Test Report Serial Number:	45461372R1.1
Test Report Date:	14 November 2016
Project Number:	1354

SAR Test Report - Class II Permissive Change

Applicant:

AWIRE Technology Corp.
41099 Circle 5 Estates
Calgary, Alberta, T3Z 2T4
Canada

Maximum Reported 1g SAR			
FCC	Face:	0.48	W/kg
	Body:	1.14	
IC	Face:	0.62	
	Body:	1.14	
General Pop. Limit:		1.60	

FCC ID: **2AIGO-AWMOD8**

IC Registration Number: **21479-AWMOD8**

Product Model Number / HVIN: **AWMOD8**

Product Name / PMN: **AWMOD8**

In Accordance With:

FCC 47 CFR §2.1093
Radiofrequency Radiation Exposure Evaluation: Portable Devices

Health Canada Safety Code 6
Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3kHz to 300GHz

Approved By:

Ben Hewson, President
Celltech Labs Inc.
21-364 Lougheed Rd.
Kelowna, BC, V1X 7R8
Canada

Test Lab Certificate: 2470.01

IC Registration 3874A-1

FCC Registration: 714830

Table of Contents

1.0 DOCUMENT CONTROL

Tested By:	**Art Voss**
Prepared By:	**Art Voss**
Reviewed By:	**Ben Hewson**

Issue Number	Description	By	Issue Date
1.0	Initial Release	Art Voss	11 November 2016
1.1	Corrections to Table 10	Art Voss	14 November 2016

2.0 NORMATIVE REFERENCES

Normative References*	
ANSI / ISO 17025:2005	General Requirements for competence of testing and calibration laboratories
FCC CFR Title 47 Part 2 Title 47: Part 2.1093:	Code of Federal Regulations Telecommunication Radiofrequency Radiation Exposure Evaluation: Portable Devices
Health Canada Safety Code 6 (2015)	Limits of Human Exposure to Radiofrequency Electromagnetic Energy in the Frequency Range from 3kHz to 300GHz
Industry Canada Spectrum Management & Telecommunications Policy RSS-102 Issue 5:	Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)
IEEE International Committee on Electromagnetic Safety IEEE 1528-2013:	IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
IEC International Standard IEC 62209-2 2010	Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Part 2
FCC KDB KDB 865664 D01v01r04	SAR Measurement Requirements for 100MHz to 6GHz
FCC KDB KDB 447498 D01v06	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
FCC KDB KDB 643646 D01v01r03	SAR Test Reduction Considerations for Occupational PTT Radios
* When the issue number or issue date is omitted, the latest version is assumed.	

3.0 CLIENT AND DEVICE INFORMATION

Client Information	
Applicant Name	AWIRE Technology Corporation
Applicant Address	41099 Circle 5 Estates
	Calgary, Alberta, T3Z 2T4
	Canada
DUT Information (DTS/DSS)	
Device Identifier(s):	**FCC ID:** 2AIGO-AWMOD8
	IC: 21479-AWMOD8
Device Type:	BlueTooth Transceiver
Type of Equipment:	Transceiver Module
Device Model(s) / HVIN:	AWMOD8
Device Marketing Name / PMN:	AWMOD8
Firmware Version ID Number / FVIN:	n/a
Host Marketing Name / HMN:	n/a
Test Sample Serial No.:	Identical Prototype - Multiple Samples
Transmit Frequency Range:	DSS: 2402-2480MHz
	DTS: 2402-2480MHz
Number of Channels:	n/a
Manuf. Max. Rated Output Power:	DSS: 0.0143W, DTS: 0.00735W
Manuf. Max. Rated BW/Data Rate:	n/a
Antenna Gain:	n/a
Antenna Type:	Internal PCB Trace
Modulation:	DQPSK
Duty Cycle:	n/a
DUT Power Source:	7.4VDC, 15Wh Li-Ion Battery (Host)
Deviation(s) from standard/procedure:	None
Modification of DUT:	None

Note: The DTS Mode transmits at 7.35mW which falls below the SAR Test Exclusion Threshold as per KDB 447498. Only the DSS Mode is considered as it exceeds the Exclusion Threshold.

Client Information	
Applicant Name	AWIRE Technology Corporation
Applicant Address	41099 Circle 5 Estates
	Calgary, Alberta, T3Z 2T4
	Canada
DUT Information (FRS/GMRS)	
Device Identifier(s):	**FCC ID:** 2AIGO-AW1001
	IC: 21479-AW1001
Device Type:	Portable UHF FRS/GMRS FM Transceiver
Type of Equipment:	Portable Push-To-Talk (PTT) Radio Transceiver
Device Model(s) / HVIN:	Stealth-AW1001
Device Marketing Name / PMN:	Stealth-AW1001
Firmware Version ID Number / FVIN:	n/a
Host Marketing Name / HMN:	n/a
Test Sample Serial No.:	Identical Prototype - Multiple Samples
Transmit Frequency Range:	FRS: 462.5625 - 462.7125MHz, 467.5625 - 467.7125MHz
	GMRS: 462.5625 - 462.7125MHz
Number of Channels:	FRS: Ch 1-14, GMRS: Ch 2-14 Even Channel Numbers
Manuf. Max. Rated Output Power:	FRS: 0.5W, GMRS: 0.6W
Manuf. Max. Rated BW/Data Rate:	n/a
Antenna Gain:	n/a
Antenna Type:	Internal PCB Trace
Modulation:	FRS/GMRS: FM
Duty Cycle:	FRA/GMRS: 50% PTT Duty Cycle
DUT Power Source:	7.4VDC, 15Wh Li-Ion Battery
Deviation(s) from standard/procedure:	None
Modification of DUT:	None

4.0 STATEMENT OF COMPLIANCE

This measurement report demonstrates that the:

Applicant:	Model / HVIN:
AWIRE Technology Corp.	**AWMOD8**

complies with the SAR (Specific Absorption Rate) RF exposure requirements and limits specified in the following when tested within the Stealth-AW1001 host transceiver (FCC ID: 2AIGO-AW1001, IC ID: 21479-AW1001).

Standard(s):	Measurement Procedure(s):
FCC 47 CFR §2.1093	**FCC KDB 865664, FCC KDB 447498, FCC KDB 643646**
Health Canada's Safety Code 6	**Industry Canada RSS-102 Issue 5**
	IEEE Standard 1528-2013, IEC 62209-2

Use Group:

☐ **Occupational / Controlled** ☒ **General Population / Uncontrolled**

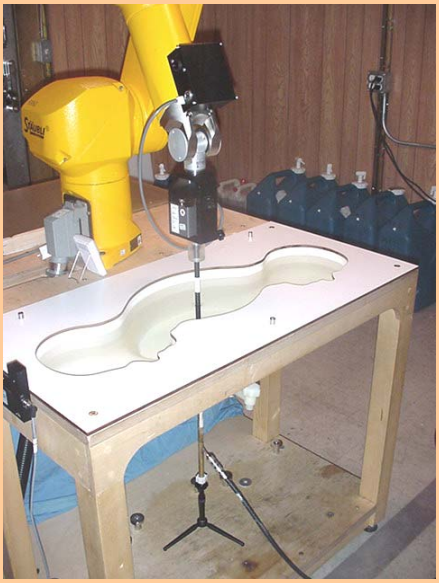
Reason for Issue:

Class II Permissive Change

A description of the device, operating configuration, detailed summary of the test results, methodology and procedures used during this evaluation, equipment used and the various provisions of the rules are included within this test report.

5.0 SAR MEASUREMENT SYSTEM

Celltech Labs Inc. SAR measurement facility employs a Dosimetric Assessment System (DASY™) manufactured by Schmid & Partner Engineering AG (SPEAG™) of Zurich, Switzerland. The DASY4 measurement system is comprised of the measurement server, a robot controller, a computer, a near-field probe, a probe alignment sensor, an Elliptical Planar Phantom (ELI) phantom and a specific anthropomorphic mannequin (SAM) phantom 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 and a teach pendant (Joystick) to control the robot's servo 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 form the DAE to digital electronic signal 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, a command decoder and a 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 SAM PHANTOM

DASY4 MEASUREMENT SERVER

6.0 RF CONDUCTED POWER MEASUREMENT (HOST TRANSCEIVER)

Table 6.0

Conducted Power Measurements (Host Transceiver)

Channel	Frequency (MHz)	Measured Power (dBm)	Rated Power (dBm)	Rated Power (W)	Delta (dBm)	SAR Test Channel (Y/N)	Channel	Measured Power (dBm)	Rated Power (dBm)	Rated Power (W)	Delta (dBm)	SAR Test Channel (Y/N)
1-FRS	462.5625	26.68	27.00	0.50	-0.32	Y	2-GMRS	27.44	27.80	0.60	-0.36	Y
7-FRS	462.7125	26.63	27.00	0.50	-0.37	Y	14-GMRS	27.45	27.80	0.60	-0.35	N
8-FRS	467.5625	26.39	27.00	0.50	-0.61	N						
14-FRS	467.7125	26.37	27.00	0.50	-0.63	Y						

Notes:

The Conducted Power of the DUT was measured at the antenna port, with a fully charged battery and transmitting at 100% duty cycle.

