Digi International

Sigma Pumps Integrated 802.11abg Module

Report #: DGII0053.1

Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – www.nwemc.com

California – Minnesota – Oregon – New York – Washington

22975 NW Evergreen Parkway
Suite 400
Hillsboro, Oregon 97124

Certificate of Test

Last Date of Test: April 04, 2012
Digi International
Model: Sigma Pumps Integrated 802.11abg Module

Emissions

Test Description	Specification	Test Method	Pass/Fail
Emission Bandwidth	FCC 15.407:2012	ANSI C63.10:2009	**Pass**
Peak Transmit Power	FCC 15.407:2012	ANSI C63.10:2009	**Pass**
Peak Power Spectral Density	FCC 15.407:2012	ANSI C63.10:2009	**Pass**
Peak Excursion	FCC 15.407:2012	ANSI C63.10:2009	**Pass**
Transmissions Burst Duration	FCC 15.407:2012	ANSI C63.10:2009	**Pass**
Spurious Radiated Emissions	FCC 15.407:2012	ANSI C63.10:2009	**Pass**
AC Powerline Conducted Emissions	FCC 15.207:2012	ANSI C63.10:2009	**Pass**

Deviations From Test Standards

None

Approved By:

Tim O'Shea, Operations Manager

NVLAP Lab Code: 200881-0

Test Facility

The measurement facility used to collect the data is located at:

Northwest EMC, Inc.
9349 W Broadway Ave.
Brooklyn Park, MN 55445

Phone: (763) 425-2281 Fax: (763) 424-3469

This site has been fully described in a report filed with and accepted by the FCC (Federal Communications Commission) and Industry Canada (Site filing #2834E-1).

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.

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. This Report may only be duplicated in its entirety. 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.

Revision History

Revision Number	Description	Date	Page Number
00	None		

Accreditations and Authorizations

Revision
02/21/2012

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 Guide 65 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. The scope includes radio, ITE, and medical standards from around the world. See: http://www.nwemc.com/accreditations/

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

KCC / 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.

Hong Kong

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

Vietnam

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

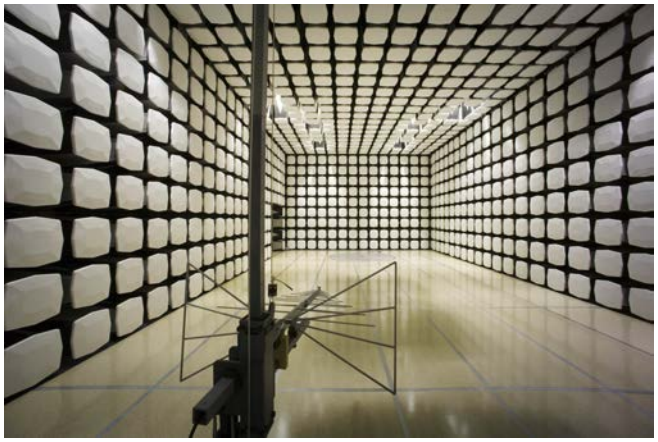
Russia

GOST – Accredited by Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC to perform EMC and Hygienic testing for Information Technology products to GOST standards**.**

Locations

Revision 2/23/12

Oregon Labs EV01-EV12 22975 NW Evergreen Pkwy, #400 Hillsboro, OR 97124 (503) 844-4066	**California** Labs OC01-OC13 41 Tesla Irvine, CA 92618 (949) 861-8918	**New York** Labs WA01-WA04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	**Minnesota** Labs MN01-MN08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	**Washington** Labs SU01-SU07 14128 339th Ave. SE Sultan, WA 98294 (360) 793-8675
VCCI				
C-1071, R-1025, G-84, C-2687, T-1658, R-2318	R-1943, G-85, C-2766, T-1659, G-548		R-3125, G-86, G-141, C-3464, T-1634	R-871, G-83, C-3265, T-1511
Industry Canada				
2834D-1, 2834D-*2*	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1



Product Description

Client and Equipment Under Test (EUT) Information

Company Name:	Digi International
Address:	11001 Bren Road East
City, State, Zip:	Minnetonka, MN 55343
Test Requested By:	Slava Gekht
Model:	Sigma Pumps Integrated 802.11abg Module
First Date of Test:	March 15 2012
Last Date of Test:	April 04, 2012
Receipt Date of Samples:	March 14, 2012
Equipment Design Stage:	Prototype
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
Sigma Pumps Integrated 802.11abg Module

Testing Objective:
To demonstrate compliance of a radio module under FCC 15.407 for operation in the 5.2, 5.3, and 5.6 GHz bands

Configurations

Configuration 1 DGII0053

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
802.11abg Module	Digi International	30012522-07 Rev A	7.06

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power Supply	GlobTek	GT-41060-2512	3509
Dev Board	Digi International	None	2.01

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	HP	NC6320	CNU7062VS5
Laptop Supply	HP	PPP014L-S	8454846603

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Power	No	2.4m	No	Power Supply	AC Mains
DC Power	No	1.8m	Yes	802.11abg Module	Power Supply
AC Power	No	1.8m	No	Laptop Supply	AC Mains
DC Power	No	1.8m	Yes	Laptop	Laptop Supply
Serial	Yes	> 3.0m	No	802.11abg Module	Laptop
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Configuration 2 DGII0053

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
802.11abg Module	Digi International	30012522-07 Rev A	7.06

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Power Supply	GlobTek	GT-41060-2512	3509
Laptop	HP	NC6320	CNU7062VS5
Laptop Supply	HP	PPP014L-S	8454846603
Dev Board	Digi International	None	2.01

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	No	1.8m	Yes	802.11abg Module	Power Supply
AC Power	No	1.8m	No	Laptop Supply	AC Mains
DC Power	No	1.8m	Yes	Laptop	Laptop Supply
Serial	Yes	1.2m	No	802.11abg Module	Laptop
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Modifications

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	3/15/2012	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	3/20/2012	Emission 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.
3	3/20/2012	Peak Excursion	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	3/20/2012	Peak Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	3/20/2012	Peak Transmit Power	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	3/20/2012	Transmissions Burst Duration	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	3/21/2012	AC 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.
8	4/4/2012	Frequency Stability	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Emission Bandwidth

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
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

FCC Public Notice DA 02-2138 was followed. The transmit frequency was set to the lowest, a medium, and the highest channels in each band. The transmit power was set to its default maximum. The lowest, a medium, and the highest data rates were measured if available. 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.

The spectrum analyzer settings were as follows:

- Span = approximately 1.5 to 2 times the emission bandwidth, centered on the transmit channel.
- RBW = Approx. 1% of the emission bandwidth (B). This was an iterative process where an exact match of 1% may not be achieved. The largest value of RBW that came close to 1% of the emission bandwidth was used.
- A peak detector was used.

Emission Bandwidth

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	03/20/12
Customer:	Digi International			**Temperature:**	22.78°C
Attendees:	None			**Humidity:**	55%
Project:	None			**Barometric Pres.:**	1007.8
Tested by:	Trevor Buls	**Power:**	110VAC/60Hz	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.407:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Duty Cycle was measured at 100% operation. Channel 36, 48, 52, 64, 100: Power level 50. Channel 120: Power level 38, and Channel 140: Power level 47 at 6 Mbps, 36 Mbps, 54 Mbps.

DEVIATIONS FROM TEST STANDARD

None

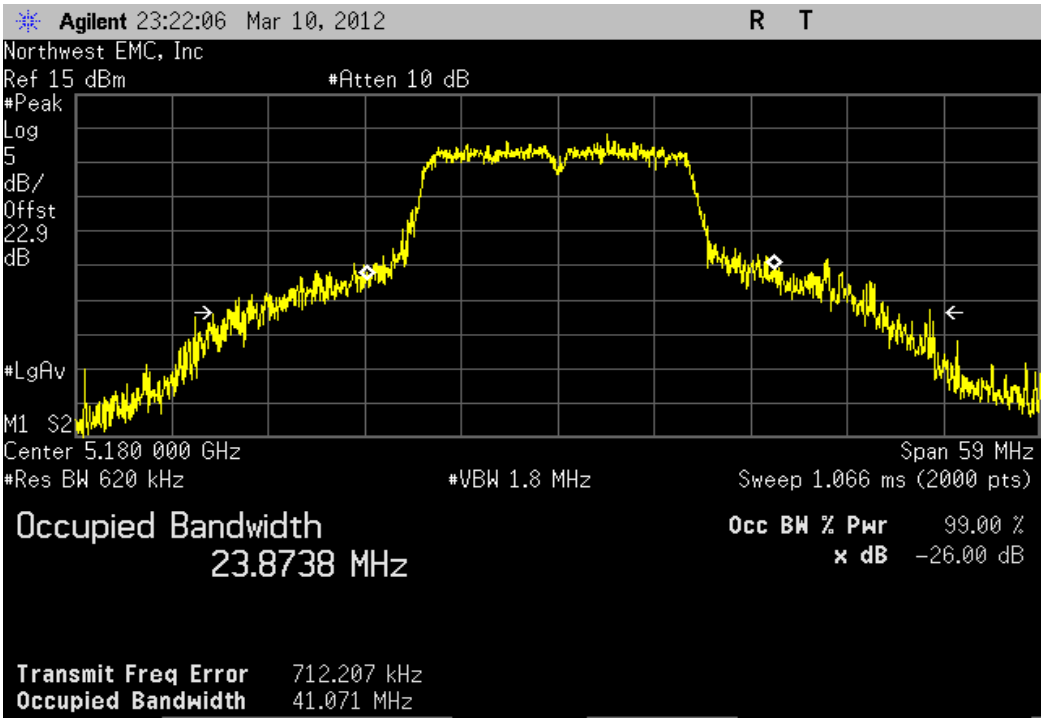
Configuration #	2	Signature	Trevor Buls

		Value	Limit	Result
802.11(a) 6 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	23.874 MHz	> 500 kHz	Pass
	Channel 48, High Channel	25.661 MHz	> 500 kHz	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	25.973 MHz	> 500 kHz	Pass
	Channel 64, High Channel	27.343 MHz	> 500 kHz	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	25.775 MHz	> 500 kHz	Pass
	Channel 120, Mid Channel	17.083 MHz	> 500 kHz	Pass
	Channel 140, High Channel	17.344 MHz	> 500 kHz	Pass
802.11(a) 36 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	22.313 MHz	> 500 kHz	Pass
	Channel 48, High Channel	24.017 MHz	> 500 kHz	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	25.211 MHz	> 500 kHz	Pass
	Channel 64, High Channel	25.498 MHz	> 500 kHz	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	24.147 MHz	> 500 kHz	Pass
	Channel 120, Mid Channel	16.898 MHz	> 500 kHz	Pass
	Channel 140, High Channel	17.004 MHz	> 500 kHz	Pass
802.11(a) 54 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	22.802 MHz	> 500 kHz	Pass
	Channel 48, High Channel	24.544 MHz	> 500 kHz	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	25.006 MHz	> 500 kHz	Pass
	Channel 64, High Channel	25.688 MHz	> 500 kHz	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	24.315 MHz	> 500 kHz	Pass
	Channel 120, Mid Channel	16.854 MHz	> 500 kHz	Pass
	Channel 140, High Channel	17.12 MHz	> 500 kHz	Pass

Emission Bandwidth

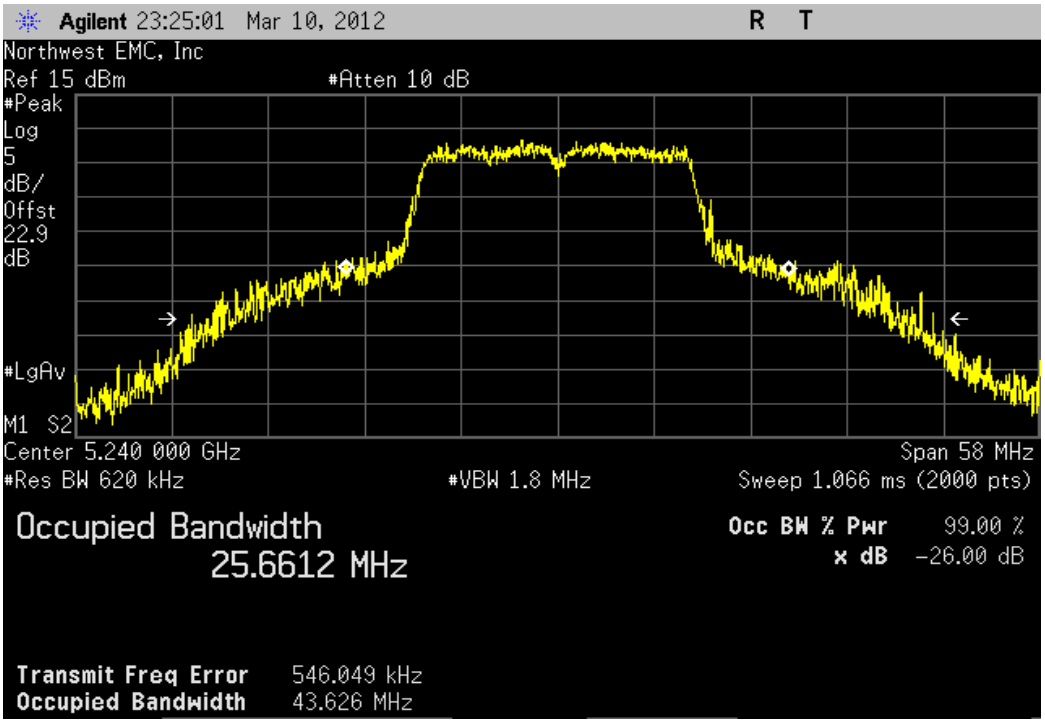
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

				Value	Limit	Result
				23.874 MHz	> 500 kHz	Pass



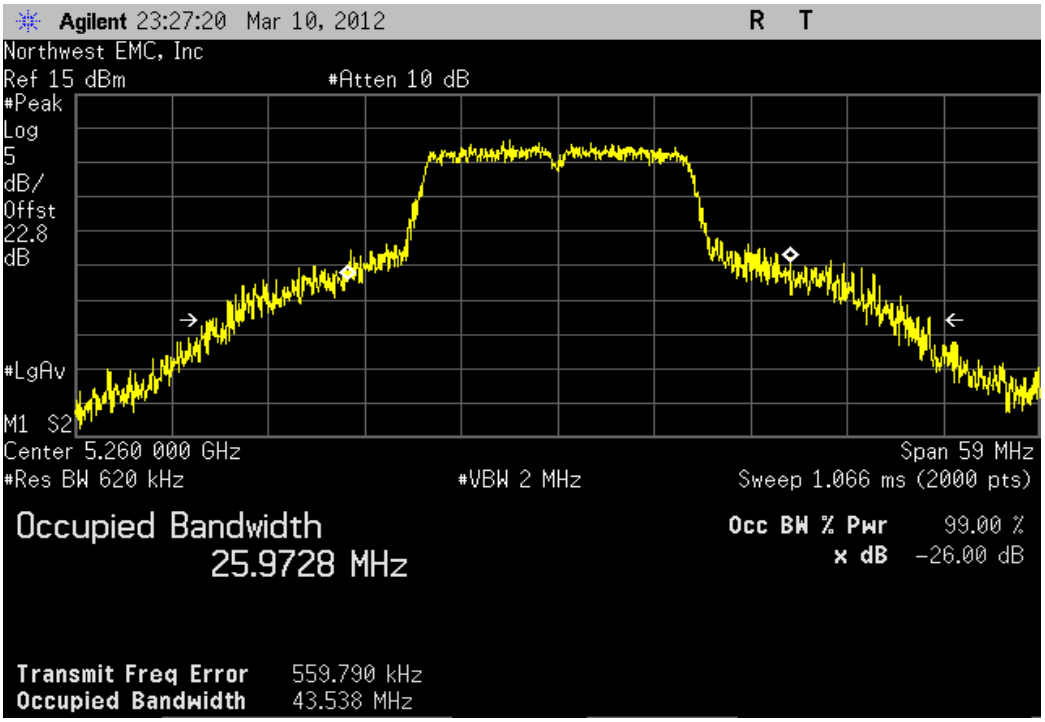
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

				Value	Limit	Result
				25.661 MHz	> 500 kHz	Pass



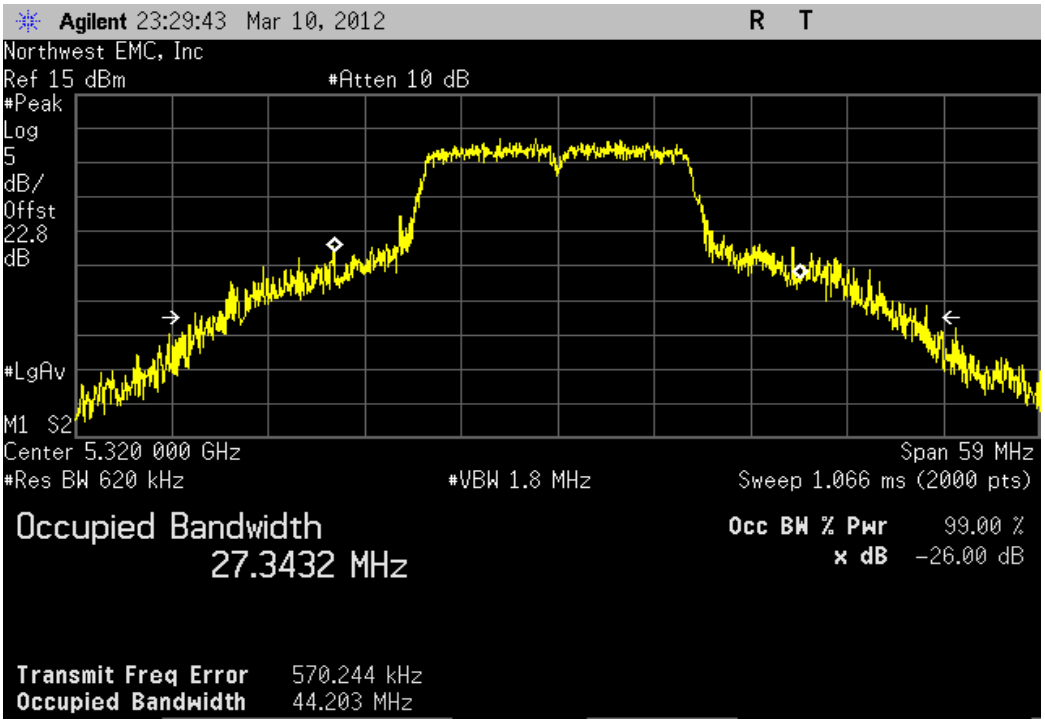
802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel

				Value	Limit	Result
				25.973 MHz	> 500 kHz	Pass



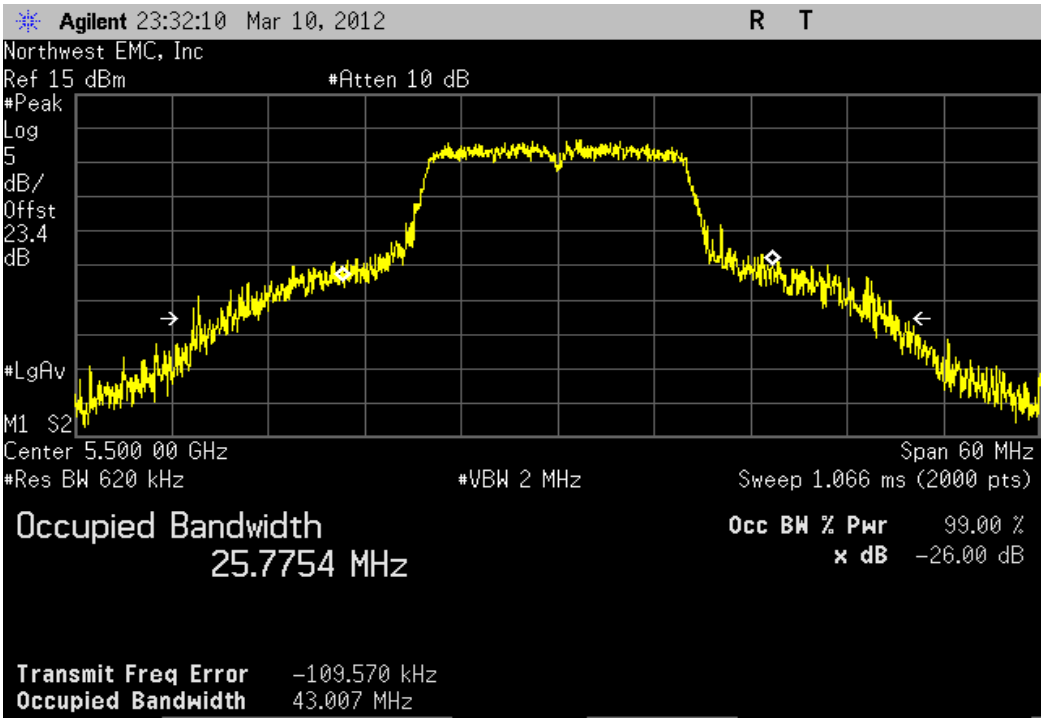
802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

				Value	Limit	Result
				27.343 MHz	> 500 kHz	Pass



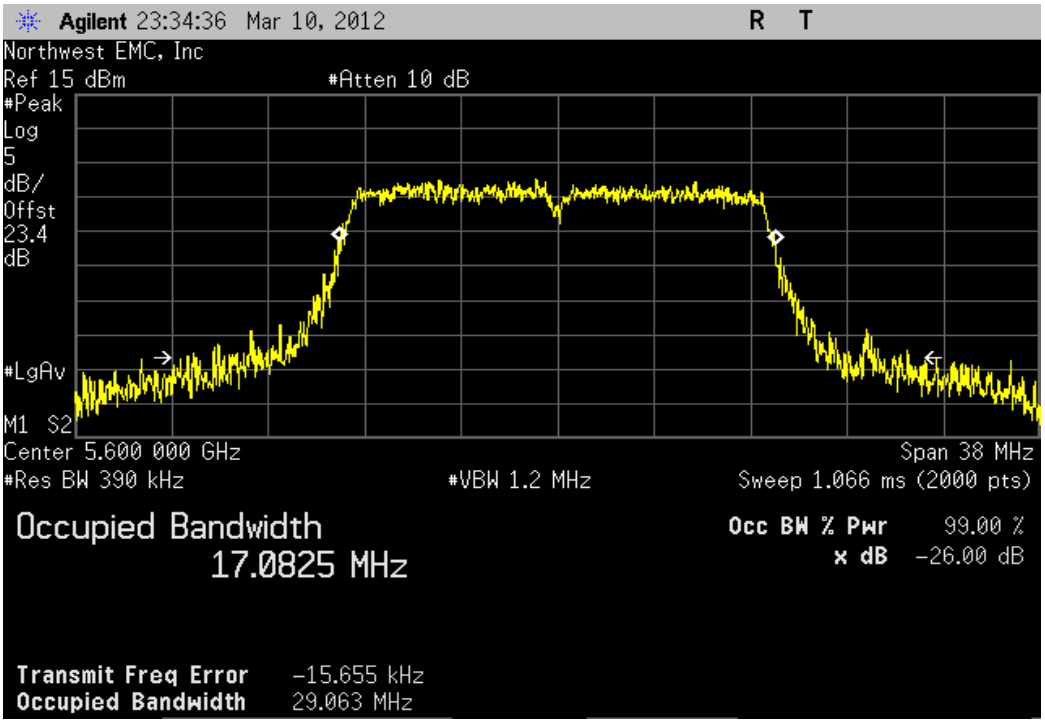
802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel

				Value	Limit	Result
				25.775 MHz	> 500 kHz	Pass



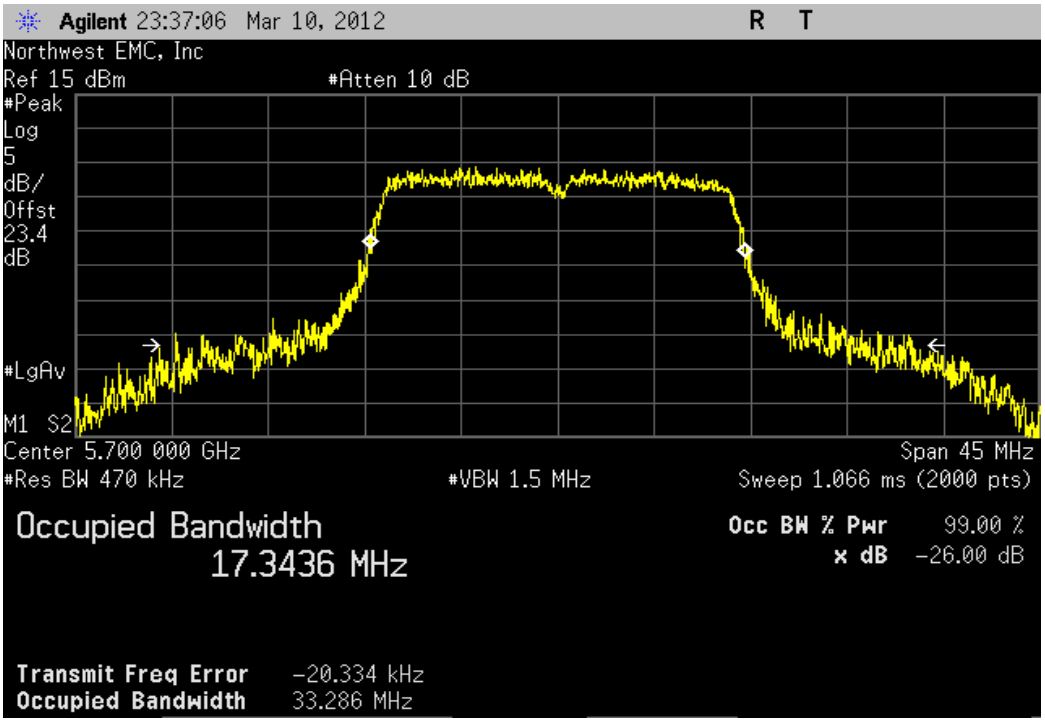
802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel

				Value	Limit	Result
				17.083 MHz	> 500 kHz	Pass



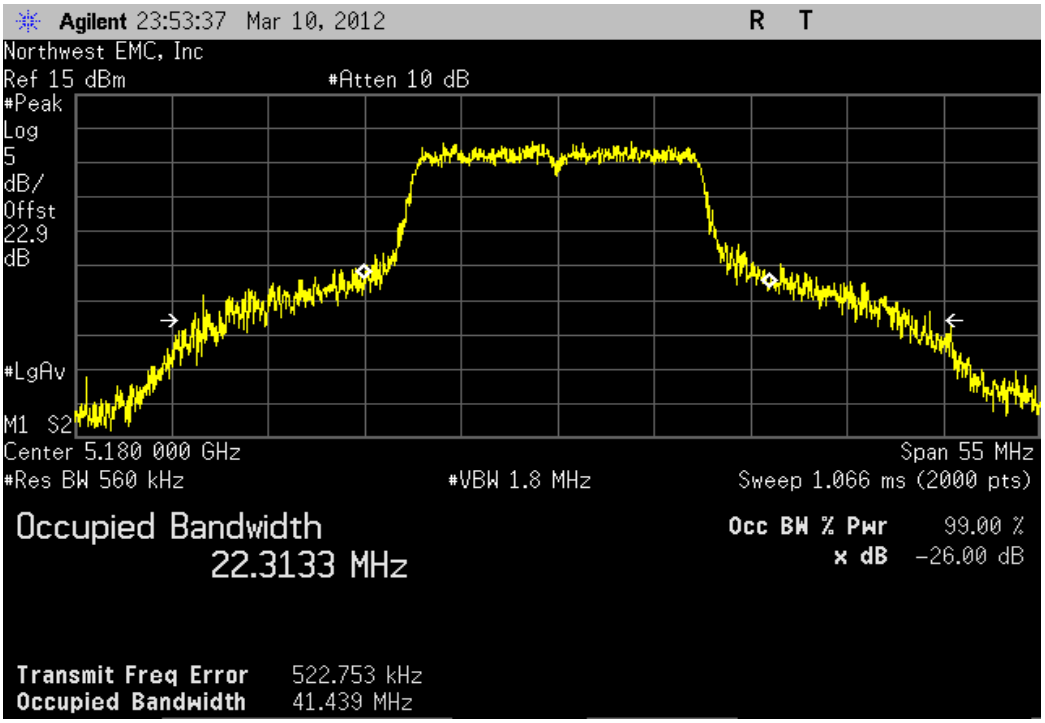
802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel

				Value	Limit	Result
				17.344 MHz	> 500 kHz	Pass



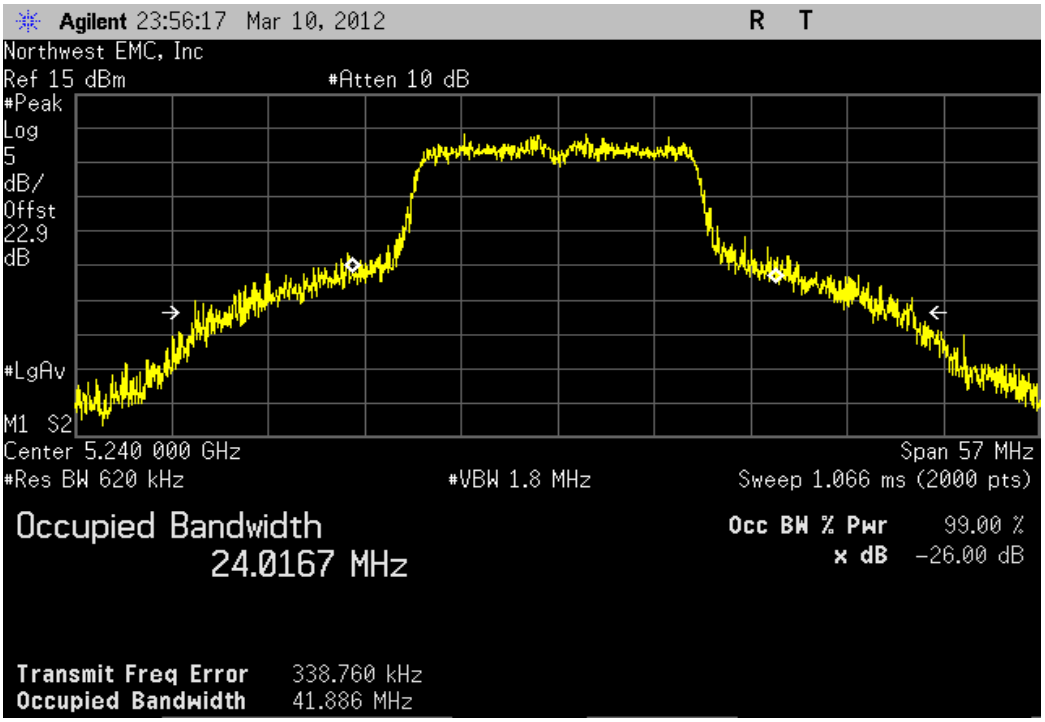
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

				Value	Limit	Result
				22.313 MHz	> 500 kHz	Pass



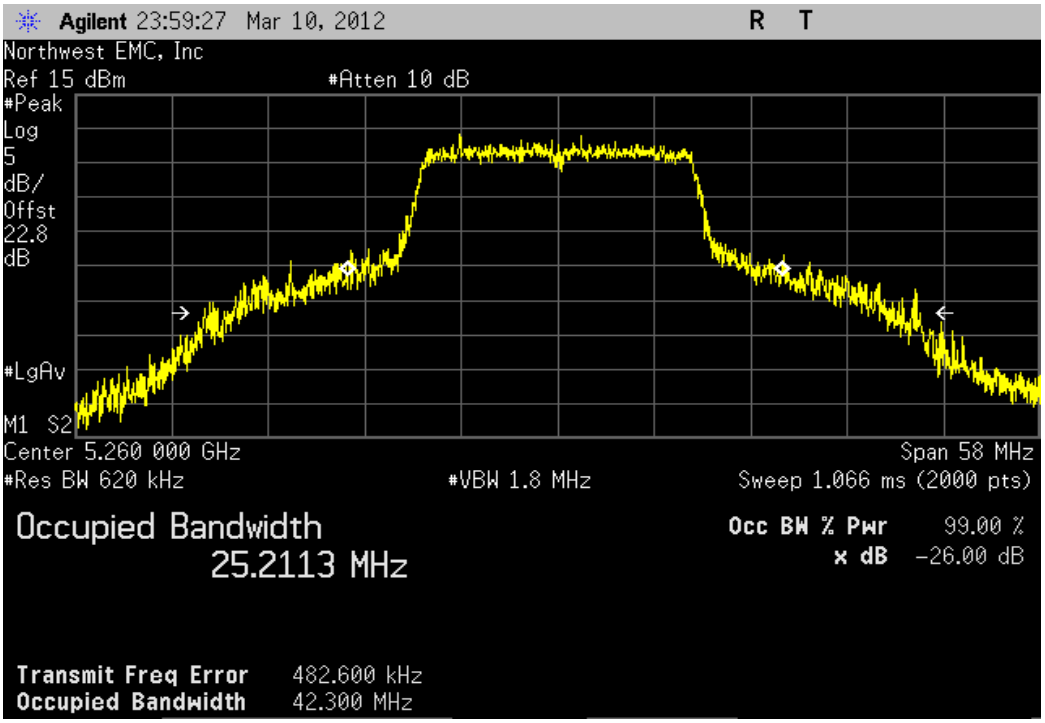
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

				Value	Limit	Result
				24.017 MHz	> 500 kHz	Pass



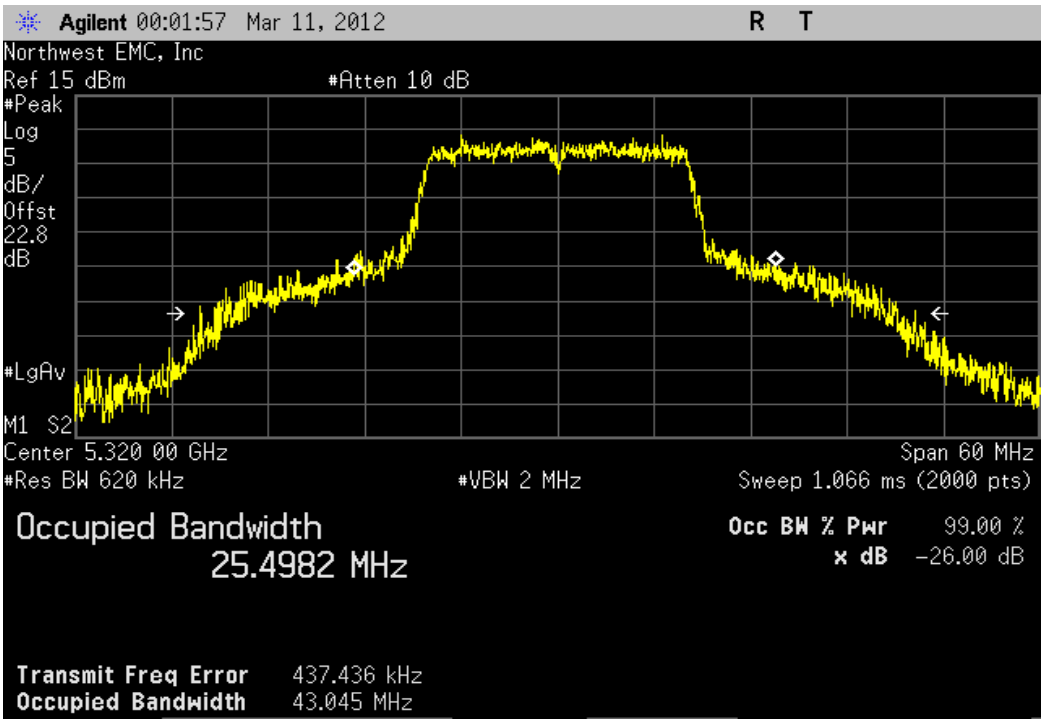
802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel

				Value	Limit	Result
				25.211 MHz	> 500 kHz	Pass



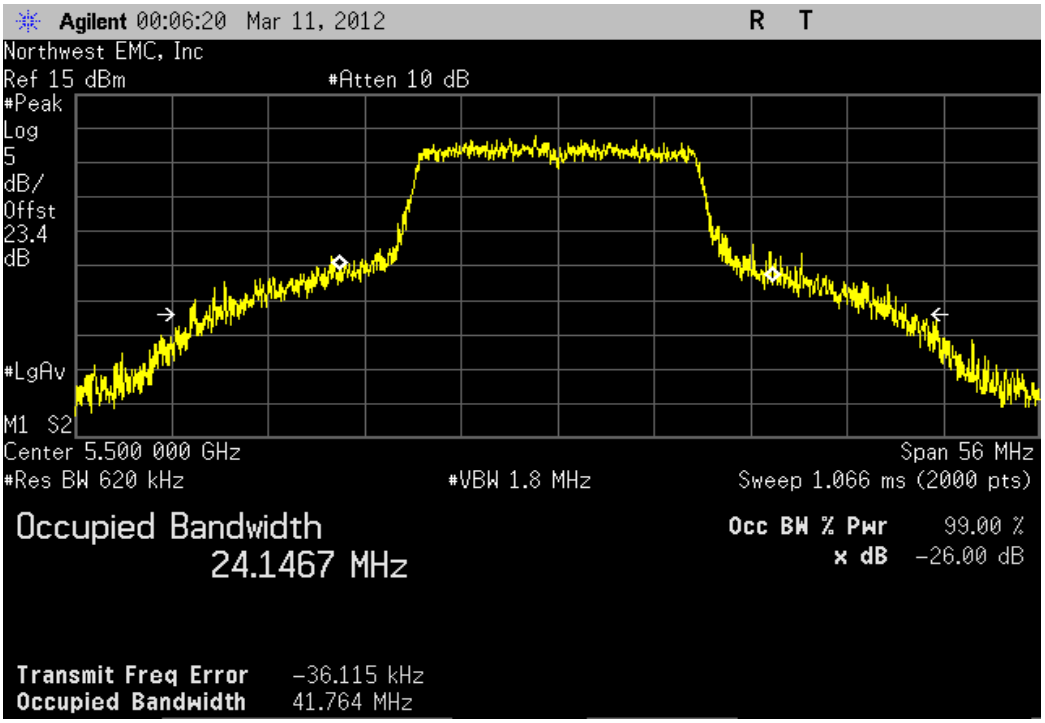
802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

				Value	Limit	Result
				25.498 MHz	> 500 kHz	Pass



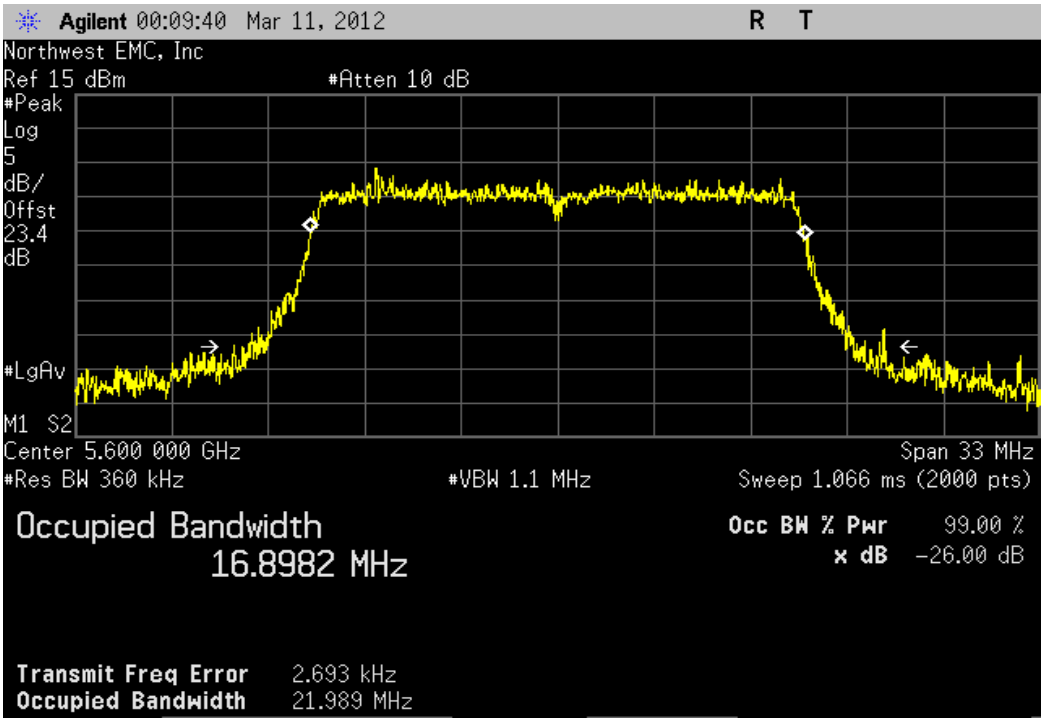
802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel

				Value	Limit	Result
				24.147 MHz	> 500 kHz	Pass



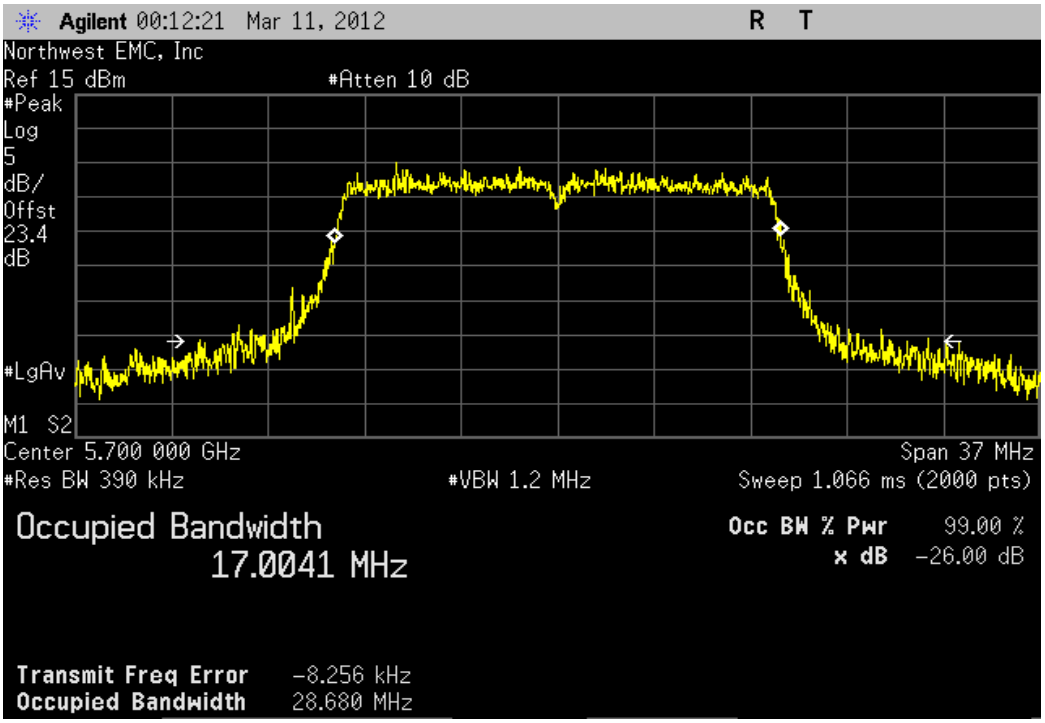
802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel

				Value	Limit	Result
				16.898 MHz	> 500 kHz	Pass



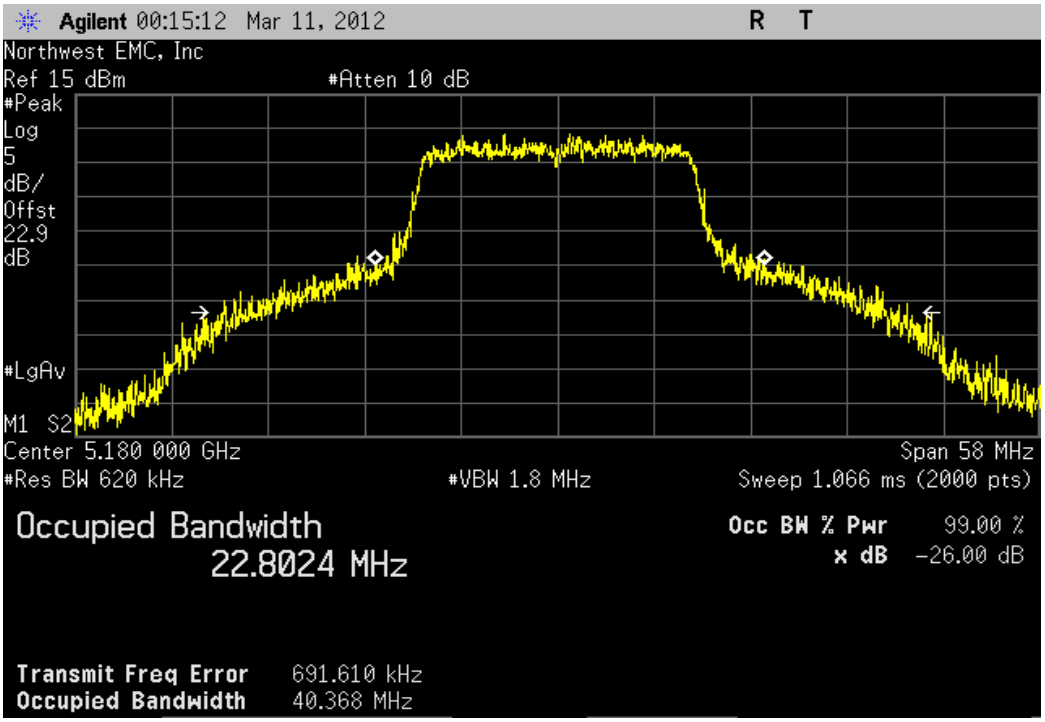
802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel

