SAR TEST REPORT (FCC/IC)

RF EXPOSURE EVALUATION | SPECIFIC ABSORPTION RATE

MANUFACTURER / APPLICANT	NORTHFIELD TELECOMMUNICATIONS, INC. D/B/A ADVANCED WIRELESS COMMUNICATIONS				
DEVICE UNDER TEST (DUT)	PORTABLE FM UHF PUSH-TO-TALK (PTT) RADIO TRANSCEIVER				
DEVICE FREQUENCY RANGE(S)	460.0 - 462.5375 MHz		462.7375 - 467.5375 MHz		467.7375 - 470.0 MHz
DEVICE MODEL(S)	AWR391V2				
DEVICE IDENTIFIER(S)	FCC ID:	Q9SAWR391V2	IC:	4651A-AWR391V2	
APPLICATION TYPE	Certification				
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 Exposure Procedures (KDB 447498 D01 v03r03)				
	Industry Canada RSS-102 Issue 2				
	IEEE 1528-2003				
	IEC 62209-1:2005				
RF EXPOSURE CATEGORY	General Population / Uncontrolled				
RF EXPOSURE EVALUATION(S)	Face-held & Body-worn				
DATE(S) OF EVALUATION(S)	May 05, 2009				
TEST REPORT SERIAL NO.	050509Q9S-T965-S90U				
TEST REPORT REVISION NO.	Revision 1.0	Initial Release		May 12, 2009	
TEST REPORT SIGNATORIES	Testing Performed By		Test Report Prepared By		
	Sean Johnston Celltech Labs Inc.		Jonathan Hughes Celltech Labs Inc.		
TEST LAB AND LOCATION	Celltech Compliance Testing and Engineering Lab				
	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada				
TEST LAB CONTACT INFO.	Tel.: 250-765-7650		Fax: 250-765-7645		
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TEST LAB ACCREDITATION(S)	ilac-MRA ACCREDITED Test Lab Certificate No. 2470.01				

DECLARATION OF COMPLIANCE
SAR RF EXPOSURE EVALUATION

Test Lab Information	**Name**	**CELLTECH LABS INC.**				
	Address	21-364 Lougheed Road, Kelowna, B.C. V1X 7R8 Canada				
Applicant Information	**Name**	**NORTHFIELD TELECOMMUNICATIONS, INC. D/B/A ADVANCED WIRELESS COMMUNICATIONS**				
	Address	20809 Kensington Blvd., Lakeville, MN 55044 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)				
	FCC	Mobile & Portable RF Exposure Procedures (KDB 447498 D01 v03r03)				
	IC	RSS-102 Issue 2				
	IEEE	1528-2003				
	IEC	62209-1:2005				
Device RF Exposure Category	**Portable**	General Population / Uncontrolled Environment				
Device Identifier(s)	**FCC ID:**	Q9SAWR391V2				
	IC:	4651A-AWR391V2				
	Model(s)	AWR391V2				
	Serial No.	20090323001 (Identical Prototype)				
Device Description	Portable FM UHF Push-To-Talk (PTT) Radio Transceiver (Business Band)					
Transmit Frequency Range(s)	460.0 - 462.5375 MHz (B1)		462.7375 - 467.5375 MHz (B2)		467.7375 - 470.0 MHz (B3)	
Max. RF Output Power Tested	1 Watt		30.0 dBm		Conducted	
Antenna Type(s) Tested	Fixed External (Non-detachable)					
Battery Type(s) Tested	Lithium-ion		3.7 V	830 mAh	Model: AWB-391	
Body-worn Accessories Tested	Lanyard		Model: AWL391		contains metallic component(s)	
	Magnetic Clothing Clip		Model: AWM-391		contains metallic component(s)	
	Belt-Clip Holster Swivel		Model: AWHOL-391		contains metallic component(s)	
Audio Accessories Tested	Earbud Headset		Model: AWEH391			
Max. SAR Level(s) Evaluated	Face-held	**0.660 W/kg**	1g	50% duty cycle	General Population / Uncontrolled	
	Body-worn	**1.39 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	

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 standards and procedures specified in FCC OET Bulletin 65, Supplement C (Edition 01-01), Industry Canada RSS-102 Issue 2, IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005. All measurements were performed in accordance with the SAR system manufacturer recommendations.

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

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

This test report shall not be reproduced partially, or in full, without the prior written approval of Celltech Labs Inc.

Test Report Approved By		**Sean Johnston**	**Celltech Labs Inc.**

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1.0 INTRODUCTION

This measurement report demonstrates compliance of the Advanced Wireless Communications Model: AWR391V2 Portable FM UHF 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 2 (see reference [4]), IEEE Standard 1528-2003 (see reference [5]) and IEC International Standard 62209-1:2005 (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 Head 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 System with Plexiglas validation phantom

DASY4 System with Plexiglas side planar phantom

3.0 SAR EVALUATION POWER THRESHOLDS FOR PTT DEVICES

The power thresholds and operating conditions listed in the table below are used to determine SAR test requirements for PTT radios required to comply with the general population and occupational exposure limit. SAR is required for PTT devices with maximum output power greater than these thresholds. SAR evaluation is also required for separation distances smaller than those listed in the table below.

SAR Evaluation Power Thresholds for PTT Devices, $f \leq 0.5$ GHz (FCC KDB 447498 D01 v03r03 Section 5)b)i) - Mobile & Portable RF Exposure Procedures)			Measured RF Conducted Output Power	
Exposure Conditions	**General Population *P* mW**	**Occupational *P* mW**	**100% PTT Duty Cycle**	**50% PTT Duty Cycle**
Held to face $d \geq 2.5$ cm	**250**	1250	1 Watt	**0.5 Watts**
Body-worn $d \geq 1.5$ cm	**200**	1000		
Body-worn $d \geq 1.0$ cm	**150**	750		
1. The time-averaged output power, corresponding to the required PTT duty factor, is compared with these thresholds. 2. The closest distance between the user and the device or its antenna is used to determine the power thresholds.				

4.0 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 [8]).

Probe Calibration Freq.	Device Measurement Freq.	Frequency Interval	±50 MHz ≥ 300 MHz
450 MHz	461.58 MHz	11.58 MHz	**< 50 MHz**
	465.56 MHz	15.56 MHz	**< 50 MHz**
	470.03 MHz	20.03 MHz	**< 50 MHz**

The probe calibration and measurement frequency interval is < 50 MHz; therefore the additional steps are not required for this evaluation.

5.0 MEASUREMENT SUMMARY

SAR EVALUATION RESULTS

Test Type	Band	Freq.	Ch.	Accessories		Device Distance to Planar Phantom		DUT Position to Planar Phantom	DUT Start Cond. Power	Measured SAR 1g (W/kg)		SAR Drift During Test	Scaled SAR with droop 1g (W/kg)	
										Duty Cycle			Duty Cycle	
		MHz		Body-worn	Audio	DUT	Antenna		dBm	100%	50%	dB	100%	50%
Face	2	465.56	3	--	--	2.5 cm	2.9 cm	Front Side	30.0	1.26	0.630	-0.200	1.32	**0.660**
Body	2	465.56	3	Lanyard	Earbud-Mic	0.0 cm	0.7 cm	Front Side	30.0	1.53	0.765	-0.003	1.53	0.766
Body	2	465.56	3	Lanyard	Earbud-Mic	0.0 cm	0.1 cm	Back Side	30.0	1.83	0.915	-0.069	1.86	0.930
Body	2	465.56	3	Magnetic Clothing Clip	Earbud-Mic	0.6 cm	0.7 cm	Back Side	30.0	P 1.50	0.750	-0.475	P 1.67	0.837
										S 1.12	0.560		S 1.25	0.625
Body	2	465.56	3	Belt-Clip Holster P1[7]	Earbud-Mic	2.0 cm	2.0 cm	Back Side	30.0	0.669	0.335	-0.032	0.674	0.337
Body	2	465.56	3	Belt-Clip Holster P2[7]	Earbud-Mic	2.0 cm	1.0 cm	Back Side	30.0	1.07	0.535	-0.321	1.15	0.576
Body	2	465.56	3	Belt-Clip Holster P3[7]	Earbud-Mic	2.0 cm	2.0 cm	Back Side	30.0	0.764	0.382	-0.047	0.772	0.386
Body	1	461.58	2	Lanyard	Earbud-Mic	0.0 cm	0.1 cm	Back Side	30.0	2.21	1.11	0.015	2.21	1.11
Body	3	470.03	4	Lanyard	Earbud-Mic	0.0 cm	0.1 cm	Back Side	30.0	2.39	1.20	-0.667	2.79	**1.39**

