



Nemko USA, Inc.
2210 Faraday Avenue, Suite 150
Carlsbad, CA 92008
Phone (760) 444-3500 Fax (760) 444-3005

CERTIFICATION TEST REPORT

Report Number: 2011 10184686 FCC

Project Number: 184686

Applicant: Global Microwave Systems, Inc.
1916 Palomar Oaks Way, Suite 100
Carlsbad, CA 92008-5523

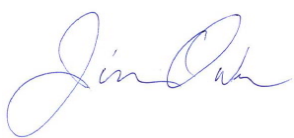
Equipment Under Test (EUT): Digital 100 mW Transmitter

Model: VMTF2BSU0XS

FCC ID: KPB-VMT-F2

In Accordance With: FCC Part 15 Subpart C, 15.247

Tested By: Nemko USA Inc.
2210 Faraday Avenue, Suite 150
Carlsbad, CA 92008

Authorized By: 
Jim Owen, Sr. EMC Engineer/Technical Lead

Date: October 2, 2011

Total Number of Pages: 74

Section1: Summary of Test Results

1.1 General

All measurements are traceable to national standards

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 15; Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made in a Semi-Anechoic Chamber. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

Apparatus Assessed:	Digital 100 mW Transmitter
Model:	VMTF2BSU0XS
Specification:	FCC Part 15 Subpart C, 15.247
Date Received in Laboratory:	August 29, 2011
Compliance Status:	Complies
Exclusions:	None
Non-compliances:	None

1.2 Report Release History

Revision	Date	Comments
-	October 2, 2011	Prepared By: Jim Owen
-	October 2, 2011	Initial Release: Alan Laudani

Note that the results contained in this report relate only to the items tested and were obtained in the period between the date of initial receipt of samples and the date of issue of the report.

This test report has been completed in accordance with the requirements of ISO/IEC 17025.

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TESTED BY:  Date: October 2, 2011
Jim Owen, Sr. EMC Engineer

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Section 2: Equipment Under Test

2.1 Product Identification

The Equipment Under Test was identified as follows:

Global Microwave Systems, Inc. VMTF2BSU0XS Digital 100 mW Transmitter

2.2 Theory of Operation

The VMTF2BSU0XS is a Digital 100 mW Transmitter. The VETA Links use a digital modulation system known as Coded Orthogonal Frequency Division Multiplexing (COFDM) that provides a robust link immune to multipath interference to provide crisp, clear pictures in the most difficult of terrains. The VETA product line employs the standard DVB-T 2K carriers COFDM technology. Additionally, an optional 1.25MHz and 2.5MHz RF bandwidth with 400 carriers may be user selected that allow a larger quantity of simultaneous A/V links to operate in the same frequency band. The 2.5MHz and 1.25MHz bandwidth technology demonstrates better propagation for longer range links. The VMTF2BSU0XS was controlled with VT_SW0070 RC7 software for testing.

The EUT's performance during test was evaluated against the performance criterion specified by applicable test standards. Performance results are detailed in the test results section of this report.

2.3 Technical Specifications of the EUT

Manufacturer:

Global Microwave Systems, Inc.

Operating Frequency:

2412.0 MHz to 2472.0 MHz

In the 2400-2483.5 MHz Band

Number of Operating Frequencies:

16 channels typical

Rated Power:

135 mW

Modulation:

COFDM

Reference Designator:

Not applicable

Antenna Connector:

Type "SMA-F" professionally installed.

Power Source:

+12 VDC nominal

Section 3: Test Conditions

3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.247

Operation within the bands 902-928 MHz, 2400-2483.5 MHz, 5725-5850 MHz
and 24.0-24.25 GHz bands.

3.3 Test Environment

All tests were performed under the following environmental conditions:

Temperature range	16-22°C
Humidity range	35-55%
Pressure range	100.0 – 102.3 kPa
Power supply range	12VDC nominal

3.4 Test Equipment

Nemko ID	Device	Manufacturer	Model	Serial Number	Cal Date	Cal Due Date
110	Antenna, LPA	Electrometrics	LPA25	1217	4/1/2011	4/1/2013
116	Antenna, Bicon	EMCO	3110	1267	12/2/2010	12/2/2012
317	Preamplifier	HP	8449A	2749A00167	5/16/2011	5/16/2012
529	Antenna, Dbl Ridge Horn	EMCO	3115	2505	10/18/2010	10/18/2012
911	Spectrum Analyzer	HP	E4440A	US41421266	10/26/2010	10/26/2011
835	Spectrum Analyzer	Rohde & Schwarz	FSEK	829058/005	7/22/2011	7/22/2012
887	Power Meter	Boonton	4232A	64001	9/9/2011	9/9/2012
902	Preamplifier	Sonoma	310 N	185803	7/14/2011	7/14/2012
625	Antenna, Dbl Ridge Guide	EMCO	3116	2325	2/1/2010	2/1/2012
888	Power Sensor	Boonton	51011-EMC	32160	9/9/2011	9/9/2012

Registration of the SAC is on file with the Federal Communications Commission.

Section 4: Observations

4.1 Modifications Performed During Assessment

No modifications were performed during assessment.

4.2 Record of Technical Judgements

No technical judgements were made during the assessment.

4.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

4.4 Deviations from Laboratory Test Procedures

No deviations from Laboratory Test Procedure

4.5 Test Deleted

No Tests were deleted from this assessment.

4.6 Additional Observations

There were no additional observations made during this assessment.



Section 5: Results Summary

This section contains the following:

FCC Part 15 Subpart C:

The column headed "Required" indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No: not applicable / not relevant

Y Yes: Mandatory i.e. the apparatus shall conform to these tests.

N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

5.1 Test Results

Part 15C	Test Description	Required	Result
15.207 (a)	Conducted Emission Limit	N*	N/A
15.215(c)	20 dB Bandwidth	Y	Pass
15.247(a)(2)	Minimum 6dB RF Bandwidth	Y	Pass
15.247(b)(3)	Peak Output Power	Y	Pass
15.247(d)	Band-edge Compliance of RF Conducted Emissions	Y	Pass
15.247 (d)	Spurious RF Conducted Emissions	Y	Pass
15.247 (d)	Spurious Radiated Emissions	Y	Pass
15.247(e)	Power Spectral Density for Digitally Modulated Devices	Y	Pass

* - device is powered by 12V DC source

Appendix A: Test Results

20 dB Bandwidth

(c) Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

Test Conditions:

Sample Number:	VMTF2BSU0XS	Temperature:	21°C
Date:	Sept. 12, 2011	Humidity:	39%
Modification State:	Low, Mid and High Channel	Tester:	Jim Owen
		Laboratory:	Nemko

Test Results: See summary below and attached plots.

Additional Observations:

- This was a conducted test.
- Span is wide enough to capture the channel transmission
- RBW is 1% of the span
- VBW is 3X RBW
- Sweep is auto
- Detector is Peak
- Trace is Max Hold
- 20 dB bandwidth: A peak output max hold reading was taken; a display line was drawn 20 dB lower than peak level. The 20 dB bandwidth was determined from where the channel output spectrum intersected the display line.

CF	Pk(Meas)	FL(Meas)	FH(Meas)	-20dB	Meas. BW (MHz)	Rpt BW (MHz)	Mod
2412	21.19	2446.3	2447.8	1.2	1.5	1.25	16QAM
	16.3	2410.7	2413.3	-3.7	2.6	2.5	16QAM
	13.1	2409.0	2415.0	-6.9	6.1	6	16QAM
	12.7	2408.5	2415.5	-7.3	7.0	7	16QAM
	12.4	2408.1	2416.0	-7.6	7.9	8	16QAM
2412	17.0	2411.2	2412.7	-3.0	1.6	1.25	QPSK
	16.5	2410.7	2413.3	-3.5	2.6	2.5	QPSK
	14.7	2409.0	2415.0	-5.3	6.0	6	QPSK
	12.8	2408.5	2415.5	-7.2	7.0	7	QPSK
	12.7	2408.0	2416.0	-7.3	8.0	8	QPSK

2412 MHz Bandwidth Summary

CF	Pk(Meas)	FL(Meas)	FH(Meas)	-20dB	Meas. BW (MHz)	Rpt BW (MHz)	Mod
2447	17.0	2446.2	2447.8	-3.0	1.6	1.25	16QAM
	16.8	2445.7	2448.3	-3.2	2.6	2.5	16QAM
	12.7	2444.0	2450.0	-7.3	6.0	6	16QAM
	12.8	2443.5	2450.5	-7.2	6.9	7	16QAM
	12.3	2443.0	2451.0	-7.7	8.0	8	16QAM
2447	20.9	2446.3	2447.8	0.9	1.5	1.25	QPSK
	15.4	2445.7	2448.3	-4.6	2.6	2.5	QPSK
	12.7	2444.0	2450.0	-7.3	6.0	6	QPSK
	12.3	2443.5	2450.5	-7.7	7.0	7	QPSK
	11.3	2443.0	2451.0	-8.7	8.0	8	QPSK

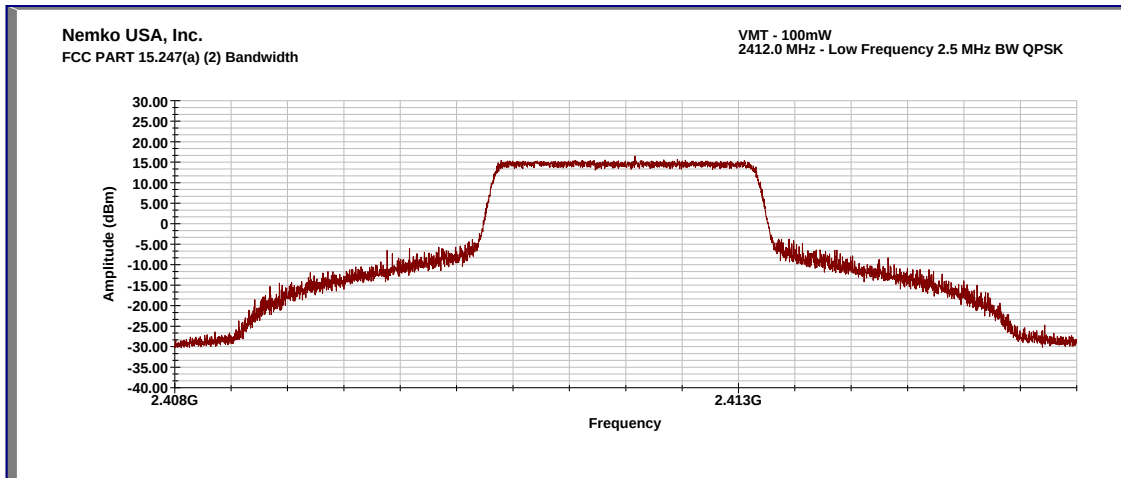
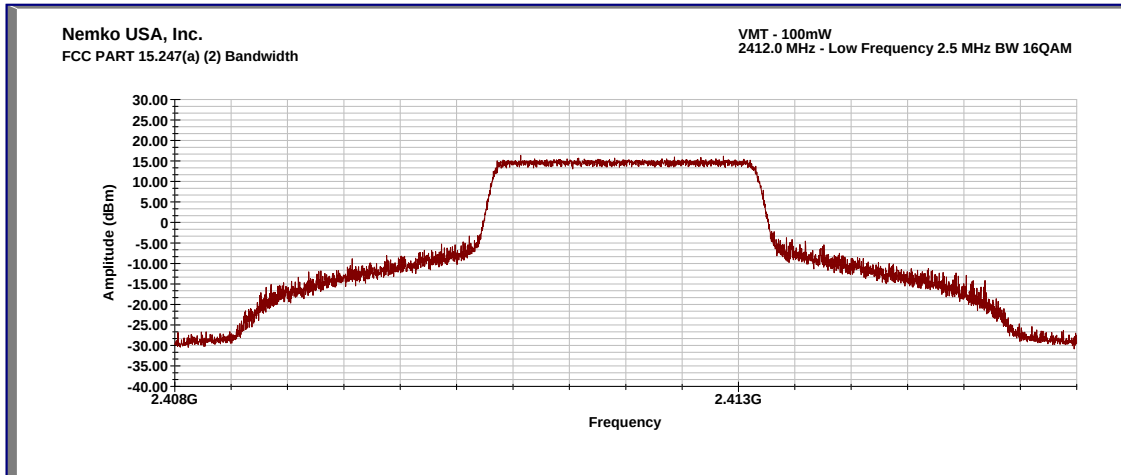
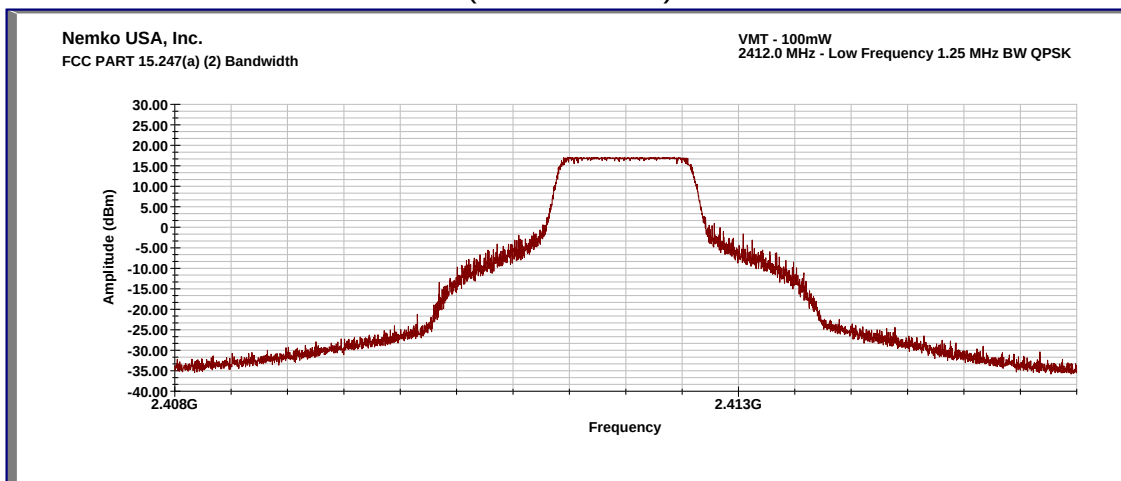
2447 MHz Bandwidth Summary

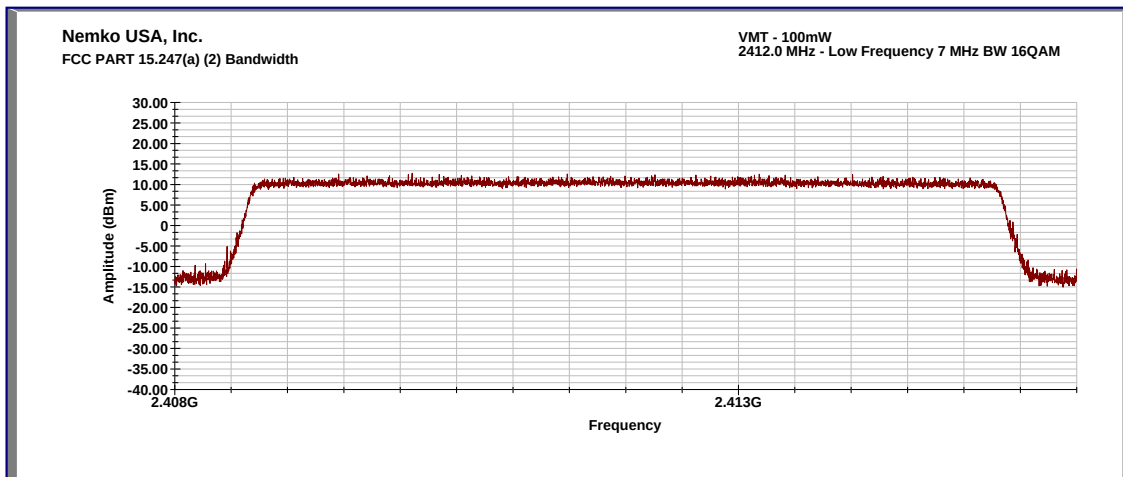
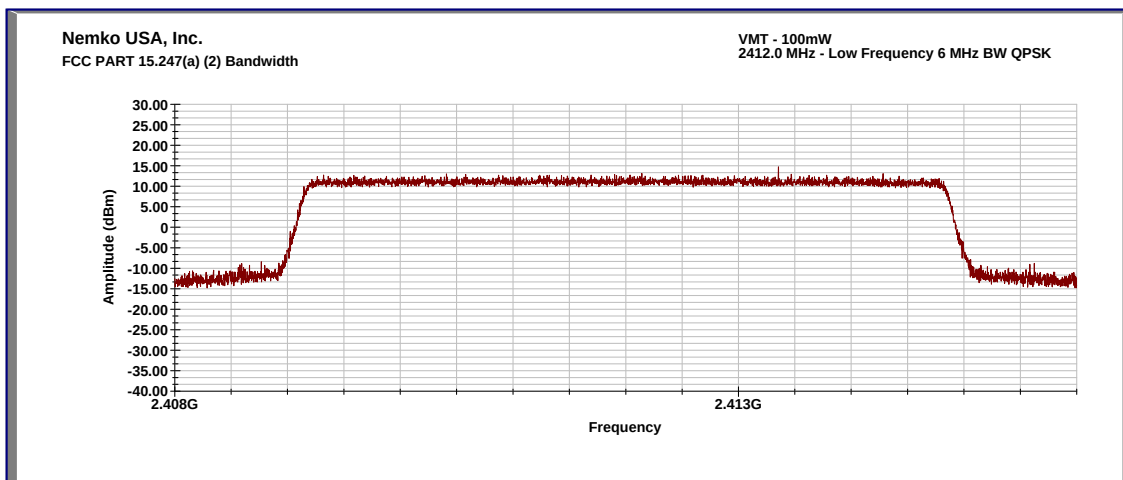
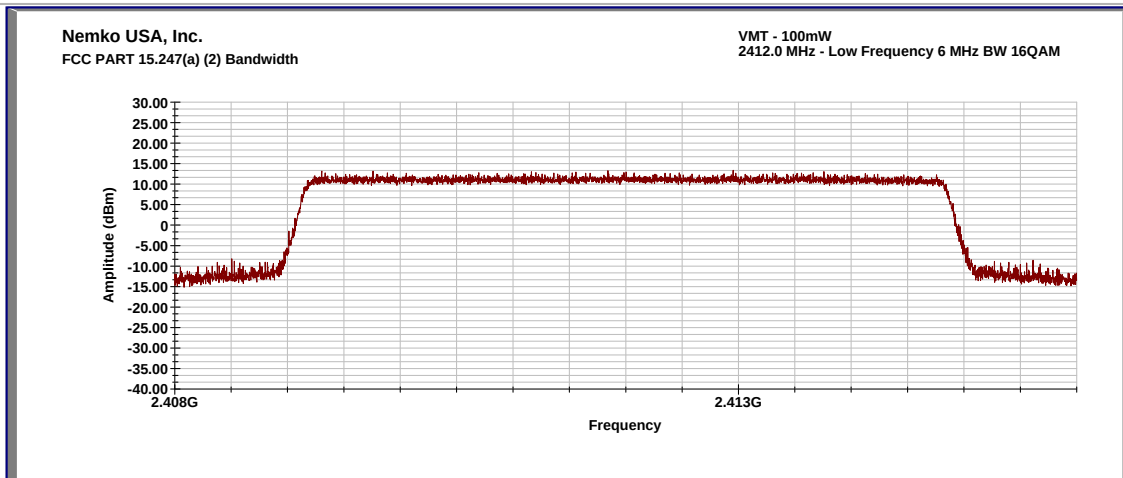
CF	Pk(Meas)	FL(Meas)	FH(Meas)	-20dB	Meas. BW (MHz)	Rpt BW (MHz)	Mod
2472	21.0	2471.2	2472.8	1.0	1.6	1.25	16QAM
	15.8	2470.6	2473.3	-4.2	2.7	2.5	16QAM
	13.1	2469.0	2475.0	-6.9	6.0	6	16QAM
	12.7	2468.5	2475.5	-7.3	7.0	7	16QAM
	13.1	2468.0	2476.0	-6.9	7.9	8	16QAM
2472	17.0	2471.1	2472.9	-3.0	1.8	1.25	QPSK
	16.1	2470.8	2473.2	-3.9	2.5	2.5	QPSK
	13.4	2469.0	2475.0	-6.6	6.0	6	QPSK
	12.9	2468.5	2475.5	-7.1	7.0	7	QPSK
	12.2	2468.0	2476.0	-7.8	8.0	8	QPSK

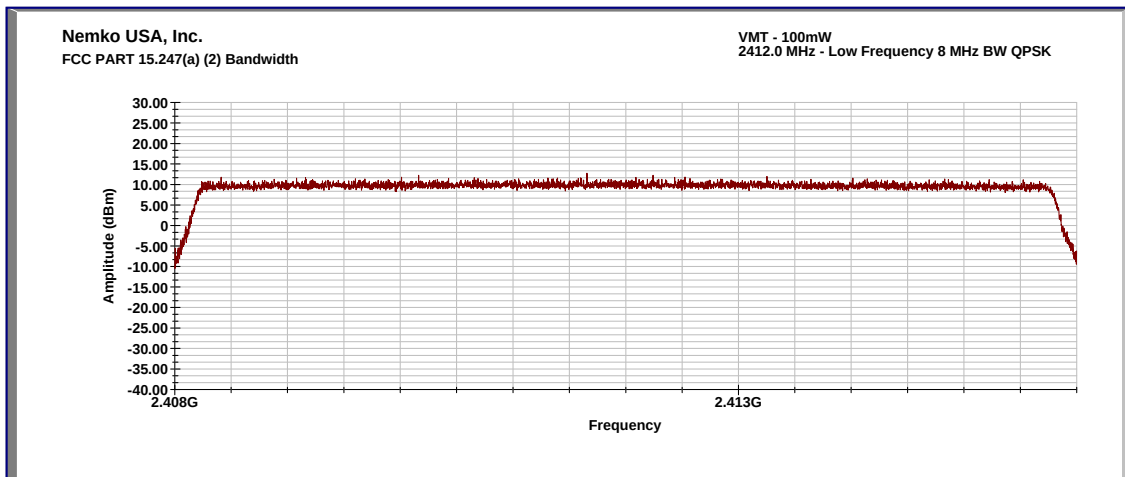
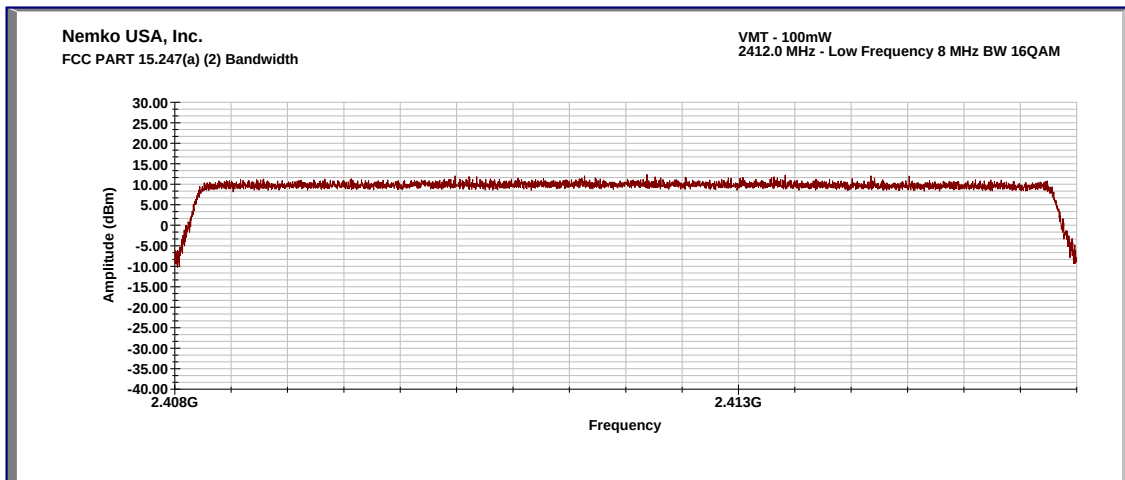
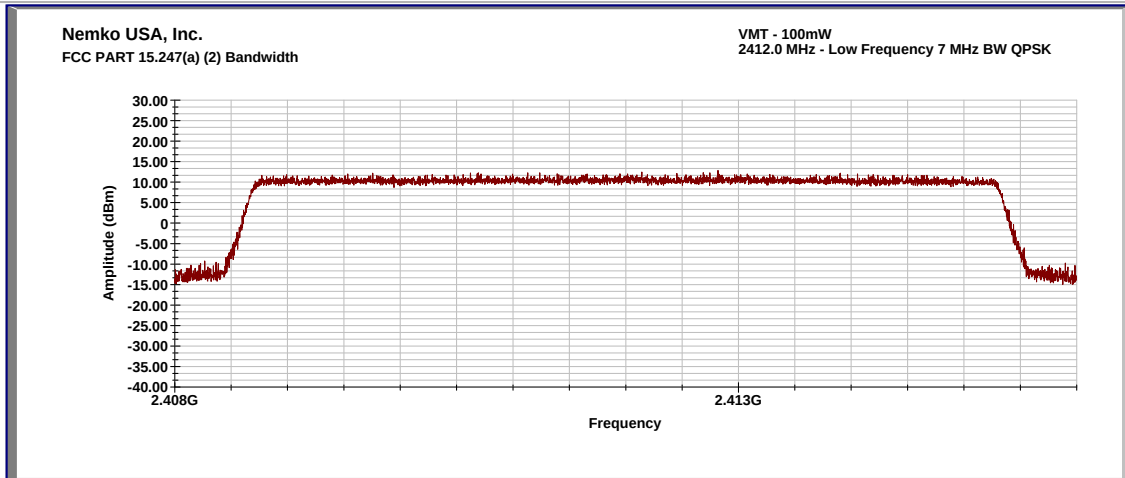
2472 MHz Bandwidth Summary

20 dB Band Width

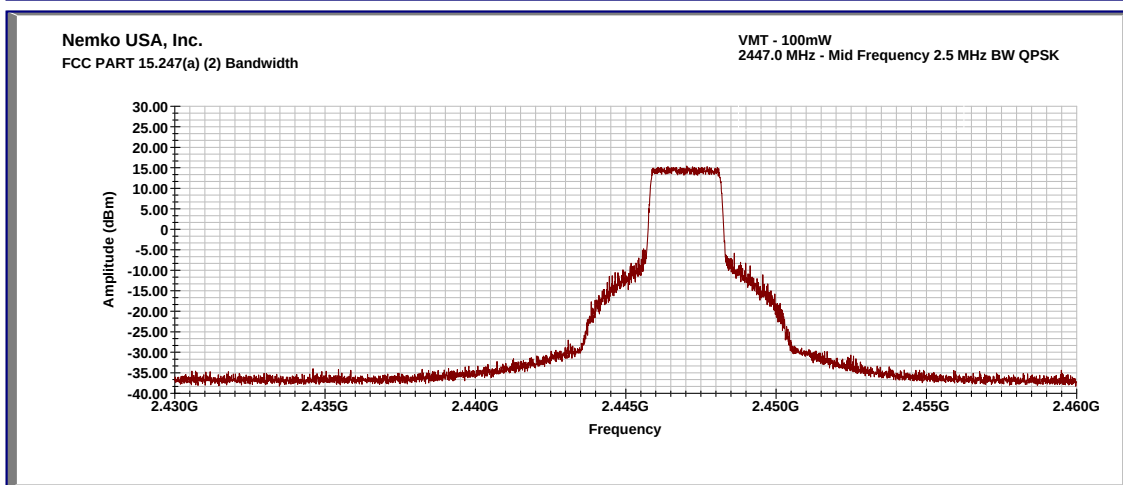
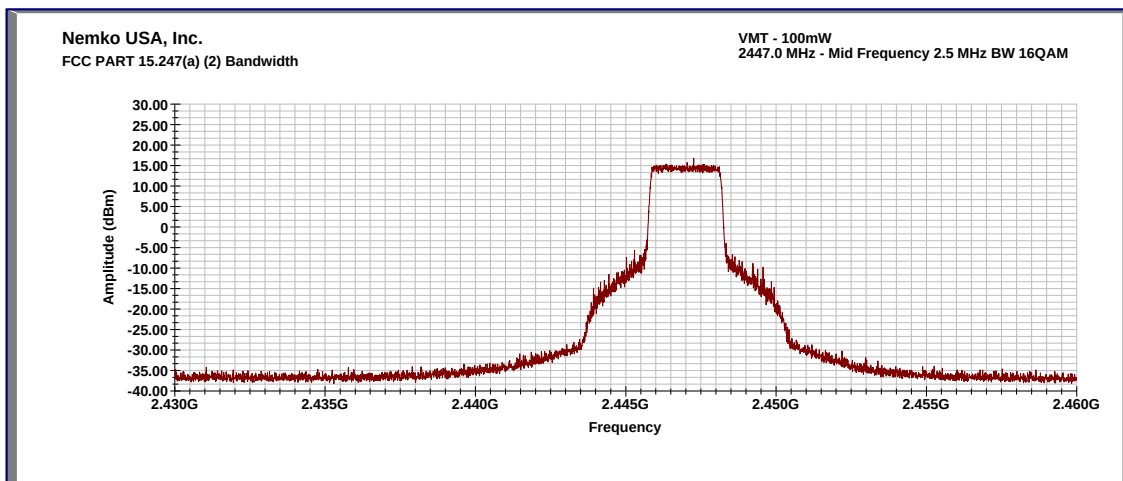
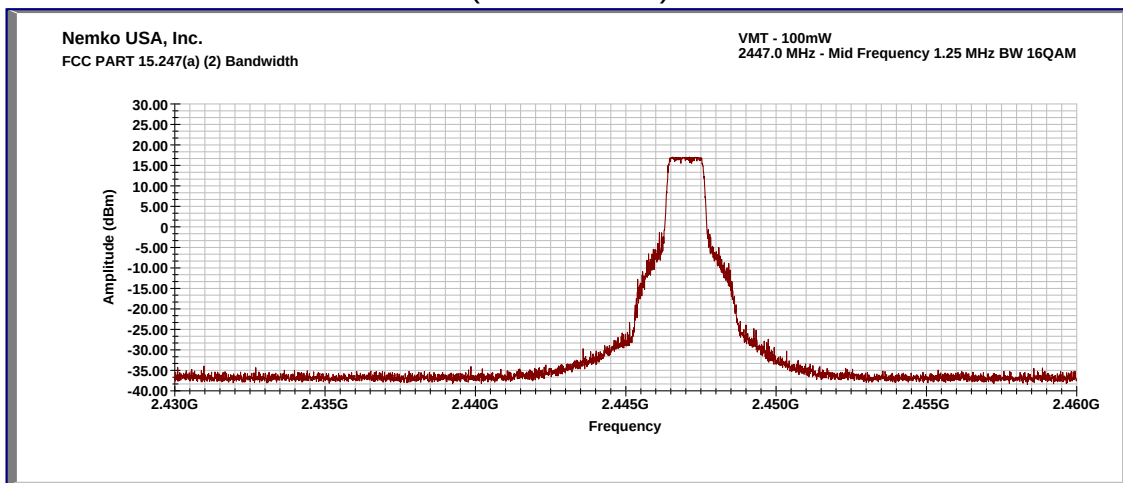
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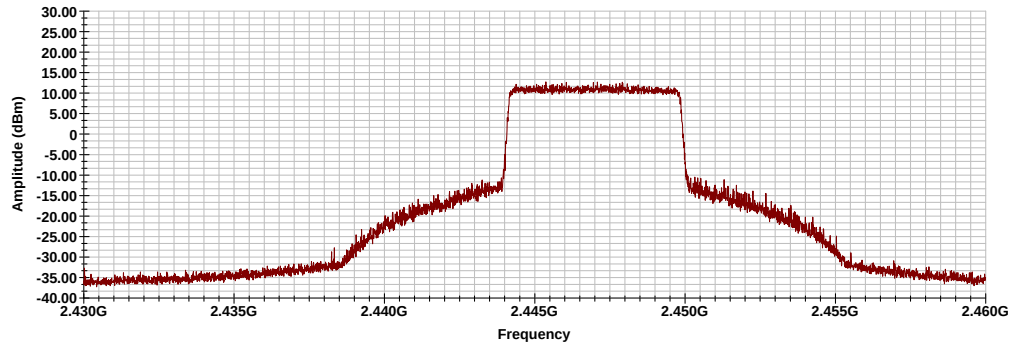


