





	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

SAR TEST REPORT (FCC/IC)			
RF EXPOSURE EVALUATION		SPECIFIC ABSORPTION RATE	
APPLICANT / MANUFACTURER	COBRA ELECTRONICS CORPORATION		
DEVICE UNDER TEST (DUT)	PORTABLE GMRS/FRS PTT RADIO TRANSCEIVER		
DUT FREQUENCY RANGE(S)	462.5500 - 462.7250 MHz	GMRS Channels 15-22	
	462.5625 - 462.7125 MHz	GMRS/FRS Channels 1-7	
	467.5625 - 467.7125 MHz	FRS Channels 8-14	
DUT MODEL(S)	CXT225		
DEVICE IDENTIFIER(S)	FCC ID:	BBOCXT90	IC: 906B-CXT90
APPLICATION TYPE	Class II Permissive Change (add new model with weather band)		
STANDARD(S) APPLIED	FCC 47 CFR §2.1093		
	Health Canada Safety Code 6		
PROCEDURE(S) APPLIED	FCC OET Bulletin 65, Supplement C (01-01)		
	FCC Mobile & Portable RF Exp. Proc. (KDB 447498 D01 v03r03)		
	Industry Canada RSS-102 Issue 3		
	IEEE 1528-2003		
RF EXPOSURE CATEGORY	General Population / Uncontrolled		
	Face-held		Body-worn
DATE(S) OF EVALUATION(S)	October 15, 2009		
TEST REPORT SERIAL NO.	101409BBO-T988-S95U		
TEST REPORT REVISION NO.	Revision 1.0	Initial Release	October 21, 2009
TEST REPORT SIGNATORIES	Testing Performed By		Test Report Prepared By
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TEST LAB ACCREDITATION(S)	 Test Lab Certificate No. 2470.01		


Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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DECLARATION OF COMPLIANCE SAR RF EXPOSURE EVALUATION

Test Lab Information	Name	CELLTECH LABS INC.			
	Address	21-364 Lougheed Road, Kelowna, British Columbia V1X 7R8 Canada			
Applicant Information	Name	COBRA ELECTRONICS CORPORATION			
	Address	6500 West Cortland Street, Chicago, IL 60707 United States			
Standard(s) Applied	FCC	47 CFR §2.1093			
	IC	Health Canada Safety Code 6			
Procedure(s) Applied	FCC	OET Bulletin 65, Supplement C (Edition 01-01) Mobile & Portable RF Exposure Procedures (KDB 447498 D01 v03r03)			
	IC	RSS-102 Issue 3			
	IEEE	1528-2003	IEC	62209-2 (Draft)	
	FCC ID:	BBOCXT90			
Device Identifier(s)	IC:	906B-CXT90			
	Model(s)	CXT225 (new model with weather band)			
	Serial No.	#1 (Identical Prototype)			
	FCC/IC	Class II Permissive Change - add new model CXT225 with weather band			
Device Description	Portable FM UHF GMRS/FRS Push-To-Talk (PTT) Radio Transceiver				
Transmit Frequency Range(s)	462.5500 - 462.7250 MHz (GMRS Channels 15-22)				
	462.5625 - 462.7125 MHz (GMRS/FRS Channels 1-7)				
	467.5625 - 467.7125 MHz (FRS Channels 8-14)				
RF Output Power Tested	27.5 dBm	0.562 Watts	Conducted	462.7000 MHz	GMRS Ch. 21
Battery Type(s) Tested	Ni-MH Battery	4x AAA	1.2 V	300 mAh	
	Alkaline Battery	4x AAA	1.5 V	Energizer Industrial	
Antenna Type(s) Tested	External Non-detachable				
Body-worn Accessories Tested	Plastic Belt-Clip (supplied with DUT)				
Audio Accessories Tested	Ear-bud with Lapel-Microphone (P/N: GA-EBM2)				
Max. SAR Level(s) Evaluated	Face-held	0.609 W/kg	1g	50% duty cycle	General Population / Uncontrolled
	Body-worn	0.482 W/kg	1g	50% duty cycle	General Population / Uncontrolled
FCC/IC Spatial Peak SAR Limit	Head/Body	1.6 W/kg	1g	50% duty cycle	General Population / Uncontrolled
<p>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 for the General Population / Uncontrolled Exposure environment. The device was tested in accordance with the measurement procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 3, IEEE Standard 1528-2003 and International Standard IEC 62209-2 (Draft). All measurements were performed in accordance with the SAR system manufacturer recommendations.</p> <p>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.</p> <p>The results and statements contained in this report pertain only to the device(s) evaluated.</p> <p>This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc.</p>					
Test Report Approved By			Sean Johnston	Celltech Labs Inc.	



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
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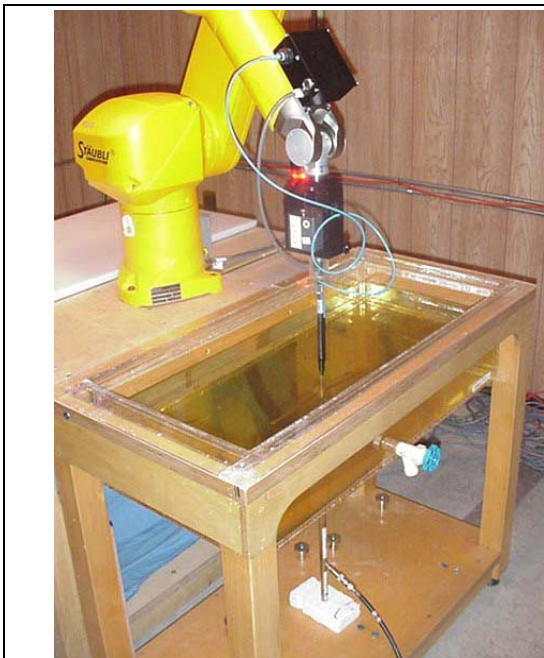
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1.0 INTRODUCTION

This measurement report demonstrates compliance of the Cobra Electronics Corporation Model: CXT225 Portable FM UHF GMRS/FRS PTT Radio Transceiver 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 3 (see reference [4]), IEEE Standard 1528-2003 (see reference [5]) and International Standard IEC 62209-2 Draft (see reference [6]) 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 provisions of the rules are included within this test report.

2.0 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 Body 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 utilizes a controller with built in VME-bus computer.





DASY4 SAR System with Plexiglas validation phantom





DASY4 SAR System with Plexiglas side planar phantom

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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 Testing and Engineering Services Lab	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
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3.0 MEASUREMENT SUMMARY

SAR EVALUATION RESULTS																
Test Type	Freq.	Channel		Test Mode	Battery Type	DUT Position to Planar Phantom	DUT Spacing to Planar Phantom		Cond. Power Before Test	Measured SAR 1g (W/kg)		SAR Drift During Test	Scaled SAR with droop 1g (W/kg)			
							DUT	Antenna		Watts	100%		50%	100%	50%	
	MHz									PTT Duty Cycle		PTT Duty Cycle				
Face	462.7000	21	GMRS	CW	Ni-MH	Front Side	2.5 cm	3.1 cm	0.562	0.835	0.418	-0.362	0.908	0.454		
	462.7000	21	GMRS	CW	Alkaline	Front Side	2.5 cm	3.1 cm	0.562	1.07	0.535	-0.560	1.22	0.609		
Body	462.7000	21	GMRS	CW	Ni-MH	Back Side	0.6 cm	1.3 cm	0.562	0.723	0.362	-0.226	0.762	0.381		
	462.7000	21	GMRS	CW	Alkaline	Back Side	0.6 cm	1.3 cm	0.562	0.858	0.429	-0.504	0.964	0.482		
SAR LIMIT(S)					HEAD & BODY			SPATIAL PEAK			RF EXPOSURE CATEGORY					
FCC 47 CFR 2.1093		Health Canada Safety Code 6			1.6 W/kg			averaged over 1 gram			General Population / Uncontrolled					
Test Date(s)		October 15, 2009				October 15, 2009				Atmos. Pressure		H	101.1	B	101.1	kPa
Measured Fluid		450 MHz Head		460 MHz Eval.		450 MHz Body		460 MHz Eval.		Relative Humidity		H	35	B	35	%
Dielectric Constant ϵ_r		IEEE Target		Meas.	Dev.	IEEE Target		Meas.	Dev.	Ambient Temp.		H	22.0	B	22.1	°C
		43.5	± 5%	43.5	0.0%	56.7	± 5%	58.0	+2.3%	Fluid Temp.		H	21.0	B	21.2	°C
Conductivity σ (mho/m)		IEEE Target		Meas.	Dev.	IEEE Target		Meas.	Dev.	Fluid Depth		H	≥ 15	B	≥ 15	cm
		0.87	± 5%	0.83	-4.6%	0.94	± 5%	0.91	-3.2%	ρ (Kg/m ³)		1000				
Notes																
1.	Detailed measurement plots showing the maximum SAR location of the DUT are reported in Appendix A.															
2.	The transmission band of the DUT is less than 10 MHz; therefore single channel data only is required to be reported (per FCC OET Bulletin 65, Supplement C, Edition 01-01 - see reference [3]).															
3.	The power droop measured by the DASY4 system for the duration of the SAR evaluation was added to the measured SAR level to report the scaled SAR result as shown in the above test data table. A SAR-versus-Time power droop evaluation was also performed and the evaluation plot is shown in Appendix A (SAR Test Plots).															
4.	The DUT was tested in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the PTT transmit key constantly depressed.															
5.	SAR Evaluation Power Thresholds for PTT Devices, $f \leq 0.5$ GHz FCC KDB 447498 D01 v03r03 Section 5)b)i)									RF Conducted Output Power Tested						
										GMRS Mode		FRS Mode				
										PTT Duty Cycle		PTT Duty Cycle				
	Exposure Conditions		P mW (General Population)			P mW (Occupational)				100%	50%	100%	50%			
	Held to face, $d \geq 2.5$ cm		250			1250				562 mW	281 mW	250 mW	125 mW			
Body-worn, $d \geq 1.5$ cm		200			1000											
Body-worn, $d \geq 1.0$ cm		150			750				562 mW	281 mW	250 mW	125 mW				
1. The time-averaged output power, corresponding to the required PTT duty factor, is compared with these thresholds.									1. The GMRS conducted output power level exceeds the FCC threshold for SAR evaluation.							
2. The closest distance between the user and the device or its antenna is used to determine the power thresholds.									2. The FRS conducted output power level is below the FCC threshold for SAR evaluation.							

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4.0 DETAILS OF SAR EVALUATION



The Cobra Electronics Corporation Model: CXT225 Portable FM UHF GMRS/FRS PTT Radio Transceiver was compliant for localized Specific Absorption Rate (General Population / Uncontrolled Exposure) based on the test provisions and conditions described below. The detailed test setup photographs are shown in Appendix D.

1. The DUT was evaluated for SAR 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 spacing was maintained between the front of the DUT and the outer surface of the planar phantom.
2. The DUT was evaluated for SAR in a body-worn configuration with the back of the radio placed parallel to the outer surface of the planar phantom. The attached plastic belt-clip accessory was touching the planar phantom and provided a 0.6 cm spacing from the back of the DUT to the outer surface of the planar phantom. The DUT was evaluated for body-worn SAR with the Cobra supplied earbud lapel-microphone audio accessory connected to the audio port.
3. The RF conducted output power levels of the DUT referenced in this report were measured by Timco Engineering prior to the SAR evaluations.
4. The DUT batteries were fully charged prior to the SAR evaluations.
5. The DUT was tested at maximum power preset by the manufacturer in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the PTT 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 fluid temperature was measured prior to and after the SAR evaluations to ensure the temperature remained within +/-2°C of the fluid temperature reported during the dielectric parameter measurements.
7. The dielectric parameters of the simulated tissue mixtures were measured prior to the SAR evaluations using a Dielectric Probe Kit and a Network Analyzer (see Appendix C).

5.0 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 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 E). 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 (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.

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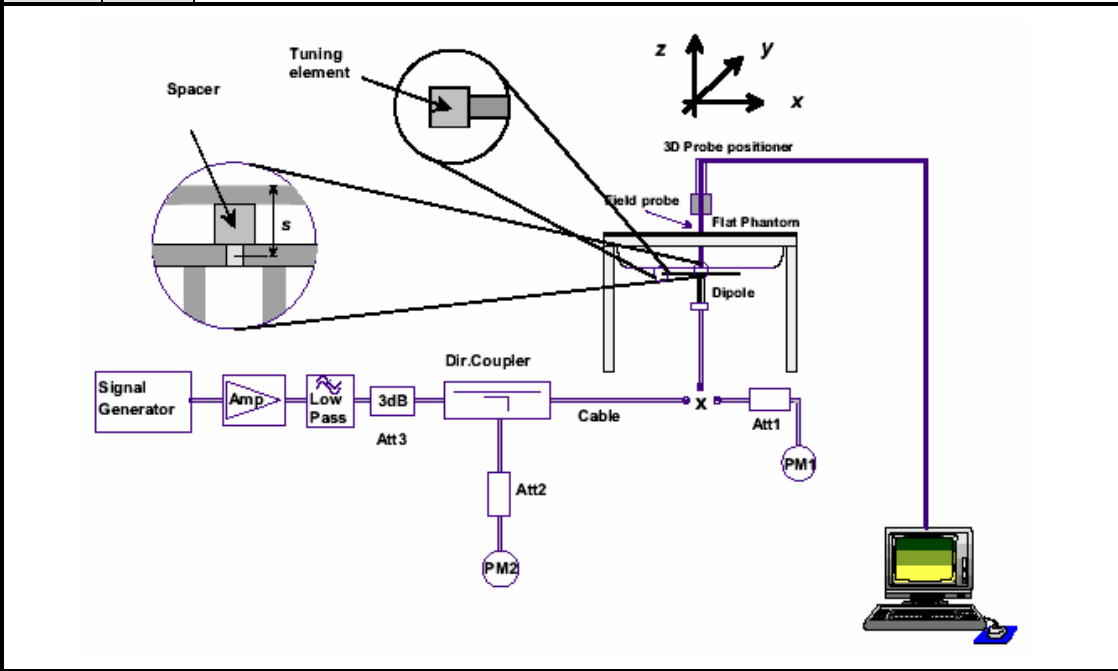
6.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluation a daily system check was performed using a Plexiglas planar phantom and 450 MHz dipole (see Appendix B for system performance check test plot) in accordance with the procedures described in IEEE Standard 1528-2003 (see reference [5]). The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C for measured fluid dielectric parameters). A forward power of 250 mW was applied to the dipole and the system was verified to a tolerance of $\pm 10\%$ from the system validation target SAR value (see Appendix E for system validation target SAR value listed on page 10 of the dipole calibration report).

SYSTEM PERFORMANCE CHECK EVALUATION



Test Date	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)
		Freq. (MHz)	Sys. Val. Target	Meas.	Dev.	Sys. Val. Target	Meas.	Dev.	Sys. Val. Target	Meas.						
Oct 15	Head 450	1.22 $\pm 10\%$	1.28	+4.9%	43.8 $\pm 5\%$	43.4	-0.9%	0.86 $\pm 5\%$	0.83	-3.5%	1000	22.0	21.0	≥ 15	35	101.1

- | | | |
|--------------|----|--|
| Notes | 1. | The target SAR value is referenced from the System Validation performed by Celltech Labs Inc. (see Appendix E). |
| | 2. | The target dielectric parameters are referenced from the System Validation performed by Celltech Labs Inc. (see Appendix E). |
| | 3. | The fluid temperature was measured prior to and after the system performance check to ensure the temperature remained within $\pm 2^\circ\text{C}$ of the fluid temperature reported during the dielectric parameter measurements. |
| | 4. | The dielectric parameters of the simulated tissue mixture were measured prior to the system performance check using a Dielectric Probe Kit and a Network Analyzer (see Appendix C). |



System Performance Check Measurement Setup (IEEE Standard 1528-2003)

450 MHz Validation Dipole Setup

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7.0 SAR PROBE CALIBRATION & MEASUREMENT FREQUENCIES

The following procedures are recommended for measurements at 150 MHz - 3 GHz to minimize probe calibration and tissue dielectric parameter discrepancies. In general, SAR measurements below 300 MHz should be within ± 50 MHz of the probe calibration frequency. At 300 MHz to 3 GHz, measurements should be within ± 100 MHz of the probe calibration frequency. Measurements exceeding 50% of these intervals, ± 25 MHz < 300 MHz and ± 50 MHz ≥ 300 MHz, require additional steps (per FCC KDB 450824 D01 v01r01, SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz - see reference [9]).

Probe Calibration Freq.	Device Measurement Freq.	Frequency Interval	± 50 MHz ≥ 300 MHz
450 MHz	462.70 MHz	12.7 MHz	< 50 MHz
The probe calibration and measurement frequency interval is < 50 MHz; therefore the additional steps are not required.			


8.0 SIMULATED EQUIVALENT TISSUES



The simulated equivalent tissue recipes in the table below are derived from the SAR system manufacturer's suggested recipes in the DASY4 manual (see references [10] and [11]) in accordance with the procedures and requirements specified in IEEE Standard 1528-2003 (see reference [5]). The ingredient percentage may have been adjusted minimally in order to achieve the appropriate target dielectric parameters within the specified tolerance.

SIMULATED TISSUE MIXTURES		
INGREDIENT	450 MHz Head	450 MHz Body
Water	38.56 %	52.00 %
Sugar	56.32 %	45.65 %
Salt	3.95 %	1.75 %
HEC	0.98 %	0.50 %
Bactericide	0.19 %	0.10 %

9.0 SAR LIMITS


SAR RF EXPOSURE LIMITS			
FCC 47 CFR 2.1093	Health Canada Safety Code 6	General Population	Occupational
Spatial Average (averaged over the whole body)		0.08 W/kg	0.4 W/kg
Spatial Peak (averaged over any 1 g of tissue)		1.6 W/kg	8.0 W/kg
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)		4.0 W/kg	20.0 W/kg
The Spatial Average value of the SAR averaged over the whole body.			
The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.			
The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.			
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.			



