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-S5368**
FCC ID (Requested):	**A3LGTS5368**
Job No:	**FI-226**
Report No:	**FI-226-S1**

- Abstract –

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

Prepared By

BH JEON - Test Engineer

Authorized By

SH ONG – Deputy of Technical Manager

Contents

1. GENERAL INFORMATION

Test Dates :	Sep.26, 2011 ~ Oct.13, 2011
Manufacturer :	SAMSUNG ELECTRONICS Co., Ltd.
Address :	416 Maetan3-Dong, Suwon City, Korea
Test Standard :	§2.1093; FCC/OET Bulletin 65, Supplement C(June 2001)
FCC Classification :	Licensed Portable Transmitter Held to Ear (PCE) Digital Transmitter System (DTS)
Tested for :	FCC/TCB Certification

2. DESCRIPTION OF DEVICE

Test Sample :	1900 GSM/GPRS/EDGE Phone with Bluetooth and WLAN
Model Number :	GT-S5368
Serial Number :	Identical prototype (S/N : # FI-226-C)
Tx Freq.Range :	1850.20 ~ 1909.80 MHz (GSM1900)
	2412 ~ 2462 MHz (WLAN)
Rx Freq.Range :	1930.20 ~ 1989.80 MHz (GSM1900)
	2412 ~ 2462 MHz (WLAN)
Antenna Manufacturer :	PARTRON
	Model No.: GT-S5368
Antenna Dimensions :	54.86*14.79*5.42 (mm)
Separation distance between Main and Bluetooth antenna :	82mm

3. DESCRIPTION OF TEST EQUIPMENT

3.1 SAR Measurement Setup

Robotic System

Measurements are performed using the DASY4 (or DASY4) 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).

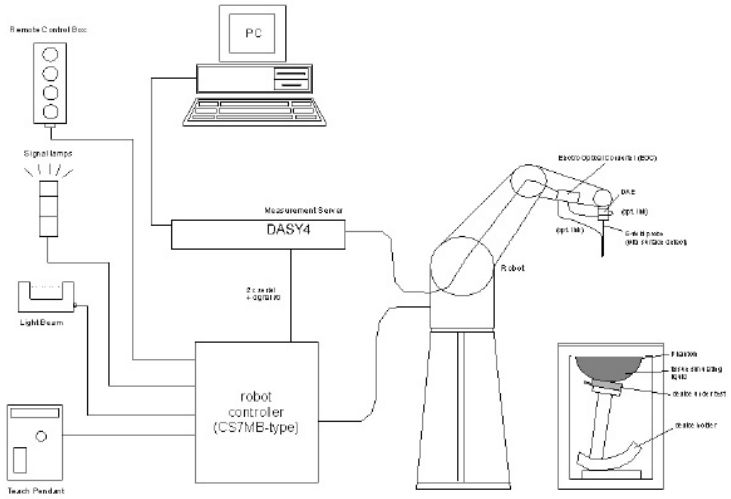


Figure 3.1 SAR Measurement System Setup

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 DASY4), LCD monitor, mouse and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the measurement server.

System Electronics

The DAE4(or DAE3) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

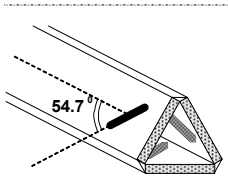
3.2 E-field Probe

Figure 3.2 DAE System

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

Probe Specifications

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



Δ - BEAM

Figure 3.3 Triangular Probe Configuration

Additional CF for other liquids and frequencies upon request

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

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

± 0.2 dB in HSL (rotation around probe axis)

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

[EX3DV4]

± 0.3 dB in HSL (rotation around probe axis)

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

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

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

[EX3DV4]

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

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

Overall length: 330 mm (Tip: 20 mm)

Tip diameter: 3.9 mm (Body: 12 mm)

Distance from probe tip to dipole centers: 2.1 mm

[ES3DV3] ,[ES3DV2]

[EX3DV4]

Overall length: 330 mm (Tip: 20 mm)

Tip diameter: 2.5 mm (Body: 12 mm)

Typical distance from probe tip to dipole centers: 1 mm

[ET3DV6]

Overall length: 330mm

Tip length: 16mm

Body diameter: 12mm

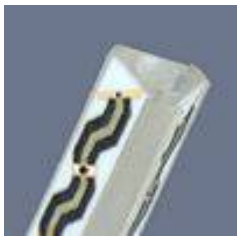
Tip diameter: 6.8mm

Distance from probe tip to dipole centers: 2.7mm

[EX3DV4]

Application **[ES3DV3], [ES3DV2]**

General dosimetry up to 5 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones



[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

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.

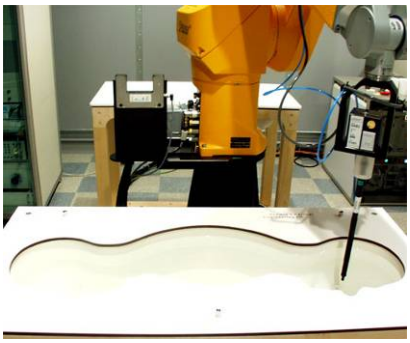


Figure 3.7 Simulated Tissue

Table 3.1 Composition of the Brain Tissue Equivalent Matter

INGREDIENTS	1900MHz Brain	1900MHz Muscle	2450MHz Brain	2450MHz Muscle
WATER	55.24%	70.23%	71.88%	73.4%
SUGAR	-	-	-	-
SALT	0.31%	0.29%	0.16%	0.06%
DGBE	44.45%	29.48%	7.99%	26.54%
Triton X-100	-	-	19.97%	-
BACTERIACIDE	-	-	-	-
HEC	-	-	-	-
Dielectric Constant Target	40	53.3	39.2	52.7
Conductivity Target (S/m)	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	1900, 2450 MHz
Return Loss	< -20 dB at specified validation position
Dimensions	D1900V2: dipole length: 68 mm; overall height: 300 mm D2450V2: dipole length: 51.8 mm; overall height: 300 mm

Note:

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

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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	Apr.14, 2012	3750
SPEAG DAE4	Feb.22, 2012	486
SPEAG Validation Dipole D1900V2	Feb.23, 2013	5d082
SPEAG Validation Dipole D2450V2	Apr.19, 2013	708
Stäubli Robot RX90BL	Not Required	F05/51G6A1/A/01
SPEAG SAM Twin Phantom V4.0	Not Required	TP-1364
SPEAG SAM Twin Phantom V4.0	Not Required	TP-1604
Modular Phantom	Not Required	MP-1010
E4421B Signal Generator	Oct.29, 2011	MY41000654
BBS3Q7ELU Power Amp	Oct.22, 2011	1007D/C0035
E4419B Power meter	Oct.22, 2011	GB41293847
E9300B Power sensor	Jan.28, 2012	MY41495533
HP-8753ES Network Analyzer	Apr.27, 2012	US39173712
HP85070C Dielectric Probe Kit	Not Required	US99360087
E4419B Power meter	Feb.25, 2012	MY45103291
E9300B Power sensor	Mar.04, 2012	MY41496209
E9300B Power sensor	Mar.04, 2012	MY41496085
DASY4 S/W (ver 4.7)	Not Required	-
E4440A Spectrum Analyzer	Feb.24, 2012	MY45304704
778D Dual Directional Coupler	Dec.02, 2011	50189
777D Dual Directional Coupler	Feb.23, 2012	07523
Base Station Simulator	Dec.20, 2011	GB46490112

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.

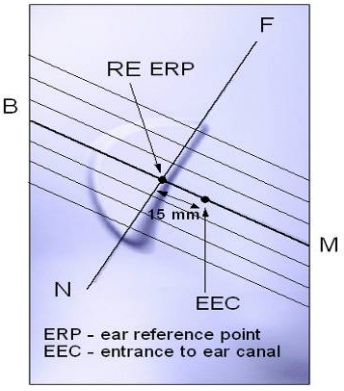

Figure 5.2 Close up side view

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

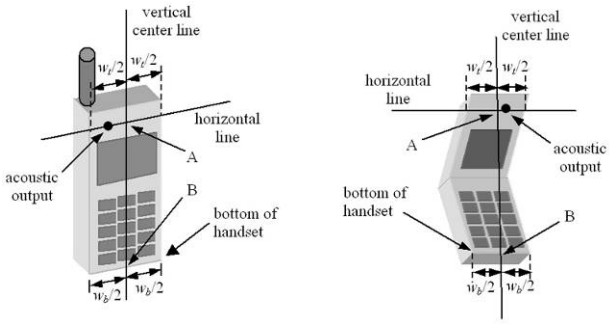

Figure 5.4 Handset vertical and horizontal reference lines

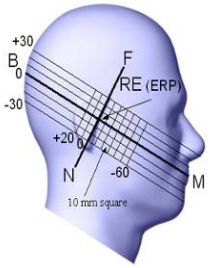

Figure 5.3 Side view of the phantom showing relevant markings

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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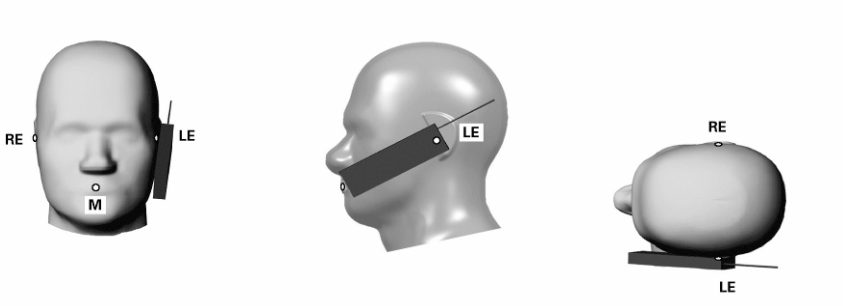

Figure 5.5 Front, Side and Top View of Cheek/Touch Position

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"

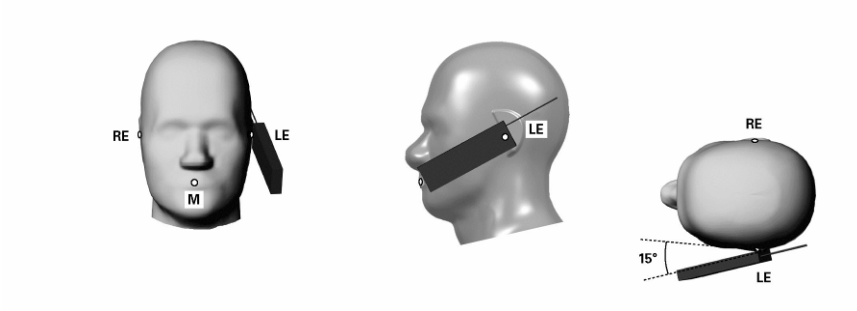

Figure 5.6 Front, side and Top View of Ear/Tilt 15° Position

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 FCC Personal Wireless Router Configurations

5.4.1 Personal Wireless Router

Some battery-operated handsets have the capability to transmit and receive internet connectivity through simultaneous transmission of WIFI in conjunction with a separate licensed transmitter. The FCC has provided guidance in KDB Publication 941225 D06 for handsets greater than 9cm x 5cm where SAR test considerations are based on a composite test separation distance of 10mm from the edges, front and back of the device with antennas 2.5cm or closer to ther edge of the device, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR test.

5.4.2 SAR test Setup for Personal Wireless Router Features

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus connot be evaluated for SAR under actual use conditions. Therefore, SAR must be evaluated for each frequency transmission and mode separately and summed with the WIFI transmitter according to KDB 648474 publication procedures. The “Portable Hotspot: feature on the handset was NOT activated, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal.

5.4.3 SAR Test Configuration

Table 5-1 Mobile Hotspot Sides for SAR testing

Mode	Back	Front	Top	Bottom	Left	Right
GPRS1900	Yes	Yes	No	Yes	Yes	Yes
WIFI	Yes	Yes	Yes	No	Yes	Yes

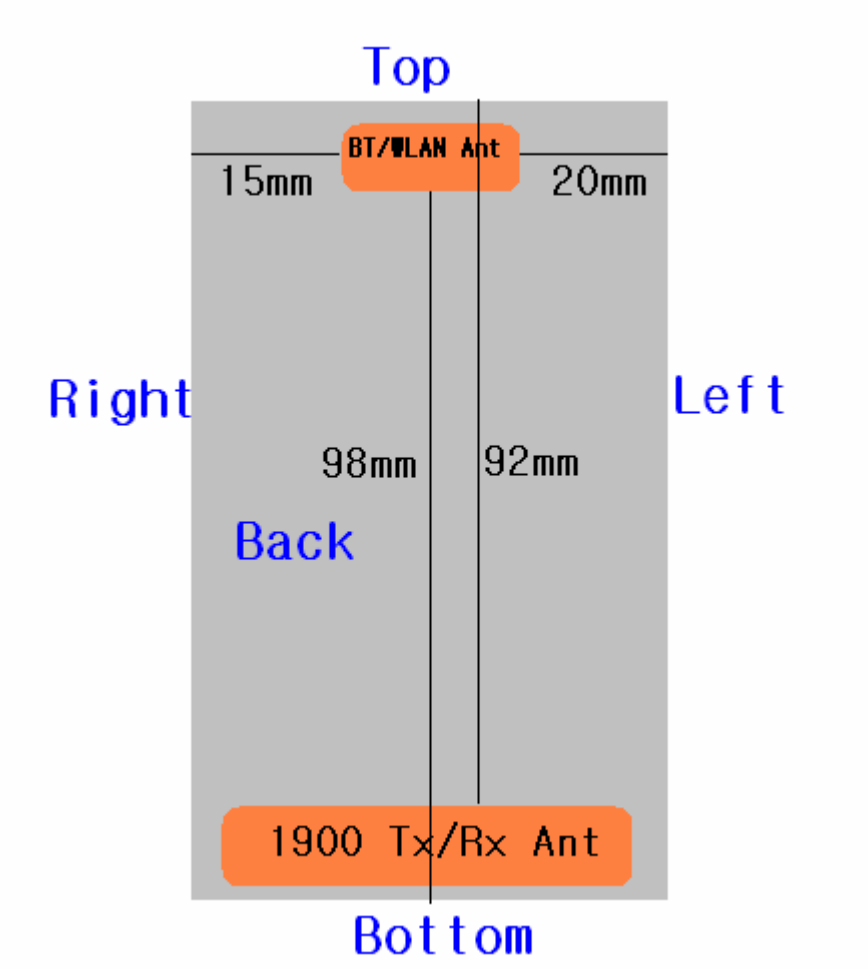

Figure 5.7 Identification of Sides for SAR Testing

Note : Particular DUT edges were not necessary to be evaluated for Wireless Router SAR if the edges were greater than 2.5cm from the transmitting antenna according to FCC KDB Publication 941225 D06 guidance, Page 2.

