

**EMC Test Report
In Accordance With
FCC Part 90****For the****P7100(PI) 800 MHz Portable Land Mobile Radio****FCC ID: OWDTR-0018-E**

Types of Emission: F3E, F1D, F1E

Grantee: M/A COM Private Radio Systems, Inc.
3315 Old Forest Road
Lynchburg, VA 24501

Grantee Contact: Bryan McWatters (434)385-2146

Test Site: Ericsson EMC Laboratory
1 Mountain View Road
Lynchburg, VA 24502

Test Date: September 30 ~ October 11, 2002

Report Date: October 14, 2002

Report Prepared By:


John Barnard
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TABLE OF CONTENTS

Request for Grant.....	3
General Information.....	3
Description of Equipment Under Test.....	3
Specific List of Equipment Under Test.....	3
Test Facility.....	3
Statement of Conformance.....	4
FCC Certification Information.....	5
2.1033(c)(1) Applicant.....	5
2.1033(c)(2) FCC ID.....	5
2.1033(c)(3) Instructions/Installation Manual.....	5
2.1033(c)(4) Type of Emission.....	5
2.1033(c)(5) Frequency Range.....	5
2.1033(c)(6) Operational Power	5
2.1033(c)(7) Maximum FCC Allowed Power Level.....	5
2.1033(c)(8) Applied Voltage and Current.....	5
2.1033(c)(9) Tune-up Procedure	5
2.1033(c)(10) Description of Freq. Determining/Stabilizing.....	6
2.1033(c)(11) Photographs or Drawing of Equipment.....	6
2.1033(c)(12) Photographs of Equipment.....	6
2.1033(c)(13) Equipment Employing Digital Modulation.....	7
2.1033(c)(14) Data Taken per Section 2.1046 to 2.1057.....	7
2.1046 Measurements Required: Antenna Port RF Power Output.....	7
2.1047 Measurements required: Modulation characteristics.....	7
2.1047(a) Audio Frequency Response.....	7
2.1047(a) Audio Low Pass Filter.....	8
2.1047(a) Modulation Limiting.....	9
2.1049 Measurements required: Occupied bandwidth.....	10
2.1051 Measurements Required: Spurious emissions at antenna.....	16
2.1053 Measurements Required: Field Strength of spurious.....	18
2.1055 Measurements required: Frequency stability.....	19
2.1057 Frequency Spectrum to be Investigated.....	21
2.202 Necessary Bandwidth and Emission Bandwidth.....	22

Compliance Test / Request of Grant

This is the original test and request for Grant of Certification for the P7100(PI) Portable Land Mobile Radio, FCC ID OWDTR-0018-E, with types of emissions to include analog modulation, digital modulation, and digital signals, and having emission designators of F3E, F1D, and F1E.

General Information

The following report has been prepared for M/A Com Private Radio Systems, Inc. for the purpose of FCC Type certification of the P7100(PI) Portable Land Mobile Radio, FCC ID OWDTR-0018-E. Further references of this equipment may be as the "EUT" and further references of this manufacturer may be as "M/A Com" in the following report. This report covers the required issues as defined by the rules set forth by the U.S. Federal Communications Commission and Industry Canada. The following report and any referenced or associated data applies only to the specific Equipment Under Test, known hereafter as the EUT, as defined within this report. The following information represented in this report is in accordance with FCC Rules 47CFR, ANSI C63.4:2000, and Industry Canada RSS-119, and TIA/EIA-603. All test instrumentation, cables, loads, attenuators, and test facilities, etc. are routinely checked and data tracked as a means of proficiency testing and to further reduce the risk of error during measurements.

Description of EUT

The EUT is the P7100(PI) Portable Land Mobile Radio, by M/A Com Private Radio Systems, Inc. The EUT is an 800MHz Portable Land Mobile communications device. The EUT is typically battery operated, uses a whip antenna, and is equipped with an accessory connection for a speaker/microphone device. The EUT also employs a rechargeable battery having an associated desktop battery charging apparatus typically used during non-transmit modes of operation.

Specific List of Equipment Under Test

The following is an itemized list of the Equipment presented for testing:

Description	Manufacturer	Model Number	Serial Number	FCC ID
Transceiver	M/A Com	P7100(PI)	TMS1-P1FCC01	OWDTR-0018-E
Battery	M/A Com	BKB 191 210/5 R5A	N/A	N/A
Hand Microphone	M/A Com	KRY 101 1617/183 R1A	N/A	N/A
Battery Charger	M/A Com	BML 161 78/20	N/A	N/A
Whip Antenna	M/A Com	KRE1011223/01	N/A	N/A

Test Facility

The Ericsson EMC Laboratory test facility is located on the grounds of Ericsson, Inc., Lynchburg, VA. The facility consists of a Three (3) Meter Open Area Test Site, an AC Line Conducted Measurements area, and complimenting laboratory space. The laboratory is accredited by A2LA, The American Association of Laboratory Accreditation for EMC testing, lab code number, certificate number 1758-01. The FCC recognizes the Ericsson EMC laboratory as an EMC test firm with a registration number of 90596 and recognized by Industry Canada, reference number IC 287.

Statement of Conformance**General**

The Rules and Regulations found within the U.S. CFR47 Parts 2, 15, 90, Industry Canada RSS-119, and the Standards found in ANSI C63.4:2000, TIA/EIA-603:1992, TIA/EIA-102.CAAA:1999, and good engineering practices have all been applied to the testing of the P7100(PI) Portable Land Mobile Radio, presented for regulatory testing by M/A Com Private Radio Systems, Inc.

Equipment

The following was the electronic equipment presented for testing:

Description	Manufacturer	Model Number	Serial Number	FCC ID
Transceiver	M/A Com	P7100(PI)	TMSI-P1FCC01	OWDTR-0018-E
Battery	M/A Com	BKB 191 210/5 R5A	N/A	N/A
Hand Microphone	M/A Com	KRY 101 1617/183 R1A	N/A	N/A
Battery Charger	M/A Com	BML 161 78/6	N/A	N/A
Whip Antenna	M/A Com	KRE1011506/1	N/A	N/A

Statement

We the undersigned do hereby declare that the equipment listed above, being the same as described within the test report which this statement of conformance is a part, is in conformance with the standards, rules and regulations listed above.

No equipment modifications, deviations, additions, or exclusions from the above standards, rules or regulations were made during the testing and reporting of the test results.


John Barnard
Quality/Technical Manager
Ericsson EMC Laboratory

October 14, 2002

FCC Certification Information**2.1033(c)(1) Applicant:**

M/A COM Private Radio Systems, Inc.
 3315 Old Forest Road
 Lynchburg, VA 24501

2.1033(c)(2) FCC ID:

Applied FCC ID: OWDTR-0018-E
 Emission Designator(s): F3E, F1D, and F1E

2.1033(c)(3) Instructions/Installation Manual

Please refer to Exhibits for this information.

2.1033(c)(4), (5), and (6)

Emission Designator Part 2.1033(c)(4)	Frequency Range (MHz) Part 2.1033(c)(5)	Operational Power-Conducted (W) Part 2.1033(c)(6) High / Low Power
15K6F1D 15K6F1E	806-821	3.36 / 1.18
14K4F1D 14K4F1E	821-824	3.36 / 1.18
15K6F1D 15K6F1E	851-866	3.17 / 1.07
14K4F1D 14K4F1E	866-869	3.17 / 1.07
10K4F1D 10K4F1E	806-821	3.36 / 1.18
10K4F1D 10K4F1E	821-824	3.36 / 1.18
10K4F1D 10K4F1E	851-866	3.17 / 1.07
10K4F1D 10K4F1E	866-869	3.17 / 1.07
16K0F3E	806-821	3.36 / 1.18
14K0F3E	821-824	3.36 / 1.18
16K0F3E	851-866	3.17 / 1.07
14K0F3E	866-869	3.17 / 1.07

2.1033(c)(7) Maximum FCC Allowed Power Level

FCC 90.205(i) addresses maximum transmitter power limitations of equipment operating between "806–824/851–869 MHz and 896–901/935–940 MHz. "Power and height limitations are specified in § 90.635."

FCC 90.635(d) states: "The maximum output power of the transmitter for mobile stations is 100 watts (20 dBw).

2.1033(c)(8) Applied Voltage and Current

The applied voltage is 7.5VDC with a maximum DC input of 1.1 amps at full RF output power. Measured input current at anytime during testing of the transmitter was recorded at 1.1 amps.

2.1033(c)(9) Tune-up Procedure

Please refer to accompanying Exhibits.

2.1033(c)(10) Description of Frequency Determining/Stabilizing Circuits and Devices, Spurious Suppression and Power Limiting.

Please refer to accompanying Exhibits.