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10.0 ROBOT SYSTEM SPECIFICATIONS

<u>Specifications</u>	
Positioner	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability	0.02 mm
No. of axis	6
<u>Data Acquisition Electronic (DAE) System</u>	
<u>Cell Controller</u>	
Processor	AMD Athlon XP 2400+
Clock Speed	2.0 GHz
Operating System	Windows XP Professional
<u>Data Converter</u>	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	Measurement Software: DASY4, V4.7 Build 44
	Postprocessing Software: SEMCAD, V1.8 Build 171
Connecting Lines	Optical downlink for data and status info., Optical uplink for commands and clock
<u>DASY4 Measurement Server</u>	
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
<u>E-Field Probe</u>	
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)
<u>Evaluation Phantom</u>	
Type	Side Planar Phantom
Shell Material	Plexiglas
Bottom Thickness	2.0 mm ± 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)
<u>Validation Phantom (≤ 450MHz)</u>	
Type	Planar Phantom
Shell Material	Plexiglas
Bottom Thickness	6.2 mm ± 0.1 mm
Outer Dimensions	86.0 cm (L) x 39.5 cm (W) x 21.8 cm (H)

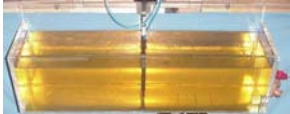
Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	


11.0 PROBE SPECIFICATION (ET3DV6)

<p>Construction: Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, glycol)</p> <p>Calibration: In air from 10 MHz to 2.5 GHz In Body simulating tissue at frequencies of 900 MHz and 1.8 GHz (accuracy $\pm 8\%$)</p> <p>Frequency: 10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)</p> <p>Directivity: ± 0.2 dB in Body tissue (rotation around probe axis) ± 0.4 dB in Body tissue (rotation normal to probe axis)</p> <p>Dynamic Range: 5 μW/g to > 100 mW/g; Linearity: ± 0.2 dB</p> <p>Surface Detect: ± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces</p> <p>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</p> <p>Application: General dosimetry up to 3 GHz Compliance tests of mobile phone</p>	
	ET3DV6 E-Field Probe


12.0 SIDE PLANAR PHANTOM


<p>The side planar phantom is constructed of Plexiglas material with a 2.0 mm shell thickness for face-held and body-worn SAR evaluations of portable radio transceivers. The side planar phantom is mounted on the side of the DASY4 compact system table.</p>	
	Plexiglas Side Planar Phantom



13.0 VALIDATION PLANAR PHANTOM

<p>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 to the table of the DASY4 compact system.</p>	
	Plexiglas Validation Planar Phantom

14.0 DEVICE HOLDER


<p>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.</p>	
	Device Holder



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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15.0 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	CNR	CNR
x	-Robot	00046	599396-01	CNR	CNR
x	-DAE4	00019	353	28Apr09	28Apr10
x	-ET3DV6 E-Field Probe	00017	1590	16Jul09	16Jul10
x	-Celltech 450 MHz Validation Dipole	00024	136	19Jan09	19Jan10
x	-Plexiglas Side Planar Phantom	00156	161	CNR	CNR
x	-Plexiglas Validation Planar Phantom	00157	137	CNR	CNR
x	HP 85070C Dielectric Probe Kit	00033	US39240170	CNR	CNR
x	HP E4408B Spectrum Analyzer	00015	US39240170	23Apr08	28Apr10
x	Gigatronics 8652A Power Meter	00007	1835272	23Apr08	28Apr10
x	Gigatronics 80701A Power Sensor	00014	1833699	23Apr08	28Apr10
x	HP 8753ET Network Analyzer	00134	US39170292	28Apr08	28Apr10
x	Rohde & Schwarz SMR20 Signal Generator	00006	100104	CNR	CNR
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
Abbr.	CNR = Calibration Not Required				

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	



16.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION

Uncertainty Component	IEEE 1528 Section	Uncertainty Value $\pm\%$	Probability Distribution	Divisor	ci 1g	ci 10g	Uncertainty Value $\pm\%$ (1g)	Uncertainty Value $\pm\%$ (10g)	V_i or V_{eff}
Measurement System									
Probe Calibration (450 MHz)	E.2.1	6.65	Normal	1	1	1	6.65	6.65	∞
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	E.2.2	9.6	Rectangular	1.732050808	0.7	0.7	3.9	3.9	∞
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0.8	Rectangular	1.732050808	1	1	0.5	0.5	∞
Integration Time	E.2.8	2.6	Rectangular	1.732050808	1	1	1.5	1.5	∞
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	∞
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	∞
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Test Sample Related									
Test Sample Positioning	E.4.2	2.9	Normal	1	1	1	2.9	2.9	12
Device Holder Uncertainty	E.4.1	3.6	Normal	1	1	1	3.6	3.6	8
SAR Drift Measurement	6.6.2	5	Rectangular	1.732050808	1	1	2.9	2.9	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measured)	E.3.3	4.6	Normal	1	0.64	0.43	2.9	2.0	∞
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measured)	E.3.3	2.3	Normal	1	0.6	0.49	1.4	1.1	∞
Combined Standard Uncertainty			RSS				11.48	11.11	
Expanded Uncertainty (95% Confidence Interval)			k=2				22.95	22.22	


Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	


17.0 REFERENCES



- [1] Federal Communications Commission - "Radiofrequency radiation exposure evaluation: portable devices", Rule Part 47 CFR §2.1093.
- [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 (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 3: June 2009.
- [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] International Standard IEC 62209-2 Draft (106-62209-2-CDV_090323) - "Human exposure to radio frequency fields from hand-held & body-mounted wireless comm. devices - Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (30 MHz to 6 GHz)".
- [7] International Standard IEC 62209-1:2005 - "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures."
- [8] Federal Communications Commission, Office of Engineering and Technology - "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies"; KDB 447498 D01 v03r03: January 2009.
- [9] Federal Communications Commission, Office of Engineering and Technology - "Application Note: SAR Probe Calibration and System Verification Considerations for Measurements at 150 MHz - 3 GHz"; KDB 450824 D01 v01r01: January 2007.
- [10] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 16 Application Note, Head Tissue Recipe: Sept. 2005.
- [11] Schmid & Partner Engineering AG - DASY4 Manual V4.6, Chapter 17 Application Note, Body Tissue Recipe: Sept. 2005.

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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APPENDIX A - SAR MEASUREMENT DATA

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 10/15/2009

Face-held SAR - GMRS Channel 21 - 462.7000 MHz - Ni-MH AAA Rechargeable Batteries

DUT: Cobra; Model: CXT225; Type: Portable GMRS/FRS PTT Radio Transceiver; Serial: FCC Sample #1

Ambient Temp: 22.0°C; Fluid Temp: 21.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: UHF FM (CW)

Frequency: 462.700 MHz; Duty Cycle: 1:1

Medium: HSL450 Medium parameters used: $f = 462.7 \text{ MHz}$; $\sigma = 0.83 \text{ mho/m}$; $\epsilon_r = 43.5$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.34, 7.34, 7.34); Calibrated: 16/07/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASy4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Face-held SAR - 2.5 cm Spacing from Front of DUT to Planar Phantom

Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.825 mW/g

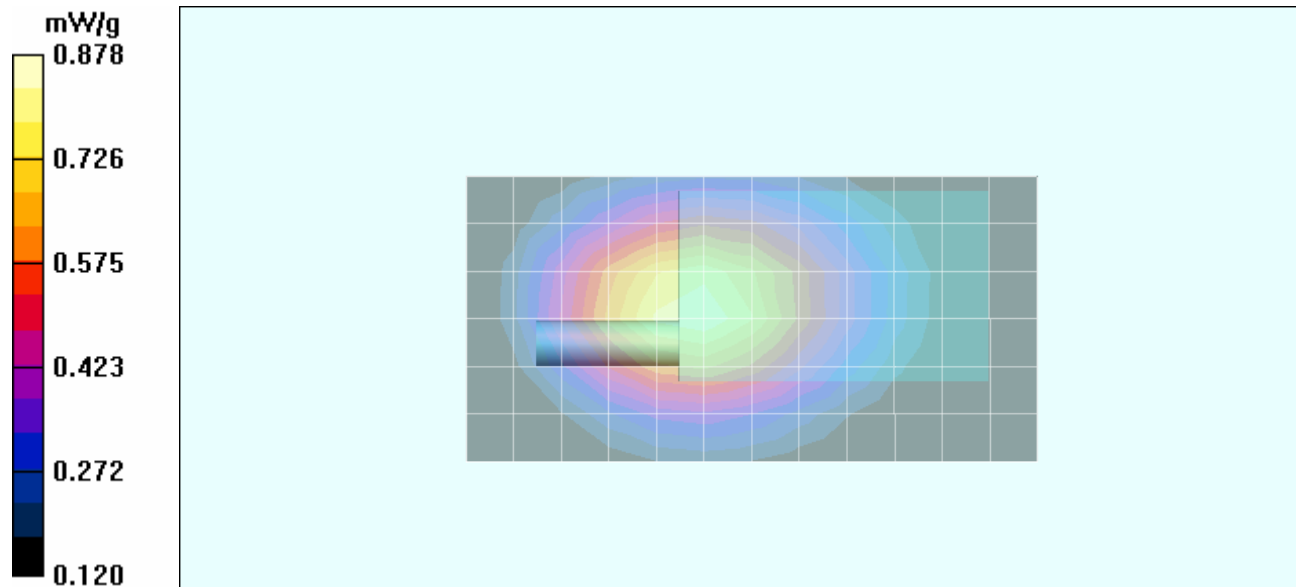
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$


Reference Value = 32.1 V/m; Power Drift = -0.362 dB



Peak SAR (extrapolated) = 1.18 W/kg

SAR(1 g) = 0.835 mW/g; SAR(10 g) = 0.600 mW/g

Maximum value of SAR (measured) = 0.878 mW/g



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 10/15/2009

Face-held SAR - GMRS Channel 21 - 462.7000 MHz - Energizer Alkaline AAA Batteries

DUT: Cobra; Model: CXT225; Type: Portable GMRS/FRS PTT Radio Transceiver; Serial: FCC Sample #1

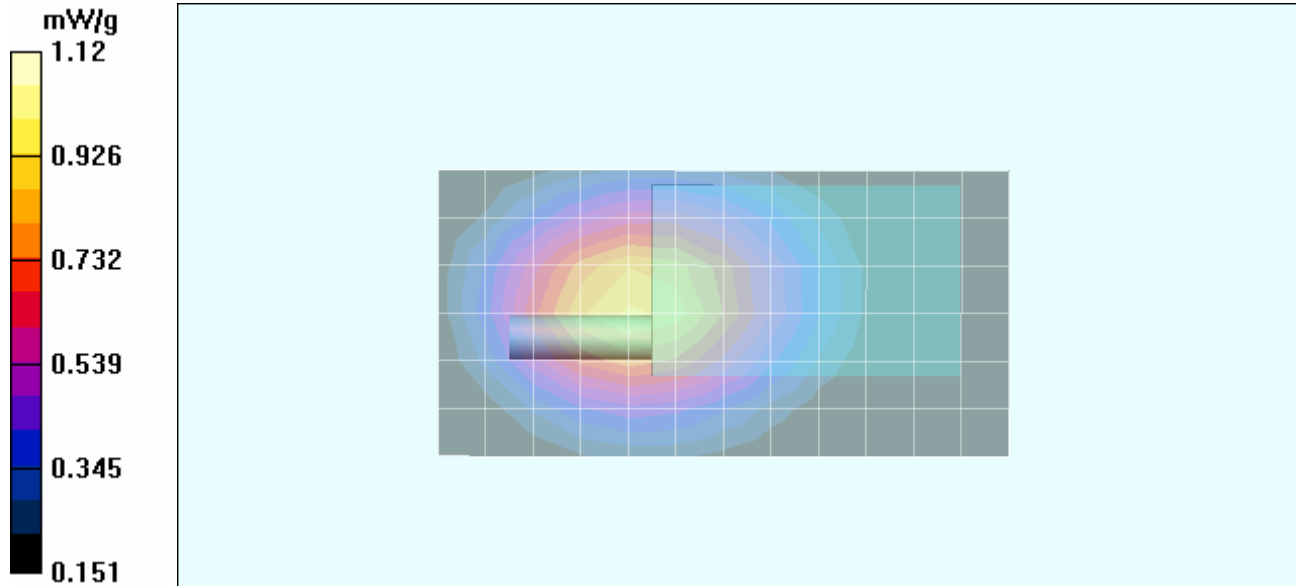
Ambient Temp: 22.0°C; Fluid Temp: 21.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%


Communication System: UHF FM (CW)
 Frequency: 462.700 MHz; Duty Cycle: 1:1
 Medium: HSL450 Medium parameters used: $f = 462.7 \text{ MHz}$; $\sigma = 0.83 \text{ mho/m}$; $\epsilon_r = 43.5$; $\rho = 1000 \text{ kg/m}^3$



- Probe: ET3DV6 - SN1590; ConvF(7.34, 7.34, 7.34); Calibrated: 16/07/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Face-held SAR - 2.5 cm Spacing from Front of DUT to Planar Phantom

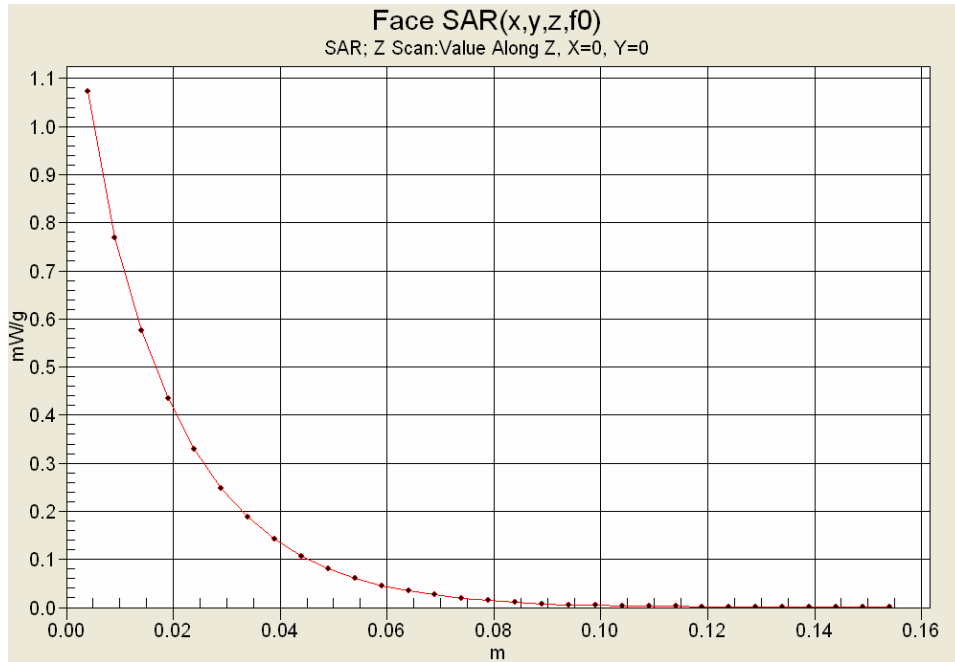
Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$
 Maximum value of SAR (measured) = 0.944 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$
 Reference Value = 38.8 V/m; Power Drift = -0.560 dB
 Peak SAR (extrapolated) = 1.52 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.773 mW/g
 Maximum value of SAR (measured) = 1.12 mW/g



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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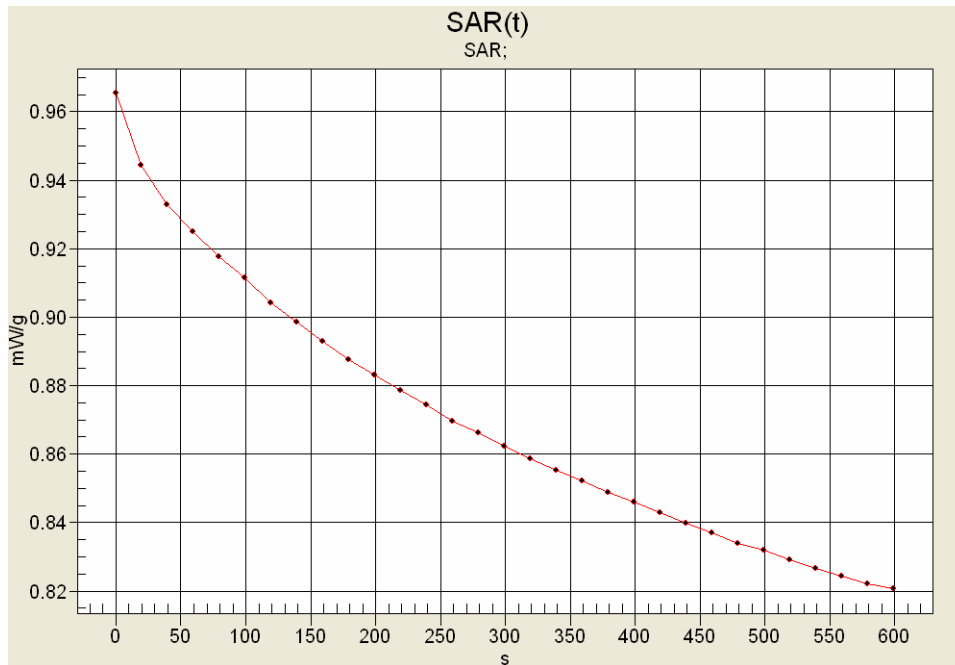
	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
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Z-Axis Scan






SAR-versus-Time Droop Evaluation

Face-held Configuration
GMRS Ch. 21 (462.7000 MHz)
Alkaline AAA Batteries



Start SAR: 0.965404 mW/g
End SAR: 0.820802 mW/g (-0.705 dB)
SAR after 340s: 0.855284 mW/g (-0.526 dB)
(340s = Zoom Scan Duration)
(600s = Area Scan Duration)

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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Date Tested: 10/15/2009

Body-worn SAR - GMRS Channel 21 - 462.7000 MHz - Ni-MH AAA Rechargeable Batteries

DUT: Cobra; Model: CXT225; Type: Portable GMRS/FRS PTT Radio Transceiver; Serial: FCC Sample #1

Body-worn Accessory: Plastic Belt-Clip; Audio Accessory: Earbud Lapel-Microphone (P/N: GA-EBM2)

Ambient Temp: 22.1°C; Fluid Temp: 21.2°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: UHF FM (CW)

Frequency: 462.700 MHz; Duty Cycle: 1:1

Medium: M450 Medium parameters used: $f = 462.7 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 58$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.34, 7.34, 7.34); Calibrated: 16/07/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 0.6 cm Belt-Clip Spacing from Back of DUT to Planar Phantom

Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.755 mW/g

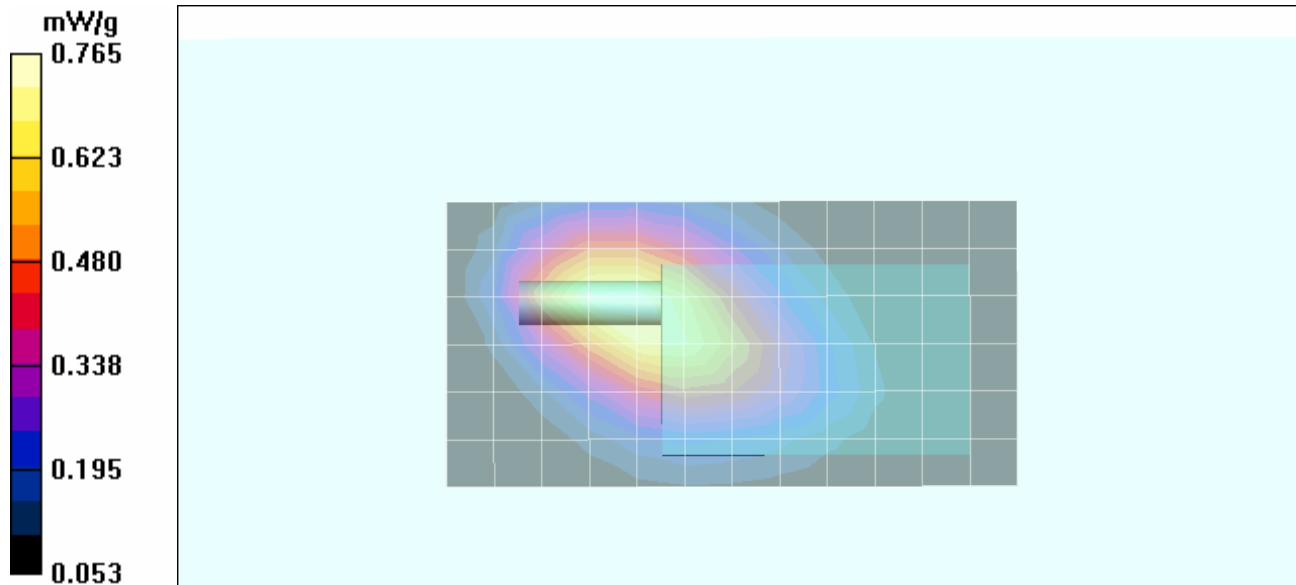
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$


