

PERMISSIVE CHANGE REPORT

for

M/A COM PRIVATE RADIO SYSTEMS

3315 Old Forest Road
Lynchburg, VA 24501

FCC ID: AXATR-307-D2

Industry Canada Certification: IC 287194122C

WLL PROJECT #:6475X-D2

This report shall not be reproduced, except in full, without the prior written consent of Washington Laboratories, Ltd.

TABLE OF CONTENTS

1	INTRODUCTION.....	1
1.1	SUMMARY.....	1
2	DESCRIPTION OF EQUIPMENT AND CHANGES TO EQUIPMENT.....	1
3	TEST CONFIGURATION	2
3.1	TESTING ALGORITHM	2
3.2	POWER OUTPUT TESTING.....	2
3.3	CARRIER BANDWIDTH TESTING.....	2
3.4	SPURIOUS EMISSIONS AT ANTENNA TERMINAL TESTING.....	2
3.5	MPE CALCULATIONS.....	2

TABLES

Table 1. Occupied Bandwidth.....	2
Table 2. MPE Results.....	3
Table 3. Equipment Under Test.....	3
Table 4. Equipment Calibration List.....	3

EXHIBITS

Exhibit 1.	Carrier Bandwidth Plot
Exhibit 2.	Emissions At The Antenna Terminal Plots
Exhibit 3.	EUT Photographs

APPENDICES

Appendix A.	Statement of Measurement Uncertainty
-------------	--------------------------------------

FCC CLASS II PERMISSIVE CHANGE REPORT

for

M/A Com - Private Radio Systems
FCC ID: AXATR-307-D2

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 (SIM) and other channel **SitePro Controller**(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 Bandwidth

Frequency (MHz)	Resolution Bandwidth	Video Bandwidth	Measured BW (kHz)	Peak Measured Power (W)
498.025	300 Hz	300 Hz	9.75 kHz	90

A spectrum analyzer plot of the bandwidth can be found in Exhibit 2.

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 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

