

DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION

<u>Test Lab</u> CELLTECH LABS INC. Testing and Engineering Services 1955 Moss Court Kelowna, B.C. Canada V1Y 9L3 Phone: 250-448-7047 Fax: 250-448-7046 e-mail: info@celltechlabs.com web site: www.celltechlabs.com		<u>Applicant Information</u> MAXON TELECOM CO., LTD. 12F., Sewon Venture Town Bldg., 705-18, Yeoksam-Dong Seoul, Korea	
FCC IDENTIFIER: IC IDENTIFIER: Model(s):		RXUSP200V2 153-SP200V2 SP200 V2	
Rule Part(s): Test Procedure(s): Device Classification: Device Description: Modulation Type:		FCC 47 CFR §2.1093; IC RSS-102 Issue 1 (Provisional) FCC OET Bulletin 65, Supplement C (Edition 01-01) Licensed Non-Broadcast Transmitter Held to Face (TNF) Portable VHF PTT Radio Transceiver FM (VHF)	
Tx Frequency Range: Max. RF Output Power Measured: Antenna Type(s) Tested: Battery Type(s) Tested:		146 - 174 MHz 38.05 dBm Conducted (160.075 MHz) Detachable Whip (P/N: ACC-102) NiMH 7.5 V, 1350 mAh (P/N: BTM100-01)	
Body-Worn Accessories Tested:		Swivel Belt-Clip (Plastic with Metal Spring) Earbud with Lapel-Microphone	
Max. SAR Levels Evaluated:		Face-held: 0.0620 W/kg (50% Duty Cycle) Body-worn: 0.109 W/kg (50% Duty Cycle)	

Celltech Labs Inc. declares under its sole responsibility that this wireless portable device has demonstrated compliance 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) and Industry Canada RSS-102 Issue 1 (Provisional) for the Occupational / Controlled 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.

This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc. The results and statements contained in this report pertain only to the device(s) evaluated.

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1.0 INTRODUCTION

This measurement report demonstrates compliance of the Maxon Telecom Co., Ltd. Model: SP200 V2 Portable FM VHF PTT Radio Transceiver FCC ID: RXUSP200V2 with the SAR (Specific Absorption Rate) RF exposure requirements specified in FCC 47 CFR §2.1093 (see reference [1]), and Health Canada Safety Code 6 (see reference [2]) for the Occupational / Controlled Exposure environment. The test procedures described in FCC OET Bulletin 65, Supplement C (Edition 01-01) (see reference [3]) and IC RSS-102 Issue 1 (Provisional) (see reference [4]), were employed. A description of the product and 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)

FCC Rule Part(s)	FCC 47 CFR §2.1093		
IC Rule Part(s)	RSS-102 Issue 1 (Provisional)		
Test Procedure(s)	FCC OET Bulletin 65, Supplement C (Edition 01-01)		
Device Classification	Licensed Non-Broadcast Transmitter Held to Face (TNF)		
Device Description	Portable VHF PTT Radio Transceiver		
FCC IDENTIFIER	RXUSP200V2		
IC IDENTIFER	153-SP200V2		
Model(s)	SP200 V2		
Serial No.	0000000003	Identical Prototype	
Modulation	FM (VHF)		
Tx Frequency Range	146 - 174 MHz		
Max. RF Output Power Measured	38.05 dBm	160.075 MHz	Conducted
Battery Type(s) Tested	NiMH	7.5 V, 1350 mAh	P/N: BTM100-01
Antenna Type(s) Tested	Whip	Length: 145 mm	P/N: ACC-102
Body-Worn Accessories Tested	Swivel Belt-Clip (Plastic with Metal Spring)		
	Earbud with Lapel-Microphone		

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 SAR Measurement System with validation phantom



DASY4 SAR Measurement System with Plexiglas planar phantom

4.0 MEASUREMENT SUMMARY

SAR EVALUATION RESULTS

Test Type	Freq. (MHz)	Chan	Test Mode	Battery Type	Antenna Position	Body-worn Accessory	Separation Distance to Planar Phantom (cm)	Cond. Power Before Test (dBm)	Measured SAR 1g (W/kg)		SAR Drift During Test (dB)	Scaled SAR 1g (W/kg)	
									Duty Cycle			Duty Cycle	
									100%	50%		100%	50%
Face	160.075	Mid	CW	NiMH	Fixed	-	2.5	38.05	0.124	0.0620	0.0774	0.124	0.0620
Body	160.075	Mid	CW	NiMH	Fixed	Ear-Mic Belt-Clip	2.5	38.02	0.212	0.106	-0.121	0.218	0.109

ANSI / IEEE C95.1 1999 - SAFETY LIMIT
Spatial Peak - Controlled Exposure / Occupational
BRAIN / BODY: 8.0 W/kg (averaged over 1 gram)

Test Date(s)	January 18, 2005		January 18, 2005		Measured Fluid Type		Brain	Body	Unit
Dielectric Constant ϵ_r	150 MHz Brain		150 MHz Body		Atmospheric Pressure		102.5	102.2	kPa
	IEEE Target	Measured	IEEE Target	Measured	Relative Humidity		30	31	%
	52.3	$\pm 5\%$	54.3	61.9	$\pm 5\%$	Ambient Temperature	23.5	24.3	°C
Conductivity σ (mho/m)	150 MHz Brain		150 MHz Body		Fluid Temperature		20.5	20.5	°C
	IEEE Target	Measured	IEEE Target	Measured	Fluid Depth		≥ 15	≥ 15	cm
	0.76	$\pm 5\%$	0.73	0.80	$\pm 5\%$	ρ (Kg/m ³)	1000		

Note(s):

- 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.
- If the scaled SAR levels evaluated at the mid channel were ≥ 3 dB below the SAR limit, SAR evaluation for the low and high channels was optional (per FCC OET Bulletin 65, Supplement C, Edition 01-01 (see reference [3])).
- The negative power drift measured by the DASY4 system during the body-worn SAR evaluation was added to the measured SAR level to report a scaled SAR result as shown in the above test data table.
- The ambient and fluid temperatures were measured prior to, and during, the fluid dielectric parameter check and the SAR evaluation. The temperatures reported were consistent for all measurement periods.
- The dielectric parameters of the simulated tissue mixtures were measured prior to the evaluation using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters).
- The SAR evaluations were performed within 24 hours of the system performance check.

5.0 DETAILS OF SAR EVALUATION

The Maxon Telecom Co., Ltd. Model: SP200 V2 Portable FM VHF PTT Radio Transceiver FCC ID: RXUSP200V2 was compliant for localized Specific Absorption Rate (Occupational / Controlled Exposure) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix F.

1. The DUT was evaluated in a face-held configuration with the front of the radio placed parallel to the outer surface of the planar phantom. A 2.5 cm separation distance was maintained between the front side of the DUT and the outer surface of the planar phantom.
2. The DUT was evaluated in a body-worn configuration with the back of the radio placed parallel to the outer surface of the planar phantom. The attached belt-clip accessory was touching the planar phantom and provided a 2.5 cm separation distance between the back of the DUT and the outer surface of the planar phantom. The DUT was tested for body-worn SAR with the earbud/lapel-microphone accessory connected to the audio port.
3. The conducted power levels were measured before each test using a Gigatronics 8652A Universal Power Meter according to the procedures described in FCC 47 CFR §2.1046.
4. The area scan evaluation was performed with a fully charged battery. After the area scan was completed the radio was cooled down to room temperature and the battery was replaced with a fully charged battery prior to the zoom scan evaluation.
5. The DUT was tested in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the transmit key constantly depressed. For a push-to-talk device the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.
6. The SAR evaluations were performed using a Plexiglas planar phantom.
7. A stack of low-density, low-loss dielectric foamed polystyrene was used in place of the device holder.

6.0 EVALUATION PROCEDURES

- (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.
- 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:

- 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:

- 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 from 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 D). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.
- 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).
- A zoom scan volume of 32 mm x 32 mm x 30 mm (5 x 5 x 7 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 (7 x 7 x 7) to ensure complete capture of the peak spatial-average SAR.

7.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluation a system check was performed using a planar phantom with a 300MHz dipole (see Appendix C for system validation procedure). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using an HP 85070C Dielectric Probe Kit and an HP 8753E Network Analyzer (see Appendix E for printout of measured fluid dielectric parameters). A forward power of 250mW was applied to the dipole and the system was verified to a tolerance of $\pm 10\%$ (see Appendix B for system performance check test plot).

SYSTEM PERFORMANCE CHECK													
Test Date	300MHz Equiv. Tissue	SAR 1g (W/kg)		Dielectric Constant ϵ_r		Conductivity σ (mho/m)		ρ (Kg/m ³)	Amb. Temp. (°C)	Fluid Temp. (°C)	Fluid Depth (cm)	Humid. (%)	Barom. Press. (kPa)
		IEEE Target	Measured	IEEE Target	Measured	IEEE Target	Measured						
01/18/05	Brain	0.750 ($\pm 10\%$)	0.796 (+6.1%)	45.3 $\pm 5\%$	45.4	0.87 $\pm 5\%$	0.86	1000	23.2	20.5	≥ 15	32	102.5

Note(s):

1. 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.

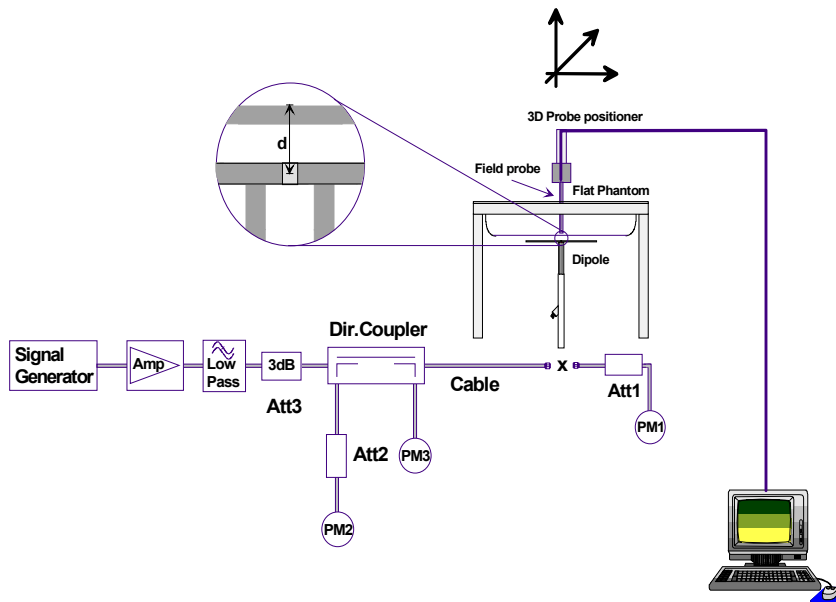


Figure 1. System Performance Check Setup Diagram



300MHz Dipole Setup

8.0 SIMULATED EQUIVALENT TISSUES

The brain and body simulated tissue mixtures consist of a viscous gel using hydroxethylcellulose (HEC) gelling agent and saline solution. Preservation with a bactericide is added and visual inspection is made to ensure air bubbles are not trapped during the mixing process. The fluid was prepared according to standardized procedures and measured for dielectric parameters (permittivity and conductivity).

SIMULATED TISSUE MIXTURES			
INGREDIENT	300 MHz Brain (%)	150 MHz Brain (%)	150 MHz Body (%)
	System Performance Check	DUT Evaluation	DUT Evaluation
Water	37.56	38.35	46.6
Sugar	55.32	55.5	49.7
Salt	5.95	5.15	2.6
HEC	0.98	0.9	1.0
Bactericide	0.19	0.1	0.1

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 1g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10g)	4.0	20.0

Notes:

1. Uncontrolled environments are defined as locations where there is potential exposure of individuals who have no knowledge or control of their potential exposure.
2. 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.: 1387
Construction: Triangular core fiber optic detection system
Frequency: 10 MHz to 6 GHz
Linearity: ± 0.2 dB (30 MHz to 3 GHz)

Phantom(s)

Evaluation Phantom

Type: Planar Phantom
Shell Material: Plexiglas
Bottom Thickness: 2.0 mm $\pm$ 0.1 mm
Outer Dimensions: 75.0 cm (L) x 22.5 cm (W) x 20.5 cm (H); Back Plane: 25.7 cm (H)

Validation Phantom (≤ 450 MHz)

Type: Planar Phantom
Shell Material: Plexiglas
Bottom Thickness: 6.2 mm $\pm$ 0.1 mm
Outer Dimensions: 86.0 cm (L) x 39.5 cm (W) x 21.8 cm (H)

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 $\pm 8\%$)
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 μ W/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 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 and body-worn radio transceivers. The planar phantom is mounted on the side of the DASY4 compact system table.



Planar Phantom

13.0 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 in the table of the DASY4 compact system.



