PERMISSIVE CHANGE REPORT

for

M/A COM PRIVATE RADIO SYSTEMS

3315 Old Forest Road
Lynchburg, VA 24501

FCC ID: OWDTR-307-A2

Industry Canada Certification: IC 287194122C

WLL PROJECT #: 6475X-A2

TABLE OF CONTENTS

TABLES

EXHIBITS

APPENDICES

FCC CLASS II PERMISSIVE CHANGE REPORT

for

M/A Com - Private Radio Systems
FCC ID: OWDTR-307-A2

1 Introduction

This report has been prepared on behalf of M/A Com - Private Radio Systems to support a Permissive Change for the above referenced unit. The test and report are assembled to document compliance with the following regulations:

Part 90 of the FCC Rules and Regulations
Industry Canada RSS-119, Issue 6

The Equipment Under Test was the M/A Com - Private Radio Systems MASTR III with SitePro Controller.

All measurements herein were performed according to the 1992 version of ANSI C63.4. The measurement equipment conforms to ANSI C63.2 Specifications for Electromagnetic Noise and field Strength Instrumentation. Calibration checks are made periodically to verify proper performance of the measuring instrumentation.

All measurements are performed at Washington Laboratories, Ltd. test center in Gaithersburg, MD. Site description and site attenuation data have been placed on file with the FCC's Sampling and Measurements Branch at the FCC laboratory in Columbia, MD. Washington Laboratories, Ltd. has been approved by the FCC and NIST NVLAP (NVLAP Lab Code: 200066-0) as an independent test laboratory.

The results of this test report relate only to the item tested. The measurement uncertainty of the data contained herein is ±2.3 dB. Refer to Appendix A for Statement of Measurement Uncertainty. This report shall not be used to claim product endorsement by NVLAP or any agency of the US Government.

1.1 Summary

The M/A Com - Private Radio Systems MASTRIII Station with Sitepro Controller complies with the following requirements:

Emissions Masks per FCC Part 90.210
Emissions Masks per IC RSS-119

2 Description of Equipment and Changes to Equipment

This Class II change request includes the following equipment changes:

1. Replace GETC controller with SitePro controller

The Com-Net Ericsson Critical Radio Systems group has developed a Motorola PowerQuicc-based CPU to replace the 8051-based GETC board due to memory limitations. In addition to replacing the functionality of the GETC module, other capabilities have been added, including support of ethernet.

The **SitePro Controller** provides baseband modulation and does not modify the RF circuitry or performance.

The **SitePro Controller** trunking shelf is used in several applications, broadly including Voting, EDACS ®, Aegis, and Digital Voice. In each of these applications the same SitePro Controller shelf is used, however, the Logic Board operates differently because of different jumper configuration, interfacing hardware, and software.

The **SitePro Controller** can be installed and programmed for several different station applications. The basic programming is for the Station Trunking Shelf. This shelf enables the station to function as part of an EDACS trunked communication system by providing digital signaling and transmitter control of the associated base station. In addition, the **SitePro Controller** provides an interface between the base station repeater, the Site Controller or Site Interface Module **(SI**M) and other channel **SitePro Controlle**r(s) at the same time.

The Controller Board, Rockwell Modem, Analog Board, Power Supply, Display Module, and Display Board are mounted on a tray and enclosed in a slide-out shelf. The **SitePro Controller** shelf is a one-rack unit assembly (1.75-inches x 19-inches), which mounts in a standard 19-inch wide equipment cabinet/rack.

3 Test Configuration

The EUT was configured in a typical operating mode at the middle of the assigned frequency band.

3.1 Testing Algorithm

The EUT was set to transmit at maximum rated power and modulated for 25 kHz channel spacing.

3.2 Power Output Testing

The EUT antenna was replaced with a coaxial cable and the cable was connected to the spectrum analyzer input through an attenuator and filter, as appropriate. An offset was programmed into the spectrum analyzer to compensate for the loss of the external attenuator.

This power was recorded as the peak power of the unit and used to set the reference for the various emissions masks.

3.3 Carrier Bandwidth Testing

The EUT antenna was connected to the input of a spectrum analyzer through attenuators for measurement of the RF conducted power. An offset was programmed into the spectrum analyzer to compensate for the loss of the external attenuator.

Measurements were made at two frequencies for this permissive change request.

Table 1. Occupied Bandwith

Frequency (MHz)	Resolution Bandwidth	Video Bandwidth	Measured BW (kHz)	Peak Measured Power (W)
425	300 Hz	300 Hz	9.583	100

A spectrum analyzer plot of the bandwidth can be found in Exhibit 1.

3.4 Spurious Emissions At Antenna Terminal Testing

The EUT antenna was connected to the input of a spectrum analyzer through attenuators and appropriate filters for measurement of the RF conducted power.

An offset was programmed into the spectrum analyzer to compensate for the loss of the external attenuator and filter insertion losses. The amplitude of the EUT carrier frequency was measured to determine the reference level for the emissions masks. The emissions were characterized at the carrier channel and out-of-band from 30 MHz up to a frequency of at least 10 times the operating frequency.

Spectrum analyzer plots of the spurious emissions are in Exhibit 2.

3.5 MPE Calculations

Maximum permissible exposure calculations have been performed for the maximum ERP level allowed.

