NORTHWEST EMC

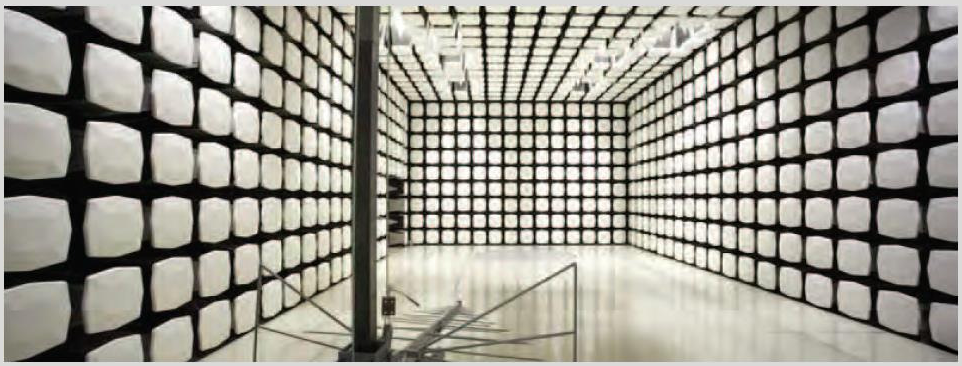
Medtronic, Inc.

ODIN Model 4NR003

FCC 15.247:2016

802.11bgn SISO Radio

Report # MDTR0496.3



NVLAP TESTING

NVLAP Lab Code: 200881-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: October 28, 2016
Medtronic, Inc.
Model: ODIN Model 4NR003

Radio Equipment Testing

Standards

Specification	Method
FCC 15.247:2016	ANSI C63.10:2013

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	No	N/A	Not required since EUT does not transmit while charging while connected to main power supply.
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.2.2.4	Output Power	Yes	Pass	
11.10.2	Power Spectral Density	Yes	Pass	
11.11	Band Edge Compliance	Yes	Pass	
11.11	Spurious Conducted Emissions	Yes	Pass	
6.5, 6.6, 11.12.1, 11.13.2	Spurious Radiated Emissions	Yes	Pass	

Deviations from Test Standards

None

Approved By:

Tim O'Shea, Operations Manager

Product compliance is the responsibility of the client; therefore, the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test. This report reflects only those tests from the referenced standards shown in the certificate of test. It does not include inspection or verification of labels, identification, marking or user information.

REVISION HISTORY

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

NORTHWEST EMC
REV 2016.7.25

United States

FCC - Designated by the FCC as a Telecommunications Certification Body (TCB). Certification chambers, Open Area Test Sites, and conducted measurement facilities are listed with the FCC.

A2LA - Accredited by A2LA to ISO / IEC 17065 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

ISED - Recognized by Innovation, Science and Economic Development Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with ISED.

European Union

European Commission – Validated by the European Commission as a Notified Body under the R&TTE Directive.

Australia/New Zealand

ACMA - Recognized by ACMA as a CAB for the acceptance of test data.

Korea

MSIP / RRA - Recognized by KCC's RRA as a CAB for the acceptance of test data.

Japan

VCCI - Associate Member of the VCCI. Conducted and radiated measurement facilities are registered.

Taiwan

BSMI – Recognized by BSMI as a CAB for the acceptance of test data.

NCC - Recognized by NCC as a CAB for the acceptance of test data.

Singapore

IDA – Recognized by IDA as a CAB for the acceptance of test data.

Israel

MOC – Recognized by MOC as a CAB for the acceptance of test data.

Hong Kong

OFCA – Recognized by OFCA as a CAB for the acceptance of test data.

Vietnam

MIC – Recognized by MIC as a CAB for the acceptance of test data.

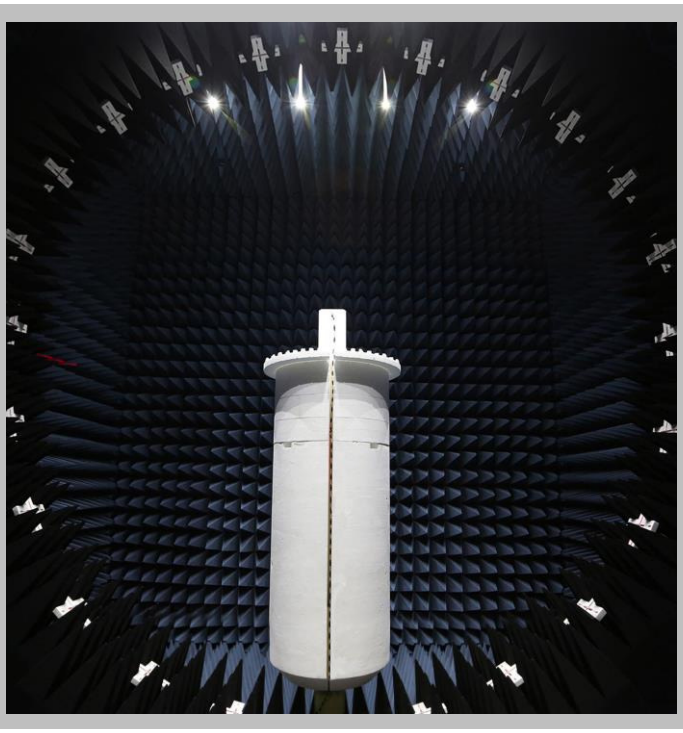
SCOPE

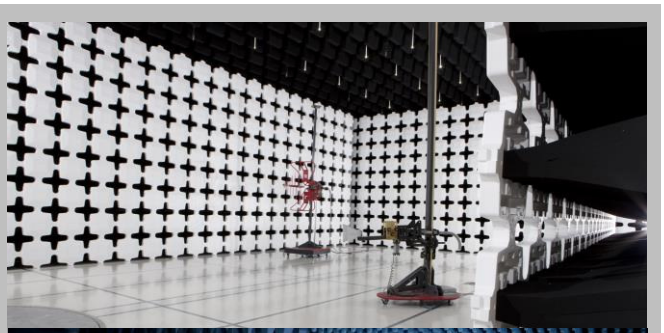
For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/
http://gsi.nist.gov/global/docs/cabs/designations.html

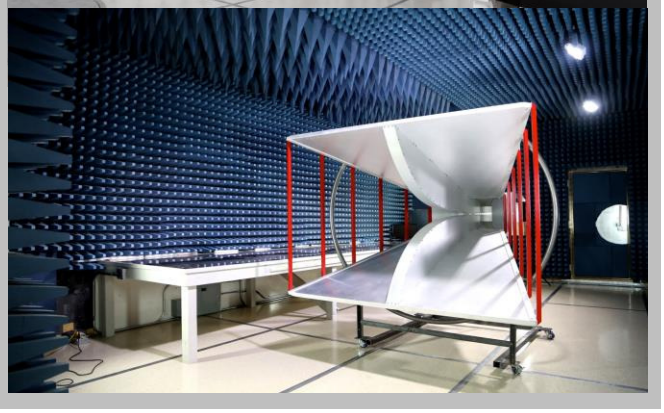
FACILITIES

NORTHWEST EMC
REV 2016.7.25

California	Minnesota	New York	Oregon	Texas	Washington
Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Labs NC01-05 19201 120th Ave NE Bothell, WA 98011 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Innovation, Science and Economic Development Canada					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-*2*	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRA, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157







MEASUREMENT UNCERTAINTY

TMU.2015.07.10

Measurement Uncertainty

When a measurement is made, the result will be different from the true or theoretically correct value. The difference is the result of tolerances in the measurement system that cannot be completely eliminated. To the extent that technology allows us, it has been our aim to minimize this error. Measurement uncertainty is a statistical expression of measurement error qualified by a probability distribution.

A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is on each data sheet. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-2 as applicable), and are available upon request.

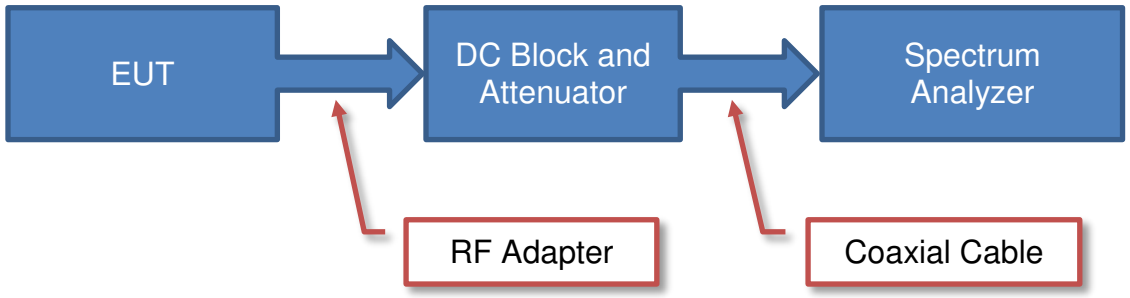
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	5.2 dB	-5.2 dB
AC Powerline Conducted Emissions (dB)	2.4 dB	-2.4 dB

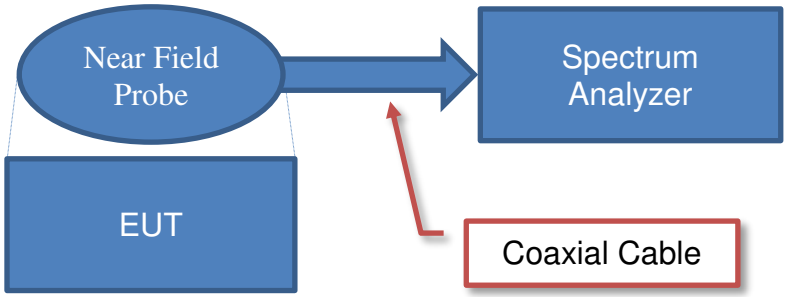
Test Setup Block Diagrams

NORTHWEST EMC
REV 2016.10.04

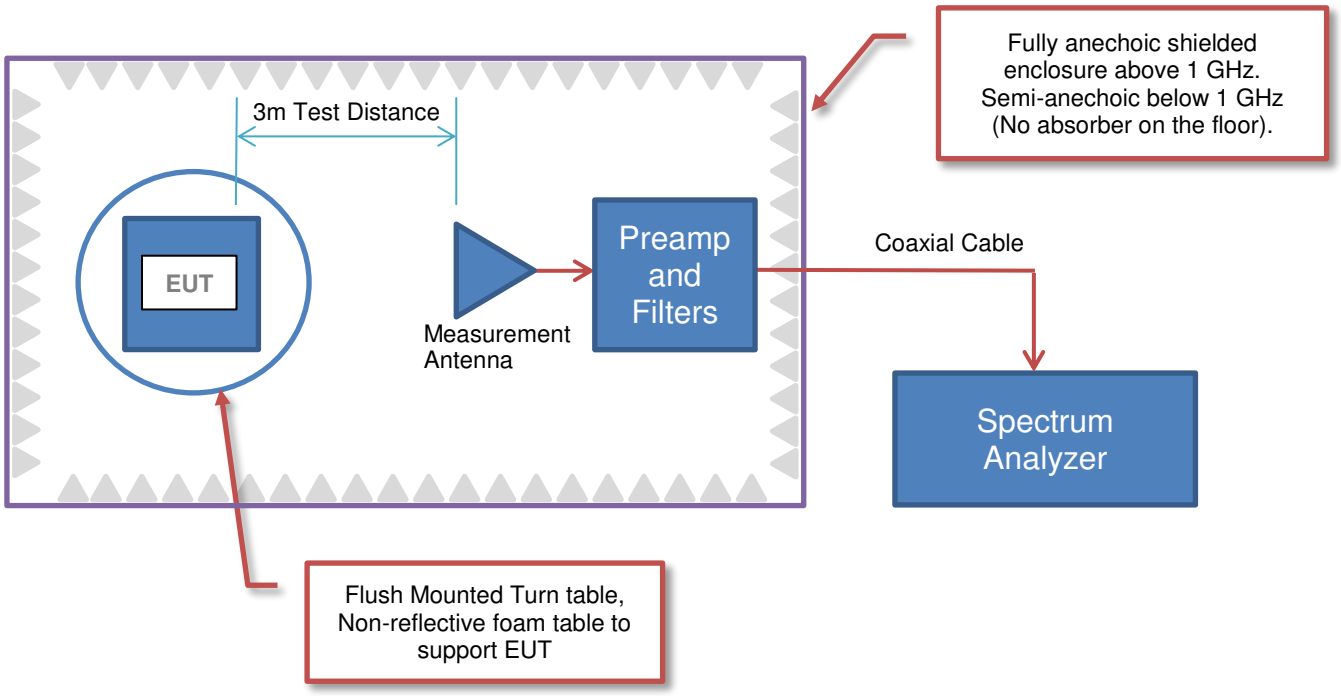
Antenna Port Conducted Measurements



Near Field Test Fixture Measurements



Spurious Radiated Emissions



PRODUCT DESCRIPTION

NORTHWEST EMC 2014-12-10

Client and Equipment Under Test (EUT) Information

Company Name:	Medtronic, Inc.
Address:	710 Medtronic Parkway
City, State, Zip:	Minneapolis, MN 55432
Test Requested By:	Guillaume Girard
Model:	ODIN Model 4NR003
First Date of Test:	August 1, 2016
Last Date of Test:	October 28, 2016
Receipt Date of Samples:	July 6, 2016
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:

The Odin Research System is a general-purpose research tool that enables advanced memory research by supporting the implementation of custom computational algorithms to coordinate neurological sensing and stimulation. The system contains a 802.11 bgn radio that operates in the 2.4GHz band. The radio is intended to communicate between the ODIN EUT and laptop.

Client Supplied Information:

Rationale for cable selection:

The Anaconda patient cable was used for radio testing purposes because it represents a worst case configuration. This was determined because it is the maximum length, and according to Medtronic it is worst case configuration in view of a stimulator connector based on the a function of cable length and monitoring sequence. Also, the patient cable has no connection to the radio circuit, and is entirely isolated from the radio and ODIN power supply. The USB cable was not used during transmitter testing because when the USB cable is connected to the Odin system the radio function is disabled.

Testing Objective:

To demonstrate compliance of the 802.11 radio under FCC 15.247 for operation in the 2.4 GHz band.

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration MDTR0496- 1

Software/Firmware Running during test	
Description	**Version**
Odin-Command Server	1.8.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
ODIN	Medtronic Inc.	4NR003	ODIN_E_01018

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Precision 7510	
Laptop Power Supply	Dell	DA180PM111	CN-0WW4XY-48661
Differential Probe	Teledyne LeCroy	AP031	073040
Switching Adapter	DVE	DSC-6PFA-12 FUS 090060	None
Saline Tank 2700uS/Patient	Medtronic Inc.	None	None
USB WiFi Dongle	Plugable	None	2

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Digital Phosphor Oscilloscope	Tektronix	DPO 4054	DPO4054 C011890

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC (High-Voltage Differential Probe)	None	1.5m	None	Differential Probe	AC Mains
Patient/EEG Cable	None	>3m	None	ODIN	Saline Tank/Patient
AC Laptop	No	1.5m	No	Laptop Power Supply	AC Mains
DC Laptop	No	1.5m	Yes	Laptop Power Supply	Laptop

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration MDTR0496- 4

Software/Firmware Running during test	
Description	**Version**
Odin-Command Server	1.9.4
Firmware	2.8F
FPGA	V1B

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
ODIN ENS	Medtronic Inc.	4NR003	01000

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Dell	Latitude E7450	9K19362

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB (S/N 1423C13735)	No	3m	No	ODIN ENS	Laptop

MODIFICATIONS

NORTHWEST EMC
2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	8/1/2016	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	10/28/2016	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	10/28/2016	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	10/28/2016	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	10/28/2016	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	10/28/2016	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
7	10/28/2016	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE

XMit 2016.05.06

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The Duty Cycle (x) of the single channel operation of the radio as controlled by the provided test software was measured for each of the EUT operating modes.

There is no compliance requirement to be met by this test, so therefore no Pass / Fail criteria.

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum.

The duty cycle was calculated by dividing the transmission pulse duration (T) by the total period of a single on and total off time.

If the transmit duty cycle < 98 percent, burst gating may have been used during some of the other tests in this report to only take the measurement during the burst duration.

DUTY CYCLE

NORTHWEST EMC

XMit 2016.05.06

EUT:	ODIN Model 4NR003			**Work Order:**	MDTR0496
Serial Number:	01000			**Date:**	10/28/16
Customer:	Medtronic, Inc.			**Temperature:**	22.1 °C
Attendees:	Dave Hoffman			**Humidity:**	39.2% RH
Project:	None			**Barometric Pres.:**	1013 mbar
Tested by:	Cole Ghizzone	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

DEVIATIONS FROM TEST STANDARD

None

Configuration #	4	Signature

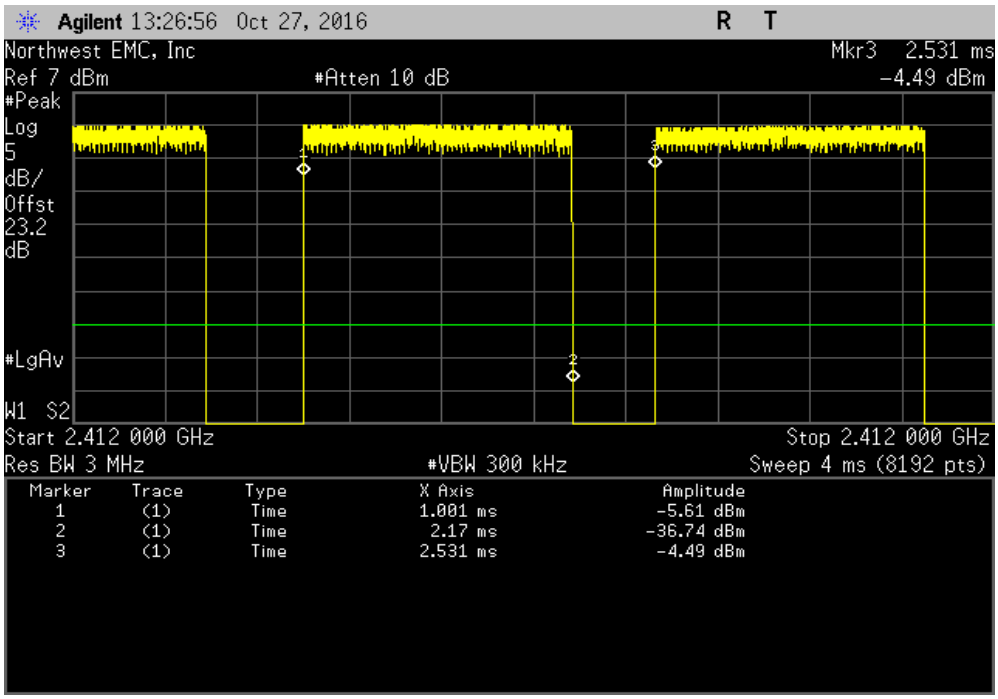
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
2400 MHz - 2483.5 MHz Band						
802.11(b) 1 Mbps						
Low Channel 1, 2412 MHz	1.169 ms	1.53 ms	1	76.4	N/A	N/A
Low Channel 1, 2412 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	1.169 ms	1.584 ms	1	73.8	N/A	N/A
Mid Channel 6, 2437 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel 11, 2462 MHz	1.169 ms	1.593 ms	1	73.4	N/A	N/A
High Channel 11, 2462 MHz	N/A	N/A	5	N/A	N/A	N/A
802.11(b) 11 Mbps						
Low Channel 1, 2412 MHz	273.9 us	517.9 us	1	52.9	N/A	N/A
Low Channel 1, 2412 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	273.6 us	517.9 us	1	52.8	N/A	N/A
Mid Channel 6, 2437 MHz	N/A	N/A	4	N/A	N/A	N/A
High Channel 11, 2462 MHz	273.6 us	517.9 us	1	52.8	N/A	N/A
High Channel 11, 2462 MHz	N/A	N/A	5	N/A	N/A	N/A
802.11(g) 6 Mbps						
Low Channel 1, 2412 MHz	184.9 us	420.1 us	1	44	N/A	N/A
Low Channel 1, 2412 MHz	N/A	N/A	3	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	184.9 us	419.7 us	1	44.1	N/A	N/A
Mid Channel 6, 2437 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel 11, 2462 MHz	184.9 us	420.1 us	1	44	N/A	N/A
High Channel 11, 2462 MHz	N/A	N/A	4	N/A	N/A	N/A
802.11(g) 36 Mbps						
Low Channel 1, 2412 MHz	64.1 us	232.5 us	1	27.6	N/A	N/A
Low Channel 1, 2412 MHz	N/A	N/A	4	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	64.1 us	232.5 us	1	27.6	N/A	N/A
Mid Channel 6, 2437 MHz	N/A	N/A	4	N/A	N/A	N/A
High Channel 11, 2462 MHz	64.1 us	232.5 us	1	27.6	N/A	N/A
High Channel 11, 2462 MHz	N/A	N/A	3	N/A	N/A	N/A
802.11(g) 54 Mbps						
Low Channel 1, 2412 MHz	43.9 us	212.8 us	1	20.6	N/A	N/A
Low Channel 1, 2412 MHz	N/A	N/A	4	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	44 us	212.8 us	1	20.7	N/A	N/A
Mid Channel 6, 2437 MHz	N/A	N/A	4	N/A	N/A	N/A
High Channel 11, 2462 MHz	43.9 us	212.8 us	1	20.6	N/A	N/A
High Channel 11, 2462 MHz	N/A	N/A	4	N/A	N/A	N/A
802.11(n) MCS0						
Low Channel 1, 2412 MHz	40.7 us	208.8 us	1	19.5	N/A	N/A
Low Channel 1, 2412 MHz	N/A	N/A	4	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	39.9 us	208.4 us	1	19.1	N/A	N/A
Mid Channel 6, 2437 MHz	N/A	N/A	4	N/A	N/A	N/A
High Channel 11, 2462 MHz	40.7 us	208.8 us	1	19.5	N/A	N/A
High Channel 11, 2462 MHz	N/A	N/A	4	N/A	N/A	N/A
802.11(n) MCS7						
Low Channel 1, 2412 MHz	56.4 us	224.9 us	1	25.1	N/A	N/A
Low Channel 1, 2412 MHz	N/A	N/A	4	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	56.4 us	224.9 us	1	25.1	N/A	N/A
Mid Channel 6, 2437 MHz	N/A	N/A	4	N/A	N/A	N/A
High Channel 11, 2462 MHz	56 us	224.5 us	1	24.9	N/A	N/A
High Channel 11, 2462 MHz	N/A	N/A	4	N/A	N/A	N/A

DUTY CYCLE

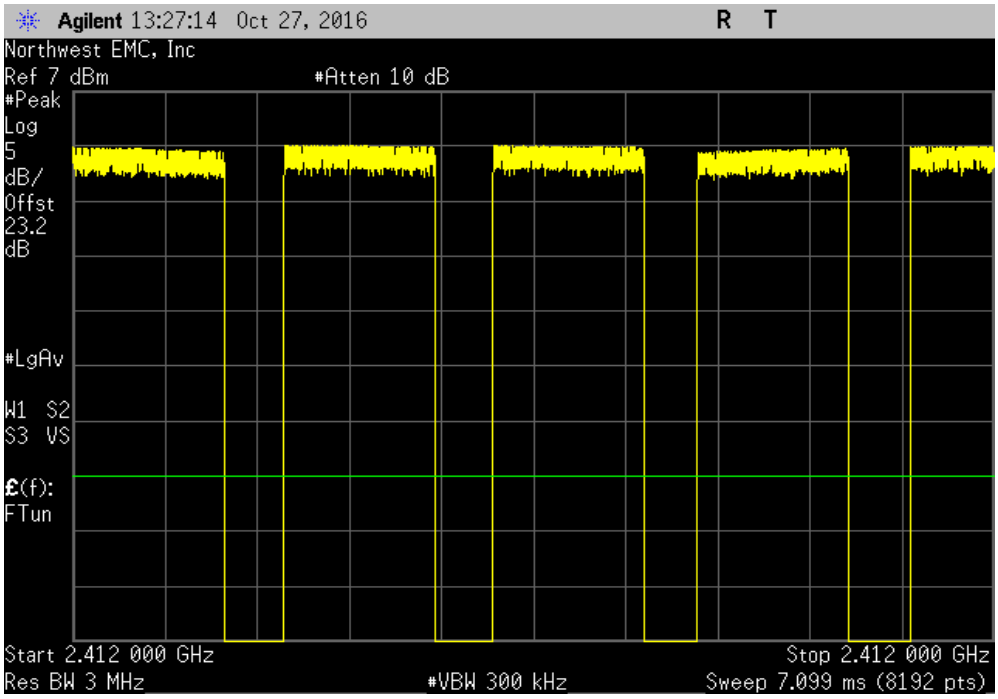
NORTHWEST EMC

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.169 ms	1.53 ms	1	76.4	N/A	N/A



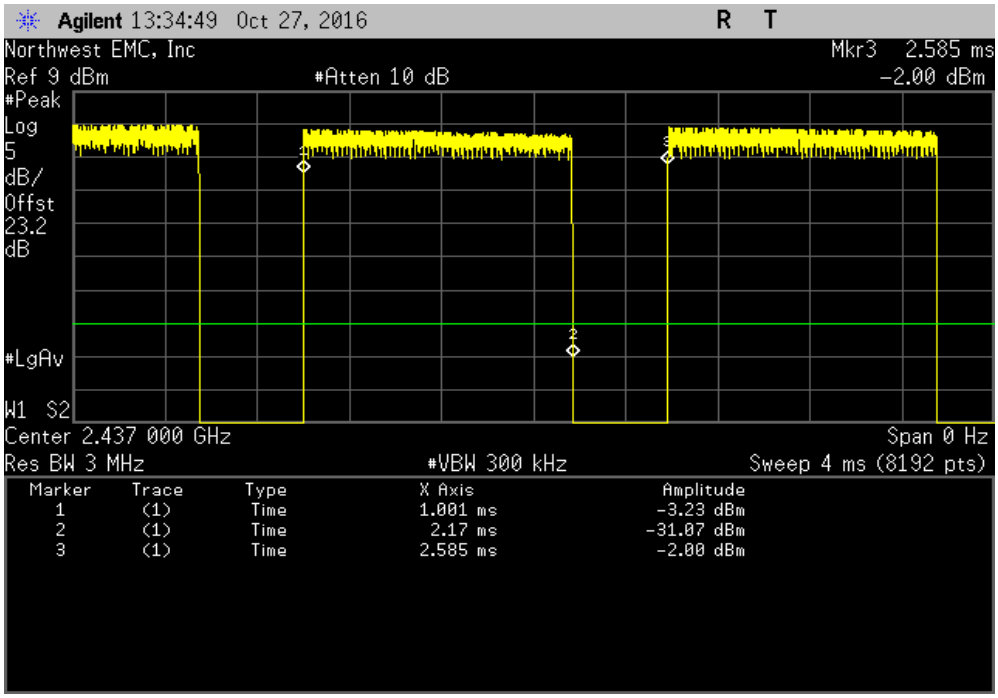
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



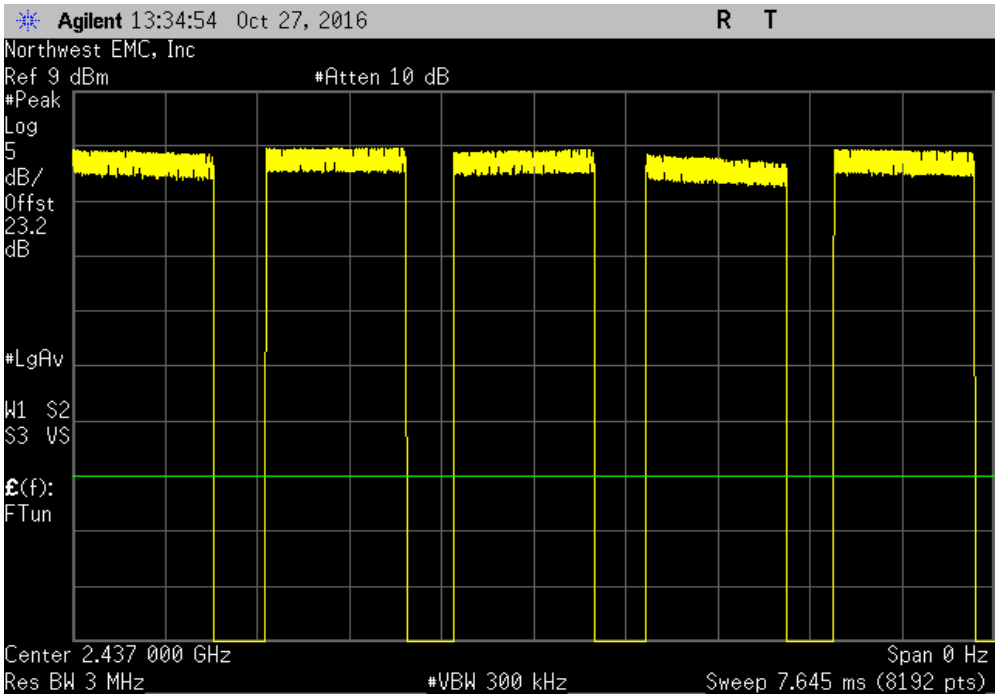
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.169 ms	1.584 ms	1	73.8	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A

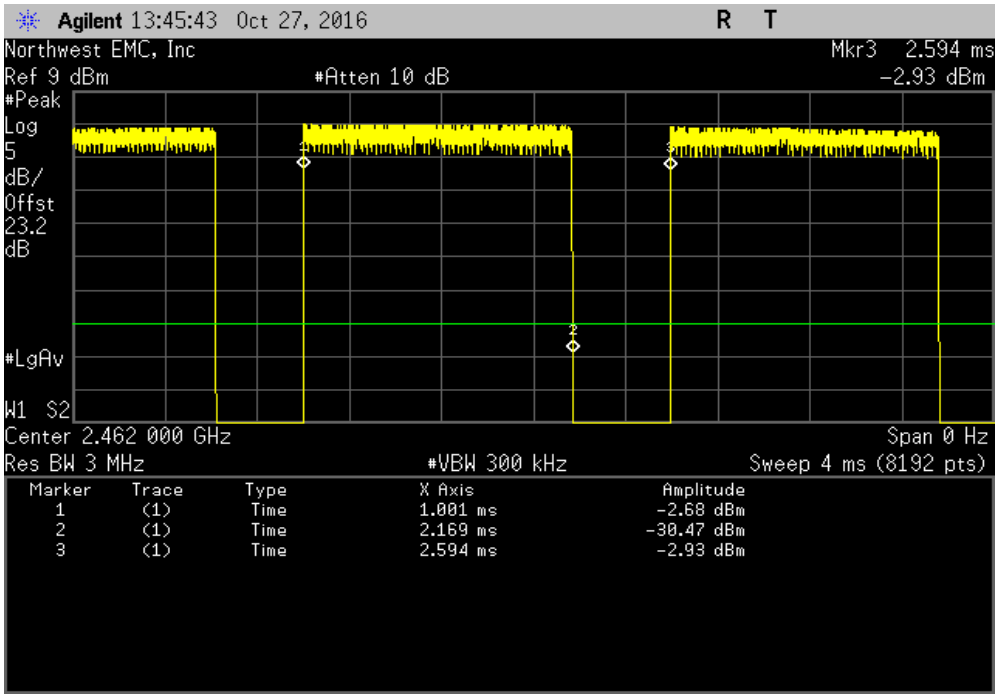


DUTY CYCLE

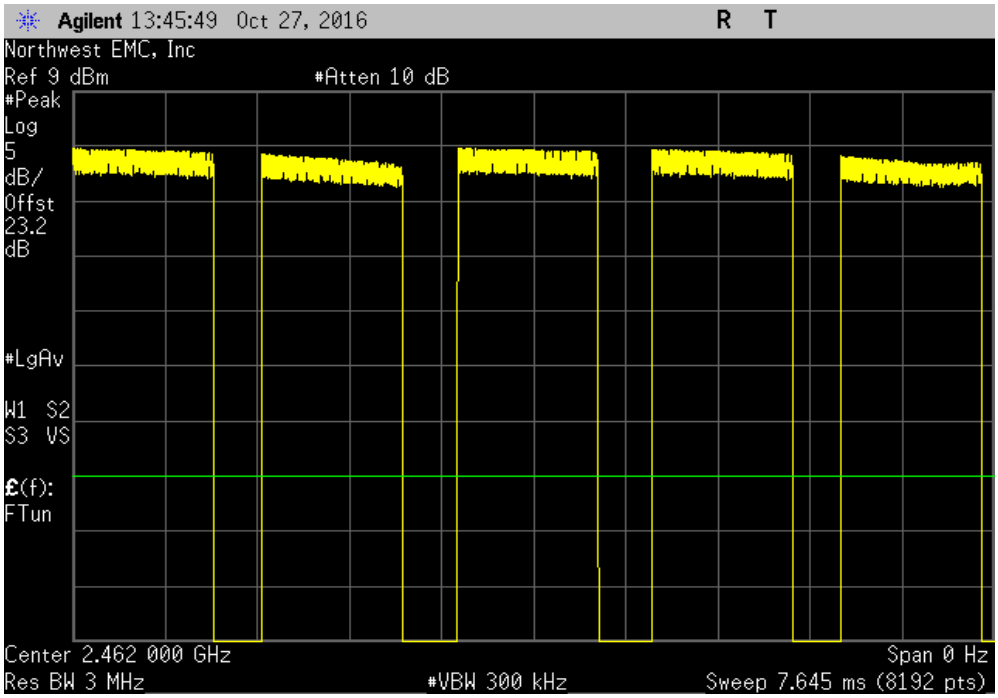
NORTHWEST EMC

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.169 ms	1.593 ms	1	73.4	N/A	N/A



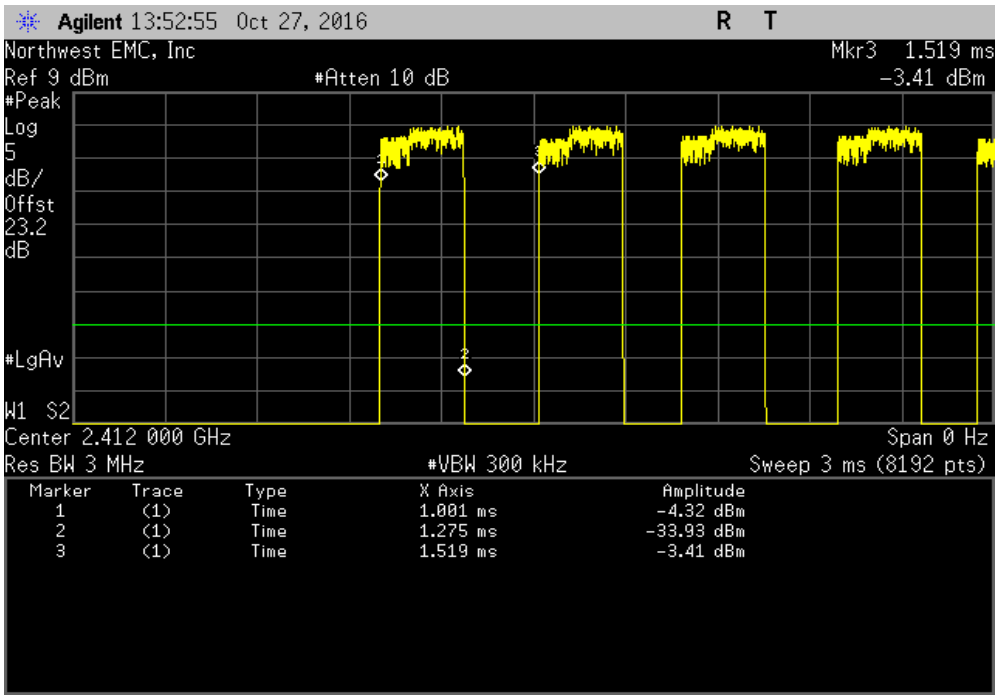
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



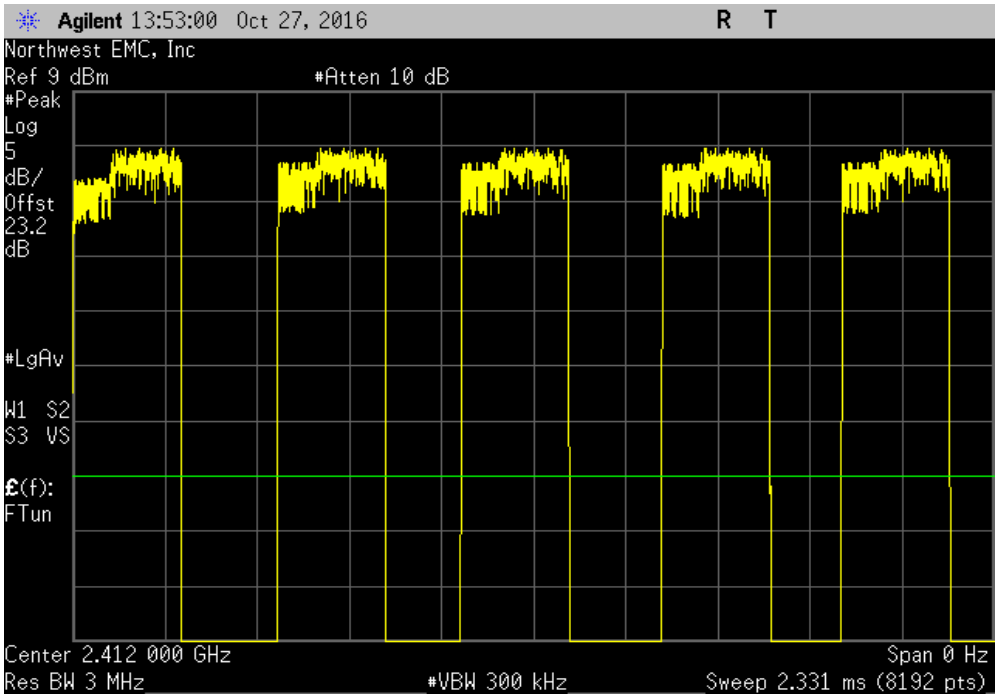
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	273.9 us	517.9 us	1	52.9	N/A	N/A



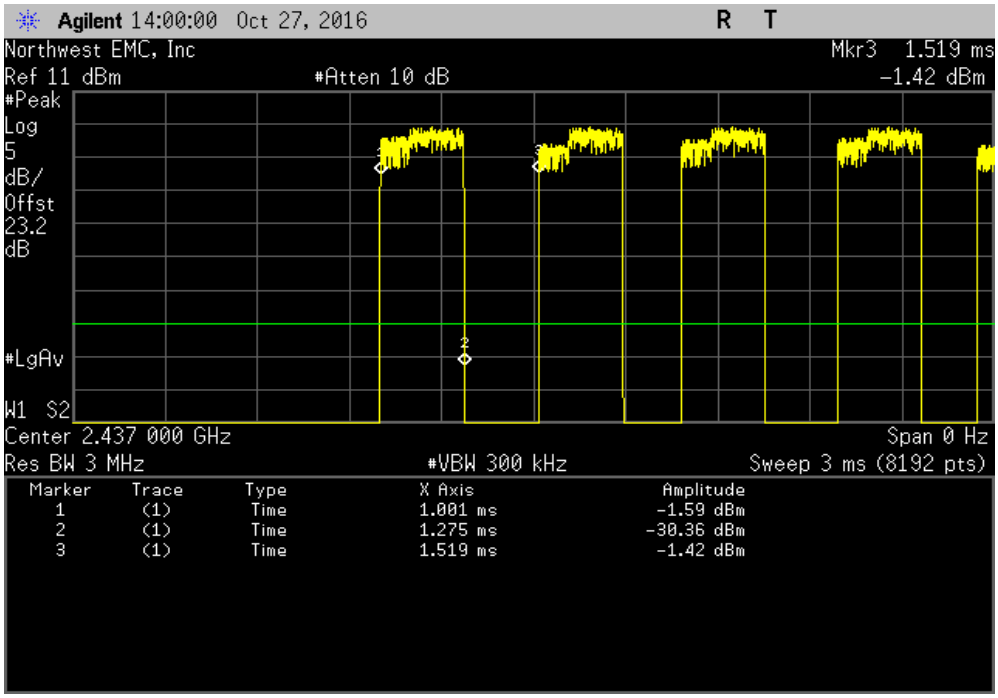
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



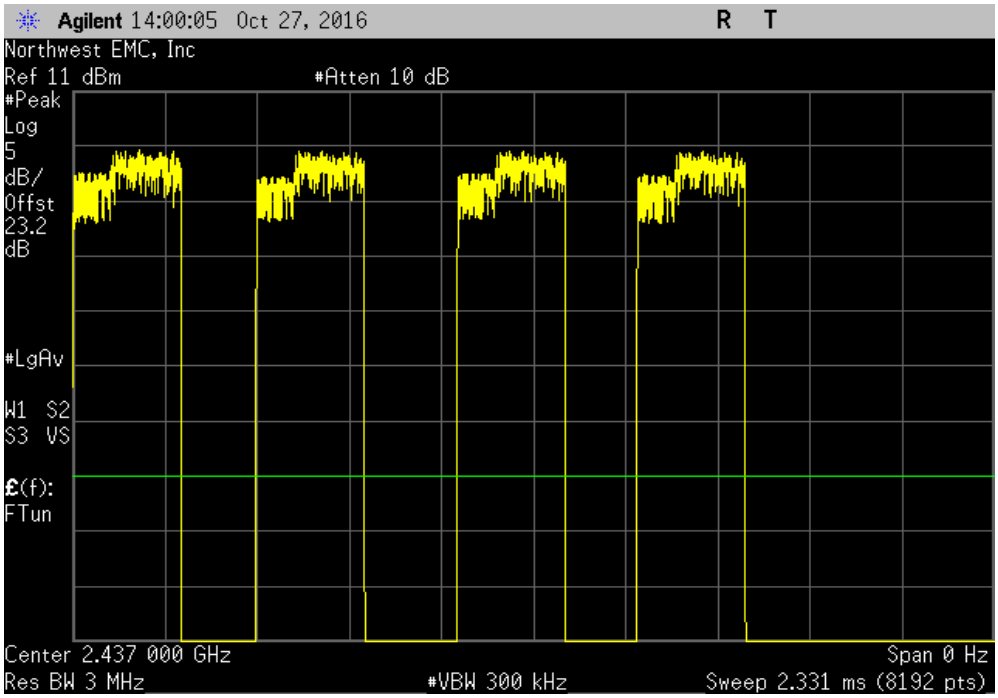
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	273.6 us	517.9 us	1	52.8	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A

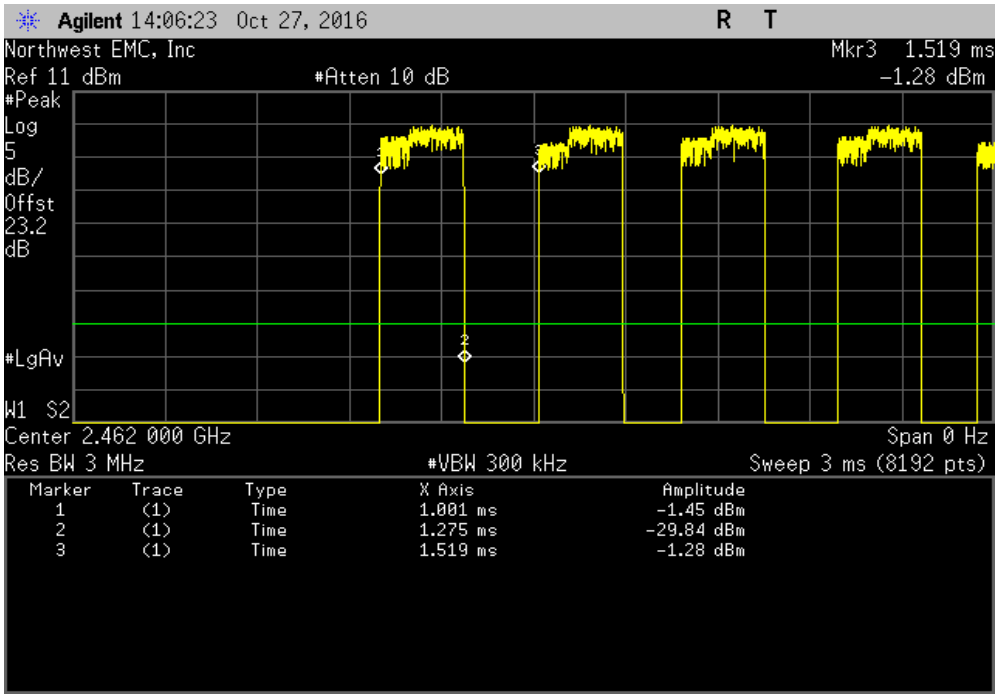


DUTY CYCLE

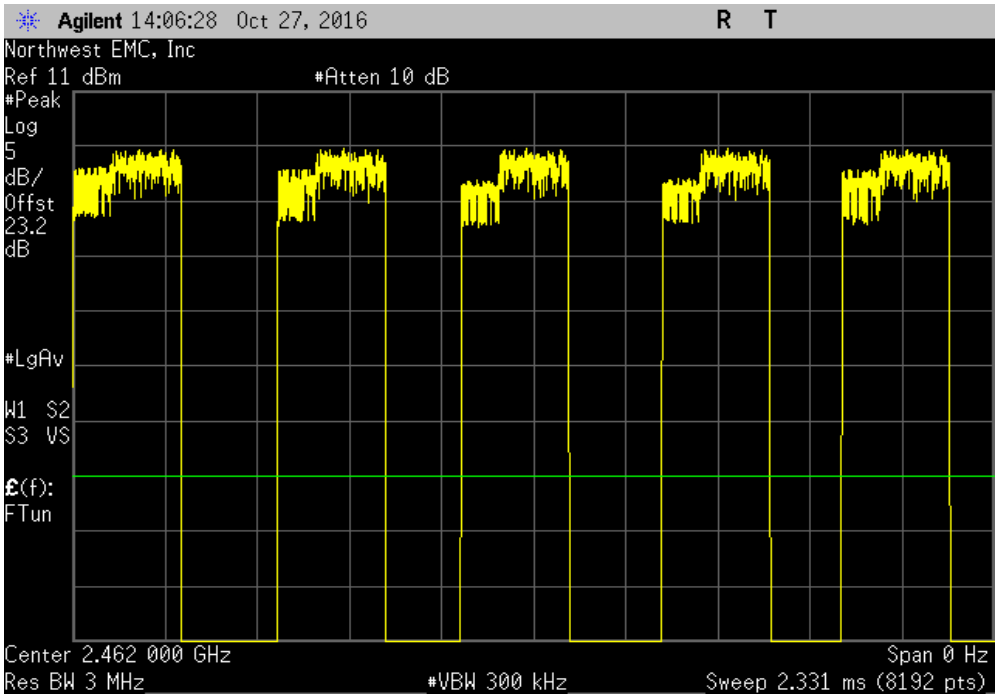
NORTHWEST EMC

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	273.6 us	517.9 us	1	52.8	N/A	N/A



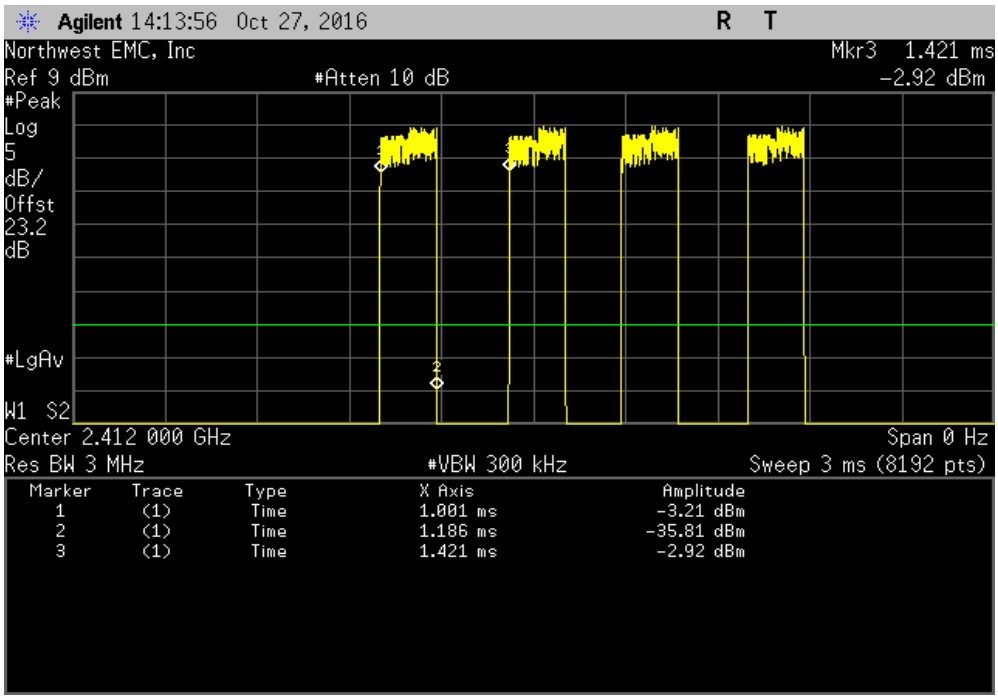
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



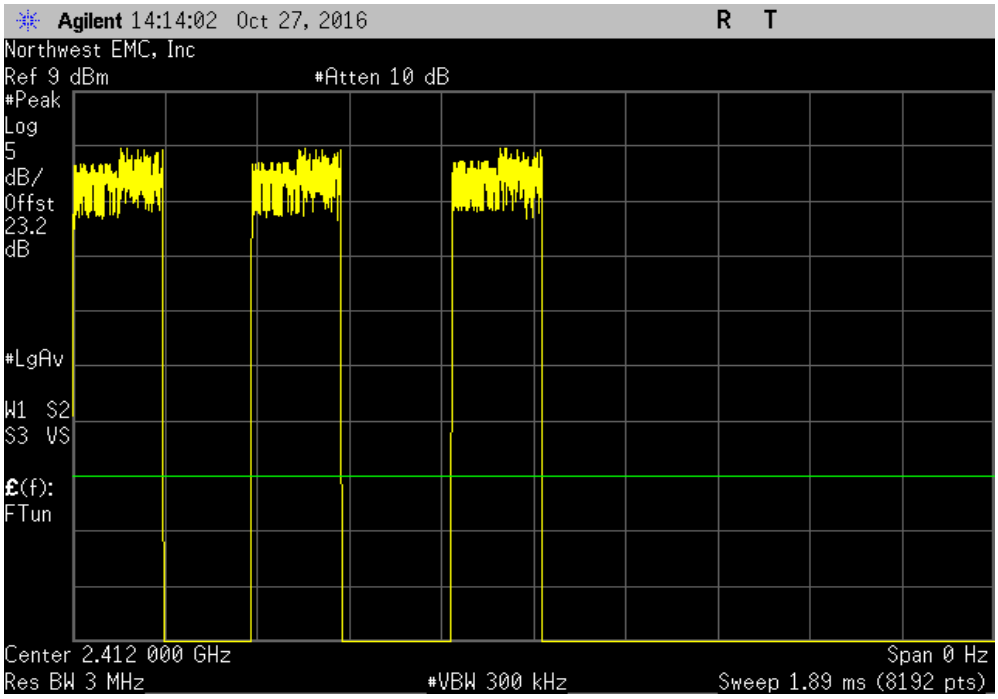
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	184.9 us	420.1 us	1	44	N/A	N/A



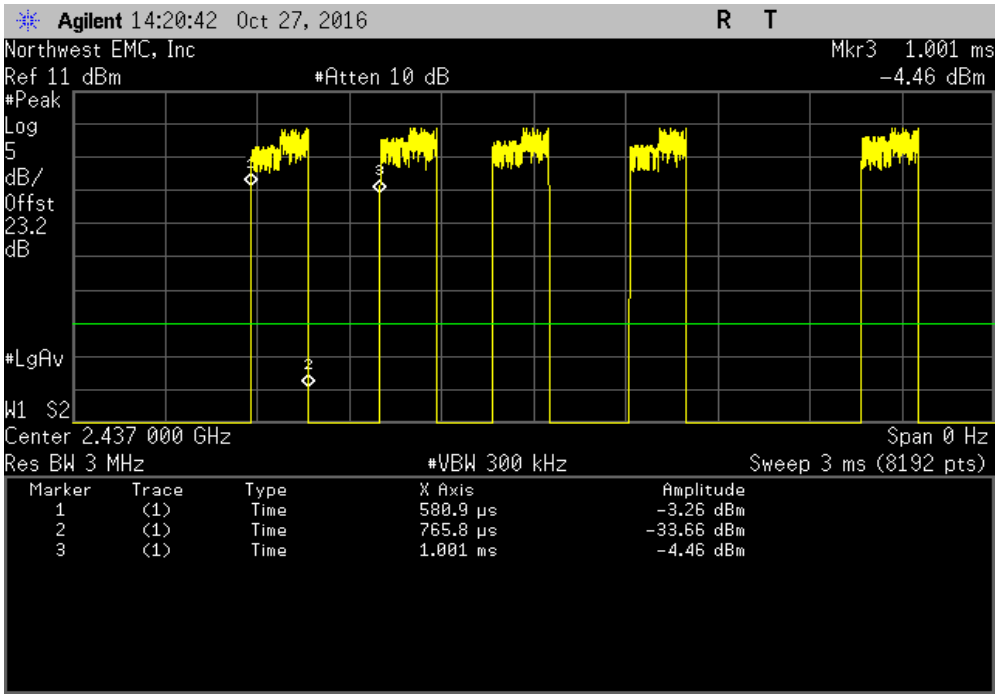
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	3	N/A	N/A	N/A



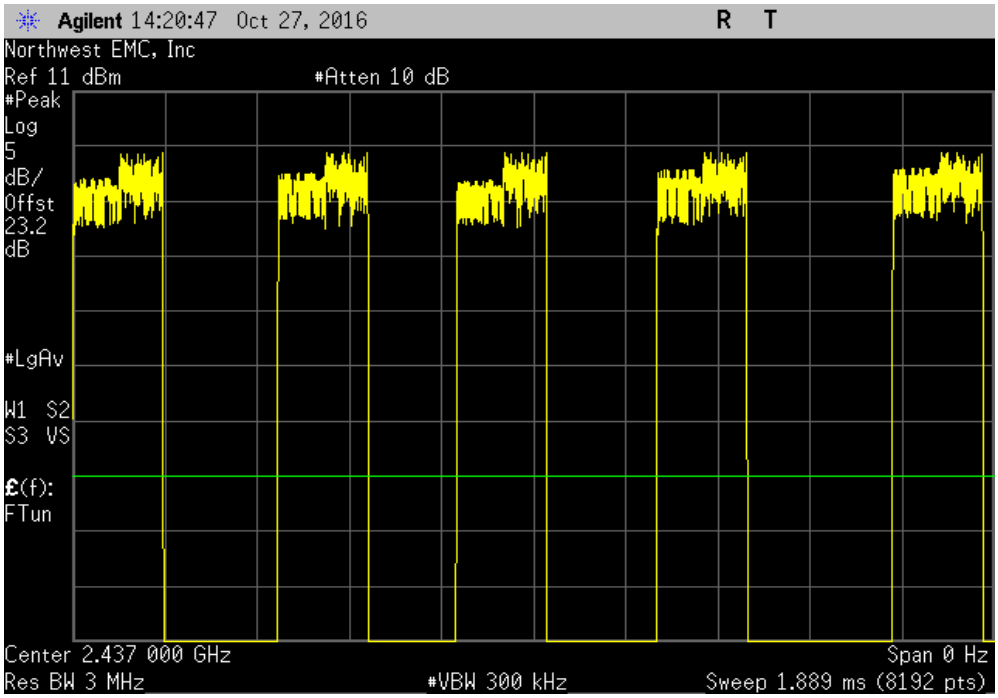
DUTY CYCLE

XMit 2016.05.06

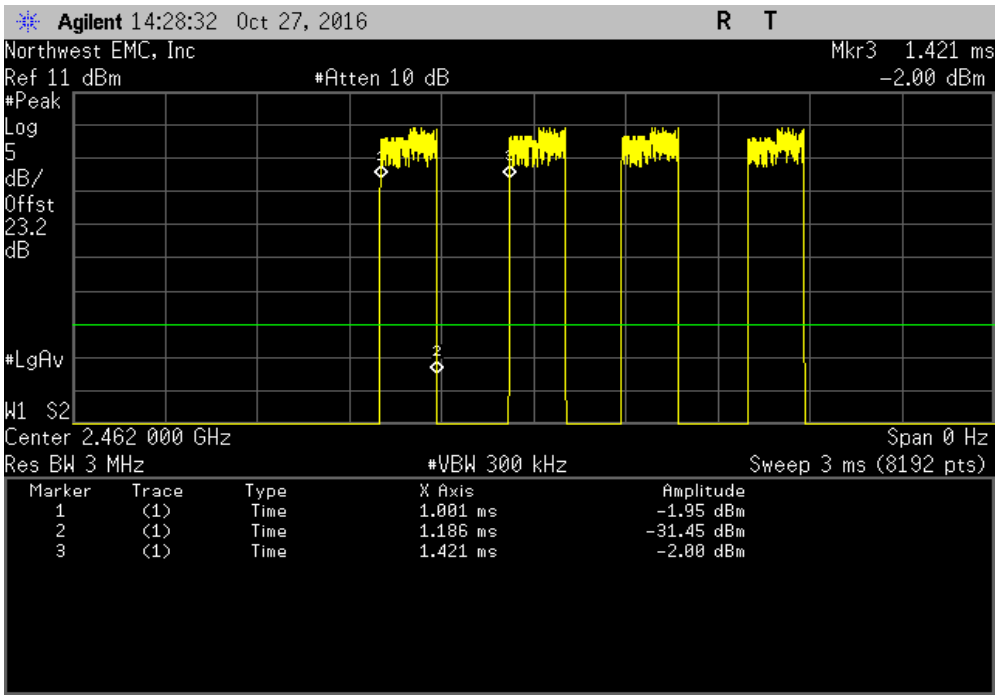
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	184.9 us	419.7 us	1	44.1	N/A	N/A