7.0 NUMBER OF TEST CHANNELS (N_C) (HOST TRANSCEIVER)

Table 7.0

Number of Required Test Channels

Frequency			Number of Channels		Spacing	
f_{LOW} (MHz)	f_{HIGH} (MHz)	f_C (MHz)	KDB 447498 (N_C)	IEC 62209 (N_C)	KDB 447498 (MHz)	IEC 62209 (MHz)
462.5625	467.7125	**465.1375**	**2**	**3**	**5.1**	**2.6**

KDB 447498: $N_C = \text{RoundUp}\{[100(F_{HIGH} - F_{LOW})/Fc]^{0.5} \times (F_C/100)^{0.2}\}$

IEC 62209-1: $N_C = 2 \times \{\text{RoundUp}[10(F_{HIGH} - F_{LOW})/F_C]\} + 1$

Notes:

Since the FRS band is broken into two distinct channel groups, 462MHz and 467MHz, and since the GMRS channels of this device only transmit on certain channels of the FRS 462MHz channels, two channels of the 462MHz and one channel of the 467MHz channel groups were chosen.
See Section 6.0 Conducted Power for channel selection.

8.0 ACCESSORIES EVALUATED (HOST TRANSCEIVER)

The AWIRE AW1001 is supplied an integral non-removable belt clip and a means to plug in any third part headset with a 3.5mm headset jack. A typical third party headset was used during this SAR evaluation.

9.0 SAR MEASUREMENT SUMMARY

The measurement results below are of the Host Device with co-located FRS/GMRS & DSS/DTS transmitters.

Table 9.0

Measured SAR Results (1g)- FACE Configuration (FCC/IC)

Date	Plot ID	DUT		Test Frequency (*MHz*)	Modulation	Accessories				DUT Spacing		Measured SAR (1g)		SAR Drift (dB)
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (*mm*)	Antenna (*mm*)	100% DC (*W/kg*)	50% DC (*W/kg*)	
30 May 2016	F1	AW1001	Sys	462.5625	CW	n/a	n/a	n/a	n/a	25	n/a	0.162	0.081	-0.190
30 May 2016	F2	AW1001	Sys	462.7125	CW	n/a	n/a	n/a	n/a	25	n/a	0.113	0.057	-0.170
30 May 2016	F3	AW1001	Sys	467.7125	CW	n/a	n/a	n/a	n/a	25	n/a	0.068	0.034	-0.140
30 May 2016	F4	AW1001	Sys	462.5625	GMRS	n/a	n/a	n/a	n/a	25	n/a	0.095	0.047	-0.160
SAR Limit							Head/Body			Spatial Peak		RF Exposure Category		
FCC 47 CFR 2.1093				Health Canada Safety Code 6			1.6 W/kg			1 Gram Average		General Population		

Table 9.1

Measured SAR Results (1g)- BODY Configuration (FCC/IC)

Date	Plot ID	DUT		Test Frequency (*MHz*)	Modulation	Accessories				DUT Spacing		Measured SAR (1g)		SAR Drift (dB)
		M/N	Type			Antenna ID	Battery ID	Body ID	Audio ID	DUT (*mm*)	Antenna (*mm*)	100% DC (*W/kg*)	50% DC (*W/kg*)	
31 May 2016	B1	AW1001	Sys	462.4625	CW	n/a	n/a	BC	n/a	0	n/a	1.297	0.649	-0.130
31 May 2016	B2	AW1001	Sys	462.7125	CW	n/a	n/a	BC	n/a	0	n/a	1.028	0.514	-0.180
1 June 2016	B3	AW1001	Sys	467.7125	CW	n/a	n/a	BC	n/a	0	n/a	0.576	0.288	-0.180
1 June 2016	B4	AW1001	Sys	462.5625	CW	n/a	n/a	BC	n/a	0	n/a	1.187	0.593	-0.150
1 June 2016	B5	AW1001	Sys	462.5625	GMRS	n/a	n/a	BC	n/a	0	n/a	1.290	0.645	-0.196
1 June 2016	B6*	AW1001	Sys	462.5625	CW	n/a	n/a	BC	n/a	0	n/a	1.396	0.698	-0.160
7 July 2016	B7	AW1001	Sys	2441	BT - DSS	n/a	n/a	BC	n/a	0	n/a	0.063	-	-0.175
7 July 2016	B8	AW1001	Sys	2441	BT - DSS	n/a	n/a	BC	n/a	0	n/a	0.390	-	-0.181
SAR Limit							Head/Body			Spatial Peak		RF Exposure Category		
FCC 47 CFR 2.1093				Health Canada Safety Code 6			1.6 W/kg			1 Gram Average		General Population		

* This configuration was tested with the front (face) of the device against the phantom. All other Body configurations were tested with the back (belt clip) against the phantom. This supports the configuration described in the manufacturer's User's Manual.

10.0 SCALING OF MAXIMUM MEASURE SAR

Table 10.0

Scaling of Maximum Measured SAR [1]

Plot ID	Configuration	Freq (MHz)	Measured Fluid Deviation Permittivity	Measured Fluid Deviation Conductivity	Measured Conducted Power (dBm)	Measured Drift (dB)	Measured SAR (1g) (W/kg)
F1	Face	462.5625	3.65%	5.75%	26.7	-0.190	0.081
B6	B-F	462.5625	-1.00%	2.92%	26.7	-0.160	0.698

Step 1

Fluid Sensitivity Adjustment

Plot ID	Scale Factor (%)		Measured SAR (W/kg)		Step 1 Adjusted SAR (1g) (W/kg)
F1	1.037%	x	0.081	=	0.084
B6	1.000%	x	0.698	=	0.698

Step 2

Manufacturer's Tune-Up Tolerance

Plot ID	Measured Conducted Power (dBm)	Rated Power (dBm)	Delta (dB)		Step 1 Adjusted SAR (W/kg)		Step 2 Adjusted SAR (1g) (W/kg)
F1	26.7	27.0	-0.32	+	0.084	=	0.090
B6	26.7	27.0	-0.32	+	0.698	=	0.752

Step 3

Simultaneous Transmission - Bluetooth and/or WiFi

Plot ID	Rated Output Power (Pmax) (mW)	Freq (MHz)	Separation Distance (mm)	Measured SAR* (W/kg)		Step 2 Adjusted SAR (W/kg)		Step 3 Adjusted SAR (W/kg)
F1	14.3	2402-2480	5	0.39	+	0.090	=	0.480
B6	14.3	2402-2480	5	0.39	+	0.752	=	1.142

Step 4

Drift Adjustment

Plot ID	Measured Drift (dB)		Step 3 Adjusted SAR (W/kg)		Step 4 Adjusted SAR (1g) (W/kg)
F1	-0.190	+	0.480	=	0.617
B6	-0.160	+	1.142	=	1.185

Step 5

Reported SAR

Plot ID	FCC From Steps 1 through 3 1g SAR (W/kg)	IC From Steps 1 through 4 1g SAR (W/kg)
F1	0.48	0.62
B6	1.14	1.19

* Worst case SAR evaluated for all configurations.
Note: The BlueTooth DTS Mode transmits at 7.35mW which falls below the SAR Test Exclusion Threshold as per KDB 447498. Only the DSS Mode is considered contribution SAR contribution as it exceeds the Exclusion Threshold. The calculated SAR of the DTS Mode is less than the measured SAR of the DSS Mode. The DTS Mode does not simultaneously transmit with the DSS Mode.

NOTES to Table 10.0
(1) Scaling of the Maximum Measured SAR is based on the highest, 100% duty cycle, Face, Body and/or Head SAR measured of ALL test channels, configurations and accessories used during THIS evaluation. The Measured Fluid Deviation parameters apply only to deviation of the tissue equivalent fluids used at the frequencies which produced the highest measured SAR. The Measured Conducted Power applies to the Conducted Power measured at the frequencies producing the highest Face and Body SAR. The Measured Drift is the SAR drift associated with that specific SAR measurement. The Reported SAR is the accumulation of all SAR Adjustments from the applicable Steps 1 through 4. The Plot ID is for indentification of the SAR Measurement Plots in Annex A of this report. NOTE: Some of the scaling factors in Steps 1 through 4 may not apply and are identified by light gray text.
Step 1
Per IEC-62209-1 and FCC KDB 865664. Scaling required only when Measured Fluid Deviation is greater than 5%. If the Measured Fluid Deviation is greater than 5%, Table 10.1 will be shown and will indicate the SAR scaling factor in percent (%). SAR is MULTIPLIED by this scaling factor only when the scaling factor is positive (+).
Step 2
Per KDB 447498. Scaling required only when the difference (Delta) between the Measured Conducted Power and the Manufacturer's Rated Conducted Power is (-) Negative. The absolute value of Delta is ADDED to the SAR.
Step 3
Per KDB 447498 4.3.2. The SAR, either measured or calculated, of ANY and ALL simultaneous transmitters must be added together and includes all contributors.
Step 4
Per IEC 62209-1. Scaling required only when Measured Drift is (-) Negative. The absolute value of Measured Drift is added to Reported or Simultaneous Reported SAR.
Step 5
The Reported SAR is the Maximum Final Adjusted Cumulative SAR from the applicable Steps 1 through 4 and are reported on Page 1 of this report.

