RF Exposure Lab

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CERTIFICATE OF COMPLIANCE
SAR EVALUATION

Polycom Inc.
4750 Willow Road
Pleasanton, CA 94588

Dates of Test: Oct. 31 – Nov. 3, 2011
Test Report Number: SAR.20111101

FCC ID:	M72-PS8452
IC Certificate:	1849C-PS8452
Model(s):	SpectraLink 8452
Test Sample:	Engineering Unit Same as Production
Serial No.:	610926770
Equipment Type:	Wireless VoIP Handset
Classification:	Portable Transmitter Next to Head and Body
TX Frequency Range:	2412 – 2462 MHz; 5180 – 5320 MHz; 5500 – 5700 MHz; 5745 – 5825 MHz
Frequency Tolerance:	± 2.5 ppm
Maximum RF Output:	2450 MHz (b) – 17.76 dB, 2450 MHz (g) – 17.56dB, 2450 MHz (n20) – 17.29 dB, 5250 MHz (a) – 15.43 dB, 5250 MHz (n20) – 15.56 dB, 5600 MHz (a) – 16.41 dB, 5600 MHz (n20) – 16.23 dB, 5800 MHz (a) – 19.22 dB, 5800 MHz (n20) – 19.16 dB Conducted
Signal Modulation:	DSSS, OFDM
Antenna Type:	Plated Antenna on PCB, 2.5 dBi Gain in 2.4 GHz Band, 5.51 dBi Gain in 5 GHz Bands
Application Type:	Certification
FCC Rule Parts:	Part 2, 15C, 15E
KDB Test Methodology:	KDB 447498, KDB 248227, KDB 648474
Industry Canada:	RSS-102, Safety Code 6
Maximum SAR Value:	0.586 W/kg Head, 0.799 W/kg Body
Separation Distance:	0 mm for Body

This wireless mobile and/or portable device has been shown to be compliant for localized specific absorption rate (SAR) for uncontrolled environment/general exposure limits specified in ANSI/IEEE Std. C95.1-1992 and had been tested in accordance with the measurement procedures specified in IEEE 1528-2003, and OET Bulletin 65 Supp. C (See test report).

I attest to the accuracy of the data. All measurements were performed by myself 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.

RF Exposure Lab, LLC certifies that no party to this application is subject to a denial of Federal benefits that includes FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a).

Jay M. Moulton
Vice President

ACCREDITED
Certificate # 2387.01

Table of Contents

1. Introduction

This measurement report shows compliance of the Polycom Inc. Model SpectraLink 8452 FCC ID: M72-PS8452 with FCC Part 2, 1093, ET Docket 93-62 Rules for mobile and portable devices and IC Certificate: 1849C-PS8452 with RSS102 & Safety Code 6. The FCC have adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on August 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC regulated portable devices. [1], [6]

The test results recorded herein are based on a single type test of Polycom Inc. model SpectraLink 8452 and therefore apply only to the tested sample.

The test procedures, as described in ANSI C95.1 – 1999 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [2], ANSI C95.3 – 2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields [3], FCC OET Bulletin 65 Supp. C – 2001 [4], IEEE Std.1528 – 2003 Recommended Practice [5], and Industry Canada Safety Code 6 Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3kHz to 300 GHz were employed.

SAR Definition [5]

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (*dW*) absorbed by (dissipated in) an incremental mass (*dm*) contained in a volume element (*dV*) of a given density (ρ).

$$SAR = \frac{d}{dt}\left(\frac{dW}{dm}\right) = \frac{d}{dt}\left(\frac{dW}{\rho dV}\right)$$

SAR is expressed in units of watts per kilogram (W/kg). *SAR* can be related to the electric field at a point by

$$SAR = \frac{\sigma \mid E \mid^2}{\rho}$$

where:

σ = conductivity of the tissue (S/m)

ρ = mass density of the tissue (kg/m^3)

E = rms electric field strength (V/m)

2. SAR Measurement Setup

Robotic System

The measurements are conducted utilizing the ALSAS-10-U automated dosimetric assessment system. The ALSAS-10-U is designed and manufactured by Aprel Laboratories in Nepean, Ontario, Canada. The system utilizes a Robcomm 3 robot manufactured by ThermoCRS located in Michigan USA.

System Hardware

The system consists of a six axis articulated arm, controller for precise probe positioning (0.05 mm repeatability), a power supply, a teach pendent for teaching area scans, near field probe, an IBM Pentium 4™ 2.66 GHz PC with Windows XP Pro™, and custom software developed to enable communications between the robot controller software and the host operating system.

An amplifier is located on the articulated arm, which is isolated from the custom designed end effector and robot arm. The end effector provides the mechanical touch detection functionality and probe connection interface. The amplifier is functionally validated within the manufacturer's site and calibrated at NCL Calibration Laboratories. A Data Acquisition Card (DAC) is used to collect the signal as detected by the isotropic e-field probe. The DAC manufacturer calibrates the DAC to NIST standards. A formal validation is executed using all mechanical and electronic components to prove conformity of the measurement platform as a whole.

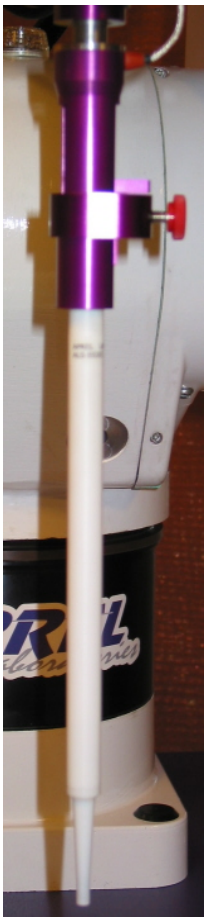
System Description

The ALSAS-10-U has been designed to measure devices within the compliance environment to meet all recognized standards. The system also conforms to standards, which are currently being developed by the scientific and manufacturing community.

The course scan resolution is defined by the operator and reflects the requirements of the standard to which the device is being tested. Precise measurements are made within the predefined course scan area and the values are logged.

The user predefines the sample rate for which the measurements are made so as to ensure that the full duty-cycle of a pulse modulation device is covered during the sample. The following algorithm is an example of the function used by the system for linearization of the output for the probe.

$$V_i = U_i + U_i^2 \bullet \frac{cf}{dcp_i}$$



The Aprel E-Field probe is evaluated to establish the diode compression point.

A complex algorithm is then used to calculate the values within the measured points down to a resolution of 1mm. The data from this process is then used to provide the co-ordinates from which the cube scan is created for the determination of the 1 g and 10 g averages.

Cube scan averaging consists of a number of complex algorithms, which are used to calculate the one, and ten gram averages. The basis for the cube scan process is centered on the location where the maximum measured SAR value was found. When a secondary peak value is found which is within 60% of the initial peak value, the system will report this back to the operator who can then assess the need for further analysis of both the peak values prior to the one and ten-gram cube scan averaging process. The algorithm consists of 3D cubic Spline, and Lagrange extrapolation to the surface, which form the matrix for calculating the measurement output for the one and ten gram average values. The resolution for the physical scan integral is user defined with a final calculated resolution down to 1mm.

In-depth analysis for the differential of the physical scanning resolution for the cube scan analysis has been carried out, to identify the optimum setting for the probe positioning steps, and this has been determined at 8mm increments on the X, & Y planes. The reduction of the physical step increment increased the time taken for analysis but did not provide a better uncertainty or return on measured values.

The final output from the system provides data for the area scan measurements, physical and splined (1mm resolution) cube scan with physical and calculated values (1mm resolution).

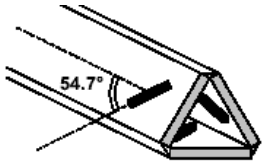
The overall uncertainty for the methodology and algorithms the ALSAS-10-U used during the SAR calculation was evaluated using the data from IEEE 1528 f3 algorithm:

$$f_3(x,y,z) = A\frac{a^2}{\frac{a^2}{4} + x'^2 + y'^2}\left(e^{-\frac{2z}{a}} + \frac{a^2}{2(a+2z)^2}\right)$$

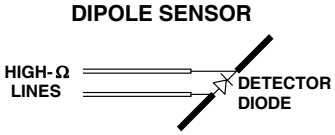
The probe used during the measurement process has been assessed to provide values for diode compression. These values are calculated during the probe calibration exercise and are used in the mathematical calculations for the assessment of SAR.

E-Field Probe

The E-field probe used by RF Exposure Lab, LLC, has been fully calibrated and assessed for isotropic, and boundary effect. The probe utilizes a triangular sensor arrangement as detailed in the diagram below right.



Δ-BEAM



The SAR is assessed with the probe which moves at a default height of 4mm from the center of the diode, which is mounted to the sensor, to the phantom surface (Z height). The diagram above right shows how the center of the sensor is defined with the location of the diode placed at the center of the dipole. The 4mm default in the Z axis is the optimum height for assessing SAR where the boundary effect is at its least, with the probe located closest to the phantom surface (boundary).

The manufacturer specified precision of the robot is ± 0.05 mm and the precision of the APREL bottom detection device is ± 0.1 mm. These precisions are calibrated and tested in the manufacturing process of the bottom detection device. A constant distance is maintained because the surface of the phantom is dynamically detected for each point. The surface detection algorithm corrects the position of the robot so that the probe rests on the surface of the phantom. The probe is then moved to the measurement location 2.44 mm above the phantom surface resulting in the probe center location to be at 4.0 mm above the phantom surface. Therefore, the probe sensor will be at 4.0 mm above the phantom surface ± 0.1 mm for each SAR location for frequencies below 3 GHz. The probe is moved to the measurement location 1.44 mm above the phantom surface resulting in the probe center location to be at 2.0 mm above the phantom surface. Therefore, the probe sensor will be at 2.0 mm above the phantom surface ± 0.1 mm for each SAR location for frequencies above 3 GHz.

The probe boundary effect compensation cannot be disabled in the ALSAS-10U testing system. The probe tip will always be at least half a probe tip diameter from the phantom surface. For frequencies up to 3 GHz, the probe diameter is 5 mm. With the sensor offset set at 1.54 mm (default setting), the sensor to phantom gap will be 4.0 mm which is greater than half the probe tip diameter. For frequencies greater than 3 GHz, the probe diameter is 3 mm. With the sensor offset set at 0.56 mm (default setting), the sensor to phantom gap will be 3.0 mm which is greater than half the probe tip diameter.

The separation of the first 2 measurement points in the zoom scan is specified in the test setup software. For frequencies below 3 GHz, the user must specify a zoom scan resolution of less than 6 mm in the z-axis to have the first two measurements within 1 cm of the surface. The z-axis is set to 4 mm as shown on each of the data sheets in Appendix B. For frequencies above 3 GHz, the user must specify a zoom scan resolution of less than 3 mm in the z-axis to have the first two measurements within 5 mm of the surface. The z-axis is set to 2 mm as shown on each of the data sheets in Appendix B.

The zoom scan volume for devices ≤3 GHz with a cube scan of 5x5x8 yields a volume of 32x32x28 mm^3. For devices >3 GHz and <4.5 GHz, the cube scan of 9x9x9 yields a volume of 32x32x24 mm^3. For devices ≥4.5 GHz, the cube scan of 7x7x12 yields a volume of 24x24x22 mm^3.

3. Robot Specifications

Specifications

Positioner:	ThermoCRS, Robot Model: Robocomm 3
Repeatability:	0.05 mm
No. of axis:	6

Data Acquisition Card (DAC) System

Cell Controller

Processor:	Pentium 4™
Clock Speed:	2.66 GHz
Operating System:	Windows XP Pro™

Data Converter

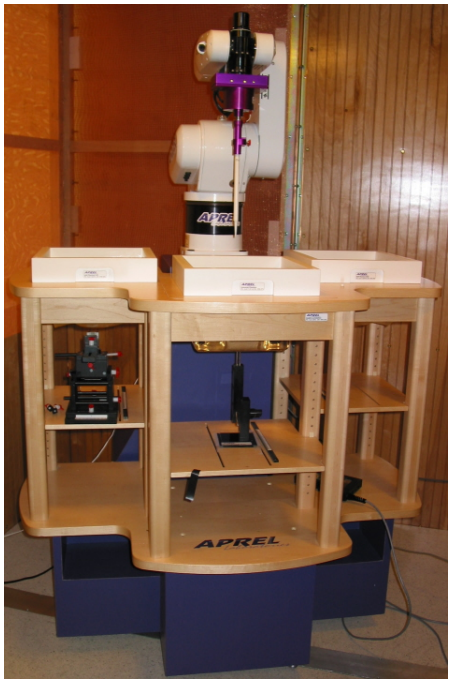
Features:	Signal Amplifier, End Effector, DAC
Software:	ALSAS 10-U Software

E-Field Probe

Model:	Various See Probe Calibration Sheet
Serial Number:	Various See Probe Calibration Sheet
Construction:	Triangular Core Touch Detection System
Frequency:	10MHz to 6GHz

Phantom

Phantom:	Uniphantom, Right Phantom, Left Phantom



4. Probe and Dipole Calibration

See Appendix D and E.

5. Phantom & Simulating Tissue Specifications

SAM Phantom

The Aprel system utilizes three separate phantoms. Each phantom for SAR assessment testing is a low loss dielectric shell, with shape and dimensions derived from the anthropomorphic data of the 90th percentile adult male head dimensions as tabulated by the US Army. The SAM phantom shell is bisected along the mid sagittai plane into right and left halves. The perimeter sidewalls of each phantom half is extended to allow filling with liquid to a depth of 15 cm that is sufficient to minimize reflections from the upper surface [5]. The Uni-Phantom is used to conduct body measurements and held to face measurements. The depth of the phantom allows for 15 cm of tissue material to be filled within the phantom. See photos in Appendix C.

Head & Body Simulating Mixture Characterization

The head and body mixtures consist of the material based on the table listed below. The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. Body tissue parameters that have not been specified in P1528 are derived from the issue dielectric parameters computed from the 4-Cole-Cole equations.

Table 5.1 Typical Composition of Ingredients for Tissue

Ingredients		Simulating Tissue							
		2450 MHz Head	2450 MHz Body	5250 MHz Head	5250 MHz Body	5600 MHz Head	5600 MHz Body	5785 MHz Head	5785 MHz Body
Mixing Percentage									
Water		71.88	73.20	68.70	70.00	71.10	74.20	73.90	76.50
Sugar		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Salt		0.16	0.04	1.70	1.50	1.70	1.50	1.70	1.50
HEC		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Bactericide		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
DGBE		7.99	26.70	8.80	26.70	8.40	24.30	8.20	22.00
Triton X-100		19.97	0.00	20.80	0.00	18.80	0.00	16.2	0.00
Dielectric Constant	Target	39.20	52.70	35.93	48.95	35.53	48.47	35.32	48.22
Conductivity (S/m)	Target	1.80	1.95	4.71	5.36	5.07	5.77	5.25	5.98

Device Holder

In combination with the SAM phantom, the mounting device enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation point is the ear opening. The devices can easily, accurately, and repeatably be positioned according to the FCC specifications. The device holder can be locked at different phantom locations (left head, right head, and uni-phantom).

6. Definition of Reference Points

Ear Reference Point

Figure 6.2 shows the front, back and side views of the SAM Phantom. The point "M" is the reference point for the center of the mouth, "LE" is the left ear reference point (ERP), and "RE" is the right ERP. The ERPs are 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 6.1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 6.1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

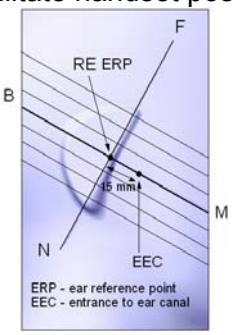


Figure 6.1 Close-up side view of ERP's

Figure 6.2 Front, back and side view of SAM

Device Reference Points

Two imaginary lines on the device need to be established: the vertical centerline and the horizontal line. The test device is placed in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Fig. 6.3). The "test device reference point" is than located at the same level as the center of the ear reference point. The test device is positioned so that the "vertical centerline" is bisecting the front surface of the device at it's top and bottom edges, positioning the "ear reference point" on the outer surface of both the left and right head phantoms on the ear reference point [5].

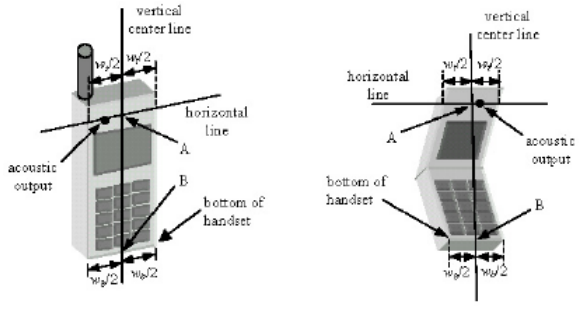


Figure 6.3 Handset Vertical Center & Horizontal Line Reference Points

7. Test Configuration Positions

Positioning for Cheek/Touch [5]

1. Position the device close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 7.1), such that the plane defined by the vertical center line and the horizontal line of the device is approximately parallel to the sagittal plane of the phantom.

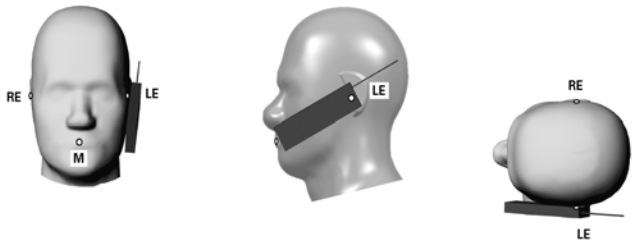


Figure 7.1 Front, Side and Top View of Cheek/Touch Position

2. Translate the device towards the phantom along the line passing through RE and LE until the device touches the ear.

3. While maintaining the device in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to MB-NF including the line MB (called the reference plane).

4. Rotate the device around the vertical centerline until the device (horizontal line) is symmetrical with respect to the line NF.

5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE and maintaining the device contact with the ear, rotate the device about the line NF until any point on the device is in contact with a phantom point below the ear (cheek). See Figure 7.2.

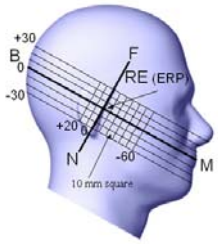


Figure 7.2 Side view w/ relevant markings

Positioning for Ear / 15° Tilt [5]

With the test device aligned in the Cheek/Touch Position":

1. While maintaining the orientation of the device, retracted the device parallel to the reference plane far enough to enable a rotation of the device by 15 degrees.

2. Rotate the device around the horizontal line by 15 degrees.

3. While maintaining the orientation of the device, move the device parallel to the reference plane until any part of the device touches the head. (In this position, point A is located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna, the angle of the device shall be reduced. The tilted position is obtained when any part of the device is in contact with the ear as well as a second part of the device is in contact with the head (see Figure 7.3).

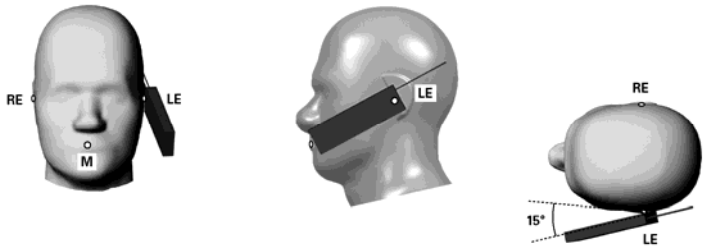


Figure 7.3 Front, Side and Top View of Ear/15° Tilt Position

Body Worn Configurations

Body-worn operating configurations are tested with the accessories attached to the device and positioned against a flat phantom in a normal use configuration. A device with a headset output is tested with a headset connected to the device. Body dielectric parameters are used.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then, when multiple accessories that contain metallic components are supplied with the device, the device is tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration where a separation distance between the back of the device and the flat phantom is used. All test position spacings are documented.

In all cases SAR measurements are performed to investigate the worst-case positioning. Worst-case positioning is then documented and used to perform Body SAR testing.

In order for users to be aware of the body-worn operating requirements for meeting RF exposure compliance, operating instructions and cautions statements are included in the user's guide.

8. ANSI/IEEE C95.1 – 1992 RF Exposure Limits [2]

Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 8.1 Human Exposure Limits

	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIROMENT Professional Population (W/kg) or (mW/g)
SPATIAL PEAK SAR[1] Head	1.60	8.00
SPATIAL AVERAGE SAR[2] Whole Body	0.08	0.40
SPATIAL PEAK SAR[3] Hands, Feet, Ankles, Wrists	4.00	20.00

[1] 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.
[2] The Spatial Average value of the SAR averaged over the whole body.
[3] 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.

9. Measurement Uncertainty

Exposure Assessment Measurement Uncertainty

Source of Uncertainty	Tolerance Value	Probability Distribution	Divisor	c_i^1 (1-g)	c_i^1 (10-g)	Standard Uncertainty (1-g) %	Standard Uncertainty (10-g) %	v_i
Measurement System								
Probe Calibration	3.5	normal	1	1	1	3.5	3.5	∞
Axial Isotropy	3.7	rectangular	√3	0.7	0.7	1.5	1.5	∞
Hemispherical Isotropy	10.9	rectangular	√3	0.7	0.7	4.4	4.4	∞
Boundary Effect	1.0	rectangular	√3	1	1	0.6	0.6	∞
Linearity	4.7	rectangular	√3	1	1	2.7	2.7	∞
Detection Limit	1.0	rectangular	√3	1	1	0.6	0.6	∞
Readout Electronics	1.0	normal	1	1	1	1.0	1.0	∞
Response Time	0.8	rectangular	√3	1	1	0.5	0.5	∞
Integration Time	1.7	rectangular	√3	1	1	1.0	1.0	∞
RF Ambient Condition	3.0	rectangular	√3	1	1	1.7	1.7	∞
Probe Positioner Mech. Restriction	0.4	rectangular	√3	1	1	0.2	0.2	∞
Probe Positioning with respect to Phantom Shell	2.9	rectangular	√3	1	1	1.7	1.7	∞
Extrapolation and Integration	3.7	rectangular	√3	1	1	2.1	2.1	∞
Test Sample Positioning	4.0	normal	1	1	1	4.0	4.0	7
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0	2
Drift of Output Power	5.0	rectangular	√3	1	1	2.4	2.4	∞
Phantom and Setup								
Phantom Uncertainty(shape & thickness tolerance)	3.4	rectangular	√3	1	1	2.0	2.0	∞
Liquid Conductivity(target)	5.0	rectangular	√3	0.7	0.5	2.0	1.4	∞
Liquid Conductivity(meas.)	0.5	normal	1	0.7	0.5	0.4	0.3	5
Liquid Permittivity(target)	5.0	rectangular	√3	0.6	0.5	1.7	1.4	∞
Liquid Permittivity(meas.)	1.0	normal	1	0.6	0.5	0.6	0.5	5
Combined Uncertainty		RSS				9.6	9.4	>500
Combined Uncertainty (coverage factor=2)		Normal(k=2)				19.1	18.8	>500

10. System Validation

Tissue Verification

Table 10.1 Measured Tissue Parameters

		2450 MHz Head		2450 MHz Body		5250 MHz Head	
Date(s)		Oct. 31, 2011		Oct. 31, 2011		Nov. 1, 2011	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		39.20	39.15	52.70	52.13	35.93	35.14
Conductivity: σ		1.80	1.82	1.95	1.96	4.71	4.74
		5250 MHz Body		5600 MHz Head		5600 MHz Body	
Date(s)		Nov. 1, 2011		Nov. 2, 2011		Nov. 2, 2011	
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: ε		48.95	47.71	35.53	35.16	48.47	48.32
Conductivity: σ		5.36	5.42	5.07	5.08	5.77	5.92
		5785 MHz Head		5785 MHz Body			
Date(s)		Nov. 3, 2011		Nov. 3, 2011			
Liquid Temperature (˚C)	20.0	Target	Measured	Target	Measured		
Dielectric Constant: ε		35.32	35.21	48.22	48.12		
Conductivity: σ		5.25	5.29	5.98	5.99		

See Appendix A for data printout.

Test System Verification

Prior to assessment, the system is verified to the ±10% of the specifications at the test frequency by using the system kit. Power is normalized to 1 watt. (Graphic Plots Attached)

Table 10.2 System Dipole Validation Target & Measured

	Test Frequency	Targeted SAR_{1g} (W/kg)	Measure SAR_{1g} (W/kg)	Tissue Used for Verification	Deviation (%)
31-Oct-2011	2450 MHz	53.10	54.26	Head	+ 2.18
31-Oct-2011	2450 MHz	51.50	52.09	Body	+ 1.15
01-Nov-2011	5250 MHz	61.66	60.72	Head	- 1.52
01-Nov-2011	5250 MHz	59.81	60.56	Body	+ 1.25
02-Nov-2011	5600 MHz	65.03	64.24	Head	- 1.21
02-Nov-2011	5600 MHz	63.10	62.28	Body	- 1.30
03-Nov-2011	5800 MHz	63.43	62.73	Head	- 1.10
03-Nov-2011	5800 MHz	61.36	60.08	Body	- 2.09

See Appendix A for data plots.

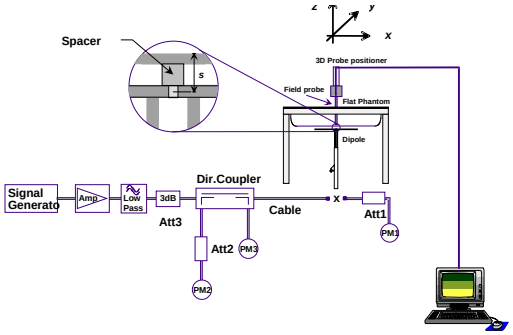


Figure 10.1 Dipole Validation Test Setup

Note: KDB 450824 was applied for probe calibration frequencies greater than or equal to 50 MHz of the DUT frequencies.

11. SAR Test Data Summary

See Measurement Result Data Pages

See Appendix B for SAR Test Data Plots.
See Appendix C for SAR Test Setup Photos.

Procedures Used To Establish Test Signal

The device was either placed into simulated transmit mode using the manufacturer's test codes or the actual transmission is activated through a base station simulator or similar equipment. See data pages for actual procedure used in measurement.

Device Test Condition

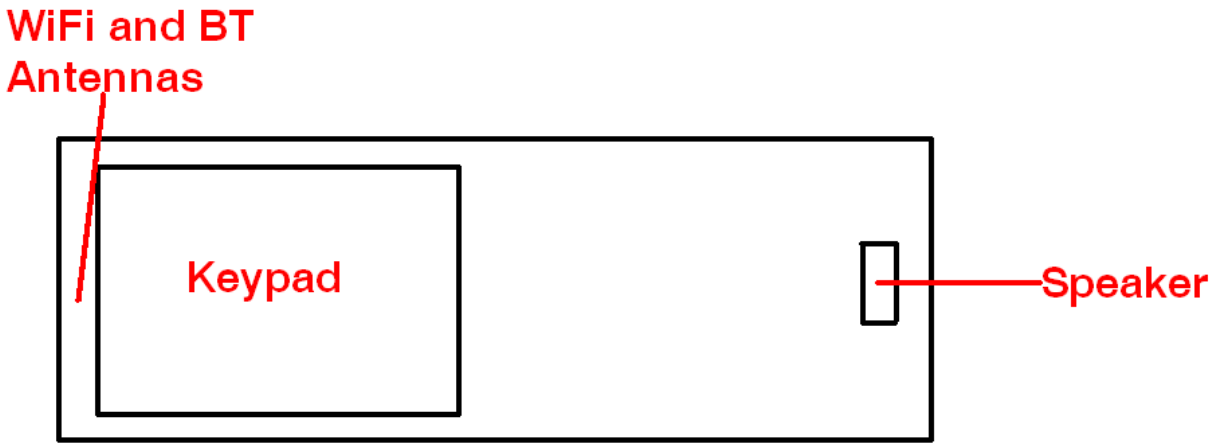
Due to the requirement to disassemble the unit and disconnect the antenna, the conducted output power measurements were performed after the completion of all SAR measurements. The power drift of each test is measured at the start of the test and again at the end of the test. The drift percentage is calculated by the formula ((end/start)-1)*100 and rounded to three decimal places. The drift percentage is calculated into the resultant SAR value on the data sheet for each test.

The data rates used when evaluating the WiFi transmitter were the lowest data rates for each mode. The device was operating at its maximum output power at the lowest data rate for all measurements. The maximum duty cycle the device could be programmed to transmit at was 99.9% duty cycle.

Bluetooth operation was not evaluated as the power level of the BT transmitter was 5 mW which is $\leq P_{Ref}$ for 2.4 GHz. Based on KDB 648474, stand-alone SAR is not required for an unlicensed transmitter with output power $\leq P_{Ref}$ mW when either the output power or 1-g SAR for each of the other antennas within 2.5 cm of that unlicensed transmitting antenna is $\leq P_{Ref}$ mW or < 1.2 W/kg.

The device was using the Polycom test utility Version fcc-1.14.

SAR Antenna Location Diagram



802.11b						2450 GHz n HT20				
Freq	Channel	Data Rate	Antenna	Power		Freq	Channel	Data Rate	Antenna	Power
2412	1	1	Main	16.49		2412	1	6	Main	16.11
2437	6	1	Main	17.76		2437	6	6	Main	17.29
2462	11	1	Main	17.55		2462	11	6	Main	17.10

802.11g				
Freq	Channel	Data Rate	Antenna	Power
2412	1	6	Main	16.05
2437	6	6	Main	17.56
2462	11	6	Main	17.31

802.11a 5.18-5.24 GHz				
Freq	Channel	Data Rate	Antenna	Power
5.18	36	6	Main	14.69
5.20	40	6	Main	14.65
5.22	44	6	Main	14.80
5.24	48	6	Main	14.72

802.11 n20 5.18-5.24 GHz				
Freq	Channel	Data Rate	Antenna	Power
5.18	36	6	Main	14.72
5.20	40	6	Main	14.73
5.22	44	6	Main	14.75
5.24	48	6	Main	14.74

802.11 n20 5.24-5.32 GHz				
Freq	Channel	Data Rate	Antenna	Power
5.26	52	6	Main	15.37
5.28	56	6	Main	15.56
5.30	60	6	Main	15.49
5.32	64	6	Main	15.40

802.11a 5.24-5.32 GHz				
Freq	Channel	Data Rate	Antenna	Power
5.26	52	6	Main	15.36
5.28	56	6	Main	15.43
5.30	60	6	Main	15.32
5.32	64	6	Main	15.20

802.11a 5.6 GHz				
Freq	Channel	Data Rate	Antenna	Power
5.50	100	6	Main	16.13
5.52	104	6	Main	16.12
5.54	108	6	Main	16.25
5.56	112	6	Main	16.27
5.58	116	6	Main	16.41
5.60	120	6	Main	16.21
5.62	124	6	Main	16.25
5.64	128	6	Main	16.30
5.66	132	6	Main	16.27
5.68	136	6	Main	16.26
5.70	140	6	Main	16.28

802.11 n20 5.6 GHz				
Freq	Channel	Data Rate	Antenna	Power
5.50	100	6	Main	15.99
5.52	104	6	Main	16.05
5.54	108	6	Main	15.98
5.56	112	6	Main	16.00
5.58	116	6	Main	15.96
5.60	120	6	Main	16.23
5.62	124	6	Main	16.10
5.64	128	6	Main	16.14
5.66	132	6	Main	16.05
5.68	136	6	Main	16.02
5.70	140	6	Main	16.15

802.11a 5.8 GHz				
Freq	Channel	Data Rate	Antenna	Power
5.745	149	6	Main	19.10
5.765	153	6	Main	19.15
5.785	157	6	Main	19.22
5.805	161	6	Main	19.12
5.825	165	6	Main	19.00

802.11 n20 5.8 GHz				
Freq	Channel	Data Rate	Antenna	Power
5.745	149	6	Main	19.05
5.765	153	6	Main	19.12
5.785	157	6	Main	19.16
5.805	161	6	Main	19.13
5.825	165	6	Main	18.95

SAR Data Summary – 2450 MHz Head 802.11b

MEASUREMENT RESULTS						
Head	**Position**	**Frequency**		**Modulation**	**End Power**	**SAR (W/kg) Measured**
		MHz	**Ch.**		**(dBm)**	
Right	Touch	2437	6	DSSS	17.76	0.537
	Tilt	2437	6	DSSS	17.76	0.284
Left	Touch	2437	6	DSSS	17.76	0.521
	Tilt	2437	6	DSSS	17.76	0.110
				Body 1.6 W/kg (mW/g) averaged over 1 gram		

1. Battery is fully charged for all tests.
   Power Measured ☒Conducted ☐ERP ☐EIRP
2. SAR Measurement
   Phantom Configuration ☒Left Head ☐Uniphantom ☒Right Head
   SAR Configuration ☒Head ☐Body
3. Test Signal Call Mode ☒Test Code ☐Base Station Simulator
4. Test Configuration ☐With Belt Clip ☐Without Belt Clip ☒N/A
5. Tissue Depth is at least 15.0 cm

Jay M. Moulton
Vice President

Note: SAR Tested on the Highest output power channel. When the measured channel is 3 dB or more below the limit the remaining channels are not required to be tested per KDB 447498 section 1) e). SAR is not required for 802.11g/HT20/HT40 channels when the maximum average output power is less than ¼ dB higher than that measured in the 802.11b. All testing was conducted per KDB 447498, 248227, 648474 and OET Bulletin 65. See the photo in Appendix C for a pictorial of the setup and labeling of the test locations.

SAR Data Summary – 2450 MHz Body 802.11b

MEASUREMENT RESULTS						
Gap	Position	Frequency		Modulation	End Power	SAR (W/kg) Measured
		MHz	Ch.		(dBm)	
0 mm	Back	2437	6	DSSS	17.76	0.698

Body
1.6 W/kg (mW/g)
averaged over 1 gram

1. Battery is fully charged for all tests.
   Power Measured ☒Conducted ☐ERP ☐EIRP
2. SAR Measurement
   Phantom Configuration ☐Left Head ☒Uniphantom ☐Right Head
   SAR Configuration ☐Head ☒Body
3. Test Signal Call Mode ☒Test Code ☐Base Station Simulator
4. Test Configuration ☐With Belt Clip ☒Without Belt Clip ☐N/A
5. Tissue Depth is at least 15.0 cm

Jay M. Moulton
Vice President

Note: SAR Tested on the Highest output power channel. When the measured channel is 3 dB or more below the limit the remaining channels are not required to be tested per KDB 447498 section 1) e). SAR is not required for 802.11g/HT20/HT40 channels when the maximum average output power is less than ¼ dB higher than that measured in the 802.11b. All testing was conducted per KDB 447498, 248227, 648474 and OET Bulletin 65. See the photo in Appendix C for a pictorial of the setup and labeling of the test locations.

SAR Data Summary – 5250 MHz Head 802.11a

MEASUREMENT RESULTS						
Head	**Position**	**Frequency**		**Modulation**	**End Power**	**SAR (W/kg) Measured**
		MHz	**Ch.**		**(dBm)**	
Right	Touch	5220	44	OFDM	14.80	0.536
	Tilt	5220	44	OFDM	14.80	0.188
Left	Touch	5220	44	OFDM	14.80	0.586
	Tilt	5220	44	OFDM	14.80	0.223
Right	Touch	5280	56	OFDM	15.43	0.554
	Tilt	5280	56	OFDM	15.43	0.197
Left	Touch	5280	56	OFDM	15.43	0.566
	Tilt	5280	56	OFDM	15.43	0.230
				Body 1.6 W/kg (mW/g) averaged over 1 gram		

1. Battery is fully charged for all tests.
   Power Measured ☒Conducted ☐ERP ☐EIRP
2. SAR Measurement
   Phantom Configuration ☒Left Head ☐Uniphantom ☒Right Head
   SAR Configuration ☒Head ☐Body
3. Test Signal Call Mode ☒Test Code ☐Base Station Simulator
4. Test Configuration ☐With Belt Clip ☐Without Belt Clip ☒N/A
5. Tissue Depth is at least 15.0 cm

Jay M. Moulton
Vice President

Note: SAR Tested on the Highest output power channel. When the measured channel is 3 dB or more below the limit the remaining channels are not required to be tested per KDB 447498 section 1) e). SAR is not required for 802.11 HT20/HT40 channels when the maximum average output power is less than ¼ dB higher than that measured in the 802.11a. All testing was conducted per KDB 447498, 248227, 648474 and OET Bulletin 65. See the photo in Appendix C for a pictorial of the setup and labeling of the test locations.

SAR Data Summary – 5250 MHz Body 802.11a

MEASUREMENT RESULTS						
Gap	Position	Frequency		Modulation	End Power	SAR (W/kg) Measured
		MHz	Ch.		(dBm)	
0 mm	Back	5220	44	OFDM	14.80	0.778
		5280	56	OFDM	15.43	0.795
				Body 1.6 W/kg (mW/g) averaged over 1 gram		

1. Battery is fully charged for all tests.
   Power Measured ☒Conducted ☐ERP ☐EIRP
2. SAR Measurement
   Phantom Configuration ☐Left Head ☒Uniphantom ☐Right Head
   SAR Configuration ☐Head ☒Body
3. Test Signal Call Mode ☒Test Code ☐Base Station Simulator
4. Test Configuration ☐With Belt Clip ☐Without Belt Clip ☒N/A
5. Tissue Depth is at least 15.0 cm

Jay M. Moulton
Vice President

Note: SAR Tested on the Highest output power channel. When the measured channel is 3 dB or more below the limit the remaining channels are not required to be tested per KDB 447498 section 1) e). SAR is not required for 802.11 HT20/HT40 channels when the maximum average output power is less than ¼ dB higher than that measured in the 802.11a. All testing was conducted per KDB 447498, 248227, 648474 and OET Bulletin 65. See the photo in Appendix C for a pictorial of the setup and labeling of the test locations.

SAR Data Summary – 5600 MHz Head 802.11a

MEASUREMENT RESULTS						
Head	**Position**	**Frequency**		**Modulation**	**End Power**	**SAR (W/kg) Measured**
		MHz	**Ch.**		**(dBm)**	
Right	Touch	5580	116	OFDM	16.41	0.574
	Tilt	5580	116	OFDM	16.41	0.207
Left	Touch	5580	116	OFDM	16.41	0.551
	Tilt	5580	116	OFDM	16.41	0.253
				Body 1.6 W/kg (mW/g) averaged over 1 gram		

1. Battery is fully charged for all tests.
   Power Measured ☒Conducted ☐ERP ☐EIRP
2. SAR Measurement
   Phantom Configuration ☒Left Head ☐Uniphantom ☒Right Head
   SAR Configuration ☒Head ☐Body
3. Test Signal Call Mode ☒Test Code ☐Base Station Simulator
4. Test Configuration ☐With Belt Clip ☐Without Belt Clip ☒N/A
5. Tissue Depth is at least 15.0 cm

Jay M. Moulton
Vice President

Note: SAR Tested on the Highest output power channel. When the measured channel is 3 dB or more below the limit the remaining channels are not required to be tested per KDB 447498 section 1) e). SAR is not required for 802.11 HT20/HT40 channels when the maximum average output power is less than ¼ dB higher than that measured in the 802.11a. All testing was conducted per KDB 447498, 248227, 648474 and OET Bulletin 65. See the photo in Appendix C for a pictorial of the setup and labeling of the test locations.

SAR Data Summary – 5600 MHz Body 802.11a

MEASUREMENT RESULTS						
Gap	Position	Frequency		Modulation	End Power	SAR (W/kg) Measured
		MHz	Ch.		(dBm)	
0 mm	Back	5580	116	OFDM	16.41	0.770

Body
1.6 W/kg (mW/g)
averaged over 1 gram

1. Battery is fully charged for all tests.
   Power Measured ☒Conducted ☐ERP ☐EIRP
2. SAR Measurement
   Phantom Configuration ☐Left Head ☒Uniphantom ☐Right Head
   SAR Configuration ☐Head ☒Body
3. Test Signal Call Mode ☒Test Code ☐Base Station Simulator
4. Test Configuration ☐With Belt Clip ☒Without Belt Clip ☐N/A
5. Tissue Depth is at least 15.0 cm

Jay M. Moulton
Vice President

Note: SAR Tested on the Highest output power channel. When the measured channel is 3 dB or more below the limit the remaining channels are not required to be tested per KDB 447498 section 1) e). SAR is not required for 802.11 HT20/HT40 channels when the maximum average output power is less than ¼ dB higher than that measured in the 802.11a. All testing was conducted per KDB 447498, 248227, 648474 and OET Bulletin 65. See the photo in Appendix C for a pictorial of the setup and labeling of the test locations.

SAR Data Summary – 5800 MHz Head 802.11a

MEASUREMENT RESULTS						
Head	**Position**	**Frequency**		**Modulation**	**End Power**	**SAR (W/kg) Measured**
		MHz	**Ch.**		**(dBm)**	
Right	Touch	5785	157	OFDM	19.22	0.575
	Tilt	5785	157	OFDM	19.22	0.190
Left	Touch	5785	157	OFDM	19.22	0.558
	Tilt	5785	157	OFDM	19.22	0.244
		Body 1.6 W/kg (mW/g) averaged over 1 gram				

1. Battery is fully charged for all tests.
   Power Measured ☒Conducted ☐ERP ☐EIRP
2. SAR Measurement
   Phantom Configuration ☒Left Head ☐Uniphantom ☒Right Head
   SAR Configuration ☒Head ☐Body
3. Test Signal Call Mode ☒Test Code ☐Base Station Simulator
4. Test Configuration ☐With Belt Clip ☐Without Belt Clip ☒N/A
5. Tissue Depth is at least 15.0 cm

Jay M. Moulton
Vice President

Note: SAR Tested on the Highest output power channel. When the measured channel is 3 dB or more below the limit the remaining channels are not required to be tested per KDB 447498 section 1) e). SAR is not required for 802.11 HT20/HT40 channels when the maximum average output power is less than ¼ dB higher than that measured in the 802.11a. All testing was conducted per KDB 447498, 248227, 648474 and OET Bulletin 65. See the photo in Appendix C for a pictorial of the setup and labeling of the test locations.

