RF EXPOSURE EVALUATION

SPECIFIC ABSORPTION RATE

SAR TEST REPORT

FOR

ASCALADE TECHNOLOGIES INC.

PORTABLE UPCS DECT CORDLESS HANDSET

MODEL(S): PHILIPS VOIP433XY/ZZ

FCC ID: PBWB187R26H

IC ID: 3842A-B187

Test Report Serial Number

040406PBW-T737-S15T

Test Report Issue Number

S737T-041906-R0

Test Lab

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DECLARATION OF COMPLIANCE
SAR RF EXPOSURE EVALUATION

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Company Information

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FCC ID:	**PBWB187R26H**
IC ID:	**3842A-B187**
Model(s):	**PHILIPS VOIP433XY/ZZ**
Test Requirement(s):	**FCC 47 CFR §2.1093; Health Canada Safety Code 6**
Test Procedure(s):	**FCC OET Bulletin 65, Supplement C (Edition 01-01)** **Industry Canada RSS-102 Issue 2** **IEEE Standard 1525-2003**
Device Classification:	**Part 15 Unlicensed PCS portable Tx held to ear (PUE)**
Device Description:	**Portable UPCS DECT Cordless Handset**
Transmit Frequency Range:	**1921.536 - 1928.448 MHz**
Mode of Operation:	**TDMA (Time Division Multiple Access)**
Modulation Type:	**GFSK (Gaussian Frequency Shift Keying)**
Max. RF Output Power Level Tested:	**21.89 dBm (155 mW) EIRP (1924.992 MHz)**
Source-Based Time-Av. Duty Cycle Tested:	**8 % (Crest Factor: 1:12.5)**
Max. Source-Based Time-Av. Power Tested:	**10.92 dBm (12.4 mW) EIRP (1924.992 MHz)**
Antenna Type(s) Tested:	**Internal (pre-formed wire soldered on PCB)**
Battery Type(s) Tested:	**NiMH 1.2 V, 750 mAh AAA (x2)**
Body-worn Accessories Tested:	**Plastic Belt-Clip (4 mm thickness)**
Audio Accessories Tested:	**Generic Ear-Microphone**
Max. SAR Level(s) Measured:	**Head: 0.074 W/kg (1g average)** **Body: 0.053 W/Kg (1g average)**
Class II Permissive Change(s)	**Add new model (VOIP433XY/ZZ)**

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device is compliant with the Specific Absorption Rate (SAR) RF exposure requirements specified in FCC 47 CFR §2.1093 and Health Canada's Safety Code 6. The device was tested in accordance with the measurement standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 2 and IEEE Standard 1528-2003 for the General Population / Uncontrolled Exposure environment. All measurements were performed in accordance with the SAR system manufacturer recommendations.

I attest to the accuracy of data. All measurements were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

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The results and statements contained in this report pertain only to the device(s) evaluated.

Tested By:	**Reviewed By:**
Sean Johnston **Compliance Technologist** **Celltech Labs Inc.**	**Spencer Watson** **Senior Compliance Technologist** **Celltech Labs Inc.**

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1.0 INTRODUCTION

This measurement report demonstrates that the Ascalade Technologies Inc. Model(s): VOIP433XY/ZZ Portable UPCS DECT Cordless Handset FCC ID: PBWB187R26H, with the Class II Permissive Change(s) described in this report, complies with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]) and Health Canada's Safety Code 6 (see reference [2]) for the General Population / Uncontrolled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3]), IC RSS-102 Issue 2 (see reference [4]), and IEEE Standard 1528-2003 (see reference [5]) were employed. A description of the product, operating configuration, detailed summary of the test results, methodology and procedures used in the evaluation, equipment used, and the various provisions of the rules are included within this test report.

2.0 DESCRIPTION OF DEVICE UNDER TEST (DUT)

Test Requirement(s)	FCC Rule Part 47 CFR §2.1093			
	Health Canada Safety Code 6			
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (01-01)			
	Industry Canada RSS-102 Issue 2			
	IEEE Standard 1528-2003			
FCC Device Classification	Part 15 Unlicensed PCS portable Tx held to ear (PUE)			15(D)
IC Device Classification	2 GHz Licence Exempt Personal Communications Service Device (PCS)			RSS-213 Issue 2
Device Description	Portable UPCS DECT Cordless Handset			
RF Exposure Category	General Population / Uncontrolled Exposure Environment			
FCC IDENTIFIER	PBWB187R26H			
IC IDENTIFIER	3842A-B187			
Model(s)	VOIP433XY/ZZ			
Trade Name(s)	Philips			
Test Sample Serial No.	MS000608010006		Identical Prototype	
Transmit Frequency Range	1921.536 - 1928.448 MHz			
Mode of Operation	TDMA		Time Division Multiple Access	
Modulation Scheme	GFSK		Gaussian Frequency Shift Keying	
Max. RF Output Power Tested	21.89 dBm	155 mW	EIRP	1924.992 MHz
Source-Based Time-Averaged RF Output Power Tested	10.92 dBm	12.4 mW	EIRP	1924.992 MHz
Source-Based Time-Averaged Duty Cycle Tested	8 %		Crest Factor: 1:12.5	
Battery Type(s) Tested	NiMH	1.2 V	750 mAh	AAA (x2)
Antenna Type(s) Tested	Internal (pre-formed wire soldered on PCB)			
Body-Worn Accessories Tested	Plastic Belt-Clip		4 mm thickness	
Audio Accessories Tested	Generic Ear-Microphone			
Class II Permissive Change(s)	Add new model (VOIP433XY/ZZ)			

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3.0 SAR MEASUREMENT SYSTEM

Celltech Labs Inc. SAR measurement facility utilizes the Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. 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). A cell controller system contains 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.

DASY4 Measurement System with SAM Phantom and device holder

DASY4 Measurement System with SAM Phantom and validation dipole

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4.0 MEASUREMENT SUMMARY

HEAD SAR EVALUATION RESULTS

Freq. (MHz)	Chan.	Test Mode	Battery Type	Antenna Position	Phantom Section	DUT Test Position	Start Power EIRP (mW)		SAR Drift During Test (dB)	Measured SAR 1g (W/kg)
							Peak	SBTA		
1924.992	3	TDMA	NiMH	Internal	Left Ear	Ear/Tilt (15°)	155	12.4	0.041	0.027
1924.992	3	TDMA	NiMH	Internal	Left Ear	Cheek/Touch	155	12.4	0.016	**0.074**
1924.992	3	TDMA	NiMH	Internal	Right Ear	Ear/Tilt (15°)	155	12.4	0.011	0.026
1924.992	3	TDMA	NiMH	Internal	Right Ear	Cheek/Touch	155	12.4	0.049	0.064
ANSI / IEEE C95.1 1999 - SAFETY LIMIT				**BRAIN: 1.6 W/kg (averaged over 1 gram)**			**Spatial Peak Uncontrolled Exposure / General Population**			

Test Date(s)	April 06, 2006				**Relative Humidity**	30	**%**
Measured Fluid Type	**1920 MHz Brain**				**Atmospheric Pressure**	101.3	**kPa**
Dielectric Constant ε_r	**IEEE Target**		**Measured**	**Deviation**	**Ambient Temperature**	24.9	**°C**
	40.0	**± 5%**	38.2	-4.5%	**Fluid Temperature**	23.8	**°C**
Conductivity σ (mho/m)	**IEEE Target**		**Measured**	**Deviation**	**Fluid Depth**	≥ 15	**cm**
	1.40	**± 5%**	1.40	0.0%	**ρ (Kg/m^3)**	1000	

Notes	1.	The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
	2.	The power drifts of the DUT measured by the DASY4 system during the SAR evaluations were <5% from the start power.
	3.	The DUT batteries were fully charged prior to the SAR evaluations.
	4.	The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluations. The temperatures reported in the table above were consistent for all measurement periods.
	5.	The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations (see Appendix C).
	6.	The SAR evaluations were performed within 24 hours of the system performance check.

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MEASUREMENT SUMMARY (Cont.)

BODY-WORN SAR EVALUATION RESULTS

Freq. (MHz)	Chan.	Test Mode	Battery Type	Antenna Position	Phantom Section	DUT Test Position	Separation Distance to Planar Phantom (mm)	Accessories		Start Power EIRP (mW)		SAR Drift During Test (dB)	Measured SAR 1g (W/kg)
								Body-Worn	Audio	Peak	SBTA		
1924.992	3	TDMA	NiMH	Internal	Planar	Back Side	4.0	Belt-Clip	Ear-Mic	155	12.4	-0.021	**0.053**
ANSI / IEEE C95.1 1999 - SAFETY LIMIT					**BODY: 1.6 W/kg (averaged over 1 gram)**				**Spatial Peak Uncontrolled Exposure / General Population**				

Test Date(s)	April 07, 2006				**Relative Humidity**	30	**%**
Measured Fluid Type	**1920 MHz Body**				**Atmospheric Pressure**	101.6	**kPa**
Dielectric Constant ε_r	**IEEE Target**		**Measured**	**Deviation**	**Ambient Temperature**	24.8	**°C**
	53.3	**± 5%**	51.3	-3.8%	**Fluid Temperature**	23.8	**°C**
Conductivity σ (mho/m)	**IEEE Target**		**Measured**	**Deviation**	**Fluid Depth**	≥ 15	**cm**
	1.52	**± 5%**	1.48	-2.6%	**ρ (Kg/m^3)**	1000	

Notes		
	1.	The measurement results were obtained with the DUT tested in the conditions described in this report. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A.
	2.	The power drifts of the DUT measured by the DASY4 system during the SAR evaluations were <5% from the start power.
	3.	The DUT batteries were fully charged prior to the SAR evaluations.
	4.	The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluations. The temperatures reported in the table above were consistent for all measurement periods.
	5.	The dielectric parameters of the simulated tissue mixture were measured prior to the SAR evaluations (see Appendix C).
	6.	The SAR evaluations were performed within 24 hours of the system performance check.

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5.0 DETAILS OF SAR EVALUATION

The Ascalade Technologies Inc. Model(s): VOIP433XY/ZZ Portable UPCS DECT Cordless Handset FCC ID: PBWB187R26H, with the Class II Permissive Change(s) described in this report, was compliant for localized Specific Absorption Rate (SAR) based on the test provisions and conditions described below. Detailed measurement data and plots showing the maximum SAR location of the DUT are reported in Appendix A. The detailed test setup photographs are shown in Appendix D.

Ear-held Configuration

1) The DUT was tested in an ear-held configuration on both the left and right sections of the SAM phantom at the mid channel of the operating band. The transmission band of the DUT is less than 10 MHz; therefore mid channel data only was reported (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [3]).

a) The handset was placed in the device holder 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, with the center of the earpiece touching the center of the ear spacer of the SAM phantom.

b) With the handset positioned parallel to the cheek, the test device reference point was aligned to the ear reference point on the head phantom, and the vertical centerline was aligned to the phantom reference plane (initial ear position).

c) While maintaining the three alignments, the body of the handset was gradually adjusted to each of the following test positions:

- Cheek/Touch Position: the handset was brought toward the mouth of the head phantom by pivoting against the ear reference point until any point of the mouthpiece or keypad touched the phantom.

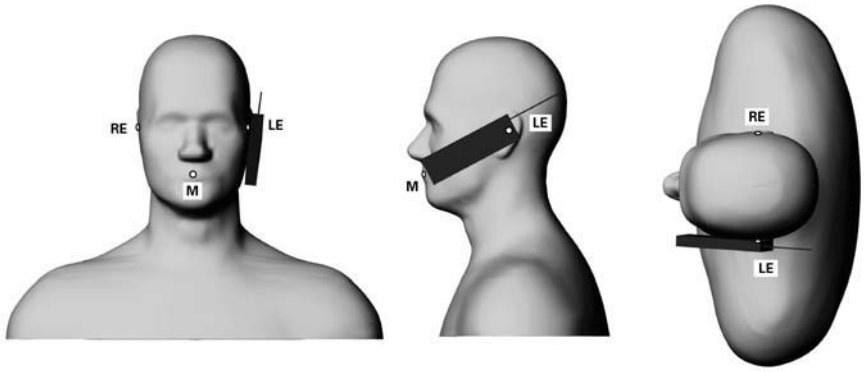

Figure 1. Phone position 1 - "cheek" or "touch" position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated (Shoulders are shown for illustration only).

- Ear/Tilt Position: With the phone aligned in the Cheek/Touch position, the handset was tilted away from the mouth with respect to the test device reference point by 15 degrees.

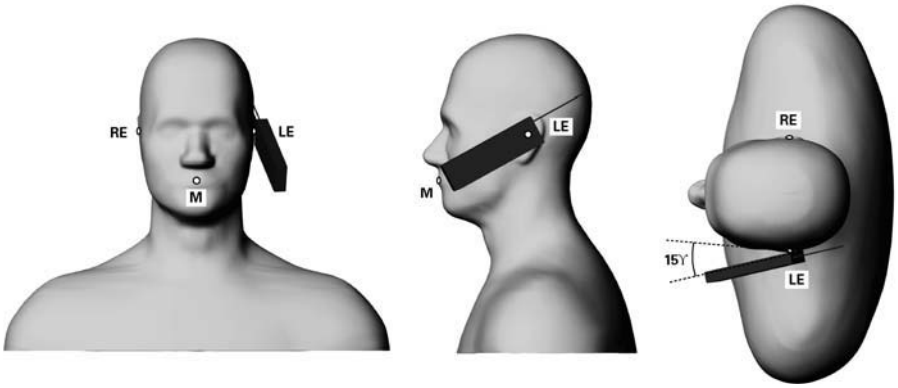

Figure 2. Phone position 2 - "tilted position." The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for phone positioning, are indicated (Shoulders are shown for illustration only).

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DETAILS OF SAR EVALUATION (Cont.)

Body-worn Configuration

2) The DUT was tested in a body-worn configuration with the back side of the device placed parallel to the outer surface of the SAM phantom (planar section). The attached belt-clip accessory was touching the outer surface of the SAM phantom (planar section) and provided a 4 mm separation distance from the back of the DUT to the SAM phantom (planar section). The DUT was evaluated for body-worn SAR with a generic ear-microphone audio accessory connected to the audio port.

Test Mode & Power Setting

3) The DUT was programmed in test mode using internal software controlled by the handset keypad.
4) The DUT was tested at maximum power setting in TDMA modulation with a duty cycle of 8% and a crest factor of 1:12.5.
5) The RF conducted output power of the DUT could not be measured by Celltech Labs prior to the SAR evaluations due to an internal antenna. The DUT was evaluated for SAR at the maximum RF conducted output power level preset by the manufacturer.
6) The radiated output power (EIRP) of the DUT was measured by Timco Engineering Inc. prior to the SAR evaluations with the same test sample using the signal substitution method in accordance with ANSI/TIA-603-C-2004 (see reference [6]).
7) The DUT batteries were fully charged prior to the SAR evaluations.
8) The power drifts measured by the DASY4 system for the duration of the SAR evaluations were < 5% from the start power.

