MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
33439 WESTERN AVENUE ! UNION CITY, CALIFORNIA 94587-3201 ! PHONE (510) 489-6300 ! FAX (510) 489-6372

Dosimetric Assessment Test Report

for the

NEC Infrontia, Inc.,
S1613-01 Tablet PC

Tested and Evaluated In Accordance With
FCC OET 65 Supplement C: 01-01

Prepared for

NEC Infrontia, Inc.
6535 N. State Hwy 161
Irving, TX 75039

Engineering Statement: The measurements shown in this report were made in accordance with the procedures specified in Supplement C to OET Bulletin 65 of the Federal Communications Commission (FCC) Guidelines [FCC 2001] and Industry Canada RSS-102 for uncontrolled exposure. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment evaluated is capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE Std. C95.1-1999.

SAR Evaluation
Certificate of Compliance

FCC ID: UI3S1613-01
APPLICANT: NEC Infrontia, Inc.

Applicant Name and Address: **NEC Infrontia, Inc.**
6535 N. State Highway 161
Irving, TX 75039

Test Location: MET Laboratories, Inc.
4855 Patrick Henry Dr. Bldg #6
Santa Clara, CA 95054
USA

EUT:	S1613-01 Tablet PC		
Date of Receipt:	September 25, 2006		
Device Category:	FCC 15.407		
RF exposure environment:	Uncontrolled Exposure/General Population		
RF exposure category:	Portable		
Power supply:	7.4 VDC Li-Ion/2400mah and AC		
Antenna:	Dual Internal antennas		
Production/prototype:	Production		
Modulation:	DTS		
Duty Cycle:	100%		
TX Range:	5180-5240MHz	5260-5320MHz	5745-5805MHz
Maximum RF Power Output	4.8dBm	7.7dBm	7.7dBm

Shawn McMillen
Senior Engineer

INTRODUCTION

This measurement report demonstrates that the NEC Infrontia, S1613-01 Table PC FCC ID: UI3S1613-01 described within this report complies with the Specific Absorption Rate (SAR) RF exposure requirements specified in ANSI/IEEE Std. C95.1-1999 and FCC 47 CFR §2.1093 for the Controlled Exposure/Occupational environment. The test procedures described in FCC OET Bulletin 65, Supplement C, Edition 01-01 and IEEE Std. 1528 - 2003 were employed.

A description of the device under test, device operating configuration and test conditions, measurement and site description, methodology and procedures used in the evaluation, equipment used, detailed summary of the test results and the various provisions of the rules are included in this dosimetric assessment test report.

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 (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Fig. 1.1).

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

Figure 1.1
SAR Mathematical Equation

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

$$\mathrm{SAR} = \sigma\, E^2 / \rho$$

where:

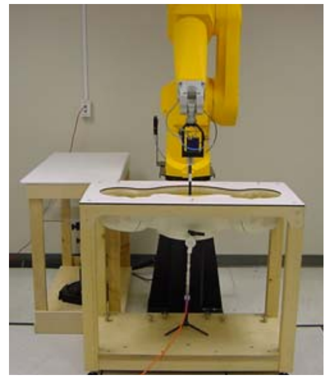
- σ - conductivity of the tissue - simulant material (S/m)
- ρ - mass density of the tissue - simulant material (kg/m3)
- E - Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of 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.

DESCRIPTION OF DEVICE UNDER TEST (EUT)

Applicant:	NEC Infrontia, Inc.		
Description of Test Item:	S1613-01 Table PC		
Supply Voltage:	7.4 VDC Li-Ion/2400mah and AC		
Antenna Type(s) Tested:	Dual Internal		
Modes of Operation:	DTS		
Maximum Duty Cycle Tested:	100%		
Tested Frequency (MHz)	5180-5240MHz	5260-5320MHz	5745-5805MHz
Maximum RF Power Output 2450MHz Band DTS Mode:	5180-5240MHz	Modulated	4.8dBm
	5260-5320MHz	Modulated	7.7dBm
	5745-5805MHz	Modulated	7.7dBm
Maximum SAR Measured	5180-5240MHz	**0.341 mW/g**	
	5260-5320MHz	**1.14 mW/g**	
	5745-5805MHz	**1.33 mW/g**	
Application Type:	Certification		
Exposure Category:	Uncontrolled Exposure/General Population		
FCC and IC Rule Part(s):	FCC 47 CFR §2.1093, Part 15.407		
Standards:	IEEE Std. 1528-2003, FCC OET Bulletin 65, Supplement C, Edition 01-01		

SAR MEASUREMENT SYSTEM



MET Laboratories, Inc SAR measurement facility utilizes the DASY4 Professional Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland for performing SAR compliance tests. The DASY4 measurement system is comprised of the measurement server, robot controller, computer, near-field probe, probe alignment sensor, specific anthropomorphic mannequin (SAM) phantom, and various planar phantoms for brain and/or body SAR evaluations. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF). The Cell controller system contain the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The Staubli robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit 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 DASY4 measurement server. The DAE4 utilizes 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 DASY4 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. The sensor systems are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

MEASUREMENT SUMMARY

BODY SAR MEASUREMENT RESULTS (5180-5240MHz) Band									
Freq (MHz)	**Chan**	**Test Mode**	**Conducted Power Before (dBm)**	**Power Supply**	**Antenna position**	**EUT Test Position**	**Phantom Section**	**Antenna housing Sep. Dist. (cm)**	**Measured SAR 1g (W/kg)**
5200	Mid	DTS	4.8	AC	Top	Face	Planar	0.0	0.317
5200	Mid	DTS	4.8	AC	Side	Face	Planar	0.0	0.341
5200	Mid	DTS	4.8	Battery	Side	Face	Planar	0.0	0.334
ANSI/IEEE C95.1 1992 – SAFETY LIMIT BODY: 1.6 W/kg (averaged over 1 gram) Spatial Peak – Uncontrolled Exposure/General Population									
Measured Mixture Type			5200 MHz Body				**Date Tested**		Sept 25, 2006
Dielectric Constant εr			**IEEE Target**		**Measured**		**Duty Cycle**		100%
			49.0		48.6		**Ambient Temperature (C)**		22.6
Conductivity σ (mho/m)			**IEEE Target**		**Measured**		**Fluid Temperature (C)**		21.5
			5.30		5.31		**Fluid Depth**		≥15cm

BODY SAR MEASUREMENT RESULTS (5260-5320MHz) Band									
Freq (MHz)	**Chan**	**Test Mode**	**Conducted Power Before (dBm)**	**Power Supply**	**Antenna position**	**EUT Test Position**	**Phantom Section**	**Antenna housing Sep. Dist. (cm)**	**Measured SAR 1g (W/kg)**
5300	Mid	DTS	7.7	AC	Top	Face	Planar	0.0	1.05
5300	Mid	DTS	7.7	AC	Side	Face	Planar	0.0	0.913
5300	Mid	DTS	7.7	Battery	Top	Face	Planar	0.0	0.948
5260	Low	DTS	7.7	AC	Top	Face	Planar	0.0	1.06
5260	Low	DTS	7.7	AC	Side	Face	Planar	0.0	0.892
5320	High	DTS	7.7	AC	Top	Face	Planar	0.0	1.14
5320	High	DTS	7.7	AC	Side	Face	Planar	0.0	1.07
ANSI/IEEE C95.1 1992 – SAFETY LIMIT BODY: 1.6 W/kg (averaged over 1 gram) Spatial Peak – Uncontrolled Exposure/General Population									

Measured Mixture Type	5300 MHz Body		**Date Tested**	Sept 26, 2006
Dielectric Constant εr	**IEEE Target**	**Measured**	**Duty Cycle**	100%
	48.8	48.9	**Ambient Temperature (C)**	22.6
Conductivity σ (mho/m)	**IEEE Target**	**Measured**	**Fluid Temperature (C)**	21.5
	5.41	5.27	**Fluid Depth**	≥15cm

BODY SAR MEASUREMENT RESULTS (5745-5805MHz) Band									
Freq (MHz)	**Chan**	**Test Mode**	**Conducted Power Before (dBm)**	**Power Supply**	**Antenna position**	**EUT Test Position**	**Phantom Section**	**Antenna housing Sep. Dist. (cm)**	**Measured SAR 1g (W/kg)**
5765	Mid	DTS	7.7	AC	Top	Face	Planar	0.0	1.09
5765	Mid	DTS	7.7	AC	Side	Face	Planar	0.0	1.11
5765	Mid	DTS	7.7	Battery	Side	Face	Planar	0.0	1.09
5745	Low	DTS	7.7	AC	Top	Face	Planar	0.0	1.33
5745	Low	DTS	7.7	AC	Side	Face	Planar	0.0	1.05
5805	High	DTS	7.7	AC	Top	Face	Planar	0.0	1.32
5805	High	DTS	7.7	AC	Side	Face	Planar	0.0	1.07

ANSI/IEEE C95.1 1992 – SAFETY LIMIT
BODY: 1.6 W/kg (averaged over 1 gram)
Spatial Peak – Uncontrolled Exposure/General Population

Measured Mixture Type	5800 MHz Body		**Date Tested**	Sept 25, 2006
Dielectric Constant εr	**IEEE Target**	**Measured**	**Duty Cycle**	100%
	48.2	47.5	**Ambient Temperature (C)**	22.6
Conductivity σ (mho/m)	**IEEE Target**	**Measured**	**Fluid Temperature (C)**	21.5
	6.00	6.18	**Fluid Depth**	≥15cm

DETAILS OF SAR EVALUATION

The NEC Infrontia, Inc., S1610-01 Table PC was determined to be compliant for localized Specific Absorption Rate based on the test provisions and conditions described below.

1. The EUT was tested for body SAR in two different positions. There are two internal antennas which are used for diversity purposes and cannot be operated simultaneously. Below is a drawing indicating the position of the antennas relative to the form factor. The antennas are mounted such that they are closest to the face of the EUT. Therefore, the EUT was placed with the face of the unit next to the planar section of the phantom in order to facilitate a 0.0cm separation between the EUT housing and the phantom surface. The EUT was positioned about the phantom so the center of each antenna was located at or near the reference point of the phantom.

2. The EUT was placed into a test mode using ART protocol software.

3. The SAR evaluations were performed with a fully charged battery.

4. The EUT was dismantled prior to the SAR evaluations in order to measure the conducted power. It was not practical to measure the output before and after each SAR evaluation. The EUT's RF output power was stable throughout the SAR evaluations. The RF power at each data rate setting was measured and only the data rate which produced the highest output power was measured for SAR.

5. The dielectric parameters of the simulated body fluid were measured prior to the evaluation using an 85070D Dielectric Probe Kit and an 8722D Network Analyzer.

6. The fluid and air temperature was measured prior to and after each SAR evaluation to ensure the temperature remained within ±2 deg C of the temperature of the fluid when the dielectric properties were measured.

7. During the SAR evaluations if a distribution produced several hotspots over the course of the area scan, each hotspot was evaluated separately.

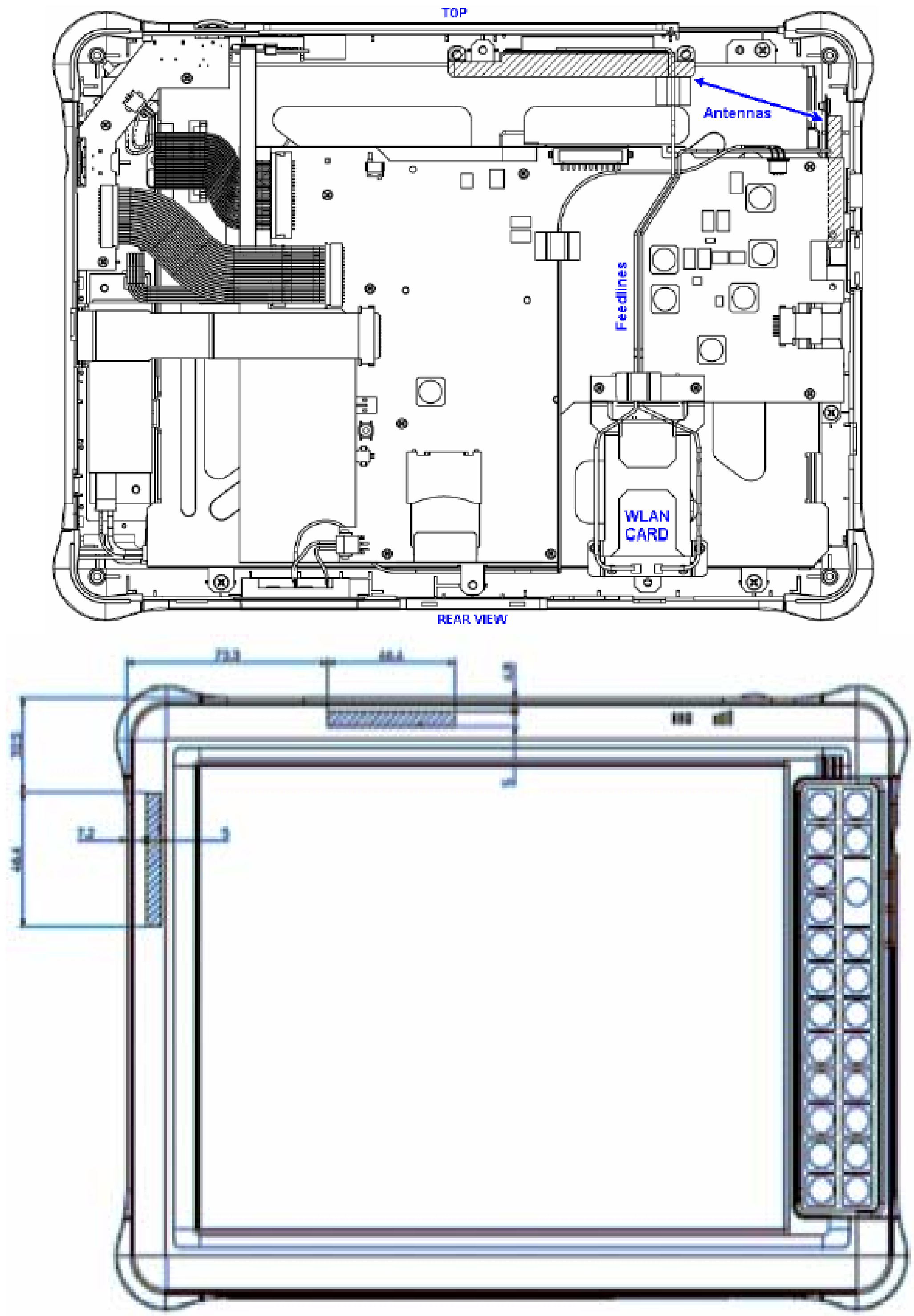


Figure 1. Locations of the Antenna Relative to the Form Factor

EVALUATION PROCEDURES

The evaluation was performed in the applicable area of the phantom depending on the type of device being tested.

(i) For devices held to the ear during normal operation, both the left and right ear positions were evaluated using the SAM phantom.
(ii) For body-worn and face-held devices a planar phantom was used.

The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference check, the exposed region of the phantom was scanned near the inner surface with a grid spacing of 15mm x 15mm.

An area scan was determined as follows:

Based on the defined area scan grid, a more detailed grid is created to increase the points by a factor of 10. The interpolation function then evaluates all field values between corresponding measurement points.

A linear search is applied to find all the candidate maxima. Subsequently, all maxima are removed that are >2 dB from the global maximum. The remaining maxima are then used to position the cube scans.

A 1g and 10g spatial peak SAR was determined as follows:

Based on the area scan, a 32mm x 32mm x 34mm (7x7x7 data points) zoom scan was assessed at the position where the greatest V/m was detected. The data at the surface was extrapolated since the distance from the probes sensors to the surface is 3.9cm. A least squares fourth-order polynomial was used to generate points between the probe detector and the inner surface of the phantom.

Interpolated data is used to calculate the average SAR over 1g and 10g cubes by spatially discretizing the entire measured cube. The volume used to determine the averaged SAR is a 1mm grid (42875 interpolated points).

Z-Scan was determined as follows:

The Z-scan measures points along a vertical straight line. The line runs along a line normal to the inner surface of the phantom surface.

DATA EVALUATION PROCEDURES

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

Probe Parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion Factor	$ConvF_i$
	- Dipole Compression Point	dcp_i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used. The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC - transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

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

with V_i = Compensated signal of channel i (i = x, y, z)
U_i = Input signal of channel i (i = x, y, z)
cf = Crest factor of exciting field (DASY parameter)
dcp_i = Diode compression point (DASY parameter)

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

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

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

with V_i = Compensated signal of channel i (i = x, y, z)
$Norm_i$ = Sensor sensitivity of channel i (i = x, y, z)
μV/(V/m)^2 for E-field probes
$ConvF$ = Sensitivity enhancement in solution
a_{ij} = Sensor sensitivity factors for H-field probes
f = Carrier frequency (GHz)
E_i = Electric field strength of channel i in V/m
H_i = Magnetic field strength of channel i in A/m

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

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

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

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

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

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.

The power flow density is calculated assuming the excitation field as a free space field.

$$P_{pwe} = \frac{E_{tot}^2}{3770} \qquad \text{or} \qquad P_{pwe} = H_{tot}^2 \cdot 37.7$$

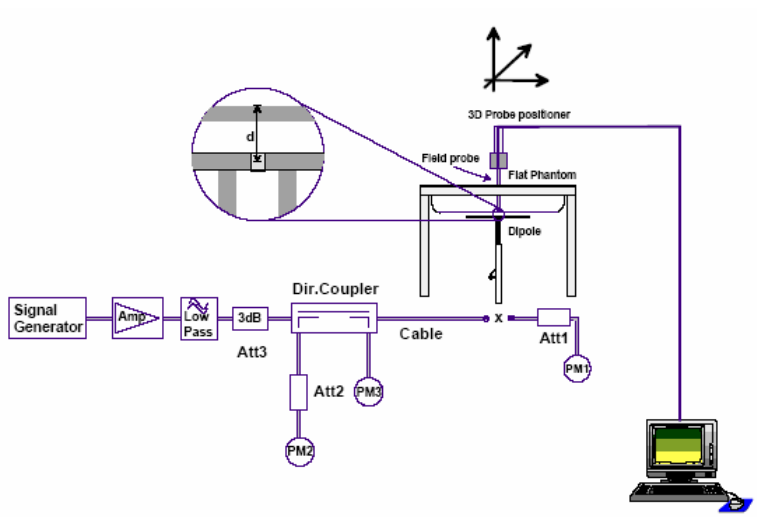
with P_{pwe} = Equivalent power density of a plane wave in mW/cm2
E_{tot} = total electric field strength in V/m
H_{tot} = total magnetic field strength in A/m

SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluation a system check was performed in the planar section of the SAM phantom with a 5-6GHz dipole. The dielectric parameters of the simulated brain fluid were measured prior to the system performance check using an 85070D Dielectric Probe Kit and an 8722D Network Analyzer. A forward power of 250mW was applied to the dipole and the system was verified to a tolerance of +10%. All results were normalized to 1W.

Test Date	5-6GHz Equivalent Tissue	SAR 1g (W/kg)		Permittivity Constant εr		Conductivity σ (mho/m)		Ambient Temp. (C)	Fluid Temp. (C)	Fluid Depth (cm)
		Calibrated Target	Measured	IEEE Target	Measured	IEEE Target	Measured			
09/25/06	5200 Body	68.0±5%	67.2	49.0 ±5%	48.6	5.30±10%	5.33	22.6	21.5	≥15
09/25/06	5800 Body	64.8±5%	65.6	48.6 ±5%	47.5	6.00±10%	6.18	22.6	21.5	≥15
09/26/06	5200 Body	68.0±5%	64.8	49.0 ±5%	48.2	5.30±10%	5.08	22.6	21.5	≥15

Note: The ambient and fluid temperatures were measured prior to the fluid parameter check and the system performance check. The temperatures listed in the table above were consistent for all measurement periods.



SIMULATED EQUIVALENT TISSUES

Simulated Tissue Mixture (Proprietary)	
Ingredient	**5-6GHz Body**
Water	60-78%
Salt	0.4-3.0%
Emulsifiers	0.5-15.0
Mineral Oil	11.0-36.0

SAR SAFETY LIMITS

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	**(Occupational / Controlled Exposure Environment)**
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10g)	4.0	20.0

Notes:
1. Uncontrolled exposure environments are locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.

