Side	Slots	Spacing	Antenna Type	Battery	Test Position	SAR Level (W/kg)
MHz	Ch		Start	End							
1880	661	GSM1900	29.20	29.32	Back	2Tx	1cm	Intenna	Standard	Body	0.628
1880	661	GSM1900	26.23	26.33	Back	3Tx	1cm	Intenna	Standard	Body	0.349
1880	661	GSM1900	24.40	24.45	Back	4Tx	1cm	Intenna	Standard	Body	0.300
1880	661	GSM1900	29.30	29.28	Front	2Tx	1cm	Intenna	Standard	Body	0.622
1880	661	GSM1900	29.26	29.36	Side B	2Tx	1cm	Intenna	Standard	Body	0.119
1880	661	GSM1900	29.28	29.31	Side A	2Tx	1cm	Intenna	Standard	Body	0.185
1880	661	GSM1900	29.24	29.30	Side C	2Tx	1cm	Intenna	Standard	Body	**0.723**
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. The burst power and timing period is more than 2dB higher in GPRS mode than in GSM1900 and EDGE. Hence, the GSM1900 and EDGE 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 WLAN Head SAR Results

Frequency		Mode	Conducted		Side	Test Position	Antenna Type	Battery	Data Rate	SAR Level (W/kg)
MHz	Ch		Start	End						
2437	6	IEEE 802.11b	17.05	17.06	Right	Cheek/Touch	Intenna	Standard	1Mbps	0.133
2437	6	IEEE 802.11b	17.03	17.05	Right	Ear/Tilt 15°	Intenna	Standard	1Mbps	0.071
2437	6	IEEE 802.11b	17.09	17.05	Left	Cheek/Touch	Intenna	Standard	1Mbps	**0.178**
2437	6	IEEE 802.11b	17.06	17.08	Left	Ear/Tilt 15°	Intenna	Standard	1Mbps	0.110
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 the lowest data rate were 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.

8.6 WLAN Body SAR Results

Frequency		Mode	Conducted		Side	Test Position	Spacing	Antenna Type	Battery	Data Rate	SAR Level (W/kg)
MHz	Ch		Start	End							
2437	6	IEEE 802.11b	17.06	17.06	Back	Body	1cm	Intenna	Standard	1Mbps	**0.335**
2437	6	IEEE 802.11b	17.08	17.03	Front	Body	1cm	Intenna	Standard	1Mbps	0.035
2437	6	IEEE 802.11b	17.09	17.09	Side A	Body	1cm	Intenna	Standard	1Mbps	0.190
2437	6	IEEE 802.11b	17.07	17.09	Side D	Body	1cm	Intenna	Standard	1Mbps	0.024
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 the lowest data rate were 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 C edge was not tested because antenna distance was >2.5cm, per TCB workshop October 2010.
10. WLAN transmission was verified using a spectrum analyzer.

8.7 WCDMA1700 Head SAR Results

Frequency		Mode	Conducted Power		Side	Test Position	Antenna Type	Battery	SAR Level (W/kg)
MHz	Ch		Start	End					
1732.4	1412	UMTS IV	22.01	21.97	Right	Cheek/Touch	Intenna	Standard	0.668
1732.4	1412	UMTS IV	21.98	21.96	Right	Ear/Tilt 15°	Intenna	Standard	0.265
1732.4	1412	UMTS IV	21.99	21.95	Left	Cheek/Touch	Intenna	Standard	**0.829**
1732.4	1412	UMTS IV	22.00	21.94	Left	Ear/Tilt 15°	Intenna	Standard	0.214
1712.4	1312	UMTS IV	21.97	21.98	Left	Cheek/Touch	Intenna	Standard	0.803
1752.5	1862	UMTS IV	21.92	21.96	Left	Cheek/Touch	Intenna	Standard	0.813
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) and Public Notice DA-02-1438, 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 12.2 kbps with HSPA Inactive.

8.8 WCDMA1700 Body SAR Results

Frequency		Mode	Conducted		Side	Spacing	Antenna Type	Battery	Test Postion	SAR Level (W/kg)
MHz	Ch		Start	End						
1732.4	1412	UMTS IV	21.95	22.01	Back	1cm	Intenna	Standard	Body	0.616
1732.4	1412	UMTS IV	21.96	21.94	Front	1cm	Intenna	Standard	Body	0.485
1732.4	1412	UMTS IV	21.99	22.00	Side A	1cm	Intenna	Standard	Body	0.197
1732.4	1412	UMTS IV	21.97	21.96	Side B	1cm	Intenna	Standard	Body	0.217
1732.4	1412	UMTS IV	21.98	21.95	Side C	1cm	Intenna	Standard	Body	**0.721**
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.

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:
0.0691 W/Kg GSM850 Head SAR / 0.306 W/Kg GPRS850 Body SAR
0.316 W/Kg GSM1900 Head SAR / 0.723 W/Kg GPRS1900 Body SAR
0.829 W/Kg UMTS IV Head SAR / 0.721 W/Kg UMTS IV Body SAR
0.178W/Kg 2.4GHz WLAN Head SAR / 0.335W/Kg 2.4GHz WLAN Body SAR

10. REFERENCES

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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).

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

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;

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

where:

σ = simulated tissue conductivity

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

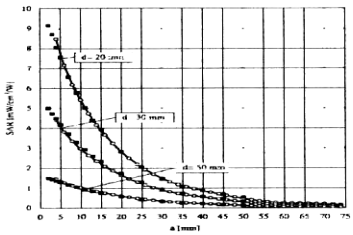

Figure B.1. E-Field and Temperature measurements at 900MHz

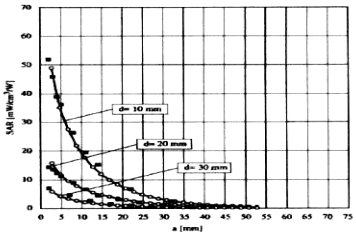

Figure B.2. E-Field and temperature measurements at 1.9GHz

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.

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APPENDIX D
The Validation Measurements

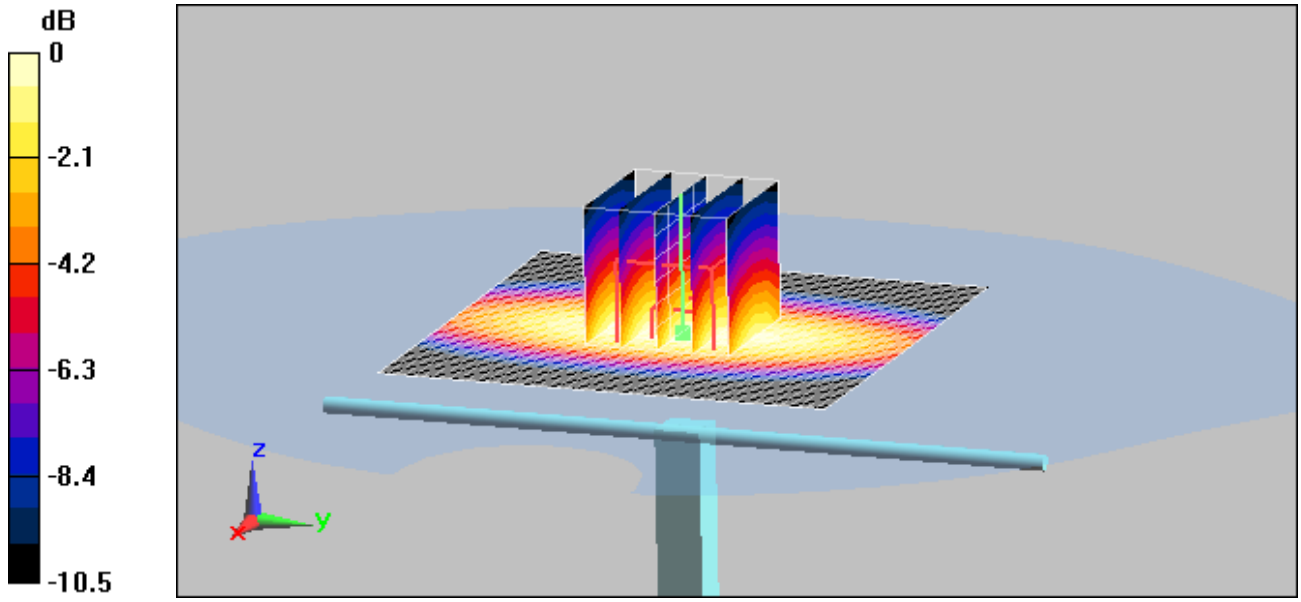
DUT: Dipole 835 MHz; Serial: 4d050
Program Name: 835MHz Dipole Validation 2010.12.28
Procedure Name: 835MHz @ 250mW
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.88 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.63, 9.63, 9.63); Calibrated: 2010-11-26
- 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) = 2.4 mW/g

835MHz @ 250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.4 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 3.38 W/kg
SAR(1 g) = 2.24 mW/g; SAR(10 g) = 1.46 mW/g
Maximum value of SAR (measured) = 2.41 mW/g



0 dB = 2.41mW/g

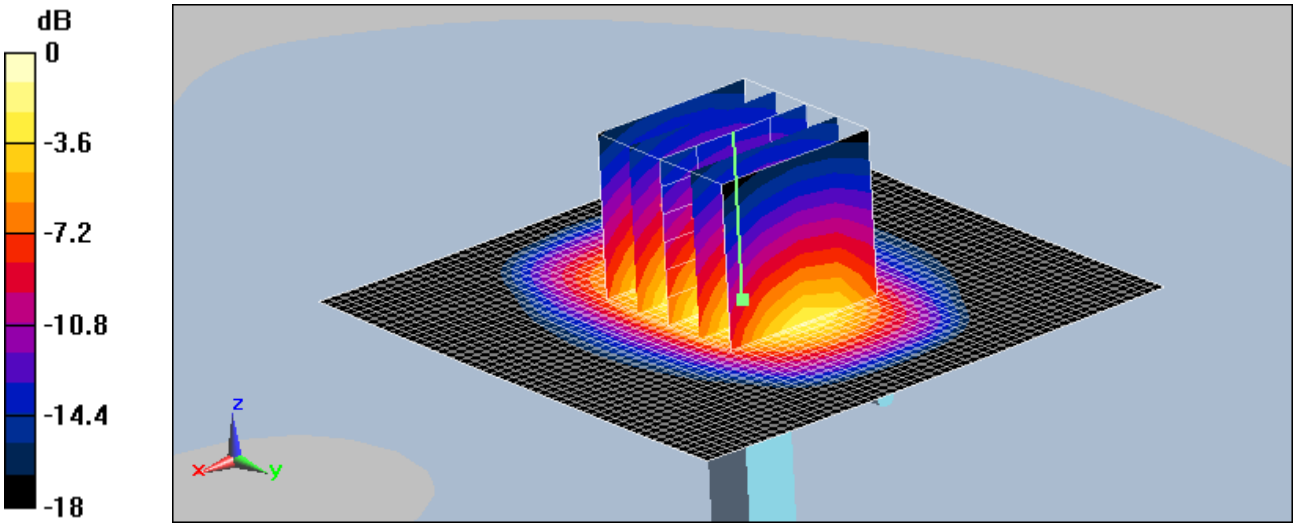
DUT: Dipole 1800 MHz; Serial: 2d105
Program Name: 1800MHz Dipole Valdation 2010.12.29
Procedure Name: 1800MHz @ 250mW
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: CW; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.44 mho/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Flat Section DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.66, 8.66, 8.66); Calibrated: 2010-11-26
- 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

1800MHz @ 250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 14.7 mW/g

1800MHz @ 250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 86.1 V/m; Power Drift = 0.013 dB
Peak SAR (extrapolated) = 18 W/kg

SAR(1 g) = 9.63 mW/g; SAR(10 g) = 5.01 mW/g
Maximum value of SAR (measured) = 10.7 mW/g



0 dB = 10.7mW/g

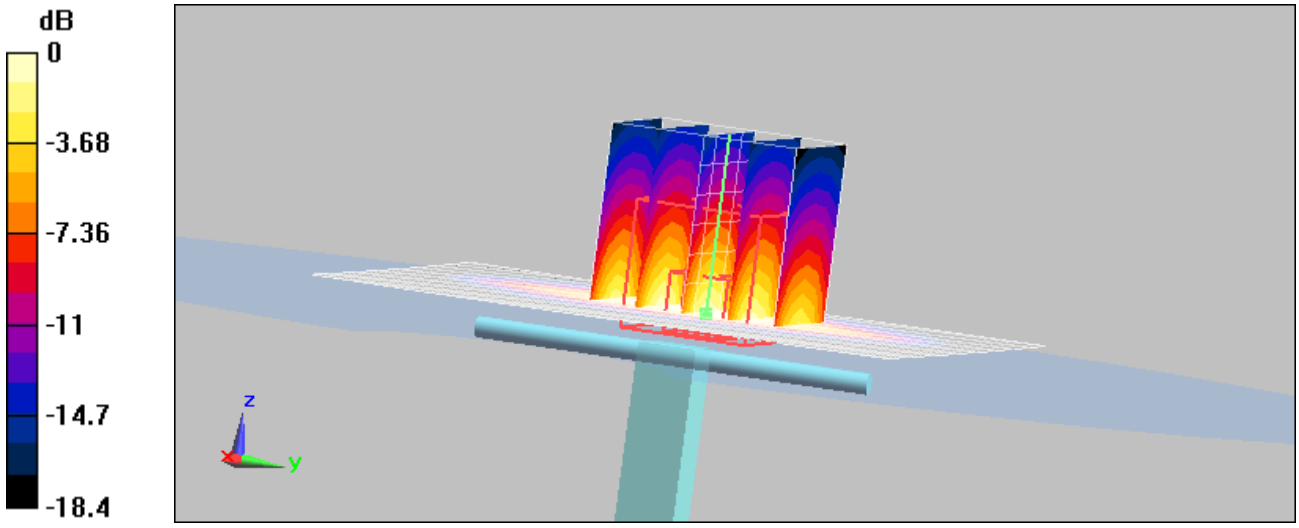
DUT: Dipole 1900 MHz; Serial: 5d082
Program Name: 1900MHz Dipole Valdation 2010.12.28
Procedure Name: 1900MHz @ 250mW
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.4 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.25, 8.25, 8.25); Calibrated: 2010-11-26
- 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

1900MHz @ 250mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 10.7 mW/g

1900MHz @ 250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 62.3 V/m; Power Drift = 0.184 dB
Peak SAR (extrapolated) = 18 W/kg
SAR(1 g) = 9.54 mW/g; SAR(10 g) = 4.92 mW/g
Maximum value of SAR (measured) = 10.6 mW/g



0 dB = 10.6mW/g

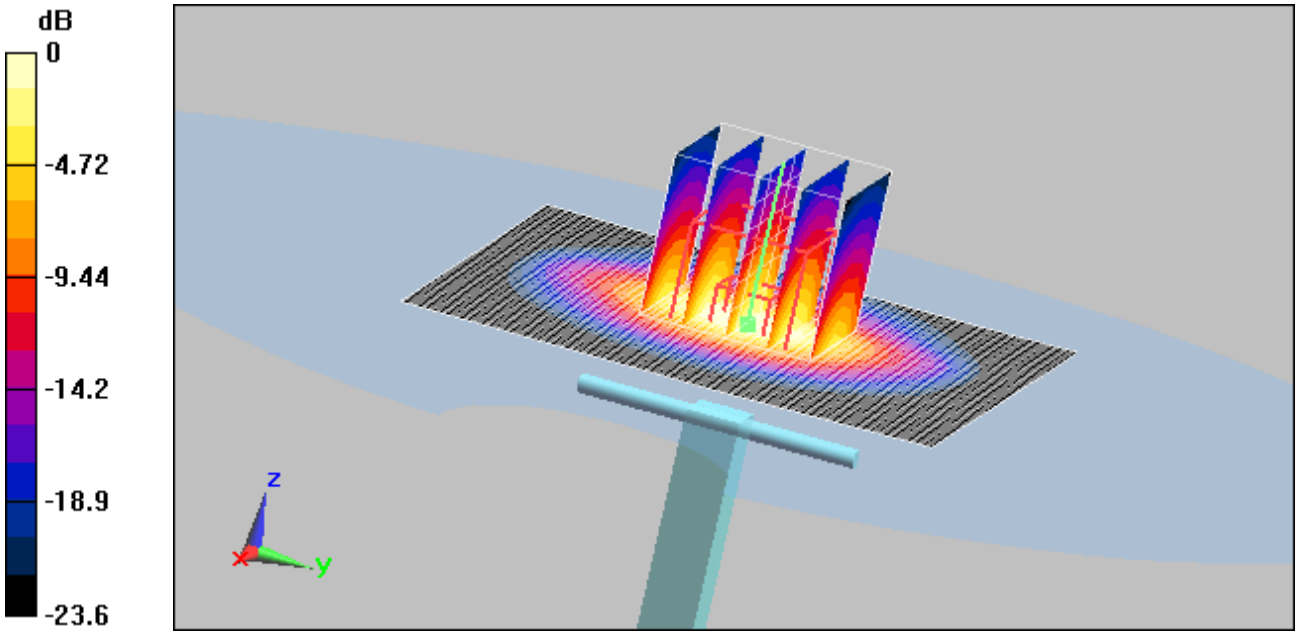
DUT: Dipole 2450 MHz; Serial: 708
Program Name: 2450MHz 100mW Dipole Validation 2010.12.29
Procedure Name: 2450MHz @ 100mW
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.8 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.59, 7.59, 7.59); Calibrated: 2010-11-26
- 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) = 7.51 mW/g

2450MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 49.5 V/m; Power Drift = 0.187 dB
Peak SAR (extrapolated) = 12 W/kg
SAR(1 g) = 5.57 mW/g; SAR(10 g) = 2.53 mW/g
Maximum value of SAR (measured) = 6.29 mW/g



0 dB = 6.29mW/g

APPENDIX E

Plots of The SAR Measurements

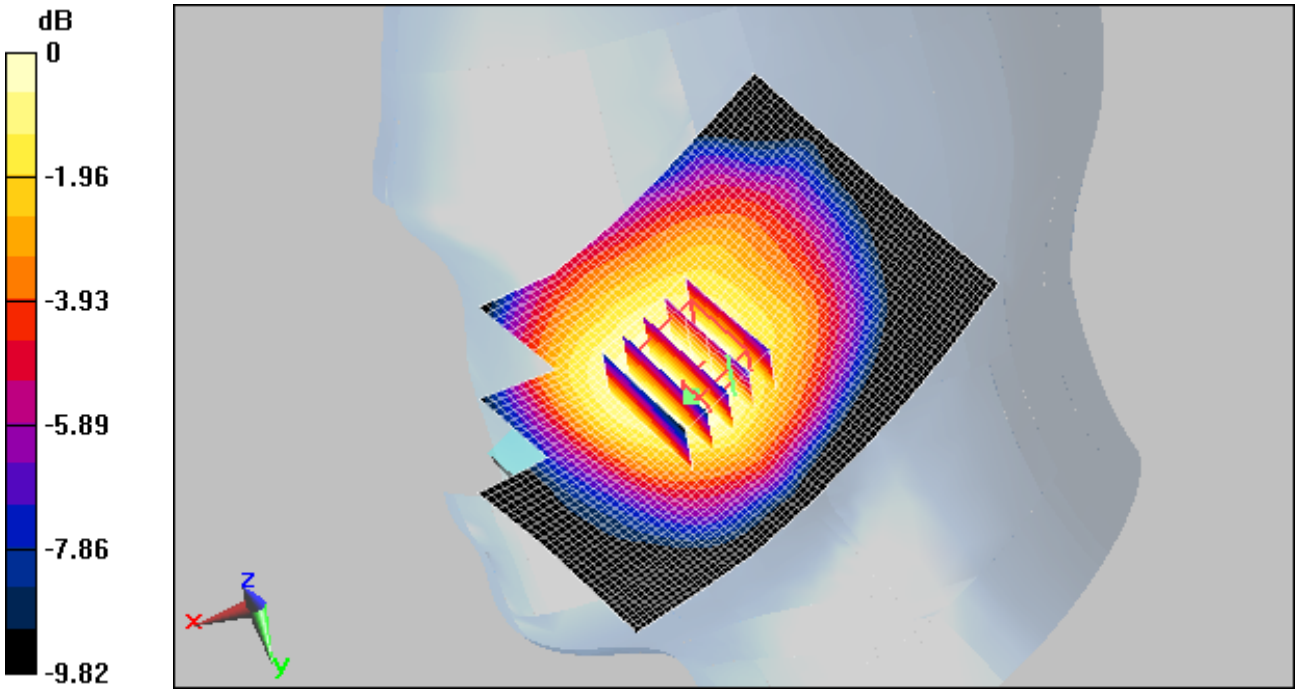
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GSM850 Right (Job No. : FH-286)
Procedure Name: Cheek , Ch.190, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 836.6 MHz; σ = 0.88 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.63, 9.63, 9.63); Calibrated: 2010-11-26
- 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.190, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.056 mW/g