(Mid Channel)



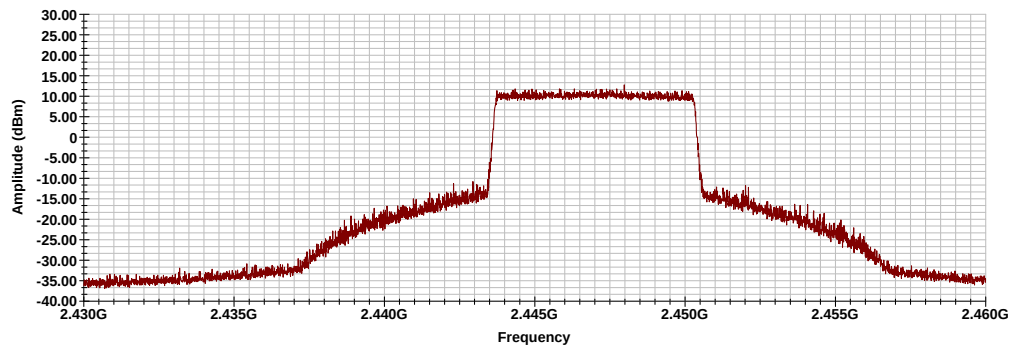
Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

VMT - 100mW
2447.0 MHz - Mid Frequency 6 MHz BW 16QAM



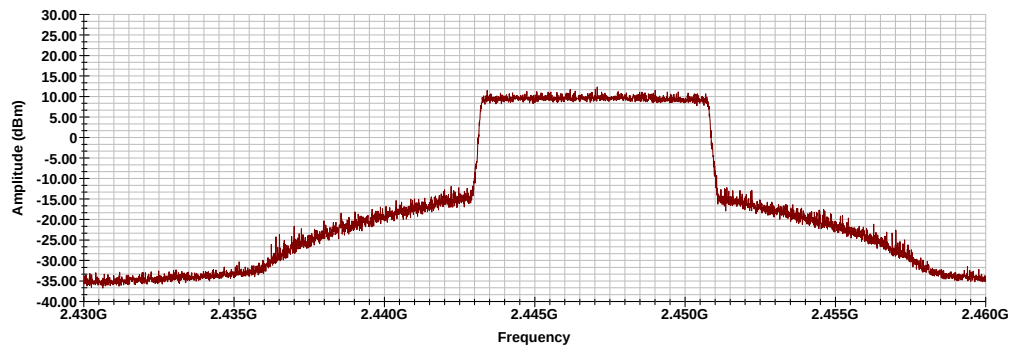
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FCC PART 15.247(a) (2) Bandwidth

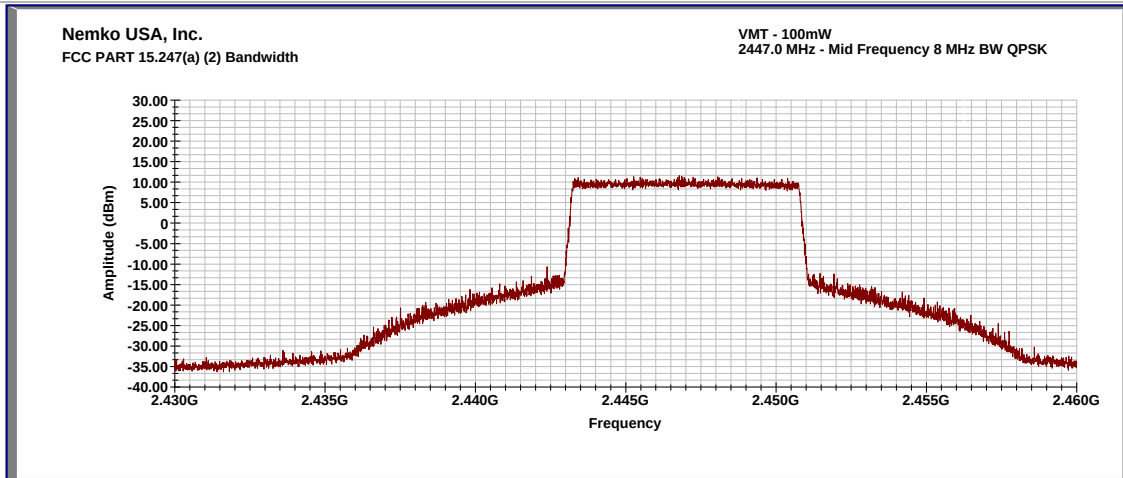
VMT - 100mW
2447.0 MHz - Mid Frequency 7 MHz BW 16QAM



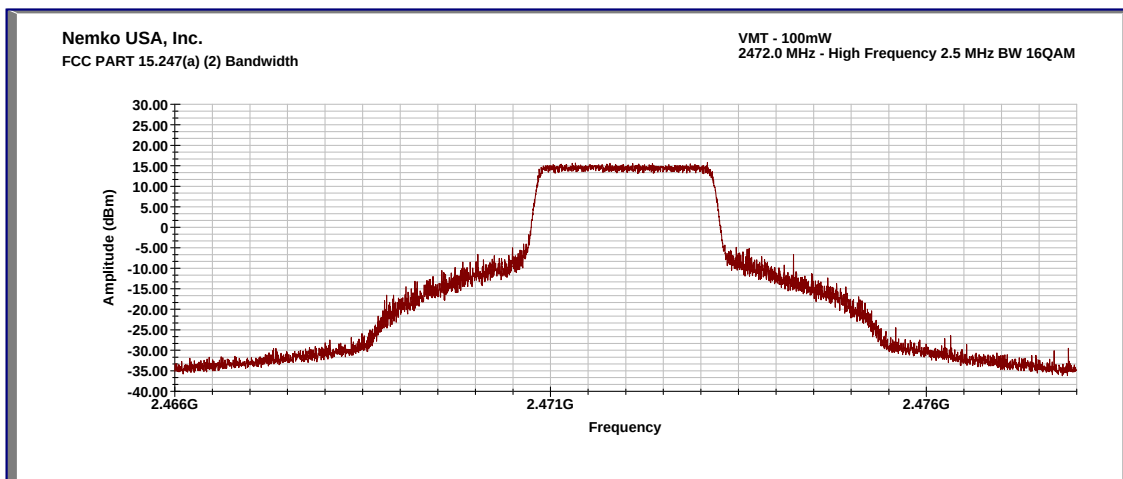
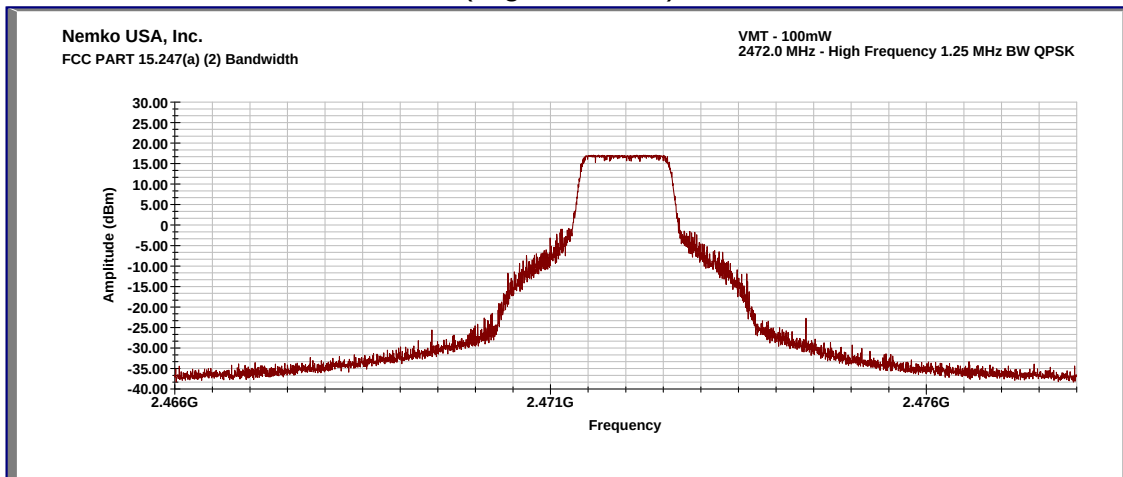
Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

VMT - 100mW
2447.0 MHz - Mid Frequency 8 MHz BW 16QAM



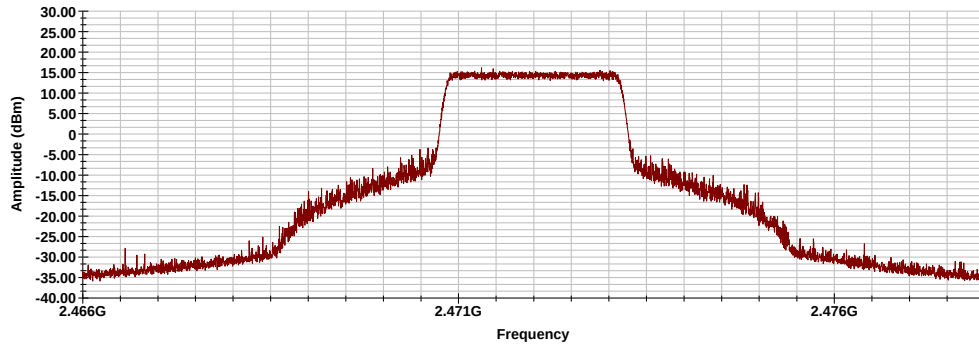


(High Channel)



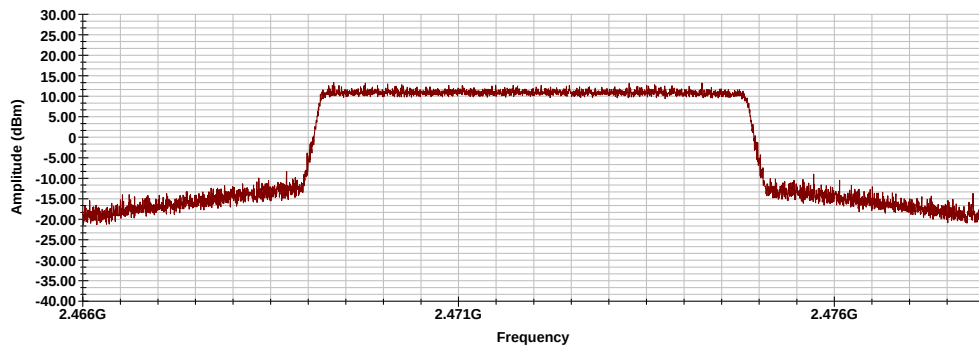
Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

VMT - 100mW
2472.0 MHz - High Frequency 2.5 MHz BW QPSK



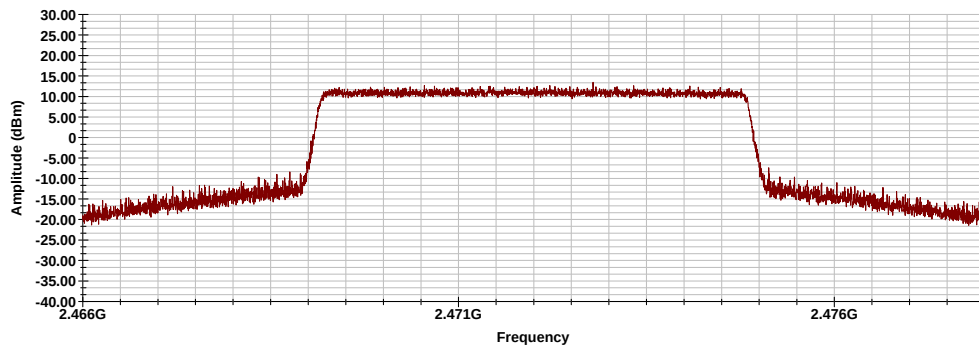
Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

VMT - 100mW
2472.0 MHz - High Frequency 6 MHz BW 16QAM



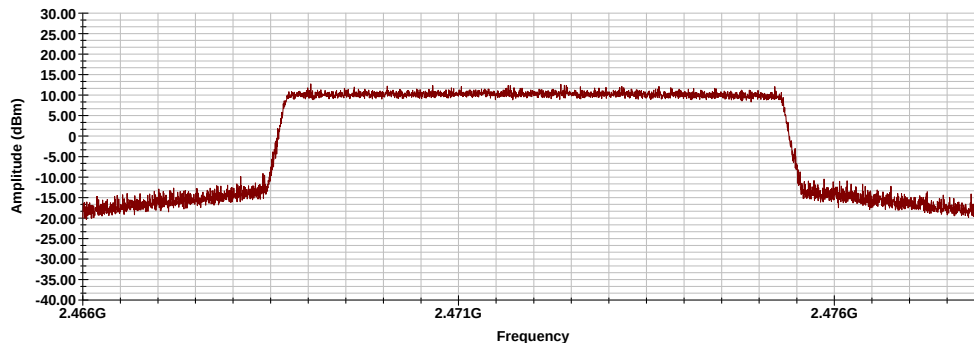
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FCC PART 15.247(a) (2) Bandwidth

VMT - 100mW
2472.0 MHz - High Frequency 6 MHz BW QPSK



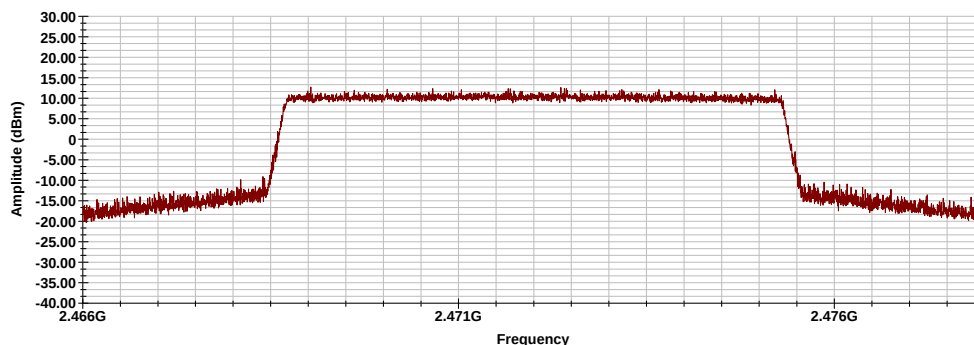
Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

VMT - 100mW
2472.0 MHz - High Frequency 7 MHz BW 16QAM



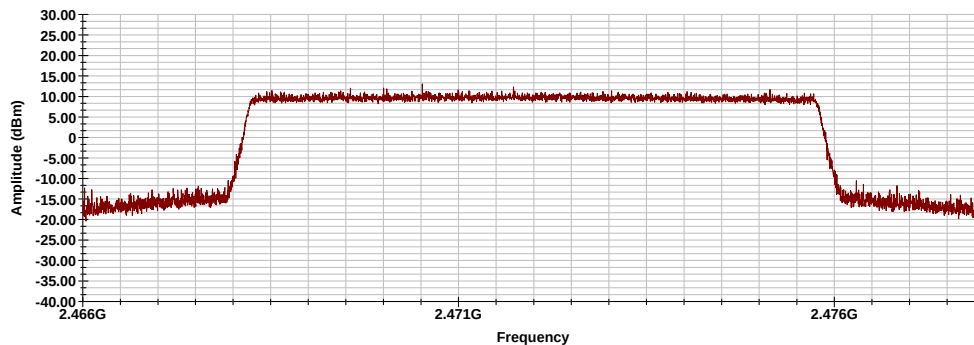
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FCC PART 15.247(a) (2) Bandwidth

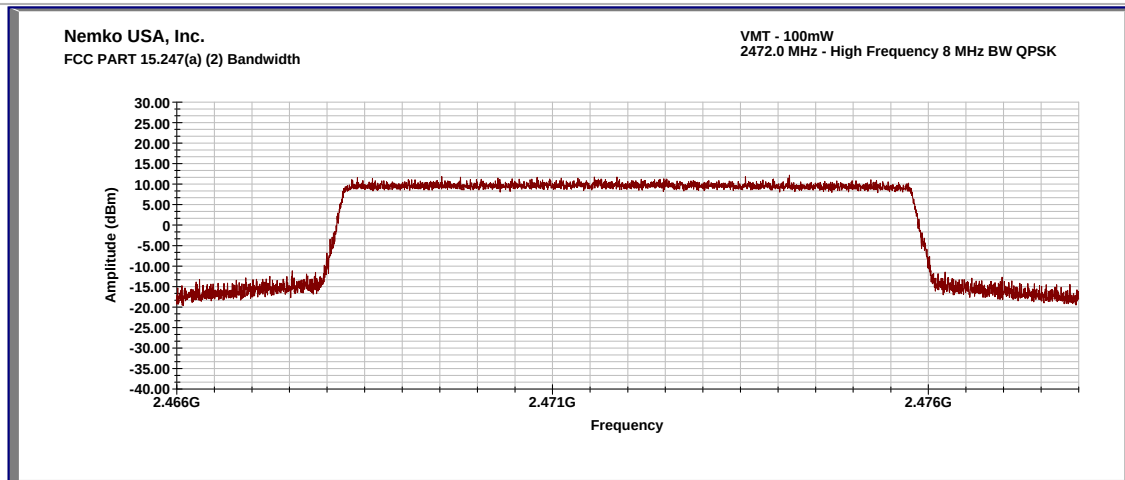
VMT - 100mW
2472.0 MHz - High Frequency 7 MHz BW 16QAM



Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

VMT - 100mW
2472.0 MHz - High Frequency 8 MHz BW 16QAM





Minimum 6dB RF Bandwidth

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

Test Conditions:

Sample Number:	VMTF2BSU0XS	Temperature:	21°C
Date:	Sept. 12, 2011	Humidity:	39%
Modification State:	Low, Mid and High Channel	Tester:	Jim Owen
		Laboratory:	Nemko

Test Results: EUT complies, See attached plots.

Additional Observations:

- This is a conducted test
- RBW is set to 100kHz
- VBW is 3X RBW
- Sweep is auto
- Detector is Peak
- Trace is Max Hold
- For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A PEAK output reading was plotted; a DISPLAY line was drawn 6 dB lower than PEAK level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.
- EUT complies as 6 dB BW > 500 kHz

CF	Pk(Meas)	FL(Meas)	FH(Meas)	-6dB	Meas. BW (MHz)	Rpt BW (MHz)	Mod
2412	21.2	2446.4	2447.6	15.2	1.2	1.25	16QAM
	16.3	2410.8	2413.2	10.3	2.4	2.5	16QAM
	13.1	2409.1	2414.9	7.1	5.7	6	16QAM
	12.7	2408.7	2415.3	6.7	6.7	7	16QAM
	12.4	2408.2	2415.8	6.4	7.6	8	16QAM
2412	17.0	2411.4	2412.6	11.0	1.2	1.25	QPSK
	16.5	2410.8	2413.2	10.5	2.3	2.5	QPSK
	14.7	2409.2	2414.8	8.7	5.7	6	QPSK
	12.8	2408.7	2415.3	6.8	6.7	7	QPSK
	12.7	2408.2	2415.8	6.7	7.6	8	QPSK

2412 MHz Bandwidth Summary

CF	Pk(Meas)	FL(Meas)	FH(Meas)	-6dB	Meas. BW (MHz)	Rpt BW (MHz)	Mod
2447	17.0	2446.4	2447.6	11.0	1.2	1.25	16QAM
	16.8	2445.8	2448.2	10.8	2.3	2.5	16QAM
	12.7	2444.1	2449.8	6.7	5.7	6	16QAM
	12.8	2443.7	2450.3	6.8	6.7	7	16QAM
	12.3	2443.2	2450.8	6.3	7.6	8	16QAM
2447	20.9	2446.4	2447.6	14.9	1.2	1.25	QPSK
	15.4	2445.8	2448.2	9.4	2.4	2.5	QPSK
	12.7	2444.1	2449.9	6.7	5.7	6	QPSK
	12.3	2443.7	2450.3	6.3	6.7	7	QPSK
	11.3	2443.2	2450.8	5.3	7.6	8	QPSK

2447 MHz Bandwidth Summary

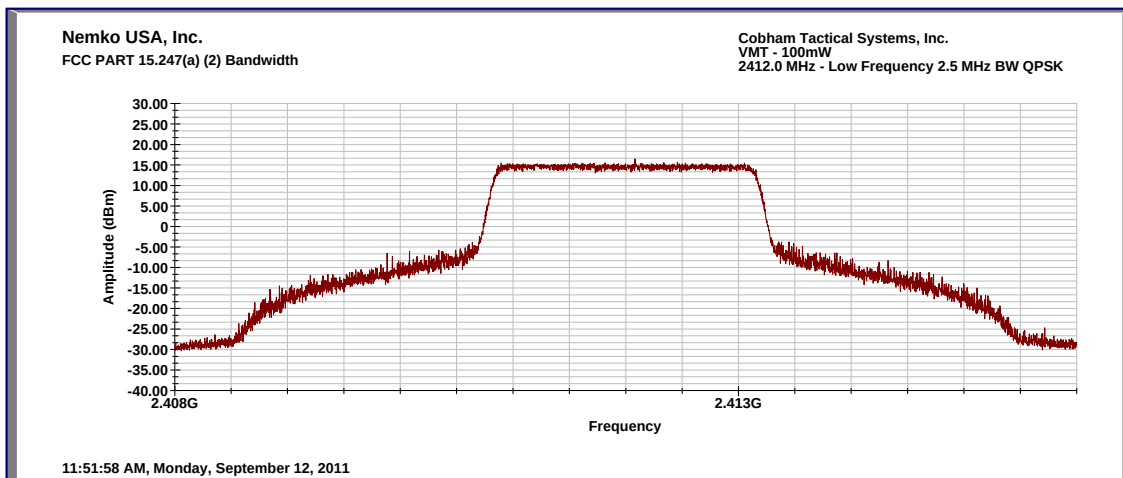
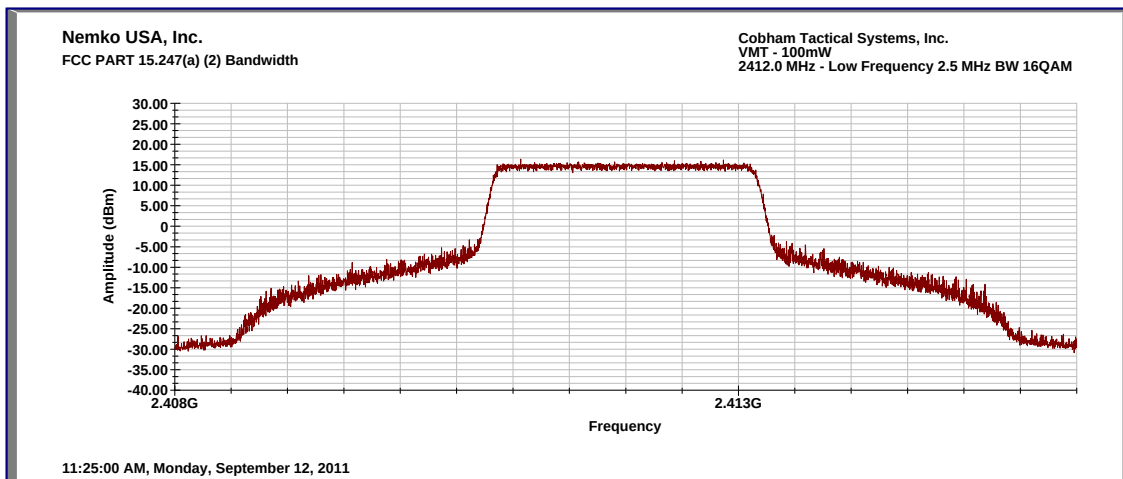
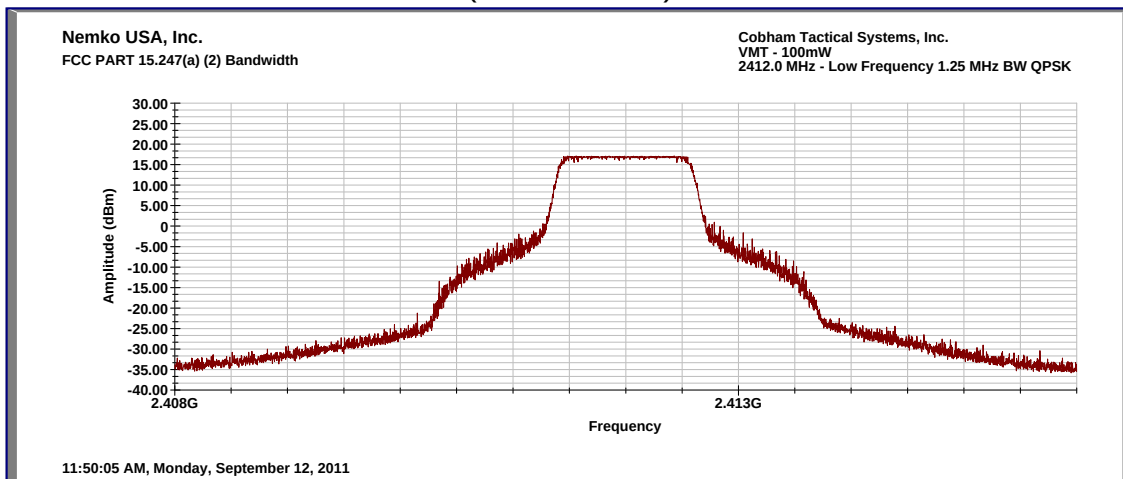
CF	Pk(Meas)	FL(Meas)	FH(Meas)	-6dB	Meas. BW (MHz)	Rpt BW (MHz)	Mod
2472	21.04	2471.4	2472.6	15.0	1.2	1.25	16QAM
	15.8	2470.8	2473.2	9.8	2.4	2.5	16QAM
	13.2	2469.1	2474.9	7.2	5.7	6	16QAM
	12.7	2468.7	2475.3	6.7	6.7	7	16QAM
	13.1	2468.2	2475.8	7.1	7.6	8	16QAM
2472	17.0	2471.4	2472.6	11.0	1.2	1.25	QPSK
	16.1	2470.8	2473.2	10.1	2.4	2.5	QPSK
	13.4	2469.1	2474.9	7.4	5.7	6	QPSK
	12.9	2468.7	2475.3	6.9	6.7	7	QPSK
	12.2	2468.2	2475.8	6.2	7.6	8	QPSK

