

# RF Exposure Lab

802 N. Twin Oaks Valley Road, Suite 105 • San Marcos, CA 92069 • U.S.A.

TEL (760) 471-2100 • FAX (760) 471-2121

<http://www.rfexposurelab.com>

## CERTIFICATE OF COMPLIANCE SAR EVALUATION

Intermec  
6001 36<sup>th</sup> Avenue West  
Everett, WA 98203

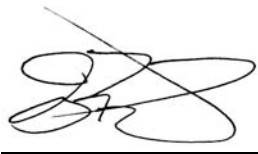
Dates of Test: January 21 – 26, 2011  
Test Report Number: SAR.20110107  
Revision A

FCC ID:	EHA-1000CP01UX1
IC Certificate:	1223A-1000CP01UX1
Model(s):	1001CP01U
Test Sample:	Engineering Unit Same as Production
Serial No.:	7077
Equipment Type:	Wireless Handheld Computer
Classification:	PCS Licensed Transmitter (PCB)
TX Frequency Range:	824.2 – 848.8 MHz, 1850.2 – 1909.8 MHz
Frequency Tolerance:	± 2.5 ppm
Maximum RF Output:	850 MHz (GSM) – 31.92 dBm, 850 MHz (WCDMA) – 23.16 dBm, 1900 MHz (GSM) – 29.59 dBm 1900 MHz (WCDMA) – 22.46 dBm, Conducted
Signal Modulation:	GMSK, 8PSK, WCDMA
Antenna Type (Length):	Internal
Application Type:	Certification
FCC Rule Parts:	Part 22, 24
Industry Canada:	RSS-102

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, OET Bulletin 65 Supp. C, RSS-102 and Safety Code 6 (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 has been denied 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



Certificate # 2387.01

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## 1. Introduction

This measurement report shows compliance of the Intermec Model 1001CP01U FCC ID: EHA-1000CP01UX1 with FCC Part 2, 1093, ET Docket 93-62 Rules for mobile and portable devices and IC Certificate: 1223A-1000CP01UX1 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 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 ( $\rho$ ).

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

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

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

where:

$\sigma$  = conductivity of the tissue (S/m)

$\rho$  = mass density of the tissue (kg/m<sup>3</sup>)

$E$  = 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 pendant 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 April 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).

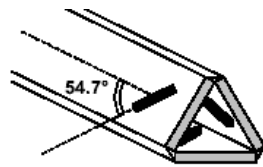
The overall uncertainty for the methodology and algorithms the ALSAS-10-U used during the SAR calculation was evaluated using the data from IEEE 1528 f3 algorithm:

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

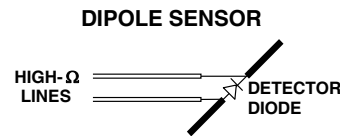
The probe used during the measurement process has been assessed to provide values for diode compression. These values are calculated during the probe calibration exercise and are used in the mathematical calculations for the assessment of SAR.

## 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 5mm 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 5mm 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  $\pm 0.05$  mm and the precision of the APREL bottom detection device is  $\pm 0.1$  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  $\pm 0.1$  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  $\pm 0.1$  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  $\leq 3$  GHz with a cube scan of 5x5x8 yields a volume of 32x32x28 mm<sup>3</sup>. For devices  $>3$  GHz and  $<4.5$  GHz, the cube scan of 9x9x9 yields a volume of 32x32x24 mm<sup>3</sup>. For devices  $\geq 4.5$  GHz, the cube scan of 7x7x12 yields a volume of 24x24x22 mm<sup>3</sup>.

### 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 90<sup>th</sup> percentile adult male head dimensions as tabulated by the US Army. The SAM phantom shell is bisected along the mid sagittal 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 tissue dielectric parameters computed from the 4-Cole-Cole equations.

**Table 5.1 Typical Composition of Ingredients for Tissue**

Ingredients		Simulating Tissue			
		850 MHz Head	850 MHz Body	1900 MHz Head	1900 MHz Body
Mixing Percentage					
Water		51.07	52.40	54.88	69.91
Sugar		47.31	45.00	0.00	0.00
Salt		1.15	1.40	0.21	0.13
HEC		0.23	1.00	0.00	0.00
Bactericide		0.24	0.10	0.00	0.00
DGBE		0.00	0.00	44.91	29.96
Dielectric Constant	Target	41.50	55.20	40.00	53.30
Conductivity (S/m)	Target	0.90	0.97	1.40	1.52

### Device Holder

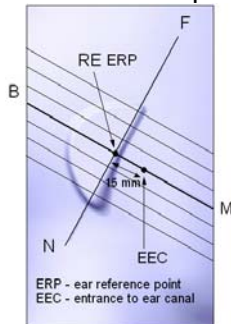


In combination with the SAM phantom, the mounting device enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation point is the ear opening. The devices can easily, accurately, and repeatably be positioned according to the FCC specifications. The device holder can 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].



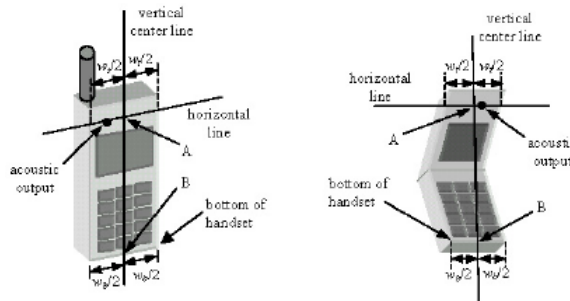
**Figure 6.1 Close-up side view of ERP's**



**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 then 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 its 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].

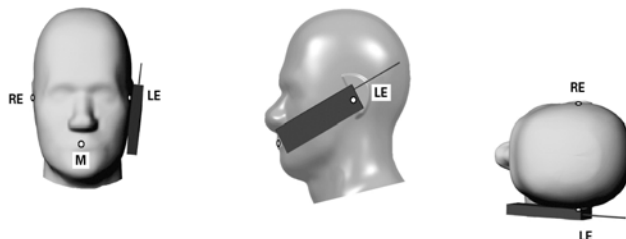


**Figure 6.3 Handset Vertical Center & Horizontal Line Reference Points**

## 7. Test Configuration Positions

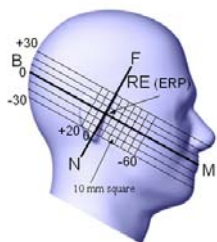
### Positioning for Cheek/Touch [5]

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.

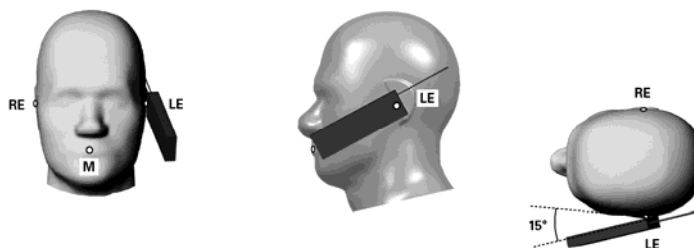


**Figure 7.2 Side view w/ relevant markings**

### 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.

Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessory(ies), including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

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 manual.

## 8. ANSI/IEEE C95.1 – 1999 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 <sup>1</sup> Head	1.60	8.00
SPATIAL AVERAGE SAR <sup>2</sup> Whole Body	0.08	0.40
SPATIAL PEAK SAR <sup>3</sup> Hands, Feet, Ankles, Wrists	4.00	20.00

<sup>1</sup> 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.

<sup>2</sup> The Spatial Average value of the SAR averaged over the whole body.

<sup>3</sup> 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	$\infty$
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-c_p)^{1/2}$	$(1-c_p)^{1/2}$	1.5	1.5	$\infty$
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{c_p}$	$\sqrt{c_p}$	4.4	4.4	$\infty$
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7	$\infty$
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6	$\infty$
Readout Electronics	1.0	normal	1	1	1	1.0	1.0	$\infty$
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5	$\infty$
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0	$\infty$
RF Ambient Condition	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7	$\infty$
Probe Positioner Mech. Restriction	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2	$\infty$
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7	$\infty$
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1	$\infty$
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	4.2	rectangular	$\sqrt{3}$	1	1	2.4	2.4	$\infty$
Phantom and Setup								
Phantom Uncertainty (shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0	$\infty$
Liquid Conductivity (target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4	$\infty$
Liquid Conductivity (meas.)	0.5	normal	1	0.7	0.5	0.4	0.3	5
Liquid Permittivity (target)	5.0	rectangular	$\sqrt{3}$	0.6	0.5	1.7	1.4	$\infty$
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

Note: A sensitivity coefficient ( $c_p$ ) of 0.5 was used for probe isotropy.

## 10. System Validation

### Tissue Verification

**Table 10.1 Measured Tissue Parameters**

		835 MHz Head		835 MHz Head		1900 MHz Head	
Date(s)		Jan. 22, 2011		Jan. 23, 2011		Jan. 21, 2011	
Liquid Temperature (°C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: $\epsilon$		41.50	41.23	41.50	41.46	40.00	39.51
Conductivity: $\sigma$		0.90	0.93	0.90	0.91	1.40	1.41
		1900 MHz Head		835 MHz Body		835 MHz Body	
Date(s)		Jan. 22, 2011		Jan. 25, 2011		Jan. 26, 2011	
Liquid Temperature (°C)	20.0	Target	Measured	Target	Measured	Target	Measured
Dielectric Constant: $\epsilon$		40.00	39.72	55.20	54.98	55.20	54.72
Conductivity: $\sigma$		1.40	1.40	0.97	0.99	0.97	0.98
		1900 MHz Body		1900 MHz Body			
Date(s)		Jan. 24, 2011		Jan. 25, 2011			
Liquid Temperature (°C)	20.0	Target	Measured	Target	Measured		
Dielectric Constant: $\epsilon$		53.30	53.07	53.30	53.16		
Conductivity: $\sigma$		1.52	1.54	1.52	1.53		

See Appendix A for data printout.

### Test System Verification

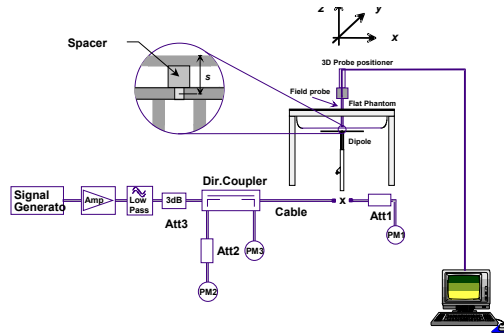
Prior to assessment, the system is verified to the  $\pm 10\%$  of the specifications at the test frequency by using the system kit. Power is extrapolated to 1 watt. (Graphic Plots Attached)

**Table 10.2 System Dipole Validation Target & Measured**

Date	Test Frequency	Head/Body	Targeted SAR <sub>10g</sub> (W/kg)	Measure SAR <sub>10g</sub> (W/kg)	Deviation (%)
21-Jan-2011	1900 MHz	Head	38.70	39.11	+ 1.06
22-Jan-2011	1900 MHz	Head	38.70	38.81	+ 0.28
22-Jan-2011	850 MHz	Head	9.49	9.37	- 1.26
23-Jan-2011	850 MHz	Head	9.49	9.82	+ 3.48
24-Jan-2011	1900 MHz	Body	40.90	39.95	- 2.32
25-Jan-2011	1900 MHz	Body	40.90	40.37	- 1.30
25-Jan-2011	850 MHz	Body	9.81	9.63	- 1.83
26-Jan-2011	850 MHz	Body	9.81	9.45	- 3.67

See Appendix A for data plots.





**Figure 10.1 Dipole Validation Test Setup**

## **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 placed into a call using the actual transmission activated through a base station simulator.

### **Device Test Condition**

In order to verify that the device was tested at full power, peak SAR measurement was performed before and after each SAR measurement to confirm the output power. If a measured deviation of more than 5% occurred, the test was repeated.

The head measurements were conducted per section 7 of this report. The body measurements were conducted with the device in the holster in all possible positions. See the photo in Appendix C for a pictorial of the setups.

This device is capable of operating in 850/1900 GSM/GPRS/EDGE frequency bands. In GSM/GPRS mode, the device is in Class 4 for 850 MHz and Class 1 for 1900 MHz. In EDGE mode, the device is in Class E2 for 850/1900 MHz. The GSM/GPRS testing was conducted in the GSM mode for head and body measurements. The GPRS mode has 1-slot and 2-slot configurations. The power measured is peak power. The average power in GSM is higher than the average power in GPRS 1-slot which is higher than 2-slot. The EDGE mode is 3 dB lower than its equivalent slot configuration for GPRS. Therefore, the device was only tested in the highest power configuration which was GSM.

The WCDMA testing was conducted using 12.2 kbps RMC configured in Test Loop Mode 1. The HSPA testing was conducted with HS-DPCCH, E-DPCCH and E-DPDCH all enabled and a 12.2 kbps RMC. FRC was configured according to HS-DPCCH Sub-Test 1 using H-set 1 and QPSK.

## 12. FCC Measurement Procedures

Power measurements were performed using a base station simulator under average power.

### 12.1 Procedures Used to Establish RF Signal for SAR

The device was placed into a simulated call using a base station simulator in a screen room. Such test signals offer a consistent means for testing SAR and recommended for evaluating SAR. The SAR measurement software calculates a reference point at the start and end of the test to check for power drifts. If conducted power deviations of more than 5% occurred, the tests were repeated.

### 12.2 SAR Measurement Conditions for WCDMA/HSDPA/HSUPA

Configure the call box 8960 to support all WCDMA tests in respect to the 3GPP 34.121 (listed in Table below). Measure the power at Ch4132, 4182 and 4233 for US cell; Ch9262, 9400 and 9538 for US PCS band.

For Rel99

- Set a Test Mode 1 loop back with a 12.2kbps Reference Measurement Channel (RMC).
- Set and send continuously Up power control commands to the device
- Measure the power at the device antenna connector using the power meter with average detector.

For HSDPA Rel 6

- Establish a Test Mode 1 loop back with both 1 12.2kbps RMC channel and a H-Set1 Fixed Reference Channel (FRC). With the 8820 this is accomplished by setting the signal Channel Coding to "Fixed Reference Channel" and configuring for HSET-1 QKSP.
- Set beta values and HSDPA settings for HSDPA Subtest1 according to Table below.
- Send continuously Up power control commands to the device
- Measure the power at the device antenna connector using the power meter with modulated average detector.
- Repeat the measurement for the HSDPA Subtest2, 3 and 4 as given in Table below.

For HSUPA Rel 6

- Use UL RMC 12.2kbps and FRC H-Set1 QPSK, Test Mode 1 loop back. With the 8960 this is accomplished by setting the signal Channel Coding to "E-DCH Test Channel" and configuring the equipment category to Cat5\_10ms.
- Set the Absolute Grant for HSUPA Subtest1 according to Table below.
- Set the device power to be at least 5dB lower than the Maximum output power
- Send power control bits to give one TPC\_cmd = +1 command to the device. If the device doesn't send any E-DPCH data with decreased E-TFCl within 500ms, then repeat this process until the decreased E-TFCl is reported.
- Confirm that the E-TFCl transmitted by the device is equal to the target E-TFCl in Table below. If the E-TFCl transmitted by the device is not equal to the target E-TFCl, then send power control bits to give one TPC\_cmd = -1 command to the UE. If UE sends any E-DPCH data with decreased E-TFCl within 500 ms, send new

power control bits to give one TPC\_cmd = -1 command to the UE. Then confirm that the E-TFCl transmitted by the UE is equal to the target E-TFCl in Table below.

- Measure the power using the power meter with modulated average detector.
- Repeat the measurement for the HSUPA Subtest2, 3, 4 and 5 as given in Table below.

### 12.3 SAR Measurement Conditions for GSM

Configure the 8960 box to support GMSK and 8PSK call respectively, and set one timeslot and two timeslot transmission for GMSK GSM/GPRS and 8PSK EDGE. Measure and record power outputs for both modulations.

GSM		
Band	Channel	Power
Cellular	128	31.92
	190	31.34
	251	31.86
PCS	512	29.08
	661	29.30
	810	29.59

GPRS/1 slot		
Band	Channel	Power
Cellular	128	31.87
	190	31.31
	251	31.79
PCS	512	29.02
	661	29.24
	810	29.48

GPRS/2 slot		
Band	Channel	Power
Cellular	128	28.80
	190	28.22
	251	28.71
PCS	512	26.01
	661	26.18
	810	26.32

EDGE/1 slot		
Band	Channel	Power
Cellular	128	28.82
	190	28.30
	251	28.81
PCS	512	26.05
	661	26.27
	810	26.51

EDGE/2 slot		
Band	Channel	Power
Cellular	128	25.63
	190	25.09
	251	25.71
PCS	512	23.16
	661	23.42
	810	23.67

3GPP Release Version	Mode	Cellular Band [dBm]			Sub-Test (See Table Below)	MPR
		4132	4183	4233		
99	WCDMA	23.16	22.87	22.76	-	-
6	HSDPA	23.04	22.69	22.60	1	0
6		23.09	22.72	22.58	2	0
6		22.48	22.35	22.16	3	0.5
6		22.50	22.39	22.11	4	0.5
6	HSUPA	23.02	22.71	22.62	1	0
6		20.90	20.76	20.71	2	2
6		21.94	21.65	21.43	3	1
6		21.08	20.76	20.80	4	2
6		23.07	22.76	22.52	5	0

3GPP Release Version	Mode	PCS Band [dBm]			Sub-Test (See Table Below)	MPR
		9262	9400	9538		
99	WCDMA	22.46	22.18	21.92	-	-
6	HSDPA	22.44	22.16	21.85	1	0
6		22.31	22.11	21.64	2	0
6		21.89	21.61	21.35	3	0.5
6		21.77	21.51	21.39	4	0.5
6	HSUPA	22.40	22.18	21.84	1	0
6		20.53	20.30	19.92	2	2
6		21.49	21.22	20.99	3	1
6		20.48	20.15	19.89	4	2
6		22.36	22.09	21.74	5	0

**Sub-Test Setup for Release 6 HSDPA**

Sub-Test	$\beta_c$	$\beta_d$	$B_c / \beta_d$	$\beta_{hs}$
1	2/15	15/15	2/15	4/15
2	12/15	15/15	15/15	24/15
3	15/15	8/15	15/8	30/15
4	15/15	4/15	15/4	30/15

$\Delta_{ack}, \Delta_{nack}$  and  $\Delta_{cqi} = 8$

**Sub-Test Setup for Release 6 HSUPA**

Sub-Test	$\beta_c$	$\beta_d$	$B_c / \beta_d$	$\beta_{hs}$	$B_{ec}$	$B_{ed}$	MPR	AG Index	E-TFCI
1	11/15	15/15	11/15	22/15	209/225	1039/225	0.0	20	75
2	6/15	15/15	6/15	12/15	12/15	94/75	2.0	12	67
3	15/15	9/15	15/9	30/15	30/15	47/15	1.0	15	92
4	2/15	15/15	2/15	4/15	2/15	56/15	2.0	17	71
5	15/15	15/15	15/15	30/15	24/15	134/15	0.0	21	81

$\Delta_{ack}, \Delta_{nack}$  and  $\Delta_{cqi} = 8$

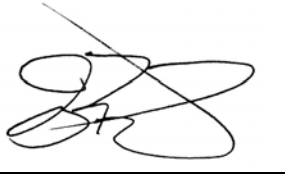
**SAR Data Summary – 850 MHz Head**

**MEASUREMENT RESULTS**

Position	Side	Frequency		Modulation	Begin Power (dBm)	TX Level/RMC	Multislot Configuration/ Test Set Up	SAR (W/kg)
		MHz	Ch.					
Touch	Right	836.6	190	GMSK	31.34	0	1 Slot	0.380
	Left	836.6	190	GMSK	31.34	0	1 Slot	0.320
Tilt	Right	836.6	190	GMSK	31.34	0	1 Slot	0.265
	Left	836.6	190	GMSK	31.34	0	1 Slot	0.209
Touch	Right	836.6	4183	WCDMA	22.87	12.2 kbps	Test Loop 1	0.352
	Left	836.6	4183	WCDMA	22.87	12.2 kbps	Test Loop 1	0.271
Tilt	Right	836.6	4183	WCDMA	22.87	12.2 kbps	Test Loop 1	0.247
	Left	836.6	4183	WCDMA	22.87	12.2 kbps	Test Loop 1	0.238

**Head**  
**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

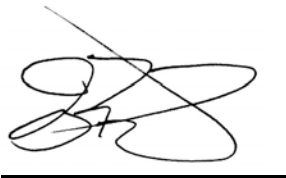
Note: When the mid channel is 3 dB or more below the limit the low and high channel are not required to be tested per KDB 447498 section 1) e).

**SAR Data Summary – 850 MHz Body**

MEASUREMENT RESULTS								
Position	Side	Frequency		Modulation	Begin Power (dBm)	TX Level/RMC	Multislot Configuration/ Test Set Up	SAR (W/kg)
		MHz	Ch.					
Touch	Front	836.6	190	GMSK	31.34	0	1 Slot	0.156
	Right	836.6	190	GMSK	31.34	0	1 Slot	0.062
	Left	836.6	190	GMSK	31.34	0	1 Slot	0.150
	Front	836.6	4183	WCDMA	22.87	12.2 kbps	Test Loop 1	0.150
	Right	836.6	4183	WCDMA	22.87	12.2 kbps	Test Loop 1	0.068
	Left	836.6	4183	WCDMA	22.87	12.2 kbps	Test Loop 1	0.139

**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 Holster  Without Belt Clip  N/A
5. Tissue Depth is at least 15.0 cm



Jay M. Moulton  
 Vice President

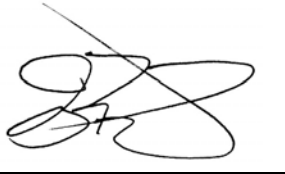
Note: When the mid channel is 3 dB or more below the limit the low and high channel are not required to be tested per KDB 447498 section 1) e).

**SAR Data Summary – 1900 MHz Head**

MEASUREMENT RESULTS								
Position	Side	Frequency		Modulation	Begin Power (dBm)	TX Level/RMC	Multislot Configuration/ Test Set Up	SAR (W/kg)
		MHz	Ch.					
Touch	Right	1880.0	661	GMSK	29.30	0	1 Slot	0.409
	Left	1880.0	661	GMSK	29.30	0	1 Slot	0.157
Tilt	Right	1880.0	661	GMSK	29.30	0	1 Slot	0.178
	Left	1880.0	661	GMSK	29.30	0	1 Slot	0.159
Touch	Right	1880.0	9400	WCDMA	22.18	12.2 kbps	Test Loop 1	0.601
	Left	1880.0	9400	WCDMA	22.18	12.2 kbps	Test Loop 1	0.397
Tilt	Right	1880.0	9400	WCDMA	22.18	12.2 kbps	Test Loop 1	0.380
	Left	1880.0	9400	WCDMA	22.18	12.2 kbps	Test Loop 1	0.358

**Head**  
**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



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 Vice President

Note: When the mid channel is 3 dB or more below the limit the low and high channel are not required to be tested per KDB 447498 section 1) e).



**SAR Data Summary – 1900 MHz Body**

MEASUREMENT RESULTS								
Position	Side	Frequency		Modulation	Begin Power (dBm)	TX Level/RMC	Multislot Configuration/ Test Set Up	SAR (W/kg)
		MHz	Ch.					
Touch	Front	1880.0	661	GMSK	29.30	0	1 Slot	0.103
	Right	1880.0	661	GMSK	29.30	0	1 Slot	0.134
	Left	1880.0	661	GMSK	29.30	0	1 Slot	0.345
	Front	1880.0	9400	WCDMA	22.18	12.2 kbps	Test Loop 1	0.166
	Right	1880.0	9400	WCDMA	22.18	12.2 kbps	Test Loop 1	0.153
	Left	1880.0	9400	WCDMA	22.18	12.2 kbps	Test Loop 1	<b>0.765</b>

**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 Holster  Without Belt Clip  N/A
5. Tissue Depth is at least 15.0 cm



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 Vice President

Note: When the mid channel is 3 dB or more below the limit the low and high channel are not required to be tested per KDB 447498 section 1) e).

### 13. Test Equipment List

**Table 12.1 Equipment Specifications**

Type	Calibration Due Date	Serial Number
ThermoCRS Robot	N/A	RAF0338198
ThermoCRS Controller	N/A	RCF0338224
ThermoCRS Teach Pendant (Joystick)	N/A	STP0334405
IBM Computer, 2.66 MHz P4	N/A	8189D8U KCPR08N
Apriel E-Field Probe ALS-E020	09/22/2011	RFE-215
Apriel E-Field Probe ALS-E030	07/12/2011	E030-001
Apriel Dummy Probe	N/A	023
Apriel Left Phantom	N/A	RFE-267
Apriel Right Phantom	N/A	RFE-268
Apriel UniPhantom	N/A	RFE-273
Apriel Valid. Dipole ALS-D-450-S-2 – Head	01/12/2012	RFE-362
Apriel Valid. Dipole ALS-D-835-S-2 – Head	01/14/2012	180-00561
Apriel Valid. Dipole ALS-D-835-S-2 – Body	11/16/2011	180-00561
Apriel Valid. Dipole ALS-D-900-S-2 – Head	01/12/2012	RFE-275
Apriel Valid. Dipole ALS-D-900-S-2 – Body	11/19/2011	RFE-275
Apriel Valid. Dipole ALS-D-1900-S-2 – Head	01/15/2012	210-00713
Apriel Valid. Dipole ALS-D-1900-S-2 – Body	11/16/2011	210-00713
Apriel Valid. Dipole ALS-D-2450-S-2 – Head	01/12/2012	RFE-278
Apriel Valid. Dipole ALS-D-2450-S-2 – Body	11/18/2011	RFE-278
Apriel Valid. Dipole RFE-D-2600-S-2 – Body	01/18/2012	RFE-121
Apriel Valid. Dipole RFE-D-BB-S-2 – Body	01/12/2012	235-00801
Agilent (HP) 437B Power Meter	03/24/2011	3125U08837
Agilent (HP) 8481B Power Sensor	03/24/2011	3318A05384
Advantest R3261A Spectrum Analyzer	03/24/2011	31720068
Agilent (HP) 8350B Signal Generator	04/19/2011	2749A10226
Agilent (HP) 83525A RF Plug-In	04/19/2011	2647A01172
Agilent (HP) 8753C Vector Network Analyzer	03/25/2011	3135A01724
Agilent (HP) 85047A S-Parameter Test Set	03/25/2011	2904A00595
Agilent (HP) E55125C Base Station Sim.	03/25/2012	MY48360364
Apriel Dielectric Probe Assembly	N/A	0011
Head Equivalent Matter (450 MHz)	N/A	N/A
Head Equivalent Matter (835 MHz)	N/A	N/A
Head Equivalent Matter (1900 MHz)	N/A	N/A
Head Equivalent Matter (2450 MHz)	N/A	N/A
Body Equivalent Matter (450 MHz)	N/A	N/A
Body Equivalent Matter (835 MHz)	N/A	N/A
Body Equivalent Matter (1900 MHz)	N/A	N/A
Body Equivalent Matter (2450 MHz)	N/A	N/A
Body Equivalent Matter (5200 MHz)	N/A	N/A
Body Equivalent Matter (5800 MHz)	N/A	N/A

## 14. 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.

## 15. 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] Industry 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

Sat 22/Jan/2011 01:21:26

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_eH	FCC_sH	Test_e	Test_s
0.8050	41.66	0.90	41.41	0.91
0.8150	41.60	0.90	41.34	0.91
0.8250	41.55	0.90	41.29	0.92
0.8350	41.50	0.90	41.23	0.93
0.8450	41.50	0.91	41.20	0.94
0.8550	41.50	0.92	41.18	0.95
0.8650	41.50	0.93	41.17	0.97

\*\*\*\*\*

Test Result for UIM Dielectric Parameter

Sun 23/Jan/2011 07:31:46

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_eH	FCC_sH	Test_e	Test_s
0.8050	41.66	0.90	41.64	0.88
0.8150	41.60	0.90	41.57	0.89
0.8250	41.55	0.90	41.51	0.90
0.8350	41.50	0.90	41.46	0.91
0.8450	41.50	0.91	41.43	0.92
0.8550	41.50	0.92	41.42	0.93
0.8650	41.50	0.93	41.41	0.95

\*\*\*\*\*

Test Result for UIM Dielectric Parameter

Tue 25/Jan/2011 03:06:51

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
0.8050	55.32	0.97	55.12	0.94
0.8150	55.28	0.97	55.08	0.96
0.8250	55.24	0.97	55.03	0.98
0.8350	55.20	0.97	54.98	0.99
0.8450	55.17	0.98	54.95	1.01
0.8550	55.14	0.99	54.91	1.02
0.8650	55.11	1.01	54.87	1.04

\*\*\*\*\*

Test Result for UIM Dielectric Parameter

Wed 26/Jan/2011 07:01:36

Freq Frequency(GHz)

FCC\_eH FCC Bulletin 65 Supplement C ( June 2001) Limits for Head Epsilon

FCC\_sH FCC Bulletin 65 Supplement C (June 2001) Limits for Head Sigma

FCC\_eB FCC Limits for Body Epsilon

FCC\_sB FCC Limits for Body Sigma

Test\_e Epsilon of UIM

Test\_s Sigma of UIM

\*\*\*\*\*

Freq	FCC_eB	FCC_sB	Test_e	Test_s
0.8050	55.32	0.97	55.87	0.94
0.8150	55.28	0.97	55.82	0.96
0.8250	55.24	0.97	55.77	0.97
0.8350	55.20	0.97	54.72	0.98
0.8450	55.17	0.98	54.69	0.99
0.8550	55.14	0.99	54.65	1.01
0.8650	55.11	1.01	54.61	1.03

\*\*\*\*\*

Test Result for UIM Dielectric Parameter

Fri 21/Jan/2011 09:04:36

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_eH	FCC_sH	Test_e	Test_s
1.8700	40.00	1.40	39.56	1.37
1.8800	40.00	1.40	39.55	1.38
1.8900	40.00	1.40	39.53	1.40
1.9000	40.00	1.40	39.51	1.41
1.9100	40.00	1.40	39.48	1.42
1.9200	40.00	1.40	39.46	1.43
1.9300	40.00	1.40	39.45	1.45

\*\*\*\*\*

Test Result for UIM Dielectric Parameter

Sat 22/Jan/2011 08:08:54

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_eH	FCC_sH	Test_e	Test_s
1.8700	40.00	1.40	39.79	1.36
1.8800	40.00	1.40	39.77	1.38
1.8900	40.00	1.40	39.75	1.39
1.9000	40.00	1.40	39.72	1.40
1.9100	40.00	1.40	39.70	1.41
1.9200	40.00	1.40	39.68	1.43
1.9300	40.00	1.40	39.65	1.44

\*\*\*\*\*

Test Result for UIM Dielectric Parameter

Mon 24/Jan/2011 07:06:22

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
1.8700	53.30	1.52	53.14	1.50
1.8800	53.30	1.52	53.12	1.52
1.8900	53.30	1.52	53.09	1.53
1.9000	53.30	1.52	53.07	1.54
1.9100	53.30	1.52	53.05	1.55
1.9200	53.30	1.52	53.03	1.57
1.9300	53.30	1.52	53.01	1.58

\*\*\*\*\*

Test Result for UIM Dielectric Parameter

Tue 25/Jan/2011 08:31:37

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
1.8700	53.30	1.52	53.23	1.49
1.8800	53.30	1.52	53.21	1.51
1.8900	53.30	1.52	53.18	1.52
1.9000	53.30	1.52	53.16	1.53
1.9100	53.30	1.52	53.14	1.54
1.9200	53.30	1.52	53.12	1.55
1.9300	53.30	1.52	53.11	1.57



**SAR Test Report**

By Operator : Jay  
Measurement Date : 21-Jan-2011  
Starting Time : 21-Jan-2011 09:08:10 AM  
End Time : 21-Jan-2011 09:21:14 AM  
Scanning Time : 784 secs

## Product Data

Device Name : Validation  
Serial No. : 1900  
Type : Dipole  
Model : ALS-D-1900-S-2  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.1 W  
Drift Time : 0 min(s)  
Length : 68 mm  
Width : 3.6 mm  
Depth : 39.5 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 4.422 W/kg  
Power Drift-Finish: 4.547 W/kg  
Power Drift (%) : 2.820

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 21-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 49.00 RH%  
Epsilon : 39.51 F/m  
Sigma : 1.41 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

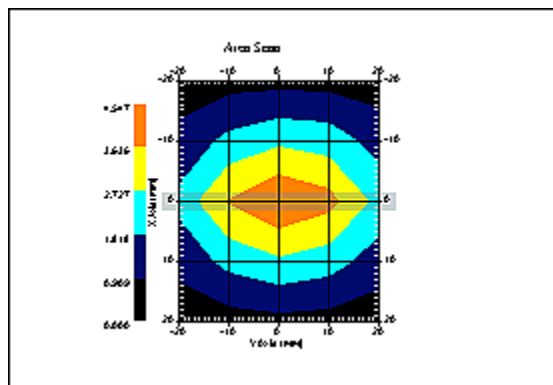
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 4.9  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 21-Jan-2011  
Set-up Time : 8:39:41 AM  
Area Scan : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

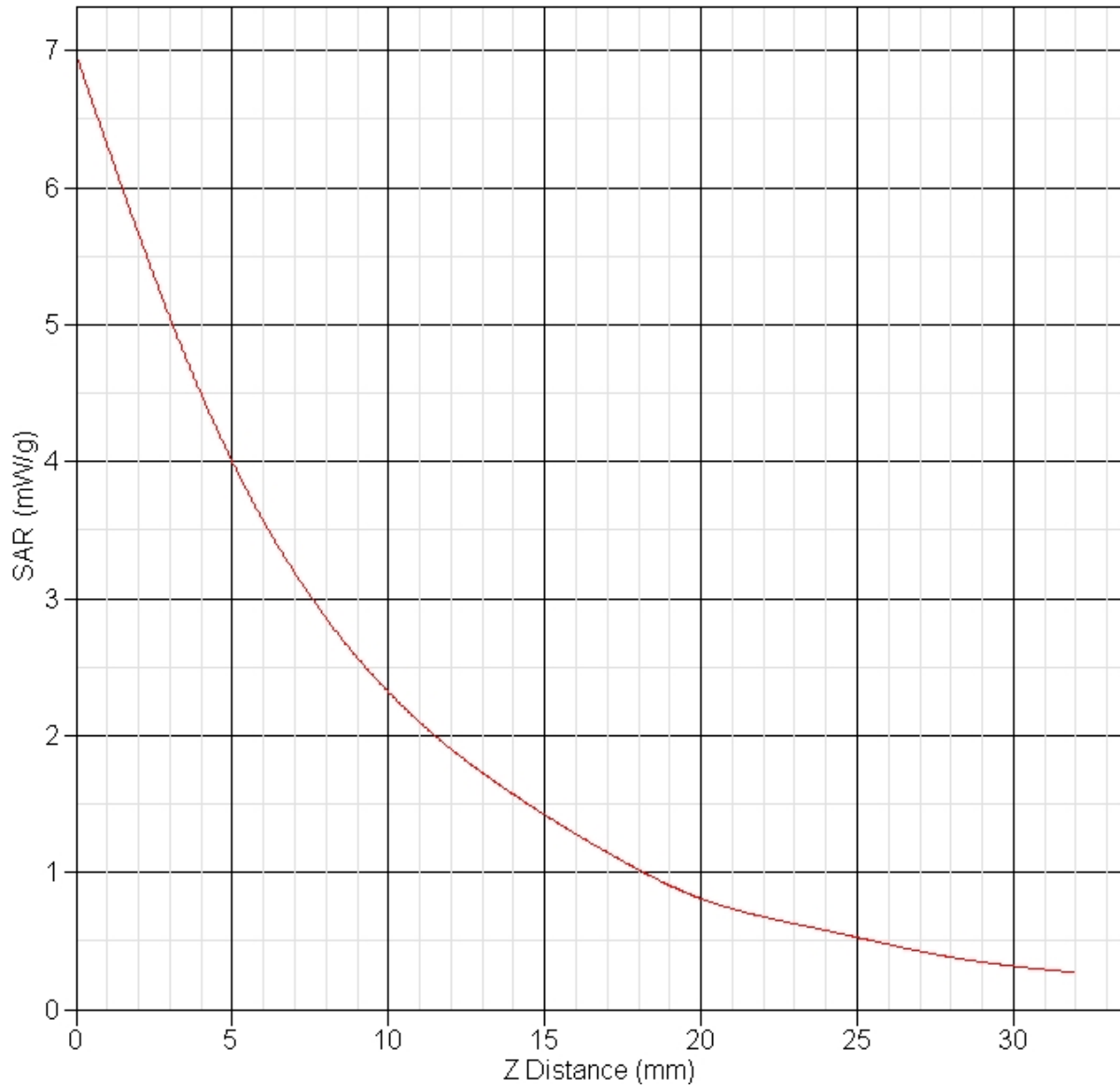
Other Data

DUT Position : Touch  
Separation : 10 mm  
Channel : Mid



1 gram SAR value : 3.911 W/kg  
10 gram SAR value : 2.049 W/kg  
Area Scan Peak SAR : 4.547 W/kg  
Zoom Scan Peak SAR : 6.976 W/kg

**SAR-Z Axis**  
at Hotspot x:0.28 y:-0.15



**SAR Test Report**

By Operator : Jay  
Measurement Date : 22-Jan-2011  
Starting Time : 22-Jan-2011 08:16:30 AM  
End Time : 22-Jan-2011 08:29:59 AM  
Scanning Time : 809 secs

## Product Data

Device Name : Validation  
Serial No. : 1900  
Type : Dipole  
Model : ALS-D-1900-S-2  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.1 W  
Drift Time : 0 min(s)  
Length : 68 mm  
Width : 3.6 mm  
Depth : 39.5 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 4.433 W/kg  
Power Drift-Finish: 4.485 W/kg  
Power Drift (%) : 1.176

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 22-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 49.00 RH%  
Epsilon : 39.72 F/m  
Sigma : 1.40 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

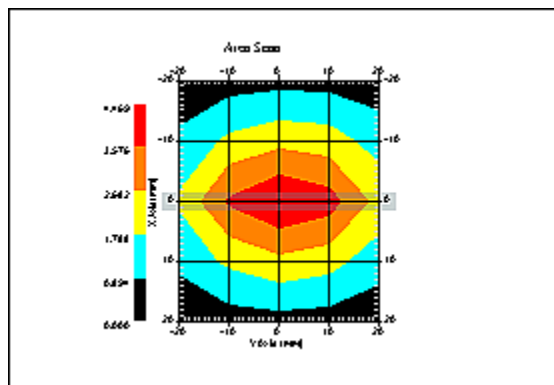
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 4.9  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 22-Jan-2011  
Set-up Time : 8:03:12 AM  
Area Scan : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