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6. MEASUREMENT UNCERTAINTY

Table 6.1 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 6.2 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

	1900MHz Head		1900MHz Body		1900MHz Body	
	Target	Measured	Target	Measured	Target	Measured
Date	Sep.26, 2011		Sep.26, 2011		Oct.13, 2011	
Liquid Temperature(° C)	22.1		21.9		22.3	
Dielectric Constant: å'	40	40	53.3	51.9	53.3	52.3
Conductivity:	1.4	1.4	1.52	1.51	1.52	1.52
Tissue Batch Number	19000F2001T		1900B1001T		1900B1001T	

	2450MHz Head		2450MHz Body	
	Target	Measured	Target	Measured
Date	Sep.29, 2011		Sep.27. 2011	
Liquid Temperature(° C)	22.1		22.2	
Dielectric Constant: å'	39.2	37.5	52.7	51.4
Conductivity:	1.8	1.89	1.95	1.96
Tissue Batch Number	2450MF3001F		2450B1001U	

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

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7.2 Test System Validation

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

Table 7.2 System Validation Results

System Validation Kit	Tissue	Targeted SAR_{1g} (mW/g)	Measured SAR_{1g} (mW/g)	Nomalized SAR_{1g} (mW/g)	Deviation (%)	Date	Ambient Temperature(°C)	Liquid Temperature(°C)	Input Power (mW)
5d082	1900MHz Brain	41.4	4.26	42.6	2.90	Sep.26, 2011	22.4	21.8	100
5d082	1900MHz Body	40.7	3.92	39.2	-3.69	Sep.26, 2011	22.4	22.1	100
5d082	1900MHz Body	40.7	4.03	40.3	-0.98	Oct.13, 2011	22.9	22.4	100
708	2450MHz Brain	55.8	5.57	55.7	-0.18	Sep.29, 2011	22.1	21.5	100
708	2450MHz Body	51.2	4.95	49.5	-3.32	Sep.27, 2011	22.5	21.9	100

*Validation was measured with input power 100 mW and normalized to 1W.

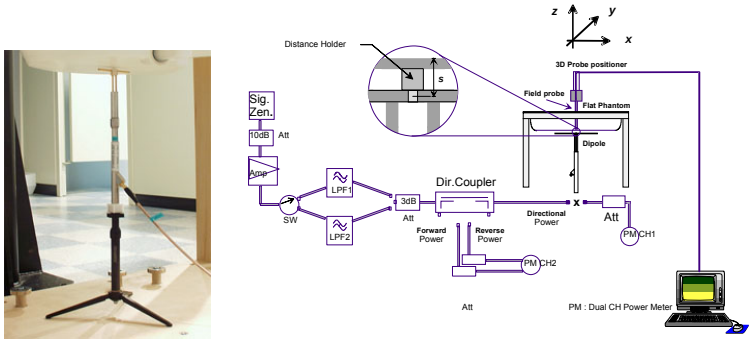

Figure 7.1 Dipole Validation Test Setup

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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.

Device Test Conditions

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(1~2Tx) conducted power were also investigated.

Table 8.1 Maximum Burst-Averaged Output Power for GT-S5368

Band	Channel	Voice	GPRS/EDGE (GMSK)		EDGE (8-PSK)	
		GSM(dBm) CS(1 Tx)	1Tx(dBm)	2Tx(dBm)	1Tx(dBm)	2Tx(dBm)
1900	512	30.25	30.22	**30.26**	27.15	27.14
	661	30.21	30.22	**30.24**	27.44	27.24
	810	30.29	30.27	**30.28**	27.42	27.31

Table 8.2 Calculated Frame-Averaged Output Power Table for GT-S5368

Band	Channel	Voice	GPRS/EDGE (GMSK)		EDGE (8-PSK)	
		GSM(dBm) CS(1 Tx)	1Tx(dBm)	2Tx(dBm)	1Tx(dBm)	2Tx(dBm)
1900	512	21.22	21.19	**24.24**	18.12	21.12
	661	21.18	21.19	**24.22**	18.41	21.22
	810	21.26	21.24	**24.26**	18.39	21.29

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Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. The bolded GPRS/EDGE modes were selected according to the highest frame-averaged output power table per KDB Publication 941225 D03.
3. GPRS/EDGE(GMSK) output powers measured with CS1. EDGE(8-PSK) power were measured with MCS7

GSM Class : B

GPRS Multislot Class : 10 (max 2 Tx Uplink slots)

EDGE Multislot Class : 10 (max 2 Tx Uplink slots)

DTM Multislot Class : N/A

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Table 8.3 802.11b Conducted Output Power

Freq [MHz]	Channel	Data Rate [Mbps]	Measured Average Power [dBm]	Measured Peak Power [dBm]
2412	1	1	**15.21**	17.74
		2	15.19	17.66
		5.5	15.2	17.62
		11	15.17	17.62
2437	6	1	14.7	17.23
		2	14.77	17.22
		5.5	14.78	17.2
		11	14.68	17.17
2462	11	1	14.2	16.8
		2	14.24	16.75
		5.5	14.35	16.71
		11	14.26	16.67

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Table 8.4 802.11g Conducted Output Power

Freq [MHz]	Channel	Data Rate [Mbps]	Measured Average Power [dBm]	Measured Peak Power [dBm]
2412	1	6	11.68	19.4
		9	11.69	19.3
		12	11.62	19.25
		18	11.71	19.3
		24	11.7	19.65
		36	11.55	19.45
		48	11.6	19.6
		54	11.6	19.8
2437	6	6	11.66	19.63
		9	11.65	19.3
		12	11.65	19.5
		18	11.75	19.45
		24	11.7	19.72
		36	11.6	19.4
		48	11.75	19.5
		54	11.65	19.4
2462	11	6	11.2	19.2
		9	11.15	18.8
		12	11.1	18.8
		18	11.2	19
		24	11.22	19.05
		36	11.1	18.72
		48	11.2	18.9
		54	11.12	19.3

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Table 8.5 802.11n Conducted Output Power

Freq [MHz]	Channel	MCS Index	Data Rate [Mbps]	Measured Average Power [dBm]	Measured Peak Power [dBm]
2412	1	0	6.5/7.2	8.85	16.7
		1	13/14.4	8.8	16.95
		2	19.5/21.7	8.9	16.44
		3	26/28.9	8.95	16.23
		4	39/43.3	9	16.4
		5	52/57.8	9	16.23
		6	58.5/65	8.95	16.7
		7	65/72.2	9.02	16.61
2437	6	0	6.5/7.2	9.02	16.7
		1	13/14.4	8.9	16.9
		2	19.5/21.7	9.02	16.57
		3	26/28.9	9.01	16.4
		4	39/43.3	9.07	16.3
		5	52/57.8	9	16.32
		6	58.5/65	9.05	16.76
		7	65/72.2	9.08	16.61
2462	11	0	6.5/7.2	8.6	16.25
		1	13/14.4	8.45	16.4
		2	19.5/21.7	8.6	16
		3	26/28.9	8.6	15.97
		4	39/43.3	8.6	15.82
		5	52/57.8	8.54	16.01
		6	58.5/65	8.6	16.3
		7	65/72.2	8.65	16.3

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Simultaneous Transmission

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

Table 8.6 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				

Table 8.7 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	

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Table 8.8 Simultaneous Transmission Summation for Held to Ear Voice Call

Simult Tx	Configuration	GSM1900 SAR(W/Kg)	WIFI SAR (W/Kg)	Σ SAR (W/Kg)
Head SAR	Right Cheek	0.452	0.166	0.618
	Right Tilt	0.216	0.174	0.39
	Left Cheek	0.735	0.193	0.928
	Left Tilt	0.211	0.261	0.472

The above tables represent a held to ear voice call with 2.4GHz WLAN.

Table 8.9 Simultaneous Transmission Summation for 2G voice and WIFI(Body-Worn)

Configuration	Mode	2G SAR (W/Kg)	WIFI SAR (W/Kg)	Σ SAR (W/Kg)
Back	GSM1900	0.445	0.362	0.808

The above tables represent a body worn voice call with 2.4GHz WLAN.

Table 8.10 Simultaneous Transmission Summation for 2G Data and WIFI(Hotspot)

Simult Tx	Configuration	GPRS1900 SAR(W/Kg)	WIFI SAR (W/Kg)	Σ SAR (W/Kg)
Body SAR	Back	0.938	0.362	1.30
	Front	0.549	0.272	0.821
	Top	-	0.133	0.133
	Bottom	0.304	-	0.304
	Left	0.176	0.088	0.264
	Right	0.087	0.086	0.173

Note : Per FCC KDB Publication941225 D06, the edges with antennas more than 2.5cm are not required to be evaluated for SAR(”-“). The above tables represent a portable hotspot condition.

Multiple Antenna/Transmission Information for GT-S5368

The separation between the main antenna and the Bluetooth and WLAN antennas is 82mm.

RF Conducted Power of Bluetooth Tx is 4.85 dBm.

RF Conducted Power of WLAN is 15.21 dBm.

Simultaneous Transmission Conclusion

The above numerical summed SAR was below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. Therefore, no volumetric SAR summation is required since the numerical sums are below the limit

Based on the output power, antenna separation distance, and Body SAR of the dominant transmitter, a stand-alone Bluetooth SAR test is not required while for WLAN it is required.

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8.1 GSM1900 Head SAR Results

Frequency		Mode	Conducted		Side	Test Position	Antenna Type	Battery	Drift (dB)	SAR Level (W/kg)
MHz	Ch		Start	End						
1880	661	GSM1900	30.24	30.21	Right	Cheek/Touch	Intenna	Standard	0.041	0.452
1880	661	GSM1900	30.20	30.25	Right	Ear/Tilt 15°	Intenna	Standard	0.147	0.216
1880	661	GSM1900	30.19	30.20	Left	Cheek/Touch	Intenna	Standard	0.159	**0.735**
1880	661	GSM1900	30.21	20.24	Left	Ear/Tilt 15°	Intenna	Standard	0.045	0.211
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 [June 2001].

2. Tissue parameters and temperatures are listed on the SAR plot.
3. Liquid tissue depth is 15.2 ± 0.2cm
4. Battery is fully charged for all readings.
5. Test Configuration ☐ Manu. Test Codes ☒ Base Station Simulator
6. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June, 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 GSM1900 Body-Worn SAR Results

Frequency		Mode	Conducted		Separation Distance	Test Position	Antenna Type	Battery	Tx GSM Slots	Drift (dB)	SAR Level (W/kg)
MHz	Ch		Start	End							
1880	661	GSM1900	30.22	30.23	1.0 cm	Back	Intenna	Standard	1	-0.024	**0.445**
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 [June 2001].
2. Tissue parameters and temperatures are listed on the SAR plot.
3. Liquid tissue depth is 15.2 ± 0.2cm
4. Battery is fully charged for all readings.
5. Device was tested using a fixed spacing for body-worn testing. A separation distance of 10mm was tested because the manufacturer has determined that there will be body-worn accessories.
6. Body-Worn accessory testing is typically associated with voice operations. Therefore body-worn SAR testing was performed in GSM voice mode only. GPRS DATA mode is covered in the hotspot SAR Testing at the same test distance
7. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June 2001) and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).

8.3 GSM1900 Hotspot SAR Results

Frequency		Mode	Conducted		Separation Distance	Test Position	Antenna Type	Battery	Tx GPRS Slots	Drift (dB)	SAR Level (W/kg)
MHz	Ch		Start	End							
1850.2	512	GPRS1900	30.21	30.24	1.0 cm	Back	Intenna	Standard	2	0.033	0.775
1880	661	GPRS1900	30.18.	30.21	1.0 cm	Back	Intenna	Standard	2	-0.063	**0.938**
1909.8	810	GPRS1900	30.23	30.28	1.0 cm	Back	Intenna	Standard	2	0.046	0.842
1880	661	GPRS1900	30.24	30.23	1.0 cm	Front	Intenna	Standard	2	-0.030	0.549
1880	661	GPRS1900	30.21	30.25	1.0 cm	Bottom	Intenna	Standard	2	-0.047	0.304
1880	661	GPRS1900	30.24	30.20	1.0 cm	Left	Intenna	Standard	2	0.016	0.176
1880	661	GPRS1900	30.23	30.21	1.0 cm	Right	Intenna	Standard	2	-0.007	0.087
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 [June 2001].
2. Tissue parameters and temperatures are listed on the SAR plot.
3. Liquid tissue depth is 15.2 ± 0.2cm
4. Battery is fully charged for all readings.
5. Justification for reduced test configurations: Per FCC/OET Bulletin 65 Supplement C (June 2001) and Public Notice DA-02-1438, if the SAR measured at the middle channel for each test configuration is at least 3.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s).
6. Body SAR was tested at 1cm distance because battery operated personal wireless routers(hotspots) enable multiple Wi-Fi connections, per KDB 941225 D06. But position 'Top' was not tested because antenna distance was >2.5cm.
7. During SAR Testing for the Wireless Router conditions per KDB 941225 D06, the actual Portable Hotspot operation (with actual simultaneous transmission with WIFI) was not activated.
8. Device was tested using a fixed spacing.

8.4 WLAN Head SAR Results

Frequency		Mode	Conducted		Side	Test Position	Antenna Type	Battery	Data Rate (Mbps)	Drift (dB)	SAR Level (W/kg)
MHz	Ch		Start	End							
2412	1	WLAN	15.23	15.25	Right	Cheek/Touch	Intenna	Standard	1	0.065	0.166
2412	1	WLAN	15.21	15.24	Right	Ear/Tilt 15°	Intenna	Standard	1	-0.020	0.174
2412	1	WLAN	15.22	15.25	Left	Cheek/Touch	Intenna	Standard	1	-0.033	0.193
2412	1	WLAN	15.21	15.24	Left	Ear/Tilt 15°	Intenna	Standard	1	-0.056	**0.261**
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 [June 2001].

2. Tissue parameters and temperatures are listed on the SAR plot.
3. Liquid tissue depth is 15.2 ± 0.2cm
4. Battery is fully charged for all readings.
5. Test Configuration ☒ Manu. Test Codes ☐ Base Station Simulator
6. Justification for reduced test configurations for WIFI channels per KDB 248227 and April 2010 FCC/TCB Meeting Note : 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.
7. WLAN Transmission was verified using a spectrum analyzer.

8.5 WLAN Body-Worn SAR Results

Frequency		Mode	Conducted		Separation Distance	Test Position	Antenna Type	Battery	Data Rate (Mbps)	Drift (dB)	SAR Level (W/kg)
MHz	Ch		Start	End							
2412	1	WLAN	15.24	15.25	1.0 cm	Back	Intenna	Standard	1	0.020	**0.362**
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 [June 2001].
2. Tissue parameters and temperatures are listed on the SAR plot.
3. Liquid tissue depth is 15.2 ± 0.2cm
4. Battery is fully charged for all readings.
5. Justification for reduced test configurations for WIFI channels per KDB 248227 and April 2010 FCC/TCB Meeting Note : 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.
6. WLAN Transmission was verified using a spectrum analyzer.
7. Per FCC KDB Publication 941225 D06, when the same wireless modes and device transmission configurations are required for body-worn accessories and hotspot mode, it is not necessary to additionally test body-worn accessory SAR for the same device orientation. Therefore, the hotspot data for the back side configuration additionally shows body-worn compliance for WLAN.

