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

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April 11, 2013

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

Dear James McIntyre,

Enclosed is the EMC Wireless test report for compliance testing of the Harris RF Communications, MASTR V, MASV-800M1, tested to the requirements of Title 47 of the Code of Federal Regulations (CFR), Part 15 Subpart B and ICES-003, Issue 5 August 2012 for a Class A Digital Device, and Part 90 and RSS-119, Issue 9 June 2007 for Land Mobile Radio Services.

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\EMC37609B-FCC90 Rev. 2)

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Electromagnetic Compatibility Criteria
Class II Permissive Change Test Report

For the

Harris RF Communications
MASTR V, MASV-800M1

Tested under

The FCC Verification Rules
Contained in Title 47 of the CFR, Part 15 B and ICES-003
for a Class A Digital Device
&
Part 90 and RSS-119
for Private Land Mobile Radio Services

MET Report: EMC37609B-FCC90 Rev. 2

April 11, 2013

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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MET Report: EMC37609B-FCC90 Rev. 2

Ben Taylor, 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 capable of operation in accordance with the requirements of Part 15 B and Part 90 of the FCC Rules and ICES-003 and RSS-199 of the Industry Canada standards under normal use and maintenance.

Asad Bajwa,
Director, Electromagnetic Compatibility Lab

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Report Status Sheet

Revision	Report Date	Reason for Revision
∅	March 15, 2013	Initial Issue.
1	March 26, 2013	Revised to reflect customer corrections.
2	April 11, 2013	Revised to reflect engineer 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

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I. Executive Summary

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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	Industry Canada References	Compliance
47 CFR Part 15.107 (a)	ICES-003, Issue 5 August 2012	Compliant
47 CFR Part 15.109 (a)	ICES-003, Issue 5 August 2012	Compliant
2.1049; 90.210(d) Occupied Bandwidth (Emission Mask)	RSS-119 5.8.10.1 Adjacent Channel Power	Compliant
2.1051; 90.210(d) Spurious Emissions at Antenna Terminals	RSS-GEN, Section 7.2.3.1, Antenna Conducted Emissions	Compliant

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II. Equipment Configuration

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2. Equipment Configuration

2.1. Overview

MET Laboratories, Inc. was contracted by Harris RF Communications to perform testing on the MASTR V, MASV-800M1 under quote number 1125872.

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-800M1.

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-800MHz	
Model(s) Covered:	MASTR V, MASV-800MHz	
Filing Option:	Class II Permissive Change	
EUT Specifications:	Primary Power Source: 110 VAC, 60 Hz	
	FCC ID: OWDTR-0053-E IC: 3636B-0053	
	Type of Modulations:	C4FM, CQPSK, HDQPSK
	Equipment Code:	TNB
	EUT Frequency Ranges:	851 MHz-869 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:	Ben Taylor	
Report Date(s):	April 11, 2013	

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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-800M1, 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-555008-011	HR0811210614
Tx #2	Transmit Module #2	EA-555008-011	HR0811210534
Tx #3	Transmit Module #3	EA-555008-012	HR0812210133
Tx #4	Transmit Module #4	EA-555008-012	HR0812210131
PA #1	Power Amplifier #1	EA-555014-011	CR0011D84543
PA #2	Power Amplifier #2	EA-555014-011	CR0011D83744
PA #3	Power Amplifier #3	EA-555014-012	060855681
PA #4	Power Amplifier #4	EA-555014-012	060855670
Rx #1	Receive Module #1	EA-555007-011	EP5173F04474
Rx #2	Receive Module #2	EA-555007-011	EP5173B00493
Rx #3	Receive Module #3	EA-555007-011	EP5173001370
Rx #4	Receive Module #4	EA-555007-011	EP5173001392
BB #1	Baseband Module #1	EA-555005-001	EP5199D03334
BB #2	Baseband Module #2	EA-555005-001	EP5199D03378
TC #1	Traffic Controller #1	EA-555004	EP5197E04439
TC #2	Traffic Controller #2	EA-555004	EP5197E04443
TC #3	Traffic Controller #3	EA-555004	EP5197E04331
TC #4	Traffic Controller #4	EA-555004	EP5197E04444
ES #1	E-Switch (Primary)	EA-555012-001	EP5198000343
ES #2	E-Switch (Redundant)	EA-555012-001	EP5198000342
PS #1	Power Supply #1	EA-555011-001	XE80595
PS #2	Power Supply #2	EA-555011-001	XE80584
PS #3	Power Supply #3	EA-555011-001	XE80582
PS #4	Power Supply #4	EA-555011-001	XE80605

Table 1. Equipment Configuration

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2.5. Support Equipment

Harris RF Communications supplied support equipment necessary for the operation and testing of the MASTR V, MASV-800M1. All support equipment supplied is listed in the following Support Equipment List.

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

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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

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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.

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III. Electromagnetic Compatibility Criteria for Unintentional Radiators

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3. Electromagnetic Compatibility Criteria

3.1. § 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): Ben Taylor

Test Date(s): 02/22/13

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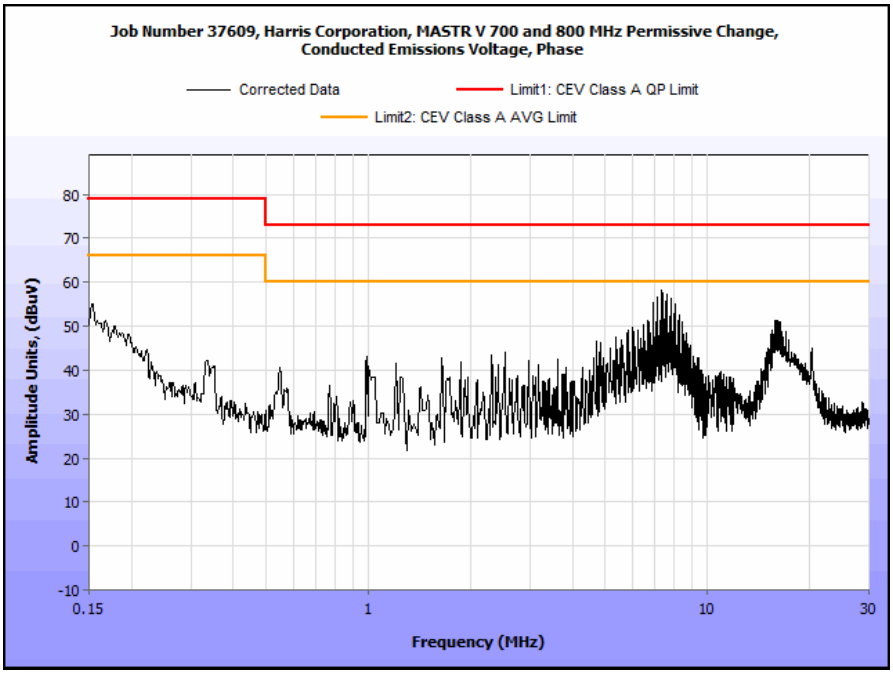
Conducted Emissions - Voltage, AC Power, Phase Line (120 VAC, 60 Hz)

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
0.1551	43.13	0	43.13	79	-35.87	22.78	0	22.78	66	-43.22
0.3306	40.99	0	40.99	79	-38.01	37.91	0	37.91	66	-28.09
0.5468	37.64	0	37.64	73	-35.36	32.42	0	32.42	60	-27.58
0.9893	42.4	0	42.4	73	-30.6	38.69	0	38.69	60	-21.31
7.365	56.41	0	56.41	73	-16.59	50.87	0	50.87	60	-9.13
16.131	48.7	0	48.7	73	-24.3	42.52	0	42.52	60	-17.48

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



Plot 1. Conducted Emission, Phase Line Plot

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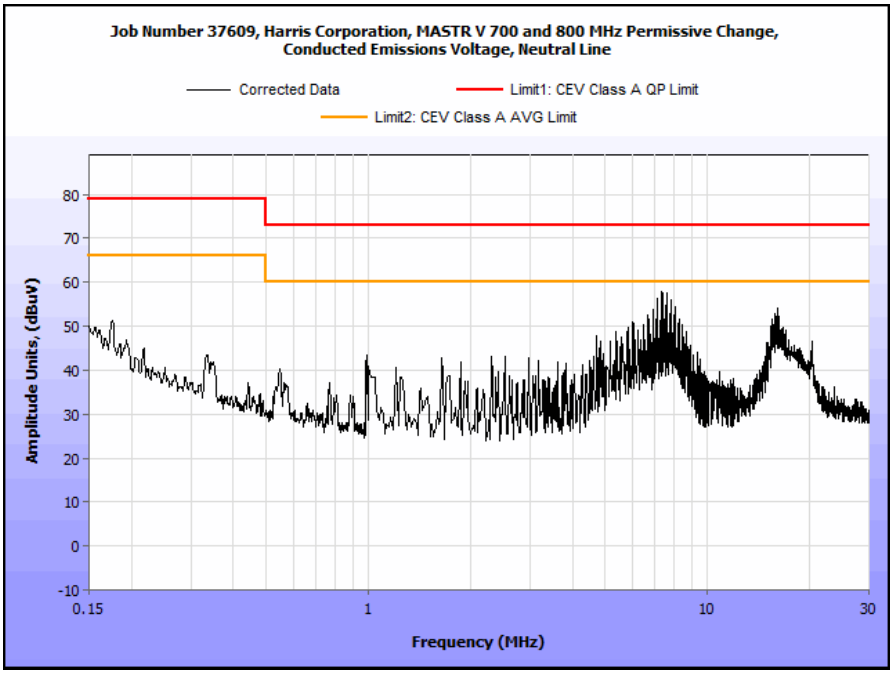
Conducted Emissions - Voltage, AC Power, Neutral Line (120 VAC, 60 Hz)

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
0.176	42.78	0	42.78	79	-36.22	34.07	0	34.07	66	-31.93
0.3313	41.45	0	41.45	79	-37.55	37.08	0	37.08	66	-28.92
0.5493	38.48	0	38.48	73	-34.52	35.01	0	35.01	60	-24.99
0.989	42.24	0	42.24	73	-30.76	39.41	0	39.41	60	-20.59
7.366	56.57	0	56.57	73	-16.43	50.48	0	50.48	60	-9.52
16.266	49.95	0	49.95	73	-23.05	44.1	0	44.1	60	-15.9

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



Plot 2. Conducted Emission, Neutral Line Plot

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Conducted Emission Limits Test Setup

Photograph 1. Conducted Emissions, Test Setup

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3.2. § 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): Ben Taylor

Test Date(s): 02/25/13 – 02/27/13

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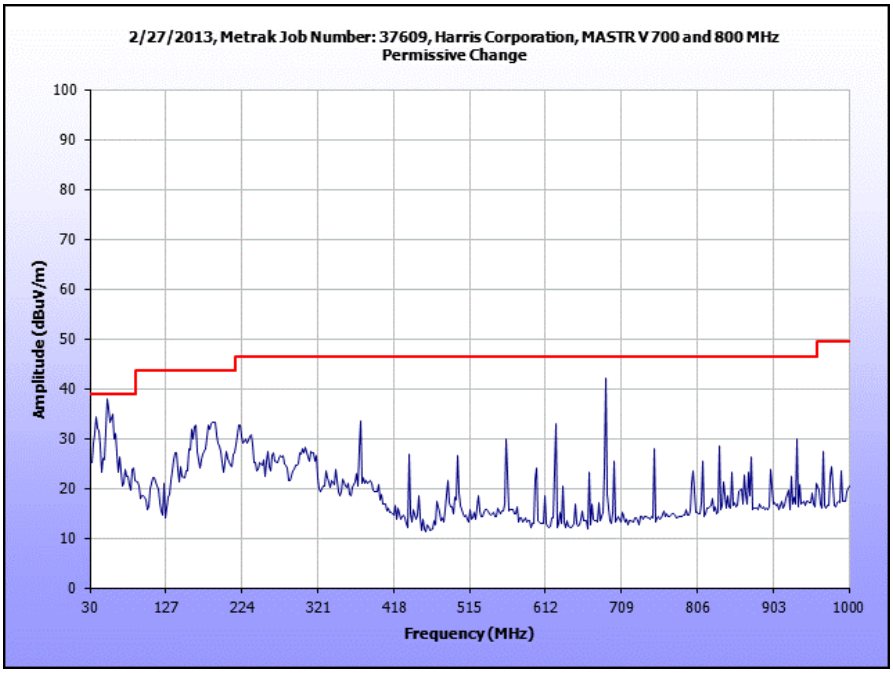
Radiated Emissions Limits Test Results, Class A

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)
59.088176	3	H	1.94	22.23	7.49	0.54	10.46	19.80	39.00	-19.20
59.088176	360	V	1.01	32.56	7.49	0.54	10.46	30.13	39.00	-8.87
52.501253	0	H	3.96	31.03	8.00	0.49	10.46	29.06	39.00	-9.94
52.501253	356	V	1.02	35.28	8.00	0.49	10.46	33.31	39.00	-5.69
374.99562	360	H	1.01	27.85	15.60	1.54	10.46	34.53	46.40	-11.87
374.99562	269	V	1.42	23.22	15.60	1.54	10.46	29.90	46.40	-16.50
625.02799	138	H	1.01	21.74	19.90	2.09	10.46	33.27	46.40	-13.13
625.02799	339	V	1.01	19.05	19.90	2.09	10.46	30.58	46.40	-15.82
687.50822	243	H	1.28	21.78	20.70	2.25	10.46	34.27	46.40	-12.13
687.50822	88	V	1.19	19.72	20.70	2.25	10.46	32.21	46.40	-14.19
980.76152	313	H	1.36	6.09	23.62	2.89	10.46	22.14	49.50	-27.36
980.76152	353	V	1.06	6.02	23.62	2.89	10.46	22.07	49.50	-27.43

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

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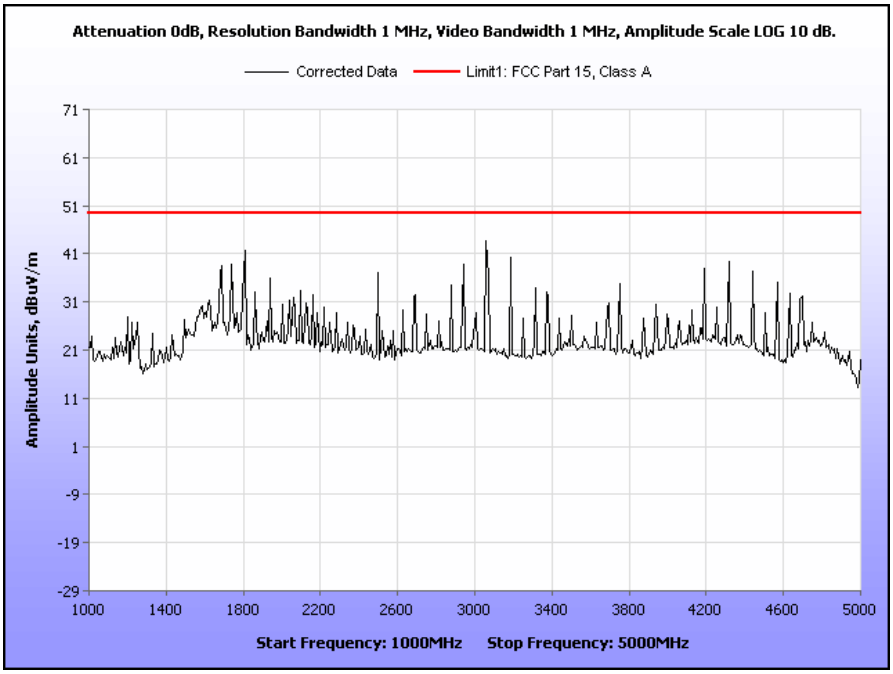
Frequency (GHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1.812	307	H	1.02	24.81	31.36	3.66	20.00	39.83	49.50	-9.67
1.812	252	V	102.60	25.23	31.72	3.66	20.00	40.61	49.50	-8.89
3.062	64	H	1.60	27.09	33.32	5.11	20.00	45.52	49.50	-3.98
3.062	34	V	1.00	27.80	33.24	5.11	20.00	46.15	49.50	-3.35
4.437	12	H	1.20	23.10	34.10	7.20	20.00	44.40	49.50	-5.10
*4.437	259	V	1.42	26.29	33.99	7.20	20.00	47.48	49.50	-2.02

Table 10. Radiated Emissions Limits, Test Results, Above 1 GHz, FCC Limits

Note 1: The EUT was tested at 3 m.
Note 2: * - At this frequency, the measured electric-field strength exhibits a margin of compliance that is less than 3 dB below the specification limit. We recommend that every emission measured, have at least a 3 dB margin to allow for deviations in the emission characteristics that may occur during the production process.



Plot 4. Radiated Emissions, 1 GHz – 5 GHz, FCC Limits

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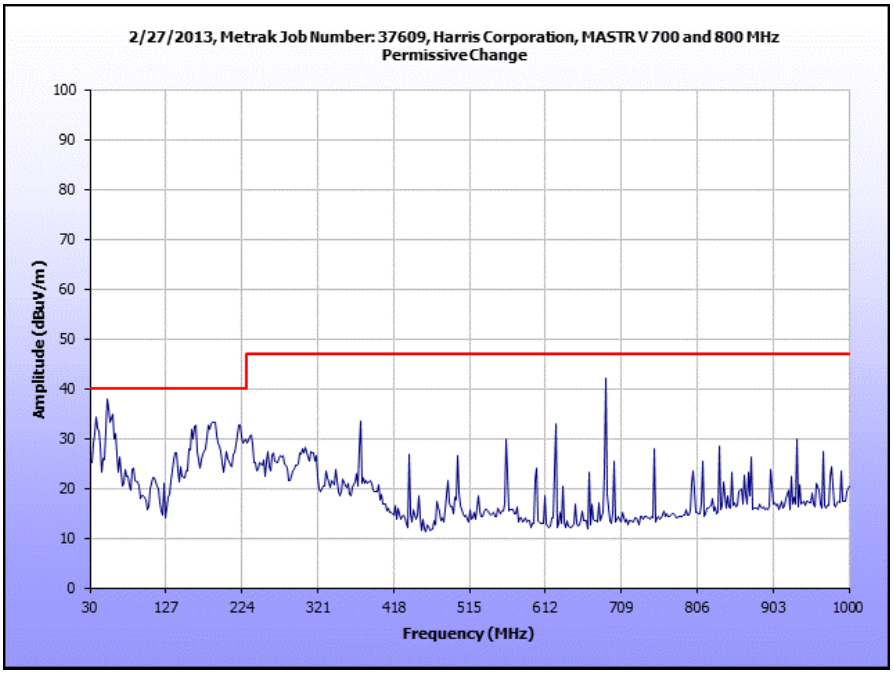
Radiated Emissions Limits Test Results, Class A

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)
59.088176	3	H	1.94	22.23	7.49	0.54	10.46	19.80	40.00	-20.20
59.088176	360	V	1.01	32.56	7.49	0.54	10.46	30.13	40.00	-9.87
52.501253	0	H	3.96	31.03	8.00	0.49	10.46	29.06	40.00	-10.94
52.501253	356	V	1.02	35.28	8.00	0.49	10.46	33.31	40.00	-6.69
374.99562	360	H	1.01	27.85	15.60	1.54	10.46	34.53	47.00	-12.47
374.99562	269	V	1.42	23.22	15.60	1.54	10.46	29.90	47.00	-17.10
625.02799	138	H	1.01	21.74	19.90	2.09	10.46	33.27	47.00	-13.73
625.02799	339	V	1.01	19.05	19.90	2.09	10.46	30.58	47.00	-16.42
687.50822	243	H	1.28	21.78	20.70	2.25	10.46	34.27	47.00	-12.73
687.50822	88	V	1.19	19.72	20.70	2.25	10.46	32.21	47.00	-14.79
980.76152	313	H	1.36	6.09	23.62	2.89	10.46	22.14	47.00	-24.86
980.76152	353	V	1.06	6.02	23.62	2.89	10.46	22.07	47.00	-24.93

Table 11. Radiated Emissions Limits, Test Results, ICES-003 Limits, 30 MHz – 1 GHz

Note: The EUT was tested at 3 m.