Test Conditions

9) The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluations. The temperatures reported were consistent for all measurement periods.
10) The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C).
11) The SAR measurements were performed within 24 hours of the system performance check.

6.0 EVALUATION PROCEDURES

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

b. The SAR was determined by a pre-defined procedure within the DASY4 software. Upon completion of a reference and optical surface 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:

c. 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.

d. 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:

e. Extrapolation is used to find the points between the dipole center of the probe and the surface of the phantom. This data cannot be measured, since the center of the dipoles is 2.7 mm away form the tip of the probe and the distance between the surface and the lowest measuring point is 1.4 mm (see probe calibration document in Appendix F). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.

f. 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).

g. A zoom scan volume of 32 mm x 32 mm x 30 mm (5x5x7 points) centered at the peak SAR location determined from the area scan is used for all zoom scans for devices with a transmit frequency < 800 MHz. Zoom scans for frequencies ≥ 800 MHz are determined with a scan volume of 30 mm x 30 mm x 30 mm (7x7x7 points) to ensure complete capture of the peak spatial-average SAR.

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EVALUATION PROCEDURES (Cont.)

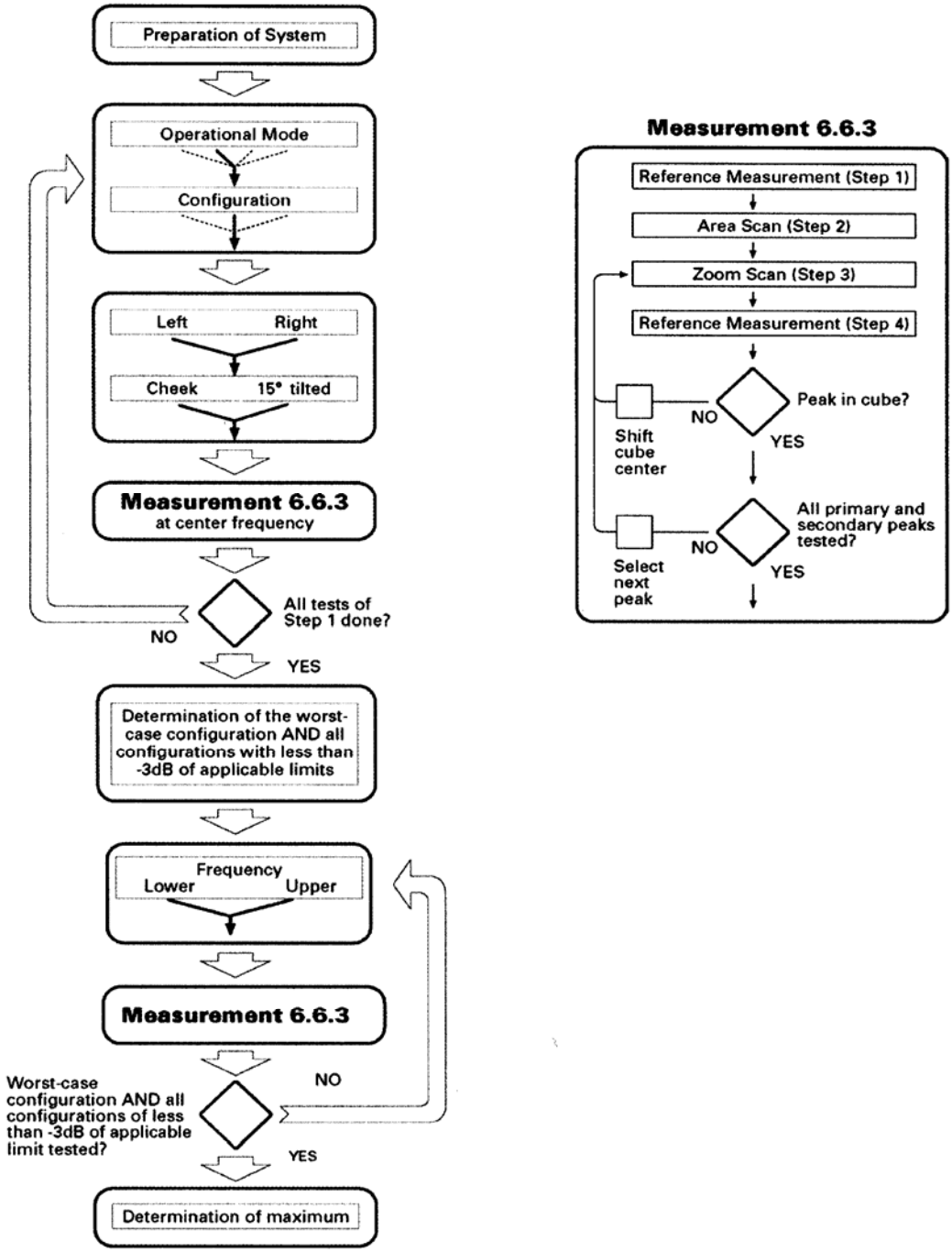

Figure 3. Flow Chart for determining the largest peak spatial-average SAR from all device configurations per IEEE Standard 1528-2003 (see reference [5]).

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7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations a system check was performed at the planar section of the SAM phantom with a 1900MHz dipole (see Appendix E for system validation procedures). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using an ALS-PR-DIEL Dielectric Probe Kit and an HP 8753ET Network Analyzer (see Appendix C). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of ±10% (see Appendix B for system performance check test plots).

SYSTEM PERFORMANCE CHECK EVALUATIONS

Test Date	Equiv. Tissue	SAR 1g (W/kg)			Dielectric Constant ε_r			Conductivity σ (mho/m)			ρ (Kg/m³)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
	MHz	IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.	IEEE Target	Meas.	Dev.						
4/6/06	1900 Brain	9.93 ±10%	9.30	-6.3%	40.0±5%	38.2	-4.5%	1.40±5%	1.39	-0.7%	1000	24.9	23.8	≥ 15	30	101.3
4/7/06	1900 Brain	9.93 ±10%	9.74	-1.9%	40.0±5%	38.2	-4.5%	1.40±5%	1.38	-1.4%	1000	23.5	23.8	≥ 15	30	101.3
Note(s):	The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the system performance check. The temperatures listed in the table above were consistent for all measurement periods.															

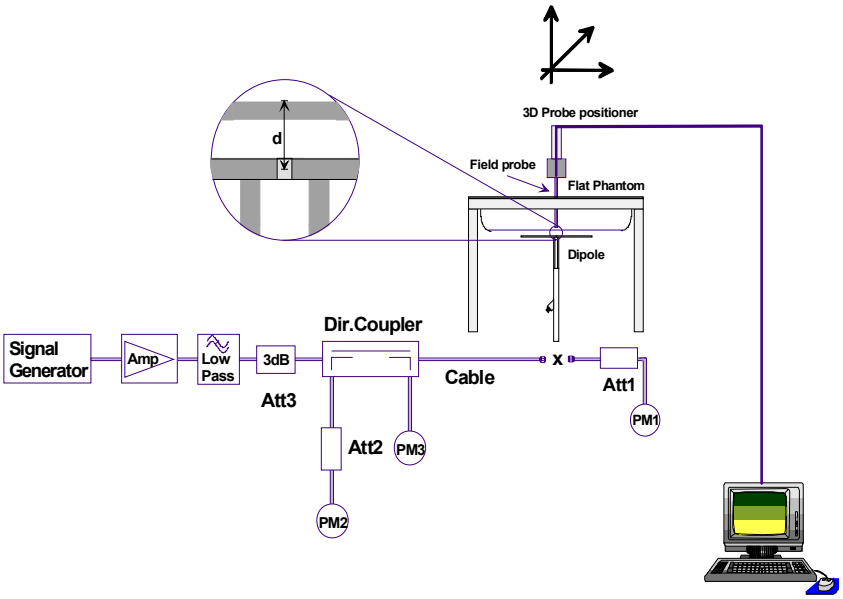

Figure 1. System Performance Check Setup

1900MHz Dipole Setup

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8.0 SIMULATED EQUIVALENT TISSUES

The 1900/1920MHz simulated equivalent tissue mixtures consists of Glycol-monobutyl, water, and salt. The fluids were prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).

1900/1920 MHz SIMULATED TISSUE MIXTURES			
INGREDIENT	1900 MHz Brain	1920 MHz Brain	1920 MHz Body
	System Performance Check	DUT Evaluation	DUT Evaluation
Water	55.85 %	55.85 %	69.85 %
Glycol Monobutyl	44.00 %	44.00 %	29.89 %
Salt	0.15 %	0.15 %	0.26 %

9.0 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 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0
Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.		
Controlled environments are defined as locations where there is potential exposure of individuals who have knowledge of their potential exposure and can exercise control over their exposure.		

10.0 ROBOT SYSTEM SPECIFICATIONS

Specifications

POSITIONER: Stäubli Unimation Corp. Robot Model: RX60L
Repeatability: 0.02 mm
No. of axis: 6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor: AMD Athlon XP 2400+
Clock Speed: 2.0 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.: 1590
Construction: Triangular core fiber optic detection system
Frequency: 10 MHz to 6 GHz
Linearity: ±0.2 dB (30 MHz to 3 GHz)

Phantom(s)

Type: SAM V4.0C
Shell Material: Fiberglass
Thickness: 2.0 ±0.1 mm
Volume: Approx. 25 liters

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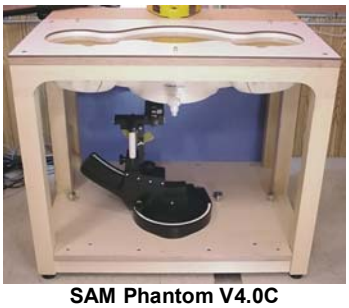
11.0 PROBE SPECIFICATION (ET3DV6)

Construction:	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g. glycol)
Calibration:	In air from 10 MHz to 2.5 GHz In brain simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy ± 8%)
Frequency:	10 MHz to >6 GHz; Linearity: ±0.2 dB (30 MHz to 3 GHz)
Directivity:	±0.2 dB in brain tissue (rotation around probe axis) ±0.4 dB in brain tissue (rotation normal to probe axis)
Dynamic Range:	5 μW/g to >100 mW/g; Linearity: ±0.2 dB
Surface Detection:	±0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions:	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application:	General dosimetry up to 3 GHz Compliance tests of mobile phone

ET3DV6 E-Field Probe

12.0 SAM PHANTOM V4.0C

The SAM phantom V4.0C is a fiberglass shell phantom with a 2.0 mm (+/-0.2 mm) shell thickness for left and right head and flat planar area integrated in a wooden table. The shape of the fiberglass shell corresponds to the phantom defined by SCC34-SC2. The device holder positions are adjusted to the standard measurement positions in the three sections (see Appendix G for specifications of the SAM phantom V4.0C).



SAM Phantom V4.0C

13.0 DEVICE HOLDER

The DASY4 device holder has two scales for device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear openings). The plane between the ear openings and the mouth tip has a rotation angle of 65°. The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections.

Device Holder

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14.0 TEST EQUIPMENT LIST

TEST EQUIPMENT		ASSET NO.	SERIAL NO.	DATE CALIBRATED		CALIBRATION DUE DATE
USED	DESCRIPTION					
x	Schmid & Partner DASY4 System	-	-	-		-
x	-DASY4 Measurement Server	00158	1078	N/A		N/A
x	-Robot	00046	599396-01	N/A		N/A
x	-DAE4	00019	353	15Jun05		15Jun06
	-DAE3	00018	370	08Feb06		08Feb07
	-ET3DV6 E-Field Probe	00016	1387	16Mar06		16Mar07
x	-ET3DV6 E-Field Probe	00017	1590	20May05		20May06
	-EX3DV4 E-Field Probe	00125	3547	14Feb06		14Feb07
	-300MHz Validation Dipole	00023	135	25Oct05		25Oct06
	-450MHz Validation Dipole	00024	136	25Oct05		25Oct06
	-835MHz Validation Dipole	00022	411	**Brain**	28Mar06	28Mar07
				Body	27Mar06	27Mar07
	-900MHz Validation Dipole	00020	054	**Brain**	10Jun05	10Jun06
				Body	10Jun05	10Jun06
	-1800MHz Validation Dipole	00021	247	**Brain**	14Jun05	14Jun06
				Body	14Jun05	14Jun06
x	-1900MHz Validation Dipole	00032	151	**Brain**	17Jun05	17Jun06
				Body	22Apr05	22Apr06
	-2450MHz Validation Dipole	00025	150	**Brain**	20Sep05	20Sep06
				Body	22Apr05	22Apr06
	-5800MHz Validation Dipole	00126	1031	**Brain**	15Mar06	15Mar07
x	-SAM Phantom V4.0C	00154	1033	N/A		N/A
	-Barski Planar Phantom	00155	03-01	N/A		N/A
	-Plexiglas Side Planar Phantom	00156	161	N/A		N/A
	-Plexiglas Validation Planar Phantom	00157	137	N/A		N/A
x	ALS-PR-DIEL Dielectric Probe Kit	00160	260-00953	N/A		N/A
	Gigatronics 8652A Power Meter	00110	1835801	16Apr05		16Apr06
	Gigatronics 8652A Power Meter	00007	1835272	03Feb06		03Feb07
x	Gigatronics 8652A Power Meter	00008	1835267	29Apr05		29Apr06
	Gigatronics 80701A Power Sensor	00011	1833542	03Feb06		03Feb07
x	Gigatronics 80701A Power Sensor	00012	1834350	12Sep05		12Sep06
	Gigatronics 80701A Power Sensor	00013	1833713	03Feb06		03Feb07
	Gigatronics 80701A Power Sensor	00014	1833699	07Sep05		07Sep06
x	Gigatronics 80701A Power Sensor	00109	1834366	16Apr05		16Apr06
x	HP 8753ET Network Analyzer	00134	US39170292	04May05		04May06
x	HP 8648D Signal Generator	00005	3847A00611	29Apr05		29Apr06
	Rohde & Schwarz SMR40 Signal Generator	00006	100104	12Apr05		12Apr06
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	N/A		N/A

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15.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION						
Error Description	**Uncertainty Value ±%**	**Probability Distribution**	**Divisor**	**ci 1g**	**Uncertainty Value ±% (1g)**	**V_i or V_{eff}**
Measurement System						
Probe calibration (1925 MHz)	3.5	Normal	1	1	3.5	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	0.7	1.9	∞
Spherical isotropy of the probe	9.6	Rectangular	1.732050808	0.7	3.9	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	1	Rectangular	1.732050808	1	0.6	∞
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	∞
Detection limit	1	Rectangular	1.732050808	1	0.6	∞
Readout electronics	0.3	Normal	1	1	0.3	∞
Response time	0.8	Rectangular	1.732050808	1	0.5	∞
Integration time	2.6	Rectangular	1.732050808	1	1.5	∞
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	∞
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	∞
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	∞
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	∞
Test Sample Related						
Device positioning	2.9	Normal	1	1	2.9	12
Device holder uncertainty	3.6	Normal	1	1	3.6	8
Power drift	5	Rectangular	1.732050808	1	2.9	∞
Phantom and Setup						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	∞
Combined Standard Uncertainty					**9.69**	
Expanded Uncertainty (k=2)					**19.39**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