2472 MHz Bandwidth Summary



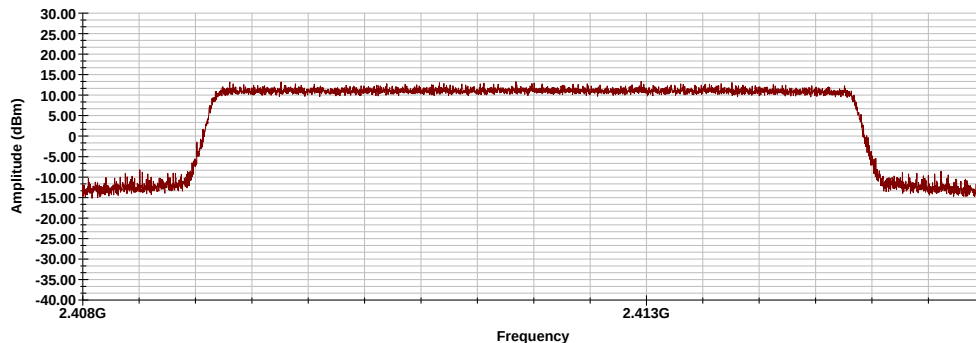
www.nemko.com

(Low Channel)



Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

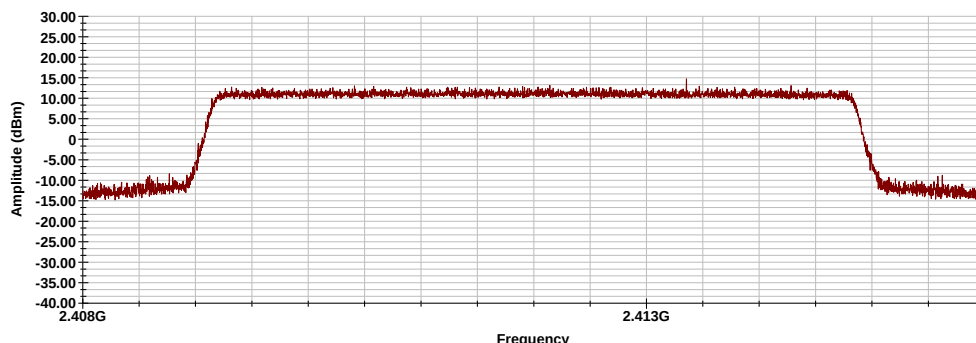
Cobham Tactical Systems, Inc.
VMT - 100mW
2412.0 MHz - Low Frequency 6 MHz BW 16QAM



11:27:04 AM, Monday, September 12, 2011

Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

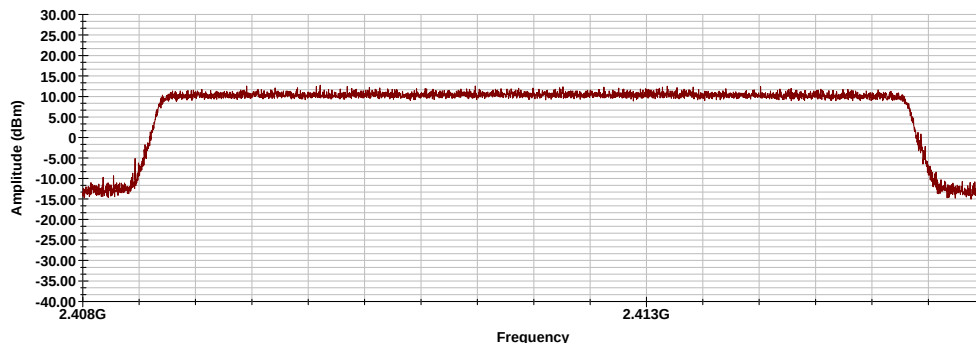
Cobham Tactical Systems, Inc.
VMT - 100mW
2412.0 MHz - Low Frequency 6 MHz BW QPSK



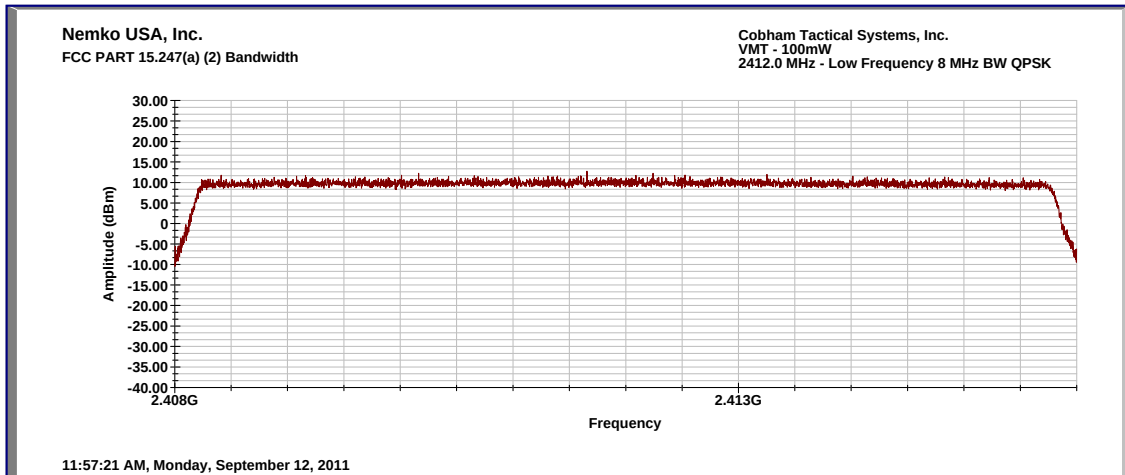
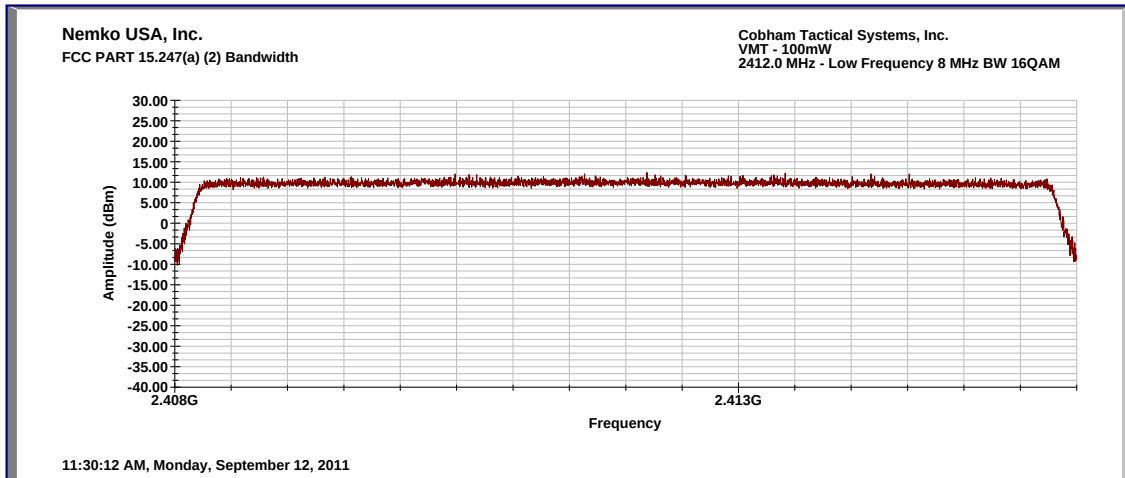
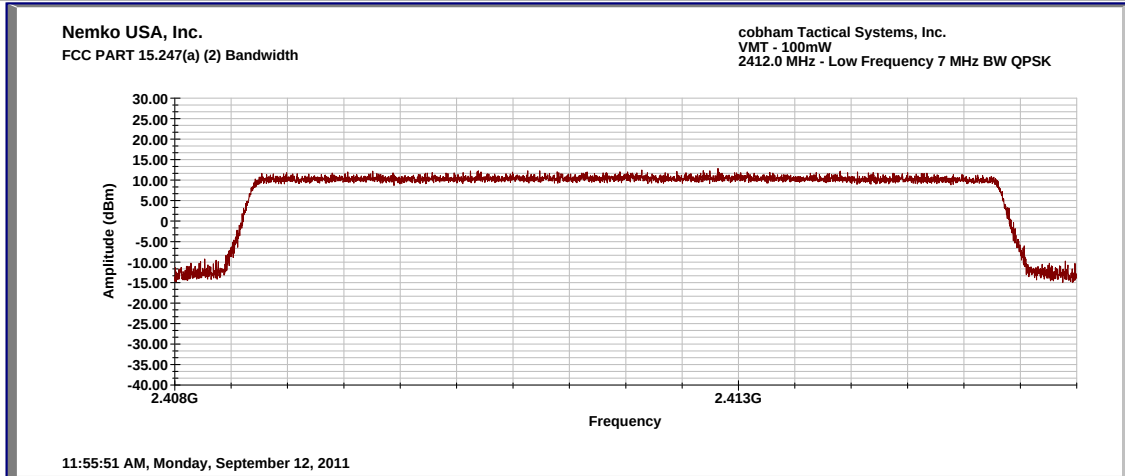
11:53:37 AM, Monday, September 12, 2011

Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

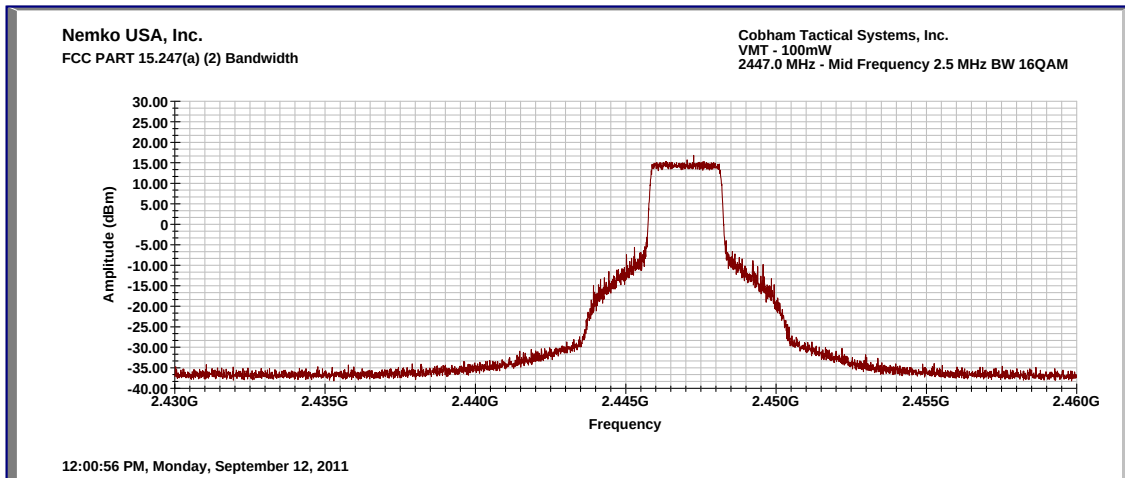
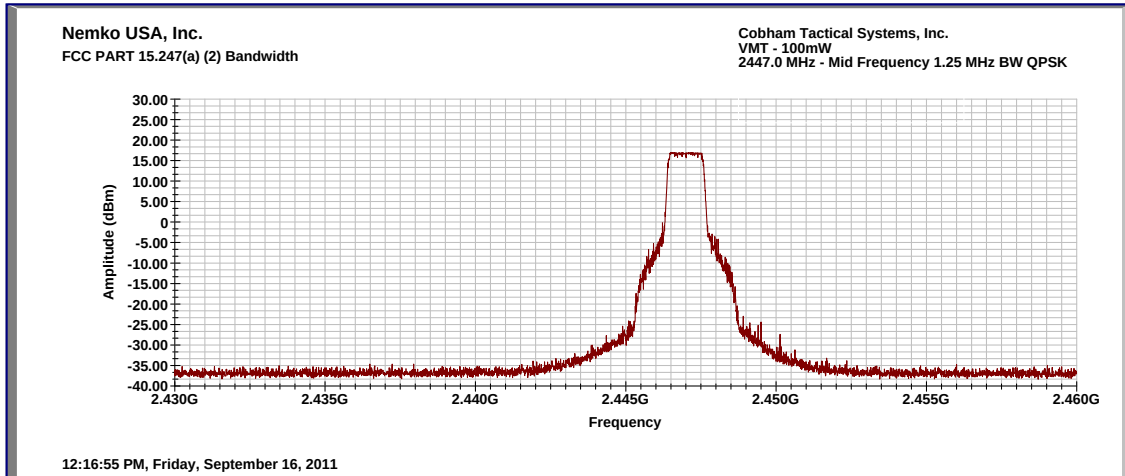
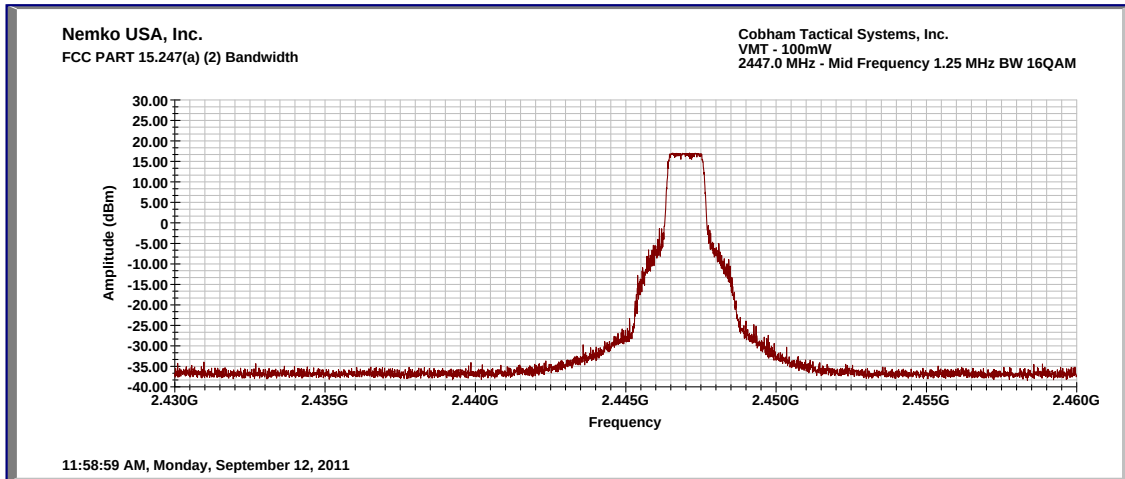
Cobham Tactical Systems, Inc.
VMT - 100mW
2412.0 MHz - Low Frequency 7 MHz BW 16QAM



11:28:39 AM, Monday, September 12, 2011

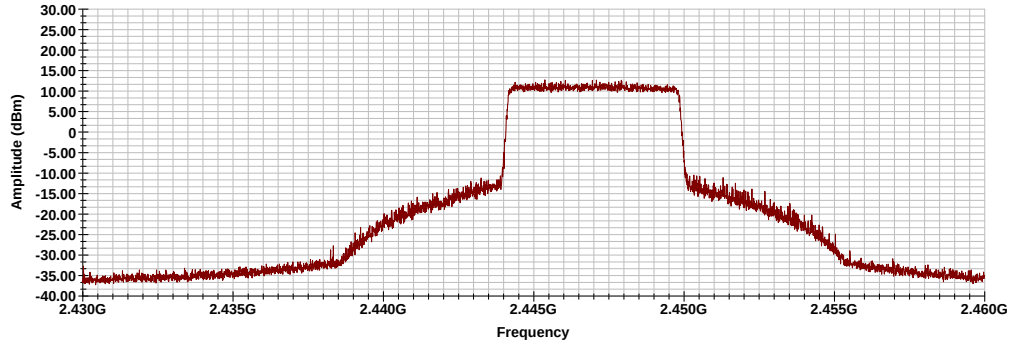


(Mid Channel)



Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

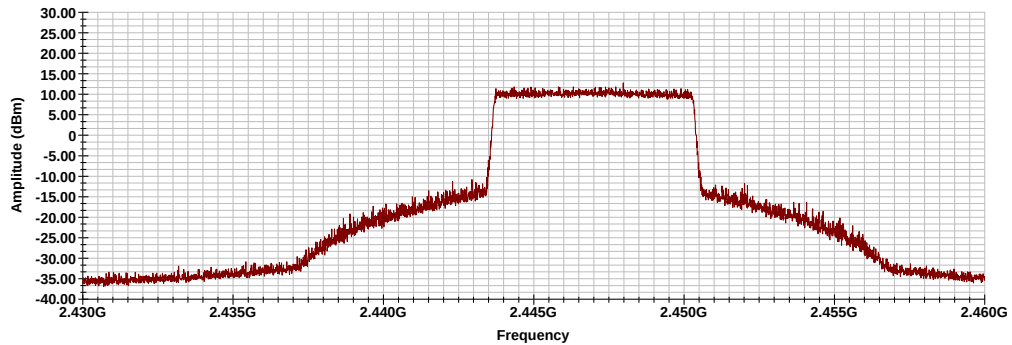
Cobham Tactical Systems, Inc.
VMT - 100mW
2447.0 MHz - Mid Frequency 6 MHz BW 16QAM



12:02:47 PM, Monday, September 12, 2011

Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

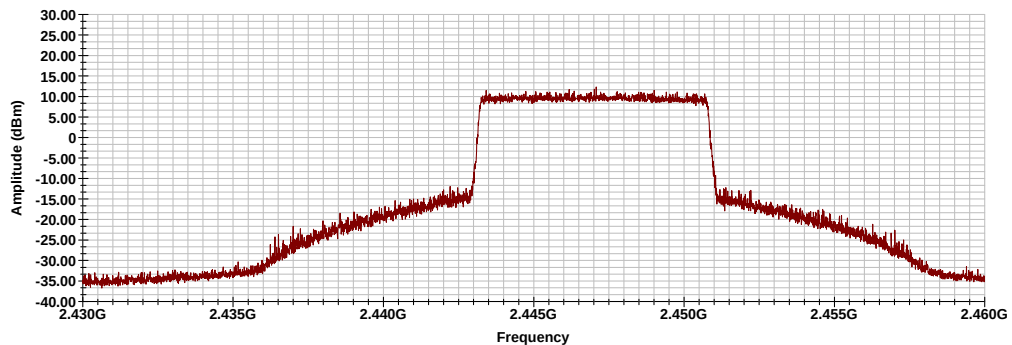
Cobham Tactical Systems, Inc.
VMT - 100mW
2447.0 MHz - Mid Frequency 7 MHz BW 16QAM



12:04:24 PM, Monday, September 12, 2011

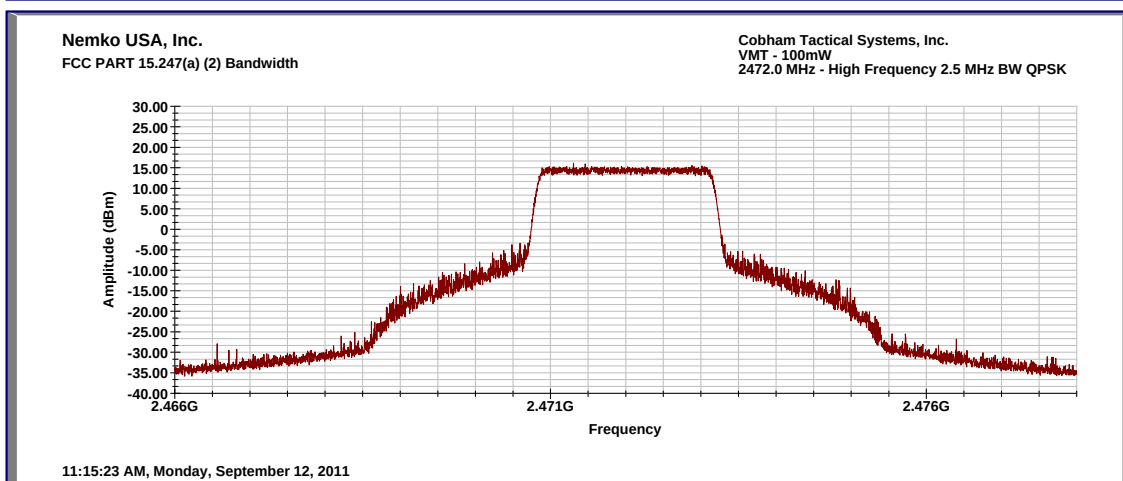
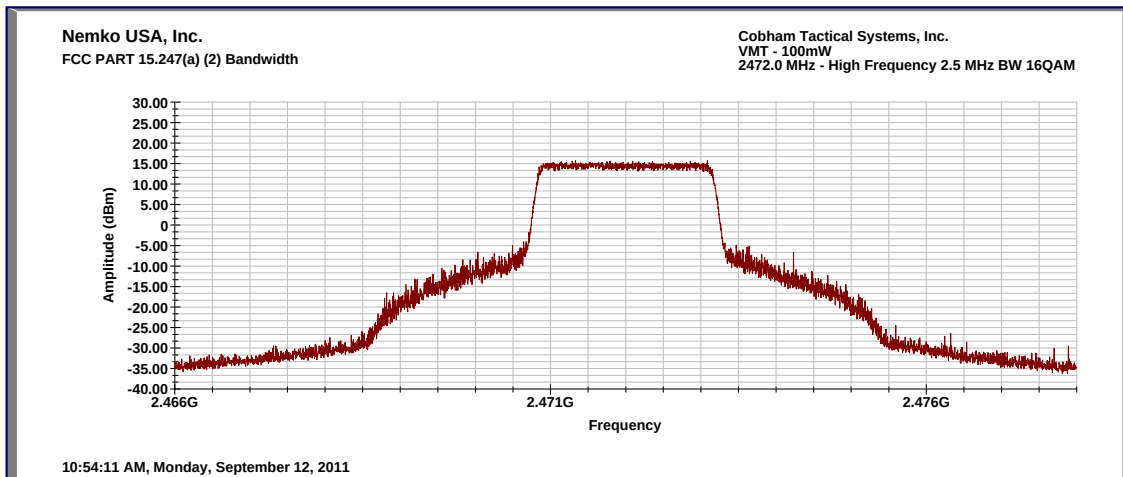
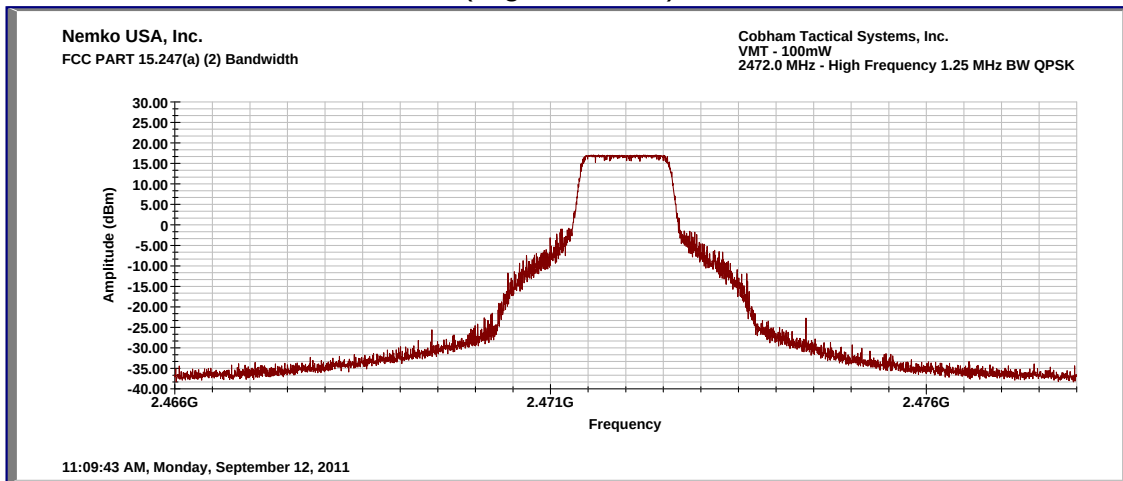
Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

Cobham Tactical Systems, Inc.
VMT - 100mW
2447.0 MHz - Mid Frequency 8 MHz BW 16QAM



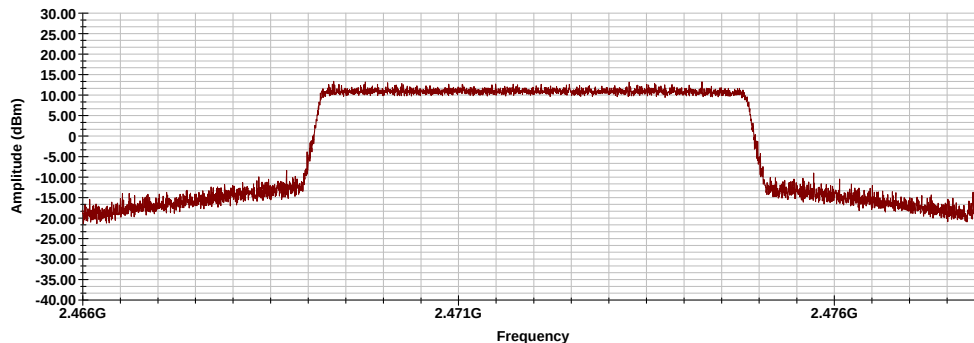
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(High Channel)



Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

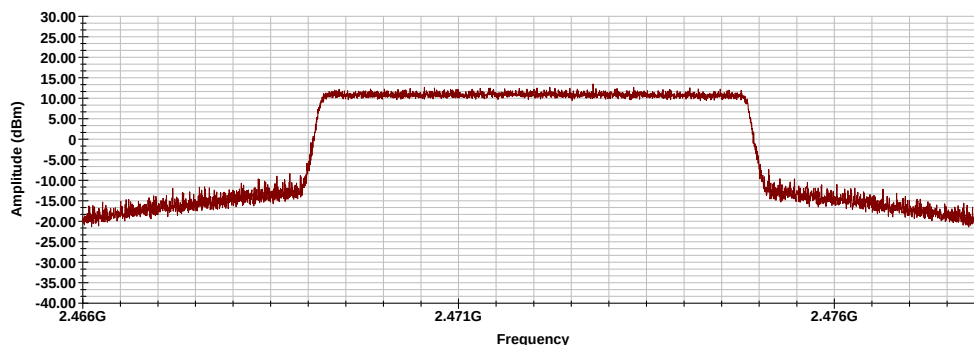
Cobham Tactical Systems, Inc.
VMT - 100mW
2472.0 MHz - High Frequency 6 MHz BW 16QAM



10:58:38 AM, Monday, September 12, 2011

Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

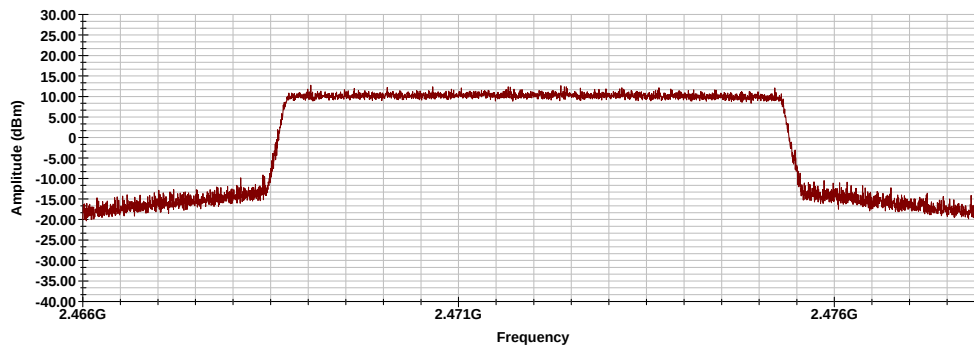
Cobham Tactical Systems, Inc.
VMT - 100mW
2472.0 MHz - High Frequency 6 MHz BW QPSK



11:17:44 AM, Monday, September 12, 2011

Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

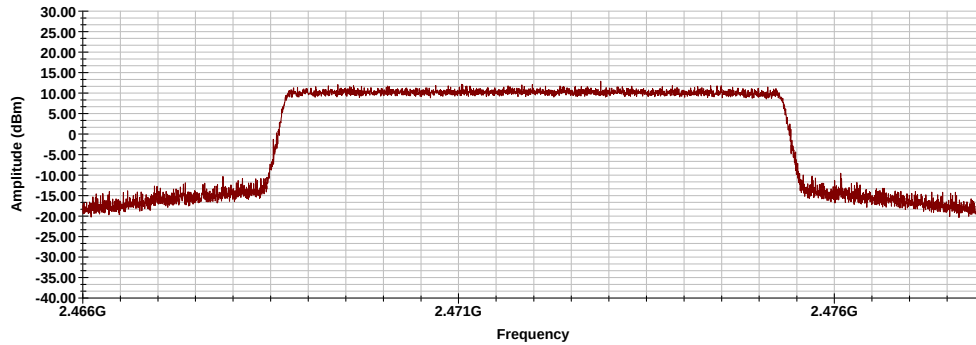
Cobham Tactical Systems, Inc.
VMT - 100mW
2472.0 MHz - High Frequency 7 MHz BW 16QAM



11:00:34 AM, Monday, September 12, 2011

Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

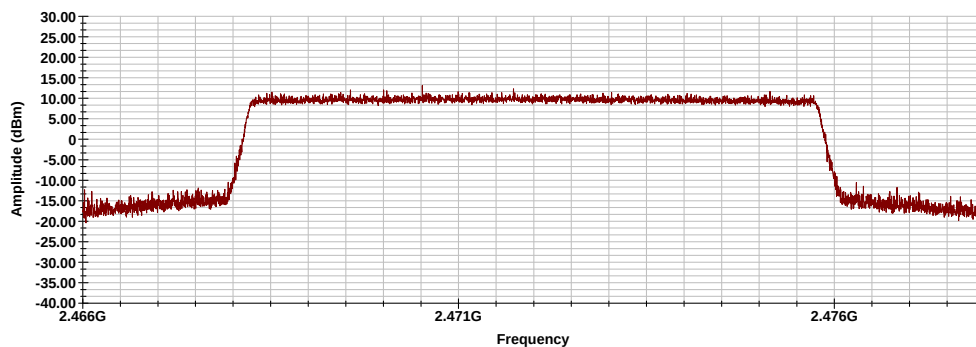
Cobham Tactical Systems, Inc.
VMT - 100mW
2472.0 MHz - High Frequency 7 MHz BW QPSK



11:19:38 AM, Monday, September 12, 2011

Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

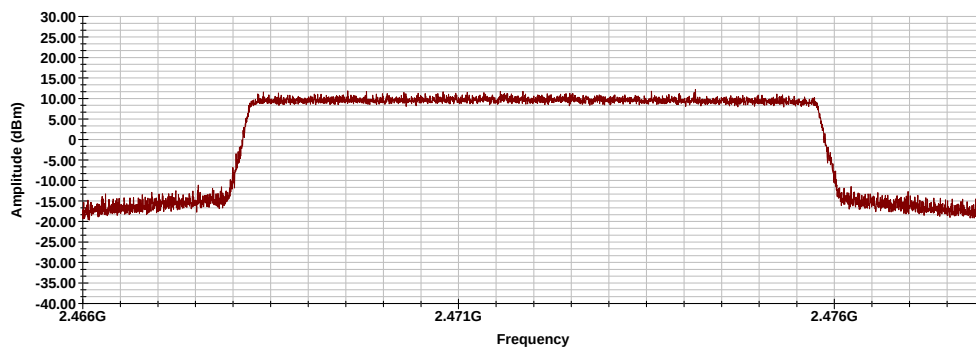
Cobham Tactical Systems, Inc.
VMT - 100mW
2472.0 MHz - High Frequency 8 MHz BW 16QAM



11:06:00 AM, Monday, September 12, 2011

Nemko USA, Inc.
FCC PART 15.247(a) (2) Bandwidth

Cobham Tactical Systems, Inc.
VMT - 100mW
2472.0 MHz - High Frequency 8 MHz BW QPSK



11:22:25 AM, Monday, September 12, 2011

Peak Output Power

(3) For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the *maximum conducted output power* is the highest total transmit power occurring in any mode.