Cheek , Ch.190, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.89 V/m; Power Drift = 0.071 dB
Peak SAR (extrapolated) = 0.069 W/kg
SAR(1 g) = 0.053 mW/g; SAR(10 g) = 0.041 mW/g
Maximum value of SAR (measured) = 0.054 mW/g



0 dB = 0.054mW/g

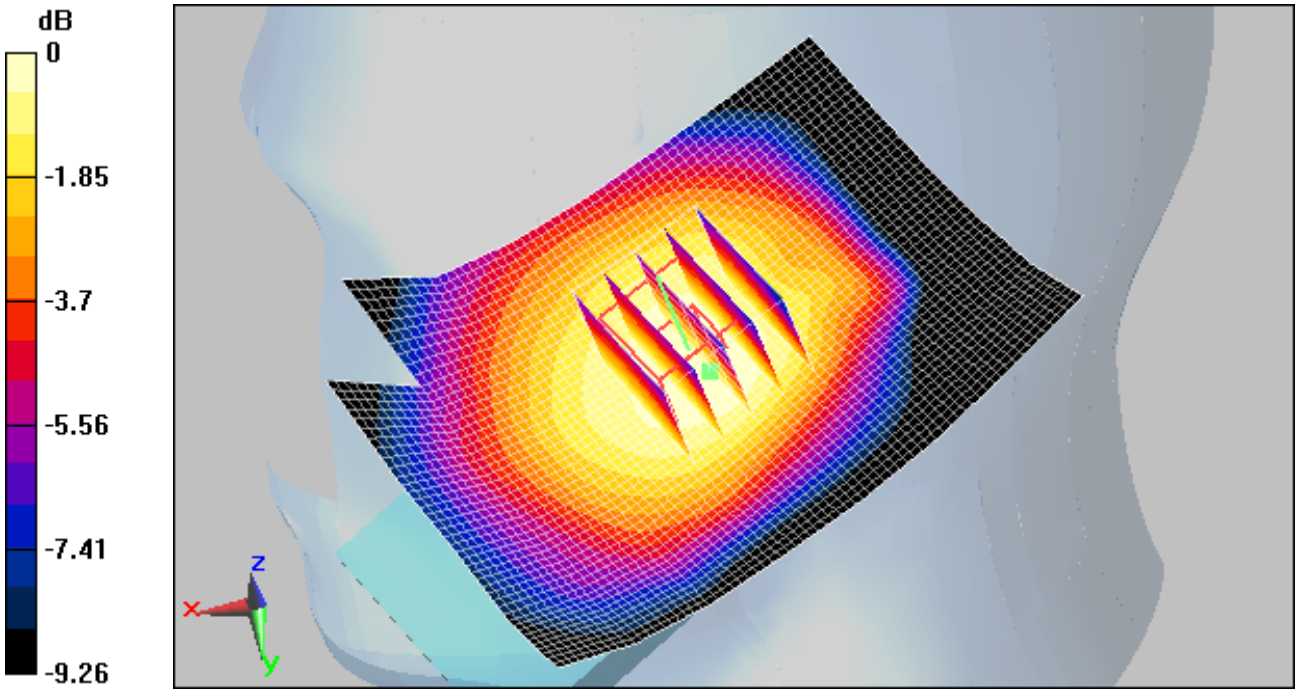
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GSM850 Right (Job No. : FH-286)
Procedure Name: Tilt, Ch.190, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 836.6 MHz; σ = 0.88 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.63, 9.63, 9.63); Calibrated: 2010-11-26
- 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.190, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.041 mW/g

Tilt, Ch.190, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.01 V/m; Power Drift = 0.083 dB
Peak SAR (extrapolated) = 0.050 W/kg
SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.030 mW/g
Maximum value of SAR (measured) = 0.041 mW/g



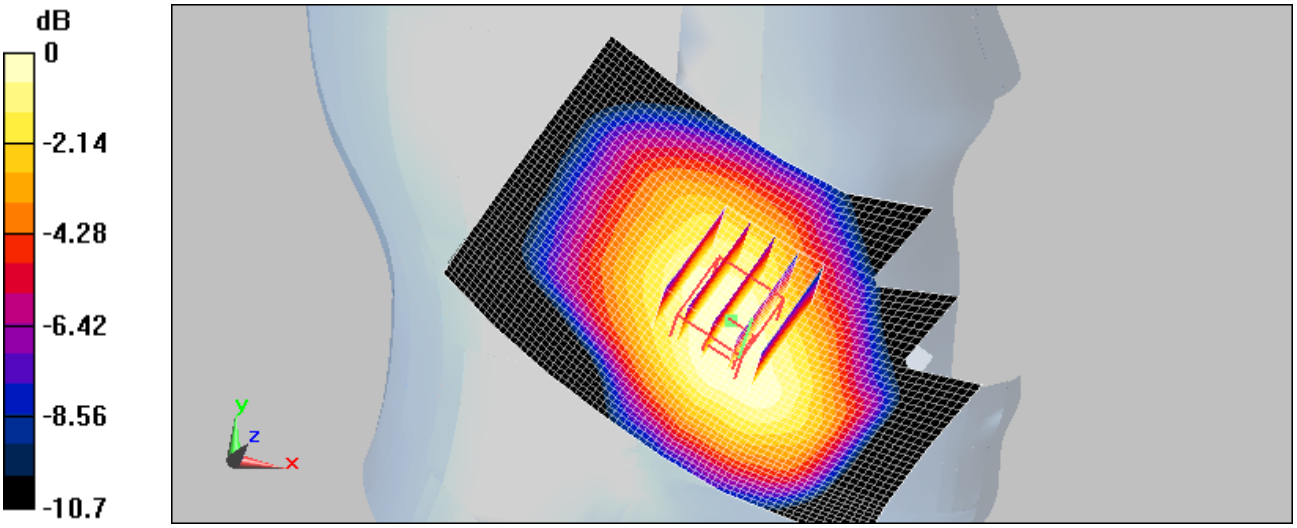
0 dB = 0.041mW/g

DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GSM850 Left (Job No. : FH-286)
Procedure Name: Cheek, Ch.190, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 836.6 MHz; σ = 0.88 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Left Section DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.63, 9.63, 9.63); Calibrated: 2010-11-26
- 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.190, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.074 mW/g

Cheek, Ch.190, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.75 V/m; Power Drift = 0.150 dB
Peak SAR (extrapolated) = 0.090 W/kg
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.052 mW/g
Maximum value of SAR (measured) = 0.072 mW/g



0 dB = 0.072mW/g

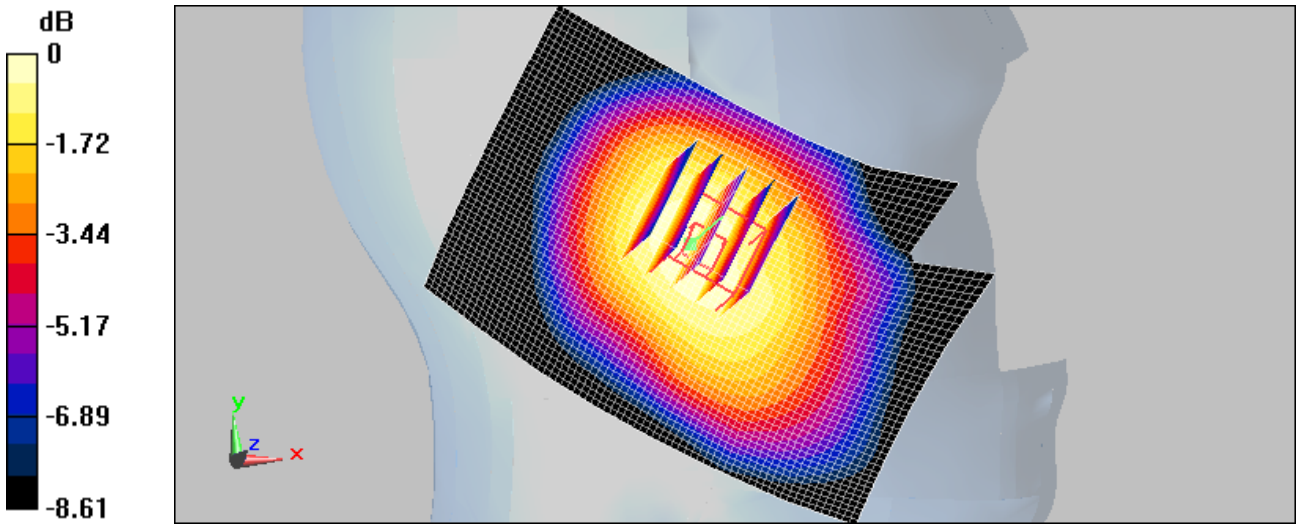
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GSM850 Left (Job No. : FH-286)
Procedure Name: Tilt, Ch.190, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 836.6 MHz; σ = 0.88 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.63, 9.63, 9.63); Calibrated: 2010-11-26
- 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.190, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.046 mW/g

Tilt, Ch.190, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.05 V/m; Power Drift = 0.081 dB
Peak SAR (extrapolated) = 0.055 W/kg
SAR(1 g) = 0.045 mW/g; SAR(10 g) = 0.034 mW/g
Maximum value of SAR (measured) = 0.047 mW/g



0 dB = 0.047mW/g

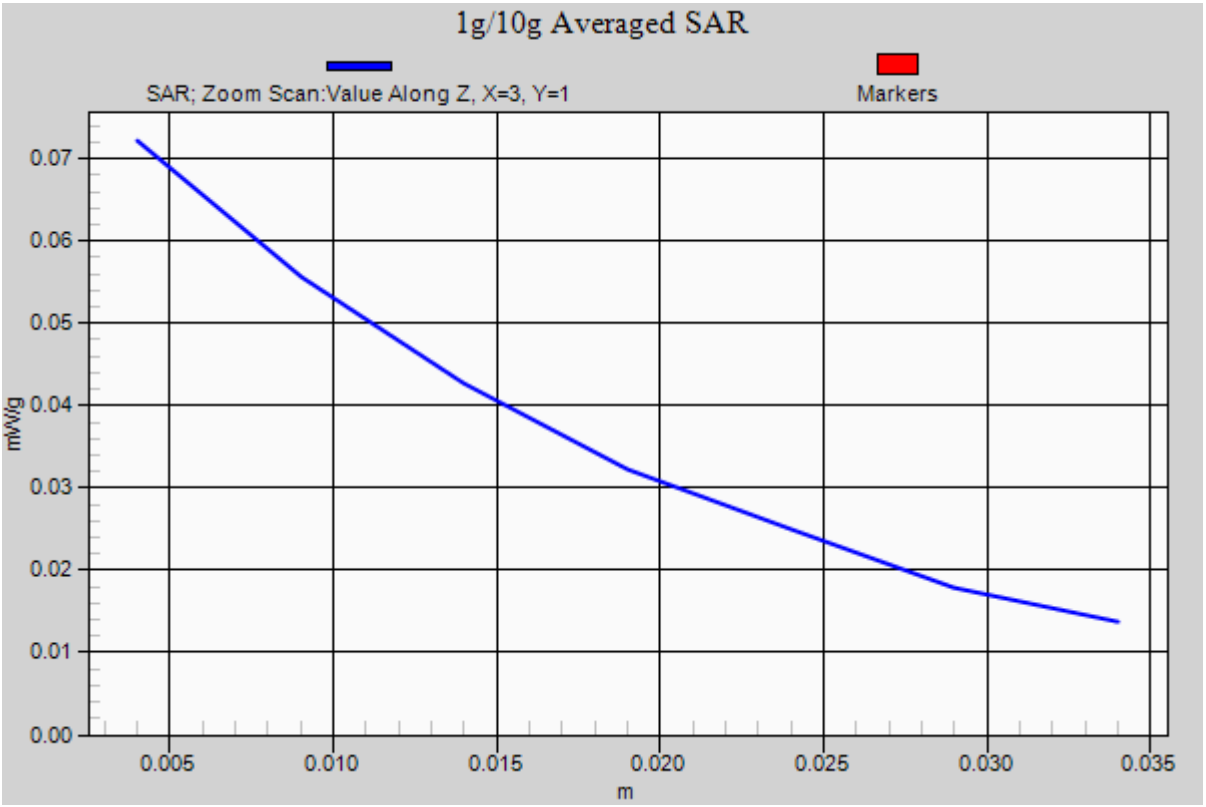
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GSM850 Left (Job No. : FH-286)
Procedure Name: Cheek, Ch.190, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: GSM850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 836.6 MHz; σ = 0.88 mho/m; ε_r = 41.1; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.63, 9.63, 9.63); Calibrated: 2010-11-26
- 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.190, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.074 mW/g

Cheek, Ch.190, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.75 V/m; Power Drift = 0.150 dB
Peak SAR (extrapolated) = 0.090 W/kg
SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.052 mW/g
Maximum value of SAR (measured) = 0.072 mW/g



DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS850 Body (Job No. : FH-286)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard, Back, 2Tx
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-21.9;Test Date-28/Dec/2010

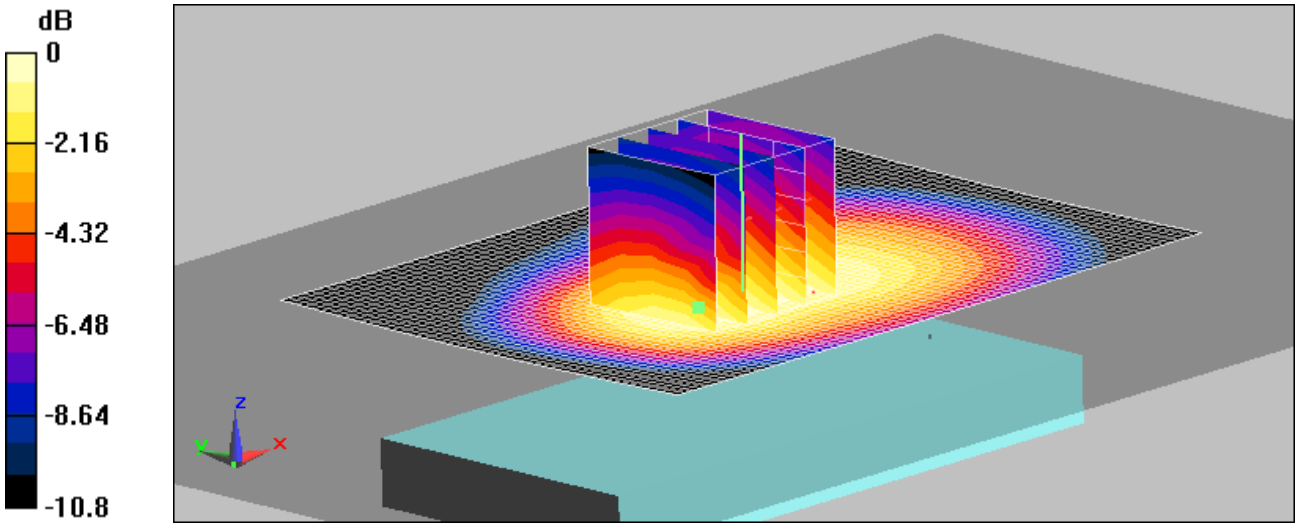
Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.57, 9.57, 9.57); Calibrated: 2010-11-26
- 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.190, Ant.Intenna, Bat.Standard, Back, 2Tx/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.336 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard, Back, 2Tx/Zoom Scan 2 (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = 0.049 dB
Peak SAR (extrapolated) = 0.427 W/kg
SAR(1 g) = 0.306 mW/g; SAR(10 g) = 0.222 mW/g

Maximum value of SAR (measured) = 0.324 mW/g



0 dB = 0.324mW/g

DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS850 Body (Job No. : FH-286)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard, Front, 2Tx
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-21.9;Test Date-28/Dec/2010

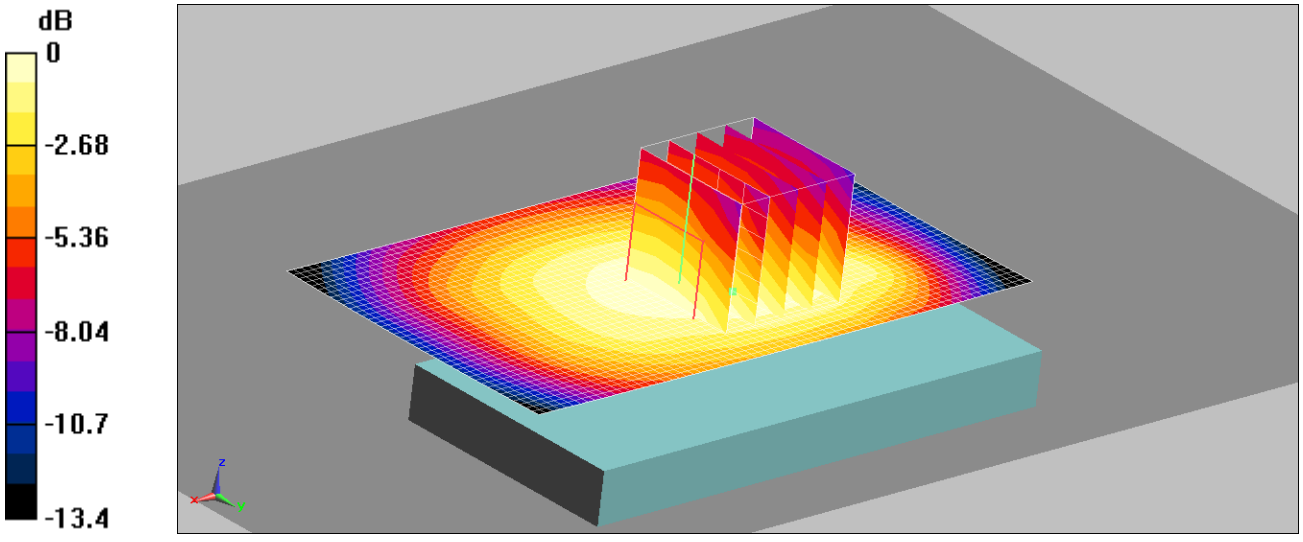
Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.57, 9.57, 9.57); Calibrated: 2010-11-26
- 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.190, Ant.Intenna, Bat.Standard, Front, 2Tx/Area Scan (41x71x1):
Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.199 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard, Front, 2Tx/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14 V/m; Power Drift = -0.040 dB
Peak SAR (extrapolated) = 0.246 W/kg
SAR(1 g) = 0.192 mW/g; SAR(10 g) = 0.144 mW/g

Maximum value of SAR (measured) = 0.200 mW/g



0 dB = 0.200mW/g

DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS850 Body (Job No. : FH-286)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard, Side A, 2Tx
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-21.9;Test Date-28/Dec/2010

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 = 56.6; ρ = 1000 kg/m^3
Phantom section: Left Section

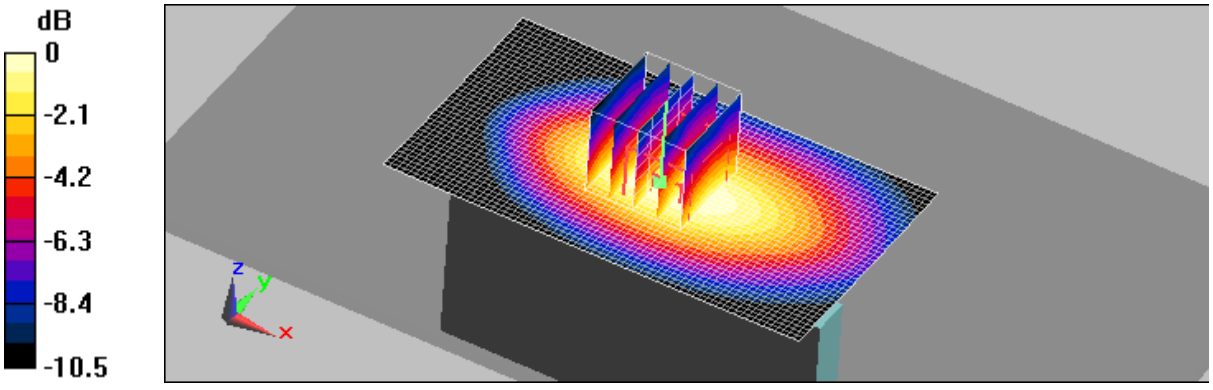
DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.57, 9.57, 9.57); Calibrated: 2010-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard, Side A, 2Tx/Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.253 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard, Side A, 2Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 15.2 V/m; Power Drift = -0.030 dB
Peak SAR (extrapolated) = 0.389 W/kg
SAR(1 g) = 0.233 mW/g; SAR(10 g) = 0.154 mW/g
Maximum value of SAR (measured) = 0.248 mW/g



