MET Laboratories, Inc. *Safety Certification - EMI - Telecom Environmental Simulation*
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May 11, 2011

Harris RF Communications
221 Jefferson Ridge Pkwy.
Lynchburg, VA 24501

Dear Brian Justin,

Enclosed is the EMC Wireless test report for compliance testing of the Harris RF Communications, MASTR V, MASV-XTXMV, tested to the requirements of Title 47 of the Code of Federal Regulations (CFR), Part 90 for Land Mobile Radio Services and RSS-119, Issue 10, April 2010.

Thank you for using the services of MET Laboratories, Inc. If you have any questions regarding these results or if MET can be of further service to you, please feel free to contact me.

Sincerely yours,
MET LABORATORIES, INC.

Jennifer Warnell
Documentation Department

Reference: (\Harris RF Communications\EMC30875-FCC90 Rev. 1)

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Electromagnetic Compatibility Criteria Test Report

For the

Harris RF Communications
MASTR V, MASV-XTXMV

Tested under

The FCC Verification Rules
Contained in Title 47 of the CFR, Part 90

for Private Land Mobile Radio Services
and
RSS-119, Issue 10, April 2010

MET Report: EMC30875-FCC90 Rev. 1

May 11, 2011

Prepared For:
Harris RF Communications
221 Jefferson Ridge Pkwy.
Lynchburg, VA 24501

Prepared By:
MET Laboratories, Inc.
914 W. Patapsco Ave.
Baltimore, MD 21230

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RSS-119, Issue 10, April 2010

MET Report: EMC30875-FCC90 Rev. 1

Len Knight, Project Engineer
Electromagnetic Compatibility Lab

Jennifer Warnell
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 / is not capable of operation in accordance with the requirements of Part 90 of the FCC Rules and Industry Canada standard RSS-119, Issue 10, April 2010 under normal use and maintenance.

Shawn McMillen,
Wireless Manager, Electromagnetic Compatibility Lab

Report Status Sheet

Revision	Report Date	Reason for Revision
∅	April 25, 2011	Initial Issue.
1	May 11, 2011	Revised to reflect editorial corrections.

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List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
FCC	**F**ederal **C**ommunications **C**ommission
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ert**z**
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**h**ert**z**
kPa	**k**ilo**pa**scal
kV	**k**ilo**v**olt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**h**ertz
µH	**microh**enry
µ	**microf**arad
µs	**micros**econds
NEBS	**N**etwork **E**quipment-**B**uilding **S**ystem
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
TWT	**T**raveling **W**ave **T**ube
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

Executive Summary

1. Testing Summary

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 90. All tests were conducted using measurement procedure ANSI TIA/EIA-603-A-2004.

Title 47 of the CFR, Part 90, and FCC 04-265 Reference and Test Description	RSS-119, Issue 10, April 2010 Reference	Conformance			Comments
		Yes	No	N/A	
		Yes - Equipment complies with the Requirement *No - Equipment does not comply with the Requirement* *N/A - Not applicable to the equipment under tests*			
47 CFR Part 15.107 (a)	ICES-003 Issue 4 February 2004	✓			Measured emissions below applicable limits.
47 CFR Part 15.109 (a)	ICES-003 Issue 4 February 2004	✓			Measured emissions below applicable limits.
2.1046; 90.1215(a) Peak Power Output	RSS-119, Section 5.4	✓			Measured emissions below applicable limits.
2.1047(a) Modulation Characteristics	N/A			✓	EUT is non-voice, data only.
2.1049; 90.210(D) Occupied Bandwidth (Emission Mask)	RSS-119, Section 5.5	✓			Measured emissions below applicable limits.
2.1051; 90.210(D) Spurious Emissions at Antenna Terminals	RSS-119, Section 5.8	✓			Measured emissions below applicable limits.
2.1053; 90.210(D) Radiated Spurious Emissions	RSS-119, Section 5.8	✓			Measured emissions below applicable limits.
2.1055(a) (1); 90.213 Frequency Stability over Temperature Variations	RSS-119, Section 5.3	✓			Measured emissions below applicable limits.
2.1055(d) (2) Frequency Stability over Voltage Variations	RSS-119, Section 5.3	✓			Measured emissions below applicable limits.
90.214 Transient Frequency Behavior	RSS-119, Section 5.9			✓	EUT is not a keyed transmitter.

Equipment Configuration

2. Equipment Configuration

2.1. Overview

MET Laboratories, Inc. was contracted by Harris RF Communications to perform testing on the MASTR V, MASV-XTXMV under quote number 1089471.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Harris RF Communications., MASTR V, MASV-XTXMV.

An EMC evaluation to determine compliance of the TB 4.9 with the requirements of Part 90, 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 TB4.9. Harris RF Communications 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. The results obtained relate only to the item(s) tested.

Model(s) Tested:	MASTR V, MASV-XTXMV	
Model(s) Covered:	MASTR V, MASV-XTXMV	
EUT Specifications:	Primary Power Source: 110 VAC	
	FCC ID: OWDTR-0065-E IC: 3636B-TR0065E	
	Type of Modulations:	C4FM, WCQPSK, HDQPSK
	Max Peak and Output Power:	50.78 dBm
	Equipment Code:	TNB
	EUT Frequency Ranges:	150.0125 – 173.9875 MHz
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature (15-35º C):	
	Relative Humidity (30-60%):	
	Barometric Pressure (860-1060 mbar):	
Evaluated by:	Len Knight	
Report Date(s):	May 11, 2011	

2.2. Test Site

All testing was performed at MET Laboratories, Inc., 914 W. Patapsco Ave., Baltimore, MD 21230. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

Radiated Emissions measurements were performed in a semi-anechoic chamber (equivalent to an Open Area Test Site). In accordance with §2.948(a)(3), a complete site description is contained at MET Laboratories.

2.3. Description of Test Sample

The Harris RF Communications MASTR V, MASV-XTXMV, Equipment Under Test (EUT), is a Radio Base Station/Repeater designed for communications in the Land Mobile Radio environment. The primary communication users are Public Safety, Utility and Military Commercial Of The Shelf.

2.4. Equipment Configuration

Ref. ID	Name / Description	Model Number	Serial Number
Tx #1	Transmit Module #1	EA-555008-002	EP5466000067
Tx #2	Transmit Module #2	EA-555008-002	EP5466000044
Tx #3	Transmit Module #3	EA-555008-002	EP5466000084
Tx #4	Transmit Module #4	EA-555008-002	EP5466000057
PA #1	Linear Power Amplifier #1	EA-555010-102 & 009-002	CR0102279950
PA #2	Linear Power Amplifier #2	EA-555010-102 & 009-002	CR0102279968
PA #3	Linear Power Amplifier #3	EA-555010-102 & 009-002	CR0102279952
PA #4	Linear Power Amplifier #4	EA-555010-102 & 009-002	CR0102279970
Rx #1	Receive Module #1	EA-555007-002	EP5466000087
Rx #2	Receive Module #2	EA-555007-002	EP5466000057
Rx #3	Receive Module #3	EA-555007-002	EP5466000067
Rx #4	Receive Module #4	EA-555007-002	EP5466000044
BB #1	Baseband Module #1	EA-555005	EP5199001553
BB #2	Baseband Module #2	EA-555005	EP5199001575
TC #1	Traffic Controller #1	EA-555004-001	EP5197001446
TC #2	Traffic Controller #2	EA-555004-001	EP5197001448
TC #3	Traffic Controller #3	EA-555004-001	EP5197001463
TC #4	Traffic Controller #4	EA-555004-001	EP5197001460
ES #1	E-Switch (Primary)	EA-555012	MACM000A7E
ES #2	E-Switch (Redundant)	EA-555012	MACM000A7G
PS #1	Power Supply #1	EA-555011-001	UG33152
PS #2	Power Supply #2	EA-555011-001	UG33199
PS #3	Power Supply #3	EA-555011-001	UG33223
PS #4	Power Supply #4	EA-555011-001	UG33182

Table 1. Equipment Configuration

2.5. Support Equipment

Harris RF Communications supplied support equipment necessary for the operation and testing of the MASTR V, MASV-XTXMV. All support equipment supplied is listed in the following Support Equipment List.

Ref. ID	Name / Description	Manufacturer	Model Number	Serial Number
N/A	Handheld Barcode Scanner	HP	LS2208-SR20361RSBRE	None
N/A	100 Watt Dummy Load (qty 4)	N/A	N/A	None

Table 2. Support Equipment

2.6. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty.	Length (m)	Shielded? (Y/N)	Termination Box ID & Port ID
Tx #1	RF Out	Coaxial Cable	1	1	Y	PA #1 RF In
Tx #2	RF Out	Coaxial Cable	1	1	Y	PA #2 RF In
Tx #3	RF Out	Coaxial Cable	1	1	Y	PA #3 RF In
Tx #4	RF Out	Coaxial Cable	1	1	Y	PA #4 RF In
PA #1	RF In	Coaxial Cable	1	1	Y	Tx #1 RF Out
PA #1	Control	15 Conductor	1	1	Y	Backplane, J21
PA #2	RF In	Coaxial Cable	1	1	Y	Tx #2 RF Out
PA #2	Control	15 Conductor	1	1	Y	Backplane, J22
PA #3	RF In	Coaxial Cable	1	1	Y	Tx #3 RF Out
PA #3	Control	15 Conductor	1	1	Y	Backplane, J23
PA #4	RF In	Coaxial Cable	1	1	Y	Tx #4 RF Out
PA #4	Control	15 Conductor	1	1	Y	Backplane, J24
PS #1	HPA	28 VDC Power	1	0.5	N	PA #1, POWER
PS #1	Shelf	5V/12V DC Power	1	1	N	Backplane, J30
PS #2	HPA	28 VDC Power	1	0.5	N	PA #2, POWER
PS #2	Shelf	5V/12V DC Power	1	1	N	Backplane, J31
PS #3	HPA	28 VDC Power	1	0.5	N	PA #3, POWER
PS #4	HPA	28 VDC Power	1	0.5	N	PA #4, POWER

Table 3. Ports and Cabling Information

Ref. ID	Port name on EUT	Cable Description or reason for no cable	Qty.	Length (m)	Shielded? (Y/N)	Termination Box ID & Port ID
PA #1	RF Out	Coaxial Cable	1	3	Y	100W Dummy Load
PA #2	RF Out	Coaxial Cable	1	1	Y	100W Dummy Load
PA #3	RF Out	Coaxial Cable	1	1	Y	100W Dummy Load
PA #4	RF Out	Coaxial Cable	1	1	Y	100W Dummy Load
Rx #1	RF In	none, terminated	1	-	Y	50Ω Dummy Load
Rx #1	Audio	none, bench test only	0	-	-	-
Rx #2	RF In	none, terminated	1	-	Y	50Ω Dummy Load
Rx #2	Audio	none, bench test only	0	-	-	-
Rx #3	RF In	none, terminated	1	-	Y	50Ω Dummy Load
Rx #3	Audio	none, bench test only	0	-	-	-
Rx #4	RF In	none, terminated	1	-	Y	50Ω Dummy Load
Rx #4	Audio	none, bench test only	0	-	-	-
BB #1	M-LAN	Ethernet Cable, CAT5	1	3	N	none
BB #1	Simulcast	15-Conductor Cable	2	3	Y	none
BB #1	COMM	none, test/local control	0	-	-	-
BB #1	Ref In	none, terminated	1	-	Y	50Ω Dummy Load
BB #2	M-LAN	Ethernet Cable, CAT5	1	3	N	none
BB #2	Simulcast	15-Conductor Cable	2	3	Y	none
BB #2	COMM	none, test/local control	0	-	-	-
BB #2	Ref In	none, terminated	1	-	Y	50Ω Dummy Load
TC #1	M-LAN	Ethernet Cable, CAT5	1	3	N	none
TC #1	P-LAN	Ethernet Cable, CAT5	1	3	N	none
TC #1	COMM	none, test/local prog	0	-	-	-
TC #2	M-LAN	Ethernet Cable, CAT5	1	3	N	none
TC #2	P-LAN	Ethernet Cable, CAT5	1	3	N	none
TC #2	COMM	none, test/local prog	0	-	-	-
TC #3	M-LAN	Ethernet Cable, CAT5	1	3	N	none
TC #3	P-LAN	Ethernet Cable, CAT5	1	3	N	none
TC #3	COMM	none, test/local prog	0	-	-	-
TC #4	M-LAN	Ethernet Cable, CAT5	1	3	N	none
TC #4	P-LAN	Ethernet Cable, CAT5	1	3	N	none
TC #4	COMM	none, test/local prog	0	-	-	-
PS #1	A/C In	A/C Power Cord	1	1	N	110 VAC Power
PS #1	5V,12V VDC AUX	none, unused	0	-	-	-
PS #2	A/C In	A/C Power Cord	1	1	N	110 VAC Power
PS #2	5V,12V VDC AUX	none, unused	0	-	-	-
PS #3	A/C In	A/C Power Cord	1	1	N	110 VAC Power
PS #3	5V,12V VDC AUX	none, unused	0	-	-	-
PS #4	A/C In	A/C Power Cord	1	1	N	110 VAC Power
PS #4	5V,12V VDC AUX	none, unused	0	-	-	-
TP	Test Port	none, unused	0	-	-	on Backplane

Table 4. External Ports and Cabling

2.7. Mode of Operation

The MASTR V can generate internal Test Patterns for each modulation mode, selecting the mode and enabling the transmitter is controller with a Bar Code Scanner connected via a standard Laptop PC to M-LAN port of the Baseband Module. No special software is required, all the commands can be sent using a Telnet session.
There are three modes of operation:
P25 Phase I – modulation C4FM
P25 Linear Simulcast – modulation WCQPSK
P25 Phase II – modulation HDQPSK

2.8. Method of Monitoring EUT Operation

A "STATUS" LED is part of each of the following modules: Tx Module, PA Module, Rx Module, Baseband Module, Traffic Controller and E-Switch. A Red indication on the "STATUS" LED indicates that the module is not functioning properly and the associated channel is taken "Out Of Service".

2.9. Modifications

2.9.1. Modifications to EUT

No modifications were made to the EUT.

2.9.2. Modifications to Test Standard

No modifications were made to the test standard.

2.10. Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Harris RF Communications upon completion of testing.

III. Electromagnetic Compatibility Criteria for Unintentional Radiators

Electromagnetic Compatibility Criteria

§ 15.107 Conducted Emissions Limits

Test Requirement(s): **15.107 (a)** Except for Class A digital devices, for equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 5. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals.

15.107 (b) For a Class A digital device that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in Table 5. Compliance with this provision shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminals. The lower limit applies at the band edges.

Frequency range (MHz)	Class A Conducted Limits (dBµV)		*Class B Conducted Limits (dBµV)	
	Quasi-Peak	Average	Quasi-Peak	Average
* 0.15- 0.45	79	66	66 - 56	56 - 46
0.45 - 0.5	79	66	56	46
0.5 - 30	73	60	60	50
Note 1 — The lower limit shall apply at the transition frequencies. Note 2 — The limit decreases linearly with the logarithm if the frequency in the range 0.15 MHz to 0.5 MHz. * -- Limits per Subsection 15.207(a).				

Table 5. Conducted Limits for Radio Frequency Devices calculated from FCC Part 15 Subsections 15.107(a) (b) and 15.207(a)

Test Results: The EUT was compliant with the Class A requirement(s) of this section. Measured emissions were below applicable limits.

