Appendix E. Dipole Calibration Data

Validation Dipole 835MHz
P/N: ALS-D-835-S-2
S/N: QTK-315

NCL CALIBRATION LABORATORIES

Calibration File No: DC-405-1
Project Number: QTKB-Dipole Cal-5226

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.

Quietek Validation Dipole

Manufacturer: APREL Laboratories
Part number: ALS-D-835-S-2
Frequency: 835 MHz
Serial No: QTK-315

Customer: Quietek

Calibrated: 15 June 2006
Released on: 15 June 2006

Released By: _____

NCL CALIBRATION LABORATORIES
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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

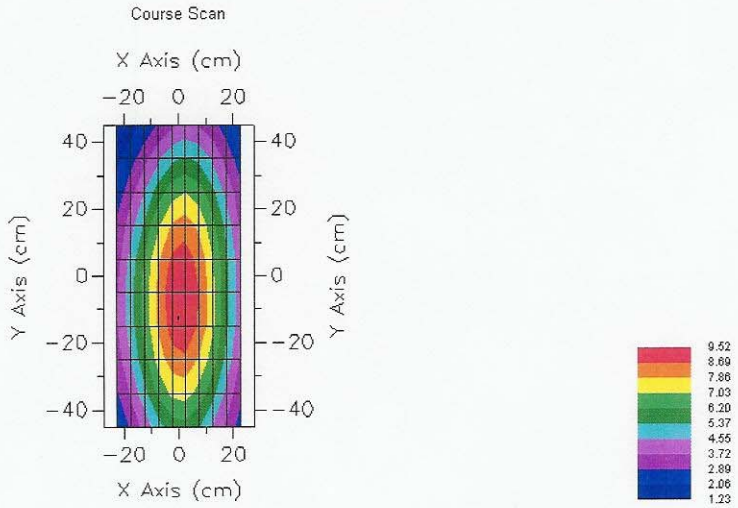
Length: 165.0 mm
Height: 90.0 mm

Electrical Specification

SWR: 1.05 U
Return Loss: -31.5 dB
Impedance: 47.6 Ω

System Validation Results

Frequency	1 Gram	10 Gram	Peak
835 MHz	9.33	6.42	15.0



Calibrated by

Approved by:

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 QTK-315. 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/APREL 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 QTK E-020 130 MHz to 26 GHz E-Field Probe Serial Number 212.

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 QTK-315 was received for 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

IEEE Length	IEEE Height	Measured Length	Measured Height
161.0 mm	89.8 mm	165.0 mm	90.0 mm

Tissue Validation

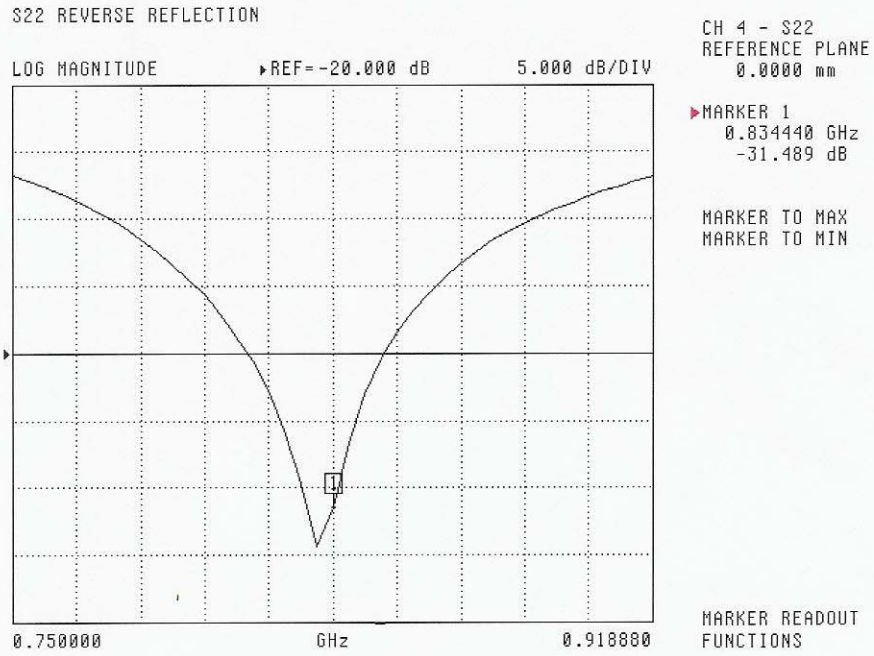
Head Tissue 835 MHz	Measured
Dielectric constant, ε_r	42.54
Conductivity, σ [S/m]	0.91