The calculations are shown in Exhibit 3

Table 2. MPE Results

For 150 MHz (FCC ID: OWDTR-197-A2), use the following:

ERP	Separation Distance (m)
500	5.7

For other Radios, use the following:

ERP	Separation Distance (m)
1000	6.94

Table 3. Equipment Under Test

EUT: M/A Com - Private Radio Systems MASTR III with SitePro Controller

Table 4. Equipment Calibration List

Equipment	Serial Number	Cal Date	Cal Due
Hewlett-Packard Spectrum Analyzer: HP 8564E	3643A00657	4/11/01	4/11/02
30 dB 100W Power Attenuator	N/A	N/A	N/A
Hi-Pass Filter	N/A	N/A	N/A
RF Signal Generator; HP 8648A	3426A00665	7/27/00	7/27/01
Tunable Notch Filter TTR 190-3EE	92166-1	N/A	N/A
Tunable Notch Filter TTR 375-3EE	92151-1	N/A	N/A
Tunable Notch Filter TTR 750-3EE	9267-1	N/A	N/A

Exhibit 1. Bandwidth Plot

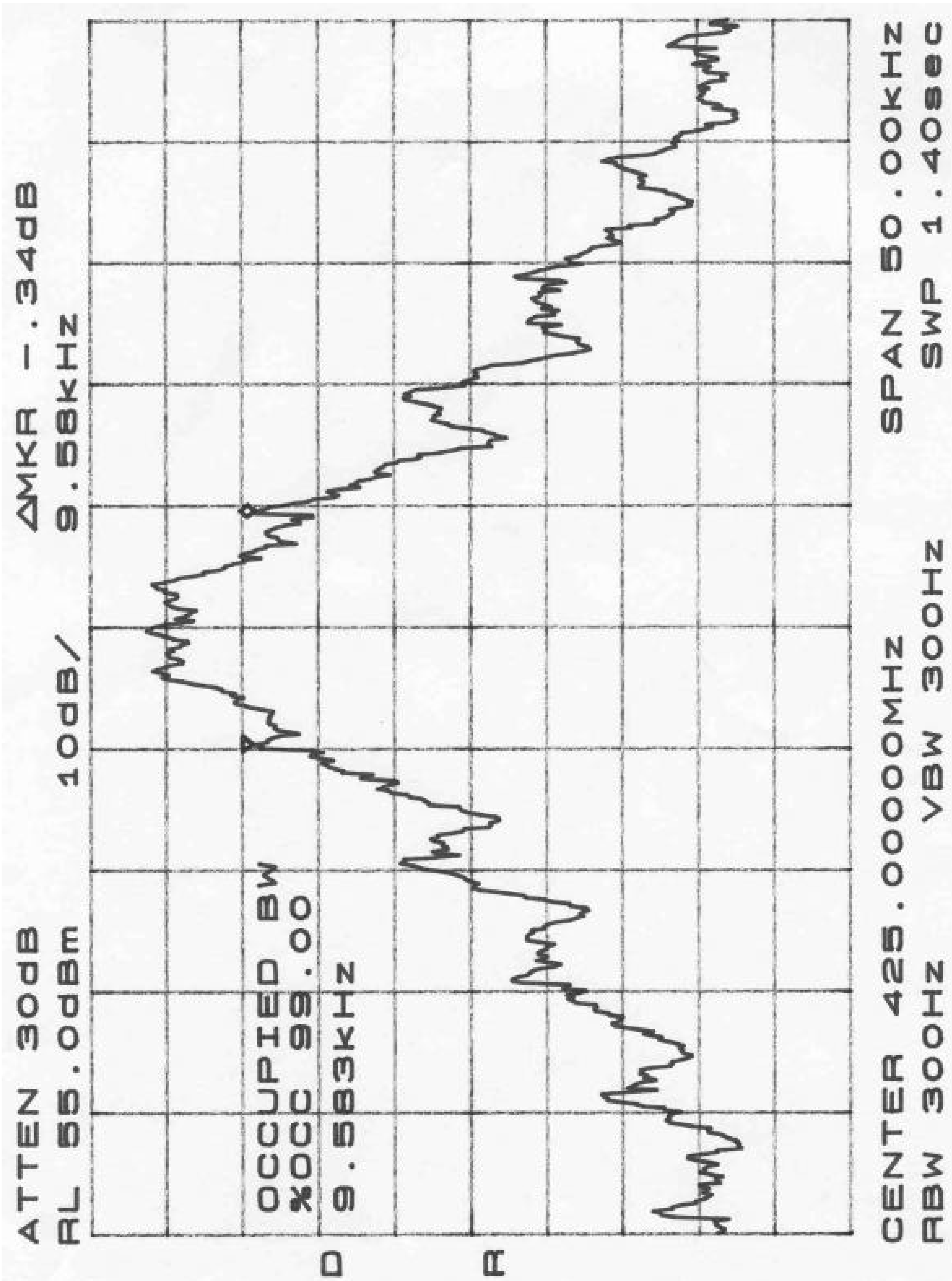
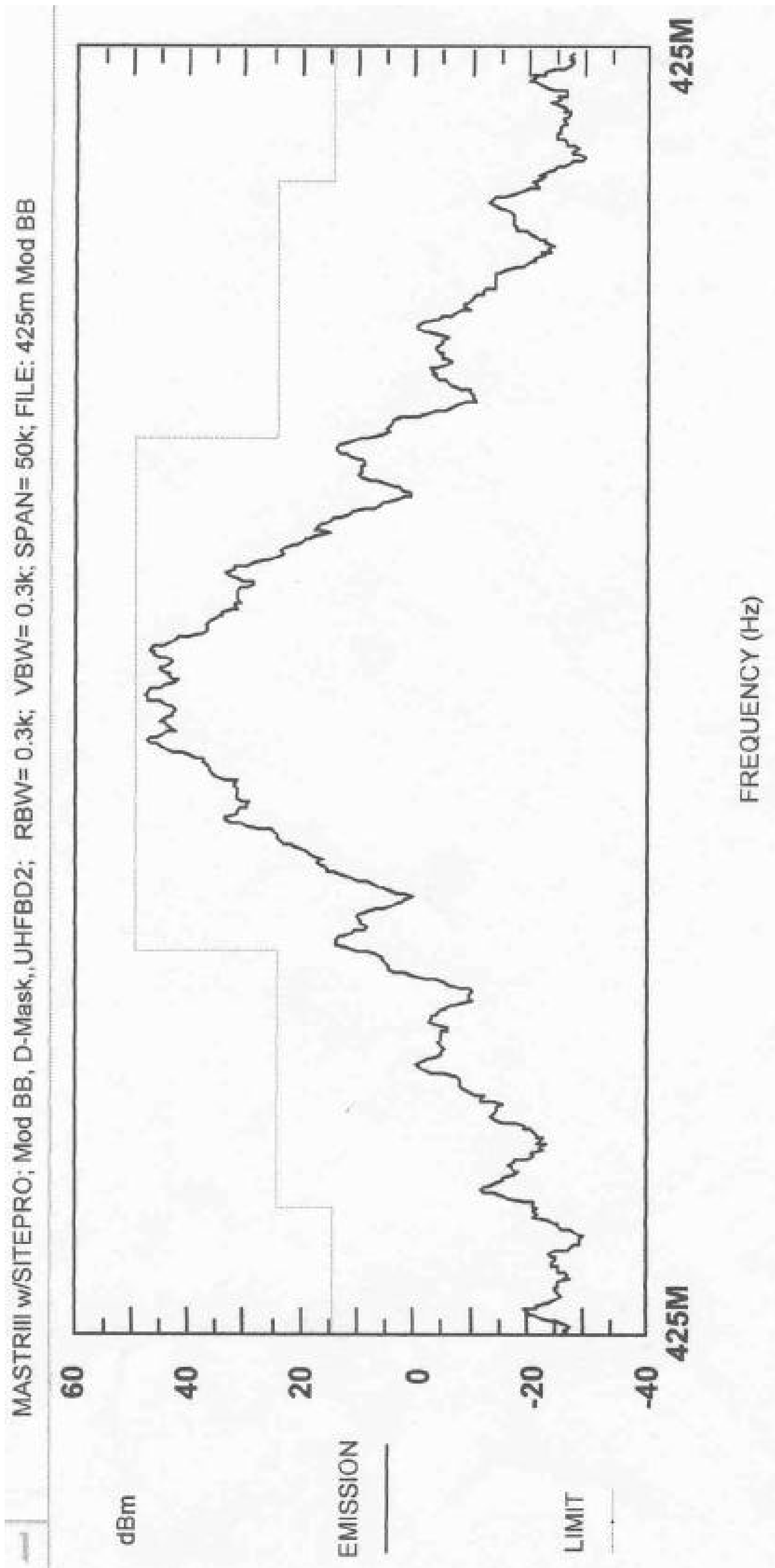
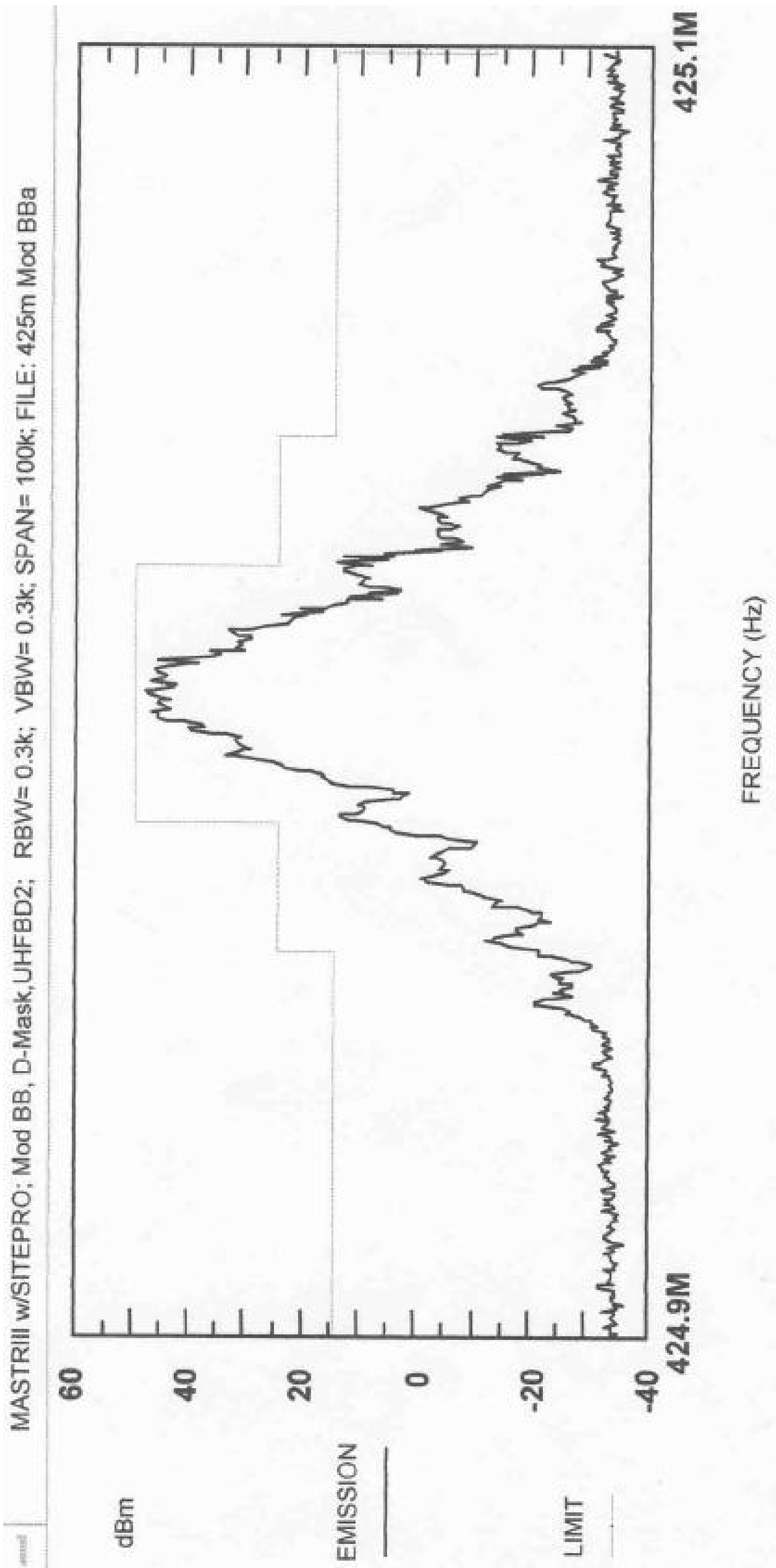
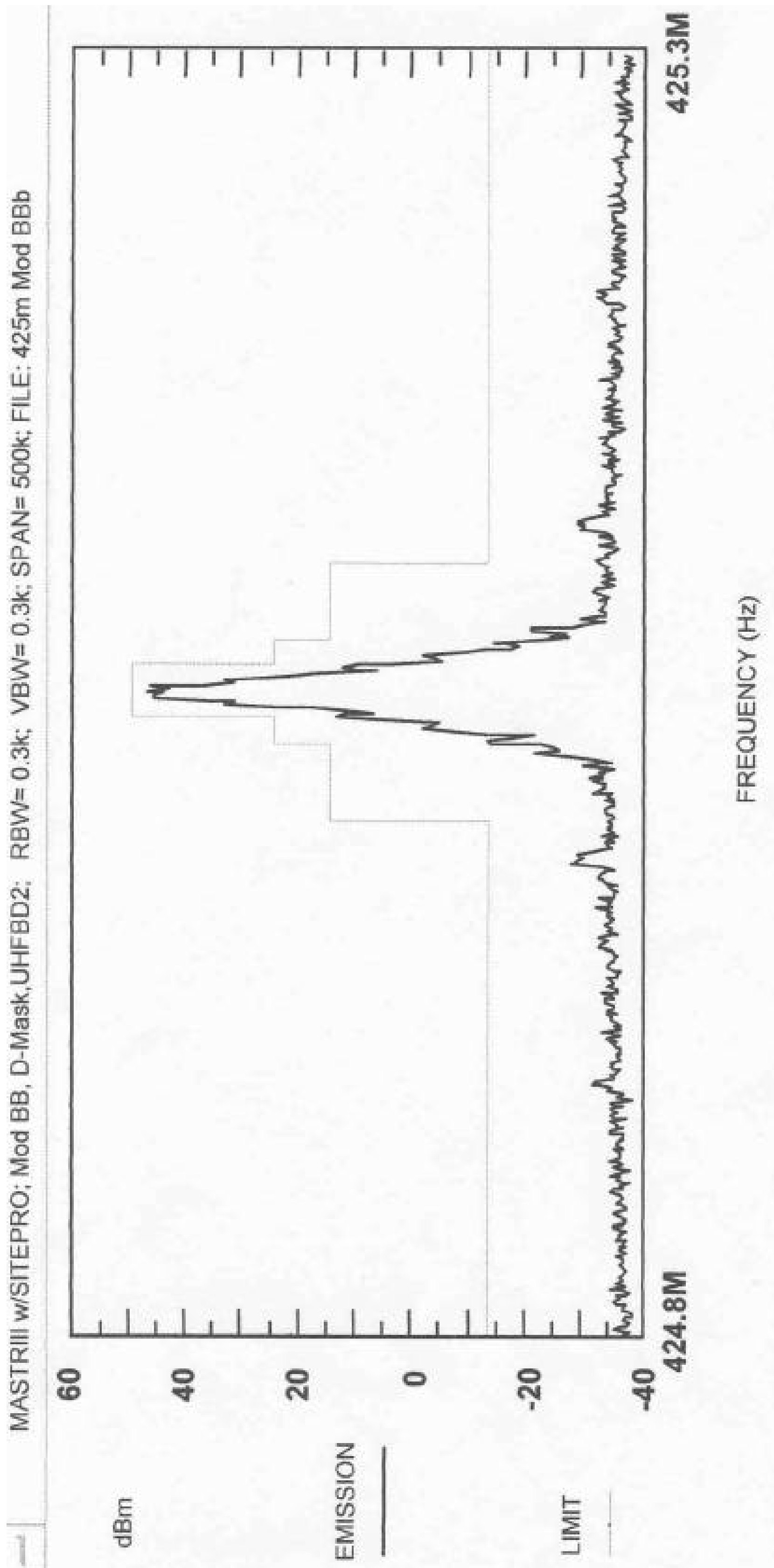
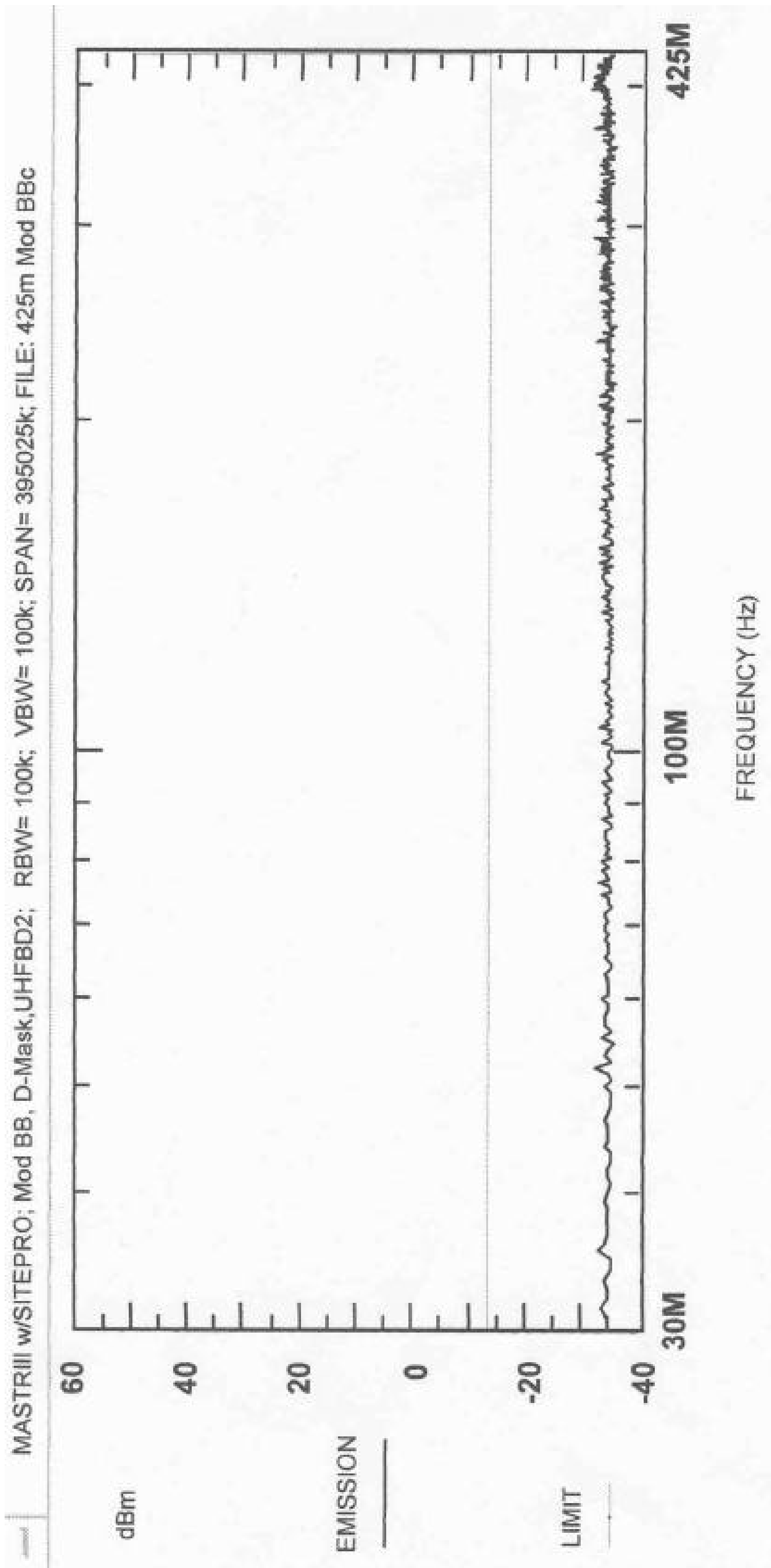