Test Conditions:

Sample Number:	VMTF2BSU0XS	Temperature:	21°C
Date:	Sept. 22, 2011	Humidity:	39%
Modification State:	Low, Mid and High Channel	Tester:	Jim Owen
		Laboratory:	Nemko

Test Results: EUT Complies

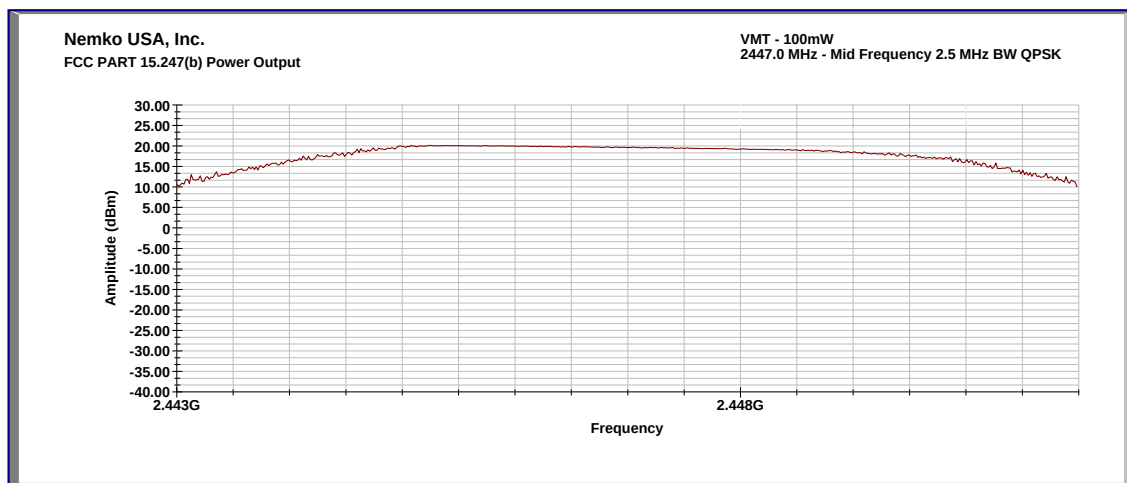
See attached table.

Additional Observations:

- This is a conducted test. 30.06 dB was offset for the cable and attenuator used.
- Device was operating at >98% duty cycle. Results were verified using spectrum analyzer methods (see example below table).
- Input voltage to the EUT was varied from 12.0+/-15%, however no variation in results observed.
- Measurement performed using Boonton Power Meter with resulting measurements reported in terms of RMS.
 - o Procedure followed:
 - Verify calibration using internal self-cal process
 - Attach sensor probe to antenna port with 30 dB attenuator (VBU) and apply required correction to adjust for loss
 - Setup EUT for channel frequency and modulation with setting at highest output level
 - Record results after power level measurement has settled
 - Repeat measurement at low/mid/high frequencies varying the bandwidth configurations and modulation modes and report results
 - o The Boonton Sensor has a bandwidth and sensitivity range as follows:
 - Frequency Range: 10 kHz to 8 GHz
 - Sensitivity: -60 dBm to +20 dBm

Test Table:

	BW (MHz)	2412 MHz		2447 MHz		2472 MHz	
Modulation	16QAM	Low		Mid		High	
	1.25	21.00	dBm	20.88	dBm	21.04	dBm
	2.5	21.01	dBm	20.90	dBm	21.06	dBm
	6	21.19	dBm	21.11	dBm	21.29	dBm
	7	21.17	dBm	21.09	dBm	21.25	dBm
	8	21.16	dBm	21.07	dBm	21.23	dBm
	BW (MHz)	2412 MHz		2447 MHz		2472 MHz	
Modulation	QPSK	Low		Mid		High	
	1.25	21.00	dBm	20.87	dBm	21.04	dBm
	2.5	21.02	dBm	20.89	dBm	21.07	dBm
	6	21.23	dBm	21.12	dBm	21.29	dBm
	7	21.21	dBm	21.09	dBm	21.27	dBm
	8	21.20	dBm	21.07	dBm	21.25	dBm



Verification Example of results

Band-edge Compliance of RF Conducted /Radiated Emissions

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Conditions:

Sample Number:	VMTF2BSU0XS	Temperature:	19°C
Date:	Sept. 7, 2011	Humidity:	45%
Modification State:	Low and High Channel	Tester:	Jim Owen
		Laboratory:	Nemko

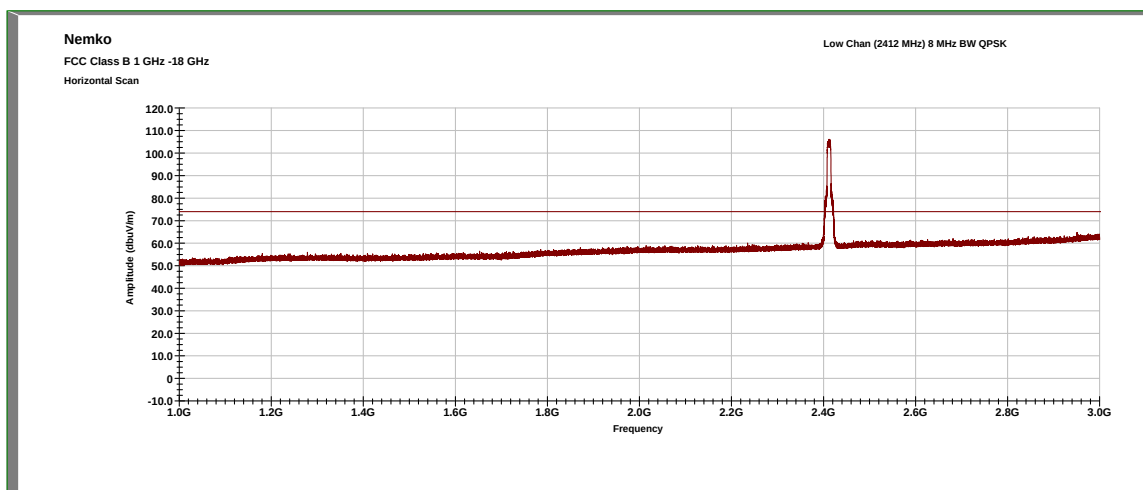
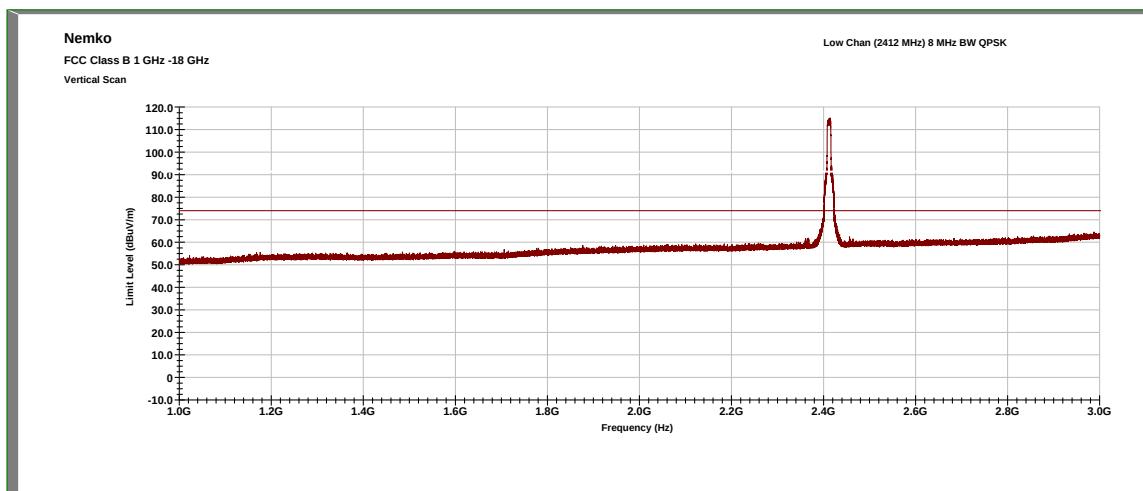
Test Results:

See attached plots.

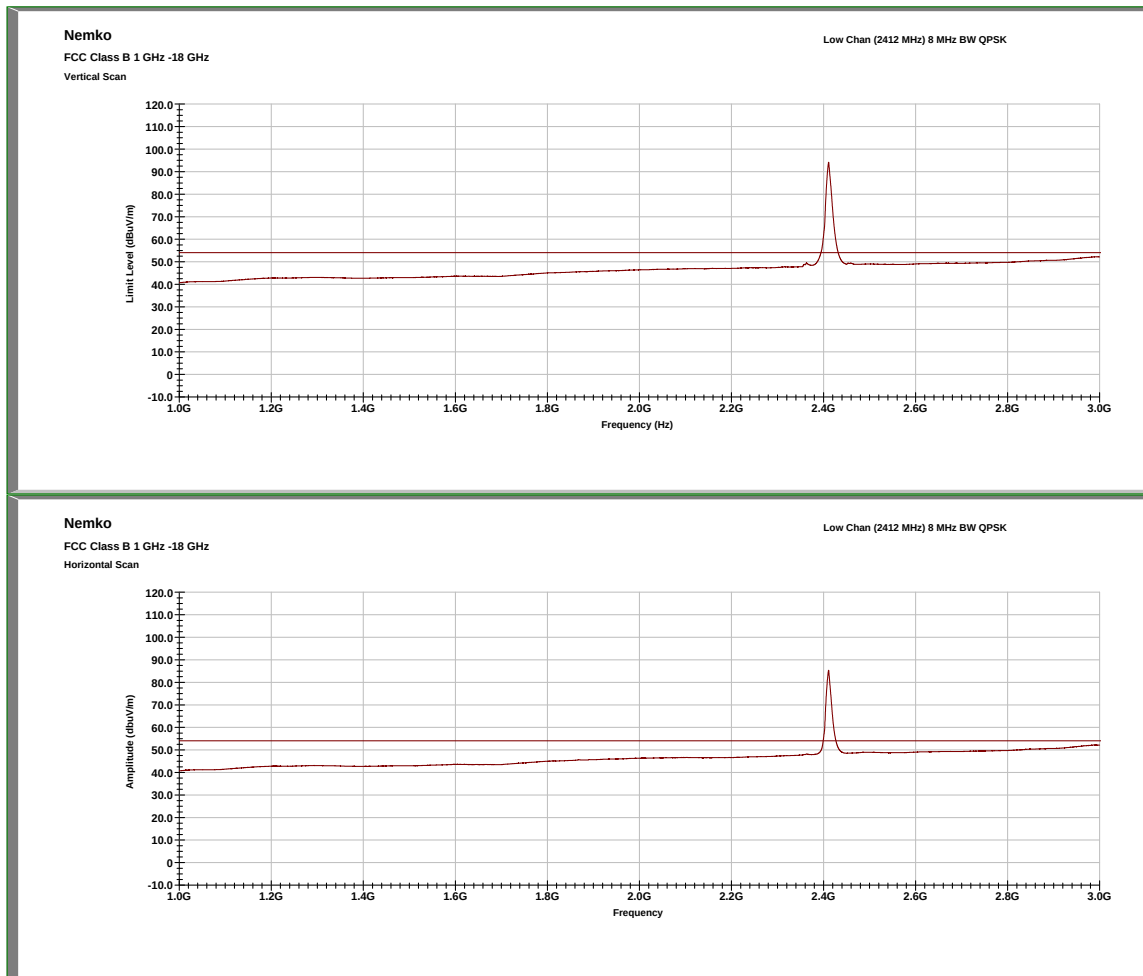
Additional Observations:

- This is a Radiated Emissions test.
- Span is wide enough to capture the peak level of the emission operating on the channel closest to the band edges (Lower and Upper).
- For bandedge (restricted zone) RBW is 1MHz
- For bandedge (restricted zone) Limit is 74 dBuV/m peak @ 3m
- For bandedge (restricted zone) Limit is 54 dBuV/m average @ 3m
- VBW is 3X RBW for Peak Detector measurement
- Sweep is auto.
- Detector is Peak, Trace is Max Hold
- Average = RBW (1MHz) & VBW (10 Hz)

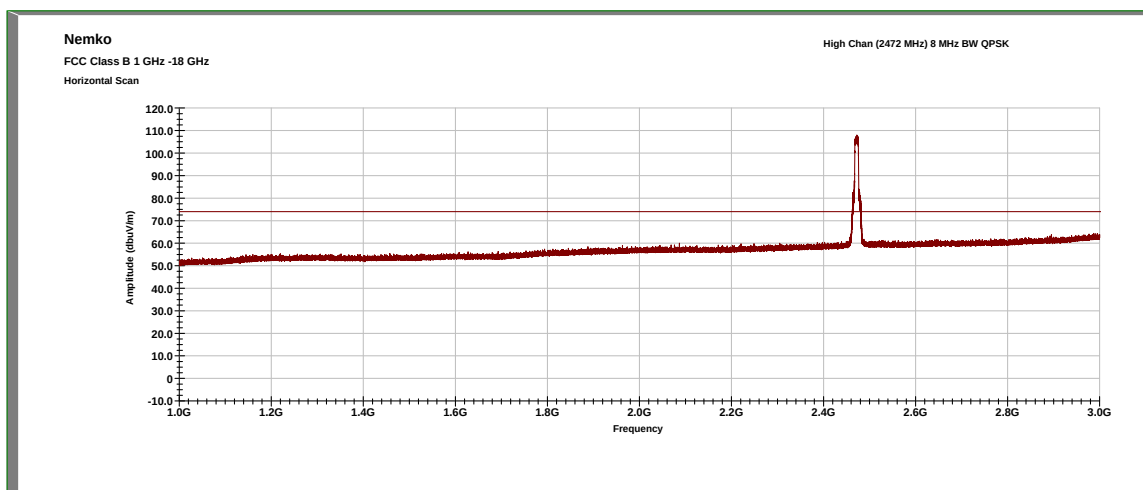
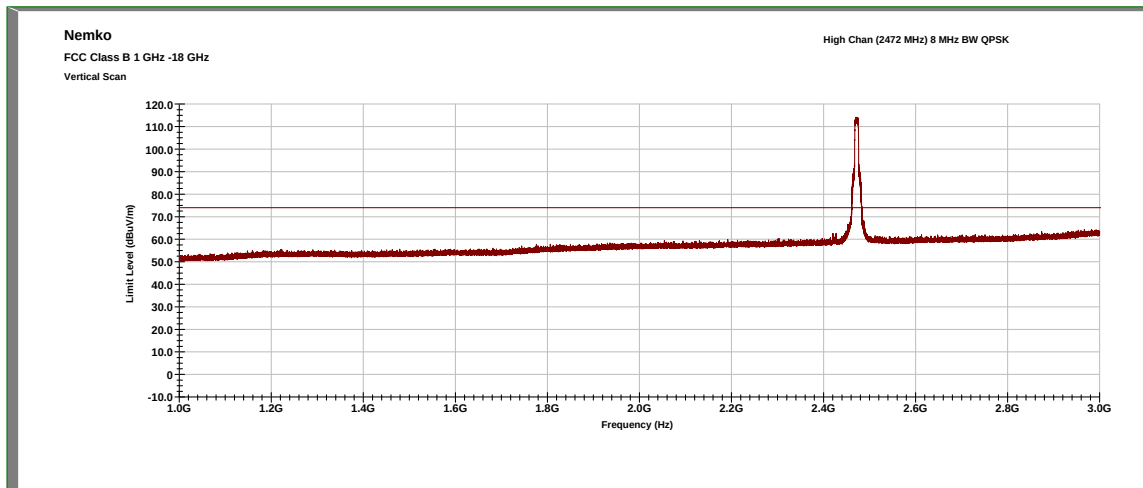
Low Channel Peak



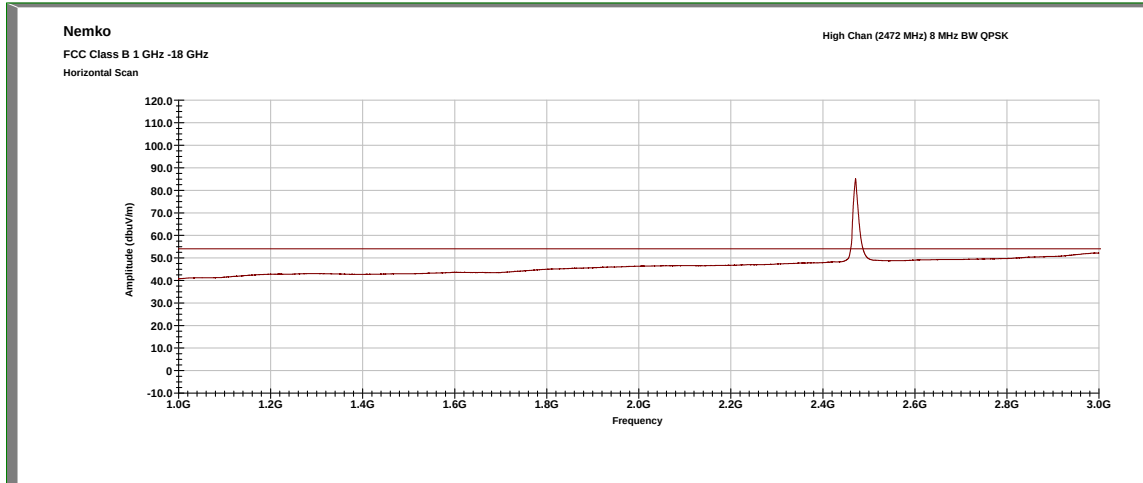
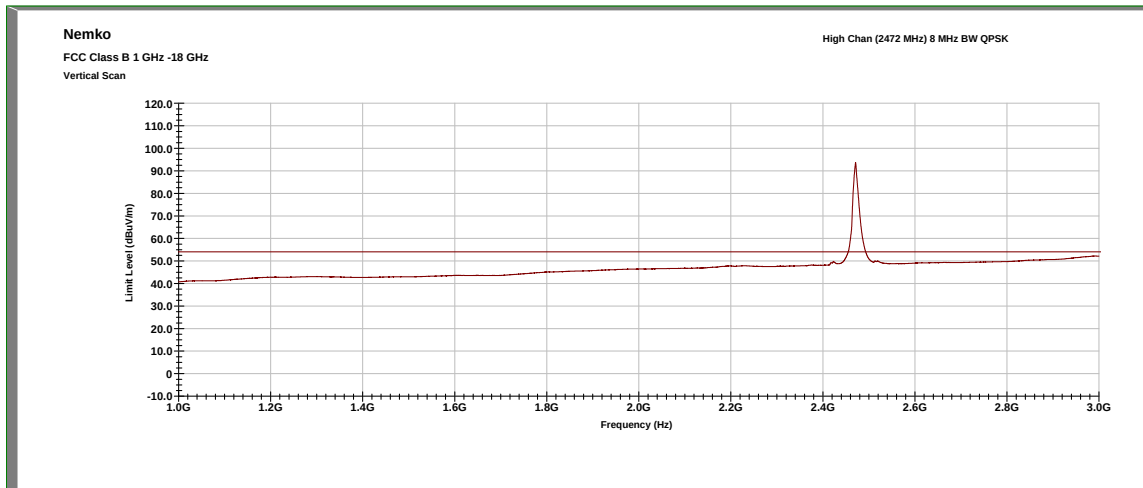
Low Channel Average



High Channel Peak



High Channel Average



Spurious RF Conducted Emissions

(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Conditions:

Sample Number:	VMTF2BSU0XS	Temperature:	19°C
Date:	Sept. 1, 2011	Humidity:	45%
Modification State:	Low, Mid and High Channel	Tester:	Jim Owen
		Laboratory:	Nemko

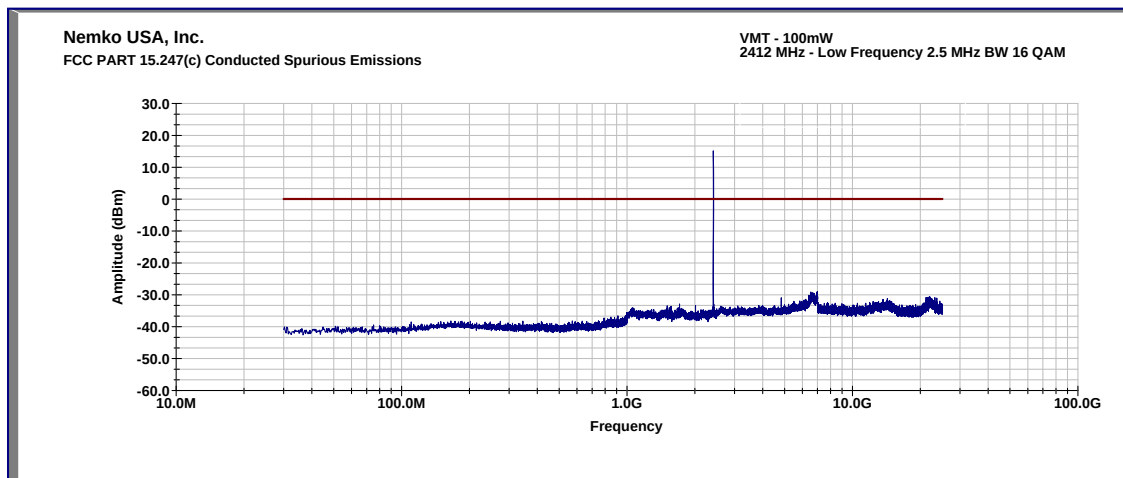
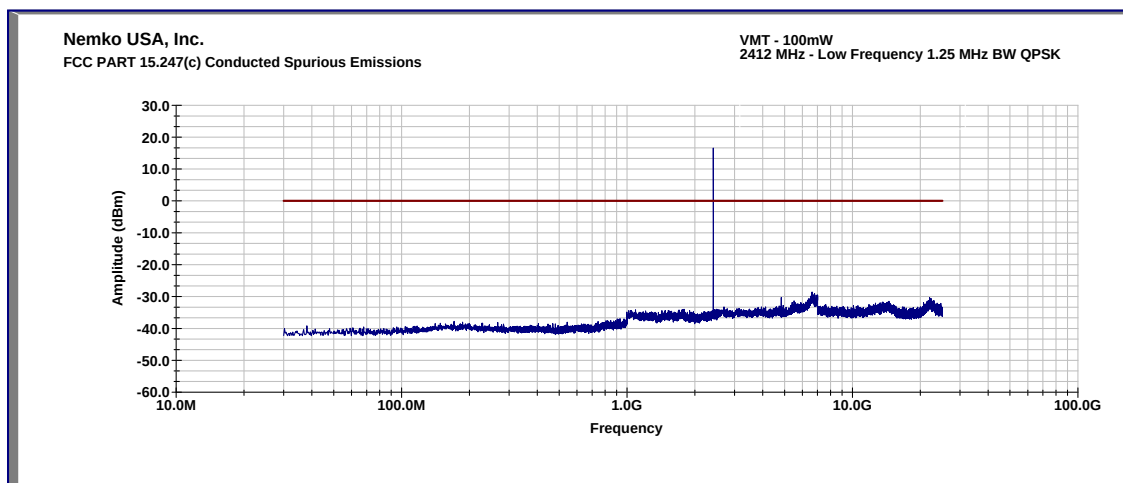
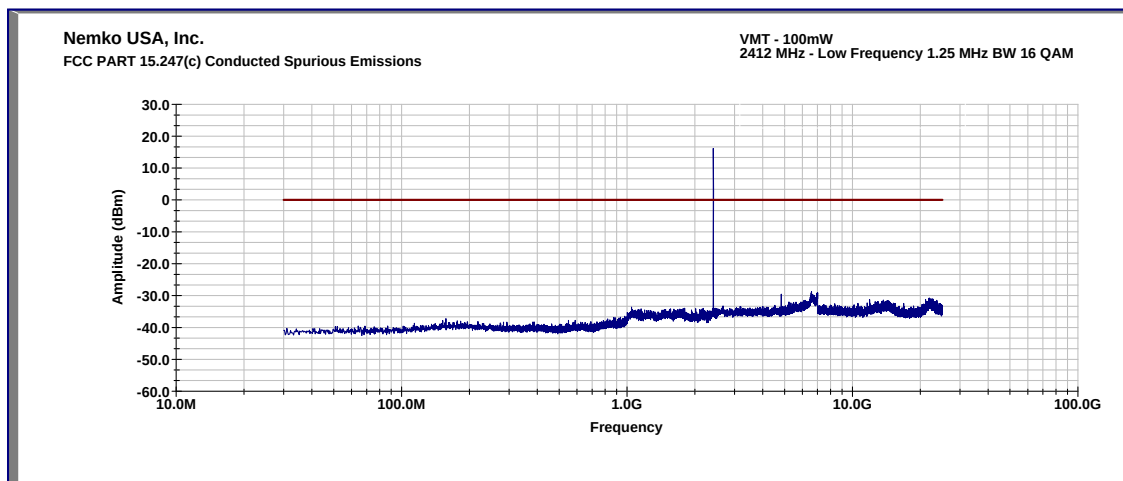
Test Results:

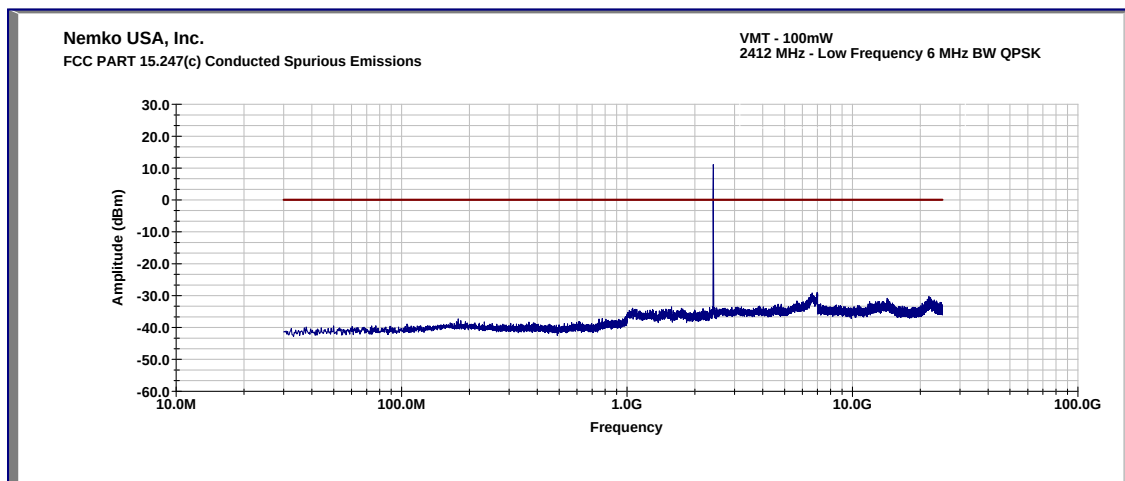
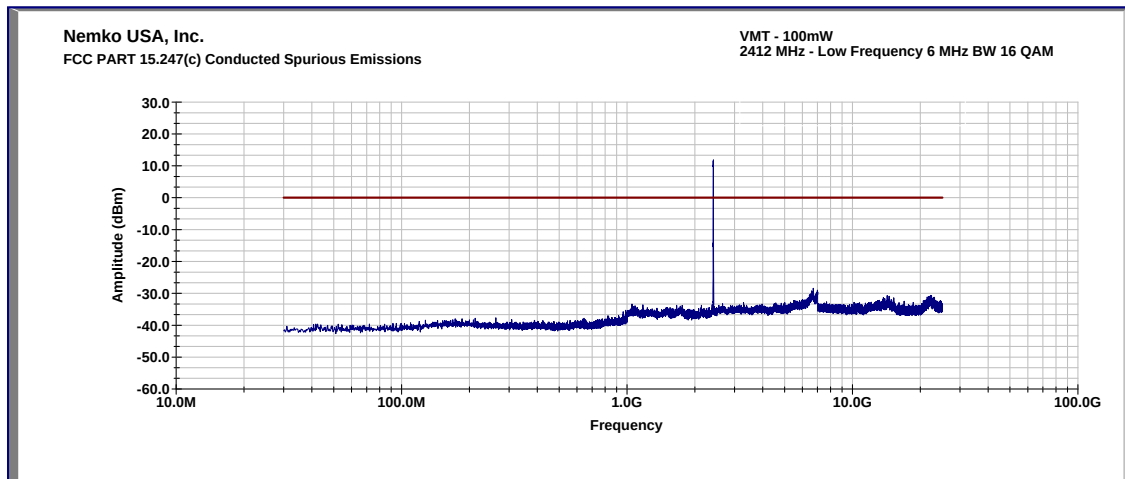
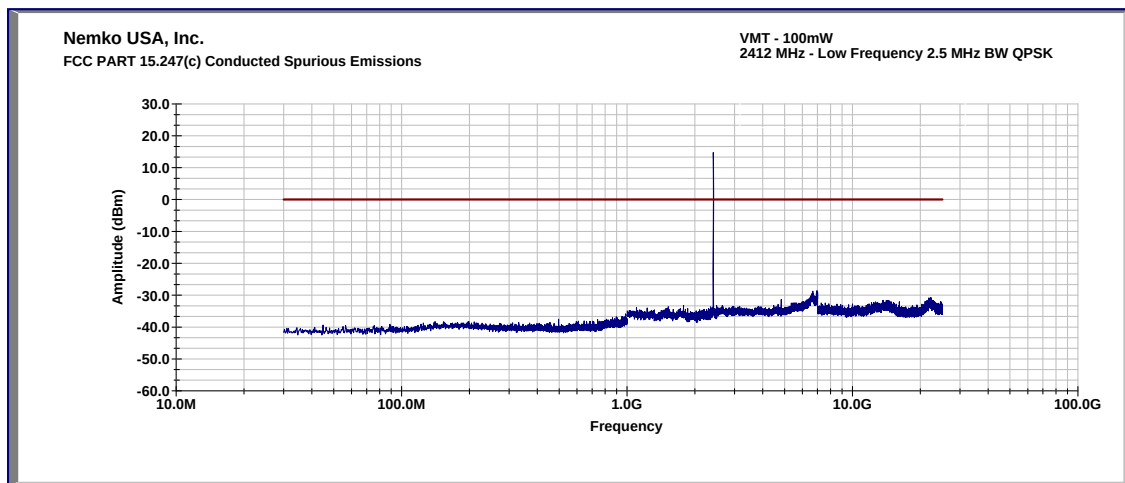
See attached plots.