2. Controlled exposure environments are locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.

ROBOT SYSTEM SPECIFICATIONS

1.1. SPECIFICATIONS

Positioner:

Robot:	Staubli Unimation Corp. Robot Model: RX90
Repeatability:	0.02 mm
No. of axis:	6

1.2. DATA ACQUISITION ELECTRONIC (DAE) SYSTEM:

Cell Controller

Processor:	Compaq Evo Clock Speed:2.4 GHz Operating System: Windows XP Professional

Data Converter

Features:	Signal Amplifier, multiplexer, A/D converter, and control logic
Software:	DASY4 software
Connecting Lines:	Optical downlink for data and status info. Optical uplink for commands and clock

Dasy4 Measurement Server

Function:	Real-time data evaluation for field measurements and surface detection
Hardware:	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections:	COM1, COM2, DAE, Robot, Ethernet, Service Interface

E-Field Probe

Model:	ET3DV6
Serial No.:	1793
Construction:	Triangular core fiber optic detection system
Frequency:	10 MHz to 6 GHz
Linearity:	± 0.2 dB (30 MHz to 3 GHz)

EX-Probe

Model:	EX3DV3
Serial No.	3511
Construction:	Triangular core
Frequency:	10 MHz to > 6 GHz
Linearity:	± 0.2 dB (30 MHz to 3 GHz)

1.3. PHANTOM(S):

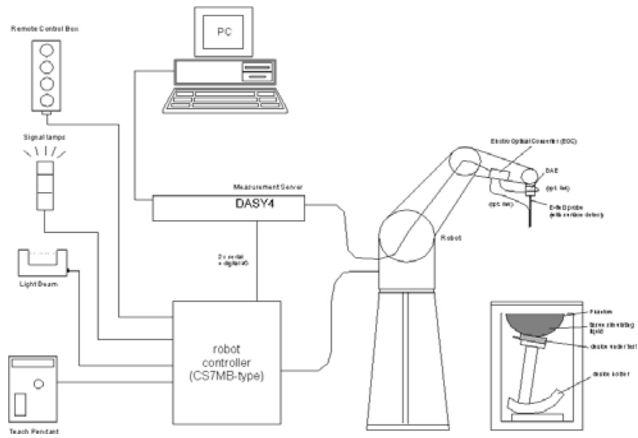
Validation & Evaluation Phantom

Type:	SAM V4.0C
Shell Material:	Fiberglass
Thickness:	2.0 ±0.1 mm
Volume:	Approx. 20 liters

PROBE SPECIFICATIONS EX3DV3

Construction:	Symmetrical design with triangular core 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 Additional CF for other liquids and frequencies upon request
Frequency:	10 MHz to 3 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Directivity:	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range:	10 µW/g to > 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions:	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application:	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%

SAR MEASUREMENT SYSTEM



Measurement System Diagram

1.4. RX90BL ROBOT

The Stäubli RX90BL Robot is a standard high precision 6-axis robot with an arm extension for accommodating the data acquisition electronics (DAE).

1.5. ROBOT CONTROLLER

The CS7MB Robot Controller system drives the robot motors. The system consists of a power supply, robot controller, and remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.

1.6. LIGHT BEAM SWITCH

The Light Beam Switch (Probe alignment tool) allows automatic ”tooling” of the probe. During the process, the actual position of the probe tip with respect to the robot arm is measured as well as the probe length and the horizontal probe offset. The software then corrects all movements, so that the robot coordinates are valid for the probe tip. The repeatability of this process is better than 0.1 mm. If a position has been taught with an aligned probe, the same position will be reached with another aligned probe within 0.1 mm, even if the other probe has different dimensions. During probe rotations, the probe tip will keep its actual position.

1.7. DATA ACQUISITION ELECTRONICS

The Data Acquisition Electronics consists of a highly sensitive electrometer grade preamplifier with auto-zeroing, a channel and gain switching multiplexer, a fast 16-bit A/D converter and a command decoder and control logic unit. Some of the task the DAE performs is signal amplification, signal multiplexing, A/D conversion, and offset measurements. The DAE also contains the mechanical probe-mounting device, which contains two different sensor systems for frontal and sideways probe contacts used for probe collision detection and mechanical surface detection for controlling the distance between the probe and the inner surface of the phantom shell. Transmission from the DAE to the measurement server, via the EOC, is through an optical downlink for data and status information as well as an optical uplink for commands and the clock.

1.8. ELECTO-OPTICAL CONVERTER (EOC)

The Electro-Optical Converter performs the conversion between the optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC connects to, and transfers data to, the DASY4 measurement server. The EOC also contains the fiber optical surface detection system for controlling the distance between the probe and the inner surface of the phantom shell.

1.9. MEASUREMENT SERVER

The Measurement Server performs time critical tasks such as signal filtering, all real-time data evaluation for field measurements and surface detection, controls robot movements, and handles safety operation. The PC-operating system cannot interfere with these time critical processes. A watchdog supervises all connections, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements.

1.10. DOSIMETRIC PROBE

Dosimetric Probe is a symmetrical design with triangular core that incorporates three 3 mm long dipoles arranged so that the overall response is close to isotropic. The probe sensors are covered by an outer protective shell, which is resistant to organic solvents i.e. glycol. The probe is equipped with an optical multi-fiber line, ending at the front of the probe tip, for optical surface detection. This line connects to the EOC box on the robot arm and provides automatic detection of the phantom surface. The optical surface detection works in transparent liquids and on diffuse reflecting surfaces with a repeatability of better than ±0.1mm.

1.11. SAM PHANTOM

The SAM (Specific Anthropomorphic Mannequin) twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region where shell thickness increases to 6mm) integrated into a wooden table. The shape of the shell corresponds to the phantom defined by SCC34-SC2. It enables the dosimetric evaluation of left hand, right hand phone usage as well as body mounted usage at the flat phantom region. The flat section is also used for system validation and the length and width of the flat section are at least 0.75 λO and 0.6 λO respectively at frequencies of 824 MHz and above (λO = wavelength in air).

Reference markings on the phantom top allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. A white cover is provided to cover the phantom during off-periods preventing water evaporation and changes in the liquid parameters. Free space scans of devices on the cover are possible. The phantom is filled with a tissue simulating liquid to a depth of at least 15 cm at each ear reference point. The bottom plate of the wooden table contains three pair of bolts for locking the device holder.

1.12. PLANAR PHANTOM

The planar phantom is constructed of Plexiglas material with a 2.0 mm shell thickness for face-held and body-worn SAR evaluations of handheld radio transceivers. The planar phantom is mounted on the wooden table of the DASY4 system.

1.13. VALIDATION PLANAR PHANTOM

The validation planar phantom is constructed of Plexiglas material with a 6.0 mm shell thickness for system validations at 450MHz and below. The validation planar phantom is mounted on the wooden table of the DASY4 system.

1.14. DEVICE HOLDER

The device holder is designed to cope with the different measurement positions in the three sections of the SAM phantom given in the standard. It has two scales, one for device rotation (with respect to the body axis) and one for device inclination (with respect to the line between the ear openings). The rotation center for both scales is the ear opening, thus the device needs no repositioning when changing the angles. The plane between the ear openings and the mouth tip has a rotation angle of 65°.

The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\varepsilon = 3$ and loss tangent $\delta = 0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

The dielectric properties of the liquid conform to all the tabulated values [2-5]. Liquids are prepared according to Annex A and dielectric properties are measured according to Annex B.

1.15. SYSTEM VALIDATION KITS

Power Capability: > 100 W (f < 1GHz); > 40 W (f > 1GHz)

Construction: Symmetrical dipole with l/4 balun Enables measurement of feed point impedance with NWA Matched for use near flat phantoms filled with brain simulating solutions Includes distance holder and tripod adaptor.

Frequency: 300, 450, 835, 1900, 2450 MHz, 5-6GHz

Return loss: >20 dB at specified validation position

Dimensions:
300 MHz Dipole: Length: 396mm; Overall Height:430 mm; Diameter: 6 mm
450 MHz Dipole: Length: 270 mm; Overall Height: 347 mm; Diameter: 6 mm
835 MHz Dipole: Length: 161 mm; Overall Height: 270 mm; Diameter: 3.6 mm
1900 MHz Dipole: Length: 68 mm; Overall Height: 219 mm; Diameter: 3.6 mm
2450 MHz Dipole: Length: 51.5 mm; Overall Height: 300 mm; Diameter: 3.6 mm
5-6GHz Dipole: Length: 26.0 mm; Overall Height: 170 mm; Diameter: 3.6 mm

TEST EQUIPMENT LIST

Test Equipment	Serial Number	Calibration Date
DASY4 System		
Robot	FO3/SX19A1/A/01	N/A
ETVDV6	1793	Sept 2005
EX3DV3	3511	Jan 2006
DAE3	584	Sept 2005
300MHz Dipole	003	Dec 2005
450MHz Dipole	004	Dec 2005
835MHz Dipole	493	Sept 2005
1900MHz Dipole	001	Feb 2006
2450MHz Dipole	002	Feb 2006
5-6GHz Dipole	001	Aug 2006
SAM Phantom V4.0C	N/A	N/A
EUT Planar Phantom	N/A	N/A
Validation Phantom	N/A	N/A
85070D Dielectric Probe Kt	N/A	N/A
83650B Signal Generator	3844A00910	June 2006
HP E4418B Power Meter	GB40205140	June 2006
HP 8482A Power Sensor	2607A11286	June 2006
HP 8722D Vector Network Analyzer	3S36140188	March 2006
Anritsu Power Meter ML2488A	6K00001832	June 2006
Anritsu Power Sensor	030864	Jan 2006
Mini-Circuits Power Amplifier	D111903#8	N/A

MEASUREMENT UNCERTANTIES

UNCERTAINTY ASSESSMENT 300MHz-3GHz

Error Description	Tol. ±%	Prob. Dist.	Div.	c_i 1g	c_i 10g	Std Unc ±% (1g)	Std Unc ±% (10g)	v_i or v_{eff}
Measurement System								
Probe calibration	4.8	N	1	1	1	4.8	4.8	∞
Axial isotropy of the probe	4.7	R	√3	0.7	0.7	1.9	1.9	∞
Spherical isotropy of the probe	9.6	R	√3	0.7	0.7	3.9	3.9	∞
Boundary effects	1.0	R	√3	1	1	4.8	4.8	∞
Probe linearity	4.7	R	√3	1	1	2.7	2.7	∞
Detection limit	1.0	R	√3	1	1	0.6	0.6	∞
Readout electronics	1.0	N	1	1	1	1.0	1.0	∞
Response time	0.8	R	√3	1	1	0.5	0.5	∞
Integration time	2.6	R	√3	1	1	0.8	0.8	∞
RF ambient conditions	3.0	R	√3	1	1	0.43	0.43	∞
Mech. constraints of robot	0.4	R	√3	1	1	0.2	0.2	∞
Probe positioning	2.9	R	√3	1	1	1.7	1.7	∞
Extrapolation & integration	1.0	R	√3	1	1	2.3	2.3	∞
Test Sample Related								
Device positioning	2.9	N	1	1	1	2.23	2.23	145
Device holder uncertainty	3.6	N	1	1	1	5.0	5.0	5
Power drift	5.0	R	√3			2.9	2.9	∞
Phantom and Setup								
Phantom uncertainty	4.0	R	√3	1	1	2.3	2.3	∞
Liquid conductivity (target)	5.0	R	√3	0.64	0.43	1.8	1.2	∞
Liquid conductivity (measured)	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid permittivity (target)	5.0	R	√3	0.6	0.5	1.7	1.4	∞
Liquid permittivity (measured)	2.5	N	1	0.6	0.5	1.5	1.2	∞
Combined Standard Uncertainty (k=1)		RSS				10.3	10.0	
Expanded Uncertainty (k=2) 95% Confidence Level						20.6	20.1	

Table: Worst-case uncertainty for DASY4 assessed according to IEEE P1528.
The budget is valid for the frequency range 300MHz to 3GHz and represents a worst-case analysis.

UNCERTAINTY ASSESSMENT 3-6GHz

Error Description	Tol. ±%	Prob. Dist.	Div.	c_i 1g	c_i 10g	Std Unc ±% (1g)	Std Unc ±% (10g)	v_i or v_{eff}
Measurement System								
Probe calibration	4.8	N	1	1	1	8.3	8.3	∞
Axial isotropy of the probe	4.7	R	√3	0.7	0.7	1.9	1.9	∞
Spherical isotropy of the probe	9.6	R	√3	0.7	0.7	3.9	3.9	∞
Boundary effects	1.0	R	√3	1	1	0.6	0.6	∞
Probe linearity	4.7	R	√3	1	1	2.7	2.7	∞
Detection limit	1.0	R	√3	1	1	0.6	0.6	∞
Readout electronics	1.0	N	1	1	1	1.0	1.0	∞
Response time	0.8	R	√3	1	1	0.5	0.5	∞
Integration time	2.6	R	√3	1	1	1.5	1.5	∞
RF ambient conditions	3.0	R	√3	1	1	1.7	1.7	∞
Mech. constraints of robot	0.4	R	√3	1	1	0.2	0.2	∞
Probe positioning	2.9	R	√3	1	1	1.7	1.7	∞
Extrapolation & integration	1.0	R	√3	1	1	0.6	0.6	∞
Test Sample Related								
Device positioning	2.9	N	1	1	1	2.9	2.9	145
Device holder uncertainty	3.6	N	1	1	1	3.6	3.6	5
Power drift	5.0	R	√3			2.9	2.9	∞
Phantom and Setup								
Phantom uncertainty	4.0	R	√3	1	1	2.3	2.3	∞
Liquid conductivity (target)	5.0	R	√3	0.64	0.43	1.8	1.2	∞
Liquid conductivity (measured)	2.5	N	1	0.64	0.43	1.6	1.1	∞
Liquid permittivity (target)	5.0	R	√3	0.6	0.5	1.7	1.4	∞
Liquid permittivity (measured)	2.5	N	1	0.6	0.5	1.5	1.2	∞
Combined Standard Uncertainty (k=1)		RSS				12.3	12.1	
Expanded Uncertainty (k=2) 95% Confidence Level						24.6	24.2	

Table: Worst-case uncertainty for DASY4 assessed according to IEEE P1528.
The budget is valid for the frequency range 3-6GHz and represents a worst-case analysis.

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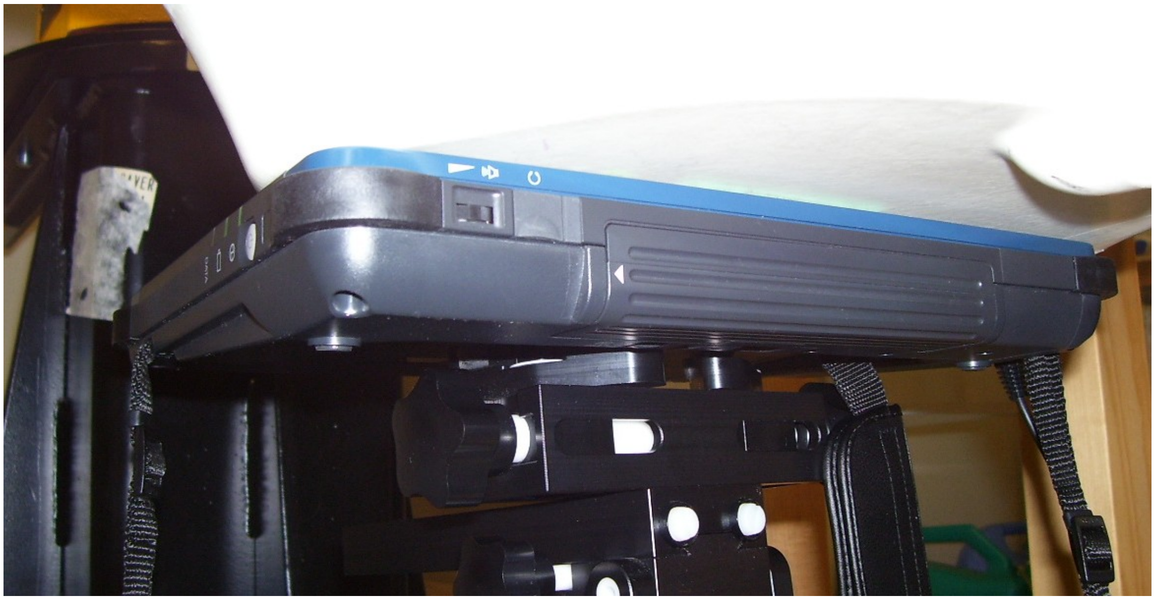
EUT PHOTOS

Photograph 1. Front of EUT

Photograph 2. Back of EUT

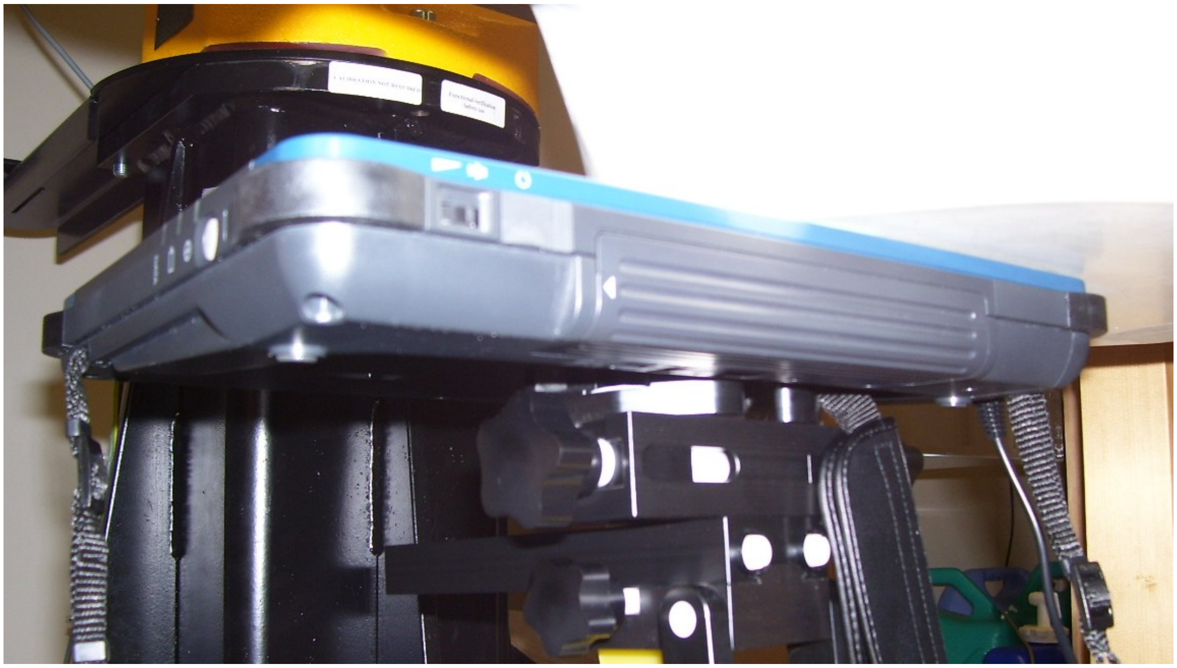
Photograph 3. Battery

TEST SET-UP



Photograph 4. Top Mounted Antenna Position

Photograph 5. Top Mounted Antenna Position



Photograph 6. Side Mounted Antenna Position

Photograph 7. Side Mounted Antenna Position

Photograph 8. Top Mounted Antenna

Photograph 9. Side Mounted Antenna

APPENDIX A - SAR MEASUREMENT DATA

5200MHz body worn/Face side/AC pwr/Top Mounted Antenna

Date/Time: 9/25/2006 1:13:50 PM

DUT: NEC; Type: S1613-01Table PC

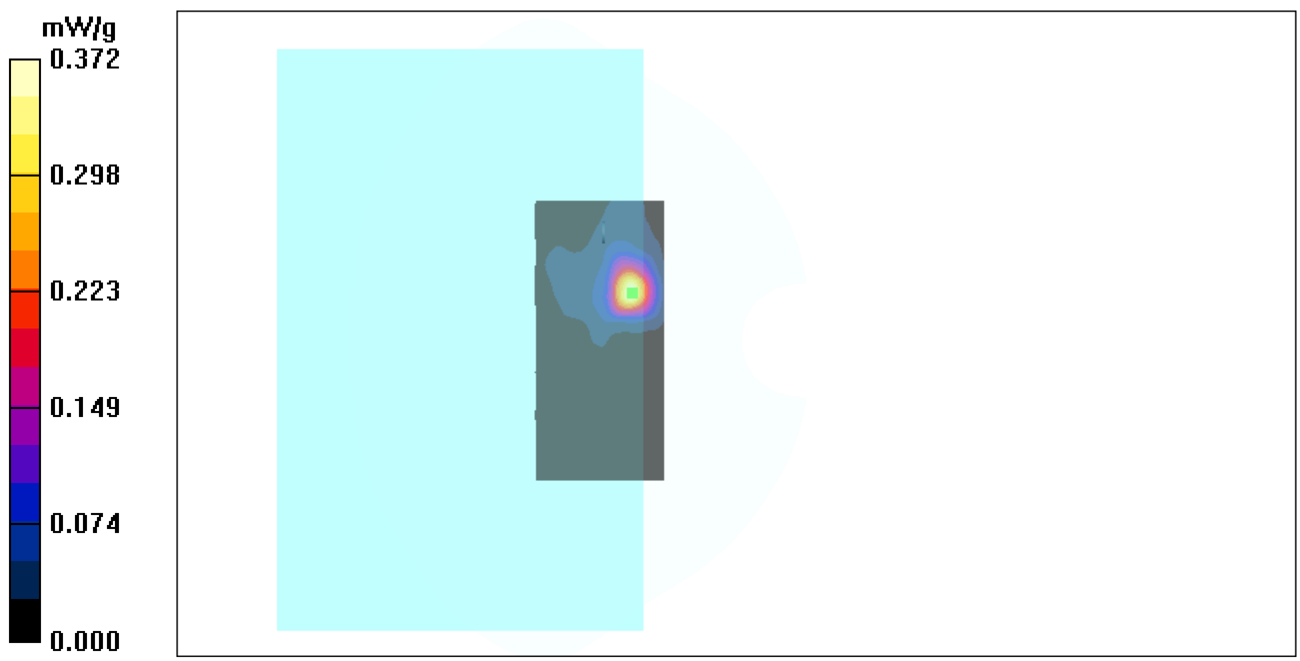
Medium Notes: Ambient Temp 22.6 deg C; Fluid Temp 21.5 deg C