0 dB = 0.248mW/g

DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS850 Body (Job No. : FH-286)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard, Side B, 2Tx
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-21.9;Test Date-28/Dec/2010

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 = 56.6; ρ = 1000 kg/m^3
Phantom section: Left Section

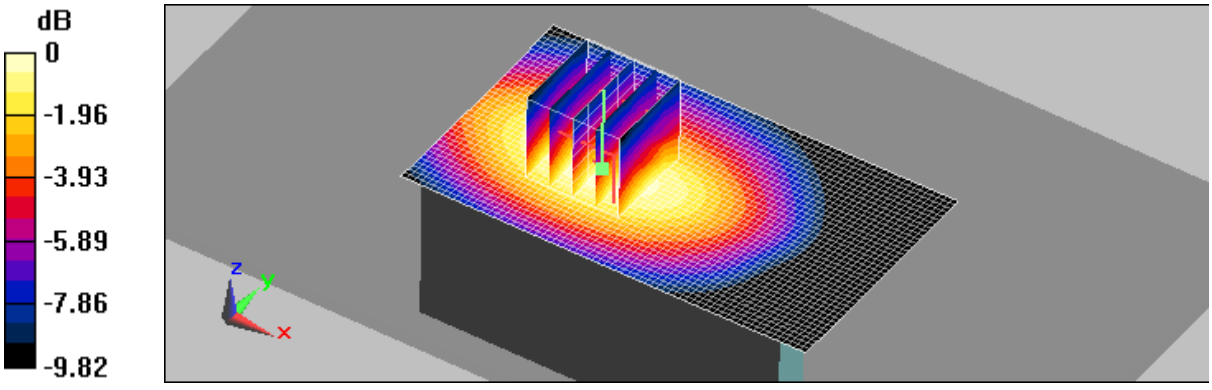
DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.57, 9.57, 9.57); Calibrated: 2010-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard, Side B, 2Tx/Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.202 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard, Side B, 2Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 12.7 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 0.288 W/kg
SAR(1 g) = 0.192 mW/g; SAR(10 g) = 0.130 mW/g
Maximum value of SAR (measured) = 0.203 mW/g



0 dB = 0.203mW/g

DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS850 Body (Job No. : FH-286)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard, Side C, 2Tx
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-21.9;Test Date-28/Dec/2010

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 = 56.6; ρ = 1000 kg/m^3
Phantom section: Left Section

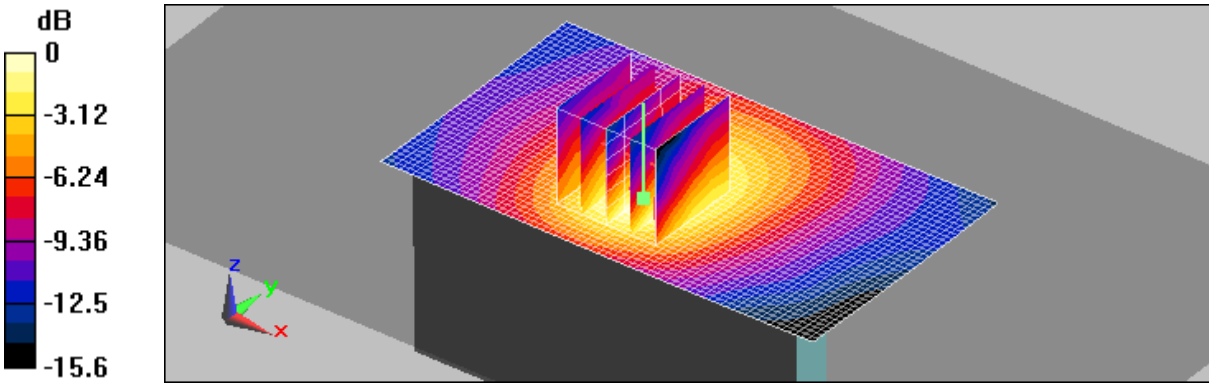
DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.57, 9.57, 9.57); Calibrated: 2010-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.190, Ant.Intenna, Bat.Standard, Side C, 2Tx/Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.057 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard, Side C, 2Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.1 V/m; Power Drift = -0.110 dB
Peak SAR (extrapolated) = 0.096 W/kg
SAR(1 g) = 0.054 mW/g; SAR(10 g) = 0.033 mW/g
Maximum value of SAR (measured) = 0.056 mW/g



0 dB = 0.056mW/g

DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS850 Body (Job No. : FH-286)
Procedure Name: Body, Ch.190, Ant.Intenna, Bat.Standard, Back, 2Tx
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-21.9;Test Date-28/Dec/2011

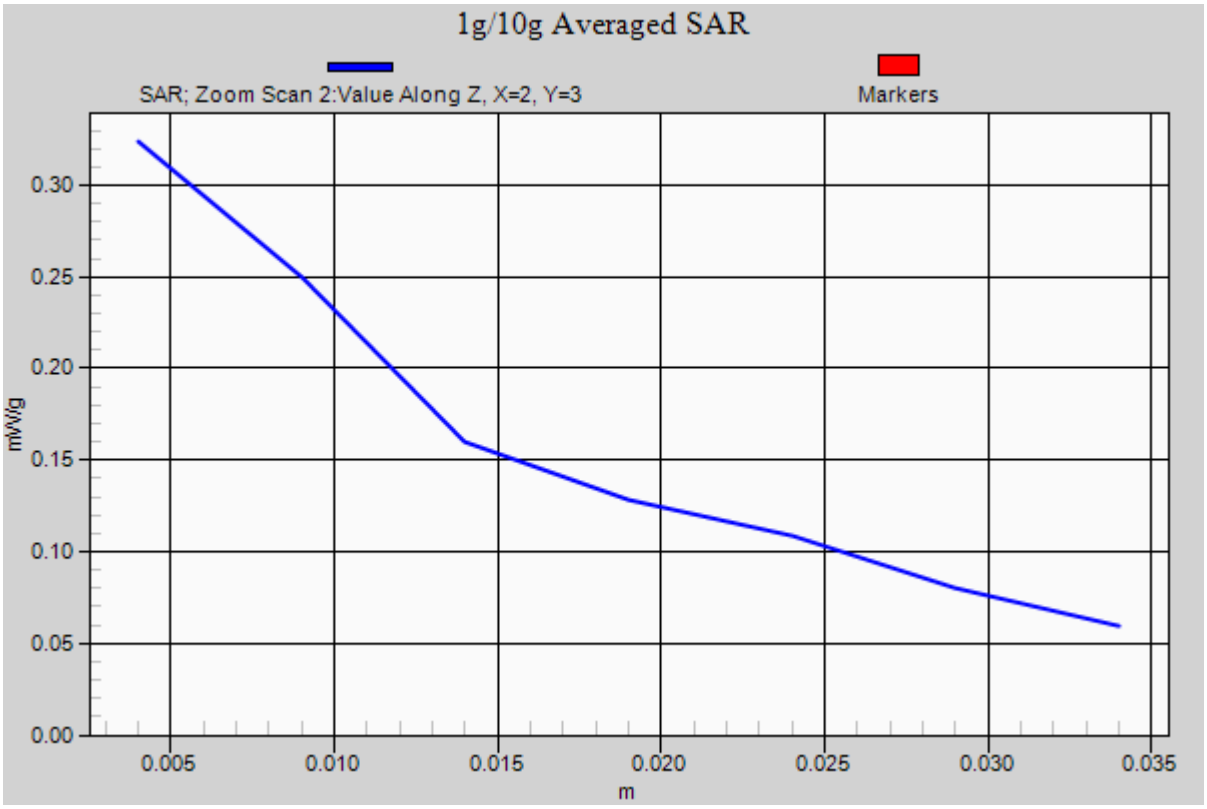
Communication System: GSM 850 (GPRS); Frequency: 836.6 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 836.6 MHz; σ = 0.99 mho/m; ε_r = 56.6; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(9.57, 9.57, 9.57); Calibrated: 2010-11-26
- 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.190, Ant.Intenna, Bat.Standard, Back, 2Tx/Area Scan (51x71x1):
Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.336 mW/g

Body, Ch.190, Ant.Intenna, Bat.Standard, Back, 2Tx/Zoom Scan 2 (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = 0.049 dB
Peak SAR (extrapolated) = 0.427 W/kg
SAR(1 g) = 0.306 mW/g; SAR(10 g) = 0.222 mW/g

Maximum value of SAR (measured) = 0.324 mW/g



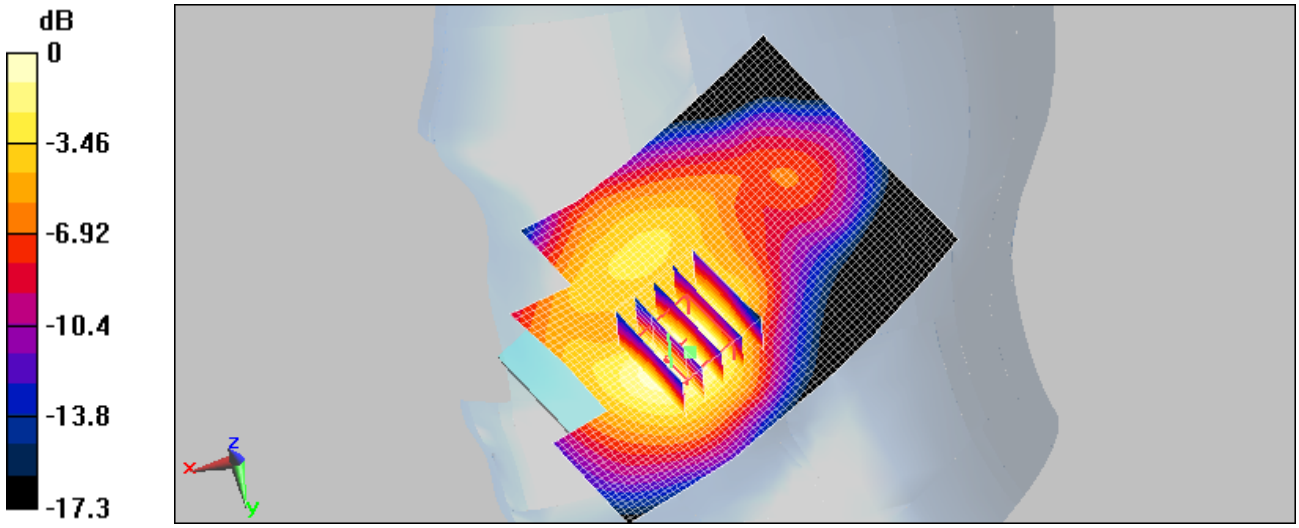
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GSM1900 Right (Job No. : FH-286)
Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.25, 8.25, 8.25); Calibrated: 2010-11-26
- 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.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.316 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 V/m; Power Drift = 0.158 dB
Peak SAR (extrapolated) = 0.495 W/kg
SAR(1 g) = 0.316 mW/g; SAR(10 g) = 0.186 mW/g
Maximum value of SAR (measured) = 0.331 mW/g



0 dB = 0.331mW/g

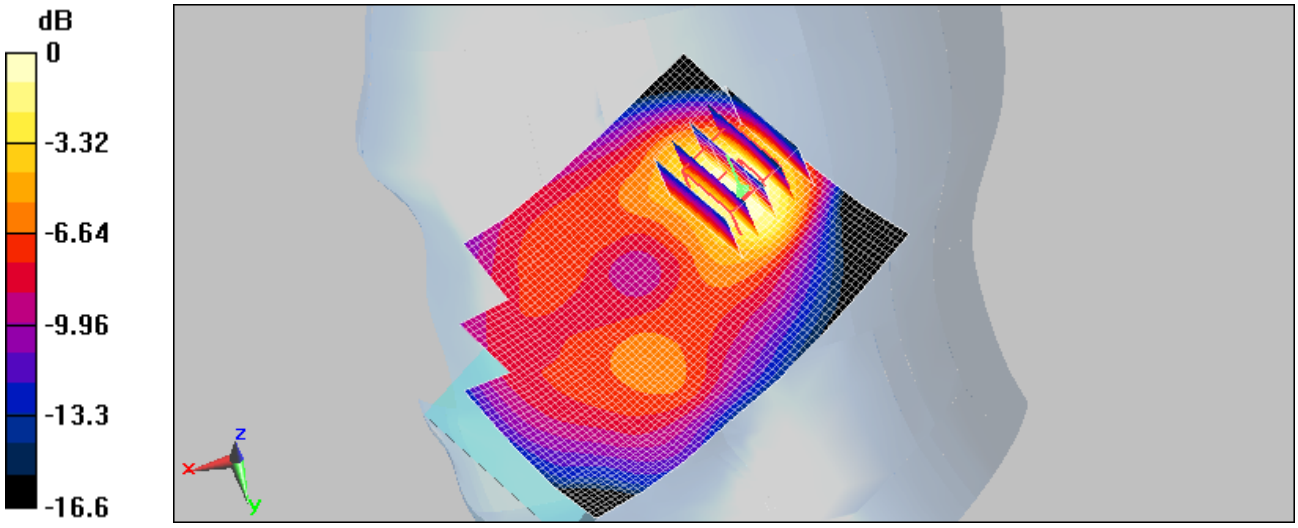
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GSM1900 Right (Job No. : FH-286)
Procedure Name: Tilt, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.25, 8.25, 8.25); Calibrated: 2010-11-26
- 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.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.155 mW/g

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = 0.061 dB
Peak SAR (extrapolated) = 0.234 W/kg
SAR(1 g) = 0.136 mW/g; SAR(10 g) = 0.076 mW/g
Maximum value of SAR (measured) = 0.150 mW/g



0 dB = 0.150mW/g

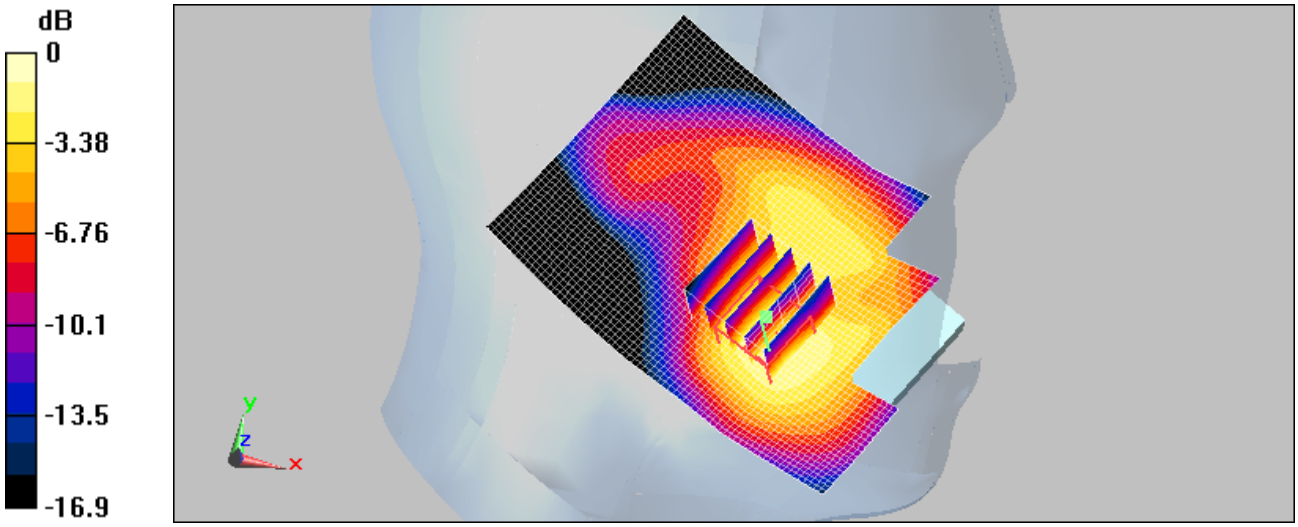
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GSM1900 Left (Job No. : FH-286)
Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.25, 8.25, 8.25); Calibrated: 2010-11-26
- 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.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.294 mW/g

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.6 V/m; Power Drift = 0.085 dB
Peak SAR (extrapolated) = 0.516 W/kg
SAR(1 g) = 0.314 mW/g; SAR(10 g) = 0.184 mW/g
Maximum value of SAR (measured) = 0.347 mW/g



0 dB = 0.347mW/g

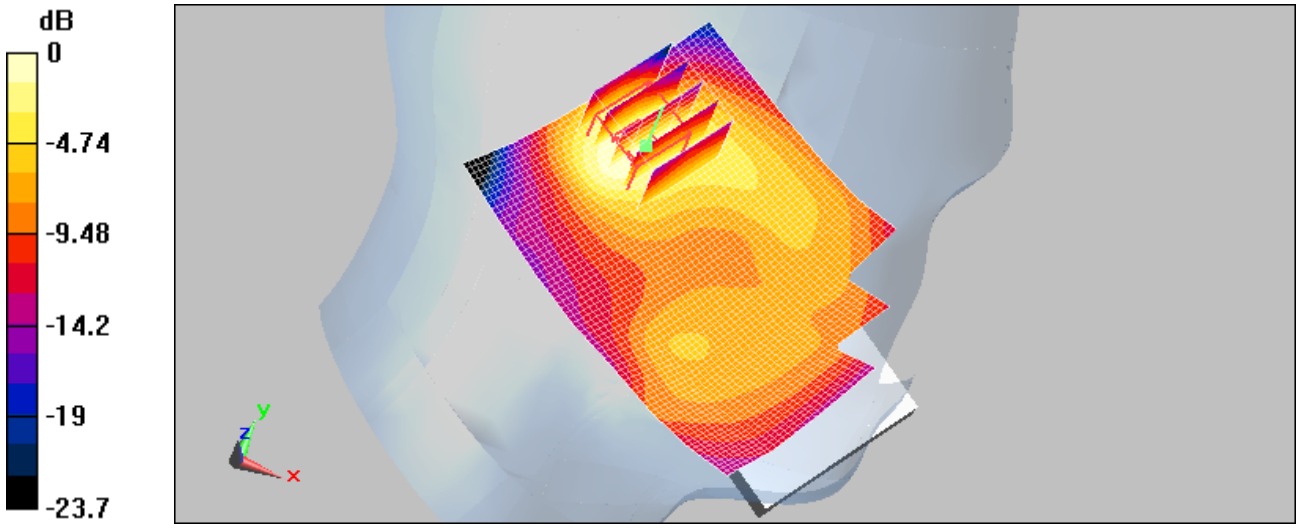
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GSM1900 Left (Job No.:FH-286)
Procedure Name: Tilt, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.25, 8.25, 8.25); Calibrated: 2010-11-26
- 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.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.132 mW/g

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.72 V/m; Power Drift = 0.087 dB
Peak SAR (extrapolated) = 0.197 W/kg
SAR(1 g) = 0.117 mW/g; SAR(10 g) = 0.066 mW/g
Maximum value of SAR (measured) = 0.125 mW/g



0 dB = 0.125mW/g

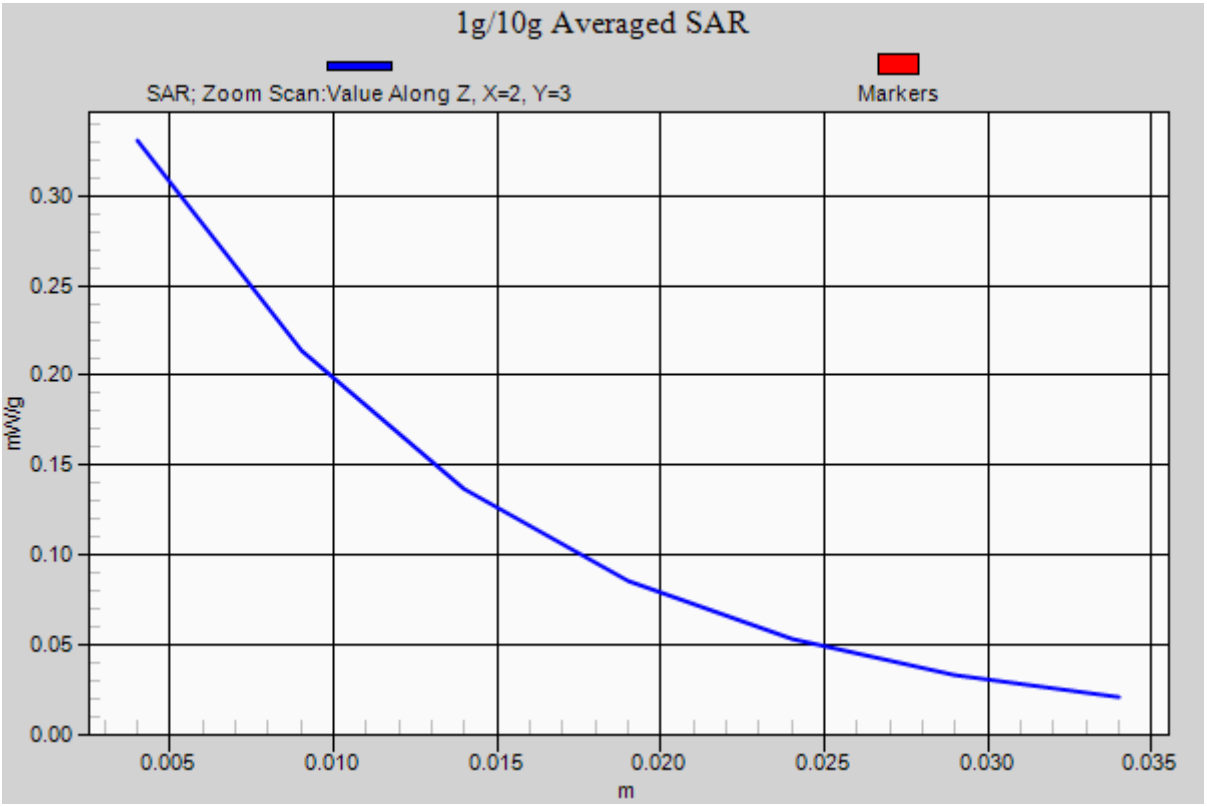
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GSM1900 Right (Job No. : FH-286)
Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.0;Test Date-28/Dec/2010