8.6 WLAN Body Hotspot SAR Results

Frequency		Mode	Conducted		Separation Distance	Test Position	Antenna Type	Battery	Data Rate (Mbps)	Drift (dB)	SAR Level (W/kg)
MHz	Ch		Start	End							
2412	1	WLAN	15.24	15.25	1.0 cm	Back	Intenna	Standard	1	0.020	**0.362**
2412	1	WLAN	15.19	15.18	1.0 cm	Front	Intenna	Standard	1	0.031	0.272
2412	1	WLAN	15.20	15.21	1.0 cm	Top	Intenna	Standard	1	0.145	0.133
2412	1	WLAN	15.22	15.20	1.0 cm	Left	Intenna	Standard	1	0.012	0.088
2412	1	WLAN	15.25	15.26	1.0 cm	Right	Intenna	Standard	1	-0.085	0.086
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 [June 2001].
2. Tissue parameters and temperatures are listed on the SAR plot.
3. Liquid tissue depth is 15.2 ± 0.2cm
4. Battery is fully charged for all readings.
5. Justification for reduced test configurations for WIFI channels per KDB 248227 and April 2010 FCC/TCB Meeting Note : 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.
6. Body SAR was tested at 1cm distance because battery operated personal wireless routers(hotspots) enable multiple Wi-Fi connections, per KDB 941225 D06. But position 'Bottom' was not tested because antenna distance was >2.5cm.
7. WLAN Transmission was verified using a spectrum analyzer.
8. During SAR Testing for the Wireless Router conditions per KDB 941225 D06, the actual Portable Hotspot operation (with actual simultaneous transmission with WIFI) was not activated.

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:
GSM1900: Head: 0.735W/Kg : Body-worn : 0.445W/Kg : Hotspot : 0.938W/Kg
WLAN: Head: 0.261W/Kg : Body-worn : 0.362W/Kg : Hotspot : 0.362W/Kg

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[27] SAR Measurement procedures for IEEE 802.11a/b/g KDB 248227

[28] FCC SAR Considerations for Handsets with Multiple Transmitters and Antennas, KDB 648474

[29] FCC Application Note for SAR Probe Calibration and System Verification Consideration for Measurements at 150 MHz – 3 GHz, KDB 450824

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[31] FCC SAR Measurement Requirements for 3 – 6 GHz, KDB 865664

[32] FCC Mobile Portable RF Exposure Procedure, KDB 447498

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[35] FCC SAR Test Considerations for LTE Handsets and Data Modems, KDB Publication 941225

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.

APPENDIX B

Probe Calibration Process

Dosimetric Assessment Procedure

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

Free Space Assessment

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

Temperature Assessment

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

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

where:

Δt = exposure time (30 seconds)

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

ΔT = temperature increase due to RF exposure.

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

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

where:

σ = simulated tissue conductivity

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

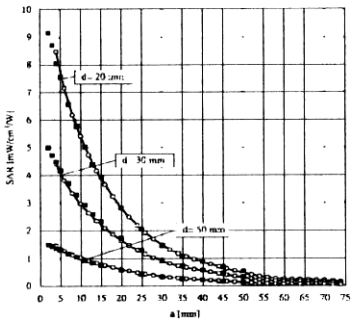


Figure B.1. E-Field and Temperature measurements at 900MHz

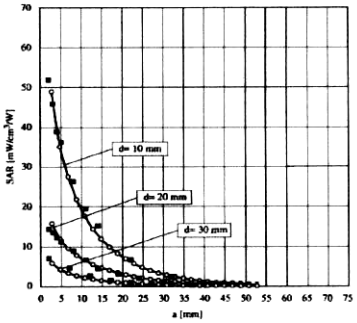


Figure B.2. E-Field and temperature measurements at 1.9GHz

APPENDIX C

ANSI/IEEE C95.1 – 1992 RF EXPOSURE LIMITS

Uncontrolled Environment

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

Controlled Environment

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

Table C.1 Safety Limits for Partial Body Exposure

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

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

APPENDIX D

The Validation Measurements

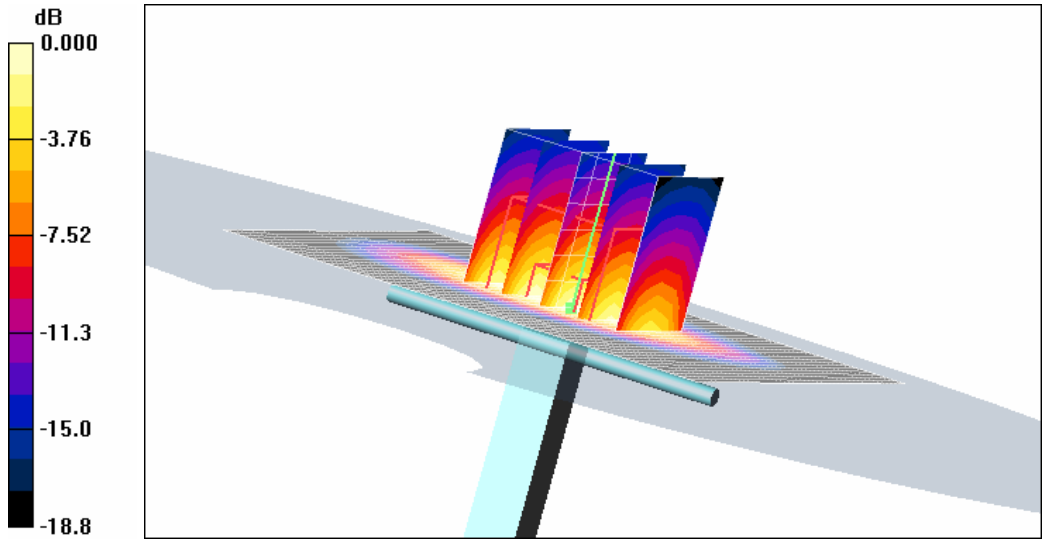
DUT: Dipole 1900 MHz; Serial: 5d082
Program Name: 1900MHz Dipole Validation 2011.09.26
Procedure Name: 1900MHz @ 100mW
Meas. Ambient Temp(celsius)-22.4Tissue Temp(celsius)-21.8;Test Date-26/Sep/2011

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

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #1; Type: SAM; Serial: TP-1364
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 5.77 mW/g

1900MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 53.0 V/m; Power Drift = -0.144 dB
Peak SAR (extrapolated) = 8.06 W/kg
SAR(1 g) = 4.26 mW/g; SAR(10 g) = 2.18 mW/g
Maximum value of SAR (measured) = 4.70 mW/g



0 dB = 4.70mW/g

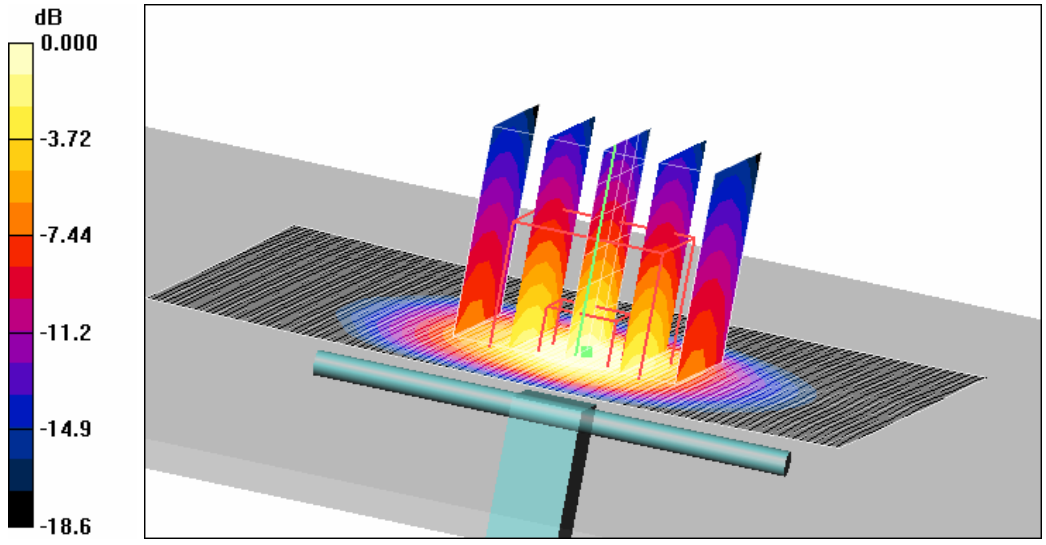
DUT: Dipole 1900 MHz; Serial: 5d082
Program Name: 1900MHz Dipole Validation 2011.09.26
Procedure Name: 1900MHz @ 100mW
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-26/Sep/2011

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.51 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 4.59 mW/g

1900MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.5 V/m; Power Drift = -0.031 dB
Peak SAR (extrapolated) = 7.24 W/kg
SAR(1 g) = 3.92 mW/g; SAR(10 g) = 2.04 mW/g
Maximum value of SAR (measured) = 4.36 mW/g



0 dB = 4.36mW/g

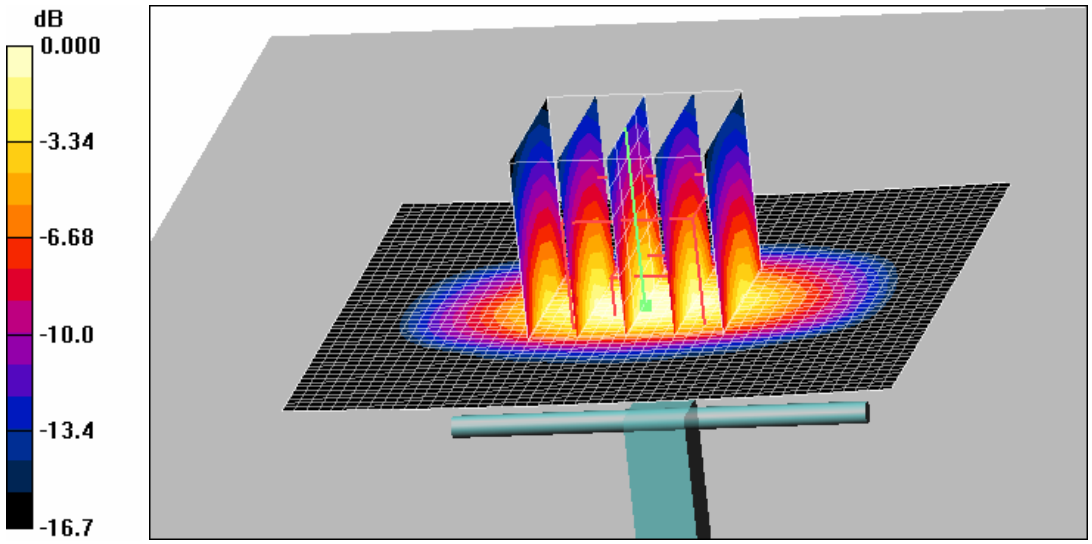
DUT: Dipole 1900 MHz; Serial: 5d082
Program Name: 1900MHz Dipole Validation 2011.10.13
Procedure Name: 1900MHz @ 100mW
Meas. Ambient Temp(celsius)-22.9,Tissue Temp(celsius)-22.4;Test Date-13/Oct/2011

Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.52 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

1900MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 5.36 mW/g

1900MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.2 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 7.16 W/kg
SAR(1 g) = 4.03 mW/g; SAR(10 g) = 2.13 mW/g
Maximum value of SAR (measured) = 4.53 mW/g



0 dB = 4.53mW/g

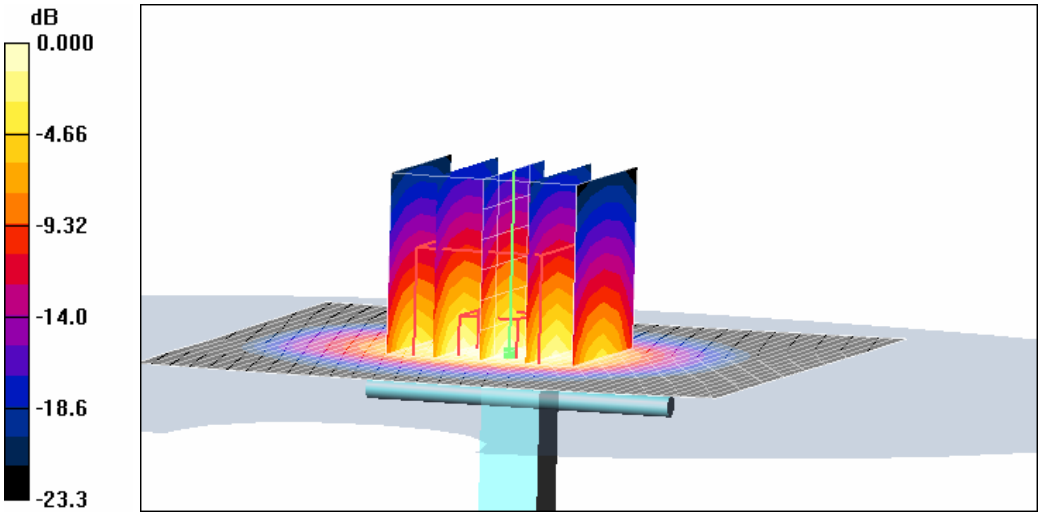
DUT: Dipole 2450 MHz; Serial: D2450V2 - SN:708
Program Name: 2450MHz Dipole Validation 2011.09.29
Procedure Name: 2450MHz @ 100mW
Meas. Ambient Temp(celsius)-22.1,Tissue Temp(celsius)-21.5;Test Date-29/Sep/2011

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.89 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

2450MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 7.49 mW/g

2450MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 56.8 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 12.1 W/kg
SAR(1 g) = 5.57 mW/g; SAR(10 g) = 2.54 mW/g
Maximum value of SAR (measured) = 6.25 mW/g



0 dB = 6.25mW/g

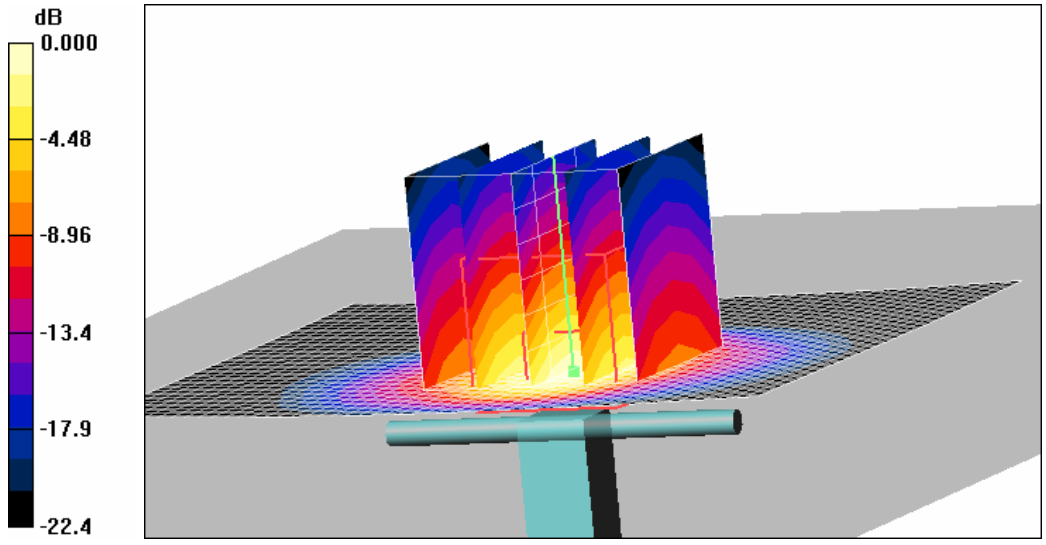
DUT: Dipole 2450 MHz; Serial: D2450V2 - SN:708
Program Name: 2450MHz Dipole Validation 2011.09.27
Procedure Name: 2450MHz @ 100mW
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-21.9;Test Date-27/Sep/2011

Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.96 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

2450MHz @ 100mW/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 5.63 mW/g

2450MHz @ 100mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.0 V/m; Power Drift = -0.037 dB
Peak SAR (extrapolated) = 10.3 W/kg
SAR(1 g) = 4.95 mW/g; SAR(10 g) = 2.26 mW/g
Maximum value of SAR (measured) = 5.64 mW/g



0 dB = 5.64mW/g

APPENDIX E

Plots of The SAR Measurements

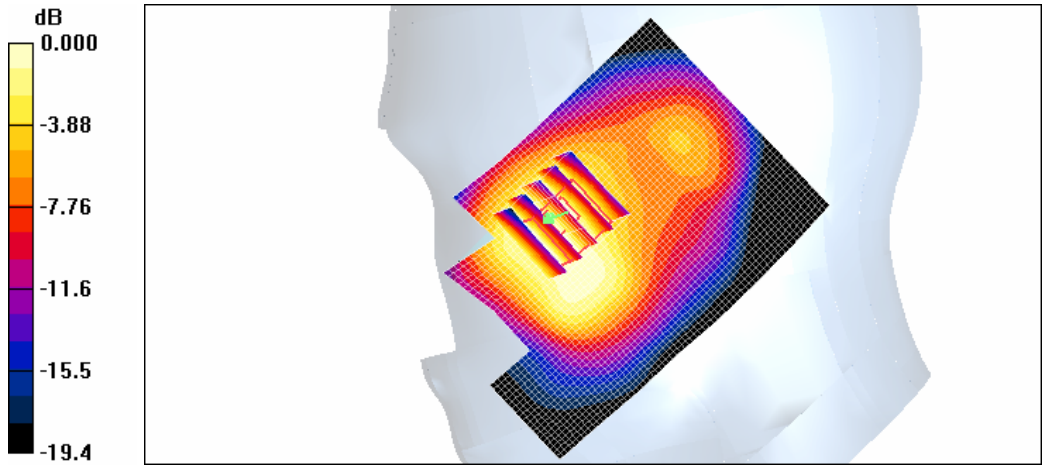
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GSM1900 Right (Job No. : FI-226)
Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4Tissue Temp(celsius)-21.8;Test Date-26/Sep/2011

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

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #1; Type: SAM; Serial: TP-1364
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.469 mW/g

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.6 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 0.683 W/kg
SAR(1 g) = 0.452 mW/g; SAR(10 g) = 0.279 mW/g
Maximum value of SAR (measured) = 0.488 mW/g



0 dB = 0.488mW/g

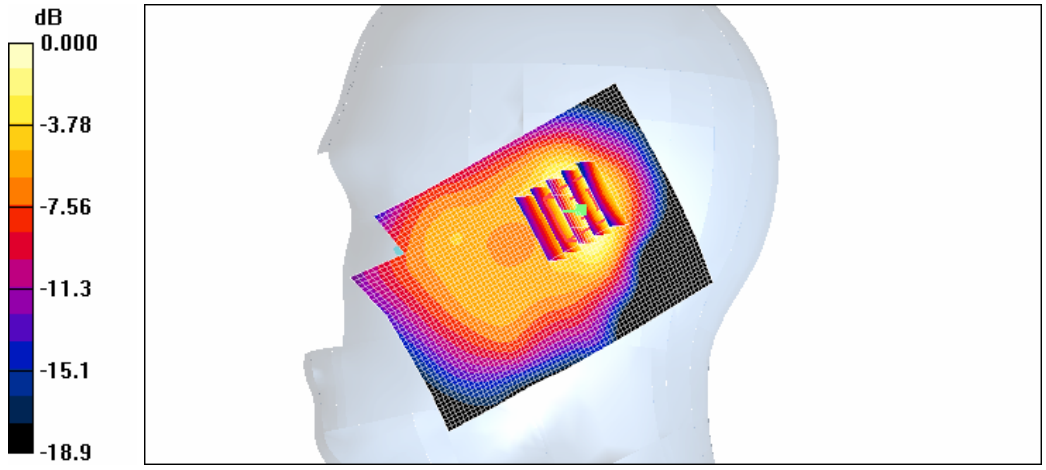
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GSM1900 Right (Job No. : FI-226)
Procedure Name: Tilt, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4Tissue Temp(celsius)-21.8;Test Date-26/Sep/2011

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

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #1; Type: SAM; Serial: TP-1364
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.246 mW/g

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.5 V/m; Power Drift = 0.147 dB
Peak SAR (extrapolated) = 0.354 W/kg
SAR(1 g) = 0.216 mW/g; SAR(10 g) = 0.121 mW/g
Maximum value of SAR (measured) = 0.230 mW/g



0 dB = 0.230mW/g

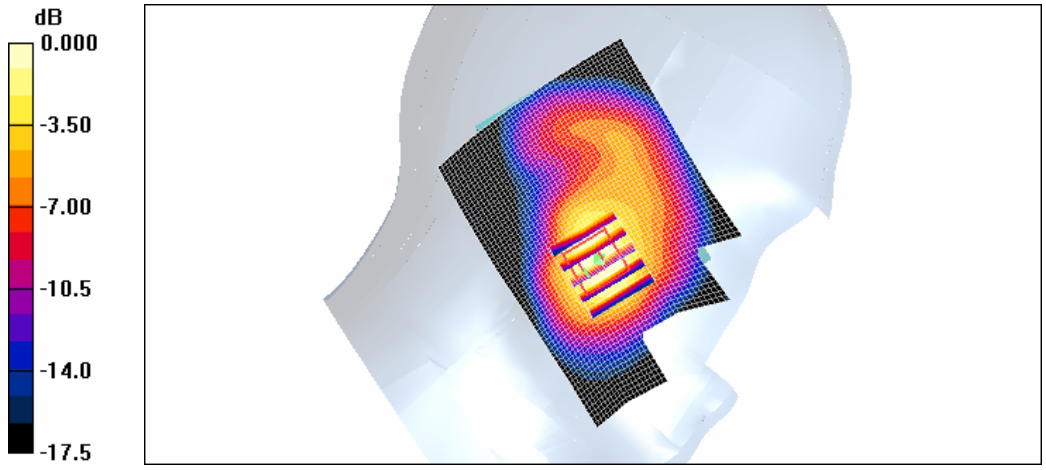
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GSM1900 Left (Job No. : FI-226)
Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4Tissue Temp(celsius)-21.8;Test Date-26/Sep/2011

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

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #1; Type: SAM; Serial: TP-1364
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.850 mW/g

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.4 V/m; Power Drift = 0.159 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.735 mW/g; SAR(10 g) = 0.410 mW/g
Maximum value of SAR (measured) = 0.760 mW/g



0 dB = 0.760mW/g

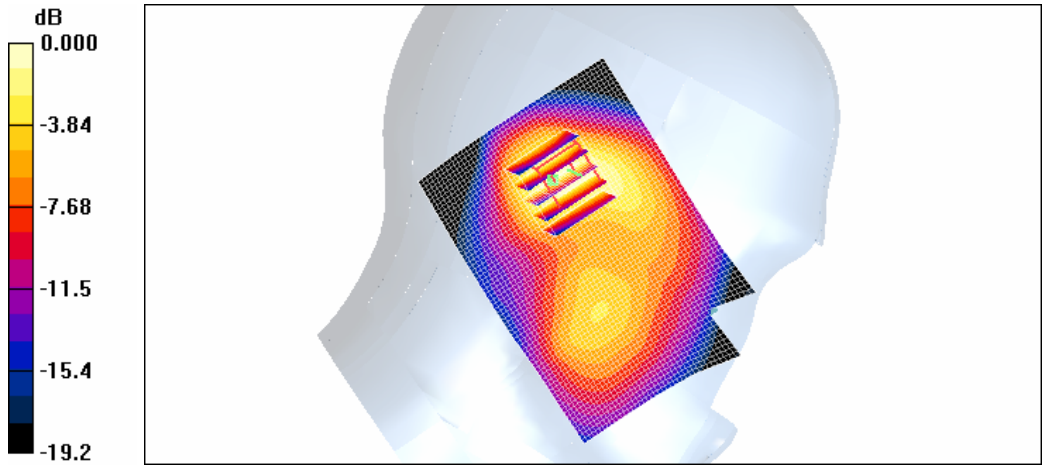
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GSM1900 Left (Job No. : FI-226)
Procedure Name: Tilt, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4Tissue Temp(celsius)-21.8;Test Date-26/Sep/2011

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

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #1; Type: SAM; Serial: TP-1364
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.198 mW/g

Tilt, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 12.7 V/m; Power Drift = 0.045 dB
Peak SAR (extrapolated) = 0.339 W/kg
SAR(1 g) = 0.211 mW/g; SAR(10 g) = 0.120 mW/g
Maximum value of SAR (measured) = 0.229 mW/g



0 dB = 0.229mW/g

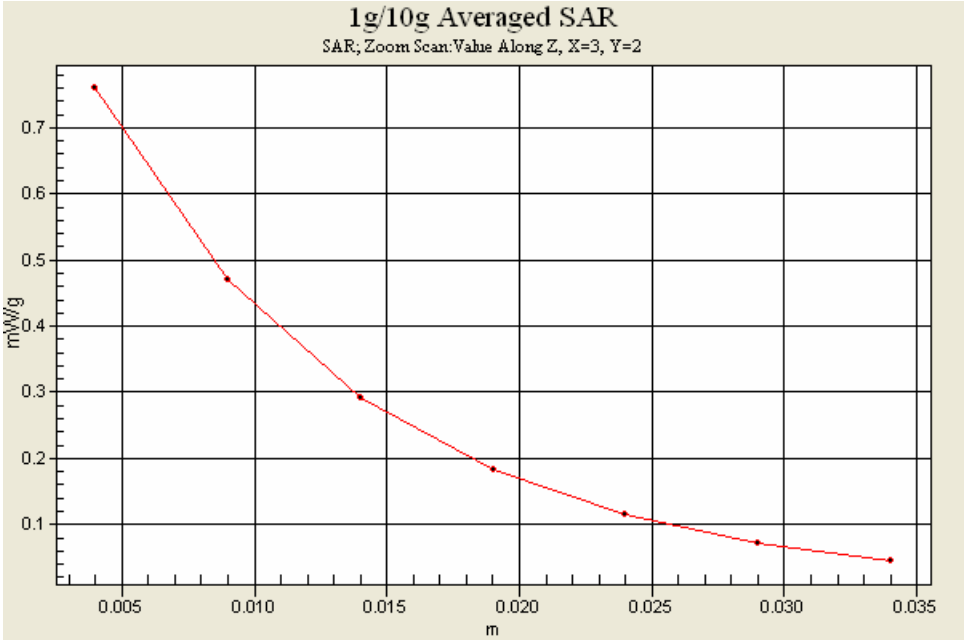
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GSM1900 Left (Job No. : FI-226)
Procedure Name: Cheek, Ch.661, Ant.Intenna, Bat.Standard
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-21.8;Test Date-26/Sep/2011

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

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.16, 7.16, 7.16); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #1; Type: SAM; Serial: TP-1364
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.850 mW/g

Cheek, Ch.661, Ant.Intenna, Bat.Standard/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.4 V/m; Power Drift = 0.159 dB
Peak SAR (extrapolated) = 1.22 W/kg
SAR(1 g) = 0.735 mW/g; SAR(10 g) = 0.410 mW/g
Maximum value of SAR (measured) = 0.760 mW/g



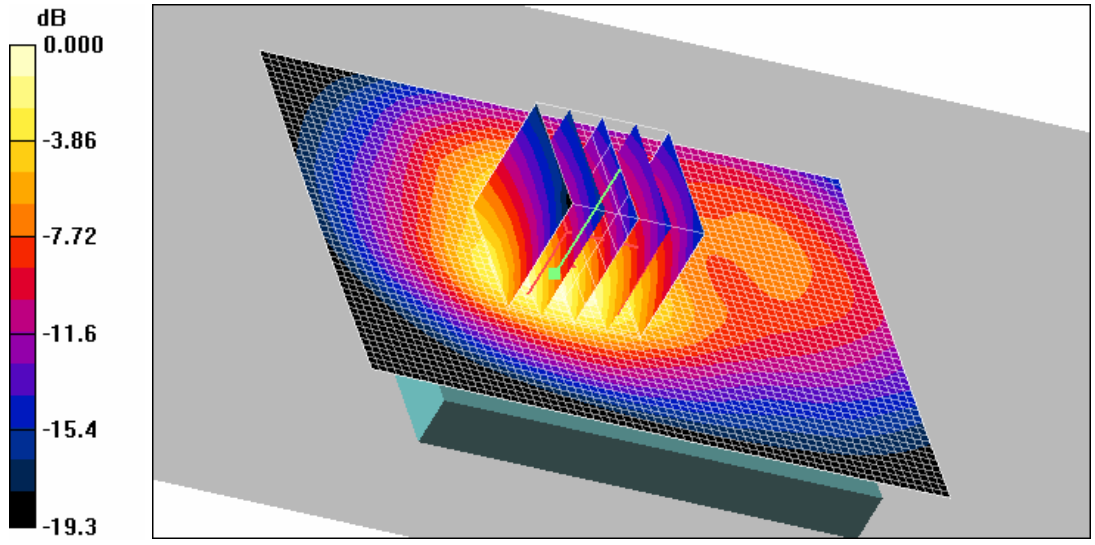
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GPRS1900 Body (Job No. : FI-226)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.9,Tissue Temp(celsius)-22.4;Test Date-13/Oct/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- ; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.524 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.6 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 0.793 W/kg
SAR(1 g) = 0.445 mW/g; SAR(10 g) = 0.246 mW/g
Maximum value of SAR (measured) = 0.493 mW/g



