NORTHWEST EMC

Digi International

WDNU-II

FCC 15.207:2015

FCC 15.247:2015

Report # ETHE0024.2

NVLAP Lab Code: 200881-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America. This Report may only be duplicated in its entirety

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: June 11, 2015
Digi International
Model: WDNU-II

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2015	ANSI C63.10:2009
FCC 15.247:2015	ANSI C63.10:2009

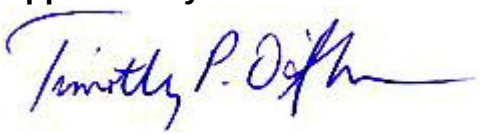
Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
6.7	Band Edge Compliance	Yes	Pass	
6.7	Spurious Conducted Emissions	Yes	Pass	
6.9.1	Occupied Bandwidth	Yes	Pass	
6.10.2	Output Power	Yes	Pass	
6.11.2	Power Spectral Density	Yes	Pass	
7.5	Duty Cycle	Yes	N/A	Characterization of radio operation.

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

REV 2015.2.19

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

IC - Recognized by Industry Canada as a Certification Body (CB). Certification chambers and Open Area Test Sites are filed with IC.

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and 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

MEASUREMENT UNCERTAINTY

TMU.2014.12.03

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.

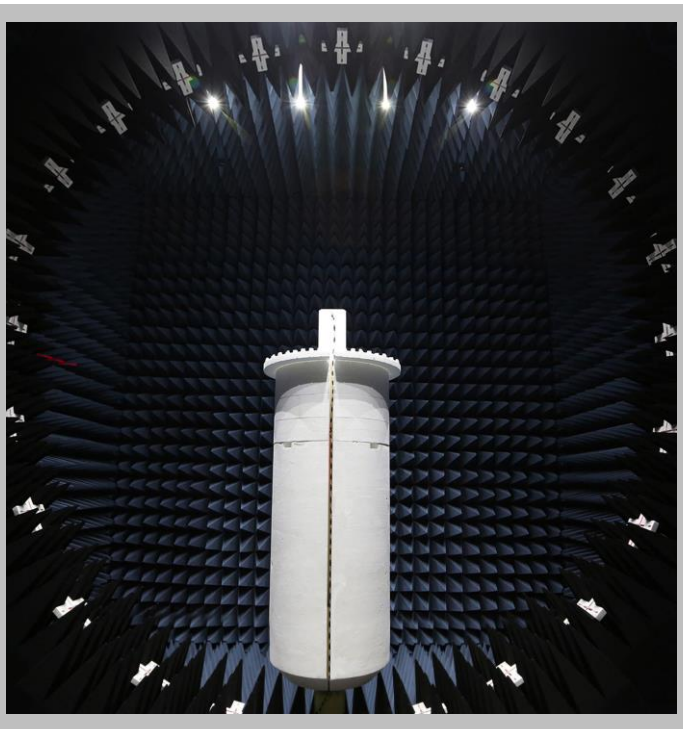
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

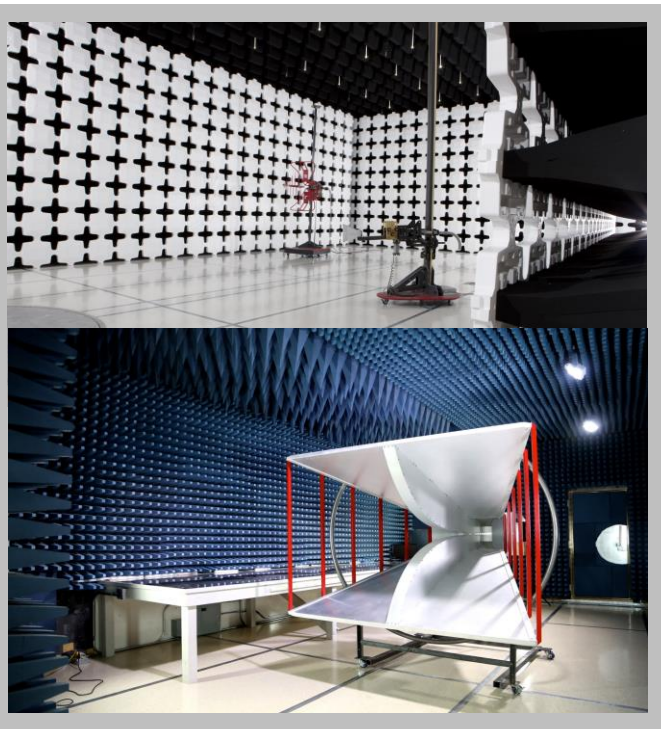
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%
Field Strength (dB)	4.7 dB	-4.7 dB
AC Powerline Conducted Emissions (dB)	2.9 dB	-2.9 dB

FACILITIES

NORTHWEST EMC
REV 2015.2.19

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 9801 (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
Industry 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





PRODUCT DESCRIPTION

NORTHWEST EMC
2014-12-10

Client and Equipment Under Test (EUT) Information

Company Name:	Digi International
Address:	11001 Bren Rd E
City, State, Zip:	Minnetonka, MN 55434
Test Requested By:	Matt Schellin
Model:	WDNU-II
First Date of Test:	April 13, 2015
Last Date of Test:	June 11, 2015
Receipt Date of Samples:	April 10, 2015
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Wireless Data Network Unit (WDNU) installed in an airplane.

Testing Objective:
To demonstrate compliance of the 802.11 radio under FCC 15.247 for operation in the 2.4 GHz band(s).

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration ETHE0024- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Bridge	Digi International	WDNU-II	W151003000015

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Diplexer	Innowave RF	901-1500-2450-N	None
Antenna	L-Com	HG72703MGURB-NM	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	Agilent	U8002A	MY50490005
Laptop	Lenovo	R61	L3-N9370
Laptop AC Adapter	Lenovo	92P1159	11S92P1160Z1ZBGH9338XW

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	No	1.25m	No	DC Power Supply	Wireless Bridge
AC Power	No	1.80m	No	DC Power Supply	AC Mains
Serial	No	1.25m	No	Laptop	Wireless Bridge
USB	Yes	1.25m	No	Unterminated	Wireless Bridge
Ethernet	Yes	1.25m	No	Unterminated	Wireless Bridge
Coaxial RF Cable	Yes	0.60m	No	Diplexer	Wireless Bridge
Coaxial RF Cable	Yes	0.60m	No	Diplexer	Wireless Bridge
Antenna Cable	Yes	3.00m	No	Diplexer	Antenna
DC Power (Laptop)	No	1.8m	Yes	Laptop	Laptop AC Adapter
AC Mains Cable (Laptop)	No	1.8m	No	Laptop AC Adapter	AC Mains

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration ETHE0024- 3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Bridge	Digi International	WDNU-II	00409D7FB3D5

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Diplexer	Innowave RF	901-1500-2450-N	None
Antenna	L-Com	HG72703MGURB-NM	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	EZ	GP-4303D	TPY
Laptop	Lenovo	R61	L3-N9370
Laptop AC Adapter	Lenovo	92P1159	11S92P1160Z1ZBGH9338XW

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	No	1.25m	No	DC Power Supply	Wireless Bridge
AC Power	No	1.80m	No	DC Power Supply	AC Mains
Serial	No	1.25m	No	Laptop	Wireless Bridge
USB	Yes	1.25m	No	Unterminated	Wireless Bridge
Ethernet	Yes	1.25m	No	Unterminated	Wireless Bridge
Coaxial RF Cable	Yes	0.60m	No	Diplexer	Wireless Bridge
Coaxial RF Cable	Yes	0.60m	No	Diplexer	Wireless Bridge
Antenna Cable	Yes	3.00m	No	Diplexer	Antenna
DC Power (Laptop)	No	1.8m	Yes	Laptop	Laptop AC Adapter
AC Mains Cable (Laptop)	No	1.8m	No	Laptop AC Adapter	AC Mains

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration ETHE0024- 4

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Bridge	Digi International	WDNU-II	00409D7FB3D3

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	EZ	GP-4303D	TPY
Laptop	Lenovo	R61	L3-N9370
Laptop AC Adapter	Lenovo	92P1159	11S92P1160Z1ZBGH9338XW

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	No	1.25m	No	DC Power Supply	Wireless Bridge
AC Power	No	1.80m	No	DC Power Supply	AC Mains
Serial	No	1.25m	No	Laptop	Wireless Bridge
USB	Yes	1.25m	No	Unterminated	Wireless Bridge
Ethernet	Yes	1.25m	No	Unterminated	Wireless Bridge
DC Power (Laptop)	No	1.8m	Yes	Laptop	Laptop AC Adapter
AC Mains Cable (Laptop)	No	1.8m	No	Laptop AC Adapter	AC Mains

Configuration ETHE0024- 7

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Bridge	Digi International	WDNU-II	00409D7FB3D0

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Lenovo	R61	L3-N9370
Laptop AC Adapter	Lenovo	92P1159	11S92P1160Z1ZBGH9338XW

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	EZ	GP-4303D	TPY

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	No	1.25m	No	DC Power Supply	Wireless Bridge
AC Power	No	1.80m	No	DC Power Supply	AC Mains
Serial	No	1.25m	No	Laptop	Wireless Bridge
USB	Yes	1.25m	No	Unterminated	Wireless Bridge
Ethernet	Yes	1.25m	No	Unterminated	Wireless Bridge
DC Power (Laptop)	No	1.8m	Yes	Laptop	Laptop AC Adapter
AC Mains Cable (Laptop)	No	1.8m	No	Laptop AC Adapter	AC Mains

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration ETHE0024- 8

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Bridge	Digi International	WDNU-II	00409D7FB3D0

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Diplexer	Innowave RF	901-1500-2450-N	None
Antenna	L-Com	HG72703MGURB-NM	None

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
DC Power Supply	Agilent	U8002A	MY50490005

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	No	1.25m	No	DC Power Supply	Wireless Bridge
AC Power	No	1.80m	No	DC Power Supply	AC Mains
Serial	No	1.25m	No	Laptop	Wireless Bridge
USB	Yes	1.25m	No	Unterminated	Wireless Bridge
Ethernet	Yes	1.25m	No	Unterminated	Wireless Bridge
Coaxial RF Cable	Yes	0.60m	No	Diplexer	Wireless Bridge
Coaxial RF Cable	Yes	0.60m	No	Diplexer	Wireless Bridge
Antenna Cable	Yes	3.00m	No	Diplexer	Antenna

MODIFICATIONS

NORTHWEST EMC
2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	4/13/2015	Powerline 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.
2	4/15/2015	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	4/21/2015	Receiver Spurious 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.
4	5/14/2015	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.
5	5/14/2015	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.
6	6/9/2015	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.
7	6/11/2015	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.
8	6/11/2015	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50 Ω measuring port is terminated by a 50 Ω EMI meter or a 50 Ω resistive load. All 50 Ω measuring ports of the LISN are terminated by 50Ω.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Receiver	Rohde & Schwarz	ESR7	ARI	5/6/2014	05/06/2015
Attenuator 20dB, BNC	Fairview Microwave	SA01B-20	AQP	7/22/2014	07/22/2015
High Pass Filter	TTE	H97-100K-50-720B	HGN	5/23/2014	05/23/2015
MN03 Cables	ESM Cable Corp.	Conducted Cables	MNC	11/20/2014	11/20/2015
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	3/23/2015	03/23/2016

CONFIGURATIONS INVESTIGATED

ETHE0024-1

MODES INVESTIGATED

Transmitting WiFi, Low channel: 2412 MHz
Transmitting WiFi, Mid channel: 2437 MHz
Transmitting WiFi, High channel: 2472 MHz

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

EUT:	WDNU-II	Work Order:	ETHE0024
Serial Number:	W151003000015	Date:	04/13/2015
Customer:	Digi International	Temperature:	23.6°C
Attendees:	None	Relative Humidity:	29.9%
Customer Project:	None	Bar. Pressure:	1014.3 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	28VDC	Configuration:	ETHE0024-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2009

TEST PARAMETERS

Run #:	7	Line:	Positive	Ext. Attenuation (dB):	20

COMMENTS

Transmitting at full power, +27dBm

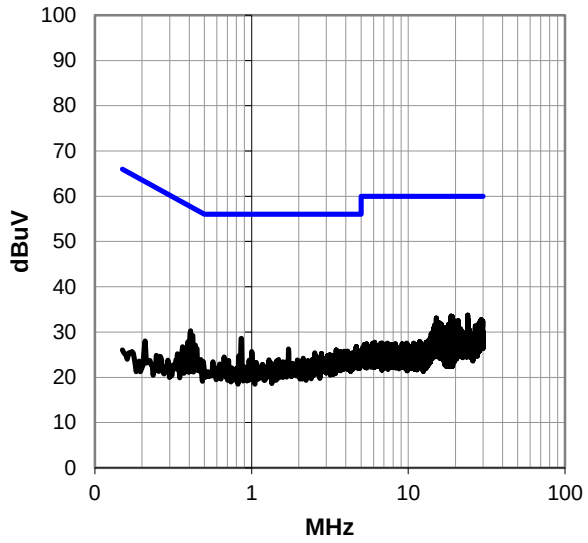
EUT OPERATING MODES

Transmitting WiFi, Low channel: 2412 MHz

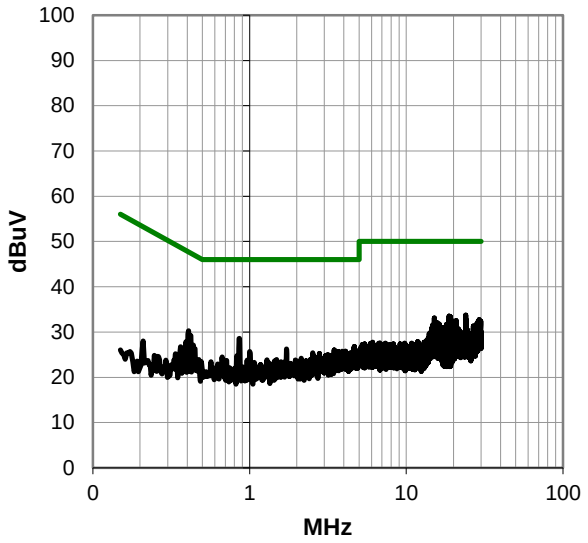
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

RESULTS - Run #7

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.971	11.9	21.8	33.7	60.0	-26.3
18.767	12.2	21.3	33.5	60.0	-26.5
19.110	12.0	21.4	33.4	60.0	-26.6
15.133	12.1	21.0	33.1	60.0	-26.9
24.023	11.1	21.8	32.9	60.0	-27.1
29.153	10.4	22.3	32.7	60.0	-27.3
0.859	8.4	20.2	28.6	56.0	-27.4
19.442	11.2	21.4	32.6	60.0	-27.4
0.407	10.1	20.2	30.3	57.7	-27.4
20.778	11.0	21.5	32.5	60.0	-27.5
28.817	10.1	22.3	32.4	60.0	-27.6
29.836	10.0	22.4	32.4	60.0	-27.6
15.752	11.0	21.1	32.1	60.0	-27.9
23.997	10.1	21.8	31.9	60.0	-28.1
28.478	9.5	22.3	31.8	60.0	-28.2
0.422	9.0	20.2	29.2	57.4	-28.2
28.164	9.5	22.3	31.8	60.0	-28.2
15.678	10.7	21.1	31.8	60.0	-28.2
16.230	10.6	21.1	31.7	60.0	-28.3
18.095	10.4	21.3	31.7	60.0	-28.3
14.749	10.6	21.0	31.6	60.0	-28.4
29.496	9.2	22.4	31.6	60.0	-28.4
18.431	10.2	21.3	31.5	60.0	-28.5
26.818	9.2	22.1	31.3	60.0	-28.7
19.774	9.9	21.4	31.3	60.0	-28.7
16.181	10.2	21.1	31.3	60.0	-28.7

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.971	11.9	21.8	33.7	50.0	-16.3
18.767	12.2	21.3	33.5	50.0	-16.5
19.110	12.0	21.4	33.4	50.0	-16.6
15.133	12.1	21.0	33.1	50.0	-16.9
24.023	11.1	21.8	32.9	50.0	-17.1
29.153	10.4	22.3	32.7	50.0	-17.3
0.859	8.4	20.2	28.6	46.0	-17.4
19.442	11.2	21.4	32.6	50.0	-17.4
0.407	10.1	20.2	30.3	47.7	-17.4
20.778	11.0	21.5	32.5	50.0	-17.5
28.817	10.1	22.3	32.4	50.0	-17.6
29.836	10.0	22.4	32.4	50.0	-17.6
15.752	11.0	21.1	32.1	50.0	-17.9
23.997	10.1	21.8	31.9	50.0	-18.1
28.478	9.5	22.3	31.8	50.0	-18.2
0.422	9.0	20.2	29.2	47.4	-18.2
28.164	9.5	22.3	31.8	50.0	-18.2
15.678	10.7	21.1	31.8	50.0	-18.2
16.230	10.6	21.1	31.7	50.0	-18.3
18.095	10.4	21.3	31.7	50.0	-18.3
14.749	10.6	21.0	31.6	50.0	-18.4
29.496	9.2	22.4	31.6	50.0	-18.4
18.431	10.2	21.3	31.5	50.0	-18.5
26.818	9.2	22.1	31.3	50.0	-18.7
19.774	9.9	21.4	31.3	50.0	-18.7
16.181	10.2	21.1	31.3	50.0	-18.7

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

EUT:	WDNU-II	Work Order:	ETHE0024
Serial Number:	W151003000015	Date:	04/13/2015
Customer:	Digi International	Temperature:	23.6°C
Attendees:	None	Relative Humidity:	29.9%
Customer Project:	None	Bar. Pressure:	1014.3 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	28VDC	Configuration:	ETHE0024-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2009

TEST PARAMETERS

Run #:	8	Line:	Negative	Ext. Attenuation (dB):	20

COMMENTS

Transmitting at full power, +27dBm

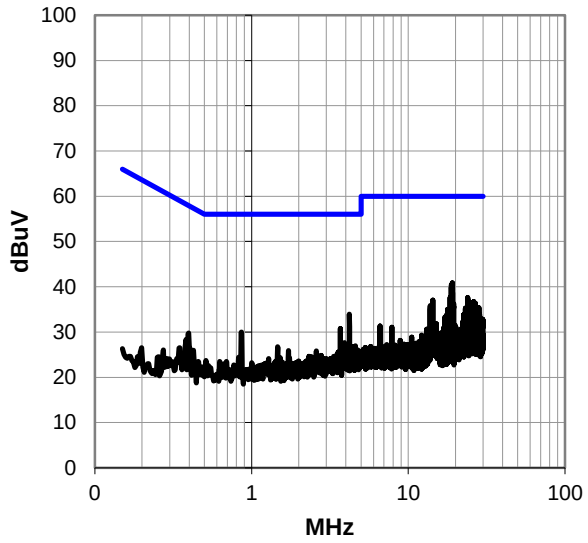
EUT OPERATING MODES

Transmitting WiFi, Low channel: 2412 MHz

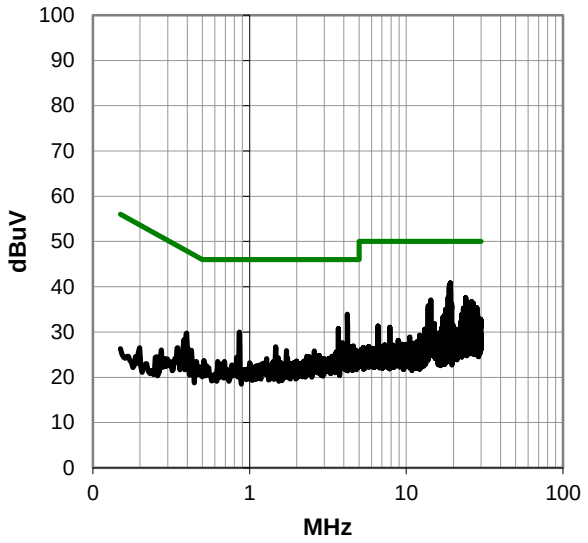
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

RESULTS - Run #8

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
19.162	19.5	21.4	40.9	60.0	-19.1
18.823	19.1	21.3	40.4	60.0	-19.6
4.213	13.5	20.5	34.0	56.0	-22.0
23.971	15.8	21.8	37.6	60.0	-22.4
18.491	16.3	21.3	37.6	60.0	-22.4
24.023	15.5	21.8	37.3	60.0	-22.7
14.331	16.1	20.9	37.0	60.0	-23.0
26.221	14.6	22.1	36.7	60.0	-23.3
24.206	14.6	21.8	36.4	60.0	-23.6
24.542	14.5	21.9	36.4	60.0	-23.6
26.892	14.2	22.1	36.3	60.0	-23.7
19.494	14.9	21.4	36.3	60.0	-23.7
13.793	14.9	20.9	35.8	60.0	-24.2
24.863	13.7	21.9	35.6	60.0	-24.4
26.549	13.3	22.1	35.4	60.0	-24.6
28.228	13.1	22.3	35.4	60.0	-24.6
25.881	13.3	22.0	35.3	60.0	-24.7
25.557	13.3	22.0	35.3	60.0	-24.7
23.188	13.5	21.8	35.3	60.0	-24.7
17.815	13.7	21.3	35.0	60.0	-25.0
3.683	10.4	20.4	30.8	56.0	-25.2
23.520	12.8	21.8	34.6	60.0	-25.4
18.158	13.2	21.3	34.5	60.0	-25.5
23.870	12.5	21.8	34.3	60.0	-25.7
27.247	11.9	22.2	34.1	60.0	-25.9
22.863	12.3	21.7	34.0	60.0	-26.0

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
19.162	19.5	21.4	40.9	50.0	-9.1
18.823	19.1	21.3	40.4	50.0	-9.6
4.213	13.5	20.5	34.0	46.0	-12.0
23.971	15.8	21.8	37.6	50.0	-12.4
18.491	16.3	21.3	37.6	50.0	-12.4
24.023	15.5	21.8	37.3	50.0	-12.7
14.331	16.1	20.9	37.0	50.0	-13.0
26.221	14.6	22.1	36.7	50.0	-13.3
24.206	14.6	21.8	36.4	50.0	-13.6
24.542	14.5	21.9	36.4	50.0	-13.6
26.892	14.2	22.1	36.3	50.0	-13.7
19.494	14.9	21.4	36.3	50.0	-13.7
13.793	14.9	20.9	35.8	50.0	-14.2
24.863	13.7	21.9	35.6	50.0	-14.4
26.549	13.3	22.1	35.4	50.0	-14.6
28.228	13.1	22.3	35.4	50.0	-14.6
25.881	13.3	22.0	35.3	50.0	-14.7
25.557	13.3	22.0	35.3	50.0	-14.7
23.188	13.5	21.8	35.3	50.0	-14.7
17.815	13.7	21.3	35.0	50.0	-15.0
3.683	10.4	20.4	30.8	46.0	-15.2
23.520	12.8	21.8	34.6	50.0	-15.4
18.158	13.2	21.3	34.5	50.0	-15.5
23.870	12.5	21.8	34.3	50.0	-15.7
27.247	11.9	22.2	34.1	50.0	-15.9
22.863	12.3	21.7	34.0	50.0	-16.0

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

EUT:	WDNU-II	Work Order:	ETHE0024
Serial Number:	W151003000015	Date:	04/13/2015
Customer:	Digi International	Temperature:	23.6°C
Attendees:	None	Relative Humidity:	29.9%
Customer Project:	None	Bar. Pressure:	1014.3 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	28VDC	Configuration:	ETHE0024-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2009

TEST PARAMETERS

Run #:	9	Line:	Negative	Ext. Attenuation (dB):	20

COMMENTS

Transmitting at full power, +27dBm

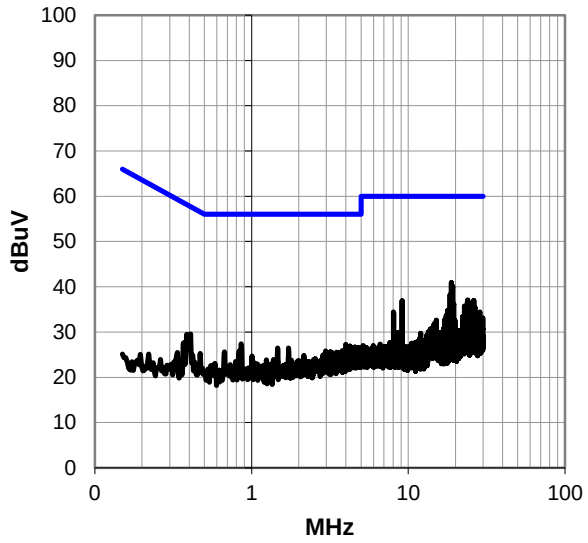
EUT OPERATING MODES

Transmitting WiFi, Mid channel: 2437 MHz

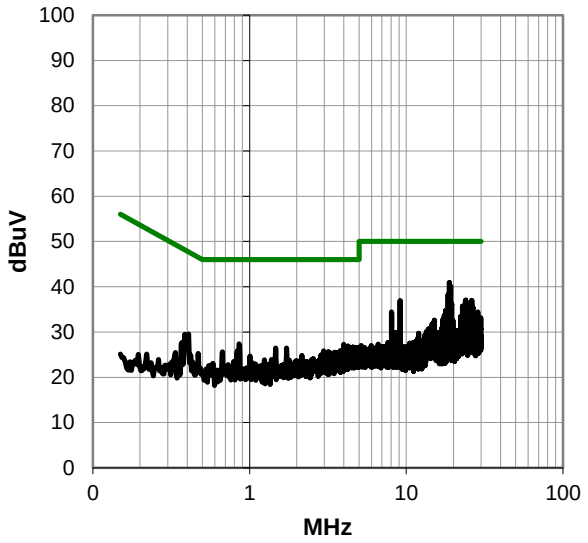
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

RESULTS - Run #9

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
18.841	19.6	21.3	40.9	60.0	-19.1
19.177	18.7	21.4	40.1	60.0	-19.9
18.502	16.9	21.3	38.2	60.0	-21.8
23.967	15.2	21.8	37.0	60.0	-23.0
26.243	14.9	22.1	37.0	60.0	-23.0
9.130	16.2	20.7	36.9	60.0	-23.1
24.023	15.0	21.8	36.8	60.0	-23.2
23.896	14.9	21.8	36.7	60.0	-23.3
19.520	14.9	21.4	36.3	60.0	-23.7
24.553	14.0	21.9	35.9	60.0	-24.1
24.225	14.0	21.8	35.8	60.0	-24.2
22.870	14.0	21.7	35.7	60.0	-24.3
25.911	13.7	22.0	35.7	60.0	-24.3
26.579	13.4	22.1	35.5	60.0	-24.5
23.229	13.1	21.8	34.9	60.0	-25.1
25.240	12.9	22.0	34.9	60.0	-25.1
24.900	12.9	21.9	34.8	60.0	-25.2
18.173	13.4	21.3	34.7	60.0	-25.3
17.838	13.4	21.3	34.7	60.0	-25.3
8.067	13.8	20.7	34.5	60.0	-25.5
28.593	12.1	22.3	34.4	60.0	-25.6
26.915	12.2	22.1	34.3	60.0	-25.7
27.243	11.9	22.2	34.1	60.0	-25.9
23.997	12.2	21.8	34.0	60.0	-26.0
27.933	11.7	22.3	34.0	60.0	-26.0
23.564	12.1	21.8	33.9	60.0	-26.1

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
18.841	19.6	21.3	40.9	50.0	-9.1
19.177	18.7	21.4	40.1	50.0	-9.9
18.502	16.9	21.3	38.2	50.0	-11.8
23.967	15.2	21.8	37.0	50.0	-13.0
26.243	14.9	22.1	37.0	50.0	-13.0
9.130	16.2	20.7	36.9	50.0	-13.1
24.023	15.0	21.8	36.8	50.0	-13.2
23.896	14.9	21.8	36.7	50.0	-13.3
19.520	14.9	21.4	36.3	50.0	-13.7
24.553	14.0	21.9	35.9	50.0	-14.1
24.225	14.0	21.8	35.8	50.0	-14.2
22.870	14.0	21.7	35.7	50.0	-14.3
25.911	13.7	22.0	35.7	50.0	-14.3
26.579	13.4	22.1	35.5	50.0	-14.5
23.229	13.1	21.8	34.9	50.0	-15.1
25.240	12.9	22.0	34.9	50.0	-15.1
24.900	12.9	21.9	34.8	50.0	-15.2
18.173	13.4	21.3	34.7	50.0	-15.3
17.838	13.4	21.3	34.7	50.0	-15.3
8.067	13.8	20.7	34.5	50.0	-15.5
28.593	12.1	22.3	34.4	50.0	-15.6
26.915	12.2	22.1	34.3	50.0	-15.7
27.243	11.9	22.2	34.1	50.0	-15.9
23.997	12.2	21.8	34.0	50.0	-16.0
27.933	11.7	22.3	34.0	50.0	-16.0
23.564	12.1	21.8	33.9	50.0	-16.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

EUT:	WDNU-II	Work Order:	ETHE0024
Serial Number:	W151003000015	Date:	04/13/2015
Customer:	Digi International	Temperature:	23.6°C
Attendees:	None	Relative Humidity:	29.9%
Customer Project:	None	Bar. Pressure:	1014.3 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	28VDC	Configuration:	ETHE0024-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2009

TEST PARAMETERS

Run #:	10	Line:	Positive	Ext. Attenuation (dB):	20

COMMENTS

Transmitting at full power, +27dBm

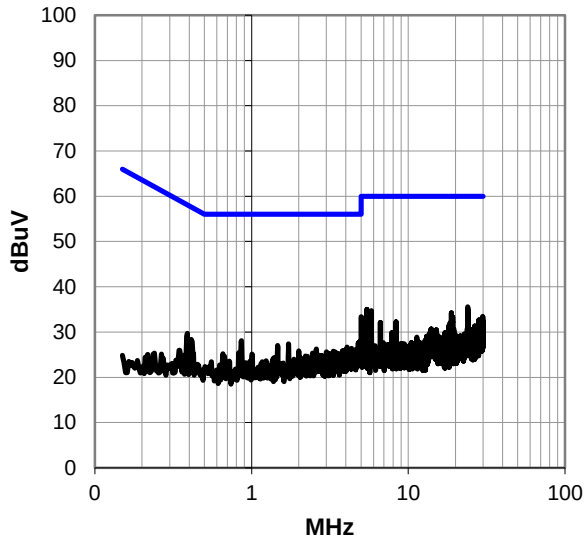
EUT OPERATING MODES

Transmitting WiFi, Mid channel: 2437 MHz

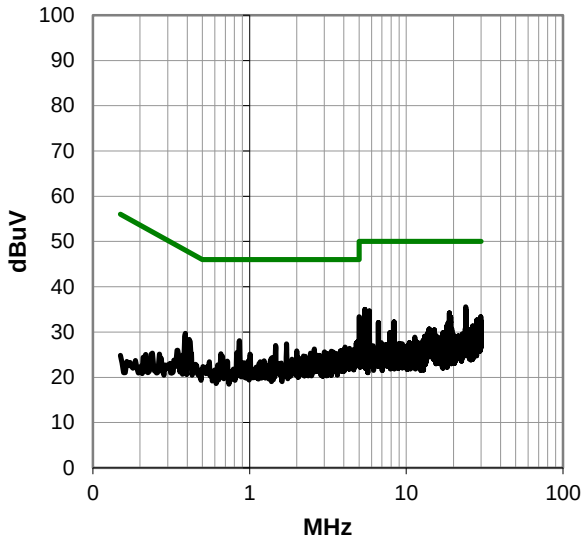
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

RESULTS - Run #10

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
24.023	13.7	21.8	35.5	60.0	-24.5
23.967	13.2	21.8	35.0	60.0	-25.0
5.455	14.5	20.5	35.0	60.0	-25.0
5.828	14.1	20.5	34.6	60.0	-25.4
18.860	12.9	21.3	34.2	60.0	-25.8
5.015	12.9	20.5	33.4	60.0	-26.6
29.959	11.0	22.4	33.4	60.0	-26.6
19.192	11.9	21.4	33.3	60.0	-26.7
28.291	10.4	22.3	32.7	60.0	-27.3
8.365	11.6	20.7	32.3	60.0	-27.7
6.649	11.6	20.5	32.1	60.0	-27.9
0.863	7.9	20.2	28.1	56.0	-27.9
18.528	10.7	21.3	32.0	60.0	-28.0
28.967	9.6	22.3	31.9	60.0	-28.1
29.295	9.5	22.4	31.9	60.0	-28.1
28.623	9.5	22.3	31.8	60.0	-28.2
4.869	7.3	20.5	27.8	56.0	-28.2
23.997	9.8	21.8	31.6	60.0	-28.4
4.806	7.1	20.5	27.6	56.0	-28.4
0.389	9.5	20.2	29.7	58.1	-28.4
29.858	9.0	22.4	31.4	60.0	-28.6
1.724	7.1	20.3	27.4	56.0	-28.6
29.034	9.0	22.3	31.3	60.0	-28.7
26.598	9.2	22.1	31.3	60.0	-28.7
18.188	10.0	21.3	31.3	60.0	-28.7
29.619	8.9	22.4	31.3	60.0	-28.7

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
24.023	13.7	21.8	35.5	50.0	-14.5
23.967	13.2	21.8	35.0	50.0	-15.0
5.455	14.5	20.5	35.0	50.0	-15.0
5.828	14.1	20.5	34.6	50.0	-15.4
18.860	12.9	21.3	34.2	50.0	-15.8
5.015	12.9	20.5	33.4	50.0	-16.6
29.959	11.0	22.4	33.4	50.0	-16.6
19.192	11.9	21.4	33.3	50.0	-16.7
28.291	10.4	22.3	32.7	50.0	-17.3
8.365	11.6	20.7	32.3	50.0	-17.7
6.649	11.6	20.5	32.1	50.0	-17.9
0.863	7.9	20.2	28.1	46.0	-17.9
18.528	10.7	21.3	32.0	50.0	-18.0
28.967	9.6	22.3	31.9	50.0	-18.1
29.295	9.5	22.4	31.9	50.0	-18.1
28.623	9.5	22.3	31.8	50.0	-18.2
4.869	7.3	20.5	27.8	46.0	-18.2
23.997	9.8	21.8	31.6	50.0	-18.4
4.806	7.1	20.5	27.6	46.0	-18.4
0.389	9.5	20.2	29.7	48.1	-18.4
29.858	9.0	22.4	31.4	50.0	-18.6
1.724	7.1	20.3	27.4	46.0	-18.6
29.034	9.0	22.3	31.3	50.0	-18.7
26.598	9.2	22.1	31.3	50.0	-18.7
18.188	10.0	21.3	31.3	50.0	-18.7
29.619	8.9	22.4	31.3	50.0	-18.7

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

EUT:	WDNU-II	Work Order:	ETHE0024
Serial Number:	W151003000015	Date:	04/13/2015
Customer:	Digi International	Temperature:	23.6°C
Attendees:	None	Relative Humidity:	29.9%
Customer Project:	None	Bar. Pressure:	1014.3 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	28VDC	Configuration:	ETHE0024-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2009

TEST PARAMETERS

Run #:	11	Line:	Positive	Ext. Attenuation (dB):	20

COMMENTS

Transmitting at full power, +27dBm

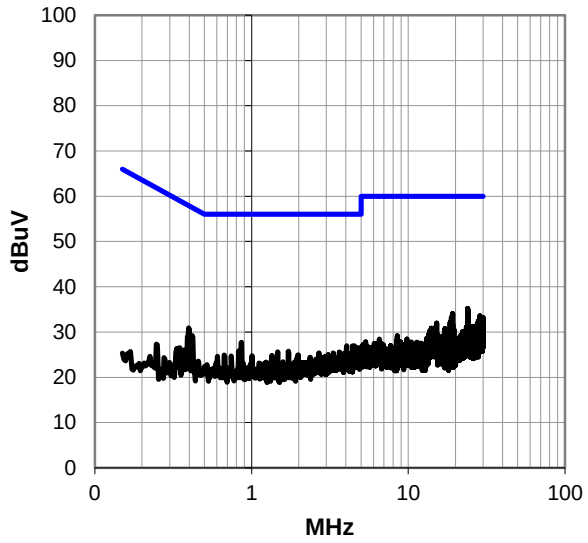
EUT OPERATING MODES

Transmitting WiFi, High channel: 2472 MHz

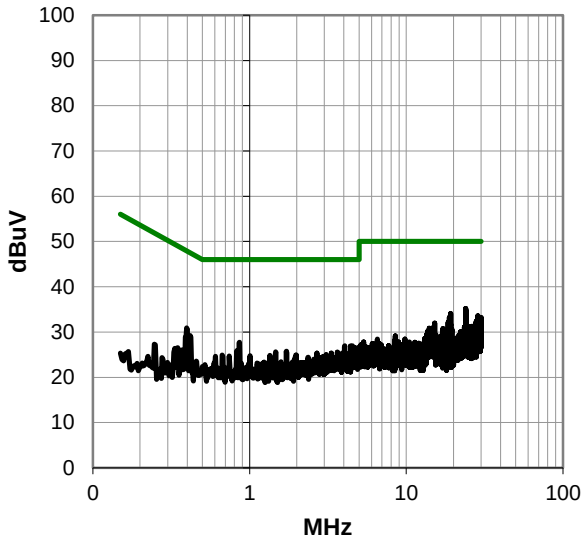
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

RESULTS - Run #11

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.967	13.4	21.8	35.2	60.0	-24.8
24.023	13.1	21.8	34.9	60.0	-25.1
19.203	12.7	21.4	34.1	60.0	-25.9
28.649	11.3	22.3	33.6	60.0	-26.4
18.867	11.9	21.3	33.2	60.0	-26.8
29.996	10.8	22.4	33.2	60.0	-26.8
29.317	10.7	22.4	33.1	60.0	-26.9
0.396	10.7	20.2	30.9	57.9	-27.1
29.661	10.0	22.4	32.4	60.0	-27.6
27.963	10.1	22.3	32.4	60.0	-27.6
23.997	10.4	21.8	32.2	60.0	-27.8
18.532	10.8	21.3	32.1	60.0	-27.9
15.163	11.0	21.0	32.0	60.0	-28.0
28.993	9.5	22.3	31.8	60.0	-28.2
28.306	9.5	22.3	31.8	60.0	-28.2
0.419	9.0	20.2	29.2	57.5	-28.3
0.863	7.5	20.2	27.7	56.0	-28.3
26.284	9.2	22.1	31.3	60.0	-28.7
25.329	9.2	22.0	31.2	60.0	-28.8
23.911	9.3	21.8	31.1	60.0	-28.9
23.497	9.3	21.8	31.1	60.0	-28.9
24.247	9.2	21.9	31.1	60.0	-28.9
4.545	6.5	20.5	27.0	56.0	-29.0
4.045	6.5	20.5	27.0	56.0	-29.0
28.489	8.6	22.3	30.9	60.0	-29.1
4.403	6.4	20.5	26.9	56.0	-29.1

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
23.967	13.4	21.8	35.2	50.0	-14.8
24.023	13.1	21.8	34.9	50.0	-15.1
19.203	12.7	21.4	34.1	50.0	-15.9
28.649	11.3	22.3	33.6	50.0	-16.4
18.867	11.9	21.3	33.2	50.0	-16.8
29.996	10.8	22.4	33.2	50.0	-16.8
29.317	10.7	22.4	33.1	50.0	-16.9
0.396	10.7	20.2	30.9	47.9	-17.1
29.661	10.0	22.4	32.4	50.0	-17.6
27.963	10.1	22.3	32.4	50.0	-17.6
23.997	10.4	21.8	32.2	50.0	-17.8
18.532	10.8	21.3	32.1	50.0	-17.9
15.163	11.0	21.0	32.0	50.0	-18.0
28.993	9.5	22.3	31.8	50.0	-18.2
28.306	9.5	22.3	31.8	50.0	-18.2
0.419	9.0	20.2	29.2	47.5	-18.3
0.863	7.5	20.2	27.7	46.0	-18.3
26.284	9.2	22.1	31.3	50.0	-18.7
25.329	9.2	22.0	31.2	50.0	-18.8
23.911	9.3	21.8	31.1	50.0	-18.9
23.497	9.3	21.8	31.1	50.0	-18.9
24.247	9.2	21.9	31.1	50.0	-18.9
4.545	6.5	20.5	27.0	46.0	-19.0
4.045	6.5	20.5	27.0	46.0	-19.0
28.489	8.6	22.3	30.9	50.0	-19.1
4.403	6.4	20.5	26.9	46.0	-19.1

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

EUT:	WDNU-II	Work Order:	ETHE0024
Serial Number:	W151003000015	Date:	04/13/2015
Customer:	Digi International	Temperature:	23.6°C
Attendees:	None	Relative Humidity:	29.9%
Customer Project:	None	Bar. Pressure:	1014.3 mb
Tested By:	Johnathan Lee	Job Site:	MN03
Power:	28VDC	Configuration:	ETHE0024-1

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2015	ANSI C63.10:2009

TEST PARAMETERS

Run #:	12	Line:	Negative	Ext. Attenuation (dB):	20

COMMENTS

Transmitting at full power, +27dBm

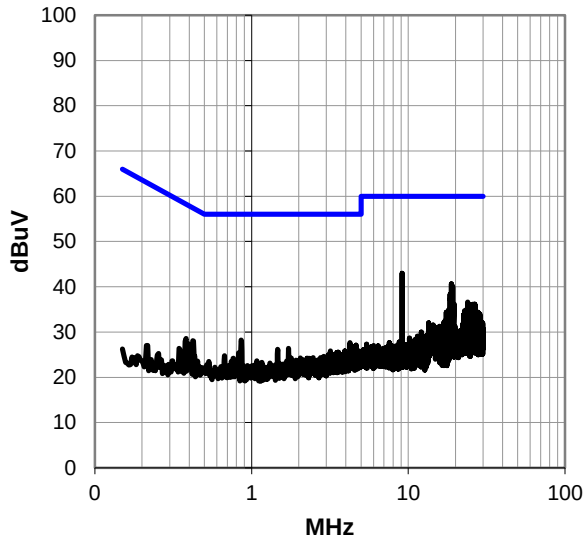
EUT OPERATING MODES

Transmitting WiFi, High channel: 2472 MHz

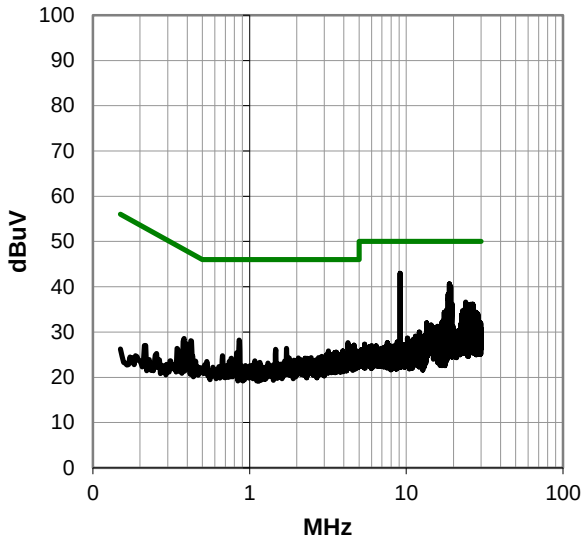
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.03.10
PSA-ESCI 2015.03.03, EmiR5 2015.03.19.1

RESULTS - Run #12

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
9.130	22.3	20.7	43.0	60.0	-17.0
18.879	19.3	21.4	40.7	60.0	-19.3
19.207	18.7	21.4	40.1	60.0	-19.9
18.539	17.0	21.3	38.3	60.0	-21.7
24.023	14.8	21.8	36.6	60.0	-23.4
23.967	14.6	21.8	36.4	60.0	-23.6
19.546	14.8	21.4	36.2	60.0	-23.8
24.262	14.3	21.9	36.2	60.0	-23.8
25.945	14.1	22.0	36.1	60.0	-23.9
26.635	14.0	22.1	36.1	60.0	-23.9
26.292	14.0	22.1	36.1	60.0	-23.9
24.598	13.9	21.9	35.8	60.0	-24.2
25.613	13.3	22.0	35.3	60.0	-24.7
23.598	13.2	21.8	35.0	60.0	-25.0
18.196	13.6	21.3	34.9	60.0	-25.1
22.919	13.0	21.7	34.7	60.0	-25.3
24.937	12.7	21.9	34.6	60.0	-25.4
25.269	12.6	22.0	34.6	60.0	-25.4
26.963	12.4	22.1	34.5	60.0	-25.5
27.303	12.3	22.2	34.5	60.0	-25.5
23.266	12.6	21.8	34.4	60.0	-25.6
17.524	13.1	21.3	34.4	60.0	-25.6
24.165	12.5	21.8	34.3	60.0	-25.7
23.911	12.5	21.8	34.3	60.0	-25.7
27.974	12.0	22.3	34.3	60.0	-25.7
28.314	11.9	22.3	34.2	60.0	-25.8

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
9.130	22.3	20.7	43.0	50.0	-7.0
18.879	19.3	21.4	40.7	50.0	-9.3
19.207	18.7	21.4	40.1	50.0	-9.9
18.539	17.0	21.3	38.3	50.0	-11.7
24.023	14.8	21.8	36.6	50.0	-13.4
23.967	14.6	21.8	36.4	50.0	-13.6
19.546	14.8	21.4	36.2	50.0	-13.8
24.262	14.3	21.9	36.2	50.0	-13.8
25.945	14.1	22.0	36.1	50.0	-13.9
26.635	14.0	22.1	36.1	50.0	-13.9
26.292	14.0	22.1	36.1	50.0	-13.9
24.598	13.9	21.9	35.8	50.0	-14.2
25.613	13.3	22.0	35.3	50.0	-14.7
23.598	13.2	21.8	35.0	50.0	-15.0
18.196	13.6	21.3	34.9	50.0	-15.1
22.919	13.0	21.7	34.7	50.0	-15.3
24.937	12.7	21.9	34.6	50.0	-15.4
25.269	12.6	22.0	34.6	50.0	-15.4
26.963	12.4	22.1	34.5	50.0	-15.5
27.303	12.3	22.2	34.5	50.0	-15.5
23.266	12.6	21.8	34.4	50.0	-15.6
17.524	13.1	21.3	34.4	50.0	-15.6
24.165	12.5	21.8	34.3	50.0	-15.7
23.911	12.5	21.8	34.3	50.0	-15.7
27.974	12.0	22.3	34.3	50.0	-15.7
28.314	11.9	22.3	34.2	50.0	-15.8

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

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 at 1 Mbps, 6 Mbps, 11 Mbps, 36 Mbps, 54 Mbps, MCS0, and MCS7; low channel (2412 MHz), mid channel (2437 MHz), and high channel (2462 MHz.)

POWER SETTINGS INVESTIGATED

28VDC

CONFIGURATIONS INVESTIGATED

ETHE0024 - 3
ETHE0024 - 8

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
Low Pass Filter, 0 - 1000 MHz	Micro-Tronics	LPM50004	HGK	3/2/2015	12 mo
High Pass Filter, 2.8 - 18 GHz	Micro-Tronics	HPM50111	HGQ	3/2/2015	12 mo
Attenuator, 20 dB, 'SMA'	SM Electronics	SA6-20	REO	3/2/2015	12 mo
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	10/3/2014	12 mo
MN05 Cable	N/A	18-26GHz Standard Gain Horn Cable	MNP	10/3/2014	12 mo
Antenna, Horn	ETS	3160-09	AHG	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	3/2/2015	12 mo
Antenna, Horn	ETS Lindgren	3160-08	AIQ	NCR	0 mo
MN05 Cables	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	3/30/2015	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	3/2/2015	12 mo
Antenna, Horn	ETS	3160-07	AXP	NCR	0 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	3/2/2015	12 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	3/30/2015	12 mo
Antenna, Horn	ETS	3115	AJA	6/3/2014	24 mo
Pre-Amplifier	Miteq	AM-1616-1000	PAD	3/2/2015	12 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	3/30/2015	12 mo
Antenna, Biconilog	Teseq	CBL 6141B	AYD	12/17/2013	24 mo
Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2015	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.

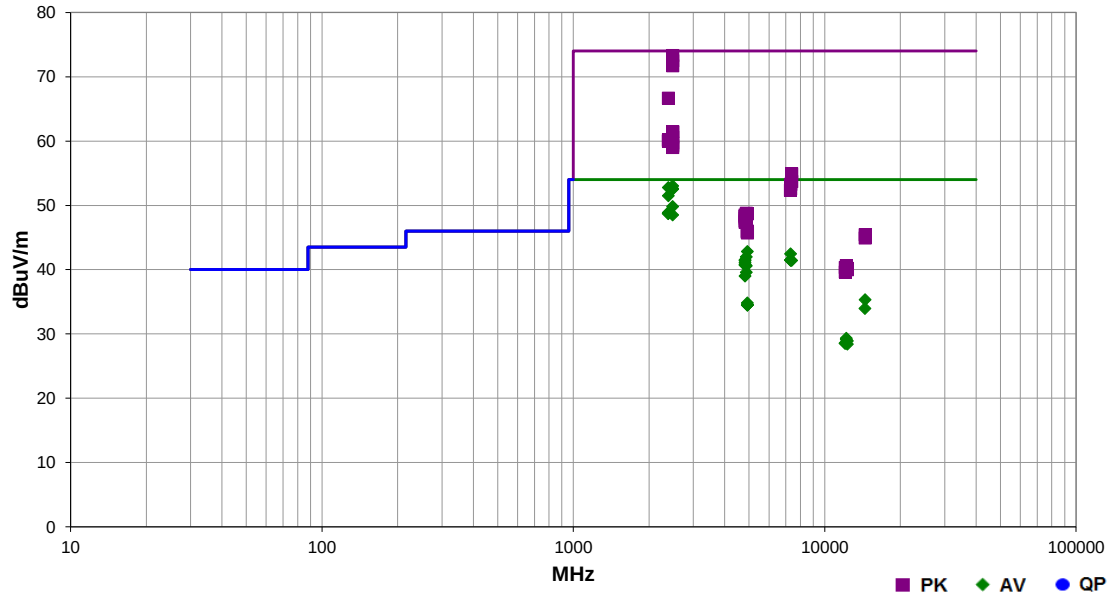
The device contains WiFi and Cellular radio modules. They can transmit simultaneously through the same antenna. After the spurious emissions from the WiFi radio were measured, both radios were set to transmit simultaneously and radiated scans were performed to identify any new or higher emissions due to the simultaneous transmission. No new or higher emissions were detected.

SPURIOUS RADIATED EMISSIONS

Work Order:	ETHE0024	**Date:**	04/15/15		
Project:	None	**Temperature:**	22.7 °C		
Job Site:	MN05	**Humidity:**	26.6% RH		
Serial Number:	00409D7FB3D5, 00409D7FB3D0	**Barometric Pres.:**	1023.2 mbar	**Tested by:**	Dustin Sparks
EUT:	WDNU-II				
Configuration:	3, 8				
Customer:	Digi International				
Attendees:	None				
EUT Power:	28VDC				
Operating Mode:	Transmitting 802.11 at 1 Mbps, 6 Mbps, 11 Mbps, 36 Mbps, 54 Mbps, MCS0, and MCS7; low channel (2412 MHz), mid channel (2437 MHz), and high channel (2462 MHz.)				
Deviations:	None				
Comments:	Tested with customer supplied antenna and diplexer. Net gain of 1.5dBi.				