Validation Planar Phantom

14.0 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

Applicant:	Maxon Telecom Co., Ltd.	FCC ID:	RXUSP200V2	IC ID:	153-SP200V2
Model:	SP200 V2	Portable FM VHF PTT Radio Transceiver		146 - 174 MHz	maxon
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15.0 TEST EQUIPMENT LIST

TEST EQUIPMENT	SERIAL NO.	DATE CALIBRATED	CALIBRATION DUE DATE
Schmid & Partner DASY4 System	-	-	-
-DASY4 Measurement Server	1078	N/A	N/A
-Robot	599396-01	N/A	N/A
-DAE3	353	July 2004	July 2005
-DAE3	370	May 2004	May 2005
-ET3DV6 E-Field Probe	1387	March 2004	March 2005
-ET3DV6 E-Field Probe	1590	May 2004	May 2005
-300MHz Validation Dipole	135	October 2004	October 2005
-450MHz Validation Dipole	136	November 2004	November 2005
-835MHz Validation Dipole	411	March 2004	March 2005
-900MHz Validation Dipole	054	June 2004	June 2005
-1800MHz Validation Dipole	247	June 2004	June 2005
-1900MHz Validation Dipole	151	June 2004	June 2005
-2450MHz Validation Dipole	150	September 2004	September 2005
-SAM Phantom V4.0C	1033	N/A	N/A
-Barski Planar Phantom	03-01	N/A	N/A
-Plexiglas Planar Phantom	161	N/A	N/A
-Validation Planar Phantom	137	N/A	N/A
HP 85070C Dielectric Probe Kit	N/A	N/A	N/A
Gigatronics 8651A Power Meter	8650137	April 2004	April 2005
Gigatronics 8652A Power Meter	1835267	April 2004	April 2005
Gigatronics 80701A Power Sensor	1833535	April 2004	April 2005
Gigatronics 80701A Power Sensor	1833542	April 2004	April 2005
Gigatronics 80701A Power Sensor	1834350	April 2004	April 2005
HP 8594E Spectrum Analyzer	3543A02721	April 2004	April 2005
HP 8753E Network Analyzer	US38433013	April 2004	April 2005
HP 8648D Signal Generator	3847A00611	April 2004	April 2005
Amplifier Research 5S1G4 Power Amplifier	26235	N/A	N/A

16.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	C_i 1g	Standard Uncertainty ±% (1g)	v_i or v_{eff}
Measurement System						
Probe calibration	± 4.0	Normal	1	1	± 4.0	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	(1- C_p)	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	(C_p)	± 3.9	∞
Spatial resolution	± 0.0	Rectangular	√3	1	± 0.0	∞
Boundary effects	± 5.5	Rectangular	√3	1	± 3.2	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 1.0	Normal	1	1	± 1.0	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 1.4	Rectangular	√3	1	± 0.8	∞
RF ambient conditions	± 3.0	Rectangular	√3	1	± 1.7	∞
Mech. constraints of robot	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Extrapolation & integration	± 3.9	Rectangular	√3	1	± 2.3	∞
Test Sample Related						
Device positioning	± 6.0	Normal	√3	1	± 6.7	12
Device holder uncertainty	± 5.0	Normal	√3	1	± 5.9	8
Power drift	± 5.0	Rectangular	√3		± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid conductivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Combined Standard Uncertainty						
					± 13.03	
Expanded Uncertainty (k=2)						
					± 26.07	

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

MEASUREMENT UNCERTAINTIES (Cont.)

UNCERTAINTY BUDGET FOR SYSTEM VALIDATION						
Error Description	Uncertainty Value ±%	Probability Distribution	Divisor	C_i 1g	Standard Uncertainty ±% (1g)	v_i or v_{eff}
Measurement System						
Probe calibration	± 4.0	Normal	1	1	± 4.0	∞
Axial isotropy of the probe	± 4.7	Rectangular	√3	(1- C_p)	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	√3	(C_p)	± 3.9	∞
Spatial resolution	± 0.0	Rectangular	√3	1	± 0.0	∞
Boundary effects	± 5.5	Rectangular	√3	1	± 3.2	∞
Probe linearity	± 4.7	Rectangular	√3	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	√3	1	± 0.6	∞
Readout electronics	± 1.0	Normal	1	1	± 1.0	∞
Response time	± 0.8	Rectangular	√3	1	± 0.5	∞
Integration time	± 1.4	Rectangular	√3	1	± 0.8	∞
RF ambient conditions	± 3.0	Rectangular	√3	1	± 1.7	∞
Mech. constraints of robot	± 0.4	Rectangular	√3	1	± 0.2	∞
Probe positioning	± 2.9	Rectangular	√3	1	± 1.7	∞
Extrapolation & integration	± 3.9	Rectangular	√3	1	± 2.3	∞
Dipole						
Dipole Axis to Liquid Distance	± 2.0	Rectangular	√3	1	± 1.2	∞
Input Power	± 4.7	Rectangular	√3	1	± 2.7	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	√3	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid conductivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (target)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Liquid permittivity (measured)	± 5.0	Rectangular	√3	0.6	± 1.7	∞
Combined Standard Uncertainty						
					± 9.58	
Expanded Uncertainty (k=2)						
					± 19.16	

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

17.0 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.
- [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, "Evaluation Procedure for Mobile and Portable Radio Transmitters with respect to Health Canada's Safety Code 6 for Exposure of Humans to Radio Frequency Fields", Radio Standards Specification RSS-102 Issue 1 (Provisional): September 1999.
- [5] IEEE Std 1528-2003, "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques": June 2003.

APPENDIX A - SAR MEASUREMENT DATA

Date Tested: 01/18/05

Face-Held SAR

DUT: Maxon Model: SP200 V2; Type: Portable FM VHF PTT Radio Transceiver; Serial: 0000000003

Ambient Temp: 23.5 °C; Fluid Temp: 20.5 °C; Barometric Pressure: 102.5 kPa; Humidity: 30%

Communication System: FM VHF

Frequency: 160.075 MHz; Duty Cycle: 1:1

RF Output Power: 38.05 dBm (Conducted)

7.5V 1350mAh NiMH Battery Pack (P/N: BTM100-01)

Medium: HSL150 ($\sigma = 0.73$ mho/m; $\epsilon_r = 54.3$; $\rho = 1000$ kg/m³)

- Probe: ET3DV6 - SN1387; ConvF(9.1, 9.1, 9.1); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Face-Held - 2.5 cm Separation Distance - Mid Channel/Area Scan (8x19x1):

Measurement grid: dx=15mm, dy=15mm

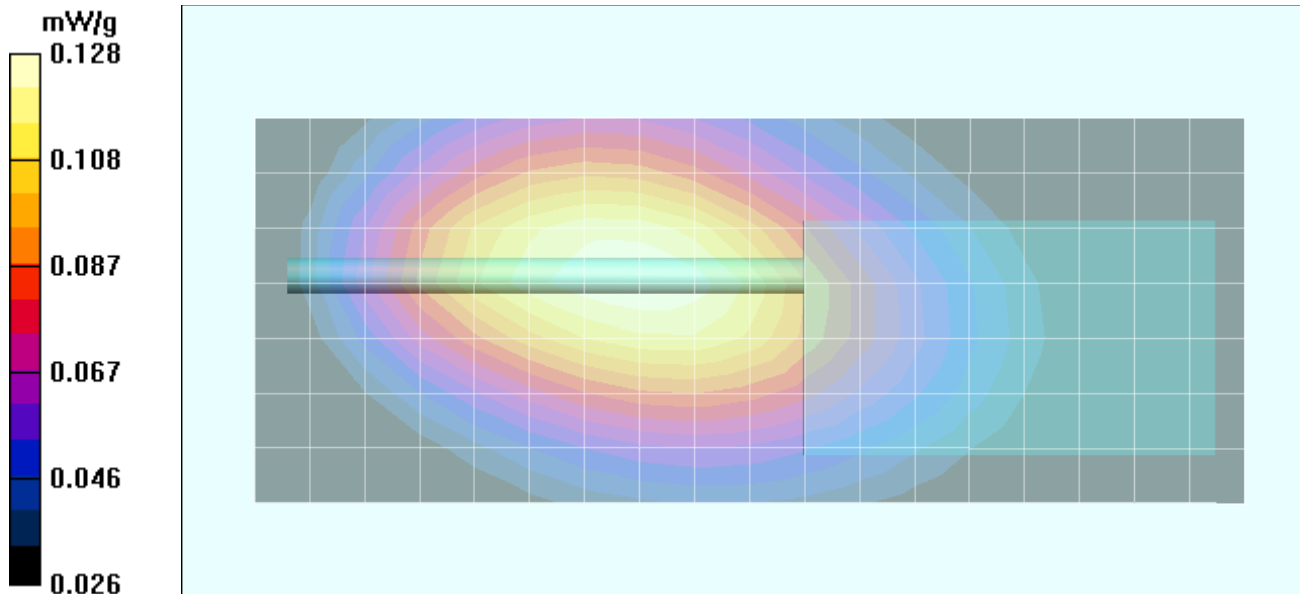
Face-Held - 2.5 cm Separation Distance - Mid Channel/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

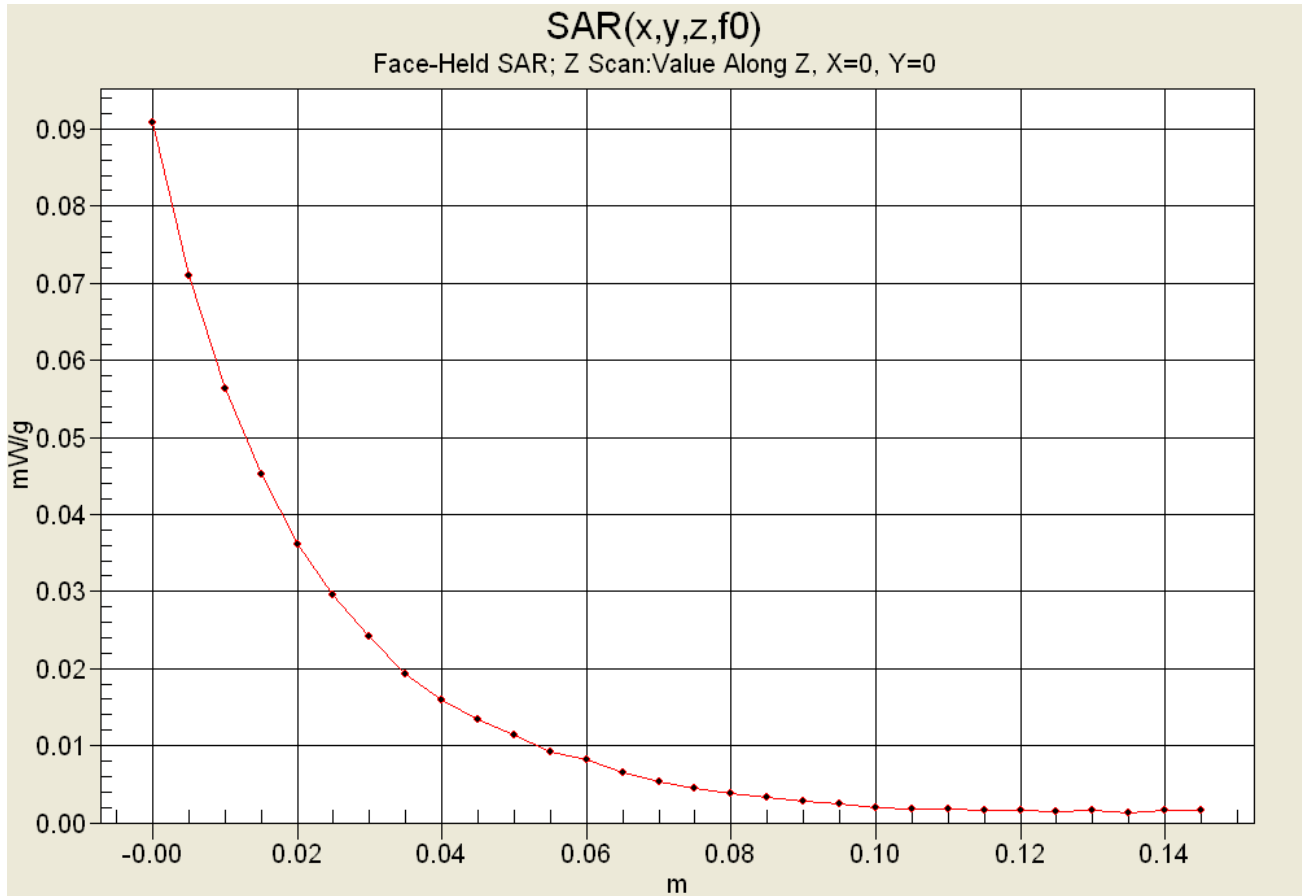
Reference Value = 11.1 V/m; Power Drift = 0.0774 dB

Peak SAR (extrapolated) = 0.191 W/kg

SAR(1 g) = 0.124 mW/g; SAR(10 g) = 0.091 mW/g



Z-Axis Scan



Date Tested: 01/18/05

Body-Worn SAR

DUT: Maxon Model: SP200 V2; Type: Portable FM VHF PTT Radio Transceiver; Serial: 0000000003

Ambient Temp: 24.3 °C; Fluid Temp: 20.5 °C; Barometric Pressure: 102.2 kPa; Humidity: 31%

Communication System: FM VHF

Frequency: 160.075 MHz; Duty Cycle: 1:1

RF Output Power: 38.02 dBm (Conducted)

7.5V 1350mAh NiMH Battery Pack (P/N: BTM100-01)

Medium: M150 ($\sigma = 0.79$ mho/m; $\epsilon_r = 62.3$; $\rho = 1000$ kg/m³)

- Probe: ET3DV6 - SN1387; ConvF(8.7, 8.7, 8.7); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

