

## SAR Test Report

Operator : Chen  
 Validation Date : 03-Oct-2004  
 Measurement Date : 03-Oct-2004  
 Starting Time : 03-Oct-2004 04:03:23 PM  
 End Time : 03-Oct-2004 04:17:05 PM  
 Scanning Time : 822 secs

Product Data  
 Device Name : HP Heavenly ABG Card  
 Serial No. : CAT000121872  
 Type : Other  
 Model : HP Heavenly  
 Frequency : 5200.00 MHz  
 Max. Transmit Pwr : 0.1 W  
 Drift Time : 0 min(s)  
 Length : 110  
 Width : 180  
 Depth : 0  
 Antenna Type : Internal  
 Power Drift-Start : 0.01  
 Power Drift-Finish : 0.00  
 Power Drift : 0.01

Phantom Data  
 Name : APREL-Uni  
 Type : Uni-Phantom  
 Size : 280 x 280 x 200  
 Serial No. : User Define  
 Location : Center  
 Description : Uni

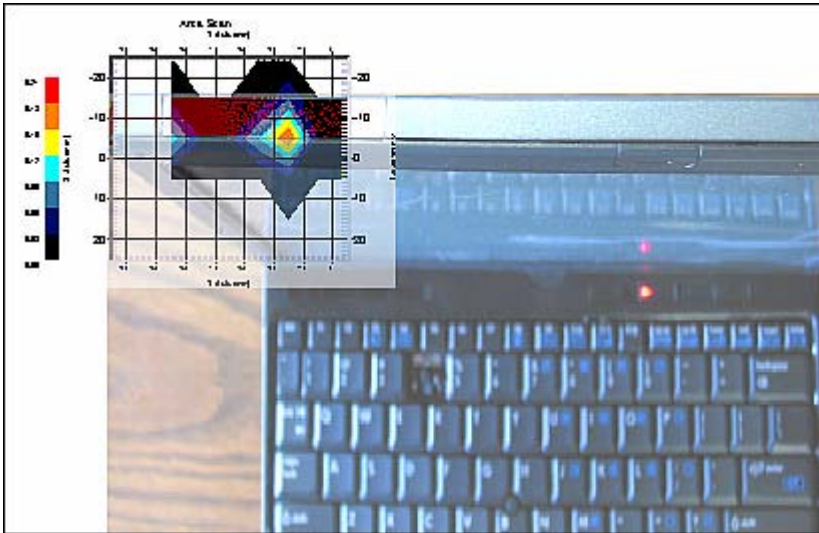
Tissue Data  
 Type : Body  
 Serial No. : 5200  
 Frequency : 5200 MHz  
 Calibration Date : 03-Oct-2004  
 Temperature : 23 °C  
 Ambient Temp. : 23 °C  
 Humidity : 50 RH%  
 Epsilon : 36.0 F/m  
 Sigma : 5.4 S/m  
 Density : 1000 kg/cu. m

Probe Data  
 Name : APREL Probe 212  
 Model : E020  
 Type : E-Field Triangle  
 Serial No. : 212  
 Calibration Date : 03-Oct-2004  
 Frequency : 5245 MHz  
 Duty Cycle Factor: 1  
 Conversion Factor: 7.8  
 Probe Sensitivity: 0.61 0.61 0.61  $\mu\text{V}/(\text{V}/\text{sq. m})$   
 Compression Point: 95  
 Offset : 1.56

Measurement Data  
 Crest Factor : 1  
 Scan Type : Complete  
 Set-up Date : 03-Oct-2004  
 Set-up Time : 4:03:14 PM



Other Data  
DUT Position : Touch  
Separation : 0  
Channel : Mid - 5260

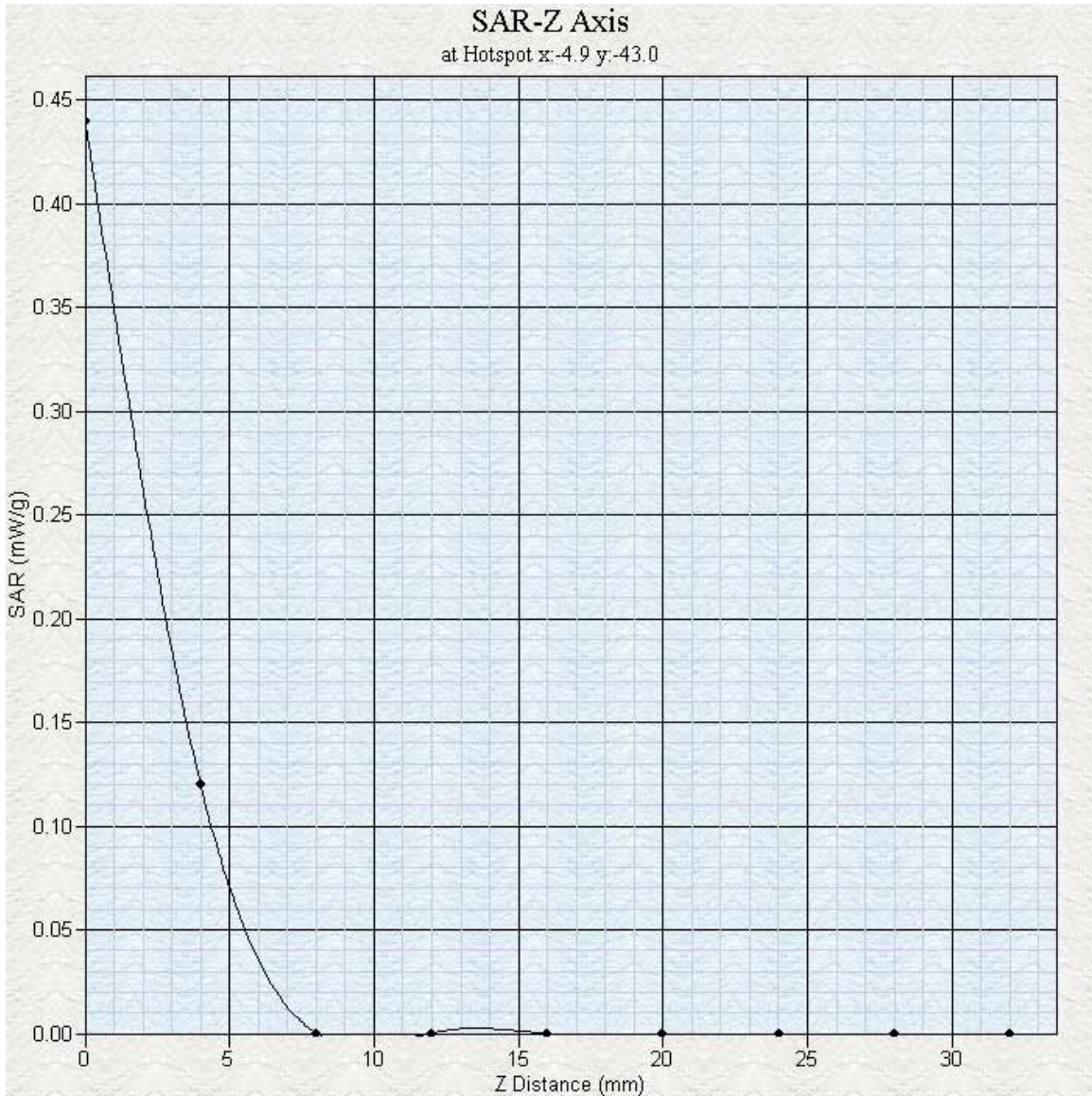


1 gram SAR value : 0.09 W/kg  
Zoom Scan Peak SAR : 0.44

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)
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{cp}$	$\sqrt{cp}$	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech.	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	4.0	normal	1	1	1	4.0	4.0
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0
Drift of Output Power	0.0	rectangular	$\sqrt{3}$	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty (shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity (target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4
Liquid Conductivity (meas.)	0.6	rectangular	$\sqrt{3}$	0.7	0.5	0.2	0.2
Liquid Permittivity (target)	2.0	rectangular	$\sqrt{3}$	0.6	0.5	0.7	0.6
Liquid Permittivity (meas.)	2.6	rectangular	$\sqrt{3}$	0.6	0.5	0.9	0.8
Combined Uncertainty		RSS				9.1	9.0
Combined Uncertainty (coverage factor=2)		Normal (k=2)				18.3	18.0





Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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## SAR Test Report

Operator : Chen  
 Validation Date : 03-Oct-2004  
 Measurement Date : 03-Oct-2004  
 Starting Time : 03-Oct-2004 04:03:23 PM  
 End Time : 03-Oct-2004 04:17:05 PM  
 Scanning Time : 822 secs

Product Data  
 Device Name : HP Heavenly ABG Card  
 Serial No. : CAT000121872  
 Type : Other  
 Model : HP Heavenly  
 Frequency : 5200.00 MHz  
 Max. Transmit Pwr : 0.1 W  
 Drift Time : 0 min(s)  
 Length : 110  
 Width : 180  
 Depth : 0  
 Antenna Type : Internal  
 Power Drift-Start : 0.01  
 Power Drift-Finish : 0.00  
 Power Drift : 0.01

Phantom Data  
 Name : APREL-Uni  
 Type : Uni-Phantom  
 Size : 280 x 280 x 200  
 Serial No. : User Define  
 Location : Center  
 Description : Uni

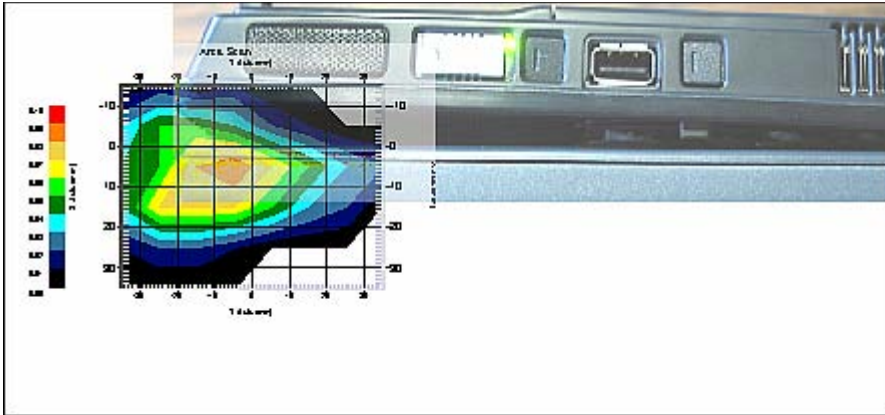
Tissue Data  
 Type : Body  
 Serial No. : 5200  
 Frequency : 5200 MHz  
 Calibration Date : 03-Oct-2004  
 Temperature : 23 °C  
 Ambient Temp. : 23 °C  
 Humidity : 50 RH%  
 Epsilon : 36.0 F/m  
 Sigma : 5.4 S/m  
 Density : 1000 kg/cu. m

Probe Data  
 Name : APREL Probe 212  
 Model : E020  
 Type : E-Field Triangle  
 Serial No. : 212  
 Calibration Date : 03-Oct-2004  
 Frequency : 5245 MHz  
 Duty Cycle Factor: 1  
 Conversion Factor: 7.8  
 Probe Sensitivity: 0.61 0.61 0.61  $\mu\text{V}/(\text{V}/\text{sq. m})$   
 Compression Point: 95  
 Offset : 1.56

Measurement Data  
 Crest Factor : 1  
 Scan Type : Complete  
 Set-up Date : 03-Oct-2004  
 Set-up Time : 4:03:14 PM



Other Data  
DUT Position : Touch  
Separation : 0  
Channel : Mid - 5260

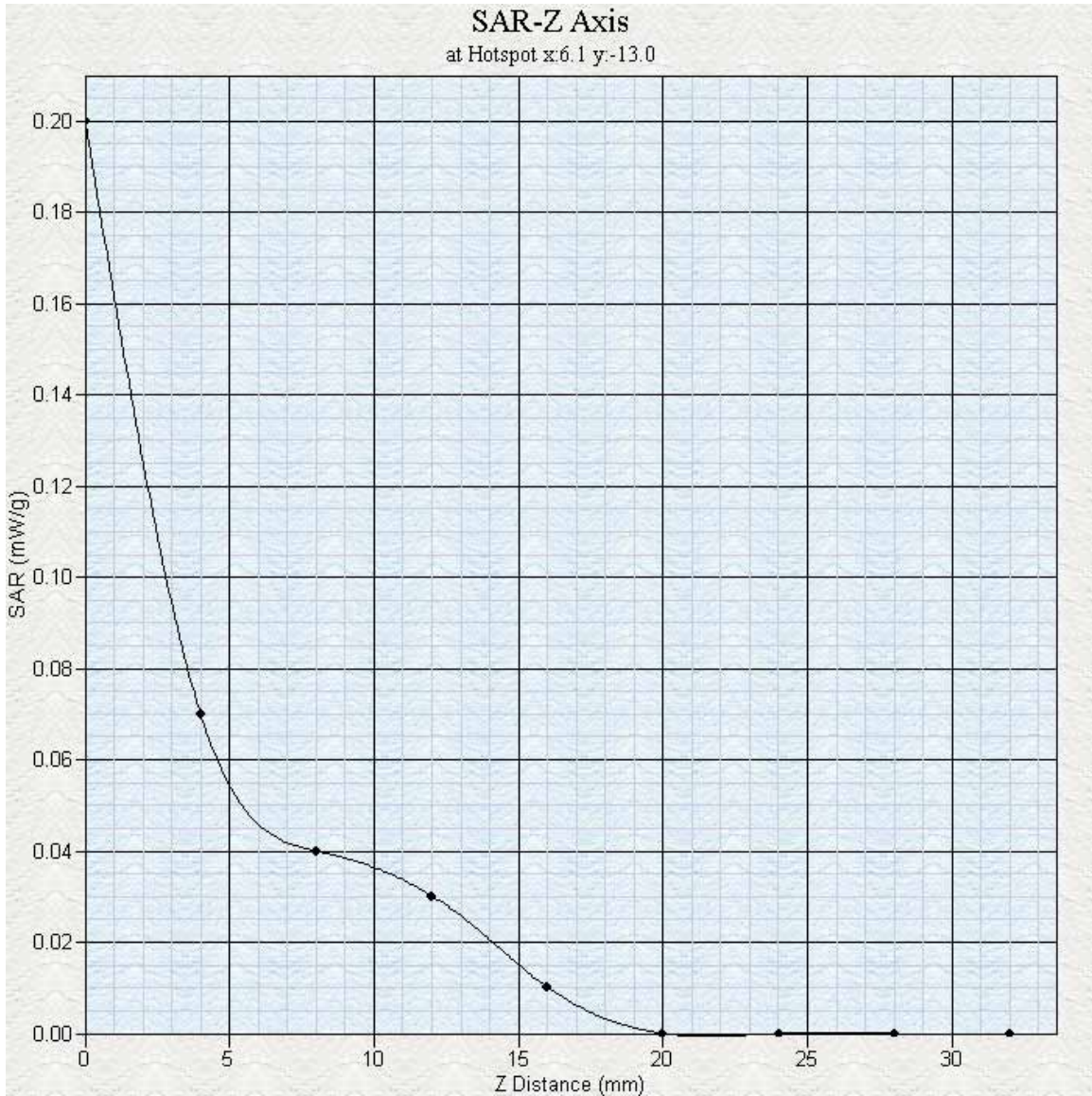


1 gram SAR value : 0.06 W/kg  
Zoom Scan Peak SAR : 0.20

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)
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{cp}$	$\sqrt{cp}$	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech.	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	4.0	normal	1	1	1	4.0	4.0
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0
Drift of Output Power	0.0	rectangular	$\sqrt{3}$	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty (shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity (target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4
Liquid Conductivity (meas.)	0.6	rectangular	$\sqrt{3}$	0.7	0.5	0.2	0.2
Liquid Permittivity (target)	2.0	rectangular	$\sqrt{3}$	0.6	0.5	0.7	0.6
Liquid Permittivity (meas.)	2.6	rectangular	$\sqrt{3}$	0.6	0.5	0.9	0.8
Combined Uncertainty		RSS				9.1	9.0
Combined Uncertainty (coverage factor=2)		Normal (k=2)				18.3	18.0





Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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## SAR Test Report

Operator : Chen  
 Validation Date : 03-Oct-2004  
 Measurement Date : 03-Oct-2004  
 Starting Time : 03-Oct-2004 01:37:52 PM  
 End Time : 03-Oct-2004 01:51:23 PM  
 Scanning Time : 811 secs

Product Data  
 Device Name : HP Heavenly ABG Card  
 Serial No. : CAT000121872  
 Type : Other  
 Model : HP Heavenly  
 Frequency : 5800.00 MHz  
 Max. Transmit Pwr : 0.1 W  
 Drift Time : 0 min(s)  
 Length : 110  
 Width : 180  
 Depth : 0  
 Antenna Type : Internal  
 Power Drift-Start : 0.00  
 Power Drift-Finish : 0.00  
 Power Drift : 0.00

Phantom Data  
 Name : APREL-Uni  
 Type : Uni-Phantom  
 Size : 280 x 280 x 200  
 Serial No. : User Define  
 Location : Center  
 Description : Uni

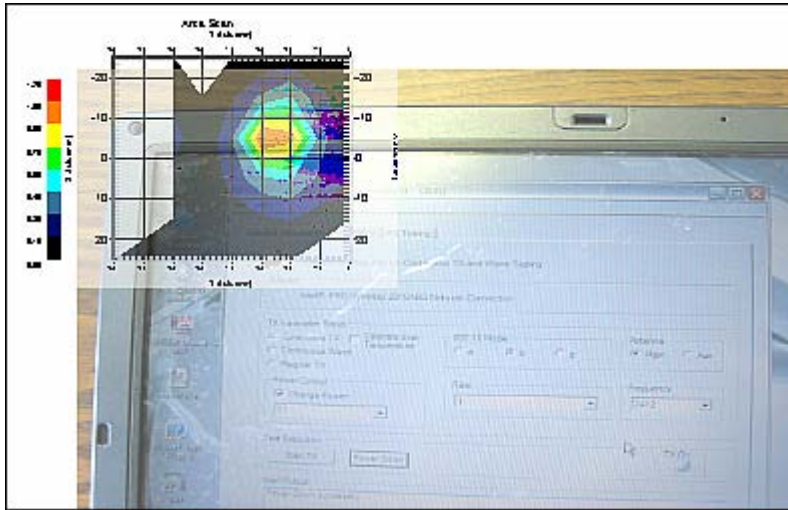
Tissue Data  
 Type : Body  
 Serial No. : 5800  
 Frequency : 5800 MHz  
 Calibration Date : 03-Oct-2004  
 Temperature : 23 °C  
 Ambient Temp. : 23 °C  
 Humidity : 50 RH%  
 Epsilon : 41.0 F/m  
 Sigma : 6.3 S/m  
 Density : 1000 kg/cu. m

Probe Data  
 Name : APREL Probe 212  
 Model : E020  
 Type : E-Field Triangle  
 Serial No. : 212  
 Calibration Date : 03-Oct-2004  
 Frequency : 5800 MHz  
 Duty Cycle Factor: 1  
 Conversion Factor: 7.1  
 Probe Sensitivity: 0.61 0.61 0.61  $\mu\text{V}/(\text{V}/\text{sq. m})$   
 Compression Point: 95  
 Offset : 1.56

Measurement Data  
 Crest Factor : 1  
 Scan Type : Complete  
 Set-up Date : 03-Oct-2004  
 Set-up Time : 1:37:11 PM



Other Data  
DUT Position : Touch  
Separation : 0  
Channel : Low - 5745



1 gram SAR value : 0.83 W/kg  
Zoom Scan Peak SAR : 3.21

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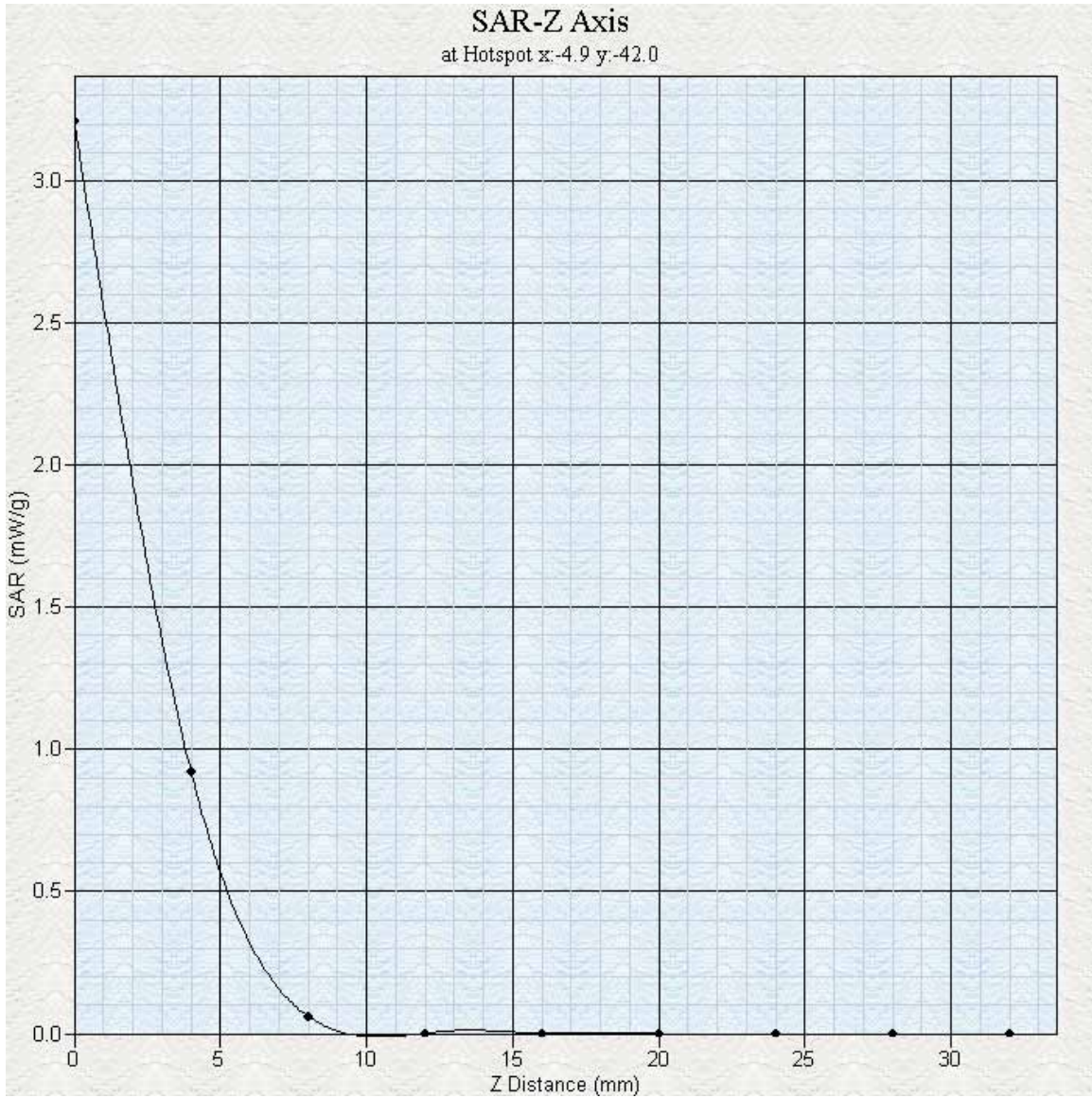


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Exposure Assessment Measurement Uncertainty

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)
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{cp}$	$\sqrt{cp}$	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech.	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	4.0	normal	1	1	1	4.0	4.0
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0
Drift of Output Power	0.0	rectangular	$\sqrt{3}$	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty (shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity (target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4
Liquid Conductivity (meas.)	0.7	rectangular	$\sqrt{3}$	0.7	0.5	0.3	0.2
Liquid Permittivity (target)	2.0	rectangular	$\sqrt{3}$	0.6	0.5	0.7	0.6
Liquid Permittivity (meas.)	3.1	rectangular	$\sqrt{3}$	0.6	0.5	1.1	0.9
Combined Uncertainty		RSS				9.2	9.0
Combined Uncertainty (coverage factor=2)		Normal (k=2)				18.3	18.1





## SAR Test Report

Operator : Chen  
 Validation Date : 04-Oct-2004  
 Measurement Date : 04-Oct-2004  
 Starting Time : 04-Oct-2004 09:00:40 AM  
 End Time : 04-Oct-2004 09:16:09 AM  
 Scanning Time : 929 secs

Product Data  
 Device Name : HP Heavenly ABG Card  
 Serial No. : CAT000121872  
 Type : Other  
 Model : HP Heavenly  
 Frequency : 5800.00 MHz  
 Max. Transmit Pwr : 0.1 W  
 Drift Time : 0 min(s)  
 Length : 180  
 Width : 110  
 Depth : 0  
 Antenna Type : Internal  
 Power Drift-Start : 0.00  
 Power Drift-Finish : 0.00  
 Power Drift : 0.00

Phantom Data  
 Name : APREL-Uni  
 Type : Uni-Phantom  
 Size : 280 x 280 x 200  
 Serial No. : User Define  
 Location : Center  
 Description : Uni

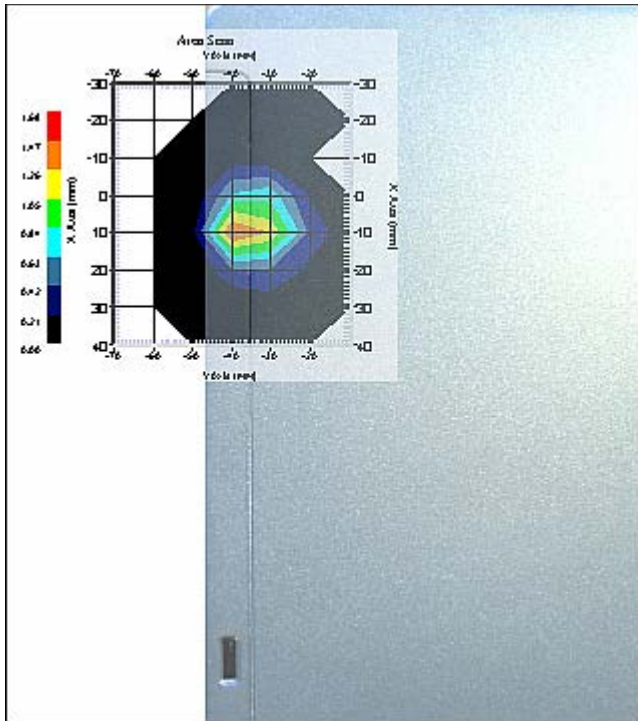
Tissue Data  
 Type : Body  
 Serial No. : 5800  
 Frequency : 5800 MHz  
 Calibration Date : 04-Oct-2004  
 Temperature : 23 °C  
 Ambient Temp. : 23 °C  
 Humidity : 50 RH%  
 Epsilon : 41.0 F/m  
 Sigma : 6.3 S/m  
 Density : 1000 kg/cu. m

Probe Data  
 Name : APREL Probe 212  
 Model : E020  
 Type : E-Field Triangle  
 Serial No. : 212  
 Calibration Date : 03-Oct-2004  
 Frequency : 5800 MHz  
 Duty Cycle Factor: 1  
 Conversion Factor: 7.1  
 Probe Sensitivity: 0.61 0.61 0.61  $\mu\text{V}/(\text{V}/\text{sq. m})$   
 Compression Point: 95  
 Offset : 1.56

Measurement Data  
 Crest Factor : 1  
 Scan Type : Complete  
 Set-up Date : 04-Oct-2004  
 Set-up Time : 8:35:00 AM



Other Data  
DUT Position : Touch  
Separation : 0  
Channel : Low - 5745



1 gram SAR value : 1.25 W/kg  
Zoom Scan Peak SAR : 4.69

Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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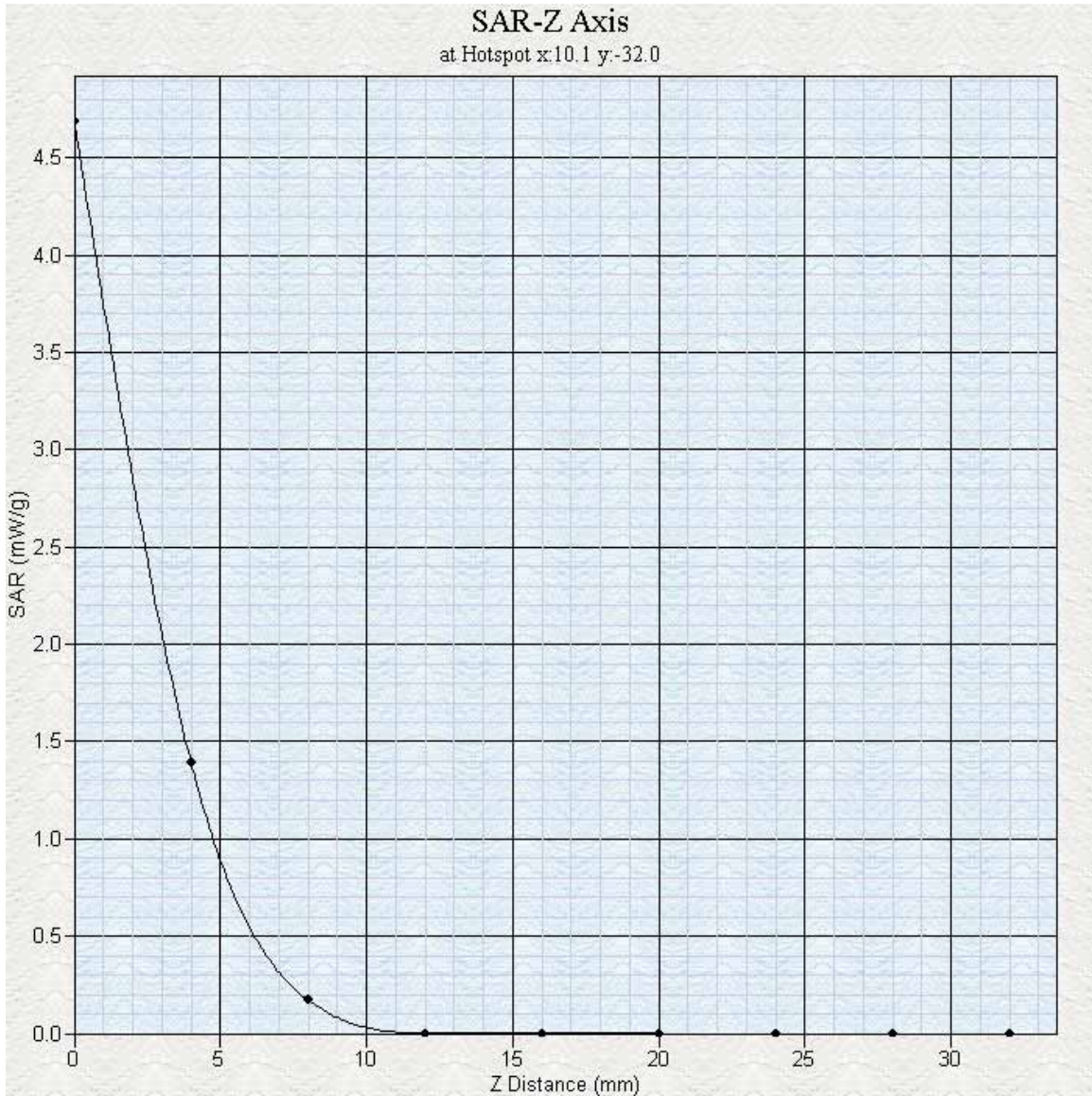