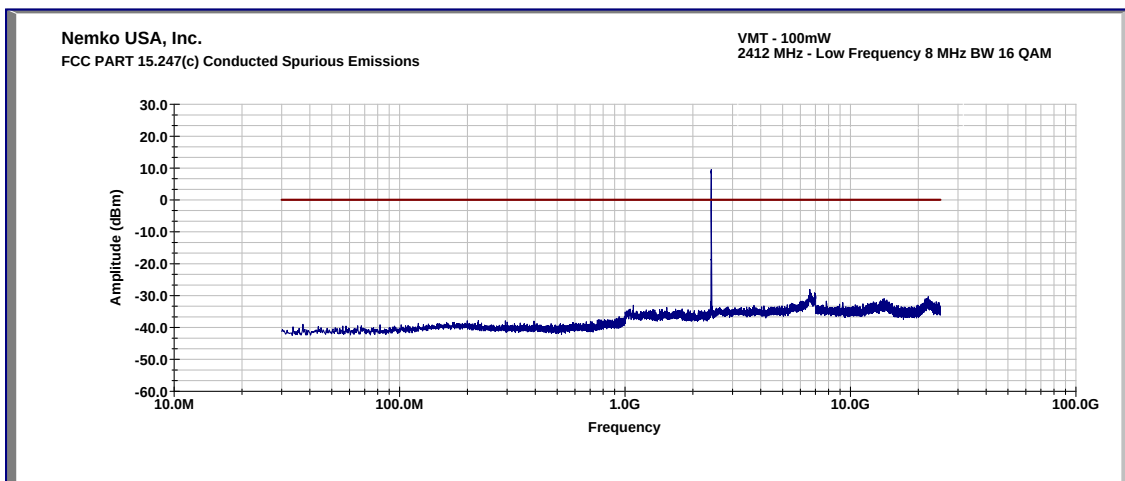
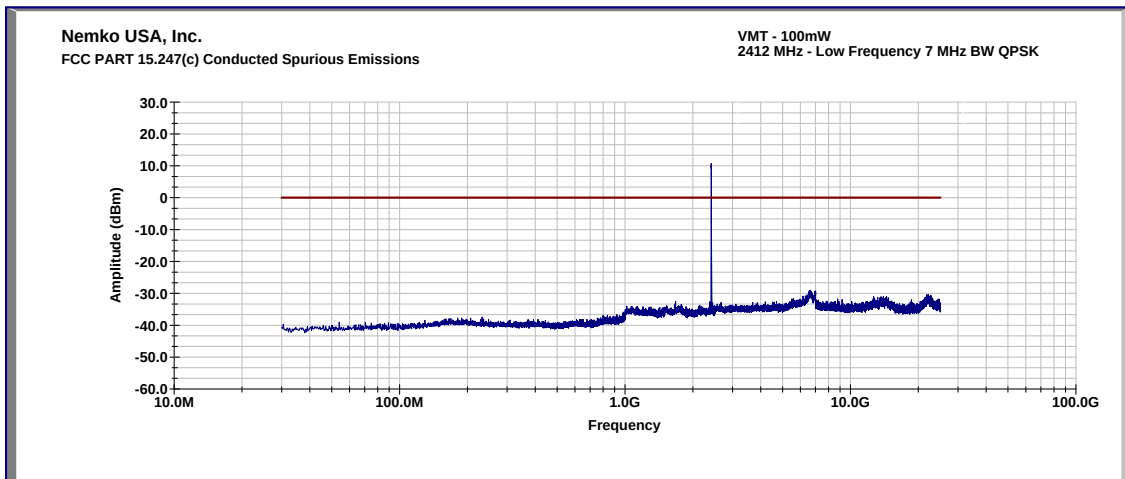
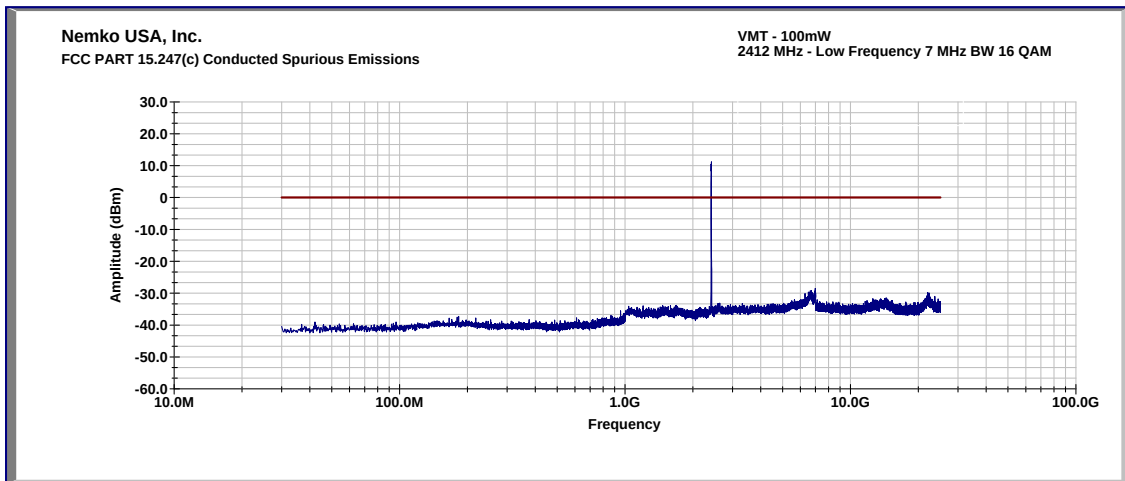
Additional Observations:

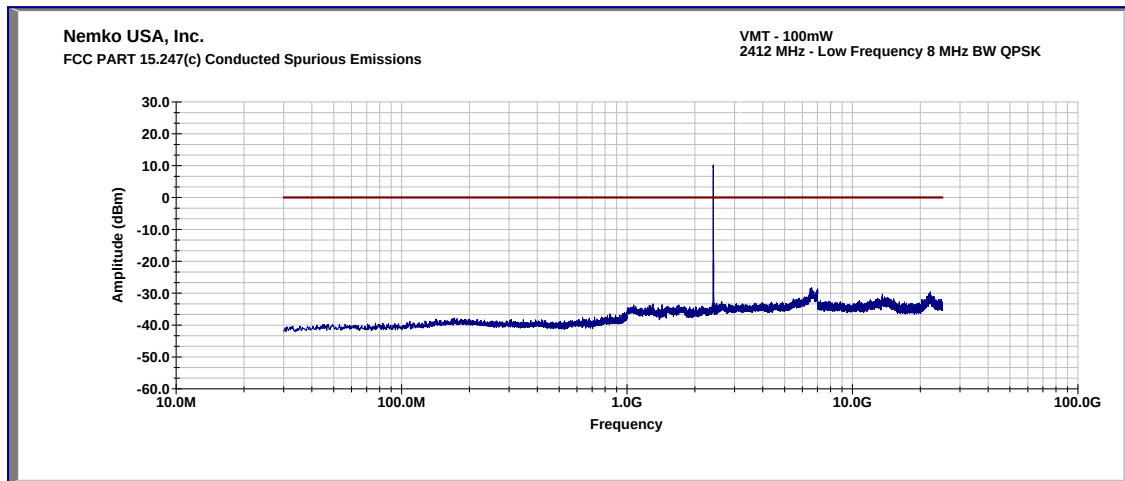
- This is a conducted test. 30.6 dB was offset for the cable and attenuator used.
- The peak level reading was taken at the carrier frequency then a display line was drawn 20 dBc below this level which will be the limit for this test.
- RBW is 100 kHz
- VBW is 3X RBW
- Sweep is auto.
- Detector is Peak, Trace is Max Hold
- Emissions were searched from 30 MHz to 2400 MHz and from 2483.5 MHz to 25000 MHz, no emissions within 20 dB of the limit were detected.
- EUT complies.

Low Channel

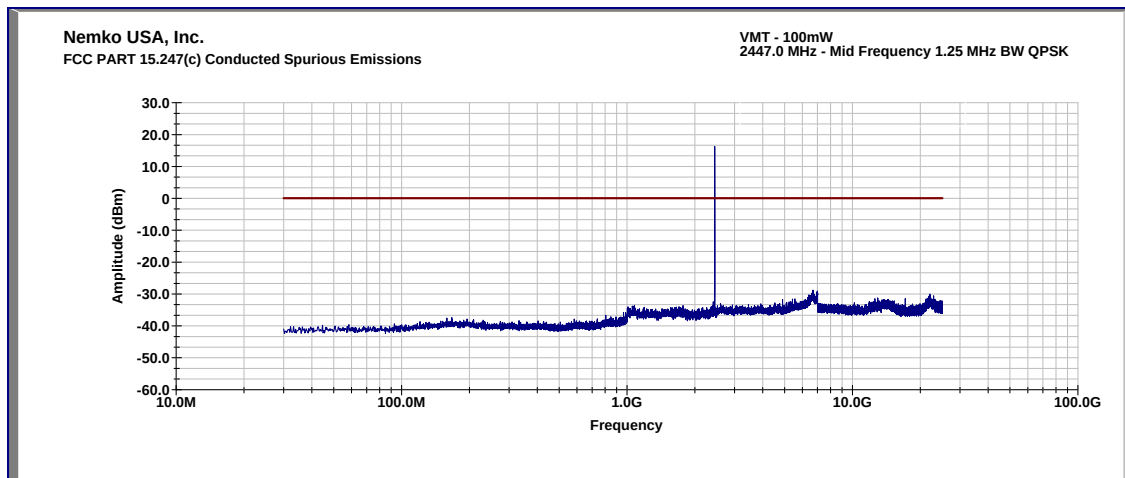
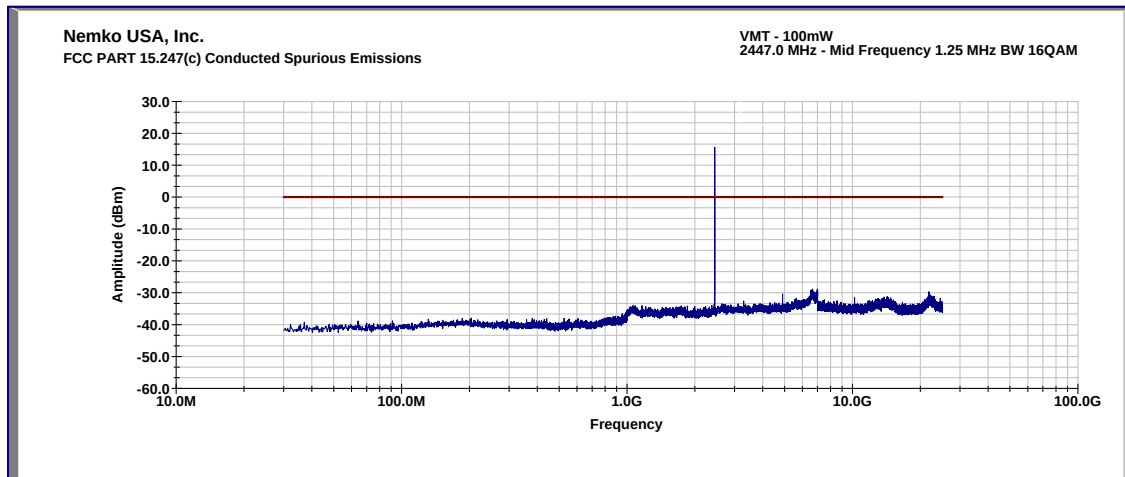






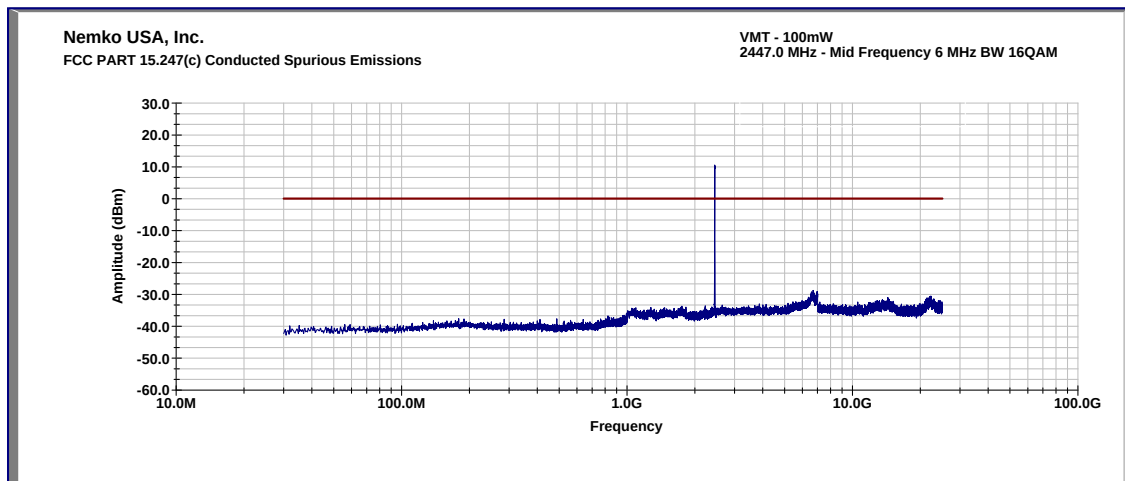
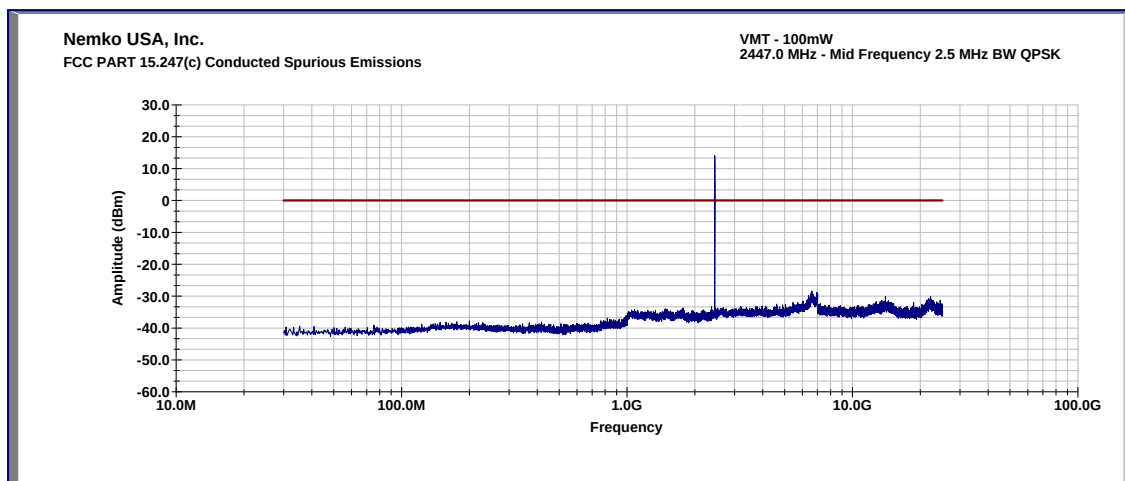
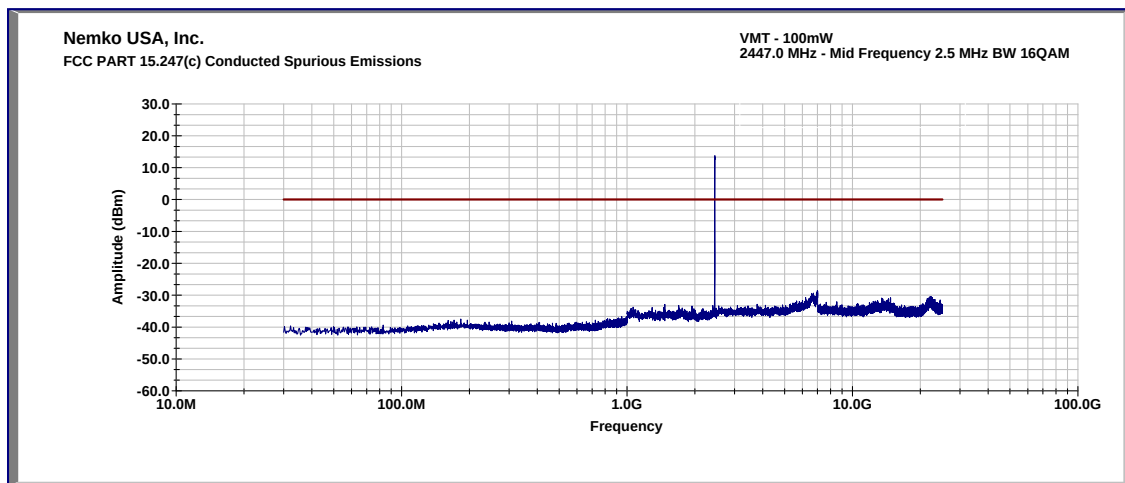


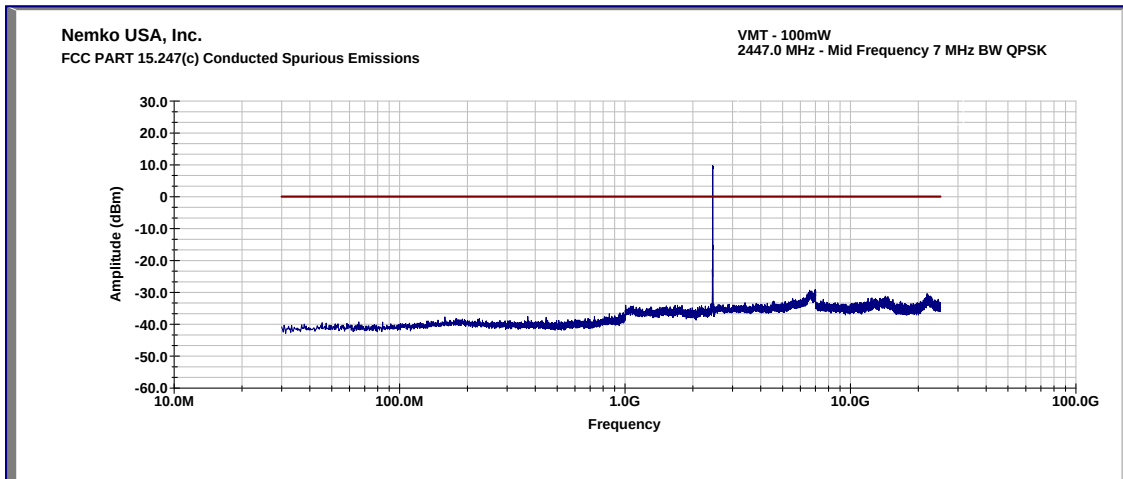
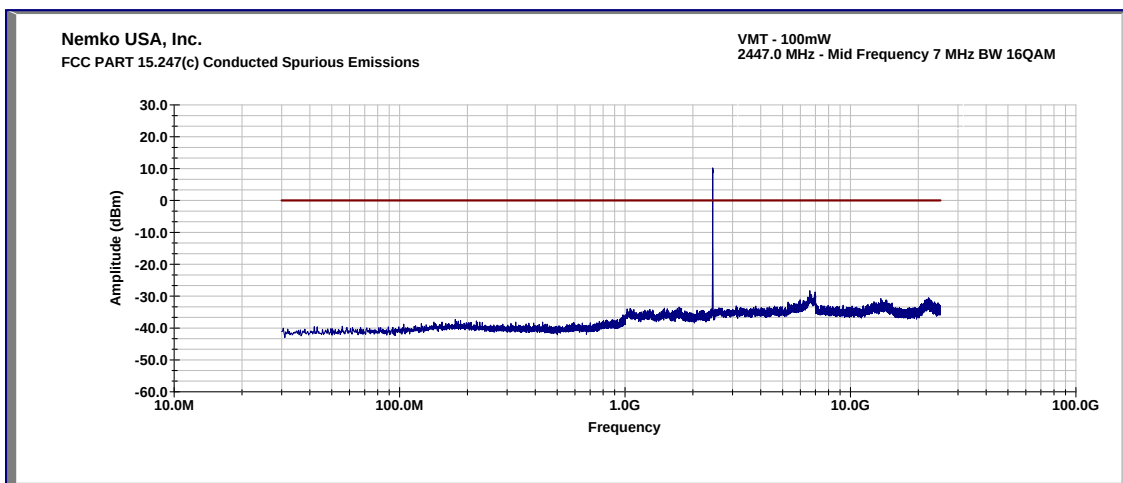
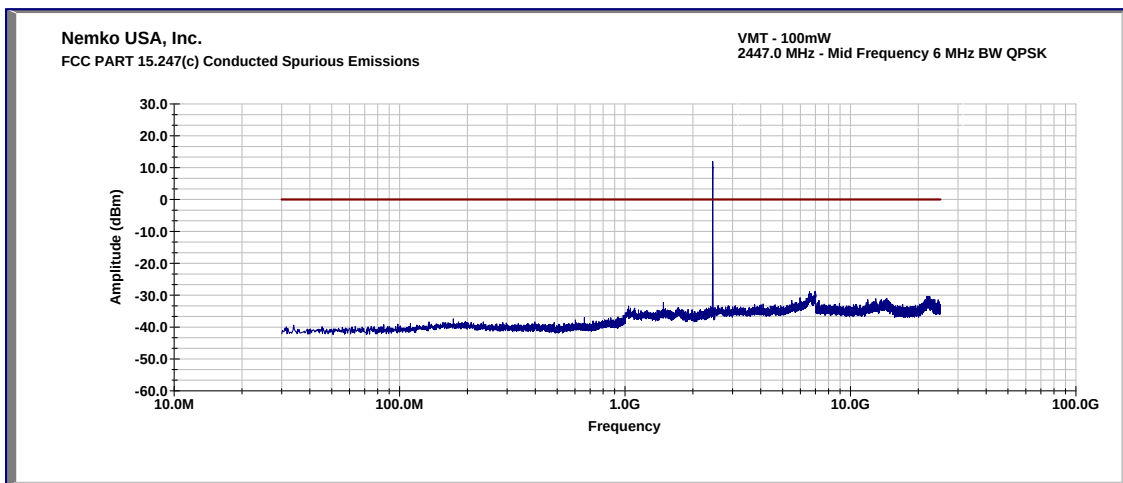
Mid Channel

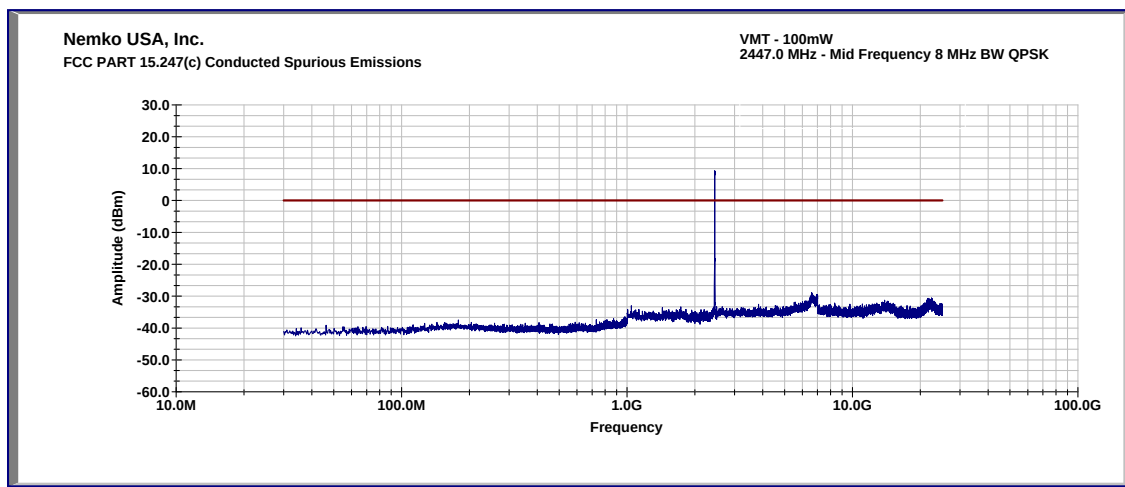
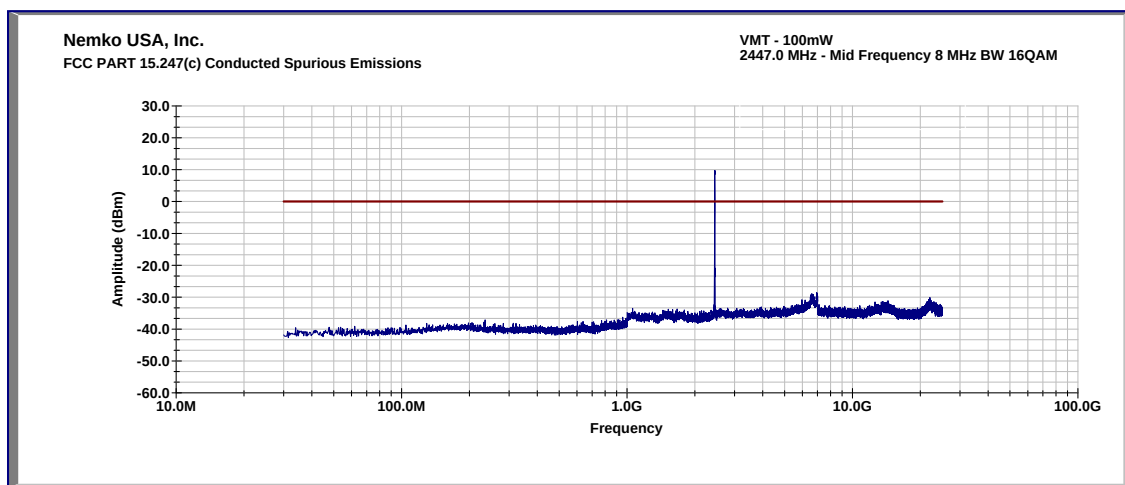