				Value	Limit	Result
				17.004 MHz	> 500 kHz	Pass



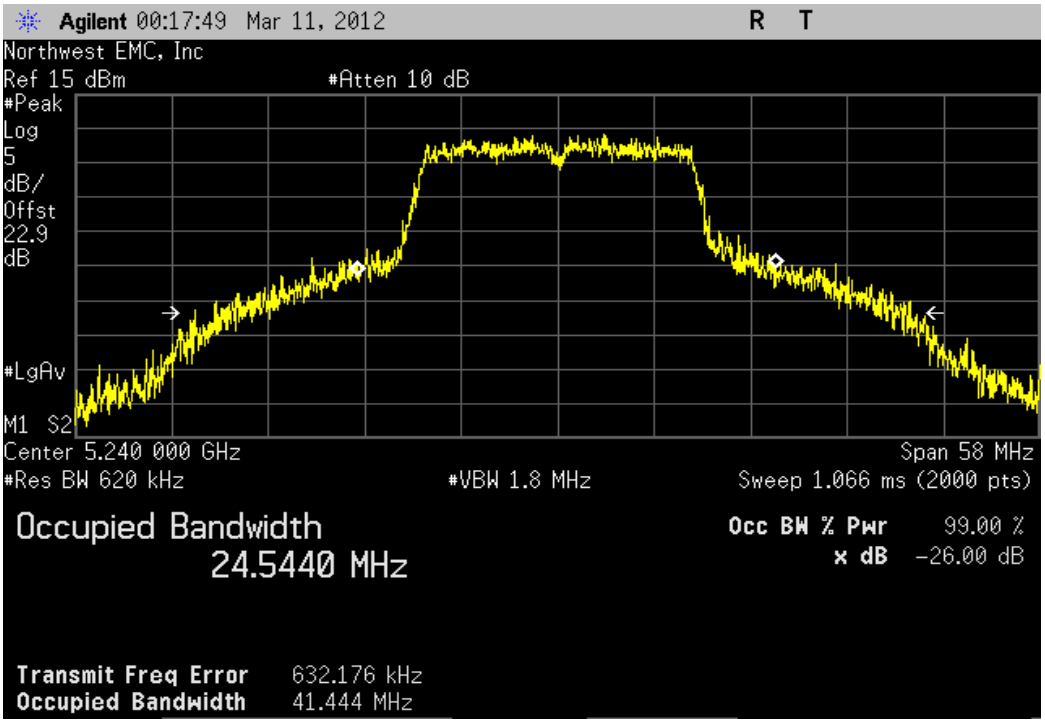
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

				Value	Limit	Result
				22.802 MHz	> 500 kHz	Pass



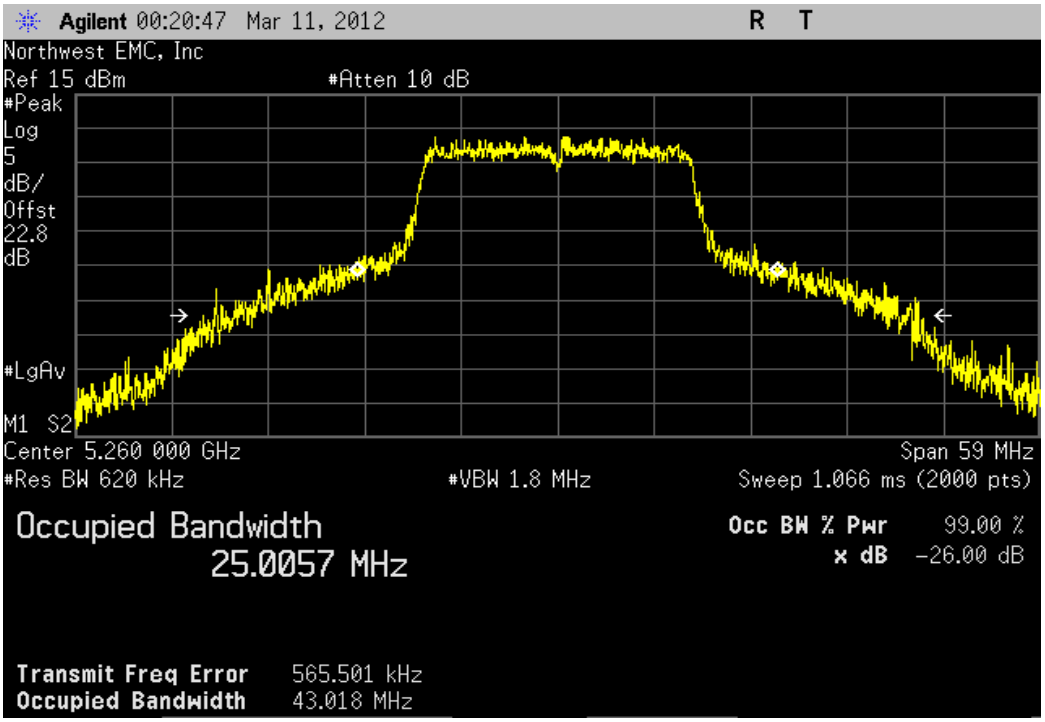
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

				Value	Limit	Result
				24.544 MHz	> 500 kHz	Pass



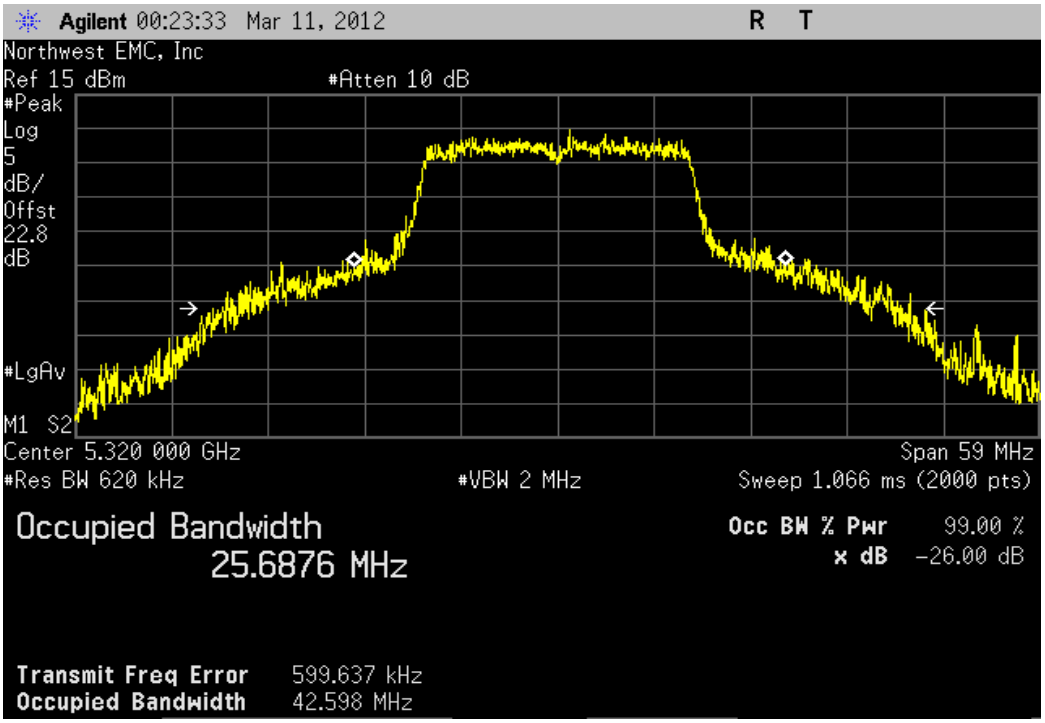
802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel

				Value	Limit	Result
				25.006 MHz	> 500 kHz	Pass



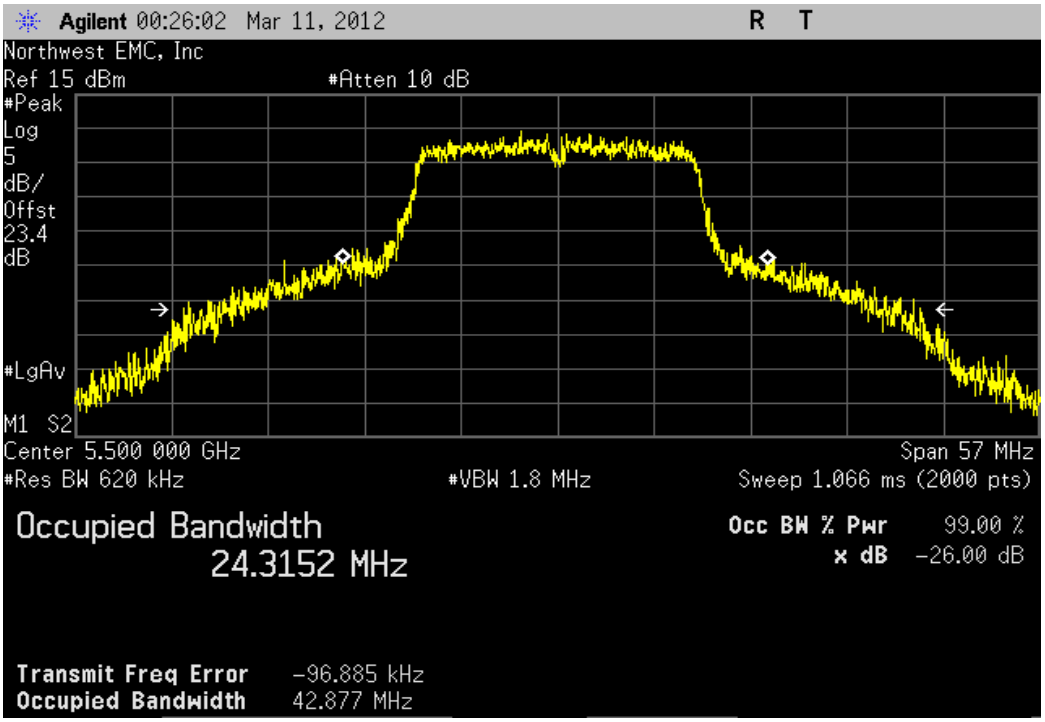
802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

				Value	Limit	Result
				25.688 MHz	> 500 kHz	Pass



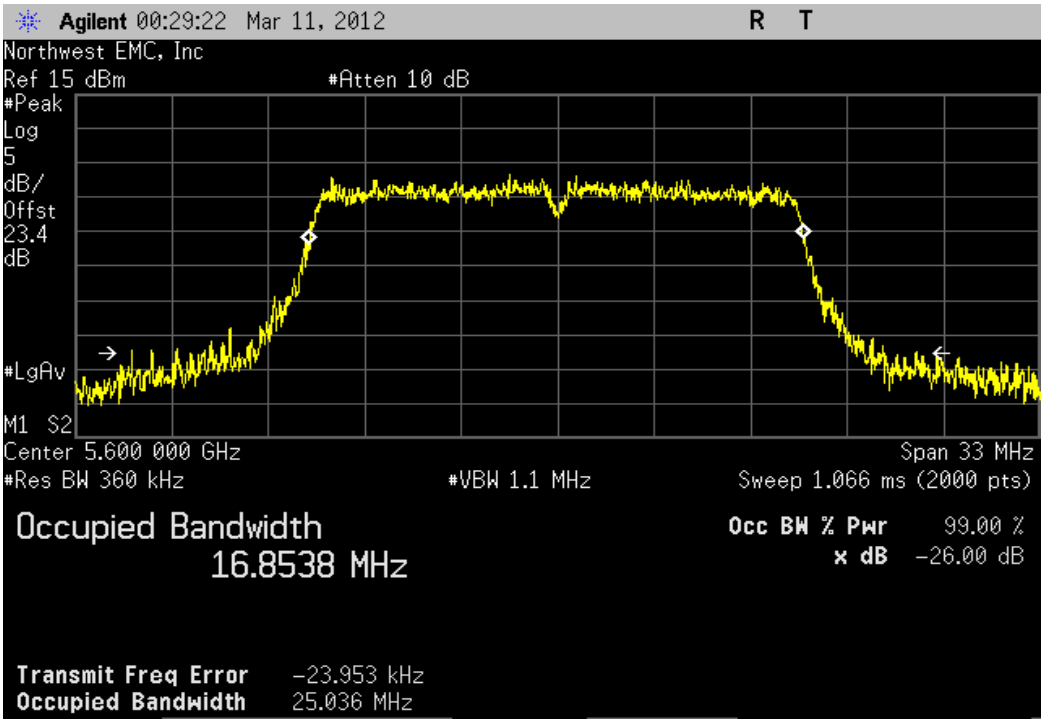
802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel

				Value	Limit	Result
				24.315 MHz	> 500 kHz	Pass



802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel

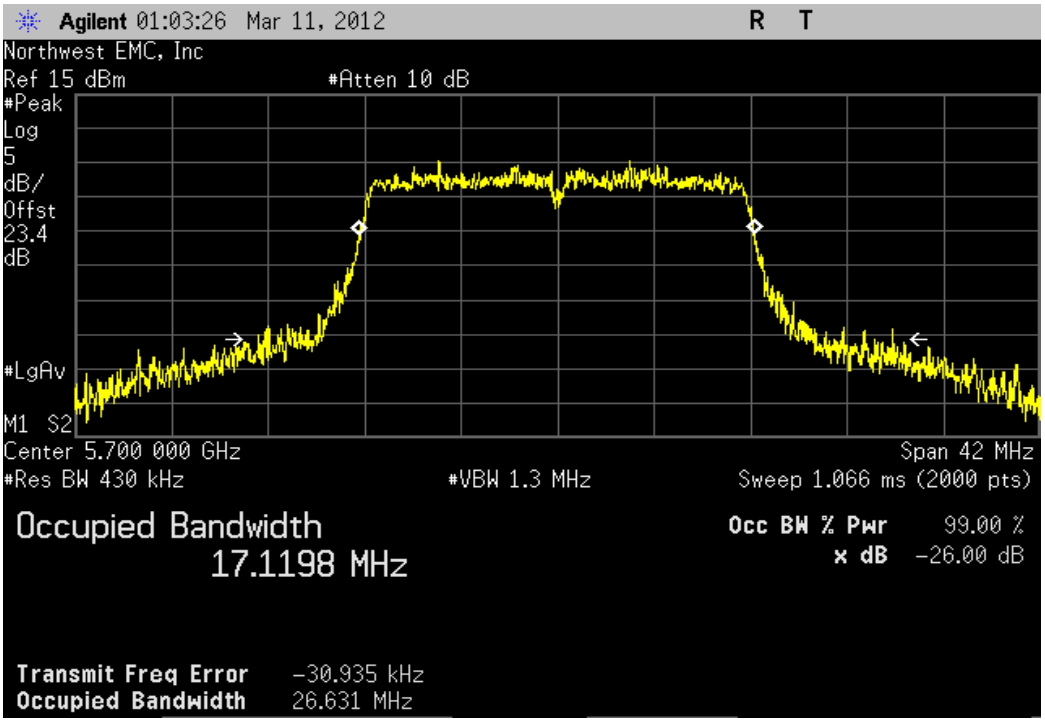
				Value	Limit	Result
				16.854 MHz	> 500 kHz	Pass



Emission Bandwidth

802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel

				Value	Limit	Result
				17.12 MHz	> 500 kHz	Pass



Peak Transmit Power

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
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

ANSI C63.10 was followed. 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. The amplitude accuracy of the spectrum analyzer was further enhanced by calibrating the setup using the power meter and synthesized signal generator.

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 Peak Transmit Power. The method of measuring the emission bandwidth and the associated data are found elsewhere in this test report. The transmission pulse duration (T) was measured using a zero span on the spectrum analyzer to see the pulses in the time domain.

Method #3 was used because the analyzer sweep time was greater than T for the operating mode which has the shortest transmi

The spectrum analyzer settings were as follows:

The span was set to encompass entire emission bandwidth (B), centered on the transmit channel.

Sample detector mode because the bin width (span / number of spectral points) < 0.5 RBW.

Power was integrated across “B”, by using the channel power function of the analyzer.

Peak Transmit Power

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	03/20/12
Customer:	Digi International			**Temperature:**	22.78°C
Attendees:	None			**Humidity:**	55%
Project:	None			**Barometric Pres.:**	1007.8
Tested by:	Trevor Buls	**Power:**	110VAC/60Hz	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.407:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Duty Cycle was measured at 100% operation. Channel 36, 48, 52, 64, 100: Power level 50. Channel 120: Power level 38, and Channel 140: Power level 47 at 6 Mbps, 36 Mbps, 54 Mbps.

DEVIATIONS FROM TEST STANDARD

None

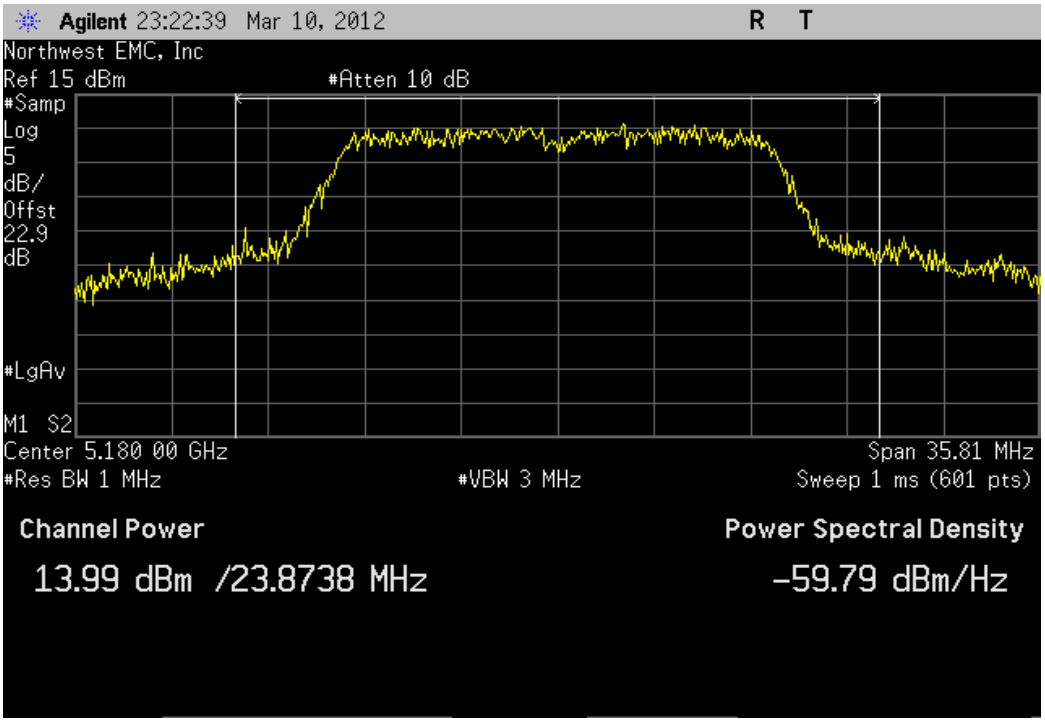
Configuration #	2	Signature	Trevor Buls

		Value	Limit	Result
802.11(a) 6 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	13.99 dBm	< 17 dBm	Pass
	Channel 48, High Channel	14.196 dBm	< 17 dBm	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	13.919 dBm	< 24 dBm	Pass
	Channel 64, High Channel	14.24 dBm	< 24 dBm	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	14.081 dBm	< 24 dBm	Pass
	Channel 120, Mid Channel	10.668 dBm	< 24 dBm	Pass
	Channel 140, High Channel	11.601 dBm	< 24 dBm	Pass
802.11(a) 36 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	13.987 dBm	< 17 dBm	Pass
	Channel 48, High Channel	14.088 dBm	< 17 dBm	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	13.906 dBm	< 24 dBm	Pass
	Channel 64, High Channel	14.195 dBm	< 24 dBm	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	14.078 dBm	< 24 dBm	Pass
	Channel 120, Mid Channel	10.626 dBm	< 24 dBm	Pass
	Channel 140, High Channel	11.509 dBm	< 24 dBm	Pass
802.11(a) 54 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	14.177 dBm	< 17 dBm	Pass
	Channel 48, High Channel	14.181 dBm	< 17 dBm	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	13.979 dBm	< 24 dBm	Pass
	Channel 64, High Channel	14.317 dBm	< 24 dBm	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	14.186 dBm	< 24 dBm	Pass
	Channel 120, Mid Channel	10.798 dBm	< 24 dBm	Pass
	Channel 140, High Channel	11.608 dBm	< 24 dBm	Pass

Peak Transmit Power

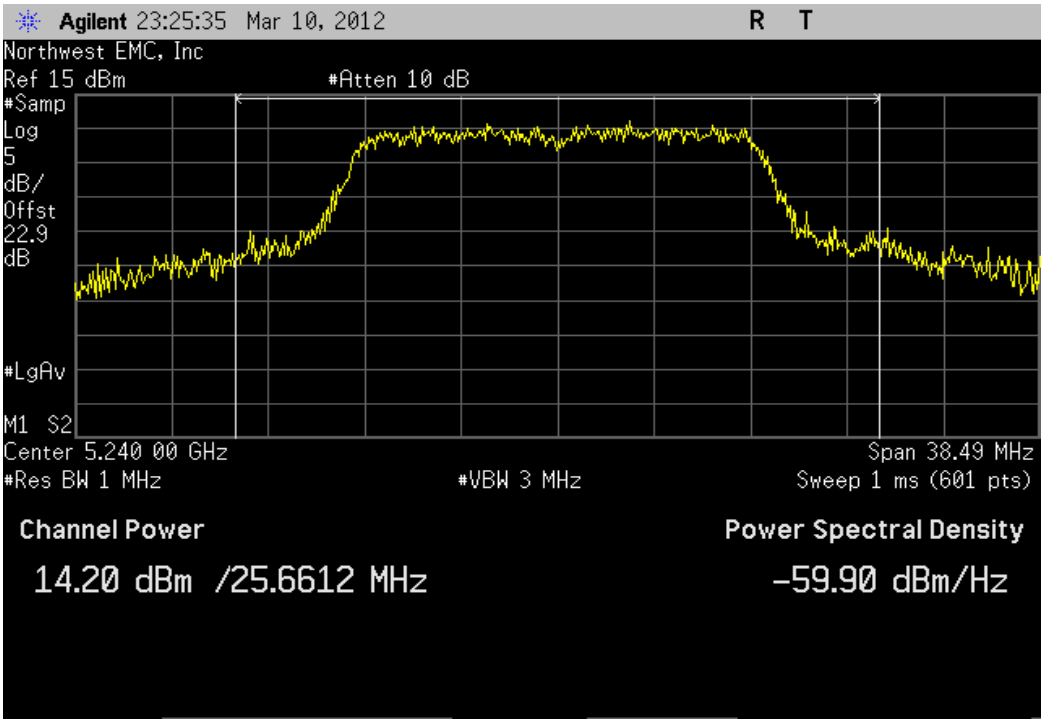
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

				Value	Limit	Result
				13.99 dBm	< 17 dBm	Pass



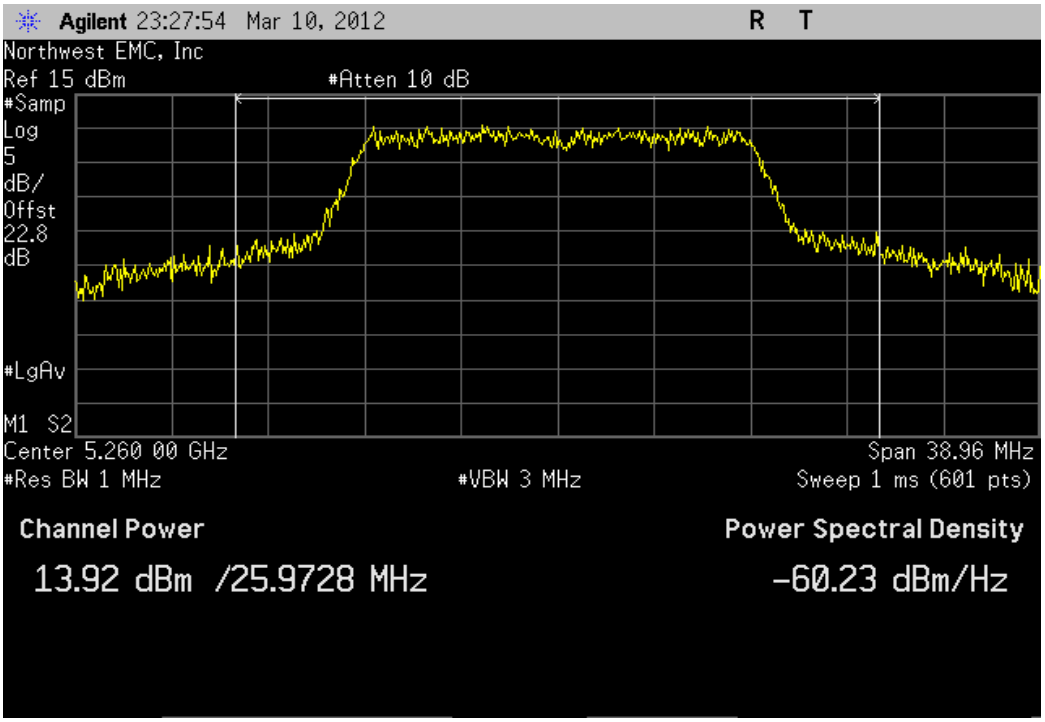
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

				Value	Limit	Result
				14.196 dBm	< 17 dBm	Pass



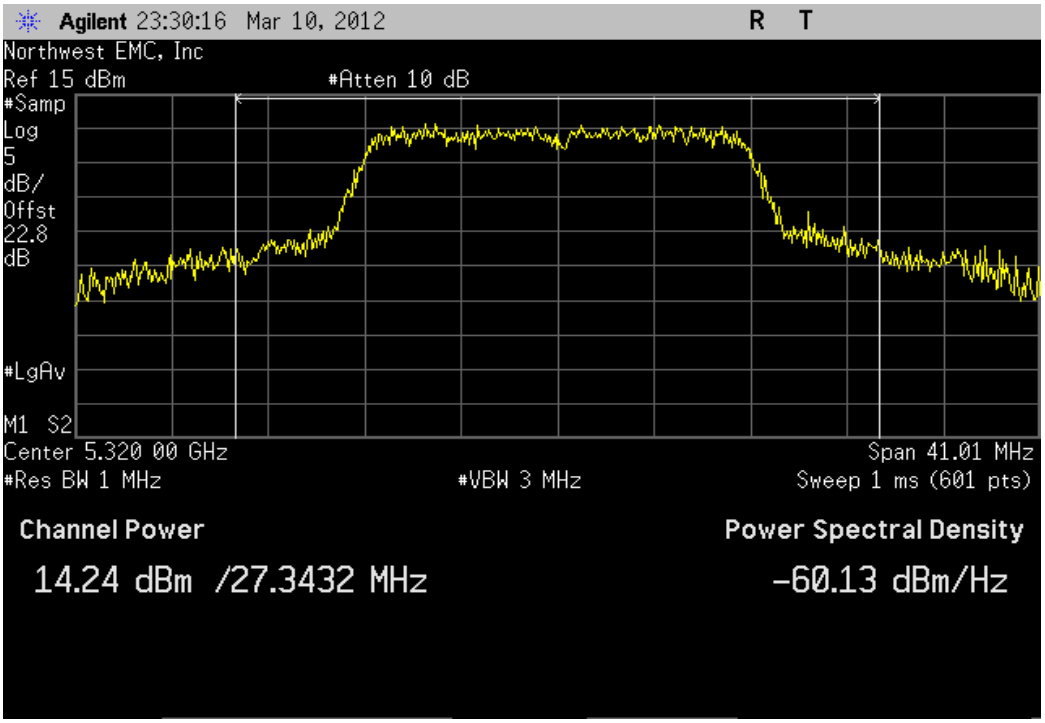
802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel

				Value	Limit	Result
				13.919 dBm	< 24 dBm	Pass



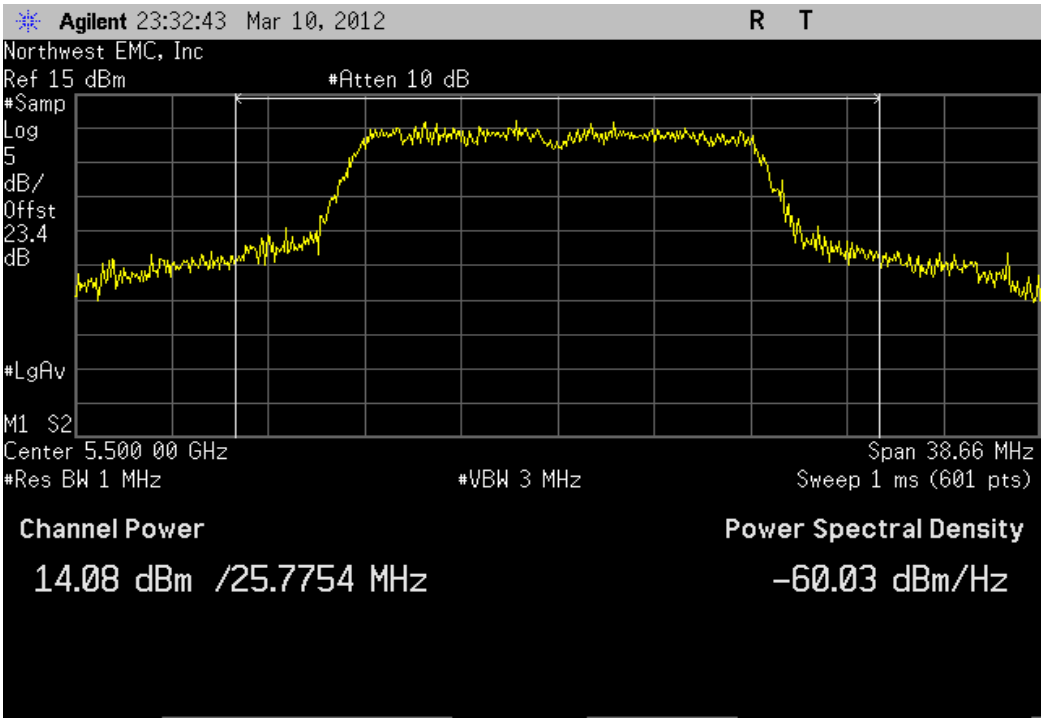
802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

				Value	Limit	Result
				14.24 dBm	< 24 dBm	Pass



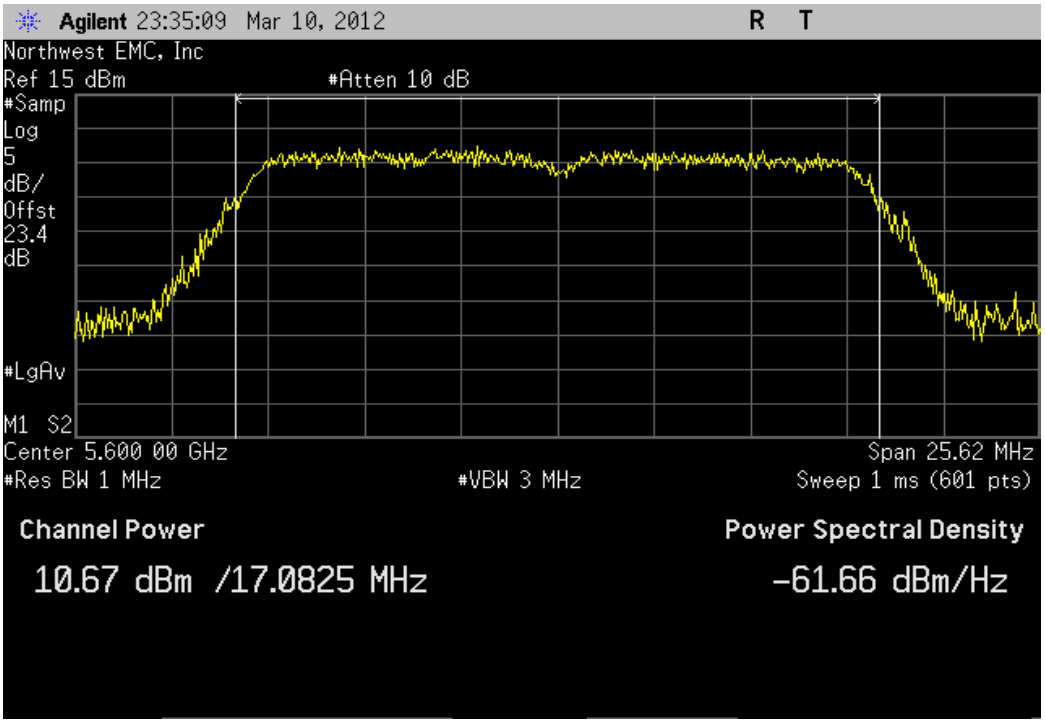
802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel

				Value	Limit	Result
				14.081 dBm	< 24 dBm	Pass



802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel

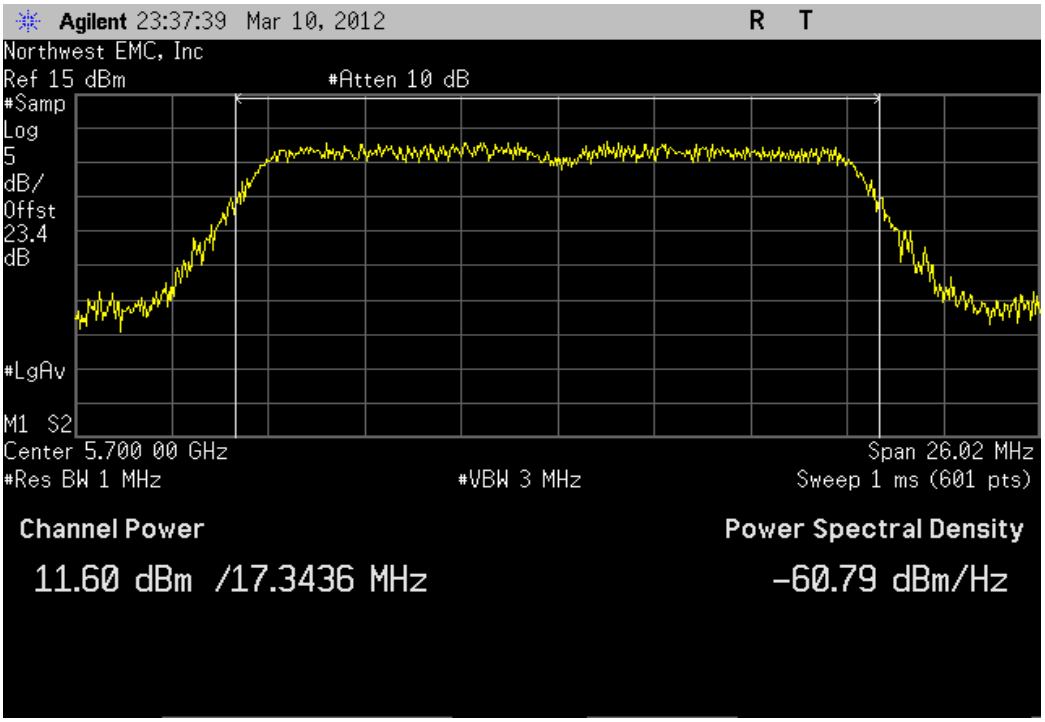
				Value	Limit	Result
				10.668 dBm	< 24 dBm	Pass



Peak Transmit Power

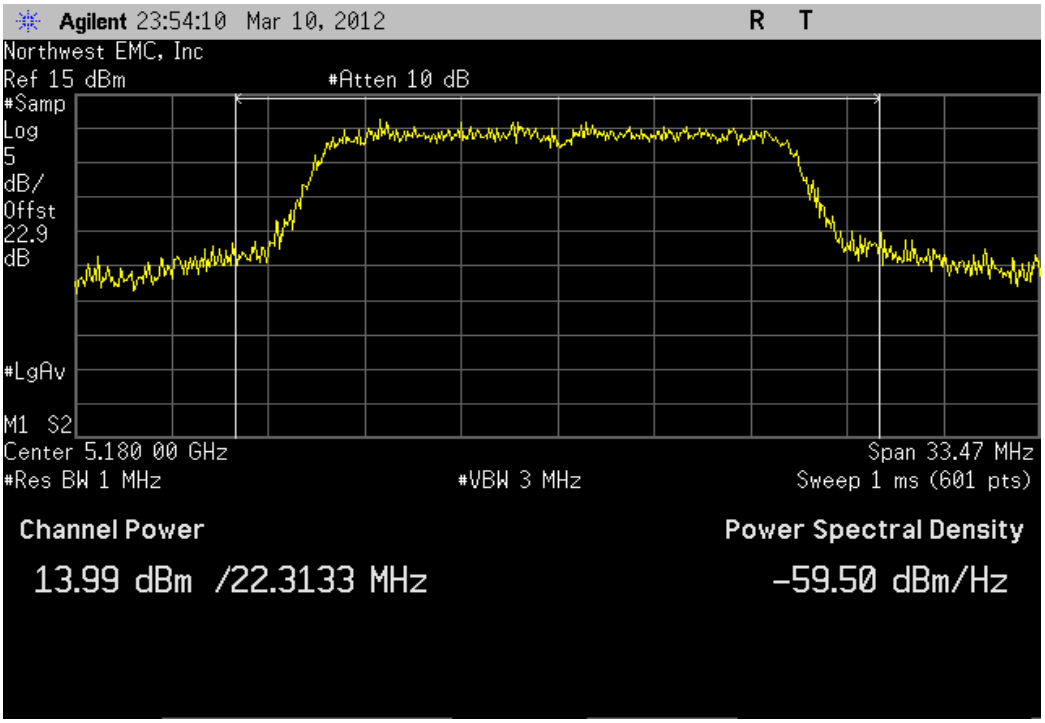
802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel

				Value	Limit	Result
				11.601 dBm	< 24 dBm	Pass



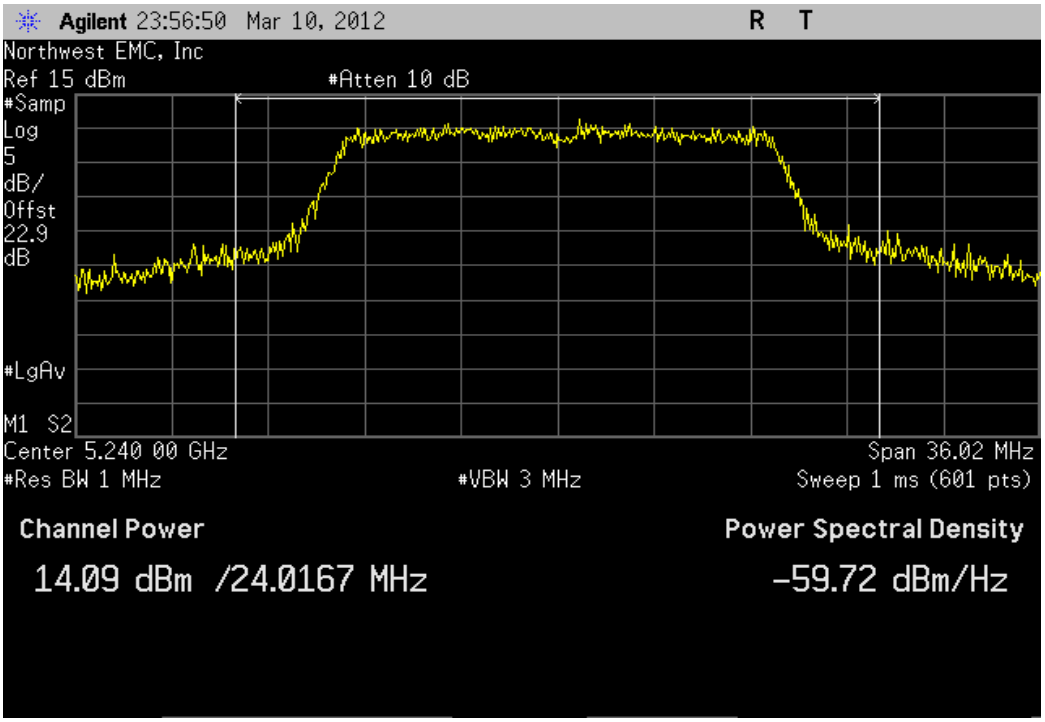
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

				Value	Limit	Result
				13.987 dBm	< 17 dBm	Pass



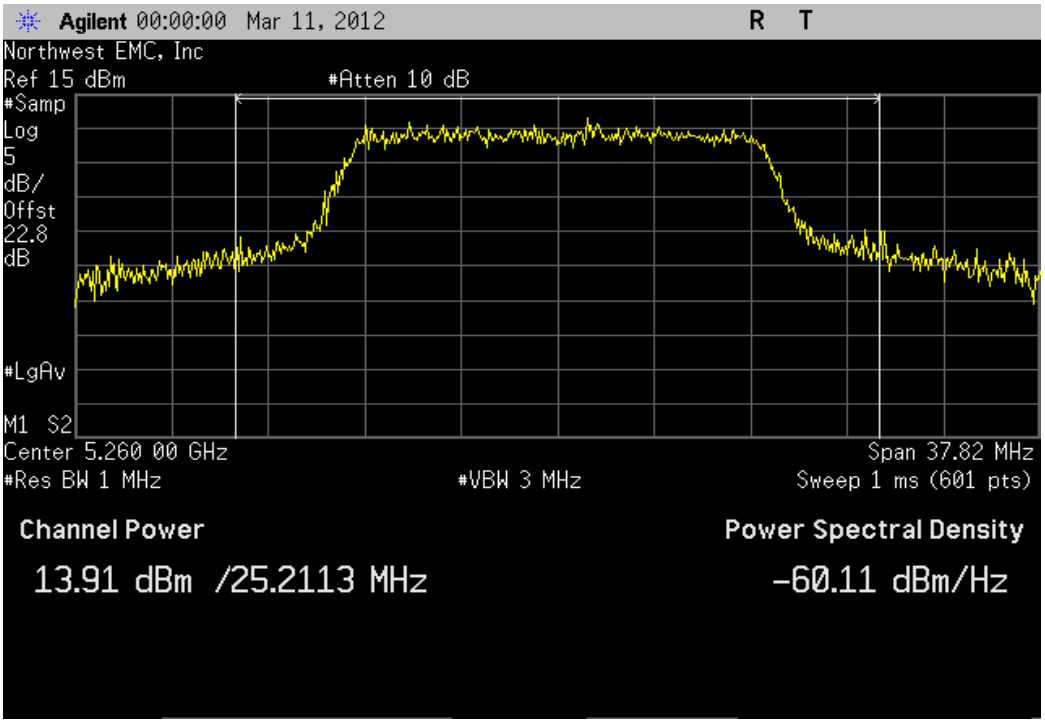
802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

				Value	Limit	Result
				14.088 dBm	< 17 dBm	Pass



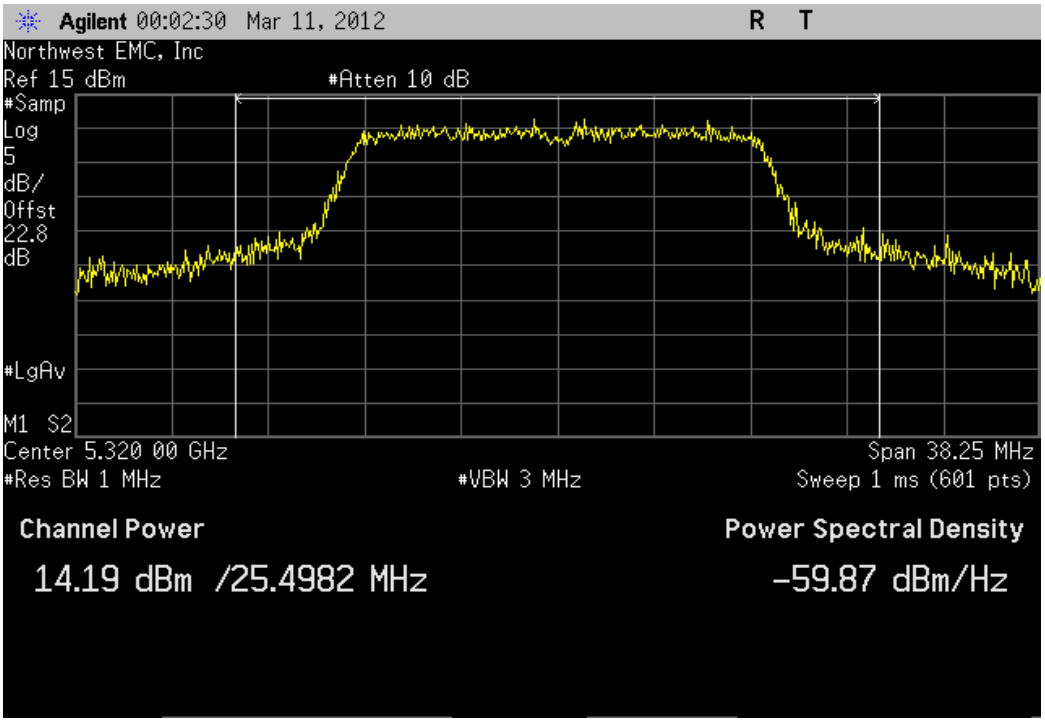
802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel

				Value	Limit	Result
				13.906 dBm	< 24 dBm	Pass



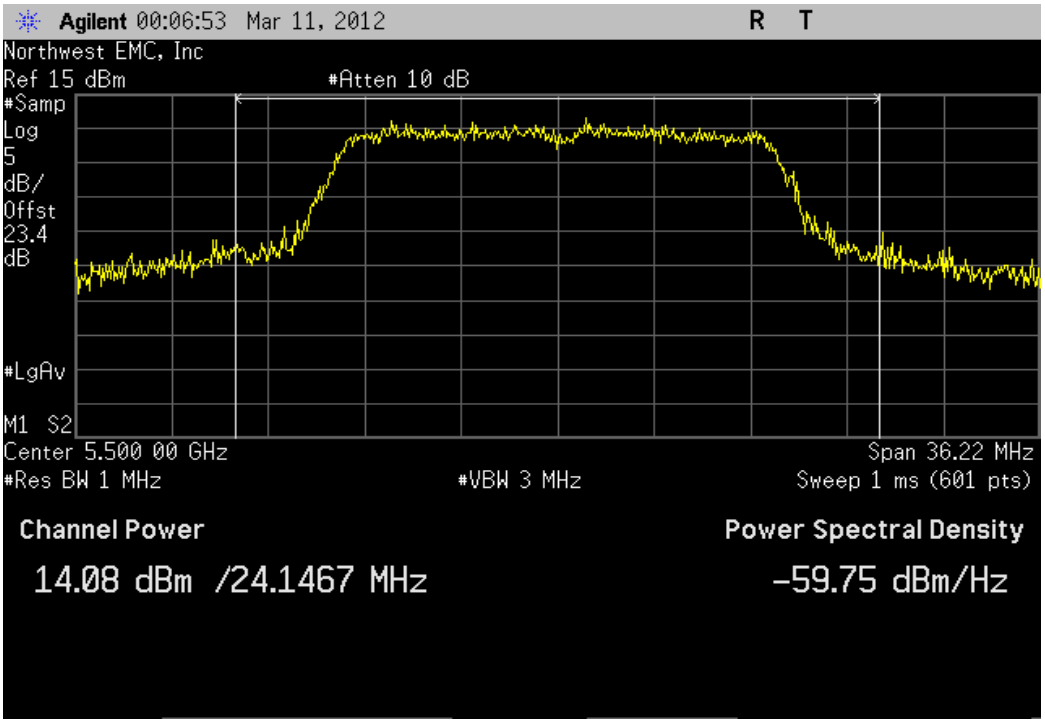
802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

				Value	Limit	Result
				14.195 dBm	< 24 dBm	Pass



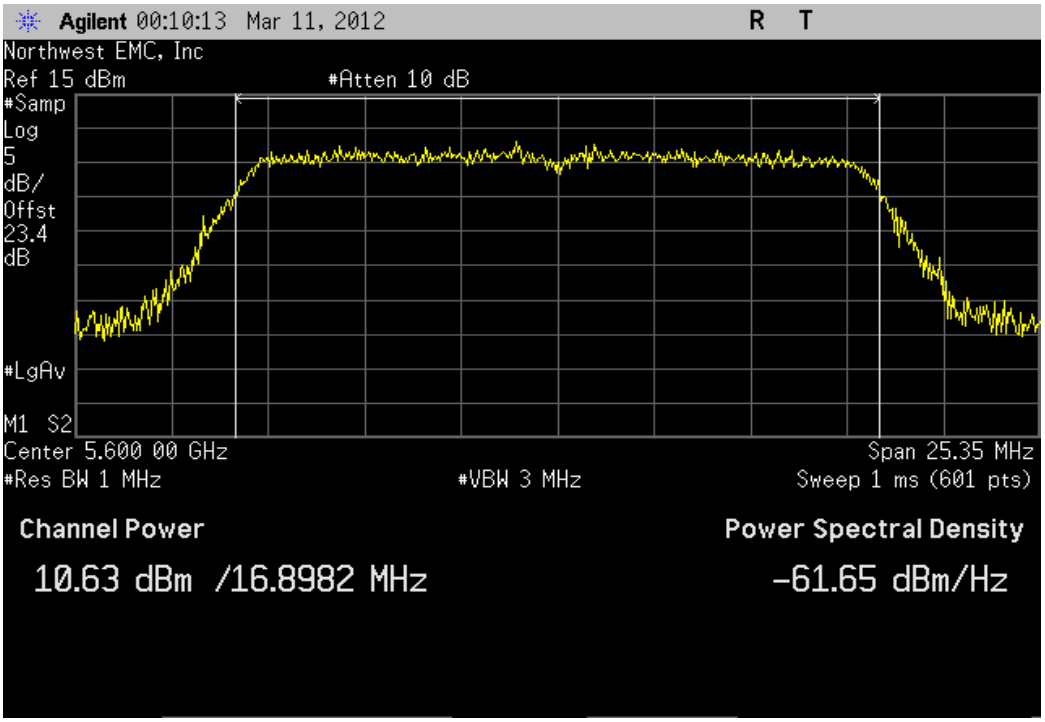
802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel

				Value	Limit	Result
				14.078 dBm	< 24 dBm	Pass



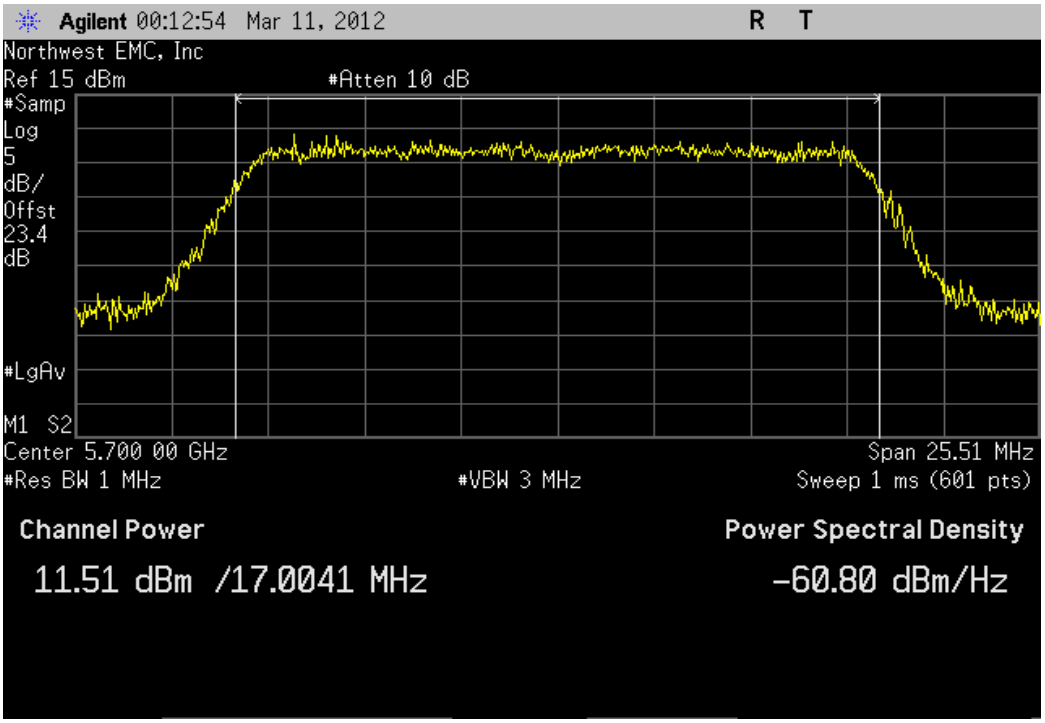
802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel

				Value	Limit	Result
				10.626 dBm	< 24 dBm	Pass



802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel

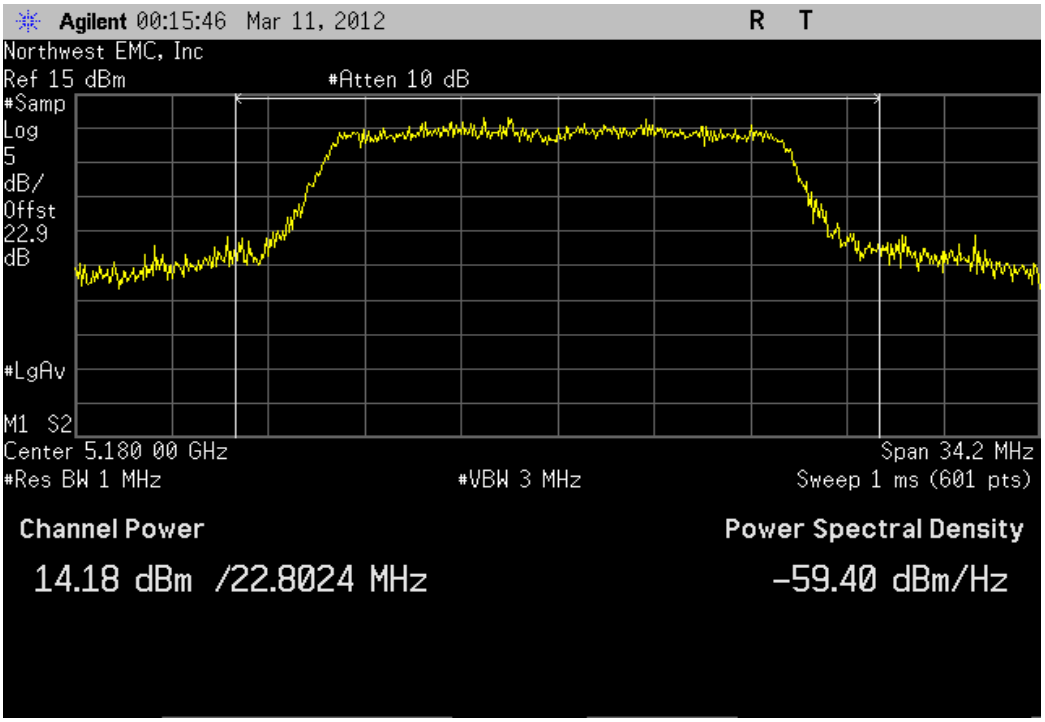
				Value	Limit	Result
				11.509 dBm	< 24 dBm	Pass



Peak Transmit Power

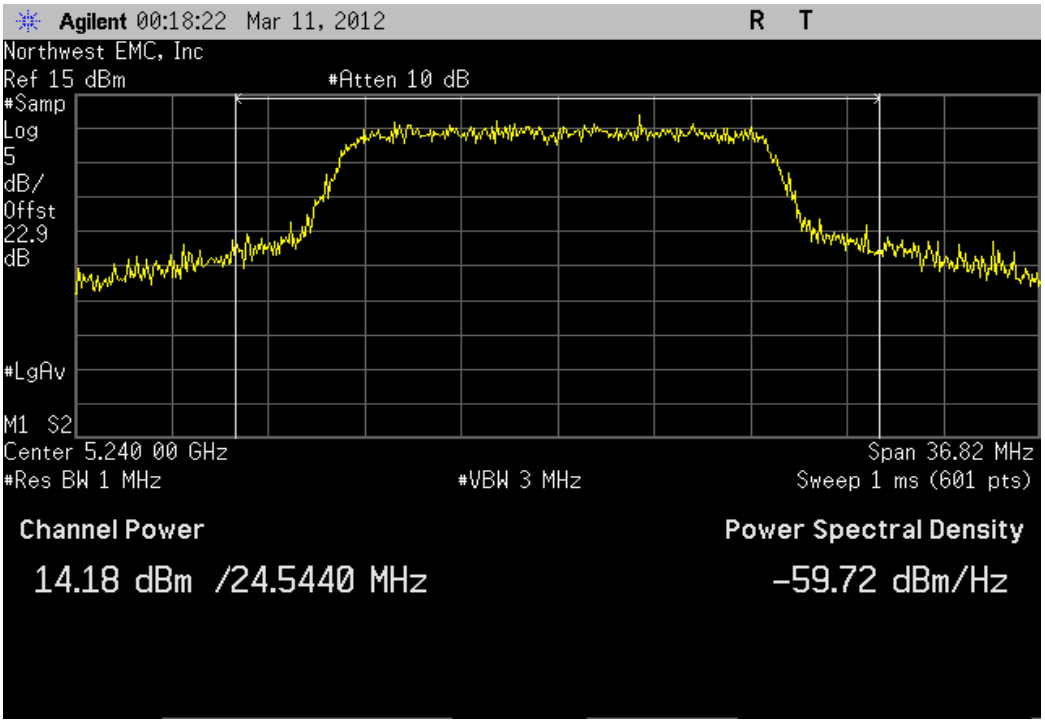
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

				Value	Limit	Result
				14.177 dBm	< 17 dBm	Pass



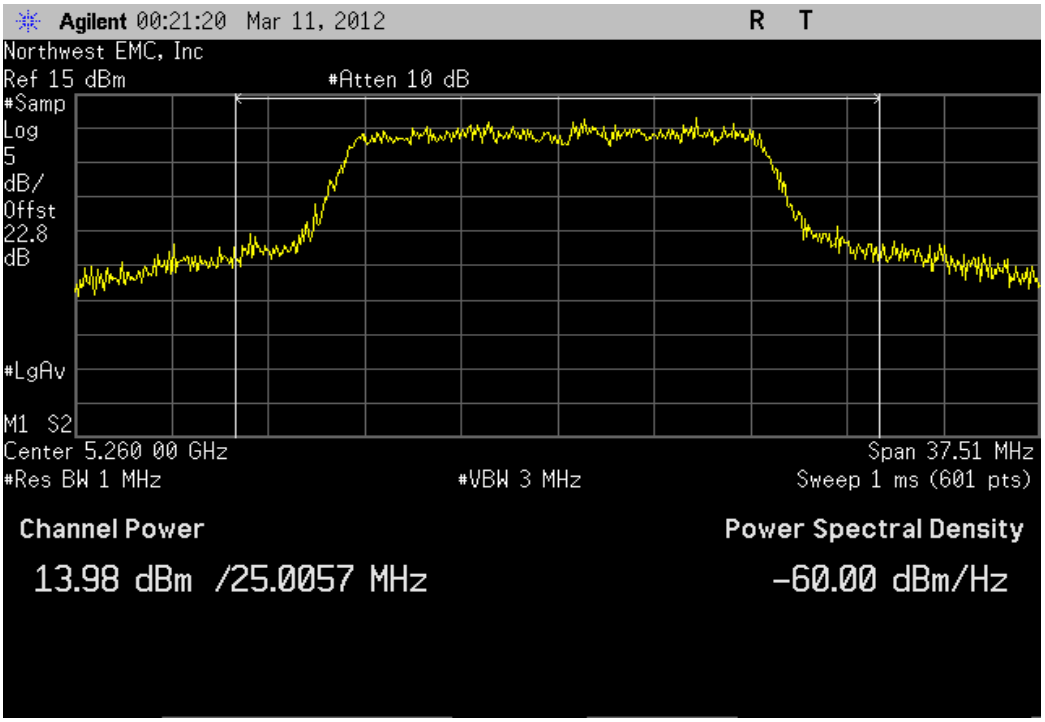
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

				Value	Limit	Result
				14.181 dBm	< 17 dBm	Pass



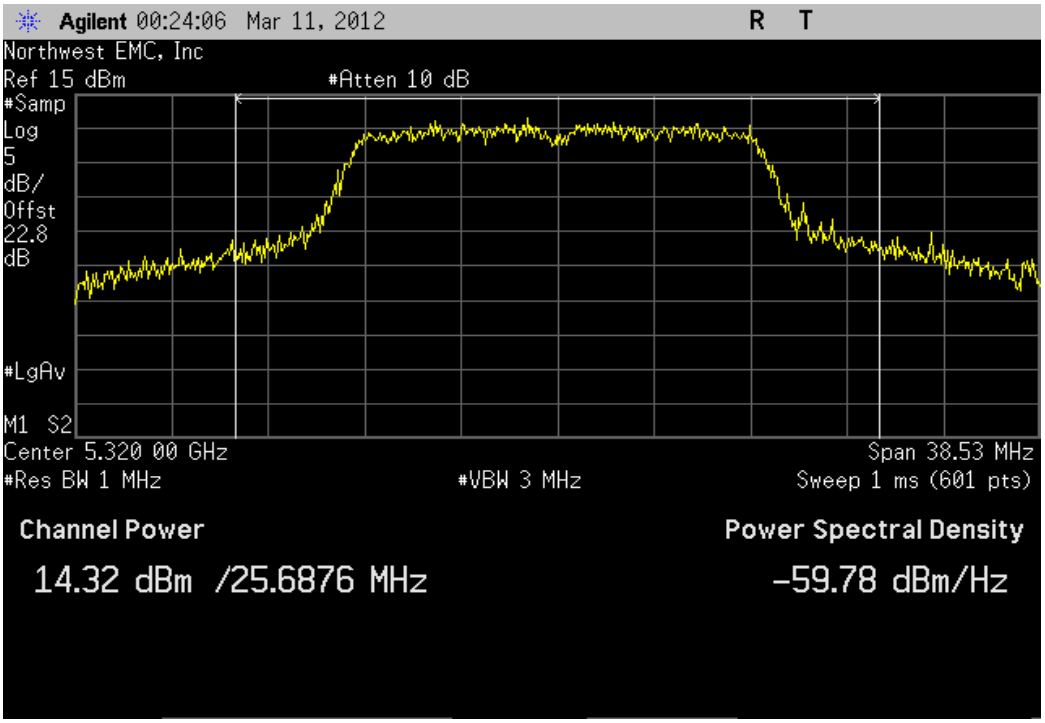
802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel

				Value	Limit	Result
				13.979 dBm	< 24 dBm	Pass



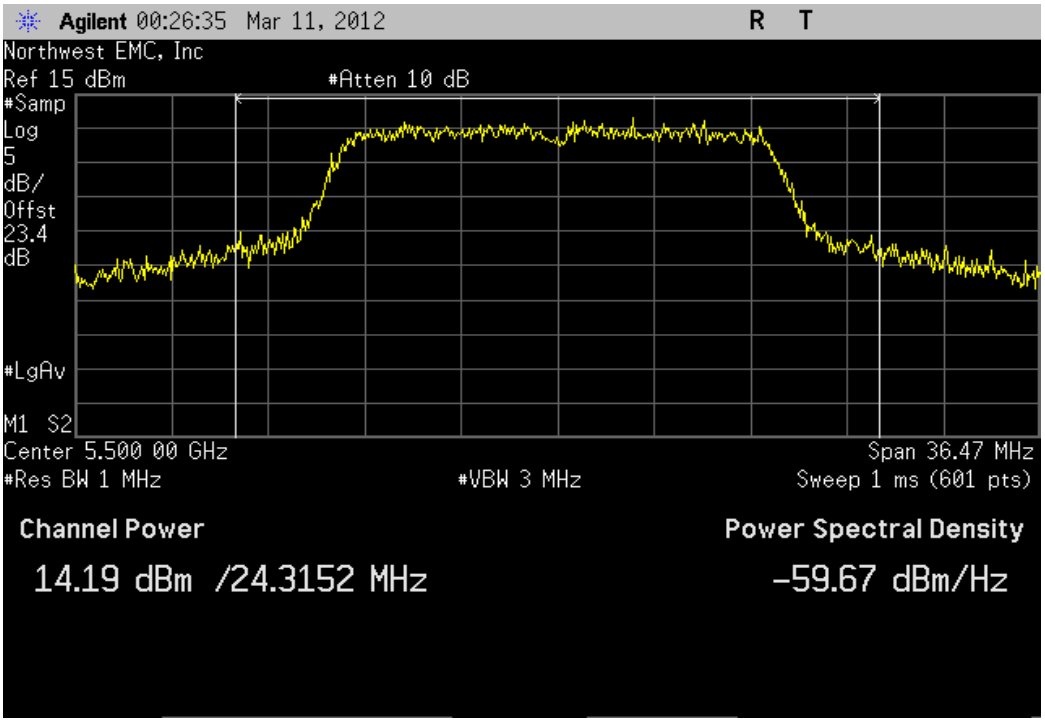
802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

				Value	Limit	Result
				14.317 dBm	< 24 dBm	Pass



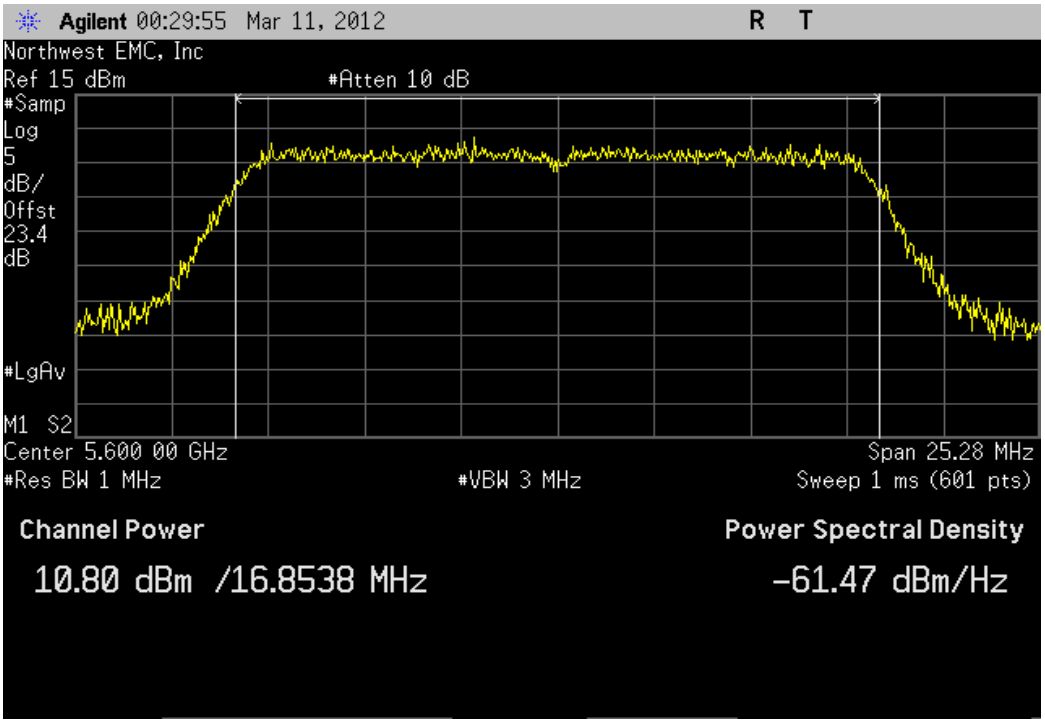
802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel

				Value	Limit	Result
				14.186 dBm	< 24 dBm	Pass



802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel

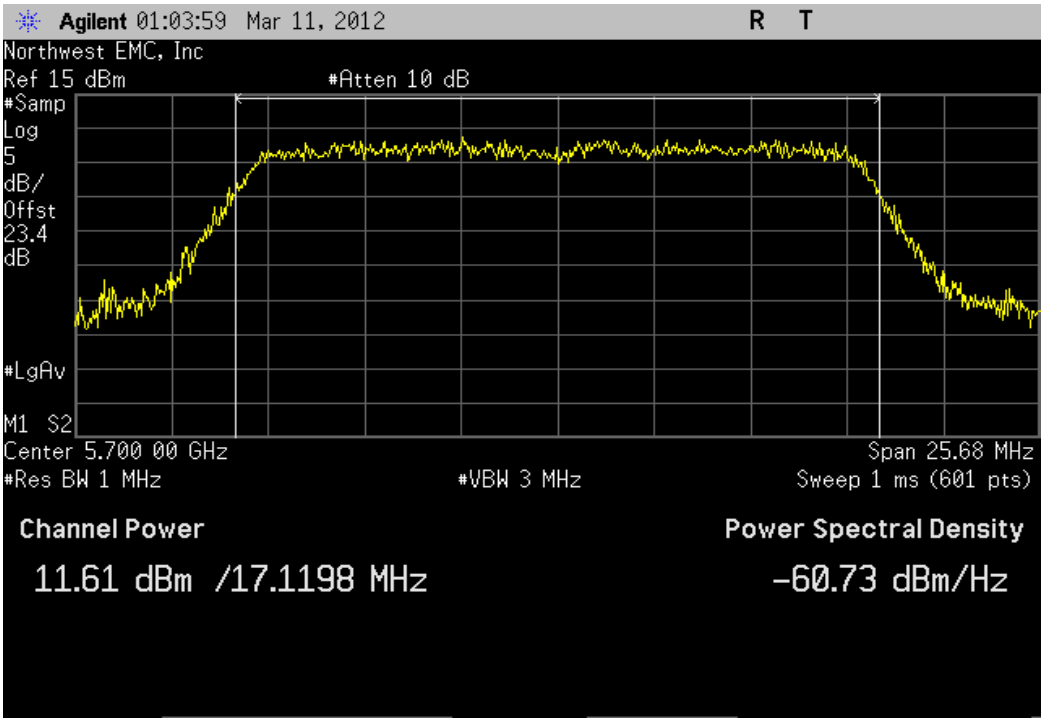
				Value	Limit	Result
				10.798 dBm	< 24 dBm	Pass



Peak Transmit Power

802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel

				Value	Limit	Result
				11.608 dBm	< 24 dBm	Pass



Peak Power Spectral Density

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
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

ANSI C63.10 was followed. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. The lowest data rate was measured as it provided the highest output power. 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. The amplitude accuracy of the spectrum analyzer was further enhanced by calibrating the setup using the power meter and synthesized signal generator.

Prior to measuring peak power spectral density, the transmission pulse duration (T) were measured. The transmission pulse duration and the associated data are found elsewhere in this test report.

Method #2 was used.

The spectrum analyzer settings were as follows:

The span was set to encompass entire emission bandwidth (B), centered on the transmit channel.
RBW = 1 MHz, VBW >= 3 MHz because the emission bandwidth (B) is greater than 1 MHz
Sample detector mode because the bin width (span / number of spectral points) < 0.5 RBW.
Trace average 100 traces in power averaging mode (not video averaging).

The peak power spectral density (PPSD) was determined to be the highest level found across the emission in any 1 MHz band after 100 sweeps of power averaging (not video averaging).

Peak Power Spectral Density

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	03/20/12
Customer:	Digi International			**Temperature:**	22.78°C
Attendees:	None			**Humidity:**	55%
Project:	None			**Barometric Pres.:**	1007.8
Tested by:	Trevor Buls	**Power:**	110VAC/60Hz	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.407:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Duty Cycle was measured at 100% operation. Channel 36, 48, 52, 64, 100: Power level 50. Channel 120: Power level 38, and Channel 140: Power level 47 at 6 Mbps, 36 Mbps, 54 Mbps.

DEVIATIONS FROM TEST STANDARD

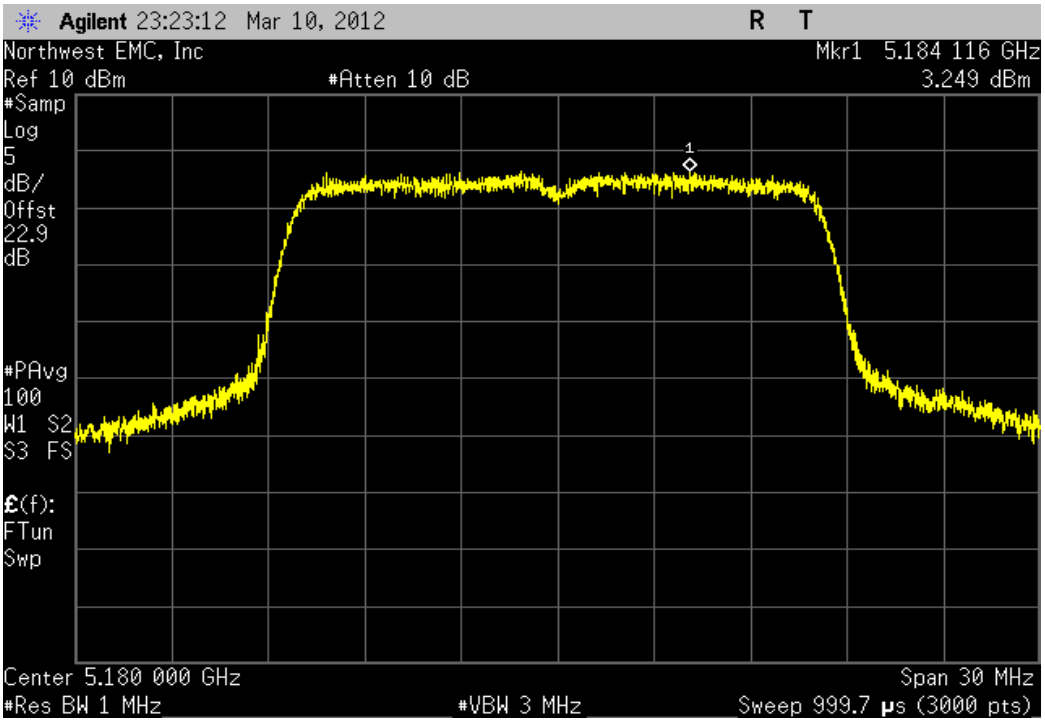
None

Configuration #	2	Signature	Trevor Buls

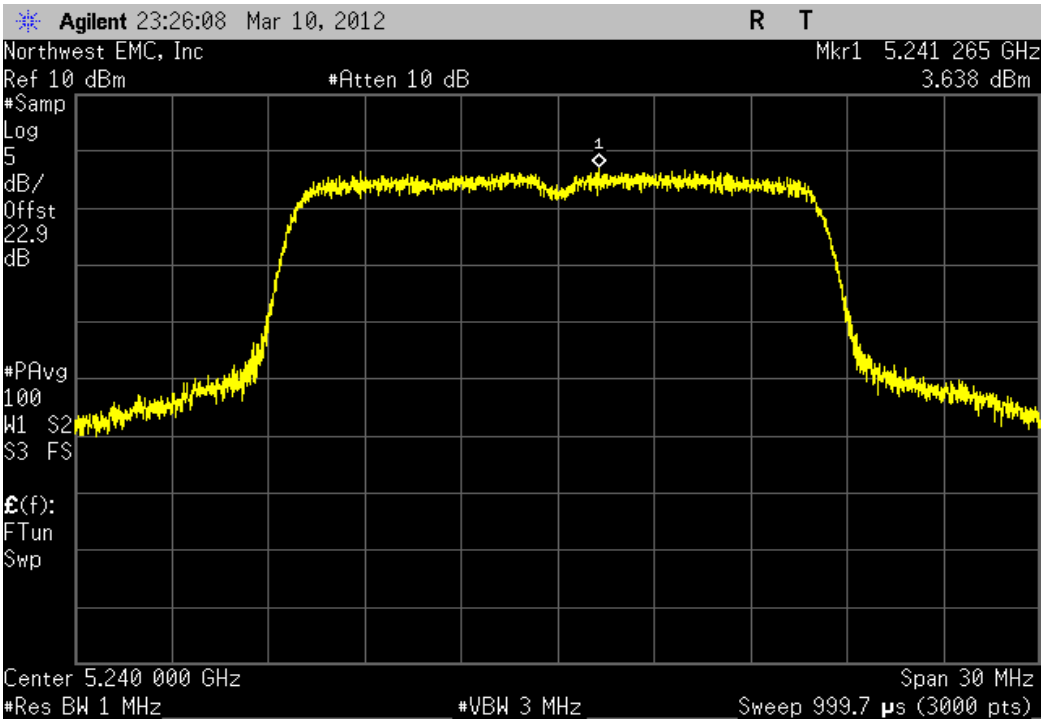
		Value (dBm / MHz)	Limit (dBm / MHz)	Result
802.11(a) 6 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	3.249	4	Pass
	Channel 48, High Channel	3.638	4	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	3.299	4	Pass
	Channel 64, High Channel	3.632	4	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	3.402	4	Pass
	Channel 120, Mid Channel	-0.025	4	Pass
	Channel 140, High Channel	1.028	4	Pass
802.11(a) 36 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	3.287	4	Pass
	Channel 48, High Channel	3.538	4	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	3.571	4	Pass
	Channel 64, High Channel	3.588	4	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	3.327	4	Pass
	Channel 120, Mid Channel	0.176	4	Pass
	Channel 140, High Channel	1.107	4	Pass
802.11(a) 54 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	3.875	4	Pass
	Channel 48, High Channel	3.699	4	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	3.293	4	Pass
	Channel 64, High Channel	3.586	4	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	3.439	4	Pass
	Channel 120, Mid Channel	0.522	4	Pass
	Channel 140, High Channel	1.056	4	Pass

Peak Power Spectral Density

802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel							
					Value (dBm / MHz)	Limit (dBm / MHz)	Result
					3.249	4	Pass

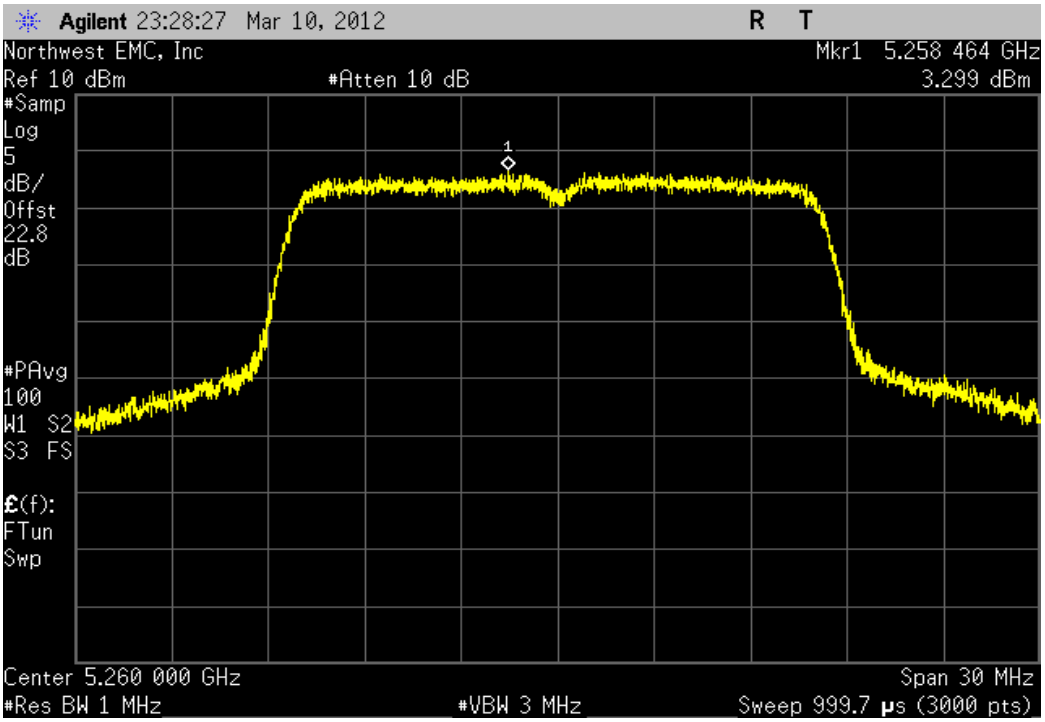


802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel							
					Value (dBm / MHz)	Limit (dBm / MHz)	Result
					3.638	4	Pass

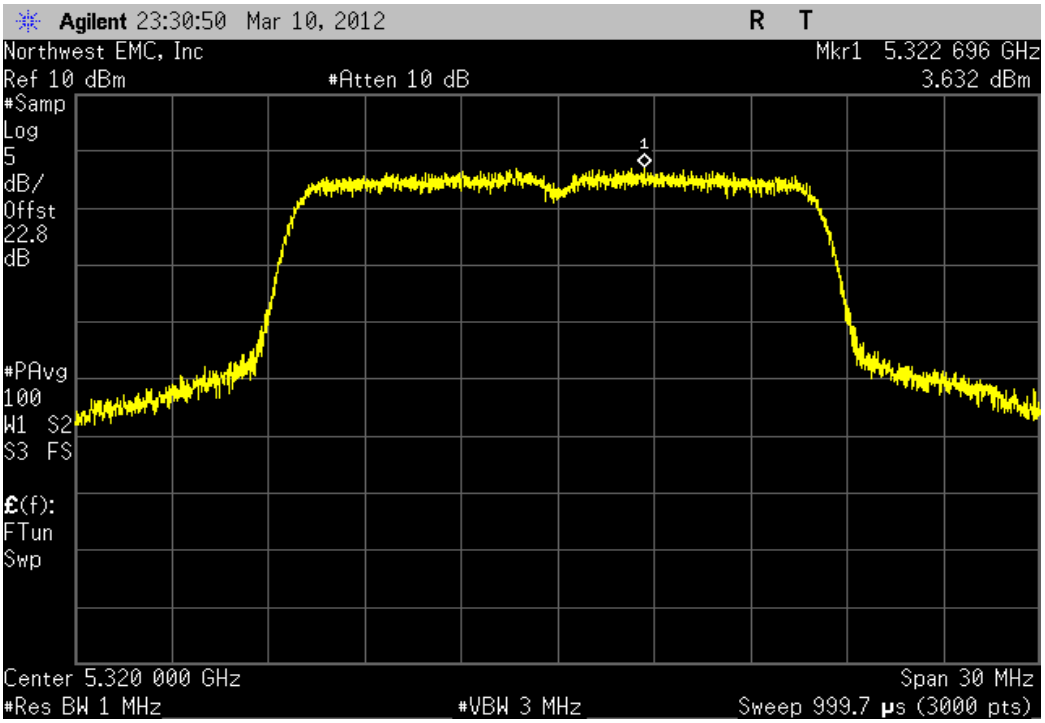


Peak Power Spectral Density

802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel							
					Value (dBm / MHz)	Limit (dBm / MHz)	Result
					3.299	4	Pass

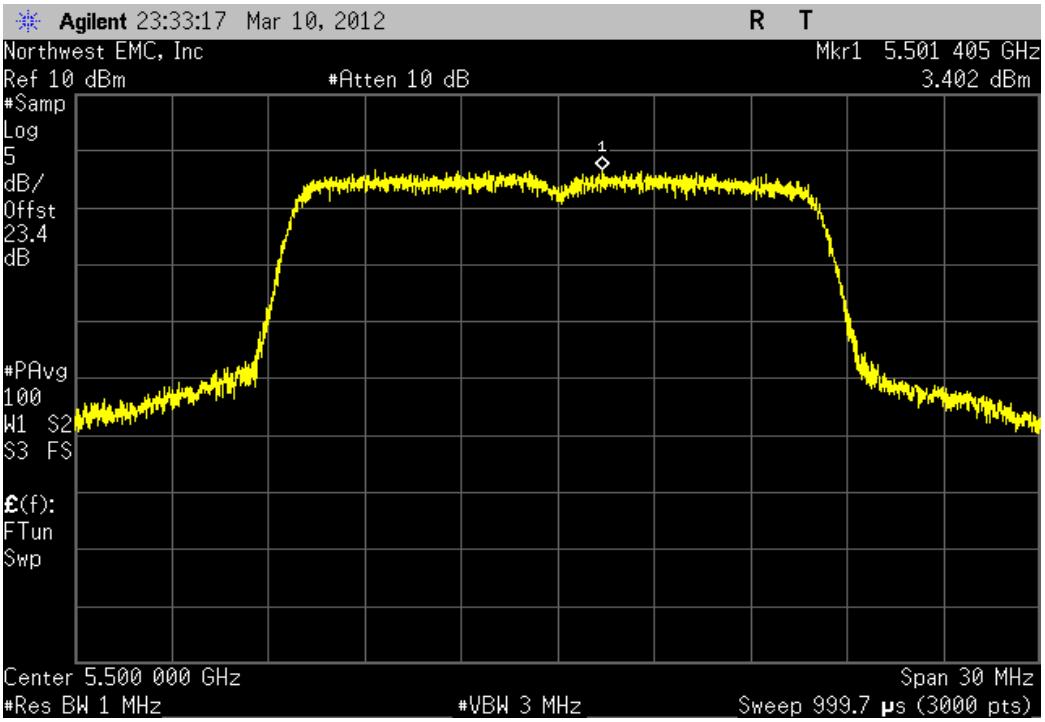


802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel							
					Value (dBm / MHz)	Limit (dBm / MHz)	Result
					3.632	4	Pass