Communication System: OFDM; ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5200 MHz Body Medium parameters used: f = 5200 MHz; σ = 5.33 mho/m; ε_r = 48.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.372 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.75 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 1.02 W/kg
SAR(1 g) = 0.317 mW/g; SAR(10 g) = 0.099 mW/g
Maximum value of SAR (measured) = 0.431 mW/g



5200MHz/body worn/face side/side mounted antenna/AC pwr

Date/Time: 9/25/2006 1:36:17 PM

DUT: NEC; Type: S1613-01Table PC

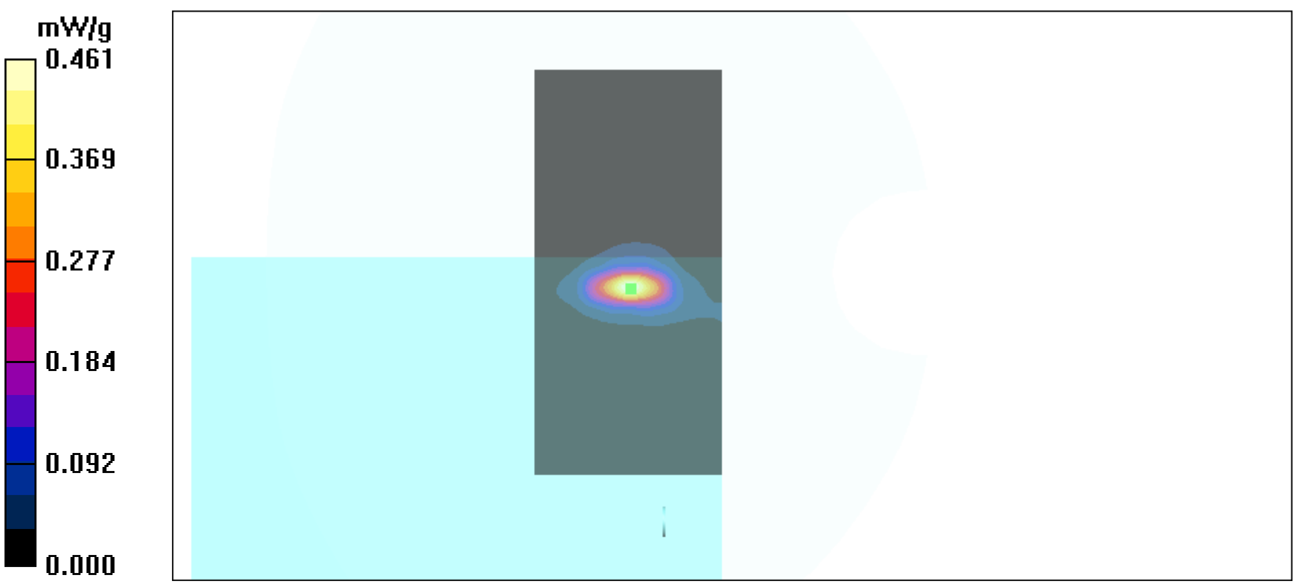
Medium Notes: Ambient Temp 22.6 deg C; Fluid Temp 21.5 deg C

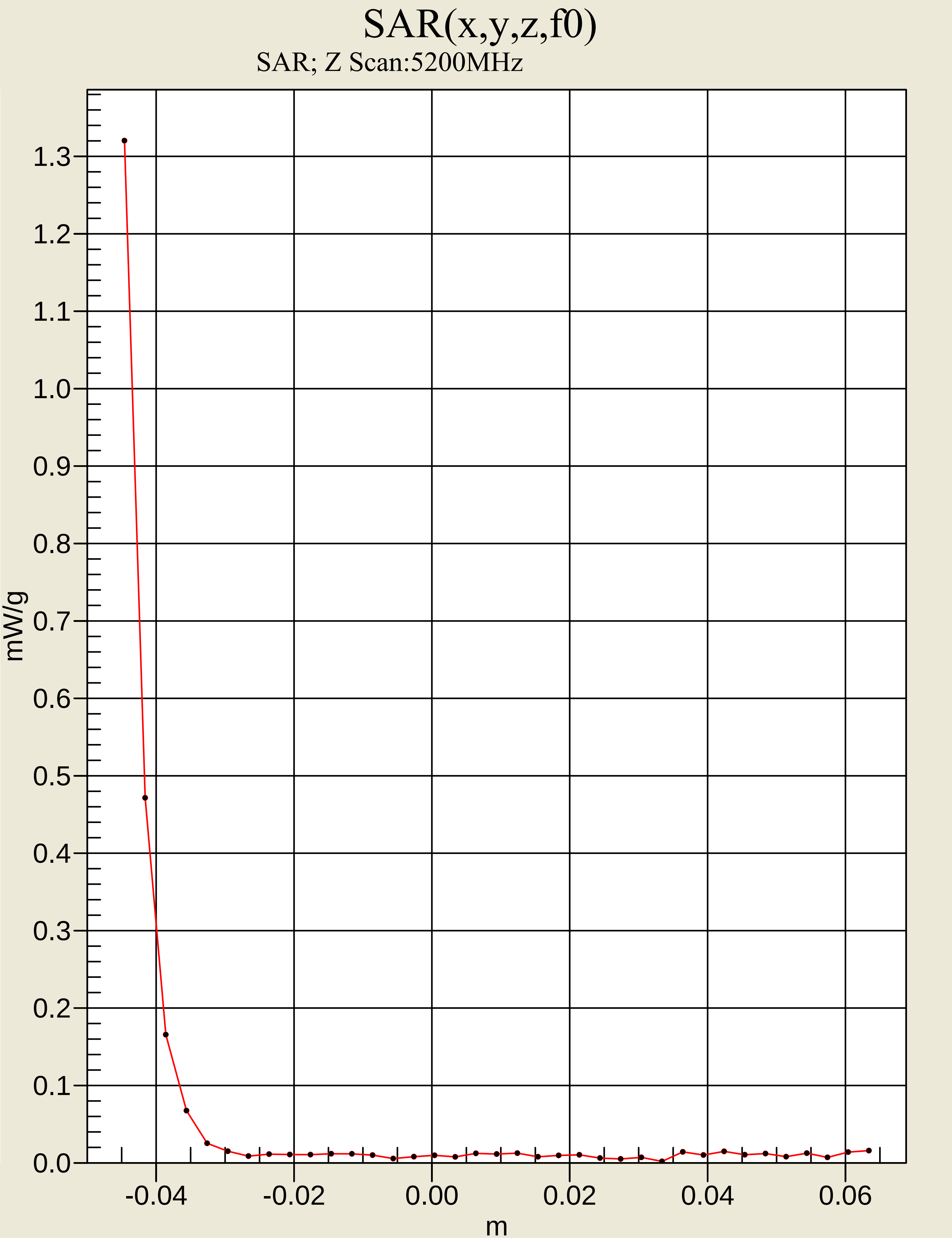
Communication System: OFDM; ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5200 MHz Body Medium parameters used: f = 5200 MHz; σ = 5.33 mho/m; ε_r = 48.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.461 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.72 V/m; Power Drift = 0.187 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.341 mW/g; SAR(10 g) = 0.097 mW/g
Maximum value of SAR (measured) = 0.473 mW/g




SAR(x,y,z,f0)
SAR; Z Scan:5200MHz
mW/g
1.3
1.2
1.1
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
0.0
-0.04
-0.02
0.00
0.02
0.04
0.06
m

5200MHz/body worn/face side/side mounted antenna/battery pwr

Date/Time: 9/25/2006 4:56:07 PM

DUT: NEC; Type: S1613-01Table PC

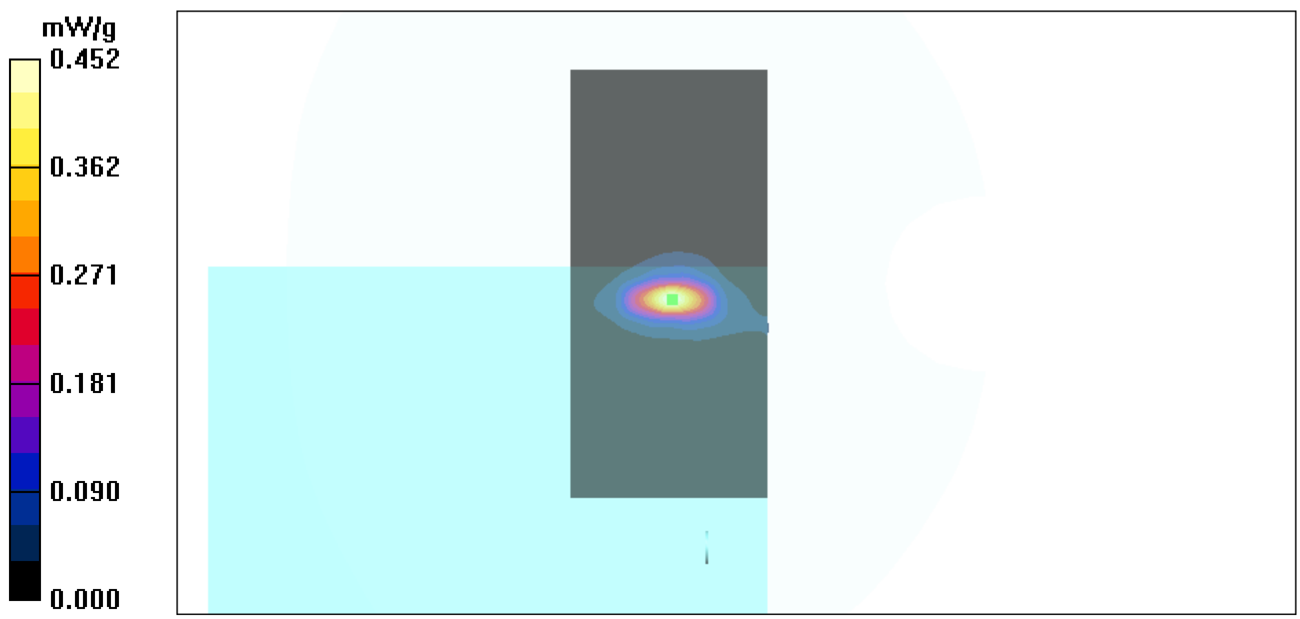
Medium Notes: Ambient Temp 22.6 deg C; Fluid Temp 21.5 deg C

Communication System: OFDM; ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5200 MHz Body Medium parameters used: f = 5200 MHz; σ = 5.33 mho/m; ε_r = 48.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.452 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.72 V/m; Power Drift = 0.106 dB
Peak SAR (extrapolated) = 1.11 W/kg
SAR(1 g) = 0.334 mW/g; SAR(10 g) = 0.095 mW/g
Maximum value of SAR (measured) = 0.463 mW/g



5300MHz/body worn/face side/top mounted antenna/AC pwr

Date/Time: 9/26/2006 9:14:01 AM

DUT: NEC; Type: S1613-01 Tablet PC

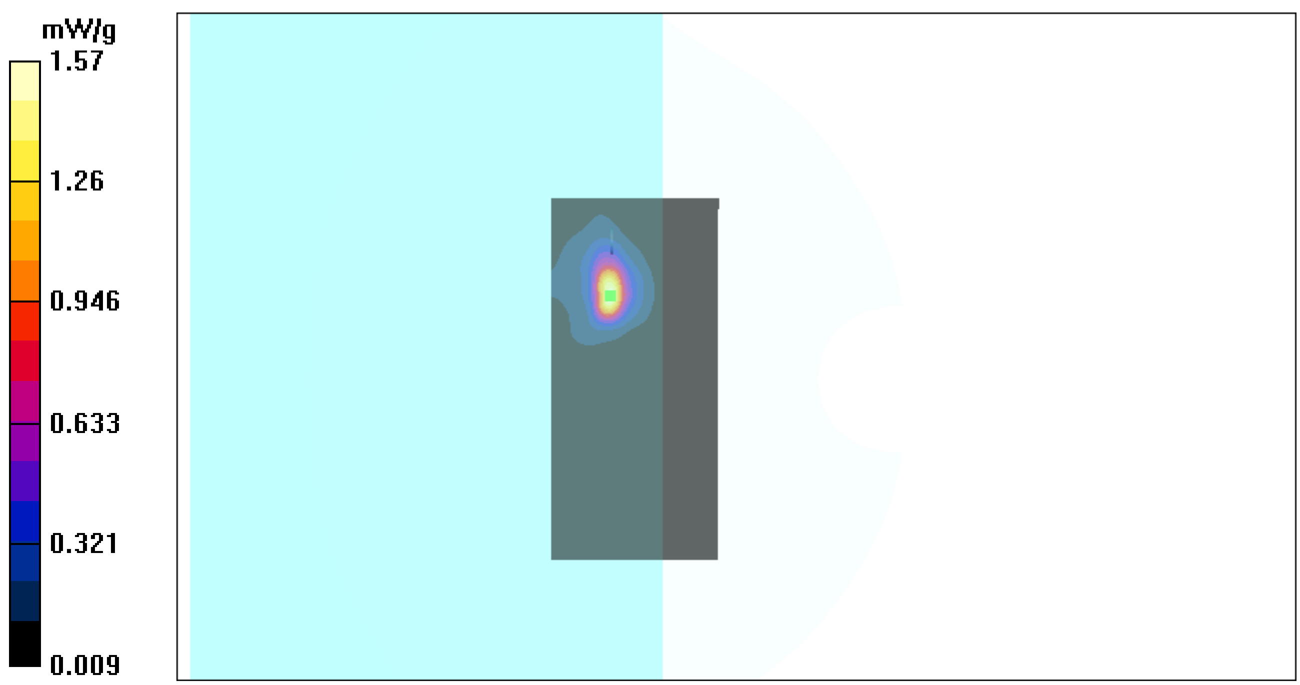
Medium Notes: Ambient Temp: 22.6 deg C; Fluid Temp: 21.5 deg C

Communication System: OFDM; ; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: 5300 MHz Body Medium parameters used: f = 5300 MHz; σ = 5.27 mho/m; ε_r = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.57 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.76 V/m; Power Drift = -0.268 dB
Peak SAR (extrapolated) = 3.52 W/kg
SAR(1 g) = 1.05 mW/g; SAR(10 g) = 0.297 mW/g
Maximum value of SAR (measured) = 1.41 mW/g



5300MHz/body worn/face side/side mounted antenna/AC pwr

Date/Time: 9/26/2006 9:58:11 AM

DUT: NEC; Type: S1613-01

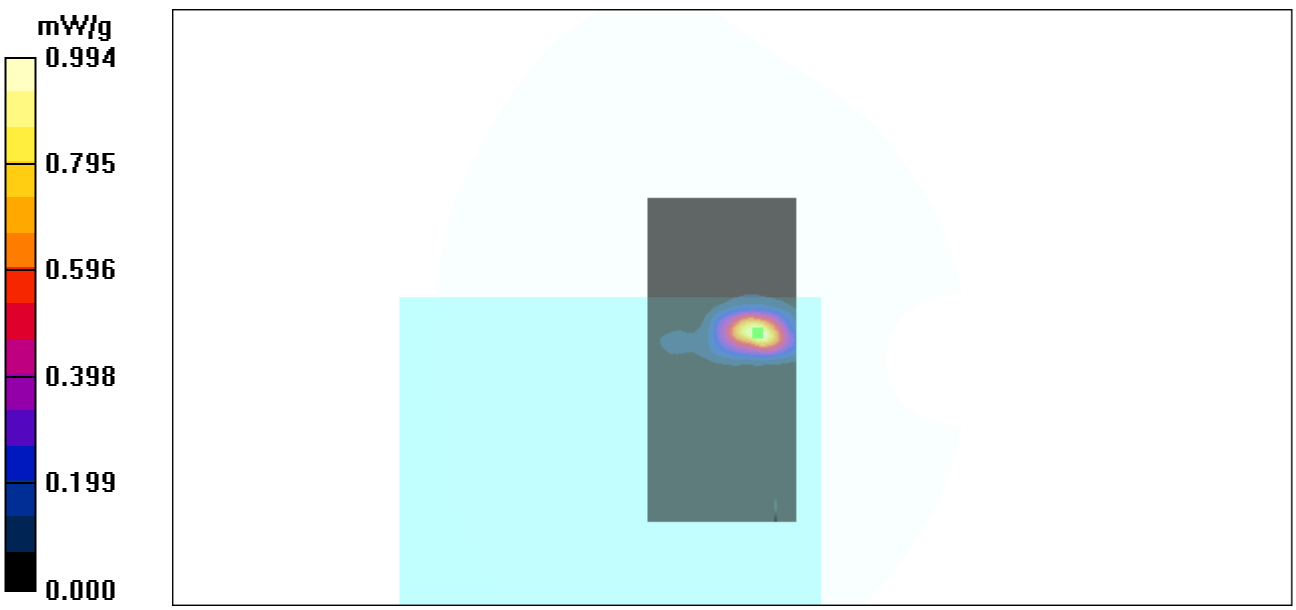
Medium Notes: Ambient Temp: 22.6 deg C; Fluid Temp: 22.1 deg C

Communication System: OFDM; ; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: 5300 MHz Body Medium parameters used: f = 5300 MHz; σ = 5.27 mho/m; er = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 0.994 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.95 V/m; Power Drift = 0.185 dB
Peak SAR (extrapolated) = 3.08 W/kg
SAR(1 g) = 0.913 mW/g; SAR(10 g) = 0.257 mW/g
Maximum value of SAR (measured) = 1.24 mW/g



5300MHz/body worn/face side/top mounted antenna/battery pwr

Date/Time: 9/26/2006 11:04:01 AM

DUT: NEC; Type: S1613-01 Tablet PC

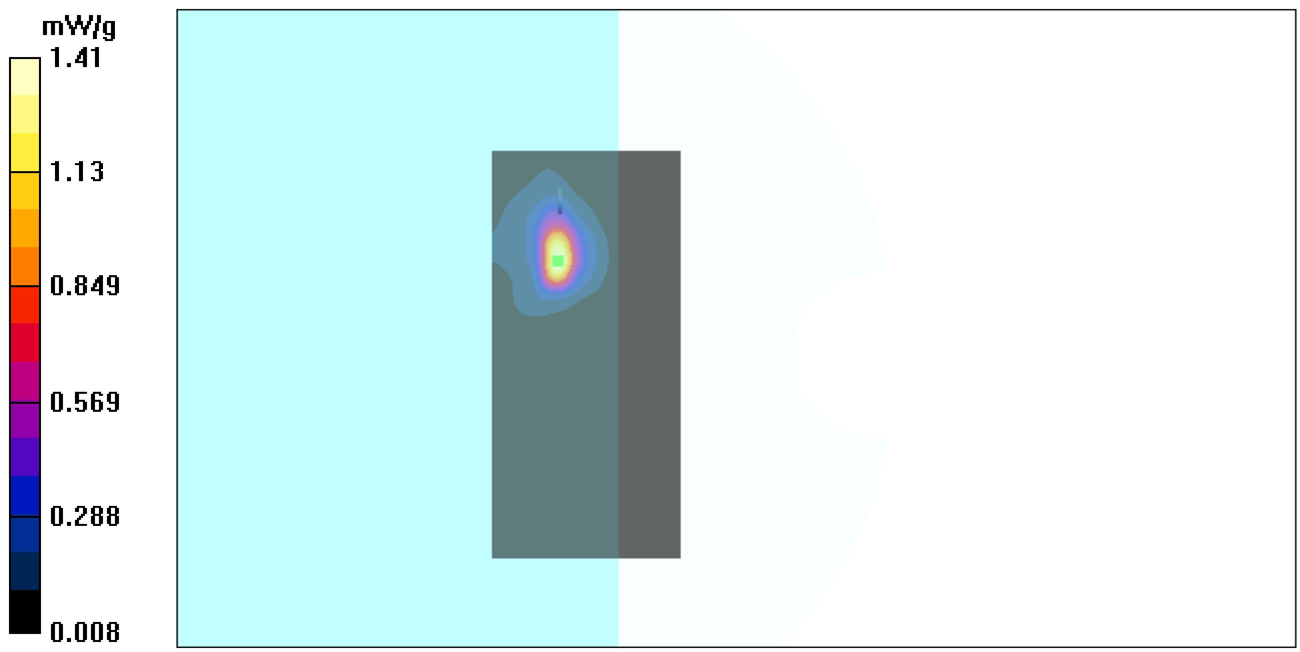
Medium Notes: Ambient Temp: 22.6 deg C; Fluid Temp: 21.5 deg C