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

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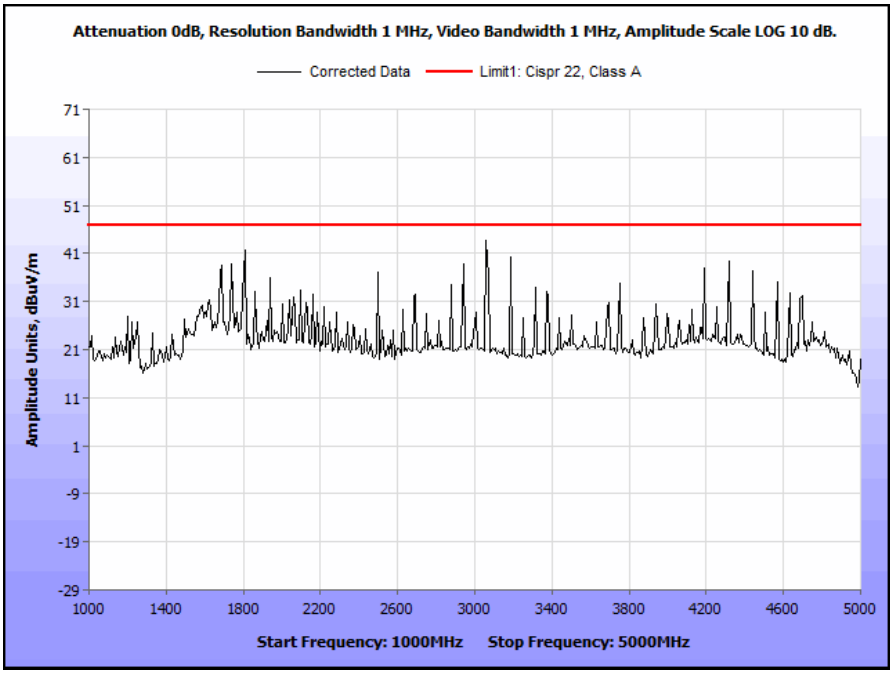
Frequency (MHz)	EUT Azimuth (Degrees)	Antenna Polarity (H/V)	Antenna HEIGHT (m)	Uncorrected Amplitude (dBuV)	Antenna Correction Factor (dB) (+)	Cable Loss (dB) (+)	Distance Correction Factor (dB) (-)	Corrected Amplitude (dBuV/m)	Limit (dBuV/m)	Margin (dB)
1.812	307	H	1.02	23.79	31.36	3.66	20	38.81	47	-8.19
1.812	252	V	102.6	24.45	31.72	3.66	20	39.83	47	-7.17
3.062	64	H	1.6	26.98	33.32	5.11	20	45.41	47	-1.59
3.062	34	V	1	27.6	33.24	5.11	20	45.95	47	-1.05
4.437	12	H	1.2	22.9	34.10	7.20	20	44.20	47	-2.80
4.437	259	V	1.42	25.29	33.99	7.20	20	46.48	47	-0.52

Table 12. Radiated Emissions Limits, Test Results, ICES-003 Limits, 1 GHz – 5 GHz

Note: The EUT was tested at 3 m.



Plot 6. Radiated Emissions, 1 GHz – 5 GHz, ICES-003 Limits

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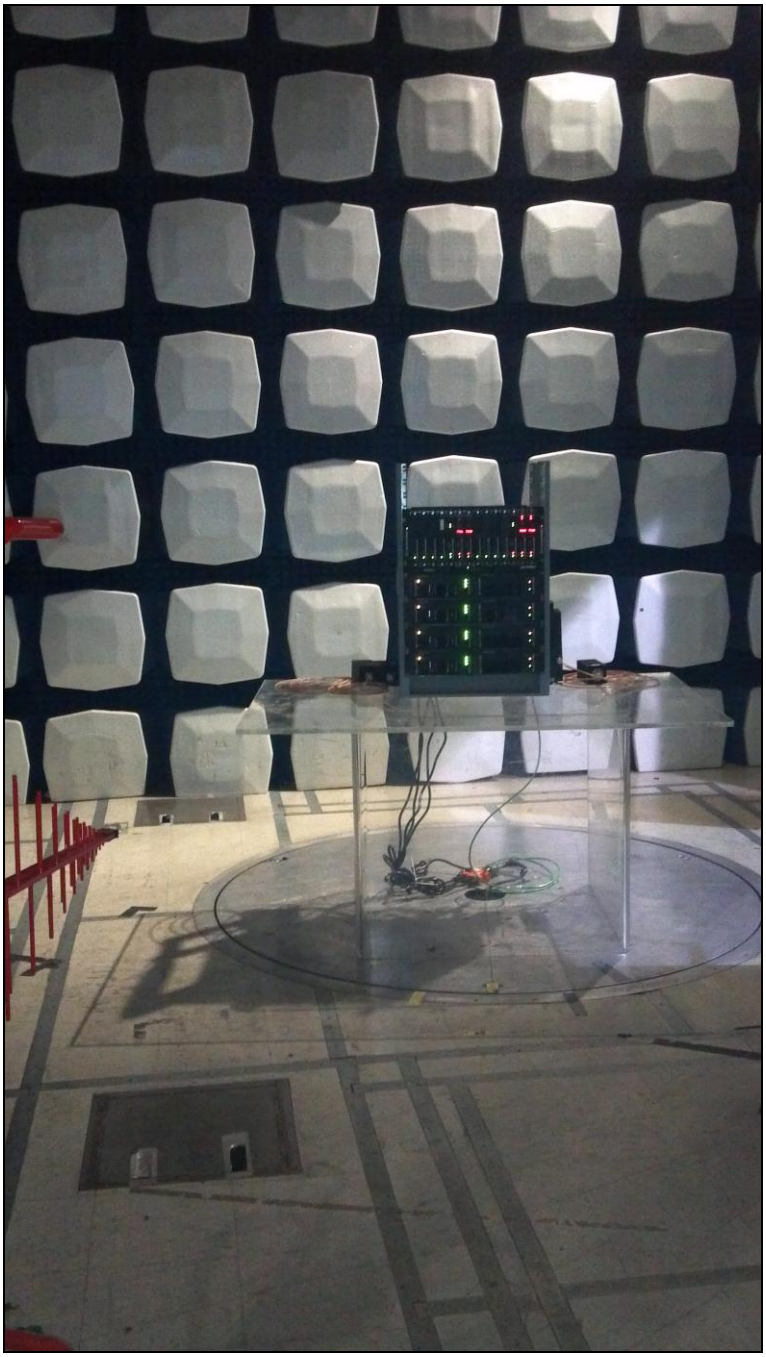
Radiated Emission Limits Test Setup



Photograph 2. Radiated Emission, Test Setup

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IV. Electromagnetic Compatibility Criteria for Intentional Radiators

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4. Electromagnetic Compatibility RF Power Output Requirements

4.1. Emission Mask

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

Test Procedures: The EUT was connected to a spectrum analyzer through an RF attenuator. The EUT was set to transmit a CW signal on the low, mid, and high channels. The RBW of the spectrum analyzer was set to 100 kHz and the trace was set to max hold. The peak of the unmodulated carrier was then set as the reference level and another trace was turned on. The modulation was turned on and the RBW was reduced to 100 Hz, the trace was set to max hold, and the in-band emissions were compared to the emission mask. This was repeated for low, mid, and high channels for each modulation.

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 C.*). The EUT does not exceed the Emission Masks limit.

The following pages show measurements of Emission Mask plots:

Test Engineer(s): Ben Taylor

Test Date(s): 02/20/13 – 02/22/13

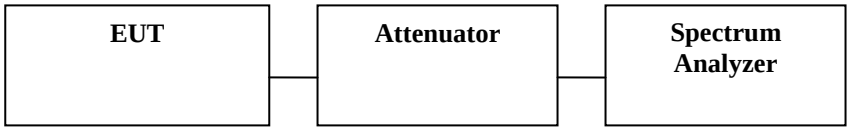

Figure 1. Emission Mask Test Setup

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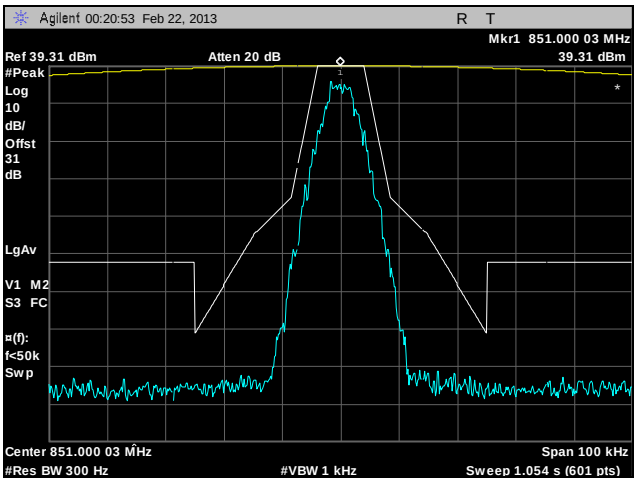
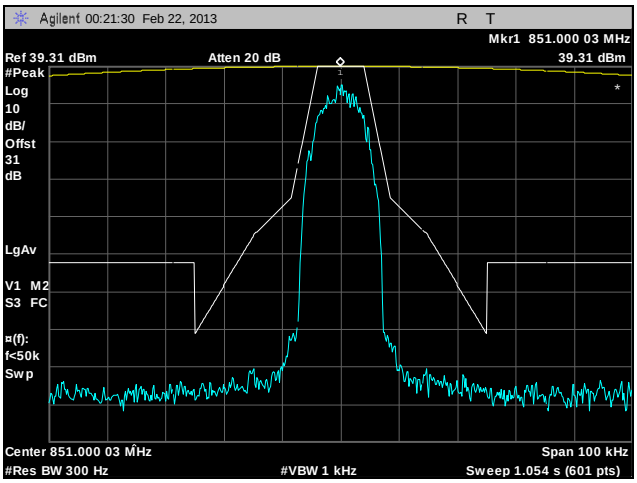
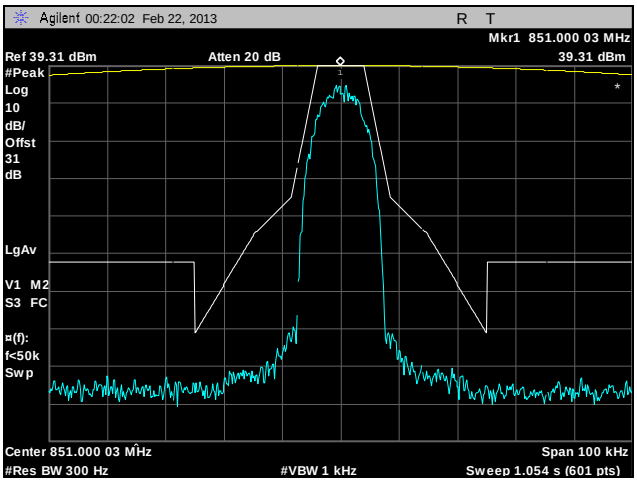


Plot 7. Emission Mask, 851 MHz, C4FM, 10 W



Plot 8. Emission Mask, 851 MHz, CQPSK, 10 W



Plot 9. Emission Mask, 851 MHz, HDQPSK, 10 W

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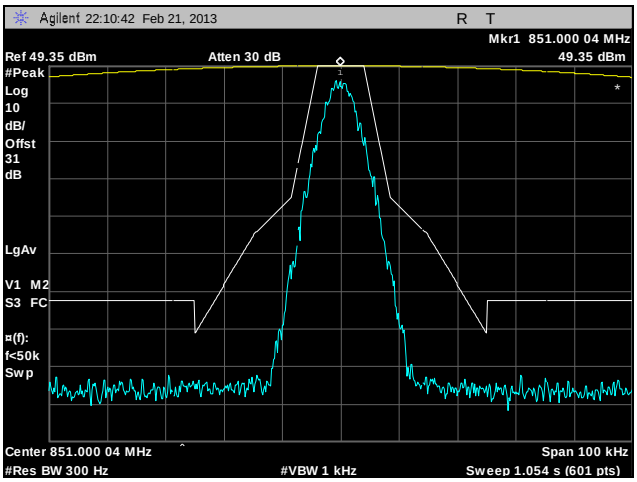
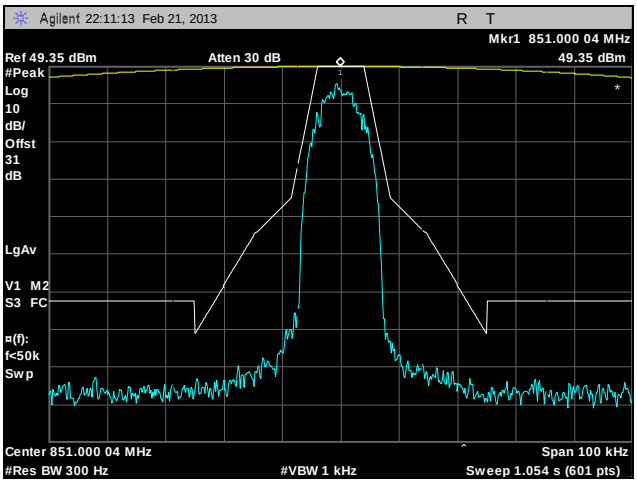
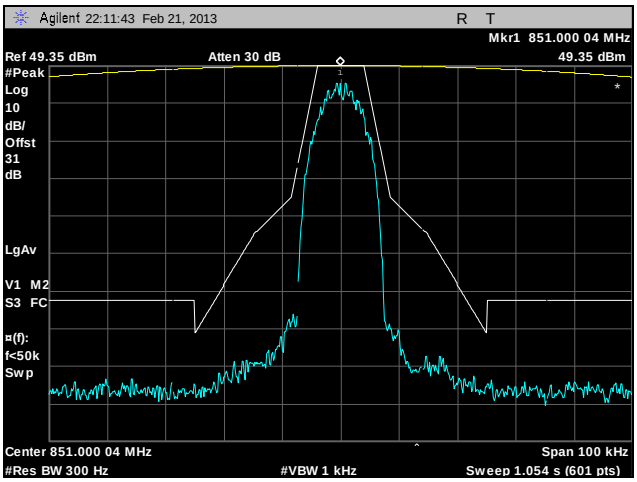


Plot 10. Emission Mask, 851 MHz, C4FM, 100 W



Plot 11. Emission Mask, 851 MHz, CQPSK, 100 W



Plot 12. Emission Mask, 851 MHz, HDQPSK, 100 W

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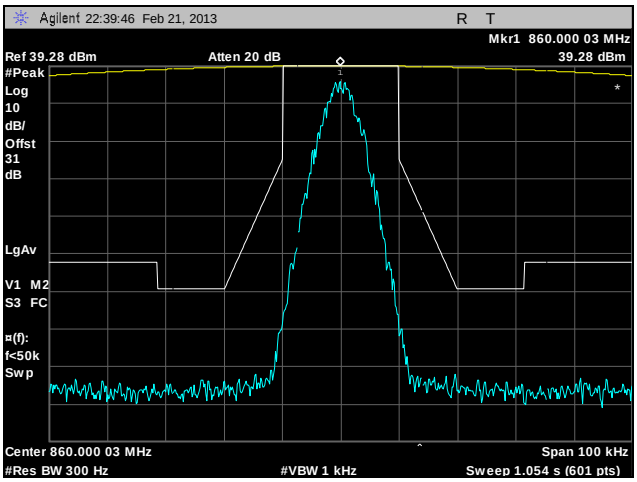
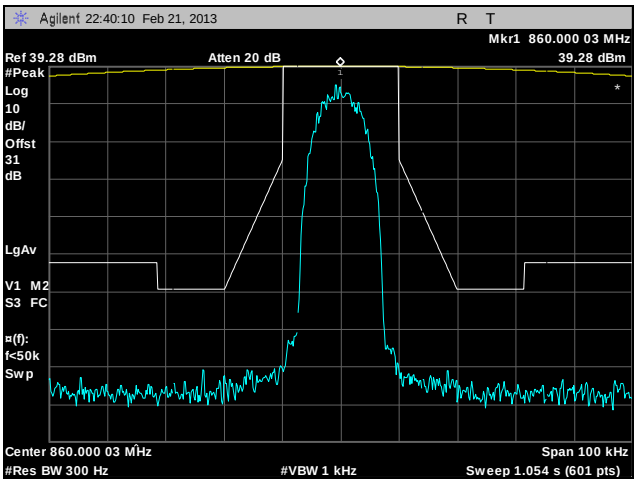
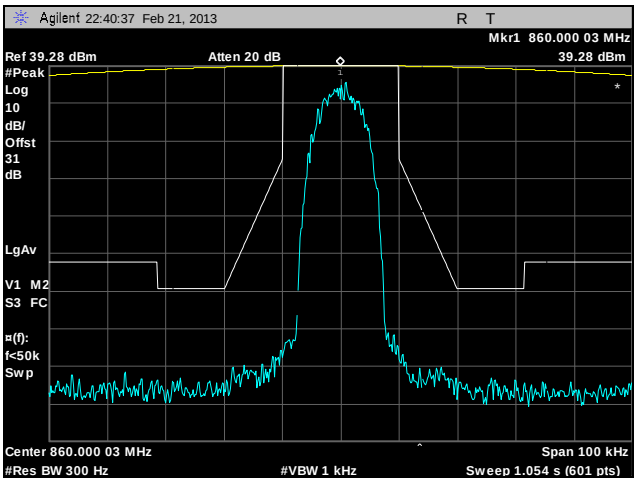