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

Measurement Date	May 05, 2009				May 05, 2009				Measured Fluid Type	Head	Body	Unit
Measured Fluid Freq.	470 MHz Head				470 MHz Body				Ambient Temperature	24.0	24.0	°C
Dielectric Constant ε_r	450 Target		Meas.	Dev.	450 Target		Meas.	Dev.	Fluid Temperature	22.8	22.5	°C
	43.5	± 5%	44.5	+2.3%	56.7	± 5%	56.2	-0.9%	Atmospheric Pressure	101.1	101.1	kPa
Conductivity σ (mho/m)	450 Target		Meas.	Dev.	450 Target		Meas.	Dev.	Relative Humidity	35	35	%
	0.87	± 5%	0.90	+3.5%	0.94	± 5%	0.90	-4.3%	ρ (Kg/m^3)	1000		

Notes

1.	Detailed measurement data and plots showing the maximum SAR location of the DUT are shown in Appendix A.
2.	The SAR evaluations were performed at the middle frequency band (Band 2). The maximum SAR level configuration was subsequently re-evaluated at the lower and upper frequency bands (Band 1 and Band 3). The transmission bands of the DUT are 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 area scan evaluation was performed with a fully charged Li-ion battery. After the area scan was completed the battery was replaced with a fully charged battery prior to the zoom scan evaluation.
4.	The SAR droop of the DUT was measured by the DASY4 system. The SAR droop was added to the measured SAR level to report the scaled SAR results as shown in the above test data table. A SAR-versus-Time droop evaluation was performed in the maximum SAR level configuration and the evaluation plot is shown in Appendix A (SAR Test Plots).
5.	The DUT was tested at maximum power setting in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the transmit key constantly depressed. For a push-to-talk device the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.
6.	Fluid Depth: ≥ 15 cm
7.	Belt-Clip Swivel Position 1 = 0 degrees / Belt-Clip Swivel Position 2 = -90 degrees / Belt-Clip Swivel Position 3 = 90 degrees

6.0 DETAILS OF SAR EVALUATION

The Advanced Wireless Communications Model: AWR391V2 Portable FM UHF 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 in a face-held configuration with the front of the radio placed parallel to the planar phantom. A 2.5 cm spacing was maintained between the front of the DUT and the planar phantom.
2. The DUT was tested in a body-worn configuration with the customer-supplied lanyard accessory attached to the radio. The DUT was evaluated consecutively with the front side and back side of the radio placed parallel to, and touching, the planar phantom. The lanyard accessory supports operation of the radio when worn around the neck.
3. The DUT was tested in a body-worn configuration with the adhesive section of the metal magnetic clothing clip accessory mounted to the back side of the radio placed parallel to the outer surface of the planar phantom. The back side of the radio with magnetic clothing clip was magnetically attached to the non-adhesive section of the metal magnetic clothing clip and the non-adhesive section of the metal magnetic clothing clip was touching the planar phantom. The adhesive and non-adhesive sections of the magnetic clothing clip accessory provided a combined spacing of 0.6 cm from the back side of the radio to the planar phantom.
4. The DUT was tested in a body-worn configuration with the radio placed inside the belt-clip holster swivel accessory. The back side of the belt-clip holster swivel accessory was touching the planar phantom and provided a 2.0 cm spacing from the back side of the radio to the planar phantom. The DUT with belt-clip holster swivel accessory was evaluated in (3) alternate test configurations (see footnote 7 page 6 for configuration description).
5. The body-worn SAR evaluations were performed with the customer-supplied earbud headset audio accessory connected to the headset jack on the DUT.
6. The average conducted power levels of the DUT referenced in this report were measured by Timco Engineering prior to the SAR evaluations on the test sample used for the SAR evaluations.
7. 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.
8. 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).

7.0 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 F). The extrapolation was based on trivariate quadratics computed from the previously calculated 3D interpolated points nearest the phantom surface.

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

g. A zoom scan volume of 32 mm x 32 mm x 30 mm (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.

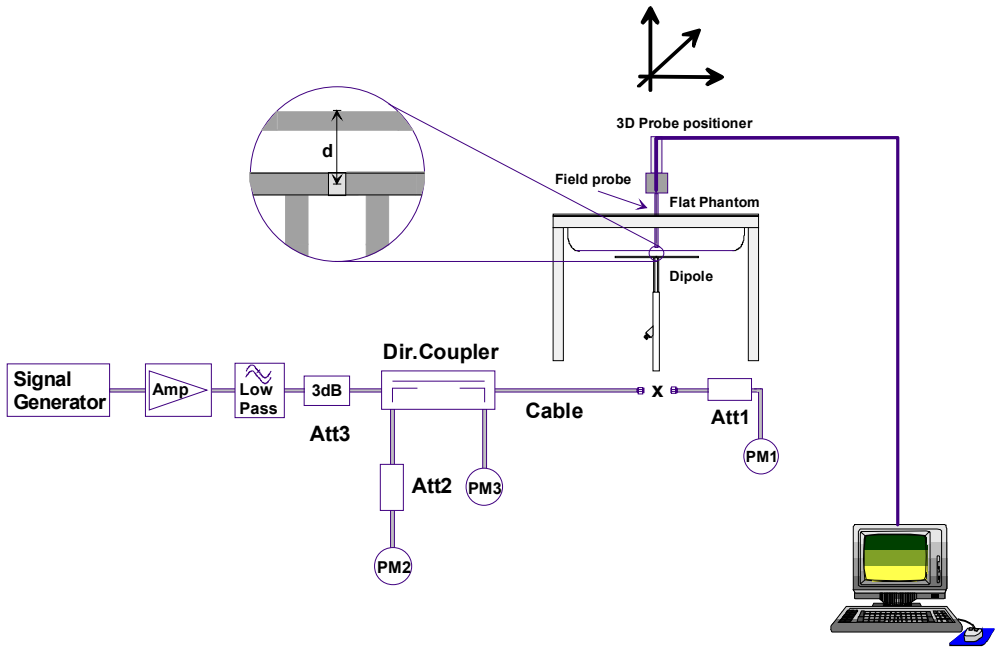
8.0 SYSTEM PERFORMANCE CHECK

Prior to the SAR evaluations 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]) and IEC International Standard 62209-1:2005 (see reference [6]). 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 ±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.	Dev.						
May 05	Head 450	1.22 ±10%	1.27	+4.1%	43.8 ±5%	45.3	+3.5%	0.86 ±5%	0.89	+3.5%	1000	24.0	22.8	≥ 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 +/-2°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 Diagram

450 MHz Validation Dipole Setup

9.0 SIMULATED EQUIVALENT TISSUES

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

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

10.0 SAR LIMITS

SAR RF EXPOSURE LIMITS			
FCC 47 CFR 2.1093	**Health Canada Safety Code 6**	**(General Population / Uncontrolled Exposure)**	**(Occupational / Controlled Exposure)**
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.			

11.0 ROBOT SYSTEM SPECIFICATIONS

Specifications	
Positioner	Stäubli Unimation Corp. Robot Model: RX60L
Repeatability	0.02 mm
No. of axis	6
Data Acquisition Electronic (DAE) System	
Cell Controller	
Processor	AMD Athlon XP 2400+
Clock Speed	2.0 GHz
Operating System	Windows XP Professional
Data Converter	
Features	Signal Amplifier, multiplexer, A/D converter, and control logic
Software	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
DASY4 Measurement Server	
Function	Real-time data evaluation for field measurements and surface detection
Hardware	PC/104 166MHz Pentium CPU; 32 MB chipdisk; 64 MB RAM
Connections	COM1, COM2, DAE, Robot, Ethernet, Service Interface
E-Field Probe	
Model	ET3DV6
Serial No.	1590
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
Evaluation Phantom	
Type	Side Planar Phantom
Shell Material	Plexiglas
Bottom Thickness	2.0 mm ± 0.1 mm
Inner Dimensions	72.6 cm (L) x 20.3 cm (W) x 20.3 cm (H)
Validation Phantom (≤ 450MHz)	
Type	Planar Phantom
Shell Material	Plexiglas
Bottom Thickness	6 mm ± 0.1 mm
Inner Dimensions	83.5 cm (L) x 36.9 cm (W) x 21.8 cm (H)

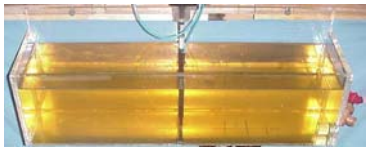
12.0 PROBE SPECIFICATION (ET3DV6)

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

ET3DV6 E-Field Probe

13.0 SIDE PLANAR PHANTOM

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.