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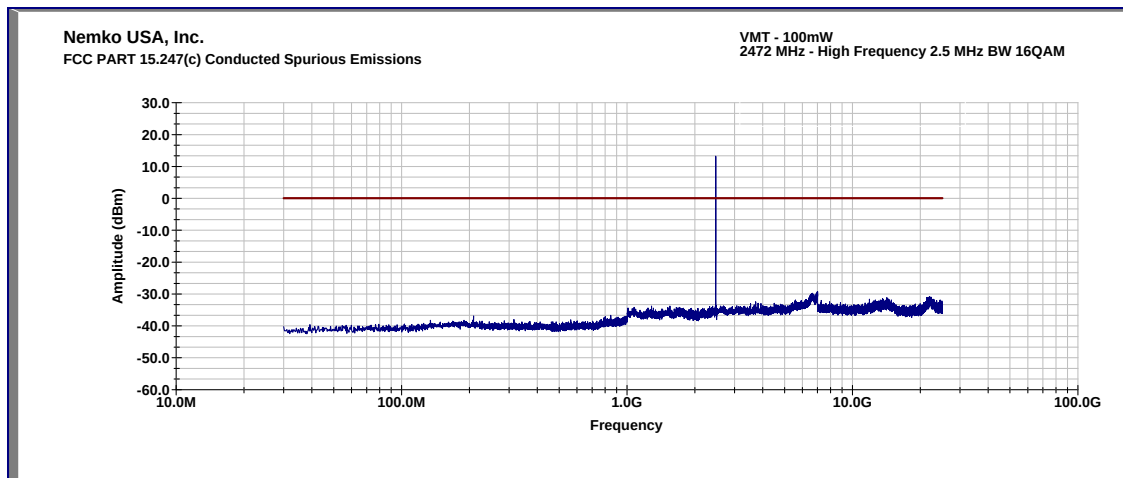
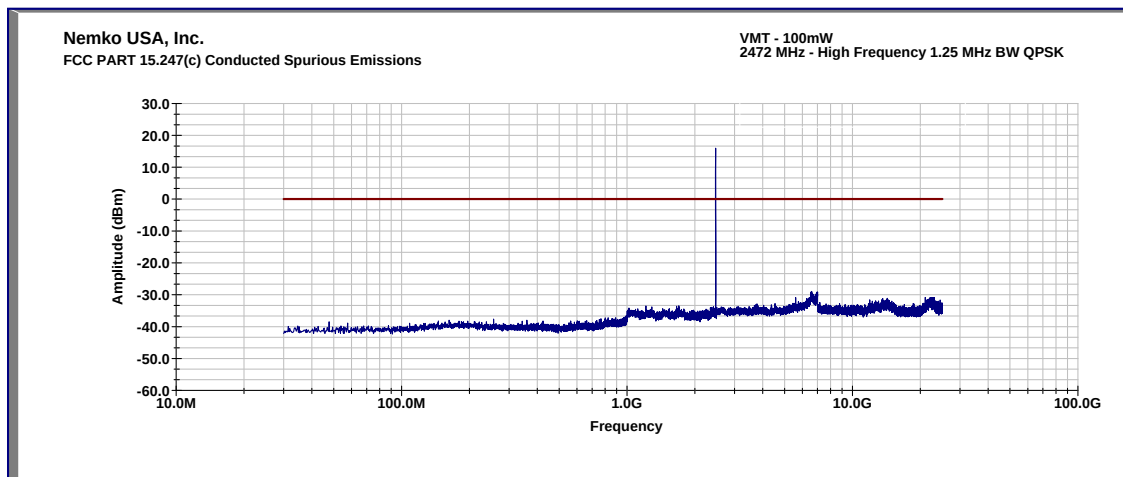
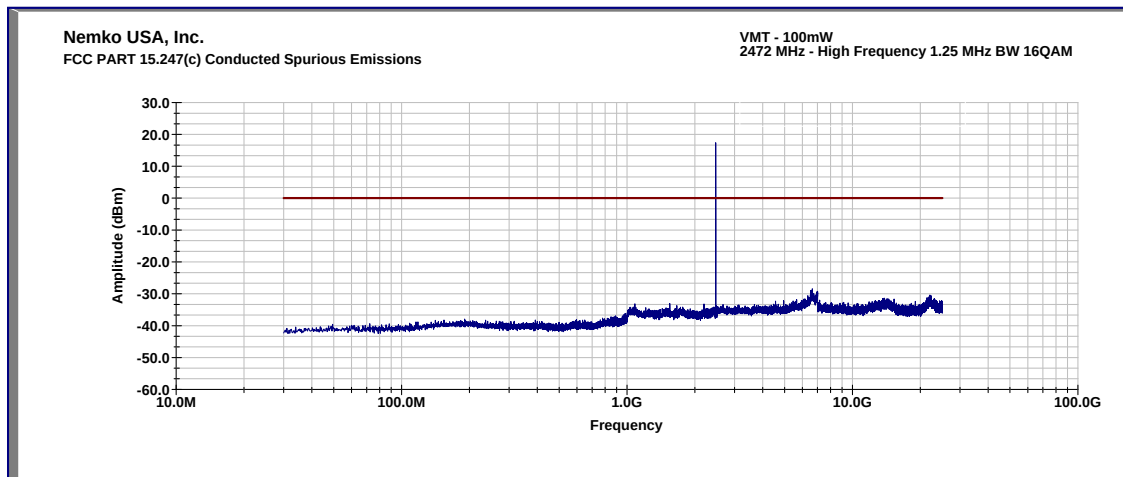


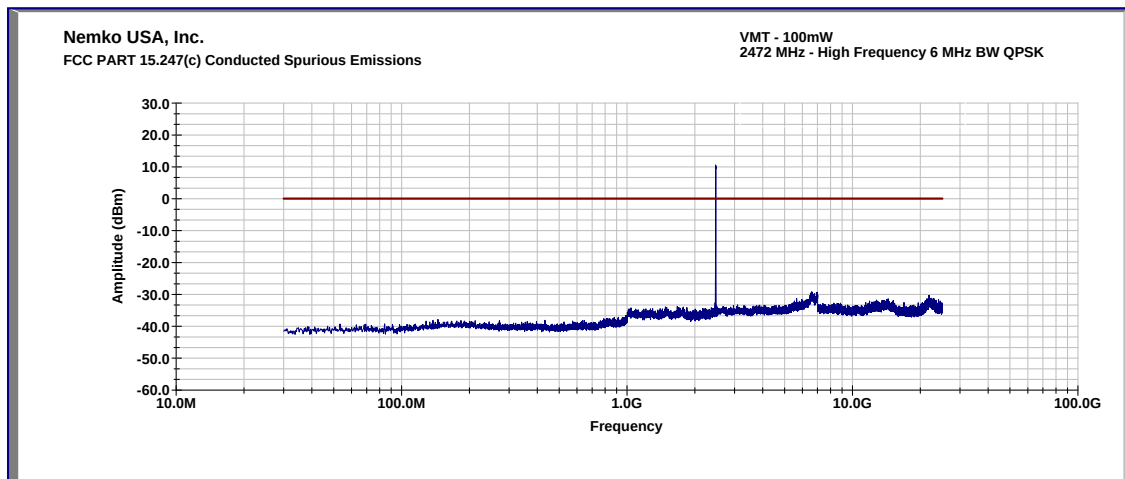
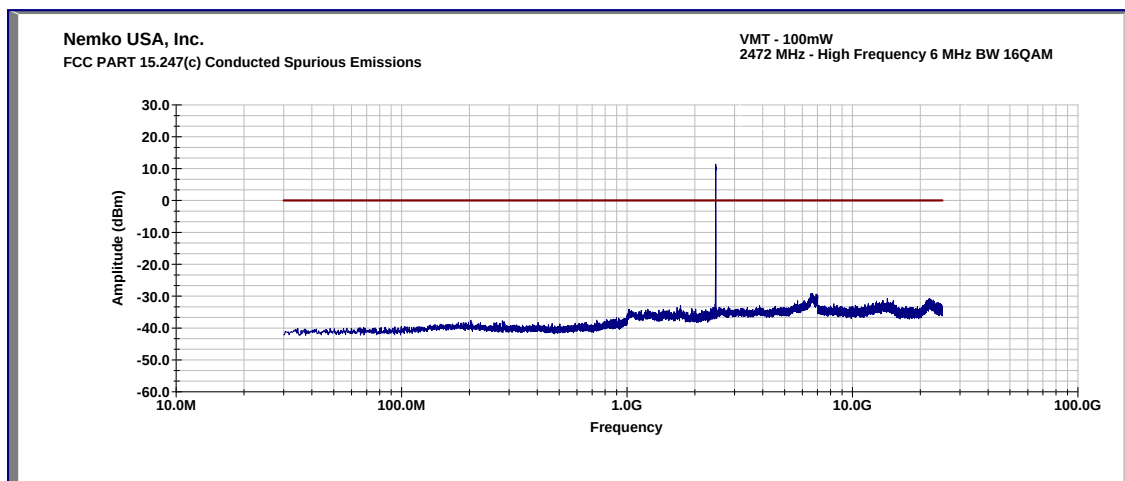
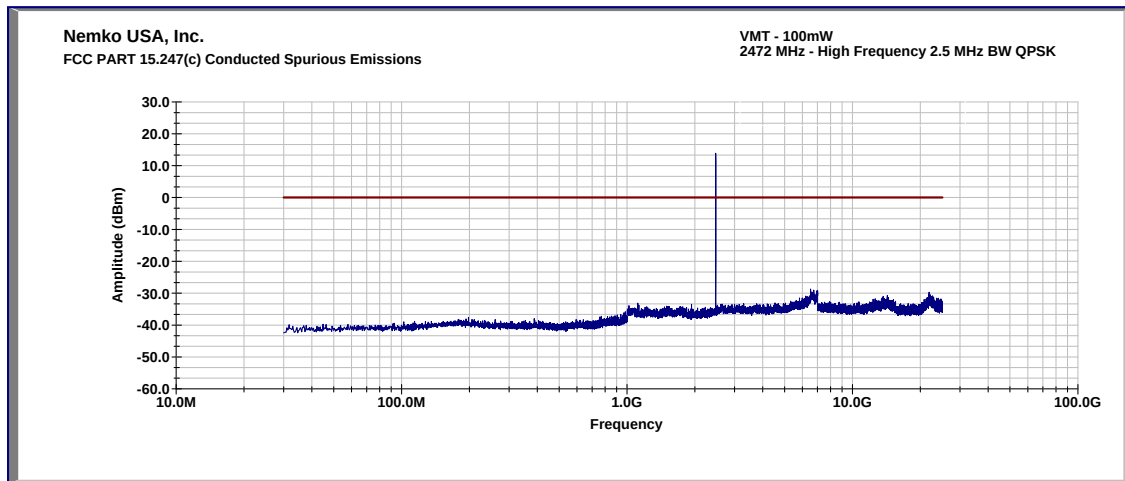


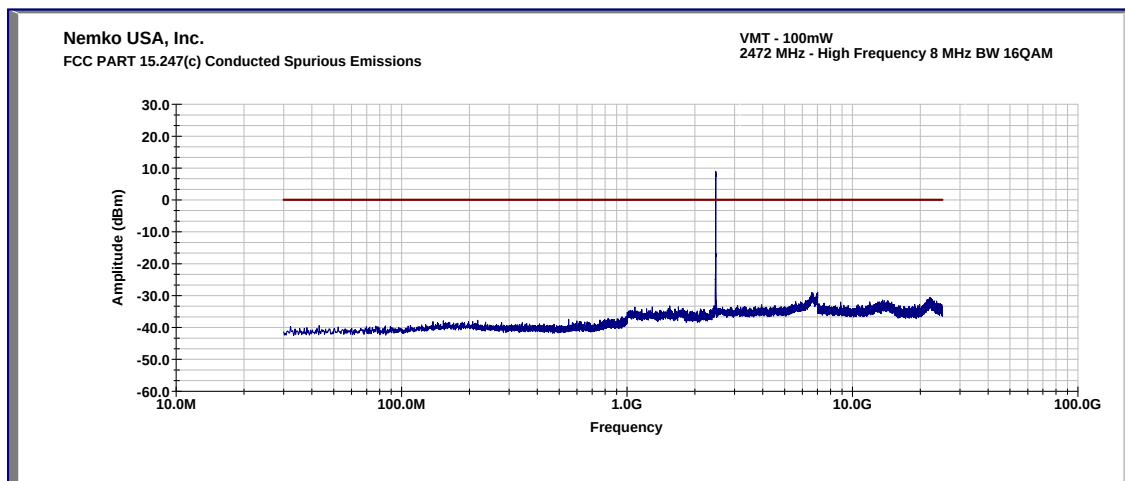
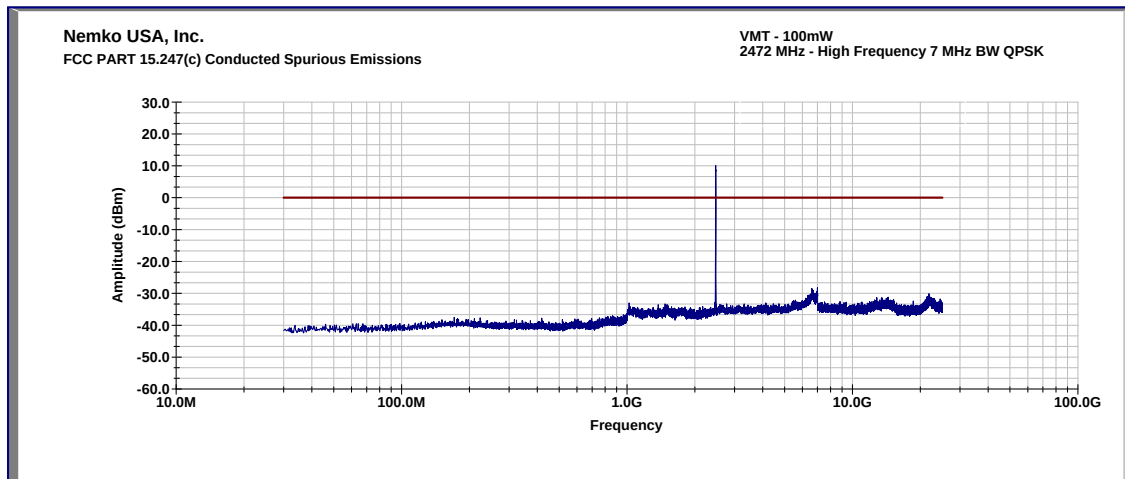
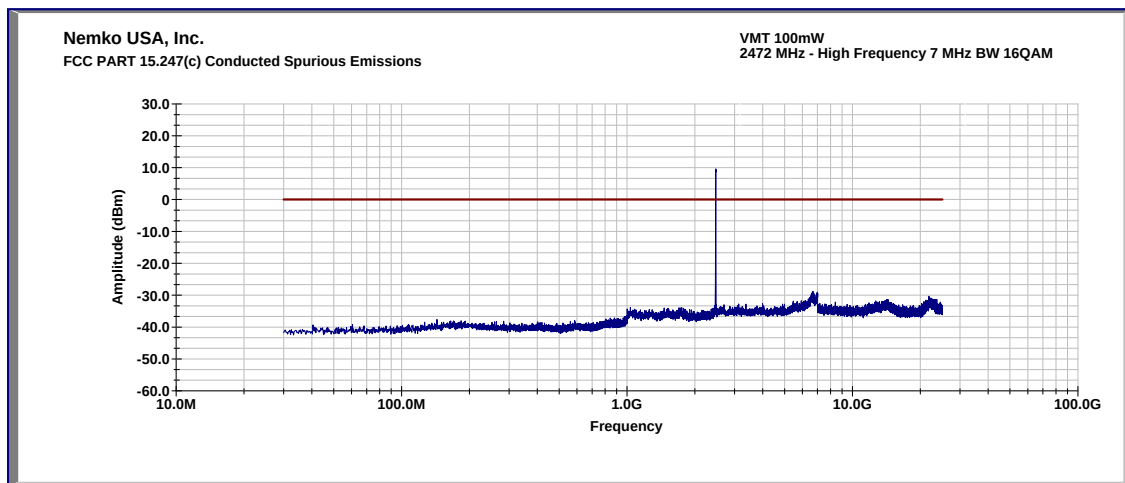


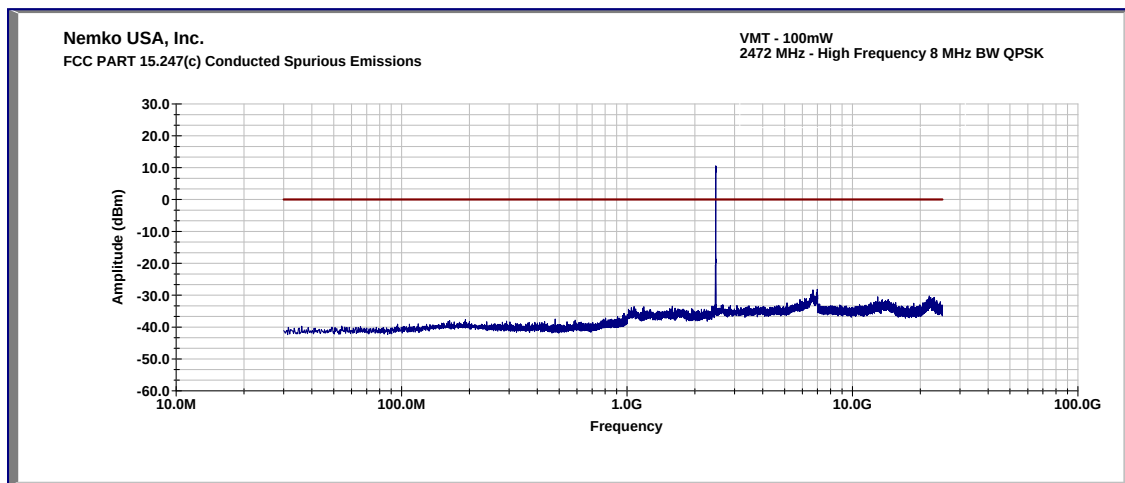
www.nemko.com

High Channel









Spurious Radiated Emissions

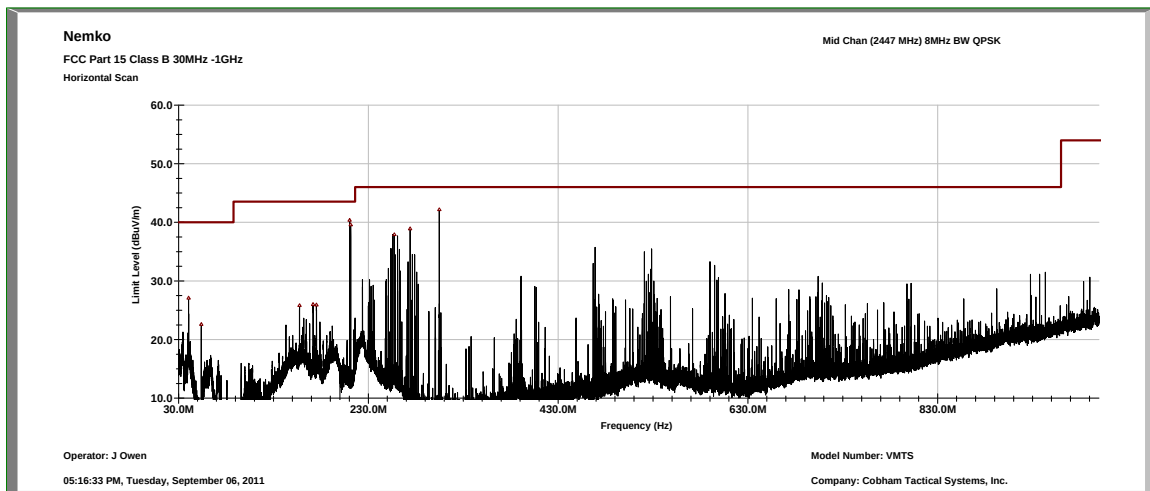
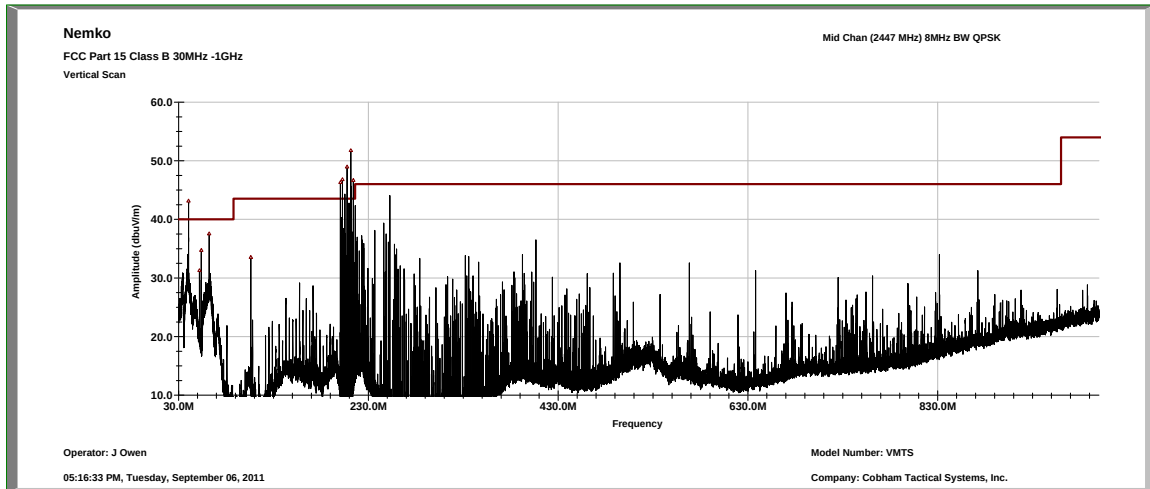
(d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

Test Conditions:

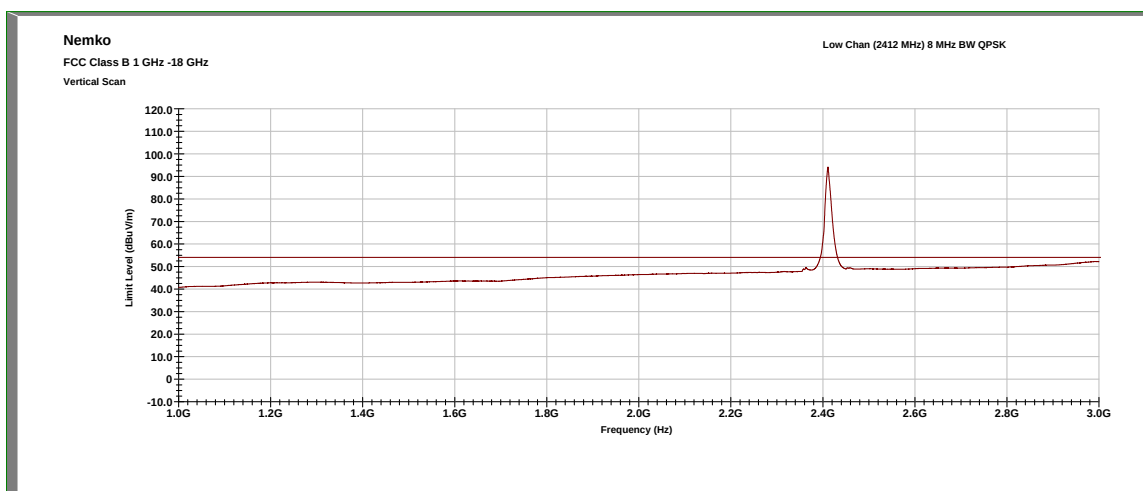
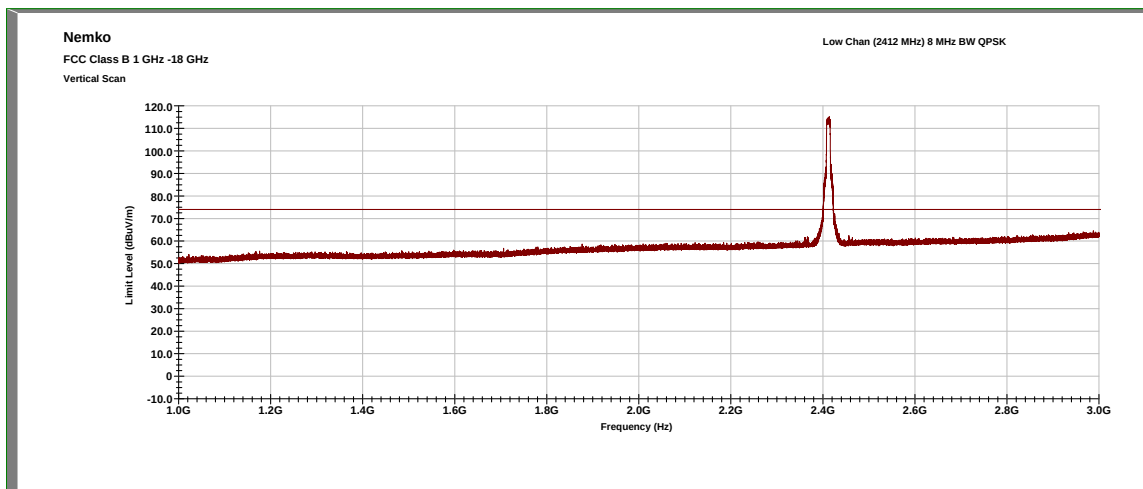
Sample Number:	VMTF2BSU0XS	Temperature:	19°C
Date:	Sept. 6/7, 2011	Humidity:	40%
Modification State:	Transmit with modulation	Tester:	Jim Owen
		Laboratory:	Nemko

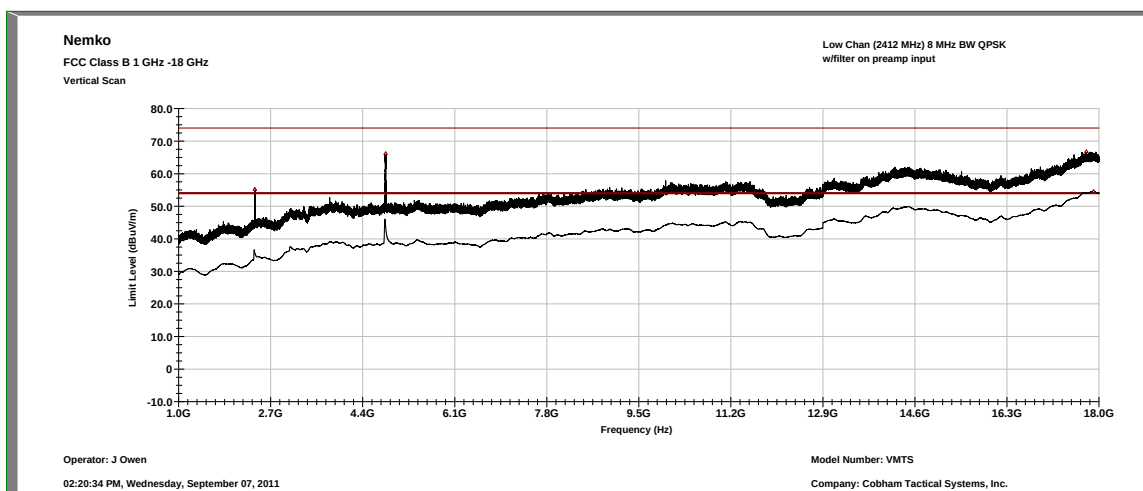
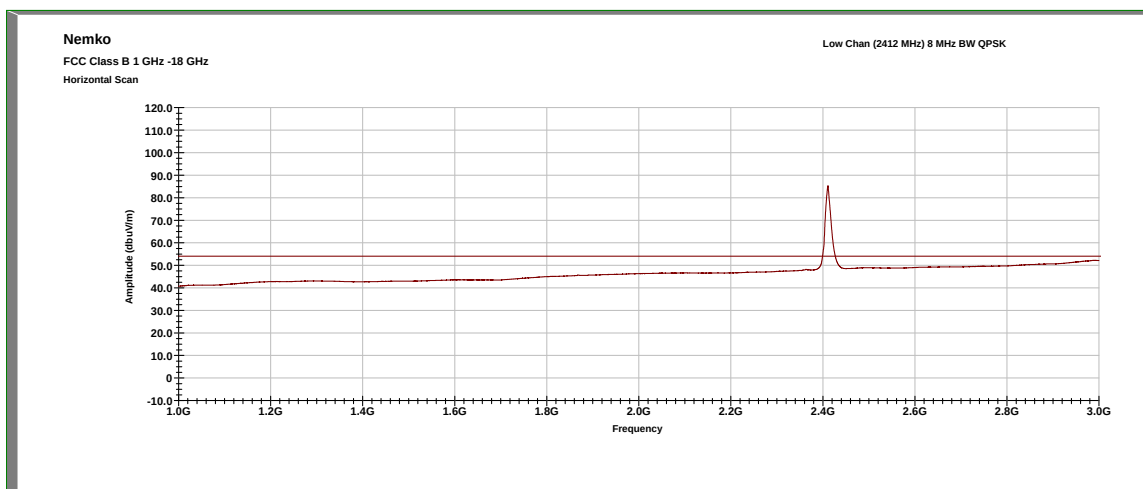
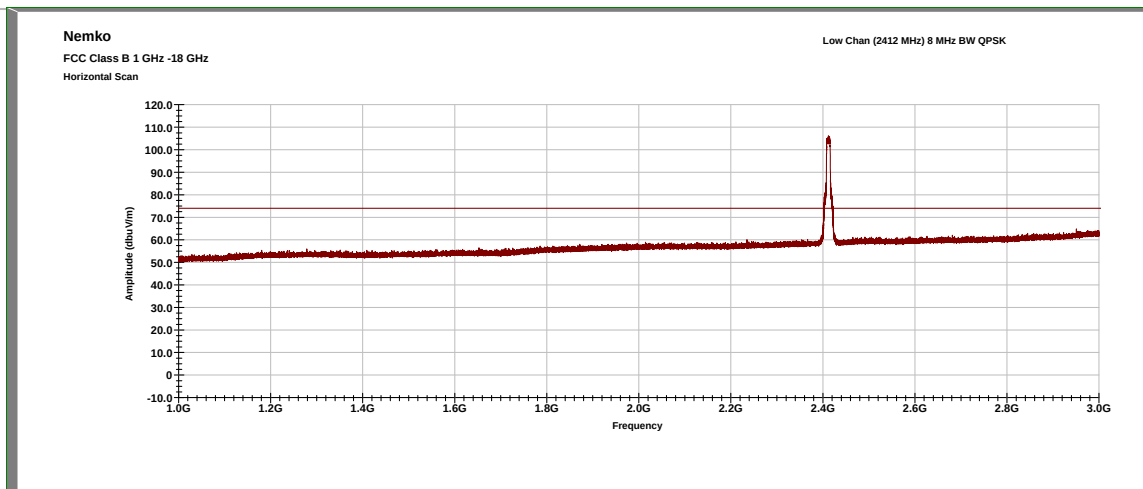
Test Results: EUT complies.

