



MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
914 WEST PATAPSCO AVENUE ! BALTIMORE, MARYLAND 21230-3432 ! PHONE (410) 354-3300 ! FAX (410) 354-3313



Sept 17, 2003

Matrics Inc.
8850 Stanford Blvd.
Columbia, MD 21045

Reference: Clamp Truck Reader

Dear Mr. Kevin J. Powell,

Enclosed is the EMC Test Report for the Matrics Inc., Ruggedized Reader, Model RDR-RG-010 tested to the requirements of the FCC Rules and Regulations, Part 90 Subpart M, of Title 47 of the CFR, for Private Land Mobile Radio Services.

Thank you for using the testing services of MET Laboratories. If you have any questions regarding these results or if MET can be of further assistance to you, please feel free to contact me. We appreciate your business and look forward to working with you again soon.

Kindest Regards,
MET LABORATORIES, INC.

Marianne Bosley
Documentation Department

Enclosures: (\Matrics\EMI13988-FCC90.rpt)

DOCTEM-23 Jan 02

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**Electro-Magnetic Compatibility
Test Report**

for the

**Matrics, Inc.
Ruggedized Reader,
Model RDR-RG-010**

Tested Under

FCC Part 90, Subpart M
Title 47 of the CFR
for Private Land Mobile Radio Services

MET REPORT: EMC13988-FCC90

April 29, 2003

PREPARED FOR:

Matrics, Inc.,
8850 Stanford Blvd., Suite 3000
Columbia, MD 21230

PREPARED BY:

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914 W. Patapsco Avenue
Baltimore, Maryland 21230

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The Nation's First Licensed Nationally Recognized Testing Laboratory



Electro-Magnetic Compatibility Test Report

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Tested Under**

FCC Part 90, Subpart M
Title 47 of the CFR
for Private Land Mobile Radio Services

MET REPORT: EMC13988-FCC90

PREPARED FOR:

Matrics, Inc.,
8850 Stanford Blvd., Suite 3000
Columbia, MD 21230

Len Knight
EMC Laboratory Manager

Marianne Bosley
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them. It is further stated that upon the basis of the measurements made, the equipment tested is capable of operation in accordance with the requirements of Part 90, Subpart M, of the FCC Rules under normal use and maintenance.

Hoosamuddin S. Bandukwala
Project Engineer



REPORT STATUS SHEET

Revision	Report/Revision Date	Reason for Revision
0	September 17, 2003	Initial Issue.



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LIST OF TERMS AND ABBREVIATIONS

AC	Alternating Current
Cal	Calibration
<i>d</i>	Measurement Distance
dB	Decibels
dBm	decibels Below 1 milliwatt
dB μ A	Decibels above one microamp
dB μ V	Decibels above one microvolt
dB μ A/m	Decibels above one microamp per meter
dB μ V/m	Decibels above one microvolt per meter
DC	Direct Current
E	Electric Field
DSL	Digital Subscriber Line
ESD	Electrostatic Discharge
EUT	Equipment Under Test
<i>f</i>	Frequency
FCC	Federal Communications Commission
CISPR	Comite International Special des Perturbations Radioelectriques (International Special Committee on Radio Interference)
GRP	Ground Reference Plane
H	Magnetic Field
HCP	Horizontal Coupling Plane
Hz	Hertz
IEC	International Electrotechnical Commission
kHz	kilohertz
kPa	kilopascal
kV	kilovolt
LISN	Line Impedance Stabilization Network
MHz	Megahertz
μ H	microhenry
μ F	microfarad
μ s	microseconds
NEBS	Network Equipment-Building System
PRF	Pulse Repetition Frequency
RF	Radio Frequency
RMS	Root-Mean-Square
TWT	Traveling Wave Tube
V/m	Volts per meter
VCP	Vertical Coupling Plane
W	Watts



Summary of Test Results

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 90, Subpart M. All tests were conducted using measurement procedure ANSI TIA/EIA-603-A-2001.

Type of Submission/ Rule Part:	Certification / Part 90 Subpart J
EUT:	Ruggedized Radio Frequency Identification (RFID) Reader, Model RDR-RG-010
Occupied BW:	286.7KHz
Emission Mask:	K
Type of Emissions:	A1D
RF Power Output (rated):	20 Watts
Frequency Range (MHz):	909.75 - 921.75

Table 1. Summary of Test Data

Name of Test	FCC Rule Part/Section	Results
RF Power Output	2.1046; 90.219(b)	Complies
Modulation Characteristics	2.1047(a)	Complies
Occupied Bandwidth	2.1049; 90.209	Complies
Spurious Emissions at Antenna Terminals	2.1051; 90.210	Complies
Radiated Spurious Emissions	2.1053; 90.210	Complies
Frequency Stability over Temperature Variations	2.1055(a) (1); 90.213	N/A- See note 13 of 90.213
Frequency Stability over Voltage Variations	2.1055(d) (2)	N/A- See note 13 of 90.213
Transient Frequency Behavior	90.214	N/A

Table 2. Summary of Test Results



I. Executive Summary



I. Executive Summary

A. Purpose of Test

An EMC evaluation to determine compliance of the Ruggedized RFID Reader, Model RDR-RG-010 (referred to as EUT hereafter) with the requirements of Part 90, Subpart M, was conducted. (All references are to the most current version of Title 47 of the Code of Federal Regulations in effect). In accordance with §2.1033, the following data is presented in support of the Certification of the EUT. Matrics, Inc. should retain a copy of this document and it should be kept on file for at least five years after the manufacturing of the EUT has been **permanently** discontinued.

B. Executive Summary

The EUT, as supplied to MET Laboratories, complied with the requirements stated in this test report.

References	Description
Purchase Order #10494	Matrics Purchase Order for Ruggedized RFID Reader, Model RDR-RG-010 testing
ANSI-C63.4: 2001	Methods and Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz
TIA/EIA-603-A-2001	Land Mobile HM or PM Communications Equipment Measurement and Performance Standards
FCC 47CFR, Chapter 1, Part 2	Title 47 Code of Federal Regulations Part 2 - Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
FCC 47CFR, Chapter 1, Part 15	Title 47 Code of Federal Regulations Part 15 - Digital Devices
FCC 47CFR, Chapter 1, Part 90	Title 47 Code of Federal Regulations Part 90 - M

Table 3. References



II. General



II. General

A. Test Site

All testing was conducted at MET Laboratories, Inc., 914 W. Patapsco Avenue, Baltimore, Maryland 21230. Radiated Emissions measurements were performed inside a 3 meter semi-anechoic chamber. In accordance with §2.948(a)(2), a complete site description is filed with the Commission's Laboratory in Columbia, Maryland. MET Laboratories has been accredited by the National Voluntary Laboratory Accreditation Program (Lab Code: 100273-0).

B. Description of Test Sample

The EUT is a Class A Radio Frequency Identification (RFID) tag reader. It identifies encoded tags within a certain proximity to the unit.

C. General Test Setup

The EUT was configured with an DC voltage of 48 and PC (HOST) interface to program the EUT controlling the Channel Allocation. The EUT was operated in a manner representative of the typical usage of the equipment. During all testing, system components were manipulated with the confines of typical usage to maximize each emission.

D. Mode of Operation

The EUT was configured in accordance with the manufacturer's instructions and was operated as follows for all testing contained in this report unless stated otherwise:

The EUT continuously monitors for signals from the IF tags. When received, the display indicates that an ID has been received.

II. General

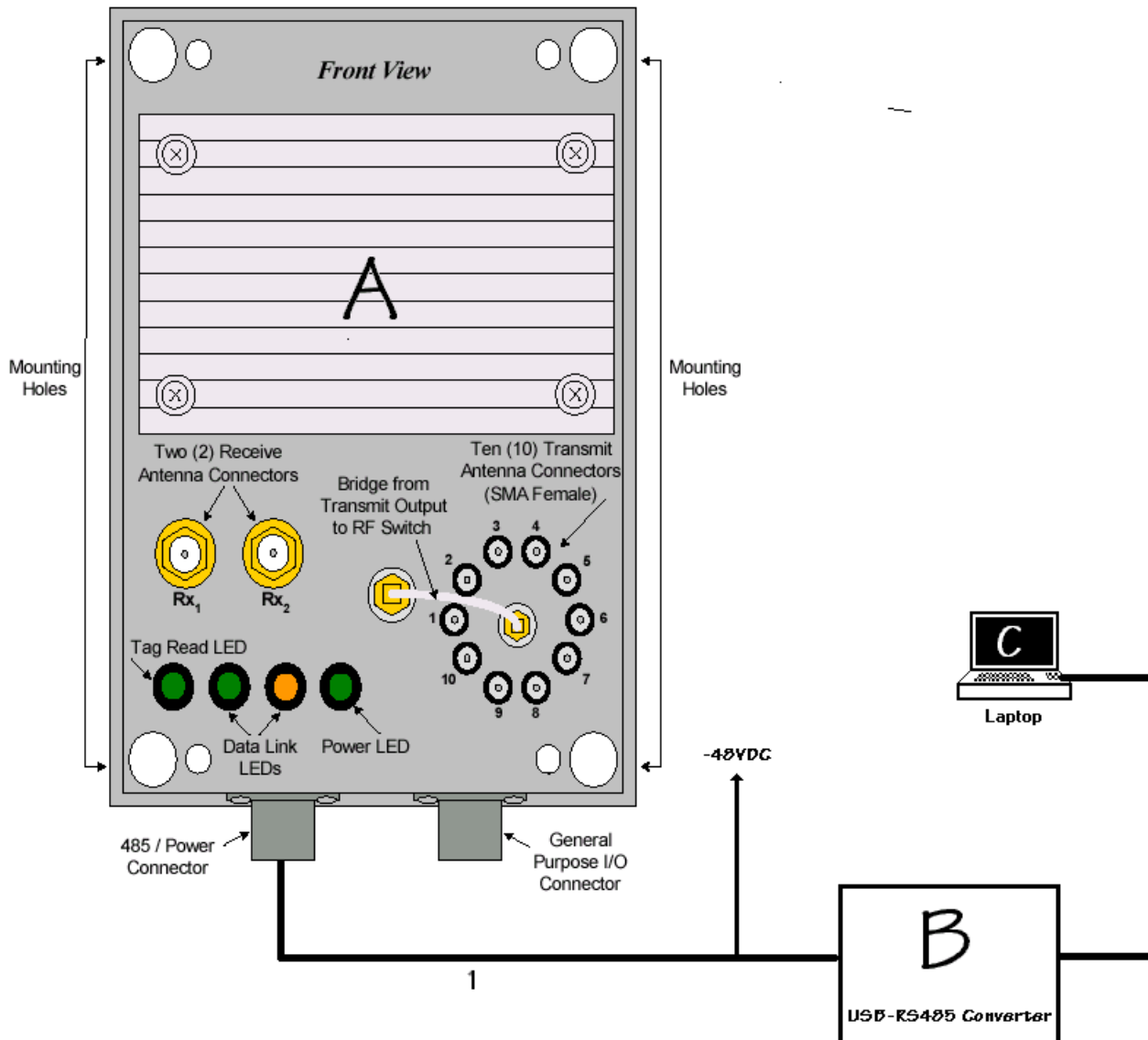


Figure 1. Test Configuration



II. General

TEST CONFIGURATION

EUT and Support Equipment

Ref. ID	Description	Manufacturer	Model Number	Customer Supplied Calibration Data*	Additional Information
A	Ruggedized Reader - EUT	Matrics	RDR-RG-010	N/A	N/A
B	USB to RS-485 Converter	Sealevel Systems	2102	N/A	Functional Verification
C	Laptop Computer	Toshiba	Portage 4005	N/A	

Ports and Cabling Information

Ref. ID	Port Name	Port Location (Ref. ID + Slot)	Connector Type	Cable Type	Qty.	Length (m)	Shielded ?		Cable Termination (Ref. ID + Slot + Port ID)
							Y	N	
1	I/O Power	A	6c, 20 AWG	Coax	1	2		X	2 lines to power supply, 4 lines to USB-RS485 adapter



III. Electromagnetic Compatibility RF Power Output Requirements



III. Electromagnetic Compatibility RF Power Output Requirements

A. RF Power Output

Technical Specifications: §2.1046 and 90.205(j)

Test equipment: Test equipment for RF Power Output is listed in Section VIII of this report.

Photograph:



Photograph 1. RF Power Output Test Setup Photo



III. Electromagnetic Compatibility RF Power Output Requirements

Measurement

Procedures: As required by 47 CFR 2.1046, *RF power output measurements* were made at the RF output terminals of the EUT using a 50-watt 30 dB attenuator and a Spectrum Analyzer measuring PEP (Peak Envelope Power).

The EUT was set to transmit two tones in the lowest of the operating frequency range. The max hold button from the Spectrum Analyzer was activated capturing the PEP of the EUT. Peak Search the highest amplitude and plot the graph. This process was repeatedly done with middle and highest channels of the EUT.

Results: Equipment complies with 47CFR 2.1046 and 90.205(j). The EUT does not exceed 5 W (37 dBm) at the carrier frequency.