Plot 13. Emission Mask, 860 MHz, C4FM, 10 W



Plot 14. Emission Mask, 860 MHz, CQPSK, 10 W



Plot 15. Emission Mask, 860 MHz, HDQPSK, 10 W

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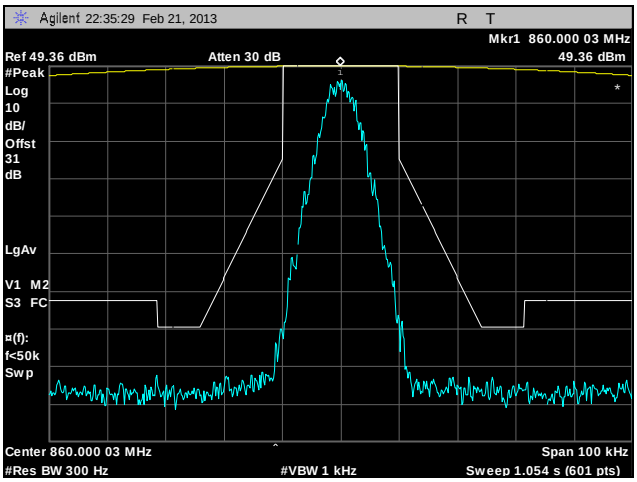
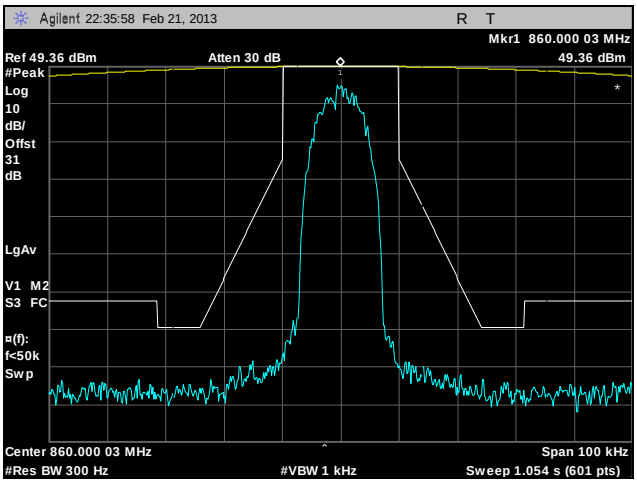
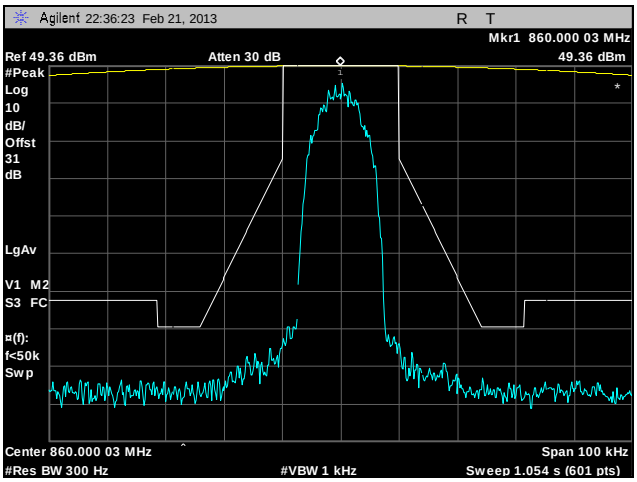


Plot 16. Emission Mask, 860 MHz, C4FM, 100 W



Plot 17. Emission Mask, 860 MHz, CQPSK, 100 W



Plot 18. Emission Mask, 860 MHz, HDQPSK, 100 W

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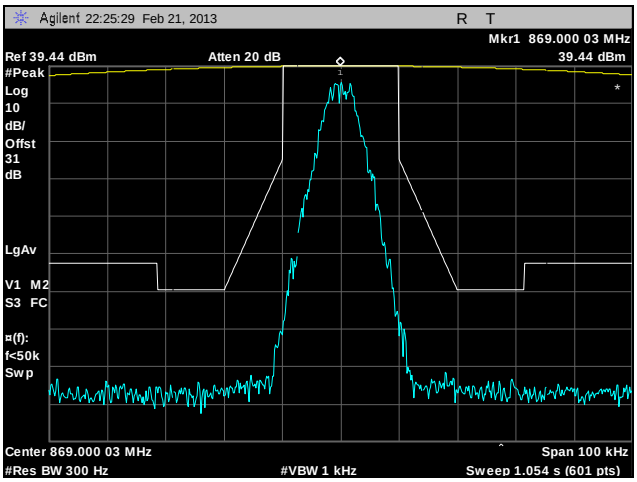
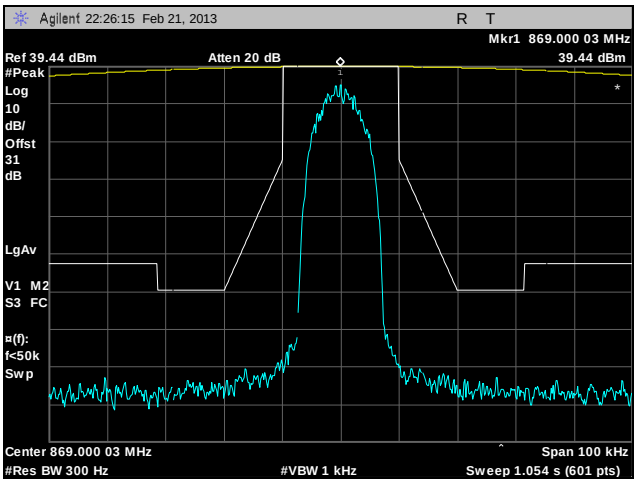
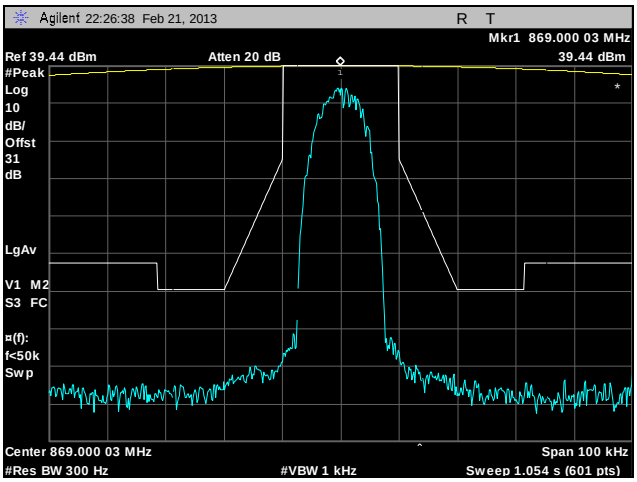


Plot 19. Emission Mask, 869 MHz, C4FM, 10 W



Plot 20. Emission Mask, 869 MHz, CQPSK, 10 W



Plot 21. Emission Mask, 869 MHz, HDQPSK, 10 W

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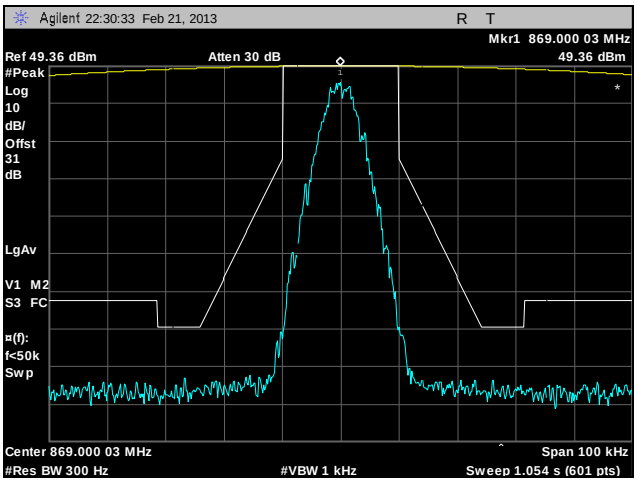
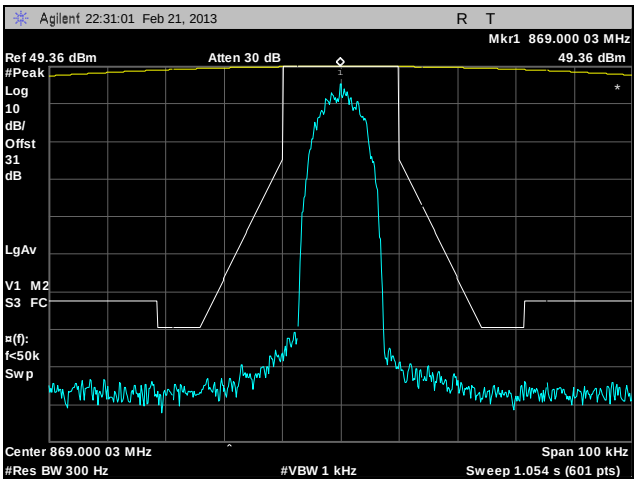
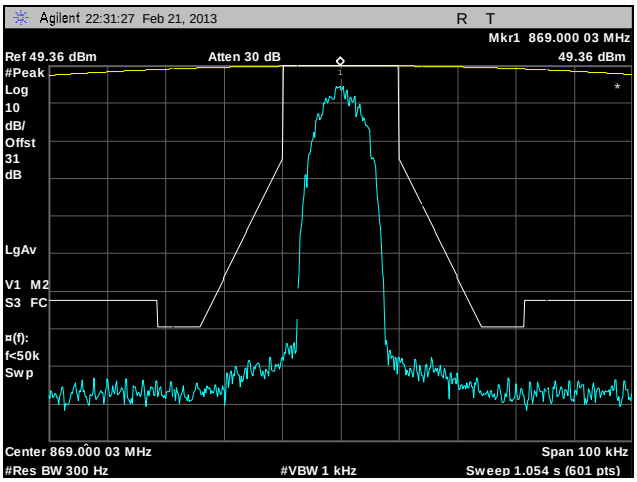


Plot 22. Emission Mask, 869 MHz, C4FM, 100 W



Plot 23. Emission Mask, 869 MHz, CQPSK, 100 W



Plot 24. Emission Mask, 869 MHz, HDQPSK, 100 W

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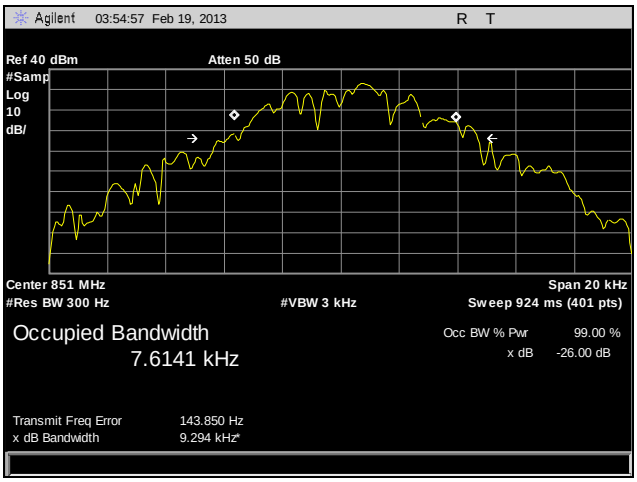
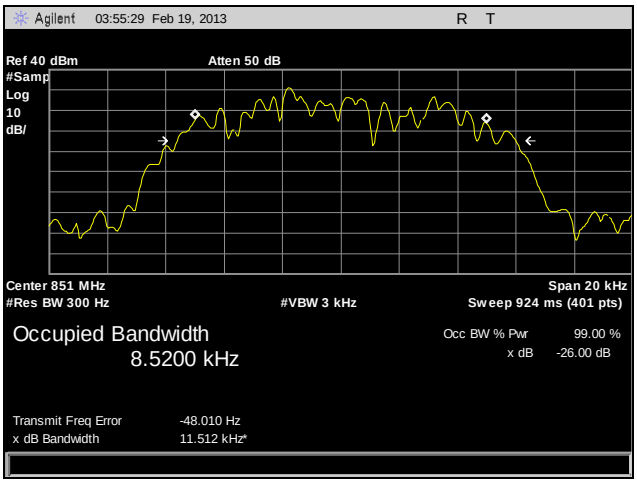
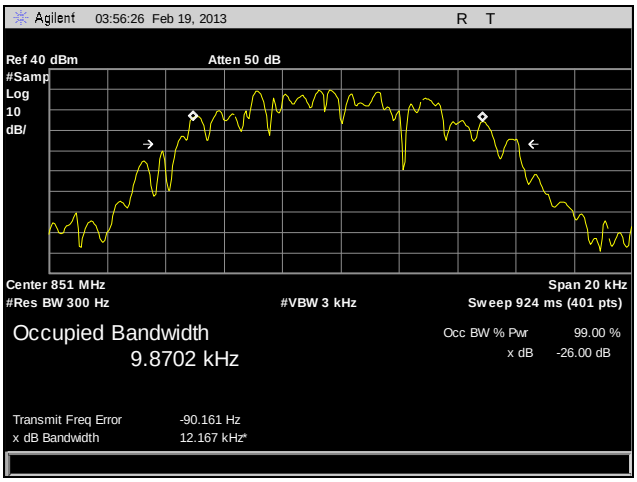


Plot 25. Occupied Bandwidth, 851 MHz, C4FM, 10 W



Plot 26. Occupied Bandwidth, 851 MHz, CQPSK, 10 W



Plot 27. Occupied Bandwidth, 851 MHz, HDQPSK, 10 W

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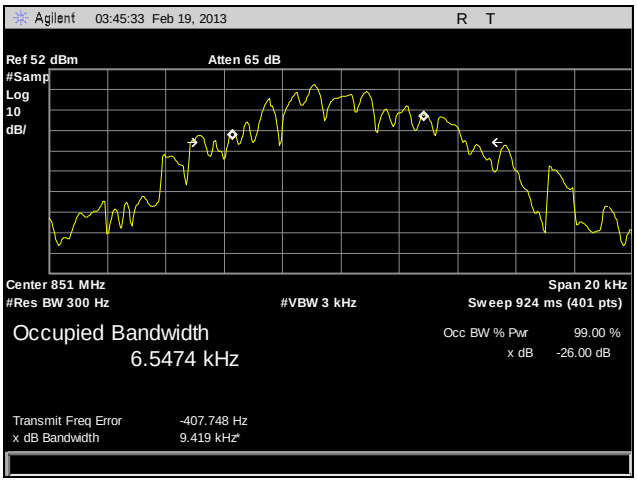
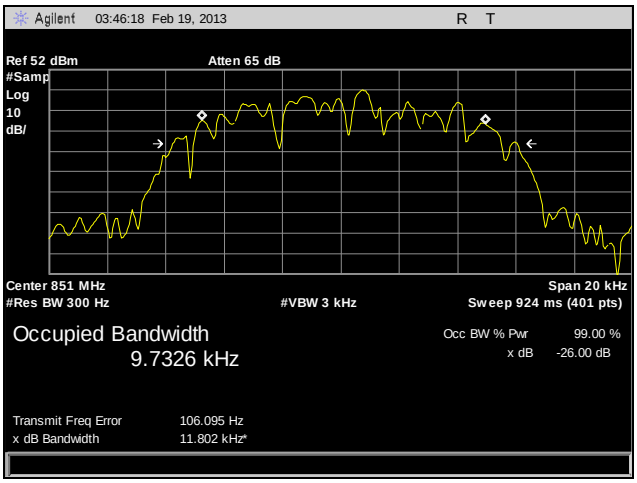
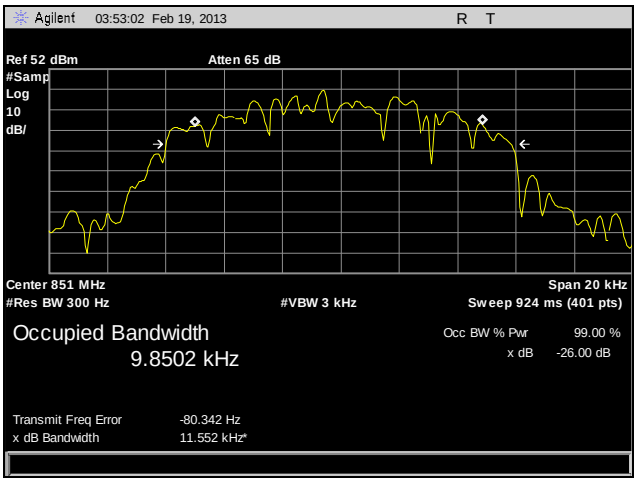