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MEASUREMENT UNCERTAINTIES (CONT.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	**Uncertainty Value ±%**	**Probability Distribution**	**Divisor**	**ci 1g**	**Uncertainty Value ±% (1g)**	**V_i or V_{eff}**
Measurement System						
Probe calibration (1900 MHz)	5.5	Normal	1	1	5.5	∞
Axial isotropy of the probe	4.7	Rectangular	1.732050808	1	2.7	∞
Spherical isotropy of the probe	0	Rectangular	1.732050808	1	0.0	∞
Spatial resolution	0	Rectangular	1.732050808	1	0.0	∞
Boundary effects	1	Rectangular	1.732050808	1	0.6	∞
Probe linearity	4.7	Rectangular	1.732050808	1	2.7	∞
Detection limit	1	Rectangular	1.732050808	1	0.6	∞
Readout electronics	0.3	Normal	1	1	0.3	∞
Response time	0	Rectangular	1.732050808	1	0.0	∞
Integration time	0	Rectangular	1.732050808	1	0.0	∞
RF ambient conditions	3	Rectangular	1.732050808	1	1.7	∞
Mech. constraints of robot	0.4	Rectangular	1.732050808	1	0.2	∞
Probe positioning	2.9	Rectangular	1.732050808	1	1.7	∞
Extrapolation & integration	1	Rectangular	1.732050808	1	0.6	∞
Test Sample Related						
Dipole Positioning	2	Normal	1.732050808	1	1.2	∞
Power & Power Drift	4.7	Normal	1.732050808	1	2.7	∞
Phantom and Setup						
Phantom uncertainty	4	Rectangular	1.732050808	1	2.3	∞
Liquid conductivity (target)	5	Rectangular	1.732050808	0.64	1.8	∞
Liquid conductivity (measured)	2.5	Normal	1	0.64	1.6	∞
Liquid permittivity (target)	5	Rectangular	1.732050808	0.6	1.7	∞
Liquid permittivity (measured)	2.5	Normal	1	0.6	1.5	∞
Combined Standard Uncertainty					**8.79**	
Expanded Uncertainty (k=2)					**17.57**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 (see reference [5])

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16.0 REFERENCES

[1] Federal Communications Commission, “Radiofrequency radiation exposure evaluation: portable devices”, Rule Part 47 CFR §2.1093: 1999.

[2] Health Canada, “Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3 kHz to 300 GHz”, Safety Code 6: 1999.

[3] Federal Communications Commission, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, OET Bulletin 65, Supplement C (Edition 01-01), FCC, Washington, D.C.: June 2001.

[4] Industry Canada, “Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)”, Radio Standards Specification RSS-102 Issue 2: November 2005.

[5] IEEE Standard 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”: December 2003.

[6] ANSI/TIA-603-C, “Land Mobile FM or PM Communications Equipment - Measurement and Performance Standards”: December 2004.

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APPENDIX A - SAR MEASUREMENT DATA

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Date Tested: 04/06/2006

Head SAR - Left Ear - Tilt Position (15º) - Mid Channel - 1924.992 MHz

DUT: Ascalade Model: VOIP433XY/ZZ; Type: Portable UPCS DECT Cordless Handset; Serial: MS000608010006

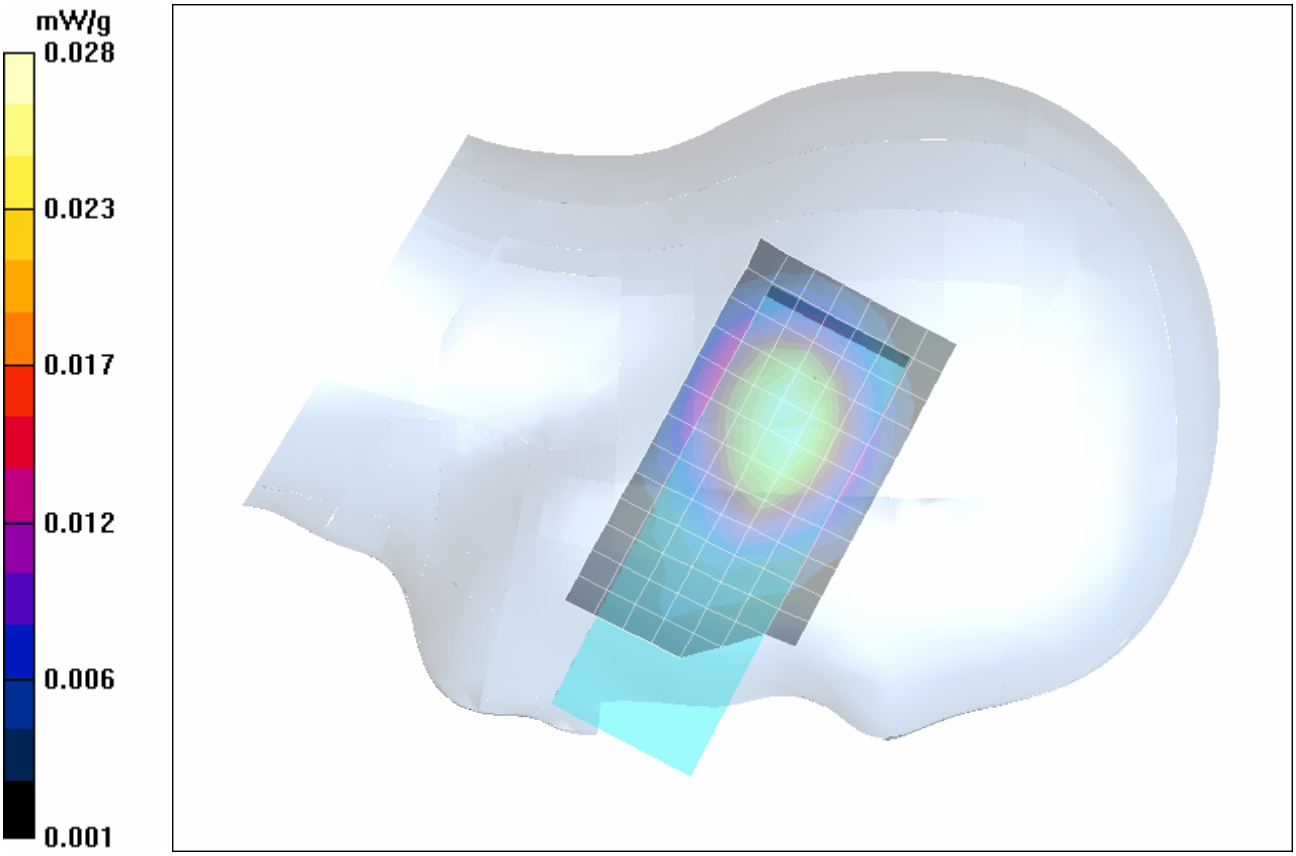
Ambient Temp: 24.9 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 101.3 kPa; Humidity: 30%

Communication System: TDMA
RF Output Power: 155 mW (EIRP)
NiMH Batteries 1.2V, 750mAh AAA (x2)
Frequency: 1924.992 MHz; Channel 3; Duty Cycle: 1:12.5
Medium: HSL1920 (σ = 1.40 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(5.3, 5.3, 5.3); Calibrated: 20/05/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Head SAR - Left Ear - Tilt Position (15º) - Mid Channel/Area Scan (8x14x1):
Measurement grid: dx=10mm, dy=10mm

Head SAR - Left Ear - Tilt Position (15º) - Mid Channel/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.39 V/m; Power Drift = 0.041 dB
Peak SAR (extrapolated) = 0.049 W/kg
SAR(1 g) = 0.027 mW/g; SAR(10 g) = 0.016 mW/g



Date Tested: 04/06/2006

Head SAR - Left Ear - Cheek/Touch Position - Mid Channel - 1924.992 MHz

DUT: Ascalade Model: VOIP433XY/ZZ; Type: Portable UPCS DECT Cordless Handset; Serial: MS000608010006

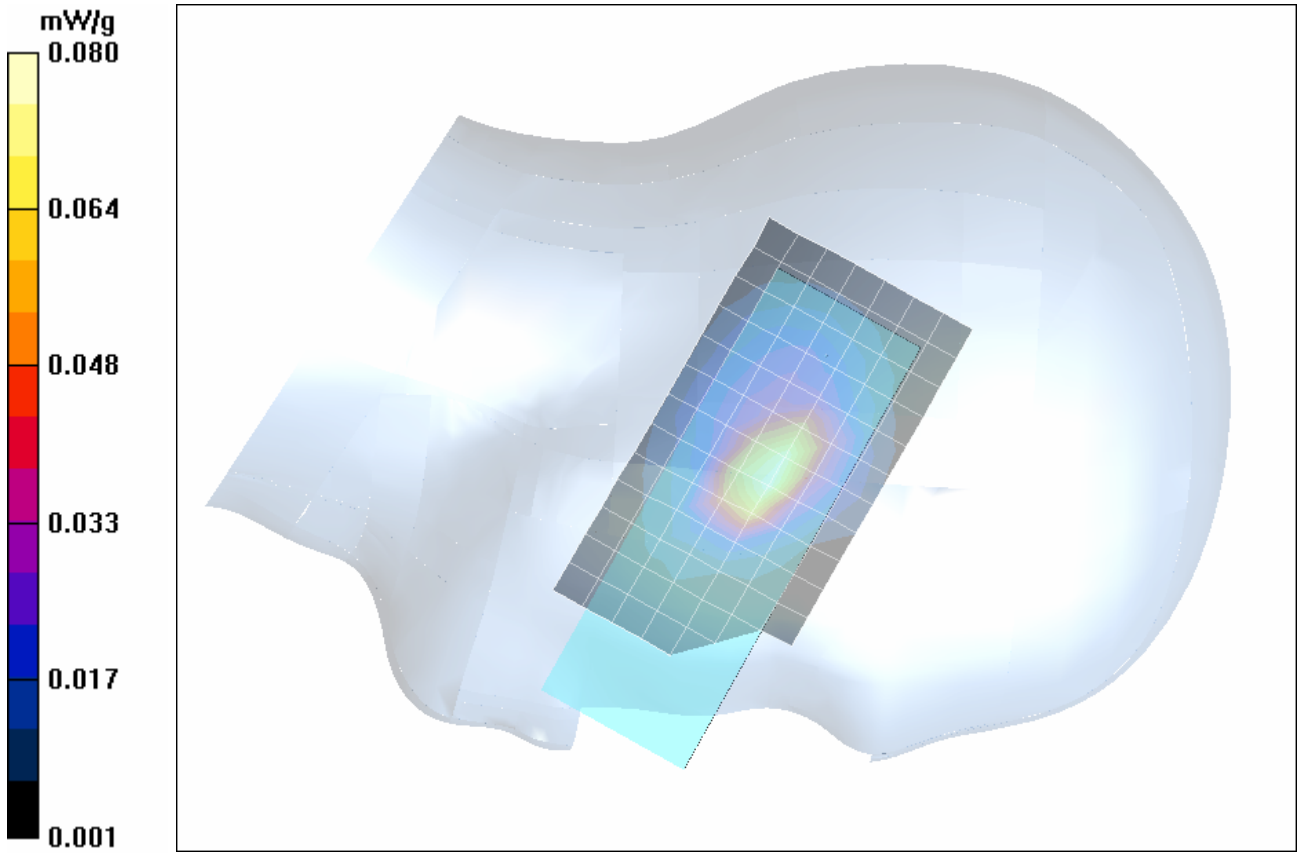
Ambient Temp: 24.9 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 101.3 kPa; Humidity: 30%

Communication System: TDMA
RF Output Power: 155 mW (EIRP)
NiMH Batteries 1.2V, 750mAh AAA (x2)
Frequency: 1924.992 MHz; Channel 3; Duty Cycle: 1:12.5
Medium: HSL1920 (σ = 1.40 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(5.3, 5.3, 5.3); Calibrated: 20/05/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Head SAR - Left Ear - Cheek/Touch Position - Mid Channel/Area Scan (8x14x1):
Measurement grid: dx=10mm, dy=10mm

Head SAR - Left Ear - Cheek/Touch Position - Mid Channel/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.45 V/m; Power Drift = 0.016 dB
Peak SAR (extrapolated) = 0.124 W/kg
SAR(1 g) = 0.074 mW/g; SAR(10 g) = 0.041 mW/g



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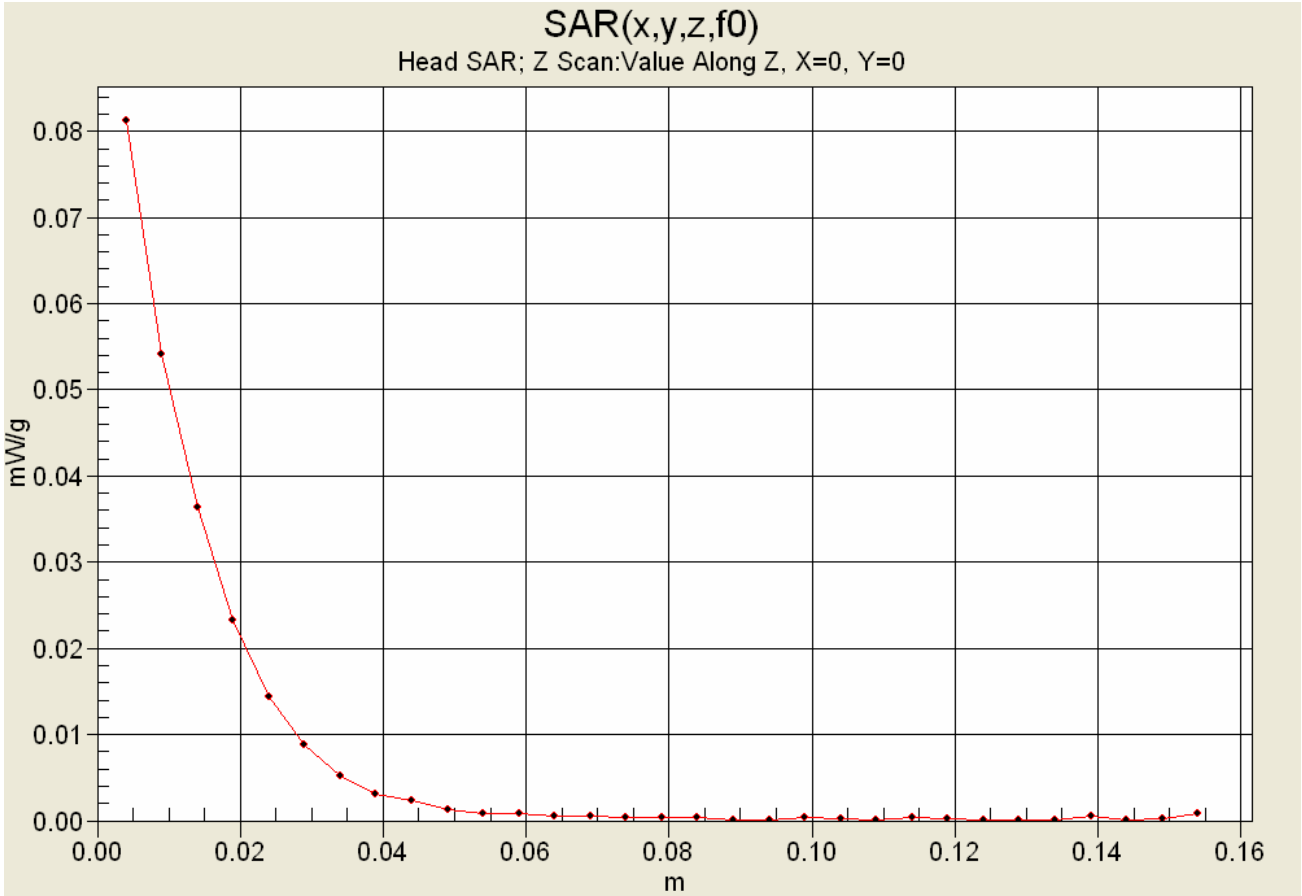
Z-Axis Scan