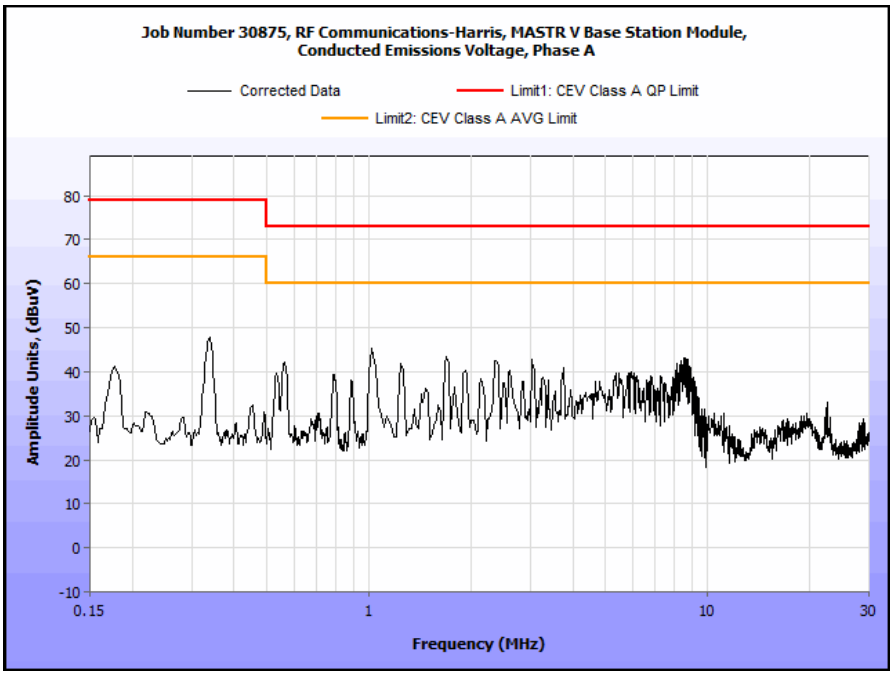
Test Engineer(s): Len Knight

Test Date(s): 03/21/11

Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
0.177	37.6	0	37.6	79	-41.4	31.61	0	31.61	66	-34.39
0.342	43.5	0.03	43.53	79	-35.47	37.57	0.03	37.6	66	-28.4
0.564	39.48	0.03	39.51	73	-33.49	33.62	0.03	33.65	60	-26.35
0.89	32.95	0.06	33.01	73	-39.99	27.42	0.06	27.48	60	-32.52
3.03	35.27	0.2	35.47	73	-37.53	29.39	0.2	29.59	60	-30.41
8.412	29.97	0.35	30.32	73	-42.68	22.63	0.35	22.98	60	-37.02

Table 6. Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

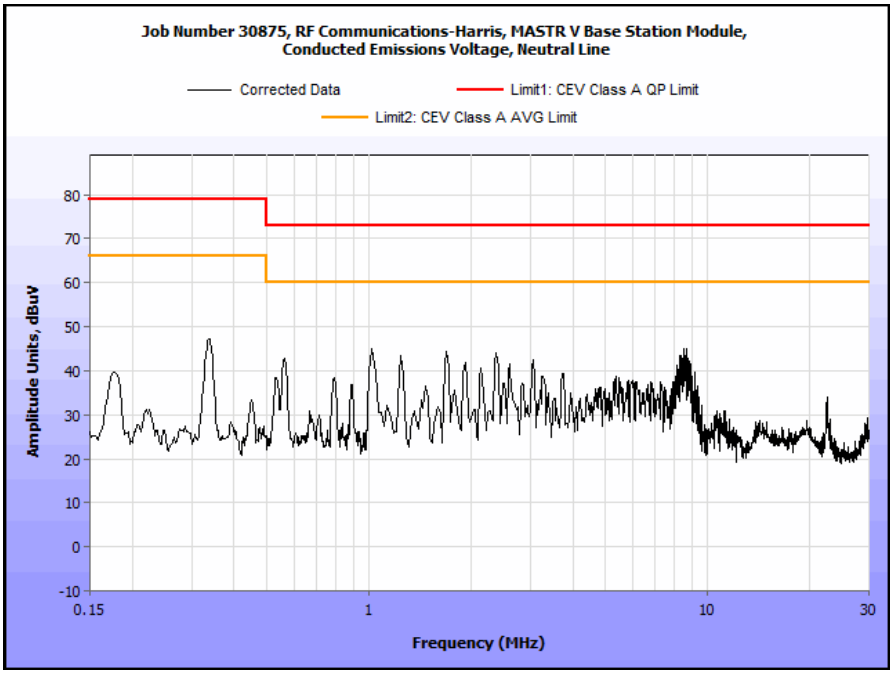


Plot 1. Conducted Emission, Phase Line Plot

Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

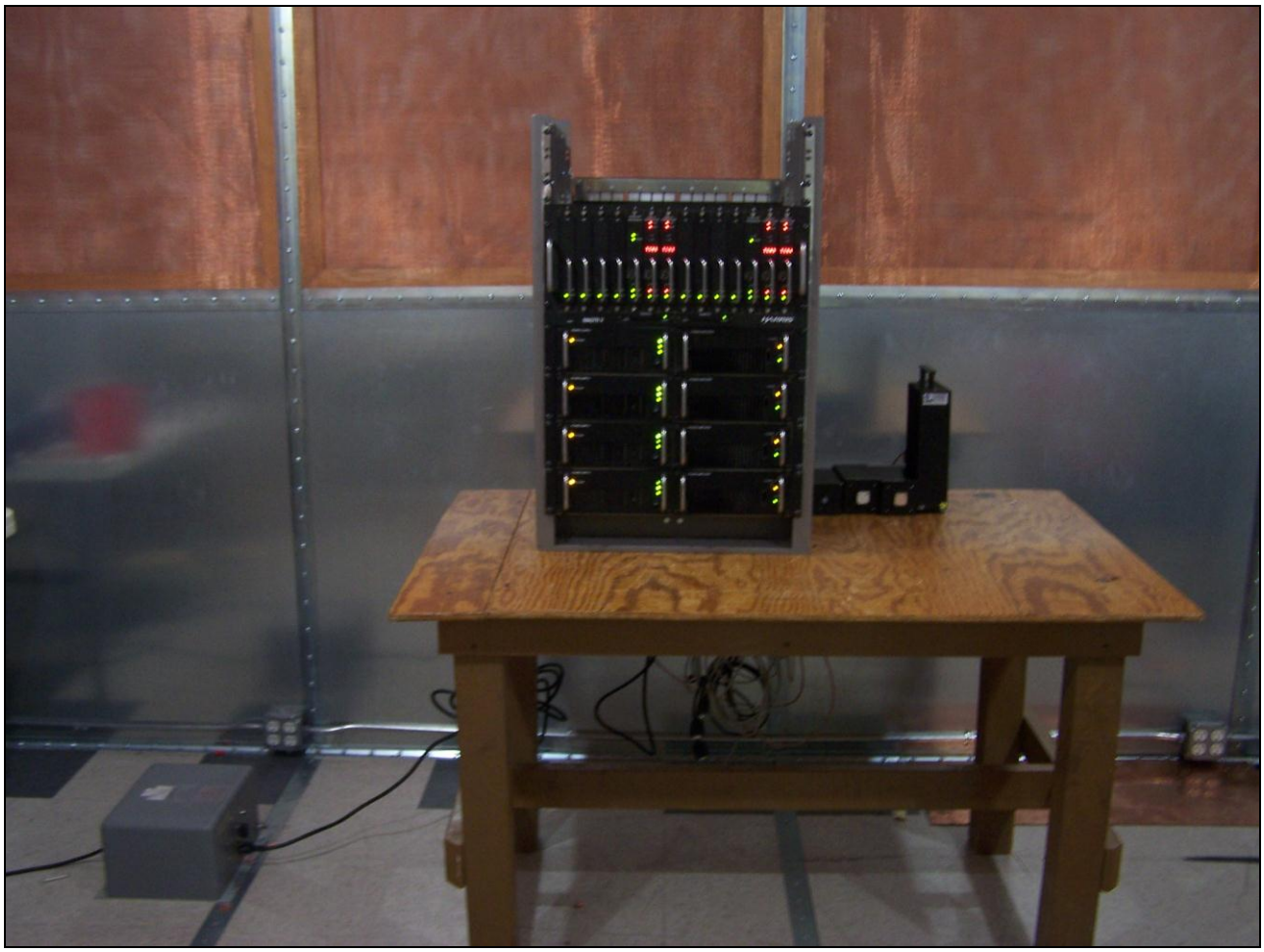
Frequency (MHz)	Uncorrected Meter Reading (dBuV) QP	Cable Loss (dB)	Corrected Measurement (dBuV) QP	Limit (dBuV) QP	Margin (dB) QP	Uncorrected Meter Reading (dBuV) Avg.	Cable Loss (dB)	Corrected Measurement (dBuV) AVG	Limit (dBuV) AVG	Margin (dB) AVG
0.341	43.92	0.03	43.95	79	-35.05	37.81	0.03	37.84	66	-28.16
0.177	37.52	0	37.52	79	-41.48	31.57	0	31.57	66	-34.43
0.567	38.61	0.03	38.64	73	-34.36	32.92	0.03	32.95	60	-27.05
0.789	35.7	0.04	35.74	73	-37.26	29.7	0.04	29.74	60	-30.26
1.68	39.54	0.14	39.68	73	-33.32	36.02	0.14	36.16	60	-23.84
8.45	39.46	0.35	39.81	73	-33.19	33.23	0.35	33.58	60	-26.42

Table 7. Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)



Plot 2. Conducted Emission, Neutral Line Plot

Conducted Emission Limits Test Setup



Photograph 1. Conducted Emissions, Test Setup

Radiated Emission Limits

§ 15.109 Radiated Emissions Limits

Test Requirement(s): **15.109 (a)** Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the Class B limits expressed in Table 8.

15.109 (b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the Class A limits expressed in Table 8.

Frequency (MHz)	Field Strength (dBµV/m)	
	§15.109 (b), Class A Limit (dBµV) @ 10m	§15.109 (a),Class B Limit (dBµV) @ 3m
30 - 88	39.00	40.00
88 - 216	43.50	43.50
216 - 960	46.40	46.00
Above 960	49.50	54.00

Table 8. Radiated Emissions Limits calculated from FCC Part 15, §15.109 (a) (b)

Test Procedures: The EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber. The method of testing and test conditions of ANSI C63.4 were used. An antenna was located 3 m from the EUT on an adjustable mast. A pre-scan was first performed in order to find prominent radiated emissions. For final emissions measurements at each frequency of interest, the EUT was rotated and the antenna height was varied between 1 m and 4 m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. Unless otherwise specified, measurements were made using a quasi-peak detector with a 120 kHz bandwidth.

Test Results: The EUT was compliant with the Class A requirement(s) of this section. Measured emissions were below applicable limits.

Test Engineer(s): Len Knight

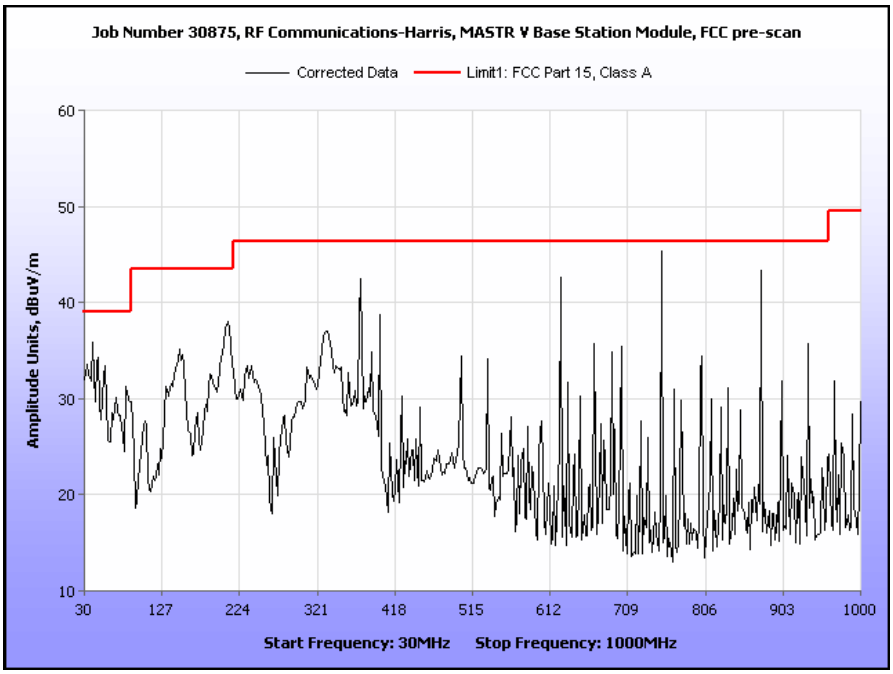
Test Date(s): 03/18/11

Radiated Emissions Limits Test Results, Class A

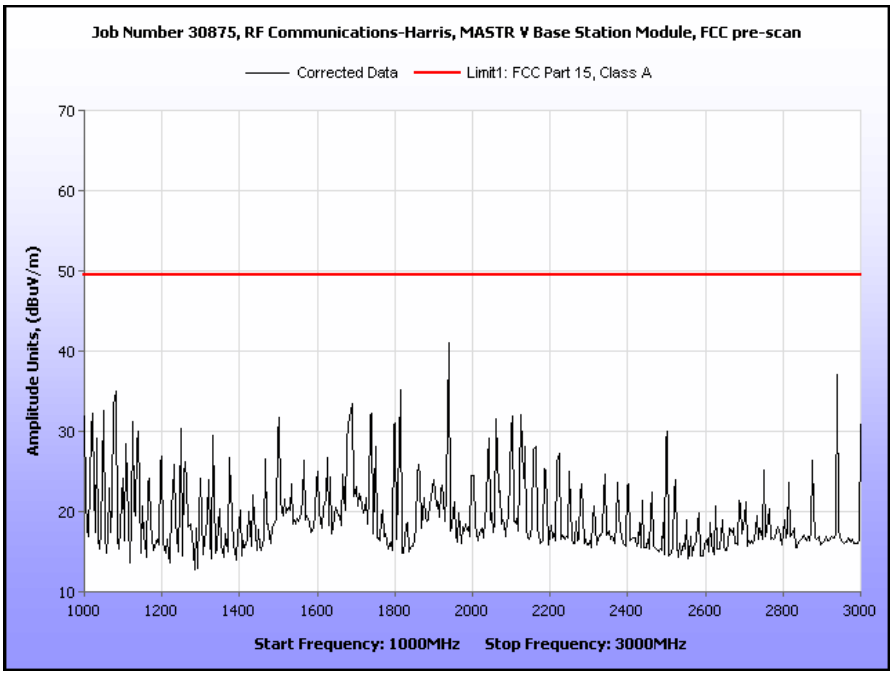
Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
54.468938	106	H	2.32	19.44	7.60	0.23	10.46	16.81	39.00	-22.19
54.468938	163	V	1.06	32.10	7.60	0.23	10.46	29.47	39.00	-9.53
374.98497	248	H	1.27	36.56	15.50	0.83	10.46	42.43	46.40	-3.97
374.98497	173	V	1.08	36.58	15.50	0.83	10.46	42.45	46.40	-3.95
207.46493	263	H	1.47	33.55	11.51	0.23	10.46	34.83	43.50	-8.67
207.46493	13	V	1.52	26.83	11.51	0.23	10.46	28.11	43.50	-15.39
750.03006	0	H	1.22	33.61	21.10	1.50	10.46	45.75	46.40	-0.65
750.03006	327	V	1.00	30.53	21.10	1.50	10.46	42.67	46.40	-3.73
150.67635	84	H	1.80	29.52	12.93	0.23	10.46	32.22	43.50	-11.28
150.67635	198	V	1.03	29.12	12.93	0.23	10.46	31.82	43.50	-11.68
625	251	H	1.43	32.68	19.70	1.17	10.46	43.09	46.40	-3.31
625	222	V	1.73	25.43	19.70	1.17	10.46	35.84	46.40	-10.56
875.02505	295	H	1.44	29.79	22.30	1.67	10.46	43.30	46.40	-3.10
875.02505	297	V	1.19	27.46	22.30	1.67	10.46	40.97	46.40	-5.43
87.039078	293	H	2.24	32.00	7.60	0.23	10.46	29.37	39.00	-9.63
87.039078	276	V	1.38	25.18	7.60	0.23	10.46	22.55	39.00	-16.45

Table 9. Radiated Emissions Limits, Test Results, FCC Limits

Note: The EUT was tested at 3 m.