Communication System: GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.4 mho/m; ε_r = 40; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.25, 8.25, 8.25); Calibrated: 2010-11-26
- 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.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.316 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 V/m; Power Drift = 0.158 dB
Peak SAR (extrapolated) = 0.495 W/kg
SAR(1 g) = 0.316 mW/g; SAR(10 g) = 0.186 mW/g
Maximum value of SAR (measured) = 0.331 mW/g



DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS1900 Body (Job No. : FH-286)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard, Back, 2Tx
Meas. Ambient Temp(celsius)-22.9;Tissue Temp(celsius)-22.2;Test Date-28/Dec/2010

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Center Section

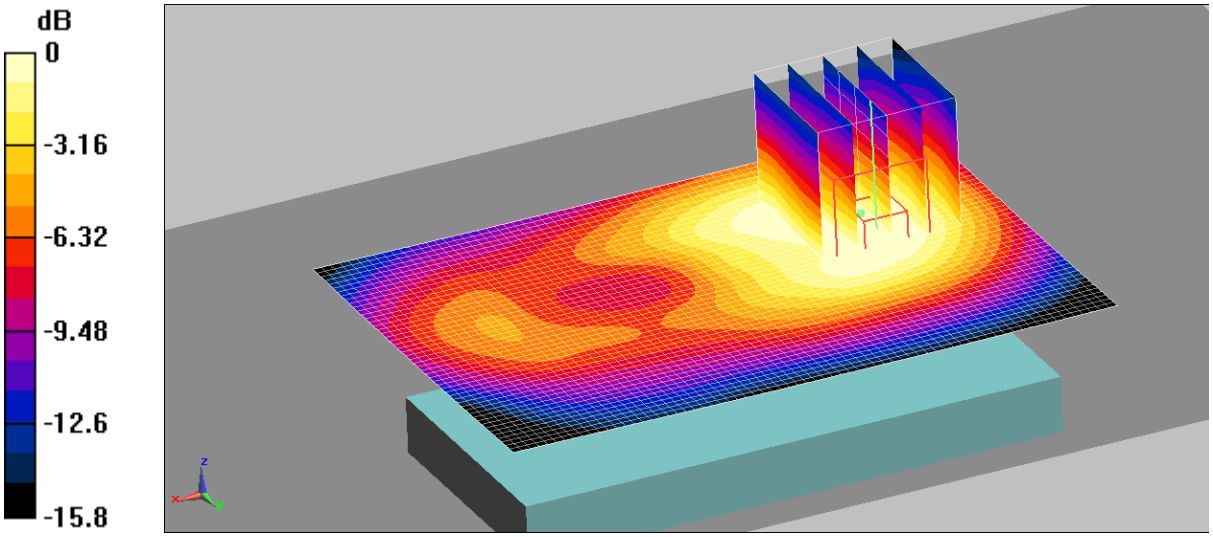
DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8, 8, 8); Calibrated: 2010-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.661, Ant.Intenna, Bat.Standard, Back, 2Tx/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.803 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard, Back, 2Tx/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.7 V/m; Power Drift = -0.127 dB
Peak SAR (extrapolated) = 1.2 W/kg
SAR(1 g) = 0.628 mW/g; SAR(10 g) = 0.395 mW/g
Maximum value of SAR (measured) = 0.698 mW/g



0 dB = 0.698mW/g

DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS1900 Body (Job No. : FH-286)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Front
Meas. Ambient Temp(celsius)-22.9;Tissue Temp(celsius)-22.2;Test Date-28/Dec/2010

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8, 8, 8); Calibrated: 2010-11-26
- 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

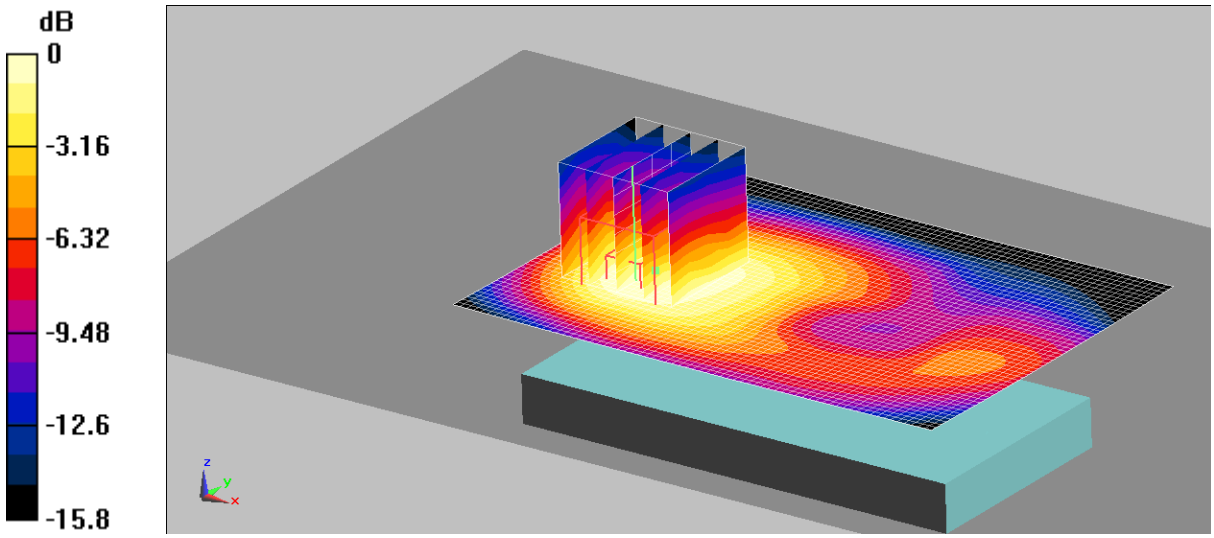
Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Front/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.806 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.8 V/m; Power Drift = -0.163 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.622 mW/g; SAR(10 g) = 0.377 mW/g

Maximum value of SAR (measured) = 0.670 mW/g



DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS1900 Body (Job No. : FH-286)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Side A
Meas. Ambient Temp(celsius)-22.9;Tissue Temp(celsius)-22.2;Test Date-28/Dec/2010

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8, 8, 8); Calibrated: 2010-11-26
- 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

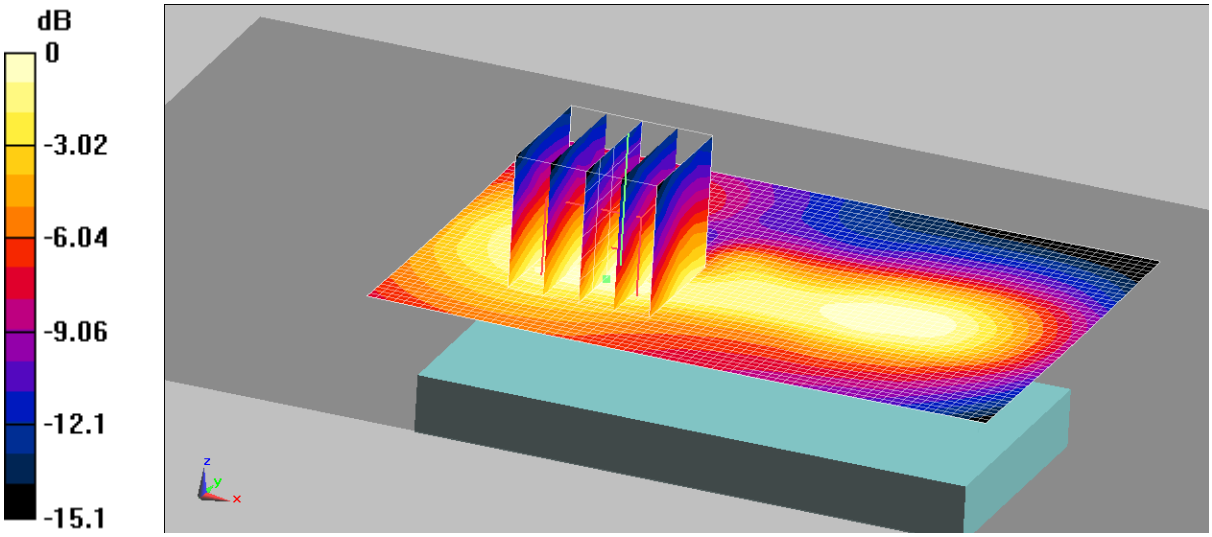
Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Side A/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.223 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Side A/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.07 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 0.304 W/kg
SAR(1 g) = 0.185 mW/g; SAR(10 g) = 0.111 mW/g

Maximum value of SAR (measured) = 0.201 mW/g



DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS1900 Body (Job No. : FH-286)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Side B
Meas. Ambient Temp(celsius)-22.9;Tissue Temp(celsius)-22.2;Test Date-28/Dec/2010

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Center Section

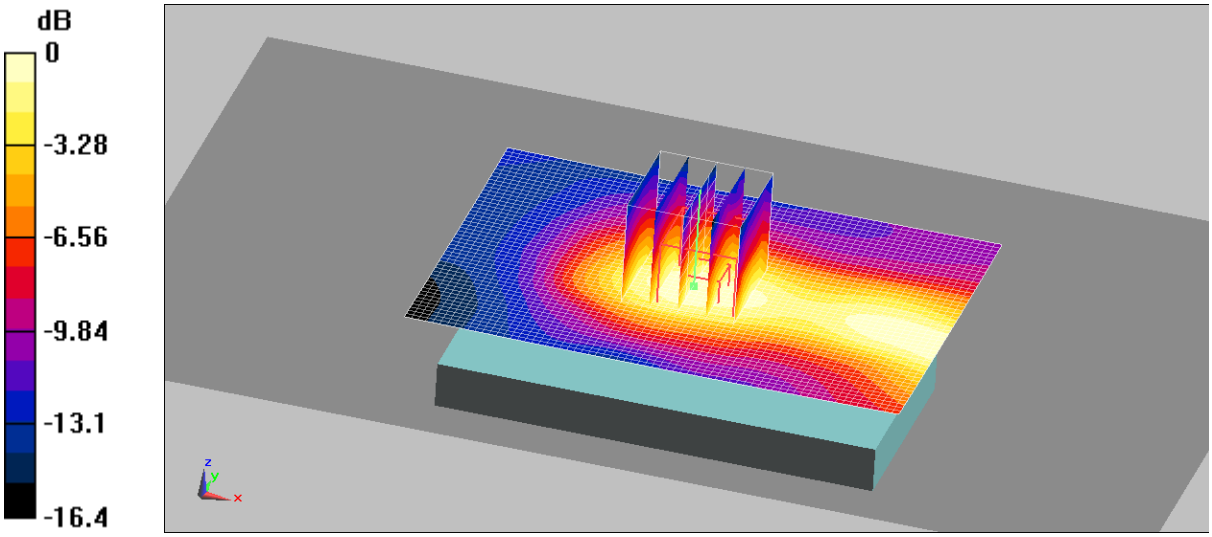
DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8, 8, 8); Calibrated: 2010-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Side B/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (interpolated) = 0.138 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Side B/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 9.33 V/m; Power Drift = 0.049 dB
Peak SAR (extrapolated) = 0.194 W/kg
SAR(1 g) = 0.119 mW/g; SAR(10 g) = 0.070 mW/g
Maximum value of SAR (measured) = 0.130 mW/g



0 dB = 0.130mW/g

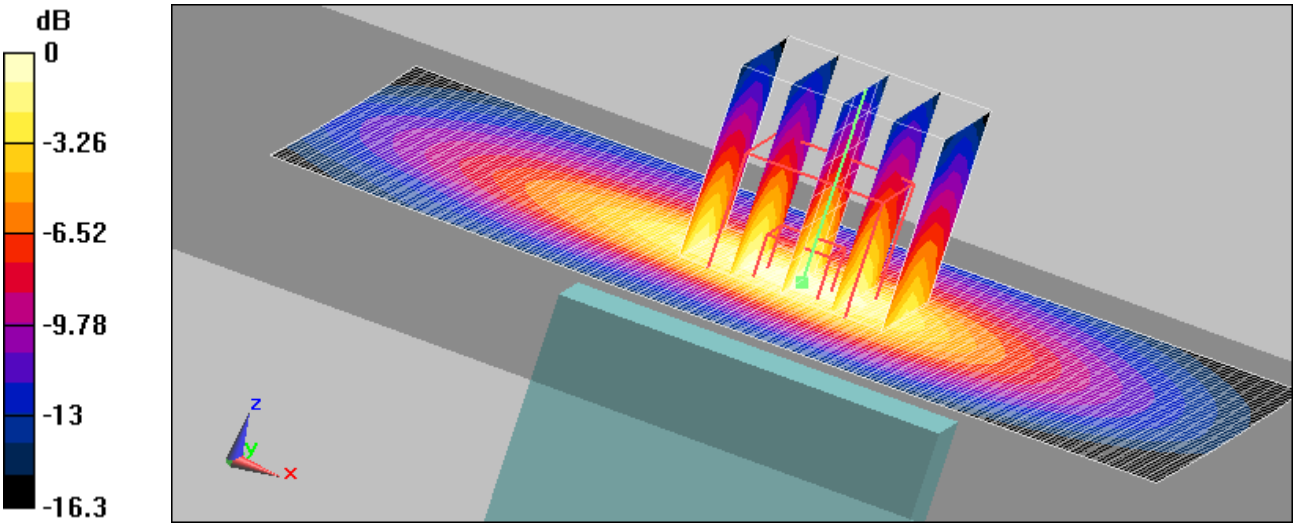
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS1900 Body (Job No. : FH-286)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Side C
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-21.9;Test Date-28/Dec/2010

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8, 8, 8); Calibrated: 2010-11-26
- 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.661, Ant.Intenna, Bat.Standard 2Tx Side C/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.728 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Side C/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23 V/m; Power Drift = 0.043 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.723 mW/g; SAR(10 g) = 0.409 mW/g
Maximum value of SAR (measured) = 0.773 mW/g



0 dB = 0.773mW/g

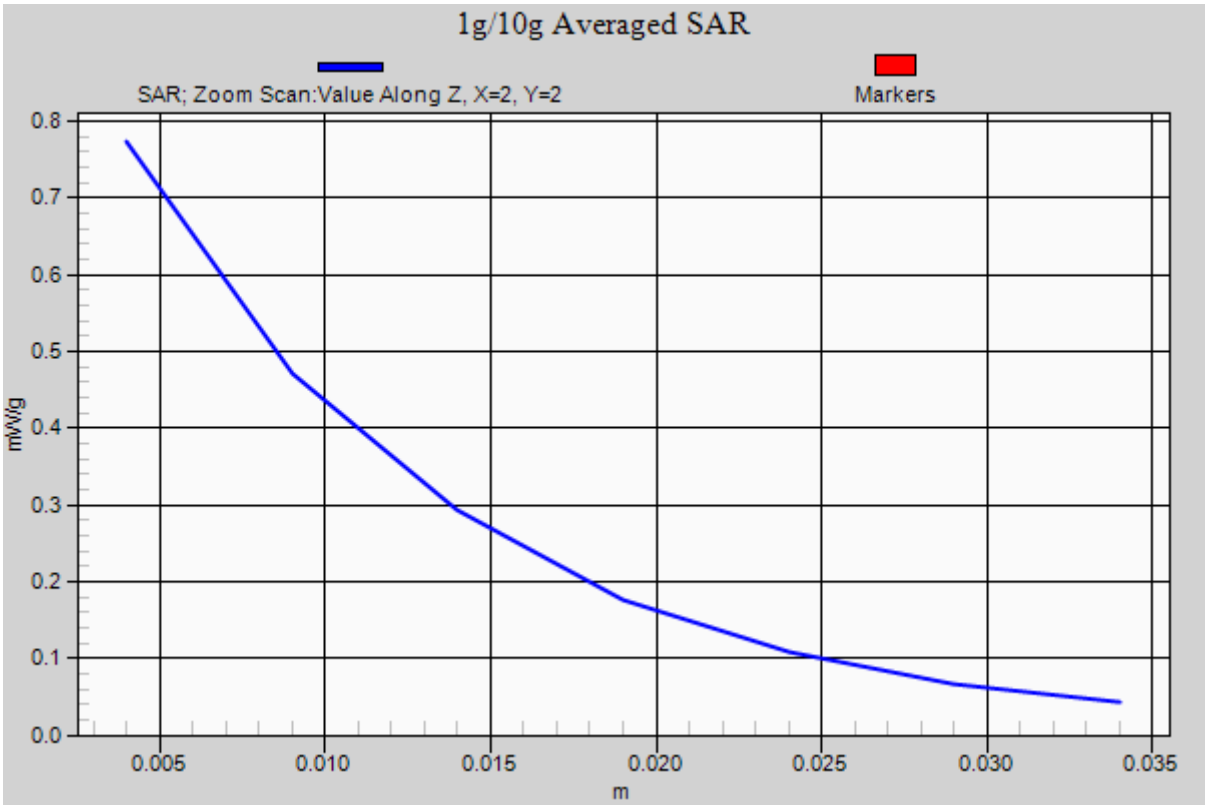
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 GPRS1900 Body (Job No. : FH-286)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Side C
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-21.9;Test Date-28/Dec/2010

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.48 mho/m; ε_r = 51.8; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8, 8, 8); Calibrated: 2010-11-26
- 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.661, Ant.Intenna, Bat.Standard 2Tx Side C/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.728 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard 2Tx Side C/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23 V/m; Power Drift = 0.043 dB
Peak SAR (extrapolated) = 1.24 W/kg
SAR(1 g) = 0.723 mW/g; SAR(10 g) = 0.409 mW/g
Maximum value of SAR (measured) = 0.773 mW/g



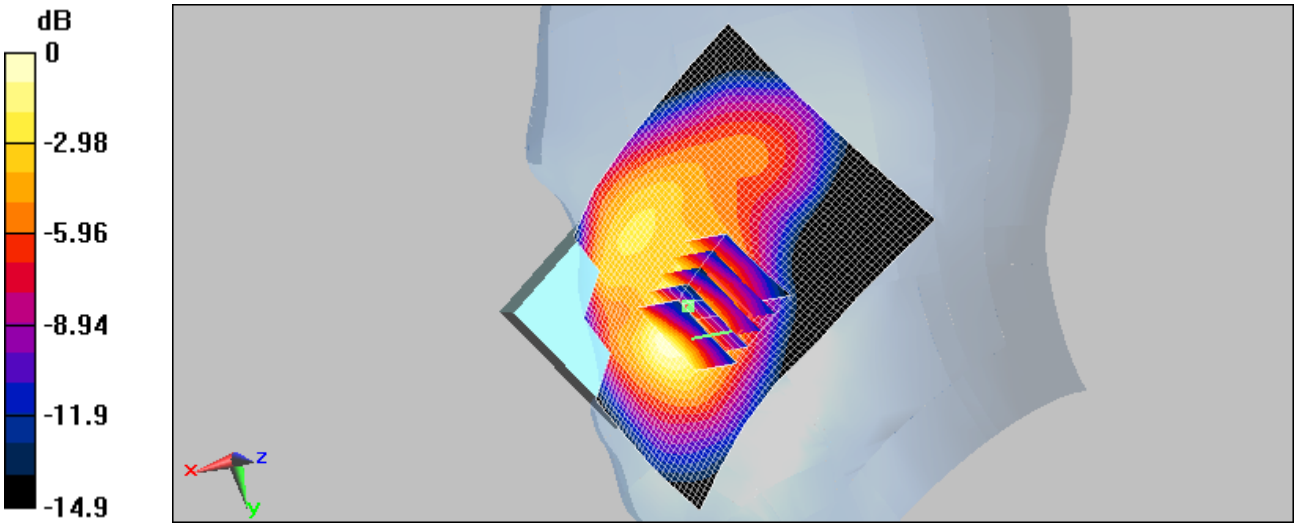
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Right(Job No. : FH-286)
Procedure Name: Cheek , Ch.1412, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.38 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.66, 8.66, 8.66); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.682 mW/g