Emissions were searched from 30MHz to 25. GHz, no other emissions within 20 dB of the limit was detected. Mid Channel evaluated from 30 MHz to 1 GHz only. Emissions detected associated with support equipment.

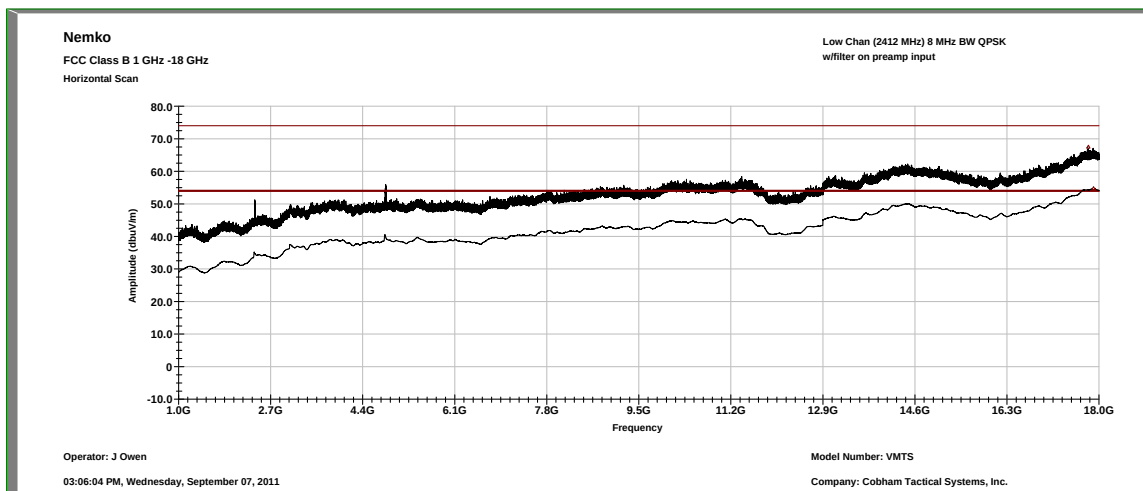


Low Channel



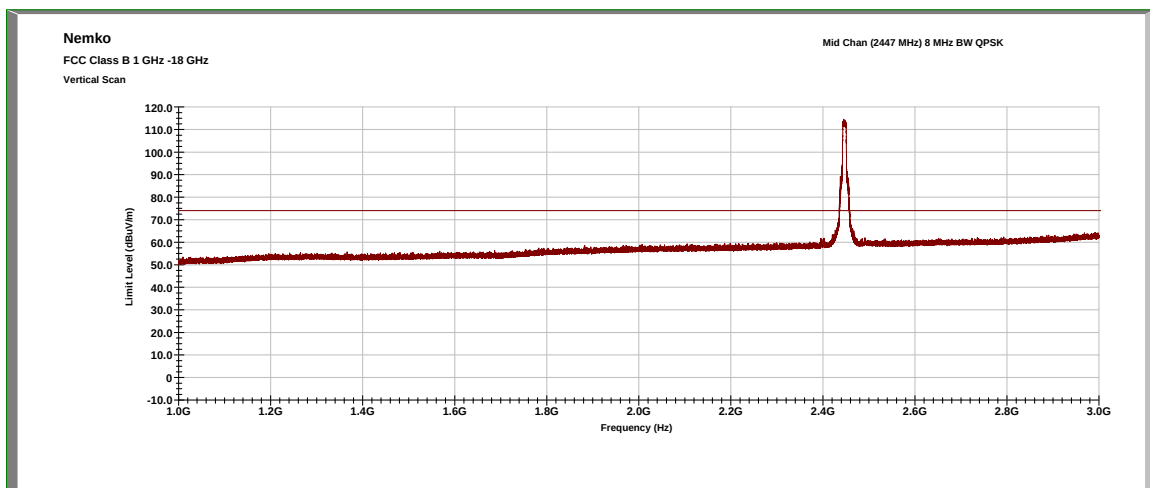
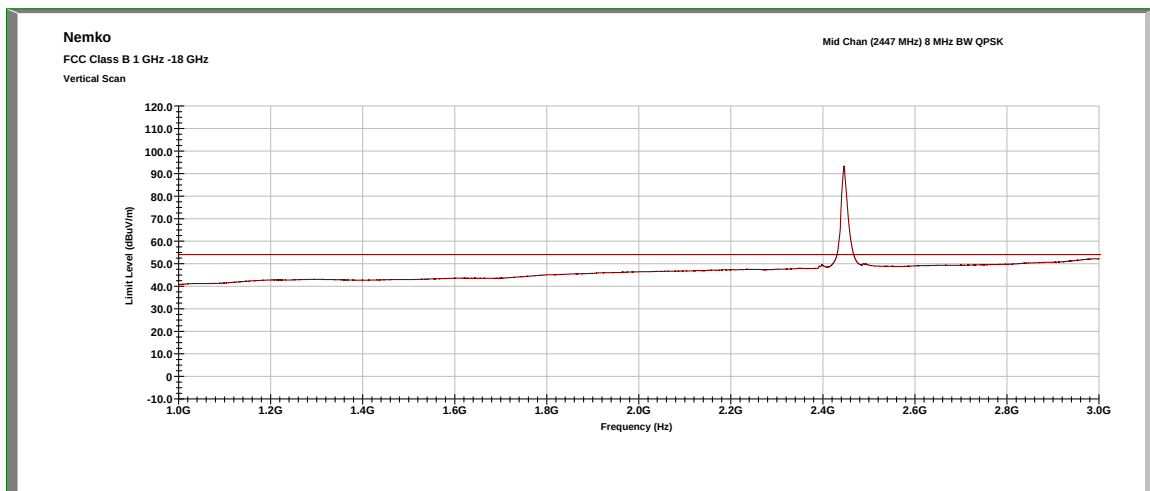
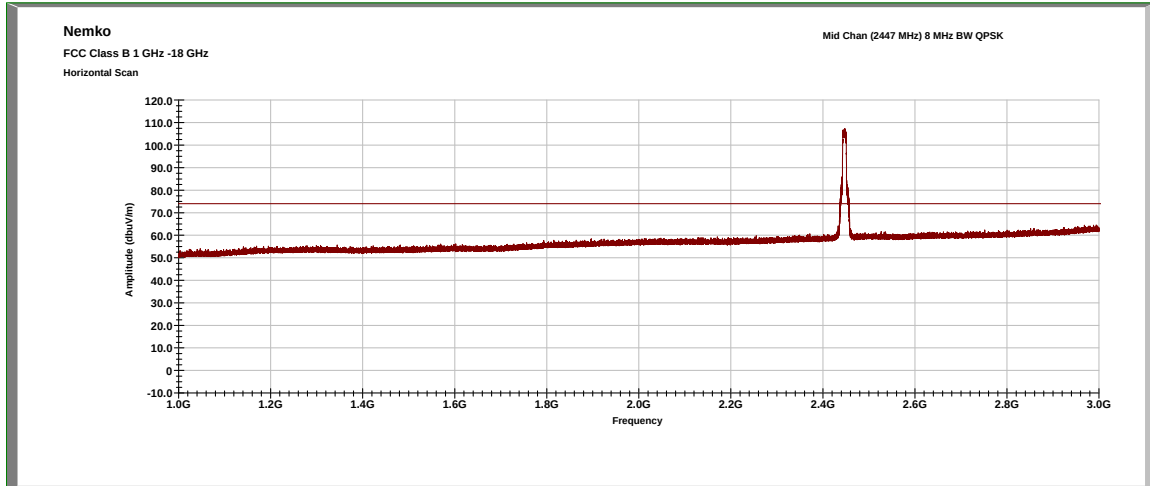


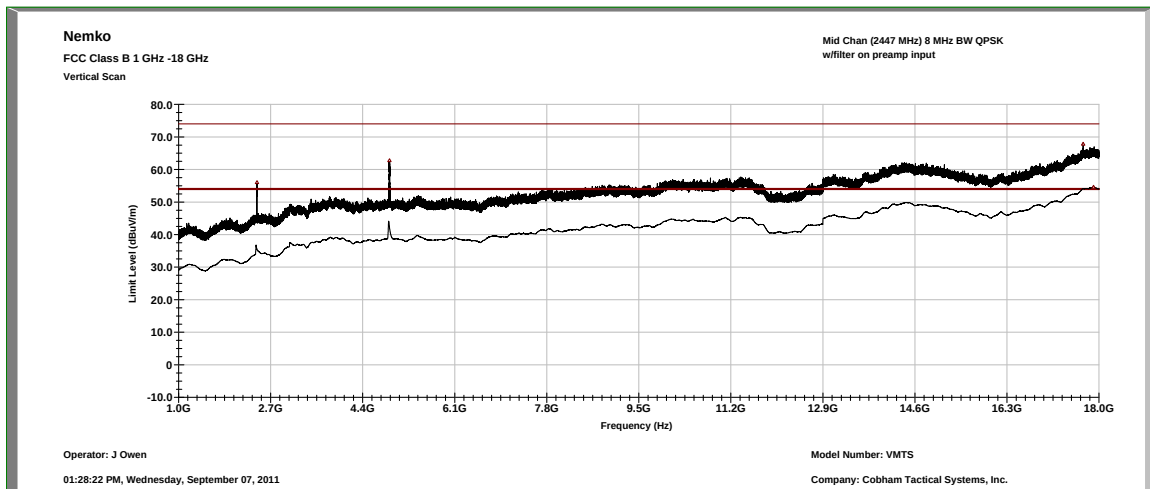
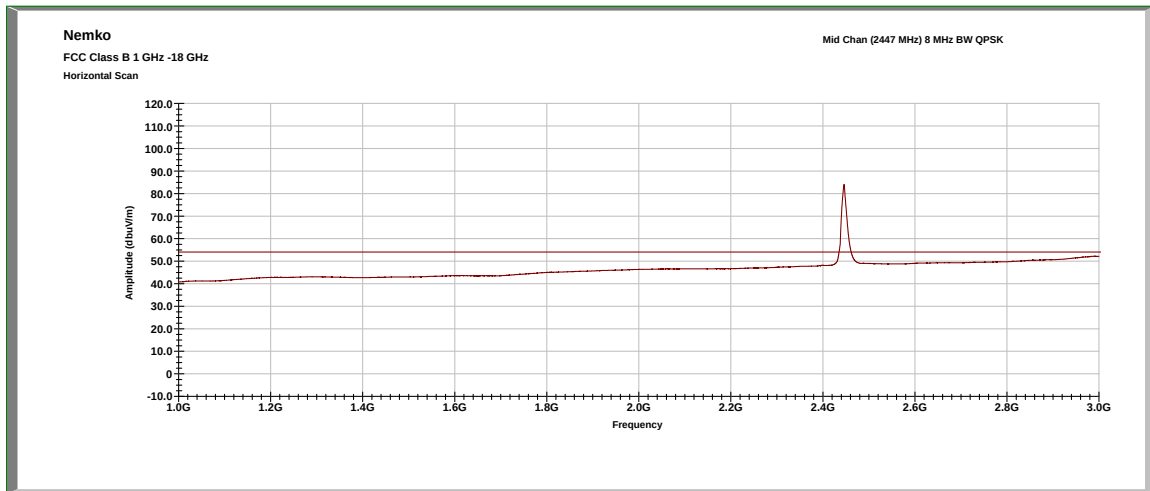
Peak and Average results shown



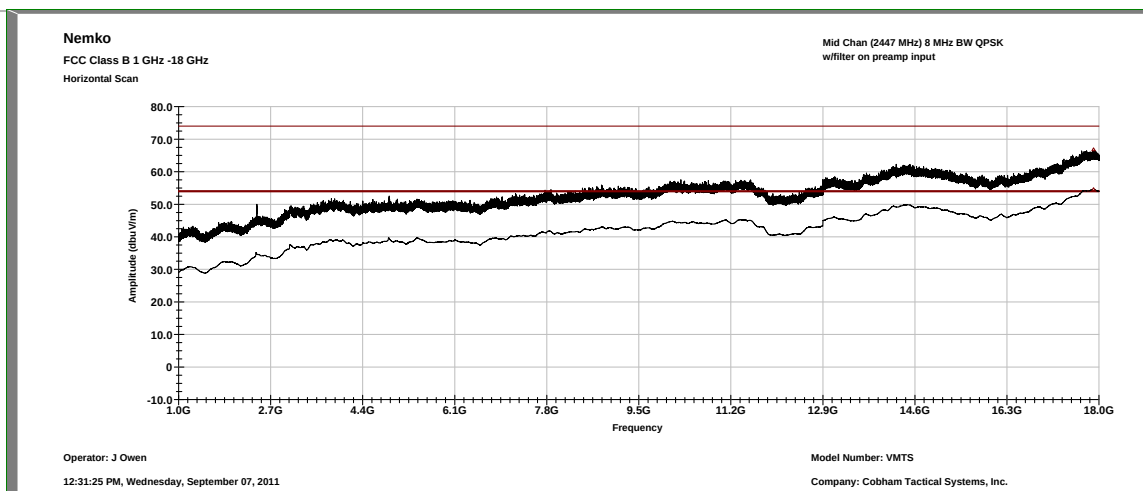
Peak and Average results shown

Mid Channel



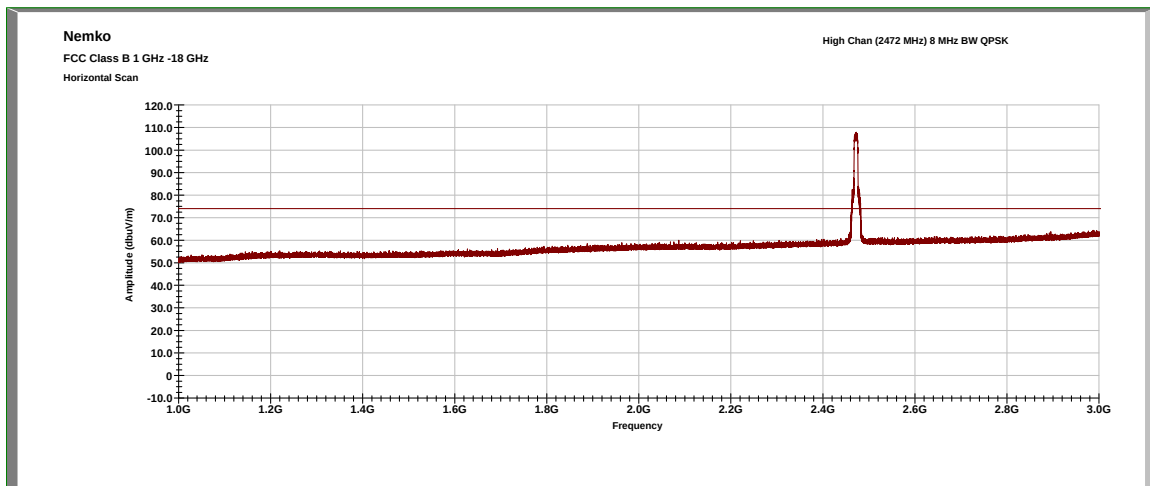
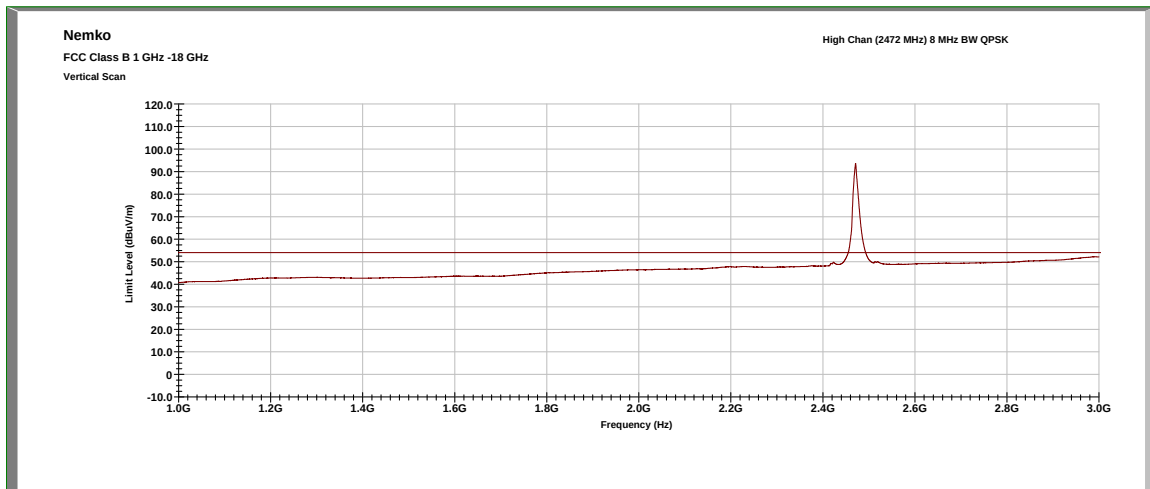
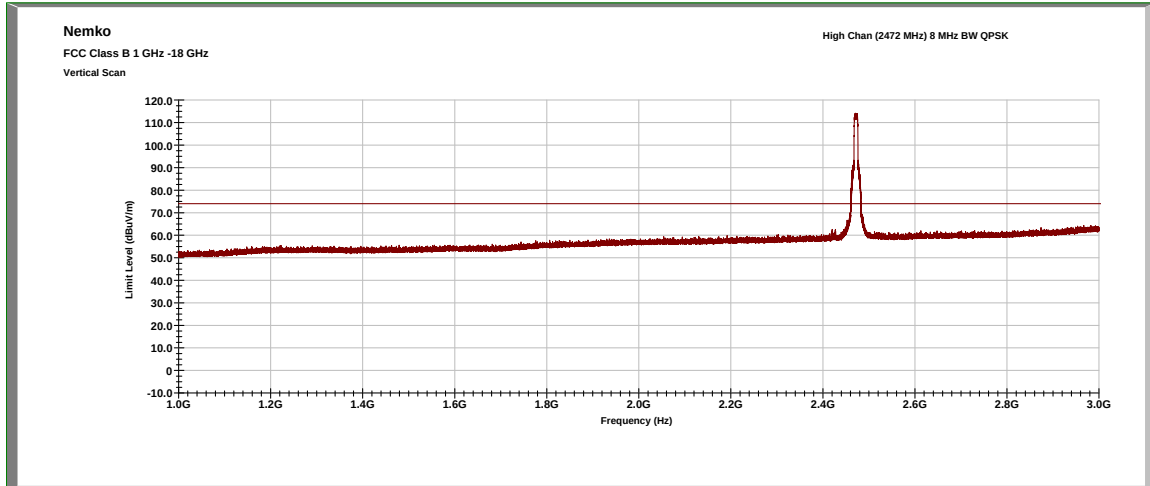


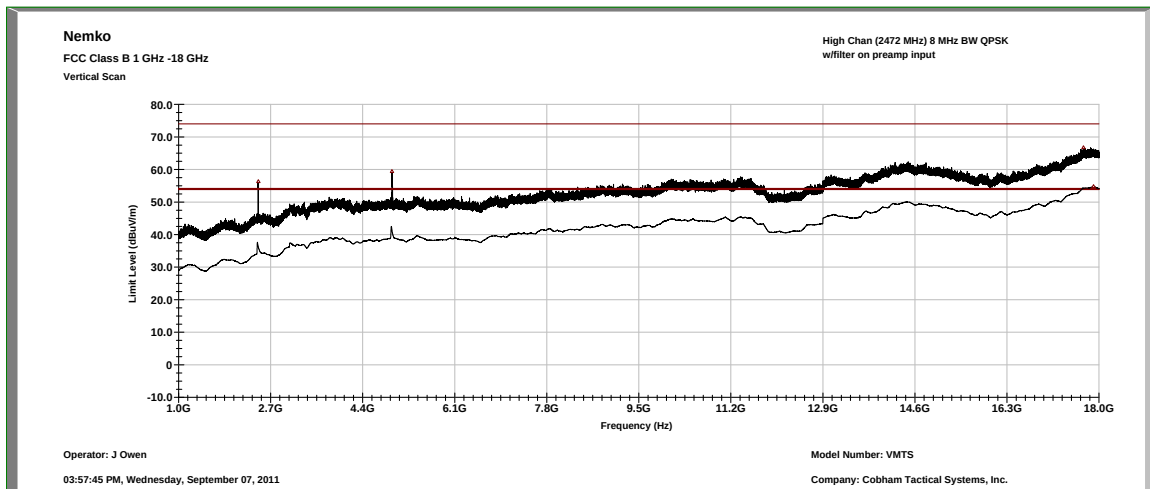
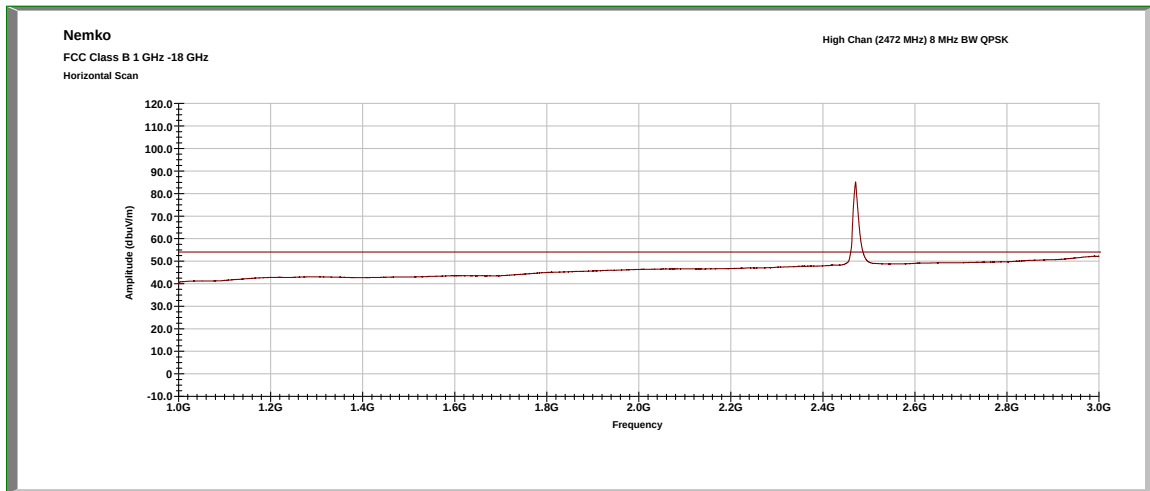
Peak and Average results shown



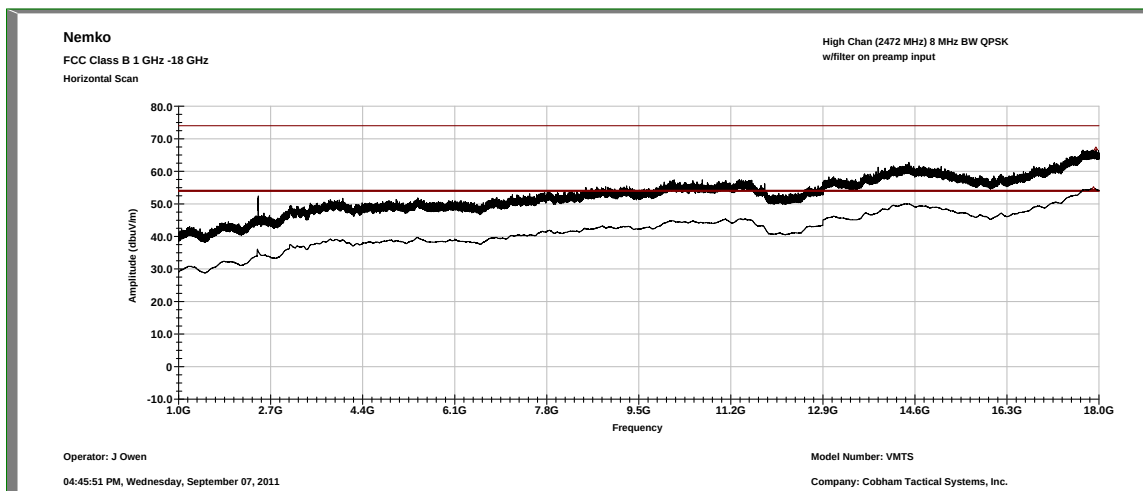
Peak and Average results shown

High Channel





Peak and Average results shown



Peak and Average results shown

Power Spectral Density for Digitally Modulated Devices

(e) For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

Test Conditions:

Sample Number:	VMTF2BSU0XS	Temperature:	19-22°C
Date:	Aug. 30 to Sept. 22, 2011	Humidity:	35-45%
Modification State:	Low, Mid and High Channel	Tester:	Jim Owen
		Laboratory:	Nemko

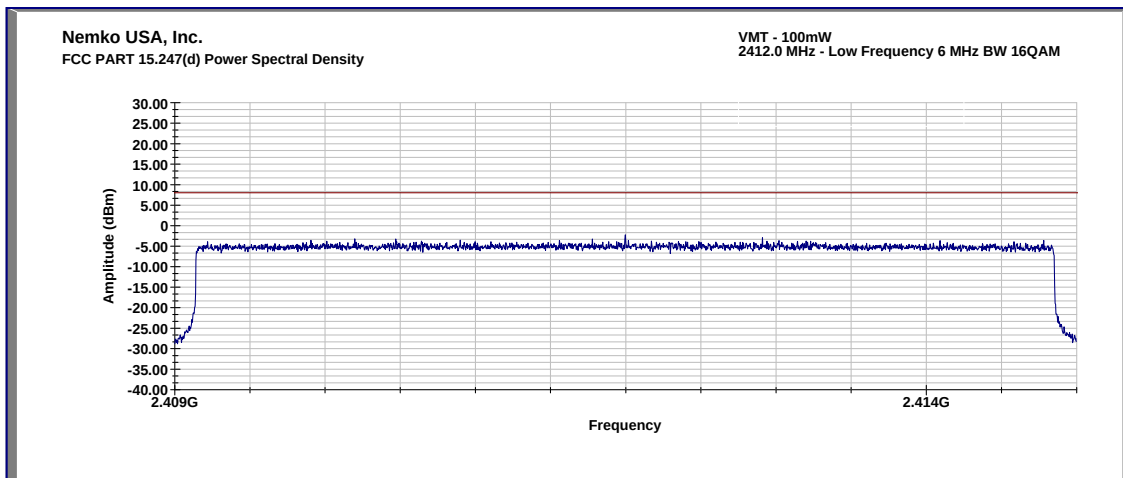
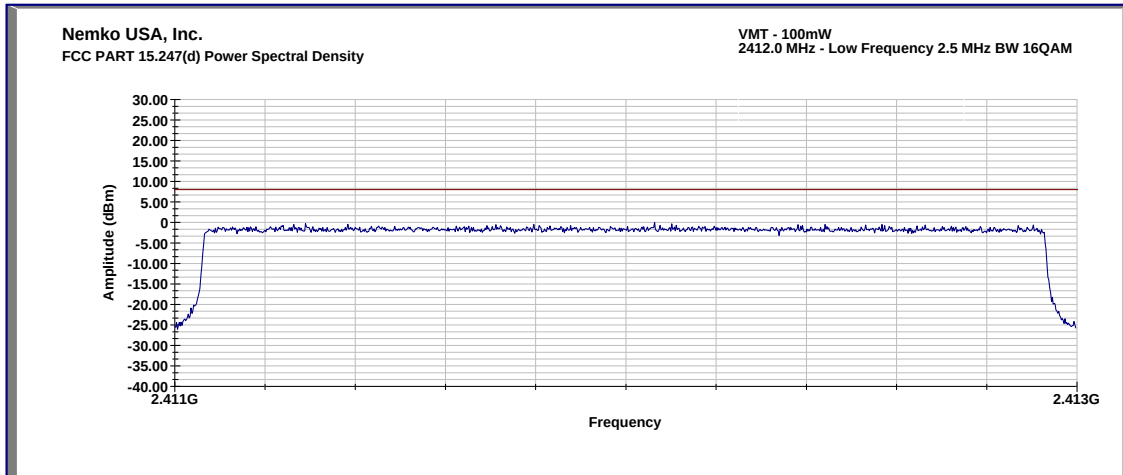
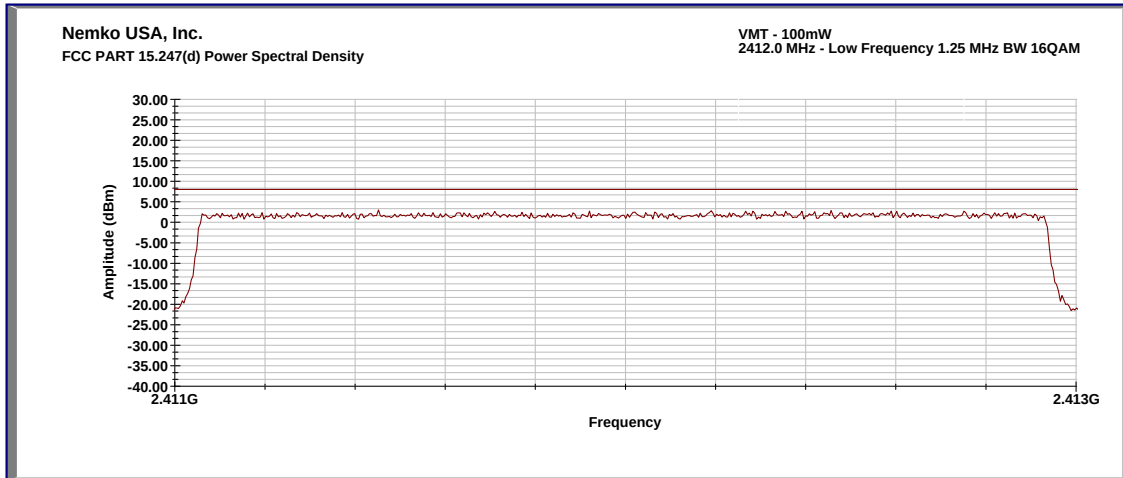
Test Results:

See attached plots.