Plot 28. Occupied Bandwidth, 851 MHz, C4FM, 100 W



Plot 29. Occupied Bandwidth, 851 MHz, CQPSK, 100 W



Plot 30. Occupied Bandwidth, 851 MHz, HDQPSK, 100 W

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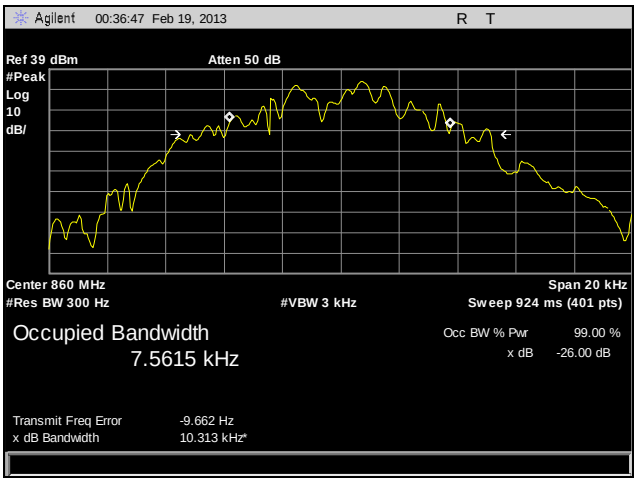
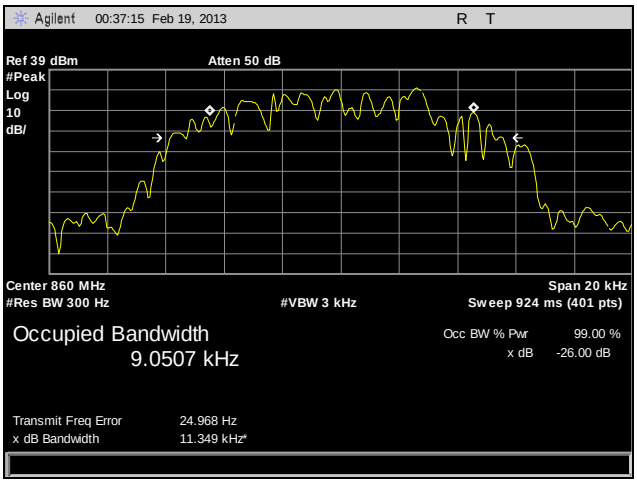
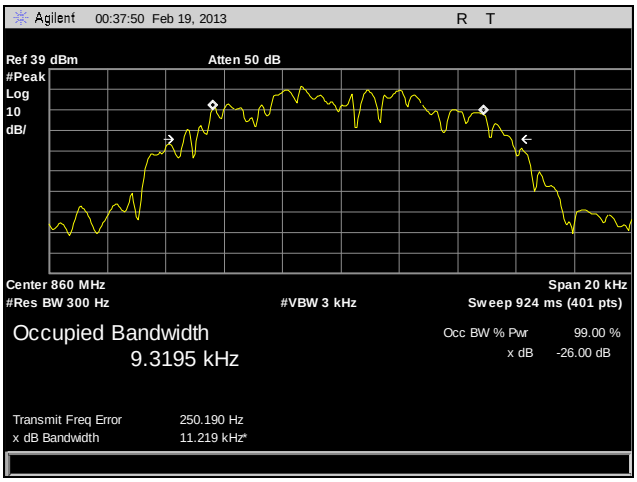


Plot 31. Occupied Bandwidth, 860 MHz, C4FM, 10 W



Plot 32. Occupied Bandwidth, 860 MHz, CQPSK, 10 W



Plot 33. Occupied Bandwidth, 860 MHz, HDQPSK, 10 W

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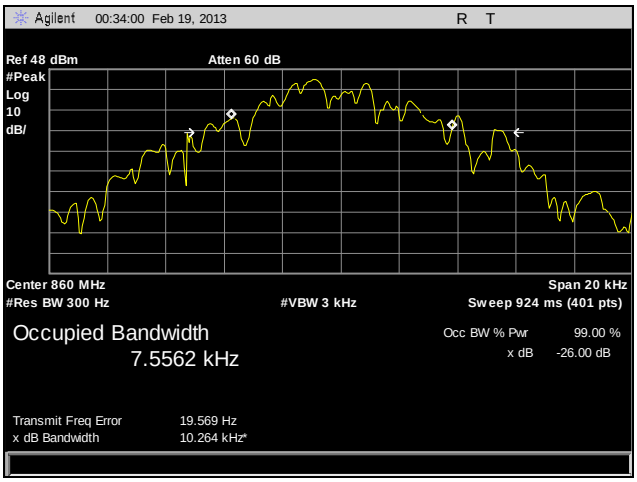
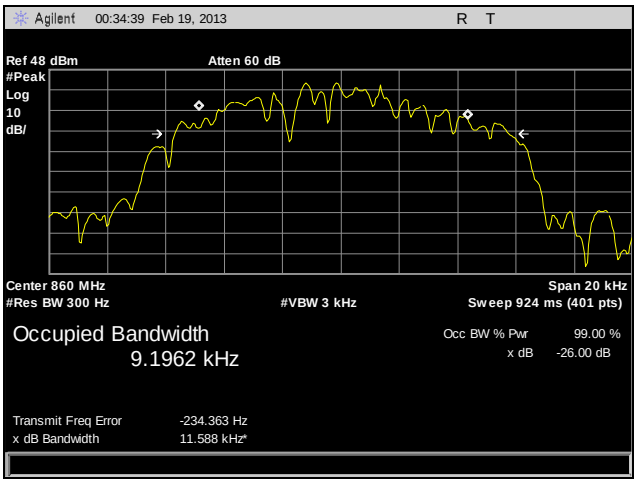
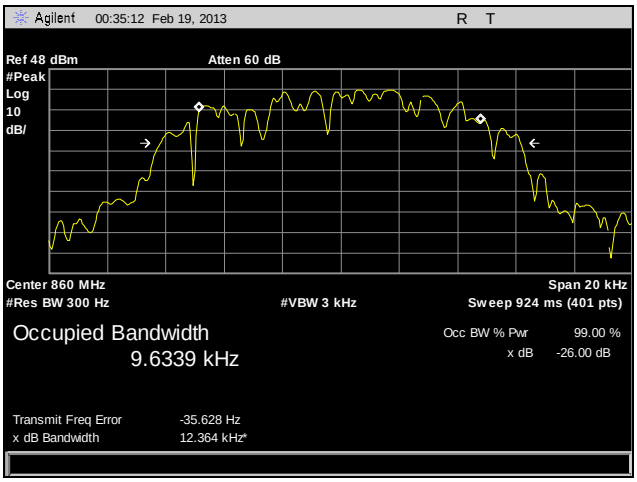


Plot 34. Occupied Bandwidth, 860 MHz, C4FM, 100 W



Plot 35. Occupied Bandwidth, 860 MHz, CQPSK, 100 W



Plot 36. Occupied Bandwidth, 860 MHz, HDQPSK, 100 W

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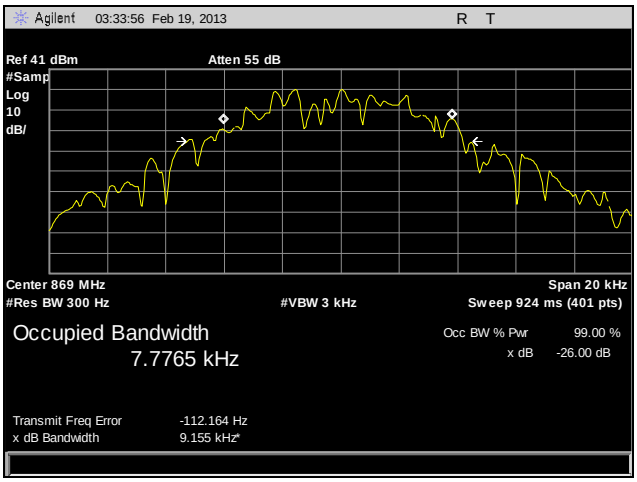
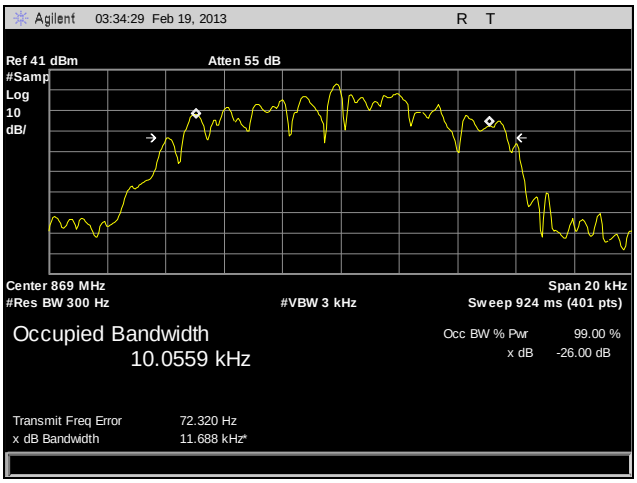
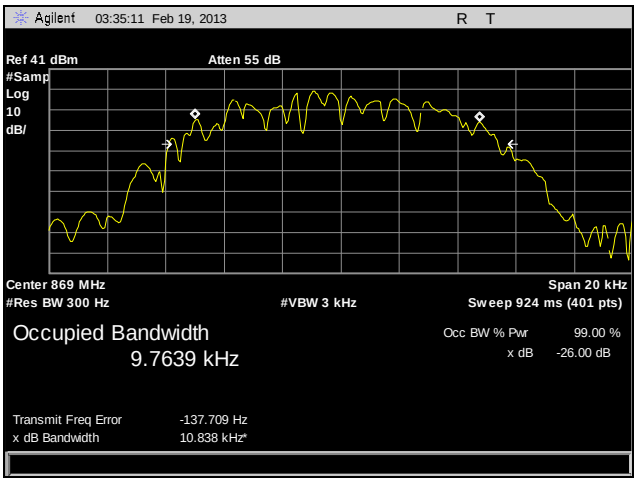


Plot 37. Occupied Bandwidth, 869 MHz, C4FM, 10 W



Plot 38. Occupied Bandwidth, 869 MHz, CQPSK, 10 W



Plot 39. Occupied Bandwidth, 869 MHz, HDQPSK, 10 W

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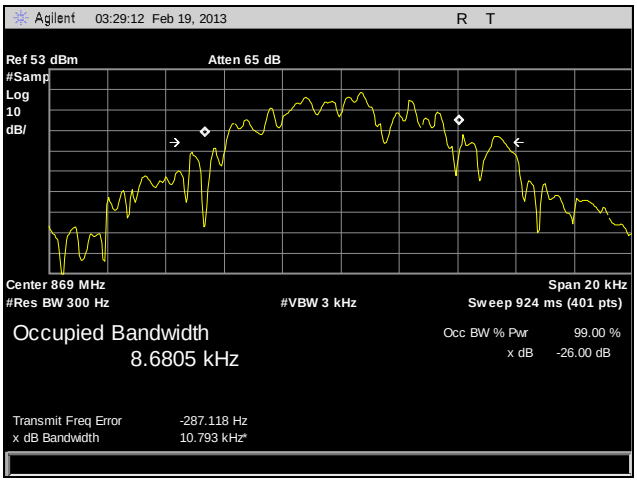
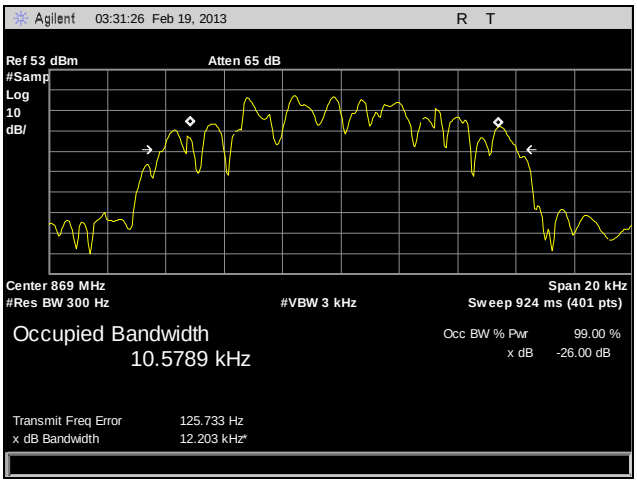
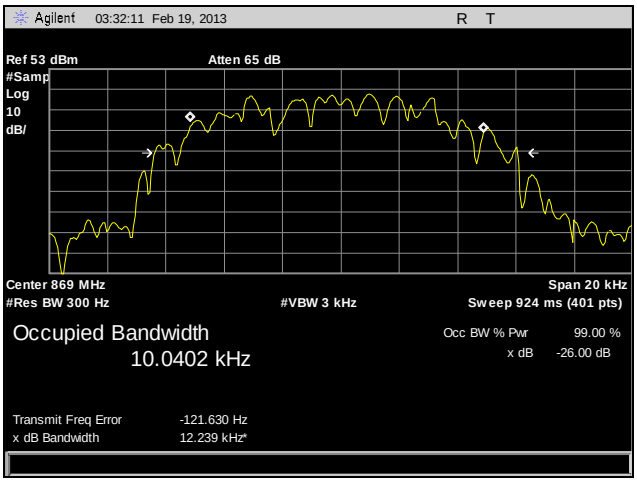


Plot 40. Occupied Bandwidth, 869 MHz, C4FM, 100 W



Plot 41. Occupied Bandwidth, 869 MHz, CQPSK, 100 W



Plot 42. Occupied Bandwidth, 869 MHz, HDQPSK, 100 W

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4.2. 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. Emissions approaching the limit were re-measured using an attenuator and a tunable bandpass filter which was centered on the harmonics in question. Their power was recorded and compared to limits of 90.210.

Test Engineer(s): Ben Taylor

Test Date(s): 02/21/13 – 02/22/13

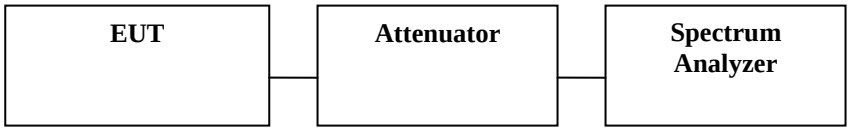

Figure 2. Spurious Emissions at Antenna Terminals Test Setup

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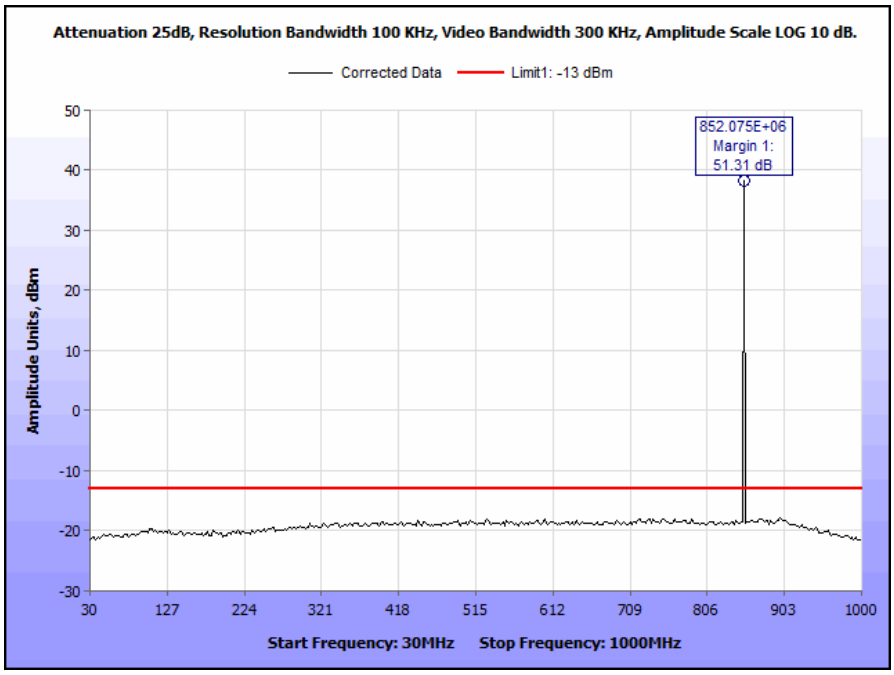
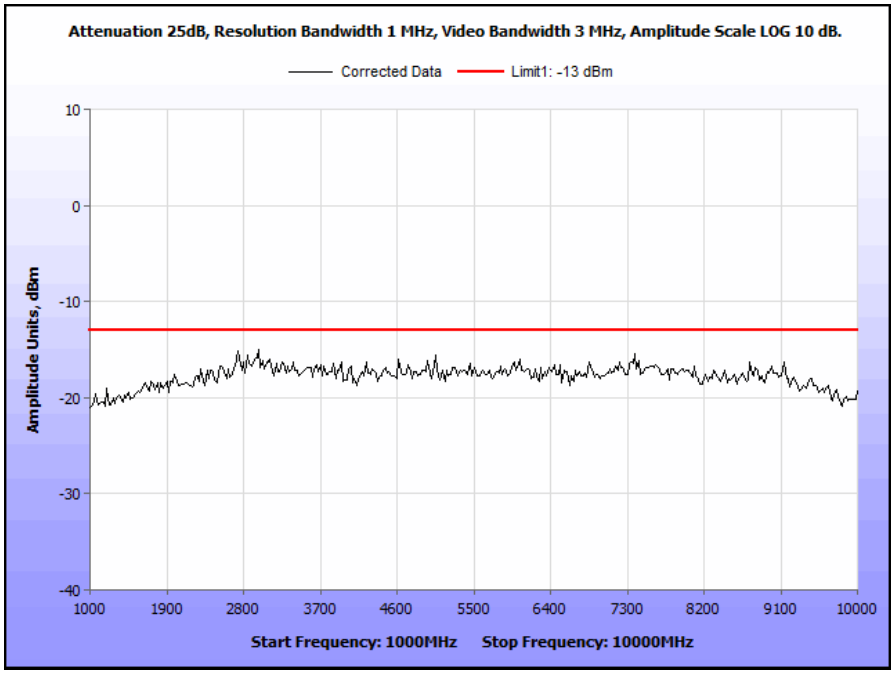