Reference Value = 27.9 V/m; Power Drift = -0.226 dB



Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.723 mW/g; SAR(10 g) = 0.498 mW/g

Maximum value of SAR (measured) = 0.765 mW/g



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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Date Tested: 10/15/2009

Body-worn SAR - GMRS Channel 21 - 462.7000 MHz - Energizer Alkaline AAA Batteries

DUT: Cobra; Model: CXT225; Type: Portable GMRS/FRS PTT Radio Transceiver; Serial: FCC Sample #1

Body-worn Accessory: Plastic Belt-Clip; Audio Accessory: Earbud Lapel-Microphone (P/N: GA-EBM2)

Ambient Temp: 22.1°C; Fluid Temp: 21.2°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: UHF FM (CW)

Frequency: 462.700 MHz; Duty Cycle: 1:1

Medium: M450 Medium parameters used: $f = 462.7 \text{ MHz}$; $\sigma = 0.91 \text{ mho/m}$; $\epsilon_r = 58$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.34, 7.34, 7.34); Calibrated: 16/07/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 0.6 cm Belt-Clip Spacing from Back of DUT to Planar Phantom

Area Scan (7x13x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 0.769 mW/g

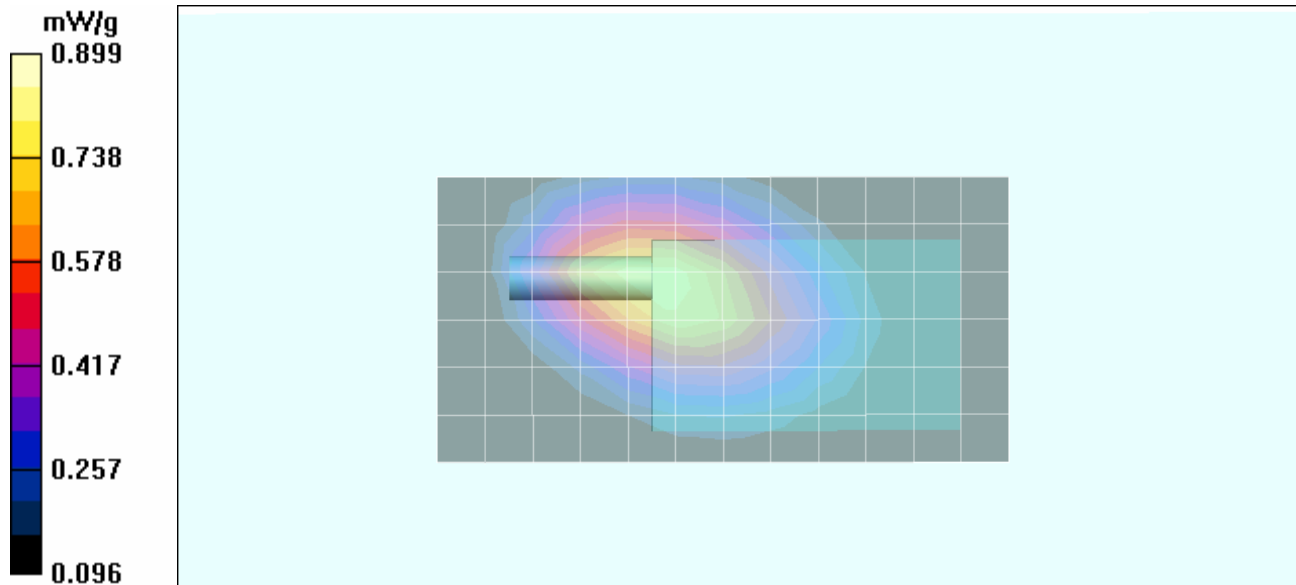
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$


Reference Value = 29.9 V/m; Power Drift = -0.504 dB



Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.858 mW/g; SAR(10 g) = 0.585 mW/g

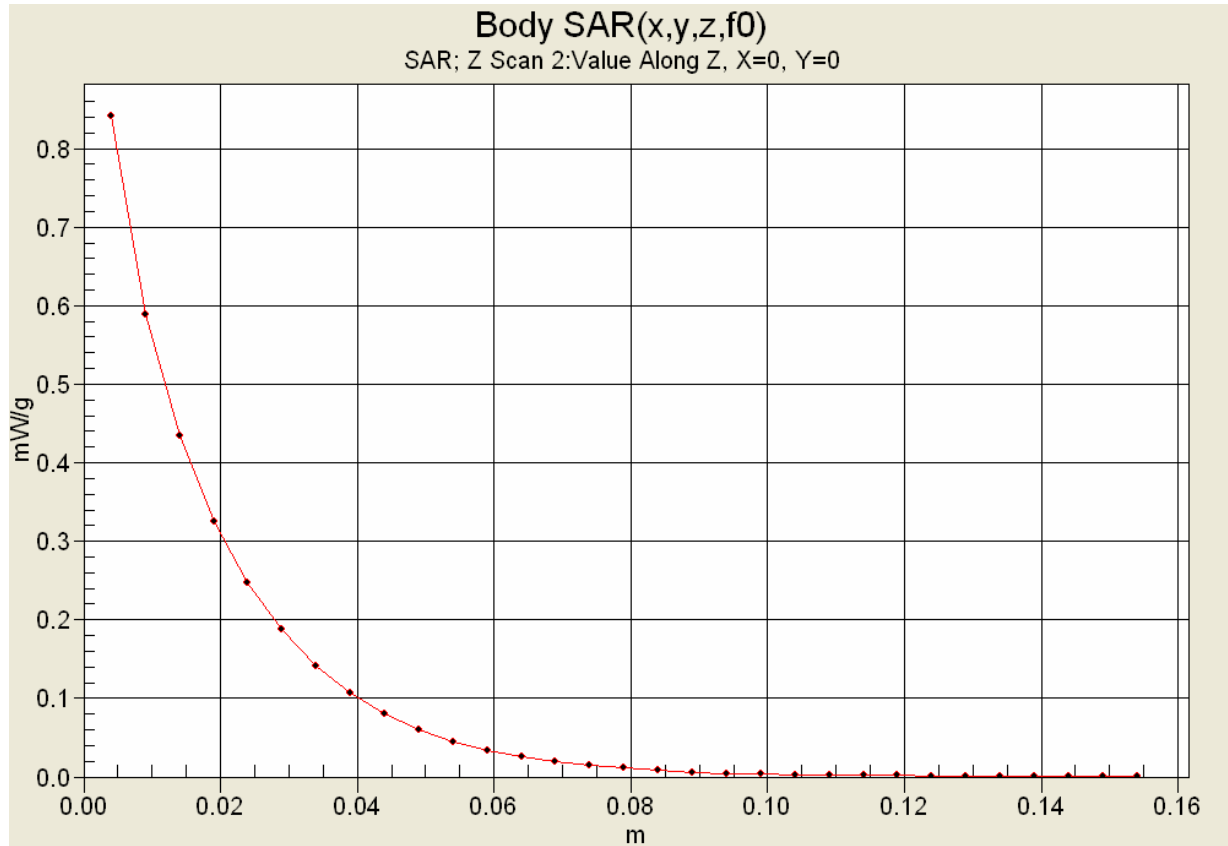
Maximum value of SAR (measured) = 0.899 mW/g





Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	



Z-Axis Scan



	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

Date Tested: 10/15/2009

System Performance Check - 450 MHz Dipole - HSL

DUT: Dipole 450 MHz; Asset: 00024; Serial: 136; Calibration: 01/19/2009

Ambient Temp: 22.0°C; Fluid Temp: 21.0°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Forward Conducted Power: 250 mW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: HSL450 Medium parameters used: $f = 450 \text{ MHz}$; $\sigma = 0.83 \text{ mho/m}$; $\epsilon_r = 43.4$; $\rho = 1000 \text{ kg/m}^3$

- Probe: ET3DV6 - SN1590; ConvF(7.34, 7.34, 7.34); Calibrated: 16/07/2009
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 28/04/2009
- Phantom: Validation Planar; Type: Plexiglas; Serial: TE#137
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

System Performance Check - 450 MHz Dipole

Area Scan (6x11x1): Measurement grid: $dx=15\text{mm}$, $dy=15\text{mm}$

Maximum value of SAR (measured) = 1.26 mW/g

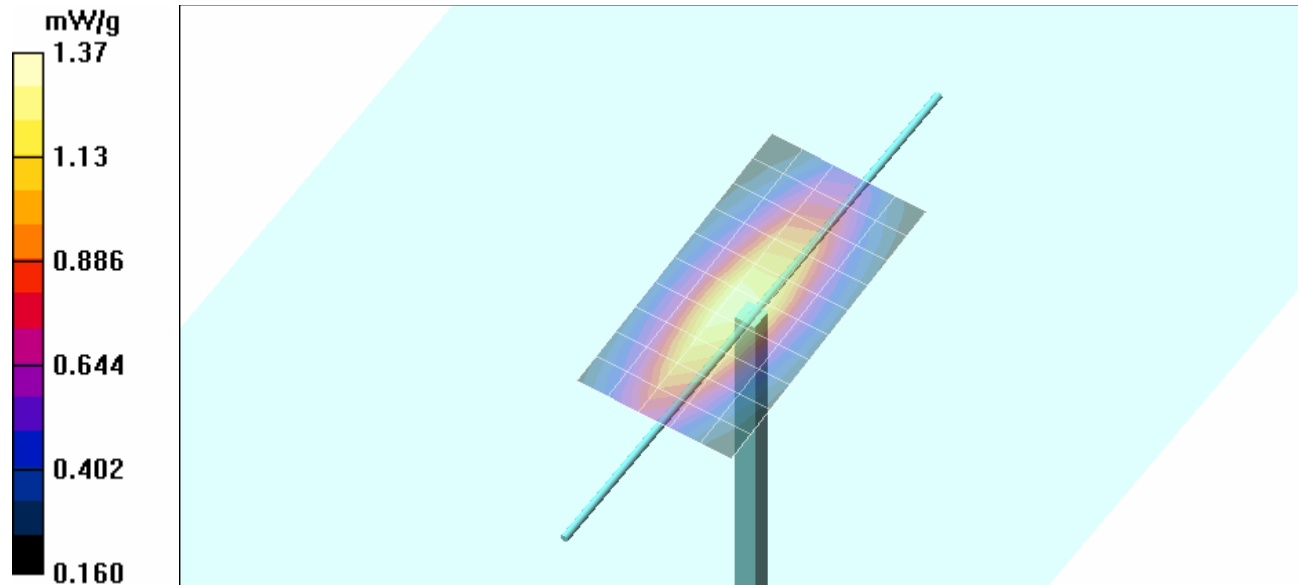
Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=7.5\text{mm}$, $dy=7.5\text{mm}$, $dz=5\text{mm}$


Reference Value = 41.2 V/m; Power Drift = -0.081 dB



Peak SAR (extrapolated) = 2.00 W/kg

SAR(1 g) = 1.28 mW/g; SAR(10 g) = 0.857 mW/g

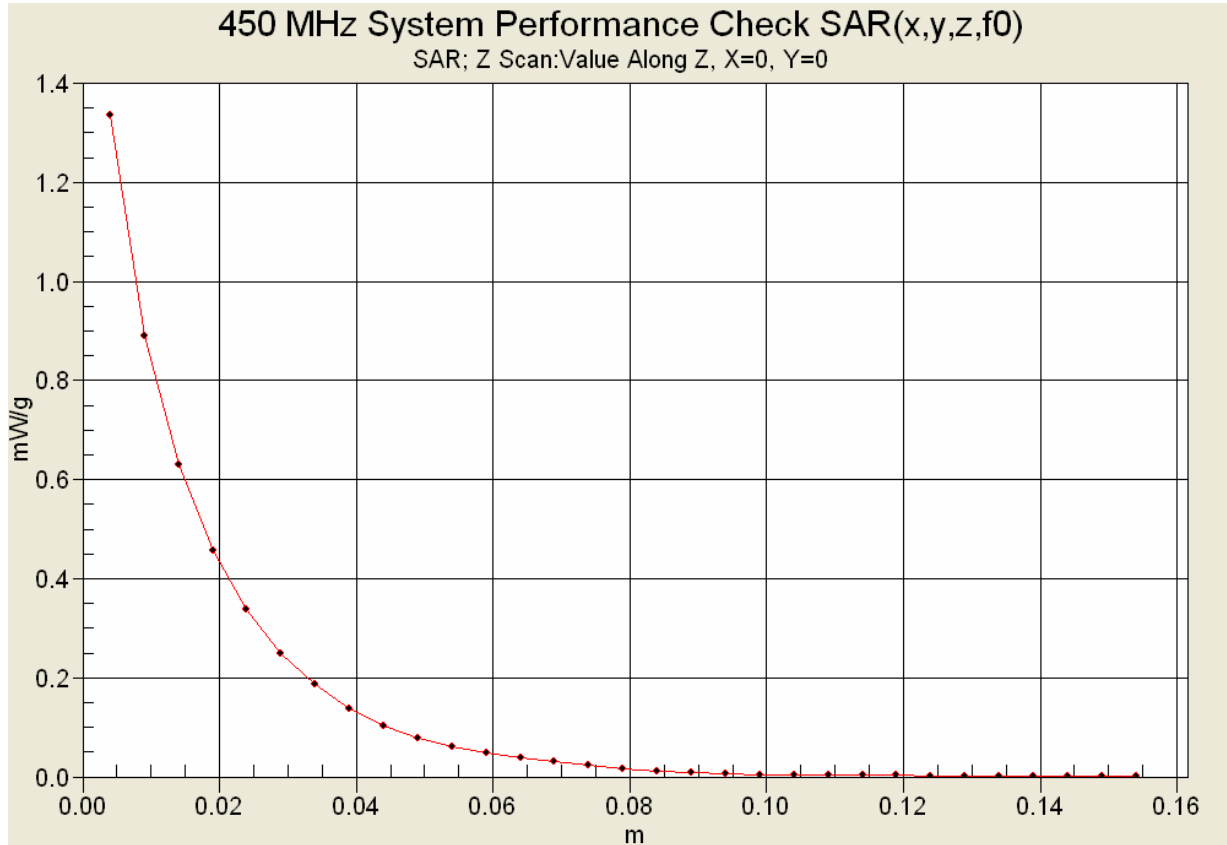
Maximum value of SAR (measured) = 1.37 mW/g






Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	


Z-Axis Scan





Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS


Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

450 MHz System Performance Check & 460 MHz DUT Evaluation (Head)

Celltech Labs Inc.
 Test Result for UIM Dielectric Parameter
 15/Oct/2009
 Frequency (GHz)
 FCC_eHFCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
 FCC_sHFCC OET 65 Supplement C (June 2001) Limits for Head Sigma
 Test_e Epsilon of UIM
 Test_s Sigma of UIM

Freq	FCC_eHFCC	FCC_sHFCC	Test_e	Test_s
0.3500	44.70	0.87	45.63	0.76
0.3600	44.58	0.87	45.73	0.75
0.3700	44.46	0.87	45.35	0.75
0.3800	44.34	0.87	44.64	0.78
0.3900	44.22	0.87	44.98	0.77
0.4000	44.10	0.87	44.81	0.79
0.4100	43.98	0.87	44.37	0.79
0.4200	43.86	0.87	44.48	0.80
0.4300	43.74	0.87	44.04	0.81
0.4400	43.62	0.87	43.73	0.82
0.4500	43.50	0.87	43.39	0.83
0.4600	43.45	0.87	43.53	0.83
0.4700	43.40	0.87	43.39	0.85
0.4800	43.34	0.87	42.76	0.84
0.4900	43.29	0.87	43.06	0.85
0.5000	43.24	0.87	42.64	0.86
0.5100	43.19	0.87	42.36	0.87
0.5200	43.14	0.88	41.91	0.88
0.5300	43.08	0.88	41.86	0.89
0.5400	43.03	0.88	41.53	0.88
0.5500	42.98	0.88	41.70	0.91


Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

460 MHz DUT Evaluation (Body)



Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
15/Oct/2009
Frequency (GHz)
FCC_eHFCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sHFCC 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
0.3500	57.70	0.93	59.14	0.85
0.3600	57.60	0.93	58.86	0.84
0.3700	57.50	0.93	58.94	0.84
0.3800	57.40	0.93	58.29	0.86
0.3900	57.30	0.93	58.90	0.86
0.4000	57.20	0.93	58.78	0.88
0.4100	57.10	0.93	57.80	0.87
0.4200	57.00	0.94	58.26	0.87
0.4300	56.90	0.94	57.89	0.87
0.4400	56.80	0.94	57.33	0.89
0.4500	56.70	0.94	57.57	0.91
0.4600	56.66	0.94	58.00	0.91
0.4700	56.62	0.94	57.31	0.92
0.4800	56.58	0.94	57.14	0.92
0.4900	56.54	0.94	57.23	0.91
0.5000	56.51	0.94	57.40	0.94
0.5100	56.47	0.94	57.39	0.95
0.5200	56.43	0.95	56.80	0.95
0.5300	56.39	0.95	56.52	0.96
0.5400	56.35	0.95	56.55	0.96
0.5500	56.31	0.95	56.61	0.98

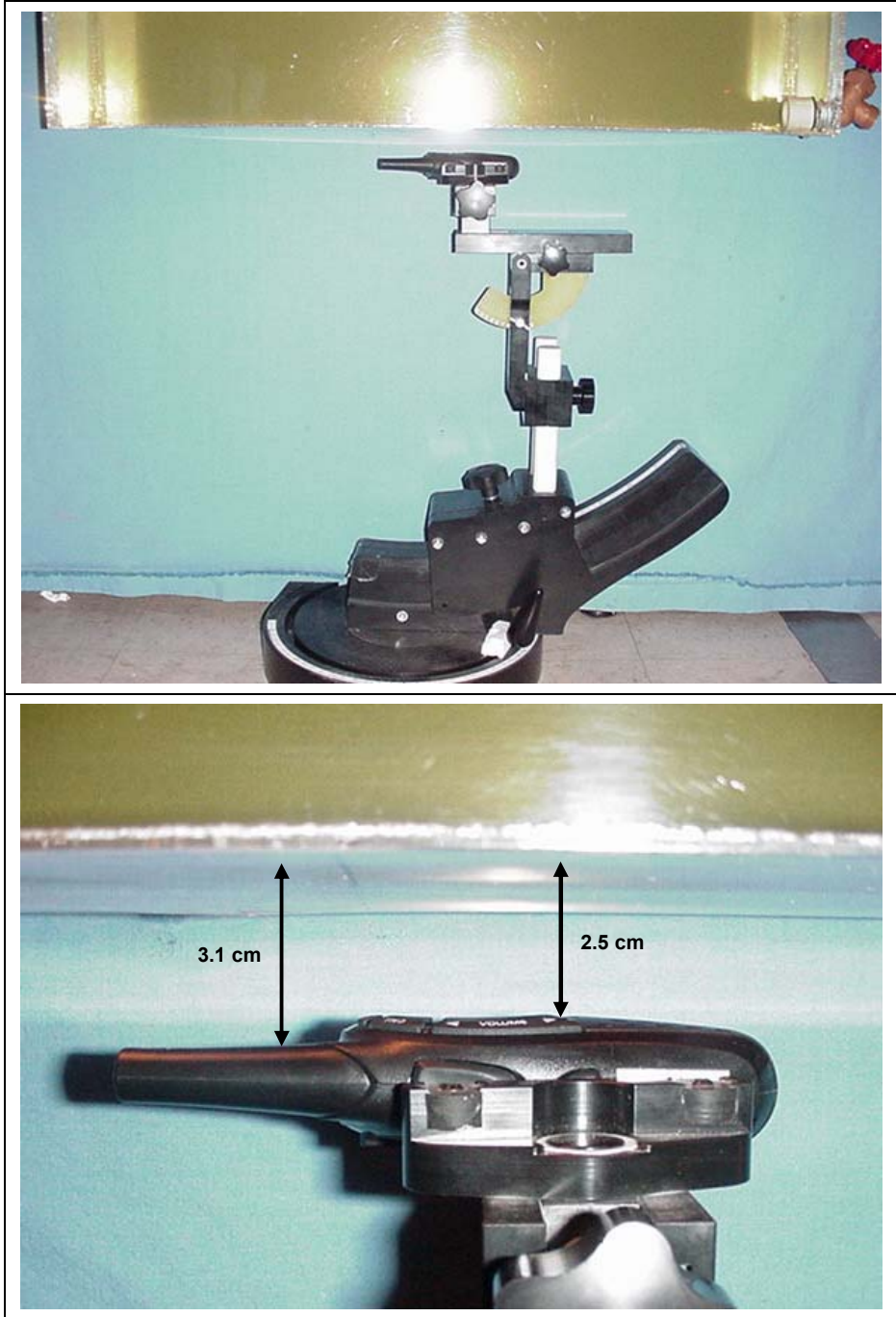
Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX D - SAR TEST SETUP & DUT PHOTOGRAPHS