Plexiglas Side Planar Phantom

14.0 VALIDATION PLANAR PHANTOM

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

Plexiglas Validation Planar Phantom

15.0 DEVICE HOLDER

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

Device Holder

16.0 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	21Jul08	21Jul09
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	Gigatronics 8652A Power Meter	00007	1835272	23Apr08	21Jul09
x	Gigatronics 80701A Power Sensor	00014	1833699	23Apr08	21Jul09
x	HP 8753ET Network Analyzer	00134	US39170292	28Apr08	28Apr10
x	HP 8648D Signal Generator	00005	3847A00611	CNR	CNR
x	Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR
Abbr.	CNR = Calibration Not Required				

17.0 MEASUREMENT UNCERTAINTIES

UNCERTAINTY BUDGET FOR DEVICE EVALUATION

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	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	4.3	Normal	1	0.64	0.43	2.8	1.8	∞
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**				**11.43**	**11.09**	
Expanded Uncertainty (95% Confidence Interval)			**k=2**				**22.86**	**22.17**	

Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003 and IEC International Standard 62209-1:2005

18.0 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 Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)", Radio Standards Specification RSS-102 Issue 2: November 2005.

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

[6] IEC International Standard 62209-1:2005 - "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures."

[7] 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.

[8] 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.

APPENDIX A - SAR MEASUREMENT DATA

Date Tested: 05/05/2009

Face-held SAR - 465.56 MHz (Band 2)

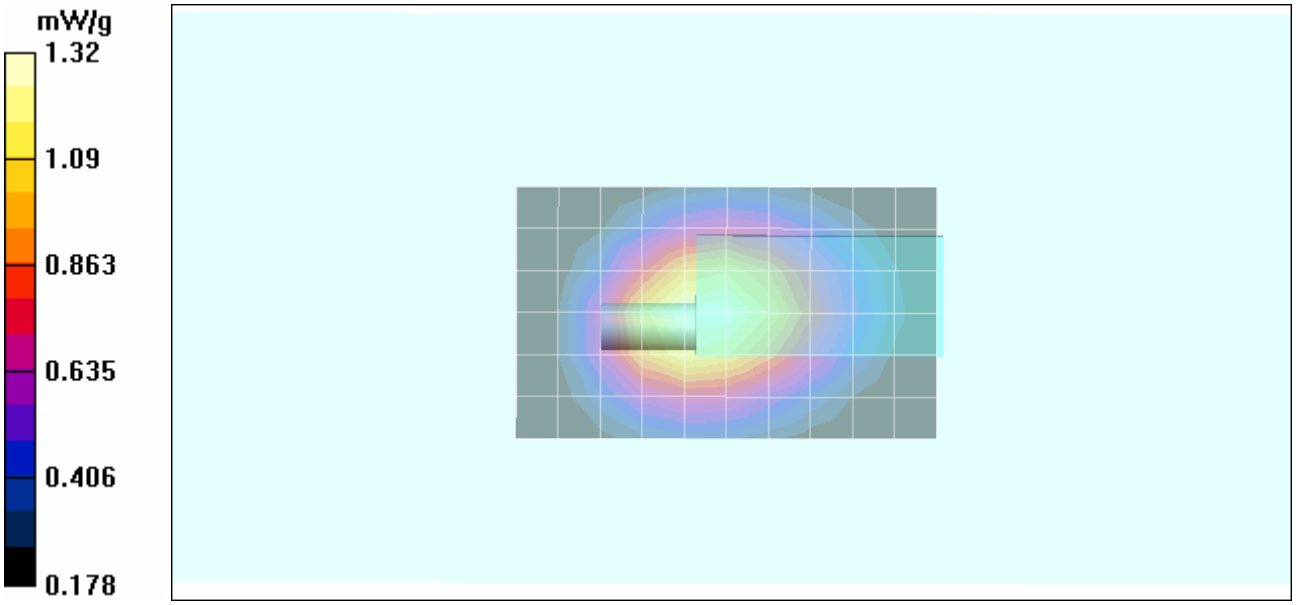
DUT: Advanced Wireless AWR391V2; Type: Portable FM UHF PTT Radio Transceiver; Serial: 20090323001

Ambient Temp: 24°C; Fluid Temp: 22.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

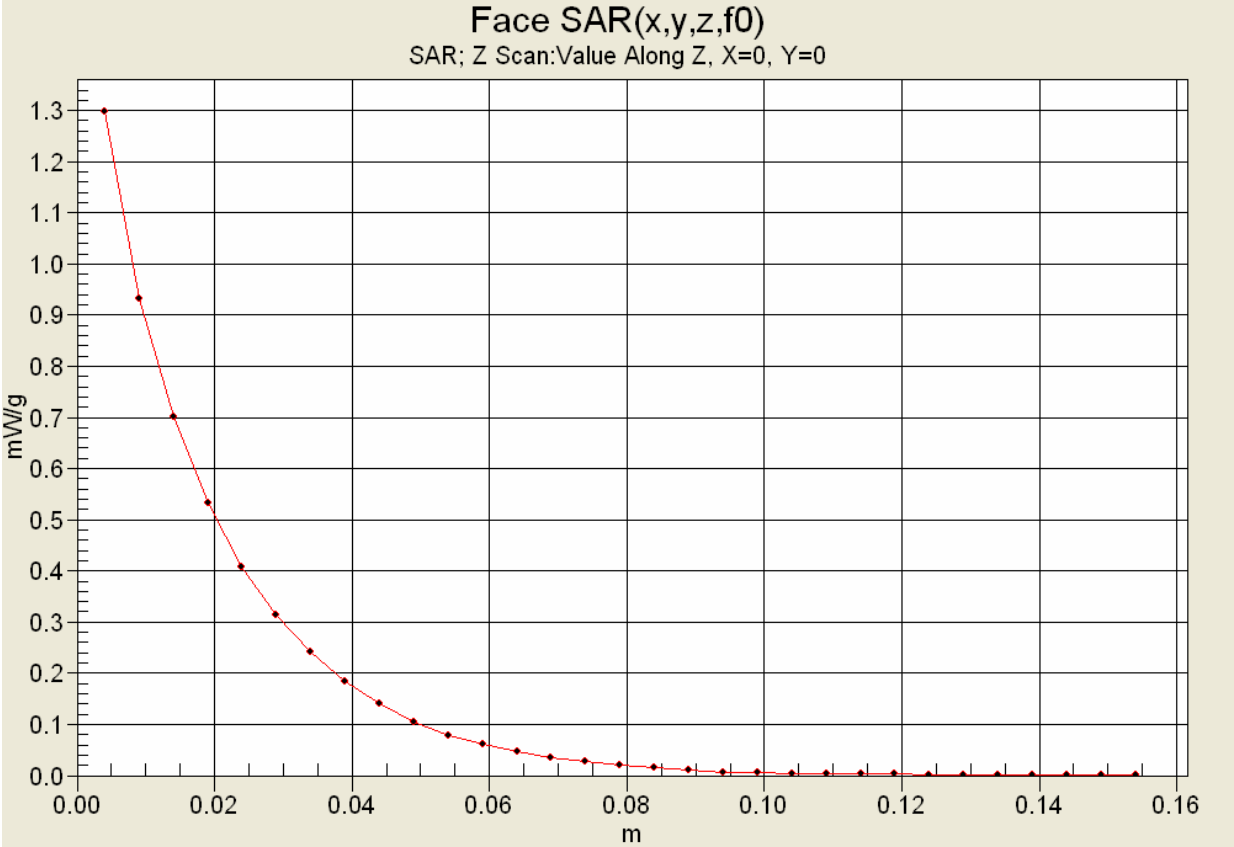
Communication System: CW
Frequency: 465.56 MHz; Duty Cycle: 1:1
Medium: HSL450 Medium parameters used: f = 465.56 MHz; σ = 0.9 mho/m; ε_r = 44.5; ρ = 1000 kg/m^3

- 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: 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 (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.32 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 39.4 V/m; Power Drift = -0.200 dB
Peak SAR (extrapolated) = 1.79 W/kg
SAR(1 g) = 1.26 mW/g; SAR(10 g) = 0.902 mW/g



Z-Axis Scan



Date Tested: 05/05/2009

Body-worn SAR - 465.56 MHz (Band 2) - Front Side of DUT with Lanyard Accessory Audio Accessory: Ear-bud Microphone