Plot 43. Conducted Spurious Emissions, 851 MHz, C4FM, 10 W, 30 MHz – 1 GHz



Plot 44. Conducted Spurious Emissions, 851 MHz, C4FM, 10 W, 1 GHz – 10 GHz

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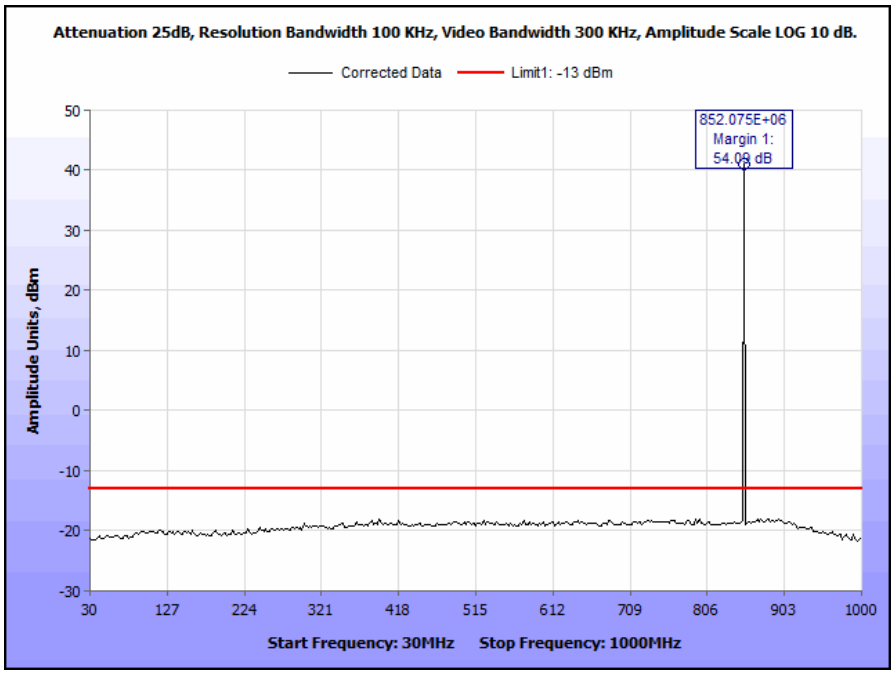
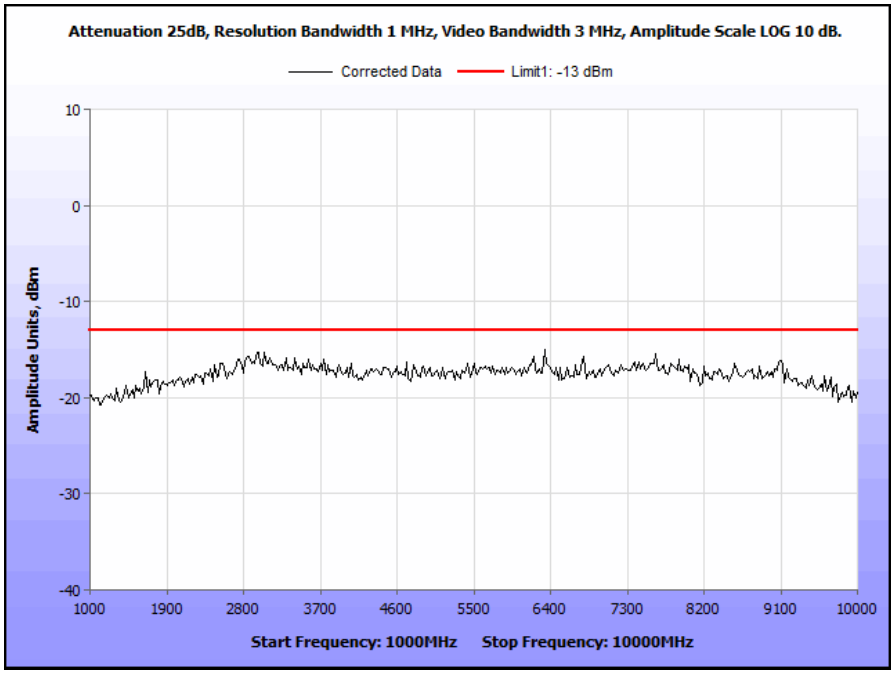


Plot 45. Conducted Spurious Emissions, 851 MHz, CQPSK, 10 W, 30 MHz – 1 GHz



Plot 46. Conducted Spurious Emissions, 851 MHz, CQPSK, 10 W, 1 GHz – 10 GHz

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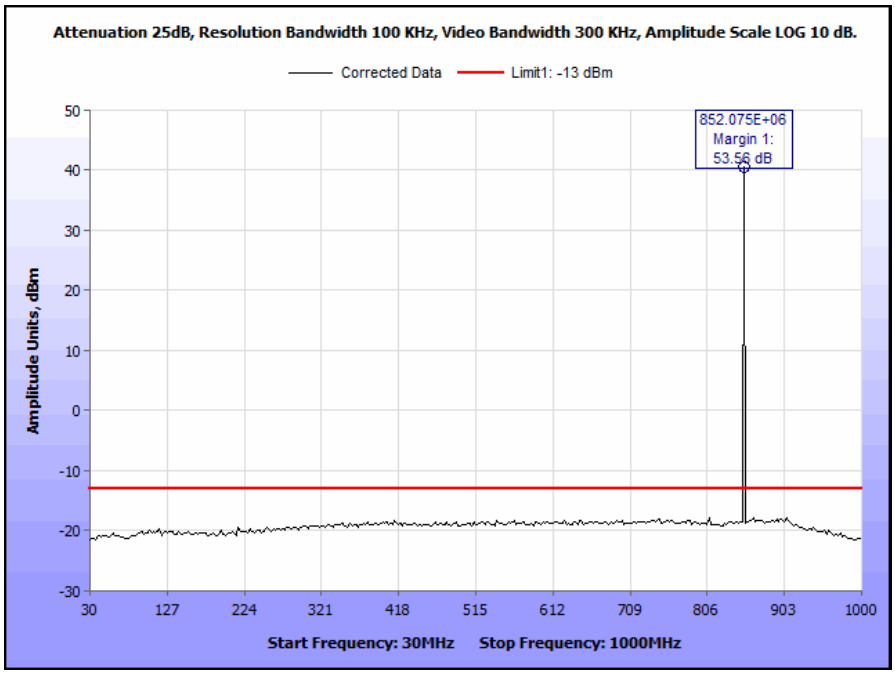
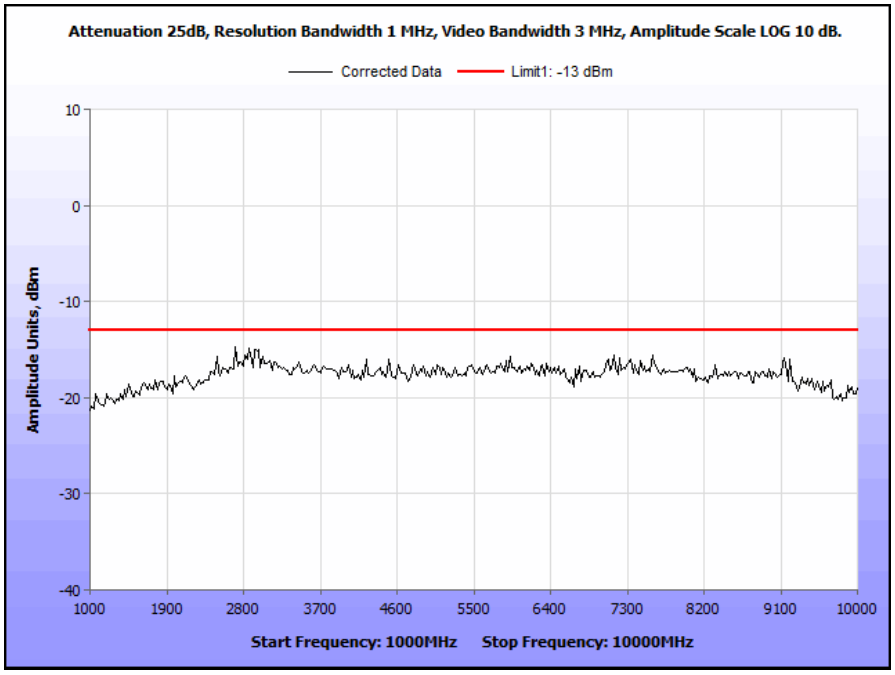


Plot 47. Conducted Spurious Emissions, 851 MHz, HDQPSK, 10 W, 30 MHz – 1 GHz



Plot 48. Conducted Spurious Emissions, 851 MHz, HDQPSK, 10 W, 1 GHz – 10 GHz

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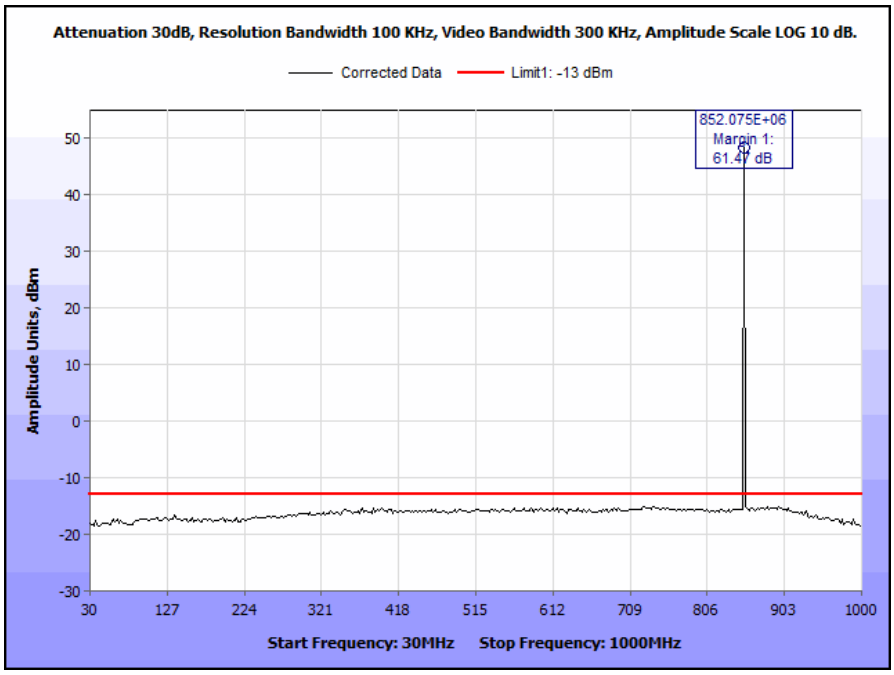
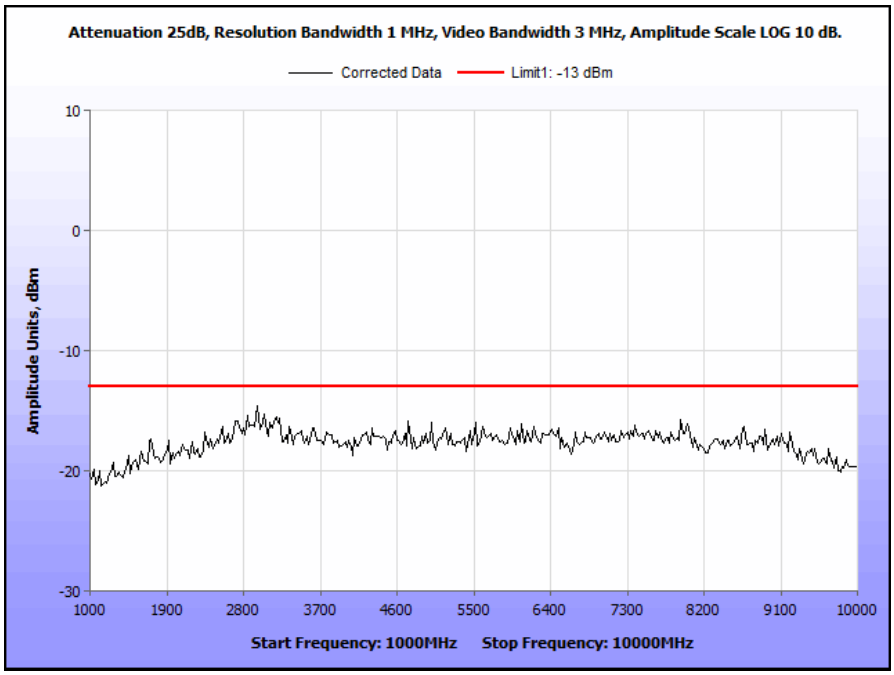


Plot 49. Conducted Spurious Emissions, 851 MHz, C4FM, 100 W, 30 MHz – 1 GHz



Plot 50. Conducted Spurious Emissions, 851 MHz, C4FM, 100 W, 1 GHz – 10 GHz

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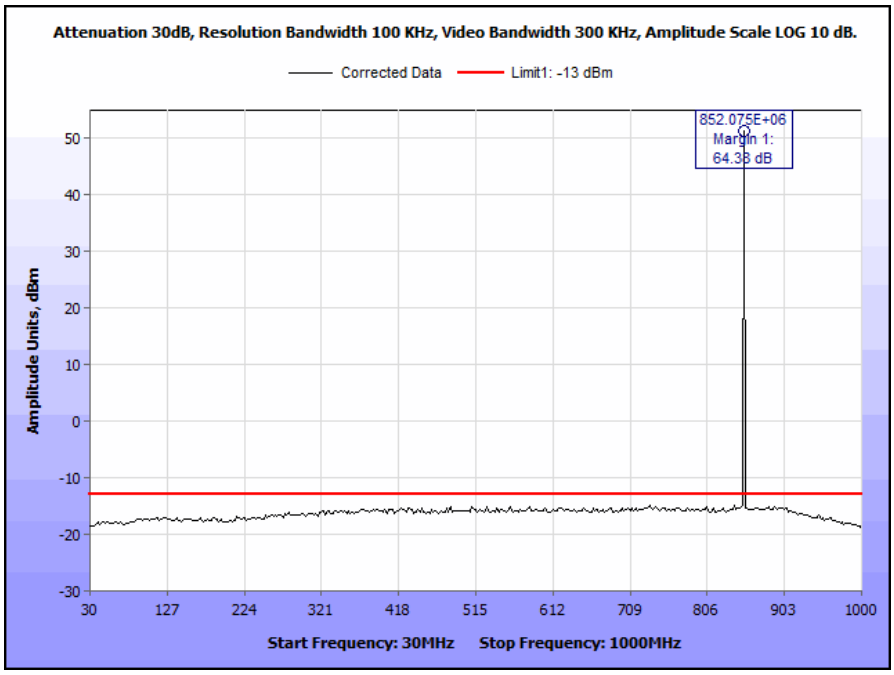
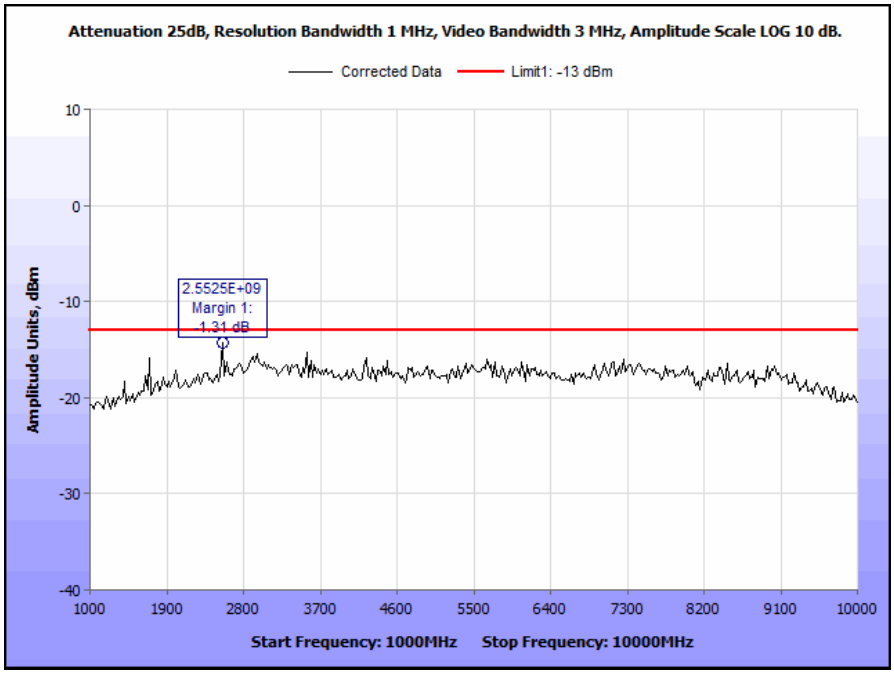


Plot 51. Conducted Spurious Emissions, 851 MHz, CQPSK, 100 W, 30 MHz – 1 GHz



Plot 52. Conducted Spurious Emissions, 851 MHz, CQPSK, 100 W, 1 GHz – 10 GHz

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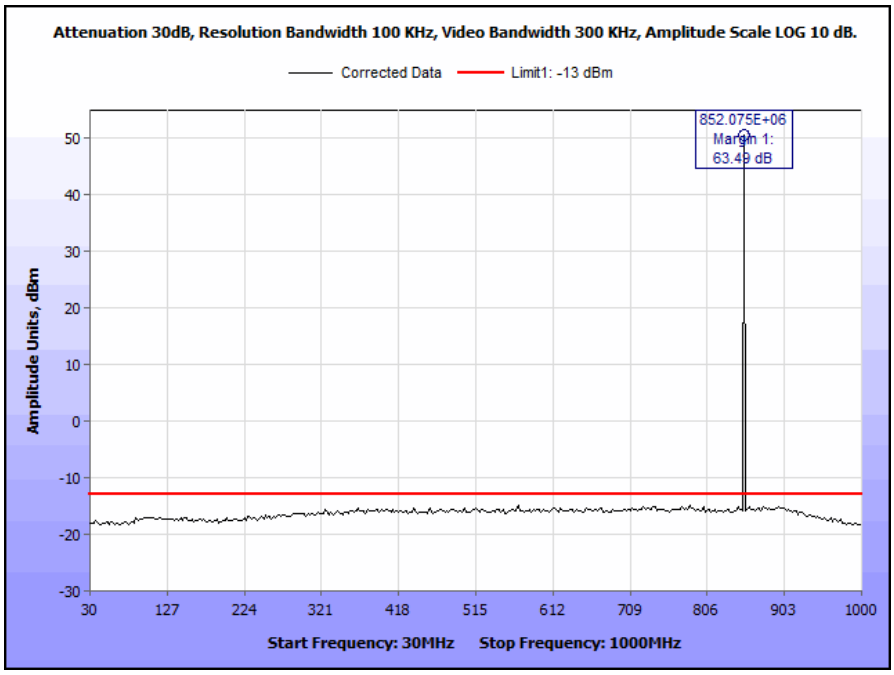
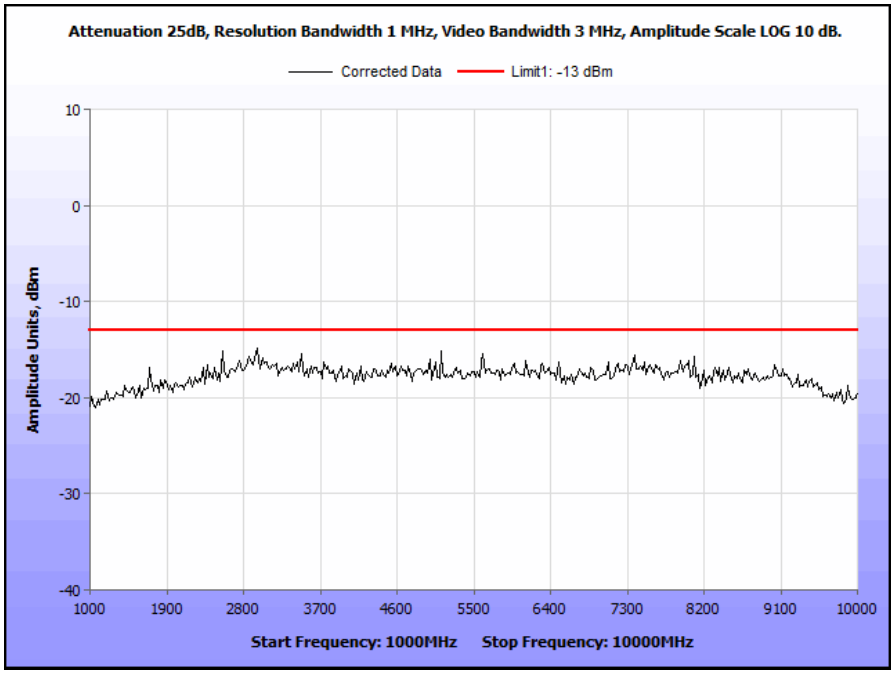