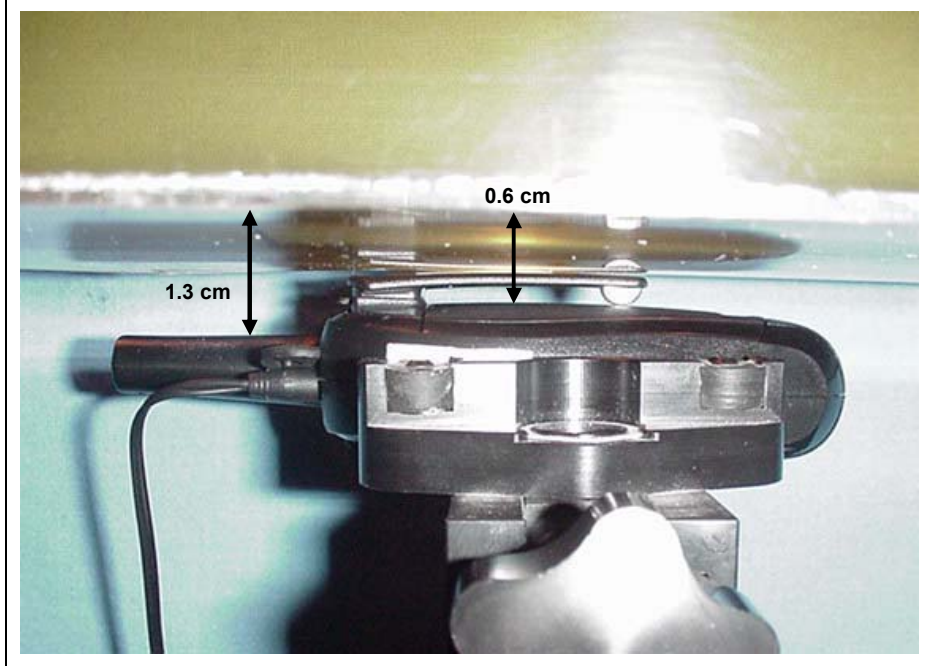
	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	



FACE-HELD SAR TEST SETUP PHOTOGRAPHS
 2.5 cm Spacing from Front of DUT to Planar Phantom



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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BODY-WORN SAR TEST SETUP PHOTOGRAPHS
0.6 cm Belt-Clip Spacing from Back of DUT to Planar Phantom
DUT with Earbud Lapel-Microphone Audio Accessory



	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	


DUT PHOTOGRAPHS





Front Side of DUT	Back Side of DUT	Back Side of DUT with Plastic Belt-Clip
-------------------	------------------	---




Top End of DUT	Bottom End of DUT
----------------	-------------------



Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

DUT PHOTOGRAPHS

			
<p style="text-align: center;">Left Side of DUT with Plastic Belt-Clip</p>			
			
<p style="text-align: center;">Right Side of DUT with Plastic Belt-Clip</p>			
			
<p style="text-align: center;">DUT Battery Housing</p>		<p style="text-align: center;">DUT with Ni-MH AAA Batteries</p>	
			
		<p style="text-align: center;">DUT with Alkaline AAA Batteries</p>	

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	


DUT PHOTOGRAPHS





DUT with ruler



DUT with Earbud Lapel-Microphone Audio Accessory (P/N: GA-EBM2)

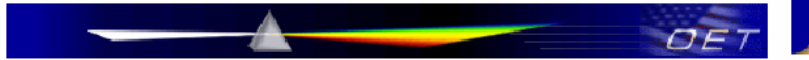
Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	<u>Date(s) of Evaluation</u> October 15, 2009	<u>Test Report Serial No.</u> 101409BBO-T988-S95U	<u>Test Report Revision No.</u> Rev. 1.0 (Initial Release)	 Test Lab Certificate No. 2470.01
	<u>Test Report Issue Date</u> October 21, 2009	<u>Description of Test(s)</u> Specific Absorption Rate	<u>RF Exposure Category</u> General Population	

APPENDIX E - DIPOLE CALIBRATION (FCC KDB 250418) & PROBE CALIBRATION



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Office of Engineering and Technology

Inquiry:

Uploading 300 MHz and 450 MHz Dipole Calibration Reports

Response:

FCC confirmation attached for Celltech Labs Dipoles with following identifications:

Serial #: 136 / 450 MHz / Head Tissue-Equivalent Medium / Expires 02/28/2010
 Serial #: 135 / 300 MHz / Head Tissue-Equivalent Medium / Expires 02/28/2010

A copy of the confirmation and corresponding Dipole Report(s) are required to be included in SAR reports of applicable equipment certification filings. Each filing must have KDB tracking number 250418 included on 731 Form.



The dipoles listed below have prior coordination with the FCC Lab for use in SAR system validation and verification by Celltech Labs through February 2010. The SAR target values, specific operating parameters and identifications are indicated below. SAR measurements using these dipoles must be in accordance with the parameters specified below; for example, phantom shell and tissue dielectric requirements etc. These will be verified during each equipment certification by the FCC or TCB, according to measurement protocols required for testing the specific device and wireless technology, to support the test methodologies and measurement results.


This confirmation and copies of the dipole calibration reports are required to be included in SAR reports for equipment certification containing SAR system verification results involving these dipoles. The information is available and can be verified through the KDB inquiry tracking number provided to Celltech Labs. The same tracking number must also be included on the 731 Form of the corresponding equipment certifications.

Dipole Serial Number	136	135
Calibration Document No.	DC450H-021209-R1.2	DC300H-021209-R1.2
Frequency	450 MHz	300 MHz
Dipole Impedance	58.21 + j 5.69 Ohms	46.39 + j 6.25 Ohms
Dipole Return Loss	-20.7 dB	- 22.6 dB
Tissue-Equivalent Dielectric Type	Head	
Tissue Dielectric Constant	43.5	45.3
Tissue Conductivity	0.87 S/m	0.87 S/m
Phantom Shell Thickness	6.0 mm Plexiglas	
Phantom Shell Dielectric Constant	2.7	
Dipole Axis to Tissue Medium Separation Distance	15.175 mm	
Numerical Simulation:	FDTD	
1-g SAR Target Value	4.893 W/kg @ 1.0 W	3.019 W/kg @ 1.0 W
10-g SAR Target Value	3.263 W/kg @ 1.0 W	2.051 W/kg @ 1.0 W
SAR at Phantom Surface above Dipole Feed-Point	6.845 W/kg @ 1.0 W	4.046 W/kg @ 1.0 W
SAR at Phantom Surface at 2.0 cm offset from Dipole Feed-Point	3.101 W/kg @ 1.0 W	2.049 W/kg @ 1.0 W
Experimental Verification:	SAR Measurements	
1-g SAR Target Value	1.21 ~ 1.23 W/kg @ 0.25 W	0.753 ~ 0.765 W/kg @ 0.25 W
10-g SAR Target Value	0.787 ~ 0.803 W/kg @ 0.25W	0.503 ~ 0.509 W/kg @ 0.25 W
SAR at Phantom Surface above Dipole Feed-Point	1.93 W/kg (average) @ 0.25 W	1.20 W/kg (average) @ 0.25 W
SAR at Phantom Surface at 2.0 cm offset from Dipole Feed-Point	0.79 W/kg @ 0.25 W	0.56 W/kg @ 0.25 W

Expires February 2010

Celltech Labs Inc.

February 13, 2009

Applicant:	Cobra Electronics Corporation	FCC ID:	BBOCXT90	IC:	906B-CXT90	
Model(s):	CXT225	DUT:	Portable GMRS/FRS PTT Radio Transceiver	462.5500 - 467.7125 MHz		
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	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2	
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:

450 MHz Dipole Calibration

Type:

450 MHz Validation Dipole

Asset Number:

00024

Serial Number:

136

Place of Calibration:

Celltech Labs Inc.

Date(s) of Calibration:

Jan. 19 & Feb. 09, 2009

Celltech Labs Inc. certifies that the 450 MHz Dipole Calibration was performed on the date(s) indicated above.

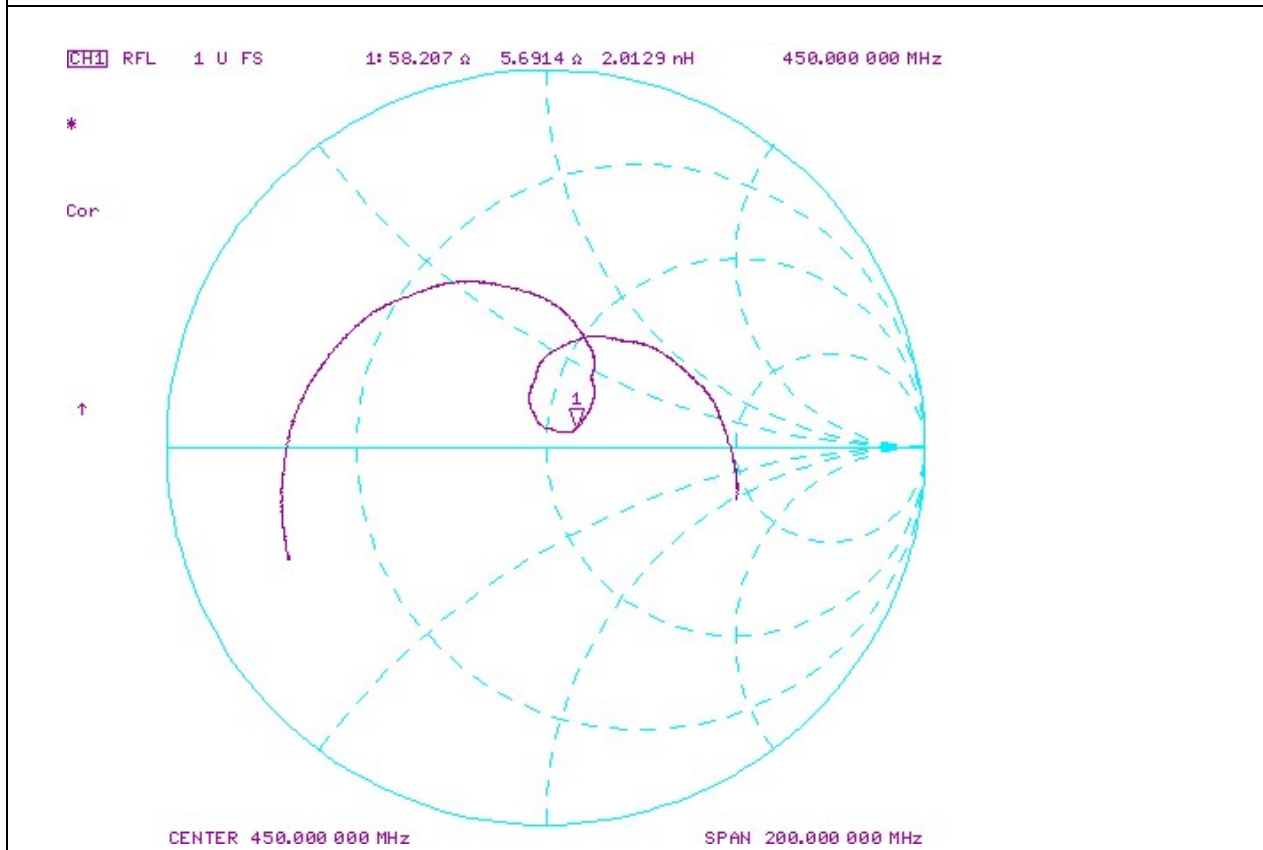
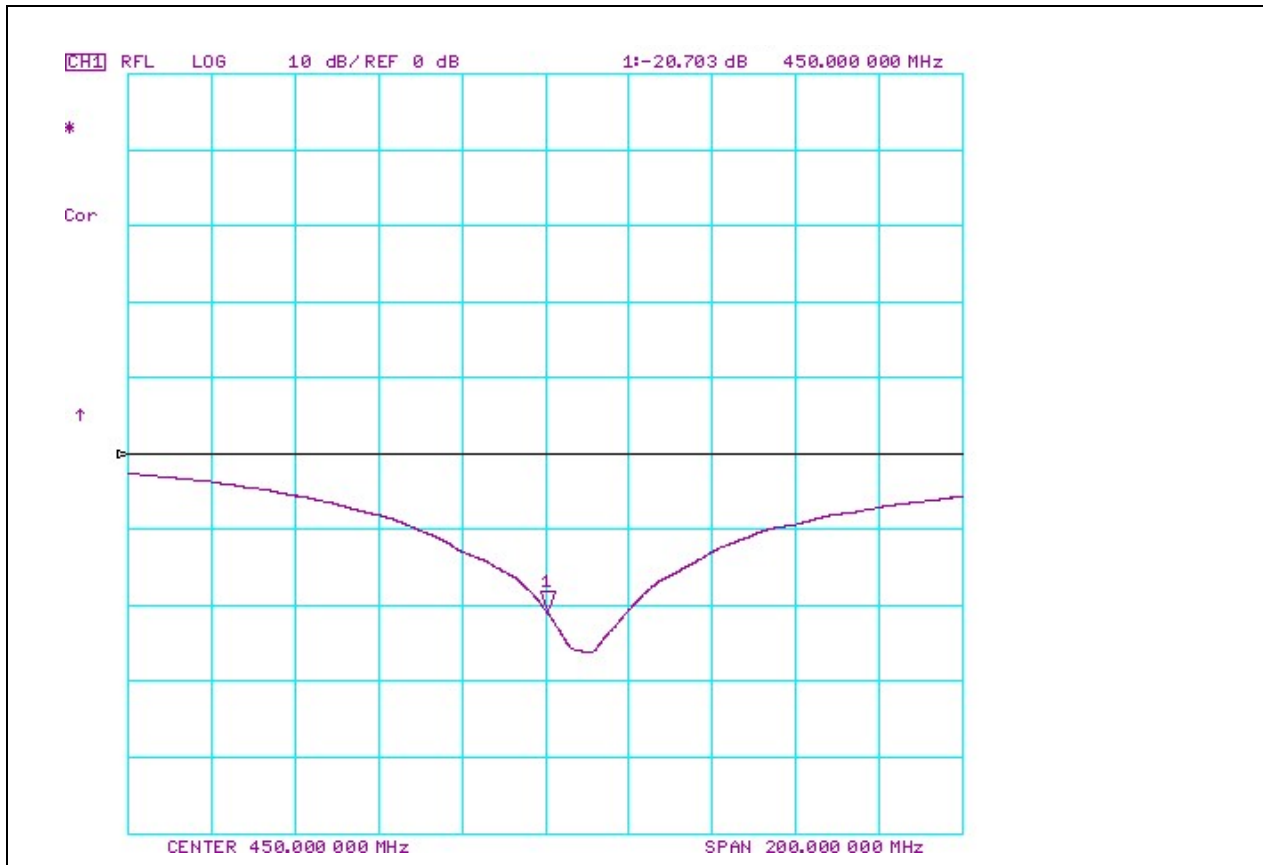
Calibrated by:

Sean Johnston

Signature:



2. Validation Dipole VSWR Data



	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2	
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type: Head

3. Validation Dipole Dimensions

Dimension	IEEE 1528 (mm)	Measured (mm)	Difference (mm)	Tolerance (1528 1%)
L (mm)	270.0	272.7	+2.7	+1%
h (mm)	166.7	167.0	+0.3	+0.2%
d (mm)	6.35	6.36	+0.01	+0.2%

The L, h and d dimensions should be within $\pm 1\%$ tolerance per 1528-2003.

4. Validation Phantom

The validation phantom (planar) was constructed using relatively low-loss tangent Plexiglas material. The dielectric constant used for the numerical analysis was 2.7. The typical range of 2.5 - 3 was selected and the mean of this value was used for the simulation.

The inner dimensions of the validation 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 $6.0 \pm 0.1\text{mm}$ Plexiglas.