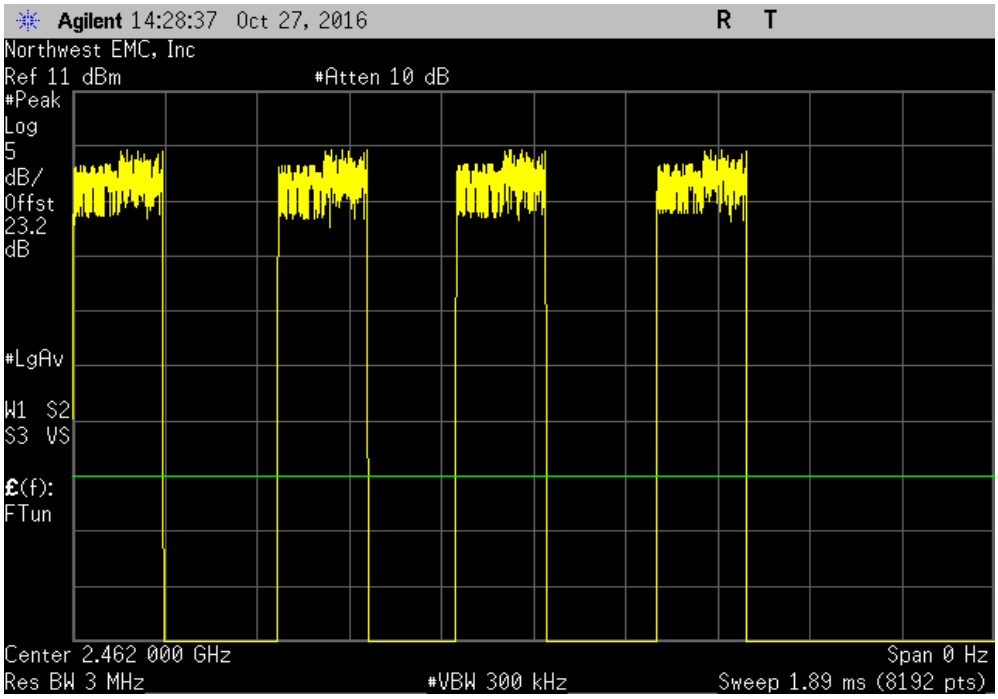
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	184.9 us	420.1 us	1	44	N/A	N/A



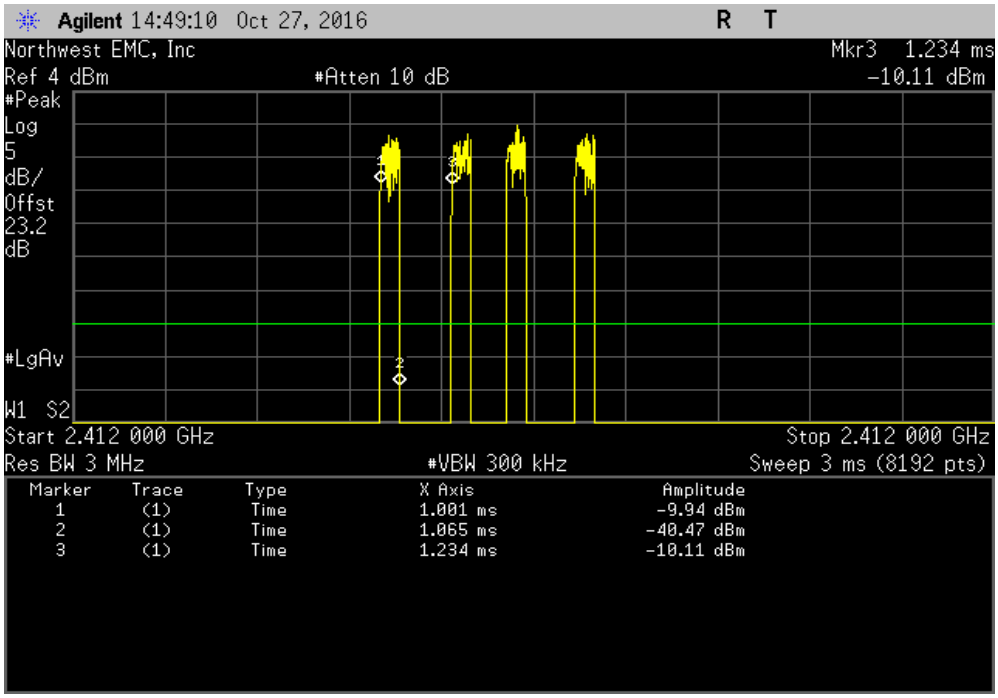
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A



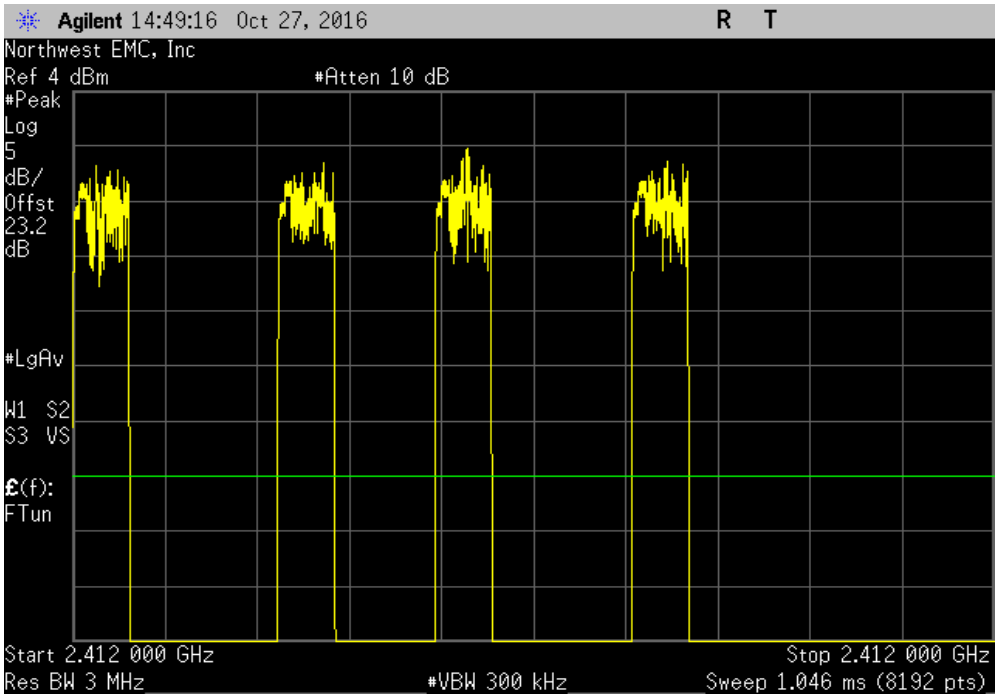
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	64.1 us	232.5 us	1	27.6	N/A	N/A

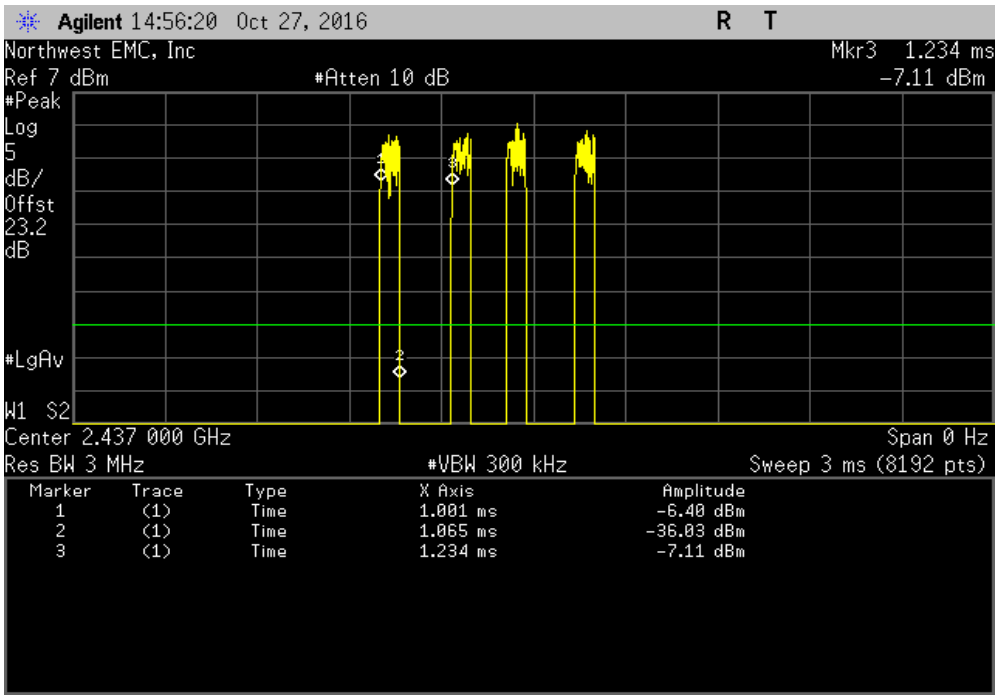


2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A

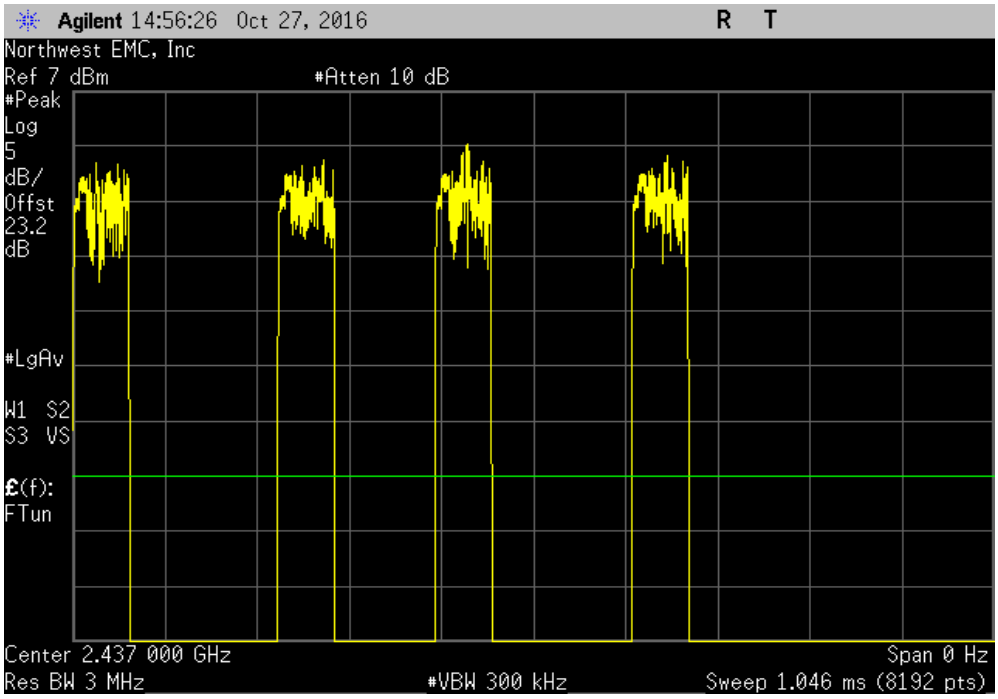


DUTY CYCLE

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	64.1 us	232.5 us	1	27.6	N/A	N/A



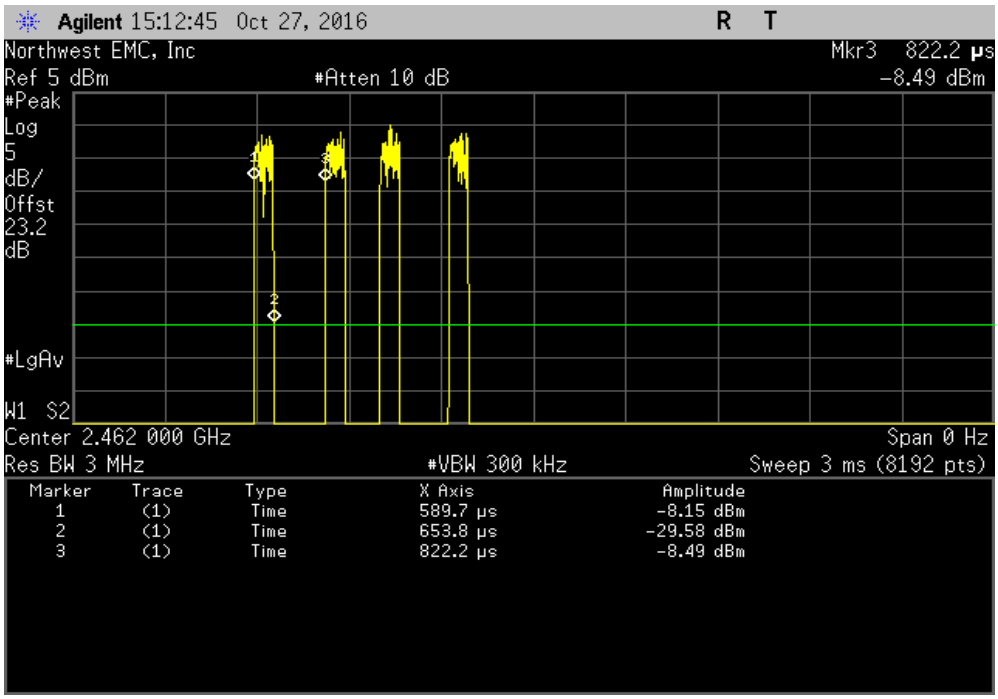
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A



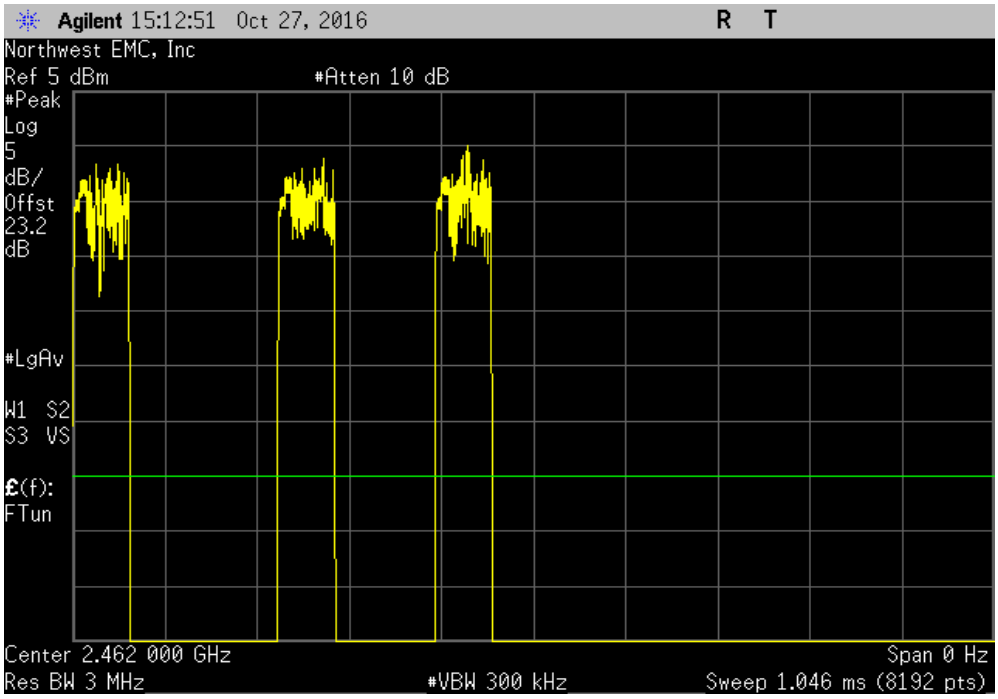
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	64.1 us	232.5 us	1	27.6	N/A	N/A



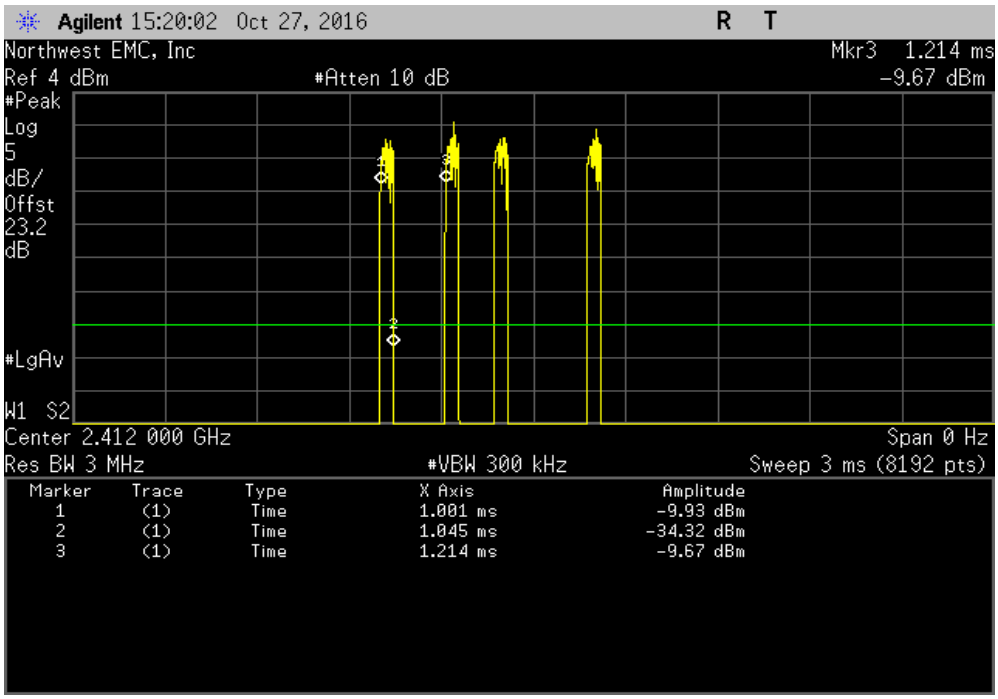
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	3	N/A	N/A	N/A



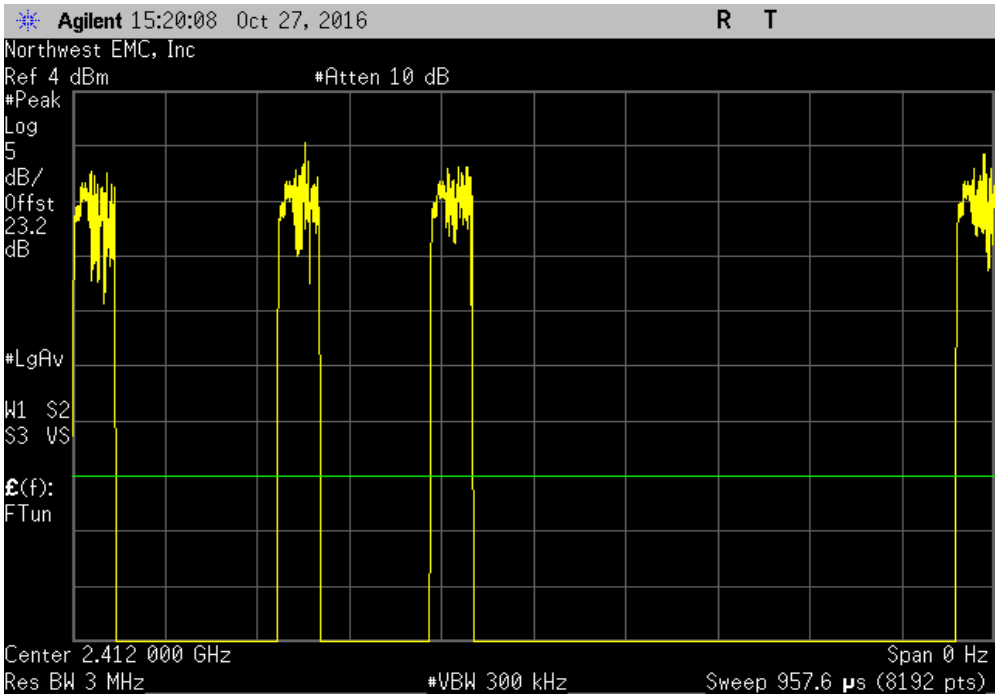
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	43.9 us	212.8 us	1	20.6	N/A	N/A



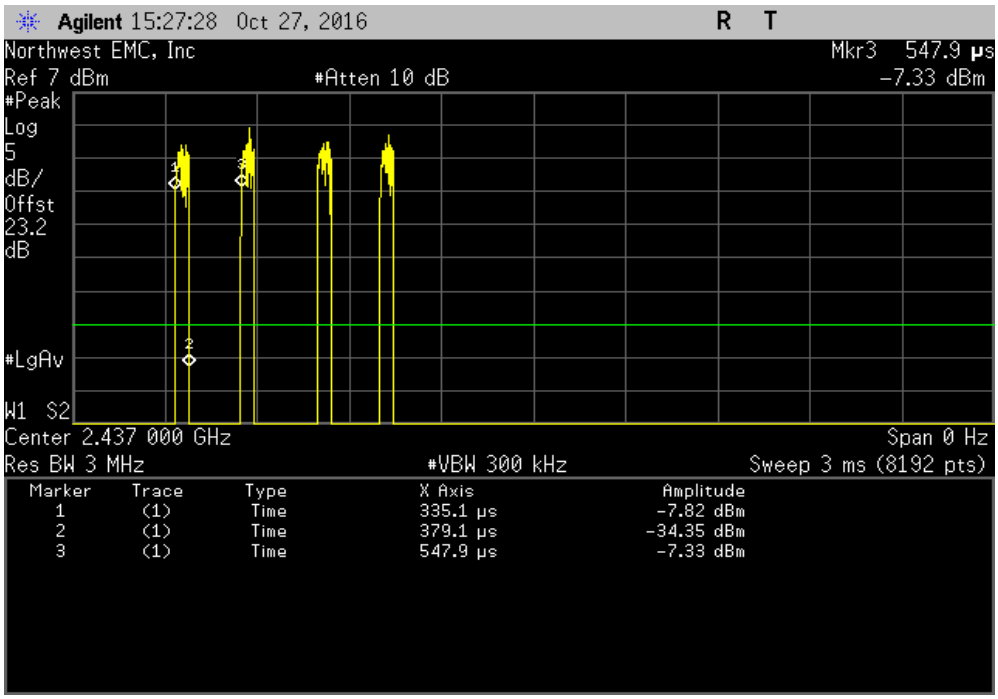
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A



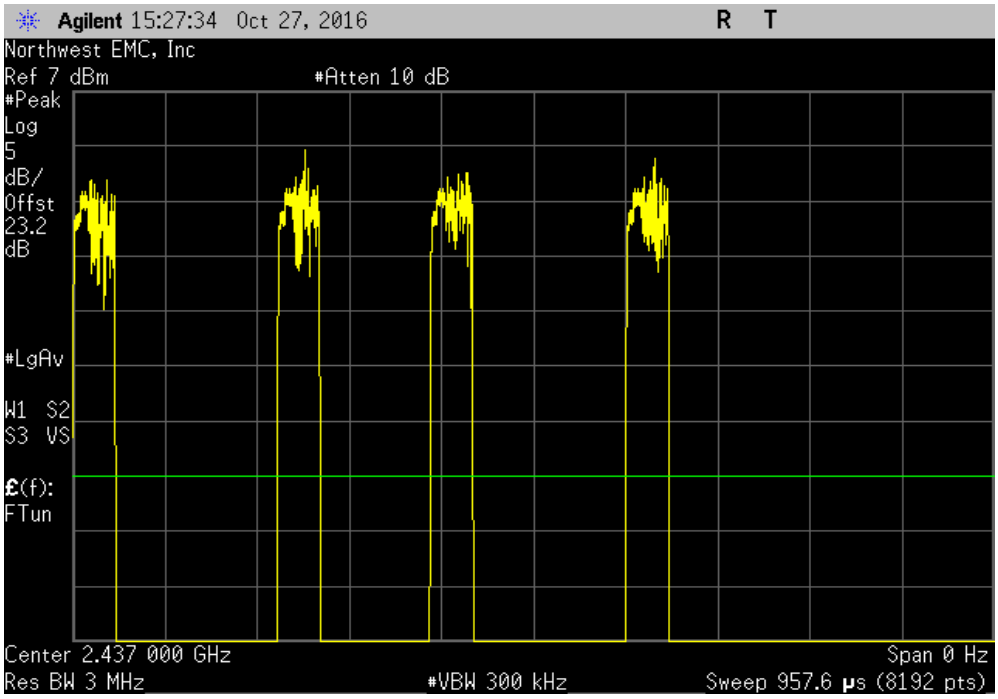
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	44 us	212.8 us	1	20.7	N/A	N/A



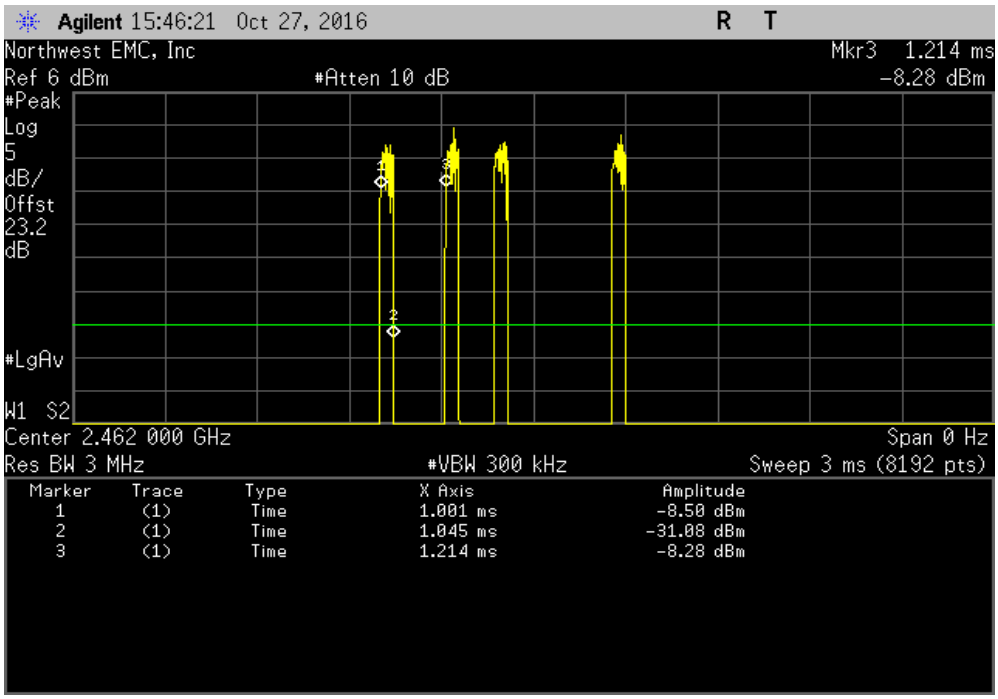
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A



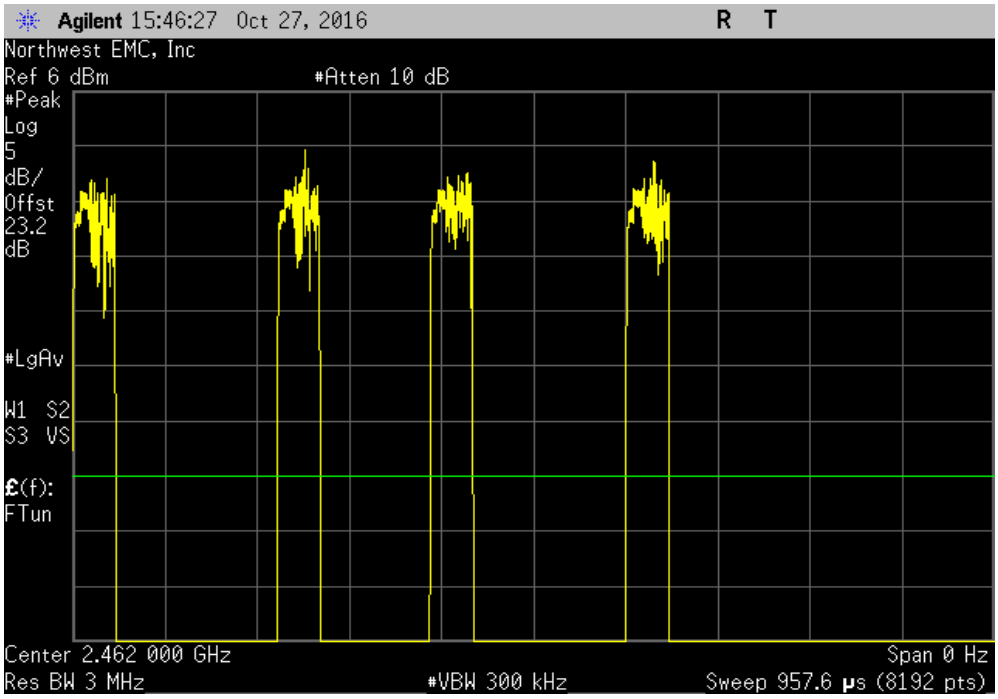
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	43.9 us	212.8 us	1	20.6	N/A	N/A

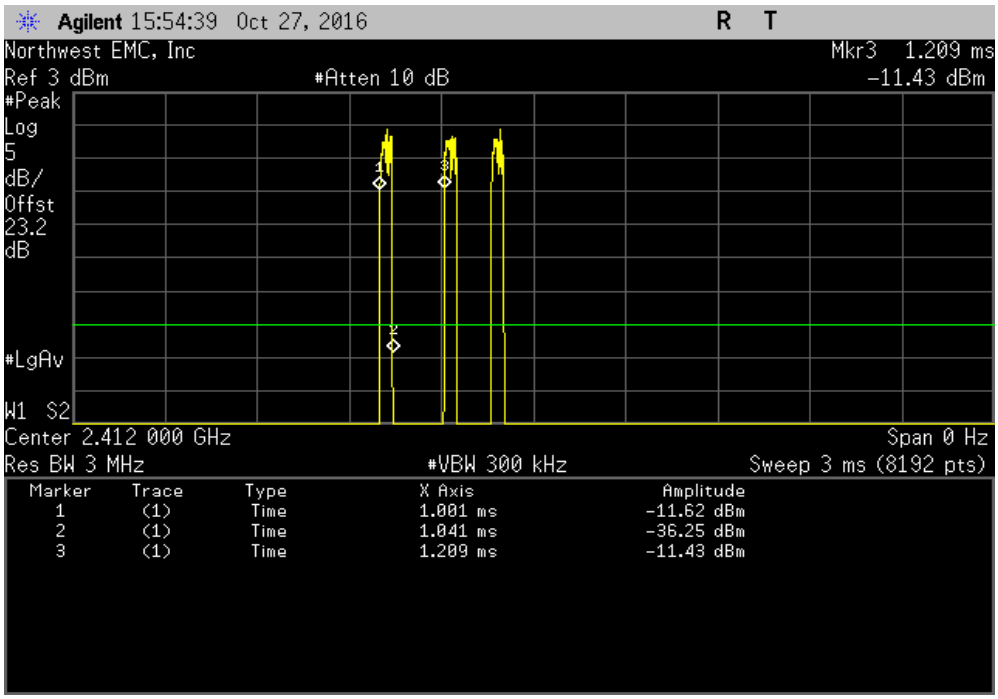


2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A

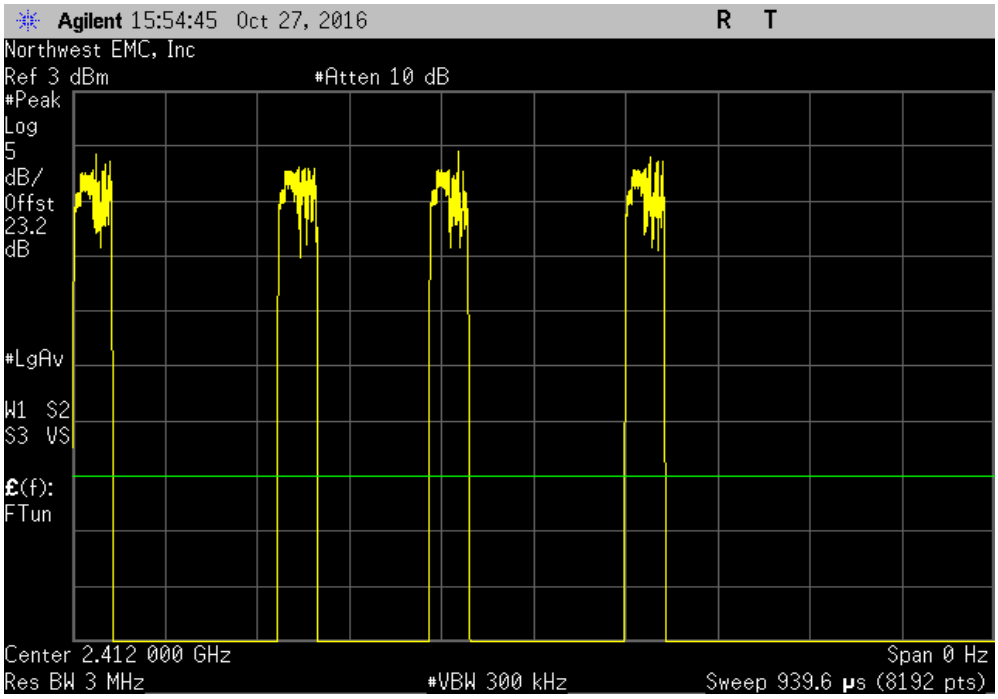


DUTY CYCLE

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	40.7 us	208.8 us	1	19.5	N/A	N/A



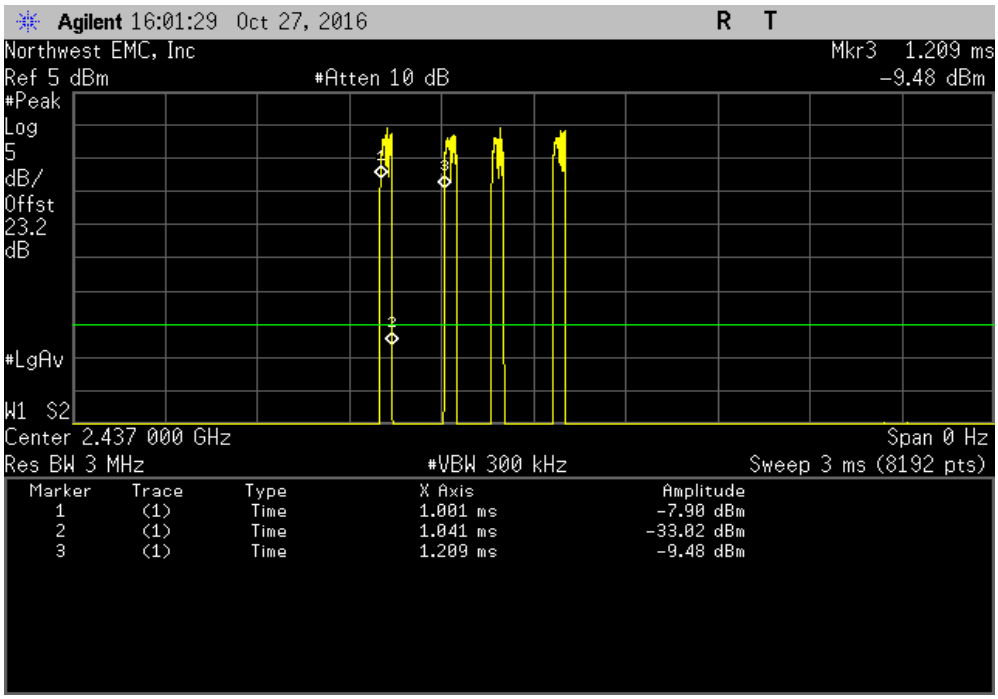
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A



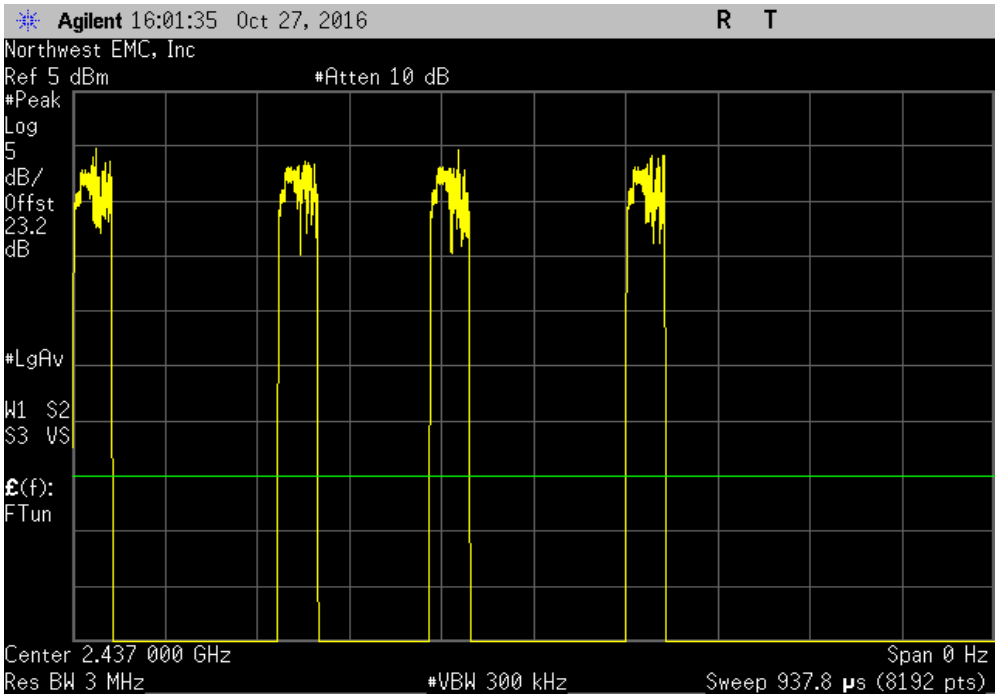
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	39.9 us	208.4 us	1	19.1	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A

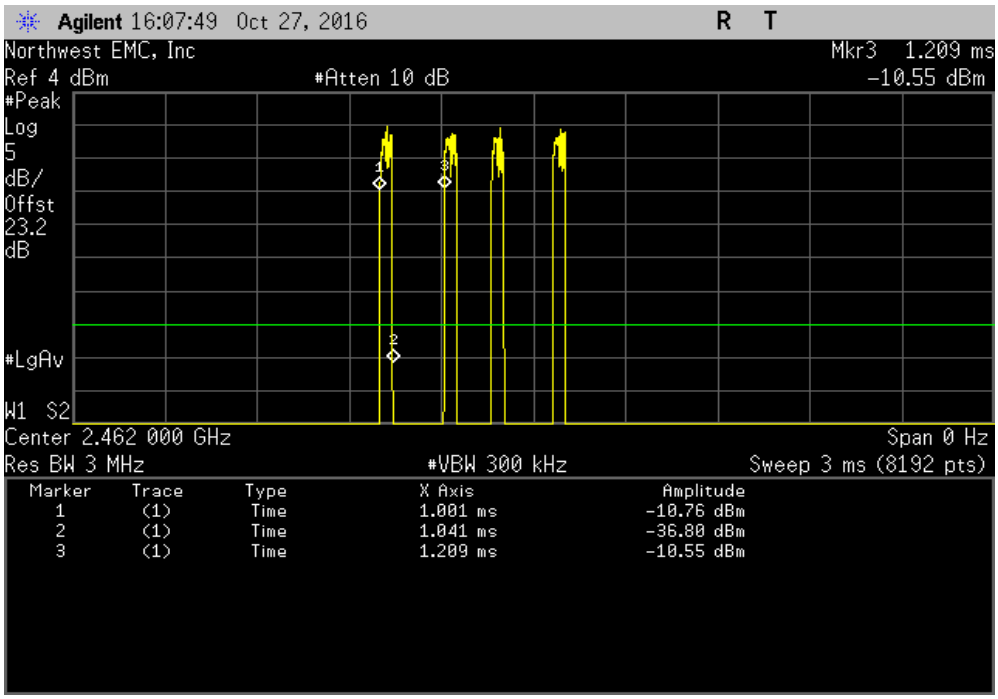


DUTY CYCLE

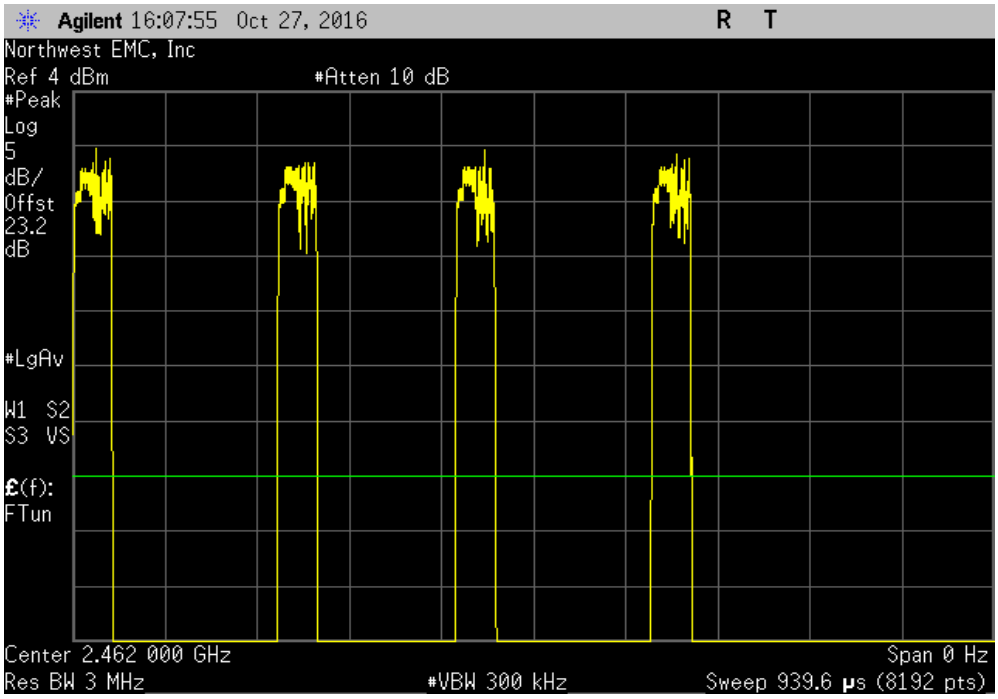
NORTHWEST EMC

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	40.7 us	208.8 us	1	19.5	N/A	N/A



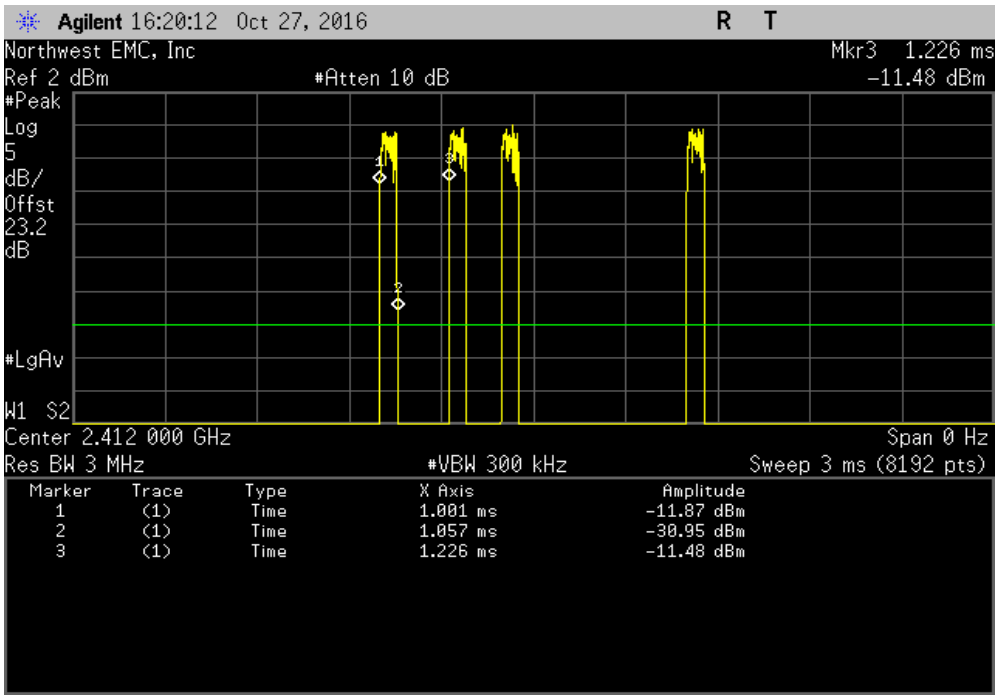
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A



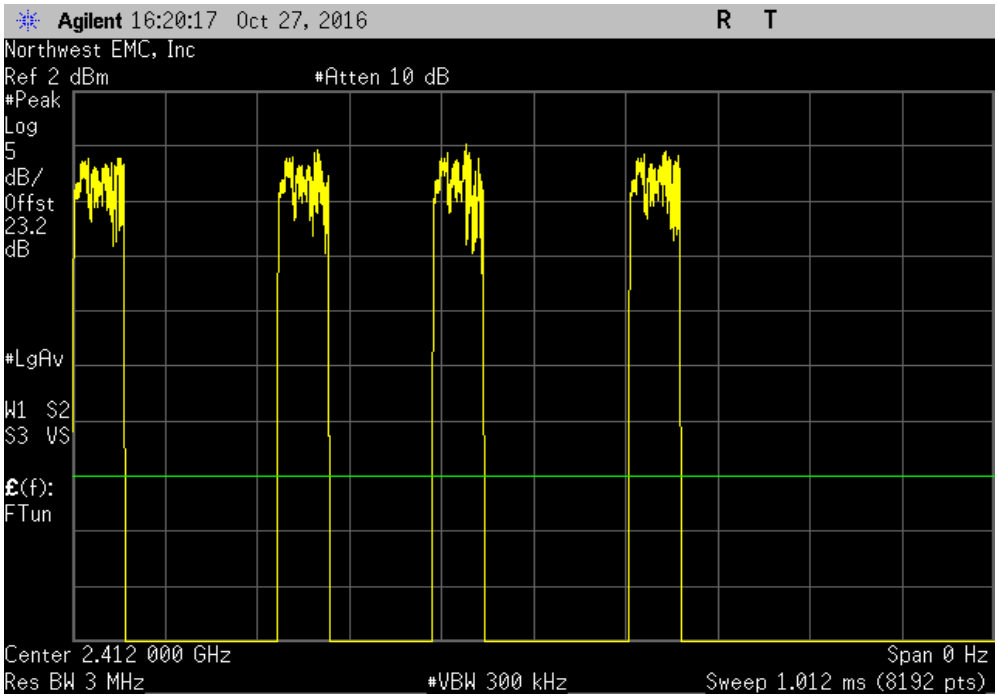
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	56.4 us	224.9 us	1	25.1	N/A	N/A



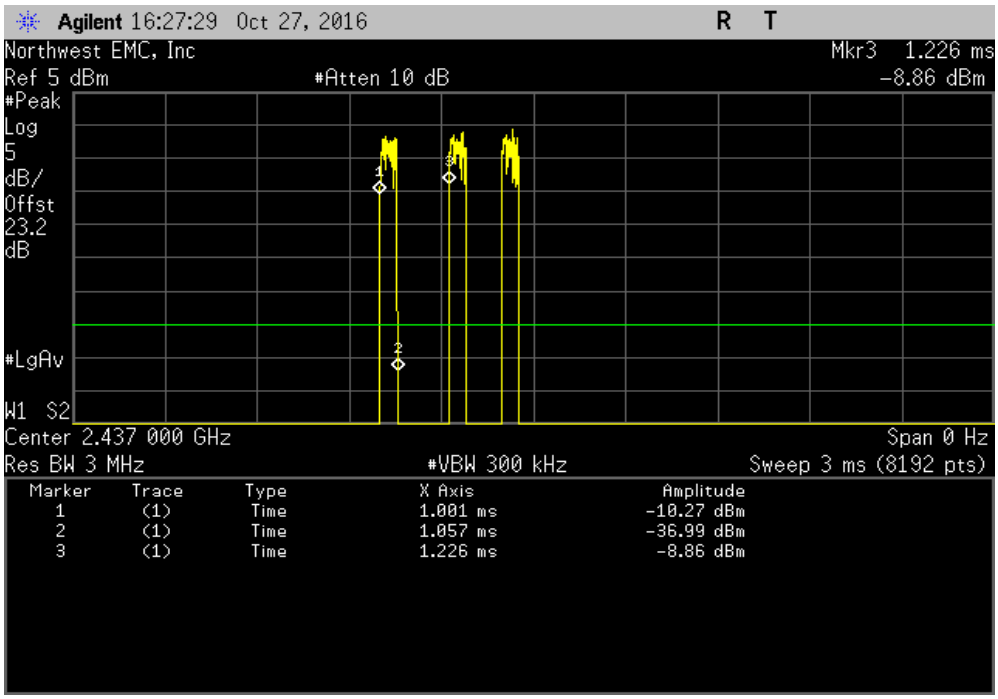
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A



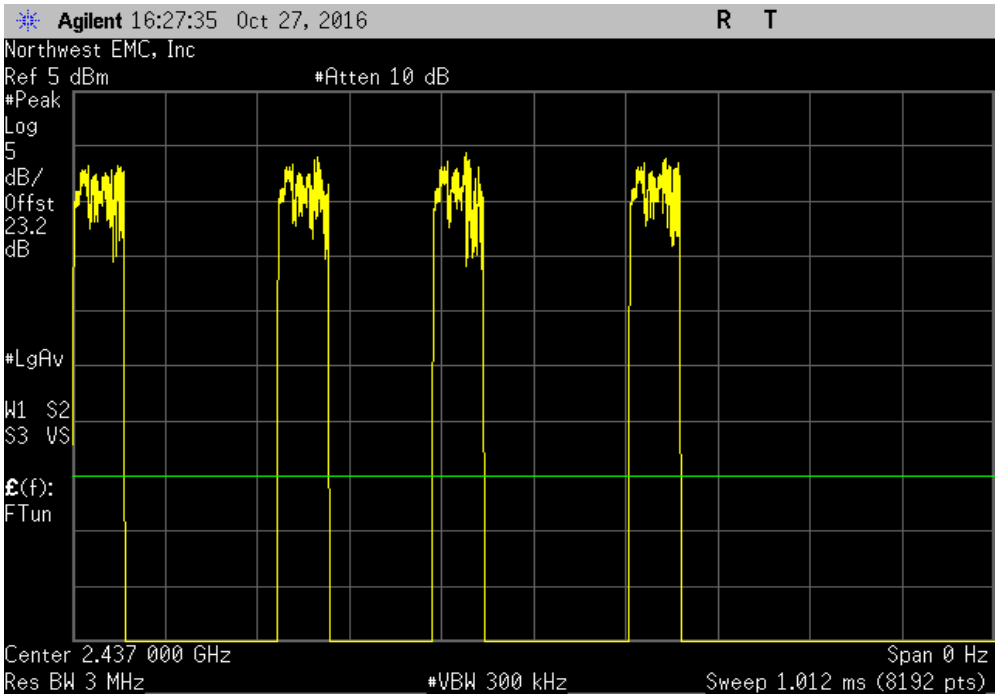
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	56.4 us	224.9 us	1	25.1	N/A	N/A



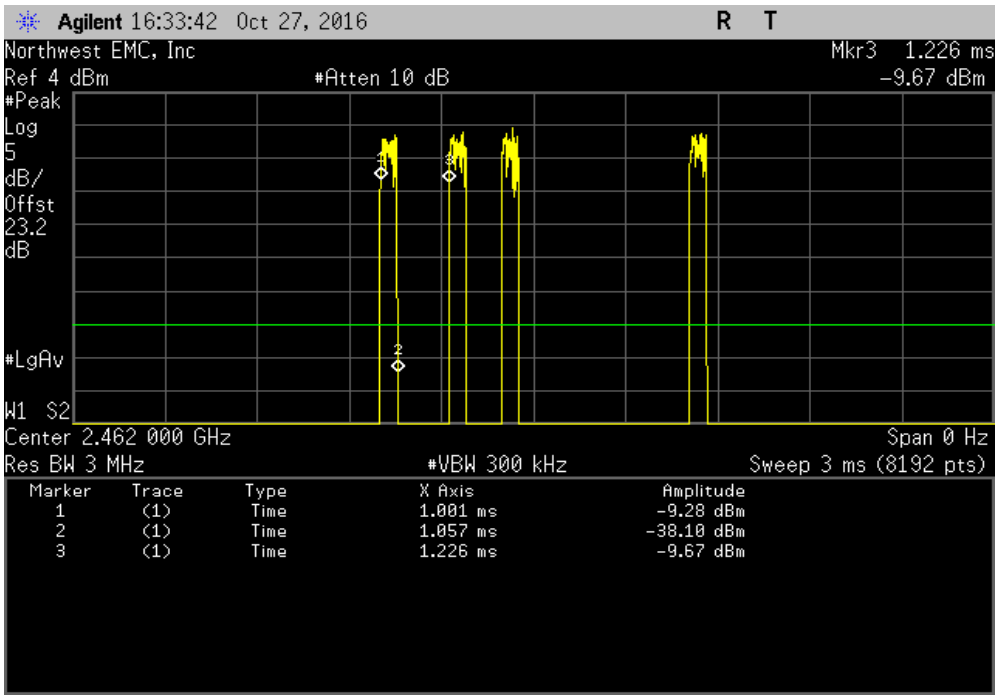
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A



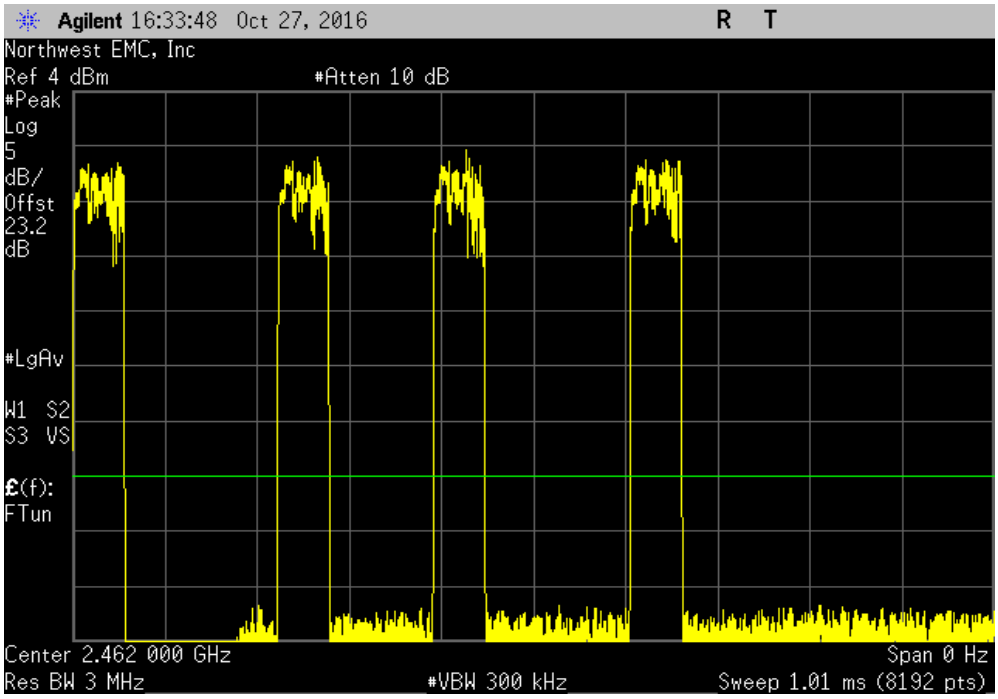
DUTY CYCLE

XMit 2016.05.06

2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	56 us	224.5 us	1	24.9	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	4	N/A	N/A	N/A



OCCUPIED BANDWIDTH

XMit 2016.05.06

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The EUT was set to the channels and modes listed in the datasheet.