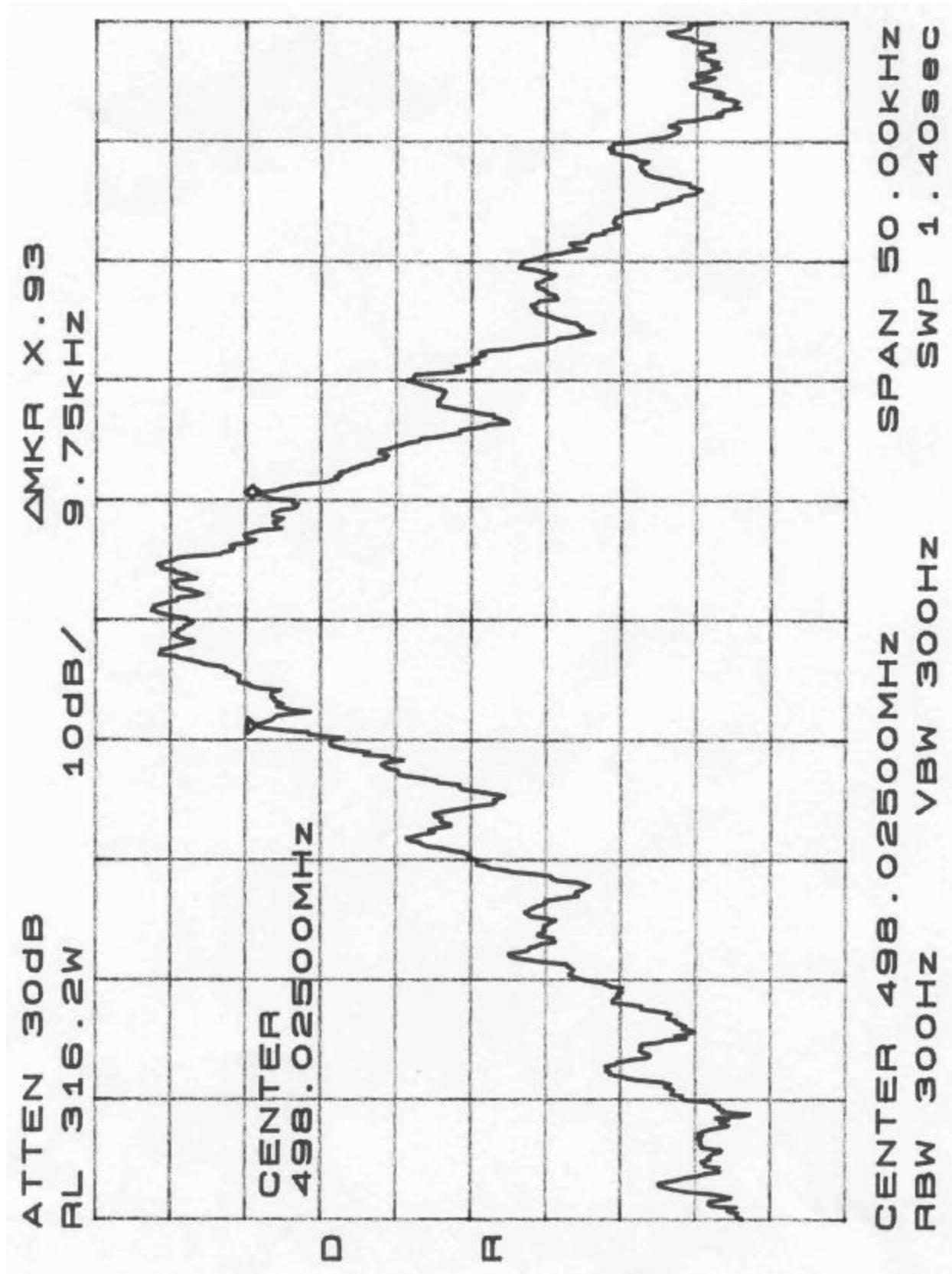
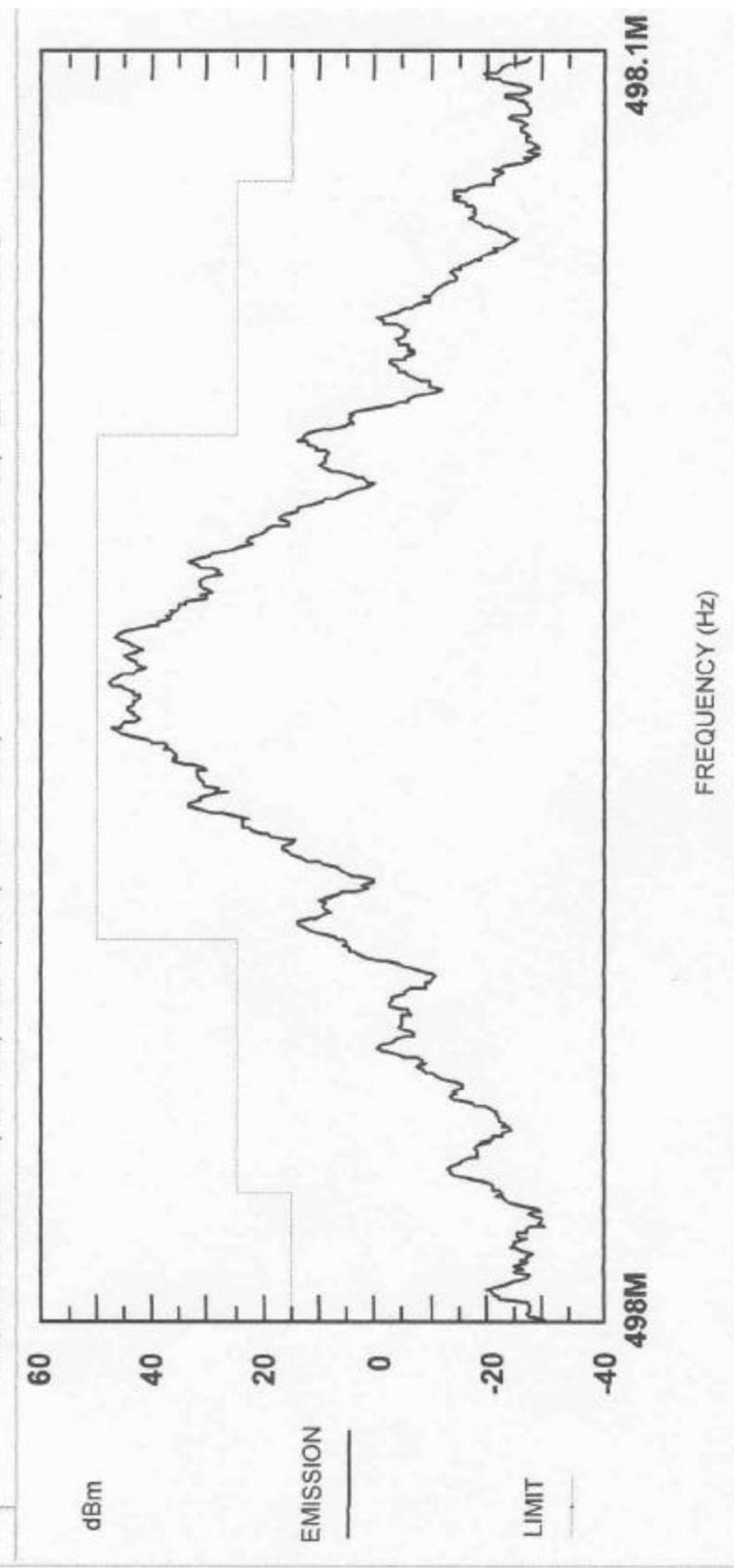