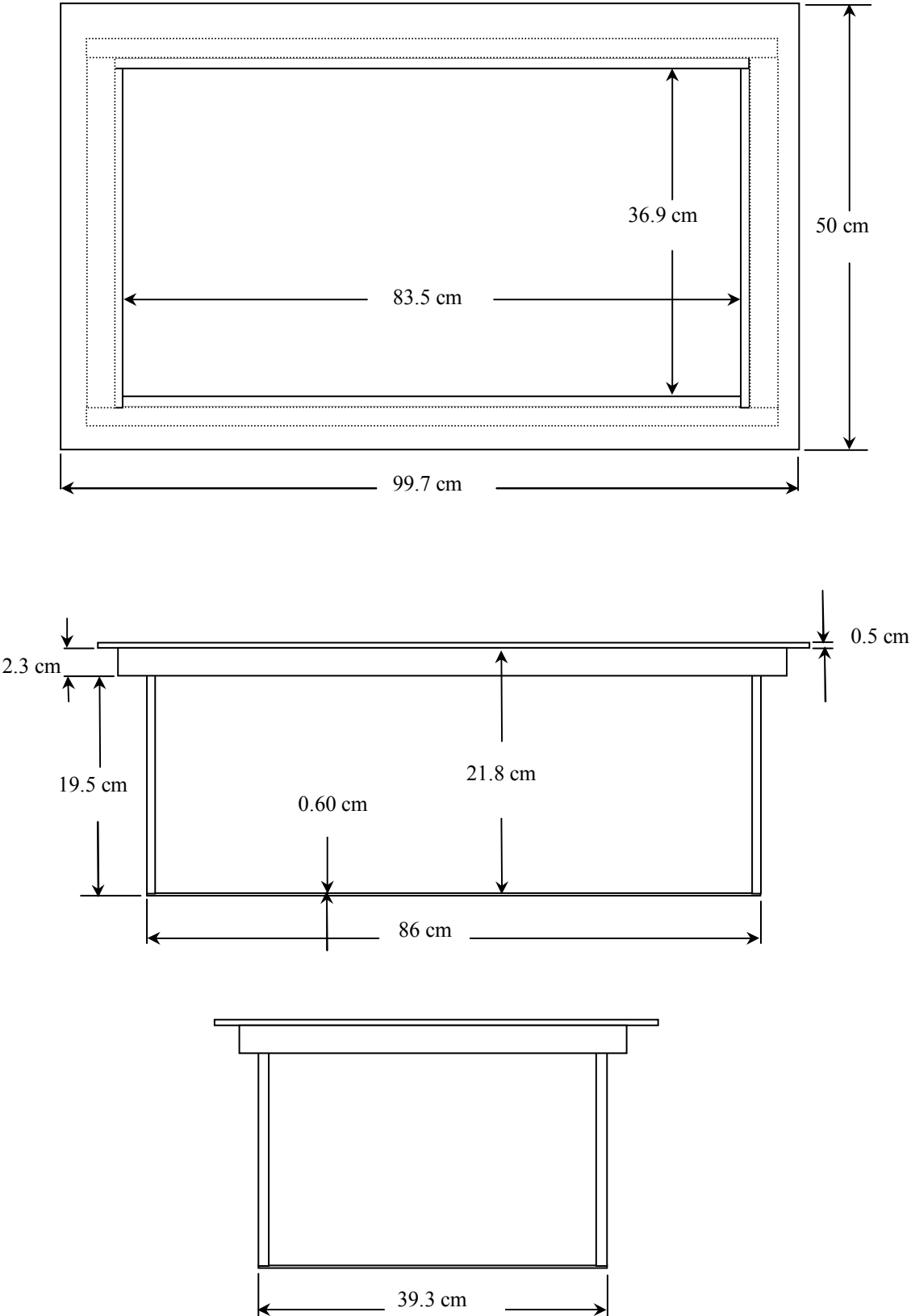
$$s = 3.175\text{mm}(d/2) + 6.0\text{mm}(\text{phantom}) + 6.0\text{mm}(\text{spacer}) = 15.175\text{mm}$$

5. Test Equipment List

TEST EQUIPMENT	ASSET NO.	SERIAL NO.	DATE OF CAL.	CAL. DUE DATE
SPEAG DASY4 Measurement Server	00158	1078	CNR	CNR
SPEAG Robot	00046	599396-01	CNR	CNR
SPEAG DAE4	00019	353	22Apr08	22Apr09
SPEAG ET3DV6 E-Field Probe	00017	1590	21Jul08	21Jul09
Plexiglas Validation Planar Phantom	00157	137	CNR	CNR
HP 85070C Dielectric Probe Kit	00033	US39240170	CNR	CNR
Gigatronics 8652A Power Meter	00007	1835272	23Apr08	23Apr09
Gigatronics 80701A Power Sensor	00014	1833699	23Apr08	23Apr09
HP 8753ET Network Analyzer	00134	US39170292	28Apr08	28Apr09
HP 8648D Signal Generator	00005	3847A00611	CNR	CNR
Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
CNR = Calibration Not Required				

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2	
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:

6. Dimensions of Plexiglas Planar Validation Phantom



	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

7. Plexiglas Planar Validation Phantom



	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

8. 450 MHz Validation Dipole



	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

9. SAR Target Validation

Parameter																Result				
	Frequency (MHz)	Shell thickness (mm)	Shell permittivity	Shell permeability	Shell Conductivity (σ) (S/m)	Phantom dimensions (mm) [x, y, z]	Liquid Relative permittivity	Liquid Conductivity (σ) (S/m)	Liquid permeability	Reference dipole distances from the liquid (mm)	Spacer (mm)	Dipole L (mm)	Dipole h (mm)	Dipole d (mm)	Distance between dipole feedpoint gap S1 (mm)	Distance between dipole balun elements S2 (mm)	1 g SAR (1 Watt)	10 g SAR (1 Watt)	Local SAR at surface (above feed-point)	Local SAR at surface (y = 2 cm offset from feed-point)
SEMCAD Simulation	450	6	2.7	1	0	700, 600, 170	43.5	0.87	1	15.175	6	270	166.7	6.35	1	4	4.893	3.263	6.845	3.101
																CELLTECH TARGET				
																1.223 W/kg	1g	0.25 W		
																0.816 W/kg	10g	0.25 W		

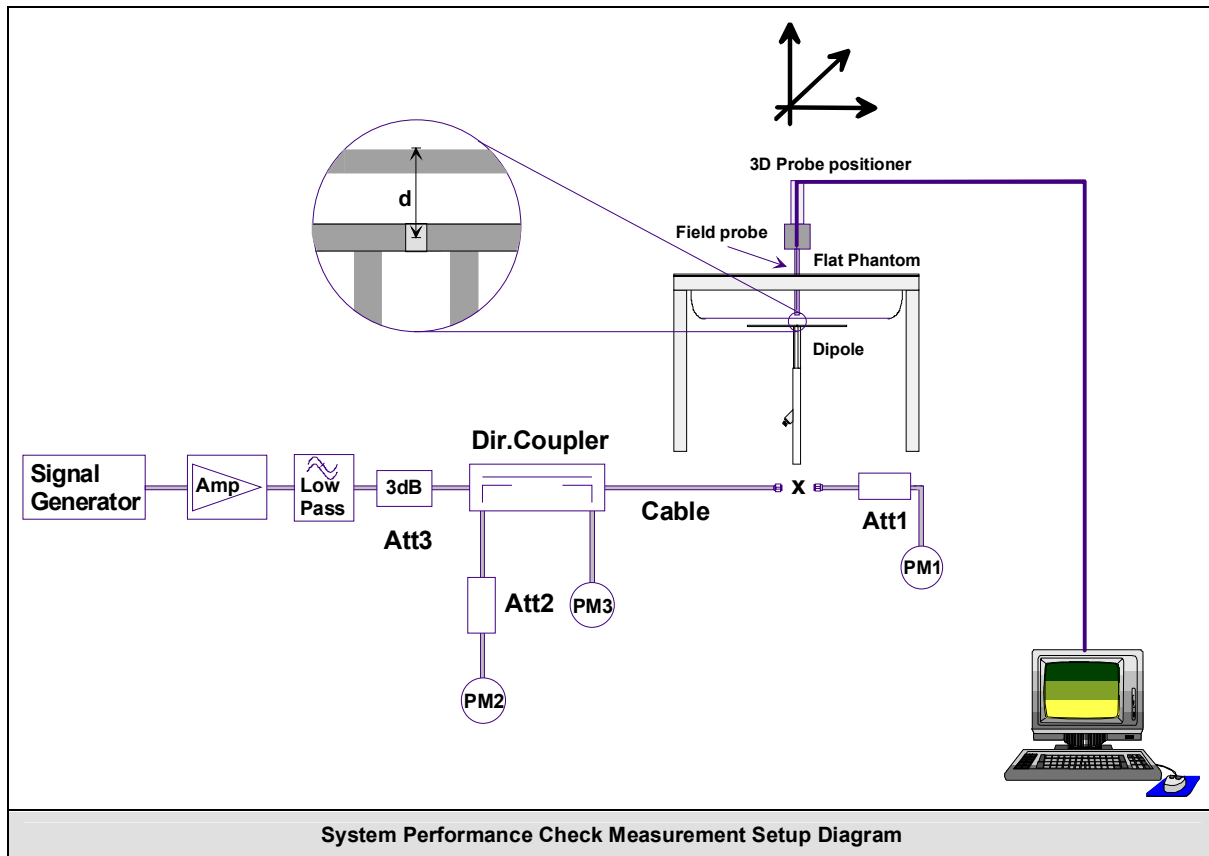
- Standard dipole dimensions used in simulation per 1528-2003 mechanical dimensions of the reference dipole.
- Reference distance from liquid is actual measured distance.

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

10. SAR Measurement

Measurements were made using a dosimetric E-field probe ET3DV6 (S/N: 1590, Conversion Factor 7.66). 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 procedures described below.

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.



	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

11. Measurement Conditions

The validation phantom was filled with 450 MHz Head tissue simulant.

Relative Permittivity: 43.8 (+0.7% deviation from target)
 Conductivity: 0.86 mho/m (-1.1% deviation from target)
 Fluid Temperature: 22.1°C (Start of Test) / 22.3°C (End of Test)
 Fluid Depth: ≥ 15.0 cm

Environmental Conditions:

Ambient Temperature: 23.1°C
 Barometric Pressure: 101.1 kPa
 Humidity: 35%

The 450 MHz Head tissue simulant consisted of the following ingredients:

Ingredient	Percentage by weight	
Water	38.56%	
Sugar	56.32%	
Salt	3.95%	
HEC	0.98%	
Dowicil 75	0.19%	
IEEE/IEC Target Dielectric Parameters (450 MHz):	$\epsilon_r = 43.5 (+/- 5\%)$	$\sigma = 0.87 \text{ S/m } (+/- 5\%)$

12. System Performance Check SAR Results

SAR @ 0.25W Input averaged over 1g (W/kg)				SAR @ 1W Input averaged over 1g (W/kg)			
Validation Target (450)	Measured	Deviation		Validation Target (450)	Measured	Deviation	
1.223	+/- 10%	1.216	-0.57%	4.892	+/- 10%	4.864	-0.57%
SAR @ 0.25W Input averaged over 10g (W/kg)				SAR @ 1W Input averaged over 10g (W/kg)			
Validation Target (450)	Measured	Deviation		Validation Target (450)	Measured	Deviation	
0.816	+/- 10%	0.799	-2.08%	3.264	+/- 10%	3.196	-2.08%

450 MHz System Performance Check @ 250mW (1g)					
	SAR 1g (mW/g)	Deviation From 450 MHz Numerical Simulation (1.223 mW/g)	STDEV	Mean	Coefficient of Variation
Test 1	1.21	-1.06%	0.008	1.216	0.007
Test 2	1.22	-0.25%			
Test 3	1.22	-0.25%			
Test 4	1.21	-1.06%			
Test 5	1.22	-0.25%			
Test 6	1.20	-1.88%			
Test 7	1.22	-0.25%			
Test 8	1.22	-0.25%			
Test 9	1.23	0.57%			
Test 10	1.21	-1.06%			
	1.216	-0.57%			

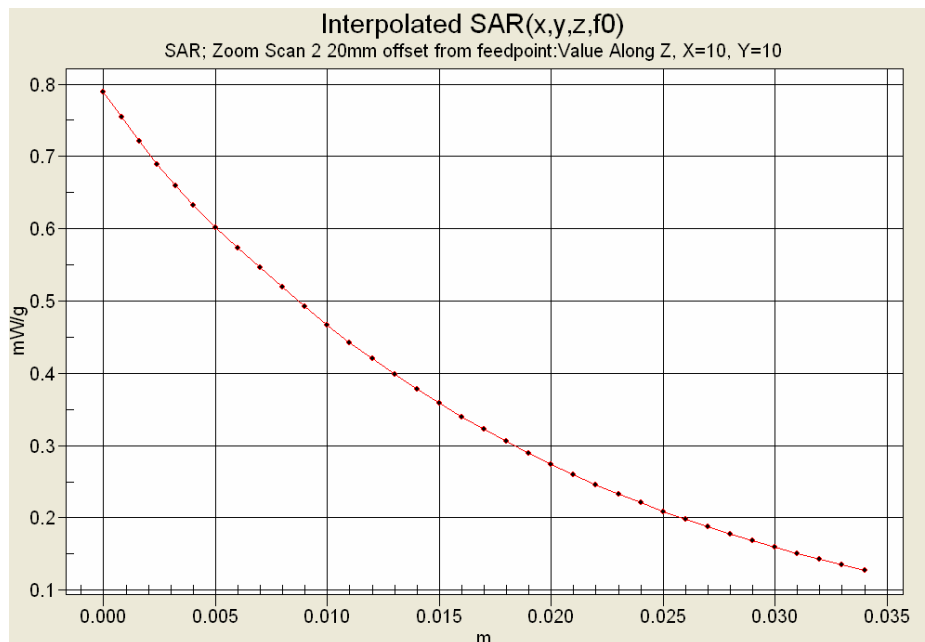
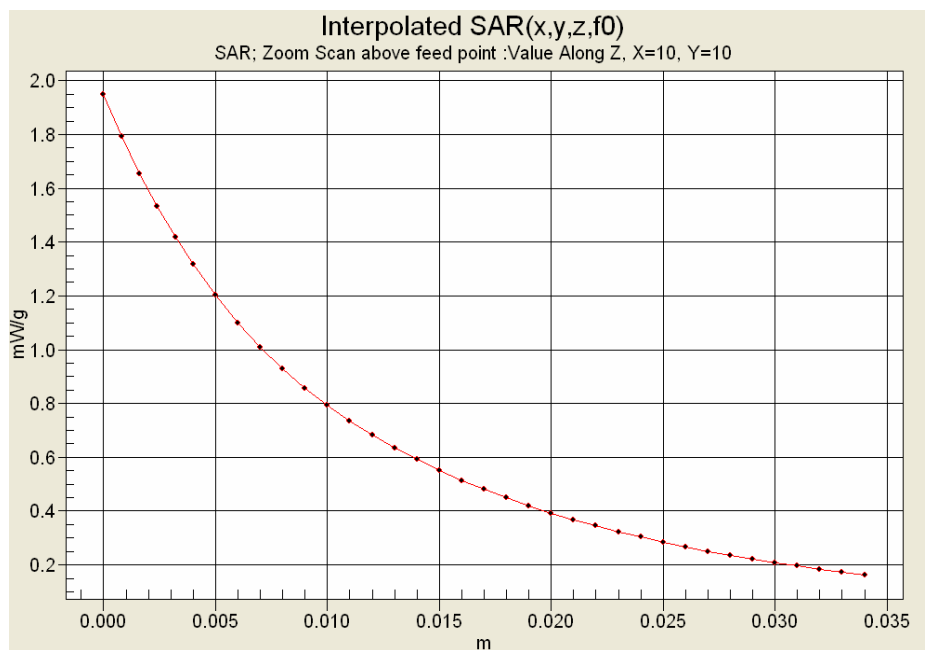
450 MHz System Performance Check @ 250mW (10g)					
	SAR 10g (mW/g)	Deviation From 450 MHz Numerical Simulation (0.816 mW/g)	STDEV	Mean	Coefficient of Variation
Test 1	0.799	-2.08%	0.006	0.799	0.007
Test 2	0.800	-1.96%			
Test 3	0.803	-1.59%			
Test 4	0.796	-2.45%			
Test 5	0.801	-1.84%			
Test 6	0.793	-2.82%			
Test 7	0.802	-1.72%			
Test 8	0.802	-1.72%			
Test 9	0.807	-1.10%			
Test 10	0.787	-3.55%			
	0.799	-2.08%			

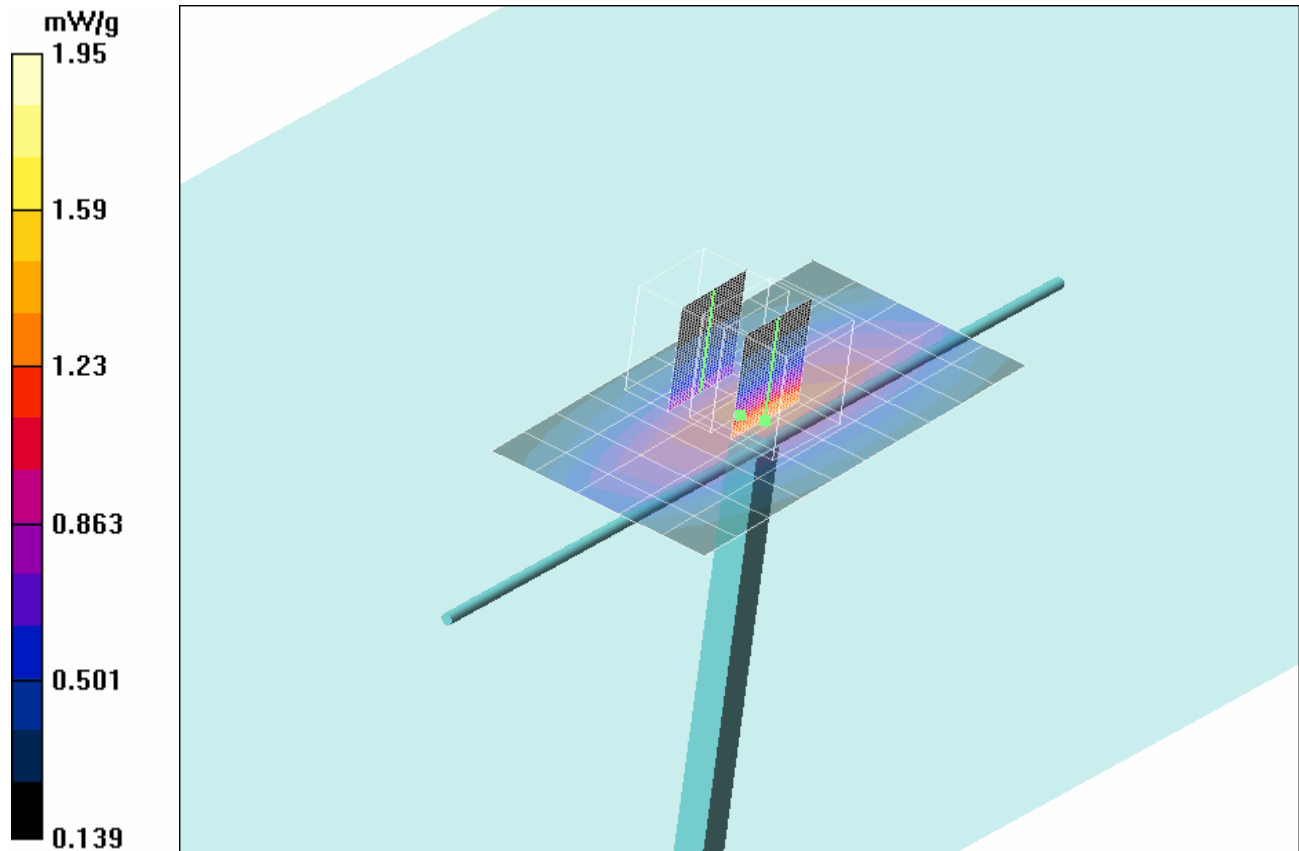
b) Extrapolation Routine:

The zoom scan routine was used to extrapolate the peak SAR above the feed point and offset at 20mm. Two zoom scans were used, the first centered above the feedpoint and the second offset 20mm. The interpolated SAR at these points are shown in the table below. Note: Center point of zoom scan located at x=10, y=10.