Additional Observations:

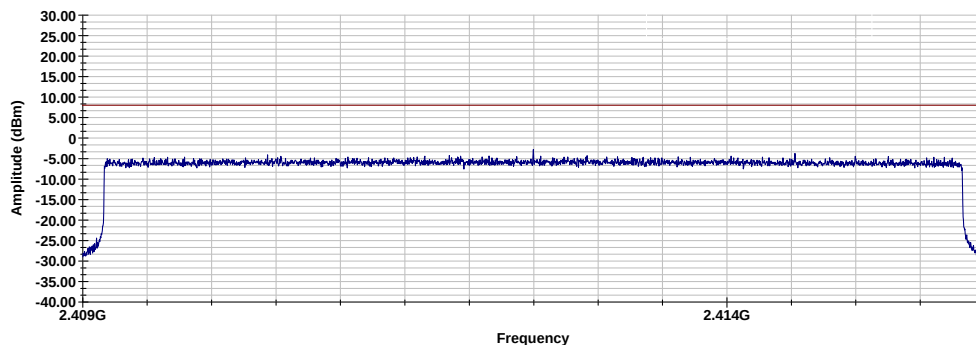
- This is a conducted test. 30.6 dB was offset for the cable and attenuator used.
- RBW is 3kHz
- VBW is 10kHz
- Span is set to 1.5 MHz
- Sweep is set to 1.5MHz/3kHz or 500 seconds
- Bandwidths greater than 1.5 MHz was evaluated in 1.5 MHz spans
 - o i.e. – 6 MHz bandwidth was evaluated in 4 segments
- Trace is set to Peak, Max hold.
- Limit is 8 dBm
- EUT complies

Low Channel – Power Spectral Density



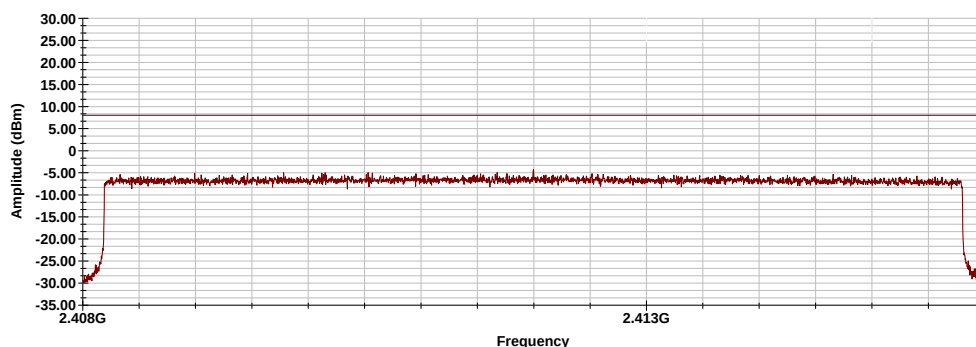
Nemko USA, Inc.
FCC PART 15.247(d) Power Spectral Density

VMT - 100mW
2412.0 MHz - Low Frequency 7 MHz BW 16QAM



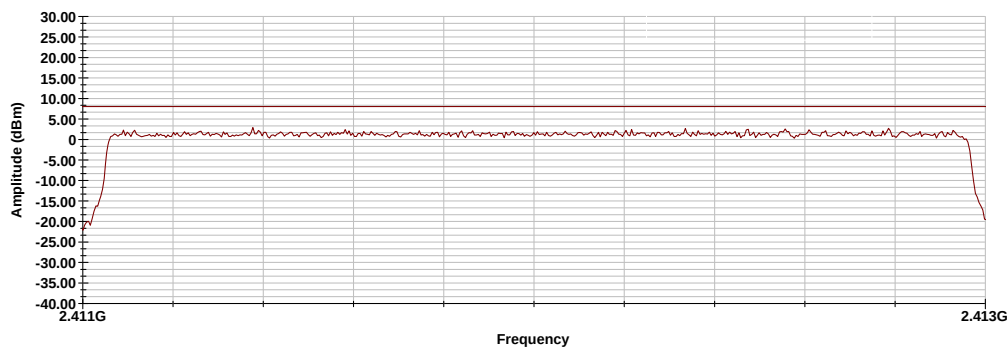
Nemko USA, Inc.
FCC PART 15.247(d) Power Spectral Density

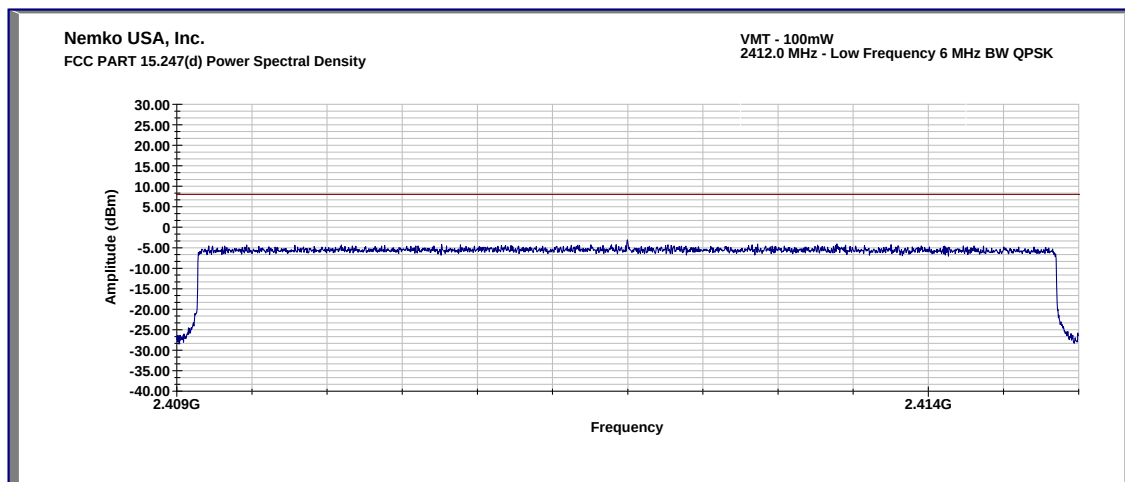
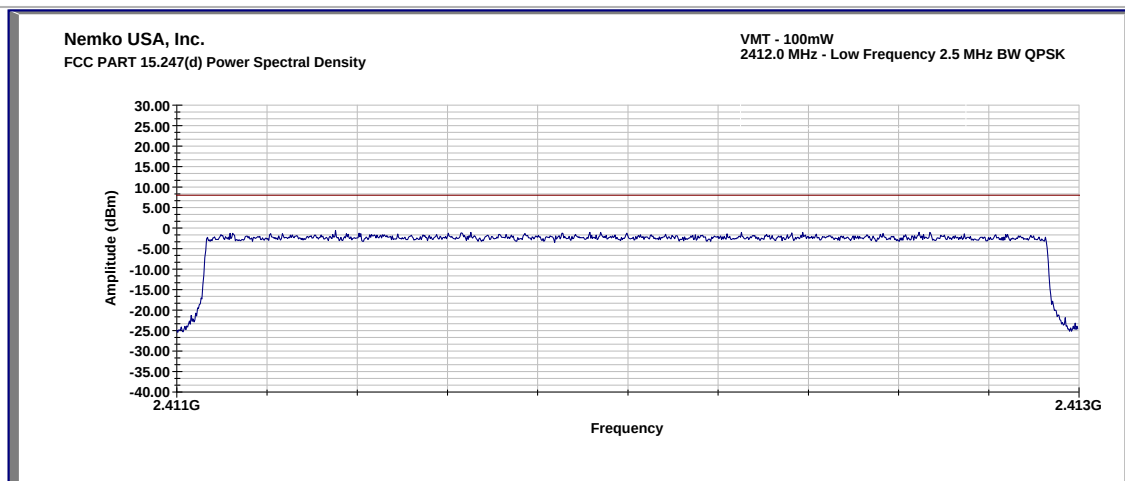
VMT - 100mW
2412.0 MHz - Low Frequency 8 MHz BW 16QAM



Nemko USA, Inc.
FCC PART 15.247(d) Power Spectral Density

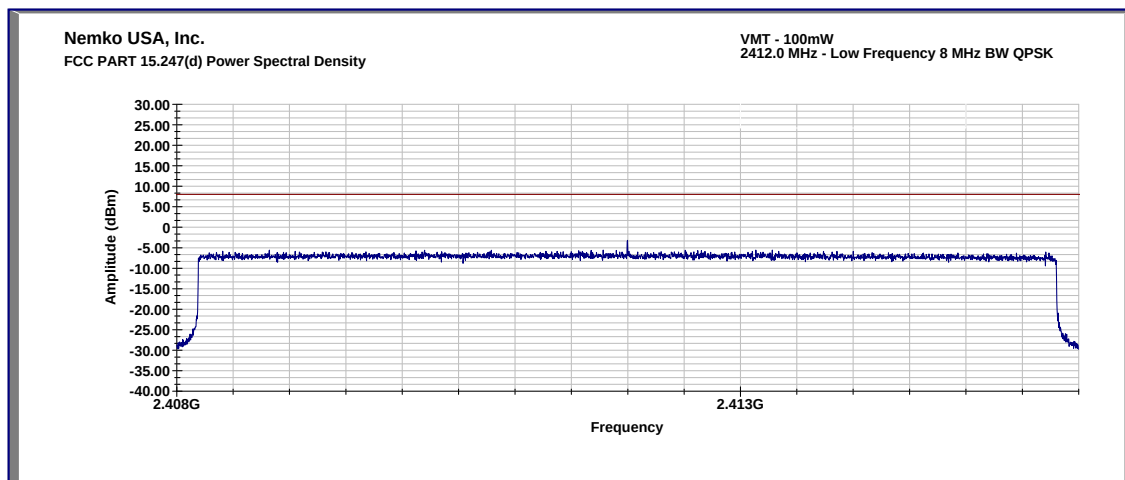
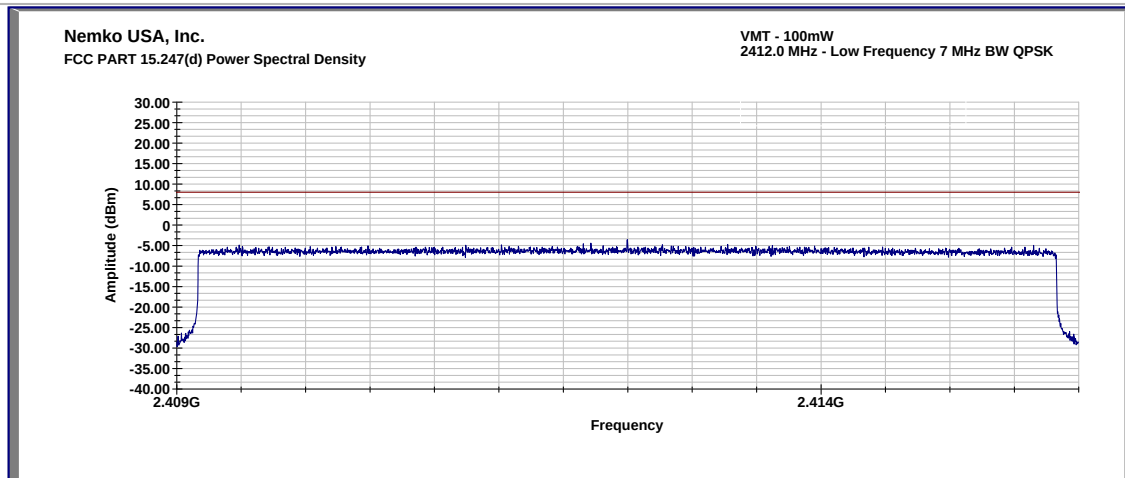
VMT - 100mW
2412.0 MHz - Low Frequency 1.25 MHz BW QPSK



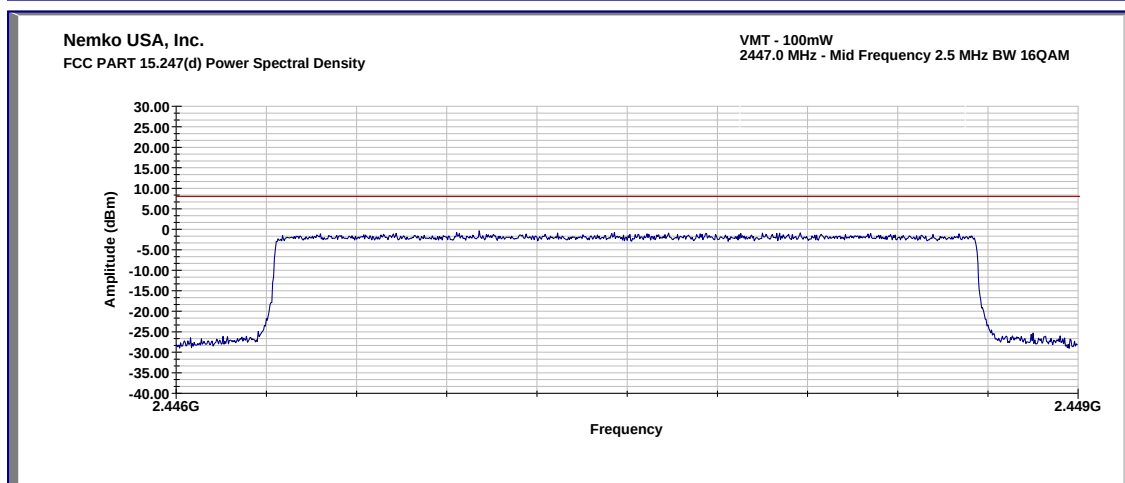
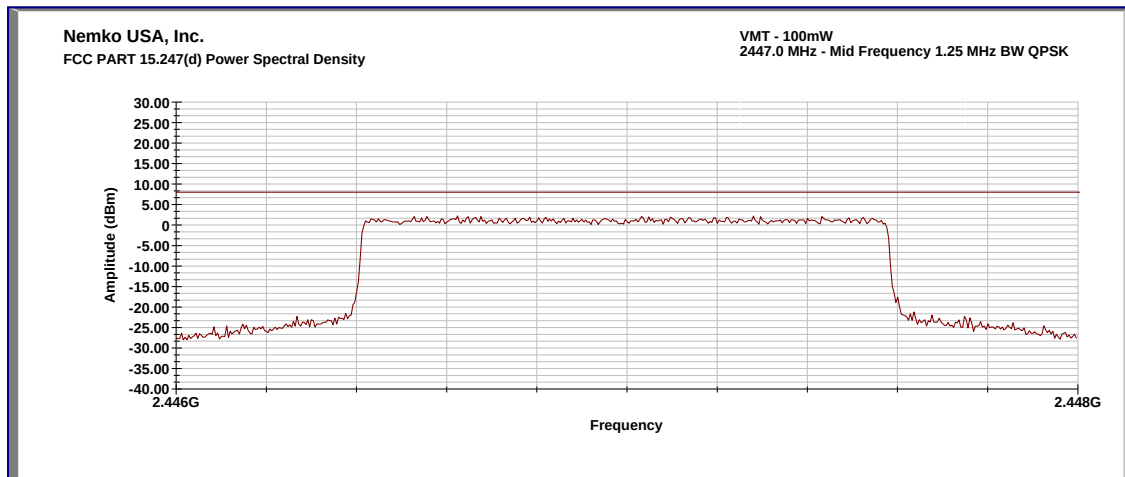
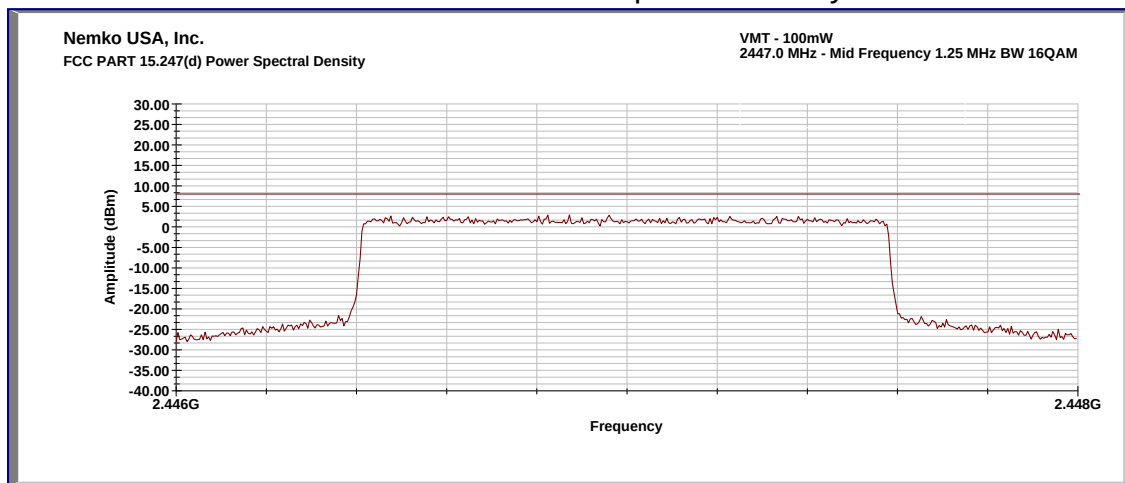


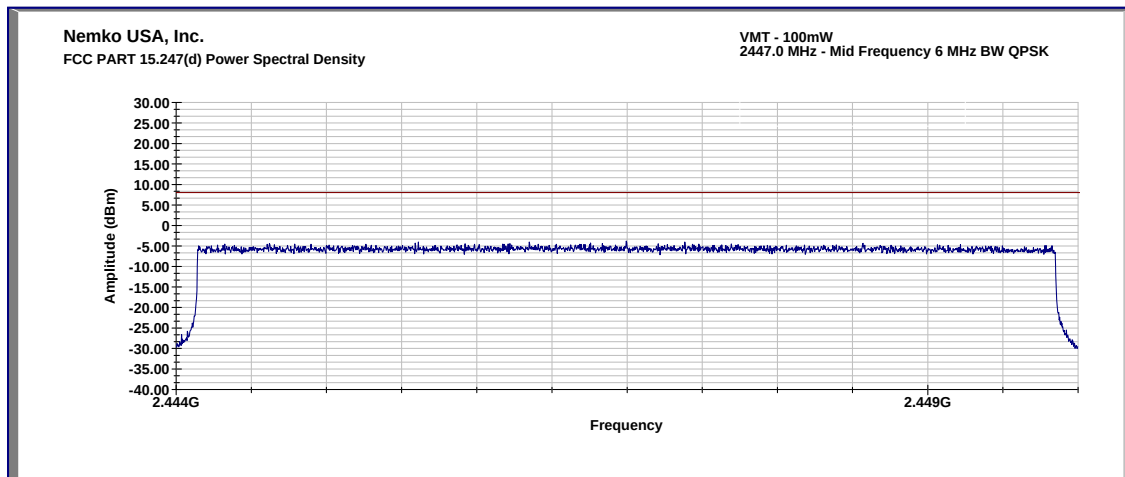
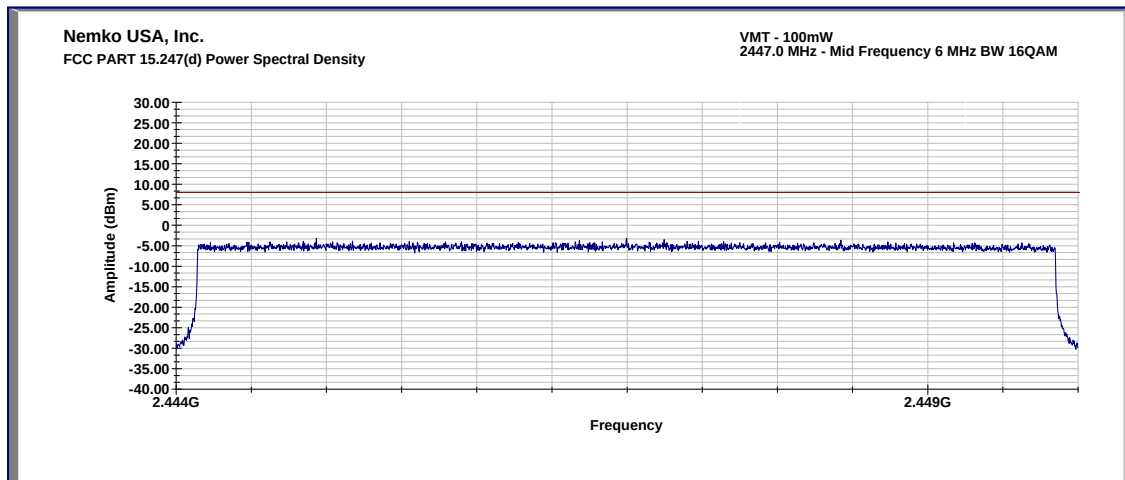
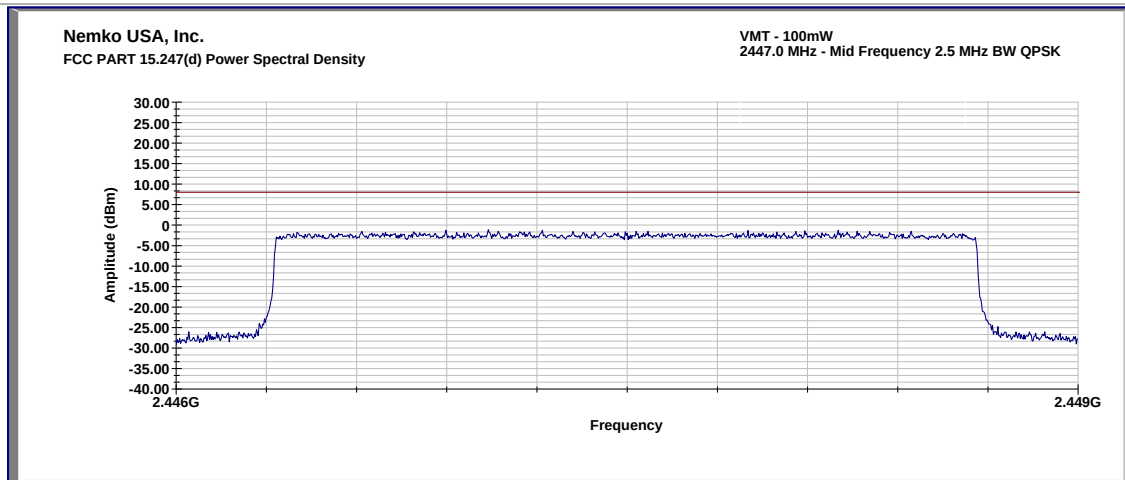
www.nemko.com





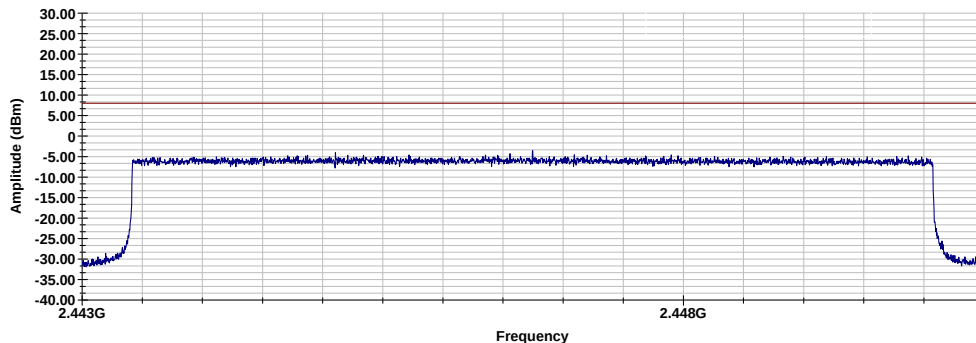
Mid Channel – Power Spectral Density





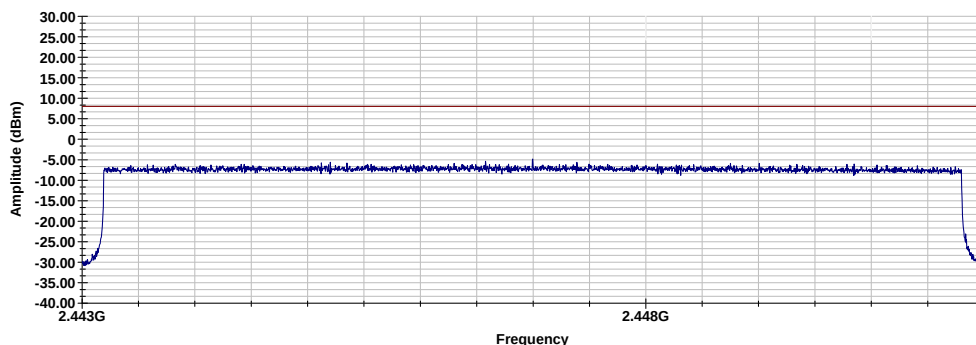
Nemko USA, Inc.
FCC PART 15.247(d) Power Spectral Density

VMT - 100mW
2447.0 MHz - Mid Frequency 7 MHz BW 16QAM



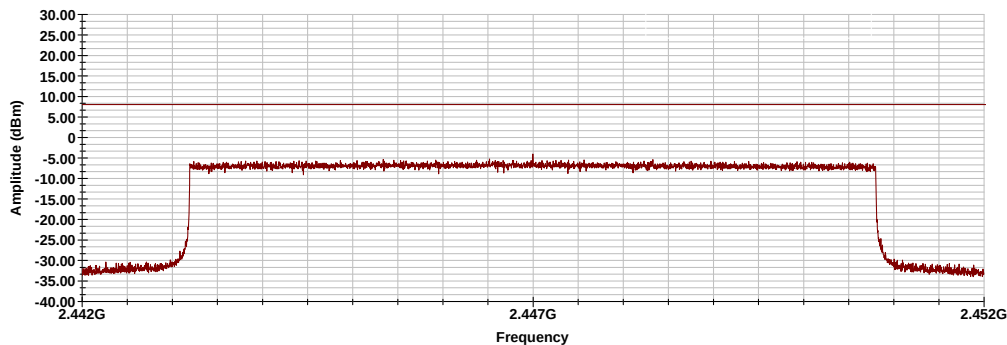
Nemko USA, Inc.
FCC PART 15.247(d) Power Spectral Density

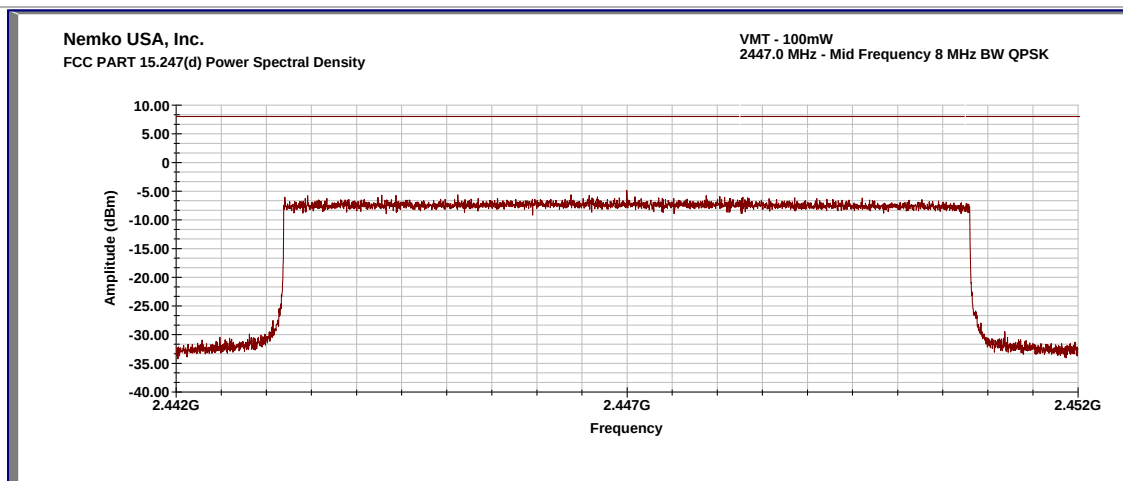
VMT - 100mW
2447.0 MHz - Mid Frequency 7 MHz BW QPSK



Nemko USA, Inc.
FCC PART 15.247(d) Power Spectral Density

VMT - 100mW
2447.0 MHz - Mid Frequency 8 MHz BW 16QAM





High Channel – Power Spectral Density