Important note: Limit shows in Effective Radiated Power (ERP), the maximum antenna gain that can be applied is 1.5 dBi with the EUT maximum power output of 30 watts. Therefore, antenna gain should not be greater than 1.5 dBi.

All RF Power output measurements were direct connection to RF output Terminal of EUT.

The following page show measurements of RF Power output which is recorded below:

Band	Frequency (MHz)	Channel #	Measured Output Power (dBm)	ERP Limit (W)
Low	912.25	0	42.56	30
Mid	915.25	6	42.71	30
High	918.75	13	42.53	30

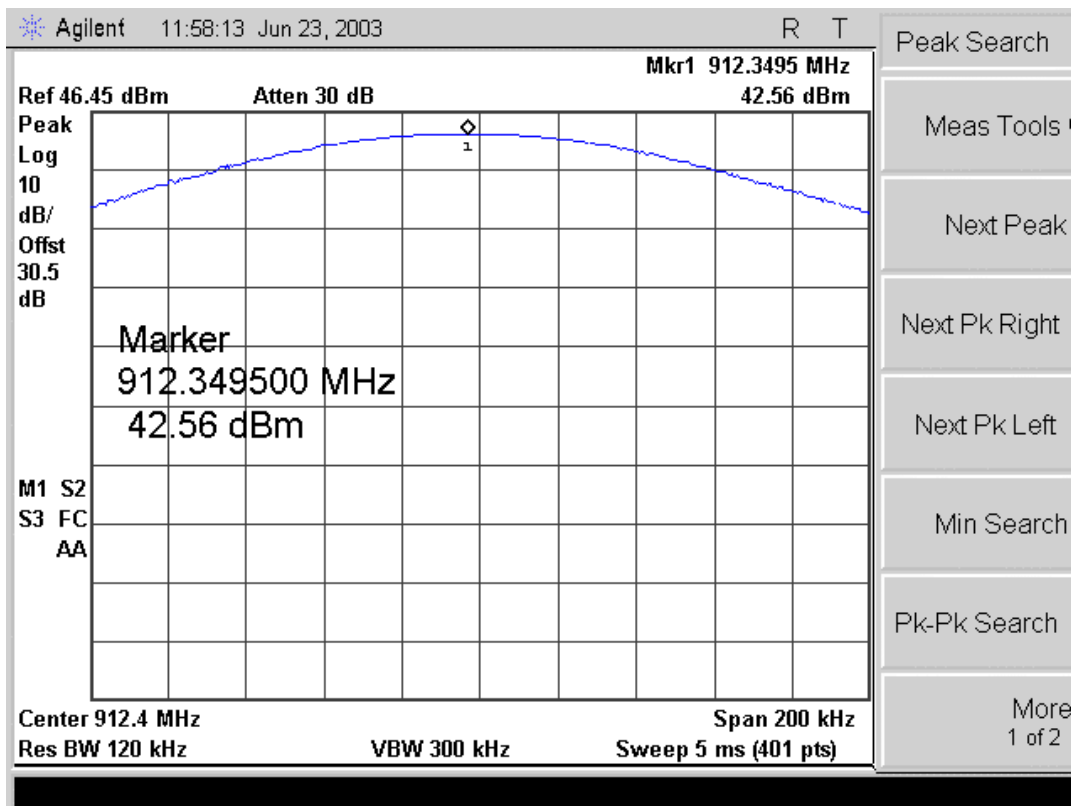
Table 4. RF Power Output measurements

Test Engineer: Hoosamuddin S. Bandukwala

Test Date: 06/23/03

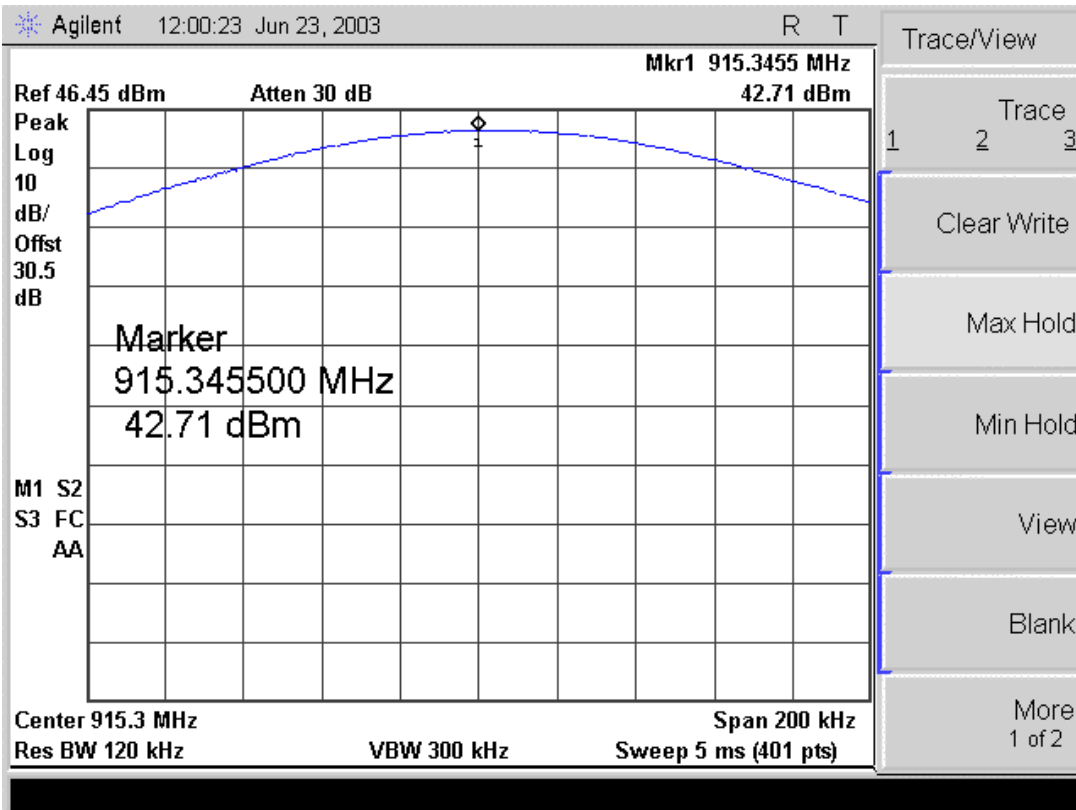


III. Electromagnetic Compatibility RF Power Output Requirements



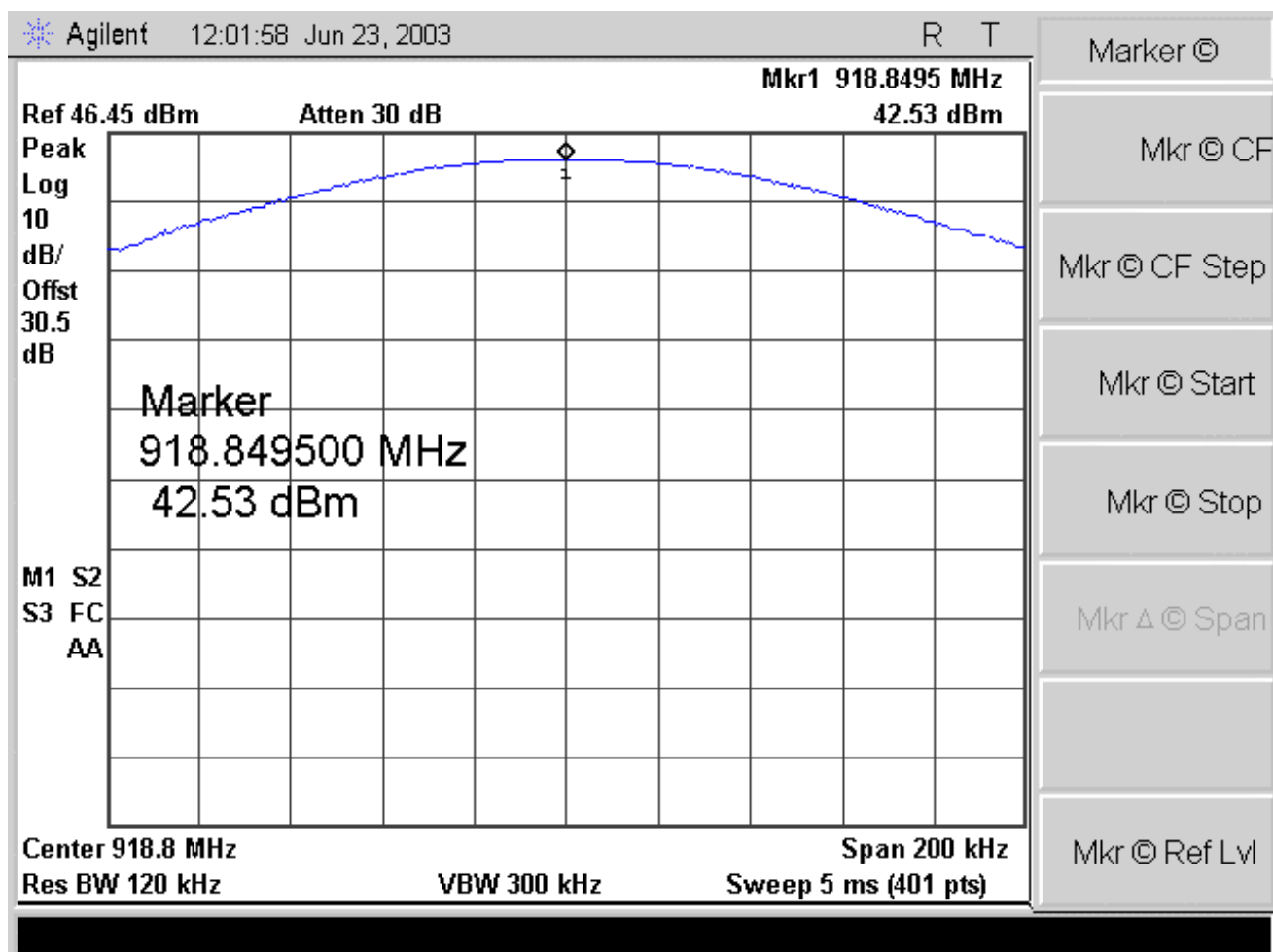


III. Electromagnetic Compatibility RF Power Output Requirements





III. Electromagnetic Compatibility RF Power Output Requirements