SAR Data Summary – 5800 MHz Body 802.11a

MEASUREMENT RESULTS						
Gap	Position	Frequency		Modulation	End Power	SAR (W/kg) Measured
		MHz	Ch.		(dBm)	
0 mm	Back	5785	157	OFDM	19.22	0.771

Body
1.6 W/kg (mW/g)
averaged over 1 gram

1. Battery is fully charged for all tests.
   Power Measured ☒Conducted ☐ERP ☐EIRP
2. SAR Measurement
   Phantom Configuration ☐Left Head ☒Uniphantom ☐Right Head
   SAR Configuration ☐Head ☒Body
3. Test Signal Call Mode ☒Test Code ☐Base Station Simulator
4. Test Configuration ☐With Belt Clip ☐Without Belt Clip ☒N/A
5. Tissue Depth is at least 15.0 cm

Jay M. Moulton
Vice President

Note: SAR Tested on the Highest output power channel. When the measured channel is 3 dB or more below the limit the remaining channels are not required to be tested per KDB 447498 section 1) e). SAR is not required for 802.11 HT20/HT40 channels when the maximum average output power is less than ¼ dB higher than that measured in the 802.11a. All testing was conducted per KDB 447498, 248227, 648474 and OET Bulletin 65. See the photo in Appendix C for a pictorial of the setup and labeling of the test locations.

12. Test Equipment List

Table 12.1 Equipment Specifications

Type	Calibration Due Date	Calibration Done Date	Serial Number
ThermoCRS Robot	N/A	N/A	RAF0338198
ThermoCRS Controller	N/A	N/A	RCF0338224
ThermoCRS Teach Pendant (Joystick)	N/A	N/A	STP0334405
IBM Computer, 2.66 MHz P4	N/A	N/A	8189D8U KCPR08N
Aprel E-Field Probe ALS-E020	07/07/2012	09/07/2011	RFE-217
Aprel E-Field Probe ALS-E030	07/14/2012	07/14/2011	E030-001
Aprel Dummy Probe	N/A	N/A	023
Aprel Left Phantom	N/A	N/A	RFE-267
Aprel Right Phantom	N/A	N/A	RFE-268
Aprel UniPhantom	N/A	N/A	RFE-273
Aprel Validation Dipole ALS-D-450-S-2 Head	01/12/2012	01/12/2010	RFE-362
Aprel Validation Dipole ALS-D-450-S-2 Body	01/19/2012	01/19/2011	RFE-362
Aprel Validation Dipole ALS-D-750-S-2 Head	01/14/2012	01/14/2010	177-00501
Aprel Validation Dipole ALS-D-750-S-2 Body	11/15/2011	11/15/2010	177-00501
Aprel Validation Dipole ALS-D-835-S-2 Head	01/14/2012	01/14/2010	180-00561
Aprel Validation Dipole ALS-D-835-S-2 Body	11/16/2011	11/16/2010	180-00561
Aprel Validation Dipole ALS-D-900-S-2 Head	01/12/2012	01/12/2010	RFE-275
Aprel Validation Dipole ALS-D-900-S-2 Body	11/19/2011	11/19/2010	RFE-275
Aprel Validation Dipole ALS-D-1900-S-2 Head	01/15/2012	01/15/2010	210-00713
Aprel Validation Dipole ALS-D-1900-S-2 Body	11/16/2011	11/16/2010	210-00713
Aprel Validation Dipole ALS-D-2450-S-2 Head	01/12/2012	01/12/2010	RFE-278
Aprel Validation Dipole ALS-D-2450-S-2 Body	11/18/2011	11/18/2010	RFE-278
Aprel Validation Dipole RFE-D-2600-S-2 Body	01/18/2012	01/18/2010	RFE-121
Aprel Validation Dipole RFE-D-BB-S-2 Head	01/12/2012	01/12/2010	235-00801
Aprel Validation Dipole RFE-D-BB-S-2 Body	02/09/2012	02/09/2011	235-00801
Agilent (HP) 437B Power Meter	03/30/2012	03/30/2011	3125U08837
Agilent (HP) 8481B Power Sensor	03/30/2012	03/30/2011	3318A05384
Agilent N1911A Power Meter	03/30/2012	03/30/2011	GB45100254
Agilent N1922A Power Sensor	03/30/2012	03/30/2011	MY45240464
Advantest R3261A Spectrum Analyzer	03/30/2012	03/30/2011	31720068
Agilent (HP) 8350B Signal Generator	03/31/2012	03/31/2011	2749A10226
Agilent (HP) 83525A RF Plug-In	03/31/2012	03/31/2011	2647A01172
Agilent (HP) 8753C Vector Network Analyzer	03/30/2012	03/30/2011	3135A01724
Agilent (HP) 85047A S-Parameter Test Set	03/31/2012	03/31/2011	2904A00595
Agilent (HP) 8960 Base Station Sim.	03/25/2012	03/25/2011	MY48360364
Anritsu MT8820C	03/23/2012	03/23/2011	6201010002
Aprel Dielectric Probe Assembly	N/A	N/A	0011
Head Equivalent Matter (450 MHz)	N/A	N/A	N/A
Head Equivalent Matter (835/900 MHz)	N/A	N/A	N/A
Head Equivalent Matter (1900 MHz)	N/A	N/A	N/A
Head Equivalent Matter (2450 MHz)	N/A	N/A	N/A
Body Equivalent Matter (450 MHz)	N/A	N/A	N/A
Body Equivalent Matter (750 MHz)	N/A	N/A	N/A
Body Equivalent Matter (835/900 MHz)	N/A	N/A	N/A
Body Equivalent Matter (1900 MHz)	N/A	N/A	N/A
Body Equivalent Matter (2450 MHz)	N/A	N/A	N/A
Body Equivalent Matter (2600 MHz)	N/A	N/A	N/A
Body Equivalent Matter (5200 MHz)	N/A	N/A	N/A
Body Equivalent Matter (5800 MHz)	N/A	N/A	N/A

13. Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect to all parameters subject to the test. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body is a very complex phenomena that depends on the mass, shape, and size of the body; the orientation of the body with respect to the field vectors; and, the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

14. References

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio Frequency Radiation, August 1996

[2] ANSI/IEEE C95.1 – 1992, American National Standard Safety Levels with respect to Human Exposure to Radio Frequency Electromagnetic Fields, 300kHz to 100GHz, New York: IEEE, 1992.

[3] ANSI/IEEE C95.3 – 1992, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields – RF and Microwave, New York: IEEE, 1992.

[4] Federal Communications Commission, OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01), Evaluating Compliance with FCC Guidelines for Human Exposure to Radio Frequency Electromagnetic Fields, June 2001.

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

[6] Industry Canada, RSS – 102e, Radio Frequency Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands), March 2010.

[7] Health Canada, Safety Code 6, Limits of Human Exposure to Radiofrequency Electromagnetic Fields in the Frequency Range from 3kHz to 300 GHz, 2009.

Appendix A – System Validation Plots and Data

```
************************************************************
Test Result for UIM Dielectric Parameter
Mon 31/Oct/2011 07:11:44
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
2.4100	39.26	1.76	39.23	1.77
2.4200	39.25	1.77	39.21	1.78
2.4300	39.24	1.78	39.19	1.79
2.4400	39.22	1.79	39.18	1.81
2.4500	39.20	1.80	39.15	1.82
2.4600	39.19	1.81	39.12	1.84
2.4700	39.17	1.82	39.09	1.86

```
************************************************************
Test Result for UIM Dielectric Parameter
Mon 31/Oct/2011 07:22:56
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
2.4100	52.75	1.91	52.25	1.90
2.4200	52.74	1.92	52.22	1.91
2.4300	52.73	1.93	52.18	1.93
2.4400	52.71	1.94	52.15	1.95
2.4500	52.70	1.95	52.13	1.96
2.4600	52.69	1.96	52.11	1.98
2.4700	52.67	1.98	52.08	2.00

```
************************************************************
Test Result for UIM Dielectric Parameter
Tue 01/Nov/2011 07:09:33
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
5.1800	36.01	4.63	35.26	4.64
5.1900	36.00	4.64	35.24	4.66
5.2000	35.99	4.65	35.23	4.68
5.2100	35.97	4.67	35.21	4.69
5.2200	35.96	4.68	35.19	4.70
5.2300	35.95	4.69	35.18	4.72
5.2400	35.94	4.70	35.16	4.73
5.2500	35.93	4.71	35.14	4.74
5.2600	35.92	4.72	35.12	4.75
5.2700	35.91	4.73	35.11	4.77
5.2800	35.89	4.74	35.09	4.78
5.2900	35.88	4.75	35.07	4.79
5.3000	35.87	4.76	35.05	4.80
5.3100	35.86	4.77	35.04	4.81
5.3200	35.85	4.78	35.02	4.83

```
************************************************************
Test Result for UIM Dielectric Parameter
Tue 01/Nov/2011 07:21:41
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
5.1800	49.04	5.28	47.85	5.32
5.1900	49.03	5.29	47.84	5.34
5.2000	49.01	5.30	47.82	5.35
5.2100	49.00	5.31	47.81	5.36
5.2200	48.99	5.32	47.79	5.37
5.2300	48.97	5.33	47.75	5.39
5.2400	48.96	5.35	47.73	5.41
5.2500	48.95	5.36	47.71	5.42
5.2600	48.93	5.37	47.68	5.43
5.2700	48.92	5.38	47.66	5.44
5.2800	48.91	5.39	47.63	5.45
5.2900	48.89	5.40	47.60	5.46
5.3000	48.88	5.42	47.58	5.48
5.3100	48.87	5.43	47.57	5.49
5.3200	48.85	5.44	47.54	5.51

```
************************************************************
Test Result for UIM Dielectric Parameter
Wed 02/Nov/2011 06:51:36
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
5.5000	35.64	4.96	35.29	4.95
5.5200	35.62	4.98	35.26	4.97
5.5400	35.60	5.00	35.24	5.00
5.5600	35.57	5.02	35.21	5.02
5.5800	35.55	5.04	35.18	5.05
5.6000	35.53	5.07	35.16	5.08
5.6200	35.51	5.09	35.14	5.10
5.6400	35.48	5.11	35.11	5.13
5.6600	35.46	5.13	35.08	5.15
5.6800	35.44	5.15	35.06	5.17
5.7000	35.41	5.17	35.02	5.19

```
************************************************************
Test Result for UIM Dielectric Parameter
Wed 02/Nov/2011 07:16:51
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
5.5000	48.61	5.65	48.54	5.77
5.5200	48.58	5.67	48.50	5.80
5.5400	48.55	5.70	48.47	5.83
5.5600	48.53	5.72	48.44	5.85
5.5800	48.50	5.74	48.40	5.87
5.6000	48.47	5.77	48.35	5.92
5.6200	48.44	5.79	48.31	5.95
5.6400	48.42	5.81	48.29	5.97
5.6600	48.39	5.84	48.25	6.00
5.6800	48.36	5.86	48.22	6.03
5.7000	48.34	5.88	48.20	6.05

```
**********************************************************
Test Result for UIM Dielectric Parameter
Thu 03/Nov/2011 07:01:56
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
5.7450	35.36	5.21	35.26	5.24
5.7550	35.35	5.22	35.25	5.25
5.7650	35.34	5.23	35.24	5.26
5.7750	35.33	5.24	35.22	5.28
5.7850	35.32	5.25	35.21	5.29
5.7950	35.31	5.26	35.20	5.31
5.8050	35.29	5.28	35.18	5.33
5.8150	35.28	5.29	34.16	5.34
5.8250	35.27	5.30	34.15	5.35

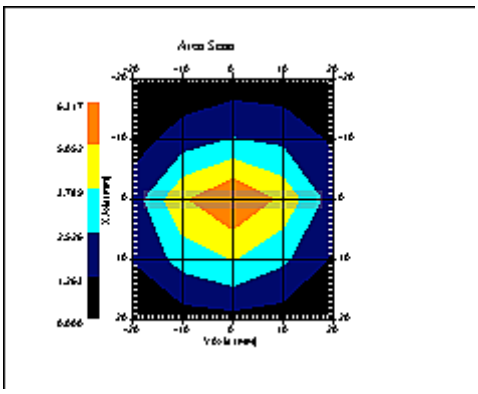
```
**********************************************************
Test Result for UIM Dielectric Parameter
Thu 03/Nov/2011 07:25:42
Freq  Frequency(GHz)
FCC_eH      FCC Bulletin 65 Supplement C ( June 2001) Limits for Head Epsilon
FCC_sH      FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma
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
5.7450	48.27	5.94	48.19	5.94
5.7550	48.26	5.95	48.18	5.95
5.7650	48.25	5.96	48.16	5.96
5.7750	48.23	5.97	48.14	5.98
5.7850	48.22	5.98	48.12	5.99
5.7950	48.21	5.99	48.10	6.01
5.8050	48.19	6.01	48.07	6.02
5.8150	48.18	6.02	48.05	6.03
5.8250	48.17	6.03	48.03	6.05

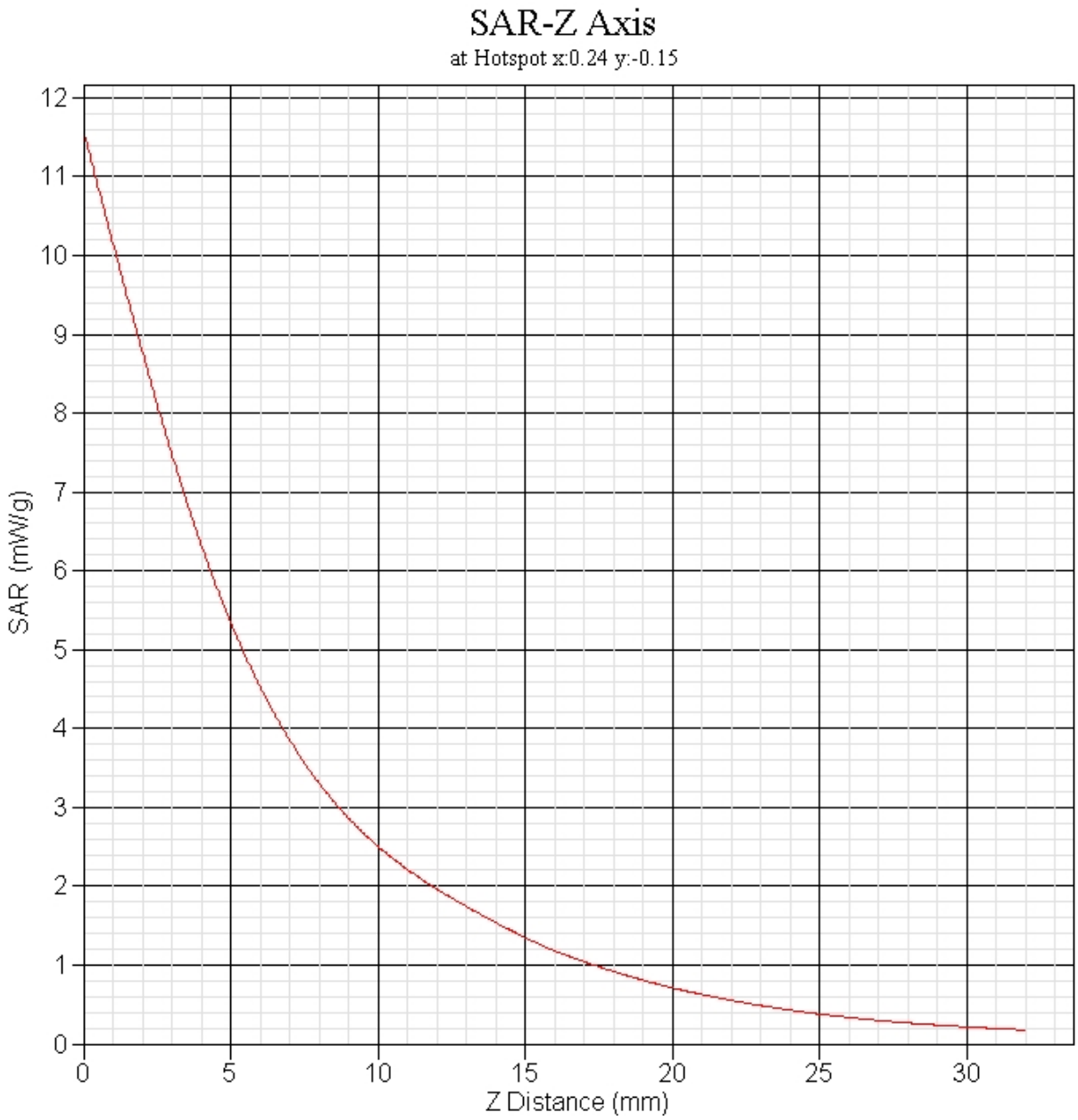
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 31-Oct-2011
Starting Time     : 31-Oct-2011  07:19:29 AM
End Time          : 31-Oct-2011  07:33:47 AM
Scanning Time     : 858 secs

Product Data
Device Name       : Validation
Serial No.        : 2450
Type              : Dipole
Model             : ALS-D-2450-S-2
Frequency         : 2450.00 MHz
Max. Transmit Pwr : 0.1 W
Drift Time        : 0 min(s)
Length            : 51.5 mm
Width             : 3.6 mm
Depth             : 30.4 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 6.373 W/kg
Power Drift-Finish: 6.568 W/kg
Power Drift (%)   : 3.061

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : HEAD
Serial No.        : 2450
Frequency         : 2450.00 MHz
Last Calib. Date  : 31-Oct-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 45.00 RH%
Epsilon           : 39.15 F/m
Sigma             : 1.82 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe 217 - RFEL
Model             : E020
Type              : E-Field Triangle
Serial No.        : 217
Last Calib. Date  : 07-Sep-2011
Frequency         : 2450.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 3.91
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 1.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 31-Oct-2011
Set-up Time       : 7:40:13 AM
Area Scan         : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan         : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

Other Data
DUT Position      : Touch
Separation        : 10 mm
Channel           : Mid
```



```
1 gram SAR value    : 5.426 W/kg
10 gram SAR value   : 2.459 W/kg
Area Scan Peak SAR  : 6.317 W/kg
Zoom Scan Peak SAR  : 11.590 W/kg
```



SAR Test Report

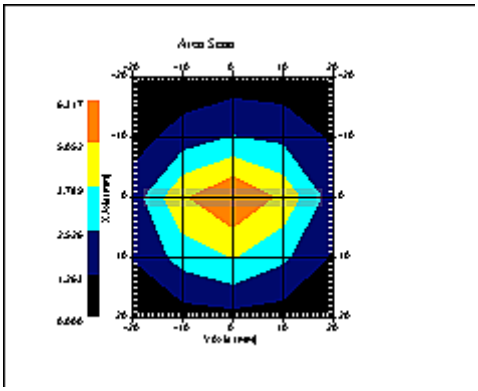
By Operator : Jay
Measurement Date : 31-Oct-2011
Starting Time : 31-Oct-2011 07:59:29 AM
End Time : 31-Oct-2011 08:13:47 AM
Scanning Time : 858 secs

Product Data
Device Name : Validation
Serial No. : 2450
Type : Dipole
Model : ALS-D-2450-S-2
Frequency : 2450.00 MHz
Max. Transmit Pwr : 0.1 W
Drift Time : 0 min(s)
Length : 51.5 mm
Width : 3.6 mm
Depth : 30.4 mm
Antenna Type : Internal
Orientation : Touch
Power Drift-Start : 6.373 W/kg
Power Drift-Finish: 6.568 W/kg
Power Drift (%) : 3.061

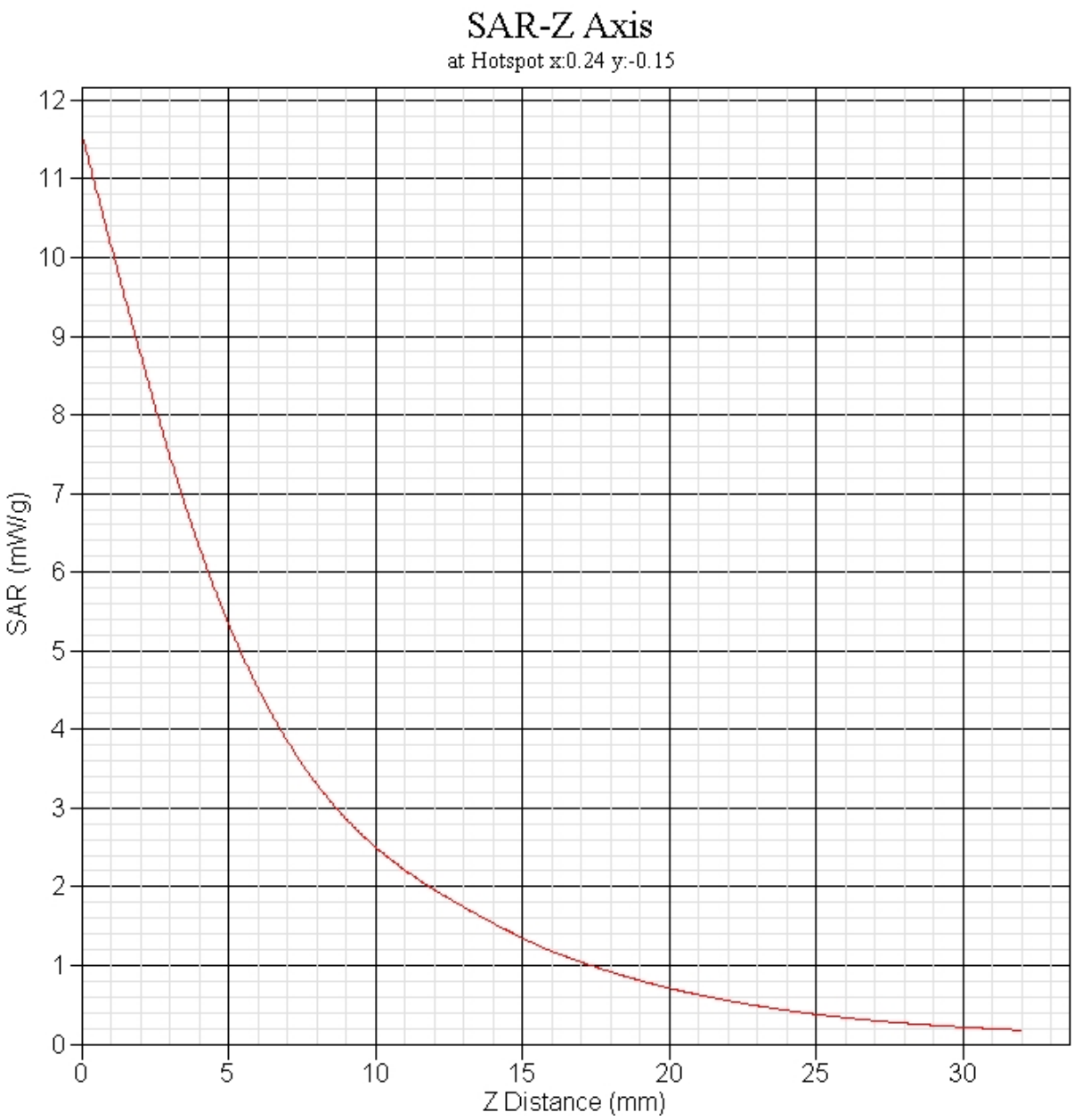
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Uni-Phantom

Tissue Data
Type : BODY
Serial No. : 2450
Frequency : 2450.00 MHz
Last Calib. Date : 31-Oct-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 52.13 F/m
Sigma : 1.96 S/m
Density : 1000.00 kg/cu. m
Probe Data
Name : Probe 217 - RFEL
Model : E020
Type : E-Field Triangle
Serial No. : 217
Last Calib. Date : 07-Sep-2011
Frequency : 2450.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 3.94
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 1.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 31-Oct-2011
Set-up Time       : 7:40:13 AM
Area Scan         : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan         : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

Other Data
DUT Position      : Touch
Separation        : 10 mm
Channel           : Mid
```



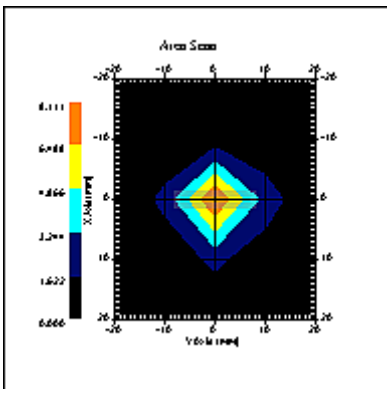
```
1 gram SAR value    : 5.209 W/kg
10 gram SAR value   : 2.328 W/kg
Area Scan Peak SAR  : 6.156 W/kg
Zoom Scan Peak SAR  : 11.492 W/kg
```



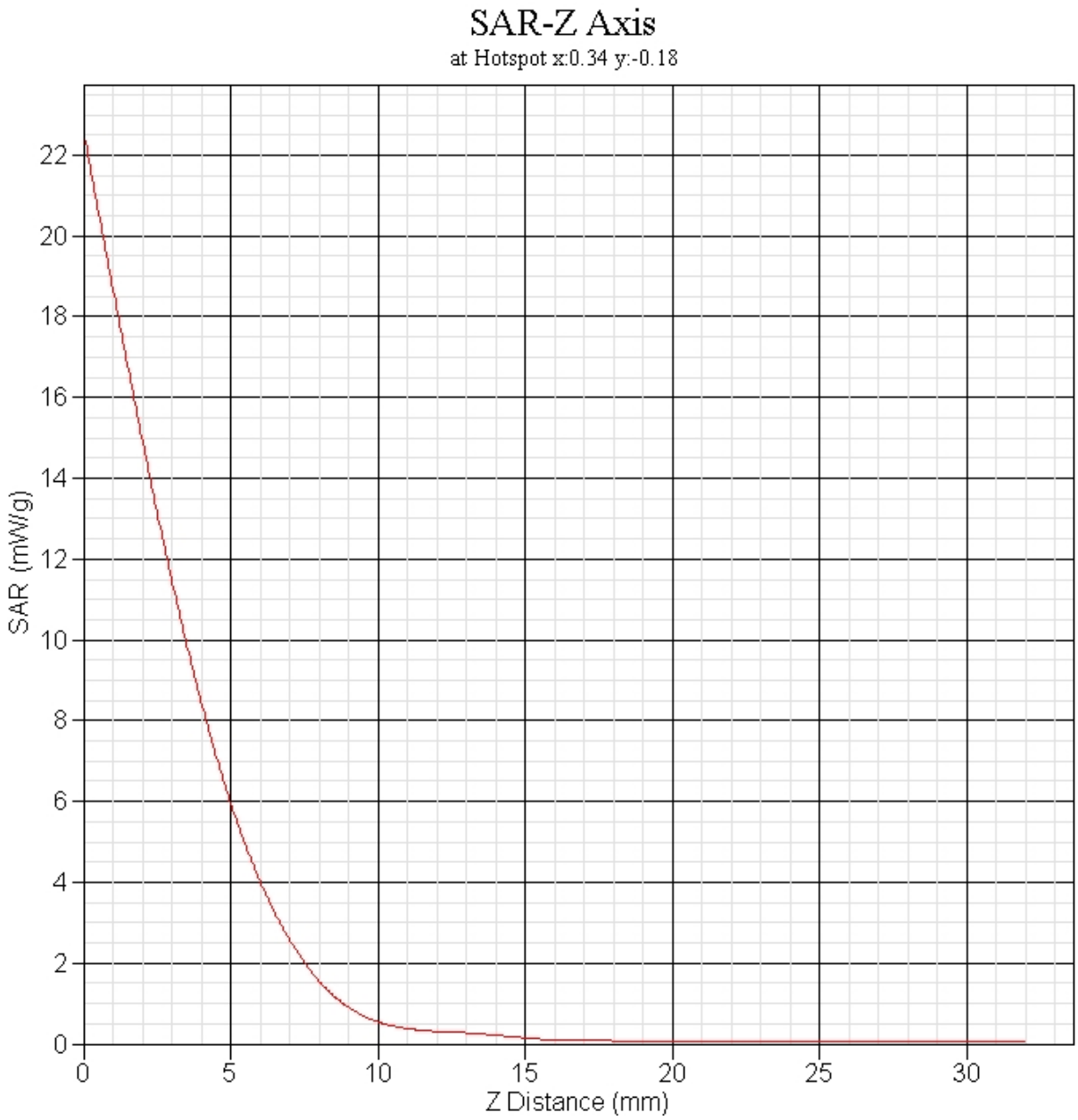
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 01-Nov-2011
Starting Time     : 01-Nov-2011  07:18:18 AM
End Time          : 01-Nov-2011  07:41:20 AM
Scanning Time     : 1382 secs

Product Data
Device Name       : Validation
Serial No.        : 5200
Type              : Dipole
Model             : ALS-D-BB-S-2
Frequency         : 5200.00 MHz
Max. Transmit Pwr : 0.1 W
Drift Time        : 0 min(s)
Length            : 23.1 mm
Width             : 3.6 mm
Depth             : 20.7 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 8.288 W/kg
Power Drift-Finish: 8.299 W/kg
Power Drift (%)   : 0.131

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : HEAD
Serial No.        : 5200
Frequency         : 5200.00 MHz
Last Calib. Date  : 01-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 50.00 RH%
Epsilon           : 35.14 F/m
Sigma             : 4.74 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5200.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 7.2
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)2
Compression Point: 95.00 mV
Offset            : 1.06 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 20-Aug-2007
Set-up Time       : 9:00:47 AM
Area Scan         : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 10 mm
Channel           : Mid
```



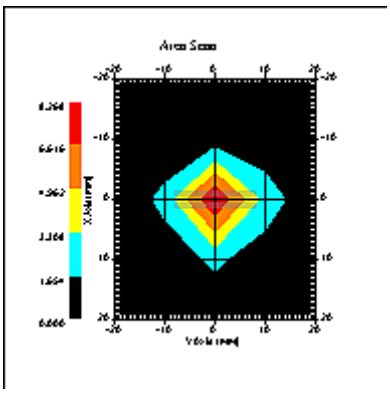
```
1 gram SAR value    : 6.072 W/kg
10 gram SAR value   : 1.948 W/kg
Area Scan Peak SAR  : 8.111 W/kg
Zoom Scan Peak SAR  : 22.618 W/kg
```



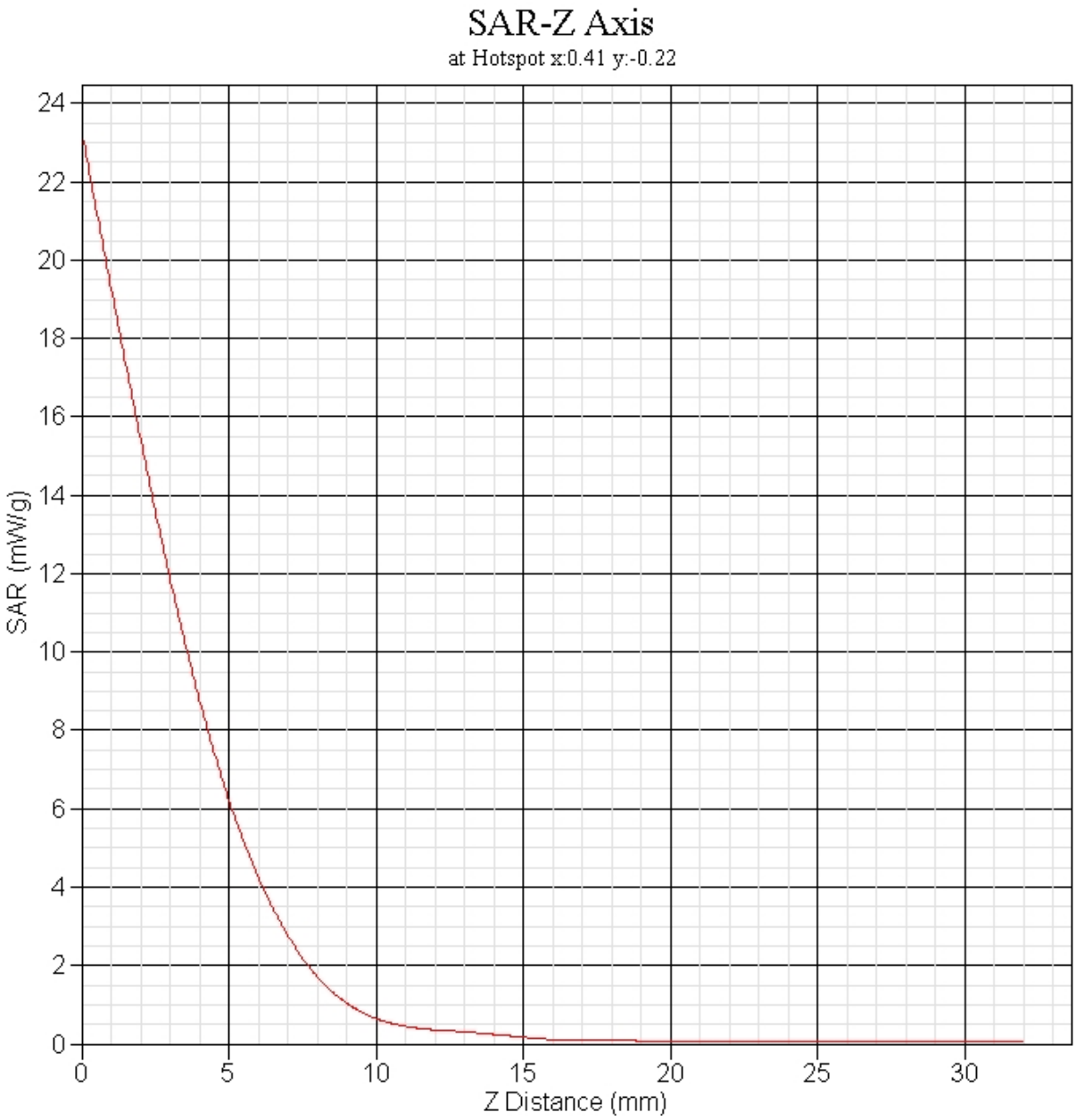
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 01-Nov-2011
Starting Time     : 01-Nov-2011  08:09:43 AM
End Time          : 01-Nov-2011  08:32:59 AM
Scanning Time     : 1396 secs

Product Data
Device Name       : Validation
Serial No.        : 5200
Type              : Dipole
Model             : ALS-D-BB-S-2
Frequency         : 5200.00 MHz
Max. Transmit Pwr : 0.1 W
Drift Time        : 0 min(s)
Length            : 23.1 mm
Width             : 3.6 mm
Depth             : 20.7 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 8.662 W/kg
Power Drift-Finish: 8.729 W/kg
Power Drift (%)   : 0.776

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : BODY
Serial No.        : 5250
Frequency         : 5250.00 MHz
Last Calib. Date  : 01-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 50.00 RH%
Epsilon           : 47.71 F/m
Sigma             : 5.42 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.7
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 01-Nov-2011
Set-up Time       : 9:00:47 AM
Area Scan         : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 10 mm
Channel           : Mid
```



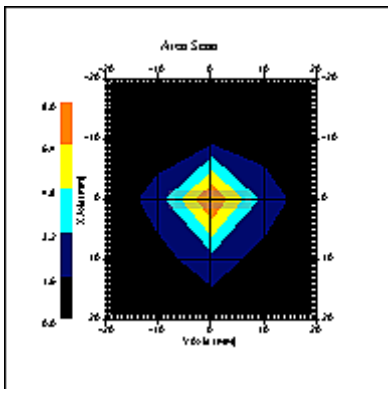
```
1 gram SAR value    : 6.056 W/kg
10 gram SAR value   : 1.983 W/kg
Area Scan Peak SAR  : 8.268 W/kg
Zoom Scan Peak SAR  : 23.318 W/kg
```



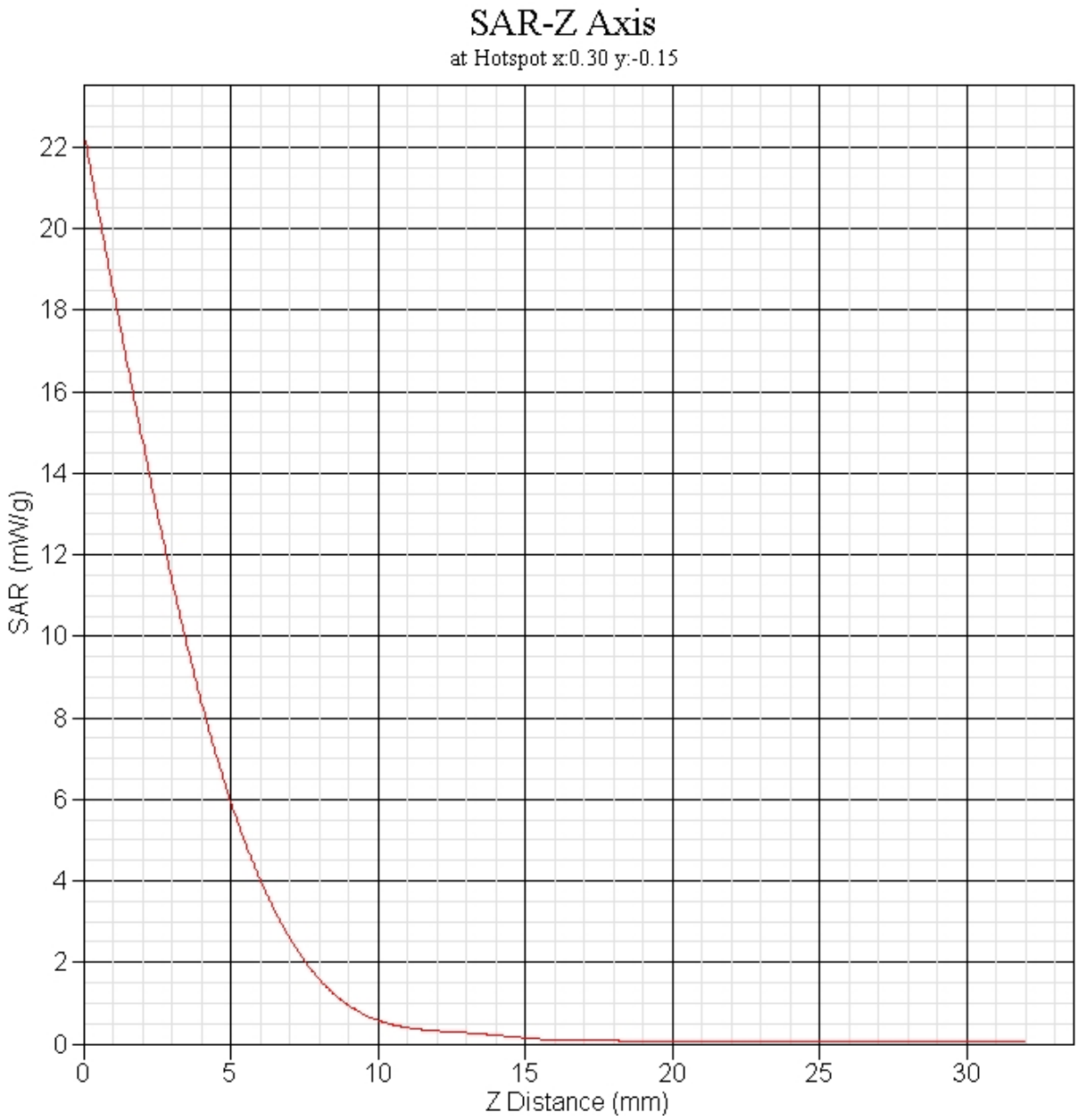
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 02-Nov-2011
Starting Time     : 02-Nov-2011  06:58:00 AM
End Time          : 02-Nov-2011  07:20:47 AM
Scanning Time     : 1367 secs

Product Data
Device Name       : Validation
Serial No.        : 5600
Type              : Dipole
Model             : ALS-D-BB-S-2
Frequency         : 5600.00 MHz
Max. Transmit Pwr : 0.1 W
Drift Time        : 0 min(s)
Length            : 23.1 mm
Width             : 3.6 mm
Depth             : 20.7 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 8.199 W/kg
Power Drift-Finish: 8.257 W/kg
Power Drift (%)   : 0.714

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : HEAD
Serial No.        : 5600
Frequency         : 5600.00 MHz
Last Calib. Date  : 02-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 50.00 RH%
Epsilon           : 35.16 F/m
Sigma             : 5.08 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5600.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.8
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 1.06 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 02-Nov-2011
Set-up Time       : 8:54:57 AM
Area Scan         : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 10 mm
Channel           : Mid
```