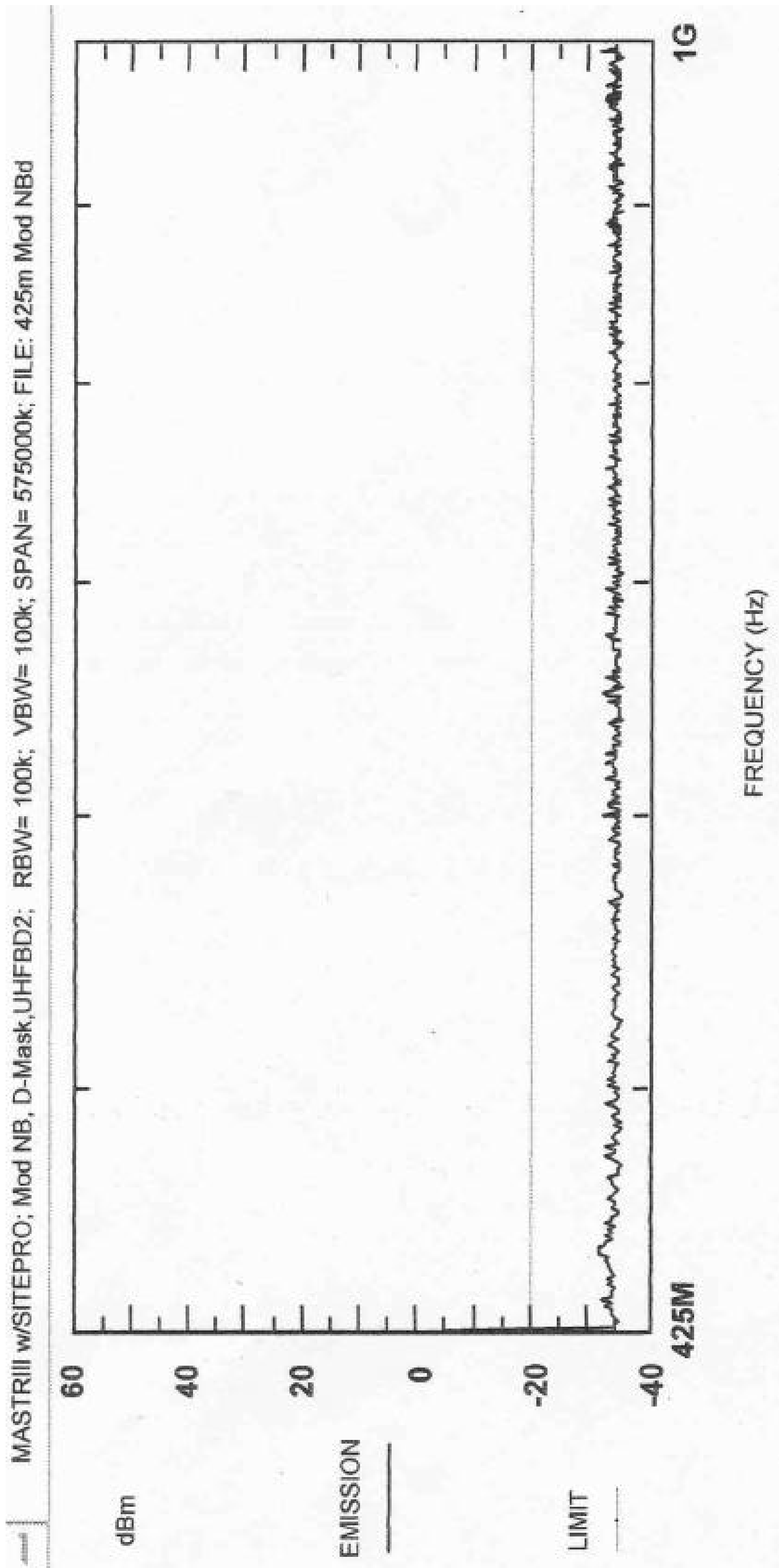
Exhibit 2. Emission at Antenna Terminal Plots