Communication System: OFDM; ; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: 5300 MHz Body Medium parameters used: f = 5300 MHz; σ = 5.27 mho/m; er = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.41 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.60 V/m; Power Drift = 0.118 dB
Peak SAR (extrapolated) = 3.23 W/kg
SAR(1 g) = 0.948 mW/g; SAR(10 g) = 0.268 mW/g
Maximum value of SAR (measured) = 1.27 mW/g



5260MHz/body worn/face side/top mounted antenna/AC pwr

Date/Time: 9/26/2006 12:49:28 PM

DUT: NEC; Type: S1613-01

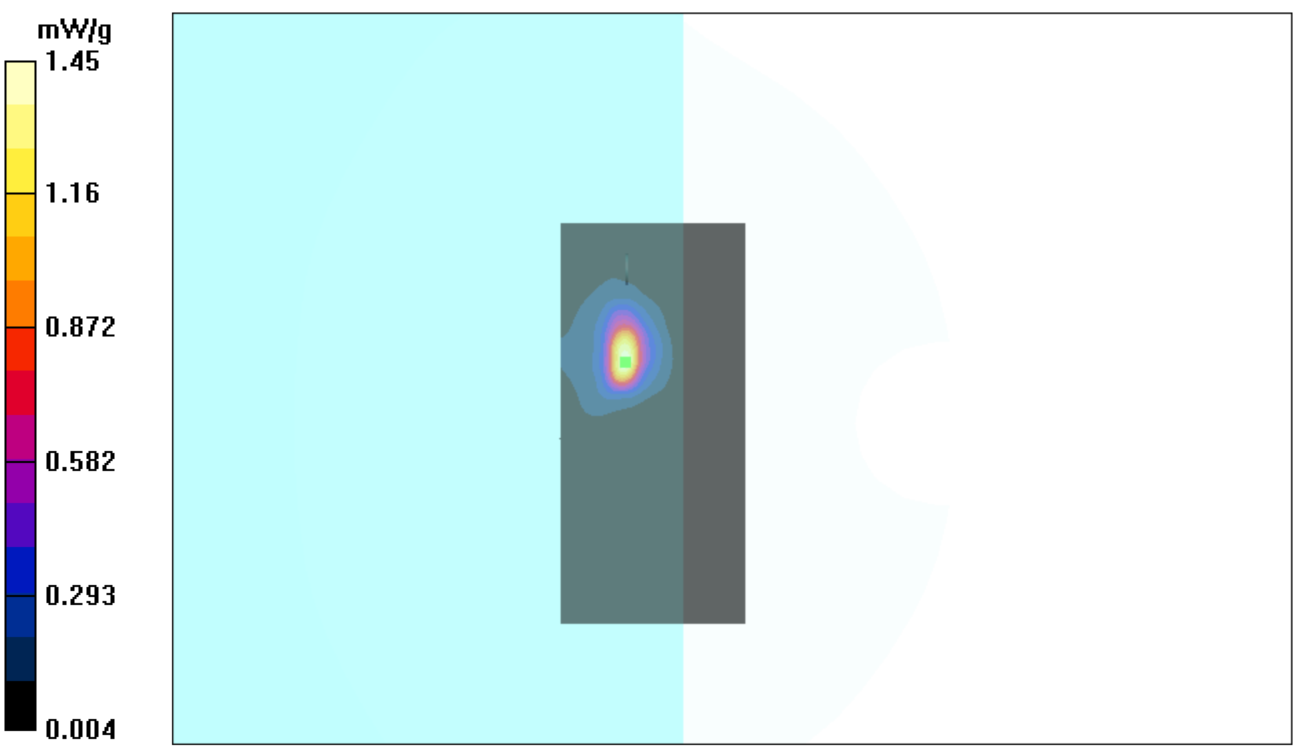
Medium Notes: Ambient Temp: 22.6 deg C; Fluid Temp: 22.1 deg C

Communication System: OFDM; ; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: 5300 MHz Body Medium parameters used: f = 5300 MHz; σ = 5.27 mho/m; er = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.45 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.69 V/m; Power Drift = 0.132 dB
Peak SAR (extrapolated) = 3.53 W/kg
SAR(1 g) = 1.06 mW/g; SAR(10 g) = 0.303 mW/g
Maximum value of SAR (measured) = 1.44 mW/g



5260MHz/body worn/face side/side mounted antenna/AC pwr

Date/Time: 9/26/2006 2:33:36 PM

DUT: NEC; Type: S1613-01 Table PC

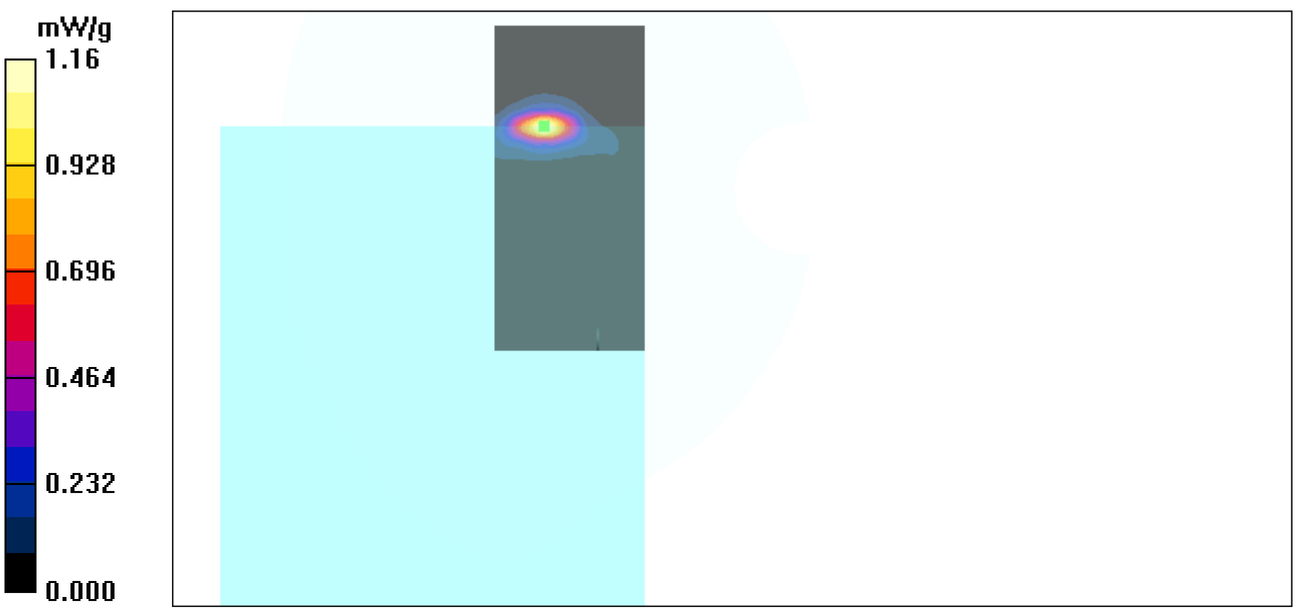
Medium Notes: Ambient Temp: 22.6 deg C; Fluid Temp: 21.5 deg C

Communication System: OFDM; ; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: 5300 MHz Body Medium parameters used: f = 5300 MHz; σ = 5.27 mho/m; er = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.16 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.16 V/m; Power Drift = 0.149 dB
Peak SAR (extrapolated) = 3.01 W/kg
SAR(1 g) = 0.892 mW/g; SAR(10 g) = 0.248 mW/g
Maximum value of SAR (measured) = 1.17 mW/g



5320MHz/body worn/face side/top mounted antenna/AC pwr

Date/Time: 9/26/2006 1:09:54 PM

DUT: NEC; Type: S1613-01

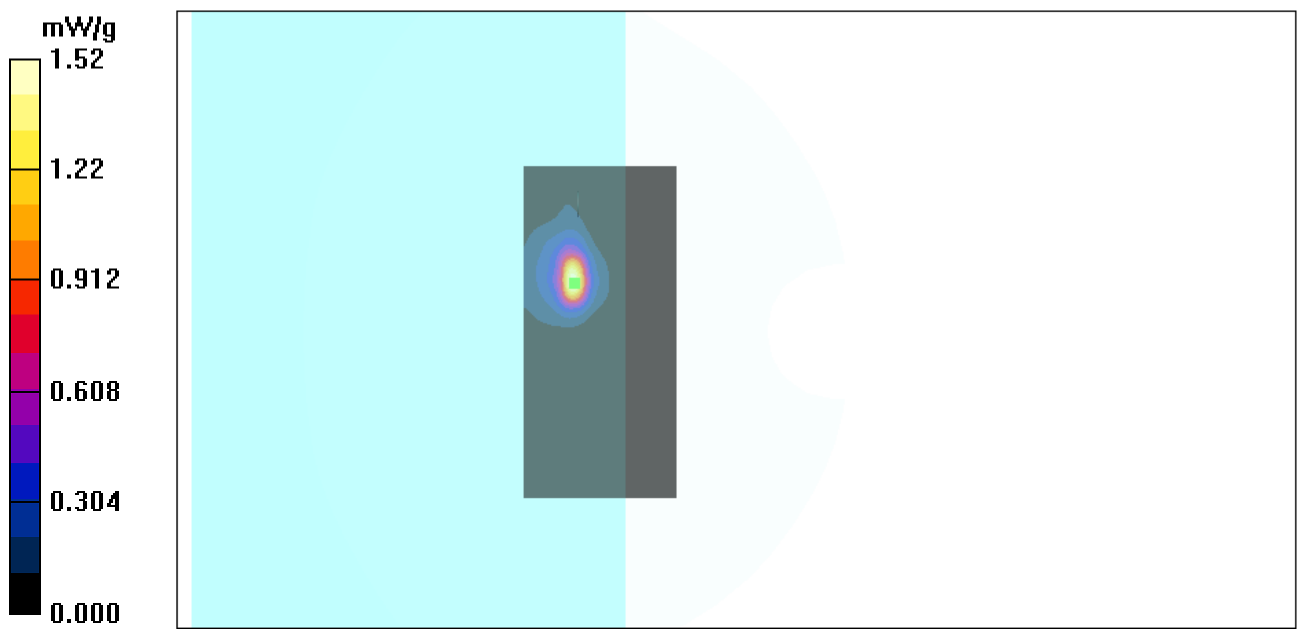
Medium Notes: Ambient Temp: 22.6 deg C; Fluid Temp: 22.1 deg C

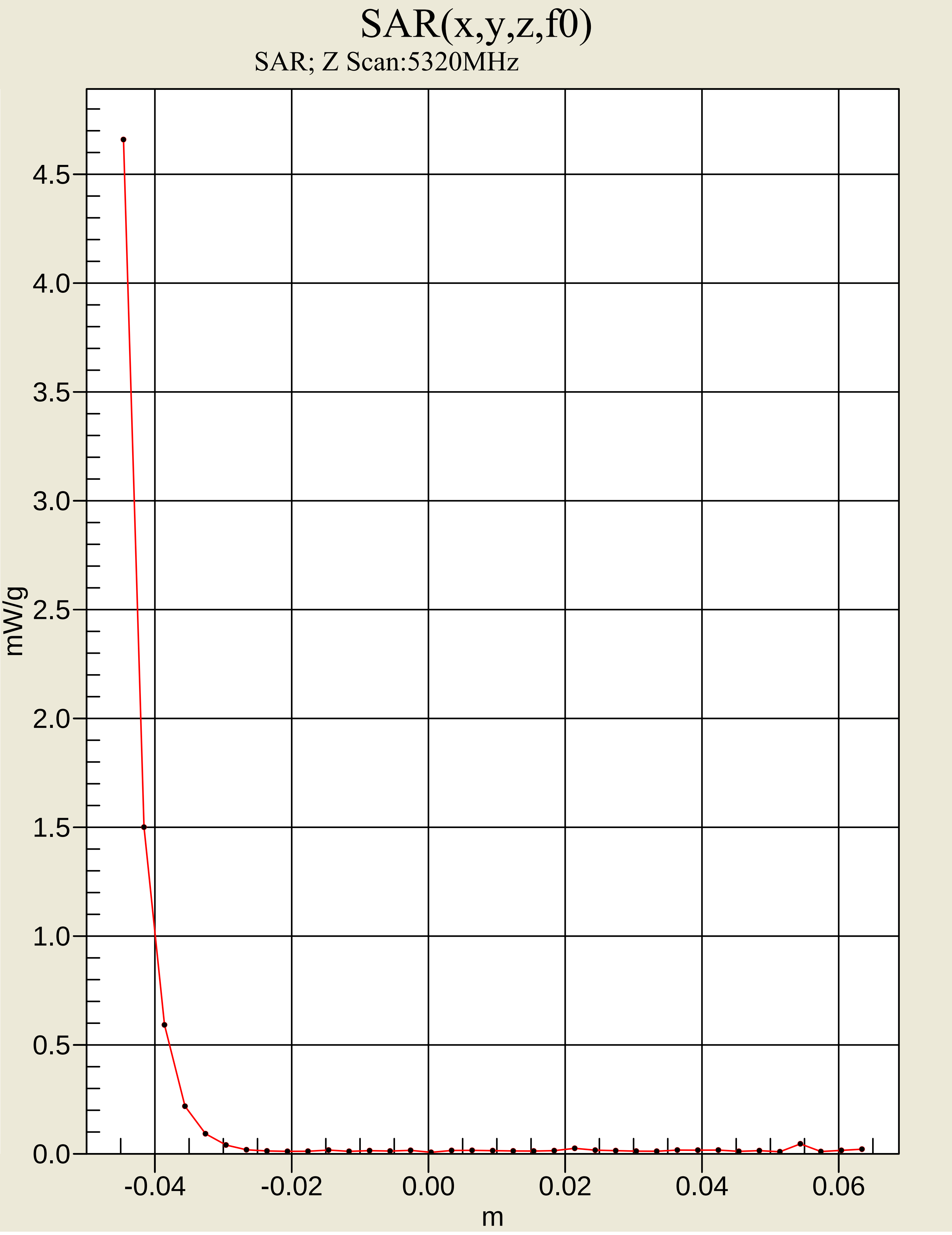
Communication System: OFDM; ; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: 5300 MHz Body Medium parameters used: f = 5300 MHz; σ = 5.27 mho/m; er = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.52 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.69 V/m; Power Drift = 0.27 dB
Peak SAR (extrapolated) = 3.66 W/kg
SAR(1 g) = 1.14 mW/g; SAR(10 g) = 0.319 mW/g
Maximum value of SAR (measured) = 1.43 mW/g




SAR(x,y,z,f0)
SAR; Z Scan:5320MHz
mW/g
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
0.0
-0.04
-0.02
0.00
0.02
0.04
0.06
m

5320MHz/body worn/face side/side mounted antenna/AC pwr

Date/Time: 9/26/2006 2:09:08 PM

DUT: NEC; Type: S1613-01 Tablet PC

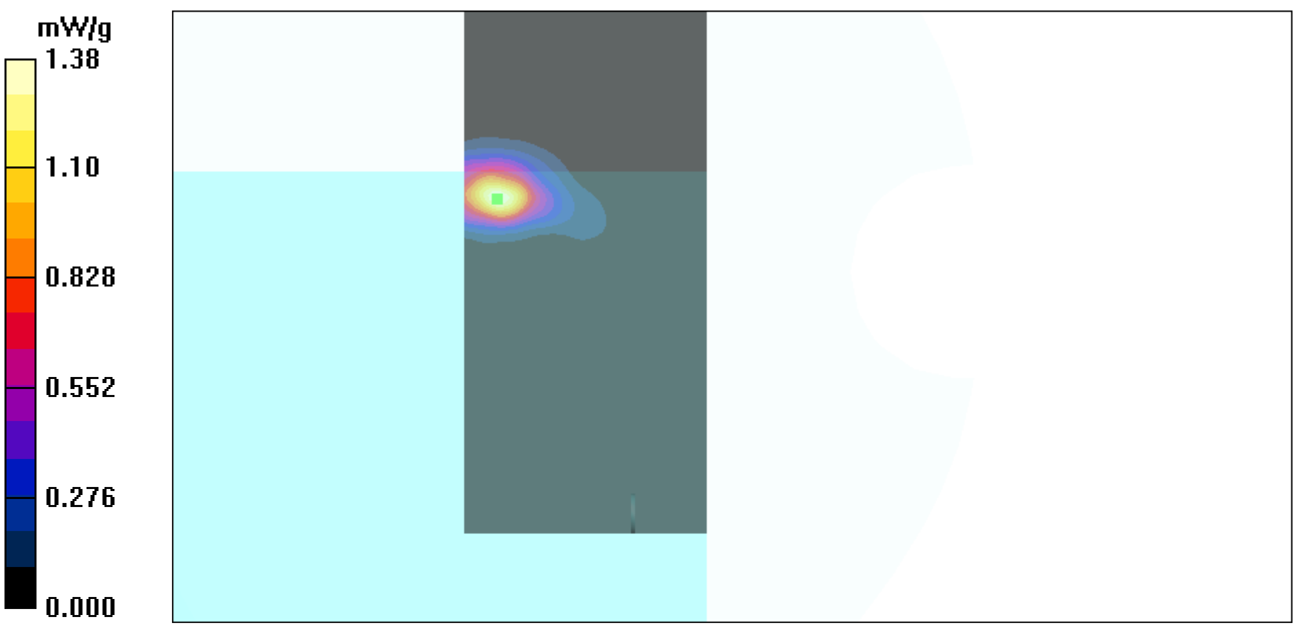
Medium Notes: Ambient Temp: 22.6 deg C; Fluid Temp: 21.5 deg C

Communication System: OFDM; ; Frequency: 5300 MHz;Duty Cycle: 1:1
Medium: 5200 MHz Body Medium parameters used: f = 5300 MHz; σ = 5.27 mho/m; er = 48.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.38 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.47 V/m; Power Drift = 0.127 dB
Peak SAR (extrapolated) = 3.70 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.294 mW/g
Maximum value of SAR (measured) = 1.48 mW/g



5765MHz/body worn/face side/top mounted antenna/AC pwr

Date/Time: 9/25/2006 2:41:29 PM

DUT: NEC; Type: S1613-01Table PC

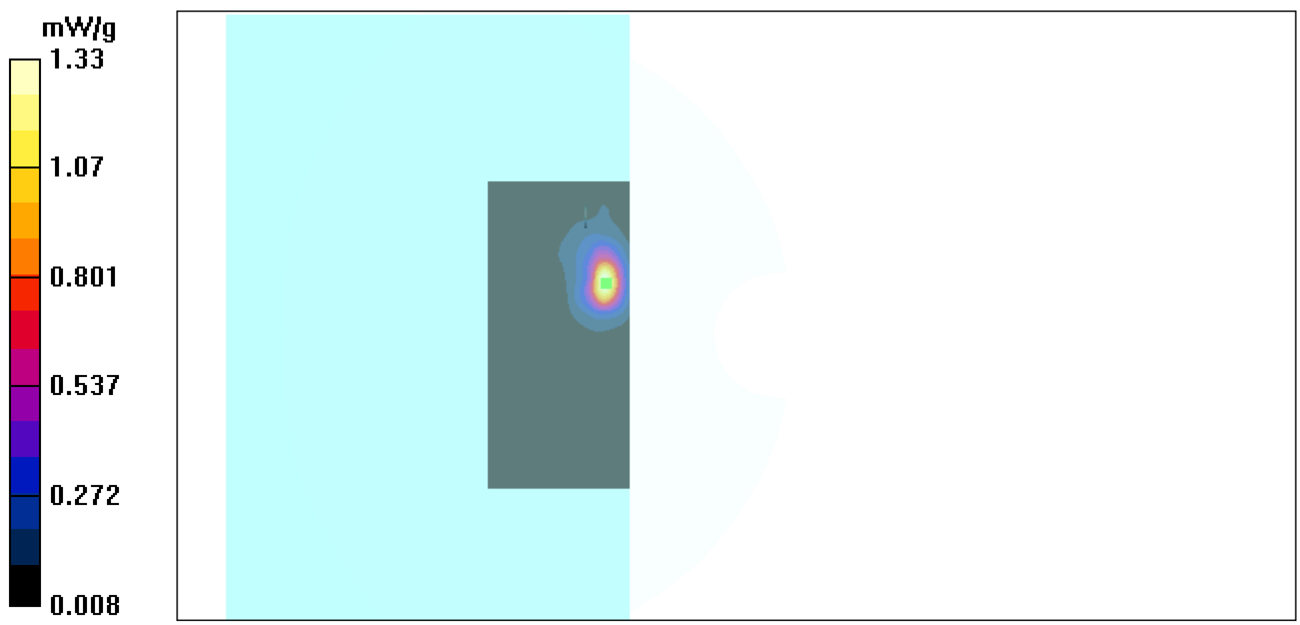
Medium Notes: Ambient Temp 22.6 deg C; Fluid Temp 21.5 deg C

Communication System: OFDM; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 MHz Body Medium parameters used: f = 5800 MHz; σ = 6.18 mho/m; ε_r = 47.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.1, 4.1, 4.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.33 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 1.96 V/m; Power Drift = 0.111 dB
Peak SAR (extrapolated) = 3.76 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.307 mW/g
Maximum value of SAR (measured) = 1.34 mW/g