```
1 gram SAR value    : 6.424 W/kg
10 gram SAR value   : 2.098 W/kg
Area Scan Peak SAR  : 8.002 W/kg
Zoom Scan Peak SAR  : 22.417 W/kg
```



SAR Test Report

By Operator : Jay
Measurement Date : 02-Nov-2011
Starting Time : 02-Nov-2011 07:51:39 AM
End Time : 02-Nov-2011 08:14:27 AM
Scanning Time : 1368 secs

Product Data
Device Name : Validation
Serial No. : 5600
Type : Dipole
Model : ALS-D-BB-S-2
Frequency : 5600.00 MHz
Max. Transmit Pwr : 0.1 W
Drift Time : 0 min(s)
Length : 23.1 mm
Width : 3.6 mm
Depth : 20.7 mm
Antenna Type : Internal
Orientation : Touch
Power Drift-Start : 8.011 W/kg
Power Drift-Finish: 8.090 W/kg
Power Drift (%) : 0.984

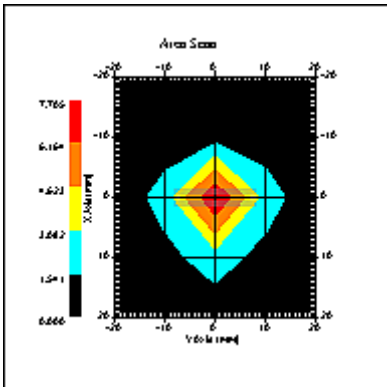
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Uni-Phantom

Tissue Data
Type : BODY
Serial No. : 5600
Frequency : 5600.00 MHz
Last Calib. Date : 02-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 50.00 RH%
Epsilon : 48.35 F/m
Sigma : 5.92 S/m
Density : 1000.00 kg/cu. m

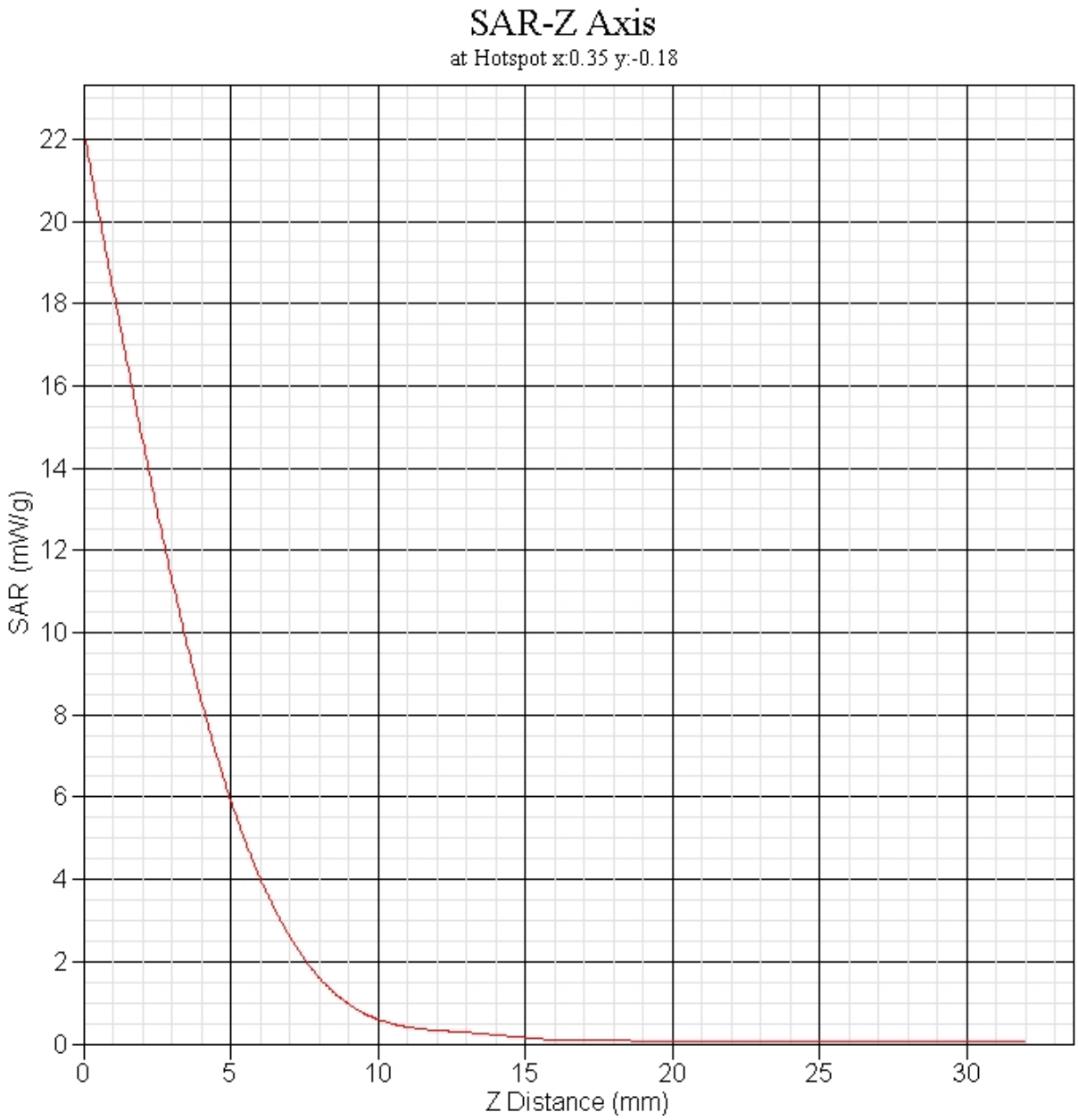
Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5600.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.3
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

Measurement Data
Crest Factor : 1
Scan Type : Complete
Tissue Temp. : 20.00 °C
Ambient Temp. : 23.00 °C
Set-up Date : 02-Nov-2011
Set-up Time : 8:54:57 AM
Area Scan : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position : Touch
Separation : 10 mm
Channel : Mid



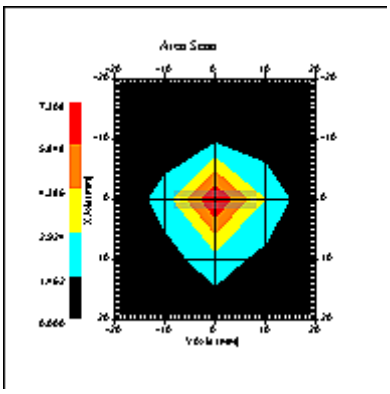
1 gram SAR value : 6.228 W/kg
10 gram SAR value : 2.156 W/kg
Area Scan Peak SAR : 7.705 W/kg
Zoom Scan Peak SAR : 22.217 W/kg



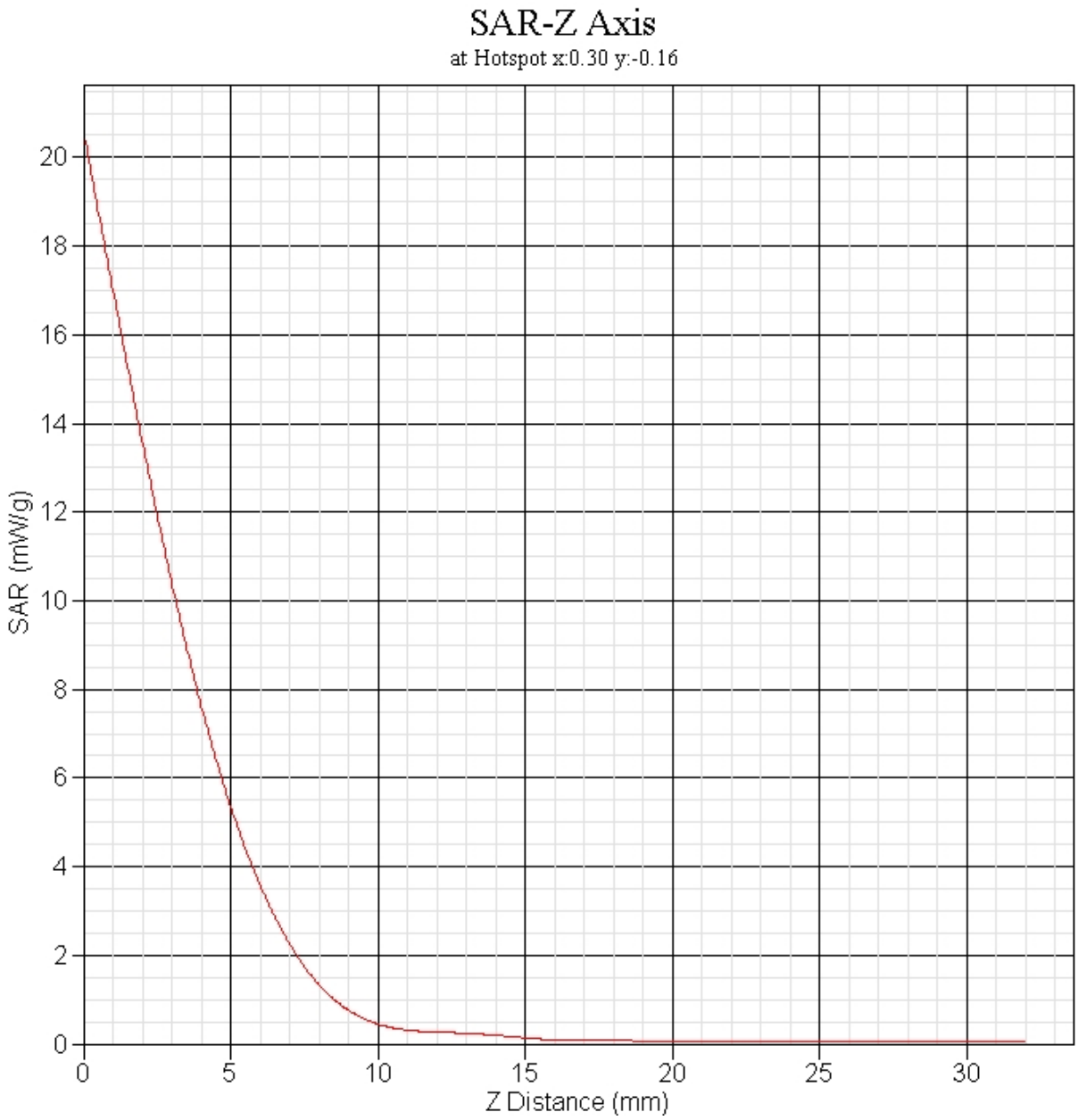
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 03-Nov-2011
Starting Time     : 03-Nov-2011  07:22:36 AM
End Time          : 03-Nov-2011  07:45:36 AM
Scanning Time     : 1380 secs

Product Data
Device Name       : Validation
Serial No.        : 5800
Type              : Dipole
Model             : ALS-D-BB-S-2
Frequency         : 5800.00 MHz
Max. Transmit Pwr : 0.1 W
Drift Time        : 0 min(s)
Length            : 23.1 mm
Width             : 3.6 mm
Depth             : 20.7 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 7.539 W/kg
Power Drift-Finish: 7.656 W/kg
Power Drift (%)   : 1.553

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : HEAD
Serial No.        : 5800
Frequency         : 5800.00 MHz
Last Calib. Date  : 03-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 50.00 RH%
Epsilon           : 35.21 F/m
Sigma             : 5.29 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.6
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)2
Compression Point: 95.00 mV
Offset            : 1.06 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 03-Nov-2011
Set-up Time       : 4:10:18 PM
Area Scan         : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 10 mm
Channel           : Mid
```



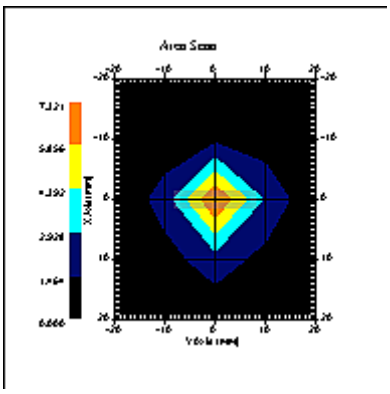
```
1 gram SAR value    : 6.273 W/kg
10 gram SAR value   : 1.980 W/kg
Area Scan Peak SAR  : 7.308 W/kg
Zoom Scan Peak SAR  : 20.616 W/kg
```



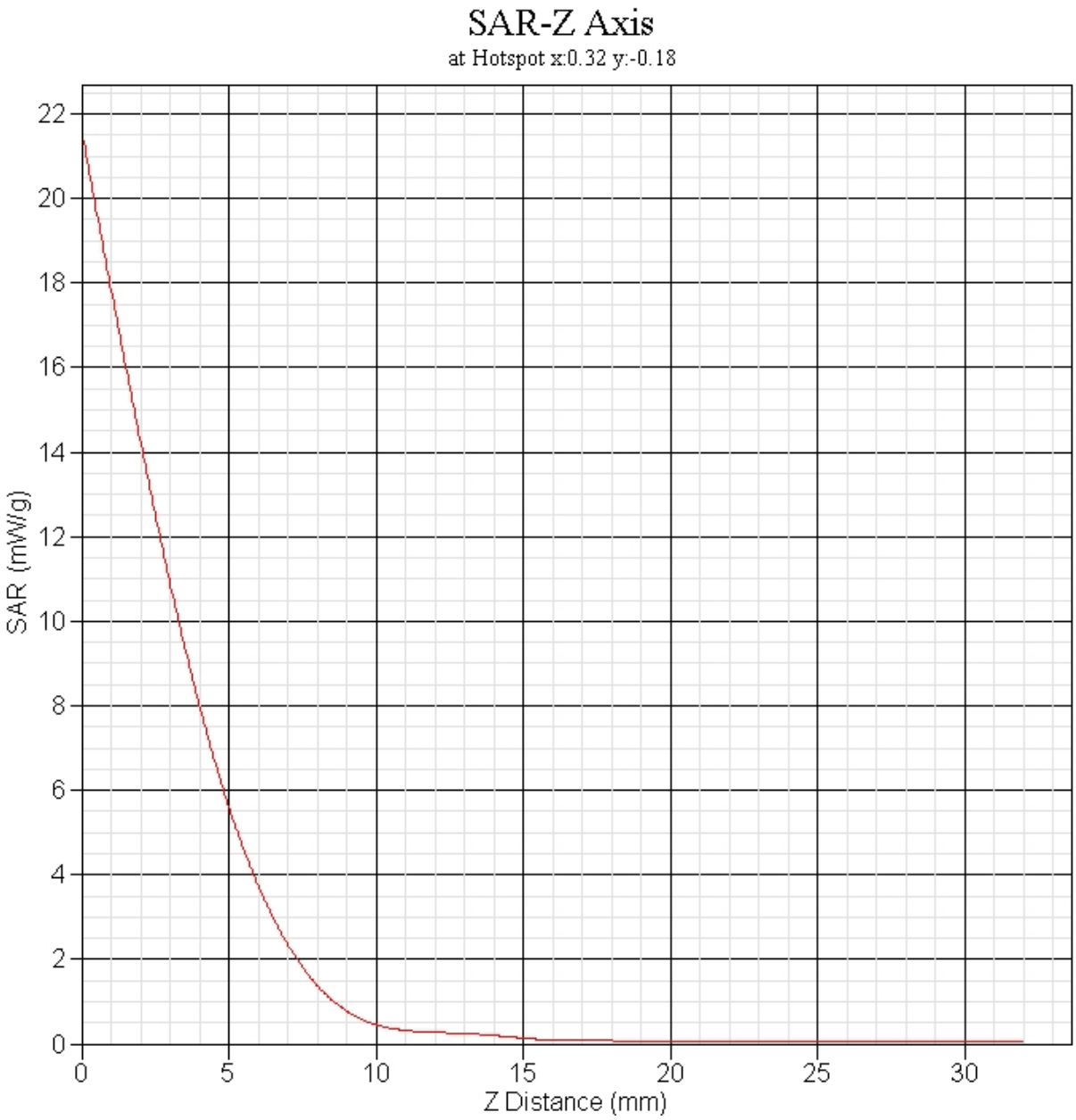
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 03-Nov-2011
Starting Time     : 03-Nov-2011  08:13:39 AM
End Time          : 03-Nov-2011  08:36:30 AM
Scanning Time     : 1371 secs

Product Data
Device Name       : Validation
Serial No.        : 5800
Type              : Dipole
Model             : ALS-D-BB-S-2
Frequency         : 5785.00 MHz
Max. Transmit Pwr : 0.1 W
Drift Time        : 0 min(s)
Length            : 23.1 mm
Width             : 3.6 mm
Depth             : 20.7 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 7.479 W/kg
Power Drift-Finish: 7.493 W/kg
Power Drift (%)   : 0.189

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : BODY
Serial No.        : 5785
Frequency         : 5785.00 MHz
Last Calib. Date  : 03-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 50.00 RH%
Epsilon           : 48.12 F/m
Sigma             : 5.99 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 5.8
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 03-Nov-2011
Set-up Time       : 4:10:18 PM
Area Scan         : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 10 mm
Channel           : Mid
```



```
1 gram SAR value    : 6.008 W/kg
10 gram SAR value   : 1.997 W/kg
Area Scan Peak SAR  : 7.321 W/kg
Zoom Scan Peak SAR  : 21.617 W/kg
```



Appendix B – SAR Test Data Plots

SAR Test Report

By Operator : Jay
Measurement Date : 31-Oct-2011
Starting Time : 31-Oct-2011 08:23:07 AM
End Time : 31-Oct-2011 08:39:59 AM
Scanning Time : 1012 secs

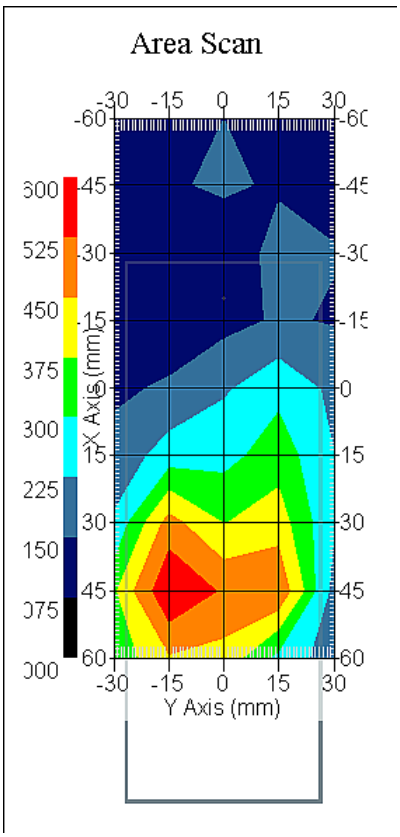
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11b
Model : SpectraLink 8452
Frequency : 2437.00 MHz
Max. Transmit Pwr : 0.059 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : Touch
Power Drift-Start : 0.125 W/kg
Power Drift-Finish: 0.125 W/kg
Power Drift (%) : 0.179

Phantom Data
Name : APREL-SAM Right Ear
Type : SAM-Right
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Right
Description : Polygon Right

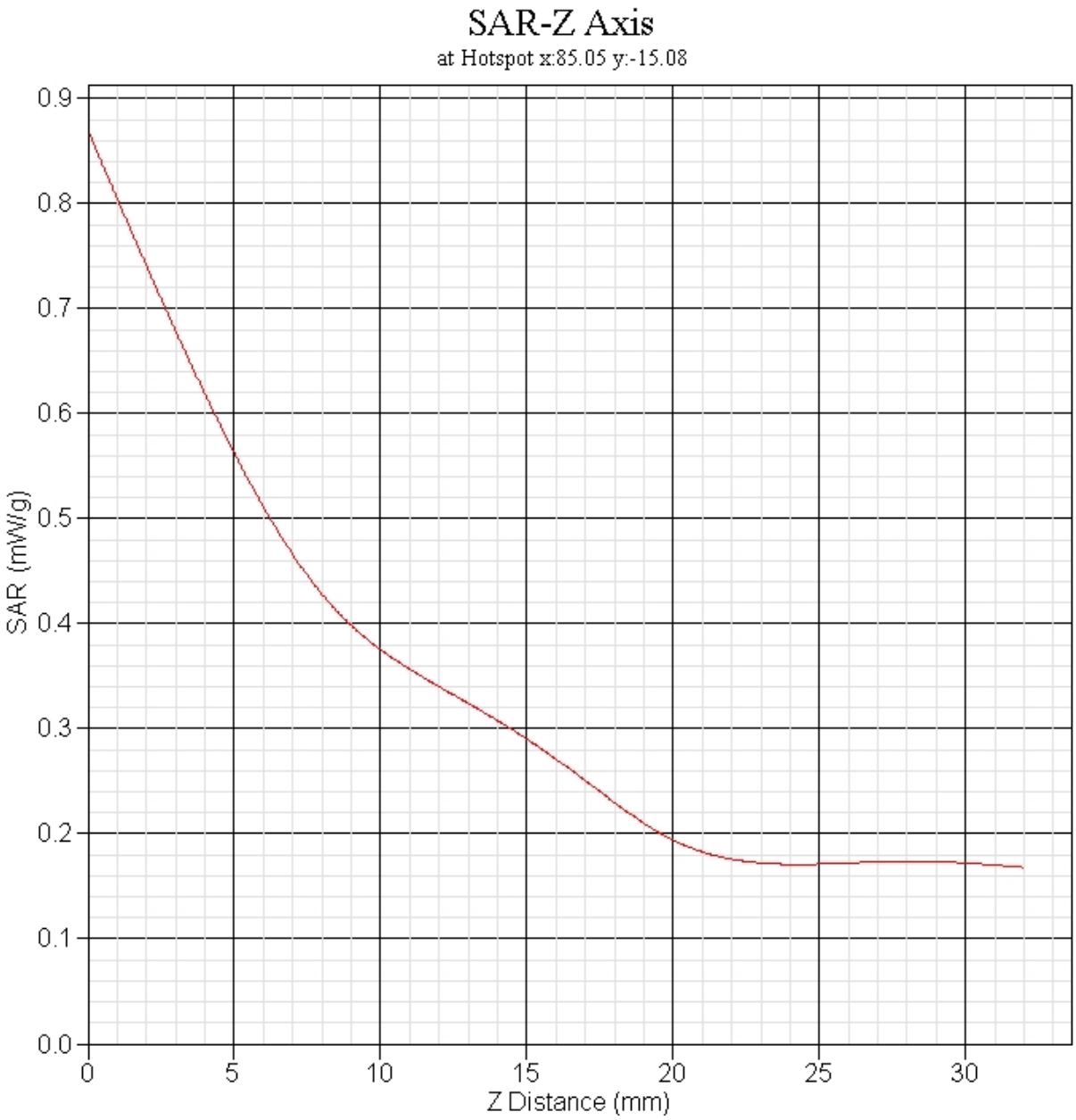
Tissue Data
Type : HEAD
Serial No. : 2440
Frequency : 2440.00 MHz
Last Calib. Date : 31-Oct-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 39.18 F/m
Sigma : 1.81 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : RFEL 217
Model : E020
Type : E-Field Triangle
Serial No. : 217
Last Calib. Date : 07-Sep-2011
Frequency : 2450.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 3.91
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 1.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 31-Oct-2011
Set-up Time       : 10:55:42 AM
Area Scan         : 9x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

Other Data
DUT Position      : Touch
Separation        : 0
Channel           : Mid
```



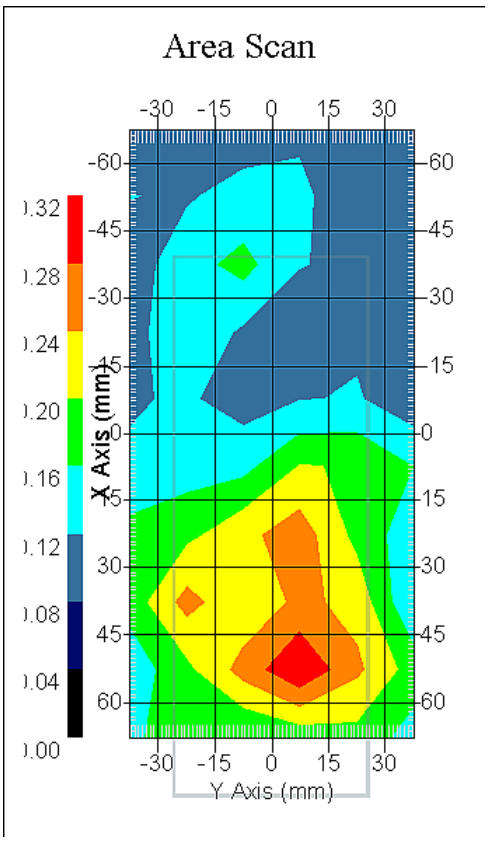

```
1 gram SAR value    : 0.537 W/kg
10 gram SAR value   : 0.342 W/kg
Area Scan Peak SAR  : 0.599 W/kg
Zoom Scan Peak SAR  : 0.870 W/kg
```



SAR Test Report

```
By Operator       : Jay
Measurement Date  : 31-Oct-2011
Starting Time     : 31-Oct-2011  08:46:22 AM
End Time          : 31-Oct-2011  09:06:17 AM
Scanning Time     : 1195 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11b
Model             : SpectraLink 8452
Frequency         : 2437.00 MHz
Max. Transmit Pwr : 0.059 W
Drift Time        : 0 min(s)
Length            : 145 mm
Width             : 54 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : 15° Tilt
Power Drift-Start : 0.142 W/kg
Power Drift-Finish: 0.139 W/kg
Power Drift (%)   : -2.115

Phantom Data
Name            : APREL-SAM Right Ear
Type            : SAM-Right
Size (mm)       : 280 x 280 x 280
Serial No.      : User Define
Location        : Right
Description     : Polygon Right

Tissue Data
Type            : HEAD
Serial No.      : 2440
Frequency       : 2440.00 MHz
Last Calib. Date : 31-Oct-2011
Temperature     : 20.00 °C
Ambient Temp.   : 23.00 °C
Humidity        : 45.00 RH%
Epsilon         : 39.18 F/m
Sigma           : 1.81 S/m
Density         : 1000.00 kg/cu. m

Probe Data
Name            : RFEL 217
Model           : E020
Type            : E-Field Triangle
Serial No.      : 217
Last Calib. Date : 07-Sep-2011
Frequency       : 2450.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 3.91
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset          : 1.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 31-Oct-2011
Set-up Time       : 9:43:07 AM
Area Scan         : 10x6x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

Other Data
DUT Position      : 15° Tilt
Separation        : 0
Channel           : Mid
```




```
1 gram SAR value    : 0.284 W/kg
10 gram SAR value   : 0.200 W/kg
Area Scan Peak SAR  : 0.318 W/kg
Zoom Scan Peak SAR  : 0.460 W/kg
```

SAR Test Report

By Operator : Jay
Measurement Date : 31-Oct-2011
Starting Time : 31-Oct-2011 09:24:49 AM
End Time : 31-Oct-2011 09:41:41 AM
Scanning Time : 1012 secs

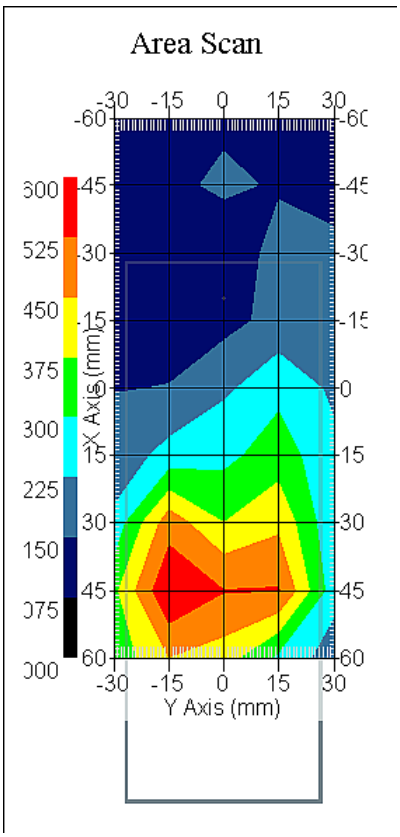
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11b
Model : SpectraLink 8452
Frequency : 2437.00 MHz
Max. Transmit Pwr : 0.059 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : Touch
Power Drift-Start : 0.139 W/kg
Power Drift-Finish: 0.138 W/kg
Power Drift (%) : -0.716

Phantom Data
Name : APREL-SAM Left Ear
Type : SAM-Left
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Left
Description : Polygon Left

Tissue Data
Type : HEAD
Serial No. : 2440
Frequency : 2440.00 MHz
Last Calib. Date : 31-Oct-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 39.18 F/m
Sigma : 1.81 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : RFEL 217
Model : E020
Type : E-Field Triangle
Serial No. : 217
Last Calib. Date : 07-Sep-2011
Frequency : 2450.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 3.91
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 1.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 31-Oct-2011
Set-up Time       : 10:55:42 AM
Area Scan         : 9x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

Other Data
DUT Position      : Touch
Separation        : 0
Channel           : Mid
```

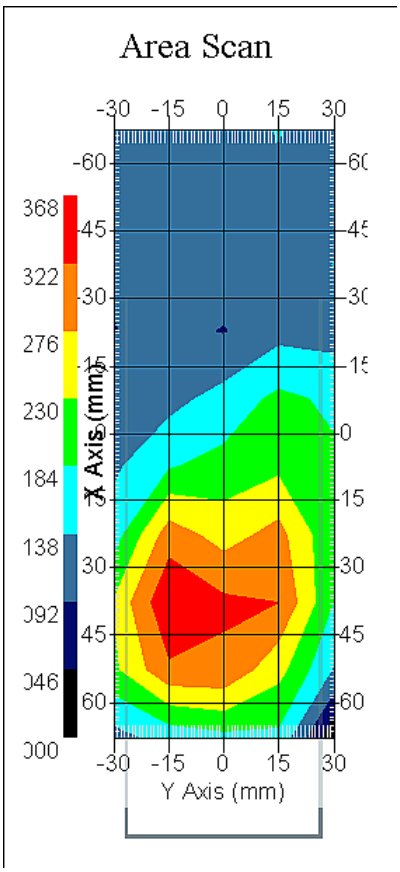



```
1 gram SAR value    : 0.521 W/kg
10 gram SAR value   : 0.340 W/kg
Area Scan Peak SAR  : 0.598 W/kg
Zoom Scan Peak SAR  : 0.880 W/kg
```

SAR Test Report

```
By Operator       : Jay
Measurement Date  : 31-Oct-2011
Starting Time     : 31-Oct-2011  09:51:03 AM
End Time          : 31-Oct-2011  10:08:42 AM
Scanning Time     : 1059 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11b
Model             : SpectraLink 8452
Frequency         : 2437.00 MHz
Max. Transmit Pwr : 0.059 W
Drift Time        : 0 min(s)
Length            : 145 mm
Width             : 54 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : 15° Tilt
Power Drift-Start : 0.108 W/kg
Power Drift-Finish: 0.110 W/kg
Power Drift (%)   : 1.853

Phantom Data
Name             : APREL-SAM Left Ear
Type             : SAM-Left
Size (mm)        : 280 x 280 x 280
Serial No.       : User Define
Location         : Left
Description      : Polygon Left

Tissue Data
Type             : HEAD
Serial No.       : 2440
Frequency        : 2440.00 MHz
Last Calib. Date : 31-Oct-2011
Temperature      : 20.00 °C
Ambient Temp.    : 23.00 °C
Humidity         : 45.00 RH%
Epsilon          : 39.18 F/m
Sigma            : 1.81 S/m
Density          : 1000.00 kg/cu. m

Probe Data
Name             : RFEL 217
Model            : E020
Type             : E-Field Triangle
Serial No.       : 217
Last Calib. Date : 07-Sep-2011
Frequency        : 2450.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 3.91
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset           : 1.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 31-Oct-2011
Set-up Time       : 9:43:07 AM
Area Scan         : 10x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

Other Data
DUT Position      : 15° Tilt
Separation        : 0
Channel           : Mid
```

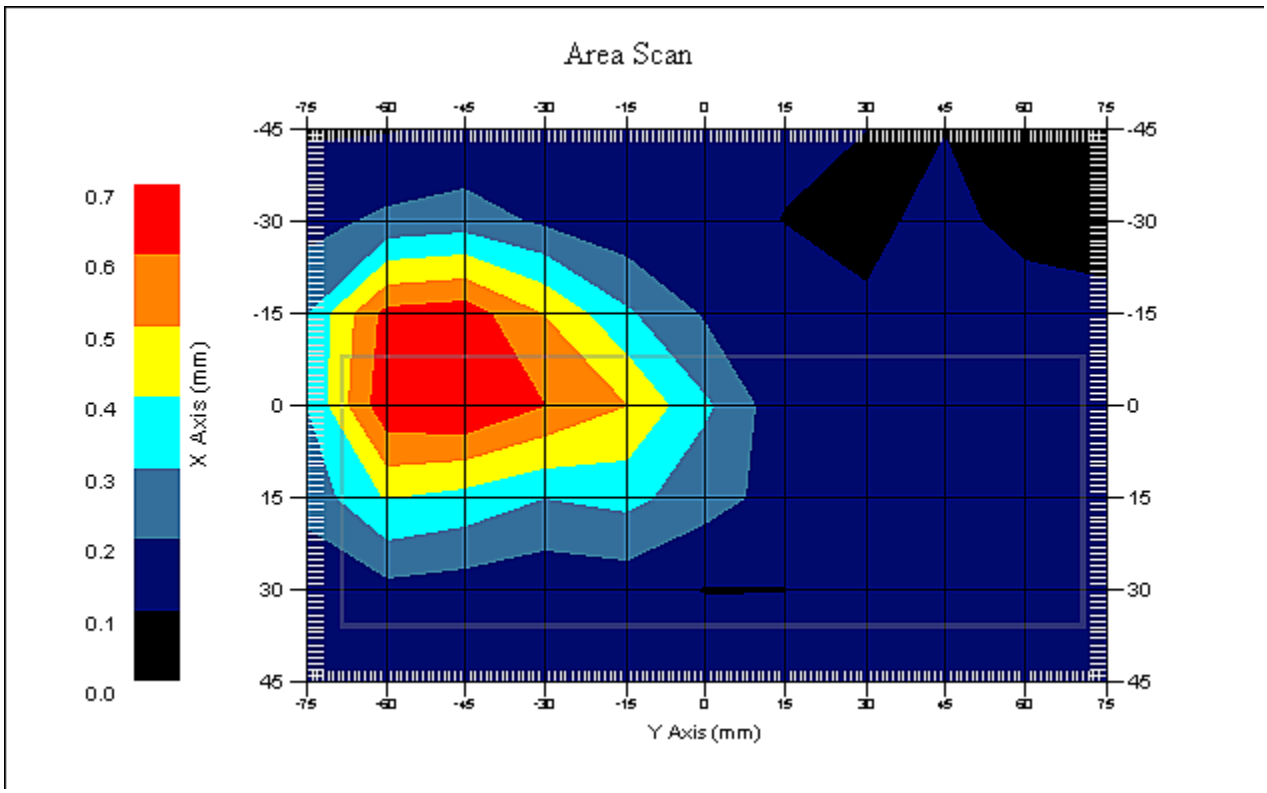



```
1 gram SAR value    : 0.110 W/kg
10 gram SAR value   : 0.157 W/kg
Area Scan Peak SAR  : 0.365 W/kg
Zoom Scan Peak SAR  : 0.130 W/kg
```

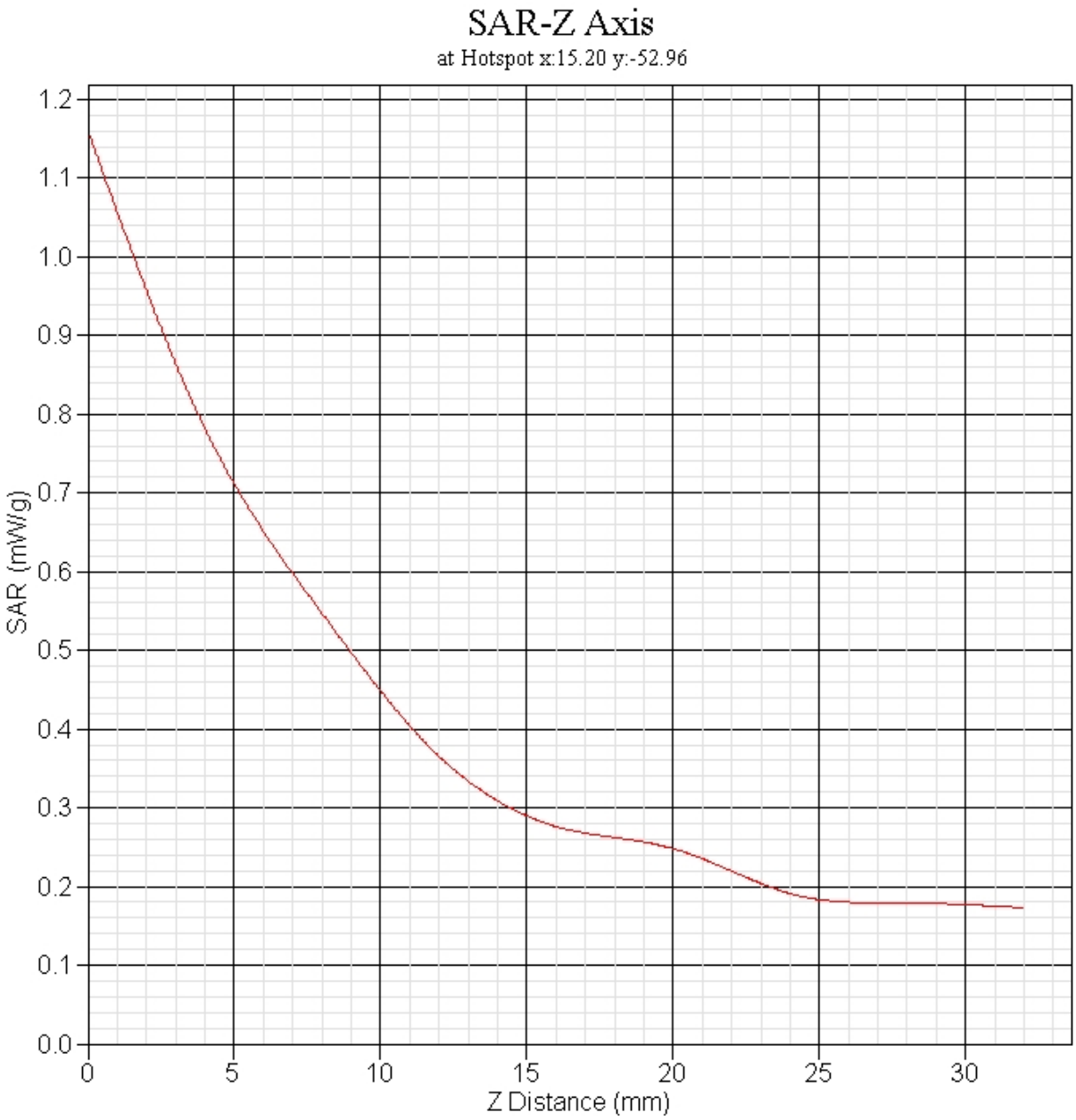
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 31-Oct-2011
Starting Time     : 31-Oct-2011  10:25:52 AM
End Time          : 31-Oct-2011  10:49:46 AM
Scanning Time     : 1434 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11b
Model             : SpectraLink 8452
Frequency         : 2437.00 MHz
Max. Transmit Pwr : 0.059 W
Drift Time        : 0 min(s)
Length            : 54 mm
Width             : 145 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : Back
Power Drift-Start : 0.210 W/kg
Power Drift-Finish: 0.211 W/kg
Power Drift (%)   : 0.470

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : BODY
Serial No.        : 2440
Frequency         : 2440.00 MHz
Last Calib. Date  : 31-Oct-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 45.00 RH%
Epsilon           : 52.15 F/m
Sigma             : 1.95 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : RFEL 217
Model             : E020
Type              : E-Field Triangle
Serial No.        : 217
Last Calib. Date  : 07-Sep-2011
Frequency         : 2450.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 3.94
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 1.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 31-Oct-2011
Set-up Time       : 11:24:00 AM
Area Scan         : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

Other Data
DUT Position      : Back
Separation        : 0 mm
Channel           : Mid
```




```
1 gram SAR value    : 0.698 W/kg
10 gram SAR value   : 0.420 W/kg
Area Scan Peak SAR  : 0.698 W/kg
Zoom Scan Peak SAR  : 1.161 W/kg
```



SAR Test Report

By Operator : Jay
Measurement Date : 01-Nov-2011
Starting Time : 01-Nov-2011 08:39:36 AM
End Time : 01-Nov-2011 09:06:31 AM
Scanning Time : 1615 secs

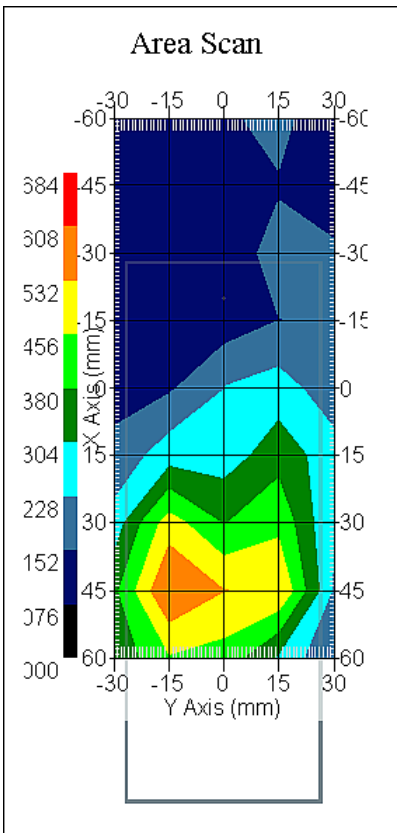
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11a
Model : SpectraLink 8452
Frequency : 5220.00 MHz
Max. Transmit Pwr : 0.03 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : Touch
Power Drift-Start : 0.163 W/kg
Power Drift-Finish: 0.170 W/kg
Power Drift (%) : 4.401