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Date Tested: 04/06/2006

Head SAR - Right Ear - Tilt Position (15º) - Mid Channel - 1924.992 MHz

DUT: Ascalade Model: VOIP433XY/ZZ; Type: Portable UPCS DECT Cordless Handset; Serial: MS000608010006

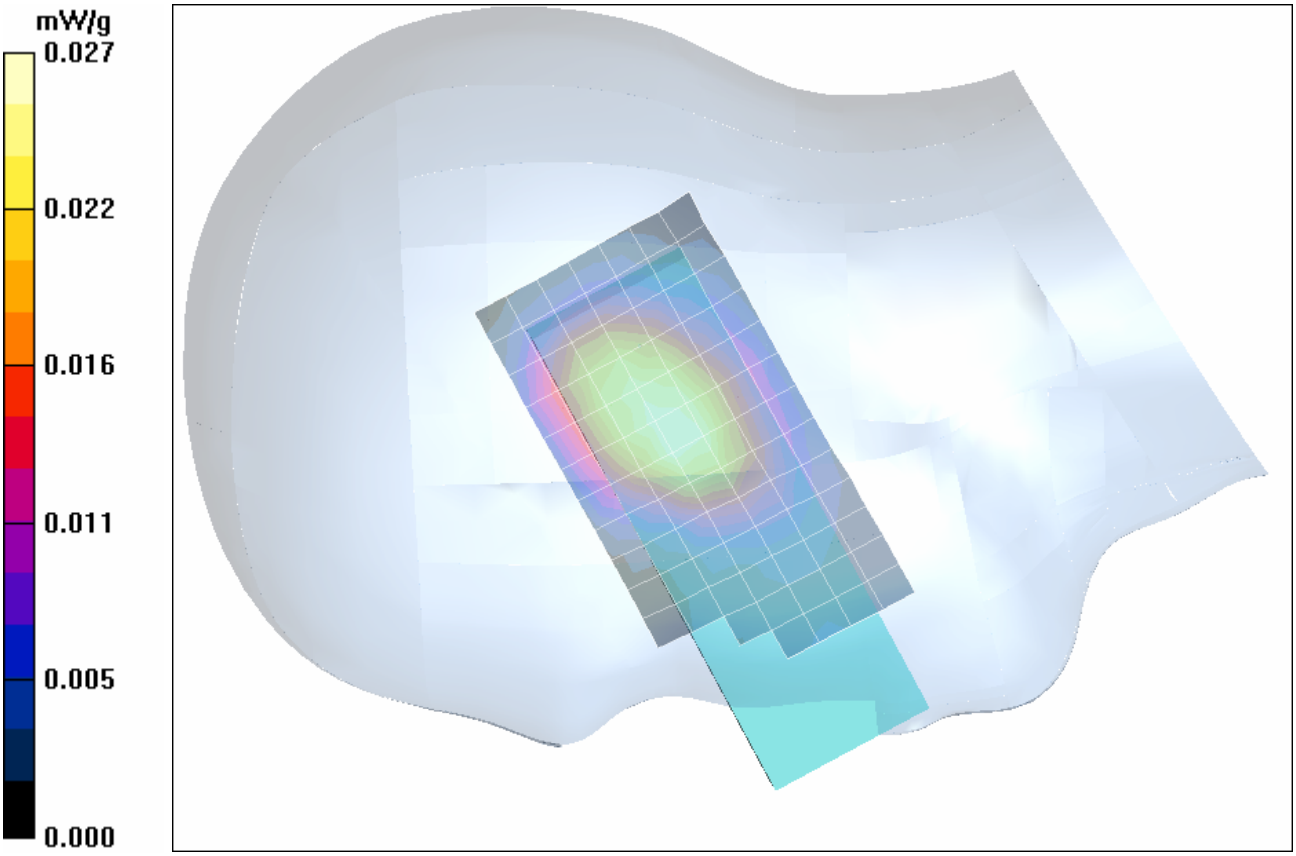
Ambient Temp: 24.9 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 101.3 kPa; Humidity: 30%

Communication System: TDMA
RF Output Power: 155 mW (EIRP)
NiMH Batteries 1.2V, 750mAh AAA (x2)
Frequency: 1924.992 MHz; Channel 3; Duty Cycle: 1:12.5
Medium: HSL1920 (σ = 1.40 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(5.3, 5.3, 5.3); Calibrated: 20/05/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Head SAR - Right Ear - Tilt Position (15º) - Mid Channel/Area Scan (8x14x1):
Measurement grid: dx=10mm, dy=10mm

Head SAR - Right Ear - Tilt Position (15º) - Mid Channel/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.28 V/m; Power Drift = 0.011 dB
Peak SAR (extrapolated) = 0.049 W/kg
SAR(1 g) = 0.026 mW/g; SAR(10 g) = 0.016 mW/g



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Date Tested: 04/06/2006

Head SAR - Right Ear - Cheek/Touch Position - Mid Channel - 1924.992 MHz

DUT: Ascalade Model: VOIP433XY/ZZ; Type: Portable UPCS DECT Cordless Handset; Serial: MS000608010006

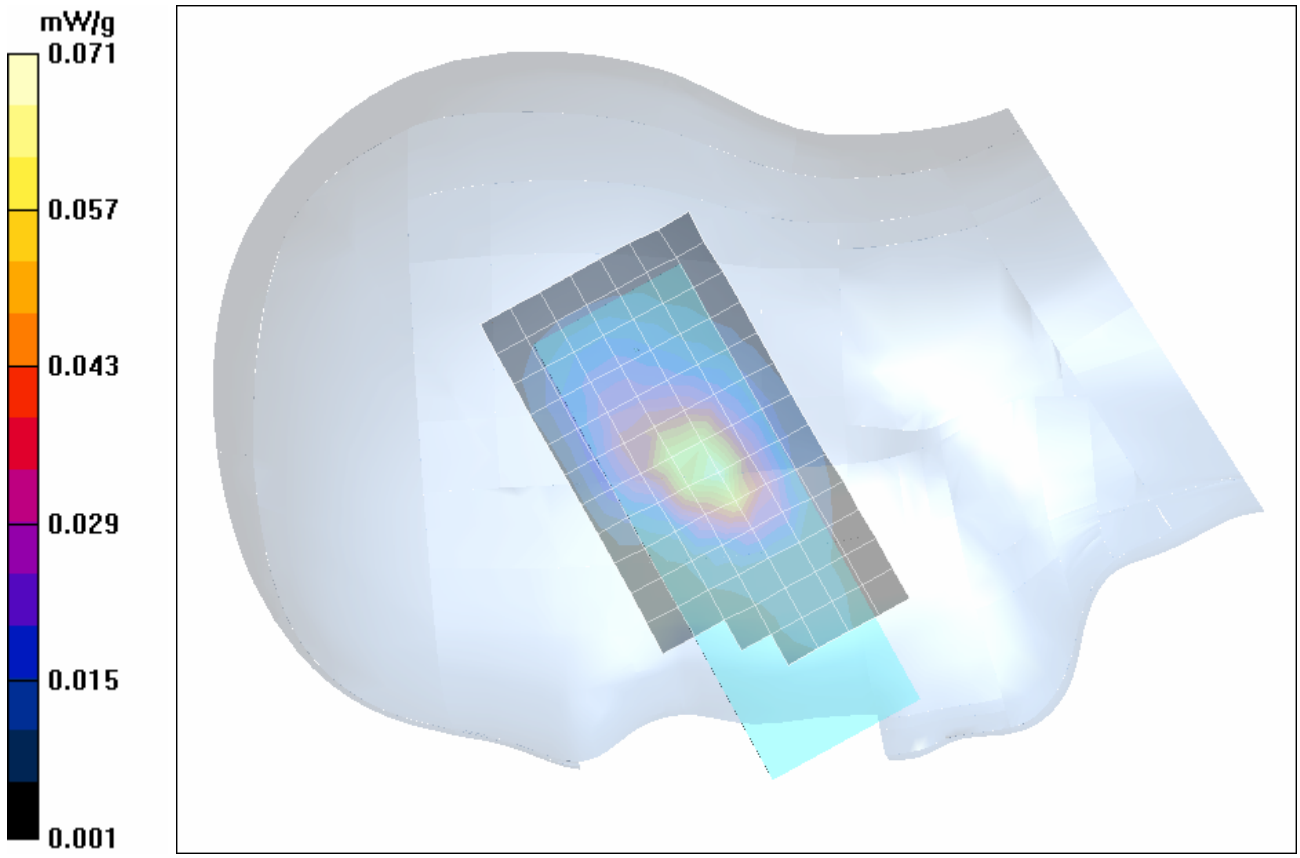
Ambient Temp: 24.9 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 101.3 kPa; Humidity: 30%

Communication System: TDMA
RF Output Power: 155 mW (EIRP)
NiMH Batteries 1.2V, 750mAh AAA (x2)
Frequency: 1924.992 MHz; Channel 3; Duty Cycle: 1:12.5
Medium: HSL1920 (σ = 1.40 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(5.3, 5.3, 5.3); Calibrated: 20/05/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Head SAR - Right Ear - Cheek/Touch Position - Mid Channel/Area Scan (8x14x1):
Measurement grid: dx=10mm, dy=10mm

Head SAR - Right Ear - Cheek/Touch Position - Mid Channel/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.95 V/m; Power Drift = 0.049 dB
Peak SAR (extrapolated) = 0.116 W/kg
SAR(1 g) = 0.064 mW/g; SAR(10 g) = 0.036 mW/g



Date Tested: 04/07/2006

Body-Worn SAR - Back Side of DUT with Plastic Belt-Clip - Mid Channel - 1924.992 MHz

DUT: Ascalade Model: VOIP433XY/ZZ; Type: Portable UPCS DECT Cordless Handset; Serial: MS000608010006

Body-Worn Accessory: Plastic Belt-Clip (4 mm); Audio Accessory: Generic Ear-Microphone

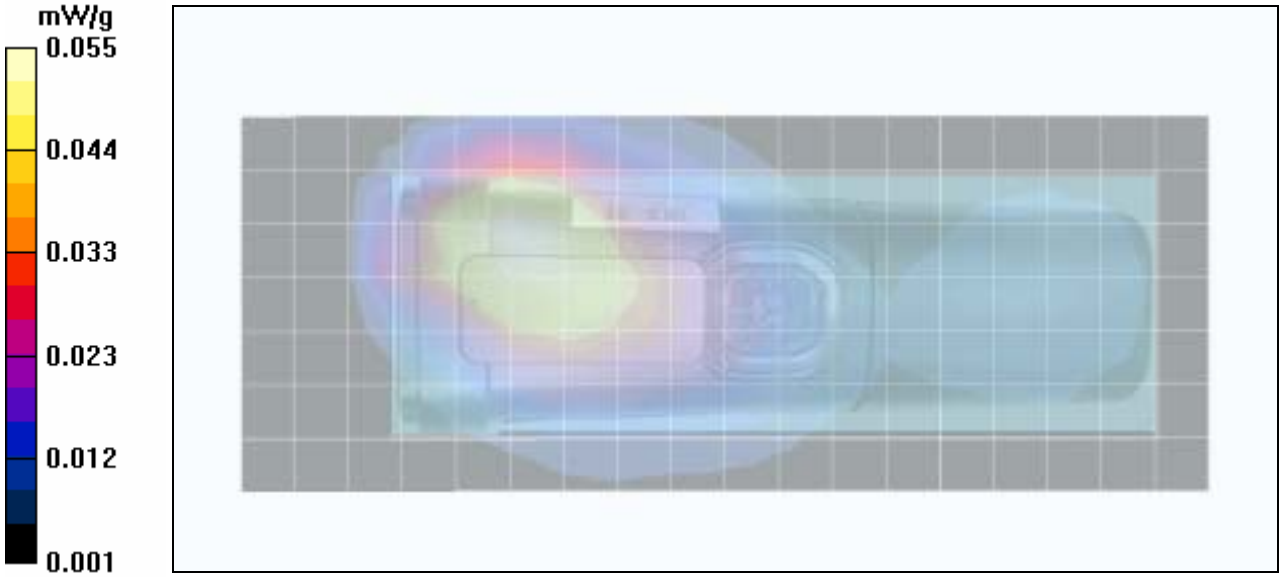
Ambient Temp: 24.8 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 101.6 kPa; Humidity: 30%

Communication System: TDMA
RF Output Power: 155 mW (EIRP)
NiMH Batteries 1.2V, 750mAh AAA (x2)
Frequency: 1924.992 MHz; Channel 3; Duty Cycle: 1:12.5
Medium: M1900 (σ = 1.48 mho/m; ε_r = 51.3; ρ = 1000 kg/m^3)