5765MHz/body worn/face side/side mounted antenna/AC pwr

Date/Time: 9/25/2006 5:52:51 PM

DUT: NEC; Type: S1613-01Table PC

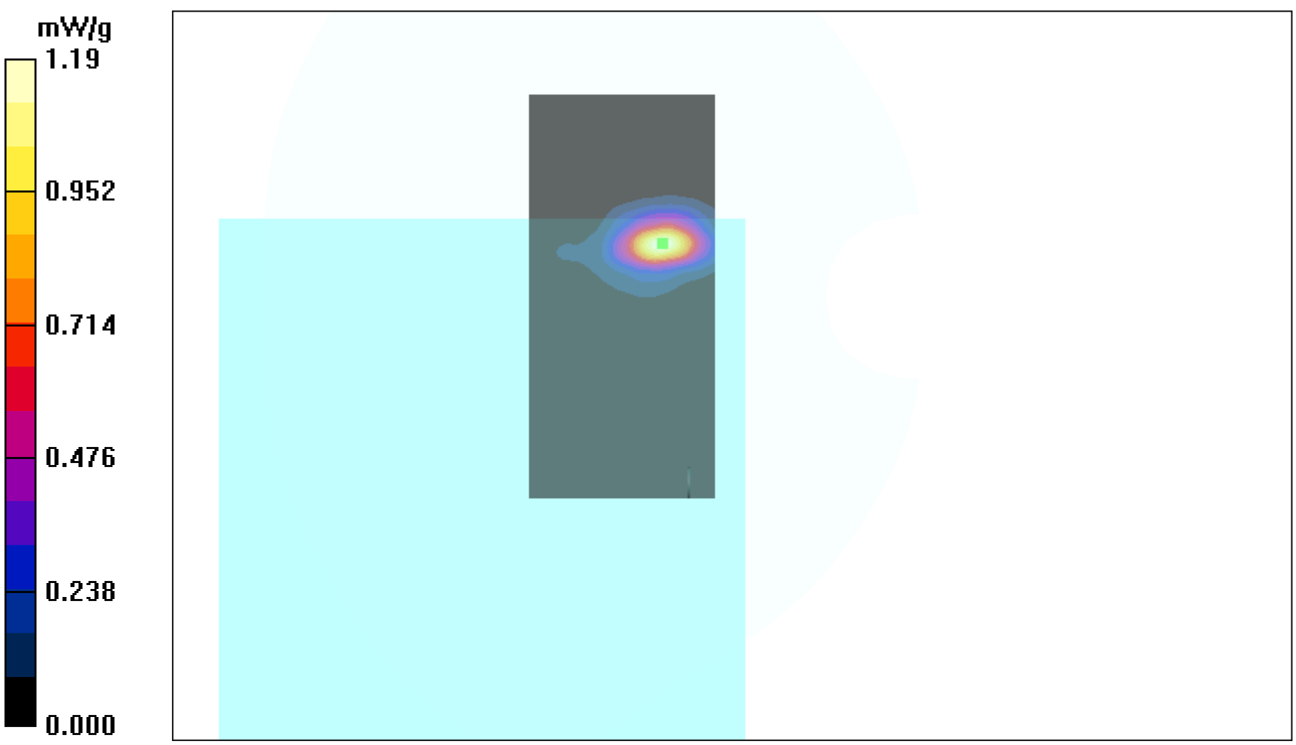
Medium Notes: Ambient Temp 22.6 deg C; Fluid Temp 21.5 deg C

Communication System: OFDM; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 MHz Body Medium parameters used: f = 5800 MHz; σ = 6.18 mho/m; ε_r = 47.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.1, 4.1, 4.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.19 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.86 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 4.00 W/kg
SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.304 mW/g
Maximum value of SAR (measured) = 1.55 mW/g



5765MHz/body worn/face side/side mounted antenna/battery pwr

Date/Time: 9/25/2006 5:32:48 PM

DUT: NEC; Type: S1613-01Table PC

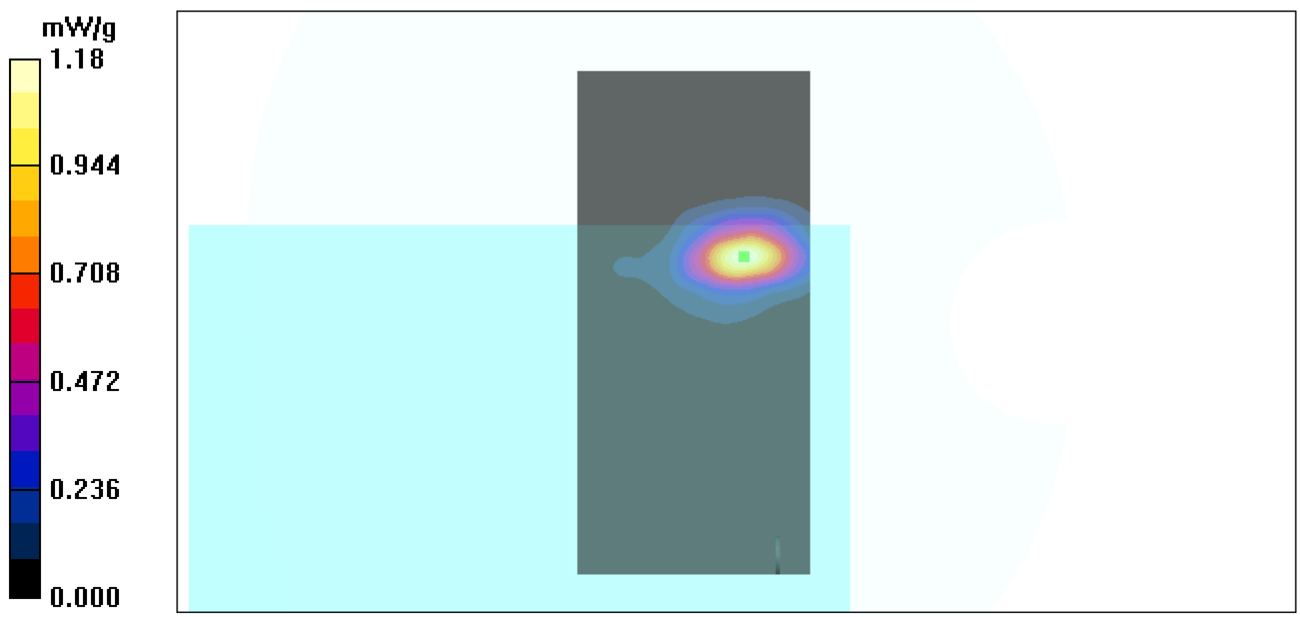
Medium Notes: Ambient Temp 22.6 deg C; Fluid Temp 21.5 deg C

Communication System: OFDM; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 MHz Body Medium parameters used: f = 5800 MHz; σ = 6.18 mho/m; ε_r = 47.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.1, 4.1, 4.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.18 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.86 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 3.95 W/kg
SAR(1 g) = 1.09 mW/g; SAR(10 g) = 0.301 mW/g
Maximum value of SAR (measured) = 1.53 mW/g



5745MHz/body worn/face side/top antenna/AC pwr

Date/Time: 9/25/2006 4:01:54 PM

DUT: NEC; Type: S1613-01 Tablet PC

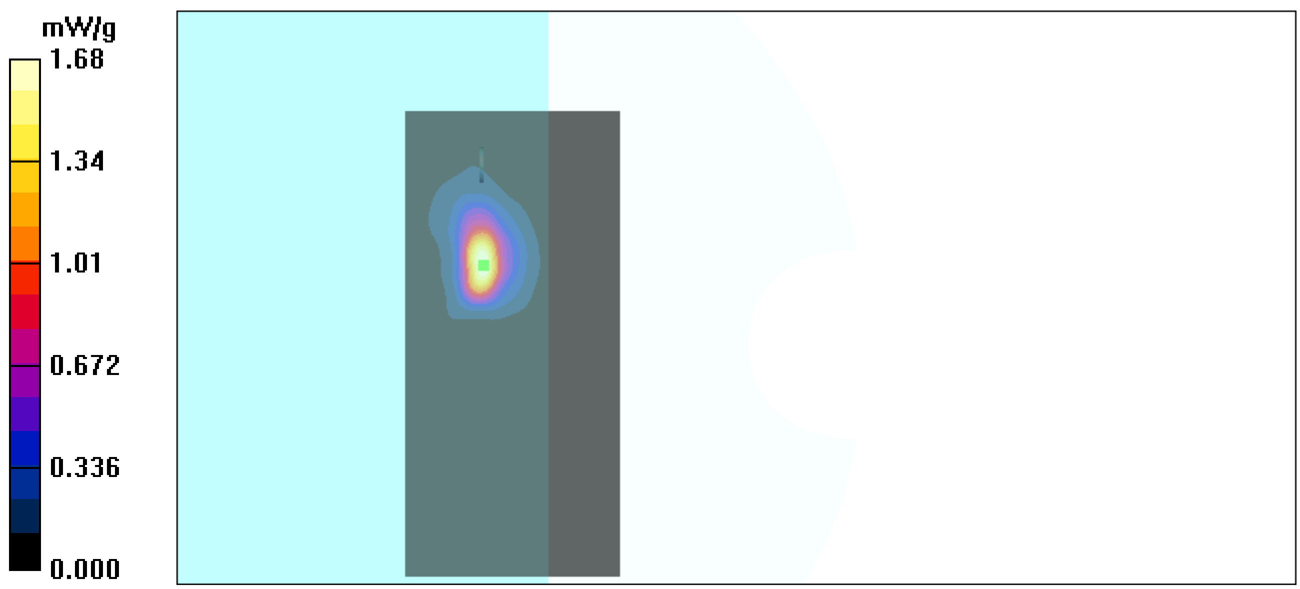
Medium Notes: Ambient Temp: 22.6 deg C; Fluid Temp: 21.5 deg C

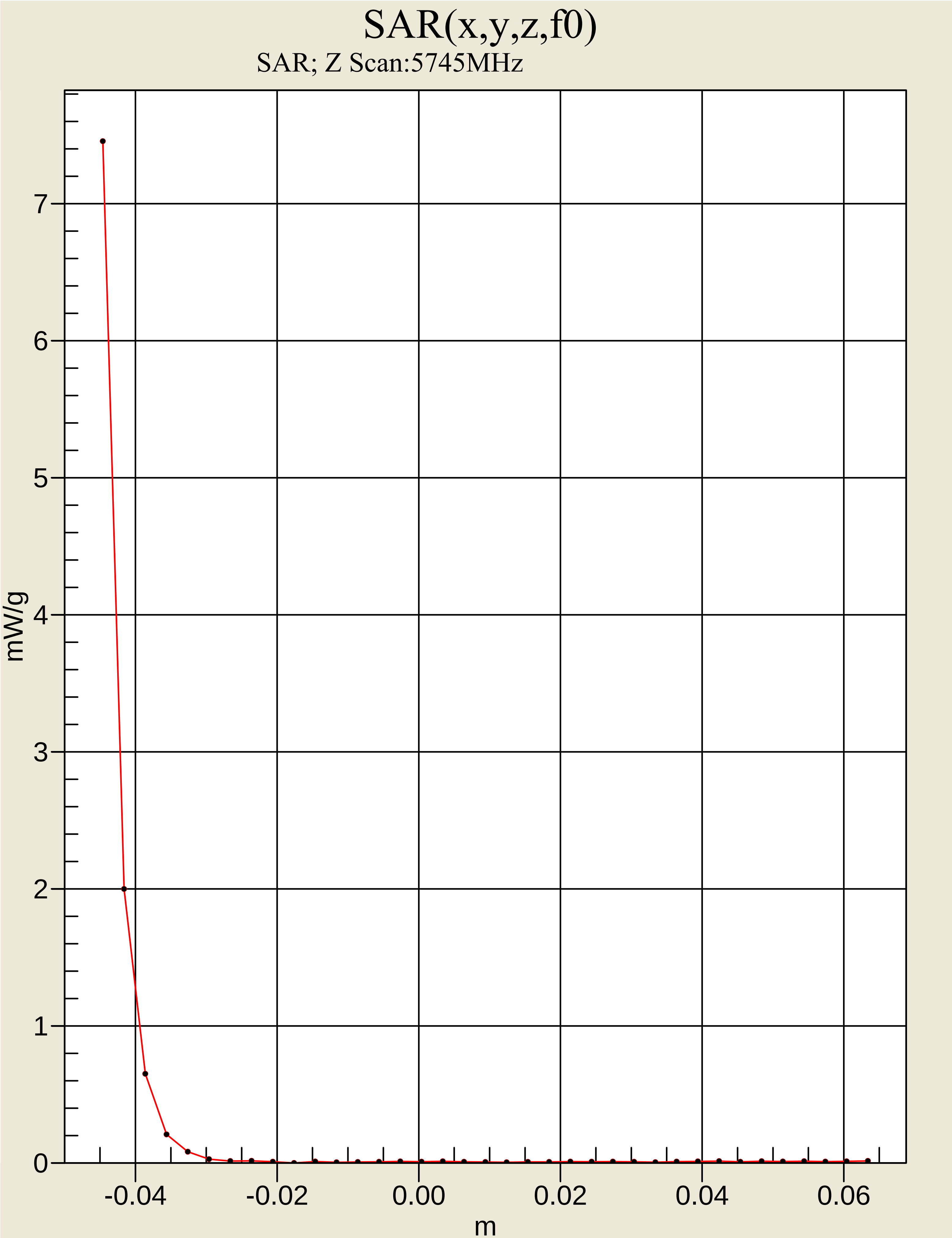
Communication System: OFDM; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 MHz Body Medium parameters used: f = 5800 MHz; σ = 6.18 mho/m; ε_r = 47.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.1, 4.1, 4.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.68 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.93 V/m; Power Drift = 0.156 dB
Peak SAR (extrapolated) = 4.71 W/kg
SAR(1 g) = 1.33 mW/g; SAR(10 g) = 0.362 mW/g
Maximum value of SAR (measured) = 1.82 mW/g





SAR(x,y,z,f0)
SAR; Z Scan:5745MHz
mW/g
7
6
5
4
3
2
1
0
-0.04
-0.02
0.00
0.02
0.04
0.06
m

5805MHz/body worn/face side/top antenna/AC pwr

Date/Time: 9/25/2006 4:01:54 PM

DUT: NEC; Type: S1613-01 Table PC

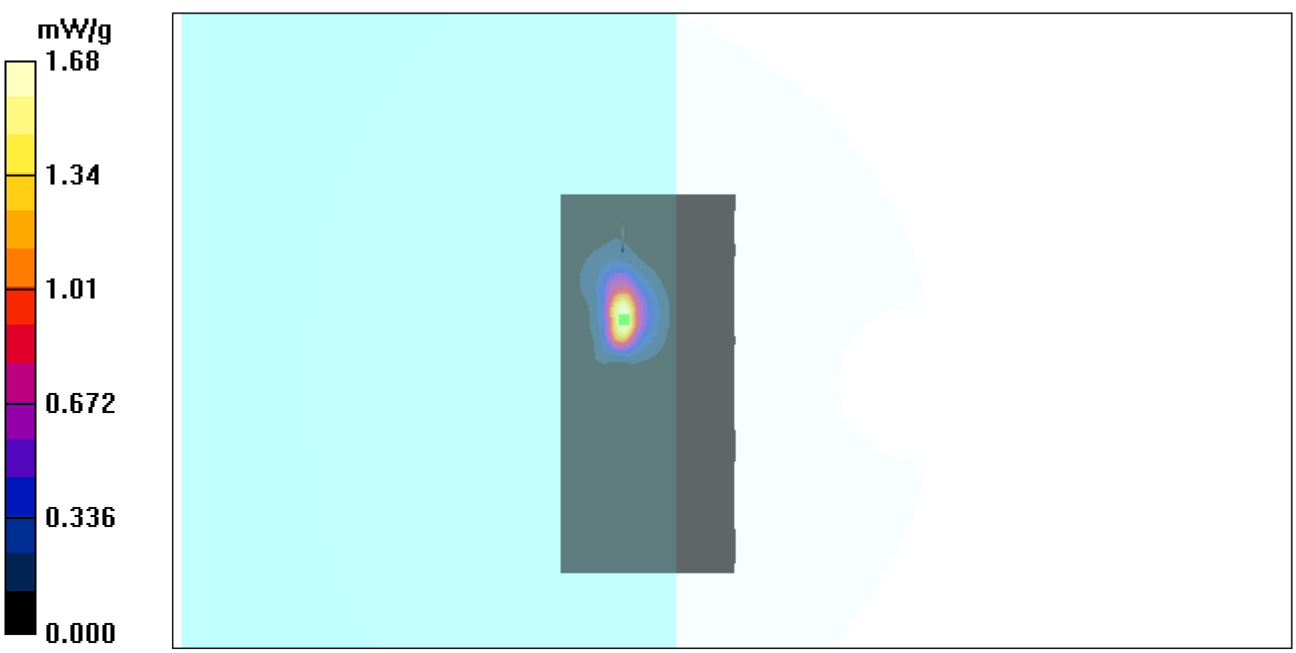
Medium Notes: Ambient Temp: 22.6 deg C; Fluid Temp: 21.5 deg C

Communication System: OFDM; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 MHz Body Medium parameters used: f = 5800 MHz; σ = 6.18 mho/m; ε_r = 47.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.1, 4.1, 4.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.68 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.93 V/m; Power Drift = 0.056 dB
Peak SAR (extrapolated) = 4.71 W/kg
SAR(1 g) = 1.32 mW/g; SAR(10 g) = 0.362 mW/g
Maximum value of SAR (measured) = 1.82 mW/g



5805MHz/body worn/face side/side antenna/AC pwr

Date/Time: 9/25/2006 5:22:11 PM

DUT: NEC; Type: S1613-01 Tablet PC

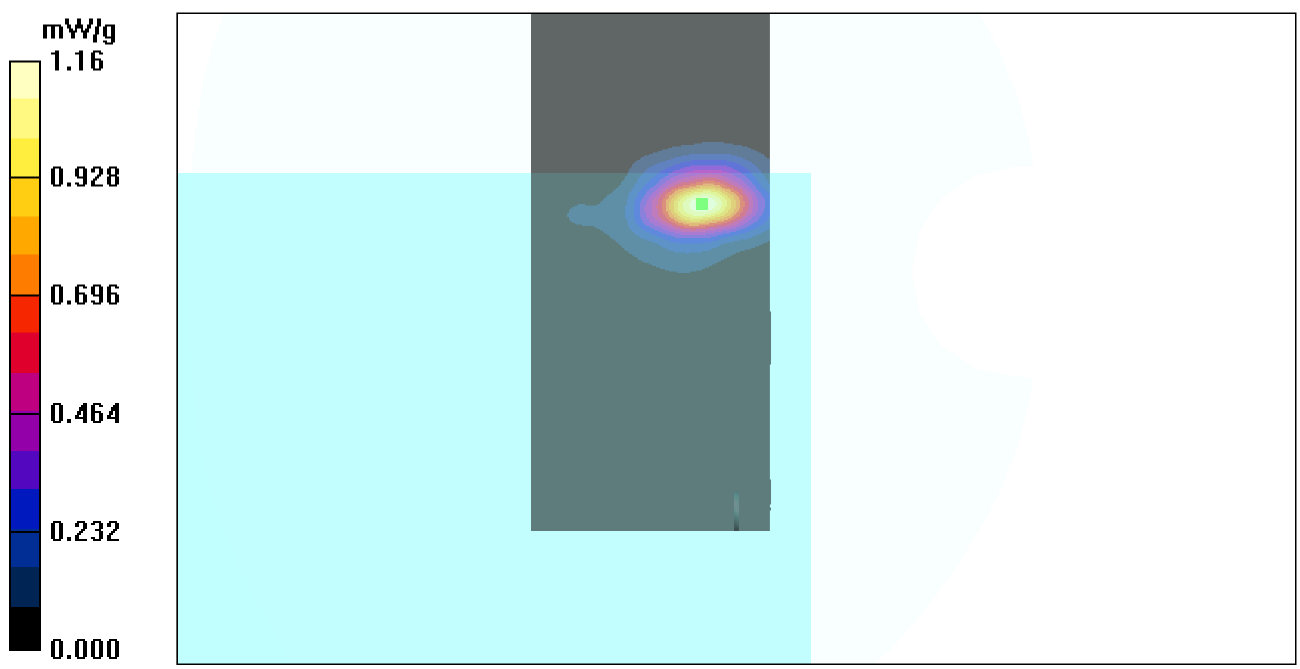
Medium Notes: Ambient Temp: 22.6 deg C; Fluid Temp: 21.5 deg C

Communication System: OFDM; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 MHz Body Medium parameters used: f = 5800 MHz; σ = 6.18 mho/m; ε_r = 47.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.1, 4.1, 4.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (61x131x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 1.16 mW/g

Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.86 V/m; Power Drift = 0.22dB
Peak SAR (extrapolated) = 3.88 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.296 mW/g
Maximum value of SAR (measured) = 1.50 mW/g