Phantom Data
Name : APREL-SAM Right Ear
Type : SAM-Right
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Right
Description : Polygon Right

Tissue Data
Type : HEAD
Serial No. : 5220
Frequency : 5220.00 MHz
Last Calib. Date : 01-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 35.19 F/m
Sigma : 4.70 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 7.2
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 03-Nov-2011
Set-up Time       : 10:55:42 AM
Area Scan         : 9x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 0
Channel           : Mid
```




```
1 gram SAR value    : 0.536 W/kg
10 gram SAR value   : 0.340 W/kg
Area Scan Peak SAR  : 0.609 W/kg
Zoom Scan Peak SAR  : 0.910 W/kg
```

SAR Test Report

By Operator : Jay
Measurement Date : 01-Nov-2011
Starting Time : 01-Nov-2011 09:13:01 AM
End Time : 01-Nov-2011 09:43:50 AM
Scanning Time : 1849 secs

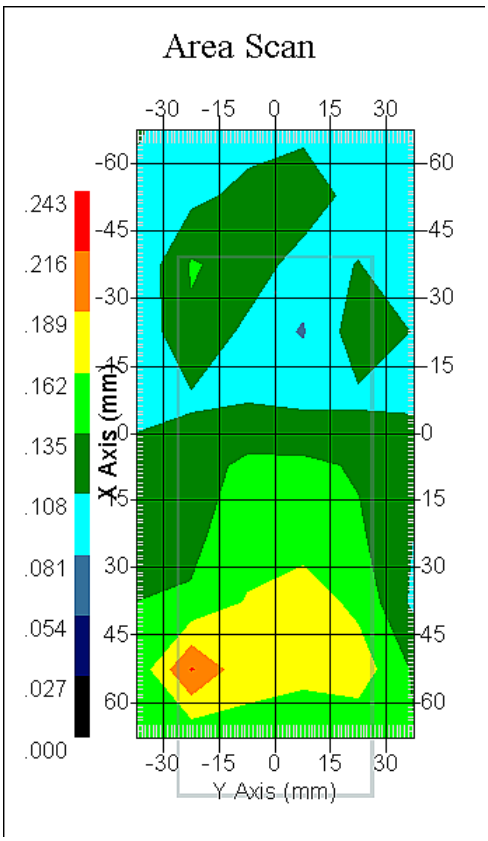
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11a
Model : SpectraLink 8452
Frequency : 5220.00 MHz
Max. Transmit Pwr : 0.03 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : 15° Tilt
Power Drift-Start : 0.115 W/kg
Power Drift-Finish: 0.115 W/kg
Power Drift (%) : 0.326

Phantom Data
Name : APREL-SAM Right Ear
Type : SAM-Right
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Right
Description : Polygon Right

Tissue Data
Type : HEAD
Serial No. : 5220
Frequency : 5220.00 MHz
Last Calib. Date : 01-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 35.19 F/m
Sigma : 4.70 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 7.2
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 01-Nov-2011
Set-up Time       : 7:28:20 AM
Area Scan         : 10x6x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : 15° Tilt
Separation        : 0
Channel           : Mid
```

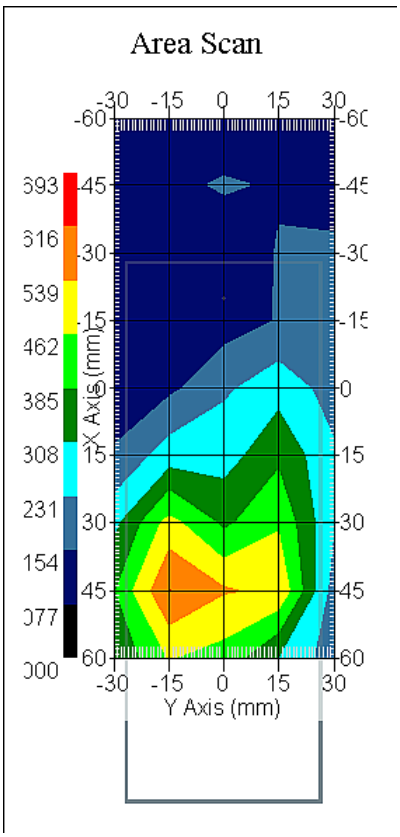



```
1 gram SAR value    : 0.188 W/kg
10 gram SAR value   : 0.141 W/kg
Area Scan Peak SAR  : 0.218 W/kg
Zoom Scan Peak SAR  : 0.320 W/kg
```

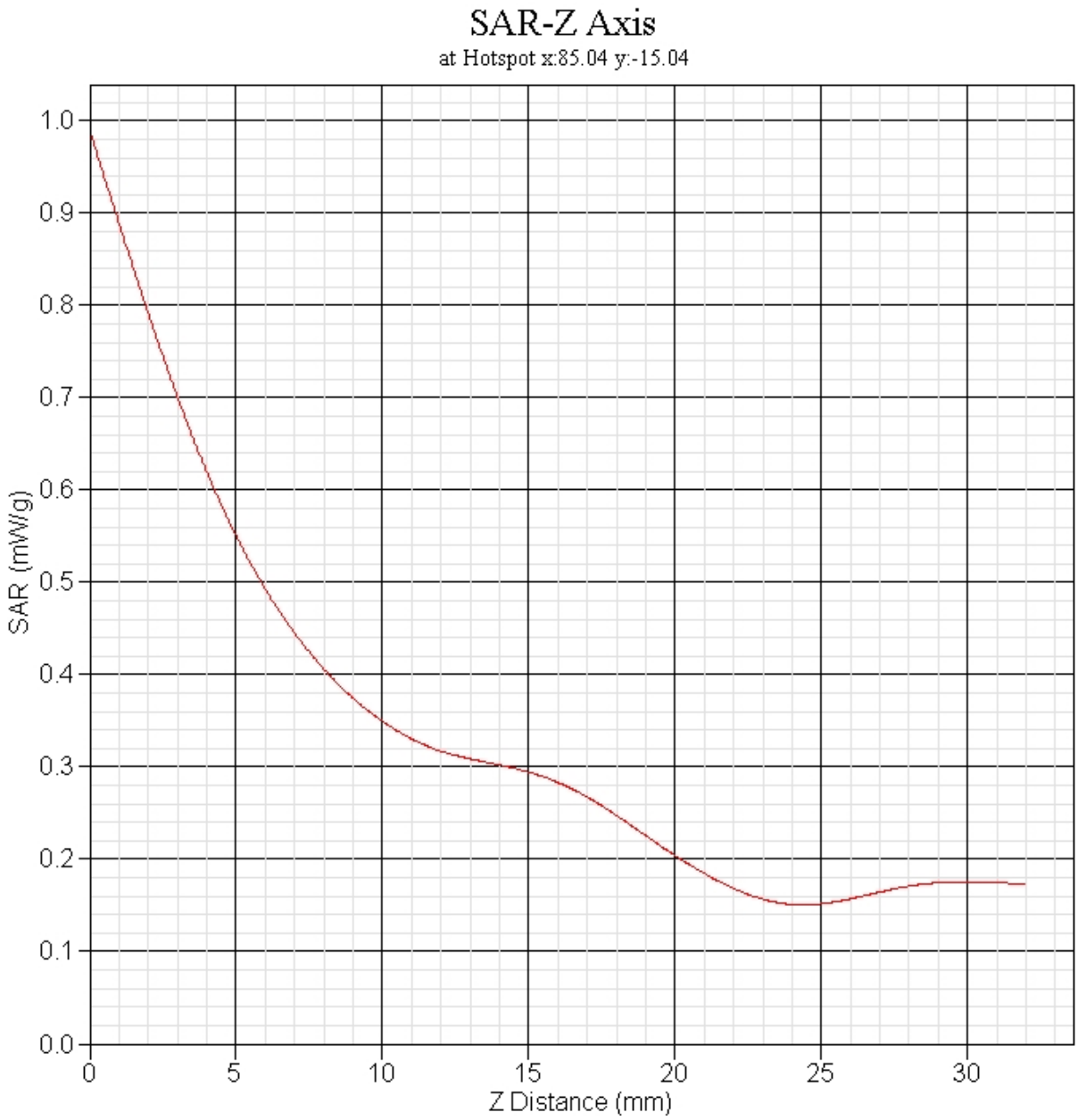
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 01-Nov-2011
Starting Time     : 01-Nov-2011  09:50:12 AM
End Time          : 01-Nov-2011  10:16:55 AM
Scanning Time     : 1603 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11a
Model             : SpectraLink 8452
Frequency         : 5220.00 MHz
Max. Transmit Pwr : 0.03 W
Drift Time        : 0 min(s)
Length            : 145 mm
Width             : 54 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 0.167 W/kg
Power Drift-Finish: 0.164 W/kg
Power Drift (%)   : -1.849

Phantom Data
Name             : APREL-SAM Left Ear
Type             : SAM-Left
Size (mm)        : 280 x 280 x 280
Serial No.       : User Define
Location         : Left
Description      : Polygon Left

Tissue Data
Type             : HEAD
Serial No.       : 5220
Frequency        : 5220.00 MHz
Last Calib. Date : 01-Nov-2011
Temperature      : 20.00 °C
Ambient Temp.    : 23.00 °C
Humidity         : 45.00 RH%
Epsilon          : 35.19 F/m
Sigma            : 4.70 S/m
Density          : 1000.00 kg/cu. m

Probe Data
Name             : Probe E030-001 - RFEL
Model            : E030
Type             : E-Field Triangle
Serial No.       : E030-001
Last Calib. Date : 15-Jul-2011
Frequency        : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 7.2
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset           : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 01-Nov-2011
Set-up Time       : 10:55:42 AM
Area Scan         : 9x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 0
Channel           : Mid
```



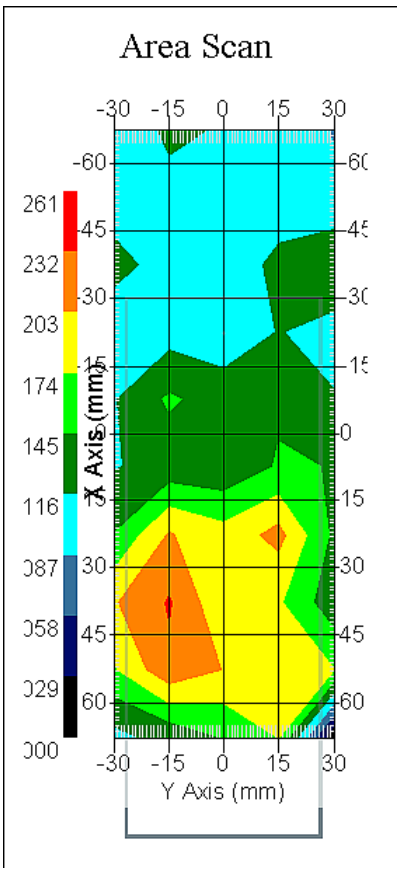

```
1 gram SAR value    : 0.586 W/kg
10 gram SAR value   : 0.370 W/kg
Area Scan Peak SAR  : 0.619 W/kg
Zoom Scan Peak SAR  : 0.990 W/kg
```



SAR Test Report

```
By Operator       : Jay
Measurement Date  : 01-Nov-2011
Starting Time     : 01-Nov-2011  10:21:20 AM
End Time          : 01-Nov-2011  10:49:06 AM
Scanning Time     : 1666 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11a
Model             : SpectraLink 8452
Frequency         : 5220.00 MHz
Max. Transmit Pwr : 0.03 W
Drift Time        : 0 min(s)
Length            : 145 mm
Width             : 54 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : 15° Tilt
Power Drift-Start : 0.117 W/kg
Power Drift-Finish: 0.120 W/kg
Power Drift (%)   : 2.567

Phantom Data
Name             : APREL-SAM Left Ear
Type             : SAM-Left
Size (mm)        : 280 x 280 x 280
Serial No.       : User Define
Location         : Left
Description      : Polygon Left

Tissue Data
Type             : HEAD
Serial No.       : 5220
Frequency        : 5220.00 MHz
Last Calib. Date : 01-Nov-2011
Temperature      : 20.00 °C
Ambient Temp.    : 23.00 °C
Humidity         : 45.00 RH%
Epsilon          : 35.19 F/m
Sigma            : 4.70 S/m
Density          : 1000.00 kg/cu. m

Probe Data
Name             : Probe E030-001 - RFEL
Model            : E030
Type             : E-Field Triangle
Serial No.       : E030-001
Last Calib. Date : 15-Jul-2011
Frequency        : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 7.2
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset           : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 01-Nov-2011
Set-up Time       : 9:43:07 AM
Area Scan         : 10x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : 15° Tilt
Separation        : 0
Channel           : Mid
```

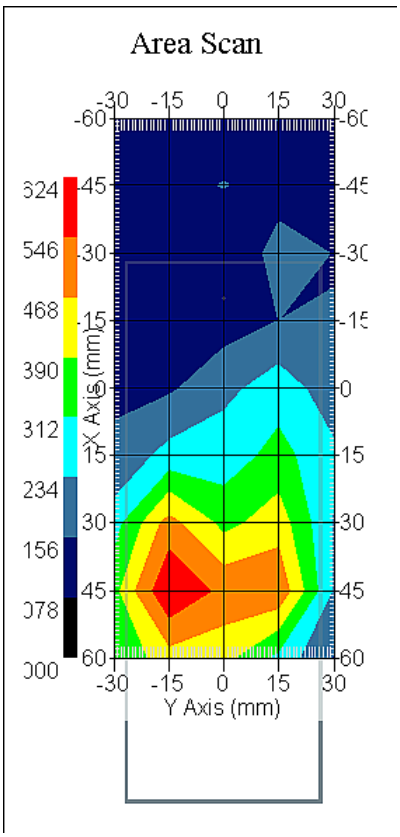



```
1 gram SAR value    : 0.223 W/kg
10 gram SAR value   : 0.182 W/kg
Area Scan Peak SAR  : 0.235 W/kg
Zoom Scan Peak SAR  : 0.310 W/kg
```

SAR Test Report

```
By Operator       : Jay
Measurement Date  : 01-Nov-2011
Starting Time     : 01-Nov-2011  12:03:03 PM
End Time          : 01-Nov-2011  12:29:58 PM
Scanning Time     : 1615 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11a
Model             : SpectraLink 8452
Frequency         : 5280.00 MHz
Max. Transmit Pwr : 0.035 W
Drift Time        : 0 min(s)
Length            : 145 mm
Width             : 54 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 0.120 W/kg
Power Drift-Finish: 0.167 W/kg
Power Drift (%)   : 39.288

Phantom Data
Name              : APREL-SAM Right Ear
Type              : SAM-Right
Size (mm)         : 280 x 280 x 280
Serial No.        : User Define
Location          : Right
Description       : Polygon Right

Tissue Data
Type              : HEAD
Serial No.        : 5280
Frequency         : 5280.00 MHz
Last Calib. Date  : 01-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 45.00 RH%
Epsilon           : 35.09 F/m
Sigma             : 4.78 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 7.2
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 01-Nov-2011
Set-up Time       : 10:55:42 AM
Area Scan         : 9x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 0
Channel           : Mid
```




```
1 gram SAR value    : 0.554 W/kg
10 gram SAR value   : 0.342 W/kg
Area Scan Peak SAR  : 0.622 W/kg
Zoom Scan Peak SAR  : 0.950 W/kg
```

SAR Test Report

By Operator : Jay
Measurement Date : 01-Nov-2011
Starting Time : 01-Nov-2011 12:35:54 PM
End Time : 01-Nov-2011 01:06:11 PM
Scanning Time : 1817 secs

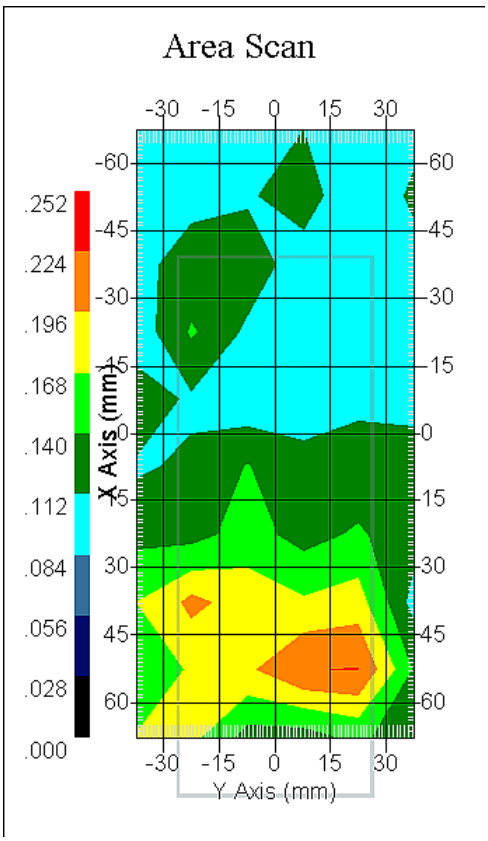
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11a
Model : SpectraLink 8452
Frequency : 5280.00 MHz
Max. Transmit Pwr : 0.035 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : 15° Tilt
Power Drift-Start : 0.121 W/kg
Power Drift-Finish: 0.120 W/kg
Power Drift (%) : -1.127

Phantom Data
Name : APREL-SAM Right Ear
Type : SAM-Right
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Right
Description : Polygon Right

Tissue Data
Type : HEAD
Serial No. : 5280
Frequency : 5280.00 MHz
Last Calib. Date : 01-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 35.09 F/m
Sigma : 4.78 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 7.2
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 01-Nov-2011
Set-up Time       : 7:28:20 AM
Area Scan         : 10x6x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : 15° Tilt
Separation        : 0
Channel           : Mid
```

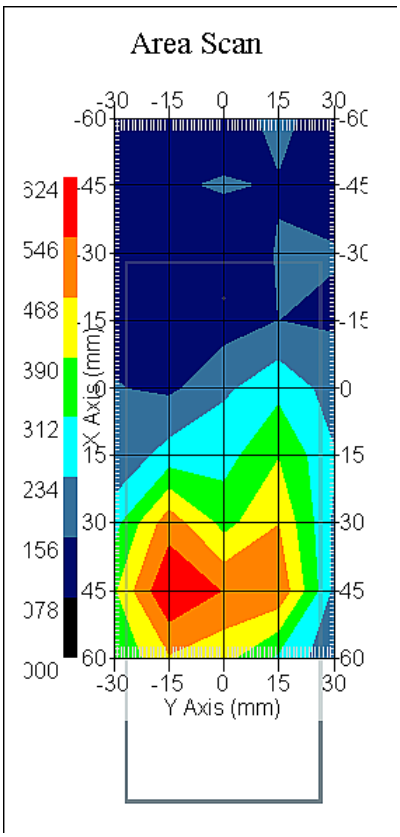



```
1 gram SAR value    : 0.197 W/kg
10 gram SAR value   : 0.155 W/kg
Area Scan Peak SAR  : 0.225 W/kg
Zoom Scan Peak SAR  : 0.220 W/kg
```

SAR Test Report

```
By Operator       : Jay
Measurement Date  : 01-Nov-2011
Starting Time     : 01-Nov-2011  10:55:32 AM
End Time          : 01-Nov-2011  11:22:24 AM
Scanning Time     : 1612 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11a
Model             : SpectraLink 8452
Frequency         : 5280.00 MHz
Max. Transmit Pwr : 0.035 W
Drift Time        : 0 min(s)
Length            : 145 mm
Width             : 54 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 0.154 W/kg
Power Drift-Finish: 0.155 W/kg
Power Drift (%)   : 0.642

Phantom Data
Name            : APREL-SAM Left Ear
Type            : SAM-Left
Size (mm)       : 280 x 280 x 280
Serial No.      : User Define
Location        : Left
Description     : Polygon Left

Tissue Data
Type            : HEAD
Serial No.      : 5280
Frequency       : 5280.00 MHz
Last Calib. Date : 01-Nov-2011
Temperature     : 20.00 °C
Ambient Temp.   : 23.00 °C
Humidity        : 45.00 RH%
Epsilon         : 35.09 F/m
Sigma           : 4.78 S/m
Density         : 1000.00 kg/cu. m

Probe Data
Name            : Probe E030-001 - RFEL
Model           : E030
Type            : E-Field Triangle
Serial No.      : E030-001
Last Calib. Date : 15-Jul-2011
Frequency       : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 7.2
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset          : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 01-Nov-2011
Set-up Time       : 10:55:42 AM
Area Scan         : 9x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 0
Channel           : Mid
```




```
1 gram SAR value    : 0.566 W/kg
10 gram SAR value   : 0.342 W/kg
Area Scan Peak SAR : 0.624 W/kg
Zoom Scan Peak SAR : 0.940 W/kg
```

SAR Test Report

By Operator : Jay
Measurement Date : 01-Nov-2011
Starting Time : 01-Nov-2011 11:29:28 AM
End Time : 01-Nov-2011 11:57:19 AM
Scanning Time : 1671 secs

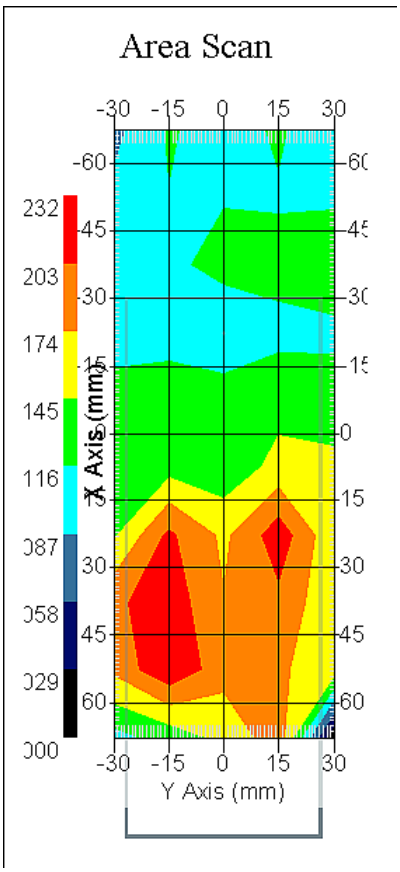
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11a
Model : SpectraLink 8452
Frequency : 5280.00 MHz
Max. Transmit Pwr : 0.035 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : 15° Tilt
Power Drift-Start : 0.118 W/kg
Power Drift-Finish: 0.121 W/kg
Power Drift (%) : 2.543

Phantom Data
Name : APREL-SAM Left Ear
Type : SAM-Left
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Left
Description : Polygon Left

Tissue Data
Type : HEAD
Serial No. : 5280
Frequency : 5280.00 MHz
Last Calib. Date : 01-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 35.09 F/m
Sigma : 4.78 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 7.2
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 01-Nov-2011
Set-up Time       : 9:43:07 AM
Area Scan         : 10x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : 15° Tilt
Separation        : 0
Channel           : Mid
```

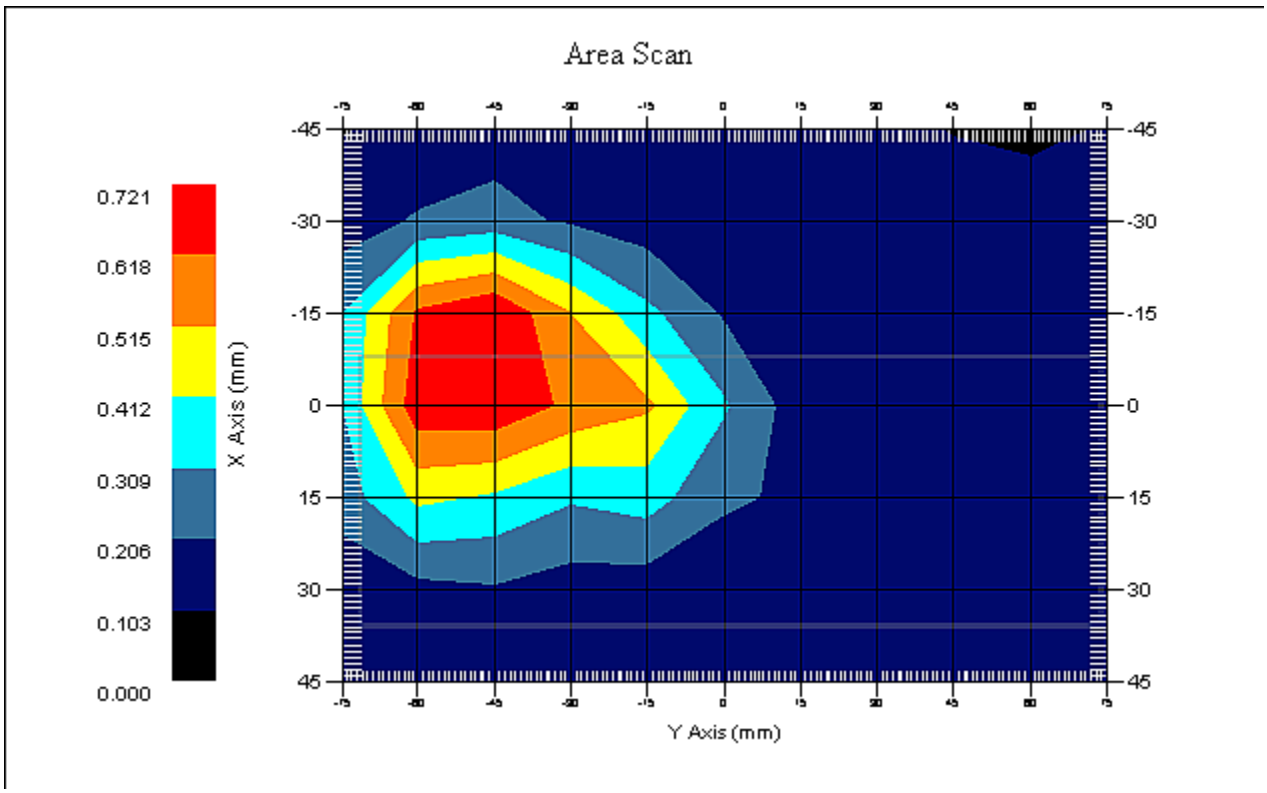



```
1 gram SAR value    : 0.230 W/kg
10 gram SAR value   : 0.176 W/kg
Area Scan Peak SAR  : 0.230 W/kg
Zoom Scan Peak SAR  : 0.340 W/kg
```

SAR Test Report

```
By Operator       : Jay
Measurement Date  : 01-Nov-2011
Starting Time     : 01-Nov-2011  01:15:21 PM
End Time          : 01-Nov-2011  01:48:32 PM
Scanning Time     : 1991 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11a
Model             : SpectraLink 8452
Frequency         : 5220.00 MHz
Max. Transmit Pwr : 0.03 W
Drift Time        : 0 min(s)
Length            : 54 mm
Width             : 145 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : Back
Power Drift-Start : 0.208 W/kg
Power Drift-Finish: 0.209 W/kg
Power Drift (%)   : 0.488

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : BODY
Serial No.        : 5220
Frequency         : 5220.00 MHz
Last Calib. Date  : 01-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 45.00 RH%
Epsilon           : 47.79 F/m
Sigma             : 5.37 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.7
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 01-Nov-2011
Set-up Time       : 11:24:00 AM
Area Scan         : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Back
Separation        : 0 mm
Channel           : Mid
```

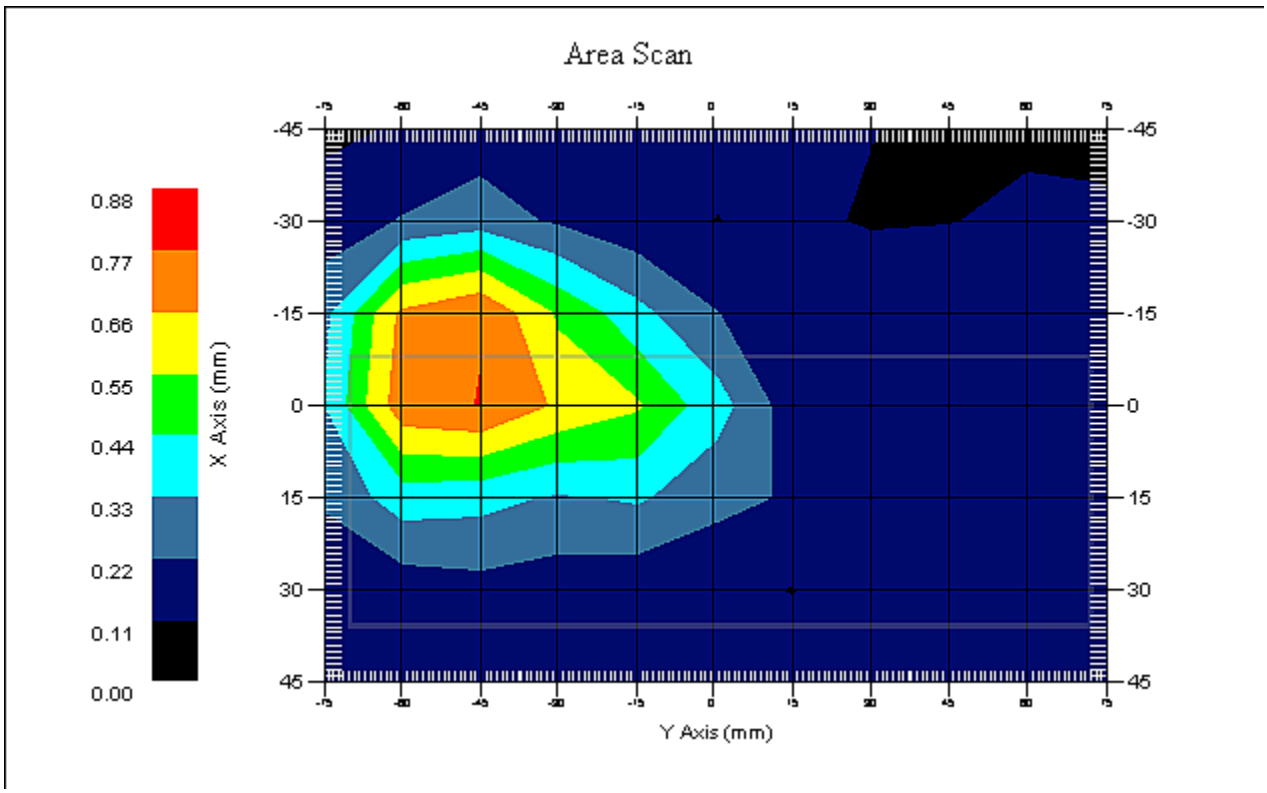



```
1 gram SAR value    : 0.778 W/kg
10 gram SAR value   : 0.488 W/kg
Area Scan Peak SAR  : 0.718 W/kg
Zoom Scan Peak SAR  : 1.251 W/kg
```

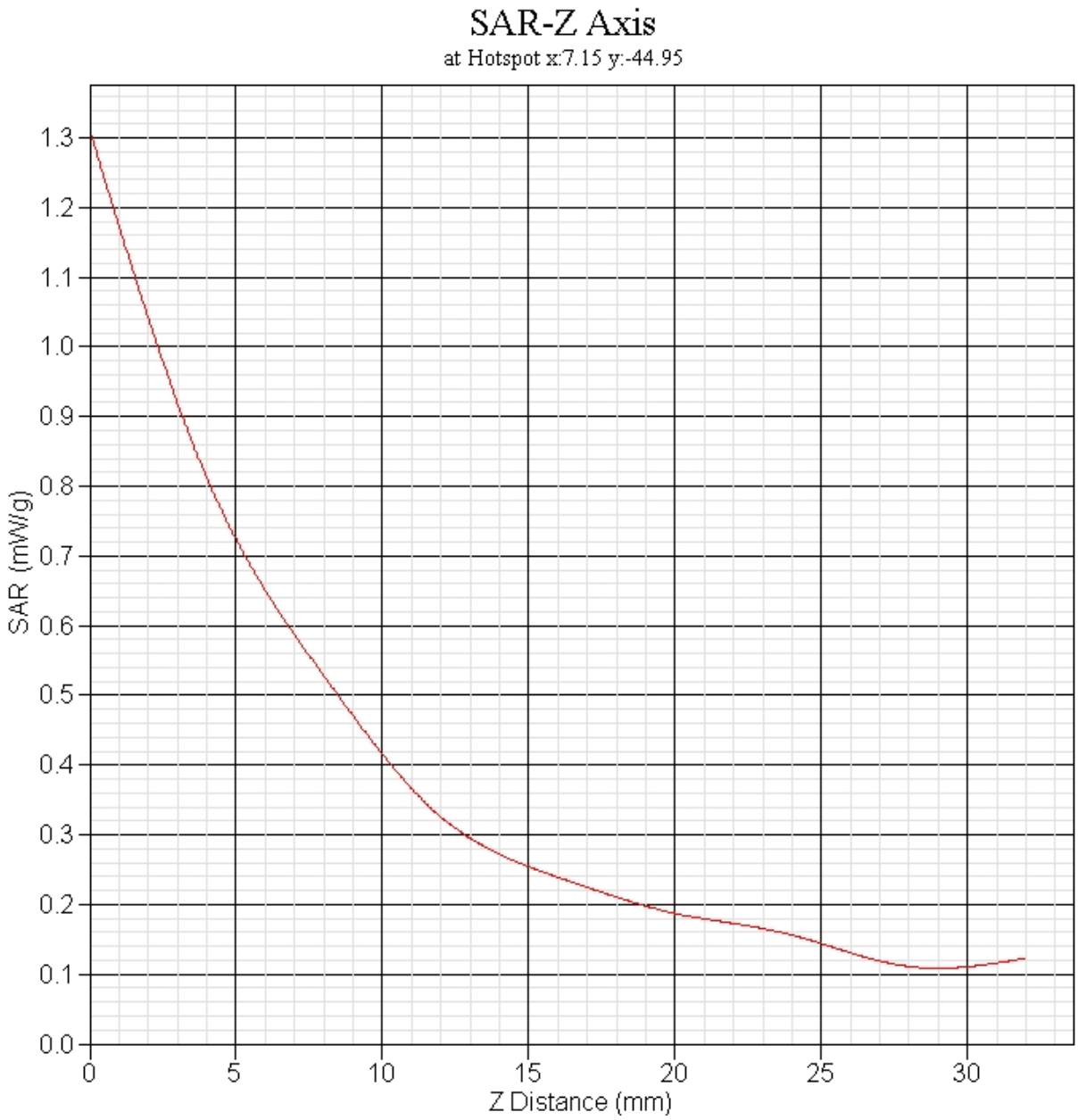
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 01-Nov-2011
Starting Time     : 01-Nov-2011  04:05:58 PM
End Time          : 01-Nov-2011  04:39:00 PM
Scanning Time     : 1982 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11a
Model             : SpectraLink 8452
Frequency         : 5280.00 MHz
Max. Transmit Pwr : 0.035 W
Drift Time        : 0 min(s)
Length            : 54 mm
Width             : 145 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : Back
Power Drift-Start : 0.214 W/kg
Power Drift-Finish: 0.221 W/kg
Power Drift (%)   : 3.278

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : BODY
Serial No.        : 5280
Frequency         : 5280.00 MHz
Last Calib. Date  : 01-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 45.00 RH%
Epsilon           : 47.63 F/m
Sigma             : 5.45 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5250.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.7
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 01-Nov-2011
Set-up Time       : 11:24:00 AM
Area Scan         : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Back
Separation        : 0 mm
Channel           : Mid
```



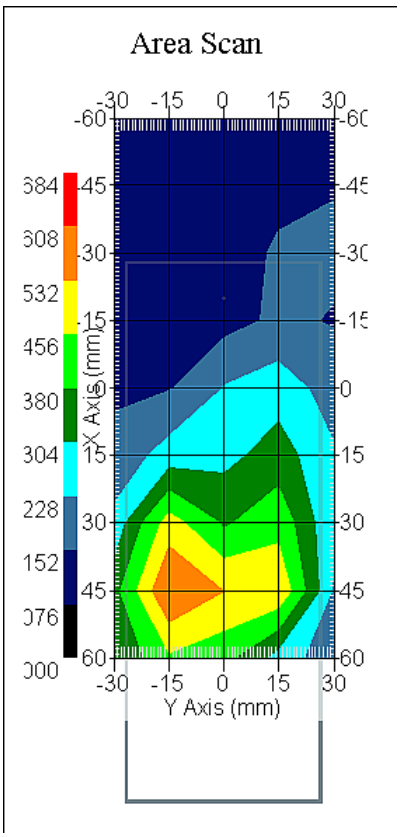

```
1 gram SAR value    : 0.795 W/kg
10 gram SAR value   : 0.492 W/kg
Area Scan Peak SAR  : 0.772 W/kg
Zoom Scan Peak SAR  : 1.311 W/kg
```



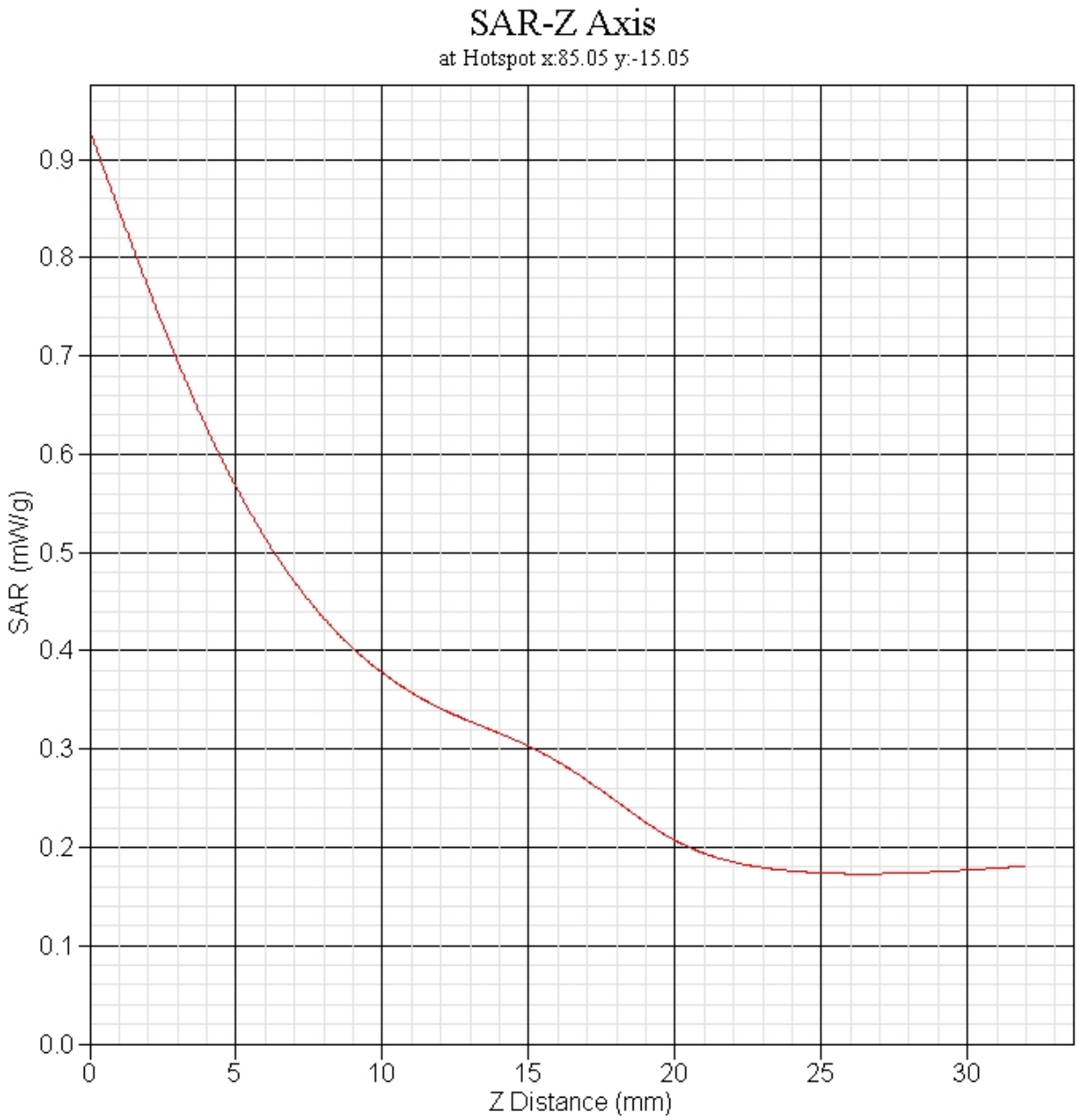
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 02-Nov-2011
Starting Time     : 02-Nov-2011  08:27:52 AM
End Time          : 02-Nov-2011  08:54:37 AM
Scanning Time     : 1605 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11a
Model             : SpectraLink 8452
Frequency         : 5580.00 MHz
Max. Transmit Pwr : 0.044 W
Drift Time        : 0 min(s)
Length            : 145 mm
Width             : 54 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 0.165 W/kg
Power Drift-Finish: 0.162 W/kg
Power Drift (%)   : -1.873

Phantom Data
Name              : APREL-SAM Right Ear
Type              : SAM- Right
Size (mm)         : 280 x 280 x 280
Serial No.        : User Define
Location          : Right
Description       : Polygon Right

Tissue Data
Type              : HEAD
Serial No.        : 5580
Frequency         : 5580.00 MHz
Last Calib. Date  : 02-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 45.00 RH%
Epsilon           : 35.18 F/m
Sigma             : 5.05 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5600.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.8
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 02-Nov-2011
Set-up Time       : 10:55:42 AM
Area Scan         : 9x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 0
Channel           : Mid
```