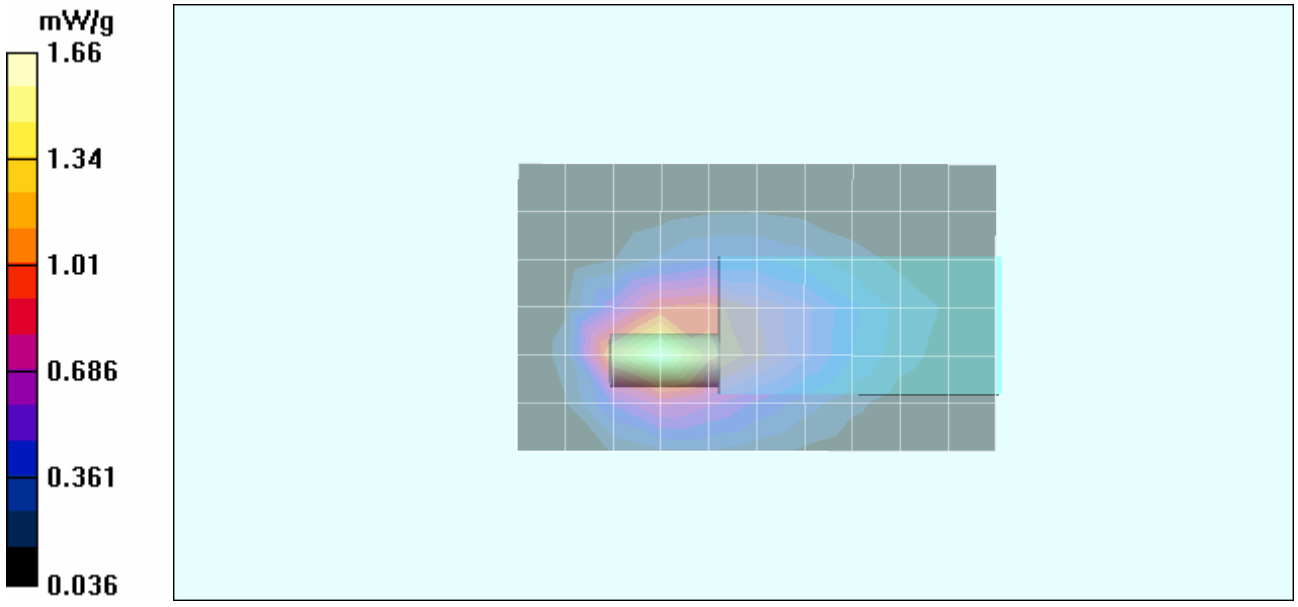
DUT: Advanced Wireless AWR391V2; Type: Portable FM UHF PTT Radio Transceiver; Serial: 20090323001

Ambient Temp: 24°C; Fluid Temp: 22.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 465.56 MHz; Duty Cycle: 1:1
Medium: M450 Medium parameters used: f = 465.56 MHz; σ = 0.9 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(8.27, 8.27, 8.27); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - Front Side of DUT Touching Planar Phantom (with Lanyard Accessory)
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.59 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 31.6 V/m; Power Drift = -0.003 dB
Peak SAR (extrapolated) = 4.12 W/kg
SAR(1 g) = 1.53 mW/g; SAR(10 g) = 0.800 mW/g
Maximum value of SAR (measured) = 1.66 mW/g



Date Tested: 05/05/2009

Body-worn SAR - 465.56 MHz (Band 2) - Back Side of DUT with Lanyard Accessory Audio Accessory: Ear-bud Microphone

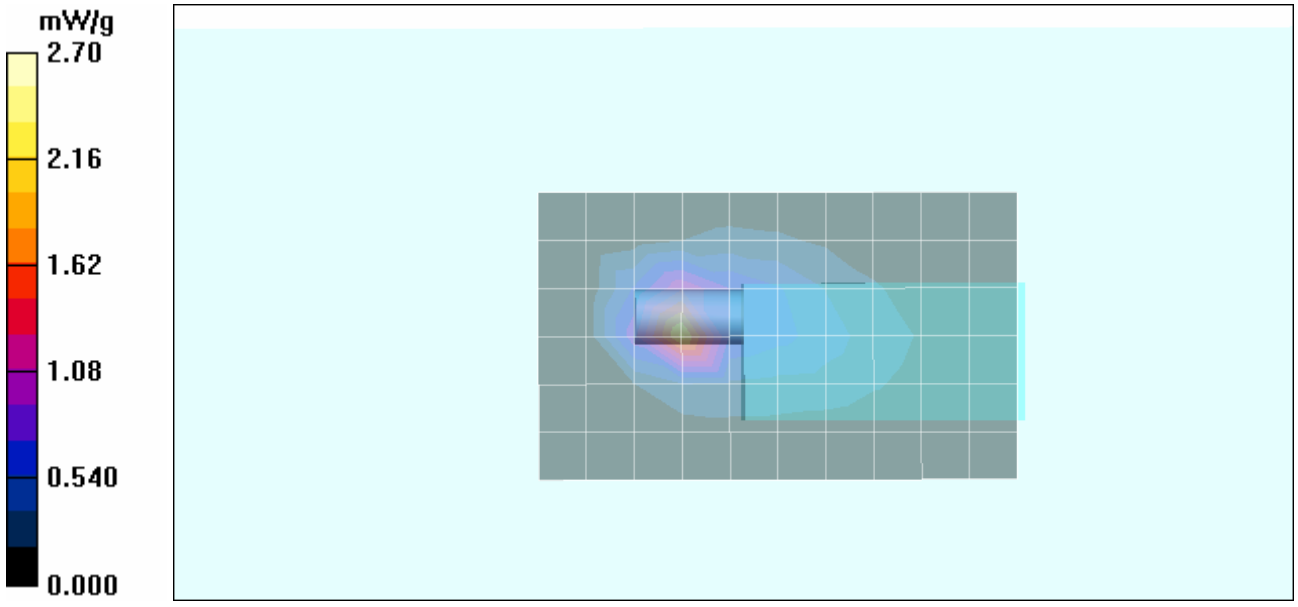
DUT: Advanced Wireless AWR391V2; Type: Portable FM UHF PTT Radio Transceiver; Serial: 20090323001

Ambient Temp: 24°C; Fluid Temp: 22.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 465.56 MHz; Duty Cycle: 1:1
Medium: M450 Medium parameters used: f = 465.56 MHz; σ = 0.9 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(8.27, 8.27, 8.27); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - Back Side of DUT Touching Planar Phantom (with Lanyard Accessory)
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.87 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 23.3 V/m; Power Drift = -0.069 dB
Peak SAR (extrapolated) = 6.20 W/kg
SAR(1 g) = 1.83 mW/g; SAR(10 g) = 0.714 mW/g
Maximum value of SAR (measured) = 2.70 mW/g



Date Tested: 05/05/2009

Body-worn SAR - 465.56 MHz (Band 2) - Back of DUT with Magnetic Clothing Clip Accessory Audio Accessory: Ear-bud Microphone

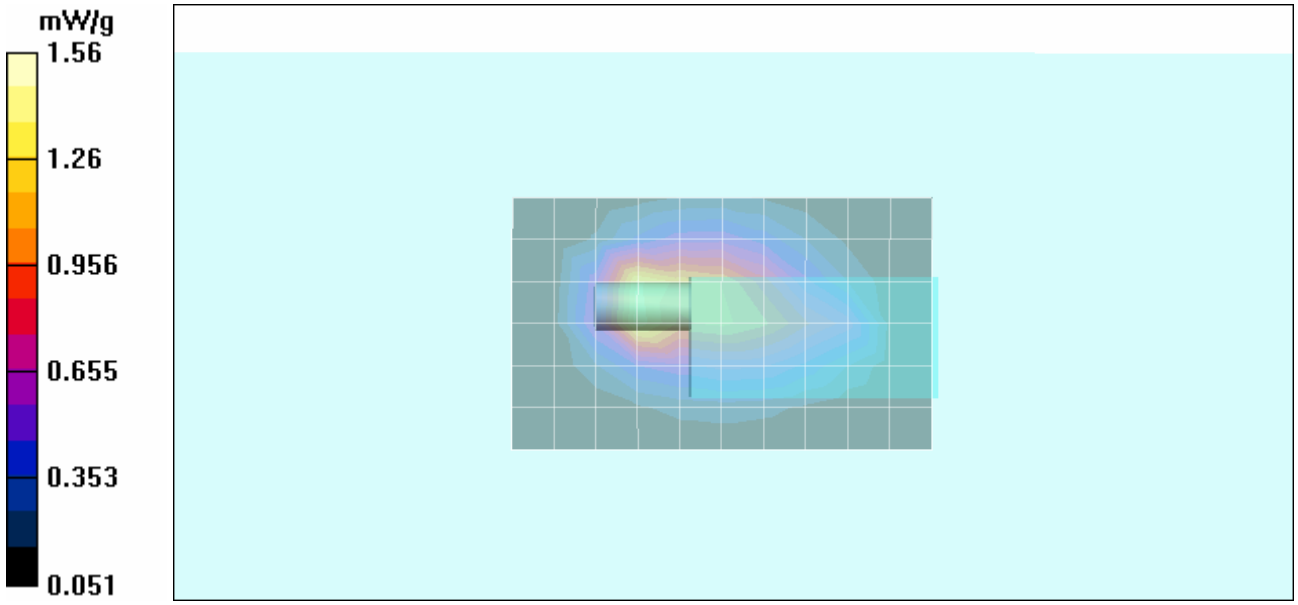
DUT: Advanced Wireless AWR391V2; Type: Portable FM UHF PTT Radio Transceiver; Serial: 20090323001