MASTRIII w/SITEPRO; Mod BB, D-Mask,,UHFBD2; RBW= 0.3k; VBW= 0.3k; SPAN= 50k; FILE: 425m Mod BB
dBm
EMISSION
LIMIT
60
40
20
0
-20
-40
425M
425M
FREQUENCY (Hz)

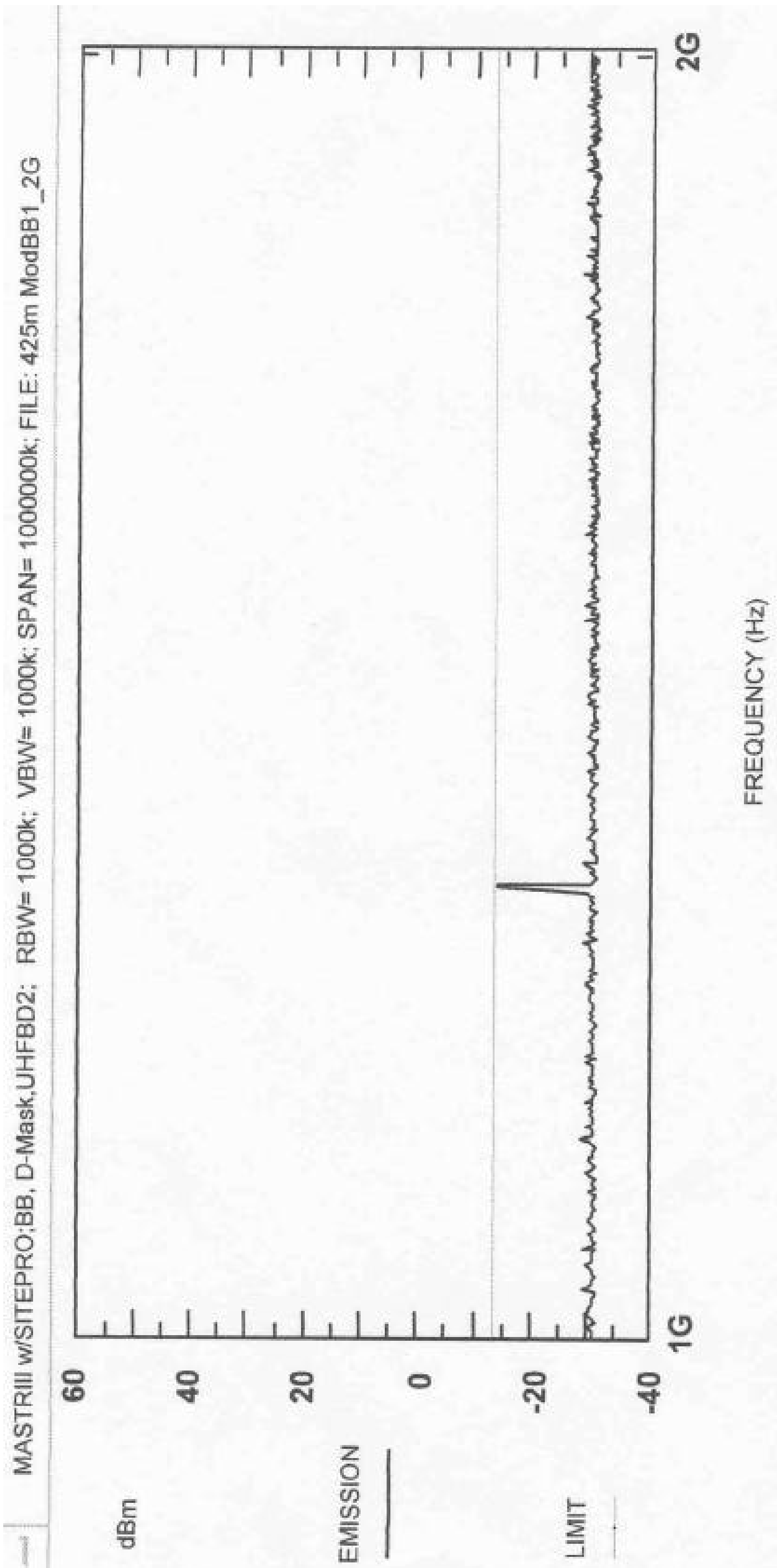

MASTRIII w/SITEPRO; Mod BB, D-Mask,UHFBD2; RBW= 0.3k; VBW= 0.3k; SPAN= 100k; FILE: 425m Mod BBa
dBm
EMISSION
LIMIT
60
40
20
0
-20
-40
424.9M
425.1M
FREQUENCY (Hz)