Table 10.1

Fluid Sensitivity Calculation (1g)

Delta SAR = Ce * Δe + Cσ*Δσ

Ce = (-0.0007854*F^3) + (0.009402*F^2) - (0.02742*F) - 0.2026

Cσ = (0.009804*F^3) - (0.08661*F^2) + (0.02981*F) + 0.7829

Attribute	Plot ID	Freq. [F] (*GHz*)	Plot ID	Freq. [F] (*GHz*)
	F1	0.4625625	-	0
Ce	-0.2133		-0.2026	
Cσ	0.7791		0.7829	
Δe	3.65%		0.00%	
Δσ	5.75%		0.00%	
ΔSAR	**3.70%**		**0.00%**	
Scaling of SAR only required for Positive ΔSAR				

I attest that the data reported herein is true and accurate within the tolerance of the Measurement Instrument Uncertainty; that all tests and measurements were performed in accordance with accepted practices or procedures; and that all tests and measurements were performed by me or by trained personnel under my direct supervision. The results of this investigation are based solely on the test sample(s) provided by the client which were not adjusted, modified or altered in any manner whatsoever, except as required to carry out specific tests or measurements. This test report has been completed in accordance with ISO/IEC 17025.

Art Voss, P.Eng.
Technical Manager
Celltech Labs Inc.

21 July 2016
Date

11.0 SAR EXPOSURE LIMITS

Table 11.0

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 to individuals who have no knowledge or control of their potential exposure.			
Controlled environments are defined as locations where there is potential exposure to individuals who have knowledge of their potential exposure and can exercise control over their exposure.			

12.0 DETAILS OF SAR EVALUATION

EVALUATION DETAILS	
1	The number of test channels and test configurations performed on this accessory were based on the antenna-configuration combinations which produced the highest, or worst case, SAR from previous SAR evaluations performed on the transceiver. Table 6.0 identifies those test channels and each channel was tested in the Body and Face configuration.
2	The DUT was evaluated for SAR in accordance with the procedures described in IEEE 1528, FCC KDB 865646 and RSS-102.
3	The DUT was evaluated for SAR at the maximum conducted output power level, preset by the manufacturer, in unmodulated continuous transmit operation (Continuous Wave mode at 100% duty cycle) with the transmit key continuously depressed. For a Push-To-Talk (PTT) device, the 50% duty cycle compensation reported assumes a transmit/receive cycle of equal time base.
4	A single point SAR measurement was taken prior to the Area Scan and after the Zoom Scan and the SAR drift of the DUT was evaluated. The measured SAR drift was added to the measured SAR levels of the Maximum ***reported*** SAR (IC/EU only).
5	Each SAR evaluations were performed with a fully charged battery.
6	The fluid temperature remained within +/-2°C from the time of the fluid dielectric parameter measurement to the completion of the SAR evaluation.
7	The fluid temperature remained within +/-0.5°C throughout the test day.

SCAN PROCEDURE	
Maximum distance from the closest measurement point to phantom surface.	4 ± 1mm
Maximum probe angle normal to phantom surface.	5^{o} ± 1^{o}
Area Scan Spatial Resolution ΔX, ΔY	15mm
Zoom Scan Spatial Resolution ΔX, ΔY	7.5mm
Zoom Scan Spatial Resolution ΔZ	5mm
Zoom Scan Volume X, Y, Z	30mm x 30mm x 30mm
Phantom	SAM
Fluid Depth	150mm
An Area Scan with an area extending beyond the device was used to locate the candidate maximas within 2dB of the global maxima.	
A Zoom Scan centered over the peak SAR location(s) determined by the Area Scan was used to determine the 1 gram and 10 gram peak spatial-average SAR	

13.0 MEASUREMENT UNCERTAINTIES

Table 13.0

UNCERTAINTY BUDGET FOR DEVICE EVALUATION (IEEE 1528-2013 Table 9)

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*	E.2.1	6.6	Normal	1	1	1	6.60	6.60	∞
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	8.3	Rectangular	1.732050808	1	1	4.8	4.8	∞
Linearity*	E.2.4	4.7	Rectangular	1.732050808	1	1	2.7	2.7	∞
System Detection Limits*	E.2.4	1.0	Rectangular	1.732050808	1	1	0.6	0.6	∞
Modulation Response	E.2.5	4.0	Rectangular	1.732050808	1	1	2.3	2.3	∞
Readout Electronics*	E.2.6	1.0	Normal	1	1	1	1.0	1.0	∞
Response Time*	E.2.7	0.8	Rectangular	1.732050808	1	1	0.5	0.5	∞
Integration Time*	E.2.8	1.4	Rectangular	1.732050808	1	1	0.8	0.8	∞
RF Ambient Conditions - Noise	E.6.1	0.0	Rectangular	1.732050808	1	1	0.0	0.0	∞
RF Ambient Conditions - Reflection	E.6.1	0.0	Rectangular	1.732050808	1	1	0.0	0.0	∞
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	3.9	Rectangular	1.732050808	1	1	2.3	2.3	∞
Test Sample Related									
Test Sample Positioning	E.4.2	0.3	Normal	1	1	1	0.3	0.3	5
Device Holder Uncertainty*	E.4.1	3.6	Normal	1	1	1	3.6	3.6	∞
SAR Drift Measurement**	E.2.9	0.0	Rectangular	1.732050808	1	1	0.0	0.0	∞
SAR Scaling***	E.6.5	2.0	Rectangular	1.732050808	1	1	1.2	1.2	∞
Phantom and Tissue Parameters									
Phantom Uncertainty*	E.3.1	4.0	Rectangular	1.732050808	1	1	2.3	2.3	∞
SAR Correction Uncertainty	E.3.2	1.2	Normal	1	1	0.84	1.2	1.0	∞
Liquid Conductivity (measurement)	E.3.3	6.8	Normal	1	0.78	0.71	5.3	4.8	10
Liquid Permittivity (measurement)	E.3.3	5.3	Normal	1	0.23	0.26	1.2	1.4	10
Liquid Conductivity (Temperature)	E.3.2	0.1	Rectangular	1.732050808	0.78	0.71	0.1	0.0	∞
Liquid Permittivity Temperature)	E.3.2	0.0	Rectangular	1.732050808	0.23	0.26	0.0	0.0	∞
Effective Degrees of Freedom(1)								**V_{eff} =**	**873.2**
Combined Standard Uncertainty			**RSS**				**12.59**	**12.40**	
Expanded Uncertainty (95% Confidence Interval)			**k=2**				**25.18**	**24.80**	
Measurement Uncertainty Table in accordance with IEEE Standard 1528-2003									

(1) The Effective Degrees of Freedom is > 30 therefore a coverage factor of k=2 represents an approximate confidence level of 95%.

* Provided by SPEAG

Table 13.1

Calculation of the Degrees and Effective Degrees of Freedom	
$v_i = n - 1$	$v_{eff} = \dfrac{u_c^4}{\dfrac{m}{\sum_{i=1} \dfrac{c_i^4 u_i^4}{v_i}}}$

14.0 FLUID DIELECTRIC PARAMETERS

****

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Sun 29/May/2016 12:50:01
Freq Frequency(GHz)
FCC_eH FCC OET 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC OET 65 Supplement C (June 2001) Limits for Head Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eH	FCC_sH	Test_e	Test_s
0.3500	44.70	0.87	46.91	0.81
0.3600	44.58	0.87	47.98	0.81
0.3700	44.46	0.87	46.37	0.82
0.3800	44.34	0.87	46.07	0.84
0.3900	44.22	0.87	45.58	0.84
0.4000	44.10	0.87	46.03	0.86
0.4100	43.98	0.87	45.75	0.87
0.4200	43.86	0.87	45.65	0.88
0.4300	43.74	0.87	45.72	0.90
0.4400	43.62	0.87	45.71	0.92
0.4500	43.50	0.87	45.73	0.92
0.4600	43.45	0.87	45.03	0.92
0.4700	43.40	0.87	45.00	0.92
0.4800	43.34	0.87	44.55	0.92
0.4900	43.29	0.87	43.76	0.92
0.5000	43.24	0.87	43.82	0.93
0.5100	43.19	0.87	43.72	0.94
0.5200	43.14	0.88	43.02	0.93
0.5300	43.08	0.88	43.03	0.97
0.5400	43.03	0.88	42.93	0.99
0.5500	42.98	0.88	43.38	1.00