Ambient Temp: 24°C; Fluid Temp: 22.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 465.56 MHz; Duty Cycle: 1:1
Medium: M450 Medium parameters used: f = 465.56 MHz; σ = 0.9 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(8.27, 8.27, 8.27); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- 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 Magnetic Clothing Clip Spacing from Back Side of DUT to Planar Phantom
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.33 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 30.5 V/m; Power Drift = -0.475 dB
Peak SAR (extrapolated) = 3.98 W/kg
SAR(1 g) = 1.5 mW/g; SAR(10 g) = 0.798 mW/g
Maximum value of SAR (measured) = 1.56 mW/g
Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 30.5 V/m; Power Drift = -0.475 dB
Peak SAR (extrapolated) = 2.45 W/kg
SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.685 mW/g
Maximum value of SAR (measured) = 1.24 mW/g



Date Tested: 05/05/2009

Body-worn SAR - 465.56 MHz (Band 2) - Back Side of DUT with Belt-Clip Holster Accessory (0°) Audio Accessory: Ear-bud Microphone

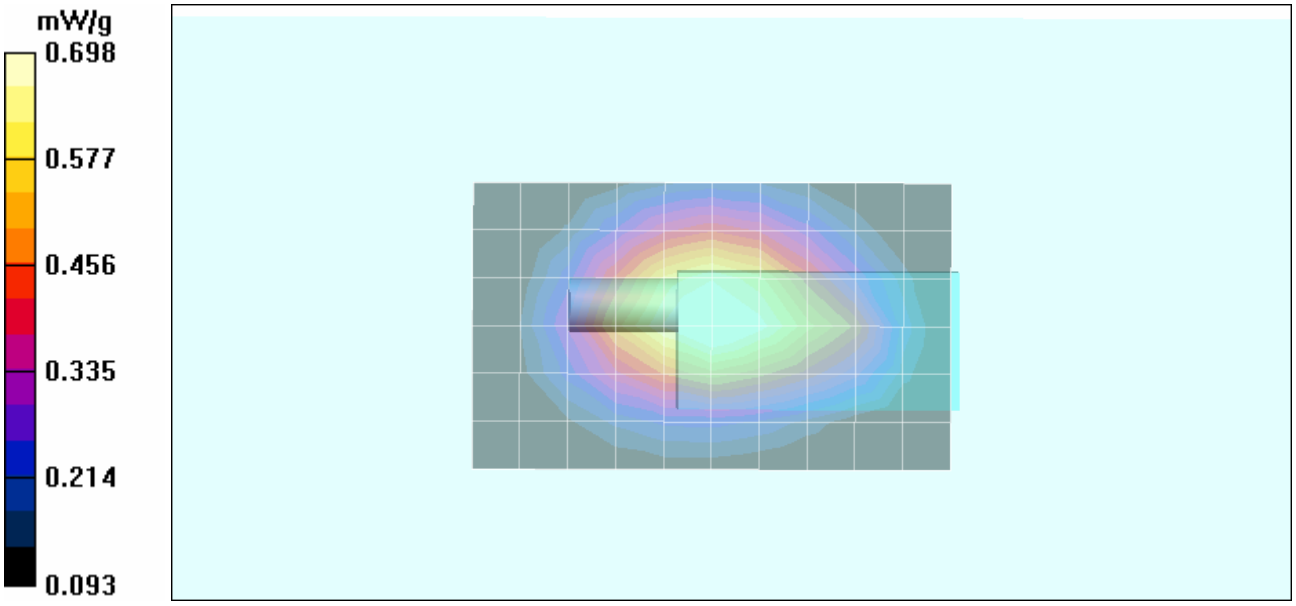
DUT: Advanced Wireless AWR391V2; Type: Portable FM UHF PTT Radio Transceiver; Serial: 20090323001

Ambient Temp: 24°C; Fluid Temp: 22.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 465.56 MHz; Duty Cycle: 1:1
Medium: M450 Medium parameters used: f = 465.56 MHz; σ = 0.9 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(8.27, 8.27, 8.27); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 2.0 cm Belt-Clip Holster Spacing (0° Swivel Position) from Back Side of DUT to Planar Phantom
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.770 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 26.3 V/m; Power Drift = -0.032 dB
Peak SAR (extrapolated) = 0.991 W/kg
SAR(1 g) = 0.669 mW/g; SAR(10 g) = 0.471 mW/g
Maximum value of SAR (measured) = 0.698 mW/g



Date Tested: 05/05/2009

Body-worn SAR - 465.56 MHz (Band 2) - Back Side of DUT with Belt-Clip Holster Accessory (-90°) Audio Accessory: Ear-bud Microphone

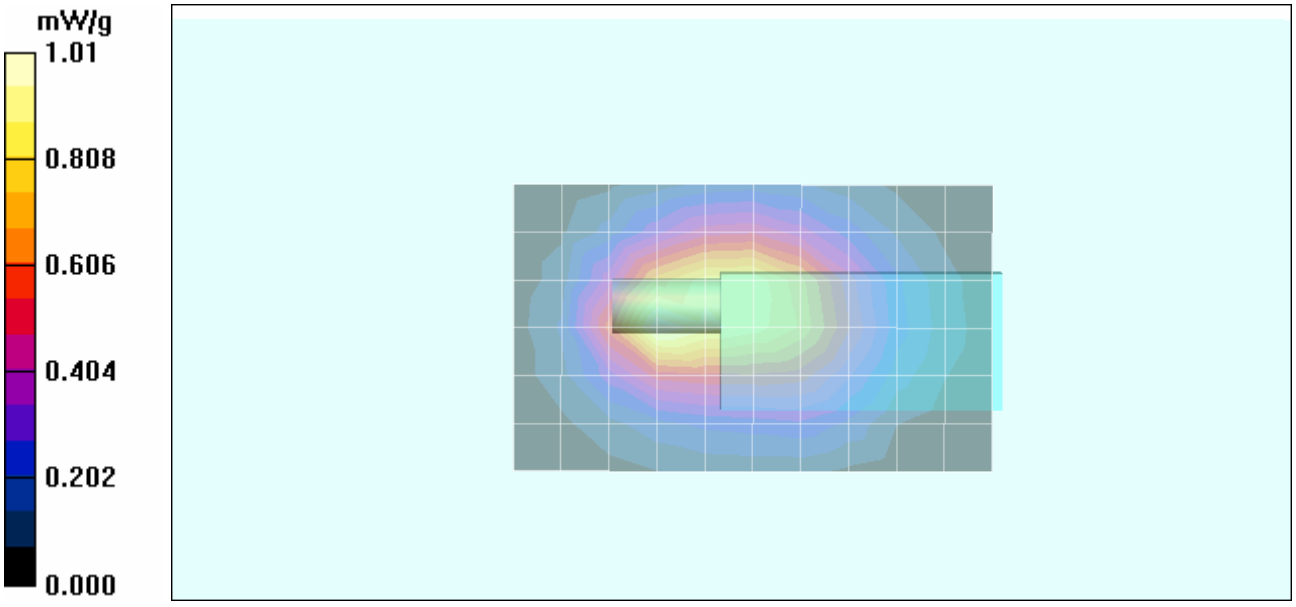
DUT: Advanced Wireless AWR391V2; Type: Portable FM UHF PTT Radio Transceiver; Serial: 20090323001

Ambient Temp: 24°C; Fluid Temp: 22.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 465.56 MHz; Duty Cycle: 1:1
Medium: M450 Medium parameters used: f = 465.56 MHz; σ = 0.9 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(8.27, 8.27, 8.27); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 2.0 cm Belt-Clip Holster Spacing (-90° Swivel Position) from Back Side of DUT to Planar Phantom
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.01 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 31.0 V/m; Power Drift = -0.321 dB
Peak SAR (extrapolated) = 2.41 W/kg
SAR(1 g) = 1.07 mW/g; SAR(10 g) = 0.583 mW/g