2.1033(c)(11) Photographs or Drawing of Equipment Identification Plate or Label

Please refer to accompanying Exhibits.

2.1033(c)(12) Photographs of Equipment

Please refer to accompanying Exhibits.

2.1033(c)(13) Equipment Employing Digital Modulation, Modulation System Description

Please refer to accompanying Exhibits.

2.1033(c)(14) Data Taken per Section 2.1046 to 2.1057**2.1046 Measurements required: Antenna Port RF Power Output.****Test Procedure:**

The EUT was operated in a typical fashion and the antenna output was connected to an average power meter through cabling and 30 dB of attenuation. A 20-dB and a 10-dB attenuator were used in series to form 30-dB combined attenuation and were then characterized. The characterized loss factor of the attenuators and cables were used to offset/correct emission measurement values during testing. The resulting output power was measured at the top, middle and bottom of the band and was recorded (see chart below).

Antenna Port RF Power Output Measurement Results:

Frequency (MHz)	High Power (W)	Low Power (W)
806.0125	3.36	1.18
815.5000	3.33	1.16
823.9875	3.33	1.16
851.0125	3.21	1.07
863.0000	3.17	1.07
868.9875	3.17	1.07

Equipment List:

Manufacturer	Model #	Serial Number	Description
Hewlett Packard	437B	3125U17126	POWER METER
Hewlett Packard	83732A	3339A00302	SIGNAL GENERATOR 10MHz-20GHz
Insulated Wire	NPS-2501-200-NPS	CABLE 13	LOW LOSS CABLE
Weinschel	33-20-34	AU6604	DC-8GHz/20dB/25Watt Attenuator
Weinschel	33-10-34	AY6086	DC-8GHz/10dB/25Watt Attenuator

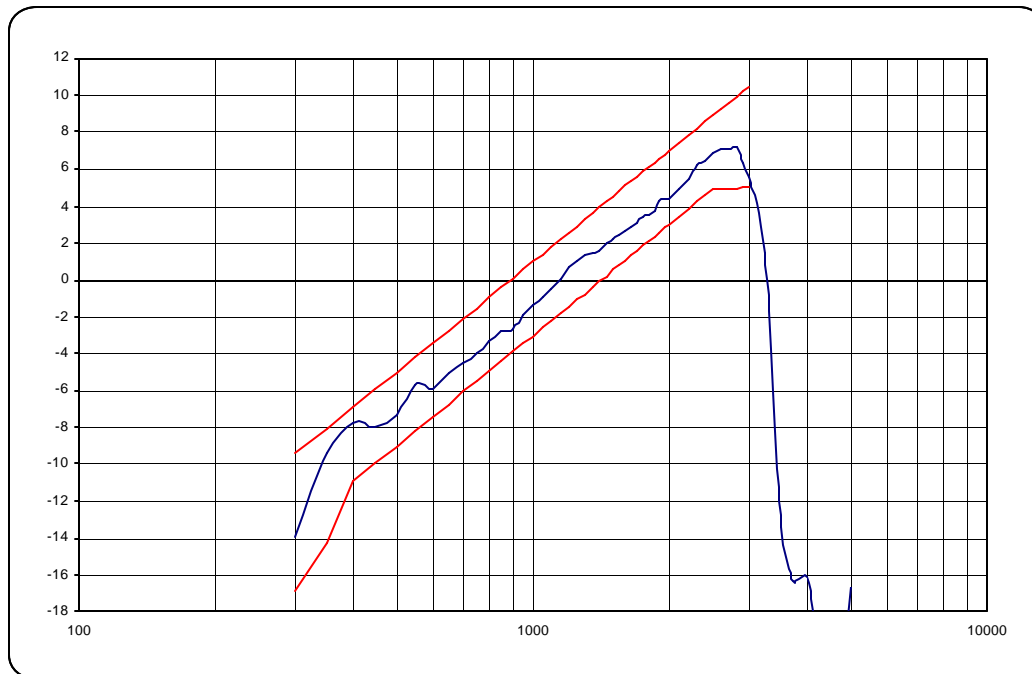
2.1047 Measurements required: Modulation characteristics.**Test Procedure**

The audio frequency response of the EUT was determined using methodologies found in TIA/EIA-603:1992. The EUT was operated in a typical fashion and the output was connected to a Rohde & Schwarz FSIQ-7 modulation analyzer through 30 dB of attenuation. A 20-dB and a 10-dB attenuator were used in series to form the 30 dB of combined attenuation. The external LF output connection of a Rohde & Schwarz SME-03 signal generator was used as an audio source and connected to the microphone input of the EUT. The specific levels, tones, and configurations of the individual sections of TIA-603 were used where appropriate and defined below with each series of data.

FCC 2.1047(a) Modulation Characteristics - Audio Frequency Response

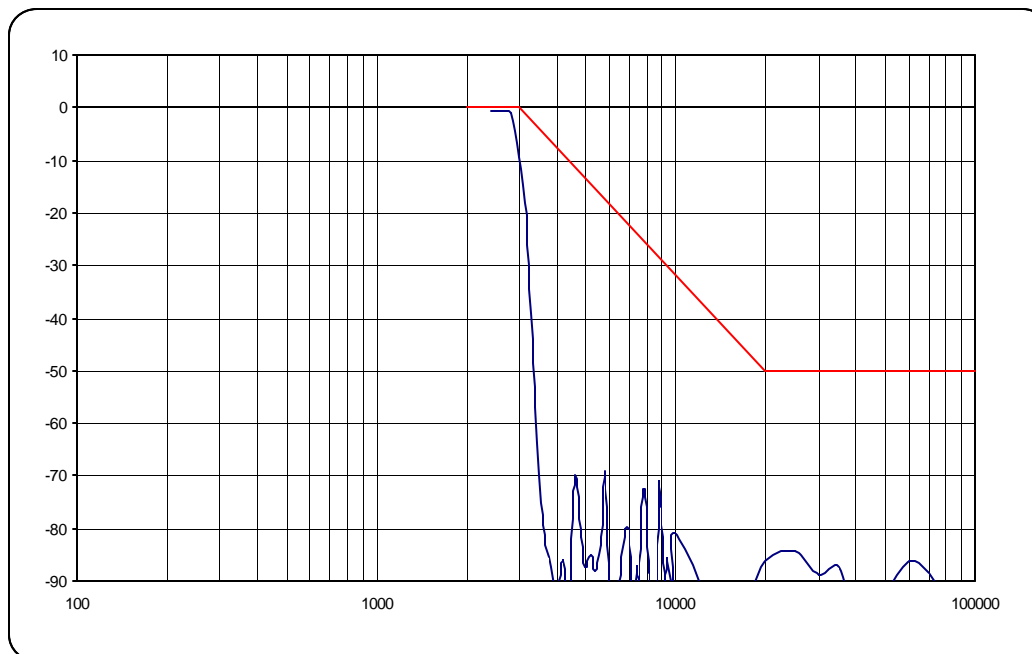
TIA/EIA-601:1992, Section 2.2.6

The microphone input of the EUT was driven with a 1000 Hz tone and set to produce 20% of the rated deviation. The audio generator was then varied from 100 Hz to 5KHz with the above-determined level held constant. The associated deviation at each frequency was then measured with a Rohde & Schwarz FSIQ-7 signal analyzer and recorded. The resulting audio frequency response of the EUT was as follows:

**FCC 2.1047(a) Modulation Characteristics - Audio Low Pass Filter**

TIA/EIA-601:1992, Section 2.2.15

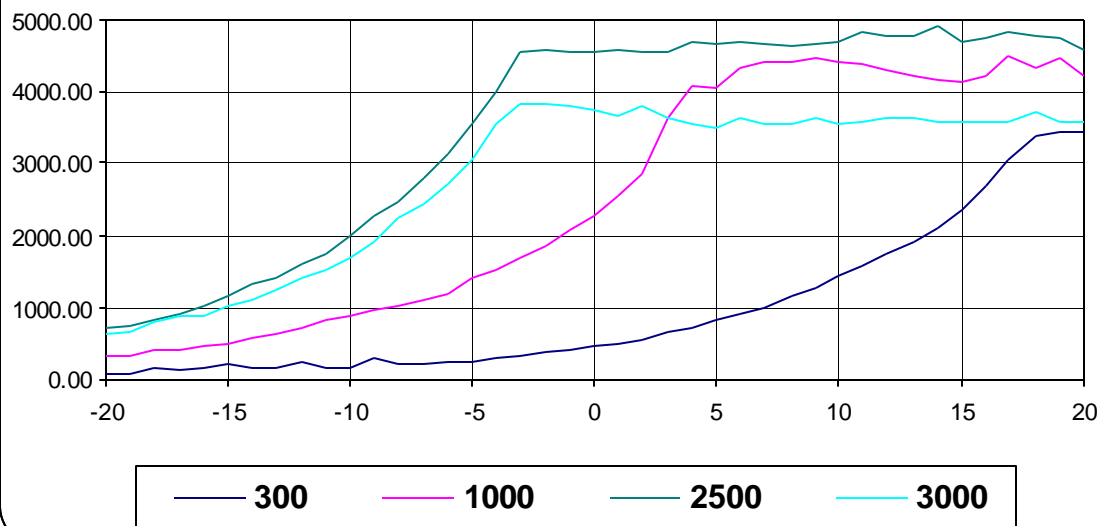
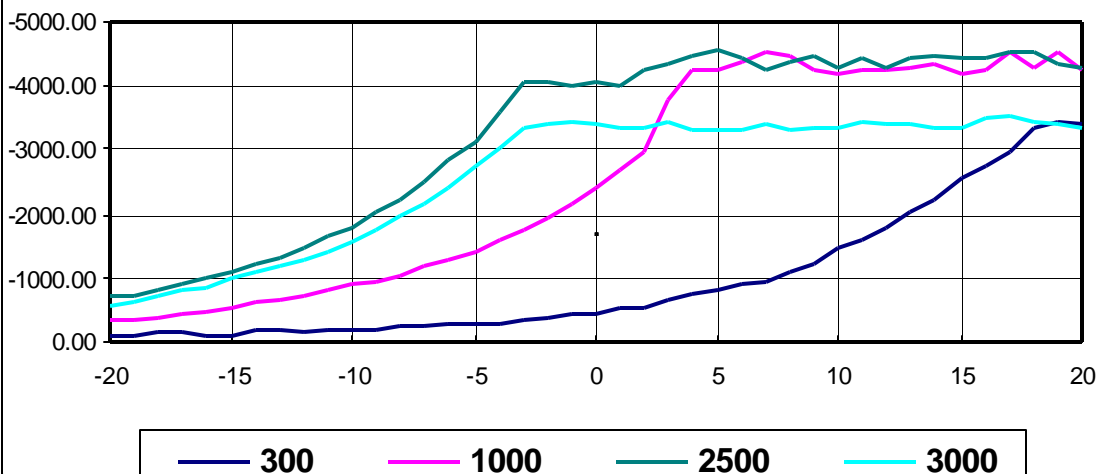
Frequency response of the post limiter filter circuit above 3000Hz.



FCC 2.1047(a) Modulation Characteristics - Modulation Limiting

TIA/EIA-603:1992, Section 2.2.3

The resulting deviation of a test that varies the microphone level plus and minus 20dB of the level required to produce 60% of the rated deviation with a 1000Hz tone. This test was repeated at 300Hz, 1000Hz, 2500Hz, and 3000Hz tones. The results are as follows:

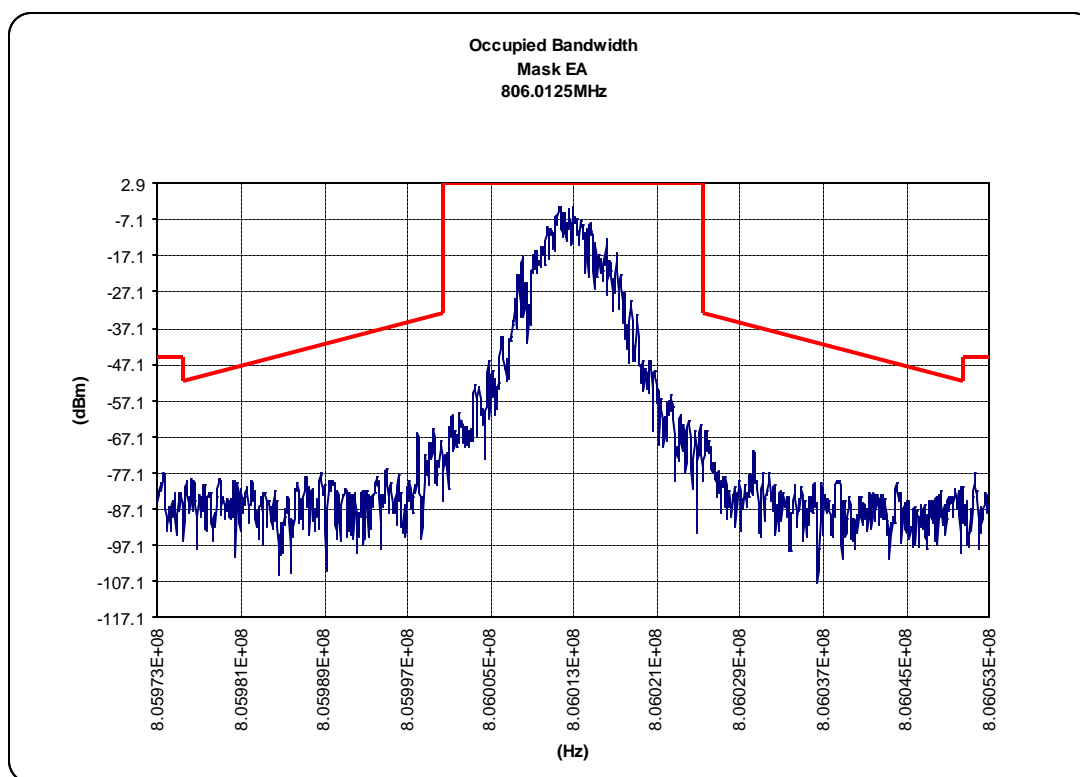
Modulation Limiting (Positive Peak)**Modulation Limiting (Negative Peak)**

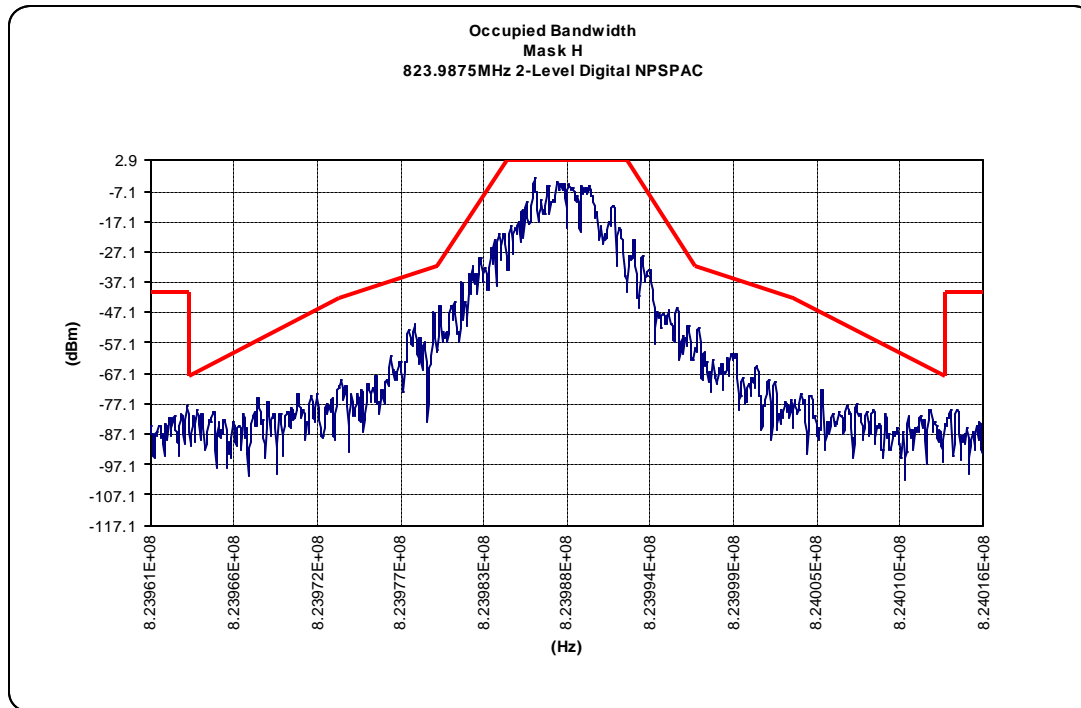
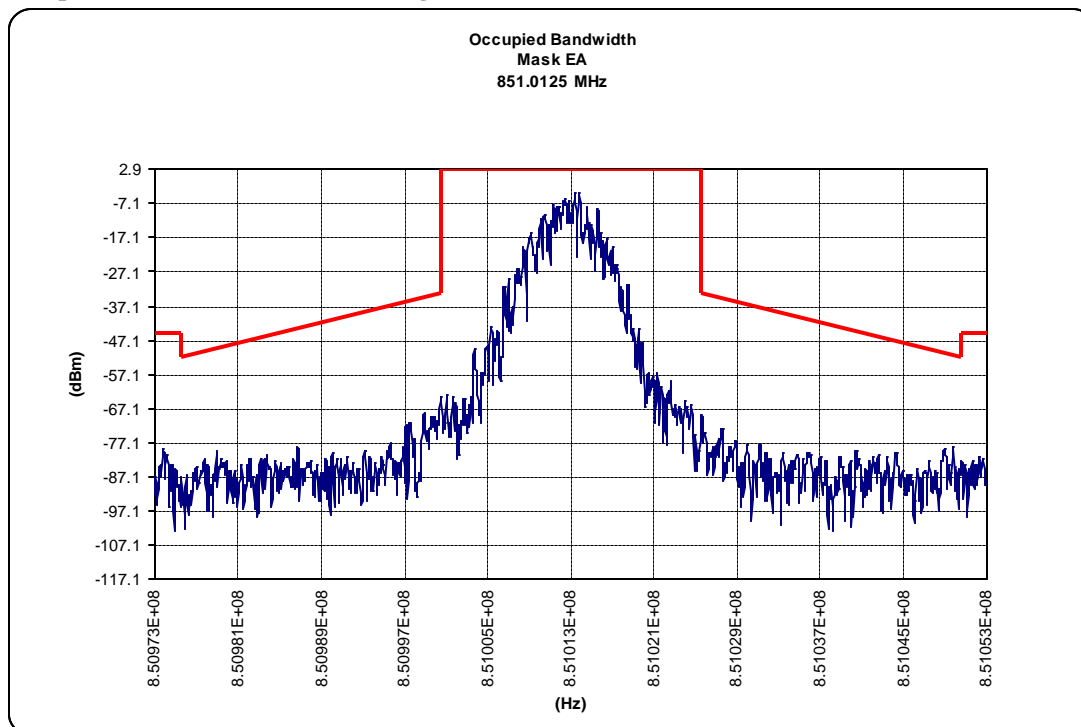
2.1049 Measurements required: Occupied bandwidth.**Test Procedure**