Test Specifications	**Test Method**
FCC 15.247:2015	ANSI C63.10:2009

Run #	18	**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
2484.558	56.2	-2.9	1.0	257.0	3.0	20.0	Vert	PK	0.0	73.3	74.0	-0.7	6 Mbps, high ch, EUT horz, pwr 25.5
2483.542	35.9	-2.9	1.0	312.9	3.0	20.0	Vert	AV	0.0	53.0	54.0	-1.0	6 Mbps, high ch, EUT horz, pwr 25
2390.000	36.0	-3.2	1.0	1.1	3.0	20.0	Vert	AV	0.0	52.8	54.0	-1.2	MCS0, low ch, EUT horz, pwr 25
2483.517	35.5	-2.9	1.0	268.0	3.0	20.0	Vert	AV	0.0	52.6	54.0	-1.4	36 Mbps, high ch, EUT horz, pwr 25
2484.433	55.4	-2.9	1.0	312.9	3.0	20.0	Vert	PK	0.0	72.5	74.0	-1.5	6 Mbps, high ch, EUT horz, pwr 25
2483.517	35.4	-2.9	1.0	252.0	3.0	20.0	Vert	AV	0.0	52.5	54.0	-1.5	MCS0, high ch, EUT horz, pwr 25
2485.050	54.6	-2.9	1.0	252.0	3.0	20.0	Vert	PK	0.0	71.7	74.0	-2.3	MCS0, high ch, EUT horz, pwr 25
2389.925	34.7	-3.2	1.0	318.9	3.0	20.0	Vert	AV	0.0	51.5	54.0	-2.5	6 Mbps, low ch, EUT horz, pwr 25
2483.692	32.7	-2.9	1.0	154.0	3.0	20.0	Vert	AV	0.0	49.8	54.0	-4.2	1 Mbps, high ch, EUT horz, pwr 25
2389.917	32.1	-3.2	1.0	213.1	3.0	20.0	Vert	AV	0.0	48.9	54.0	-5.1	1 Mbps, low ch, EUT horz, pwr 25
2386.275	31.9	-3.2	1.3	296.0	3.0	20.0	Vert	AV	0.0	48.7	54.0	-5.3	11 Mbps, low ch, EUT horz, pwr 25
2483.958	31.4	-2.9	3.6	9.0	3.0	20.0	Vert	AV	0.0	48.5	54.0	-5.5	11 Mbps, high ch, EUT horz, pwr 25
2389.775	49.9	-3.2	1.0	318.9	3.0	20.0	Vert	PK	0.0	66.7	74.0	-7.3	6 Mbps, low ch, EUT horz, pwr 25
4923.975	37.8	5.0	1.3	113.1	3.0	0.0	Horz	AV	0.0	42.8	54.0	-11.2	1 Mbps, high ch, EUT horz, pwr 27
7311.908	29.7	12.8	1.0	7.0	3.0	0.0	Vert	AV	0.0	42.5	54.0	-11.5	1 Mbps, mid ch, EUT horz, pwr 27
4874.067	37.0	5.0	1.1	102.1	3.0	0.0	Vert	AV	0.0	42.0	54.0	-12.0	1 Mbps, mid ch, EUT horz, pwr 27
4824.008	36.4	5.1	1.1	264.0	3.0	0.0	Vert	AV	0.0	41.5	54.0	-12.5	1 Mbps, low ch, EUT vert, pwr 27
7312.575	28.7	12.8	1.4	159.1	3.0	0.0	Horz	AV	0.0	41.5	54.0	-12.5	1 Mbps, mid ch, EUT horz, pwr 27
7311.975	28.7	12.8	1.0	150.0	3.0	0.0	Horz	AV	0.0	41.5	54.0	-12.5	1 Mbps, mid ch, EUT horz, pwr 27
7311.858	28.7	12.8	1.0	0.0	3.0	0.0	Vert	AV	0.0	41.5	54.0	-12.5	1 Mbps, mid ch, EUT horz, pwr 27
2487.425	44.3	-2.9	1.0	154.0	3.0	20.0	Vert	PK	0.0	61.4	74.0	-12.6	1 Mbps, high ch, EUT horz, pwr 25
7383.517	28.4	13.0	3.3	139.0	3.0	0.0	Horz	AV	0.0	41.4	54.0	-12.6	1 Mbps, high ch, EUT horz, pwr 27
4824.075	36.3	5.1	1.2	256.0	3.0	0.0	Vert	AV	0.0	41.4	54.0	-12.6	1 Mbps, low ch, EUT horz, pwr 27
4824.042	36.0	5.1	1.1	13.0	3.0	0.0	Vert	AV	0.0	41.1	54.0	-12.9	1 Mbps, low ch, EUT on side, pwr 27
4824.000	35.7	5.1	1.0	204.0	3.0	0.0	Horz	AV	0.0	40.8	54.0	-13.2	1 Mbps, low ch, EUT horz, pwr 27
4823.967	35.6	5.1	1.0	169.0	3.0	0.0	Horz	AV	0.0	40.7	54.0	-13.3	1 Mbps, low ch, EUT vert, pwr 27
2485.108	43.5	-2.9	1.8	268.9	3.0	20.0	Horz	PK	0.0	60.6	74.0	-13.4	6 Mbps, high ch, EUT on side, pwr 20

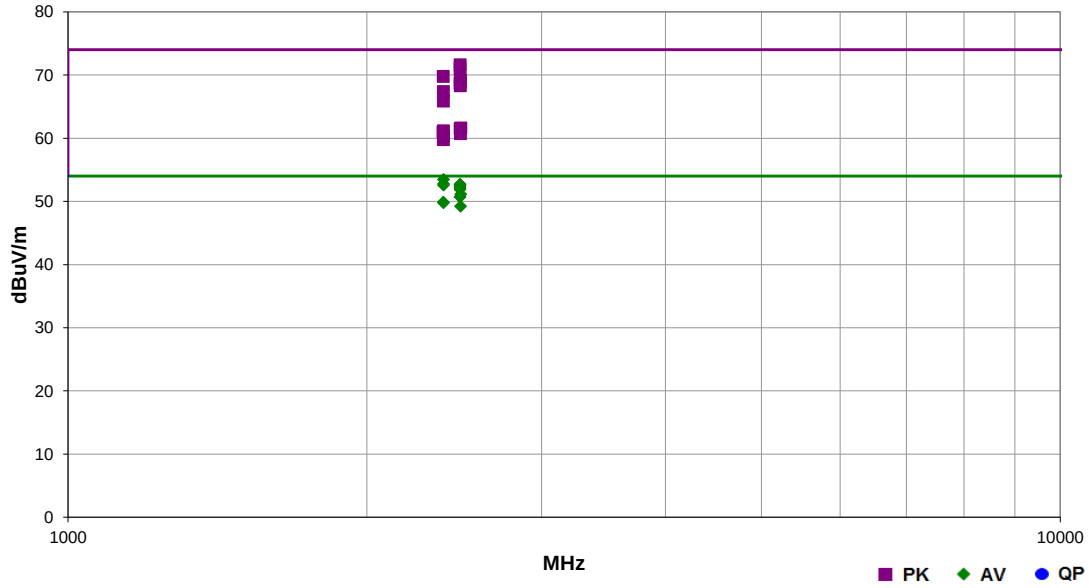
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
4873.992	35.6	5.0	1.2	93.0	3.0	0.0	Horz	AV	0.0	40.6	54.0	-13.4	1 Mbps, mid ch, EUT horz, pwr 27
2387.133	43.4	-3.2	1.0	213.1	3.0	20.0	Vert	PK	0.0	60.2	74.0	-13.8	1 Mbps, low ch, EUT horz, pwr 25
2389.300	43.2	-3.2	1.3	296.0	3.0	20.0	Vert	PK	0.0	60.0	74.0	-14.0	11 Mbps, low ch, EUT horz, pwr 25
2484.850	42.6	-2.9	3.6	9.0	3.0	20.0	Vert	PK	0.0	59.7	74.0	-14.3	11 Mbps, high ch, EUT horz, pwr 25
4873.958	34.6	5.0	1.0	69.1	3.0	0.0	Horz	AV	0.0	39.6	54.0	-14.4	1 Mbps, mid ch, EUT horz, pwr 27
2486.392	42.2	-2.9	1.0	282.0	3.0	20.0	Horz	PK	0.0	59.3	74.0	-14.7	1 Mbps, high ch, EUT on side, pwr 24
2485.000	41.9	-2.9	1.0	243.9	3.0	20.0	Horz	PK	0.0	59.0	74.0	-15.0	11 Mbps, high ch, EUT on side, pwr 24
4824.067	33.9	5.1	1.0	208.0	3.0	0.0	Horz	AV	0.0	39.0	54.0	-15.0	1 Mbps, low ch, EUT on side, pwr 27
14472.100	32.3	3.0	1.0	135.0	3.0	0.0	Horz	AV	0.0	35.3	54.0	-18.7	1 Mbps, low ch, EUT horz, pwr 27
7385.625	41.9	13.0	1.0	217.1	3.0	0.0	Vert	PK	0.0	54.9	74.0	-19.1	1 Mbps, high ch, EUT horz, pwr 27
4924.117	29.8	5.0	1.3	234.0	3.0	0.0	Horz	AV	0.0	34.8	54.0	-19.2	11 Mbps, high ch, EUT horz, pwr 27
4926.408	29.5	5.0	1.3	234.0	3.0	0.0	Horz	AV	0.0	34.5	54.0	-19.5	36 Mbps, high ch, EUT horz, pwr 27
4926.250	29.5	5.0	1.3	234.0	3.0	0.0	Horz	AV	0.0	34.5	54.0	-19.5	MCS0, high ch, EUT horz, pwr 27
4926.183	29.5	5.0	1.3	234.0	3.0	0.0	Horz	AV	0.0	34.5	54.0	-19.5	MCS7, high ch, EUT horz, pwr 27
4925.925	29.5	5.0	1.3	234.0	3.0	0.0	Horz	AV	0.0	34.5	54.0	-19.5	54 Mbps, high ch, EUT horz, pwr 27
4925.333	29.5	5.0	1.3	234.0	3.0	0.0	Horz	AV	0.0	34.5	54.0	-19.5	6 Mbps, high ch, EUT horz, pwr 27
7386.783	40.7	13.0	3.3	139.0	3.0	0.0	Horz	PK	0.0	53.7	74.0	-20.3	1 Mbps, high ch, EUT horz, pwr 27
7313.250	40.5	12.8	1.4	159.1	3.0	0.0	Horz	PK	0.0	53.3	74.0	-20.7	1 Mbps, mid ch, EUT horz, pwr 27
7310.958	40.5	12.8	1.0	7.0	3.0	0.0	Vert	PK	0.0	53.3	74.0	-20.7	1 Mbps, mid ch, EUT horz, pwr 27
7312.617	39.8	12.8	1.0	150.0	3.0	0.0	Horz	PK	0.0	52.6	74.0	-21.4	1 Mbps, mid ch, EUT horz, pwr 27
7309.808	39.6	12.8	1.0	0.0	3.0	0.0	Vert	PK	0.0	52.4	74.0	-21.6	1 Mbps, mid ch, EUT horz, pwr 27
12187.260	34.1	-4.8	1.0	36.0	3.0	0.0	Vert	AV	0.0	29.3	54.0	-24.7	1 Mbps, mid ch, EUT horz, pwr 27
12186.400	33.9	-4.8	1.0	306.0	3.0	0.0	Horz	AV	0.0	29.1	54.0	-24.9	1 Mbps, mid ch, EUT horz, pwr 27
12307.800	33.6	-4.7	1.0	258.9	3.0	0.0	Vert	AV	0.0	28.9	54.0	-25.1	1 Mbps, high ch, EUT horz, pwr 27
4874.075	43.8	5.0	1.1	102.1	3.0	0.0	Vert	PK	0.0	48.8	74.0	-25.2	1 Mbps, mid ch, EUT horz, pwr 27
4924.058	43.7	5.0	1.3	113.1	3.0	0.0	Horz	PK	0.0	48.7	74.0	-25.3	1 Mbps, high ch, EUT horz, pwr 27
12061.480	33.8	-5.3	1.0	228.1	3.0	0.0	Horz	AV	0.0	28.5	54.0	-25.5	1 Mbps, low ch, EUT horz, pwr 27
12059.260	33.8	-5.3	1.2	286.9	3.0	0.0	Vert	AV	0.0	28.5	54.0	-25.5	1 Mbps, low ch, EUT horz, pwr 27
4824.242	43.4	5.1	1.1	264.0	3.0	0.0	Vert	PK	0.0	48.5	74.0	-25.5	1 Mbps, low ch, EUT vert, pwr 27
12307.700	33.1	-4.7	1.0	70.1	3.0	0.0	Horz	AV	0.0	28.4	54.0	-25.6	1 Mbps, high ch, EUT horz, pwr 27
4823.958	43.2	5.1	1.0	169.0	3.0	0.0	Horz	PK	0.0	48.3	74.0	-25.7	1 Mbps, low ch, EUT vert, pwr 27
4824.017	43.2	5.1	1.2	256.0	3.0	0.0	Vert	PK	0.0	48.3	74.0	-25.7	1 Mbps, low ch, EUT horz, pwr 27
4824.267	42.9	5.1	1.1	13.0	3.0	0.0	Vert	PK	0.0	48.0	74.0	-26.0	1 Mbps, low ch, EUT on side, pwr 27
4873.850	43.0	5.0	1.2	93.0	3.0	0.0	Horz	PK	0.0	48.0	74.0	-26.0	1 Mbps, mid ch, EUT horz, pwr 27
4874.258	42.7	5.0	1.0	69.1	3.0	0.0	Horz	PK	0.0	47.7	74.0	-26.3	1 Mbps, mid ch, EUT horz, pwr 27
4823.683	42.5	5.1	1.0	204.0	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	1 Mbps, low ch, EUT horz, pwr 27
4823.742	42.3	5.1	1.0	208.0	3.0	0.0	Horz	PK	0.0	47.4	74.0	-26.6	1 Mbps, low ch, EUT on side, pwr 27
4922.792	41.0	5.0	1.3	234.0	3.0	0.0	Horz	PK	0.0	46.0	74.0	-28.0	11 Mbps, high ch, EUT horz, pwr 27
4926.025	40.9	5.0	1.3	234.0	3.0	0.0	Horz	PK	0.0	45.9	74.0	-28.1	6 Mbps, high ch, EUT horz, pwr 27
4924.108	40.9	5.0	1.3	234.0	3.0	0.0	Horz	PK	0.0	45.9	74.0	-28.1	54 Mbps, high ch, EUT horz, pwr 27
4925.817	40.8	5.0	1.3	234.0	3.0	0.0	Horz	PK	0.0	45.8	74.0	-28.2	MCS0, high ch, EUT horz, pwr 27
4924.525	40.8	5.0	1.3	234.0	3.0	0.0	Horz	PK	0.0	45.8	74.0	-28.2	36 Mbps, high ch, EUT horz, pwr 27
4922.558	40.7	5.0	1.3	234.0	3.0	0.0	Horz	PK	0.0	45.7	74.0	-28.3	MCS7, high ch, EUT horz, pwr 27
14472.160	42.4	3.0	1.0	135.0	3.0	0.0	Horz	PK	0.0	45.4	74.0	-28.6	1 Mbps, low ch, EUT horz, pwr 27
14471.480	41.9	3.0	1.0	36.0	3.0	0.0	Vert	PK	0.0	44.9	74.0	-29.1	1 Mbps, low ch, EUT horz, pwr 27
12186.680	45.4	-4.8	1.0	36.0	3.0	0.0	Vert	PK	0.0	40.6	74.0	-33.4	1 Mbps, mid ch, EUT horz, pwr 27
12061.760	45.6	-5.3	1.2	286.9	3.0	0.0	Vert	PK	0.0	40.3	74.0	-33.7	1 Mbps, low ch, EUT horz, pwr 27
12310.850	44.9	-4.7	1.0	258.9	3.0	0.0	Vert	PK	0.0	40.2	74.0	-33.8	1 Mbps, high ch, EUT horz, pwr 27
12186.920	44.9	-4.8	1.0	306.0	3.0	0.0	Horz	PK	0.0	40.1	74.0	-33.9	1 Mbps, mid ch, EUT horz, pwr 27
12309.980	44.7	-4.7	1.0	70.1	3.0	0.0	Horz	PK	0.0	40.0	74.0	-34.0	1 Mbps, high ch, EUT horz, pwr 27
12062.370	44.9	-5.3	1.0	228.1	3.0	0.0	Horz	PK	0.0	39.6	74.0	-34.4	1 Mbps, low ch, EUT horz, pwr 27
14469.510	30.9	3.1	1.0	36.0	3.0	0.0	Vert	AV	0.0	34.0	74.0	-40.0	1 Mbps, low ch, EUT horz, pwr 27

SPURIOUS RADIATED EMISSIONS

Work Order:	ETHE0024	**Date:**	06/09/15	Trevor Buls	
Project:	None	**Temperature:**	23.3 °C		
Job Site:	MN05	**Humidity:**	52.7% RH		
Serial Number:	00409D7FB3D0	**Barometric Pres.:**	975.5 mbar	**Tested by:**	Trevor Buls
EUT:	WDNU-II				
Configuration:	8				
Customer:	Digi International				
Attendees:	None				
EUT Power:	28VDC				
Operating Mode:	Transmitting 802.11 at 1 Mbps, 6 Mbps, 11 Mbps, 36 Mbps, 54 Mbps, MCS0, and MCS7; low channel (2412 MHz), mid channel (2437 MHz), and high channel (2462 MHz.)				
Deviations:	None				
Comments:	EEprom file version 06. 0.5 dB increase for 2412, and 2462 MHz on all rates except 1, 6 Mbps and MCS0. (Power setting 2C)				

Test Specifications	**Test Method**
FCC 15.247:2015	ANSI C63.10:2009

Run #	87	**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
2389.992	35.7	-2.2	1.0	124.1	3.0	20.0	Vert	AV	0.0	53.5	54.0	-0.5	EUT Horizontal, Low Ch, MCS7, Pwr 2C
2389.983	35.0	-2.2	1.0	124.1	3.0	20.0	Vert	AV	0.0	52.8	54.0	-1.2	EUT Horizontal, Low Ch, 36 Mbps, Pwr 2C
2483.525	34.6	-1.9	1.0	205.0	3.0	20.0	Vert	AV	0.0	52.7	54.0	-1.3	EUT Horizontal, High Ch, MCS7, Pwr 2C
2483.742	34.5	-1.9	1.0	205.0	3.0	20.0	Vert	AV	0.0	52.6	54.0	-1.4	EUT Horizontal, High Ch, 36 Mbps, Pwr 2C
2389.867	34.8	-2.2	1.0	124.1	3.0	20.0	Vert	AV	0.0	52.6	54.0	-1.4	EUT Horizontal, Low Ch, 54 Mbps, Pwr 2C
2483.650	34.3	-1.9	1.0	205.0	3.0	20.0	Vert	AV	0.0	52.4	54.0	-1.6	EUT Horizontal, High Ch, 54 Mbps, Pwr 2C
2483.700	34.0	-1.9	1.6	283.9	3.0	20.0	Horz	AV	0.0	52.1	54.0	-1.9	EUT Vertical, High Ch, MCS7, Pwr 2C
2483.717	33.8	-1.9	1.0	258.9	3.0	20.0	Horz	AV	0.0	51.9	54.0	-2.1	EUT on Side, High Ch, MCS7, Pwr 2C
2483.908	53.5	-1.9	1.0	205.0	3.0	20.0	Vert	PK	0.0	71.6	74.0	-2.4	EUT Horizontal, High Ch, MCS7, Pwr 2C
2487.708	33.0	-1.9	1.0	205.0	3.0	20.0	Vert	AV	0.0	51.1	54.0	-2.9	EUT Horizontal, High Ch, 11 Mbps, Pwr 2C
2483.525	52.9	-1.9	1.0	258.9	3.0	20.0	Horz	PK	0.0	71.0	74.0	-3.0	EUT on Side, High Ch, MCS7, Pwr 2C
2483.558	32.6	-1.9	3.9	242.0	3.0	20.0	Vert	AV	0.0	50.7	54.0	-3.3	EUT on Side, High Ch, MCS7, Pwr 2C
2389.550	32.1	-2.2	1.0	124.1	3.0	20.0	Vert	AV	0.0	49.9	54.0	-4.1	EUT Horizontal, Low Ch, 1 Mbps, Pwr 2C
2388.658	52.0	-2.2	1.0	124.1	3.0	20.0	Vert	PK	0.0	69.8	74.0	-4.2	EUT Horizontal, Low Ch, MCS7, Pwr 2C
2389.925	32.0	-2.2	1.0	124.1	3.0	20.0	Vert	AV	0.0	49.8	54.0	-4.2	EUT Horizontal, Low Ch, 11 Mbps, Pwr 2C
2486.925	31.1	-1.9	1.0	78.0	3.0	20.0	Vert	AV	0.0	49.2	54.0	-4.8	EUT Vertical, High Ch, MCS7, Pwr 2C
2485.025	51.1	-1.9	1.6	283.9	3.0	20.0	Horz	PK	0.0	69.2	74.0	-4.8	EUT Vertical, High Ch, MCS7, Pwr 2C
2486.233	51.0	-1.9	1.0	205.0	3.0	20.0	Vert	PK	0.0	69.1	74.0	-4.9	EUT Horizontal, High Ch, 54 Mbps, Pwr 2C
2483.708	50.6	-1.9	1.0	205.0	3.0	20.0	Vert	PK	0.0	68.7	74.0	-5.3	EUT Horizontal, High Ch, 36 Mbps, Pwr 2C
2484.933	50.2	-1.9	3.9	242.0	3.0	20.0	Vert	PK	0.0	68.3	74.0	-5.7	EUT on Side, High Ch, MCS7, Pwr 2C
2389.142	49.6	-2.2	1.0	124.1	3.0	20.0	Vert	PK	0.0	67.4	74.0	-6.6	EUT Horizontal, Low Ch, 36 Mbps, Pwr 2C
2389.150	48.1	-2.2	1.0	124.1	3.0	20.0	Vert	PK	0.0	65.9	74.0	-8.1	EUT Horizontal, Low Ch, 54 Mbps, Pwr 2C
2487.900	43.5	-1.9	1.0	205.0	3.0	20.0	Vert	PK	0.0	61.6	74.0	-12.4	EUT Horizontal, High Ch, 11 Mbps, Pwr 2C
2483.558	43.4	-1.9	1.0	78.0	3.0	20.0	Vert	PK	0.0	61.5	74.0	-12.5	EUT Vertical, High Ch, MCS7, Pwr 2C
2389.042	43.4	-2.2	1.0	124.1	3.0	20.0	Vert	PK	0.0	61.2	74.0	-12.8	EUT Horizontal, Low Ch, 11 Mbps, Pwr 2C
2387.000	43.2	-2.2	1.0	124.1	3.0	20.0	Vert	PK	0.0	61.0	74.0	-13.0	EUT Horizontal, Low Ch, 1 Mbps, Pwr 2C
2485.917	42.6	-1.9	1.0	121.0	3.0	20.0	Horz	PK	0.0	60.7	74.0	-13.3	EUT Horizontal, High Ch, MCS7, Pwr 2C
2389.842	42.6	-2.2	1.0	256.0	3.0	20.0	Vert	PK	0.0	60.4	74.0	-13.6	EUT Horizontal, Low Ch, 11 Mbps, Pwr 2C
2389.183	42.0	-2.2	1.0	256.0	3.0	20.0	Vert	PK	0.0	59.8	74.0	-14.2	EUT Horizontal, Low Ch, 1 Mbps, Pwr 2C

SPURIOUS CONDUCTED EMISSIONS

XMit 2015.01.14

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.	Interval (mo)
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
Attenuator - 26dB SMA	Fairview Microwave	18B5W-26	RFY	7/22/2014	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12

TEST DESCRIPTION

The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. 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 2015.01.14

EUT:	WDNU-II			**Work Order:**	ETHE0024
Serial Number:	00:40:9D:7F:B3:D3			**Date:**	04/21/15
Customer:	Digi International			**Temperature:**	22°C
Attendees:	None			**Humidity:**	31%
Project:	None			**Barometric Pres.:**	1014
Tested by:	Jared Ison	**Power:**	28 VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2009

COMMENTS

Single channel continuous transmission provided by client. Duty cycle set to 100%. Low and High channel digital attenuation set to 2A. Middle channel digital attenuation set to 31.

DEVIATIONS FROM TEST STANDARD

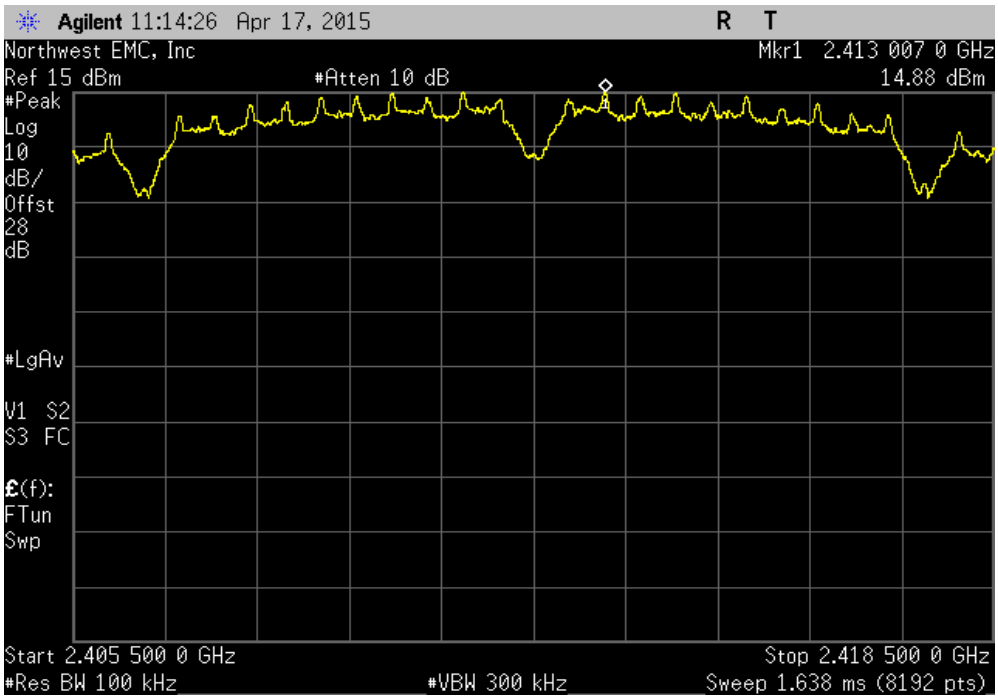
None

Configuration #	ETHE0024-4	Signature

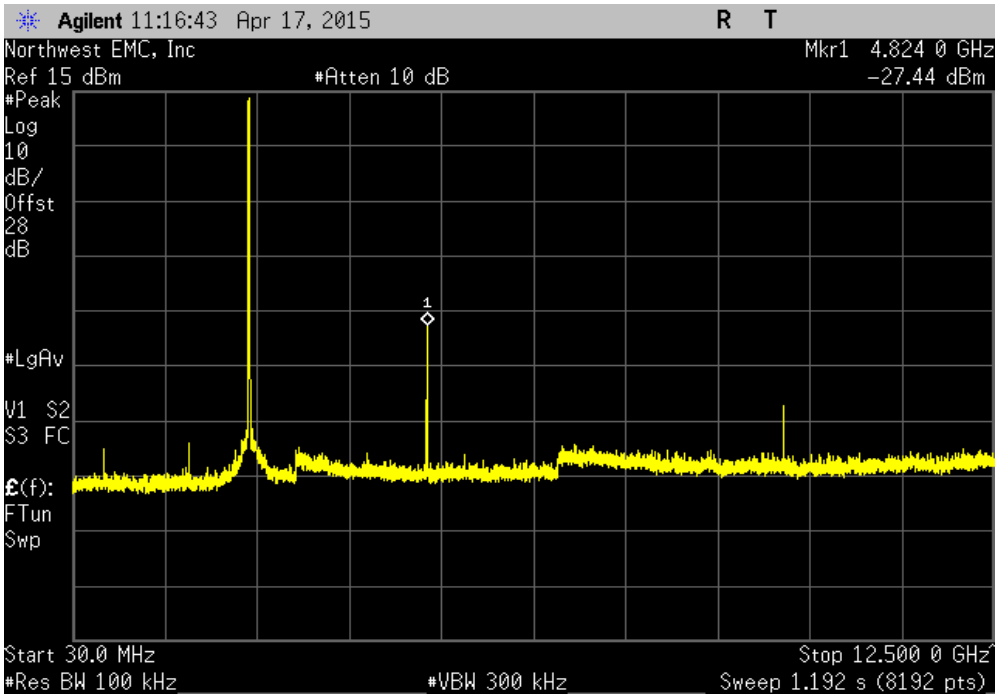
		Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result
20 MHz					
	2400 MHz - 2483.5 MHz Band				
	802.11(b) 1 Mbps				
	Low Channel 1, 2412 MHz	Fundamental	N/A	N/A	N/A
	Low Channel 1, 2412 MHz	30 MHz - 12.5 GHz	-42.32	-20	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 18 GHz	-62.17	-20	Pass
	Low Channel 1, 2412 MHz	18 GHz - 25 GHz	-57.96	-20	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-41.43	-20	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 18 GHz	-64.92	-20	Pass
	Mid Channel 6, 2437 MHz	18 GHz - 25 GHz	-60.94	-20	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-44.01	-20	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 18 GHz	-62.39	-20	Pass
	High Channel 11, 2462 MHz	18 GHz - 25 GHz	-57.66	-20	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	-43.65	-20	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 18 GHz	-62.04	-20	Pass
	Low Channel 1, 2412 MHz	18 GHz - 25 GHz	-56.98	-20	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-51.14	-20	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 18 GHz	-65.04	-20	Pass
	Mid Channel 6, 2437 MHz	18 GHz - 25 GHz	-60.5	-20	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-44.38	-20	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 18 GHz	-62.46	-20	Pass
	High Channel 11, 2462 MHz	18 GHz - 25 GHz	-58.24	-20	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	-45.33	-20	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 18 GHz	-58.02	-20	Pass
	Low Channel 1, 2412 MHz	18 GHz - 25 GHz	-53.55	-20	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-45.79	-20	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 18 GHz	-61.84	-20	Pass
	Mid Channel 6, 2437 MHz	18 GHz - 25 GHz	-56.83	-20	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-46.56	-20	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 18 GHz	-58.26	-20	Pass
	High Channel 11, 2462 MHz	18 GHz - 25 GHz	-53.5	-20	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	-48.03	-20	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 18 GHz	-59.2	-20	Pass
	Low Channel 1, 2412 MHz	18 GHz - 25 GHz	-54.51	-20	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-47.89	-20	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 18 GHz	-62.21	-20	Pass
	Mid Channel 6, 2437 MHz	18 GHz - 25 GHz	-57.23	-20	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-50.48	-20	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 18 GHz	-59.35	-20	Pass
	High Channel 11, 2462 MHz	18 GHz - 25 GHz	-54.27	-20	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	-50.09	-20	Pass
	Low Channel 1, 2412 MHz	12.5 GHz - 18 GHz	-59.72	-20	Pass
	Low Channel 1, 2412 MHz	18 GHz - 25 GHz	-55.54	-20	Pass
	Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
	Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-49.31	-20	Pass
	Mid Channel 6, 2437 MHz	12.5 GHz - 18 GHz	-62.7	-20	Pass
	Mid Channel 6, 2437 MHz	18 GHz - 25 GHz	-57.91	-20	Pass
	High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
	High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-50.13	-20	Pass
	High Channel 11, 2462 MHz	12.5 GHz - 18 GHz	-58.78	-20	Pass
	High Channel 11, 2462 MHz	18 GHz - 25 GHz	-54.76	-20	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	-46.7	-20	Pass
Low Channel 1, 2412 MHz	12.5 GHz - 18 GHz	-58.02	-20	Pass
Low Channel 1, 2412 MHz	18 GHz - 25 GHz	-53.38	-20	Pass
Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-47	-20	Pass
Mid Channel 6, 2437 MHz	12.5 GHz - 18 GHz	-61.16	-20	Pass
Mid Channel 6, 2437 MHz	18 GHz - 25 GHz	-56.42	-20	Pass
High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-47.9	-20	Pass
High Channel 11, 2462 MHz	12.5 GHz - 18 GHz	-58.37	-20	Pass
High Channel 11, 2462 MHz	18 GHz - 25 GHz	-53.84	-20	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	-49.11	-20	Pass
Low Channel 1, 2412 MHz	12.5 GHz - 18 GHz	-58.87	-20	Pass
Low Channel 1, 2412 MHz	18 GHz - 25 GHz	-53.78	-20	Pass
Mid Channel 6, 2437 MHz	Fundamental	N/A	N/A	N/A
Mid Channel 6, 2437 MHz	30 MHz - 12.5 GHz	-48.68	-20	Pass
Mid Channel 6, 2437 MHz	12.5 GHz - 18 GHz	-61.44	-20	Pass
Mid Channel 6, 2437 MHz	18 GHz - 25 GHz	-57.56	-20	Pass
High Channel 11, 2462 MHz	Fundamental	N/A	N/A	N/A
High Channel 11, 2462 MHz	30 MHz - 12.5 GHz	-50.45	-20	Pass
High Channel 11, 2462 MHz	12.5 GHz - 18 GHz	-59.37	-20	Pass
High Channel 11, 2462 MHz	18 GHz - 25 GHz	-55.19	-20	Pass

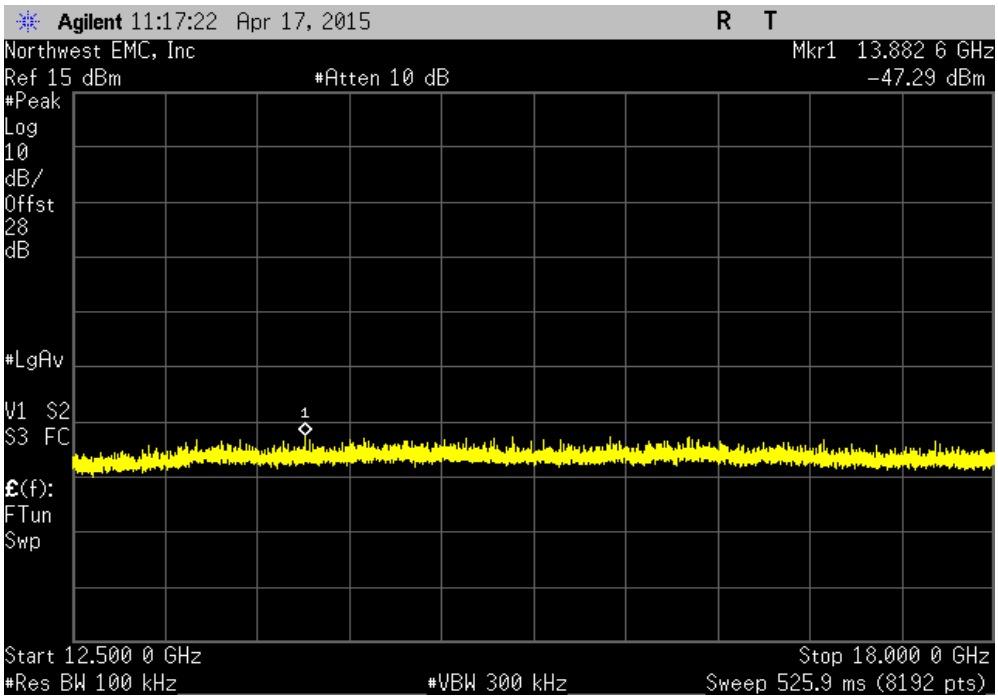
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



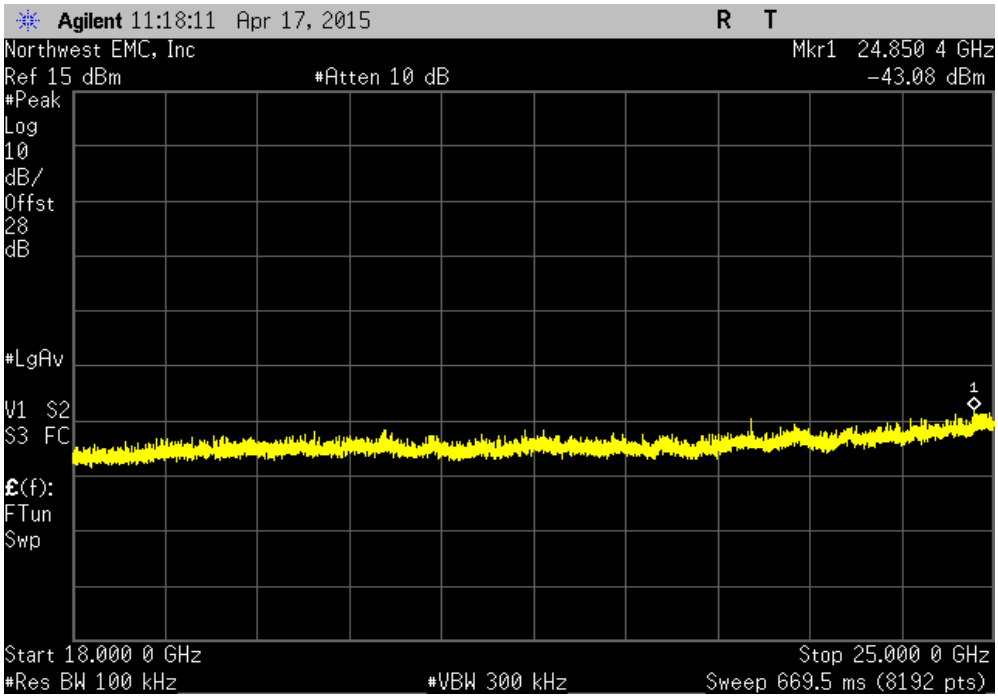
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-42.32	-20	Pass



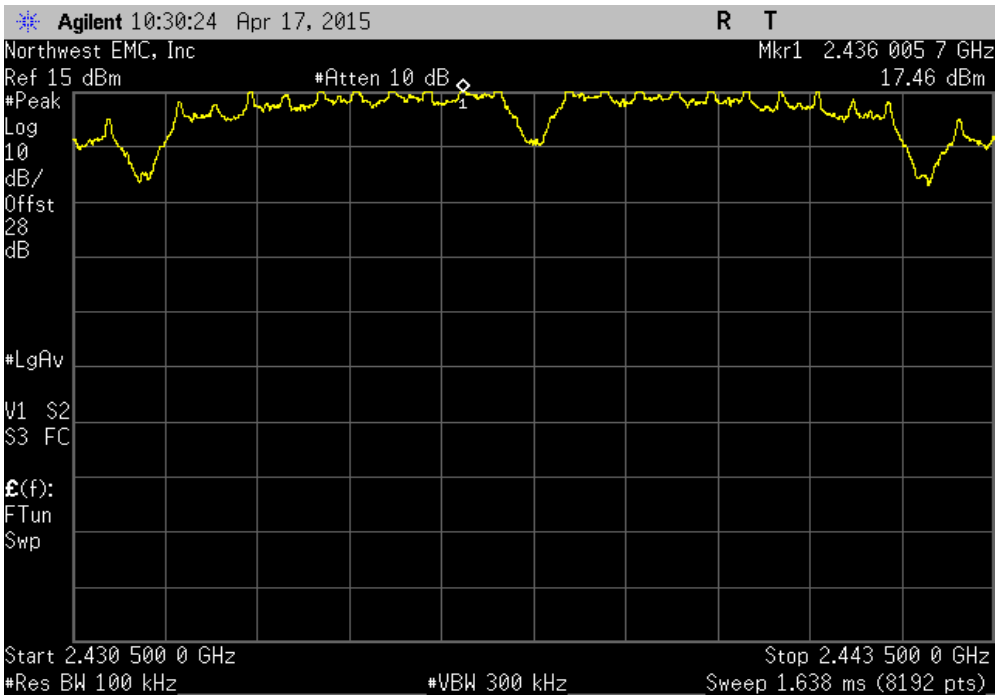
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-62.17	-20	Pass



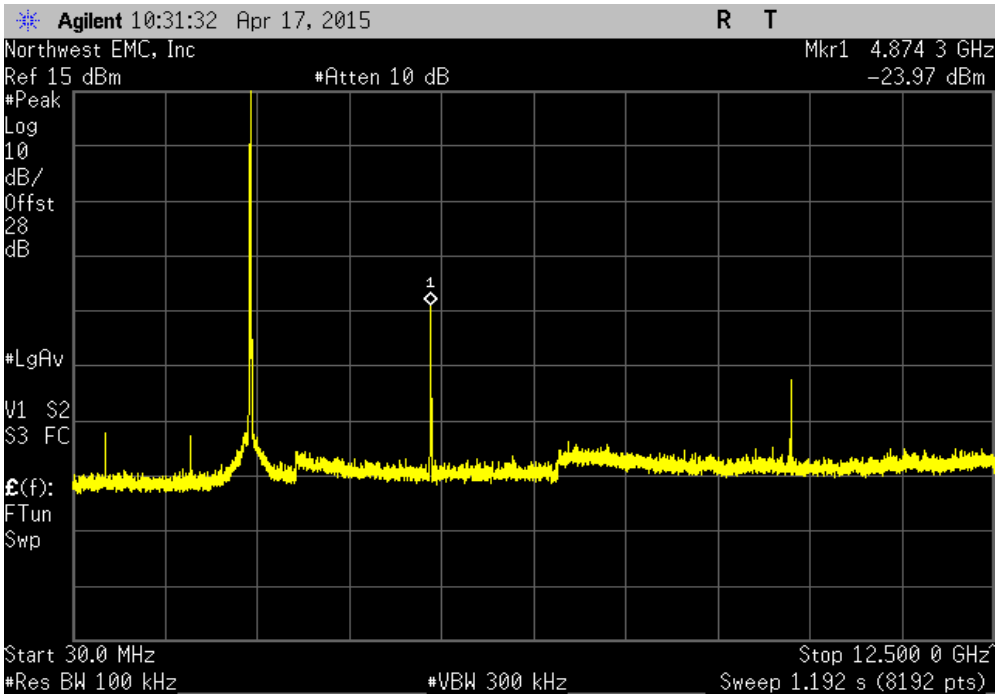
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-57.96	-20	Pass



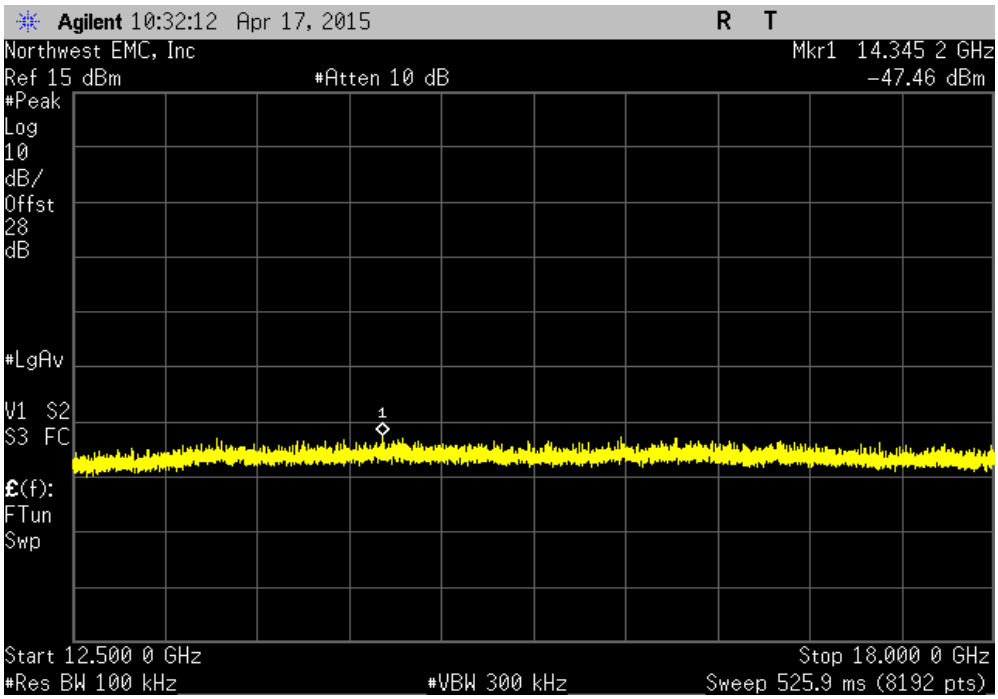
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



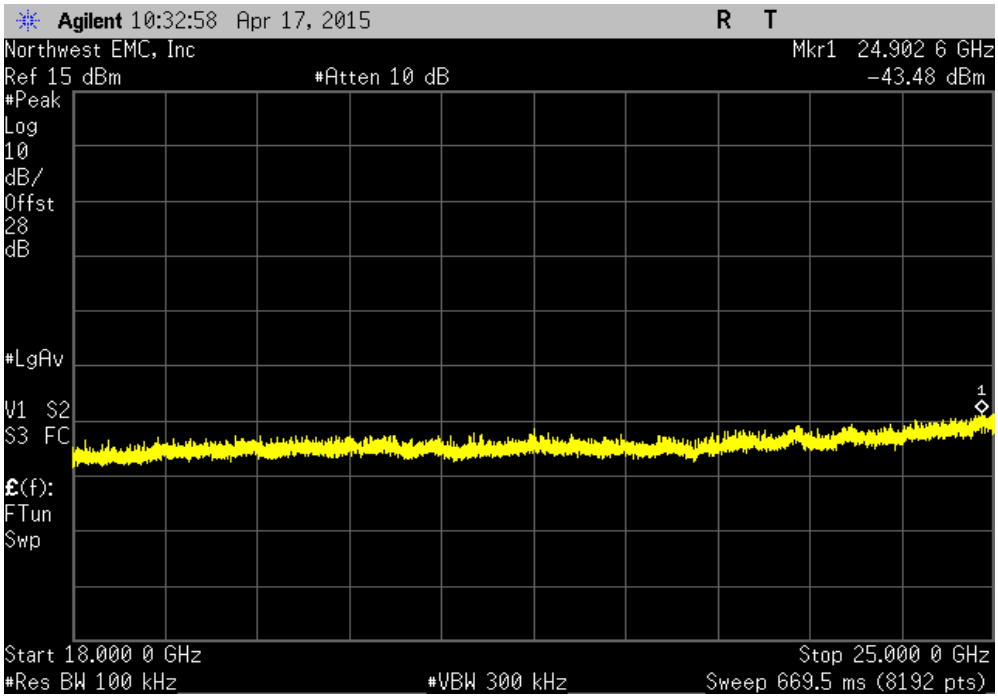
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz					
	Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
	30 MHz - 12.5 GHz		-41.43	-20	Pass



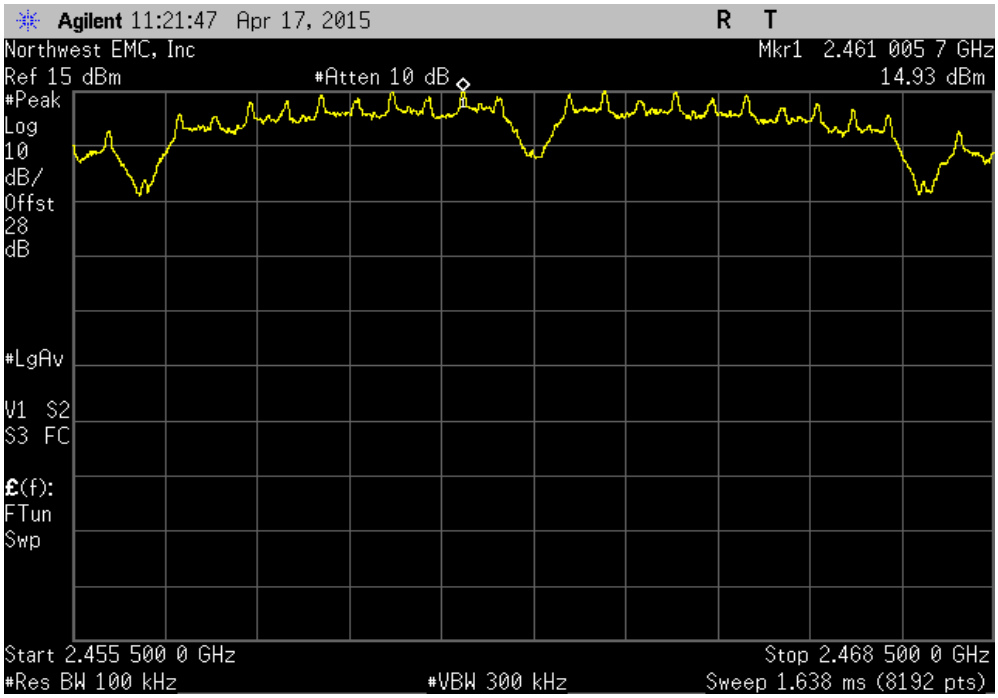
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-64.92	-20	Pass



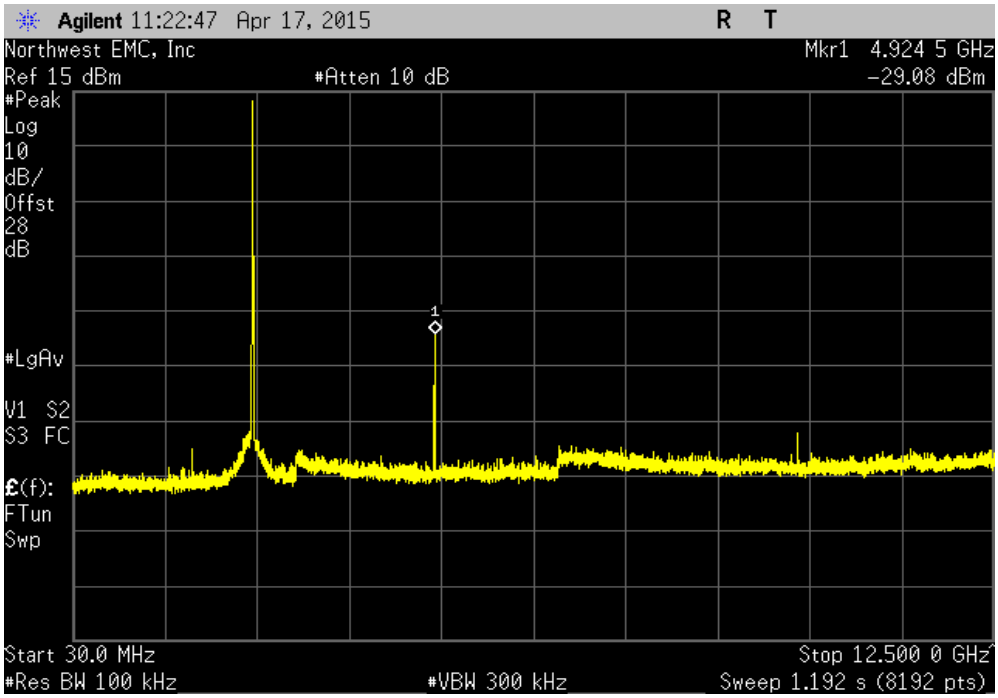
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-60.94	-20	Pass



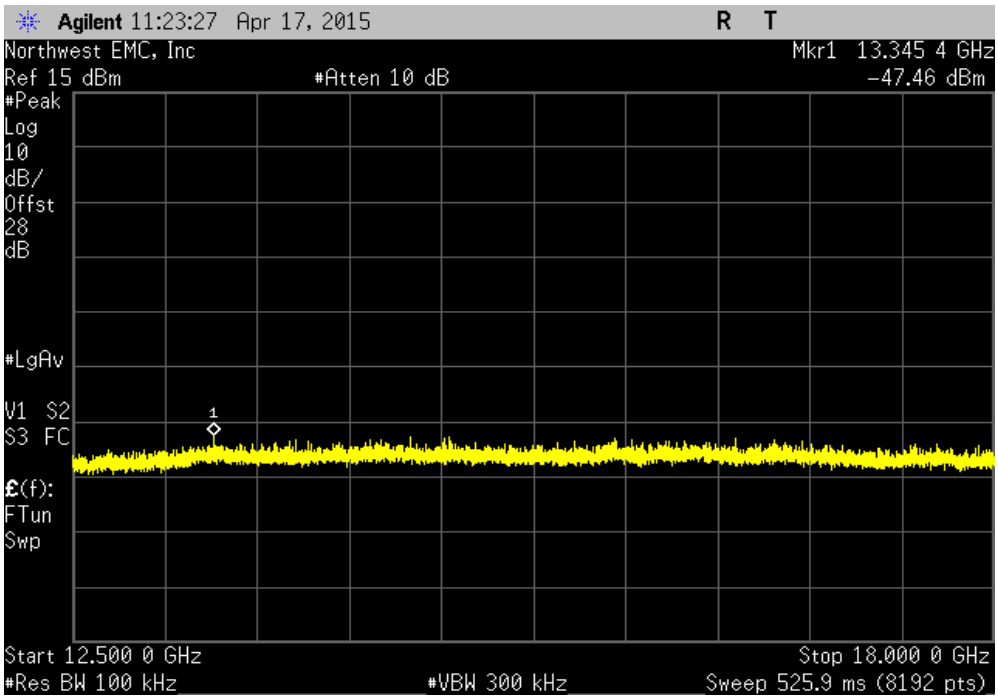
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



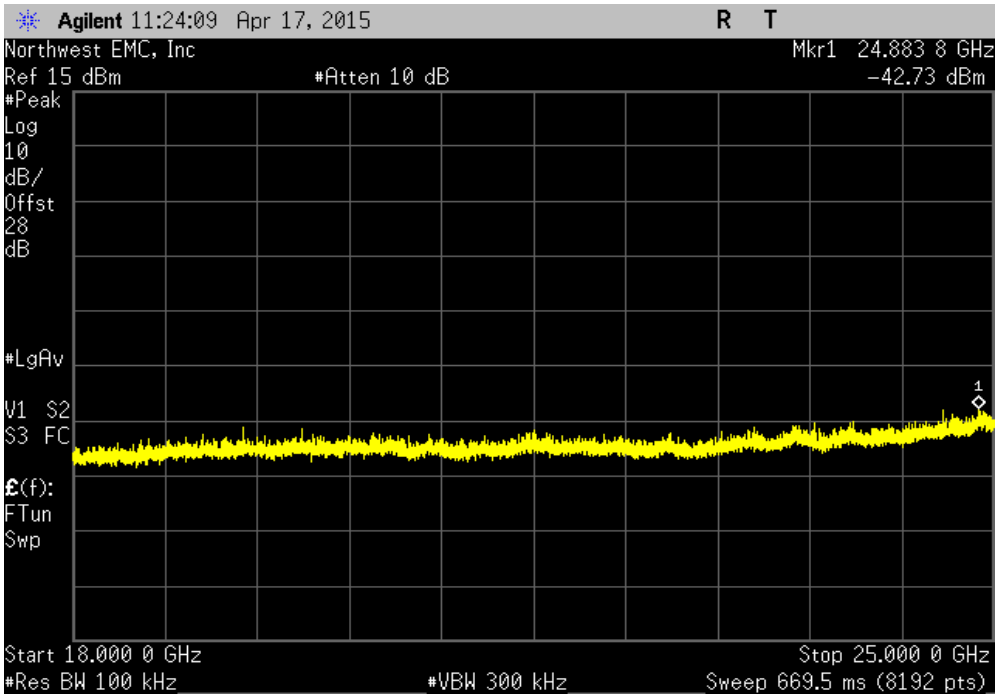
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz					
	Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
	30 MHz - 12.5 GHz		-44.01	-20	Pass



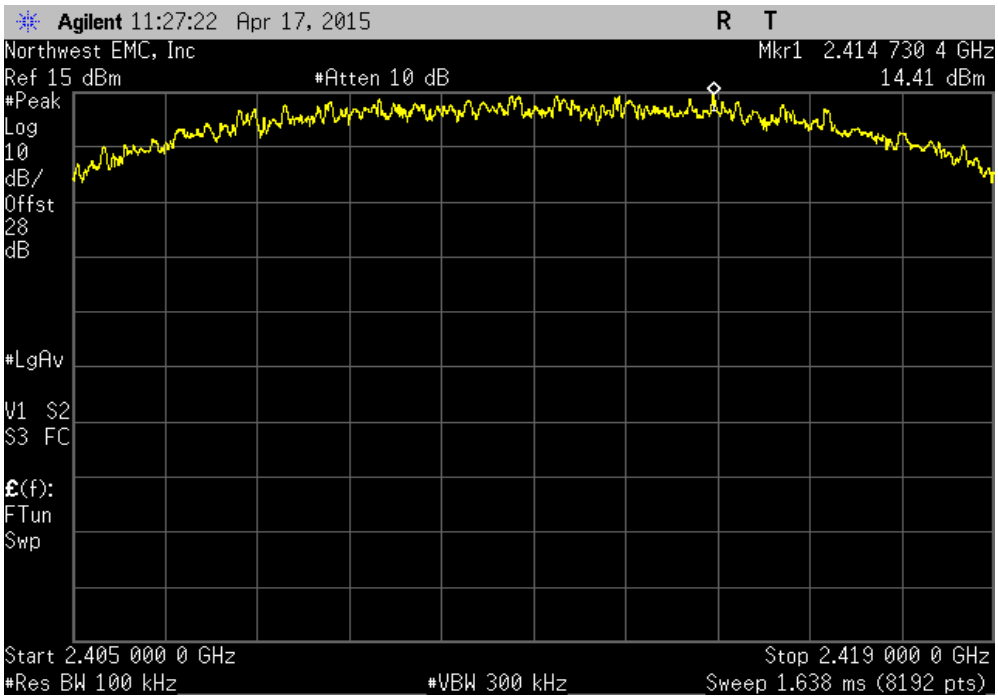
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-62.39	-20	Pass



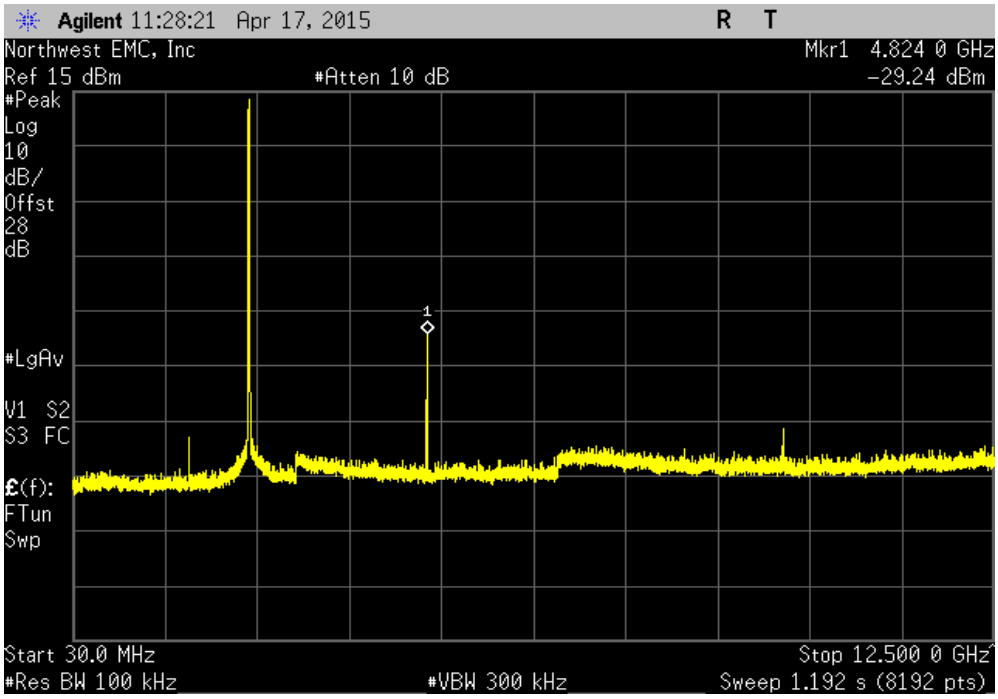
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 1 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-57.66	-20	Pass



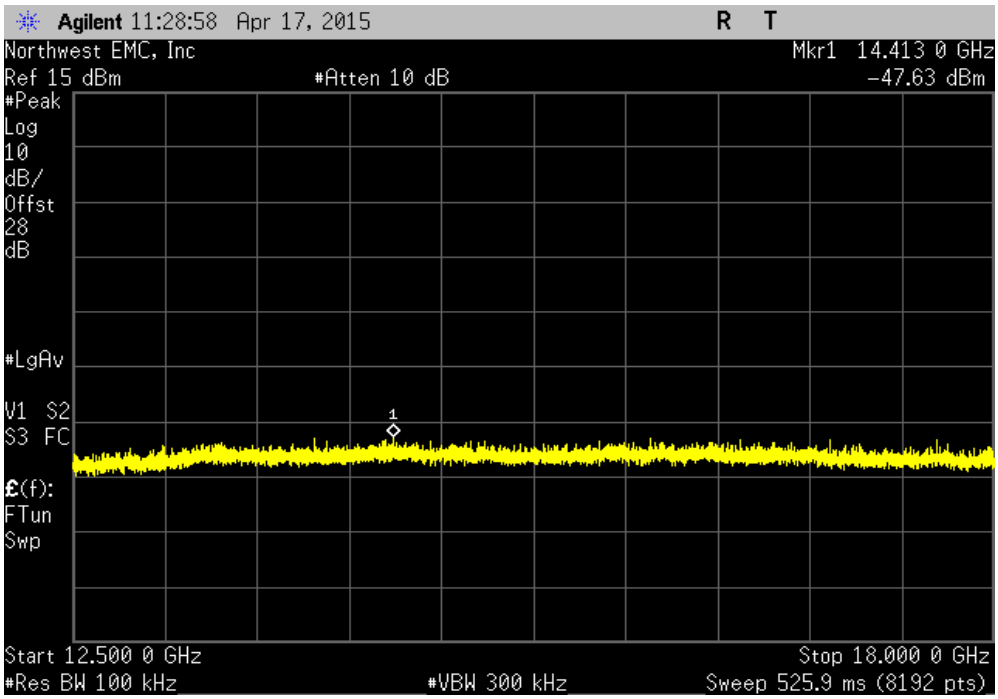
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