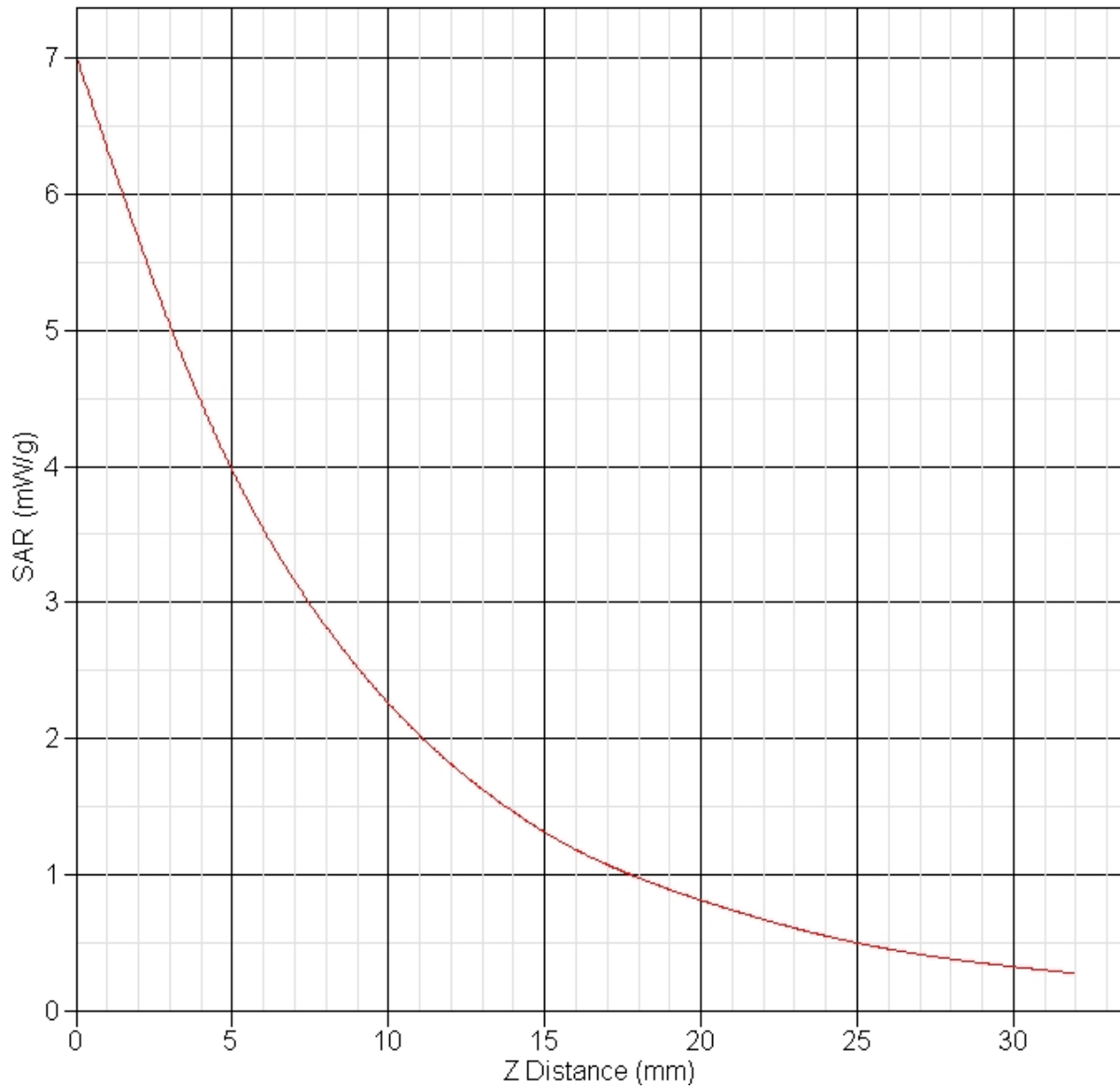
Other Data

DUT Position : Touch  
Separation : 10 mm  
Channel : Mid



1 gram SAR value : 3.881 W/kg  
10 gram SAR value : 1.999 W/kg  
Area Scan Peak SAR : 4.469 W/kg  
Zoom Scan Peak SAR : 7.026 W/kg

**SAR-Z Axis**  
at Hotspot x:0.30 y:-0.16



**SAR Test Report**

By Operator : Jay  
Measurement Date : 22-Jan-2011  
Starting Time : 22-Jan-2011 01:30:41 PM  
End Time : 22-Jan-2011 01:45:49 PM  
Scanning Time : 908 secs

## Product Data

Device Name : Validation  
Serial No. : 835  
Type : Dipole  
Model : ALS-D-835-S-2  
Frequency : 835.00 MHz  
Max. Transmit Pwr : 0.1 W  
Drift Time : 0 min(s)  
Length : 161 mm  
Width : 3.6 mm  
Depth : 89.8 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 0.999 W/kg  
Power Drift-Finish: 0.972 W/kg  
Power Drift (%) : -2.646

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 22-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 49.00 RH%  
Epsilon : 41.23 F/m  
Sigma : 0.93 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

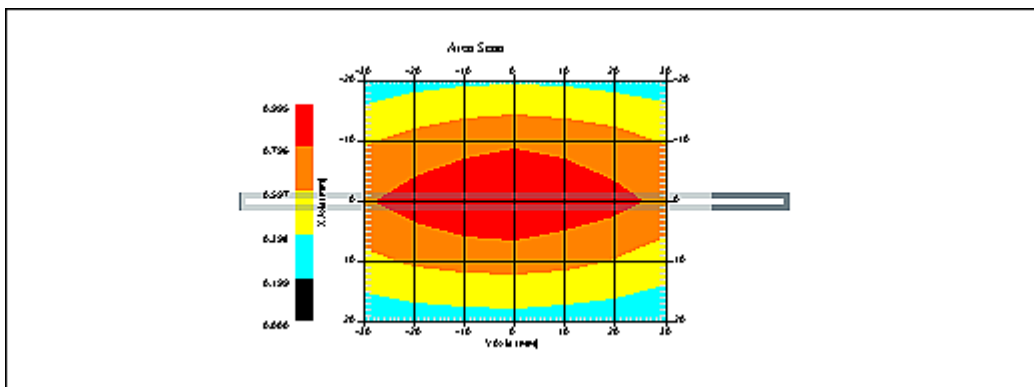
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.2  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 25.00 °C  
Set-up Date : 22-Jan-2011  
Set-up Time : 9:21:48 AM  
Area Scan : 5x7x1 : Measurement x=10mm, y=10mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

Other Data

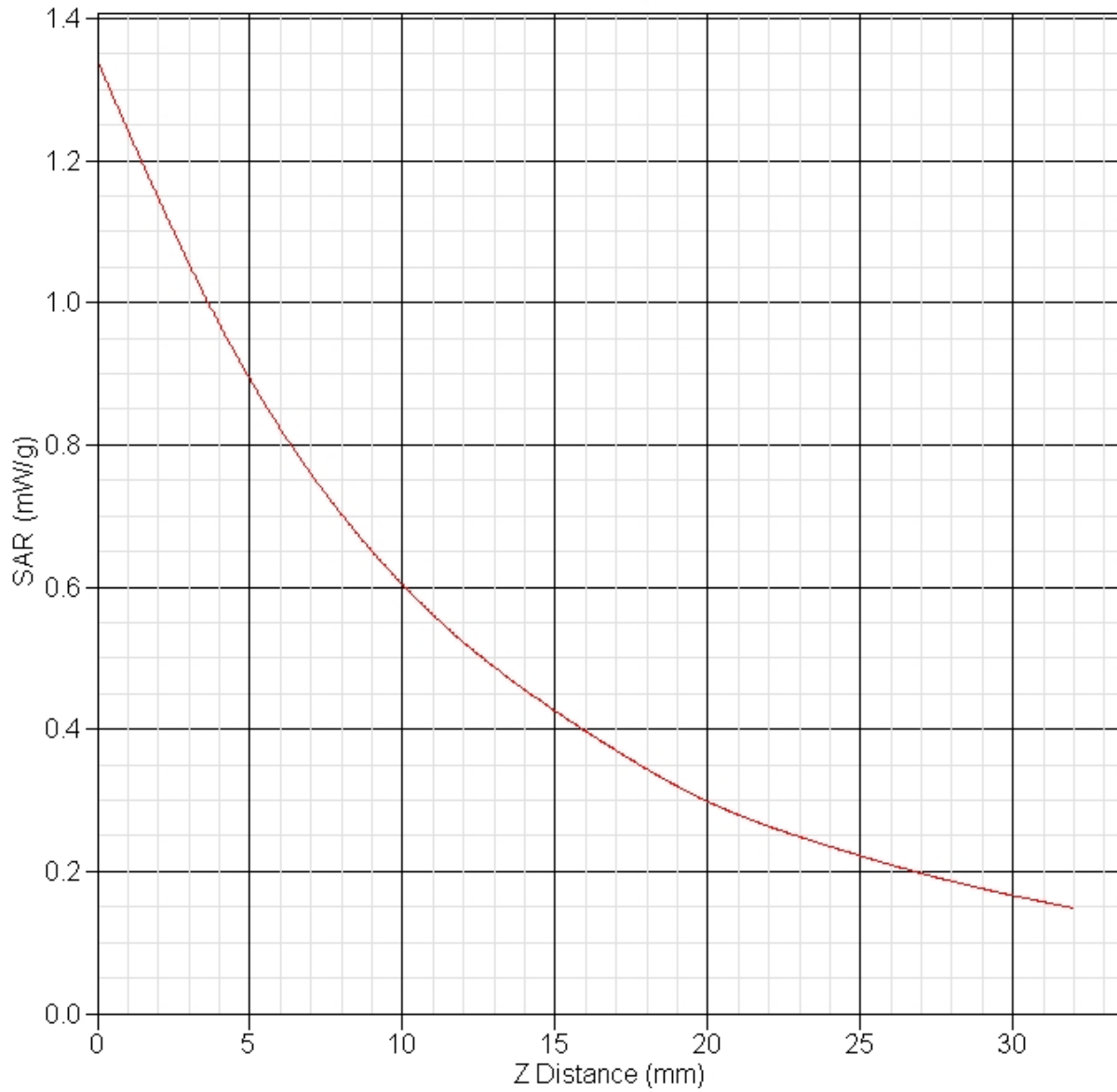
DUT Position : Touch  
Separation : 15 mm  
Channel : Mid



1 gram SAR value : 0.937 W/kg  
10 gram SAR value : 0.585 W/kg  
Area Scan Peak SAR : 0.994 W/kg  
Zoom Scan Peak SAR : 1.341 W/kg



**SAR-Z Axis**  
at Hotspot x:0.22 y:-0.17



**SAR Test Report**

By Operator : Jay  
Measurement Date : 23-Jan-2011  
Starting Time : 23-Jan-2011 07:37:14 AM  
End Time : 23-Jan-2011 07:52:33 AM  
Scanning Time : 919 secs

## Product Data

Device Name : Validation  
Serial No. : 835  
Type : Dipole  
Model : ALS-D-835-S-2  
Frequency : 835.00 MHz  
Max. Transmit Pwr : 0.1 W  
Drift Time : 0 min(s)  
Length : 161 mm  
Width : 3.6 mm  
Depth : 89.8 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 1.084 W/kg  
Power Drift-Finish: 1.073 W/kg  
Power Drift (%) : -1.005

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 23-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 49.00 RH%  
Epsilon : 41.46 F/m  
Sigma : 0.91 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

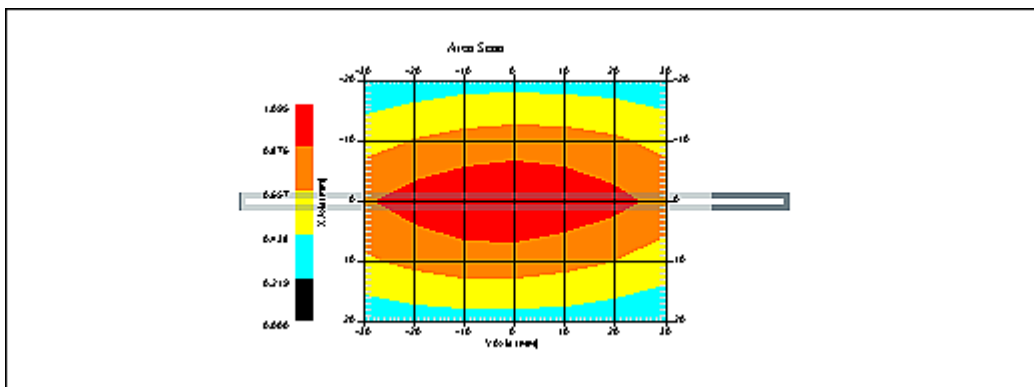
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.2  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 25.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 9:21:48 AM  
Area Scan : 5x7x1 : Measurement x=10mm, y=10mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

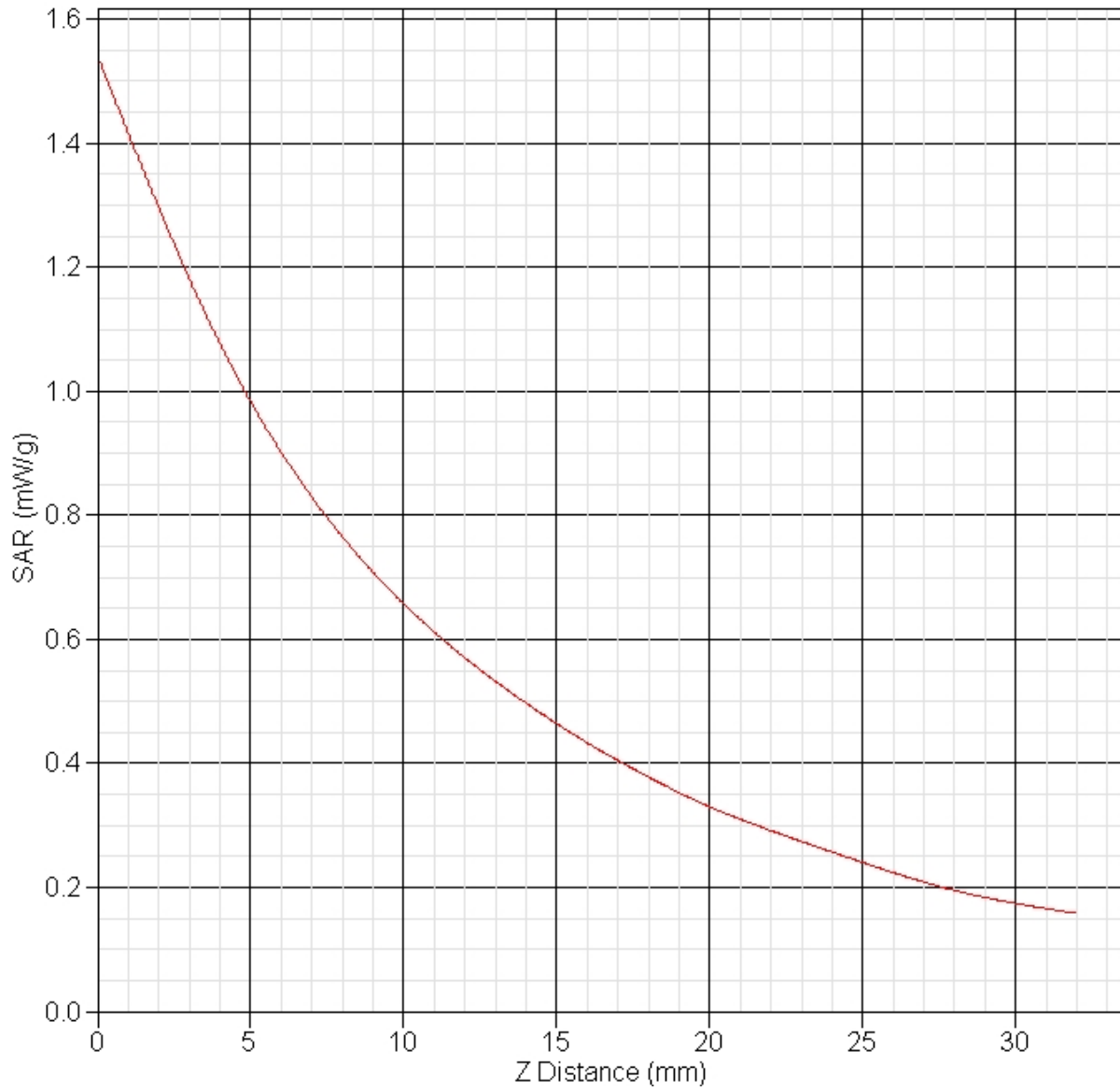
### Other Data

DUT Position : Touch  
Separation : 15 mm  
Channel : Mid



1 gram SAR value : 0.982 W/kg  
10 gram SAR value : 0.621 W/kg  
Area Scan Peak SAR : 1.094 W/kg  
Zoom Scan Peak SAR : 1.541 W/kg

**SAR-Z Axis**  
at Hotspot x:0.23 y:-0.13



**SAR Test Report**

By Operator : Jay  
Measurement Date : 24-Jan-2011  
Starting Time : 24-Jan-2011 07:12:34 AM  
End Time : 24-Jan-2011 07:25:31 AM  
Scanning Time : 777 secs

## Product Data

Device Name : Validation  
Serial No. : 1900  
Type : Dipole  
Model : ALS-D-1900-S-2  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.1 W  
Drift Time : 0 min(s)  
Length : 68 mm  
Width : 3.6 mm  
Depth : 39.5 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 4.542 W/kg  
Power Drift-Finish: 4.577 W/kg  
Power Drift (%) : 0.784

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 24-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 49.00 RH%  
Epsilon : 53.07 F/m  
Sigma : 1.54 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

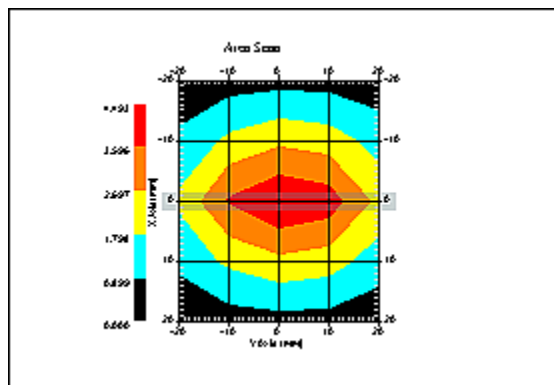
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 5  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 24-Jan-2011  
Set-up Time : 8:03:12 AM  
Area Scan : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

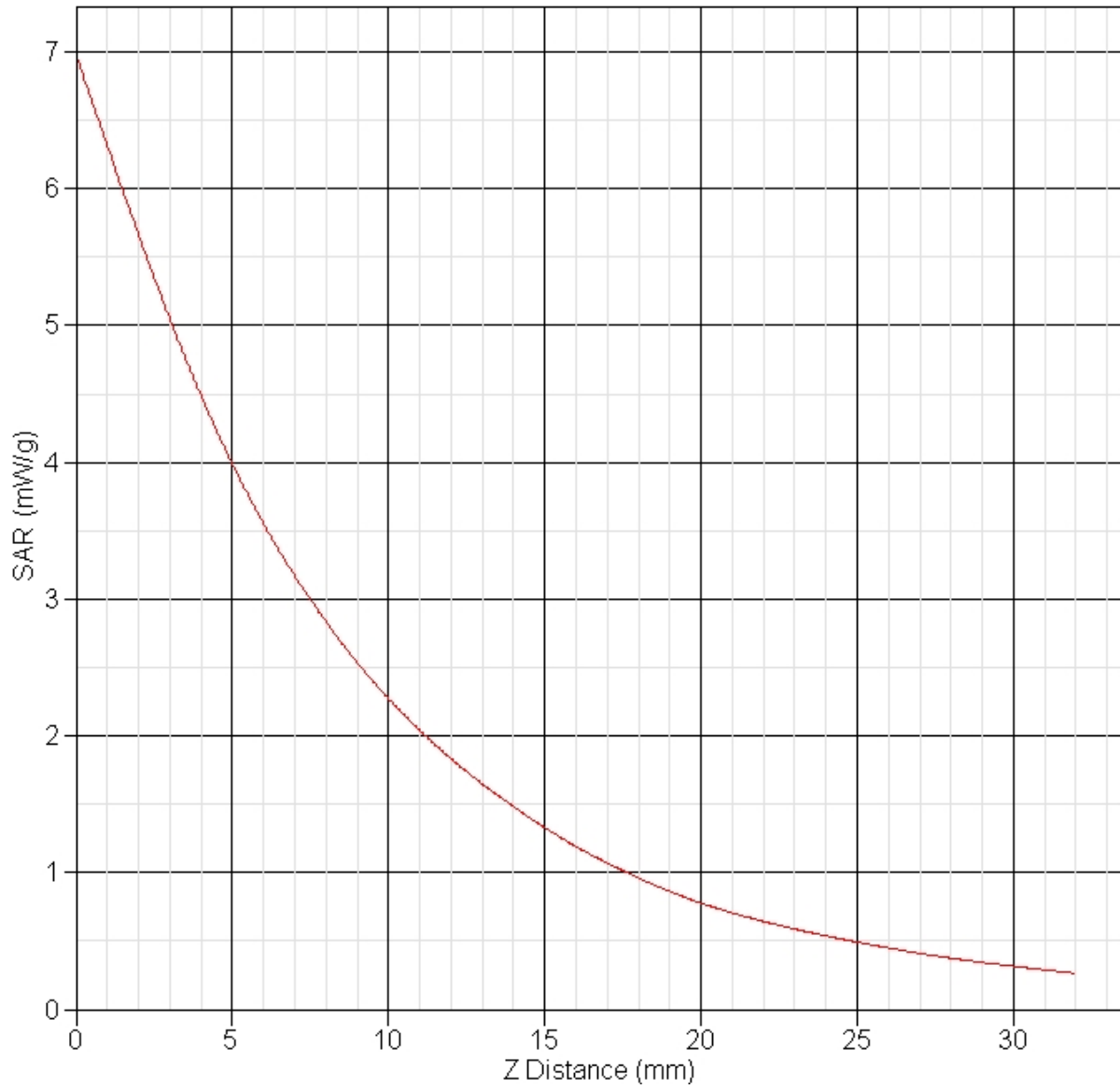
Other Data

DUT Position : Touch  
Separation : 10 mm  
Channel : Mid



1 gram SAR value : 3.995 W/kg  
10 gram SAR value : 2.052 W/kg  
Area Scan Peak SAR : 4.493 W/kg  
Zoom Scan Peak SAR : 6.986 W/kg

**SAR-Z Axis**  
at Hotspot x:0.25 y:-0.15



**SAR Test Report**

By Operator : Jay  
Measurement Date : 25-Jan-2011  
Starting Time : 25-Jan-2011 08:42:43 AM  
End Time : 25-Jan-2011 08:55:37 AM  
Scanning Time : 774 secs

## Product Data

Device Name : Validation  
Serial No. : 1900  
Type : Dipole  
Model : ALS-D-1900-S-2  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.1 W  
Drift Time : 0 min(s)  
Length : 68 mm  
Width : 3.6 mm  
Depth : 39.5 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 4.663 W/kg  
Power Drift-Finish: 4.734 W/kg  
Power Drift (%) : 1.523

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 25-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 49.00 RH%  
Epsilon : 53.16 F/m  
Sigma : 1.53 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 5  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

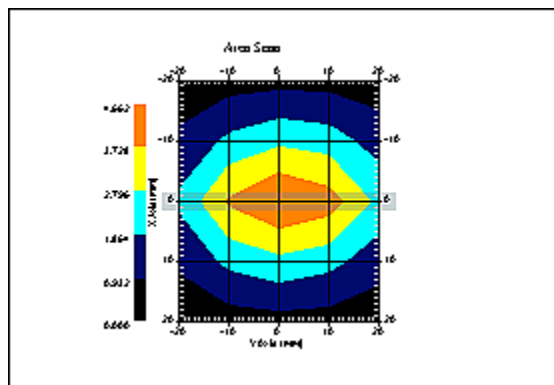


Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 25-Jan-2011  
Set-up Time : 8:03:12 AM  
Area Scan : 5x5x1 : Measurement x=10mm, y=10mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

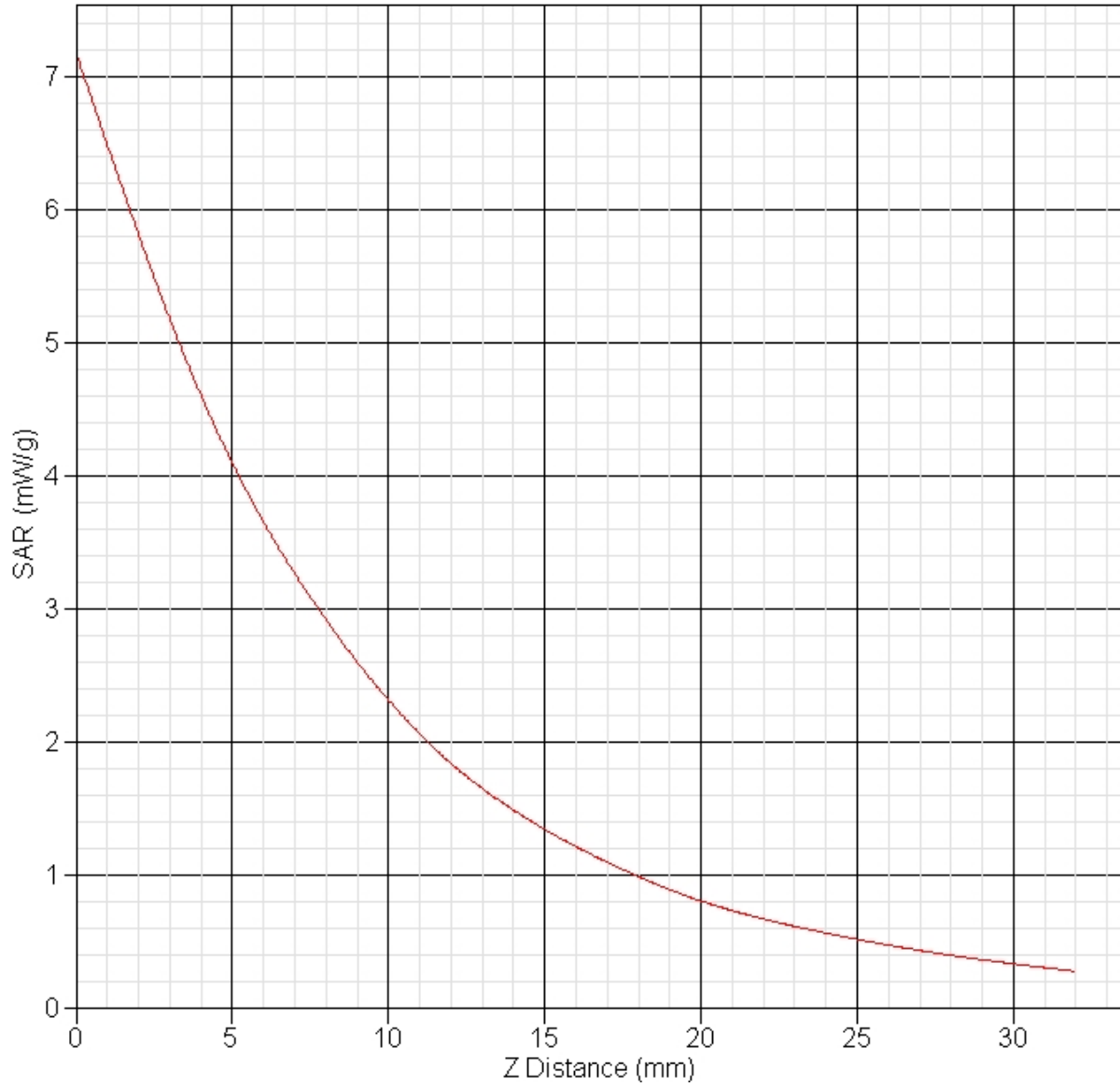
Other Data

DUT Position : Touch  
Separation : 10 mm  
Channel : Mid



1 gram SAR value : 4.037 W/kg  
10 gram SAR value : 2.084 W/kg  
Area Scan Peak SAR : 4.662 W/kg  
Zoom Scan Peak SAR : 7.186 W/kg

**SAR-Z Axis**  
at Hotspot x:0.22 y:-0.15



**SAR Test Report**

By Operator : Jay  
Measurement Date : 25-Jan-2011  
Starting Time : 25-Jan-2011 03:17:45 PM  
End Time : 25-Jan-2011 03:32:55 PM  
Scanning Time : 910 secs

## Product Data

Device Name : Validation  
Serial No. : 835  
Type : Dipole  
Model : ALS-D-835-S-2  
Frequency : 835.00 MHz  
Max. Transmit Pwr : 0.1 W  
Drift Time : 0 min(s)  
Length : 161 mm  
Width : 3.6 mm  
Depth : 89.8 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 1.033 W/kg  
Power Drift-Finish: 1.020 W/kg  
Power Drift (%) : -1.199

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 25-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 49.00 RH%  
Epsilon : 54.98 F/m  
Sigma : 0.99 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

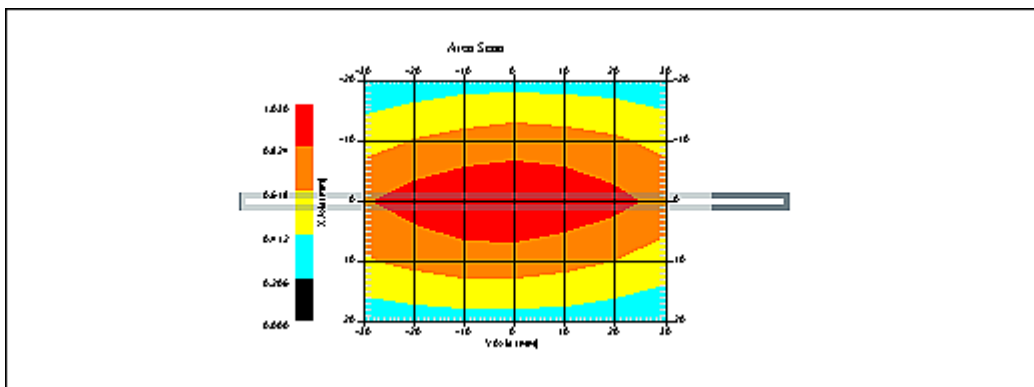
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.3  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 25.00 °C  
Set-up Date : 25-Jan-2011  
Set-up Time : 9:21:48 AM  
Area Scan : 5x7x1 : Measurement x=10mm, y=10mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

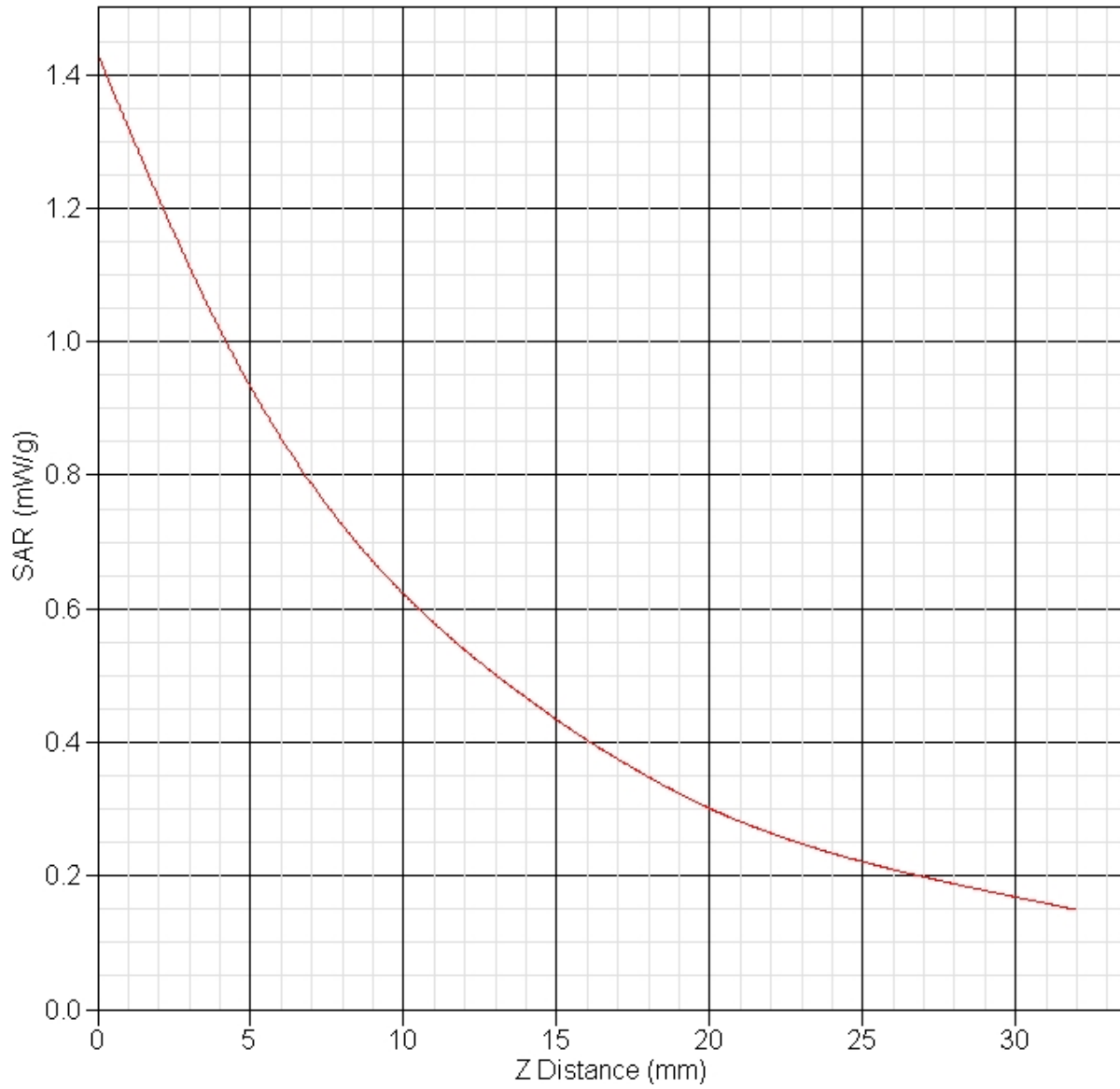
Other Data

DUT Position : Touch  
Separation : 15 mm  
Channel : Mid



1 gram SAR value : 0.963 W/kg  
10 gram SAR value : 0.604 W/kg  
Area Scan Peak SAR : 1.028 W/kg  
Zoom Scan Peak SAR : 1.431 W/kg

**SAR-Z Axis**  
at Hotspot x:0.26 y:-0.21



**SAR Test Report**

By Operator : Jay  
Measurement Date : 26-Jan-2011  
Starting Time : 26-Jan-2011 07:09:30 AM  
End Time : 26-Jan-2011 07:24:35 AM  
Scanning Time : 905 secs

## Product Data

Device Name : Validation  
Serial No. : 835  
Type : Dipole  
Model : ALS-D-835-S-2  
Frequency : 835.00 MHz  
Max. Transmit Pwr : 0.1 W  
Drift Time : 0 min(s)  
Length : 161 mm  
Width : 3.6 mm  
Depth : 89.8 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 1.026 W/kg  
Power Drift-Finish: 1.035 W/kg  
Power Drift (%) : 0.881

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 26-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 49.00 RH%  
Epsilon : 54.72 F/m  
Sigma : 0.98 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

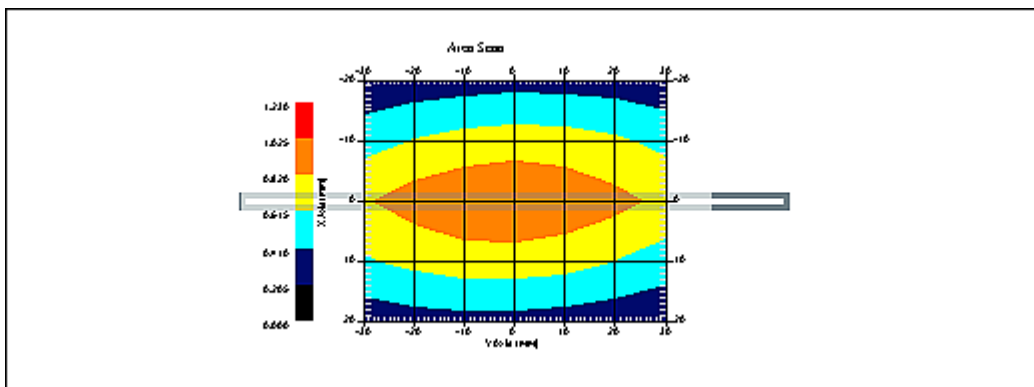
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.3  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 25.00 °C  
Set-up Date : 26-Jan-2011  
Set-up Time : 9:21:48 AM  
Area Scan : 5x7x1 : Measurement x=10mm, y=10mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

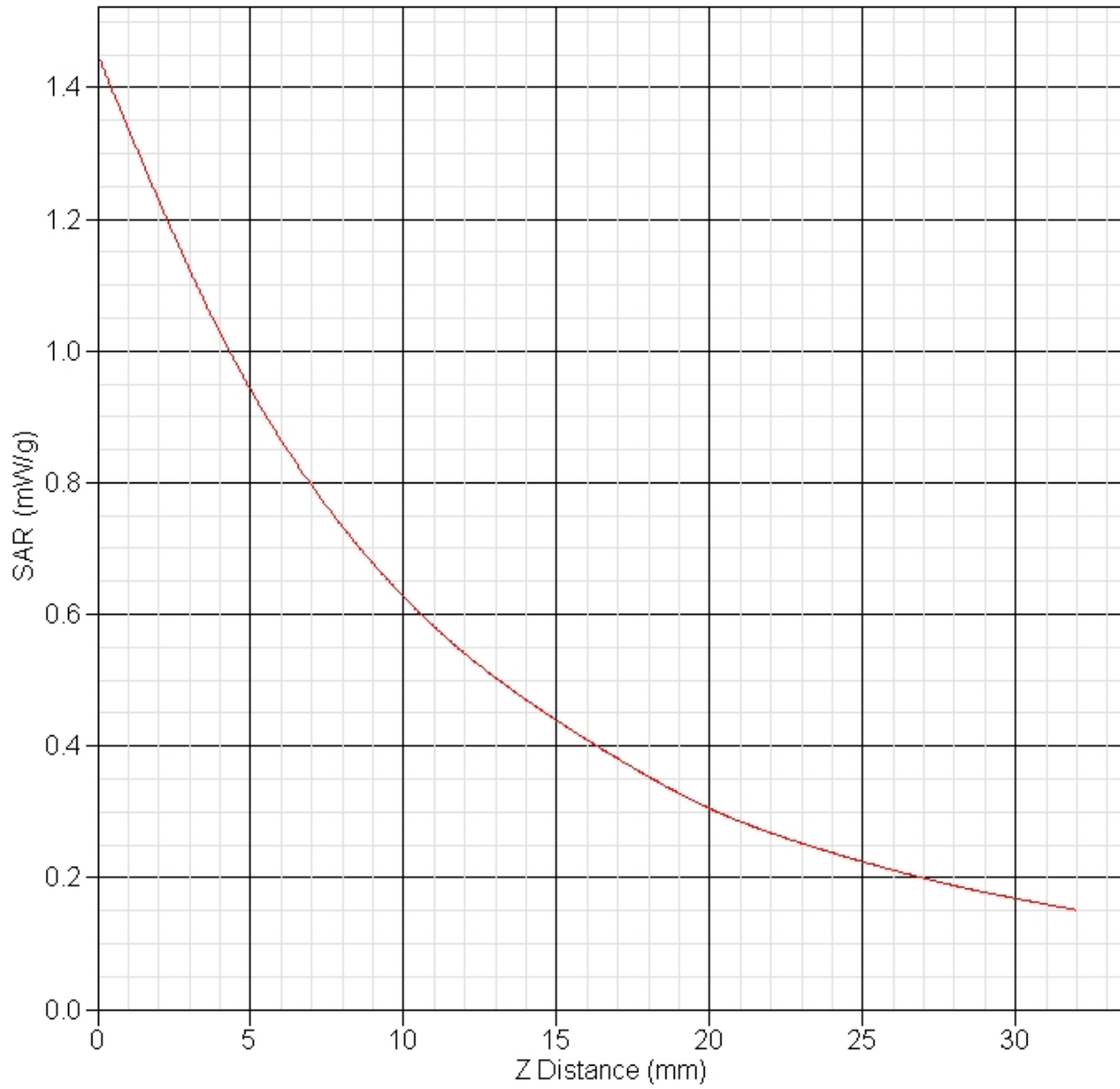
Other Data

DUT Position : Touch  
Separation : 15 mm  
Channel : Mid



1 gram SAR value : 0.945 W/kg  
10 gram SAR value : 0.598 W/kg  
Area Scan Peak SAR : 1.026 W/kg  
Zoom Scan Peak SAR : 1.451 W/kg

**SAR-Z Axis**  
at Hotspot x:0.25 y:-0.13





## Appendix B – SAR Test Data Plots

**Note:** In all data sheets in Appendix B, the frequency noted in the ‘Product Data’ section is the frequency band which the device was transmitting. This frequency does not refer to the actual frequency and channel of the test. The channel is listed in the ‘Other Data’ section of the data sheet as Low, Mid or High. The actual test frequency is listed in Section 12 in each of the data summary sheets.