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### Exposure Assessment Measurement Uncertainty

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)
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{cp}$	$\sqrt{cp}$	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech.	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	4.0	normal	1	1	1	4.0	4.0
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0
Drift of Output Power	0.0	rectangular	$\sqrt{3}$	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty (shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity (target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4
Liquid Conductivity (meas.)	0.7	rectangular	$\sqrt{3}$	0.7	0.5	0.3	0.2
Liquid Permittivity (target)	2.0	rectangular	$\sqrt{3}$	0.6	0.5	0.7	0.6
Liquid Permittivity (meas.)	3.1	rectangular	$\sqrt{3}$	0.6	0.5	1.1	0.9
Combined Uncertainty		RSS				9.2	9.0
Combined Uncertainty (coverage factor=2)		Normal (k=2)				18.3	18.1





Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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## SAR Test Report

Operator : Chen  
 Validation Date : 03-Oct-2004  
 Measurement Date : 03-Oct-2004  
 Starting Time : 03-Oct-2004 04:50:30 PM  
 End Time : 03-Oct-2004 05:04:51 PM  
 Scanning Time : 861 secs

Product Data  
 Device Name : HP Heavenly ABG Card  
 Serial No. : CAT000121872  
 Type : Other  
 Model : HP Heavenly  
 Frequency : 5800.00 MHz  
 Max. Transmit Pwr : 0.1 W  
 Drift Time : 0 min(s)  
 Length : 110  
 Width : 180  
 Depth : 0  
 Antenna Type : Internal  
 Power Drift-Start : 0.23  
 Power Drift-Finish : 0.10  
 Power Drift : 0.13

Phantom Data  
 Name : APREL-Uni  
 Type : Uni-Phantom  
 Size : 280 x 280 x 200  
 Serial No. : User Define  
 Location : Center  
 Description : Uni

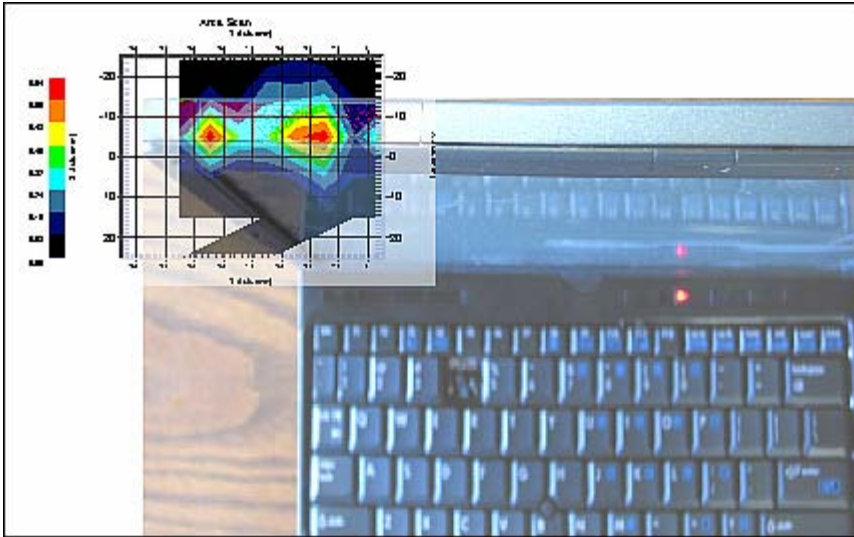
Tissue Data  
 Type : Body  
 Serial No. : 5800  
 Frequency : 5800 MHz  
 Calibration Date : 03-Oct-2004  
 Temperature : 23 °C  
 Ambient Temp. : 23 °C  
 Humidity : 50 RH%  
 Epsilon : 41.0 F/m  
 Sigma : 6.3 S/m  
 Density : 1000 kg/cu. m

Probe Data  
 Name : APREL Probe 212  
 Model : E020  
 Type : E-Field Triangle  
 Serial No. : 212  
 Calibration Date : 03-Oct-2004  
 Frequency : 5800 MHz  
 Duty Cycle Factor: 1  
 Conversion Factor: 7.1  
 Probe Sensitivity: 0.61 0.61 0.61  $\mu\text{V}/(\text{V}/\text{sq. m})$   
 Compression Point: 95  
 Offset : 1.56

Measurement Data  
 Crest Factor : 1  
 Scan Type : Complete  
 Set-up Date : 03-Oct-2004  
 Set-up Time : 2:30:51 PM



Other Data  
DUT Position : Touch  
Separation : 0  
Channel : Low - 5745



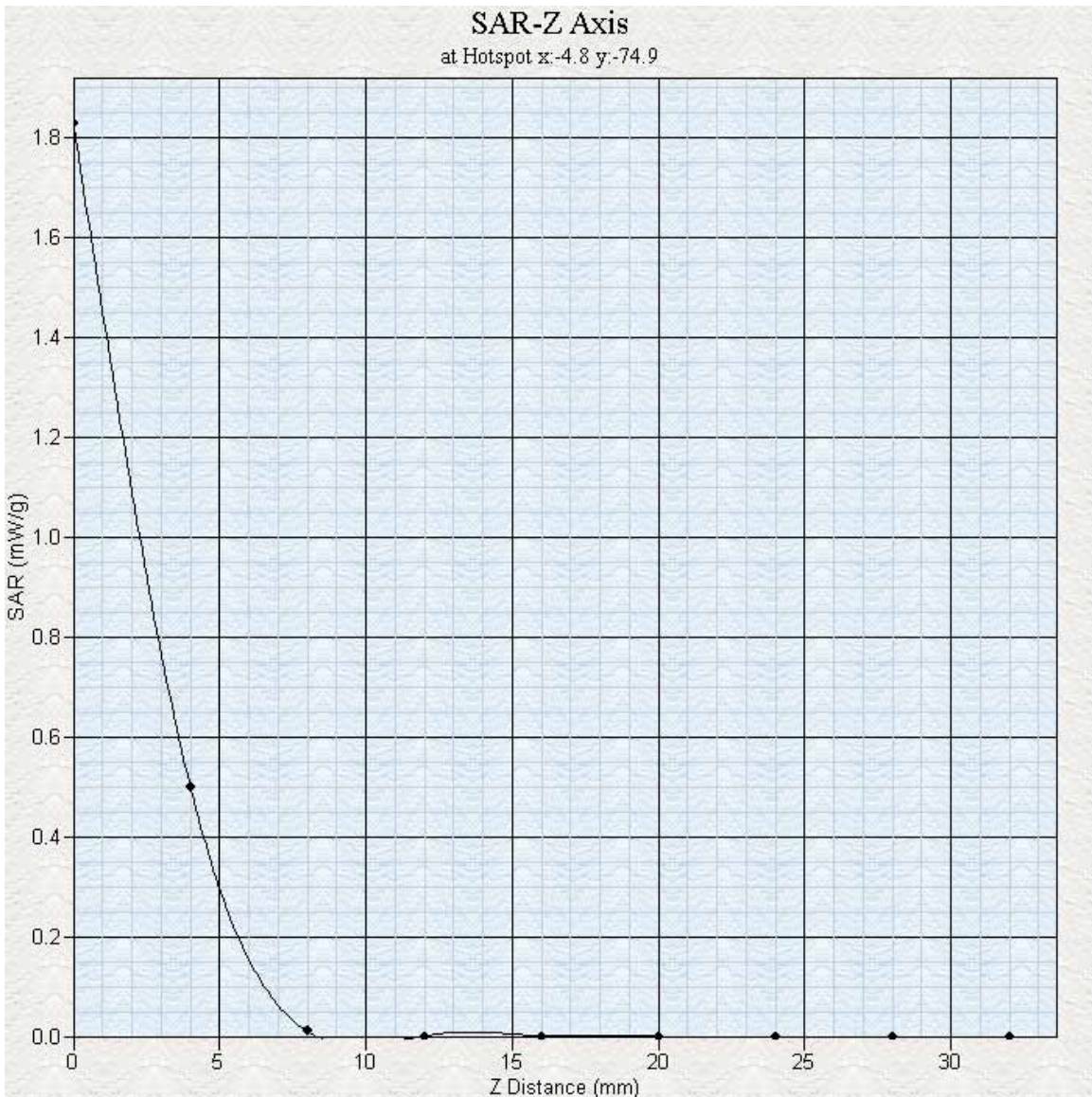
1 gram SAR value : 0.40 W/kg  
Zoom Scan Peak SAR : 1.83



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)
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{cp}$	$\sqrt{cp}$	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech.	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	4.0	normal	1	1	1	4.0	4.0
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0
Drift of Output Power	0.1	rectangular	$\sqrt{3}$	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty (shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity (target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4
Liquid Conductivity (meas.)	0.7	rectangular	$\sqrt{3}$	0.7	0.5	0.3	0.2
Liquid Permittivity (target)	2.0	rectangular	$\sqrt{3}$	0.6	0.5	0.7	0.6
Liquid Permittivity (meas.)	3.1	rectangular	$\sqrt{3}$	0.6	0.5	1.1	0.9
Combined Uncertainty		RSS				9.2	9.0
Combined Uncertainty (coverage factor=2)		Normal (k=2)				18.3	18.1





Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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www.aprel.com

## SAR Test Report

Operator : Chen  
 Validation Date : 03-Oct-2004  
 Measurement Date : 03-Oct-2004  
 Starting Time : 03-Oct-2004 04:50:30 PM  
 End Time : 03-Oct-2004 05:04:51 PM  
 Scanning Time : 861 secs

Product Data  
 Device Name : HP Heavenly ABG Card  
 Serial No. : CAT000121872  
 Type : Other  
 Model : HP Heavenly  
 Frequency : 5800.00 MHz  
 Max. Transmit Pwr : 0.1 W  
 Drift Time : 0 min(s)  
 Length : 110  
 Width : 180  
 Depth : 0  
 Antenna Type : Internal  
 Power Drift-Start : 0.23  
 Power Drift-Finish : 0.10  
 Power Drift : 0.13

Phantom Data  
 Name : APREL-Uni  
 Type : Uni-Phantom  
 Size : 280 x 280 x 200  
 Serial No. : User Define  
 Location : Center  
 Description : Uni

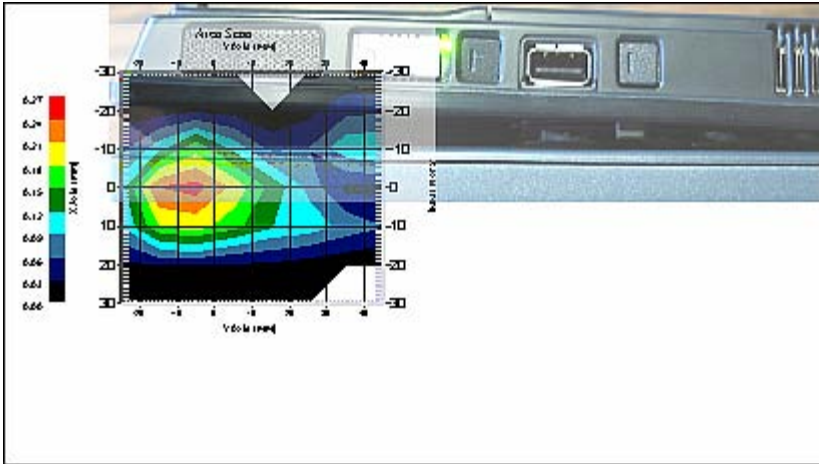
Tissue Data  
 Type : Body  
 Serial No. : 5800  
 Frequency : 5800 MHz  
 Calibration Date : 03-Oct-2004  
 Temperature : 23 °C  
 Ambient Temp. : 23 °C  
 Humidity : 50 RH%  
 Epsilon : 41.0 F/m  
 Sigma : 6.3 S/m  
 Density : 1000 kg/cu. m

Probe Data  
 Name : APREL Probe 212  
 Model : E020  
 Type : E-Field Triangle  
 Serial No. : 212  
 Calibration Date : 03-Oct-2004  
 Frequency : 5800 MHz  
 Duty Cycle Factor: 1  
 Conversion Factor: 7.1  
 Probe Sensitivity: 0.61 0.61 0.61  $\mu\text{V}/(\text{V}/\text{sq. m})$   
 Compression Point: 95  
 Offset : 1.56

Measurement Data  
 Crest Factor : 1  
 Scan Type : Complete  
 Set-up Date : 03-Oct-2004  
 Set-up Time : 2:30:51 PM



Other Data  
DUT Position : Touch  
Separation : 0  
Channel : Low - 5745



1 gram SAR value : 0.19 W/kg  
Zoom Scan Peak SAR : 0.41

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)
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{cp}$	$\sqrt{cp}$	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech.	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	4.0	normal	1	1	1	4.0	4.0
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0
Drift of Output Power	0.1	rectangular	$\sqrt{3}$	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty (shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity (target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4
Liquid Conductivity (meas.)	0.7	rectangular	$\sqrt{3}$	0.7	0.5	0.3	0.2
Liquid Permittivity (target)	2.0	rectangular	$\sqrt{3}$	0.6	0.5	0.7	0.6
Liquid Permittivity (meas.)	3.1	rectangular	$\sqrt{3}$	0.6	0.5	1.1	0.9
Combined Uncertainty		RSS				9.2	9.0
Combined Uncertainty (coverage factor=2)		Normal (k=2)				18.3	18.1







**Appendix B**  
**Probe Calibration Certificate**

Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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**NCL CALIBRATION LABORATORIES**

Calibration File No.: CP-339

Client.: APREL

**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 2450 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

Serial No.: 212

BODY Calibration

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

Project No: Internal

Calibrated: 4<sup>th</sup> June 2004  
Released on: 4<sup>th</sup> June 2004

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

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

**NCL CALIBRATION LABORATORIES**

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

Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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## 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-020 212.