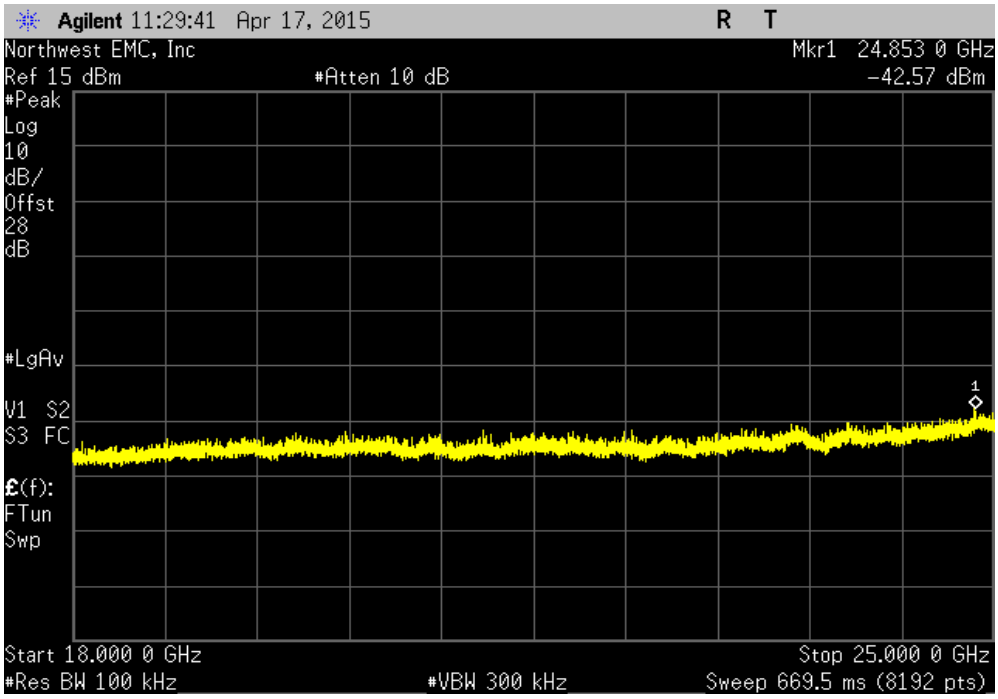
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-43.65	-20	Pass



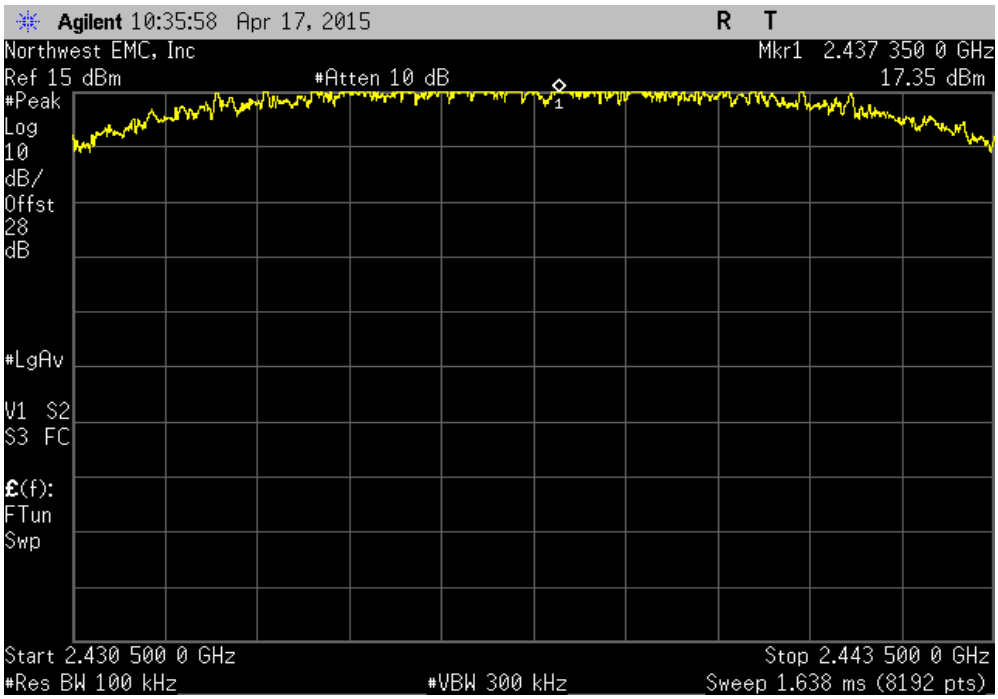
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-62.04	-20	Pass



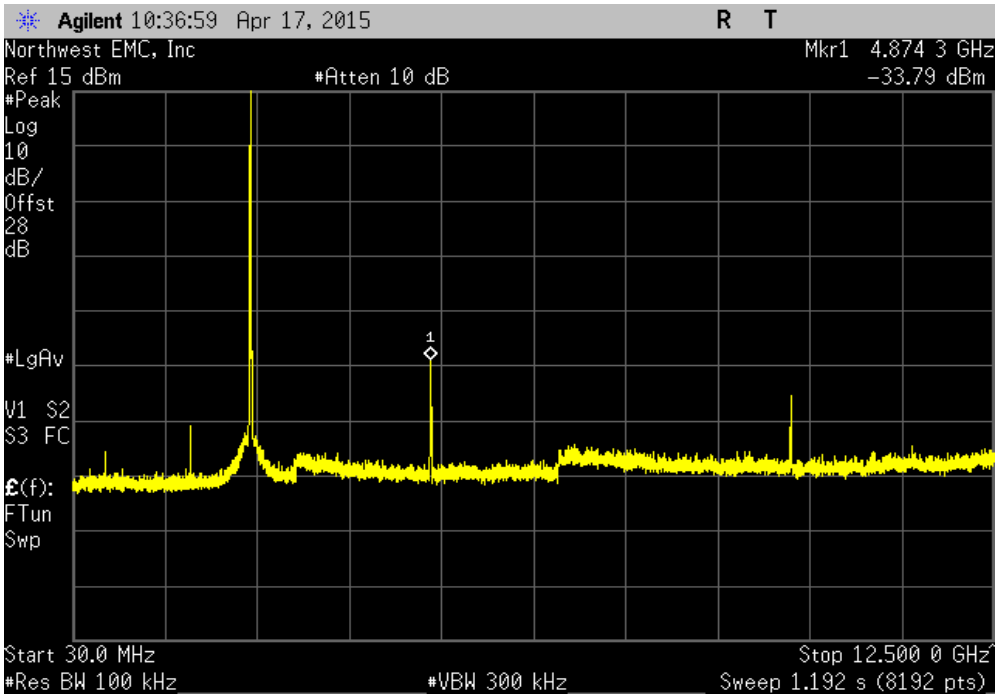
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-56.98	-20	Pass



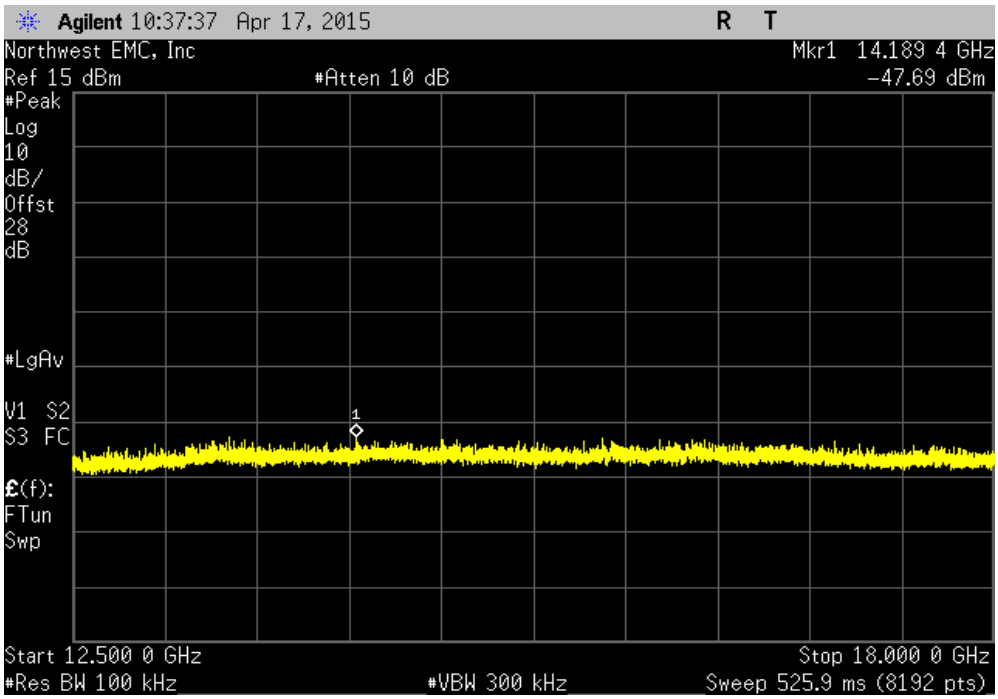
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



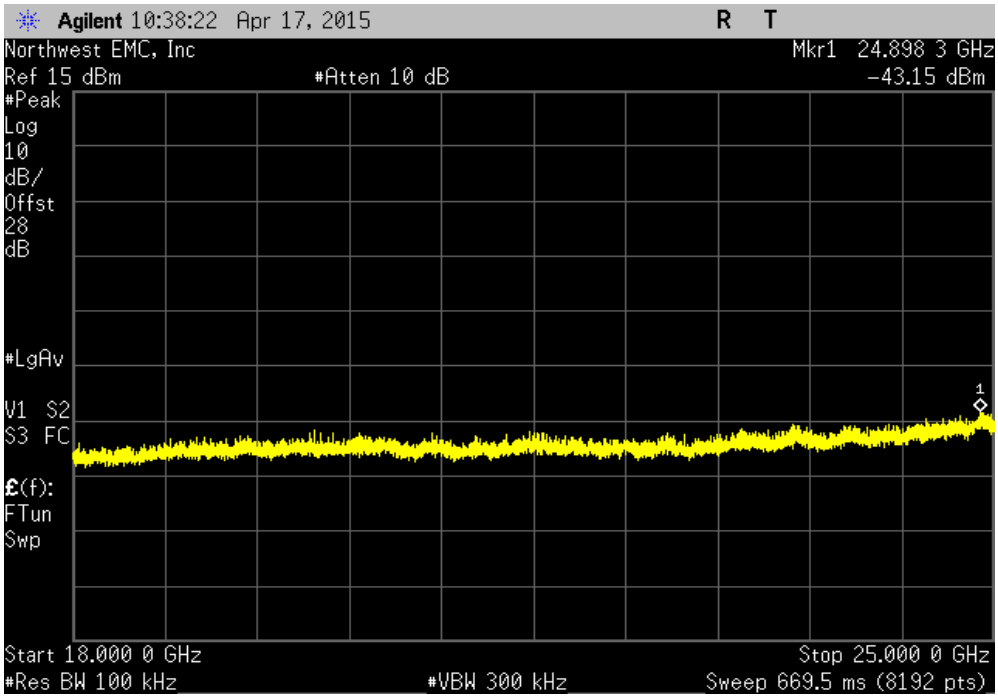
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz					
	Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
	30 MHz - 12.5 GHz		-51.14	-20	Pass



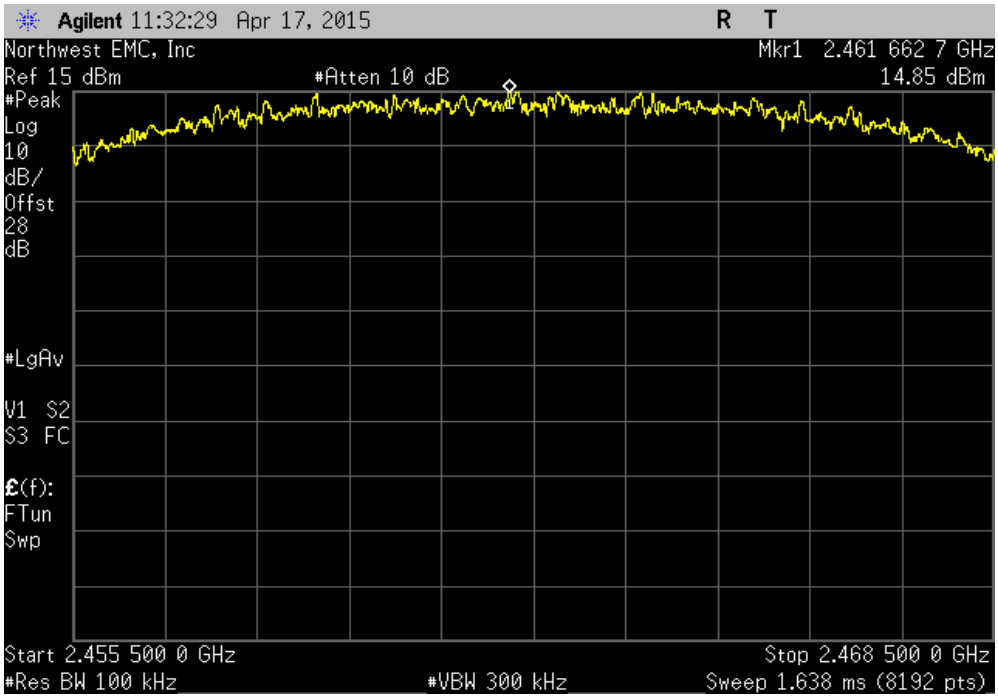
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-65.04	-20	Pass



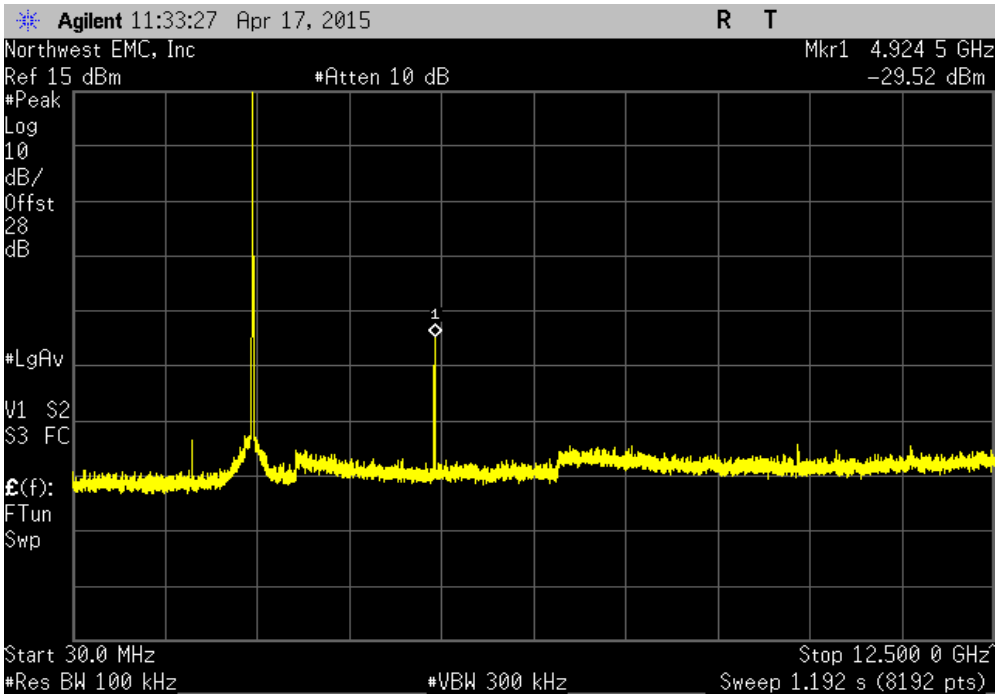
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-60.5	-20	Pass



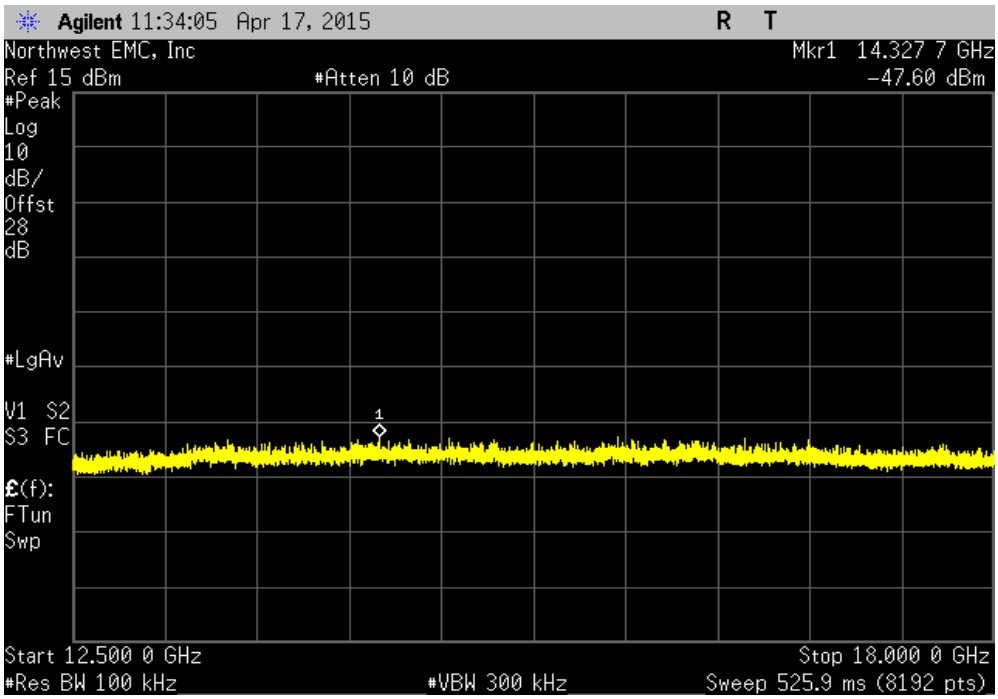
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



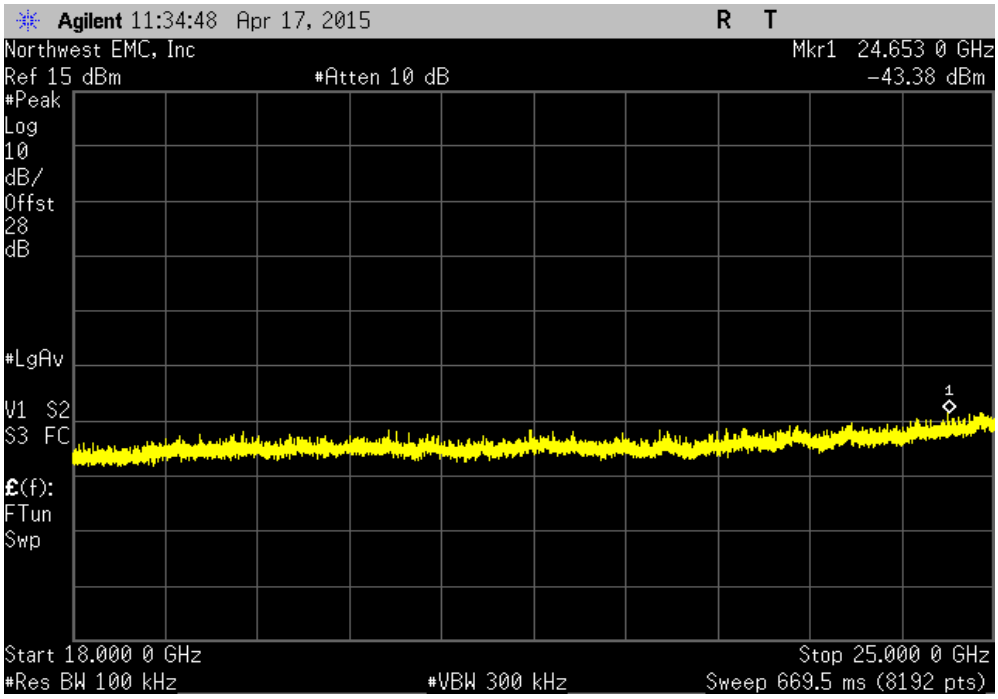
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-44.38	-20	Pass



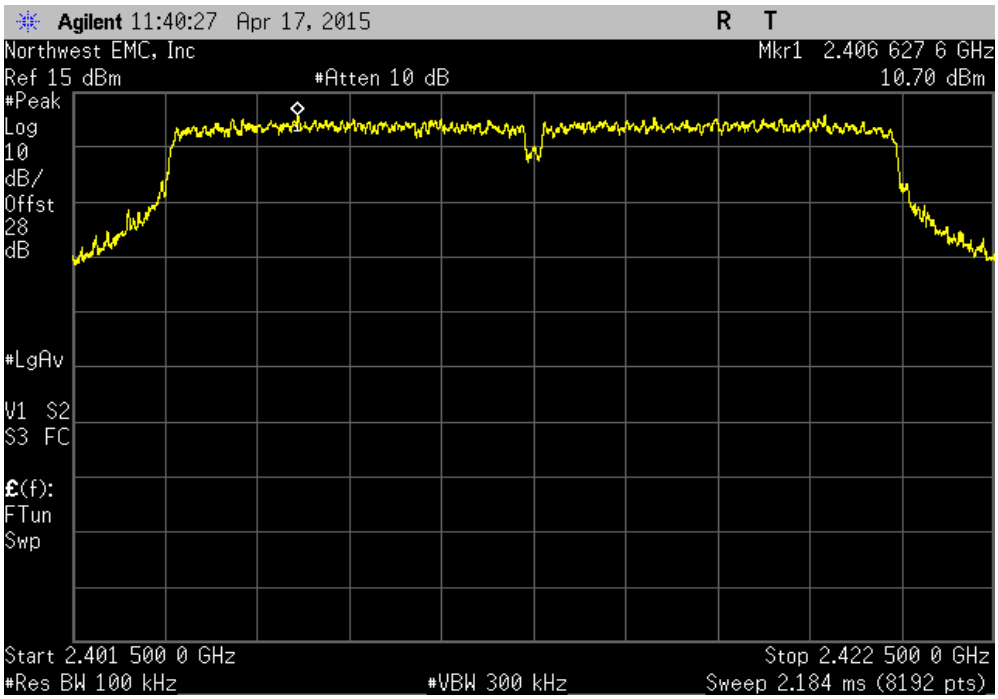
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-62.46	-20	Pass



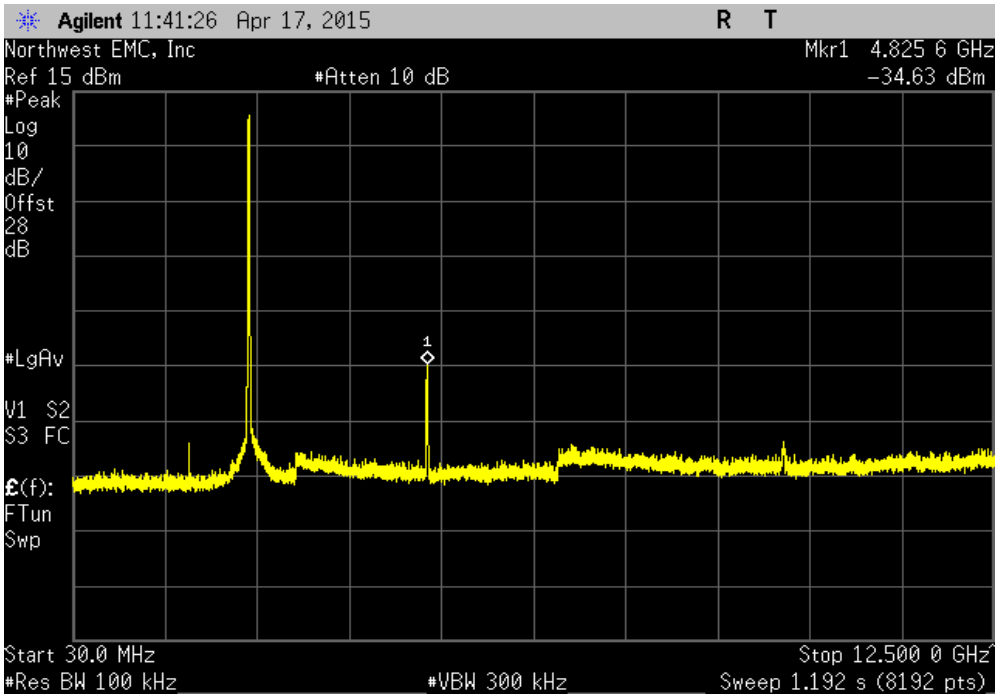
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(b) 11 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-58.24	-20	Pass



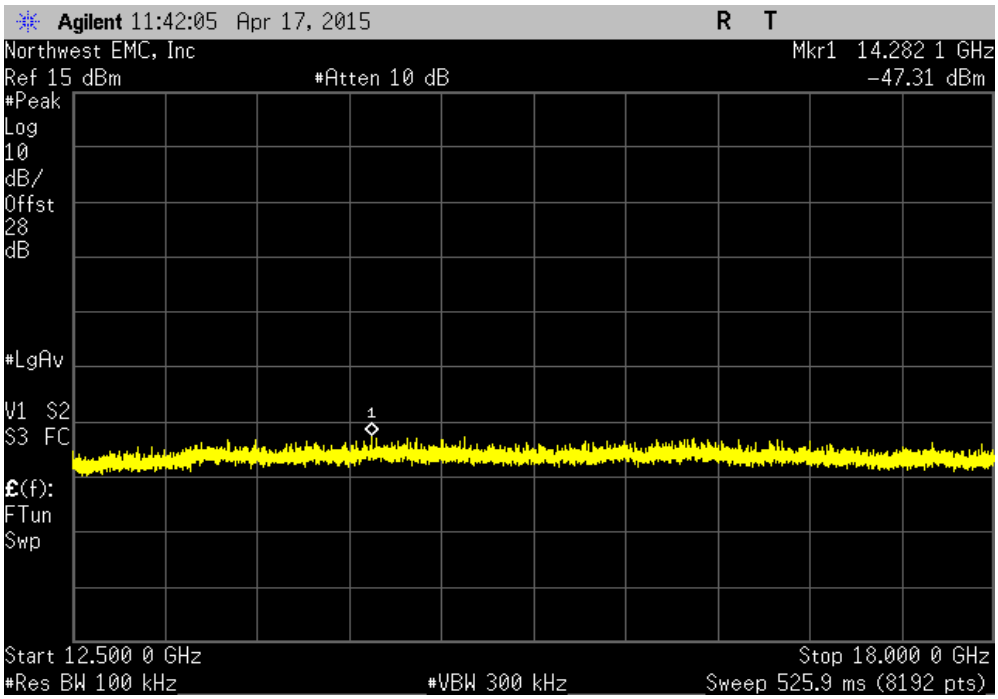
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



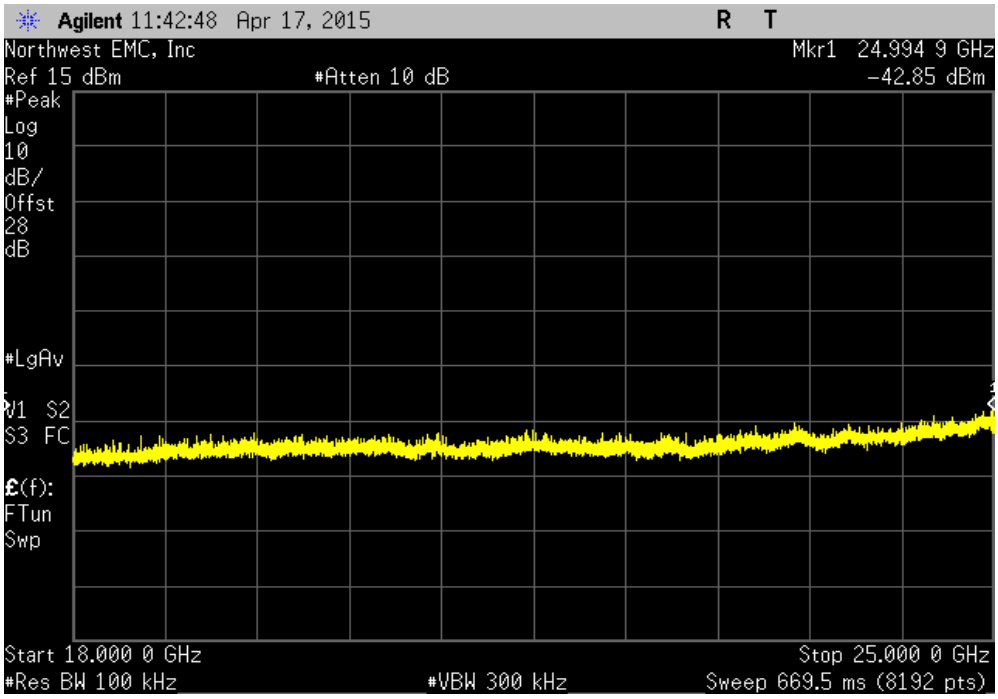
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-45.33	-20	Pass



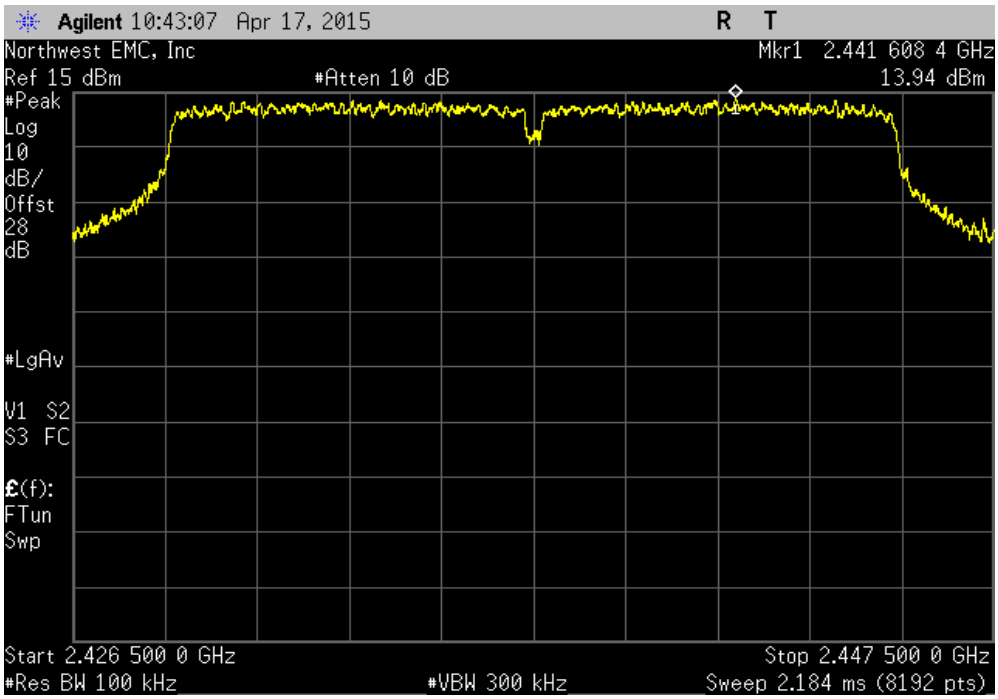
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-58.02	-20	Pass



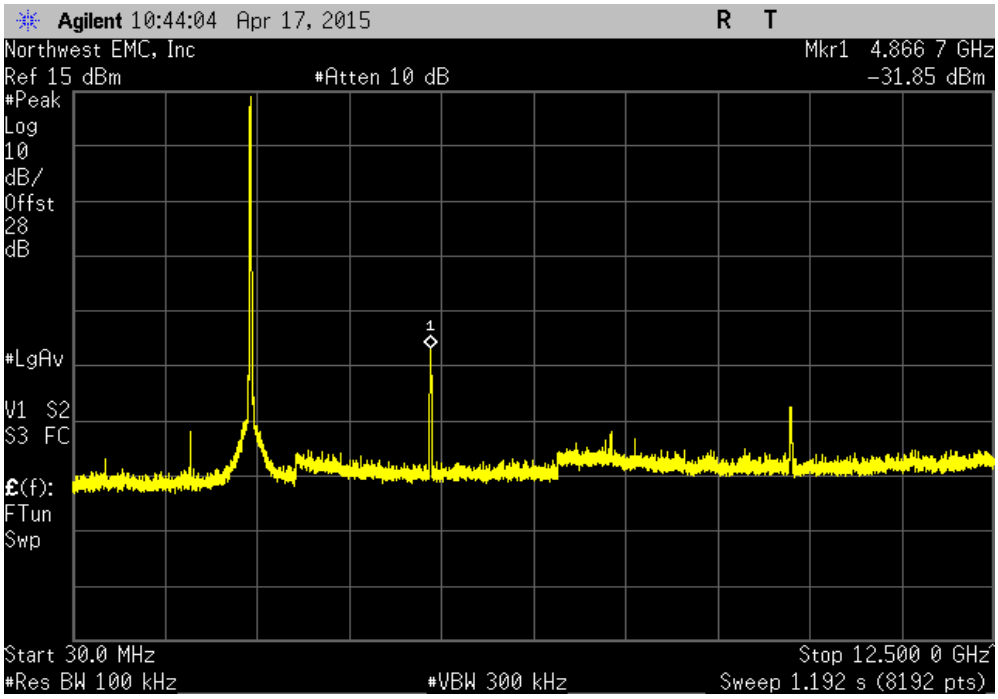
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-53.55	-20	Pass



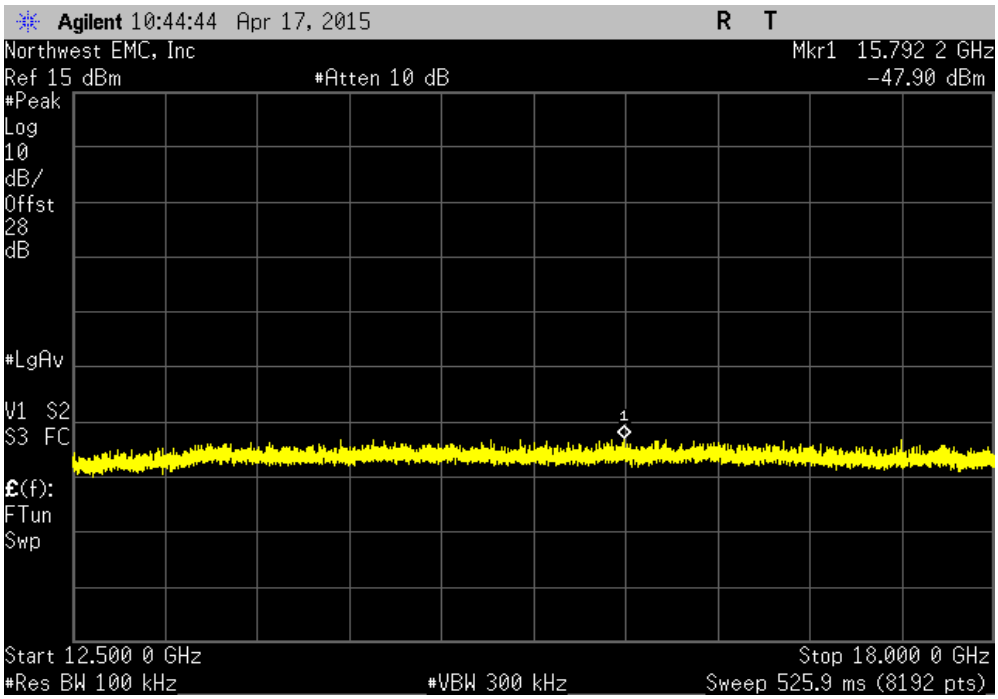
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



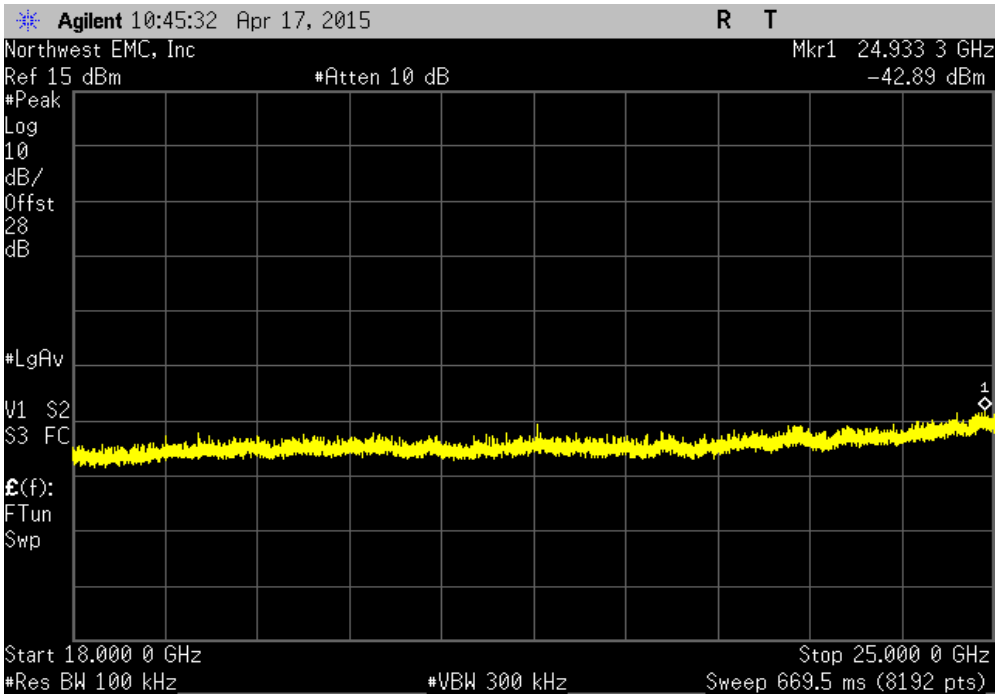
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz					
	Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
	30 MHz - 12.5 GHz		-45.79	-20	Pass



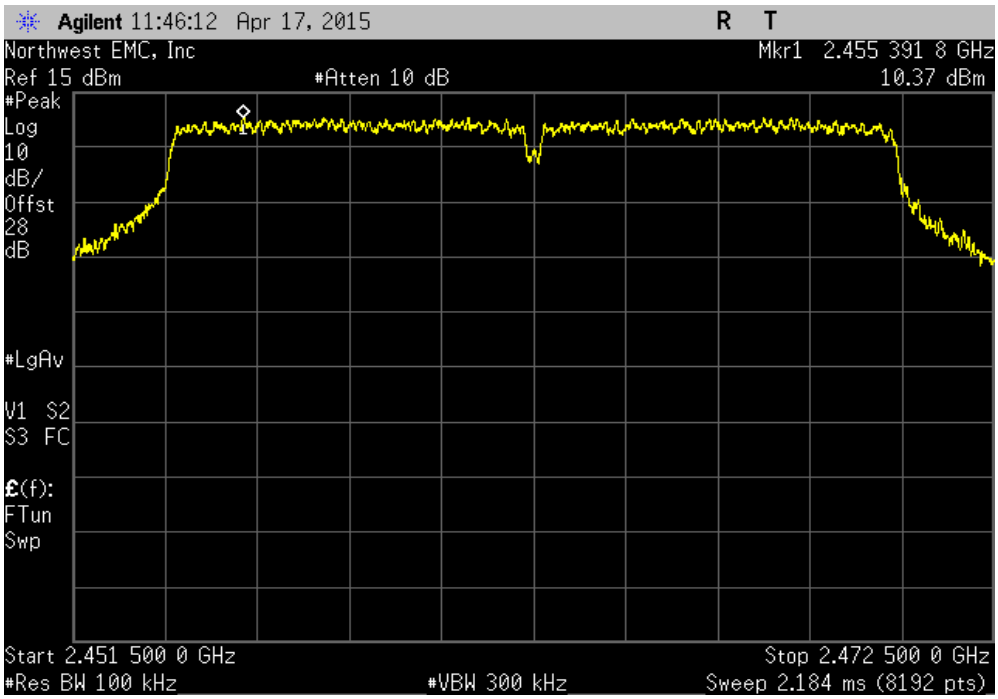
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-61.84	-20	Pass



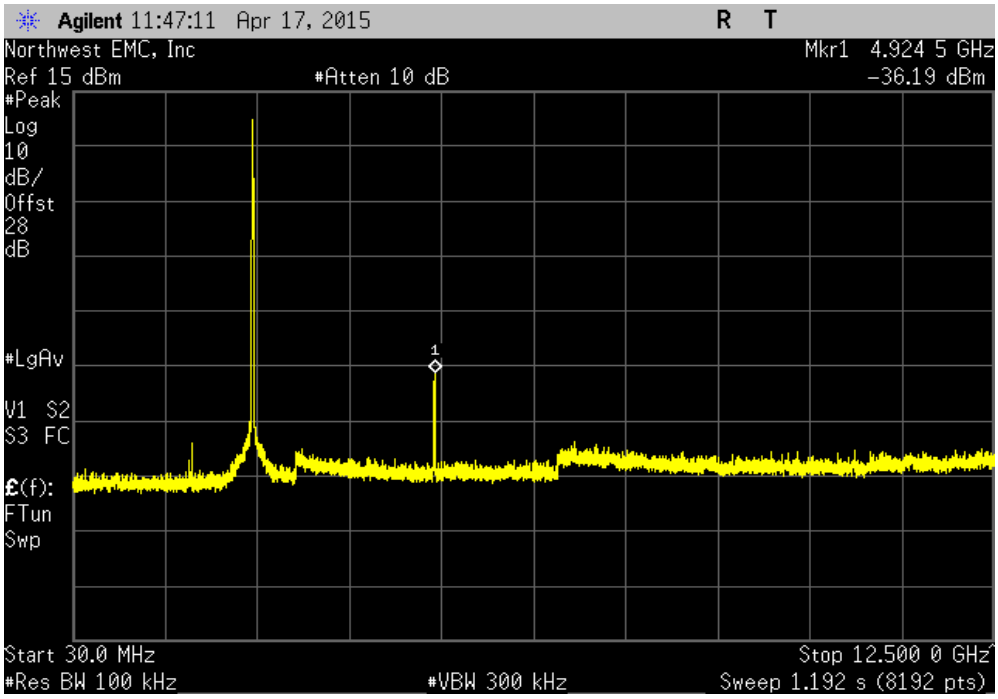
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-56.83	-20	Pass



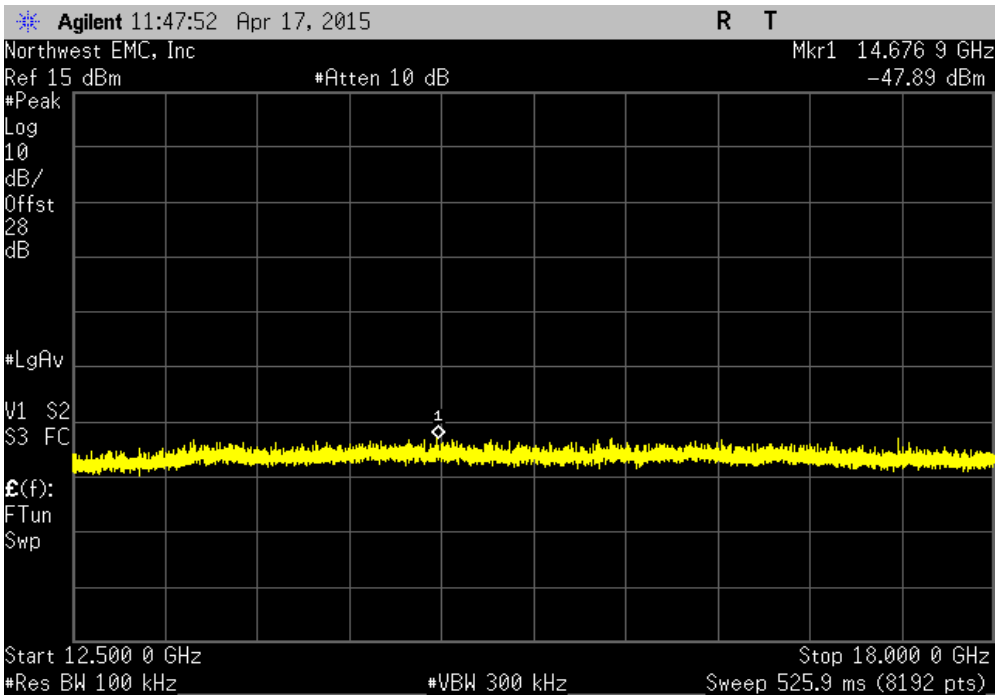
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



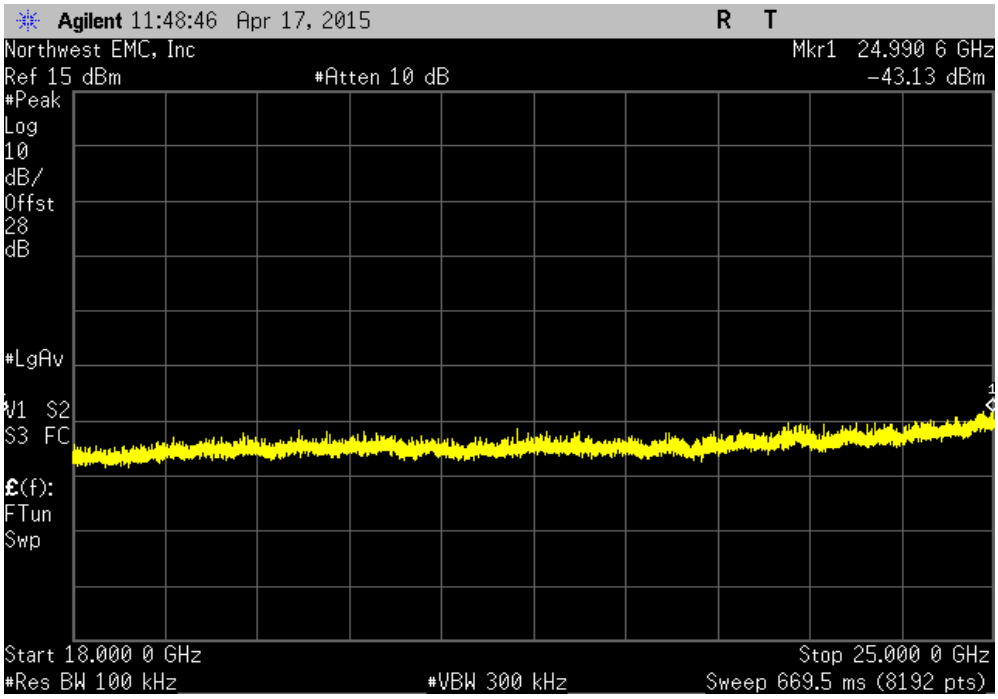
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz					
	Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
	30 MHz - 12.5 GHz		-46.56	-20	Pass



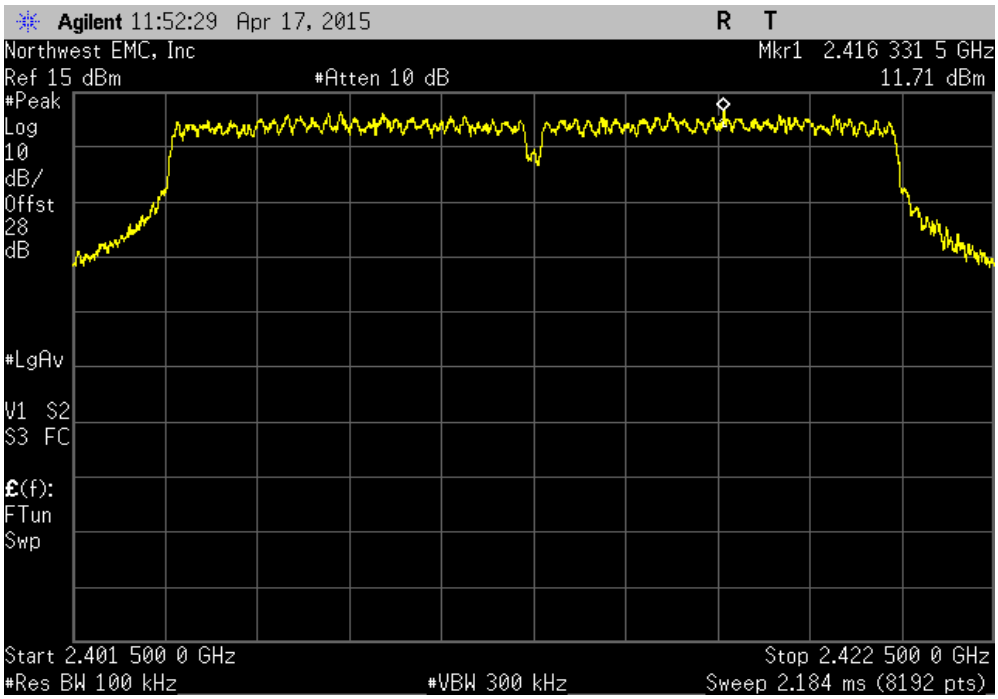
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-58.26	-20	Pass



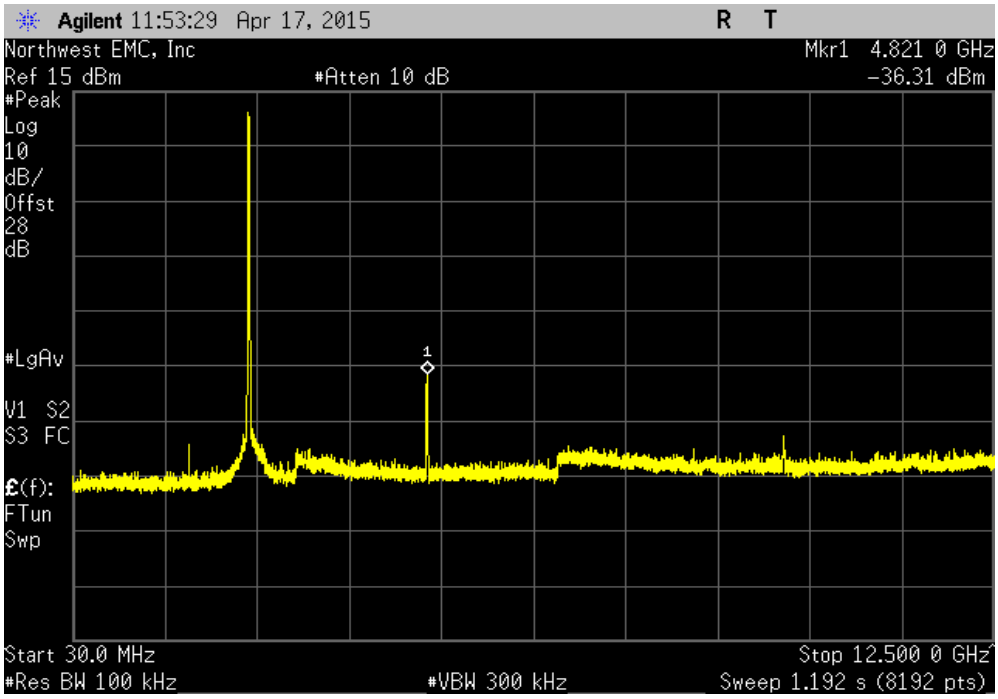
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 6 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-53.5	-20	Pass



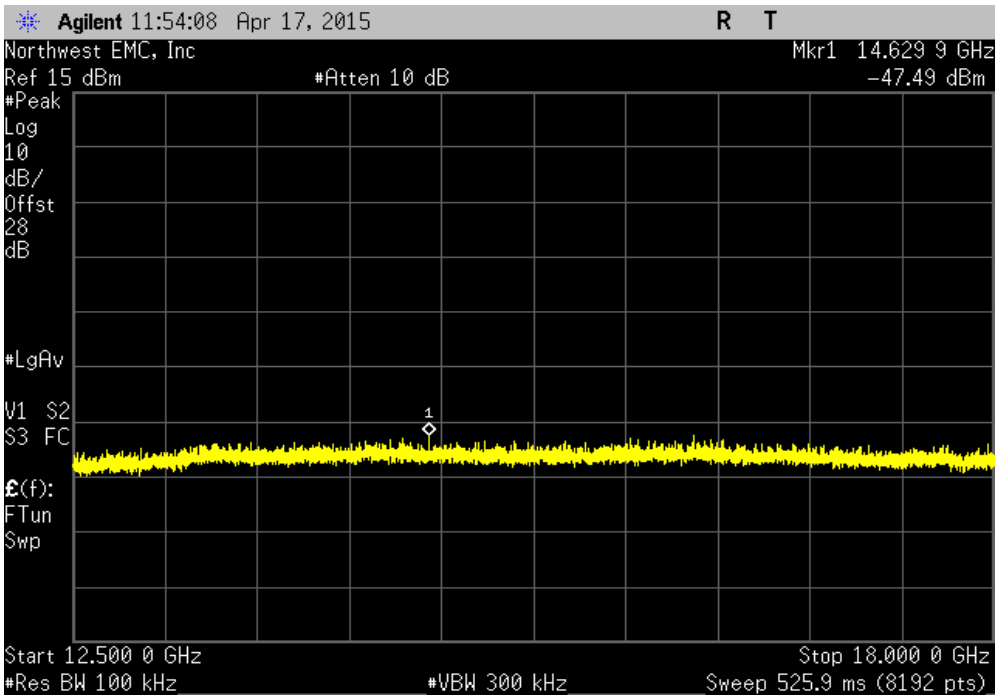
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



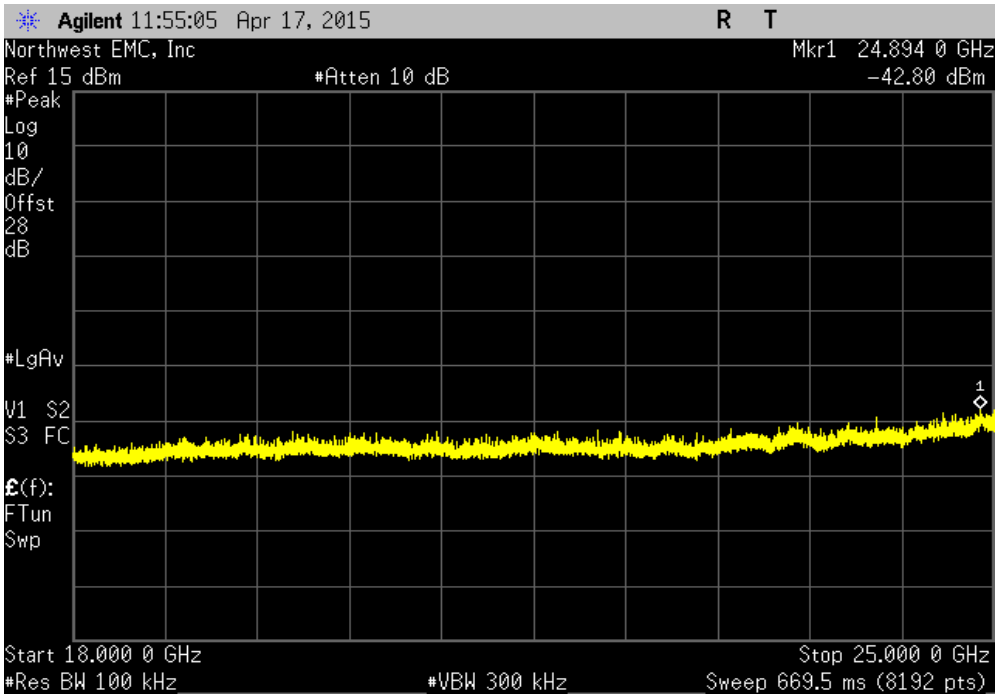
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz					
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-48.03	-20	Pass



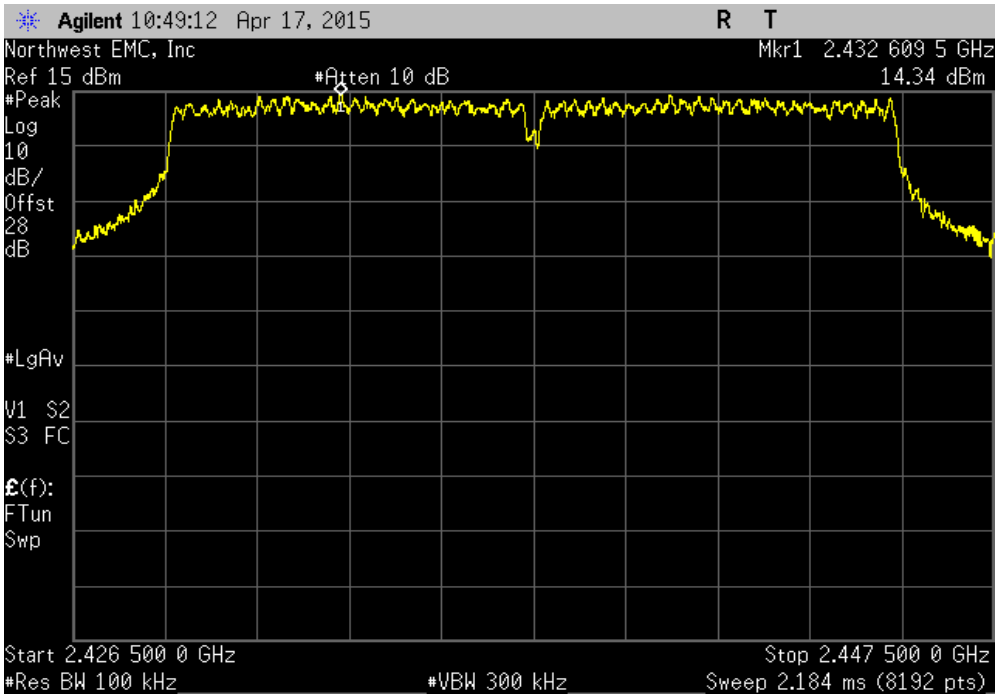
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-59.2	-20	Pass