Electrical Calibration

Test	Result
S11 R/L	-31.5 dB
SWR	1.06 U
Impedance	47.6 Ω

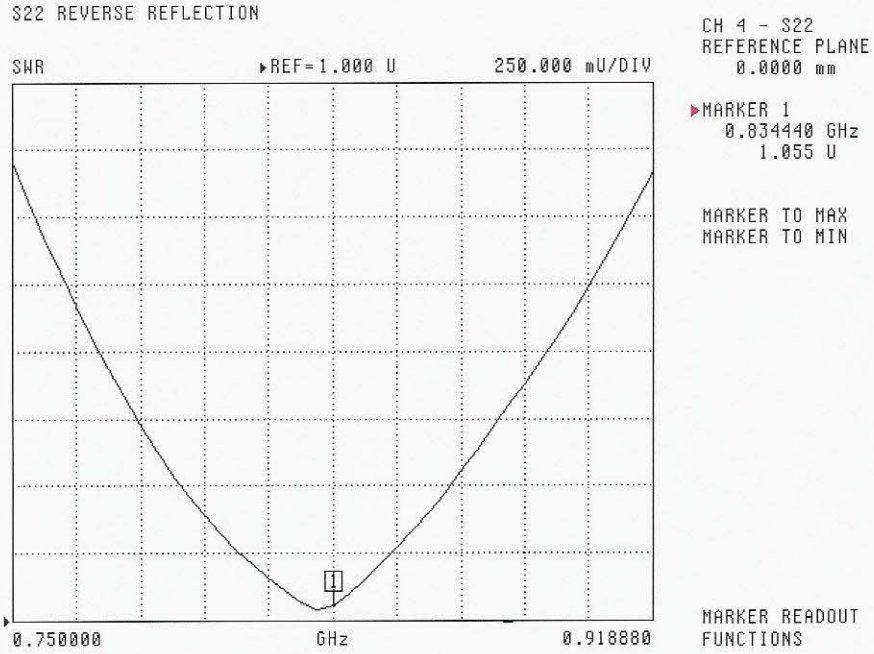
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss



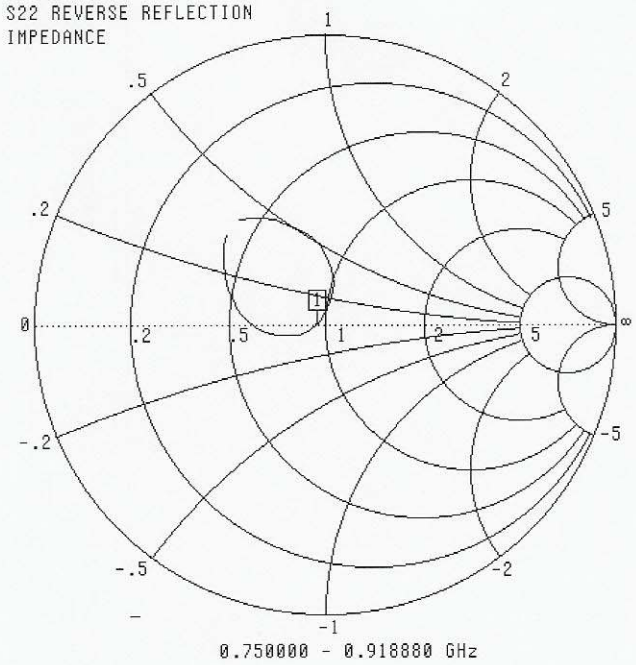
Calibrated by
Approved by:

SWR



Calibrated by
Approved by:

Smith Chart Dipole Impedance

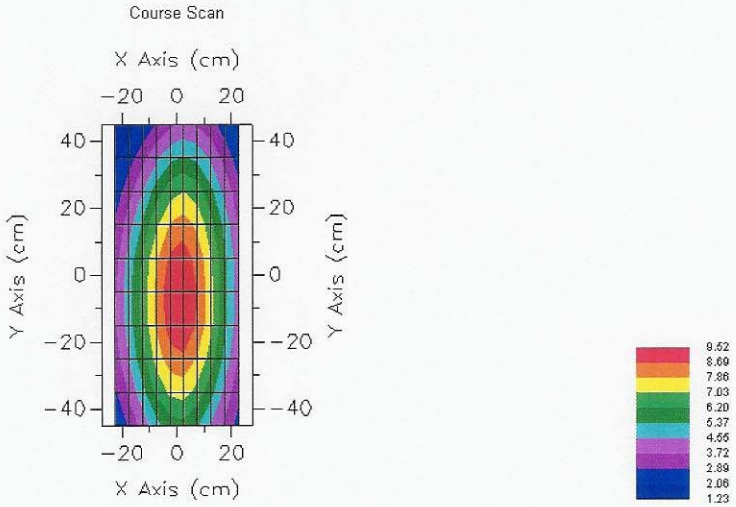


Calibrated by

Approved by:

System Validation Results Using the Electrically Calibrated Dipole

Head Tissue Frequency	1 Gram	10 Gram	Peak Above Feed Point
835 MHz	9.33	6.42	15.0



Calibrated by
Approved by:

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

Appendix E. Dipole Calibration Data

Validation Dipole 1900MHz
P/N: ALS-D-1900-S-2
S/N: QTK-318

NCL CALIBRATION LABORATORIES

Calibration File No: DC-408-1
Project Number: QTKB-Dipole Cal-5230

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.

Quietek Validation Dipole

Manufacturer: APREL Laboratories
Part number: ALS-D-1900-S-2
Frequency: 1.9 GHz
Serial No: QTK-318

Customer: Quietek

Calibrated: 15 June 2006
Released on: 15 June 2006

Released By: _____

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FAX: (613) 820-4161

Calibration Results Summary

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

Mechanical Dimensions

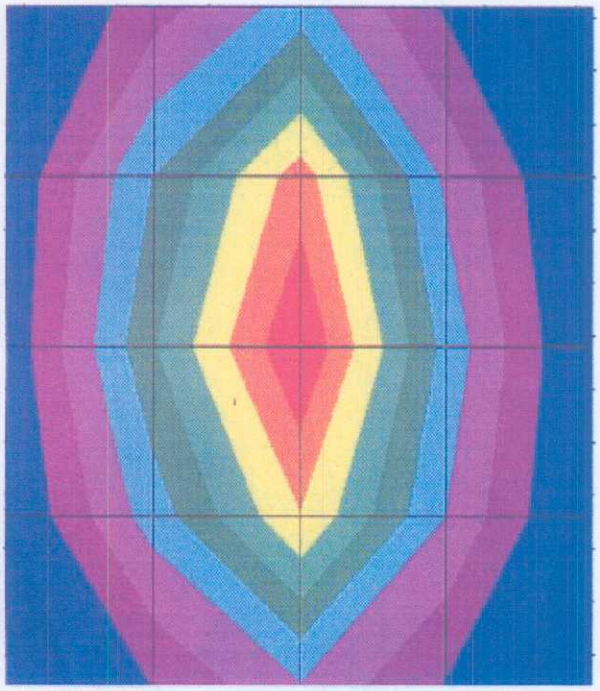
Length: 70.0 mm
Height: 39.5 mm

Electrical Specification

SWR: 1.1 U
Return Loss: -25.7 dB
Impedance: 46.8 Ω

System Validation Results

Frequency	1 Gram	10 Gram	Peak
1.9 GHz	36.0	20.78	67.7



Calibrated by

Approved by:

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 QTK-318. 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/APREL 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 QTK E-020 130 MHz to 26 GHz E-Field Probe Serial Number 212.

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 QTK-318 was received for calibration.

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

Calibrated by
Approved by:

Dipole Calibration Results

Mechanical Verification

IEEE Length	IEEE Height	Measured Length	Measured Height
68.0 mm	39.5 mm	70.0 mm	39.5 mm

Tissue Validation

Head Tissue 1900 MHz	Measured
Dielectric constant, ε_r	39.9
Conductivity, σ [S/m]	1.42