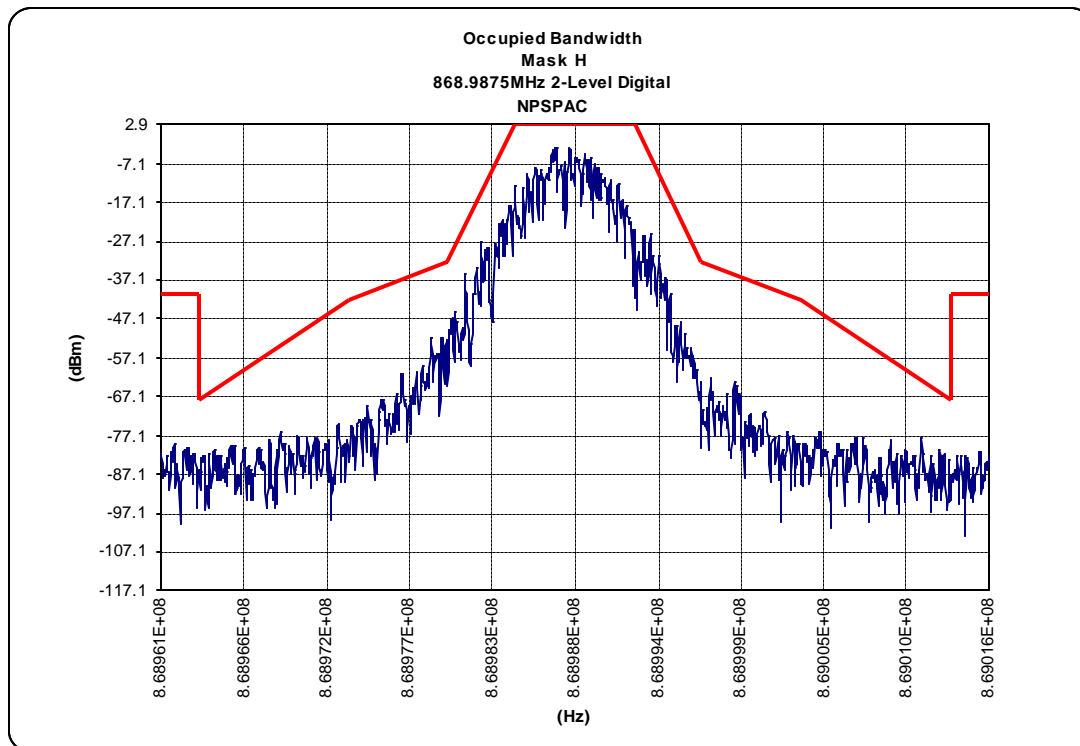
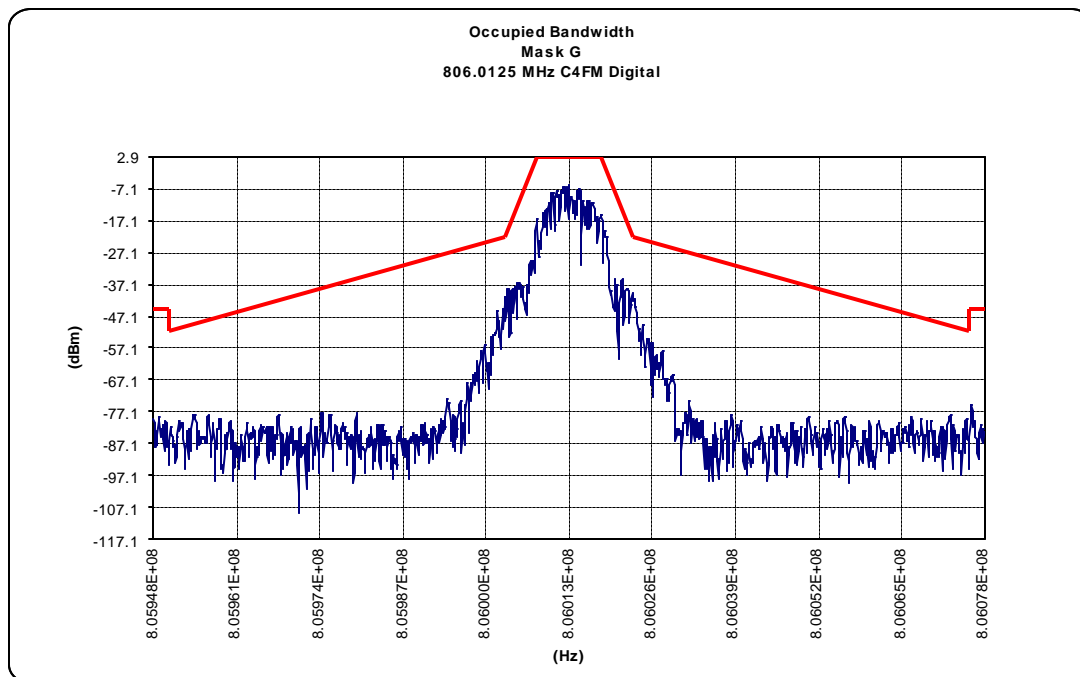
The EUT was operated in a typical fashion and the output was connected to a Rohde & Schwarz FSIQ-7 modulation analyzer through 30 dB of attenuation. A 20-dB and a 10-dB attenuator were used in series to form the 30 dB of combined attenuation. A 2500Hz modulating tone was applied during analog modulation tests with a level 16dB greater than required to produce 50% rated deviation with a 1000Hz tone. The FSIQ-7 was configured for correct channel spacing, resolution bandwidth, video bandwidth and set to measure 99% OBW with graphing to include the defined mask. Occupied bandwidth of the EUT output signal was measured by the instrument and reported in numerical value and in plot form (see the following charts/graphs). This setup/test procedure was repeated for each of the emission mask of interest.