Date Tested: 05/05/2009

Body-worn SAR - 465.56 MHz (Band 2) - Back Side of DUT with Belt-Clip Holster Accessory (90°) Audio Accessory: Ear-bud Microphone

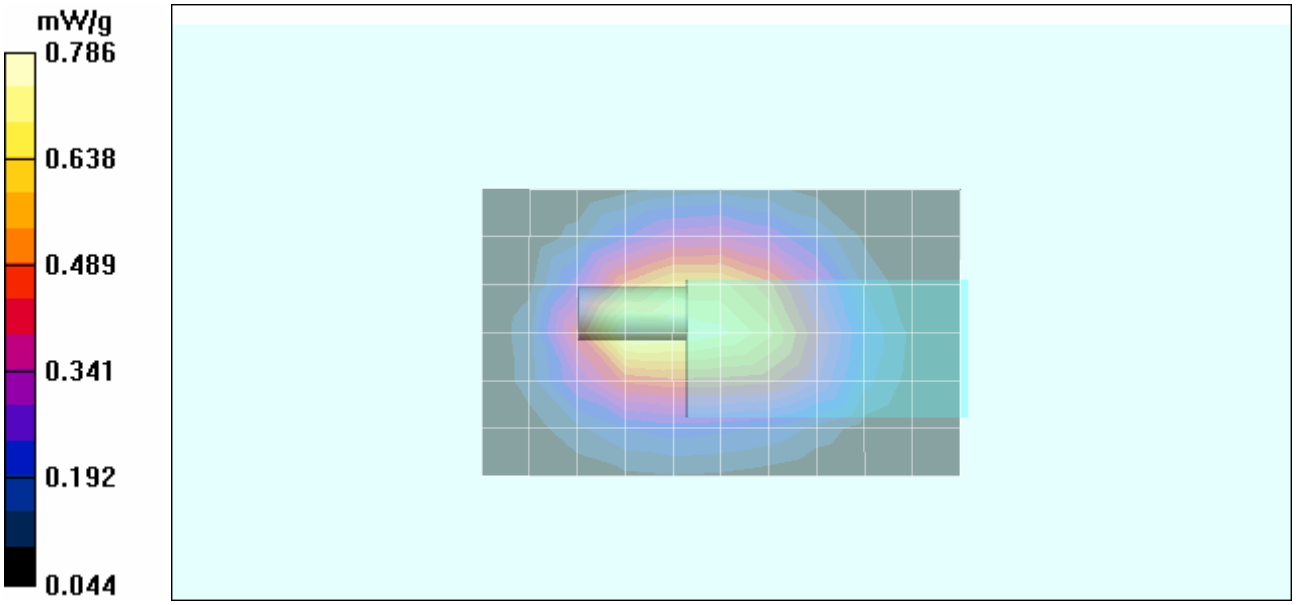
DUT: Advanced Wireless AWR391V2; Type: Portable FM UHF PTT Radio Transceiver; Serial: 20090323001

Ambient Temp: 24°C; Fluid Temp: 22.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 465.56 MHz; Duty Cycle: 1:1
Medium: M450 Medium parameters used: f = 465.56 MHz; σ = 0.9 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(8.27, 8.27, 8.27); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - 2.0 cm Belt-Clip Holster Spacing (90° Swivel Position) from Back Side of DUT to Planar Phantom
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.755 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 24.6 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.764 mW/g; SAR(10 g) = 0.510 mW/g
Maximum value of SAR (measured) = 0.786 mW/g



Date Tested: 05/05/2009

Body-worn SAR - 461.58 MHz (Band 1) - Back Side of DUT with Lanyard Accessory Audio Accessory: Ear-bud Microphone

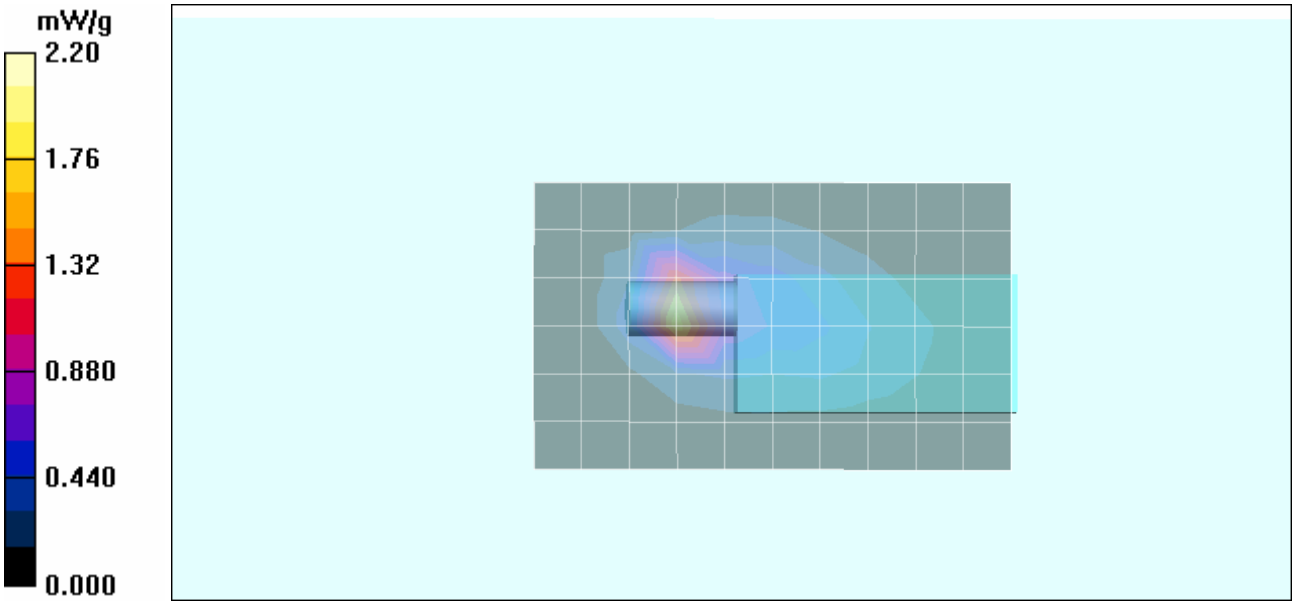
DUT: Advanced Wireless AWR391V2; Type: Portable FM UHF PTT Radio Transceiver; Serial: 20090323001

Ambient Temp: 24°C; Fluid Temp: 22.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

Communication System: CW
Frequency: 461.58 MHz; Duty Cycle: 1:1
Medium: M450 Medium parameters used: f = 461.58 MHz; σ = 0.9 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(8.27, 8.27, 8.27); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - Back Side of DUT Touching Planar Phantom (with Lanyard Accessory)
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.60 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 22.8 V/m; Power Drift = 0.015 dB
Peak SAR (extrapolated) = 11.0 W/kg
SAR(1 g) = 2.21 mW/g; SAR(10 g) = 0.784 mW/g
Maximum value of SAR (measured) = 2.20 mW/g



Date Tested: 05/05/2009

Body-worn SAR - 470.03 MHz (Band 3) - Back Side of DUT with Lanyard Accessory Audio Accessory: Ear-bud Microphone

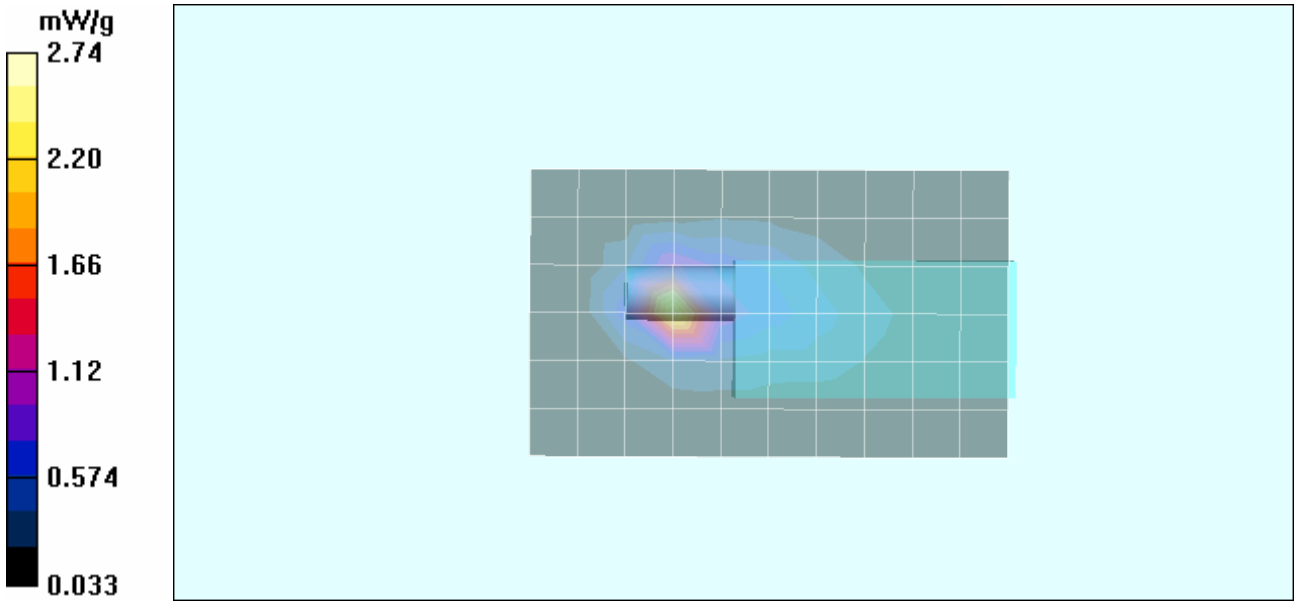
DUT: Advanced Wireless AWR391V2; Type: Portable FM UHF PTT Radio Transceiver; Serial: 20090323001