Plot 3. Radiated Emissions, 30 MHz - 1 GHz, FCC Limits



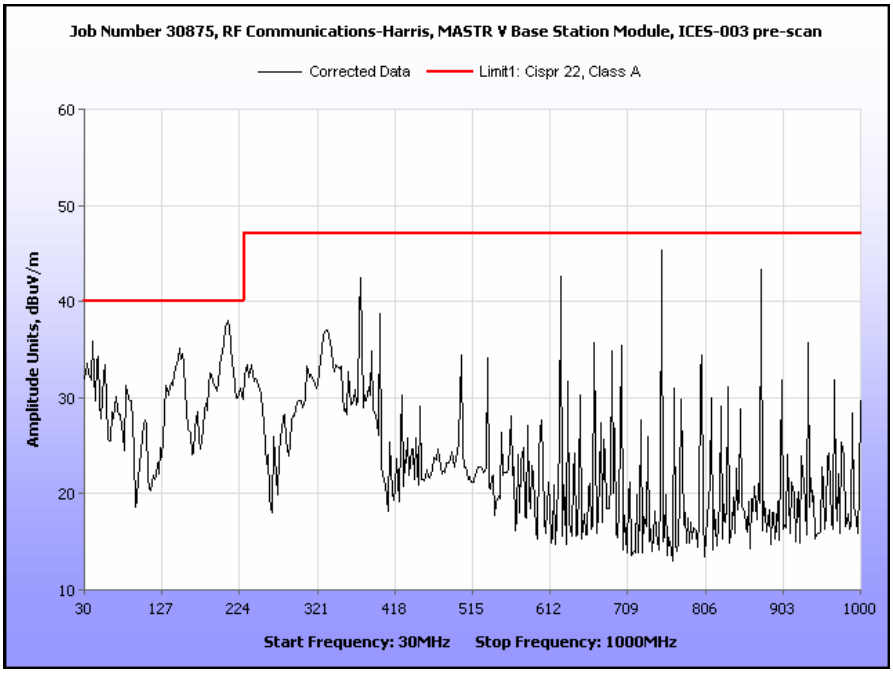
Plot 4. Radiated Emissions, 1 GHz – 3 GHz, FCC Limits

Radiated Emissions Limits Test Results, Class A

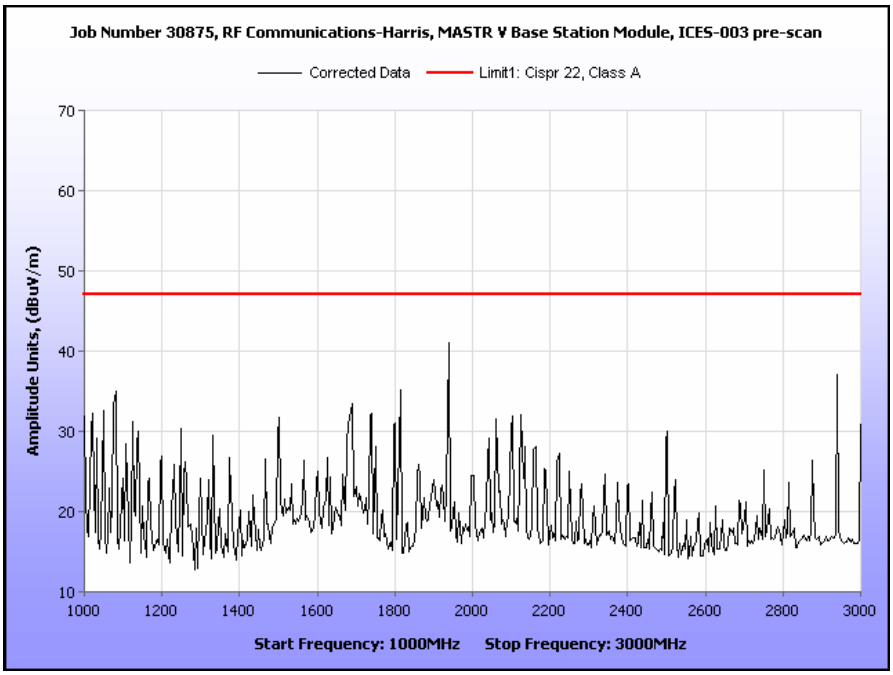
Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
54.468938	106	H	2.32	19.44	7.60	0.23	10.46	16.81	40.00	-23.19
54.468938	163	V	1.06	32.10	7.60	0.23	10.46	29.47	40.00	-10.53
374.98497	248	H	1.27	36.56	15.50	0.83	10.46	42.43	47.00	-4.57
374.98497	173	V	1.08	36.58	15.50	0.83	10.46	42.45	47.00	-4.55
207.46493	263	H	1.47	33.55	11.51	0.23	10.46	34.83	40.00	-5.17
207.46493	13	V	1.52	26.83	11.51	0.23	10.46	28.11	40.00	-11.89
750.03006	0	H	1.22	33.61	21.10	1.50	10.46	45.75	47.00	-1.25
750.03006	327	V	1.00	30.53	21.10	1.50	10.46	42.67	47.00	-4.33
150.67635	84	H	1.80	29.52	12.93	0.23	10.46	32.22	40.00	-7.78
150.67635	198	V	1.03	29.12	12.93	0.23	10.46	31.82	40.00	-8.18
625	251	H	1.43	32.68	19.70	1.17	10.46	43.09	47.00	-3.91
625	222	V	1.73	25.43	19.70	1.17	10.46	35.84	47.00	-11.16
875.02505	295	H	1.44	29.79	22.30	1.67	10.46	43.30	47.00	-3.70
875.02505	297	V	1.19	27.46	22.30	1.67	10.46	40.97	47.00	-6.03
87.039078	293	H	2.24	32.00	7.60	0.23	10.46	29.37	40.00	-10.63
87.039078	276	V	1.38	25.18	7.60	0.23	10.46	22.55	40.00	-17.45

Table 10. Radiated Emissions Limits, Test Results, ICES-003 Limits

Note: The EUT was tested at 3 m.

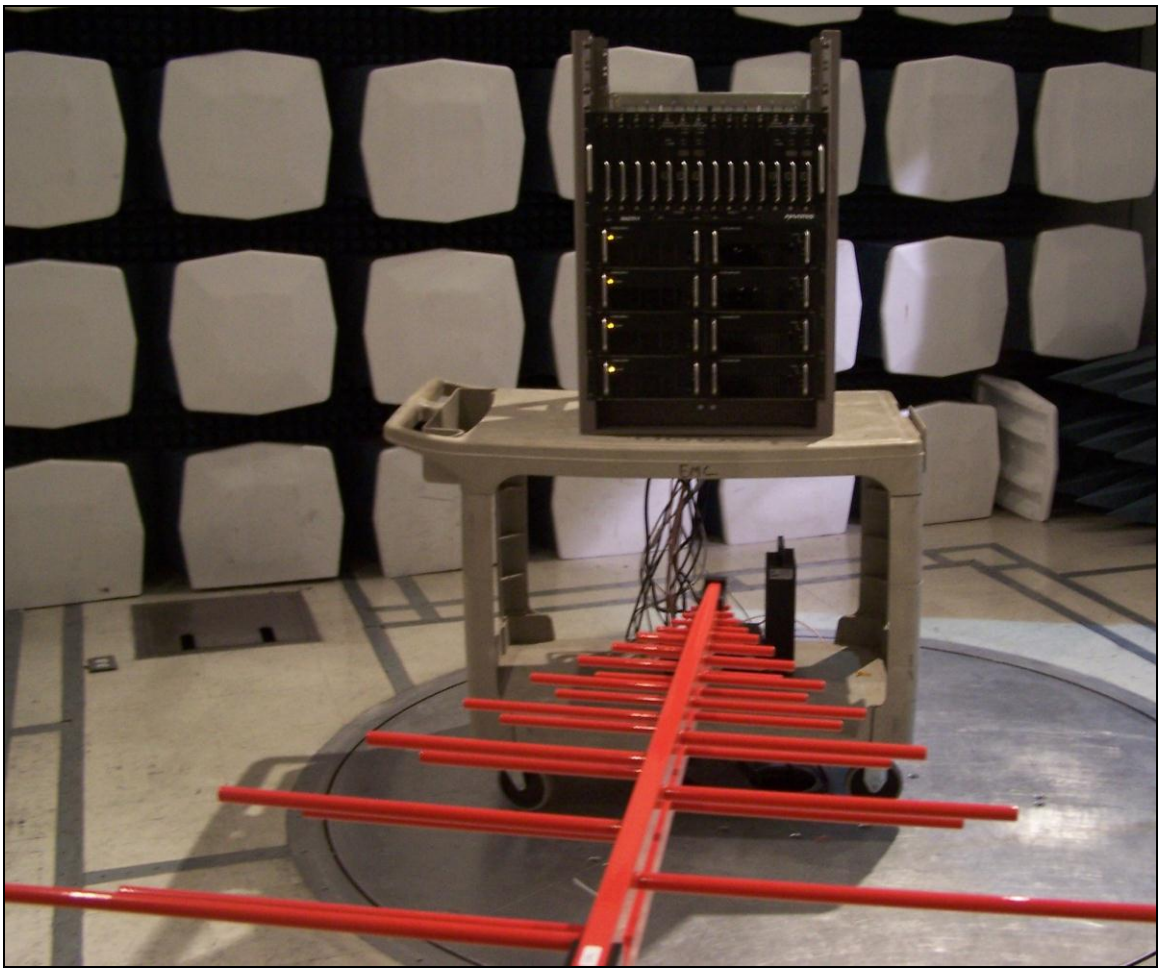


Plot 5. Radiated Emissions, 30 MHz – 1 GHz, ICES-003 Limits



Plot 6. Radiated Emissions, 1 GHz – 3 GHz, ICES-003 Limits

Radiated Emission Limits Test Setup



Photograph 2. Radiated Emission, Test Setup

IV. Electromagnetic Compatibility Criteria for Intentional Radiators

4. Electromagnetic Compatibility RF Power Output Requirements

4.1. RF Power Output

Test Requirement(s): **§2.1046 and §90.1215(a) with FCC 04-265**

Test Procedures: As required by 47 CFR 2.1046, *RF power output measurements* were made at the RF output terminals using a Spectrum Analyzer.

A laptop was connected to EUT to control the RF power output and frequency channel. The EUT was connected to a Spectrum Analyzer via an attenuator to measure the conducted output power. The EUT power was adjusted enough to produce maximum output power as specified in the owner's manual. The EUT has both a 10 Watt mode and a 100 Watt mode. The output power was then recorded as an average power. Measurements were made at the all four frequencies possible by the EUT sample.

Test Results: Equipment complies with 47CFR 2.1046 and 90.1215(a) with FCC 04-265.

Test Engineer(s): Len Knight

Test Date(s): 03/15/11

Frequency (MHz)	Modulation	Power (dBm)	
		10 Watt	100 Watt
150.0125	C4FM	39.08	50.57
	CQPSK	39.59	50.09
	HDQPSK	38.16	50.22
156.0125	C4FM	38.70	50.09
	CQPSK	38.69	50.78
	HDQPSK	38.30	50.13
160.0125	C4FM	38.84	50.16
	CQPSK	38.83	50.38
	HDQPSK	38.79	50.61
173.9875	C4FM	38.20	50.51
	CQPSK	38.77	50.00
	HDQPSK	39.60	50.50

Table 11. RF Power Output, Test Results

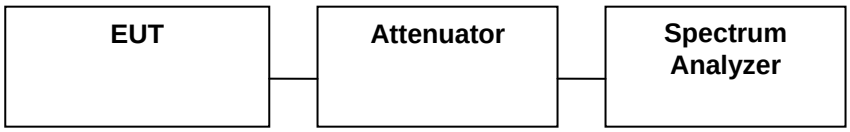
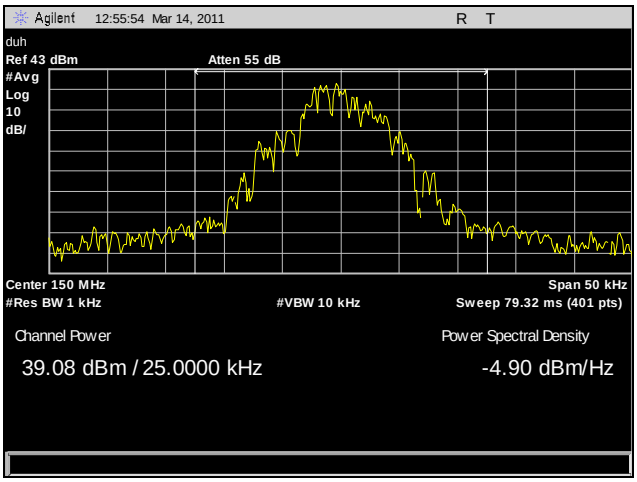
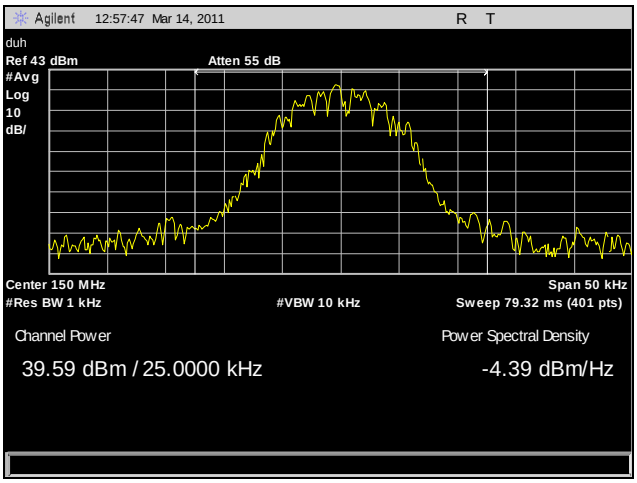


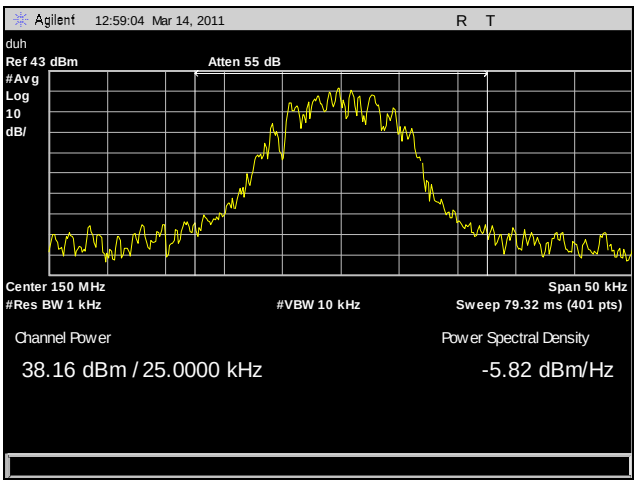
Figure 1. RF Power Output Test Setup



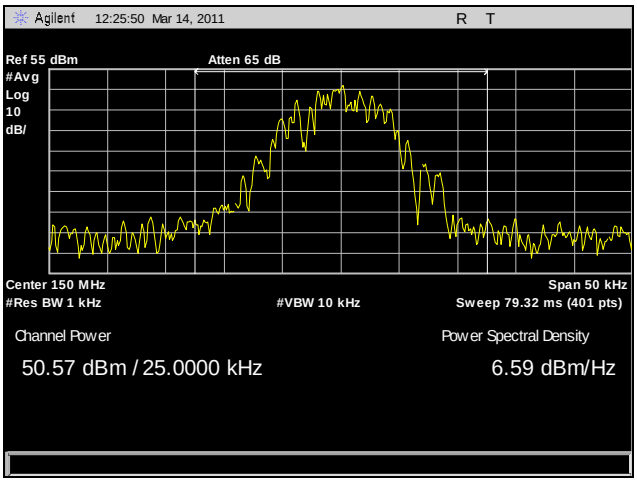
Plot 7. RF Power Output, 150.0125, 10W, C4FM