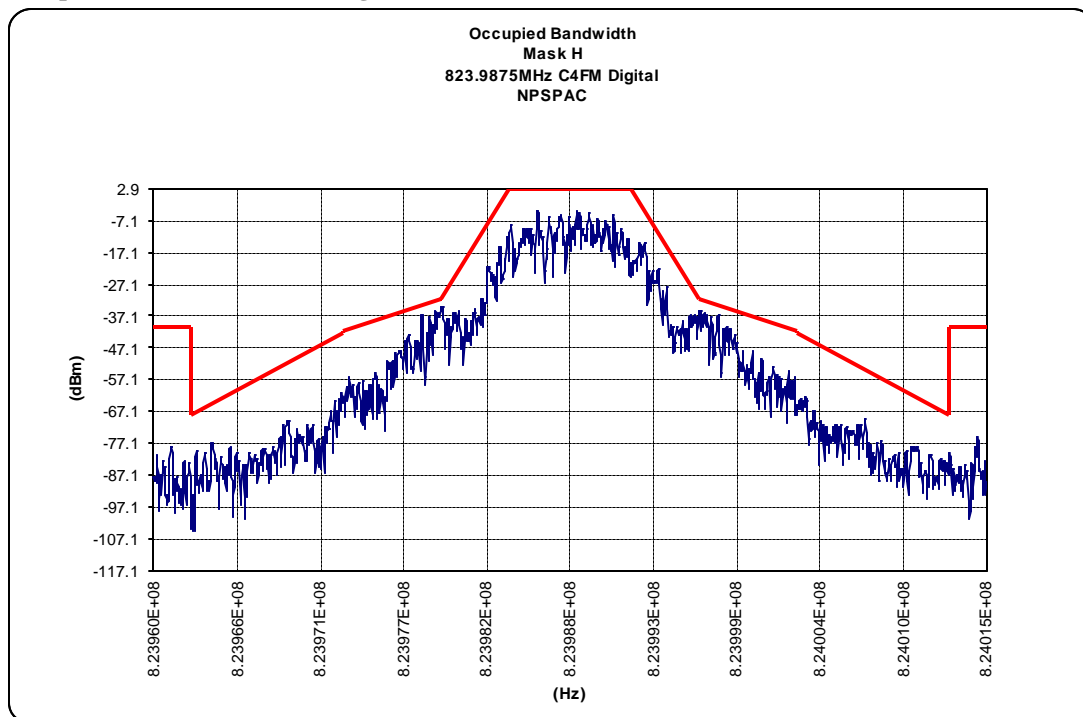
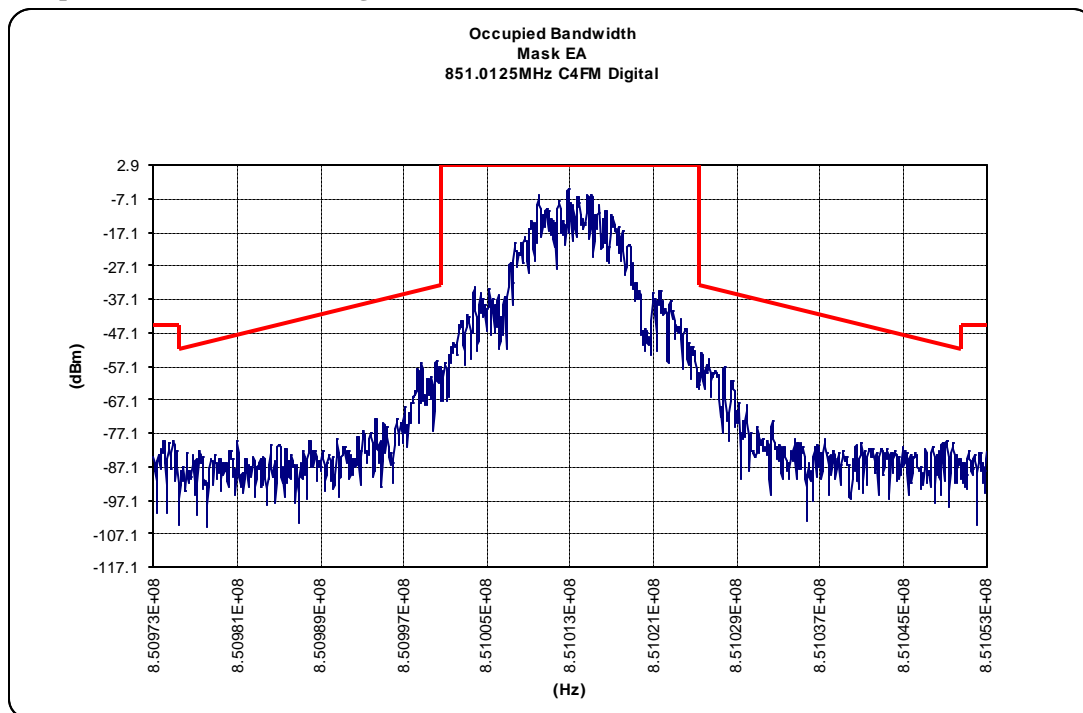
Occupied Bandwidth (Numeric Values):

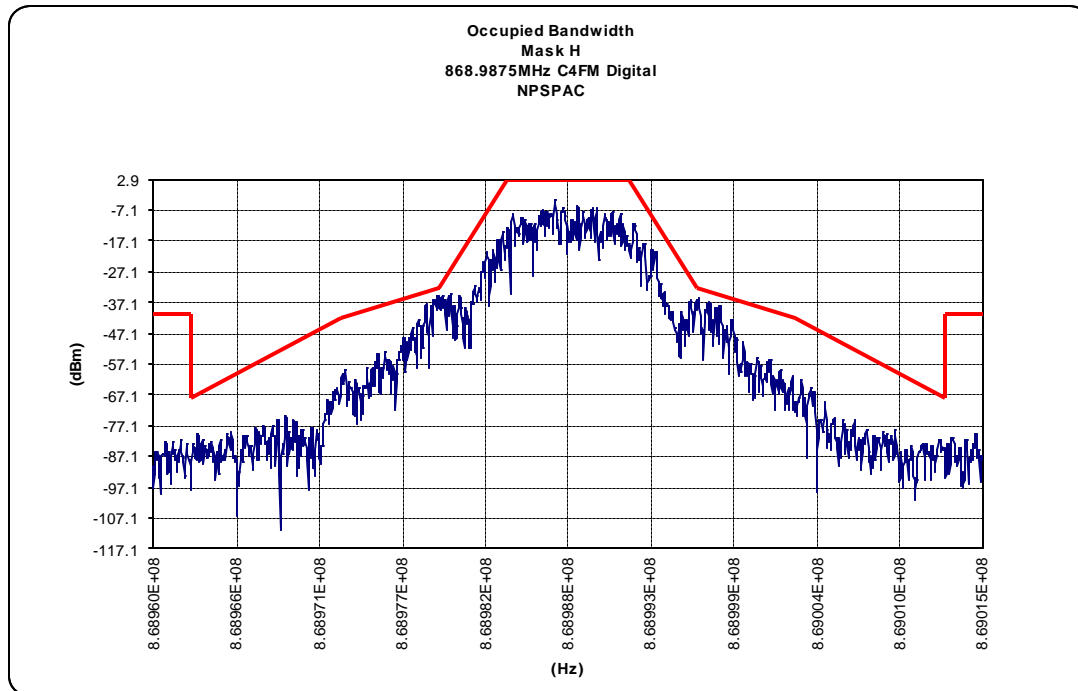
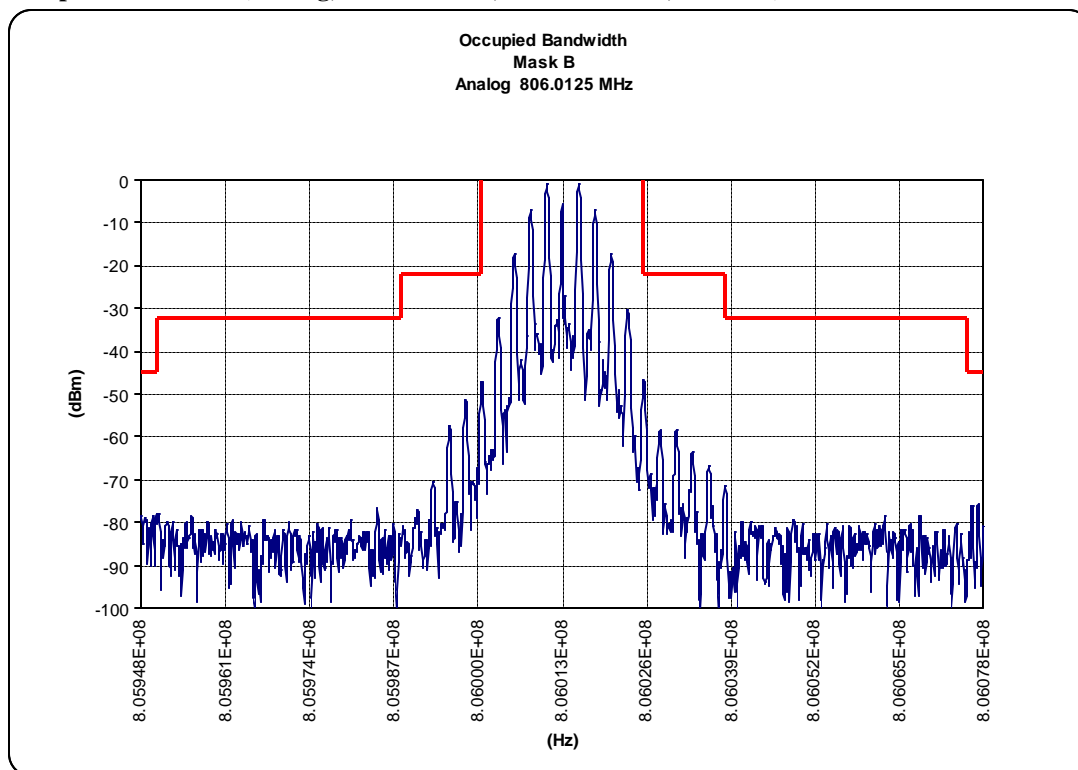
Frequency (MHz)	Mode	OBW
806.0125 MHz	Analog	14.6KHz
806.0125 MHz	2 Level FM Digital Modulation	9.3 KHz
806.0125 MHz	C4FM Digital Modulation	8.1 KHz