APPENDIX B - SYSTEM PERFORMANCE CHECK

5200MHz Validation

Date/Time: 9/25/2006 8:57:49 AM

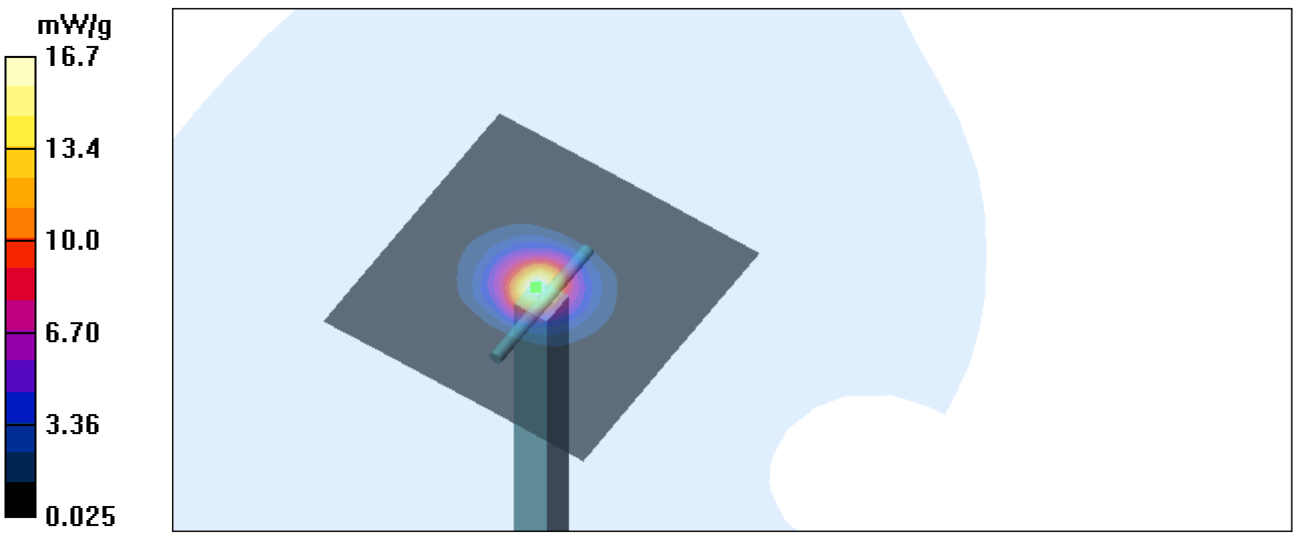
DUT: Dipole 5200 MHz; Type: D5200V2; Serial: D5200V2 - SN:001

Communication System: CW; ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5200 MHz Body Medium parameters used: f = 5200 MHz; σ = 5.33 mho/m; ε_r = 48.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.7 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 54.9 V/m; Power Drift = 0.012 dB
Peak SAR (extrapolated) = 76.4 W/kg
SAR(1 g) = 16.8 mW/g; SAR(10 g) = 5.09 mW/g
Maximum value of SAR (measured) = 31.8 mW/g



5800MHz Validation

Date/Time: 9/25/2006 9:23:39 AM

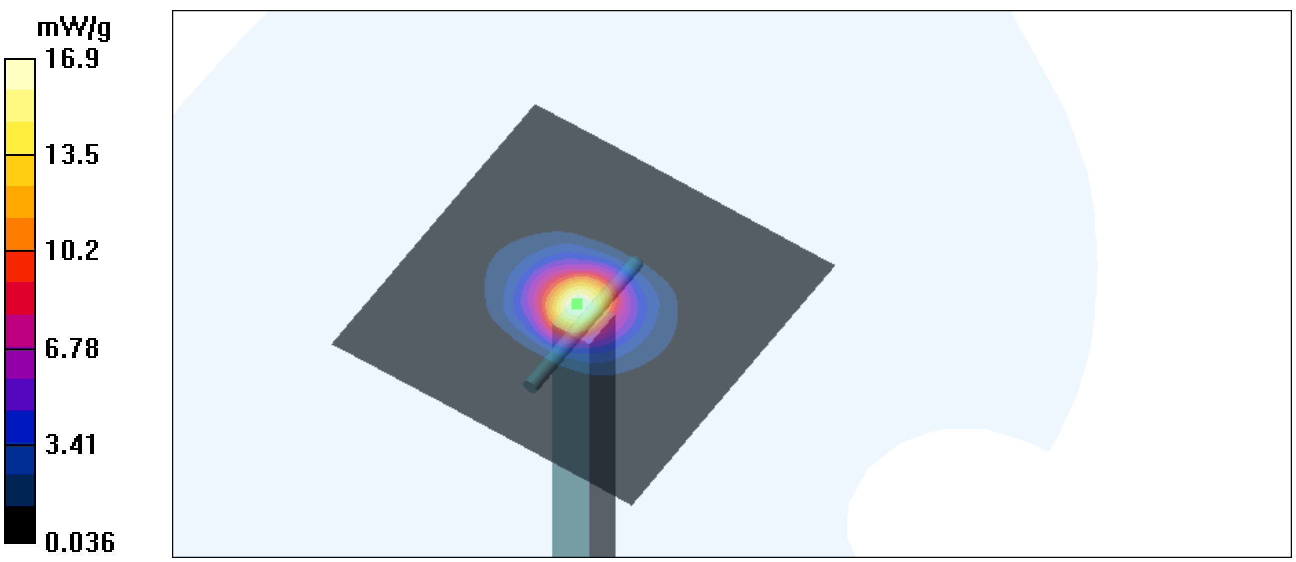
DUT: Dipole 5800 MHz; Type: D5800V2; Serial: D5800V2 - SN:001

Communication System: CW; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5500 MHz Body Medium parameters used: f = 5800 MHz; σ = 6.18 mho/m; ε_r = 47.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.1, 4.1, 4.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.9 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 53.4 V/m; Power Drift = 0.104 dB
Peak SAR (extrapolated) = 70.6 W/kg
SAR(1 g) = 16.4 mW/g; SAR(10 g) = 5.01 mW/g
Maximum value of SAR (measured) = 31.8 mW/g



5200MHz Validation

Date/Time: 9/26/2006 7:56:22 AM

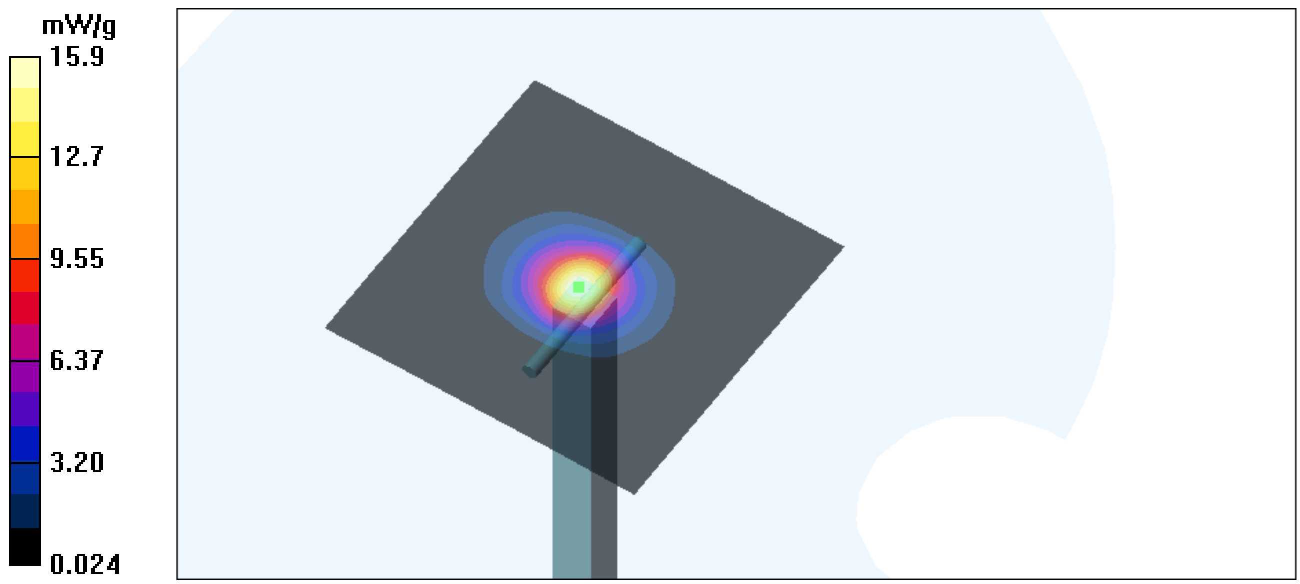
DUT: Dipole 5200 MHz; Type: D5200V2; Serial: D5200V2 - SN:001

Communication System: CW; ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5200 MHz Body Medium parameters used: f = 5200 MHz; σ = 5.08 mho/m; ε_r = 49.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 15.9 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 54.9 V/m; Power Drift = 0.096 dB
Peak SAR (extrapolated) = 72.8 W/kg
SAR(1 g) = 16.2 mW/g; SAR(10 g) = 4.85 mW/g
Maximum value of SAR (measured) = 30.3 mW/g



APPENDIX C – PROBE CALIBRATION CERTIFICATE

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

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

Accredited by the Swiss Federal Office of Metrology and Accreditation
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 **MET Laboratories**

Certificate No: EX3-3511_Jan06

CALIBRATION CERTIFICATE

Object	EX3DV3 - SN:3511
Calibration procedure(s)	QA CAL-01.v5 and QA CAL-14.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	January 23, 2006
Condition of the calibrated item	In Tolerance

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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41495277	3-May-05 (METAS, No. 251-00466)	May-06
Power sensor E4412A	MY41498087	3-May-05 (METAS, No. 251-00466)	May-06
Reference 3 dB Attenuator	SN: S5054 (3c)	11-Aug-05 (METAS, No. 251-00499)	Aug-06
Reference 20 dB Attenuator	SN: S5086 (20b)	3-May-05 (METAS, No. 251-00467)	May-06
Reference 30 dB Attenuator	SN: S5129 (30b)	11-Aug-05 (METAS, No. 251-00500)	Aug-06
Reference Probe ES3DV2	SN: 3013	2-Jan-06 (SPEAG, No. ES3-3013_Jan06)	Jan-07
DAE4	SN: 654	27-Oct-05 (SPEAG, No. DAE4-654_Oct05)	Oct-06

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (SPEAG, in house check Nov-05)	In house check: Nov-07
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Nov-05)	In house check: Nov 06

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

Issued: January 23, 2006

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
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) CENELEC EN 50361, "Basic standard for the measurement of Specific Absorption Rate related to human exposure to electromagnetic fields from mobile phones (300 MHz - 3 GHz), July 2001

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- *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 EX3DV3

SN:3511

Manufactured:	December 15, 2003
Last calibrated:	January 23, 2004
Recalibrated:	January 23, 2006

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: EX3DV3 SN:3511

Sensitivity in Free Space[A]

NormX	**0.770** ± 10.1%	$\mu V/(V/m)^2$
NormY	**0.606** ± 10.1%	$\mu V/(V/m)^2$
NormZ	**0.634** ± 10.1%	$\mu V/(V/m)^2$

Diode Compression[B]

DCP X	**96** mV
DCP Y	**96** mV
DCP Z	**96** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL 900 MHz Typical SAR gradient: 5 % per mm

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	3.3	1.3
SAR_{be} [%]	With Correction Algorithm	0.2	0.4

TSL 1810 MHz Typical SAR gradient: 10 % per mm

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	2.5	1.3
SAR_{be} [%]	With Correction Algorithm	0.4	0.4

Sensor Offset

Probe Tip to Sensor Center **1.0** mm

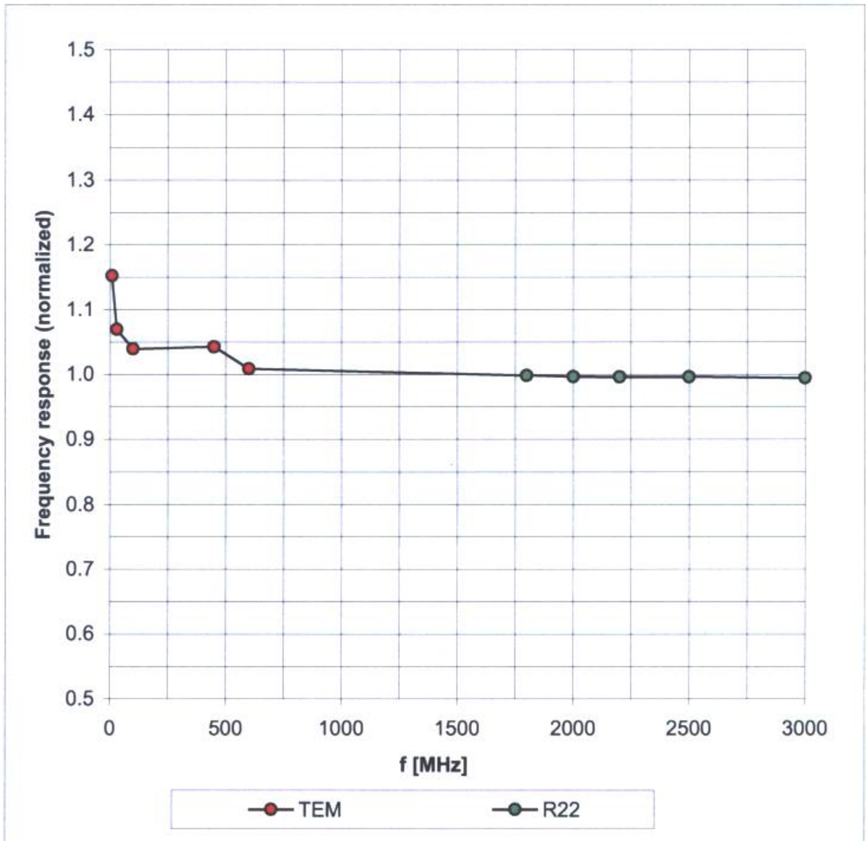
The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

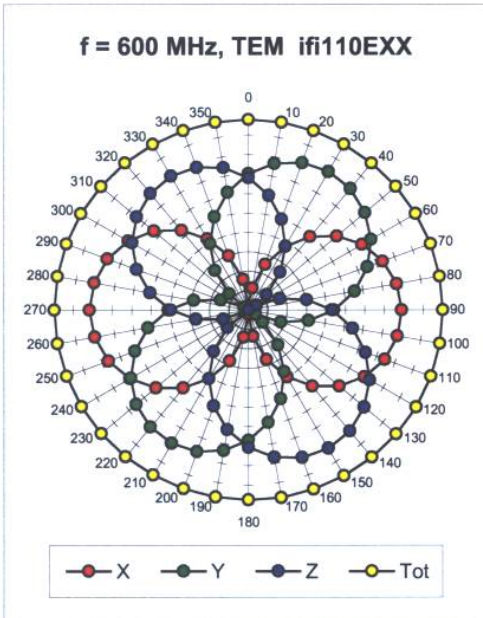
Frequency Response of E-Field

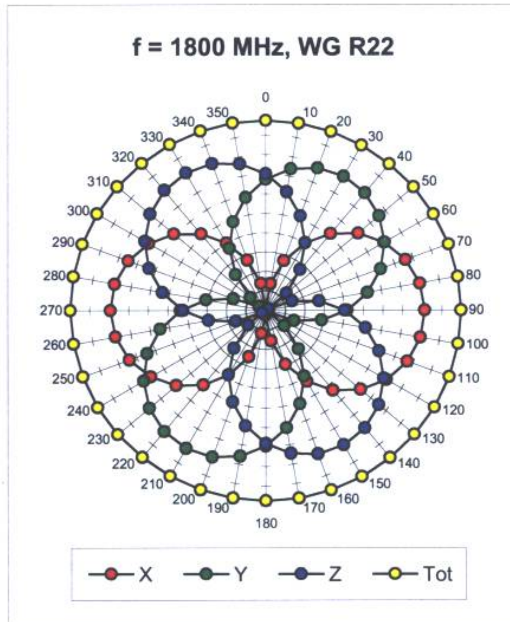
(TEM-Cell:ifi110 EXX, Waveguide: R22)

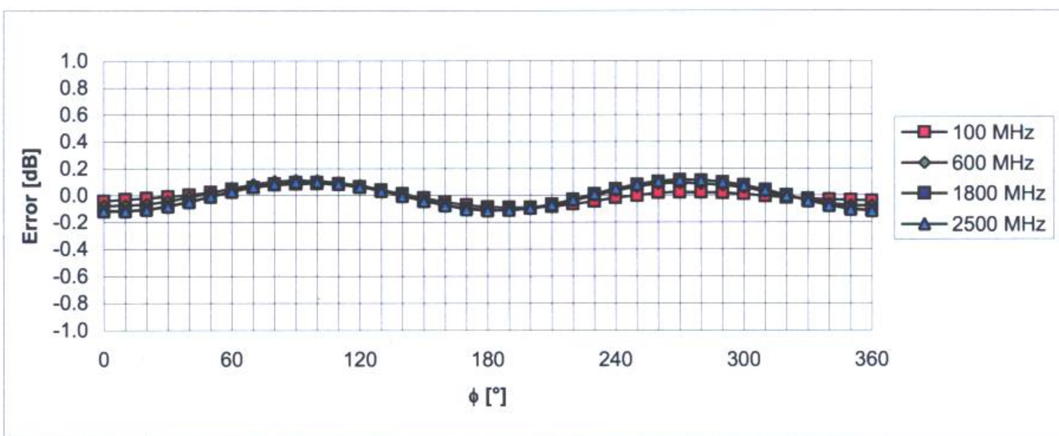


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), $\vartheta = 0°$



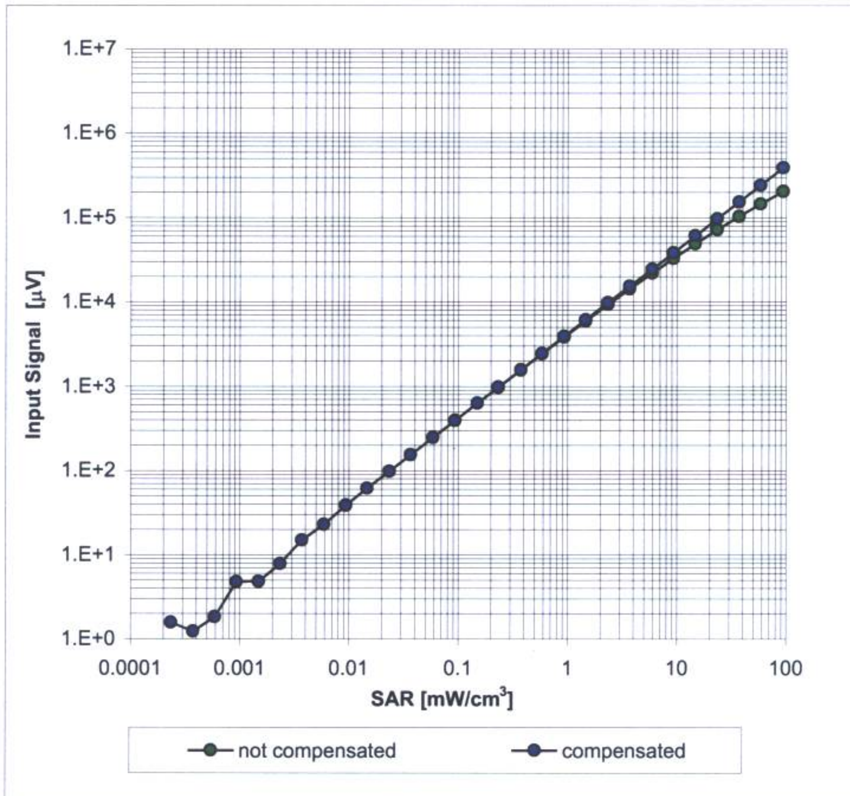


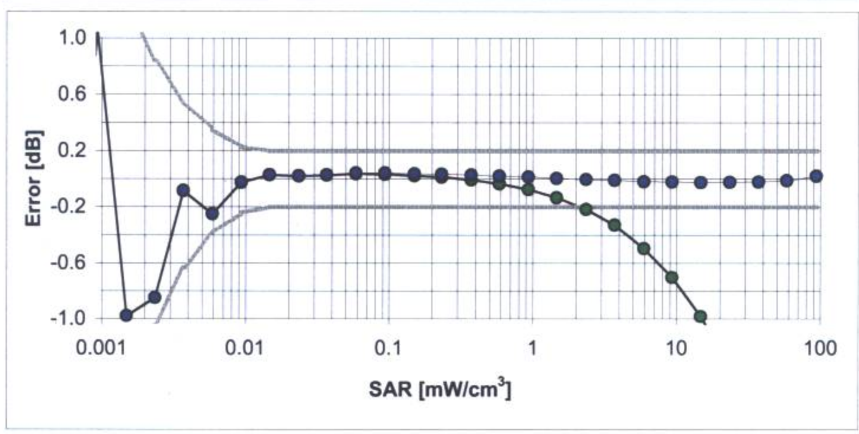


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})