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.0% occupied bandwidth was also measured at the same time which can be needed during Output Power depending on the applicable method.

OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2016.05.06

EUT:	ODIN Model 4NR003			**Work Order:**	MDTR0496
Serial Number:	01000			**Date:**	10/28/16
Customer:	Medtronic, Inc.			**Temperature:**	21.7 °C
Attendees:	Dave Hoffman			**Humidity:**	39.7% RH
Project:	None			**Barometric Pres.:**	1013 mbar
Tested by:	Cole Ghizzone	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

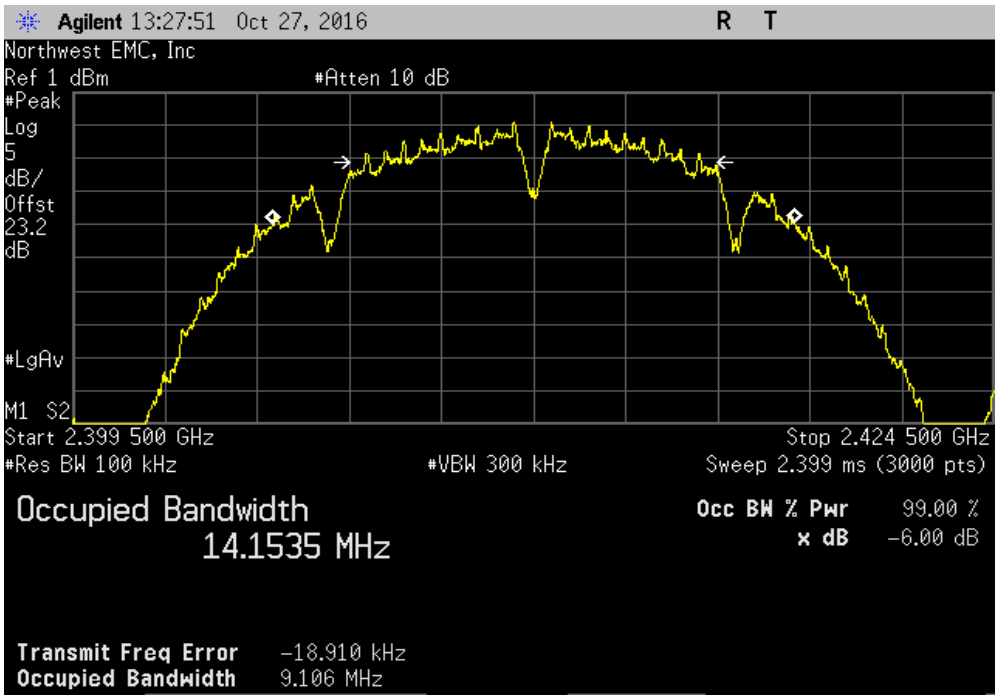
DEVIATIONS FROM TEST STANDARD

None

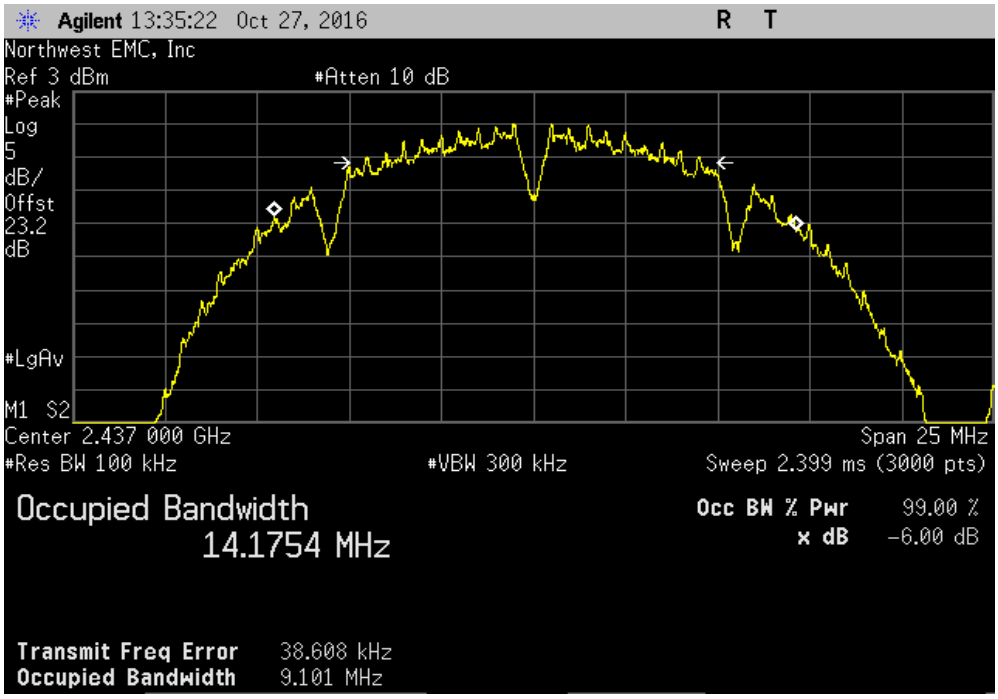
Configuration #	4	Signature

	Value	Limit (>)	Result
2400 MHz - 2483.5 MHz Band			
802.11(b) 1 Mbps			
Low Channel 1, 2412 MHz	9.106 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	9.101 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	9.067 MHz	500 kHz	Pass
802.11(b) 11 Mbps			
Low Channel 1, 2412 MHz	9.092 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	9.009 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	9.206 MHz	500 kHz	Pass
802.11(g) 6 Mbps			
Low Channel 1, 2412 MHz	9.979 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	9.962 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	9.231 MHz	500 kHz	Pass
802.11(g) 36 Mbps			
Low Channel 1, 2412 MHz	15.753 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	15.617 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	15.978 MHz	500 kHz	Pass
802.11(g) 54 Mbps			
Low Channel 1, 2412 MHz	16.228 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	16.068 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	15.858 MHz	500 kHz	Pass
802.11(n) MCS0			
Low Channel 1, 2412 MHz	15.92 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	15.331 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	14.887 MHz	500 kHz	Pass
802.11(n) MCS7			
Low Channel 1, 2412 MHz	16.379 MHz	500 kHz	Pass
Mid Channel 6, 2437 MHz	16.289 MHz	500 kHz	Pass
High Channel 11, 2462 MHz	17.342 MHz	500 kHz	Pass

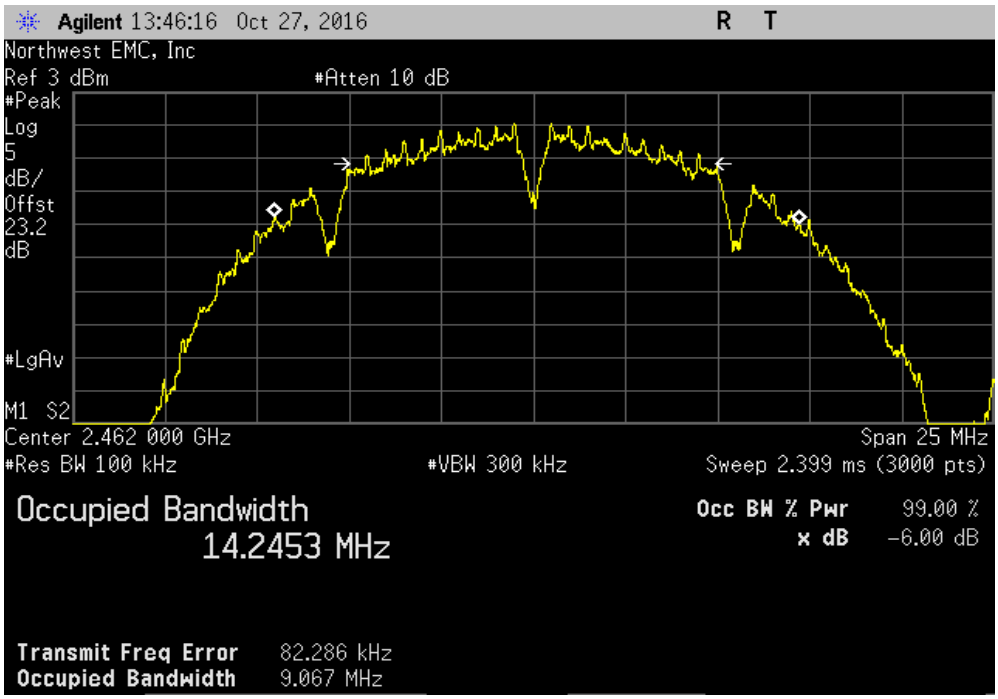
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				9.106 MHz	500 kHz	Pass



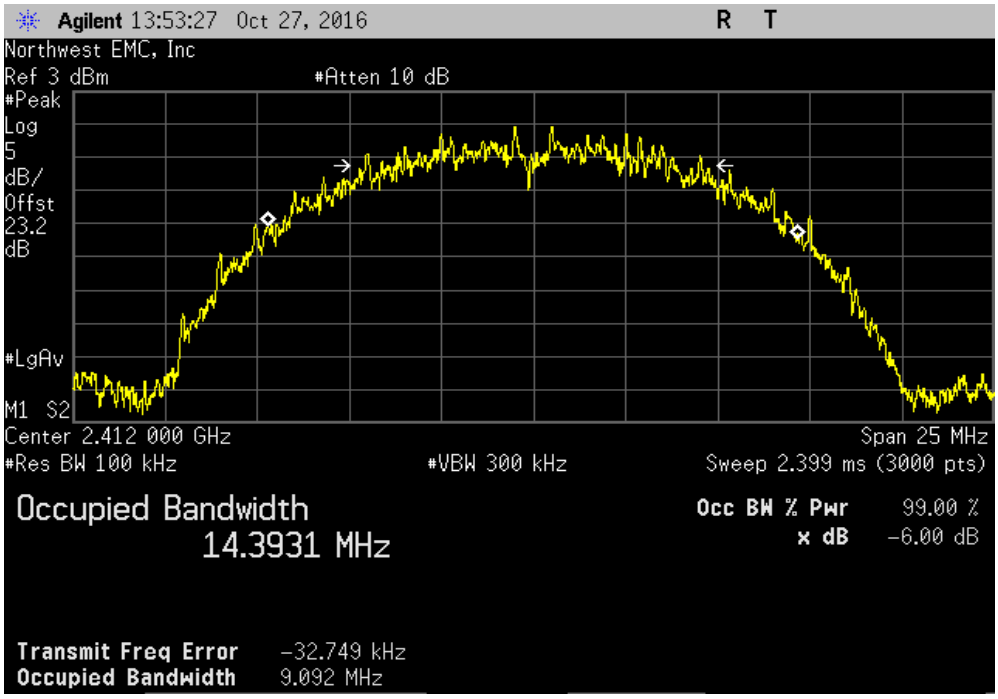
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				9.101 MHz	500 kHz	Pass



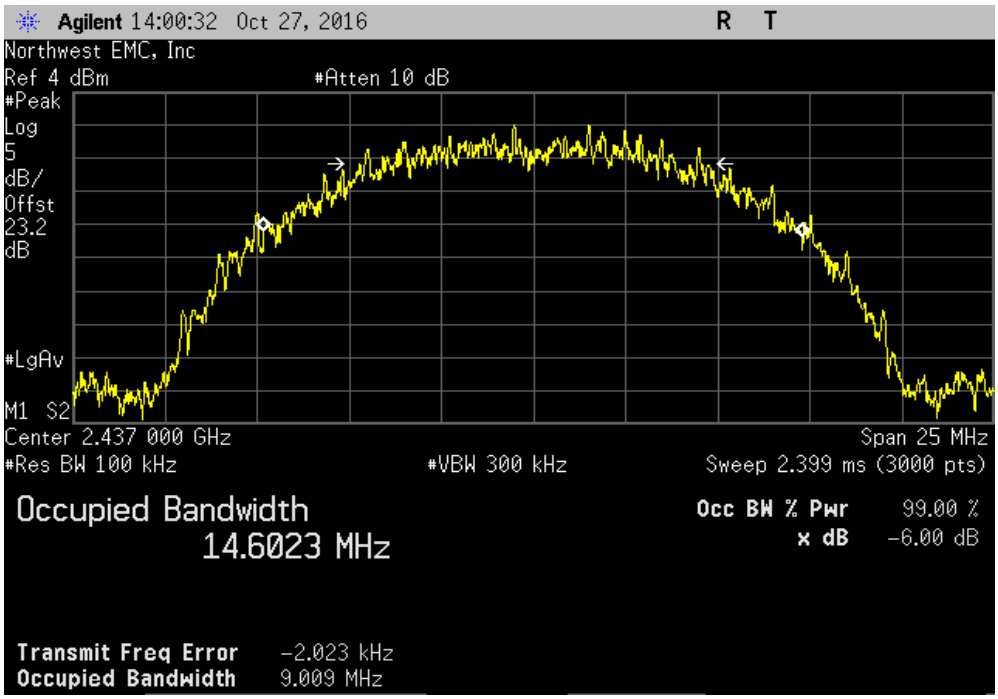
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				9.067 MHz	500 kHz	Pass



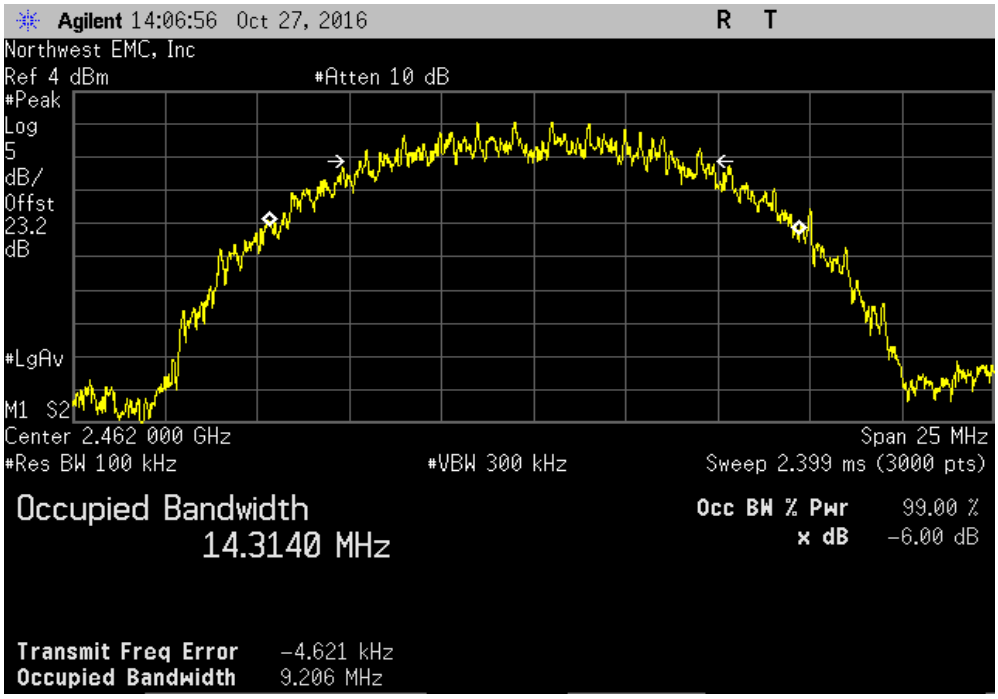
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				9.092 MHz	500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				9.009 MHz	500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				9.206 MHz	500 kHz	Pass



OCCUPIED BANDWIDTH

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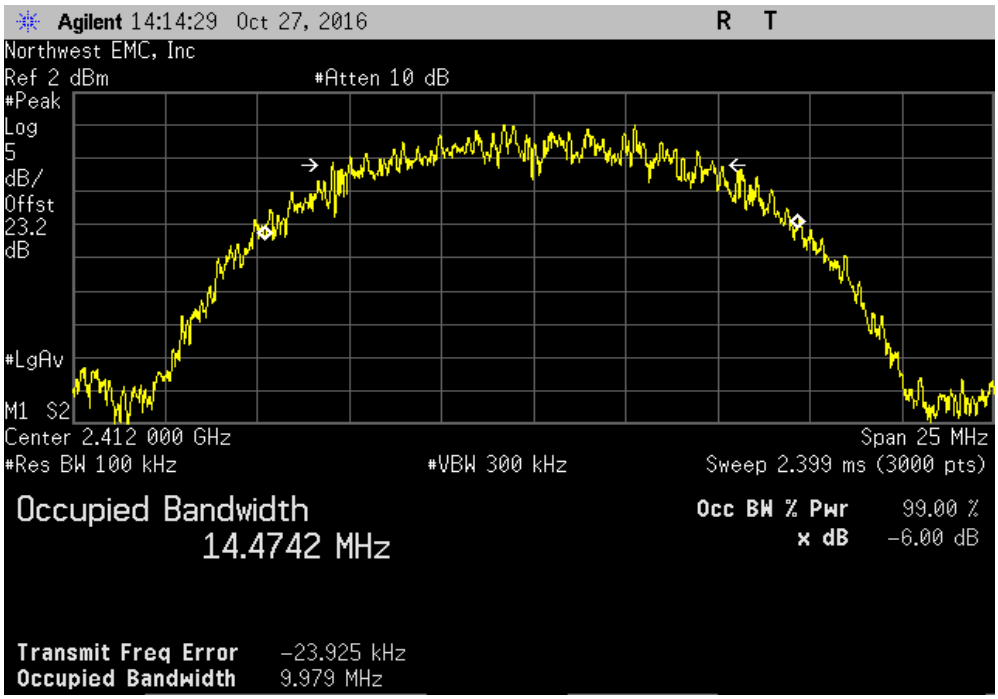
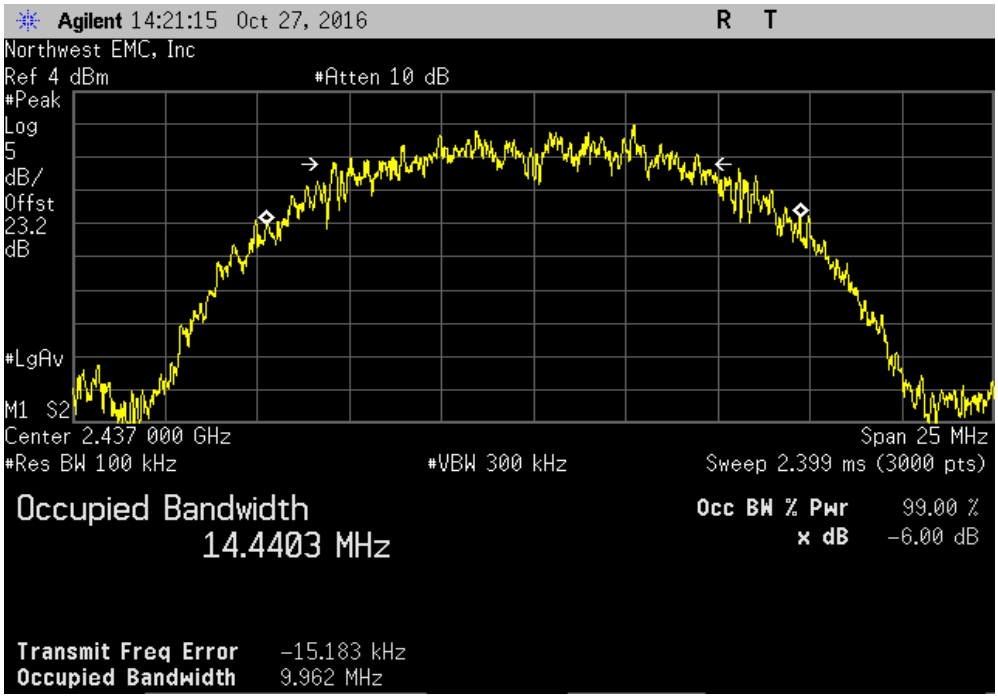
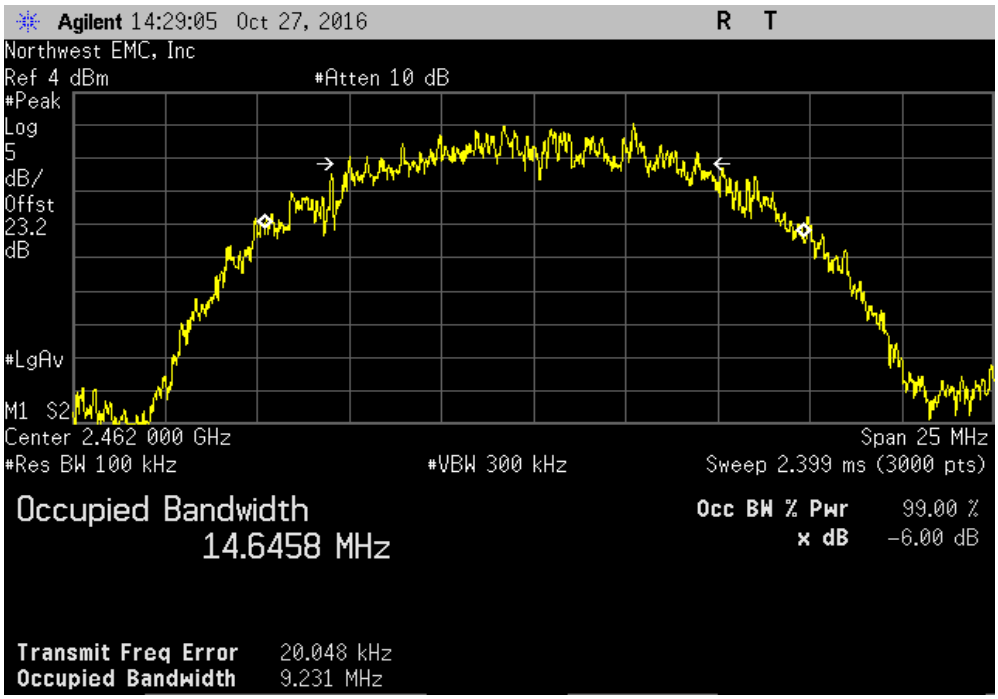
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				9.979 MHz	500 kHz	Pass



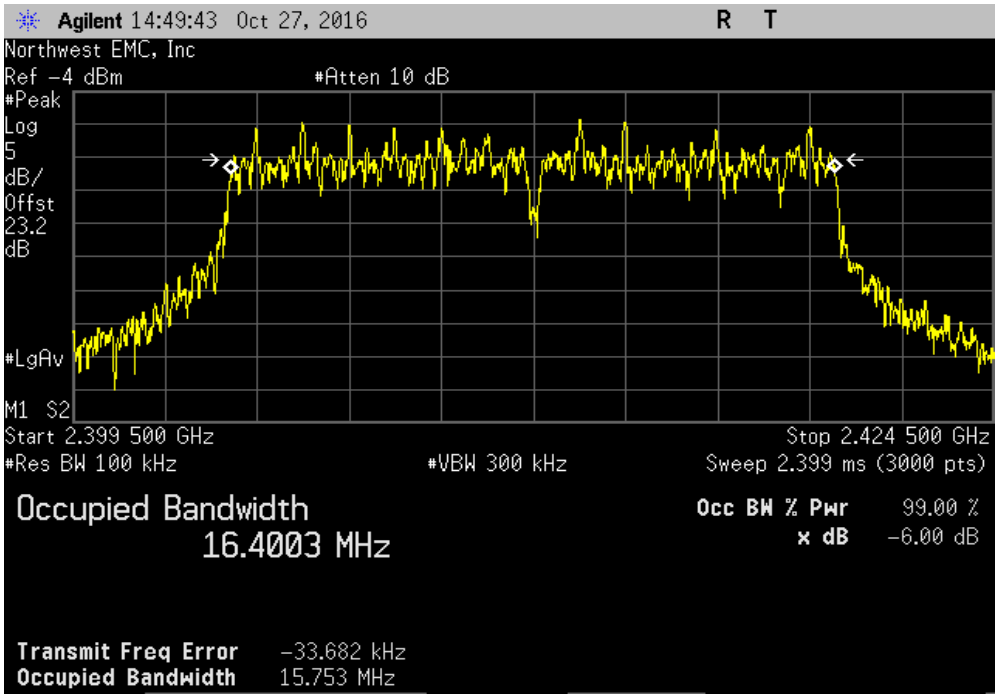
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				9.962 MHz	500 kHz	Pass



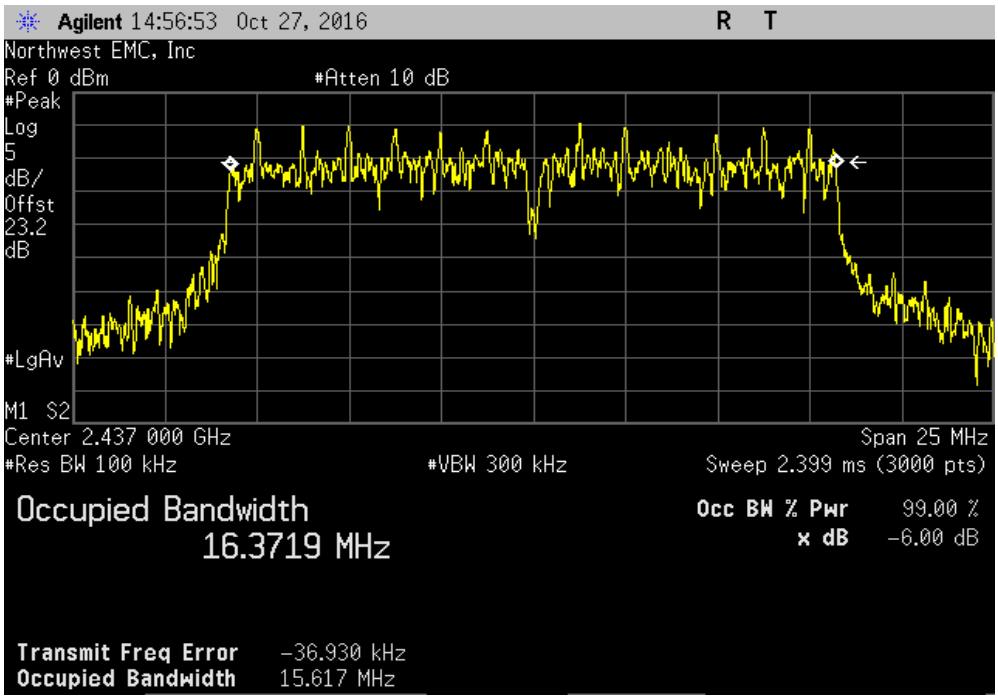
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				9.231 MHz	500 kHz	Pass



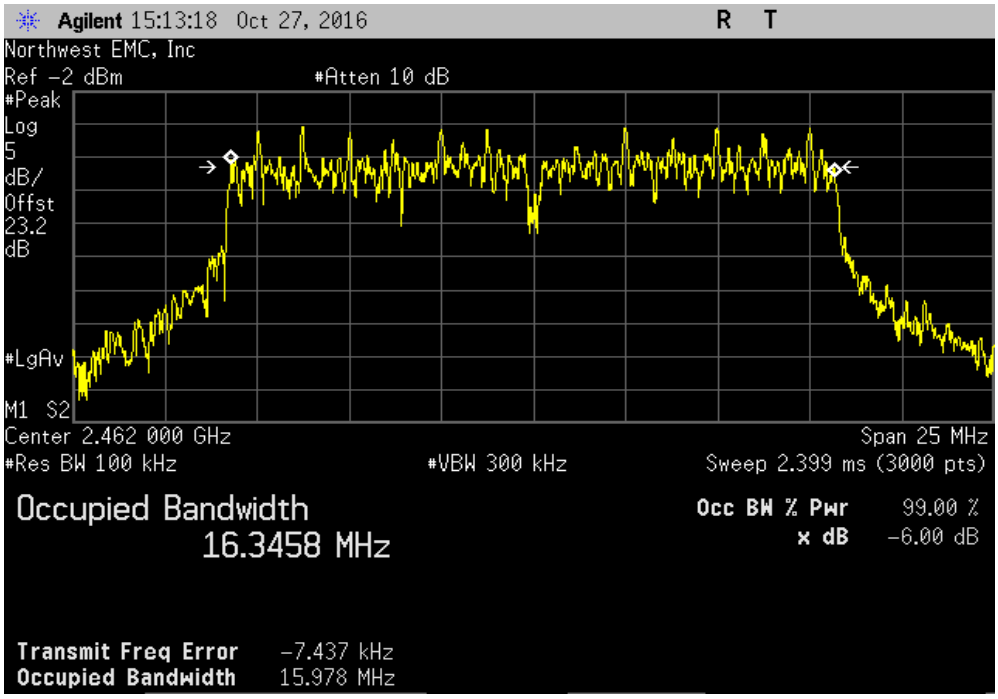
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				15.753 MHz	500 kHz	Pass



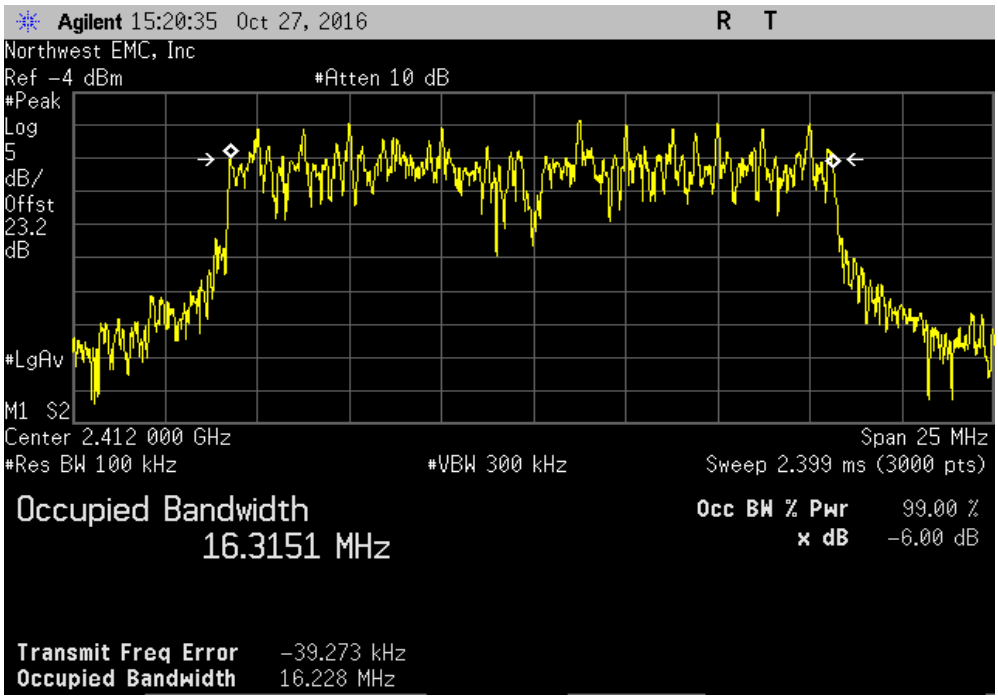
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				15.617 MHz	500 kHz	Pass



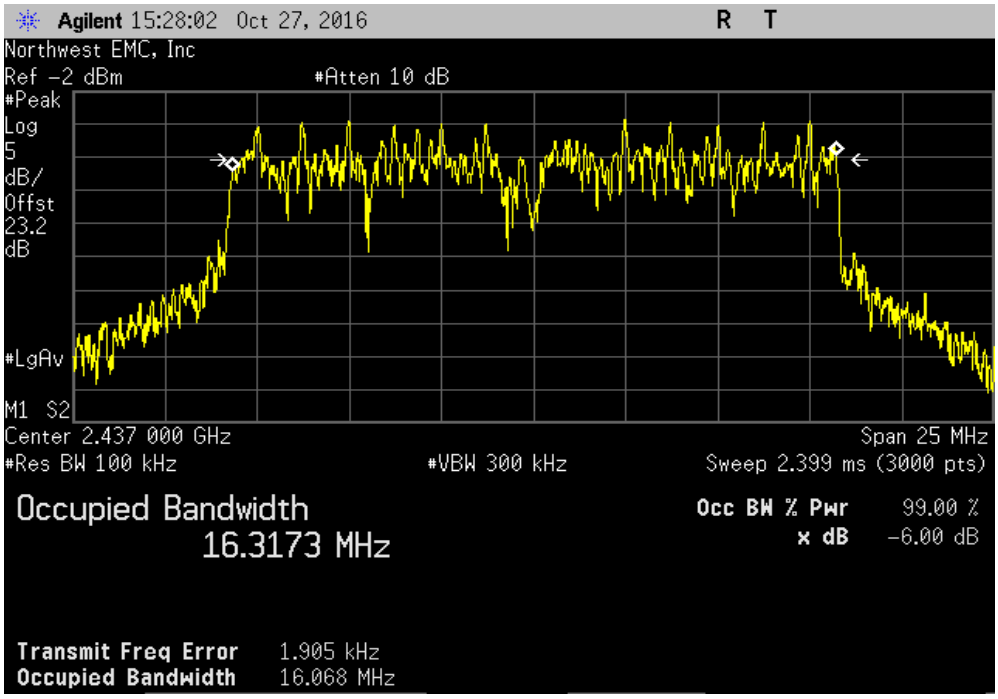
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				15.978 MHz	500 kHz	Pass



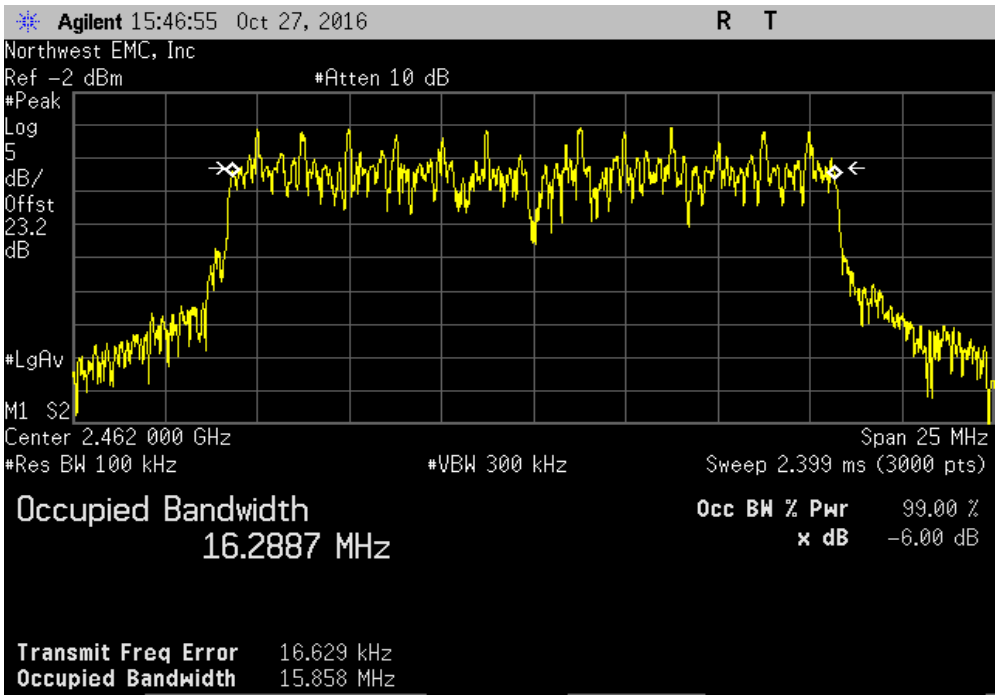
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				16.228 MHz	500 kHz	Pass



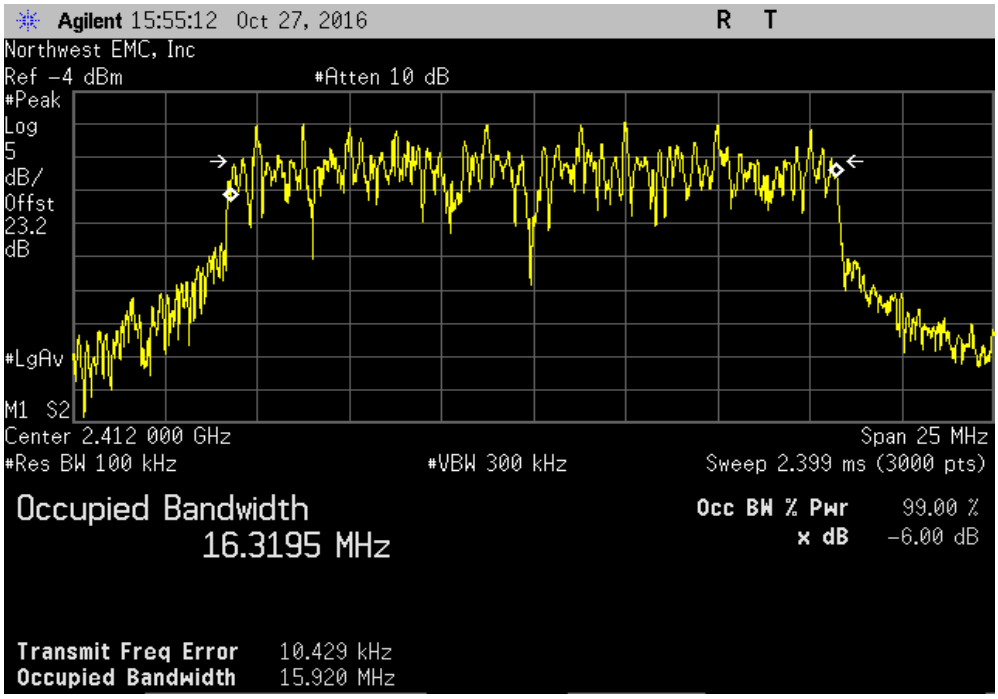
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				16.068 MHz	500 kHz	Pass



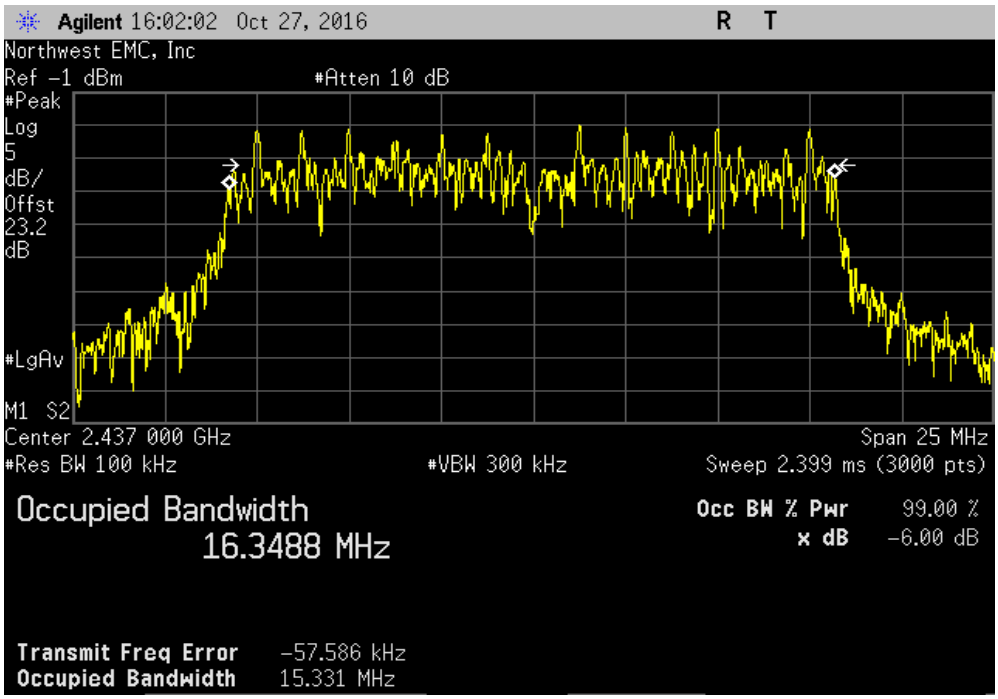
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				15.858 MHz	500 kHz	Pass



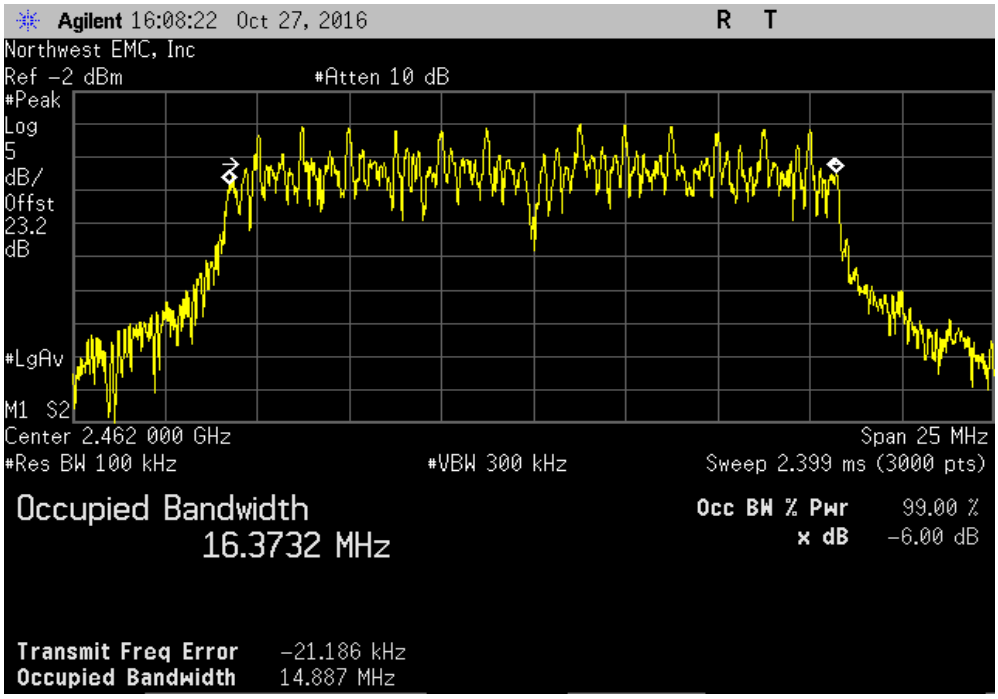
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				15.92 MHz	500 kHz	Pass



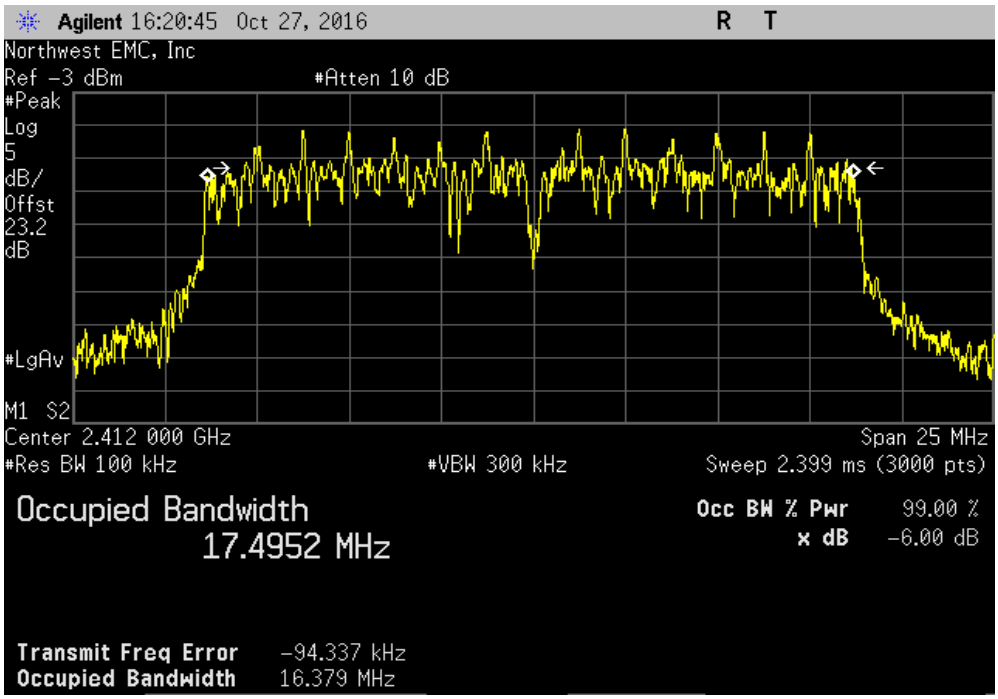
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				15.331 MHz	500 kHz	Pass



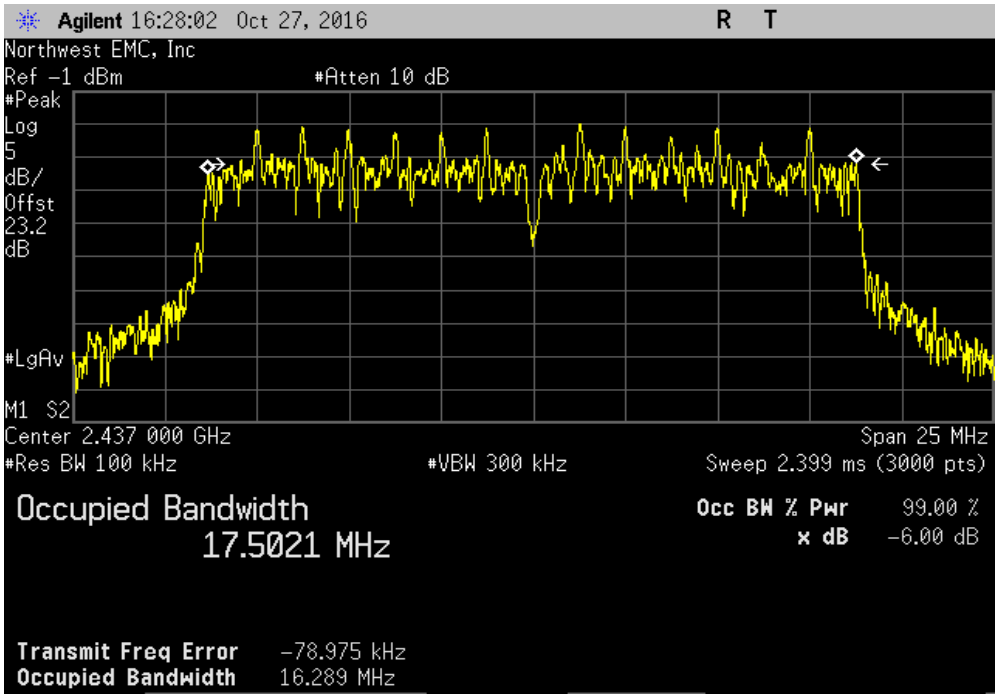
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				14.887 MHz	500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				16.379 MHz	500 kHz	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				16.289 MHz	500 kHz	Pass



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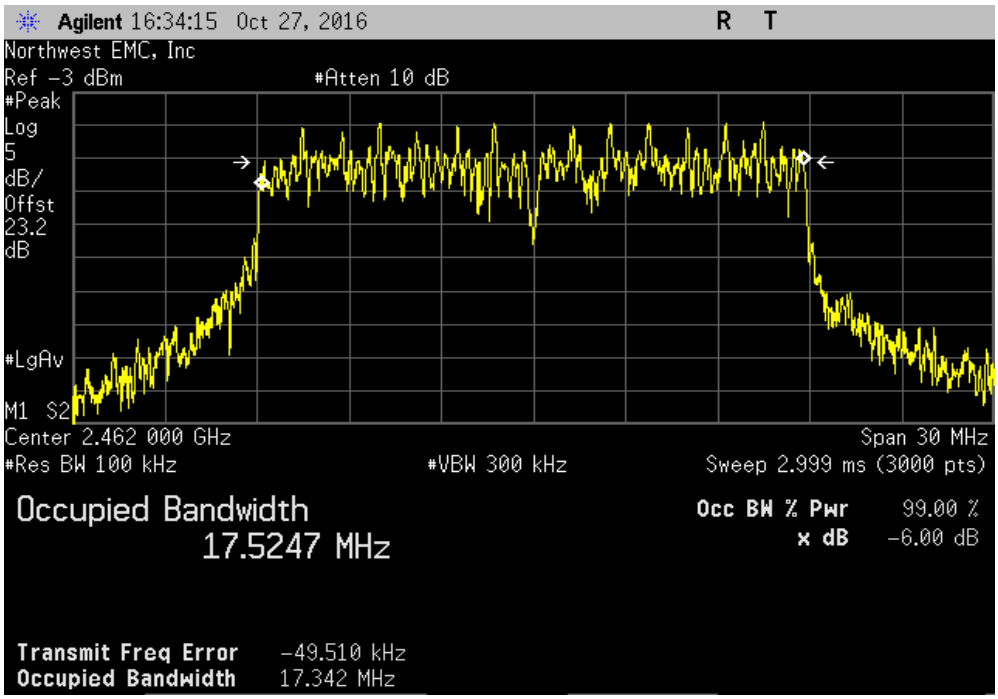
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				17.342 MHz	500 kHz	Pass



OUTPUT POWER

NORTHWEST EMC

XMit 2016.05.06

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

Prior to measuring output power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. Both are required to determine the method of measuring Maximum Conducted Output Power. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

The method AVGSA-2 in section 11.9.2.2.4 of ANSI C63.10:2013 was used to make the measurement. This method uses trace averaging across ON and OFF times of the EUT transmissions in the spectrum analyzer channel power function using an RMS detector. Following the measurement a duty cycle correction was applied by adding [10 log (1 / D)], where D is the duty cycle, to the measured power to compute the average power during the actual transmission times.

De Facto EIRP Limit: The EUT meets the de facto EIRP limit of +36 dBm.