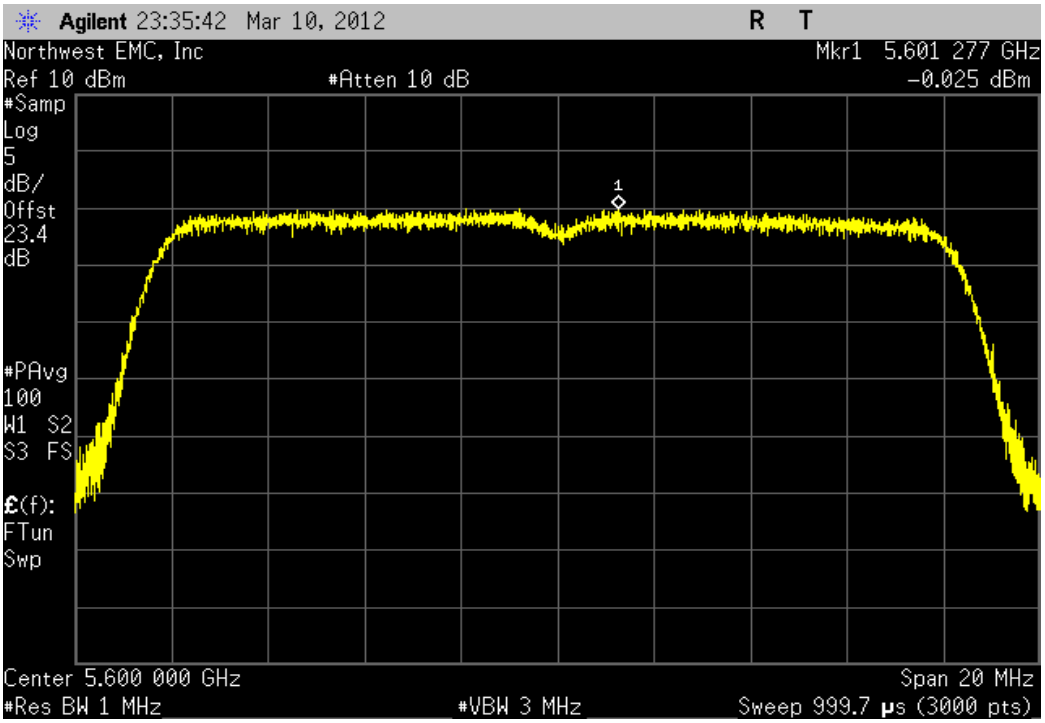


Peak Power Spectral Density

802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.402	4	Pass

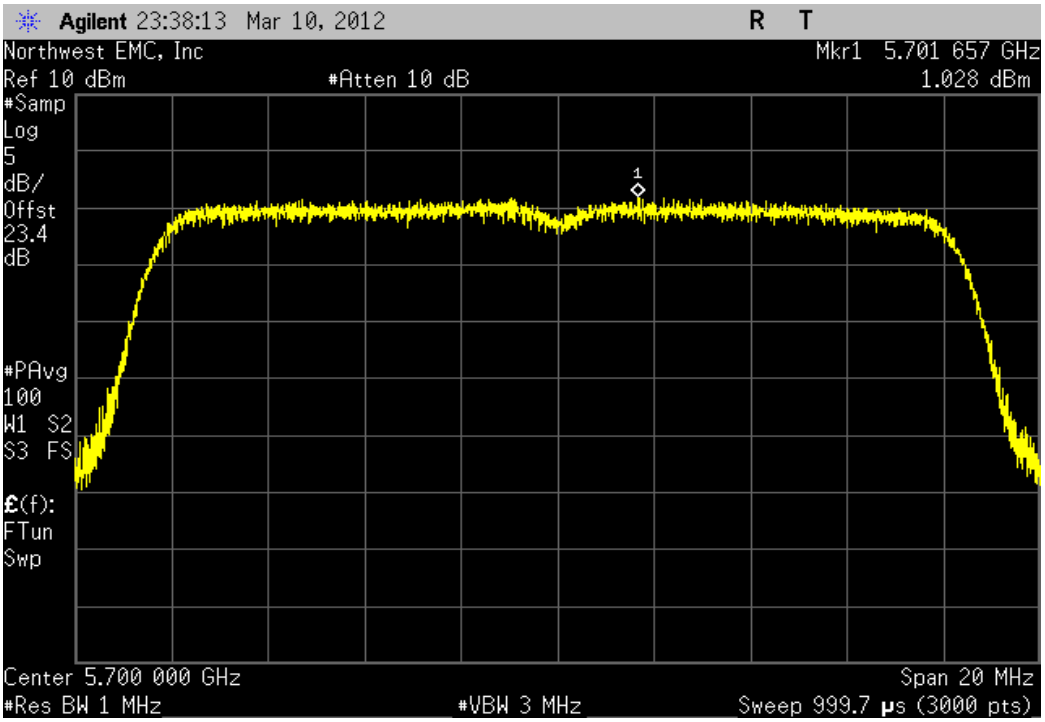


802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				-0.025	4	Pass

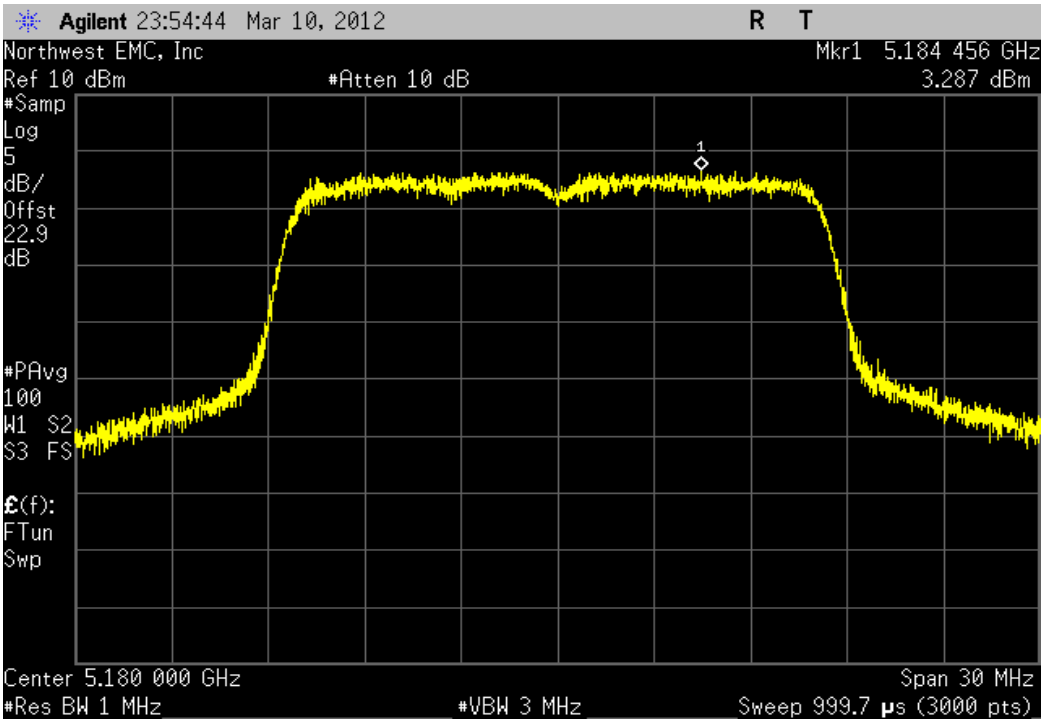


Peak Power Spectral Density

802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				1.028	4	Pass

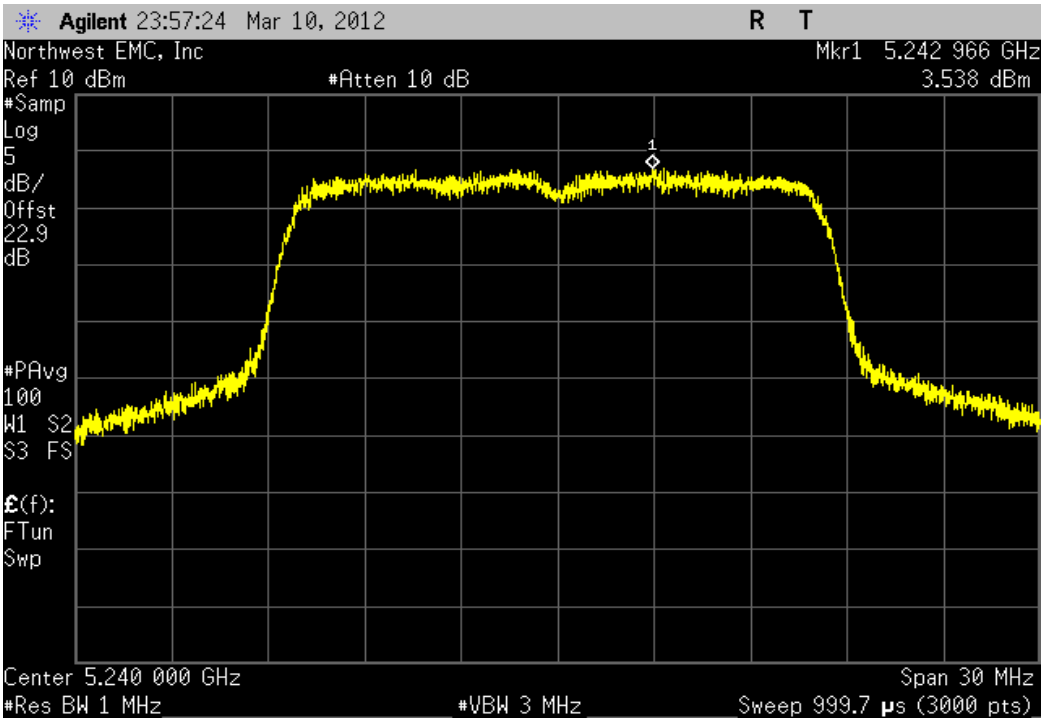


802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.287	4	Pass

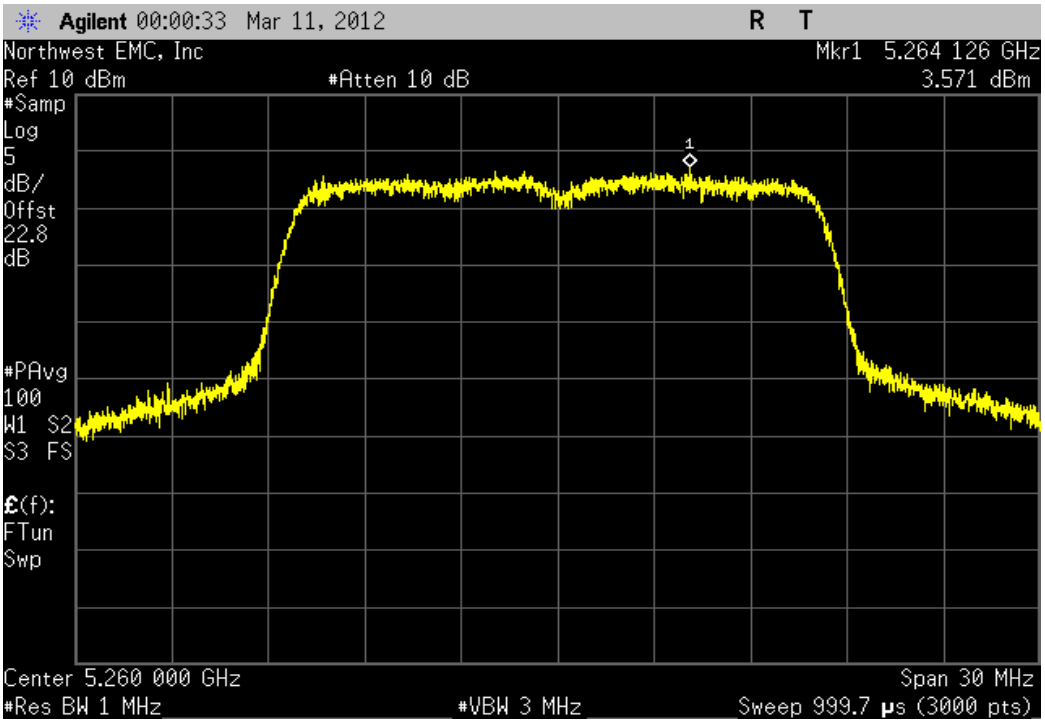


Peak Power Spectral Density

802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.538	4	Pass

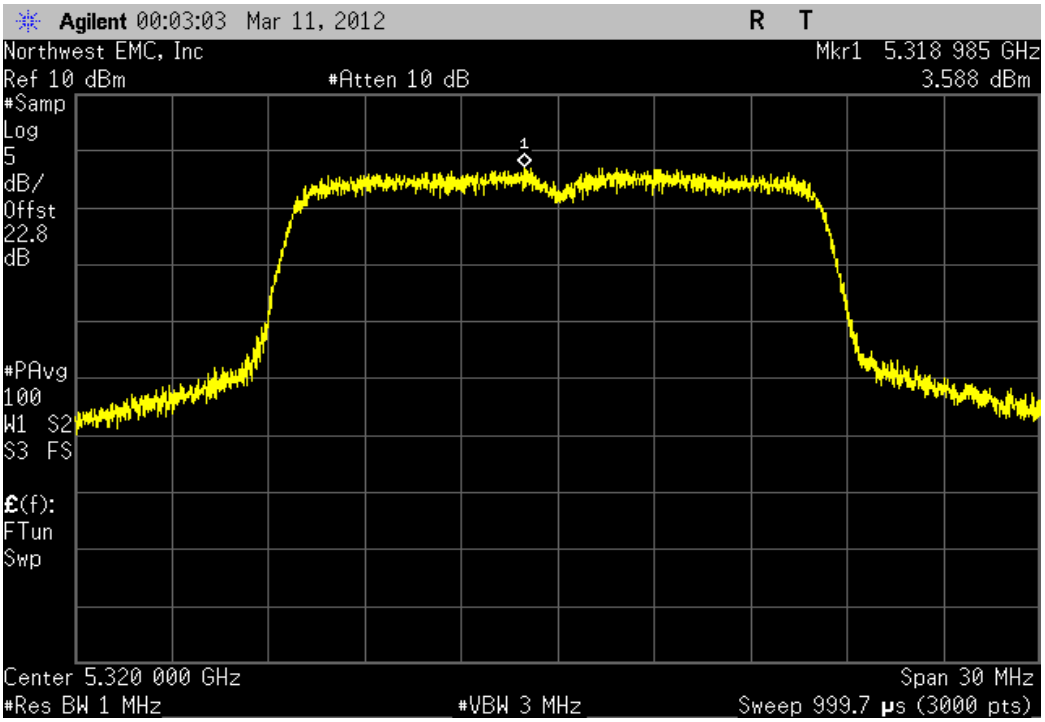


802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.571	4	Pass

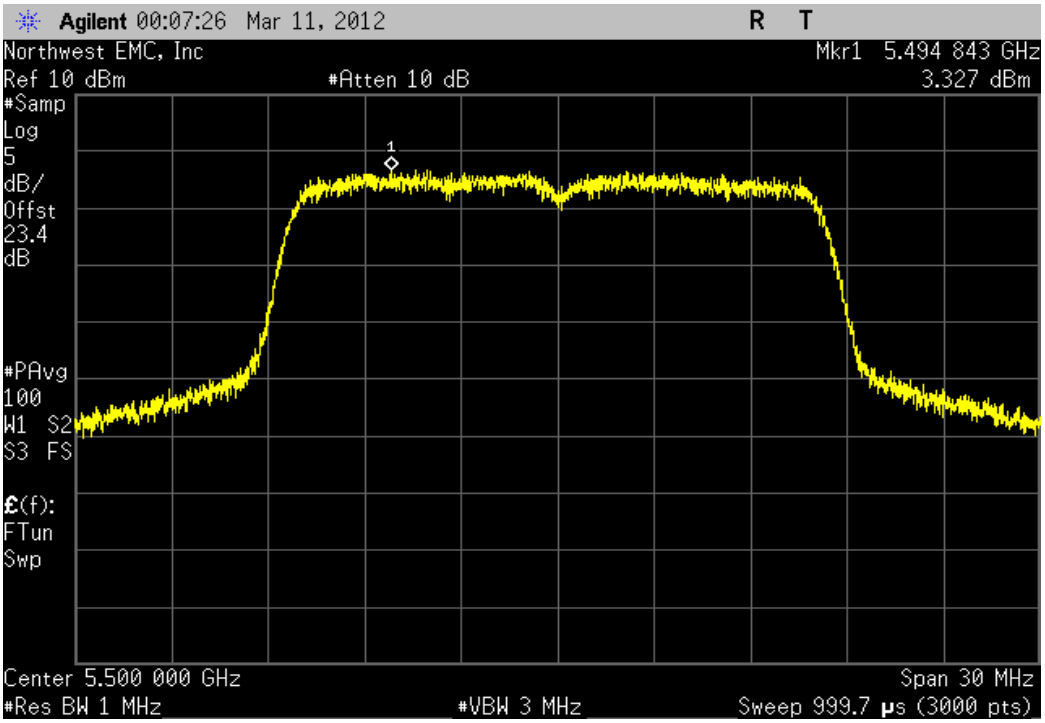


Peak Power Spectral Density

802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.588	4	Pass

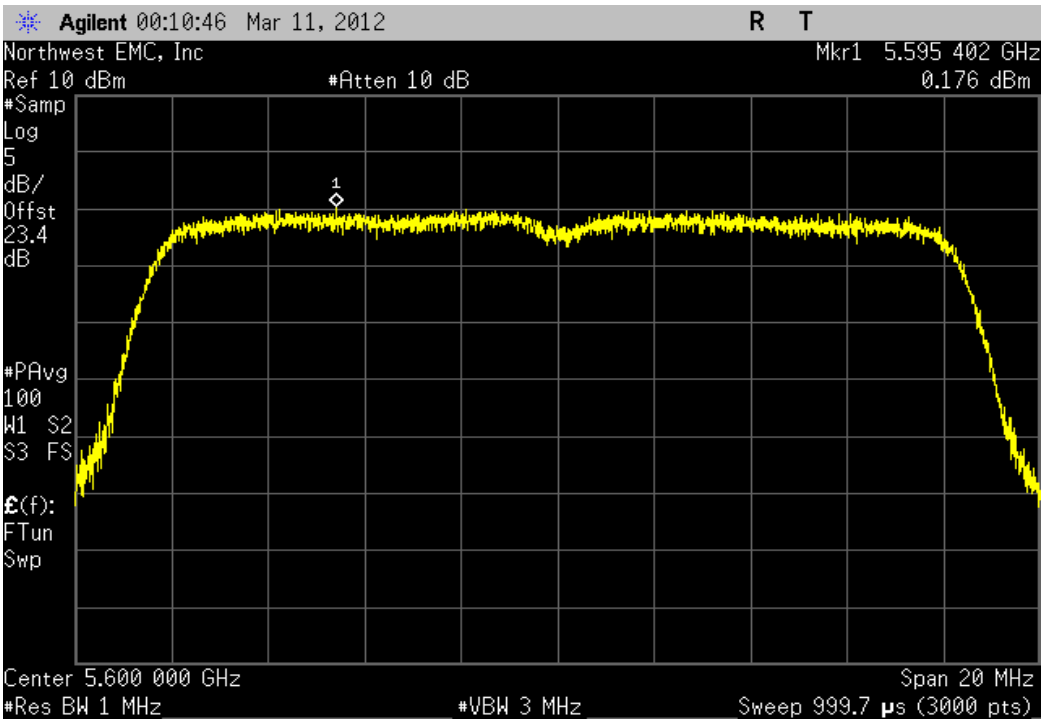


802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.327	4	Pass

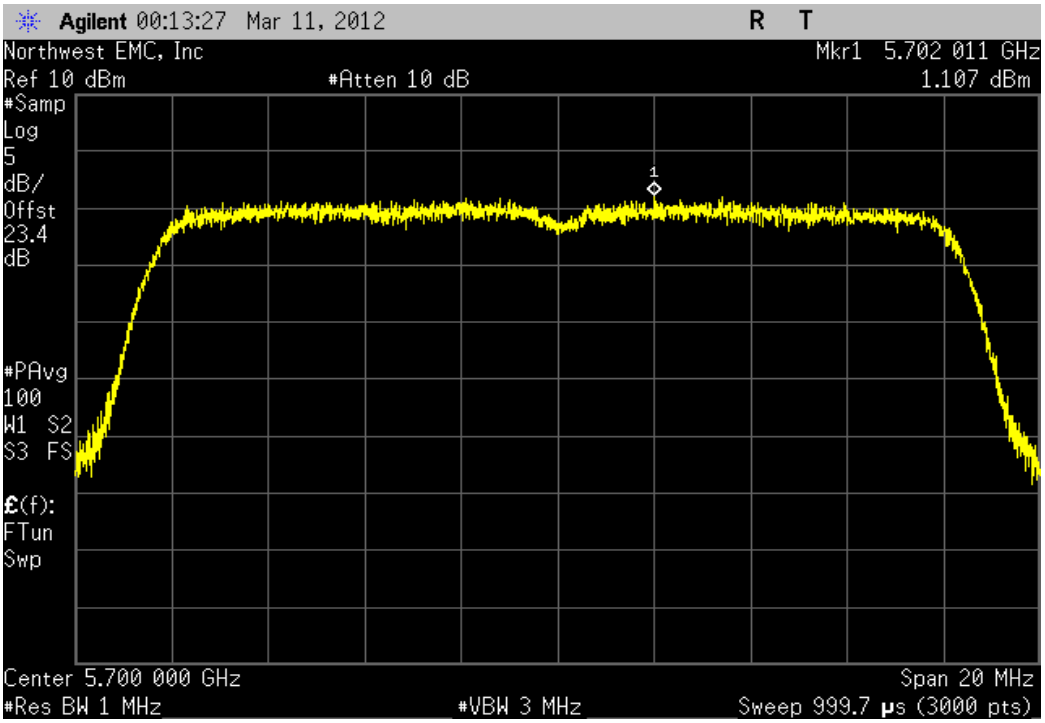


Peak Power Spectral Density

802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				0.176	4	Pass

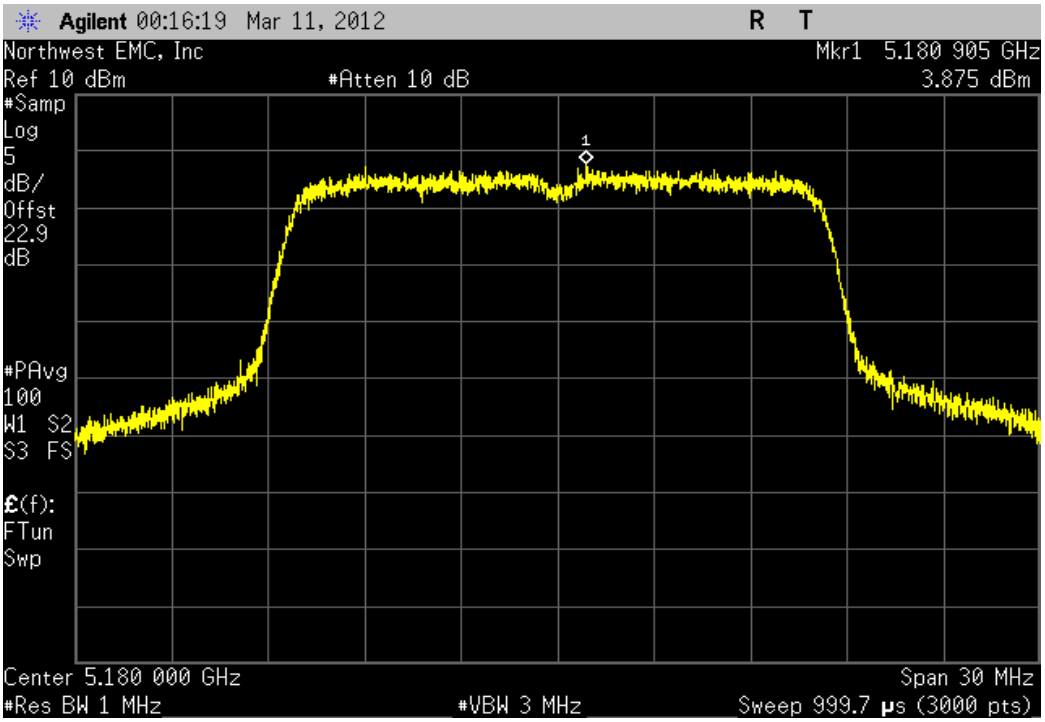


802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				1.107	4	Pass

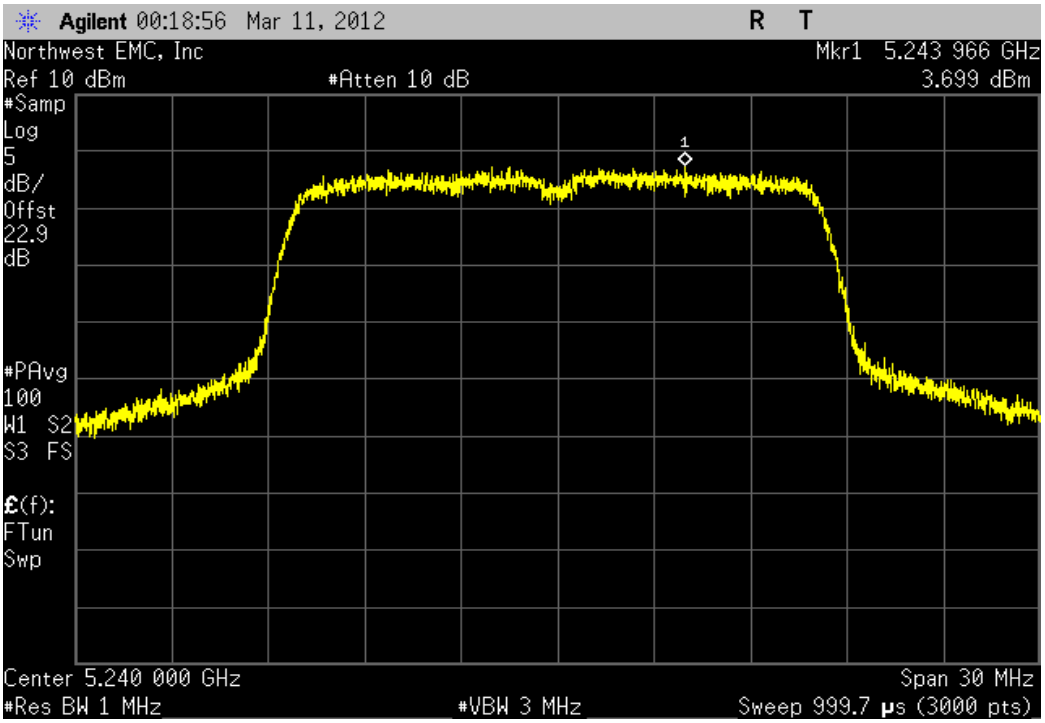


Peak Power Spectral Density

802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel							
					Value (dBm / MHz)	Limit (dBm / MHz)	Result
					3.875	4	Pass

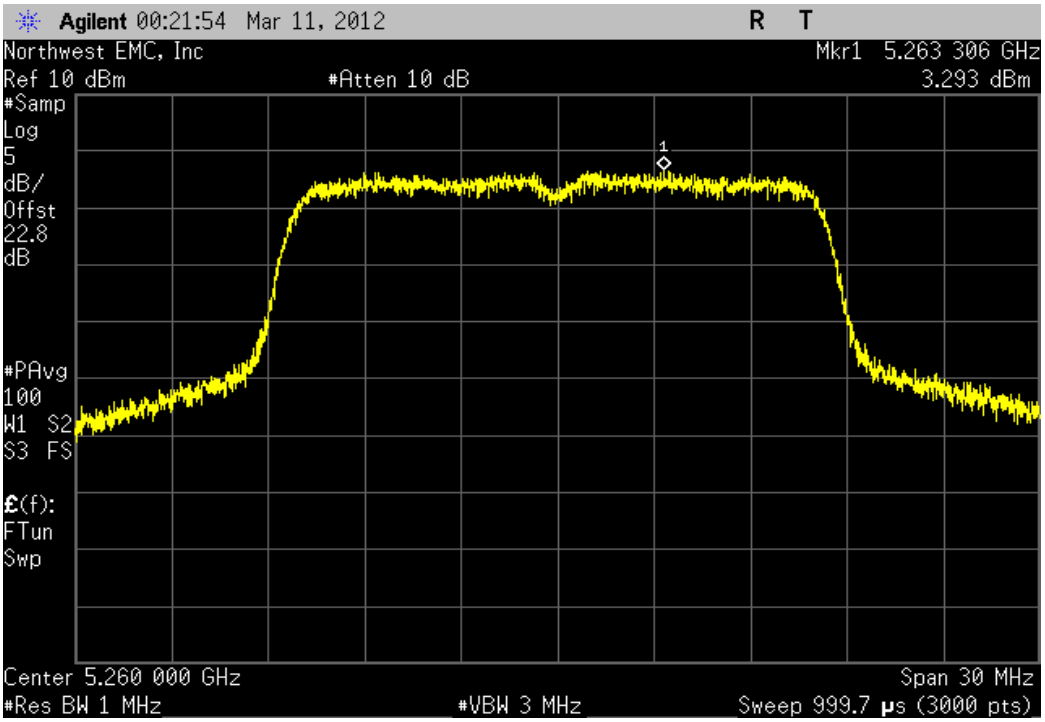


802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel							
					Value (dBm / MHz)	Limit (dBm / MHz)	Result
					3.699	4	Pass

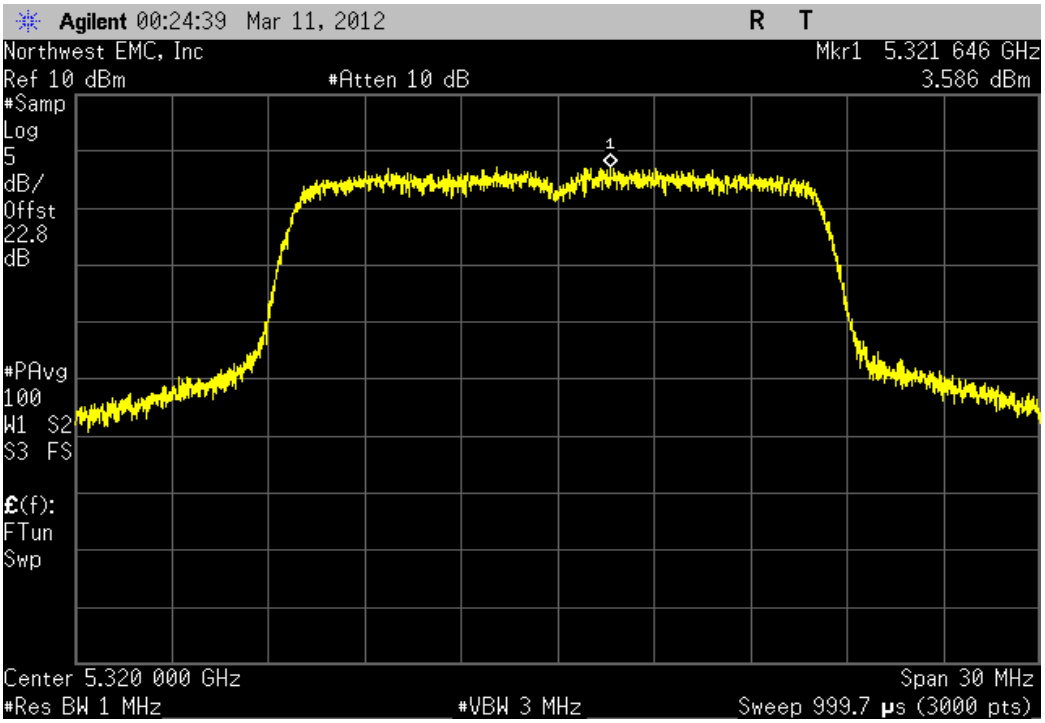


Peak Power Spectral Density

802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.293	4	Pass

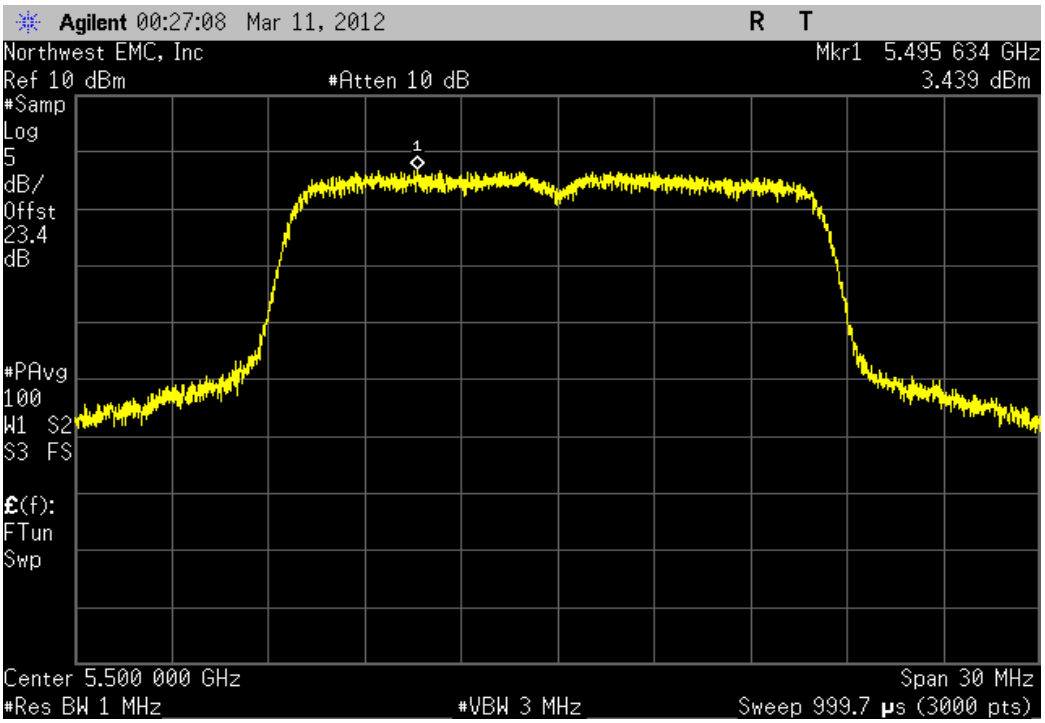


802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.586	4	Pass

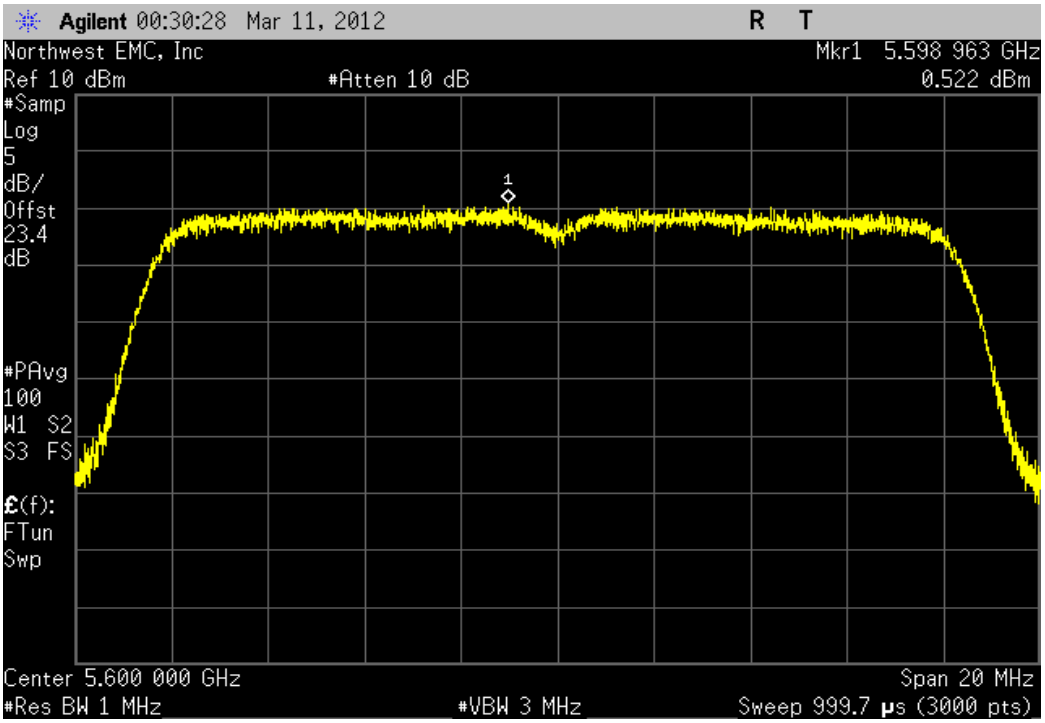


Peak Power Spectral Density

802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				3.439	4	Pass

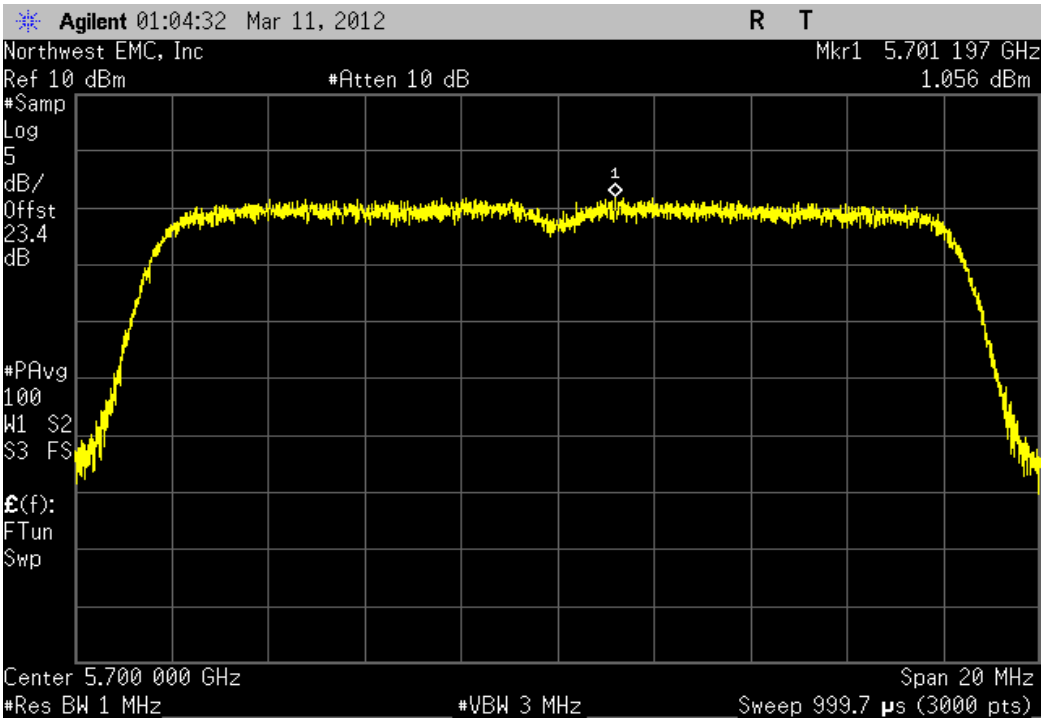


802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				0.522	4	Pass



Peak Power Spectral Density

802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel						
				Value (dBm / MHz)	Limit (dBm / MHz)	Result
				1.056	4	Pass



Peak Excursion

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
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

FCC Public Notice DA 02-2138 was followed. The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. The lowest, a medium, and the highest data rates were measured. 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.

The spectrum analyzer settings were as follows:

- Span set to encompass the entire emission bandwidth (B), centered on the transmit channel.
- Using the marker delta function, the largest difference between the following two traces was measured:
  - 1st Trace: RBW = 1 MHz, VBW >= 3 MHz with peak detector and max-hold settings.
  - 2nd Trace: Use same settings as were used for peak conducted transmit power. The sample detector was used as well as the VBW being matched to that used on the peak conducted transmit power.

Peak Excursion

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	03/20/12
Customer:	Digi International			**Temperature:**	22.78°C
Attendees:	None			**Humidity:**	55%
Project:	None			**Barometric Pres.:**	1007.8
Tested by:	Trevor Buls	**Power:**	110VAC/60Hz	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.407:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Duty Cycle was measured at 100% operation. Channel 36, 48, 52, 64, 100: Power level 50. Channel 120: Power level 38, and Channel 140: Power level 47 at 6 Mbps, 36 Mbps, 54 Mbps.

DEVIATIONS FROM TEST STANDARD

None

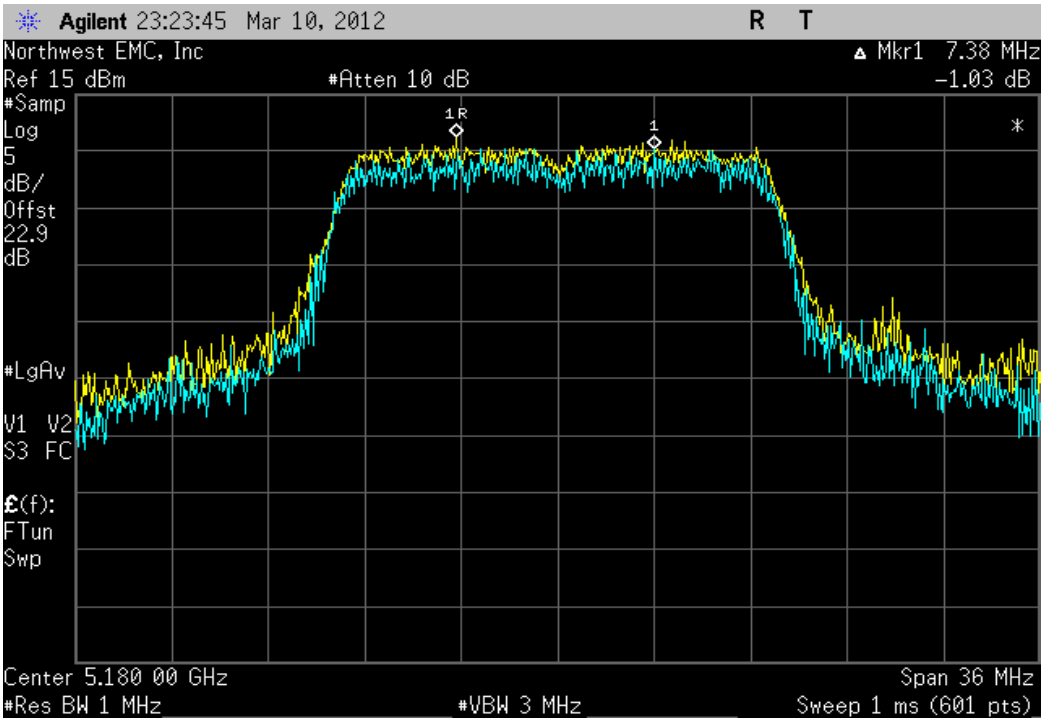
Configuration #	2	Signature	Trevor Buls

		Value	Limit	Result
802.11(a) 6 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	1.034 dB	≤ 13 dB	Pass
	Channel 48, High Channel	0.928 dB	≤ 13 dB	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	0.644 dB	≤ 13 dB	Pass
	Channel 64, High Channel	1.175 dB	≤ 13 dB	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	0.578 dB	≤ 13 dB	Pass
	Channel 120, Mid Channel	0.494 dB	≤ 13 dB	Pass
	Channel 140, High Channel	0.35 dB	≤ 13 dB	Pass
802.11(a) 36 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	0.391 dB	≤ 13 dB	Pass
	Channel 48, High Channel	0.528 dB	≤ 13 dB	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	0.665 dB	≤ 13 dB	Pass
	Channel 64, High Channel	0.634 dB	≤ 13 dB	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	1.144 dB	≤ 13 dB	Pass
	Channel 120, Mid Channel	0.411 dB	≤ 13 dB	Pass
	Channel 140, High Channel	0.797 dB	≤ 13 dB	Pass
802.11(a) 54 Mbps				
	5150 - 5250 MHz Band			
	Channel 36, Low Channel	0.165 dB	≤ 13 dB	Pass
	Channel 48, High Channel	0.493 dB	≤ 13 dB	Pass
	5250 - 5350 MHz Band			
	Channel 52, Low Channel	1.355 dB	≤ 13 dB	Pass
	Channel 64, High Channel	0.186 dB	≤ 13 dB	Pass
	5470 - 5725 MHz Band			
	Channel 100, Low Channel	0.258 dB	≤ 13 dB	Pass
	Channel 120, Mid Channel	0.23 dB	≤ 13 dB	Pass
	Channel 140, High Channel	0.643 dB	≤ 13 dB	Pass

Peak Excursion

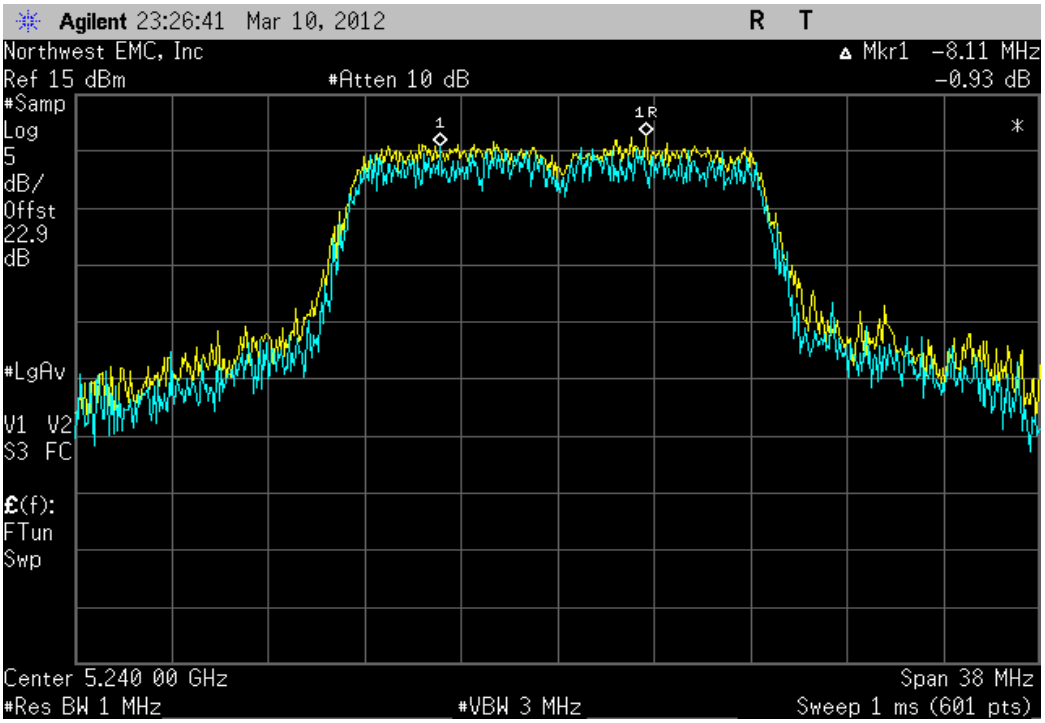
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

Value	Limit	Result
1.034 dB	≤ 13 dB	Pass



802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

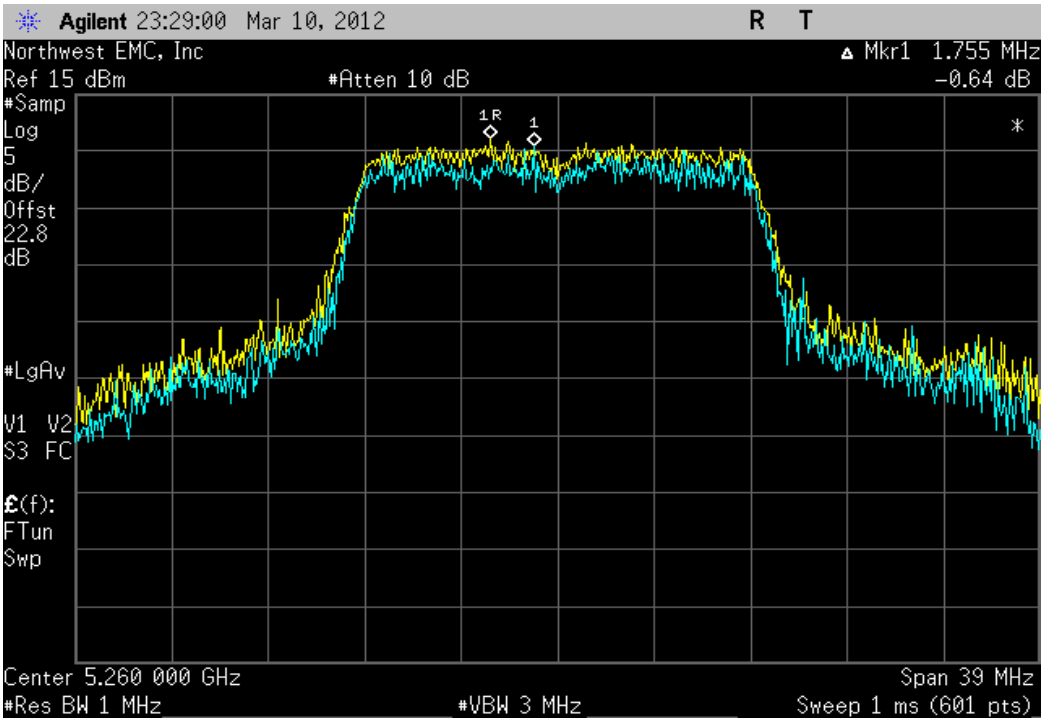
Value	Limit	Result
0.928 dB	≤ 13 dB	Pass



Peak Excursion

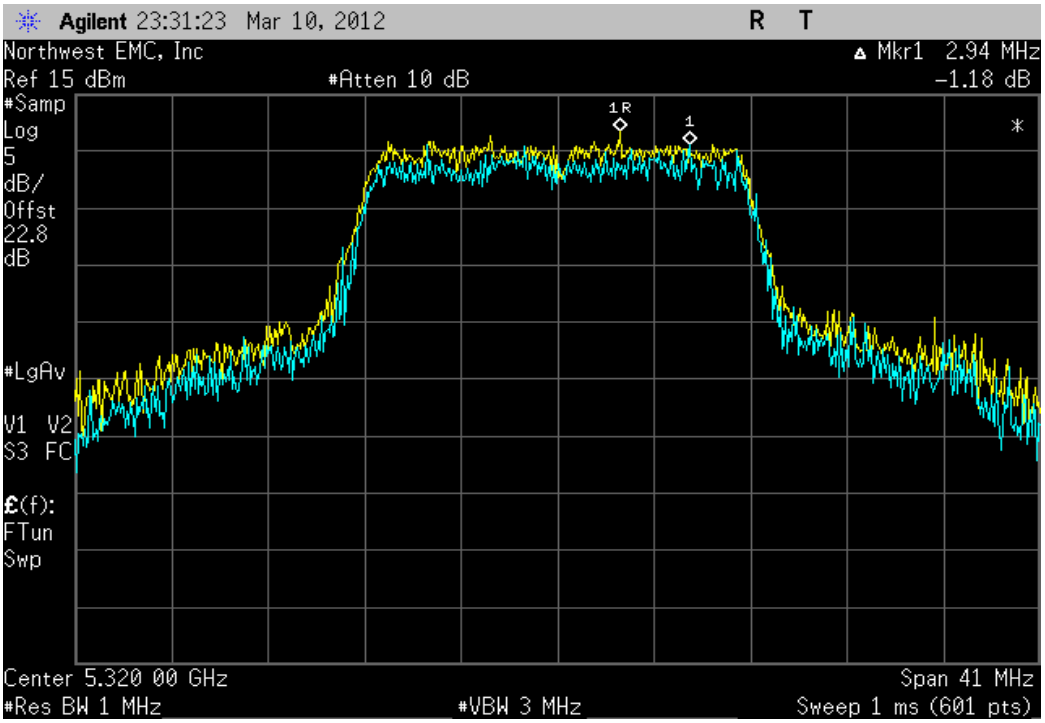
802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel

Value	Limit	Result
0.644 dB	≤ 13 dB	Pass



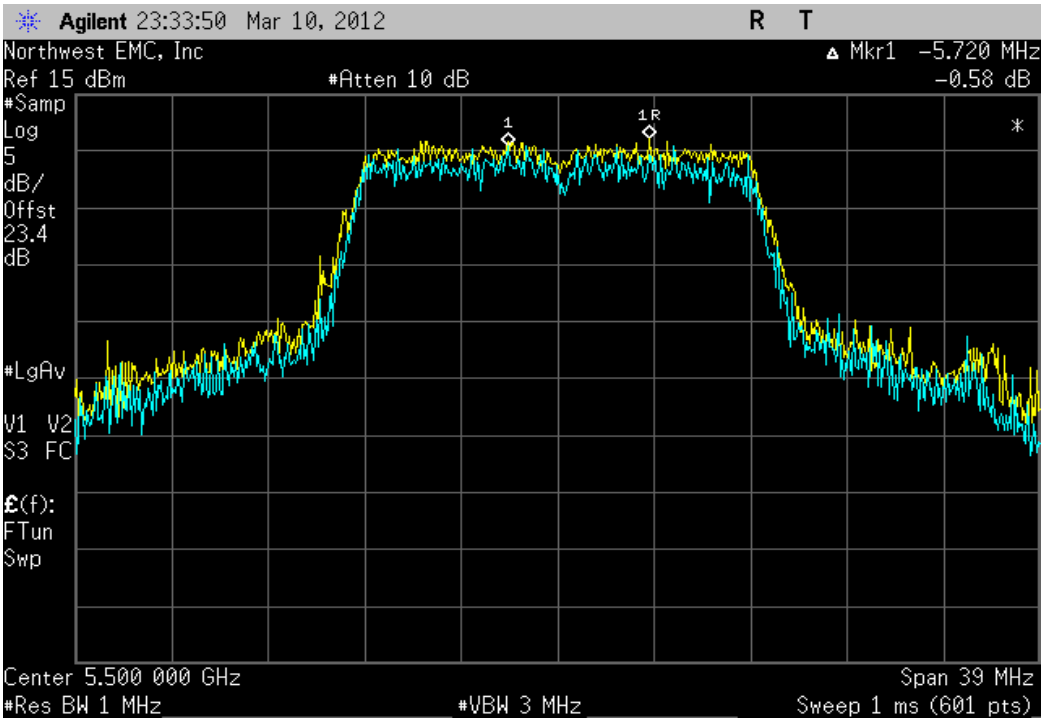
802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

Value	Limit	Result
1.175 dB	≤ 13 dB	Pass

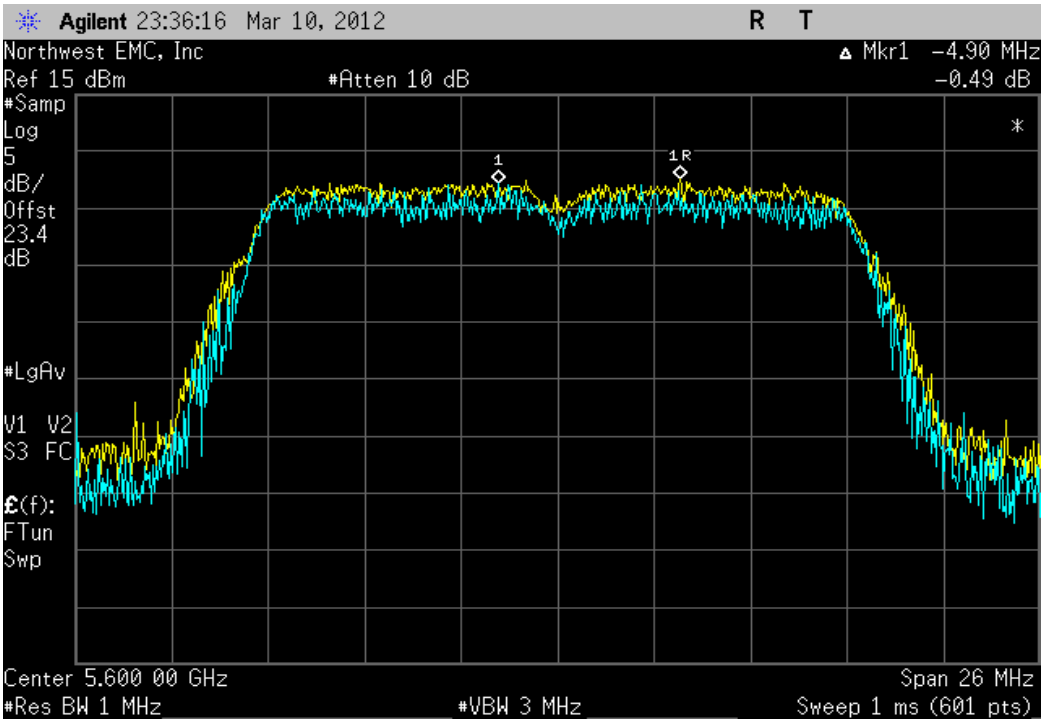


Peak Excursion

802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel						
				Value	Limit	Result
				0.578 dB	≤ 13 dB	Pass



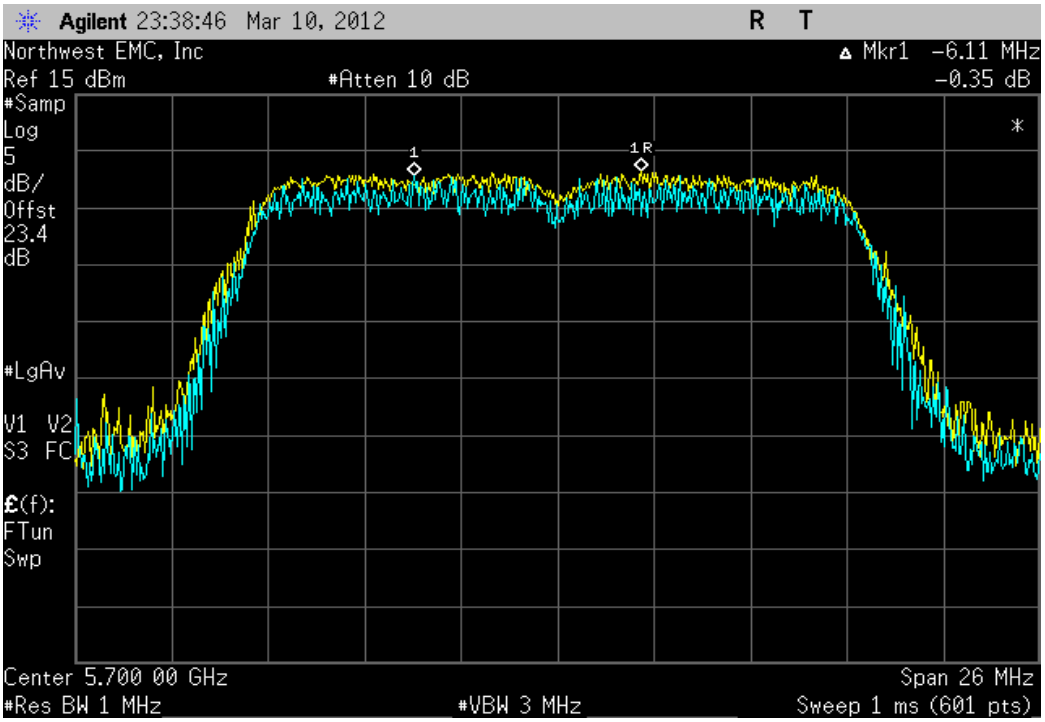
802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel						
				Value	Limit	Result
				0.494 dB	≤ 13 dB	Pass



Peak Excursion

802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel

				Value	Limit	Result
				0.35 dB	≤ 13 dB	Pass

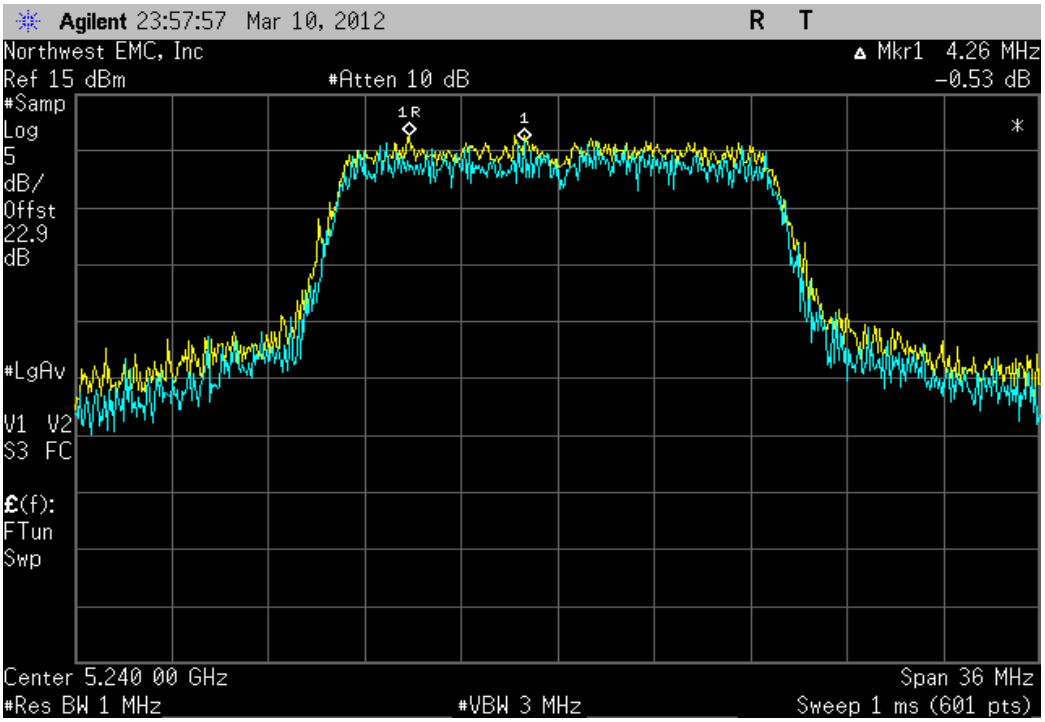


802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

				Value	Limit	Result
				0.391 dB	≤ 13 dB	Pass

Peak Excursion

802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
				Value	Limit	Result
				0.528 dB	≤ 13 dB	Pass

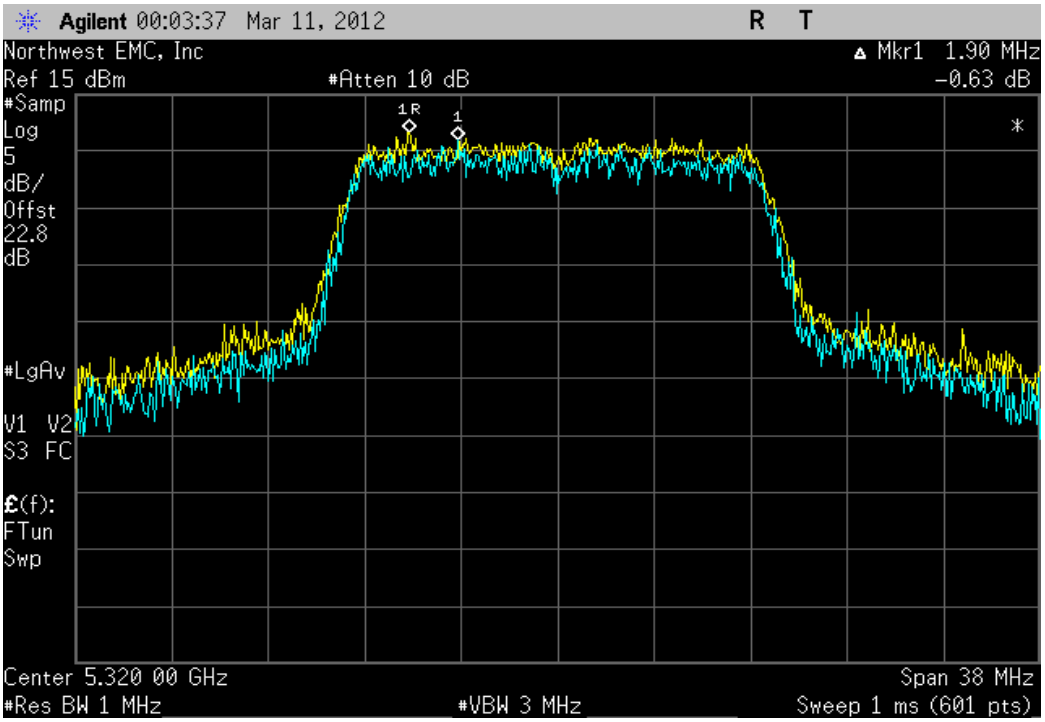


802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel						
				Value	Limit	Result
				0.665 dB	≤ 13 dB	Pass

Peak Excursion

802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

				Value	Limit	Result
				0.634 dB	≤ 13 dB	Pass



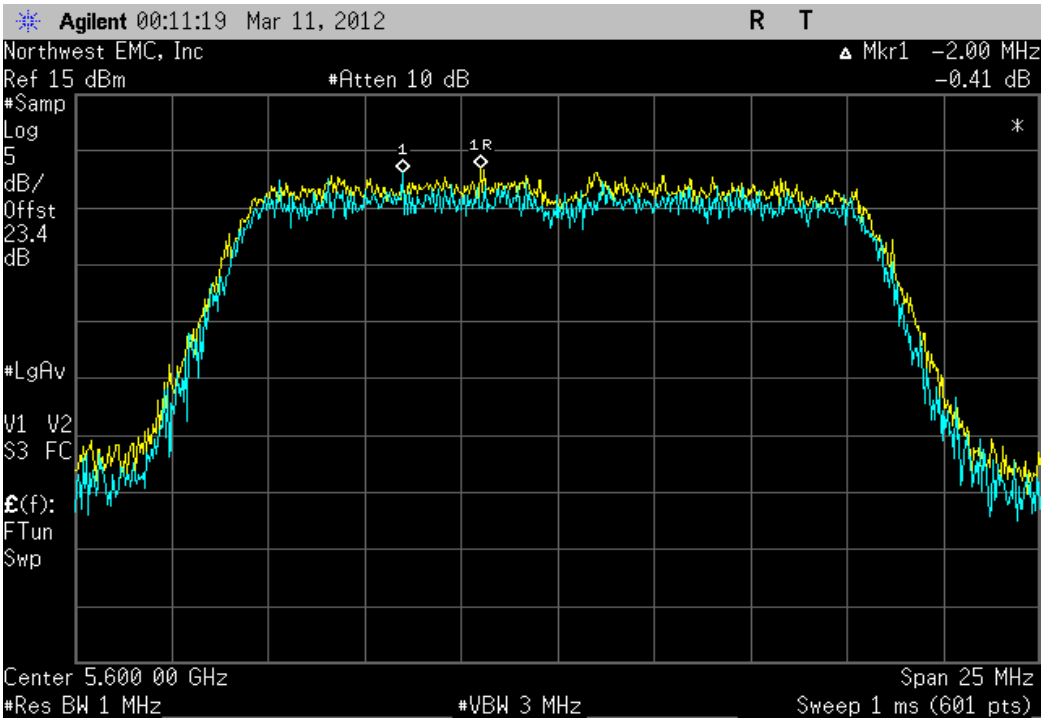
802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel

				Value	Limit	Result
				1.144 dB	≤ 13 dB	Pass

Peak Excursion

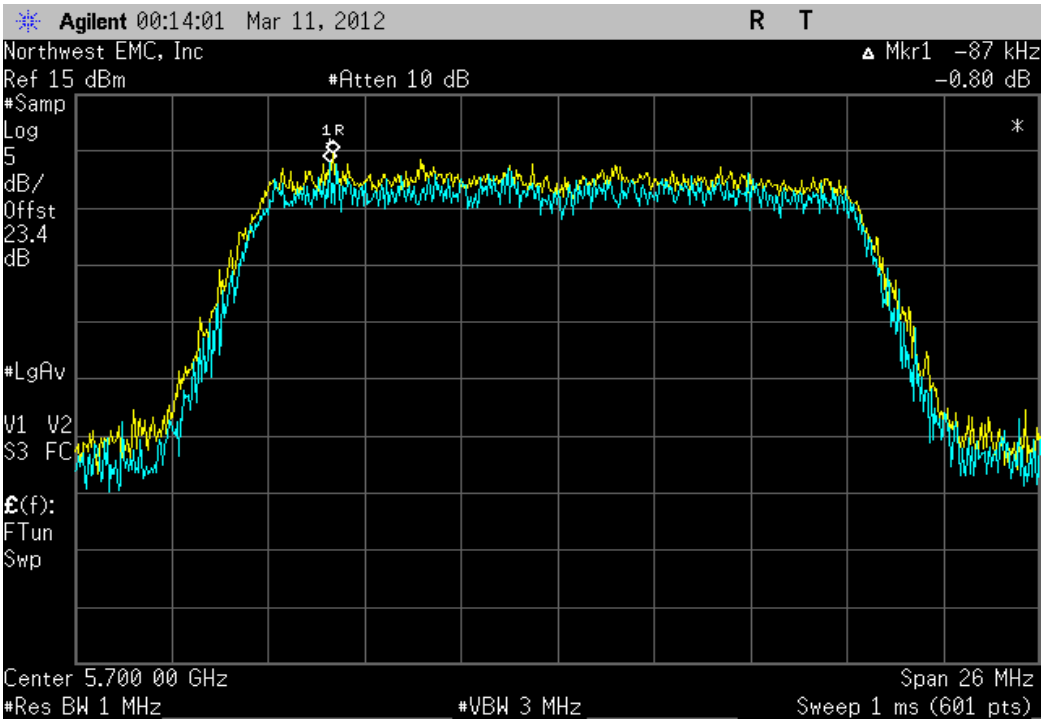
802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel

				Value	Limit	Result
				0.411 dB	≤ 13 dB	Pass



802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel

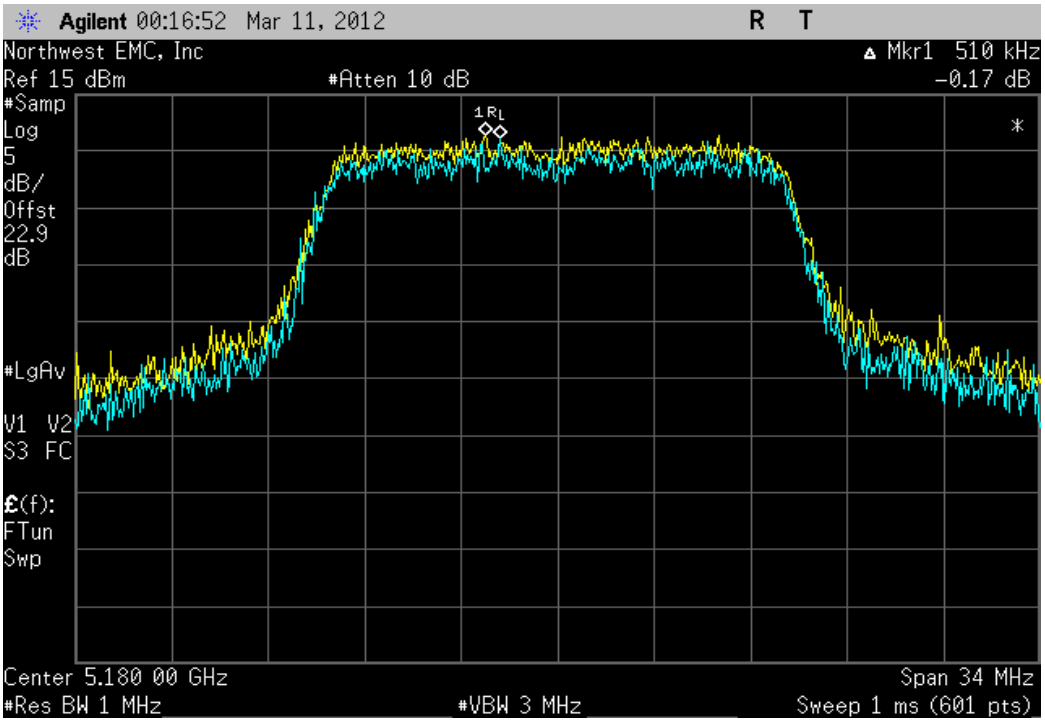
				Value	Limit	Result
				0.797 dB	≤ 13 dB	Pass



Peak Excursion

802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel

				Value	Limit	Result
				0.165 dB	≤ 13 dB	Pass



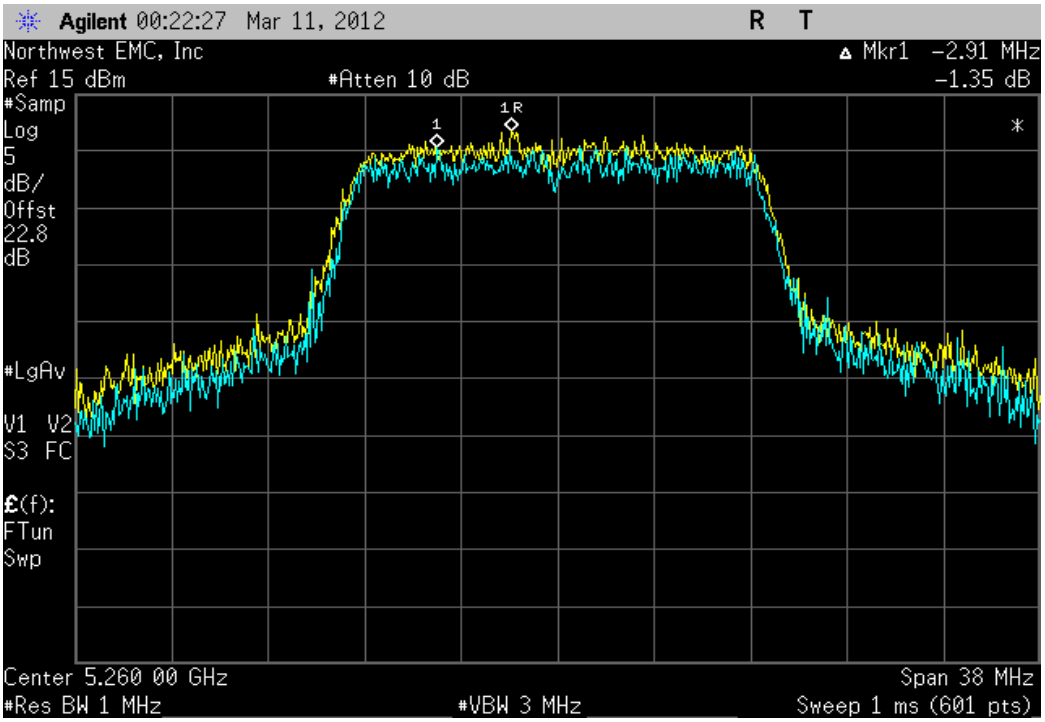
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel

				Value	Limit	Result
				0.493 dB	≤ 13 dB	Pass

Peak Excursion

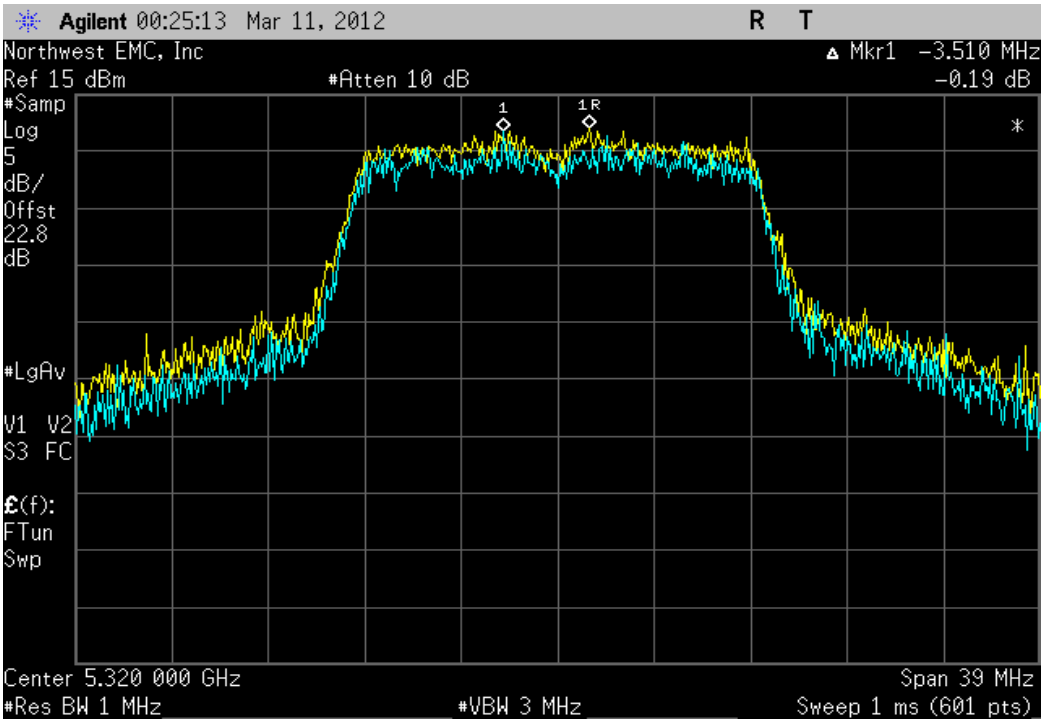
802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel

Value	Limit	Result
1.355 dB	≤ 13 dB	Pass



802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

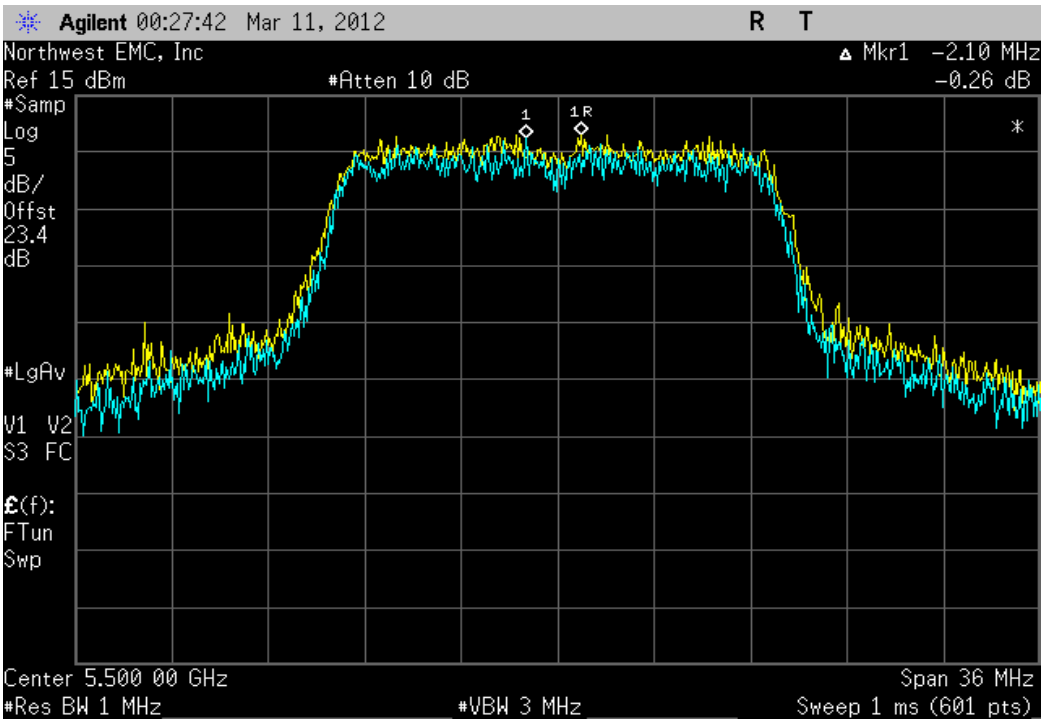
Value	Limit	Result
0.186 dB	≤ 13 dB	Pass



Peak Excursion

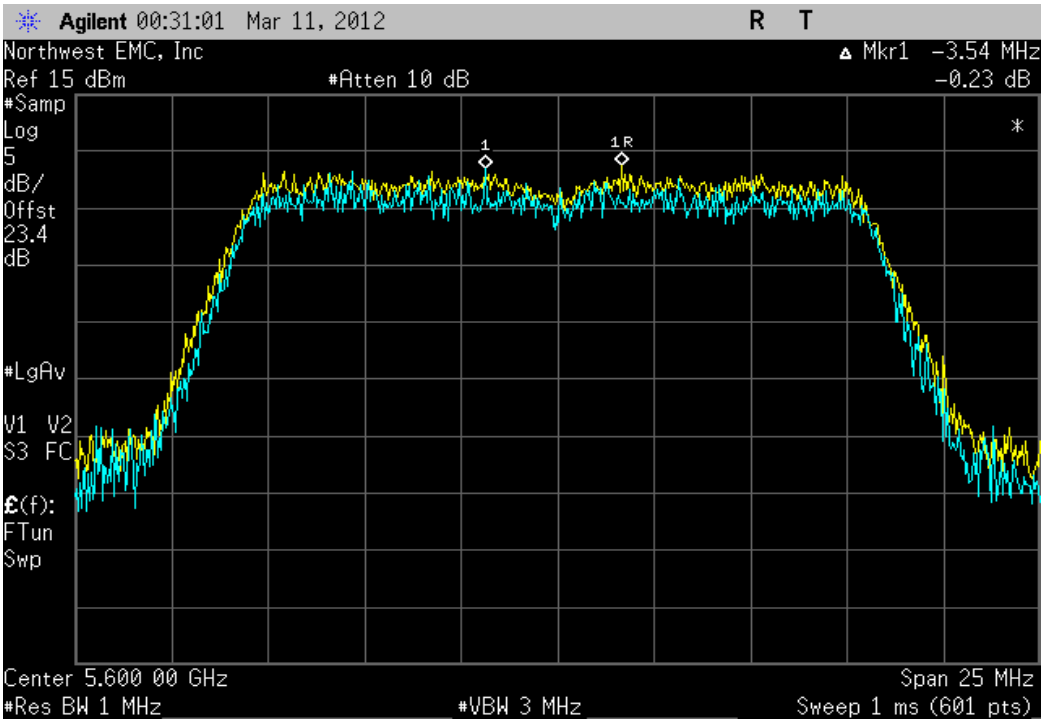
802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel

				Value	Limit	Result
				0.258 dB	≤ 13 dB	Pass



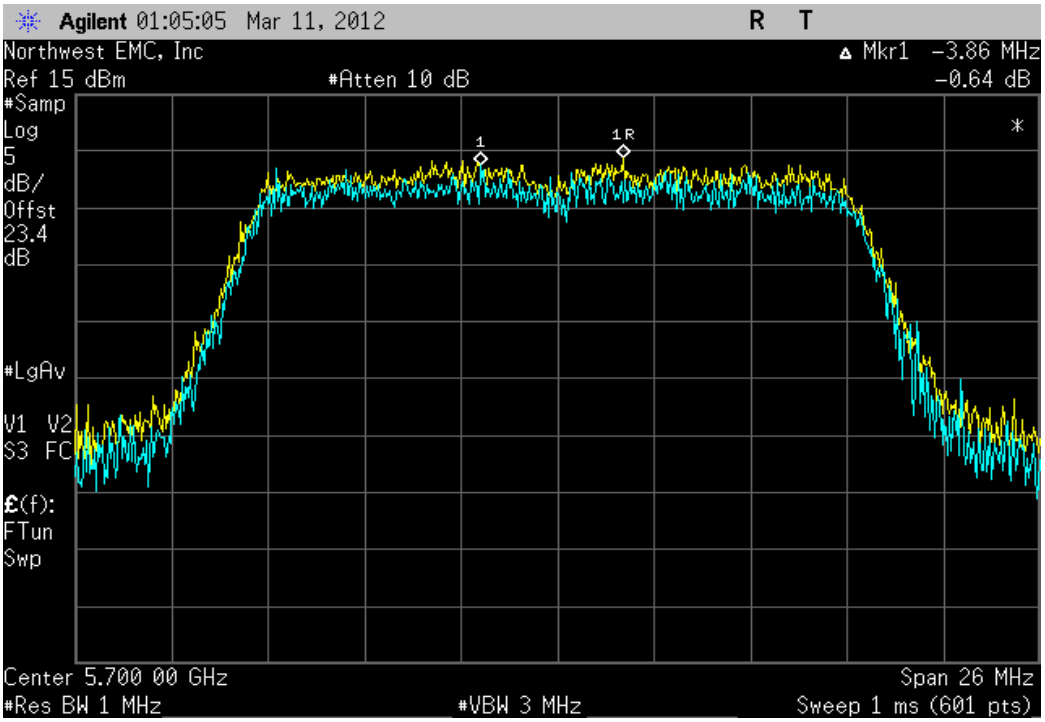
802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel

				Value	Limit	Result
				0.23 dB	≤ 13 dB	Pass



Peak Excursion

802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel						
				Value	Limit	Result
				0.643 dB	≤ 13 dB	Pass



Transmissions Burst Duration

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
Attenuator SMA - 20dB, 40 GHz	Fairview Microwave	SA4014-20	AQI	10/12/2011	12
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The transmission pulse duration (T) were measured for each of the EUT operating modes. The transmission pulse duration (T) was measured 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.

Transmissions Burst Duration

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	03/20/12
Customer:	Digi International			**Temperature:**	22.78°C
Attendees:	None			**Humidity:**	55%
Project:	None			**Barometric Pres.:**	1007.8
Tested by:	Trevor Buls	**Power:**	110VAC/60Hz	**Job Site:**	MN05

TEST SPECIFICATIONS	Test Method
FCC 15.407:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). EUT was measured with normal operation settings. Channel 36, 48, 52, 64, 100: Power level 50. Channel 120: Power level 38, and Channel 140: Power level 47 at 6 Mbps, 36 Mbps, 54 Mbps. This data represents normal operation of the device. The other tests in this report were performed at a duty cycle of 100%. Tx frame period set to 20ms.

DEVIATIONS FROM TEST STANDARD

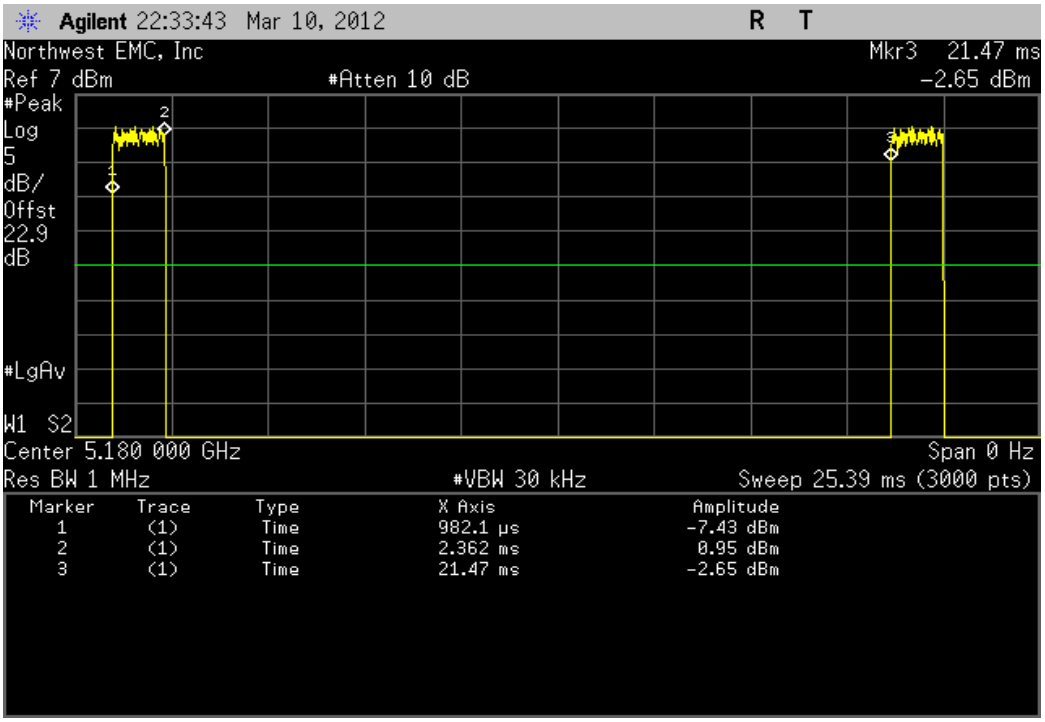
None

Configuration #	2	Signature	Trevor Buls

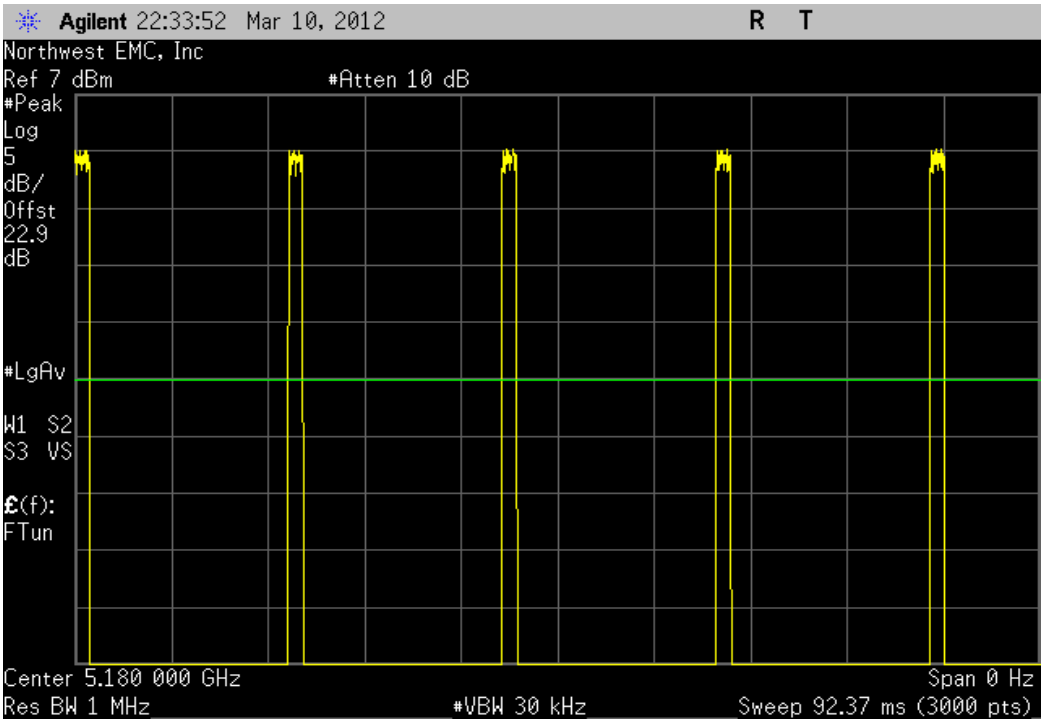
		Number of Pulses	Value	Limit	Result
802.11(a) 6 Mbps					
	5150 - 5250 MHz Band				
	Channel 36, Low Channel	1	1.38 ms	N/A	N/A
	Channel 36, Low Channel	5		N/A	N/A
	Channel 48, High Channel	1	1.38 ms	N/A	N/A
	Channel 48, High Channel	5		N/A	N/A
	5250 - 5350 MHz Band				
	Channel 52, Low Channel	1	1.38 ms	N/A	N/A
	Channel 52, Low Channel	5		N/A	N/A
	Channel 64, High Channel	1	1.38 ms	N/A	N/A
	Channel 64, High Channel	5		N/A	N/A
	5470 - 5725 MHz Band				
	Channel 100, Low Channel	1	1.38 ms	N/A	N/A
	Channel 100, Low Channel	5		N/A	N/A
	Channel 120, Mid Channel	1	1.38 ms	N/A	N/A
	Channel 120, Mid Channel	5		N/A	N/A
	Channel 140, High Channel	1	1.38 ms	N/A	N/A
	Channel 140, High Channel	5		N/A	N/A
802.11(a) 36 Mbps					
	5150 - 5250 MHz Band				
	Channel 36, Low Channel	1	0.237 ms	N/A	N/A
	Channel 36, Low Channel	5		N/A	N/A
	Channel 48, High Channel	1	0.237 ms	N/A	N/A
	Channel 48, High Channel	5		N/A	N/A
	5250 - 5350 MHz Band				
	Channel 52, Low Channel	1	0.237 ms	N/A	N/A
	Channel 52, Low Channel	5		N/A	N/A
	Channel 64, High Channel	1	0.237 ms	N/A	N/A
	Channel 64, High Channel	5		N/A	N/A
	5470 - 5725 MHz Band				
	Channel 100, Low Channel	1	0.246 ms	N/A	N/A
	Channel 100, Low Channel	5		N/A	N/A
	Channel 120, Mid Channel	1	0.237 ms	N/A	N/A
	Channel 120, Mid Channel	5		N/A	N/A
	Channel 140, High Channel	1	0.246 ms	N/A	N/A
	Channel 140, High Channel	5		N/A	N/A
802.11(a) 54 Mbps					
	5150 - 5250 MHz Band				
	Channel 36, Low Channel	1	0.169 ms	N/A	N/A
	Channel 36, Low Channel	5		N/A	N/A
	Channel 48, High Channel	1	0.169 ms	N/A	N/A
	Channel 48, High Channel	5		N/A	N/A
	5250 - 5350 MHz Band				
	Channel 52, Low Channel	1	0.161 ms	N/A	N/A
	Channel 52, Low Channel	5		N/A	N/A
	Channel 64, High Channel	1	0.161 ms	N/A	N/A
	Channel 64, High Channel	5		N/A	N/A
	5470 - 5725 MHz Band				
	Channel 100, Low Channel	1	0.161 ms	N/A	N/A
	Channel 100, Low Channel	5		N/A	N/A
	Channel 120, Mid Channel	1	0.161 ms	N/A	N/A
	Channel 120, Mid Channel	5		N/A	N/A
	Channel 140, High Channel	1	0.161 ms	N/A	N/A
	Channel 140, High Channel	5		N/A	N/A

Transmissions Burst Duration

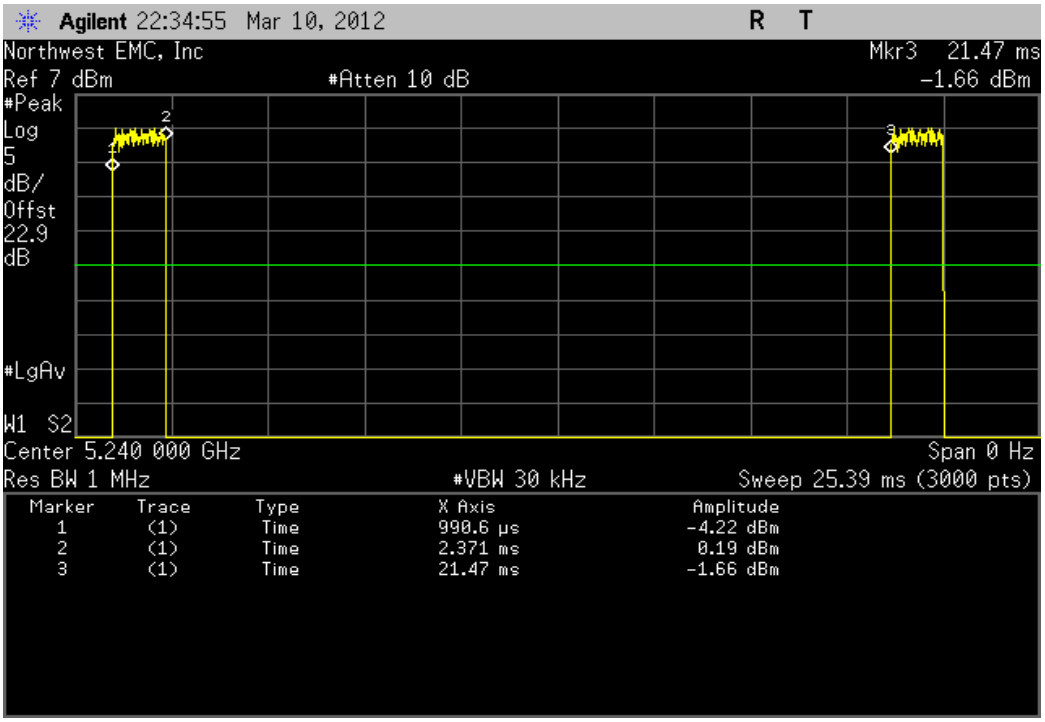
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel						
			Number of Pulses	Value	Limit	Result
			1	1.38 ms	N/A	N/A



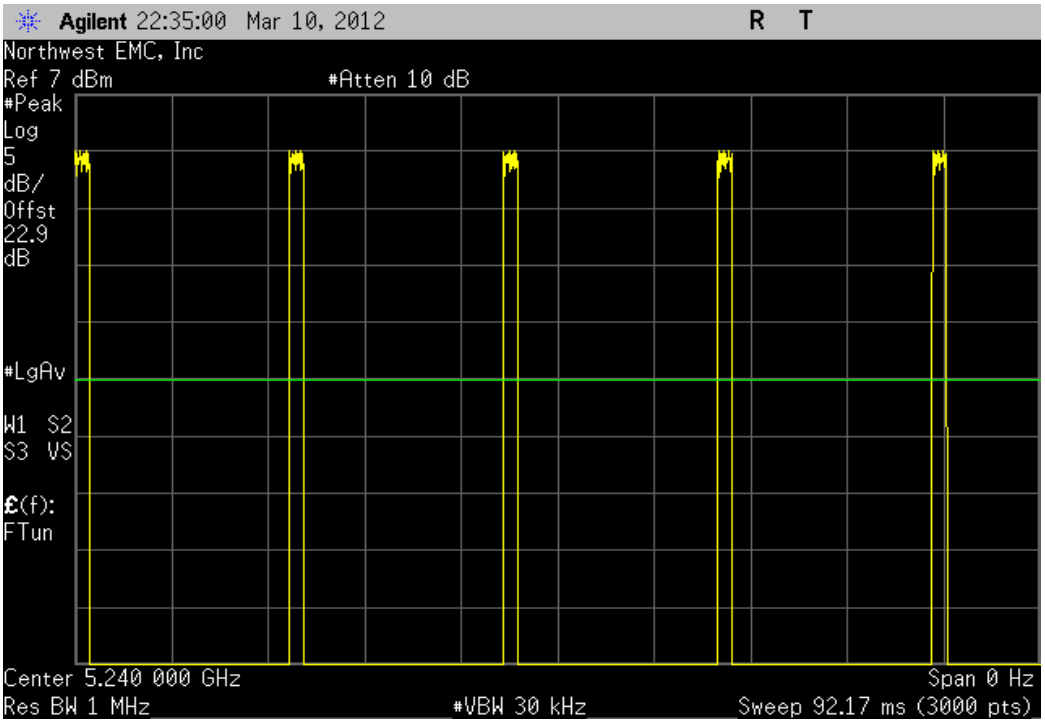
802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A