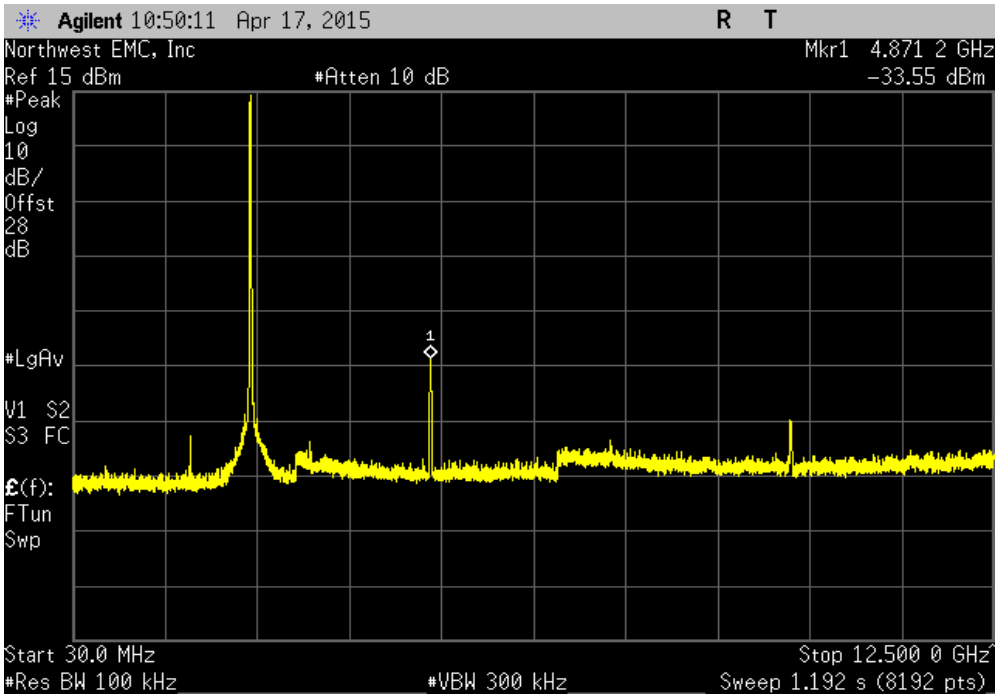
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-54.51	-20	Pass



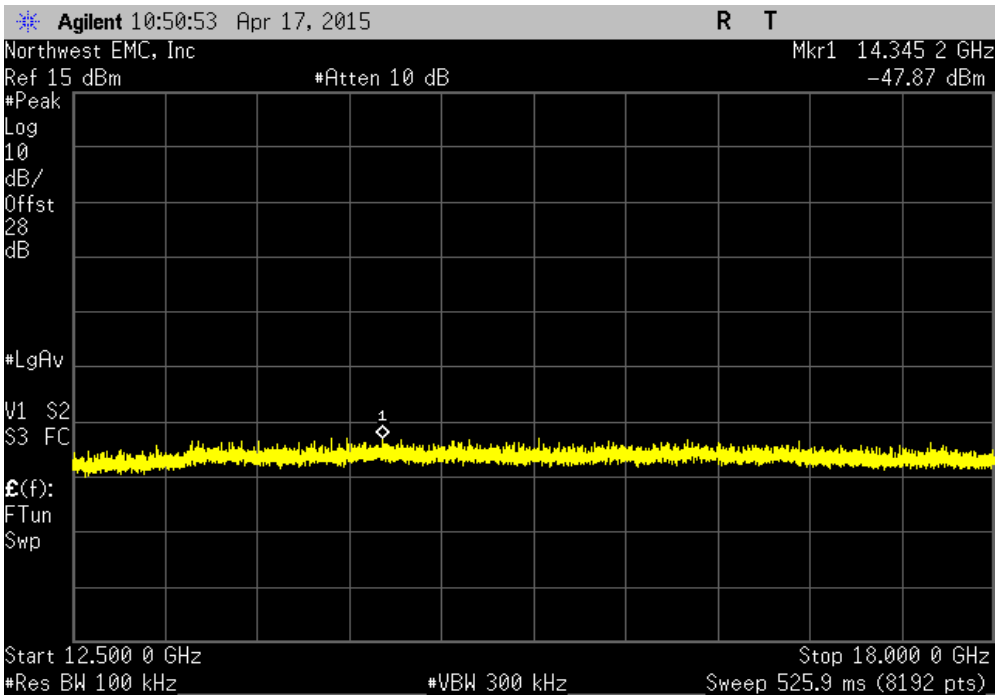
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



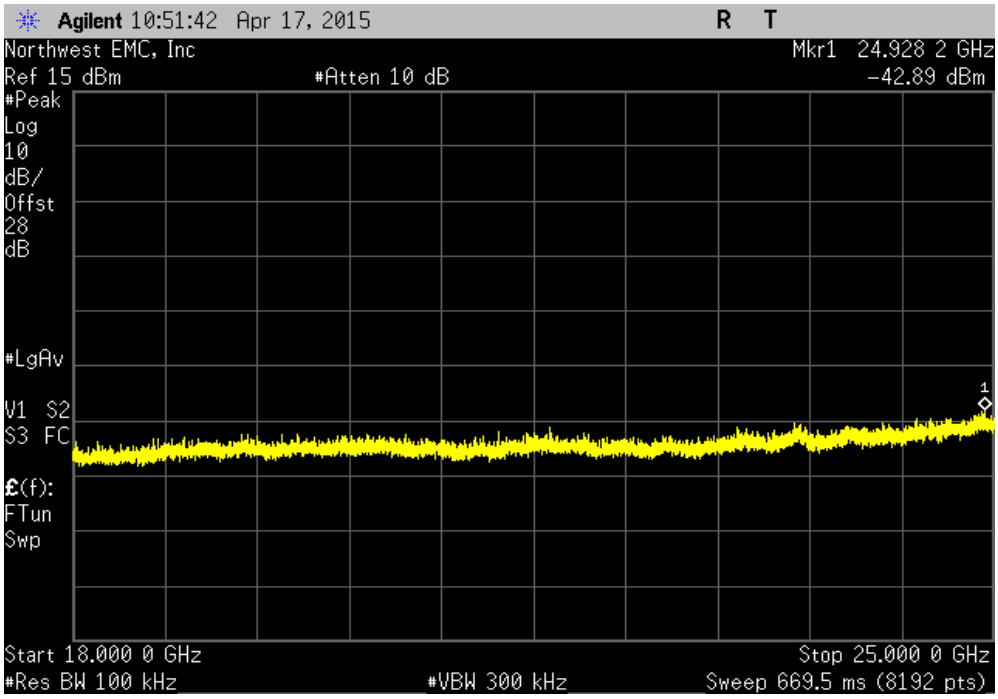
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-47.89	-20	Pass



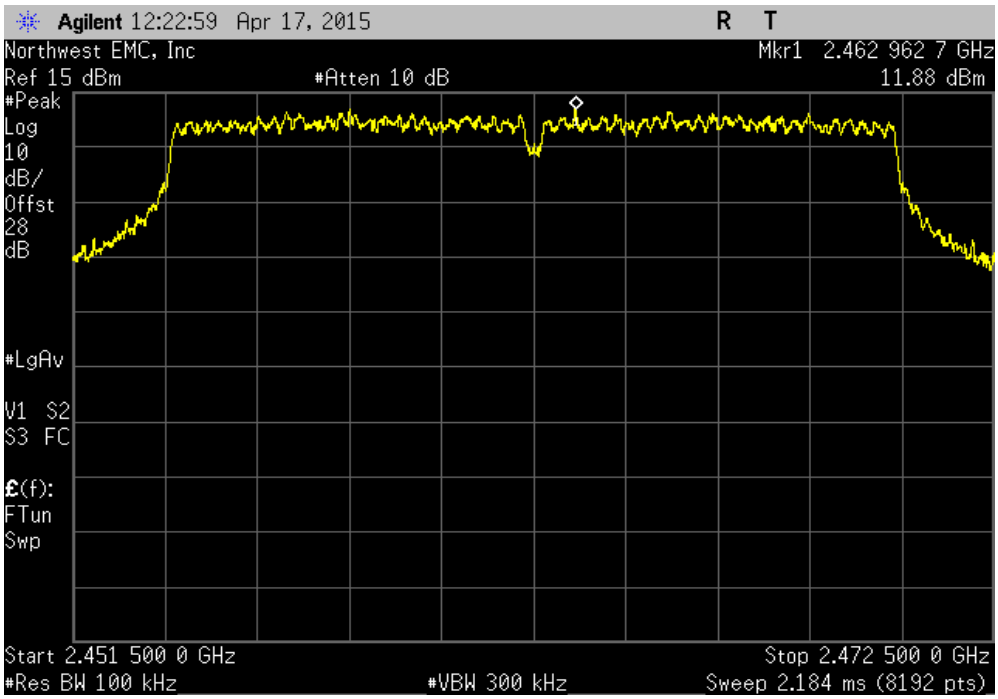
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-62.21	-20	Pass



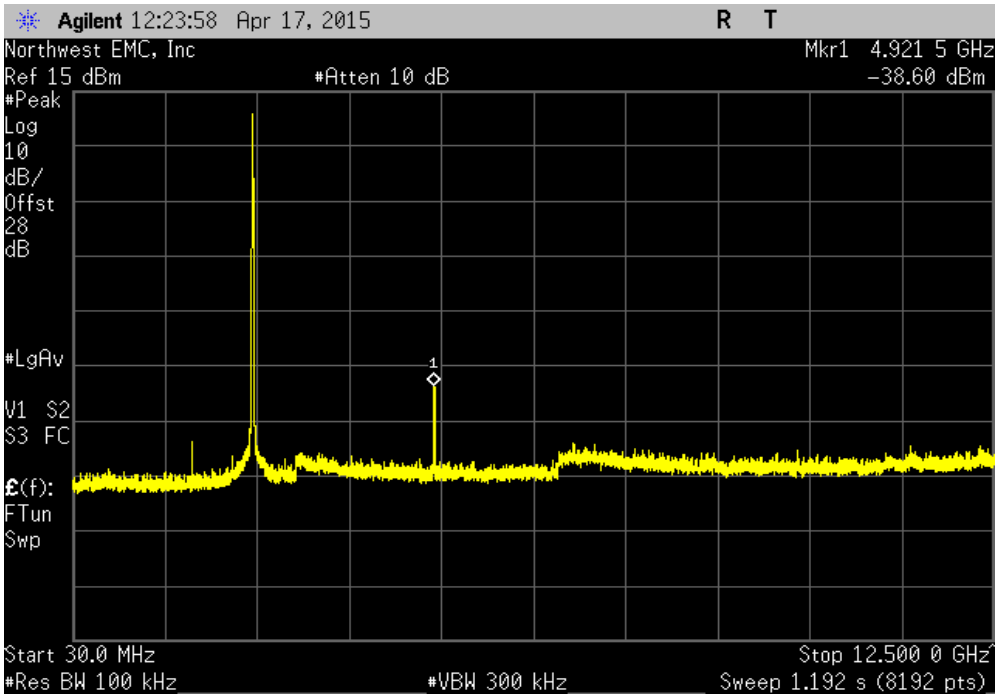
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-57.23	-20	Pass



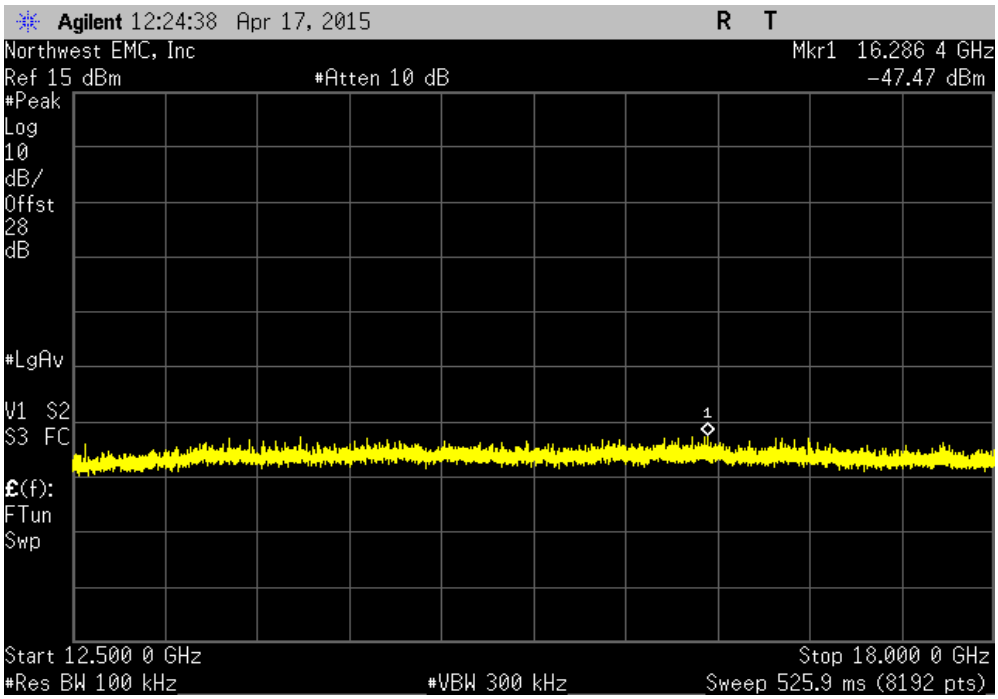
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



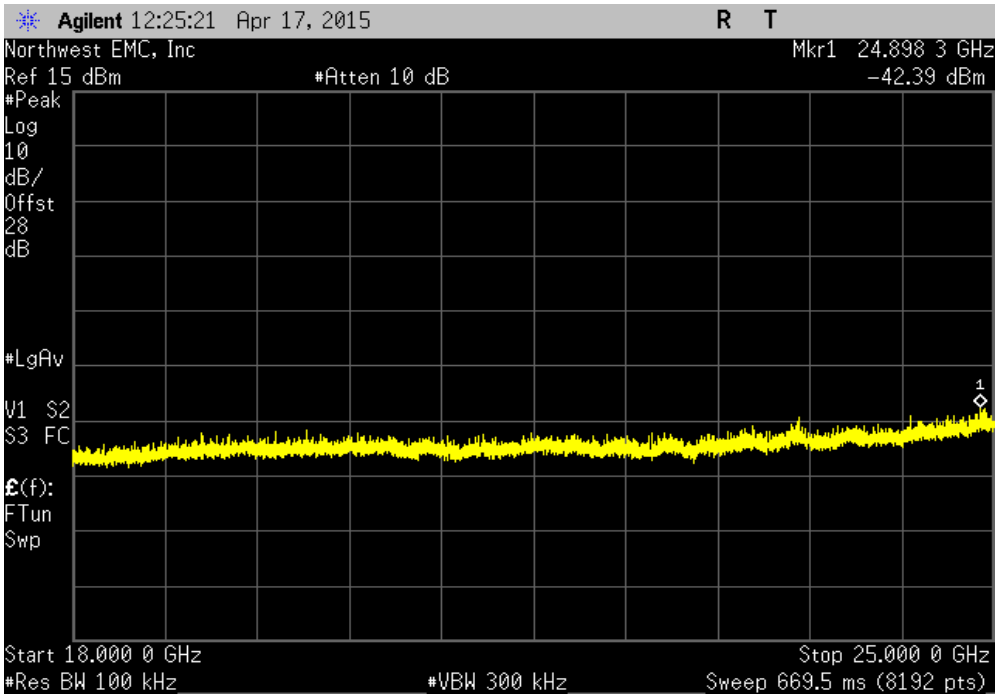
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-50.48	-20	Pass



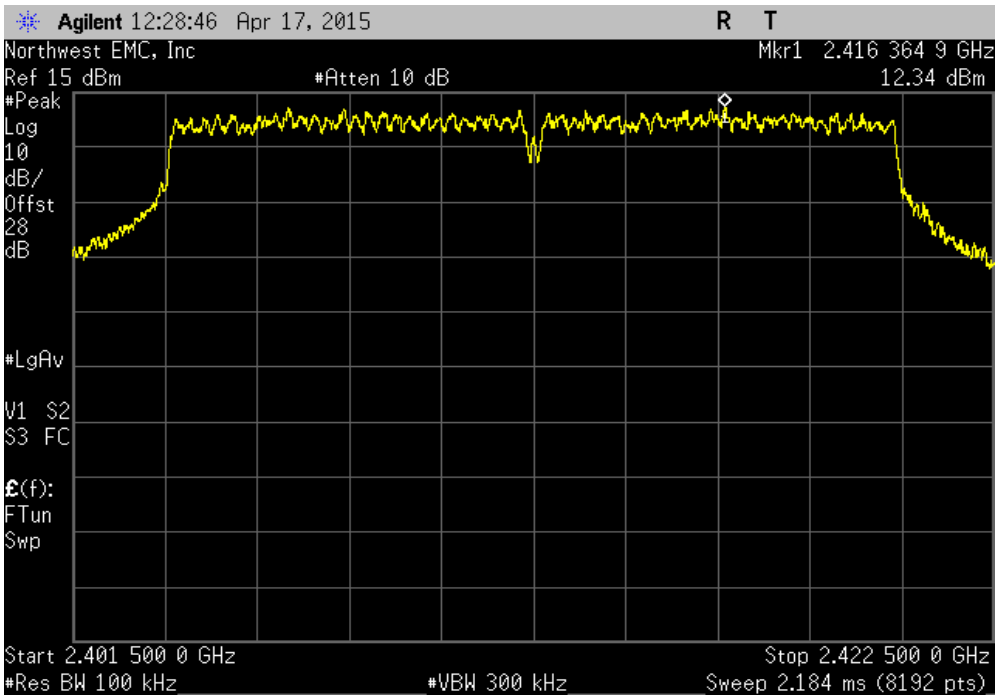
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-59.35	-20	Pass



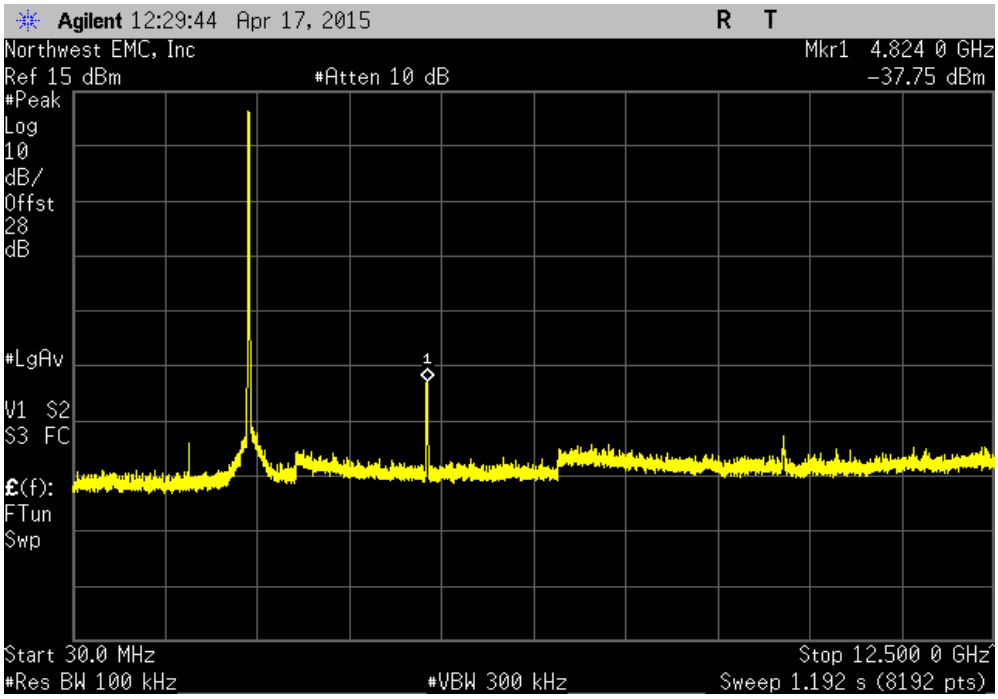
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 36 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-54.27	-20	Pass



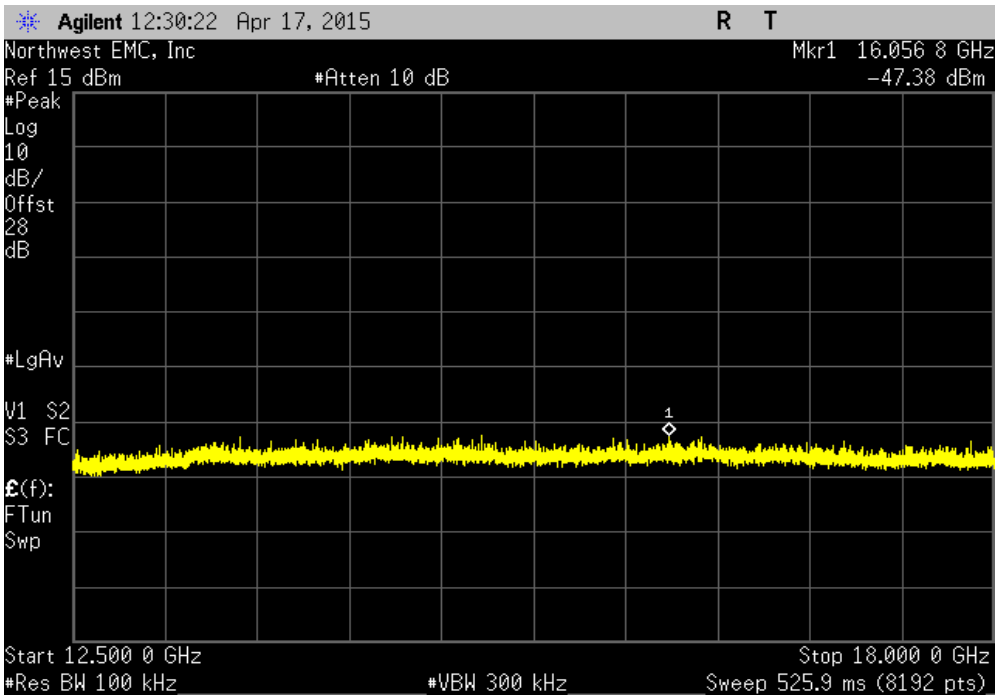
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



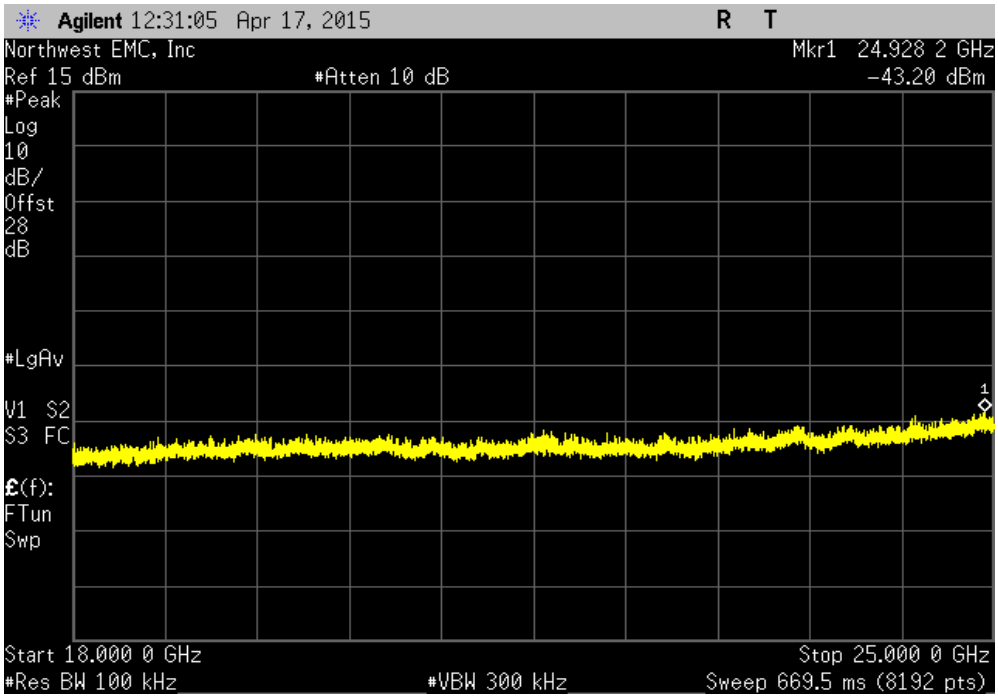
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-50.09	-20	Pass



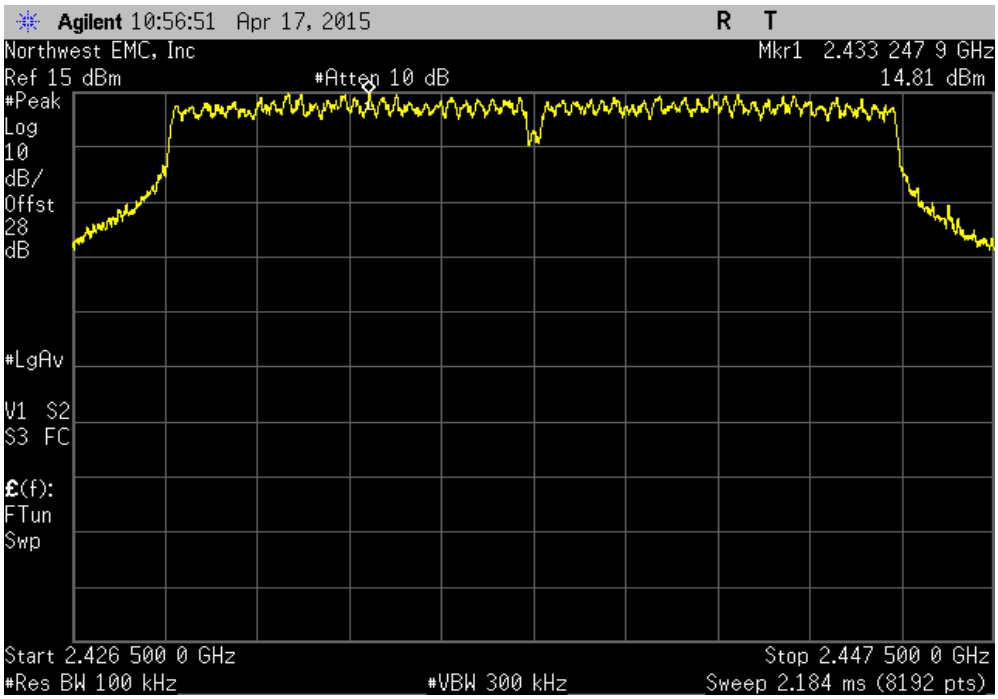
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-59.72	-20	Pass



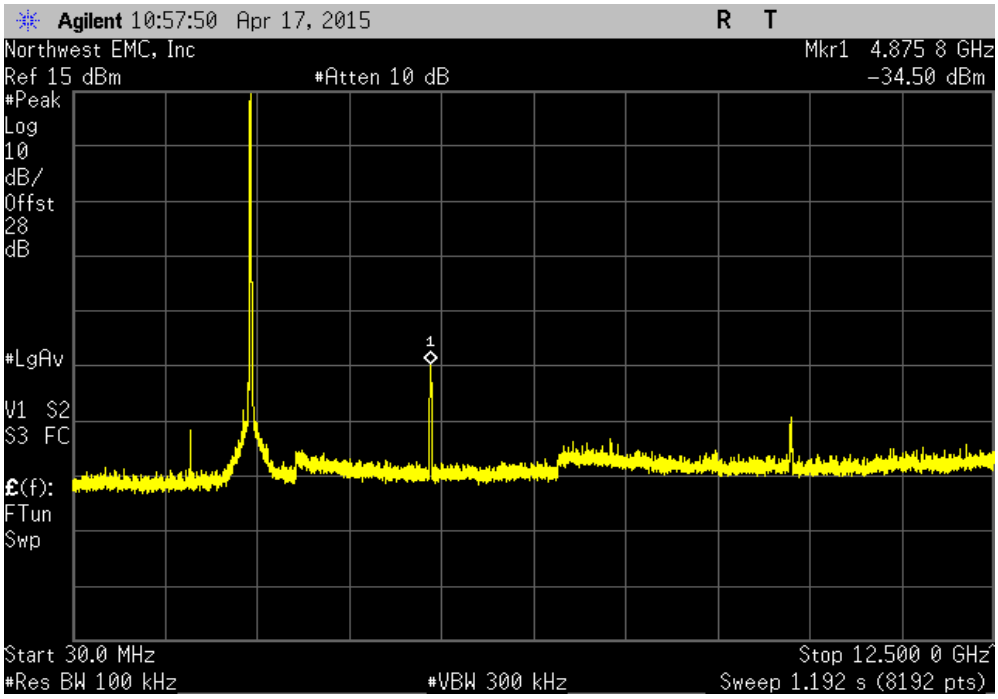
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-55.54	-20	Pass



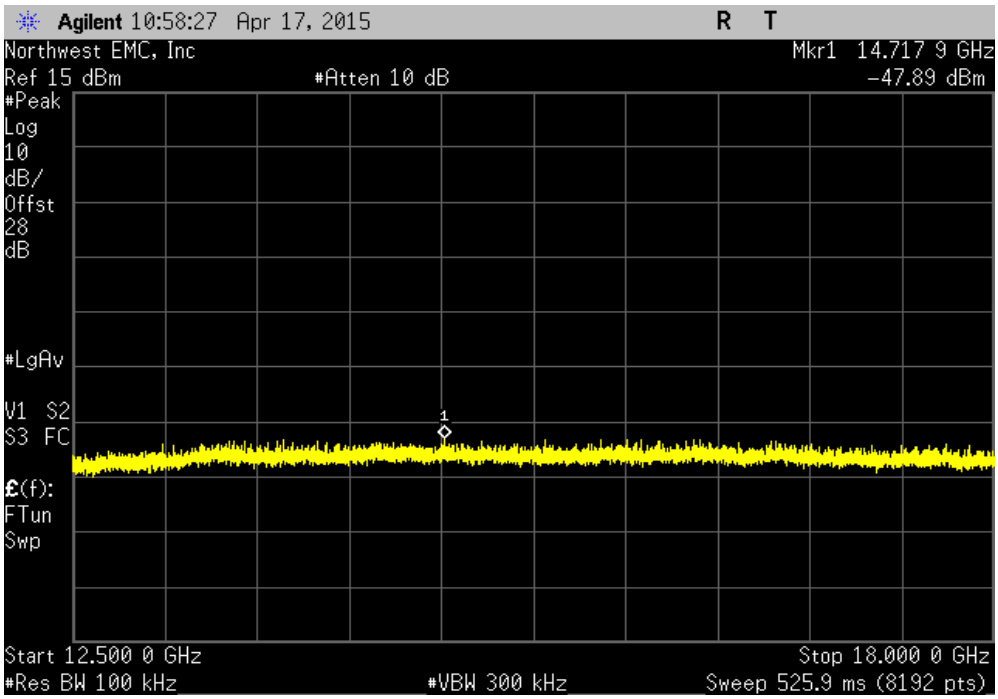
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



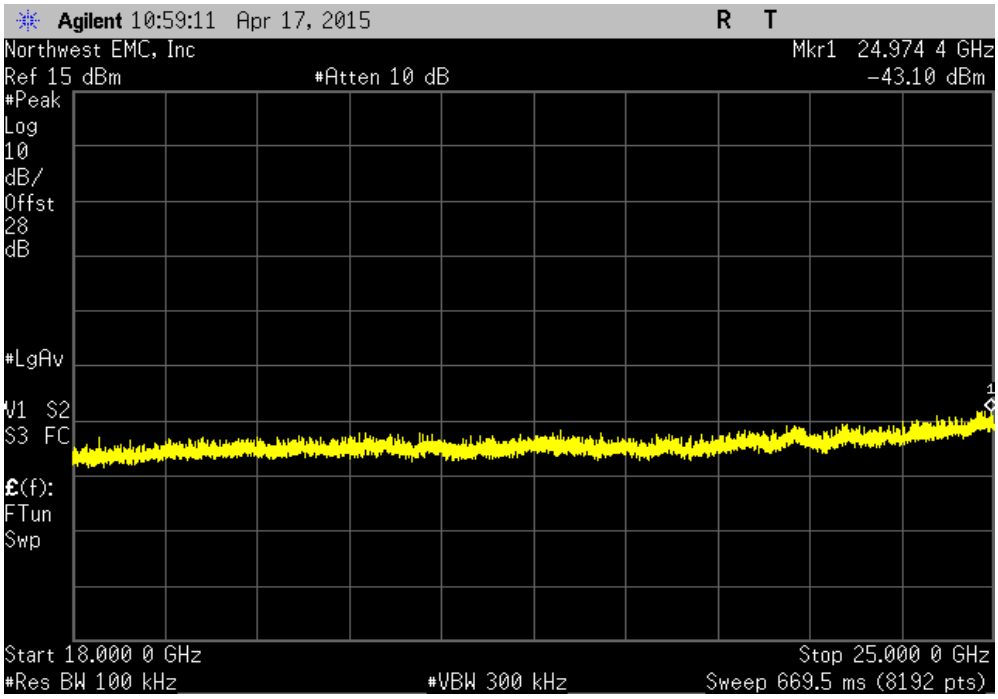
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-49.31	-20	Pass



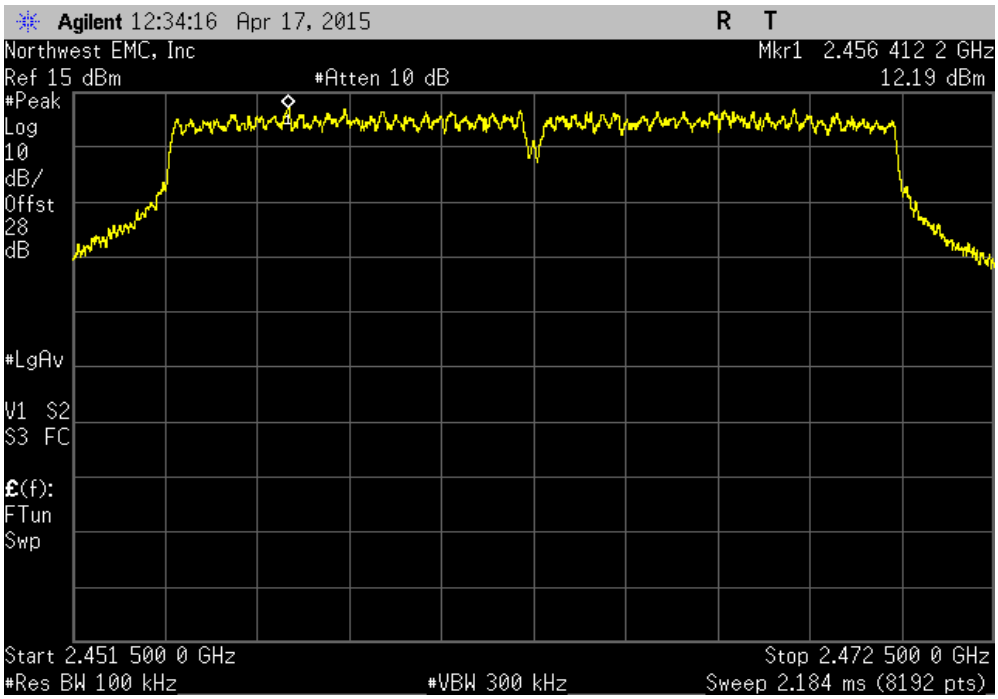
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-62.7	-20	Pass



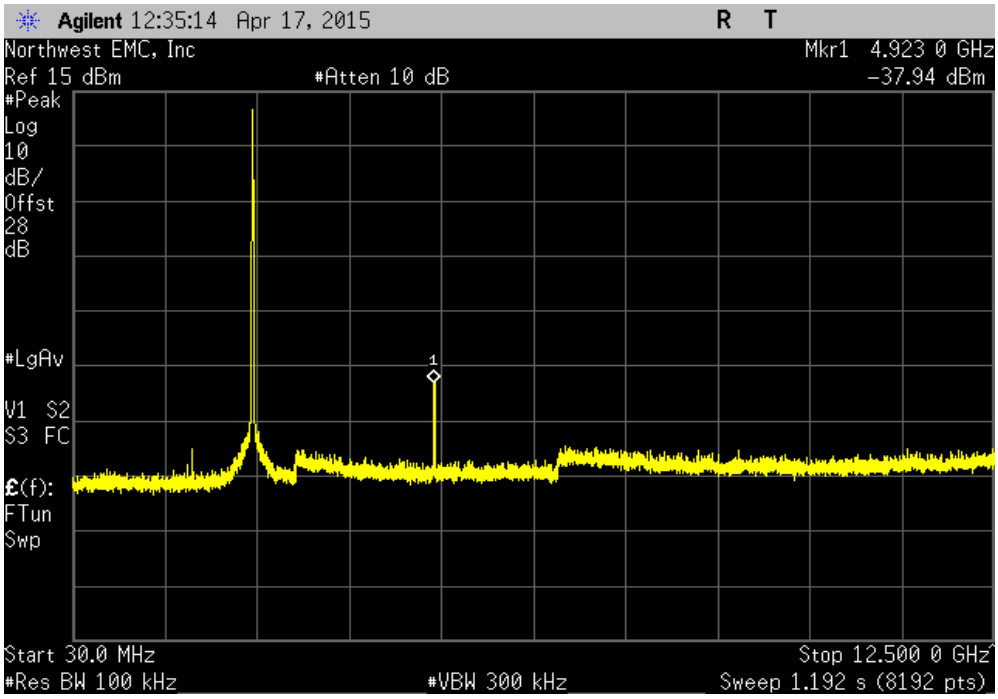
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-57.91	-20	Pass



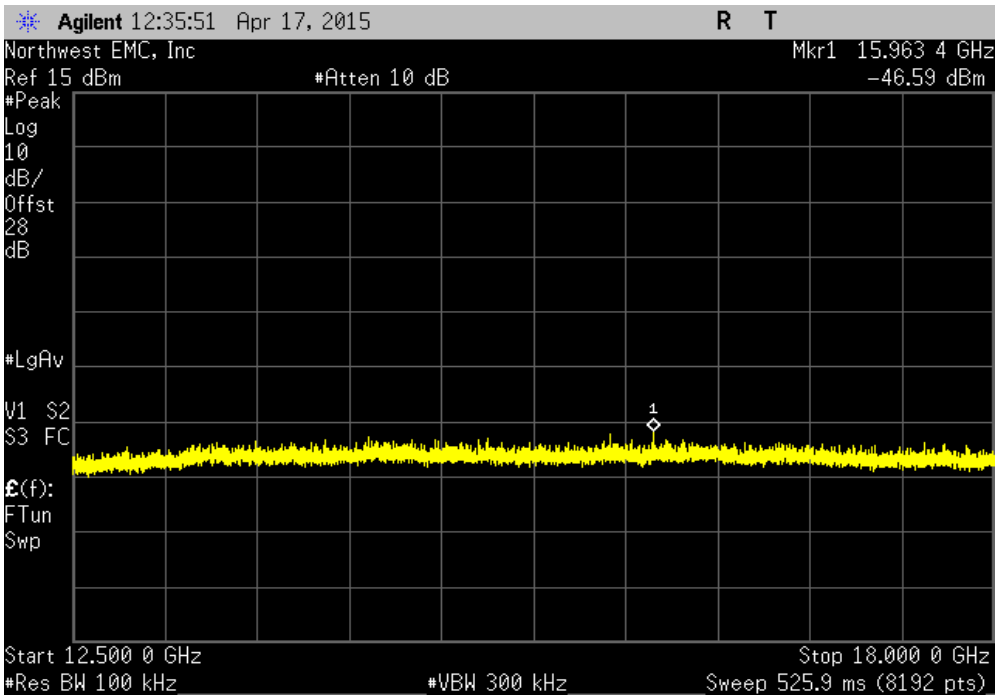
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



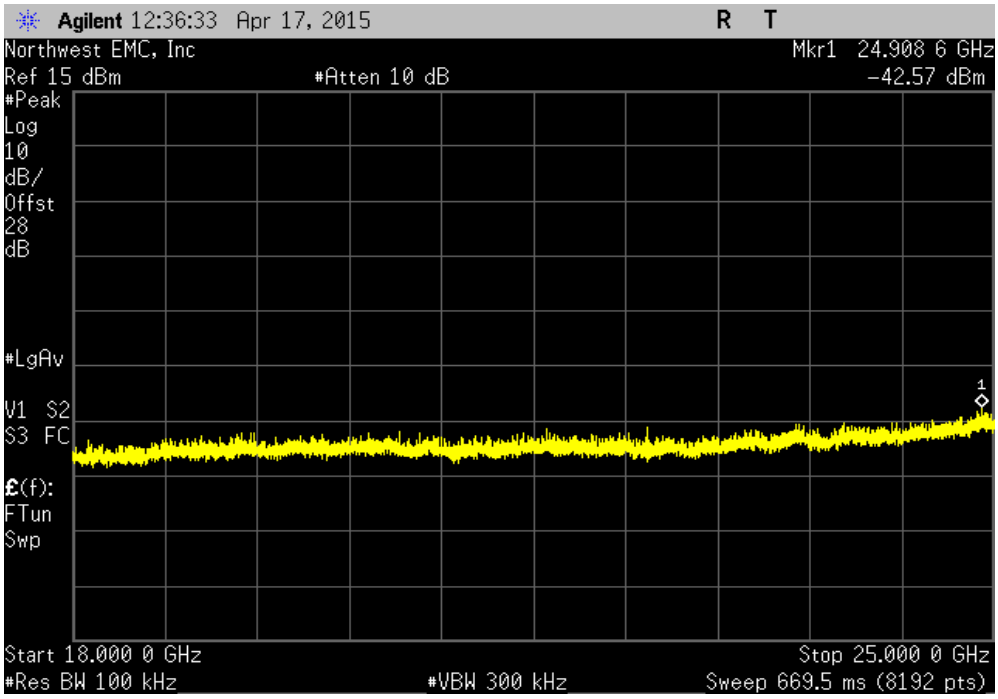
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz					
Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz			-50.13	-20	Pass



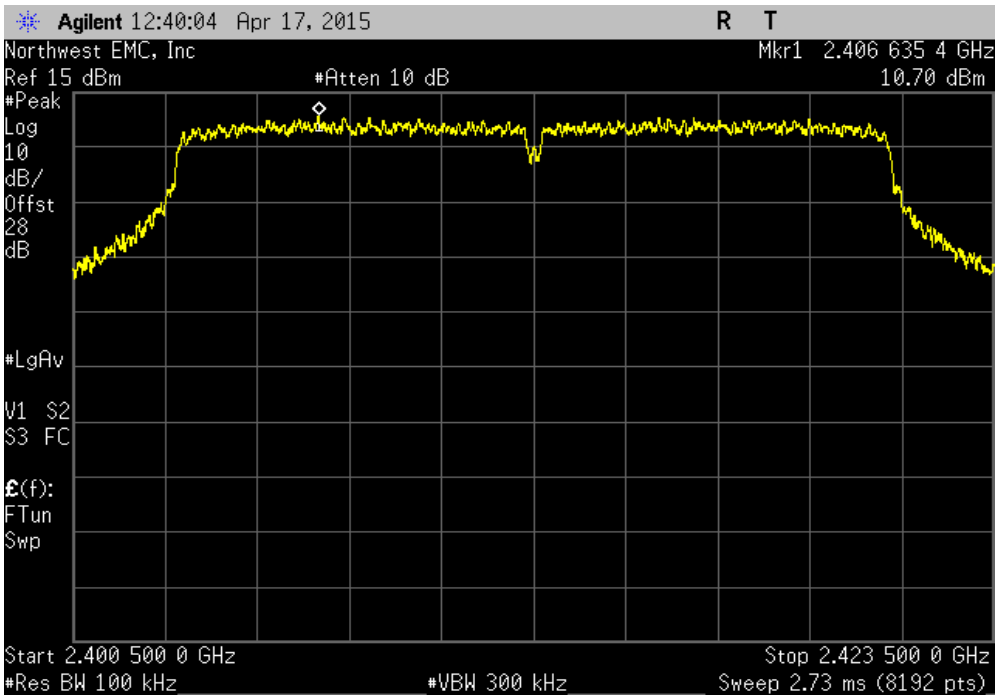
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-58.78	-20	Pass



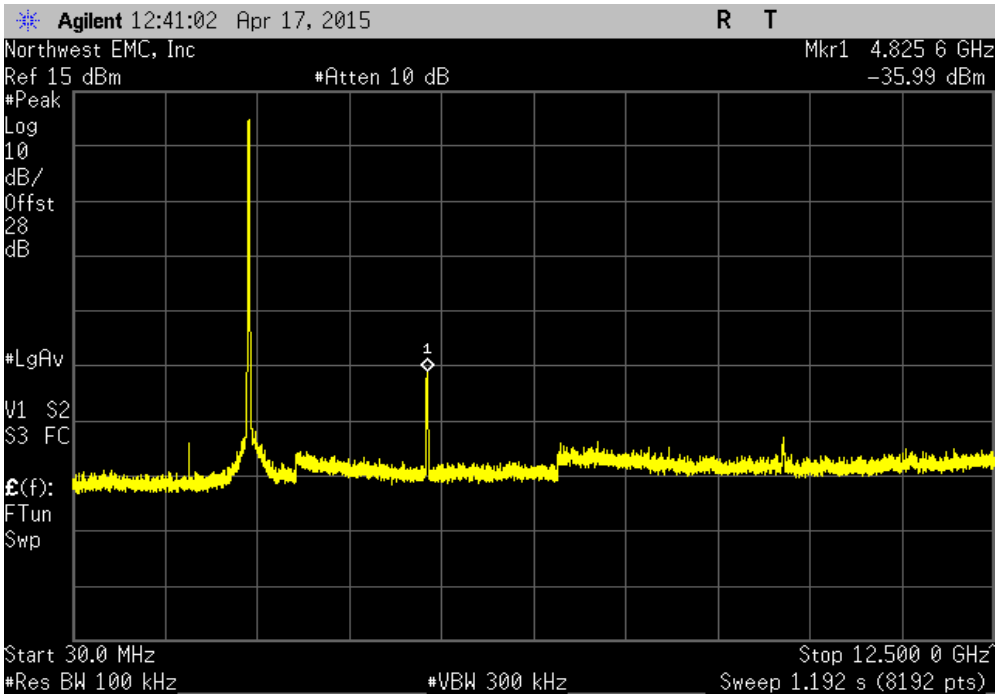
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(g) 54 Mbps, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-54.76	-20	Pass



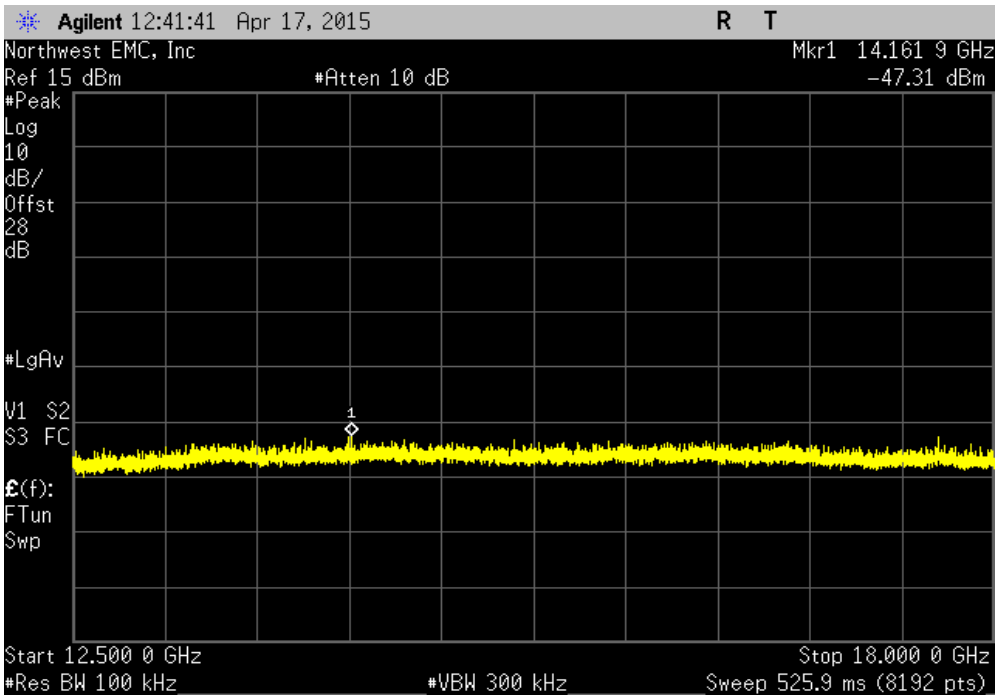
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



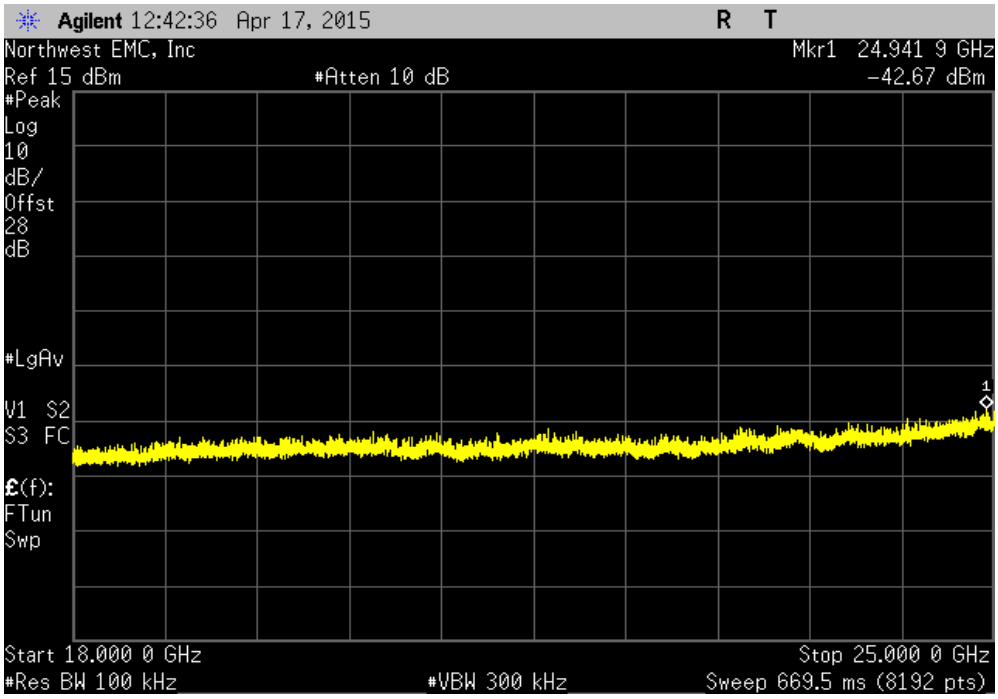
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz				
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 12.5 GHz		-46.7	-20	Pass



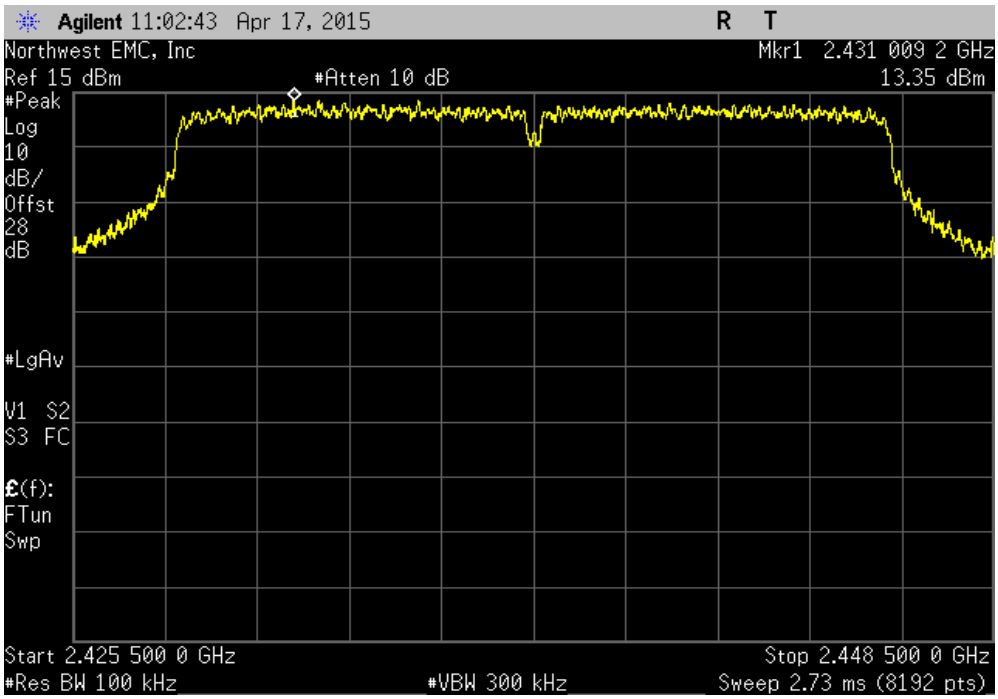
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-58.02	-20	Pass



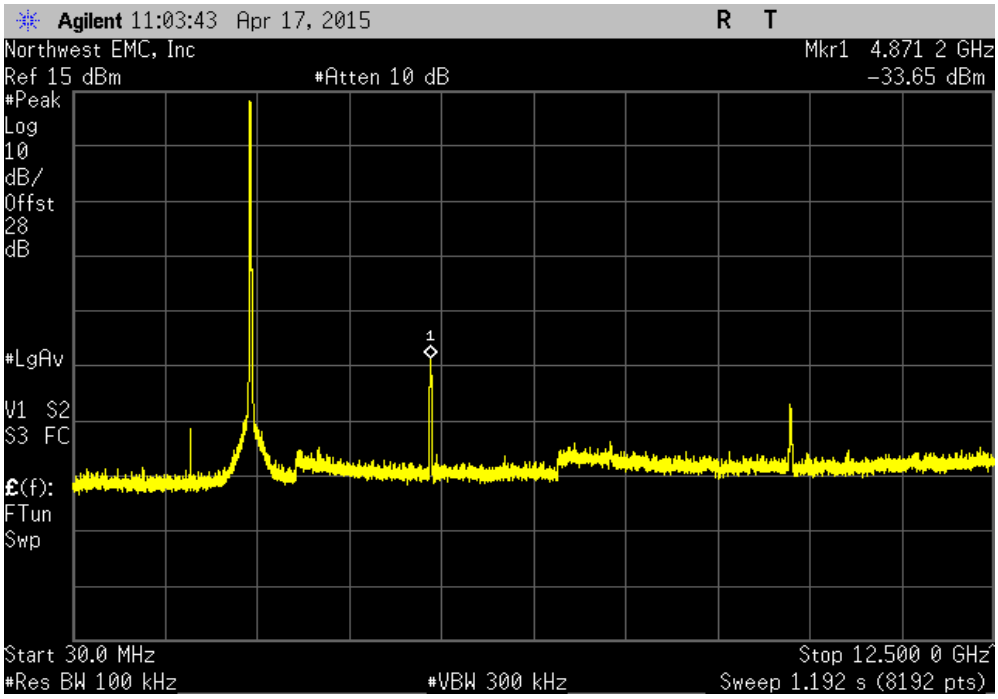
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-53.38	-20	Pass