IV. Electromagnetic Compatibility Modulation Characteristics Requirements



IV. Electromagnetic Compatibility Modulation Characteristics Requirements

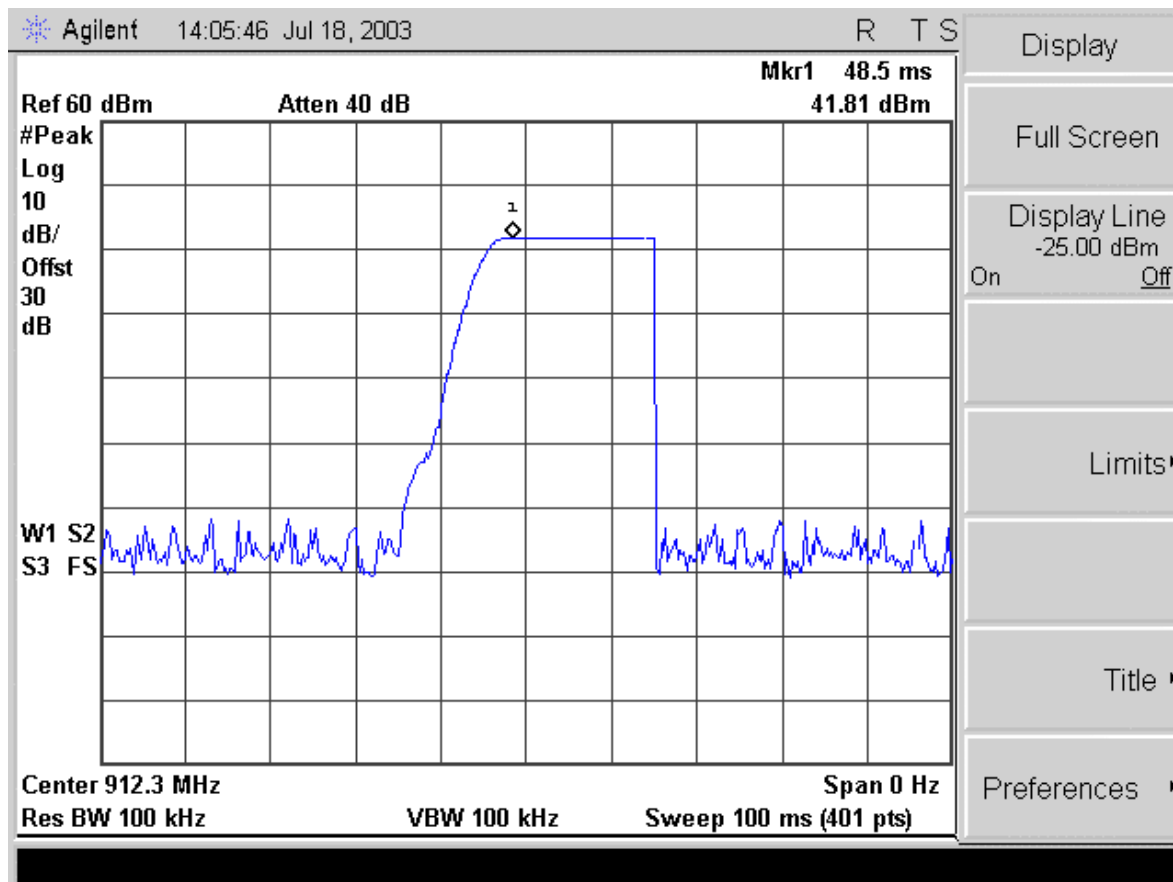
A. Modulation Characteristics

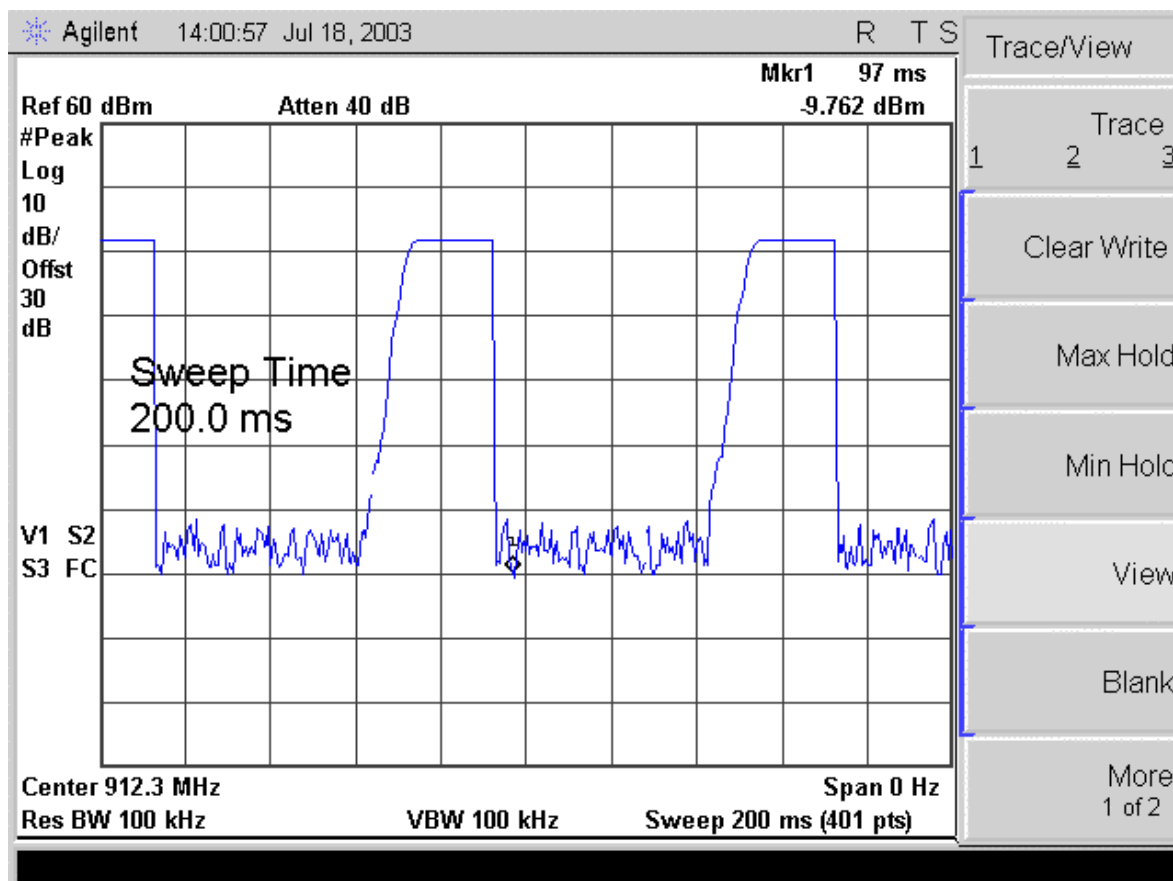
Technical Specifications: §2.1047

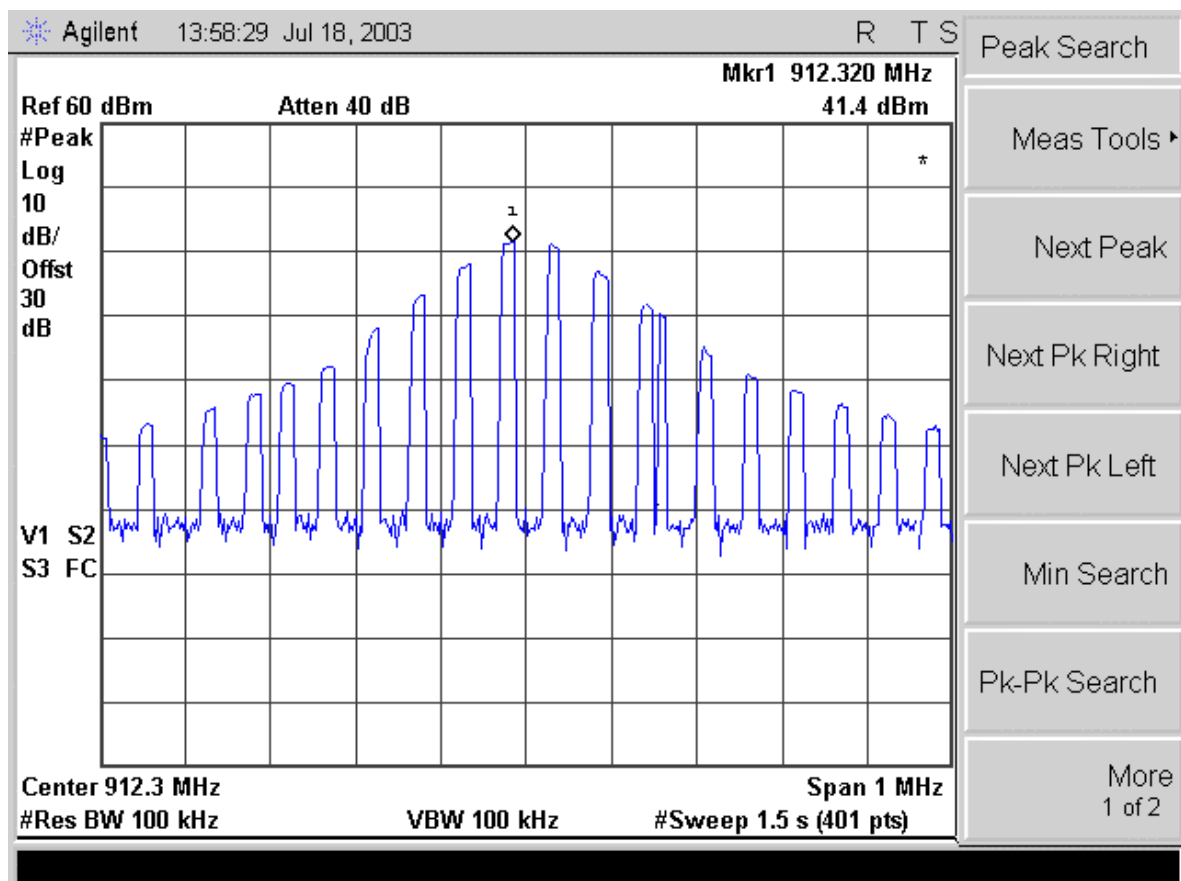
Test equipment: Test equipment for Modulation Characteristics is listed in Section VIII of this report.

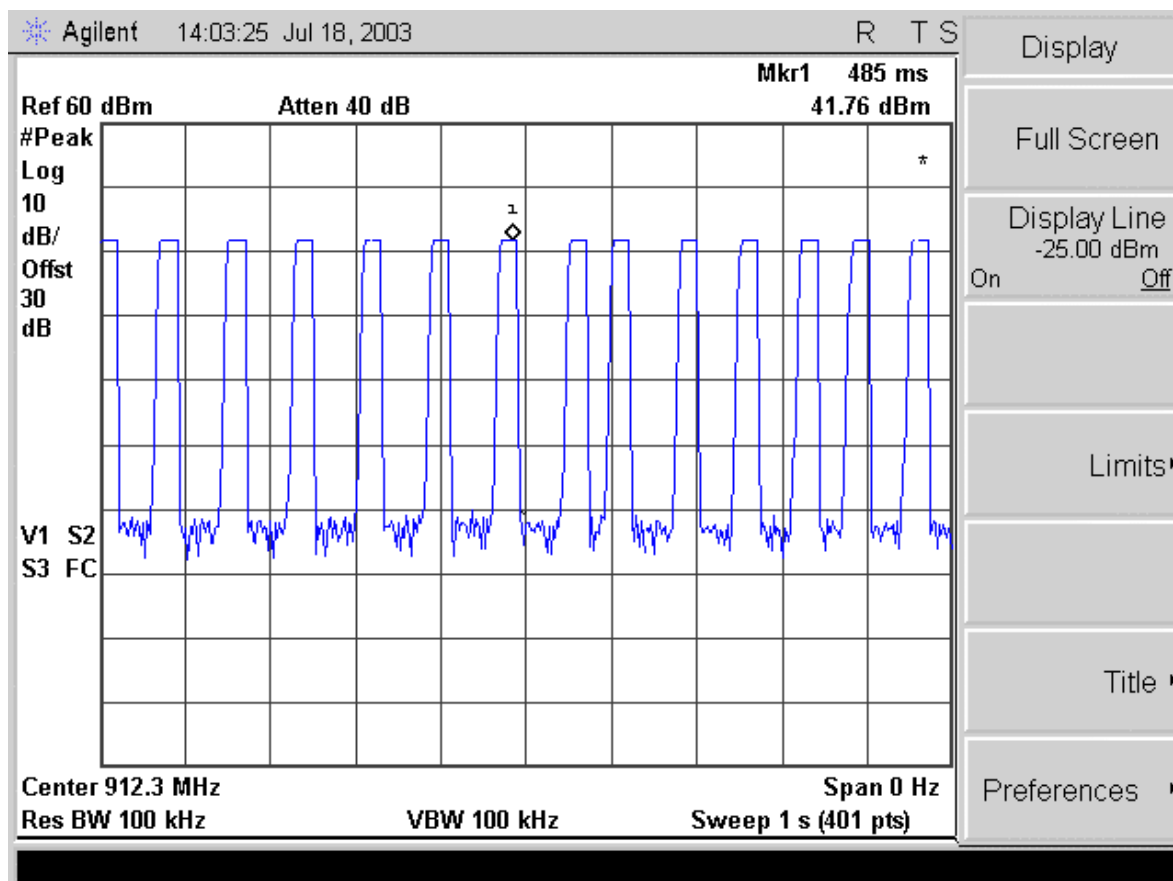
Measurement Procedures: As required by 47 CFR 2.1047, *Modulation Characteristics measurements* were made at the RF output terminals.

Results: See plots on the following pages











V. Electromagnetic Compatibility Occupied Bandwidth Requirements

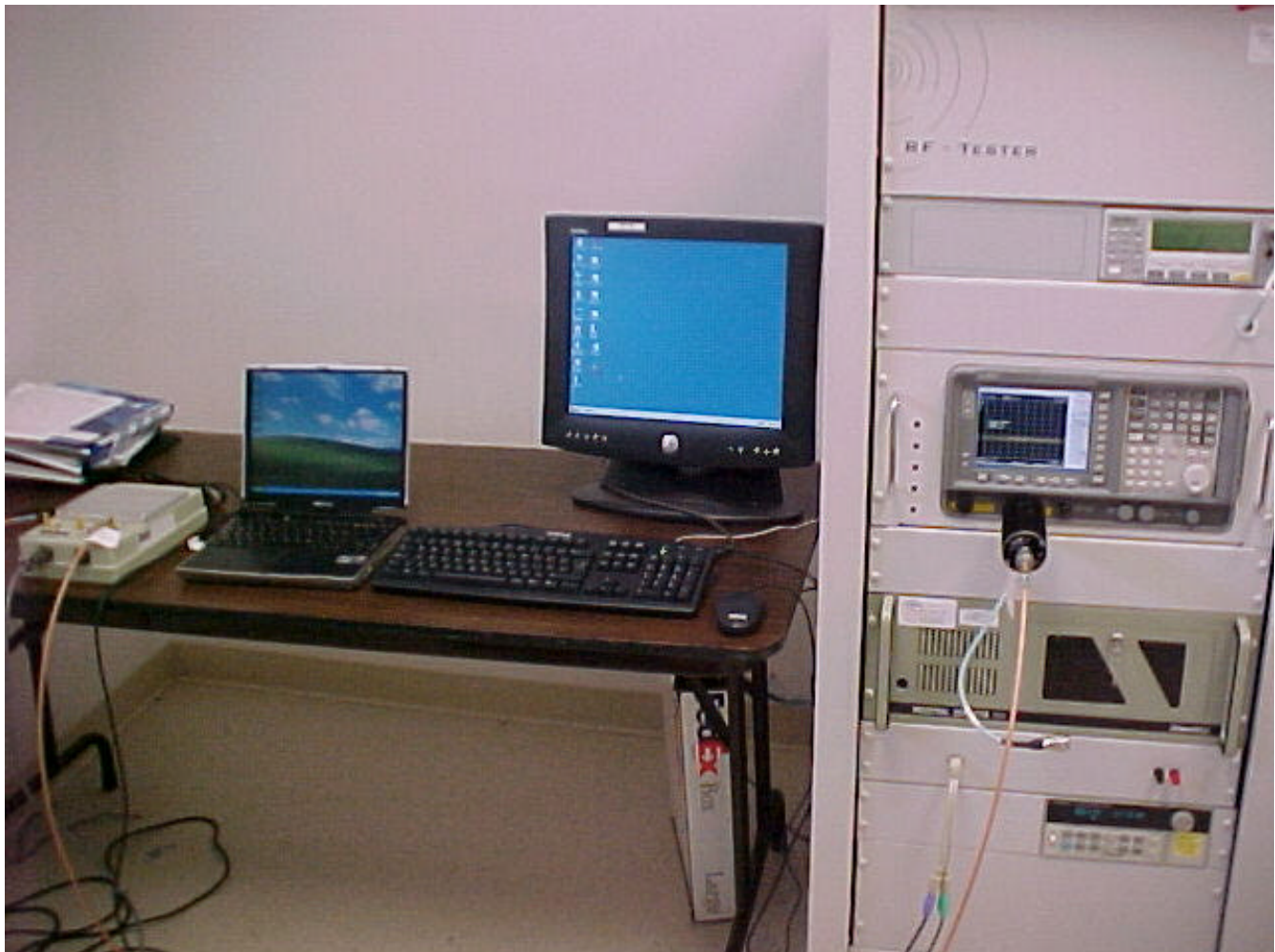
V. Electromagnetic Compatibility Occupied Bandwidth Requirements

A. Occupied Bandwidth

Technical Specifications: §2.1049 and §90.209

Test equipment: Test equipment for Occupied Bandwidth is listed in Section VIII of this report.