Plot 53. Conducted Spurious Emissions, 851 MHz, HDQPSK, 100 W, 30 MHz – 1 GHz



Plot 54. Conducted Spurious Emissions, 851 MHz, HDQPSK, 100 W, 1 GHz – 10 GHz

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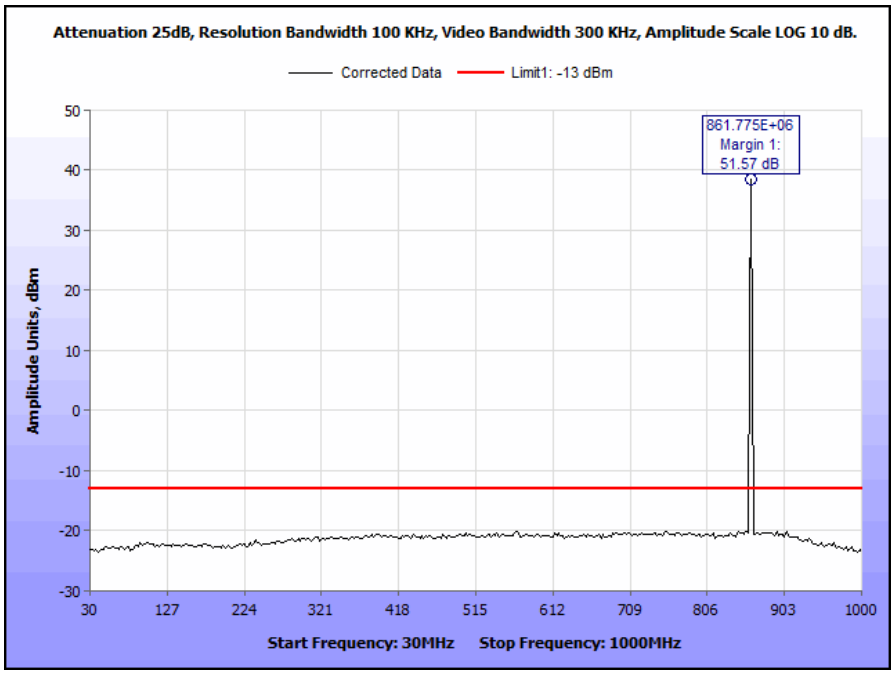
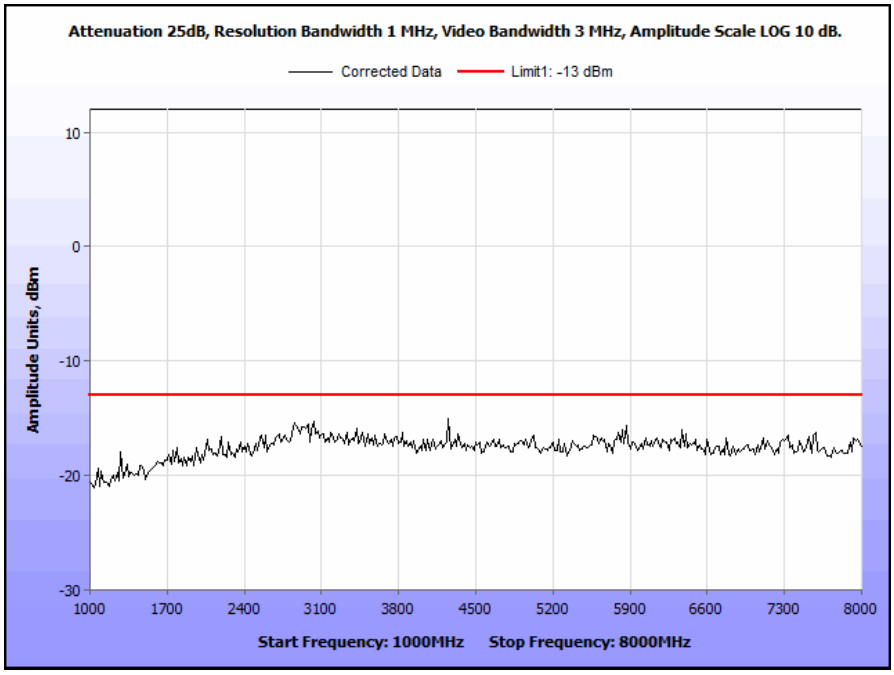


Plot 55. Conducted Spurious Emissions, 860 MHz, C4FM, 10 W, 30 MHz – 1 GHz



Plot 56. Conducted Spurious Emissions, 860 MHz, C4FM, 10 W, 1 GHz – 8 GHz

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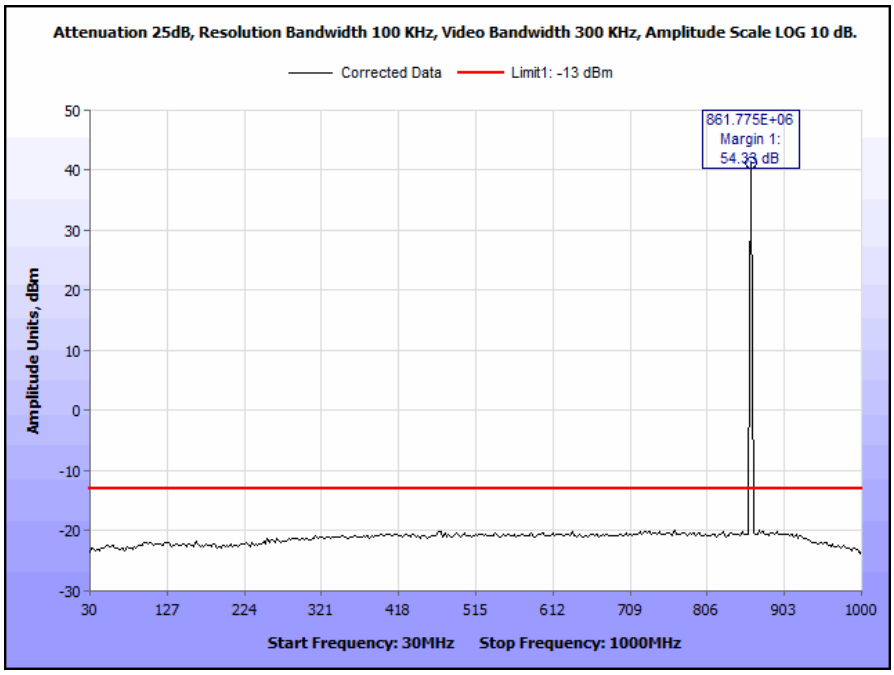
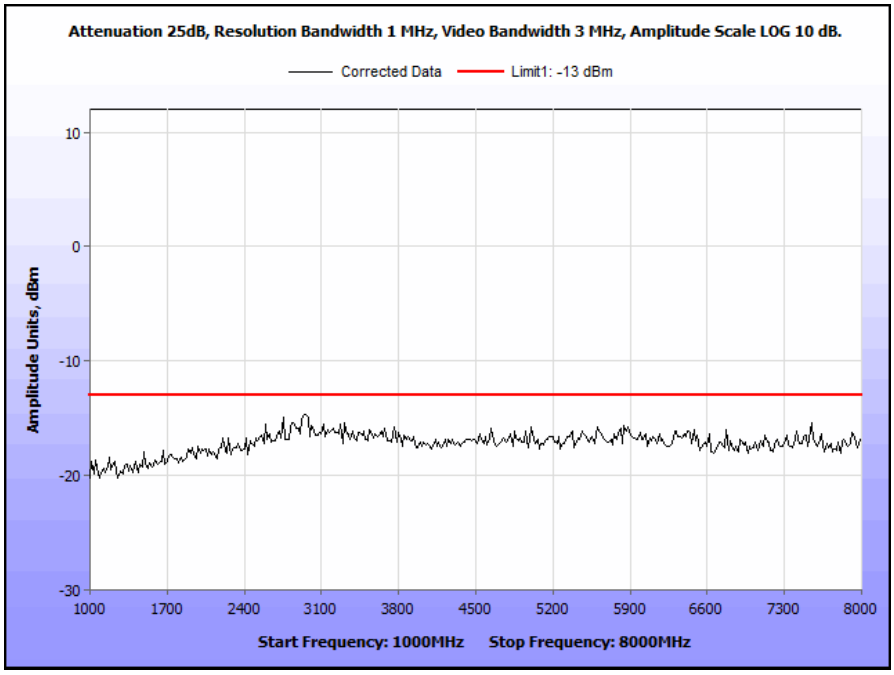


Plot 57. Conducted Spurious Emissions, 860 MHz, CQPSK, 10 W, 30 MHz – 1 GHz



Plot 58. Conducted Spurious Emissions, 860 MHz, CQPSK, 10 W, 1 GHz – 8 GHz

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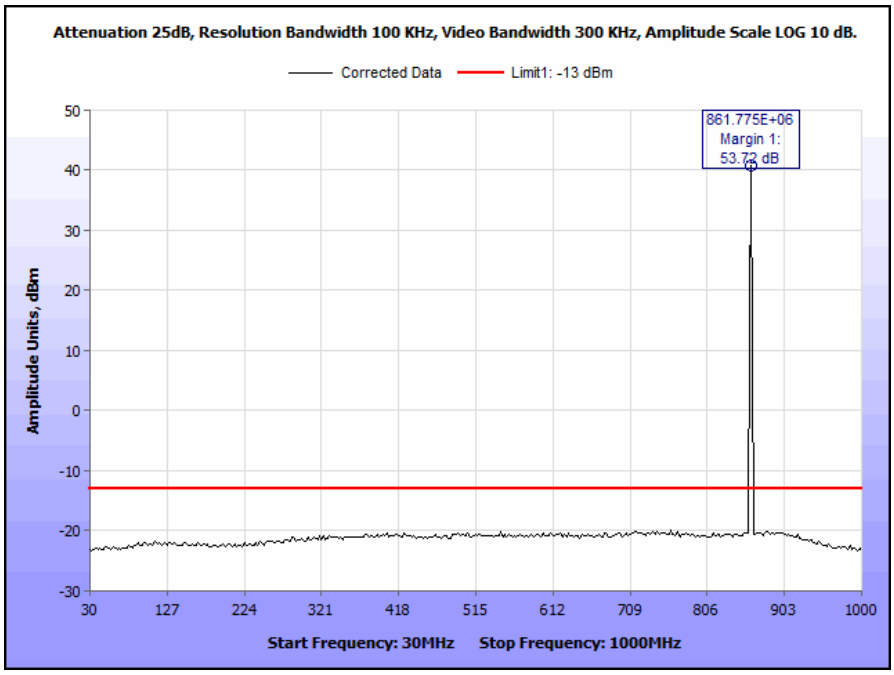
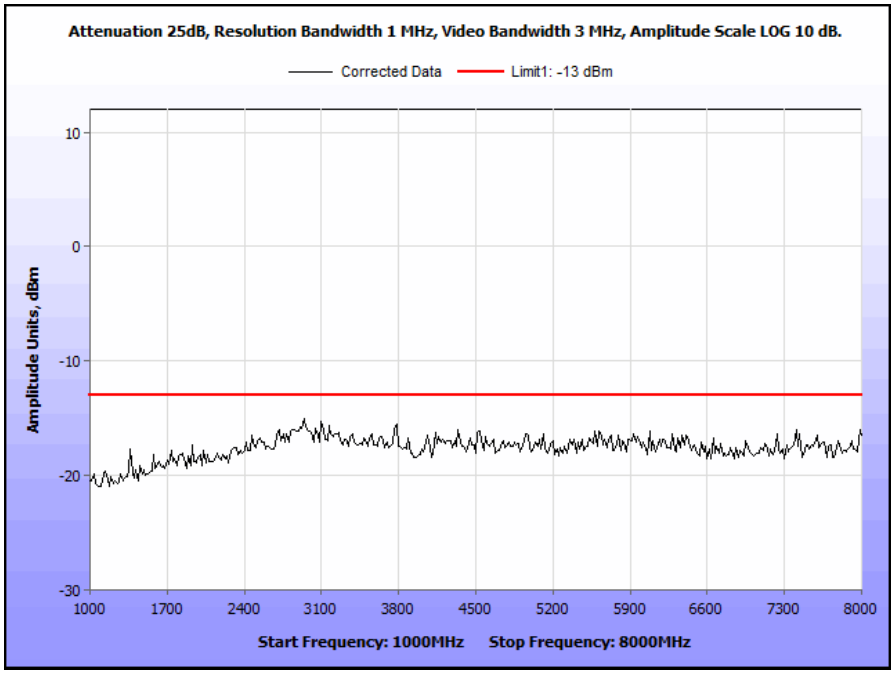


Plot 59. Conducted Spurious Emissions, 860 MHz, HDQPSK, 10 W, 30 MHz – 1 GHz



Plot 60. Conducted Spurious Emissions, 860 MHz, HDQPSK, 10 W, 1 GHz – 8 GHz

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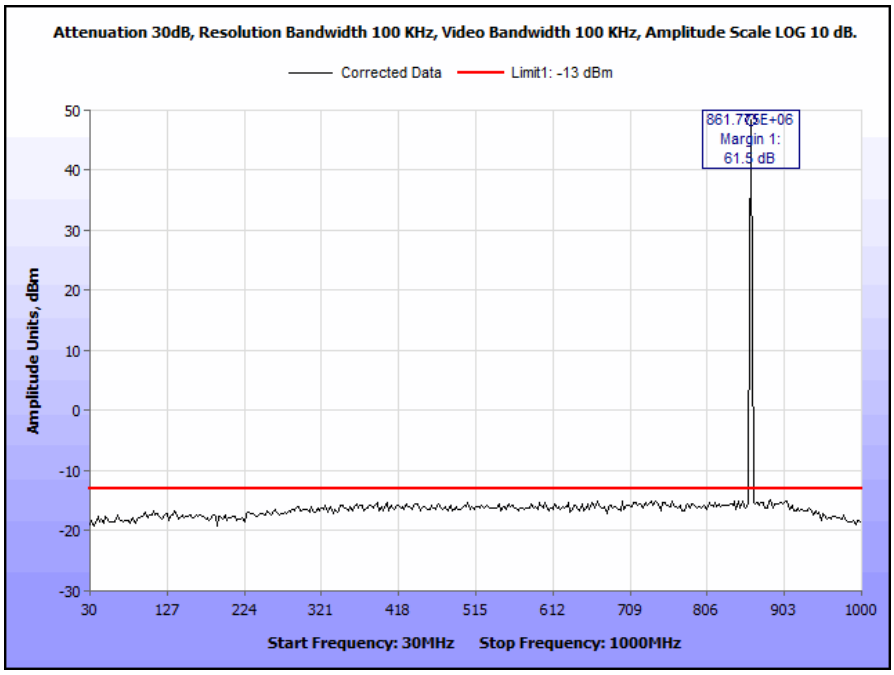
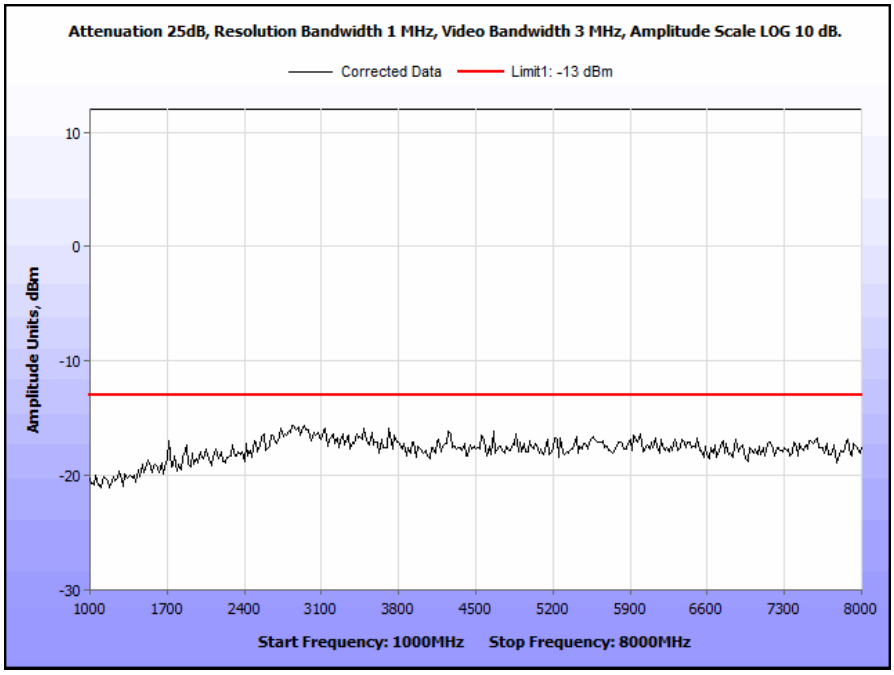