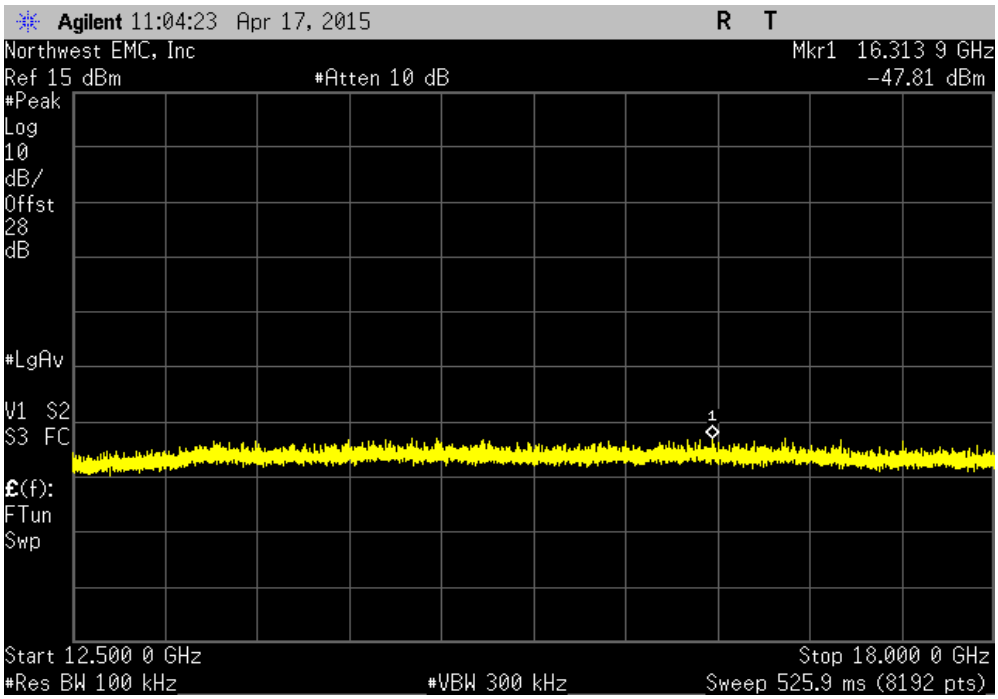
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



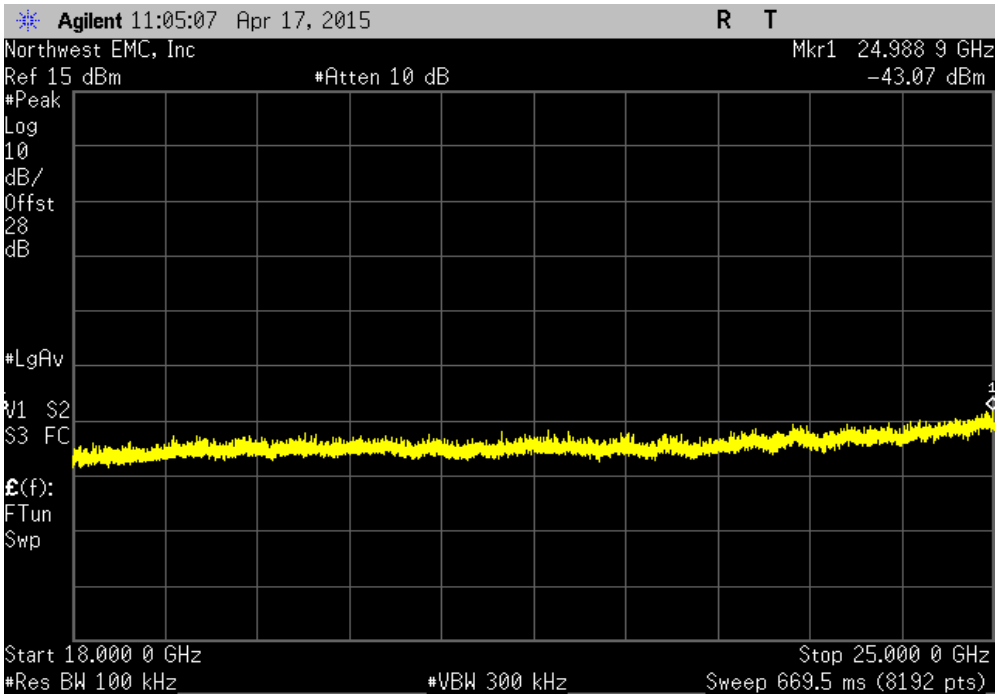
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz					
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		-47	-20	Pass	



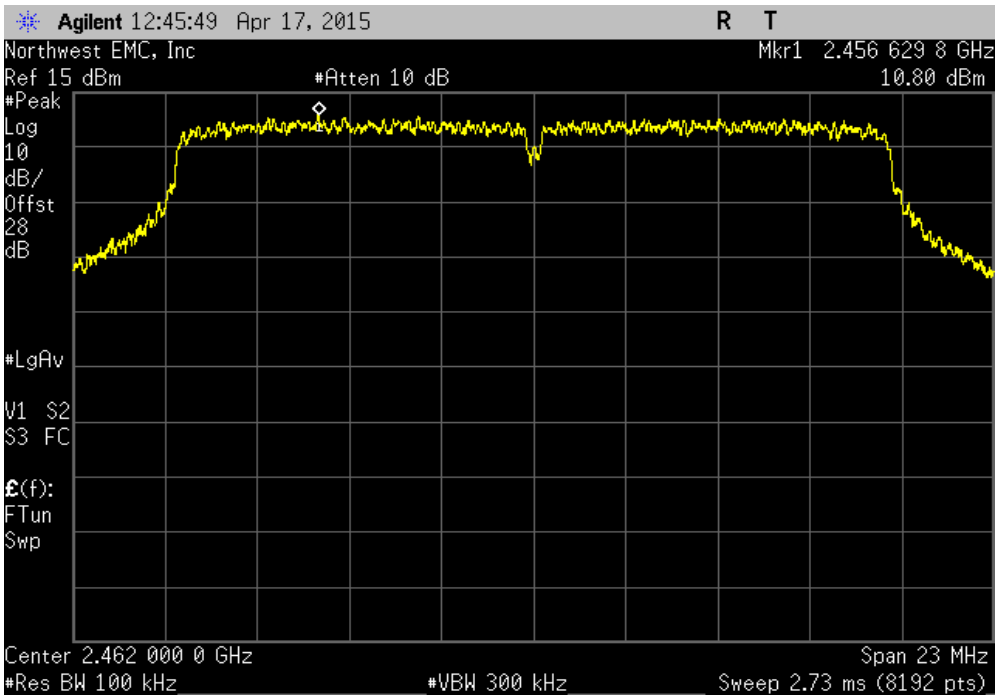
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-61.16	-20	Pass



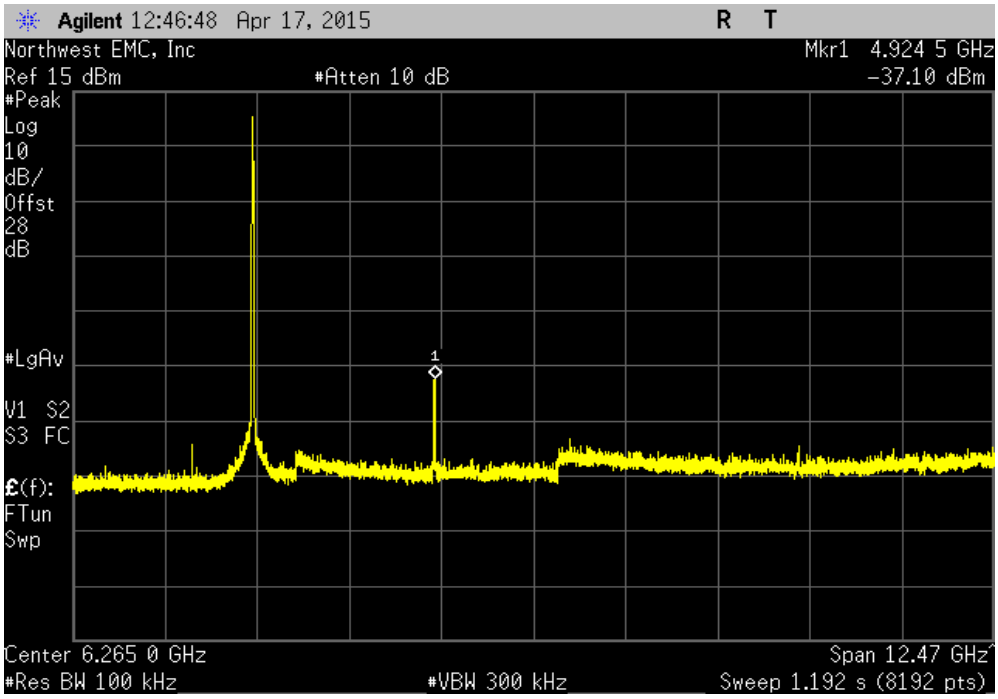
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-56.42	-20	Pass



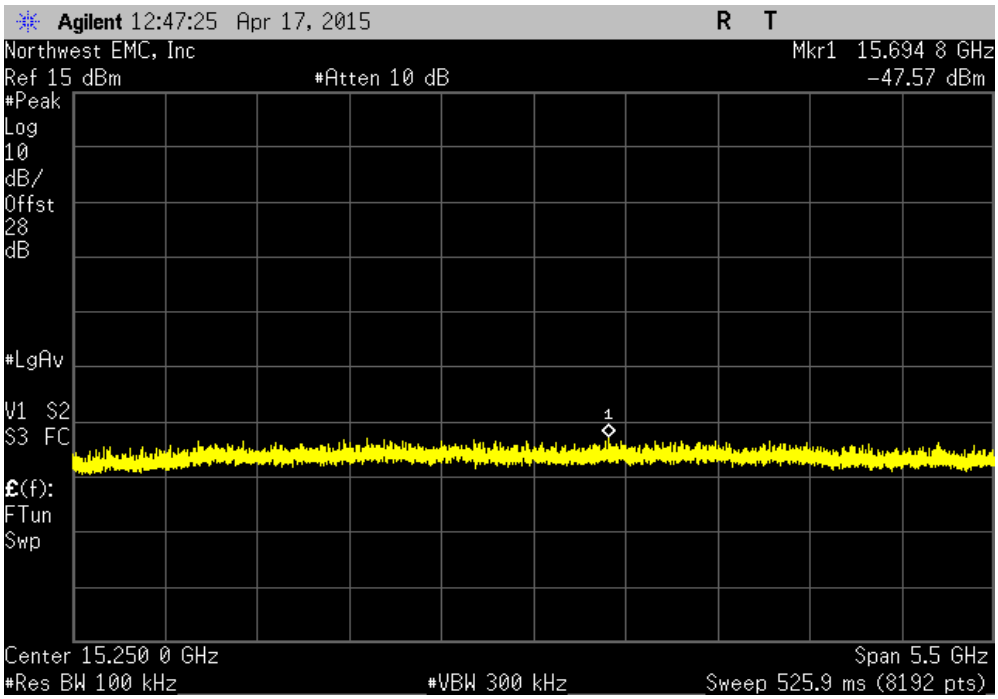
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



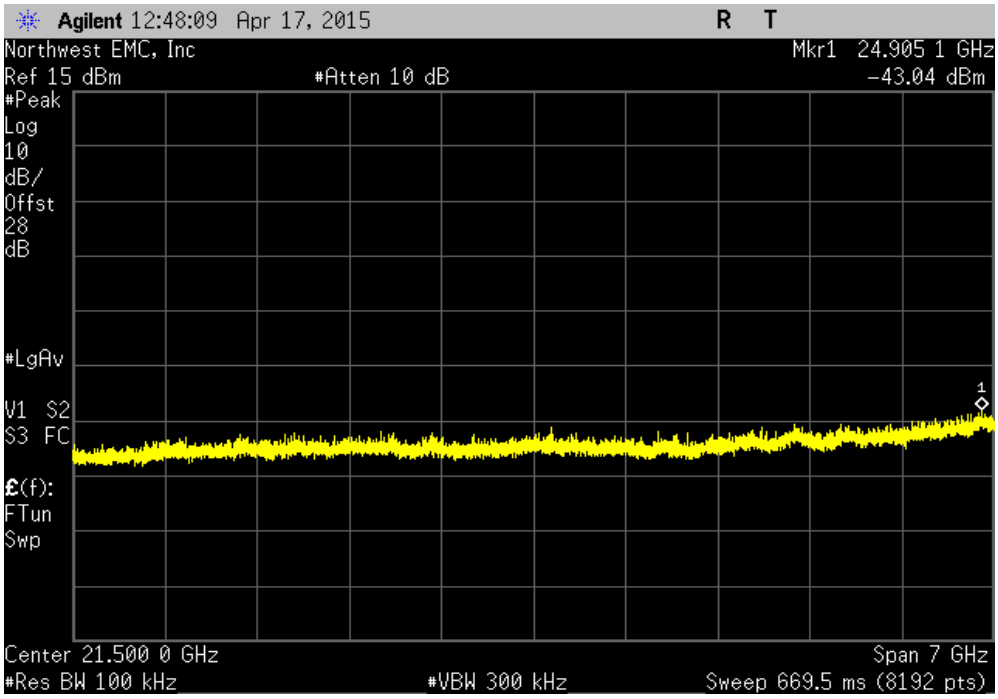
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz					
	Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result
	30 MHz - 12.5 GHz		-47.9	-20	Pass



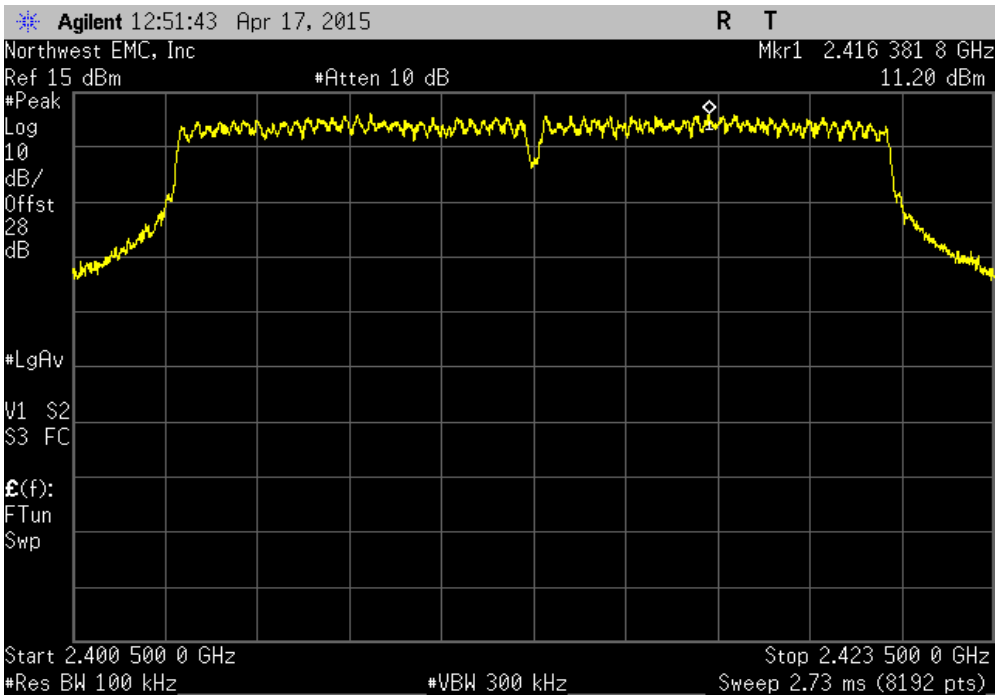
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-58.37	-20	Pass



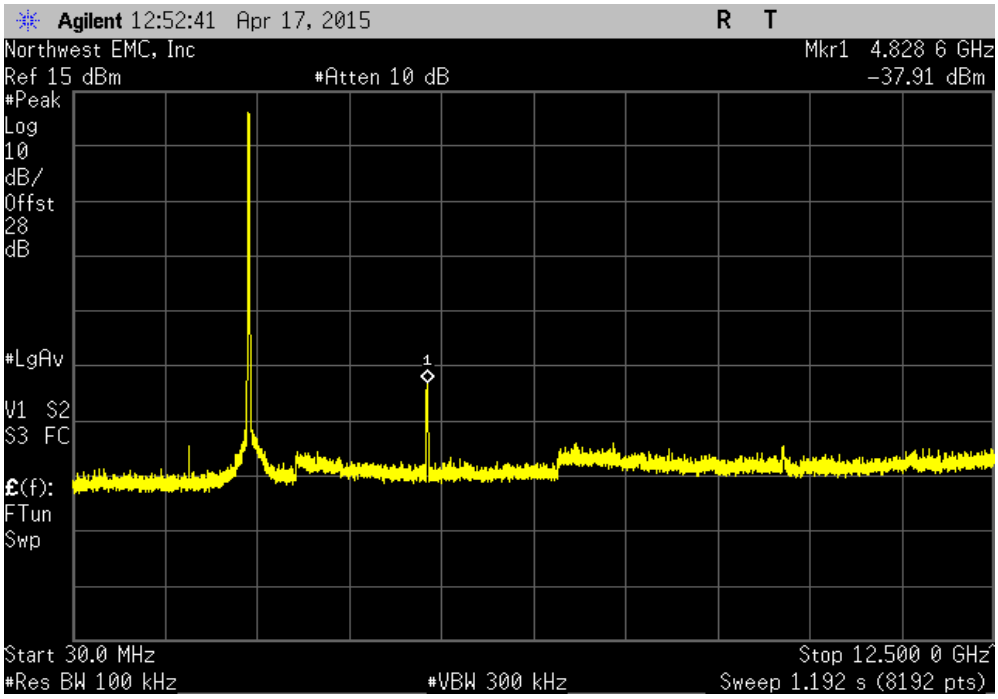
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS0, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-53.84	-20	Pass



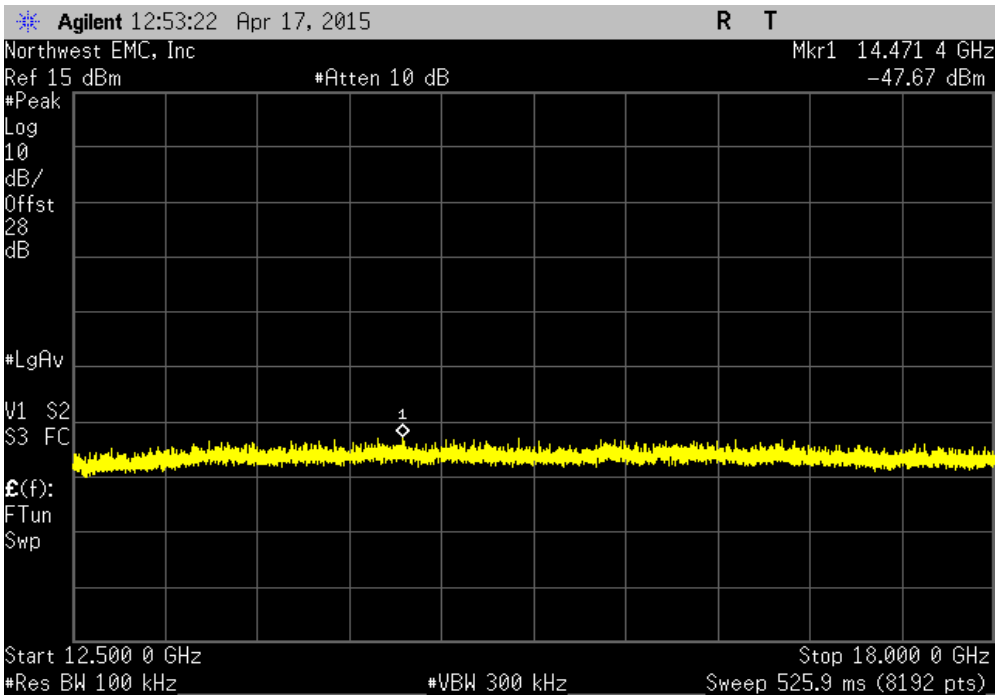
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



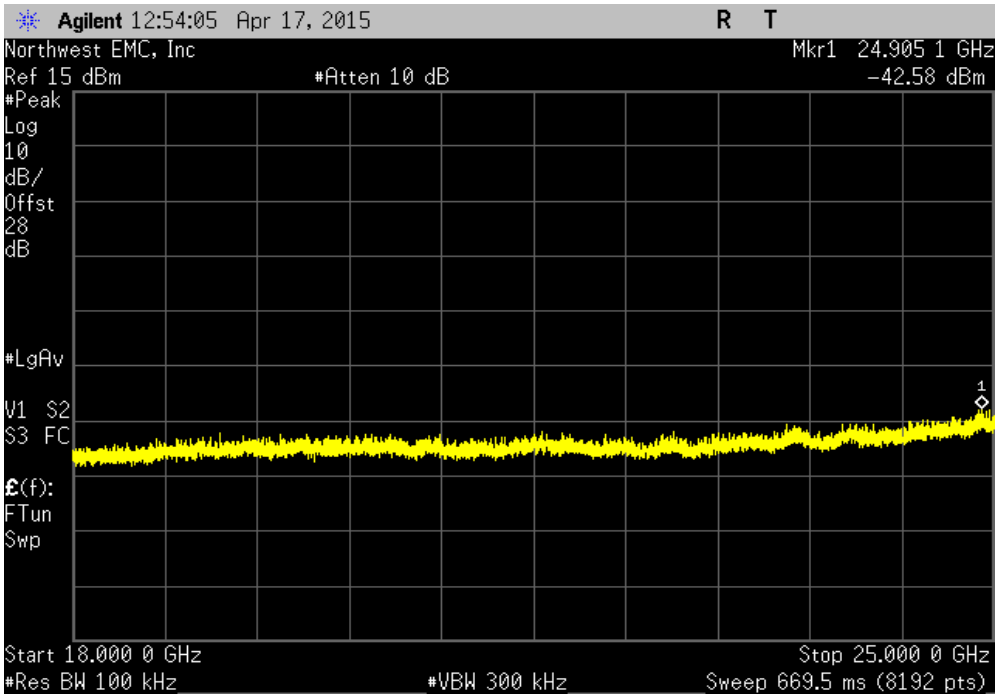
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz					
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		-49.11	-20	Pass	



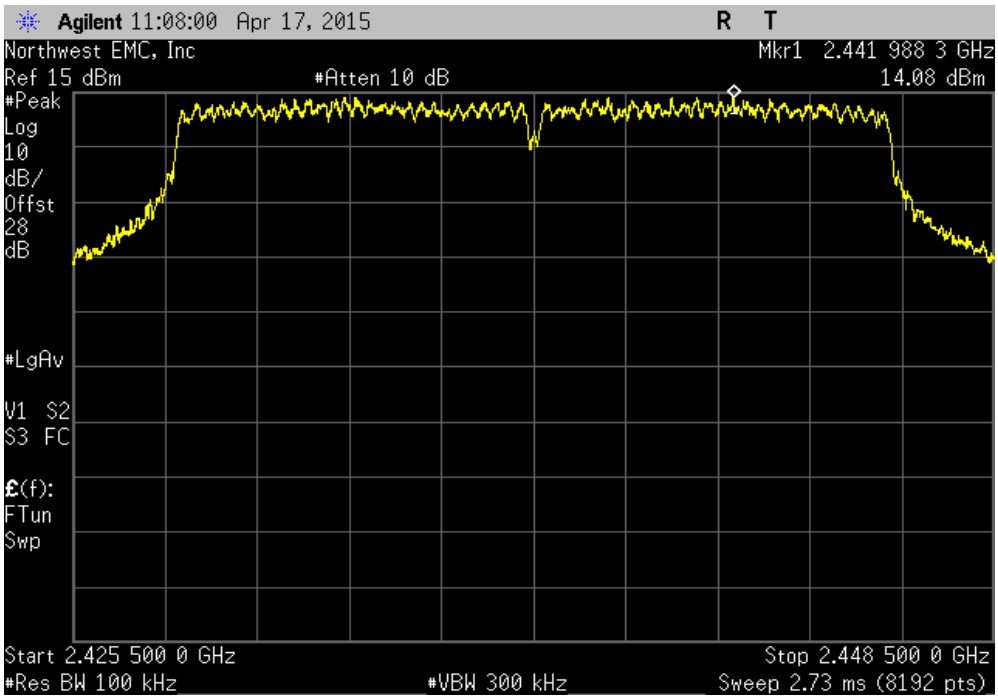
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-58.87	-20	Pass



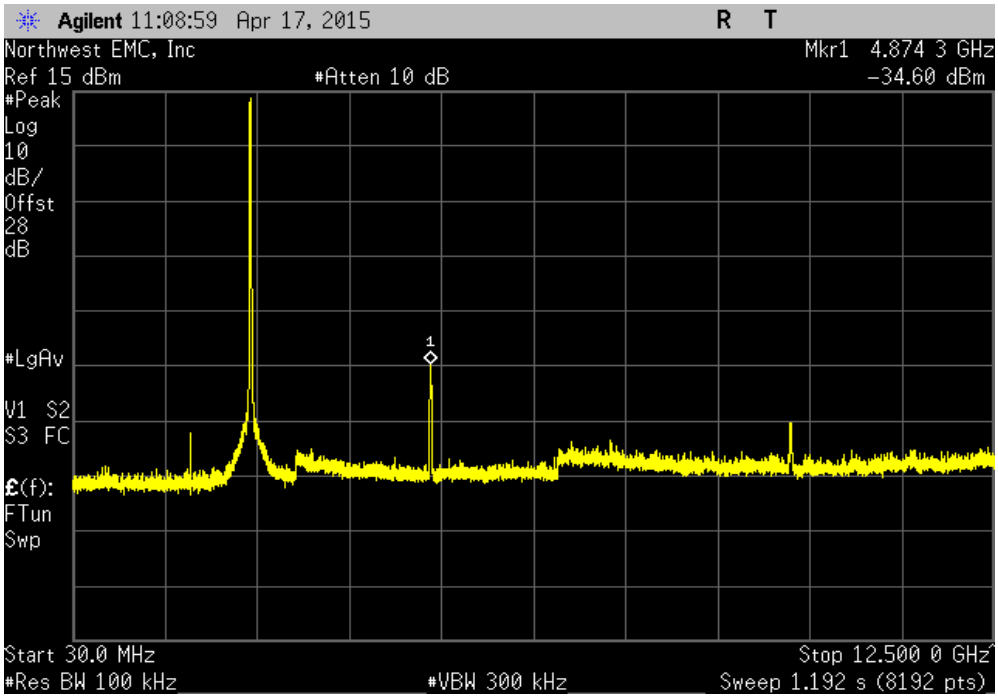
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Low Channel 1, 2412 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-53.78	-20	Pass



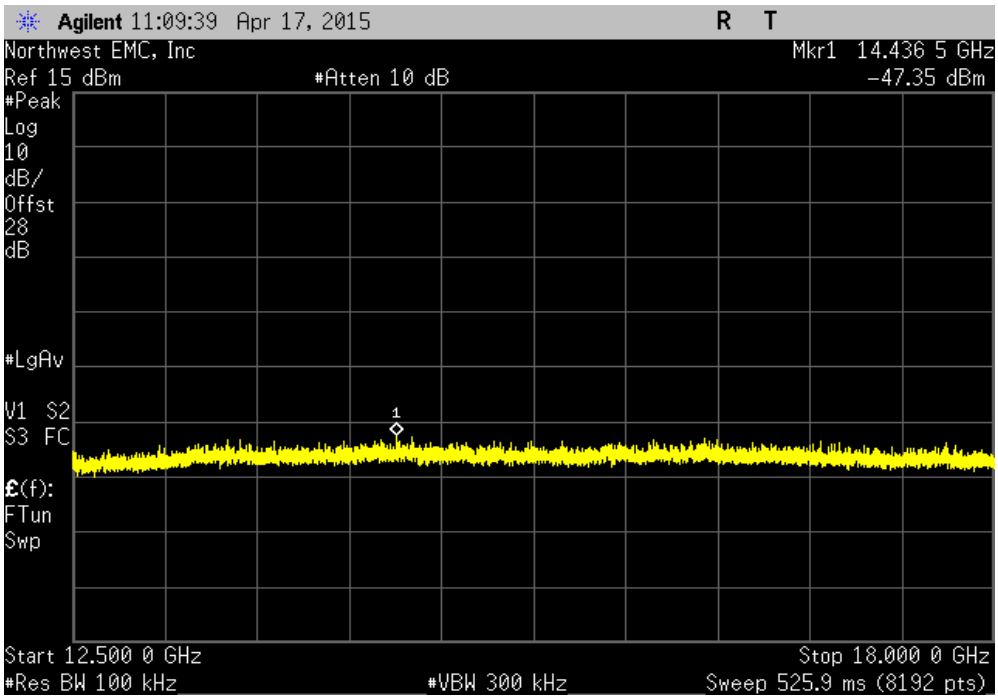
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz						
	Frequency Range			**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
	Fundamental			N/A	N/A	N/A



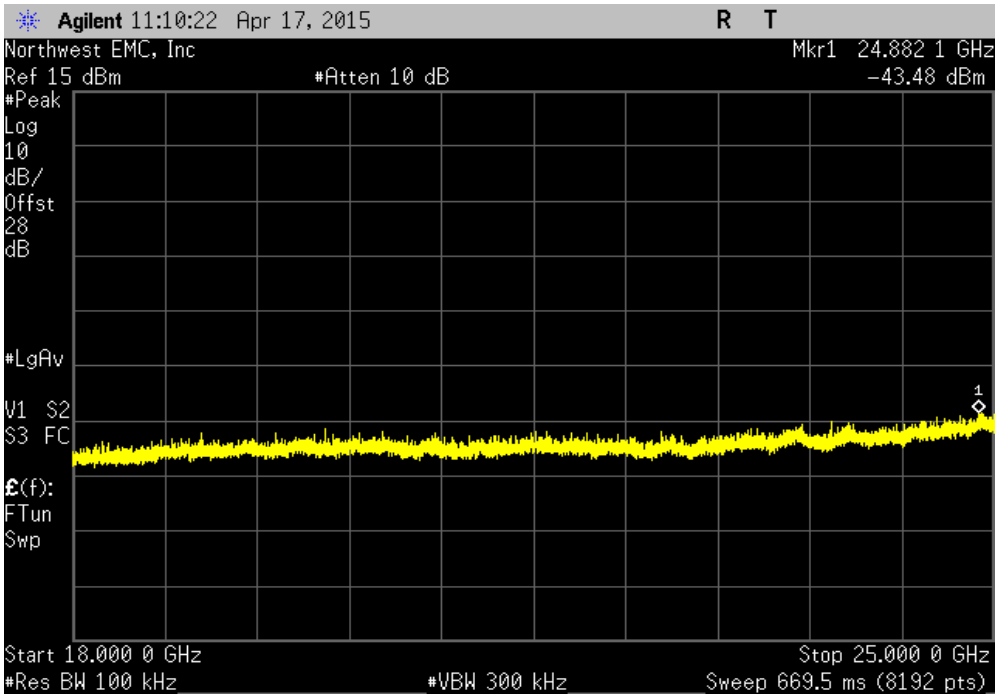
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz					
Frequency Range			**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
30 MHz - 12.5 GHz			-48.68	-20	Pass



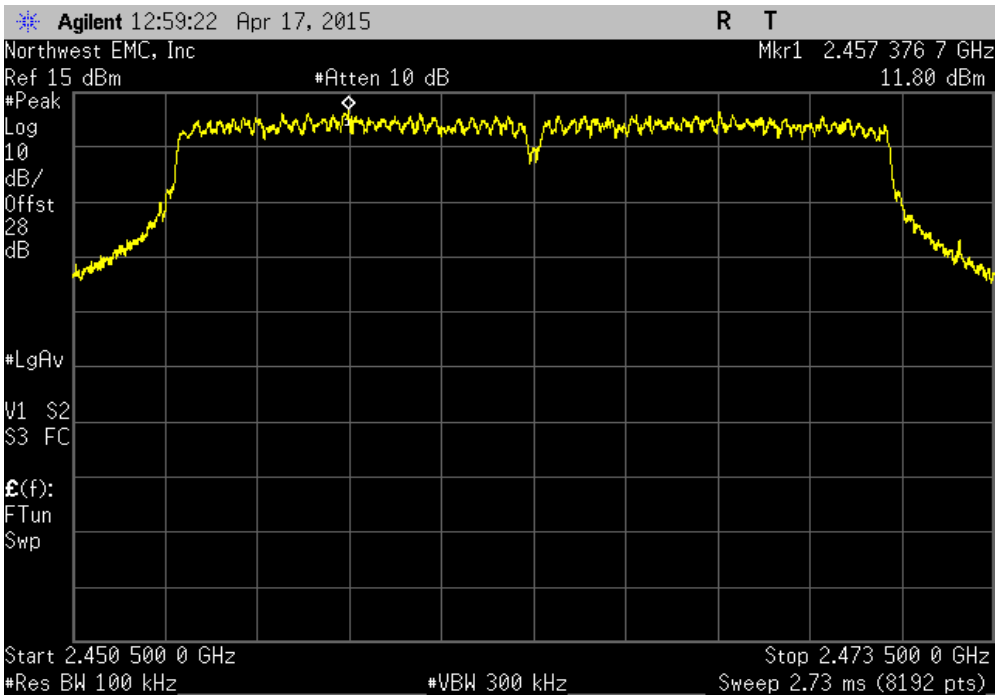
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-61.44	-20	Pass



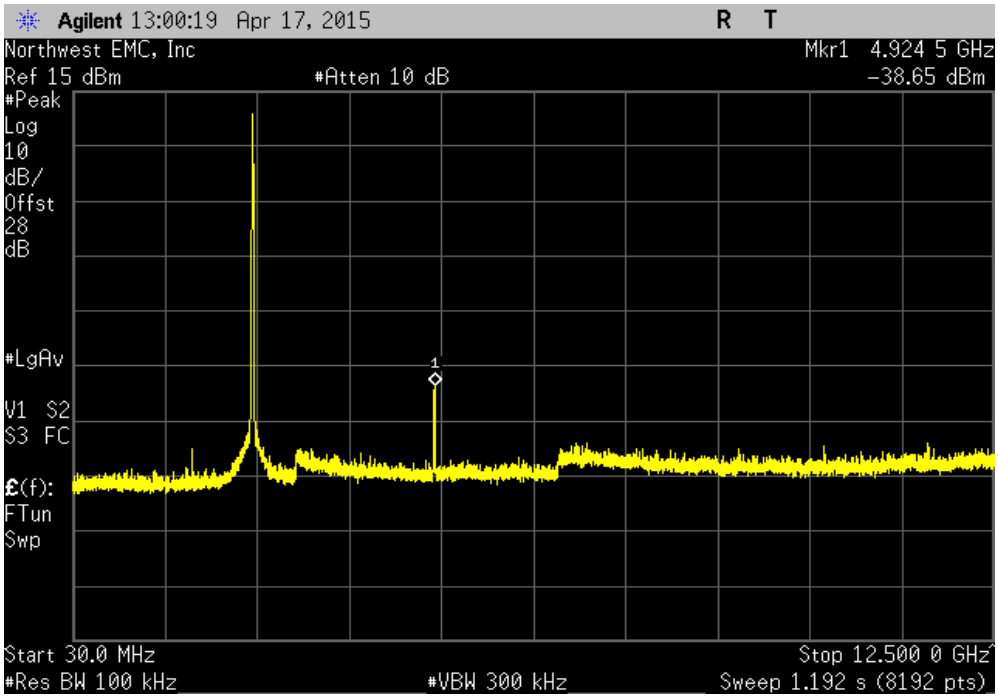
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, Mid Channel 6, 2437 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-57.56	-20	Pass



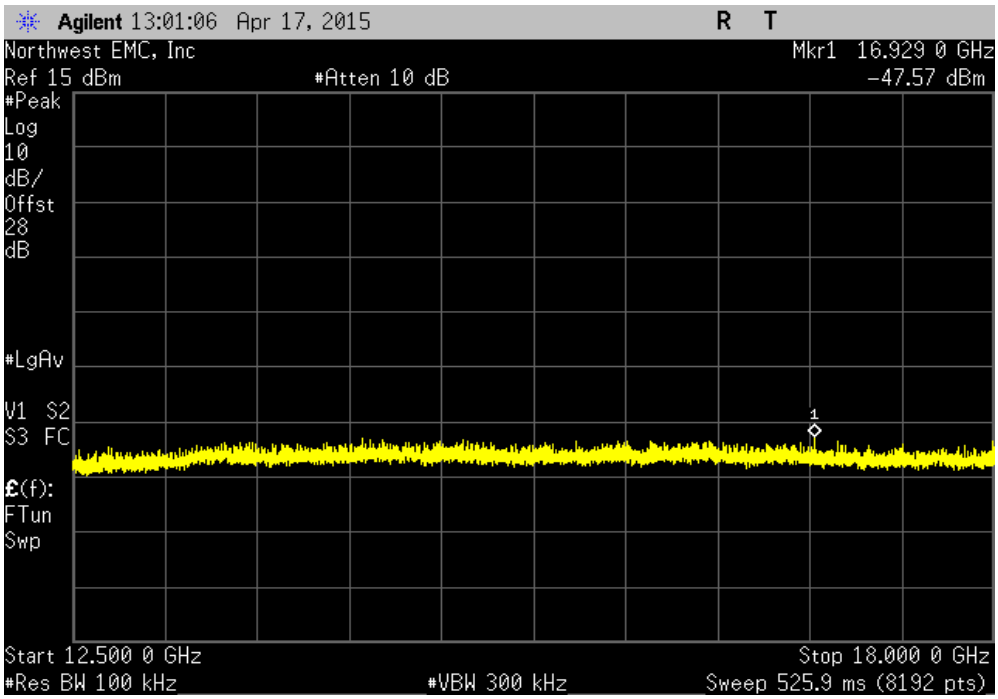
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz						
	Frequency Range			Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



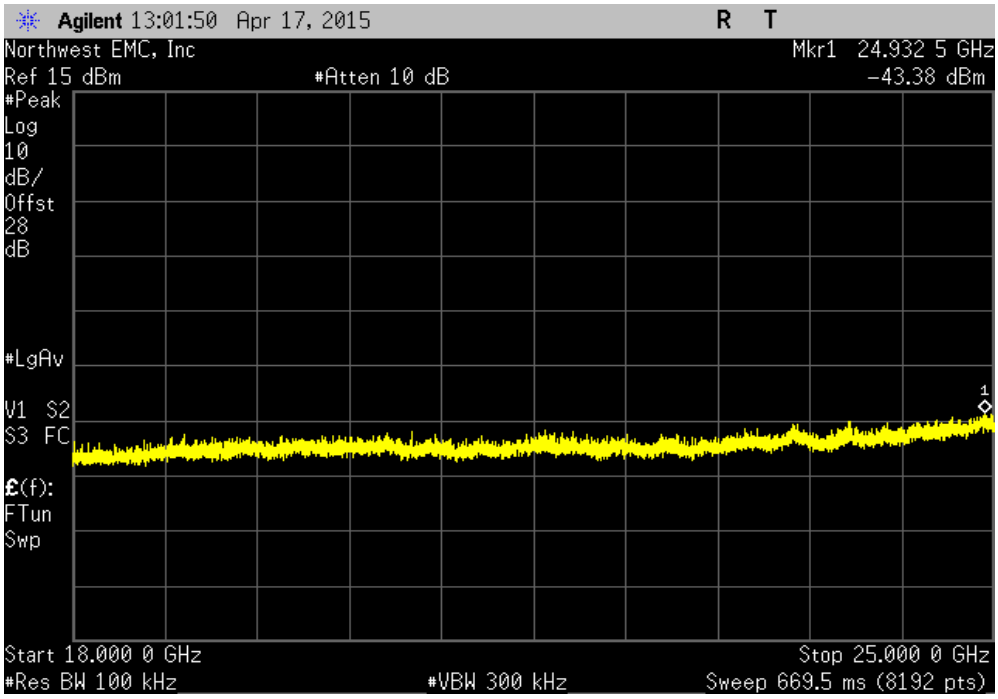
20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz					
Frequency Range		Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz		-50.45	-20	Pass	



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
12.5 GHz - 18 GHz		-59.37	-20	Pass



20 MHz, 2400 MHz - 2483.5 MHz Band, 802.11(n) MCS7, High Channel 11, 2462 MHz				
Frequency Range		**Value (dBc)**	**Limit ≤ (dBc)**	**Result**
18 GHz - 25 GHz		-55.19	-20	Pass



BAND EDGE COMPLIANCE

XMit 2015.01.14

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.	Interval (mo)
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	0
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
Attenuator - 26dB SMA	Fairview Microwave	18B5W-26	RFY	7/22/2014	12
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12

TEST DESCRIPTION

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 measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. 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.

BAND EDGE COMPLIANCE

NORTHWEST EMC

XMit 2015.01.14

EUT:	WDNU-II			**Work Order:**	ETHE0024
Serial Number:	00:40:9D:7F:B3:D0			**Date:**	05/14/15
Customer:	Digi International			**Temperature:**	22.5°C
Attendees:	None			**Humidity:**	38%
Project:	None			**Barometric Pres.:**	991.1
Tested by:	Trevor Buls, Dustin Sparks	**Power:**	28 VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2009

COMMENTS

Single channel continuous transmission provided by client. Duty cycle set to 100%. Low and High channel digital attenuation set to 2C. Middle channel digital attenuation set to 32.

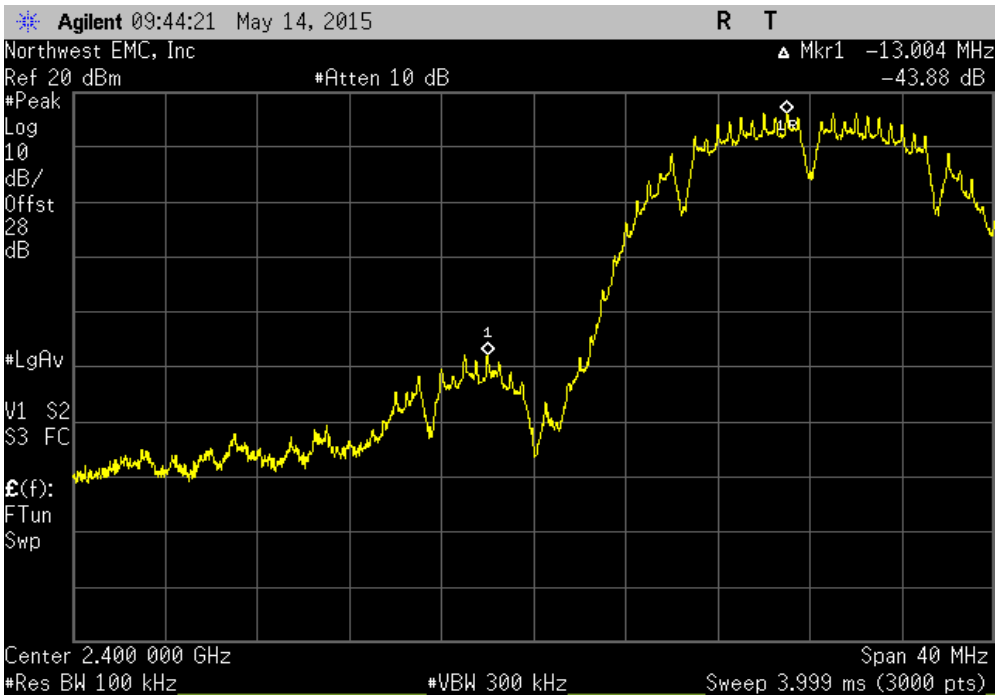
DEVIATIONS FROM TEST STANDARD

None

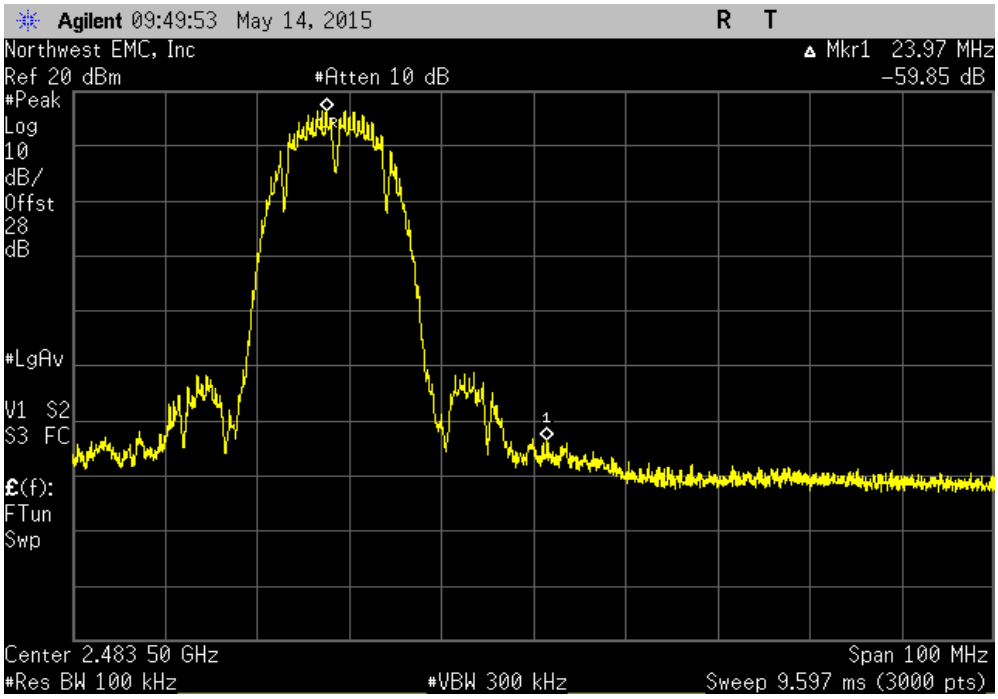
Configuration #	ETHE0024-7	Signature	Trevor Buls

		Value (dBc)	Limit ≤ (dBc)	Result
802.11(b) 1 Mbps				
	Low Channel 1, 2412 MHz	-43.88	-20	Pass
	High Channel 11, 2462 MHz	-59.85	-20	Pass
802.11(b) 11 Mbps				
	Low Channel 1, 2412 MHz	-43.43	-20	Pass
	High Channel 11, 2462 MHz	-61.83	-20	Pass
802.11(g) 6 Mbps				
	Low Channel 1, 2412 MHz	-29.19	-20	Pass
	High Channel 11, 2462 MHz	-46.93	-20	Pass
802.11(g) 36 Mbps				
	Low Channel 1, 2412 MHz	-31.22	-20	Pass
	High Channel 11, 2462 MHz	-50.97	-20	Pass
802.11(g) 54 Mbps				
	Low Channel 1, 2412 MHz	-30.79	-20	Pass
	High Channel 11, 2462 MHz	-50.95	-20	Pass
802.11(n) MCS0				
	Low Channel 1, 2412 MHz	-27.61	-20	Pass
	High Channel 11, 2462 MHz	-44.86	-20	Pass
802.11(n) MCS7				
	Low Channel 1, 2412 MHz	-30.14	-20	Pass
	High Channel 11, 2462 MHz	-47.24	-20	Pass

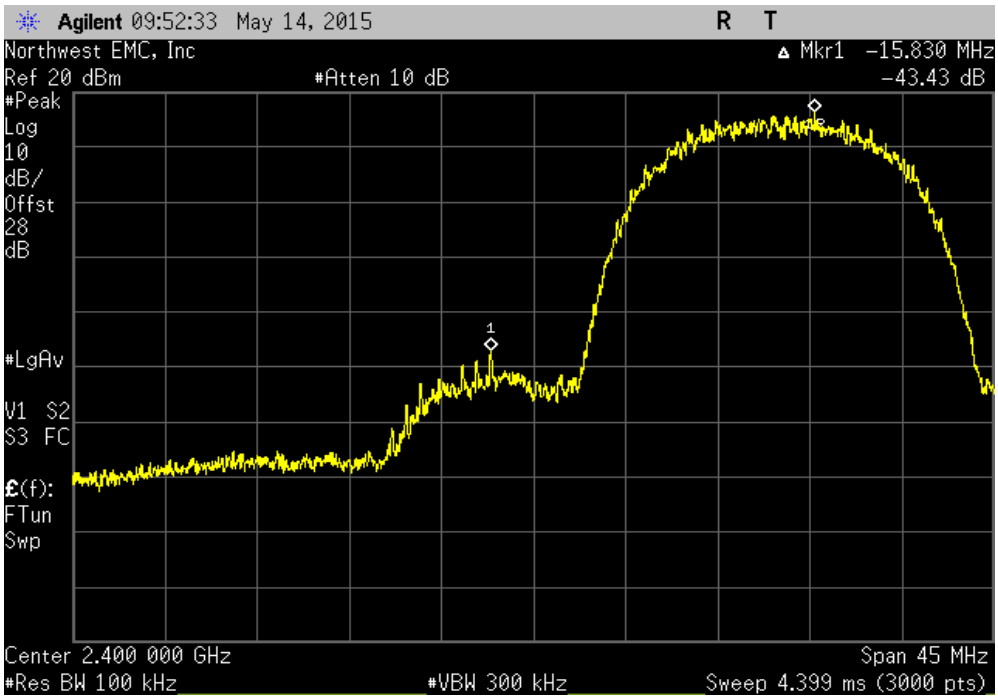
802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-43.88	-20	Pass



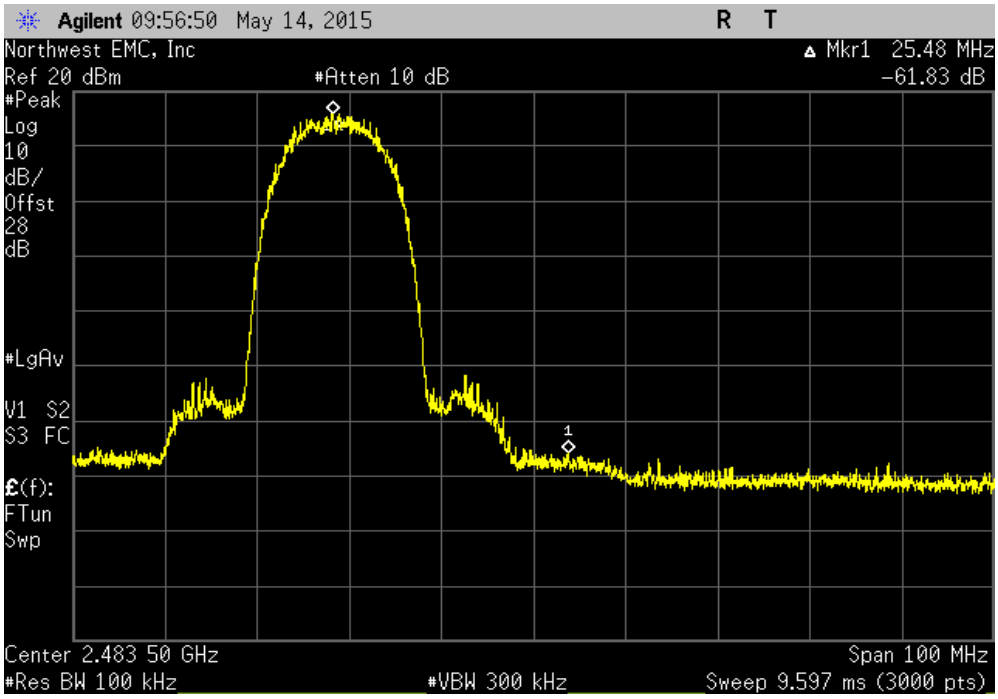
802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-59.85	-20	Pass



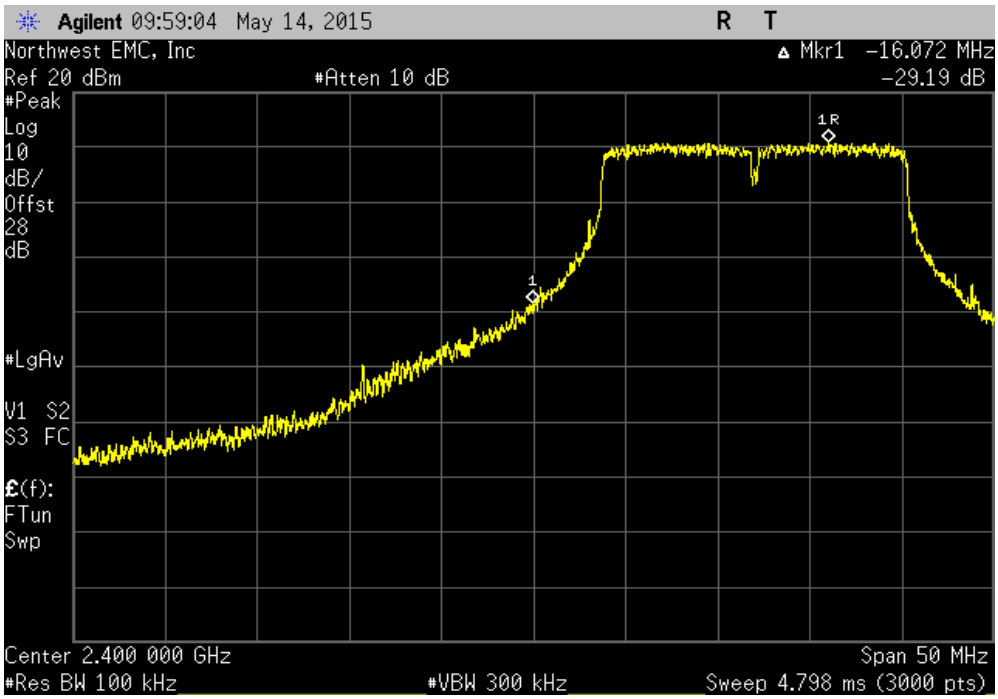
802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-43.43	-20	Pass



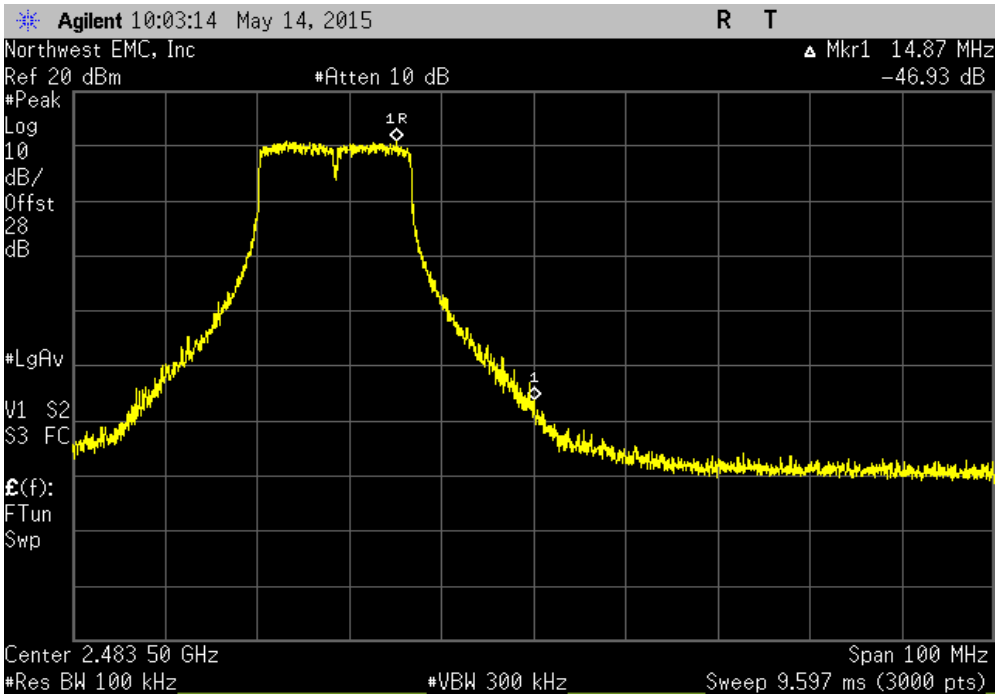
802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-61.83	-20	Pass



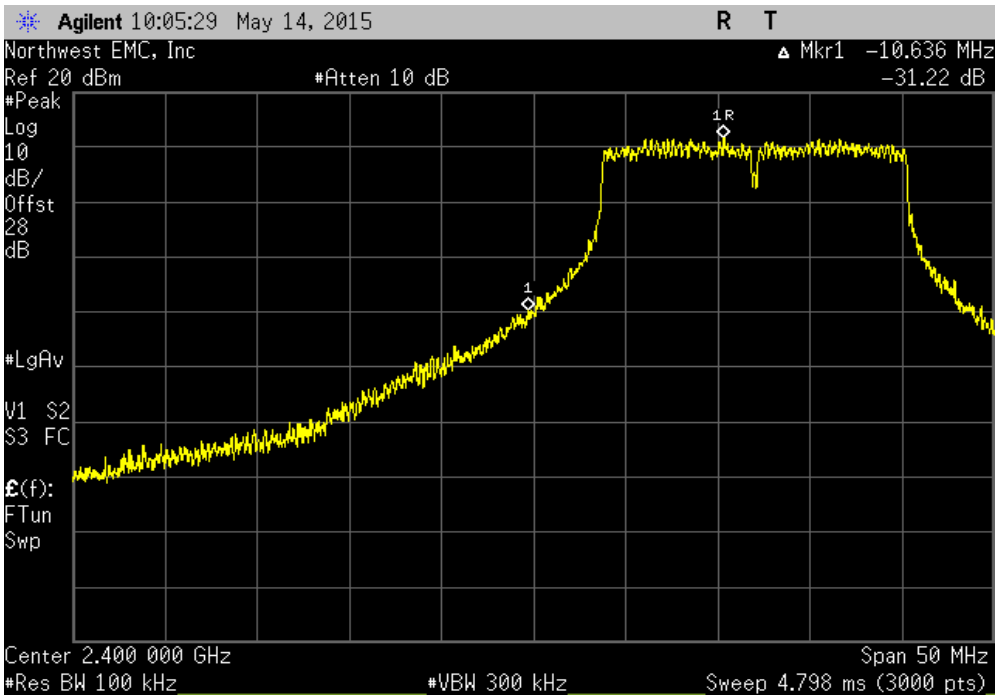
802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-29.19	-20	Pass