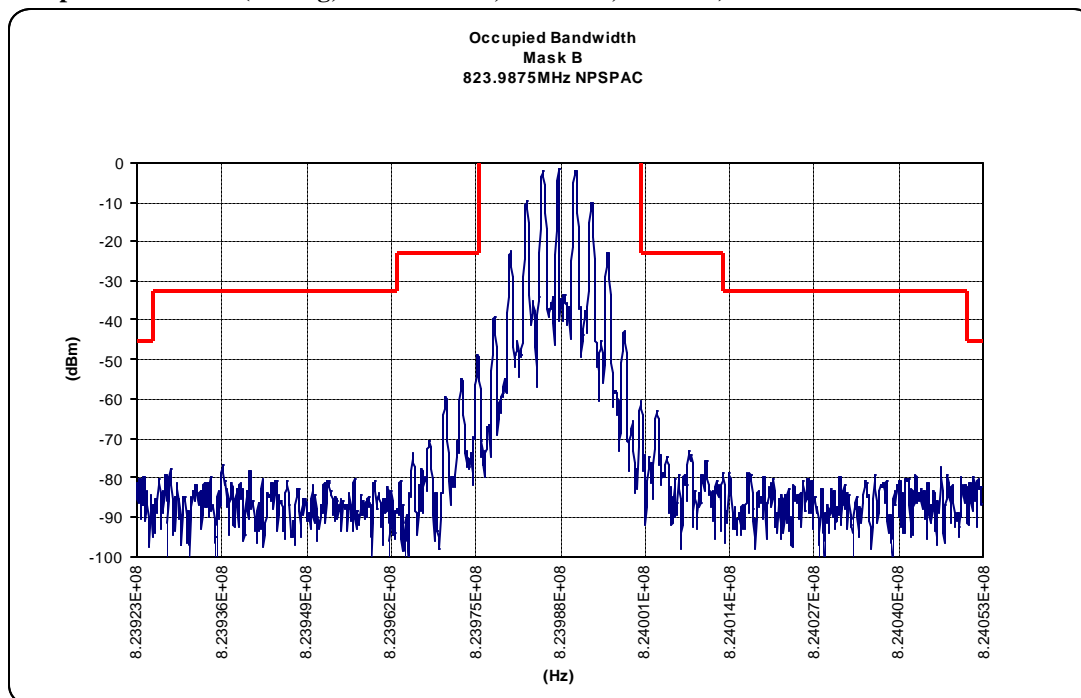
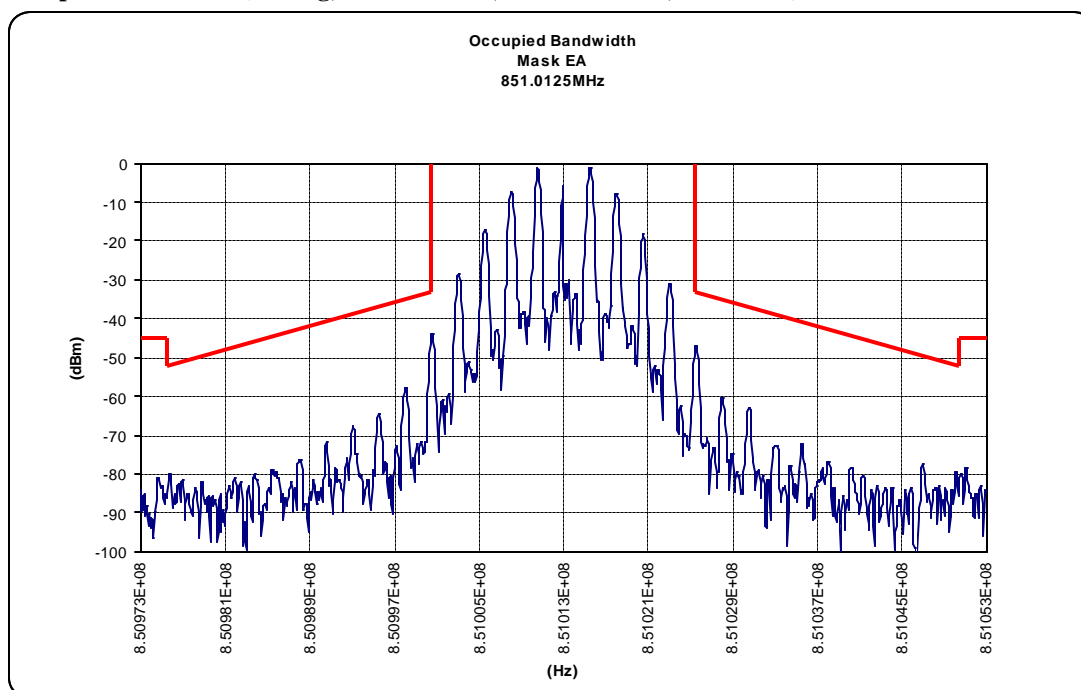
Occupied Bandwidth (2 Level FM Digital, 806-821MHz Band, Non-NPSPAC, Mask EA)

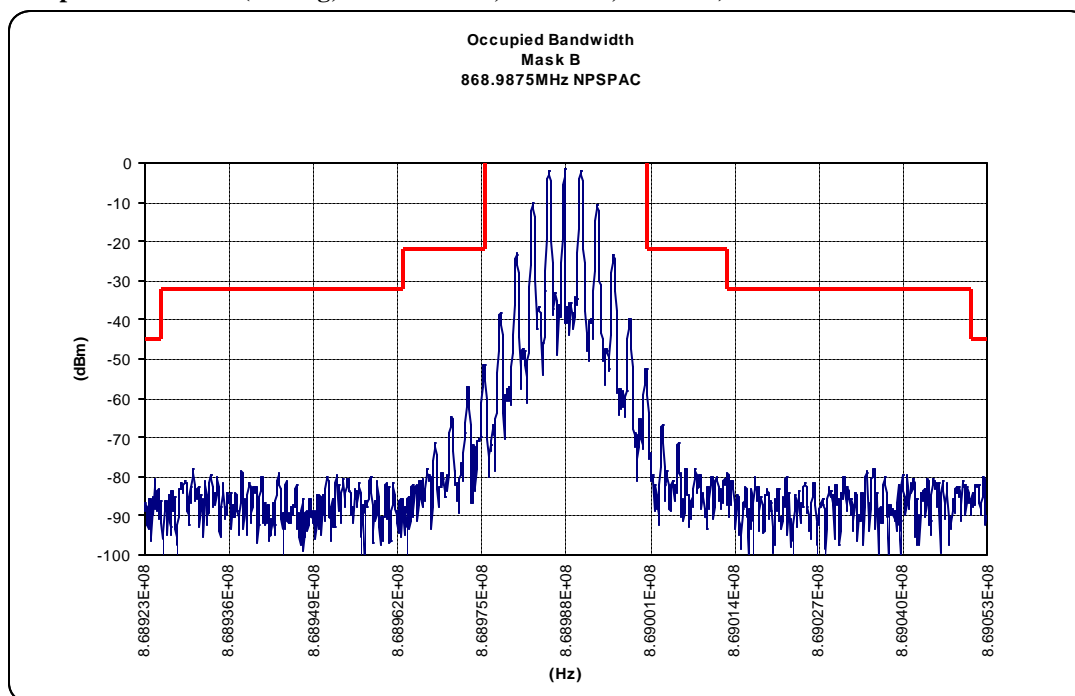
Occupied Bandwidth (2 Level FM Digital, 821-824MHz Band, NPSPAC, Mask H)**Occupied Bandwidth (2 Level FM Digital, 851-866MHz, Non-NPSPAC, Mask EA)**

Occupied Bandwidth (2 Level FM Digital, 866-869MHz, NPSPAC, Mask H)**Occupied Bandwidth (C4FM Digital, 806-821MHz, Non-NPSPAC, Mask G)**

Occupied Bandwidth (C4FM Digital, 821-824MHz, NPSPAC, Mask H)**Occupied Bandwidth (C4FM Digital, 851-866MHz, Non-NPSPAC, Mask EA)**