**SAR Test Report**

By Operator : Jay  
Measurement Date : 22-Jan-2011  
Starting Time : 22-Jan-2011 01:49:51 PM  
End Time : 22-Jan-2011 02:09:21 PM  
Scanning Time : 1170 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 1.361 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 0.094 W/kg  
Power Drift-Finish: 0.096 W/kg  
Power Drift (%) : 2.127

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 22-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 41.23 F/m  
Sigma : 0.93 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

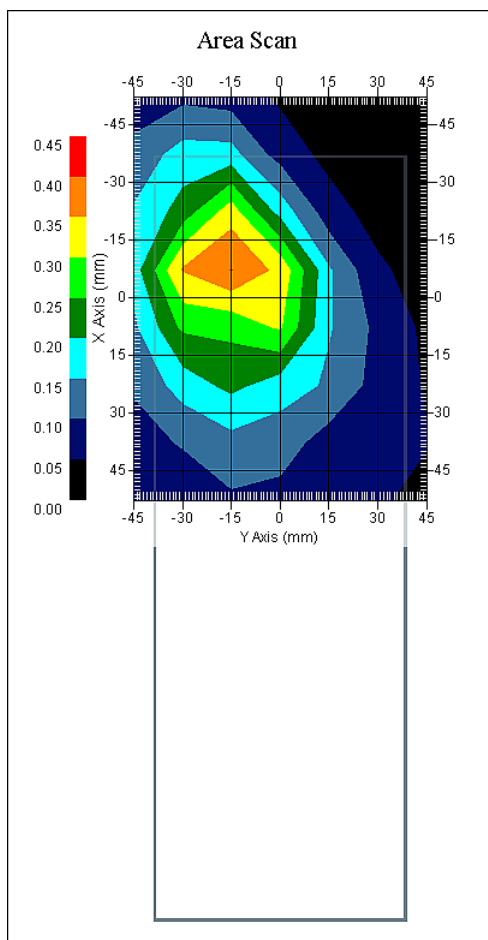
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 6.2  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 22-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 8x7x1 : Measurement x=15mm, y=15mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

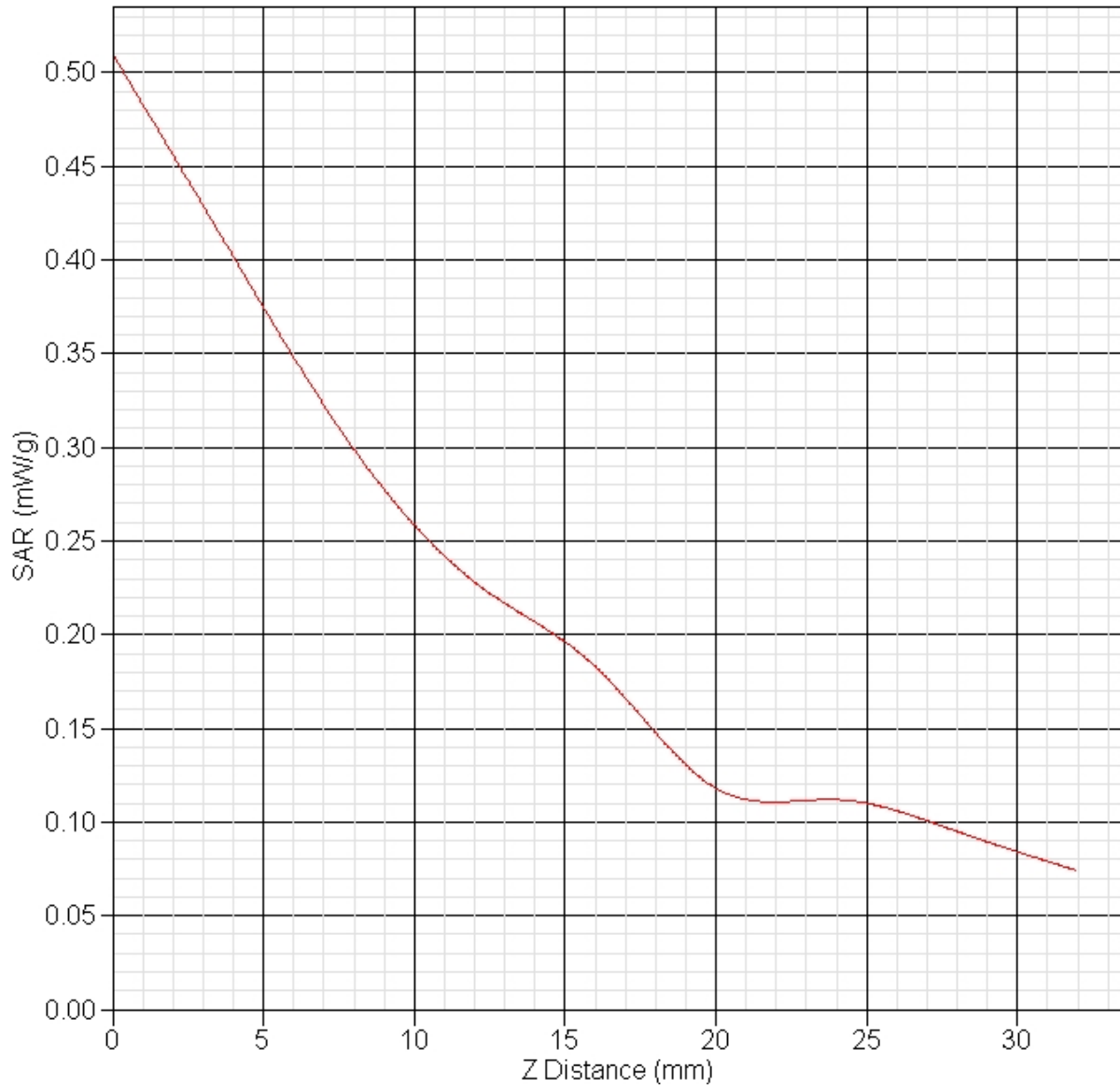
Other Data

DUT Position : Touch  
Separation : 0  
Channel : Mid



1 gram SAR value : 0.380 W/kg  
10 gram SAR value : 0.255 W/kg  
Area Scan Peak SAR : 0.401 W/kg  
Zoom Scan Peak SAR : 0.510 W/kg

**SAR-Z Axis**  
at Hotspot x:17.23 y:-22.97



**SAR Test Report**

By Operator : Jay  
Measurement Date : 23-Jan-2011  
Starting Time : 23-Jan-2011 08:03:41 AM  
End Time : 23-Jan-2011 08:23:45 AM  
Scanning Time : 1204 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 1.361 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 0.087 W/kg  
Power Drift-Finish: 0.087 W/kg  
Power Drift (%) : 0.468

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 23-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 41.46 F/m  
Sigma : 0.91 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

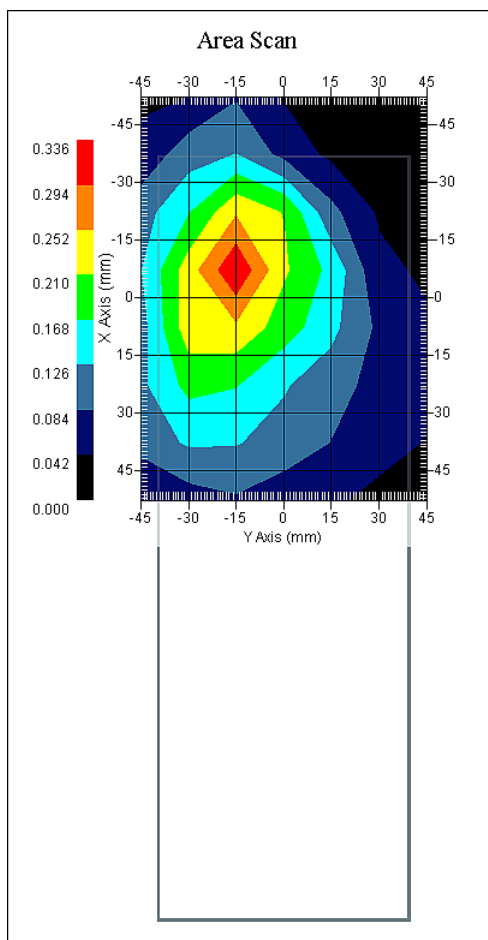
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 6.2  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 8x7x1 : 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 : 0.320 W/kg  
10 gram SAR value : 0.208 W/kg  
Area Scan Peak SAR : 0.335 W/kg  
Zoom Scan Peak SAR : 0.530 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 22-Jan-2011  
Starting Time : 22-Jan-2011 02:12:32 PM  
End Time : 22-Jan-2011 02:31:44 PM  
Scanning Time : 1152 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 1.361 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : 15° Tilt  
Power Drift-Start : 0.142 W/kg  
Power Drift-Finish: 0.145 W/kg  
Power Drift (%) : 2.116

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 22-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 41.23 F/m  
Sigma : 0.93 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

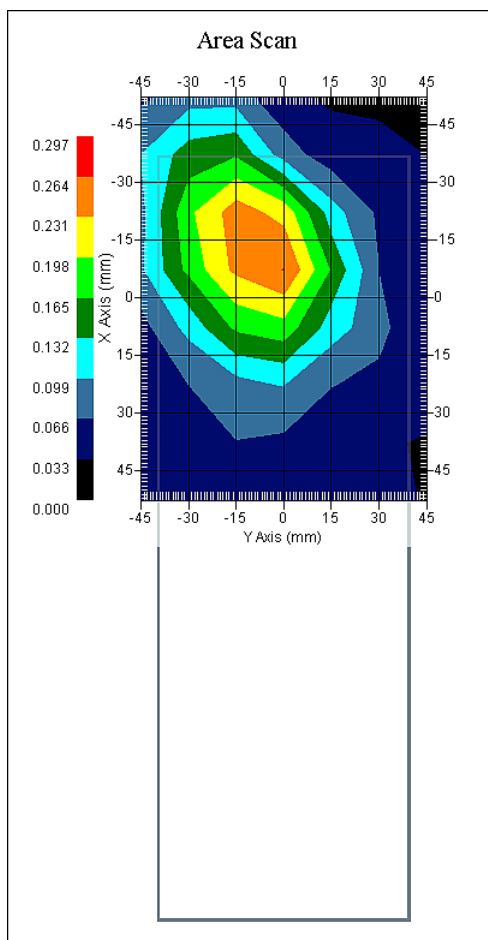
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 6.2  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 22-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 8x7x1 : 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 : 0.265 W/kg  
10 gram SAR value : 0.188 W/kg  
Area Scan Peak SAR : 0.265 W/kg  
Zoom Scan Peak SAR : 0.420 W/kg



**SAR Test Report**

By Operator : Jay  
Measurement Date : 23-Jan-2011  
Starting Time : 23-Jan-2011 08:25:54 AM  
End Time : 23-Jan-2011 08:45:45 AM  
Scanning Time : 1191 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 1.361 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : 15° Tilt  
Power Drift-Start : 0.128 W/kg  
Power Drift-Finish: 0.128 W/kg  
Power Drift (%) : -0.277

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 23-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 41.46 F/m  
Sigma : 0.91 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

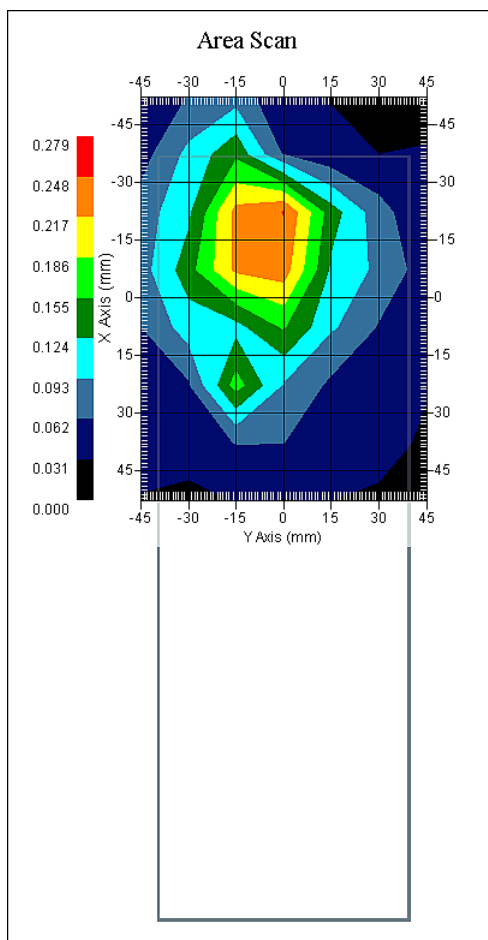
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 6.2  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 8x7x1 : 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 : 0.209 W/kg  
10 gram SAR value : 0.142 W/kg  
Area Scan Peak SAR : 0.249 W/kg  
Zoom Scan Peak SAR : 0.350 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 22-Jan-2011  
Starting Time : 22-Jan-2011 02:59:17 PM  
End Time : 22-Jan-2011 03:18:29 PM  
Scanning Time : 1152 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 0.194 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 0.117 W/kg  
Power Drift-Finish: 0.119 W/kg  
Power Drift (%) : 1.049

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 22-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 41.23 F/m  
Sigma : 0.93 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

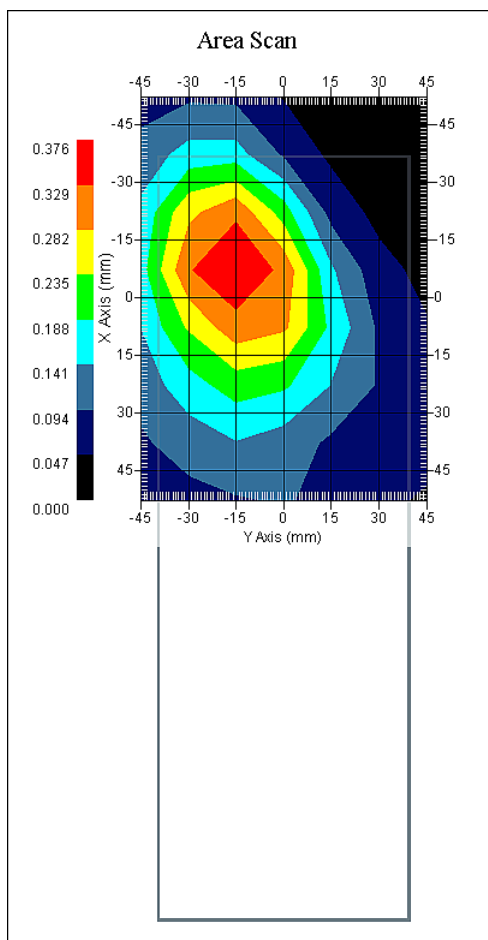
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.2  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 22-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 8x7x1 : 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 : 0.352 W/kg  
10 gram SAR value : 0.238 W/kg  
Area Scan Peak SAR : 0.375 W/kg  
Zoom Scan Peak SAR : 0.450 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 23-Jan-2011  
Starting Time : 23-Jan-2011 09:10:22 AM  
End Time : 23-Jan-2011 09:30:02 AM  
Scanning Time : 1180 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 0.194 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 0.141 W/kg  
Power Drift-Finish: 0.144 W/kg  
Power Drift (%) : 2.136

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 23-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 41.46 F/m  
Sigma : 0.91 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

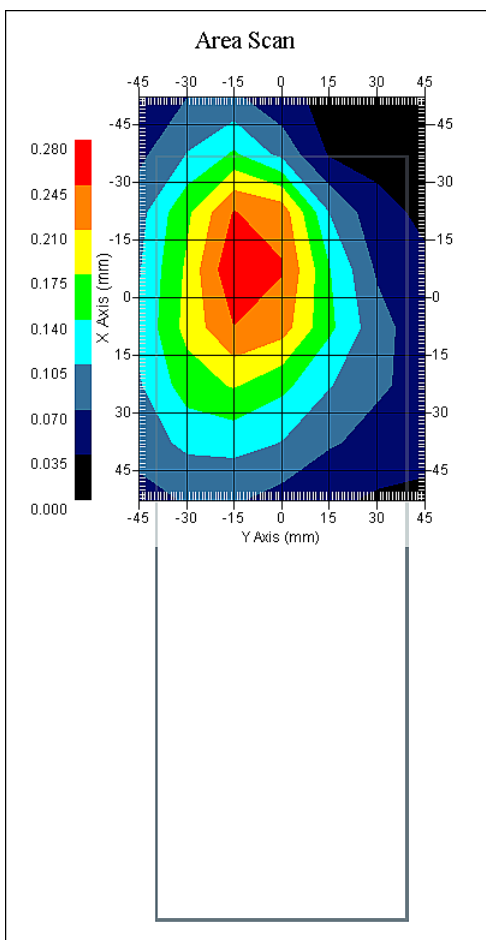
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.2  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 8x7x1 : 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 : 0.271 W/kg  
10 gram SAR value : 0.194 W/kg  
Area Scan Peak SAR : 0.278 W/kg  
Zoom Scan Peak SAR : 0.370 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 22-Jan-2011  
Starting Time : 22-Jan-2011 02:36:53 PM  
End Time : 22-Jan-2011 02:56:03 PM  
Scanning Time : 1150 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 0.194 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : 15° Tilt  
Power Drift-Start : 0.126 W/kg  
Power Drift-Finish: 0.126 W/kg  
Power Drift (%) : 0.406

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 22-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 41.23 F/m  
Sigma : 0.93 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

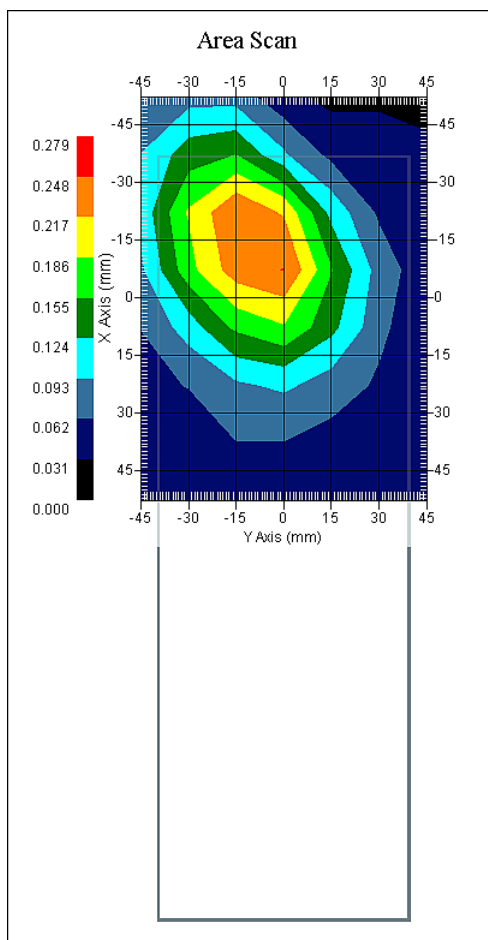
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.2  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 22-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 8x7x1 : 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 : 0.247 W/kg  
10 gram SAR value : 0.179 W/kg  
Area Scan Peak SAR : 0.249 W/kg  
Zoom Scan Peak SAR : 0.320 W/kg



**SAR Test Report**

By Operator : Jay  
Measurement Date : 23-Jan-2011  
Starting Time : 23-Jan-2011 08:48:15 AM  
End Time : 23-Jan-2011 09:07:45 AM  
Scanning Time : 1170 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 0.194 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : 15° Tilt  
Power Drift-Start : 0.127 W/kg  
Power Drift-Finish: 0.125 W/kg  
Power Drift (%) : -1.178

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 23-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 41.46 F/m  
Sigma : 0.91 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

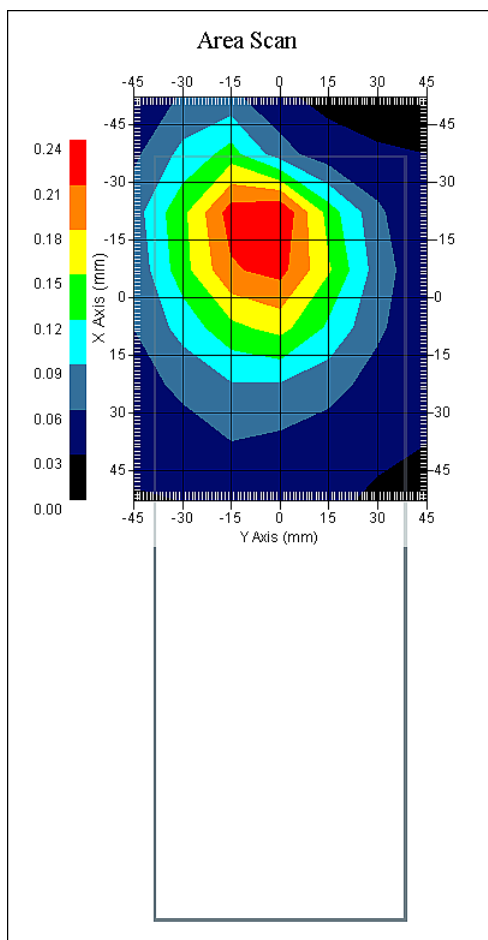
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.2  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 8x7x1 : 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 : 0.238 W/kg  
10 gram SAR value : 0.165 W/kg  
Area Scan Peak SAR : 0.237 W/kg  
Zoom Scan Peak SAR : 0.320 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 26-Jan-2011  
Starting Time : 26-Jan-2011 11:15:40 AM  
End Time : 26-Jan-2011 11:39:23 AM  
Scanning Time : 1423 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 1.361 W  
Drift Time : 0 min(s)  
Length : 80 mm  
Width : 238 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Front  
Power Drift-Start : 0.079 W/kg  
Power Drift-Finish: 0.080 W/kg  
Power Drift (%) : 1.260

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 26-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 54.72 F/m  
Sigma : 0.98 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

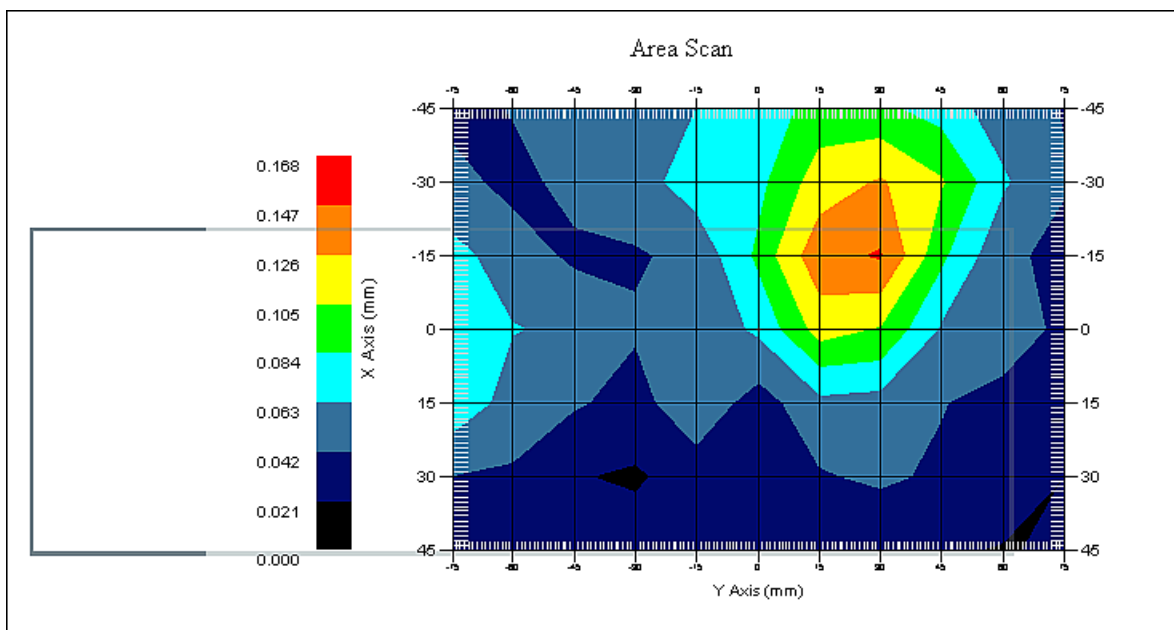
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 6.3  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

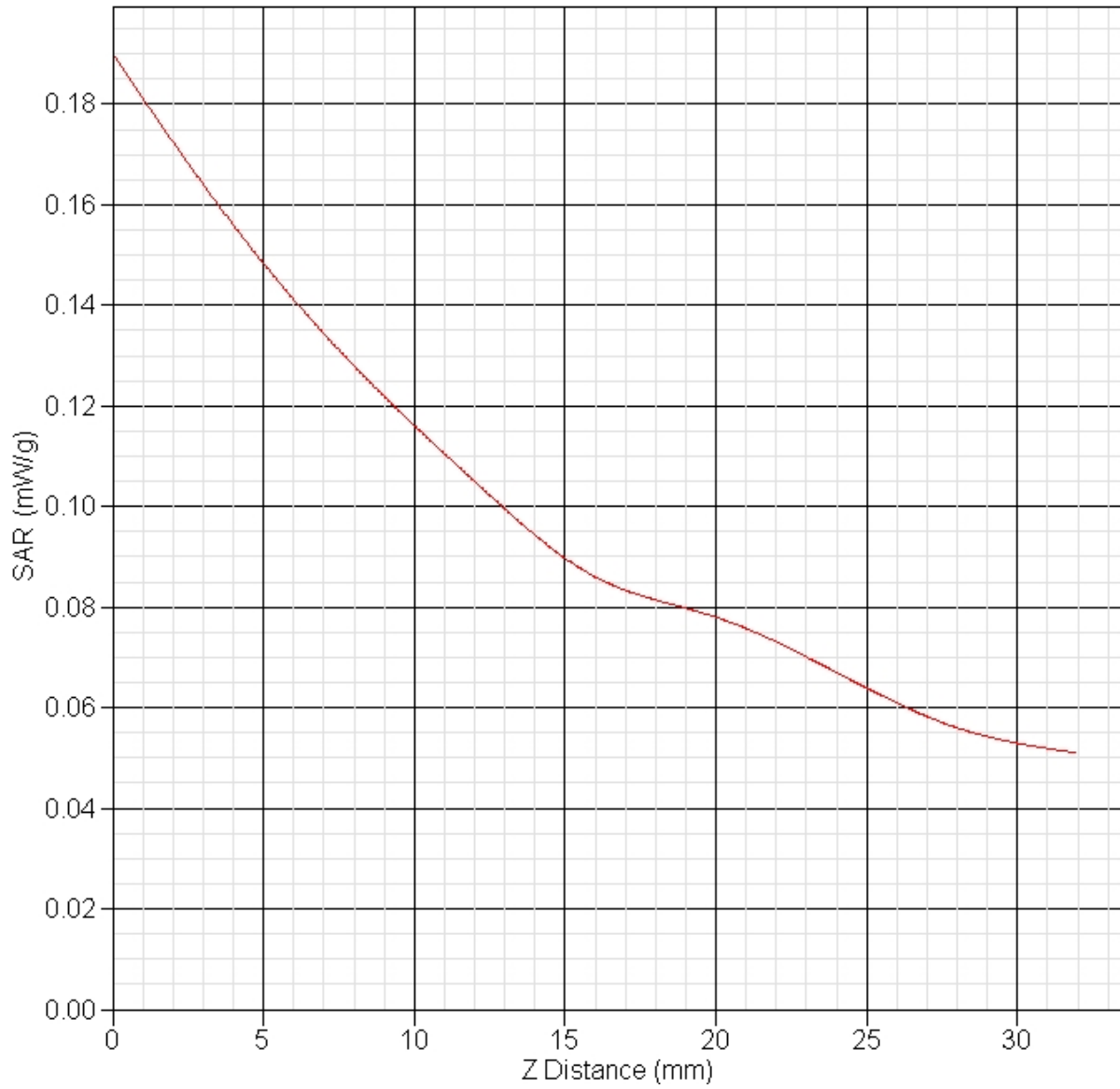
### Other Data

DUT Position : Front  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.156 W/kg  
10 gram SAR value : 0.109 W/kg  
Area Scan Peak SAR : 0.149 W/kg  
Zoom Scan Peak SAR : 0.220 W/kg

**SAR-Z Axis**  
at Hotspot x:-7.97 y:21.84



**SAR Test Report**

By Operator : Jay  
Measurement Date : 26-Jan-2011  
Starting Time : 26-Jan-2011 02:45:51 PM  
End Time : 26-Jan-2011 03:09:40 PM  
Scanning Time : 1429 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 1.361 W  
Drift Time : 0 min(s)  
Length : 46 mm  
Width : 238 mm  
Depth : 80 mm  
Antenna Type : Internal  
Orientation : Right  
Power Drift-Start : 0.031 W/kg  
Power Drift-Finish: 0.031 W/kg  
Power Drift (%) : 2.291

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 26-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 54.72 F/m  
Sigma : 0.98 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

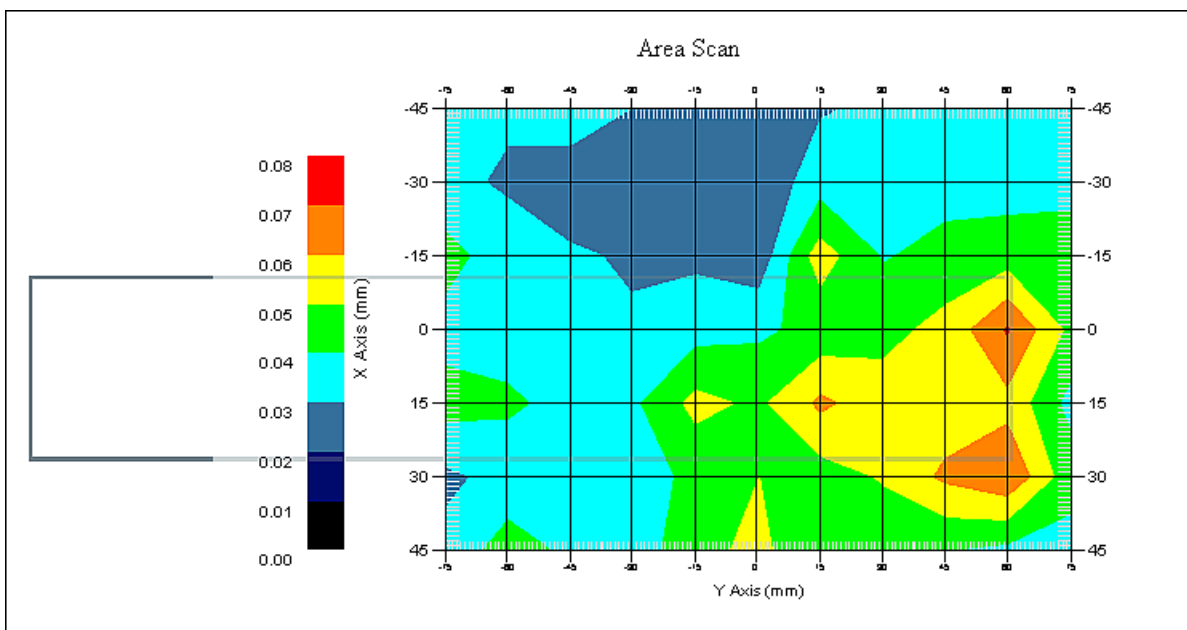
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 6.3  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

### Other Data

DUT Position : Right  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.062 W/kg  
10 gram SAR value : 0.046 W/kg  
Area Scan Peak SAR : 0.071 W/kg  
Zoom Scan Peak SAR : 0.120 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 26-Jan-2011  
Starting Time : 26-Jan-2011 02:19:56 PM  
End Time : 26-Jan-2011 02:43:52 PM  
Scanning Time : 1436 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 1.361 W  
Drift Time : 0 min(s)  
Length : 46 mm  
Width : 238 mm  
Depth : 80 mm  
Antenna Type : Internal  
Orientation : Left  
Power Drift-Start : 0.052 W/kg  
Power Drift-Finish: 0.052 W/kg  
Power Drift (%) : -0.191

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 26-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 54.72 F/m  
Sigma : 0.98 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 6.3  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

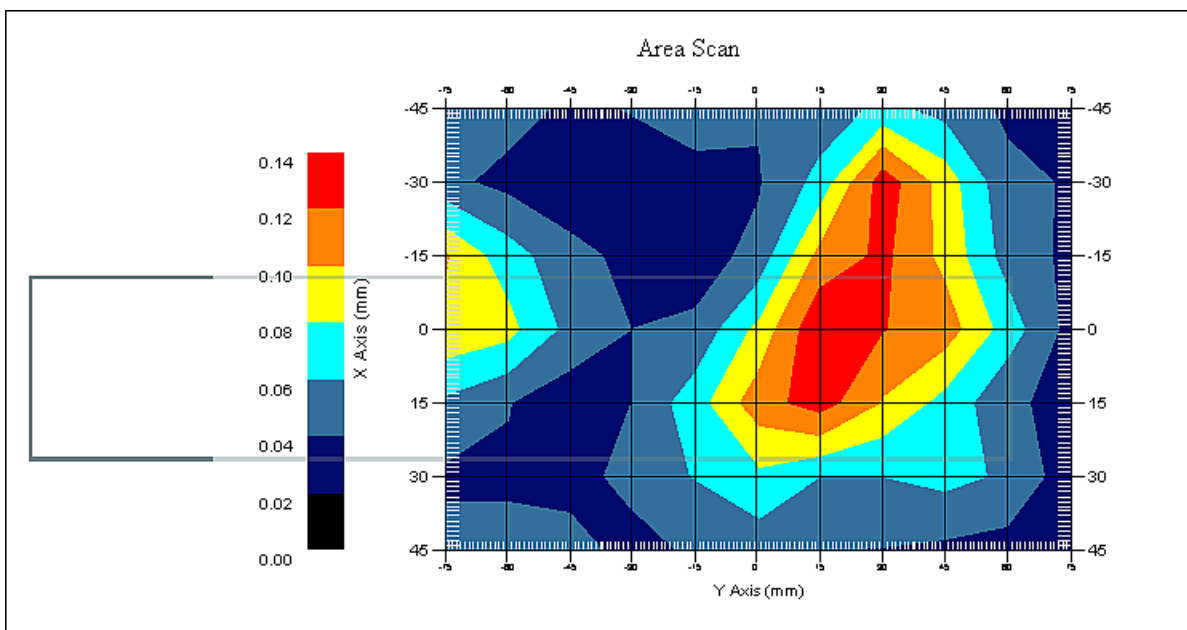


### Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

### Other Data

DUT Position : Left  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.150 W/kg  
10 gram SAR value : 0.127 W/kg  
Area Scan Peak SAR : 0.138 W/kg  
Zoom Scan Peak SAR : 0.220 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 26-Jan-2011  
Starting Time : 26-Jan-2011 11:42:32 AM  
End Time : 26-Jan-2011 12:05:51 PM  
Scanning Time : 1399 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 0.194 W  
Drift Time : 0 min(s)  
Length : 80 mm  
Width : 238 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Front  
Power Drift-Start : 0.080 W/kg  
Power Drift-Finish: 0.080 W/kg  
Power Drift (%) : 0.280

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 26-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 54.72 F/m  
Sigma : 0.98 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

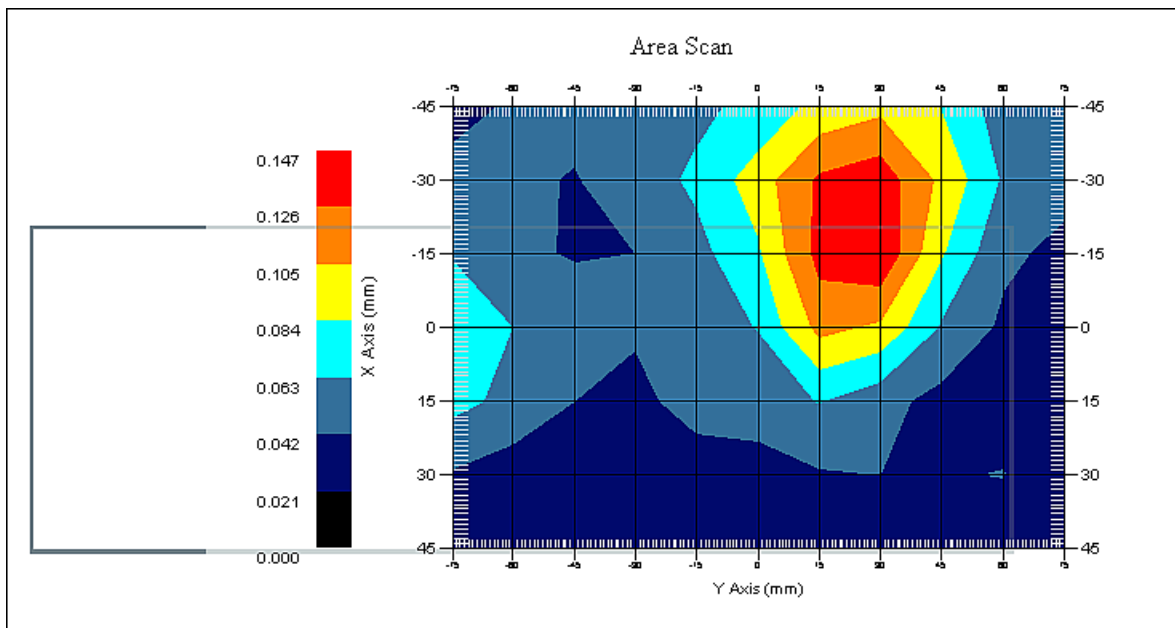
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.3  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

### Other Data

DUT Position : Front  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.150 W/kg  
10 gram SAR value : 0.111 W/kg  
Area Scan Peak SAR : 0.145 W/kg  
Zoom Scan Peak SAR : 0.190 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 26-Jan-2011  
Starting Time : 26-Jan-2011 03:11:38 PM  
End Time : 26-Jan-2011 03:35:04 PM  
Scanning Time : 1406 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 0.194 W  
Drift Time : 0 min(s)  
Length : 46 mm  
Width : 238 mm  
Depth : 80 mm  
Antenna Type : Internal  
Orientation : Right  
Power Drift-Start : 0.027 W/kg  
Power Drift-Finish: 0.028 W/kg  
Power Drift (%) : 2.969

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 26-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 54.72 F/m  
Sigma : 0.98 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