0 dB = 0.493mW/g

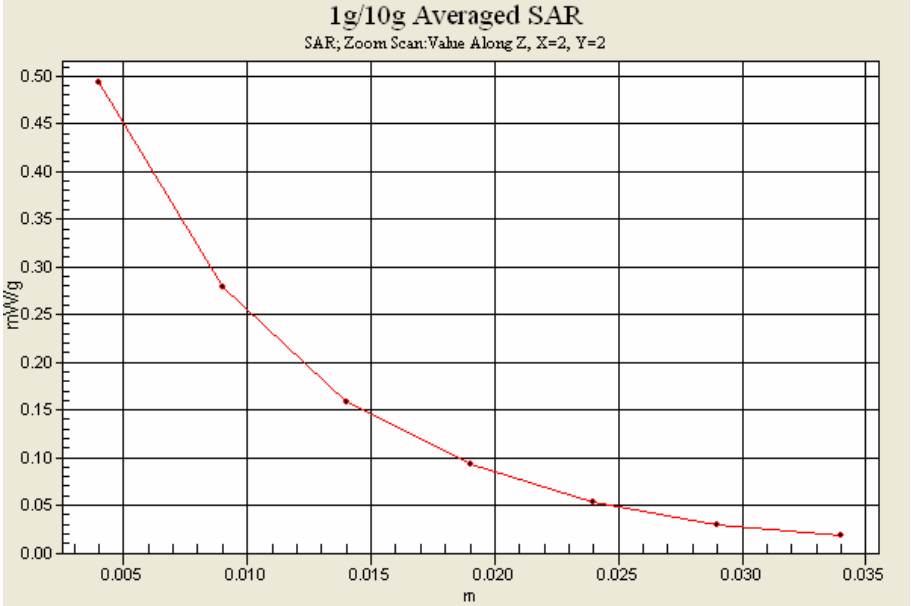
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GPRS1900 Body (Job No. : FI-226)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.9,Tissue Temp(celsius)-22.4;Test Date-13/Oct/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:8.3
Medium parameters used: f = 1880 MHz; σ = 1.52 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- ; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.524 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 15.6 V/m; Power Drift = -0.024 dB
Peak SAR (extrapolated) = 0.793 W/kg
SAR(1 g) = 0.445 mW/g; SAR(10 g) = 0.246 mW/g
Maximum value of SAR (measured) = 0.493 mW/g



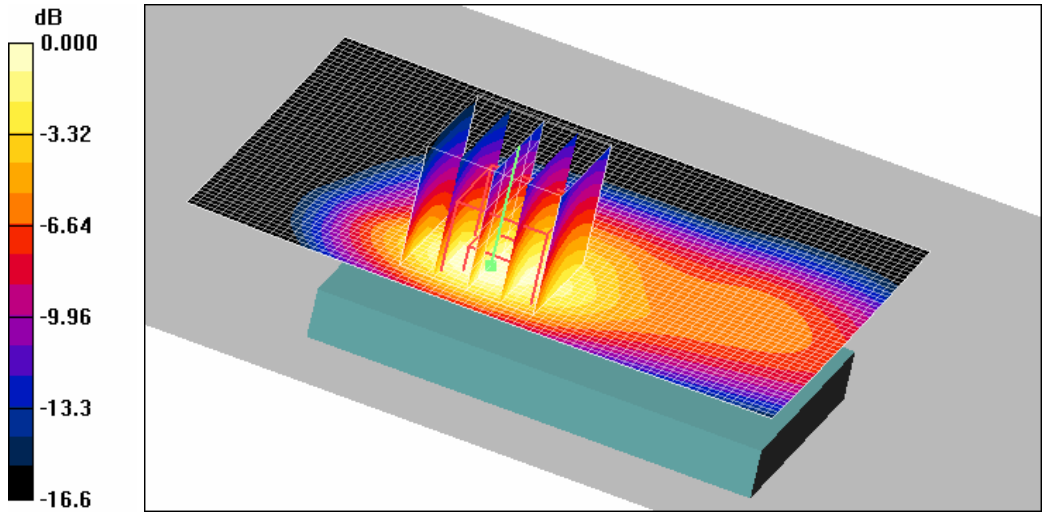
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GPRS1900 Body (Job No. : FI-226)
Procedure Name: Body, Ch.512, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-26/Sep/2011

Communication System: Body GPRS ; Frequency: 1850.2 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1850.2 MHz; σ = 1.51 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.512, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.904 mW/g

Body, Ch.512, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.5 V/m; Power Drift = 0.033 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.775 mW/g; SAR(10 g) = 0.447 mW/g
Maximum value of SAR (measured) = 0.847 mW/g



0 dB = 0.847mW/g

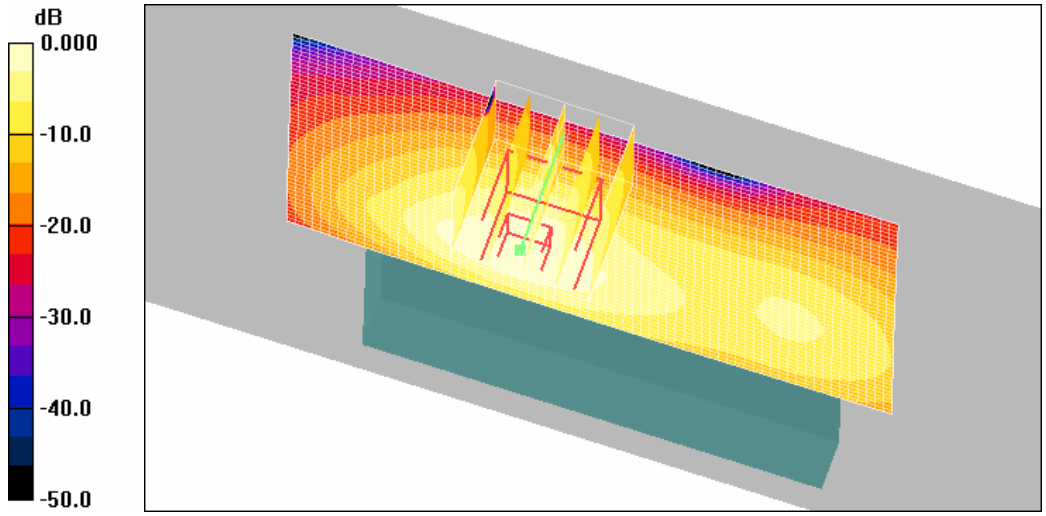
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GPRS1900 Body (Job No. : FI-226)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-26/Sep/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.51 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.07 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 0.938 mW/g; SAR(10 g) = 0.540 mW/g
Maximum value of SAR (measured) = 1.03 mW/g



0 dB = 1.03mW/g

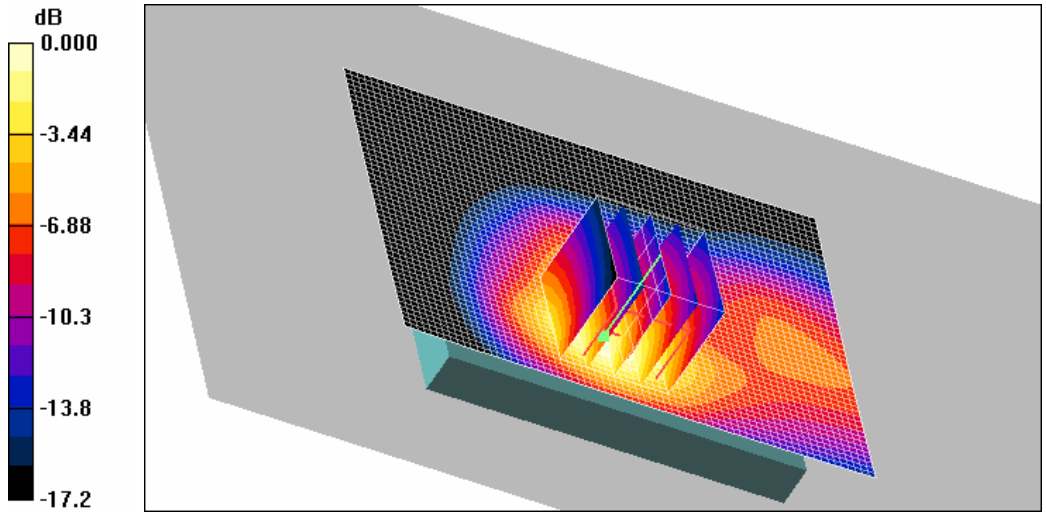
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GPRS1900 Body (Job No. : FI-226)
Procedure Name: Body, Ch.810, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-26/Sep/2011

Communication System: Body GPRS ; Frequency: 1909.8 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1909.8 MHz; σ = 1.51 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.810, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.982 mW/g

Body, Ch.810, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = 0.046 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 0.842 mW/g; SAR(10 g) = 0.481 mW/g
Maximum value of SAR (measured) = 0.927 mW/g



0 dB = 0.927mW/g

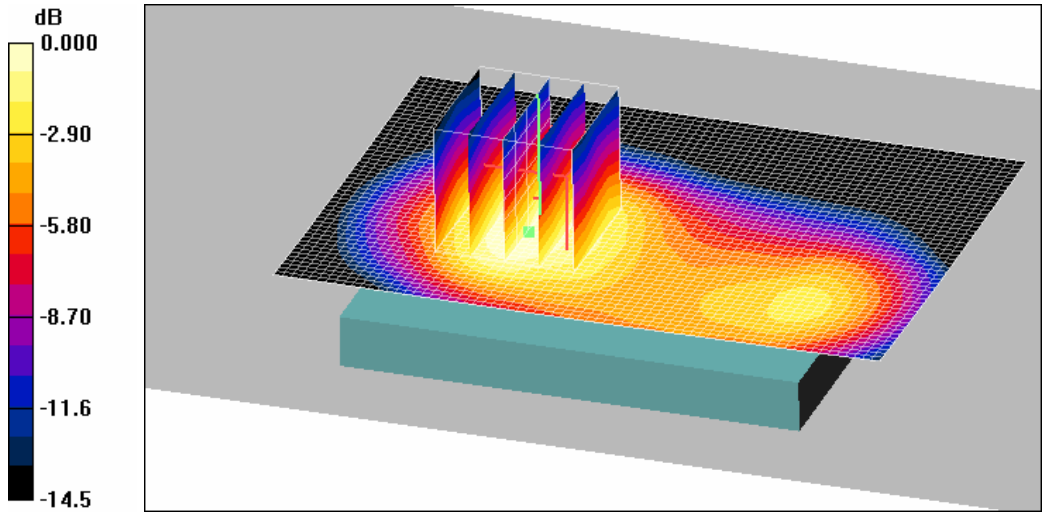
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GPRS1900 Body (Job No. : FI-226)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Front
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-26/Sep/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.51 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard Front/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.601 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Front/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.2 V/m; Power Drift = -0.030 dB
Peak SAR (extrapolated) = 0.901 W/kg
SAR(1 g) = 0.549 mW/g; SAR(10 g) = 0.331 mW/g
Maximum value of SAR (measured) = 0.600 mW/g



0 dB = 0.600mW/g

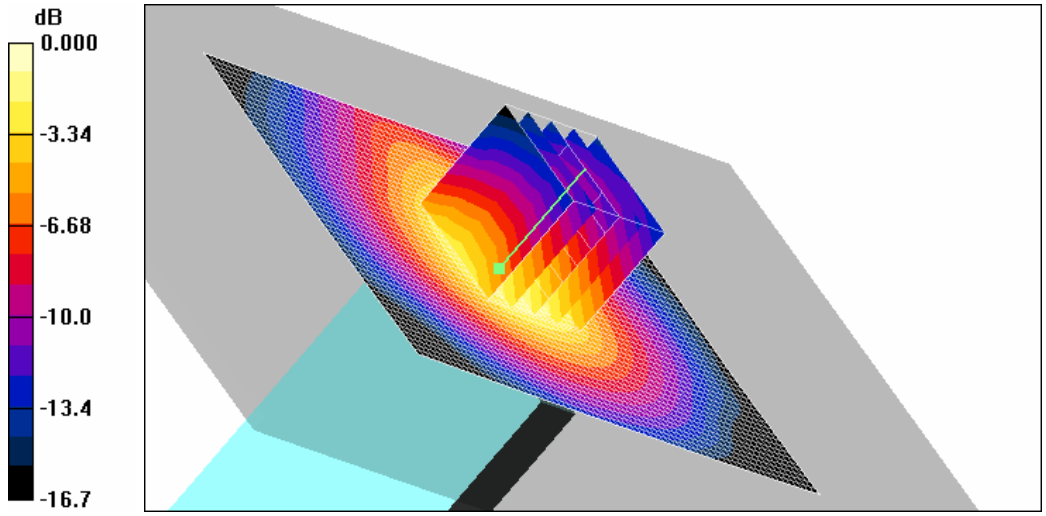
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GPRS1900 Body (Job No. : FI-226)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Bottom
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-26/Sep/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.51 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard Bottom/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.304 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Bottom/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.6 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 0.477 W/kg
SAR(1 g) = 0.304 mW/g; SAR(10 g) = 0.184 mW/g
Maximum value of SAR (measured) = 0.329 mW/g



0 dB = 0.329mW/g

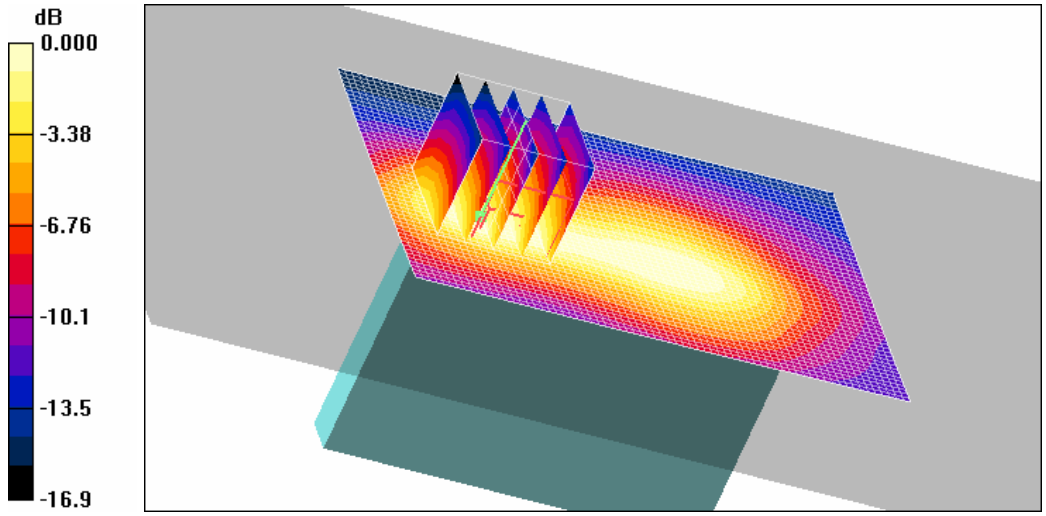
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GPRS1900 Body (Job No. : FI-226)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Left
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-26/Sep/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.51 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard Left/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.199 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Left/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.75 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 0.279 W/kg
SAR(1 g) = 0.176 mW/g; SAR(10 g) = 0.105 mW/g
Maximum value of SAR (measured) = 0.191 mW/g