Cheek , Ch.1412, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.2 V/m; Power Drift = 0.059 dB
Peak SAR (extrapolated) = 1.01 W/kg
SAR(1 g) = 0.668 mW/g; SAR(10 g) = 0.409 mW/g
Maximum value of SAR (measured) = 0.689 mW/g



0 dB = 0.689mW/g

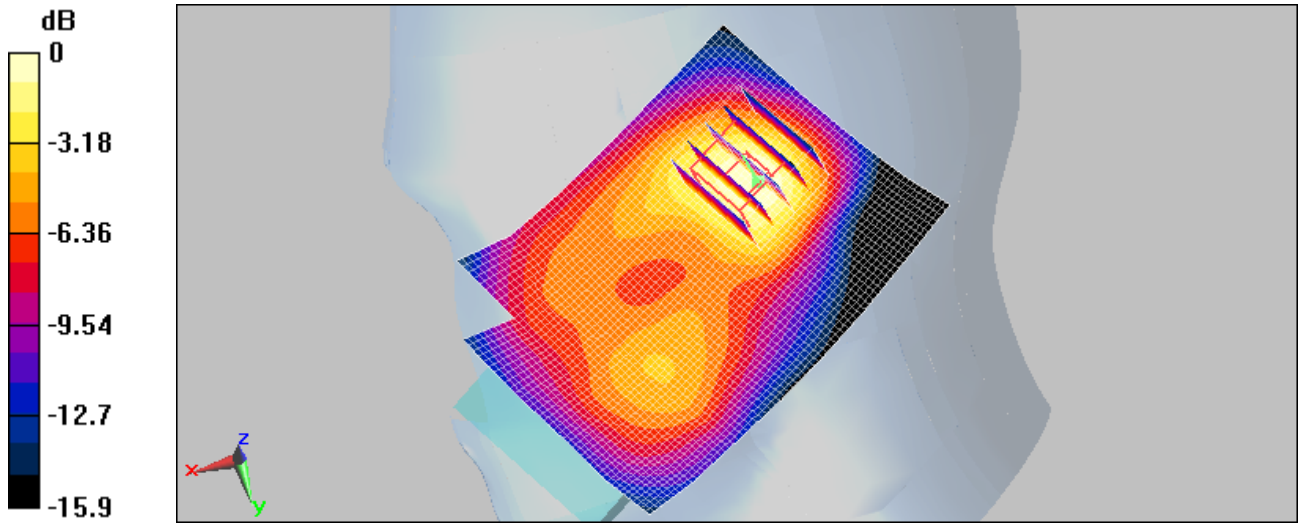
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Right(Job No. : FH-286)
Procedure Name: Tilt, Ch.1412, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.38 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.66, 8.66, 8.66); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.283 mW/g

Tilt, Ch.1412, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.4 V/m; Power Drift = 0.053 dB
Peak SAR (extrapolated) = 0.422 W/kg
SAR(1 g) = 0.265 mW/g; SAR(10 g) = 0.156 mW/g
Maximum value of SAR (measured) = 0.290 mW/g



0 dB = 0.290mW/g

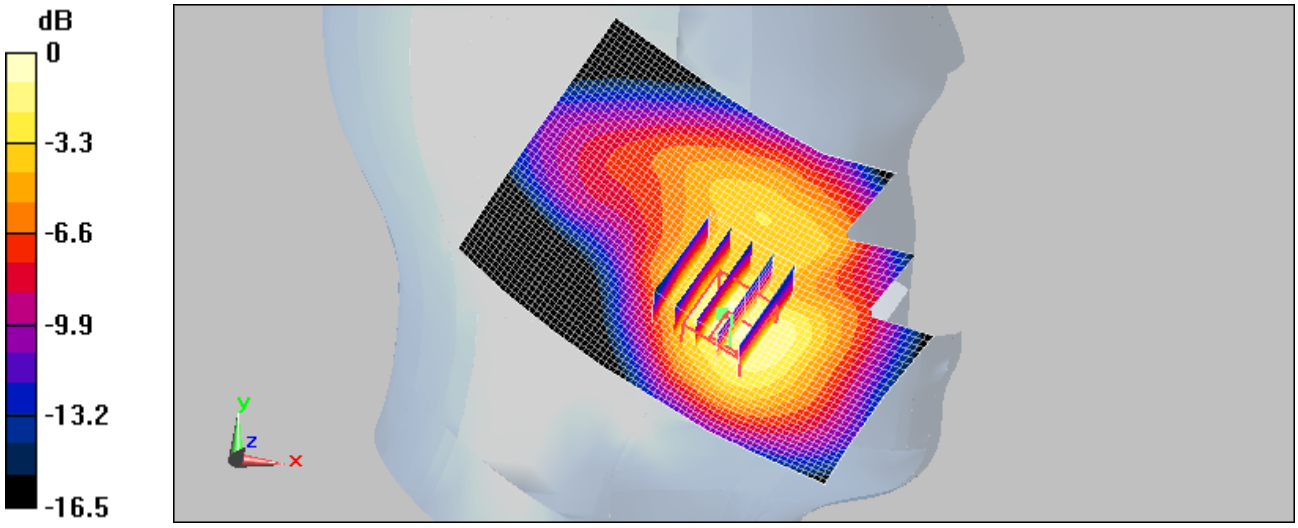
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Left (Job No. : FH-286)
Procedure Name: Cheek , Ch.1412, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.38 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.66, 8.66, 8.66); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.764 mW/g

Cheek , Ch.1412, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = 0.028 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.829 mW/g; SAR(10 g) = 0.475 mW/g
Maximum value of SAR (measured) = 0.883 mW/g



0 dB = 0.883mW/g

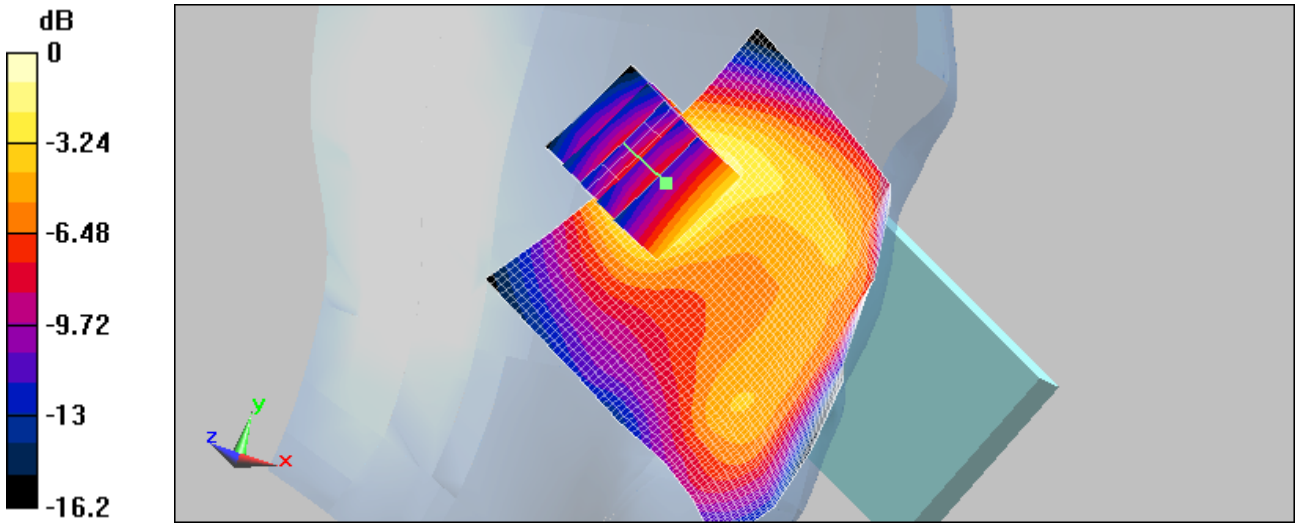
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Left (Job No. : FH-286)
Procedure Name: Tilt, Ch.1412, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.38 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.66, 8.66, 8.66); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.198 mW/g

Tilt, Ch.1412, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.1 V/m; Power Drift = 0.060 dB
Peak SAR (extrapolated) = 0.344 W/kg
SAR(1 g) = 0.214 mW/g; SAR(10 g) = 0.126 mW/g
Maximum value of SAR (measured) = 0.236 mW/g



0 dB = 0.236mW/g

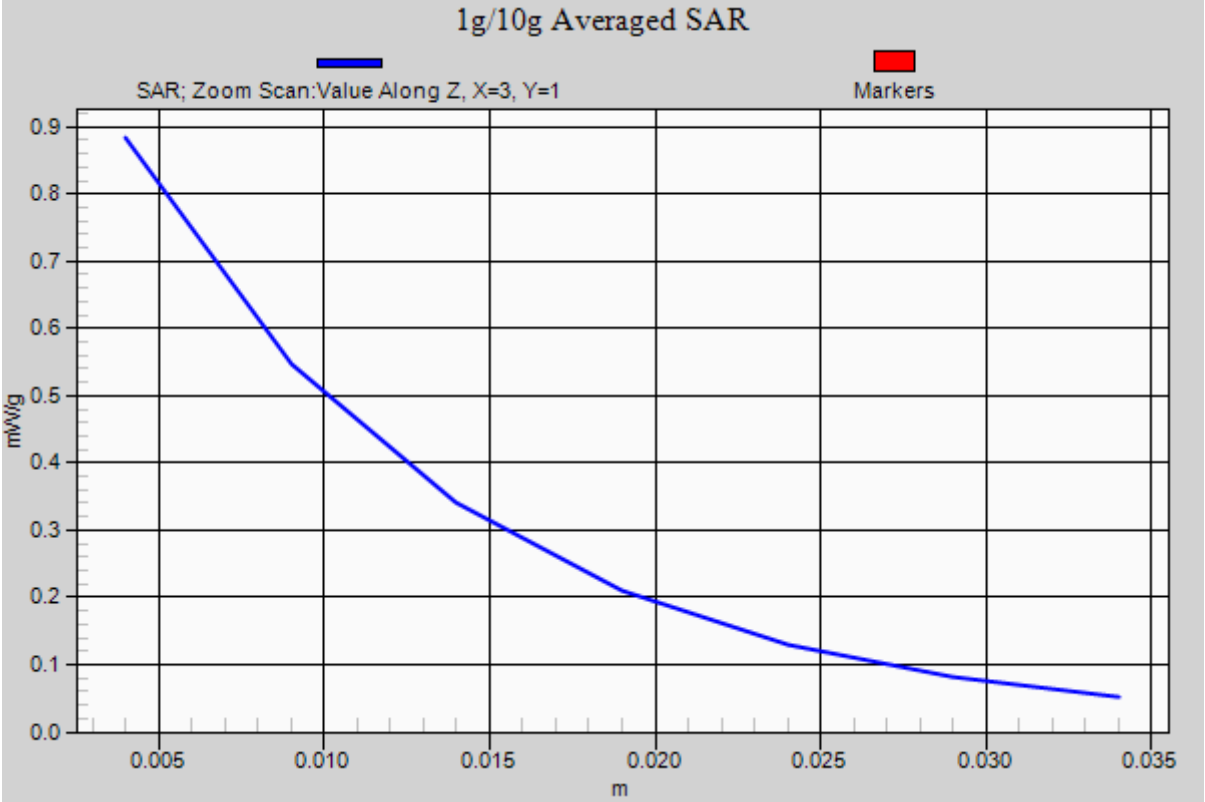
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Left (Job No. : FH-286)
Procedure Name: Cheek , Ch.1412, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.38 mho/m; ε_r = 39.4; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.66, 8.66, 8.66); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.764 mW/g

Cheek , Ch.1412, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.8 V/m; Power Drift = 0.028 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.829 mW/g; SAR(10 g) = 0.475 mW/g
Maximum value of SAR (measured) = 0.883 mW/g



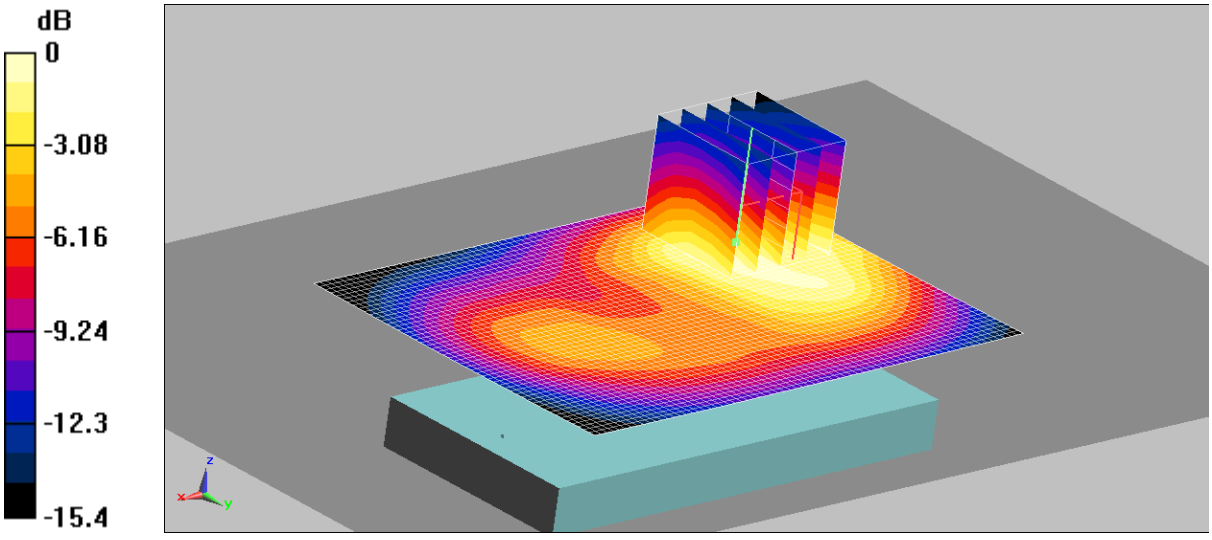
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Body (Job No. : FH-286)
Procedure Name: Body, Ch.1412, Ant.Intenna, Bat.Standard, Back
Meas. Ambient Temp(celsius)-22.9;Tissue Temp(celsius)-22.2;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.44 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.12, 8.12, 8.12); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard, Back/Area Scan (51x71x1):
Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.688 mW/g

Body, Ch.1412, Ant.Intenna, Bat.Standard, Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10 V/m; Power Drift = -0.043 dB
Peak SAR (extrapolated) = 1.04 W/kg
SAR(1 g) = 0.616 mW/g; SAR(10 g) = 0.361 mW/g
Maximum value of SAR (measured) = 0.665 mW/g



0 dB = 0.665mW/g

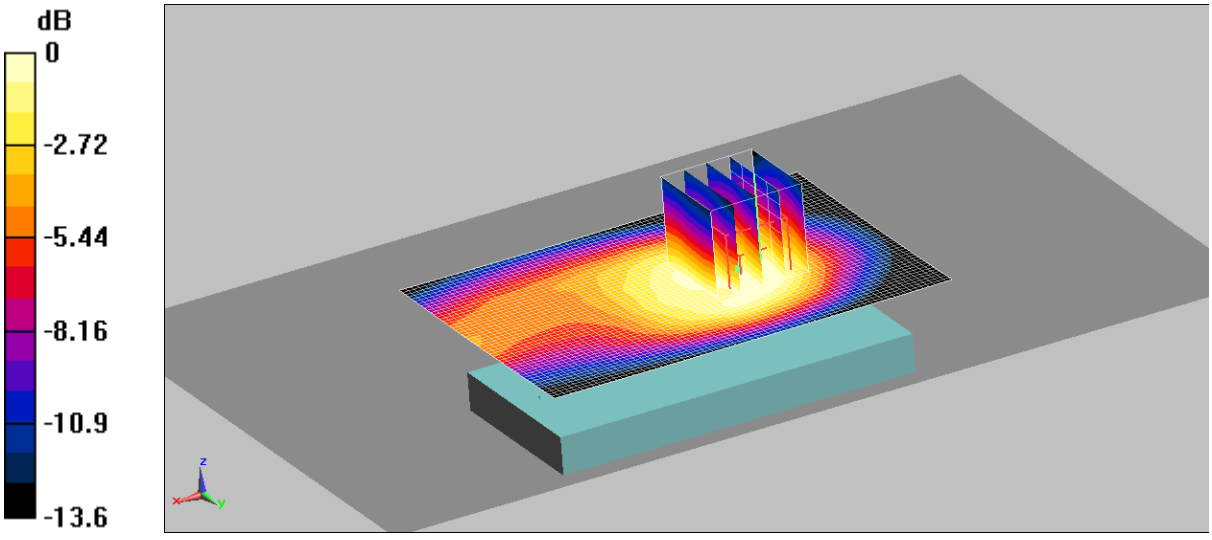
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Body (Job No. : FH-286)
Procedure Name: Body, Ch.1412, Ant.Intenna, Bat.Standard, Front
Meas. Ambient Temp(celsius)-22.9;Tissue Temp(celsius)-22.2;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.44 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.12, 8.12, 8.12); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard, Front/Area Scan (51x71x1):
Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.621 mW/g

Body, Ch.1412, Ant.Intenna, Bat.Standard, Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.4 V/m; Power Drift = -0.075 dB
Peak SAR (extrapolated) = 0.747 W/kg
SAR(1 g) = 0.485 mW/g; SAR(10 g) = 0.300 mW/g
Maximum value of SAR (measured) = 0.516 mW/g



0 dB = 0.516mW/g

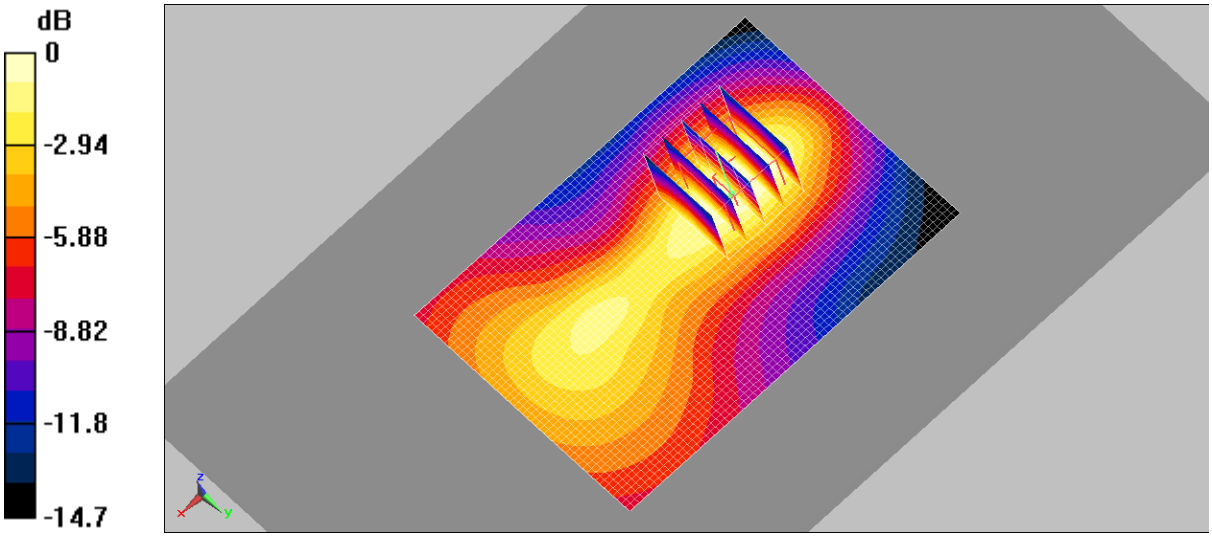
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Body (Job No. : FH-286)
Procedure Name: Body, Ch.1412, Ant.Intenna, Bat.Standard, Side A
Meas. Ambient Temp(celsius)-22.9;Tissue Temp(celsius)-22.2;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.44 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.12, 8.12, 8.12); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard, Side A/Area Scan (51x71x1):
Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.221 mW/g

Body, Ch.1412, Ant.Intenna, Bat.Standard, Side A/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.21 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.319 W/kg
SAR(1 g) = 0.197 mW/g; SAR(10 g) = 0.119 mW/g
Maximum value of SAR (measured) = 0.213 mW/g