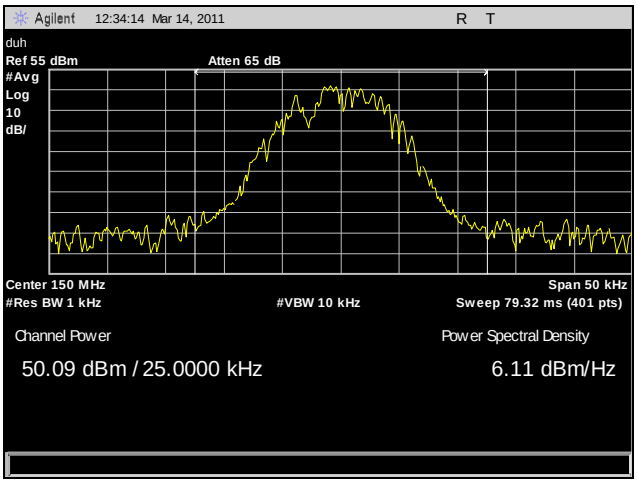
Plot 8. RF Power Output, 150.0125, 10W, CQPSK



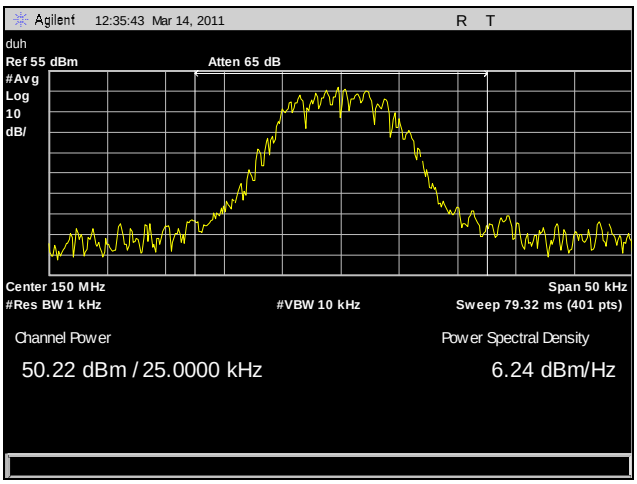
Plot 9. RF Power Output, 150.0125, 10W, HDQPSK



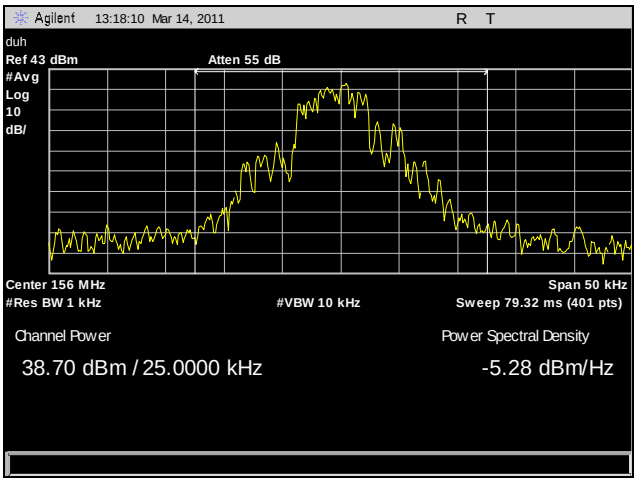
Plot 10. RF Power Output, 150.0125, 100W, C4FM



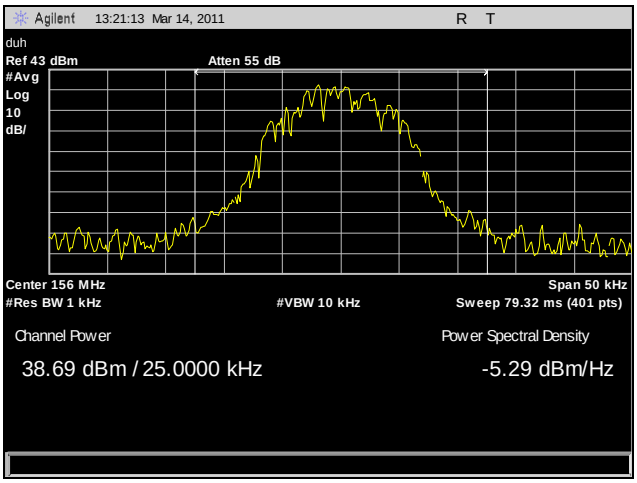
Plot 11. RF Power Output, 150.0125, 100W, CQPSK



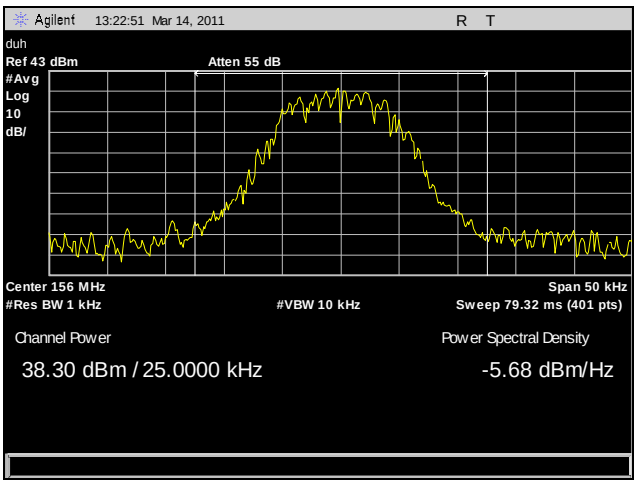
Plot 12. RF Power Output, 150.0125, 100W, HDQPSK



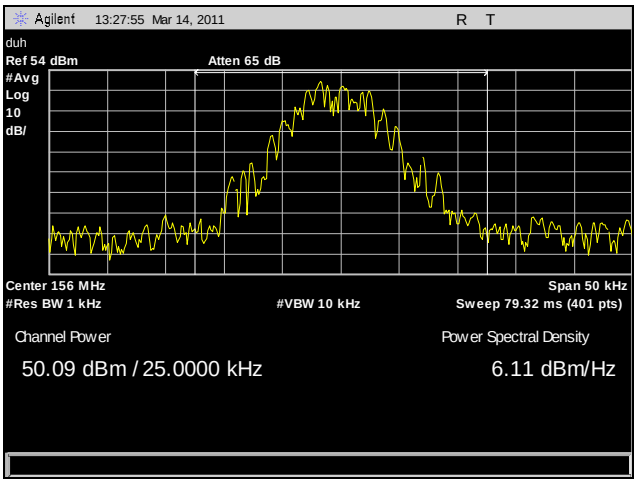
Plot 13. RF Power Output, 156.0125, 10W, C4FM



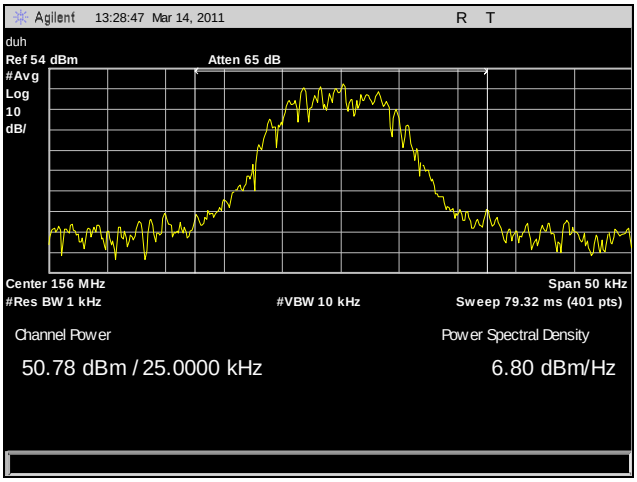
Plot 14. RF Power Output, 156.0125, 10W, CQPSK



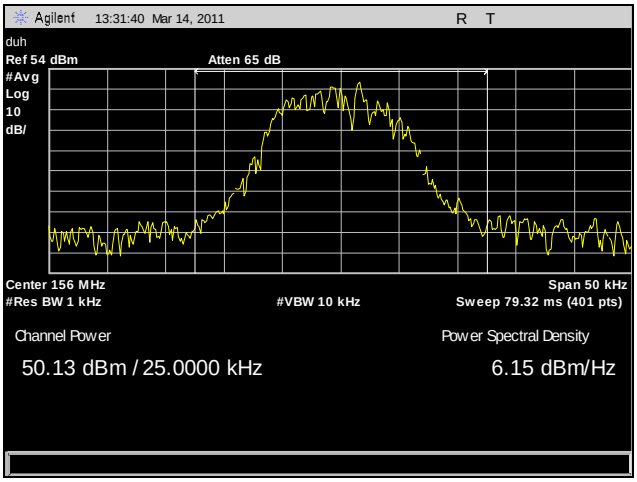
Plot 15. RF Power Output, 156.0125, 10W, HDQPSK



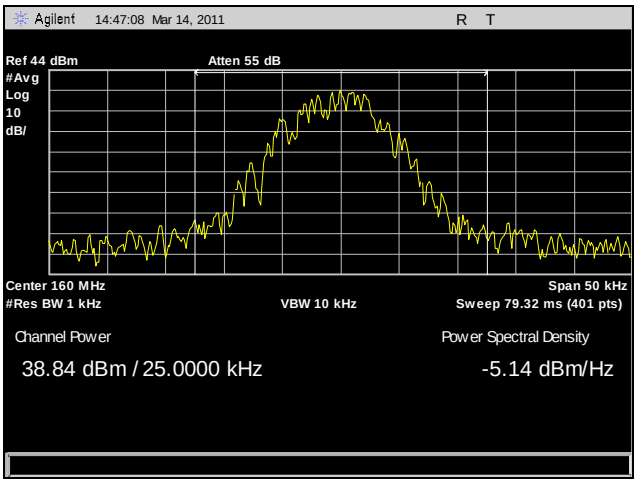
Plot 16. RF Power Output, 156.0125, 100W, C4FM



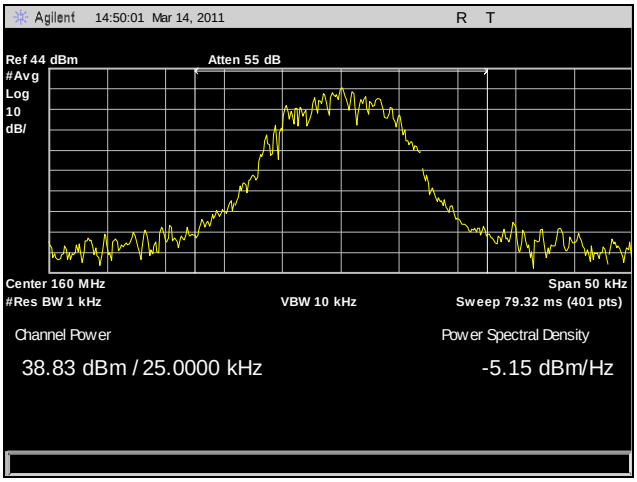
Plot 17. RF Power Output, 156.0125, 100W, CQPSK



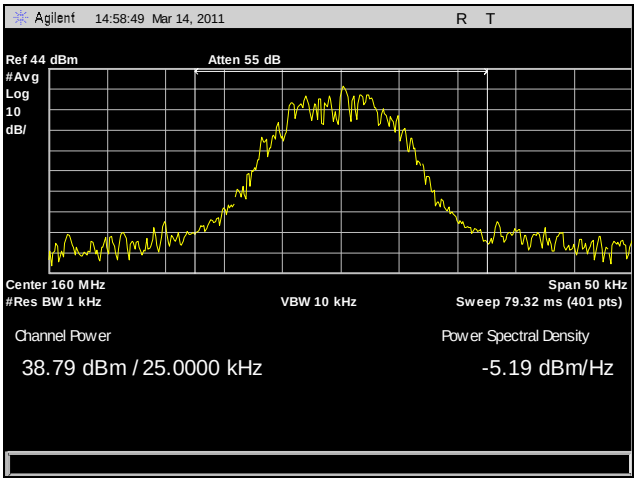
Plot 18. RF Power Output, 156.0125, 100W, HDQPSK



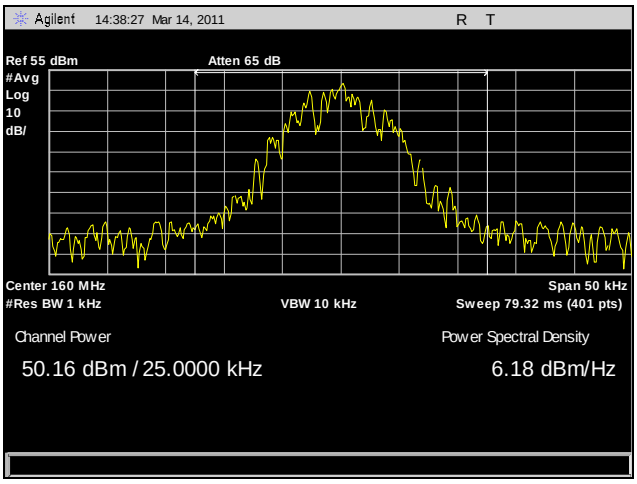
Plot 19. RF Power Output, 160.0125, 10W, C4FM



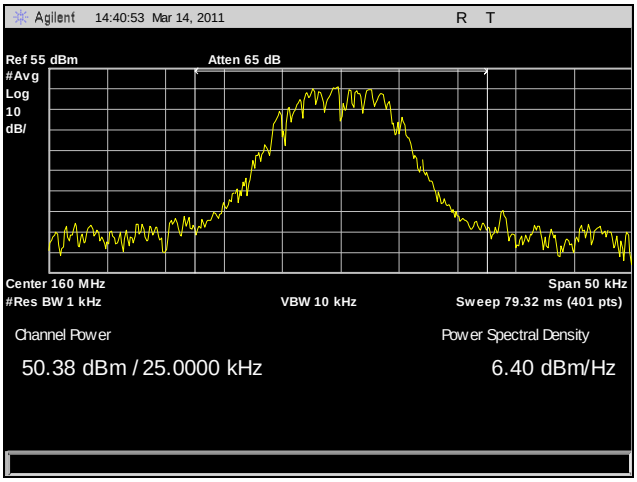
Plot 20. RF Power Output, 160.0125, 10W, CQPSK



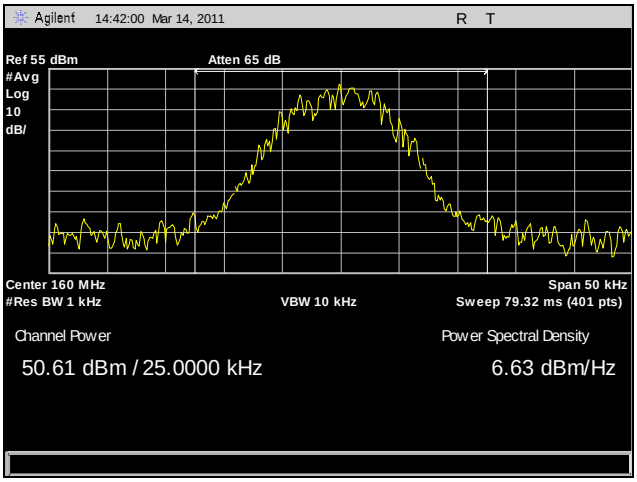
Plot 21. RF Power Output, 160.0125, 10W, HDQPSK