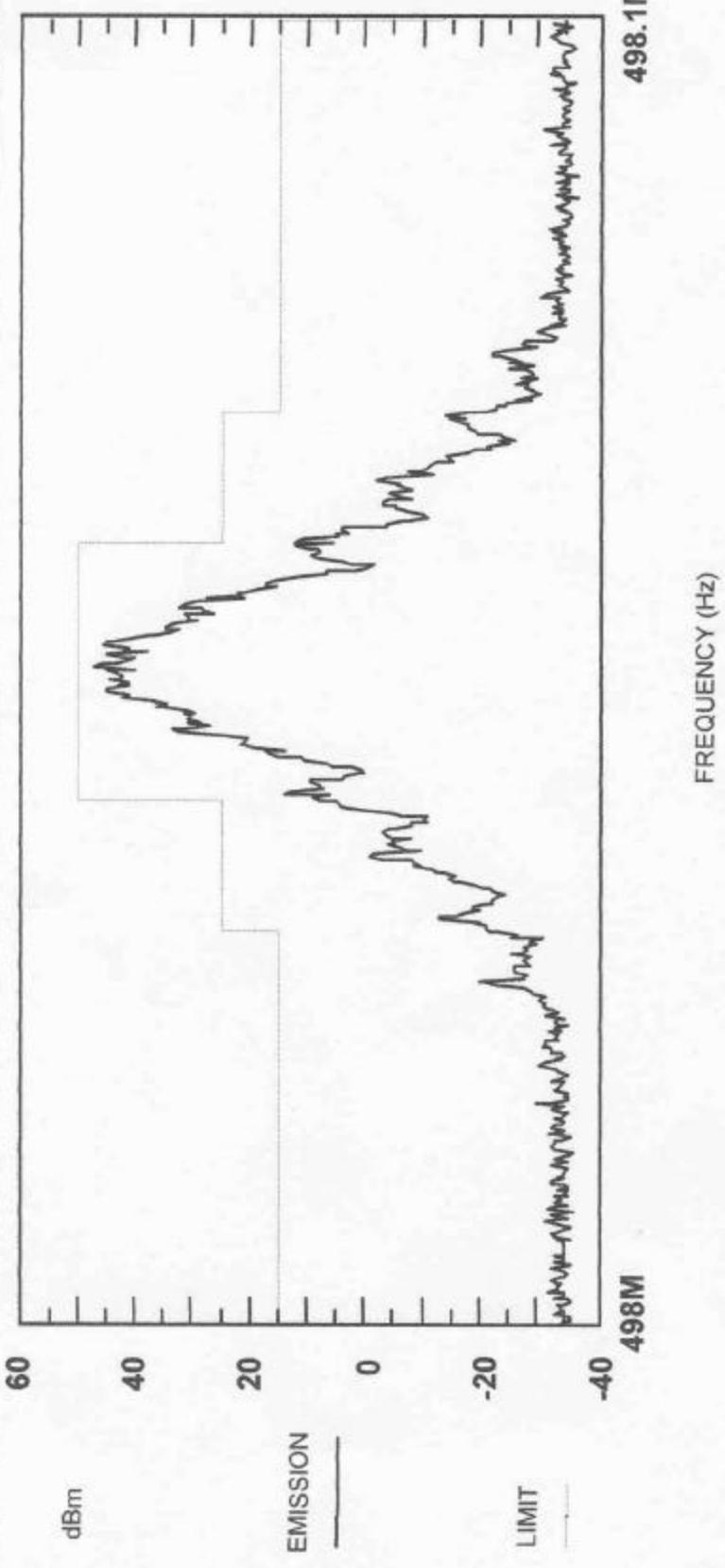
Exhibit 2. Emission at Antenna Terminal Plots