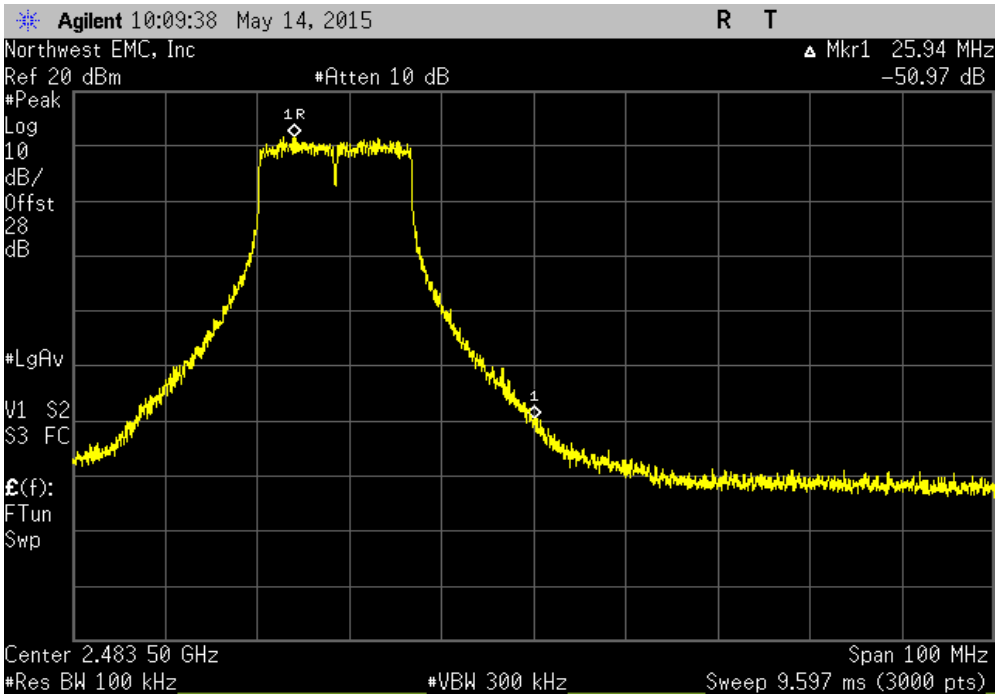
802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-46.93	-20	Pass



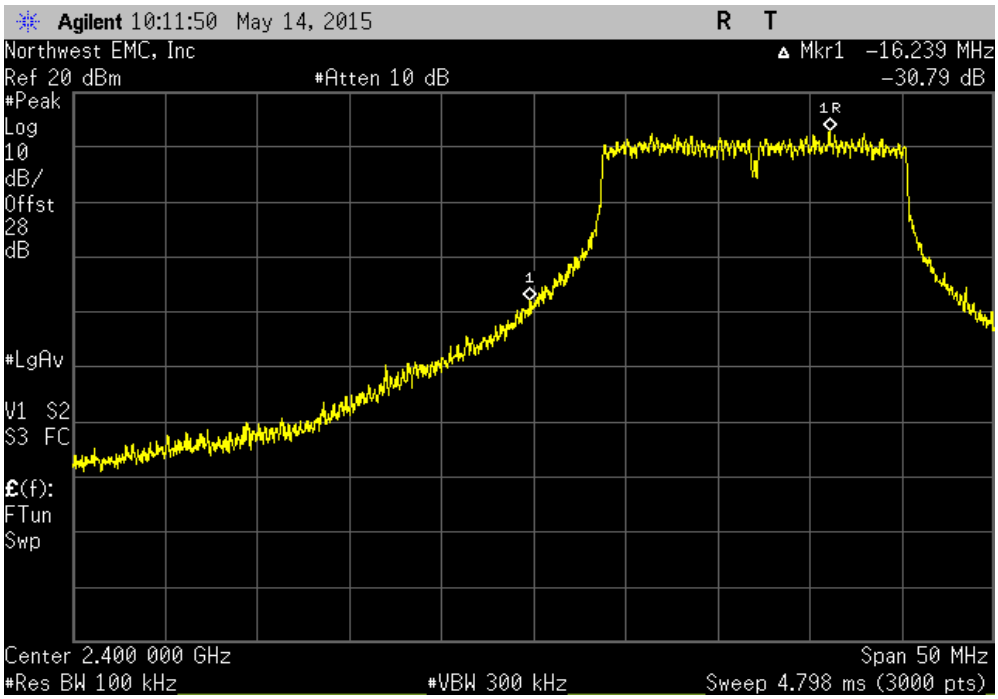
802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-31.22	-20	Pass



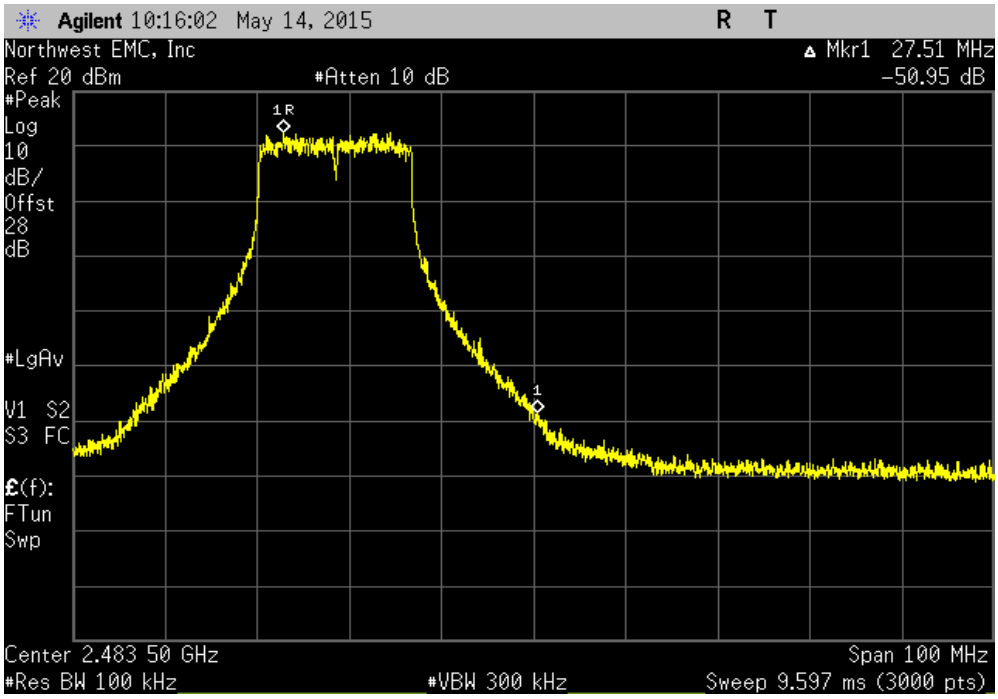
802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-50.97	-20	Pass



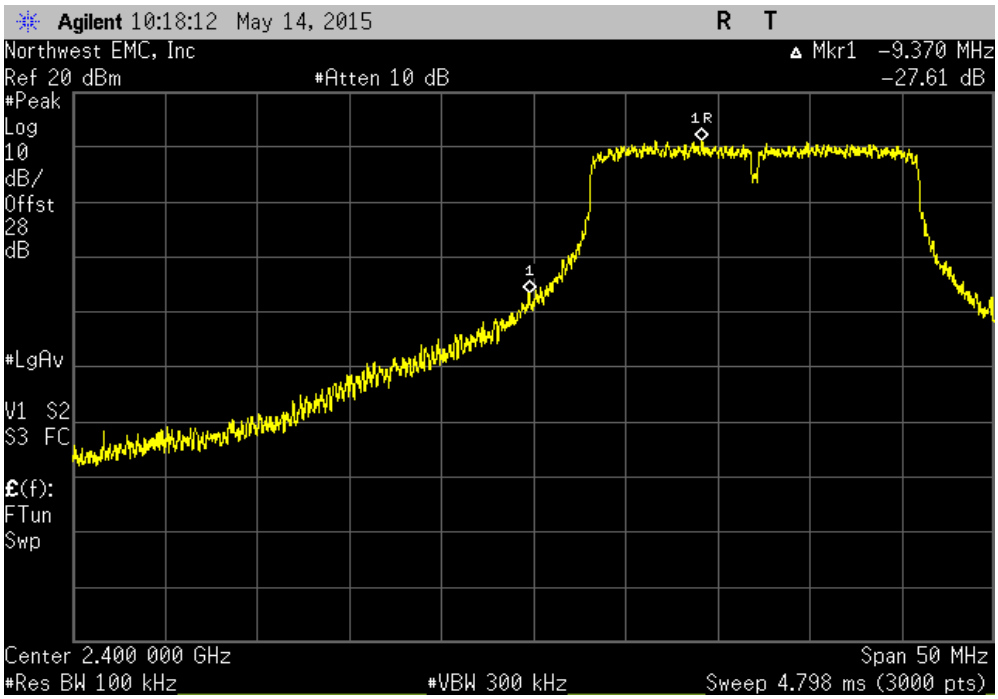
802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-30.79	-20	Pass



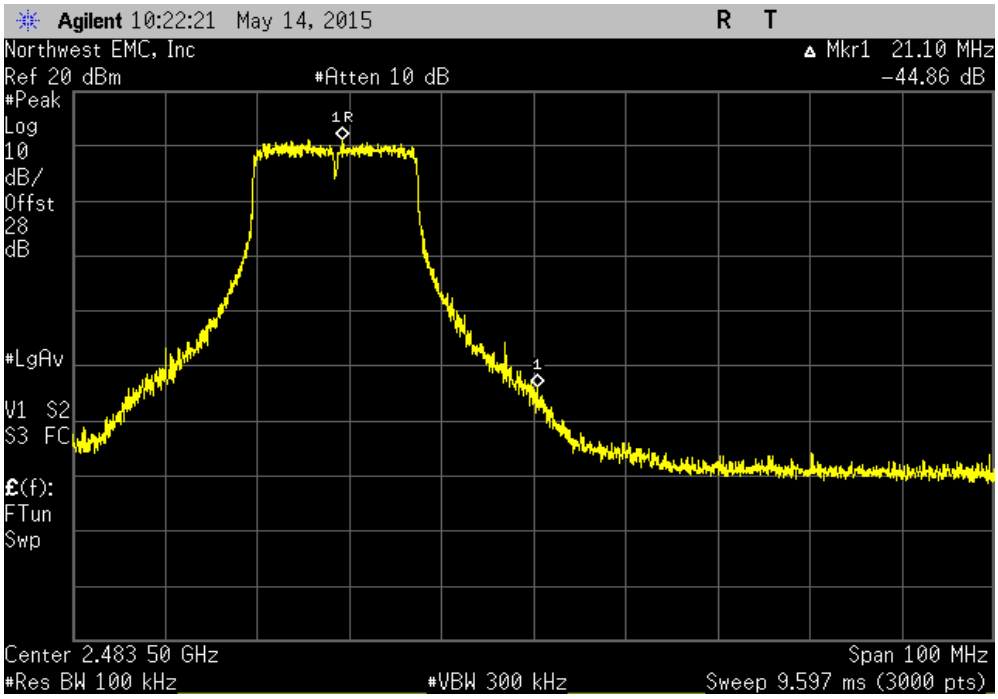
802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-50.95	-20	Pass



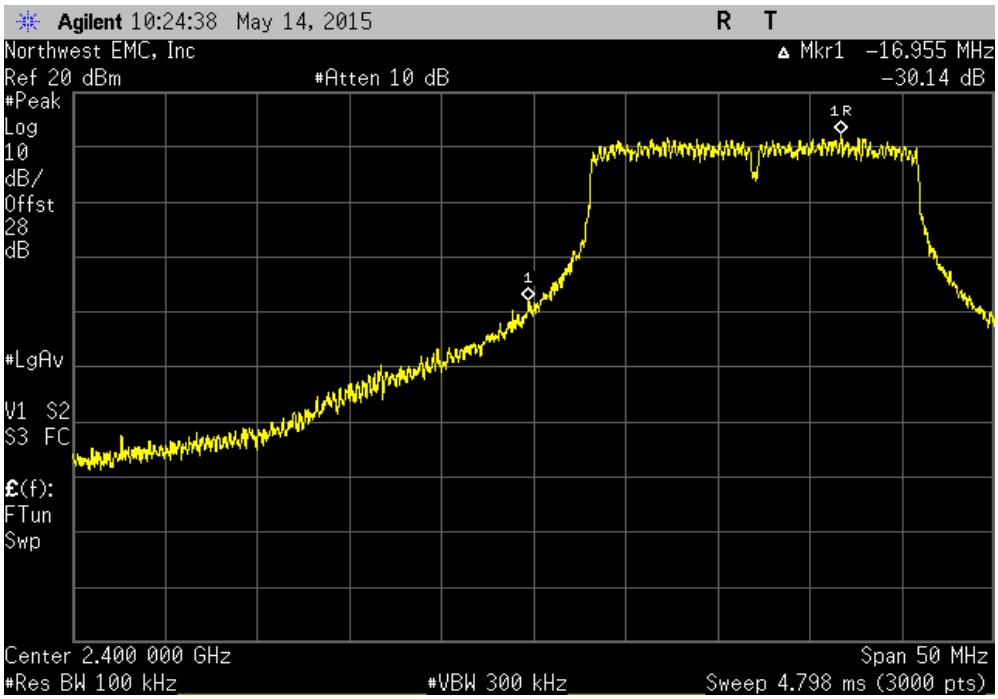
802.11(n) MCS0, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-27.61	-20	Pass



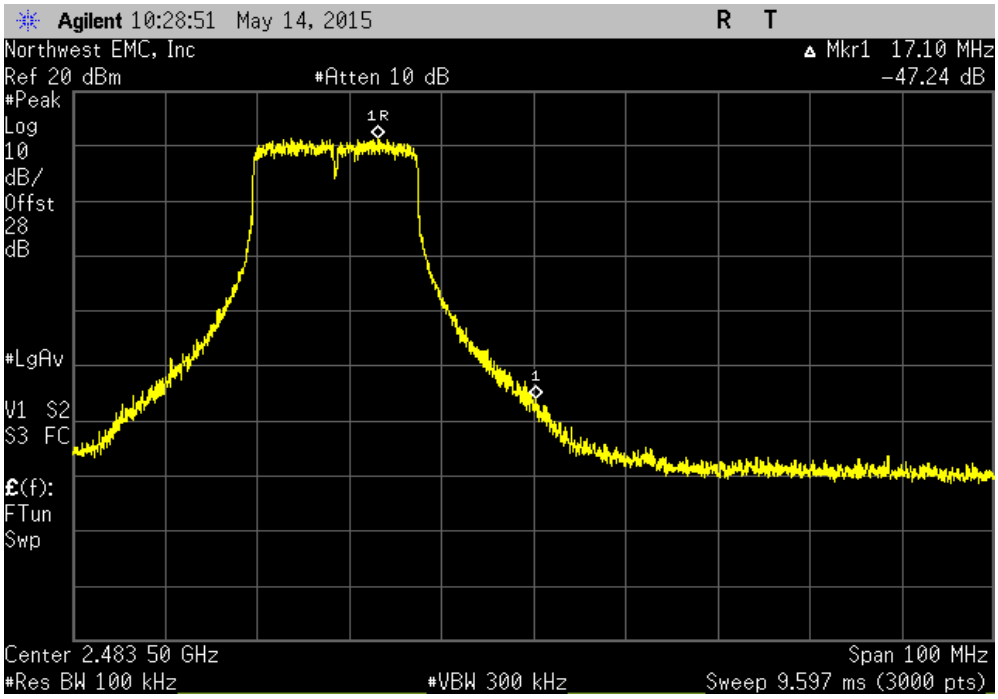
802.11(n) MCS0, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-44.86	-20	Pass



802.11(n) MCS7, Low Channel 1, 2412 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-30.14	-20	Pass



802.11(n) MCS7, High Channel 11, 2462 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-47.24	-20	Pass



OCCUPIED BANDWIDTH

XMit 2015.01.14

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.	Interval (mo)
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	0
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
Attenuator - 26dB SMA	Fairview Microwave	18B5W-26	RFY	7/22/2014	12
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12

TEST DESCRIPTION

The 6dB occupied bandwidth was measured using 100 kHz resolution bandwidth and 300 kHz video bandwidth. The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time.

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

OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2015.01.14

EUT:	WDNU-II			**Work Order:**	ETHE0024
Serial Number:	00:40:9D:7F:B3:D0			**Date:**	05/14/15
Customer:	Digi International			**Temperature:**	22.5°C
Attendees:	None			**Humidity:**	38%
Project:	None			**Barometric Pres.:**	991.1
Tested by:	Trevor Buls, Dustin Sparks	**Power:**	28 VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2009

COMMENTS

Single channel continuous transmission provided by client. Duty cycle set to 100%. Low and High channel digital attenuation set to 2C. Middle channel digital attenuation set to 32.

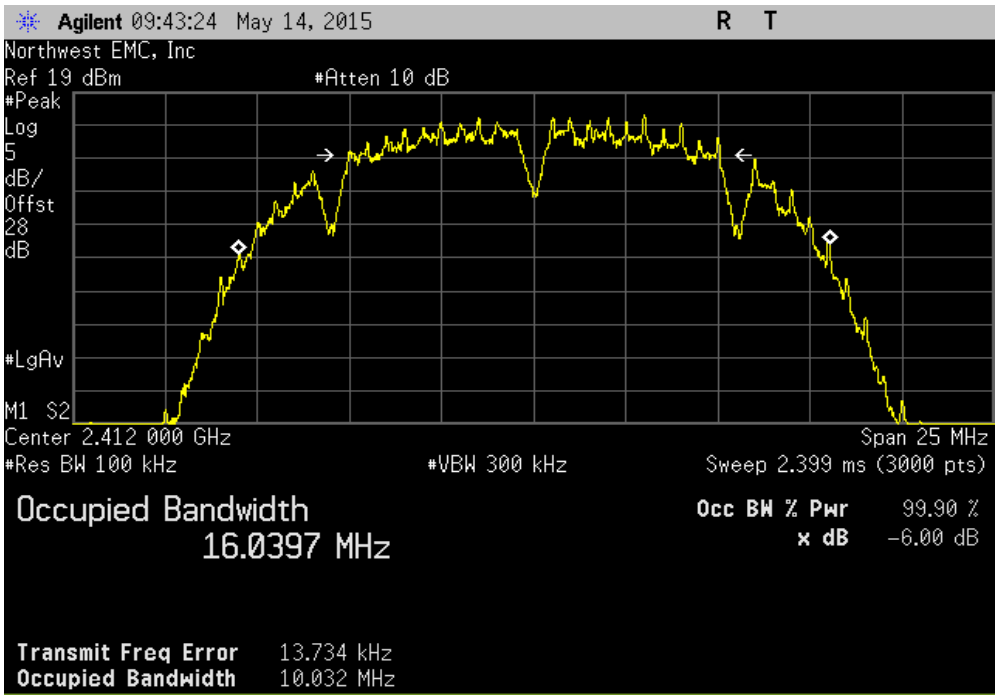
DEVIATIONS FROM TEST STANDARD

None

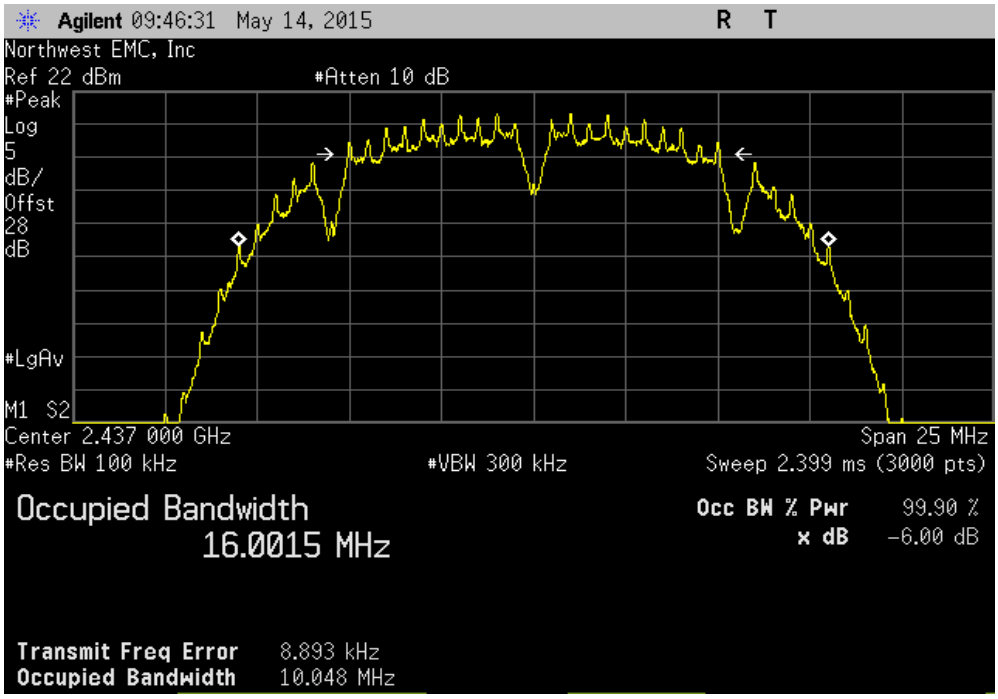
Configuration #	ETHE0024-7	Signature	Trevor Buls

		Value	Limit (>)	Result
802.11(b) 1 Mbps				
	Low Channel 1, 2412 MHz	10.032 MHz	500 kHz	Pass
	Mid Channel 6, 2437 MHz	10.048 MHz	500 kHz	Pass
	High Channel 11, 2462 MHz	10.088 MHz	500 kHz	Pass
802.11(b) 11 Mbps				
	Low Channel 1, 2412 MHz	10.5 MHz	500 kHz	Pass
	Mid Channel 6, 2437 MHz	10.348 MHz	500 kHz	Pass
	High Channel 11, 2462 MHz	10.347 MHz	500 kHz	Pass
802.11(g) 6 Mbps				
	Low Channel 1, 2412 MHz	16.548 MHz	500 kHz	Pass
	Mid Channel 6, 2437 MHz	16.553 MHz	500 kHz	Pass
	High Channel 11, 2462 MHz	16.537 MHz	500 kHz	Pass
802.11(g) 36 Mbps				
	Low Channel 1, 2412 MHz	16.519 MHz	500 kHz	Pass
	Mid Channel 6, 2437 MHz	16.494 MHz	500 kHz	Pass
	High Channel 11, 2462 MHz	16.52 MHz	500 kHz	Pass
802.11(g) 54 Mbps				
	Low Channel 1, 2412 MHz	16.49 MHz	500 kHz	Pass
	Mid Channel 6, 2437 MHz	16.505 MHz	500 kHz	Pass
	High Channel 11, 2462 MHz	16.494 MHz	500 kHz	Pass
802.11(n) MCS0				
	Low Channel 1, 2412 MHz	17.7 MHz	500 kHz	Pass
	Mid Channel 6, 2437 MHz	17.742 MHz	500 kHz	Pass
	High Channel 11, 2462 MHz	17.744 MHz	500 kHz	Pass
802.11(n) MCS7				
	Low Channel 1, 2412 MHz	17.734 MHz	500 kHz	Pass
	Mid Channel 6, 2437 MHz	17.733 MHz	500 kHz	Pass
	High Channel 11, 2462 MHz	17.76 MHz	500 kHz	Pass

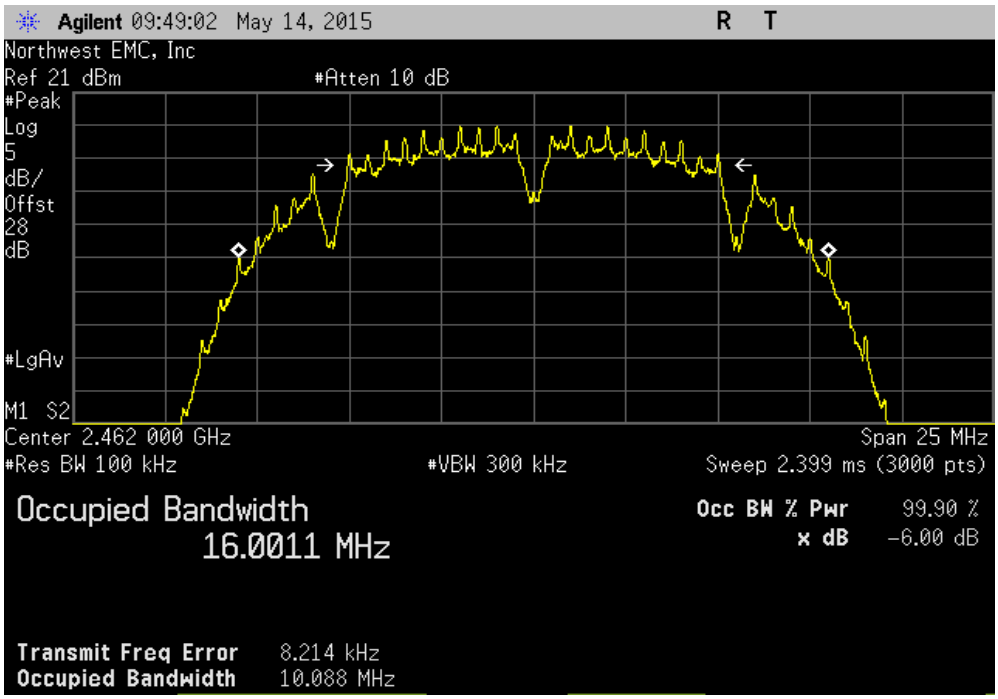
802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				10.032 MHz	500 kHz	Pass



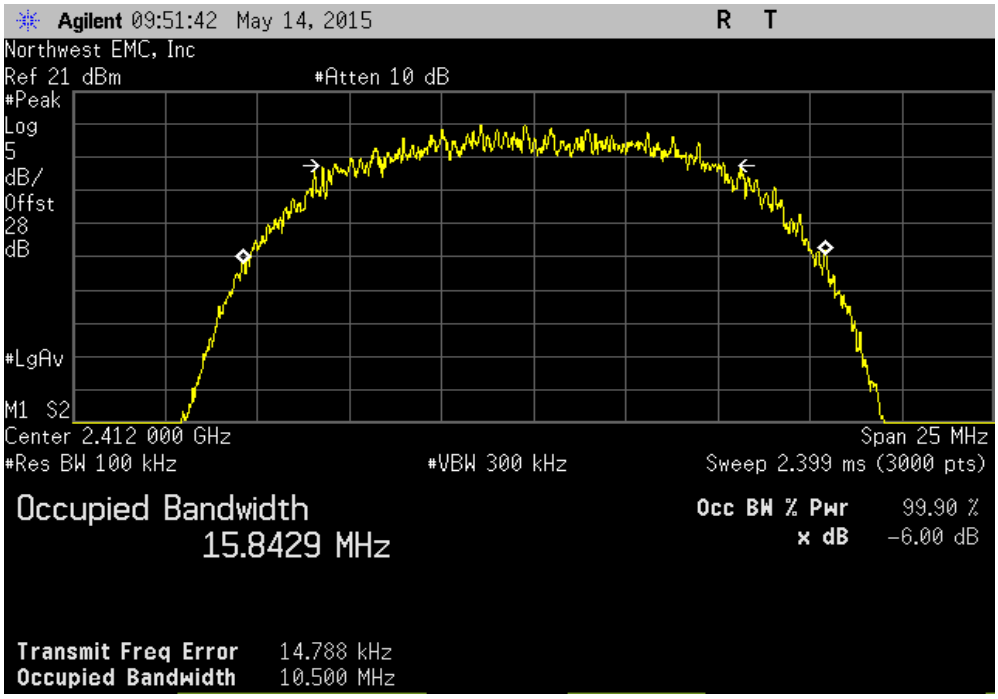
802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				10.048 MHz	500 kHz	Pass



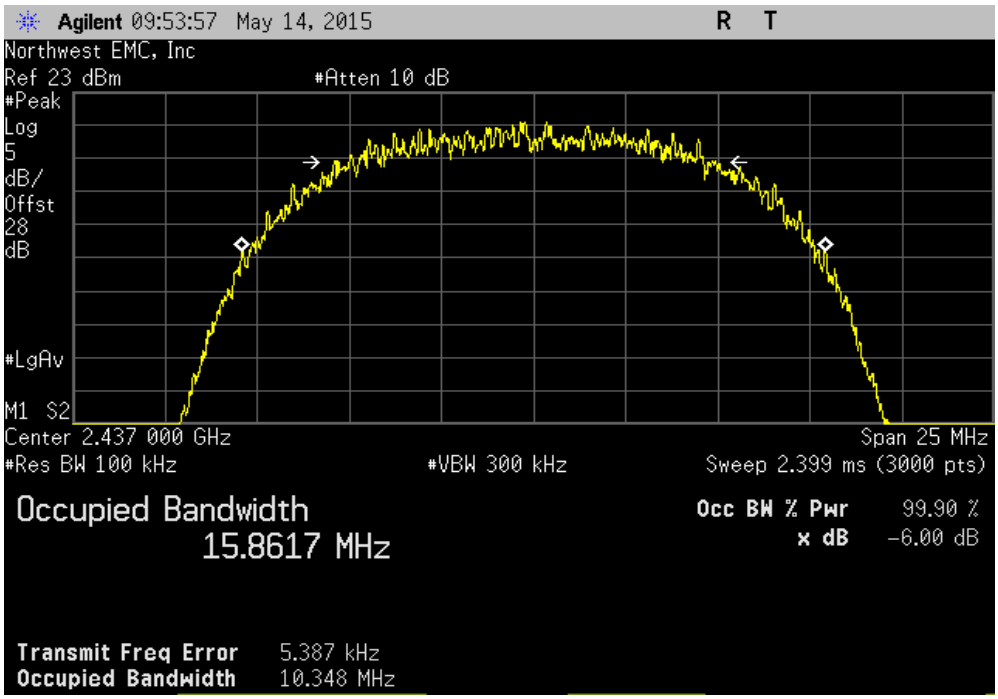
802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				10.088 MHz	500 kHz	Pass



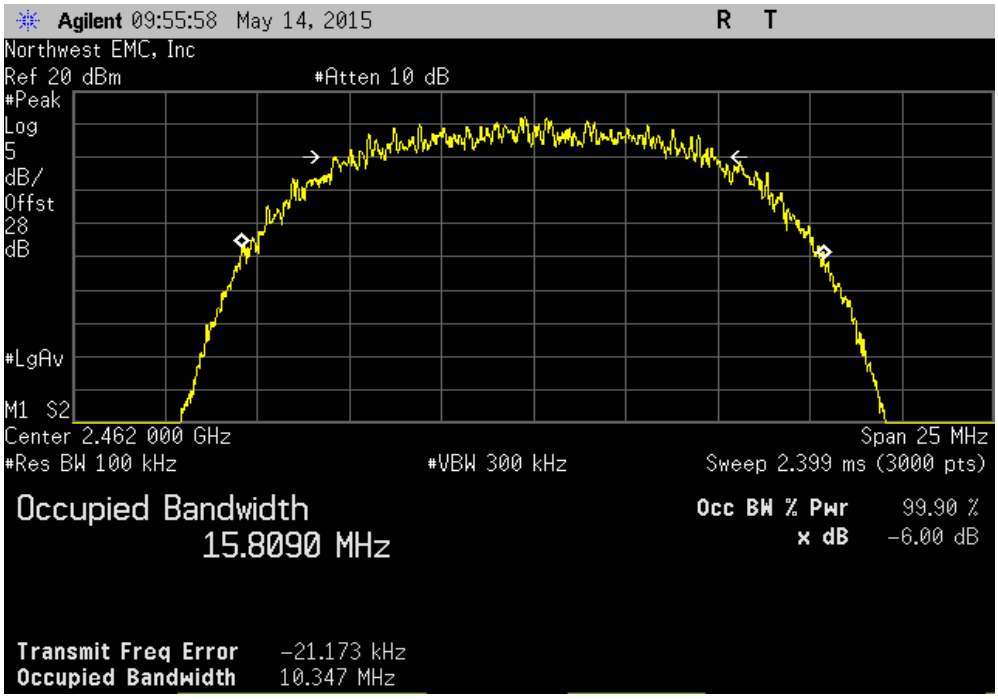
802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				10.5 MHz	500 kHz	Pass



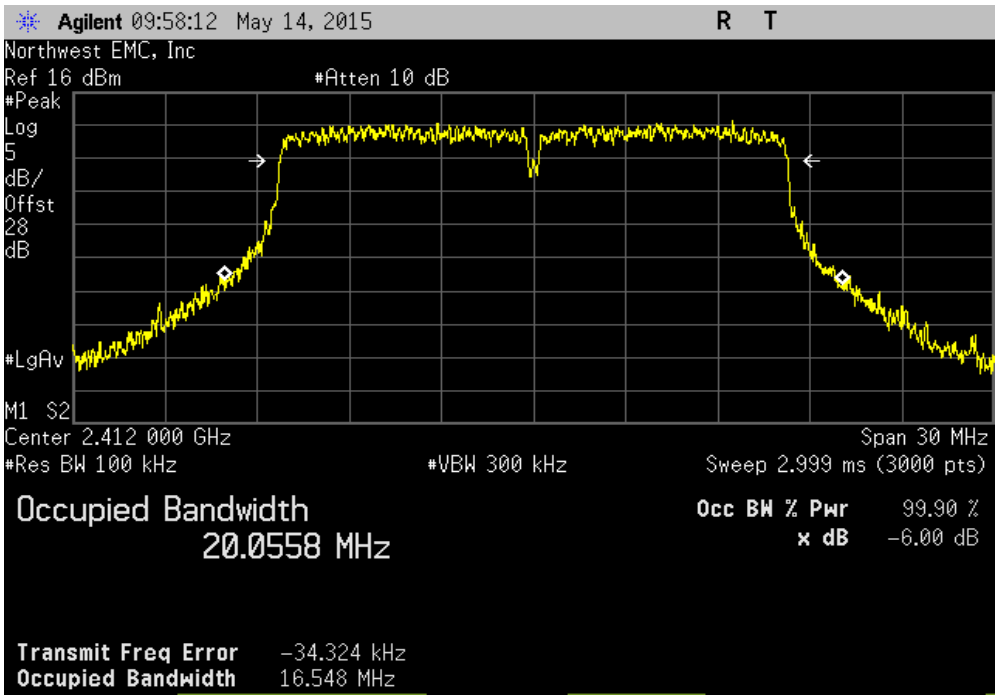
802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				10.348 MHz	500 kHz	Pass



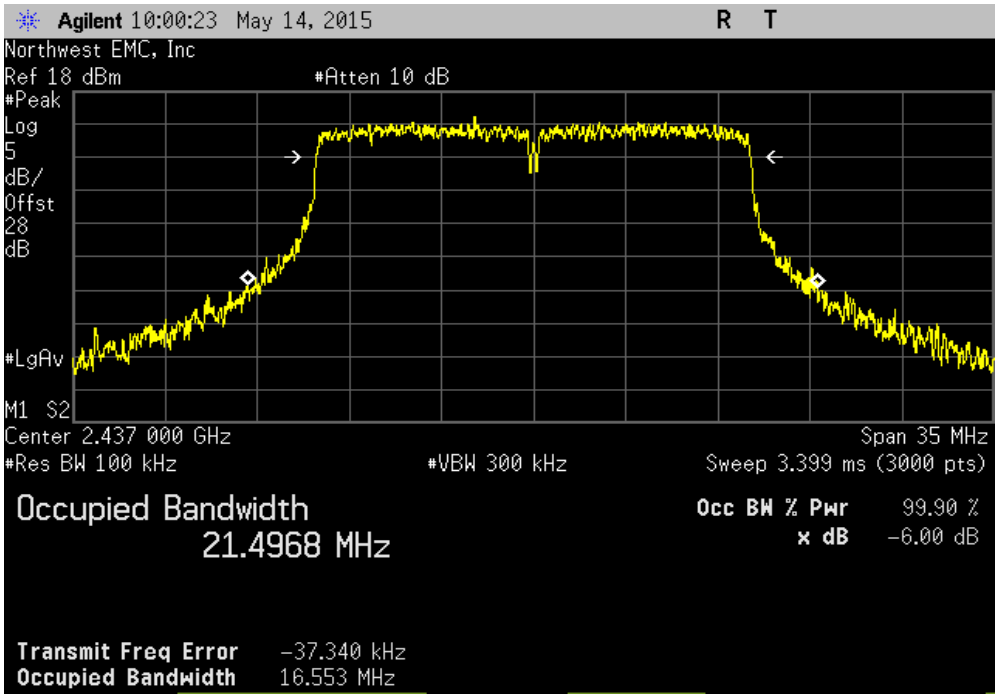
802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				10.347 MHz	500 kHz	Pass



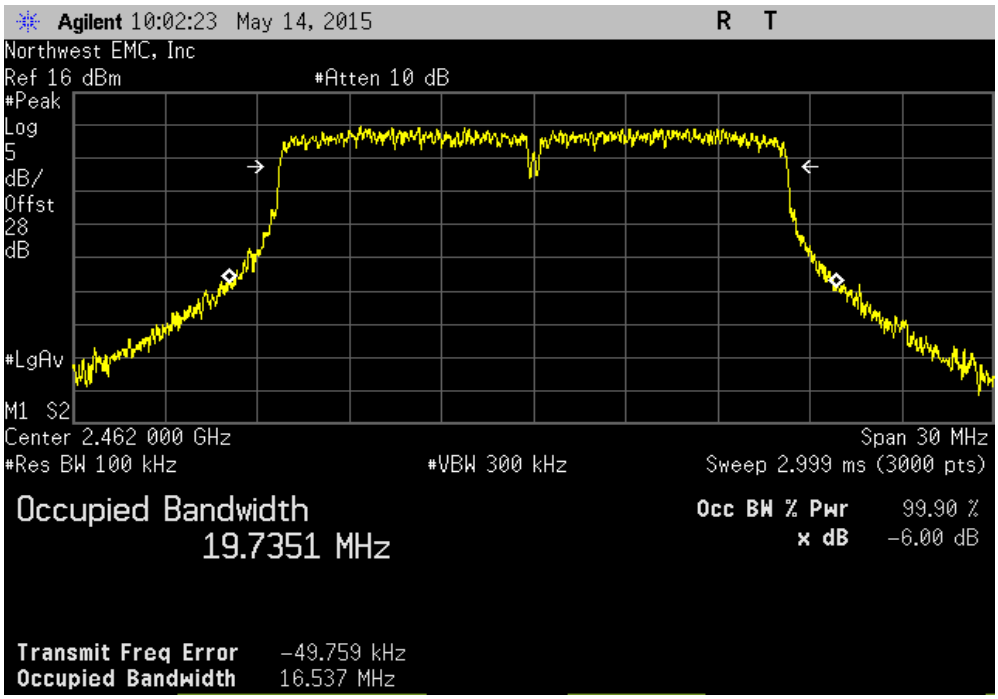
802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				16.548 MHz	500 kHz	Pass



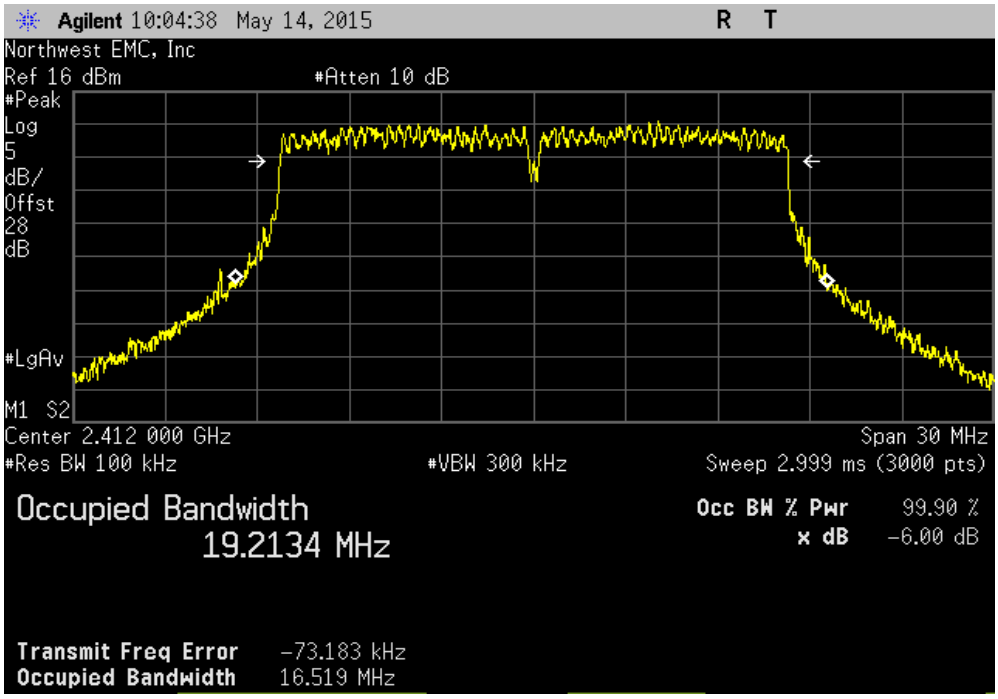
802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				16.553 MHz	500 kHz	Pass



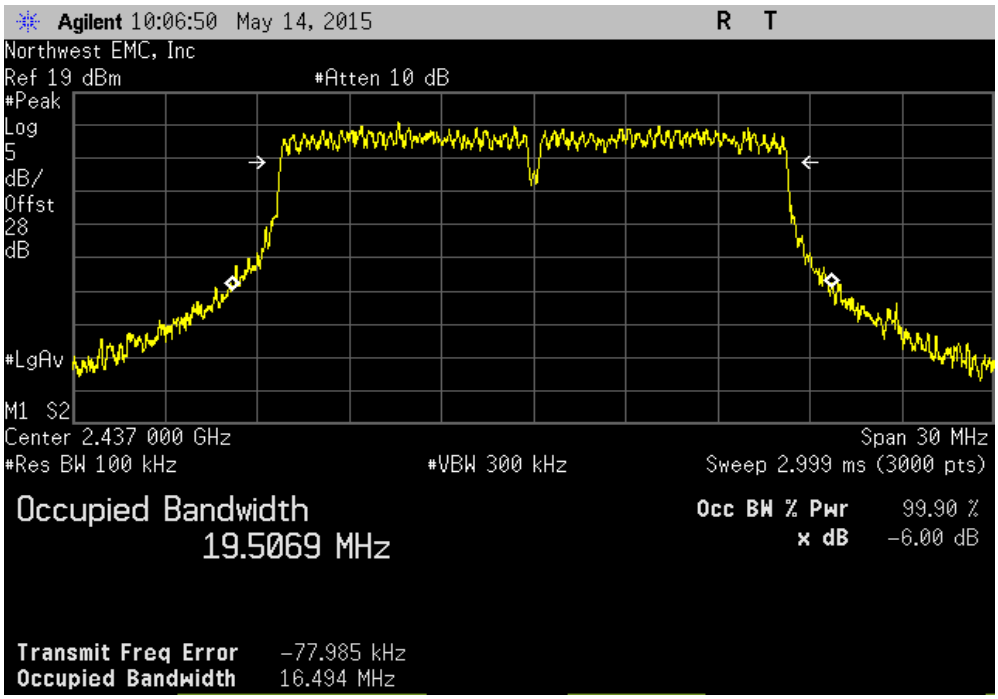
802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				16.537 MHz	500 kHz	Pass



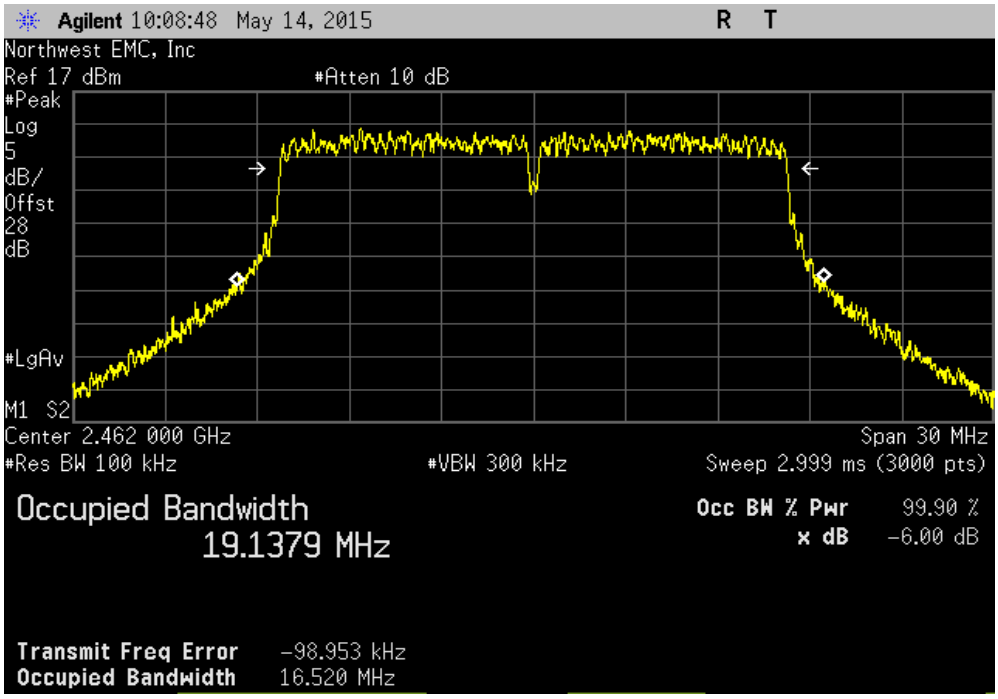
802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				16.519 MHz	500 kHz	Pass



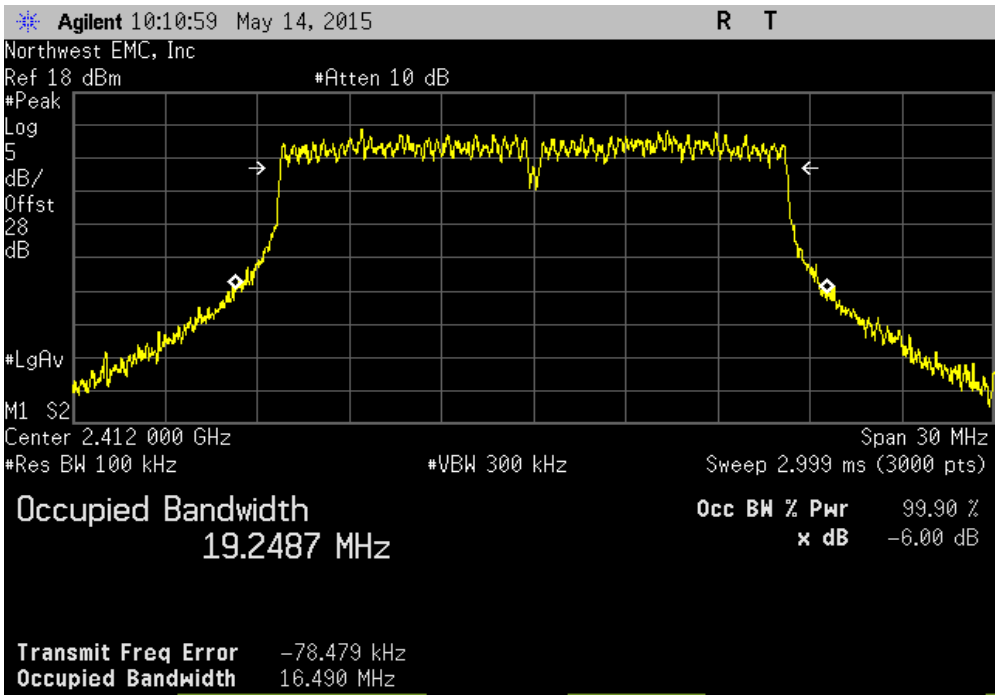
802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz							
					Value	Limit (>)	Result
					16.494 MHz	500 kHz	Pass



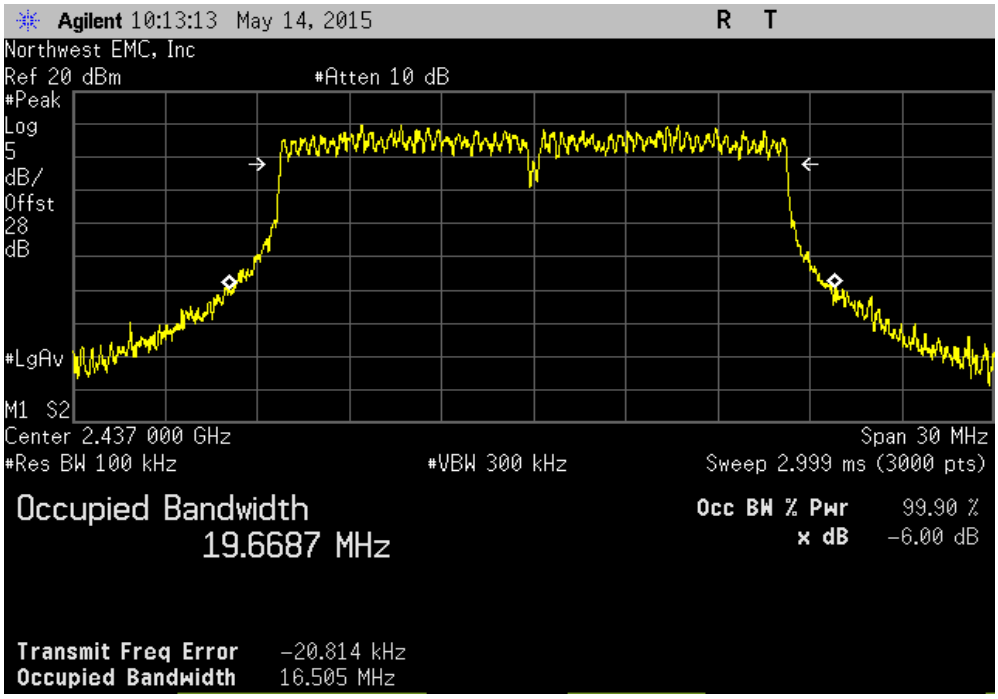
802.11(g) 36 Mbps, High Channel 11, 2462 MHz							
					Value	Limit (>)	Result
					16.52 MHz	500 kHz	Pass



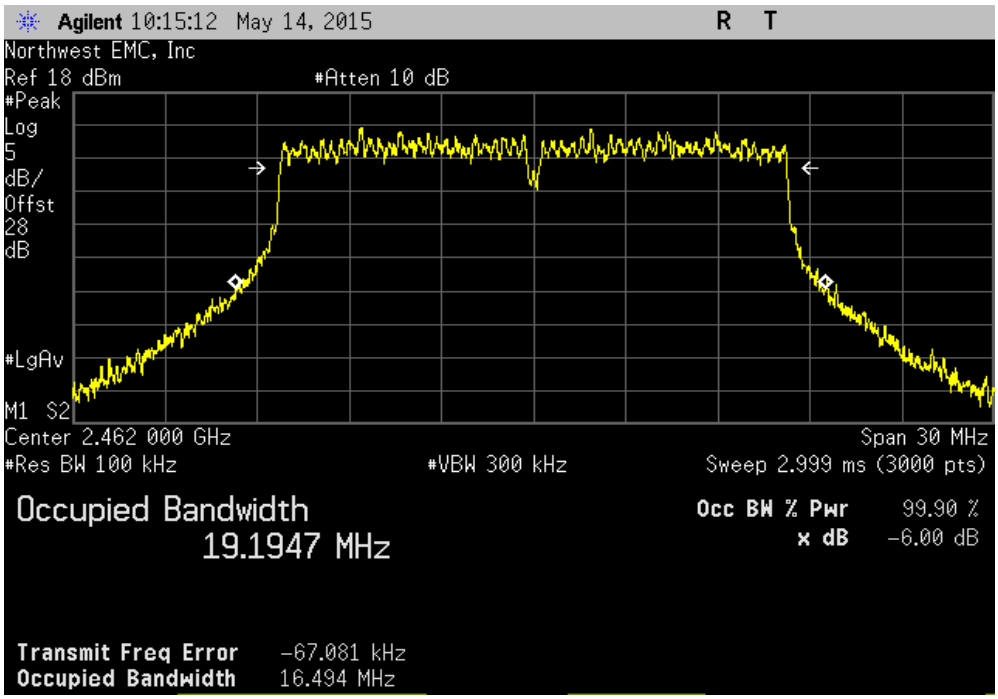
802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				16.49 MHz	500 kHz	Pass



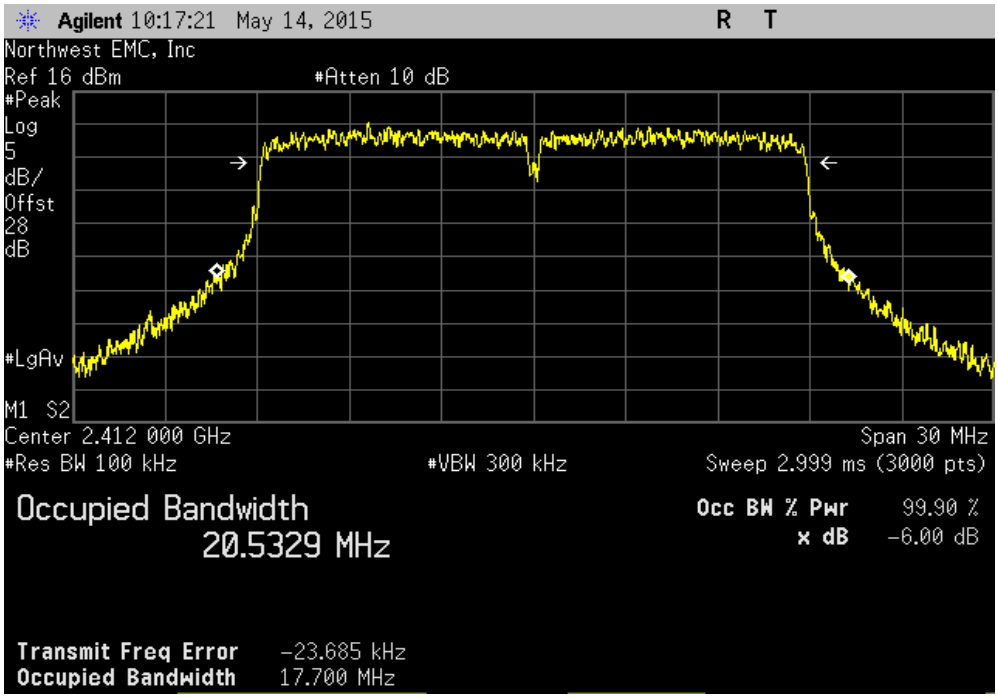
802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				16.505 MHz	500 kHz	Pass



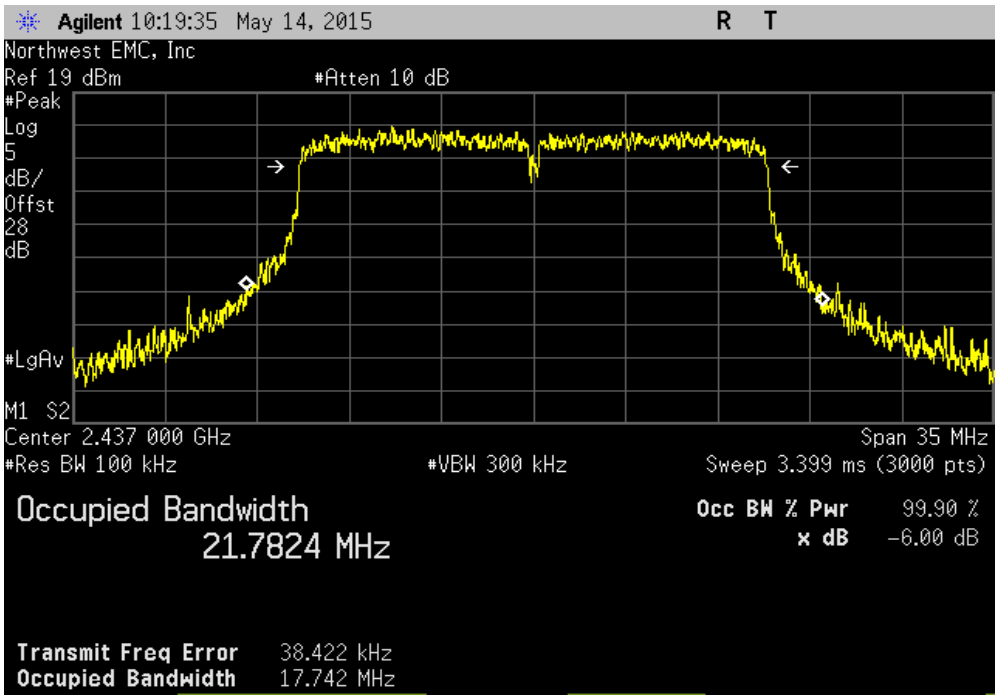
802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				16.494 MHz	500 kHz	Pass