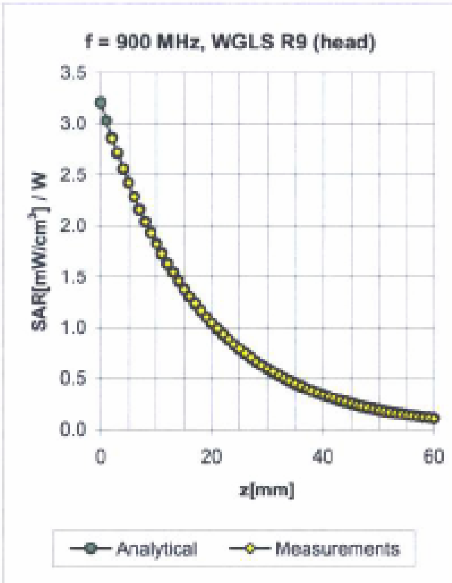
(Waveguide R22, f = 1800 MHz)

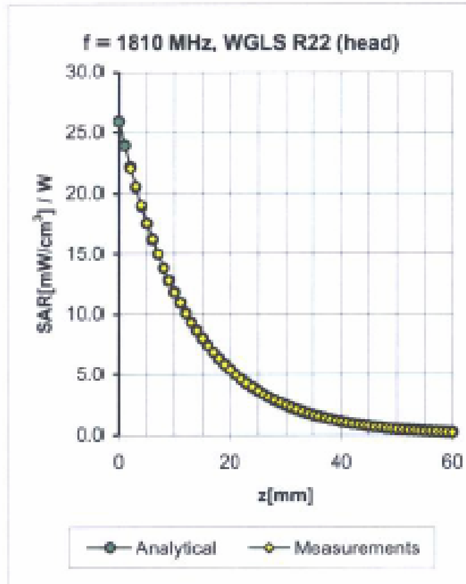




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment



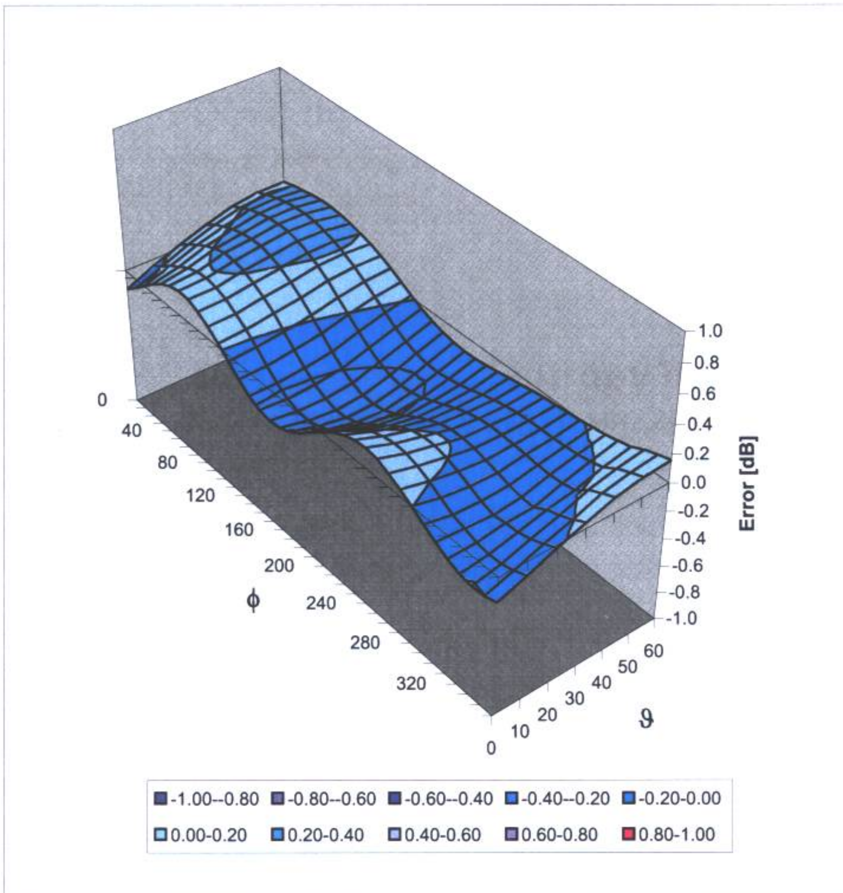


f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.58	0.70	9.68 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.29	0.86	8.41 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.49	0.55	7.64 ± 11.8% (k=2)
5200	± 50 / ± 100	Head	35.6 ± 5%	4.66 ± 5%	0.49	1.10	5.10 ± 13.1% (k=2)
5500	± 50 / ± 100	Head	35.6 ± 5%	4.96 ± 5%	0.49	1.10	4.70 ± 13.1% (k=2)
5800	± 50 / ± 100	Head	35.3 ± 5%	5.30 ± 5%	0.49	1.10	4.47 ± 13.1% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.57	0.72	9.55 ± 11.0% (k=2)
1810	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.21	1.95	8.14 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.99	0.39	7.80 ± 11.8% (k=2)
5200	± 50 / ± 100	Body	49.0 ± 5%	5.30 ± 5%	0.44	1.69	4.68 ± 13.1% (k=2)
5500	± 50 / ± 100	Body	48.6 ± 5%	5.65 ± 5%	0.45	1.68	4.30 ± 13.1% (k=2)
5800	± 50 / ± 100	Body	48.2 ± 5%	6.00 ± 5%	0.46	1.69	4.10 ± 13.1% (k=2)

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

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

APPENDIX D – DIPOLE CALIBRATION CERTIFICATE

CALIBRATION CERTIFICATE

Object: 5000MHz Validation Dipole serial #001

Calibration Procedure: Calibration procedure for a validation dipole

Calibration Date: August 22, 2006

Condition of the Calibrated Item: In Tolerance

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 a closed laboratory facility: environment temperature (22 ± 3) ^{o}C and humidity < 70%

Calibration equipment used

Model Type	Serial Number	MET Asset #	Cal Date
Anritsu Power Meter ML2488A	6K00001832	1S2430	June 2006
Anritsu Power Sensor	030864	1S2432	Jan 2006
HP E4418B Power Meter	GB40205140	1S2276	June 2006
HP 8482A Power Sensor	2607A11286	1S2140	June 2006
83650B Signal Generator	3844A00910	1S2278	June 2006
HP 8722D Vector Network Analyzer	3S36140188	1S2272	March 2006

Calibrated by: Shawn McMillen (Name) Senior Engineer (Function) Signature

This calibration certificate shall not be reproduced except in full

Date of Issue: August 22, 2006

Calibration procedure for validation dipole

Calibration is performed according to the following standards:

a) IEC Std 62209 Part 2, “Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body-Mounted Wireless Communication Devices in the Frequency Range of 30MHz- 6GHz: Human models, Instrumentation and Procedures” Part 2: “Procedure to determine the Specific Absorption Rate (SAR) for including accessories and multiple transmitter”, Draft Version 0.9, December 2004.
b) Federal Communications Commission Office of Engineering & Technology (FCC OET), “Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions”, Bulletin 65 Supplement C (Edition01-01).

Additional Documents

c) DASY4 System Handbook

Methods Applied and Interpretation of Parameters:

- Measurement Conditions: Further details are available from the Validation Report at the end of the certificate. All Figures stated in the certificate are valid at the frequency indicated.
- Antenna check: The antenna is checked for straightness using a straight edge placed parallel to the dipole arms prior to installing it against the phantom surface.
- The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- Antenna flatness: The spacer thickness used for the 5000MHz dipole is 10.00mm +/- 0.2mm. To insure the antenna is within +/- 2 degrees of flatness to the phantom surface use a caliper to measure the dipole ends from the surface of the phantom.
- Vector Network Analyzer: The network analyzer is calibrated as per the user’s manual.
- Feed Point Impedance and Return Loss: These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. A Return Loss >20dB ensures low reflected power. No uncertainty required.
- Electrical Delay: One-way delay between the SMA connector and the antenna feed point. No Uncertainty required.
- SAR measured: SAR measured at the stated antenna input power.
- SAR normalized: SAR as measured, normalized to an input power of 1W at the antenna connector. No Uncertainty required
- SAR for nominal head and muscle parameters: The measured TSL parameters are used to calculate the SAR results.

Measurement Conditions

DASY system configuration

DASY Version	DASY4	V4.6
Extrapolation	Advanced Extrapolation	
Phantom	Planar Validation Phantom	
Dipole Spacer		
Distance Dipole Center-TSL	10.0mm ± 0.2mm	With spacer
Area Scan resolution	dx, dy = 10mm	
Zoom Scan resolution	dx, dy, = 4.3mm, dz = 3mm	
Frequency	5200MHz ± 1MHz 5500MHz ± 1MHz 5800MHz ± 1MHz	

Head TSL Parameters @ 5200 MHz

The following parameters and calculations were applied

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL Parameters	22.0 ^{o}C	36.0	4.66
Measured Head TSL Parameters		37.4 ±5%	4.70 ±5%
Head TSL Temperature during Test	22.0 ^{o}C	--	--

SAR results with Head TSL @ 5200 MHz

SAR averaged over 1 cm^3 (1g) of Head TSL	Condition	22.3 mW/g
SAR Normalized	Normalized to 1 W	89.2 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	89.2 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Head TSL	Condition	6.81 mW/g
SAR Normalized	Normalized to 1 W	27.2 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	27.2 ± 21.46% mW/g (k=2)

Head TSL Parameters @ 5500 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL Parameters	22.0 ^{o}C	35.6	4.96
Measured Head TSL Parameters		37.1 ±5%	5.04 ±5%
Head TSL Temperature during Test	21.9 ^{o}C	--	--

SAR results with Head TSL @ 5500 MHz

SAR averaged over 1 cm^3 (1g) of Head TSL	Condition	20.9 mW/g
SAR Normalized	Normalized to 1 W	83.6 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	83.6 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Head TSL	Condition	6.41 mW/g
SAR Normalized	Normalized to 1 W	25.6 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	25.6 ± 21.46% mW/g (k=2)

Head TSL Parameters @ 5800 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL Parameters	22.0 ^{o}C	35.3	5.27
Measured Head TSL Parameters		36.4 ±5%	5.31 ±5%
Head TSL Temperature during Test	22.0 ^{o}C	--	--

SAR results with Head TSL @ 5800 MHz

SAR averaged over 1 cm^3 (1g) of Head TSL	Condition	20.5 mW/g
SAR Normalized	Normalized to 1 W	82.0 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	82.0 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Head TSL	Condition	6.35 mW/g
SAR Normalized	Normalized to 1 W	25.4 mW/g
SAR for nominal Head TSL Parameters	Normalized to 1W	25.4 ± 21.46% mW/g (k=2)

Body TSL Parameters @ 5200 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Body TSL Parameters	22.0 ^{o}C	49.0	5.30
Measured Body TSL Parameters		48.2 ±5%	5.37 ±5%
Body TSL Temperature during Test	22.0 ^{o}C	--	--

SAR results with Body TSL @ 5200 MHz

SAR averaged over 1 cm^3 (1g) of Body TSL	Condition	17.0
SAR Normalized	Normalized to 1 W	68.0 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	68.0 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Body TSL	Condition	5.13
SAR Normalized	Normalized to 1 W	20.5 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	20.5 ± 21.46% mW/g (k=2)

Body TSL Parameters @ 5500 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Body TSL Parameters	22.0 ^{o}C	47.8	5.65
Measured Body TSL Parameters		47.8 ±5%	5.80 ±5%
Body TSL Temperature during Test	22.0 ^{o}C	--	--

SAR results with Body TSL @ 5500 MHz

SAR averaged over 1 cm^3 (1g) of Body TSL	Condition	16.8
SAR Normalized	Normalized to 1 W	67.2 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	67.2 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Body TSL	Condition	5.24
SAR Normalized	Normalized to 1 W	20.9 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	20.9 ± 21.46% mW/g (k=2)

Body TSL Parameters @ 5800 MHz

The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Body TSL Parameters	22.0 ^{o}C	48.2	6.00
Measured Body TSL Parameters		47.1 ±5%	6.15 ±5%
Body TSL Temperature during Test	22.0 ^{o}C	--	--

SAR results with Body TSL @ 5800 MHz

SAR averaged over 1 cm^3 (1g) of Body TSL	Condition	16.2
SAR Normalized	Normalized to 1 W	64.8 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	64.8 ± 23.32% mW/g (k=2)

SAR averaged over 1 cm^3 (10g) of Body TSL	Condition	4.99
SAR Normalized	Normalized to 1 W	19.6 mW/g
SAR for nominal Body TSL Parameters	Normalized to 1W	19.6 ± 21.46% mW/g (k=2)

5200MHz Head

Date/Time: 8/21/2006 3:28:44 PM

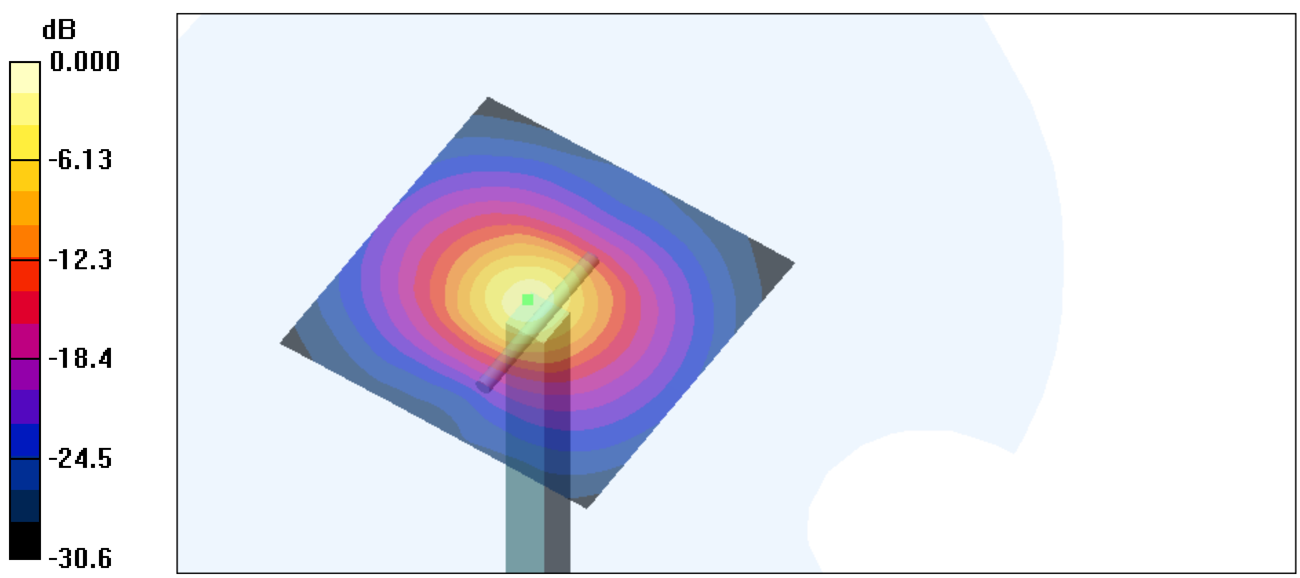
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5500 MHz Head Medium parameters used: f = 5200 MHz; σ = 4.7 mho/m; ε_r = 37.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(5.1, 5.1, 5.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 22.1 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 67.2 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 101.4 W/kg
SAR(1 g) = 22.3 mW/g; SAR(10 g) = 6.81 mW/g
Maximum value of SAR (measured) = 41.7 mW/g



0 dB = 41.7mW/g

5500MHz Head

Date/Time: 8/21/2006 2:45:05 PM

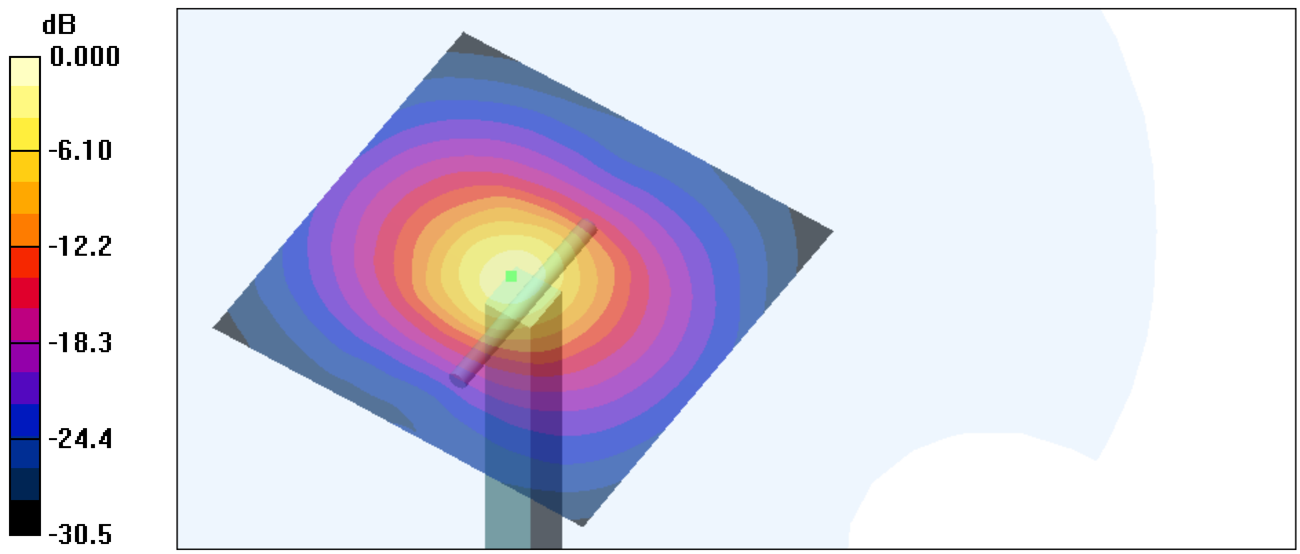
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5500 MHz Head Medium parameters used: f = 5500 MHz; σ = 5.08 mho/m; ε_r = 36.5; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.7, 4.7, 4.7); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 22.0 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 65.4 V/m; Power Drift = -0.039 dB
Peak SAR (extrapolated) = 83.5 W/kg
SAR(1 g) = 20.9 mW/g; SAR(10 g) = 6.41 mW/g
Maximum value of SAR (measured) = 39.6 mW/g



0 dB = 39.6mW/g

5800MHz Head

Date/Time: 8/21/2006 4:22:21 PM

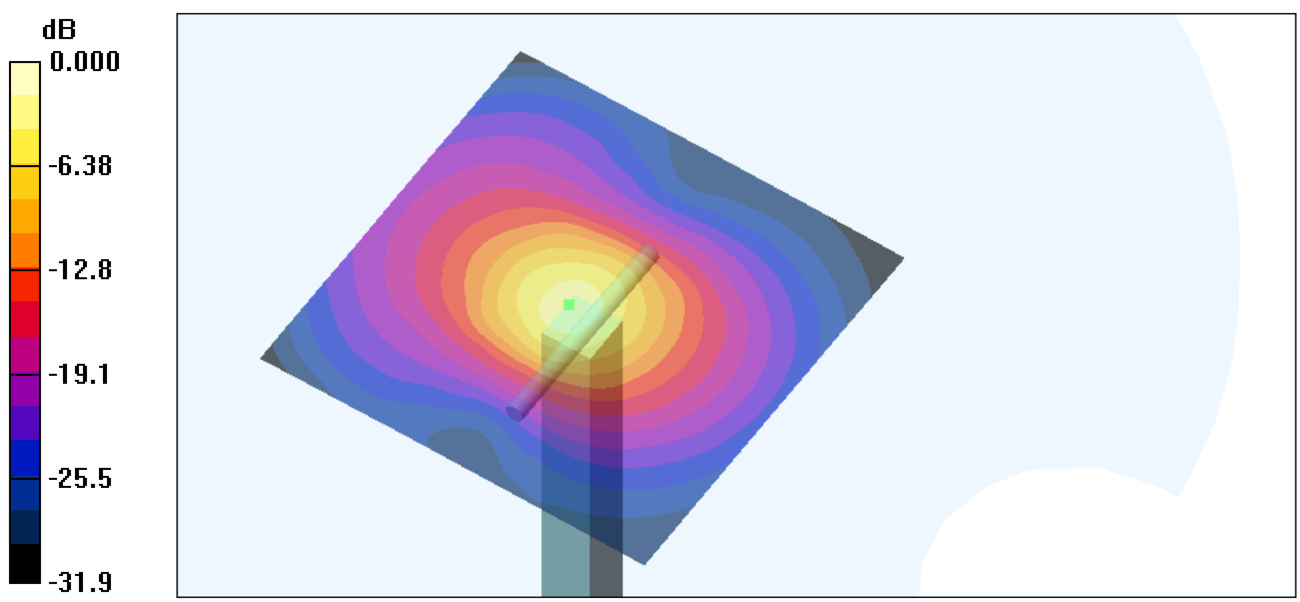
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 MHz Head Medium parameters used: f = 5800 MHz; σ = 5.31 mho/m; ε_r = 36.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.47, 4.47, 4.47); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 18.5 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 58.2 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 103.7 W/kg
SAR(1 g) = 20.5 mW/g; SAR(10 g) = 6.35 mW/g
Maximum value of SAR (measured) = 38.3 mW/g