0 dB = 0.191mW/g

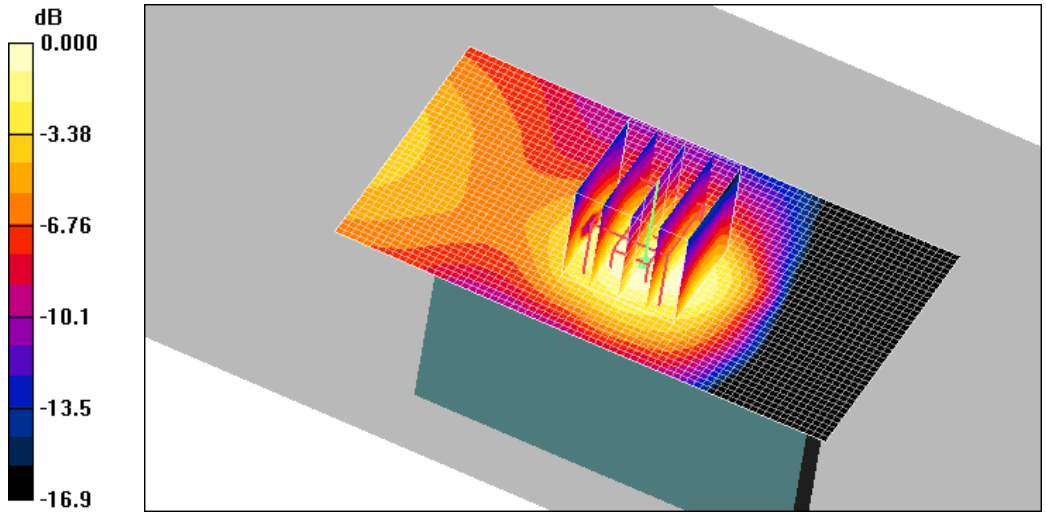
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GPRS1900 Body (Job No. : FI-226)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Right
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-26/Sep/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.51 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard Right/Area Scan (41x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.100 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Right/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.49 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 0.164 W/kg
SAR(1 g) = 0.087 mW/g; SAR(10 g) = 0.052 mW/g
Maximum value of SAR (measured) = 0.095 mW/g



0 dB = 0.095mW/g

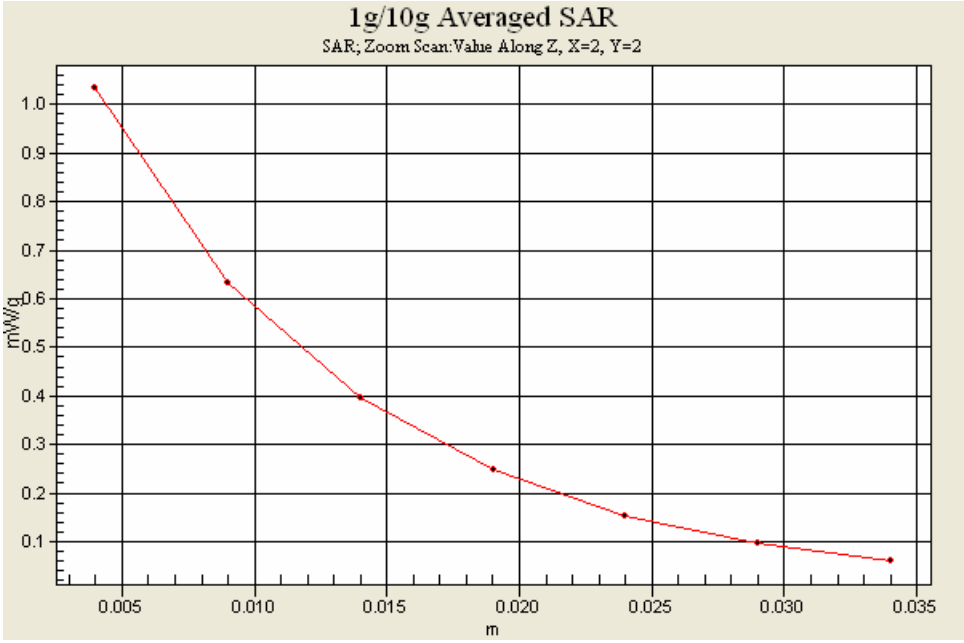
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 GPRS1900 Body (Job No. : FI-226)
Procedure Name: Body, Ch.661, Ant.Intenna, Bat.Standard Back
Meas. Ambient Temp(celsius)-22.4,Tissue Temp(celsius)-22.1;Test Date-26/Sep/2011

Communication System: Body GPRS ; Frequency: 1880 MHz;Duty Cycle: 1:4.15
Medium parameters used: f = 1880 MHz; σ = 1.51 mho/m; ε_r = 51.9; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(7.12, 7.12, 7.12); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.661, Ant.Intenna, Bat.Standard Back/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 1.07 mW/g

Body, Ch.661, Ant.Intenna, Bat.Standard Back/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.3 V/m; Power Drift = -0.063 dB
Peak SAR (extrapolated) = 1.59 W/kg
SAR(1 g) = 0.938 mW/g; SAR(10 g) = 0.540 mW/g
Maximum value of SAR (measured) = 1.03 mW/g



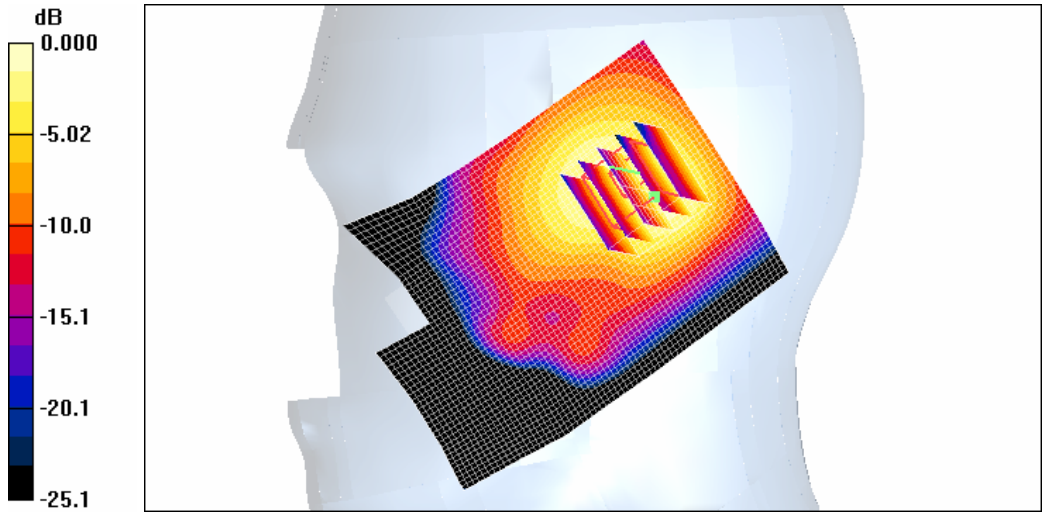
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Right(Job No. : FI-226)
Procedure Name: Cheek, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps
Meas. Ambient Temp(celsius)-22.1,Tissue Temp(celsius)-21.5;Test Date-29/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.89 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.170 mW/g

Cheek, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps/Zoom Scan 2 (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.91 V/m; Power Drift = 0.065 dB
Peak SAR (extrapolated) = 0.305 W/kg
SAR(1 g) = 0.166 mW/g; SAR(10 g) = 0.087 mW/g
Maximum value of SAR (measured) = 0.192 mW/g



0 dB = 0.192mW/g

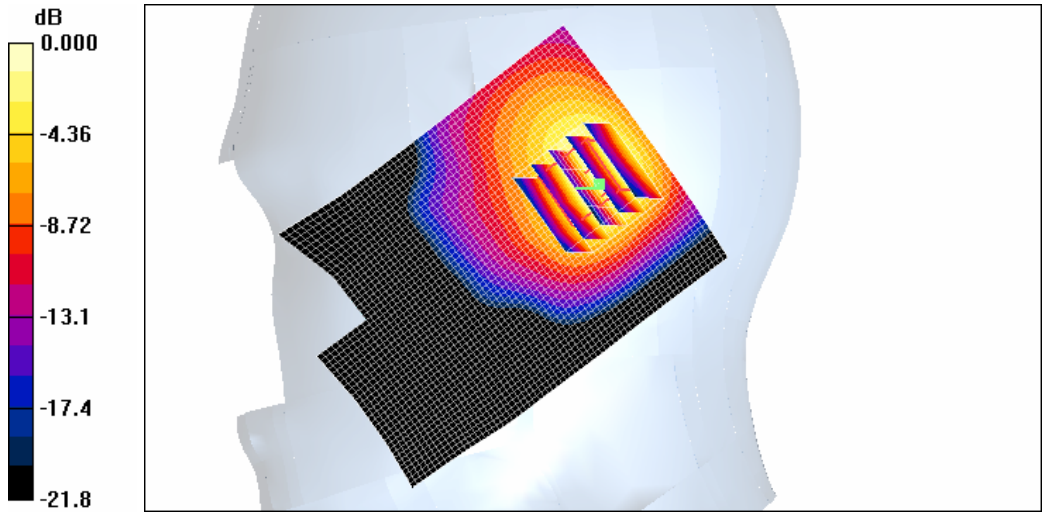
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Right(Job No. : FI-226)
Procedure Name: Tilted, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps
Meas. Ambient Temp(celsius)-22.1,Tissue Temp(celsius)-21.5;Test Date-29/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.89 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilted, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.202 mW/g

Tilted, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.72 V/m; Power Drift = -0.020 dB
Peak SAR (extrapolated) = 0.328 W/kg
SAR(1 g) = 0.174 mW/g; SAR(10 g) = 0.093 mW/g
Maximum value of SAR (measured) = 0.186 mW/g



0 dB = 0.186mW/g

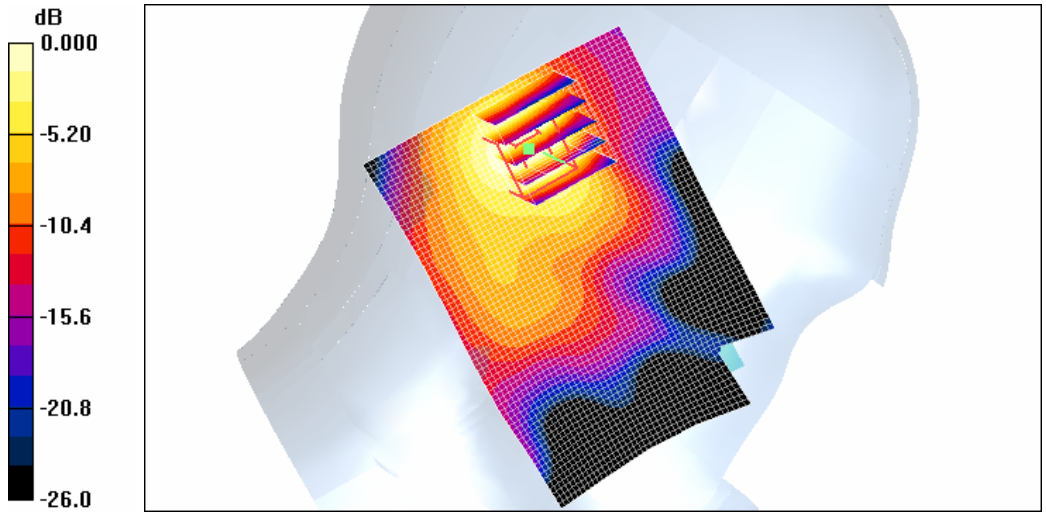
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Left(Job No. : FI-226)
Procedure Name: Cheek, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps
Meas. Ambient Temp(celsius)-22.1,Tissue Temp(celsius)-21.5;Test Date-29/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.89 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Cheek, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.226 mW/g

Cheek, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = -0.033 dB
Peak SAR (extrapolated) = 0.380 W/kg
SAR(1 g) = 0.193 mW/g; SAR(10 g) = 0.099 mW/g
Maximum value of SAR (measured) = 0.199 mW/g



0 dB = 0.199mW/g

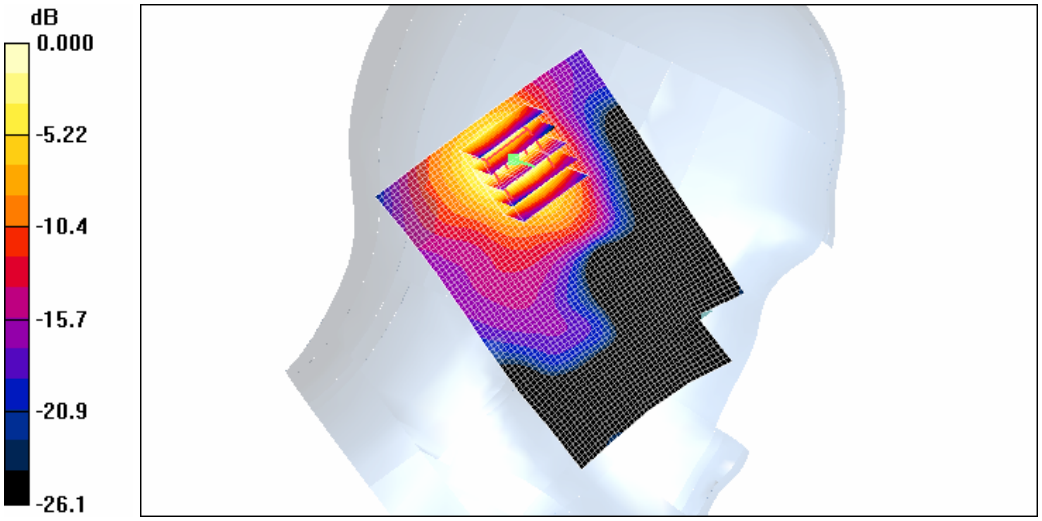
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Left(Job No. : FI-226)
Procedure Name: Tilted, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps
Meas. Ambient Temp(celsius)-22.1,Tissue Temp(celsius)-21.5;Test Date-29/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.89 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilted, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.334 mW/g

Tilted, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.1 V/m; Power Drift = -0.056 dB
Peak SAR (extrapolated) = 0.529 W/kg
SAR(1 g) = 0.261 mW/g; SAR(10 g) = 0.129 mW/g
Maximum value of SAR (measured) = 0.290 mW/g