Plot 61. Conducted Spurious Emissions, 860 MHz, C4FM, 100 W, 30 MHz – 1 GHz



Plot 62. Conducted Spurious Emissions, 860 MHz, C4FM, 100 W, 1 GHz – 8 GHz

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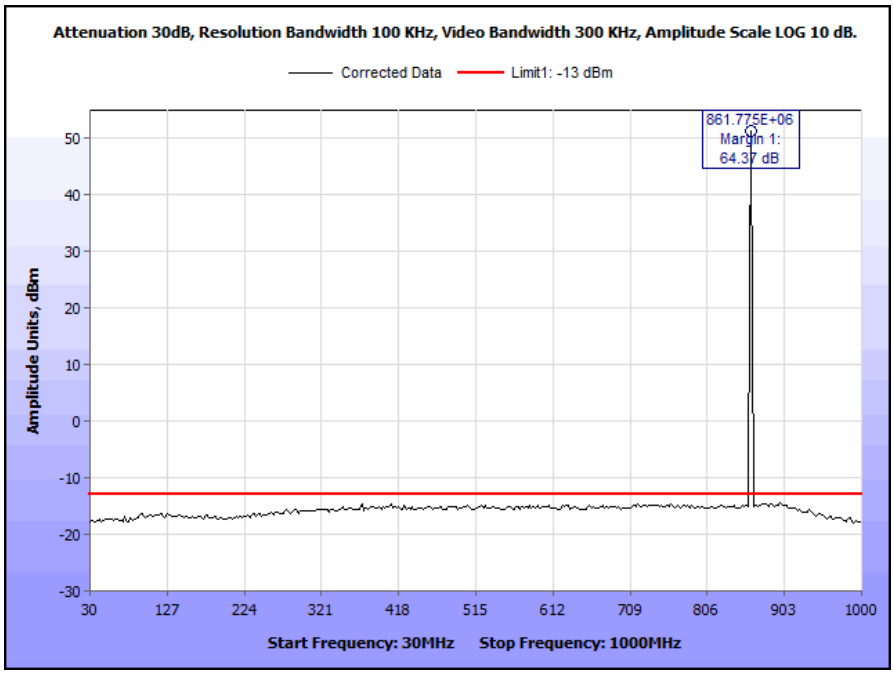
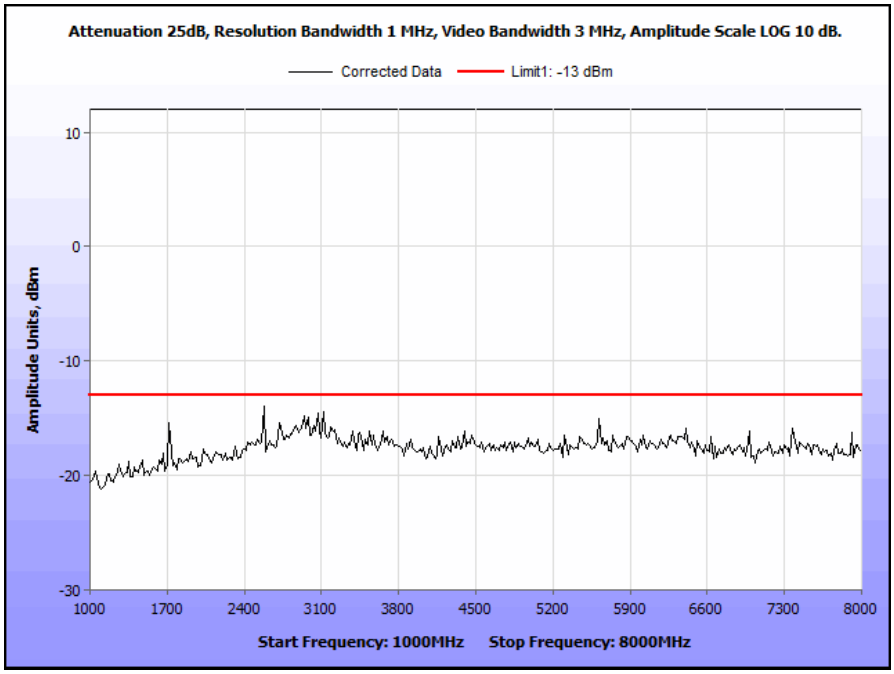


Plot 63. Conducted Spurious Emissions, 860 MHz, CQPSK, 100 W, 30 MHz – 1 GHz



Plot 64. Conducted Spurious Emissions, 860 MHz, CQPSK, 100 W, 1 GHz – 8 GHz

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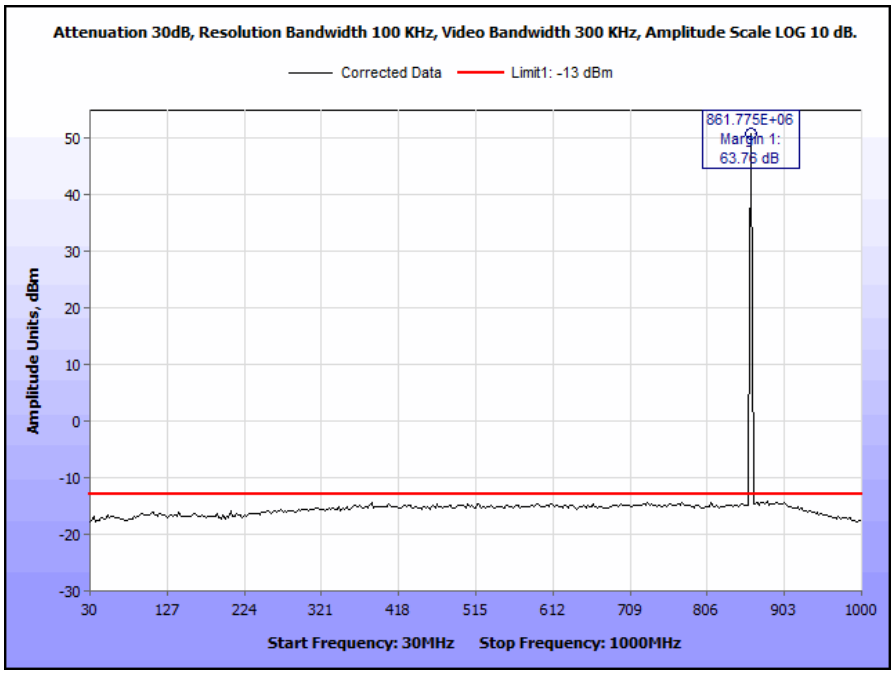
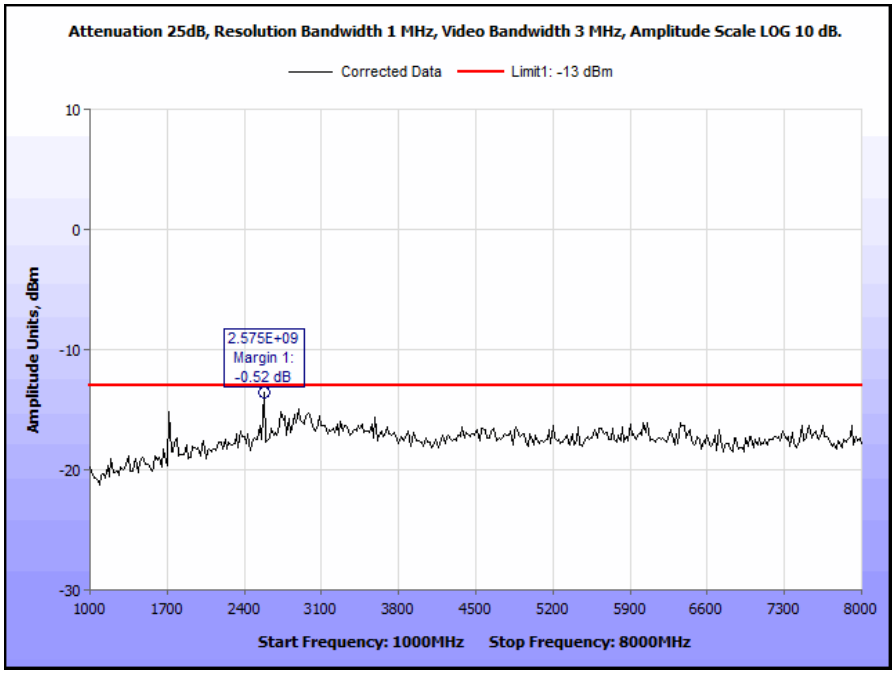


Plot 65. Conducted Spurious Emissions, 860 MHz, HDQPSK, 100 W, 30 MHz – 1 GHz



Plot 66. Conducted Spurious Emissions, 860 MHz, HDQPSK, 100 W, 1 GHz – 8 GHz

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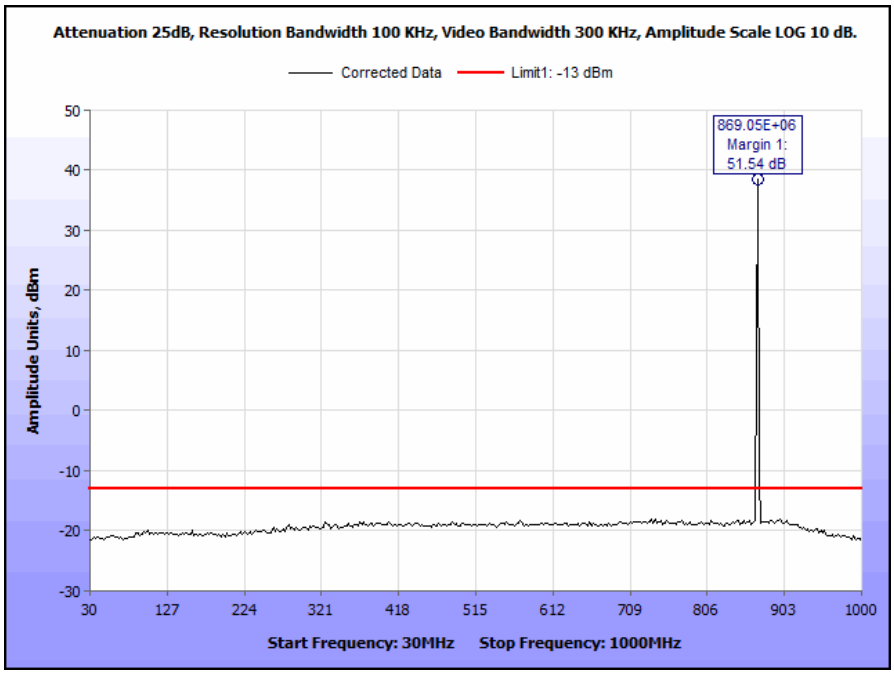
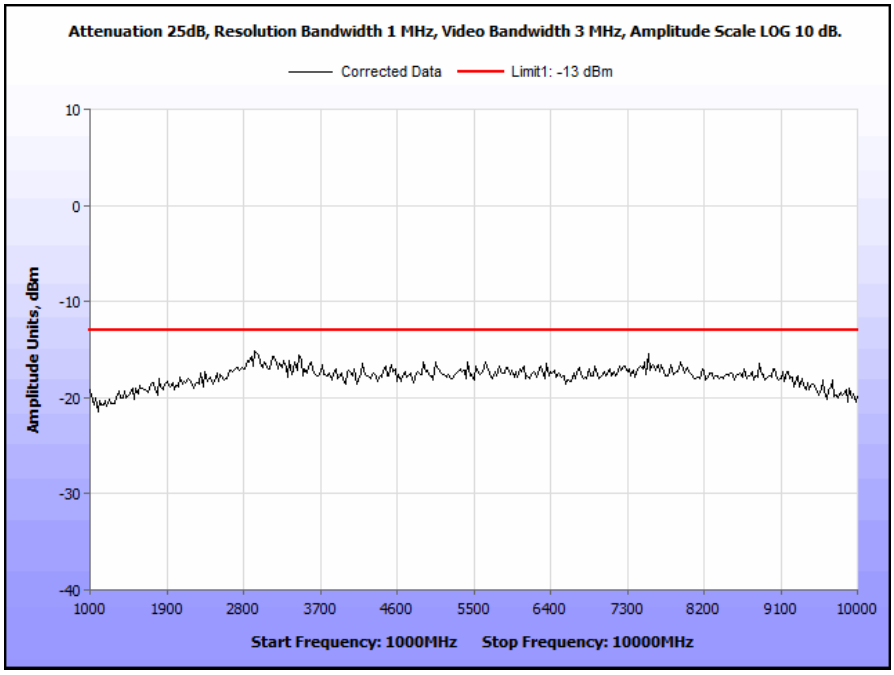


Plot 67. Conducted Spurious Emissions, 869 MHz, C4FM, 10 W, 30 MHz – 1 GHz



Plot 68. Conducted Spurious Emissions, 869 MHz, C4FM, 10 W, 1 GHz – 10 GHz

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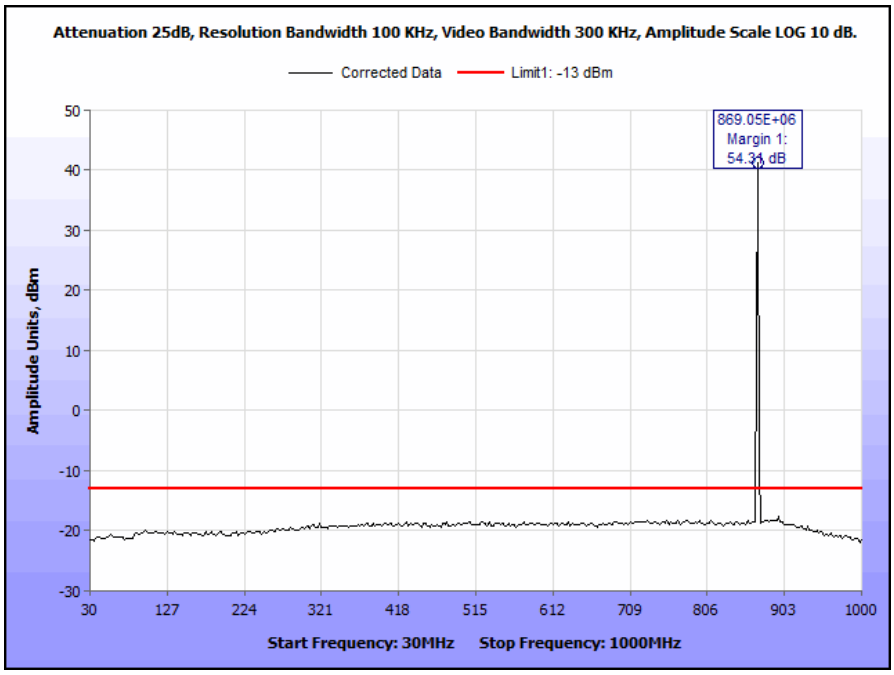
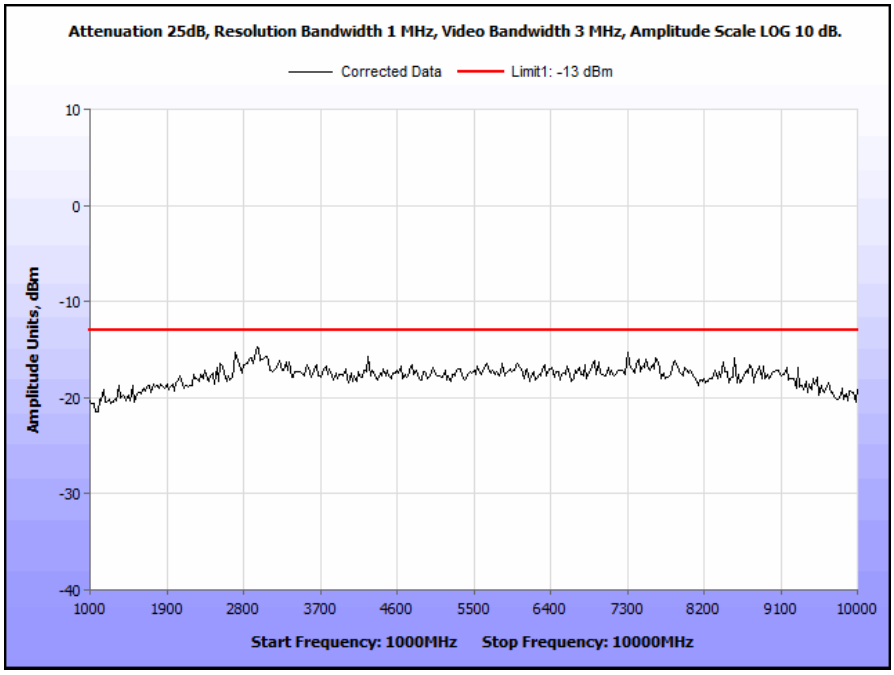


Plot 69. Conducted Spurious Emissions, 869 MHz, CQPSK, 10 W, 30 MHz – 1 GHz



Plot 70. Conducted Spurious Emissions, 869 MHz, CQPSK, 10 W, 1 GHz – 10 GHz

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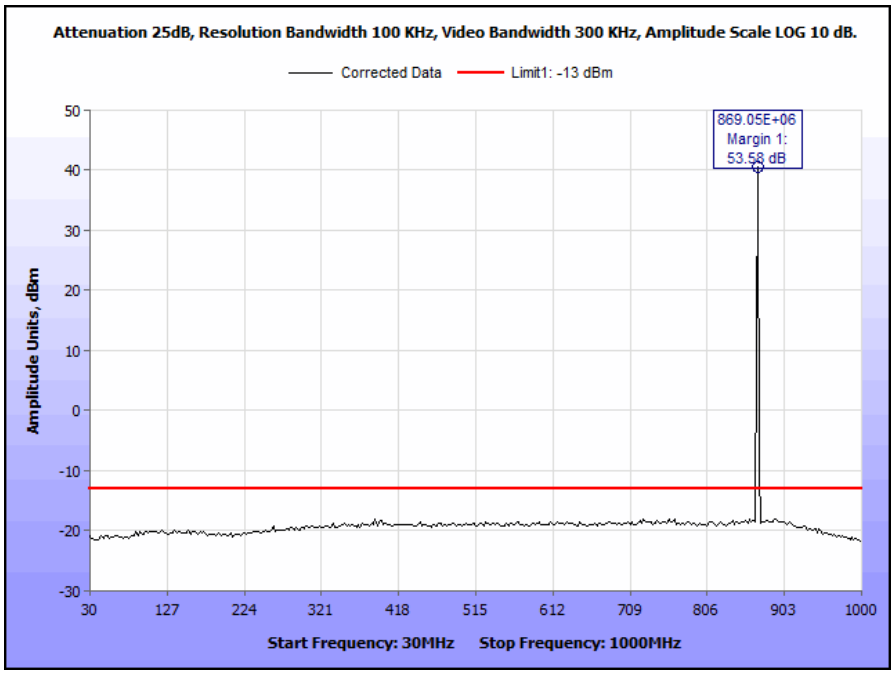
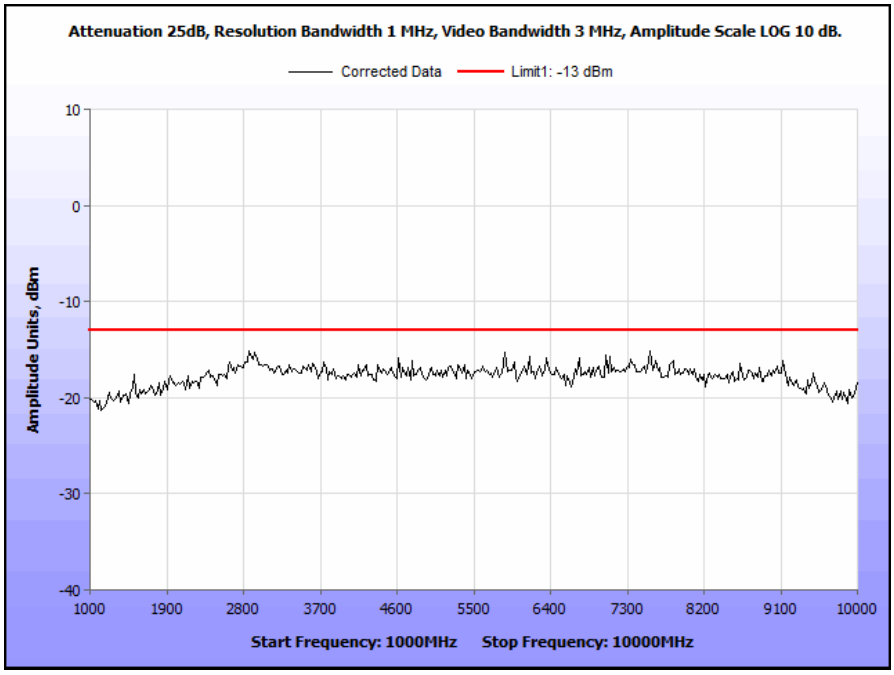