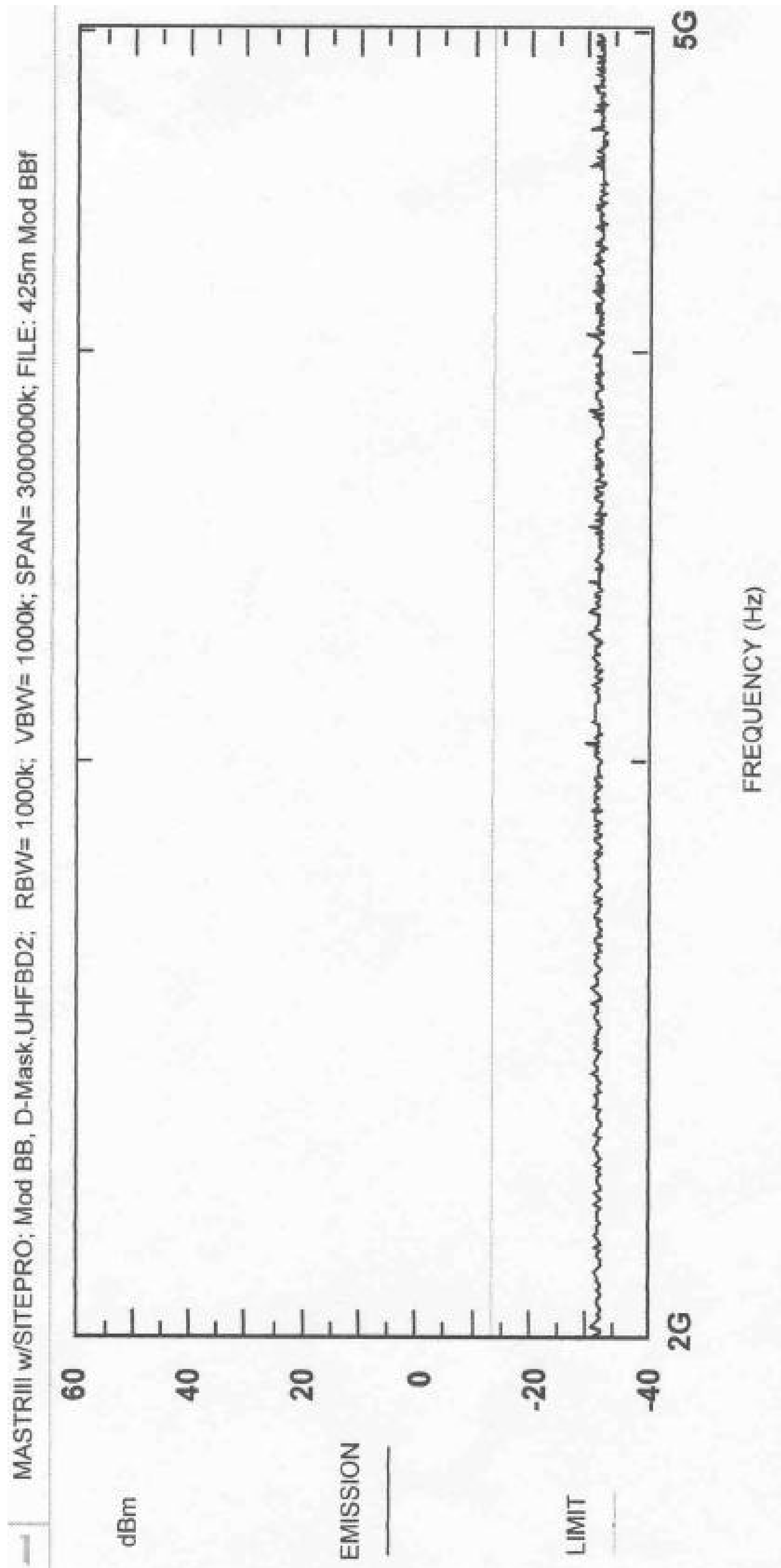

MASTRIII w/SITEPRO; Mod BB, D-Mask,UHFBD2; RBW= 0.3k; VBW= 0.3k; SPAN= 500k; FILE: 425m Mod BBb
dBm
EMISSION
LIMIT
60
40
20
0
-20
-40
424.8M
425.3M
FREQUENCY (Hz)


MASTRIII w/SITEPRO; Mod BB, D-Mask,UHFBD2; RBW= 100k; VBW= 100k; SPAN= 395025k; FILE: 425m Mod BBc
dBm
EMISSION
LIMIT
60
40
20
0
-20
-40
30M
100M
425M
FREQUENCY (Hz)



MASTRIII w/SITEPRO; Mod NB, D-Mask,UHFBD2; RBW= 100k; VBW= 100k; SPAN= 575000k; FILE: 425m Mod NBd
dBm
EMISSION
LIMIT
60
40
20
0
-20
-40
425M
1G
FREQUENCY (Hz)


MASTRIII w/SITEPRO;BB, D-Mask,UHFBD2; RBW= 1000k; VBW= 1000k; SPAN= 1000000k; FILE: 425m ModBB1_2G
dBm
EMISSION
LIMIT
60
40
20
0
-20
-40
1G
2G
FREQUENCY (Hz)


MASTRIII w/SITEPRO: Mod BB, D-Mask,UHFBD2; RBW= 1000k; VBW= 1000k; SPAN= 3000000k; FILE: 425m Mod BBf
dBm
EMISSION
LIMIT
60
40
20
0
-20
-40
2G
5G
FREQUENCY (Hz)


MASTRIII w/SITEPRO;BB, D-Mask,UHFBD2; RBW= 1000k; VBW= 1000k; SPAN= 3000000k; FILE: 425m ModBB2_5G
dBm
EMISSION
LIMIT
60
40
20
0
-20
-40
2G
5G
FREQUENCY (Hz)

Exhibit 3. MPE Calculation

STUDENT >

STUDENT > $\text{evalf}\left(\left(\frac{1000\ 1.64}{.001\ 4\ \pi\ \frac{851}{1500}}\right)^{\left(\frac{1}{2}\right)}, 15\right)$

cm assuming a maximum 1000 Watts ERP per 90.635   479.620614869999

STUDENT > $\text{evalf}\left(\frac{\left(\frac{1000\ 1.64}{.001\ 4\ \pi\ \frac{851}{1500}}\right)^{\left(\frac{1}{2}\right)}}{2.54}, 15\right)$

inches assuming a maximum 1000 Watts ERP per 90.635 188.827013707022

STUDENT > $\frac{188.827013707022}{12}$

feet assuming a maximum 1000 Watts ERP per 90.635   15.73558447

STUDENT >

Exhibit 4. EUT Photograph

Appendix A

Statement of Measurement Uncertainty

For the purposes of the measurements performed by Washington Laboratories, the measurement uncertainty is ±2.3 dB. This has been calculated for a *worst-case situation* (radiated emissions measurements performed on an open area test site).

The following measurement uncertainty calculation is provided:

$$\text{Total Uncertainty} = (A^2 + B^2 + C^2)^{1/2}/(n-1)$$

where:

A = Antenna calibration uncertainty, in dB = 2 dB
B = Spectrum Analyzer uncertainty, in dB = 1 dB
C = Site uncertainty, in dB = 4 dB
n = number of factors in uncertainty calculation = 3

$$\text{Thus, Total Uncertainty} = 0.5\,(2^2 + 1^2 + 4^2)^{1/2} = \pm 2.3 \text{ dB}$$