Photograph:



Photograph 2. Occupied Bandwidth Test Setup Photo



V. Electromagnetic Compatibility Occupied Bandwidth Requirements

Measurement

Procedures: As required by 47 CFR 2.1049 & 90.209, *occupied bandwidth measurements* were made at the RF output terminals using a 50-watt 30 dB attenuator and a Spectrum Analyzer.

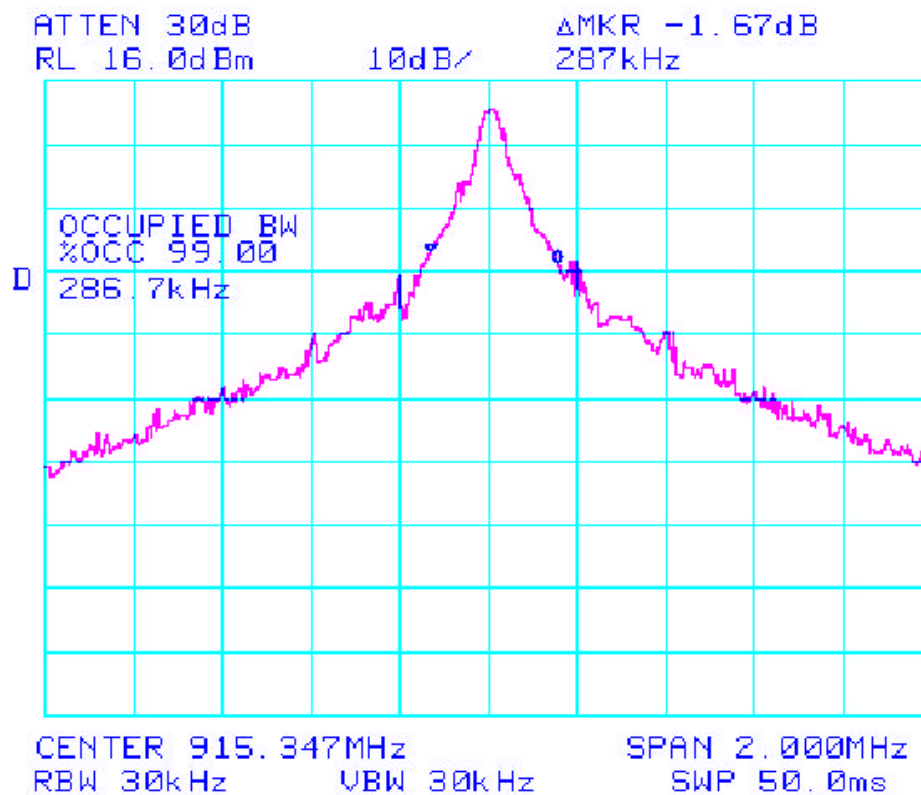
The EUT was set to transmit at its middle channel of the operating frequency range. The max hold button from the Spectrum Analyzer was activated capturing the modulated envelope of the EUT. Peak Search the highest amplitude and activated the 99% BW of the Spectrum Analyzer. Plot the graph. Resolution bandwidth (RBW) is set to 1% of emissions bandwidth for frequencies up to 1GHz, and for frequencies above 1GHz RBW, is set to 1MHz. Video Bandwidth (VBW) is equal to RBW per 90.209 (b)(5), note 4. The maximum authorized bandwidth shall be 12MHz for non-multilateration LMS operations in the band 909.75-921.75MHz.

Results: Equipment complies with Section 2.1049 and 90.209. The EUT does not exceed 12MHz bandwidth.

The following pages show measurements of Occupied Bandwidth plots:

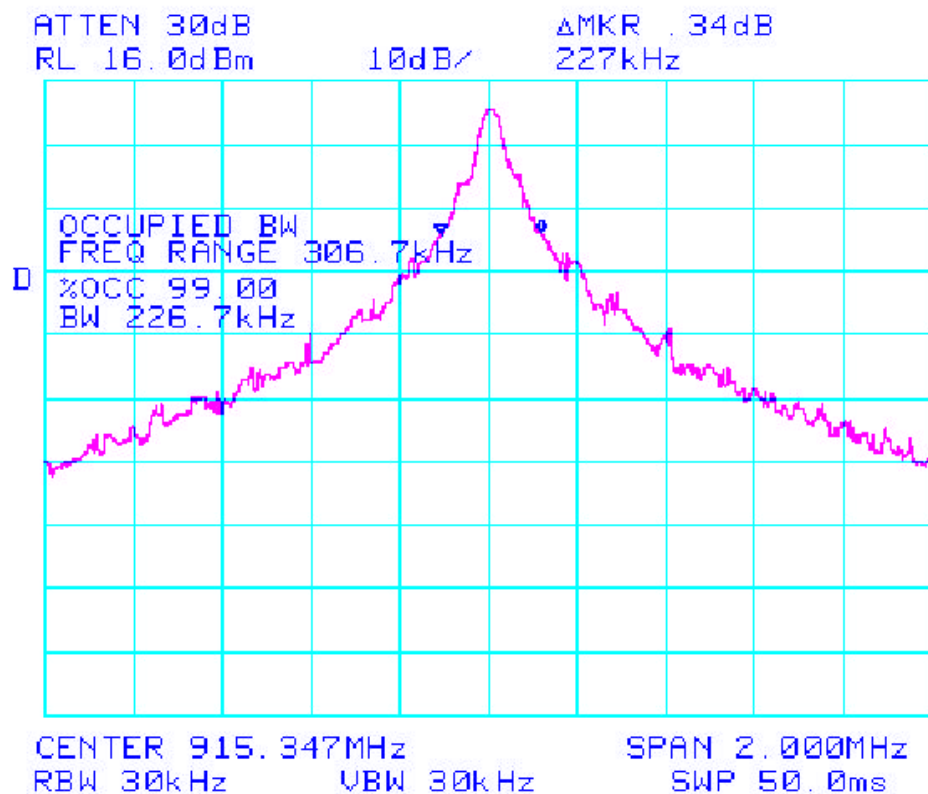


V. Electromagnetic Compatibility Occupied Bandwidth Requirements



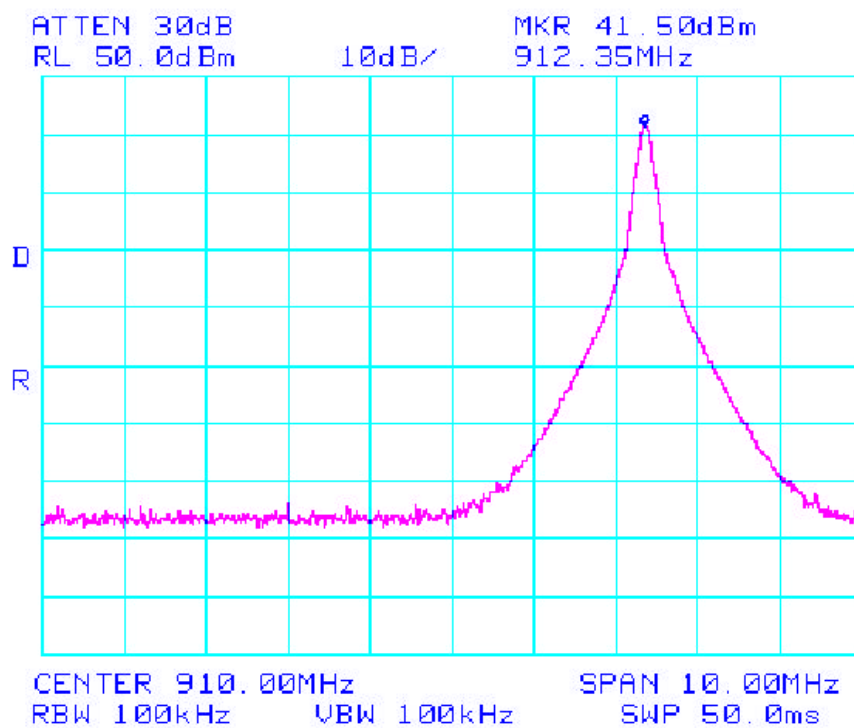


V. Electromagnetic Compatibility Occupied Bandwidth Requirements





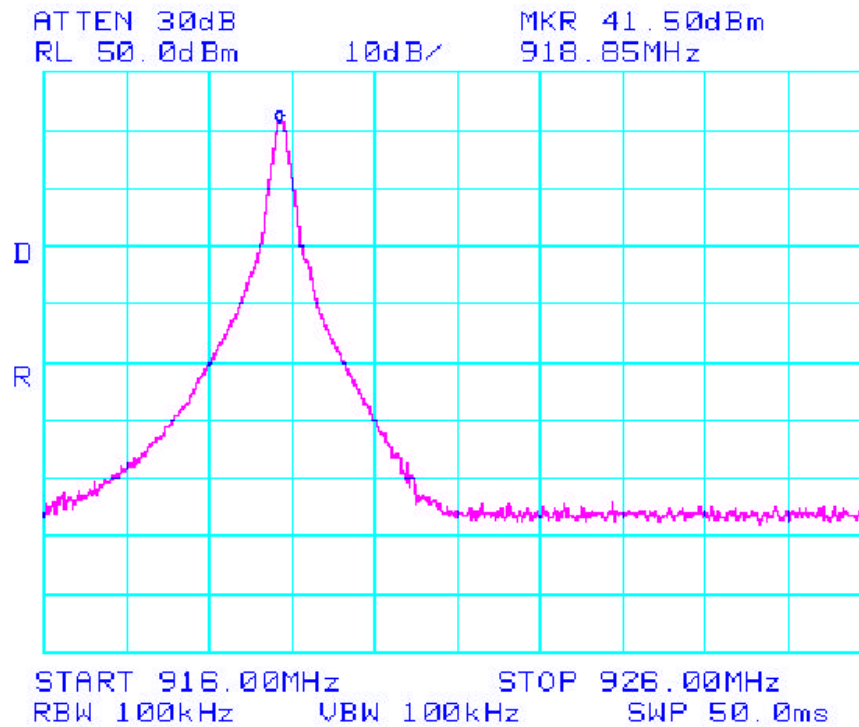
V. Electromagnetic Compatibility Band Edges Requirements