0 dB = 0.213mW/g

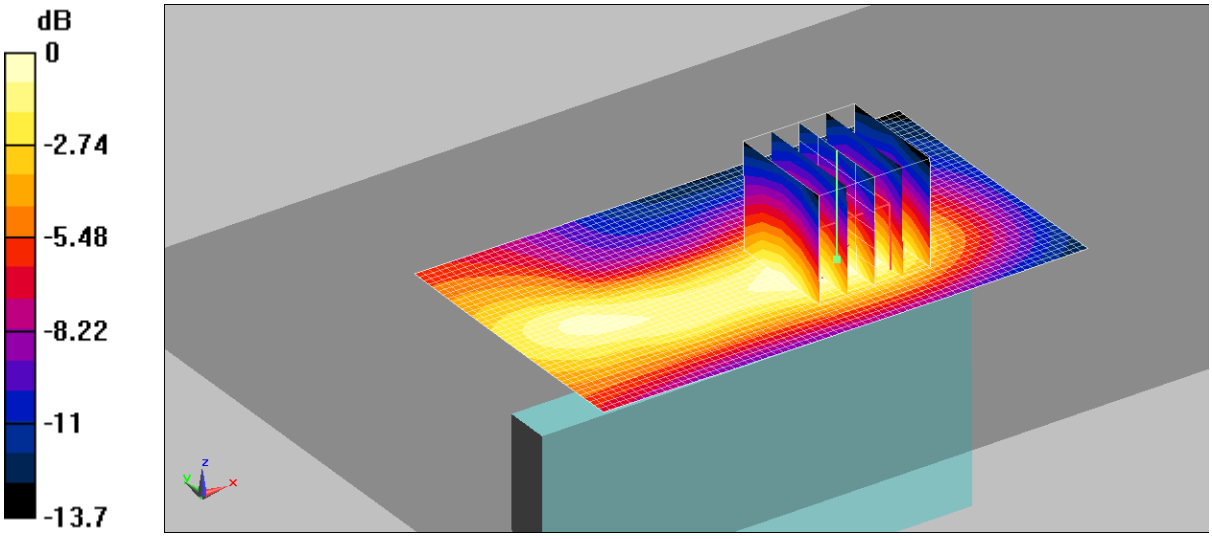
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Body (Job No. : FH-286)
Procedure Name: Body, Ch.1412, Ant.Intenna, Bat.Standard, Side B
Meas. Ambient Temp(celsius)-22.9;Tissue Temp(celsius)-22.2;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.44 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.12, 8.12, 8.12); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard, Side B/Area Scan (71x41x1):
Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.246 mW/g

Body, Ch.1412, Ant.Intenna, Bat.Standard, Side B/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.9 V/m; Power Drift = 0.066 dB
Peak SAR (extrapolated) = 0.342 W/kg
SAR(1 g) = 0.217 mW/g; SAR(10 g) = 0.132 mW/g
Maximum value of SAR (measured) = 0.235 mW/g



0 dB = 0.235mW/g

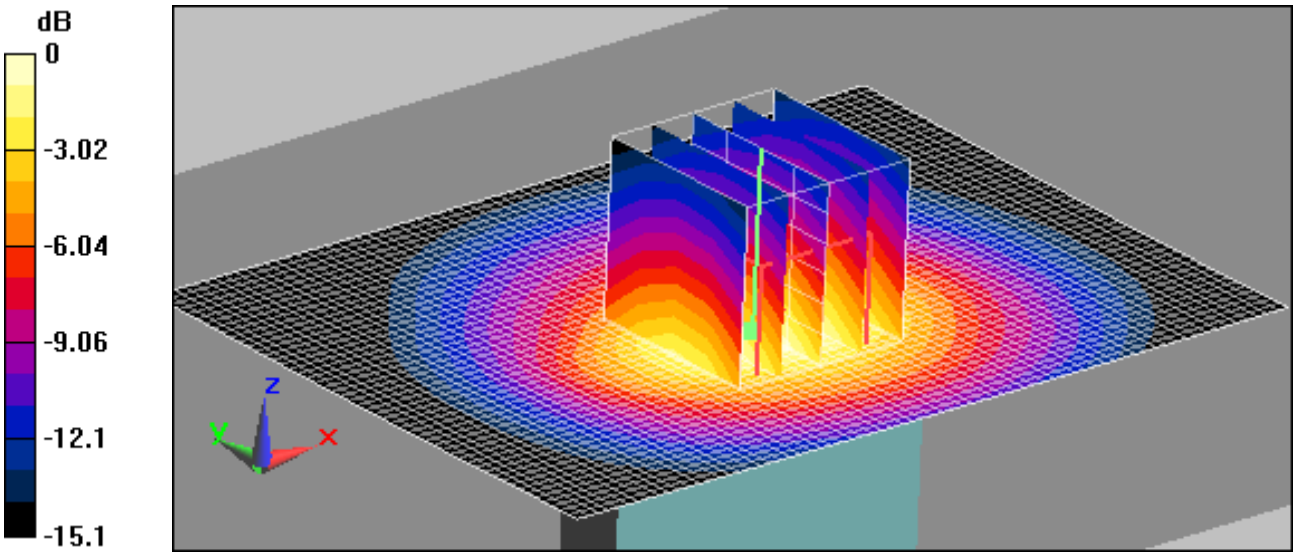
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Body (Job No. : FH-286)
Procedure Name: Body, Ch.1412, Ant.Intenna, Bat.Standard, Side C
Meas. Ambient Temp(celsius)-22.9,Tissue Temp(celsius)-22.2;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.44 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.12, 8.12, 8.12); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard, Side C/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.805 mW/g

Body, Ch.1412, Ant.Intenna, Bat.Standard, Side C/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19 V/m; Power Drift = 0.110 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.721 mW/g; SAR(10 g) = 0.428 mW/g
Maximum value of SAR (measured) = 0.783 mW/g



0 dB = 0.783mW/g

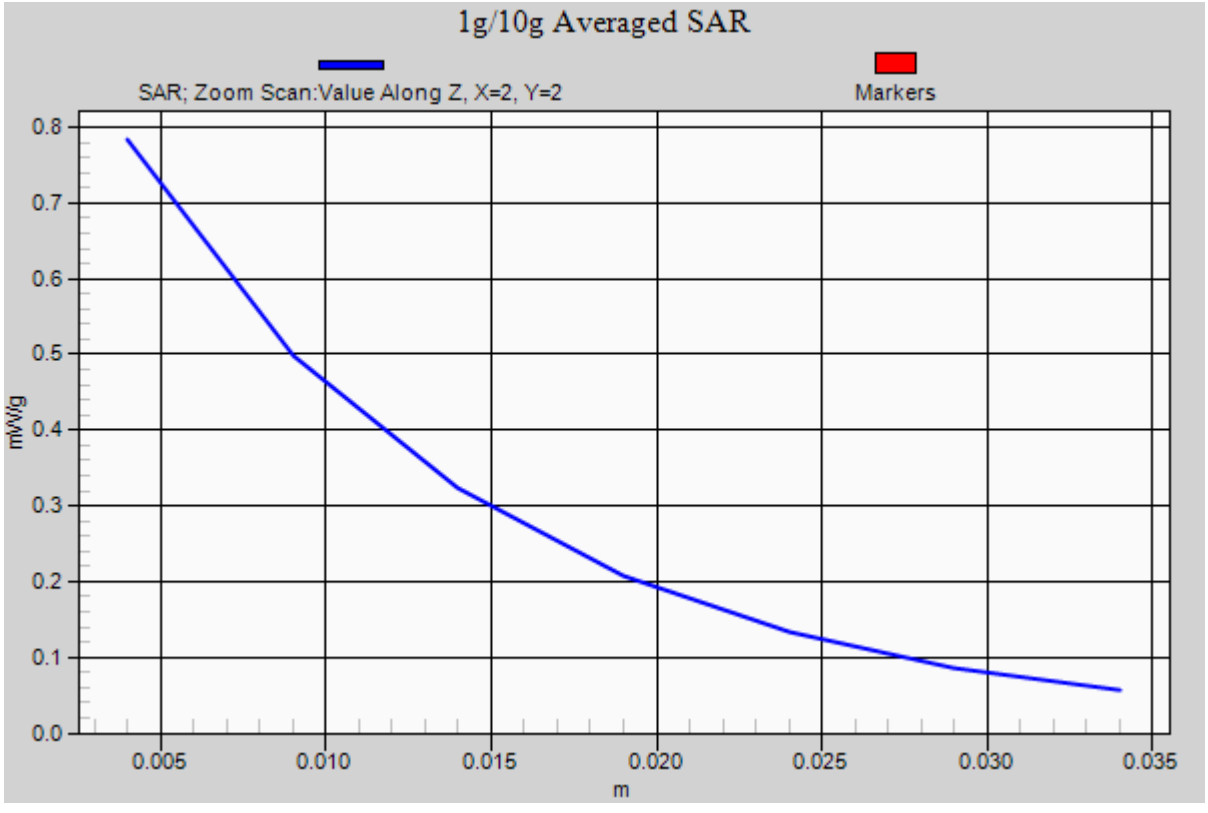
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WCDMA1700 Body (Job No. : FH-286)
Procedure Name: Body, Ch.1412, Ant.Intenna, Bat.Standard, Side C
Meas. Ambient Temp(celsius)-22.9;Tissue Temp(celsius)-22.2;Test Date-29/Dec/2010

Communication System: WCDMA1700; Frequency: 1732.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732.4 MHz; σ = 1.44 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(8.12, 8.12, 8.12); Calibrated: 2010-11-26
- 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.1412, Ant.Intenna, Bat.Standard, Side C/Area Scan (51x71x1):
Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.805 mW/g

Body, Ch.1412, Ant.Intenna, Bat.Standard, Side C/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19 V/m; Power Drift = 0.110 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.721 mW/g; SAR(10 g) = 0.428 mW/g
Maximum value of SAR (measured) = 0.783 mW/g

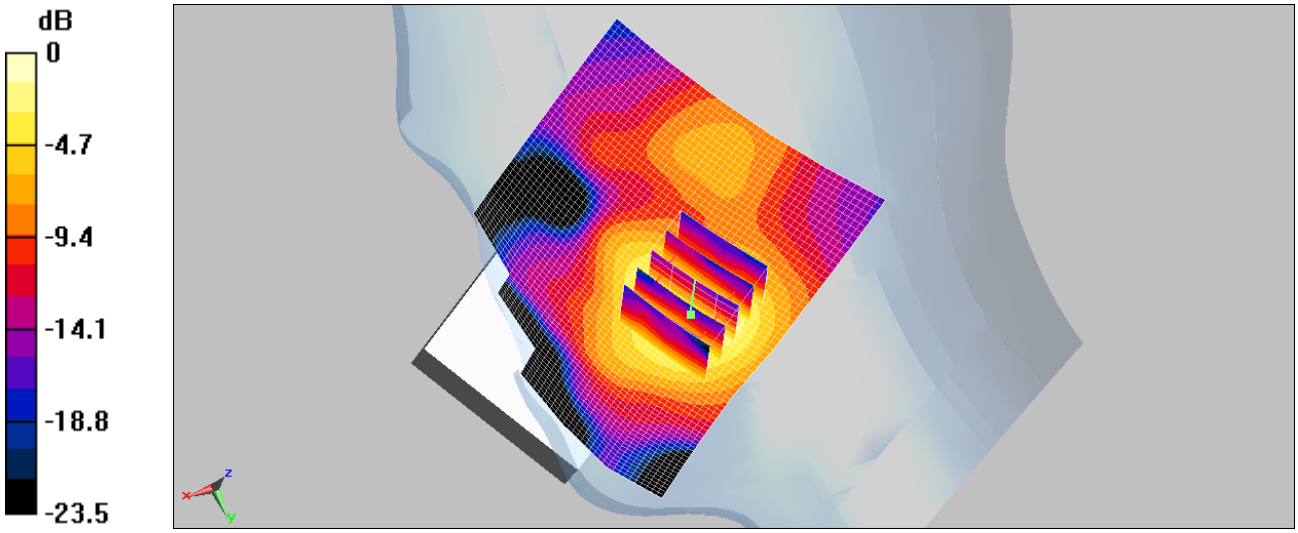


DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WLAN Right(Job No. : FH-286)
Procedure Name: Cheek , Ch.6, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.8 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.59, 7.59, 7.59); Calibrated: 2010-11-26
- 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.6, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.136 mW/g
Cheek , Ch.6, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.69 V/m; Power Drift = 0.076 dB
Peak SAR (extrapolated) = 0.265 W/kg
SAR(1 g) = 0.133 mW/g; SAR(10 g) = 0.067 mW/g
Maximum value of SAR (measured) = 0.150 mW/g



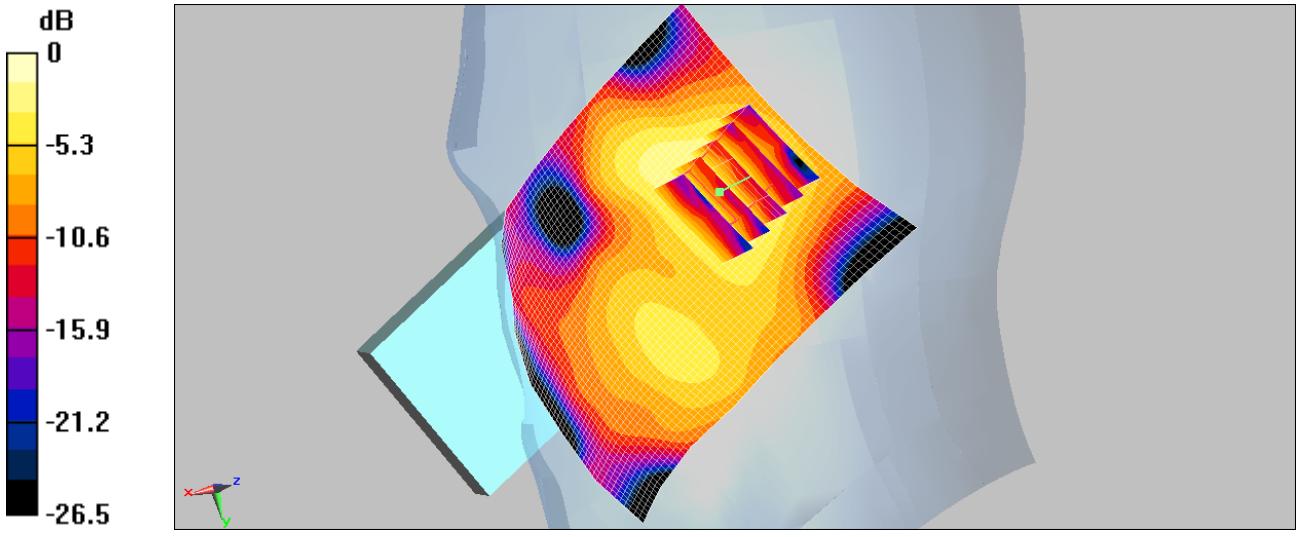
0 dB = 0.150mW/g

DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WLAN Right(Job No. : FH-286)
Procedure Name: Tilt, Ch.6, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.8 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.59, 7.59, 7.59); Calibrated: 2010-11-26
- 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.6, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.062 mW/g
Tilt, Ch.6, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.5 V/m; Power Drift = 0.158 dB
Peak SAR (extrapolated) = 0.133 W/kg
SAR(1 g) = 0.071 mW/g; SAR(10 g) = 0.037 mW/g
Maximum value of SAR (measured) = 0.077 mW/g



0 dB = 0.077mW/g

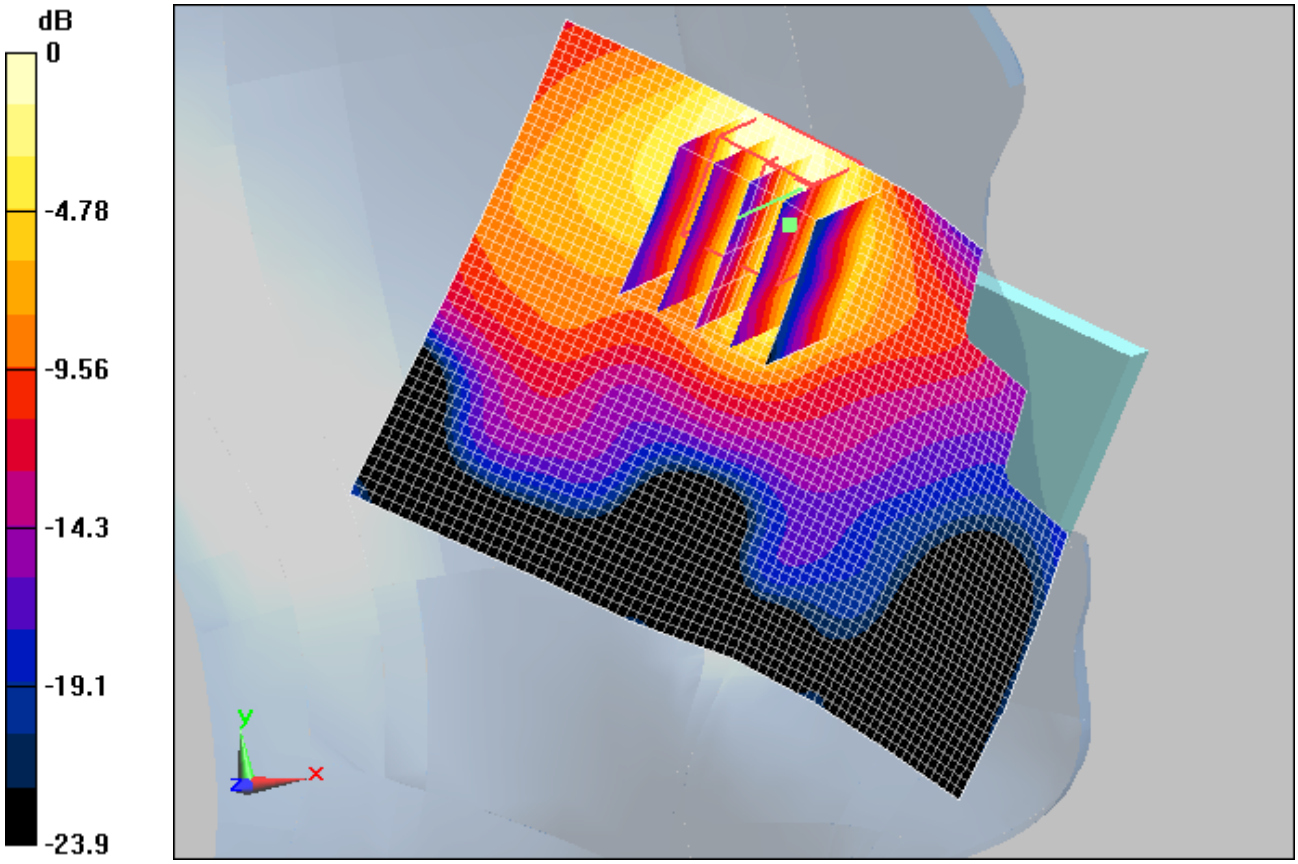
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WLAN Left (Job No. : FH-286)
Procedure Name: Cheek , Ch.6, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.8 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.59, 7.59, 7.59); Calibrated: 2010-11-26
- 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.6, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.178 mW/g
Cheek , Ch.6, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.31 V/m; Power Drift = 0.156 dB
Peak SAR (extrapolated) = 0.368 W/kg
SAR(1 g) = 0.178 mW/g; SAR(10 g) = 0.093 mW/g