```
1 gram SAR value    : 0.574 W/kg
10 gram SAR value   : 0.367 W/kg
Area Scan Peak SAR  : 0.610 W/kg
Zoom Scan Peak SAR  : 0.930 W/kg
```



SAR Test Report

By Operator : Jay
Measurement Date : 02-Nov-2011
Starting Time : 02-Nov-2011 08:58:34 AM
End Time : 02-Nov-2011 09:28:48 AM
Scanning Time : 1814 secs

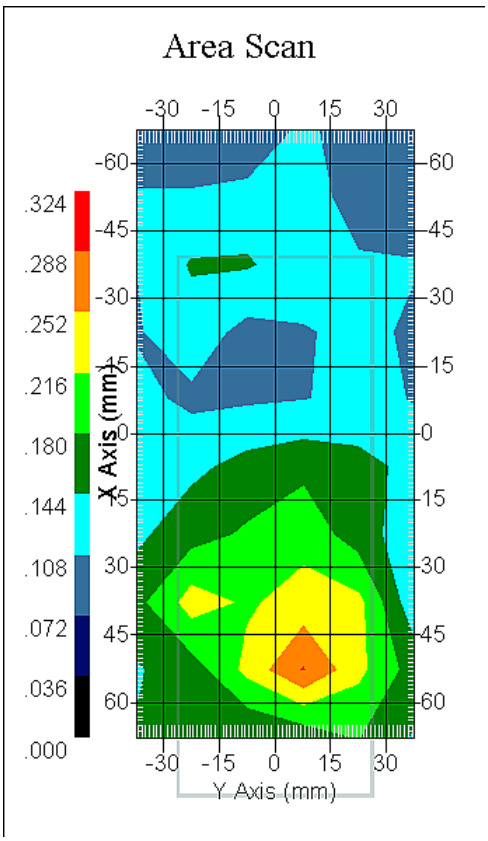
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11a
Model : SpectraLink 8452
Frequency : 5580.00 MHz
Max. Transmit Pwr : 0.044 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : 15° Tilt
Power Drift-Start : 0.109 W/kg
Power Drift-Finish: 0.106 W/kg
Power Drift (%) : -2.755

Phantom Data
Name : APREL-SAM Right Ear
Type : SAM-Right
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Right
Description : Polygon Right

Tissue Data
Type : HEAD
Serial No. : 5580
Frequency : 5580.00 MHz
Last Calib. Date : 02-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 35.18 F/m
Sigma : 5.05 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5600.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.8
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 02-Nov-2011
Set-up Time       : 9:43:07 AM
Area Scan         : 10x6x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : 15° Tilt
Separation        : 0
Channel           : Mid
```




```
1 gram SAR value    : 0.207 W/kg
10 gram SAR value   : 0.163 W/kg
Area Scan Peak SAR  : 0.290 W/kg
Zoom Scan Peak SAR  : 0.250 W/kg
```

SAR Test Report

By Operator : Jay
Measurement Date : 02-Nov-2011
Starting Time : 02-Nov-2011 09:32:54 AM
End Time : 02-Nov-2011 09:59:55 AM
Scanning Time : 1621 secs

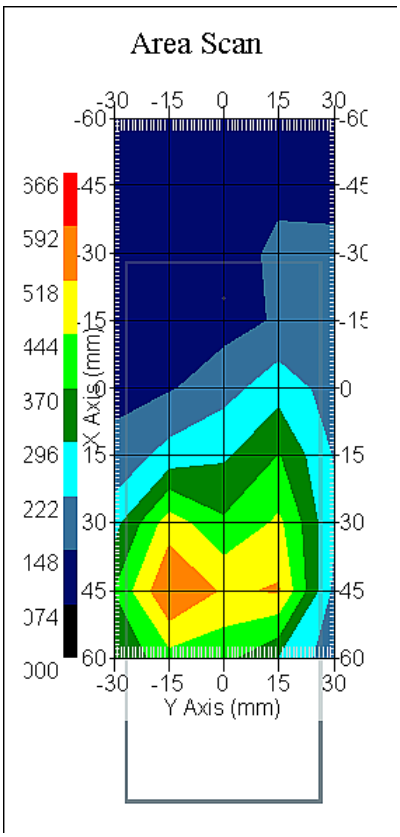
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11a
Model : SpectraLink 8452
Frequency : 5580.00 MHz
Max. Transmit Pwr : 0.044 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : Touch
Power Drift-Start : 0.150 W/kg
Power Drift-Finish: 0.150 W/kg
Power Drift (%) : 0.216

Phantom Data
Name : APREL-SAM Left Ear
Type : SAM-Left
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Left
Description : Polygon Left

Tissue Data
Type : HEAD
Serial No. : 5580
Frequency : 5580.00 MHz
Last Calib. Date : 02-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 35.18 F/m
Sigma : 5.05 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5600.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.8
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 02-Nov-2011
Set-up Time       : 10:55:42 AM
Area Scan         : 9x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 0
Channel           : Mid
```




```
1 gram SAR value    : 0.551 W/kg
10 gram SAR value   : 0.335 W/kg
Area Scan Peak SAR  : 0.593 W/kg
Zoom Scan Peak SAR  : 1.010 W/kg
```

SAR Test Report

By Operator : Jay
Measurement Date : 02-Nov-2011
Starting Time : 02-Nov-2011 10:05:56 AM
End Time : 02-Nov-2011 10:33:46 AM
Scanning Time : 1670 secs

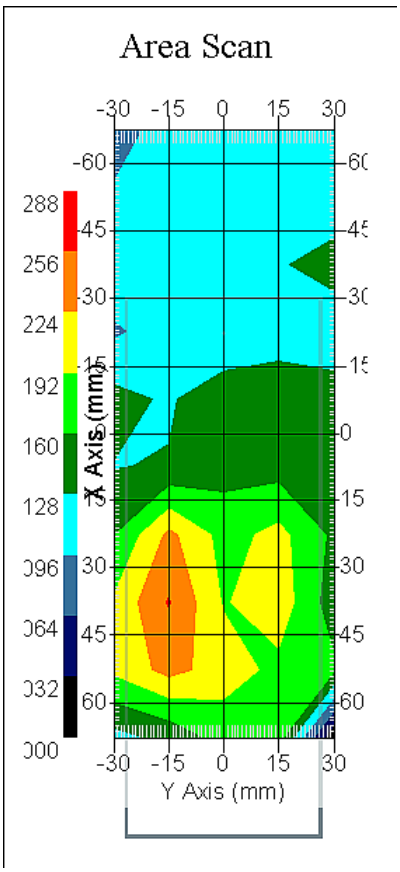
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11a
Model : SpectraLink 8452
Frequency : 5580.00 MHz
Max. Transmit Pwr : 0.044 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : 15° Tilt
Power Drift-Start : 0.121 W/kg
Power Drift-Finish: 0.123 W/kg
Power Drift (%) : 1.657

Phantom Data
Name : APREL-SAM Left Ear
Type : SAM-Left
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Left
Description : Polygon Left

Tissue Data
Type : HEAD
Serial No. : 5580
Frequency : 5580.00 MHz
Last Calib. Date : 02-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 35.18 F/m
Sigma : 5.05 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5600.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.8
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 02-Nov-2011
Set-up Time       : 9:43:07 AM
Area Scan         : 10x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : 15° Tilt
Separation        : 0
Channel           : Mid
```

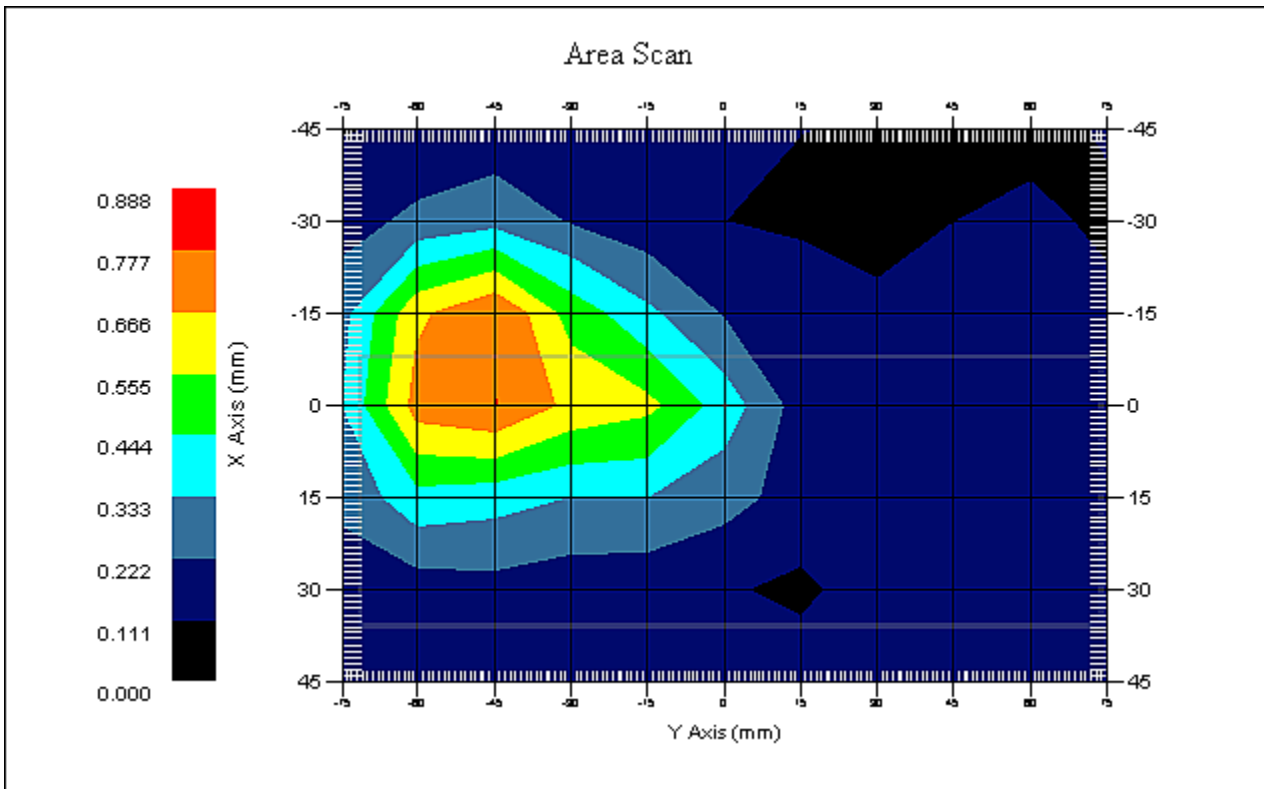



```
1 gram SAR value    : 0.253 W/kg
10 gram SAR value   : 0.190 W/kg
Area Scan Peak SAR  : 0.258 W/kg
Zoom Scan Peak SAR  : 0.380 W/kg
```

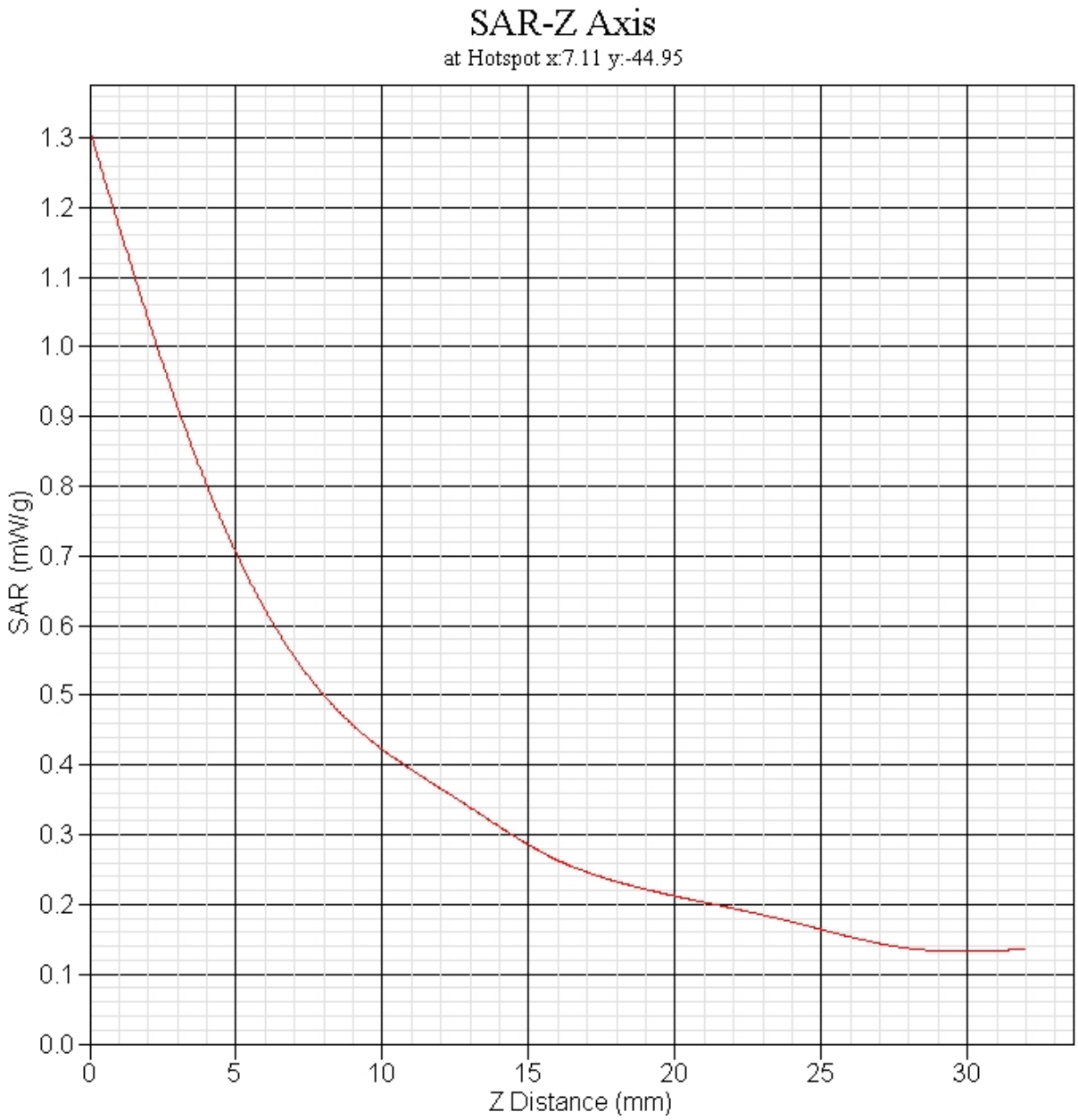
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 02-Nov-2011
Starting Time     : 02-Nov-2011  10:40:18 AM
End Time          : 02-Nov-2011  11:13:18 AM
Scanning Time     : 1980 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11a
Model             : SpectraLink 8452
Frequency         : 5580.00 MHz
Max. Transmit Pwr : 0.044 W
Drift Time        : 0 min(s)
Length            : 54 mm
Width             : 145 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : Back
Power Drift-Start : 0.215 W/kg
Power Drift-Finish: 0.212 W/kg
Power Drift (%)   : -1.393

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : BODY
Serial No.        : 5580
Frequency         : 5580.00 MHz
Last Calib. Date  : 02-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 45.00 RH%
Epsilon           : 48.40 F/m
Sigma             : 5.87 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5600.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.3
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 02-Nov-2011
Set-up Time       : 11:24:00 AM
Area Scan         : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Back
Separation        : 0 mm
Channel           : Mid
```




```
1 gram SAR value    : 0.770 W/kg
10 gram SAR value   : 0.480 W/kg
Area Scan Peak SAR  : 0.778 W/kg
Zoom Scan Peak SAR  : 1.311 W/kg
```



SAR Test Report

By Operator : Jay
Measurement Date : 03-Nov-2011
Starting Time : 03-Nov-2011 08:46:15 AM
End Time : 03-Nov-2011 09:13:00 AM
Scanning Time : 1605 secs

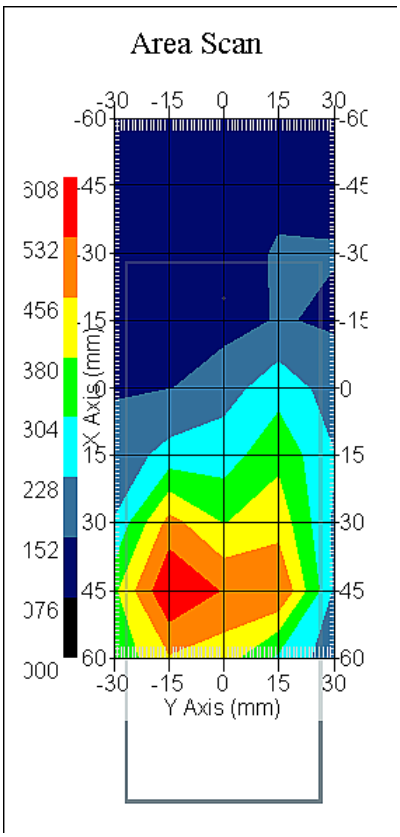
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11a
Model : SpectraLink 8452
Frequency : 5785.00 MHz
Max. Transmit Pwr : 0.083 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : Touch
Power Drift-Start : 0.132 W/kg
Power Drift-Finish: 0.132 W/kg
Power Drift (%) : 0.184

Phantom Data
Name : APREL-SAM Right Ear
Type : SAM- Right
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Right
Description : Polygon Right

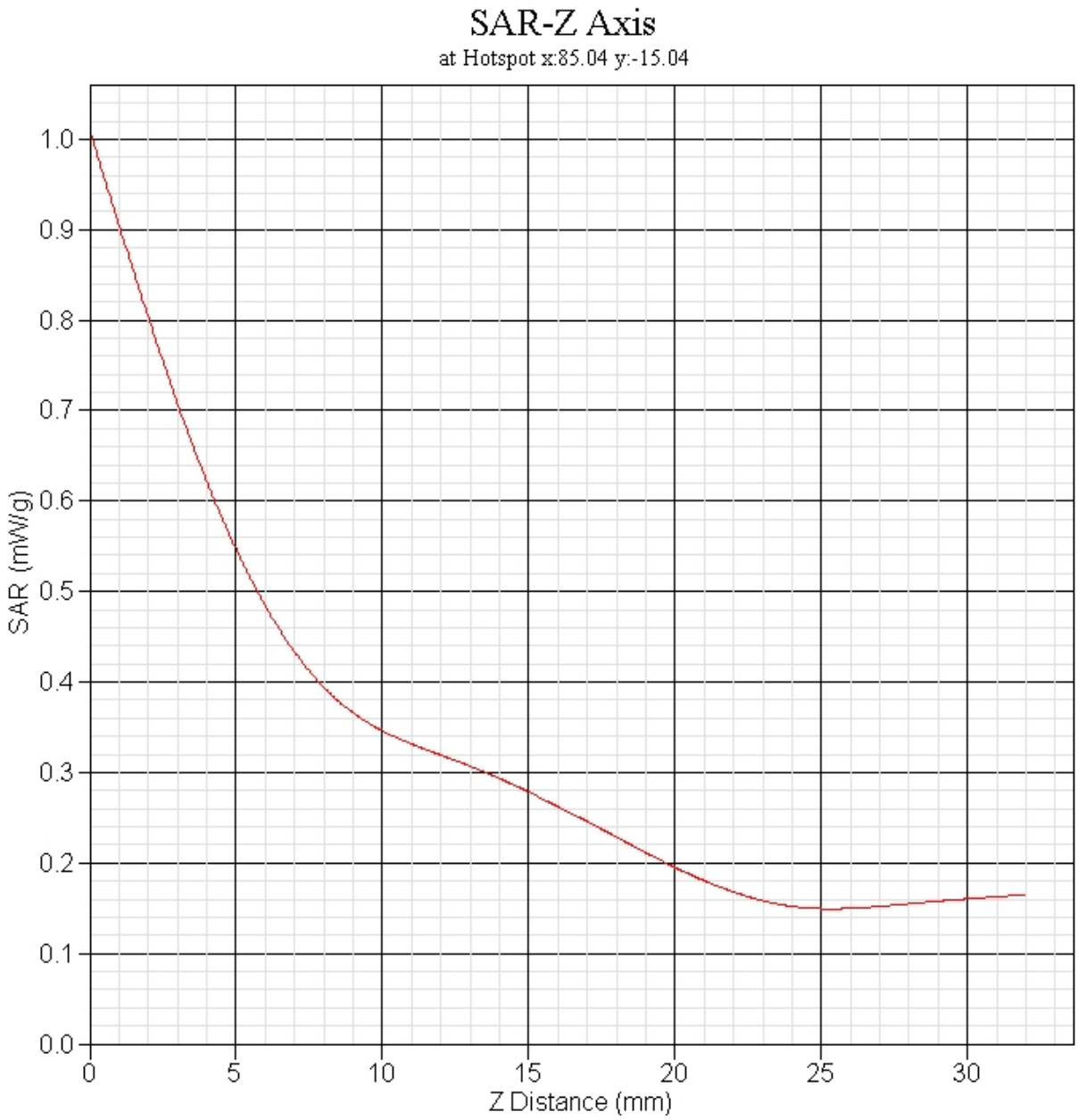
Tissue Data
Type : HEAD
Serial No. : 5785
Frequency : 5785.00 MHz
Last Calib. Date : 03-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 35.21 F/m
Sigma : 5.29 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.6
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 03-Nov-2011
Set-up Time       : 10:55:42 AM
Area Scan         : 9x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 0
Channel           : Mid
```




```
1 gram SAR value    : 0.575 W/kg
10 gram SAR value   : 0.362 W/kg
Area Scan Peak SAR  : 0.606 W/kg
Zoom Scan Peak SAR  : 1.010 W/kg
```



SAR Test Report

By Operator : Jay
Measurement Date : 03-Nov-2011
Starting Time : 03-Nov-2011 09:20:18 AM
End Time : 03-Nov-2011 09:50:22 AM
Scanning Time : 1804 secs

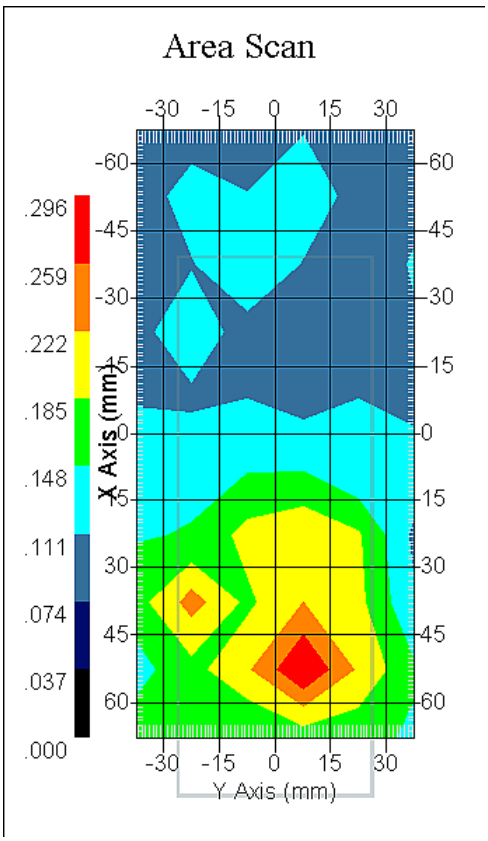
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11a
Model : SpectraLink 8452
Frequency : 5785.00 MHz
Max. Transmit Pwr : 0.083 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : 15° Tilt
Power Drift-Start : 0.117 W/kg
Power Drift-Finish: 0.112 W/kg
Power Drift (%) : -4.035

Phantom Data
Name : APREL-SAM Right Ear
Type : SAM-Right
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Right
Description : Polygon Right

Tissue Data
Type : HEAD
Serial No. : 5785
Frequency : 5785.00 MHz
Last Calib. Date : 03-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 35.21 F/m
Sigma : 5.29 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.6
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 03-Nov-2011
Set-up Time       : 9:43:07 AM
Area Scan         : 10x6x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : 15° Tilt
Separation        : 0
Channel           : Mid
```

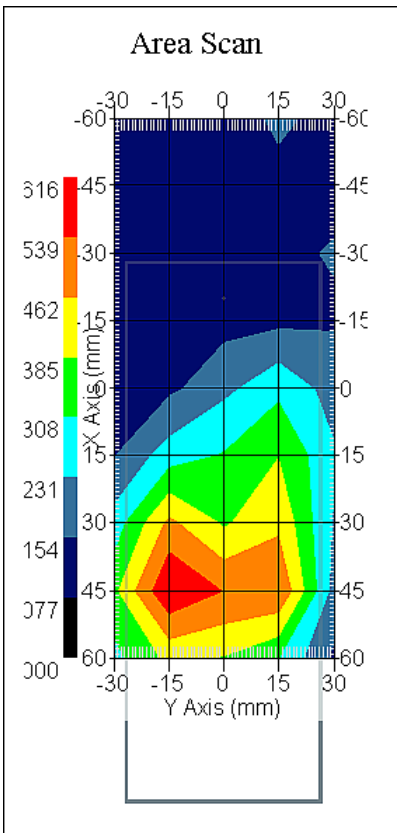



```
1 gram SAR value    : 0.190 W/kg
10 gram SAR value   : 0.153 W/kg
Area Scan Peak SAR  : 0.296 W/kg
Zoom Scan Peak SAR  : 0.230 W/kg
```

SAR Test Report

```
By Operator       : Jay
Measurement Date  : 03-Nov-2011
Starting Time     : 03-Nov-2011  10:05:30 AM
End Time          : 03-Nov-2011  10:32:29 AM
Scanning Time     : 1619 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11a
Model             : SpectraLink 8452
Frequency         : 5785.00 MHz
Max. Transmit Pwr : 0.083 W
Drift Time        : 0 min(s)
Length            : 145 mm
Width             : 54 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : Touch
Power Drift-Start : 0.158 W/kg
Power Drift-Finish: 0.155 W/kg
Power Drift (%)   : -1.890

Phantom Data
Name             : APREL-SAM Left Ear
Type             : SAM-Left
Size (mm)        : 280 x 280 x 280
Serial No.       : User Define
Location         : Left
Description      : Polygon Left

Tissue Data
Type             : HEAD
Serial No.       : 5785
Frequency        : 5785.00 MHz
Last Calib. Date : 03-Nov-2011
Temperature      : 20.00 °C
Ambient Temp.    : 23.00 °C
Humidity         : 45.00 RH%
Epsilon          : 35.21 F/m
Sigma            : 5.29 S/m
Density          : 1000.00 kg/cu. m

Probe Data
Name             : Probe E030-001 - RFEL
Model            : E030
Type             : E-Field Triangle
Serial No.       : E030-001
Last Calib. Date : 15-Jul-2011
Frequency        : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.6
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset           : 0.56 mm
```

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 03-Nov-2011
Set-up Time       : 10:55:42 AM
Area Scan         : 9x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Touch
Separation        : 0
Channel           : Mid
```




```
1 gram SAR value    : 0.558 W/kg
10 gram SAR value   : 0.337 W/kg
Area Scan Peak SAR  : 0.615 W/kg
Zoom Scan Peak SAR  : 1.000 W/kg
```

SAR Test Report

By Operator : Jay
Measurement Date : 03-Nov-2011
Starting Time : 03-Nov-2011 10:37:36 AM
End Time : 03-Nov-2011 11:05:22 AM
Scanning Time : 1666 secs

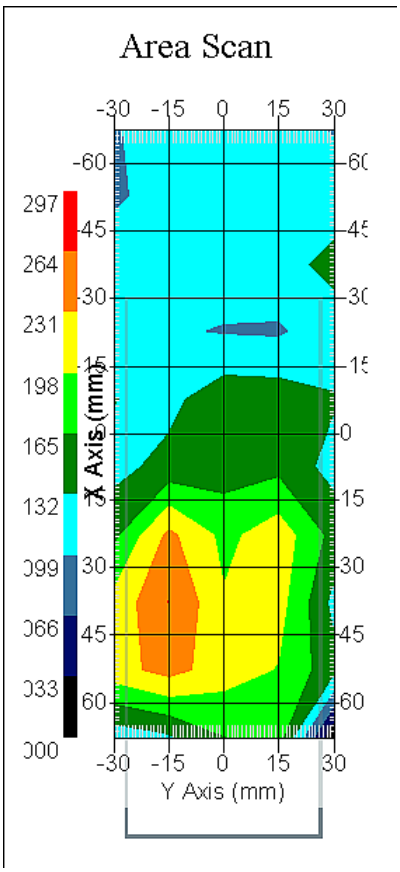
Product Data
Device Name : Polycom Inc.
Serial No. : 610926770
Mode : 802.11a
Model : SpectraLink 8452
Frequency : 5785.00 MHz
Max. Transmit Pwr : 0.083 W
Drift Time : 0 min(s)
Length : 145 mm
Width : 54 mm
Depth : 23 mm
Antenna Type : Internal
Orientation : 15° Tilt
Power Drift-Start : 0.120 W/kg
Power Drift-Finish: 0.125 W/kg
Power Drift (%) : 4.050

Phantom Data
Name : APREL-SAM Left Ear
Type : SAM-Left
Size (mm) : 280 x 280 x 280
Serial No. : User Define
Location : Left
Description : Polygon Left

Tissue Data
Type : HEAD
Serial No. : 5785
Frequency : 5785.00 MHz
Last Calib. Date : 03-Nov-2011
Temperature : 20.00 °C
Ambient Temp. : 23.00 °C
Humidity : 45.00 RH%
Epsilon : 35.21 F/m
Sigma : 5.29 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : Probe E030-001 - RFEL
Model : E030
Type : E-Field Triangle
Serial No. : E030-001
Last Calib. Date : 15-Jul-2011
Frequency : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 6.6
Probe Sensitivity: 1.20 1.20 1.20 $\mu V/(V/m)^2$
Compression Point: 95.00 mV
Offset : 0.56 mm

```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 03-Nov-2011
Set-up Time       : 9:43:07 AM
Area Scan         : 10x5x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : 15° Tilt
Separation        : 0
Channel           : Mid
```

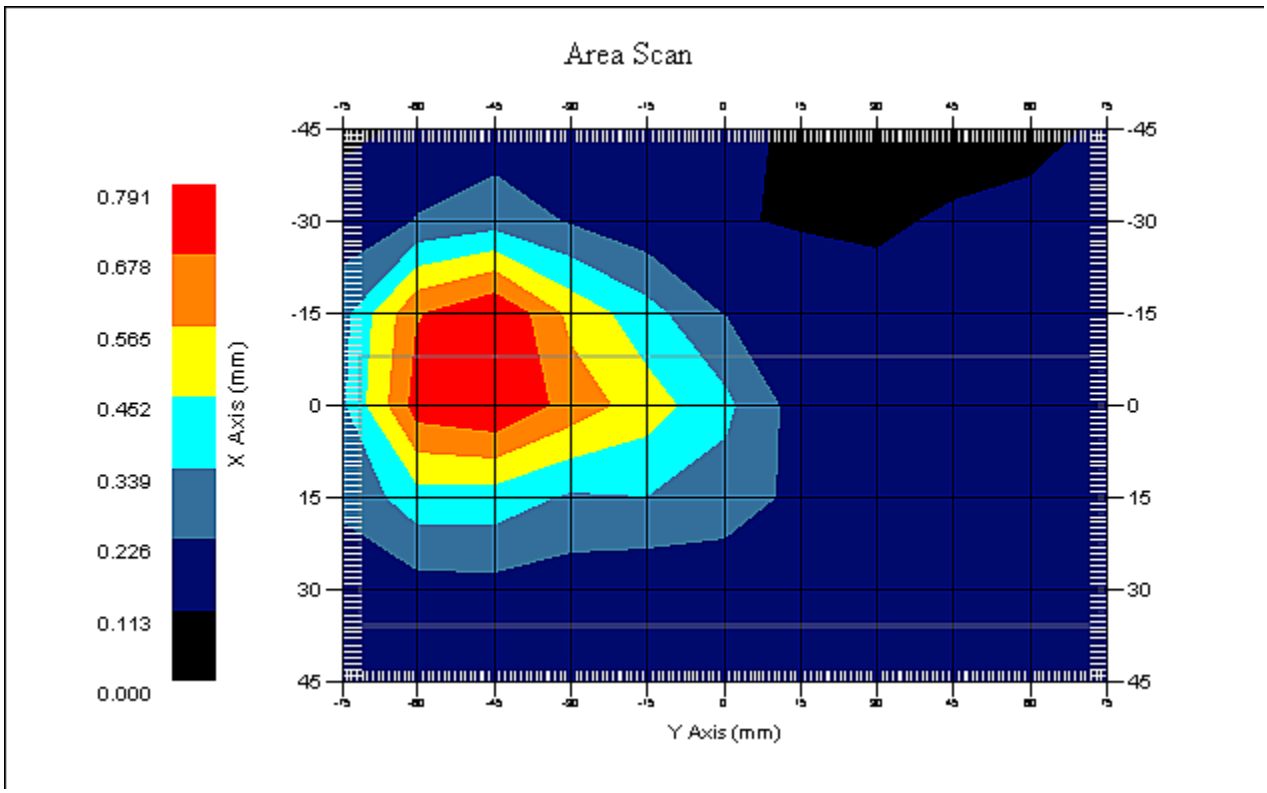



```
1 gram SAR value    : 0.244 W/kg
10 gram SAR value   : 0.195 W/kg
Area Scan Peak SAR  : 0.265 W/kg
Zoom Scan Peak SAR  : 0.350 W/kg
```

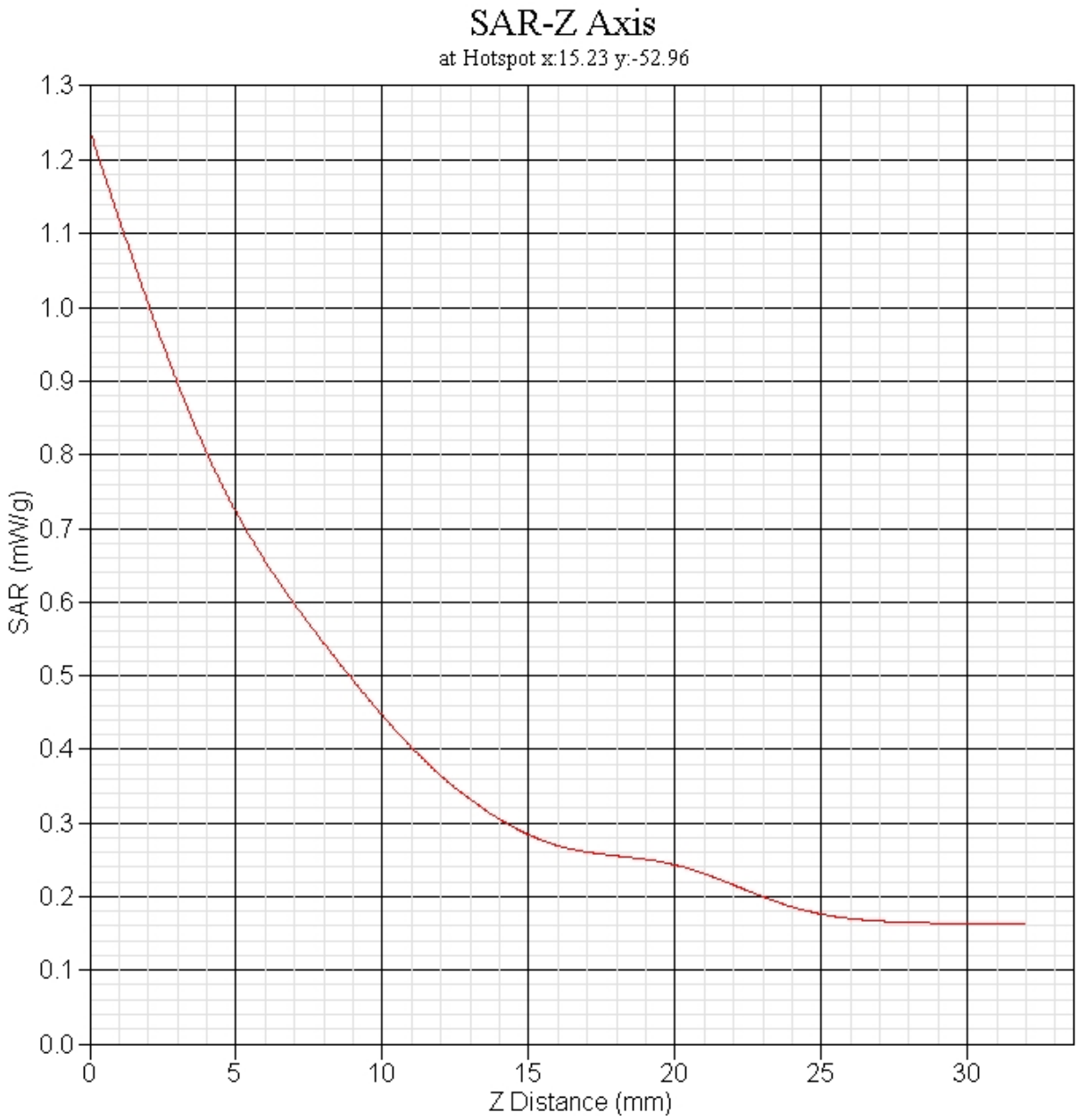
SAR Test Report

```
By Operator       : Jay
Measurement Date  : 03-Nov-2011
Starting Time     : 03-Nov-2011  11:18:10 AM
End Time          : 03-Nov-2011  11:51:31 AM
Scanning Time     : 2001 secs

Product Data
Device Name       : Polycom Inc.
Serial No.        : 610926770
Mode              : 802.11a
Model             : SpectraLink 8452
Frequency         : 5785.00 MHz
Max. Transmit Pwr : 0.083 W
Drift Time        : 0 min(s)
Length            : 54 mm
Width             : 145 mm
Depth             : 23 mm
Antenna Type      : Internal
Orientation       : Back
Power Drift-Start : 0.214 W/kg
Power Drift-Finish: 0.215 W/kg
Power Drift (%)   : 0.463

Phantom Data
Name              : APREL-Uni
Type              : Uni-Phantom
Size (mm)         : 280 x 280 x 200
Serial No.        : System Default
Location          : Center
Description       : Uni-Phantom

Tissue Data
Type              : BODY
Serial No.        : 5785
Frequency         : 5785.00 MHz
Last Calib. Date  : 03-Nov-2011
Temperature       : 20.00 °C
Ambient Temp.     : 23.00 °C
Humidity          : 45.00 RH%
Epsilon           : 48.12 F/m
Sigma             : 5.99 S/m
Density           : 1000.00 kg/cu. m

Probe Data
Name              : Probe E030-001 - RFEL
Model             : E030
Type              : E-Field Triangle
Serial No.        : E030-001
Last Calib. Date  : 15-Jul-2011
Frequency         : 5800.00 MHz
Duty Cycle Factor: 1
Conversion Factor: 5.8
Probe Sensitivity: 1.20  1.20  1.20   µV/(V/m)^2
Compression Point: 95.00 mV
Offset            : 0.56 mm
```

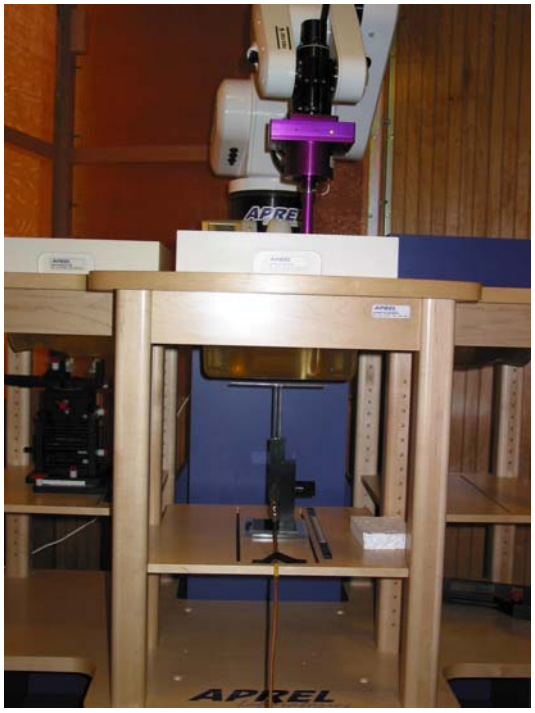
```
Measurement Data
Crest Factor      : 1
Scan Type         : Complete
Tissue Temp.      : 20.00 °C
Ambient Temp.     : 23.00 °C
Set-up Date       : 03-Nov-2011
Set-up Time       : 11:24:00 AM
Area Scan         : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm
Zoom Scan         : 7x7x10 : Measurement x=4mm, y=4mm, z=2.5mm

Other Data
DUT Position      : Back
Separation        : 0 mm
Channel           : Mid
```



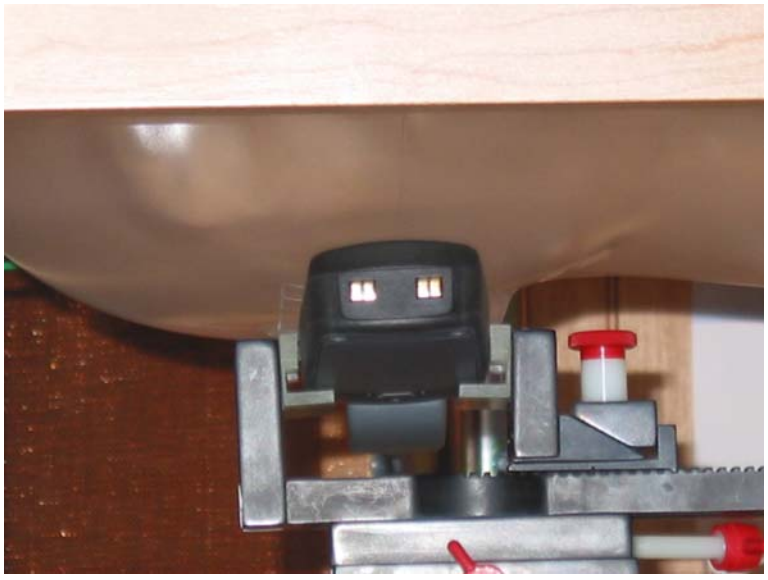

```
1 gram SAR value    : 0.771 W/kg
10 gram SAR value   : 0.474 W/kg
Area Scan Peak SAR  : 0.791 W/kg
Zoom Scan Peak SAR  : 1.241 W/kg
```



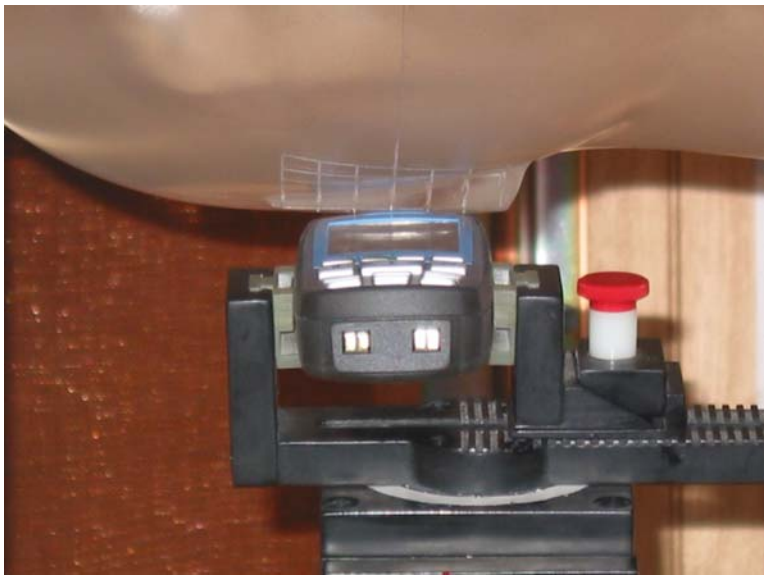
Appendix C – SAR Test Setup Photos



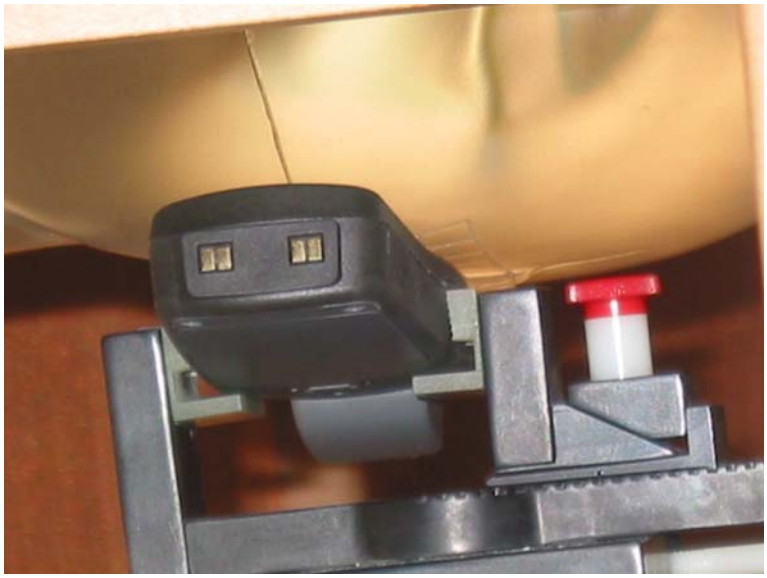
System Configuration



Right Head Touch Test Position



Right Head Tilt Test Position



Left Head Touch Test Position

Left Head Tilt Test Position

Body Test Position 0 mm Gap

Front of Device

Back of Device

PCB with Antenna Locations

Battery

Appendix D – Probe Calibration Data Sheets

NCL CALIBRATION LABORATORIES

Calibration File No.: PC1333-1350

Client.: RFEL

C E R T I F I C A T E OF C A L I B R A T I O N

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

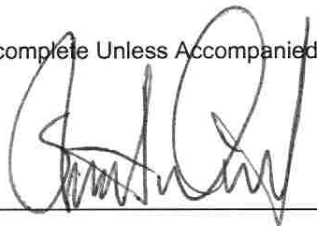
Equipment: Miniature Isotropic RF Probe
Record of Calibration
Head and Body
Manufacturer: APREL Laboratories
Model No.: E-020
Serial No.: 217

Calibration Procedure: D01-032-E020-V2, D22-012-Tissue, D28-002-Dipole
Project No: RFEL-PC-5620

Calibrated: 7th September 2011
Released on: 7th September 2011

Approved By: Stuart Nicol

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary

Released By: 

NCL CALIBRATION LABORATORIES
303 Terry Fox Drive, Suite 102
Kanata, Ontario
CANADA K2K 3J1
Division of APREL
TEL: (613) 435-8300
FAX: (613) 435-8306

Introduction

This Calibration Report reproduces the results of the calibration performed in line with the references listed below. Calibration is performed using accepted methodologies as per the references listed below. Probes are calibrated for air, and tissue and the values reported are the results from the physical quantification of the probe through meteorgical practices.