Calibrated by

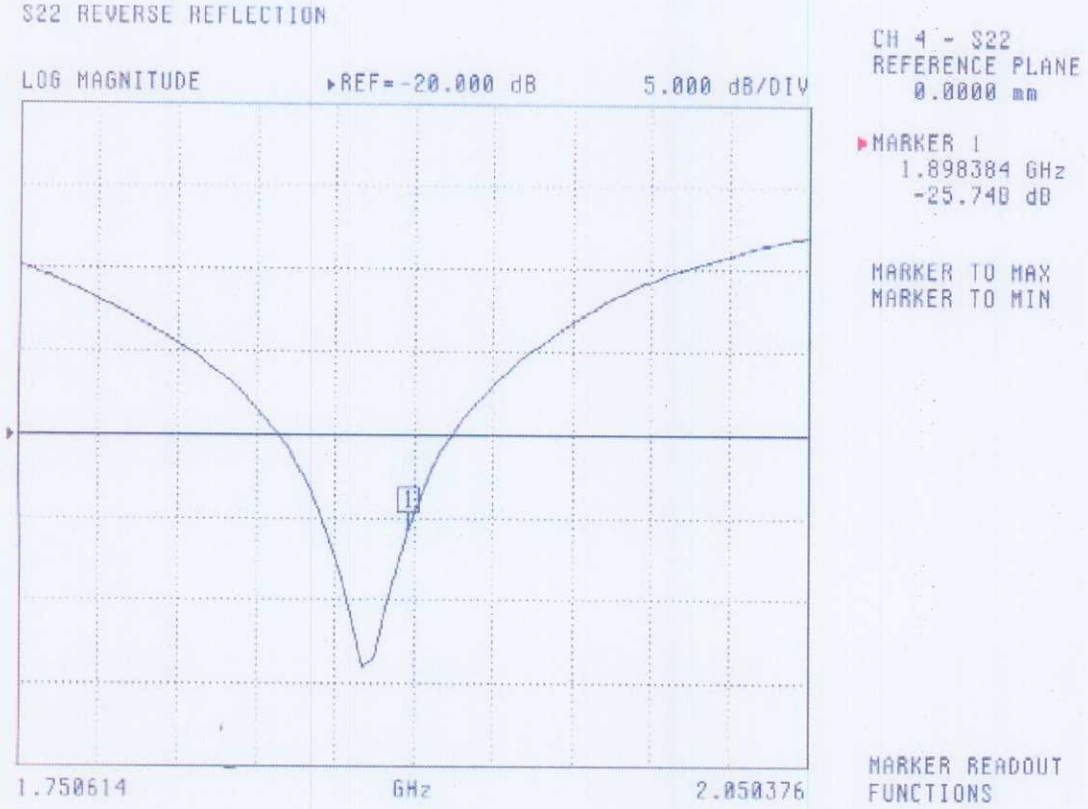
Approved by:

Electrical Calibration

Test	Result
S11 R/L	-25.7 dB
SWR	1.1 U
Impedance	46.8 Ω

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

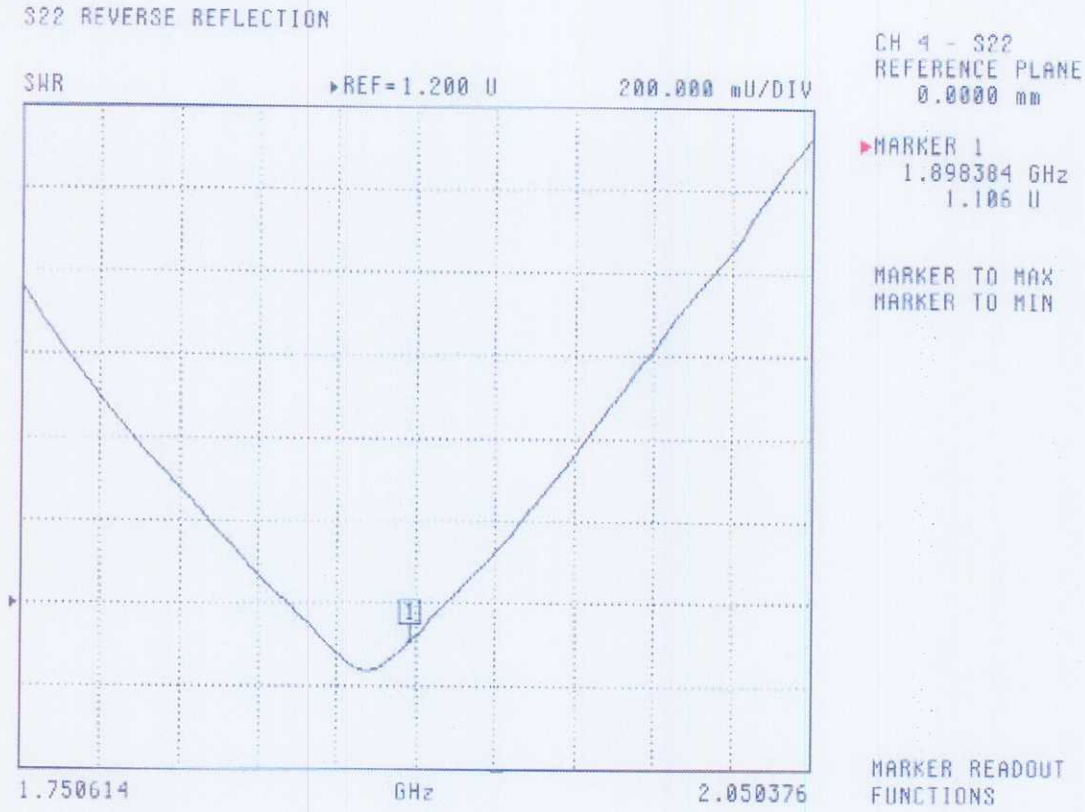
S11 Parameter Return Loss



Calibrated by

Approved by:

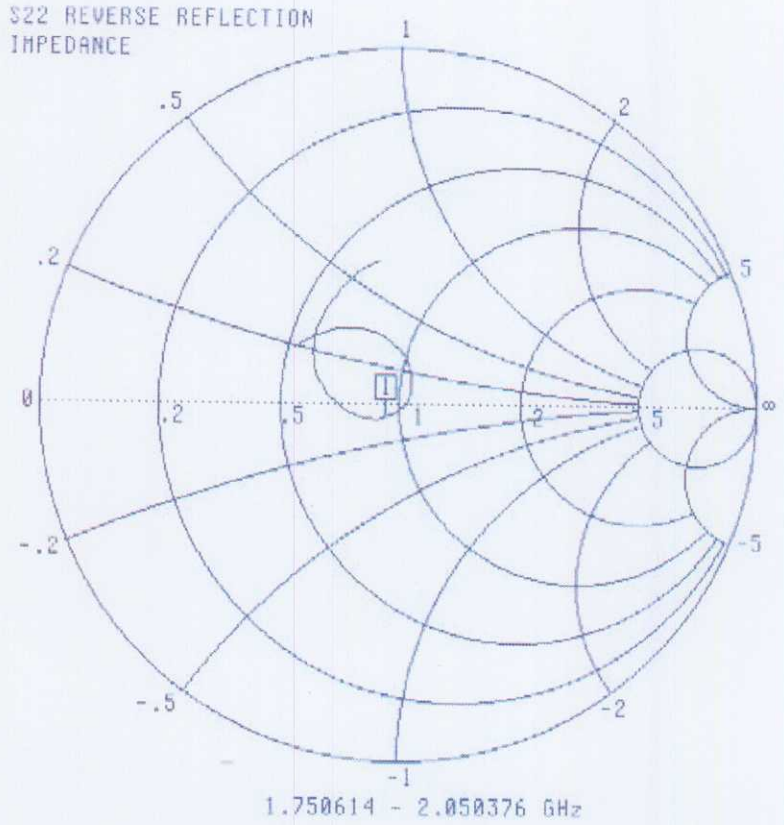
SWR



Calibrated by

Approved by:

Smith Chart Dipole Impedance

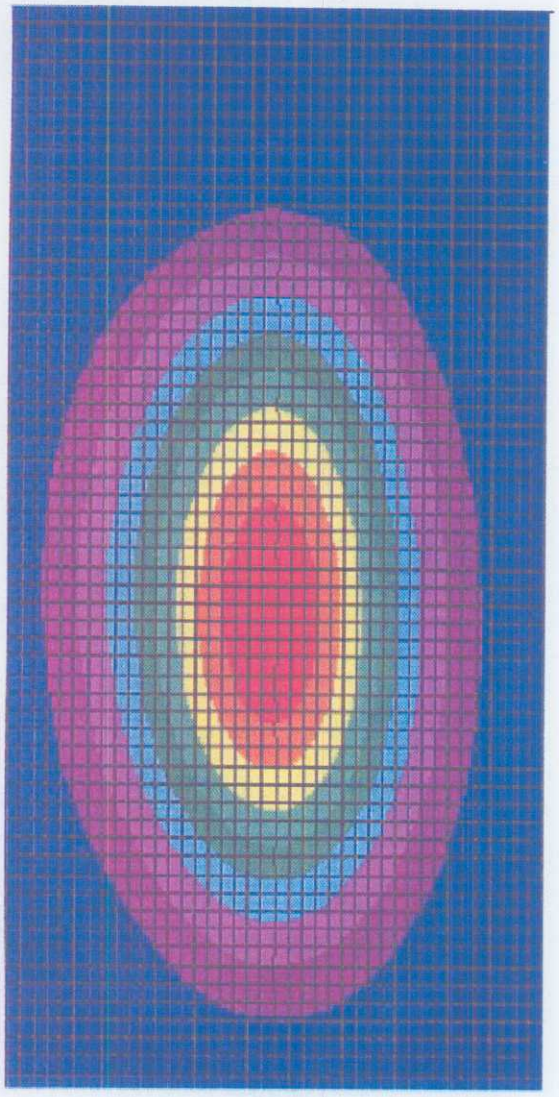


Calibrated by

Approved by:

System Validation Results Using the Electrically Calibrated Dipole

Frequency	1 Gram	10 Gram	Peak Above Feed Point
1.9 GHz	36.0	20.78	67.7



Calibrated by

Approved by:

Test Equipment

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