Lower Band Edge



V. Electromagnetic Compatibility Band Edges Requirements



Upper Band Edge

Test Engineer: Hoosamuddin S. Bandukwala

Test Date: 06/25/03



VI. Electromagnetic Compatibility Spurious Emissions at Antenna Terminal Requirements

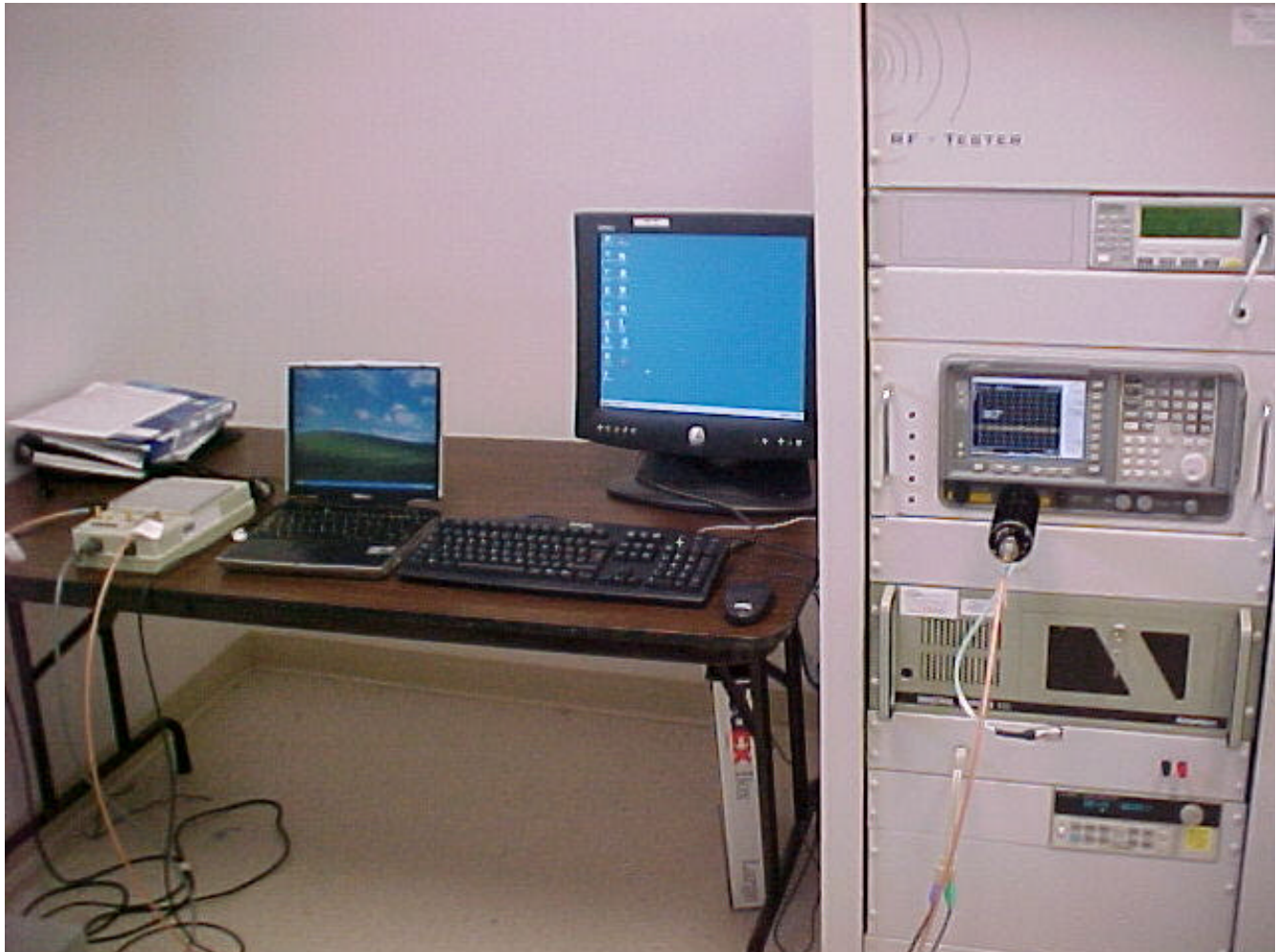
VI. Electromagnetic Compatibility Spurious Emissions at Antenna Terminal Requirements

A. Spurious Emissions at Antenna Terminals

Technical Specifications: §2.1051 and §90.210

Test equipment: Test equipment for Spurious Emissions at Antenna Terminals is listed in Section VIII of this report.

Photograph:



Photograph 3. Spurious Emissions at Antenna Terminals



VI. Electromagnetic Compatibility Spurious Emissions at Antenna Terminal Requirements

Measurement

Procedures: As required by 47 CFR 2.1051, *spurious emissions at antenna terminal measurements* were made at the RF output terminals using a 50-watt 30 dB attenuator and a Spectrum Analyzer.

The EUT was set to transmit in the lowest of the operating frequency range. The Spectrum Analyzer was set to sweep upto the 10th harmonic of the fundamental. Plotted the Spurious Emissions graph. This process was repeatedly done at the middle and highest channels of the operating frequency range of the EUT

According to 90.210 transmitter operating in the 902-928MHz band shall meet the emission mask K.

Output Power of EUT: 20 Watts

Spur limit = $P_o - (55 + 10\log P_o)$; $P_o = 20$ watts or 43 dBm

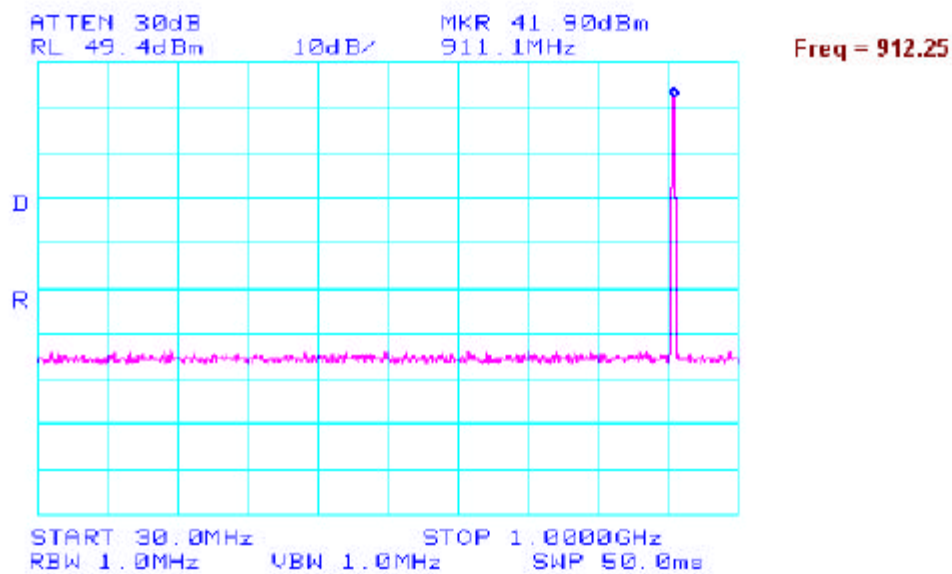
$43\text{dBm} - (55 + 10\log 20) = 43\text{ dBm} - (68\text{ dB}) = -25\text{ dBm}$

Results: Equipment complies with Section 2.1051 and 90.210. The following pages show measurements of Spurious Emission plots which is recorded below:

The following plots are included to illustrate compliance with the required rule parts.

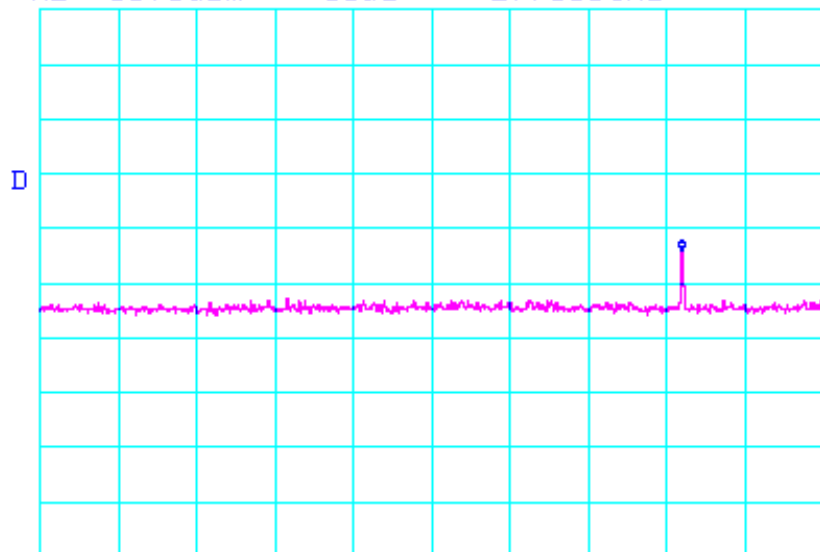


VI. Electromagnetic Compatibility Spurious Emissions at Antenna Terminal Requirements





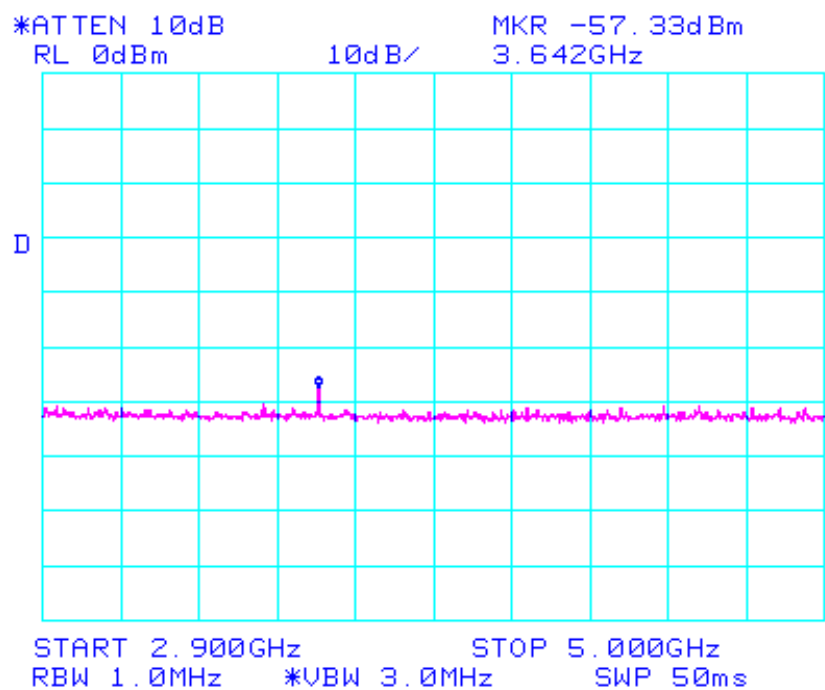
*ATTEN 10dB MKR -54.00dBm
RL -10.0dBm 10dB/ 2.7380GHz