Body-Worn - 2.5 cm Belt-Clip Separation Distance - Mid Channel/Area Scan (8x19x1):

Measurement grid: dx=15mm, dy=15mm

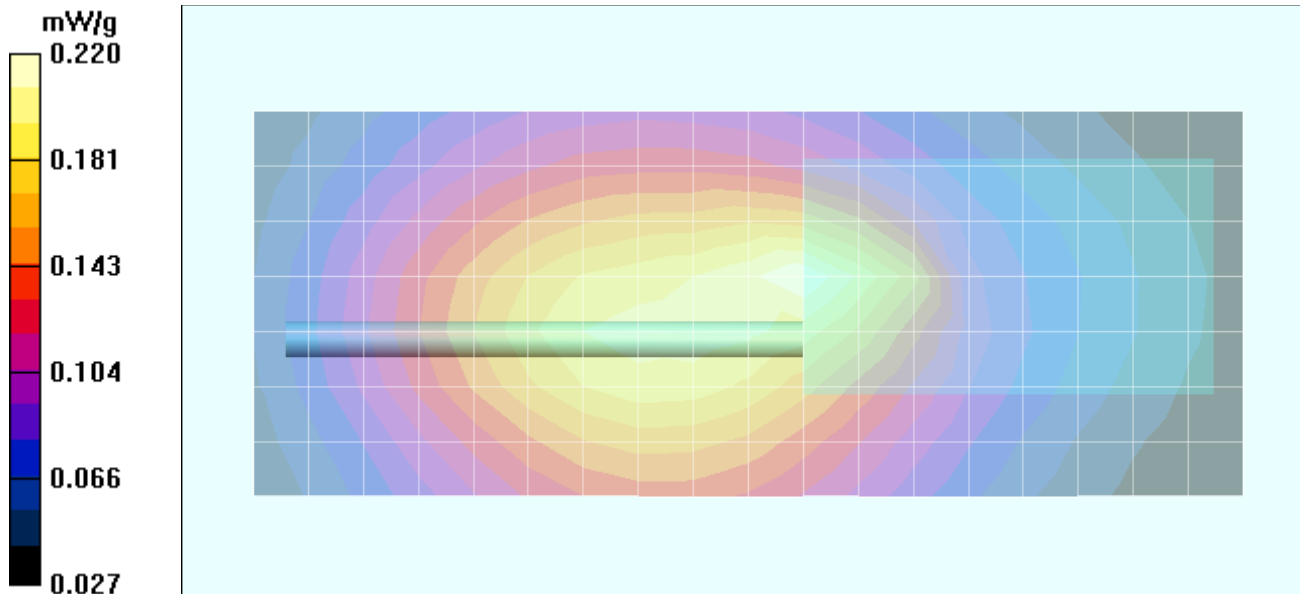
Body-Worn - 2.5 cm Belt-Clip Separation Distance - Mid Channel/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

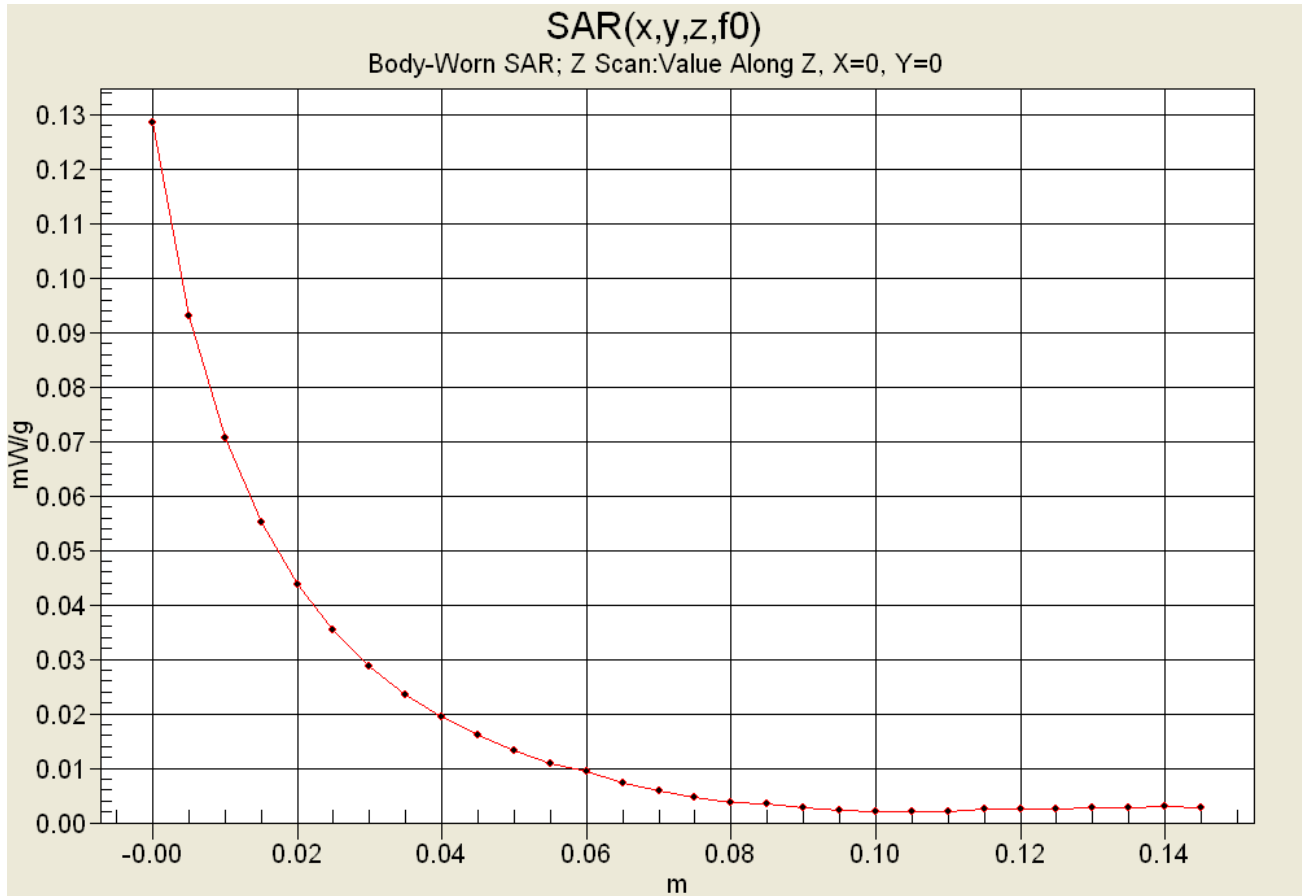
Reference Value = 16.7 V/m; Power Drift = -0.121 dB

Peak SAR (extrapolated) = 0.457 W/kg

SAR(1 g) = 0.212 mW/g; SAR(10 g) = 0.133 mW/g



Z-Axis Scan



APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Date Tested: 01/18/05

System Performance Check - 300 MHz Dipole

DUT: Dipole 300 MHz; Model: D300V2; Type: System Performance Check; Serial: 135; Calibrated: 10/26/2004

Ambient Temp: 23.2 °C; Fluid Temp: 20.5 °C; Barometric Pressure: 102.5 kPa; Humidity: 32%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 300 MHz; Duty Cycle: 1:1

Medium: 300 HSL ($\sigma = 0.86$ mho/m; $\epsilon_r = 45.4$; $\rho = 1000$ kg/m³)

- Probe: ET3DV6 - SN1387; ConvF(7.8, 7.8, 7.8); Calibrated: 18/03/2004
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn353; Calibrated: 06/07/2004
- Phantom: Validation Planar; Type: Plexiglas; Serial: 137
- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

300 MHz Dipole - System Performance Check/Area Scan (6x11x1):

Measurement grid: dx=15mm, dy=15mm

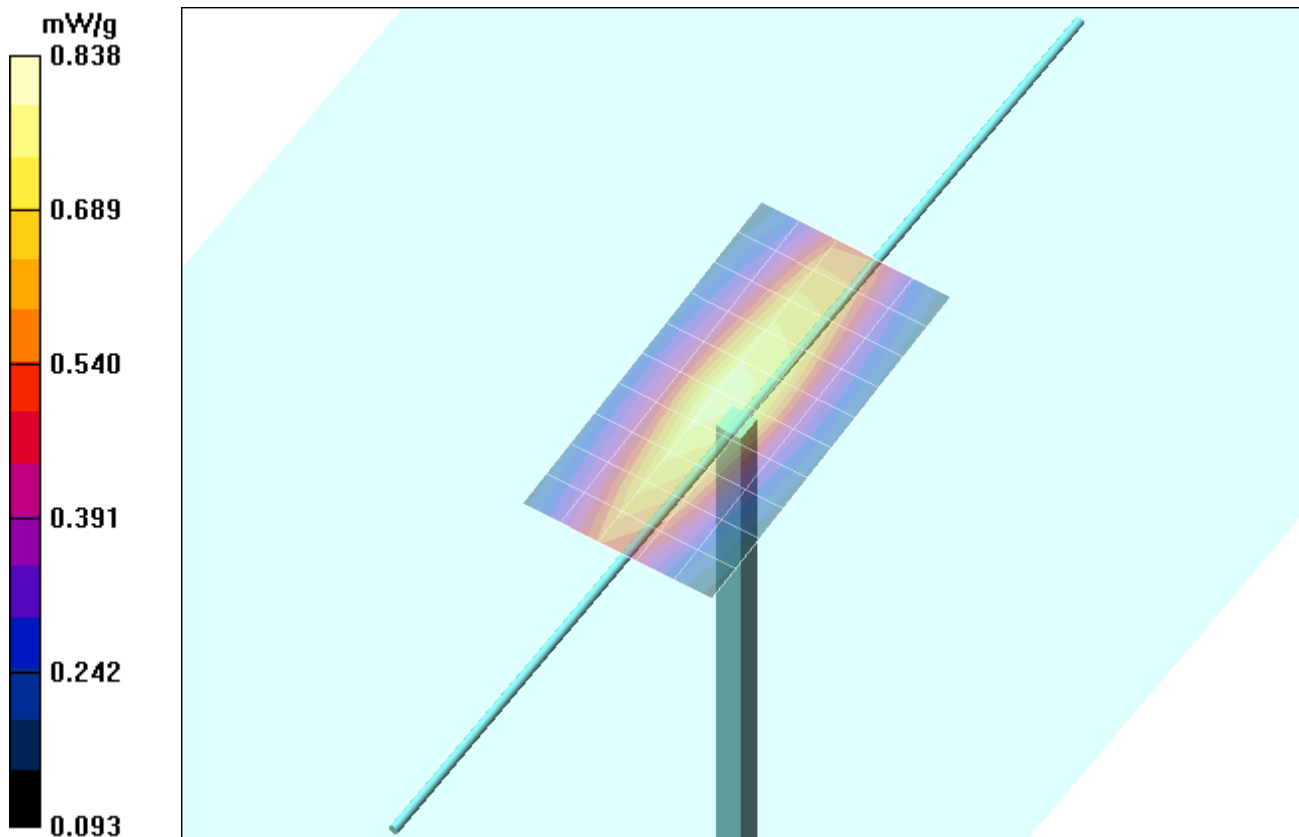
300 MHz Dipole - System Performance Check/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 31.3 V/m; Power Drift = -0.0 dB

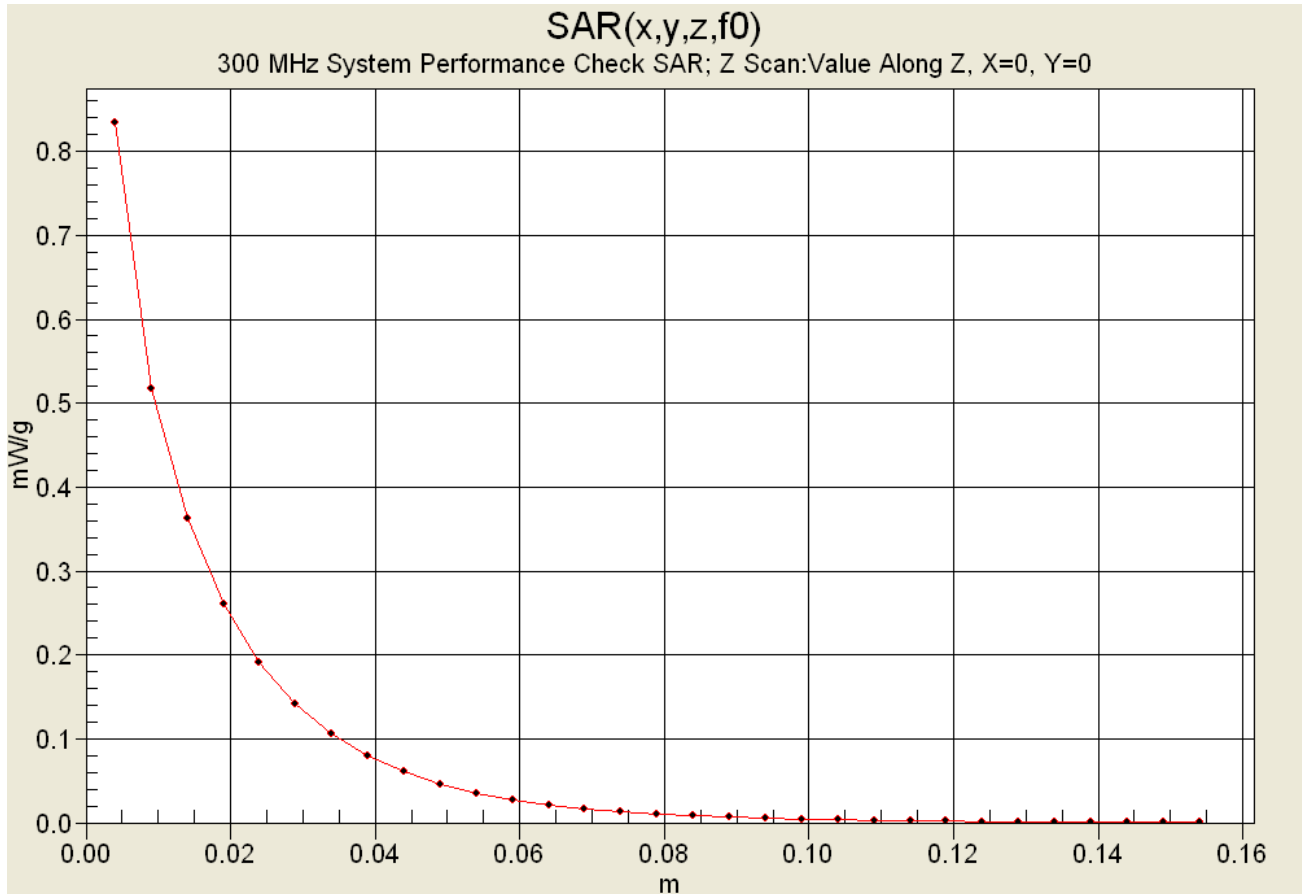
Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.796 mW/g; SAR(10 g) = 0.517 mW/g