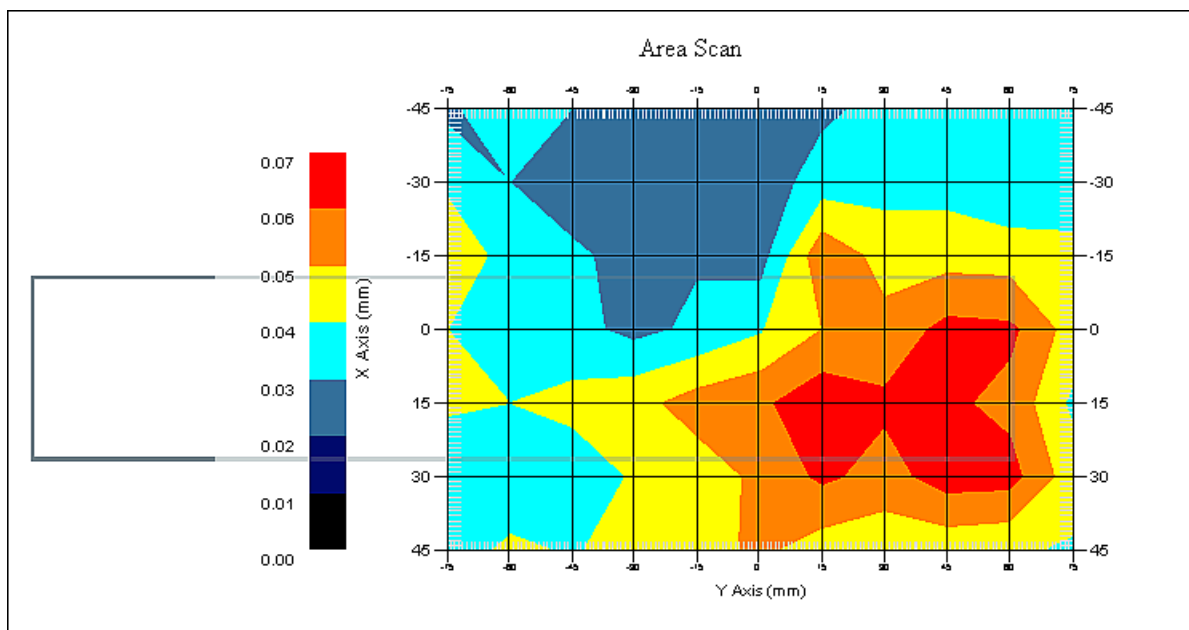
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.3  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

### Other Data

DUT Position : Right  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.068 W/kg  
10 gram SAR value : 0.051 W/kg  
Area Scan Peak SAR : 0.067 W/kg  
Zoom Scan Peak SAR : 0.110 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 26-Jan-2011  
Starting Time : 26-Jan-2011 01:53:51 PM  
End Time : 26-Jan-2011 02:17:07 PM  
Scanning Time : 1396 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 0.194 W  
Drift Time : 0 min(s)  
Length : 46 mm  
Width : 238 mm  
Depth : 80 mm  
Antenna Type : Internal  
Orientation : Left  
Power Drift-Start : 0.054 W/kg  
Power Drift-Finish: 0.054 W/kg  
Power Drift (%) : 1.616

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 26-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 54.72 F/m  
Sigma : 0.98 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

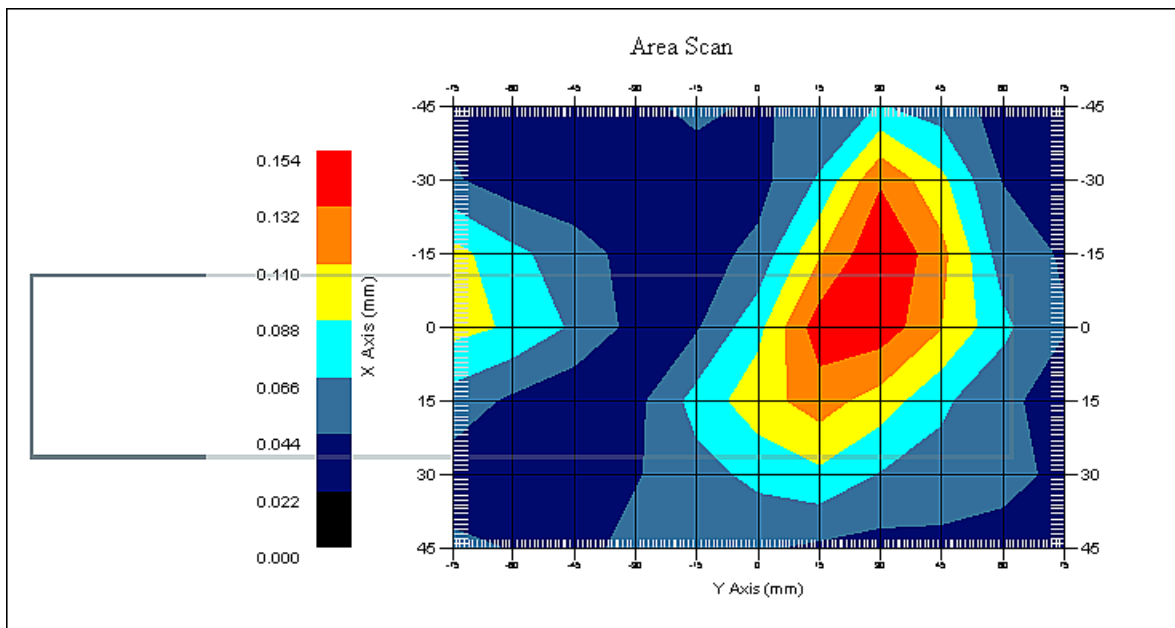
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.3  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
Area Scan : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

### Other Data

DUT Position : Left  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.139 W/kg  
10 gram SAR value : 0.098 W/kg  
Area Scan Peak SAR : 0.153 W/kg  
Zoom Scan Peak SAR : 0.180 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 26-Jan-2011  
Starting Time : 26-Jan-2011 01:26:48 PM  
End Time : 26-Jan-2011 01:50:15 PM  
Scanning Time : 1407 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 850.00 MHz  
Max. Transmit Pwr : 0.194 W  
Drift Time : 0 min(s)  
Length : 80 mm  
Width : 238 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Back w/Headset  
Power Drift-Start : 0.198 W/kg  
Power Drift-Finish: 0.202 W/kg  
Power Drift (%) : 2.148

## 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. : 835  
Frequency : 835.00 MHz  
Last Calib. Date : 26-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 40.00 RH%  
Epsilon : 54.72 F/m  
Sigma : 0.98 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 835.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 6.3  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

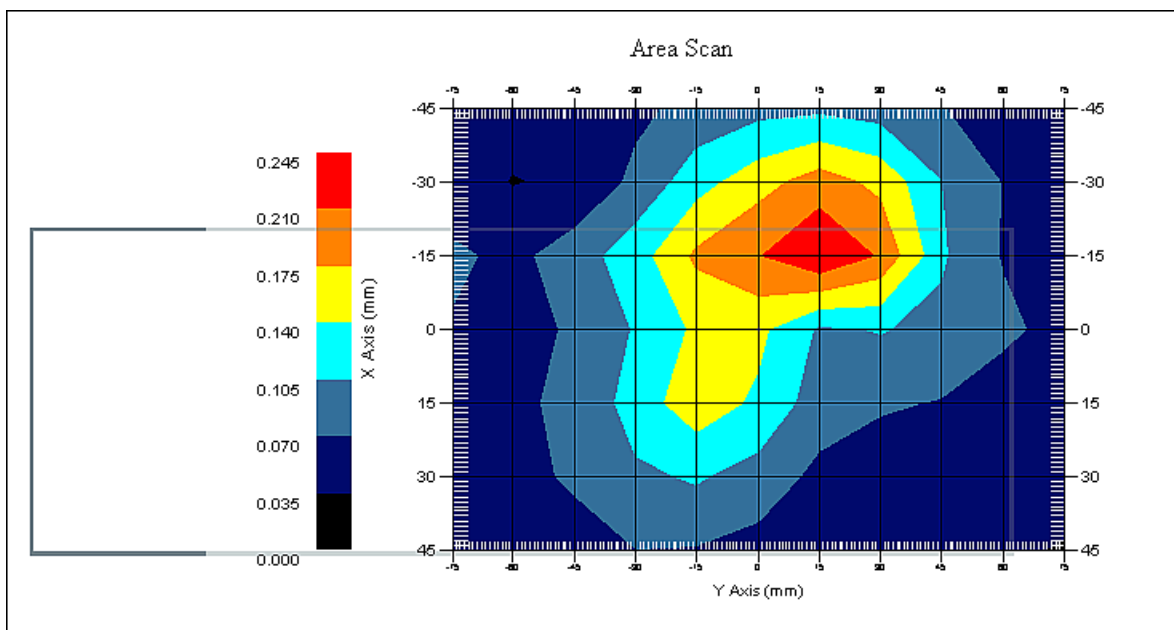


### Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 23-Jan-2011  
Set-up Time : 1:49:45 PM  
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 w/Headset  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.240 W/kg  
10 gram SAR value : 0.145 W/kg  
Area Scan Peak SAR : 0.245 W/kg  
Zoom Scan Peak SAR : 0.410 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 21-Jan-2011  
Starting Time : 21-Jan-2011 11:49:02 AM  
End Time : 21-Jan-2011 12:09:25 PM  
Scanning Time : 1223 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.851 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 0.116 W/kg  
Power Drift-Finish: 0.120 W/kg  
Power Drift (%) : 3.442

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 21-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 39.51 F/m  
Sigma : 1.41 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

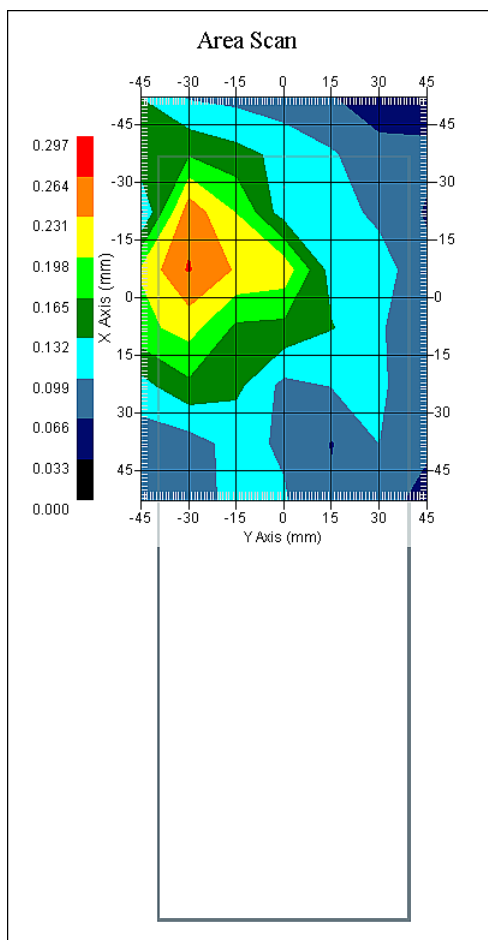
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 4.9  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 21-Jan-2011  
Set-up Time : 11:48:56 AM  
Area Scan : 8x7x1 : 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 : 0.409 W/kg  
10 gram SAR value : 0.183 W/kg  
Area Scan Peak SAR : 0.267 W/kg  
Zoom Scan Peak SAR : 1.251 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 22-Jan-2011  
Starting Time : 22-Jan-2011 08:37:03 AM  
End Time : 22-Jan-2011 08:58:40 AM  
Scanning Time : 1297 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.851 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 0.117 W/kg  
Power Drift-Finish: 0.118 W/kg  
Power Drift (%) : 0.867

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 22-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 39.72 F/m  
Sigma : 1.40 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

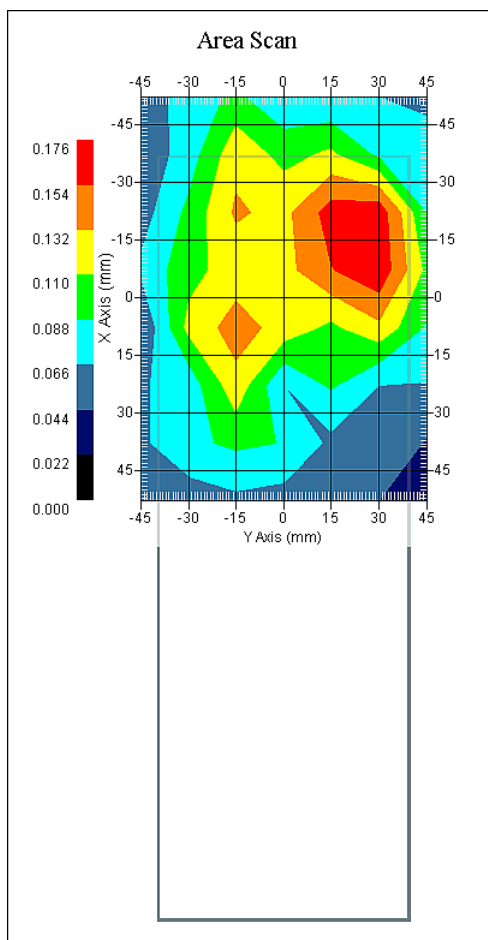
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 4.9  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 22-Jan-2011  
Set-up Time : 11:48:56 AM  
Area Scan : 8x7x1 : 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 : 0.157 W/kg  
10 gram SAR value : 0.103 W/kg  
Area Scan Peak SAR : 0.172 W/kg  
Zoom Scan Peak SAR : 0.330 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 21-Jan-2011  
Starting Time : 21-Jan-2011 12:54:07 PM  
End Time : 21-Jan-2011 01:14:06 PM  
Scanning Time : 1199 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.851 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : 15° Tilt  
Power Drift-Start : 0.132 W/kg  
Power Drift-Finish: 0.135 W/kg  
Power Drift (%) : 2.233

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 21-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 39.51 F/m  
Sigma : 1.41 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

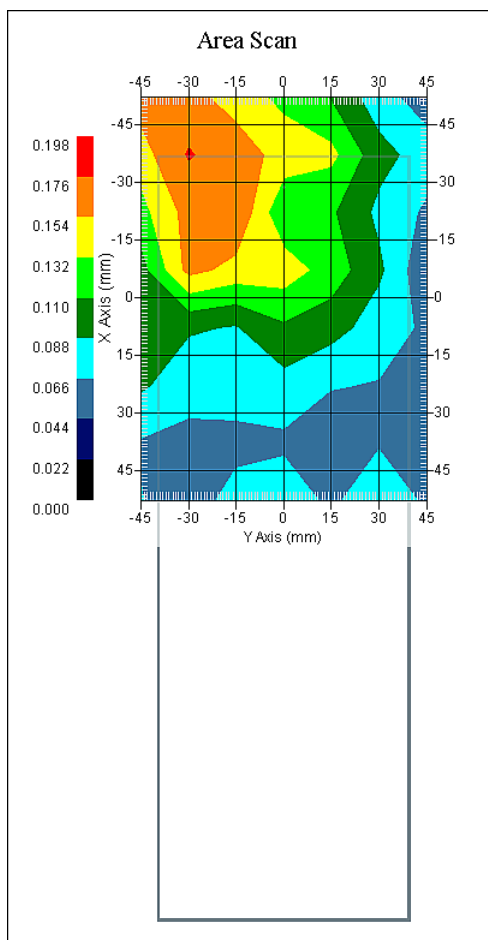
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 4.9  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 21-Jan-2011  
Set-up Time : 11:48:56 AM  
Area Scan : 8x7x1 : 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 : 0.178 W/kg  
10 gram SAR value : 0.120 W/kg  
Area Scan Peak SAR : 0.178 W/kg  
Zoom Scan Peak SAR : 0.260 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 22-Jan-2011  
Starting Time : 22-Jan-2011 09:00:31 AM  
End Time : 22-Jan-2011 09:21:03 AM  
Scanning Time : 1232 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.851 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : 15° Tilt  
Power Drift-Start : 0.161 W/kg  
Power Drift-Finish: 0.156 W/kg  
Power Drift (%) : -3.101

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 22-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 39.72 F/m  
Sigma : 1.40 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 4.9  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

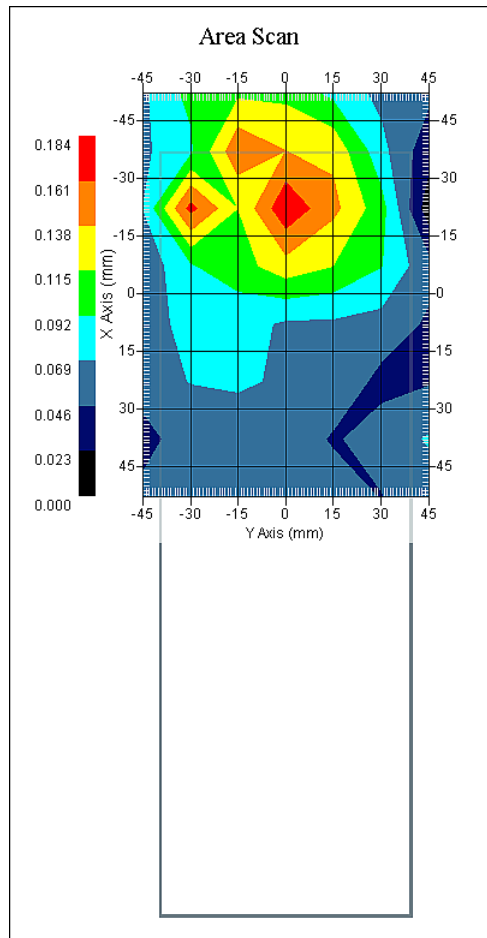


Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 22-Jan-2011  
Set-up Time : 11:48:56 AM  
Area Scan : 8x7x1 : 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 : 0.159 W/kg  
10 gram SAR value : 0.109 W/kg  
Area Scan Peak SAR : 0.180 W/kg  
Zoom Scan Peak SAR : 0.230 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 21-Jan-2011  
Starting Time : 21-Jan-2011 01:38:41 PM  
End Time : 21-Jan-2011 01:57:54 PM  
Scanning Time : 1153 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.165 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 0.217 W/kg  
Power Drift-Finish: 0.214 W/kg  
Power Drift (%) : -1.349

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 21-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 39.51 F/m  
Sigma : 1.41 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

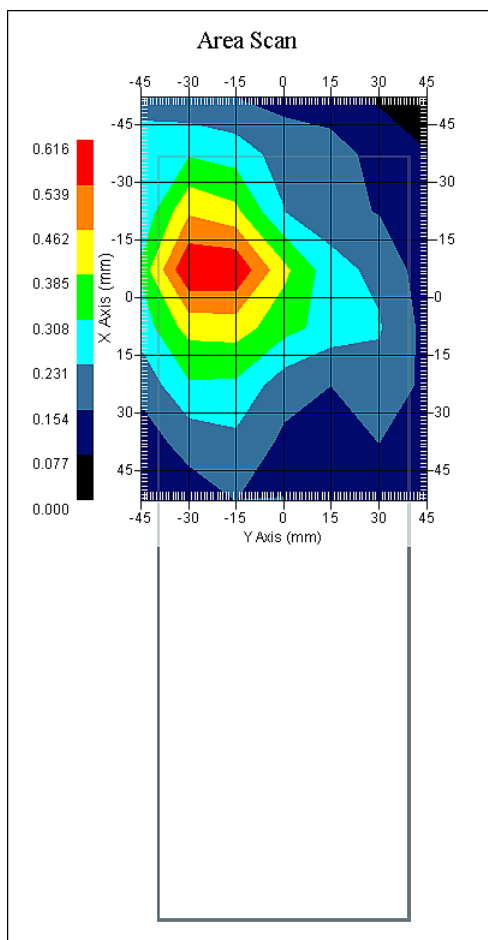
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 4.9  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 21-Jan-2011  
Set-up Time : 11:48:56 AM  
Area Scan : 8x7x1 : Measurement x=15mm, y=15mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

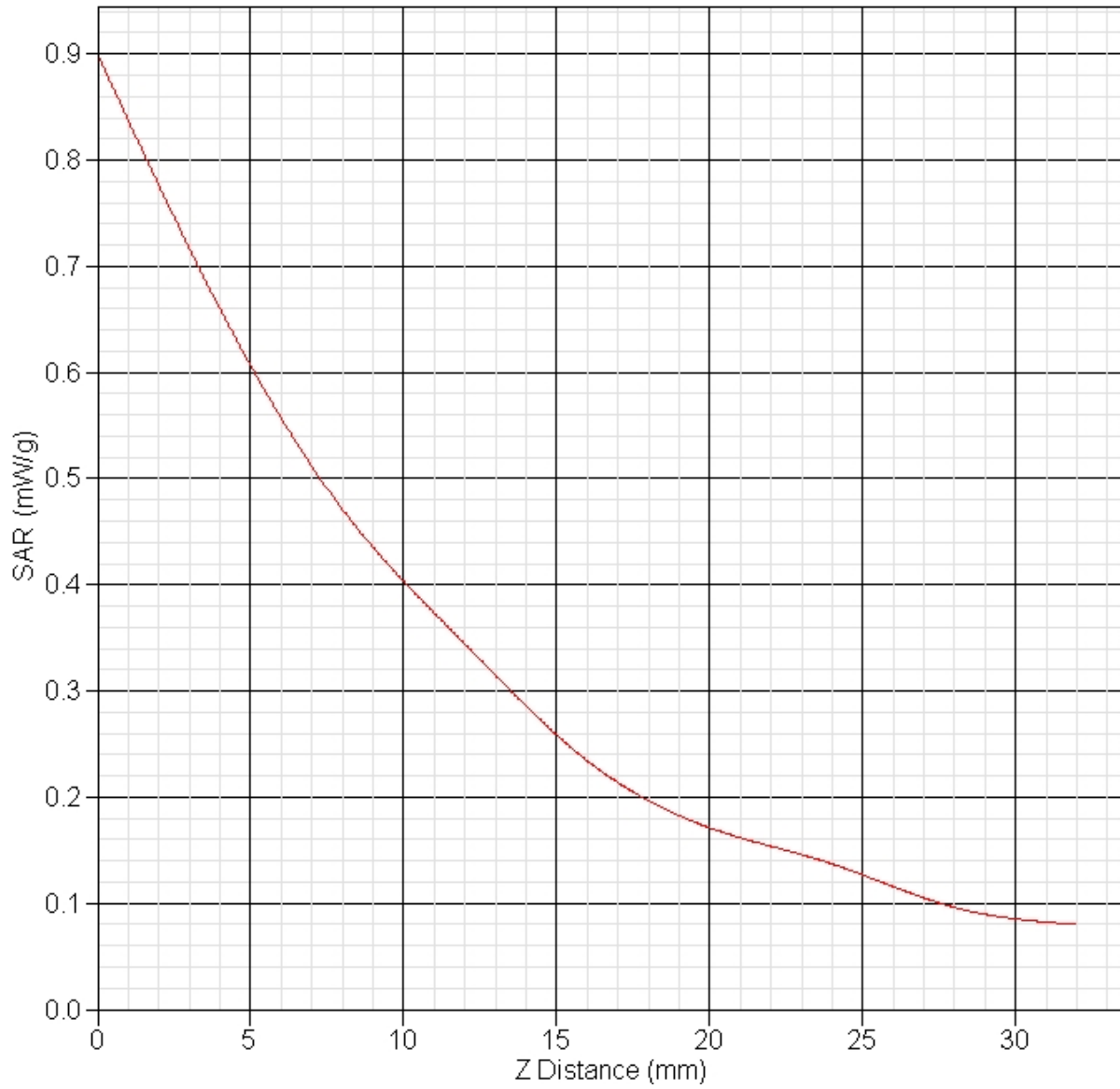
Other Data

DUT Position : Touch  
Separation : 0  
Channel : Mid



1 gram SAR value : 0.601 W/kg  
10 gram SAR value : 0.349 W/kg  
Area Scan Peak SAR : 0.615 W/kg  
Zoom Scan Peak SAR : 0.900 W/kg

**SAR-Z Axis**  
at Hotspot x:25.10 y:-21.97



**SAR Test Report**

By Operator : Jay  
Measurement Date : 22-Jan-2011  
Starting Time : 22-Jan-2011 09:45:56 AM  
End Time : 22-Jan-2011 10:05:37 AM  
Scanning Time : 1181 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.165 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Touch  
Power Drift-Start : 0.288 W/kg  
Power Drift-Finish: 0.290 W/kg  
Power Drift (%) : 0.643

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 22-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 39.72 F/m  
Sigma : 1.40 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

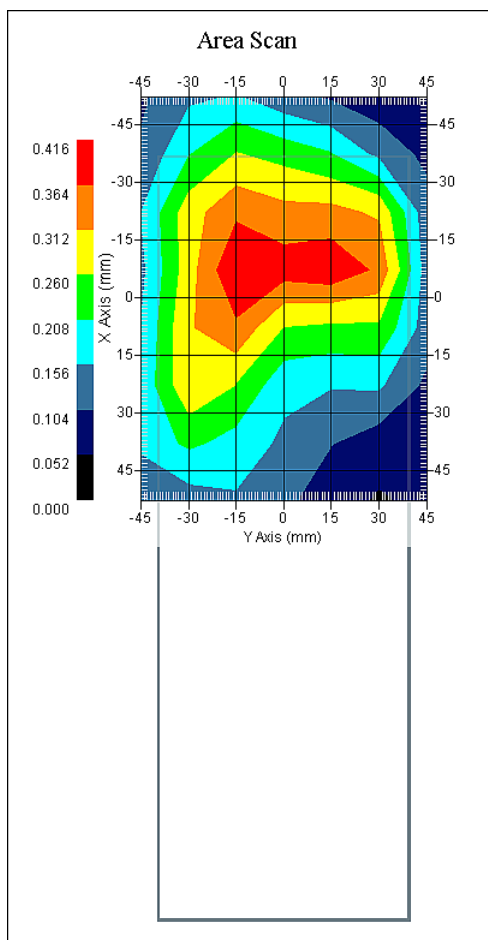
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 4.9  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 22-Jan-2011  
Set-up Time : 11:48:56 AM  
Area Scan : 8x7x1 : 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 : 0.397 W/kg  
10 gram SAR value : 0.255 W/kg  
Area Scan Peak SAR : 0.416 W/kg  
Zoom Scan Peak SAR : 0.630 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 21-Jan-2011  
Starting Time : 21-Jan-2011 01:16:50 PM  
End Time : 21-Jan-2011 01:35:58 PM  
Scanning Time : 1148 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.165 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : 15° Tilt  
Power Drift-Start : 0.267 W/kg  
Power Drift-Finish: 0.255 W/kg  
Power Drift (%) : -4.496

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 21-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 39.51 F/m  
Sigma : 1.41 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

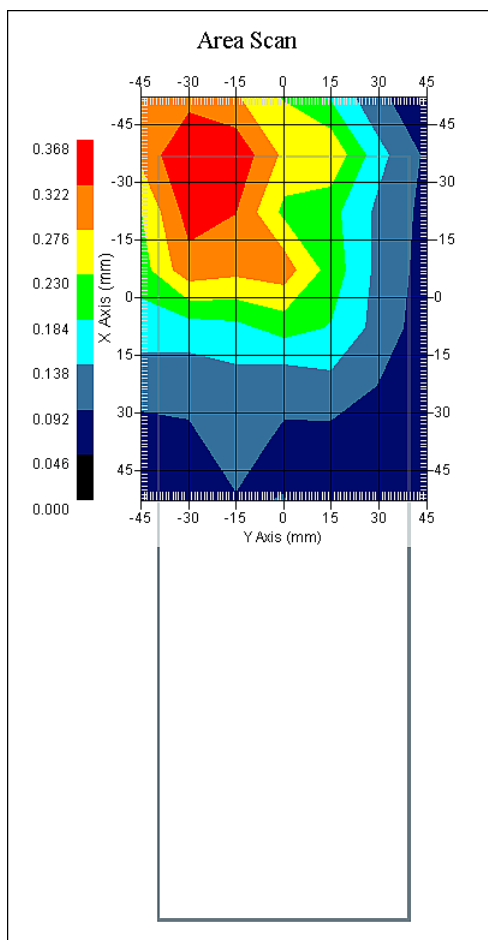
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 4.9  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 21-Jan-2011  
Set-up Time : 11:48:56 AM  
Area Scan : 8x7x1 : 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 : 0.380 W/kg  
10 gram SAR value : 0.233 W/kg  
Area Scan Peak SAR : 0.368 W/kg  
Zoom Scan Peak SAR : 0.600 W/kg



**SAR Test Report**

By Operator : Jay  
Measurement Date : 22-Jan-2011  
Starting Time : 22-Jan-2011 09:23:44 AM  
End Time : 22-Jan-2011 09:43:13 AM  
Scanning Time : 1169 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.165 W  
Drift Time : 0 min(s)  
Length : 238 mm  
Width : 80 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : 15° Tilt  
Power Drift-Start : 0.356 W/kg  
Power Drift-Finish: 0.342 W/kg  
Power Drift (%) : -3.939

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 22-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 39.72 F/m  
Sigma : 1.40 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

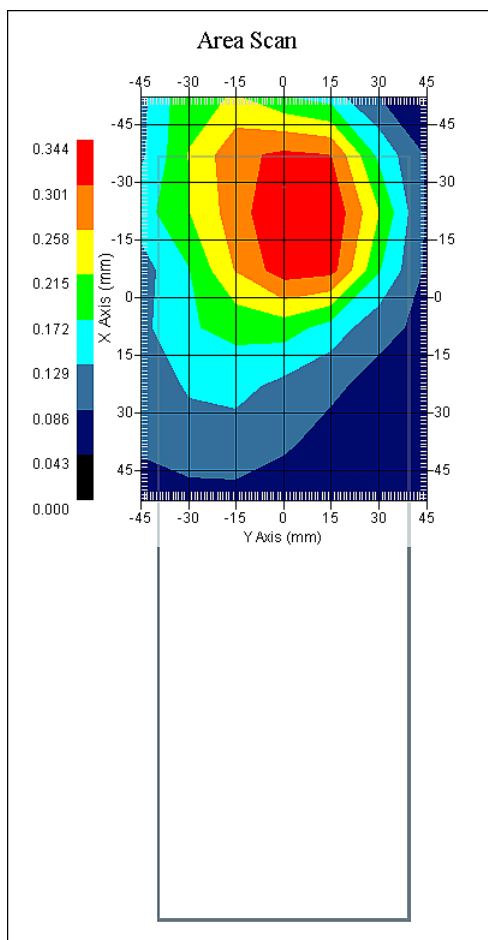
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 4.9  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 22-Jan-2011  
Set-up Time : 11:48:56 AM  
Area Scan : 8x7x1 : 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 : 0.358 W/kg  
10 gram SAR value : 0.232 W/kg  
Area Scan Peak SAR : 0.341 W/kg  
Zoom Scan Peak SAR : 0.540 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 24-Jan-2011  
Starting Time : 24-Jan-2011 08:14:45 AM  
End Time : 24-Jan-2011 08:39:45 AM  
Scanning Time : 1500 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.851 W  
Drift Time : 0 min(s)  
Length : 80 mm  
Width : 238 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Front  
Power Drift-Start : 0.064 W/kg  
Power Drift-Finish: 0.063 W/kg  
Power Drift (%) : -1.567

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 24-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 53.07 F/m  
Sigma : 1.54 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

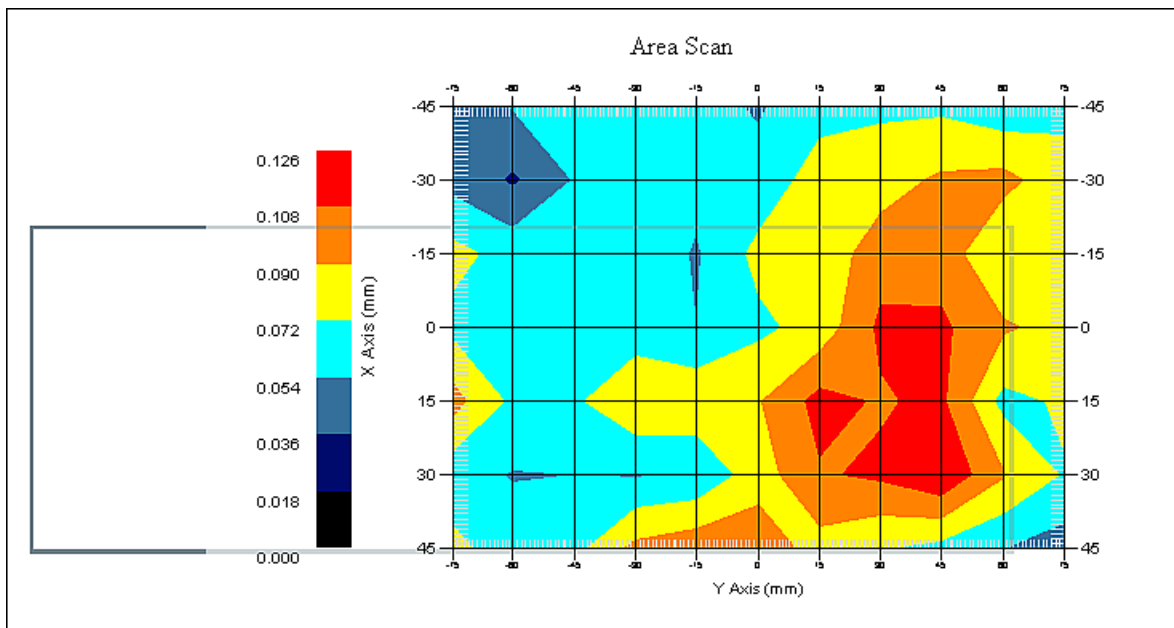
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 5  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 24-Jan-2011  
Set-up Time : 11:48:56 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 : Front  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.103 W/kg  
10 gram SAR value : 0.080 W/kg  
Area Scan Peak SAR : 0.124 W/kg  
Zoom Scan Peak SAR : 0.160 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 24-Jan-2011  
Starting Time : 24-Jan-2011 10:58:45 AM  
End Time : 24-Jan-2011 11:22:41 AM  
Scanning Time : 1436 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.851 W  
Drift Time : 0 min(s)  
Length : 46 mm  
Width : 238 mm  
Depth : 80 mm  
Antenna Type : Internal  
Orientation : Right  
Power Drift-Start : 0.050 W/kg  
Power Drift-Finish: 0.052 W/kg  
Power Drift (%) : 4.044

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 24-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 53.07 F/m  
Sigma : 1.54 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

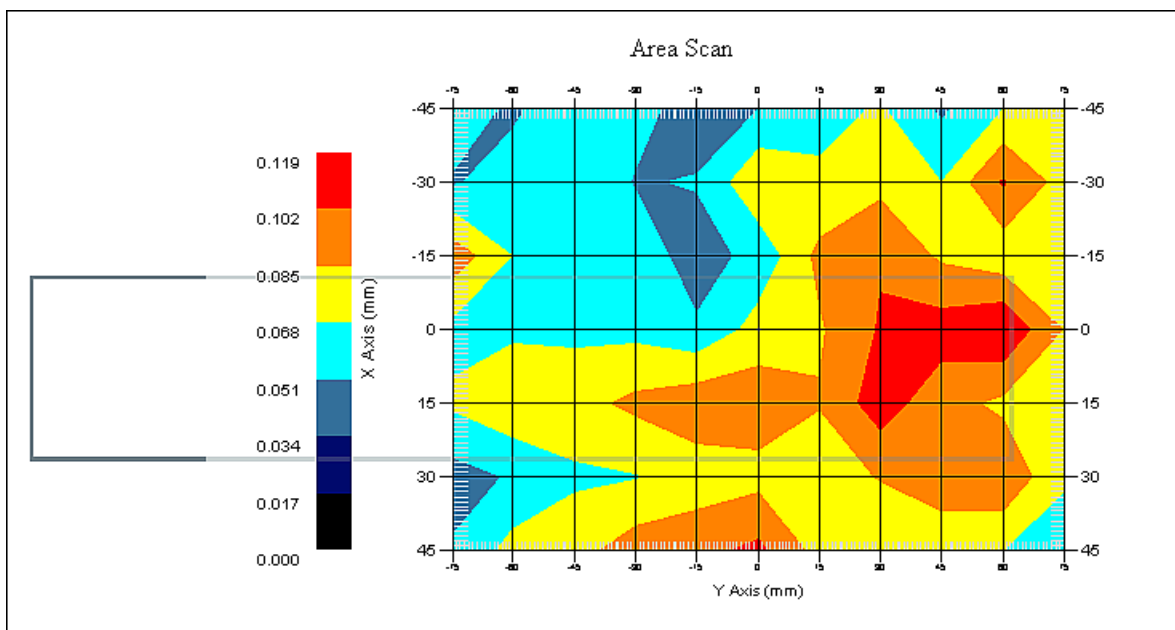
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 5  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 24-Jan-2011  
Set-up Time : 11:48:56 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 : Right  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.134 W/kg  
10 gram SAR value : 0.101 W/kg  
Area Scan Peak SAR : 0.118 W/kg  
Zoom Scan Peak SAR : 0.240 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 24-Jan-2011  
Starting Time : 24-Jan-2011 11:51:31 AM  
End Time : 24-Jan-2011 12:15:12 PM  
Scanning Time : 1421 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : GSM  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.851 W  
Drift Time : 0 min(s)  
Length : 46 mm  
Width : 238 mm  
Depth : 80 mm  
Antenna Type : Internal  
Orientation : Left  
Power Drift-Start : 0.140 W/kg  
Power Drift-Finish: 0.140 W/kg  
Power Drift (%) : 0.373

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 24-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 53.07 F/m  
Sigma : 1.54 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

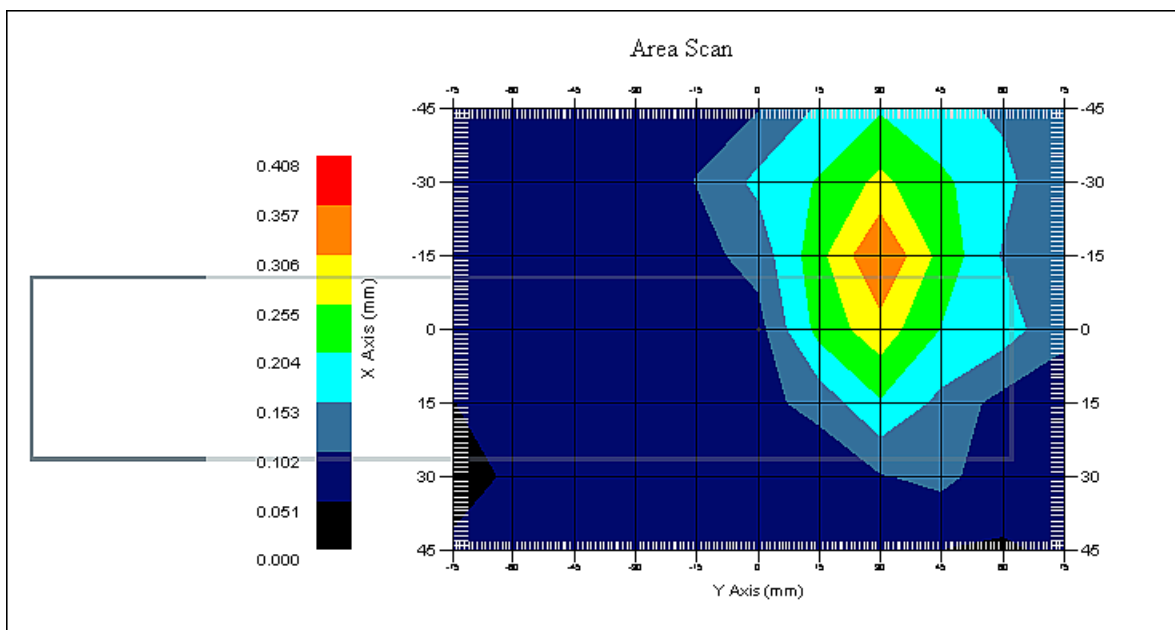
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 8  
Conversion Factor: 5  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 8  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 24-Jan-2011  
Set-up Time : 11:48:56 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 : Left  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.345 W/kg  
10 gram SAR value : 0.210 W/kg  
Area Scan Peak SAR : 0.358 W/kg  
Zoom Scan Peak SAR : 0.590 W/kg