START 2.0000GHz STOP 2.9000GHz
RBW 1.0MHz *VBW 3.0MHz SWP 50ms

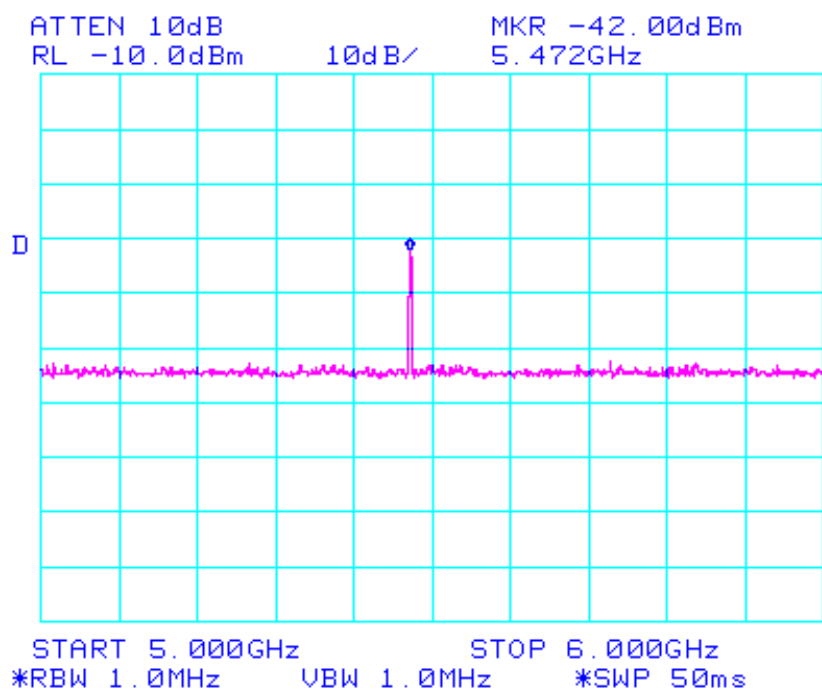


VI. Electromagnetic Compatibility Spurious Emissions at Antenna Terminal Requirements





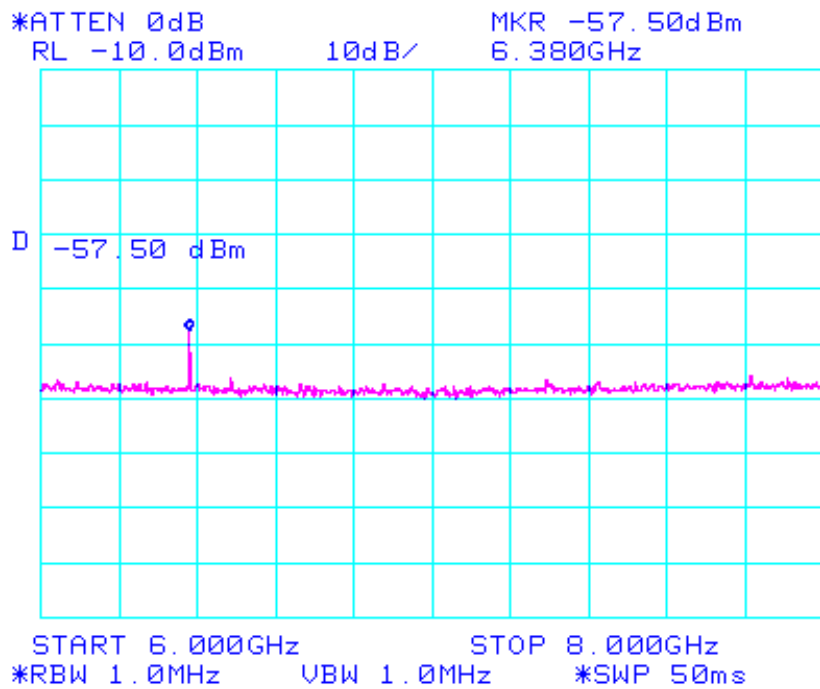
Ch# 0





VI. Electromagnetic Compatibility Spurious Emissions at Antenna Terminal Requirements

ch#0

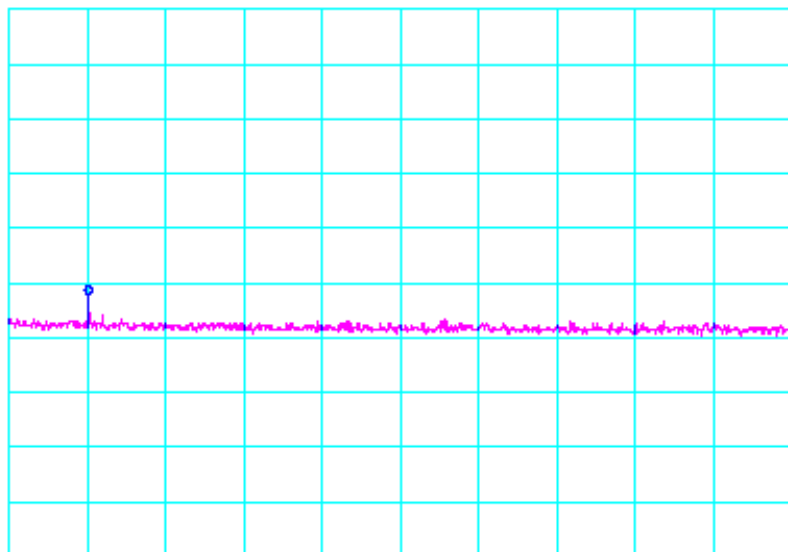




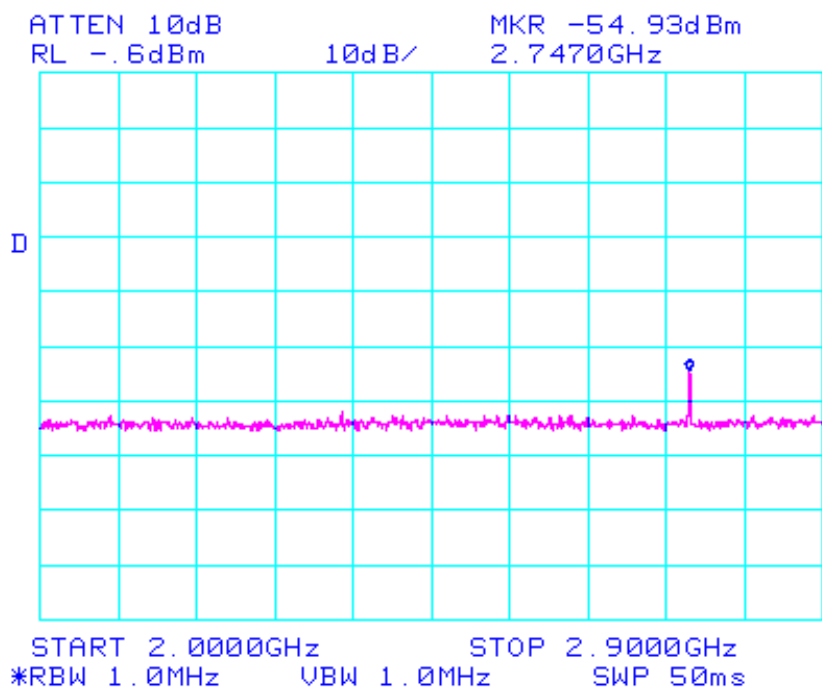
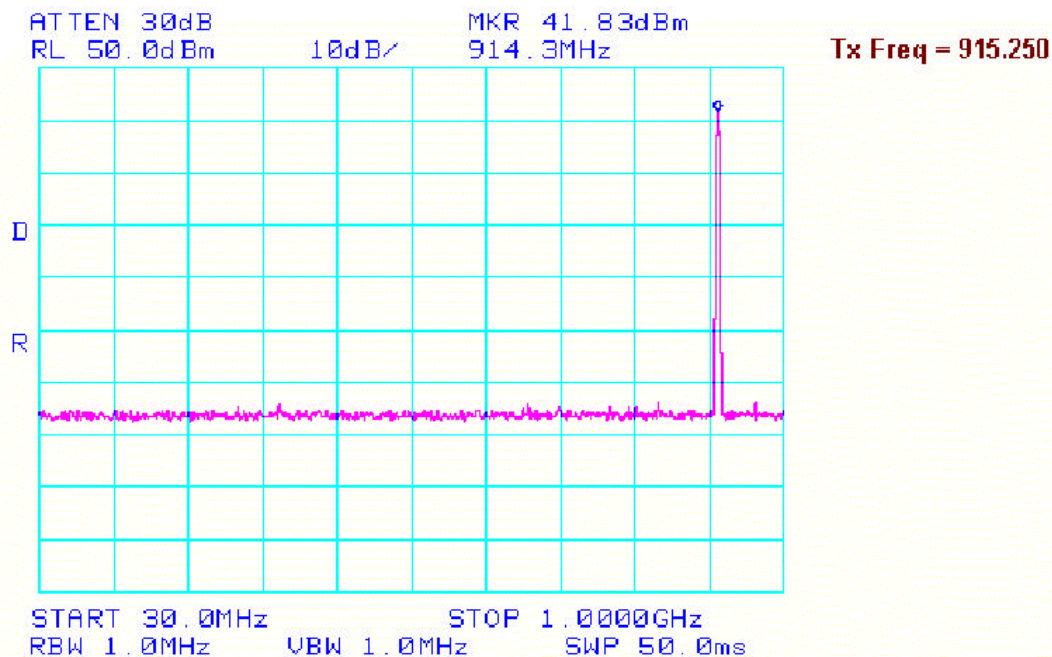
Ch# 0