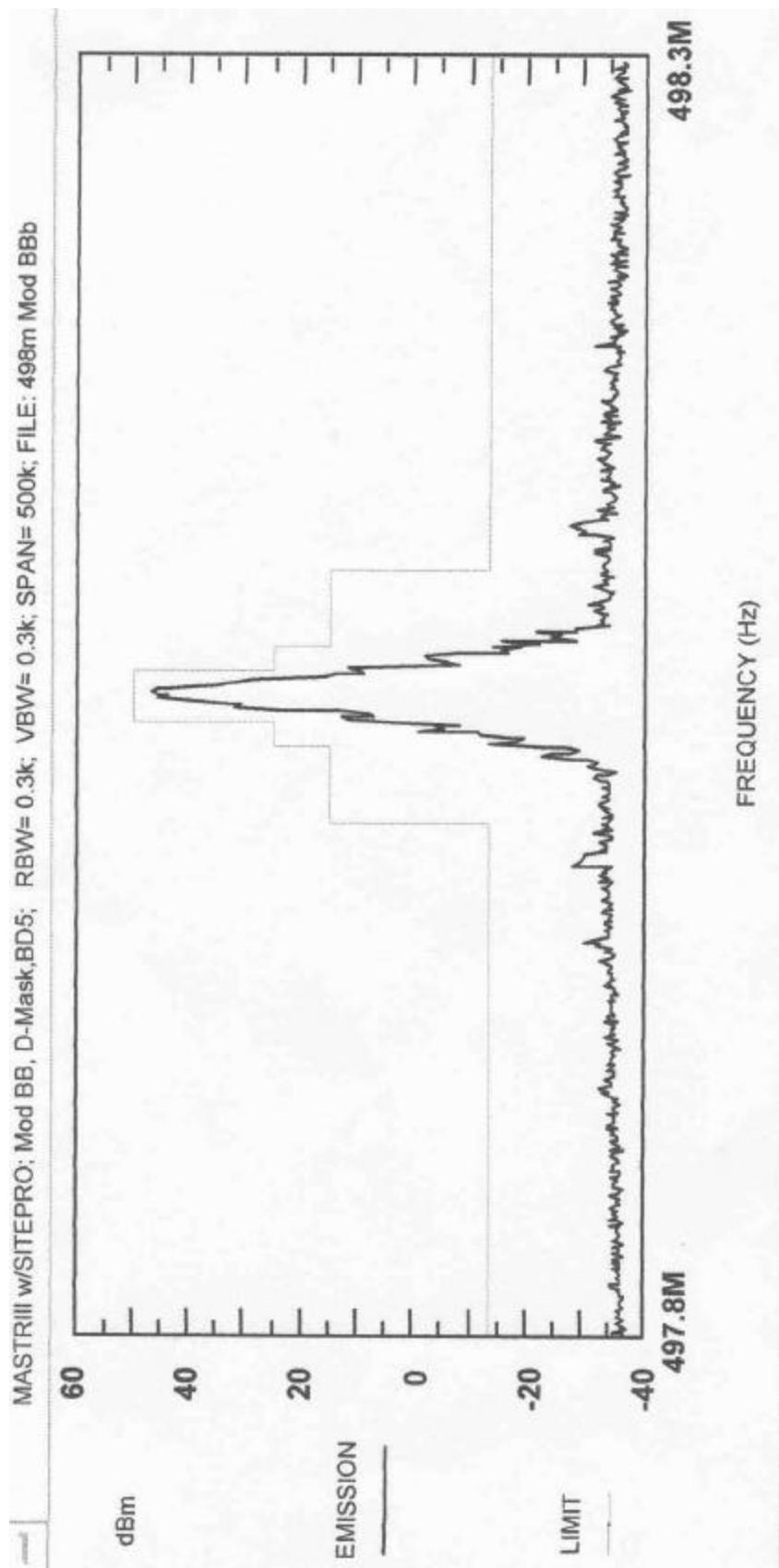
MASTR III w/SITEPRO; Mod BB, D-Mask, BD5; RBW= 0.3k; VBW= 0.3k; SPAN= 50k; FILE: 498m Mod BB