Calibration Method

Probes are calibrated using the following methods.

<1000MHz
TEM Cell for sensitivity in air
Standard phantom using temperature transfer method for sensitivity in tissue

>1000MHz
Waveguide* method to determine sensitivity in air and tissue
*Waveguide is numerically (simulation) assessed to determine the field distribution and power

The boundary effect for the probe is assessed using a standard flat phantom where the probe output is compared against a numerically simulated series of data points

References

- IEEE Standard 1528 (2003) including Amendment 1
  IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
- EN 62209-1 (2006)
  Human Exposure to RF Fields from hand-held and body-mounted wireless communication devices - Human models. instrumentation, and procedures-Part 1: Procedure to measure the Specific Absorption Rate (SAR) for hand-held mobile wireless devices
- IEC 62209-2 Ed. 1.0 (2010-03)
  Human exposure to RF fields from hand-held and body-mounted wireless devices - Human models, instrumentation, and procedures - Part 2: specific absorption rate (SAR) for wireless communication devices (30 MHz - 6 GHz)
- TP-D01-032-E020-V2 E-Field probe calibration procedure
- D22-012-Tissue dielectric tissue calibration procedure
- D28-002-Dipole procedure for validation of SAR system using a dipole
- IEEE 1309 Draft Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9kHz to 40GHz

Conditions

Probe 217 was a re-calibration.

Ambient Temperature of the Laboratory:	22 °C +/- 1.5°C
Temperature of the Tissue:	21 °C +/- 1.5°C
Relative Humidity:	< 60%

Primary Measurement Standards

Instrument	**Serial Number**	**Cal date**
Power meter Anritsu MA2408A	90025437	Nov.4, 2010
Power Sensor Anritsu MA2481D	103555	Nov 4, 2010
Attenuator HP 8495A (70dB)	1944A10711	Sept. 14, 2010
Network Analyzer Anritsu MT8801C	MB11855	Feb. 8, 2011

Secondary Measurement Standards

Signal Generator Agilent E4438C -506	MY55182336	June 7, 2011

Attestation

The below named signatories have conducted the calibration and review of the data which is presented in this calibration report.

We the undersigned attest that to the best of our knowledge the calibration of this probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

Stuart Nicol

Jesse Hones

Probe Summary

Probe Type:	E-Field Probe E020
Serial Number:	217
Frequency:	750MHz
Sensor Offset:	1.56
Sensor Length:	2.5
Tip Enclosure:	Composite*
Tip Diameter:	< 2.9 mm
Tip Length:	55 mm
Total Length:	289 mm

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

Channel X:	1.2 μV/(V/m)^2
Channel Y:	1.2 μV/(V/m)^2
Channel Z:	1.2 μV/(V/m)^2
Diode Compression Point:	95 mV

Calibration for Tissue (Head H, Body B)

Frequency	Tissue Type	Measured Epsilon	Measured Sigma	Calibration Uncertainty	Tolerance Uncertainty for 5%*	Conversion Factor
450 H	**Head**	**45.31**	**0.91**	**4.1**	**3.6**	**5.8**
450 B	**Body**	**56.77**	**0.99**	**4.1**	**3.6**	**6.0**
650 B	**Body**	**57.42**	**0.91**	**3.96**	**3.5**	**6.2**
750 H	Head	X	X	X	X	X
750 B	**Body**	**55.54**	**0.94**	**3.94**	**3.4**	**6.3**
835 H	**Head**	**42.5**	**0.93**	**3.5**	**3.4**	**6.4**
835 B	**Body**	**56.37**	**0.954**	**3.5**	**3.4**	**6.4**
900 H	**Head**	**41.89**	**1.0**	**3.5**	**3.4**	**6.1**
900 B	**Body**	**53.68**	**1.05**	**3.5**	**3.4**	**6.1**
1450 H	Head	X	X	X	X	X
1450 B	Body	X	X	X	X	X
1500 H	Head	X	X	X	X	X
1500 B	Body	X	X	X	X	X
1640 H	**Head**	**39.0**	**1.25**	**3.5**	**2.7**	**5.2**
1640 B	**Body**	**52.03**	**1.39**	**3.5**	**2.7**	**5.0**
1735 H	Head	X	X	X	X	X
1735 B	**Body**	**51.68**	**1.5**	**3.5**	**2.7**	**5.2**
1800 H	**Head**	**38.38**	**1.39**	**3.5**	**2.7**	**4.9**
1800 B	**Body**	**51.54**	**1.56**	**3.5**	**2.7**	**5.1**
1900 H	**Head**	**38.4**	**1.43**	**3.5**	**2.7**	**4.9**
1900 B	**Body**	**52.08**	**1.59**	**3.5**	**2.7**	**4.8**
2000 H	Head	X	X	X	X	X
2000 B	Body	X	X	X	X	X
2100 H	Head	X	X	X	X	X
2100 B	Body	X	X	X	X	X
2300 H	Head	X	X	X	X	X
2300 B	Body	X	X	X	X	X
2450 H	**Head**	**38.2**	**1.82**	**3.5**	**3.5**	**3.91**
2450B	**Body**	**51.74**	**1.96**	**3.5**	**3.5**	**3.94**
2600 H	Head	X	X	X	X	X
2600 B	**Body**	**51.18**	**2.16**	**3.5**	**3.5**	**4.0**
3000 H	Head	X	X	X	X	X
3000 B	Body	X	X	X	X	X
3600 H	Head	X	X	X	X	X
3600 B	Body	X	X	X	X	X
5200 H	Head	X	X	X	X	X
5200 B	Body	X	X	X	X	X
5600 H	Head	X	X	X	X	X
5600 B	Body	X	X	X	X	X
5800 H	Head	X	X	X	X	X
5800 B	Body	X	X	X	X	X

Boundary Effect:

Uncertainty resulting from the boundary effect is less than 2.1% for the distance between the tip of the probe and the tissue boundary, when less than 0.58mm.

Spatial Resolution:

The spatial resolution uncertainty is less than 1.5% for 4.9mm diameter probe.
The spatial resolution uncertainty is less than 1.0% for 2.5mm diameter probe.

DAQ-PAQ Contribution

To minimize the uncertainty calculation all tissue sensitivity values were calculated using a load impedance of 5 MΩ.

Boundary Effect:

For a distance of 0.58mm the worst case evaluated uncertainty (increase in the probe sensitivity) is less than 2.1%.

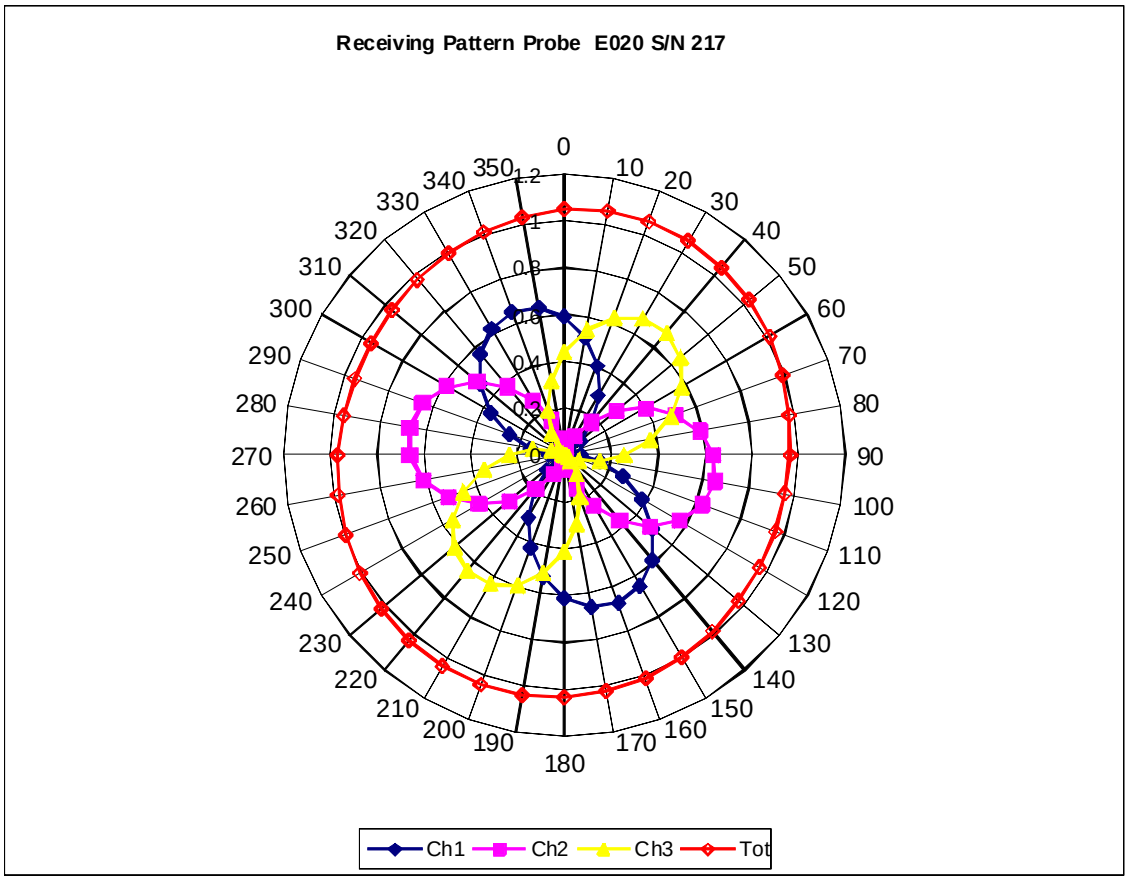
NOTES:

*The maximum deviation from the centre frequency when comparing the lower to upper range is listed.

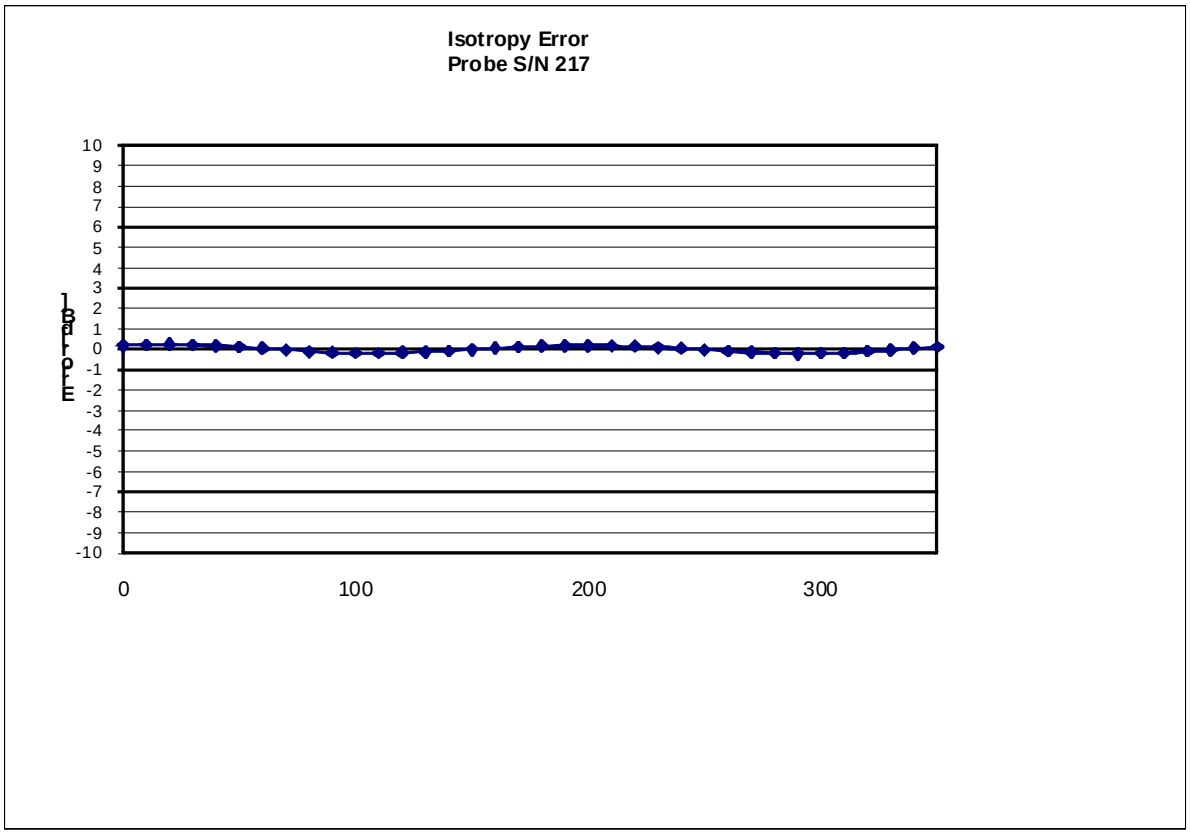
The probe was received in good condition.

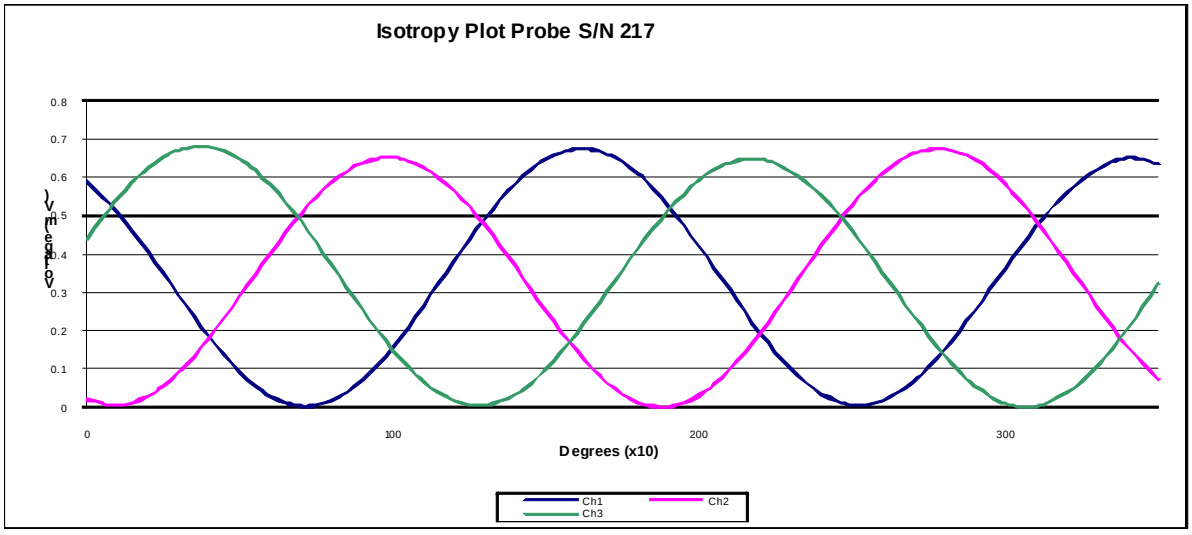
Probe was calibrated on new DAC-PAQ.

Receiving Pattern Air



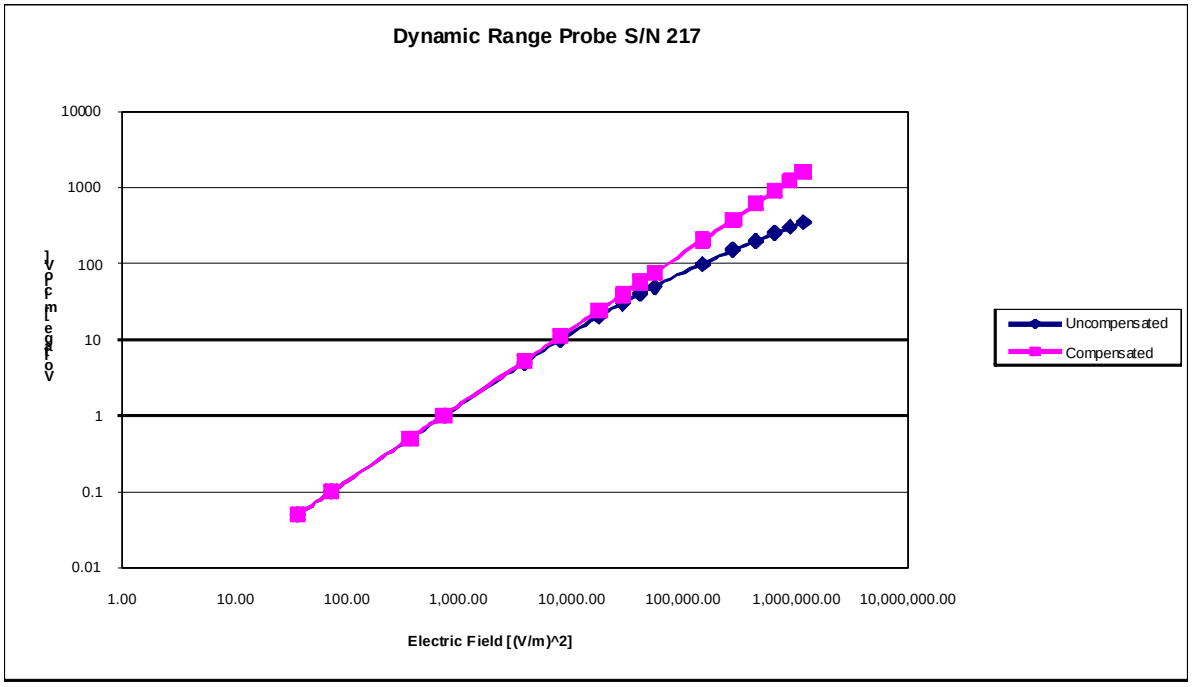
Isotropy Error



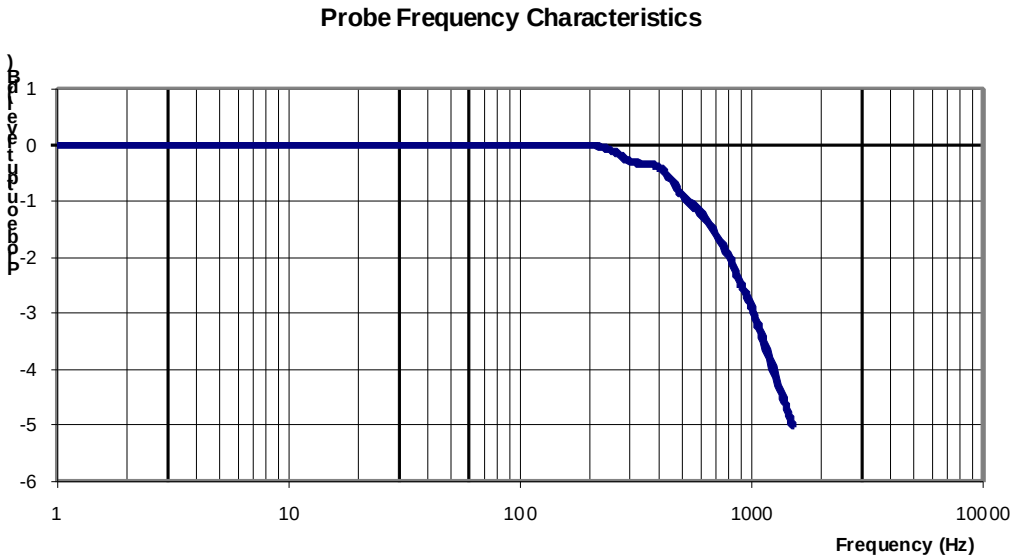


Isotropicity Tissue: 0.12 dB

Dynamic Range



Video Bandwidth



Video Bandwidth at 500 Hz	1 dB
Video Bandwidth at 1.02 KHz:	3 dB

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2011.

NCL CALIBRATION LABORATORIES

Calibration File No.: 1271-1276

Client.: RFEL

C E R T I F I C A T E OF C A L I B R A T I O N

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

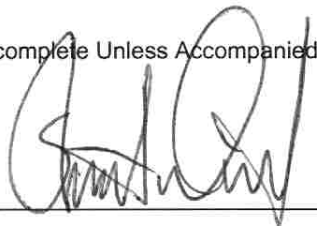
Equipment: Miniature Isotropic RF Probe
Record of Calibration
Head and Body
Manufacturer: APREL Laboratories
Model No.: E-020
Serial No.: E030-001

Calibration Procedure: D01-032-E020-V2, D22-012-Tissue, D28-002-Dipole
Project No: RFEL-5611

Calibrated: 15th July 2011
Released on: 20th July 2011

Approved By: Stuart Nicol

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary

Released By: 

NCL CALIBRATION LABORATORIES
303 Terry Fox Drive, Suite 102
Kanata, Ontario
CANADA K2K 3J1
Division of APREL
TEL: (613) 435-8300
FAX: (613) 435-8306

Introduction

This Calibration Report reproduces the results of the calibration performed in line with the references listed below. Calibration is performed using accepted methodologies as per the references listed below. Probes are calibrated for air, and tissue and the values reported are the results from the physical quantification of the probe through meteorgical practices.

Calibration Method

Probes are calibrated using the following methods.

<1000MHz
TEM Cell for sensitivity in air
Standard phantom using temperature transfer method for sensitivity in tissue

>1000MHz
Waveguide* method to determine sensitivity in air and tissue
*Waveguide is numerically (simulation) assessed to determine the field distribution and power

The boundary effect for the probe is assessed using a standard flat phantom where the probe output is compared against a numerically simulated series of data points

References

- IEEE Standard 1528 (2003) including Amendment 1
  IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
- EN 62209-1 (2006)
  Human Exposure to RF Fields from hand-held and body-mounted wireless communication devices - Human models. instrumentation, and procedures-Part 1: Procedure to measure the Specific Absorption Rate (SAR) for hand-held mobile wireless devices
- IEC 62209-2 Ed. 1.0 (2010-03)
  Human exposure to RF fields from hand-held and body-mounted wireless devices - Human models, instrumentation, and procedures - Part 2: specific absorption rate (SAR) for wireless communication devices (30 MHz - 6 GHz)
- TP-D01-032-E020-V2 E-Field probe calibration procedure
- D22-012-Tissue dielectric tissue calibration procedure
- D28-002-Dipole procedure for validation of SAR system using a dipole
- IEEE 1309 Draft Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9kHz to 40GHz

Conditions

Probe E030-001 was a re-calibration.
The probe tip condition was in need of repair and this caused the probe to be out of tolerance.
**After the repair the probe was found to be in tolerance.

Ambient Temperature of the Laboratory:	22 °C +/- 1.5°C
Temperature of the Tissue:	21 °C +/- 1.5°C
Relative Humidity:	< 60%

Primary Measurement Standards

Instrument	**Serial Number**	**Cal due date**
Power meter Anritsu MA2408A	90025437	Nov.4, 2011
Power Sensor Anritsu MA2481D	103555	Nov 4, 2011
Attenuator HP 8495A (70dB)	1944A10711	Sept. 14, 2011
Network Analyzer Anritsu MT8801C	MB11855	Feb. 8, 2012

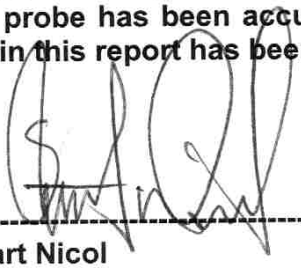
Secondary Measurement Standards

Signal Generator Agilent E4438C -506	MY55182336	June 7, 2012

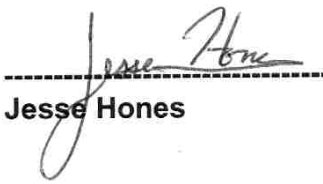
Attestation

The below named signatories have conducted the calibration and review of the data which is presented in this calibration report.

We the undersigned attest that to the best of our knowledge the calibration of this probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.



Stuart Nicol



Jesse Hones

Probe Summary

Probe Type:	E-Field Probe E030
Serial Number:	E030-001
Frequency:	As presented on page 5
Sensor Offset:	0.56
Sensor Length:	2.5
Tip Enclosure:	Composite*
Tip Diameter:	< 2.9 mm
Tip Length:	55 mm
Total Length:	289 mm

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

Channel X:	1.2 $\mu V/(V/m)^2$
Channel Y:	1.2 $\mu V/(V/m)^2$
Channel Z:	1.2 $\mu V/(V/m)^2$
Diode Compression Point:	95 mV

Calibration for Tissue (Head H, Body B)

Frequency	Tissue Type	Measured Epsilon	Measured Sigma	Calibration Uncertainty	Tolerance Uncertainty for 5%*	Conversion Factor
450 H	Head	X	X	X	X	X
450 B	Body	X	X	X	X	X
750 H	Head	X	X	X	X	X
750 B	Body	X	X	X	X	X
835 H	Head	X	X	X	X	X
835 B	Body	X	X	X	X	X
900 H	Head	X	X	X	X	X
900 B	Body	X	X	X	X	X
1450 H	Head	X	X	X	X	X
1450 B	Body	X	X	X	X	X
1500 H	Head	X	X	X	X	X
1500 B	Body	X	X	X	X	X
1640 H	Head	X	X	X	X	X
1640 B	Body	X	X	X	X	X
1750 H	Head	X	X	X	X	X
1750 B	Body	X	X	X	X	X
1800 H	Head	X	X	X	X	X
1800 B	Body	X	X	X	X	X
1900 H	Head	X	X	X	X	X
1900 B	Body	X	X	X	X	X
2000 H	Head	X	X	X	X	X
2000 B	Body	X	X	X	X	X
2100 H	Head	X	X	X	X	X
2100 B	Body	X	X	X	X	X
2300 H	Head	X	X	X	X	X
2300 B	Body	X	X	X	X	X
2450 H	Head	X	X	X	X	X
2450B	Body	X	X	X	X	X
2600 H	Head	X	X	X	X	X
2600 B	Body	X	X	X	X	X
3000 H	Head	X	X	X	X	X
3000 B	Body	X	X	X	X	X
3600 H	Head	X	X	X	X	X
3600 B	Body	X	X	X	X	X
5200 H	**Head**	**35.37**	**4.58**	**3.5**	**2.6**	**7.2**
5200 B	**Body**	**47.63**	**5.14**	**3.5**	**2.6**	**6.7**
5600 H	**Head**	**34.04**	**5.05**	**3.5**	**2.6**	**6.8**
5600 B	**Body**	**46.38**	**5.79**	**3.5**	**2.6**	**6.3**
5800 H	**Head**	**33.62**	**5.27**	**3.5**	**2.6**	**6.6**
5800 B	**Body**	**45.87**	**6.07**	**3.5**	**2.6**	**5.8**

Boundary Effect:

Uncertainty resulting from the boundary effect is less than 2.1% for the distance between the tip of the probe and the tissue boundary, when less than 0.58mm.

Spatial Resolution:

The spatial resolution uncertainty is less than 1.5% for 4.9mm diameter probe.
The spatial resolution uncertainty is less than 1.0% for 2.5mm diameter probe.

DAQ-PAQ Contribution

To minimize the uncertainty calculation all tissue sensitivity values were calculated using a load impedance of 5 MΩ.

Boundary Effect:

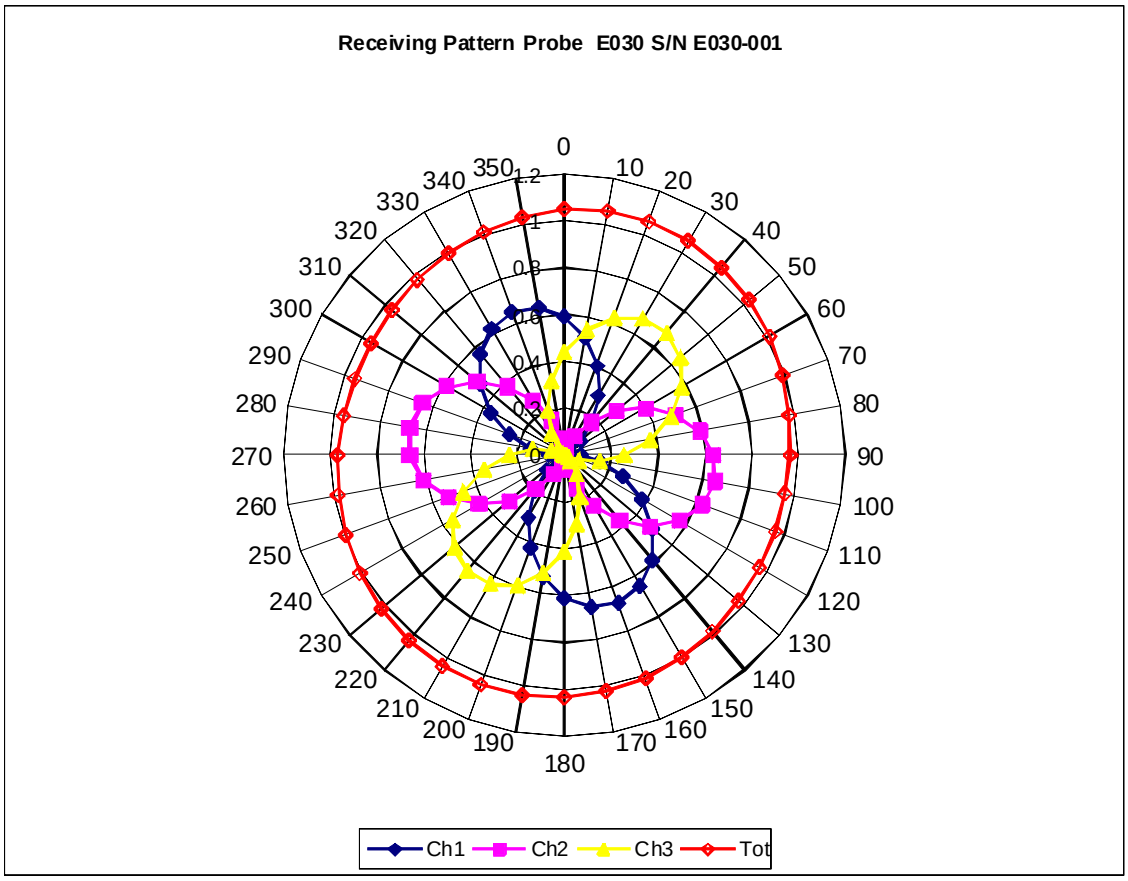
For a distance of 0.58mm the worst case evaluated uncertainty (increase in the probe sensitivity) is less than 2.1%.

NOTES:

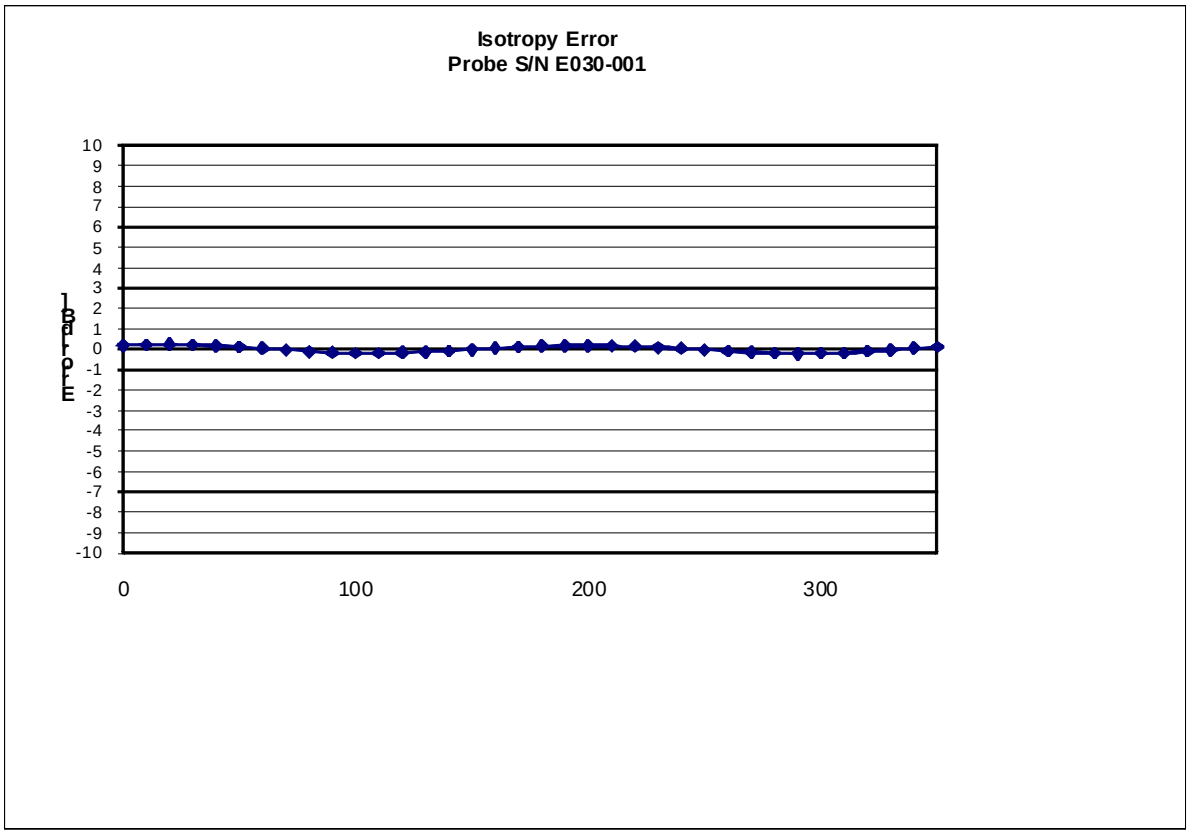
*The maximum deviation from the centre frequency when comparing the lower to upper range is listed.

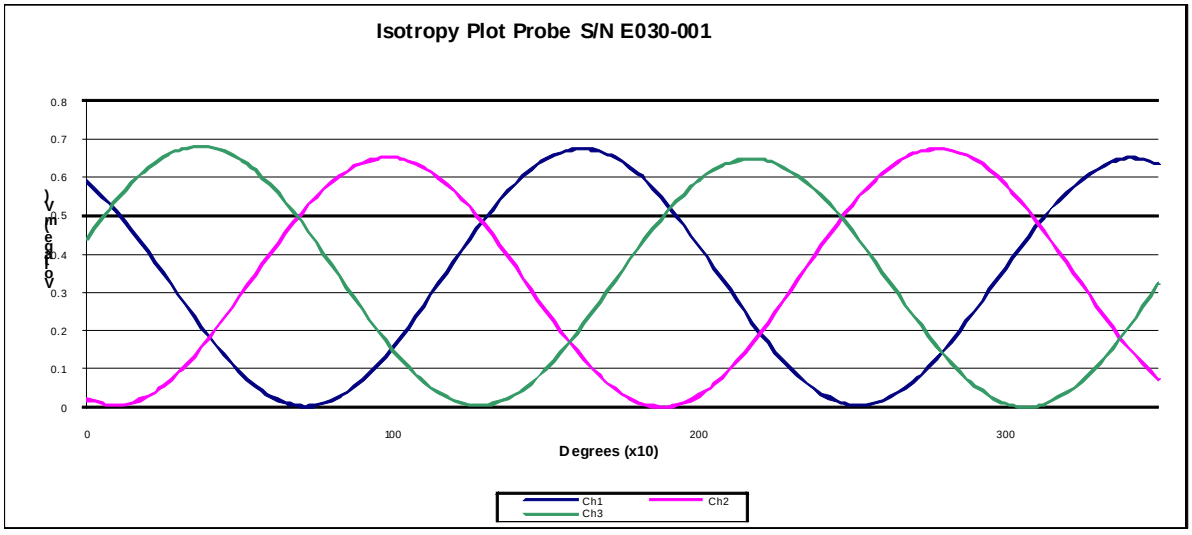
**The deviation of the calibration factor from the calculated values was found to be as much as +18% worst case for this probe. It was found that the probe tip had been damaged and that once repaired the deviation from calculated values was less than 2%. As the deviation measured would have contributed to a higher SAR value APREL can conclude that SAR measurements made with this probe will have been within typical uncertainty of 10% and that this would not contribute to SAR value which if corrected would yield a higher than reported value.