Maximum value of SAR (measured) = 0.195 mW/g



0 dB = 0.195mW/g

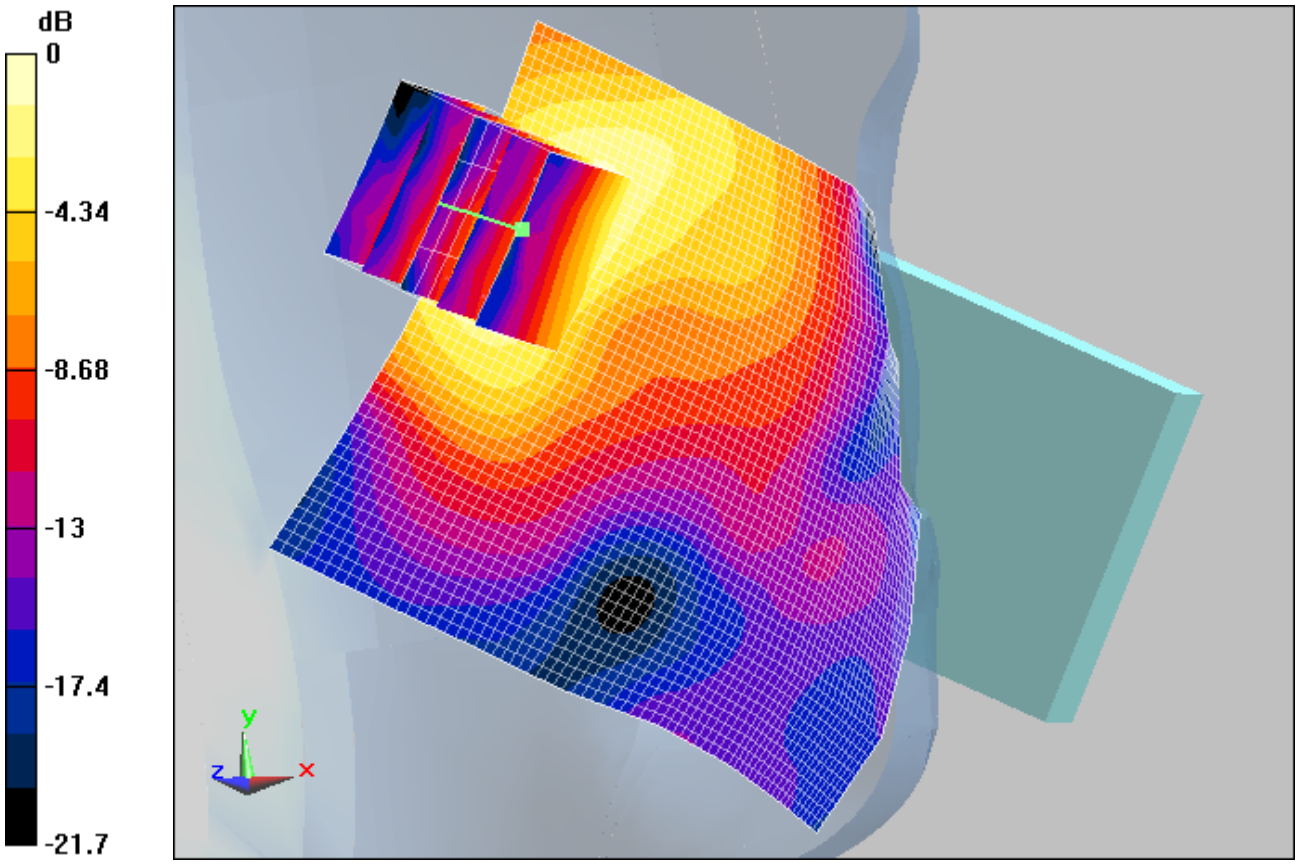
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WLAN Left (Job No. : FH-286)
Procedure Name: Tilt, Ch.6, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.8 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.59, 7.59, 7.59); Calibrated: 2010-11-26
- 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.6, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.110 mW/g

Tilt, Ch.6, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.88 V/m; Power Drift = 0.062 dB
Peak SAR (extrapolated) = 0.199 W/kg
SAR(1 g) = 0.110 mW/g; SAR(10 g) = 0.060 mW/g
Maximum value of SAR (measured) = 0.122 mW/g



0 dB = 0.122mW/g

DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WLAN Left (Job No. : FH-286)
Procedure Name: Cheek , Ch.6, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

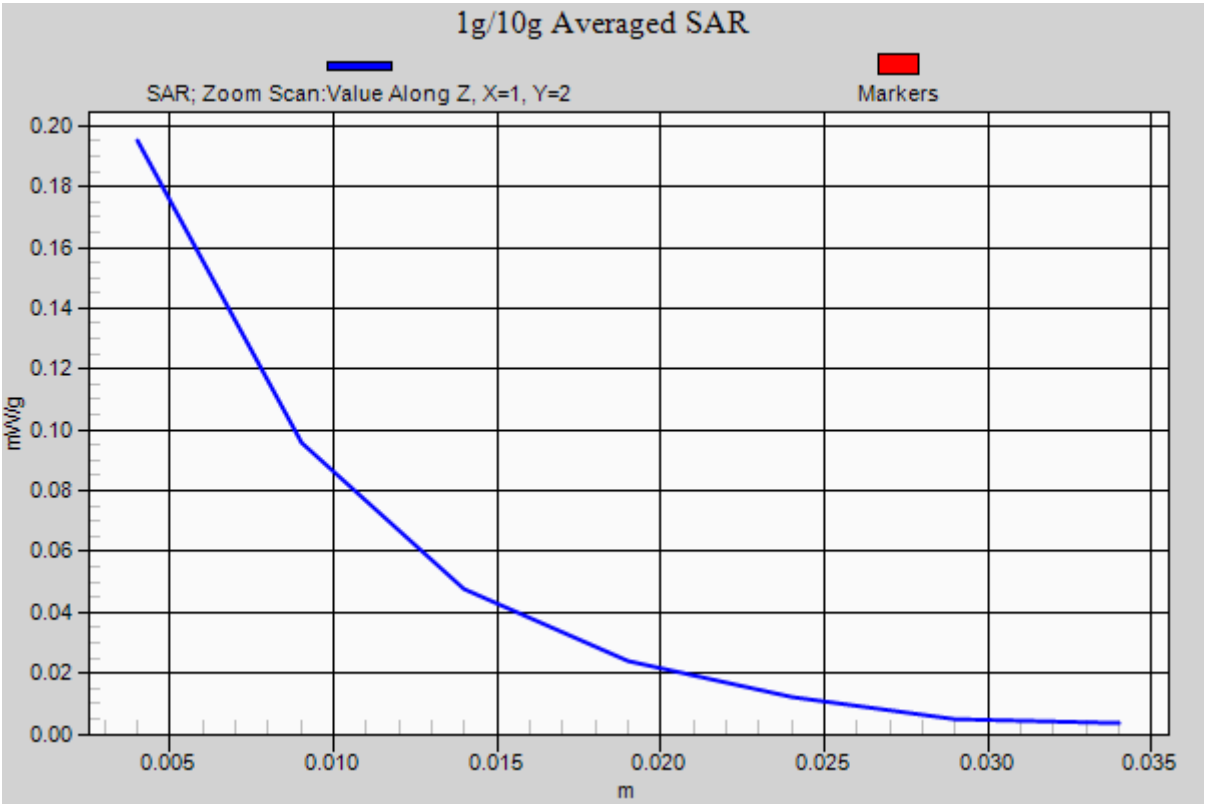
Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.8 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.59, 7.59, 7.59); Calibrated: 2010-11-26
- 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.6, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.178 mW/g

Cheek , Ch.6, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.31 V/m; Power Drift = 0.156 dB
Peak SAR (extrapolated) = 0.368 W/kg
SAR(1 g) = 0.178 mW/g; SAR(10 g) = 0.093 mW/g

Maximum value of SAR (measured) = 0.195 mW/g



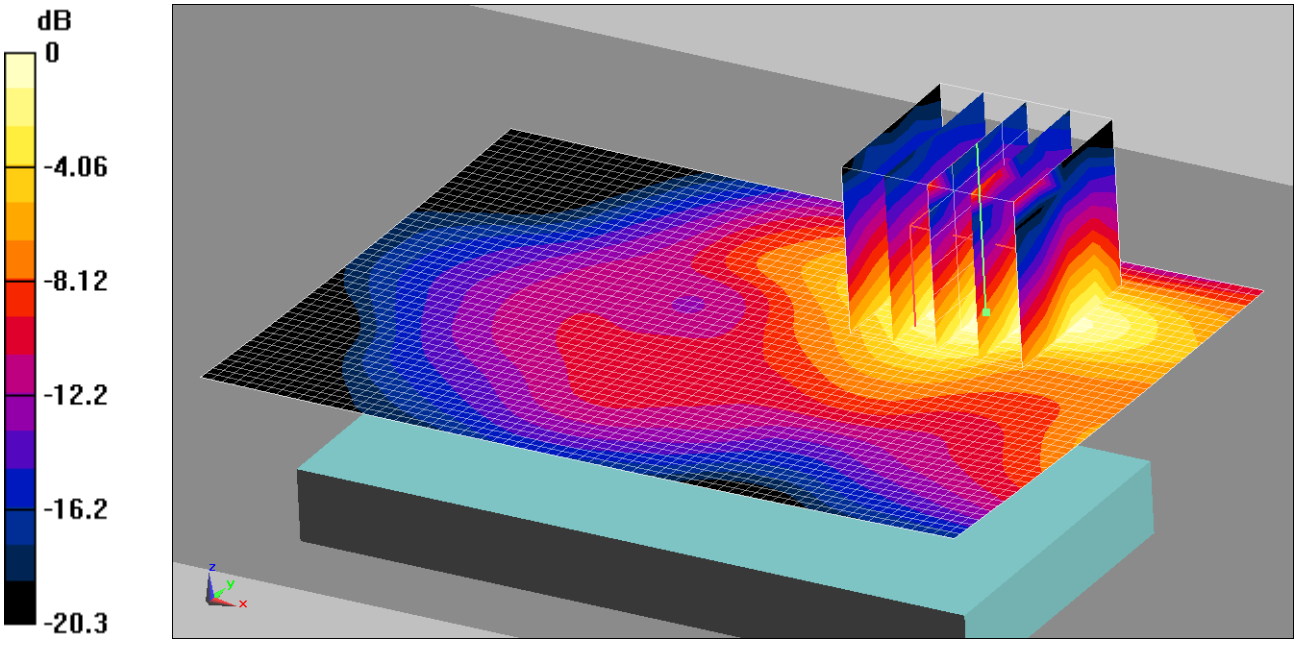
DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WLAN Body (Job No. : FH-286)
Procedure Name: Body, Ch.6, Ant.Intenna, Bat.Standard, Back
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.99 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.89, 7.89, 7.89); Calibrated: 2010-11-26
- 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.6, Ant.Intenna, Bat.Standard, Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.378 mW/g

Body, Ch.6, Ant.Intenna, Bat.Standard, Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.25 V/m; Power Drift = 0.075 dB
Peak SAR (extrapolated) = 0.722 W/kg
SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.155 mW/g
Maximum value of SAR (measured) = 0.338 mW/g



0 dB = 0.338mW/g

DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WLAN Body (Job No. : FH-286)
Procedure Name: Body, Ch.6, Ant.Intenna, Bat.Standard, Front
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.99 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.89, 7.89, 7.89); Calibrated: 2010-11-26
- 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

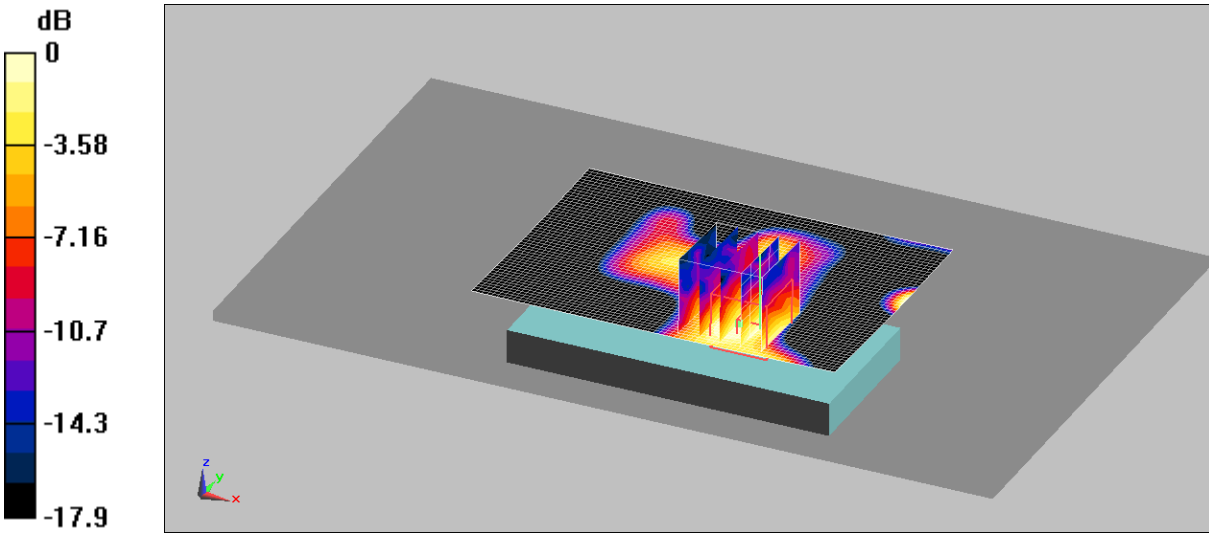
Body, Ch.6, Ant.Intenna, Bat.Standard, Front/Area Scan (51x71x1):

Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.053 mW/g

Body, Ch.6, Ant.Intenna, Bat.Standard, Front/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.32 V/m; Power Drift = 0.162 dB
Peak SAR (extrapolated) = 0.063 W/kg
SAR(1 g) = 0.035 mW/g; SAR(10 g) = 0.019 mW/g

Maximum value of SAR (measured) = 0.038 mW/g



DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WLAN Body (Job No. : FH-286)
Procedure Name: Body, Ch.6, Ant.Intenna, Bat.Standard, Side A
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.99 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.89, 7.89, 7.89); Calibrated: 2010-11-26
- 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

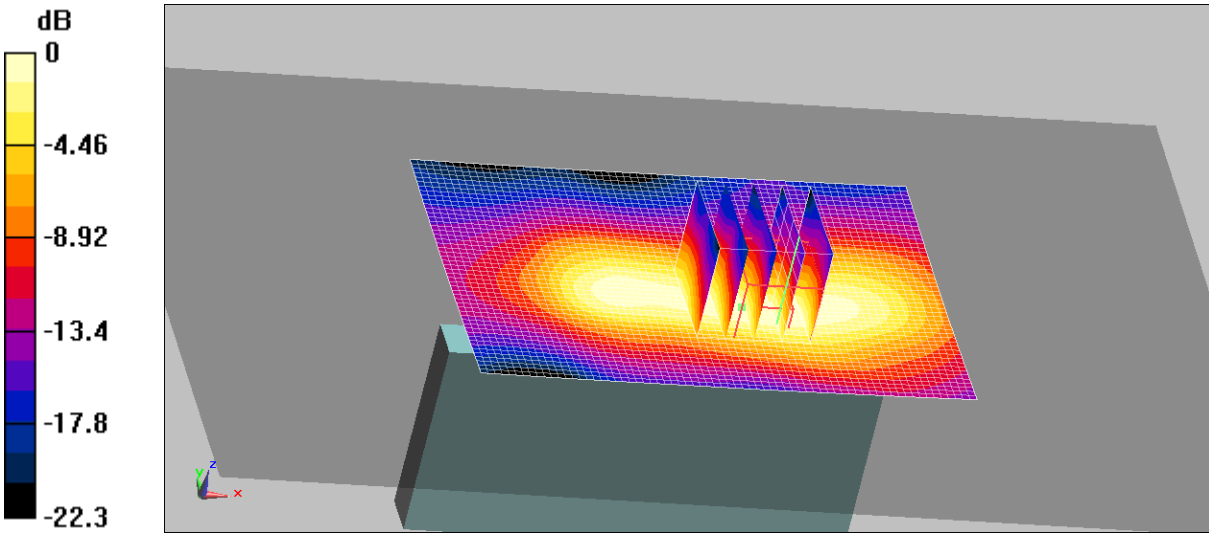
Body, Ch.6, Ant.Intenna, Bat.Standard, Side A/Area Scan (51x71x1):

Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.189 mW/g

Body, Ch.6, Ant.Intenna, Bat.Standard, Side A/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.57 V/m; Power Drift = 0.025 dB
Peak SAR (extrapolated) = 0.390 W/kg
SAR(1 g) = 0.190 mW/g; SAR(10 g) = 0.091 mW/g

Maximum value of SAR (measured) = 0.197 mW/g



DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WLAN Body (Job No. : FH-286)
Procedure Name: Body, Ch.6 Ant.Intenna, Bat.Standard, Side D
Meas. Ambient Temp(celsius)-22.4;Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.99 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.89, 7.89, 7.89); Calibrated: 2010-11-26
- 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

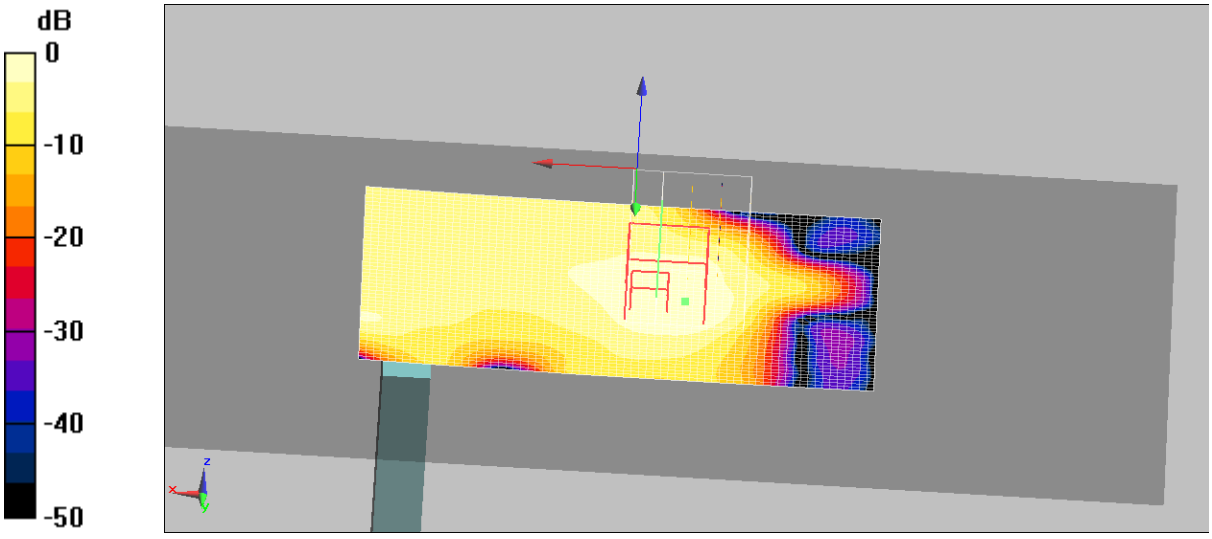
Body, Ch.6 Ant.Intenna, Bat.Standard, Side C/Area Scan (51x71x1):

Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.030 mW/g

Body, Ch.6 Ant.Intenna, Bat.Standard, Side C/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.32 V/m; Power Drift = 0.00147 dB
Peak SAR (extrapolated) = 0.044 W/kg
SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.014 mW/g

Maximum value of SAR (measured) = 0.027 mW/g



DUT: GT-I9023; Serial: FH-286-B
Program Name: GT-I9023 WLAN Body (Job No. : FH-286)
Procedure Name: Body, Ch.6, Ant.Intenna, Bat.Standard, Back
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-29/Dec/2010

Communication System: WLAN; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: f = 2437 MHz; σ = 1.99 mho/m; ε_r = 52.2; ρ = 1000 kg/m^3

Phantom section: Left Section

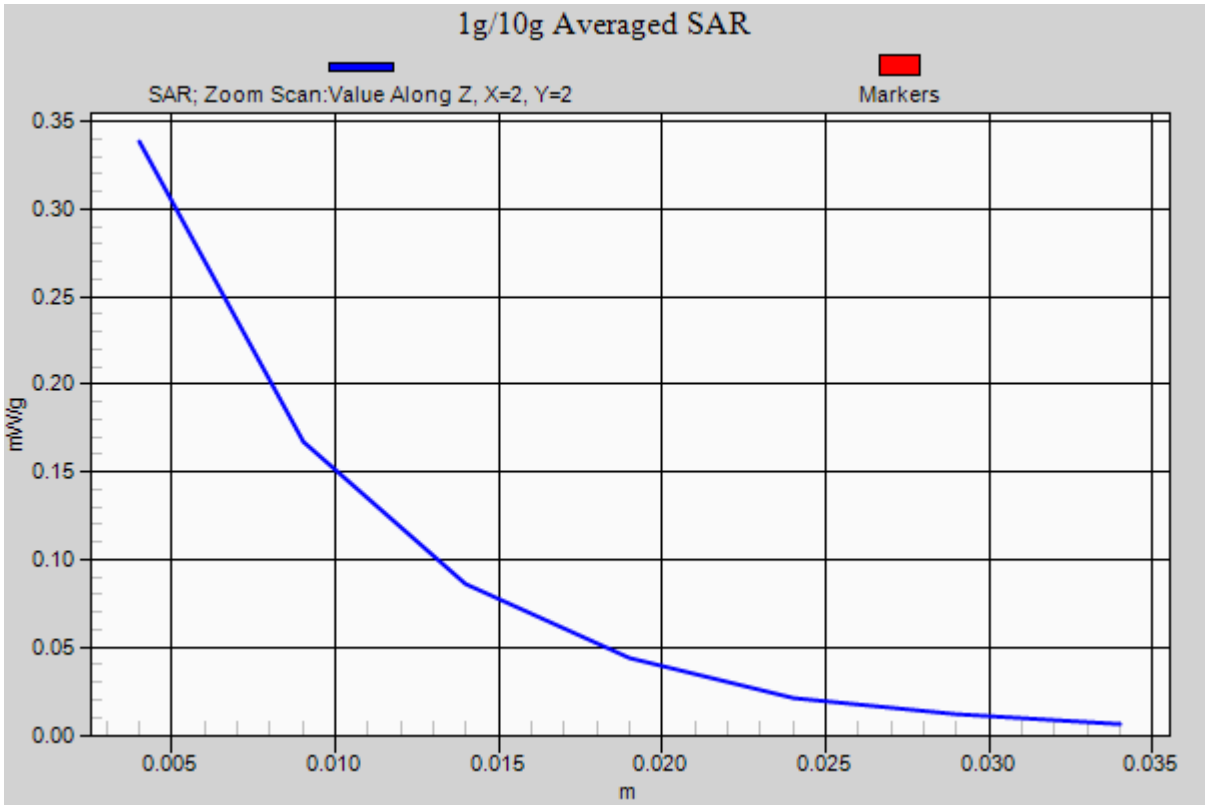
DASY5 Configuration:
- Probe: EX3DV4 - SN3537; ConvF(7.89, 7.89, 7.89); Calibrated: 2010-11-26
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn686; Calibrated: 2010-03-17
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: 1001
- Measurement SW: DASY5, V5.0 Build 125; SEMCAD X Version 13.4 Build 125

Body, Ch.6, Ant.Intenna, Bat.Standard, Back/Area Scan (51x71x1):

Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.378 mW/g

Body, Ch.6, Ant.Intenna, Bat.Standard, Back/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.25 V/m; Power Drift = 0.075 dB
Peak SAR (extrapolated) = 0.722 W/kg
SAR(1 g) = 0.335 mW/g; SAR(10 g) = 0.155 mW/g
Maximum value of SAR (measured) = 0.338 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
S Swiss Calibration Service

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

Accreditation No.: SCS 108

Client **Samsung (Dymstec)**

Certificate No: EX3-3537_Nov10

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3537

Calibration procedure(s): QA CAL-01.v6, QA CAL-14.v3, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes

Calibration date: November 26, 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-10)	In house check: Oct-11

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

Issued: November 26, 2010

O.K to use
2010. 12. 9

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

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

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

Accreditation No.: **SCS 108**

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3537

Manufactured:	August 23, 2004
Last calibrated:	November 20, 2009
Recalibrated:	November 26, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 SN:3537

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.37	0.39	0.46	± 10.1%
DCP (mV)[B]	100.1	100.7	100.0	

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	180.4	± 2.9 %
			Y	0.00	0.00	1.00	175.1	
			Z	0.00	0.00	1.00	146.7	

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

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

[B] Numerical linearization parameter: uncertainty not required.