Ambient Temp: 24°C; Fluid Temp: 22.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

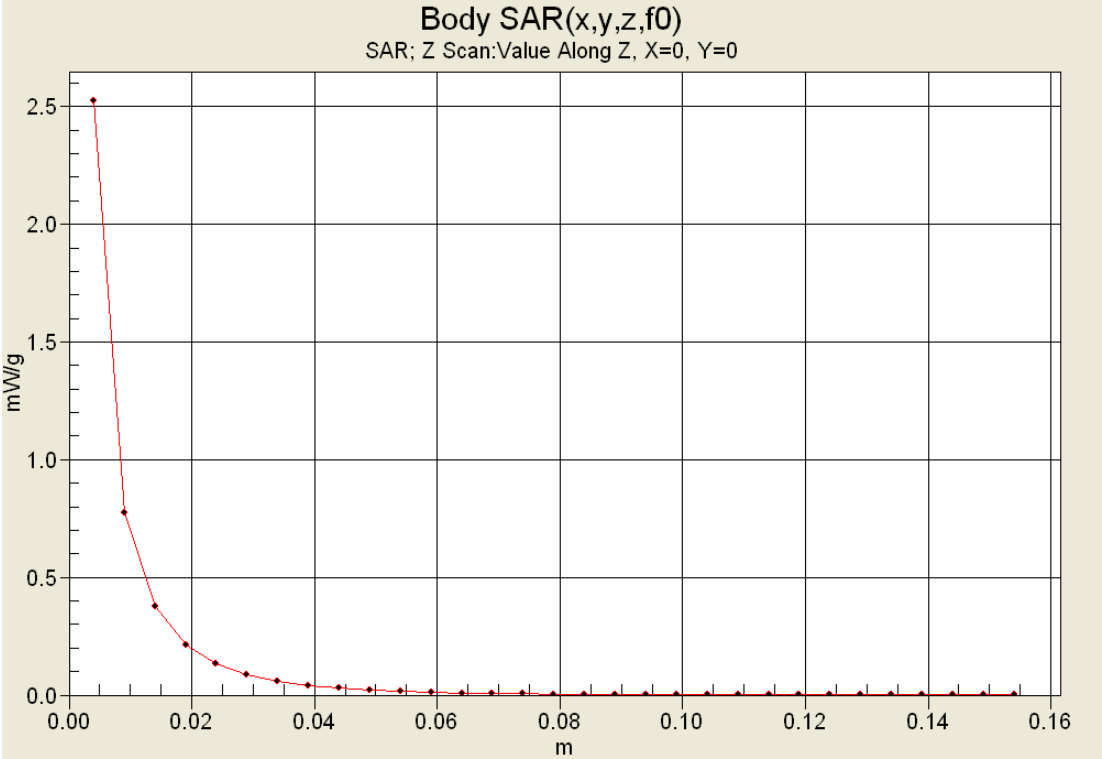
Communication System: CW
Frequency: 470.03 MHz; Duty Cycle: 1:1
Medium: M450 Medium parameters used: f = 470.03 MHz; σ = 0.9 mho/m; ε_r = 56.2; ρ = 1000 kg/m^3

- Probe: ET3DV6 - SN1590; ConvF(8.27, 8.27, 8.27); Calibrated: 21/07/2008
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353; Calibrated: 22/04/2008
- Phantom: Side Planar; Type: Plexiglas; Serial: 161
- Measurement SW: DASY4, V4.7 Build 44; Postprocessing SW: SEMCAD, V1.8 Build 171

Body-worn SAR - Back Side of DUT Touching Planar Phantom (with Lanyard Accessory)
Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.31 mW/g
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.5 V/m; Power Drift = -0.667 dB
Peak SAR (extrapolated) = 6.47 W/kg
SAR(1 g) = 2.39 mW/g; SAR(10 g) = 0.937 mW/g
Maximum value of SAR (measured) = 2.74 mW/g

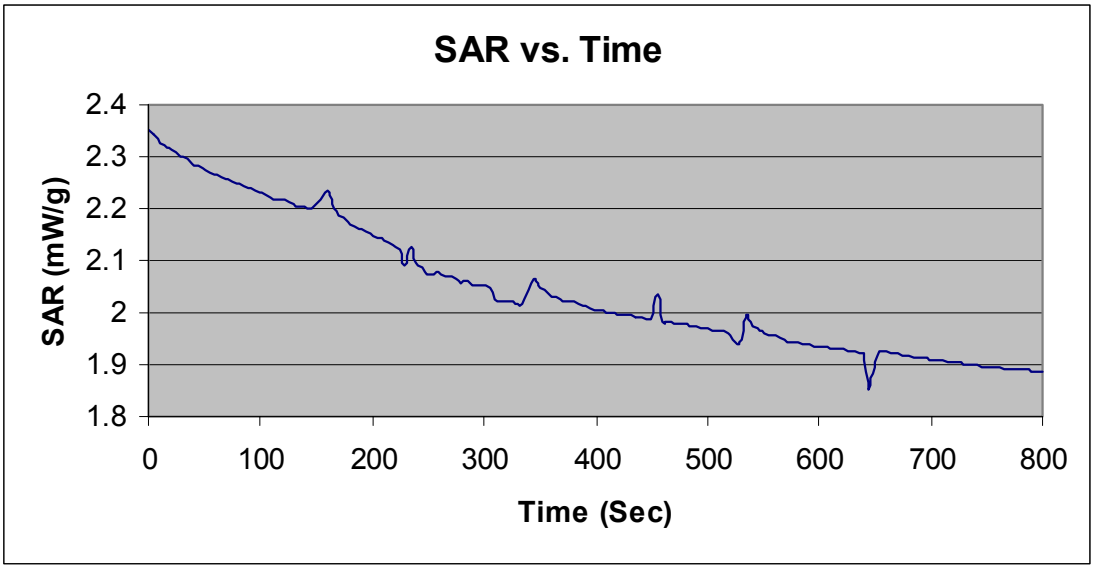


Z-Axis Scan



SAR-versus-Time Droop Evaluation

Body-worn - Back Side with Lanyard
Channel 4 - 470.03 MHz



Start SAR: 2.35017 mW/g
End SAR: 1.88648 mW/g (-0.954 dB)
SAR after 340s: 2.06638 mW/g (-0.559 dB)
340s = Zoom Scan Duration