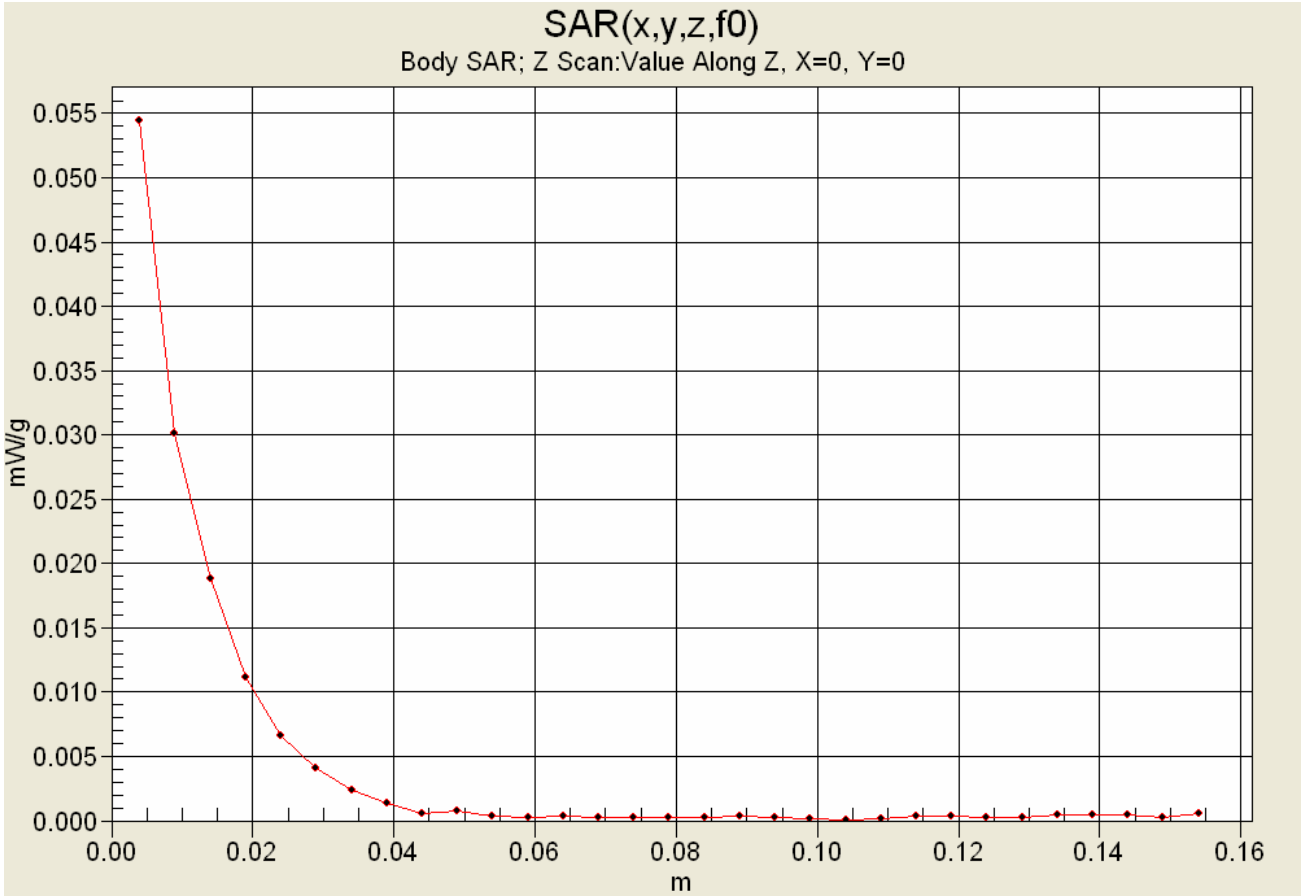
- Probe: ET3DV6 - SN1590; ConvF(4.8, 4.8, 4.8); Calibrated: 20/05/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

Body-Worn SAR - 4 mm Belt-Clip Separation Distance from Back of DUT to Planar Phantom - Mid Channel
Area Scan (8x19x1): Measurement grid: dx=10mm, dy=10mm

Body-Worn SAR - 4 mm Belt-Clip Separation Distance from Back of DUT to Planar Phantom - Mid Channel
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.07 V/m; Power Drift = -0.021 dB
Peak SAR (extrapolated) = 0.123 W/kg
SAR(1 g) = 0.053 mW/g; SAR(10 g) = 0.029 mW/g



Z-Axis Scan



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Fluid Depth (>15cm)

Right Head Section

Planar Section

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APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

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Date Tested: 04/06/2006

System Performance Check (Brain) - 1900 MHz Dipole

DUT: Dipole 1900 MHz; Model: D1900V2; Type: System Performance Check; Serial: 151; Calibrated: 06/17/2005

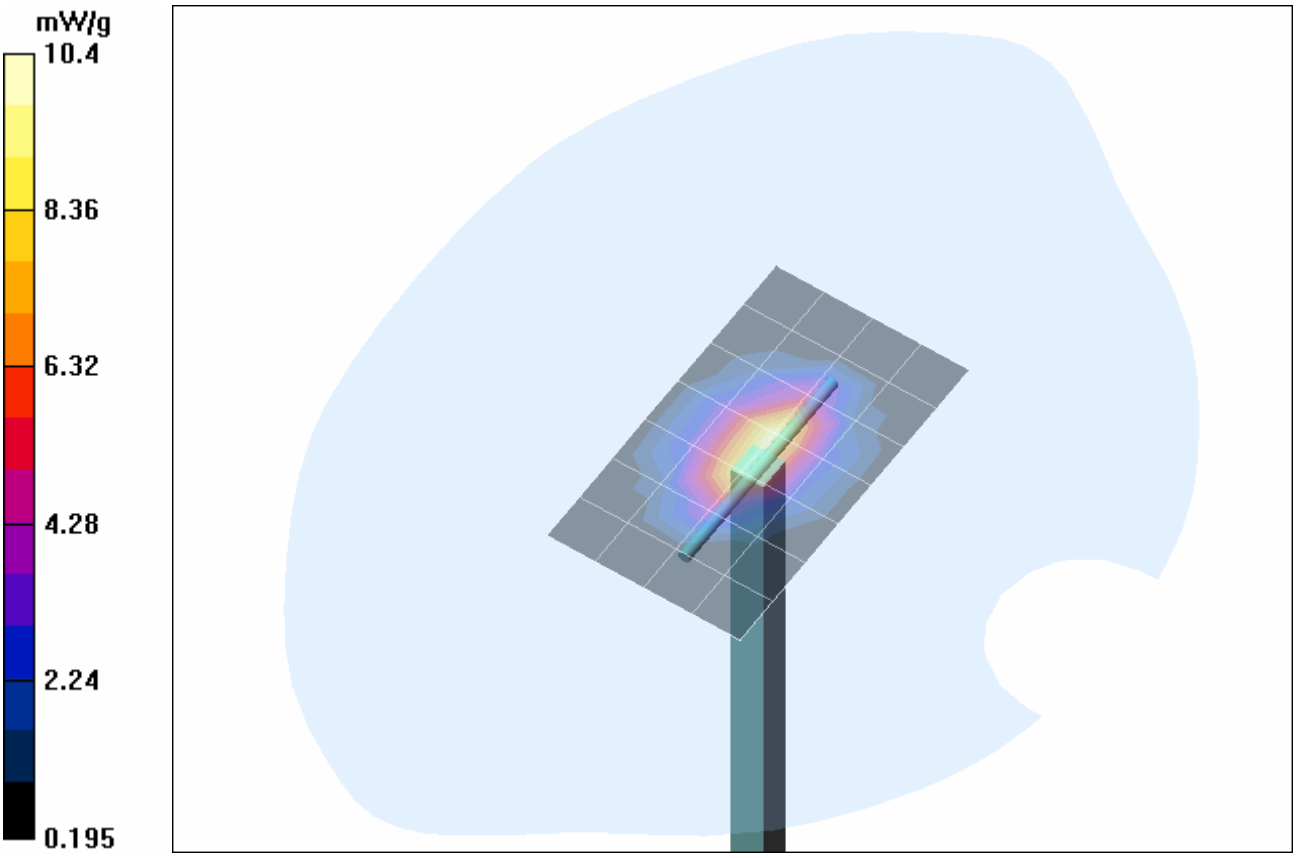
Ambient Temp: 24.9 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 101.3 kPa; Humidity: 30%

Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 (σ = 1.39 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(5.44, 5.44, 5.44); Calibrated: 20/05/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

1900 MHz Dipole - System Performance Check/Area Scan (5x8x1):
Measurement grid: dx=15mm, dy=15mm

1900 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 91.4 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 16.5 W/kg
SAR(1 g) = 9.30 mW/g; SAR(10 g) = 4.87 mW/g



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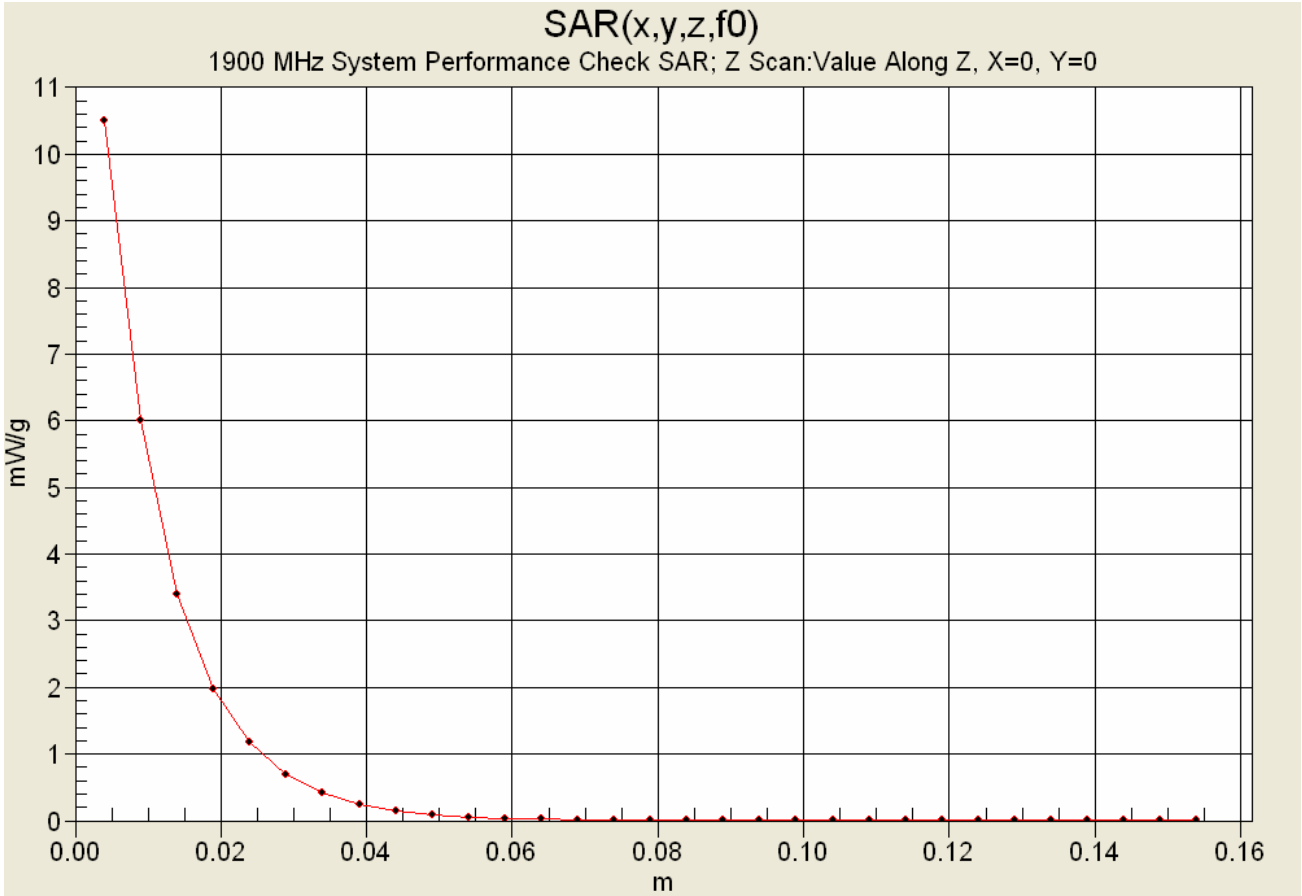
Z-Axis Scan



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Date Tested: 04/07/2006

System Performance Check (Brain) - 1900 MHz Dipole

DUT: Dipole 1900 MHz; Model: D1900V2; Type: System Performance Check; Serial: 151; Calibrated: 06/17/2005

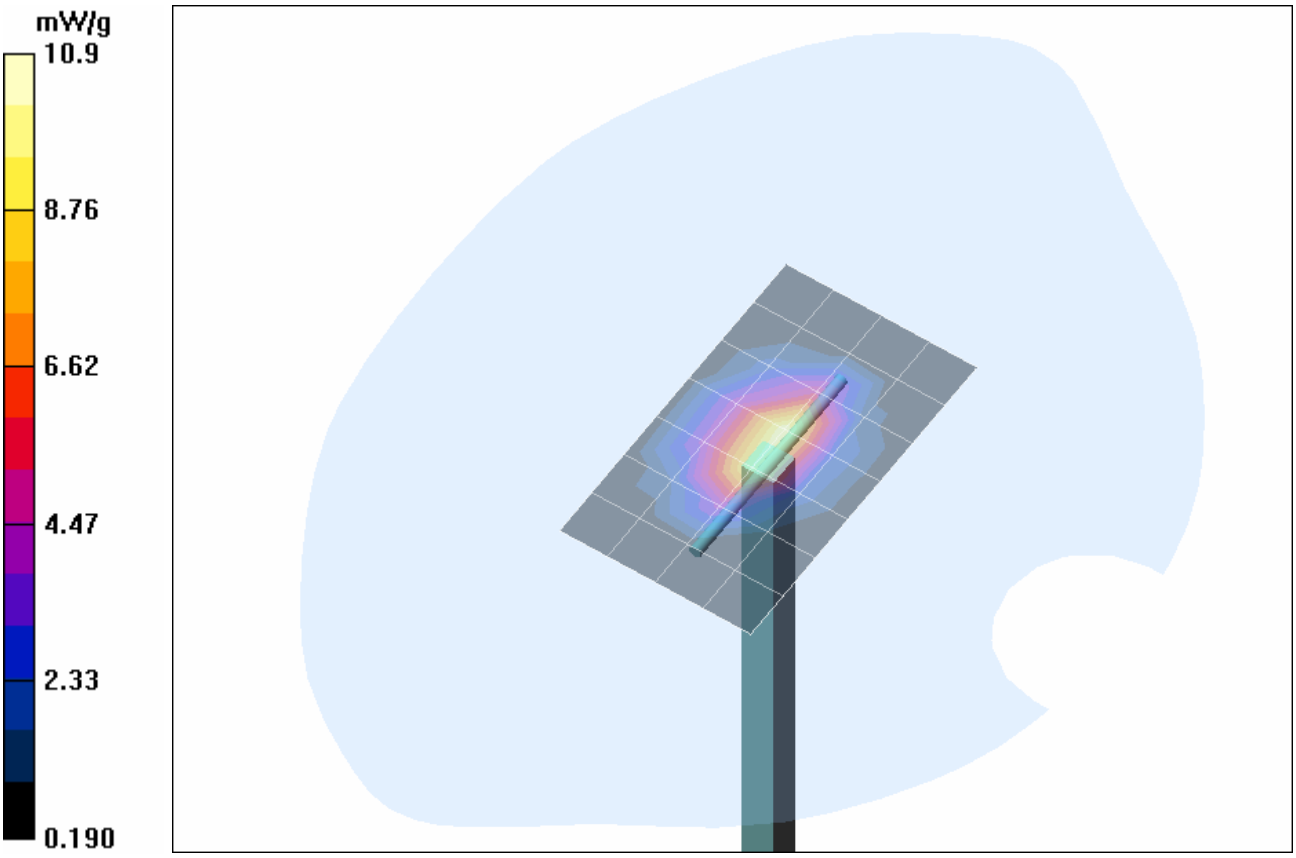
Ambient Temp: 23.5 °C; Fluid Temp: 23.8 °C; Barometric Pressure: 101.3 kPa; Humidity: 30%

Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 (σ = 1.38 mho/m; ε_r = 38.2; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(5.44, 5.44, 5.44); Calibrated: 20/05/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 15/06/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.6 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 159

1900 MHz Dipole - System Performance Check/Area Scan (5x8x1):
Measurement grid: dx=15mm, dy=15mm

1900 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.7 V/m; Power Drift = 0.005 dB
Peak SAR (extrapolated) = 17.4 W/kg
SAR(1 g) = 9.74 mW/g; SAR(10 g) = 5.08 mW/g



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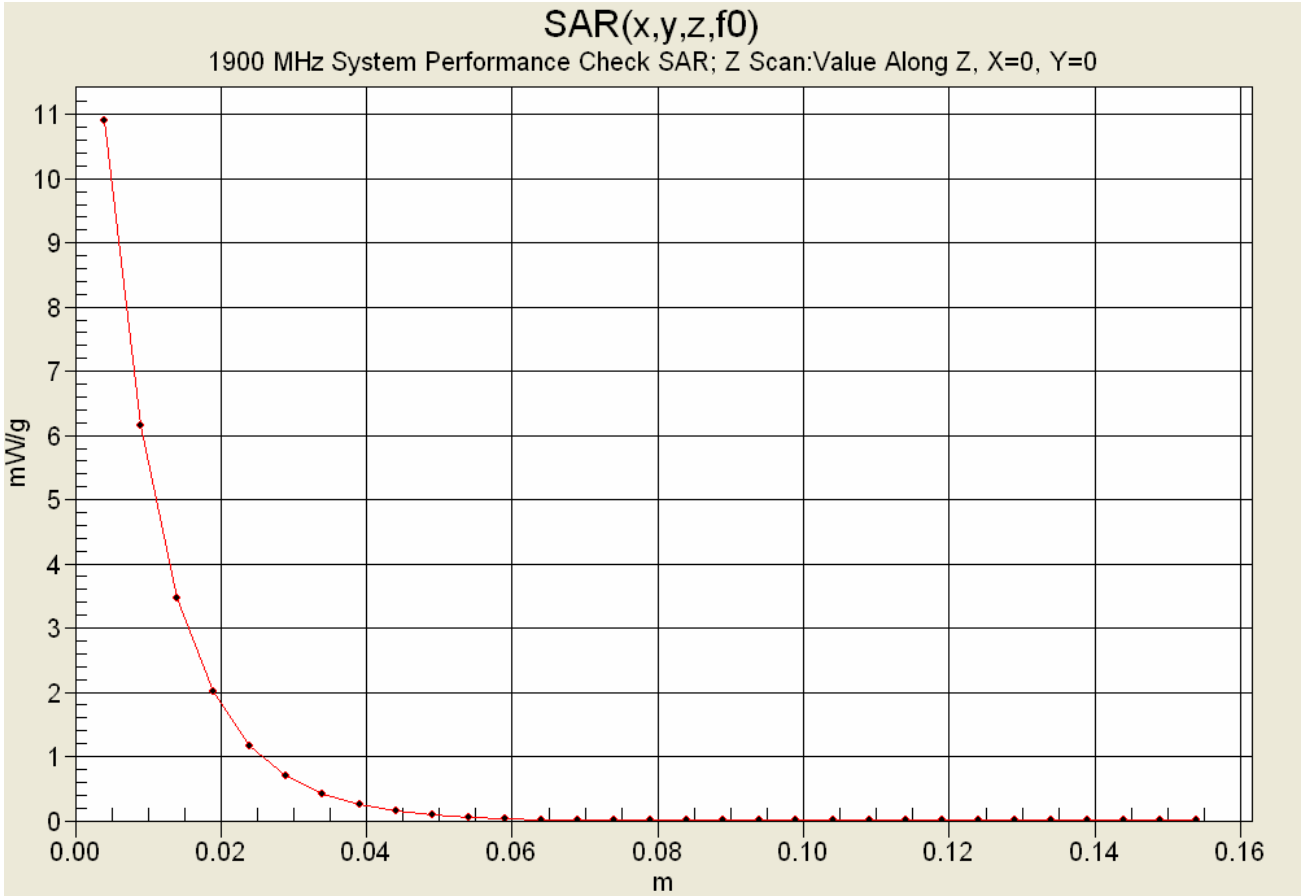
Z-Axis Scan



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APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

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1900 MHz System Performance Check & 1920 MHz DUT Evaluation (Brain)

****

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
Thu 06/Apr/2006
Frequency(GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
1.8000	40.00	1.40	38.68	1.30
1.8100	40.00	1.40	38.67	1.31
1.8200	40.00	1.40	38.52	1.32
1.8300	40.00	1.40	38.56	1.32
1.8400	40.00	1.40	38.60	1.33
1.8500	40.00	1.40	38.43	1.35
1.8600	40.00	1.40	38.39	1.35
1.8700	40.00	1.40	38.35	1.36
1.8800	40.00	1.40	38.32	1.37
1.8900	40.00	1.40	38.27	1.37
1.9000	40.00	1.40	38.20	1.39
1.9100	40.00	1.40	38.19	1.40
1.9200	40.00	1.40	38.20	1.40
1.9300	40.00	1.40	38.09	1.41
1.9400	40.00	1.40	38.06	1.42
1.9500	40.00	1.40	38.03	1.44
1.9600	40.00	1.40	37.94	1.45
1.9700	40.00	1.40	37.84	1.45
1.9800	40.00	1.40	37.81	1.48
1.9900	40.00	1.40	37.87	1.48
2.0000	40.00	1.40	37.89	1.50

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1900 MHz System Performance Check (Brain)

****

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
Fri 07/Apr/2006
Frequency(GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
1.8000	40.00	1.40	38.55	1.30
1.8100	40.00	1.40	38.57	1.31
1.8200	40.00	1.40	38.48	1.32
1.8300	40.00	1.40	38.45	1.33
1.8400	40.00	1.40	38.43	1.34
1.8500	40.00	1.40	38.40	1.34
1.8600	40.00	1.40	38.43	1.35
1.8700	40.00	1.40	38.26	1.36
1.8800	40.00	1.40	38.32	1.37
1.8900	40.00	1.40	38.18	1.38
1.9000	40.00	1.40	38.15	1.38
1.9100	40.00	1.40	38.19	1.39
1.9200	40.00	1.40	38.10	1.40
1.9300	40.00	1.40	38.08	1.42
1.9400	40.00	1.40	38.12	1.42
1.9500	40.00	1.40	38.03	1.43
1.9600	40.00	1.40	38.04	1.43
1.9700	40.00	1.40	38.05	1.45
1.9800	40.00	1.40	38.03	1.46
1.9900	40.00	1.40	37.90	1.46
2.0000	40.00	1.40	37.87	1.49

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1920 MHz DUT Evaluation (Body)

****

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
Fri 07/Apr/2006
Frequency(GHz)
FCC_eH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eB	FCC_sB	Test_e	Test_s
1.8000	53.30	1.52	51.70	1.39
1.8100	53.30	1.52	51.75	1.39
1.8200	53.30	1.52	51.72	1.41
1.8300	53.30	1.52	51.72	1.41
1.8400	53.30	1.52	51.68	1.42
1.8500	53.30	1.52	51.58	1.42
1.8600	53.30	1.52	51.68	1.42
1.8700	53.30	1.52	51.63	1.44
1.8800	53.30	1.52	51.63	1.43
1.8900	53.30	1.52	51.50	1.44
1.9000	53.30	1.52	51.43	1.46
1.9100	53.30	1.52	51.58	1.46
1.9200	53.30	1.52	51.34	1.48
1.9300	53.30	1.52	51.47	1.49
1.9400	53.30	1.52	51.49	1.49
1.9500	53.30	1.52	51.40	1.51
1.9600	53.30	1.52	51.48	1.51
1.9700	53.30	1.52	51.49	1.52
1.9800	53.30	1.52	51.45	1.53
1.9900	53.30	1.52	51.33	1.54
2.0000	53.30	1.52	51.36	1.56

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APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS

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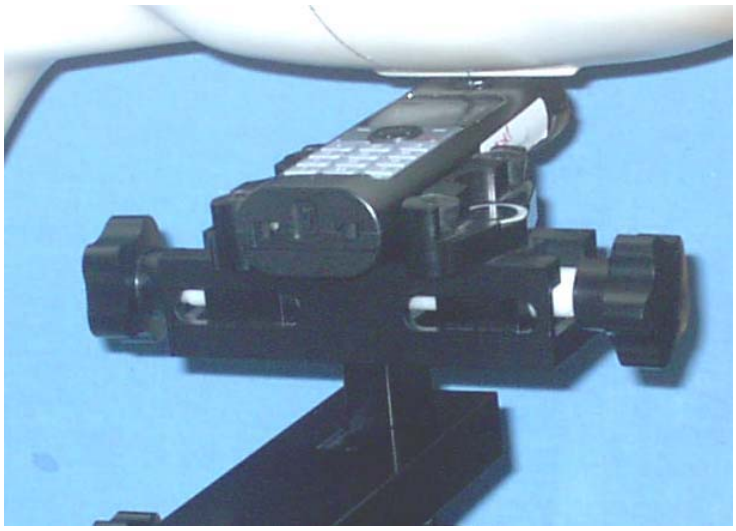
HEAD SAR TEST SETUP PHOTOGRAPHS

Left Head Section / Ear-Tilt Position (15°)



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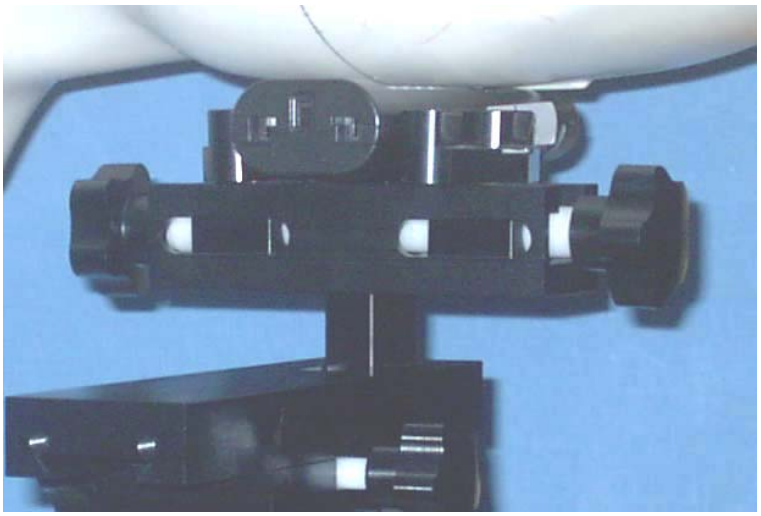
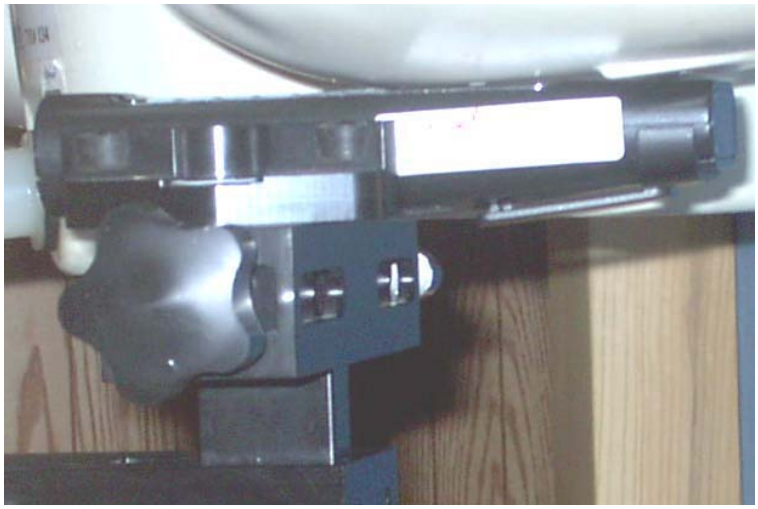
HEAD SAR TEST SETUP PHOTOGRAPHS

Left Head Section / Cheek-Touch Position





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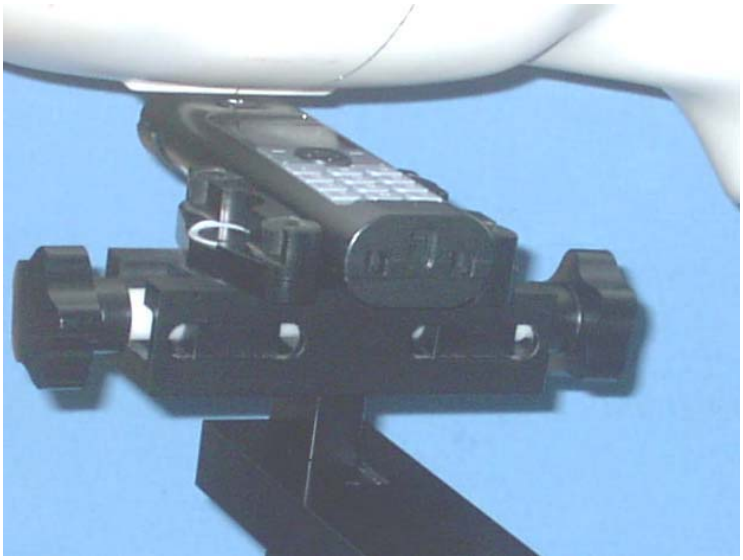
HEAD SAR TEST SETUP PHOTOGRAPHS

Right Head Section / Ear-Tilt Position (15º)



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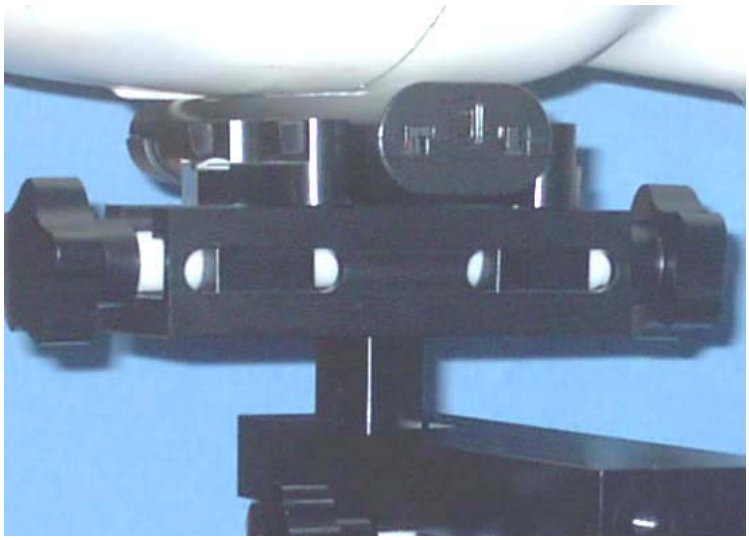
HEAD SAR TEST SETUP PHOTOGRAPHS