Receiving Pattern Air



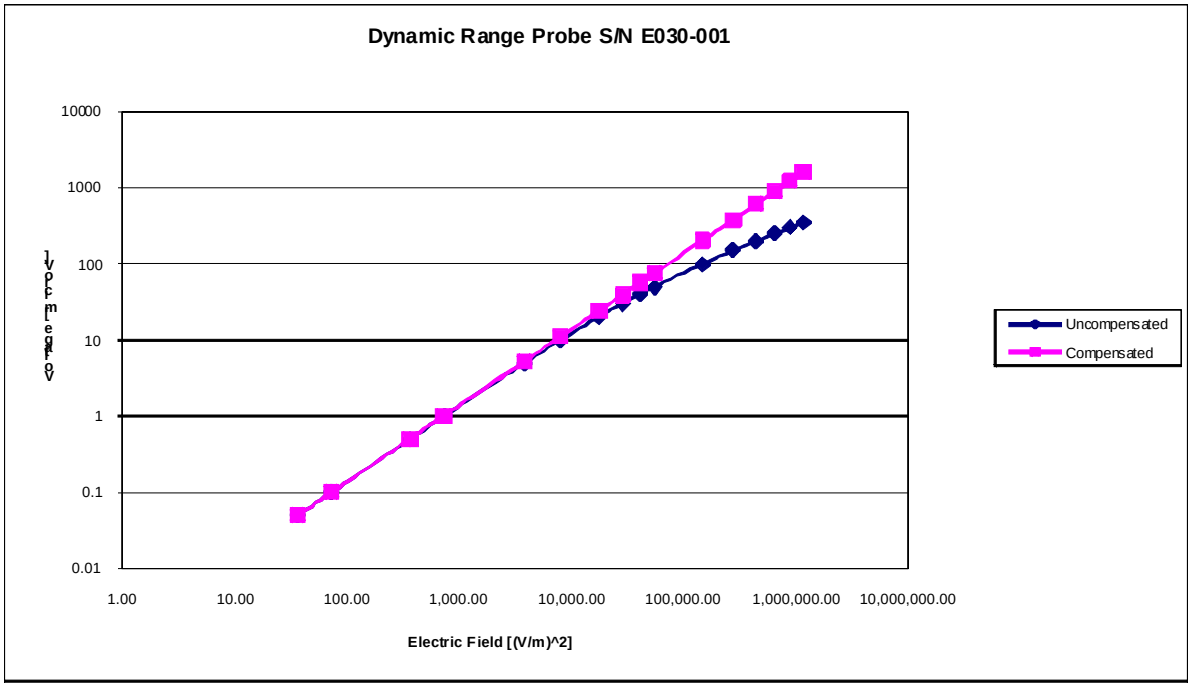
Isotropy Error Air



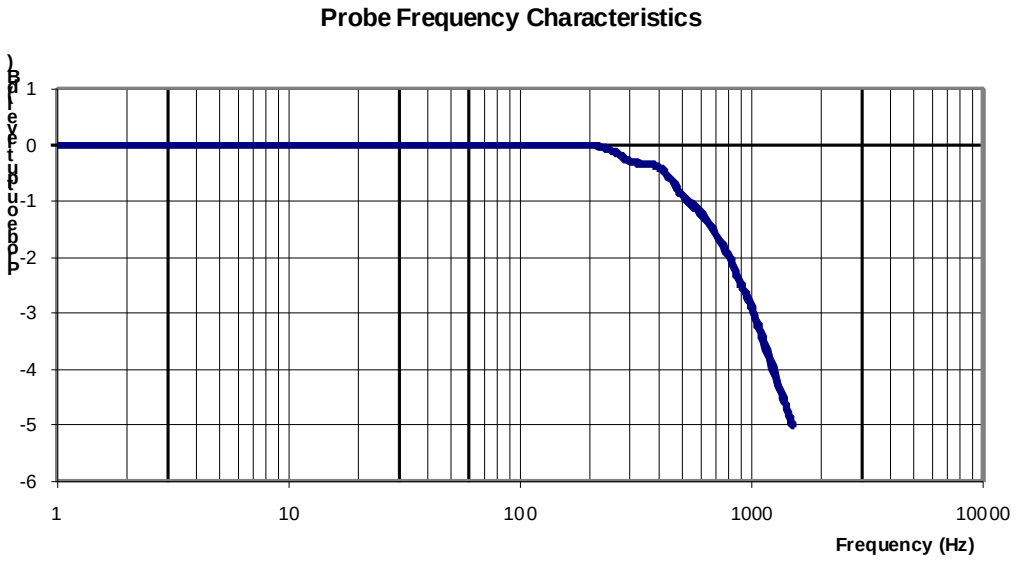


Isotropicity Tissue: 0.10 dB

Dynamic Range



Video Bandwidth



Video Bandwidth at 500 Hz 1 dB
Video Bandwidth at 1.02 KHz: 3 dB

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2011.

Appendix E – Dipole Calibration Data Sheets

NCL CALIBRATION LABORATORIES

Calibration File No: DC-1109
Project Number: RFEB-5495

C E R T I F I C A T E OF C A L I B R A T I O N

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

Validation Dipole

Manufacturer: APREL Laboratories
Part number: ALS-D-2450-S-2
Frequency: 2450 MHz
Serial No: RFE-278

Customer: RFEL

Calibrated: 12th January 2010
Released on: 12th January 2010

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary

Released By: _____

NCL CALIBRATION LABORATORIES
51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6
Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4162

Conditions

Dipole RFE-278 was a new calibration.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 21 °C +/- 0.5°C

We the undersigned attest that to the best of our knowledge the calibration of this device has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

We the undersigned attest that to the best of our knowledge the calibration of this device has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

Stuart Nicol

C. Teodorian

Calibration Results Summary

The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

Mechanical Dimensions

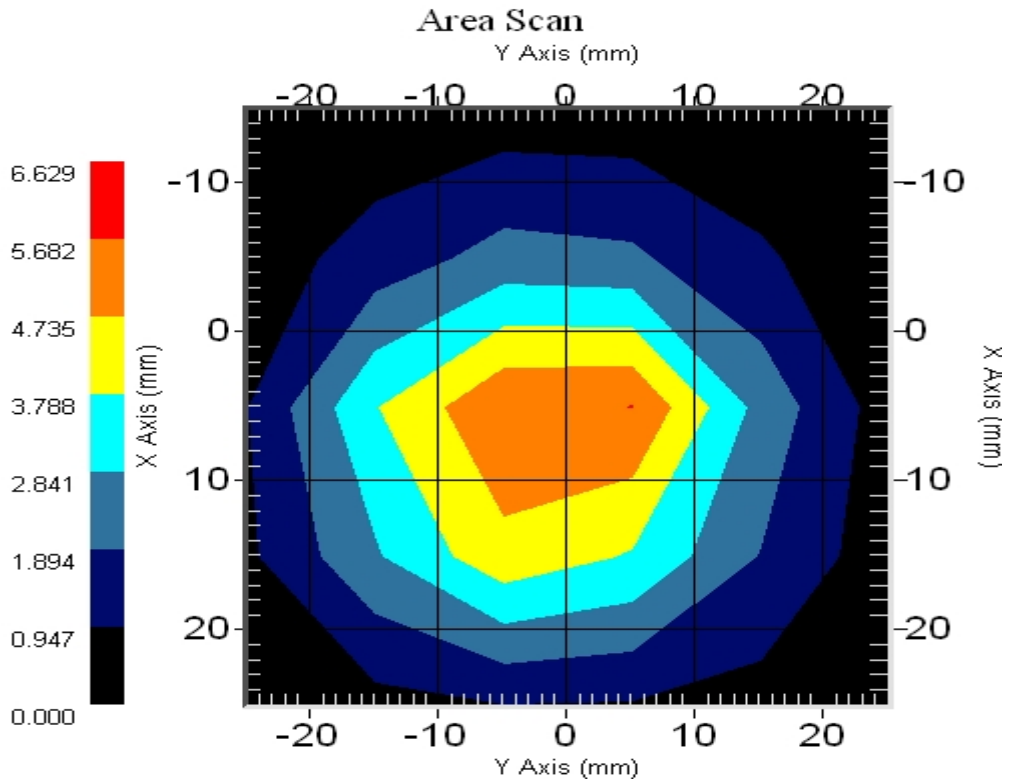
Length: 51.5 mm
Height: 30.4 mm

Electrical Specification

SWR: 1.070 U
Return Loss: -29.451 dB
Impedance: 50.710 Ω

System Validation Results @ 100mW

Frequency	1 Gram	10 Gram	Peak
2450 MHz	5.31	2.44	10.18



Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole RFE-278. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-020 130 MHz to 26 GHz E-Field Probe Serial Number 226.

References

SSI-TP-018-ALSAS Dipole Calibration Procedure
SSI-TP-016 Tissue Calibration Procedure
IEEE 1528 “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques”

Conditions

Dipole RFE-278 was a re-calibration.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 20 °C +/- 0.5°C

Dipole Calibration Results

Mechanical Verification

APREL Length	APREL Height	Measured Length	Measured Height
51.5 mm	30.4 mm	52.1 mm	31.0 mm

Tissue Validation

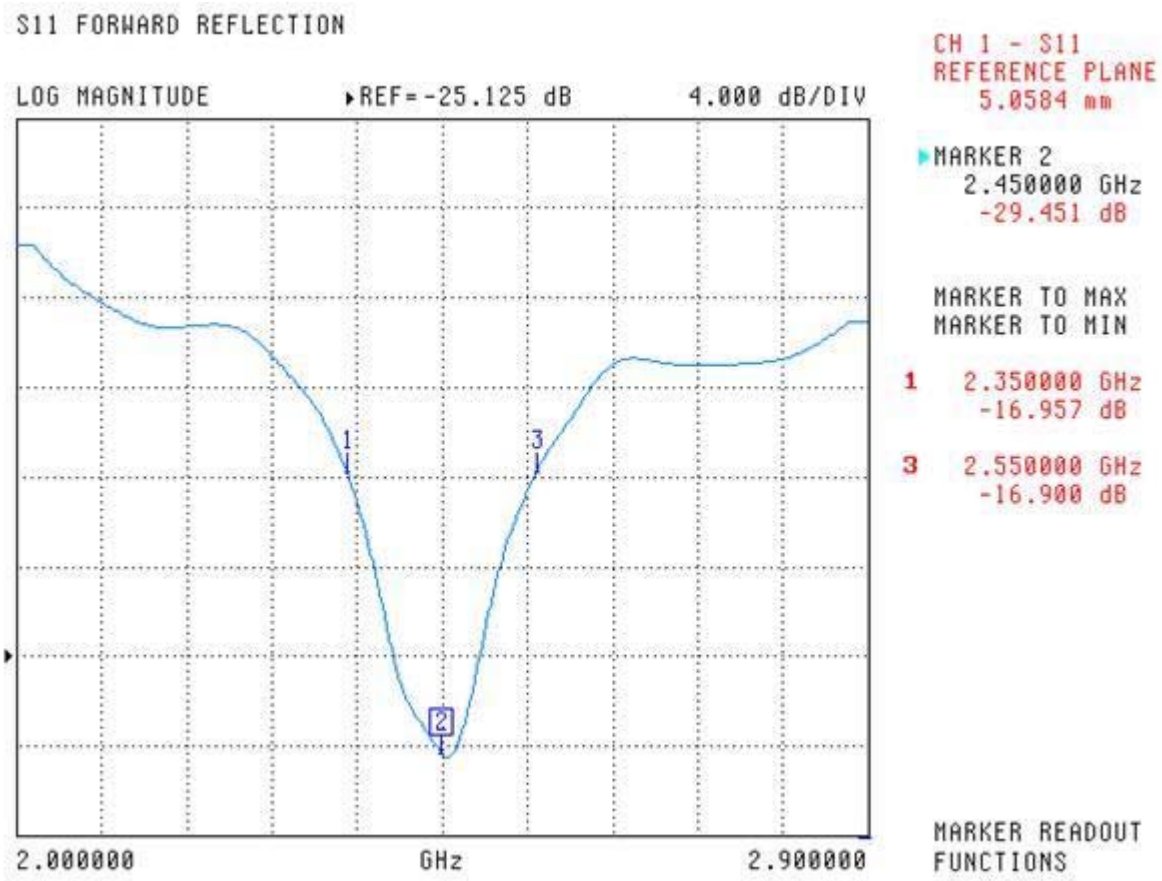
Head Tissue 2450 MHz	Measured
Dielectric constant, ε_r	39.8
Conductivity, σ [S/m]	1.85

Electrical Calibration

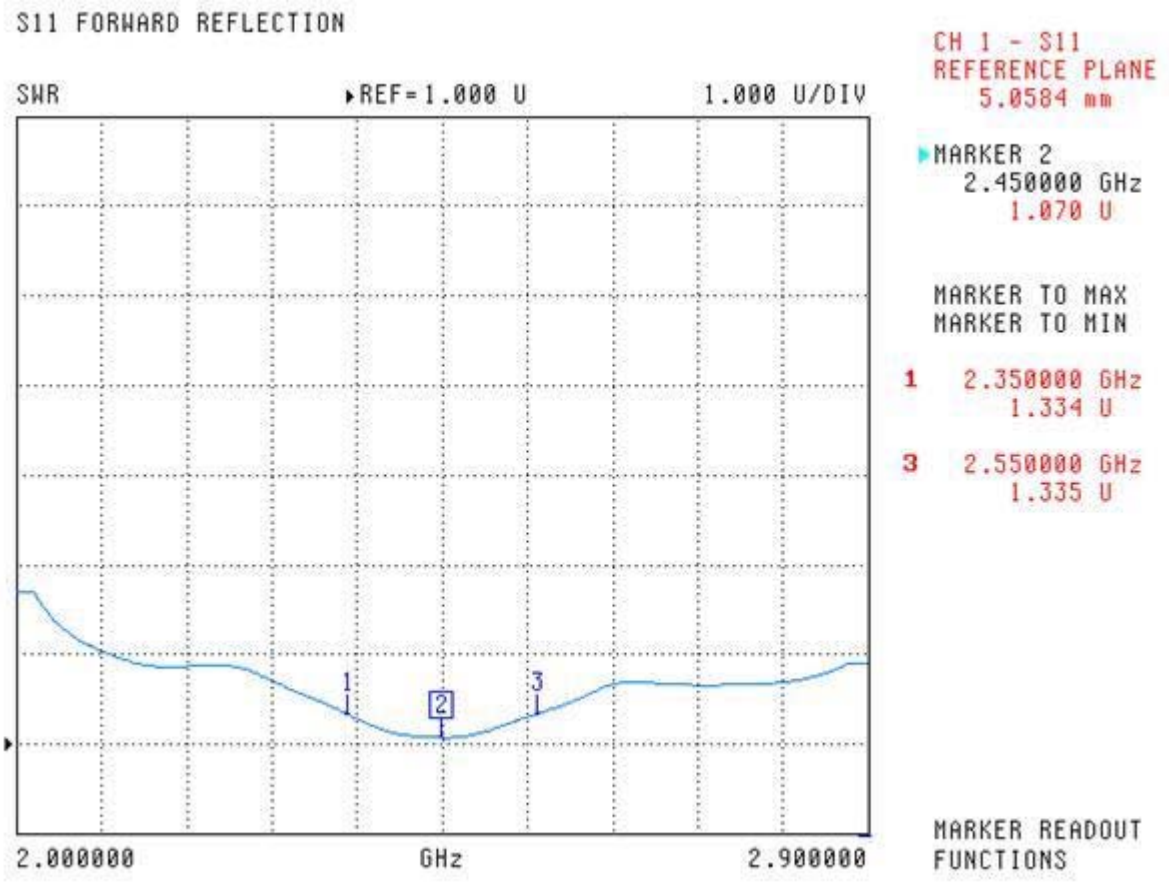
Test	Result
S11 R/L	-29.451 dB
SWR	1.070 U
Impedance	50.710 Ω

The Following Graphs are the results as displayed on the Vector Network Analyzer.

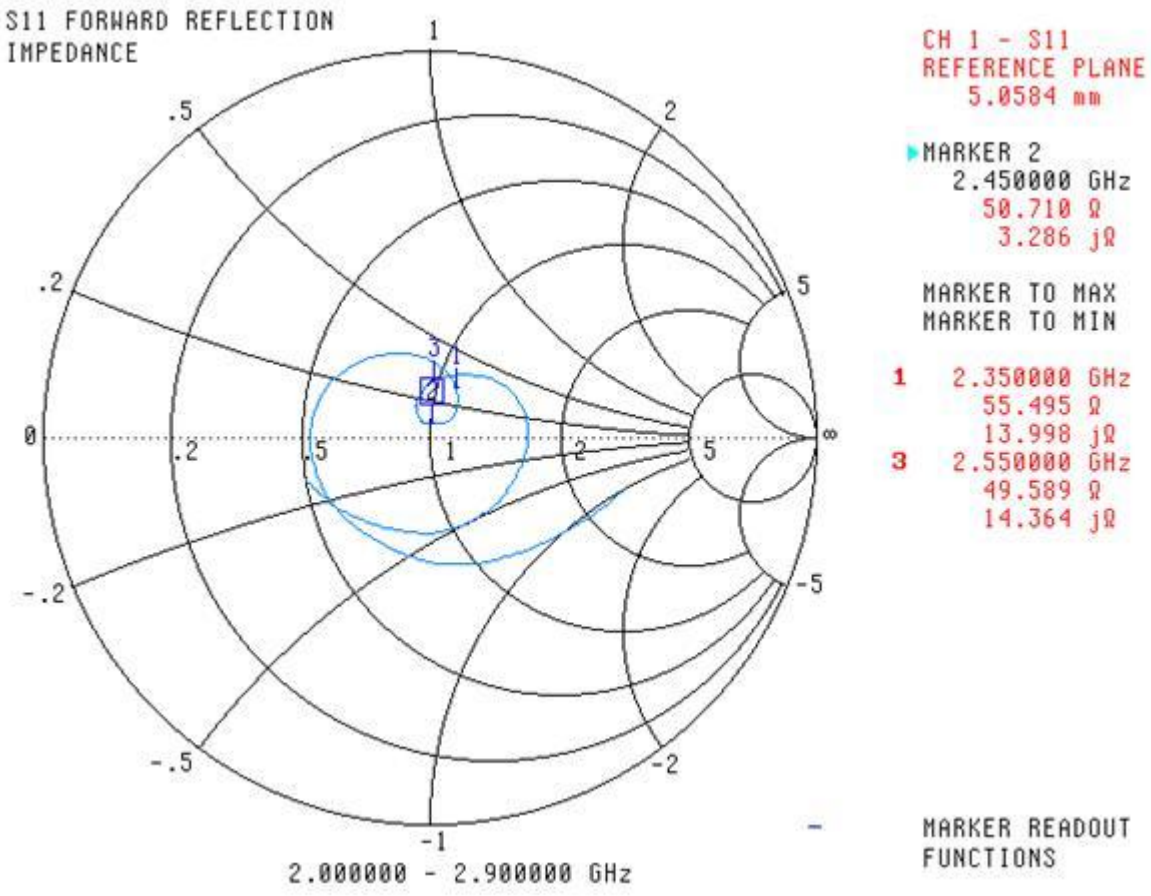
S11 Parameter Return Loss



SWR



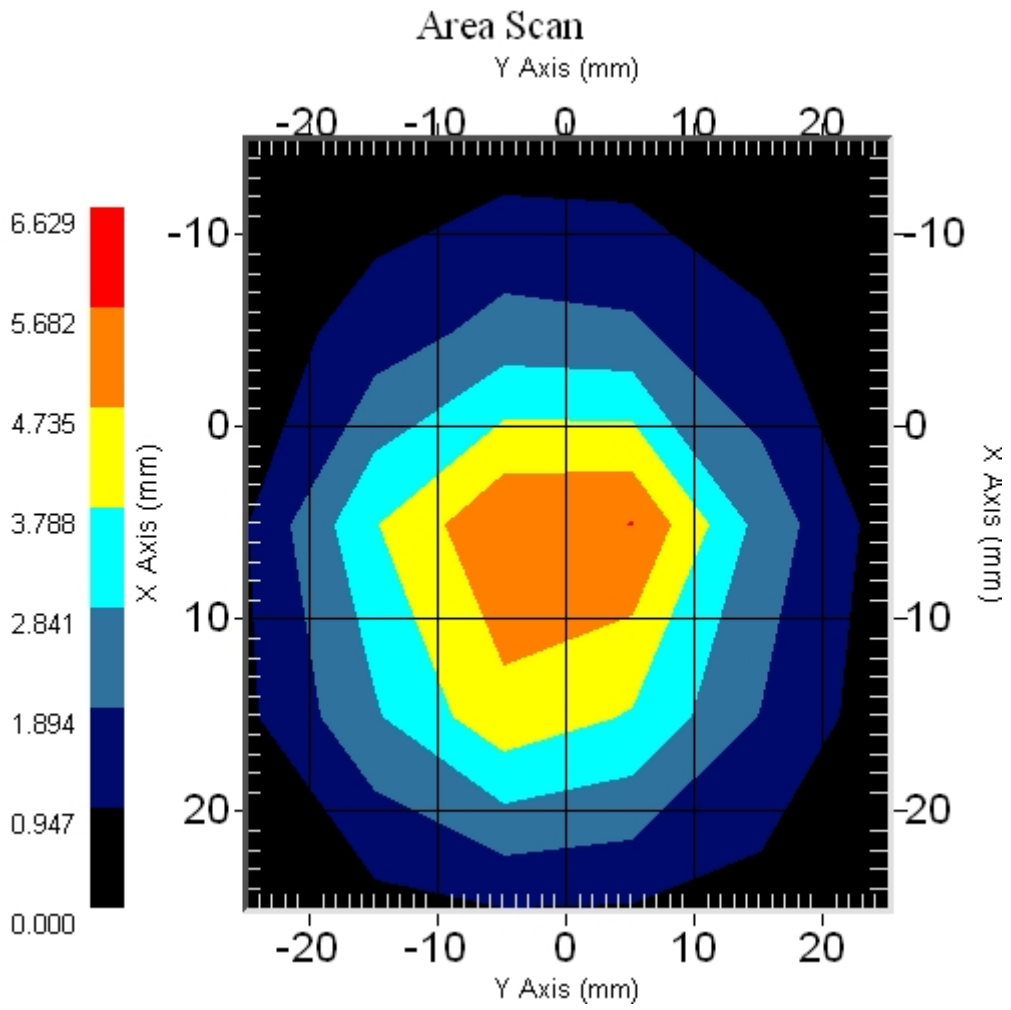
Smith Chart Dipole Impedance



System Validation Results Using the Electrically Calibrated Dipole

Results @ 100mW

Head Tissue Frequency	1 Gram	10 Gram	Peak Above Feed Point
2450 MHz	5.31	2.44	10.18



Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2009.

Usage of SAR dipoles calibrated less than 2 years ago but more than 1 year ago were confirmed in maintaining return loss (< -20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 450824:

NCL CALIBRATION LABORATORIES

Calibration File No: DC-1182
Project Number: RFEB-5552

C E R T I F I C A T E OF C A L I B R A T I O N

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

Validation Dipole

Manufacturer: APREL Laboratories
Part number: ALS-D-2450-S-2
Frequency: 2450 MHz
Serial No: RFE-278

Customer: RFEL
Body Calibration

Calibrated: 18th November 2010
Released on: 19th November 2010

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary

Released By: _____

NCL CALIBRATION LABORATORIES
51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6
Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4162

Conditions

Dipole RFE-278 was a new calibration.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 21 °C +/- 0.5°C

We the undersigned attest that to the best of our knowledge the calibration of this device has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

We the undersigned attest that to the best of our knowledge the calibration of this device has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

Stuart Nicol

C. Teodorian

Calibration Results Summary

The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

Mechanical Dimensions

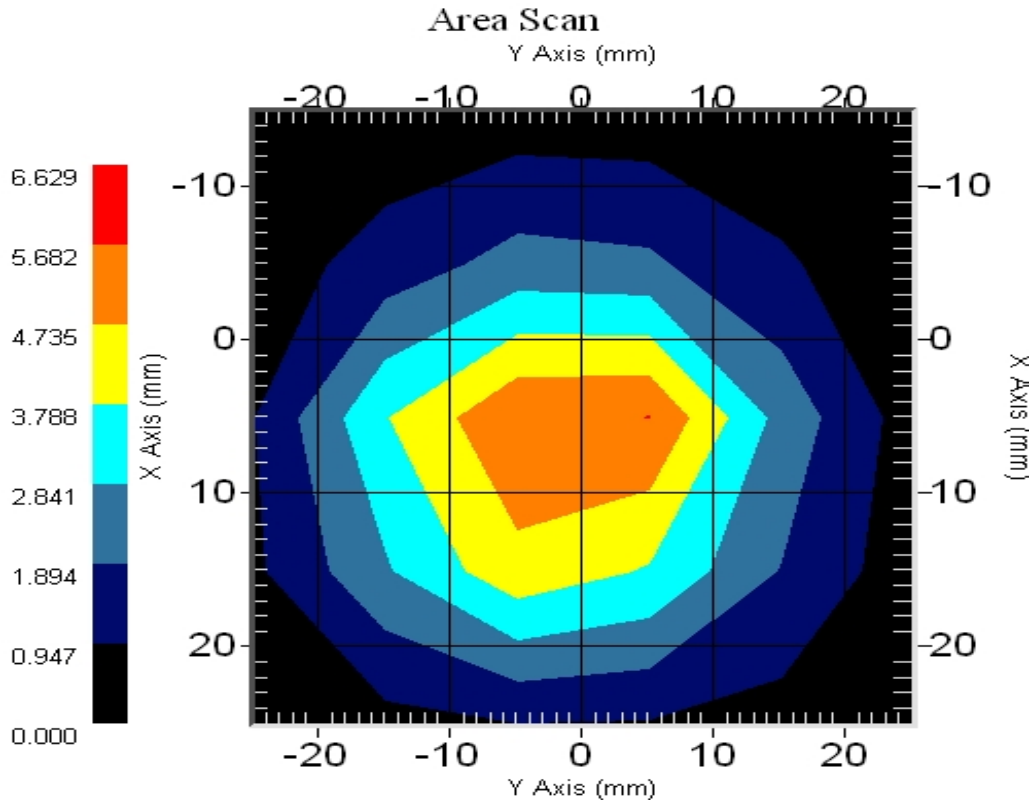
Length: 51.5 mm
Height: 30.4 mm

Electrical Specification

SWR: 1.249 U
Return Loss: -19.170 dB
Impedance: 42.223 Ω

System Validation Results @ 100mW

Frequency	1 Gram	10 Gram	Peak
2450 MHz	5.15	2.31	10.01



Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole RFE-278. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-020 130 MHz to 26 GHz E-Field Probe Serial Number 226.

References

SSI-TP-018-ALSAS Dipole Calibration Procedure
SSI-TP-016 Tissue Calibration Procedure
IEEE 1528 “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques”

Conditions

Dipole RFE-278 was a re-calibration.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 20 °C +/- 0.5°C

Dipole Calibration Results

Mechanical Verification

APREL Length	APREL Height	Measured Length	Measured Height
51.5 mm	30.4 mm	52.1 mm	31.0 mm

Tissue Validation

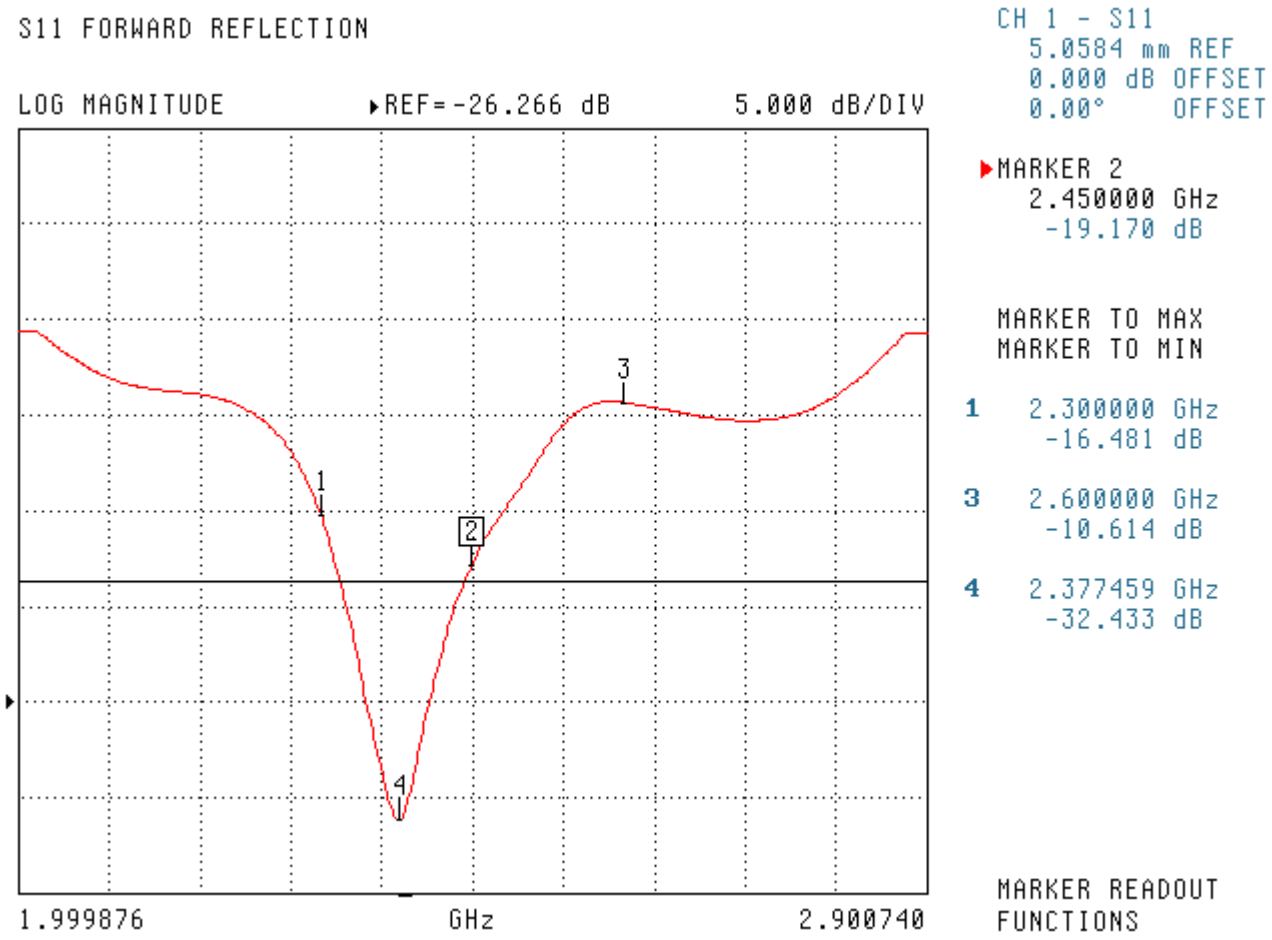
Body Tissue 2450 MHz	Measured
Dielectric constant, ε_r	52.0
Conductivity, σ [S/m]	1.92

Electrical Calibration

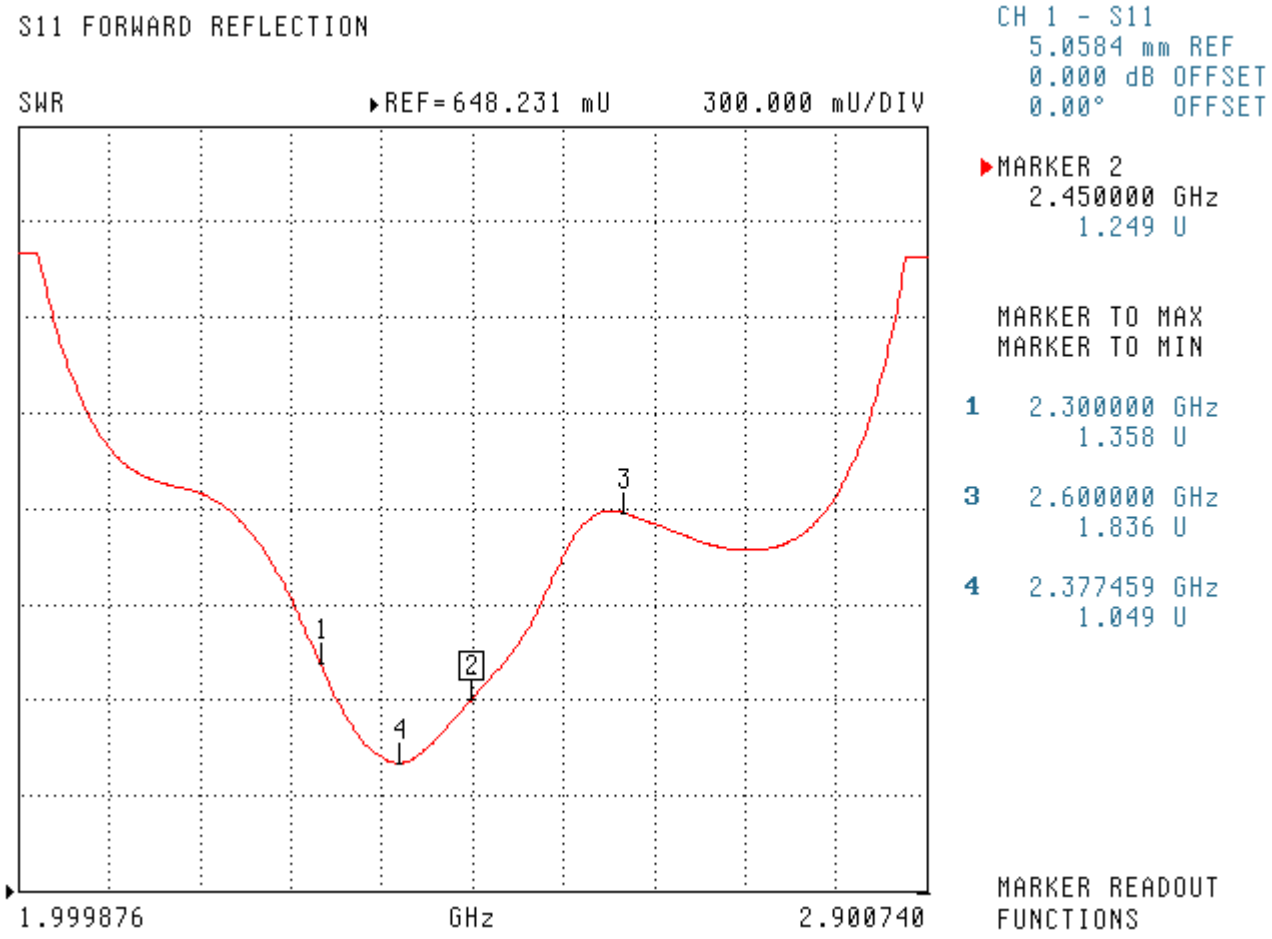
Test	Result
S11 R/L	-19.170 dB
SWR	1.249 U
Impedance	42.223 Ω

The Following Graphs are the results as displayed on the Vector Network Analyzer.

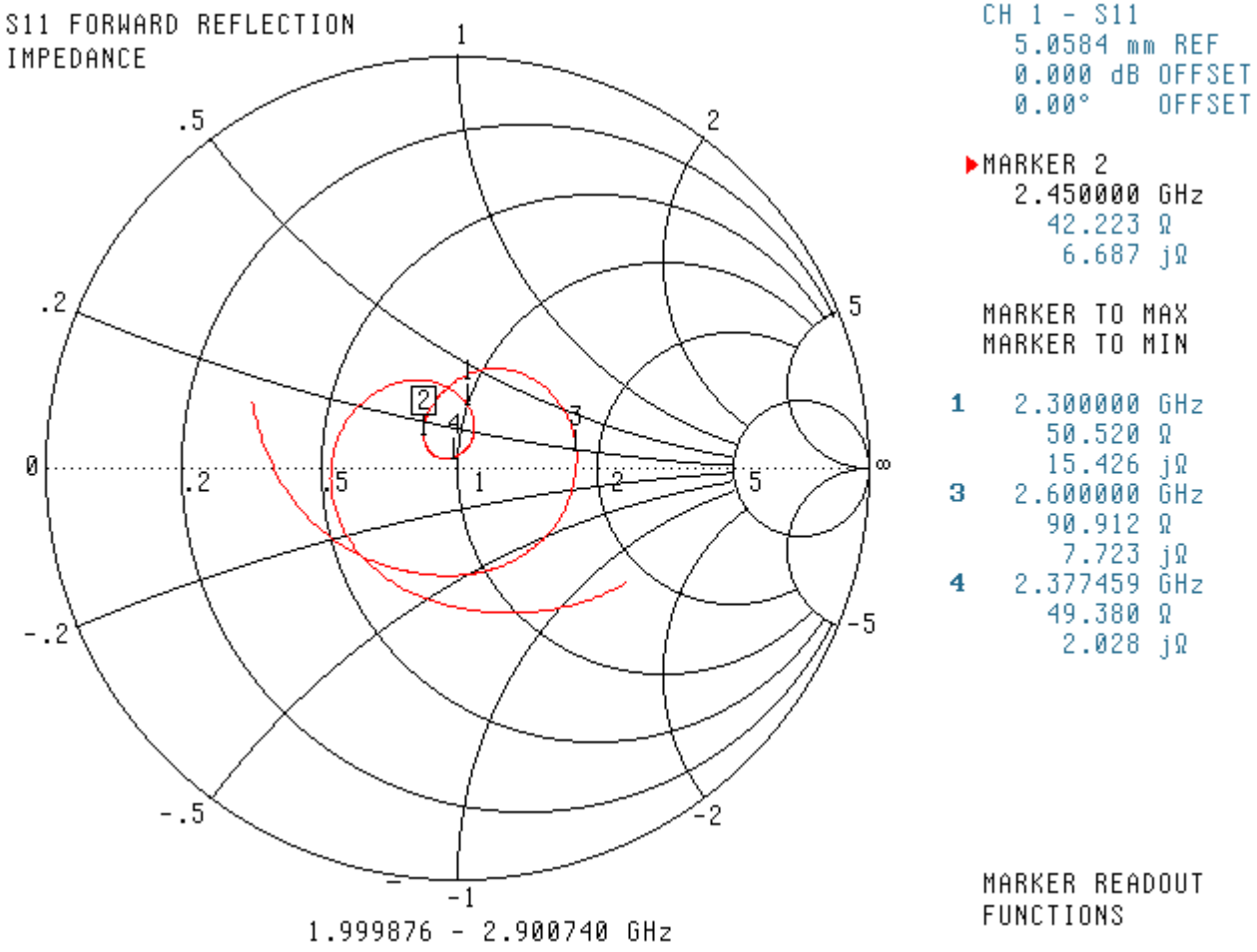
S11 Parameter Return Loss



SWR



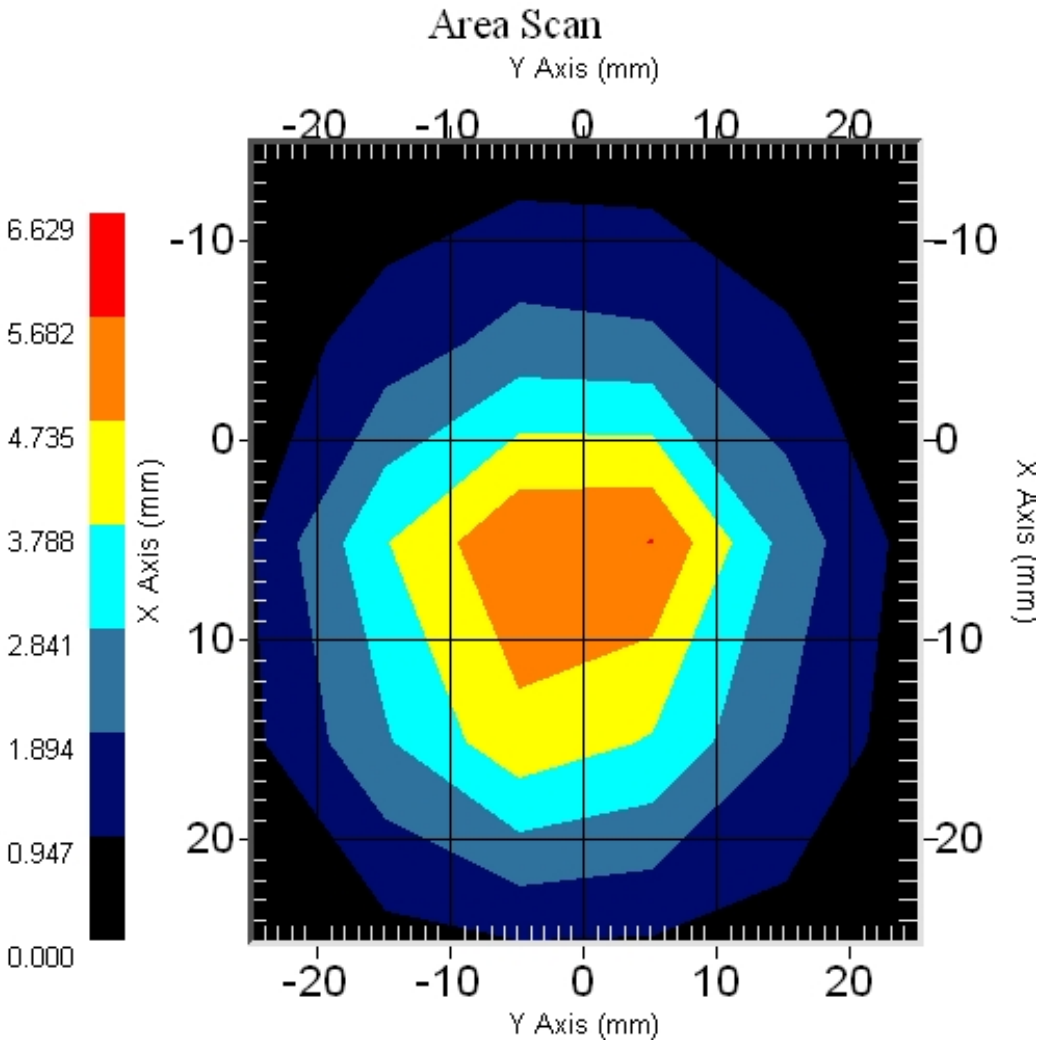
Smith Chart Dipole Impedance



System Validation Results Using the Electrically Calibrated Dipole

Results @ 100mW

Body Tissue Frequency	1 Gram	10 Gram	Peak Above Feed Point
2450 MHz	5.15	2.31	10.01



Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2010.