Applicant:	Maxon Telecom Co., Ltd.	FCC ID:	RXUSP200V2	IC ID:	153-SP200V2
Model:	SP200 V2	Portable FM VHF PTT Radio Transceiver		146 - 174 MHz	
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Z-Axis Scan



APPENDIX C - SYSTEM VALIDATION

300 MHz SYSTEM VALIDATION DIPOLE

Type:

300 MHz Validation Dipole

Serial Number:

135

Place of Calibration:

Celltech Labs Inc.

Date of Calibration:

October 26, 2004

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

Calibrated by:

Spencer Watson

Approved by:

Russell W. Pipe

1. Validation Dipole Construction & Electrical Characteristics

The validation dipole was constructed in accordance with the IEEE Std. "Recommended Practice for Determining the Spatial-Peak Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques". The electrical properties were measured using an HP 8753E 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 15.0mm from the simulating fluid using a loss-less dielectric spacer. The measured input impedance is:

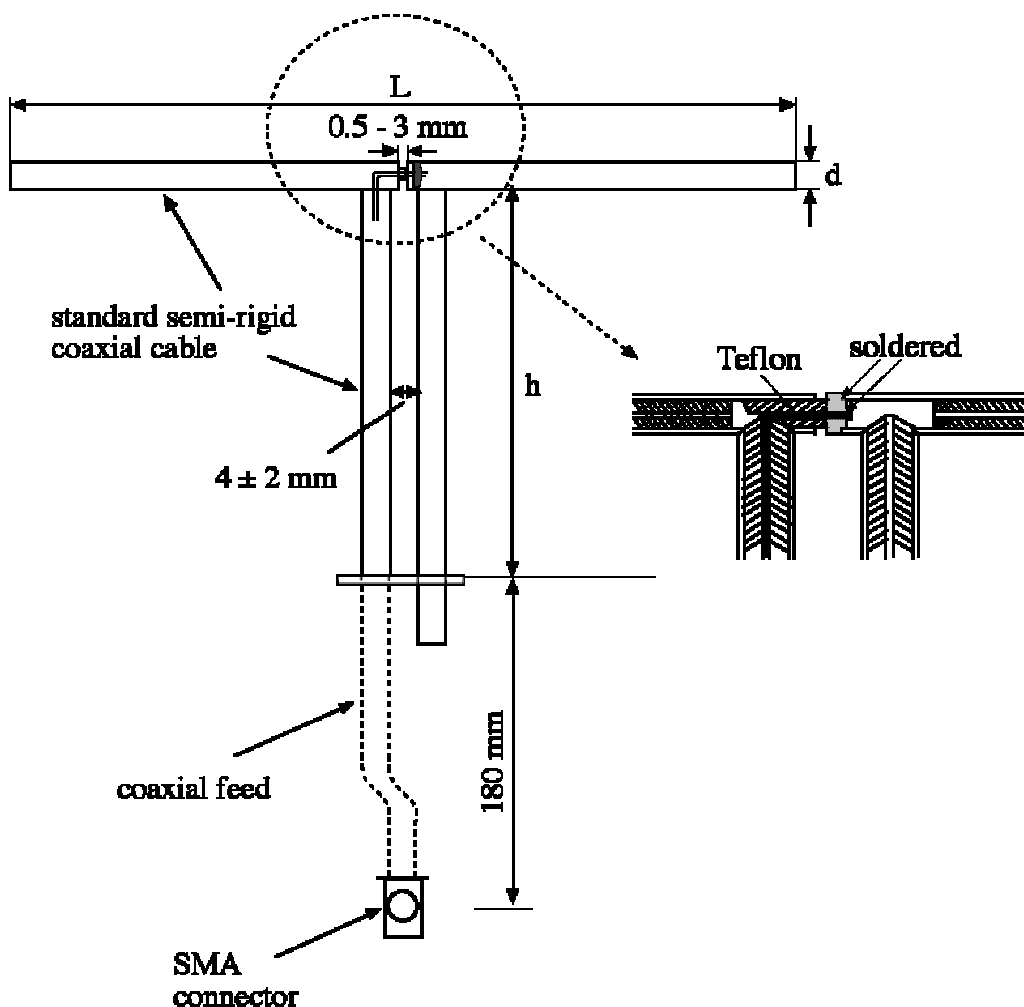
Feed point impedance at 300MHz

$$\text{Re}\{Z\} = 45.156\Omega$$

$$\text{Im}\{Z\} = -2.1934\Omega$$

Return Loss at 300MHz

$$-25.060\text{dB}$$



CH1 MEM 1 U FS

1:45.156 μ -2.1934 μ 241.87 pF

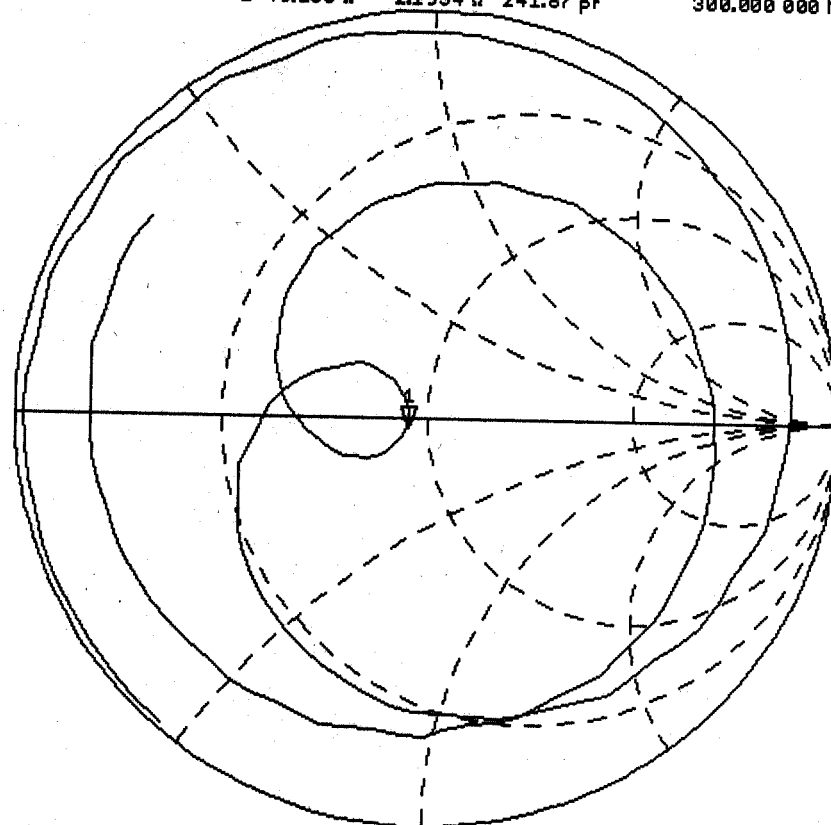
26 Oct 2004 10:03:55

300.000 000 MHz

PRM

Cor

↑



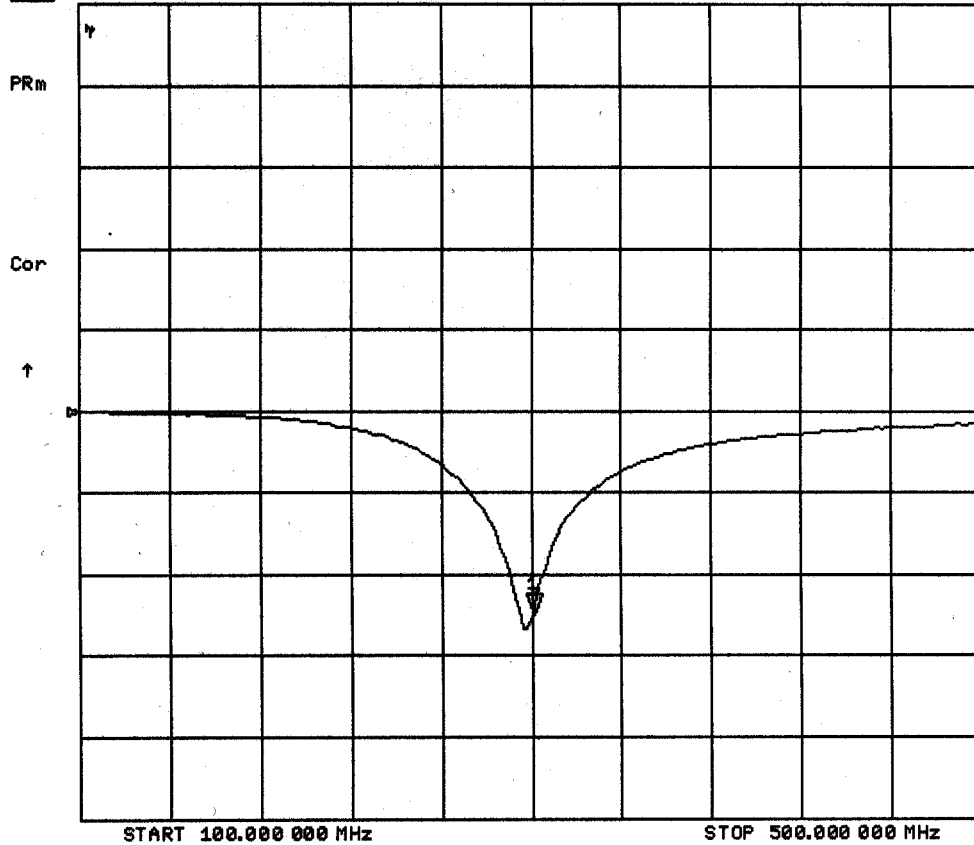
START 100.000 000 MHz

STOP 500.000 000 MHz

26 Oct 2004 10:02:53

CH1 MEM LOG 10 dB/REF 0 dB

11-25.060 dB 300.000 000 MHz



2. 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

3. Validation Phantom

The validation phantom was constructed using relatively low-loss tangent Plexiglas material. The inner dimensions of the phantom are as follows:

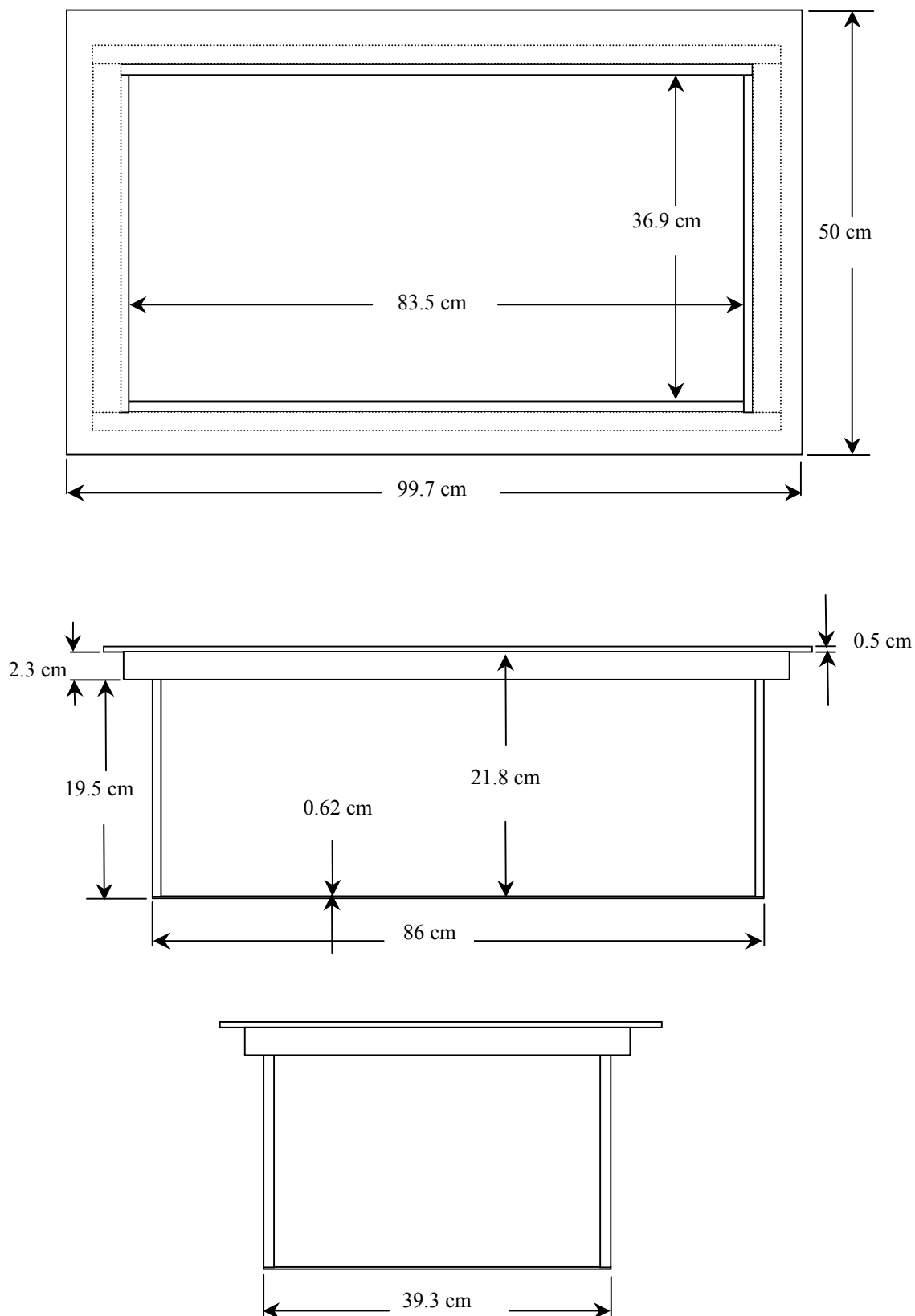
Length: 83.5 cm

Width: 36.9 cm

Height: 21.8 cm

The bottom section of the validation phantom is constructed of 6.2 ± 0.1 mm Plexiglas.

4. Dimensions of Plexiglas Planar Phantom



5. 300 MHz System Validation Setup



300 MHz Validation Dipole Setup



6. Measurement Conditions

The planar phantom was filled with simulated brain tissue having the following parameters at 300 MHz:

Relative Permittivity:	45.9
Conductivity:	0.87 mho/m
Fluid Temperature:	22.8 °C
Fluid Depth:	≥ 15 cm

Environmental Conditions:

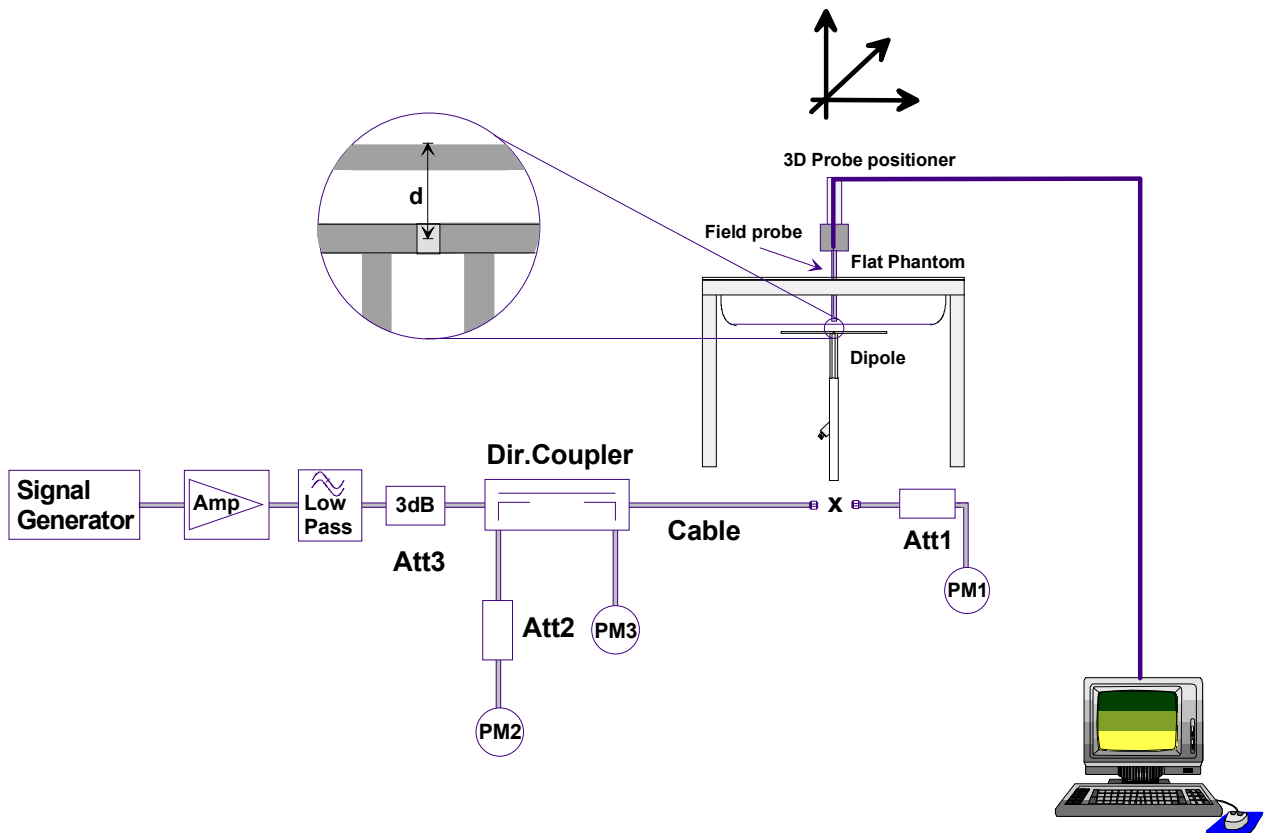
Ambient Temperature:	23.7 °C
Humidity:	33 %
Barometric Pressure:	101.9 kPa

The 300 MHz simulated brain tissue mixture consists of the following ingredients:

Ingredient	Percentage by weight
Water	37.56%
Sugar	55.32%
Salt	5.95%
HEC	0.98%
Dowicil 75	0.19%
300 MHz Target Dielectric Parameters at 22°C	$\epsilon_r = 45.3$ $\sigma = 0.87 \text{ S/m}$

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 20dB 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	0.740	2.96	0.478	1.91	0.779
Test 2	0.736	2.94	0.475	1.90	0.773
Test 3	0.747	2.99	0.482	1.93	0.790
Test 4	0.735	2.94	0.476	1.90	0.776
Test 5	0.743	2.97	0.480	1.92	0.781
Test 6	0.741	2.96	0.479	1.92	0.782
Test 7	0.742	2.97	0.480	1.92	0.780
Test 8	0.740	2.96	0.478	1.91	0.777
Test 9	0.748	2.99	0.484	1.94	0.787
Test 10	0.744	2.98	0.481	1.92	0.781
Average Value	0.742	2.97	0.479	1.92	0.781

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

IEEE Target over 1cm^3 (1g) of tissue: 3.0 mW/g (+/- 10%)

Averaged over 1cm^3 (1g) of tissue: 2.97 mW/g (-3% deviation)

IEEE Target over 10cm^3 (10g) of tissue: 2.0 mW/g (+/- 10%)

Averaged over 10cm^3 (10g) of tissue: 1.92 mW/g (-4% deviation)

300 MHz System Validation - October 26, 2004

DUT: Dipole 300 MHz; Model: D300V2; Serial: 135; Calibrated: 10/26/04

Ambient Temp: 23.7 °C; Fluid Temp: 22.8 °C; Barometric Pressure: 101.9 kPa; Humidity: 33%

Communication System: CW

Frequency: 300 MHz; Duty Cycle: 1:1

Medium: 300 HSL ($\sigma = 0.87$ mho/m; $\epsilon_r = 45.9$; $\rho = 1000$ kg/m³)

- Probe: ET3DV6 - SN1387; ConvF(7.8, 7.8, 7.8); Calibrated: 18/03/2004

- Sensor-Surface: 4mm (Mechanical Surface Detection)

- Electronics: DAE3 Sn370; Calibrated: 14/05/2004

- Phantom: Validation Planar; Type: Plexiglas; Serial: 137

- Measurement SW: DASY4, V4.3 Build 22; Postprocessing SW: SEMCAD, V1.8 Build 127

300 MHz System Validation/Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm

300 MHz System Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.740 mW/g; SAR(10 g) = 0.478 mW/g

300 MHz System Validation/Zoom Scan 2 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.8 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.736 mW/g; SAR(10 g) = 0.475 mW/g

300 MHz System Validation/Zoom Scan 3 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 1.34 W/kg

SAR(1 g) = 0.747 mW/g; SAR(10 g) = 0.482 mW/g

300 MHz System Validation/Zoom Scan 4 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.8 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 1.31 W/kg

SAR(1 g) = 0.735 mW/g; SAR(10 g) = 0.476 mW/g

300 MHz System Validation/Zoom Scan 5 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.743 mW/g; SAR(10 g) = 0.480 mW/g

300 MHz System Validation/Zoom Scan 6 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = -0.0 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.741 mW/g; SAR(10 g) = 0.479 mW/g

300 MHz System Validation/Zoom Scan 7 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.742 mW/g; SAR(10 g) = 0.480 mW/g

300 MHz System Validation/Zoom Scan 8 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 29.9 V/m; Power Drift = 4e-005 dB

Peak SAR (extrapolated) = 1.32 W/kg

SAR(1 g) = 0.740 mW/g; SAR(10 g) = 0.478 mW/g

300 MHz System Validation/Zoom Scan 9 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 30 V/m; Power Drift = 0.0 dB

Peak SAR (extrapolated) = 1.34 W/kg

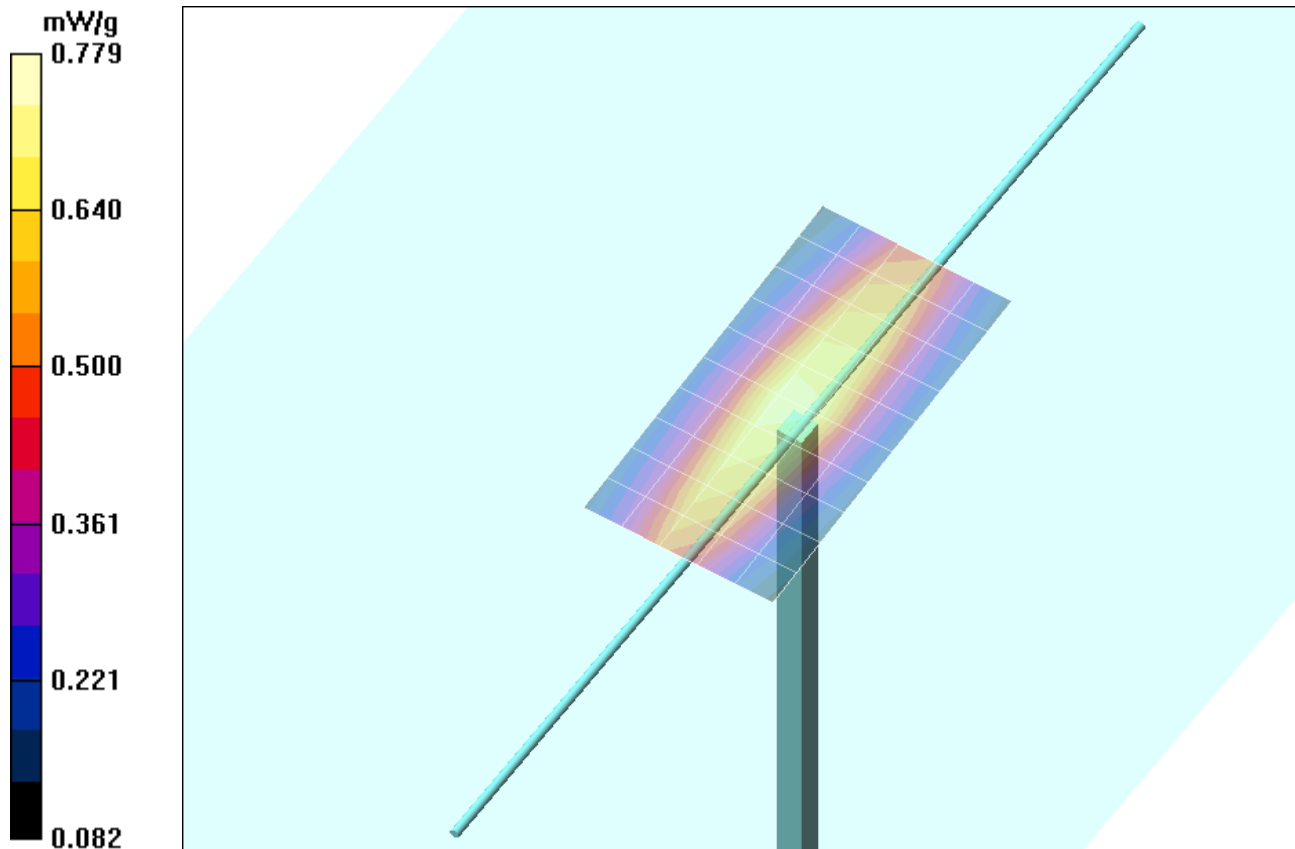
SAR(1 g) = 0.748 mW/g; SAR(10 g) = 0.484 mW/g