Table 14.0

FLUID DIELECTRIC PARAMETERS

Date:	29 May 2016	Fluid Temp:	20.9	Frequency:	450MHz	Tissue:	Head

Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
350.0000		46.9100	0.8100	44.7000	0.87	4.94%	-6.90%
360.0000		47.9800	0.8100	44.5800	0.87	7.63%	-6.90%
370.0000		46.3700	0.8200	44.4600	0.87	4.30%	-5.75%
380.0000		46.0700	0.8400	44.3400	0.87	3.90%	-3.45%
390.0000		45.5800	0.8400	44.2200	0.87	3.08%	-3.45%
400.0000		46.0300	0.8600	44.1000	0.87	4.38%	-1.15%
410.0000		45.7500	0.8700	43.9800	0.87	4.02%	0.00%
420.0000		45.6500	0.8800	43.8600	0.87	4.08%	1.15%
430.0000		45.7200	0.9000	43.7400	0.87	4.53%	3.45%
440.0000		45.7100	0.9200	43.6200	0.87	4.79%	5.75%
450.0000		45.7300	0.9200	43.5000	0.87	5.13%	5.75%
460.0000		45.0300	0.9200	43.4500	0.87	3.64%	5.75%
462.5625	*	45.0223	0.9200	43.4372	0.87	3.65%	5.75%
462.7125	*	45.0219	0.9200	43.4364	0.87	3.65%	5.75%
467.7125	*	45.0069	0.9200	43.4114	0.87	3.68%	5.75%
470.0000		45.0000	0.9200	43.4000	0.87	3.69%	5.75%
480.0000		44.5500	0.9200	43.3400	0.87	2.79%	5.75%
490.0000		43.7600	0.9200	43.2900	0.87	1.09%	5.75%
500.0000		43.8200	0.9300	43.2400	0.87	1.34%	6.90%
510.0000		43.7200	0.9400	43.1900	0.87	1.23%	8.05%
520.0000		43.0200	0.9300	43.1400	0.88	-0.28%	5.68%
530.0000		43.0300	0.9700	43.0800	0.88	-0.12%	10.23%
540.0000		42.9300	0.9900	43.0300	0.88	-0.23%	12.50%
550.0000		43.3800	1.0000	42.9800	0.88	0.93%	13.64%

*Channel Frequency Tested

****

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Tue 31/May/2016 10:50:11
Freq Frequency(GHz)
FCC_eH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.3500	57.70	0.93	58.61	0.86
0.3600	57.60	0.93	58.11	0.87
0.3700	57.50	0.93	57.34	0.87
0.3800	57.40	0.93	56.97	0.89
0.3900	57.30	0.93	57.59	0.89
0.4000	57.20	0.93	57.27	0.89
0.4100	57.10	0.93	56.60	0.92
0.4200	57.00	0.94	56.90	0.91
0.4300	56.90	0.94	56.59	0.93
0.4400	56.80	0.94	56.45	0.94
0.4500	56.70	0.94	56.34	0.95
0.4600	56.66	0.94	56.04	0.97
0.4700	56.62	0.94	56.21	0.96
0.4800	56.58	0.94	55.81	0.95
0.4900	56.54	0.94	55.43	0.96
0.5000	56.51	0.94	55.52	0.97
0.5100	56.47	0.94	55.18	0.98
0.5200	56.43	0.95	55.12	0.98
0.5300	56.39	0.95	55.00	1.00
0.5400	56.35	0.95	54.54	1.01
0.5500	56.31	0.95	54.98	1.03

Table 14.1

FLUID DIELECTRIC PARAMETERS

Date:	31 May 2016	Fluid Temp:	20	Frequency:	450MHz	Tissue:	Body

Freq (MHz)		Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
350.0000		58.6100	0.8600	57.7000	0.93	1.58%	-7.53%
360.0000		58.1100	0.8700	57.6000	0.93	0.89%	-6.45%
370.0000		57.3400	0.8700	57.5000	0.93	-0.28%	-6.45%
380.0000		56.9700	0.8900	57.4000	0.93	-0.75%	-4.30%
390.0000		57.5900	0.8900	57.3000	0.93	0.51%	-4.30%
400.0000		57.2700	0.8900	57.2000	0.93	0.12%	-4.30%
410.0000		56.6000	0.9200	57.1000	0.93	-0.88%	-1.08%
420.0000		56.9000	0.9100	57.0000	0.94	-0.18%	-3.19%
430.0000		56.5900	0.9300	56.9000	0.94	-0.54%	-1.06%
440.0000		56.4500	0.9400	56.8000	0.94	-0.62%	0.00%
450.0000		56.3400	0.9500	56.7000	0.94	-0.63%	1.06%
460.0000		56.0400	0.9700	56.6600	0.94	-1.09%	3.19%
462.5625	*	56.0836	0.9674	56.6498	0.94	-1.00%	2.92%
462.7125	*	56.0861	0.9673	56.6492	0.94	-0.99%	2.90%
467.7125	*	56.1711	0.9623	56.6292	0.94	-0.81%	2.37%
470.0000		56.2100	0.9600	56.6200	0.94	-0.72%	2.13%
480.0000		55.8100	0.9500	56.5800	0.94	-1.36%	1.06%
490.0000		55.4300	0.9600	56.5400	0.94	-1.96%	2.13%
500.0000		55.5200	0.9700	56.5100	0.94	-1.75%	3.19%
510.0000		55.1800	0.9800	56.4700	0.94	-2.28%	4.26%
520.0000		55.1200	0.9800	56.4300	0.95	-2.32%	3.16%
530.0000		55.0000	1.0000	56.3900	0.95	-2.46%	5.26%
540.0000		54.5400	1.0100	56.3500	0.95	-3.21%	6.32%
550.0000		54.9800	1.0300	56.3100	0.95	-2.36%	8.42%

*Channel Frequency Tested

****

Aprel Laboratory
Test Result for UIM Dielectric Parameter
Thu 07/Jul/2016 15:16:29
Freq Frequency(GHz)
FCC_eH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Epsilon
FCC_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
FCC_eB FCC Limits for Body Epsilon
FCC_sB FCC Limits for Body Sigma
Test_e Epsilon of UIM
Test_s Sigma of UIM

****

Freq	FCC_eB	FCC_sB	Test_e	Test_s
2.3500	52.83	1.85	50.59	1.79
2.3600	52.82	1.86	50.38	1.79
2.3700	52.81	1.87	50.58	1.82
2.3800	52.79	1.88	50.45	1.79
2.3900	52.78	1.89	50.36	1.84
2.4000	52.77	1.90	50.14	1.82
2.4100	52.75	1.91	50.30	1.86
2.4200	52.74	1.92	50.03	1.86
2.4300	52.73	1.93	50.13	1.87
2.4400	52.71	1.94	50.12	1.87
2.4500	52.70	1.95	50.11	1.93
2.4600	52.69	1.96	50.06	1.92
2.4700	52.67	1.98	50.01	1.92
2.4800	52.66	1.99	49.98	1.94
2.4900	52.65	2.01	49.93	1.93
2.5000	52.64	2.02	49.78	1.95
2.5100	52.62	2.04	49.77	1.97
2.5200	52.61	2.05	49.70	1.98
2.5300	52.60	2.06	49.85	2.02
2.5400	52.59	2.08	49.77	2.04
2.5500	52.57	2.09	49.82	2.04

Table 14.2

FLUID DIELECTRIC PARAMETERS

Date:	7 Jul 2016	Fluid Temp:	24.4	Frequency:	2450MHz	Tissue:	Body

Freq (MHz)	Test_e	Test_s	Target_e	Target_s	Deviation Permittivity	Deviation Conductivity
2350.0000	50.5900	1.7900	52.8300	1.85	-4.24%	-3.24%
2360.0000	50.3800	1.7900	52.8200	1.86	-4.62%	-3.76%
2370.0000	50.5800	1.8200	52.8100	1.87	-4.22%	-2.67%
2380.0000	50.4500	1.7900	52.7900	1.88	-4.43%	-4.79%
2390.0000	50.3600	1.8400	52.7800	1.89	-4.59%	-2.65%
2400.0000	50.1400	1.8200	52.7700	1.90	-4.98%	-4.21%
2410.0000	50.3000	1.8600	52.7500	1.91	-4.64%	-2.62%
2420.0000	50.0300	1.8600	52.7400	1.92	-5.14%	-3.12%
2430.0000	50.1300	1.8700	52.7300	1.93	-4.93%	-3.11%
2440.0000	50.1200	1.8700	52.7100	1.94	-4.91%	-3.61%
2450.0000	50.1100	1.9300	52.7000	1.95	-4.91%	-1.03%
2460.0000	50.0600	1.9200	52.6900	1.96	-4.99%	-2.04%
2470.0000	50.0100	1.9200	52.6700	1.98	-5.05%	-3.03%
2480.0000	49.9800	1.9400	52.6600	1.99	-5.09%	-2.51%
2490.0000	49.9300	1.9300	52.6500	2.01	-5.17%	-3.98%
2500.0000	49.7800	1.9500	52.6400	2.02	-5.43%	-3.47%
2510.0000	49.7700	1.9700	52.6200	2.04	-5.42%	-3.43%
2520.0000	49.7000	1.9800	52.6100	2.05	-5.53%	-3.41%
2530.0000	49.8500	2.0200	52.6000	2.06	-5.23%	-1.94%
2540.0000	49.7700	2.0400	52.5900	2.08	-5.36%	-1.92%
2550.0000	49.8200	2.0400	52.5700	2.09	-5.23%	-2.39%