Right Head Section / Cheek-Touch Position



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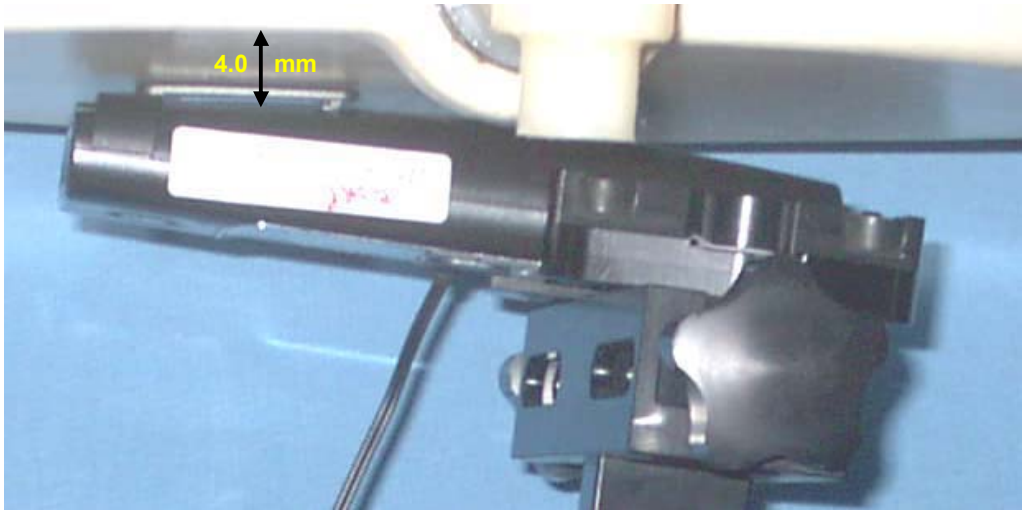
BODY-WORN SAR TEST SETUP PHOTOGRAPHS

4 mm Plastic Belt-Clip Separation Distance from Back of DUT to Planar Phantom
With Generic Ear-Microphone audio accessory



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DUT PHOTOGRAPHS

Front of DUT

Back of DUT with Plastic Belt-Clip

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DUT PHOTOGRAPHS

Left Side of DUT

Right Side of DUT

Plastic Belt-Clip accessory (4 mm thickness)

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DUT PHOTOGRAPHS

Top end of DUT

Bottom end of DUT

DUT Battery Compartment

NiMH AAA Batteries

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DUT PHOTOGRAPHS

DUT with Generic Ear-Microphone audio accessory

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APPENDIX E - SYSTEM VALIDATION

1900 MHz SYSTEM VALIDATION DIPOLE

Type:	**1900 MHz Validation Dipole**
Asset Number:	**00032**
Serial Number:	**151**
Place of Calibration:	**Celltech Labs Inc.**
Date of Calibration:	**June 17, 2005**

Celltech Labs Inc. hereby certifies that this device has been calibrated on the date indicated above.

Calibrated by:

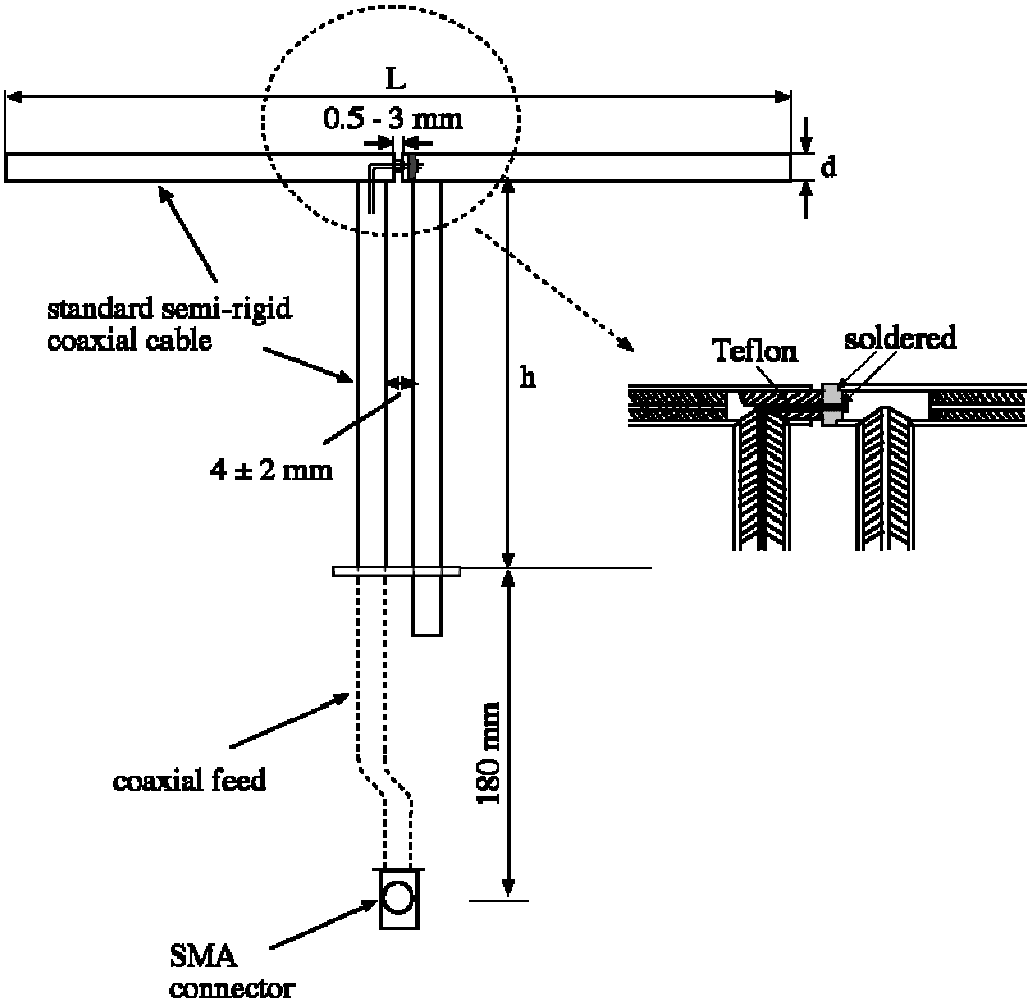
Approved by:

Celltech Labs Inc. 1955 Moss Court, Kelowna, B.C. Canada V1Y 9L3
Tel. 250-448-7047 • Fax. 250-448-7046 • e-mail: info@celltechlabs.com
www.celltechlabs.com

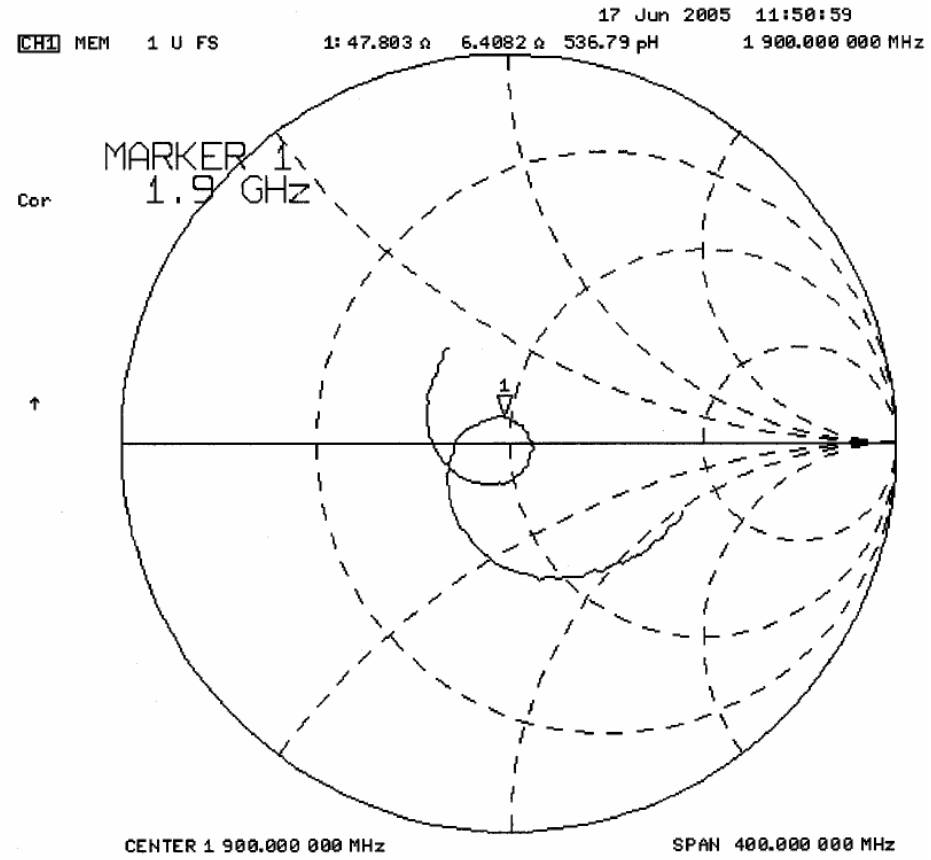
1. Dipole Construction & Electrical Characteristics

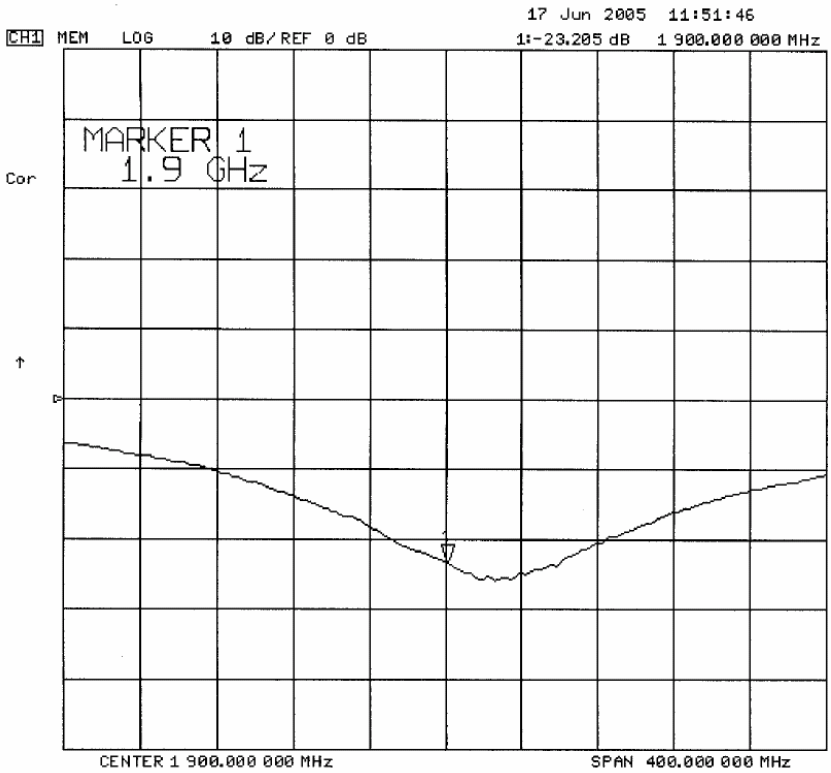
The validation dipole was constructed in accordance with the IEEE Standard "Annex G (informative) Reference dipoles for use in system validation". The electrical properties were measured using an HP 8753ET Network Analyzer. The network analyzer was calibrated to the validation dipole N-type connector feed point using an HP85032E Type N calibration kit. The dipole was placed parallel to a planar phantom at a separation distance of 10.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

Feed point impedance at 1900MHz	Re{Z} = 47.803Ω
	Im{Z} = 6.4002Ω
Return Loss at 1900MHz	-23.205dB



2. Validation Dipole VSWR Data





3. Validation Dipole Dimensions

Frequency (MHz)	L (mm)	h (mm)	d (mm)
300	420.0	250.0	6.2
450	288.0	167.0	6.2
835	161.0	89.8	3.6
900	149.0	83.3	3.6
1450	89.1	51.7	3.6
1800	72.0	41.7	3.6
1900	68.0	39.5	3.6
2000	64.5	37.5	3.6
2450	51.8	30.6	3.6
3000	41.5	25.0	3.6

4. Validation Phantom

The validation phantom is the SAM (Specific Anthropomorphic Mannequin) phantom manufactured by Schmid & Partner Engineering AG. The SAM phantom is a Fiberglass shell integrated in a wooden table. The shape of the shell corresponds to the phantom defined by SCC34-SC2. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.

Shell Thickness: 2.0 ± 0.1 mm
Filling Volume: Approx. 25 liters
Dimensions: 50 cm (W) x 100 cm (L)

5. 1900 MHz System Validation Setup

1900 MHz System Validation Setup

6. Measurement Conditions

The SAM phantom was filled with 1900 MHz brain simulating tissue.