300 MHz Validation/Zoom Scan 10 (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

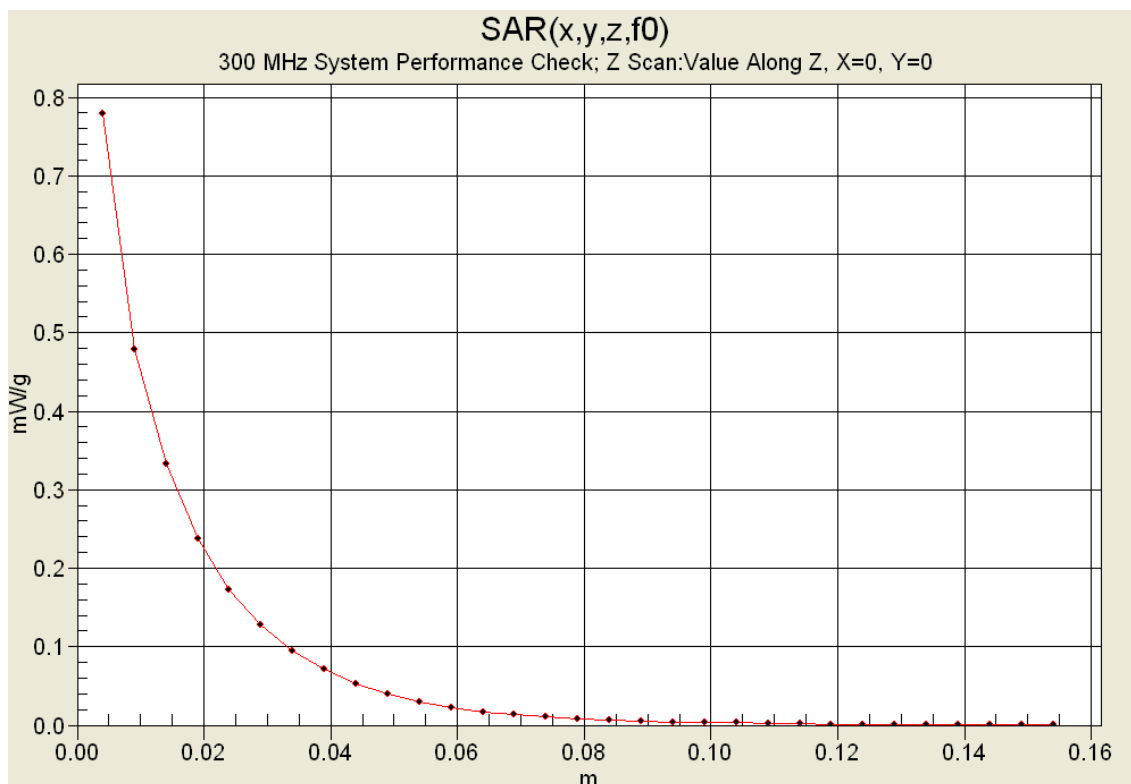
Reference Value = 29.9 V/m; Power Drift = 0.005 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.744 mW/g; SAR(10 g) = 0.481 mW/g



1 g average of 10 measurements: 0.742 mW/g
10 g average of 10 measurements: 0.479 mW/g



300 MHz System Validation

Measured Fluid Dielectric Parameters (Brain)

October 26, 2004

Frequency	e'	e''
200.000000 MHz	49.9683	70.5699
210.000000 MHz	49.2757	67.8974
220.000000 MHz	49.0561	65.5986
230.000000 MHz	48.5199	63.5063
240.000000 MHz	47.9983	61.3980
250.000000 MHz	47.6116	59.5294
260.000000 MHz	47.1692	57.8735
270.000000 MHz	46.7769	56.3204
280.000000 MHz	46.4409	54.8280
290.000000 MHz	46.0613	53.4572
300.000000 MHz	45.8972	52.0989
310.000000 MHz	45.6039	51.0027
320.000000 MHz	45.2697	49.7697
330.000000 MHz	44.7890	48.6923
340.000000 MHz	44.3811	47.7213
350.000000 MHz	44.0222	46.8979
360.000000 MHz	43.6368	46.0075
370.000000 MHz	43.3432	45.1665
380.000000 MHz	43.1554	44.4459
390.000000 MHz	42.9327	43.7340
400.000000 MHz	42.6580	43.0434

APPENDIX D - PROBE CALIBRATION

Client **Celltech**

CALIBRATION CERTIFICATE

Object(s) **ET3DV6 - SN:1387**

Calibration procedure(s) **QA CAL-01.v2**
Calibration procedure for dosimetric E-field probes

Calibration date: **March 18, 2004**

Condition of the calibrated item **In Tolerance (according to the specific calibration document)**

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 +/- 2 degrees Celsius and humidity < 75%.

Calibration Equipment used (M&TE critical for calibration)

Model Type	ID #	Cal Date (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM E4419B	GB41293874	2-Apr-03 (METAS, No 252-0250)	Apr-04
Power sensor E4412A	MY41495277	2-Apr-03 (METAS, No 252-0250)	Apr-04
Reference 20 dB Attenuator	SN: 5086 (20b)	3-Apr-03 (METAS, No. 251-0340)	Apr-04
Fluke Process Calibrator Type 702	SN: 6295803	8-Sep-03 (Sintrel SCS No. E-030020)	Sep-04
Power sensor HP 8481A	MY41092180	18-Sep-02 (SPEAG, in house check Oct-03)	In house check: Oct 05
RF generator HP 8684C	US3642U01700	4-Aug-99 (SPEAG, in house check Aug-02)	In house check: Aug-05
Network Analyzer HP 8753E	US37390585	18-Oct-01 (SPEAG, in house check Oct-03)	In house check: Oct 05

	Name	Function	Signature
Calibrated by:	Nico Vetterli	Technician	
Approved by:	Katja Pokovic	Laboratory Director	

Date issued: March 18, 2004

This calibration certificate is issued as an intermediate solution until the accreditation process (based on ISO/IEC 17025 International Standard) for Calibration Laboratory of Schmid & Partner Engineering AG is completed.

Probe ET3DV6

SN:1387

Manufactured:	September 21, 1999
Last calibrated:	February 26, 2003
Recalibrated:	March 18, 2004

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: ET3DV6 SN:1387

Sensitivity in Free Space

Diode Compression^A

NormX	$1.62 \mu\text{V}/(\text{V}/\text{m})^2$	DCP X	92	mV
NormY	$1.71 \mu\text{V}/(\text{V}/\text{m})^2$	DCP Y	92	mV
NormZ	$1.71 \mu\text{V}/(\text{V}/\text{m})^2$	DCP Z	92	mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 7.

Boundary Effect

Head 900 MHz Typical SAR gradient: 5 % per mm

Sensor Cener to Phantom Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	9.3	4.4
SAR _{be} [%]	With Correction Algorithm	0.0	0.1

Head 1800 MHz Typical SAR gradient: 10 % per mm

Sensor to Surface Distance		3.7 mm	4.7 mm
SAR _{be} [%]	Without Correction Algorithm	14.8	10.0
SAR _{be} [%]	With Correction Algorithm	0.2	0.0

Sensor Offset

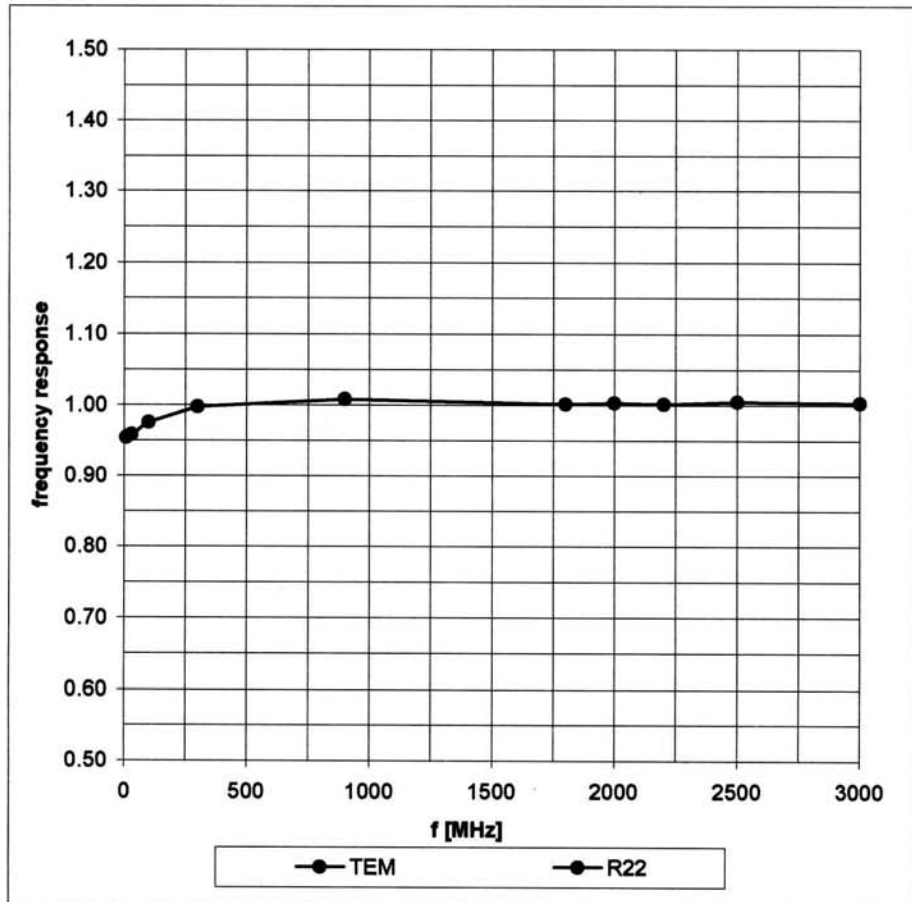
Probe Tip to Sensor Center	2.7 mm
Optical Surface Detection	in tolerance

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%.

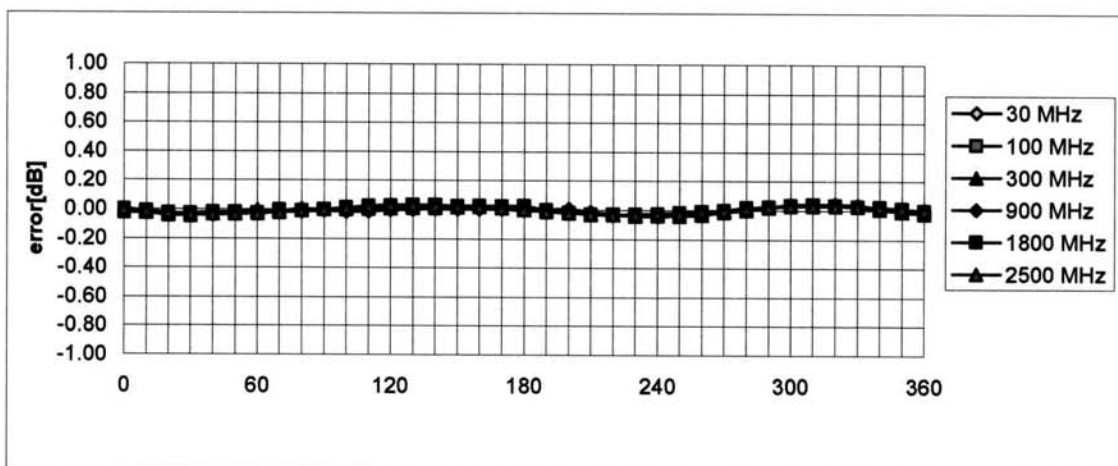
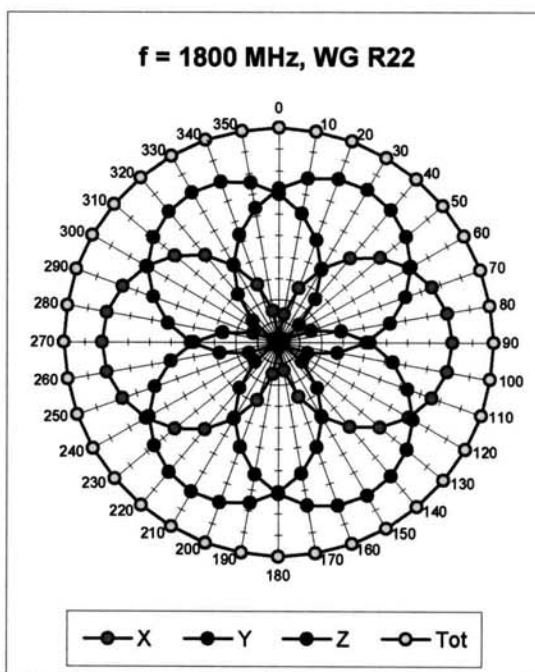
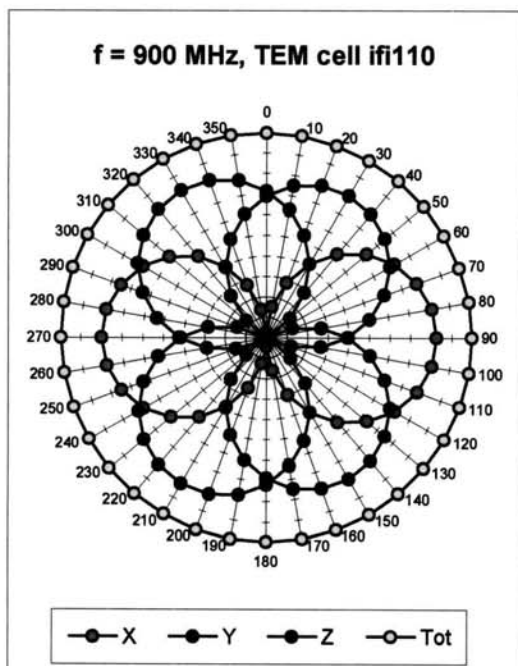
^A numerical linearization parameter: uncertainty not required