*Channel Frequency Tested

15.0 SYSTEM VERIFICATION TEST RESULTS

Table 15.0

System Verification Test Results

Date	Frequency (MHz)	Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward Power(1) (mW)	Dipole Spacing (mm)	Validation Source P/N	Validation Source S/N
29 May 2016	450	Head	20.9	21	22%	250	15	D450V3	1068

SAR						Fluid Parameters					
1 gram			10 gram			Permittivity			Conductivity		
Measured	Target(2)	Deviation	Measured	Target(2)	Deviation	Measured	Target	Deviation	Measured	Target	Deviation
1.08	1.16	-6.90%	0.73	0.78	-6.43%	45.73	43.50	5.13%	0.92	0.87	5.75%

SAR Normalized to 1W Forward Power					
Normalized	Target(3)	Deviation	Normalized	Target(3)	Deviation
4.32	4.49	-3.79%	2.92	3.02	-3.31%

Prior to the SAR evaluations, system checks were performed on the planar section of the phantom and a SPEAG validation dipole in accordance with the procedures described in IEEE 1528-2013, FCC KDB 846224 and IEC 62209-1. 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 Section "Fluid Dielectric Parameters"). The forward power was applied to the dipole and the system was verified to a tolerance of +10% from the system manufacturer's dipole calibration target SAR value (see Appendix "Dipole Calibration" for system manufacturer's dipole calibration procedures).

(1) The Forward Power applied to the Validation Source during this System Verification is the Forward Power applied by the manufacturer during the calibration of this validation source.

(2) The Target SAR values are the SAR values that were measured using the Forward Power indicated above by the manufacture during the calibration of this validation source.

(3) Based on manufacturer's 1W Normalized SAR during the calibration of this validation source.

Table 15.1

System Verification Test Results

Date	Frequency (MHz)	Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward[1] Power (mW)	Dipole Spacing (mm)	Validation Source P/N	Validation Source S/N
31 May 2016	450	Body	20.0	22	21%	250	15	D450V3	1068

SAR						Fluid Parameters					
1 gram			10 gram			Permittivity			Conductivity		
Measured	Target[2]	Deviation	Measured	Target[2]	Deviation	Measured	Target	Deviation	Measured	Target	Deviation
1.12	1.12	0.00%	0.76	0.74	3.39%	56.34	56.70	-0.63%	0.95	0.94	1.06%

SAR Normalized to 1W Forward Power					
Normalized	Target[3]	Deviation	Normalized	Target[3]	Deviation
4.48	4.42	-1.35%	3.04	2.92	-4.10%

Prior to the SAR evaluations, system checks were performed on the planar section of the phantom and a SPEAG validation dipole in accordance with the procedures described in IEEE 1528-2013, FCC KDB 846224 and IEC 62209-1. 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 Section "Fluid Dielectric Parameters"). The forward power was applied to the dipole and the system was verified to a tolerance of +10% from the system manufacturer's dipole calibration target SAR value (see Appendix "Dipole Calibration" for system manufacturer's dipole calibration procedures).

(1) The Forward Power applied to the Validation Source during this System Verification is the Forward Power applied by the manufacturer during the calibration of this validation source.

(2) The Target SAR values are the SAR values that were measured using the Forward Power indicated above by the manufacture during the calibration of this validation source.

(3) Based on manufacturer's 1W Normalized SAR during the calibration of this validation source.

Table 15.2

System Verification Test Results

Date	Frequency (MHz)	Fluid Type	Fluid Temp °C	Ambient Temp °C	Ambient Humidity (%)	Forward(1) Power (mW)	Dipole Spacing (mm)	Validation Source P/N	Validation Source S/N
7 July 2016	2450	Body	24.4	24	21%	250	10	D2450V2	825

SAR						Fluid Parameters					
1 gram			10 gram			Permittivity			Conductivity		
Measured	Target(2)	Deviation	Measured	Target(2)	Deviation	Measured	Target	Deviation	Measured	Target	Deviation
13.40	13.00	3.08%	6.33	6.05	4.63%	50.11	52.70	-4.91%	1.93	1.95	-1.03%

SAR Normalized to 1W Forward Power					
Normalized	Target(3)	Deviation	Normalized	Target(3)	Deviation
53.60	50.70	5.72%	25.32	23.80	6.39%

Prior to the SAR evaluations, system checks were performed on the planar section of the phantom and a SPEAG validation dipole in accordance with the procedures described in IEEE 1528-2013, FCC KDB 846224 and IEC 62209-1. 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 Section "Fluid Dielectric Parameters"). The forward power was applied to the dipole and the system was verified to a tolerance of +10% from the system manufacturer's dipole calibration target SAR value (see Appendix "Dipole Calibration" for system manufacturer's dipole calibration procedures).

(1) The Forward Power applied to the Validation Source during this System Verification is the Forward Power applied by the manufacturer during the calibration of this validation source.

(2) The Target SAR values are the SAR values that were measured using the Forward Power indicated above by the manufacture during the calibration of this validation source.

(3) Based on manufacturer's 1W Normalized SAR during the calibration of this validation source.

16.0 MEASUREMENT SYSTEM SPECIFICATIONS

Table 16.0

Measurement System Specification	
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 80
	Postprocessing Software: SEMCAD, V1.8 Build 186
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	EX3DV4
Serial No.	3600
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	±0.2 dB (30 MHz to 3 GHz)
Phantom	
Type	SAM
Shell Material	Fiberglass
Thickness	2mm +/- .2mm
Volume	> 30 Liter

Table 16.1

Measurement System Specification (Continued)

Probe Specification

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

EX3DV4 E-Field Probe

Phantom Specification

The ELI V5.0 phantom is an elliptical planar fiberglass shell phantom with a shell thickness of 2.0mm +/- .2mm at the planar area. This phantom conforms to OET Bulletin 65, Supplement C, IEEE 1528-2013, IEC 62209-1 and IEC 62209-2.

ELI Phantom

Device Positioner Specification

The DASY4 device positioner 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^{O}. 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 Positioner

17.0 TEST EQUIPMENT LIST

Table 17.0

Test Equipment List

DESCRIPTION	ASSET NO.	SERIAL NO.	DATE CALIBRATED	CALIBRATION INTERVAL
Schmid & Partner DASY4 System	-	-	-	-
-DASY4 Measurement Server	00158	1078	CNR	CNR
-Robot	00046	599396-01	CNR	CNR
-DAE4	00019	353	20 April 2016	Annual
-DAE3	00018	370	22 April 2016	Annual
-EX3DV6 E-Field Probe	00213	3600	27 April 2016	Annual
-CLA150 Validation Source	00251	4007	24 Jan 2016	Triennial
-D835V2 Validation Dipole	00217	4D075	23 April 2015	Triennial
-D450V3 Validation Dipole	00221	1068	21 April 2015	Triennial
ELI Phantom	00247	-	CNR	CNR
HP 85070C Dielectric Probe Kit	00033	none	CNR	CNR
Gigatronics 8652A Power Meter	00110	1835801	29 Feb 2016	Triennial
Gigatronics 80701A Power Sensor	00248	1833687	29 Feb 2016	Triennial
HP 8753ET Network Analyzer	00134	US39170292	22 Oct 2014	Triennial
Rohde & Schwarz SMR20 Signal Generator	00006	100104	8 May 2014	Triennial
Amplifier Research 5S1G4 Power Amplifier	00106	26235	CNR	CNR

CNR = Calibration Not Required

18.0 FLUID COMPOSITION

Table 18.0			450MHz Head	
Tissue Simulating Liquid (TSL) Composition				
Component by Percent Weight				
Water	Sugar	Salt(1)	HEC(2)	Bacteriacide(3)
38.56	56.32	3.95	0.98	0.19

(1) Non-Iodinized
(2) **H**ydroxy**E**thyl-**C**ellulose: Sigma-Aldrich P/N 54290-500g
(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