*ATTEN 0dB MKR -62.33dBm
RL -10.0dBm 10dB/ 8.203GHz

D

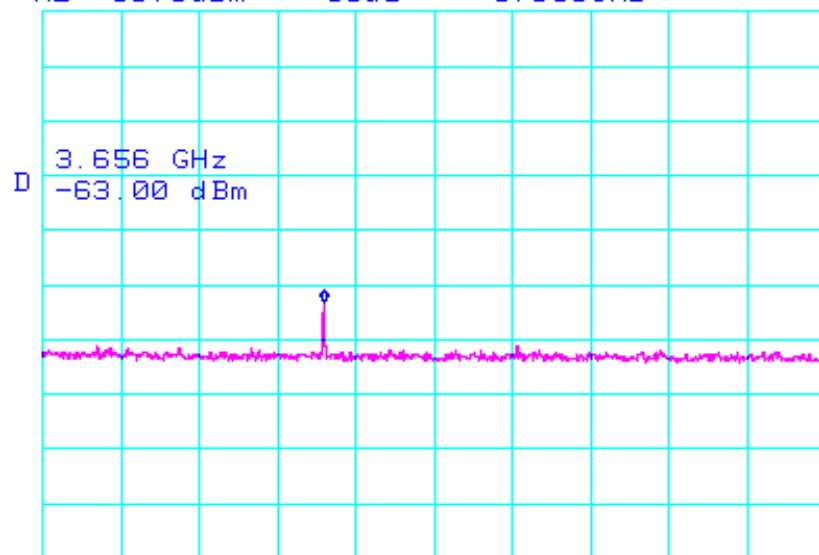


START 8.000GHz STOP 10.000GHz
*RBW 1.0MHz VBW 1.0MHz *SWP 50ms



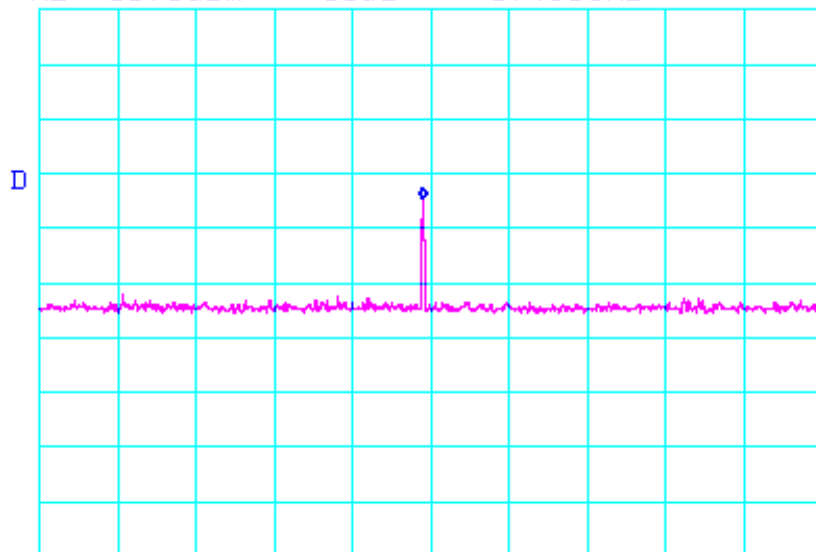


*ATTEN 0dB MKR -63.00dBm
RL -10.0dBm 10dB/ 3.656GHz



START 2.900GHz STOP 5.000GHz
*RBW 1.0MHz VBW 1.0MHz SWP 50ms

ATTEN 10dB MKR -44.67dBm
RL -10.0dBm 10dB/ 5.490GHz

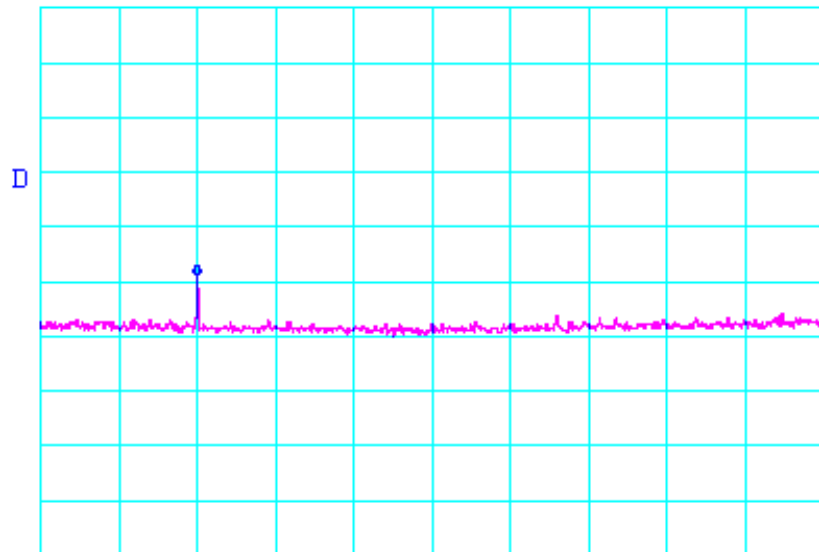


START 5.000GHz STOP 6.000GHz
*RBW 1.0MHz VBW 1.0MHz *SWP 50ms



Ch# 6

*ATTEN 0dB MKR -59.00dBm
RL -10.0dBm 10dB/ 6.400GHz

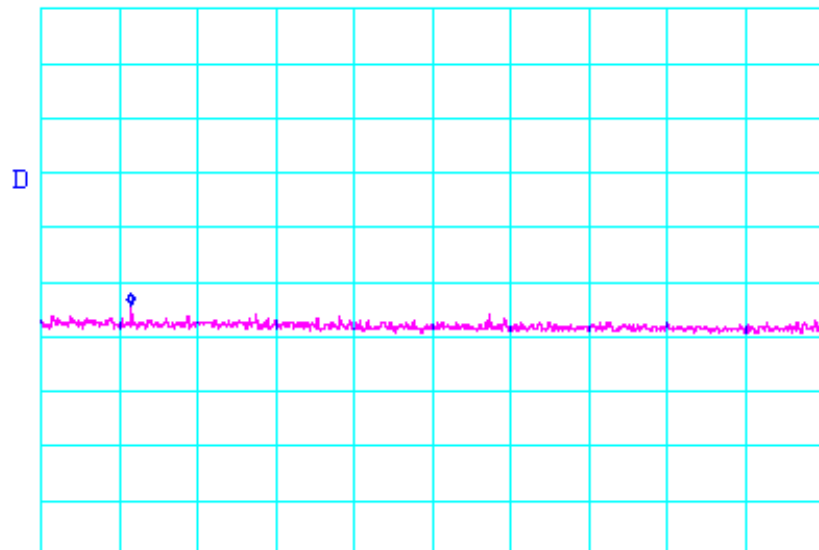


START 6.000GHz STOP 8.000GHz
*RBW 1.0MHz VBW 1.0MHz *SWP 50ms



Ch # 6

*ATTEN 0dB MKR -64.17dBm
RL -10.0dBm 10dB/ 8.230GHz

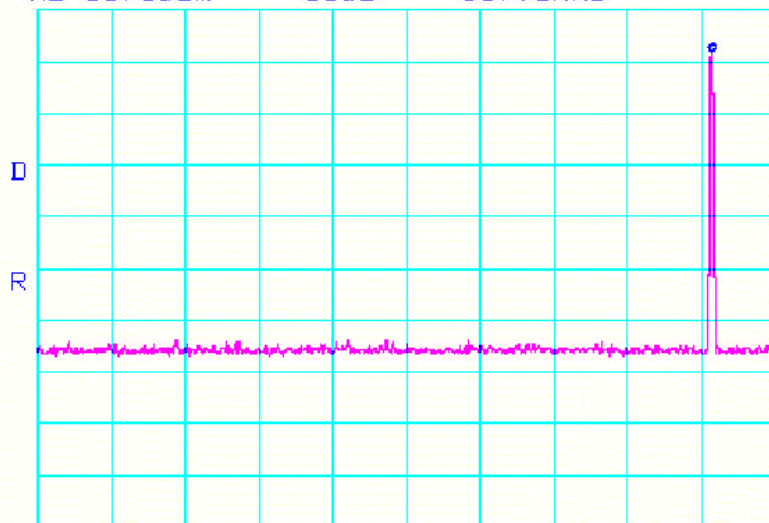


START 8.000GHz STOP 10.000GHz
*RBW 1.0MHz VBW 1.0MHz *SWP 50ms



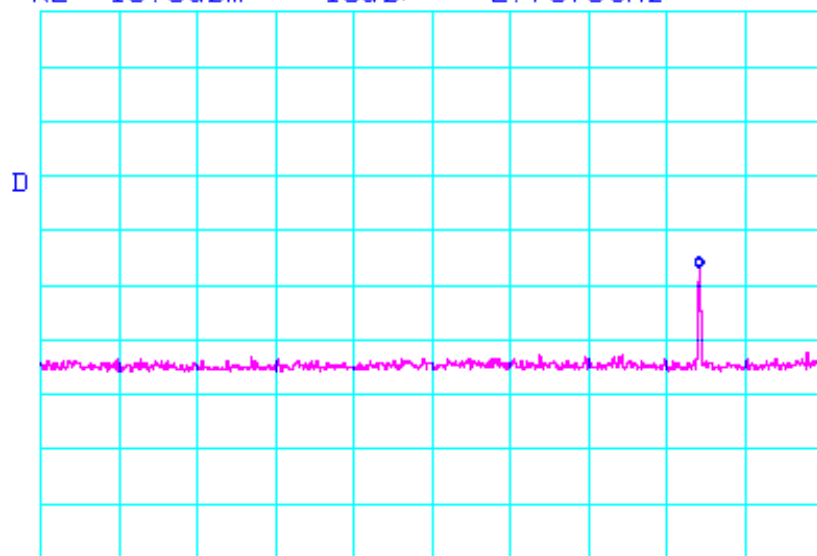
ATTEN 30dB
RL 50.0dBm 10dB/ MKR 41.83dBm
917.6MHz

Tx Freq = 918.75

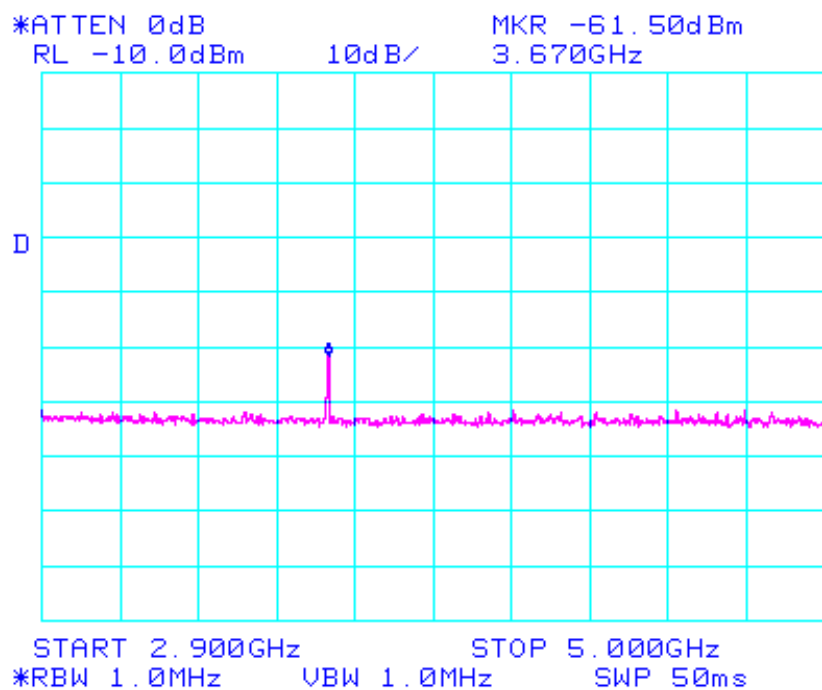


START 30.0MHz STOP 1.0000GHz
RBW 1.0MHz VBW 1.0MHz SWP 50.0ms

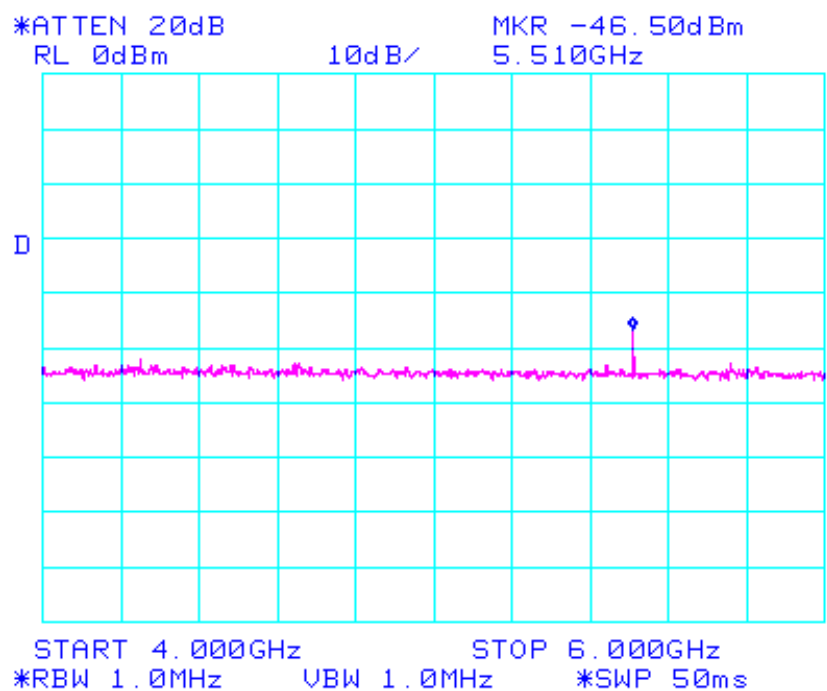
*ATTEN 0dB
RL -10.0dBm 10dB/ MKR -56.83dBm
2.7575GHz



START 2.0000GHz STOP 2.9000GHz
*RBW 1.0MHz VBW 1.0MHz SWP 50ms



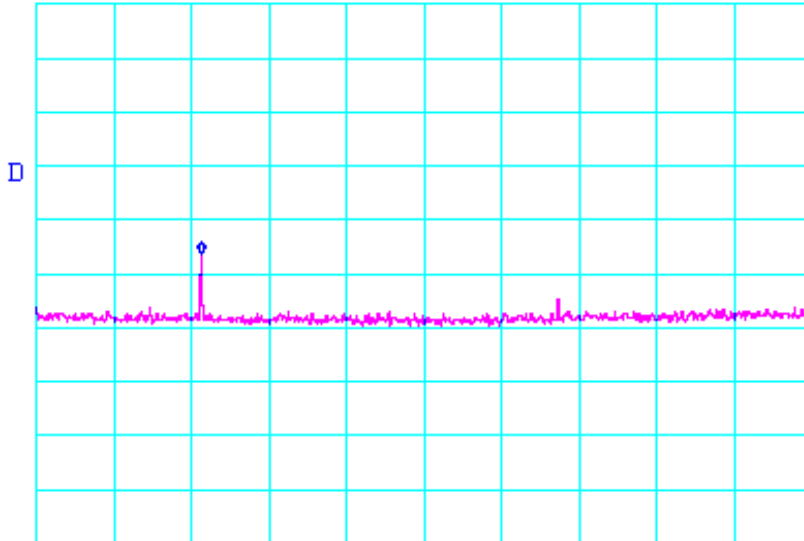
Ch # 13





CH # 13

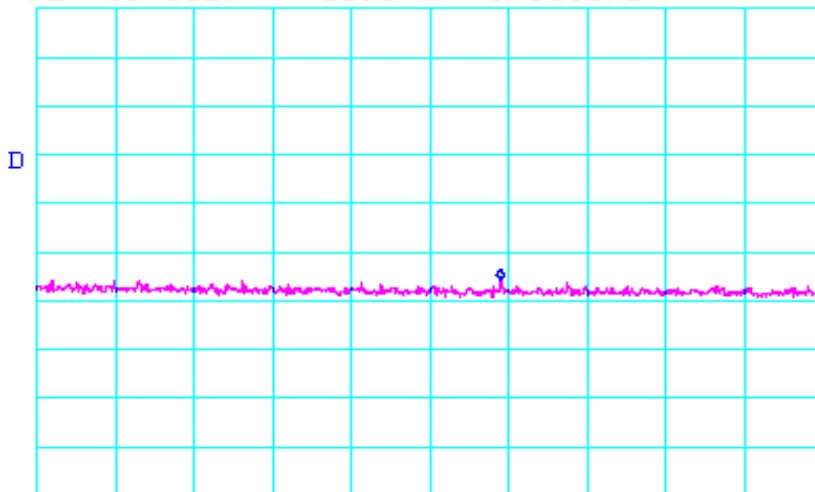
*ATTEN 0dB
RL -10.0dBm 10dB/
MKR -56.17dBm
6.427GHz



START 6.000GHz STOP 8.000GHz
*RBW 1.0MHz VBW 1.0MHz *SWP 50ms

Ch # 13

*ATTEN 0dB
RL -10.0dBm 10dB/
MKR -65.67dBm
9.180GHz



START 8.000GHz STOP 10.000GHz
*RBW 1.0MHz VBW 1.0MHz *SWP 50ms

Test Engineer: Hoosamuddin S. Bandukwala



Test Date: 09/02/03



VII. Electromagnetic Compatibility Radiated Emissions Requirements



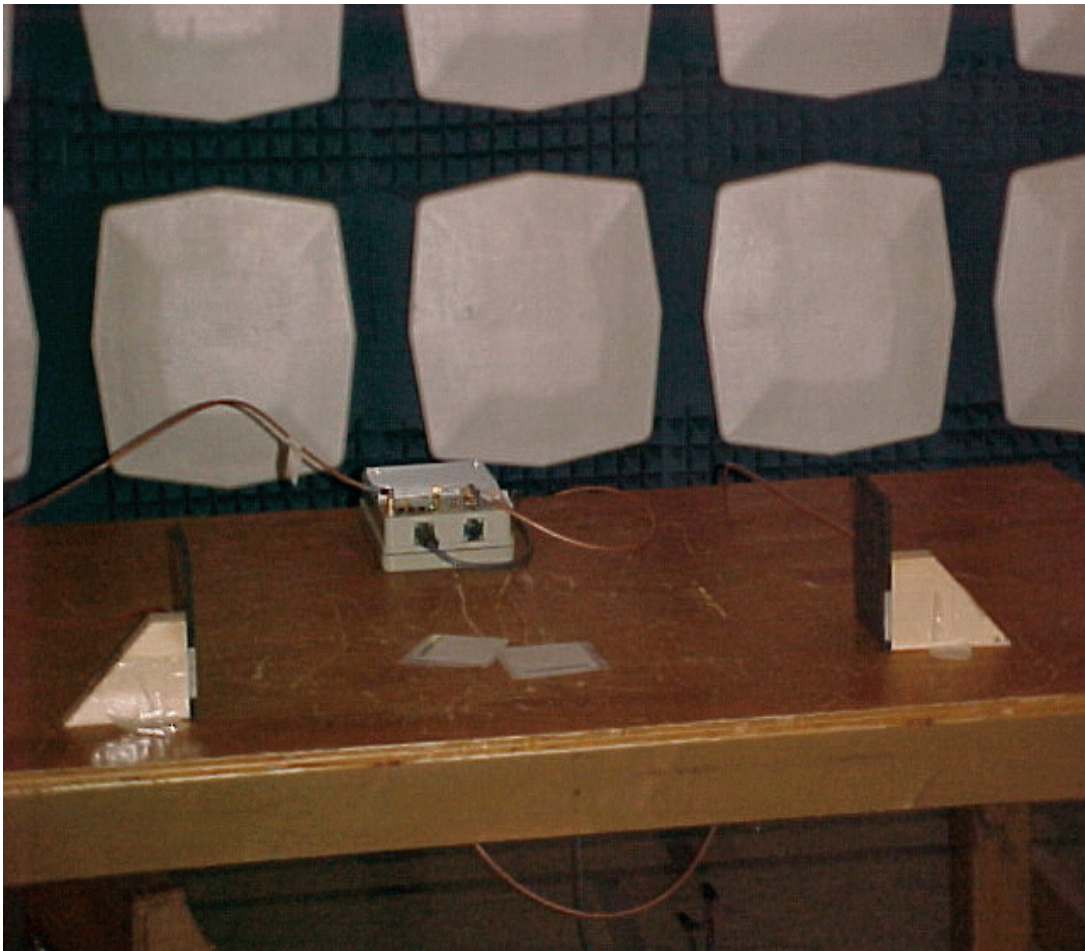
VII. Electromagnetic Compatibility Radiated Emissions Requirements

A. Radiated Emissions

Technical Specifications: §2.1053 and §90.210

Test equipment: Test equipment for Radiated Emissions is listed in Section VIII this report.