Measurement Location	Measured SAR mW/g	SAR 1W Normalized	Peak Target mW/g	Deviation	System Performance Check Expanded Uncertainty +/-%
Feed Point	1.93*	7.72	6.85	12.7%	17.86
2 cm Offset	0.79	3.16	3.10	1.9%	17.86

*Note: measured SAR level is the average from the 10 evaluations





	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

System Performance Check - 450 MHz Dipole - HSL

DUT: Dipole 450 MHz; Asset: 00024; Serial: 136

Ambient Temp: 23.1°C; Fluid Temp: 22.1°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW

Frequency: 450 MHz; Duty Cycle: 1:1

Medium: HSL450 Medium parameters used: $f = 450$ MHz; $\sigma = 0.86$ mho/m; $\epsilon_r = 43.8$; $\rho = 1000$ kg/m³

- Probe: ET3DV6 - SN1590; ConvF(7.66, 7.66, 7.66); Calibrated: 21/07/2008

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

- Electronics: DAE4 Sn353; Calibrated: 22/04/2008

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

- Measurement SW: DASy4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

450 MHz Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.20 mW/g

450 MHz Zoom Scan 1 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 39.6 V/m; Power Drift = -0.035 dB

Peak SAR (extrapolated) = 1.92 W/kg

SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.799 mW/g

Maximum value of SAR (measured) = 1.30 mW/g

450 MHz Zoom Scan 2 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 39.5 V/m; Power Drift = -0.022 dB

Peak SAR (extrapolated) = 1.93 W/kg

SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.800 mW/g

Maximum value of SAR (measured) = 1.30 mW/g

450 MHz Zoom Scan 3 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 39.4 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 1.92 W/kg

SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.803 mW/g

Maximum value of SAR (measured) = 1.30 mW/g

450 MHz Zoom Scan 4 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 39.3 V/m; Power Drift = 0.001 dB

Peak SAR (extrapolated) = 1.92 W/kg

SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.796 mW/g

Maximum value of SAR (measured) = 1.29 mW/g

450 MHz Zoom Scan 5 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 39.5 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 1.94 W/kg

SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.801 mW/g

Maximum value of SAR (measured) = 1.32 mW/g

450 MHz Zoom Scan 6 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 39.3 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 1.90 W/kg

SAR(1 g) = 1.20 mW/g; SAR(10 g) = 0.793 mW/g

Maximum value of SAR (measured) = 1.29 mW/g

450 MHz Zoom Scan 7 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 39.4 V/m; Power Drift = 0.006 dB

Peak SAR (extrapolated) = 1.94 W/kg

SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.802 mW/g

Maximum value of SAR (measured) = 1.31 mW/g

450 MHz Zoom Scan 8 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 39.7 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 1.93 W/kg

SAR(1 g) = 1.22 mW/g; SAR(10 g) = 0.802 mW/g

Maximum value of SAR (measured) = 1.30 mW/g

450 MHz Zoom Scan 9 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 39.6 V/m; Power Drift = -0.009 dB

Peak SAR (extrapolated) = 1.95 W/kg

SAR(1 g) = 1.23 mW/g; SAR(10 g) = 0.807 mW/g

Maximum value of SAR (measured) = 1.32 mW/g

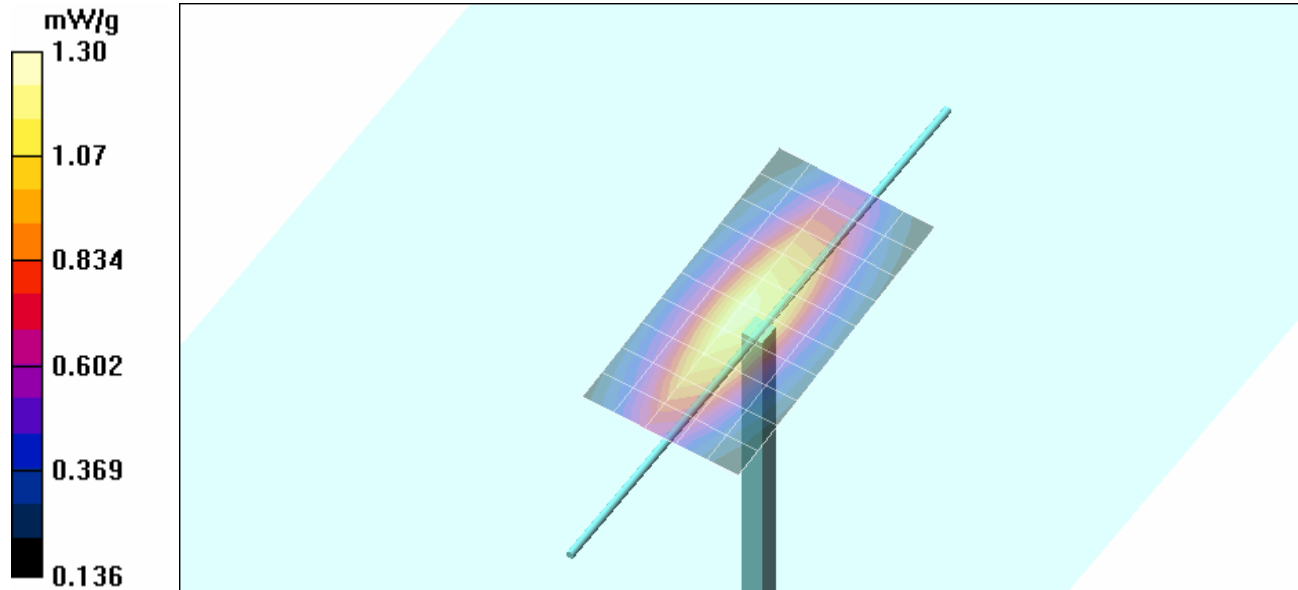
450 MHz Zoom Scan 10 (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm

Reference Value = 39.3 V/m; Power Drift = 0.007 dB

Peak SAR (extrapolated) = 1.92 W/kg

SAR(1 g) = 1.21 mW/g; SAR(10 g) = 0.787 mW/g

Maximum value of SAR (measured) = 1.29 mW/g



13. Measured Fluid Dielectric Parameters

450 MHz (Head)

Celltech Labs Inc.

Test Result for UIM Dielectric Parameter

19/Jan/2009

Frequency (GHz)

IEEE_eH IEEE 1528-2003 Limits for Head Epsilon

IEEE_sH IEEE 1528-2003 Limits for Head Sigma

Test_e Epsilon of UIM

Test_s Sigma of UIM

Freq	FCC_eH	FCC_sH	Test_e	Test_s
0.3500	44.70	0.87	44.61	0.78
0.3600	44.58	0.87	46.57	0.79
0.3700	44.46	0.87	45.58	0.79
0.3800	44.34	0.87	44.52	0.80
0.3900	44.22	0.87	44.68	0.82
0.4000	44.10	0.87	44.30	0.83
0.4100	43.98	0.87	43.79	0.84
0.4200	43.86	0.87	44.67	0.85
0.4300	43.74	0.87	43.93	0.86
0.4400	43.62	0.87	43.86	0.86
0.4500	43.50	0.87	43.79	0.86
0.4600	43.45	0.87	43.00	0.86
0.4700	43.40	0.87	42.82	0.88
0.4800	43.34	0.87	42.69	0.89
0.4900	43.29	0.87	42.38	0.91
0.5000	43.24	0.87	42.02	0.90
0.5100	43.19	0.87	42.04	0.92
0.5200	43.14	0.88	42.26	0.95
0.5300	43.08	0.88	41.66	0.94
0.5400	43.03	0.88	41.84	0.95
0.5500	42.98	0.88	41.33	0.96

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

14. Measurement Uncertainties

UNCERTAINTY BUDGET FOR SYSTEM PERFORMANCE CHECK									
Uncertainty Component	IEEE 1528 Section	Uncertainty Value ±%	Probability Distribution	Divisor	ci 1g	ci 10g	Uncertainty Value ±% (1g)	Uncertainty Value ±% (10g)	V _i or V _{eff}
Measurement System									
Probe Calibration (450 MHz)	E.2.1	6.65	Normal	1	1	1	6.65	6.65	∞
Axial Isotropy	E.2.2	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
Hemispherical Isotropy	E.2.2	0	Rectangular	1.732050808	1	1	0.0	0.0	∞
Boundary Effect	E.2.3	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Linearity	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
System Detection Limits	E.2.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Readout Electronics	E.2.6	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	E.2.7	0	Rectangular	1.732050808	1	1	0.0	0.0	∞
Integration Time	E.2.8	0	Rectangular	1.732050808	1	1	0.0	0.0	∞
RF Ambient Conditions	E.6.1	3	Rectangular	1.732050808	1	1	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	E.6.2	0.4	Rectangular	1.732050808	1	1	0.2	0.2	∞
Probe Positioning wrt Phantom Shell	E.6.3	2.9	Rectangular	1.732050808	1	1	1.7	1.7	∞
Extrapolation, interpolation & integration algorithms for max. SAR evaluation	E.5	1	Rectangular	1.732050808	1	1	0.6	0.6	∞
Dipole									
Dipole Positioning	E.4.2	2	Normal	1.732050808	1	1	1.2	1.2	∞
SAR Drift Measurement	6.6.2	0.5	Normal	1.732050808	1	1	0.3	0.3	∞
Phantom and Tissue Parameters									
Phantom Uncertainty	E.3.1	4	Rectangular	1.732050808	1	1	2.3	2.3	∞
Liquid Conductivity (target)	E.3.2	5	Rectangular	1.732050808	0.64	0.43	1.8	1.2	∞
Liquid Conductivity (measured)	E.3.3	1.1	Normal	1	0.64	0.43	0.7	0.5	∞
Liquid Permittivity (target)	E.3.2	5	Rectangular	1.732050808	0.6	0.49	1.7	1.4	∞
Liquid Permittivity (measured)	E.3.3	0.7	Normal	1	0.6	0.49	0.4	0.3	∞
Combined Standard Uncertainty			RSS				8.93	8.75	
Expanded Uncertainty (95% Confidence Interval)			k=2				17.86	17.50	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005									

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

15. Dipole Calibration History

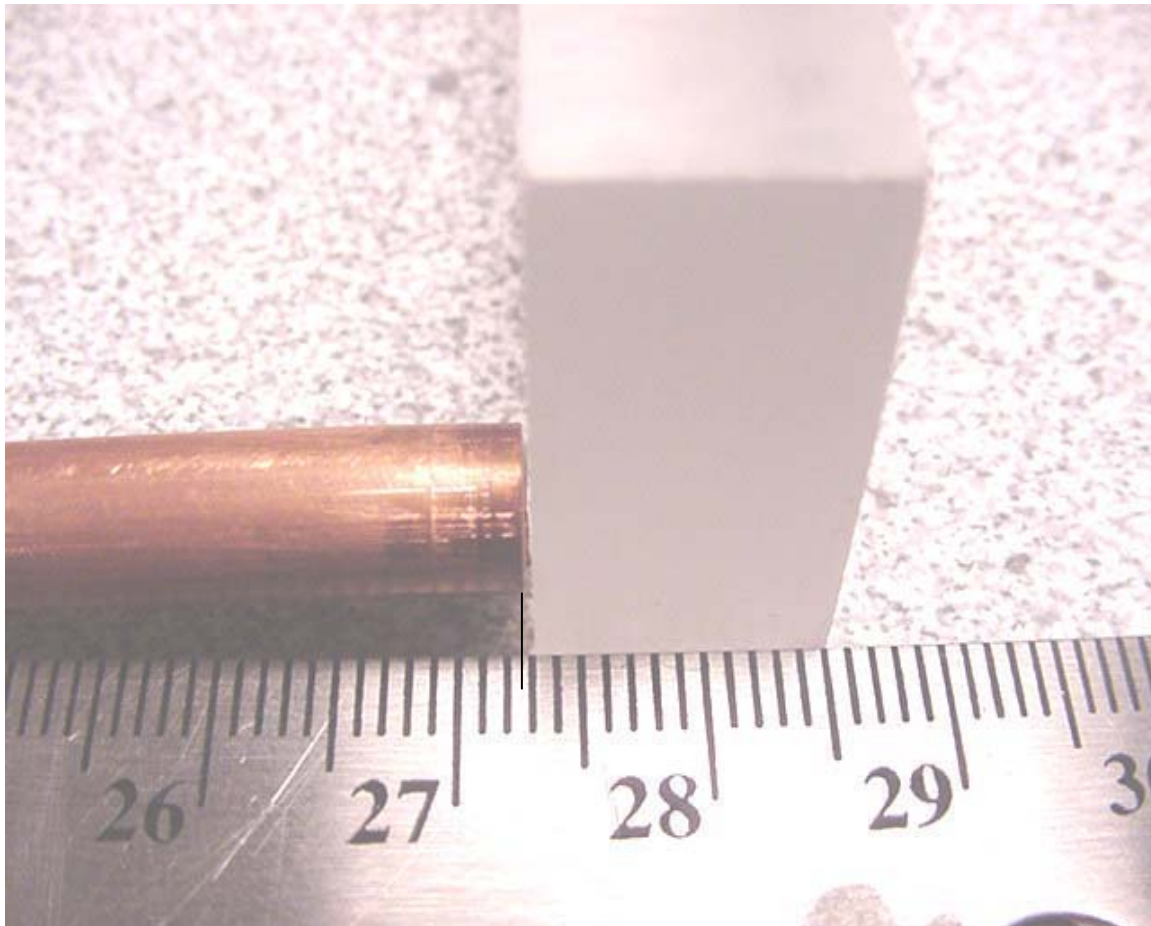
450 MHz Dipole Calibration History										
Dipole Calibration Date	SAR Probe Information			Celltech Measured Data						
	Serial Number	Calibration Factor	Calibration Procedure	SAR (W/kg) Measured at 250 mW	% Deviation from IEEE 1528 Target (4.9 W/kg @ 1 W)	% Deviation from Target validated by Celltech (4.893 W/kg @ 1 W)	Dielectric Parameters		RL (dB)	Impedance
							ϵ_r	σ		
2003	1387	7.50	Numerical	1.30	6.12		43.70	0.88	-22.60	49.98
2004	1387	7.50	Numerical	1.23	0.41		42.90	0.85	-23.74	54.04
2005	1387	7.50	Numerical	1.24	1.22		43.20	0.84	-20.40	58.50
2006	1387	7.40	Numerical	1.27	3.67		44.70	0.90	-21.60	56.17
2007	1387	7.00	Numerical	1.29	5.31		43.10	0.85	-22.20	55.20
2008	1387	7.32	Measured	1.19		-2.72	43.60	0.86	-23.10	55.60
2008	1590	7.66	Measured	1.18		-3.53	43.44	0.89	-20.70	58.20
2008	1590	7.66	Measured	1.22		-0.26	43.80	0.86	-20.70	58.20

Target Dielectric Parameters: $\epsilon_r = 43.5$, $\sigma = 0.87$ s/m

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

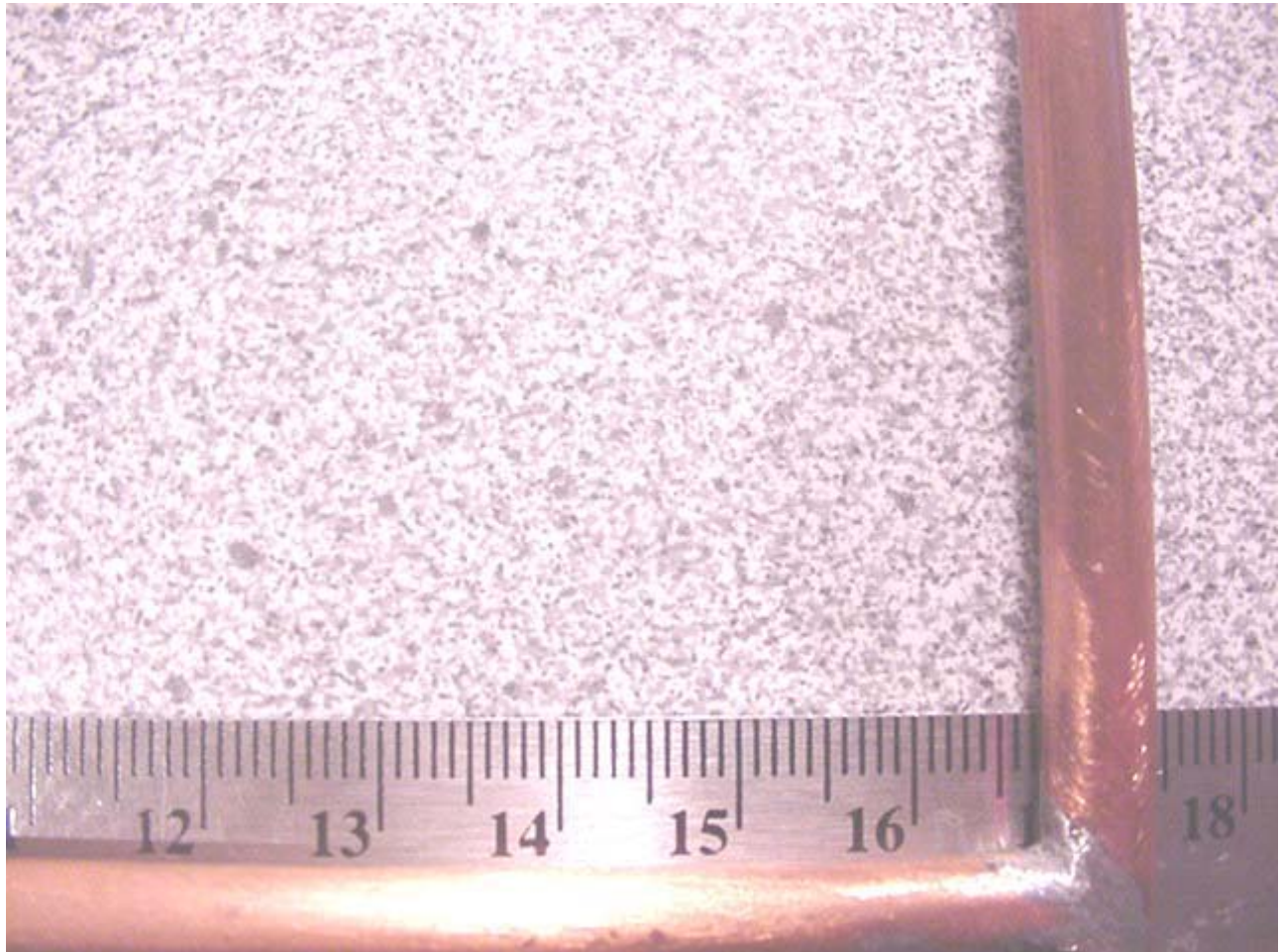
APPENDIX A - PHOTOGRAPHS

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2	
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type: Head



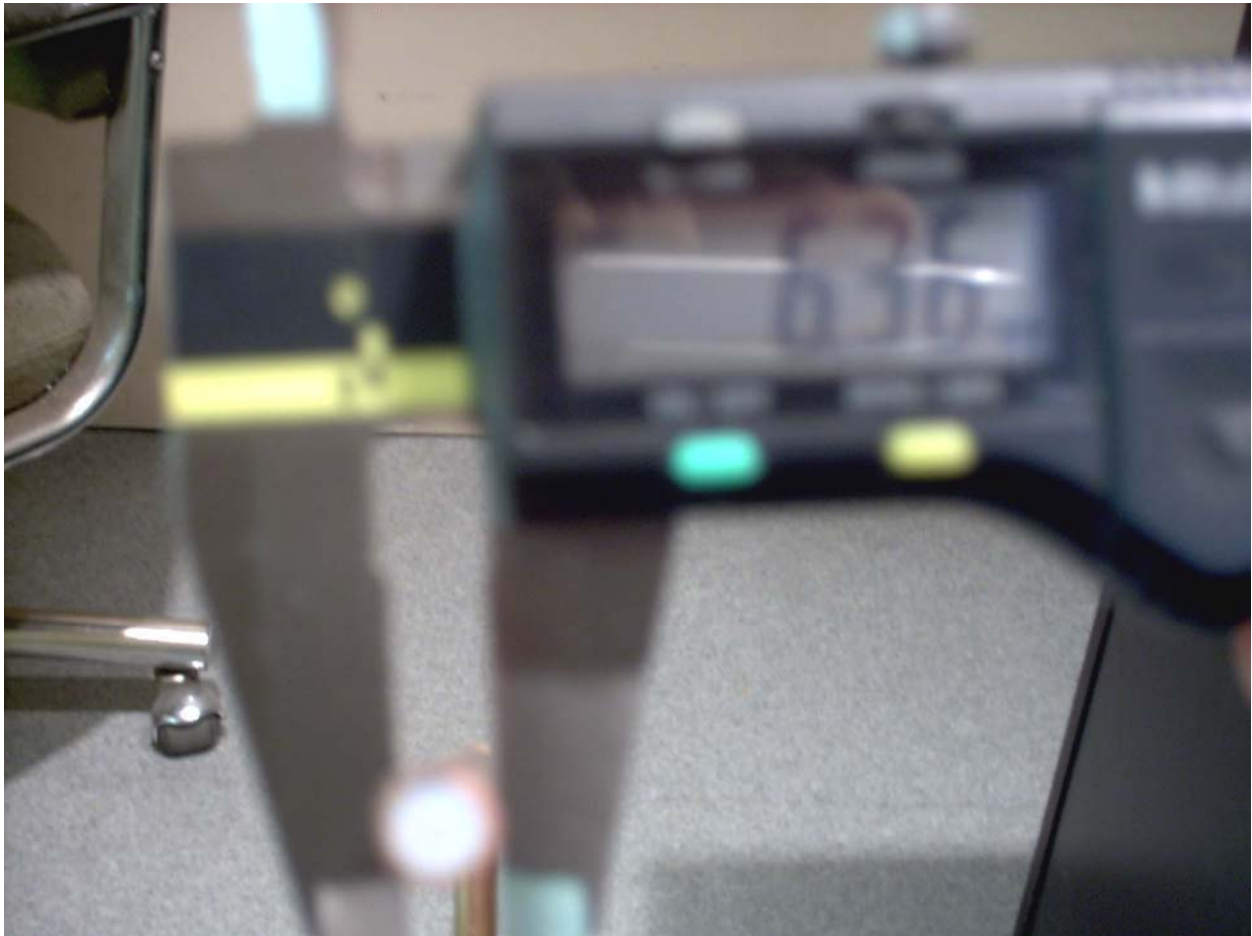
Dipole Dimension L = 272.7mm

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head



Dipole Dimension $h = 167\text{mm}$

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head



Dipole Dimension $d = 6.36\text{mm}$

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2	
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:



Dipole Spacer Dimension = 6.0mm

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

APPENDIX B - SEMCAD SIMULATION LOG FILE

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:		DC450H-021209-R1.2	
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

iSolve X, Version 13.4, Build 34, 64Bit Windows, Single Precision
Simulation name 'Dielec Const = 2.7, Low Conduct'
Maxwell Solver started the 2009-Feb-09 10:40:20.
Initializing FDTD (x1 CFL) Harmonic Simulation at 450 MHz

Overall discretization:

Smallest number of cells per wavelength = 20.202, largest = 422.988, average = 113.419
Simulation time-step = 9.781e-013 s
Simulation time-step / minimum of CFL criteria = 0.999938
Maximum of CFL criteria / minimum of CFL criteria = 64.6059
Average of CFL criteria / minimum of CFL criteria = 9.92029

Discretization by solids:

Background: epsr = 1, mur = 1, sigma = 0, sigma* = 0 - smallest number of cells per wavelength = 133.241, largest = 422.988, average = 145.219
Phantom/Shell: epsr = 2.7, mur = 1, sigma = 0, sigma* = 0 - smallest number of cells per wavelength = 81.0879, largest = 237.738, average = 120.104
Phantom/Liquid: epsr = 43.5, mur = 1, sigma = 0.87, sigma* = 0 - smallest number of cells per wavelength = 20.202, largest = 55.4378, average = 23.1303

Boundary conditions:

Side X-: U-PML(8)
Side X+: U-PML(8)
Side Y-: U-PML(8)
Side Y+: U-PML(8)
Side Z-: U-PML(8)
Side Z+: U-PML(8)

Grid:

Number of nodes=285x233x175, number of voxels=11464512

Excitations:

Initializing (Voltage) edge source Quelle
Overall duration : 3.33333e-008 s or 34080 iterations

Probes & Sensors:

Initializing near-field sensor lg
Initializing near-field sensor lg
Initializing near to far field transformation
Initializing near-field sensor Overall Field
Initializing near-field sensor Unnamed
Initializing port sensor Sensor of Quelle
Initializing port sensor TDSensor
Initializing port sensor FDSensor
Initializing port sensor ObererSensor

Enable monitoring:

Sensor of Quelle, V(t)
Sensor of Quelle, I(t)
TDSensor, V(t)
TDSensor, I(t)
FDSensor, V(t)
FDSensor, I(t)
ObererSensor, V(t)
ObererSensor, I(t)

Checking out the license feature ISOLVEX_SOLVER_FDTD, expiring the 1-mar-2009, version 10.0, (1).

Calculating update coefficients:

Created thread pool with 2 thread(s).
Calculating update coefficients: completed. Time: 17.8 seconds.

Hardware acceleration not used, please contact SPEAG for more information.

Yee (explicit) iterations starting using U-PML Boundary Condition.

0% - iterations: 8 / 34079 - [9.38 MCells/s] - Estimated time to completion: 11:34:02
0% - iterations: 16 / 34079 - [7.64 MCells/s] - Estimated time to completion: 14:11:34
0% - iterations: 24 / 34079 - [8.34 MCells/s] - Estimated time to completion: 13:00:25
0% - iterations: 32 / 34079 - [7.64 MCells/s] - Estimated time to completion: 14:11:10
0% - iterations: 43 / 34079 - [11.5 MCells/s] - Estimated time to completion: 09:27:16
0% - iterations: 53 / 34079 - [10.4 MCells/s] - Estimated time to completion: 10:23:48
0% - iterations: 62 / 34079 - [9.38 MCells/s] - Estimated time to completion: 11:32:56

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:		DC450H-021209-R1.2	
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

0% - iterations: 70 / 34079 - [8.34 MCells/s] - Estimated time to completion: 12:59:22
0% - iterations: 77 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:50:31
0% - iterations: 84 / 34079 - [6.69 MCells/s] - Estimated time to completion: 16:11:17
0% - iterations: 91 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:50:09
0% - iterations: 100 / 34079 - [9.38 MCells/s] - Estimated time to completion: 11:32:09
0% - iterations: 110 / 34079 - [10.4 MCells/s] - Estimated time to completion: 10:22:45
0% - iterations: 118 / 34079 - [8.34 MCells/s] - Estimated time to completion: 12:58:16
0% - iterations: 126 / 34079 - [7.64 MCells/s] - Estimated time to completion: 14:08:49
0% - iterations: 133 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:49:03
0% - iterations: 140 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:48:52
0% - iterations: 147 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:48:41
0% - iterations: 154 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:48:30
0% - iterations: 161 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:48:19
0% - iterations: 170 / 34079 - [9.38 MCells/s] - Estimated time to completion: 11:30:44
1% - iterations: 179 / 34079 - [9.38 MCells/s] - Estimated time to completion: 11:30:33
1% - iterations: 186 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:47:40
1% - iterations: 191 / 34079 - [5.21 MCells/s] - Estimated time to completion: 20:42:33
1% - iterations: 198 / 34079 - [6.69 MCells/s] - Estimated time to completion: 16:08:01
1% - iterations: 203 / 34079 - [4.78 MCells/s] - Estimated time to completion: 22:35:02
1% - iterations: 208 / 34079 - [4.78 MCells/s] - Estimated time to completion: 22:34:50
1% - iterations: 214 / 34079 - [6.25 MCells/s] - Estimated time to completion: 17:14:45
1% - iterations: 221 / 34079 - [6.69 MCells/s] - Estimated time to completion: 16:07:22
1% - iterations: 228 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:46:34
1% - iterations: 235 / 34079 - [6.69 MCells/s] - Estimated time to completion: 16:06:58
1% - iterations: 243 / 34079 - [8.34 MCells/s] - Estimated time to completion: 12:55:24
1% - iterations: 252 / 34079 - [7.94 MCells/s] - Estimated time to completion: 13:34:21
1% - iterations: 257 / 34079 - [5.21 MCells/s] - Estimated time to completion: 20:40:08
1% - iterations: 262 / 34079 - [5.21 MCells/s] - Estimated time to completion: 20:39:57
1% - iterations: 269 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:45:30
1% - iterations: 277 / 34079 - [8.34 MCells/s] - Estimated time to completion: 12:54:37
1% - iterations: 286 / 34079 - [8.6 MCells/s] - Estimated time to completion: 12:30:57
1% - iterations: 290 / 34079 - [3.82 MCells/s] - Estimated time to completion: 28:09:27
1% - iterations: 295 / 34079 - [4.78 MCells/s] - Estimated time to completion: 22:31:21
1% - iterations: 300 / 34079 - [4.78 MCells/s] - Estimated time to completion: 22:31:09
1% - iterations: 305 / 34079 - [5.21 MCells/s] - Estimated time to completion: 20:38:22
1% - iterations: 313 / 34079 - [8.34 MCells/s] - Estimated time to completion: 12:53:48
1% - iterations: 320 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:44:09
1% - iterations: 327 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:43:58
1% - iterations: 339 / 34079 - [12.5 MCells/s] - Estimated time to completion: 08:35:28
1% - iterations: 347 / 34079 - [8.34 MCells/s] - Estimated time to completion: 12:53:01
1% - iterations: 355 / 34079 - [8.34 MCells/s] - Estimated time to completion: 12:52:50
1% - iterations: 362 / 34079 - [6.69 MCells/s] - Estimated time to completion: 16:03:20
1% - iterations: 369 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:42:52
1% - iterations: 376 / 34079 - [6.69 MCells/s] - Estimated time to completion: 16:02:56
1% - iterations: 383 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:42:30
1% - iterations: 391 / 34079 - [7.64 MCells/s] - Estimated time to completion: 14:02:12
1% - iterations: 400 / 34079 - [8.6 MCells/s] - Estimated time to completion: 12:28:25
1% - iterations: 407 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:41:53
1% - iterations: 415 / 34079 - [8.34 MCells/s] - Estimated time to completion: 12:51:28
1% - iterations: 424 / 34079 - [9.38 MCells/s] - Estimated time to completion: 11:25:33
1% - iterations: 433 / 34079 - [8.6 MCells/s] - Estimated time to completion: 12:27:41
1% - iterations: 442 / 34079 - [9.38 MCells/s] - Estimated time to completion: 11:25:11
1% - iterations: 449 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:40:47
1% - iterations: 456 / 34079 - [6.69 MCells/s] - Estimated time to completion: 16:00:39
1% - iterations: 461 / 34079 - [5.21 MCells/s] - Estimated time to completion: 20:32:39
1% - iterations: 468 / 34079 - [6.69 MCells/s] - Estimated time to completion: 16:00:18
1% - iterations: 475 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:40:06
1% - iterations: 481 / 34079 - [6.25 MCells/s] - Estimated time to completion: 17:06:36
1% - iterations: 486 / 34079 - [4.78 MCells/s] - Estimated time to completion: 22:23:43
1% - iterations: 491 / 34079 - [5.21 MCells/s] - Estimated time to completion: 20:31:33
1% - iterations: 498 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:39:30
1% - iterations: 504 / 34079 - [5.73 MCells/s] - Estimated time to completion: 18:39:10
1% - iterations: 510 / 34079 - [5.29 MCells/s] - Estimated time to completion: 20:12:12
2% - iterations: 516 / 34079 - [5.73 MCells/s] - Estimated time to completion: 18:38:46
2% - iterations: 523 / 34079 - [7.3 MCells/s] - Estimated time to completion: 14:38:50
2% - iterations: 531 / 34079 - [8.34 MCells/s] - Estimated time to completion: 12:48:48
2% - iterations: 539 / 34079 - [8.34 MCells/s] - Estimated time to completion: 12:48:37
2% - iterations: 548 / 34079 - [9.38 MCells/s] - Estimated time to completion: 11:23:02
2% - iterations: 557 / 34079 - [9.38 MCells/s] - Estimated time to completion: 11:22:51
2% - iterations: 566 / 34079 - [8.6 MCells/s] - Estimated time to completion: 12:24:44
2% - iterations: 575 / 34079 - [9.38 MCells/s] - Estimated time to completion: 11:22:29

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:		DC450H-021209-R1.2	
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

62% - iterations: 21213 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:22:05
62% - iterations: 21221 / 34079 - [7.64 MCells/s] - Estimated time to completion: 05:21:27
62% - iterations: 21229 / 34079 - [8.34 MCells/s] - Estimated time to completion: 04:54:28
62% - iterations: 21238 / 34079 - [8.6 MCells/s] - Estimated time to completion: 04:45:21
62% - iterations: 21246 / 34079 - [8.34 MCells/s] - Estimated time to completion: 04:54:05
62% - iterations: 21254 / 34079 - [8.34 MCells/s] - Estimated time to completion: 04:53:54
62% - iterations: 21263 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:21:03
62% - iterations: 21271 / 34079 - [8.34 MCells/s] - Estimated time to completion: 04:53:31
62% - iterations: 21280 / 34079 - [8.6 MCells/s] - Estimated time to completion: 04:44:25
62% - iterations: 21289 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:20:32
62% - iterations: 21298 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:20:21
63% - iterations: 21307 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:20:10
63% - iterations: 21316 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:19:59
63% - iterations: 21329 / 34079 - [13.5 MCells/s] - Estimated time to completion: 02:59:48
63% - iterations: 21340 / 34079 - [10.5 MCells/s] - Estimated time to completion: 03:51:37
63% - iterations: 21349 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:19:18
63% - iterations: 21358 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:19:07
63% - iterations: 21367 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:18:56
63% - iterations: 21376 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:18:45
63% - iterations: 21383 / 34079 - [7.3 MCells/s] - Estimated time to completion: 05:32:30
63% - iterations: 21390 / 34079 - [6.69 MCells/s] - Estimated time to completion: 06:02:32
63% - iterations: 21397 / 34079 - [6.69 MCells/s] - Estimated time to completion: 06:02:20
63% - iterations: 21404 / 34079 - [6.69 MCells/s] - Estimated time to completion: 06:02:08
63% - iterations: 21411 / 34079 - [7.3 MCells/s] - Estimated time to completion: 05:31:46
63% - iterations: 21418 / 34079 - [7.3 MCells/s] - Estimated time to completion: 05:31:35
63% - iterations: 21425 / 34079 - [7.3 MCells/s] - Estimated time to completion: 05:31:24
63% - iterations: 21433 / 34079 - [8.34 MCells/s] - Estimated time to completion: 04:49:48
63% - iterations: 21442 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:17:25
63% - iterations: 21451 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:17:14
63% - iterations: 21457 / 34079 - [6.25 MCells/s] - Estimated time to completion: 06:25:40
63% - iterations: 21462 / 34079 - [5.21 MCells/s] - Estimated time to completion: 07:42:37
63% - iterations: 21467 / 34079 - [5.21 MCells/s] - Estimated time to completion: 07:42:26
63% - iterations: 21473 / 34079 - [5.29 MCells/s] - Estimated time to completion: 07:35:13
63% - iterations: 21482 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:16:36
63% - iterations: 21491 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:16:25
63% - iterations: 21499 / 34079 - [8.34 MCells/s] - Estimated time to completion: 04:48:17
63% - iterations: 21508 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:16:04
63% - iterations: 21516 / 34079 - [8.34 MCells/s] - Estimated time to completion: 04:47:54
63% - iterations: 21525 / 34079 - [8.6 MCells/s] - Estimated time to completion: 04:38:58
63% - iterations: 21534 / 34079 - [9.38 MCells/s] - Estimated time to completion: 04:15:32
63% - iterations: 21546 / 34079 - [12.5 MCells/s] - Estimated time to completion: 03:11:28
63% - iterations: 21557 / 34079 - [11.5 MCells/s] - Estimated time to completion: 03:28:42
63% - iterations: 21569 / 34079 - [12.5 MCells/s] - Estimated time to completion: 03:11:07
63% - iterations: 21581 / 34079 - [12.5 MCells/s] - Estimated time to completion: 03:10:56

Steady state detected at iteration: 21585 - the simulation will end shortly.
Please wait ... saving the sensor 'Overall Field' (E-fields) on disk.

Please wait ... saving the sensor 'Overall Field' (H-fields) on disk.

Please wait ... saving the sensor 'Unnamed' (E-fields) on disk.

Please wait ... saving the sensor 'Unnamed' (H-fields) on disk.

97% - iterations: 21585 / 22153 - [0.0356 MCells/s] - Estimated time to completion: 50:45:54
97% - iterations: 21592 / 22153 - [6.69 MCells/s] - Estimated time to completion: 00:16:01
98% - iterations: 21600 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:12:40
98% - iterations: 21609 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:11:04
98% - iterations: 21618 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:10:53
98% - iterations: 21627 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:10:42
98% - iterations: 21636 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:10:31
98% - iterations: 21644 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:11:39
98% - iterations: 21653 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:10:11
98% - iterations: 21662 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:10:00
98% - iterations: 21671 / 22153 - [8.6 MCells/s] - Estimated time to completion: 00:10:42
98% - iterations: 21680 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:09:38
98% - iterations: 21689 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:09:27
98% - iterations: 21698 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:09:16
98% - iterations: 21706 / 22153 - [7.64 MCells/s] - Estimated time to completion: 00:11:10
98% - iterations: 21713 / 22153 - [7.3 MCells/s] - Estimated time to completion: 00:11:31
98% - iterations: 21720 / 22153 - [7.3 MCells/s] - Estimated time to completion: 00:11:20
98% - iterations: 21727 / 22153 - [6.69 MCells/s] - Estimated time to completion: 00:12:10

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:		DC450H-021209-R1.2	
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

98% - iterations: 21735 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:09:34
98% - iterations: 21743 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:09:23
98% - iterations: 21751 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:09:12
98% - iterations: 21760 / 22153 - [8.6 MCells/s] - Estimated time to completion: 00:08:44
98% - iterations: 21769 / 22153 - [8.6 MCells/s] - Estimated time to completion: 00:08:32
98% - iterations: 21778 / 22153 - [8.6 MCells/s] - Estimated time to completion: 00:08:20
98% - iterations: 21786 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:08:24
98% - iterations: 21794 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:08:13
98% - iterations: 21802 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:08:02
98% - iterations: 21810 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:07:51
98% - iterations: 21818 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:07:40
99% - iterations: 21826 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:07:29
99% - iterations: 21834 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:07:18
99% - iterations: 21841 / 22153 - [7.3 MCells/s] - Estimated time to completion: 00:08:10
99% - iterations: 21849 / 22153 - [7.64 MCells/s] - Estimated time to completion: 00:07:36
99% - iterations: 21857 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:06:47
99% - iterations: 21865 / 22153 - [7.64 MCells/s] - Estimated time to completion: 00:07:12
99% - iterations: 21873 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:06:25
99% - iterations: 21881 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:06:14
99% - iterations: 21889 / 22153 - [7.64 MCells/s] - Estimated time to completion: 00:06:36
99% - iterations: 21897 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:05:52
99% - iterations: 21905 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:05:41
99% - iterations: 21913 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:05:30
99% - iterations: 21921 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:05:19
99% - iterations: 21929 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:05:08
99% - iterations: 21938 / 22153 - [8.6 MCells/s] - Estimated time to completion: 00:04:46
99% - iterations: 21947 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:04:11
99% - iterations: 21956 / 22153 - [8.6 MCells/s] - Estimated time to completion: 00:04:22
99% - iterations: 21965 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:03:49
99% - iterations: 21972 / 22153 - [7.3 MCells/s] - Estimated time to completion: 00:04:44
99% - iterations: 21981 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:03:30
99% - iterations: 21990 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:03:19
99% - iterations: 22001 / 22153 - [11.5 MCells/s] - Estimated time to completion: 00:02:32
99% - iterations: 22012 / 22153 - [11.5 MCells/s] - Estimated time to completion: 00:02:21
99% - iterations: 22021 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:02:41
99% - iterations: 22030 / 22153 - [8.6 MCells/s] - Estimated time to completion: 00:02:44
99% - iterations: 22039 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:02:19
100% - iterations: 22048 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:02:08
100% - iterations: 22056 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:02:13
100% - iterations: 22065 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:01:47
100% - iterations: 22072 / 22153 - [7.3 MCells/s] - Estimated time to completion: 00:02:07
100% - iterations: 22078 / 22153 - [6.25 MCells/s] - Estimated time to completion: 00:02:17
100% - iterations: 22084 / 22153 - [6.25 MCells/s] - Estimated time to completion: 00:02:06
100% - iterations: 22092 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:01:23
100% - iterations: 22101 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:01:03
100% - iterations: 22109 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:01:00
100% - iterations: 22118 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:00:42
100% - iterations: 22126 / 22153 - [8.34 MCells/s] - Estimated time to completion: 00:00:37
100% - iterations: 22135 / 22153 - [9.38 MCells/s] - Estimated time to completion: 00:00:22
100% - iterations: 22144 / 22153 - [8.6 MCells/s] - Estimated time to completion: 00:00:12
Please wait ... saving the sensor 'Overall Field' (E-fields) on disk.