Occupied Bandwidth (C4FM Digital, 866-869MHz, NPSPAC, Mask H)**Occupied Bandwidth (Analog, 806-821MHz, Non-NPSPAC, Mask B)**

Occupied Bandwidth (Analog, 821-824MHz, NPSPAC, Mask B)**Occupied Bandwidth (Analog, 851-866MHz, Non-NPSPAC, Mask EA)**

Occupied Bandwidth (Analog, 866-869MHz, NPSPAC, Mask B)**Equipment List for Occupied Bandwidth:**

Manufacturer	Model #	Serial Number	Description
Rohde & Schwarz	FSIQ7	838397/023	Signal Analy zer
Rohde & Schwarz	SME03	DE10232	GENERATOR 5kHz-3.0GHz
Insulated Wire	NPS-2501-200-NPS	CABLE 4	LOW LOSS CABLE
Weinschel	33-20-34	AU6604	DC-8GHz/20dB/25Watt Attenuator
Weinschel	33-10-34	AY6086	DC-8GHz/10dB/25Watt Attenuator

2.1051 Measurements required: Spurious emissions at antenna terminals.**Test Procedure:**

The EUT was operated in a typical fashion and the antenna output was connected to test receiver. A tunable notch filter, 20 dB attenuator, 10 dB attenuator, and interconnecting cables were used in series to form a test fixture with sufficient attenuation at the carrier frequency to prevent front-end overload of the test receiver. The transmitter was then modulated by a 2500Hz tone with an input level 16dB greater than that required to produce 50% of the rated deviation at 1000Hz tone. The EUT was then investigated at top, middle and bottom of each band and any observed emissions were recorded. The EUT was then replaced with a signal generator and the frequency and output level of the generator adjusted to match the emission observed from the EUT. The substitution value was then recorded and the worst case emissions reported below. This procedure was repeated for each frequency of test and having the notch filter tuned accordingly for each frequency.

Frequency of Operation: 806.0125MHz

Channel Spacing: 25KHz

Mask B: (P(dBm) - (43+10Log P(W)))

Conducted Power: 3.36 Watts

Frequency (MHz)	Measured Value (dB)	Substitution Value (dB)	Margin (dB)
1612.0250	-92.84	-33.1	-20.1
2418.0375	-76.89	-43.6	-30.6
3224.0500 NF	-90.54	-64.6	-51.6
4030.0625 NF	-90.21	-60.2	-47.2
4836.0750 NF	-90.10	-62.0	-49
5642.0875 NF	-86.34	-53.6	-40.6
6448.1000 NF	-86.06	-54.9	-41.9
7254.1125 NF	-84.50	-46.3	-33.3
8060.1250 NF	-84.83	-44.0	-31.0

*NF = Noise floor Measurement, No Emission Observed

Frequency of Operation: 851.0125MHz

Channel Spacing: 25KHz

Mask B: (P(dBm) - (43+10Log P(W)))

Conducted Power: 3.21 Watts

Frequency (MHz)	Measured Value (dB)	Substitution Value (dB)	Margin (dB)
1702.0250	-84.89	-36.6	-23.6
2553.0375	-77.56	-44.9	-31.9
3404.0500 NF	-91.45	-56.3	-43.3
4255.0625 NF	-90.83	-59.2	-46.2
5106.0750 NF	-87.33	-52.7	-39.7
5957.0875 NF	-86.17	-46.4	-33.4
6808.1000 NF	-84.33	-63.5	-50.5
7659.1125 NF	-84.83	-44.1	-31.1
8510.1250 NF	-83.83	-44.9	-31.9

*NF = Noise floor Measurement, No Emission Observed

Frequency of Operation: 868.9875MHz

Channel Spacing: 25KHz

Mask B: (P(dBm) - (43+10Log P(W)))

Conducted Power: 3.17 Watts

Frequency (MHz)	Measured Value (dB)	Substitution Value (dB)	Margin (dB)
1737.9750	-82.27	-40.6	-27.6
2606.9625	-75.77	-44.6	-31.6
3475.9500 NF	-90.03	-58.7	-45.7
4344.9375 NF	-90.01	-62.6	-49.6
5213.9250 NF	-90.58	-52.8	-39.8
6082.9125 NF	-91.00	-44.2	-31.2
6951.9000 NF	-85.5	-53.9	-40.9
7820.8875 NF	-85.33	-45.2	-32.2
8689.8750 NF	-85.75	-44.8	-31.8

*NF = Noise floor Measurement, No Emission Observed

Equipment List for Antenna Port Spurious Emissions:

Manufacturer	Model #	Serial Number	Description
Hewlett Packard	83732A	3339A00302	SIGNAL GENERATOR 10MHz-20GHz
Rohde & Schwarz	ESMI	DE24047	TEST RECEIVER
Insulated Wire	NPS-2501-200-NPS	CABLE 4	LOW LOSS CABLE
Insulated Wire	NPS-2501-200-NPS	CABLE 6	LOW LOSS CABLE
Weinschel	33-20-34	AU6604	DC-8GHz/20dB/25Watt Attenuator
Weinschel	33-10-34	AY6086	DC-8GHz/10dB/25Watt Attenuator
Telonic Berkeley	TTR 750-3EE1	95 168-2	Notch Filter

2.1053 Measurements required: Field strength of spurious radiation.

Radiated emissions measurements were performed at the open area test site. The EUT was set up in a typical configuration and placed in the center of a turntable on an all-wooden table that was 1.0 meter by 1.5 meter in size and 0.8 meters in height. The antenna terminal was terminated with a 50-ohm termination and the EUT was microphone input of the EUT was modulated with a 2500Hz tone at a level 16 greater than that which was required to produce 50% rated deviation at a 1000Hz tone. Measurements were taken using a Rohde & Schwarz ESMI test receiver. Resolution bandwidth during preliminary searching was set to 10 kHz. The receiving antenna was positioned 3 meters from the nearest point of the EUT.

The spectrum was investigated to ten times the highest generated frequency, with the receiving antenna at three different heights ranging between 1 and 4 meters while rotating the turntable through a 360° pattern. Emissions determined to be from the EUT were then measured using a resolution bandwidth of 100 kHz at frequencies below 1 GHz and 1 MHz RBW at frequencies above 1 GHz. Levels that were observed from the EUT within 20 dB of the defined emission mask in 47CFR90.210 were investigated further and the final measurement was taken and determined by substitution method. The measurement results were recorded. The six highest emissions were reported. In the event that less than six emissions were seen from the EUT the noise floor of the test system was recorded at frequencies spread out across the spectrum under test and resulting measurement values recorded. This procedure was performed at the top, middle, and bottom frequency points of the band.

Channel Spacing: 25KHz

Mask B: (P(dBm) - (43+10Log P(W)))

Conducted Power: 3.36 Watts

EUT Freq. of Operation:	806.0125 MHz					
Freq of Spurious Emission (MHz)	Measurement (dBm)	AFk	Cable Loss (dB)	Emission Level (EDRP)	FCC Limit (EDRP)	Margin (dB)
1612.0608	-91.52	26.7	1.7	-58.0	-13	-45.0
2418.0423	-77.88	29.1	2.2	-40.1	-13	-27.1
3224.0504 NF	-82.68	31.5	2.8	-44.0	-13	-31.0
4030.0642 NF	-85.93	34.5	3.1	-44.4	-13	-31.4
5642.1255 NF	-84.93	36.1	3.9	-41.3	-13	-28.3
6448.1312 NF	-84.56	37.1	4.3	-40.7	-13	-27.7

* Emission measurements appearing with "NF" are measurements of the noise floor.

Channel Spacing: 25KHz

Mask B: (P(dBm) - (43+10Log P(W)))

Conducted Power: 3.21 Watts

EUT Freq. of Operation:	851.0125 MHz					
Freq of Spurious Emission (MHz)	Measurement (dBm)	AFk	Cable Loss (dB)	Emission Level (EDRP)	FCC Limit (EDRP)	Margin (dB)
1702.0190	-87.71	26.7	1.7	-54.4	-13	-41.4
2553.0355	-76.38	30.4	2.3	-38.7	-13	-25.7
3404.0496 NF	-79.79	31.5	2.8	-39.8	-13	-26.8
4255.0656 NF	-78.41	34.5	3.2	-38.0	-13	-25.0
5106.0623 NF	-87.67	35.3	3.6	-45.5	-13	-31.5
5957.0989 NF	-86.21	36.1	4.0	-42.0	-13	-29.0

* Emission measurements appearing with "NF" are measurements of the noise floor.