## 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"  
SSI-TP-011 Tissue Calibration Procedure

## Conditions

Probe 212 was a new probe 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



### Calibration Results Summary

**Probe Type:** E-Field Probe E-020  
**Serial Number:** 212  
**Frequency:** 2450 MHz  
**Sensor Offset:** 1.56 mm  
**Sensor Length:** 2.5 mm  
**Tip Enclosure:** Ertalyte\*  
**Tip Diameter:** 5 mm  
**Tip Length:** 60 mm  
**Total Length:** 290 mm

\*Resistive to recommended tissue recipes per IEEE-1528

#### Sensitivity in Air

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



### Sensitivity in Body Tissue

**Frequency:** 2450 MHz

**Epsilon:** 50.6 (+/-5%)      **Sigma:** 1.98 S/m (+/-10%)

### ConvF

**Channel X:** 3.3

**Channel Y:** 3.3

**Channel Z:** 3.3

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

### Boundary Effect:

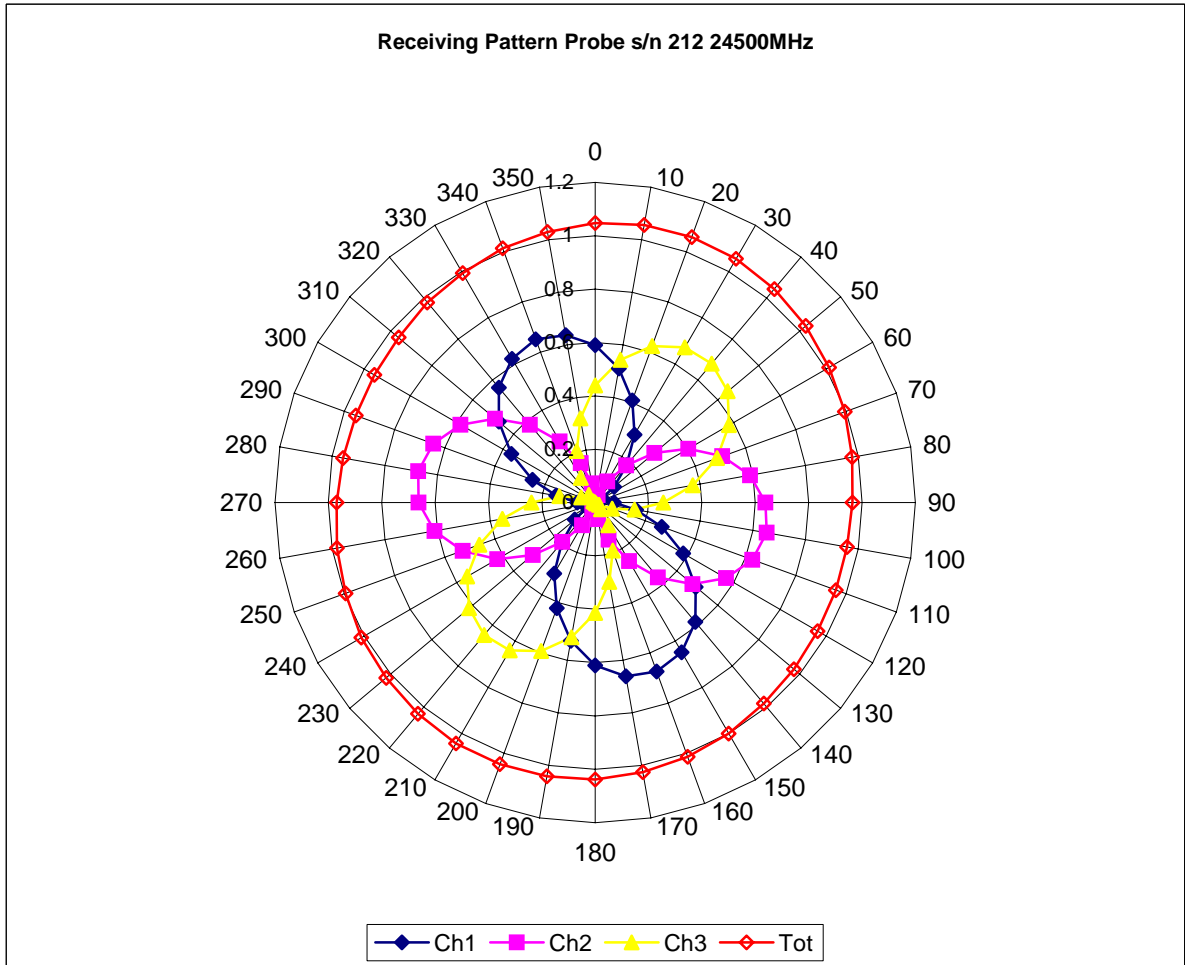
Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.4mm.

### Spatial Resolution:

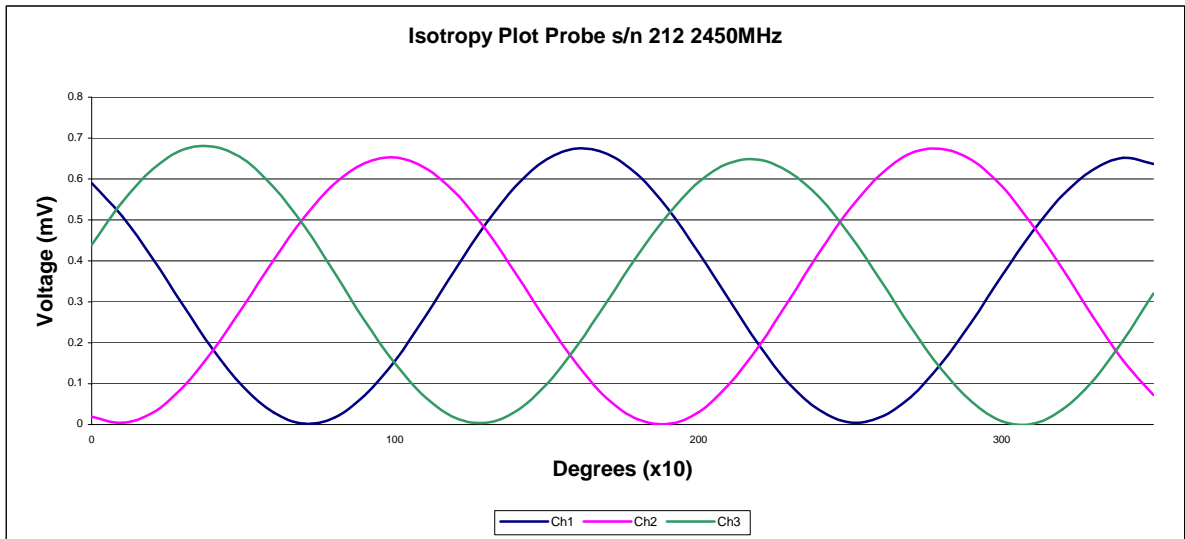
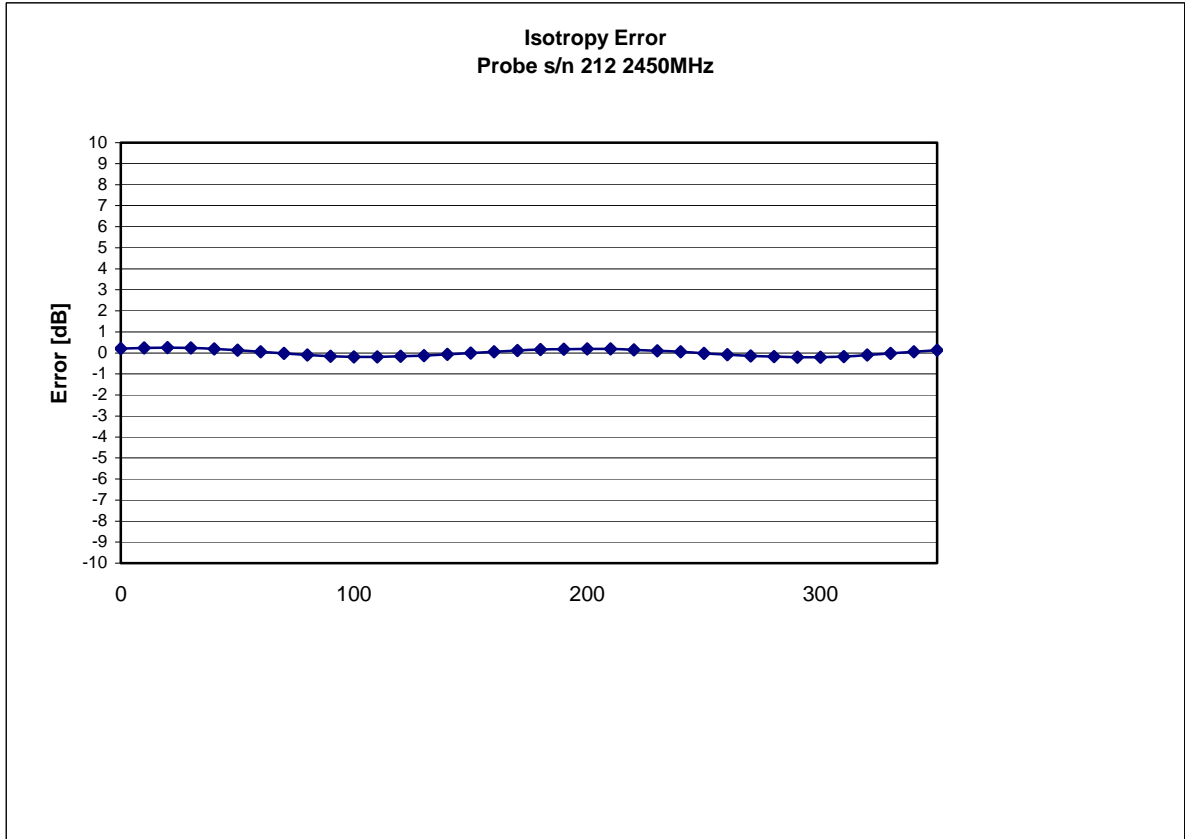
The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.



## Receiving Pattern 2450 MHz (Air)



### Isotropy Error 2450 MHz (Air)



**Isotropicity:**

0.10 dB

Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

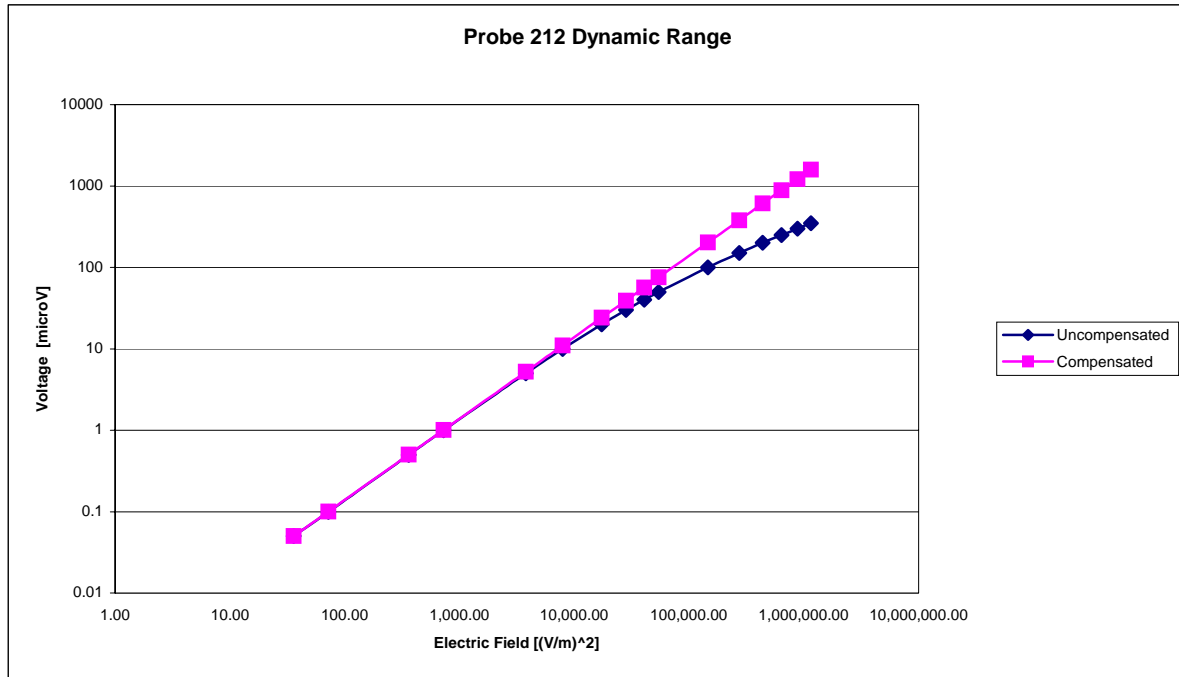
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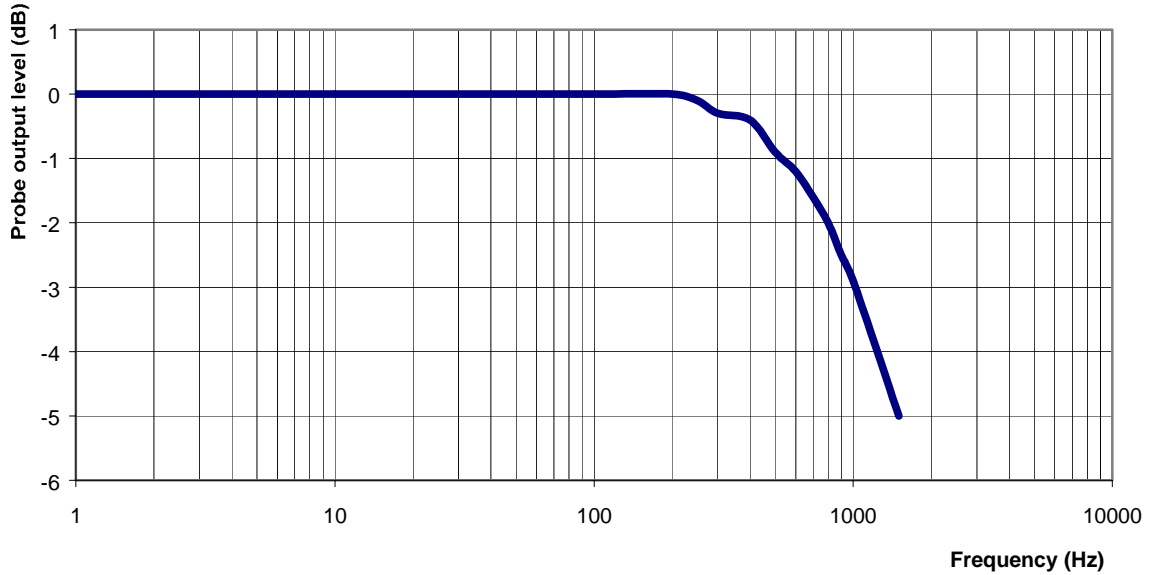
## Dynamic Range





## Video Bandwidth

### Probe Frequency Characteristics



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



## Conversion Factor Uncertainty Assessment

**Frequency:** 2450MHz

**Epsilon:** 50.6 (+/-5%)

**Sigma:** 1.98 S/m (+/-10%)

### ConvF

**Channel X:** 3.3 7%(K=2)

**Channel Y:** 3.3 7%(K=2)

**Channel Z:** 3.3 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 2.4mm 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 2004.

Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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**NCL CALIBRATION LABORATORIES**

Calibration File No.: CP-420

Client.: APREL

**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 5200 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

Serial No.: 212

BODY Calibration

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

Project No: Internal

Calibrated: 2<sup>nd</sup> March 2004

Released on: 2<sup>nd</sup> March 2004

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

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

**NCL CALIBRATION LABORATORIES**

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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-020 212.

## 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"  
SSI-TP-011 Tissue Calibration Procedure

## Conditions

Probe 212 was a new probe 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



### Calibration Results Summary

**Probe Type:** E-Field Probe E-020  
**Serial Number:** 212  
**Frequency:** 5200 MHz  
**Sensor Offset:** 1.56 mm  
**Sensor Length:** 2.5 mm  
**Tip Enclosure:** Ertalyte\*  
**Tip Diameter:** 5 mm  
**Tip Length:** 60 mm  
**Total Length:** 290 mm

\*Resistive to recommended tissue recipes per IEEE-1528

#### Sensitivity in Air

**Channel X:** 0.61  $\mu\text{V}/(\text{V}/\text{m})^2$   
**Channel Y:** 0.61  $\mu\text{V}/(\text{V}/\text{m})^2$   
**Channel Z:** 0.61  $\mu\text{V}/(\text{V}/\text{m})^2$   
**Diode Compression Point:** 95 mV



### Sensitivity in Body Tissue

**Frequency:** 5200 MHz

**Epsilon:** 36.0 (+/-5%)      **Sigma:** 4.7 S/m (+/-10%)

### ConvF

**Channel X:** 7.8

**Channel Y:** 7.8

**Channel Z:** 7.8

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

### Boundary Effect:

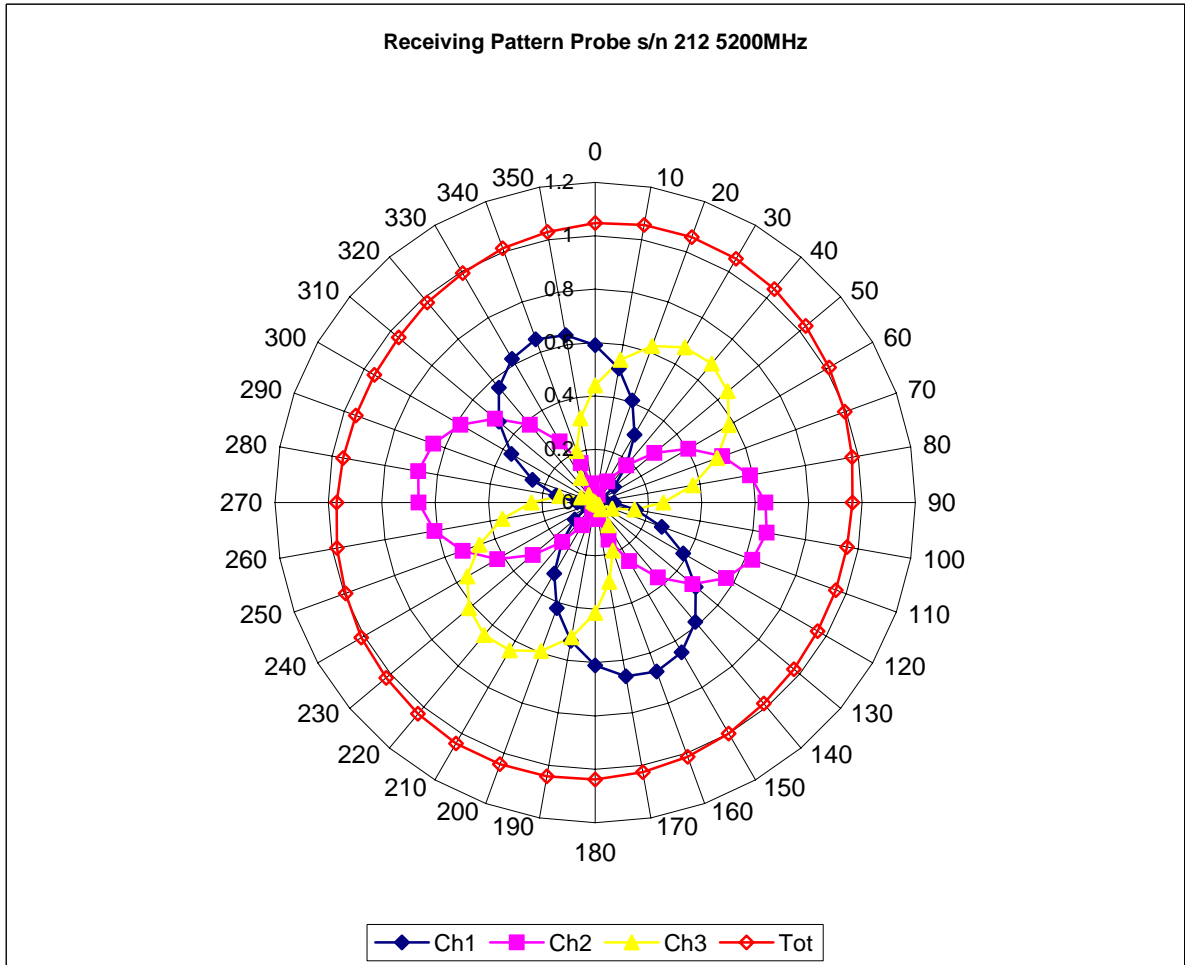
Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.4mm.

### 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.

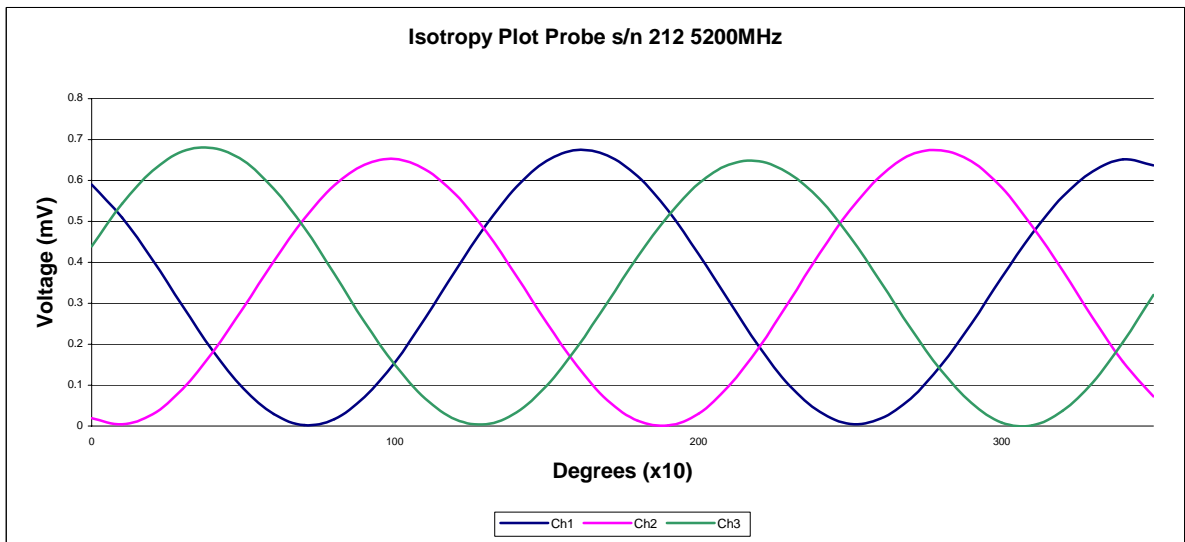
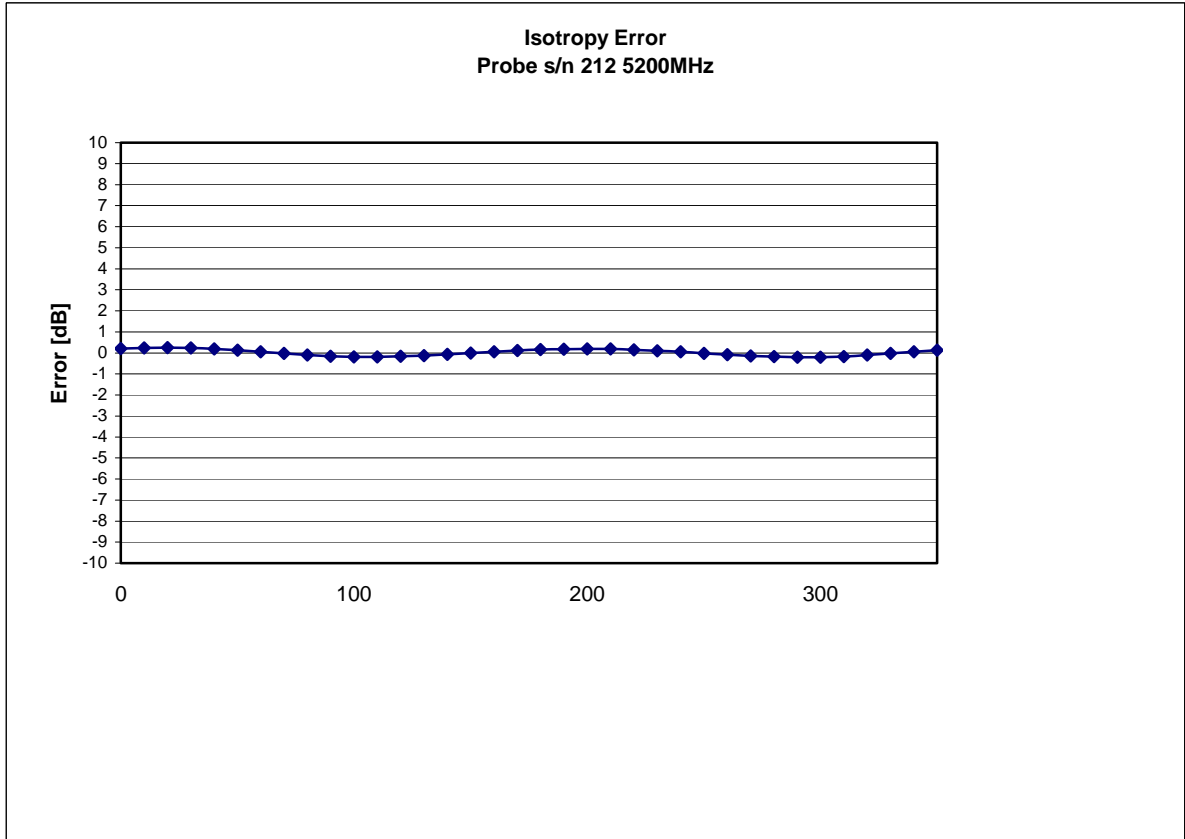


## Receiving Pattern 5200 MHz (Air)





### Isotropy Error 5200 MHz (Air)



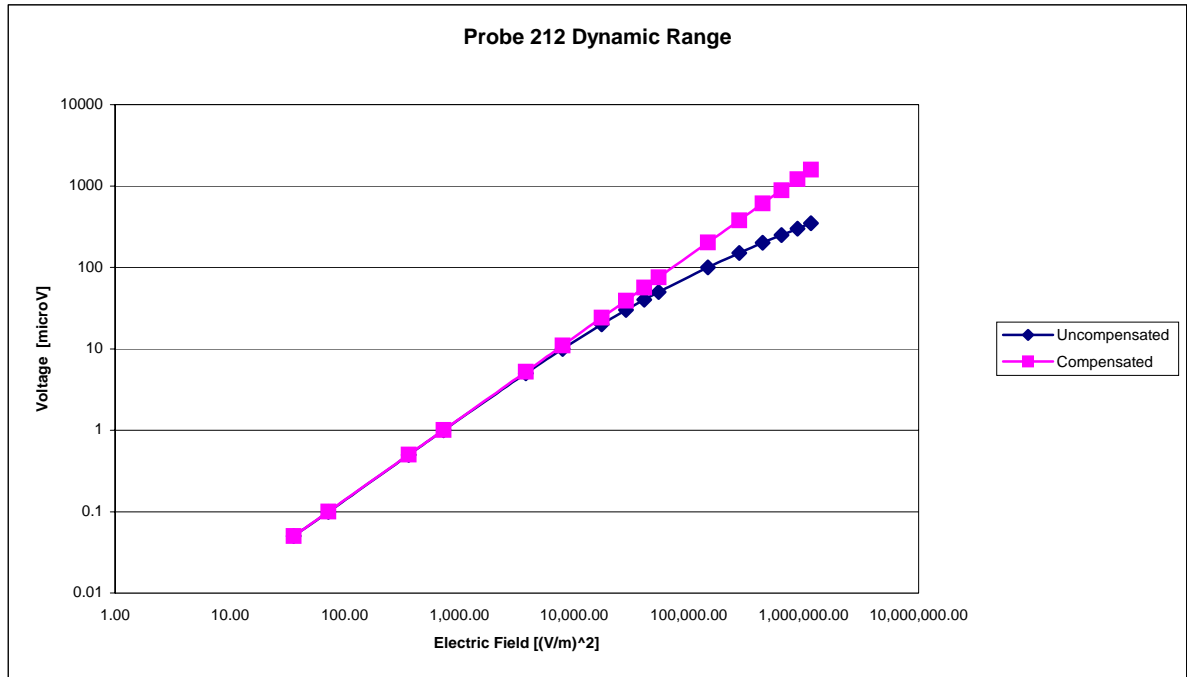
**Isotropy:**

0.10 dB

Project number: TILB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

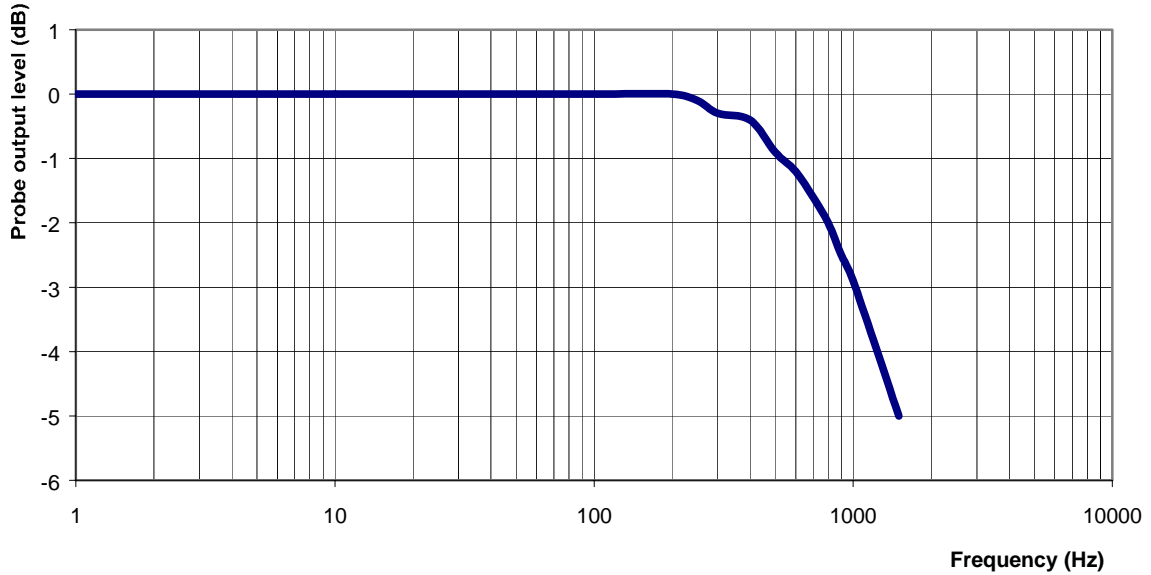


## Dynamic Range



## Video Bandwidth

### Probe Frequency Characteristics



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



## Conversion Factor Uncertainty Assessment

**Frequency:** 5200MHz

**Epsilon:** 36.0 (+/-5%)      **Sigma:** 4.7 S/m (+/-10%)

### ConvF

**Channel X:** 7.8    7%(K=2)

**Channel Y:** 7.8    7%(K=2)

**Channel Z:** 7.8    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 2.4mm 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 2004.

Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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**NCL CALIBRATION LABORATORIES**

Calibration File No.: CP-421

Client.: APREL

**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 5800 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

Serial No.: 212

BODY Calibration

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

Project No: Internal

Calibrated: 2<sup>nd</sup> March 2004

Released on: 2<sup>nd</sup> March 2004

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

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

**NCL CALIBRATION LABORATORIES**

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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-020 212.

## 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"  
SSI-TP-011 Tissue Calibration Procedure

## Conditions

Probe 212 was a new probe 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



### Calibration Results Summary

**Probe Type:** E-Field Probe E-020  
**Serial Number:** 212  
**Frequency:** 5800 MHz  
**Sensor Offset:** 1.56 mm  
**Sensor Length:** 2.5 mm  
**Tip Enclosure:** Ertalyte\*  
**Tip Diameter:** 5 mm  
**Tip Length:** 60 mm  
**Total Length:** 290 mm

\*Resistive to recommended tissue recipes per IEEE-1528

#### Sensitivity in Air

**Channel X:** 0.61  $\mu\text{V}/(\text{V}/\text{m})^2$   
**Channel Y:** 0.61  $\mu\text{V}/(\text{V}/\text{m})^2$   
**Channel Z:** 0.61  $\mu\text{V}/(\text{V}/\text{m})^2$   
**Diode Compression Point:** 95 mV





### Sensitivity in Body Tissue

**Frequency:** 5800 MHz

**Epsilon:** 35.15 (+/-5%)

**Sigma:** 6.4 S/m (+/-10%)

### ConvF

**Channel X:** 7.1

**Channel Y:** 7.1

**Channel Z:** 7.1

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

### Boundary Effect:

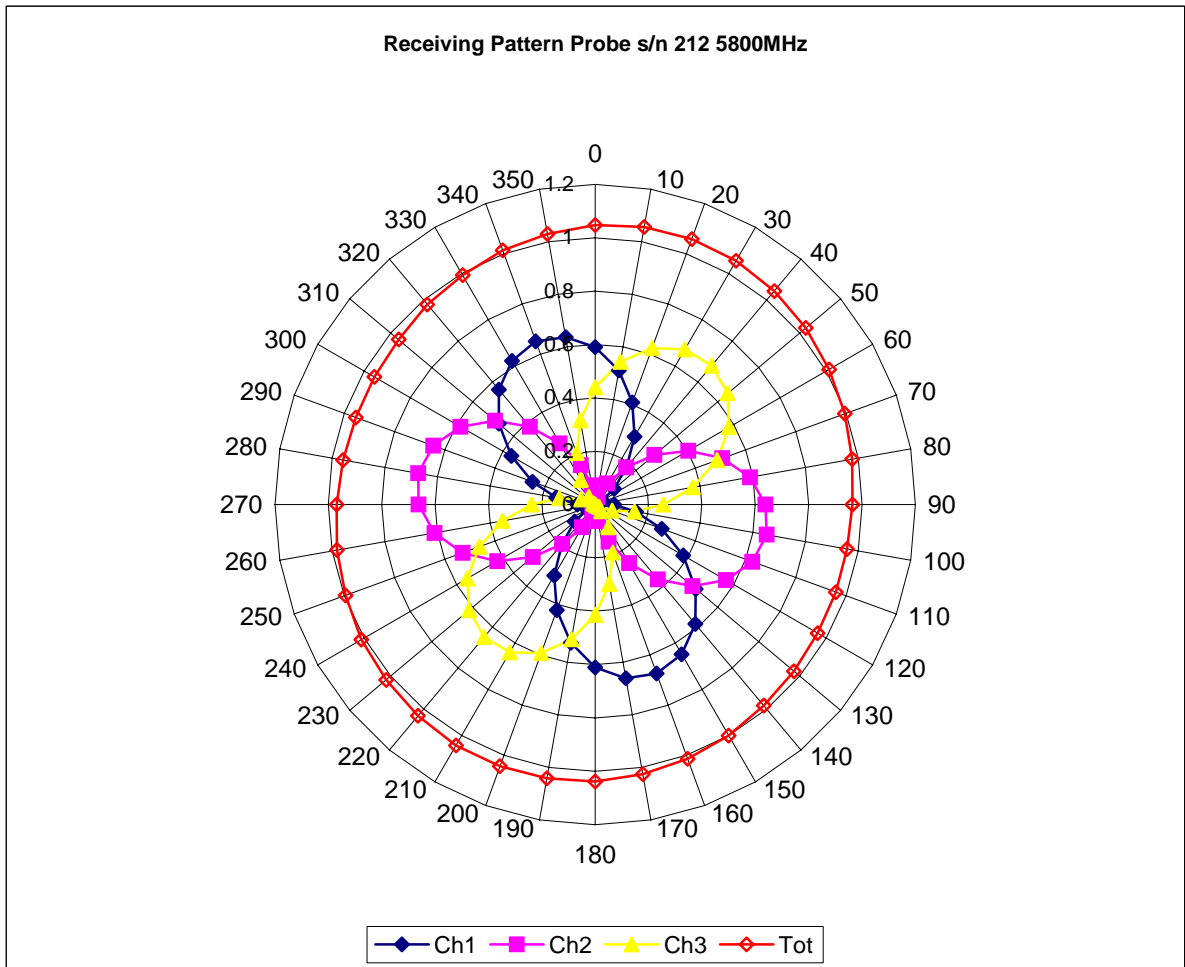
Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.4mm.

### Spatial Resolution:

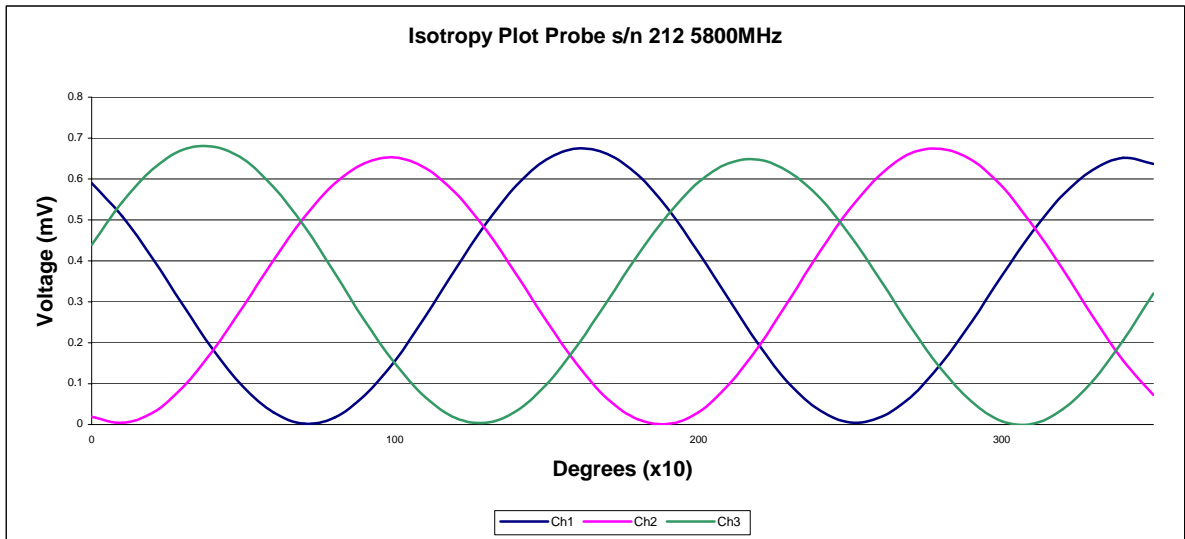
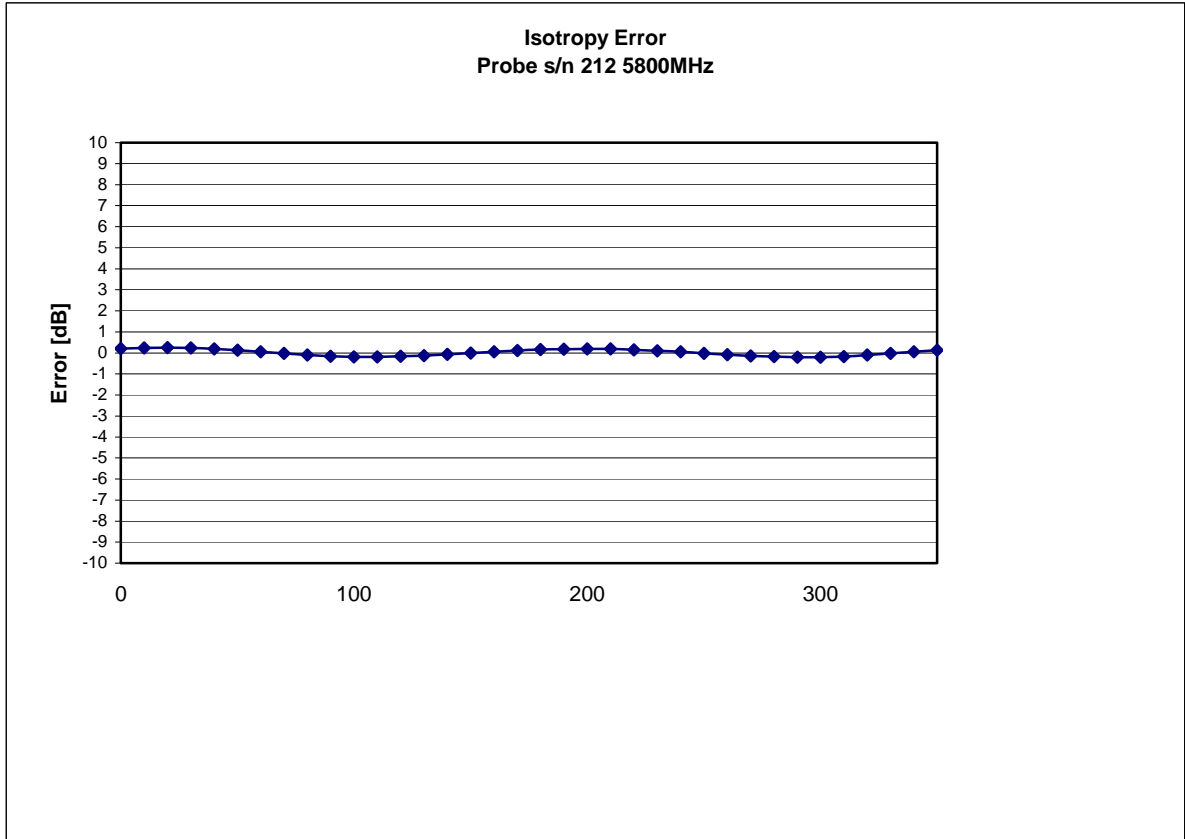
The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.