OUTPUT POWER

NORTHWEST EMC

XMit 2016.05.06

EUT:	ODIN Model 4NR003			**Work Order:**	MDTR0496
Serial Number:	01000			**Date:**	10/28/16
Customer:	Medtronic, Inc.			**Temperature:**	21.3 °C
Attendees:	Dave Hoffman			**Humidity:**	40.4% RH
Project:	None			**Barometric Pres.:**	1013 mbar
Tested by:	Cole Ghizzone	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

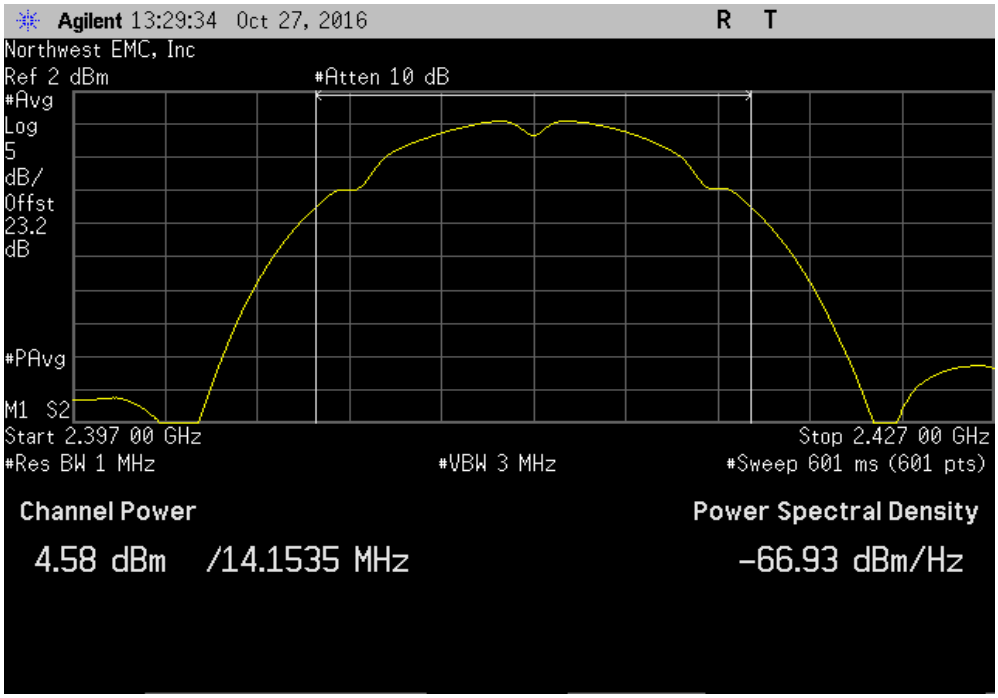
DEVIATIONS FROM TEST STANDARD

None

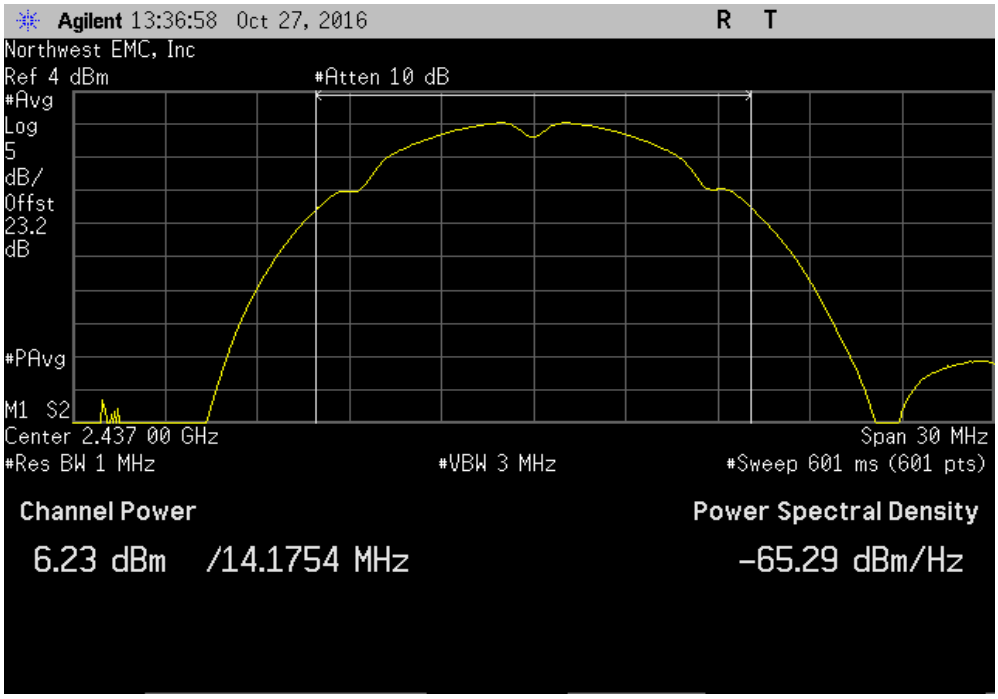
Configuration #	4	*Signature*

	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Value (dBm)	Limit (dBm)	Results
2400 MHz - 2483.5 MHz Band					
802.11(b) 1 Mbps					
Low Channel 1, 2412 MHz	4.575	1.2	5.7	30	Pass
Mid Channel 6, 2437 MHz	6.227	1.3	7.5	30	Pass
High Channel 11, 2462 MHz	6.415	1.3	7.8	30	Pass
802.11(b) 11 Mbps					
Low Channel 1, 2412 MHz	0.434	2.8	3.2	30	Pass
Mid Channel 6, 2437 MHz	2.137	2.8	4.9	30	Pass
High Channel 11, 2462 MHz	2.273	2.8	5	30	Pass
802.11(g) 6 Mbps					
Low Channel 1, 2412 MHz	-1.215	3.6	2.4	30	Pass
Mid Channel 6, 2437 MHz	0.417	3.6	4	30	Pass
High Channel 11, 2462 MHz	0.607	3.6	4.2	30	Pass
802.11(g) 36 Mbps					
Low Channel 1, 2412 MHz	-9.99	5.6	-4.4	30	Pass
Mid Channel 6, 2437 MHz	-6.482	5.6	-0.9	30	Pass
High Channel 11, 2462 MHz	-8.667	5.6	-3.1	30	Pass
802.11(g) 54 Mbps					
Low Channel 1, 2412 MHz	-11.518	6.9	-4.7	30	Pass
Mid Channel 6, 2437 MHz	-9.238	6.8	-2.4	30	Pass
High Channel 11, 2462 MHz	-10.226	6.9	-3.4	30	Pass
802.11(n) MCS0					
Low Channel 1, 2412 MHz	-11.915	7.1	-4.8	30	Pass
Mid Channel 6, 2437 MHz	-9.625	7.2	-2.4	30	Pass
High Channel 11, 2462 MHz	-10.567	7.1	-3.5	30	Pass
802.11(n) MCS7					
Low Channel 1, 2412 MHz	-10.4	6	-4.4	30	Pass
Mid Channel 6, 2437 MHz	-8.107	6	-2.1	30	Pass
High Channel 11, 2462 MHz	-9.101	6	-3.1	30	Pass

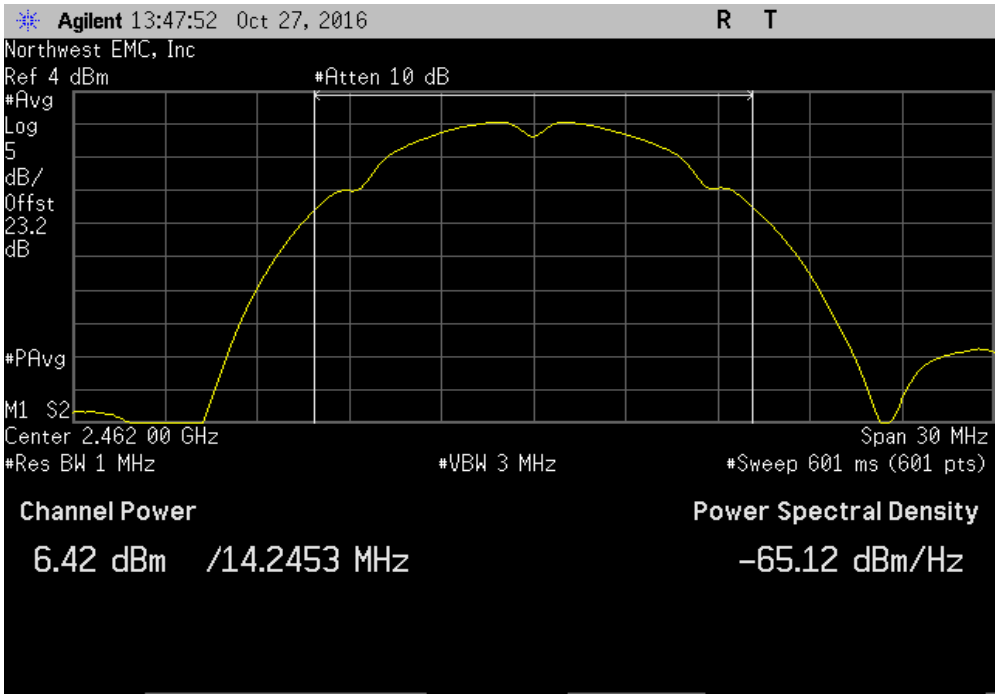
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	4.575	1.2		5.7	30	Pass



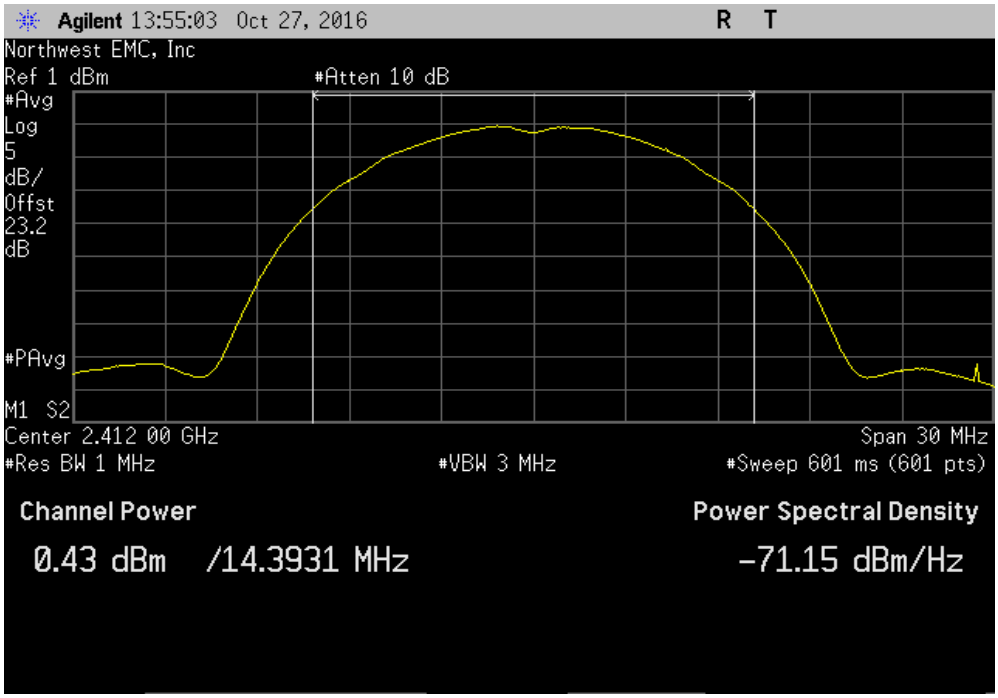
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	6.227	1.3		7.5	30	Pass



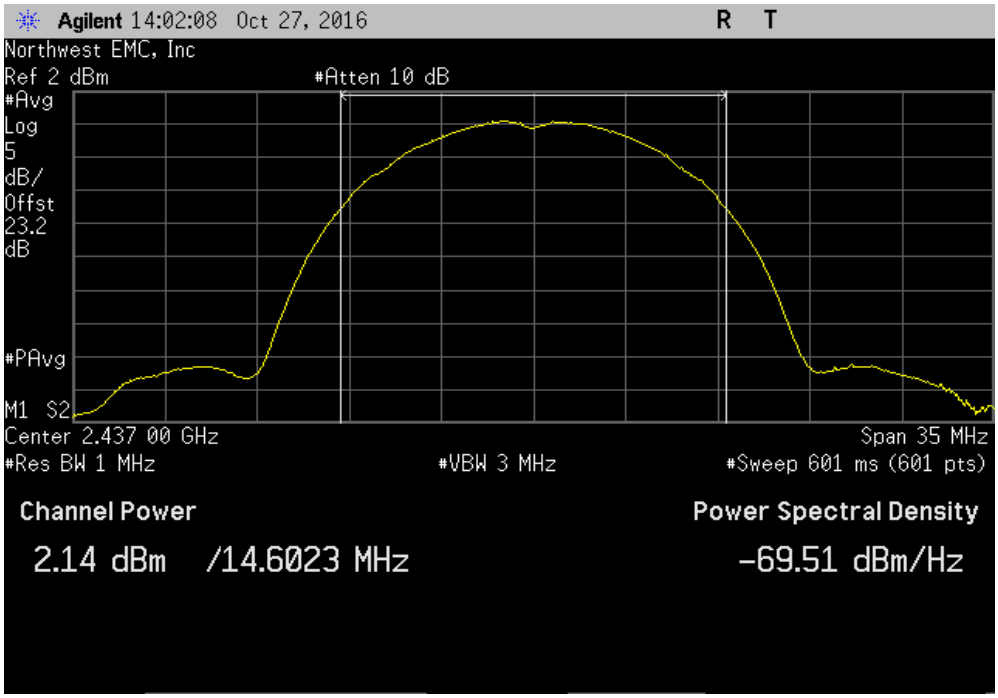
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	6.415	1.3		7.8	30	Pass



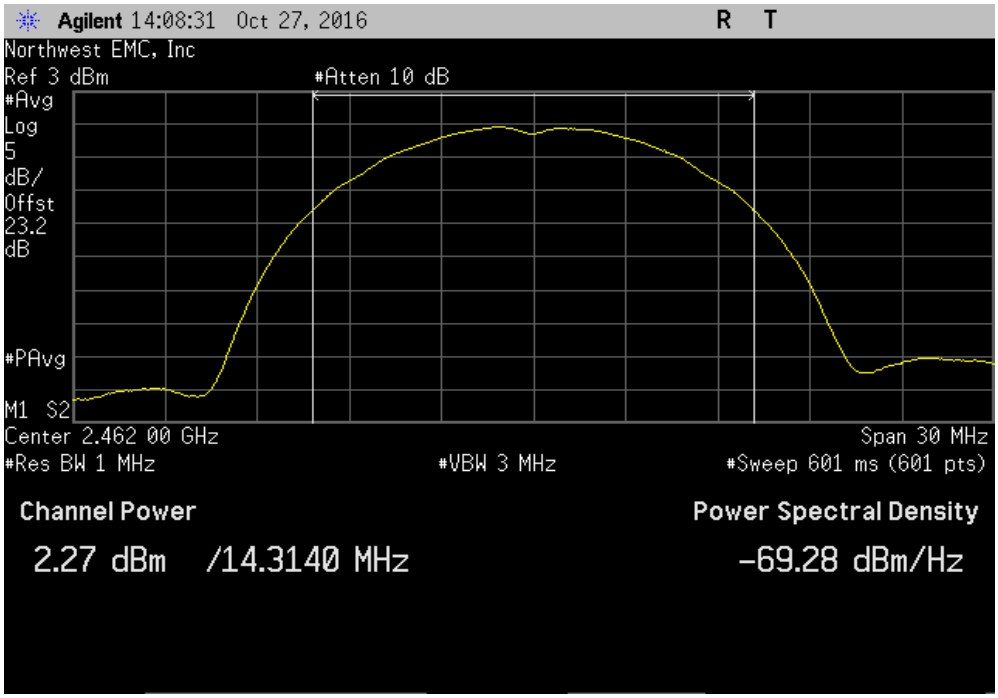
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	0.434	2.8		3.2	30	Pass



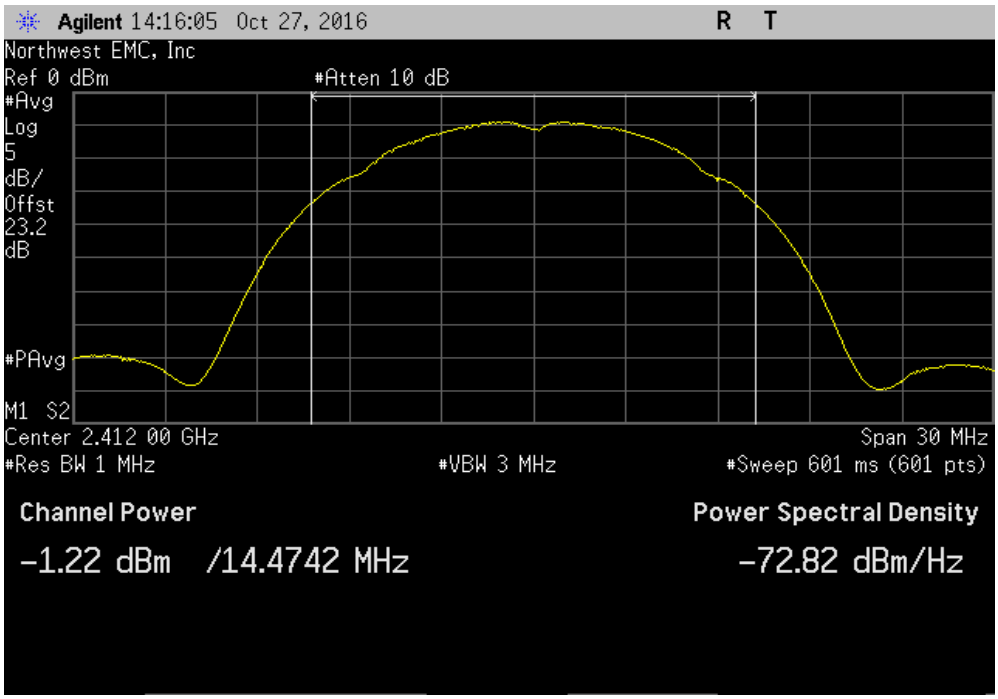
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	2.137	2.8		4.9	30	Pass



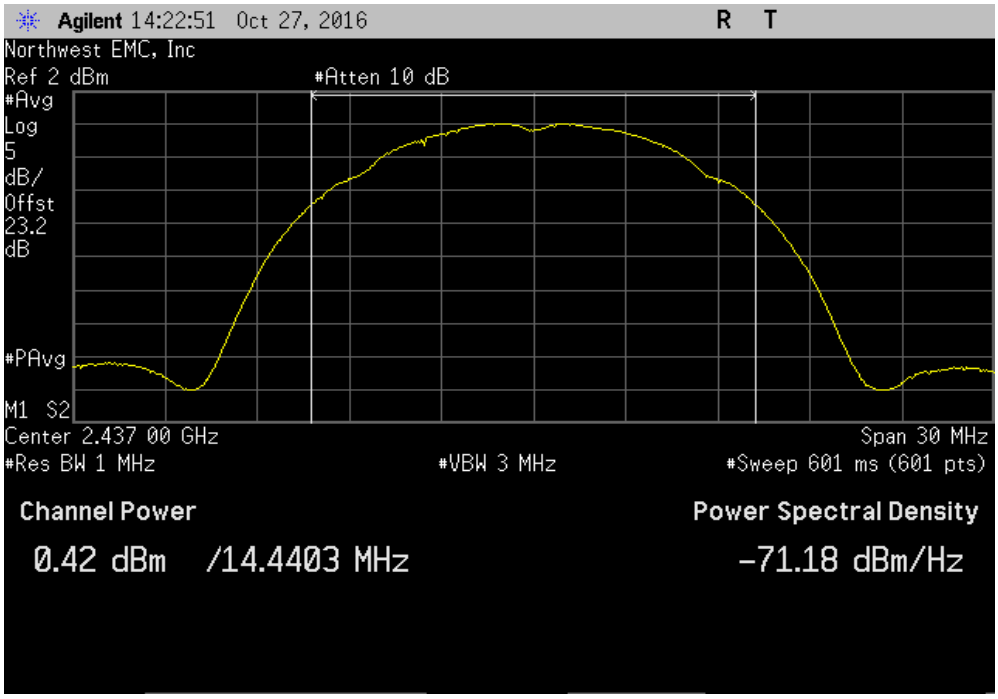
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	2.273	2.8		5	30	Pass



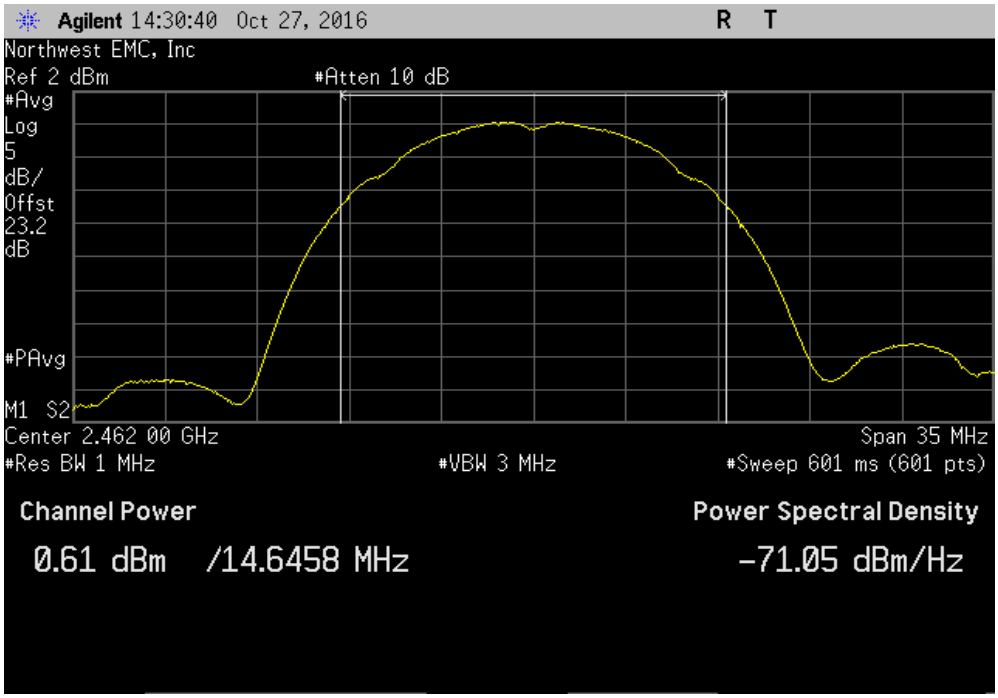
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-1.215	3.6		2.4	30	Pass



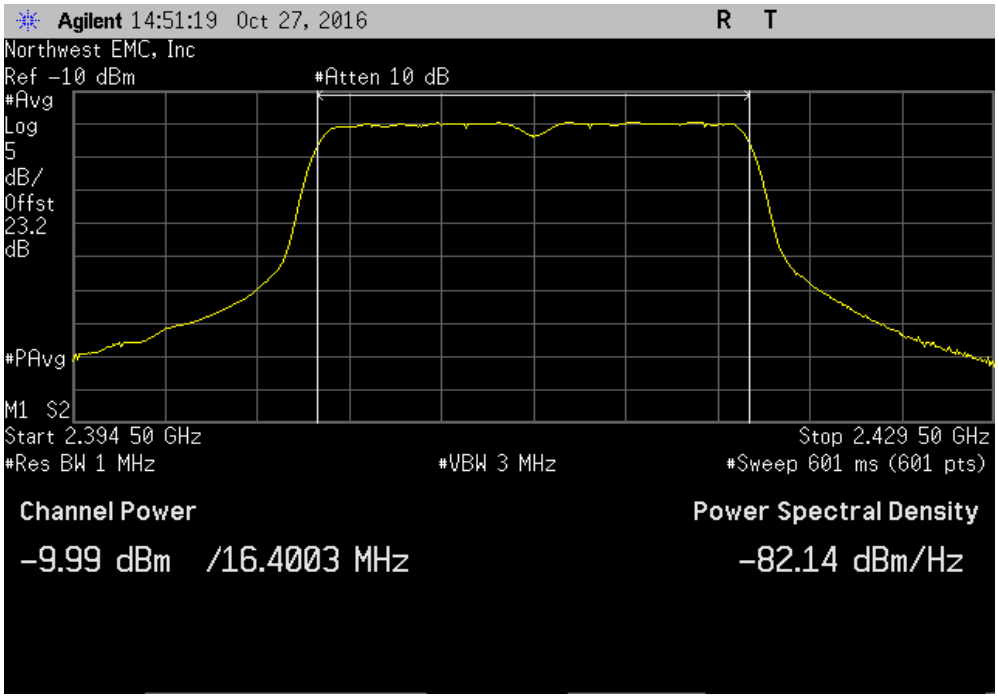
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	0.417	3.6		4	30	Pass



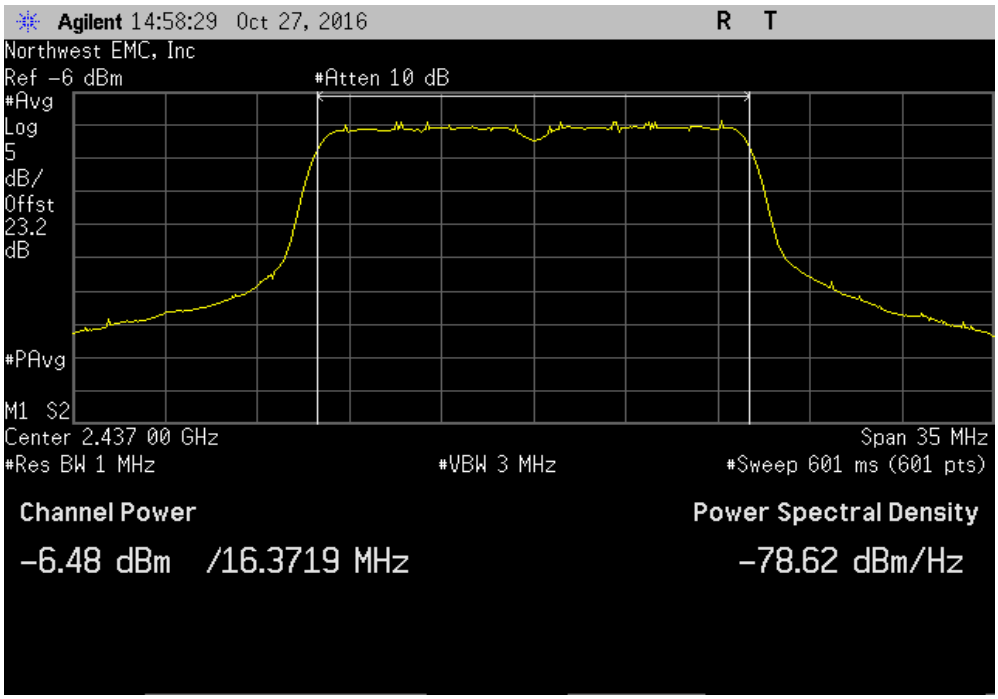
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	0.607	3.6		4.2	30	Pass



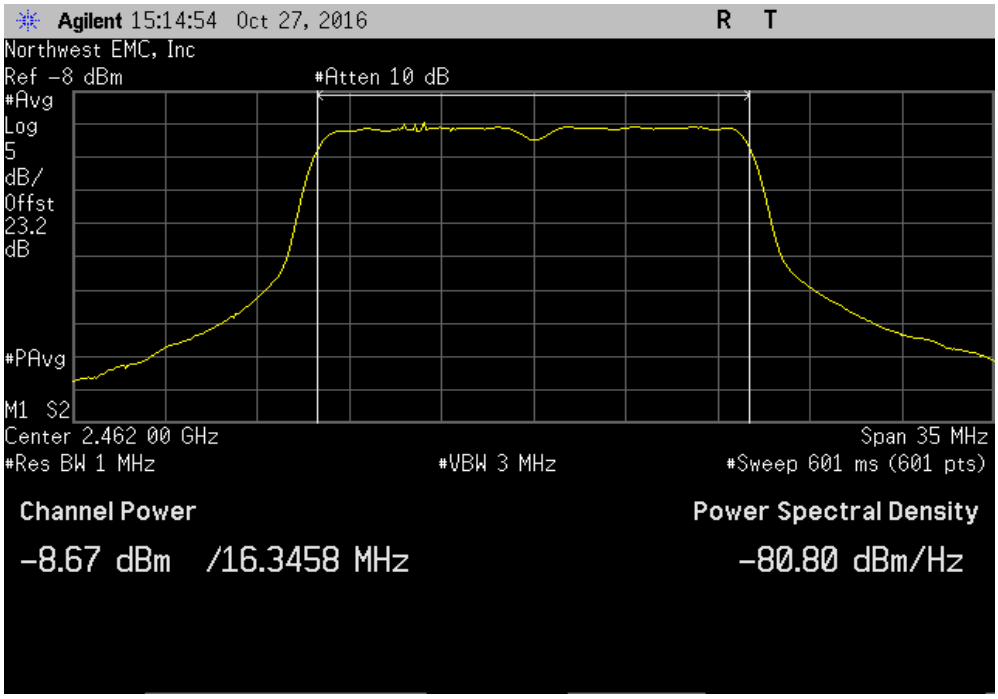
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-9.99	5.6		-4.4	30	Pass



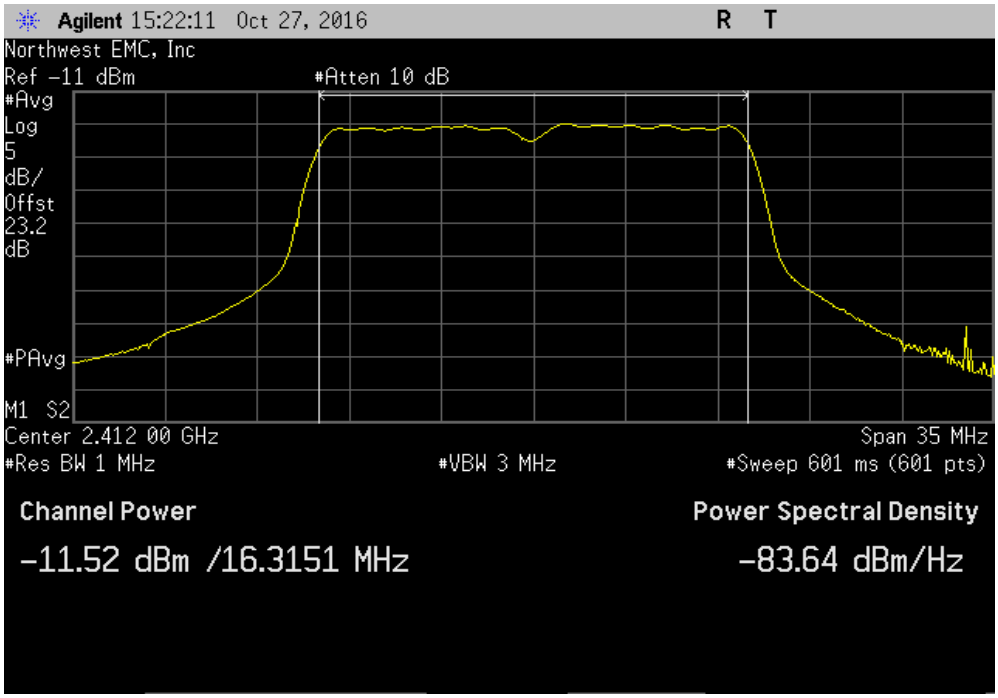
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-6.482	5.6		-0.9	30	Pass



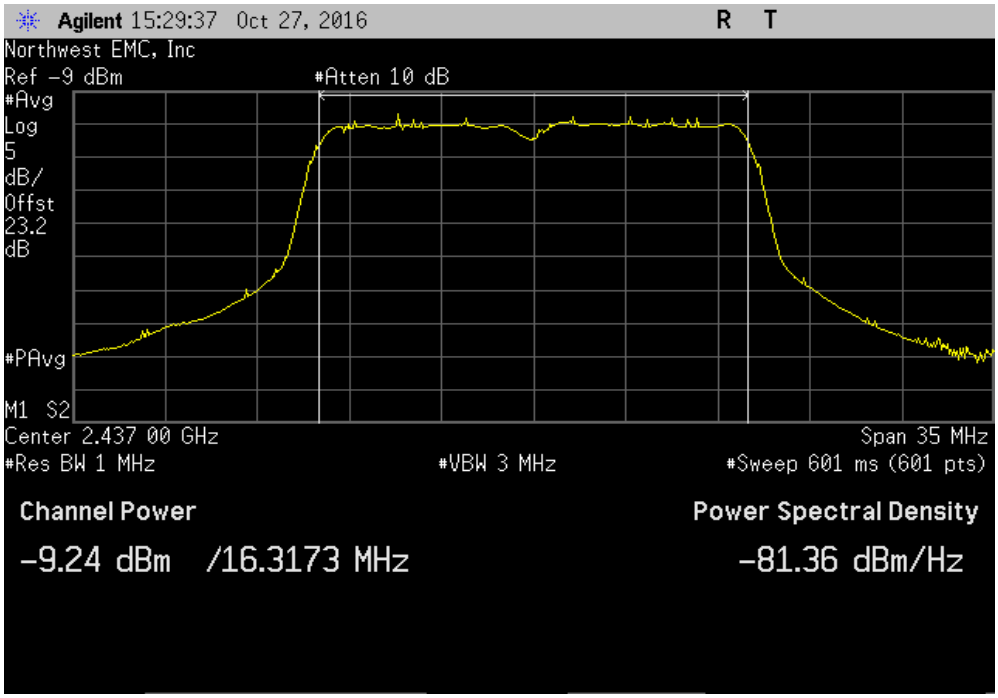
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-8.667	5.6		-3.1	30	Pass



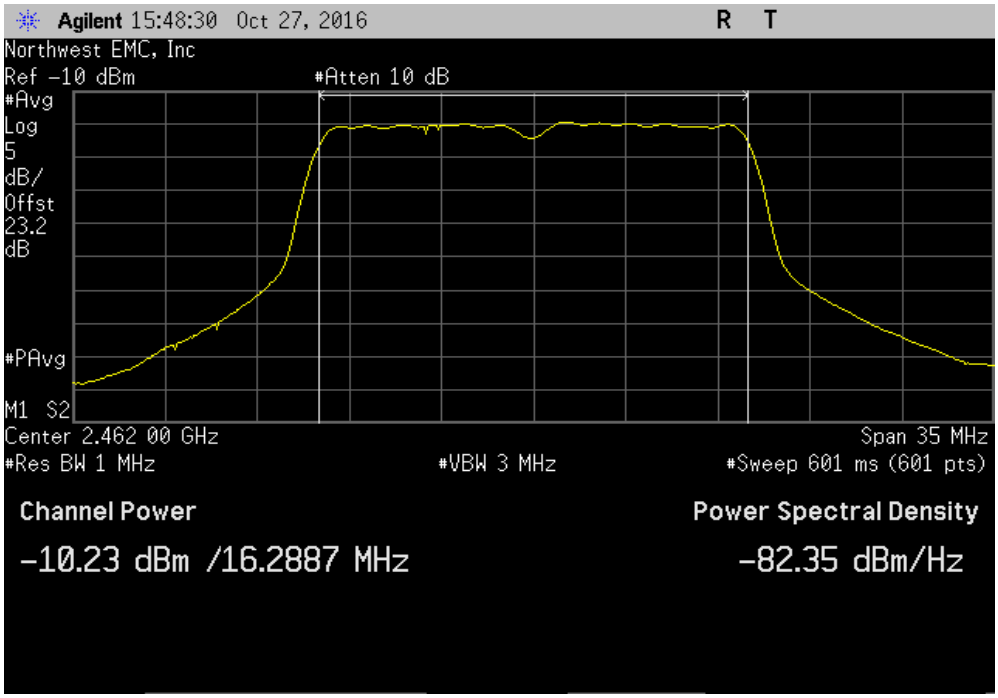
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-11.518	6.9		-4.7	30	Pass



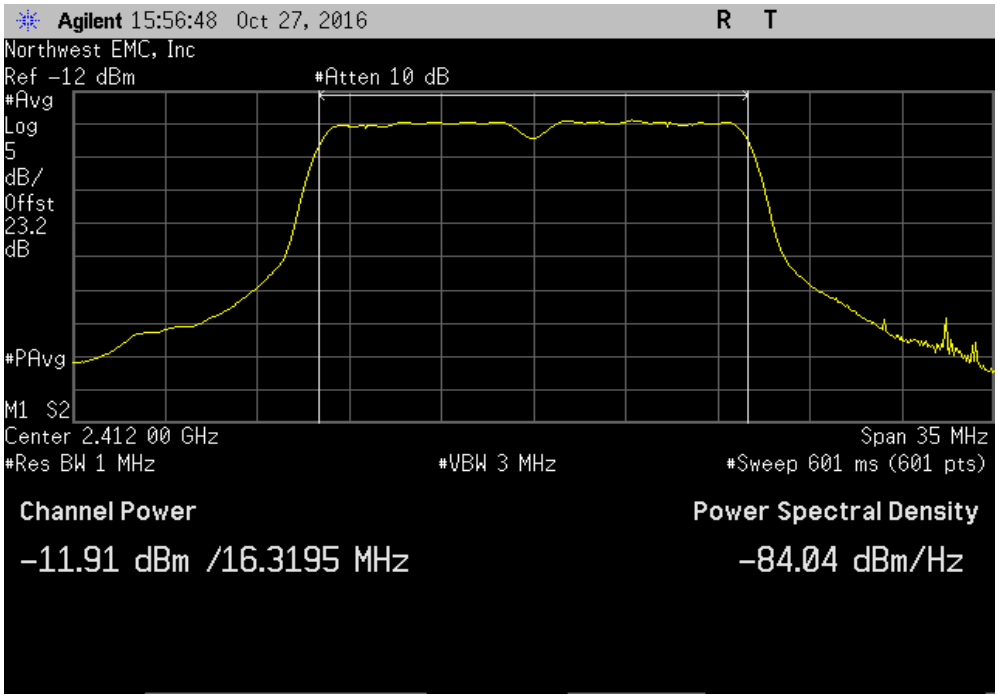
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-9.238	6.8		-2.4	30	Pass



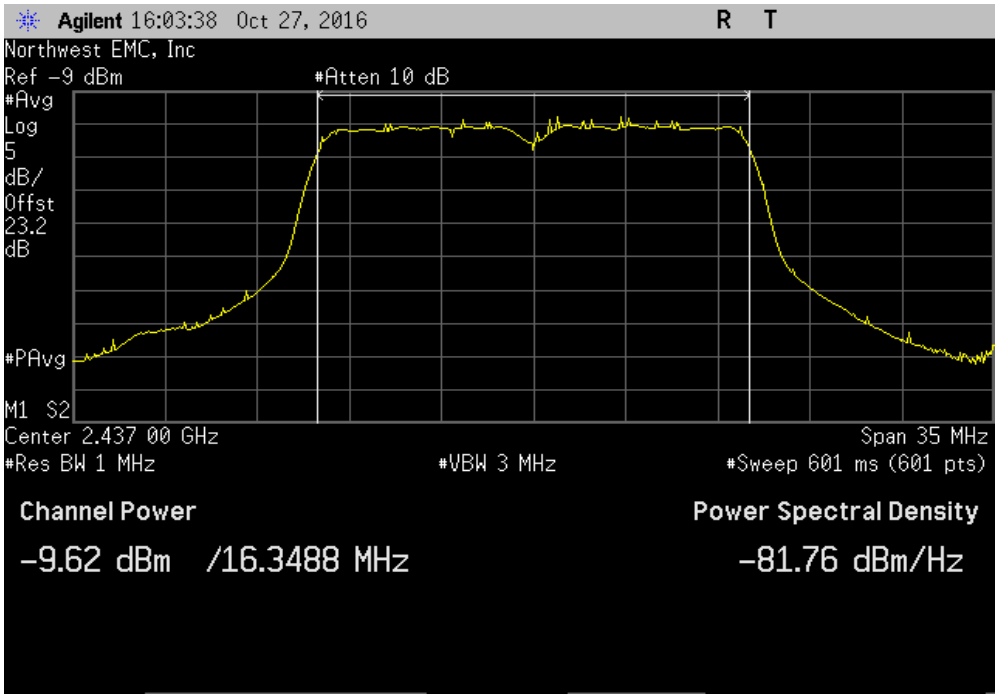
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-10.226	6.9		-3.4	30	Pass



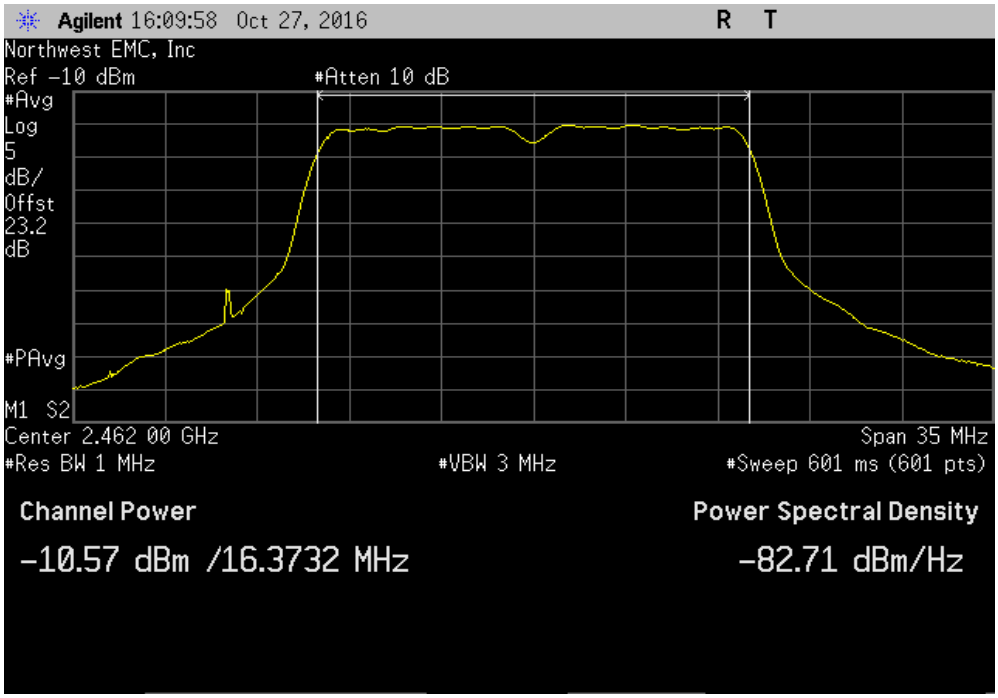
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-11.915	7.1		-4.8	30	Pass



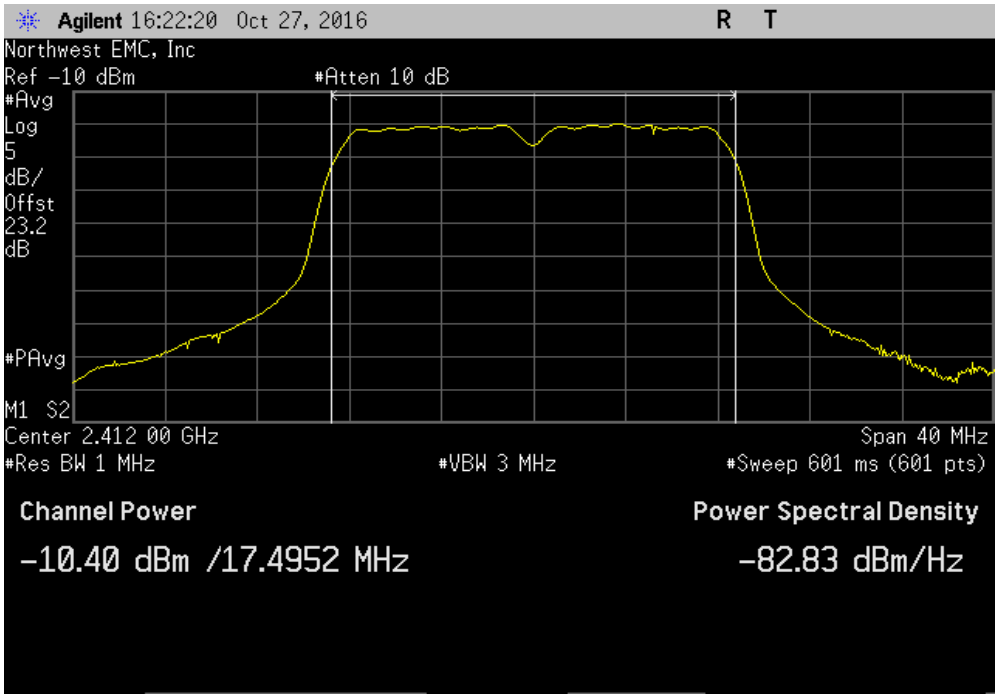
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-9.625	7.2		-2.4	30	Pass



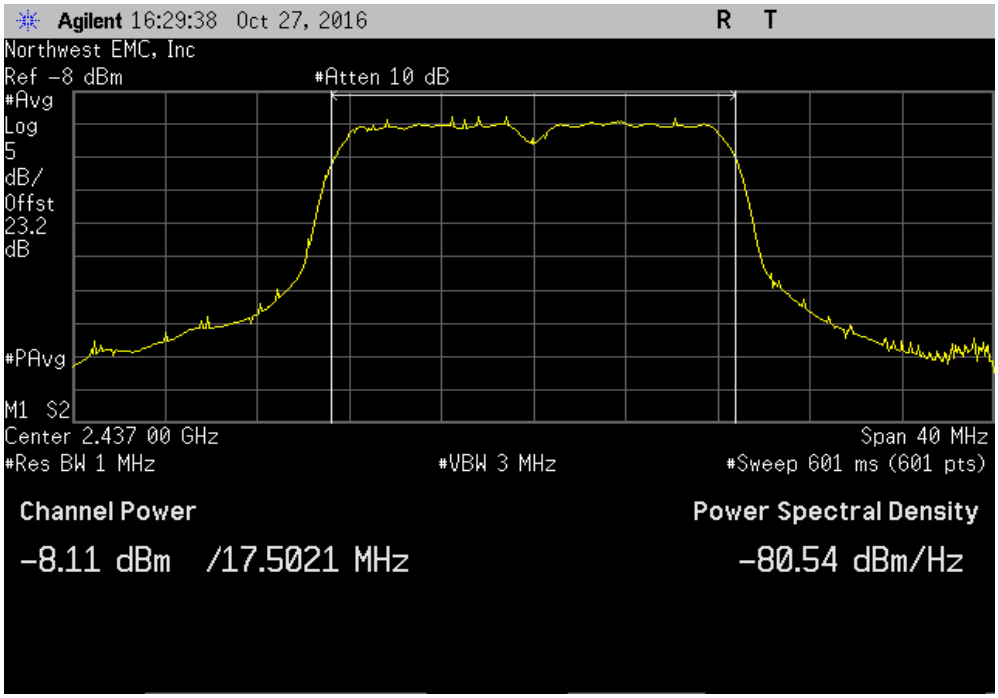
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-10.567	7.1		-3.5	30	Pass



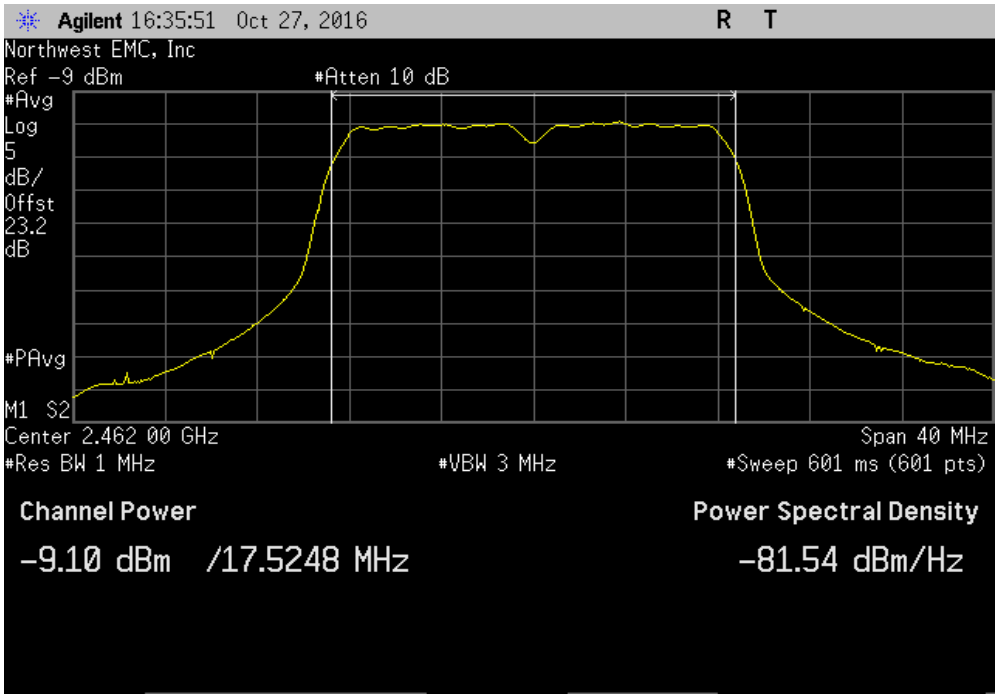
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-10.4	6		-4.4	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-8.107	6		-2.1	30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	-9.101	6		-3.1	30	Pass



POWER SPECTRAL DENSITY

XMit 2016.05.06

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The maximum power spectral density measurements was measured using the channels and modes as called out on the following data sheets.

Per the procedure outlined in ANSI C63.10 the peak power spectral density was measured in a 3 kHz RBW.

POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2016.05.06

EUT:	ODIN Model 4NR003			**Work Order:**	MDTR0496
Serial Number:	01000			**Date:**	10/28/16
Customer:	Medtronic, Inc.			**Temperature:**	20.9 °C
Attendees:	Dave Hoffman			**Humidity:**	40.6% RH
Project:	None			**Barometric Pres.:**	1013 mbar
Tested by:	Cole Ghizzone	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

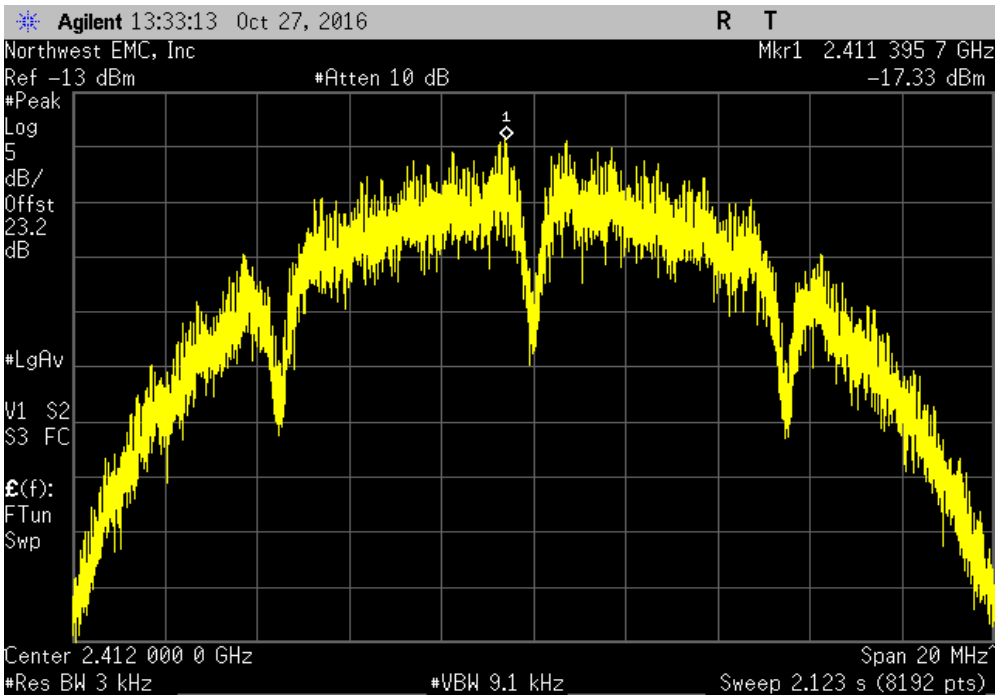
DEVIATIONS FROM TEST STANDARD

None

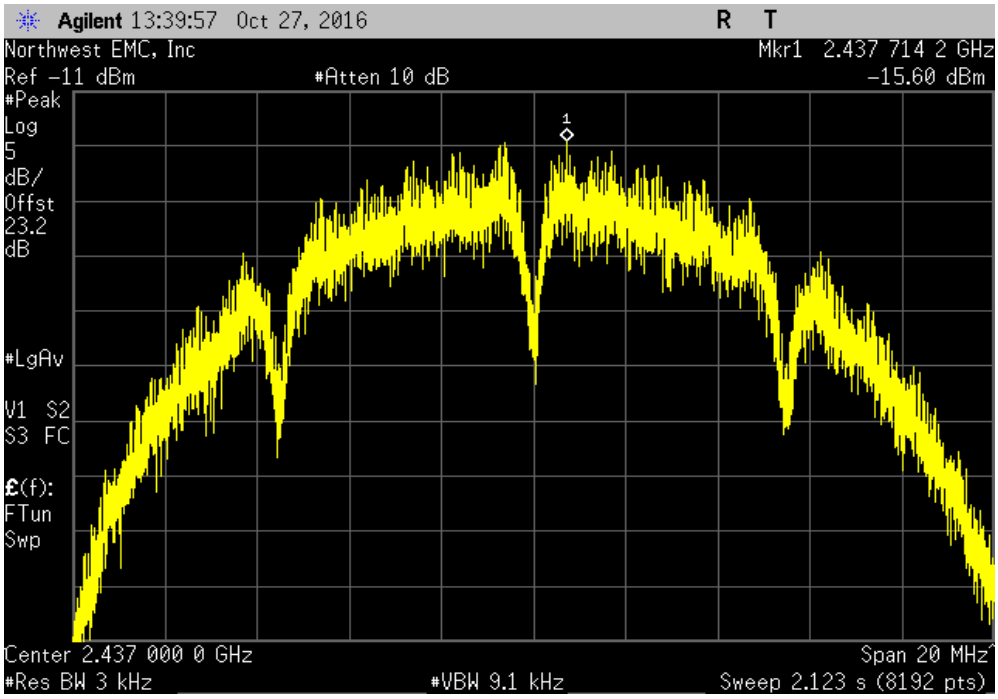
Configuration #	4	Signature

	Value dBm/3kHz	Limit < dBm/3kHz	Results
2400 MHz - 2483.5 MHz Band			
802.11(b) 1 Mbps			
Low Channel 1, 2412 MHz	-17.332	8	Pass
Mid Channel 6, 2437 MHz	-15.597	8	Pass
High Channel 11, 2462 MHz	-15.817	8	Pass
802.11(b) 11 Mbps			
Low Channel 1, 2412 MHz	-18.342	8	Pass
Mid Channel 6, 2437 MHz	-16.276	8	Pass
High Channel 11, 2462 MHz	-15.956	8	Pass
802.11(g) 6 Mbps			
Low Channel 1, 2412 MHz	-17.788	8	Pass
Mid Channel 6, 2437 MHz	-16.24	8	Pass
High Channel 11, 2462 MHz	-16.177	8	Pass
802.11(g) 36 Mbps			
Low Channel 1, 2412 MHz	-26.662	8	Pass
Mid Channel 6, 2437 MHz	-23.096	8	Pass
High Channel 11, 2462 MHz	-25.193	8	Pass
802.11(g) 54 Mbps			
Low Channel 1, 2412 MHz	-27.058	8	Pass
Mid Channel 6, 2437 MHz	-24.783	8	Pass
High Channel 11, 2462 MHz	-25.542	8	Pass
802.11(n) MCS0			
Low Channel 1, 2412 MHz	-27.2	8	Pass
Mid Channel 6, 2437 MHz	-24.942	8	Pass
High Channel 11, 2462 MHz	-26.209	8	Pass
802.11(n) MCS7			
Low Channel 1, 2412 MHz	-26.094	8	Pass
Mid Channel 6, 2437 MHz	-24.088	8	Pass
High Channel 11, 2462 MHz	-24.695	8	Pass

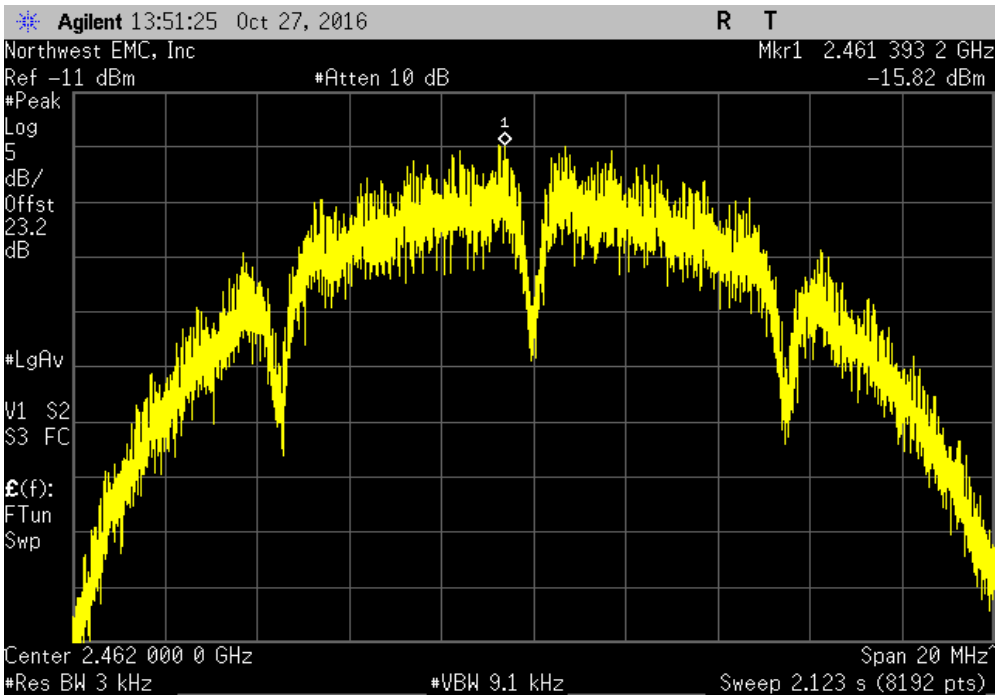
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-17.332	8	Pass



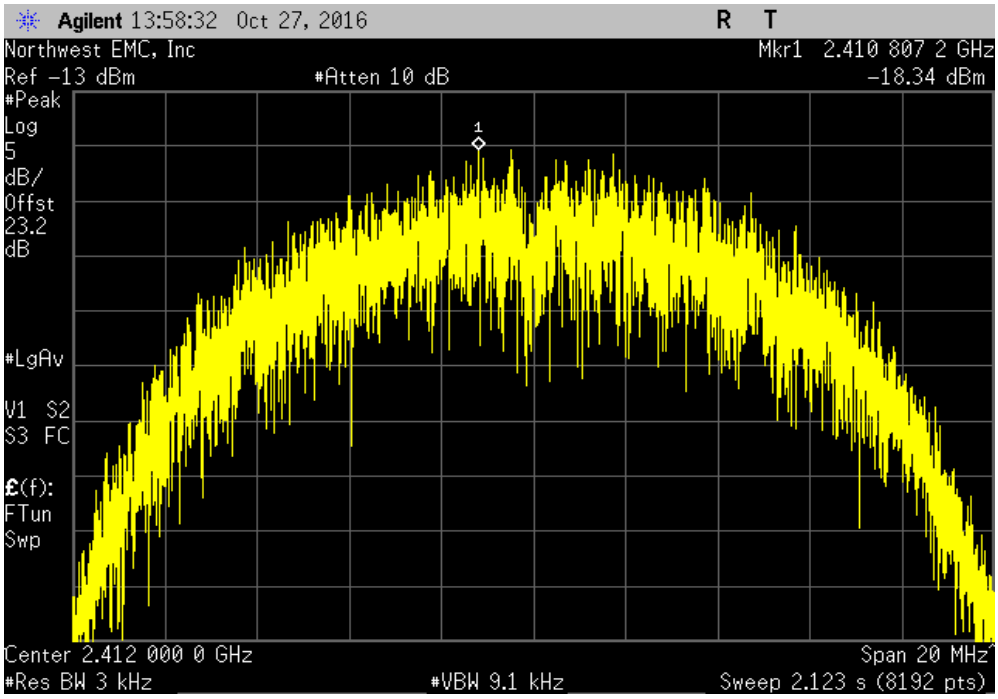
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-15.597	8	Pass



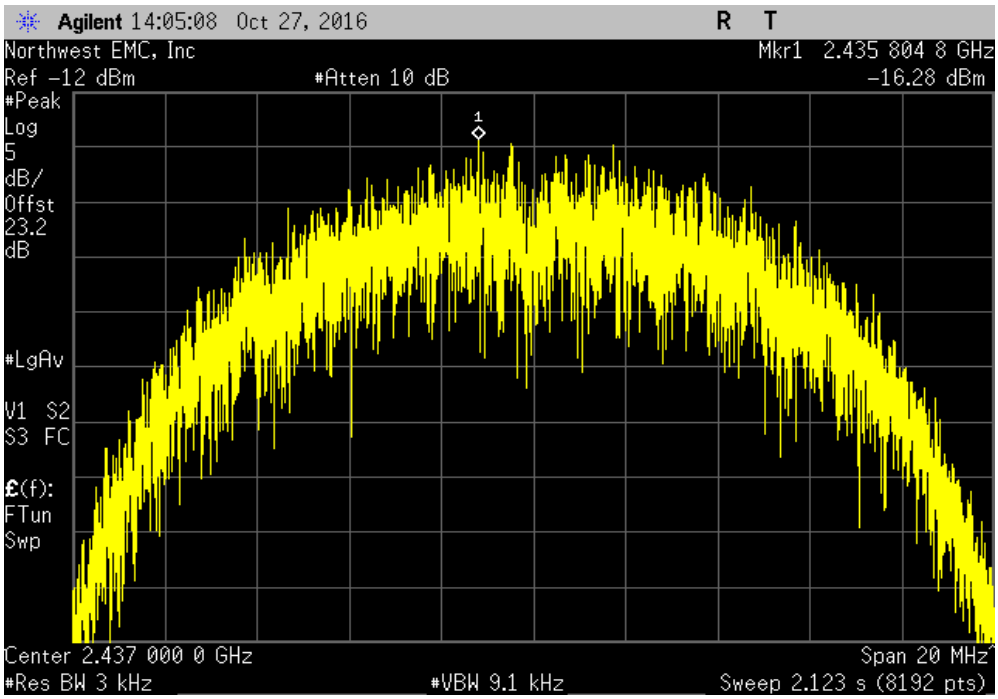
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-15.817	8	Pass