802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
			Number of Pulses	Value	Limit	Result
			1	1.38 ms	N/A	N/A

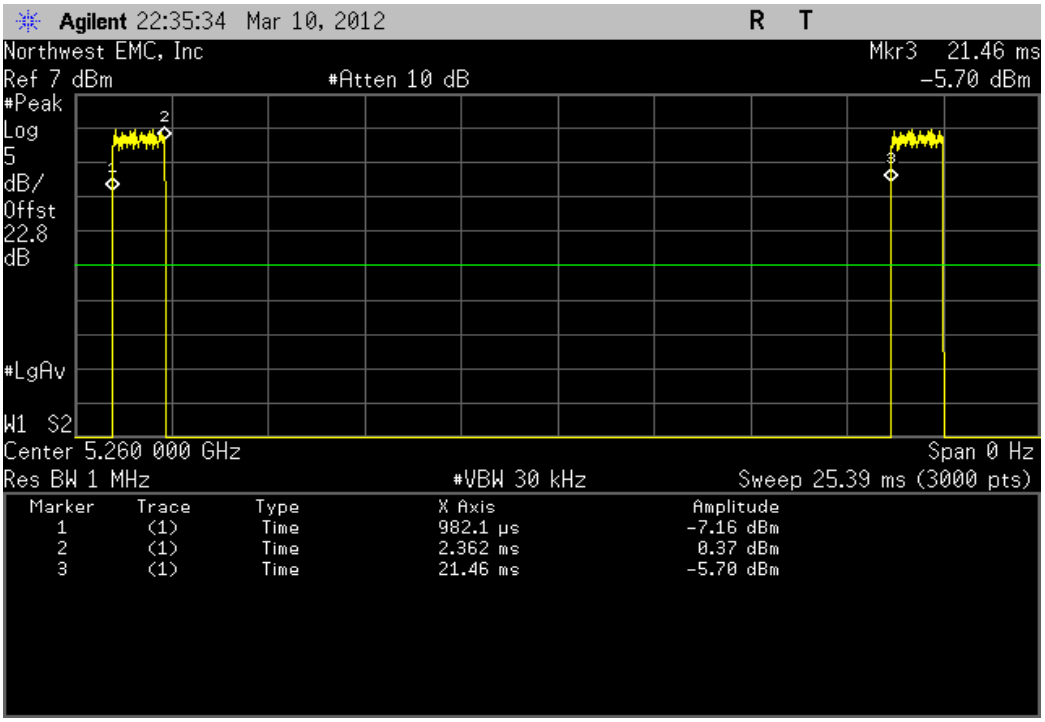


802.11(a) 6 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

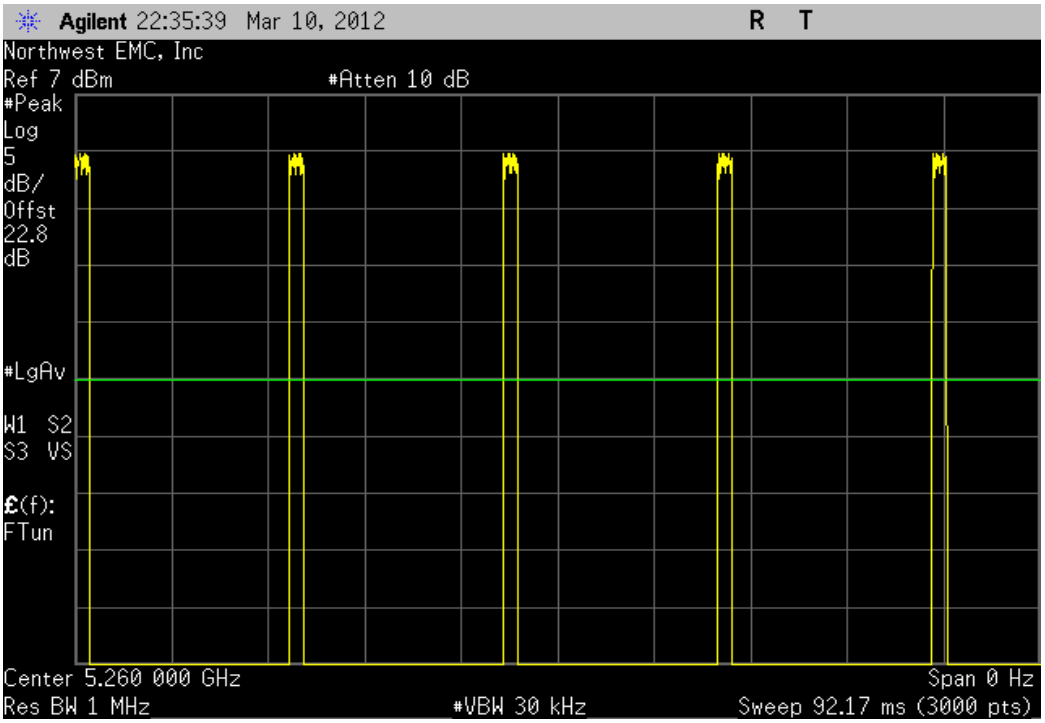


Transmissions Burst Duration

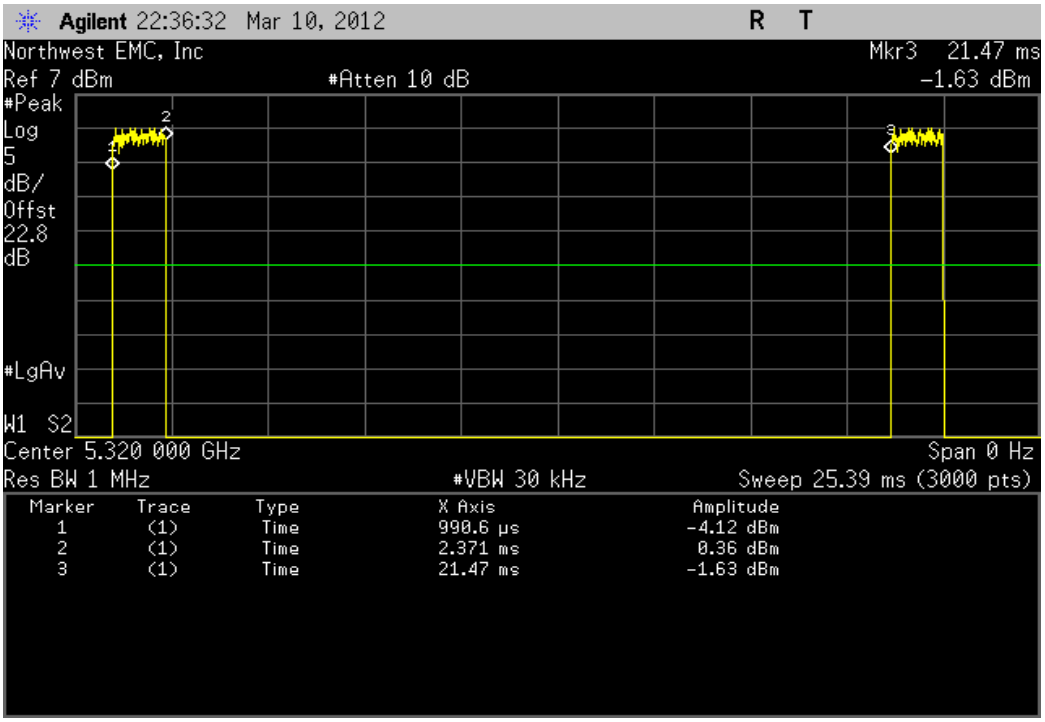
802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel						
			Number of Pulses	Value	Limit	Result
			1	1.38 ms	N/A	N/A



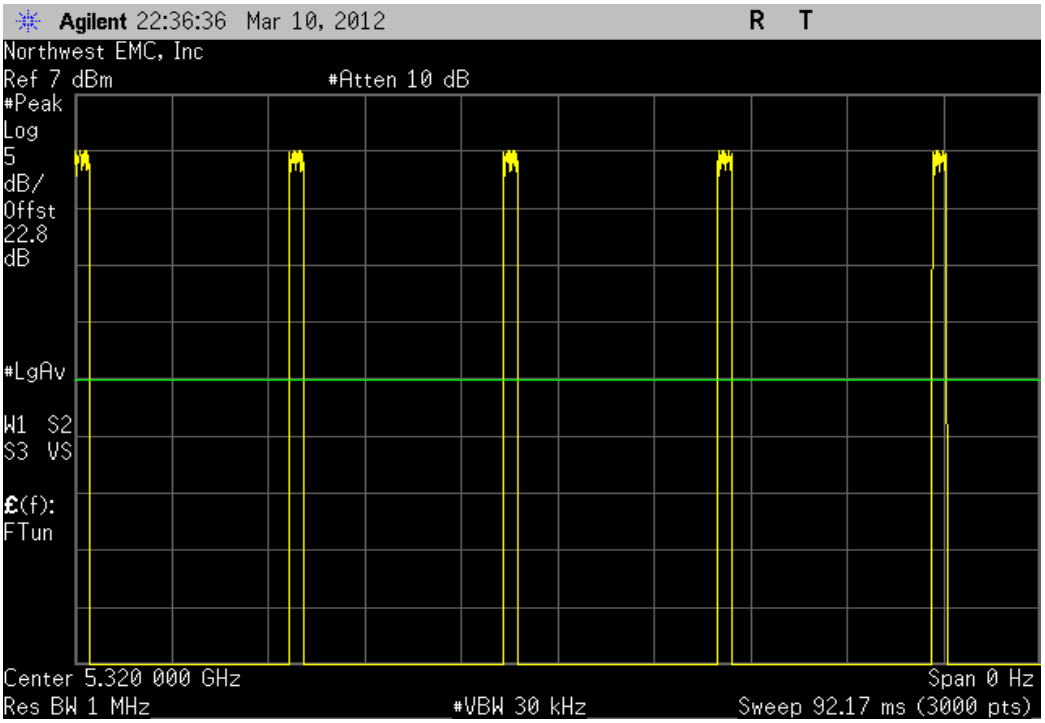
802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A



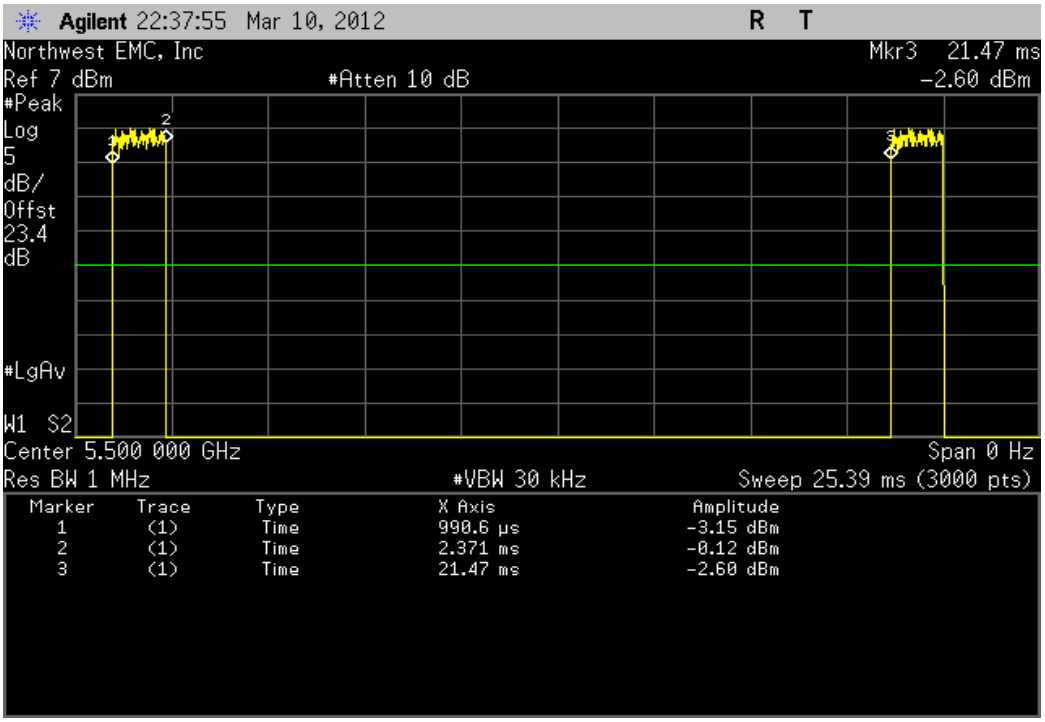
802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel						
			Number of Pulses	Value	Limit	Result
			1	1.38 ms	N/A	N/A



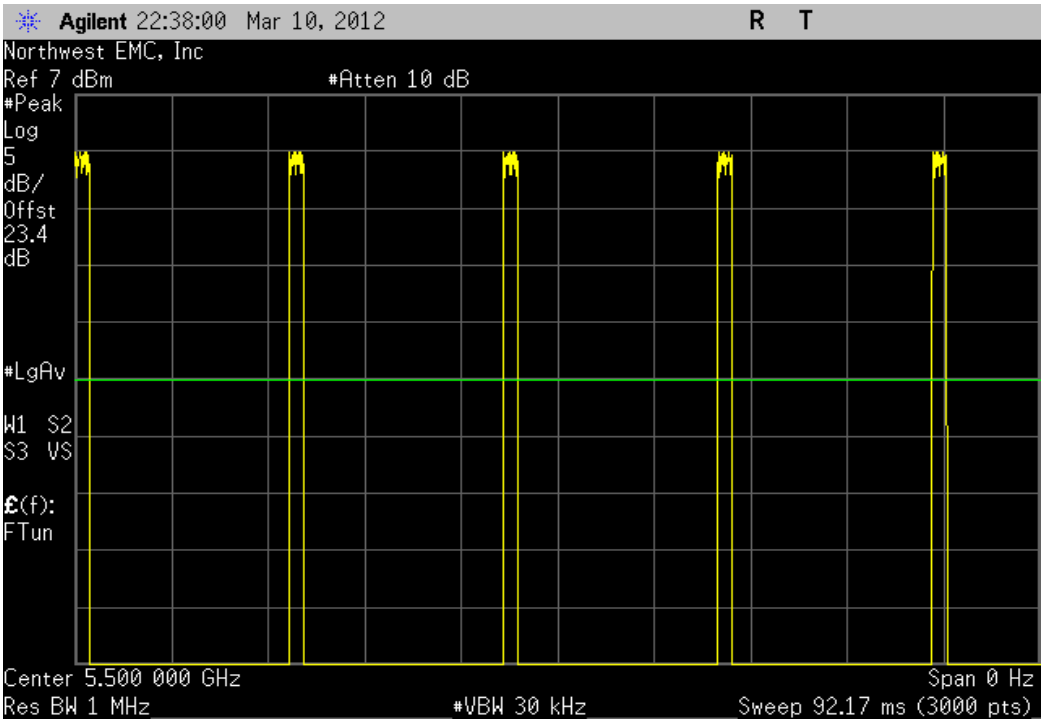
802.11(a) 6 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A



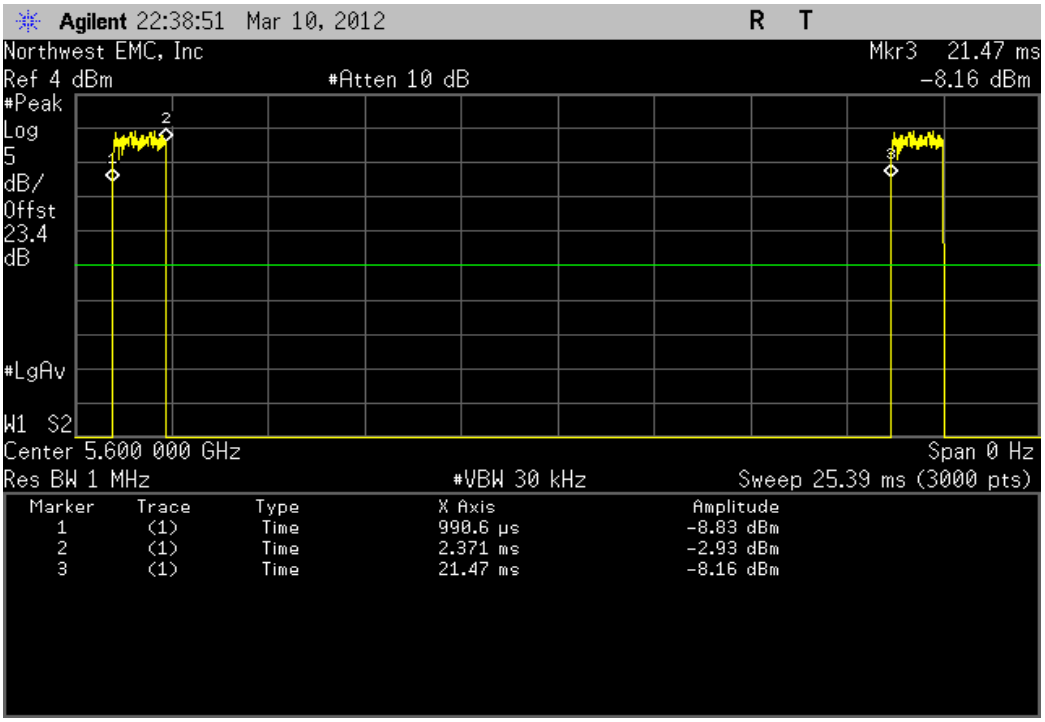
802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel						
			Number of Pulses	Value	Limit	Result
			1	1.38 ms	N/A	N/A



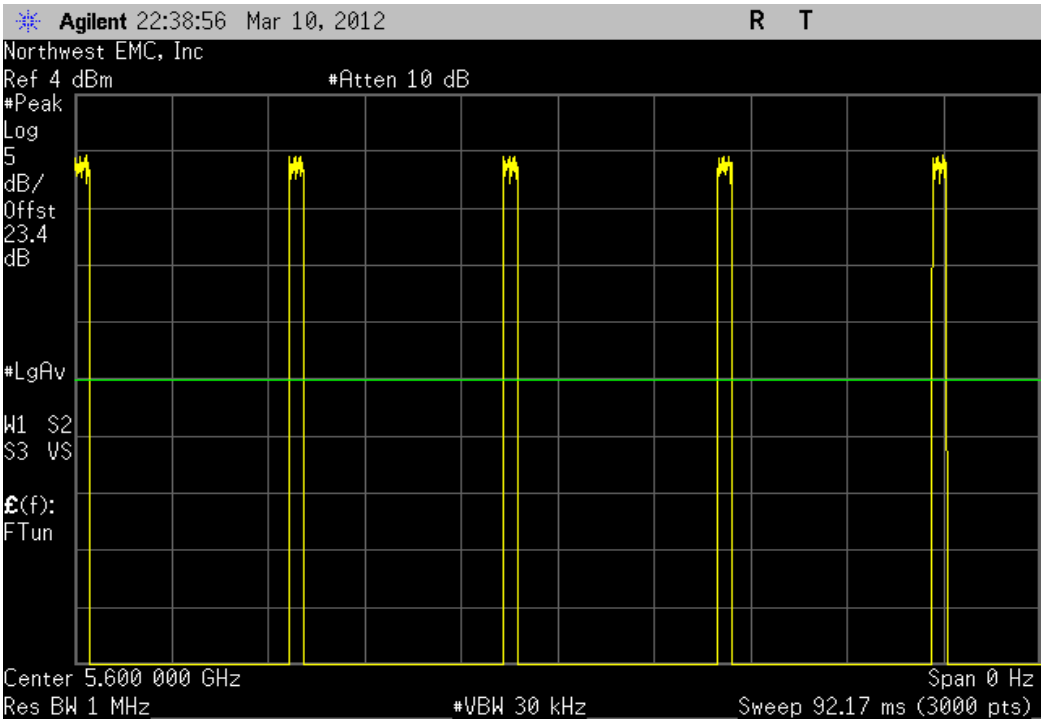
802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A



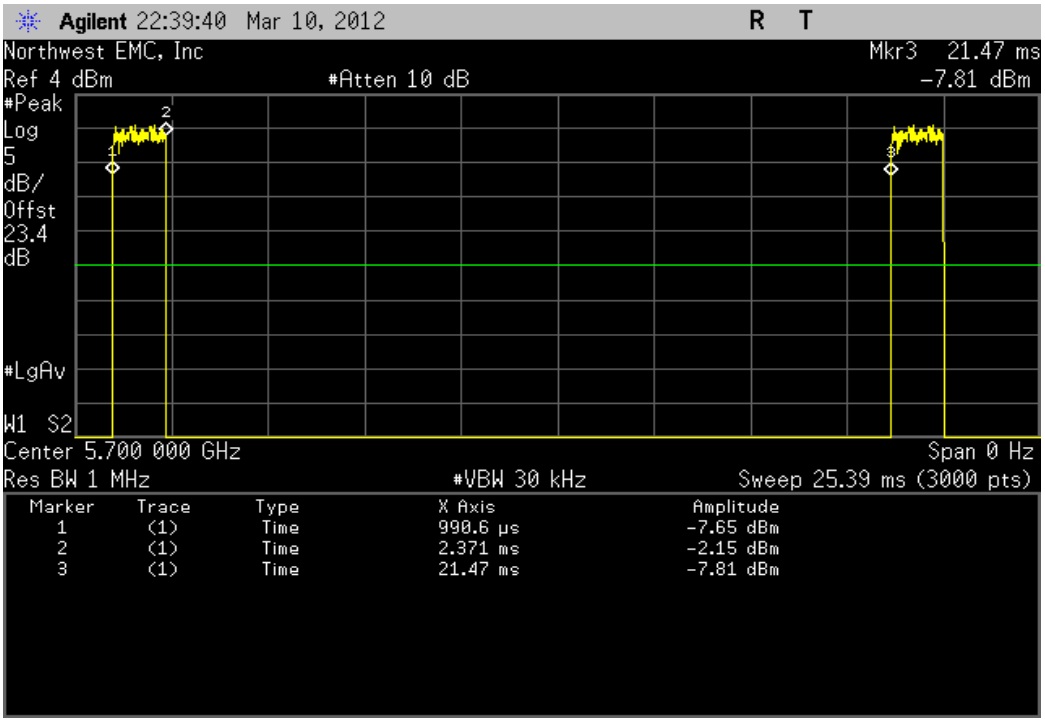
802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel						
			Number of Pulses	Value	Limit	Result
			1	1.38 ms	N/A	N/A



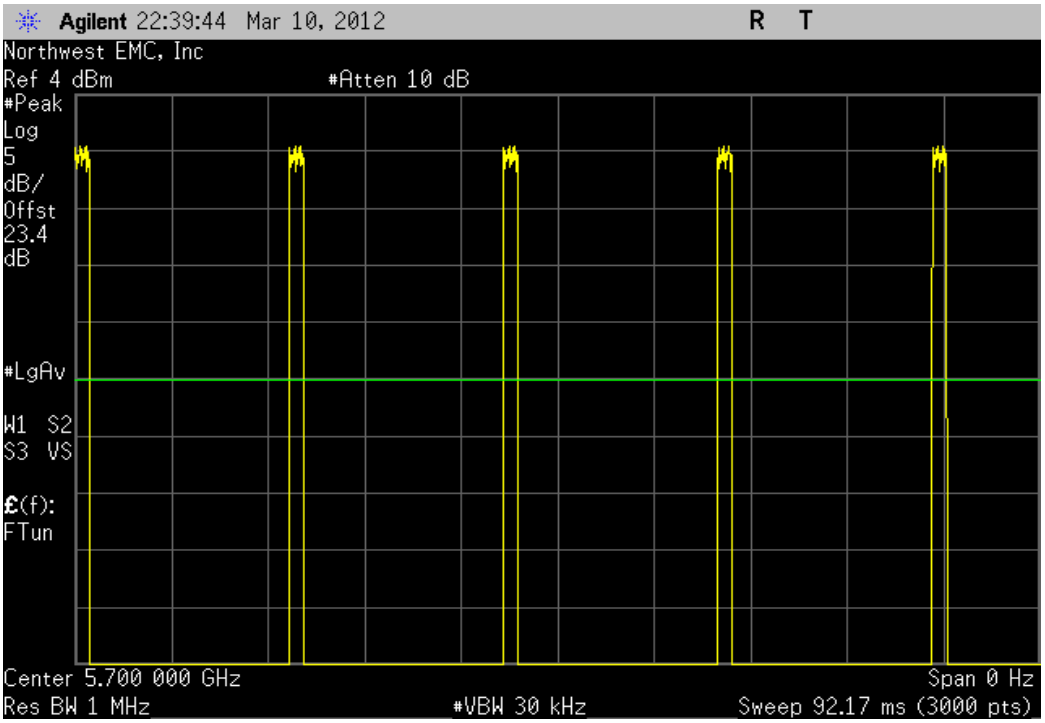
802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A



802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel						
			Number of Pulses	Value	Limit	Result
			1	1.38 ms	N/A	N/A

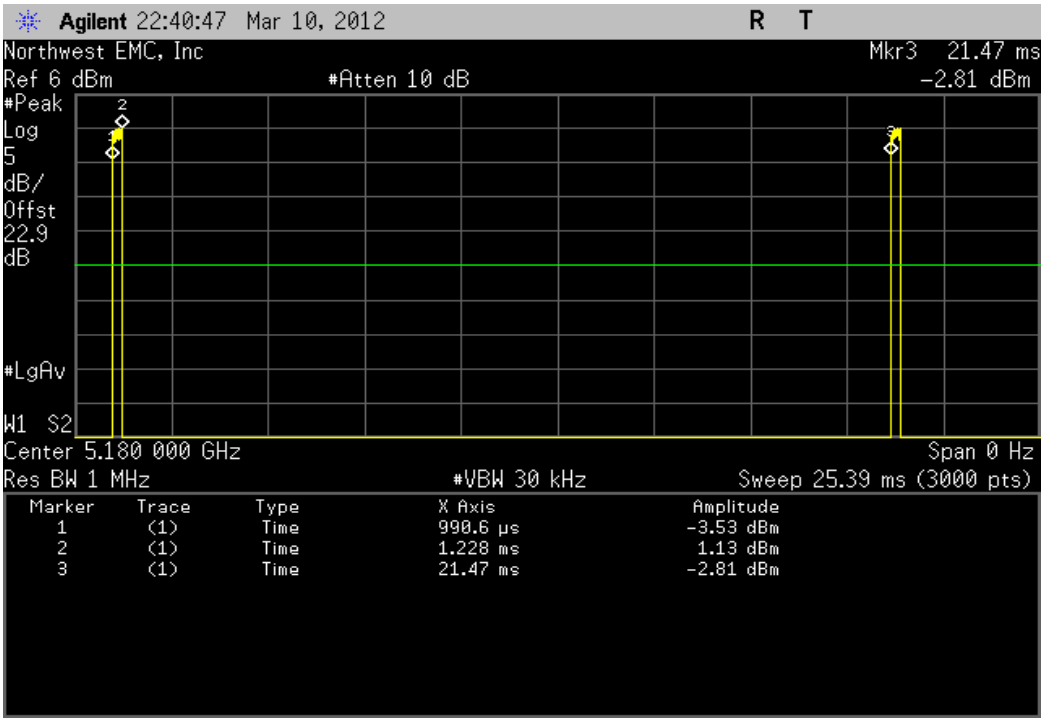


802.11(a) 6 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

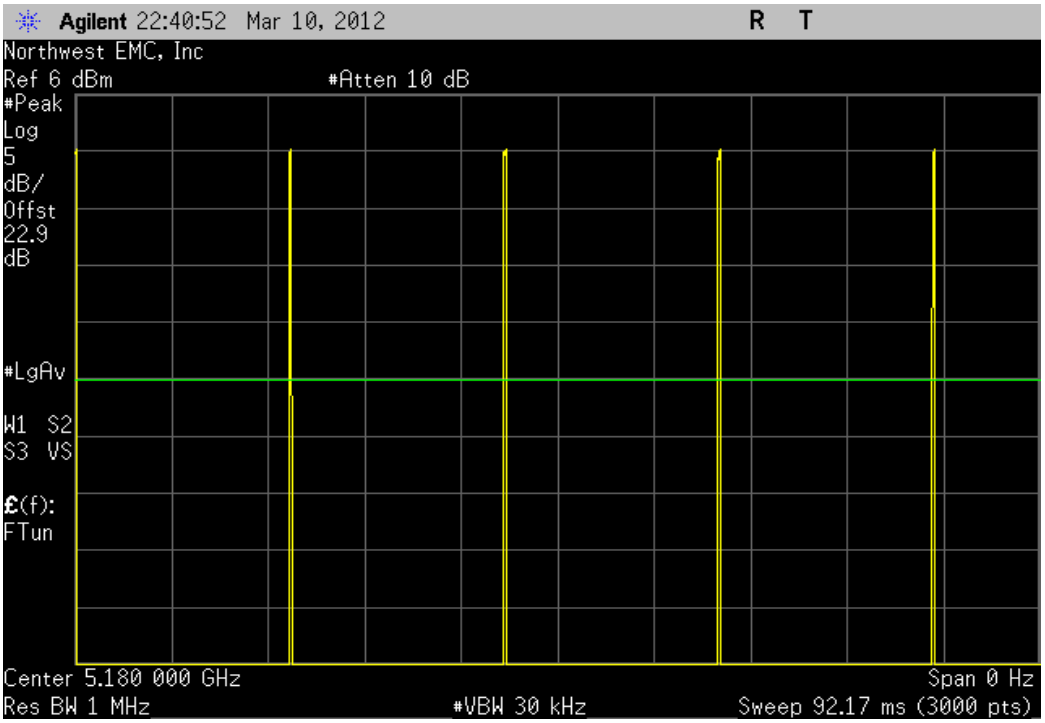


Transmissions Burst Duration

802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel						
			Number of Pulses	Value	Limit	Result
			1	0.237 ms	N/A	N/A

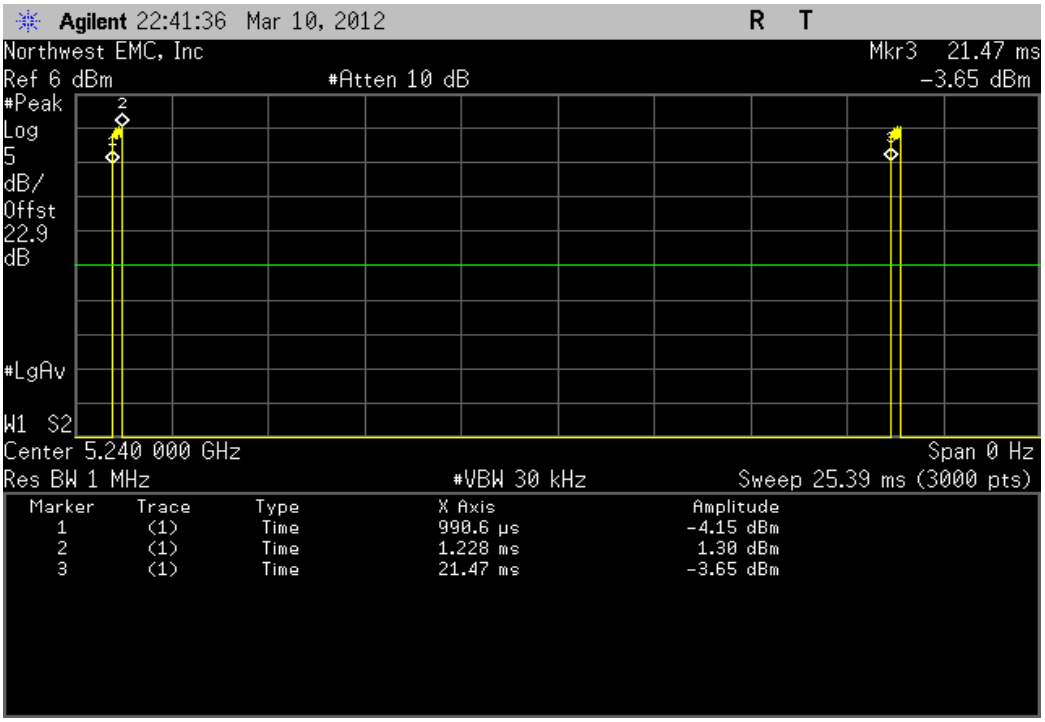


802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

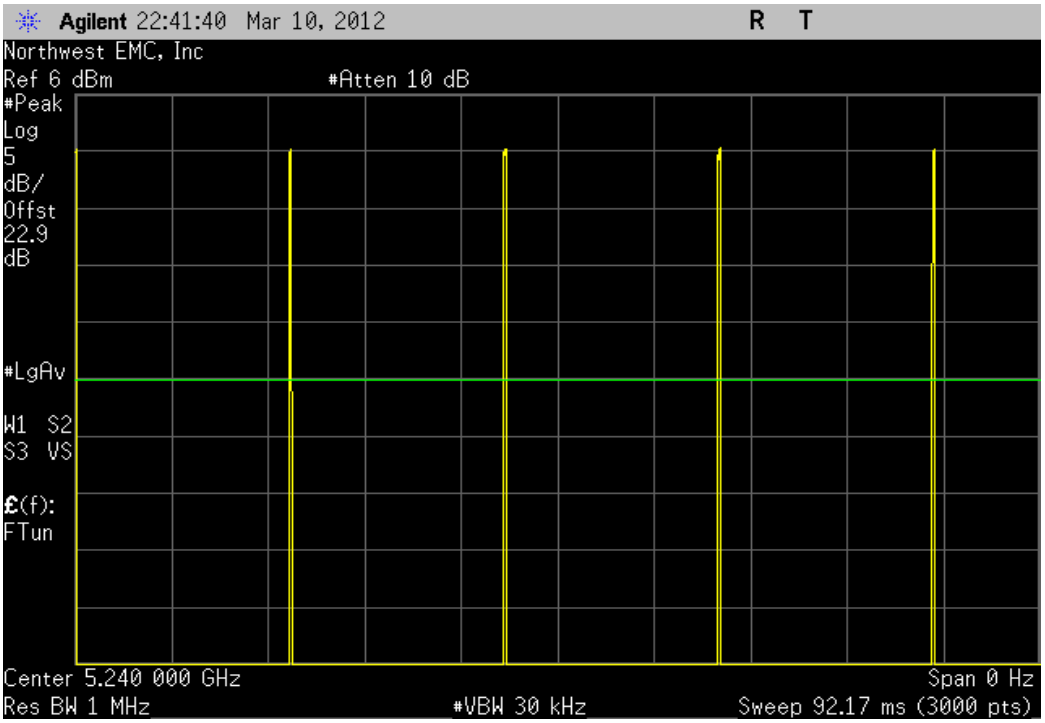


Transmissions Burst Duration

802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
			Number of Pulses	Value	Limit	Result
			1	0.237 ms	N/A	N/A

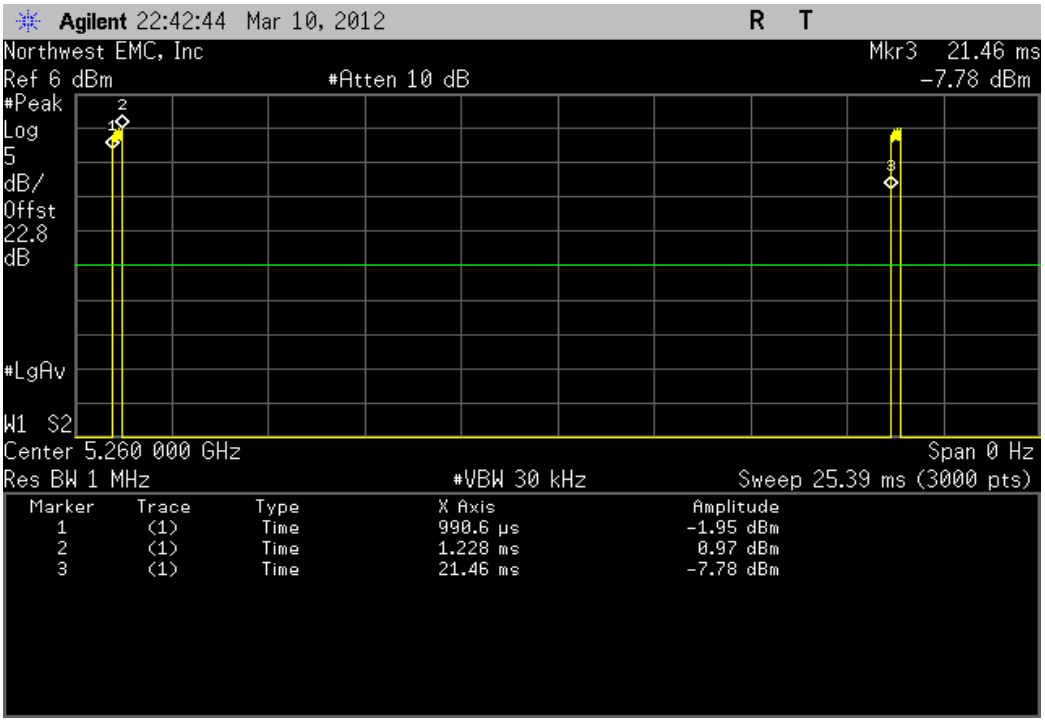


802.11(a) 36 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A



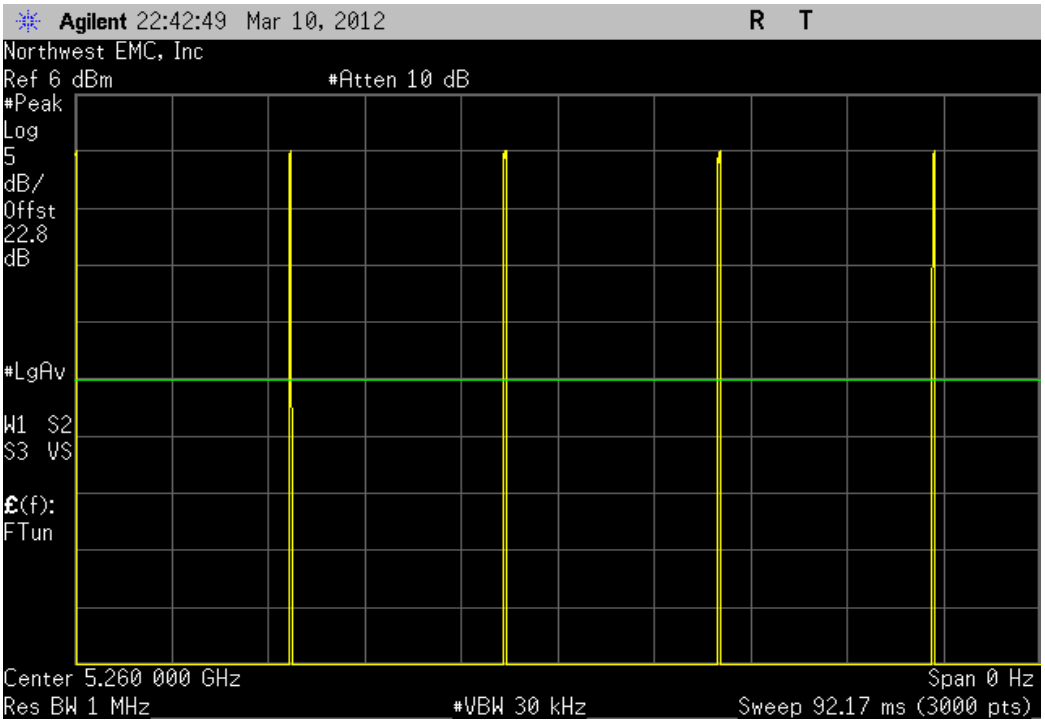
802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel

			Number of Pulses	Value	Limit	Result
			1	0.237 ms	N/A	N/A



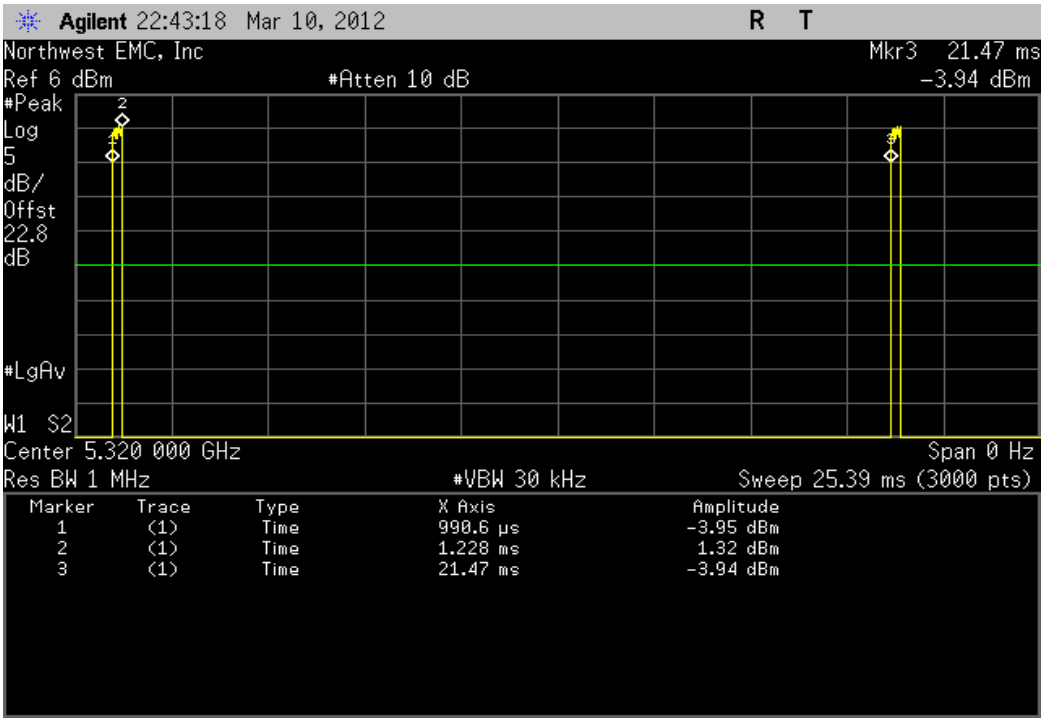
802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel

			Number of Pulses	Value	Limit	Result
			5		N/A	N/A



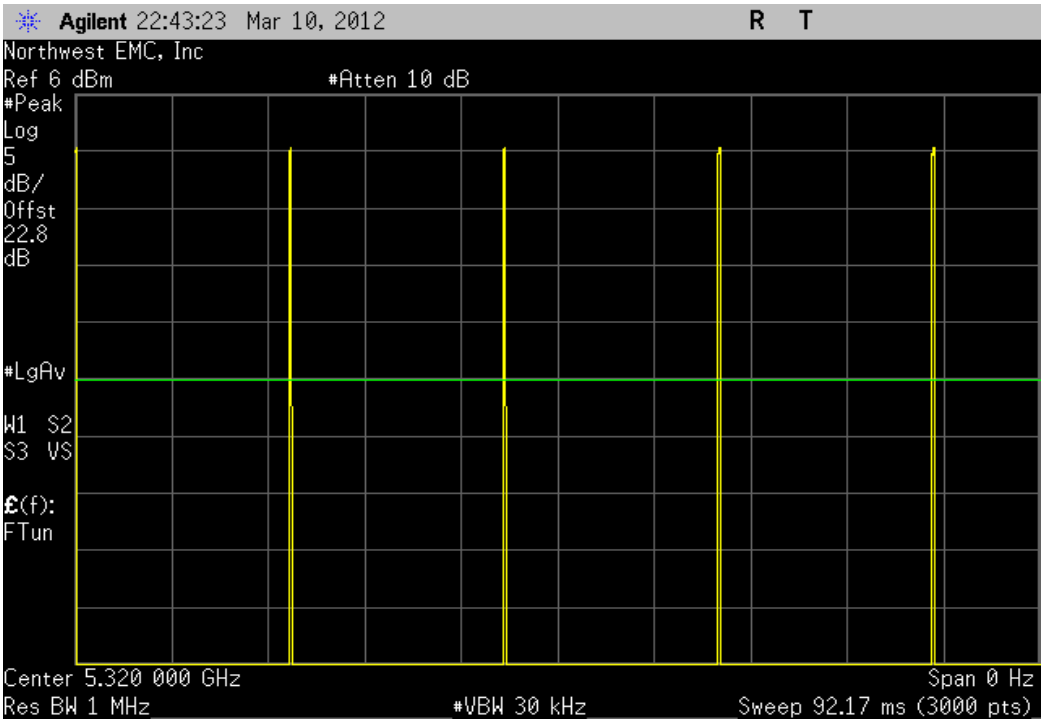
802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