APPENDIX B - SYSTEM PERFORMANCE CHECK DATA

Date Tested: 05/05/2009

System Performance Check - 450 MHz Dipole - HSL

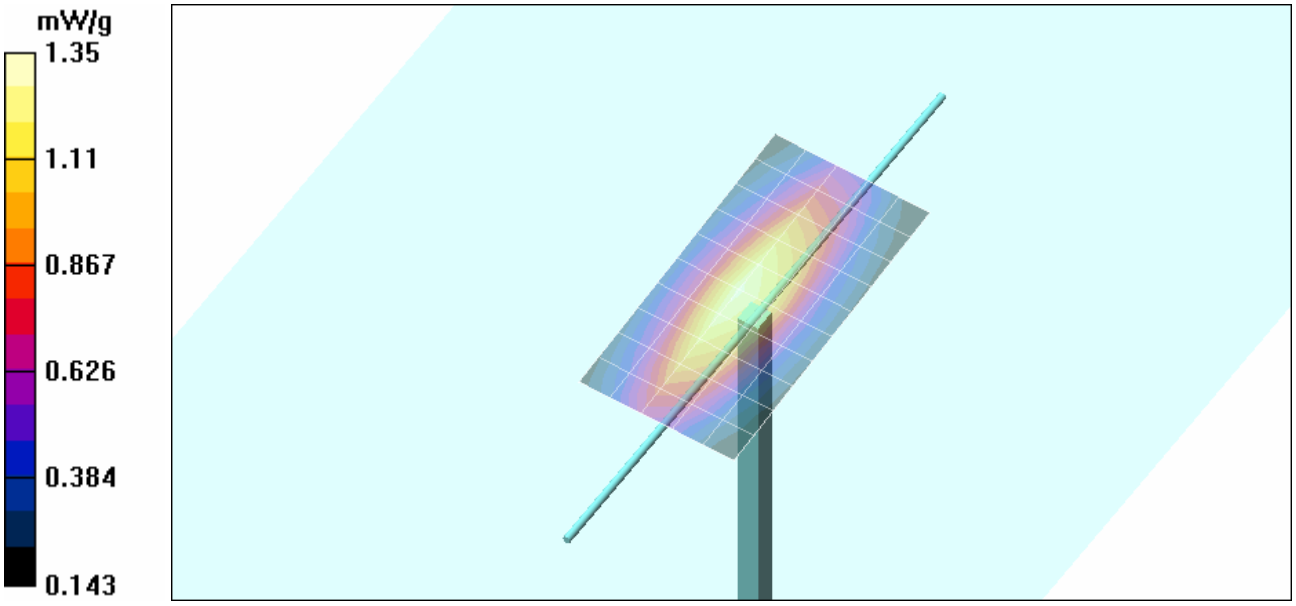
DUT: Dipole 450 MHz; Asset: 00024; Serial: 136; Calibration: 01/19/2009

Ambient Temp: 24°C; Fluid Temp: 22.8°C; Barometric Pressure: 101.1 kPa; Humidity: 35%

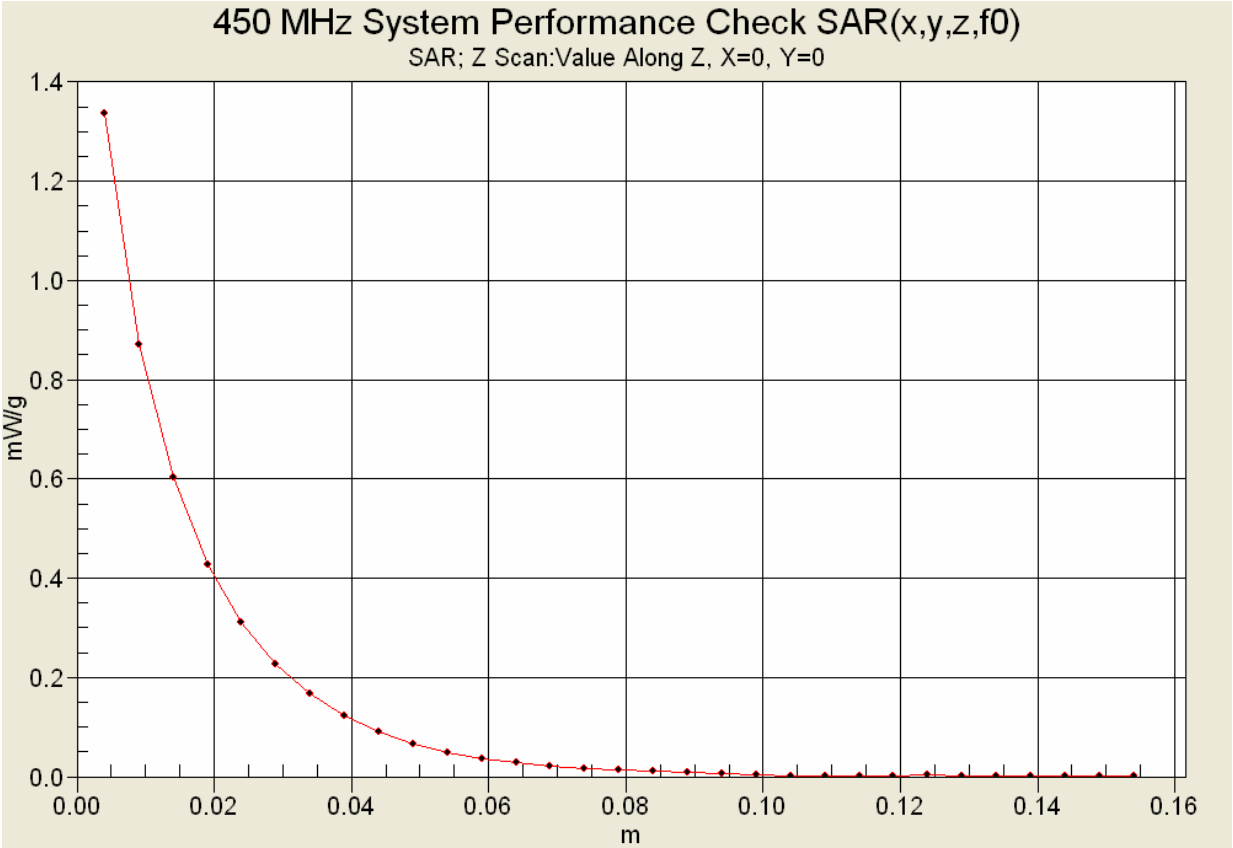
Communication System: CW
Forward Conducted Power: 250 mW
Frequency: 450 MHz; Duty Cycle: 1:1
Medium: HSL450 Medium parameters used: f = 450 MHz; σ = 0.89 mho/m; ε_r = 45.3; ρ = 1000 kg/m^3

- 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

System Performance Check - 450 MHz Dipole
Area Scan (6x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.30 mW/g
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 39.5 V/m; Power Drift = -0.007 dB
Peak SAR (extrapolated) = 2.01 W/kg
SAR(1 g) = 1.27 mW/g; SAR(10 g) = 0.836 mW/g
Maximum value of SAR (measured) = 1.35 mW/g



Z-Axis Scan



APPENDIX C - MEASURED FLUID DIELECTRIC PARAMETERS

450 MHz System Performance Check & 465 MHz DUT Evaluation (Head)

Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
05/May/2009
Frequency (GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

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Freq	FCC_eH	FCC_sH	Test_e	Test_s
0.3500	44.70	0.87	47.48	0.78
0.3600	44.58	0.87	46.91	0.79
0.3700	44.46	0.87	46.78	0.83
0.3800	44.34	0.87	46.42	0.82
0.3900	44.22	0.87	46.20	0.83
0.4000	44.10	0.87	46.52	0.85
0.4100	43.98	0.87	46.08	0.86
0.4200	43.86	0.87	46.12	0.86
0.4300	43.74	0.87	45.78	0.85
0.4400	43.62	0.87	45.74	0.88
0.4500	43.50	0.87	45.33	0.89
0.4600	43.45	0.87	45.30	0.89
0.4700	43.40	0.87	44.89	0.90
0.4800	43.34	0.87	44.35	0.92
0.4900	43.29	0.87	44.68	0.91
0.5000	43.24	0.87	44.26	0.94
0.5100	43.19	0.87	44.06	0.94
0.5200	43.14	0.88	44.04	0.95
0.5300	43.08	0.88	43.86	0.96
0.5400	43.03	0.88	43.95	0.96
0.5500	42.98	0.88	43.56	0.98

465 MHz DUT Evaluation (Body)

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Celltech Labs Inc.
Test Result for UIM Dielectric Parameter
05/May/2009
Frequency (GHz)
FCC_eH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

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Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.3500	57.70	0.93	57.81	0.81
0.3600	57.60	0.93	57.55	0.82
0.3700	57.50	0.93	57.64	0.84
0.3800	57.40	0.93	57.30	0.85
0.3900	57.30	0.93	57.95	0.84
0.4000	57.20	0.93	57.87	0.87
0.4100	57.10	0.93	57.64	0.87
0.4200	57.00	0.94	57.07	0.88
0.4300	56.90	0.94	57.57	0.87
0.4400	56.80	0.94	57.60	0.88
0.4500	56.70	0.94	57.22	0.90
0.4600	56.66	0.94	57.21	0.90
0.4700	56.62	0.94	56.15	0.90
0.4800	56.58	0.94	56.51	0.92
0.4900	56.54	0.94	57.15	0.92
0.5000	56.51	0.94	56.89	0.94
0.5100	56.47	0.94	56.16	0.95
0.5200	56.43	0.95	56.43	0.94
0.5300	56.39	0.95	56.18	0.95
0.5400	56.35	0.95	56.55	0.96
0.5500	56.31	0.95	55.78	0.97