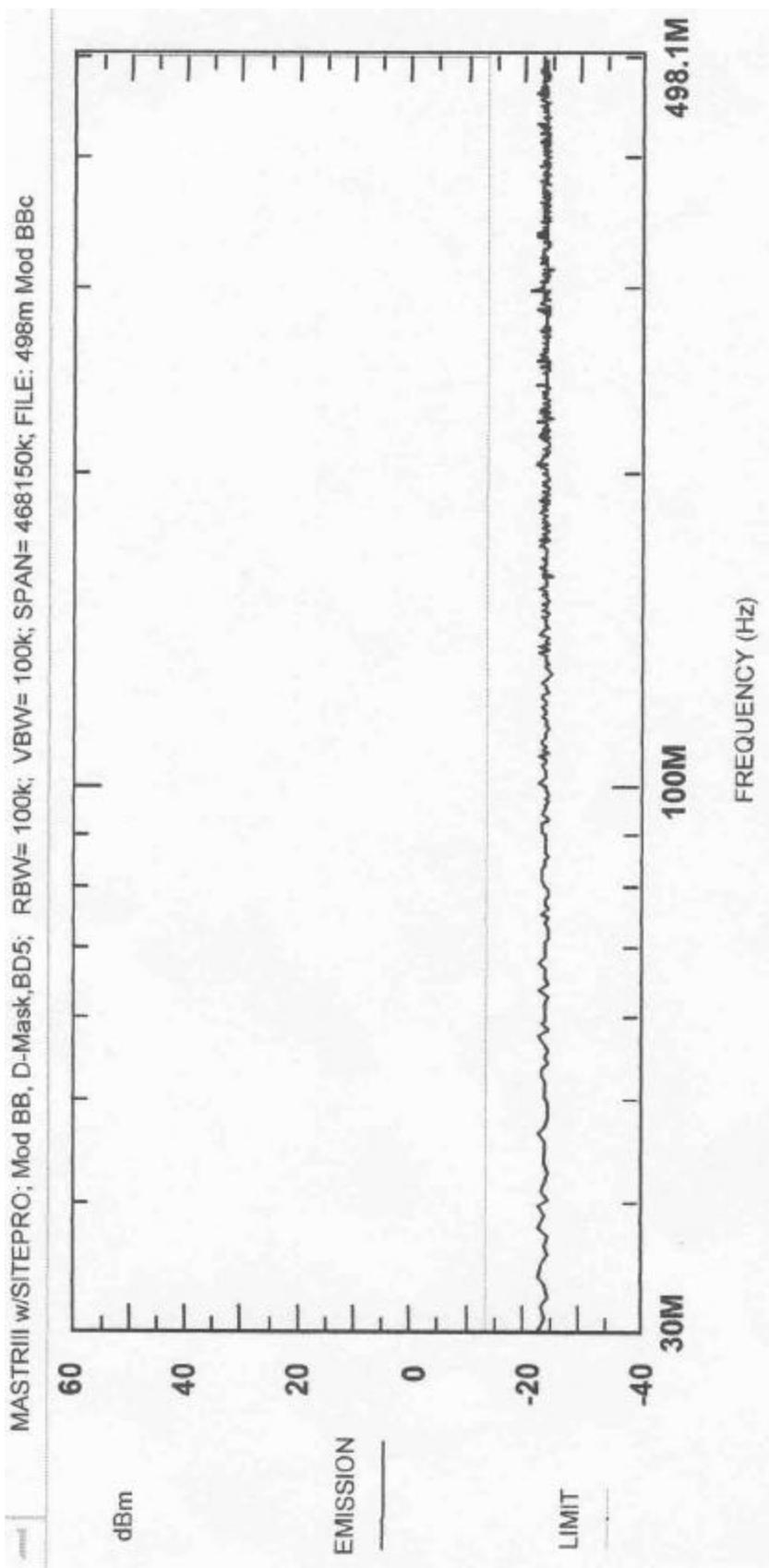
MASTR III with SitePro Controller
FCC ID: AXATR-307-D2
WLL Project #: 6475X-D2