			Number of Pulses	Value	Limit	Result
			1	0.237 ms	N/A	N/A



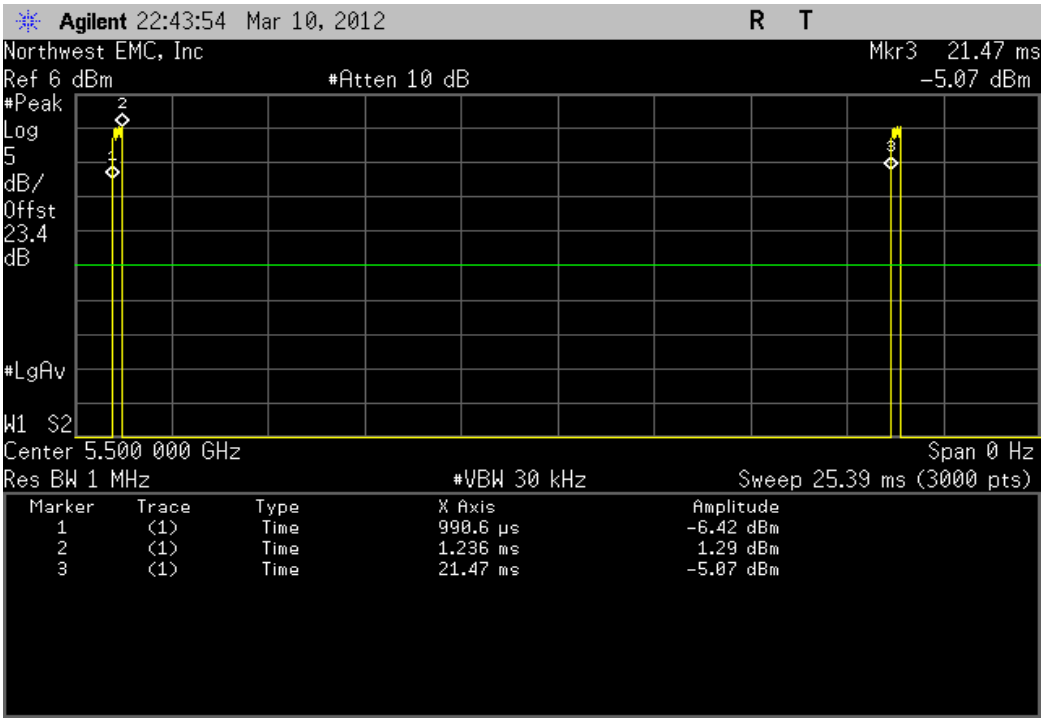
802.11(a) 36 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel

			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

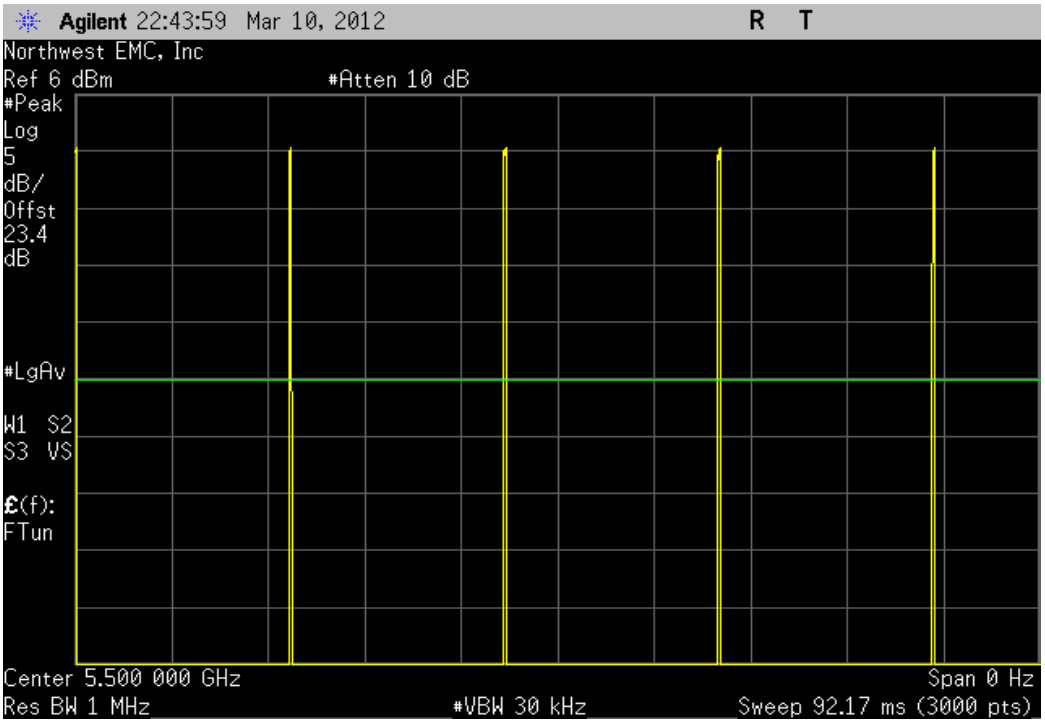


Transmissions Burst Duration

802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel						
			Number of Pulses	Value	Limit	Result
			1	0.246 ms	N/A	N/A

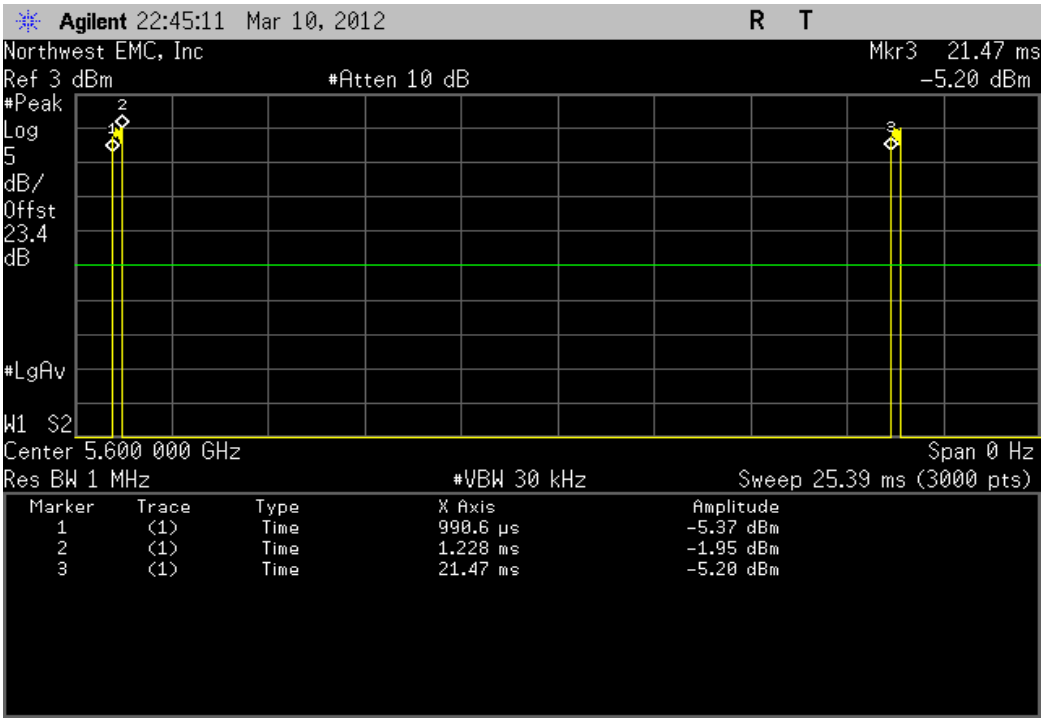


802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

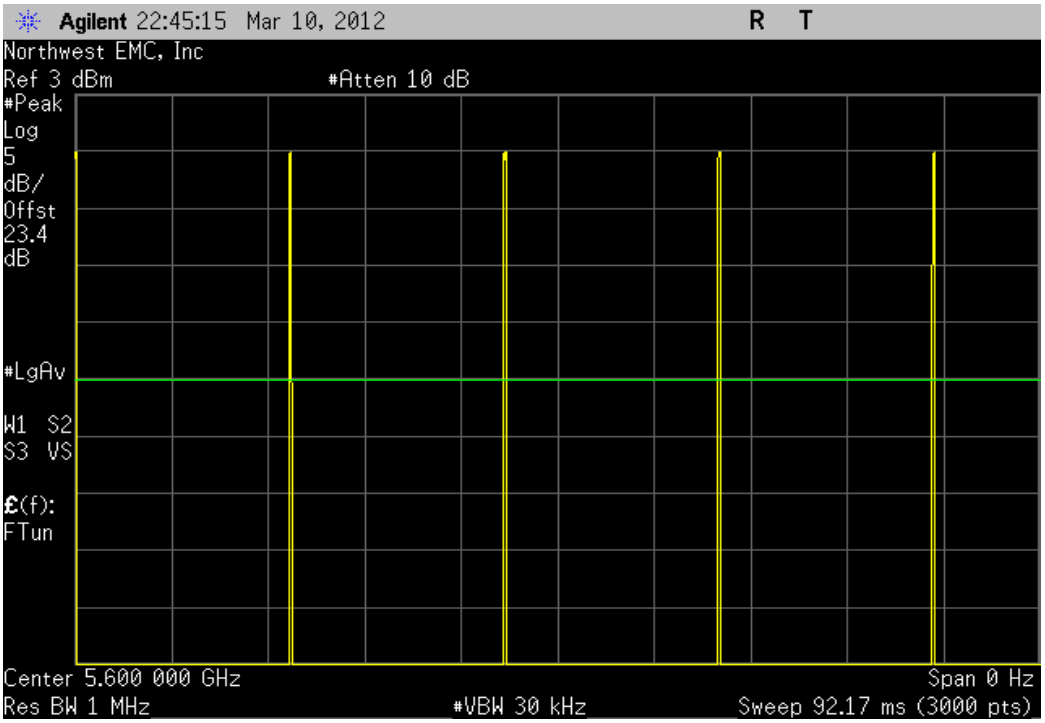


Transmissions Burst Duration

802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel						
			Number of Pulses	Value	Limit	Result
			1	0.237 ms	N/A	N/A

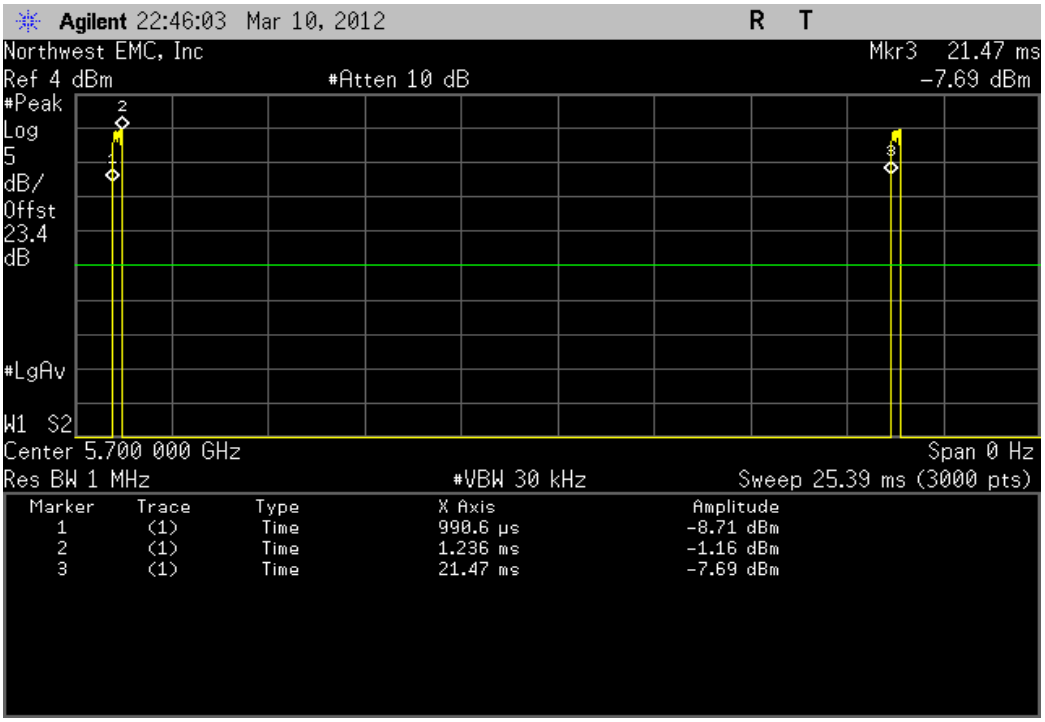


802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

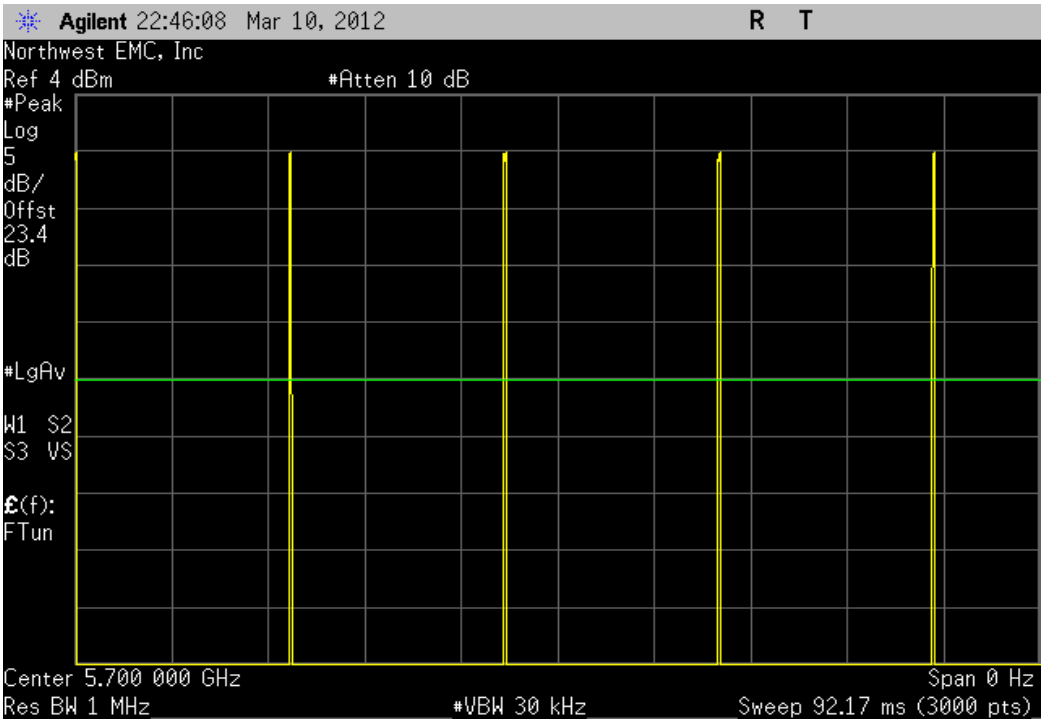


Transmissions Burst Duration

802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel						
			Number of Pulses	Value	Limit	Result
			1	0.246 ms	N/A	N/A

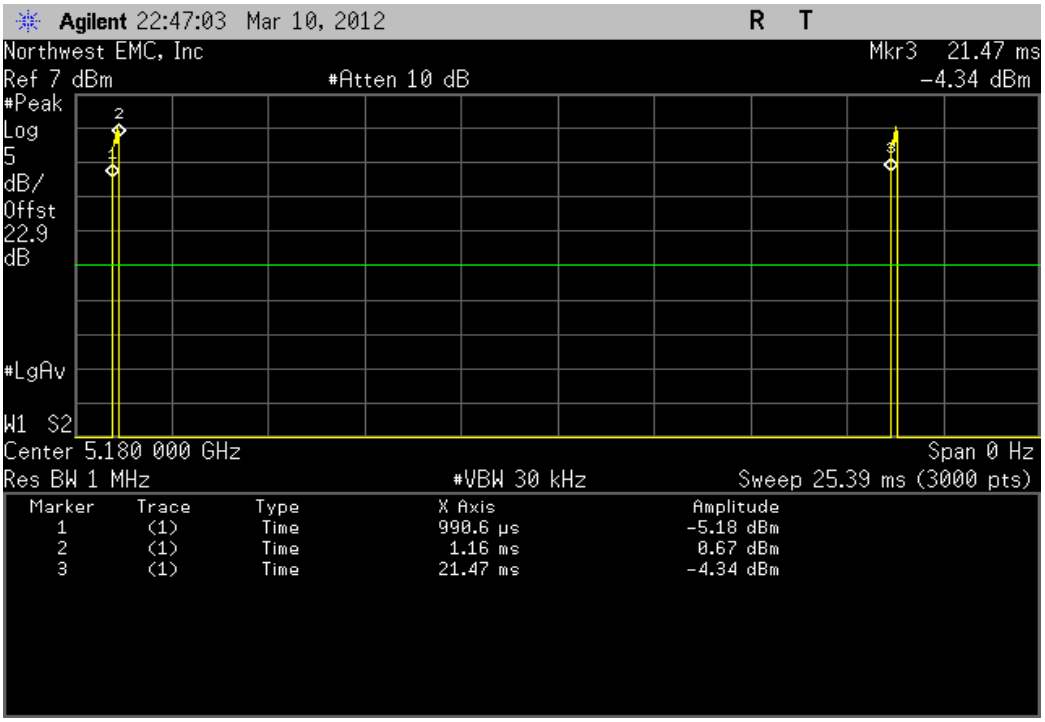


802.11(a) 36 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

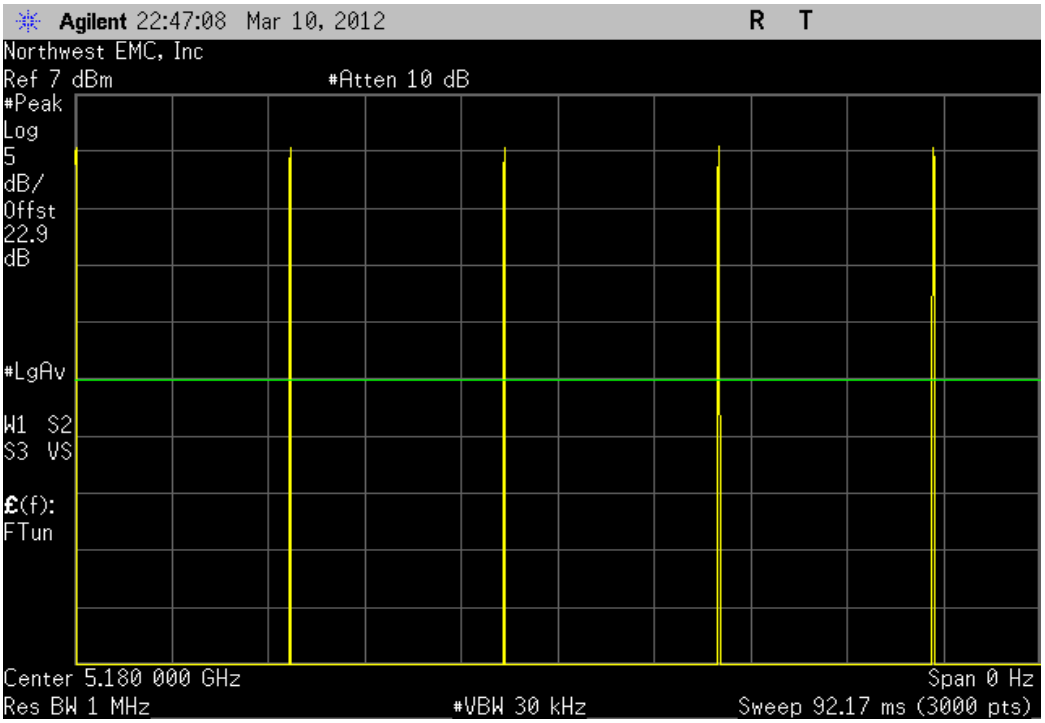


Transmissions Burst Duration

802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel						
			Number of Pulses	Value	Limit	Result
			1	0.169 ms	N/A	N/A

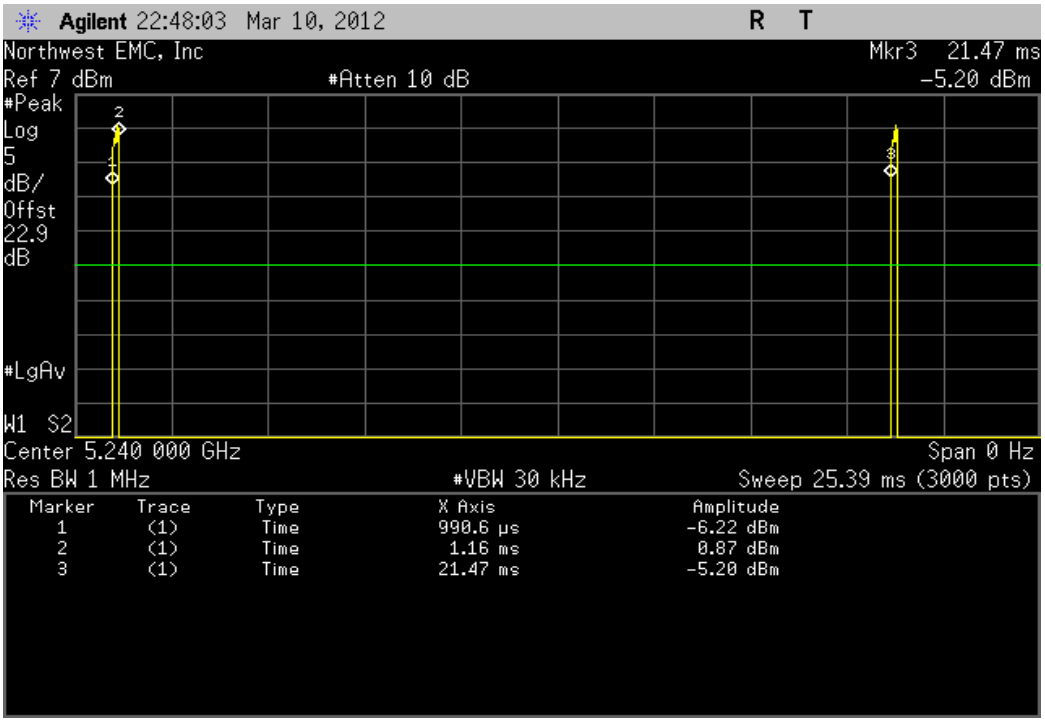


802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 36, Low Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

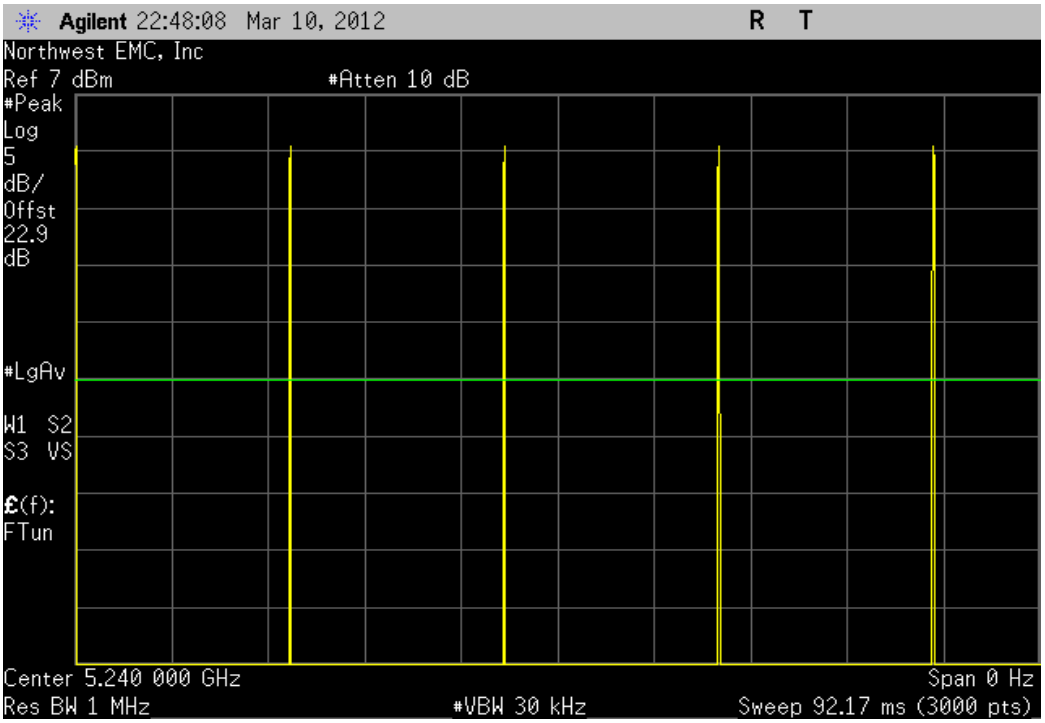


Transmissions Burst Duration

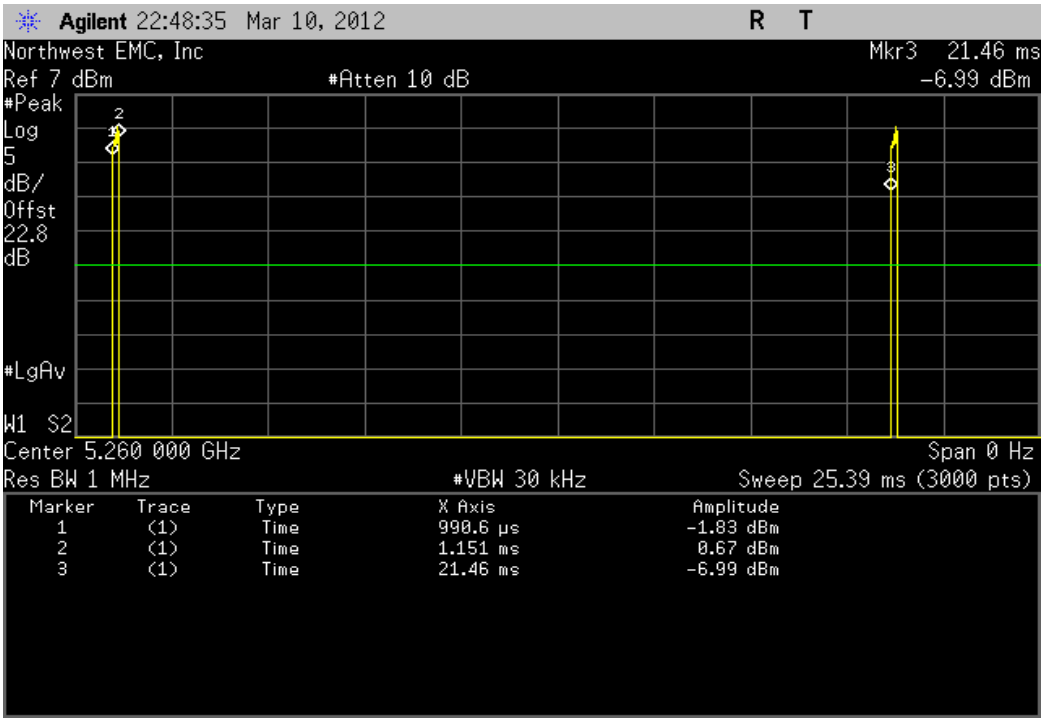
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
			Number of Pulses	Value	Limit	Result
			1	0.169 ms	N/A	N/A



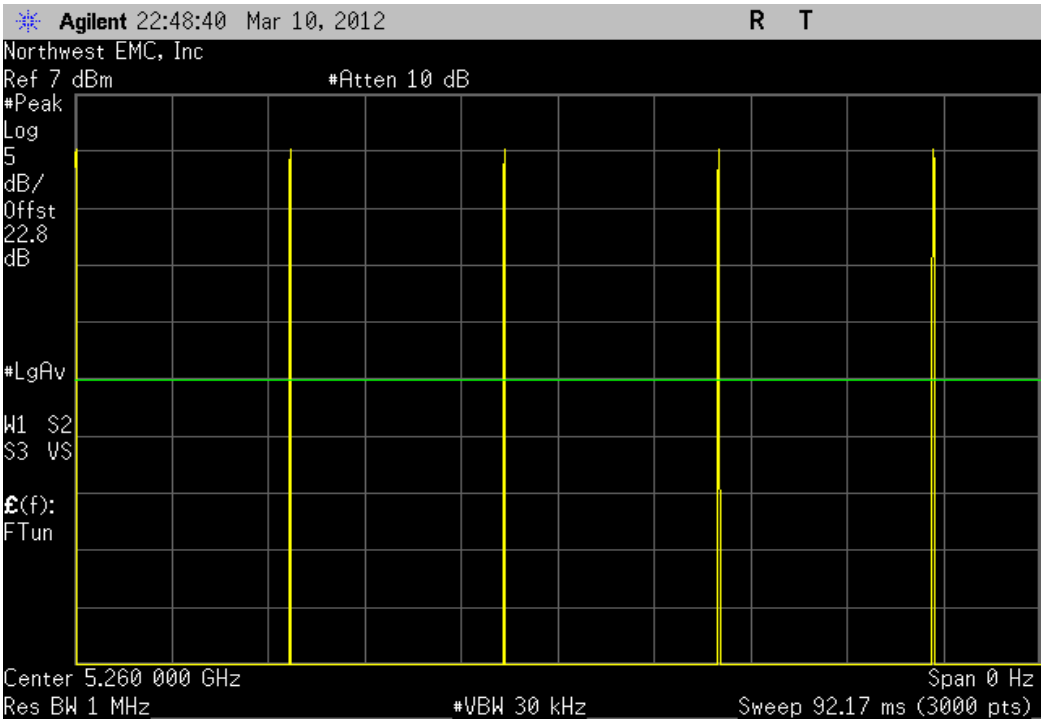
802.11(a) 54 Mbps, 5150 - 5250 MHz Band, Channel 48, High Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A



802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel						
			Number of Pulses	Value	Limit	Result
			1	0.161 ms	N/A	N/A

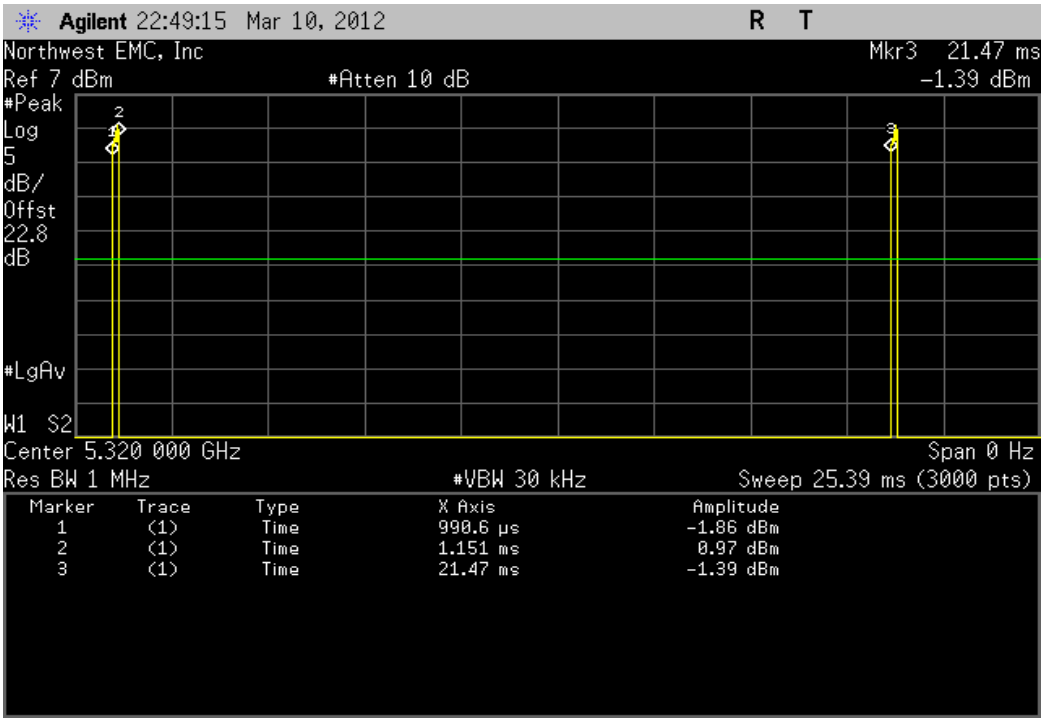


802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 52, Low Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

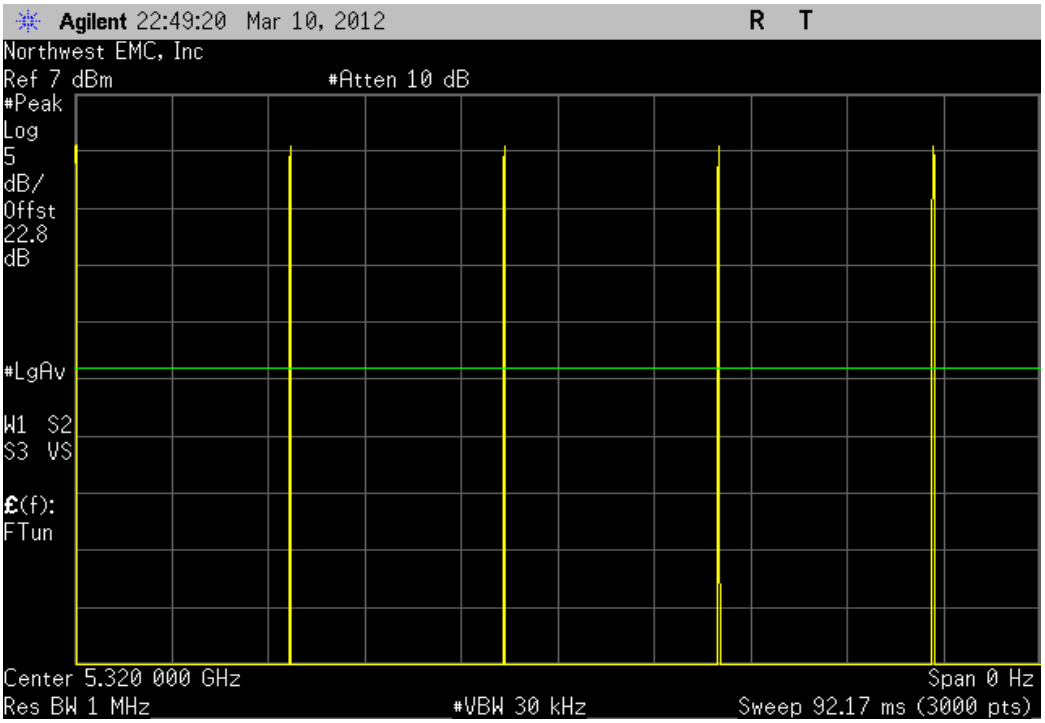


Transmissions Burst Duration

802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel						
			Number of Pulses	Value	Limit	Result
			1	0.161 ms	N/A	N/A

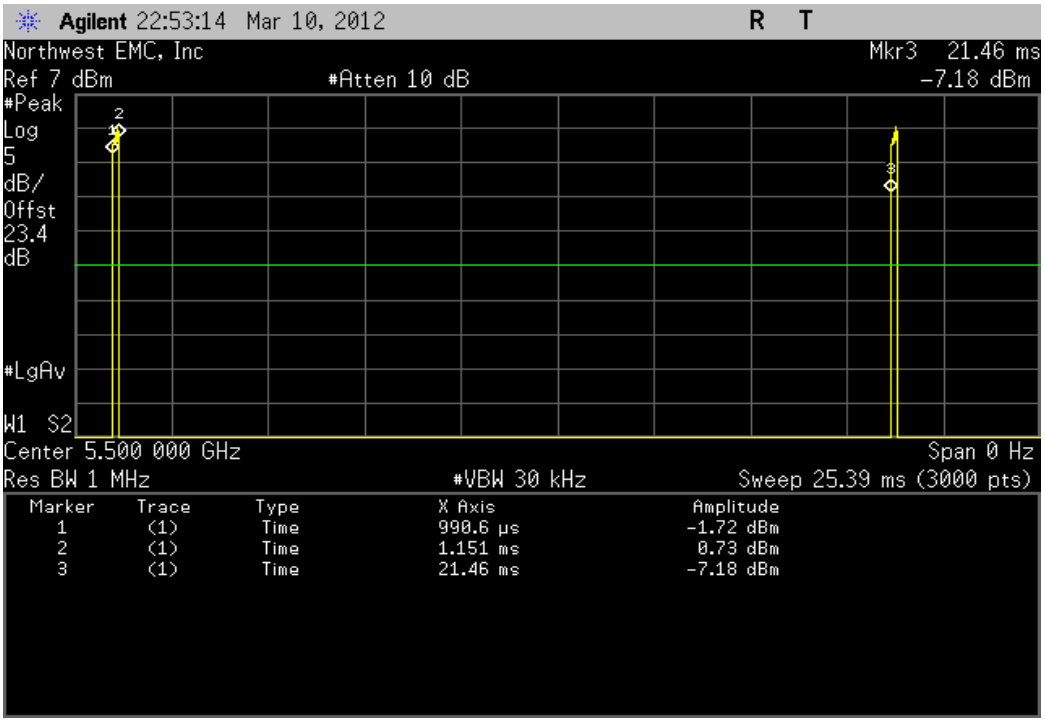


802.11(a) 54 Mbps, 5250 - 5350 MHz Band, Channel 64, High Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

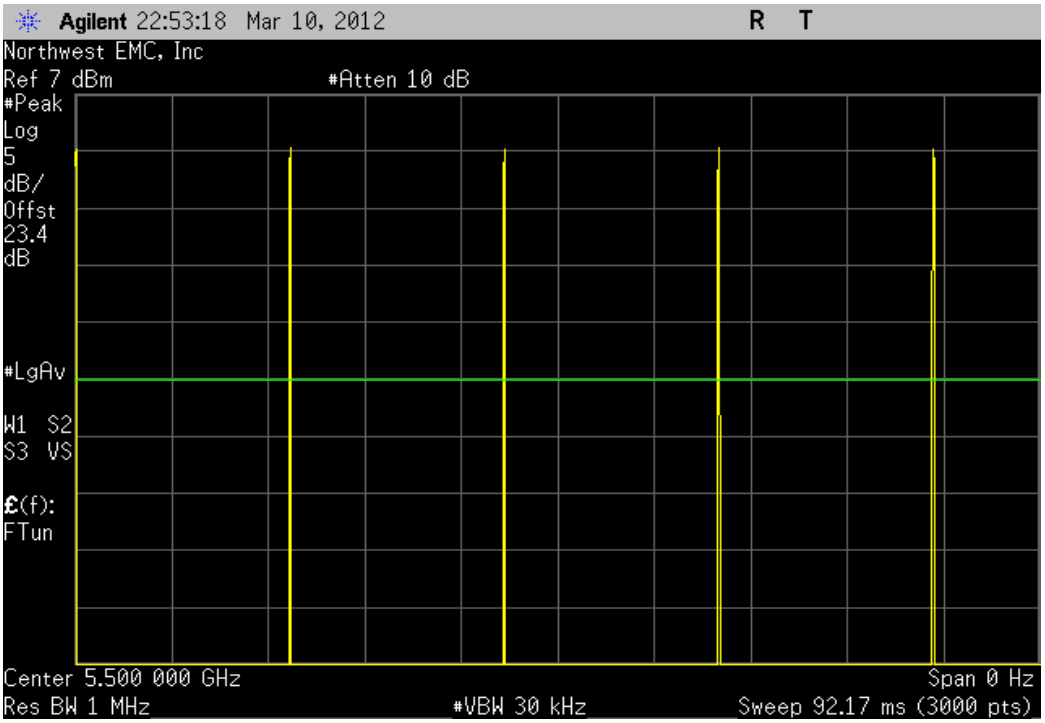


Transmissions Burst Duration

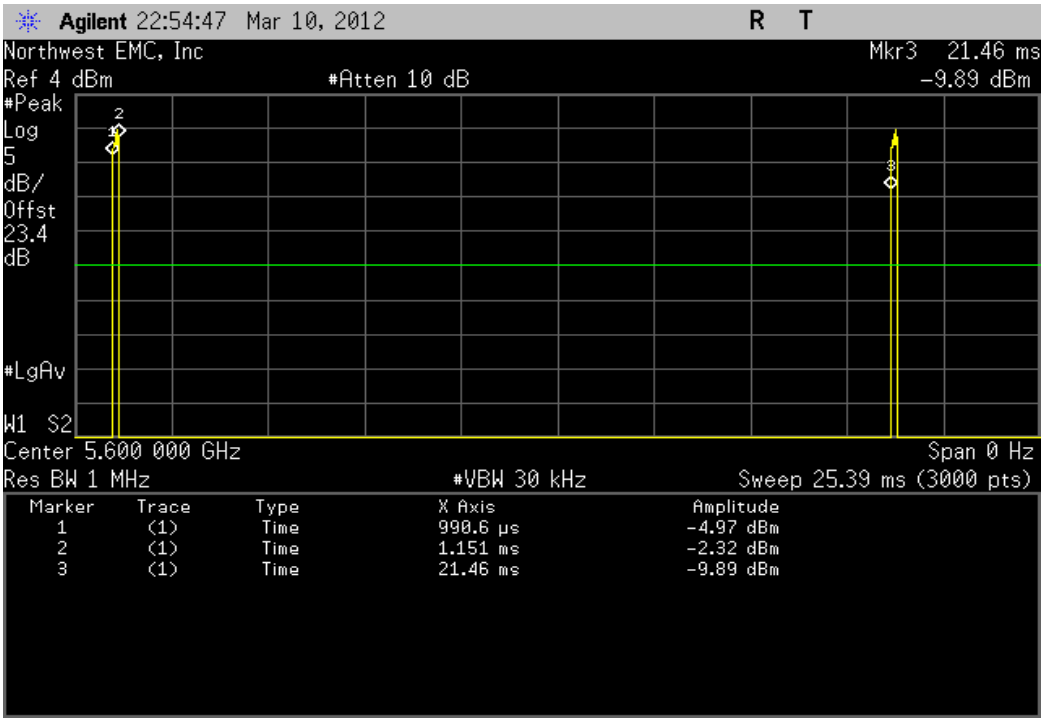
802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel						
			Number of Pulses	Value	Limit	Result
			1	0.161 ms	N/A	N/A



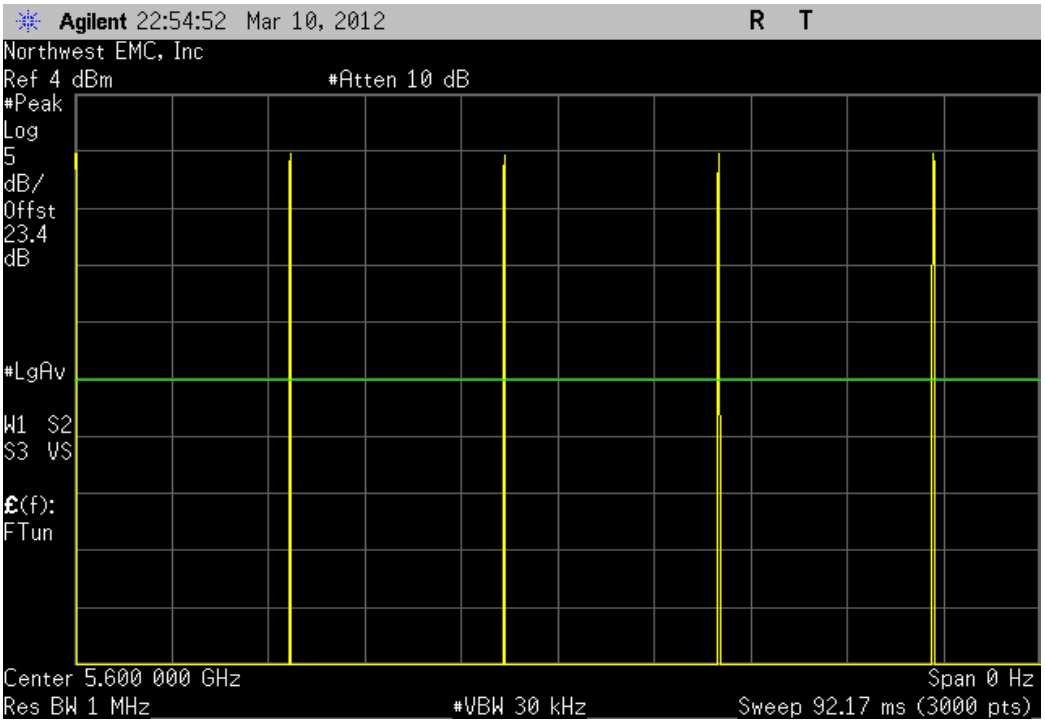
802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 100, Low Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A



802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel						
			Number of Pulses	Value	Limit	Result
			1	0.161 ms	N/A	N/A

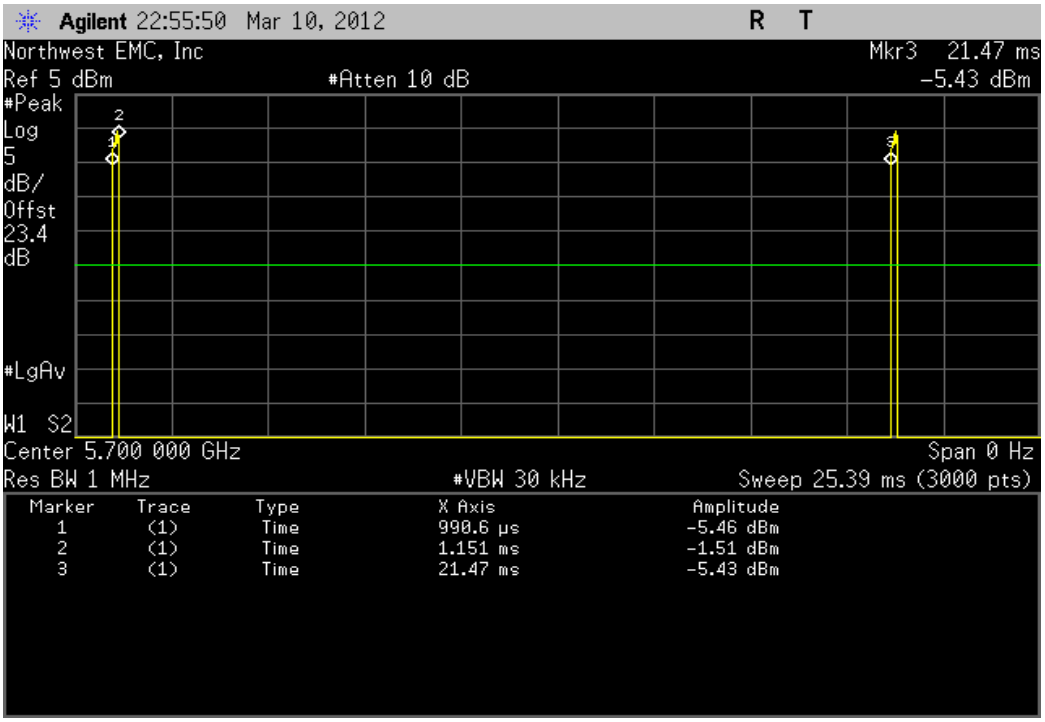


802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 120, Mid Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A

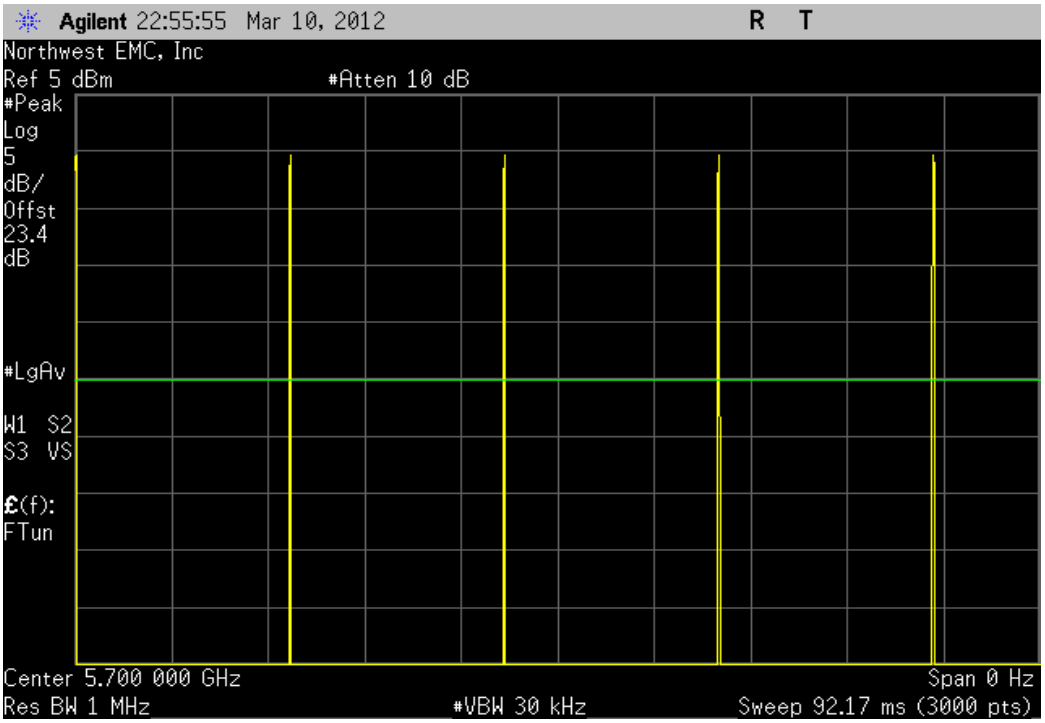


Transmissions Burst Duration

802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel						
			Number of Pulses	Value	Limit	Result
			1	0.161 ms	N/A	N/A



802.11(a) 54 Mbps, 5470 - 5725 MHz Band, Channel 140, High Channel						
			Number of Pulses	Value	Limit	Result
			5		N/A	N/A



Frequency Stability

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
40 GHz DC block	Fairview Microwave	SD3379	AMI	10/12/2011	12
Attenuator - 20db, ' SMA'	SM Electronics	SA26B-20	RFW	6/2/2011	12
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12
Multimeter	Fluke	114	MMU	7/8/2011	24
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	0
Humidity Temperature Meter	Omega Engineering, Inc.	HH31	DUB	10/25/2011	24
Chamber, Temp./Humidity Chamber	Cincinnati Sub Zero (CSZ)	ZPH-32-3.5-SCT/AC	TBF	NCR	0
Spectrum Analyzer	Agilent	E4440A	AAX	5/23/2011	12
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

Variation of Supply Voltage

The primary supply voltage was varied from the range specified by the manufacturer.