Frequency Response of E-Field

(TEM-Cell:ifi110, Waveguide R22)

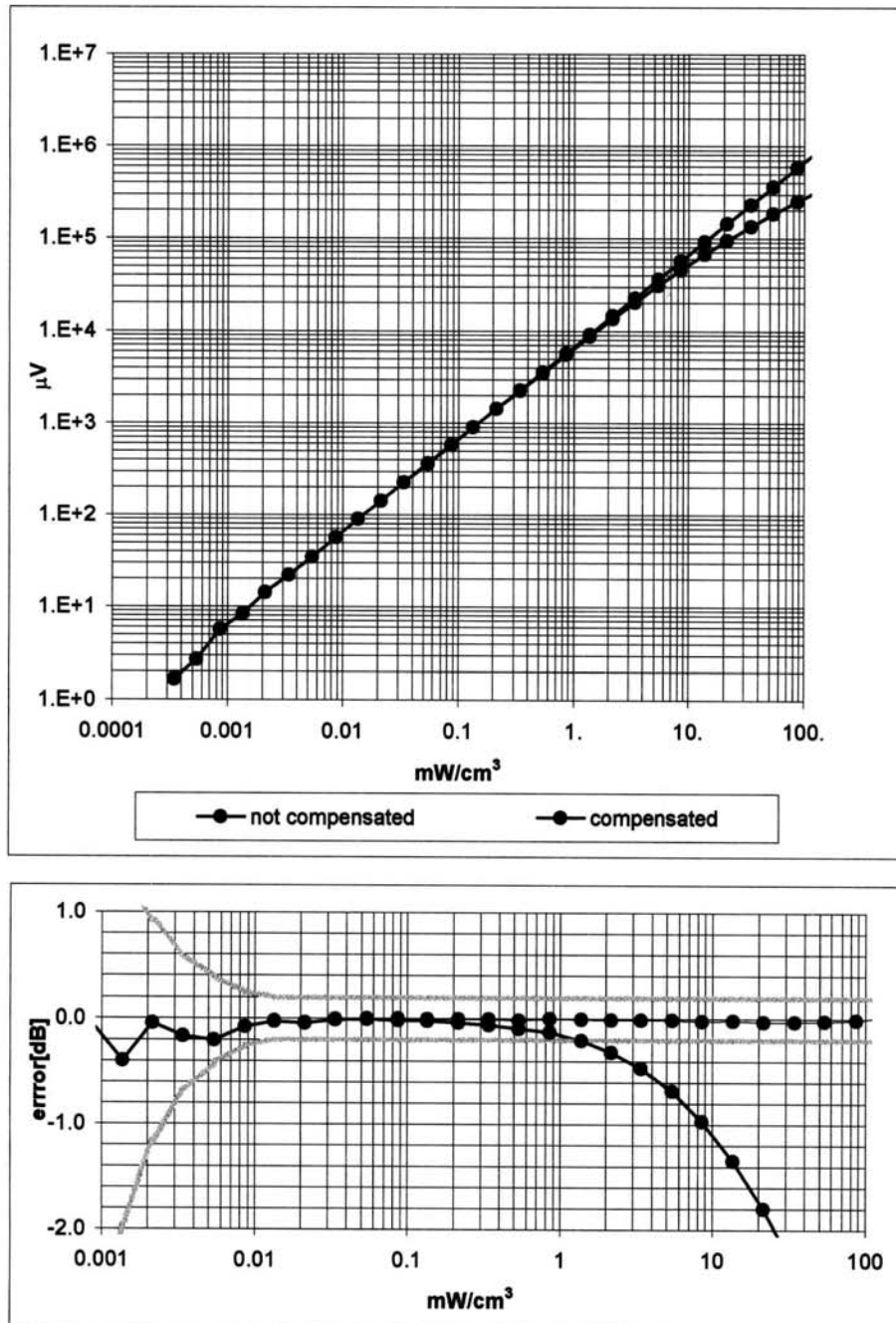


Receiving Pattern (ϕ) , $\theta = 0^\circ$



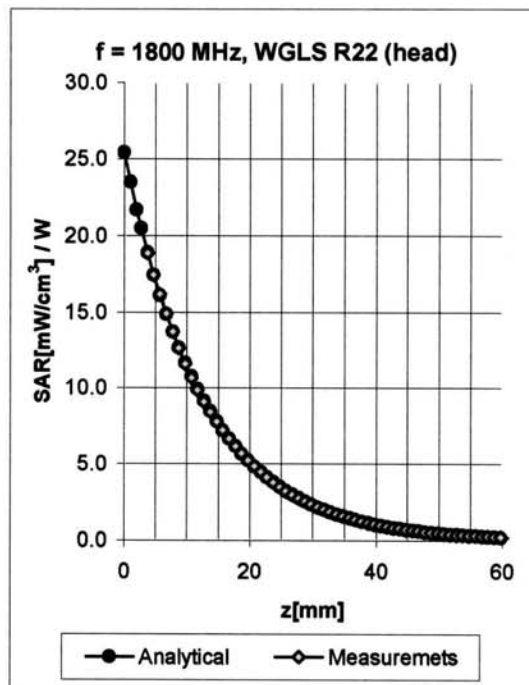
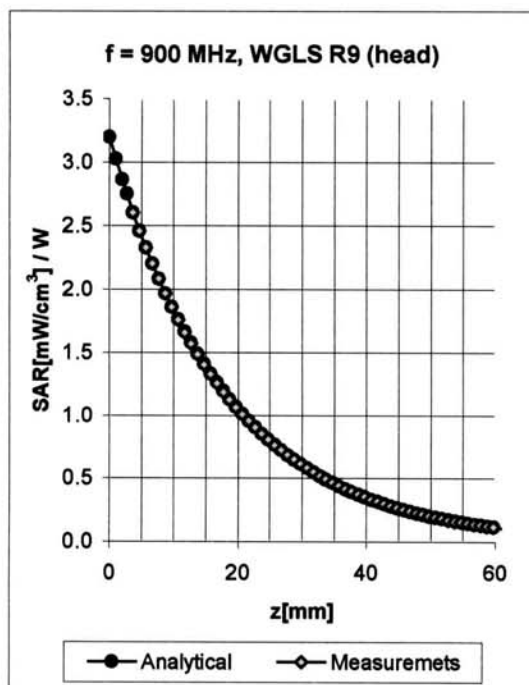
Axial Isotropy Error < ± 0.2 dB

Dynamic Range f(SAR_{head}) (Waveguide R22)



Probe Linearity $< \pm 0.2$ dB

Conversion Factor Assessment

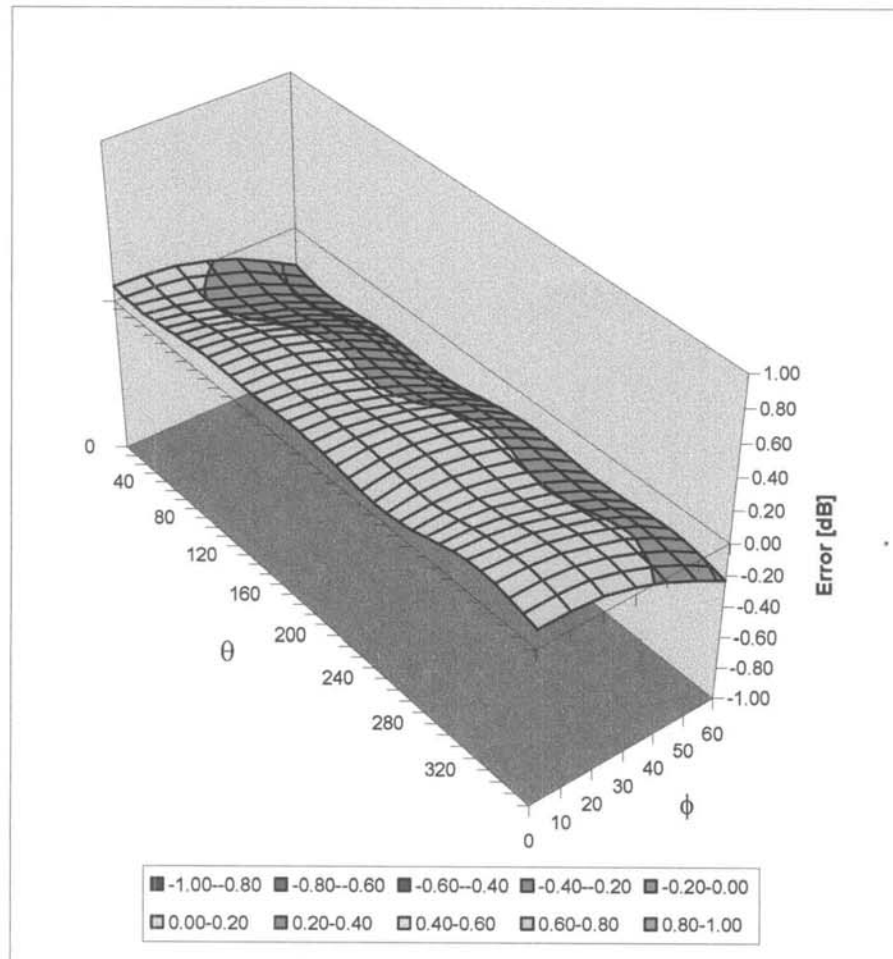


f [MHz]	Validity [MHz] ^B	Tissue	Permittivity	Conductivity	Alpha	Depth	ConvF	Uncertainty
835	750-950	Head	41.5 ± 5%	0.90 ± 5%	0.72	1.78	6.71	± 11.9% (k=2)
1750	1700-1800	Head	40.0 ± 5%	1.40 ± 5%	0.51	2.67	5.38	± 9.7% (k=2)
1900	1850-1950	Head	40.0 ± 5%	1.40 ± 5%	0.55	2.66	5.25	± 9.7% (k=2)
2450	2400-2500	Head	39.2 ± 5%	1.80 ± 5%	0.99	1.89	4.77	± 9.7% (k=2)
835	750-950	Body	55.2 ± 5%	0.97 ± 5%	0.56	2.04	6.24	± 11.9% (k=2)
1750	1700-1800	Body	53.3 ± 5%	1.52 ± 5%	0.58	2.82	4.68	± 9.7% (k=2)
1900	1850-1950	Body	53.3 ± 5%	1.52 ± 5%	0.62	2.77	4.57	± 9.7% (k=2)
2450	2400-2500	Body	52.7 ± 5%	1.95 ± 5%	1.75	1.28	4.50	± 9.7% (k=2)

^B The total standard uncertainty is calculated as root-sum-square of standard uncertainty of the Conversion Factor at calibration frequency and the standard uncertainty for the indicated frequency band.

Deviation from Isotropy in HSL

Error (θ, ϕ), $f = 900$ MHz



Spherical Isotropy Error $< \pm 0.4$ dB

Additional Conversion Factors

for Dosimetric E-Field Probe

Type:

ET3DV6

Serial Number:

1387

Place of Assessment:

Zurich

Date of Assessment:

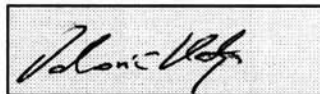
March 22, 2004

Probe Calibration Date:

March 18, 2004

Schmid & Partner Engineering AG hereby certifies that conversion factor(s) of this probe have been evaluated on the date indicated above. The assessment was performed using the FDTD numerical code SEMCAD of Schmid & Partner Engineering AG. Since the evaluation is coupled with measured conversion factors, it has to be recalculated yearly, i.e., following the re-calibration schedule of the probe. The uncertainty of the numerical assessment is based on the extrapolation from measured value at 900 MHz or at 1800 MHz.

Assessed by:



Dosimetric E-Field Probe ET3DV6 SN:1387

Conversion factor ($\pm$ standard deviation)

150 MHz	ConvF	9.1 $\pm$ 8%	$\epsilon_r = 52.3 \pm 5\%$ $\sigma = 0.76 \pm 5\%$ mho/m (head tissue)
300 MHz	ConvF	7.8 $\pm$ 8%	$\epsilon_r = 45.3 \pm 5\%$ $\sigma = 0.87 \pm 5\%$ mho/m (head tissue)
450 MHz	ConvF	7.5 $\pm$ 8%	$\epsilon_r = 43.5 \pm 5\%$ $\sigma = 0.87 \pm 5\%$ mho/m (head tissue)
150 MHz	ConvF	8.7 $\pm$ 8%	$\epsilon_r = 61.9 \pm 5\%$ $\sigma = 0.80 \pm 5\%$ mho/m (body tissue)
450 MHz	ConvF	7.6 $\pm$ 8%	$\epsilon_r = 56.7 \pm 5\%$ $\sigma = 0.94 \pm 5\%$ mho/m (body tissue)

Important Note:

For numerically assessed probe conversion factors, parameters Alpha and Delta in the DASY software must have the following entries: Alpha = 0 and Delta = 1.