MASTR III w/SITEPRO; Mod BB, D-Mask,BD5; RBW= 0.3k; VBW= 0.3k; SPAN= 100k; FILE: 498m Mod BBa



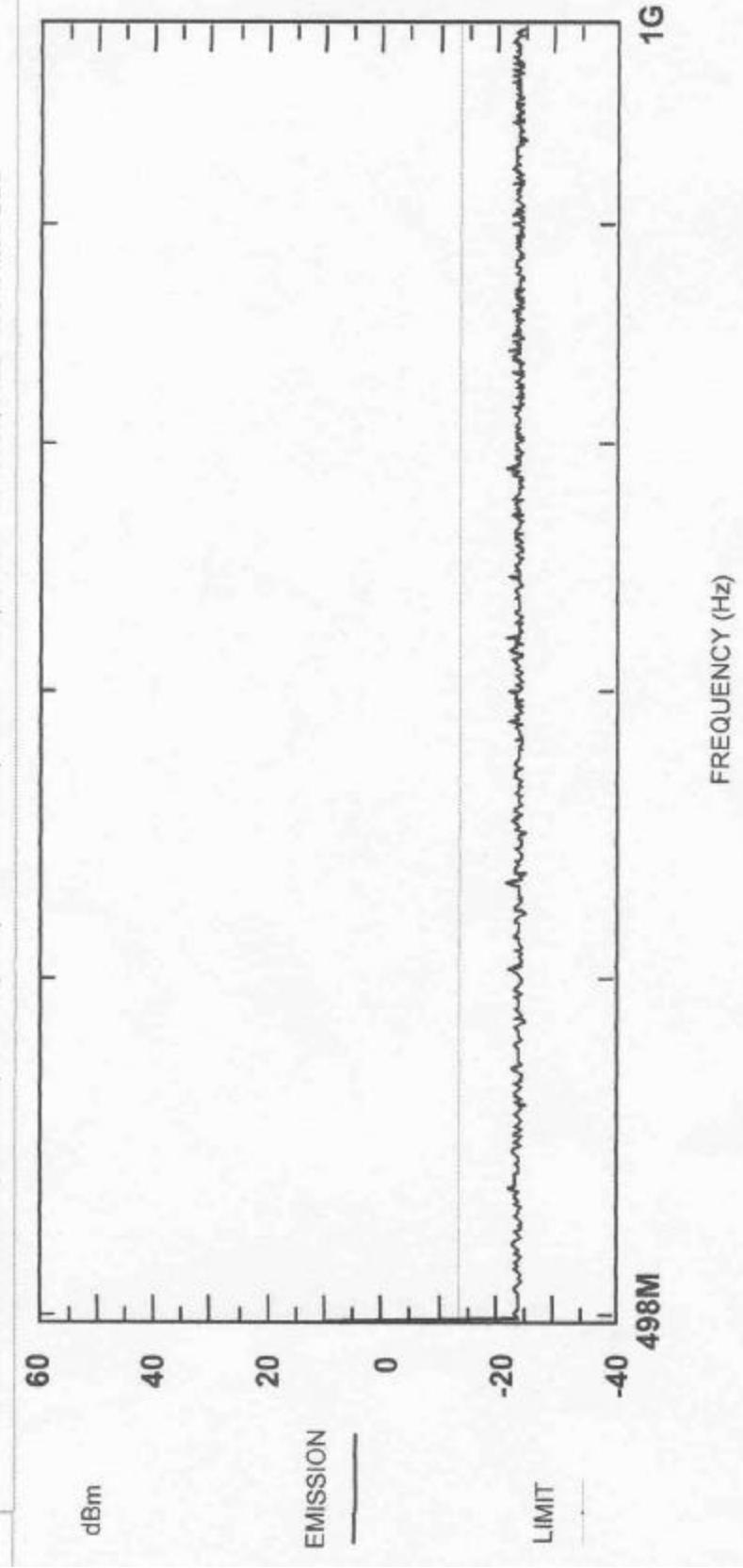


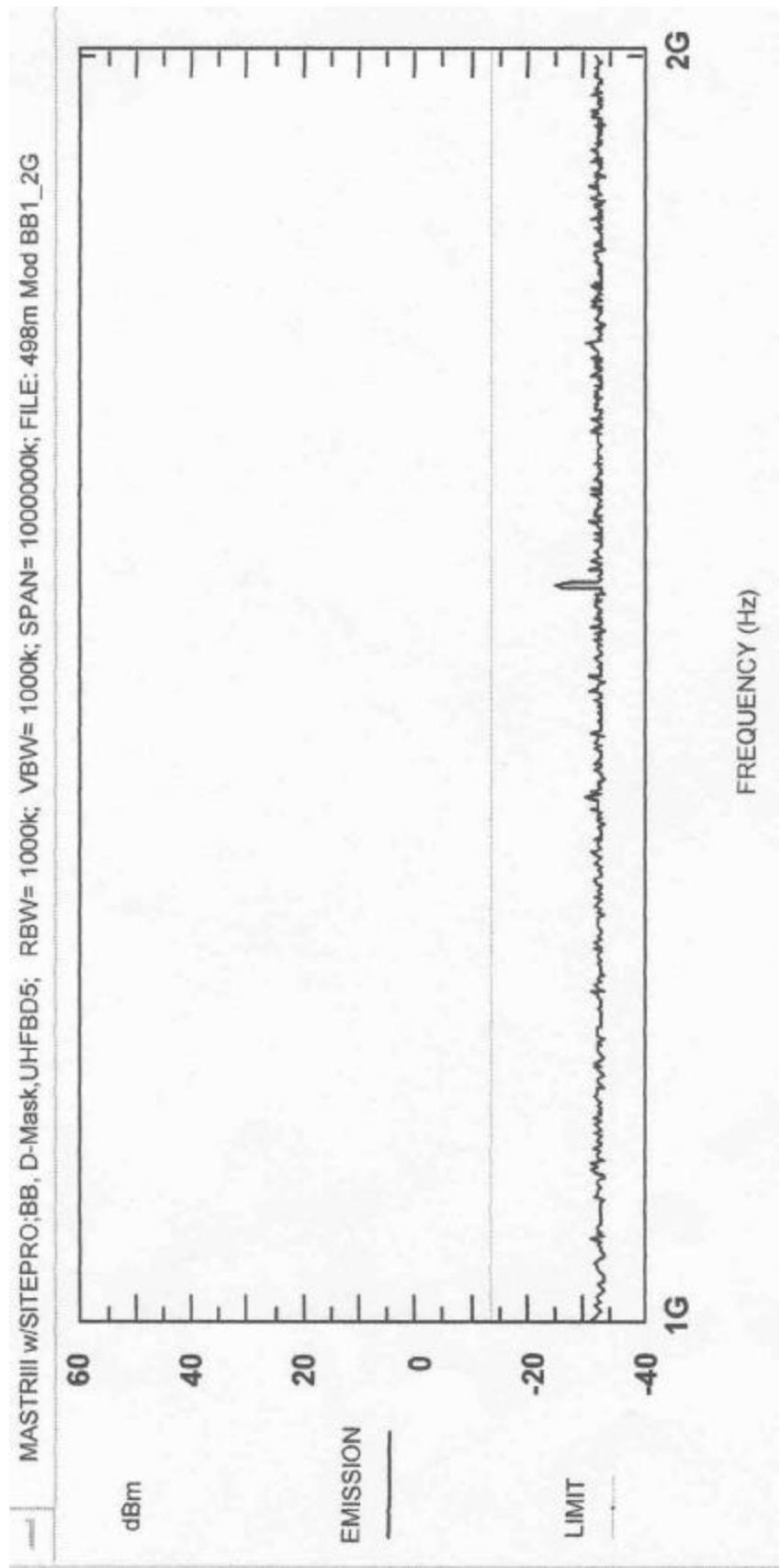
MASTR III with SitePro Controller
FCC ID: AXATR-307-D2
WLL Project #:6475X-D2



MASTR III with SitePro Controller
FCC ID: AXATR-307-D2
WLL Project #:6475X-D2

MASTR III w/SITEPRO; Mod BB, D-Mask,BD5; RBW= 100k; SPAN= 501975k; FILE: 498m Mod BBd