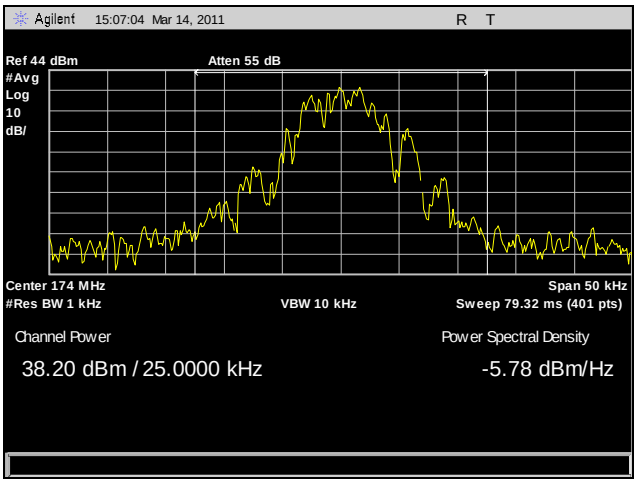
Plot 22. RF Power Output, 160.0125, 100W, C4FM



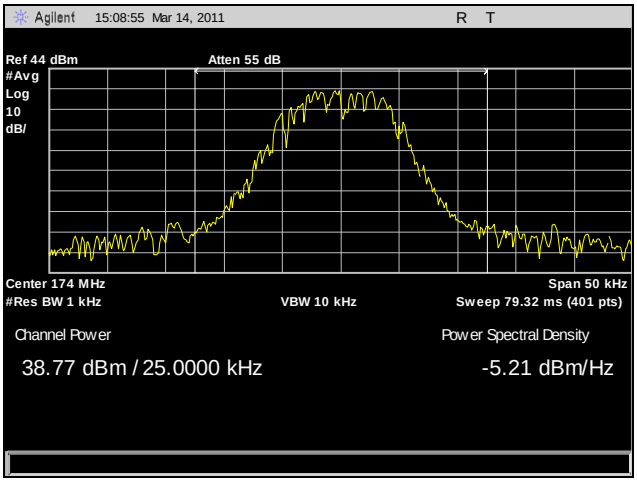
Plot 23. RF Power Output, 160.0125, 100W, CQPSK



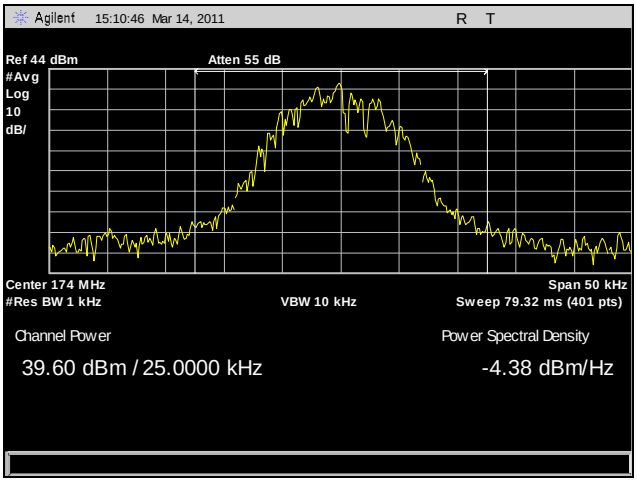
Plot 24. RF Power Output, 160.0125, 100W, HDQPSK



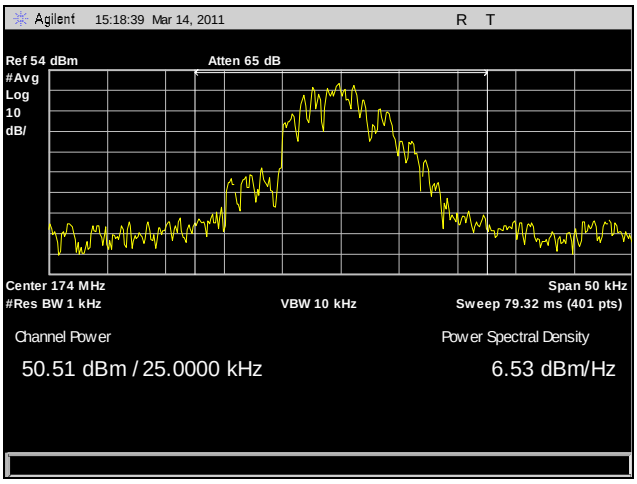
Plot 25. RF Power Output, 173.9875, 10W, C4FM



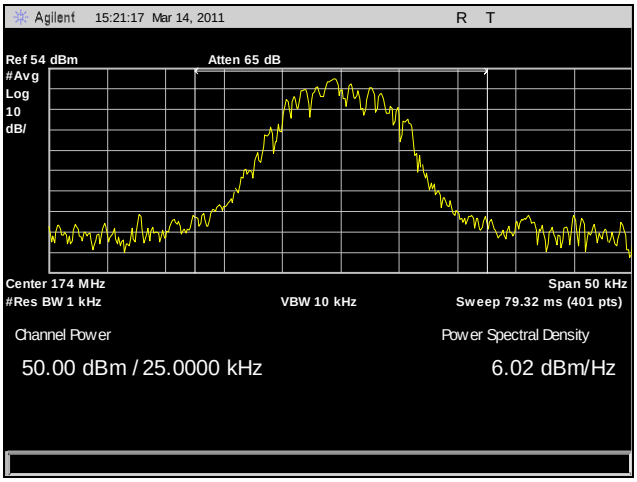
Plot 26. RF Power Output, 173.9875, 10W, CQPSK



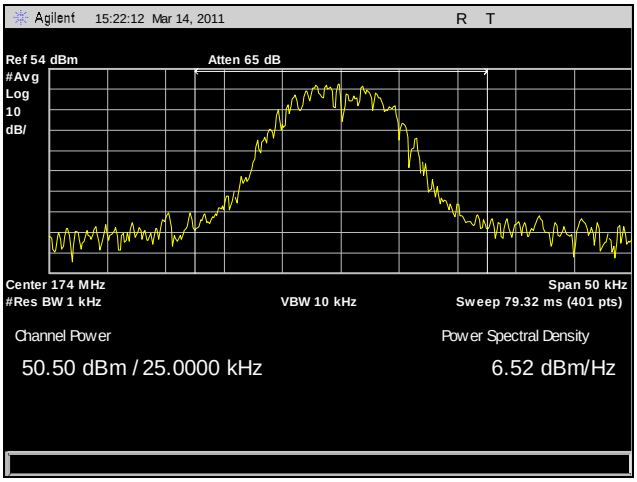
Plot 27. RF Power Output, 173.9875, 10W, HDQPSK



Plot 28. RF Power Output, 173.9875, 100W, C4FM



Plot 29. RF Power Output, 173.9875, 100W, CQPSK



Plot 30. RF Power Output, 173.9875, 100W, HDQPSK

4.2. Occupied Bandwidth (Emission Mask)

Test Requirement(s): **§2.1049 and §90.210 with FCC 04-265 (Emissions Mask D)**

Test Procedures: As required by 47 CFR 2.1049, *occupied bandwidth measurements* were made at the RF output terminals using a Spectrum Analyzer.

A laptop was connected to EUT to control the RF power output and frequency channel. The EUT was connected to a Spectrum Analyzer via attenuator. The measured highest Average Power was set relative to zero dB reference. The RBW of the Spectrum Analyzer was set to at least 1% of the channel bandwidth. The EUT power was adjusted at the maximum output power level. Measurements were carried out at all four frequencies and at all three different modulations.

Test Results: Equipment complies with Section 2.1049 and 90.210(D) with FCC 04-265 (*Equipment designed to operate with a 12.5 kHz channel bandwidth must meet the requirements of Emission Mask D.*). The EUT does not exceed the Emission Masks limit.

The following pages show measurements of Emission Mask plots:

Test Engineer(s): Len Knight

Test Date(s): 03/25/11

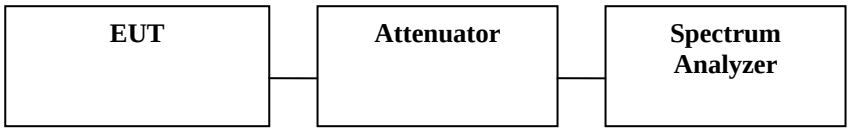
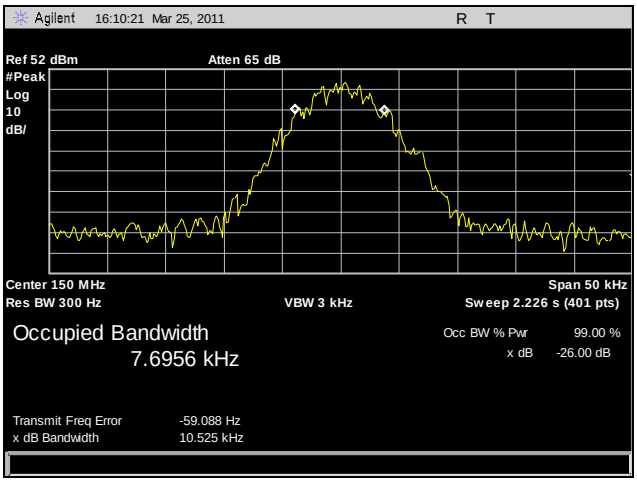
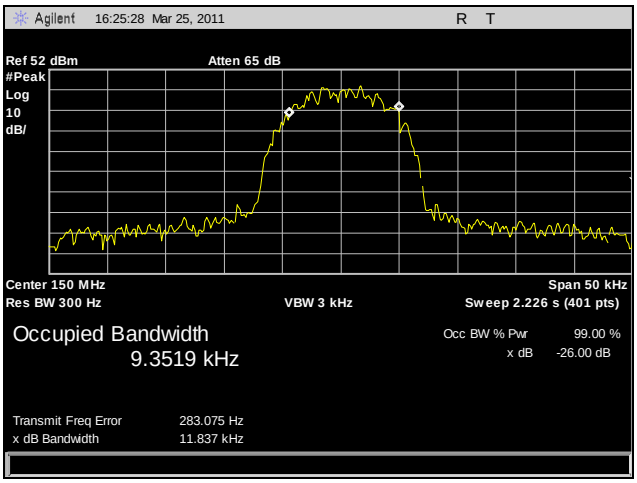


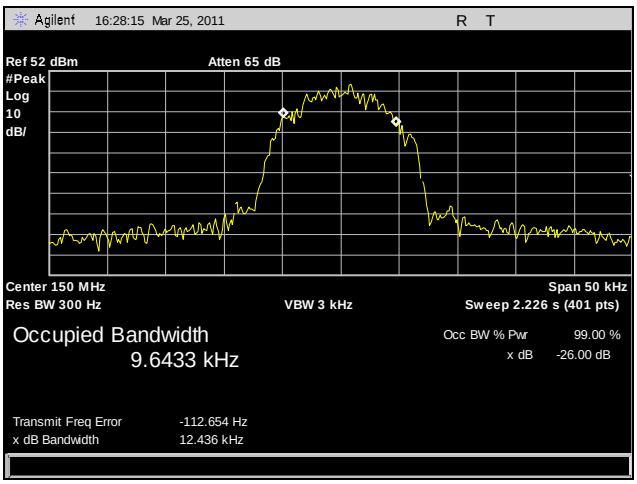
Figure 2. Occupied Bandwidth (Emission Mask) Test Setup



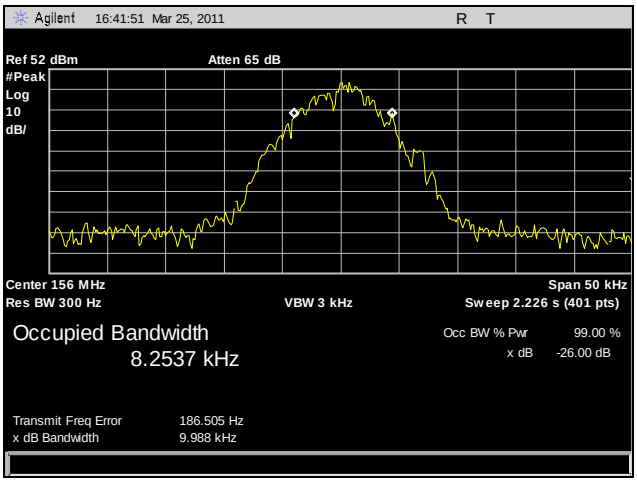
Plot 31. Occupied Bandwidth, 150.0125 MHz, C4FM



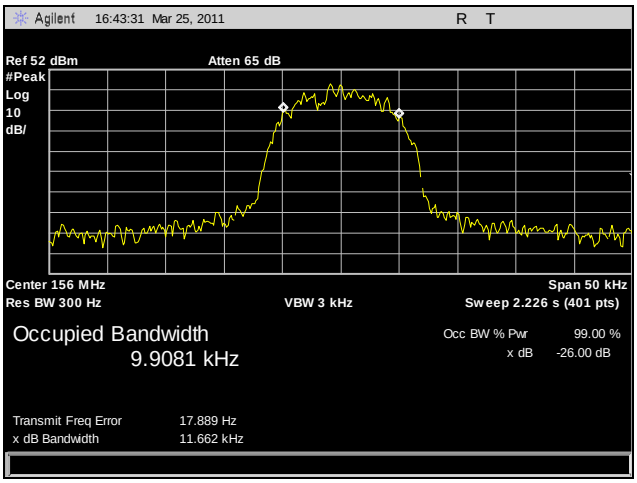
Plot 32. Occupied Bandwidth, 150.0125 MHz, CQPSK



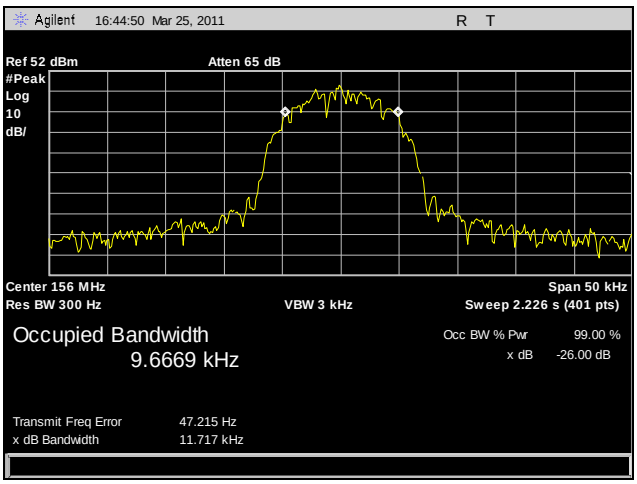
Plot 33. Occupied Bandwidth, 150.0125 MHz, HDQPSK



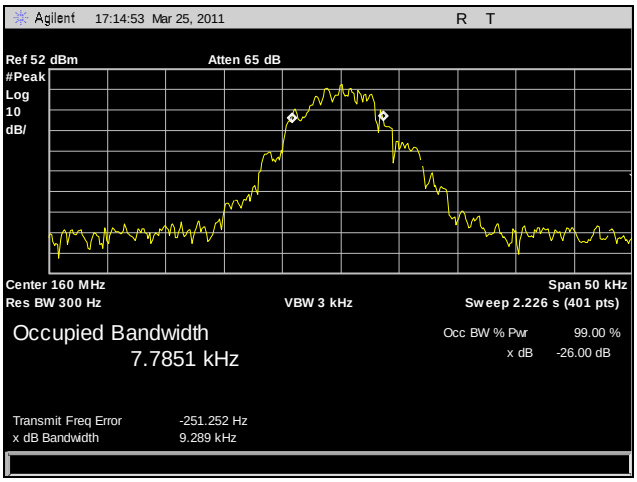
Plot 34. Occupied Bandwidth, 156.0125 MHz, C4FM