0 dB = 0.290mW/g

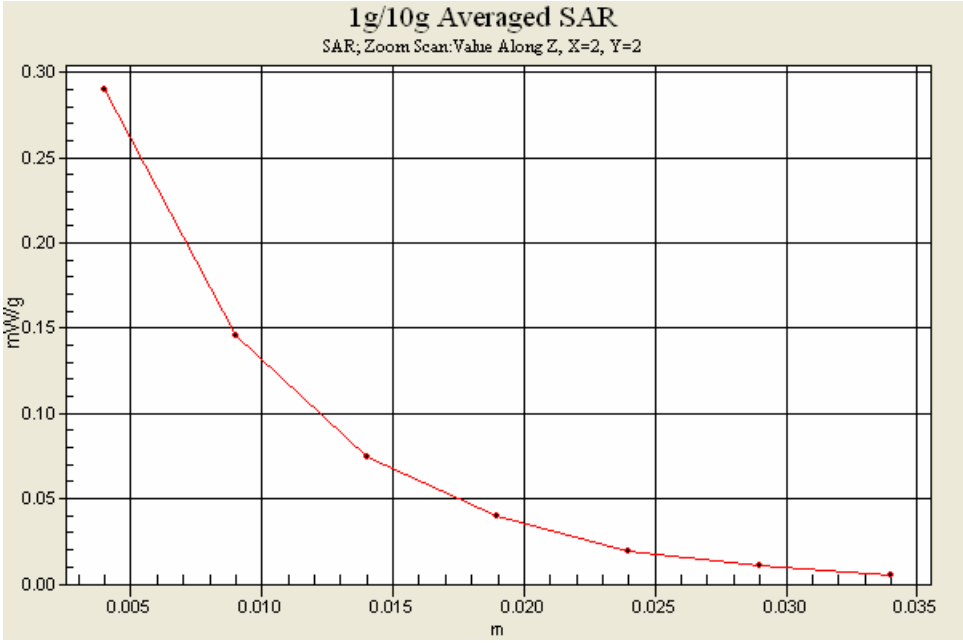
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Left(Job No. : FI-226)
Procedure Name: Tilted, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps
Meas. Ambient Temp(celsius)-22.1,Tissue Temp(celsius)-21.5;Test Date-29/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.89 mho/m; ε_r = 37.5; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.47, 6.47, 6.47); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: PHANTOM #2; Type: SAM; Serial: TP-1604
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Tilted, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.334 mW/g

Tilted, Ch.01, Ant.Intenna, Bat.Standard, 1Mbps/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.1 V/m; Power Drift = -0.056 dB
Peak SAR (extrapolated) = 0.529 W/kg
SAR(1 g) = 0.261 mW/g; SAR(10 g) = 0.129 mW/g
Maximum value of SAR (measured) = 0.290 mW/g



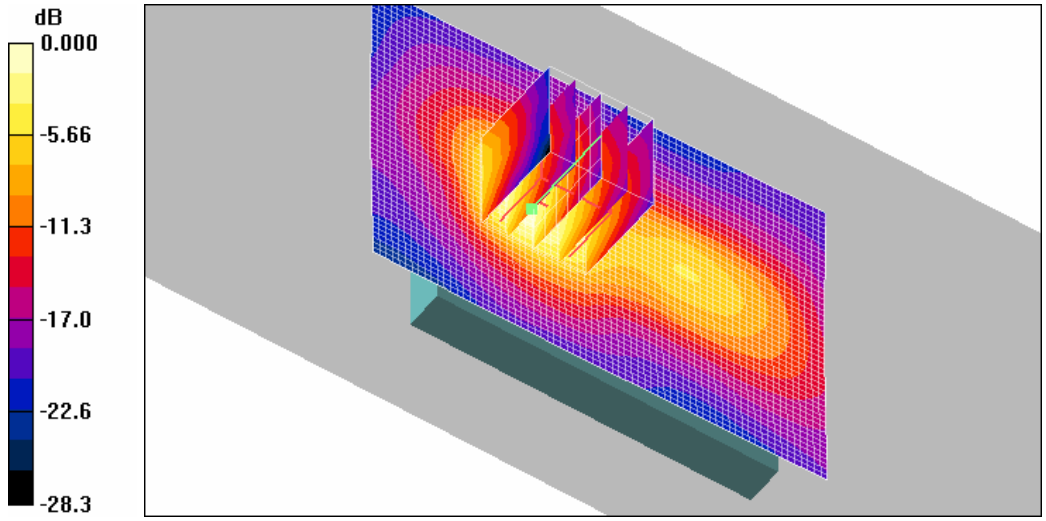
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Body (Job No. : FI-226)
Procedure Name: Body, Ch.01, Ant.Intenna, Bat.Standard Back 1Mbps
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-21.9;Test Date-27/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.96 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.01, Ant.Intenna, Bat.Standard Back 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.404 mW/g

Body, Ch.01, Ant.Intenna, Bat.Standard Back 1Mbps/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.74 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 0.807 W/kg
SAR(1 g) = 0.362 mW/g; SAR(10 g) = 0.165 mW/g
Maximum value of SAR (measured) = 0.416 mW/g



0 dB = 0.416mW/g

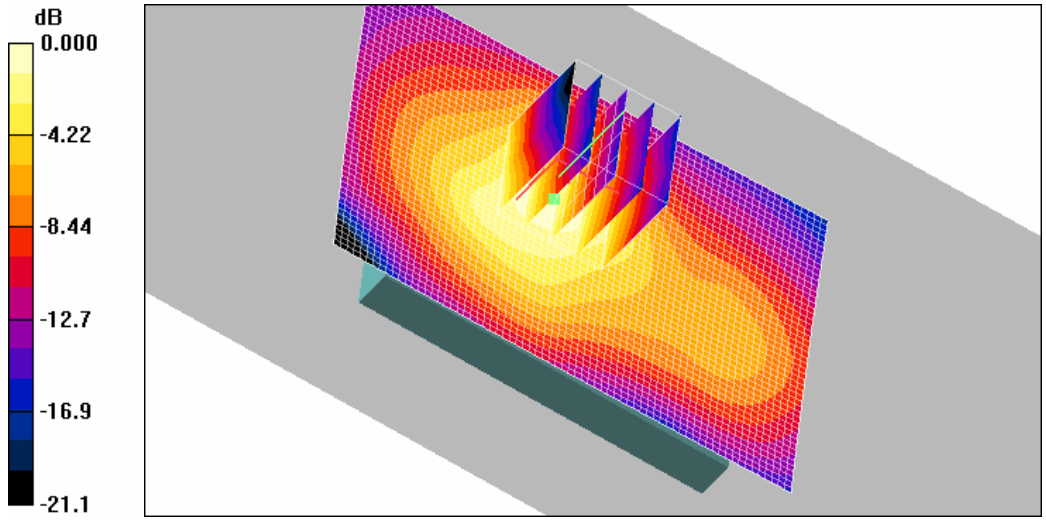
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Body (Job No. : FI-226)
Procedure Name: Body, Ch.01, Ant.Intenna, Bat.Standard Front 1Mbps
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-21.9;Test Date-27/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.96 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.01, Ant.Intenna, Bat.Standard Front 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.282 mW/g

Body, Ch.01, Ant.Intenna, Bat.Standard Front 1Mbps/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.10 V/m; Power Drift = 0.031 dB
Peak SAR (extrapolated) = 0.570 W/kg
SAR(1 g) = 0.272 mW/g; SAR(10 g) = 0.142 mW/g
Maximum value of SAR (measured) = 0.286 mW/g



0 dB = 0.286mW/g

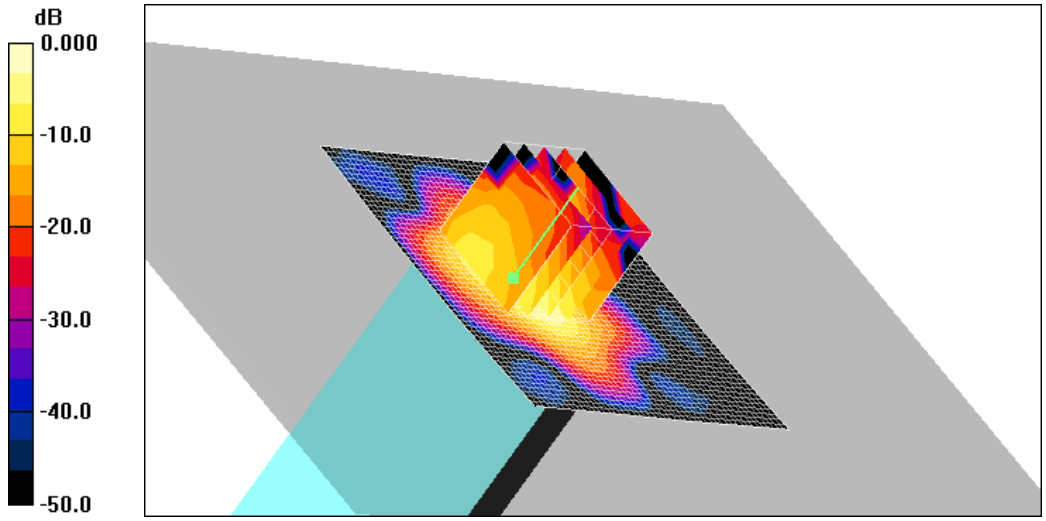
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Body (Job No. : FI-226)
Procedure Name: Body, Ch.01, Ant.Intenna, Bat.Standard Top 1Mbps
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-21.9;Test Date-27/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.96 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.01, Ant.Intenna, Bat.Standard Top 1Mbps/Area Scan (51x51x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.129 mW/g

Body, Ch.01, Ant.Intenna, Bat.Standard Top 1Mbps/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.21 V/m; Power Drift = 0.145 dB
Peak SAR (extrapolated) = 0.316 W/kg
SAR(1 g) = 0.133 mW/g; SAR(10 g) = 0.048 mW/g
Maximum value of SAR (measured) = 0.140 mW/g



0 dB = 0.140mW/g

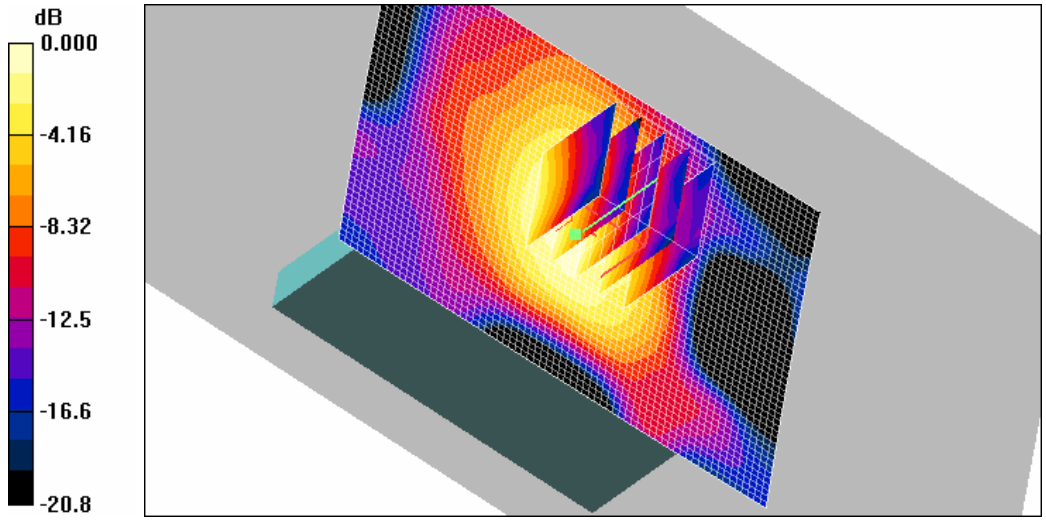
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Body (Job No. : FI-226)
Procedure Name: Body, Ch.01, Ant.Intenna, Bat.Standard Left 1Mbps
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-21.9;Test Date-27/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.96 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.01, Ant.Intenna, Bat.Standard Left 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.092 mW/g

Body, Ch.01, Ant.Intenna, Bat.Standard Left 1Mbps/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.96 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 0.162 W/kg
SAR(1 g) = 0.088 mW/g; SAR(10 g) = 0.049 mW/g
Maximum value of SAR (measured) = 0.094 mW/g



0 dB = 0.094mW/g

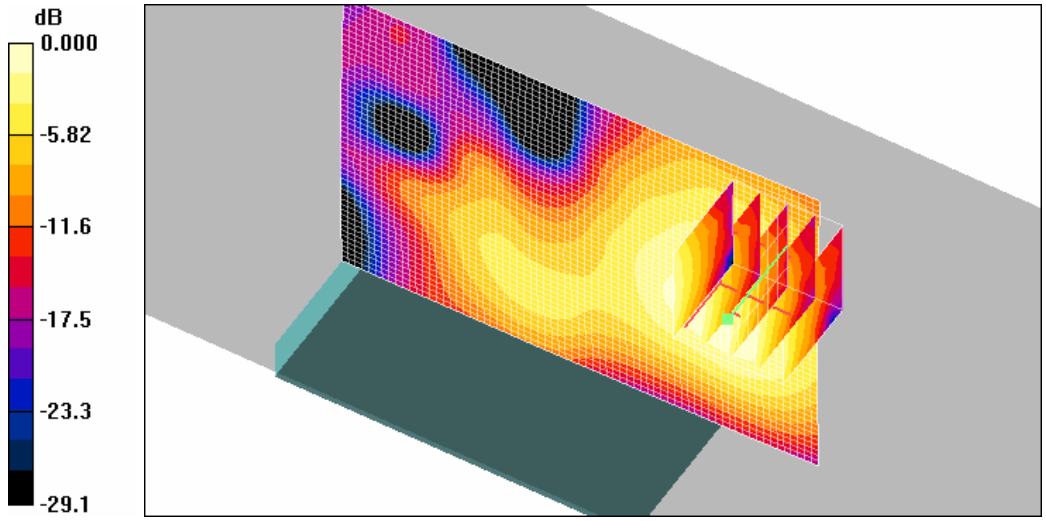
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Body (Job No. : FI-226)
Procedure Name: Body, Ch.01, Ant.Intenna, Bat.Standard Right 1Mbps
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-21.9;Test Date-27/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.96 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.01, Ant.Intenna, Bat.Standard Right 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.092 mW/g

Body, Ch.01, Ant.Intenna, Bat.Standard Right 1Mbps/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.32 V/m; Power Drift = -0.085 dB
Peak SAR (extrapolated) = 0.161 W/kg
SAR(1 g) = 0.086 mW/g; SAR(10 g) = 0.049 mW/g
Maximum value of SAR (measured) = 0.093 mW/g