Table 18.1			450MHz Body	
Tissue Simulating Liquid (TSL) Composition				
Component by Percent Weight				
Water	Sugar	Salt(1)	HEC(2)	Bacteriacide(3)
52.0	45.65	1.75	0.5	0.1

(1) Non-Iodinized
(2) **H**ydroxy**E**thyl-**C**ellulose: Sigma-Aldrich P/N 54290-500g
(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

Table 18.2			2450MHz Body	
Tissue Simulating Liquid (TSL) Composition				
Component by Percent Weight				
Water	Glycol	Salt(1)	HEC(2)	Bacteriacide(3)
69.98	30.0	0.02	0.0	0.0

(1) Non-Iodinized
(2) **H**ydroxy**E**thyl-**C**ellulose: Sigma-Aldrich P/N 54290-500g
(3) Dow Chemical Dowicil 75 Antimicrobial Perservative

APPENDIX A – SYSTEM VERIFICATION PLOTS

Date/Time: 29/05/2016 12:53:13 PMDate/Time: 29/05/2016 12:56:26 PM

Test Laboratory: Celltech Labs

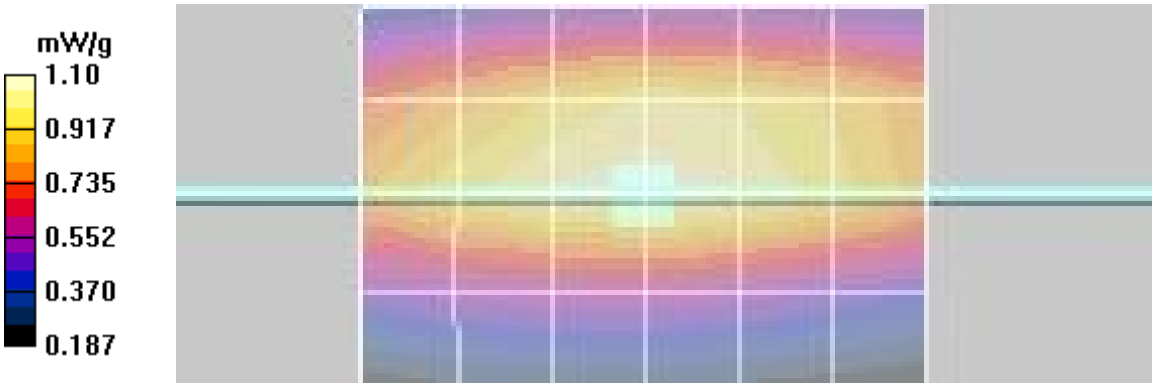
DUT: Dipole 450 MHz; Type: D450V3; Serial: 1068; Calibrated: 04/27/2012
Program Name: SPC 450H

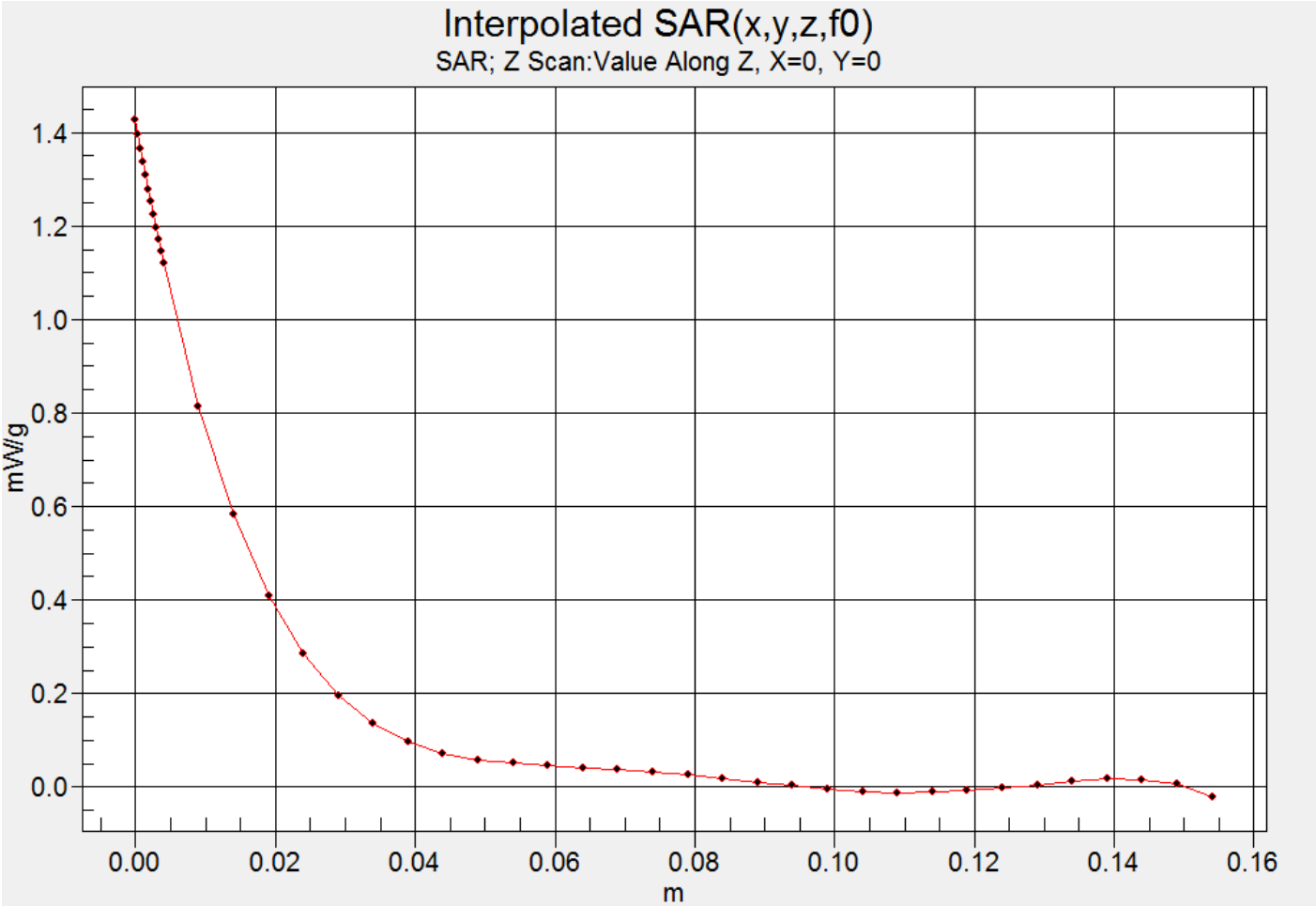
Communication System: CW; Frequency: 450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 450 MHz; σ = 0.92 mho/m; ε_r = 45.7; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3600 2016; ConvF(9.25, 9.25, 9.25); Calibrated: 27/04/2016
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353 2016; Calibrated: 20/04/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Head d=15mm Pin=250mW, TS=[1.044][1.16][1.276]/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.10 mW/g

Head d=15mm Pin=250mW, TS=[1.044][1.16][1.276]/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 34.1 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 1.57 W/kg
SAR(1 g) = 1.08 mW/g; SAR(10 g) = 0.728 mW/g
Maximum value of SAR (measured) = 1.15 mW/g





Date/Time: 31/05/2016 10:40:21 AMDate/Time: 31/05/2016 10:43:56 AM

Test Laboratory: Celltech Labs

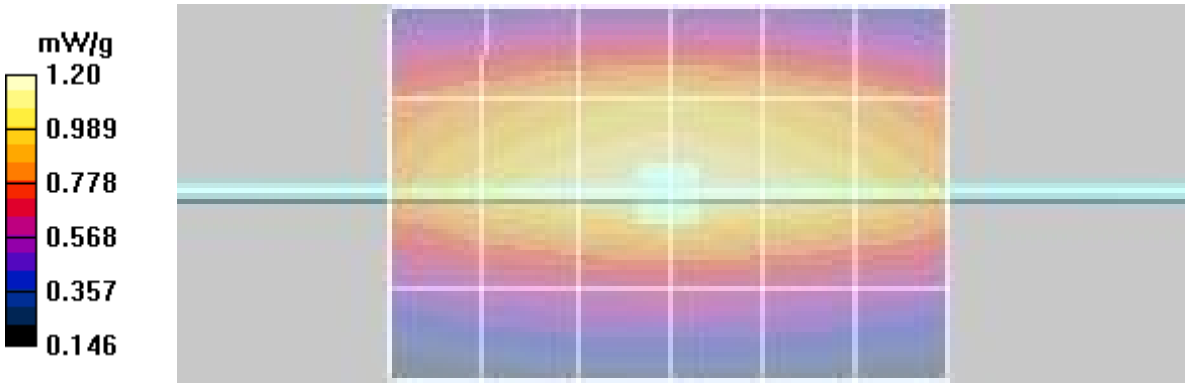
DUT: Dipole 450 MHz; Type: D450V3; Serial: 1068; Calibrated: 04/27/2012
Program Name: SPC 450B