MASTR III w/SITEPRO;BB, D-Mask,UHFBD5; RBW= 10000k; VBW= 1000k; SPAN= 3000000k; FILE: 498m Mod BB2_5G

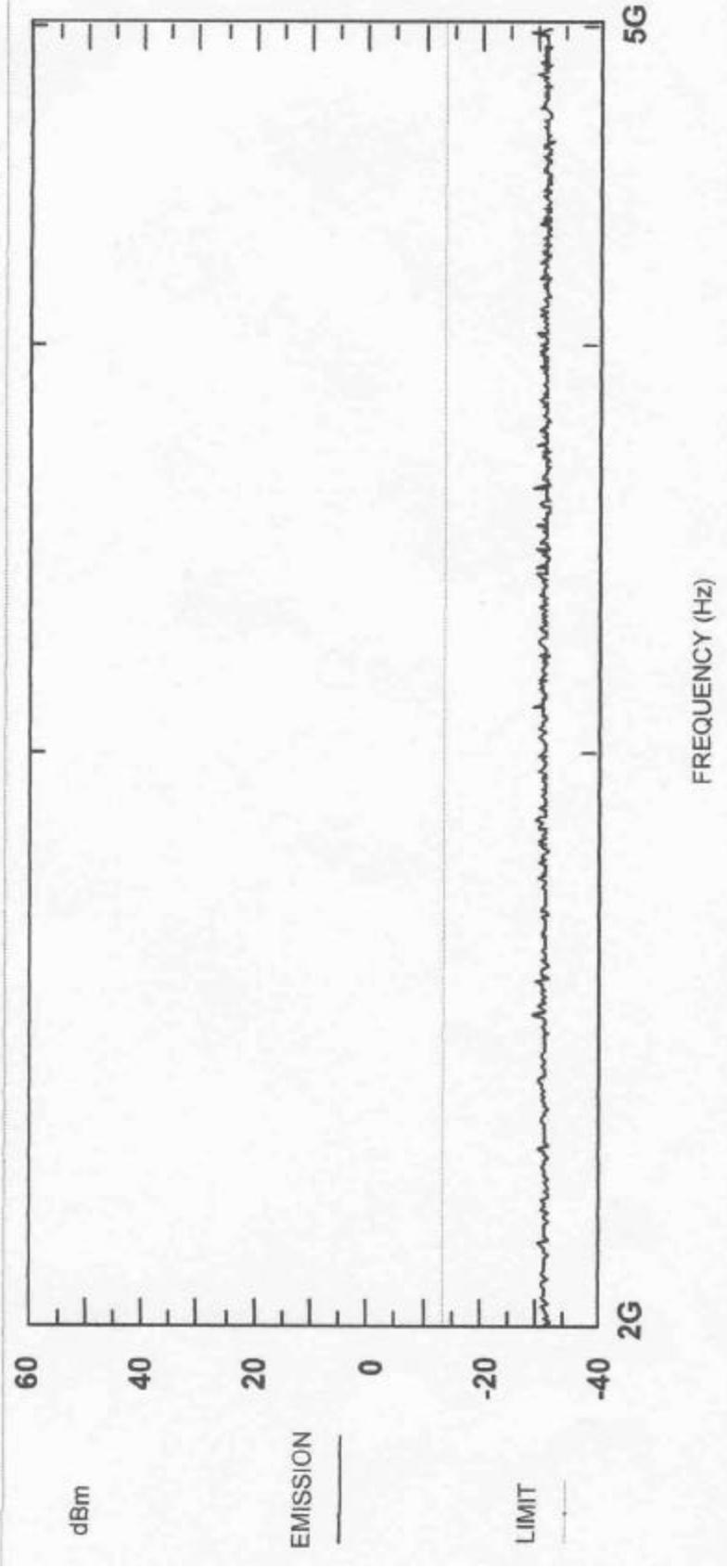


Exhibit 3. MPE Calculation

STUDENT >

$$\text{STUDENT} > \text{evalf}\left(\left(\frac{1000 \cdot 1.64}{.0014 \pi \frac{851}{1500}}\right)^{\frac{1}{2}}, 15\right)$$

cm assuming a maximum 1000 Watts ERP per 90.635 479.620614869999

$$\text{STUDENT} > \text{evalf}\left(\left(\frac{1000 \cdot 1.64}{.0014 \pi \frac{851}{1500}}\right)^{\frac{1}{2}}\right)$$

inches assuming a maximum 1000 Watts ERP per 90.635 188.827013707022

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

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

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