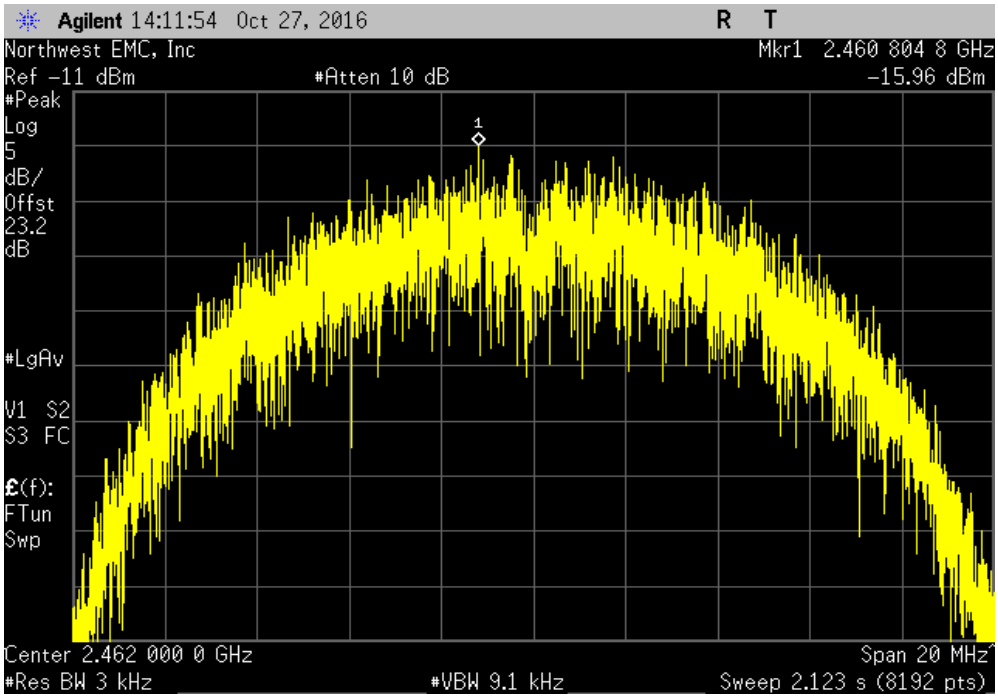
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-18.342	8	Pass



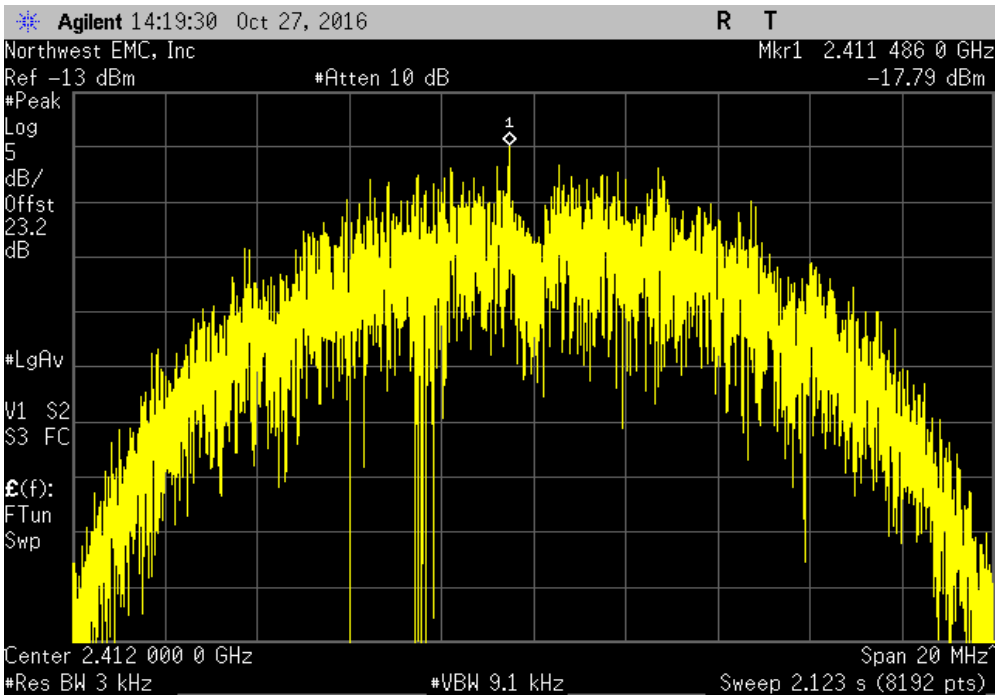
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-16.276	8	Pass



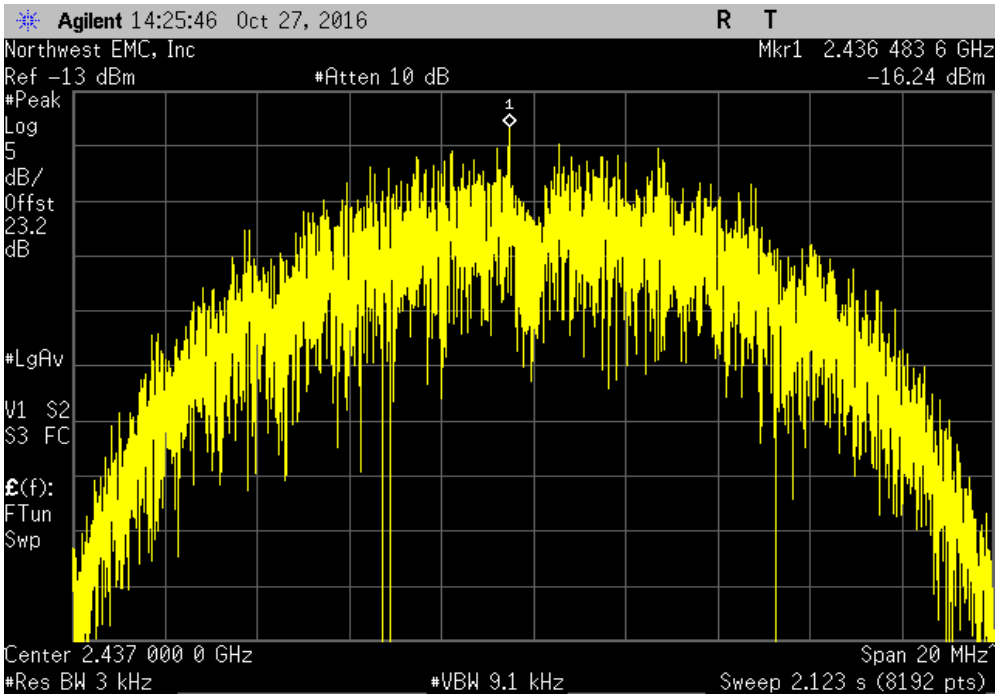
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-15.956	8	Pass



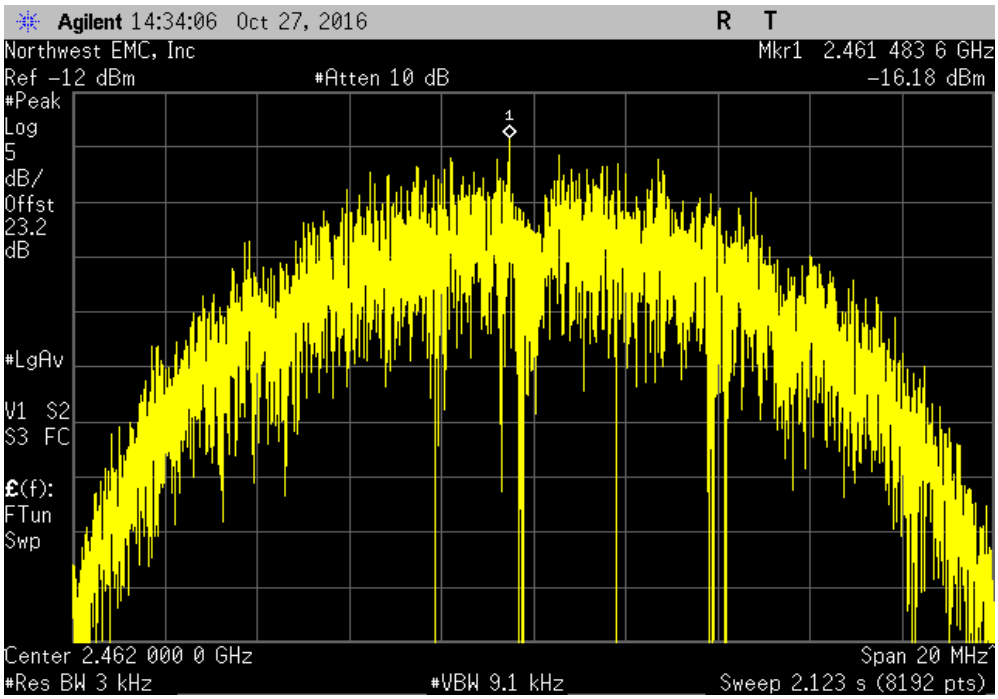
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-17.788	8	Pass



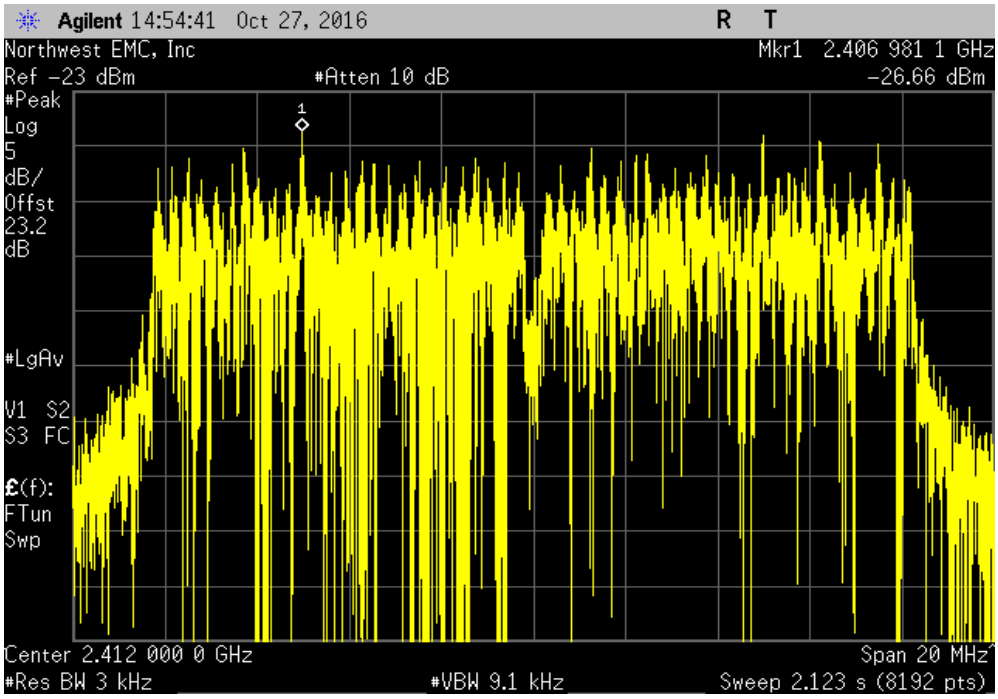
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-16.24	8	Pass



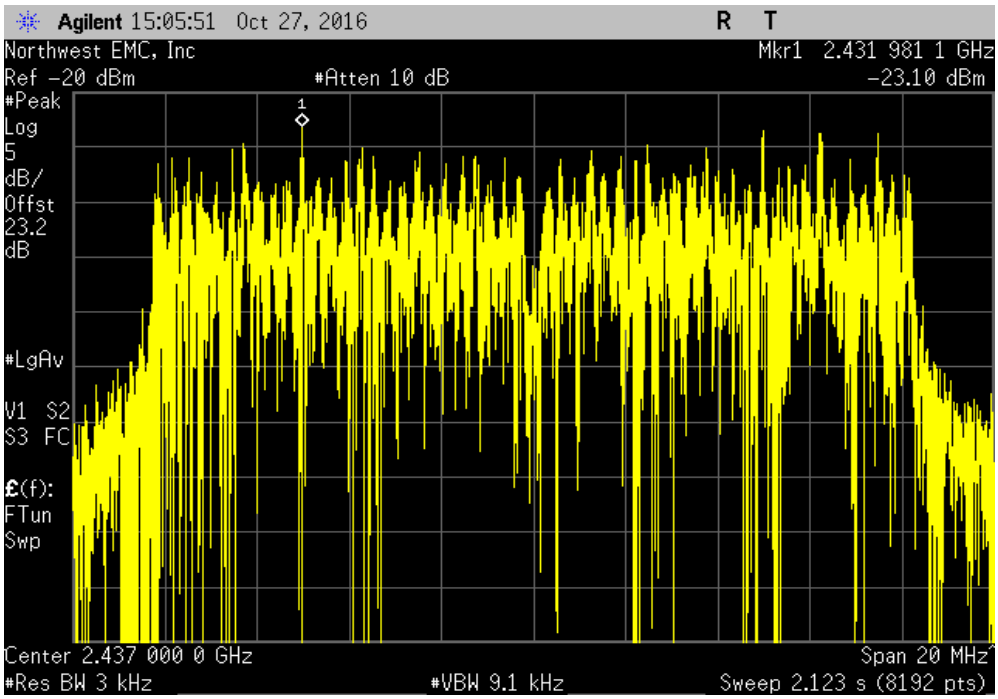
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-16.177	8	Pass



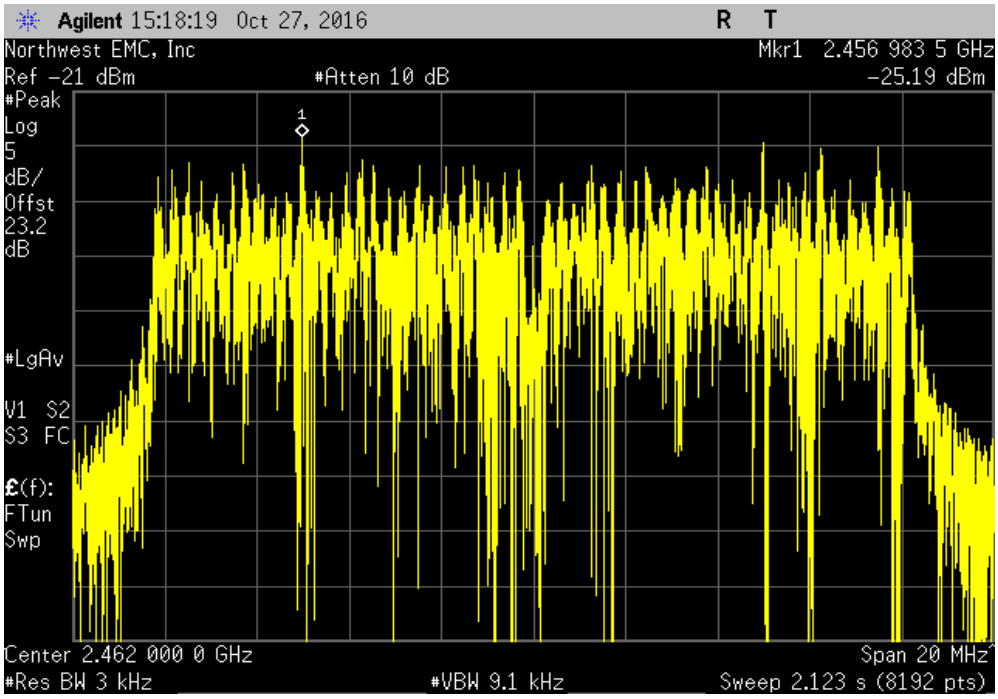
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-26.662	8	Pass



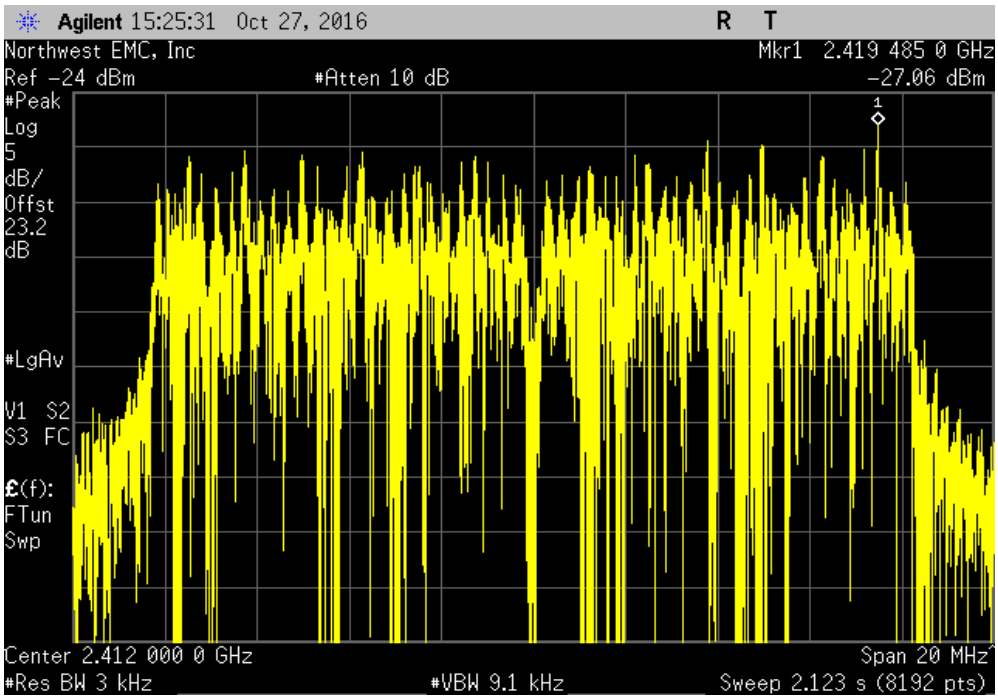
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-23.096	8	Pass



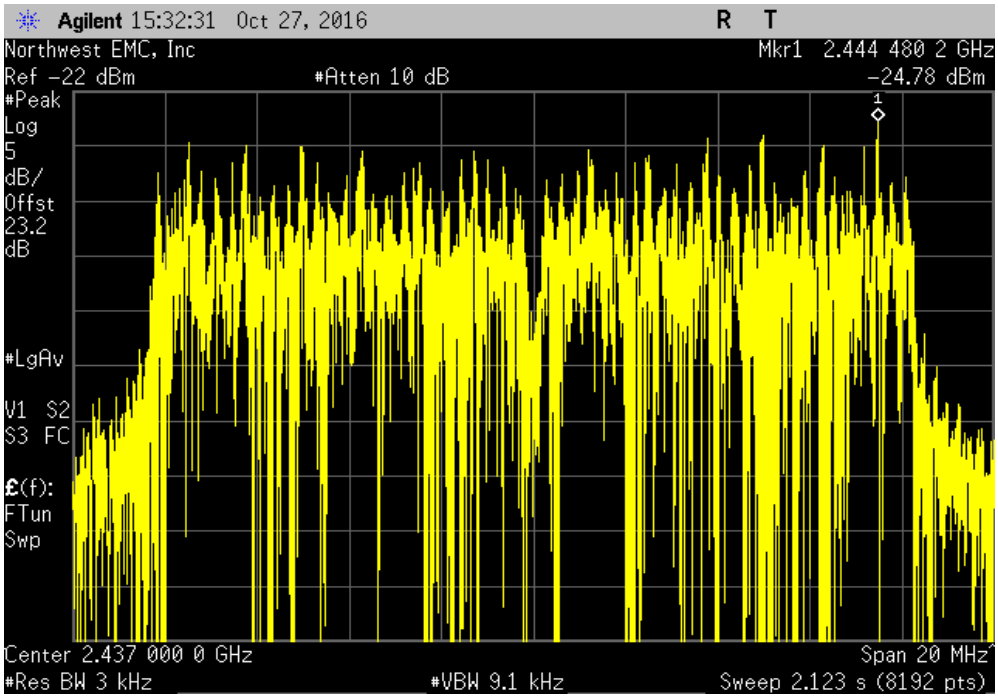
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-25.193	8	Pass



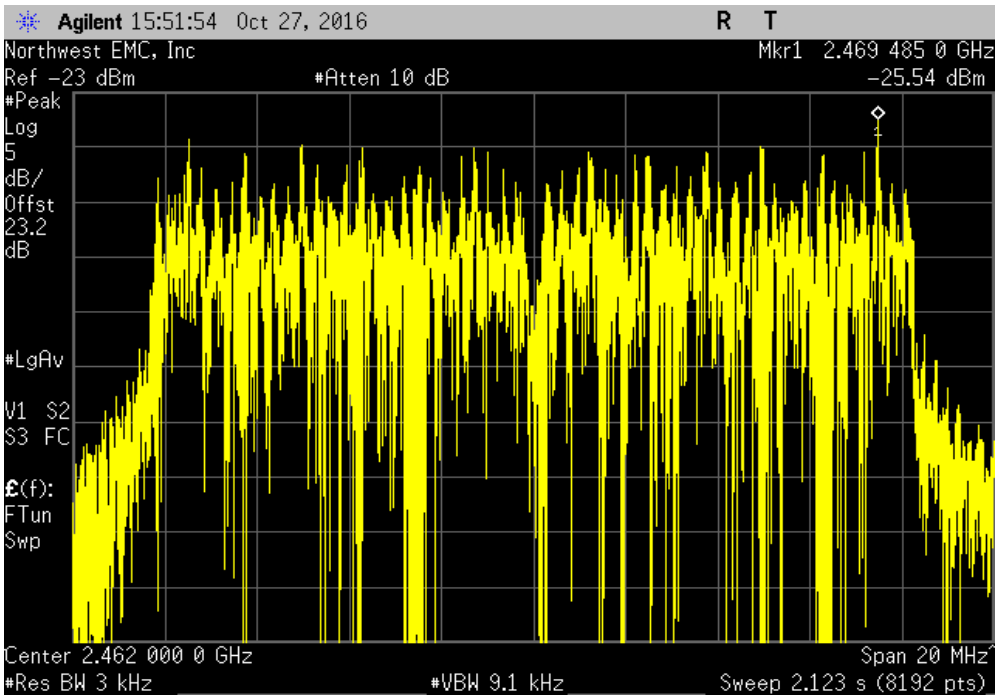
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-27.058	8	Pass



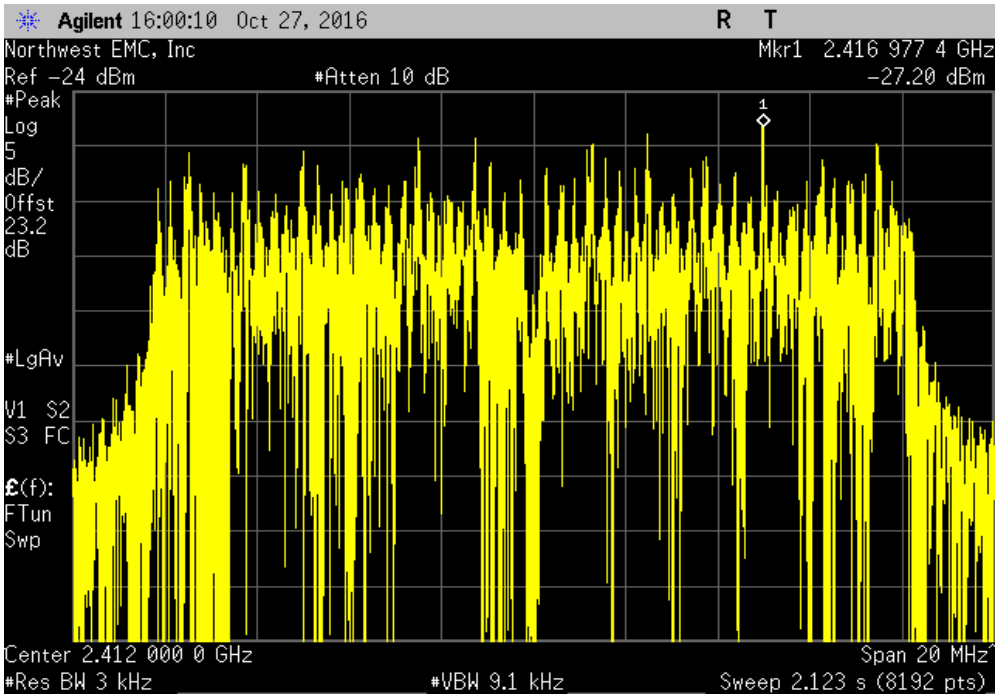
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-24.783	8	Pass



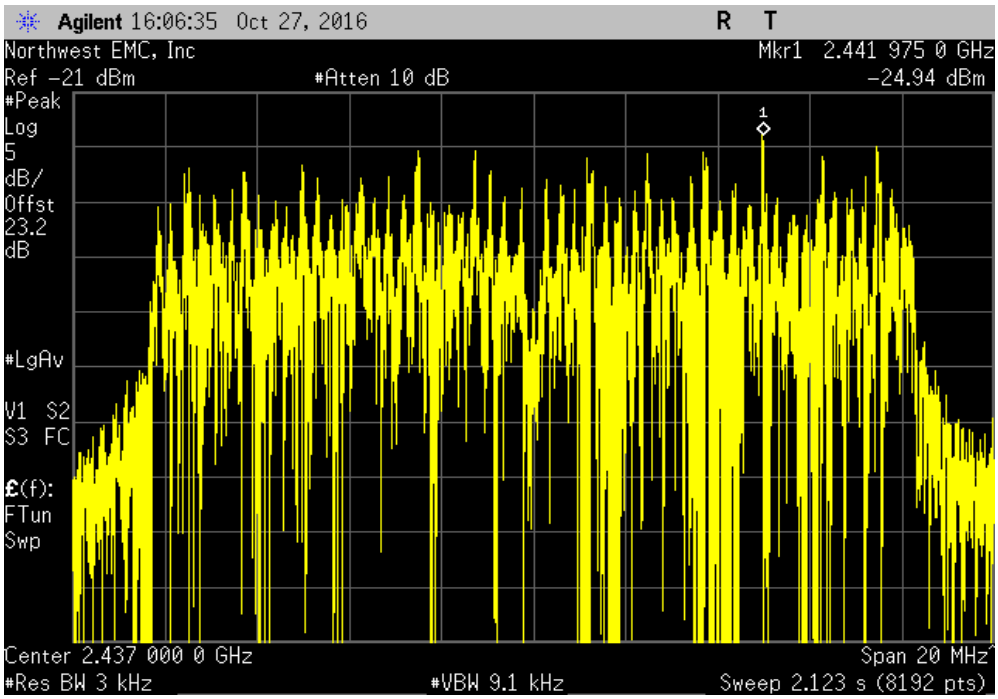
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-25.542	8	Pass



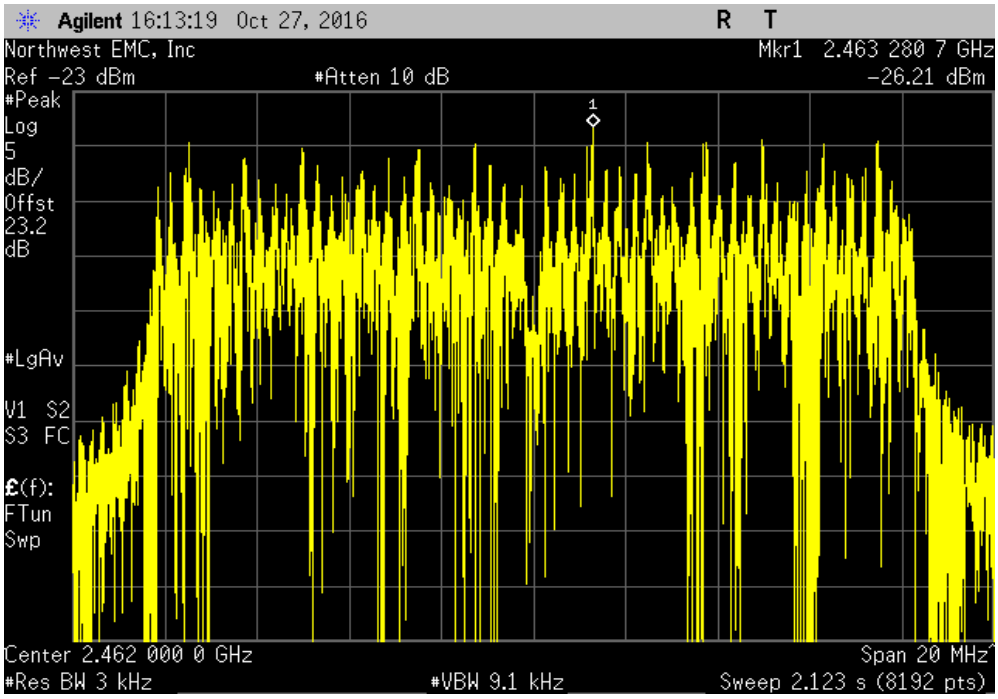
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-27.2	8	Pass



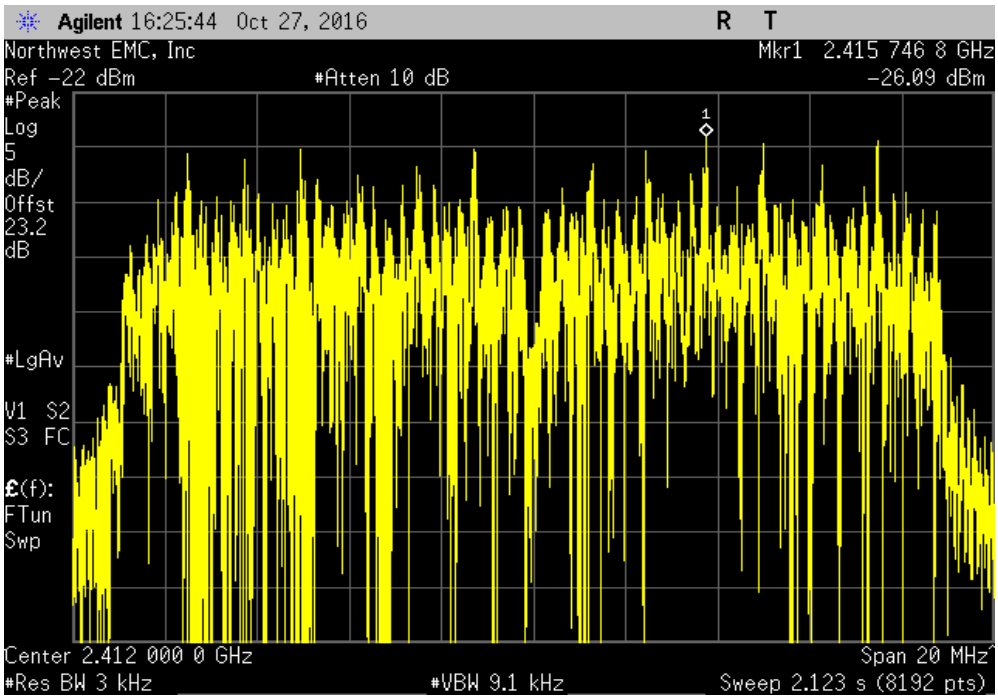
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-24.942	8	Pass



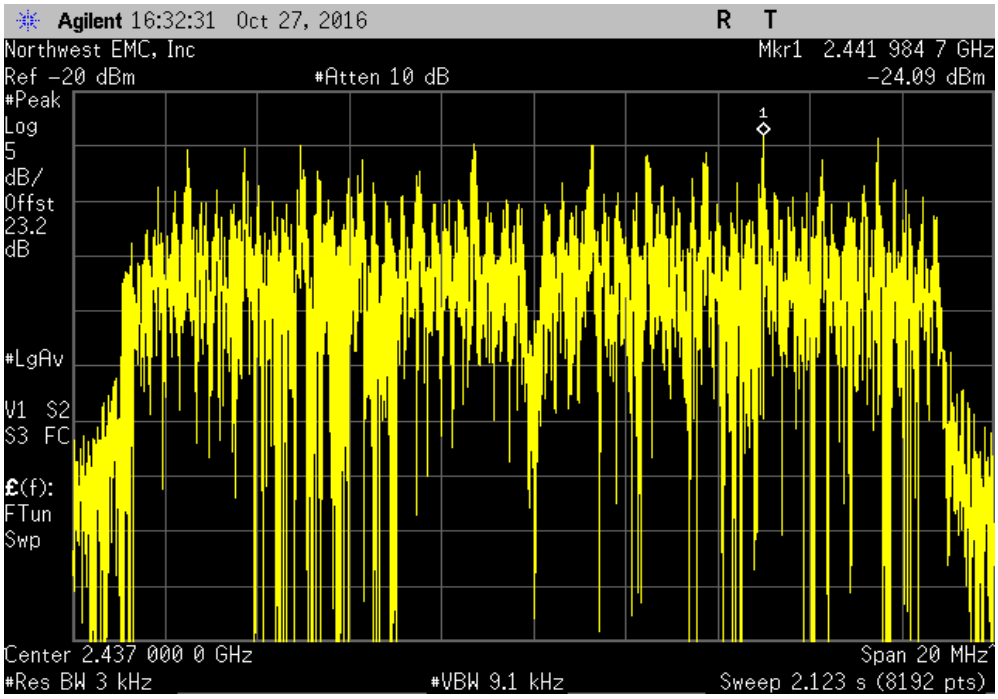
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-26.209	8	Pass



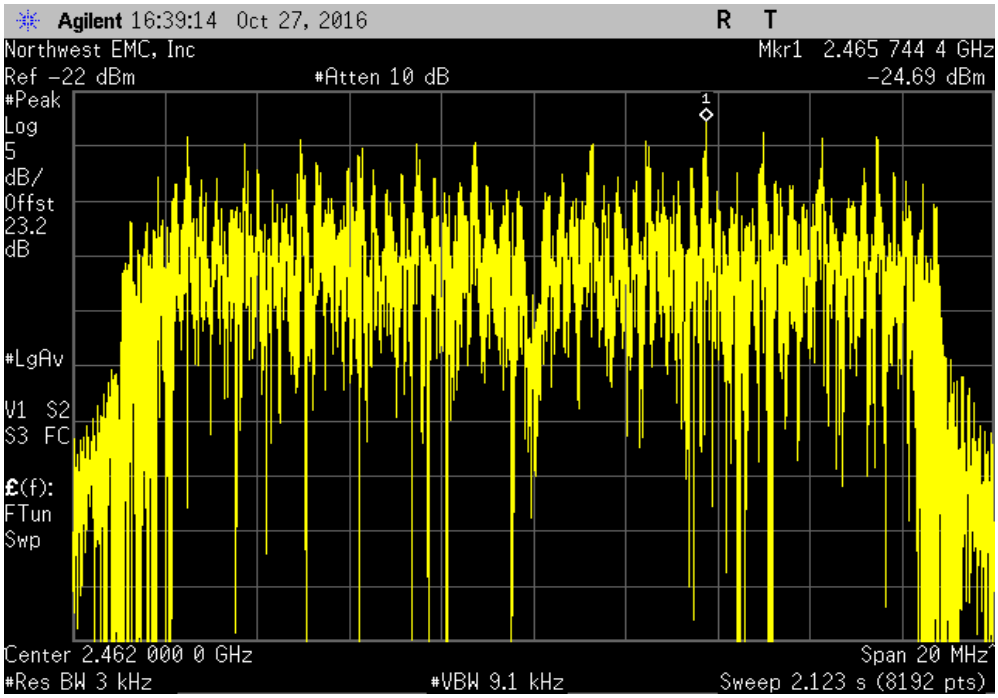
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-26.094	8	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-24.088	8	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
				Value dBm/3kHz	Limit < dBm/3kHz	Results
				-24.695	8	Pass



BAND EDGE COMPLIANCE

XMit 2016.05.06

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized bands were measured with the EUT set to low and high transmit frequencies in each available band. The channels closest to the band edges were selected. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge.

An RMS detector was used to match the method called out for Output Power. Because the reference level was taken with an RMS detector, the attenuation requirement is -30 dBc.

BAND EDGE COMPLIANCE

NORTHWEST EMC

XMit 2016.05.06

EUT:	ODIN Model 4NR003			**Work Order:**	MDTR0496
Serial Number:	01000			**Date:**	10/28/16
Customer:	Medtronic, Inc.			**Temperature:**	21.9 °C
Attendees:	Dave Hoffman			**Humidity:**	39.6% RH
Project:	None			**Barometric Pres.:**	1013 mbar
Tested by:	Cole Ghizzone	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

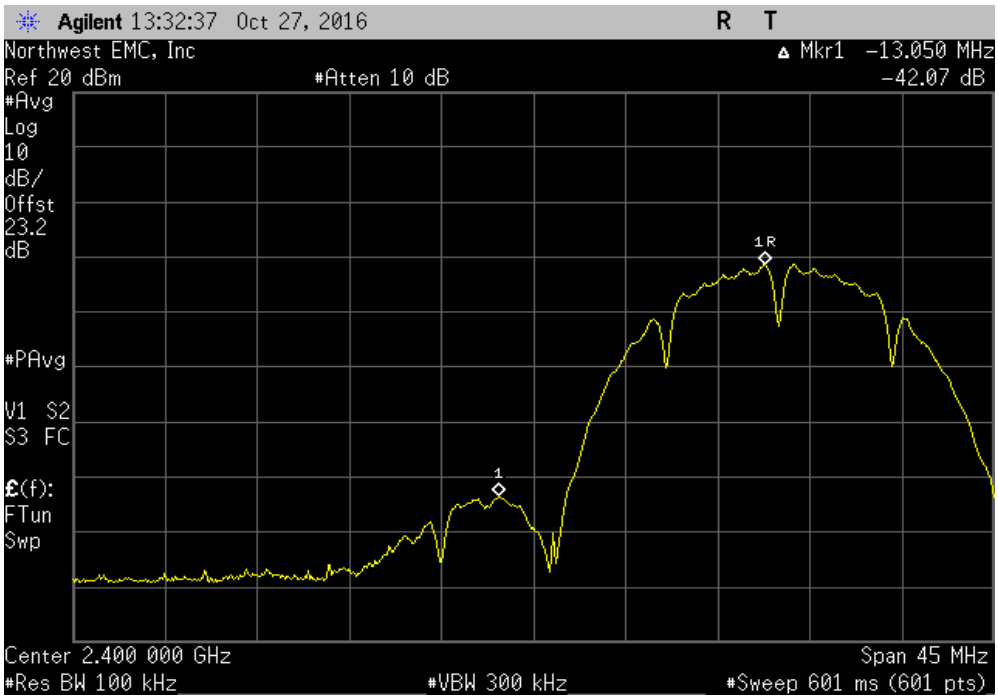
DEVIATIONS FROM TEST STANDARD

None

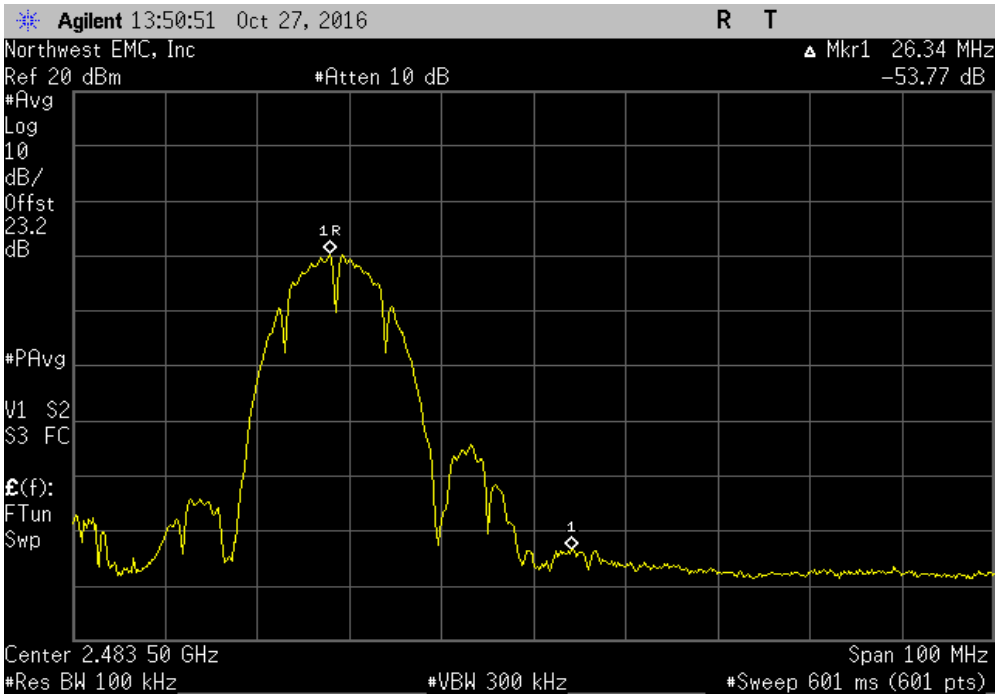
Configuration #	4	Signature

	Value (dBc)	Limit ≤ (dBc)	Result
2400 MHz - 2483.5 MHz Band			
802.11(b) 1 Mbps			
Low Channel 1, 2412 MHz	-42.07	-30	Pass
High Channel 11, 2462 MHz	-53.77	-30	Pass
802.11(b) 11 Mbps			
Low Channel 1, 2412 MHz	-36.16	-30	Pass
High Channel 11, 2462 MHz	-51.54	-30	Pass
802.11(g) 6 Mbps			
Low Channel 1, 2412 MHz	-35.7	-30	Pass
High Channel 11, 2462 MHz	-50.77	-30	Pass
802.11(g) 36 Mbps			
Low Channel 1, 2412 MHz	-31.25	-30	Pass
High Channel 11, 2462 MHz	-43.18	-30	Pass
802.11(g) 54 Mbps			
Low Channel 1, 2412 MHz	-32.48	-30	Pass
High Channel 11, 2462 MHz	-43.95	-30	Pass
802.11(n) MCS0			
Low Channel 1, 2412 MHz	-32.15	-30	Pass
High Channel 11, 2462 MHz	-43.29	-30	Pass
802.11(n) MCS7			
Low Channel 1, 2412 MHz	-32.51	-30	Pass
High Channel 11, 2462 MHz	-44.21	-30	Pass

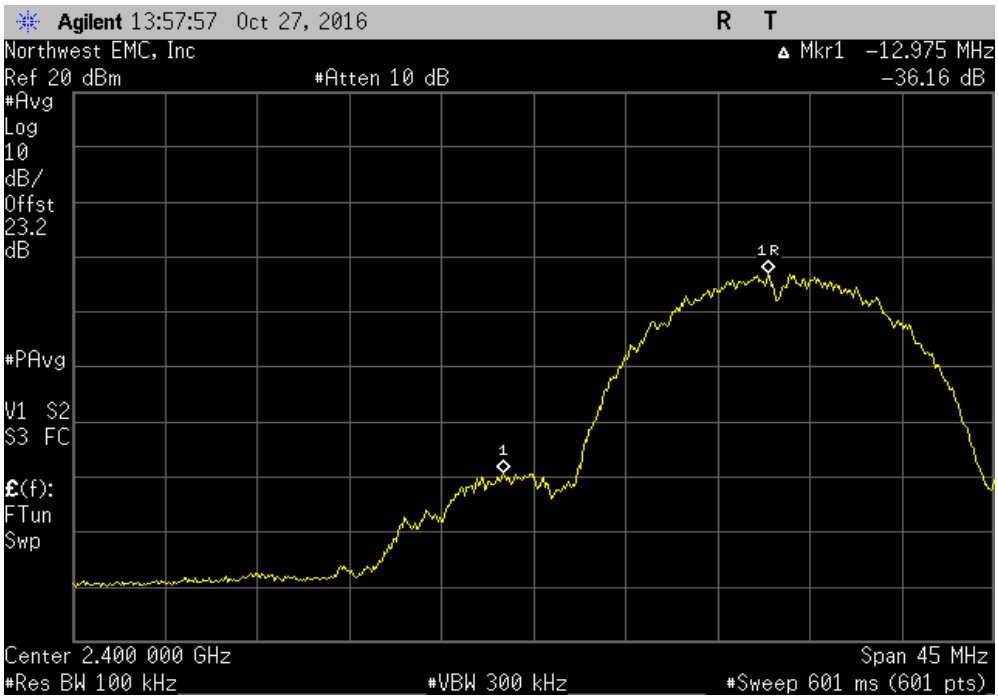
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-42.07	-30	Pass



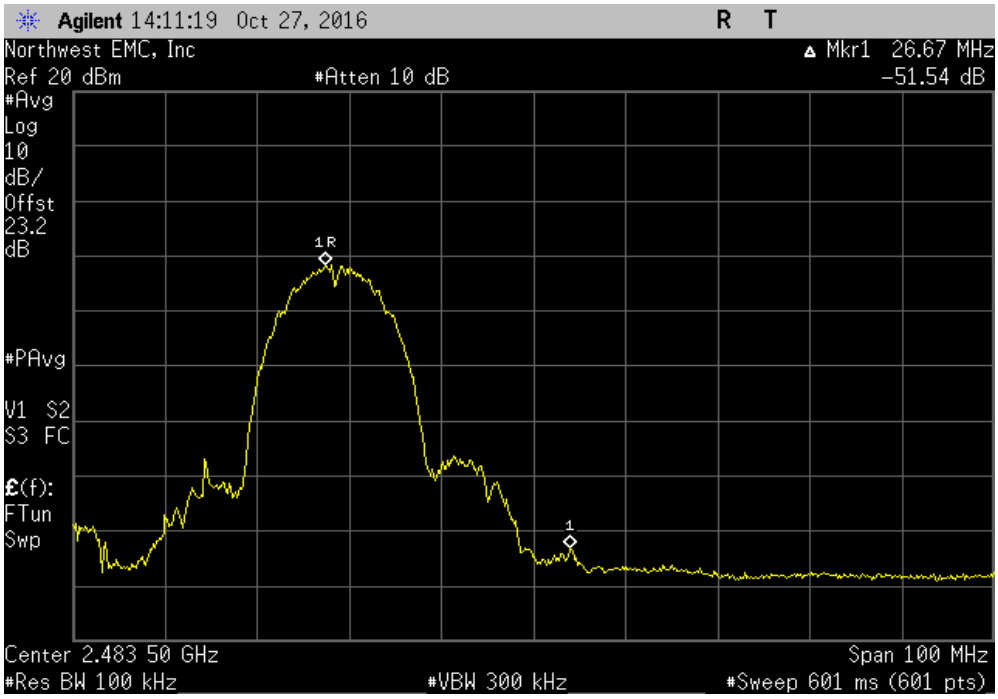
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-53.77	-30	Pass



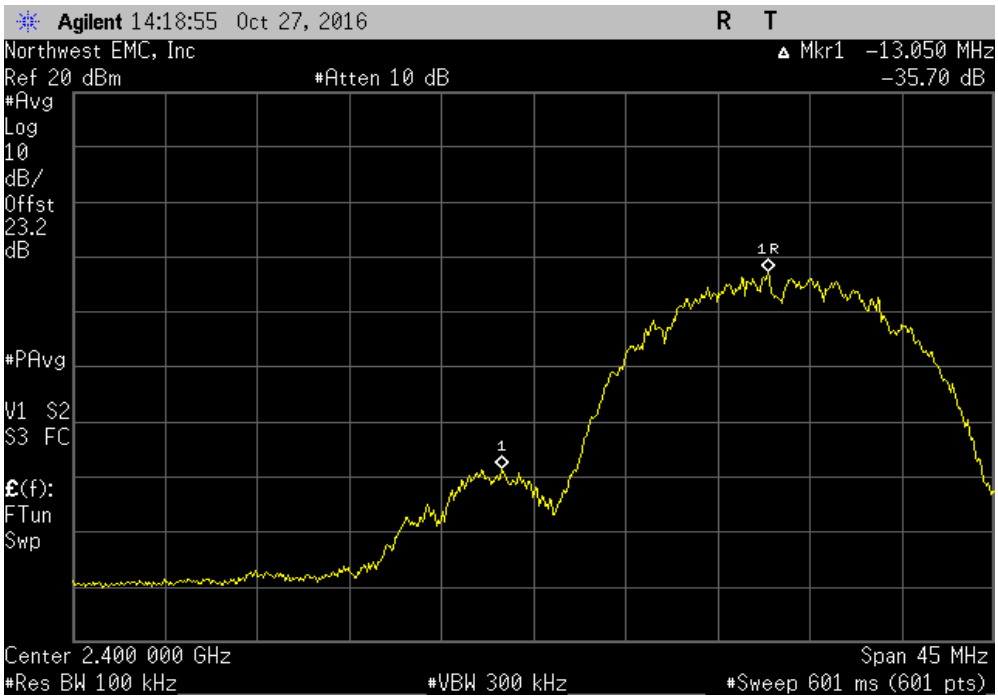
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-36.16	-30	Pass



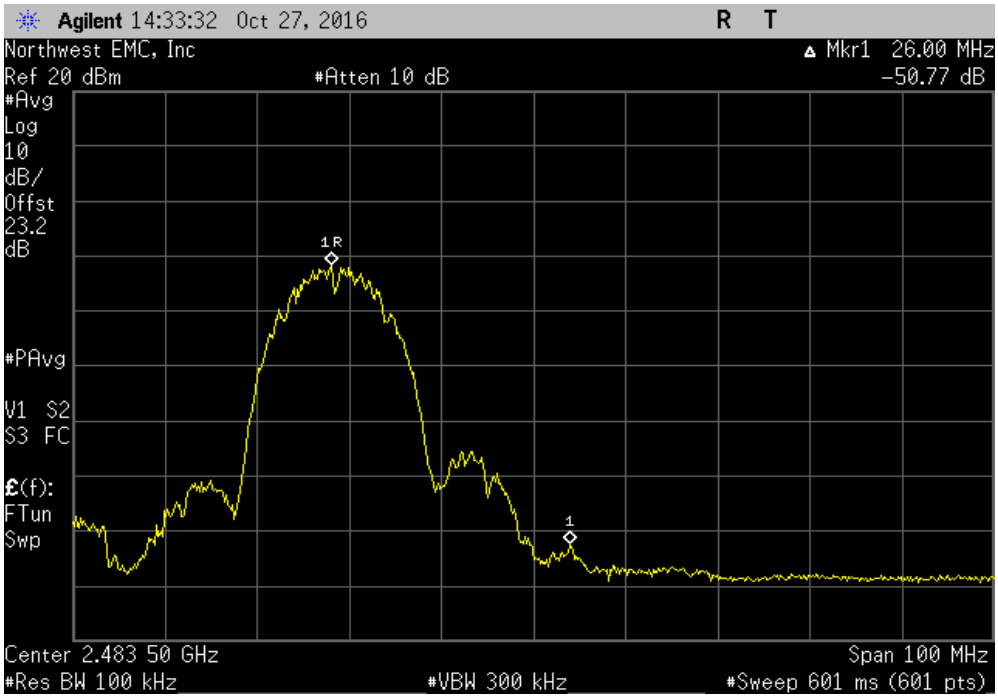
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-51.54	-30	Pass



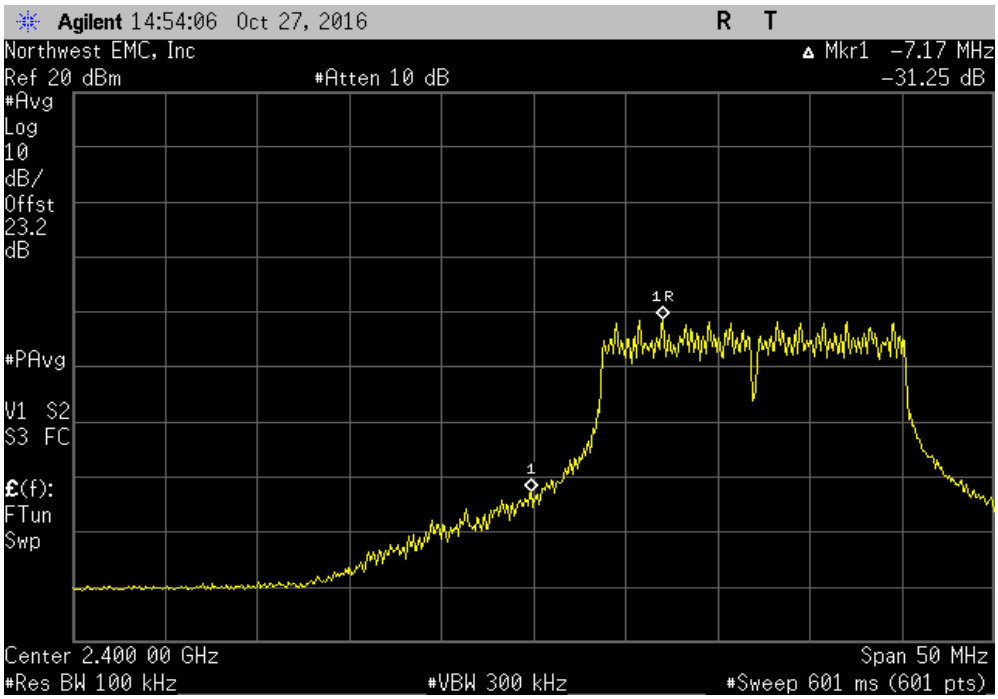
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-35.7	-30	Pass



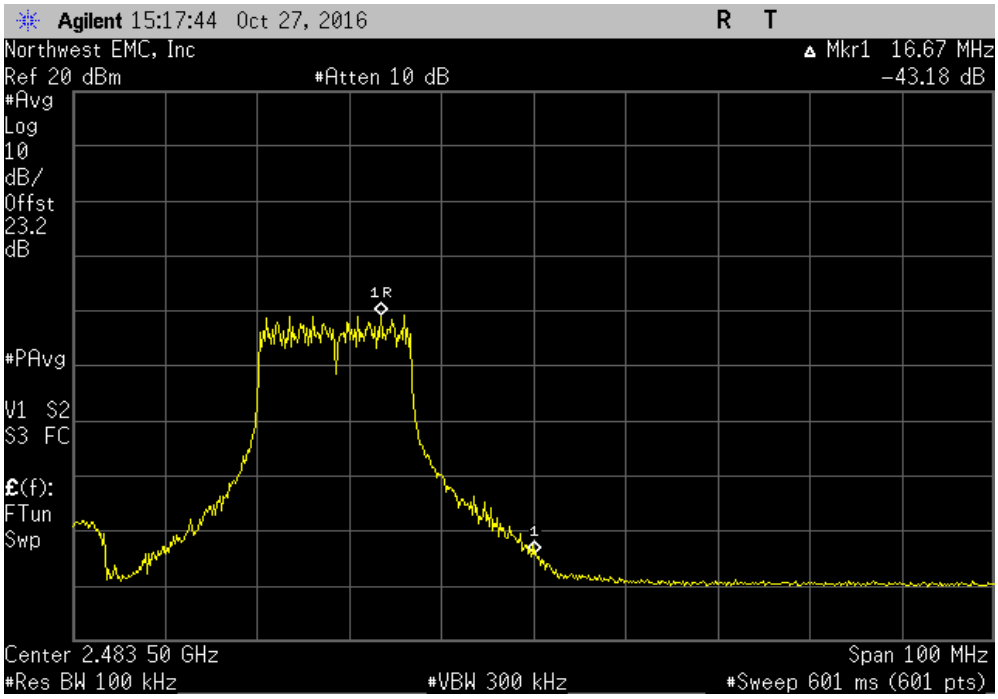
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-50.77	-30	Pass



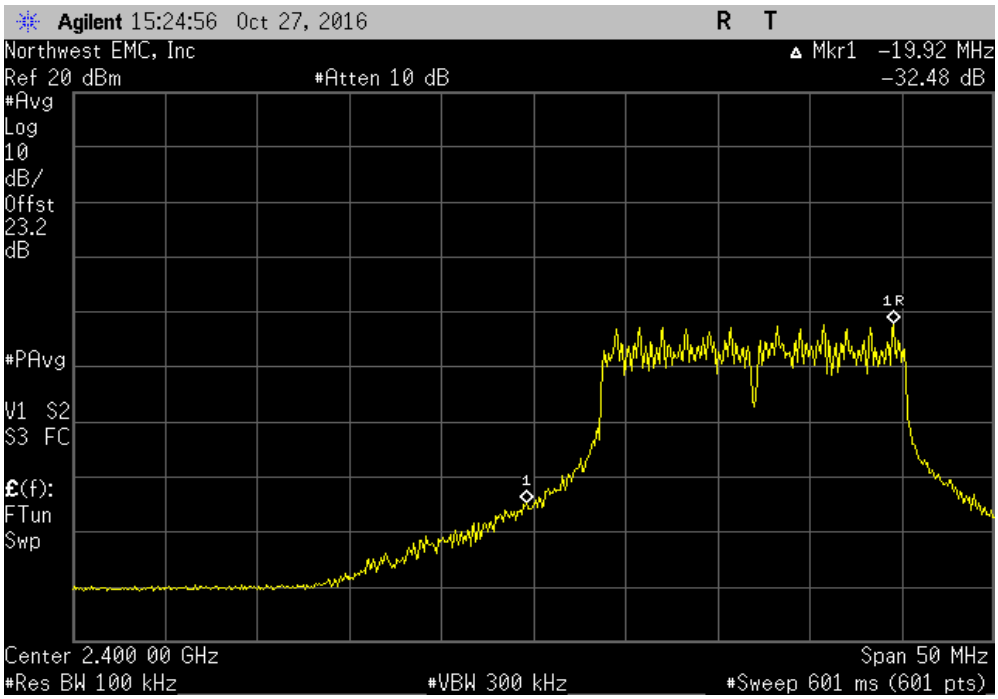
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-31.25	-30	Pass