## Receiving Pattern 5800 MHz (Air)



### Isotropy Error 5800 MHz (Air)



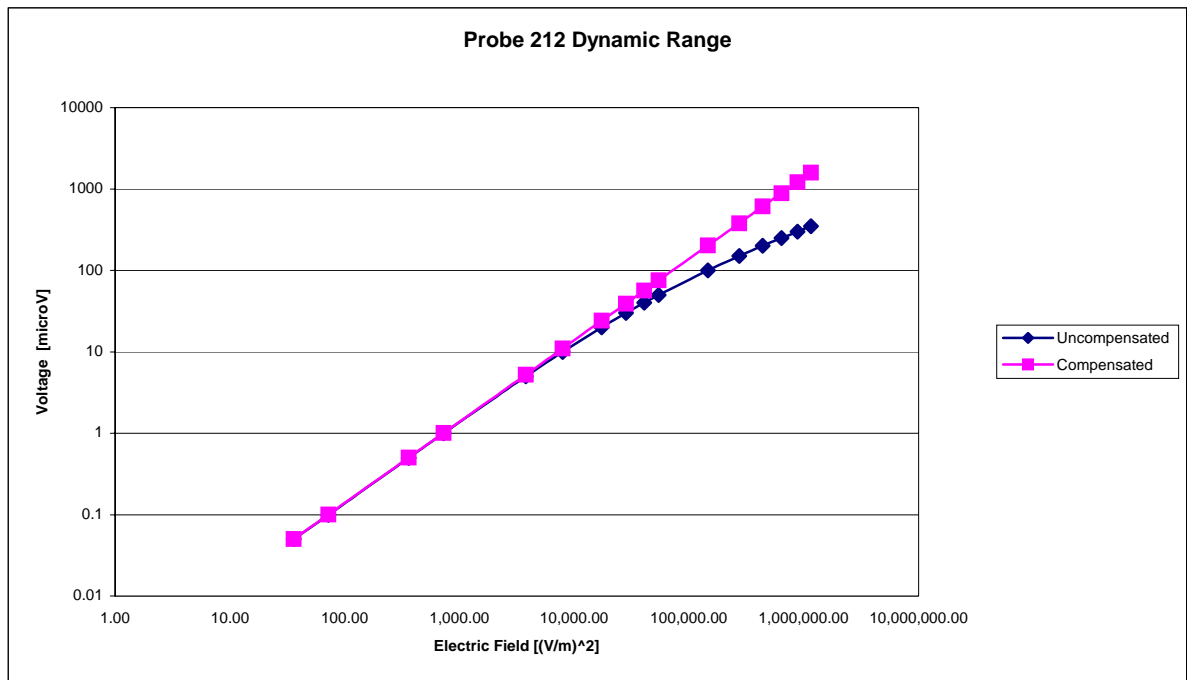
**Isotropicity:**

0.10 dB

Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

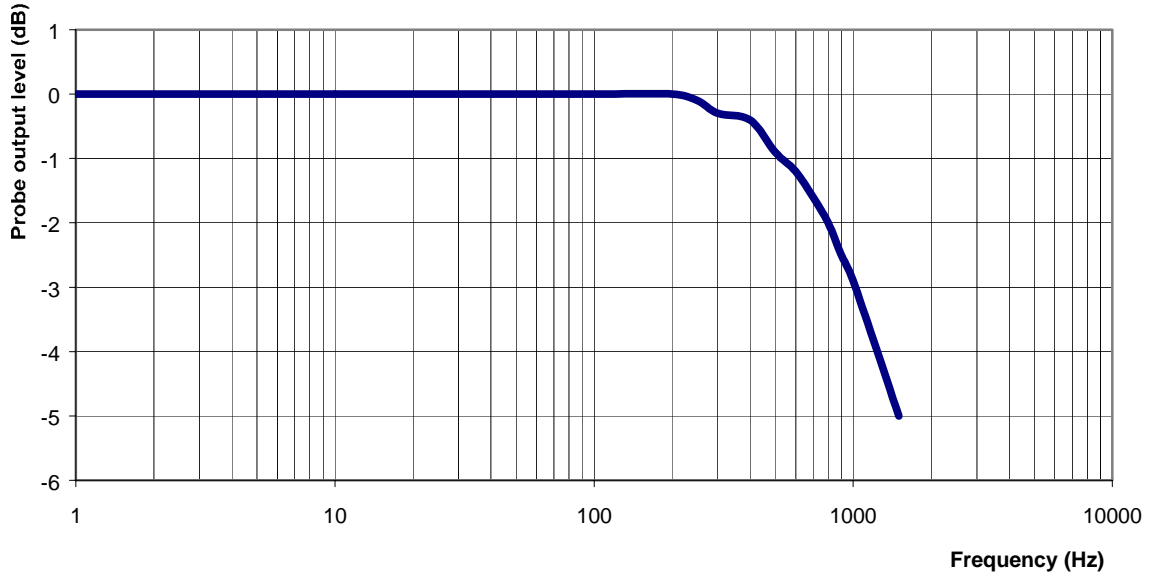


## Dynamic Range



## Video Bandwidth

### Probe Frequency Characteristics



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



## Conversion Factor Uncertainty Assessment

**Frequency:** 5800MHz

**Epsilon:** 35.15 (+/-5%)

**Sigma:** 6.4 S/m (+/-10%)

### ConvF

**Channel X:** 7.1 7%(K=2)

**Channel Y:** 7.1 7%(K=2)

**Channel Z:** 7.1 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 2.4mm 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 2004.

Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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**Appendix C**  
**Dipole Calibration Certificate**

Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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**NCL CALIBRATION LABORATORIES**

Calibration File No: DC-0265

Project Number: Internal

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

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

APREL Validation Dipole

Manufacturer: APREL Laboratories

Part number: D-2450-S-1

Frequency: 2.45 GHz

Serial No: ALCD-10

Customer: APREL

Calibrated: 14 November 2003

Released on: 15 November 2003

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

**NCL CALIBRATION LABORATORIES**

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NEPEAN, ONTARIO  
CANADA K2R 1E6

Division of APREL Lab.  
TEL: (613) 820-4988  
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### Calibration Results Summary

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

### Mechanical Dimensions

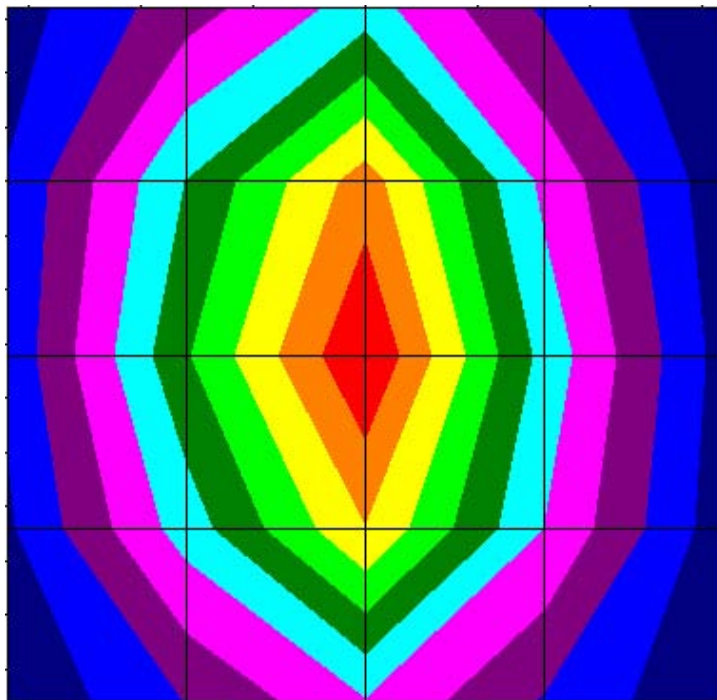
**Length:** 51.7 mm  
**Height:** 30.8 mm

### Electrical Specification

**SWR:** 1.181U  
**Return Loss:** -21.4 dB  
**Impedance:** 46.175

### System Validation Results

Frequency	1 Gram	10 Gram	Peak
2.45 GHz	52.45	22.91	102.91



## Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018. The results contained within this report are for Validation Dipole ALCD-10 at 2.45 GHz. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the IEEE mechanical specification. 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 ALIDX-500, along with the APREL Reference E-010 130 MHz to 26 GHz E-Field Probe Serial Number 163.

## References

SSI-TP-018 Dipole Calibration Procedure  
 SSI-TP-016 Tissue Calibration Procedure  
 IEEE 1528 *DRAFT* "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 ALCD-10 was a new Dipole taken from stock prior to calibration.

**Ambient Temperature of the Laboratory:** 24 °C +/- 0.5°C  
**Temperature of the Tissue:** 20 °C +/- 0.5°C



## Dipole Calibration Results

### Mechanical Verification

IEEE Length	IEEE Height	Measured Length	Measured Height
51.5 mm	30.4 mm	51.7 mm	30.8 mm

### Tissue Validation

Head Tissue 2450 MHz	Measured
Dielectric constant, $\epsilon_r$	39.2
Conductivity, $\sigma$ [S/m]	1.82
Tissue Conversion Factor,	4.61

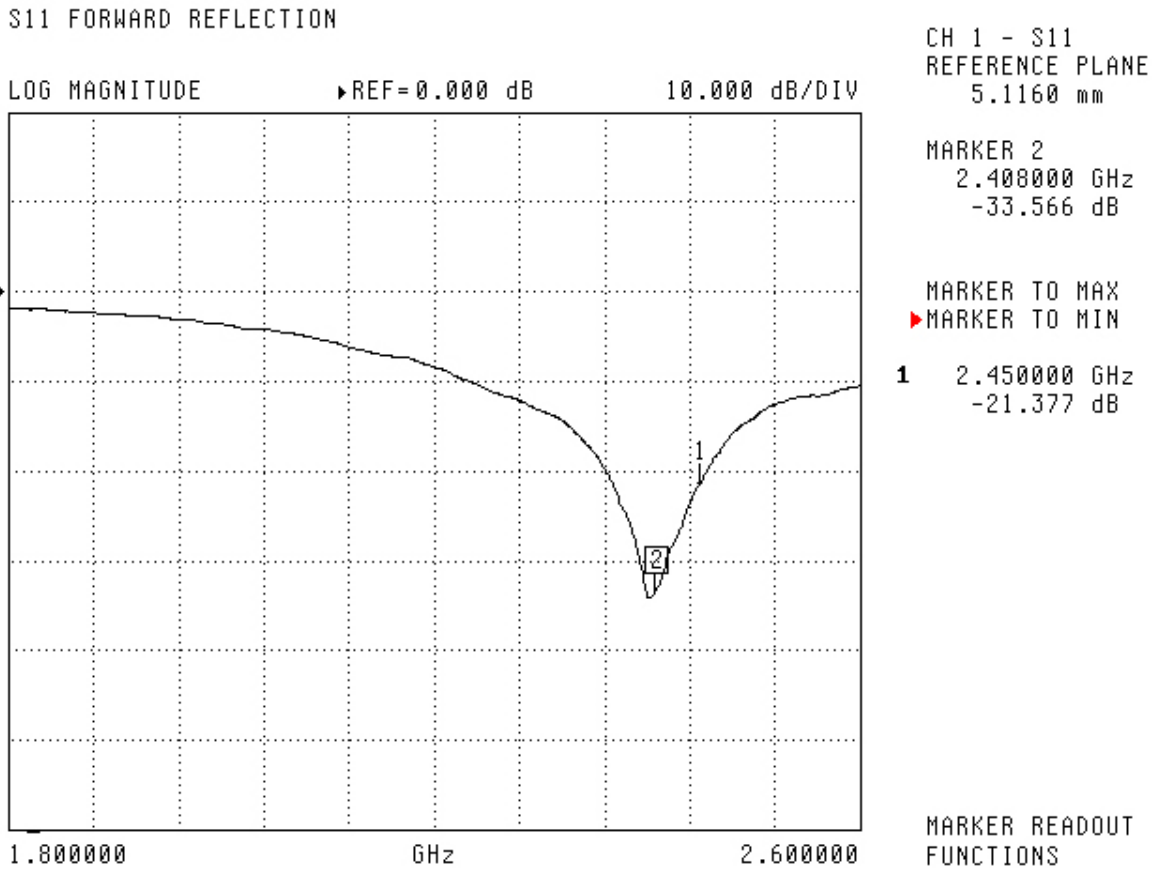


### Electrical Calibration

Test	Result	IEEE Value
S11 R/L	-21.4	-21 dB
SWR	1.181U	-
Impedance	46.175 $\Omega$	

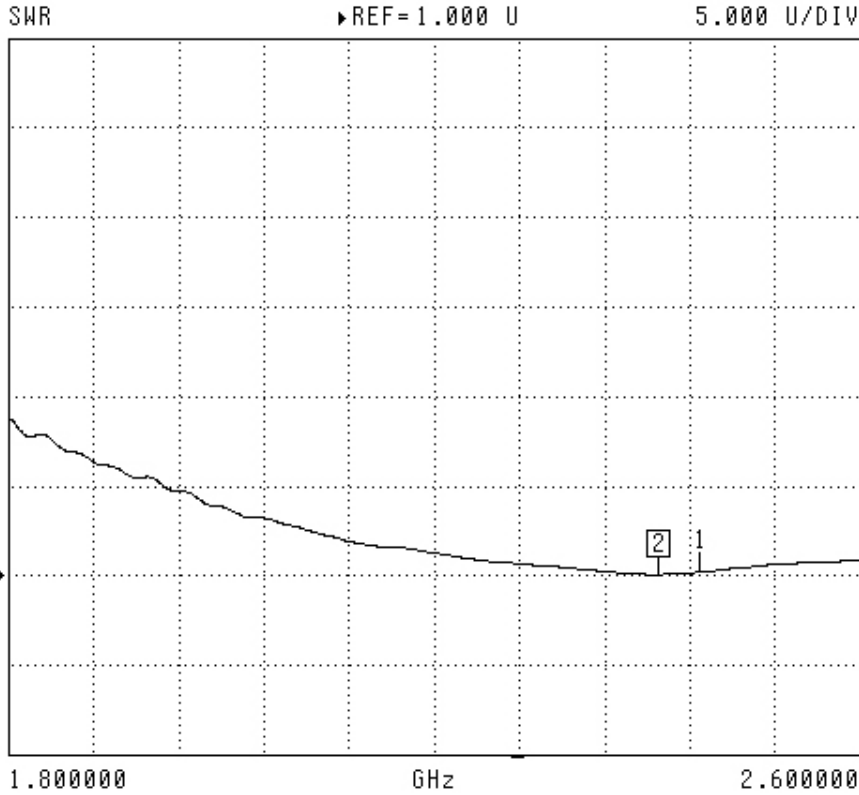
The Following Graphs are the results as displayed on the Vector Network Analyzer.

#### S11 Parameter Return Loss



## SWR

S11 FORWARD REFLECTION



CH 1 - S11  
REFERENCE PLANE  
5.1160 mm

MARKER 2  
2.411000 GHz  
1.049 U

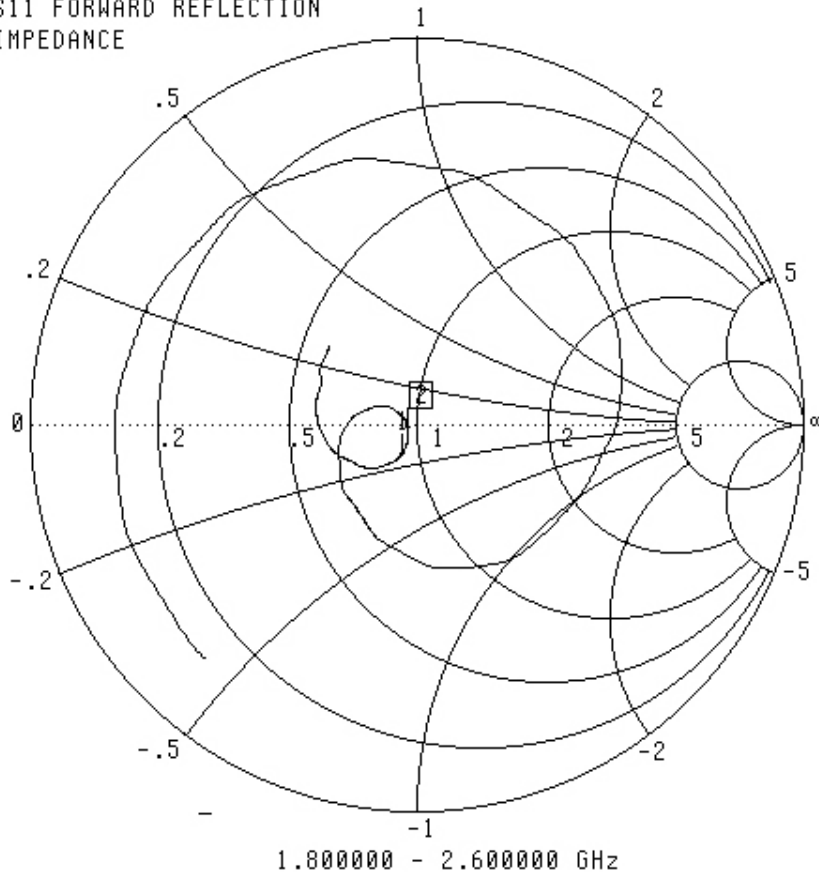
MARKER TO MAX  
▶ MARKER TO MIN  
**1** 2.450000 GHz  
1.181 U