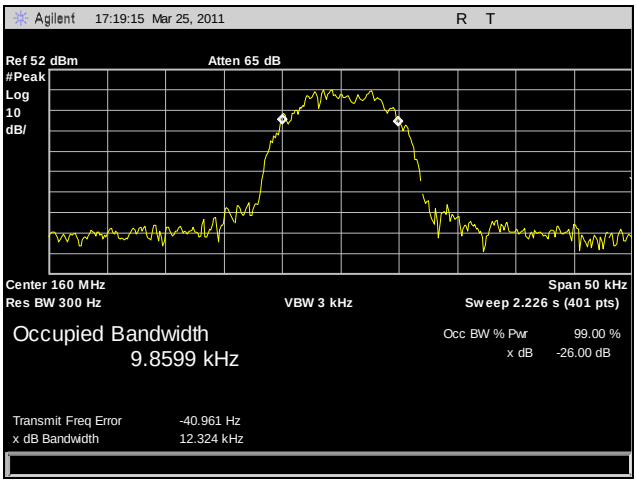
Plot 35. Occupied Bandwidth, 156.0125 MHz, CQPSK



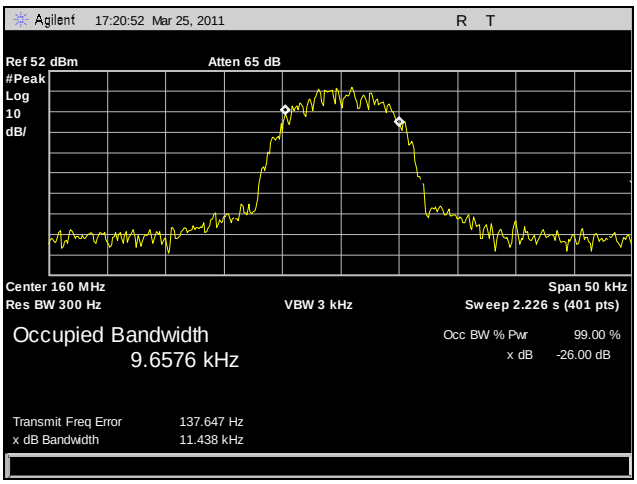
Plot 36. Occupied Bandwidth, 156.0125 MHz, HDQPSK



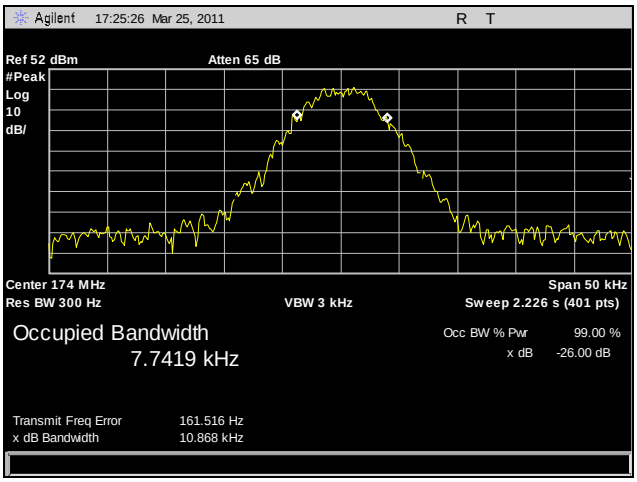
Plot 37. Occupied Bandwidth, 160.125 MHz, C4FM



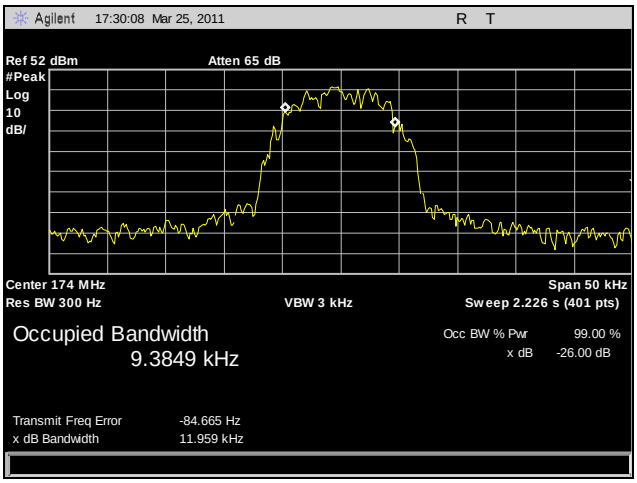
Plot 38. Occupied Bandwidth, 160.125 MHz, CQPSK



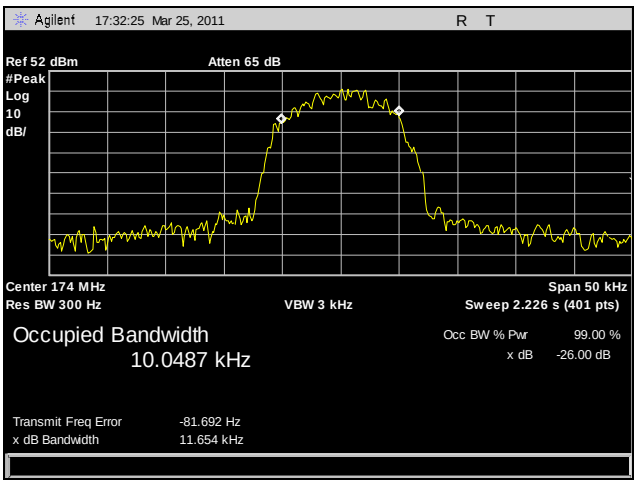
Plot 39. Occupied Bandwidth, 160.125 MHz, HDQPSK



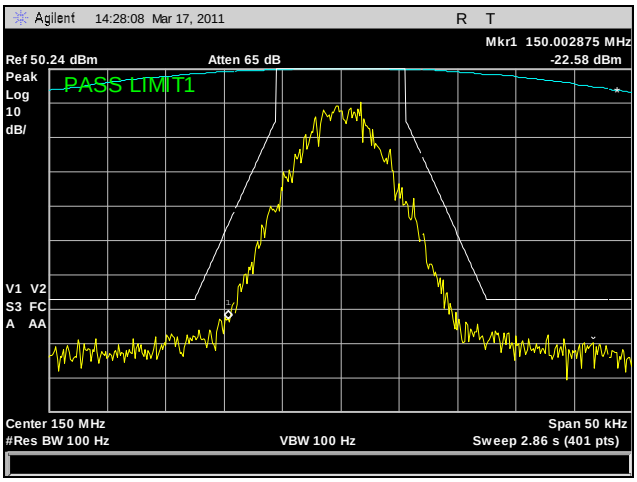
Plot 40. Occupied Bandwidth, 173.9875 MHz, C4FM



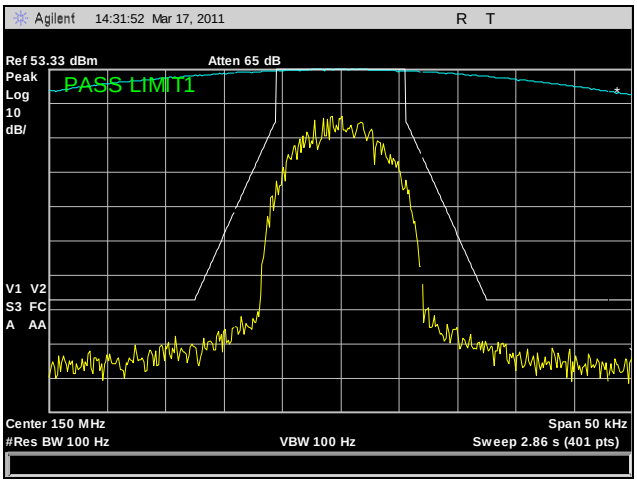
Plot 41. Occupied Bandwidth, 173.9875 MHz, CQPSK



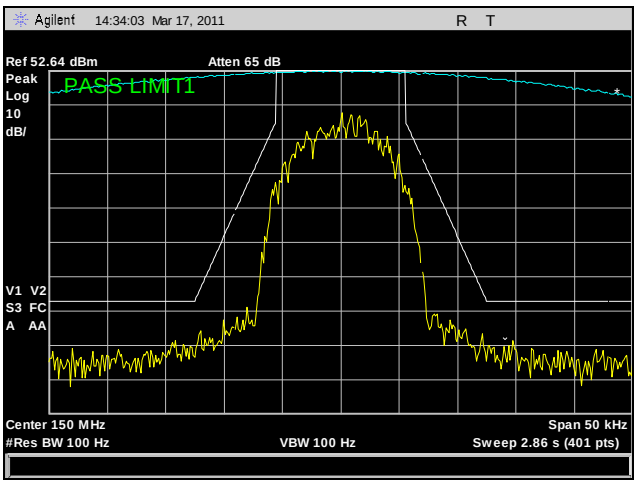
Plot 42. Occupied Bandwidth, 173.9875 MHz, HDQPSK



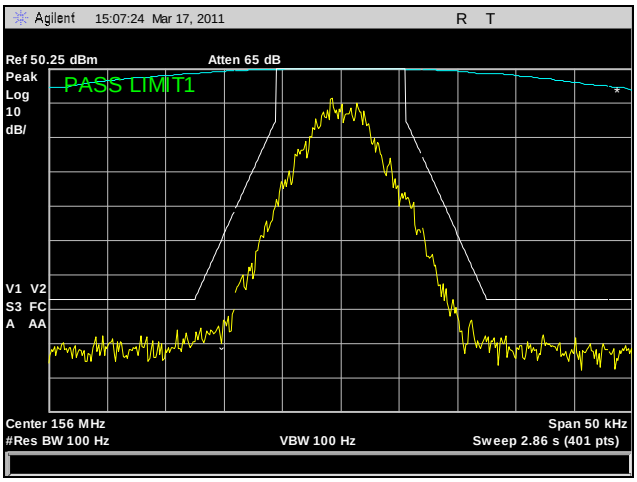
Plot 43. Emission Mask, 150.0125 MHz, C4FM



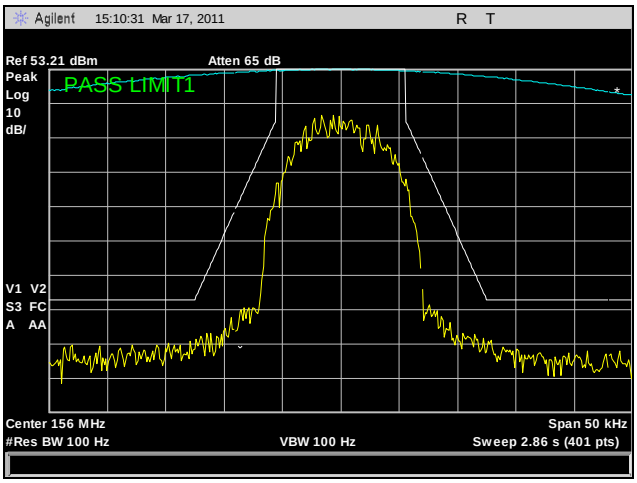
Plot 44. Emission Mask, 150.0125 MHz, CQPSK



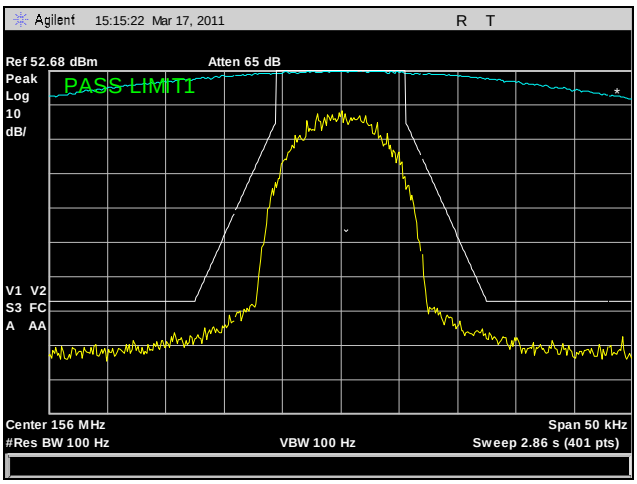
Plot 45. Emission Mask, 150.0125 MHz, HDQPSK



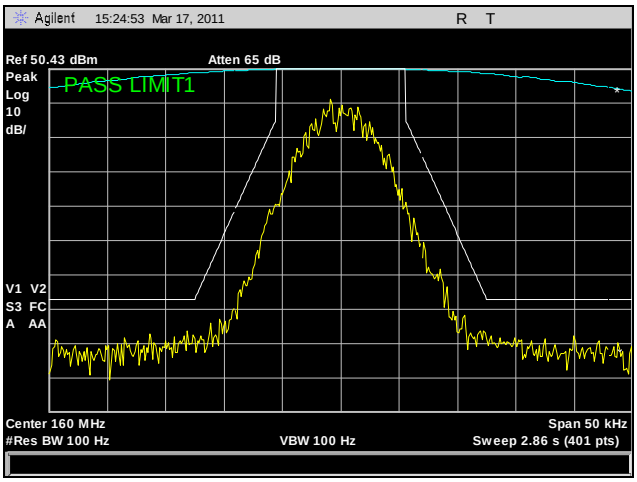
Plot 46. Emission Mask, 156.0125 MHz, C4FM



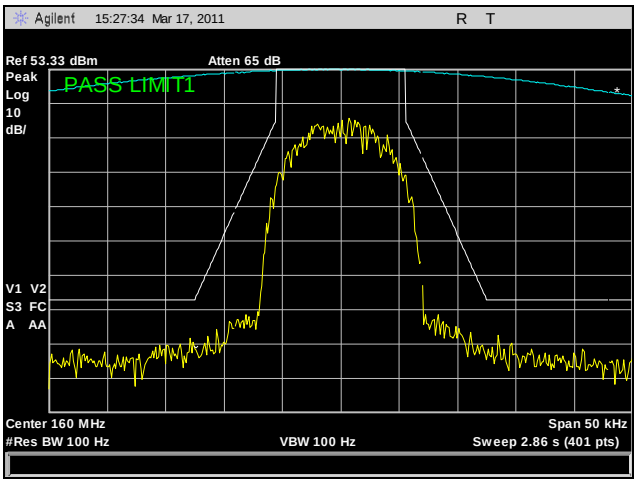
Plot 47. Emission Mask, 156.0125 MHz, CQPSK



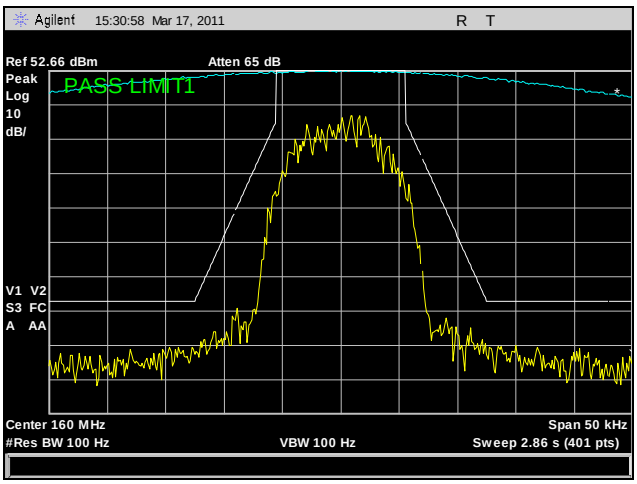
Plot 48. Emission Mask, 156.0125 MHz, HDQPSK