0 dB = 0.093mW/g

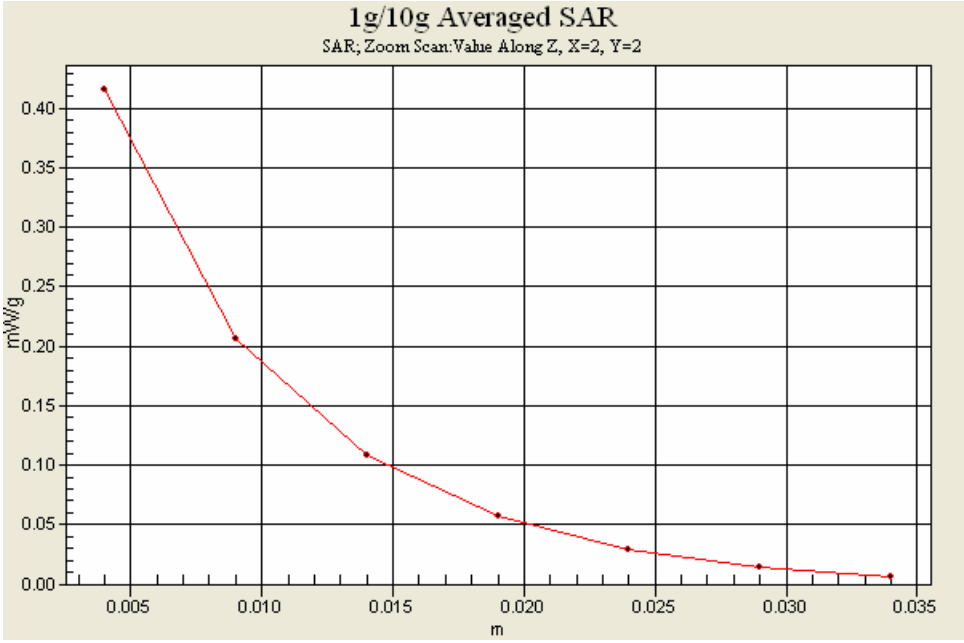
DUT: GT-S5368; Serial: FI-226-C
Program Name: GT-S5368 WLAN Body (Job No. : FI-226)
Procedure Name: Body, Ch.01, Ant.Intenna, Bat.Standard Back 1Mbps
Meas. Ambient Temp(celsius)-22.5,Tissue Temp(celsius)-21.9;Test Date-27/Sep/2011

Communication System: WLAN; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.96 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3750; ConvF(6.76, 6.76, 6.76); Calibrated: 2011-04-14
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn486; Calibrated: 2011-02-22
- Phantom: Triple Flat Phantom 5.1; Type: Triple Flat Phantom 5.1; Serial: MP-1010
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

Body, Ch.01, Ant.Intenna, Bat.Standard Back 1Mbps/Area Scan (51x71x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (interpolated) = 0.404 mW/g

Body, Ch.01, Ant.Intenna, Bat.Standard Back 1Mbps/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.74 V/m; Power Drift = 0.020 dB
Peak SAR (extrapolated) = 0.807 W/kg
SAR(1 g) = 0.362 mW/g; SAR(10 g) = 0.165 mW/g
Maximum value of SAR (measured) = 0.416 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: EX3-3750_Apr11

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3750

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

Calibration date: April 14, 2011

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41495277	31-Mar-11 (No. 217-01372)	Apr-12
Power sensor E4412A	MY41498087	31-Mar-11 (No. 217-01372)	Apr-12
Reference 3 dB Attenuator	SN: S5054 (3c)	29-Mar-11 (No. 217-01369)	Apr-12
Reference 20 dB Attenuator	SN: S5086 (20b)	29-Mar-11 (No. 217-01367)	Apr-12
Reference 30 dB Attenuator	SN: S5129 (30b)	29-Mar-11 (No. 217-01370)	Apr-12
Reference Probe ES3DV2	SN: 3013	29-Dec-10 (No. ES3-3013_Dec10)	Dec-11
DAE4	SN: 654	23-Apr-10 (No. DAE4-654_Apr10)	Apr-11
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-10)	In house check: Oct-11

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

Issued: April 14, 2011

O.K to use
2011.5.31

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

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

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

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

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:3750

Manufactured: March 26, 2010
Calibrated: April 14, 2011

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3750

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.45	0.51	0.55	± 10.1 %
DCP (mV)[B]	96.3	100.0	95.8	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dB	C dB	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	107.2	±3.0 %
			Y	0.00	0.00	1.00	120.0	
			Z	0.00	0.00	1.00	115.4	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3750

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	41.9	0.89	8.65	8.65	8.65	0.79	0.69	± 12.0 %
850	41.5	0.92	8.26	8.26	8.26	0.79	0.70	± 12.0 %
1750	40.1	1.37	7.37	7.37	7.37	0.78	0.63	± 12.0 %
1900	40.0	1.40	7.16	7.16	7.16	0.71	0.68	± 12.0 %
2450	39.2	1.80	6.47	6.47	6.47	0.65	0.66	± 12.0 %
3500	37.9	2.91	5.92	5.92	5.92	0.26	1.50	± 13.1 %
5200	36.0	4.66	4.61	4.61	4.61	0.45	1.80	± 13.1 %
5300	35.9	4.76	4.40	4.40	4.40	0.45	1.80	± 13.1 %
5500	35.6	4.96	4.23	4.23	4.23	0.45	1.80	± 13.1 %
5600	35.5	5.07	4.01	4.01	4.01	0.50	1.80	± 13.1 %
5800	35.3	5.27	4.07	4.07	4.07	0.50	1.80	± 13.1 %

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

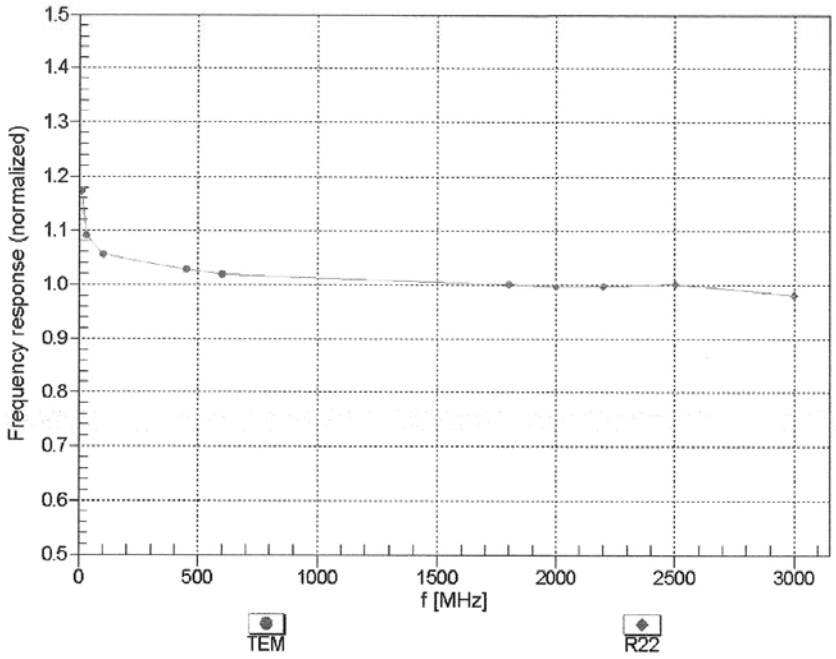
DASY/EASY - Parameters of Probe: EX3DV4- SN:3750

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha	Depth (mm)	Unct. (k=2)
750	55.5	0.96	8.48	8.48	8.48	0.79	0.72	± 12.0 %
850	55.2	0.99	8.34	8.34	8.34	0.79	0.70	± 12.0 %
1750	53.4	1.49	7.49	7.49	7.49	0.79	0.73	± 12.0 %
1900	53.3	1.52	7.12	7.12	7.12	0.79	0.70	± 12.0 %
2450	52.7	1.95	6.76	6.76	6.76	0.79	0.65	± 12.0 %
3500	51.3	3.31	5.67	5.67	5.67	0.28	1.60	± 13.1 %
5200	49.0	5.30	4.02	4.02	4.02	0.50	1.90	± 13.1 %
5300	48.9	5.42	3.83	3.83	3.83	0.52	1.90	± 13.1 %
5500	48.6	5.65	3.52	3.52	3.52	0.55	1.90	± 13.1 %
5600	48.5	5.77	3.35	3.35	3.35	0.58	1.90	± 13.1 %
5800	48.2	6.00	3.53	3.53	3.53	0.58	1.90	± 13.1 %

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

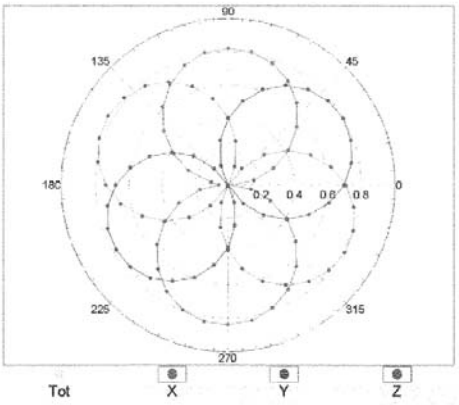
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



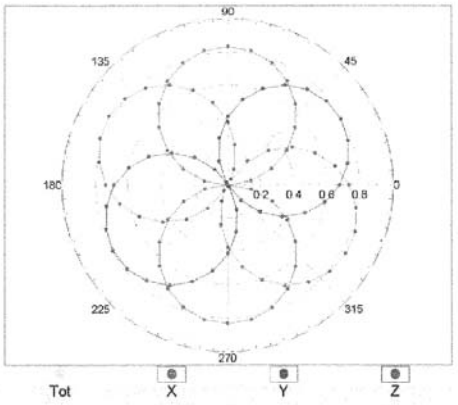
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

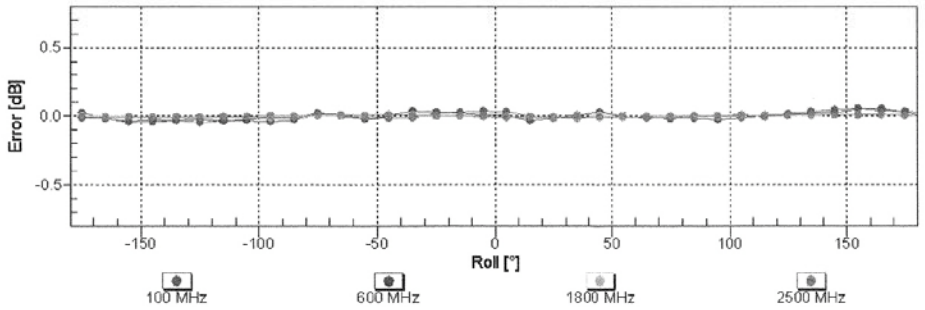
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



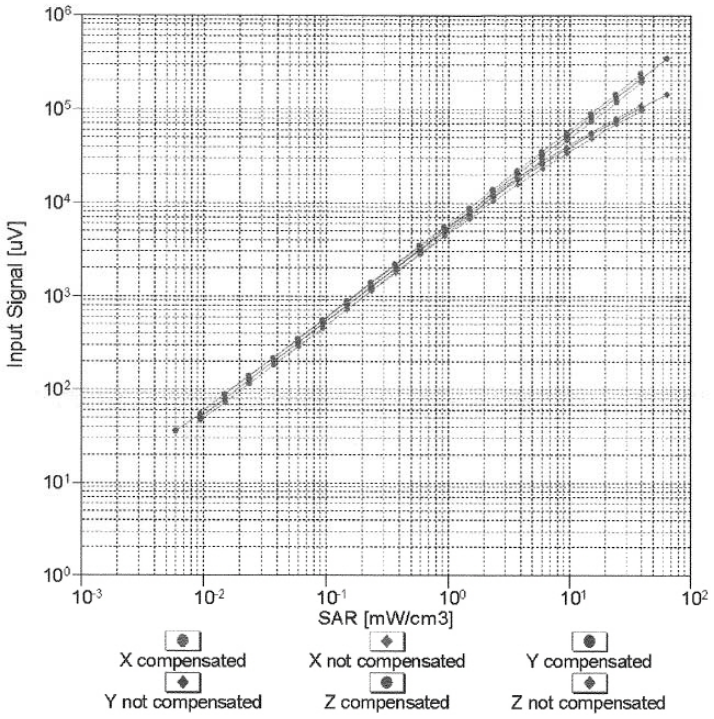
f=1800 MHz,R22

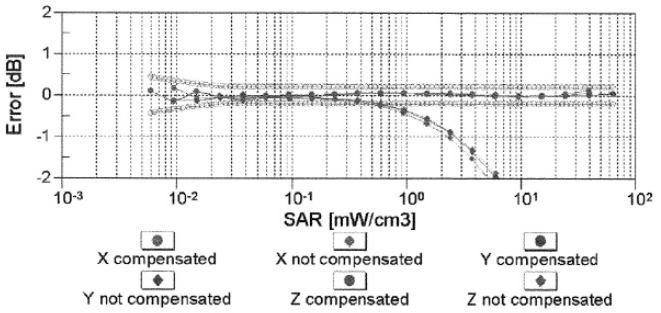




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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

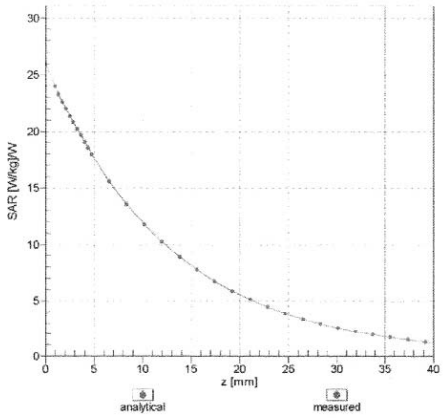




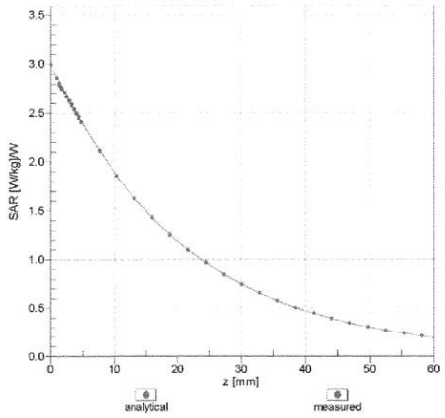
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 1750 MHz,WGLS R22 (H_convF)

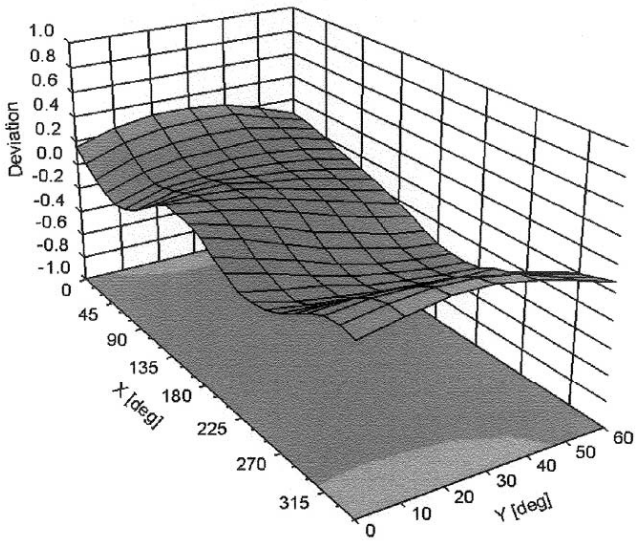


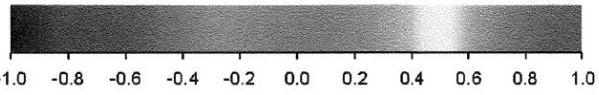
f = 750 MHz,WGLS R9 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3750

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