Please see also Section 4.7 of the DASY4 Manual.

APPENDIX E - MEASURED FLUID DIELECTRIC PARAMETERS

300 MHz System Performance Check

Measured Fluid Dielectric Parameters (Brain)

January 18, 2005

Frequency	e'	e''
200.000000 MHz	49.4893	69.7219
210.000000 MHz	48.8194	67.3647
220.000000 MHz	48.4798	65.0087
230.000000 MHz	48.0104	62.8310
240.000000 MHz	47.4765	60.7888
250.000000 MHz	47.0321	59.0189
260.000000 MHz	46.6047	57.4959
270.000000 MHz	46.1521	55.9349
280.000000 MHz	45.9696	54.5930
290.000000 MHz	45.6223	53.2583
300.000000 MHz	45.3864	51.7635
310.000000 MHz	45.1005	50.6123
320.000000 MHz	44.8108	49.4282
330.000000 MHz	44.4056	48.3546
340.000000 MHz	44.0185	47.3803
350.000000 MHz	43.6747	46.5180
360.000000 MHz	43.3482	45.6675
370.000000 MHz	42.9978	44.7867
380.000000 MHz	42.6653	44.1072
390.000000 MHz	42.4667	43.3377
400.000000 MHz	42.2258	42.6757

150 MHz DUT Evaluation (Face)

Measured Fluid Dielectric Parameters (Brain)

January 18, 2005

Frequency	e'	e''
50.000000 MHz	68.0875	233.8349
60.000000 MHz	65.1479	197.3730
70.000000 MHz	63.3647	169.9625
80.000000 MHz	61.3907	151.0194
90.000000 MHz	59.8518	135.8200
100.000000 MHz	58.5715	124.0931
110.000000 MHz	57.4132	114.2325
120.000000 MHz	56.7090	106.2608
130.000000 MHz	55.7813	98.9899
140.000000 MHz	55.2807	92.7004
150.000000 MHz	54.3474	87.8424
160.000000 MHz	53.8492	83.2570
170.000000 MHz	53.2088	79.3376
180.000000 MHz	52.6080	75.6444
190.000000 MHz	52.2278	72.6241
200.000000 MHz	51.6931	69.7301
210.000000 MHz	51.0469	67.2186
220.000000 MHz	50.5420	64.9620
230.000000 MHz	50.0470	62.8649
240.000000 MHz	49.5570	60.8731
250.000000 MHz	49.0998	59.1043

150 MHz DUT Evaluation (Body)

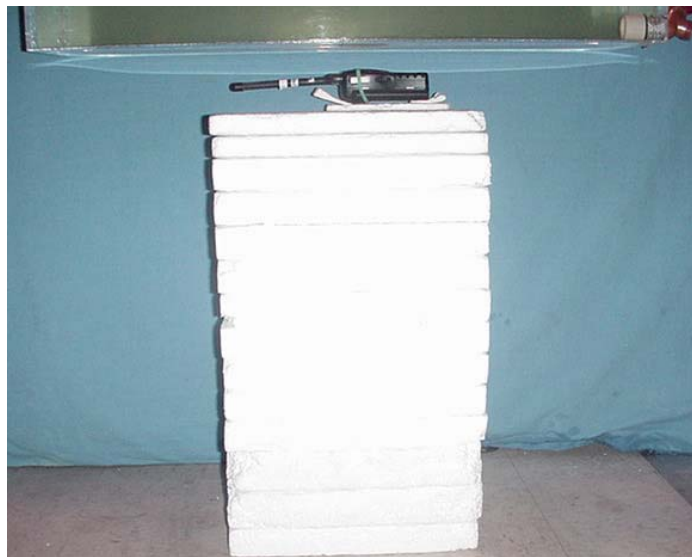
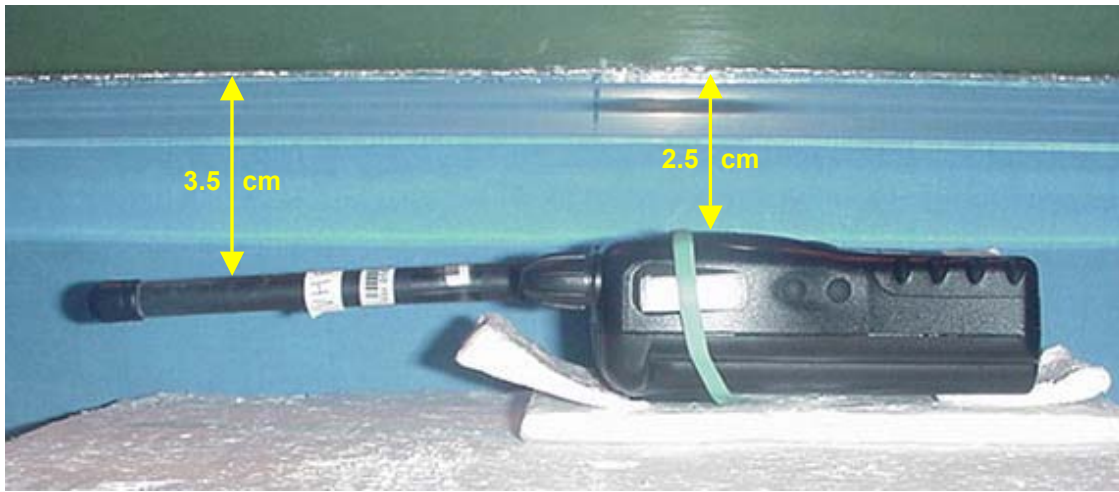
Measured Fluid Dielectric Parameters (Muscle)

January 18, 2005

Frequency	e'	e''
50.000000 MHz	68.6531	263.5710
60.000000 MHz	67.4583	221.2433
70.000000 MHz	66.8176	190.0230
80.000000 MHz	66.0650	167.2953
90.000000 MHz	65.4128	149.9082
100.000000 MHz	64.5372	136.8501
110.000000 MHz	63.6879	124.8110
120.000000 MHz	63.4803	115.6181
130.000000 MHz	62.7770	107.3153
140.000000 MHz	62.7453	100.2900
150.000000 MHz	62.2646	94.6552
160.000000 MHz	61.8389	89.5313
170.000000 MHz	61.4601	84.8760
180.000000 MHz	61.3919	80.8400
190.000000 MHz	61.0423	77.3290
200.000000 MHz	60.7056	74.0778
210.000000 MHz	60.3750	71.2082
220.000000 MHz	59.9852	68.7704
230.000000 MHz	59.6604	66.2615
240.000000 MHz	59.3498	64.1119
250.000000 MHz	59.0069	62.1673

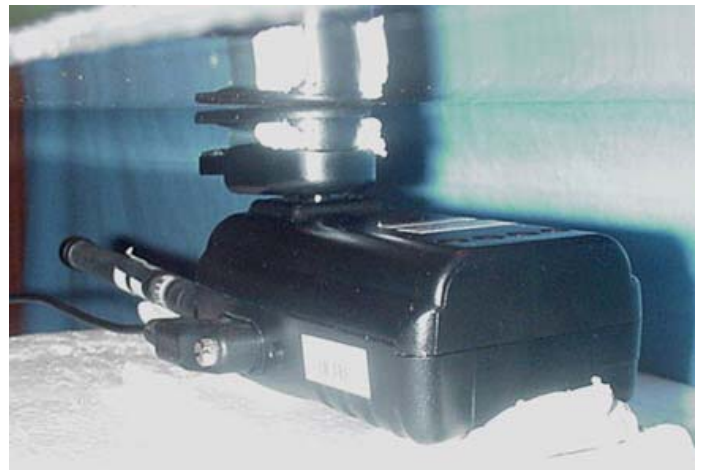
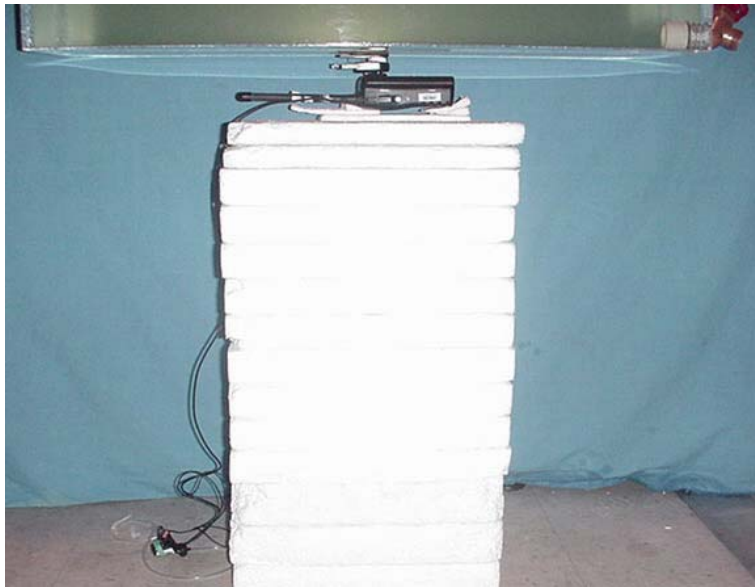
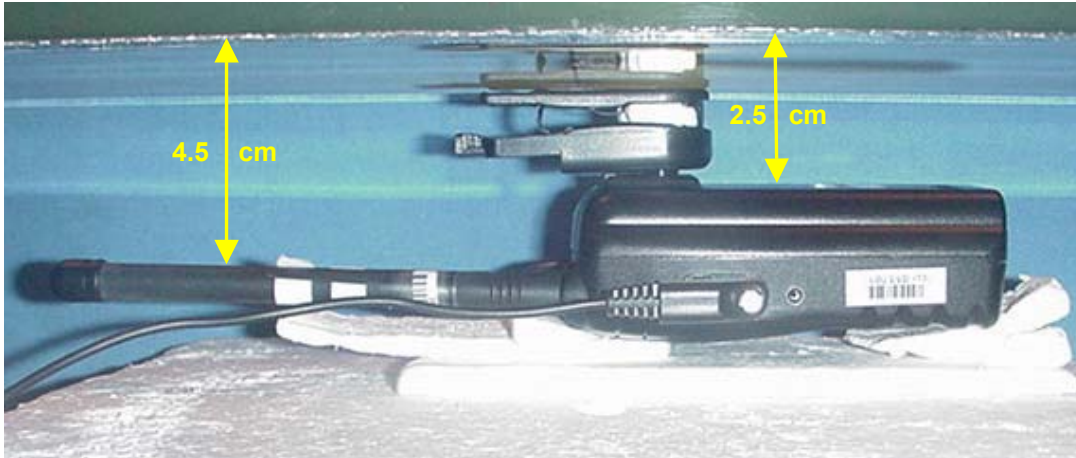
APPENDIX F - SAR TEST SETUP & DUT PHOTOGRAPHS

FACE-HELD SAR TEST SETUP PHOTOGRAPHS
2.5 cm Separation Distance from Front of Radio to Planar Phantom



Applicant:	Maxon Telecom Co., Ltd.	FCC ID:	RXUSP200V2	IC ID:	153-SP200V2
Model:	SP200 V2	Portable FM VHF PTT Radio Transceiver		146 - 174 MHz	
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BODY-WORN SAR TEST SETUP PHOTOGRAPHS
2.5 cm Belt-Clip Separation Distance from Back of Radio (Battery) to Planar Phantom
With Earbud/Lapel-Microphone Accessory



Applicant:	Maxon Telecom Co., Ltd.	FCC ID:	RXUSP200V2	IC ID:	153-SP200V2
Model:	SP200 V2	Portable FM VHF PTT Radio Transceiver		146 - 174 MHz	
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SAR TEST SETUP PHOTOGRAPHS



Face-Held Setup Configuration



Body-Worn Setup Configuration

DUT PHOTOGRAPHS



Front of DUT



Back of DUT
with Belt-Clip



Back of DUT

Applicant:	Maxon Telecom Co., Ltd.	FCC ID:	RXUSP200V2	IC ID:	153-SP200V2
Model:	SP200 V2	Portable FM VHF PTT Radio Transceiver		146 - 174 MHz	
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DUT PHOTOGRAPHS



Left Side of DUT with Belt-Clip



Right Side of DUT with Belt-Clip



Swivel Belt-Clip accessory (Plastic with metal spring)

Applicant:	Maxon Telecom Co., Ltd.	FCC ID:	RXUSP200V2	IC ID:	153-SP200V2
Model:	SP200 V2	Portable FM VHF PTT Radio Transceiver		146 - 174 MHz	
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DUT PHOTOGRAPHS



Top of DUT



Bottom of DUT

DUT PHOTOGRAPHS



DUT Battery Compartment



NiMH Battery Pack



Whip Antenna (P/N: ACC-102)

Applicant:	Maxon Telecom Co., Ltd.	FCC ID:	RXUSP200V2	IC ID:	153-SP200V2
Model:	SP200 V2	Portable FM VHF PTT Radio Transceiver		146 - 174 MHz	
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DUT PHOTOGRAPHS



DUT with Earbud/Lapel-Microphone accessory