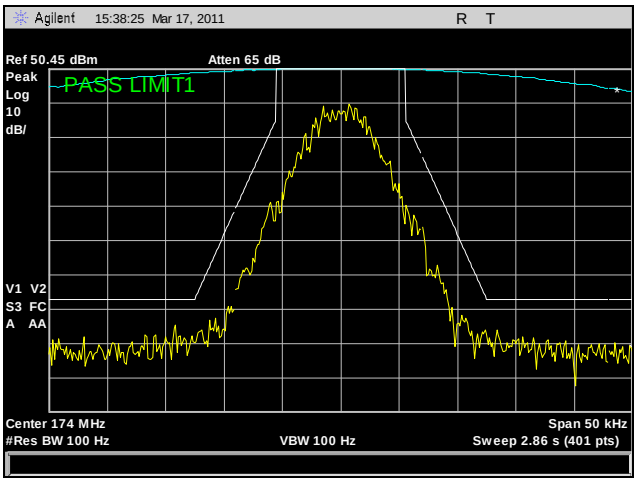
Plot 49. Emission Mask, 160.125 MHz, C4FM



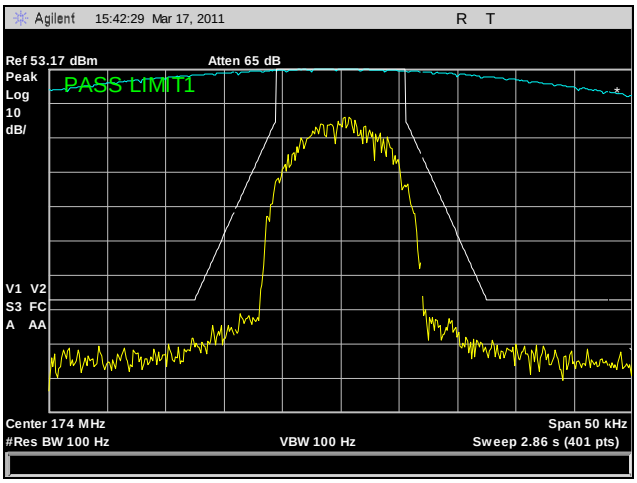
Plot 50. Emission Mask, 160.125 MHz, CQPSK



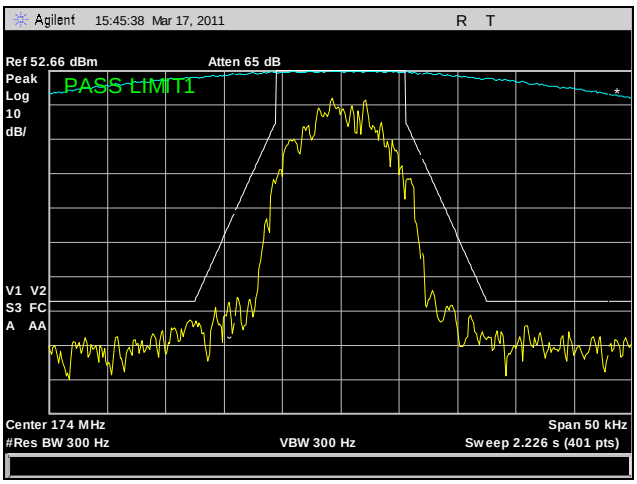
Plot 51. Emission Mask, 160.125 MHz, HDQPSK



Plot 52. Emission Mask, 173.9875 MHz, C4FM



Plot 53. Emission Mask, 173.9875 MHz, CQPSK



Plot 54. Emission Mask, 173.9875 MHz, HDQPSK

4.3. Spurious Emissions at Antenna Terminals

Test Requirement(s): **§2.1051 and §90.210(D) with FCC 04-265**

Test Procedures: As required by 47 CFR 2.1051, *spurious emissions at antenna terminal measurements* were made at the RF output terminals using a Spectrum Analyzer.

A laptop was connected to EUT to control the RF power output and frequency channel. The EUT was connected to a Spectrum Analyzer through an attenuator. The Spectrum Analyzer was set to sweep 30 MHz and up to 10th harmonic of the fundamental or 40GHz whichever is the lesser. Measurements were made at all four frequencies and at all three modulations.

Test Results: Equipment complies with Section 2.1051 and 90.210(D) with FCC 04-265.

Test Engineer(s): Len Knight

Test Date(s): 03/17/11

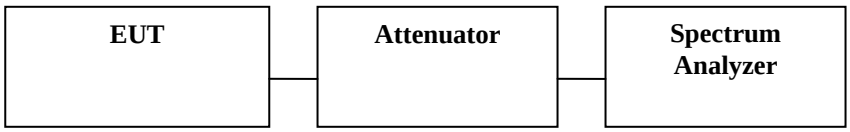
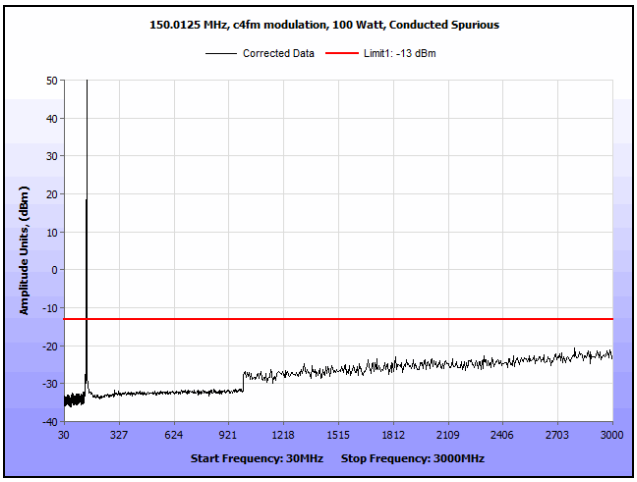
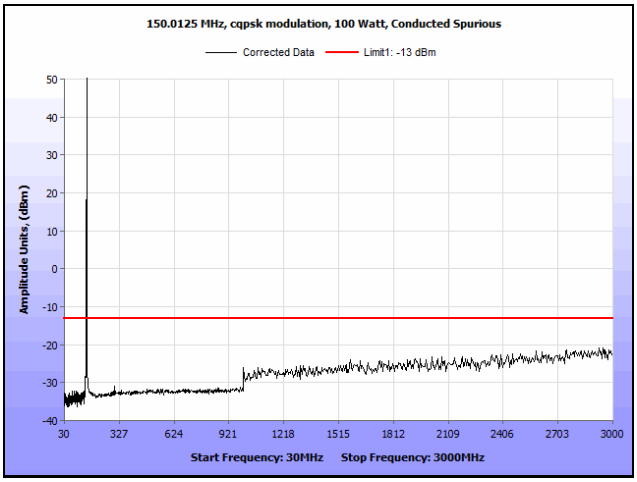


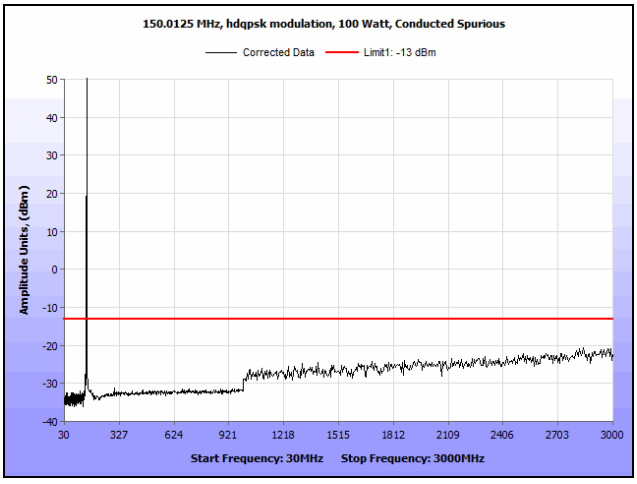
Figure 3. Spurious Emissions at Antenna Terminals Test Setup



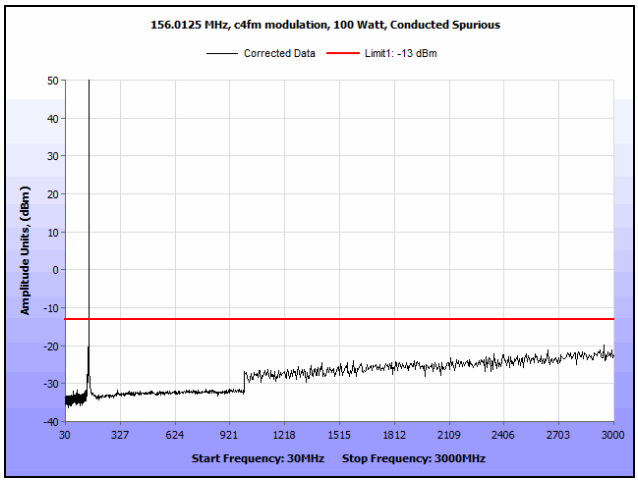
Plot 55. Conducted Spurious Emissions, 150.0125 MHz, C4FM



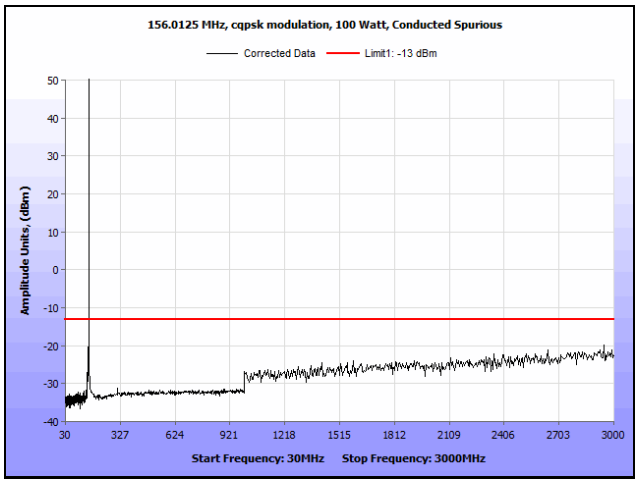
Plot 56. Conducted Spurious Emissions, 150.0125 MHz, CQPSK



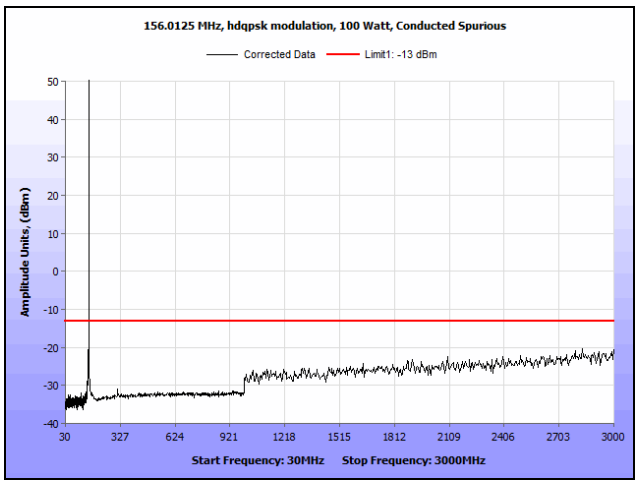
Plot 57. Conducted Spurious Emissions, 150.0125 MHz, HDQPSK



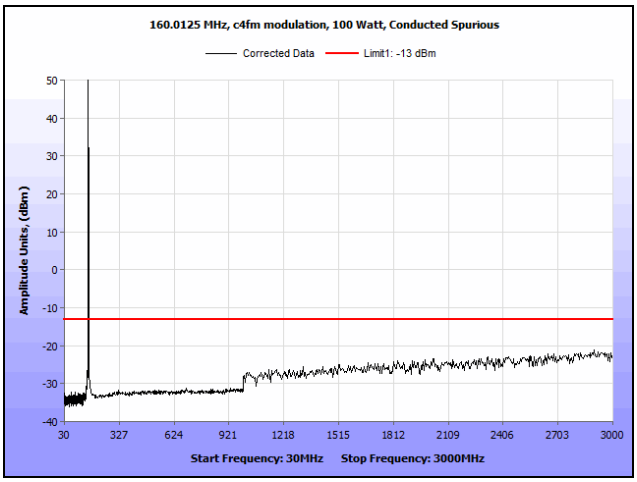
Plot 58. Conducted Spurious Emissions, 156.0125 MHz, C4FM



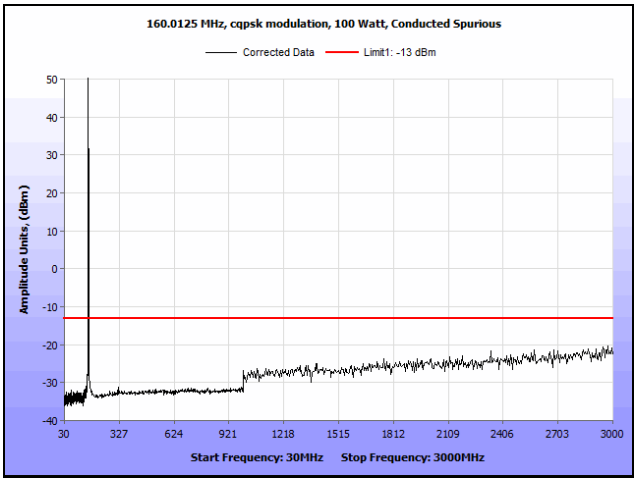
Plot 59. Conducted Spurious Emissions, 156.0125 MHz, CQPSK



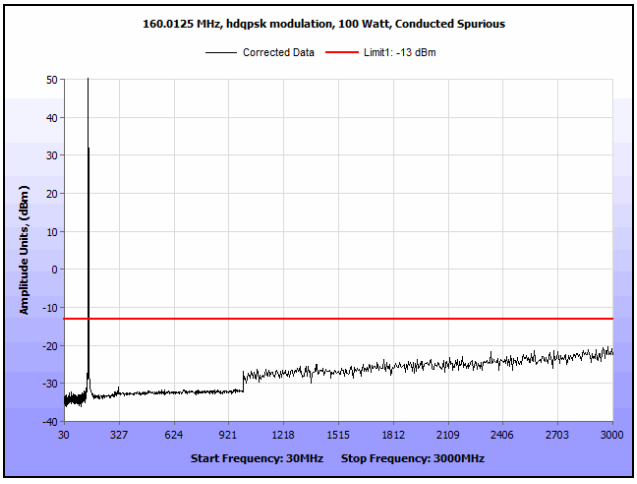
Plot 60. Conducted Spurious Emissions, 156.0125 MHz, HDQPSK



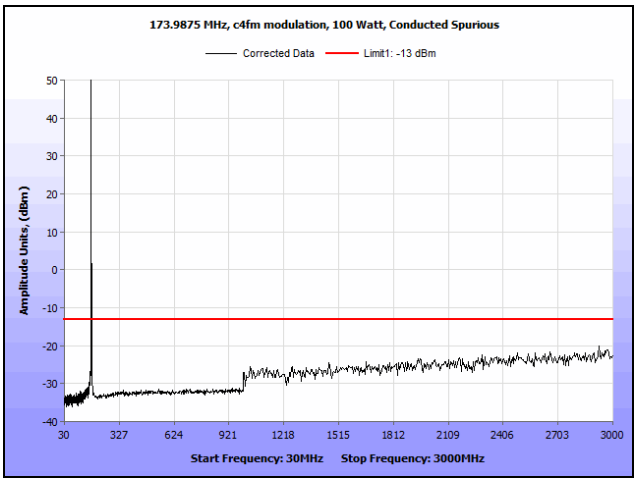
Plot 61. Conducted Spurious Emissions, 160.0125 MHz, C4FM



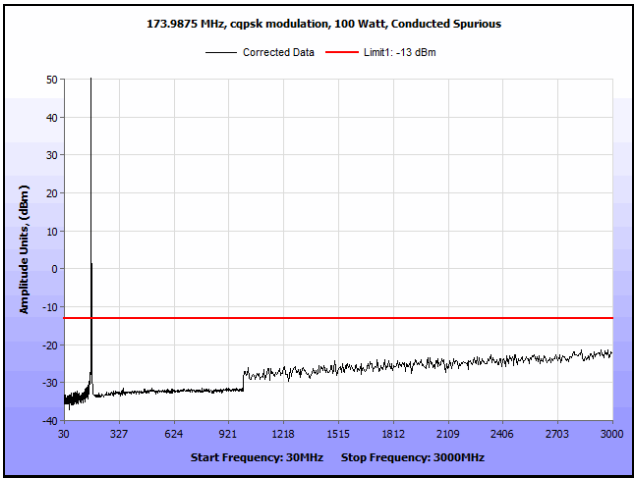
Plot 62. Conducted Spurious Emissions, 160.0125 MHz, CQPSK