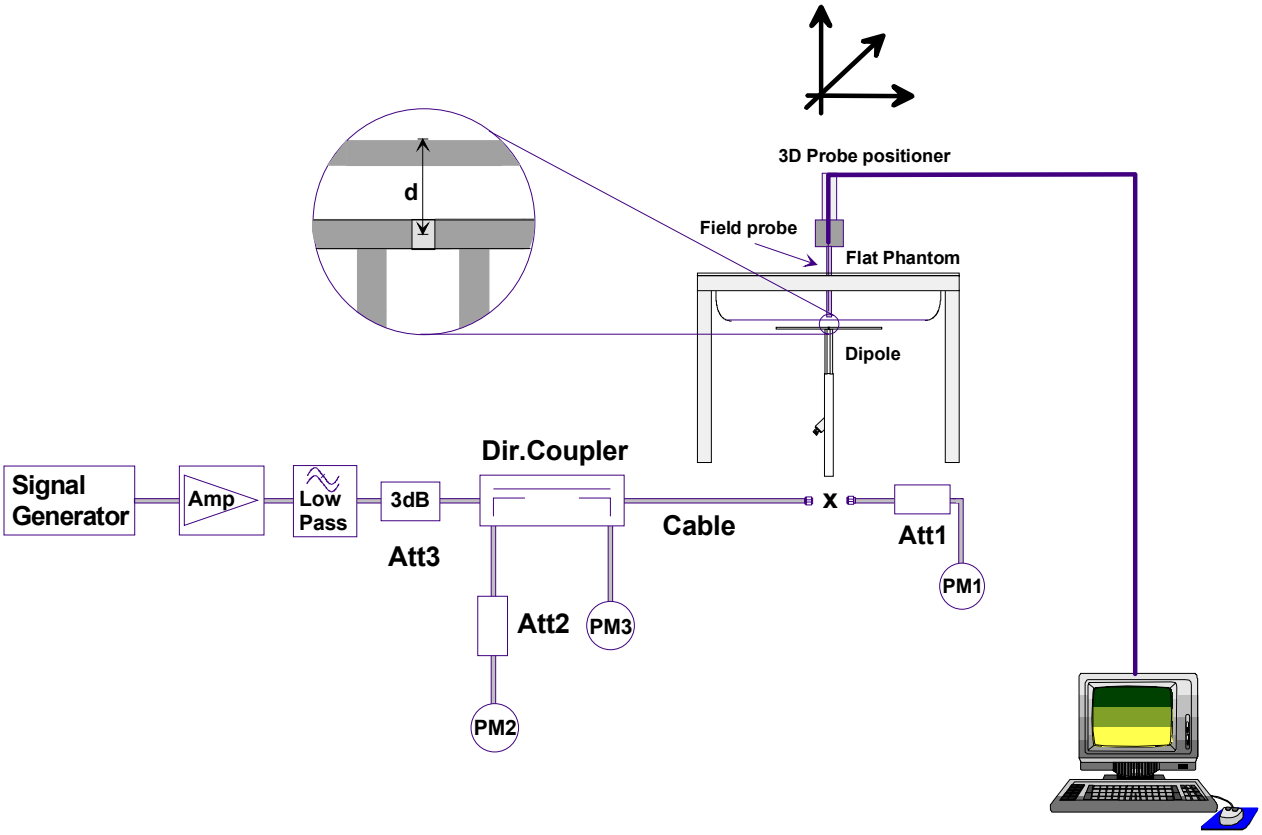
Relative Permittivity:	38.4
Conductivity:	1.40 mho/m
Ambient Temperature:	23.4 °C
Fluid Temperature:	22.7 °C
Fluid Depth:	≥ 15.0 cm
Barometric Pressure:	100.6 kPa
Humidity:	35%

The 1900 MHz tissue simulant consists of the following ingredients:

Ingredient	Percentage by weight
Water	55.85%
Glycol	44.00%
Salt	0.15%
Target Dielectric Parameters at 22 °C	ε_r = 40.0 σ = 1.40 S/m

7. SAR Measurement

The SAR measurement was performed with the E-field probe in mechanical detection mode only. The setup and determination of the forward power into the dipole was performed using the following procedures.



First the power meter PM1 (including attenuator Att1) is connected to the cable to measure the forward power at the location of the dipole connector (X). The signal generator is adjusted for the desired forward power at the dipole connector (taking into account the attenuation of Att1) as read by power meter PM2. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2. If the signal generator does not allow adjustment in 0.01dB steps, the remaining difference at PM2 must be taken into consideration. PM3 records the reflected power from the dipole to ensure that the value is not changed from the previous value. The reflected power should be 50dB below the forward power.

8. Validation Dipole SAR Test Results

Ten SAR measurements were performed in order to achieve repeatability and to establish an average target value.

Validation Measurement	SAR @ 0.25W Input averaged over 1g	SAR @ 1W Input averaged over 1g	SAR @ 0.25W Input averaged over 10g	SAR @ 1W Input averaged over 10g	Peak SAR @ 0.25W Input
Test 1	9.97	39.88	5.20	20.80	17.7
Test 2	10.0	40.00	5.19	20.76	17.9
Test 3	10.1	40.40	5.21	20.84	18.1
Test 4	9.98	39.92	5.20	20.80	17.8
Test 5	9.96	39.84	5.19	20.76	17.7
Test 6	9.99	39.96	5.18	20.72	17.9
Test 7	9.89	39.56	5.16	20.64	17.5
Test 8	9.95	39.80	5.19	20.76	17.6
Test 9	9.96	39.84	5.20	20.80	17.6
Test 10	9.92	39.68	5.19	20.76	17.5
Average	9.972	39.888	5.191	20.764	17.73

The results have been normalized to 1W (forward power) into the dipole.

1g/10g Averaged	Average Measured SAR @ 1W Input	IEEE Target SAR @ 1W Input	Deviation (%)
1 gram	39.888	39.7	+ 0.474
10 gram	20.764	20.5	+ 1.29

1900 MHz System Validation - June 17, 2005

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 151
Ambient Temp: 23.4 °C; Fluid Temp: 22.7 °C; Barometric Pressure: 100.6 kPa; Humidity: 35%
Communication System: CW
Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: HSL1900 (σ = 1.40 mho/m; ε_r = 38.4; ρ = 1000 kg/m^3)

- Probe: ET3DV6 - SN1590; ConvF(5.44, 5.44, 5.44); Calibrated: 20/05/2005
- Sensor-Surface: 4mm (Mechanical And Optical Surface Detection)
- Electronics: DAE3 Sn370; Calibrated: 25/01/2005
- Phantom: SAM 4.0; Type: Fiberglas; Serial: 1033
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 146

1900 MHz System Validation/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

1900 MHz System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.6 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 9.97 mW/g; SAR(10 g) = 5.20 mW/g

1900 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.6 V/m; Power Drift = -0.025 dB
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 10.0 mW/g; SAR(10 g) = 5.19 mW/g

1900 MHz System Validation/Zoom Scan 3 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.1 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 18.1 W/kg
SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.21 mW/g

1900 MHz System Validation/Zoom Scan 4 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.8 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 17.8 W/kg
SAR(1 g) = 9.98 mW/g; SAR(10 g) = 5.20 mW/g

1900 MHz System Validation/Zoom Scan 5 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.8 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 17.7 W/kg
SAR(1 g) = 9.96 mW/g; SAR(10 g) = 5.19 mW/g

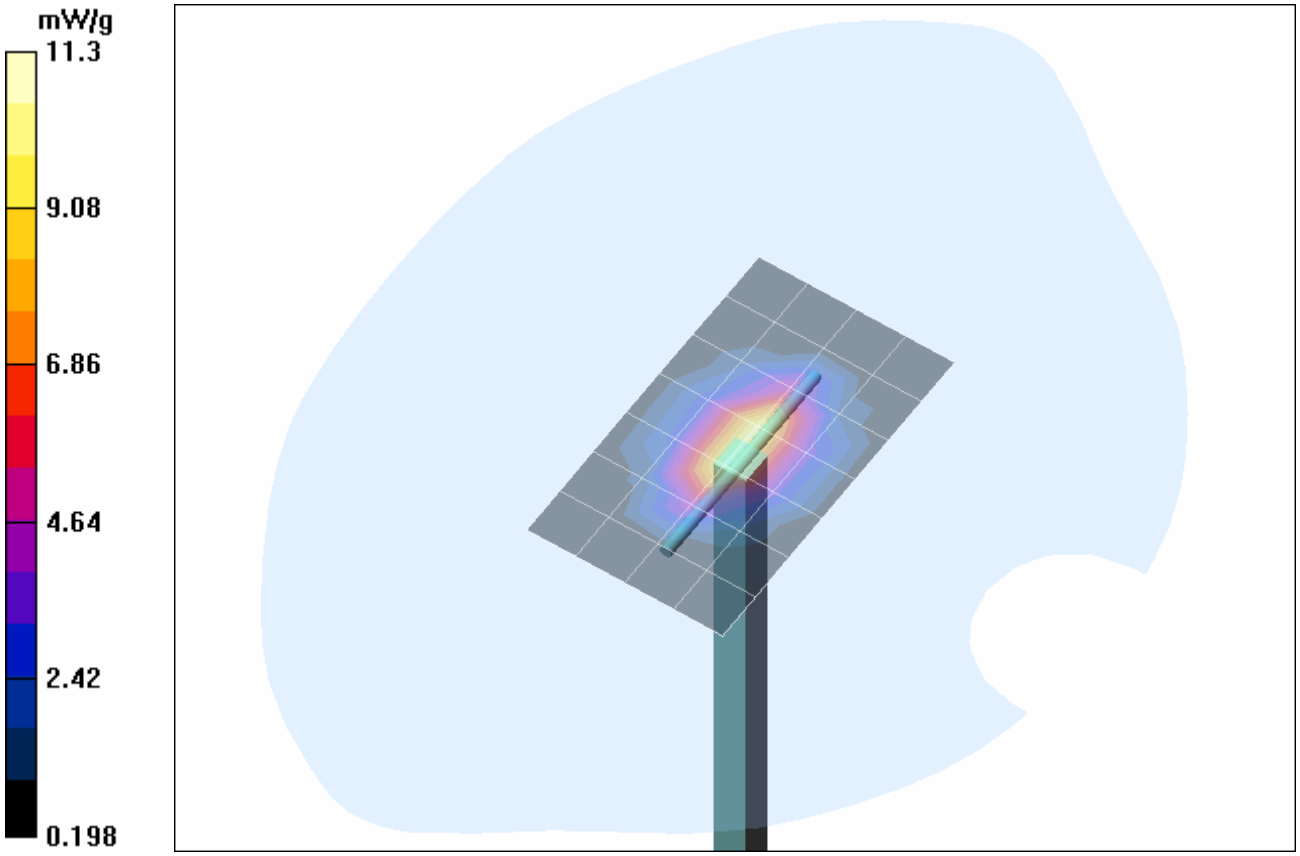
1900 MHz System Validation/Zoom Scan 6 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.6 V/m; Power Drift = -0.081 dB
Peak SAR (extrapolated) = 17.9 W/kg
SAR(1 g) = 9.99 mW/g; SAR(10 g) = 5.18 mW/g

1900 MHz System Validation/Zoom Scan 7 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.6 V/m; Power Drift = -0.019 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 9.89 mW/g; SAR(10 g) = 5.16 mW/g

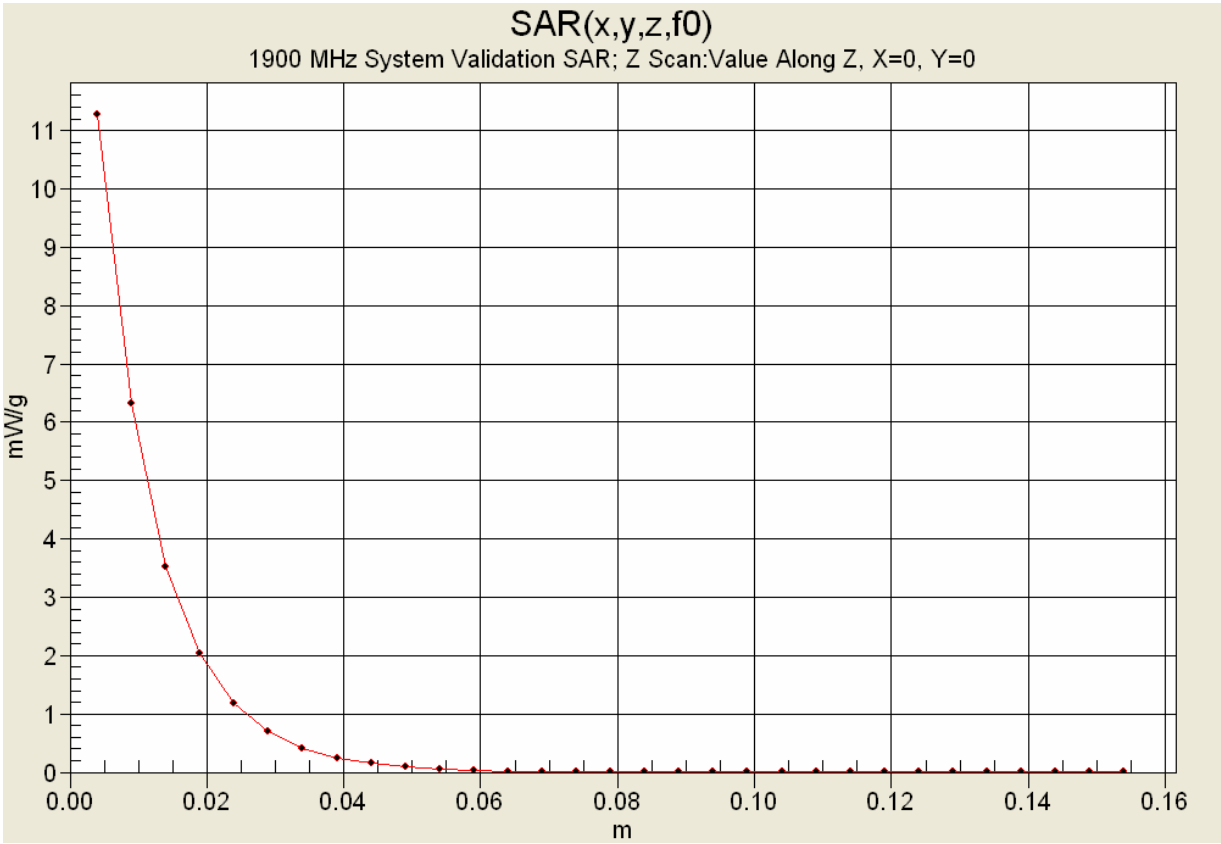
1900 MHz System Validation/Zoom Scan 8 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.0 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 17.6 W/kg
SAR(1 g) = 9.95 mW/g; SAR(10 g) = 5.19 mW/g

1900 MHz System Validation/Zoom Scan 9 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.0 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 17.6 W/kg
SAR(1 g) = 9.96 mW/g; SAR(10 g) = 5.20 mW/g

1900 MHz System Validation/Zoom Scan 10 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.7 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 17.5 W/kg
SAR(1 g) = 9.92 mW/g; SAR(10 g) = 5.19 mW/g



1 g average of 10 measurements: 9.972 mW/g
10 g average of 10 measurements: 5.191 mW/g



System Validation - 1900 MHz Dipole (Brain)

****

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
Fri 17/Jun/2005
Freq Frequency(GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
1.8000	40.00	1.40	38.82	1.30
1.8100	40.00	1.40	38.66	1.32
1.8200	40.00	1.40	38.64	1.33
1.8300	40.00	1.40	38.60	1.33
1.8400	40.00	1.40	38.57	1.34
1.8500	40.00	1.40	38.47	1.34
1.8600	40.00	1.40	38.40	1.36
1.8700	40.00	1.40	38.44	1.37
1.8800	40.00	1.40	38.34	1.38
1.8900	40.00	1.40	38.39	1.38
1.9000	40.00	1.40	38.37	1.40
1.9100	40.00	1.40	38.32	1.41
1.9200	40.00	1.40	38.34	1.42
1.9300	40.00	1.40	38.30	1.42
1.9400	40.00	1.40	38.31	1.44
1.9500	40.00	1.40	38.27	1.44
1.9600	40.00	1.40	38.20	1.46
1.9700	40.00	1.40	38.23	1.47
1.9800	40.00	1.40	38.11	1.49
1.9900	40.00	1.40	38.02	1.50
2.0000	40.00	1.40	38.11	1.52