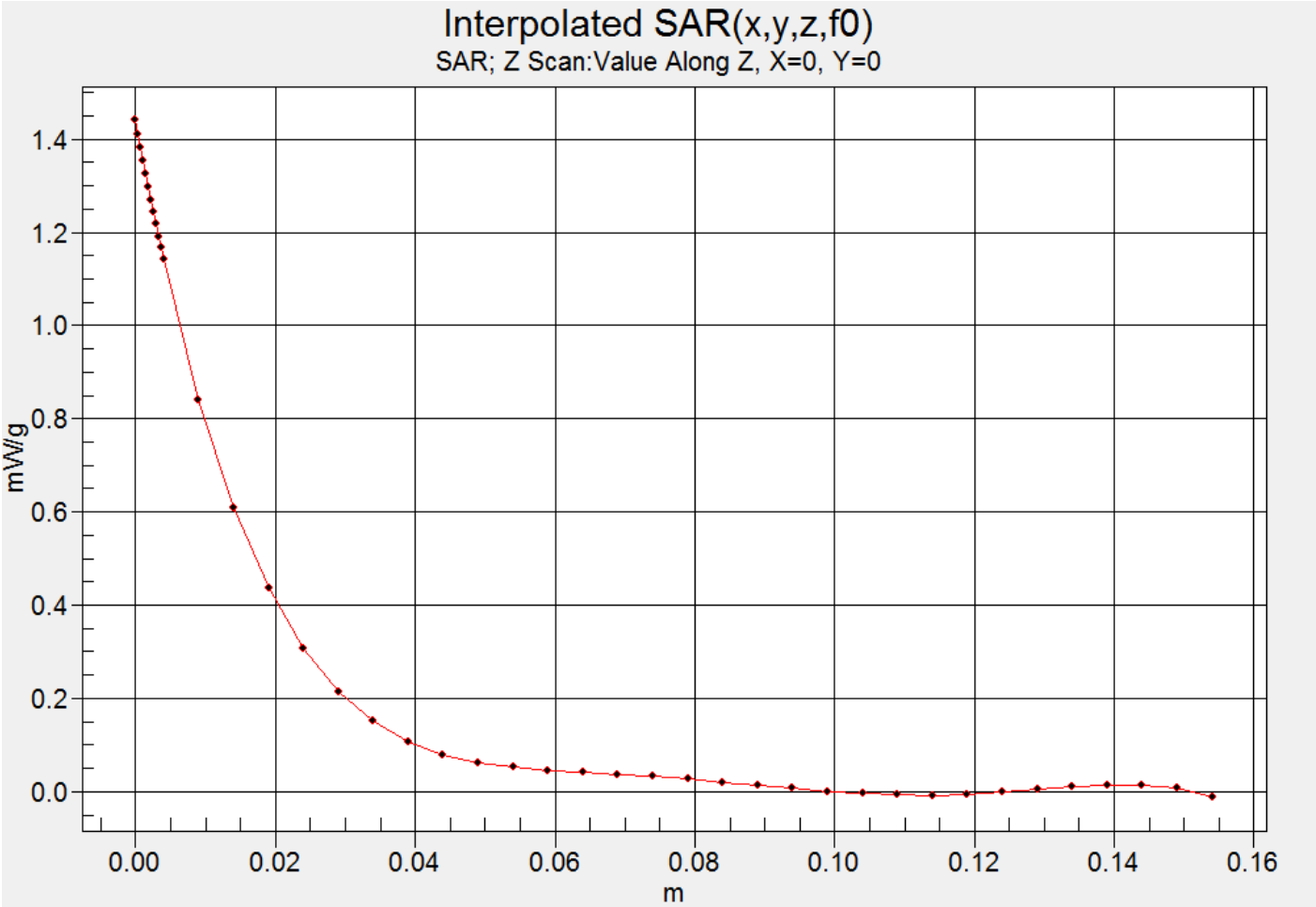
Communication System: CW; Frequency: 450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 450 MHz; σ = 0.95 mho/m; ε_r = 56.3; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3600 2016; ConvF(8.79, 8.79, 8.79); Calibrated: 27/04/2016
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353 2016; Calibrated: 20/04/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

Body d=15mm Pin=250mW, TS=[1.008][1.12][1.232]/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.20 mW/g

Body d=15mm Pin=250mW, TS=[1.008][1.12][1.232]/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 35.3 V/m; Power Drift = -0.202 dB
Peak SAR (extrapolated) = 1.64 W/kg
SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.763 mW/g





Date/Time: 07/07/2016 3:00:58 PMDate/Time: 07/07/2016 3:04:24 PM

Test Laboratory: Celltech Labs

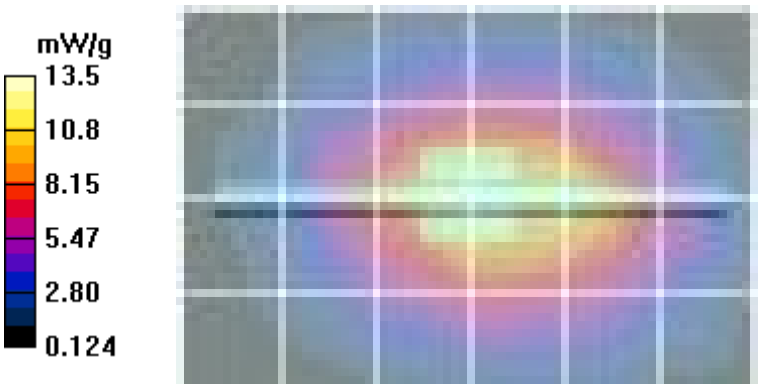
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 825; Calibrated: 25/04/2012
Program Name: 2450 MHz SPC

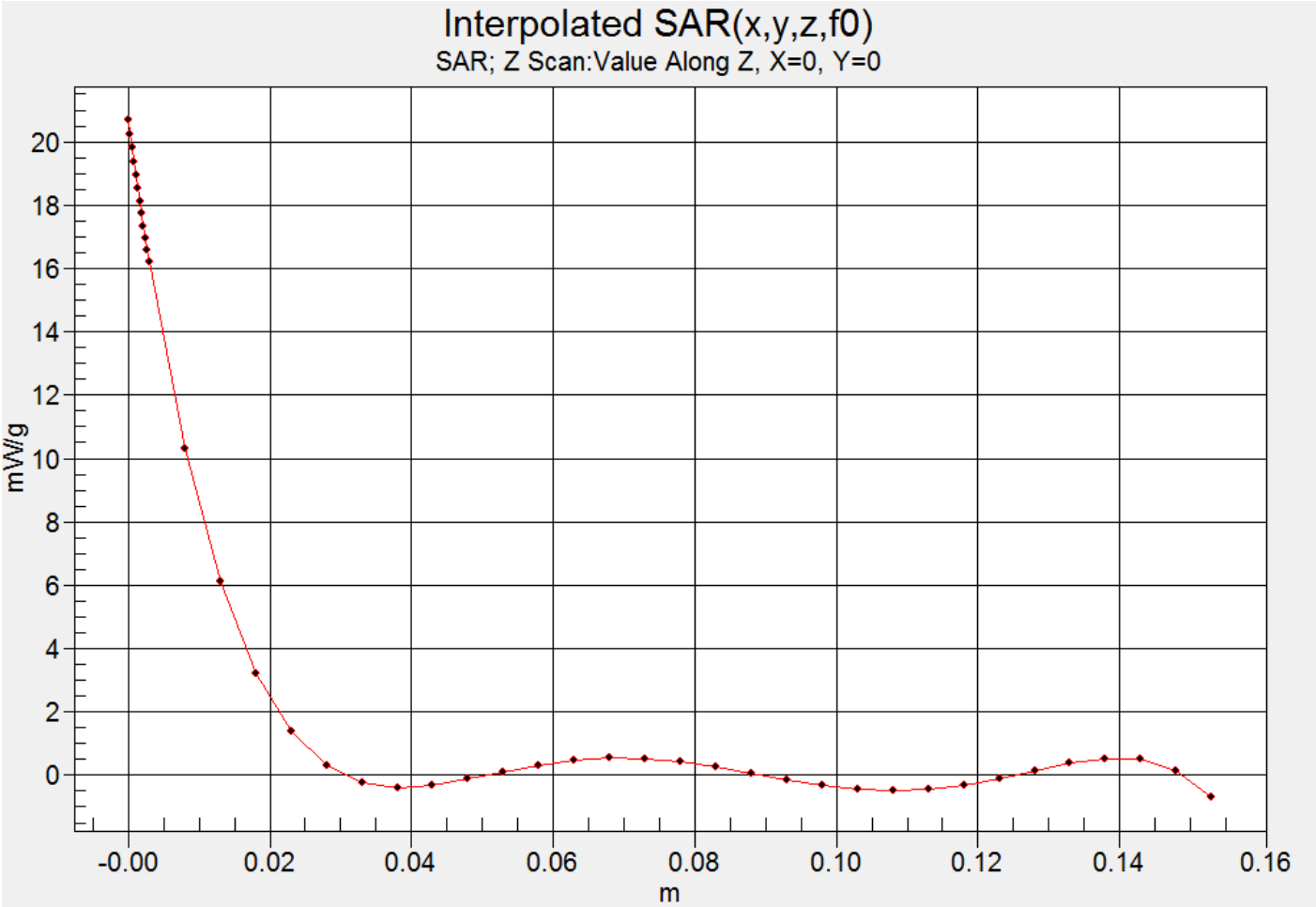
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.93 mho/m; ε_r = 50.1; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3600 2016; ConvF(6.55, 6.55, 6.55); Calibrated: 27/04/2016
- Sensor-Surface: 5mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353 2016; Calibrated: 20/04/2016
- Phantom: SAM with CRP; Type: SAM; Serial: Not Specified
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