Please wait ... saving the sensor 'Overall Field' (H-fields) on disk.

Please wait ... saving the sensor 'Unnamed' (E-fields) on disk.

Please wait ... saving the sensor 'Unnamed' (H-fields) on disk.

100% - iterations: 22153 / 22153 - [0.0834 MCells/s] - Estimated time to completion: 00:00:00

Convert time-domain data to frequency-domain data.

Maxwell Solver run ended the 2009-Feb-09 21:12:38. Total simulation time was 10:32:18 (hh:mm:ss, wall-clock time).

	Date(s) of Evaluations:	Jan. 19 & Feb. 09, 2009	Calibration Document Serial No.:	DC450H-021209-R1.2		
	Type of Evaluation:	Dipole Calibration	Dipole Frequency:	450 MHz	Fluid Type:	Head

APPENDIX C - PROBE CALIBRATION REPORT



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

Accreditation No.: **SCS 108**

Client **Calltech**

Certificate No: **ET3-1590_Jul08**

CALIBRATION CERTIFICATE

Object **ET3DV6 - SN:1590**

Calibration procedure(s) **QA CAL-01.v6, QA CAL-12.v5 and QA CAL-23.v3
Calibration procedure for dosimetric E-field probes**

Calibration date: **July 21, 2008**

Condition of the calibrated item **In Tolerance**

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 660	3-Sep-07 (No. DAE4-660_Sep07)	Sep-08
Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

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

Issued: July 21, 2008

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.



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

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,y,z}
DCP	diode compression point
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., $\vartheta = 0$ is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- NORM_{x,y,z}**: Assessed for E-field polarization $\vartheta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not effect the E²-field uncertainty inside TSL (see below *ConvF*).
- NORM(f)_{x,y,z}** = NORM_{x,y,z} * *frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- DCP_{x,y,z}**: DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- ConvF and Boundary Effect Parameters**: Assessed in flat phantom using E-field (or Temperature Transfer Standard for $f \leq 800$ MHz) and inside waveguide using analytical field distributions based on power measurements for $f > 800$ MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORM_{x,y,z} * *ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- Spherical isotropy (3D deviation from isotropy)**: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- Sensor Offset**: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ET3DV6

SN:1590

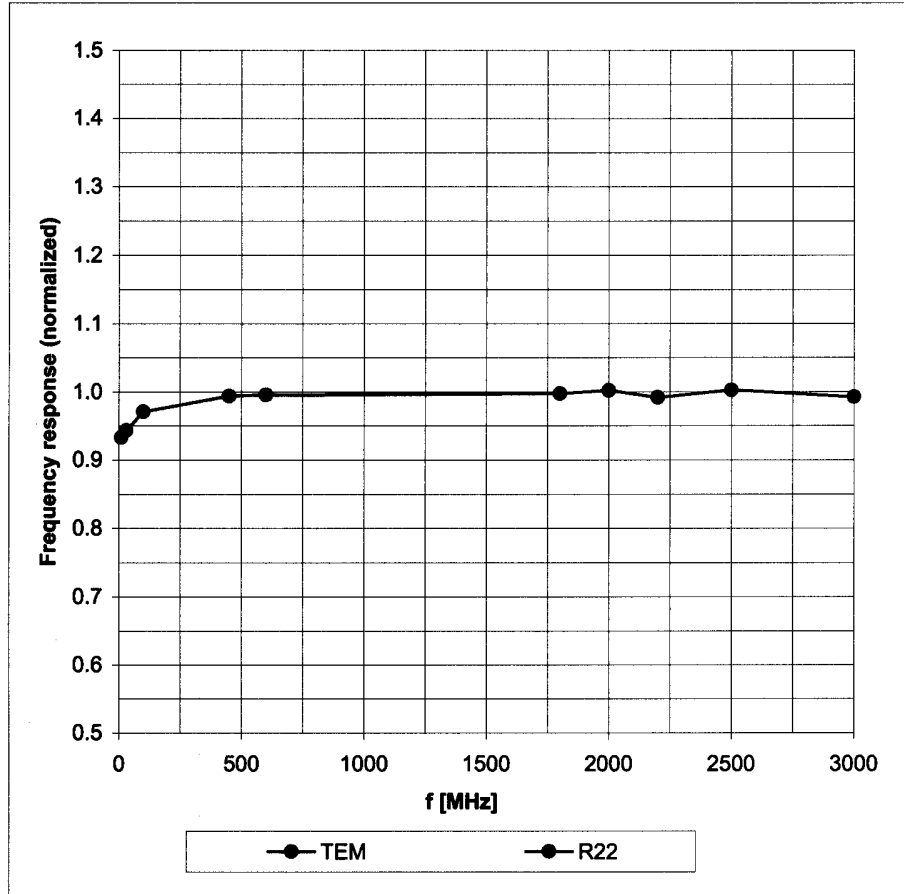
Manufactured:	March 19, 2001
Last calibrated:	May 20, 2005
Recalibrated:	July 21, 2008

Calibrated for DASY Systems

(Note: non-compatible with DASY2 system!)

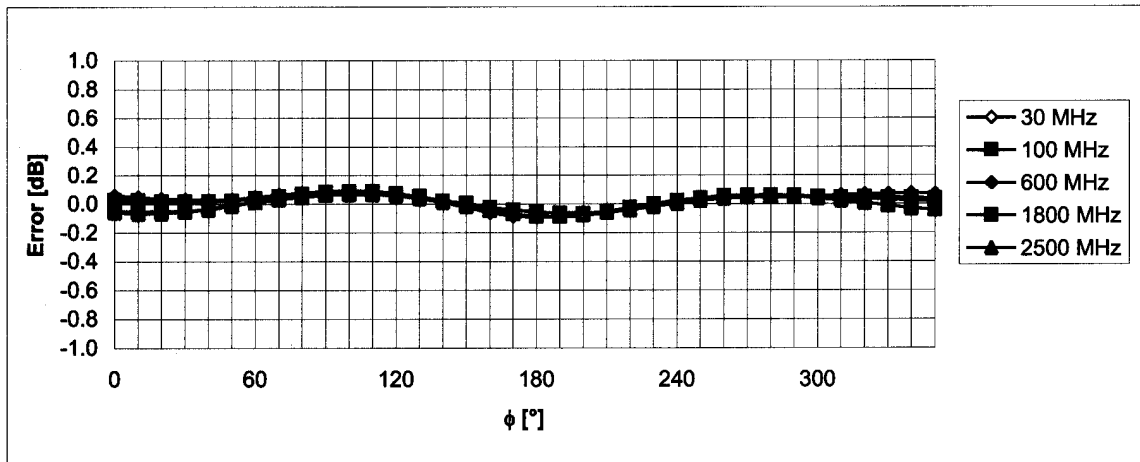
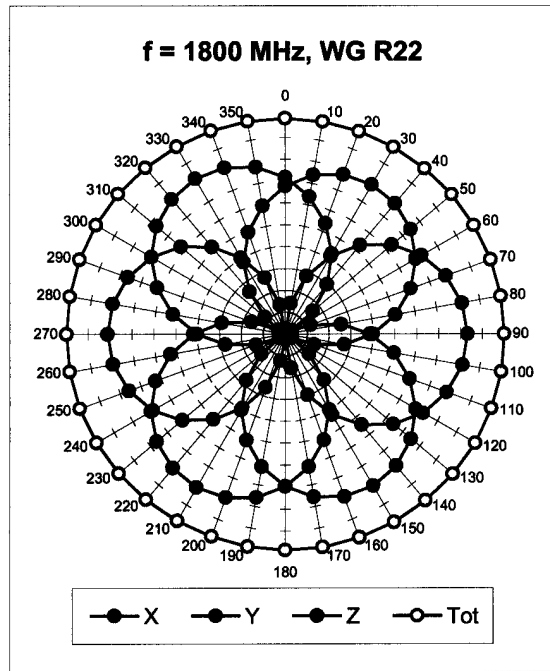
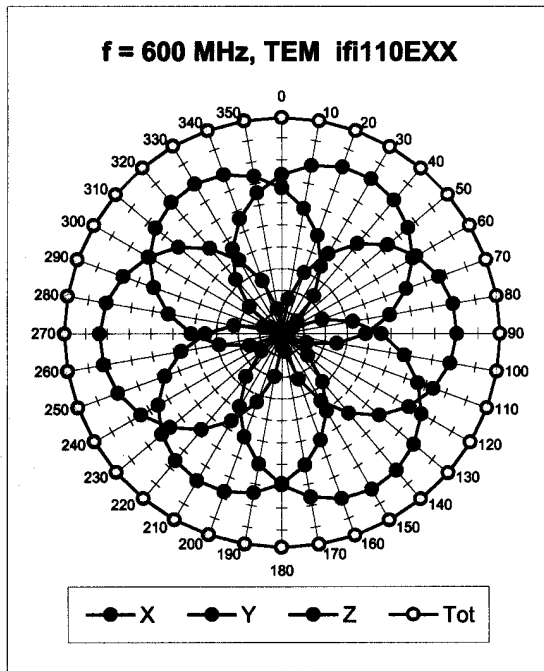
Frequency Response of E-Field

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



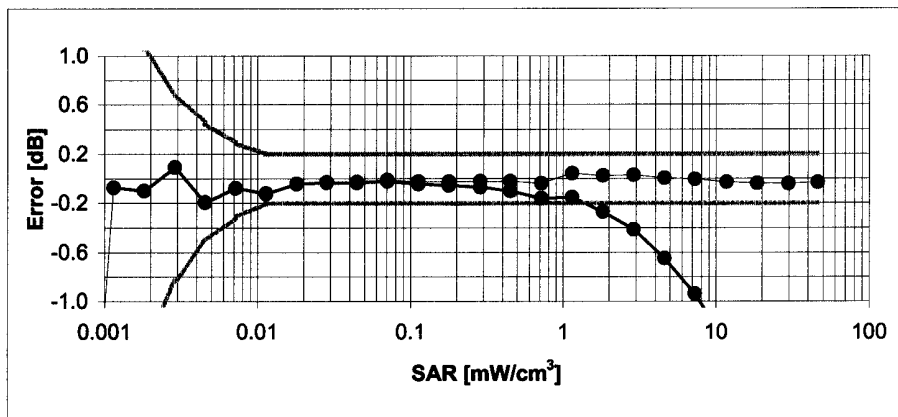
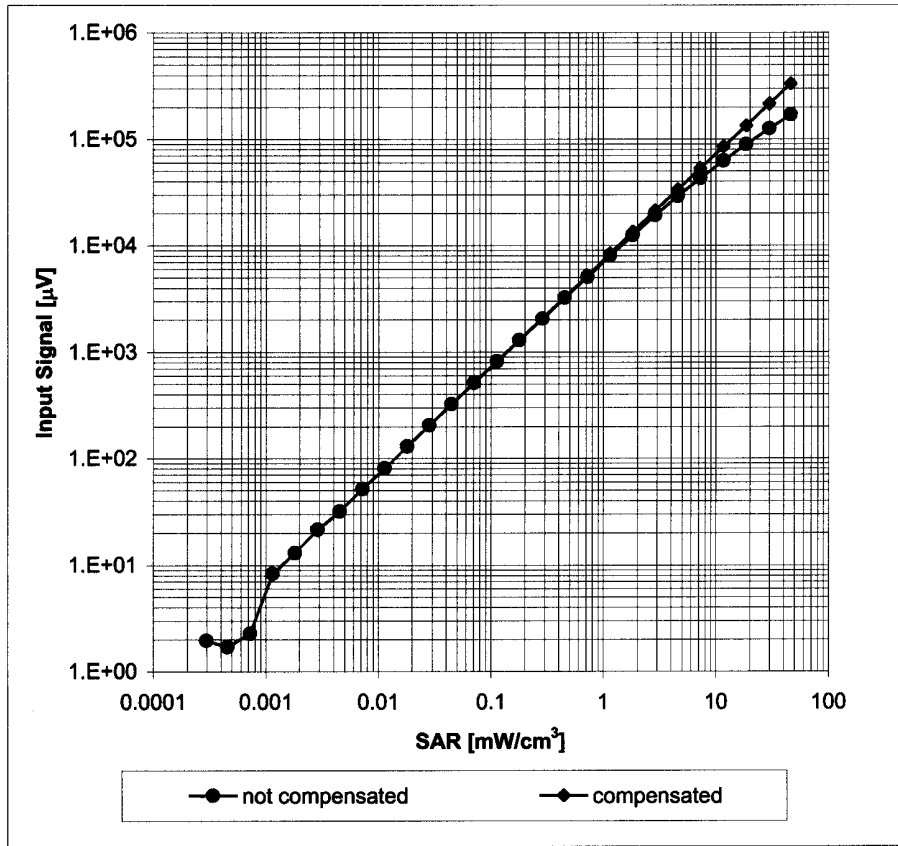
Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

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



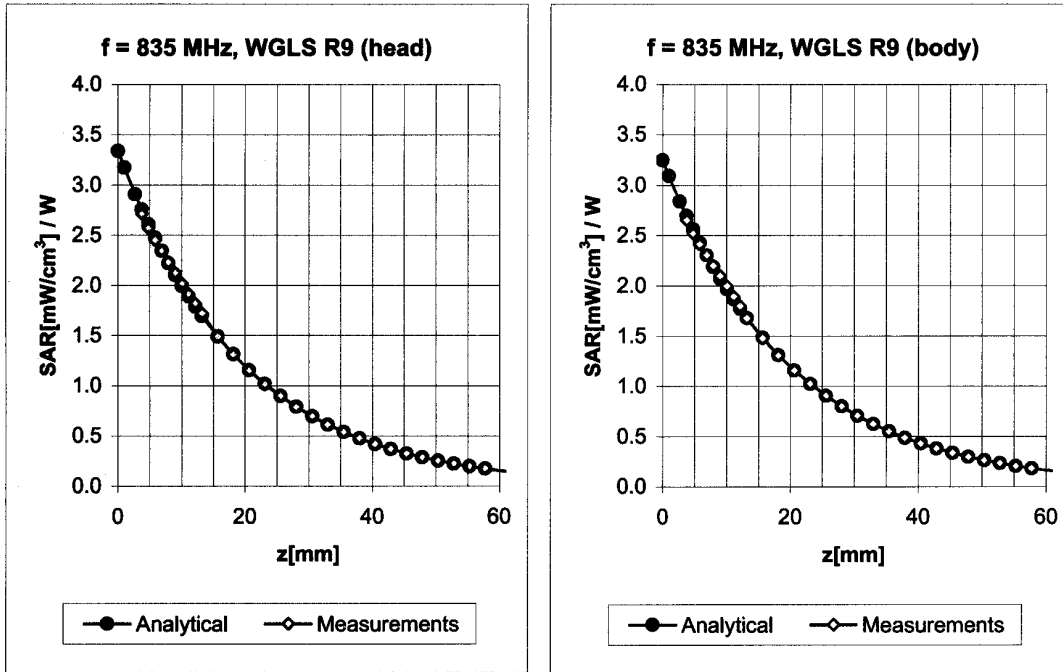
Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

Dynamic Range $f(\text{SAR}_{\text{head}})$ (Waveguide R22, $f = 1800 \text{ MHz}$)



Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

Conversion Factor Assessment

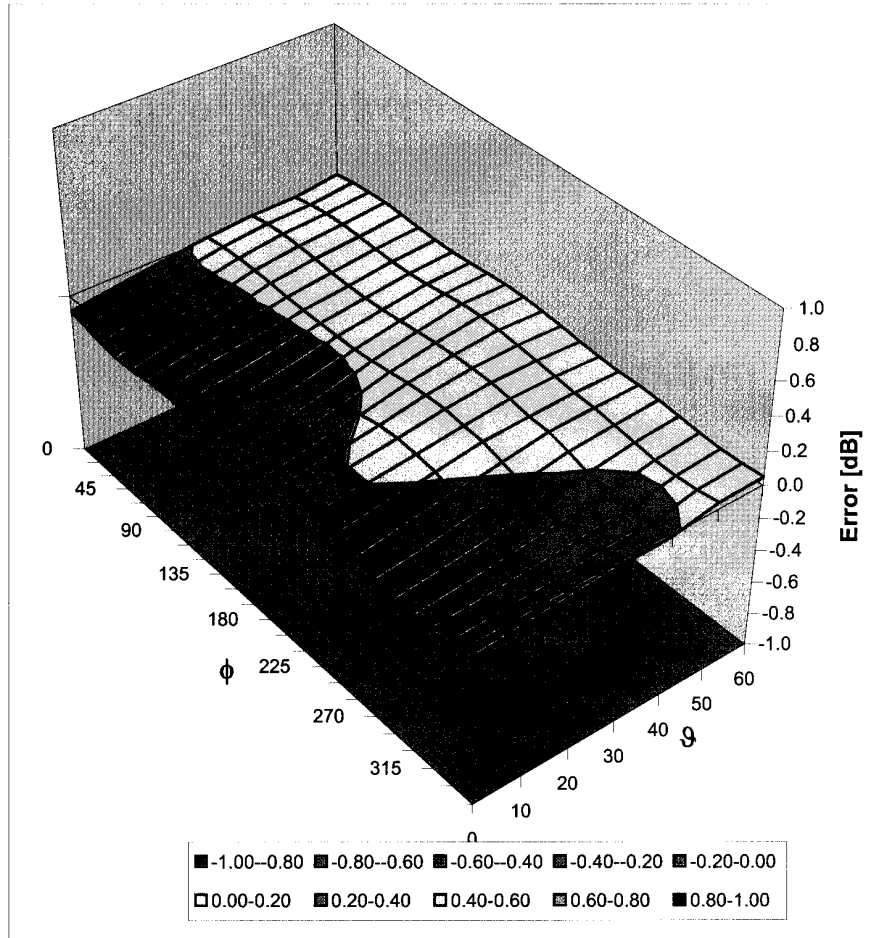


f [MHz]	Validity [MHz] ^c	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
450	± 50 / ± 100	Head	43.5 ± 5%	0.87 ± 5%	0.34	1.75	7.66 ± 13.3% (k=2)
835	± 50 / ± 100	Head	41.5 ± 5%	0.90 ± 5%	0.32	3.52	6.54 ± 11.0% (k=2)
450	± 50 / ± 100	Body	56.7 ± 5%	0.94 ± 5%	0.28	1.77	8.27 ± 13.3% (k=2)
835	± 50 / ± 100	Body	55.2 ± 5%	0.97 ± 5%	0.36	3.31	6.39 ± 11.0% (k=2)

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

Deviation from Isotropy in HSL

Error (ϕ, ϑ), $f = 900$ MHz



Uncertainty of Spherical Isotropy Assessment: $\pm 2.6\%$ ($k=2$)