NCL CALIBRATION LABORATORIES

Calibration File No: DC-1110, 1111, 1112
Project Number: RFEB-5496, 5497, 5498

C E R T I F I C A T E OF C A L I B R A T I O N

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

Validation Dipole

Manufacturer: APREL Laboratories
Part number: ALS-D-BB-S-2
Frequency: 5200-5800 MHz
Serial No: 235-00801

Customer: RFEL

Calibrated: 12th January 2010
Released on: 12th January 2010

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary

Released By: _____

NCL CALIBRATION LABORATORIES
51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6
Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4162

Conditions

Dipole 235-00801 was new and taken from stock prior to calibration.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 21 °C +/- 0.5°C

We the undersigned attest that to the best of our knowledge the calibration of this device has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

Stuart Nicol

C. Teodorian

Calibration Results Summary

The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

Mechanical Dimensions

Length: 23 mm
Height: 21 mm

Electrical Specification 5200MHz

SWR: 1.025 U
Return Loss: -38.354 dB
Impedance: 51.08 Ω

Electrical Specification 5600MHz

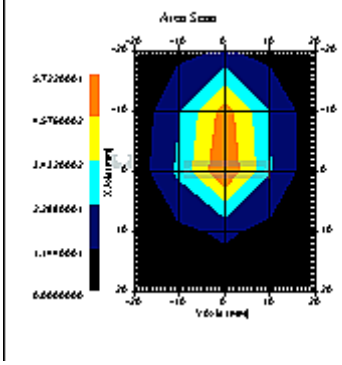
SWR: 1.025 U
Return Loss: -38.3 dB
Impedance: 49.303 Ω

Electrical Specification 5800MHz

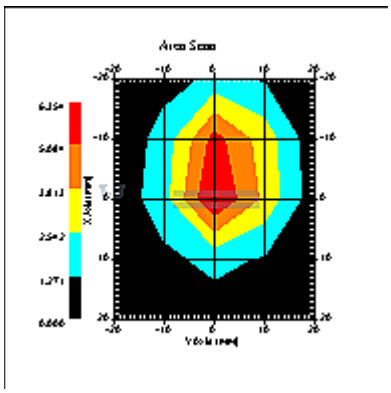
SWR: 1.038 U
Return Loss: -34.609 dB
Impedance: 48.872 Ω

System Validation Results

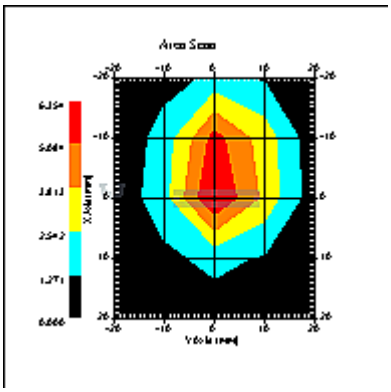
Frequency	1 Gram	10 Gram	Peak
5200 MHz	61.66	19.5	-
5600 MHz	65.03	21.2	-
5800 MHz	63.43	20.19	-



5200MHz



5600MHz



5800MHz

Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole 235-00801. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-030 130 MHz to 26 GHz E-Field Probe Serial Number 215.

References

SSI-TP-018-ALSAS Dipole Calibration Procedure
SSI-TP-016 Tissue Calibration Procedure
IEEE 1528 “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques”
IEC-62209 “Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures”
Part 1: “Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity of the ear (frequency range of 300 MHz to 3 GHz)”
IEC-62209 “Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures”
Part 2 *Draft*: “Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity of the ear (frequency range of 30 MHz to 6 GHz)”

Conditions

Dipole 235-00801 was a re-calibration.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 20 °C +/- 0.5°C

Dipole Calibration Results

Mechanical Verification

APREL Length	APREL Height	Measured Length	Measured Height
23 mm	21 mm	23 mm	21 mm

Tissue Validation

Head Tissue 5200 MHz	Measured
Dielectric constant, ε_r	47.8
Conductivity, σ [S/m]	5.27

Head Tissue 5600 MHz	Measured
Dielectric constant, ε_r	46.8
Conductivity, σ [S/m]	5.71

Head Tissue 5800 MHz	Measured
Dielectric constant, ε_r	47.9
Conductivity, σ [S/m]	6.15

Electrical Calibration

Electrical Specification 5200MHz

SWR: 1.025 U
Return Loss: -38.354 dB
Impedance: 51.08 Ω

Electrical Specification 5600MHz

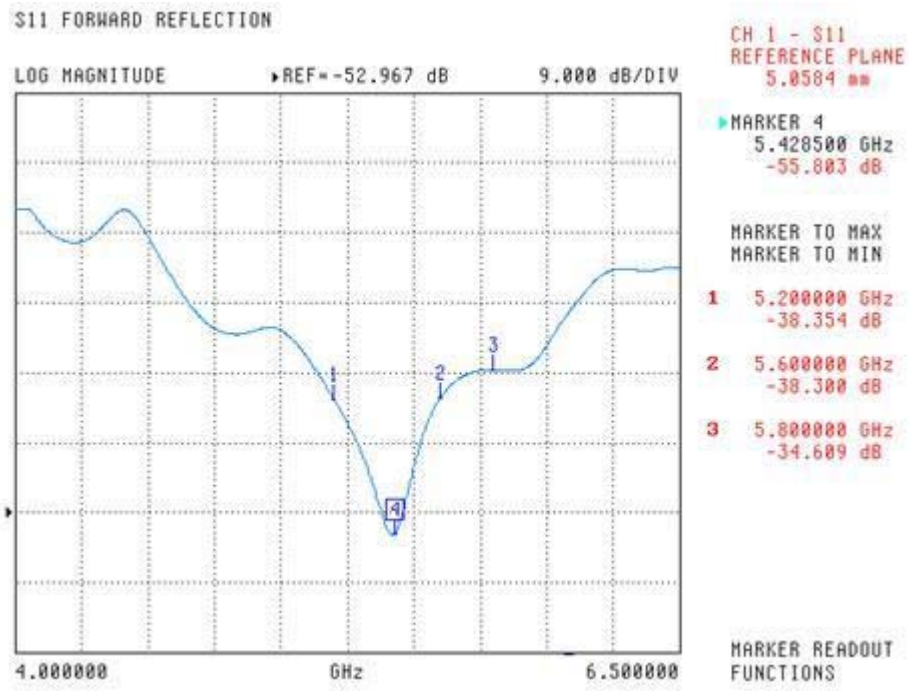
SWR: 1.025 U
Return Loss: -38.3 dB
Impedance: 49.303 Ω

Electrical Specification 5800MHz

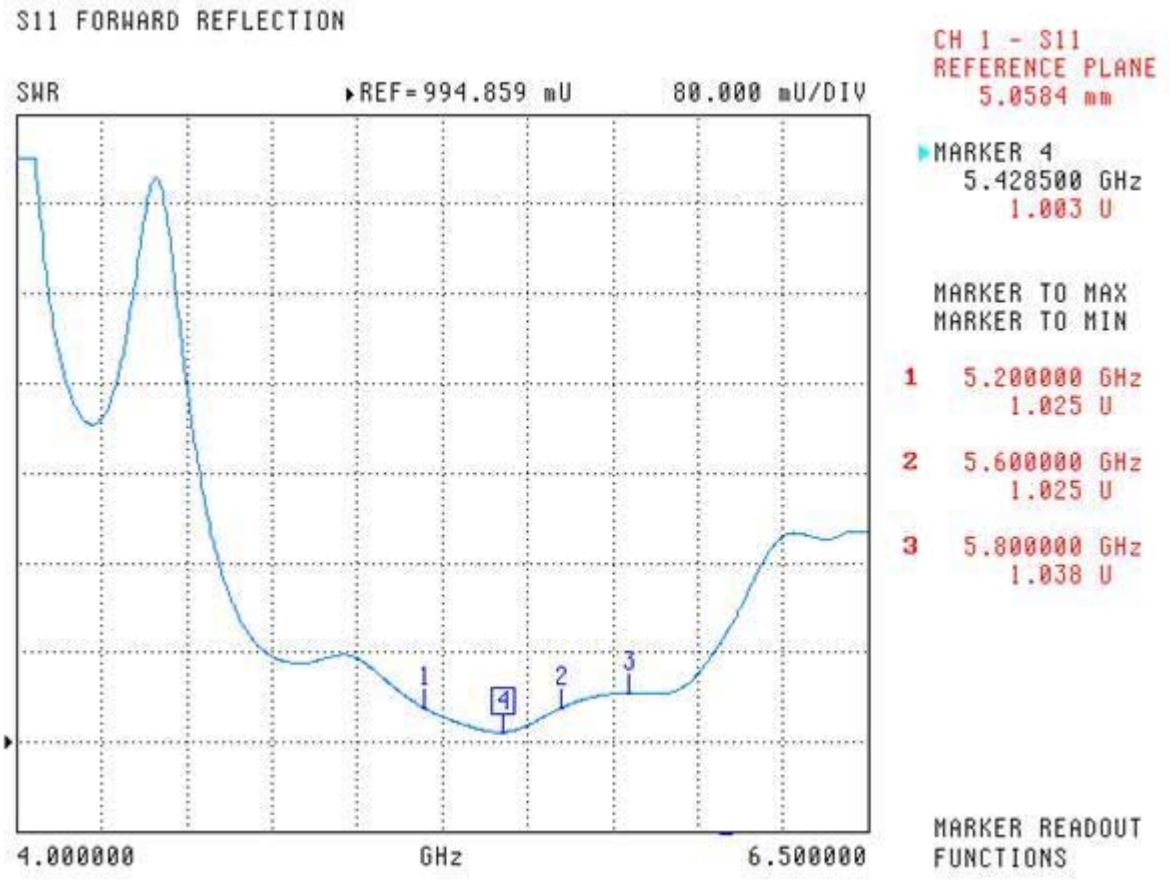
SWR: 1.038 U
Return Loss: -34.609 dB
Impedance: 48.872 Ω

The Following Graphs are the results as displayed on the Vector Network Analyzer.

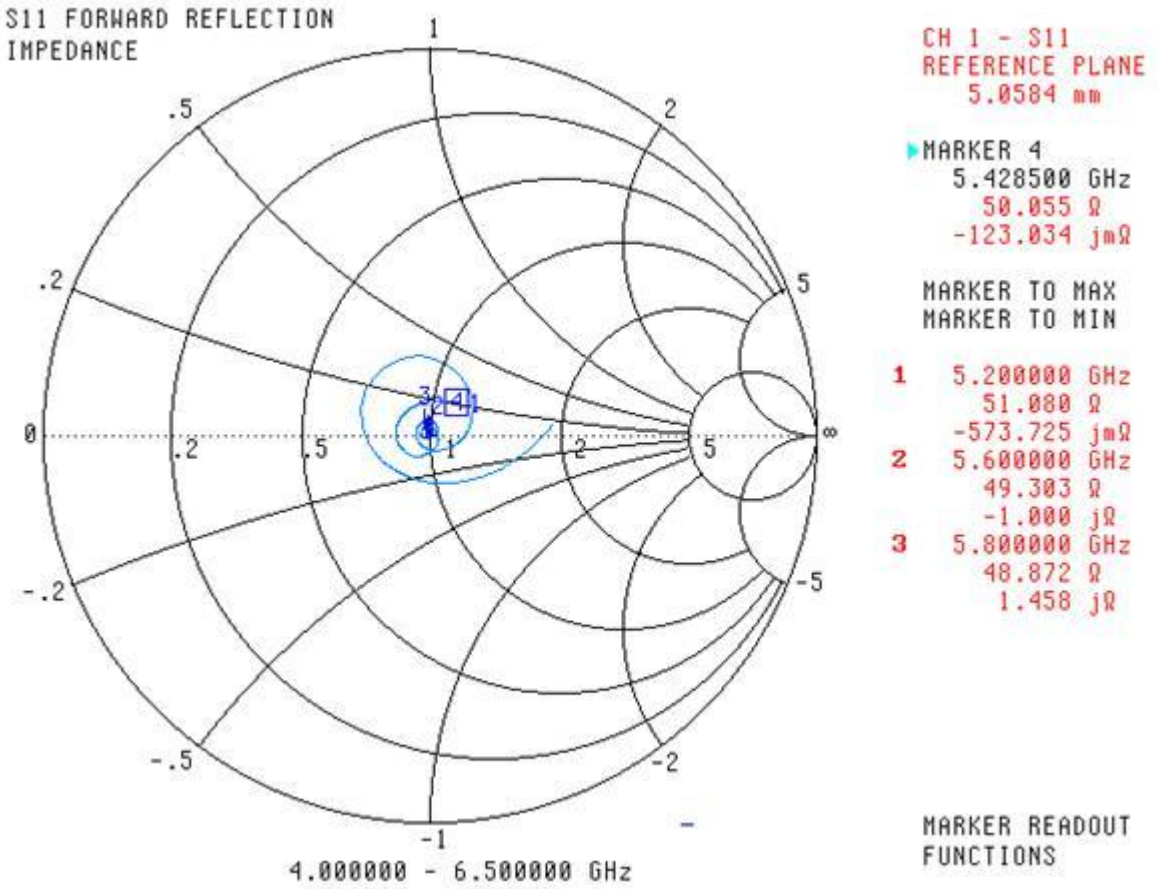
S11 Parameter Return Loss



SWR

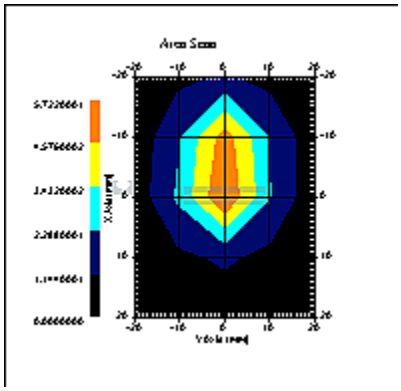


Smith Chart Dipole Impedance

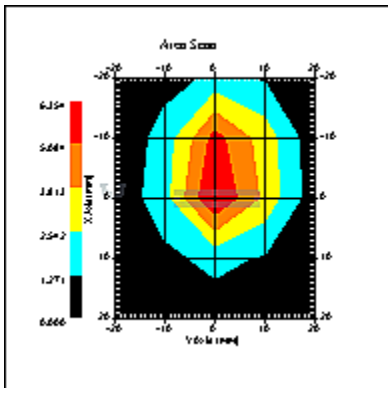


System Validation Results Using the Electrically Calibrated Dipole

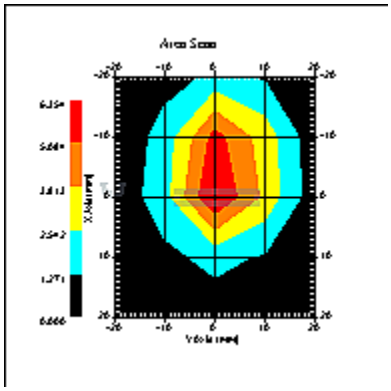
Frequency	1 Gram	10 Gram	Peak
5200 MHz	61.66	19.5	-
5600 MHz	65.03	21.2	-
5800 MHz	63.43	20.19	-



5200MHz



5600MHz



5800MHz

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2009.

Usage of SAR dipoles calibrated less than 2 years ago but more than 1 year ago were confirmed in maintaining return loss (< -20 dB, within 20% of prior calibration) and impedance (within 5 ohm from prior calibration) requirements per extended calibrations in KDB Publication 450824:

NCL CALIBRATION LABORATORIES

Calibration File No: DC-1191
Project Number: RFEB-5556

C E R T I F I C A T E OF C A L I B R A T I O N

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

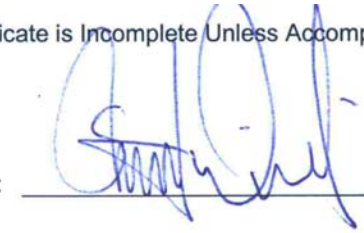
Validation Dipole

Manufacturer: APREL Laboratories
Part number: ALS-D-BB-S-2
Frequency: 5200-5800 MHz
Serial No: 235-00801

Customer: RFEL

Calibrated: 16th December 2010
Released on: 9th February 2011

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary

Released By: 

NCL CALIBRATION LABORATORIES

51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6

Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4162

Conditions

Dipole 235-00801 was new and taken from stock prior to calibration.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 21 °C +/- 0.5°C

We the undersigned attest that to the best of our knowledge the calibration of this device has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

Stuart Nicol

C. Teodorian

Calibration Results Summary

The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

Mechanical Dimensions

Length: 23 mm
Height: 21 mm

Electrical Specification 5200MHz

SWR: 1.013 U
Return Loss: -44.267 dB
Impedance: 49.892 Ω

Electrical Specification 5600MHz

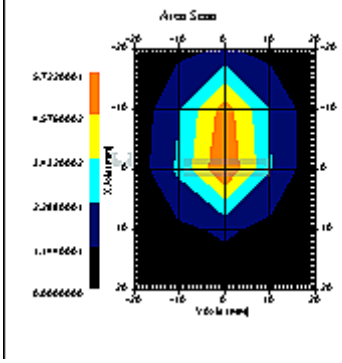
SWR: 1.006 U
Return Loss: -50.321 dB
Impedance: 50.247 Ω

Electrical Specification 5800MHz

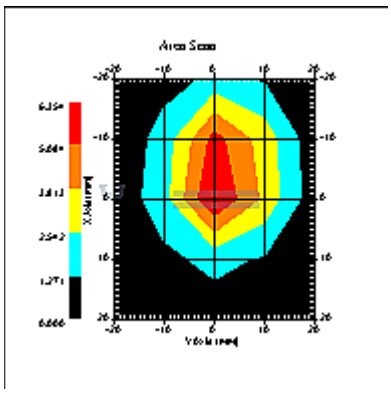
SWR: 1.021 U
Return Loss: -39.852 dB
Impedance: 49.261 Ω

System Validation Results

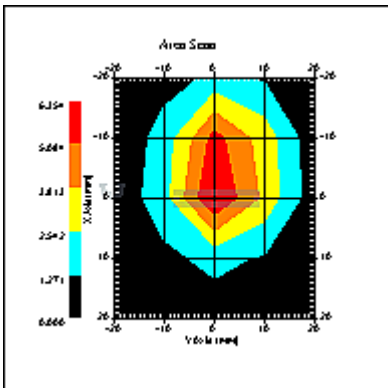
Frequency	1 Gram	10 Gram	Peak
5200 MHz	59.81	19.01	-
5600 MHz	63.10	20.60	-
5800 MHz	61.36	19.73	-



5200MHz



5600MHz



5800MHz

Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole 235-00801. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-030 130 MHz to 26 GHz E-Field Probe Serial Number 215.

References

SSI-TP-018-ALSAS Dipole Calibration Procedure
SSI-TP-016 Tissue Calibration Procedure
IEEE 1528 “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques”
IEC-62209 “Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures”
Part 1: “Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity of the ear (frequency range of 300 MHz to 3 GHz)”
IEC-62209 “Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures”
Part 2 *Draft*: “Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity of the ear (frequency range of 30 MHz to 6 GHz)”

Conditions

Dipole 235-00801 was a re-calibration.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 20 °C +/- 0.5°C

Dipole Calibration Results

Mechanical Verification

APREL Length	APREL Height	Measured Length	Measured Height
23 mm	21 mm	23 mm	21 mm

Tissue Validation

Body Tissue 5200 MHz	Measured
Dielectric constant, ε_r	48.40
Conductivity, σ [S/m]	5.12

Body Tissue 5600 MHz	Measured
Dielectric constant, ε_r	47.31
Conductivity, σ [S/m]	5.80

Body Tissue 5800 MHz	Measured
Dielectric constant, ε_r	46.72
Conductivity, σ [S/m]	6.18

Electrical Calibration

Electrical Specification 5200MHz

SWR: 1.013 U
Return Loss: -44.267 dB
Impedance: 49.892 Ω

Electrical Specification 5600MHz

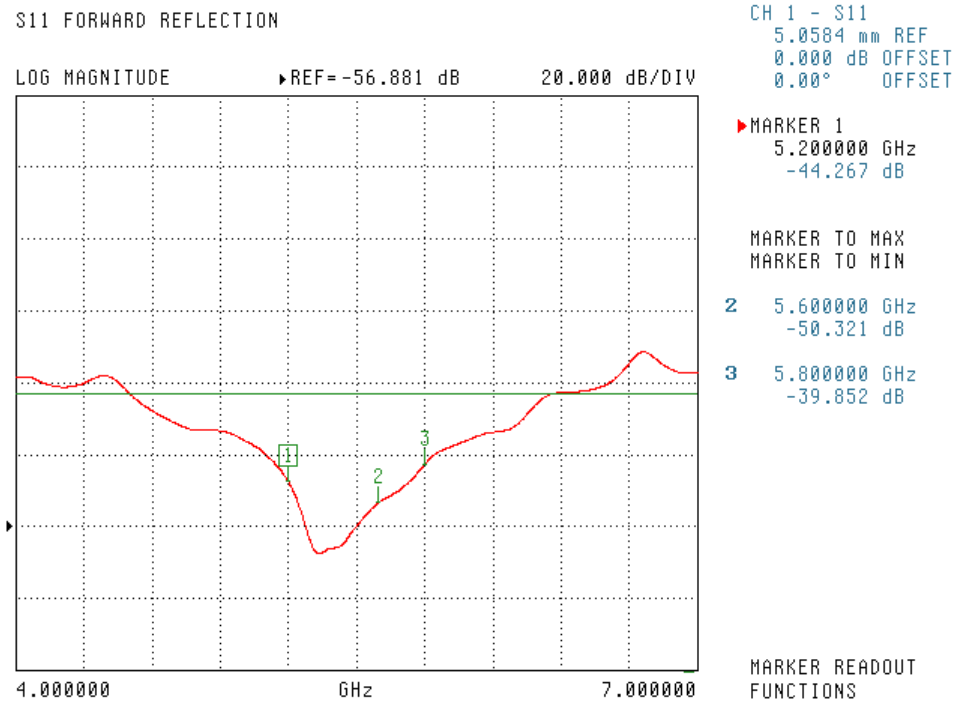
SWR: 1.006 U
Return Loss: -50.321 dB
Impedance: 50.247 Ω

Electrical Specification 5800MHz

SWR: 1.021 U
Return Loss: -39.852 dB
Impedance: 49.261 Ω

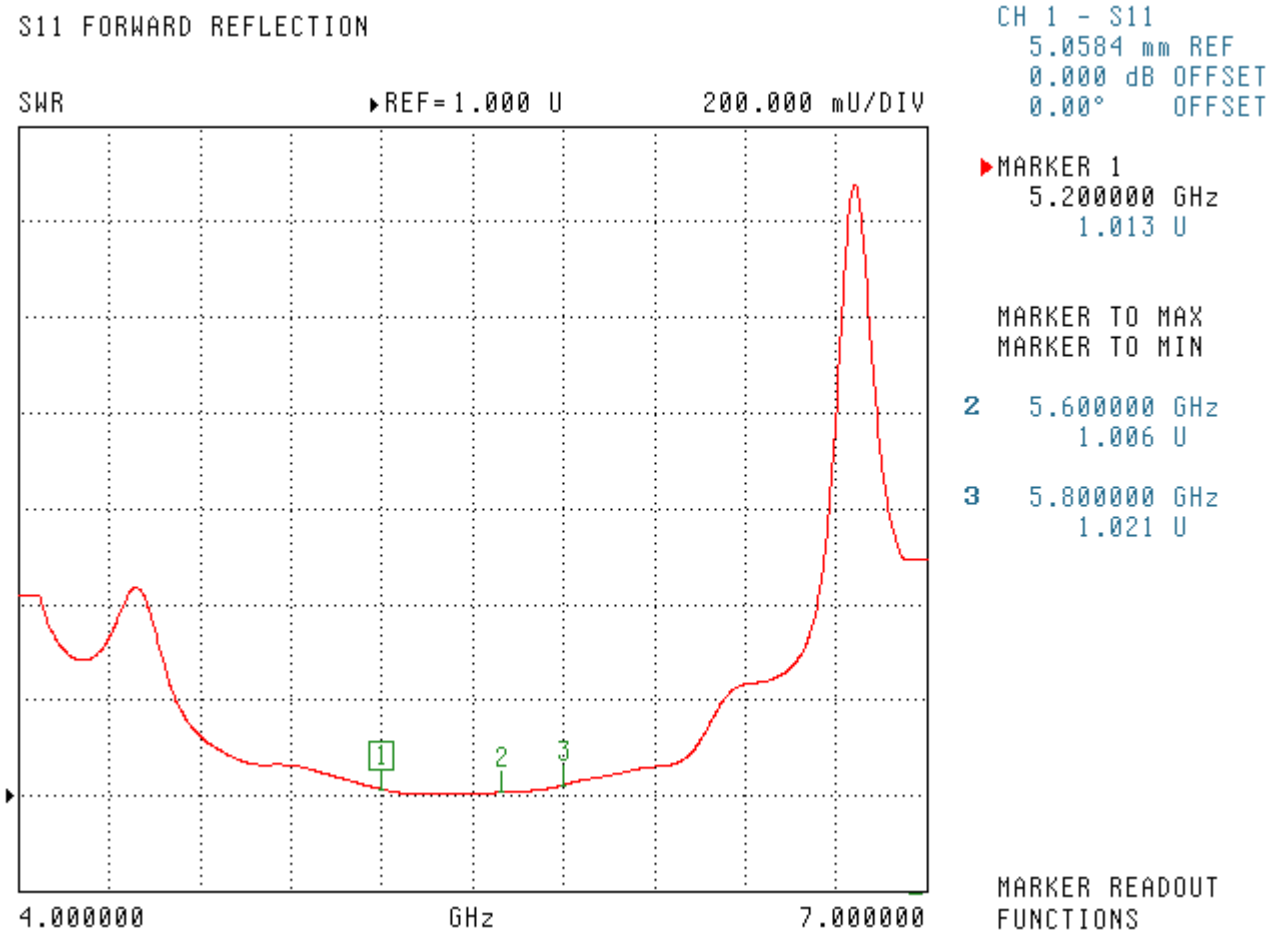
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

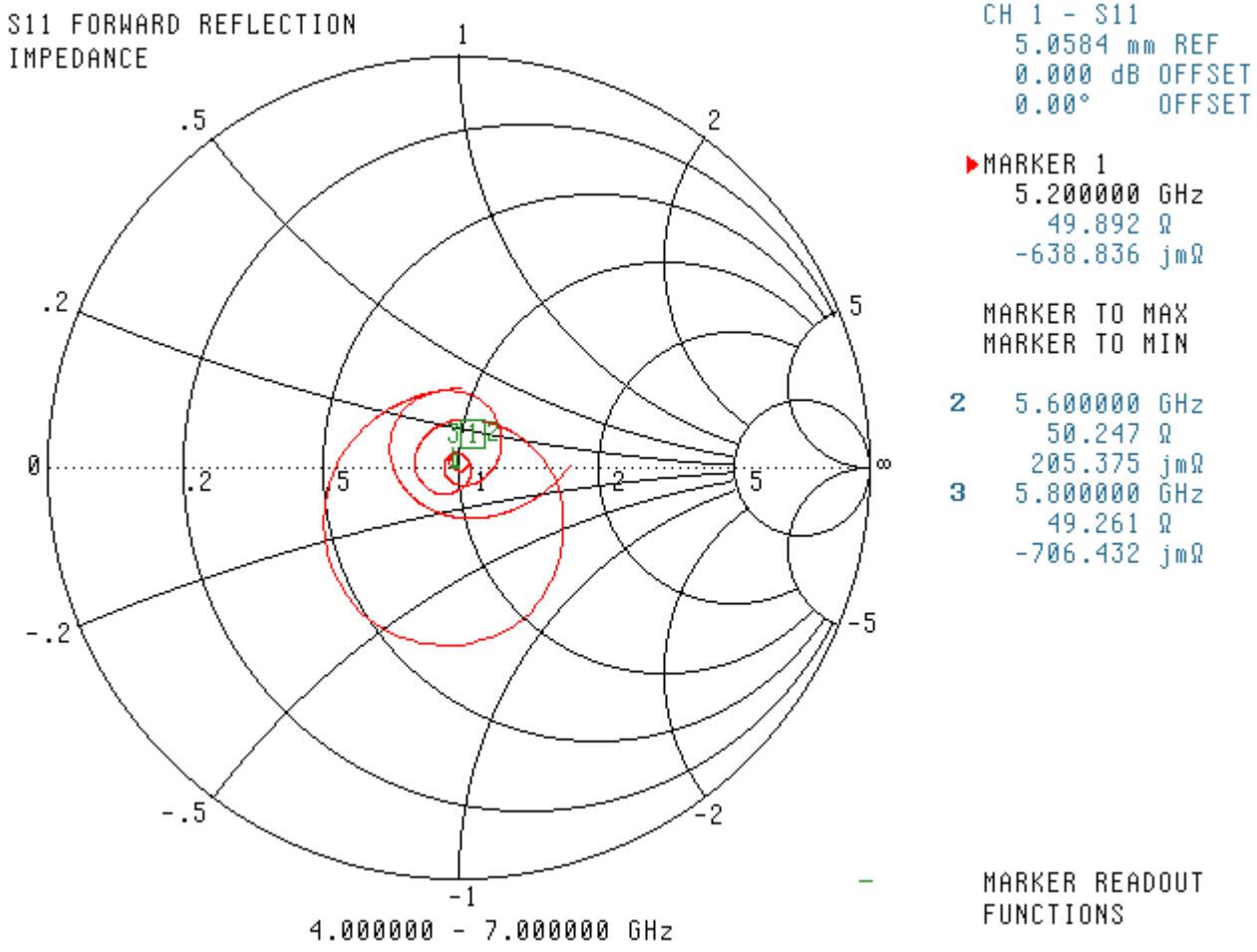


This page has been reviewed for content and attested to by signature within this document.

SWR

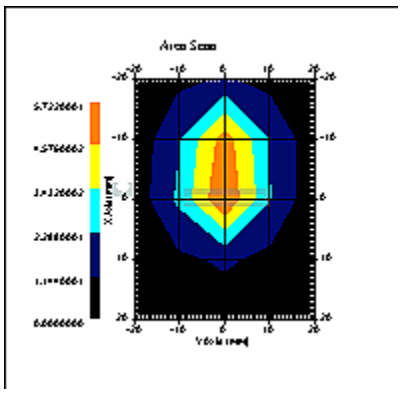


Smith Chart Dipole Impedance

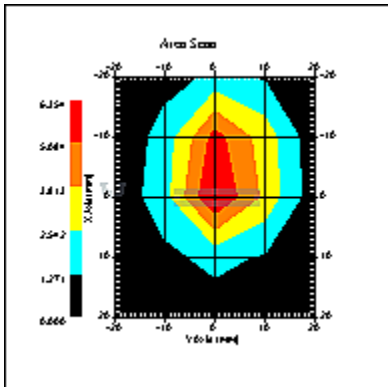


System Validation Results Using the Electrically Calibrated Dipole

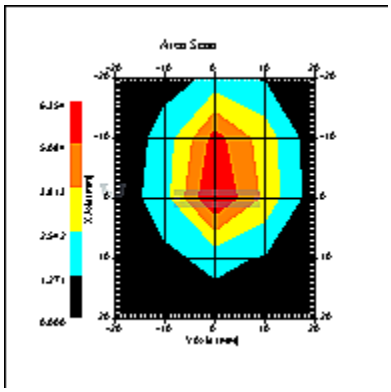
Frequency	1 Gram	10 Gram	Peak
5200 MHz	59.81	19.01	-
5600 MHz	63.10	20.60	-
5800 MHz	61.36	19.73	-



5200MHz



5600MHz



5800MHz

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2010.

Appendix F – Phantom Calibration Data Sheets

NCL CALIBRATION LABORATORIES

Calibration File No.: RFE-268

CERTIFICATE OF CALIBRATION

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to National Standards.

Unit serial number: RFE-268

MEASUREMENTS OF THE PINNA

Right SAM Head

MB0	NF6	**1.96**
MB0	NF8	**1.99**
MB -30	NF6	**1.98**
MB +30	NF6	**2.00**
MB0	NF0	**5.80**
MB +30	NF0	**4.46**
MB -30	NF0	**11.56**
MB0	NF -2	**5.6**

NOTE: Lowest value was recorded.

Calibrated By: Karim K Date: Feb 17/04.

NCL CALIBRATION LABORATORIES

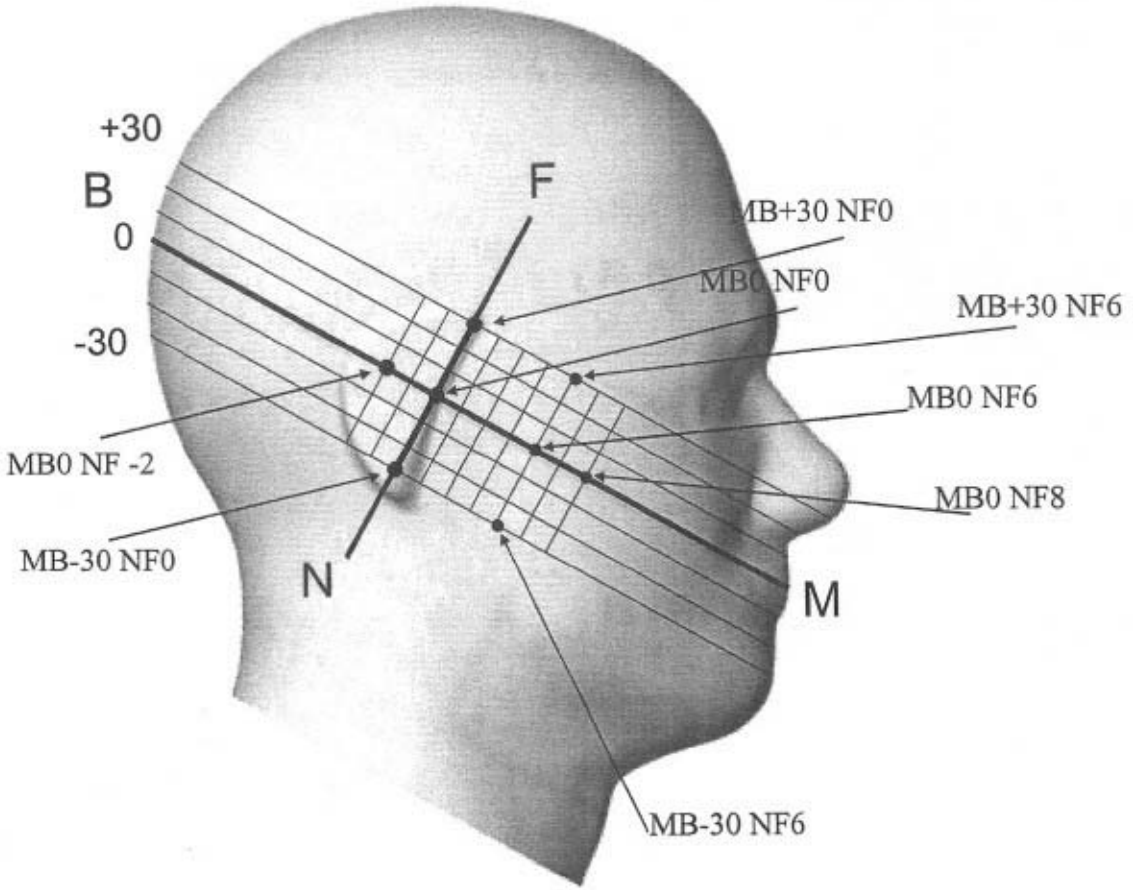
51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6

Division of APREL Laboratories.
TEL: (613) 820-4988
FAX: (613) 820-4161

NCL CALIBRATION LABORATORIES

Calibration File No.: RFE-268

CERTIFICATE OF CALIBRATION



NCL CALIBRATION LABORATORIES

51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6

Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4161

NCL CALIBRATION LABORATORIES

Calibration File No.: RFE-267

CERTIFICATE OF CALIBRATION

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to National Standards.

Unit serial number: RFE-267

MEASUREMENTS OF THE PINNA

Left SAM Head

MB0	NF6	**2.00**
MB0	NF8	**2.01**
MB -30	NF6	**2.00**
MB +30	NF6	**1.98**
MB0	NF0	**5.68**
MB +30	NF0	**4.68**
MB -30	NF0	**1.52**
MB0	NF -2	**5.61**

NOTE: Lowest value was recorded.

Calibrated By: Karim K Date: Feb 17/04

NCL CALIBRATION LABORATORIES

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NEPEAN, ONTARIO
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Division of APREL Laboratories.
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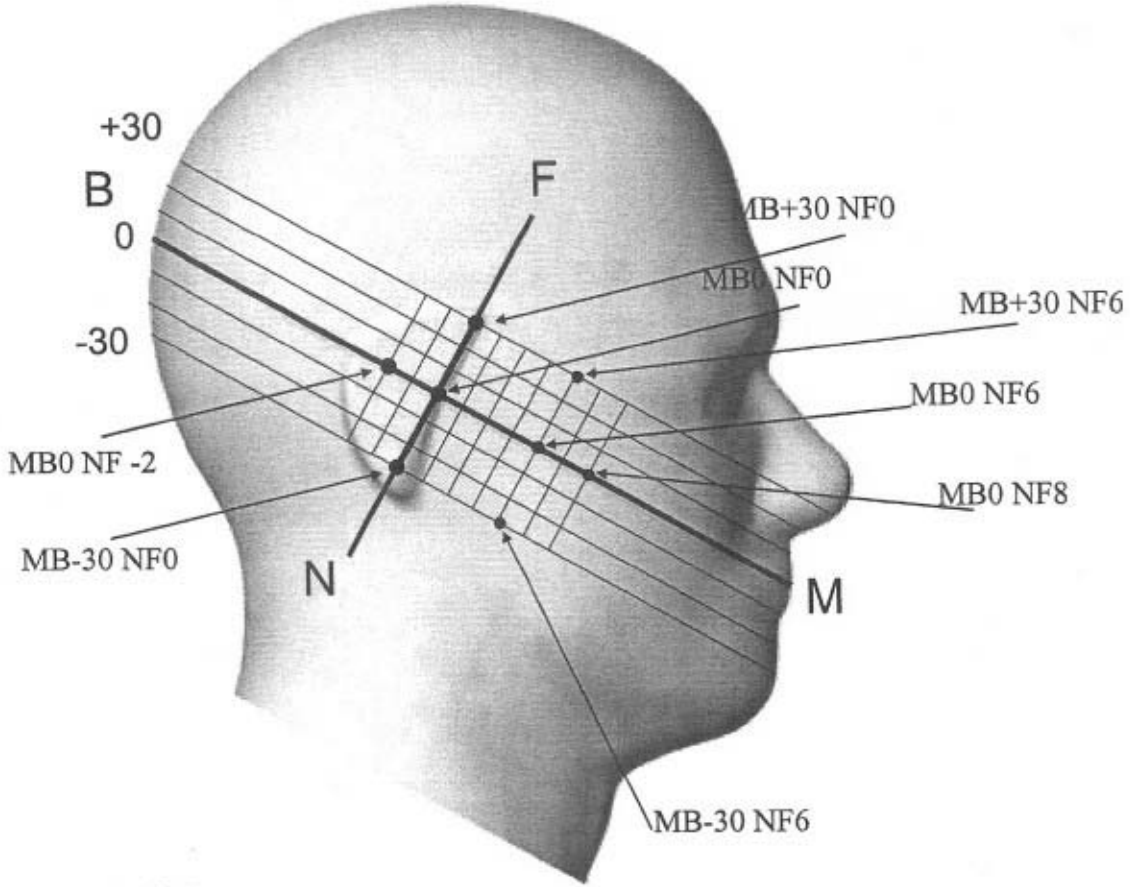
NCL CALIBRATION LABORATORIES

Calibration File No.: RFE-267

CERTIFICATE OF CALIBRATION



NCL CALIBRATION LABORATORIES

51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6

Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4161

NCL CALIBRATION LABORATORIES

Calibration File No.: RFE-273

CERTIFICATE OF CALIBRATION

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to National Standards.

Thickness of the UniPhantom is 2 mm ± 10%
Pinna thickness is 6 mm ± 10%

Resolution:	0.01 mm	Calibrated to:	0.0 mm
Stability:	OK	Accuracy:	< 0.1 mm

Calibrated By: Karen K. Feb 17/04.

NCL CALIBRATION LABORATORIES
51 SPECTRUM WAY
NEPEAN, ONTARIO
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TEL: (613) 820-4988
FAX: (613) 820-4161