Plot 71. Conducted Spurious Emissions, 869 MHz, HDQPSK, 10 W, 30 MHz – 1 GHz



Plot 72. Conducted Spurious Emissions, 869 MHz, HDQPSK, 10 W, 1 GHz – 10 GHz

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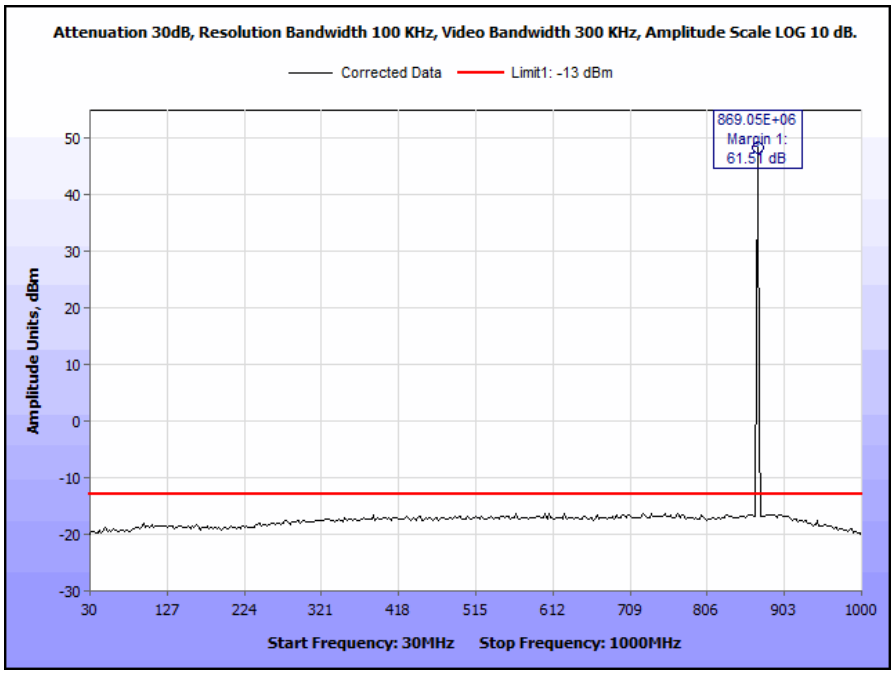
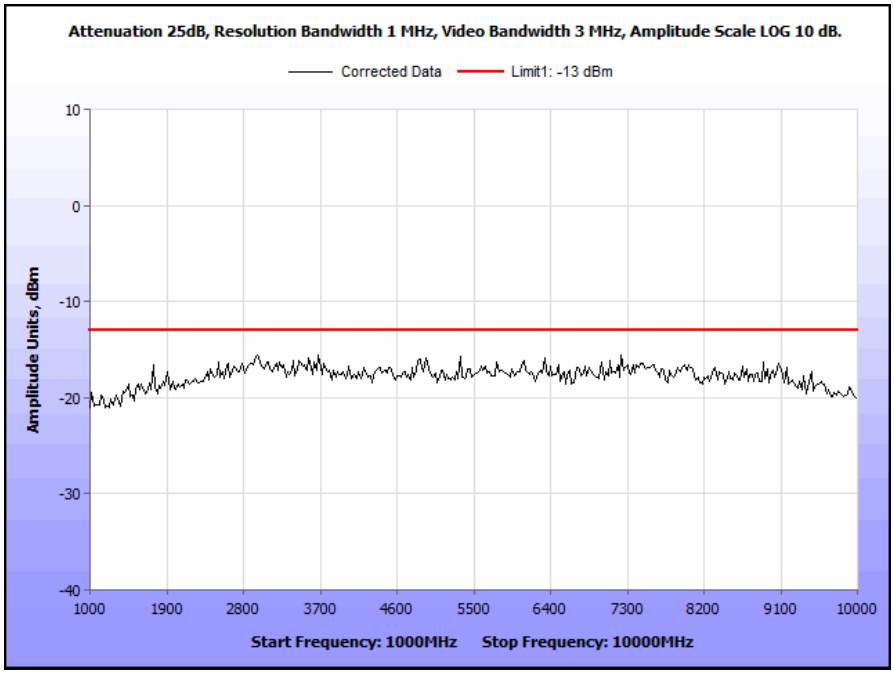


Plot 73. Conducted Spurious Emissions, 869 MHz, C4FM, 100 W, 30 MHz – 1 GHz



Plot 74. Conducted Spurious Emissions, 869 MHz, C4FM, 100 W, 1 GHz – 10 GHz

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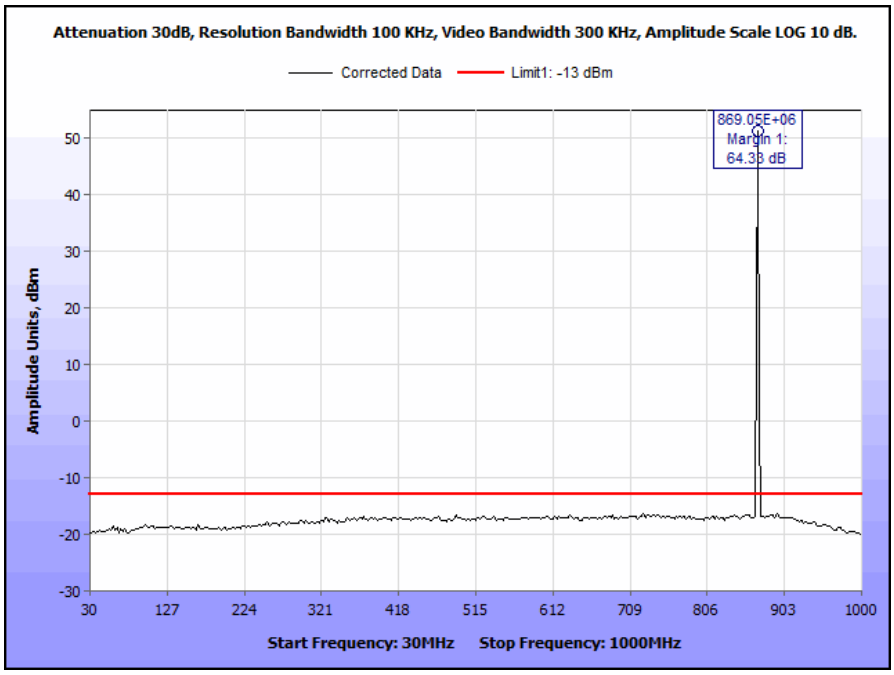
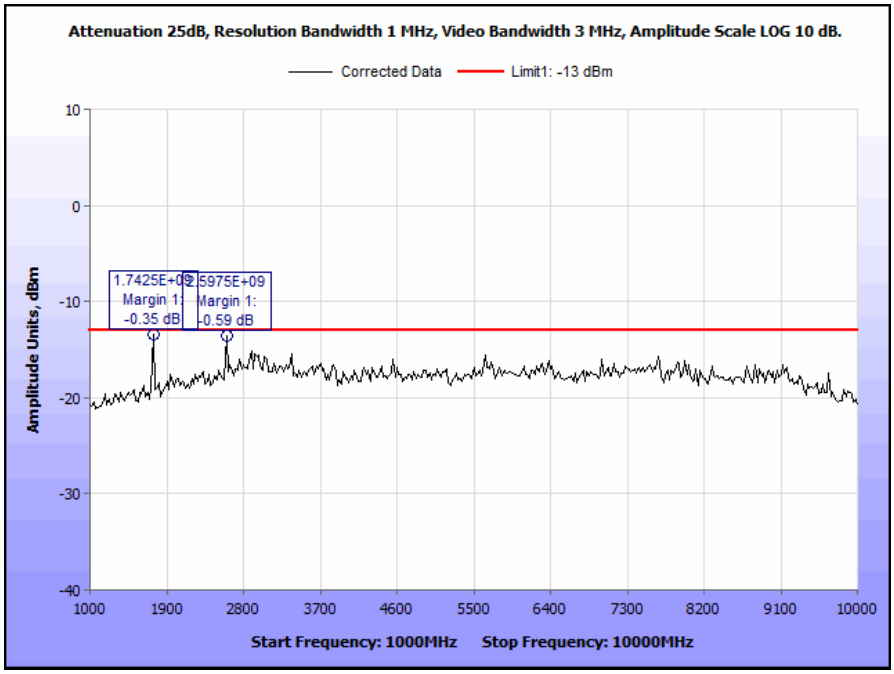


Plot 75. Conducted Spurious Emissions, 869 MHz, CQPSK, 100 W, 30 MHz – 1 GHz



Plot 76. Conducted Spurious Emissions, 869 MHz, CQPSK, 100 W, 1 GHz – 10 GHz

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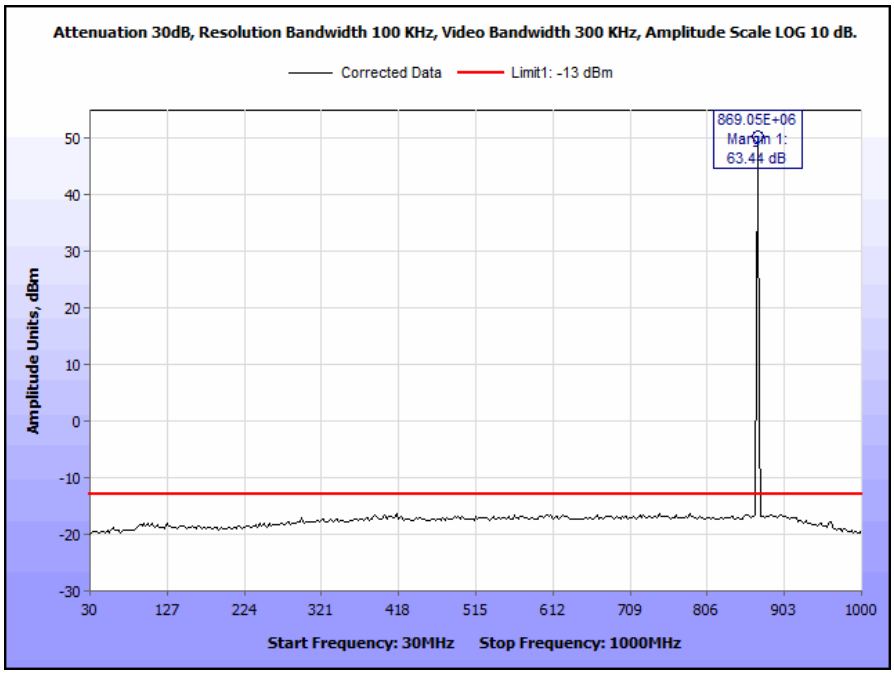
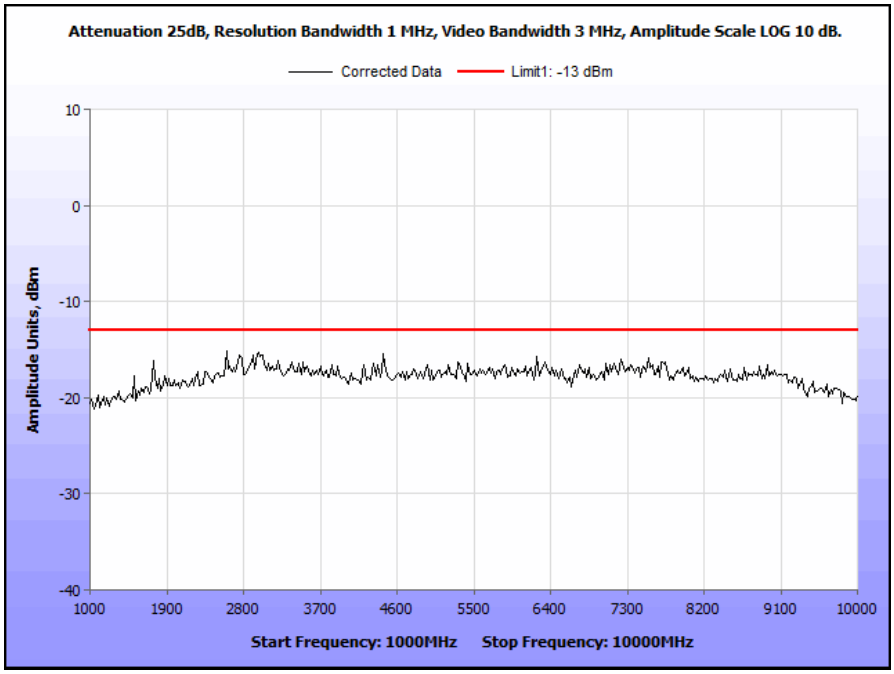


Plot 77. Conducted Spurious Emissions, 869 MHz, HDQPSK, 100 W, 30 MHz – 1 GHz



Plot 78. Conducted Spurious Emissions, 869 MHz, HDQPSK, 100 W, 1 GHz – 10 GHz

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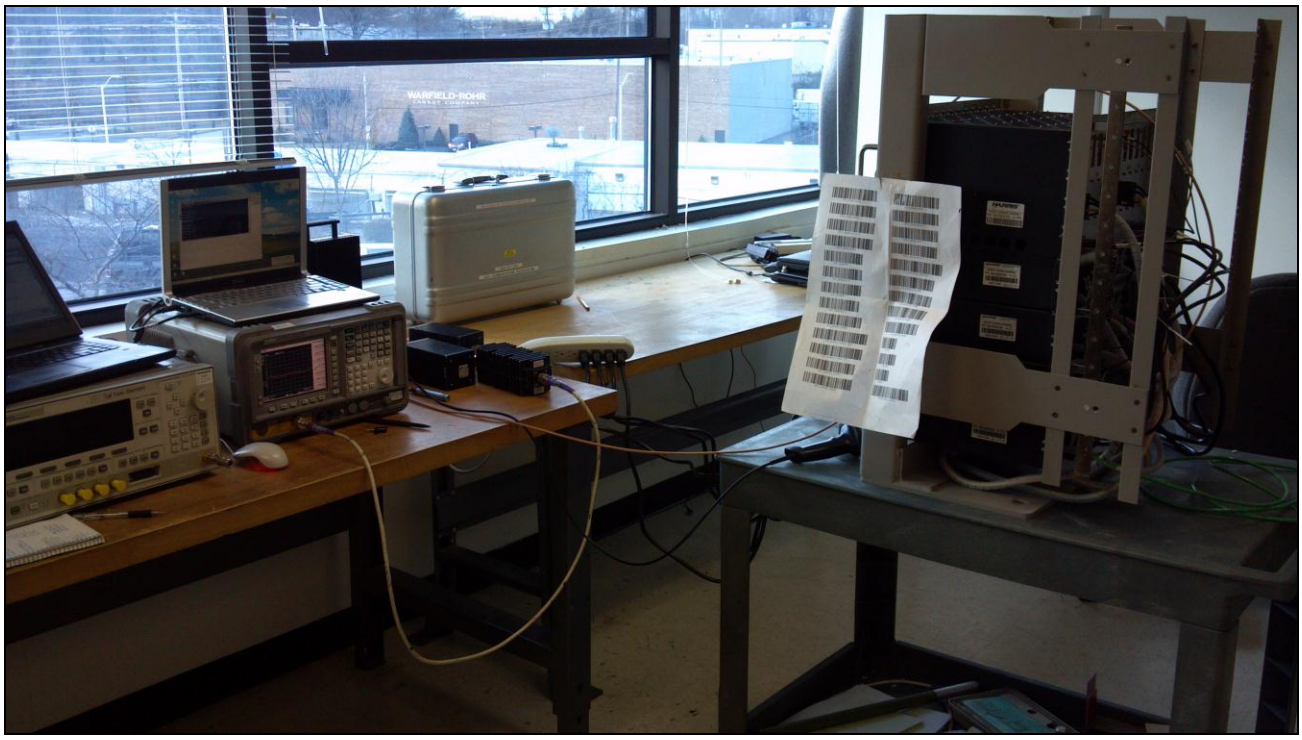

Photograph 3. Conducted Spurious Emissions, Test Setup

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V. Test Equipment

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5. Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2005.

MET Asset #	Equipment	Manufacturer	Model	Last Cal Date	Cal Due Date
1T4771	PSA SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4446A	12/12/2012	12/12/2013
1T4612	SPECTRUM ANALYZER	AGILENT TECHNOLOGIES	E4407B	05/23/2012	11/23/2013
1T4787	HYGROMETER/THERMOMETER/BAROMETER/DEW POINT PEN	CONTROL COMPANY	15-078-198, FB70423, 245CD	02/15/2012	02/15/2014
1T2278	SWEPT SIGNAL GENERATOR	HEWLETT PACKARD	83650B	10/31/2012	10/31/2013
1T4563	LISN (10 AMP)	SOLAR ELECTRONICS	9322-50-R-10-BNC	11/27/2012	05/27/2014
1T4300	SEMI-ANECHOIC CHAMBER # 1 (NSA)	EMC TEST SYSTEMS	NONE	07/24/2012	01/24/2014
1T4409	EMI RECEIVER	ROHDE & SCHWARZ	ESIB7	07/16/2012	07/16/2013
1T4818	COMB GENERATOR	COM-POWER	CGO-520	SEE NOTE	
1T4576	ANTENNA, ACTIVE HORN	COM-POWER	AHA-118	02/02/2012	08/02/2013
1T4753	ANTENNA - BILOG	SUNOL SCIENCES	JB6	01/05/2012	07/05/2013

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

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VI. Certification & User's Manual Information

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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.

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(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.

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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.

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§ 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.

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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.

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§ 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.

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End of Report

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