MARKER READOUT  
FUNCTIONS



## Smith Chart Dipole Impedance

S11 FORWARD REFLECTION  
IMPEDANCE



CH 1 - S11  
REFERENCE PLANE  
5.1160 mm

MARKER 2  
2.411000 GHz  
48.080 Ω  
-1.171 jΩ

MARKER TO MAX  
▶ MARKER TO MIN

**1** 2.450000 GHz  
46.175 Ω  
-7.199 jΩ

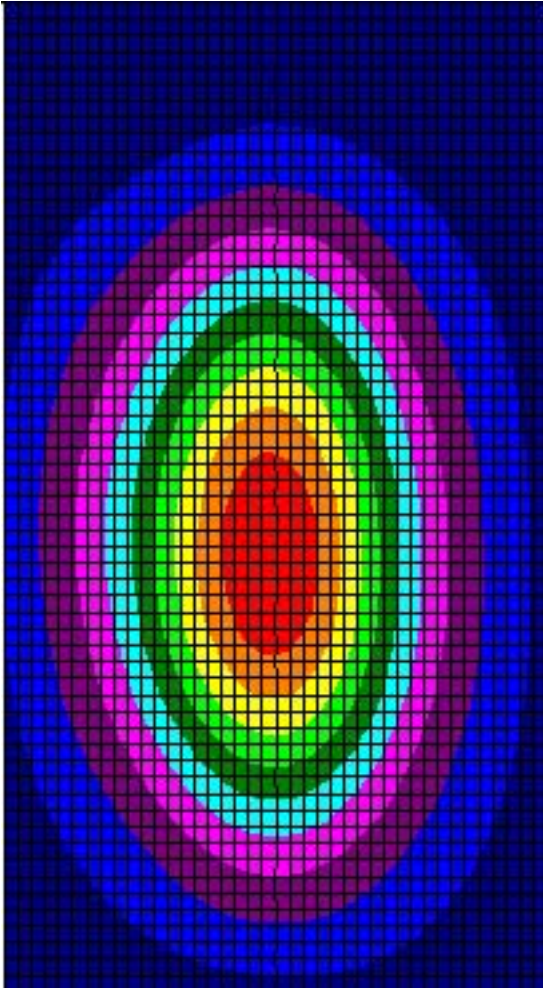
MARKER READOUT  
FUNCTIONS



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

Frequency	1 Gram	10 Gram	Peak Above Feed Point
2.45 GHz	52.45	22.91	102.91

The following Graphic Plot is the splined measurement result for the course scan.





## 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 2004.

Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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**NCL CALIBRATION LABORATORIES**

Calibration File No: DC-0254  
Project Number: Internal

**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.

APREL Validation Dipole

Manufacturer: APREL Laboratories

Part number: D-5240-S-2

Frequency: 5.24 GHz

Serial No: 301460

Customer: APREL

Calibrated: 1 March 2004  
Released on: 1 March 2004

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

**NCL CALIBRATION LABORATORIES**

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TEL: (613) 820-4988  
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Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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## Calibration Results Summary

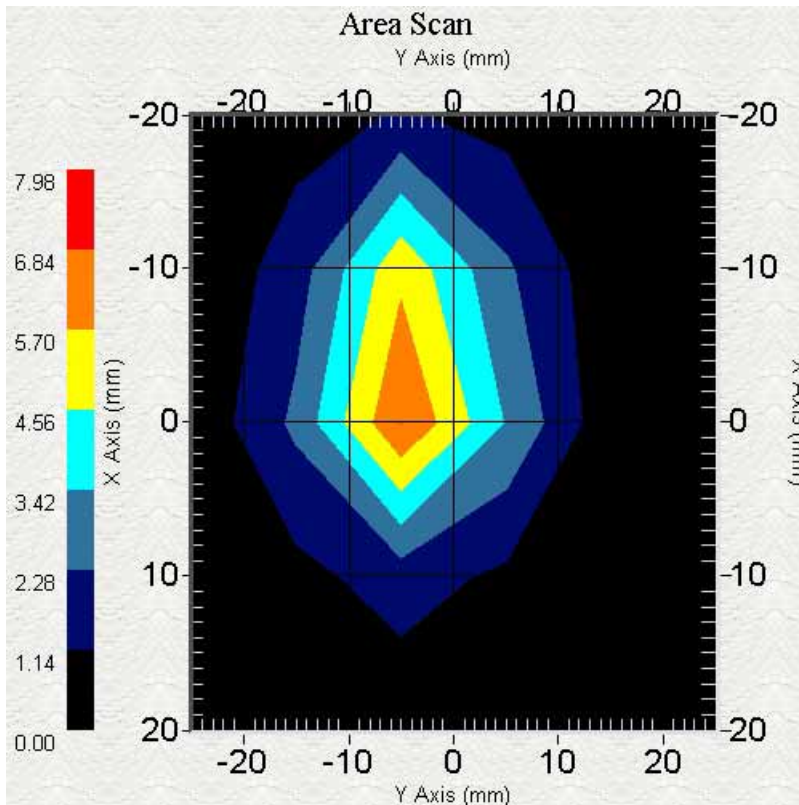
The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

## Electrical Specification

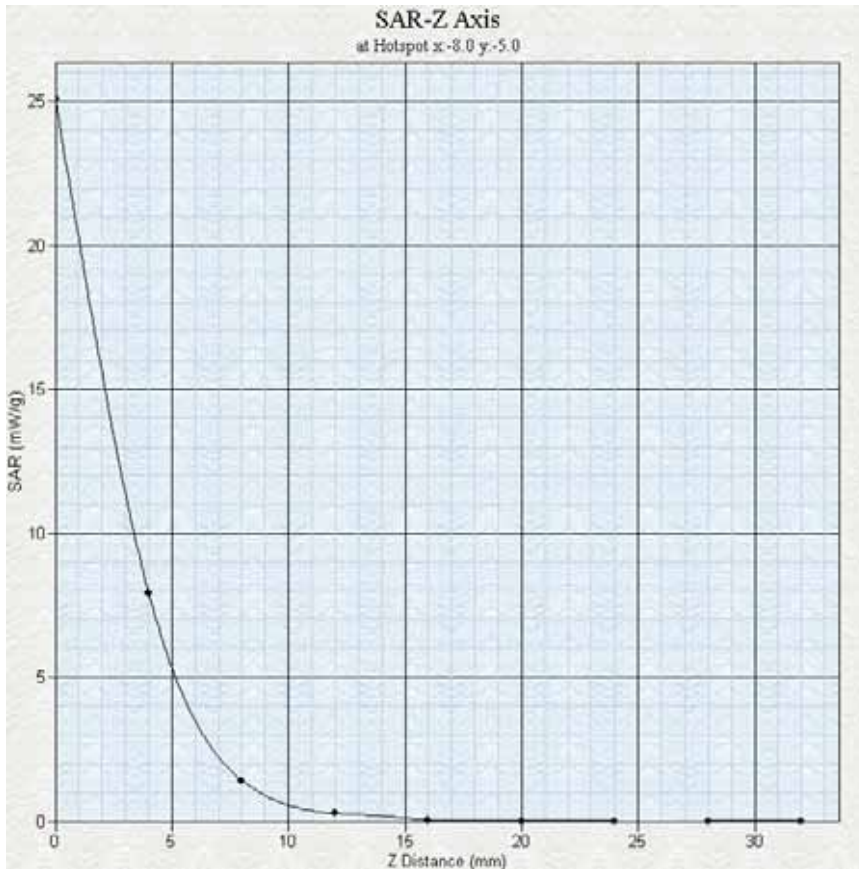
**SWR:** 1.21U  
**Return Loss:** -17.9 dB  
**Impedance:** 45.175

## System Validation Results

<b>Frequency</b>	<b>1 Gram</b>
5240 GHz	61.8



## Z-Axis Results



## Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018. The results contained within this report are for Validation Dipole 301532 at 5.8 GHz. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the IEEE mechanical specification. 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 ALIDX-500, along with the APREL Reference E-010 130 MHz to 26 GHz E-Field Probe Serial Number 163.

## References

SSI-TP-018 Dipole Calibration Procedure  
SSI-TP-016 Tissue Calibration Procedure  
IEEE P-1528 *DRAFT* "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 301532 was a new Dipole 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



**NCL CALIBRATION LABORATORIES**

Calibration File No: Not Applicable  
Project Number: Internal

**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.

APREL Validation Dipole

Manufacturer: APREL Laboratories

Part number: D-5800-S-2

Frequency: 5.80 GHz

Serial No: PT-015-a

Customer: APREL

Calibrated: 1 March 2004  
Released on: 1 March 2004

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

**NCL CALIBRATION LABORATORIES**

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Project number: ITLB-HP-5063  
FCC ID: ID: CNTWM3B2915ABG

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## Calibration Results Summary

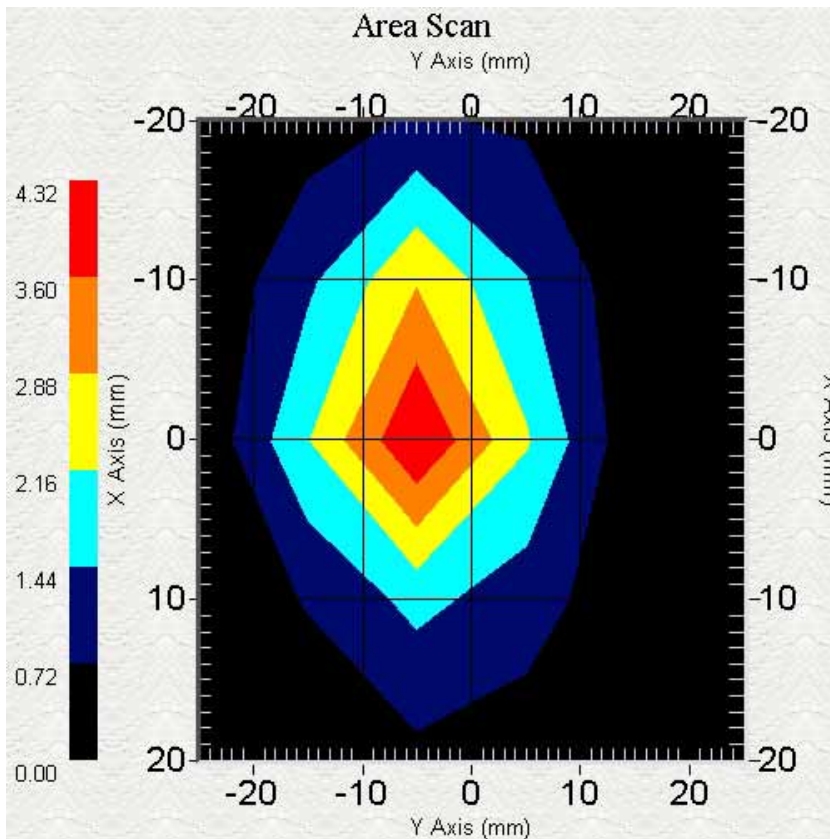
The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

## Electrical Specification

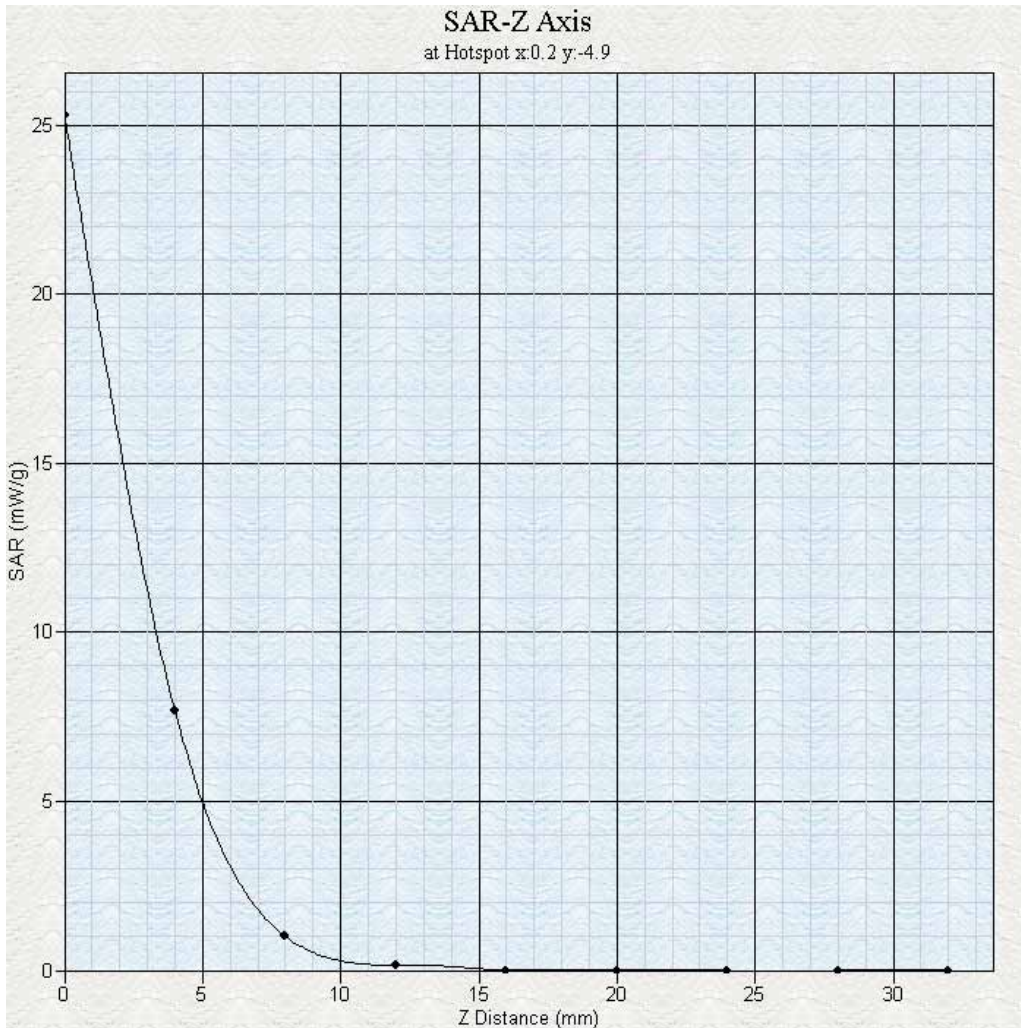
**SWR:** 1.26U  
**Return Loss:** -16.3 dB  
**Impedance:** 44.175

## System Validation Results

Frequency	1 Gram
5800 GHz	57.9



## Z-Axis Results



## Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018. The results contained within this report are for Validation Dipole 301532 at 5.8 GHz. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the IEEE mechanical specification. 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 ALIDX-500, along with the APREL Reference E-010 130 MHz to 26 GHz E-Field Probe Serial Number 163.





## References

SSI-TP-018 Dipole Calibration Procedure  
SSI-TP-016 Tissue Calibration Procedure  
IEEE P-1528 *DRAFT* "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 PT-015-a was a new Dipole 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