**SAR Test Report**

By Operator : Jay  
Measurement Date : 24-Jan-2011  
Starting Time : 24-Jan-2011 08:41:54 AM  
End Time : 24-Jan-2011 09:05:27 AM  
Scanning Time : 1413 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.165 W  
Drift Time : 0 min(s)  
Length : 80 mm  
Width : 238 mm  
Depth : 46 mm  
Antenna Type : Internal  
Orientation : Front  
Power Drift-Start : 0.106 W/kg  
Power Drift-Finish: 0.106 W/kg  
Power Drift (%) : -0.051

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 24-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 53.07 F/m  
Sigma : 1.54 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

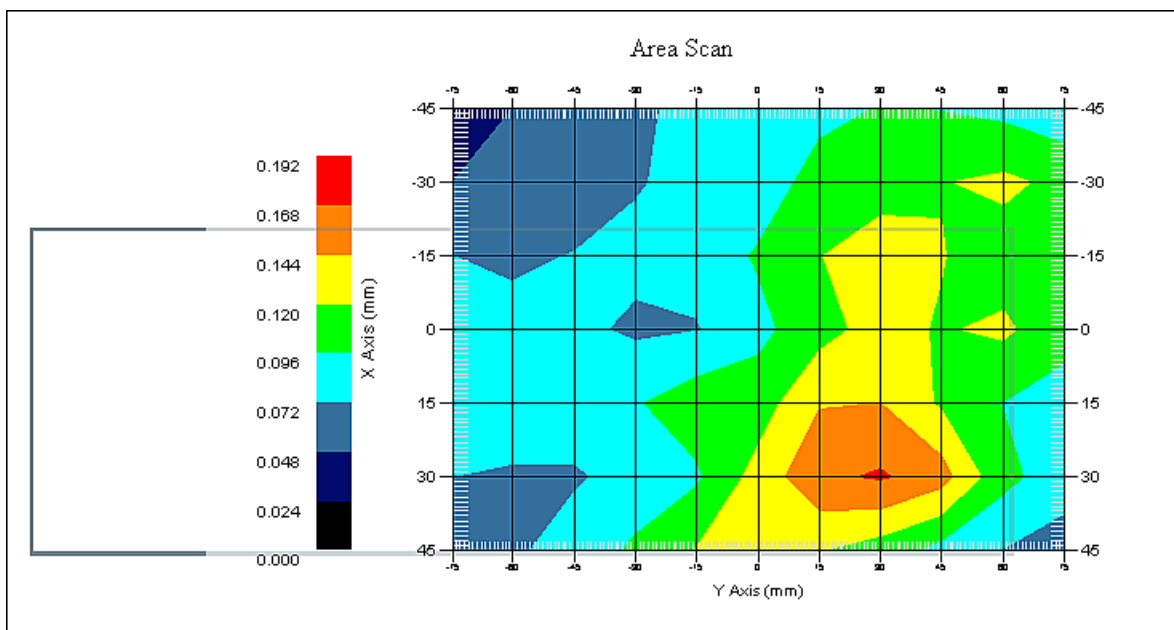
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 5  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 24-Jan-2011  
Set-up Time : 11:48:56 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 : Front  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.166 W/kg  
10 gram SAR value : 0.118 W/kg  
Area Scan Peak SAR : 0.171 W/kg  
Zoom Scan Peak SAR : 0.280 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 24-Jan-2011  
Starting Time : 24-Jan-2011 10:31:17 AM  
End Time : 24-Jan-2011 10:54:43 AM  
Scanning Time : 1406 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.165 W  
Drift Time : 0 min(s)  
Length : 46 mm  
Width : 238 mm  
Depth : 80 mm  
Antenna Type : Internal  
Orientation : Right  
Power Drift-Start : 0.059 W/kg  
Power Drift-Finish: 0.060 W/kg  
Power Drift (%) : 1.694

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 24-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 53.07 F/m  
Sigma : 1.54 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

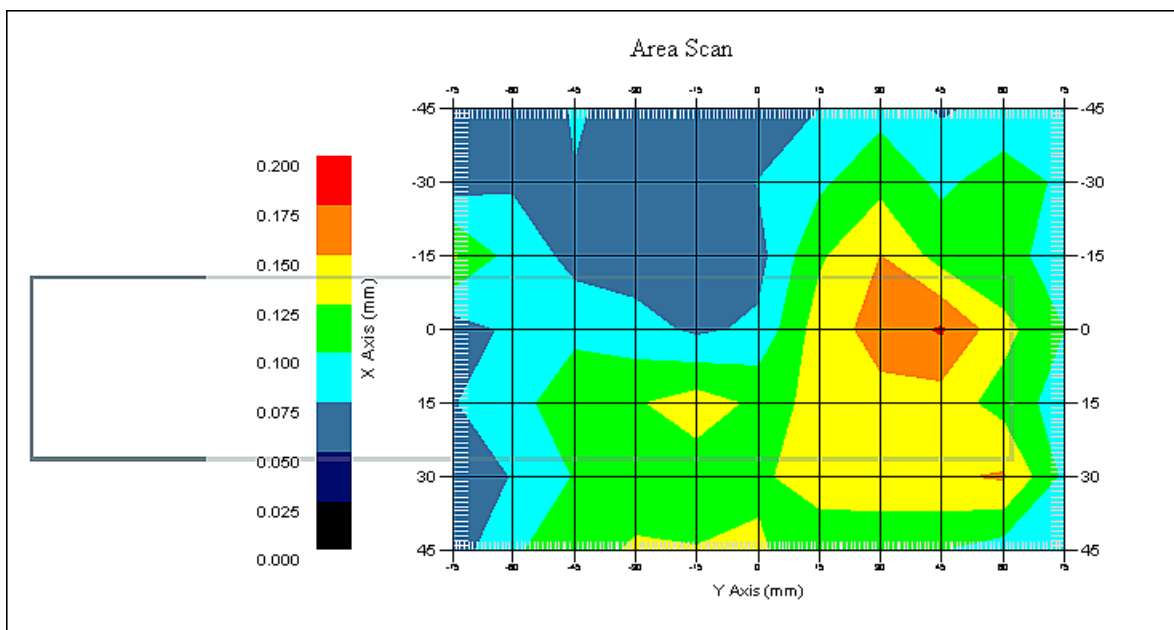
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 5  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 24-Jan-2011  
Set-up Time : 11:48:56 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 : Right  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.153 W/kg  
10 gram SAR value : 0.111 W/kg  
Area Scan Peak SAR : 0.178 W/kg  
Zoom Scan Peak SAR : 0.240 W/kg

**SAR Test Report**

By Operator : Jay  
Measurement Date : 24-Jan-2011  
Starting Time : 24-Jan-2011 12:30:26 PM  
End Time : 24-Jan-2011 12:53:50 PM  
Scanning Time : 1404 secs

## Product Data

Device Name : Intermec  
Serial No. : 7077  
Mode : WCDMA  
Model : 1001CP01U  
Frequency : 1900.00 MHz  
Max. Transmit Pwr : 0.165 W  
Drift Time : 0 min(s)  
Length : 46 mm  
Width : 238 mm  
Depth : 80 mm  
Antenna Type : Internal  
Orientation : Left  
Power Drift-Start : 0.259 W/kg  
Power Drift-Finish: 0.253 W/kg  
Power Drift (%) : -2.149

## 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. : 1900  
Frequency : 1900.00 MHz  
Last Calib. Date : 24-Jan-2011  
Temperature : 20.00 °C  
Ambient Temp. : 23.00 °C  
Humidity : 36.00 RH%  
Epsilon : 53.07 F/m  
Sigma : 1.54 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

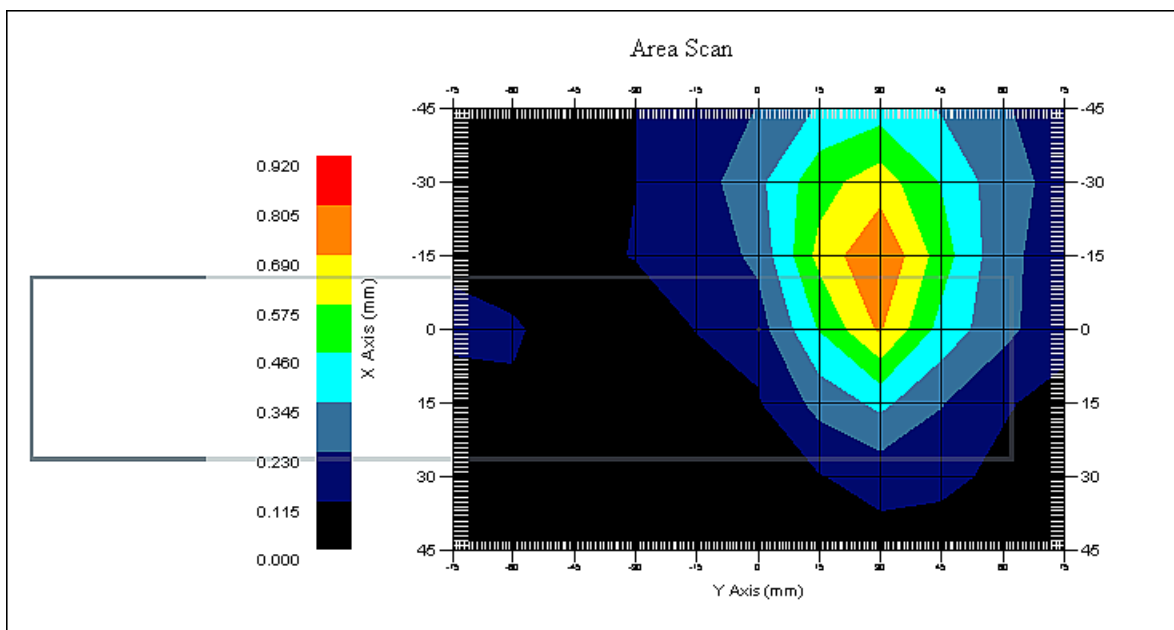
Name : Probe 215 - RFEL  
Model : E020  
Type : E-Field Triangle  
Serial No. : 215  
Last Calib. Date : 22-Sep-2010  
Frequency : 1900.00 MHz  
Duty Cycle Factor: 1  
Conversion Factor: 5  
Probe Sensitivity: 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point: 95.00 mV  
Offset : 1.56 mm

### Measurement Data

Crest Factor : 1  
Scan Type : Complete  
Tissue Temp. : 20.00 °C  
Ambient Temp. : 23.00 °C  
Set-up Date : 24-Jan-2011  
Set-up Time : 11:48:56 AM  
Area Scan : 7x11x1 : Measurement x=15mm, y=15mm, z=4mm  
Zoom Scan : 5x5x8 : Measurement x=8mm, y=8mm, z=4mm

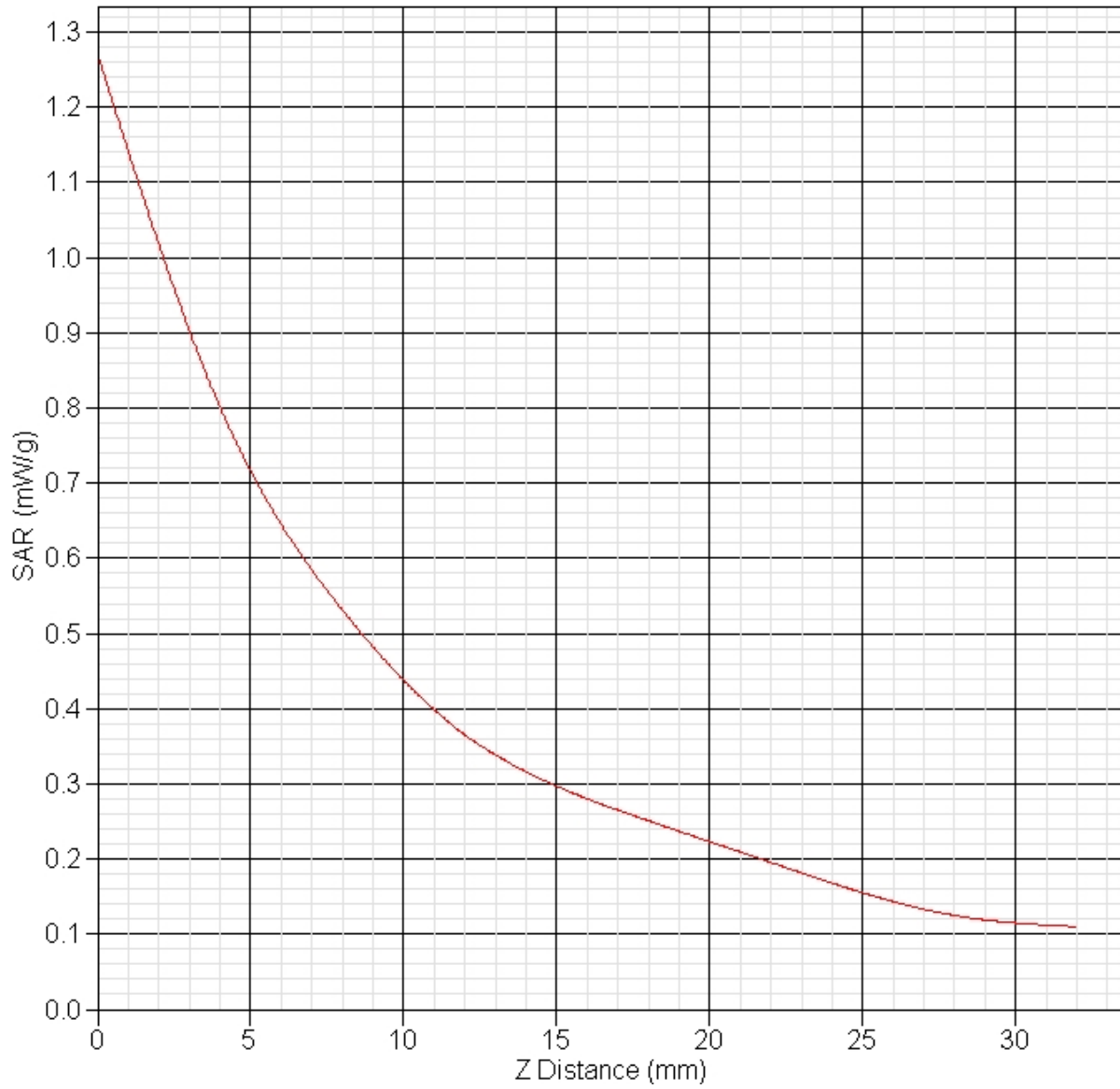
### Other Data

DUT Position : Left  
Separation : 0 mm  
Channel : Mid



1 gram SAR value : 0.765 W/kg  
10 gram SAR value : 0.462 W/kg  
Area Scan Peak SAR : 0.806 W/kg  
Zoom Scan Peak SAR : 1.271 W/kg

**SAR-Z Axis**  
at Hotspot x:8.04 y:29.86



## **Appendix D – Probe Calibration Data Sheets**



# NCL CALIBRATION LABORATORIES

Calibration File No.: CP-1155

Client.: RFEL

## 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 NRC/NIST.

Equipment: Miniature Isotropic RF Probe 835 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

Serial No.: 215

Head Calibration

Calibration Procedure: SSI/DRB-TP-D01-032-E020-V2

Project No: RFEL-E-020-Cal-5539

Calibrated: 22 September 2010

Released on: 27 September 2010

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary  
This calibration has been conducted in line with the SCC ISO-IEC 17025 Scope of Accreditation  
Accredited Laboratory Number 48

Released By: \_\_\_\_\_

**NCL** CALIBRATION LABORATORIES

17 Bentley Ave  
NEPEAN, ONTARIO  
CANADA K2E 6T7

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

## Introduction

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-020 215.

## References

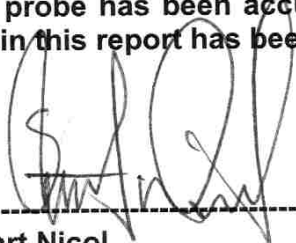
SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure  
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"  
IEEE 1309 "IEEE Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9 KHz to 40 GHz" 2005  
SSI-TP-011 Tissue Calibration Procedure  
IEC 62209 "Human exposure to radio frequency fields from handheld and body-mounted wireless communication devices –Human models, instrumentation and procedures Part 1 & 2: Procedure to determine the Specific Absorption Rate (SAR) for handheld devices used in close proximity of the ear (frequency range of 200MHz to 3GHz)"

## Conditions

Probe 215 was a re-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 probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.**

  
-----  
**Stuart Nicol**

  
-----  
**Jesse Hones**

## Calibration Results Summary

<b>Probe Type:</b>	E-Field Probe E-020
<b>Serial Number:</b>	215
<b>Frequency:</b>	835 MHz
<b>Sensor Offset:</b>	1.56 mm
<b>Sensor Length:</b>	2.5 mm
<b>Tip Enclosure:</b>	Ertalyte*
<b>Tip Diameter:</b>	<5 mm
<b>Tip Length:</b>	60 mm
<b>Total Length:</b>	290 mm

\*Resistive to recommended tissue recipes per IEEE-1528

## Sensitivity in Air

<b>Channel X:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Channel Y:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Channel Z:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Diode Compression Point:</b>	95 mV

## **Sensitivity in Head Tissue Measured**

**Frequency:** 835 MHz

**Epsilon:** 41.2 (+/-5%)      **Sigma:** 0.90 S/m (+/-5%)

### **ConvF**

**Channel X:** 6.2

**Channel Y:** 6.2

**Channel Z:** 6.2

Tissue sensitivity values were calculated using the load impedance of the APREL Laboratories Daq-Paq.

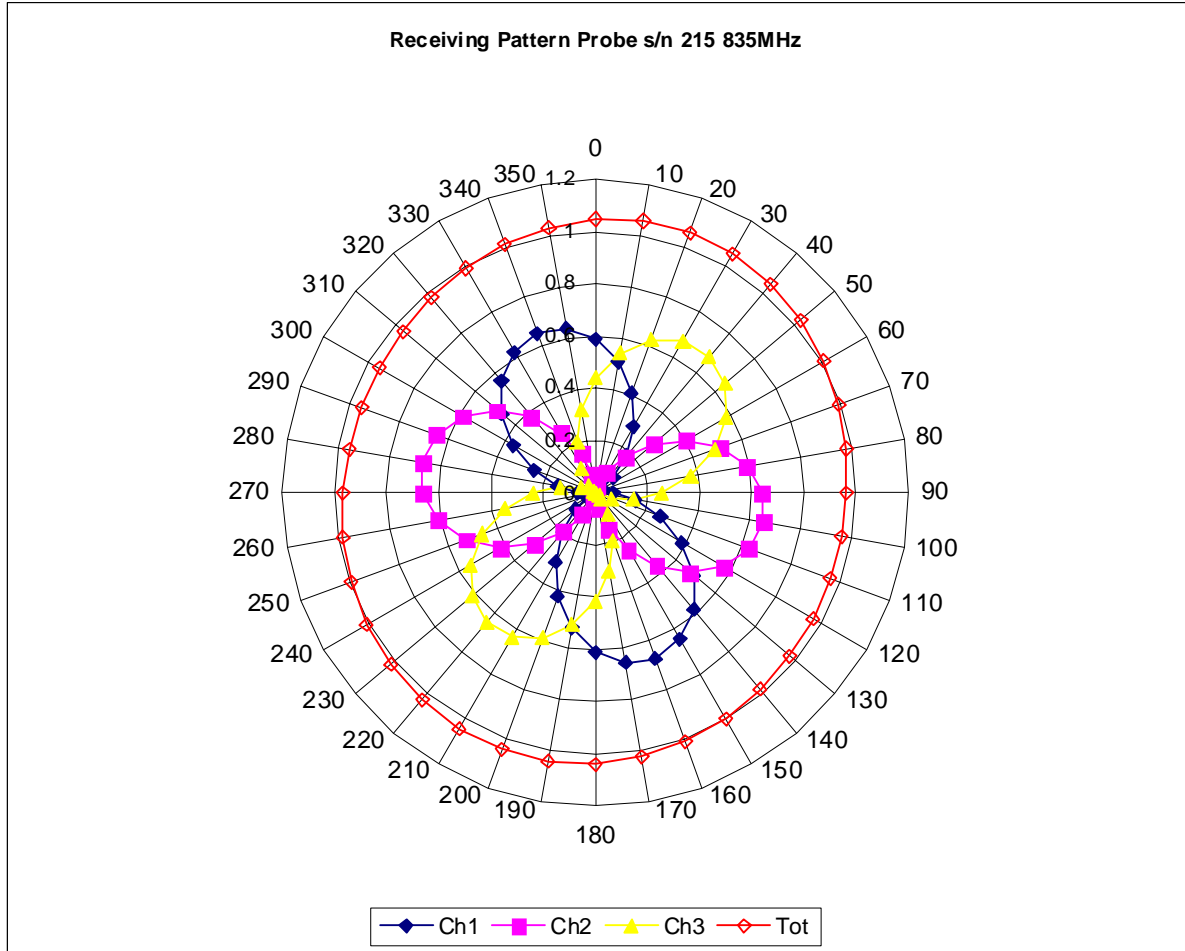
### **Boundary Effect:**

Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.44mm.

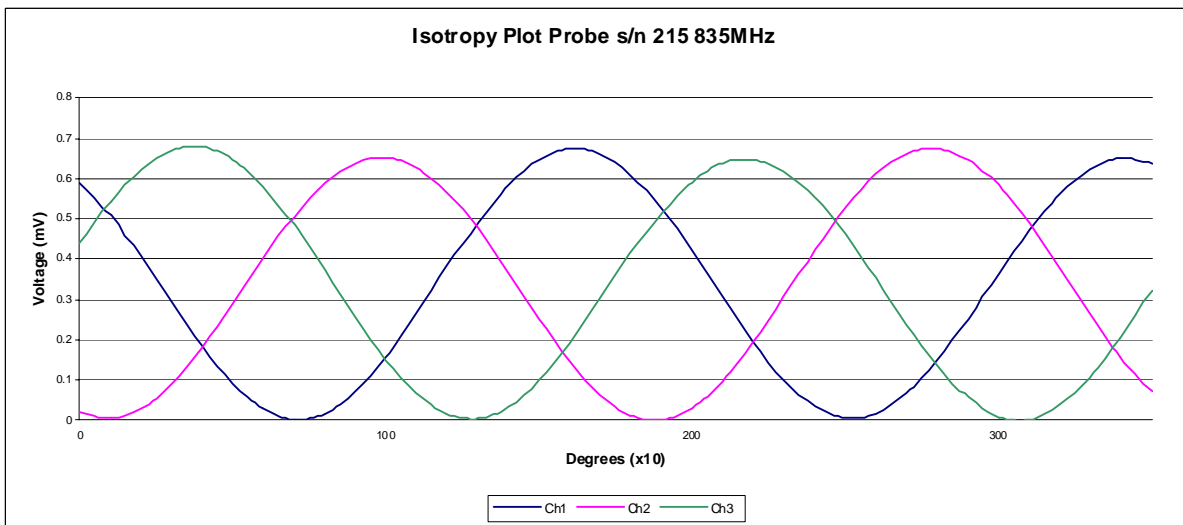
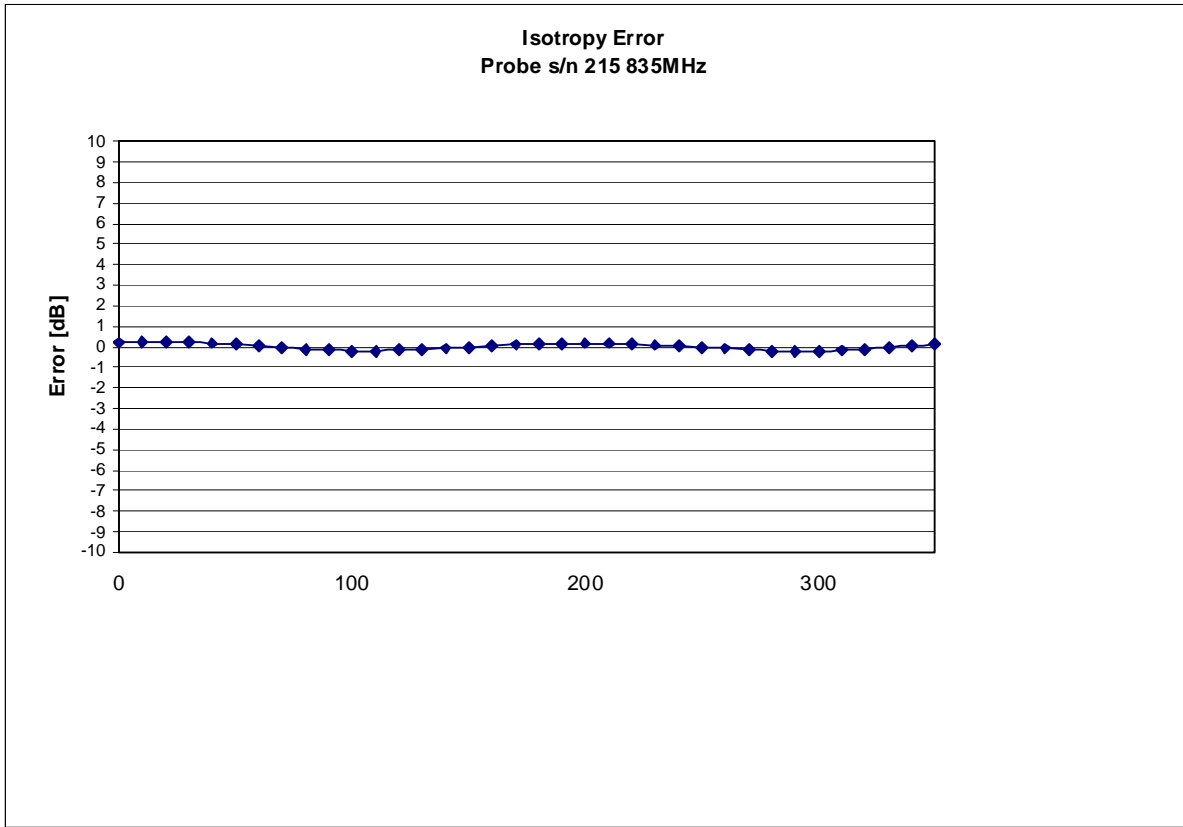
### **Spatial Resolution:**

The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.

### Receiving Pattern 835 MHz (Air)



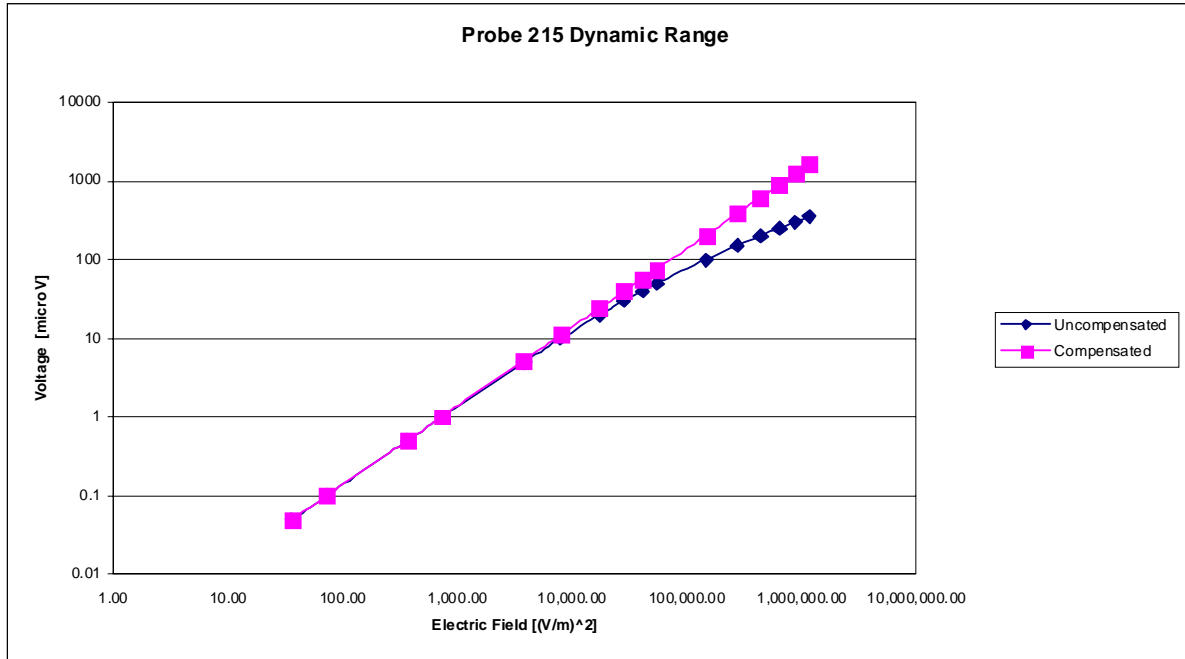
### Isotropy Error 835 MHz (Air)



Isotropicity Tissue:

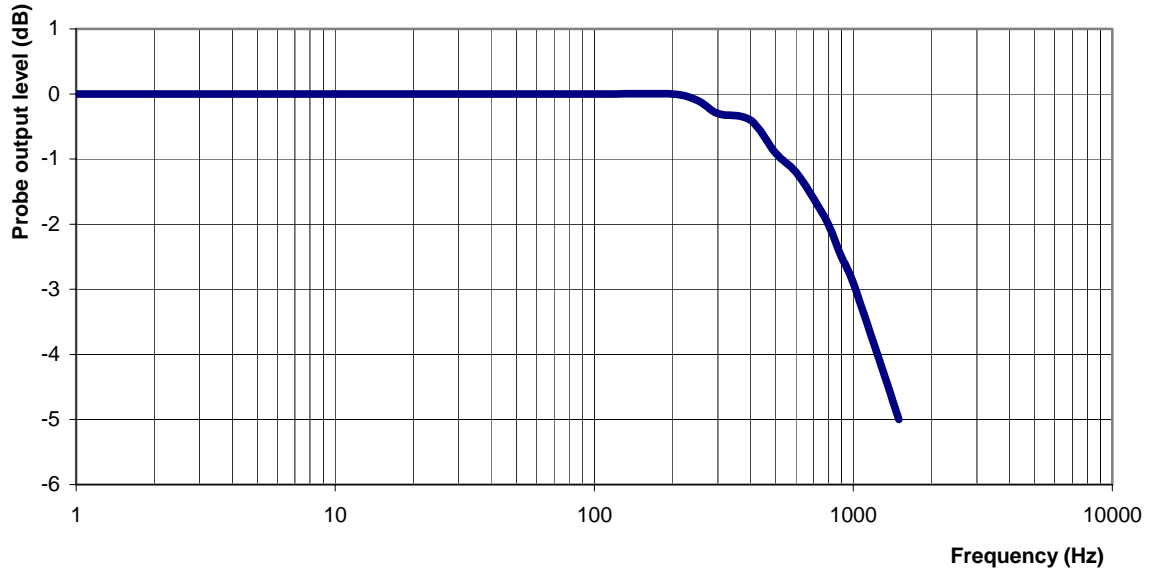
0.10 dB

## Dynamic Range



## Video Bandwidth

**Probe Frequency Characteristics**



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



## **Conversion Factor Uncertainty Assessment Measured**

**Frequency:** 835MHz  
**Epsilon:** 41.2 (+/-5%)      **Sigma:** 0.90 S/m (+/-5%)

### **ConvF**

**Channel X:** 6.2      7%(K=2)

**Channel Y:** 6.2      7%(K=2)

**Channel Z:** 6.2      7%(K=2)

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

### **Boundary Effect:**

For a distance of 2.5mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.

## **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.: CP-1156

Client.: RFEL

## 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 NRC/NIST.

Equipment: Miniature Isotropic RF Probe 835 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

Serial No.: 215

Body Calibration

Calibration Procedure: SSI/DRB-TP-D01-032-E020-V2

Project No: RFEL-E-020-Cal-5539

Calibrated: 22 September 2010

Released on: 27 September 2010

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary  
This calibration has been conducted in line with the SCC ISO-IEC 17025 Scope of Accreditation  
Accredited Laboratory Number 48

Released By: \_\_\_\_\_

**NCL** CALIBRATION LABORATORIES

17 Bentley Ave  
NEPEAN, ONTARIO  
CANADA K2E 6T7

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

## Introduction

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-020 215.

## References

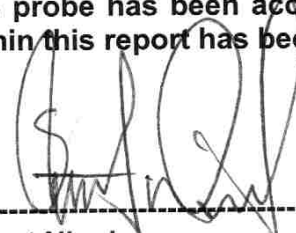
SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure  
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"  
IEEE 1309 "IEEE Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9 KHz to 40 GHz" 2005  
SSI-TP-011 Tissue Calibration Procedure  
IEC 62209 "Human exposure to radio frequency fields from handheld and body-mounted wireless communication devices –Human models, instrumentation and procedures Part 1 & 2: Procedure to determine the Specific Absorption Rate (SAR) for handheld devices used in close proximity of the ear (frequency range of 200MHz to 3GHz)"

## Conditions

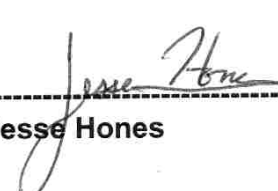
Probe 215 was a re-calibration.

**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 probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.**



-----  
**Stuart Nicol**



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**Jesse Hones**

## Calibration Results Summary

<b>Probe Type:</b>	E-Field Probe E-020
<b>Serial Number:</b>	215
<b>Frequency:</b>	835 MHz
<b>Sensor Offset:</b>	1.56 mm
<b>Sensor Length:</b>	2.5 mm
<b>Tip Enclosure:</b>	Ertalyte*
<b>Tip Diameter:</b>	<5 mm
<b>Tip Length:</b>	60 mm
<b>Total Length:</b>	290 mm

\*Resistive to recommended tissue recipes per IEEE-1528

## Sensitivity in Air

<b>Channel X:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Channel Y:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Channel Z:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Diode Compression Point:</b>	95 mV

## **Sensitivity in Body Tissue Measured**

**Frequency:** 835 MHz

**Epsilon:** 53.7 (+/-5%)      **Sigma:** 0.96 S/m (+/-5%)

### **ConvF**

**Channel X:** 6.3

**Channel Y:** 6.3

**Channel Z:** 6.3

Tissue sensitivity values were calculated using the load impedance of the APREL Laboratories Daq-Paq.

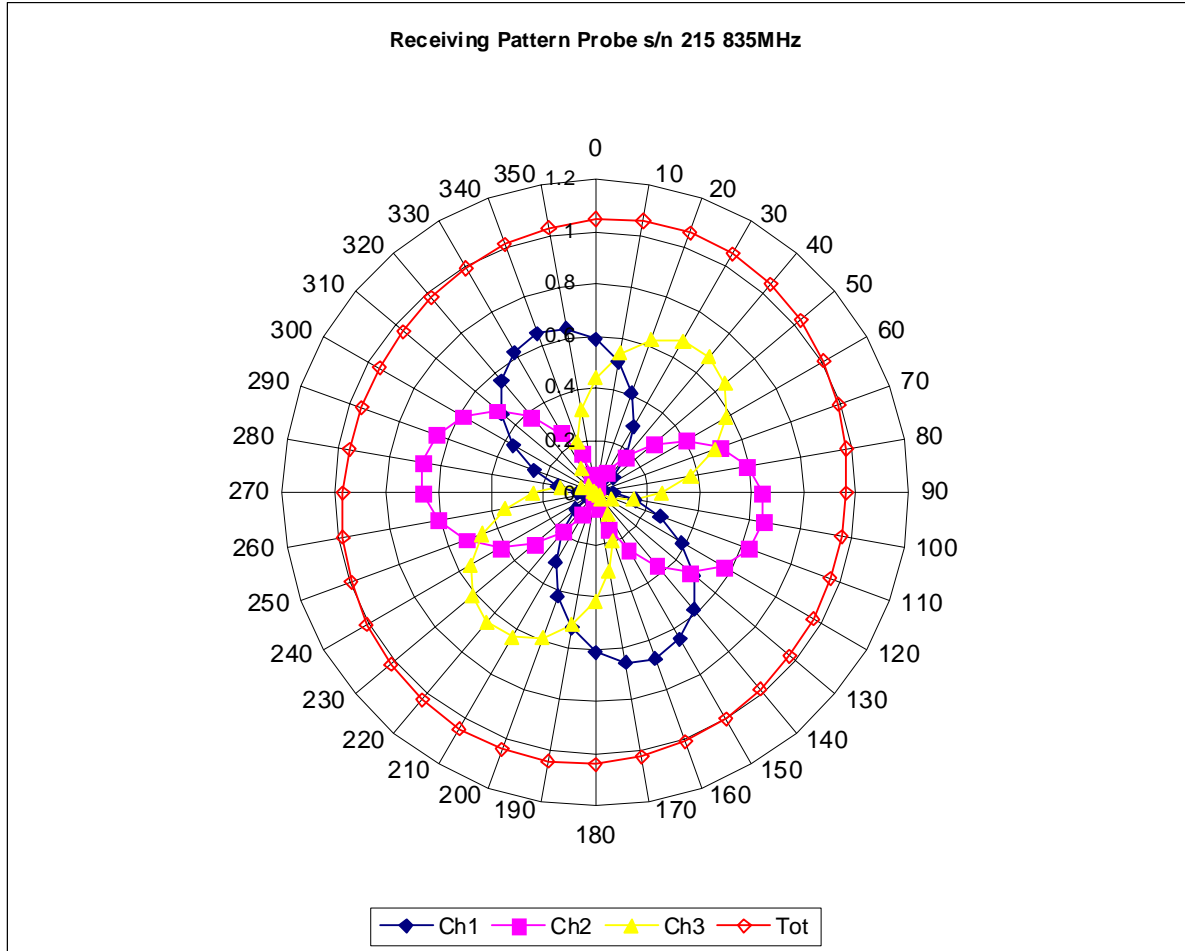
### **Boundary Effect:**

Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.44mm.