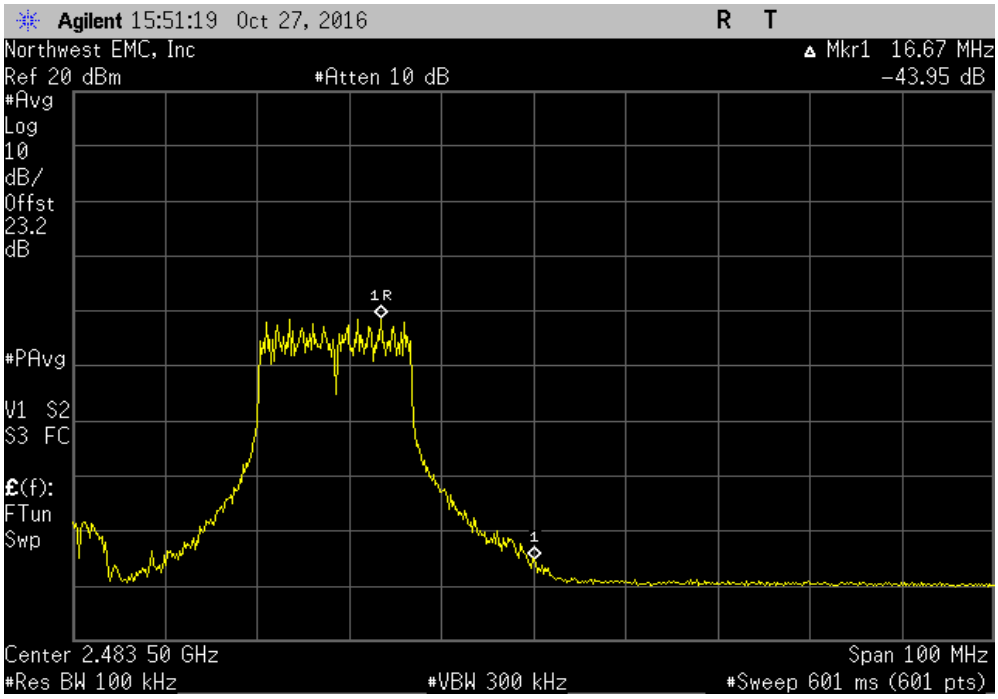
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-43.18	-30	Pass



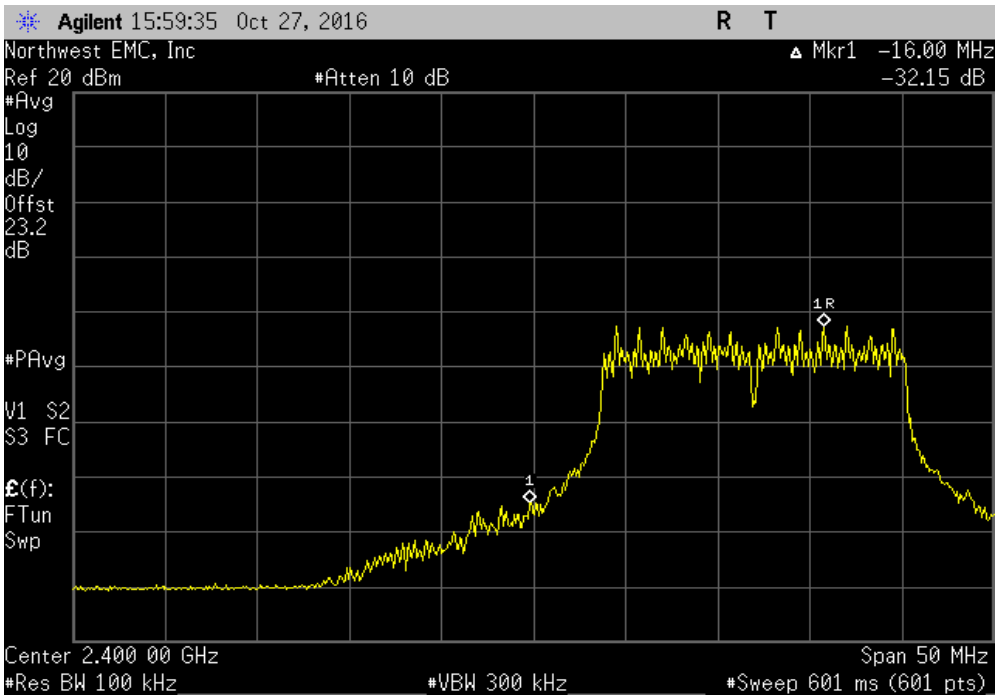
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-32.48	-30	Pass



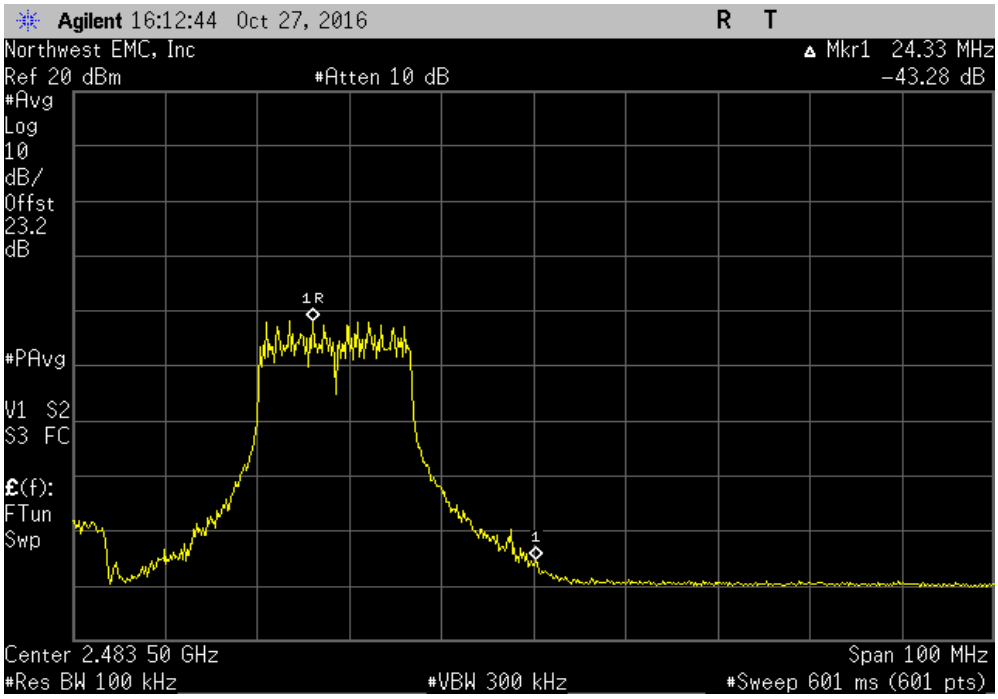
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-43.95	-30	Pass



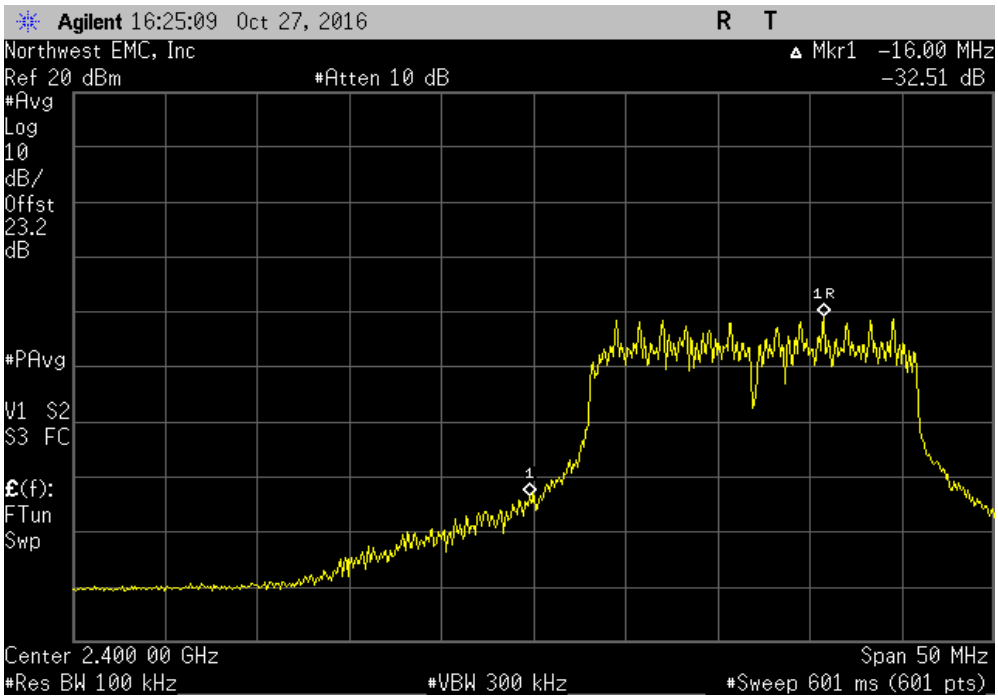
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-32.15	-30	Pass



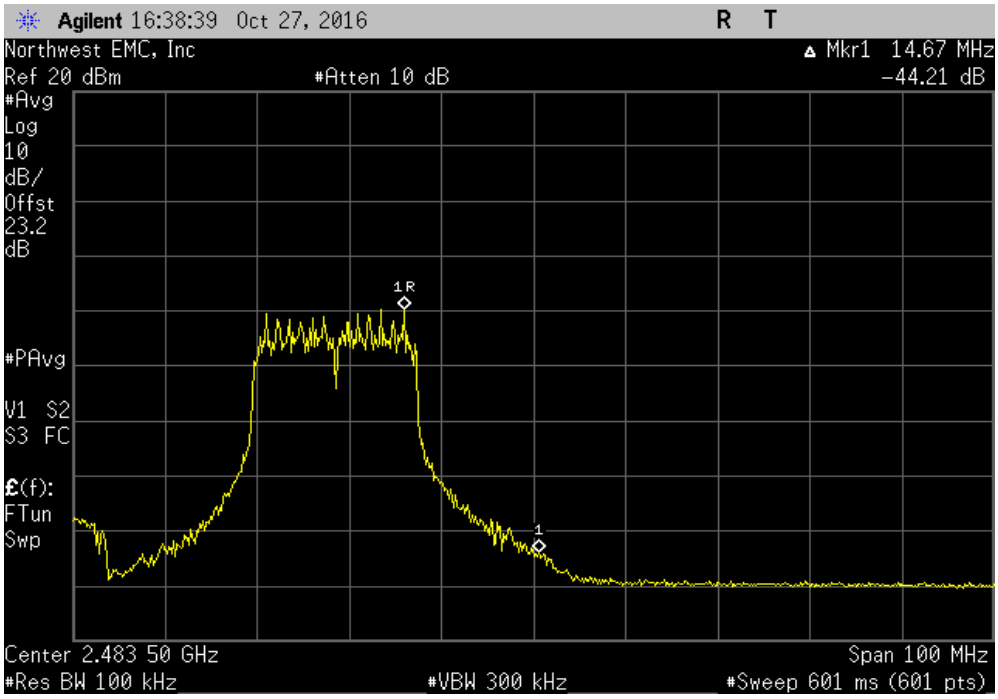
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-43.29	-30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-32.51	-30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-44.21	-30	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2016.05.06

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/15/2016	9/15/2017
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/15/2016	9/15/2017
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS

NORTHWEST EMC

XMit 2016.05.06

EUT:	ODIN Model 4NR003			**Work Order:**	MDTR0496
Serial Number:	01000			**Date:**	10/28/16
Customer:	Medtronic, Inc.			**Temperature:**	22.4 °C
Attendees:	Dave Hoffman			**Humidity:**	38% RH
Project:	None			**Barometric Pres.:**	1013 mbar
Tested by:	Cole Ghizzone	**Power:**	Battery	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2016	ANSI C63.10:2013

COMMENTS

None

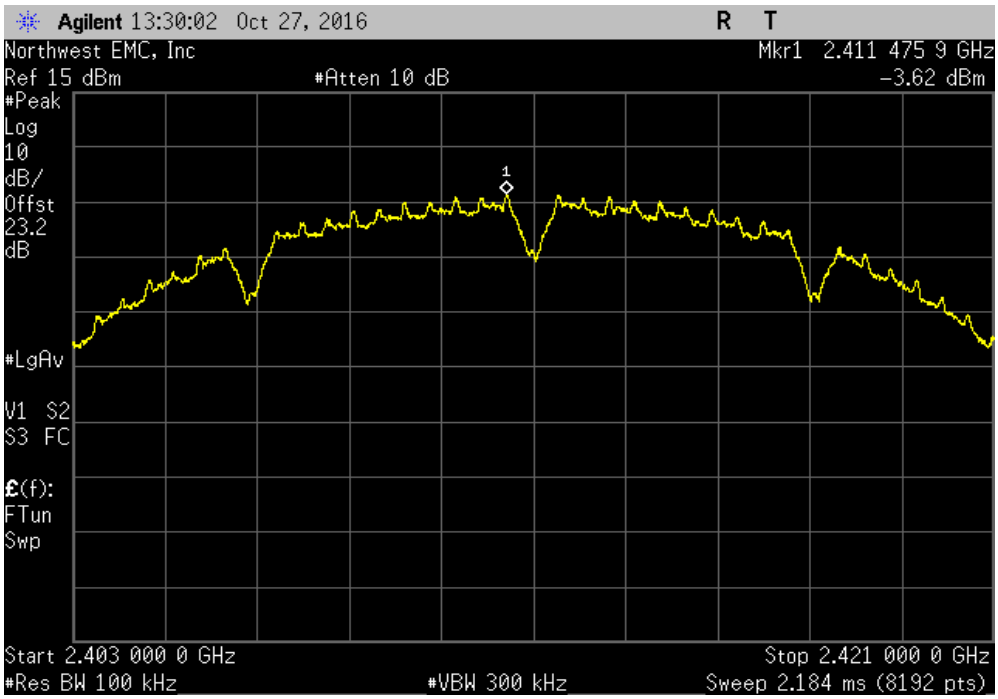
DEVIATIONS FROM TEST STANDARD

None

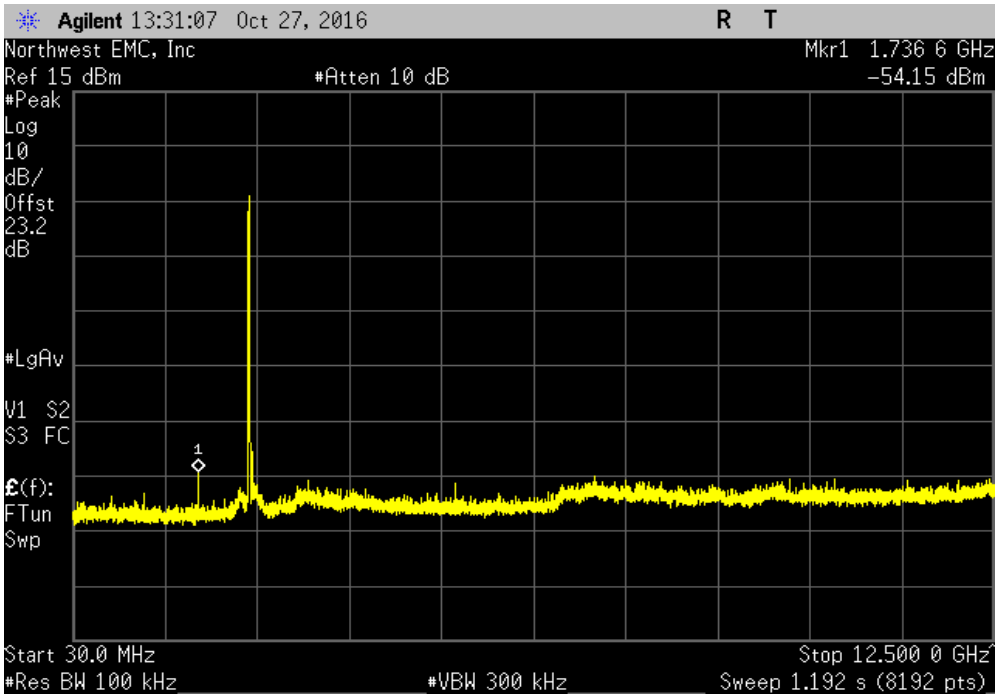
Configuration #	4	Signature

		Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result
2400 MHz - 2483.5 MHz Band					
	802.11(b) 1 Mbps				
	Low Channel 1, 2412 MHz	Fundamental	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-50.52	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-47.51	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-50.66	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-49.35	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-52.89	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-47.77	-30	Pass
	802.11(b) 11 Mbps				
	Low Channel 1, 2412 MHz	Fundamental	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-52.21	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-48.48	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-54.39	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-49.73	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-54.03	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-50.65	-30	Pass
	802.11(g) 6 Mbps				
	Low Channel 1, 2412 MHz	Fundamental	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-51.74	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-48.62	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-53.86	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-49.41	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-54.08	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-50.12	-30	Pass
	802.11(g) 36 Mbps				
	Low Channel 1, 2412 MHz	Fundamental	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-37.38	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-42.47	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-50.58	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-46.4	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-44.43	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-44.19	-30	Pass
	802.11(g) 54 Mbps				
	Low Channel 1, 2412 MHz	Fundamental	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-46.08	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-42.41	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-46.49	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-44.62	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-47.82	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-43.59	-30	Pass
	802.11(n) MCS0				
	Low Channel 1, 2412 MHz	Fundamental	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-39.64	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-42.8	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-49.41	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-45.41	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-48.08	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-44.03	-30	Pass
	802.11(n) MCS7				
	Low Channel 1, 2412 MHz	Fundamental	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-46.36	-30	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 25 GHz	-42.11	-30	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-48.98	-30	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 25 GHz	-44.89	-30	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-46.38	-30	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 25 GHz	-44.21	-30	Pass

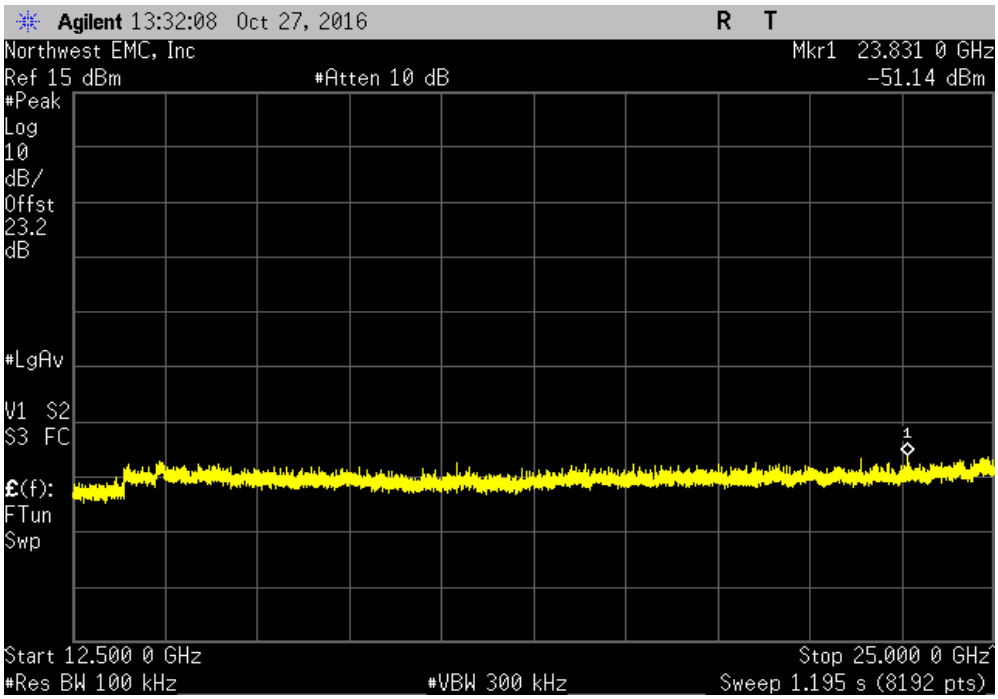
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



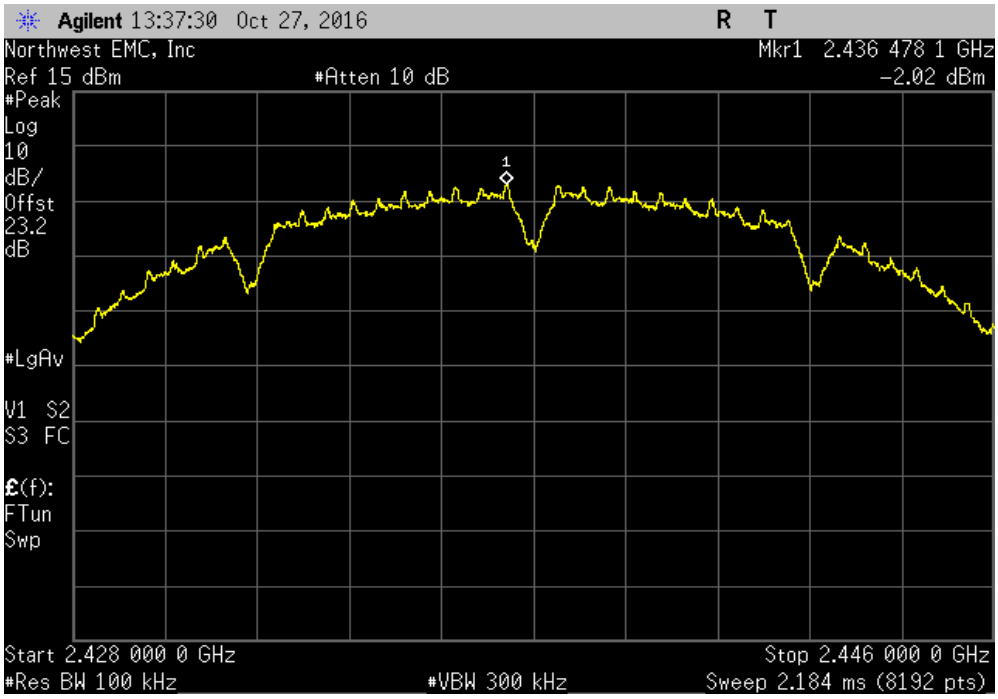
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz					
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-50.52	-30	Pass



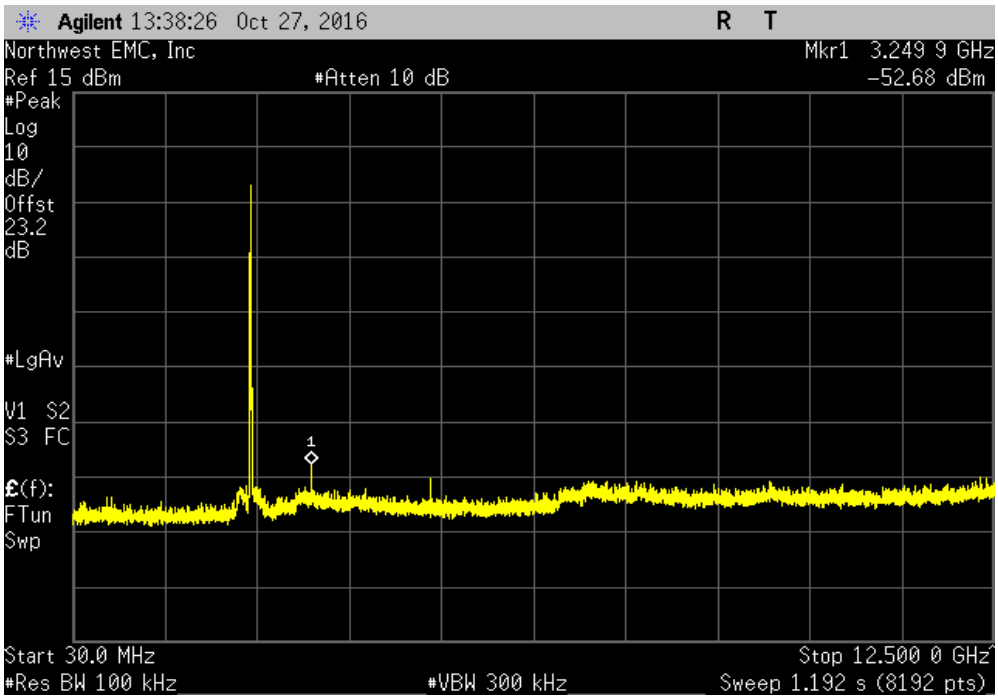
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-47.51	-30	Pass



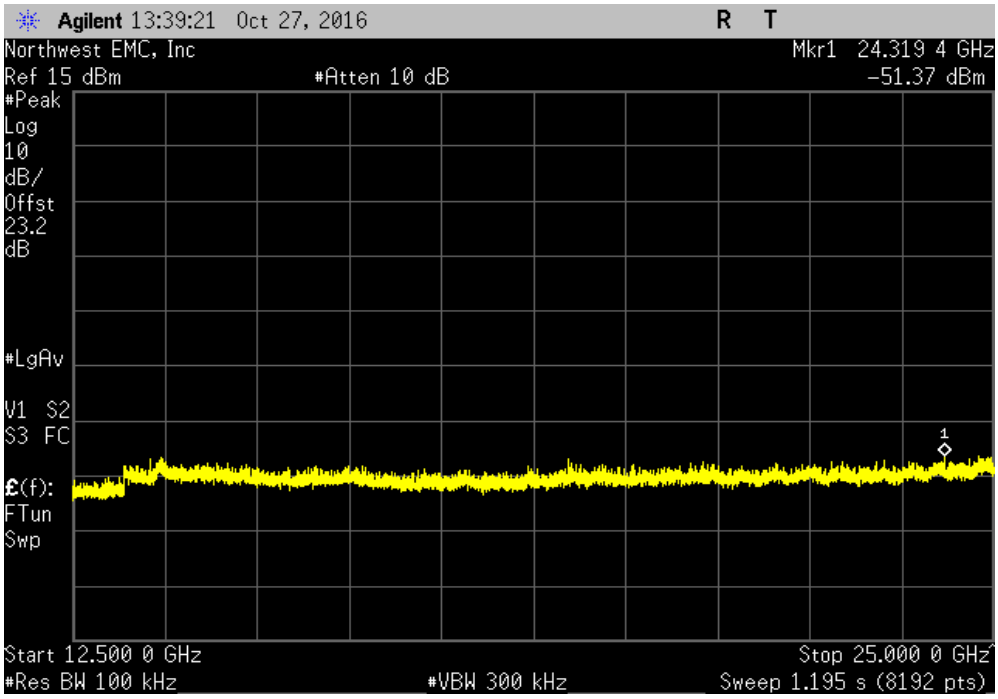
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



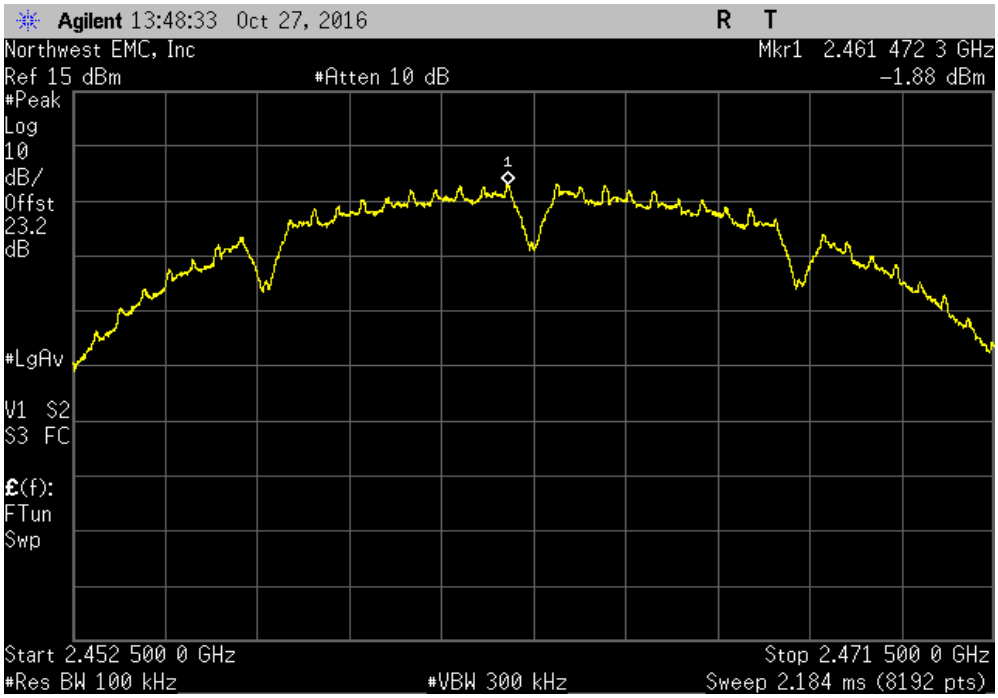
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-50.66	-30	Pass



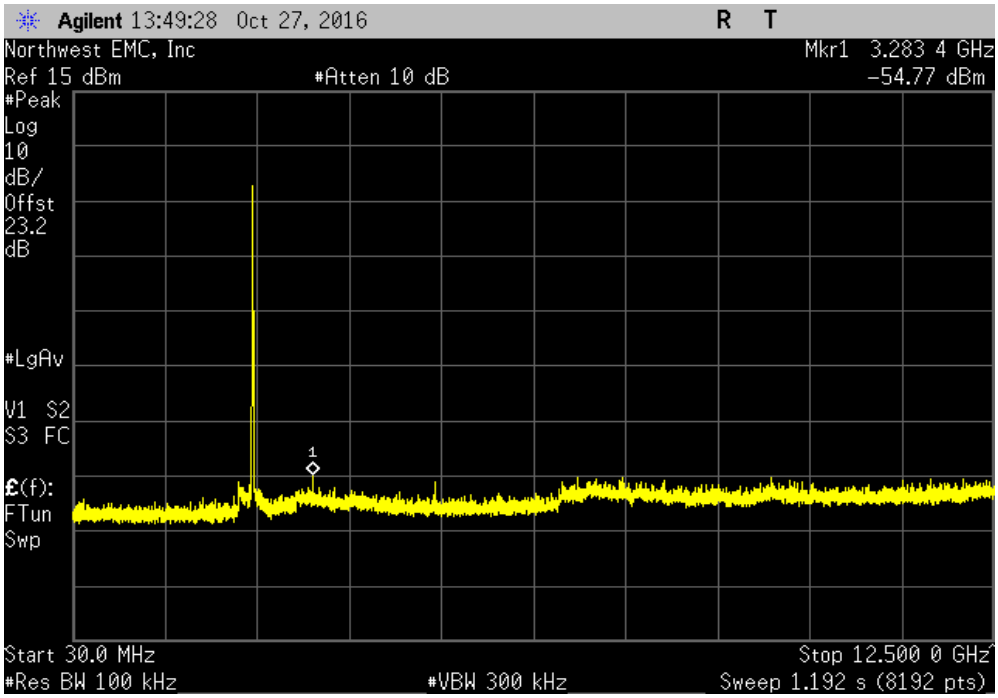
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-49.35	-30	Pass



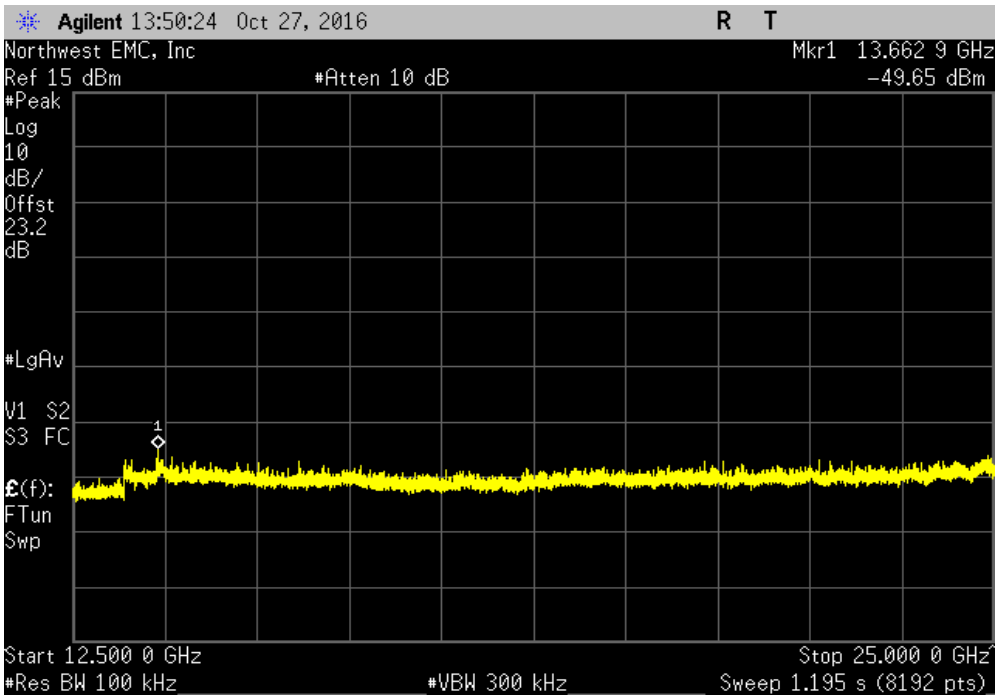
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



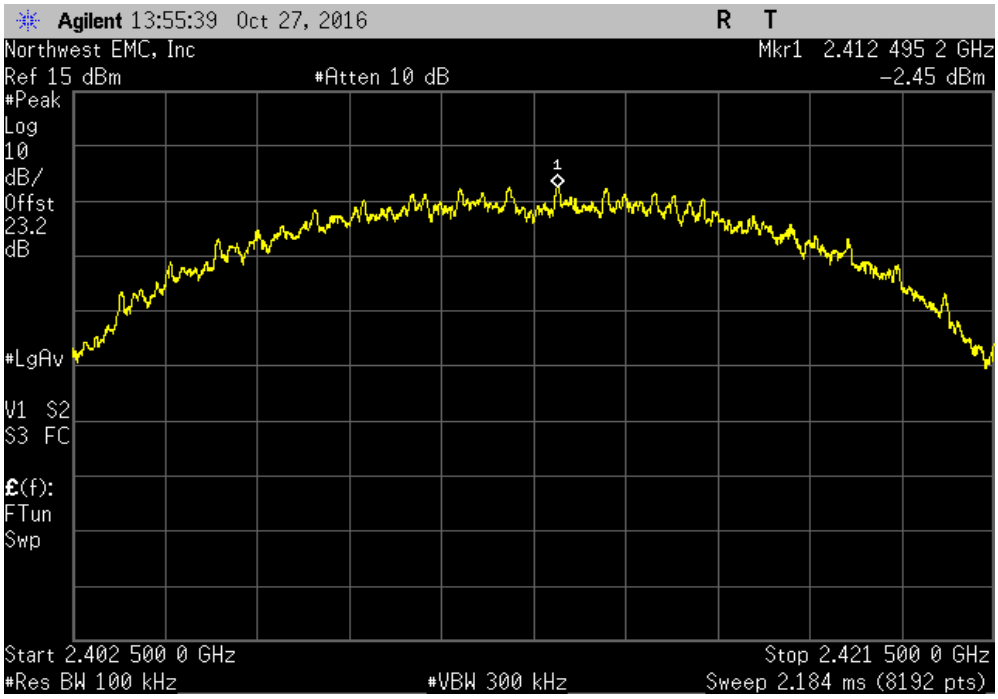
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-52.89	-30	Pass



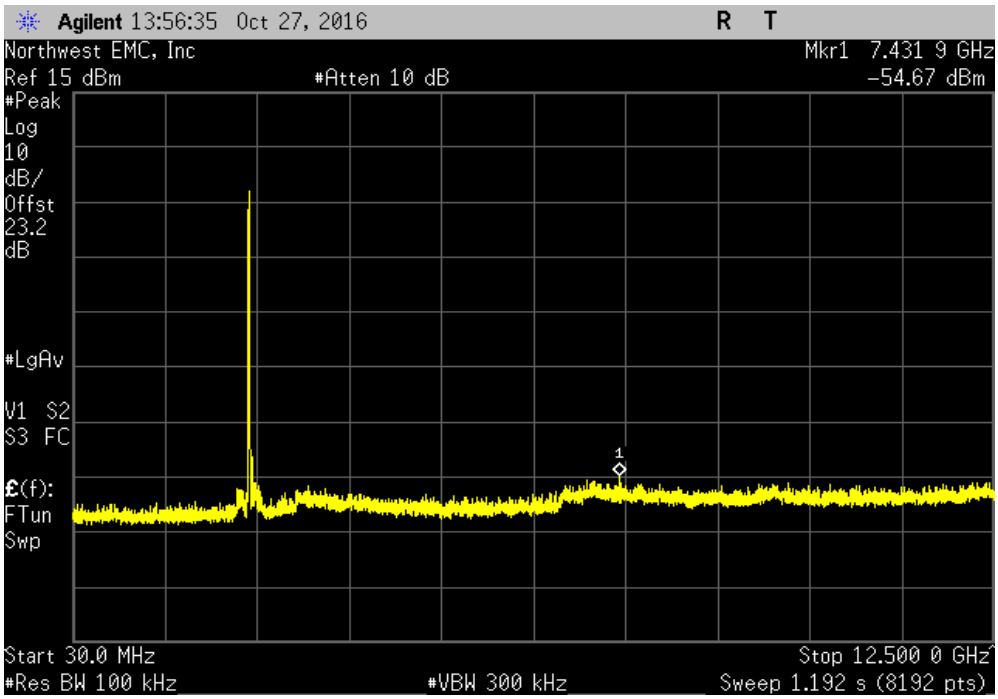
2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-47.77	-30	Pass



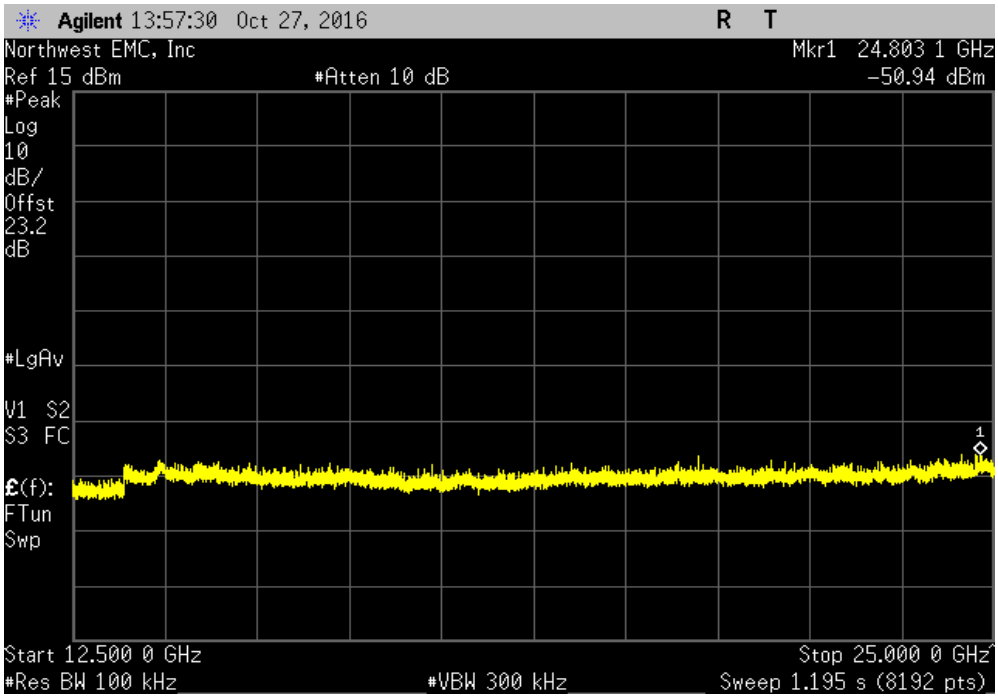
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



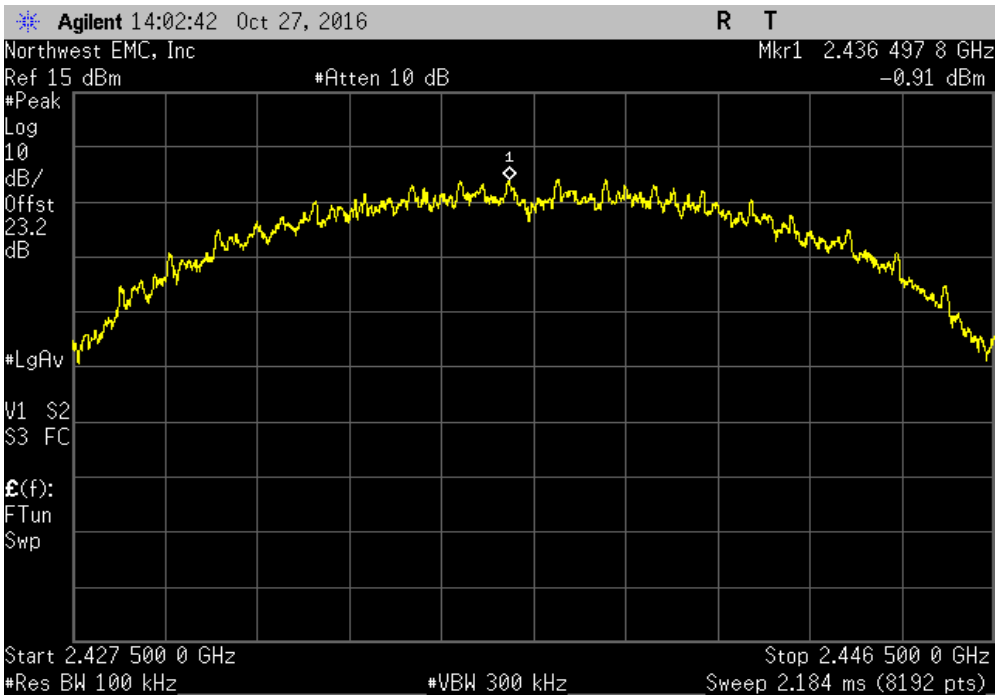
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-52.21	-30	Pass



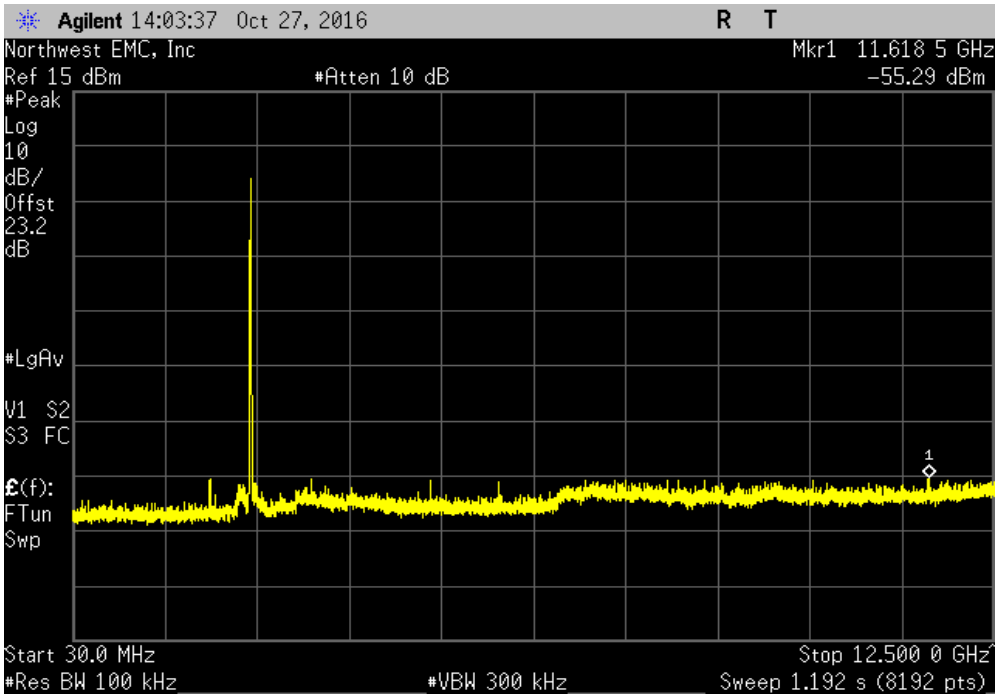
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-48.48	-30	Pass



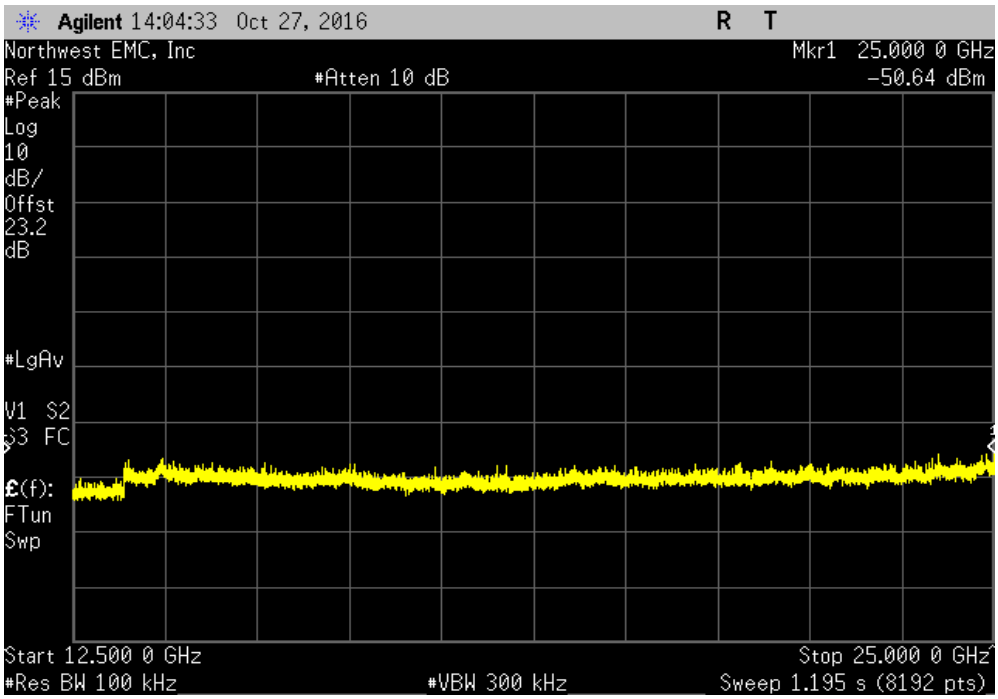
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



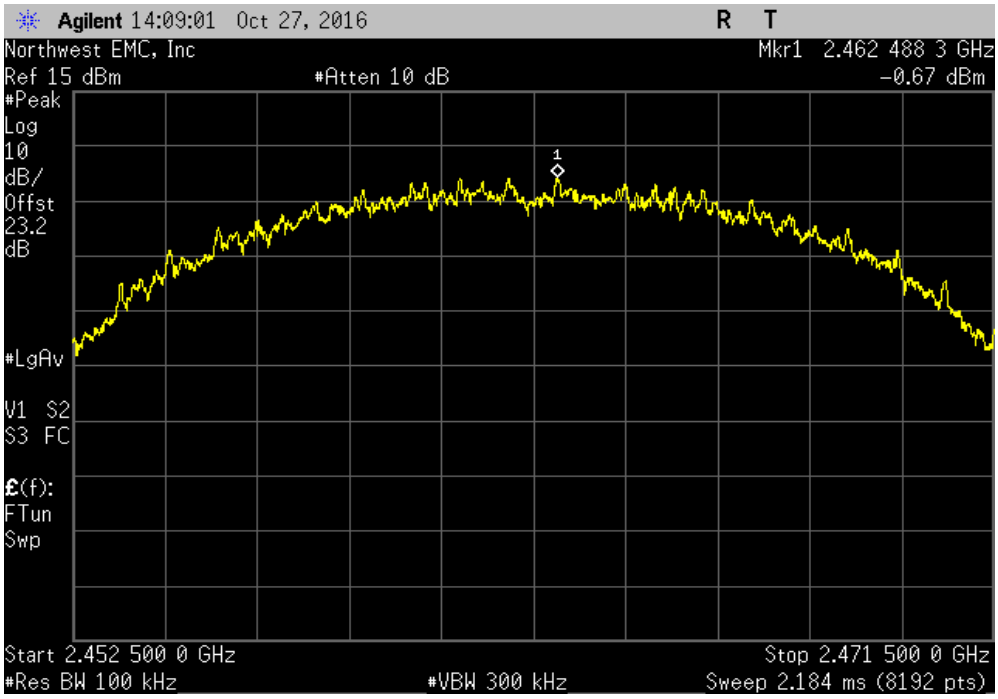
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-54.39	-30	Pass



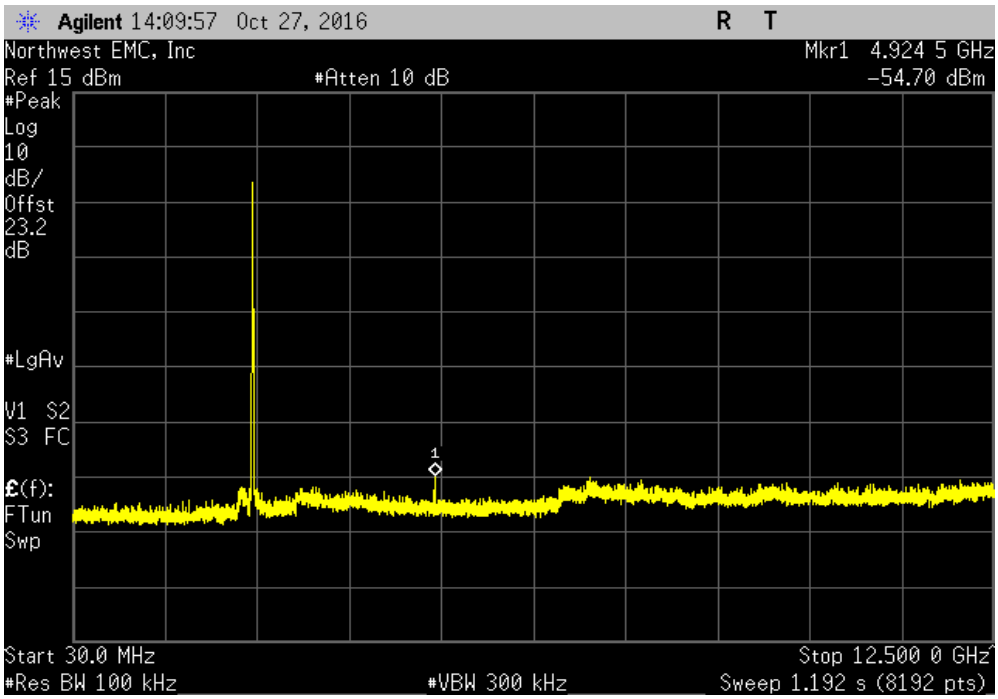
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-49.73	-30	Pass



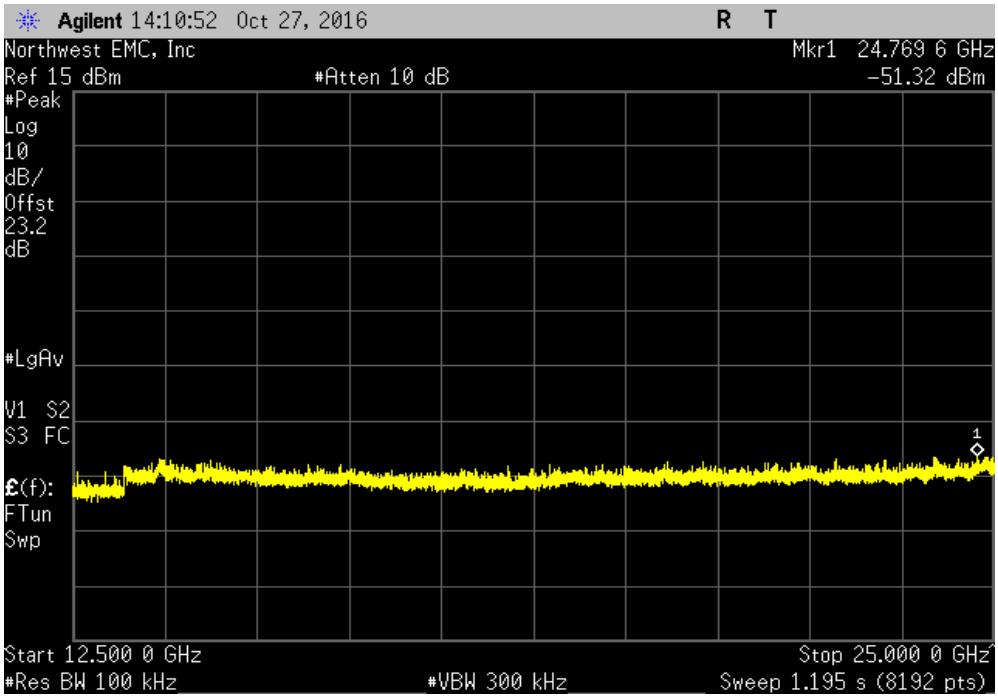
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



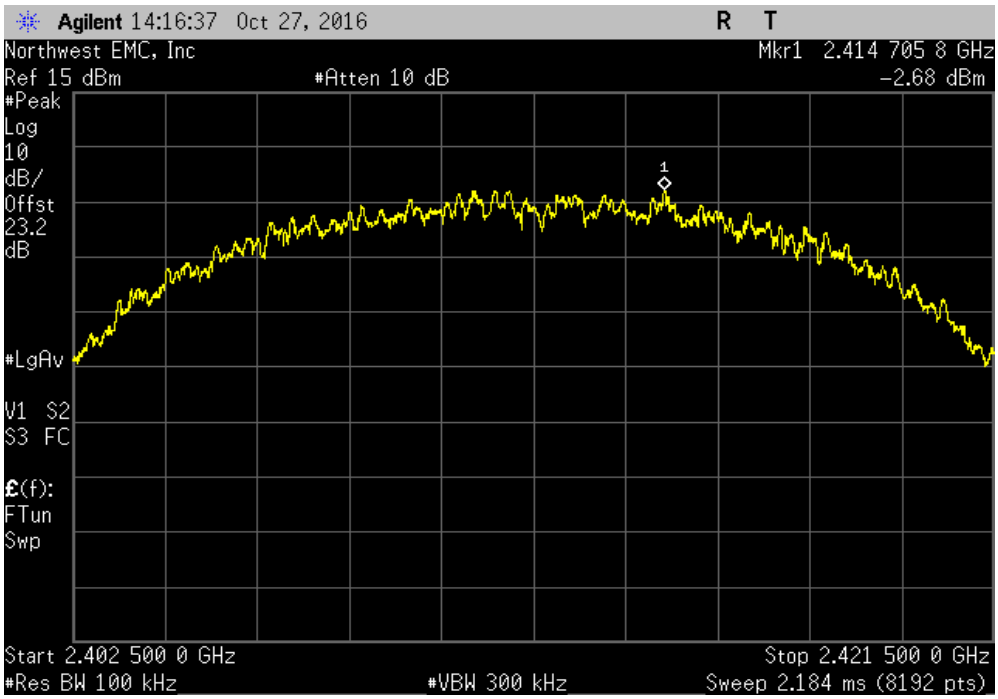
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-54.03	-30	Pass



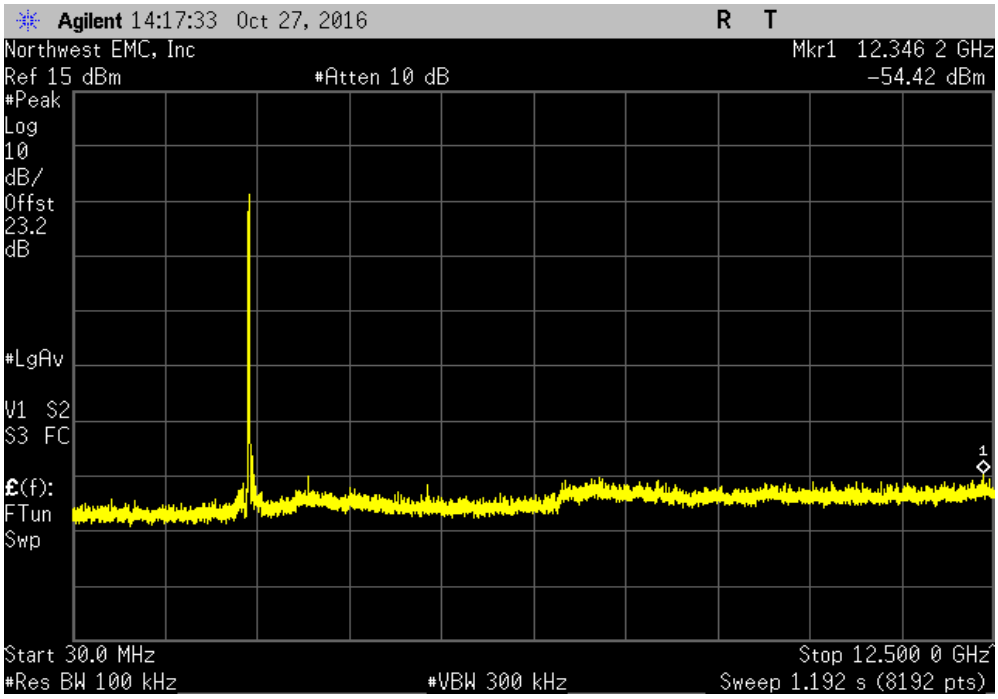
2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-50.65	-30	Pass