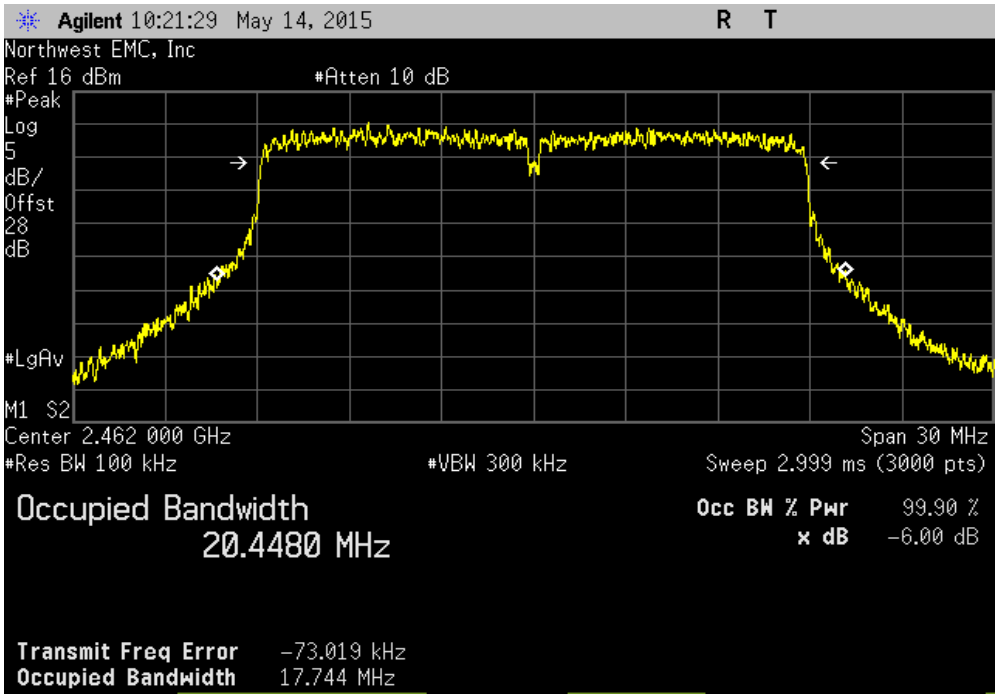
802.11(n) MCS0, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				17.7 MHz	500 kHz	Pass



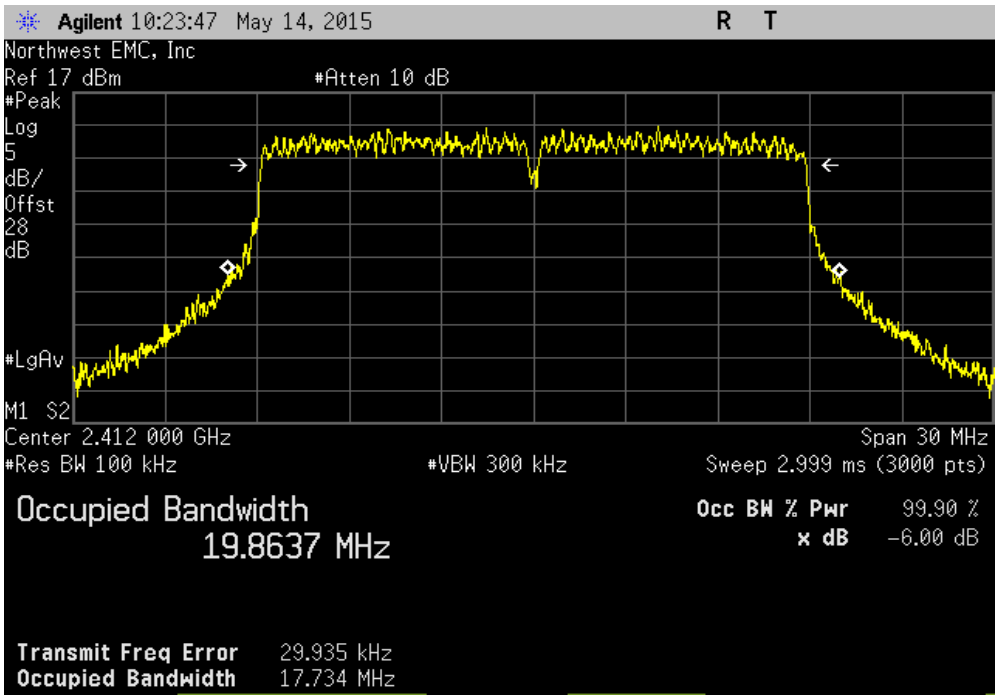
802.11(n) MCS0, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				17.742 MHz	500 kHz	Pass



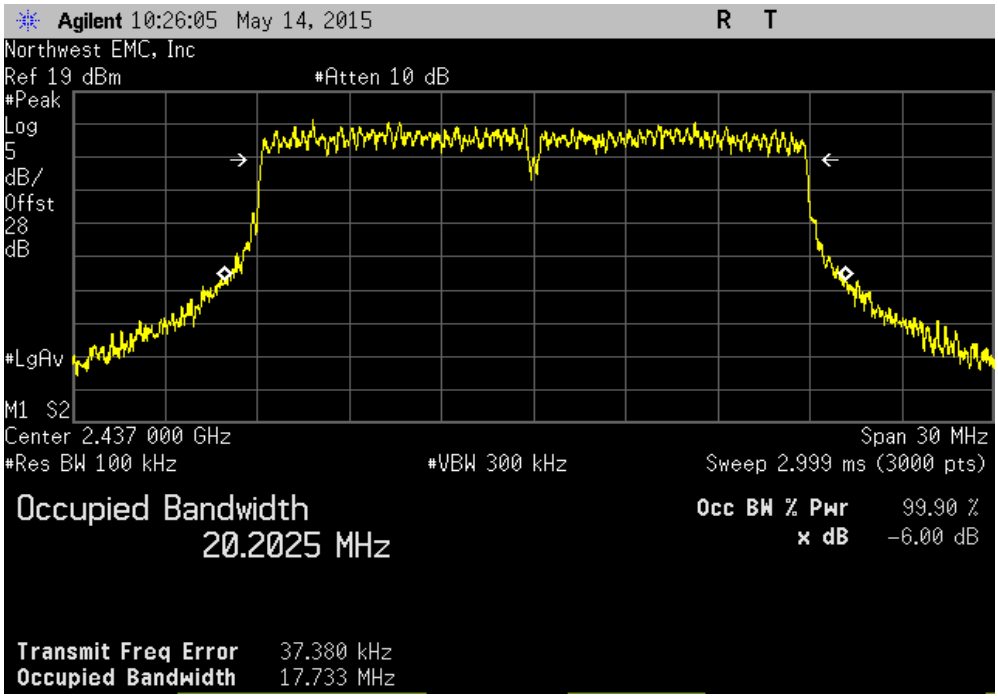
802.11(n) MCS0, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				17.744 MHz	500 kHz	Pass



802.11(n) MCS7, Low Channel 1, 2412 MHz						
				Value	Limit (>)	Result
				17.734 MHz	500 kHz	Pass



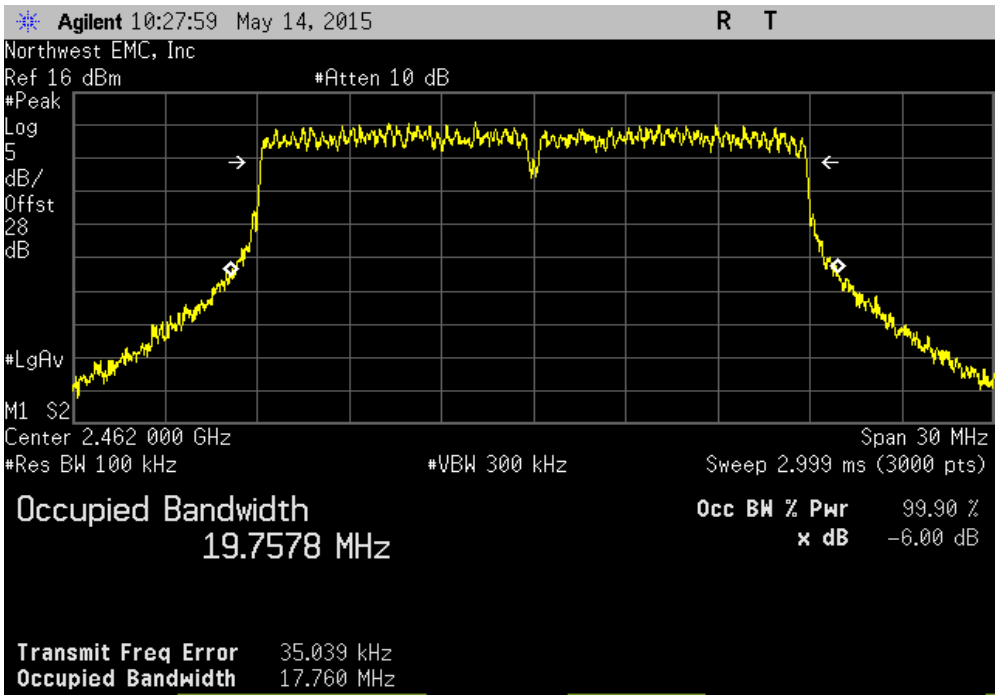
802.11(n) MCS7, Mid Channel 6, 2437 MHz						
				Value	Limit (>)	Result
				17.733 MHz	500 kHz	Pass



OCCUPIED BANDWIDTH

XMit 2015.01.14

802.11(n) MCS7, High Channel 11, 2462 MHz						
				Value	Limit (>)	Result
				17.76 MHz	500 kHz	Pass



OUTPUT POWER

XMit 2015.01.14

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.	Interval (mo)
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
Attenuator - 26dB SMA	Fairview Microwave	18B5W-26	RFY	7/22/2014	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	0
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Prior to measuring peak transmit 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 channel power integration method found in KDB 558074 DTS D01 Measurement Section 9.1.2 was used because the DTS Bandwidth of the radio was greater than the RBW on the analyzer.

De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +36 dBm.

OUTPUT POWER

NORTHWEST EMC

XMit 2015.01.14

EUT:	WDNU-II			**Work Order:**	ETHE0024
Serial Number:	00409D7FB3D0			**Date:**	06/11/15
Customer:	Digi International			**Temperature:**	23.2°C
Attendees:	None			**Humidity:**	50%
Project:	None			**Barometric Pres.:**	983
Tested by:	Trevor Buls, Dustin Sparks	**Power:**	28VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2009

COMMENTS

EEprom file version 06. 0.5 dB increase for all 2412, and all 2462 MHz except lowest data rate. Digital attenuation for low channel and high channel set to 2C, mid channel set to 32. Tx power set to 0 for 6 Mbps and MCS0, all other rates set to 1.

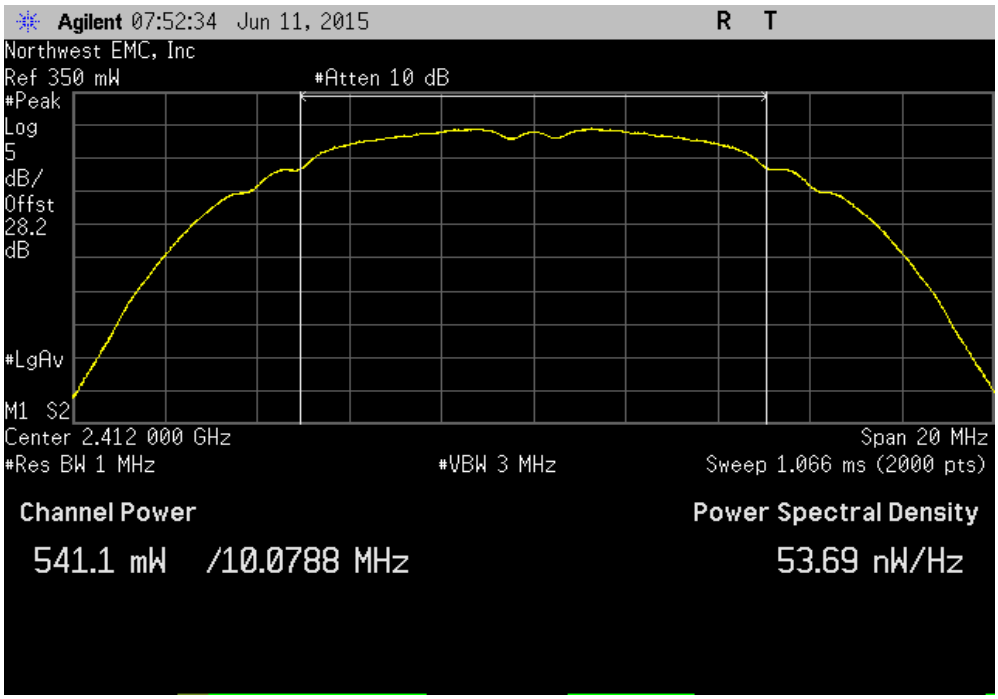
DEVIATIONS FROM TEST STANDARD

None

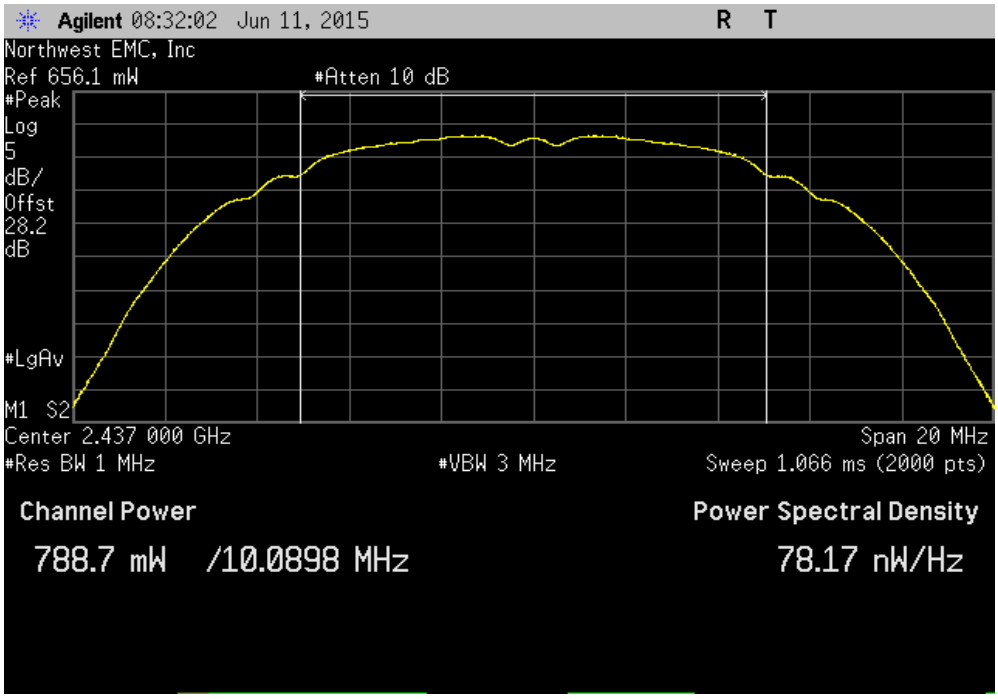
Configuration #	ETHE0024-7	Signature	Trevor Buls

		Value	Limit (<)	Result
802.11(b) 1 Mbps				
	Low Channel 1, 2412 MHz	541.121 mW	1 W	Pass
	Mid Channel 6, 2437 MHz	788.709 mW	1 W	Pass
	High Channel 11, 2462 MHz	506.904 mW	1 W	Pass
802.11(b) 11 Mbps				
	Low Channel 1, 2412 MHz	459.507 mW	1 W	Pass
	Mid Channel 6, 2437 MHz	825.251 mW	1 W	Pass
	High Channel 11, 2462 MHz	520.433 mW	1 W	Pass
802.11(g) 6 Mbps				
	Low Channel 1, 2412 MHz	488.869 mW	1 W	Pass
	Mid Channel 6, 2437 MHz	892.099 mW	1 W	Pass
	High Channel 11, 2462 MHz	469.019 mW	1 W	Pass
802.11(g) 36 Mbps				
	Low Channel 1, 2412 MHz	499.281 mW	1 W	Pass
	Mid Channel 6, 2437 MHz	797.051 mW	1 W	Pass
	High Channel 11, 2462 MHz	448.331 mW	1 W	Pass
802.11(g) 54 Mbps				
	Low Channel 1, 2412 MHz	492.609 mW	1 W	Pass
	Mid Channel 6, 2437 MHz	790.328 mW	1 W	Pass
	High Channel 11, 2462 MHz	445.313 mW	1 W	Pass
802.11(n) MCS0				
	Low Channel 1, 2412 MHz	458.445 mW	1 W	Pass
	Mid Channel 6, 2437 MHz	837.552 mW	1 W	Pass
	High Channel 11, 2462 MHz	499.965 mW	1 W	Pass
802.11(n) MCS7				
	Low Channel 1, 2412 MHz	485.468 mW	1 W	Pass
	Mid Channel 6, 2437 MHz	786.487 mW	1 W	Pass
	High Channel 11, 2462 MHz	435.383 mW	1 W	Pass

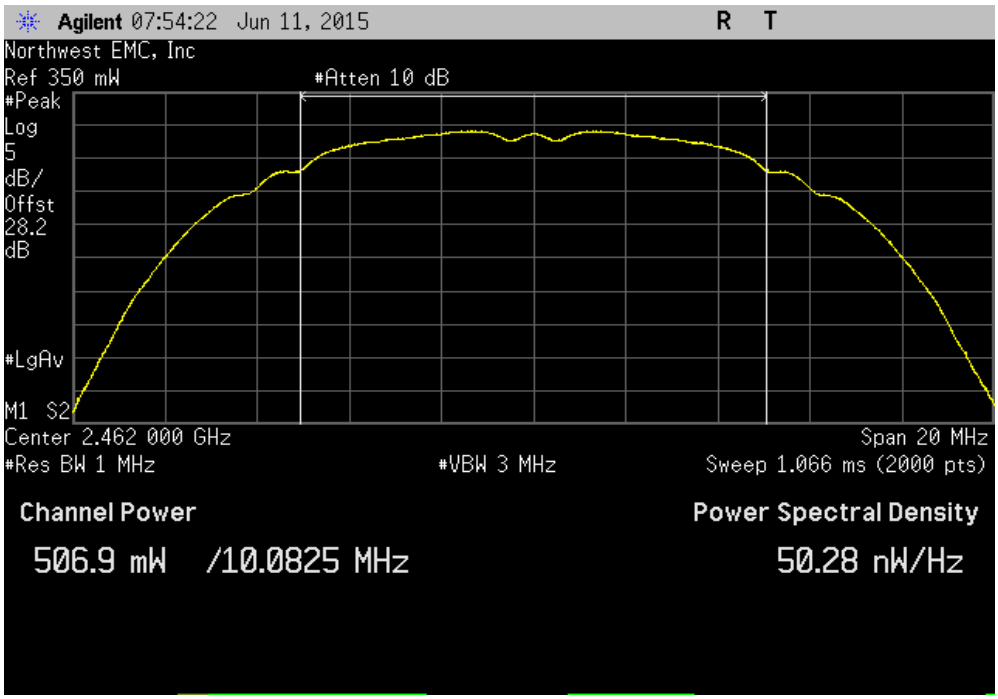
802.11(b) 1 Mbps, Low Channel 1, 2412 MHz							
					Value	Limit (<)	Result
					541.121 mW	1 W	Pass



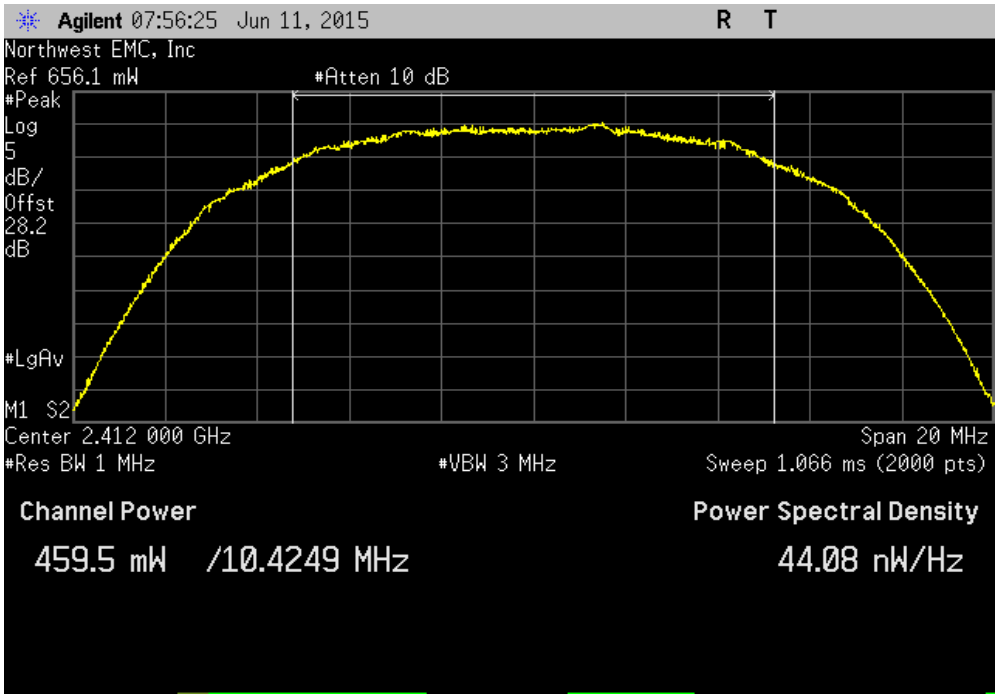
802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz							
					Value	Limit (<)	Result
					788.709 mW	1 W	Pass



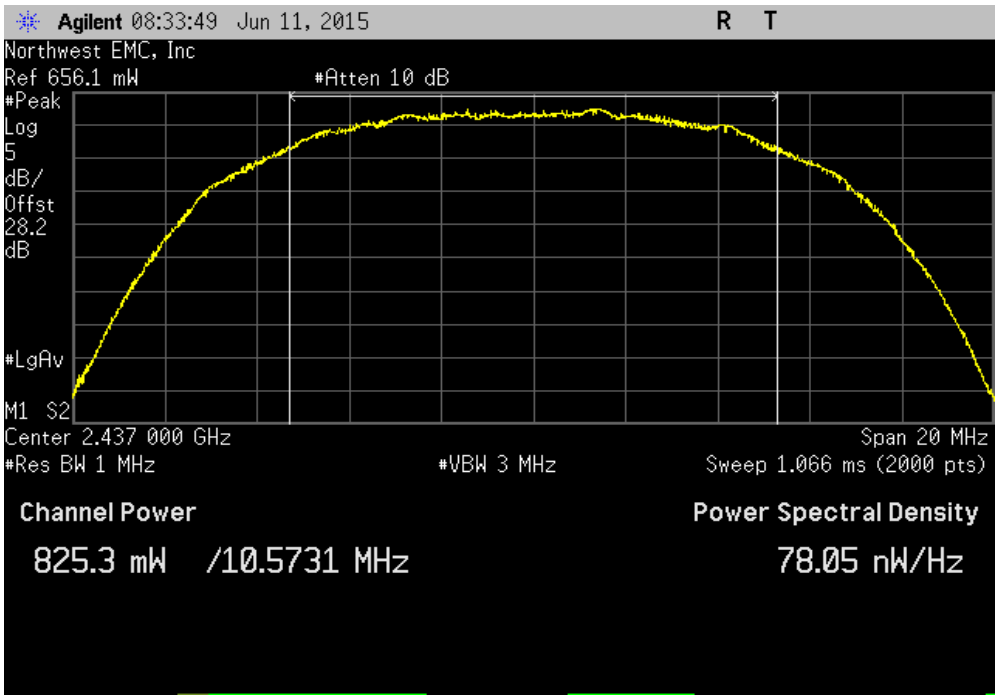
802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (<)	Result
				506.904 mW	1 W	Pass



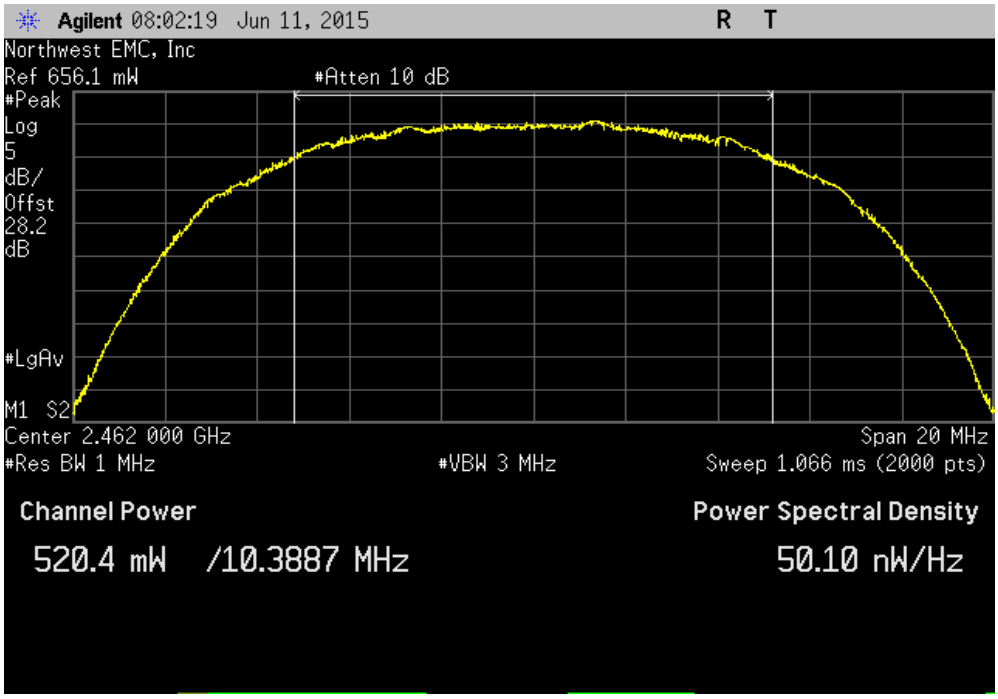
802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (<)	Result
				459.507 mW	1 W	Pass



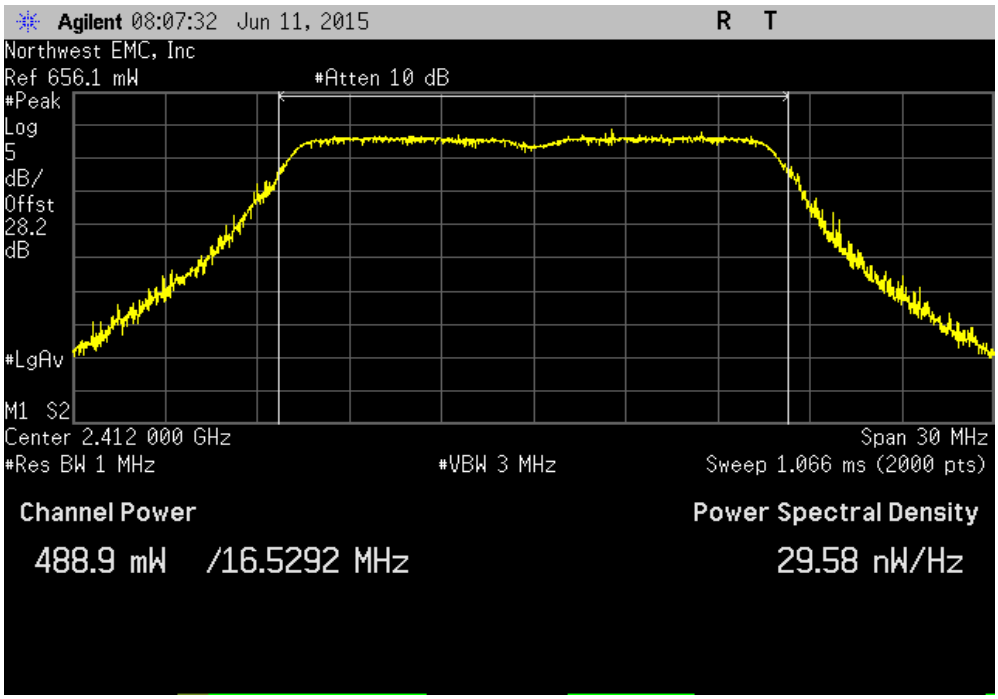
802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz							
					Value	Limit (<)	Result
					825.251 mW	1 W	Pass



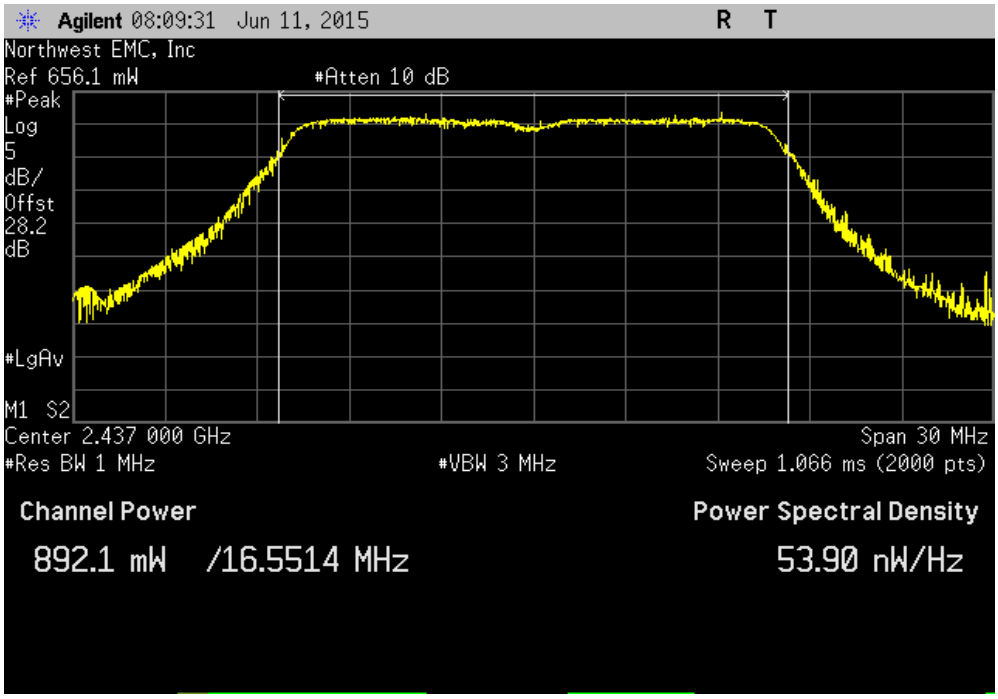
802.11(b) 11 Mbps, High Channel 11, 2462 MHz							
					Value	Limit (<)	Result
					520.433 mW	1 W	Pass



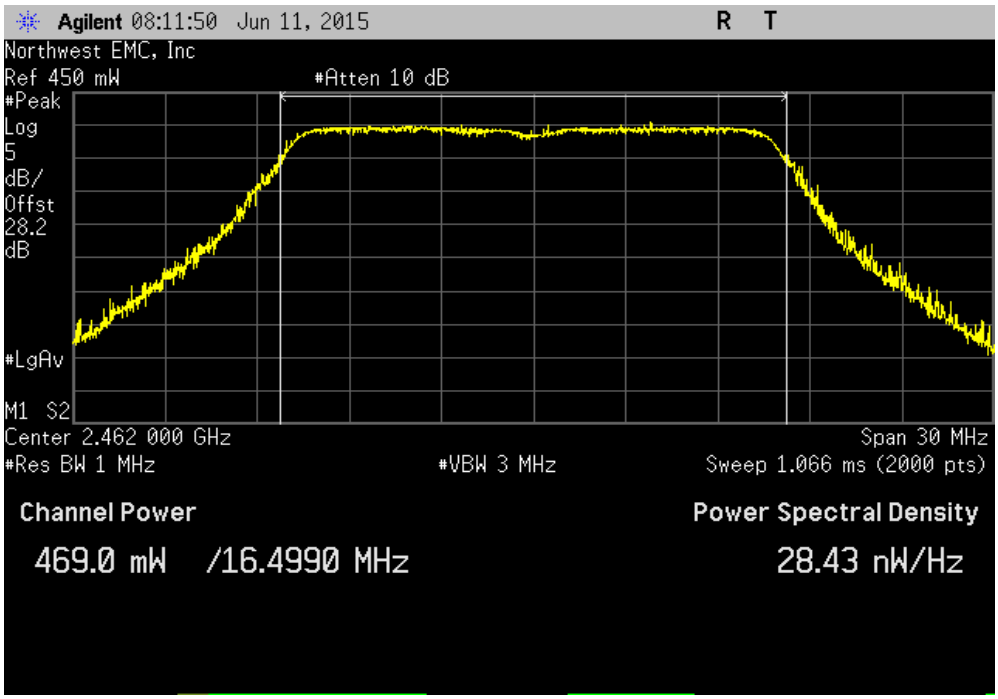
802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
				Value	Limit (<)	Result
				488.869 mW	1 W	Pass



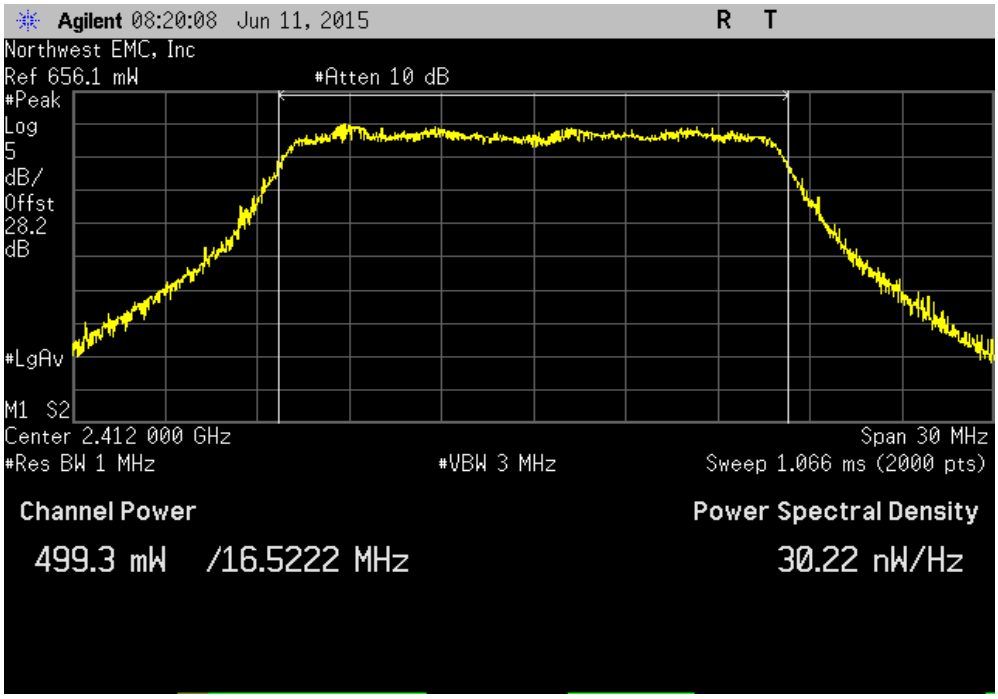
802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
				Value	Limit (<)	Result
				892.099 mW	1 W	Pass



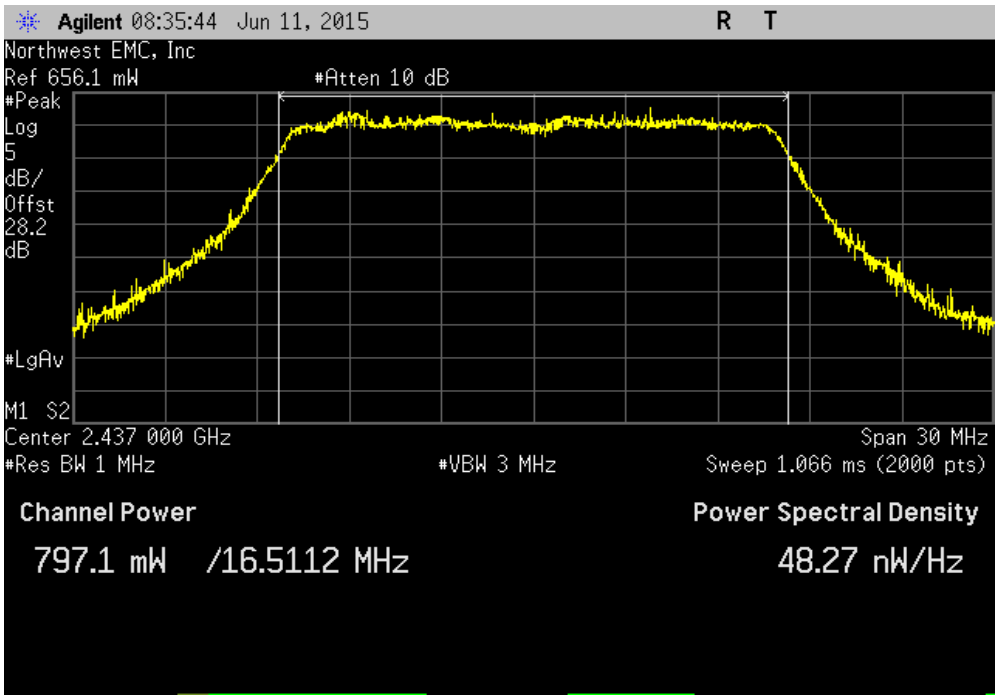
802.11(g) 6 Mbps, High Channel 11, 2462 MHz							
					Value	Limit (<)	Result
					469.019 mW	1 W	Pass



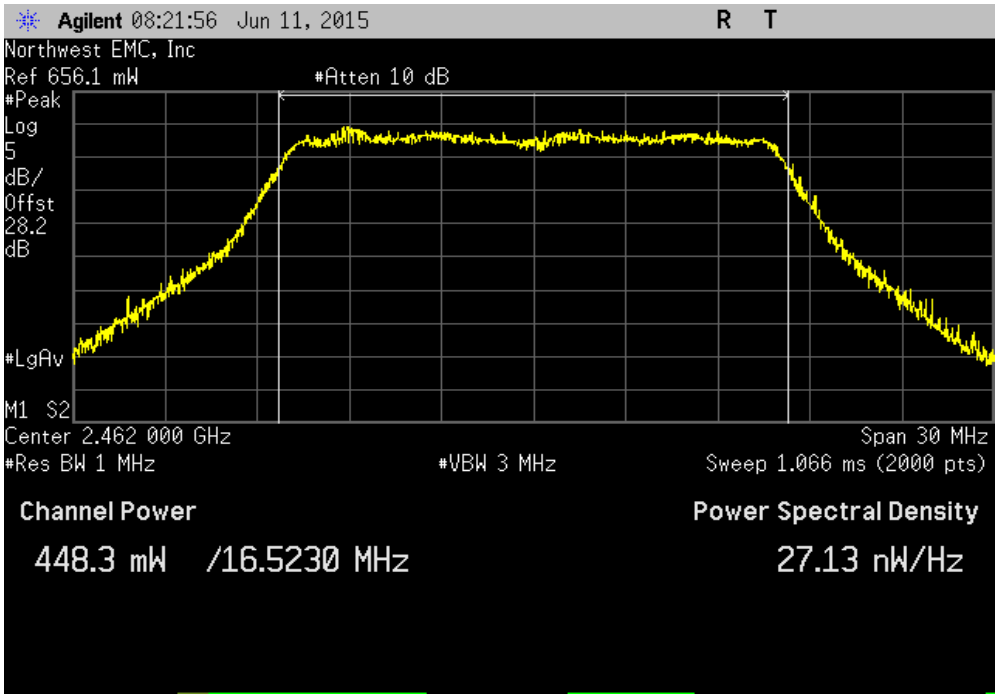
802.11(g) 36 Mbps, Low Channel 1, 2412 MHz							
					Value	Limit (<)	Result
					499.281 mW	1 W	Pass



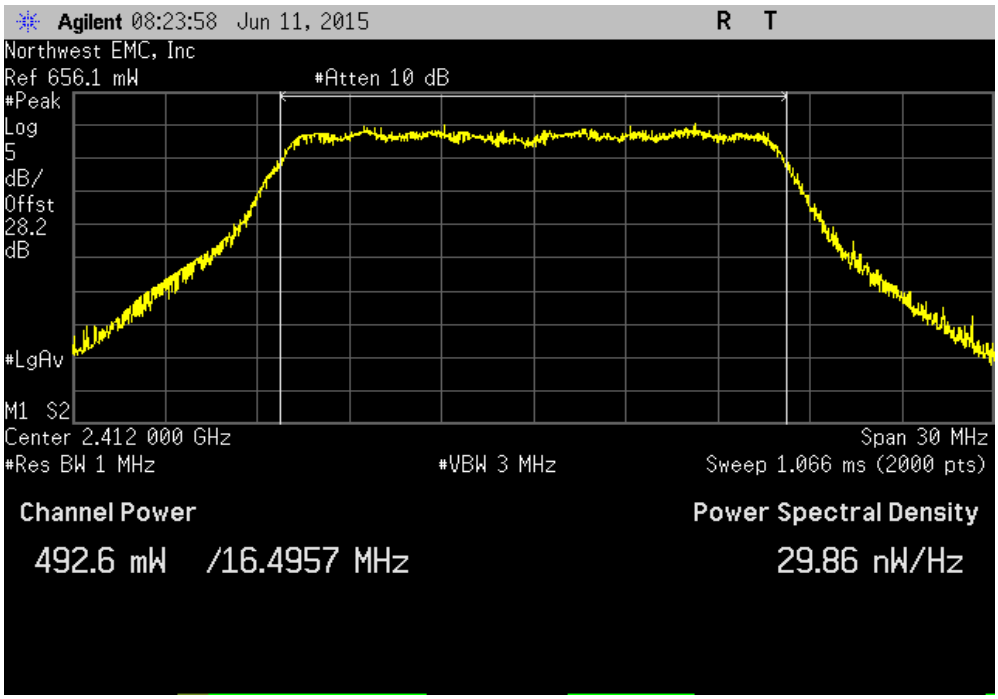
802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz							
					Value	Limit (<)	Result
					797.051 mW	1 W	Pass



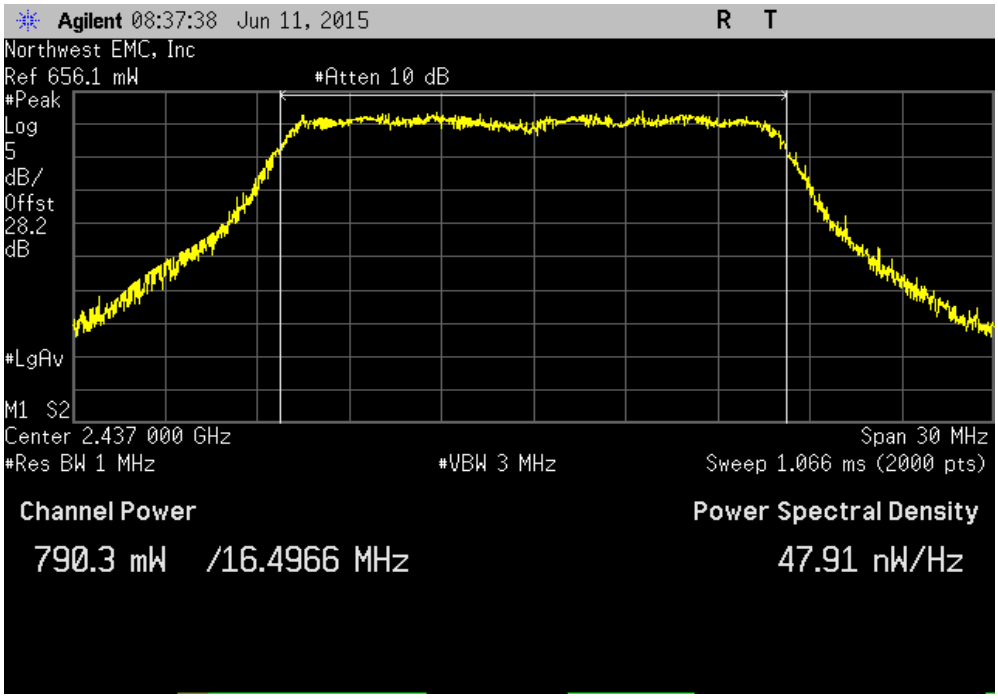
802.11(g) 36 Mbps, High Channel 11, 2462 MHz							
					Value	Limit (<)	Result
					448.331 mW	1 W	Pass



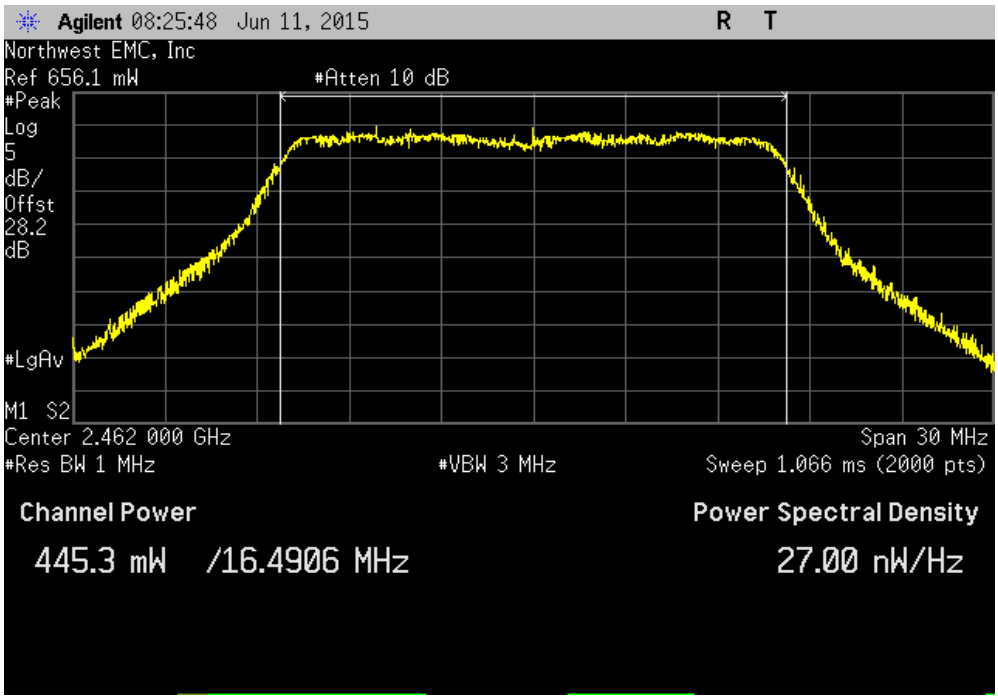
802.11(g) 54 Mbps, Low Channel 1, 2412 MHz							
					Value	Limit (<)	Result
					492.609 mW	1 W	Pass



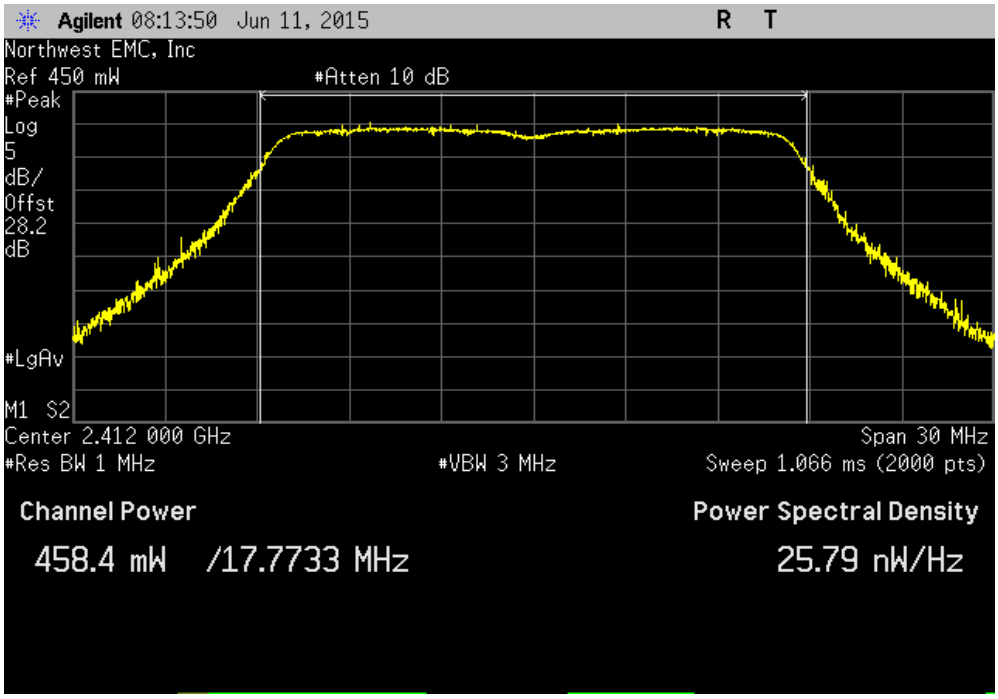
802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz							
					Value	Limit (<)	Result
					790.328 mW	1 W	Pass



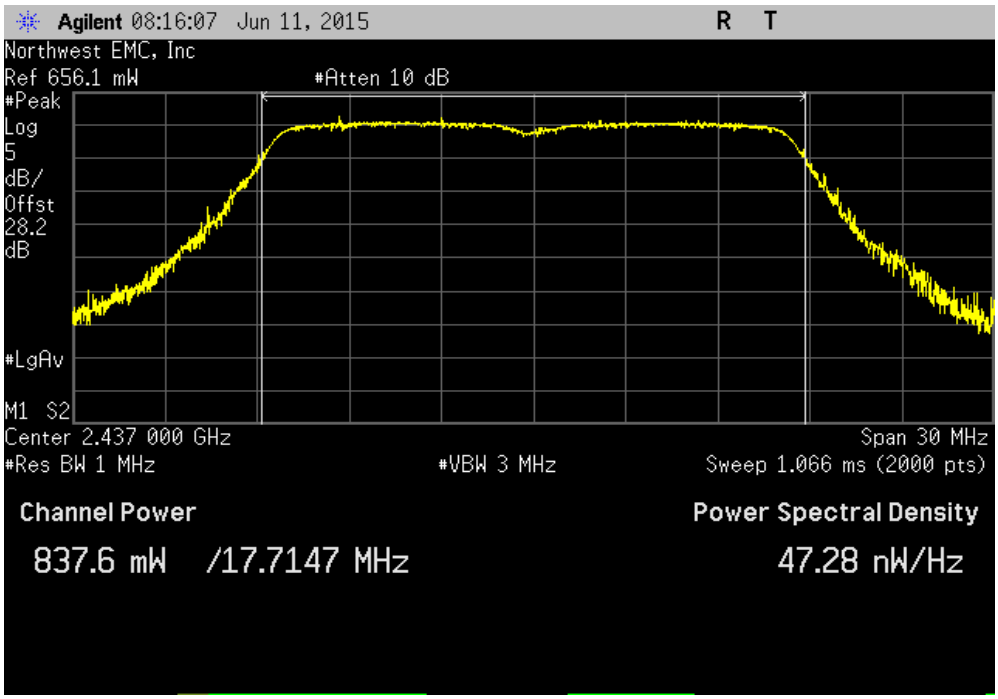
802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
				Value	Limit (<)	Result
				445.313 mW	1 W	Pass



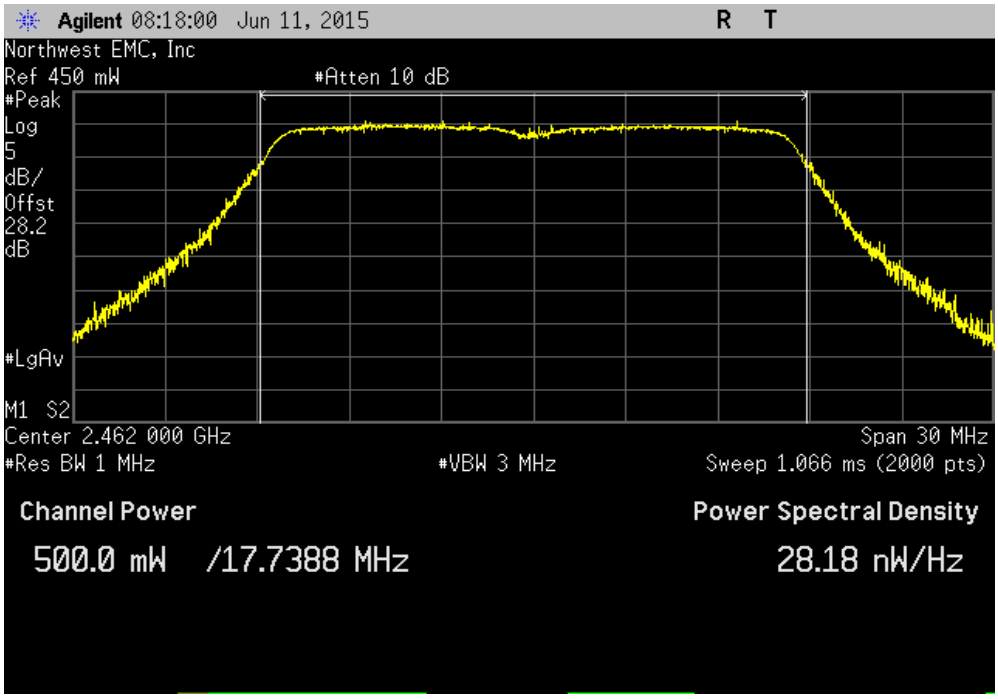
802.11(n) MCS0, Low Channel 1, 2412 MHz						
				Value	Limit (<)	Result
				458.445 mW	1 W	Pass



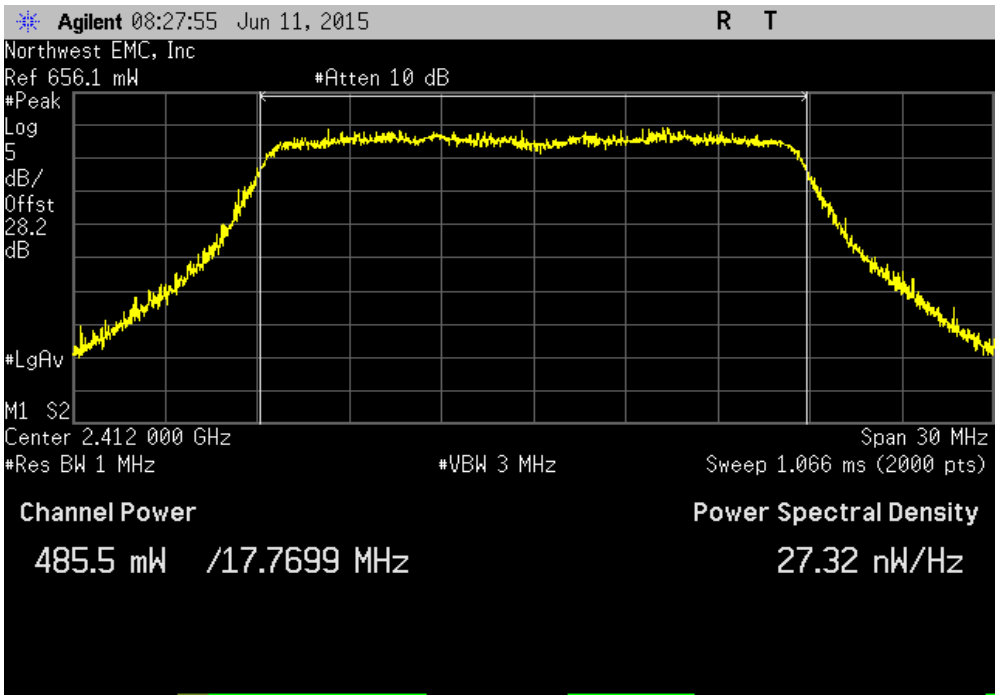
802.11(n) MCS0, Mid Channel 6, 2437 MHz							
					Value	Limit (<)	Result
					837.552 mW	1 W	Pass



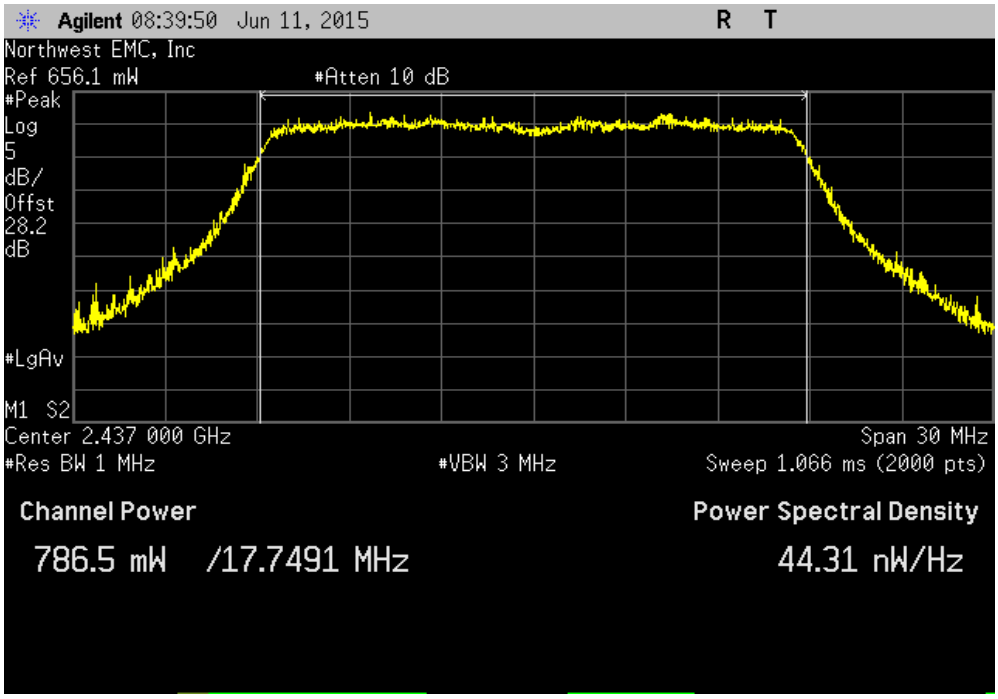
802.11(n) MCS0, High Channel 11, 2462 MHz							
					Value	Limit (<)	Result
					499.965 mW	1 W	Pass



802.11(n) MCS7, Low Channel 1, 2412 MHz							
					Value	Limit (<)	Result
					485.468 mW	1 W	Pass



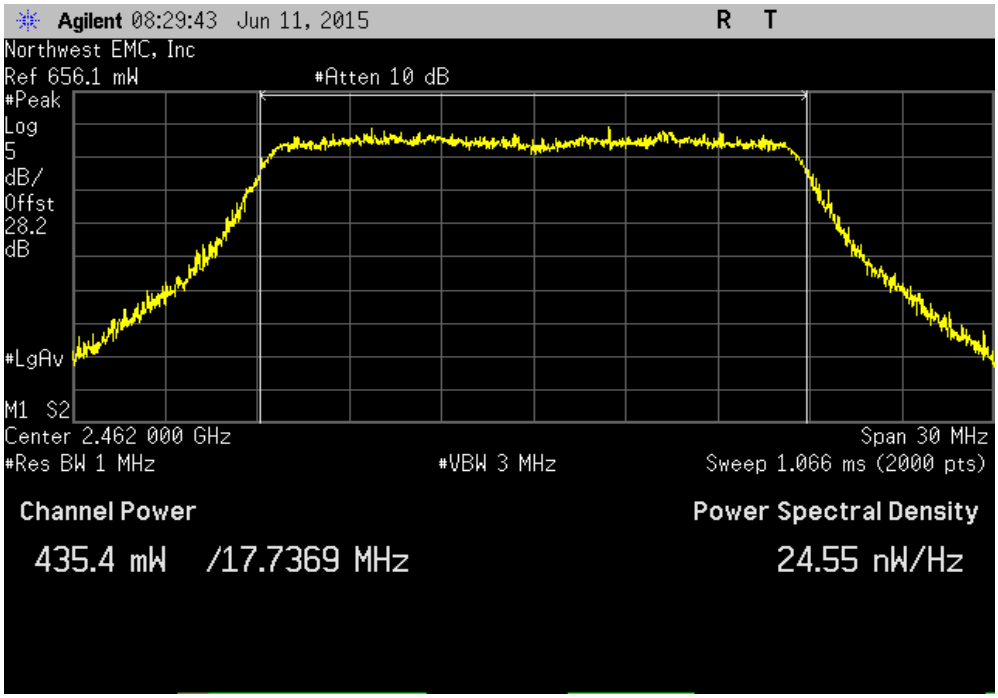
802.11(n) MCS7, Mid Channel 6, 2437 MHz							
					Value	Limit (<)	Result
					786.487 mW	1 W	Pass



OUTPUT POWER

XMit 2015.01.14

802.11(n) MCS7, High Channel 11, 2462 MHz						
				Value	Limit (<)	Result
				435.383 mW	1 W	Pass



POWER SPECTRAL DENSITY

XMit 2015.01.14

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.	Interval (mo)
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12
Attenuator - 26dB SMA	Fairview Microwave	18B5W-26	RFY	7/22/2014	12
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	0
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12

TEST DESCRIPTION

The maximum power spectral density measurements were measured with the EUT set to the required transmit frequencies in each band. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the lowest, middle, and maximum data rate for each modulation type available.