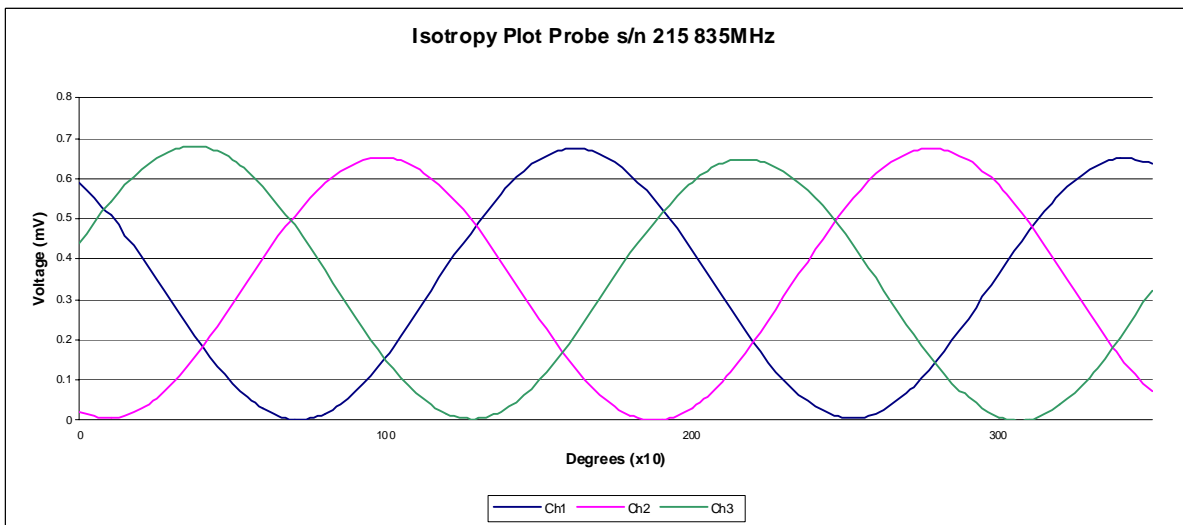
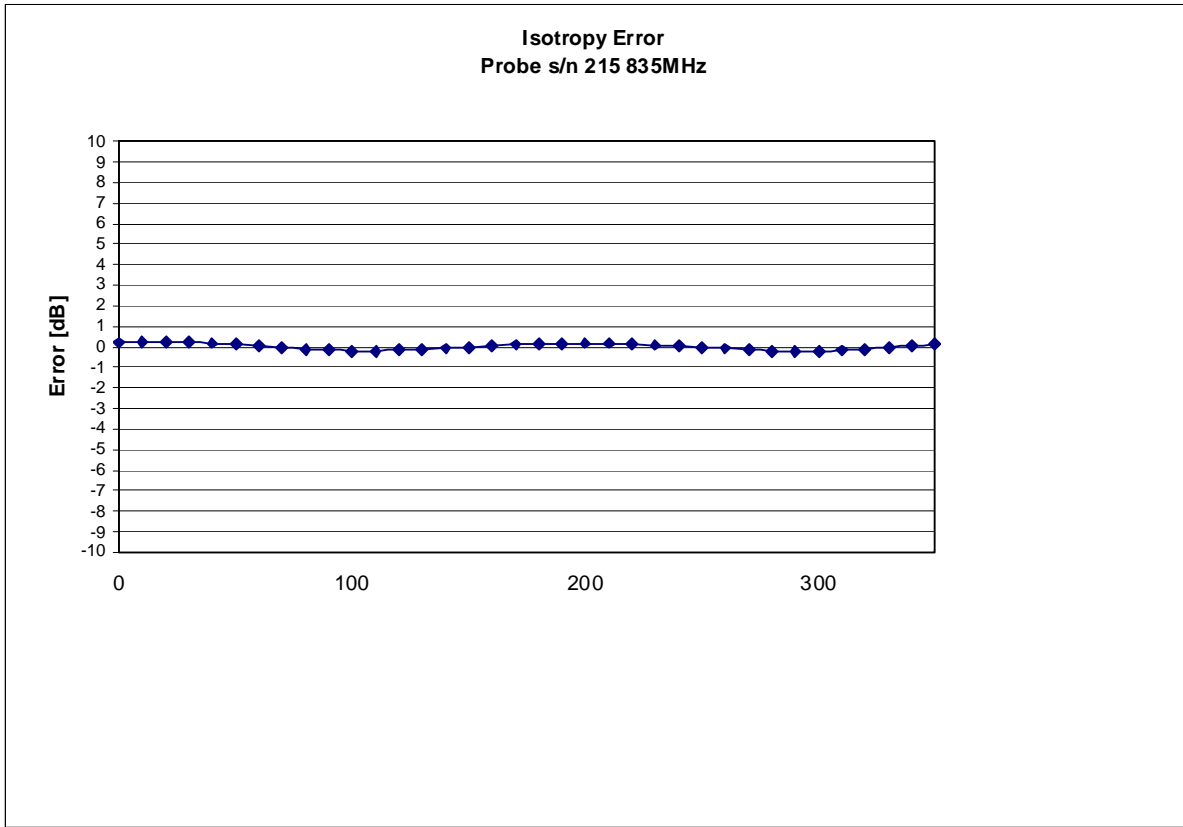
### **Spatial Resolution:**

The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.

### Receiving Pattern 835 MHz (Air)



### Isotropy Error 835 MHz (Air)

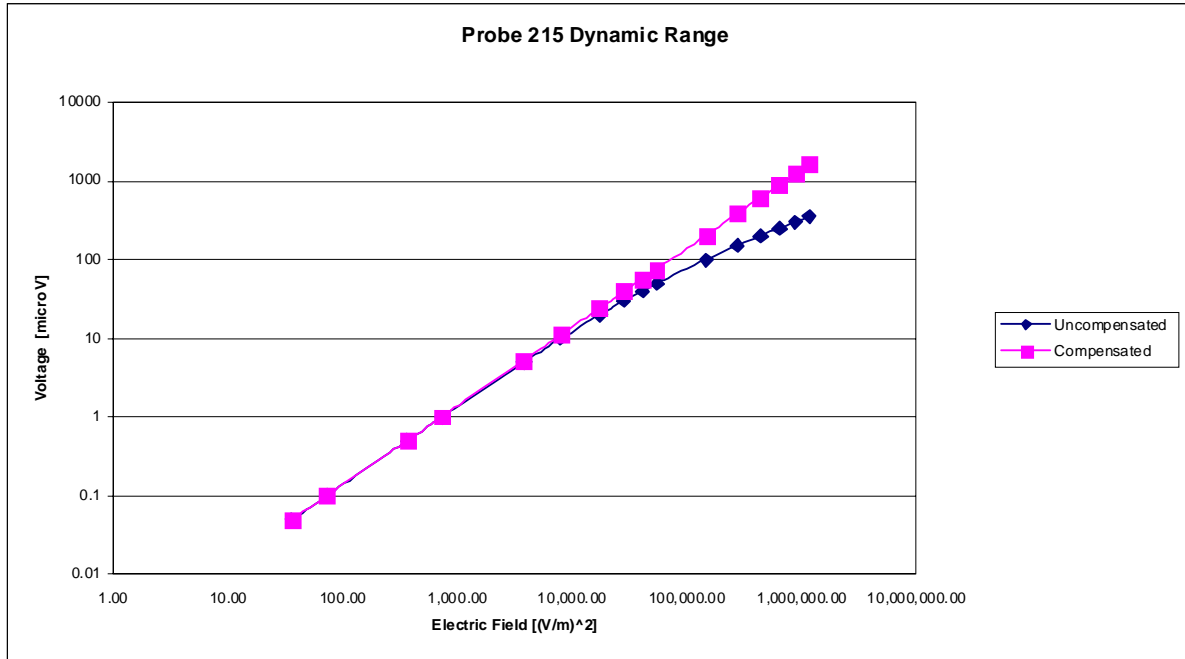


Isotropicity Tissue:

0.10 dB

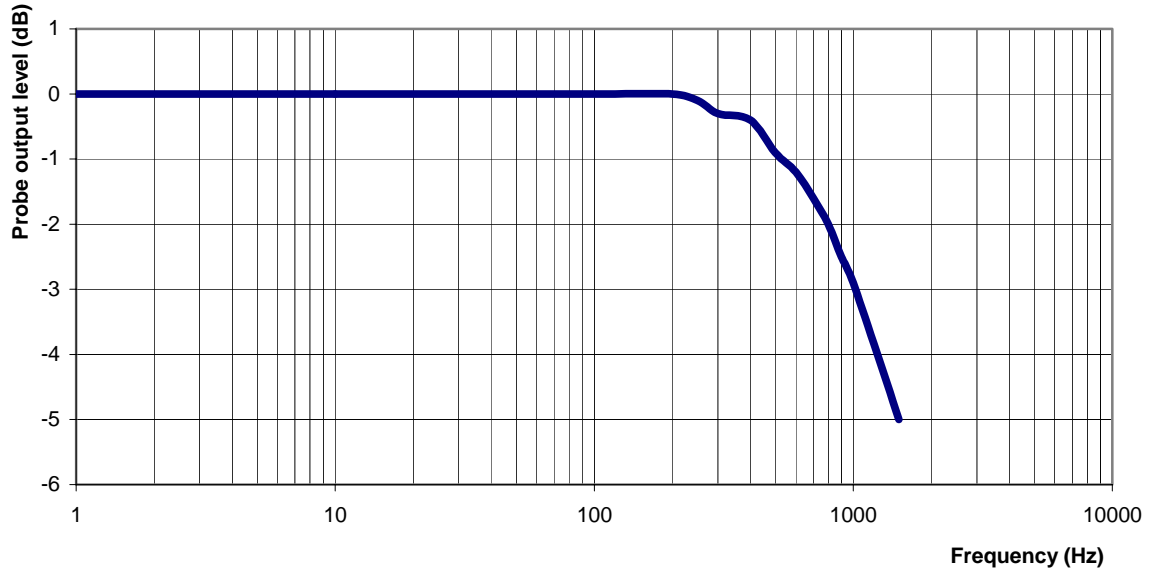


## Dynamic Range



## Video Bandwidth

**Probe Frequency Characteristics**



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

## **Conversion Factor Uncertainty Assessment Measured**

### **Sensitivity in Body Tissue**

**Frequency:** 835 MHz  
**Epsilon:** 53.7 (+/-5%)      **Sigma:** 0.96 S/m (+/-5%)

#### **ConvF**

**Channel X:** 6.3      7%(K=2)  
**Channel Y:** 6.3      7%(K=2)  
**Channel Z:** 6.3      7%(K=2)

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

#### **Boundary Effect:**

For a distance of 2.5mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.

## **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

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# NCL CALIBRATION LABORATORIES

Calibration File No.: CP-1161

Client.: RFEL

## 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 NRC/NIST.

Equipment: Miniature Isotropic RF Probe 1900 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

Serial No.: 215

Head Calibration

Calibration Procedure: SSI/DRB-TP-D01-032-E020-V2

Project No: RFEL-E-020-Cal-5539

Calibrated: 22 September 2010

Released on: 27 September 2010

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary  
This calibration has been conducted in line with the SCC ISO-IEC 17025 Scope of Accreditation  
Accredited Laboratory Number 48

Released By: \_\_\_\_\_

**NCL** CALIBRATION LABORATORIES

17 Bentley Ave  
NEPEAN, ONTARIO  
CANADA K2E 6T7

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

## Introduction

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-020 215.

## References

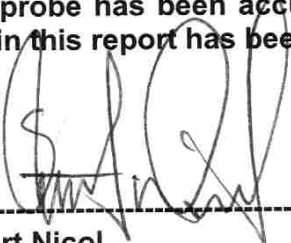
SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure  
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"  
IEEE 1309 "IEEE Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9 KHz to 40 GHz" 2005  
SSI-TP-011 Tissue Calibration Procedure  
IEC 62209 "Human exposure to radio frequency fields from handheld and body-mounted wireless communication devices –Human models, instrumentation and procedures Part 1 & 2: Procedure to determine the Specific Absorption Rate (SAR) for handheld devices used in close proximity of the ear (frequency range of 200MHz to 3GHz)"

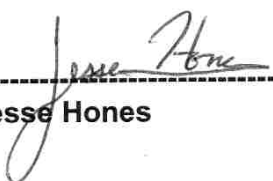
## Conditions

Probe 215 was a re-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 probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.**

  
-----  
**Stuart Nicol**

  
-----  
**Jesse Hones**

## Calibration Results Summary

<b>Probe Type:</b>	E-Field Probe E-020
<b>Serial Number:</b>	215
<b>Frequency:</b>	1900 MHz
<b>Sensor Offset:</b>	1.56 mm
<b>Sensor Length:</b>	2.5 mm
<b>Tip Enclosure:</b>	Ertalyte*
<b>Tip Diameter:</b>	<5 mm
<b>Tip Length:</b>	60 mm
<b>Total Length:</b>	290 mm

\*Resistive to recommended tissue recipes per IEEE-1528

## Sensitivity in Air

<b>Channel X:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Channel Y:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Channel Z:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Diode Compression Point:</b>	95 mV

## **Sensitivity in Head Tissue Measured**

**Frequency:** 1900 MHz

**Epsilon:** 38.09 (+/-5%)      **Sigma:** 1.38 S/m (+/-5%)

### **ConvF**

**Channel X:** 4.9

**Channel Y:** 4.9

**Channel Z:** 4.9

Tissue sensitivity values were calculated using the load impedance of the APREL Laboratories Daq-Paq.

### **Boundary Effect:**

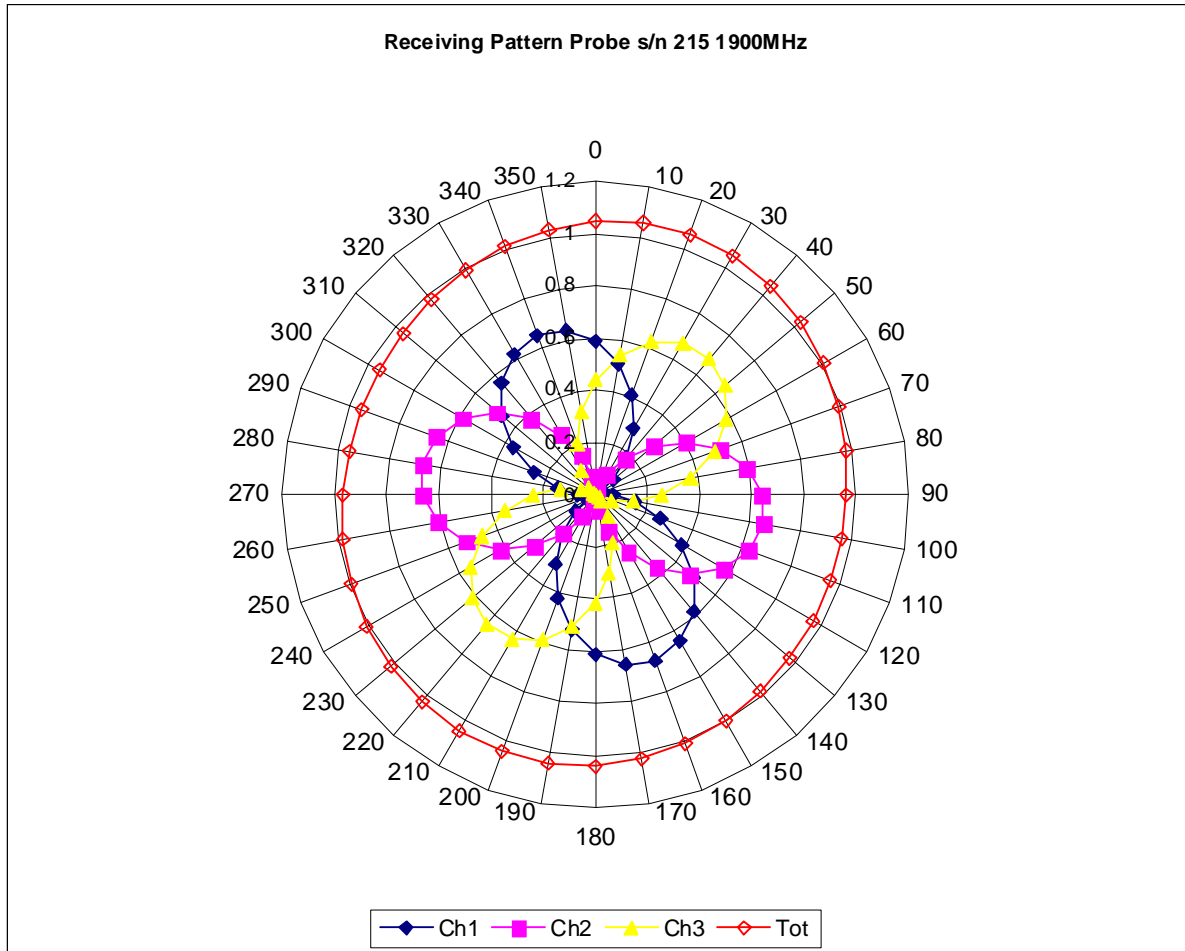
Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.44mm.

### **Spatial Resolution:**

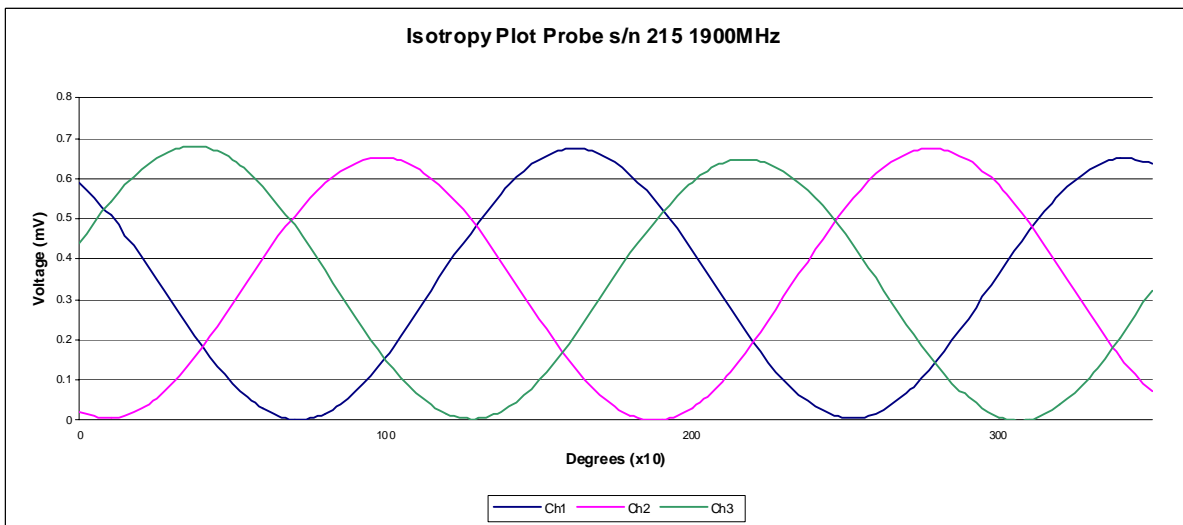
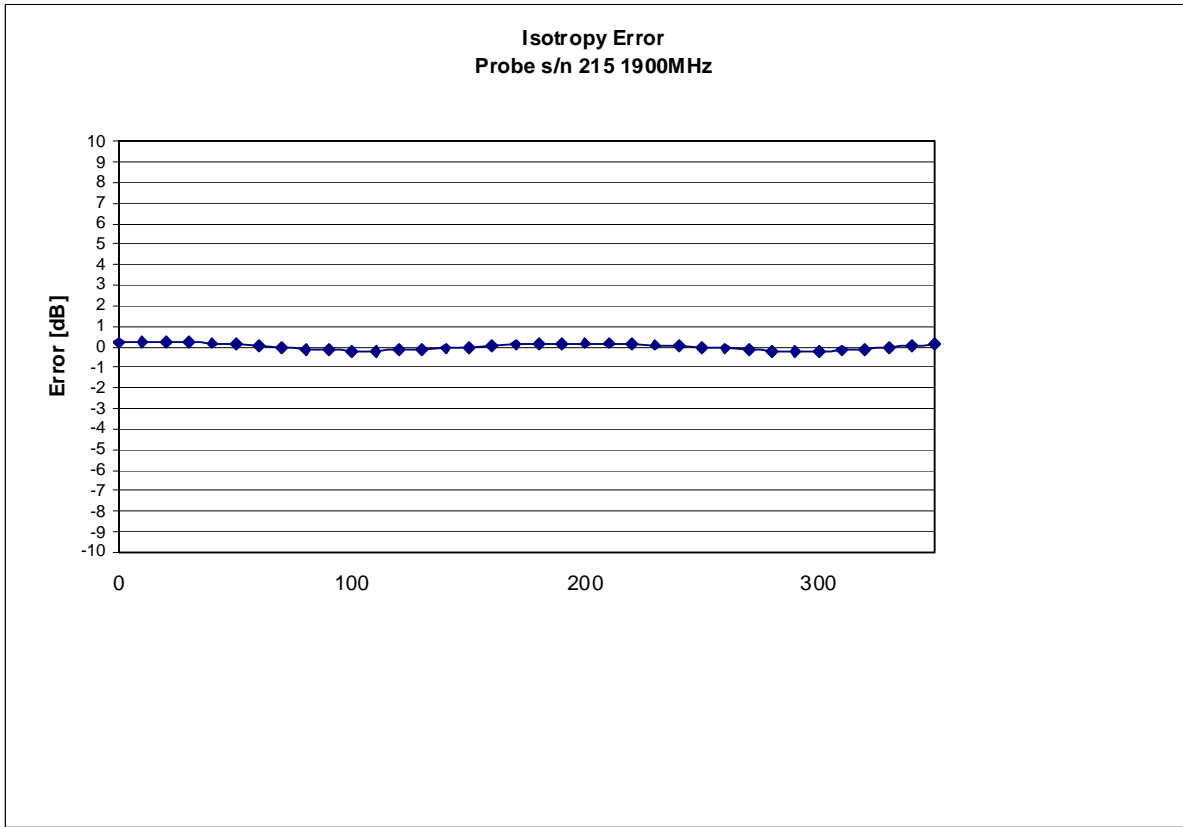
The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.



## Receiving Pattern 1900 MHz (Air)



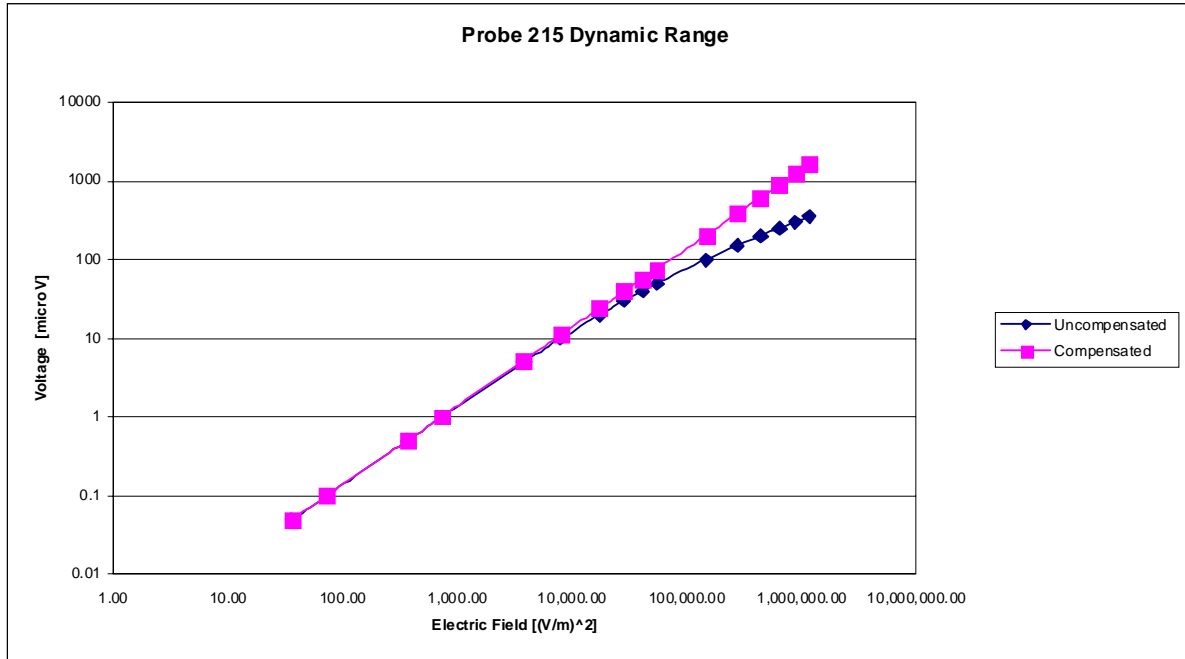
### Isotropy Error 1900 MHz (Air)



Isotropicity Tissue:

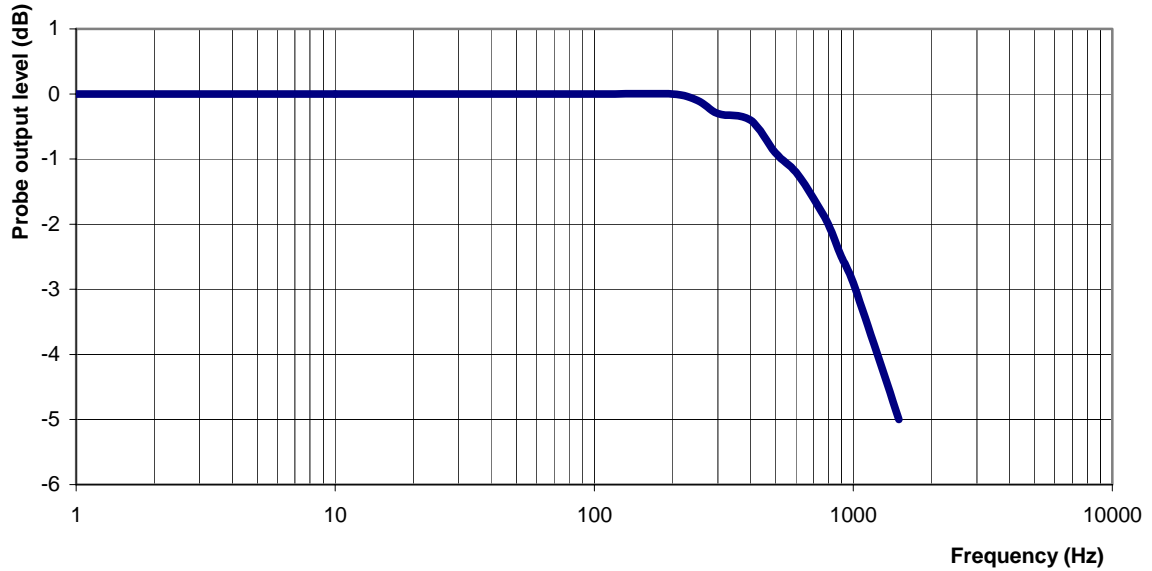
0.10 dB

## Dynamic Range



## Video Bandwidth

**Probe Frequency Characteristics**



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

## **Conversion Factor Uncertainty Assessment Measured**

### **Sensitivity in Head Tissue**

**Frequency:** 1900 MHz

**Epsilon:** 38.09 (+/-5%)      **Sigma:** 1.38 S/m (+/-5%)

#### **ConvF**

**Channel X:** 4.9      7%(K=2)

**Channel Y:** 4.9      7%(K=2)

**Channel Z:** 4.9      7%(K=2)

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

#### **Boundary Effect:**

For a distance of 2.5mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.

## **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.: CP-1162

Client.: RFEL

## 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 NRC/NIST.

Equipment: Miniature Isotropic RF Probe 1900 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

Serial No.: 215

Body Calibration

Calibration Procedure: SSI/DRB-TP-D01-032-E020-V2

Project No: RFEL-E-020-Cal-5539

Calibrated: 22 September 2010

Released on: 27 September 2010

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary  
This calibration has been conducted in line with the SCC ISO-IEC 17025 Scope of Accreditation  
Accredited Laboratory Number 48

Released By: \_\_\_\_\_

**NCL** CALIBRATION LABORATORIES

17 Bentley Ave  
NEPEAN, ONTARIO  
CANADA K2E 6T7

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

## Introduction

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-020 215.

## References

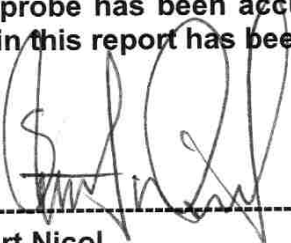
SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure  
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"  
IEEE 1309 "IEEE Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9 KHz to 40 GHz" 2005  
SSI-TP-011 Tissue Calibration Procedure  
IEC 62209 "Human exposure to radio frequency fields from handheld and body-mounted wireless communication devices –Human models, instrumentation and procedures Part 1 & 2: Procedure to determine the Specific Absorption Rate (SAR) for handheld devices used in close proximity of the ear (frequency range of 200MHz to 3GHz)"

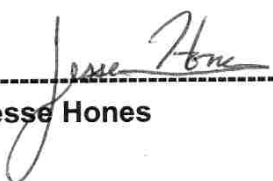
## Conditions

Probe 215 was a re-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 probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.**

  
-----  
**Stuart Nicol**

  
-----  
**Jesse Hones**



## Calibration Results Summary

<b>Probe Type:</b>	E-Field Probe E-020
<b>Serial Number:</b>	215
<b>Frequency:</b>	1900 MHz
<b>Sensor Offset:</b>	1.56 mm
<b>Sensor Length:</b>	2.5 mm
<b>Tip Enclosure:</b>	Ertalyte*
<b>Tip Diameter:</b>	<5 mm
<b>Tip Length:</b>	60 mm
<b>Total Length:</b>	290 mm

\*Resistive to recommended tissue recipes per IEEE-1528

## Sensitivity in Air

<b>Channel X:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Channel Y:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Channel Z:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Diode Compression Point:</b>	95 mV

## **Sensitivity in Body Tissue Measured**

**Frequency:** 1900 MHz

**Epsilon:** 51.9 (+/-5%)                      **Sigma:** 1.56 S/m (+/-5%)

### **ConvF**

**Channel X:** 5.0

**Channel Y:** 5.0

**Channel Z:** 5.0

Tissue sensitivity values were calculated using the load impedance of the APREL Laboratories Daq-Paq.

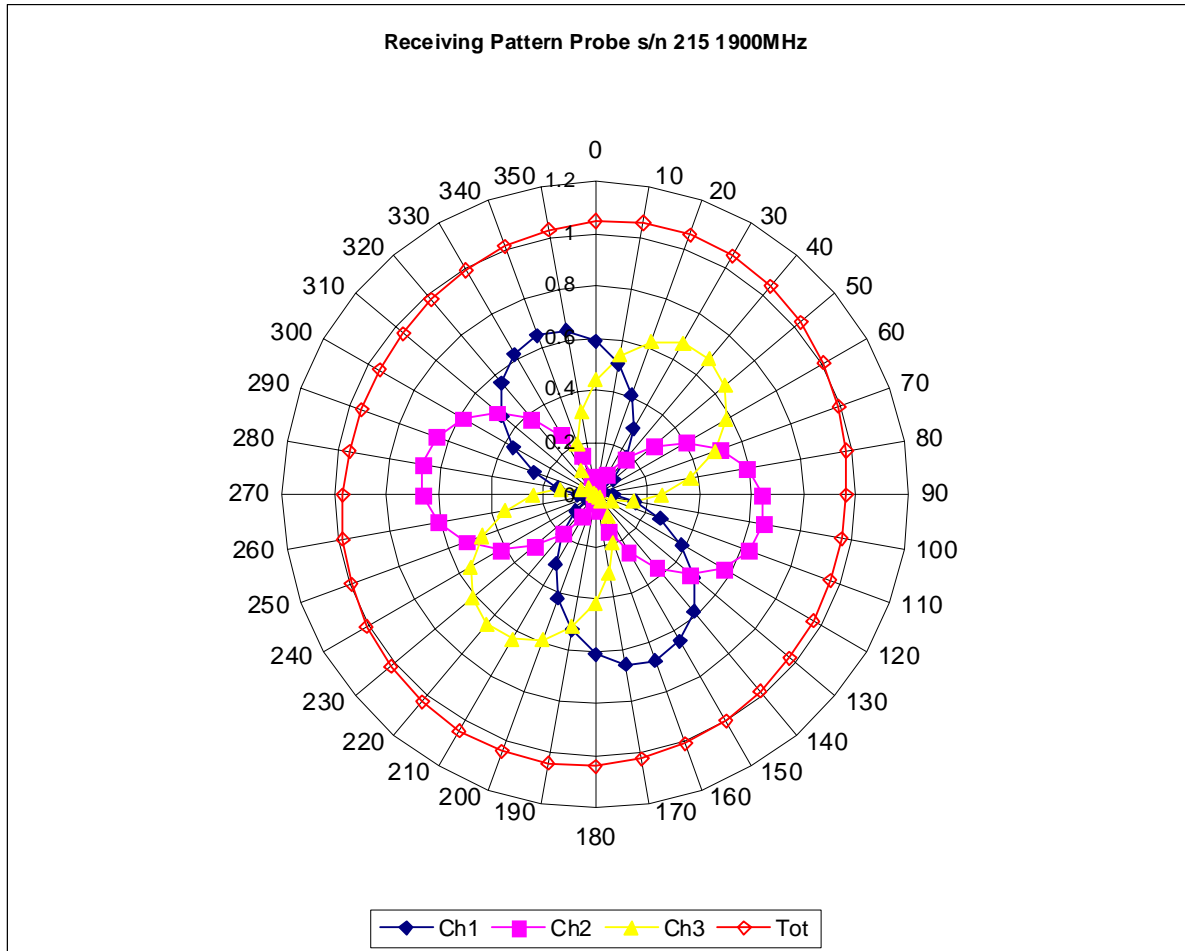
### **Boundary Effect:**

Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.44mm.

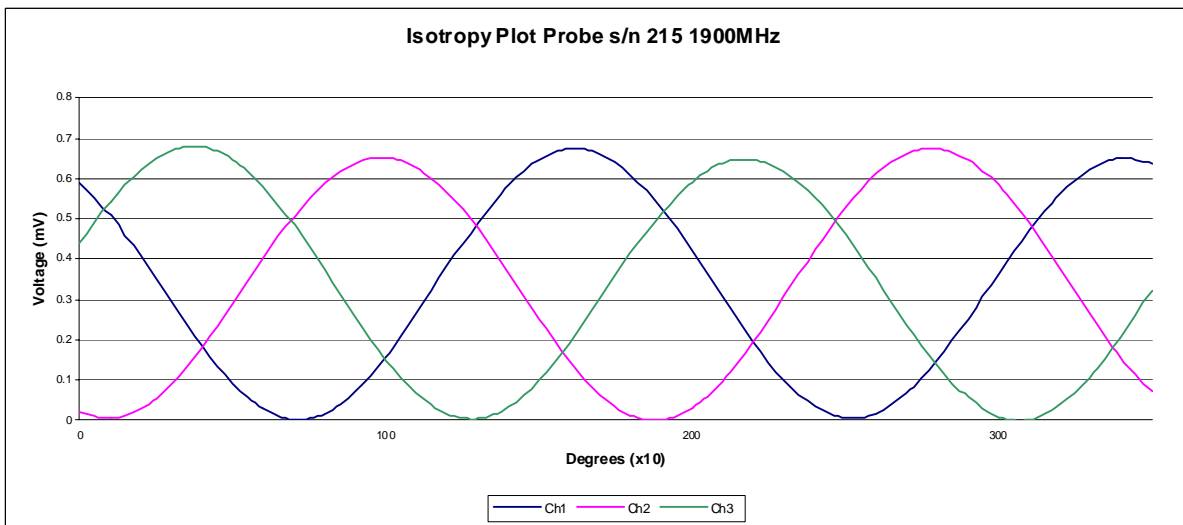
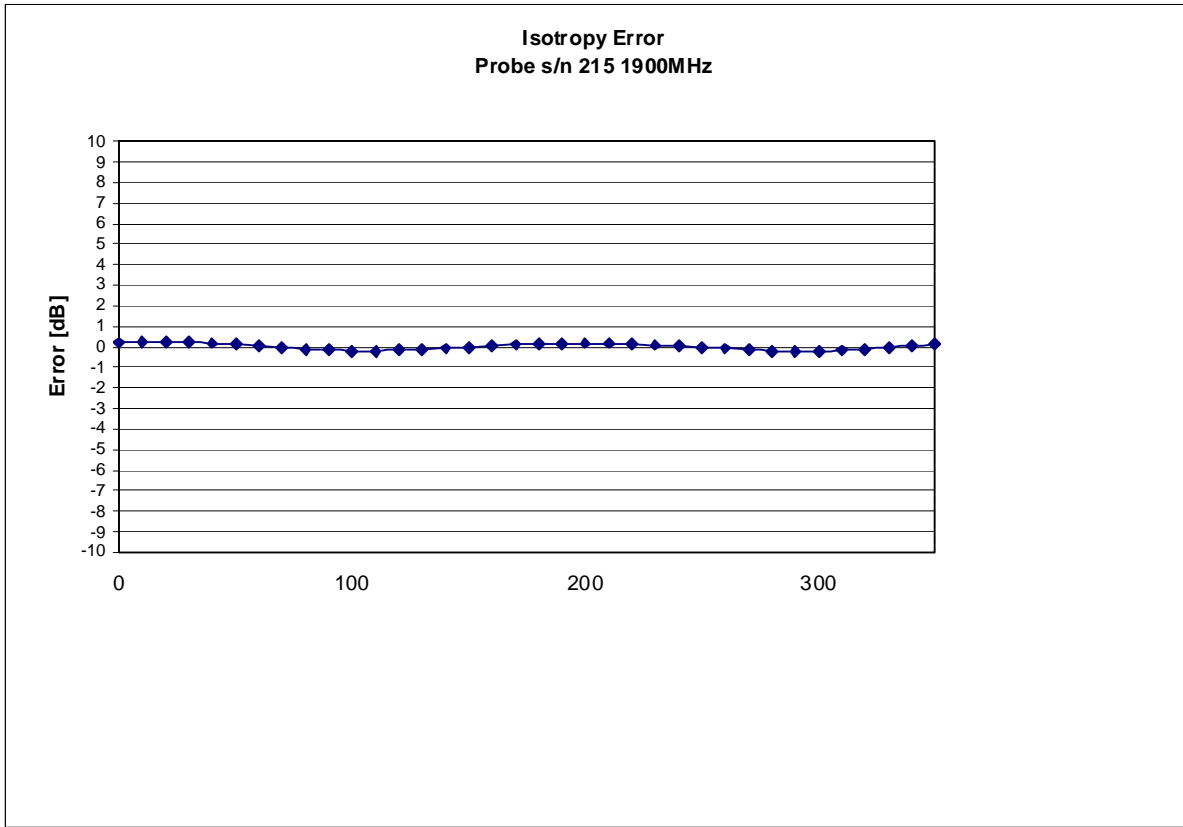
### **Spatial Resolution:**

The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.