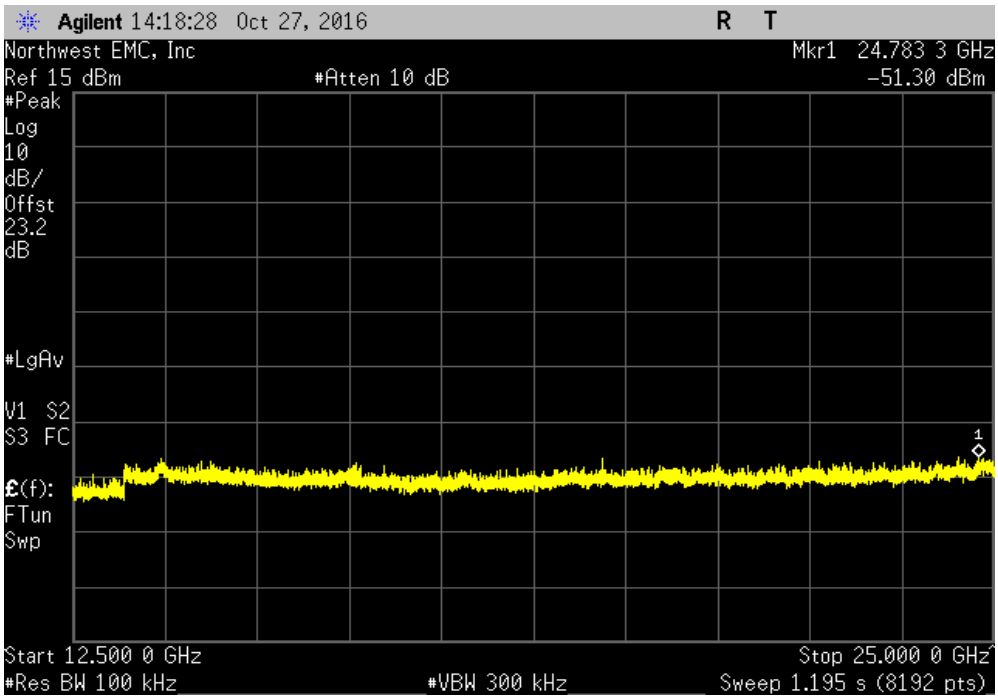
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



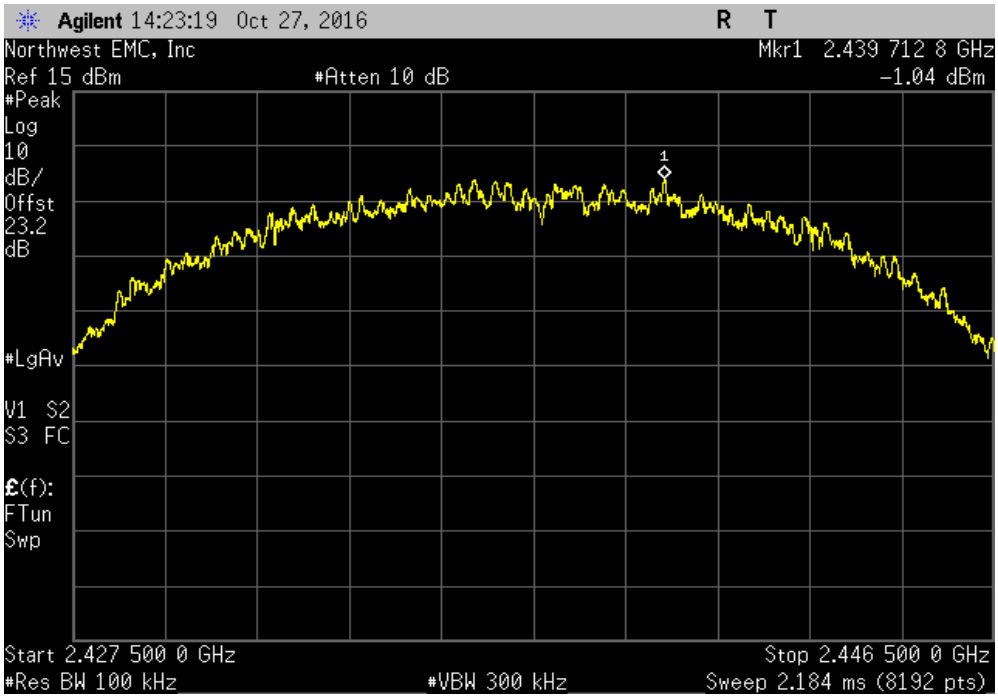
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-51.74	-30	Pass



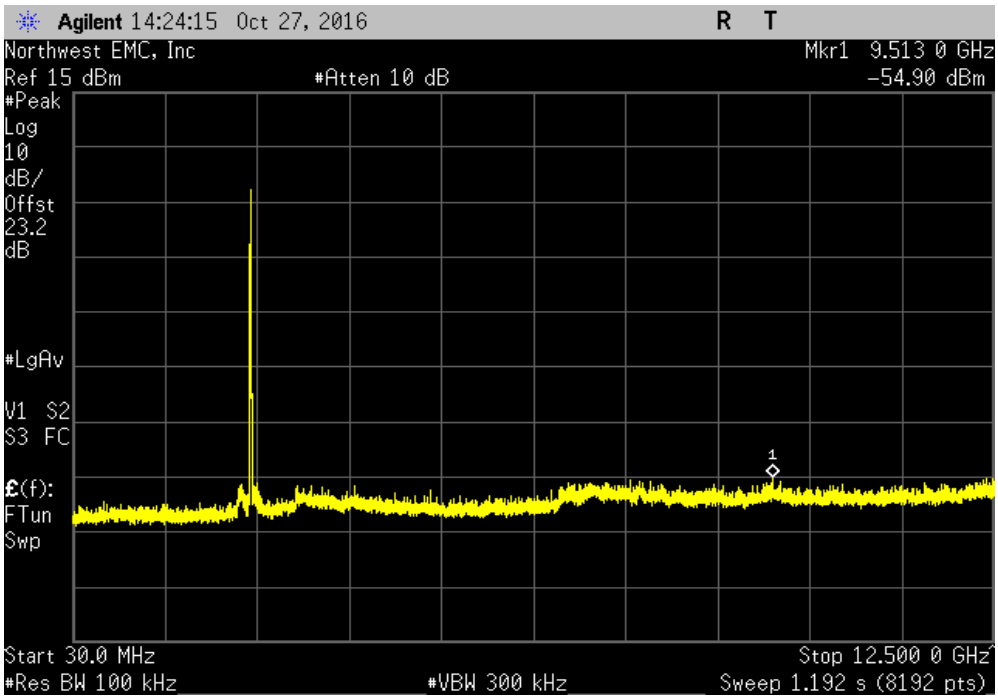
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-48.62	-30	Pass



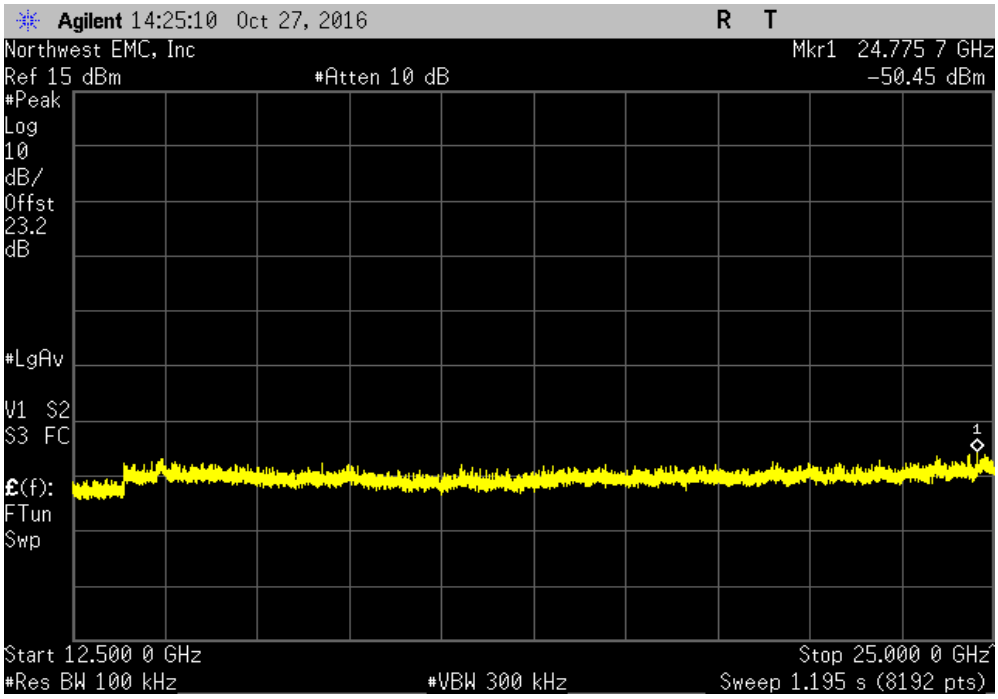
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



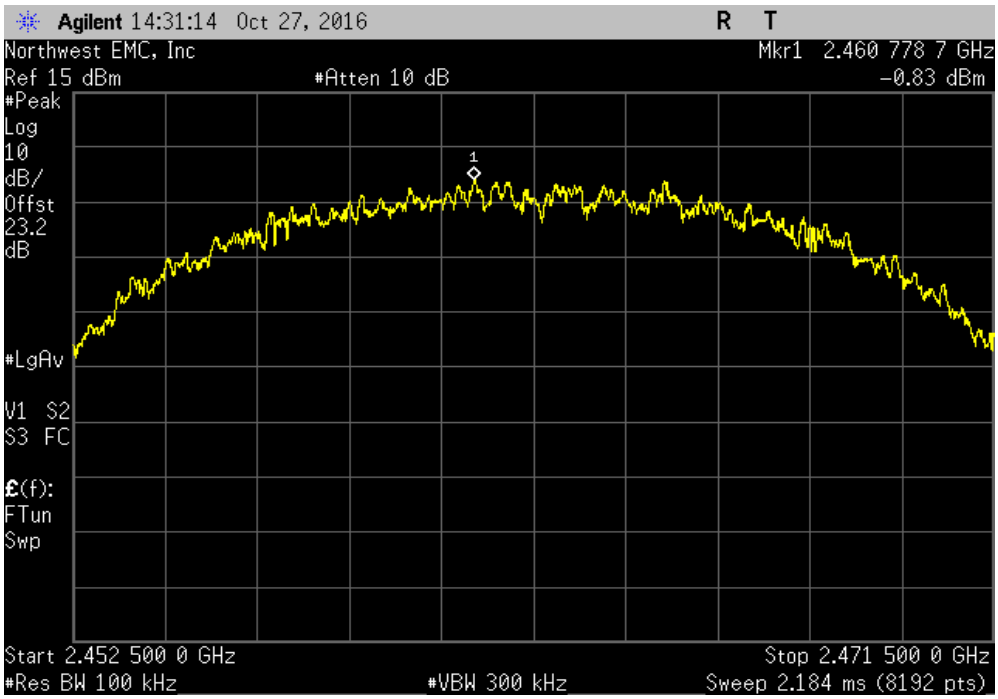
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-53.86	-30	Pass



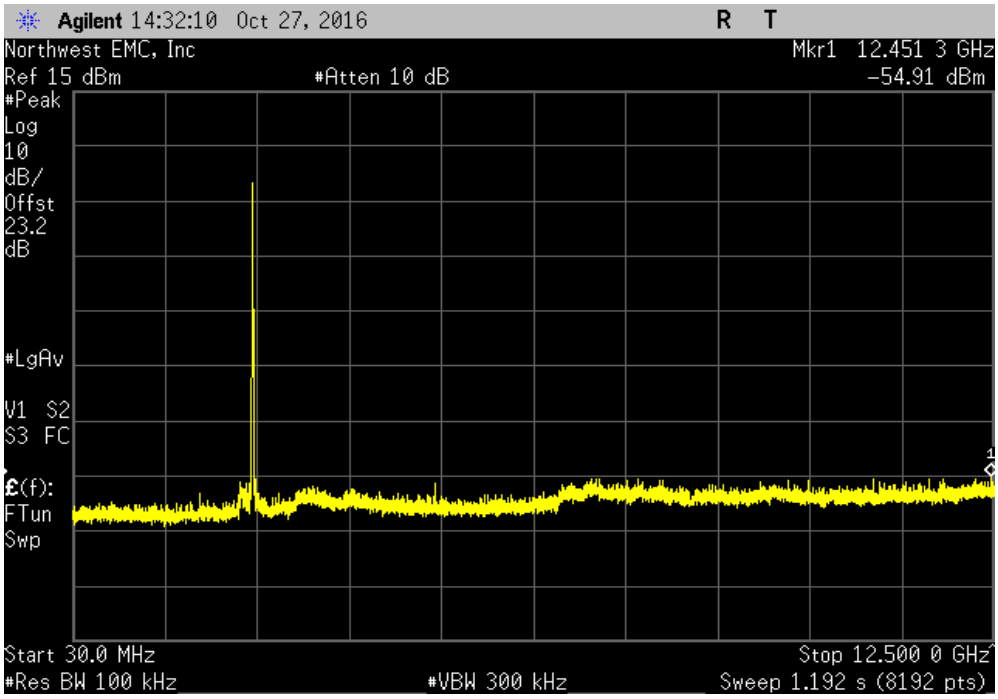
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-49.41	-30	Pass



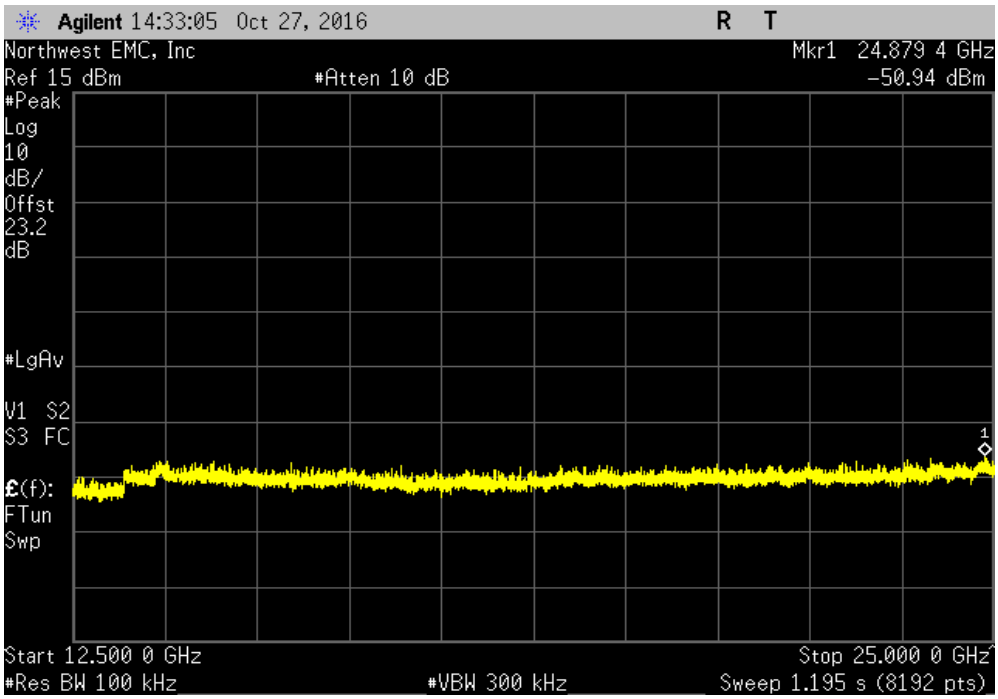
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



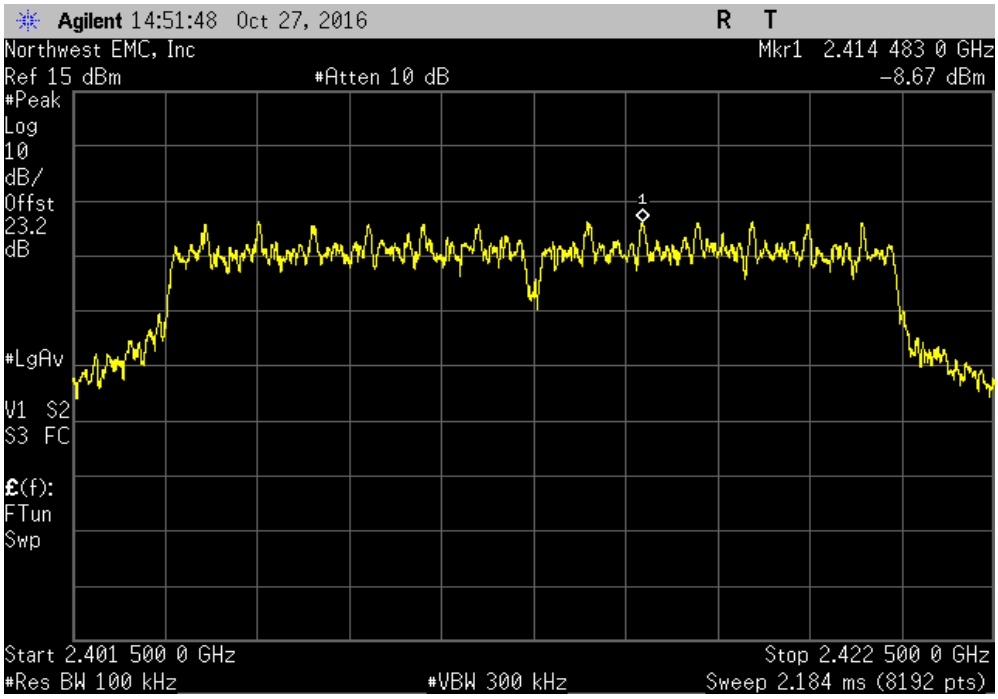
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-54.08	-30	Pass



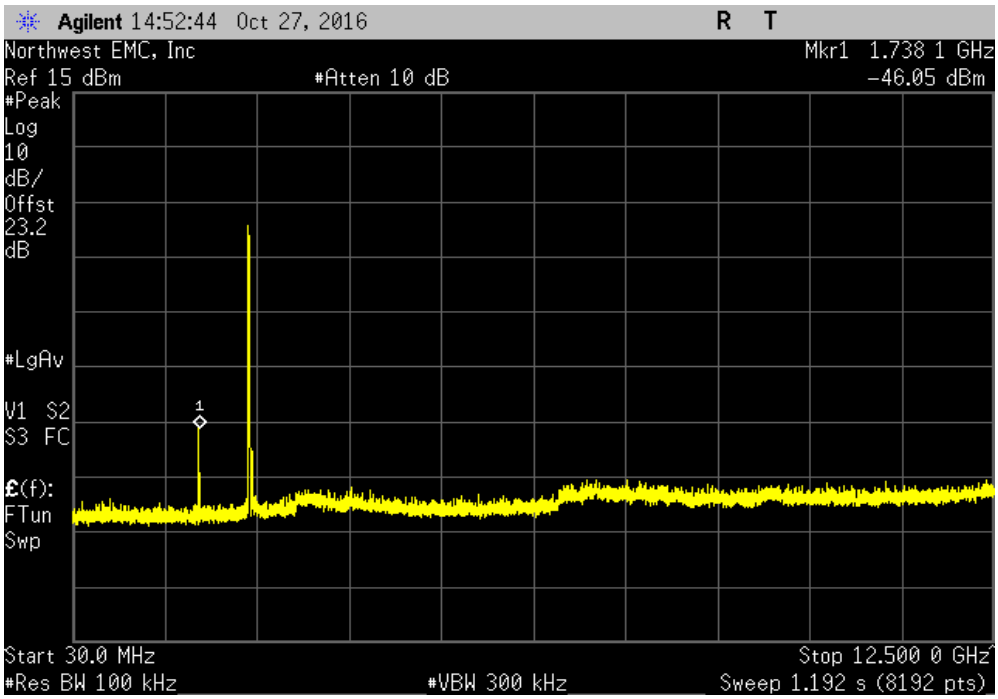
2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-50.12	-30	Pass



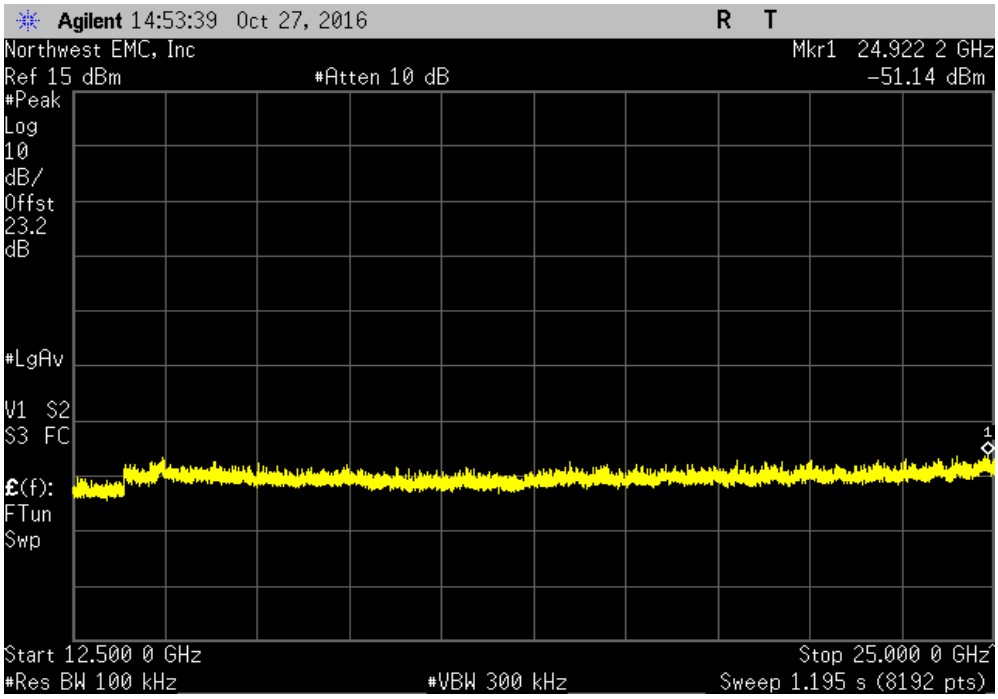
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



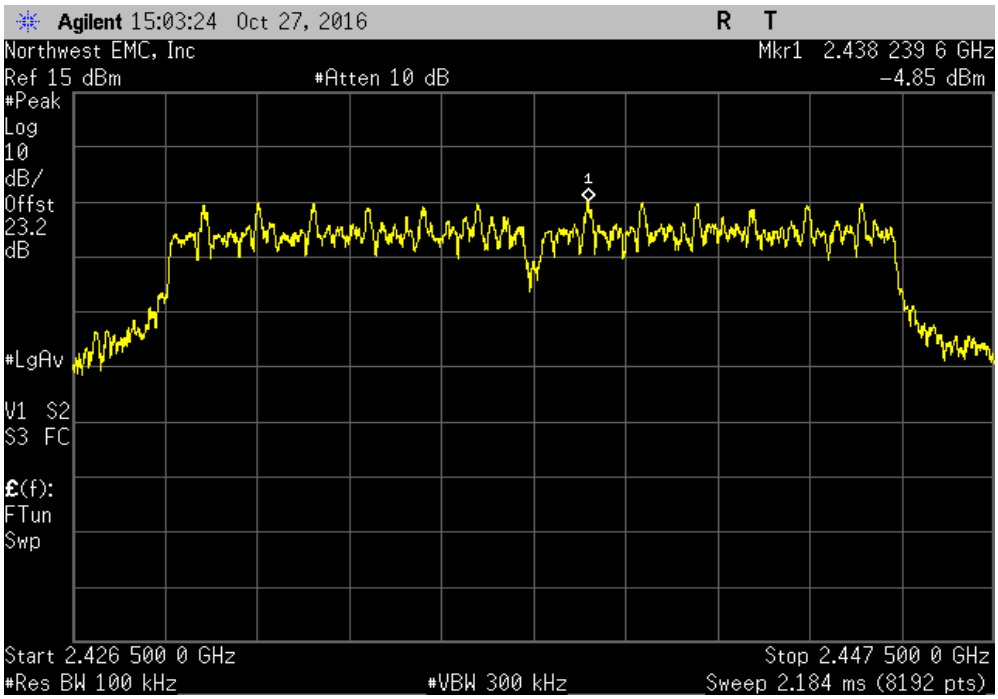
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-37.38	-30	Pass



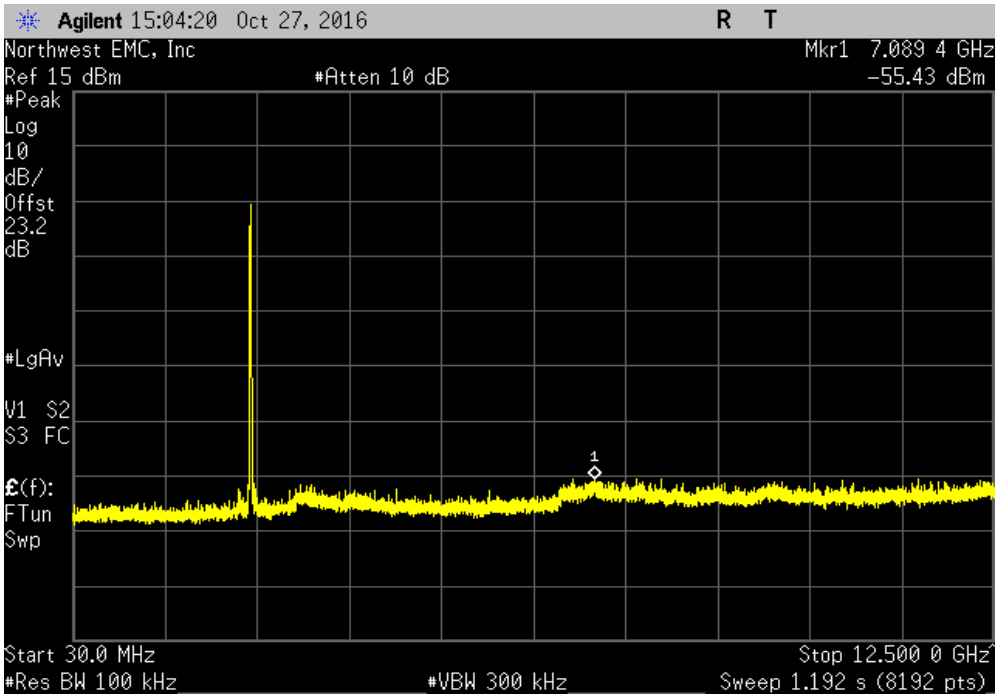
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-42.47	-30	Pass



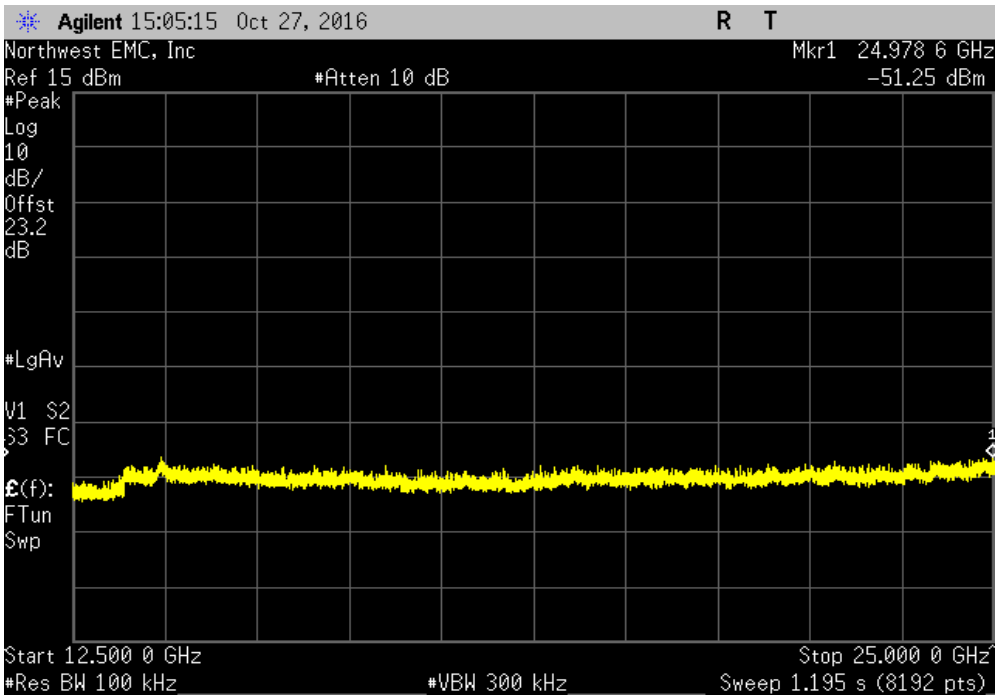
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



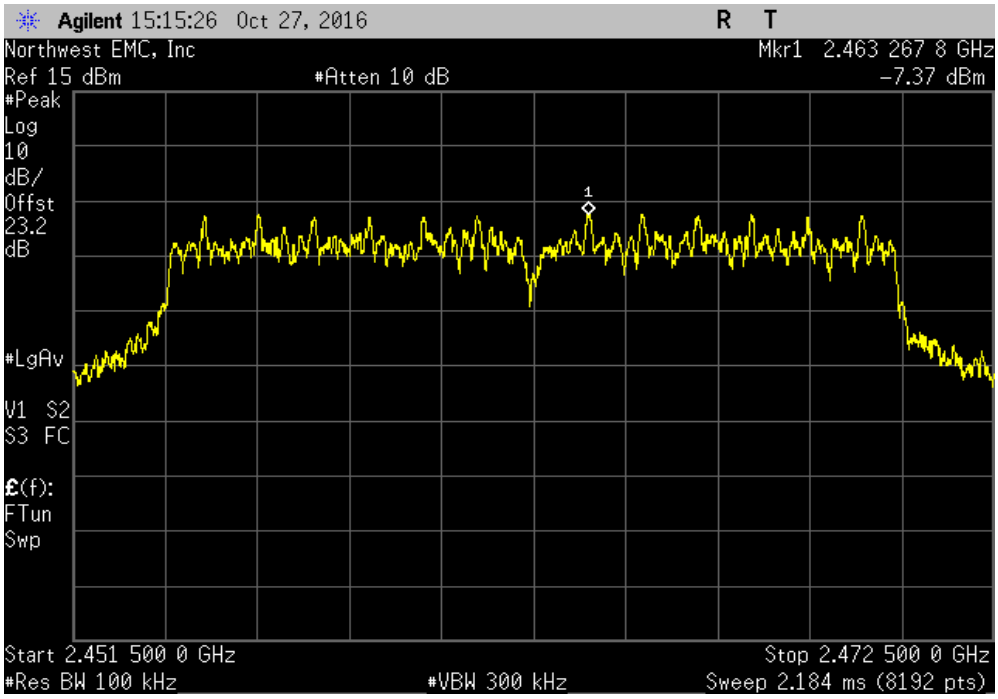
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-50.58	-30	Pass



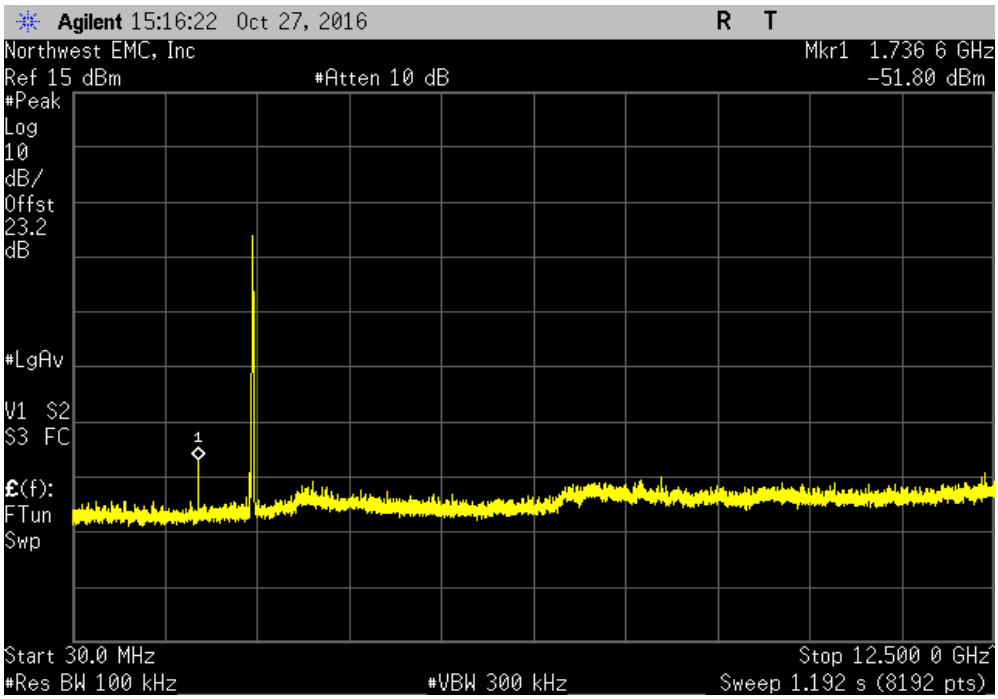
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-46.4	-30	Pass



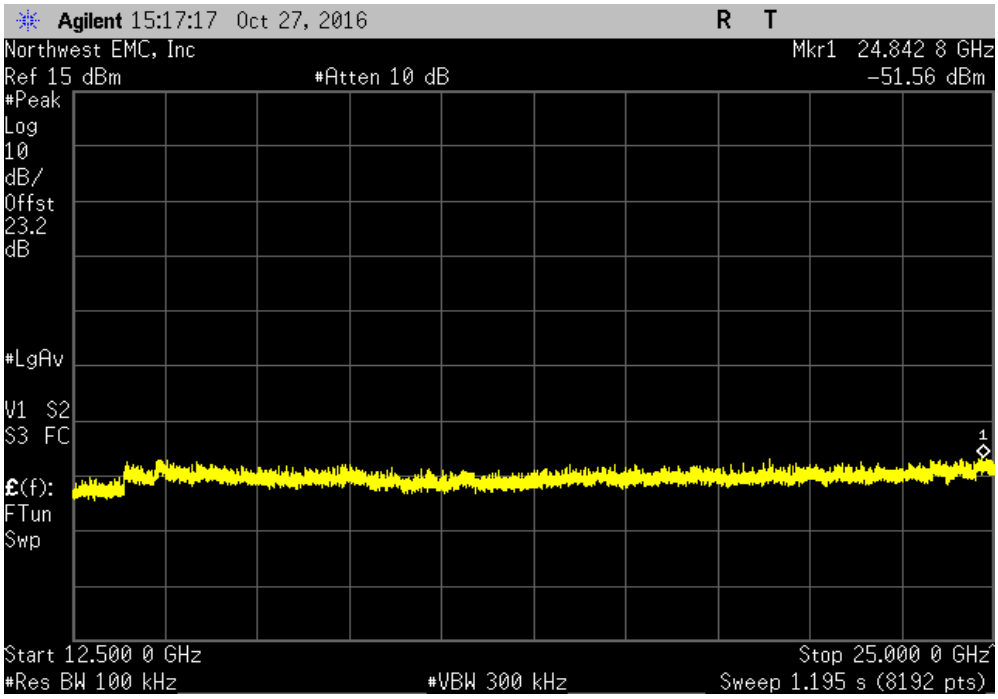
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



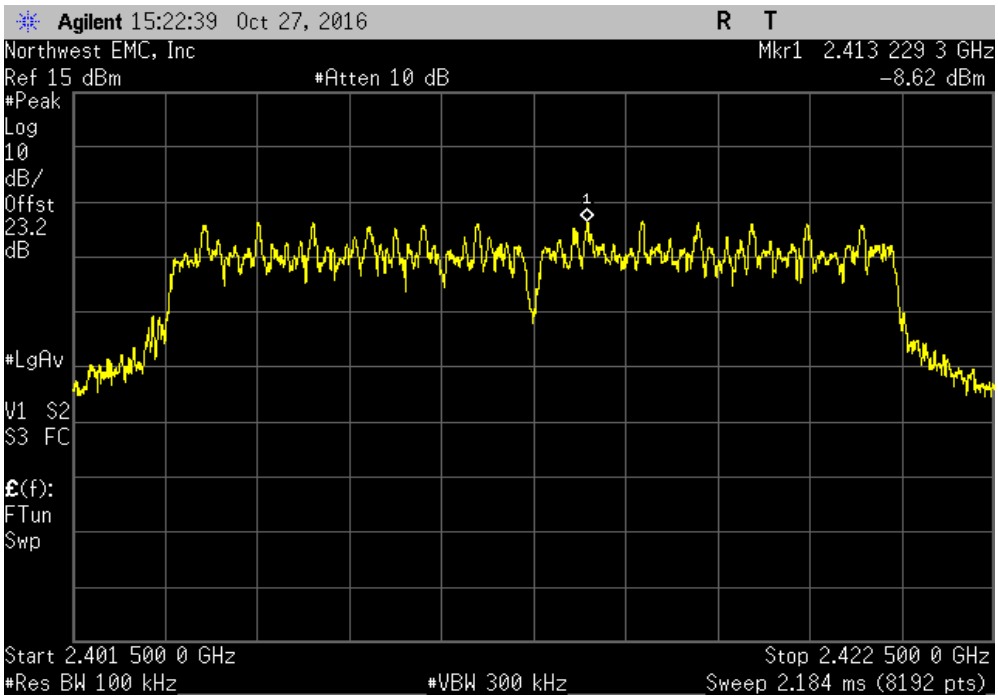
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-44.43	-30	Pass



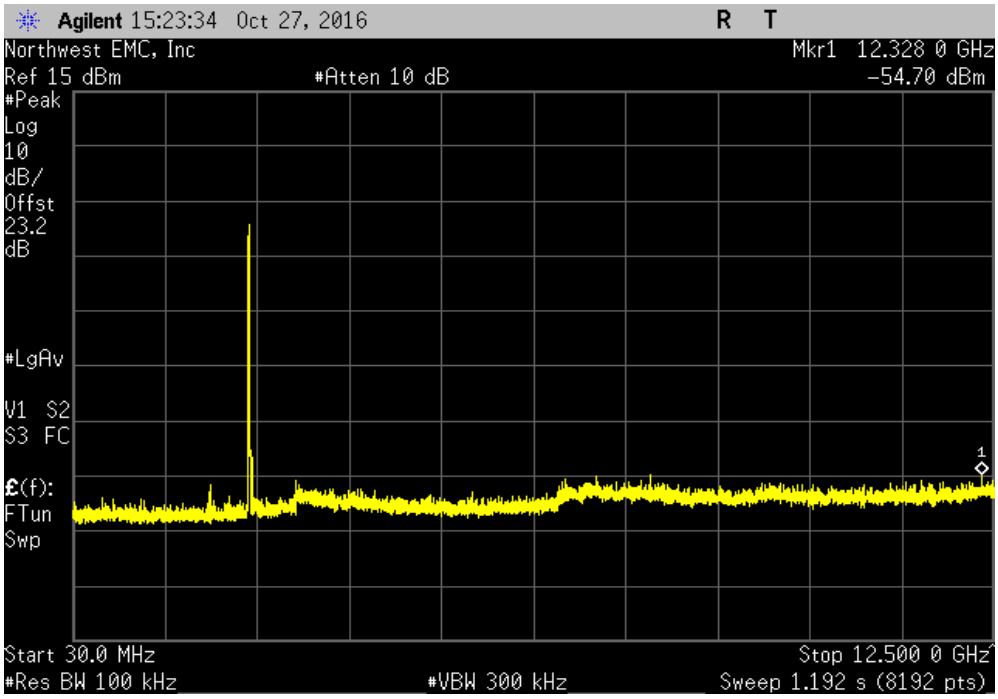
2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-44.19	-30	Pass



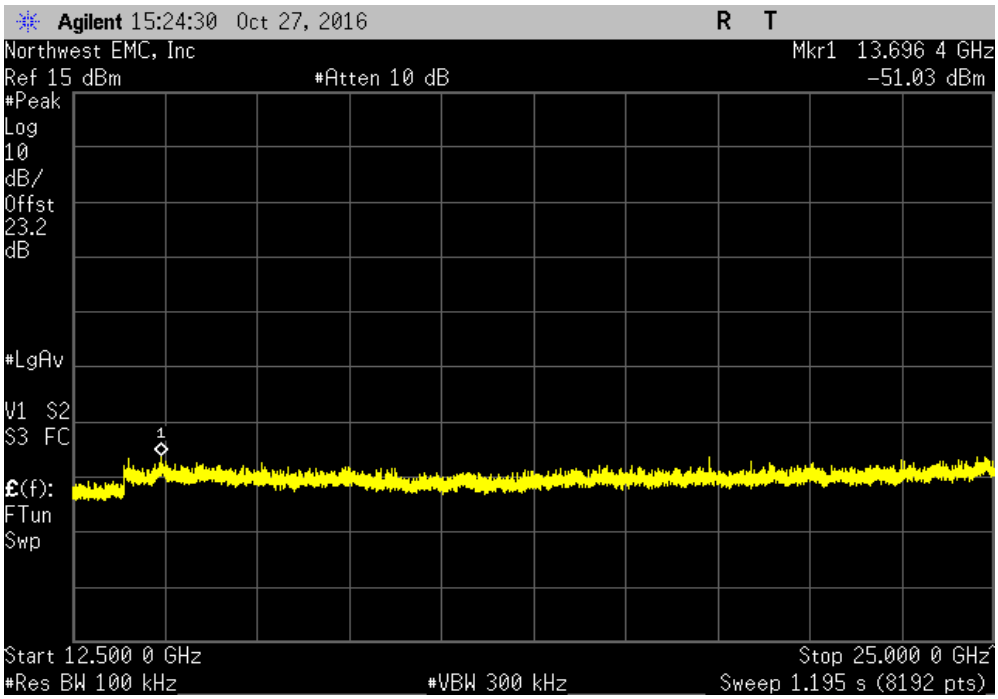
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



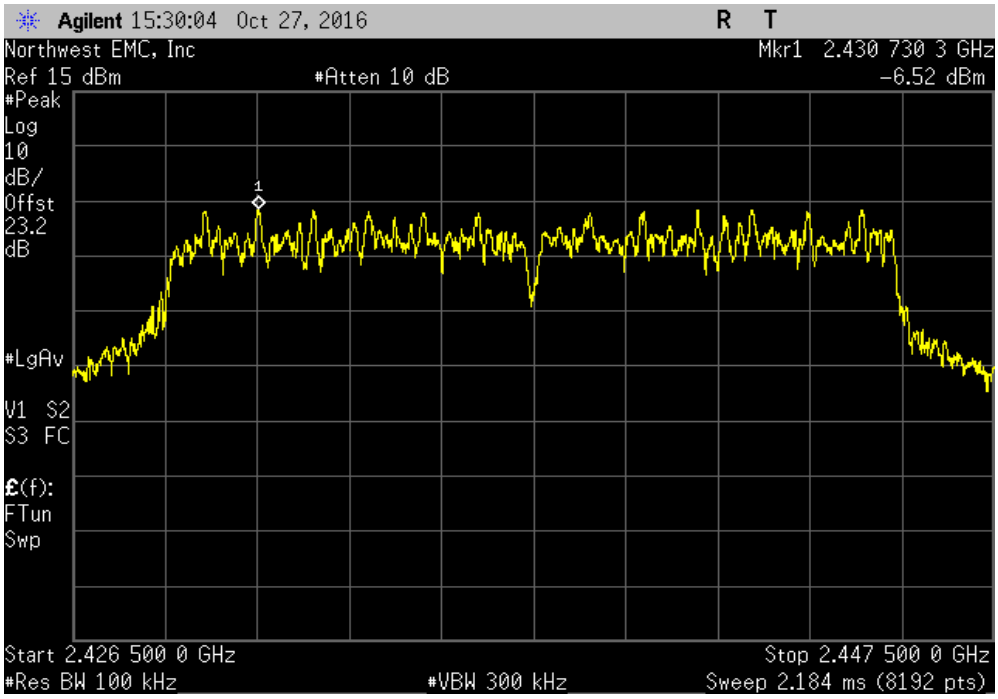
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz					
Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz			-46.08	-30	Pass



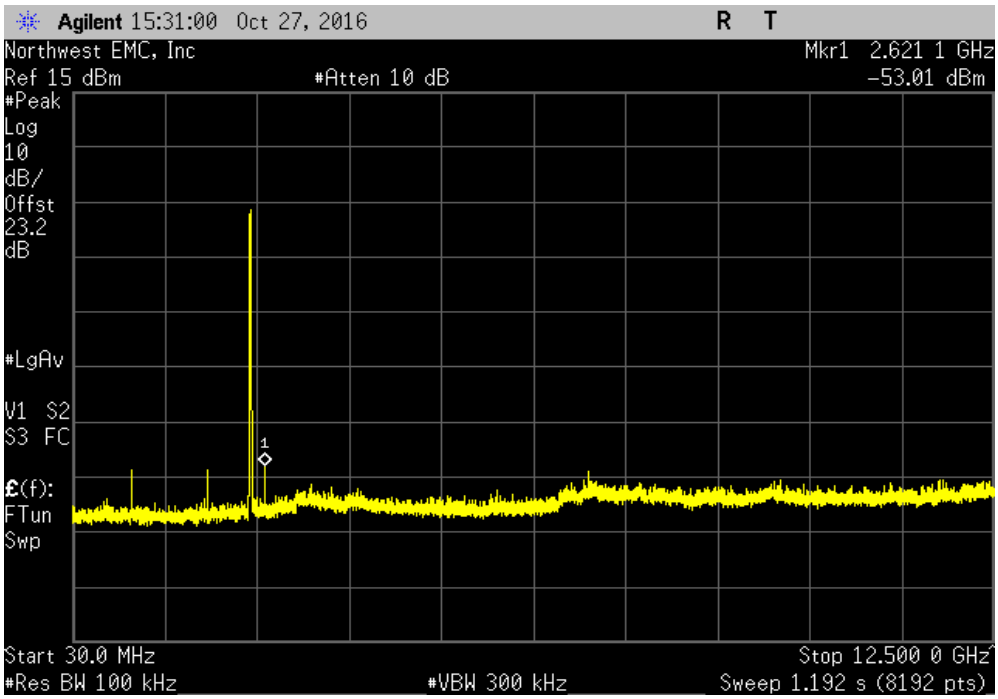
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-42.41	-30	Pass



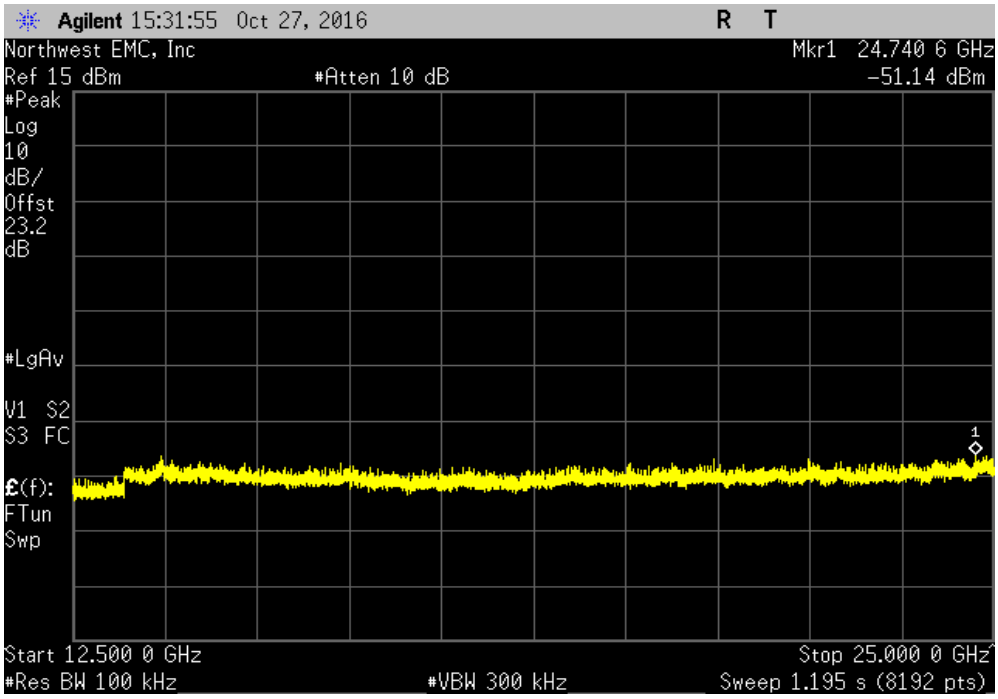
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



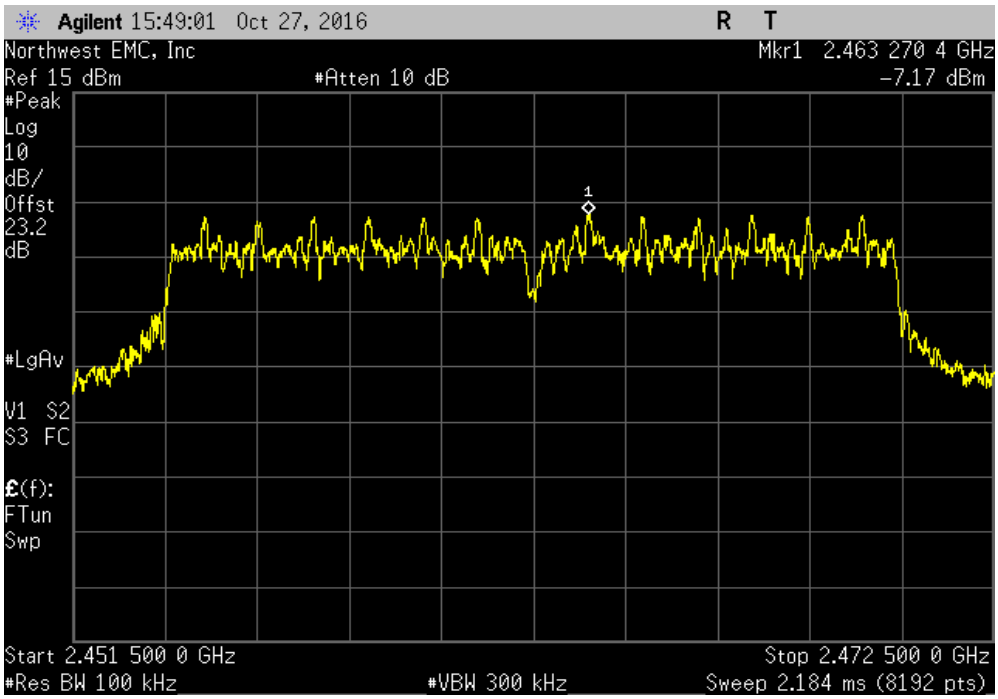
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-46.49	-30	Pass



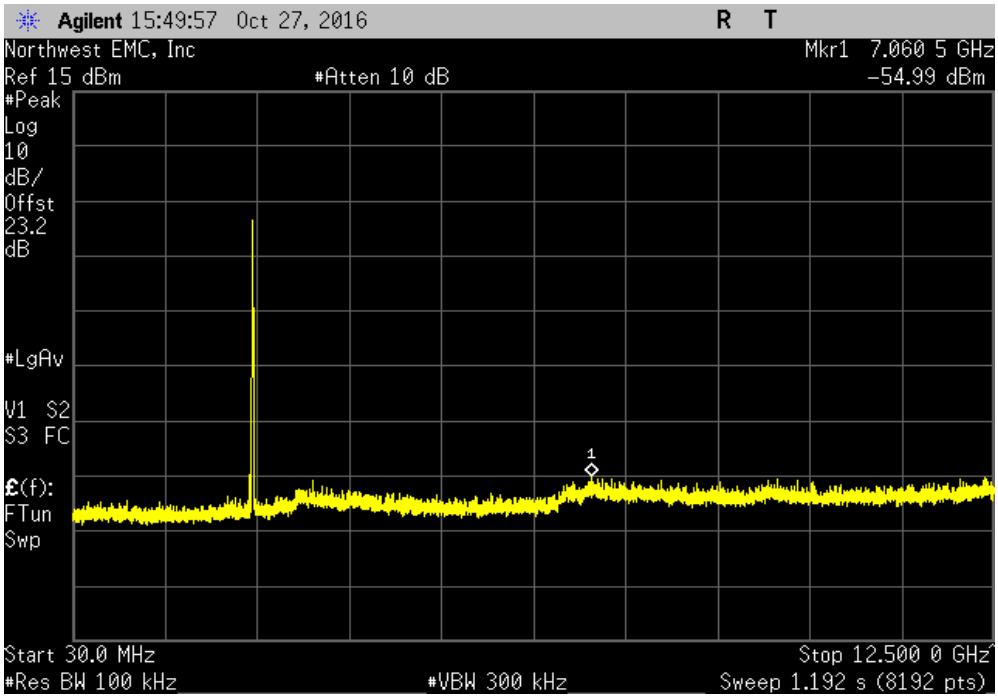
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-44.62	-30	Pass



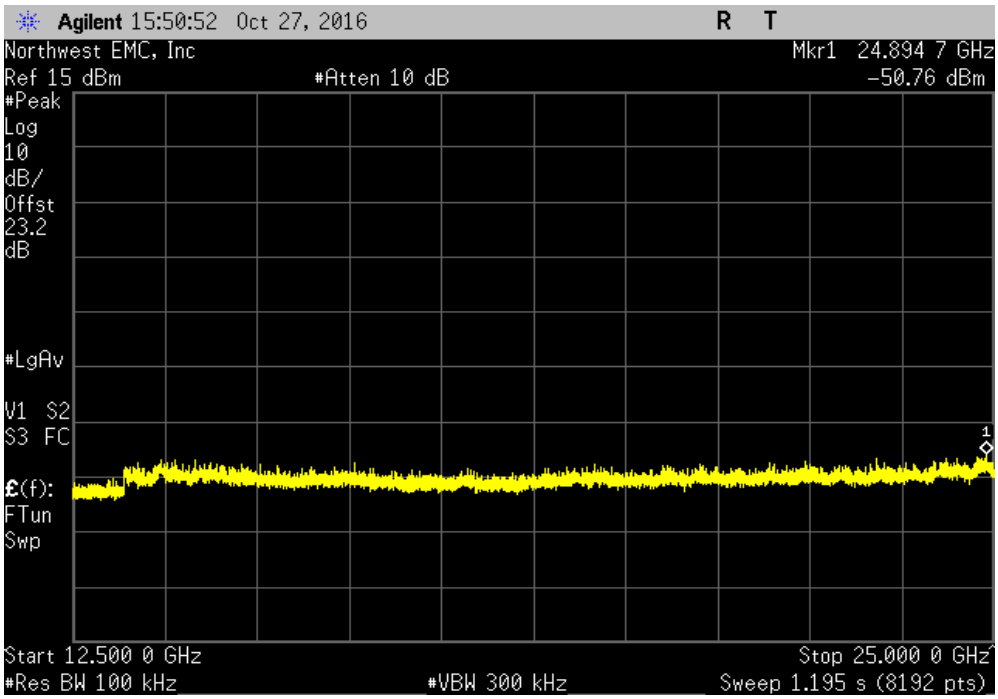
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