Per the procedure outlined in FCC KDB 558074 D01 DTS Measurement Section 5.3.1, the spectrum analyzer was used as follows:

- RBW = 100 kHz
- VBW = 300 kHz
- Detector = Peak (to match method used for power measurement)
- Trace = Max hold

The observed power level is then scaled to an equivalent value in 3 kHz by adding a Bandwidth Correction Factor (BWCF) where:

BWCF = 10*LOG (3 kHz / 100 kHz) = -15.2 dB

POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2015.01.14

EUT:	WDNU-II			**Work Order:**	ETHE0024
Serial Number:	00409D7FB3D0			**Date:**	06/11/15
Customer:	Digi International			**Temperature:**	23.2°C
Attendees:	None			**Humidity:**	50%
Project:	None			**Barometric Pres.:**	983
Tested by:	Trevor Buls, Dustin Sparks	**Power:**	28VDC	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.247:2015	ANSI C63.10:2009

COMMENTS

EEprom file version 06. 0.5 dB increase for all 2412, and all 2462 MHz except lowest data rate. Digital attenuation for low channel and high channel set to 2C, mid channel set to 32. Tx power set to 0 for 6 Mbps and MCS0, all other rates set to 1.

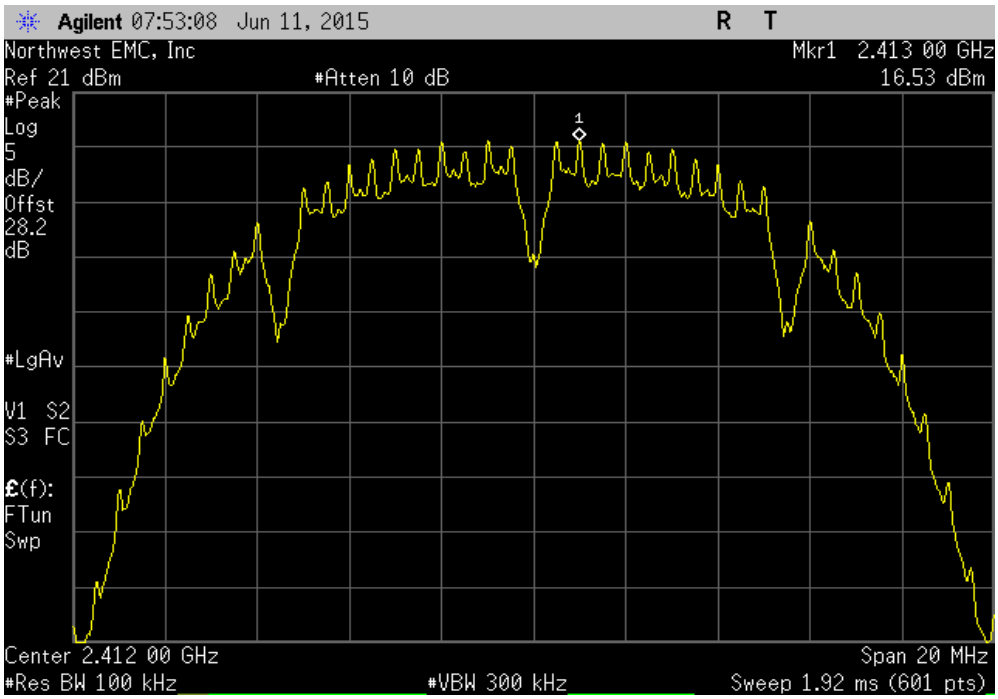
DEVIATIONS FROM TEST STANDARD

None

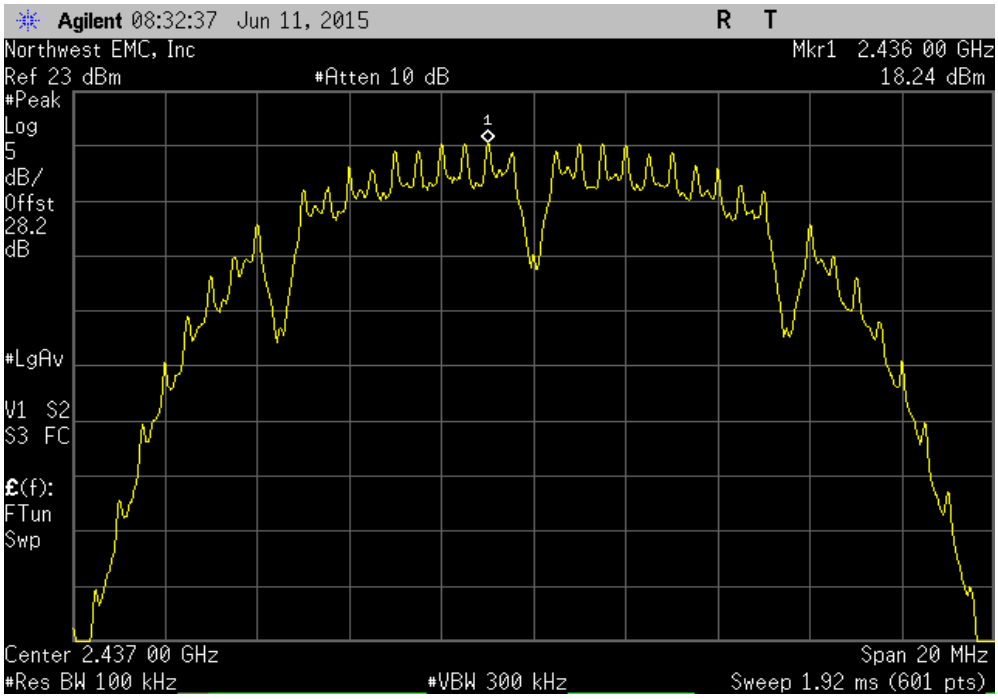
Configuration #	ETHE0024-7	Signature	Trevor Buls

		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
802.11(b) 1 Mbps						
	Low Channel 1, 2412 MHz	16.535	-15.2	1.335	8	Pass
	Mid Channel 6, 2437 MHz	18.241	-15.2	3.041	8	Pass
	High Channel 11, 2462 MHz	16.294	-15.2	1.094	8	Pass
802.11(b) 11 Mbps						
	Low Channel 1, 2412 MHz	16.852	-15.2	1.652	8	Pass
	Mid Channel 6, 2437 MHz	19.087	-15.2	3.887	8	Pass
	High Channel 11, 2462 MHz	16.938	-15.2	1.738	8	Pass
802.11(g) 6 Mbps						
	Low Channel 1, 2412 MHz	11.401	-15.2	-3.799	8	Pass
	Mid Channel 6, 2437 MHz	14.168	-15.2	-1.032	8	Pass
	High Channel 11, 2462 MHz	11.07	-15.2	-4.13	8	Pass
802.11(g) 36 Mbps						
	Low Channel 1, 2412 MHz	13.279	-15.2	-1.921	8	Pass
	Mid Channel 6, 2437 MHz	14.759	-15.2	-0.441	8	Pass
	High Channel 11, 2462 MHz	12.232	-15.2	-2.968	8	Pass
802.11(g) 54 Mbps						
	Low Channel 1, 2412 MHz	13.308	-15.2	-1.892	8	Pass
	Mid Channel 6, 2437 MHz	15.103	-15.2	-0.097	8	Pass
	High Channel 11, 2462 MHz	12.544	-15.2	-2.656	8	Pass
802.11(n) MCS0						
	Low Channel 1, 2412 MHz	11.48	-15.2	-3.72	8	Pass
	Mid Channel 6, 2437 MHz	14.181	-15.2	-1.019	8	Pass
	High Channel 11, 2462 MHz	11.523	-15.2	-3.677	8	Pass
802.11(n) MCS7						
	Low Channel 1, 2412 MHz	12.571	-15.2	-2.629	8	Pass
	Mid Channel 6, 2437 MHz	15.323	-15.2	0.123	8	Pass
	High Channel 11, 2462 MHz	12.624	-15.2	-2.576	8	Pass

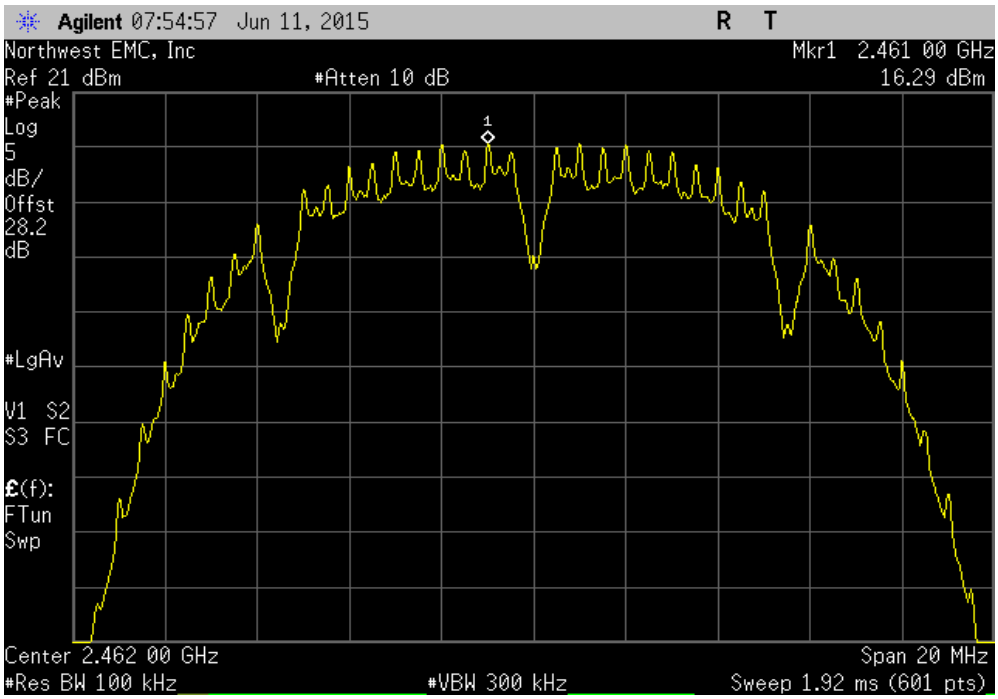
802.11(b) 1 Mbps, Low Channel 1, 2412 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		16.535	-15.2	1.335	8	Pass



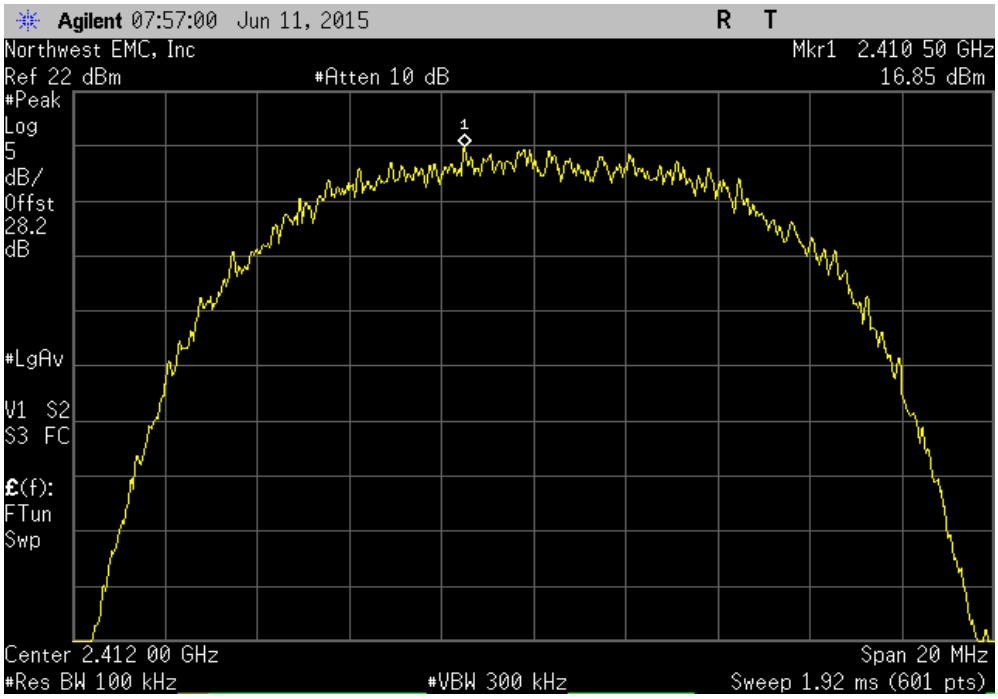
802.11(b) 1 Mbps, Mid Channel 6, 2437 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		18.241	-15.2	3.041	8	Pass



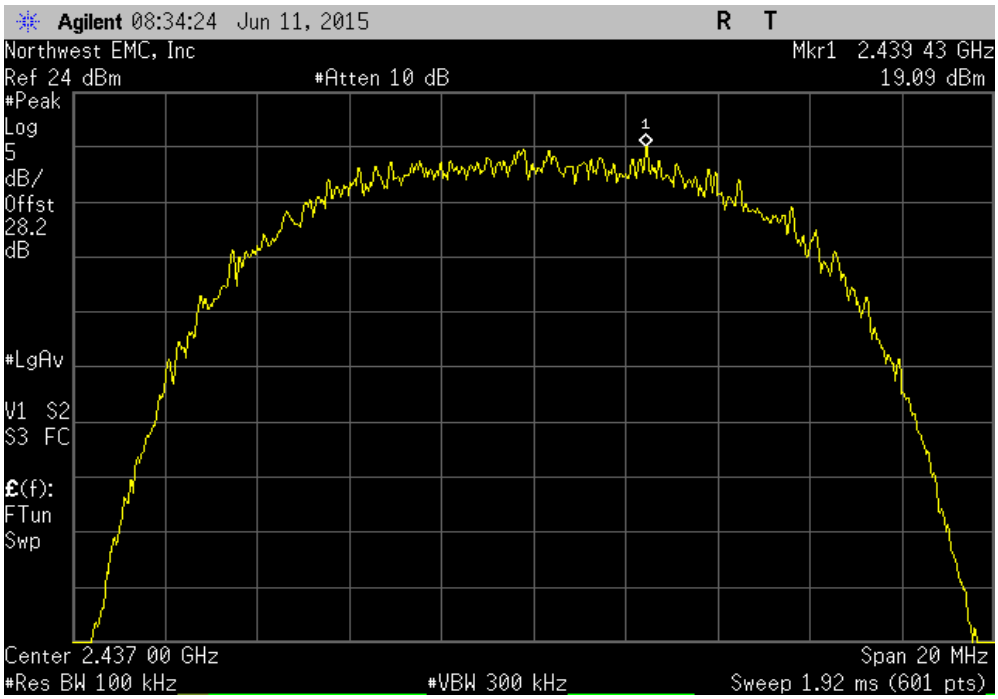
802.11(b) 1 Mbps, High Channel 11, 2462 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		16.294	-15.2	1.094	8	Pass



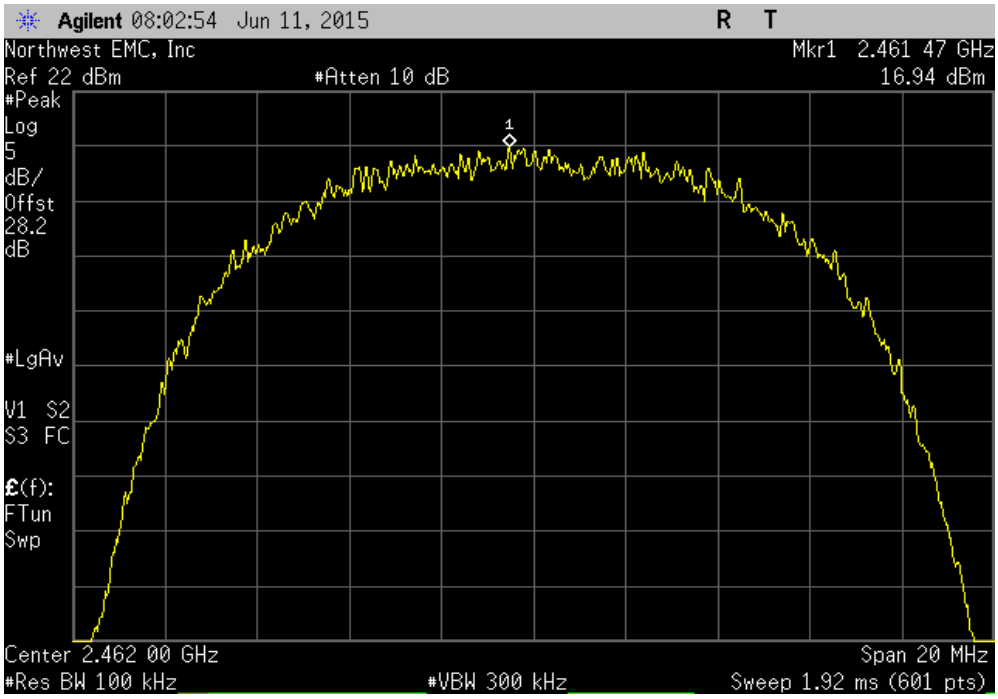
802.11(b) 11 Mbps, Low Channel 1, 2412 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		16.852	-15.2	1.652	8	Pass



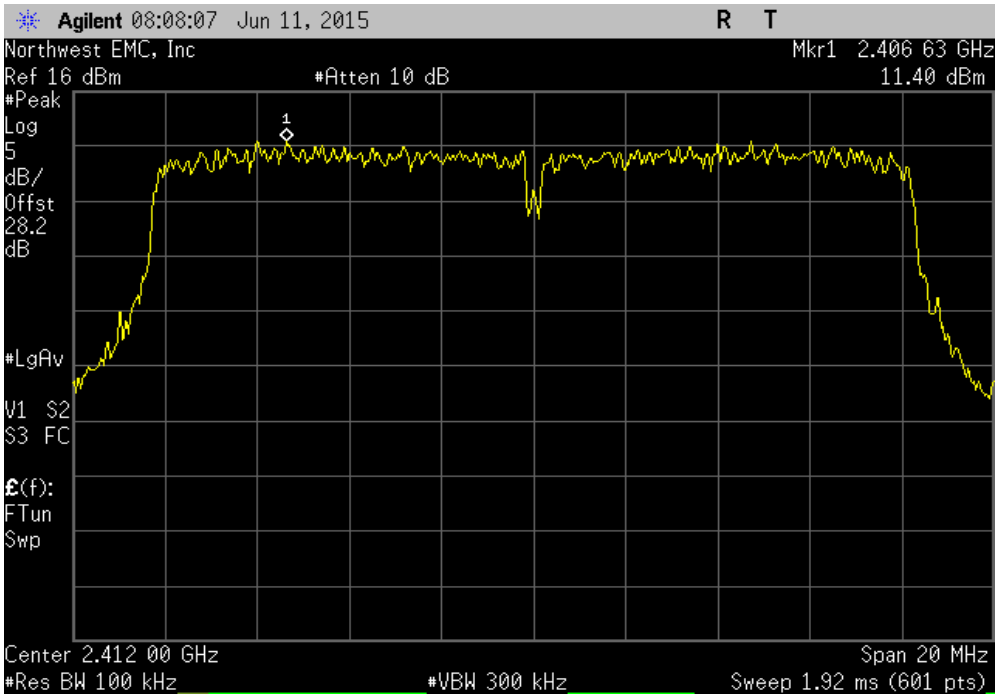
802.11(b) 11 Mbps, Mid Channel 6, 2437 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		19.087	-15.2	3.887	8	Pass



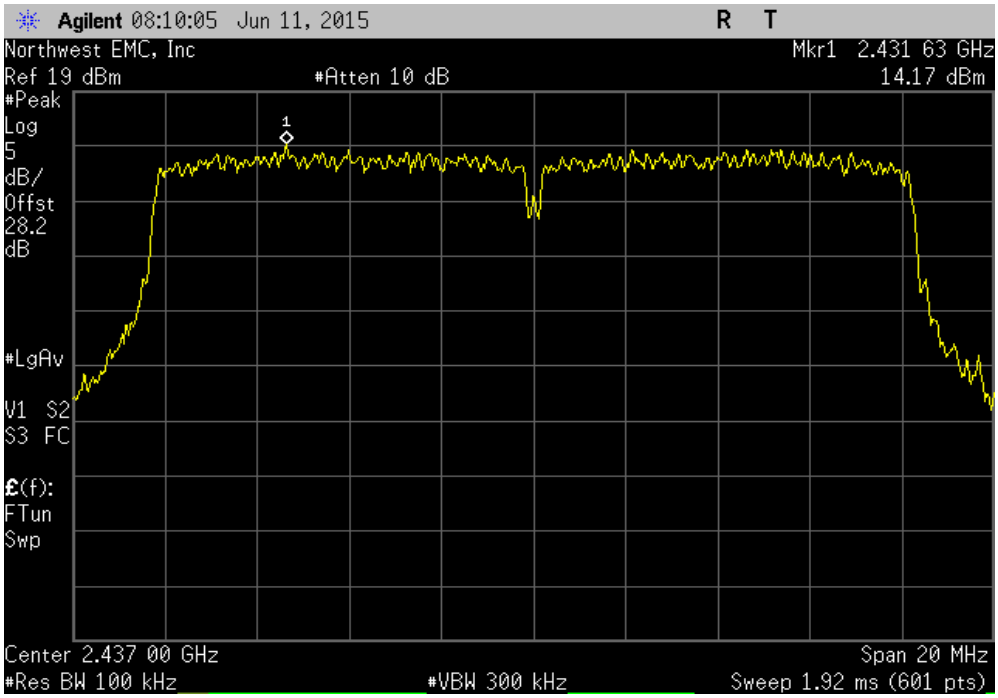
802.11(b) 11 Mbps, High Channel 11, 2462 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		16.938	-15.2	1.738	8	Pass



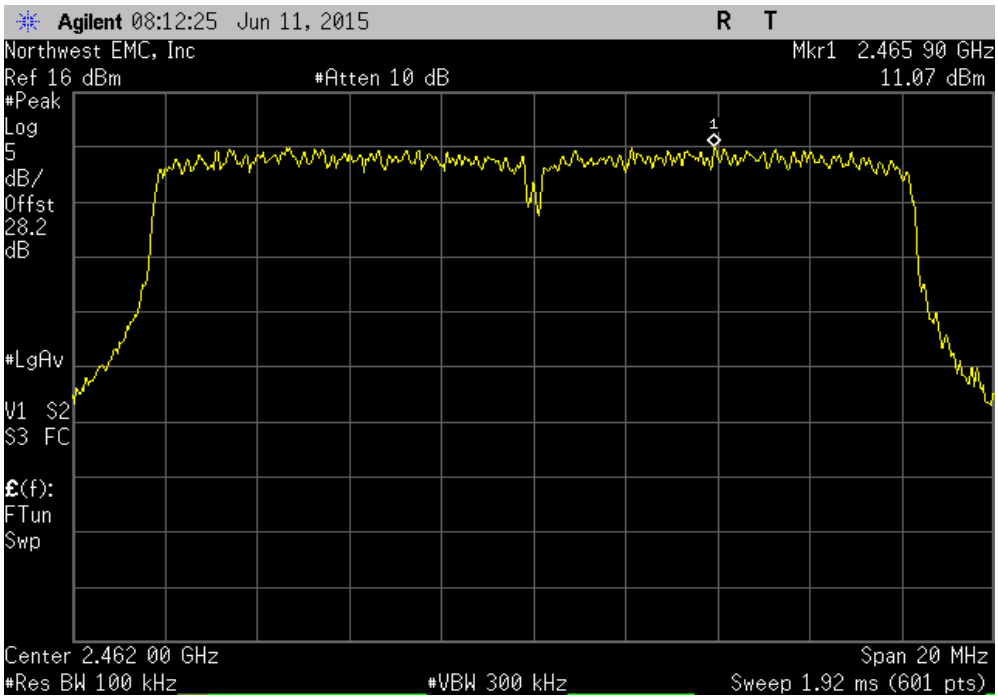
802.11(g) 6 Mbps, Low Channel 1, 2412 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		11.401	-15.2	-3.799	8	Pass



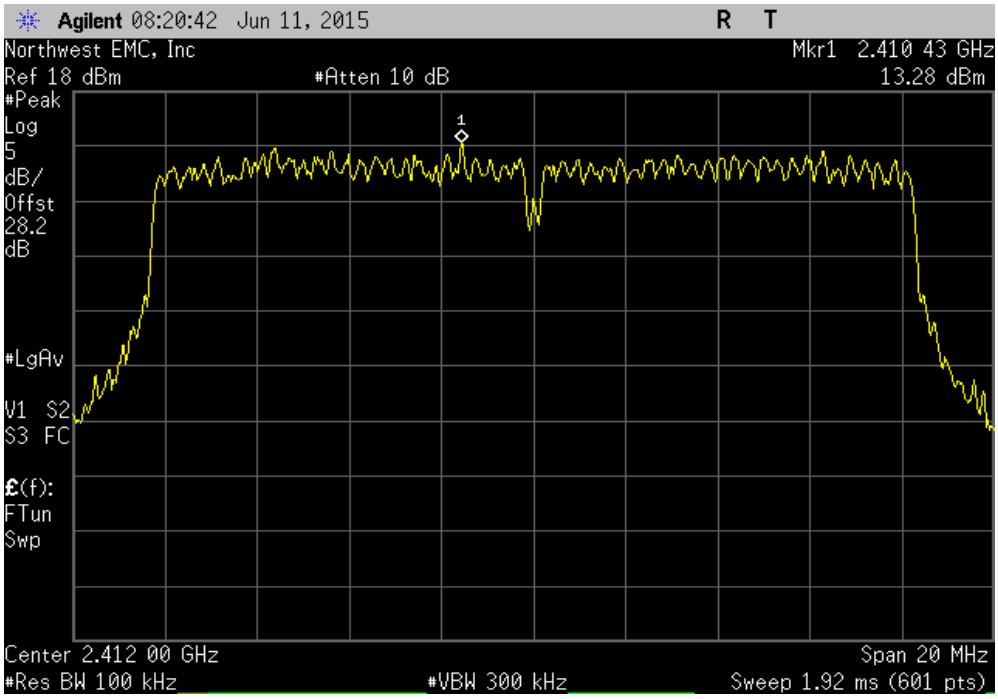
802.11(g) 6 Mbps, Mid Channel 6, 2437 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		14.168	-15.2	-1.032	8	Pass



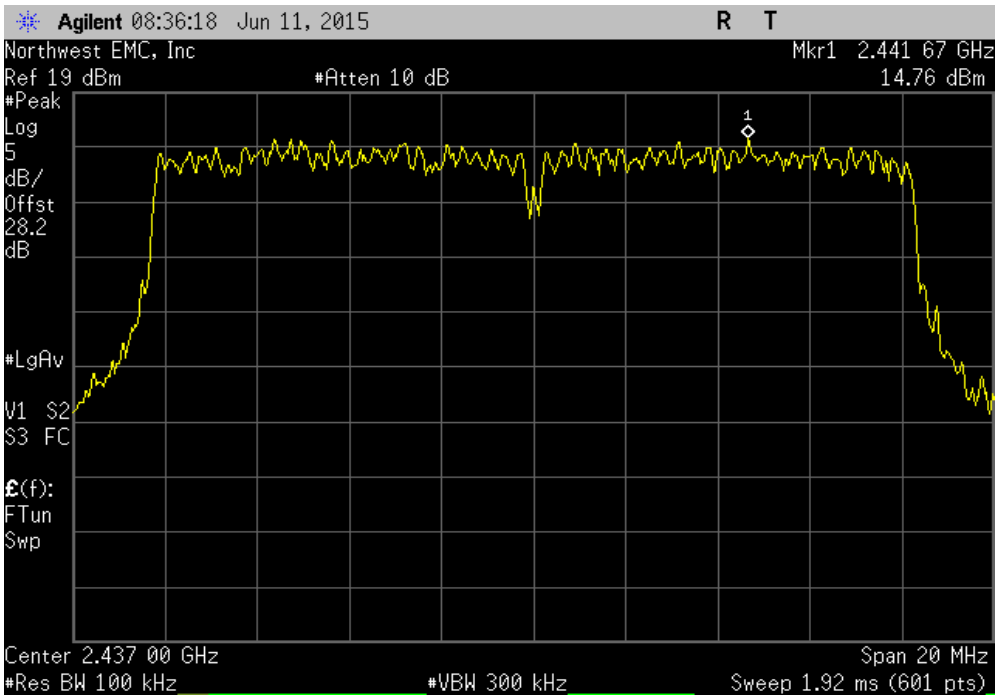
802.11(g) 6 Mbps, High Channel 11, 2462 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		11.07	-15.2	-4.13	8	Pass



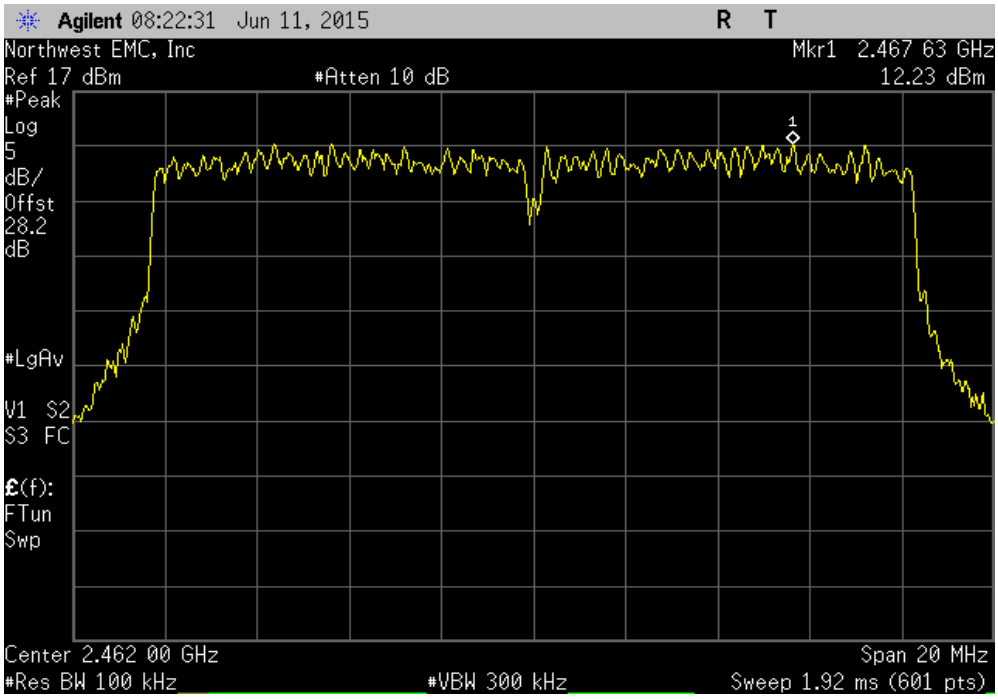
802.11(g) 36 Mbps, Low Channel 1, 2412 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		13.279	-15.2	-1.921	8	Pass



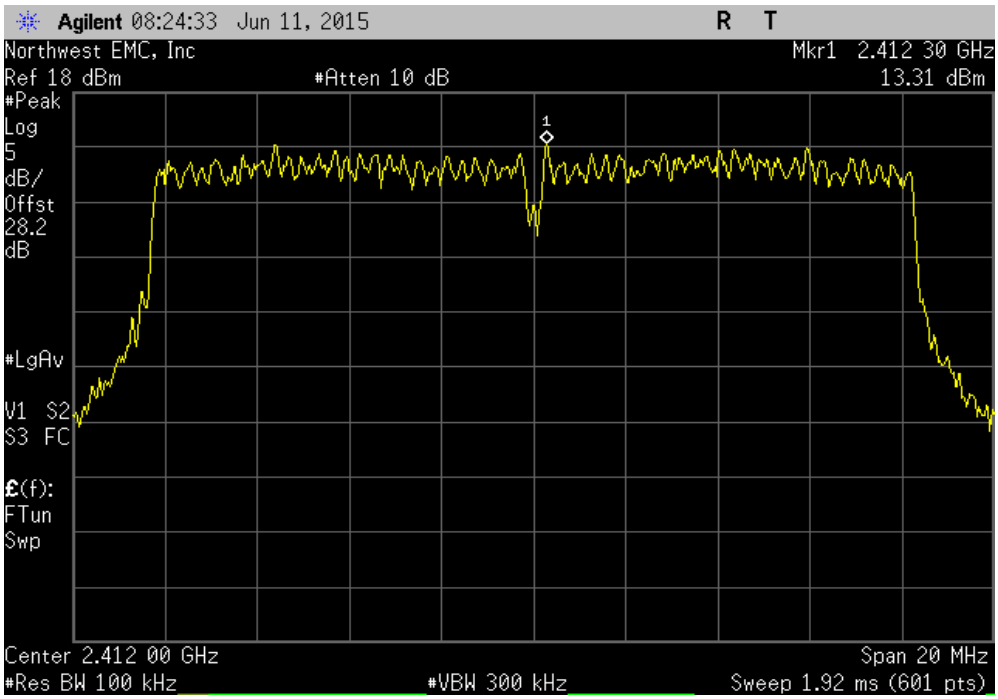
802.11(g) 36 Mbps, Mid Channel 6, 2437 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		14.759	-15.2	-0.441	8	Pass



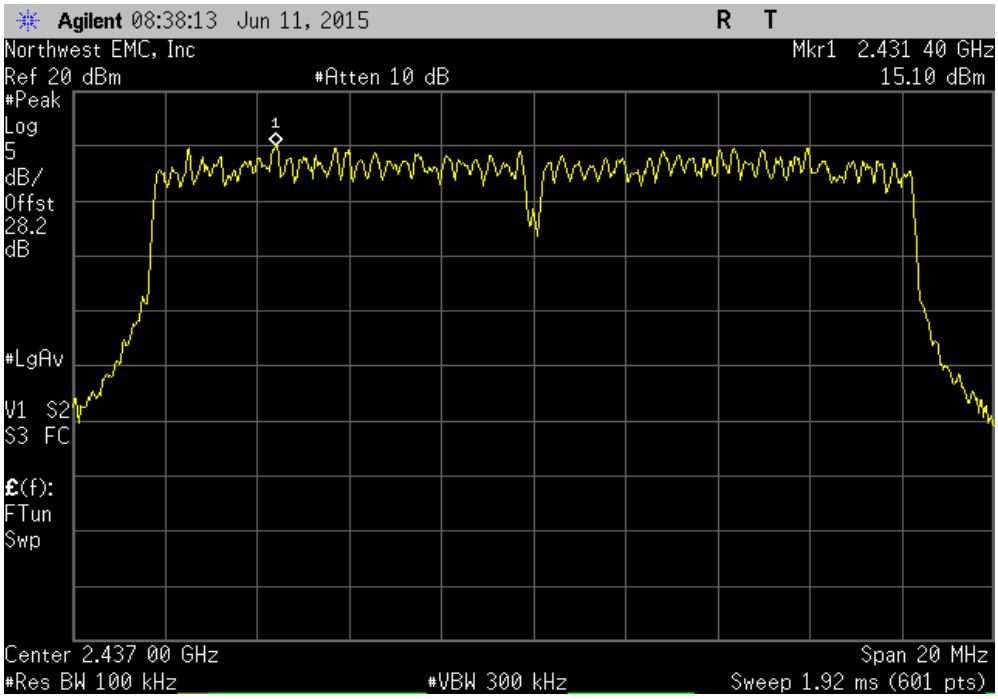
802.11(g) 36 Mbps, High Channel 11, 2462 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		12.232	-15.2	-2.968	8	Pass



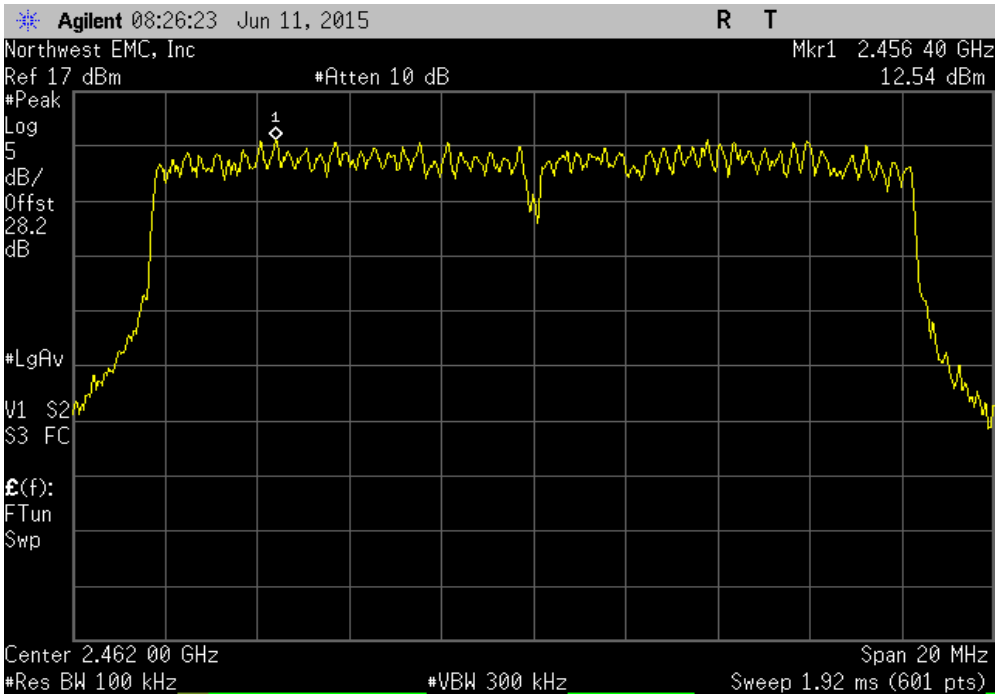
802.11(g) 54 Mbps, Low Channel 1, 2412 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		13.308	-15.2	-1.892	8	Pass



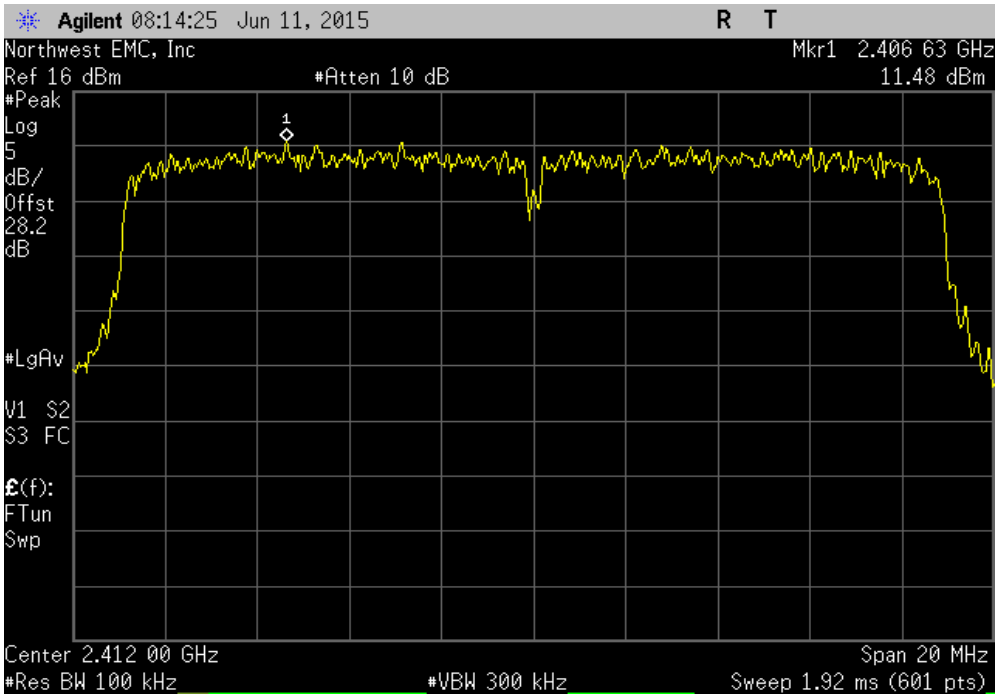
802.11(g) 54 Mbps, Mid Channel 6, 2437 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		15.103	-15.2	-0.097	8	Pass



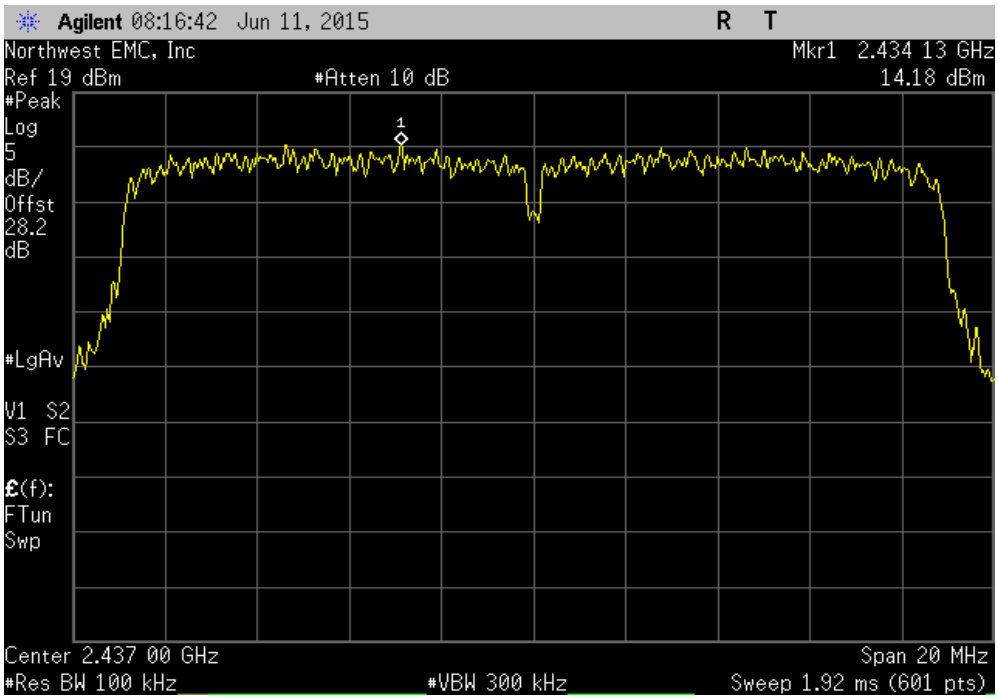
802.11(g) 54 Mbps, High Channel 11, 2462 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		12.544	-15.2	-2.656	8	Pass



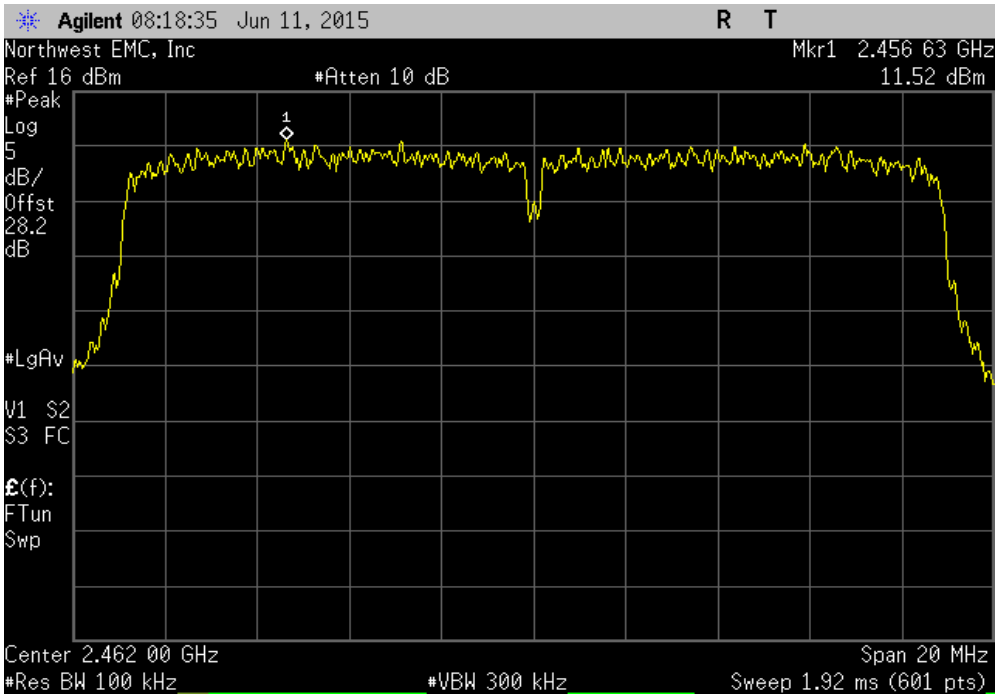
802.11(n) MCS0, Low Channel 1, 2412 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		11.48	-15.2	-3.72	8	Pass



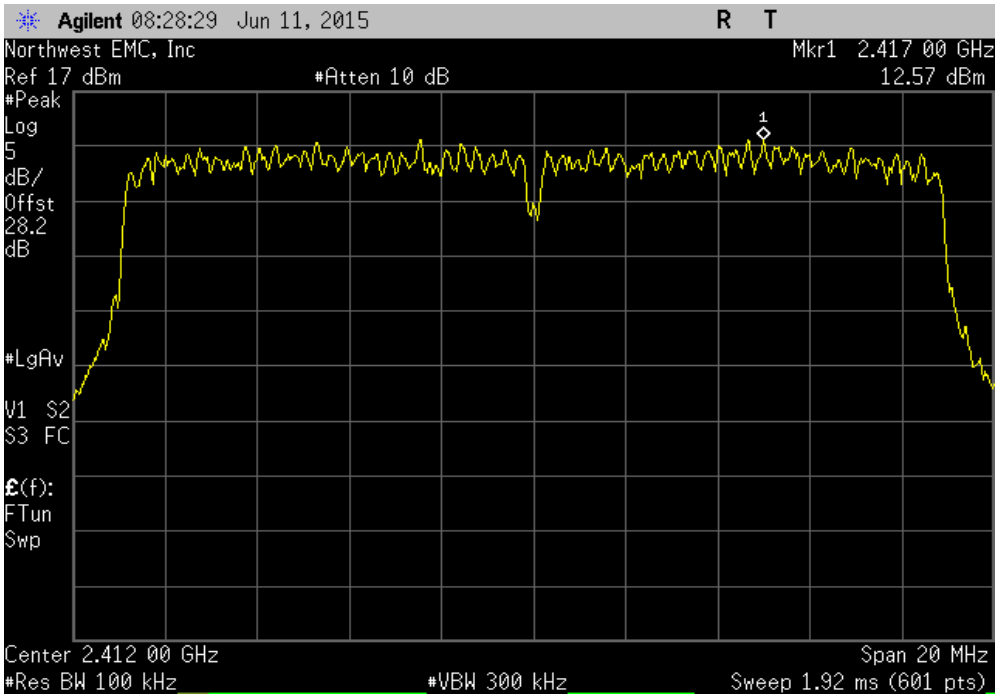
802.11(n) MCS0, Mid Channel 6, 2437 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		14.181	-15.2	-1.019	8	Pass



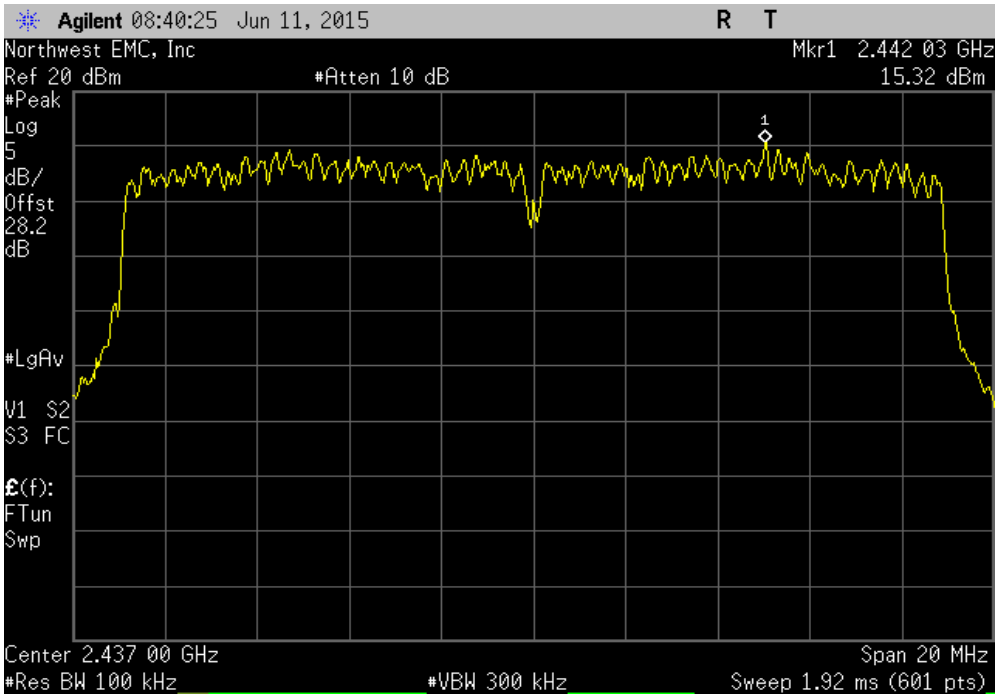
802.11(n) MCS0, High Channel 11, 2462 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		11.523	-15.2	-3.677	8	Pass



802.11(n) MCS7, Low Channel 1, 2412 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		12.571	-15.2	-2.629	8	Pass



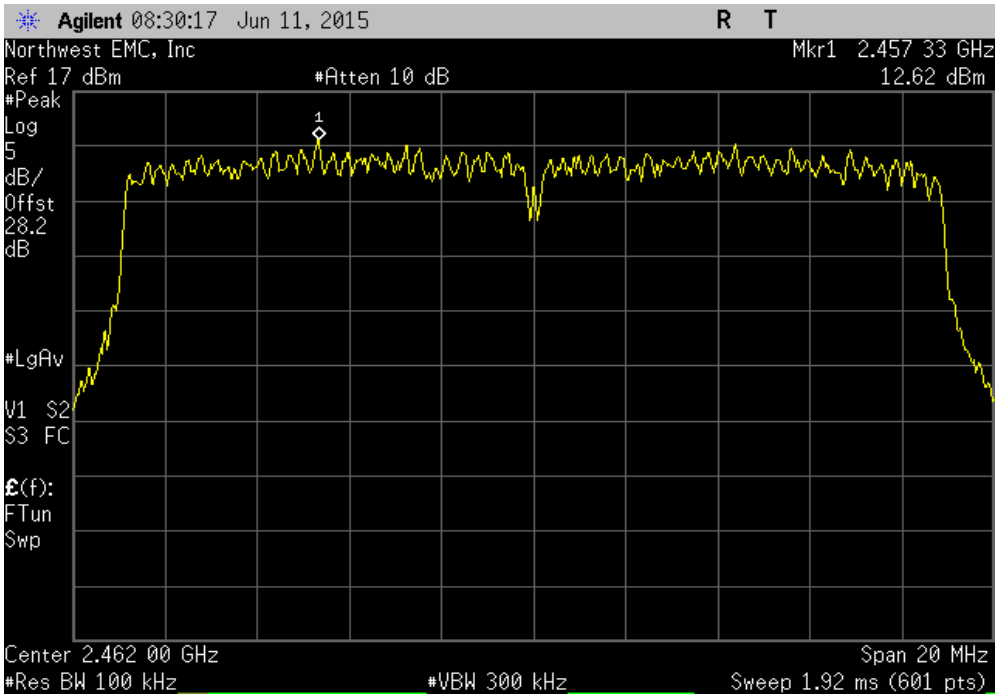
802.11(n) MCS7, Mid Channel 6, 2437 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		15.323	-15.2	0.123	8	Pass



POWER SPECTRAL DENSITY

XMit 2015.01.14

802.11(n) MCS7, High Channel 11, 2462 MHz						
		Value dBm/100kHz	dBm/100kHz To dBm/3kHz	Value dBm/3kHz	Limit dBm/3kHz	Results
		12.624	-15.2	-2.576	8	Pass



DUTY CYCLE

TEST DESCRIPTION

The Duty Cycle (x) were measured for each of the EUT operating modes. 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. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used

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

The EUT operates at 100% Duty Cycle.