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

DASY/EASY - Parameters of Probe: EX3DV4 SN:3537

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)
850	± 50 / ± 100	41.5 ± 5%	0.92 ± 5%	9.63	9.63	9.63	0.70	0.62 ± 11.0%
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	9.50	9.50	9.50	0.74	0.62 ± 11.0%
1750	± 50 / ± 100	40.1 ± 5%	1.37 ± 5%	8.66	8.66	8.66	0.60	0.61 ± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	8.43	8.43	8.43	0.81	0.50 ± 11.0%
1900	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	8.25	8.25	8.25	0.84	0.49 ± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	7.59	7.59	7.59	0.48	0.75 ± 11.0%
3500	± 50 / ± 100	37.9 ± 5%	2.91 ± 5%	6.87	6.87	6.87	0.32	1.30 ± 13.1%
5200	± 50 / ± 100	36.0 ± 5%	4.66 ± 5%	4.94	4.94	4.94	0.45	1.90 ± 13.1%
5300	± 50 / ± 100	35.9 ± 5%	4.76 ± 5%	4.62	4.62	4.62	0.50	1.90 ± 13.1%
5500	± 50 / ± 100	35.6 ± 5%	4.96 ± 5%	4.70	4.70	4.70	0.50	1.90 ± 13.1%
5600	± 50 / ± 100	35.5 ± 5%	5.07 ± 5%	4.37	4.37	4.37	0.52	1.90 ± 13.1%
5800	± 50 / ± 100	35.3 ± 5%	5.27 ± 5%	4.51	4.51	4.51	0.50	1.90 ± 13.1%

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

DASY/EASY - Parameters of Probe: EX3DV4 SN:3537

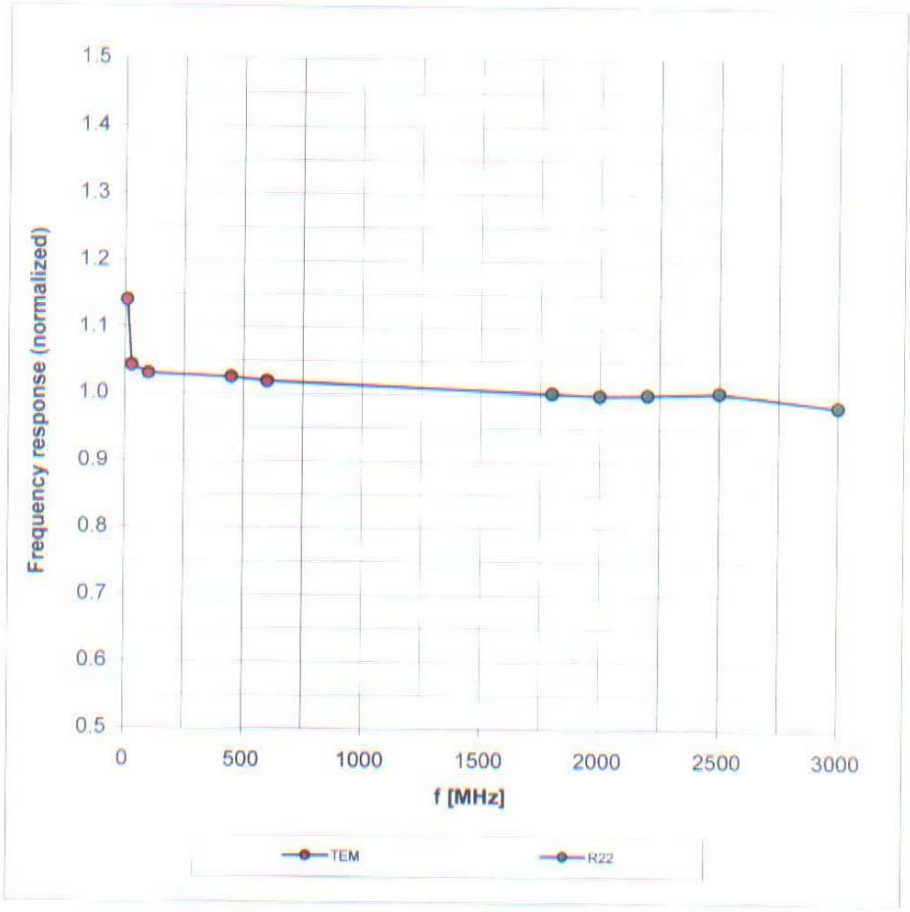
Calibration Parameter Determined in Body Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth Unc (k=2)
850	± 50 / ± 100	55.2 ± 5%	0.99 ± 5%	9.57	9.57	9.57	0.48	0.79 ± 11.0%
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	9.51	9.51	9.51	0.44	0.81 ± 11.0%
1750	± 50 / ± 100	53.4 ± 5%	1.49 ± 5%	8.12	8.12	8.12	0.69	0.60 ± 11.0%
1900	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	8.00	8.00	8.00	0.64	0.63 ± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	7.89	7.89	7.89	0.99	0.41 ± 11.0%
3500	± 50 / ± 100	51.3 ± 5%	3.31 ± 5%	6.55	6.55	6.55	0.30	1.60 ± 13.1%
5200	± 50 / ± 100	49.0 ± 5%	5.30 ± 5%	4.45	4.45	4.45	0.57	1.95 ± 13.1%
5300	± 50 / ± 100	48.9 ± 5%	5.42 ± 5%	4.19	4.19	4.19	0.58	1.95 ± 13.1%
5500	± 50 / ± 100	48.6 ± 5%	5.65 ± 5%	3.93	3.93	3.93	0.60	1.95 ± 13.1%
5600	± 50 / ± 100	48.5 ± 5%	5.77 ± 5%	3.69	3.69	3.69	0.63	1.95 ± 13.1%
5800	± 50 / ± 100	48.2 ± 5%	6.00 ± 5%	4.15	4.15	4.15	0.58	1.95 ± 13.1%

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

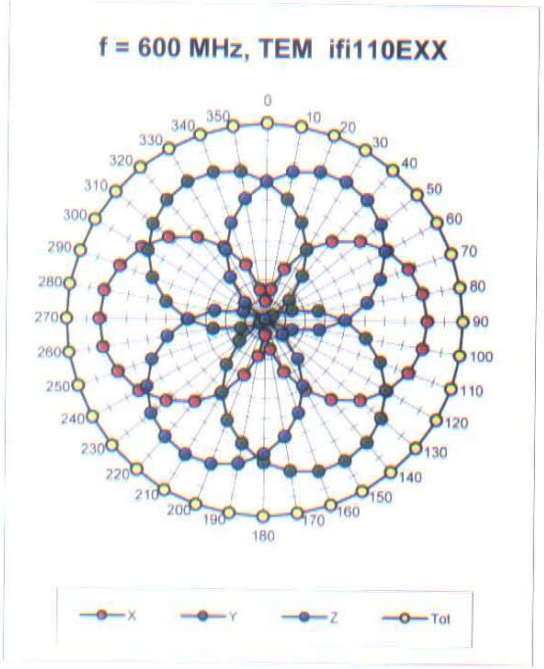
Frequency Response of E-Field

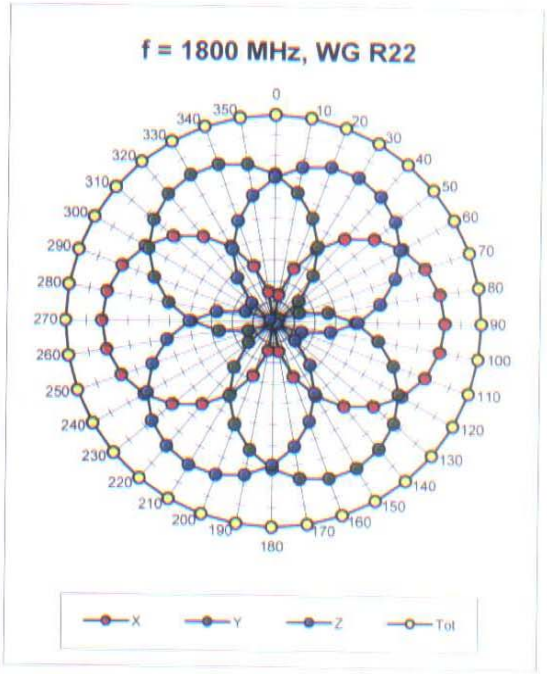
(TEM-Cell:ifi110 EXX, Waveguide: R22)

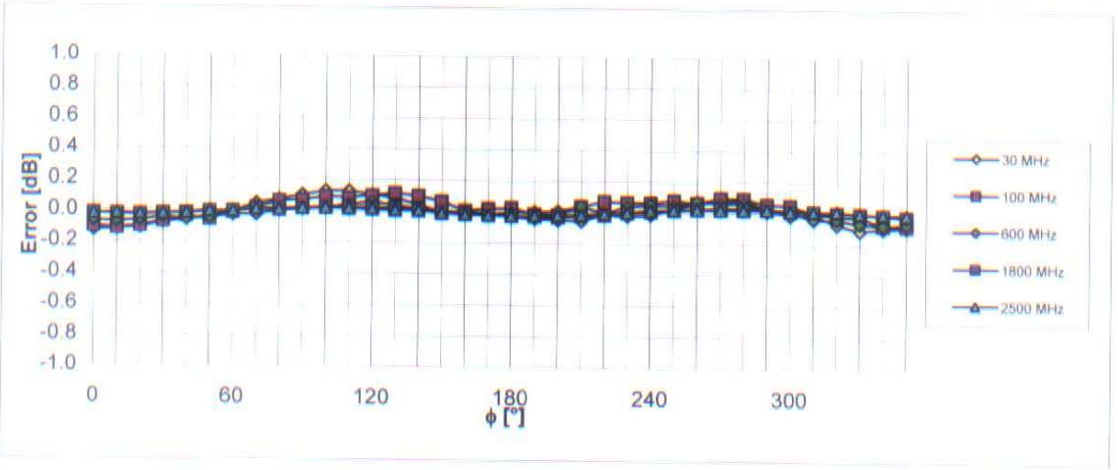


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), ϑ = 0°



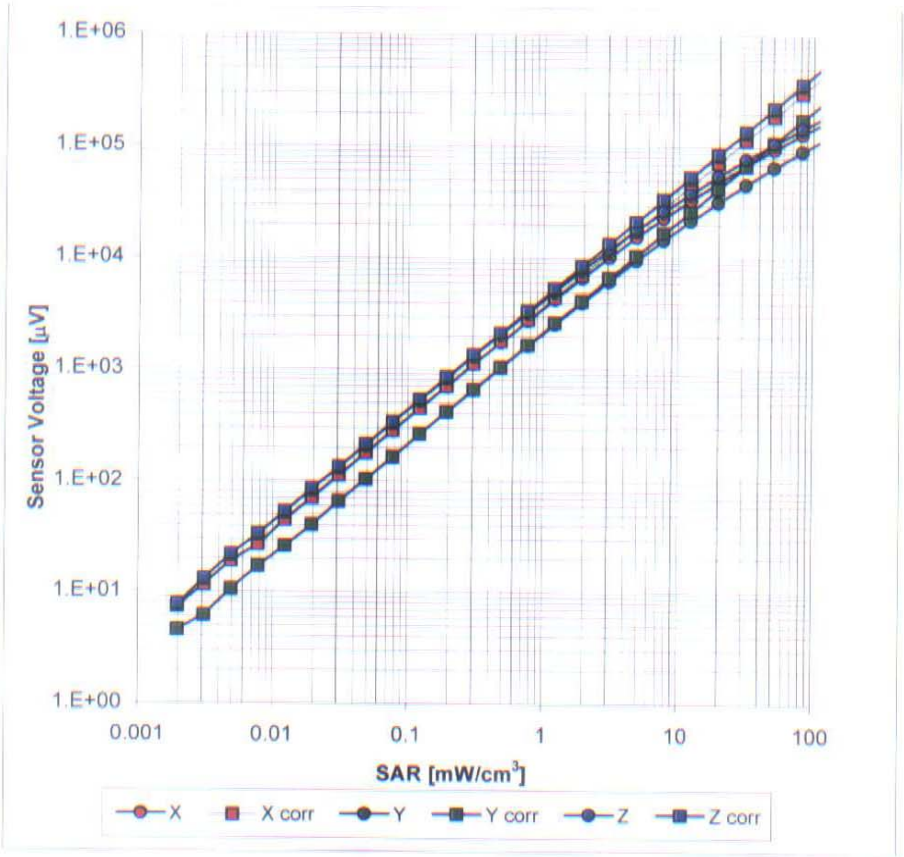


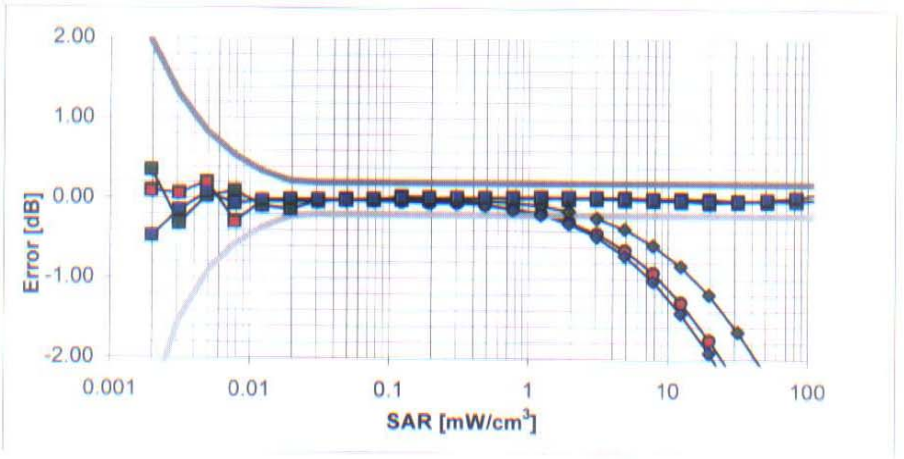


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

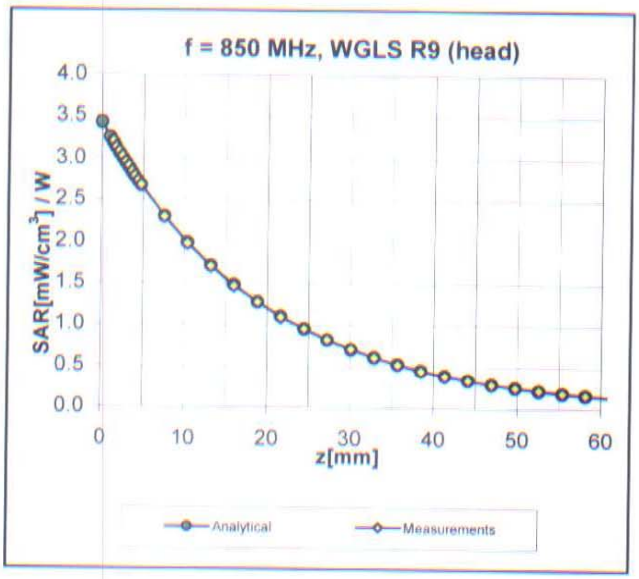
(TEM cell, f = 900 MHz)

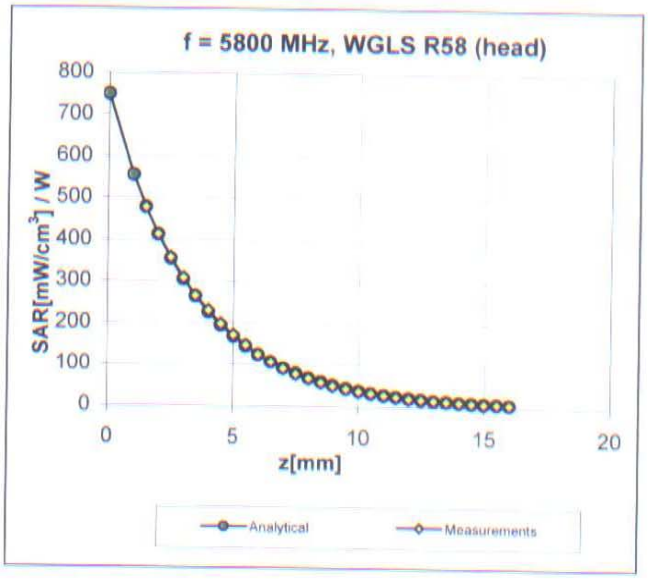




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

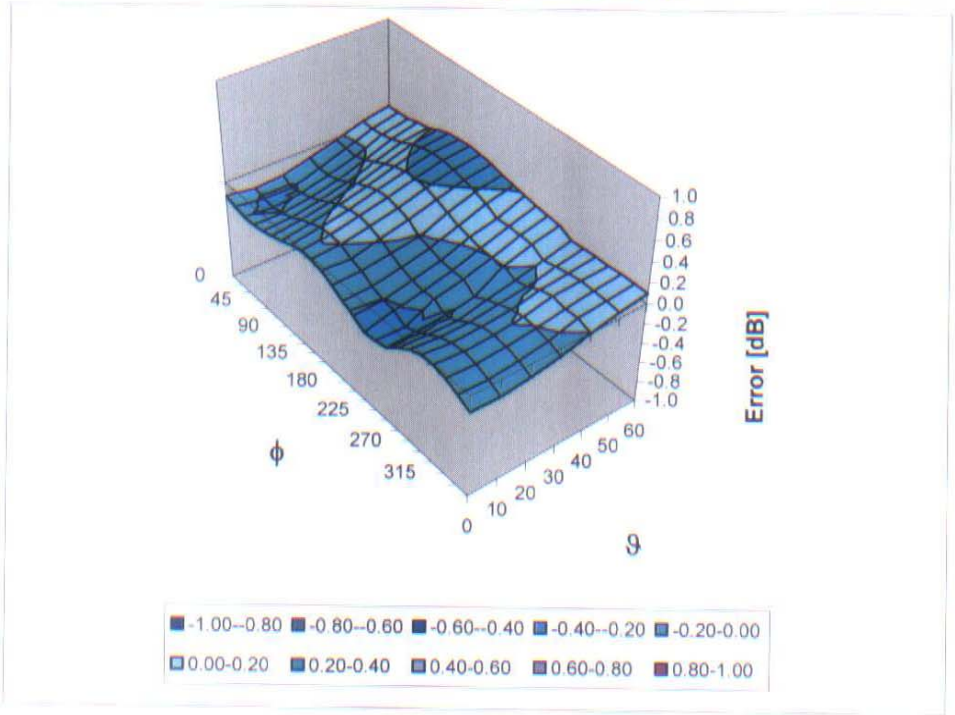
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	2 mm