2450 MHz Head Dipole d=10mm P=250mW TS=13.0/Area Scan (5x7x1): Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 13.1 mW/g

2450 MHz Head Dipole d=10mm P=250mW TS=13.0/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.9 V/m; Power Drift = -0.051 dB
Peak SAR (extrapolated) = 26.3 W/kg
SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.33 mW/g
Maximum value of SAR (measured) = 13.5 mW/g





APPENDIX B – MEASUREMENT PLOTS OF MAXIMUM MEASURED SAR

Plot F1

Date/Time: 30/05/2016 11:05:07 AMDate/Time: 30/05/2016 11:06:37 AM

Test Laboratory: Celltech Labs

DUT: AWIRE; Type: PTT Transceiver; Serial: n/a
Program Name: 450MHz Head TSL

Communication System: FRS; Frequency: 462.563 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 462.563 MHz; σ = 0.92 mho/m; ε_r = 45; ρ = 1000 kg/m^3
Phantom section: Flat Section

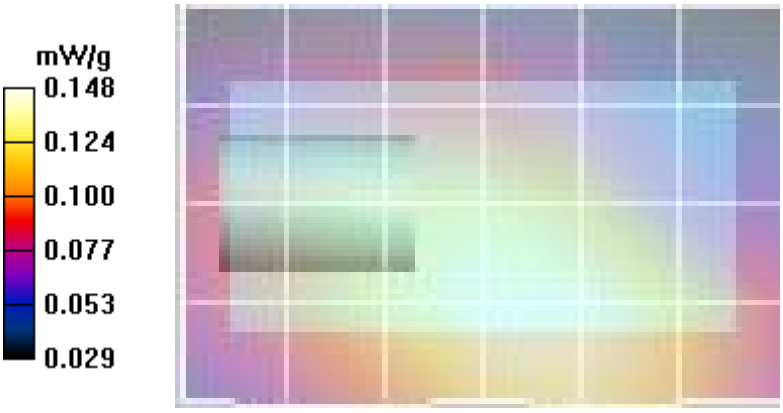
DASY4 Configuration:
- Probe: EX3DV4 - SN3600 2016; ConvF(9.25, 9.25, 9.25); Calibrated: 27/04/2016
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353 2016; Calibrated: 20/04/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

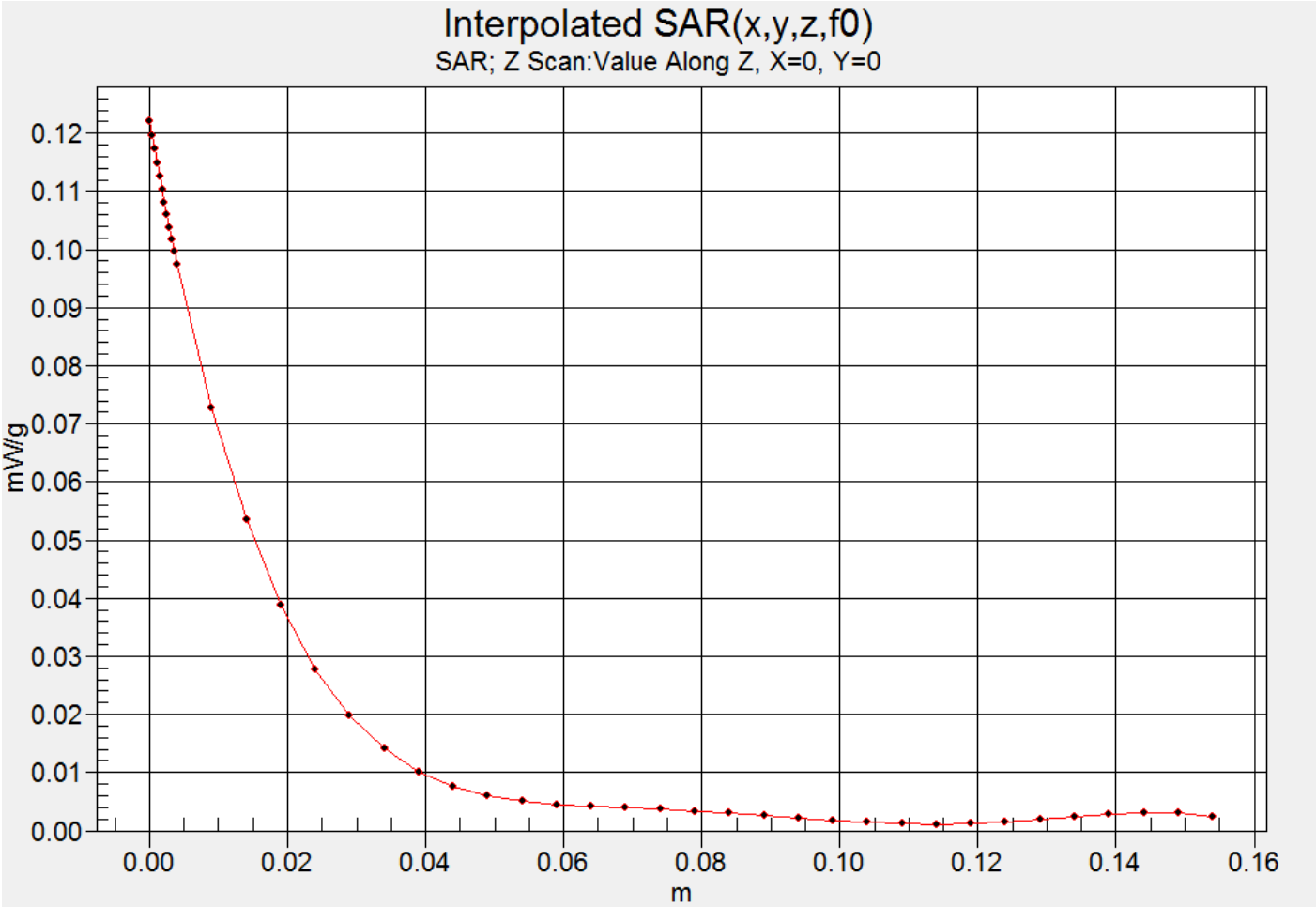
F1 - Face - 462.5625MHz, CW/Area Scan (5x7x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 0.223 mW/g

F1 - Face - 462.5625MHz, CW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 12.6 V/m; Power Drift = -0.190 dB
Peak SAR (extrapolated) = 0.225 W/kg
SAR(1 g) = 0.162 mW/g; SAR(10 g) = 0.072 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 0.170 mW/g





Plot B6

Date/Time: 01/06/2016 3:24:35 PMDate/Time: 01/06/2016 3:26:04 PM

Test Laboratory: Celltech Labs

DUT: AWIRE; Type: PTT Transceiver; Serial: n/a
Program Name: 450MHz Body TSL

Communication System: FRS; Frequency: 462.563 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 462.563 MHz; σ = 0.92 mho/m; ε_r = 45; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: EX3DV4 - SN3600 2016; ConvF(9.25, 9.25, 9.25); Calibrated: 27/04/2016
- Sensor-Surface: 4mm (Mechanical Surface Detection (Locations From Previous Scan Used))Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn353 2016; Calibrated: 20/04/2016
- Phantom: ELI v5.0; Type: QDOVA002AA; Serial: TP:xxxx
- Measurement SW: DASY4, V4.5 Build 19; Postprocessing SW: SEMCAD, V1.8 Build 145

B6 - BodyII- 462.5625MHz, CW 2/Area Scan 4000-01 (5x7x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 2.03 mW/g

B6 - BodyII- 462.5625MHz, CW 2/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=7.5mm, dy=7.5mm, dz=5mm
Reference Value = 27.4 V/m; Power Drift = -0.160 dB
Peak SAR (extrapolated) = 2.53 W/kg
SAR(1 g) = 1.396 mW/g; SAR(10 g) = 0.809 mW/g

Info: Interpolated medium parameters used for SAR evaluation!
Maximum value of SAR (measured) = 1.531 mW/g