Channel Spacing: 25KHz

Mask B: (P(dBm) - (43+10Log P(W)))

Conducted Power: 3.17 Watts

EUT Freq. of Operation:	868.9875 MHz					
Freq of Spurious Emission (MHz)	Measurement (dBm)	AFk	Cable Loss (dB)	Emission Level (EDRP)	FCC Limit (EDRP)	Margin (dB)
1737.9794	-87.51	26.7	1.7	-54.0	-13	-41.0
2606.9587	-78.80	30.4	2.3	-40.9	-13	-27.9
3475.9458 NF	-82.10	31.5	2.9	-41.9	-13	-28.9
4344.9233 NF	-77.81	34.5	3.3	-38.1	-13	-25.1
5106.0750 NF	-86.83	35.3	3.6	-44.7	-13	-30.7
5957.0875 NF	-87.84	36.1	4.0	-43.6	-13	-30.6

* Emission measurements appearing with "NF" are measurements of the noise floor.

Equipment List for Radiated Spurious Emissions:

Manufacturer	Model #	Serial Number	Description
Hewlett Packard	83732A	3339A00302	SIGNAL GENERATOR 10MHz-20GHz
Rohde & Schwarz	ESMI	DE24047	TEST RECEIVER
Rohde & Schwarz	SME03	DE10232	GENERATOR 5kHz-3.0GHz
Alan	50LH10	N/A	50 Ohm, 10 Watt Termination
EMCO	3104C	4499	BICONICAL 30MHz-200MHz
EMCO	3146	9010-2906	LOG PERIODIC 200MHz-1GHz
EMCO	3115	9202-3833	HORN 1 GHz-18 GHz

2.1055 Measurements required: Frequency stability**Test Procedure** TIA/EIA-603:1992, Section 2.2.2

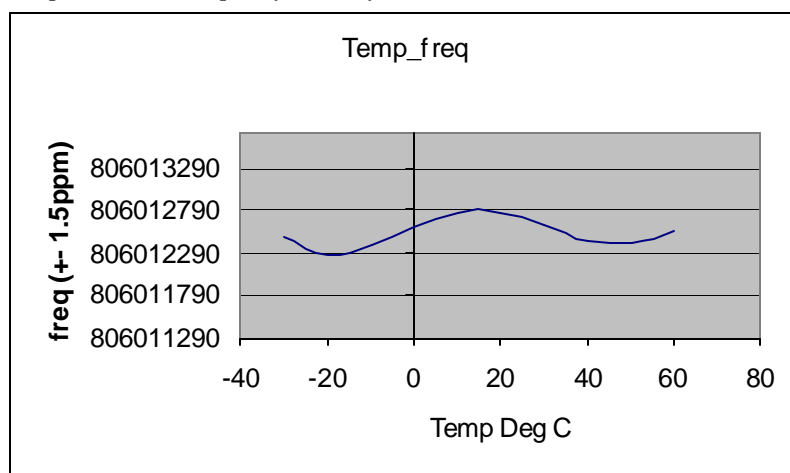
The EUT was configured in a configuration with external control capability of the ON/OFF and PTT functions and placed in a temperature chamber. The temperature was varied from -30°C to +60°C. The EUT was allowed to stabilize at -30°C for a period of 3 hours. The EUT was then turned ON and stabilized for a period of 1 minute. The DC supply voltage was adjusted to 85%, 100%, and 115% of a nominal voltage of 7.5VDC and the frequency stability was measured and recorded at each. The temperature was then raised 10°C higher and the tests repeated through +60°C. The results were as follows:

Recorded Data:

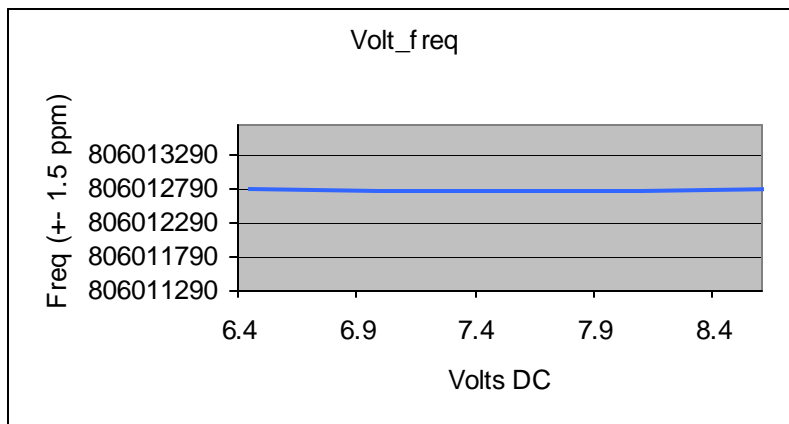
85% Nominal Voltage			
Temperature (C)	Frequency (Hz)	Voltage (V)	Current (A)
-30.1	806012484.2	6.4412	1.8159
-19.9	806012253.4	6.4412	1.829
-10	806012368.8	6.4412	1.829
0	806012599.6	6.4412	1.8356
9.9	806012772.7	6.4412	1.8487
19.9	806012772.7	6.4412	1.8552
30	806012628.4	6.4412	1.8683
40	806012426.5	6.4412	1.8814
50.1	806012397.7	6.4412	1.88945
60	806012541.9	6.4412	1.9076
100% Nominal Voltage			
-29.8	806012455.4	7.5387	1.7766
-20	806012253.4	7.5387	1.7701
-10	806012397.7	7.5387	1.7832
0	806012628.4	7.5387	1.7832
10	806012772.7	7.5387	1.7897
20	806012743.8	7.5387	1.7963
30	806012628.4	7.5387	1.8094
40	806012426.5	7.5387	1.8225
50.1	806012397.7	7.5387	1.829
60	806012570.7	7.5387	1.8421
115% Nominal Voltage			
-29.9	806012426.5	8.6696	1.7439
-19.9	806012253.4	8.6696	1.7504
-10	806012397.7	8.6696	1.7504
0	806012657.3	8.6696	1.7504
10	806012772.7	8.6696	1.757
19.9	806012772.7	8.6696	1.7635
30	806012599.6	8.6696	1.7766
40	806012426.5	8.6696	1.7832
50	806012397.7	8.6696	1.7963
60	806012570.7	8.6696	1.8028

Graphs of Frequency Stability Results:

Temperature-to-Frequency Stability:



Voltage-to-Frequency Stability:

**2.1057 Spectrum to be investigated**

This equipment operates at frequencies below 10 GHz therefore the following rule(s) apply:

2.1057(a)(1)(b)(c)

"(a) In all of the measurements set forth in §§ 2.1051 and 2.1053, the spectrum shall be investigated from the lowest radio frequency signal generated in the equipment, without going below 9 KHz, up to at least the frequency shown below:"

"FCC Rules 2.1057(1) If the equipment operates below 10 GHz: to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower."

(b) Particular attention should be paid to harmonics and sub-harmonics of the carrier frequency as well as to those frequencies removed from the carrier by multiples of the oscillator frequency. Radiation at the frequencies of multiplier stages should also be checked.

(c) The amplitude of spurious emissions which are attenuated more than 20 dB below the permissible value need not be reported.

2.202 Necessary Bandwidth and Emission Bandwidth.

Modulation	Band MHz	Max. Modulation kHz	Baud (s/s)	Bps	Channel Spacing kHz	Deviation kHz	Carson's Rule B=s/s	Emission Designator
2-level	806-821		9600	9600	25	3	2(B)/2+2D K	15K6F1D 15K6F1E
2-level	821-824		9600	9600	NPSPAC	2.4	2(B)/2+2D K	14K4F1D 14K4F1E
2-level	851-866		9600	9600	25	3	2(B)/2+2D K	15K6F1D 15K6F1E
2-level	866-869		9600	9600	NPSPAC	2.4	2(B)/2+2D K	14K4F1D 14K4F1E
C4FM	806-821		4800	9600	12.5	2.8	2(B)/2+2D K	10K4F1D 10K4F1E
C4FM	821-824		4800	9600	NPSPAC	2.8	2(B)/2+2D K	10K4F1D 10K4F1E
C4FM	851-866		4800	9600	12.5	2.8	2(B)/2+2D K	10K4F1D 10K4F1E
C4FM	866-869		4800	9600	NPSPAC	2.8	2(B)/2+2D K	10K4F1D 10K4F1E
Analog	806-821	3	N/A	N/A	25 kHz	5	2M+2DK	16K0F3E
Analog	821-824	3	N/A	N/A	NPSPAC	4	2M+2DK	14K0F3E
Analog	851-866	3	N/A	N/A	25kHz	5	2M+2DK	16K0F3E
Analog	866-869	3	N/A	N/A	NPSPAC	4	2M+2DK	14K0F3E

* Exceeds maximum allowable bandwidth allowed by FCC measurement must be done here.