## Receiving Pattern 1900 MHz (Air)



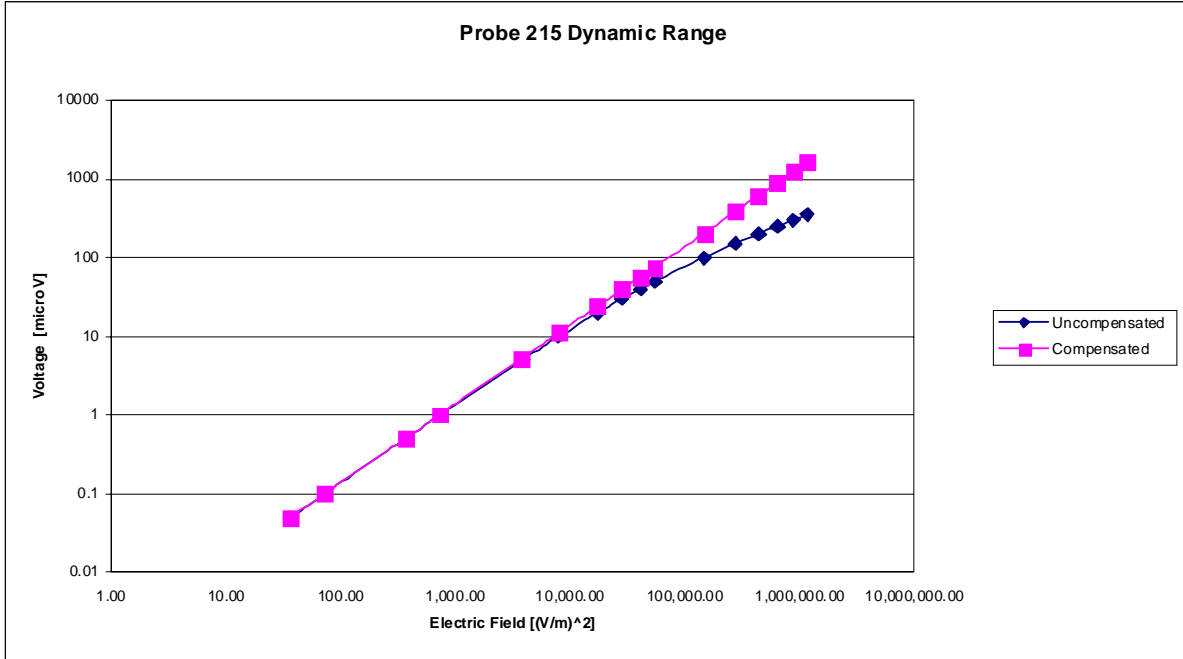
### Isotropy Error 1900 MHz (Air)



Isotropicity Tissue:

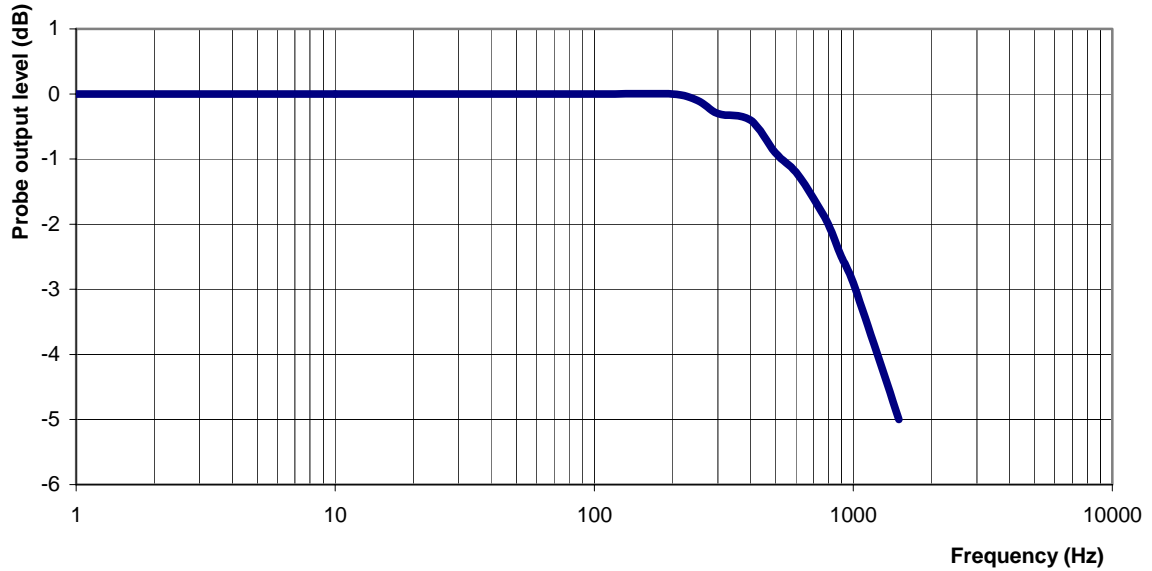
0.10 dB

## Dynamic Range



## Video Bandwidth

**Probe Frequency Characteristics**



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

## **Conversion Factor Uncertainty Assessment Measured**

### **Sensitivity in Body Tissue**

**Frequency:** 1900 MHz

**Epsilon:** 51.9 (+/-5%)      **Sigma:** 1.56 S/m (+/-5%)

#### **ConvF**

**Channel X:** 5.0      7%(K=2)

**Channel Y:** 5.0      7%(K=2)

**Channel Z:** 5.0      7%(K=2)

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

#### **Boundary Effect:**

For a distance of 2.5mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.

## **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 E – Dipole Calibration Data Sheets**

# NCL CALIBRATION LABORATORIES

Calibration File No: DC-1114  
Project Number: RFEL-835-Dipole-5480

## 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 NRC/NIST.

Validation Dipole

Manufacturer: APREL Laboratories

Part number: ALS-D-835-S-2

Frequency: 835 MHz

Serial No: 180-00561

Customer: RFEL

Calibrated: 14<sup>th</sup> January 2010  
Released on: 19<sup>th</sup> 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

## NCL Calibration Laboratories

---

Division of APREL Laboratories.

### Conditions

Dipole 180-00561 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**



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**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

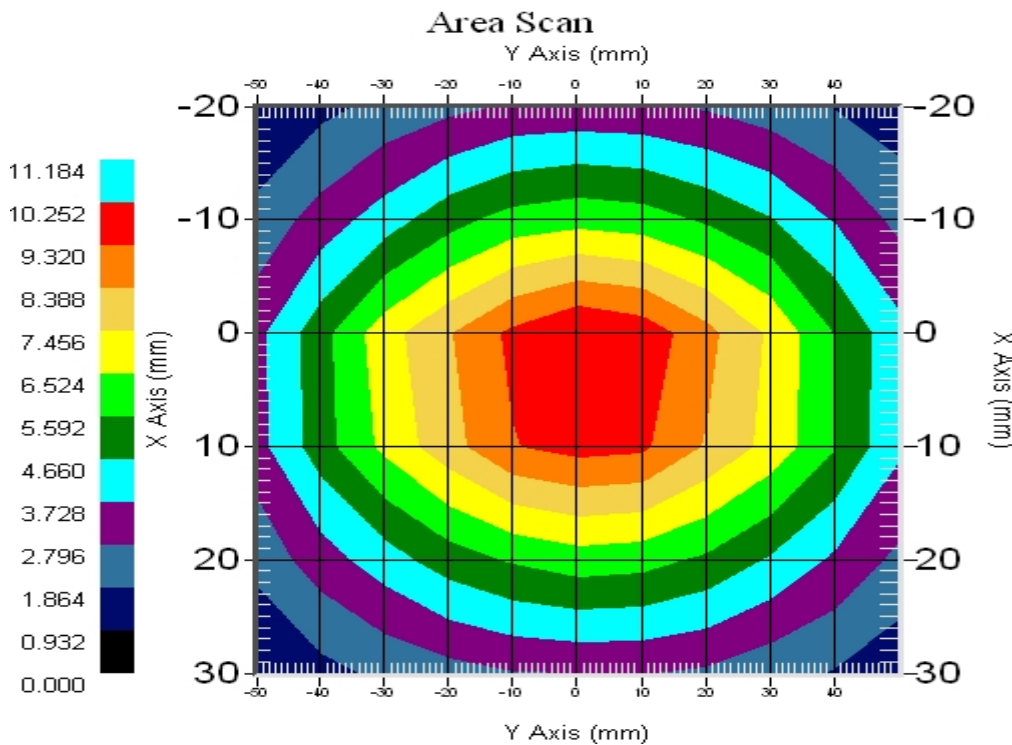
**Length:** 161.0 mm  
**Height:** 89.8 mm

### Electrical Specification

**SWR:** 1.009U  
**Return Loss:** -47.751 dB  
**Impedance:** 50.065  $\Omega$

### System Validation Results

Frequency	1 Gram	10 Gram	Peak
835 MHz	9.49	6.1	14.21



## **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 180-00561. 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 2225.

## **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 180-00561 was a new 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

<b>APREL Length</b>	<b>APREL Height</b>	<b>Measured Length</b>	<b>Measured Height</b>
161.0 mm	89.8 mm	162.1 mm	89.8 mm

### Tissue Validation

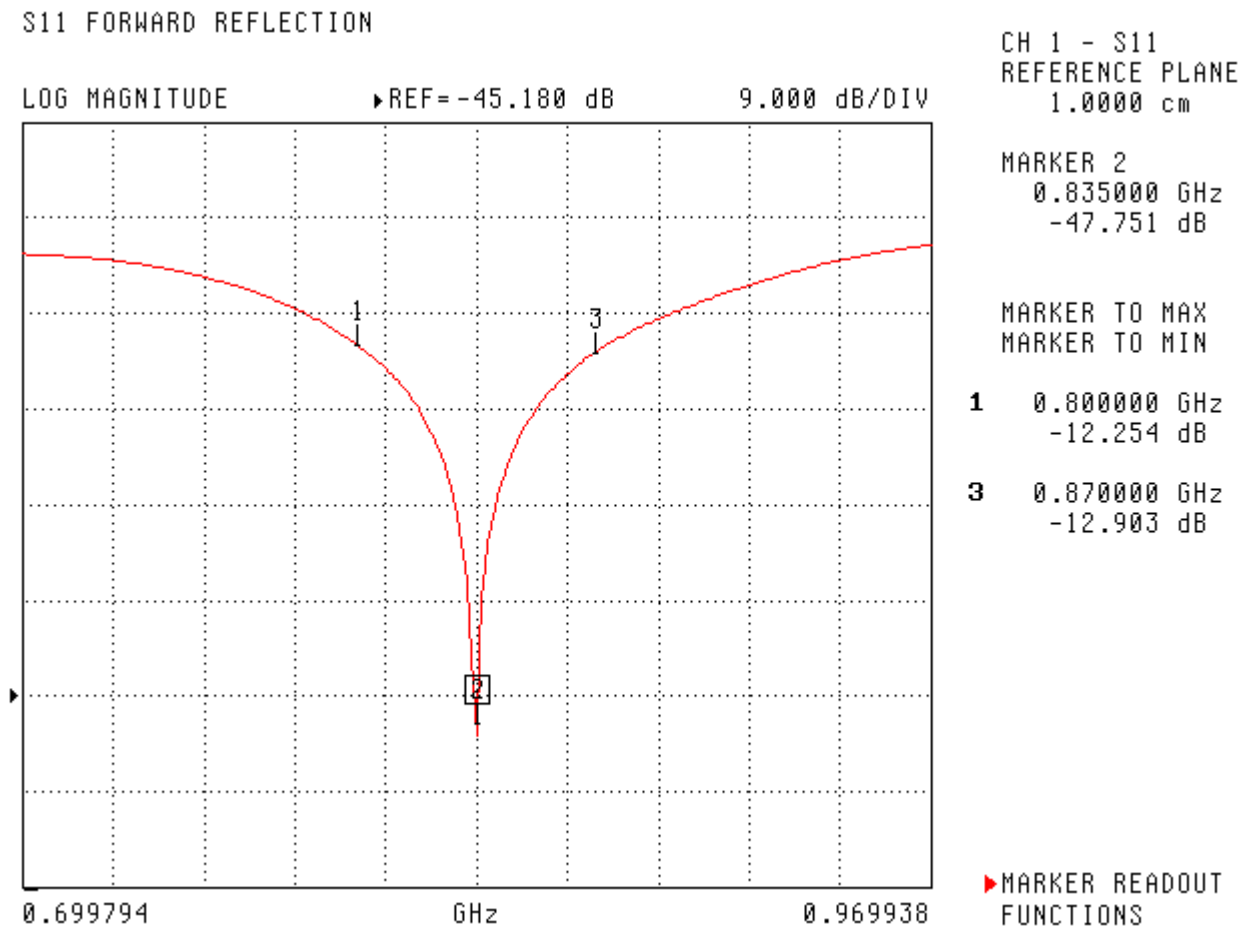
<b>Head Tissue 835MHz</b>	<b>Measured</b>
<b>Dielectric constant, <math>\epsilon_r</math></b>	41.54
<b>Conductivity, <math>\sigma</math> [S/m]</b>	0.91

**Electrical Calibration**

Test	Result
S11 RL	-47.751dB
SWR	1.009U
Impedance	50.065 $\Omega$

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

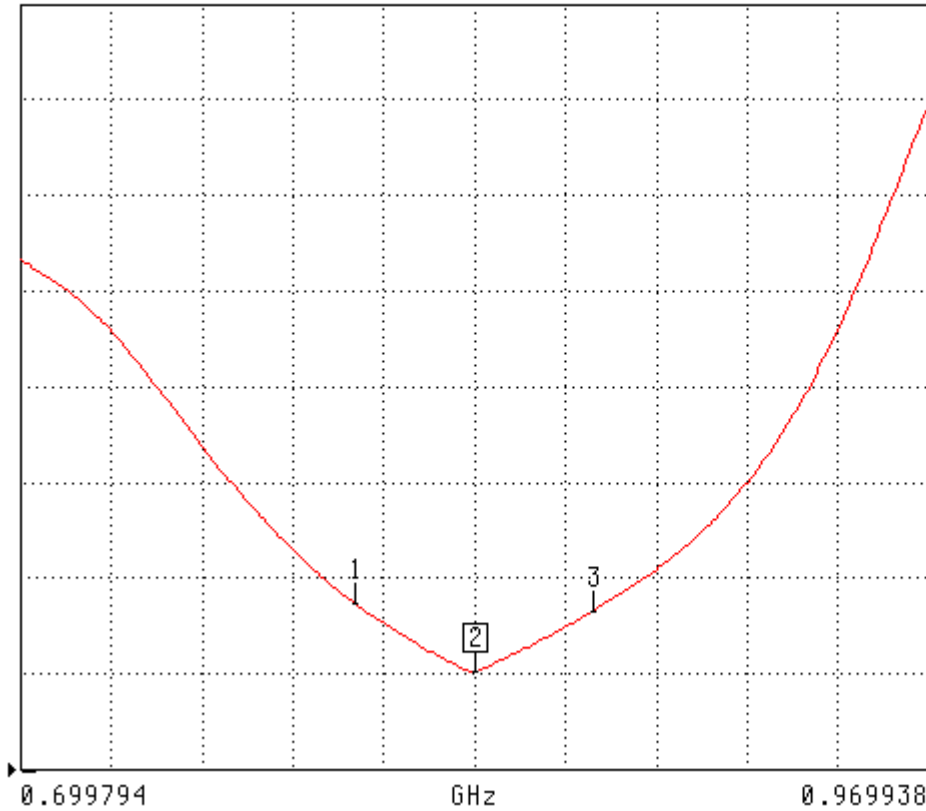
**S11 Parameter Return Loss**



SWR

S11 FORWARD REFLECTION

SWR                      ▶REF= 97.512 mU                      900.000 mU/DIV



CH 1 - S11  
REFERENCE PLANE  
1.0000 cm

MARKER 2  
0.835000 GHz  
1.009 U

MARKER TO MAX  
MARKER TO MIN

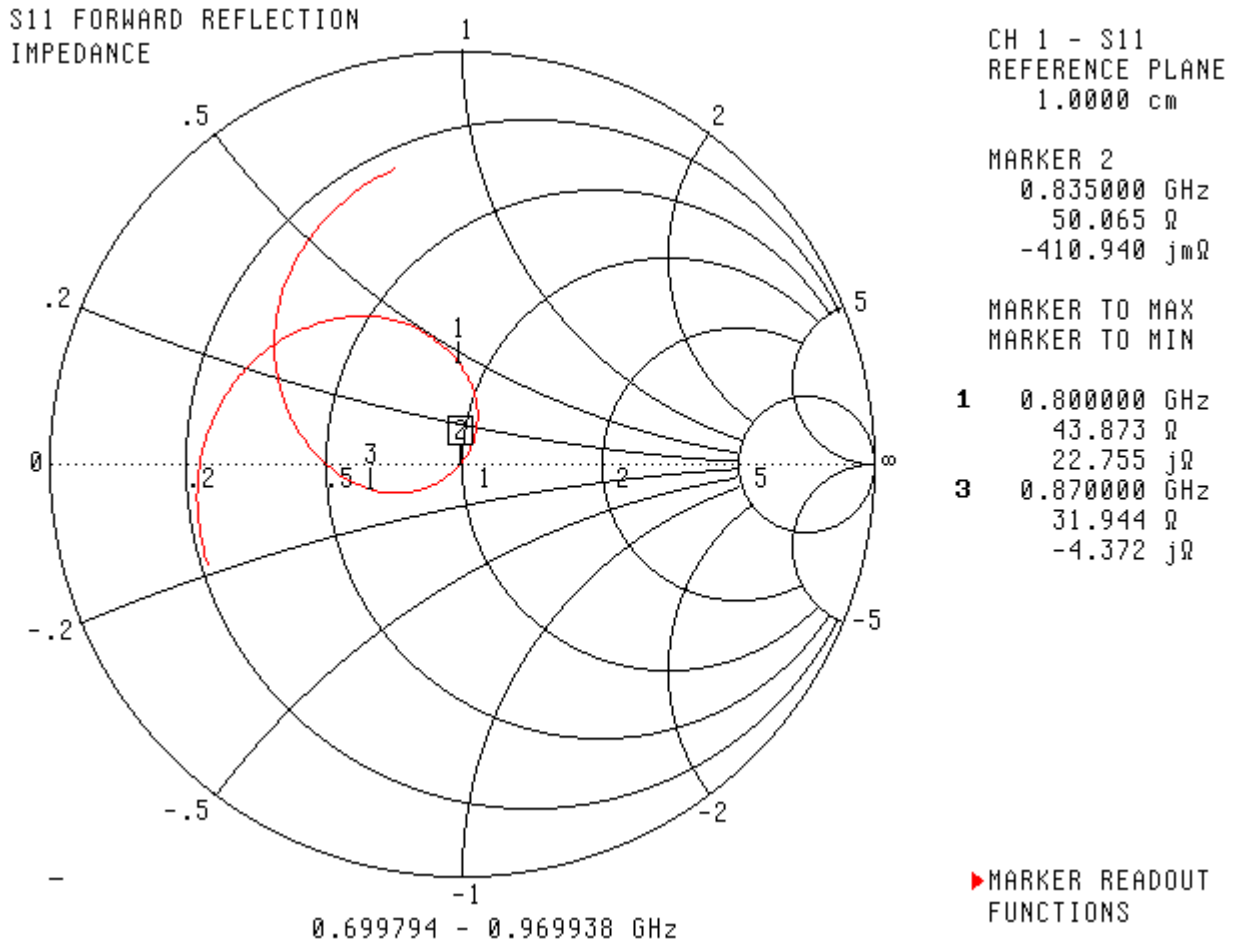
**1** 0.800000 GHz  
1.645 U

**3** 0.870000 GHz  
1.585 U

▶ MARKER READOUT  
FUNCTIONS

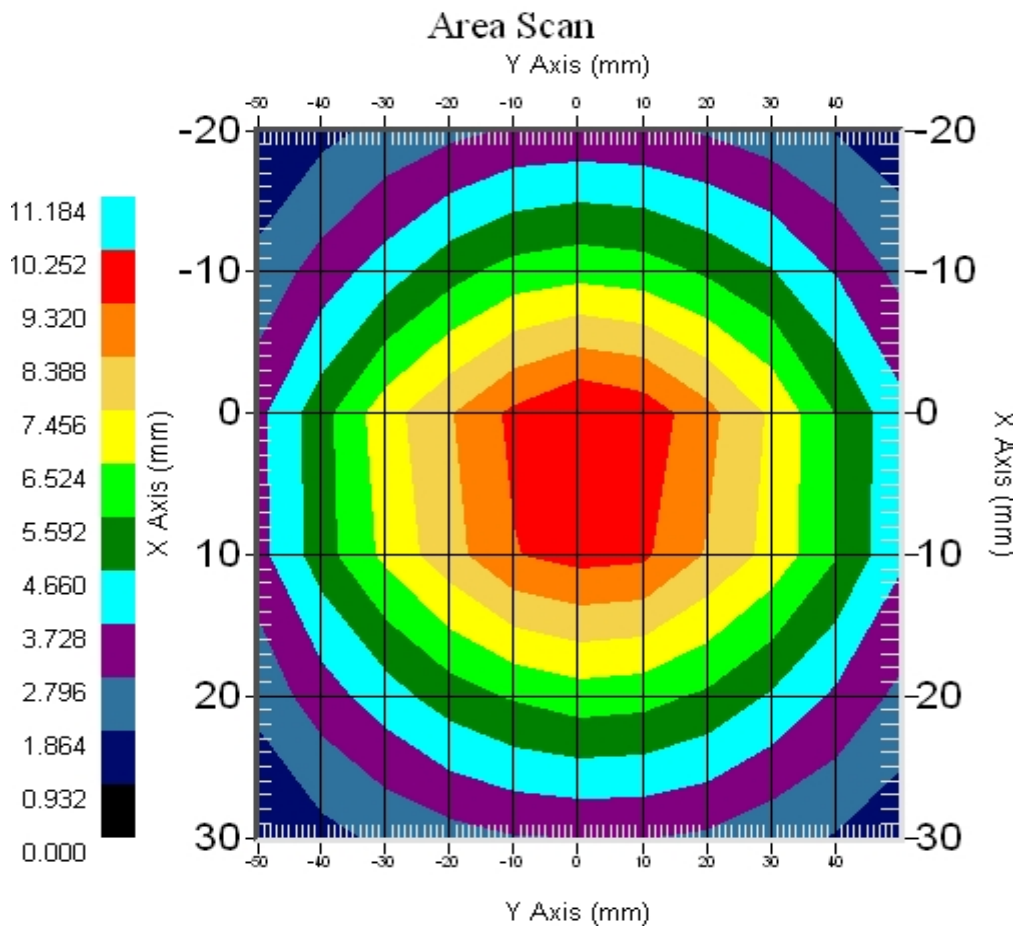


### Smith Chart Dipole Impedance



System Validation Results Using the Electrically Calibrated Dipole

Head Tissue Frequency	1 Gram	10 Gram	Peak Above Feed Point
835 MHz	9.49	6.1	14.21



## **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-1179  
Project Number: RFEL-DC-835B-5549

## 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 NRC/NIST.

Validation Dipole

Manufacturer: APREL Laboratories

Part number: ALS-D-835-S-2

Frequency: 835 MHz

Serial No: 180-00561

Customer: RFEL

Body Calibration

Calibrated: 16<sup>th</sup> November 2010  
Released on: 16<sup>th</sup> 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

## NCL Calibration Laboratories

---

Division of APREL Laboratories.

### Conditions

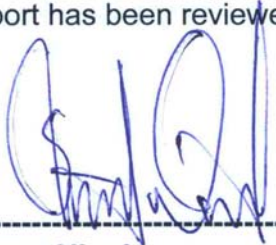
Dipole 180-00561 was a new calibration.

**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**



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**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

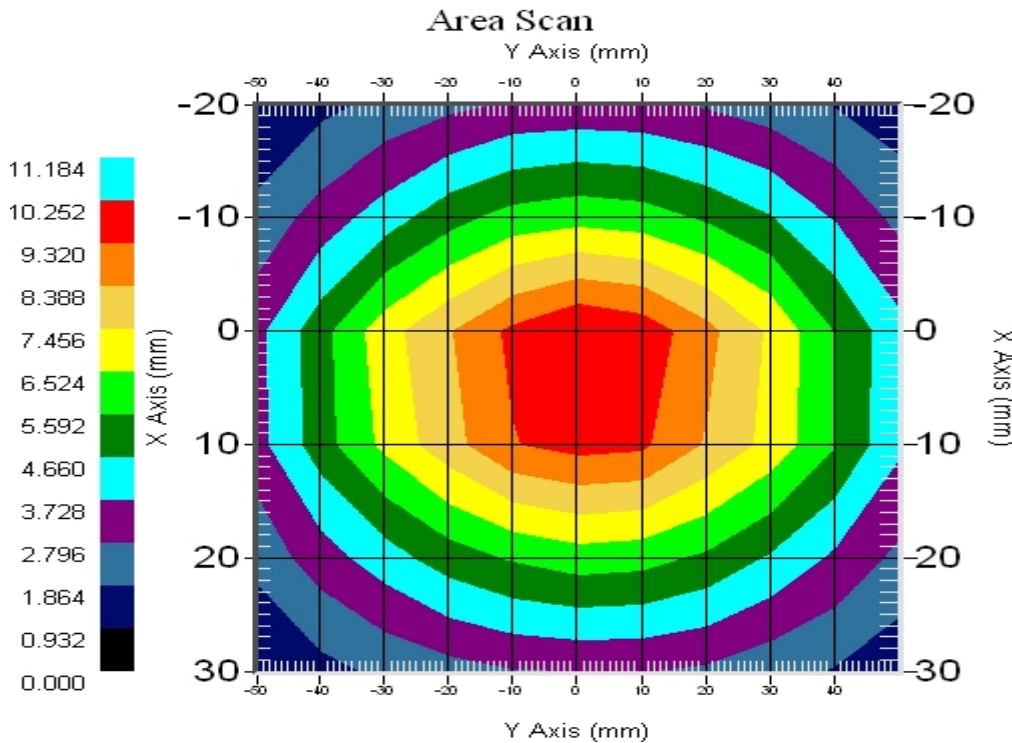
**Length:** 161.0 mm  
**Height:** 89.8 mm

### Electrical Specification

**SWR:** 1.143U  
**Return Loss:** -24.058 dB  
**Impedance:** 55.519  $\Omega$

### System Validation Results

Frequency	1 Gram	10 Gram	Peak
835 MHz	9.81	6.3	14.87



## **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 180-00561. 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 2225.

## **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 180-00561 was a new 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

<b>APREL Length</b>	<b>APREL Height</b>	<b>Measured Length</b>	<b>Measured Height</b>
161.0 mm	89.8 mm	162.1 mm	89.8 mm

### Tissue Validation

<b>Body Tissue 835MHz</b>	<b>Measured</b>
<b>Dielectric constant, <math>\epsilon_r</math></b>	57.19
<b>Conductivity, <math>\sigma</math> [S/m]</b>	0.97

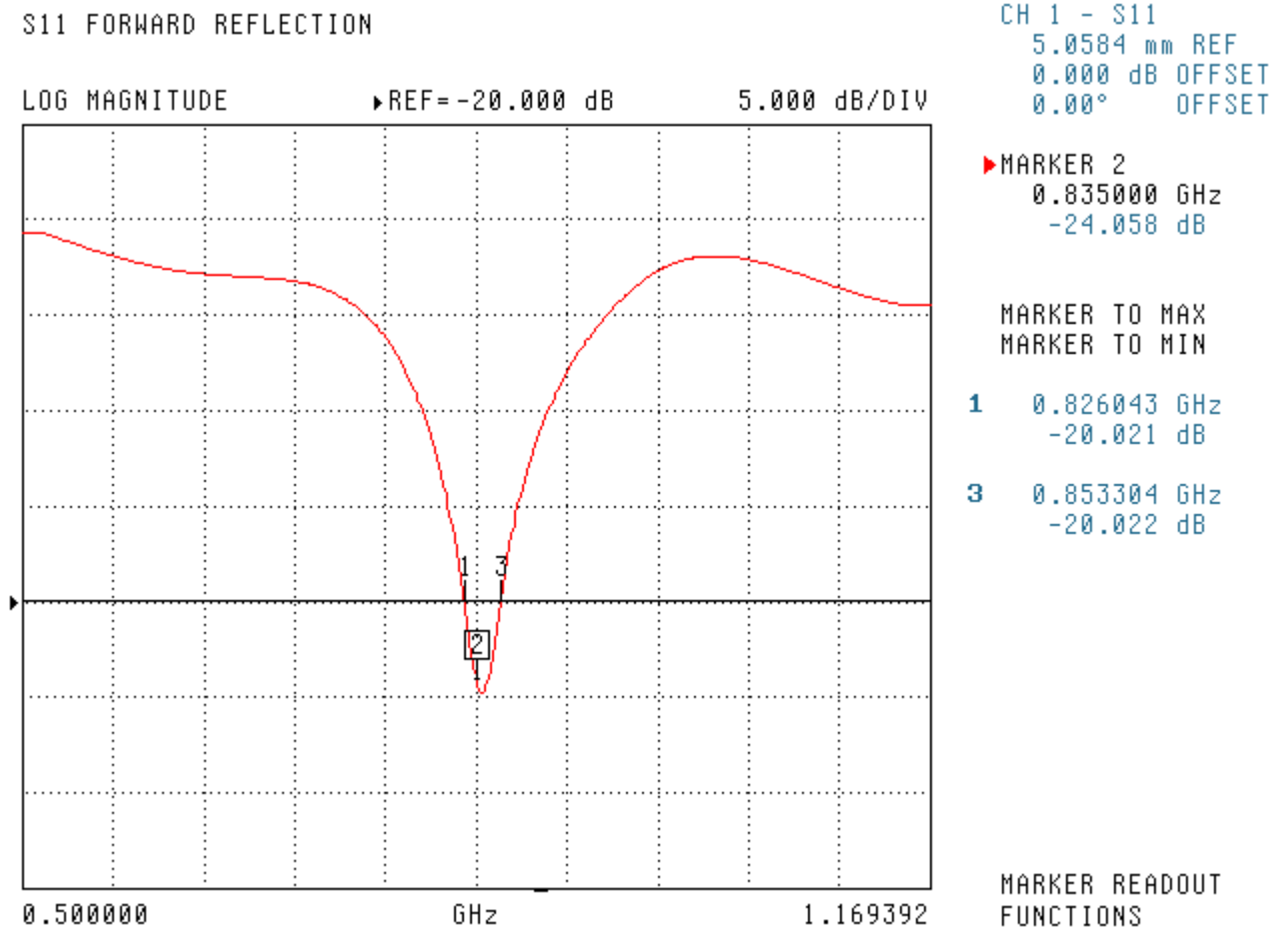


**Electrical Calibration**

Test	Result
S11 RL	-24.058dB
SWR	1.143U
Impedance	55.519 $\Omega$

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

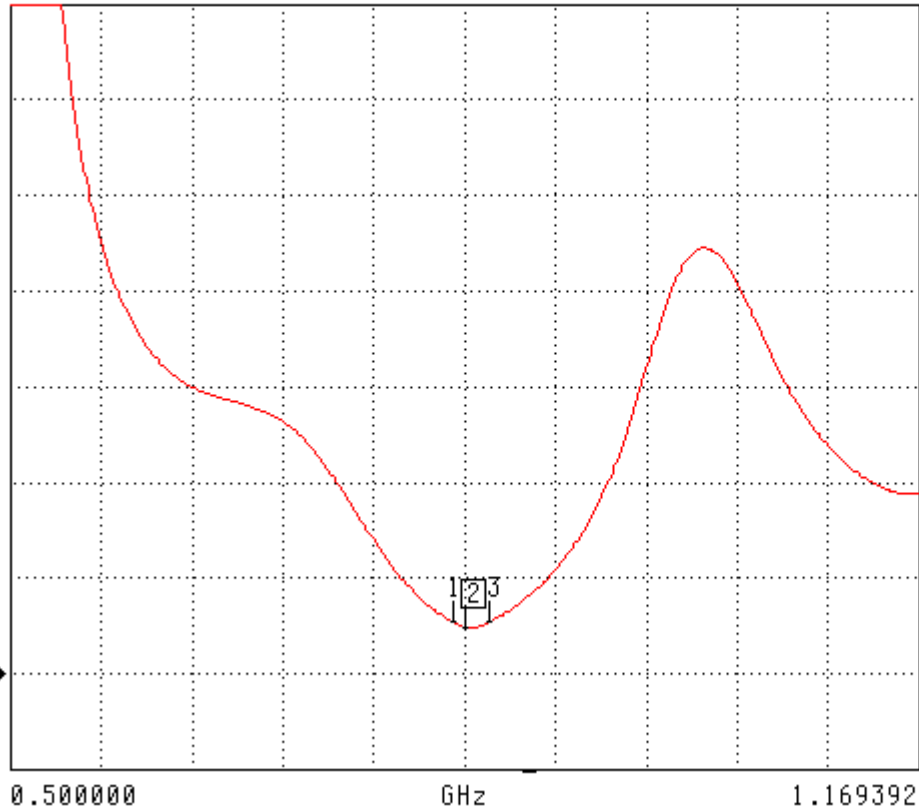
**S11 Parameter Return Loss**



SWR

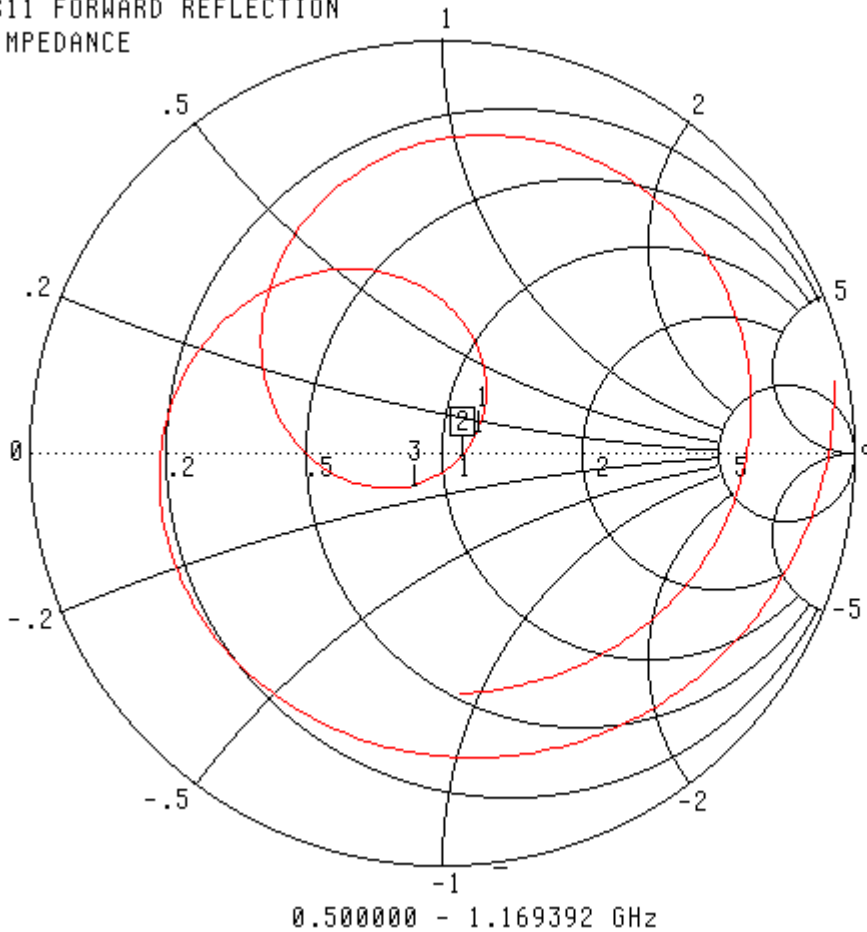
S11 FORWARD REFLECTION

SWR REF=172.168 mU 2.000 U/DIV



### Smith Chart Dipole Impedance

S11 FORWARD REFLECTION  
IMPEDANCE



CH 1 - S11  
5.0584 mm REF  
0.000 dB OFFSET  
0.00° OFFSET

▶ MARKER 2  
0.835000 GHz  
55.519 Ω  
-1.124 jΩ

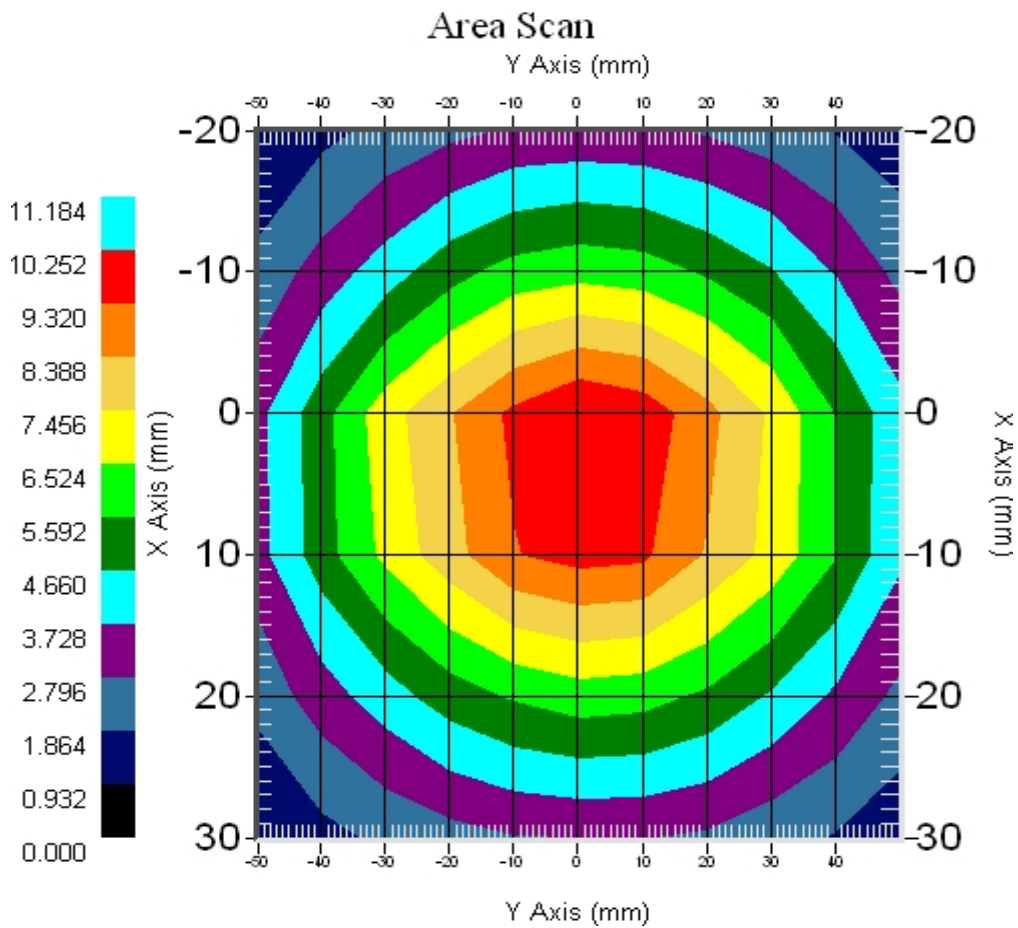
MARKER TO MAX  
MARKER TO MIN

**1** 0.826043 GHz  
59.648 Ω  
6.084 jΩ  
**3** 0.853304 GHz  
43.349 Ω  
-7.171 jΩ

MARKER READOUT  
FUNCTIONS

System Validation Results Using the Electrically Calibrated Dipole

Body Tissue Frequency	1 Gram	10 Gram	Peak Above Feed Point
835 MHz	9.81	6.3	14.87



## **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-1115  
Project Number: RFEL-1900-Dipole-5481

## 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 NRC/NIST.

Validation Dipole

Manufacturer: APREL Laboratories

Part number: ALS-D-1900-S-2

Frequency: 1900 MHz

Serial No: 210-00713

Customer: RFEL

Calibrated: 15<sup>th</sup> January 2010  
Released on: 19<sup>th</sup> 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

## **NCL Calibration Laboratories**

---

Division of APREL Laboratories.

### **Conditions**

Dipole 210-00713 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**



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**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

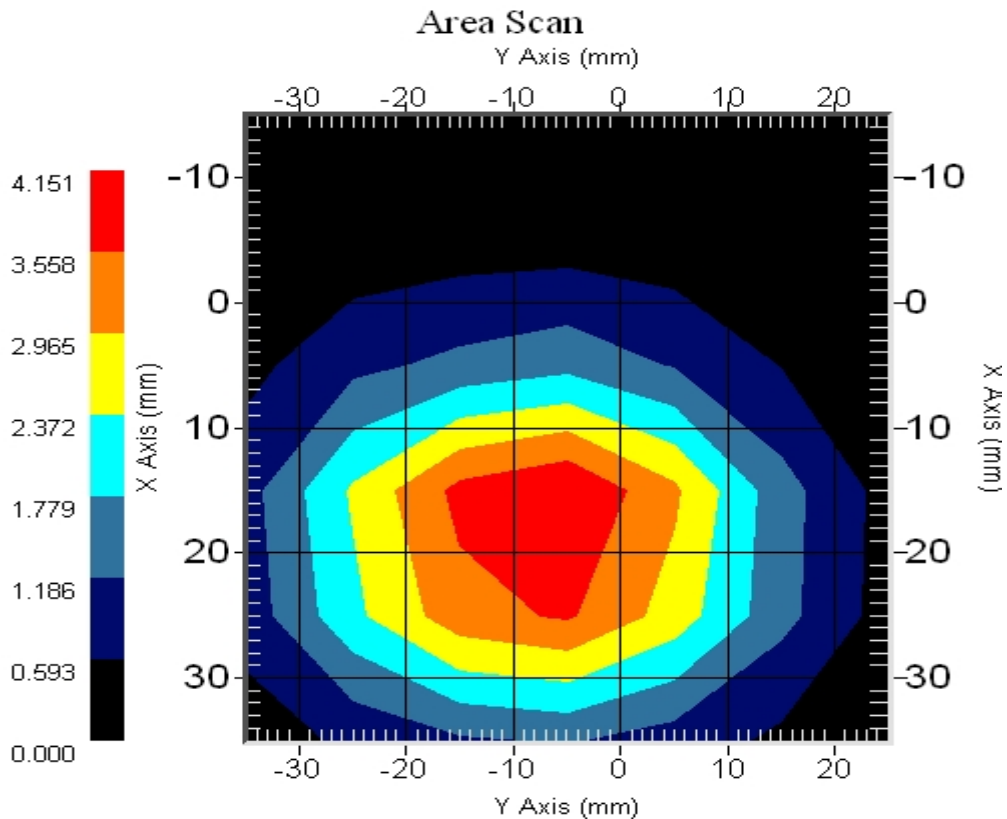
**Length:** 67.1 mm  
**Height:** 38.9 mm

### Electrical Specification

**SWR:** 1.011U  
**Return Loss:** -45.642dB  
**Impedance:** 50.194Ω

### System Validation Results

Frequency	1 Gram	10 Gram	Peak
1900 MHz	38.7	20.5	69.7





## **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 210-00713. 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 210-00713 was new taken from stock.