0 dB = 38.3mW/g

5200MHz Body

Date/Time: 8/21/2006 5:57:49 PM

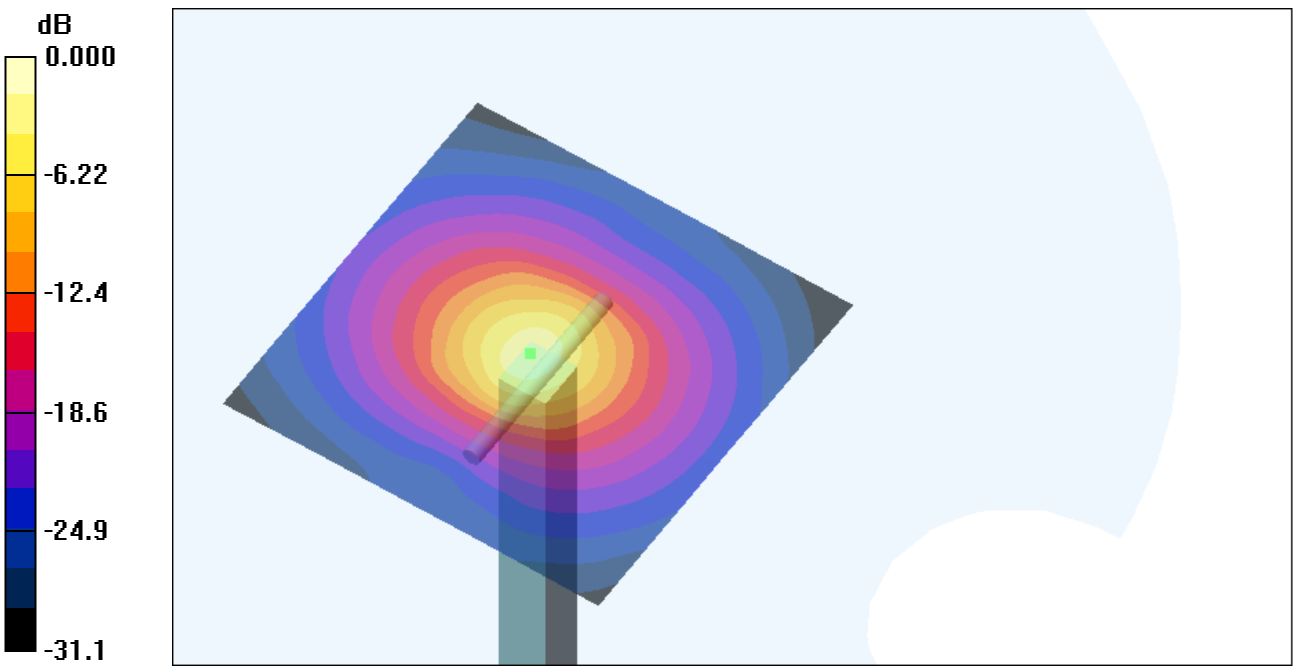
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5200 MHz;Duty Cycle: 1:1
Medium: 5200 MHz Body Medium parameters used: f = 5200 MHz; σ = 5.37 mho/m; ε_r = 48.2; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.68, 4.68, 4.68); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.8 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 54.9 V/m; Power Drift = 0.096 dB
Peak SAR (extrapolated) = 77.0 W/kg
SAR(1 g) = 17 mW/g; SAR(10 g) = 5.13 mW/g
Maximum value of SAR (measured) = 32.1 mW/g



0 dB = 32.1mW/g

5500MHz Body

Date/Time: 8/22/2006 1:17:09 PM

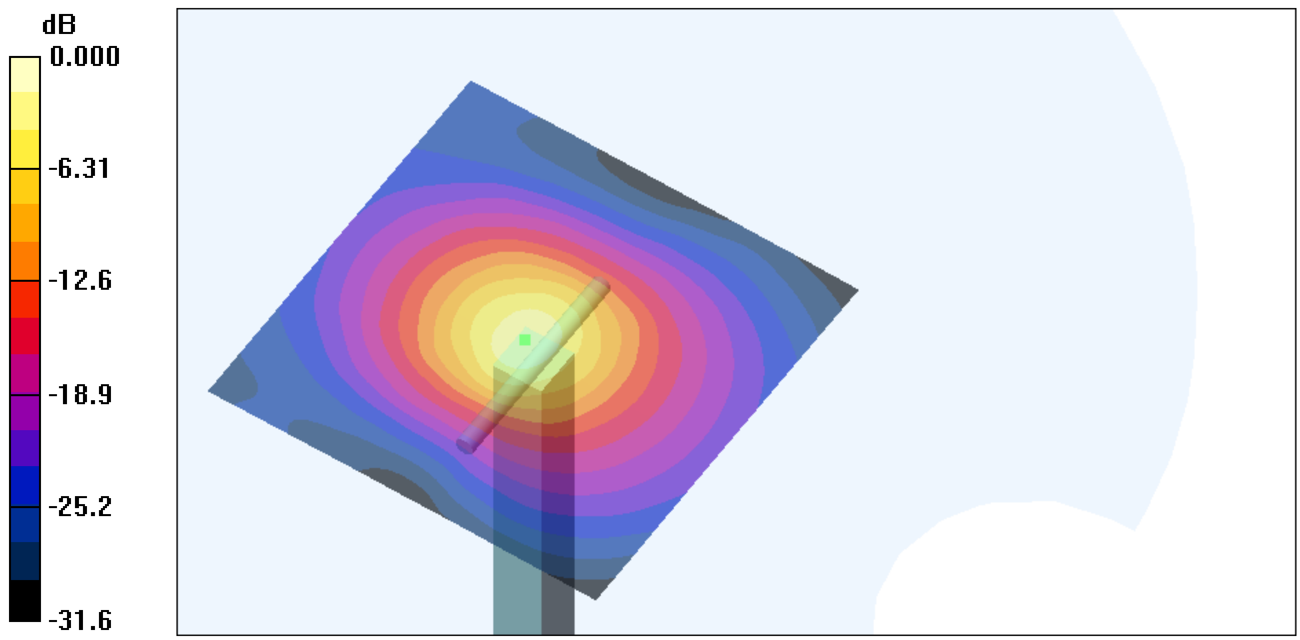
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5500 MHz;Duty Cycle: 1:1
Medium: 5500 MHz Body Medium parameters used: f = 5500 MHz; σ = 5.8 mho/m; ε_r = 47.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

Probe: EX3DV3 - SN3511; ConvF(4.3, 4.3, 4.3); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 17.3 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 55.3 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 67.3 W/kg
SAR(1 g) = 16.8 mW/g; SAR(10 g) = 5.24 mW/g
Maximum value of SAR (measured) = 32.2 mW/g



0 dB = 32.2mW/g

5800MHz Body

Date/Time: 8/22/2006 2:23:39 PM

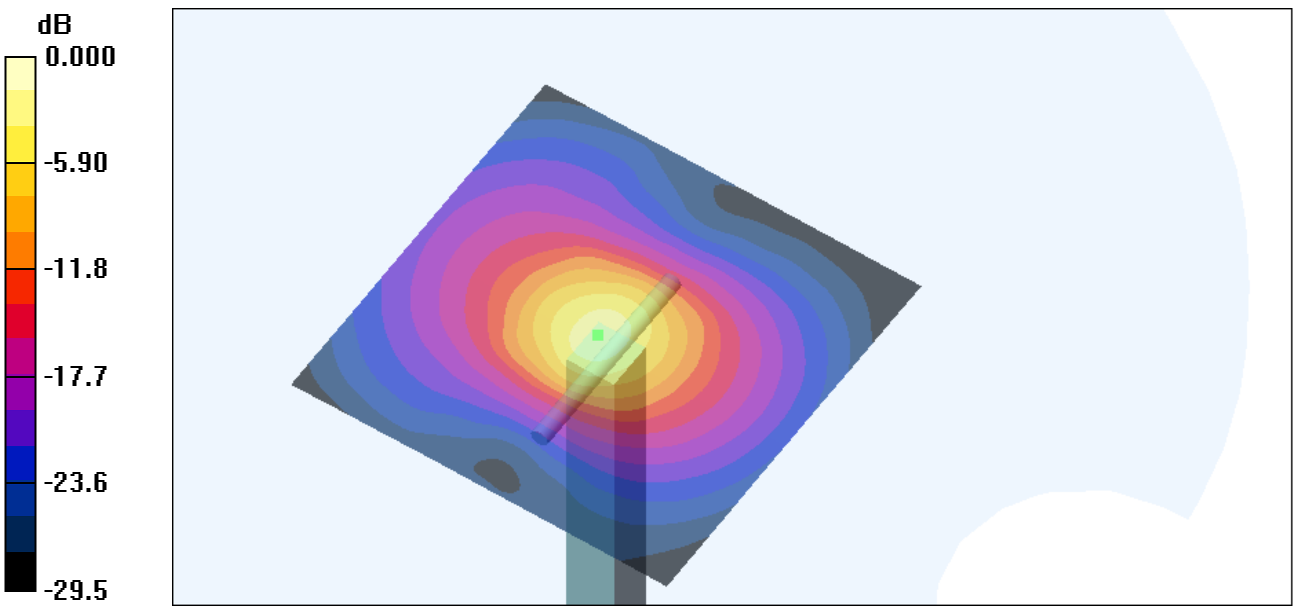
DUT: Dipole ; Type: 5000 MHz; Serial: SN:001

Communication System: CW; ; Frequency: 5800 MHz;Duty Cycle: 1:1
Medium: 5800 MHz Body Medium parameters used: f = 5800 MHz; σ = 6.15 mho/m; ε_r = 47.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

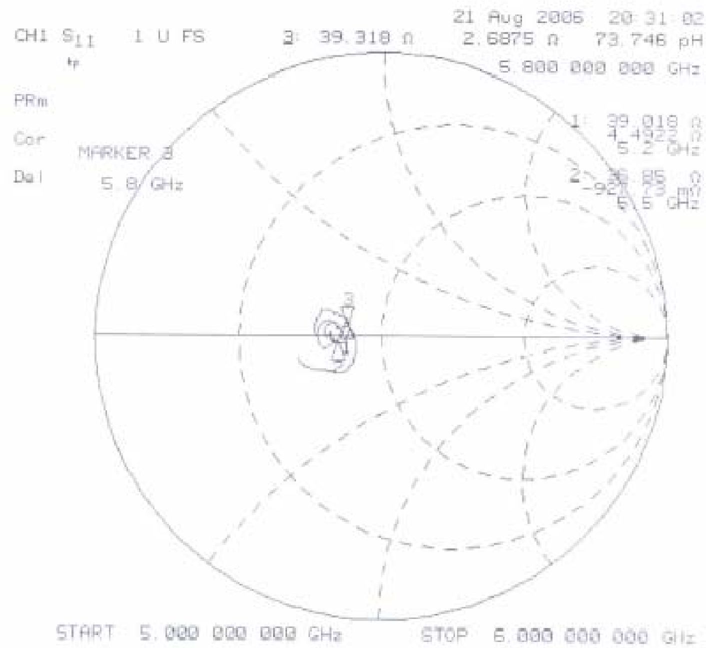
Probe: EX3DV3 - SN3511; ConvF(4.1, 4.1, 4.1); Calibrated: 1/23/2006
Sensor-Surface: 4mm (Mechanical Surface Detection)Sensor-Surface: 2mm (Mechanical Surface Detection)
Electronics: DAE3 Sn584; Calibrated: 9/22/2005
Phantom: SAM with CRP; Type: SAM; Serial: TP 1310
Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

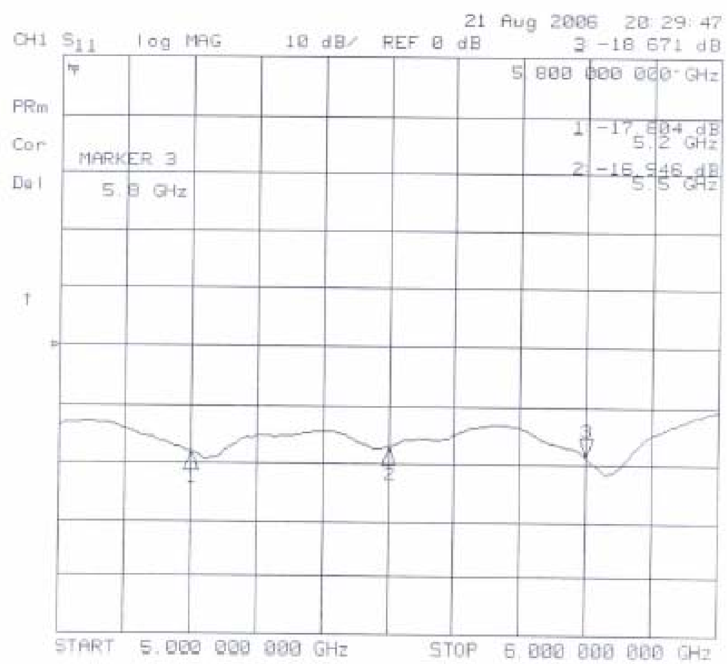
Area Scan (81x81x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (interpolated) = 16.8 mW/g

Zoom Scan (9x9x9)/Cube 0: Measurement grid: dx=4.3mm, dy=4.3mm, dz=3mm
Reference Value = 53.4 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 70.2 W/kg
SAR(1 g) = 16.2 mW/g; SAR(10 g) = 4.99 mW/g
Maximum value of SAR (measured) = 31.6 mW/g

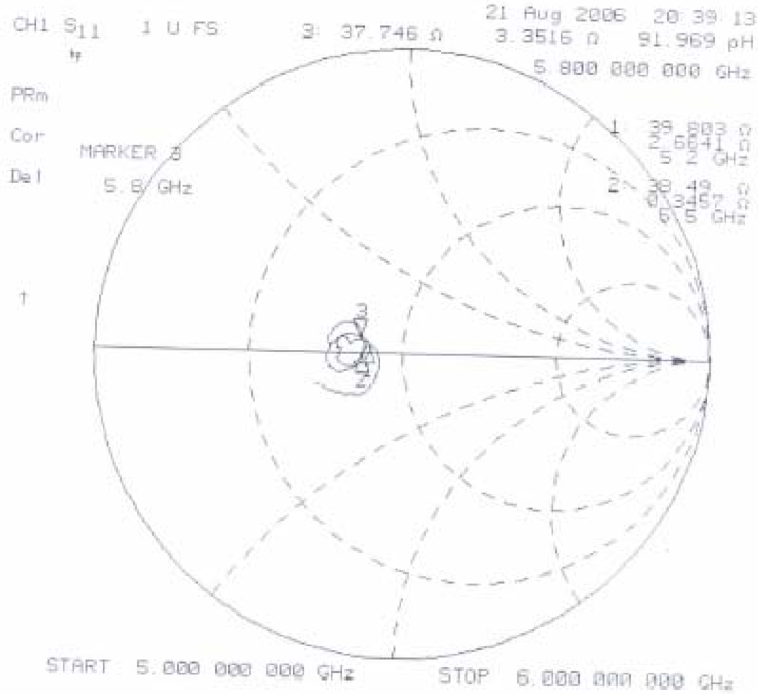


0 dB = 31.6mW/g





5000MHz Dipole with HSL Fluid



5000MHz Dipole with MSL Fluid

APPENDIX E - MEASURED FLUID DIELECTRIC PARAMETERS

5-6GHz BOdy

September 25, 2006 7:26 AM

Frequency	e'	e''
5.000000000 GHz	48.6371	18.4169
5.020000000 GHz	48.7510	18.6645
5.040000000 GHz	49.0791	18.8410
5.060000000 GHz	49.3347	18.2980
5.080000000 GHz	48.9415	18.3222
5.100000000 GHz	48.6790	18.4377
5.120000000 GHz	48.5656	18.7287
5.140000000 GHz	48.7397	18.8747
5.160000000 GHz	49.1564	18.9297
5.180000000 GHz	48.9375	18.7516
5.200000000 GHz	48.6752	18.4774
5.220000000 GHz	48.2639	18.4089
5.240000000 GHz	48.4125	18.8768
5.260000000 GHz	48.7495	19.0843
5.280000000 GHz	48.7849	19.2148
5.300000000 GHz	48.6899	18.9313
5.320000000 GHz	48.4282	18.5364
5.340000000 GHz	48.0034	18.9150
5.360000000 GHz	48.2186	19.1322
5.380000000 GHz	48.6026	19.2408
5.400000000 GHz	48.6340	19.3531
5.420000000 GHz	48.1158	18.7974
5.440000000 GHz	48.0531	18.8020
5.460000000 GHz	47.8721	19.1674
5.480000000 GHz	48.0816	19.2604
5.500000000 GHz	48.1863	19.6115
5.520000000 GHz	48.5086	19.4271
5.540000000 GHz	48.4101	19.2409
5.560000000 GHz	47.6114	18.8762
5.580000000 GHz	47.8663	19.3064
5.600000000 GHz	47.7683	19.4555
5.620000000 GHz	48.2610	19.8549
5.640000000 GHz	48.1036	19.7206
5.660000000 GHz	48.0102	19.3661
5.680000000 GHz	47.5462	19.1410
5.700000000 GHz	47.5912	19.2320
5.720000000 GHz	47.6562	19.6977
5.740000000 GHz	47.9398	20.1090
5.760000000 GHz	48.0299	19.6607
5.780000000 GHz	47.4822	19.3792
5.800000000 GHz	47.5855	19.2584
5.820000000 GHz	47.3590	19.4401
5.840000000 GHz	47.4142	19.7812
5.860000000 GHz	47.7087	19.9537
5.880000000 GHz	47.8492	19.8829

5-6GHz Body

September 26, 2006 7:53 AM

Frequency	e'	e''
5.000000000 GHz	49.8630	17.7602
5.020000000 GHz	49.8096	17.6465
5.040000000 GHz	49.6505	17.5499
5.060000000 GHz	49.5291	17.6110
5.080000000 GHz	49.5174	17.7664
5.100000000 GHz	49.3405	17.6885
5.120000000 GHz	49.1254	17.6247
5.140000000 GHz	49.1070	17.5778
5.160000000 GHz	49.1106	17.5321
5.180000000 GHz	49.0861	17.6887
5.200000000 GHz	49.1115	17.6204
5.220000000 GHz	48.9690	17.5007
5.240000000 GHz	48.8753	17.5405
5.260000000 GHz	48.9159	17.5665
5.280000000 GHz	48.9383	17.7012
5.300000000 GHz	48.9647	17.7770
5.320000000 GHz	48.9359	17.7609
5.340000000 GHz	48.7398	17.7515
5.360000000 GHz	48.6853	17.9257
5.380000000 GHz	48.7299	18.0245
5.400000000 GHz	48.6754	18.0441
5.420000000 GHz	48.6003	18.1644
5.440000000 GHz	48.4642	18.0138
5.460000000 GHz	48.2983	18.1519
5.480000000 GHz	48.3239	18.3024
5.500000000 GHz	48.3080	18.2641
5.520000000 GHz	48.1398	18.2663
5.540000000 GHz	48.0006	18.2578
5.560000000 GHz	47.9050	18.2213
5.580000000 GHz	47.7624	18.2436
5.600000000 GHz	47.8164	18.3218
5.620000000 GHz	47.7047	18.2076
5.640000000 GHz	47.4995	18.1952
5.660000000 GHz	47.4512	18.2771
5.680000000 GHz	47.3464	18.1703
5.700000000 GHz	47.3998	18.2848
5.720000000 GHz	47.4049	18.3157
5.740000000 GHz	47.2896	18.2036
5.760000000 GHz	47.1300	18.2553
5.780000000 GHz	47.1148	18.4429
5.800000000 GHz	47.1603	18.4374
5.820000000 GHz	47.0921	18.5403
5.840000000 GHz	47.0681	18.6268
5.860000000 GHz	46.9941	18.5987
5.880000000 GHz	46.8295	18.9155

APPENDIX F – PHANTOM CERTIFICATE OF CONFORMITY

Schmid & Partner Engineering AG

Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com

Certificate of conformity / First Article Inspection

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

Tests

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

Test	Requirement	Details	Units tested
Shape	Compliance with the geometry according to the CAD model.	IT'IS CAD File (*)	First article, Samples
Material thickness	Compliant with the requirements according to the standards	2mm +/- 0.2mm in specific areas; 6mm +/- 0.2mm at ERP	First article, Samples
Material parameters	Dielectric parameters for required frequencies	200 MHz – 3 GHz Relative permittivity < 5 Loss tangent < 0.05.	Material sample TP 104-5
Material resistivity	The material has been tested to be compatible with the liquids defined in the standards if handled and cleaned according to the instructions	DEGMBE based simulating liquids	Pre-series, First article, Samples

Standards

[1] CENELEC EN 50361
[2] IEEE Std 1528-200x Draft CD 1.1 (Dec 02)
[3] IEC 62209/CD (Nov 02)
(*) The IT'IS CAD file is derived from [2] and is also within the tolerance requirements of the shapes of [1] and [3].

Conformity

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

Date 7.8.2003

Signature / Stamp

s p e a g
Schmid & Partner Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland
Phone +41 1 245 9700, Fax +41 1 245 9779
info@speag.com, http://www.speag.com