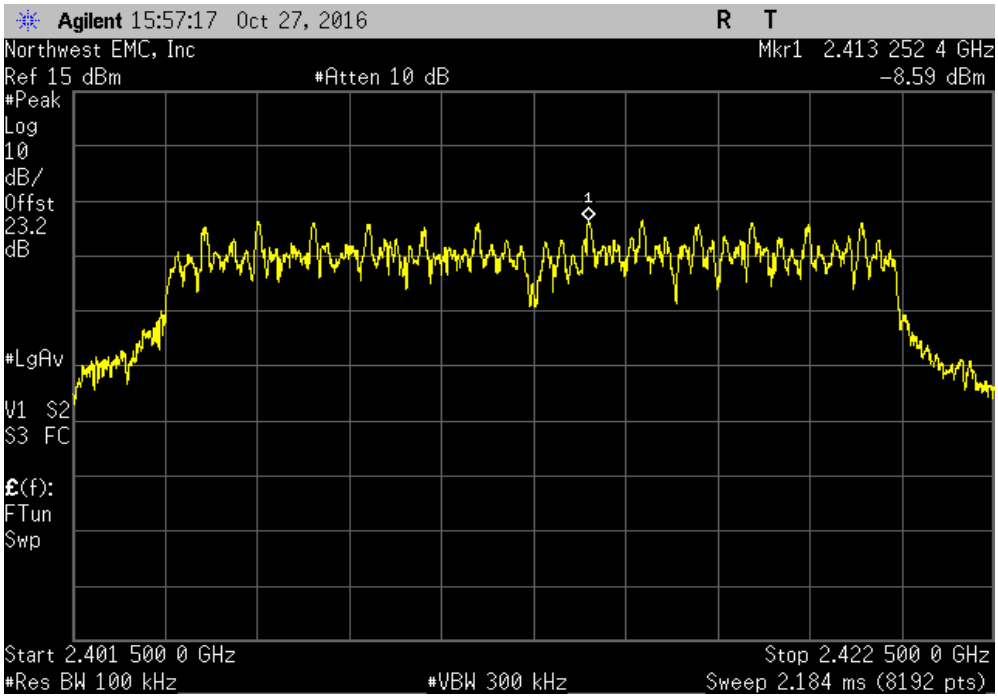
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-47.82	-30	Pass



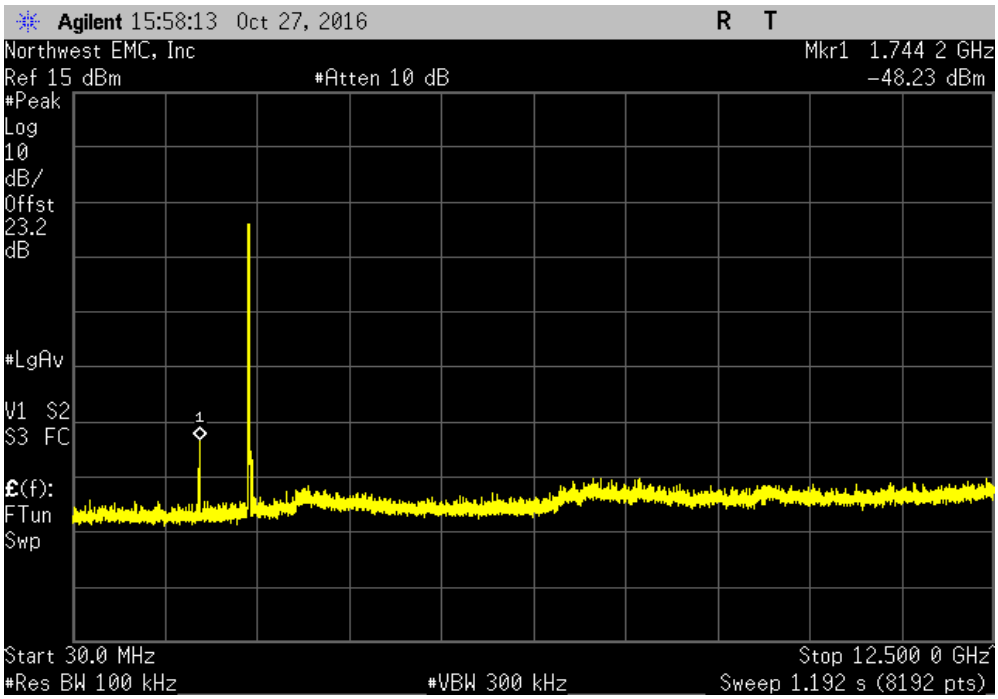
2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-43.59	-30	Pass



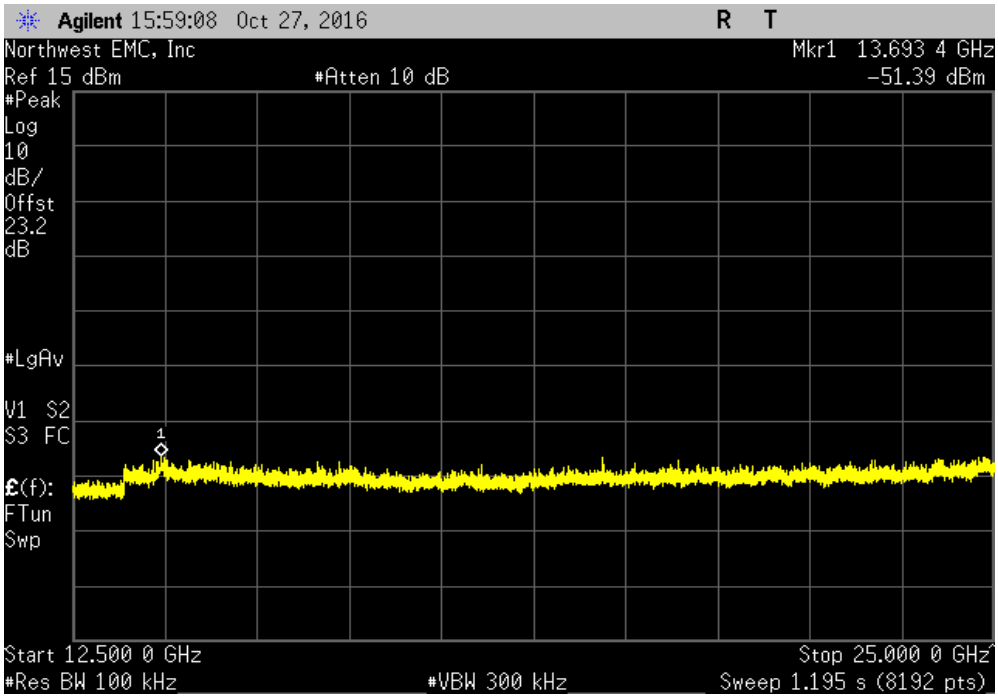
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



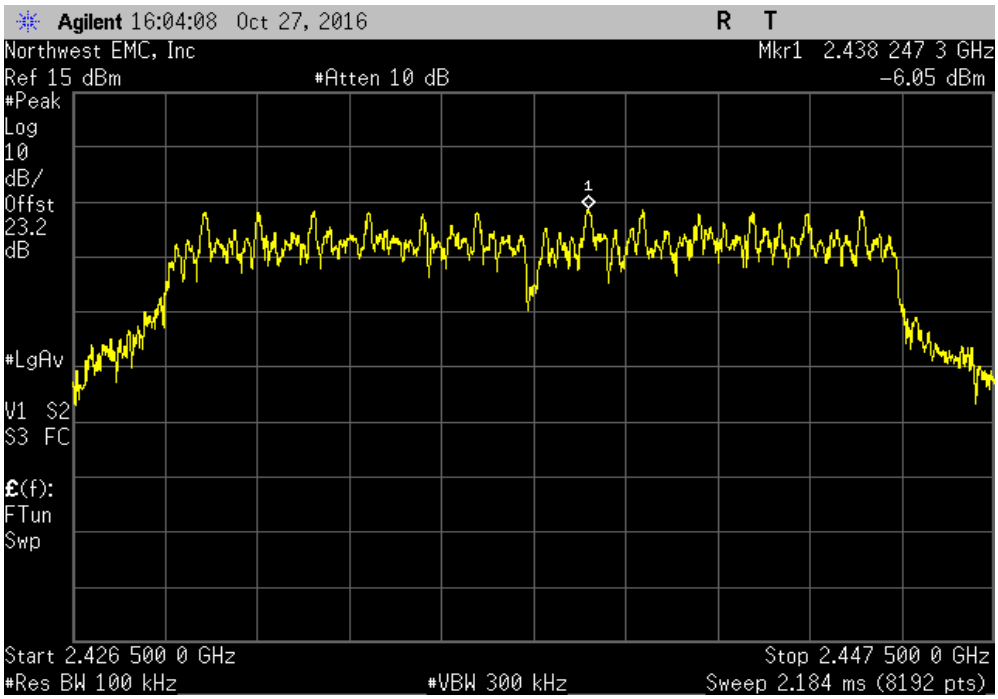
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-39.64	-30	Pass



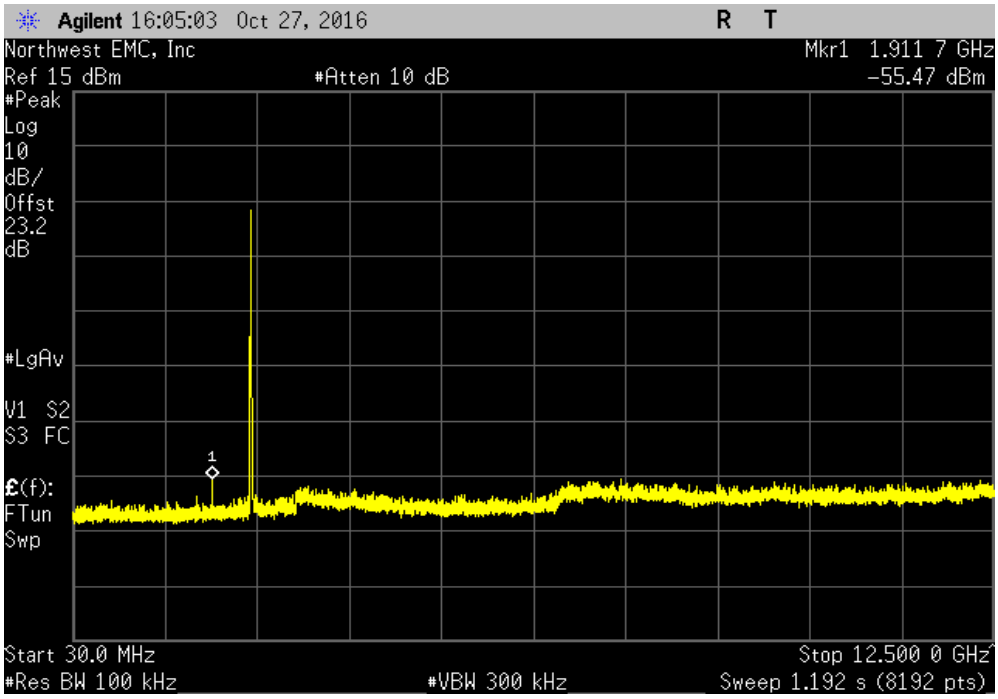
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-42.8	-30	Pass



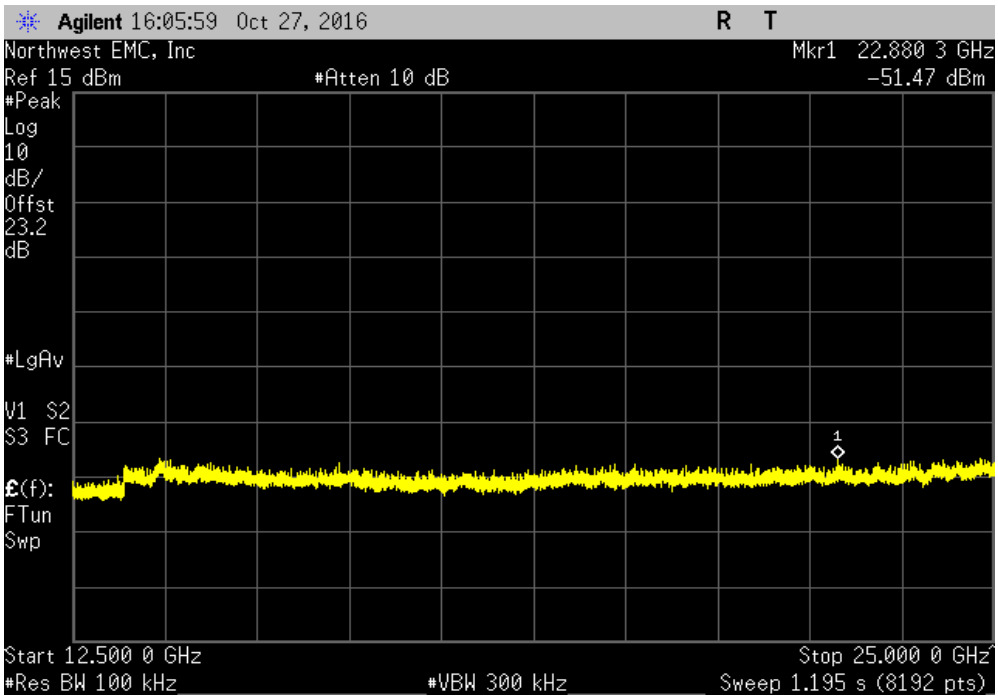
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



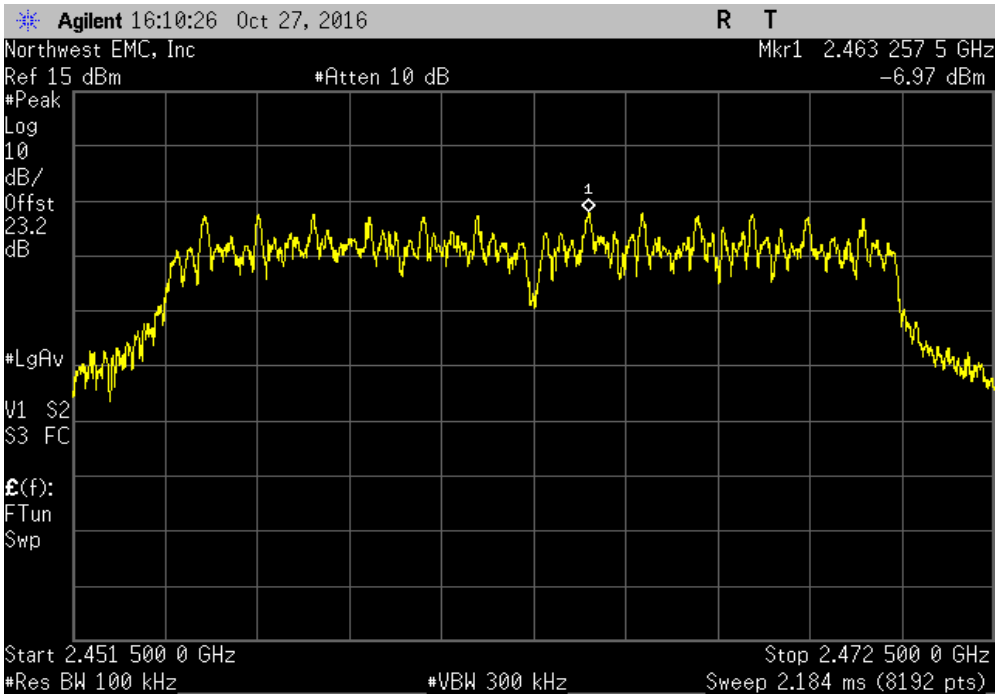
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-49.41	-30	Pass



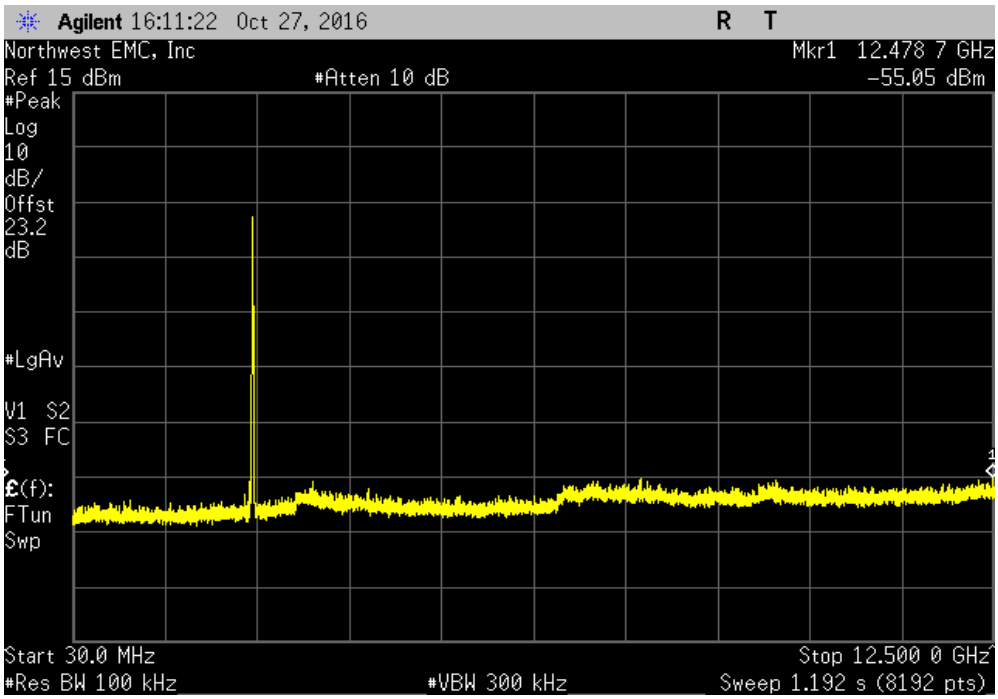
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-45.41	-30	Pass



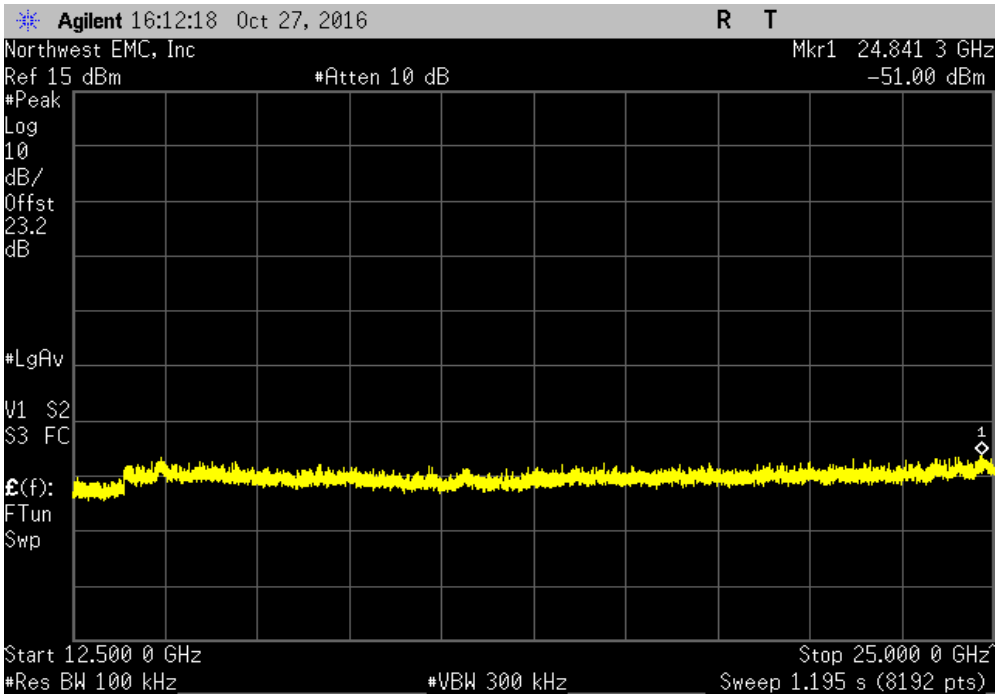
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



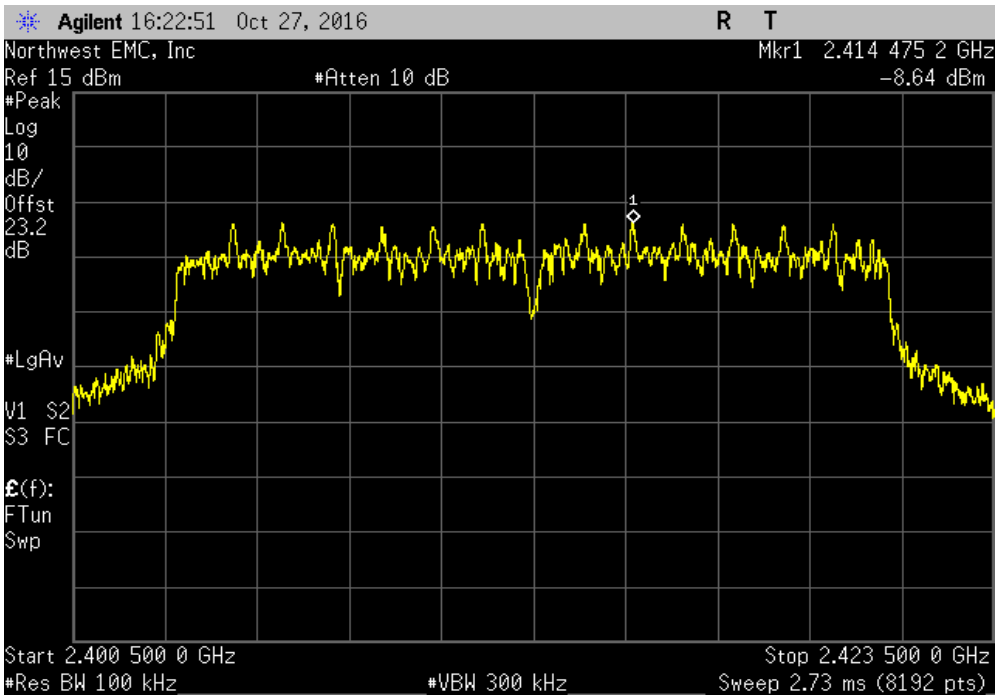
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-48.08	-30	Pass



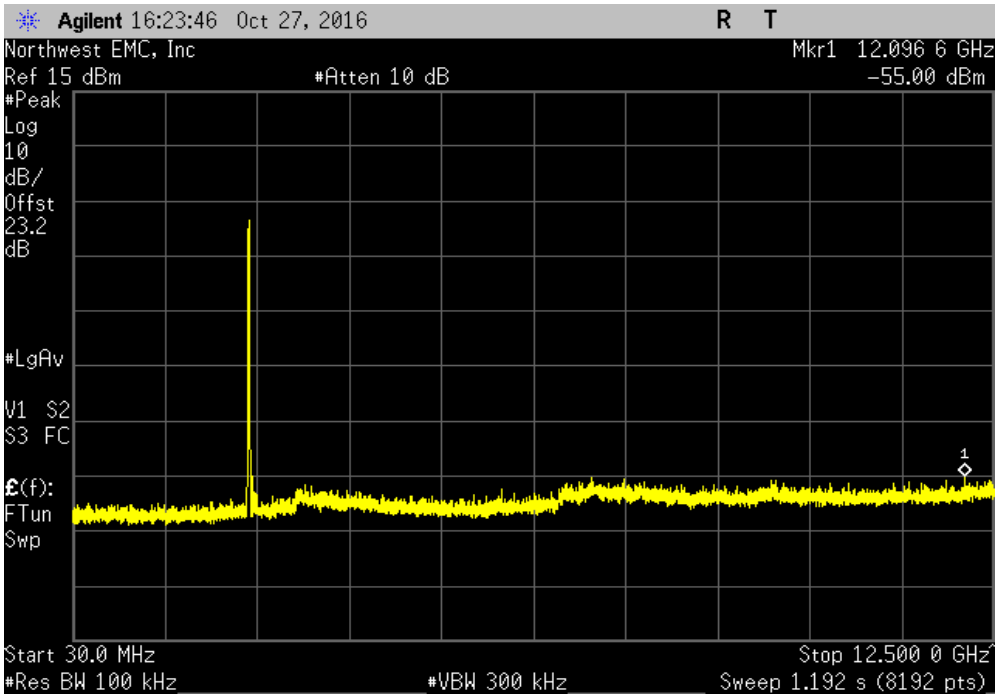
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-44.03	-30	Pass



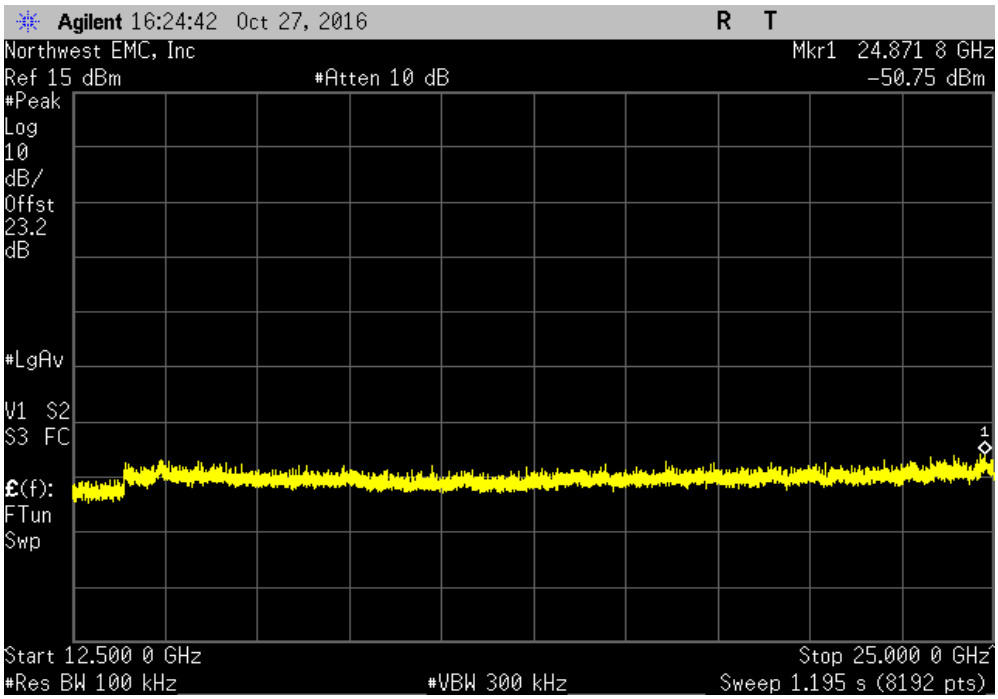
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



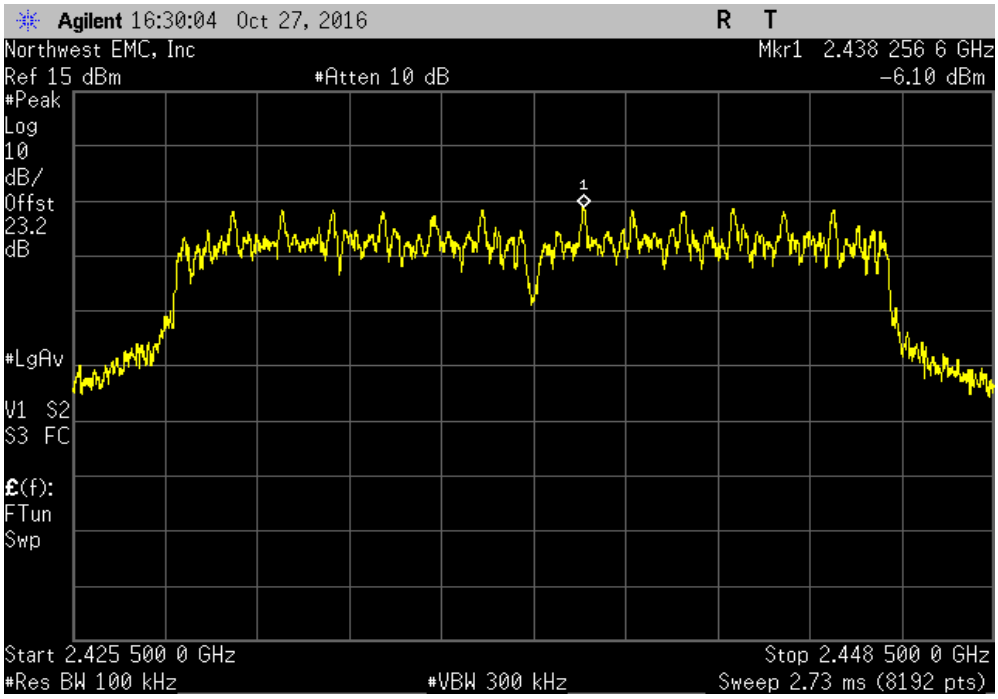
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-46.36	-30	Pass



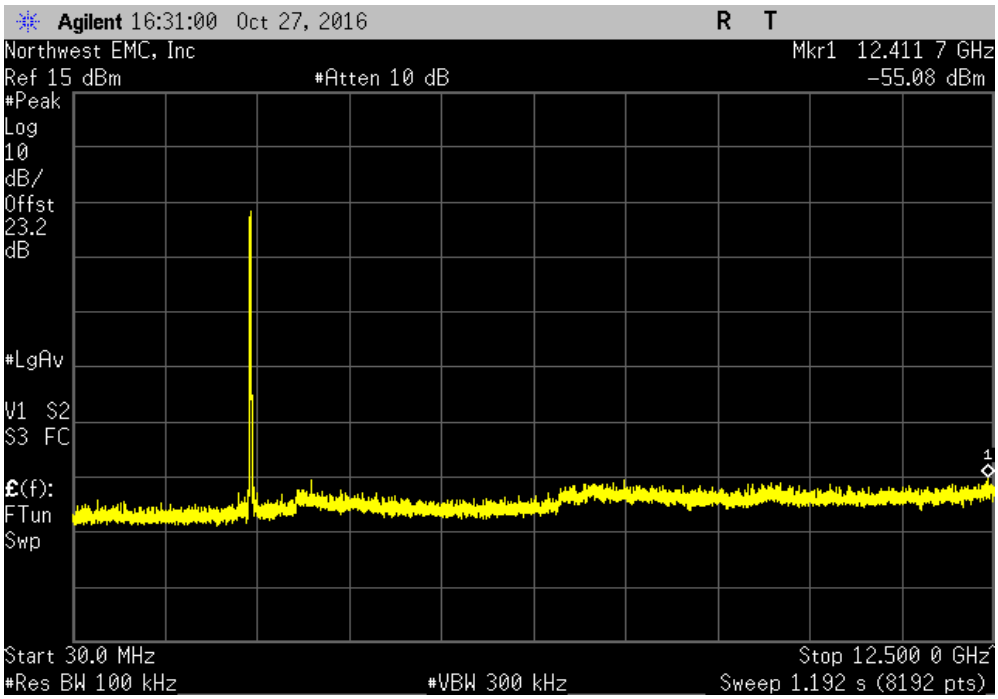
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-42.11	-30	Pass



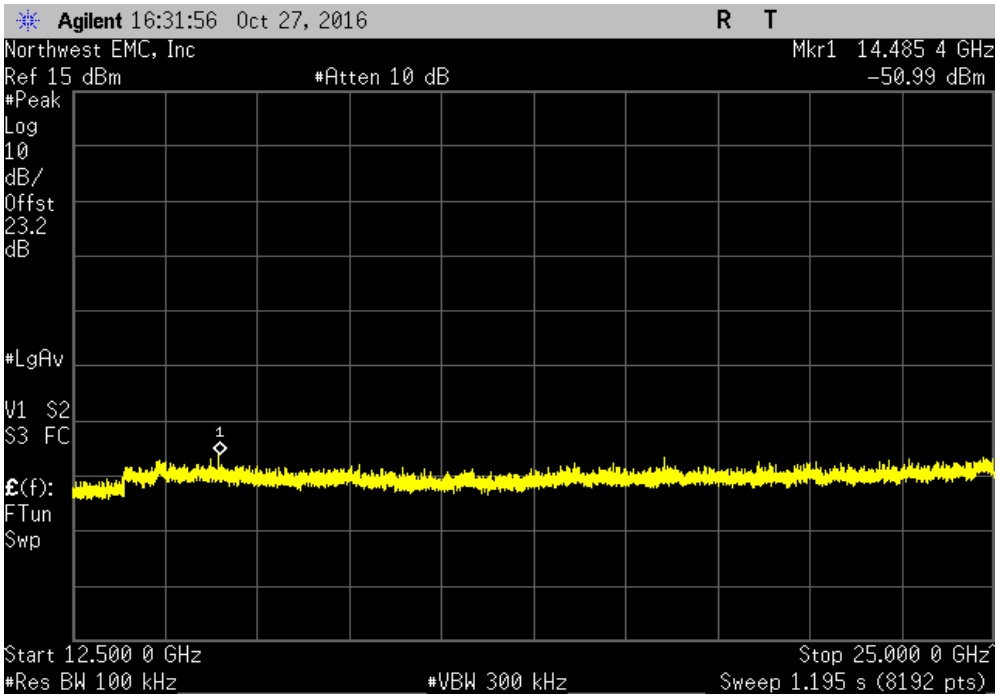
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
	Frequency Range			**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



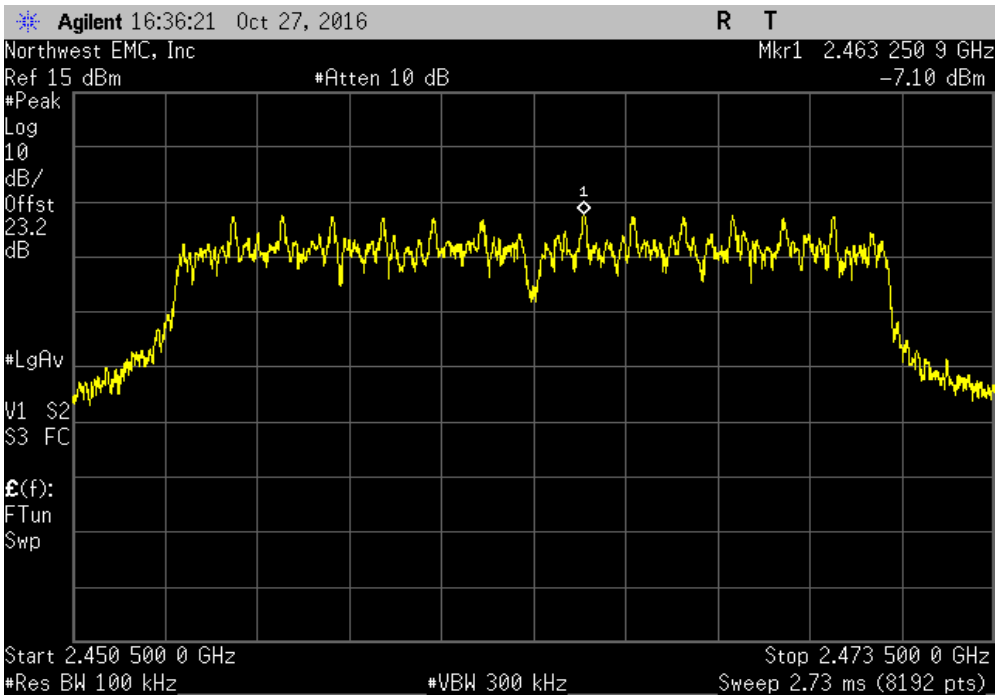
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz		-48.98	-30	Pass



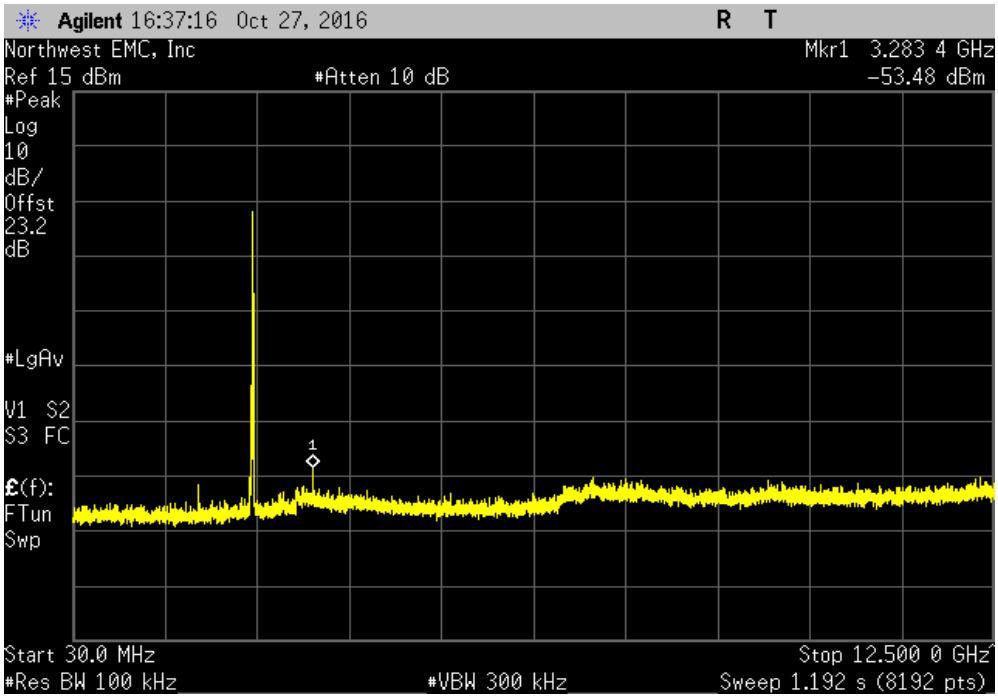
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-44.89	-30	Pass



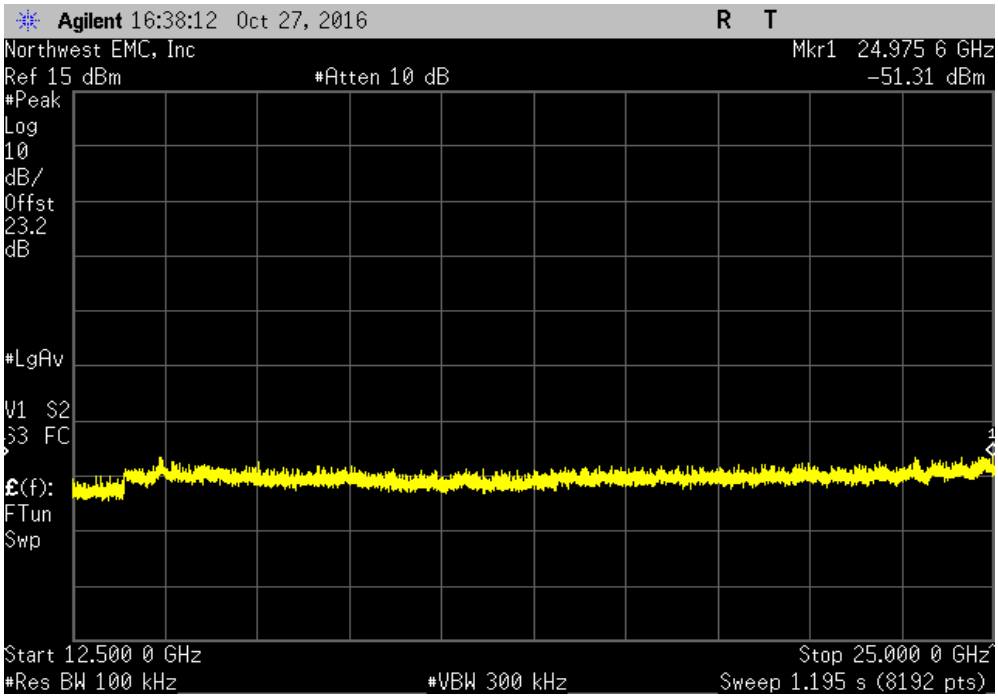
2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-46.38	-30	Pass



2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz				
Frequency Range		**Max Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 25 GHz		-44.21	-30	Pass



SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.04.26.1

Testing was performed using the mode(s) of operation and configuration(s) noted within the report. The individuals and/or the organization requesting the test provided the modes, configurations and settings used to complete the evaluation. The actual test parameters are specified in the test data, this includes items such as investigated frequency range (scanned) and test levels. The testing methods and performance specifications, as well as the test site used for the evaluation are indicated in the test data. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

MODES OF OPERATION

Transmitting 802.11 channel 11, 54 Mbps

POWER SETTINGS INVESTIGATED

Battery

CONFIGURATIONS INVESTIGATED

MDTR0496 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz

SAMPLE CALCULATIONS

Radiated Emissions: Field Strength = Measured Level + Antenna Factor + Cable Factor - Amplifier Gain + Distance Adjustment Factor + External Attenuation

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator	S.M. Electronics	SA6-20	REO	3/28/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50111	LFN	10/21/2015	12 mo
Filter - Low Pass	Micro-Tronics	LPM50004	LFK	10/21/2015	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	1/6/2016	24 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	12/7/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	12/10/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	9/18/2015	12 mo
Cable	Northwest EMC	18-26GHz Standard Gain Horn Cable	MNP	9/18/2015	12 mo
Antenna - Double Ridge	EMCO	3115	AHJ	NCR	0 mo
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	12/7/2015	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	12/7/2015	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	3/1/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	3/1/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	3/1/2016	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-08	AIQ	NCR	0 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIB	8/12/2014	24 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2016	12 mo

MEASUREMENT BANDWIDTHS

Frequency Range (MHz)	Peak Data (kHz)	Quasi-Peak Data (kHz)	Average Data (kHz)
0.01 - 0.15	1.0	0.2	0.2
0.15 - 30.0	10.0	9.0	9.0
30.0 - 1000	100.0	120.0	120.0
Above 1000	1000.0	N/A	1000.0

TEST DESCRIPTION

The highest gain of each type of antenna to be used with the EUT was tested. The EUT was configured for low, mid, and high band transmit frequencies. For each configuration, the spectrum was scanned throughout the specified range. In addition, measurements were made in the restricted bands to verify compliance. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and the EUT antenna in three orthogonal axis, and adjusting measurement antenna height and polarization. A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

SPURIOUS RADIATED EMISSIONS

NORTHWEST EMC

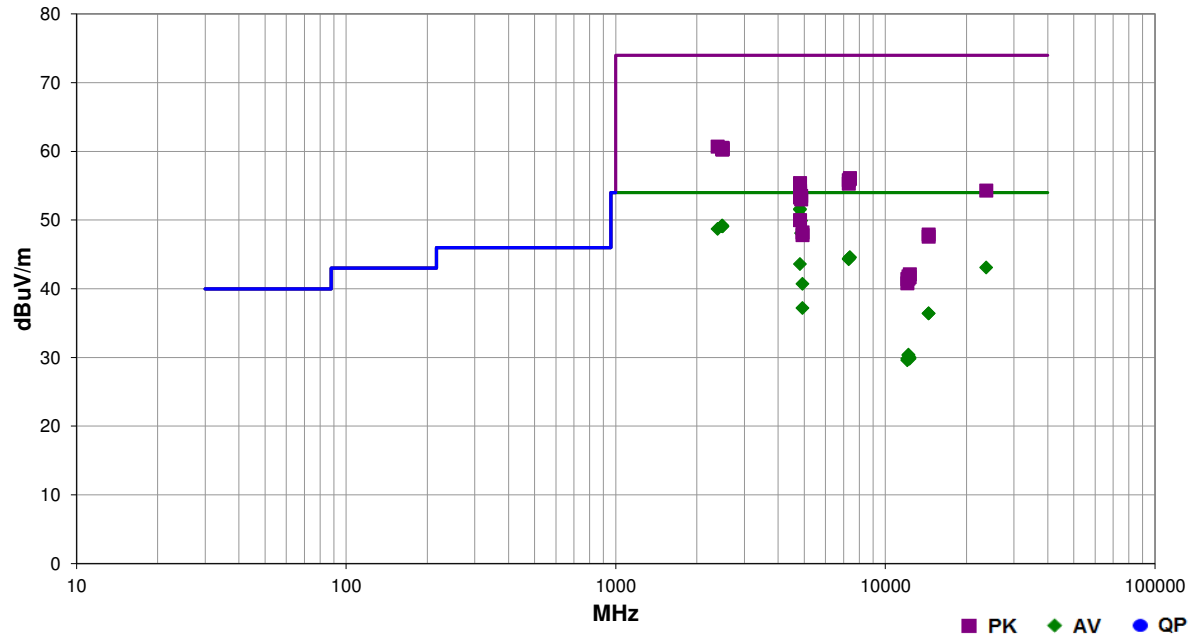
PSA-ESCI 2016.04.26.1

EmiR5 2016.04.26.1

Work Order:	MDTR0496	**Date:**	08/01/16		
Project:	None	**Temperature:**	23.7 °C		
Job Site:	MN05	**Humidity:**	59.1% RH		
Serial Number:	M966503A001	**Barometric Pres.:**	1019 mbar	**Tested by:**	Dustin Sparks
EUT:	ODIN Model 4NR003				
Configuration:	1				
Customer:	Medtronic, Inc.				
Attendees:	Guillaume Girard, Dave Hoffman				
EUT Power:	Battery				
Operating Mode:	Transmitting 802.11 - low channel (2412 MHz), mid channel (2437 MHz), and high channel (2462 MHz); 54 Mbps data rate.				
Deviations:	None				
Comments:	None				

Test Specifications	**Test Method**
FCC 15.247:2016	ANSI C63.10:2013

Run #	12	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4823.933	46.6	5.0	1.0	270.0	3.0	0.0	Vert	AV	0.0	51.6	54.0	-2.4	Low ch, EUT horz
4823.892	46.5	5.0	1.0	0.0	3.0	0.0	Vert	AV	0.0	51.5	54.0	-2.5	Low ch, EUT on side
4824.042	45.7	5.0	2.0	270.0	3.0	0.0	Horz	AV	0.0	50.7	54.0	-3.3	Low ch, EUT on side
4824.125	45.1	5.0	4.0	315.0	3.0	0.0	Vert	AV	0.0	50.1	54.0	-3.9	Low ch, EUT vert
4874.067	44.7	5.2	1.0	270.0	3.0	0.0	Vert	AV	0.0	49.9	54.0	-4.1	Mid ch, EUT horz
4824.133	44.6	5.0	1.2	0.0	3.0	0.0	Horz	AV	0.0	49.6	54.0	-4.4	Low ch, EUT vert
2484.300	32.8	-3.6	1.0	35.0	3.0	20.0	Horz	AV	0.0	49.2	54.0	-4.8	High ch, EUT on side
2483.758	32.7	-3.6	1.0	18.0	3.0	20.0	Horz	AV	0.0	49.1	54.0	-4.9	High ch, EUT horz
2484.200	32.7	-3.6	3.7	304.0	3.0	20.0	Vert	AV	0.0	49.1	54.0	-4.9	High ch, EUT horz
2487.167	32.7	-3.6	1.7	285.0	3.0	20.0	Vert	AV	0.0	49.1	54.0	-4.9	High ch, EUT on side
2488.308	32.7	-3.6	1.0	29.1	3.0	20.0	Horz	AV	0.0	49.1	54.0	-4.9	High ch, EUT vert
2487.492	32.7	-3.6	1.8	13.0	3.0	20.0	Vert	AV	0.0	49.1	54.0	-4.9	High ch, EUT vert
2388.675	32.5	-3.8	1.0	71.0	3.0	20.0	Horz	AV	0.0	48.7	54.0	-5.3	Low ch, EUT on side
4873.825	42.9	5.2	1.0	270.0	3.0	0.0	Horz	AV	0.0	48.1	54.0	-5.9	Mid ch, EUT on side
7387.542	31.6	13.0	1.0	281.0	3.0	0.0	Vert	AV	0.0	44.6	54.0	-9.4	High ch, EUT horz
7386.525	31.5	13.0	1.5	155.1	3.0	0.0	Horz	AV	0.0	44.5	54.0	-9.5	High ch, EUT on side
7313.208	31.2	13.2	1.0	132.0	3.0	0.0	Vert	AV	0.0	44.4	54.0	-9.6	Mid ch, EUT horz
7313.300	31.1	13.2	1.0	64.0	3.0	0.0	Horz	AV	0.0	44.3	54.0	-9.7	Mid ch, EUT on side

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4823.933	38.6	5.0	1.0	90.0	3.0	0.0	Horz	AV	0.0	43.6	54.0	-10.4	Low ch, EUT horz
23663.280	28.7	14.4	1.5	97.0	3.0	0.0	Vert	AV	0.0	43.1	54.0	-10.9	High ch, EUT on side
4924.133	35.4	5.3	1.0	270.0	3.0	0.0	Vert	AV	0.0	40.7	54.0	-13.3	High ch, EUT horz
2386.542	44.5	-3.8	1.0	71.0	3.0	20.0	Horz	PK	0.0	60.7	74.0	-13.3	Low ch, EUT on side
2484.525	44.1	-3.6	3.7	304.0	3.0	20.0	Vert	PK	0.0	60.5	74.0	-13.5	High ch, EUT horz
2484.167	44.1	-3.6	1.7	285.0	3.0	20.0	Vert	PK	0.0	60.5	74.0	-13.5	High ch, EUT on side
2488.075	44.1	-3.6	1.0	29.1	3.0	20.0	Horz	PK	0.0	60.5	74.0	-13.5	High ch, EUT vert
2487.242	43.9	-3.6	1.0	18.0	3.0	20.0	Horz	PK	0.0	60.3	74.0	-13.7	High ch, EUT horz
2487.817	43.9	-3.6	1.0	35.0	3.0	20.0	Horz	PK	0.0	60.3	74.0	-13.7	High ch, EUT on side
2487.833	43.9	-3.6	1.8	13.0	3.0	20.0	Vert	PK	0.0	60.3	74.0	-13.7	High ch, EUT vert
4926.442	31.8	5.4	1.0	180.0	3.0	0.0	Horz	AV	0.0	37.2	54.0	-16.8	High ch, EUT on side
14470.870	28.4	8.0	1.0	228.1	3.0	0.0	Horz	AV	0.0	36.4	54.0	-17.6	Low ch, EUT on side
14469.940	28.4	8.0	1.0	23.1	3.0	0.0	Vert	AV	0.0	36.4	54.0	-17.6	Low ch, EUT horz
7385.433	43.1	13.0	1.5	155.1	3.0	0.0	Horz	PK	0.0	56.1	74.0	-17.9	High ch, EUT on side
7388.417	43.0	13.0	1.0	281.0	3.0	0.0	Vert	PK	0.0	56.0	74.0	-18.0	High ch, EUT horz
7313.317	42.6	13.2	1.0	132.0	3.0	0.0	Vert	PK	0.0	55.8	74.0	-18.2	Mid ch, EUT horz
4823.917	50.4	5.0	1.0	0.0	3.0	0.0	Vert	PK	0.0	55.4	74.0	-18.6	Low ch, EUT on side
7311.858	42.1	13.2	1.0	64.0	3.0	0.0	Horz	PK	0.0	55.3	74.0	-18.7	Mid ch, EUT on side
4823.925	49.3	5.0	1.0	270.0	3.0	0.0	Vert	PK	0.0	54.3	74.0	-19.7	Low ch, EUT horz
23667.060	39.9	14.4	1.5	97.0	3.0	0.0	Vert	PK	0.0	54.3	74.0	-19.7	High ch, EUT on side
4823.842	49.1	5.0	2.0	270.0	3.0	0.0	Horz	PK	0.0	54.1	74.0	-19.9	Low ch, EUT on side
4823.958	48.9	5.0	4.0	315.0	3.0	0.0	Vert	PK	0.0	53.9	74.0	-20.1	Low ch, EUT vert
4874.108	48.3	5.2	1.0	270.0	3.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	Mid ch, EUT horz
4823.867	48.3	5.0	1.2	0.0	3.0	0.0	Horz	PK	0.0	53.3	74.0	-20.7	Low ch, EUT vert
4874.058	47.8	5.2	1.0	270.0	3.0	0.0	Horz	PK	0.0	53.0	74.0	-21.0	Mid ch, EUT on side
12185.920	30.9	-0.5	1.0	29.1	3.0	0.0	Horz	AV	0.0	30.4	54.0	-23.6	Mid ch, EUT on side
12186.740	30.8	-0.5	1.0	286.9	3.0	0.0	Vert	AV	0.0	30.3	54.0	-23.7	Mid ch, EUT horz
4824.058	45.0	5.0	1.0	90.0	3.0	0.0	Horz	PK	0.0	50.0	74.0	-24.0	Low ch, EUT horz
12308.480	30.2	-0.2	3.9	261.9	3.0	0.0	Vert	AV	0.0	30.0	54.0	-24.0	High ch, EUT horz
12057.580	30.6	-0.8	1.0	250.9	3.0	0.0	Vert	AV	0.0	29.8	54.0	-24.2	Low ch, EUT horz
12308.260	30.0	-0.2	1.0	43.0	3.0	0.0	Horz	AV	0.0	29.8	54.0	-24.2	High ch, EUT on side
12060.630	30.4	-0.8	1.0	297.0	3.0	0.0	Horz	AV	0.0	29.6	54.0	-24.4	Low ch, EUT on side
4924.633	42.9	5.3	1.0	270.0	3.0	0.0	Vert	PK	0.0	48.2	74.0	-25.8	High ch, EUT horz
14474.000	39.9	8.0	1.0	228.1	3.0	0.0	Horz	PK	0.0	47.9	74.0	-26.1	Low ch, EUT on side
4924.925	42.5	5.3	1.0	180.0	3.0	0.0	Horz	PK	0.0	47.8	74.0	-26.2	High ch, EUT on side
14471.260	39.6	8.0	1.0	23.1	3.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4	Low ch, EUT horz
12312.250	42.2	-0.1	1.0	43.0	3.0	0.0	Horz	PK	0.0	42.1	74.0	-31.9	High ch, EUT on side
12186.890	42.3	-0.5	1.0	286.9	3.0	0.0	Vert	PK	0.0	41.8	74.0	-32.2	Mid ch, EUT horz
12310.530	41.8	-0.1	3.9	261.9	3.0	0.0	Vert	PK	0.0	41.7	74.0	-32.3	High ch, EUT horz
12186.620	42.0	-0.5	1.0	29.1	3.0	0.0	Horz	PK	0.0	41.5	74.0	-32.5	Mid ch, EUT on side
12057.520	42.2	-0.8	1.0	250.9	3.0	0.0	Vert	PK	0.0	41.4	74.0	-32.6	Low ch, EUT horz
12059.260	41.6	-0.8	1.0	297.0	3.0	0.0	Horz	PK	0.0	40.8	74.0	-33.2	Low ch, EUT on side

NORTHWEST EMC

APPENDIX

APPENDIX B: ODIN ENS FW/FPGA UPDATE TRAVELER

Use DOC9751 practices, including the use of black ink to record results. Dates should be formatted properly (i.e. 25-Jul-2016). Leave no open fields.

General Information:

Start Date	27OCT2016
ENS Serial #	01000
PC Model & Serial #	Dell OptiPlex 9020 (Pre-Seal Test Station Desktop PC), Service Tag 5789382

Tool Information:

Torque Wrench	Calibration Date
Mountz ES053065 GOLD	No tools required as unit will stay un-covered for the rest of its lifecycle, dwh 09995 27OCT2016
MARK10 MTT03-12	No tools required as unit will stay un-covered for the rest of its lifecycle, dwh 09995 27OCT2016

Build Log:

Build Step #	Employee Initials / ID #	Date Completed	Comments/Deviations
10	dwh / 09995	27OCT2016	ENS opened for EMC WiFi direct-connect wiring, dwh 09995 27OCT2016
20	dwh / 09995	27OCT2016	ENS opened for EMC WiFi direct-connect wiring, dwh 09995 27OCT2016

Build Step #	Employee Initials / ID #	Date Completed	Comments/Deviations
30	dwh / 09995	27OCT2016	ENS opened for EMC WiFi direct-connect wiring, dwh 09995 27OCT2016
40	dwh / 09995	27OCT2016	ENS opened for EMC WiFi direct-connect wiring, dwh 09995 27OCT2016
50	dwh / 09995	27OCT2016	ENS opened for EMC WiFi direct-connect wiring, dwh 09995 27OCT2016
60	dwh / 09995	27OCT2016	ENS opened for EMC WiFi direct-connect wiring, dwh 09995 27OCT2016
70	dwh / 09995	27OCT2016	**Version of FW/FPGA Used (NRP1201-39804):** 2.8F / 1B 5.0 **VDD for Version Used (NRP1201-39833):** 5.0
80	dwh / 09995	27OCT2016	ENS opened for EMC WiFi direct-connect wiring, dwh 09995 27OCT2016
90	dwh / 09995	27OCT2016	NOT required as unit will stay un-covered for the rest of its lifecycle, dwh 09995 27OCT2016
100	dwh / 09995	27OCT2016	NOT required as unit will stay un-covered for the rest of its lifecycle, dwh 09995 27OCT2016

Build Step #	Employee Initials / ID #	Date Completed	Comments/Deviations
110	dwh / 09995	27OCT2016	NOT required as unit will stay un-covered for the rest of its lifecycle, dwh 09995 27OCT2016
120	dwh / 09995	27OCT2016	NOT required as unit will stay un-covered for the rest of its lifecycle, dwh 09995 27OCT2016
130	dwh / 09995	27OCT2016	NOT required as unit will stay un-covered for the rest of its lifecycle, dwh 09995 27OCT2016

Build Step #	Employee Initials / ID #	Date Completed	Comments/Deviations
140	dwh / 09995	27OCT2016	FW Version Result: (Pass) / Fail FPGA Version Result: (Pass) / Fail Version of Server App Used (NRP1201-39981): 1.9.4 / 11.0 VDD for Version Used (NRP1201-39934): 13.0 Validation Evidence (Document & Version #): V 6.0 NRP1201-40216
150	dwh / 09995	27OCT2016	N/A, ENS direct-connect wired unit moved to EMC WiFi testing