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

## Dipole Calibration Results

### Mechanical Verification

<b>APREL Length</b>	<b>APREL Height</b>	<b>Measured Length</b>	<b>Measured Height</b>
68.0 mm	39.5 mm	67.1mm	38.9 mm

### Tissue Validation

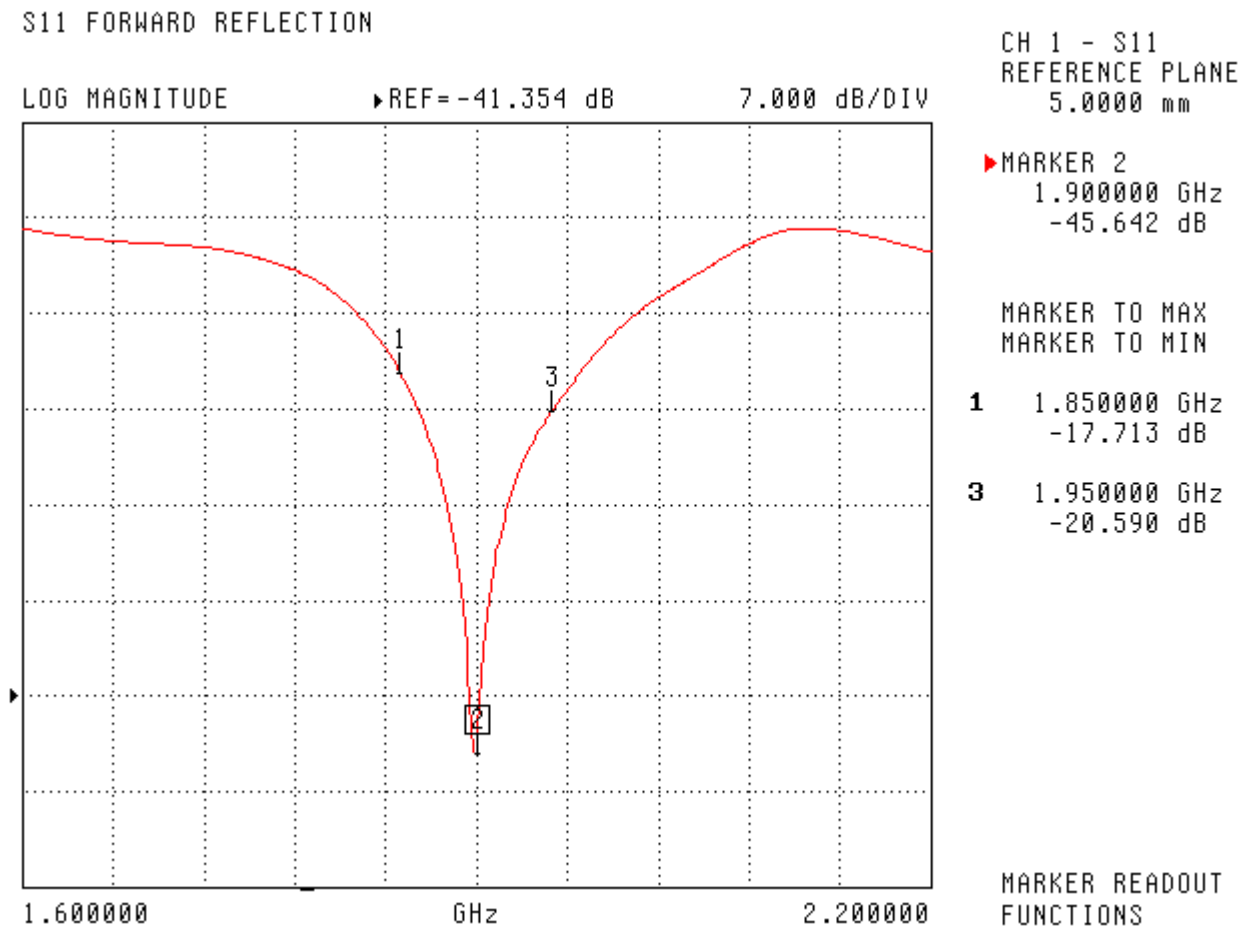
<b>Head Tissue 1900 MHz</b>	<b>Measured</b>
<b>Dielectric constant, <math>\epsilon_r</math></b>	40.03
<b>Conductivity, <math>\sigma</math> [S/m]</b>	1.38

**Electrical Calibration**

Test	Result
S11 R/L	-45.642dB
SWR	1.011U
Impedance	50.194 $\Omega$

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

**S11 Parameter Return Loss**

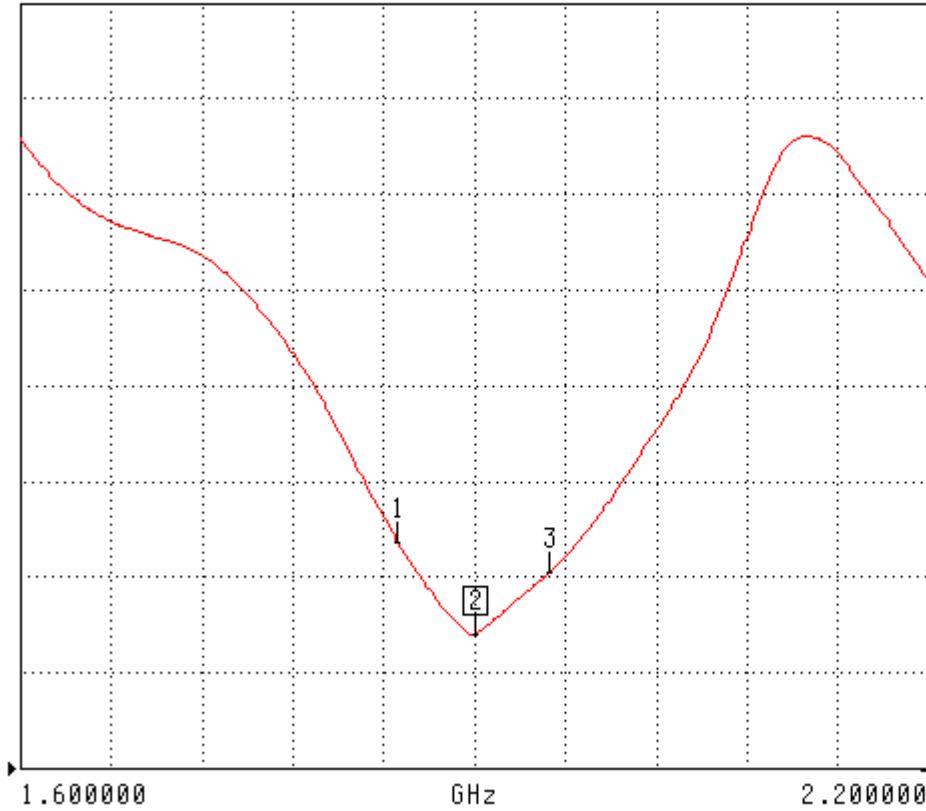


SWR

S11 FORWARD REFLECTION

SWR REF=592.479 mU 300.000 mU/DIV

CH 1 - S11  
REFERENCE PLANE  
5.0000 mm



▶ MARKER 2  
1.900000 GHz  
1.011 U

MARKER TO MAX  
MARKER TO MIN

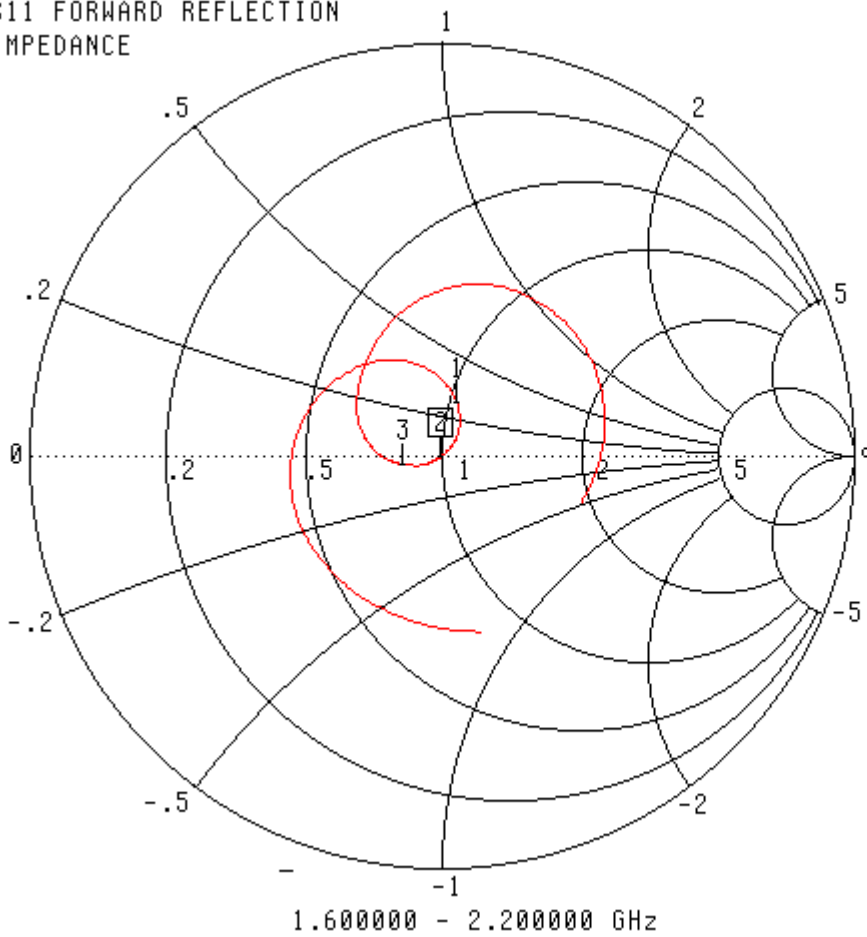
**1** 1.850000 GHz  
1.299 U

**3** 1.950000 GHz  
1.206 U

MARKER READOUT  
FUNCTIONS

### Smith Chart Dipole Impedance

S11 FORWARD REFLECTION  
IMPEDANCE



CH 1 - S11  
REFERENCE PLANE  
5.0000 mm

▶ MARKER 2  
1.900000 GHz  
50.194  $\Omega$   
-486.191  $j\Omega$

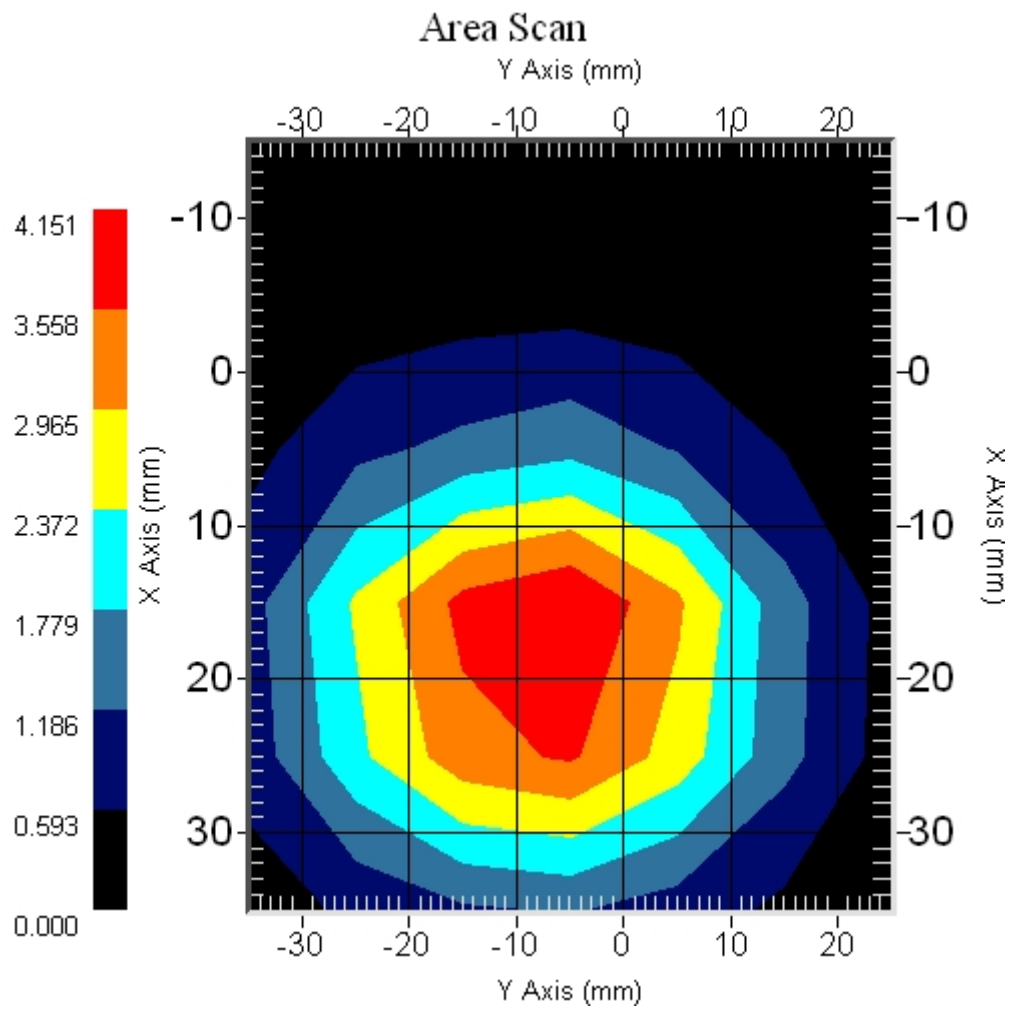
MARKER TO MAX  
MARKER TO MIN

- 1** 1.850000 GHz  
52.569  $\Omega$   
13.209  $j\Omega$
- 3** 1.950000 GHz  
41.678  $\Omega$   
-2.040  $j\Omega$

MARKER READOUT  
FUNCTIONS

**System Validation Results Using the Electrically Calibrated Dipole**

Head Tissue Frequency	1 Gram	10 Gram	Peak Above Feed Point
1900 MHz	38.7	20.5	69.7



## **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 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-1180  
Project Number: RFEL-DC-1900B-5550

## 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 NRC/NIST.

Validation Dipole

Manufacturer: APREL Laboratories

Part number: ALS-D-1900-S-2

Frequency: 1900 MHz

Serial No: 210-00713

Customer: RFEL

Body Calibration

Calibrated: 16 November 2010  
Released on: 16<sup>th</sup> 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



## NCL Calibration Laboratories

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Division of APREL Laboratories.

### Conditions

Dipole 210-00713 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**



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**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

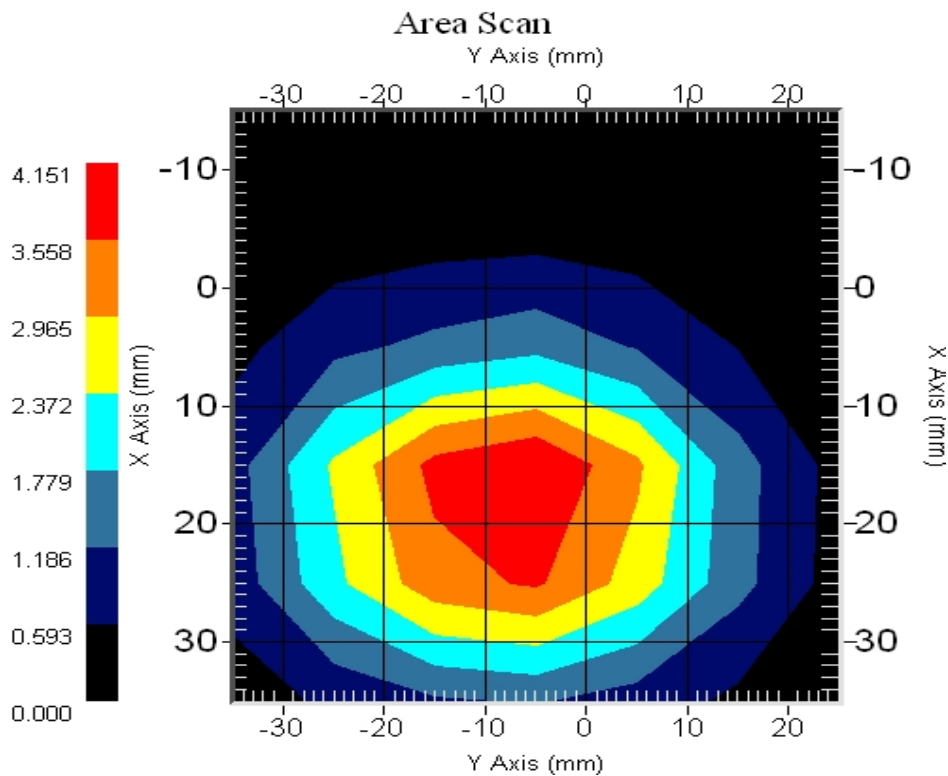
**Length:** 67.1 mm  
**Height:** 38.9 mm

### Electrical Specification

**SWR:** 1.122U  
**Return Loss:** -24.913dB  
**Impedance:** 53.469Ω

### System Validation Results

Frequency	1 Gram	10 Gram	Peak
1900 MHz	40.9	20.9	71.7



## **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 210-00713. 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 210-00713 was new taken from stock.

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

**Temperature of the Tissue:** 20 °C +/- 0.5°C

## Dipole Calibration Results

### Mechanical Verification

<b>APREL Length</b>	<b>APREL Height</b>	<b>Measured Length</b>	<b>Measured Height</b>
68.0 mm	39.5 mm	67.1mm	38.9 mm

### Tissue Validation

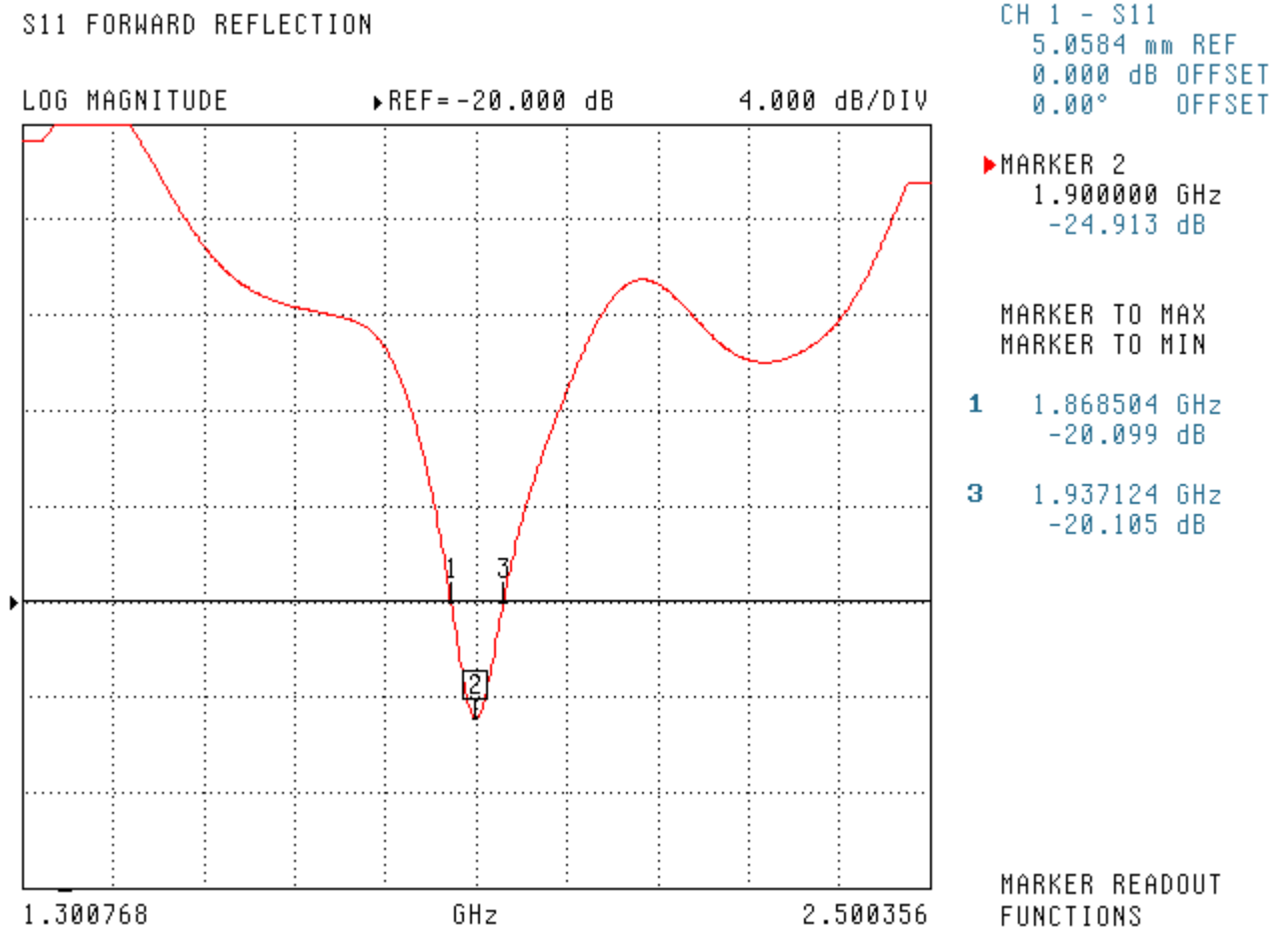
<b>Body Tissue 1900 MHz</b>	<b>Measured</b>
<b>Dielectric constant, <math>\epsilon_r</math></b>	53.87
<b>Conductivity, <math>\sigma</math> [S/m]</b>	1.55

Electrical Calibration

Test	Result
S11 R/L	-24.913dB
SWR	1.122U
Impedance	53.469 Ω

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

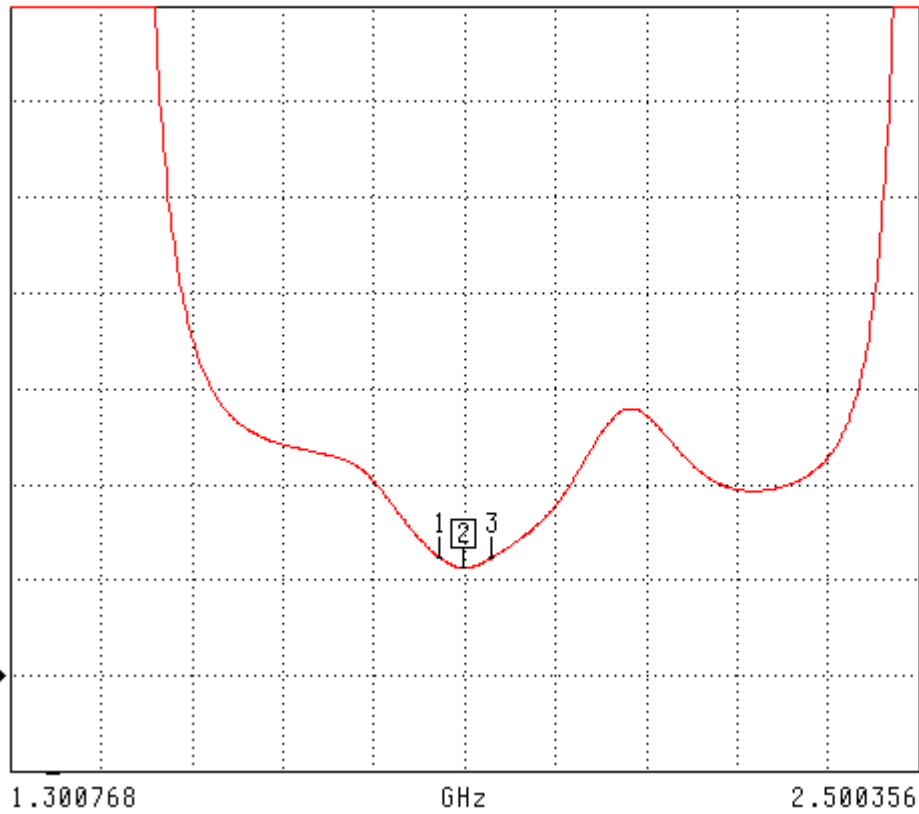
S11 Parameter Return Loss



SWR

S11 FORWARD REFLECTION

SWR REF=0.000 pU 1.000 U/DIV



CH 1 - S11  
5.0584 mm REF  
0.000 dB OFFSET  
0.00° OFFSET

▶ MARKER 2  
1.900000 GHz  
1.122 U

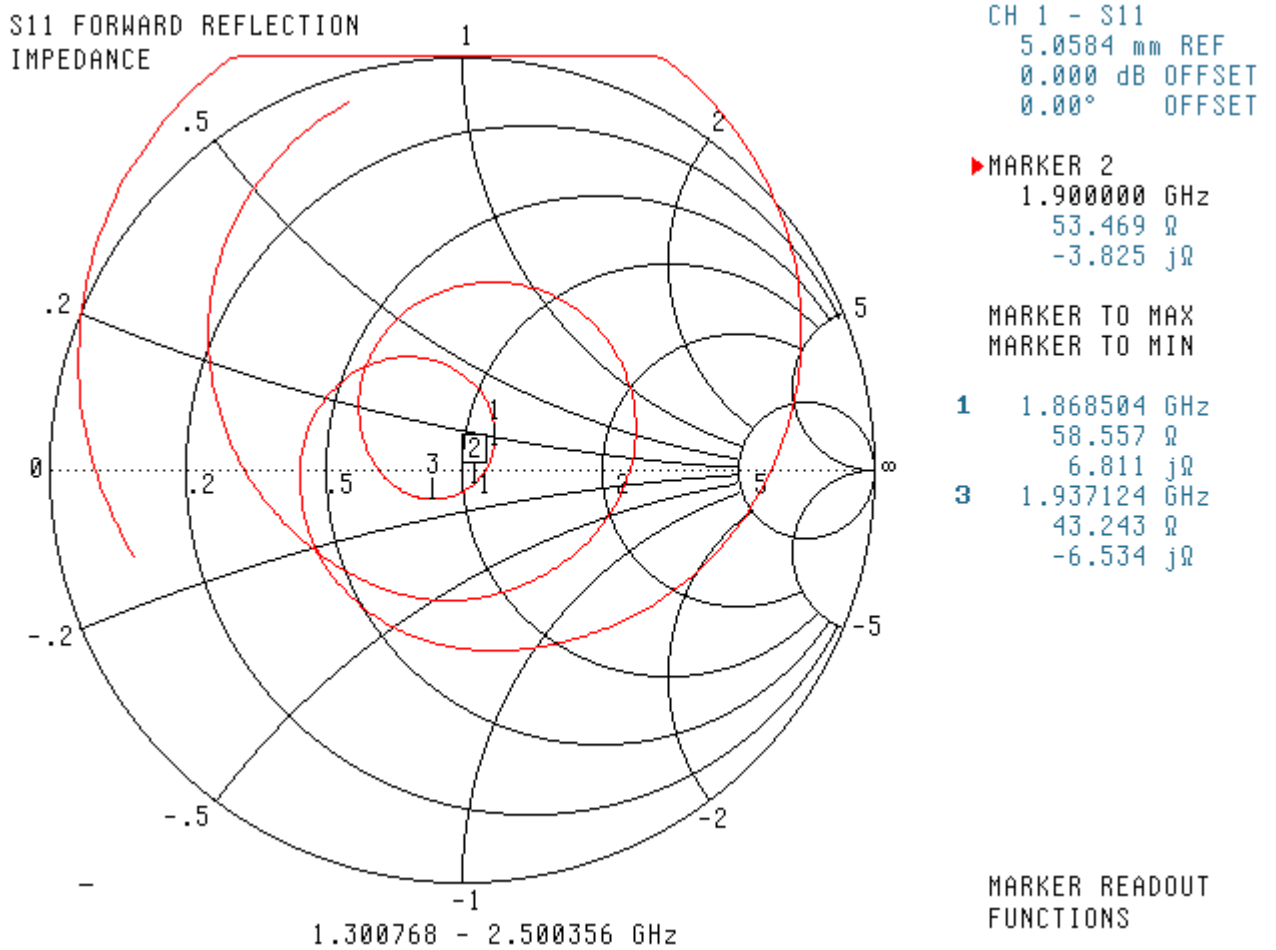
MARKER TO MAX  
MARKER TO MIN

**1** 1.868504 GHz  
1.231 U

**3** 1.937124 GHz  
1.226 U

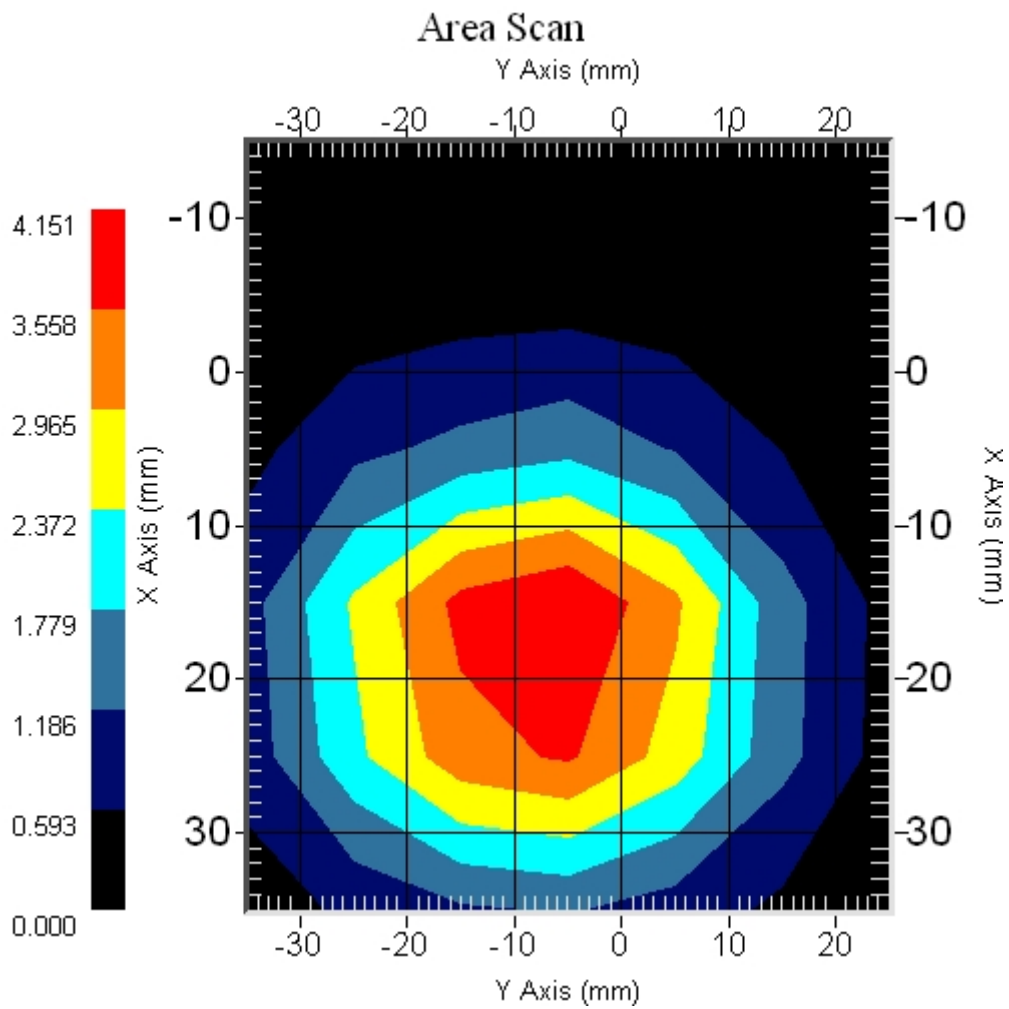
MARKER READOUT  
FUNCTIONS

## Smith Chart Dipole Impedance



**System Validation Results Using the Electrically Calibrated Dipole**

Body Tissue Frequency	1 Gram	10 Gram	Peak Above Feed Point
1900 MHz	40.9	20.9	71.7





## **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 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: Parvati K

Date: Feb 17/04

### **NCL** CALIBRATION LABORATORIES

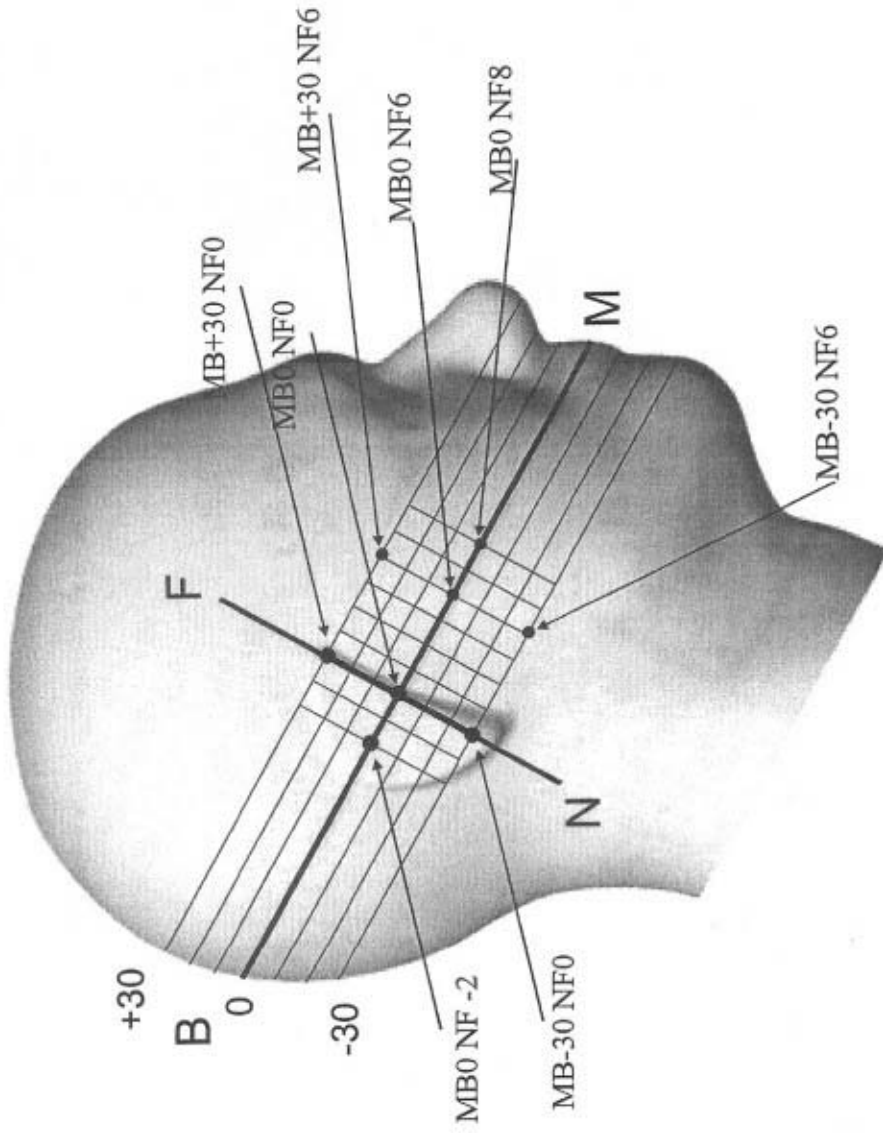
51 SPECTRUM WAY  
NEPEAN, ONTARIO  
CANADA K2R 1E6

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 APRIL 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:

*Karen K*

Date:

*Feb 17/04*

### **NCL** CALIBRATION LABORATORIES

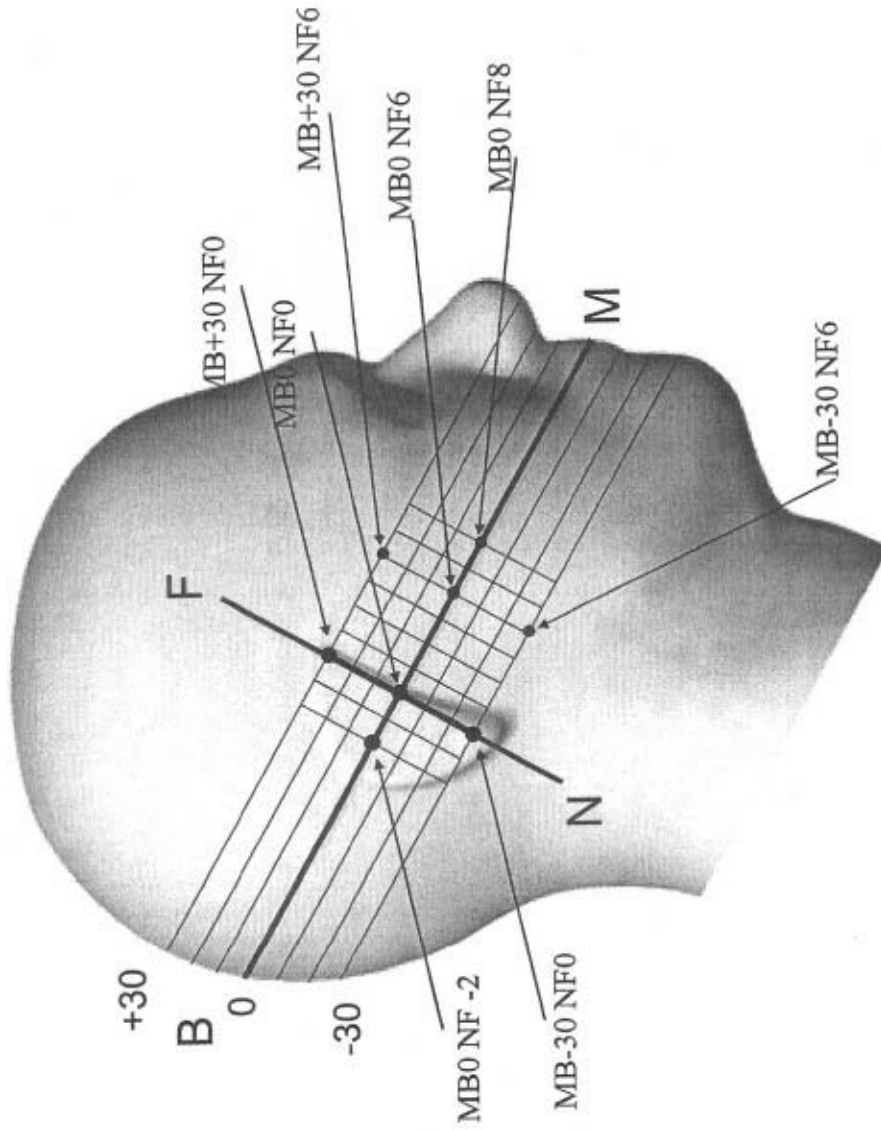
51 SPECTRUM WAY  
NEPEAN, ONTARIO  
CANADA K2R 1E6

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

# NCL CALIBRATION LABORATORIES

Calibration File No.: RFE-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) 820-4151

## 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  $\pm$  10%  
Pinna thickness is 6 mm  $\pm$  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  
CANADA K2R 1E6

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