Photograph:



Photograph 4. Radiated Emissions Test Setup Photo



VII. Electromagnetic Compatibility Radiated Emissions Requirements

Measurement

Procedures: As required by 47 CFR 2.1053, *field strength of radiated spurious measurements* were made in accordance with the procedures of TIA/EIA-603-A-2001 "Land Mobile FM or PM Communications Equipment Measurement and Performance Standards".

Radiated emission measurements were performed inside a 3 meter semi-anechoic chamber (equivalent to an Open Area Test Site). The distance between the EUT and the test antenna is 3 meter. The EUT RF ports was connected with a 1.2 meter SMA cable and terminated to 50 ohm load. The EUT was set to transmit in the middle of the operating frequency range. To capture the full power spurious emissions, maximized each frequency by rotating the turntable to 360° and varying the test antenna from 1 to 4 meter height. Once the maximized emission is found, recorded the reading in a tabular format. These steps were repeated with horizontal polarization, for Uplink and Downlink.

The Radiated Spurious Emissions *Limit* is obtained by the following:

Measured Output Power of EUT: 3.55 Watts (PEP; Peak Envelope Power)

Output Power of EUT: 20 Watts

Spur limit = $P_o - (55 + 10\log P_o)$; $P_o = 20$ watts or 43 dBm

$43\text{dBm} - (55 + 10\log 20) = 43\text{ dBm} - (68\text{ dB}) = -25\text{ dBm}$

Results: Equipment complies with Section 2.1053 and 90.210. The following pages show measurements of emissions data sheet which is recorded below:



VII. Electromagnetic Compatibility Radiated Emissions Requirements

Subject: Radiated Emissions Test Results

Specification: FCC Part 90 Subpart I, §2.1053 and §90.210

Frequency (GHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuv)	Antenna Correction Factor (dB) (+)	System Gain (dB) (-)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuv)	Limit (dBuv)	Margin (dB)
2.736	0	H	1	64.33	28.94	0.00	20	73.27	84	-10.73
2.736	0	V	1	58.17	28.84	0.00	20	67.01	84	-16.99
5.474	0	H	1	42	34.53	0.00	20	56.53	84	-27.47
5.474	0	V	1	42	34.51	0.00	20	56.51	84	-27.49
6.386	0	H	1	42	34.44	0.00	20	56.44	84	-27.56
6.386	0	V	1	42	34.39	0.00	20	56.39	84	-27.61
3.6489	0	H	1	99.33	31.76	32.00	20	79.09	84	-4.91
3.6489	0	V	1	97.17	31.76	32.00	20	76.93	84	-7.07
4.56	0	H	1	84.5	32.33	30.88	20	65.95	84	-18.05
4.56	0	V	1	81.67	32.28	30.88	20	63.07	84	-20.93
7.298	0	H	1	94	36.99	30.40	20	80.59	84	-3.41
7.298	0	V	1	93.17	37.06	30.40	20	79.82	84	-4.18
8.21	0	H	1	87.5	37.49	30.00	20	74.99	84	-9.01
8.21	0	V	1	81.33	37.29	30.00	20	68.62	84	-15.38
9.12	0	H	1	67.5	38.44	29.76	20	56.18	84	-27.82
9.12	0	V	1	67.5	38.06	29.76	20	55.80	84	-28.20

Table 5.

Test Engineer: Hoosamuddin S. Bandukwala

Test Date: 09/03/03



VIII. Test Equipment



VIII. Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ANSI/NCSL Z540-1-1994 and ANSI/ISO/IEC 17025:2000.

MET ID #	EQUIPMENT	MANUFACTURER	MODEL #	LAST CAL	CAL DUE
1T4300	Anechoic Chamber	EMC Test Systems	None	21-AUG-02	21-AUG-03
1T4303	Antenna; Bilog	Schafner-Chase EMC	CBL6140A	9-APR-03	9-APR-04
1T4302	EMC Receiver	HEWLETT PACKARD	85462A	17-SEP-02	17-SEP-03
1T4288	Spectrum Analyzer	HEWLETT PACKARD	8563A	11-JUN-03	11-JUN-04
1T2511	Horn Antenna	EMCO	3115	18-JUL-03	18-JUL-04

Table 5. Test Equipment

Note: Functionally tested equipment is verified using calibrated instrumentation at the time of testing.



IX. Certification Label & User's Manual Information



IX. Certification Label & User's Manual Information

A. Certification Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart I — Marketing of Radio frequency devices:

§ 2.801 Radio-frequency device defined.

As used in this part, a radio-frequency device is any device which in its operation is capable of Emitting radio-frequency energy by radiation, conduction, or other means. Radio- frequency devices include, but are not limited to:

- (a) The various types of radio communication transmitting devices described throughout this chapter.
- (b) The incidental, unintentional and intentional radiators defined in Part 15 of this chapter.
- (c) The industrial, scientific, and medical equipment described in Part 18 of this chapter.
- (d) Any part or component thereof which in use emits radio-frequency energy by radiation, conduction, or other means.

§ 2.803 Marketing of radio frequency devices prior to equipment authorization.

- (a) Except as provided elsewhere in this chapter, no person shall sell or lease, or offer for sale or lease (including advertising for sale or lease), or import, ship or distribute for the purpose of selling or leasing or offering for sale or lease, any radio frequency device unless:
 - (1) In the case of a device subject to certification, such device has been authorized by the Commission in accordance with the rules in this chapter and is properly identified and labeled as required by §2.925 and other relevant sections in this chapter; or
 - (2) In the case of a device that is not required to have a grant of equipment authorization issued by the Commission, but which must comply with the specified technical standards prior to use, such device also complies with all applicable administrative (including verification of the equipment or authorization under a Declaration of Conformity, where required), technical, labeling and identification requirements specified in this chapter.
- (d) Notwithstanding the provisions of paragraph (a) of this section, the offer for sale solely to business, commercial, industrial, scientific or medical users (but not an offer for sale to other parties or to end users located in a residential environment) of a radio frequency device that is in the conceptual, developmental, design or pre-production stage is permitted prior to equipment authorization or, for devices not subject to the equipment authorization requirements, prior to a determination of compliance with the applicable technical requirements *provided* that the prospective buyer is advised in writing at the time of the offer for sale that the equipment is subject to the FCC rules and that the equipment will comply with the appropriate rules before delivery to the buyer or to centers of distribution.



IX. Certification Label & User's Manual Information

- (e)(1) Notwithstanding the provisions of paragraph (a) of this section, prior to equipment authorization or determination of compliance with the applicable technical requirements any radio frequency device may be operated, but not marketed, for the following purposes and under the following conditions:
- (i) Compliance testing;
 - (ii) Demonstrations at a trade show provided the notice contained in paragraph (c) of this section is displayed in a conspicuous location on, or immediately adjacent to, the device;
 - (iii) Demonstrations at an exhibition conducted at a business, commercial, industrial, scientific or medical location, but excluding locations in a residential environment, provided the notice contained in paragraphs (c) or (d) of this section, as appropriate, is displayed in a conspicuous location on, or immediately adjacent to, the device;
 - (iv) Evaluation of product performance and determination of customer acceptability, provided such operation takes place at the manufacturer's facilities during developmental, design or pre-production states; or
 - (v) Evaluation of product performance and determination of customer acceptability where customer acceptability of a radio frequency device cannot be determined at the manufacturer's facilities because of size or unique capability of the device, provided the device is operated at a business, commercial, industrial, scientific or medical user's site, but not at a residential site, during the development, design or pre-production stages.
- (e)(2) For the purpose of paragraphs (e)(1)(iv) and (e)(1)(v) of this section, the term *manufacturer's facilities* includes the facilities of the party responsible for compliance with the regulations and the manufacturer's premises, as well as the facilities of other entities working under the authorization of the responsible party in connection with the development and manufacture, but not the marketing, of the equipment.
- (f) For radio frequency devices subject to verification and sold solely to business, commercial, industrial, scientific and medical users (excluding products sold to other parties or for operation in a residential environment), parties responsible for verification of the devices shall have the option of ensuring compliance with the applicable technical specifications of this chapter at each end user's location after installation, provided that the purchase or lease agreement includes a proviso that such a determination of compliance be made and is the responsibility of the party responsible for verification of the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 2, Subpart J — Equipment Authorization Procedures:

§ 2.901 Basis and Purpose

- (a) In order to carry out its responsibilities under the Communications Act and the various treaties and international regulations, and in order to promote efficient use of the radio spectrum, the Commission has developed technical standards for radio frequency equipment and parts or components thereof. The technical standards applicable to individual types of equipment are found in that part of the rules governing the service wherein the equipment is



IX. Certification Label & User's Manual Information

to be operated.¹ In addition to the technical standards provided, the rules governing the service may require that such equipment be verified by the manufacturer or importer, be authorized under a Declaration of Conformity, or receive an equipment authorization from the Commission by one of the following procedures: certification or registration.

- (b) The following sections describe the verification procedure, the procedure for a Declaration of Conformity, or the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant, whichever is applicable.

§ 2.907 Certification.

- (a) Certification is an equipment authorization issued by the Commission, based on representation and test data submitted by the applicant.
- (b) Certification attaches to all units subsequently marketed by the grantee which are identical (see Section 2.908) to the sample tested except for permissive changes or other variations authorized by the Commission pursuant to Section 2.1043.

§ 2.948 Description of measurement facilities.

- (a) Each party making measurements of equipment that is subject to an equipment authorization under Part 15 or Part 18 of this chapter, regardless of whether the measurements are filed with the Commission or kept on file by the party responsible for compliance of equipment marketed within the U.S. or its possessions, shall compile a description of the measurement facilities employed.
 - (1) If the measured equipment is subject to the verification procedure, the description of the measurement facilities shall be retained by the party responsible for verification of the equipment.
 - (i) If the equipment is verified through measurements performed by an independent laboratory, it is acceptable for the party responsible for verification of the equipment to rely upon the description of the measurement facilities retained by or placed on file with the Commission by that laboratory. In this situation, the party responsible for the verification of the equipment is not required to retain a duplicate copy of the description of the measurement facilities.
 - (ii) If the equipment is verified based on measurements performed at the installation site of the equipment, no specific site calibration data is required. It is acceptable to retain the description of the measurement facilities at the site at which the measurements were performed.

¹In this case, the equipment is subject to the rules of Part 15. More specifically, the equipment falls under Subpart C (of Part 15), which deals with intentional radiators.



IX. Certification Label & User's Manual Information

- (2) If the equipment is to be authorized by the Commission under the certification procedure, the description of the measurement facilities shall be filed with the Commission's Laboratory in Columbia, Maryland. The data describing the measurement facilities need only be filed once but must be updated as changes are made to the measurement facilities or as otherwise described in this section. At least every three years, the organization responsible for filing the data with the Commission shall certify that the data on file is current.

B. Label and User's Manual Information

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart A — General:

§ 15.19 Labeling requirements.

- (a) In addition to the requirements in Part 2 of this chapter, a device subject to certification or verification shall be labeled as follows:
 - (1) Receivers associated with the operation of a licensed radio service, e.g., FM broadcast under Part 73 of this chapter, land mobile operation under Part 90, etc., shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the condition that this device does not cause harmful interference.
 - (2) A stand-alone cable input selector switch, shall bear the following statement in a conspicuous location on the device:

This device is verified to comply with Part 15 of the FCC Rules for use with cable television service.
 - (3) All other devices shall bear the following statement in a conspicuous location on the device:

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
 - (4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified under paragraph (a) of this section is required to be affixed only to the main control unit.
 - (5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.



IX. Certification Label & User's Manual Information

§ 15.21 Information to user.

The users manual or instruction manual for an intentional or unintentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

The following is extracted from Title 47 of the Code of Federal Regulations, Part 15, Subpart B — Unintentional Radiators:

§ 15.105 Information to the user.

- (a) For a Class B digital device or peripheral, the instructions furnished the user shall include the following or similar statement, placed in a prominent location in the text of the manual:

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a residential environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.



END OF REPORT