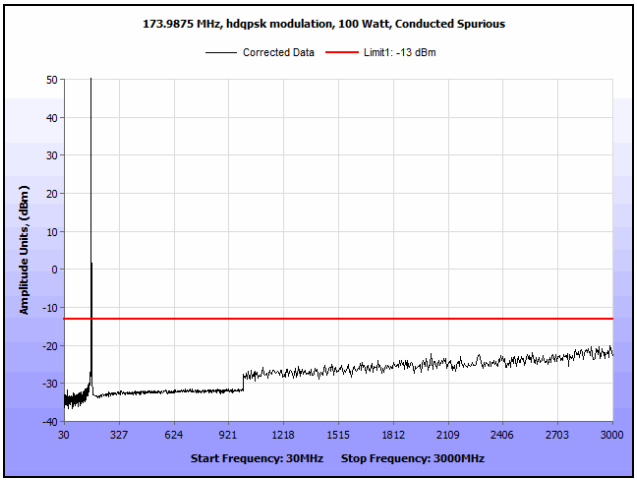
Plot 63. Conducted Spurious Emissions, 160.0125 MHz, HDQPSK



Plot 64. Conducted Spurious Emissions, 170.9875 MHz, C4FM



Plot 65. Conducted Spurious Emissions, 170.9875 MHz, CQPSK



Plot 66. Conducted Spurious Emissions, 170.9875 MHz, HDQPSK

4.4. Radiated Emissions

Test Requirement(s): **§2.1053 and §90.210**

Test 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. The EUT was set at a distance of 3m from the receiving antenna. The EUT's RF ports were terminated to 50ohm load. The EUT was set to transmit at all four channels of the transmitter frequency range at its maximum power level. The EUT was rotated about 360^0 and the receiving antenna scanned from 1-4m in order to capture the maximum emission. A calibrated antenna source was positioned in place of the EUT and the previously recorded signal was duplicated. The maximum EIRP of the emission was calculated by adding the forward power to the calibrated source plus its appropriate gain value. These steps were carried out with the receiving antenna in both vertical and horizontal polarization. Harmonic emissions up to the 10^{th} or 40GHz, which ever was the lesser, were investigated.

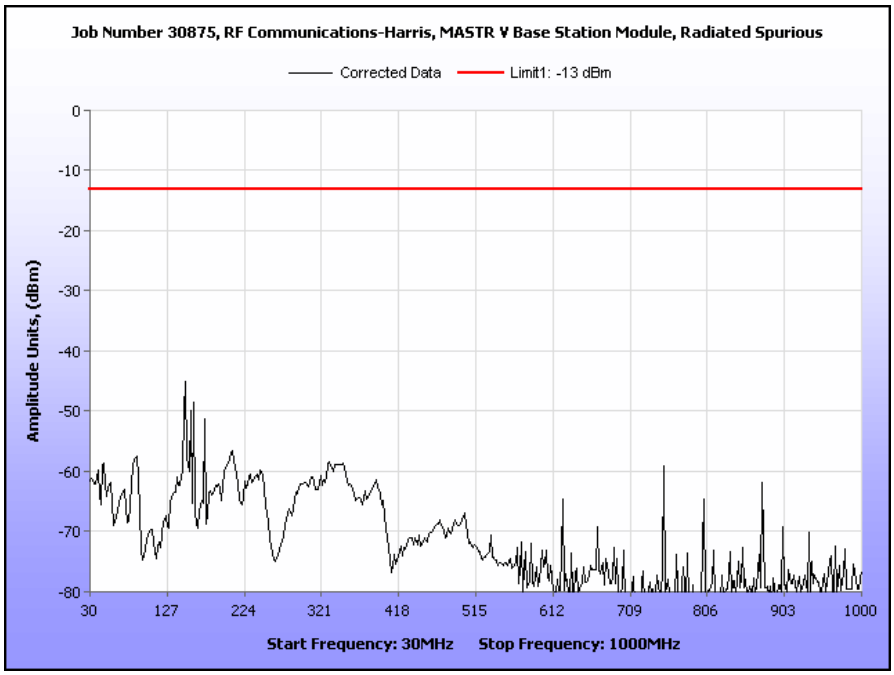
Note: Signal substitution was not performed due to the fact that no peaks were found within 20 dB of the limit.

Test Results: Equipment complies with Section 2.1053 and 90.210.

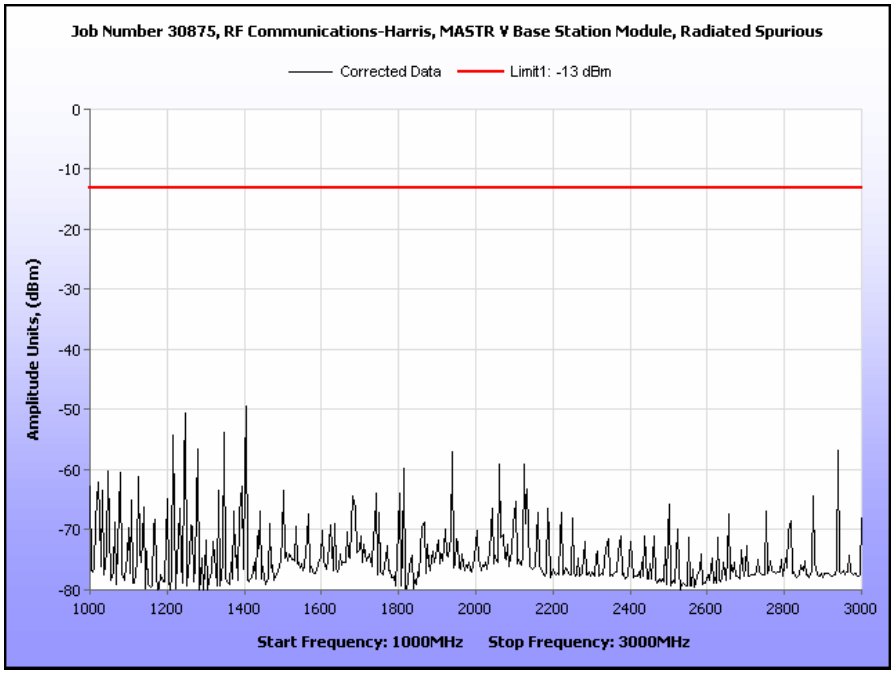
Test Engineer(s): Len Knight

Test Date(s): 03/18/11

Radiated Emissions Test Results



Plot 67. Radiated Spurious Emissions, 30 MHz – 1 GHz



Plot 68. Radiated Spurious Emissions, 1 GHz – 3 GHz

4.5. Frequency Stability

Test Requirement(s): **§2.1055 and §90.213**

Test Procedures: As required by 47 CFR 2.1055, *Frequency Stability measurements* were made at the RF output terminals using a Directional Coupler through a Spectrum Analyzer and Power Meter.

The EUT was placed in the Environmental Chamber and support equipment are outside the chamber on a table. The EUT was set to transmit a CW signal corresponding to the low, mid and high Channels for 5, 10, & 20MHz Bandwidths. The frequency counter option on the Spectrum Analyzer was used to measure frequency deviations. The frequency drift was investigated for every 10°C increment until the unit is stabilized then recorded the reading in tabular format with the temperature range of -30 to 60°C.

Voltage supplied to EUT is 120 VAC reference temperature was done at 20°C. The voltage was varied by ± 15 % of nominal

Test Results: Equipment complies with Section 2.1055 and 90.213

Test Engineer(s): Len Knight

Test Date(s): 03/25/11

Frequency Stability Test Results

Temperature (degree Celcius)	AC Voltage	Frequency Drift (ppm)
-30	120	0.053
-20	120	0.033
-10	120	0.033
0	120	0.033
10	120	0
20	102	0.013
20	120	- - - -
20	138	0.033
30	120	0
40	120	-0.007
50	120	-0.007
60	120	-0.007

Table 12. Frequency Stability, Test Results

Photograph 3. Frequency Stability, Test Setup

4.6. RSS-GEN Receiver Spurious Emissions Requirements

Test Requirements: The following receiver spurious emission limits shall be complied with:

(a) If a radiated measurement is made, all spurious emissions shall comply with the limits of Table 13.

Spurious Frequency (MHz)	Field Strength (microvolt/m at 3 metres)
30 – 88	100
88 – 216	150
216 – 960	200
Above 960	500

Table 13. Spurious Emission Limits for Receivers

(b) If a conducted measurement is made, no spurious output signals appearing at the antenna terminals shall exceed 2 nanowatts per any 4 kHz spurious frequency in the band 30-1000 MHz, or 5 nanowatts above 1 GHz.

Test Procedures: The EUT was programmed for receive mode only. Conducted measurements were taken at the antenna port of the EUT. All plots are corrected for cable loss.

Test Results: Equipment is compliant with the Receiver Spurious Emissions Requirements of RSS-GEN.

Test Engineer(s): Len Knight

Test Date(s): 03/25/11

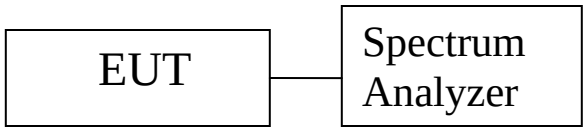
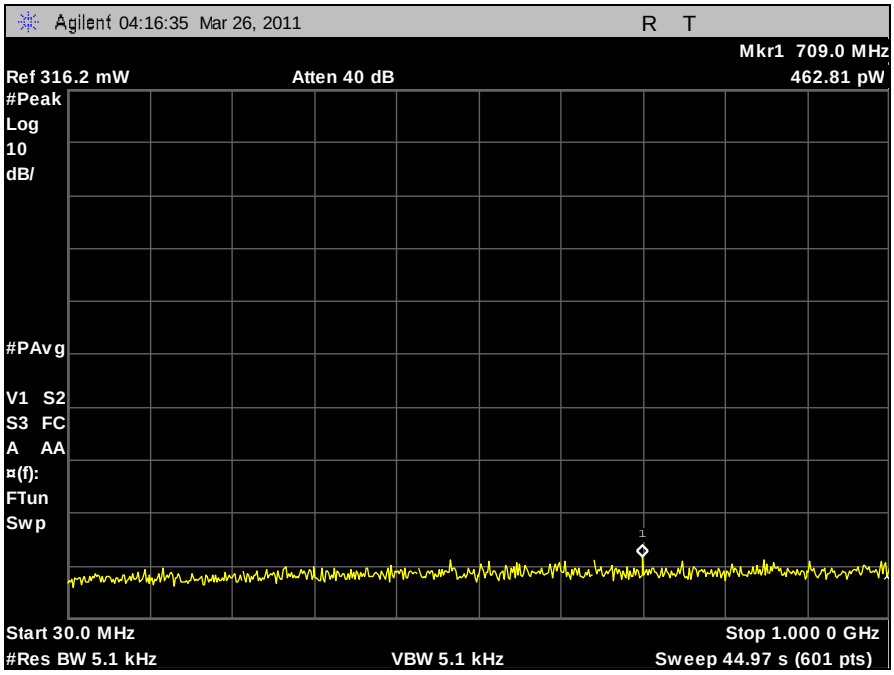
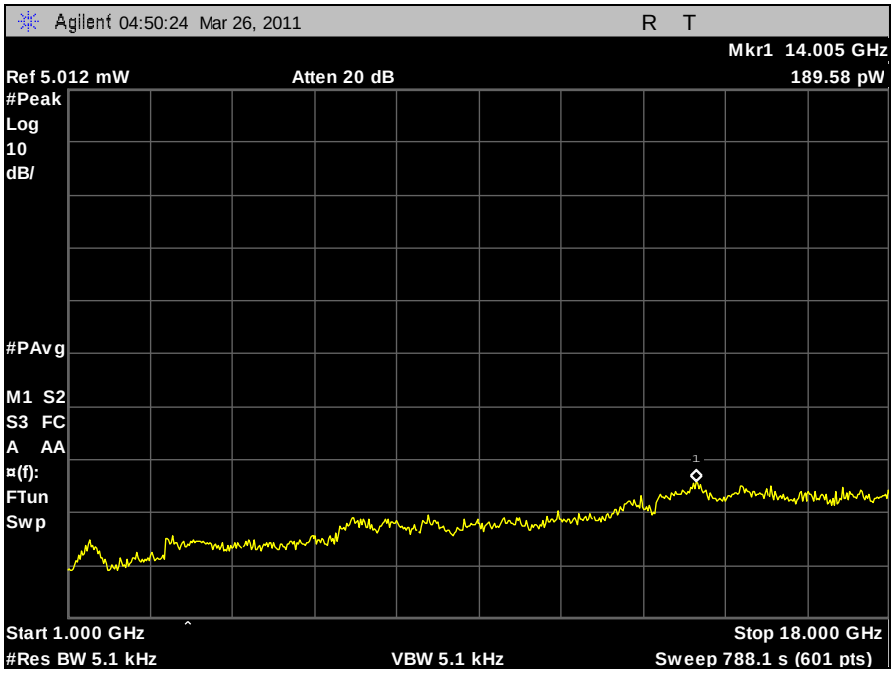


Figure 4. Block Diagram, Conducted Receiver Spurious Emissions Test Setup

Conducted Receiver Spurious Emissions



Plot 69. Receiver Spurious Emission, 30 MHz – 1 GHz



Plot 70. Receiver Spurious Emission, 1 GHz – 18 GHz

5. 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 Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1T4300	SEMI-ANECHOIC CHAMBER # 1	EMC TEST SYSTEMS	NONE	08/23/2010	08/23/2013
1T4503	SHIELDED ROOM	UNIVERSAL SHIELDING CORP	N/A	SEE NOTE	
1T4571	50 MV SHUNT	DATEL, INC.	39-1734103	SEE NOTE	
1T4621	ESA-E SERIES SPECTRUM ANALYZER	AGILENT	E4402B	05/10/2010	05/10/2011
1T4502	COMB GENERATOR	COM-POWER	CGC-255	10/06/2010	10/06/2011
1T4758	THERMO-HYGROMETER	CONTROL COMPANY	4040	05/21/2010	05/21/2012
1T4564	LISN (24 AMP)	SOLAR ELECTRONICS	9252-50-R-24-BNC	10/06/2010	10/06/2011
1T4568	RADIATING NOISE SOURCE	MET LABORATORIES	N/A	SEE NOTE	
1T4728	PROGRAMMABLE AC POWER SOURCE	QUADTECH	31010	SEE NOTE	
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	05/25/2010	05/25/2011
1T4576	ANTENNA, ACTIVE HORN	COM-POWER	AHA-118	01/12/2011	01/12/2012
1T4627	THERMO/HYGROMETER	CONTROL COMPANY	S6-627-9	10/09/2009	10/09/2011
4T7285	DMM	FLUKE	87V	11/11/2010	11/11/2011
2T5915	TEMPERATURE CHAMBER/ ALARM/ CONTROLLER	ENVIROTRONICS	F-70-2-30/ TEMP SENTRY 0120011/ SYSTEMS PLUS 386 (T)	11/28/2010	11/28/2011

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

Certification & User's Manual Information

6. Certification Label & User's Manual Information

6.1. 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.

(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 provision 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 Y — 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 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, and the procedures to be followed in obtaining certification from the Commission and the conditions attendant to such a grant, whichever is applicable.

§ 2.902 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.

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

§ 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.

(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.

6.2. 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.

§ 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