Variation of Ambient Temperature

Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (0 ° to +50° C) and at 10°C intervals, per the manufacturer stated operating range.

A direct connect measurement was made between the EUT's antenna cable and a spectrum analyzer. The spectrum analyzer is equipped with a precision frequency reference that exceeds the stability requirement of the EUT.

Per FCC 15.407(g), states that the EUT will stay in the band of operation during all test conditions.

Frequency Stability

EUT:	Sigma Pumps Integrated 802.11abg Module			**Work Order:**	DGII0053
Serial Number:	7.06			**Date:**	04/04/12
Customer:	Digi International			**Temperature:**	22.50°C
Attendees:	None			**Humidity:**	23%
Project:	None			**Barometric Pres.:**	1019.2
Tested by:	Trevor Buls	**Power:**	110VAC/60Hz	**Job Site:**	MN08

TEST SPECIFICATIONS	Test Method
FCC 15.407:2012	ANSI C63.10:2009

COMMENTS

Added second harmonic filter on 5GHz path (footprint exists on board for this filter). Duty Cycle was measured at 100% operation. Channel 36, 48, 52, 64, 100: Power level 50. Channel 120: Power level 38, and Channel 140: Power level 47 at 6 Mbps, 36 Mbps, 54 Mbps.

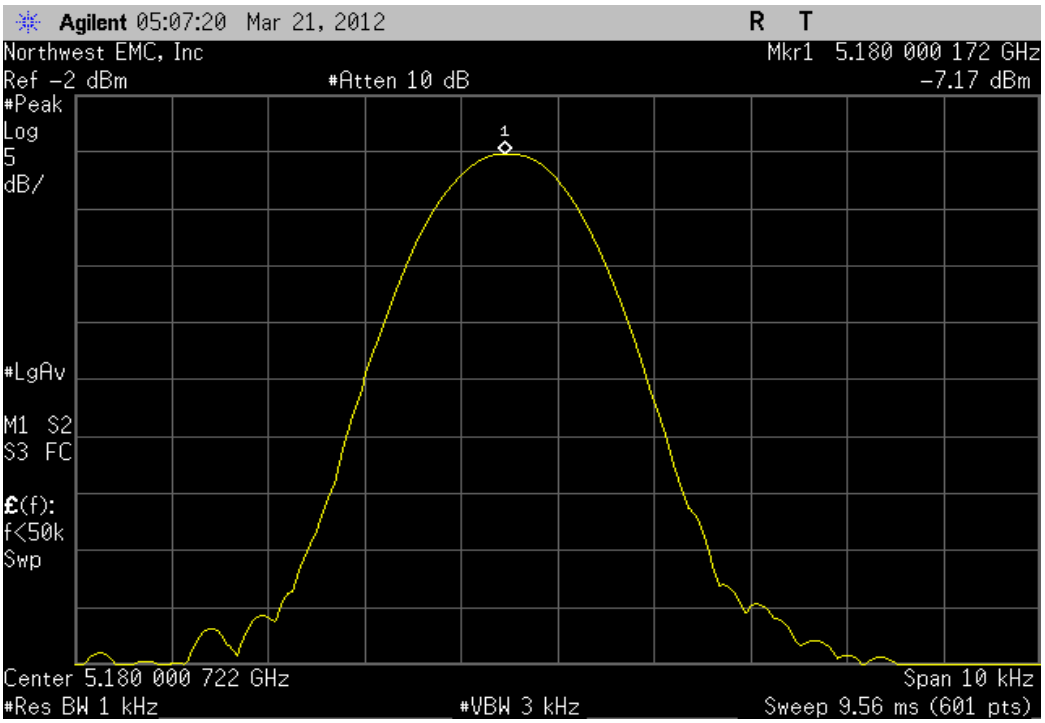
DEVIATIONS FROM TEST STANDARD

None

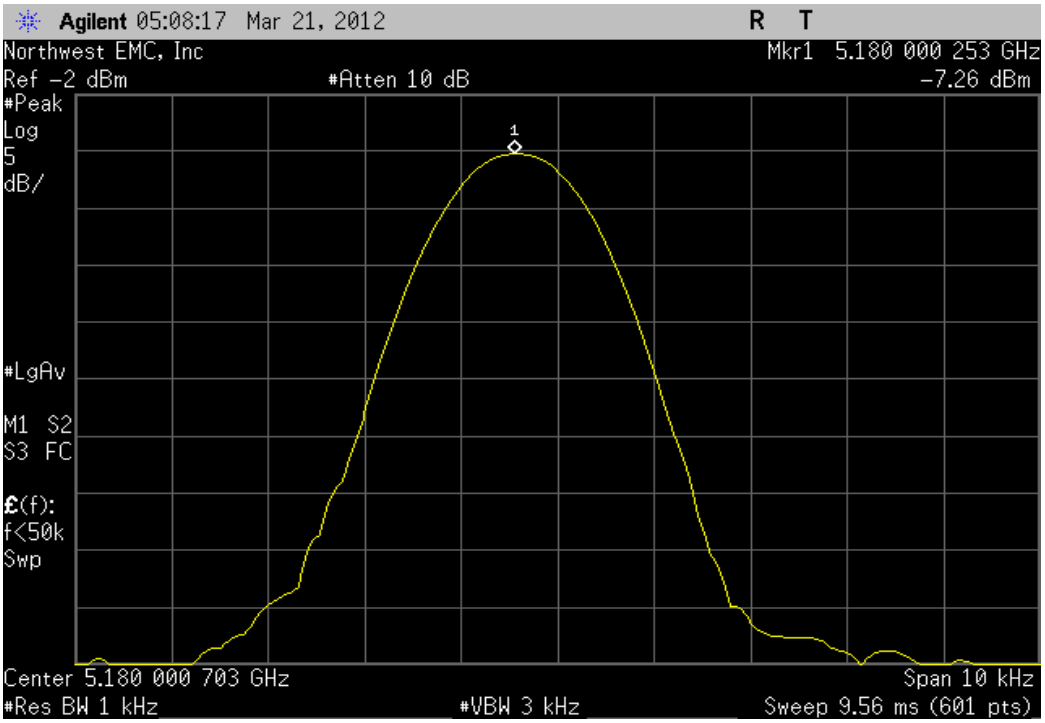
Configuration #	2	Signature	Trevor Buls

	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
5150 MHz - 5250 MHz - Low Channel, 5180 MHz					
Voltage +8.4VDC	5180.000172	5180	0.03	N/A	N/A
Voltage +7.0VDC	5180.000253	5180	0.05	N/A	N/A
Voltage +6.0VDC	5180.000303	5180	0.06	N/A	N/A
Temperature: +50°	5180.000054	5180	0.01	N/A	N/A
Temperature: +40°	5179.99972	5180	0.05	N/A	N/A
Temperature: +30°	5179.999317	5180	0.13	N/A	N/A
Temperature: +20°	5179.999017	5180	0.19	N/A	N/A
Temperature: +10°	5179.998417	5180	0.31	N/A	N/A
Temperature: 0°	5179.997398	5180	0.5	N/A	N/A
5250 MHz - 5350 MHz - High Channel, 5320 MHz					
Voltage +8.4VDC	5320.000959	5320	0.18	N/A	N/A
Voltage +7.0VDC	5320.000973	5320	0.18	N/A	N/A
Voltage +6.0VDC	5320.001009	5320	0.19	N/A	N/A
Temperature: +50°	5320.000773	5320	0.15	N/A	N/A
Temperature: +40°	5320.000423	5320	0.08	N/A	N/A
Temperature: +30°	5319.999888	5320	0.02	N/A	N/A
Temperature: +20°	5319.999586	5320	0.08	N/A	N/A
Temperature: +10°	5319.998952	5320	0.2	N/A	N/A
Temperature: 0°	5319.997981	5320	0.38	N/A	N/A
5470 MHz - 5725 MHz - Low Channel, 5500 MHz					
Voltage +8.4VDC	5500.001018	5500	0.19	N/A	N/A
Voltage +7.0VDC	5500.001018	5500	0.19	N/A	N/A
Voltage +6.0VDC	5500.001036	5500	0.19	N/A	N/A
Temperature: +50°	5500.000768	5500	0.14	N/A	N/A
Temperature: +40°	5500.000386	5500	0.07	N/A	N/A
Temperature: +30°	5499.999967	5500	0.01	N/A	N/A
Temperature: +20°	5499.99955	5500	0.08	N/A	N/A
Temperature: +10°	5499.999	5500	0.18	N/A	N/A
Temperature: 0°	5499.997899	5500	0.38	N/A	N/A
5470 MHz - 5725 MHz - High Channel, 5700 MHz					
Voltage +8.4VDC	5700.00072	5700	0.13	N/A	N/A
Voltage +7.0VDC	5700.000704	5700	0.12	N/A	N/A
Voltage +6.0VDC	5700.000687	5700	0.12	N/A	N/A
Temperature: +50°	5700.000456	5700	0.08	N/A	N/A
Temperature: +40°	5700.000105	5700	0.02	N/A	N/A
Temperature: +30°	5699.999573	5700	0.07	N/A	N/A
Temperature: +20°	5699.999269	5700	0.13	N/A	N/A
Temperature: +10°	5699.998618	5700	0.24	N/A	N/A
Temperature: 0°	5699.9975	5700	0.44	N/A	N/A

5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage +8.4VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5180.000172	5180	0.03	N/A	N/A

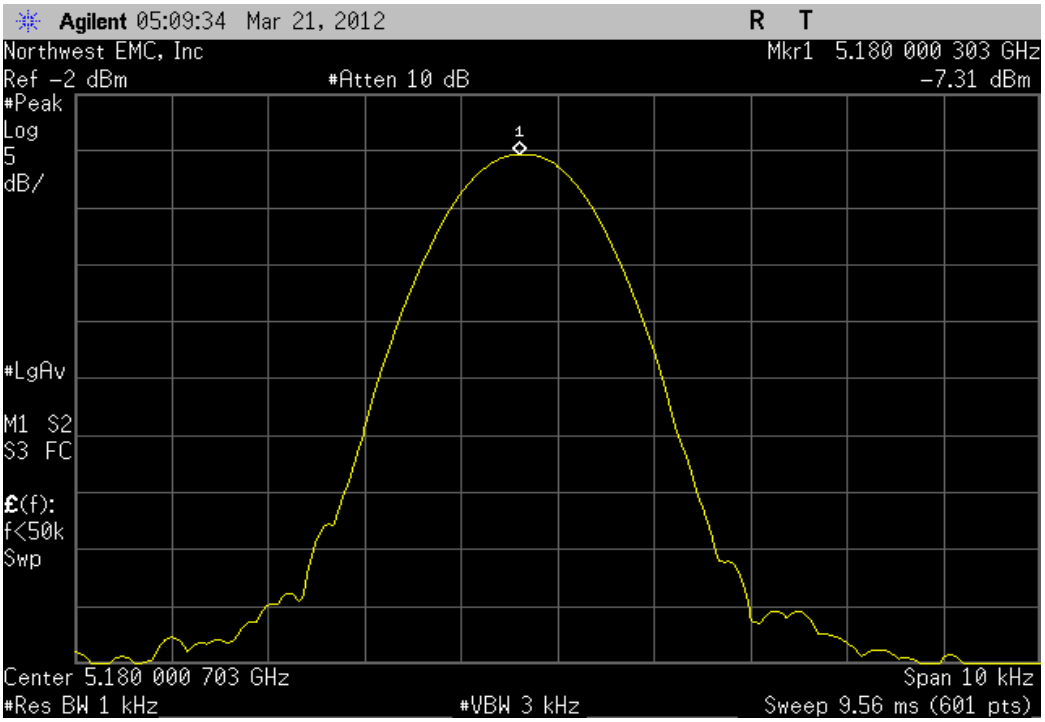


5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage +7.0VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5180.000253	5180	0.05	N/A	N/A

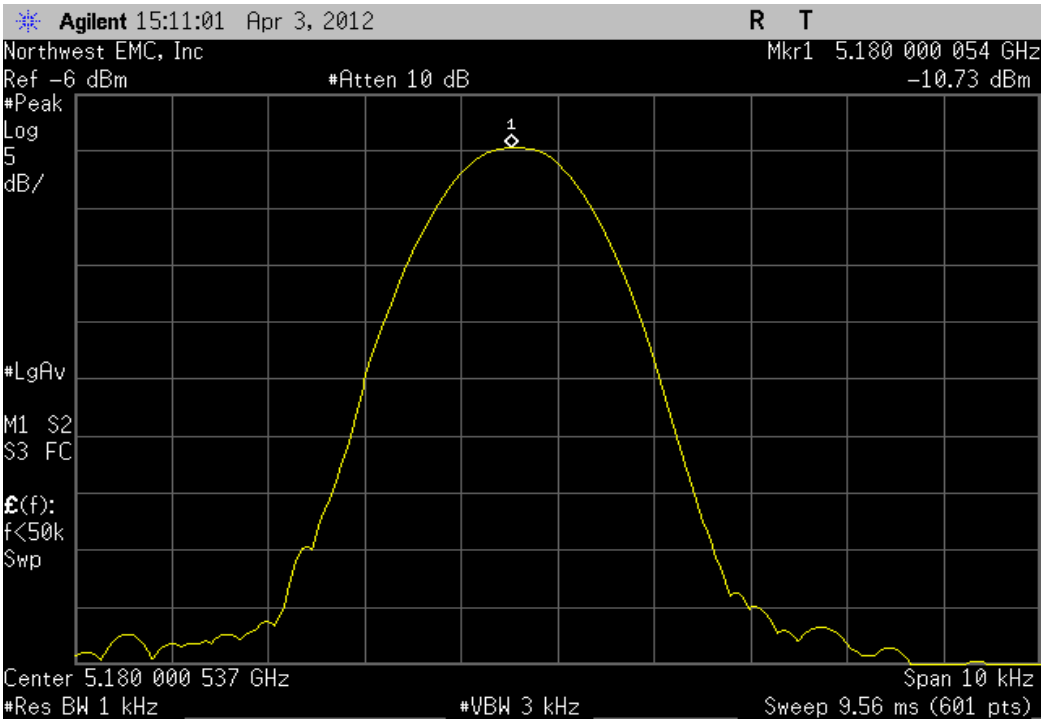


Frequency Stability

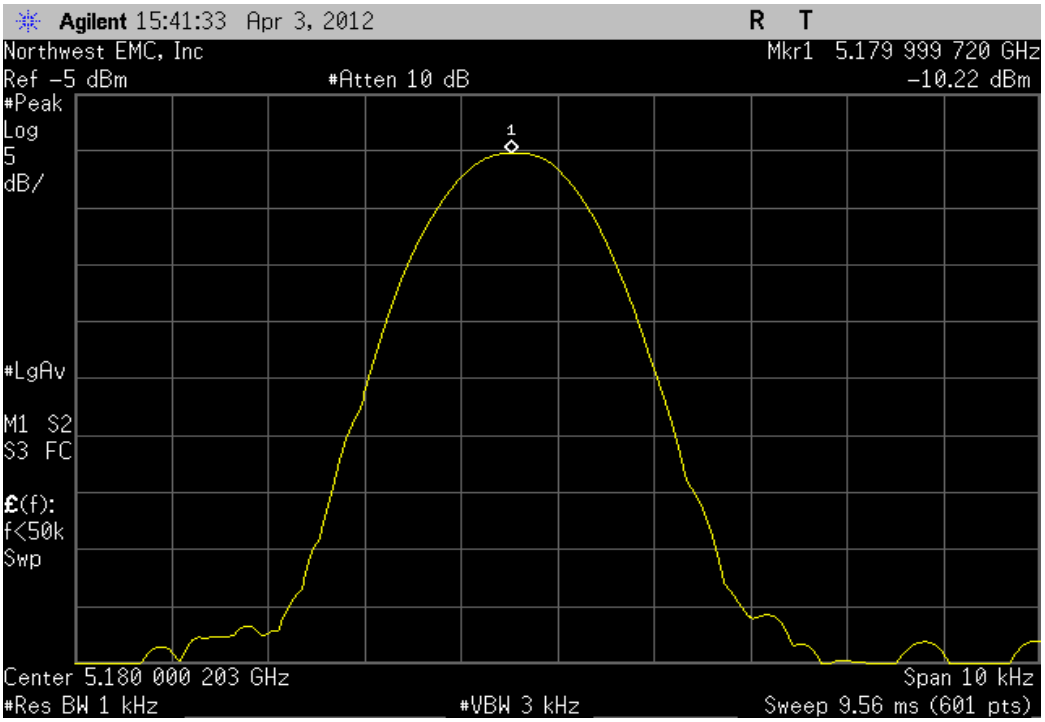
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Voltage +6.0VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5180.000303	5180	0.06	N/A	N/A



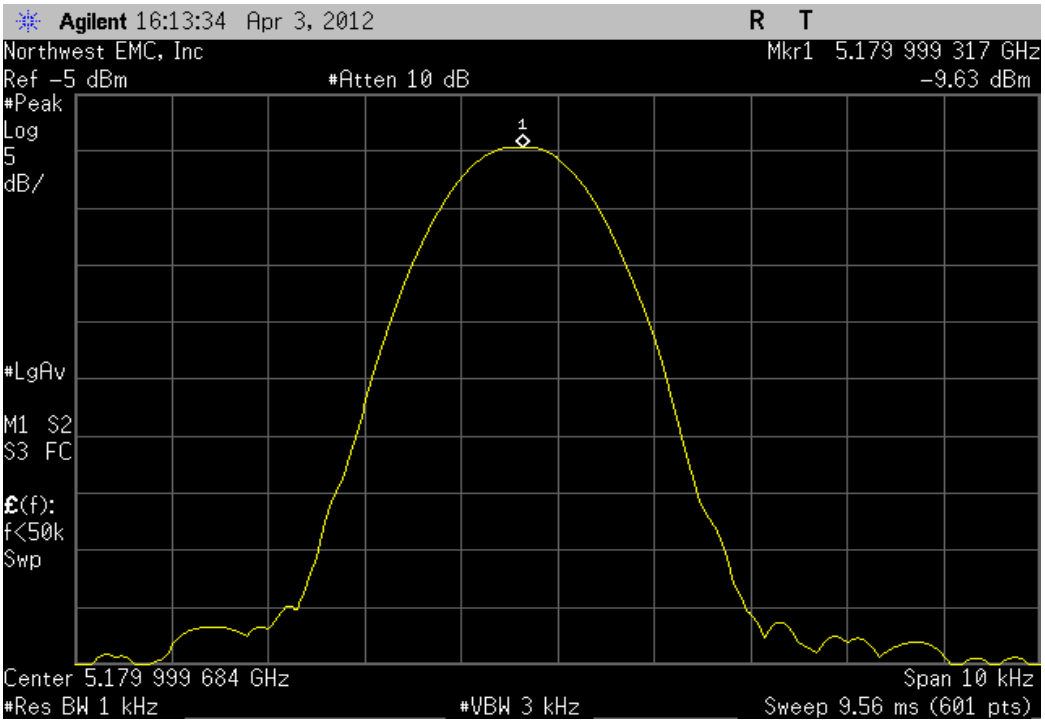
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +50°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5180.000054	5180	0.01	N/A	N/A



5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +40°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5179.99972	5180	0.05	N/A	N/A

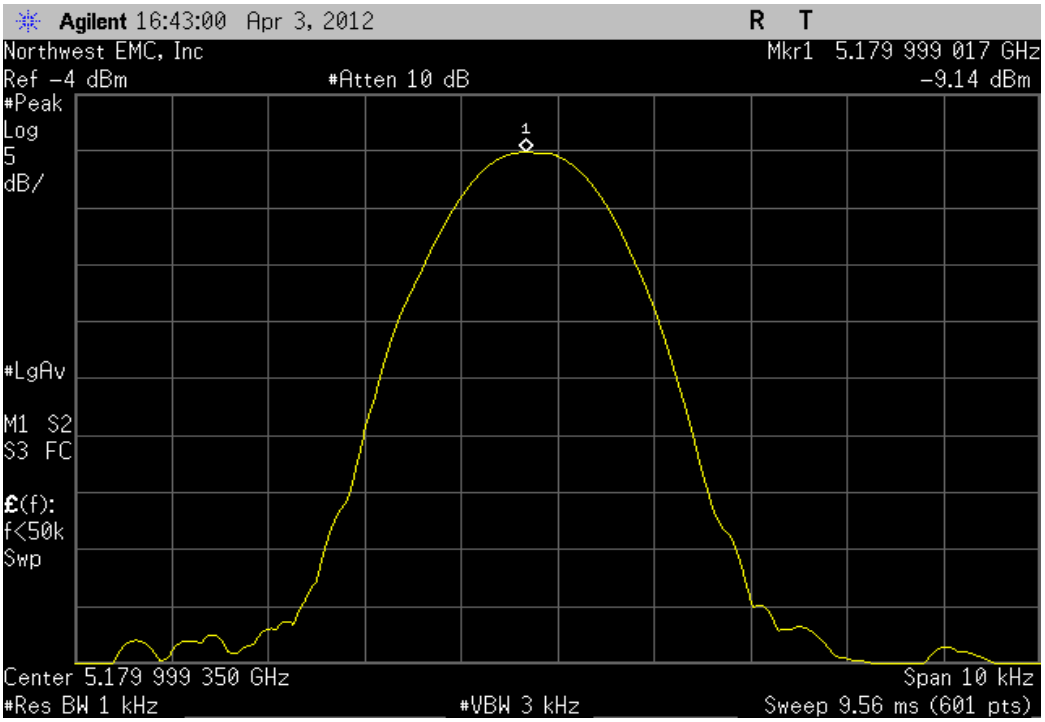


5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +30°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5179.999317	5180	0.13	N/A	N/A

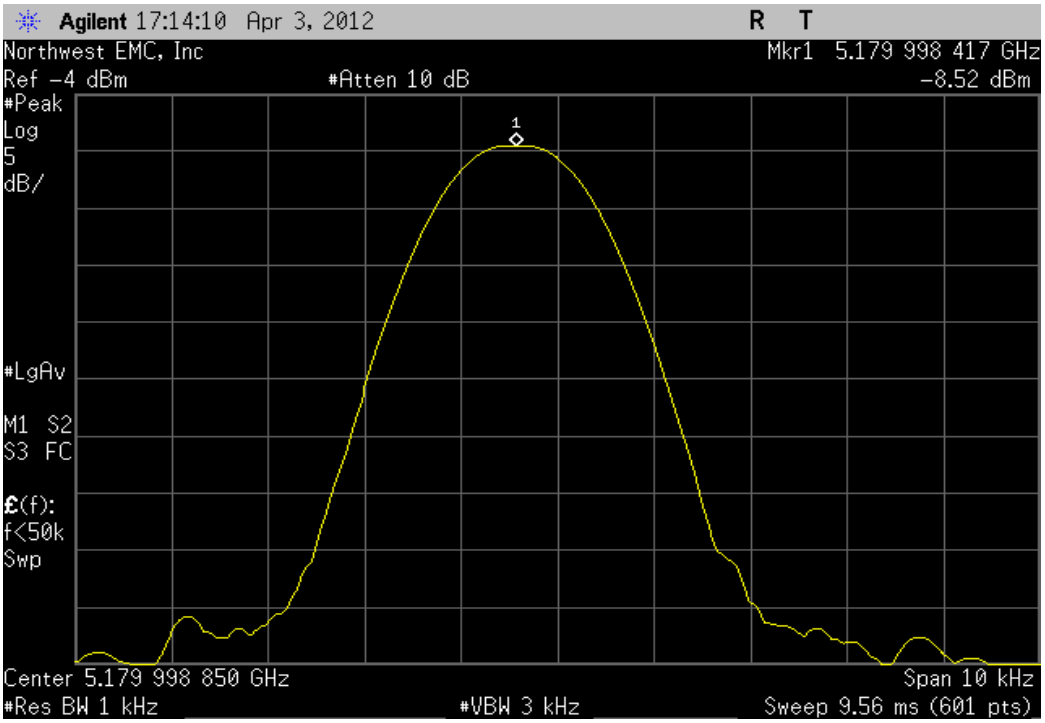


Frequency Stability

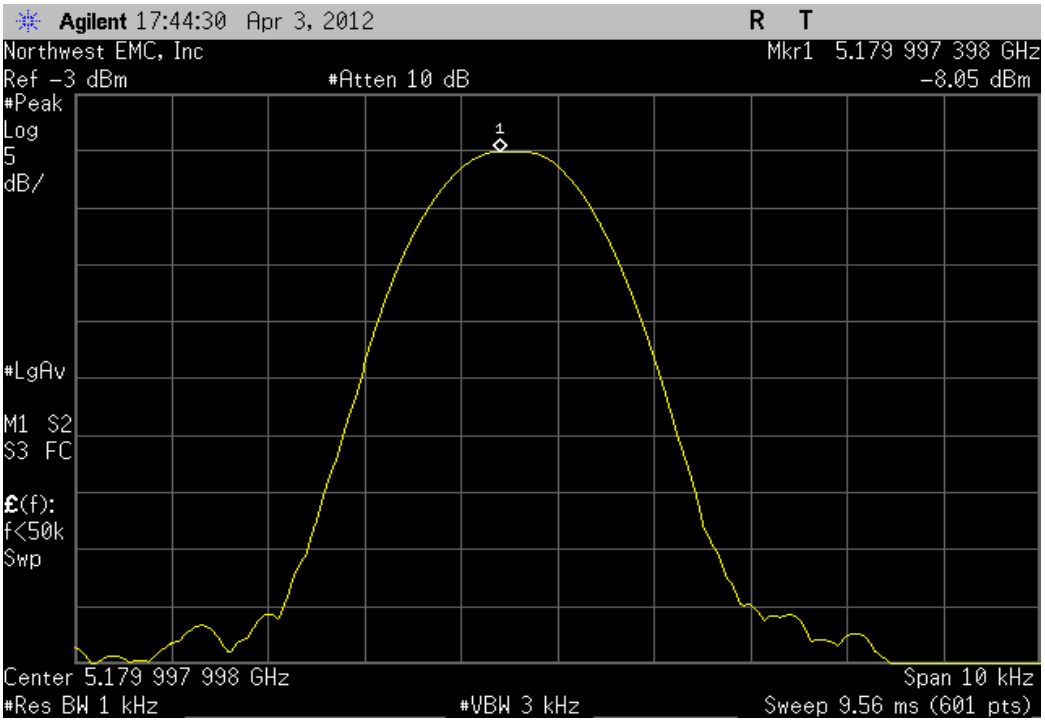
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +20°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5179.999017	5180	0.19	N/A	N/A



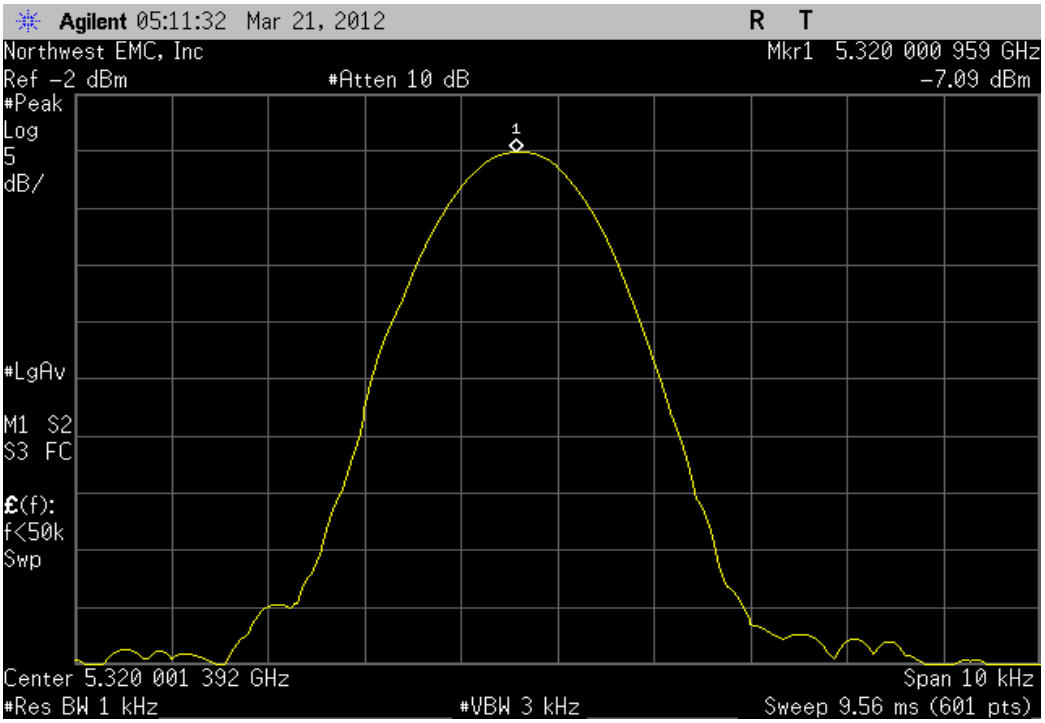
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: +10°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5179.998417	5180	0.31	N/A	N/A



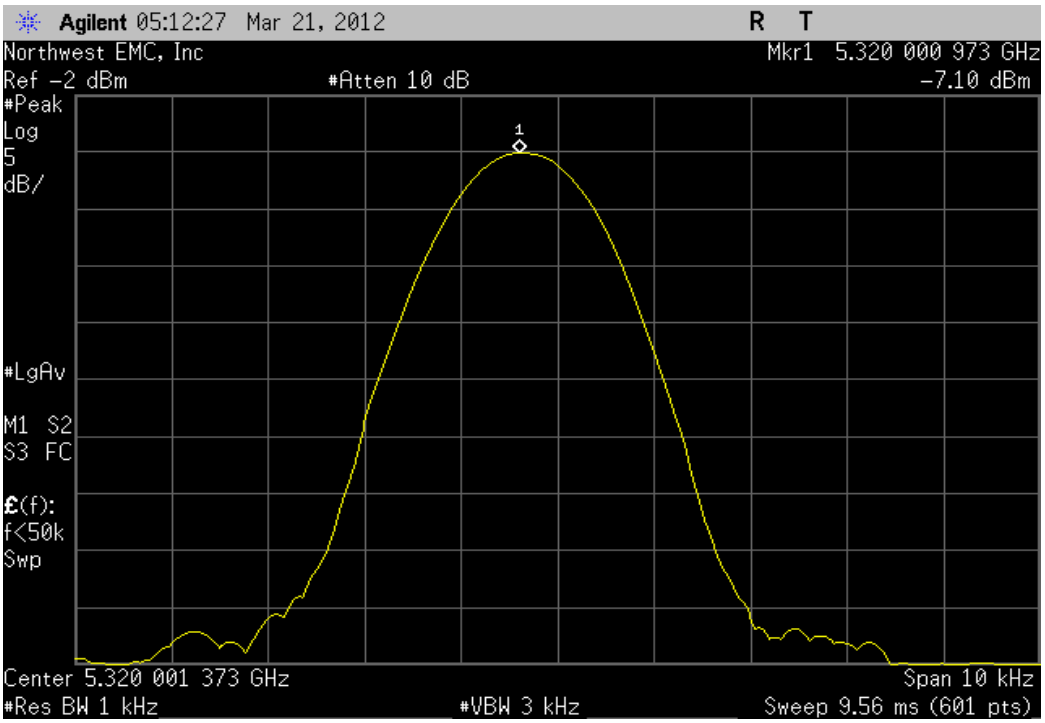
5150 MHz - 5250 MHz - Low Channel, 5180 MHz, Temperature: 0°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5179.997398	5180	0.5	N/A	N/A



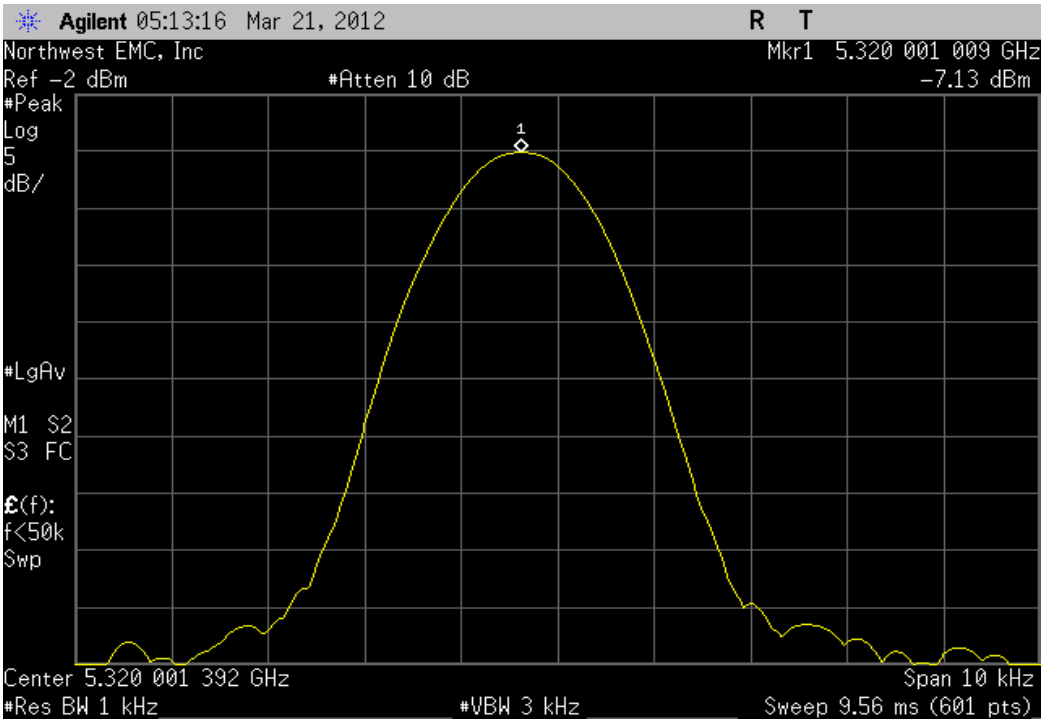
5250 MHz - 5350 MHz - High Channel, 5320 MHz, Voltage +8.4VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5320.000959	5320	0.18	N/A	N/A



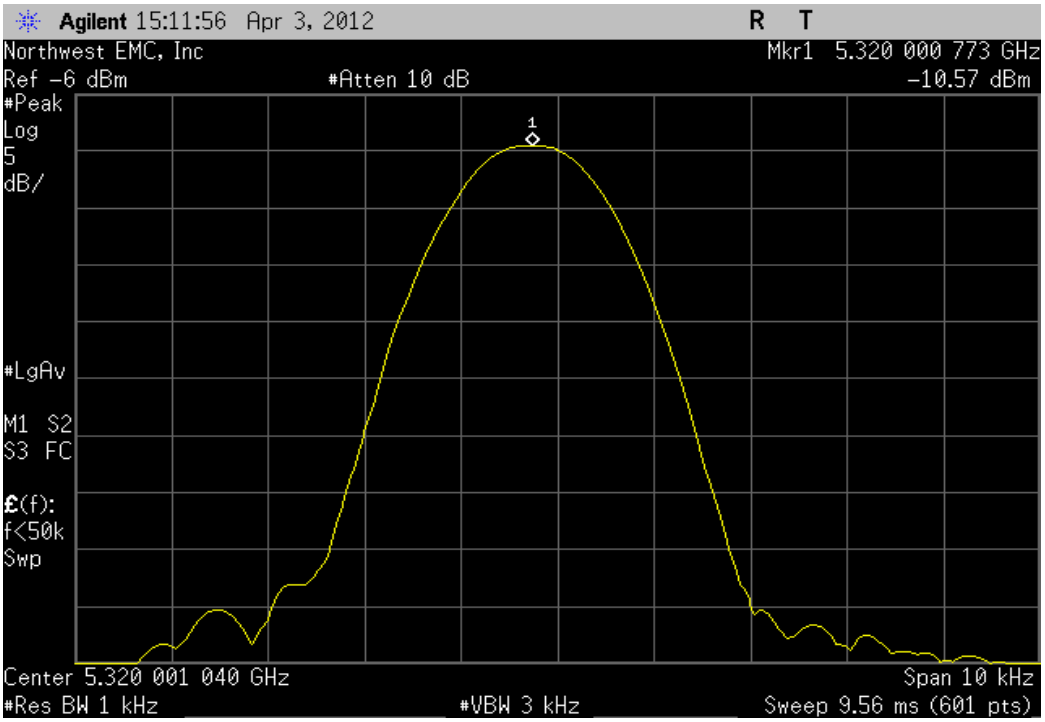
5250 MHz - 5350 MHz - High Channel, 5320 MHz, Voltage +7.0VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5320.000973	5320	0.18	N/A	N/A



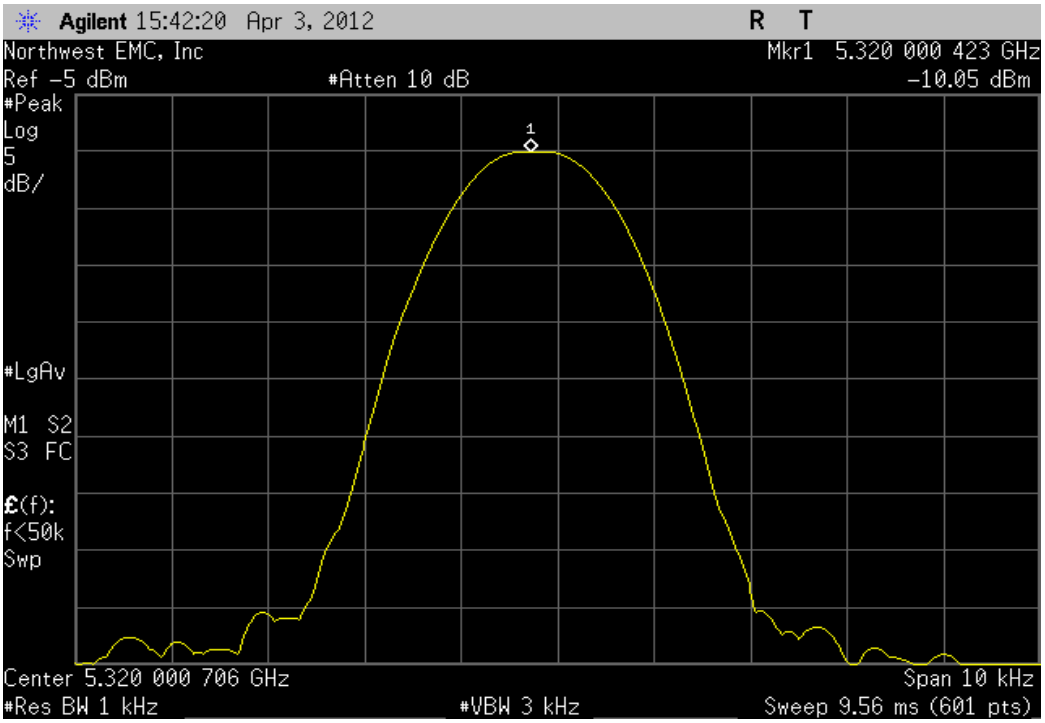
5250 MHz - 5350 MHz - High Channel, 5320 MHz, Voltage +6.0VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5320.001009	5320	0.19	N/A	N/A



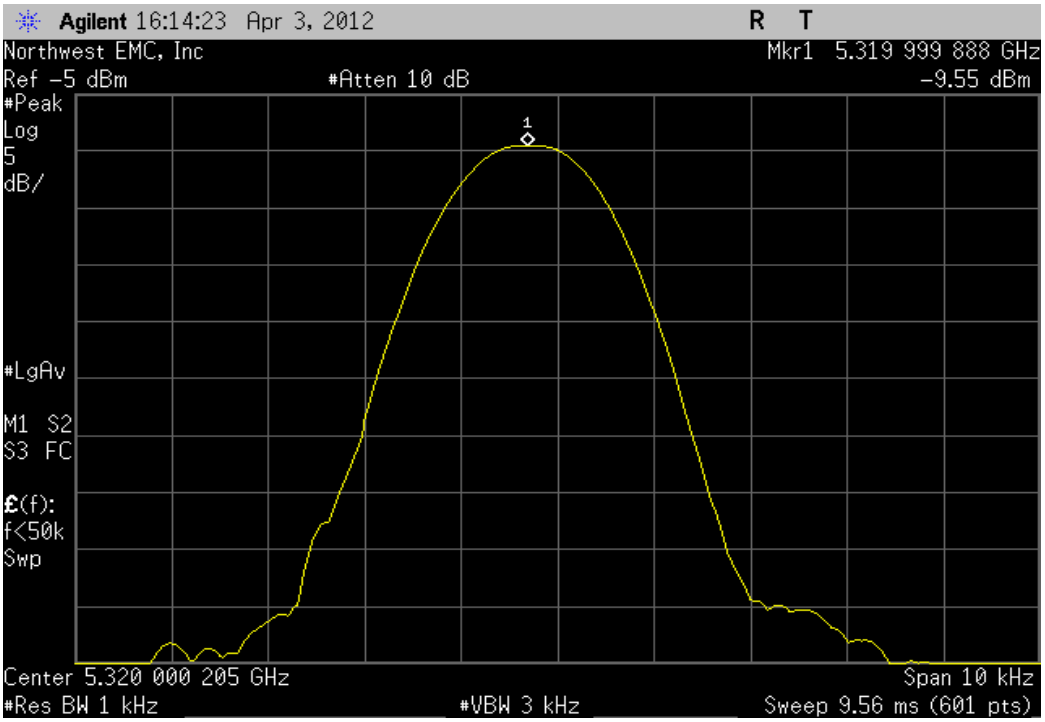
5250 MHz - 5350 MHz - High Channel, 5320 MHz, Temperature: +50°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5320.000773	5320	0.15	N/A	N/A



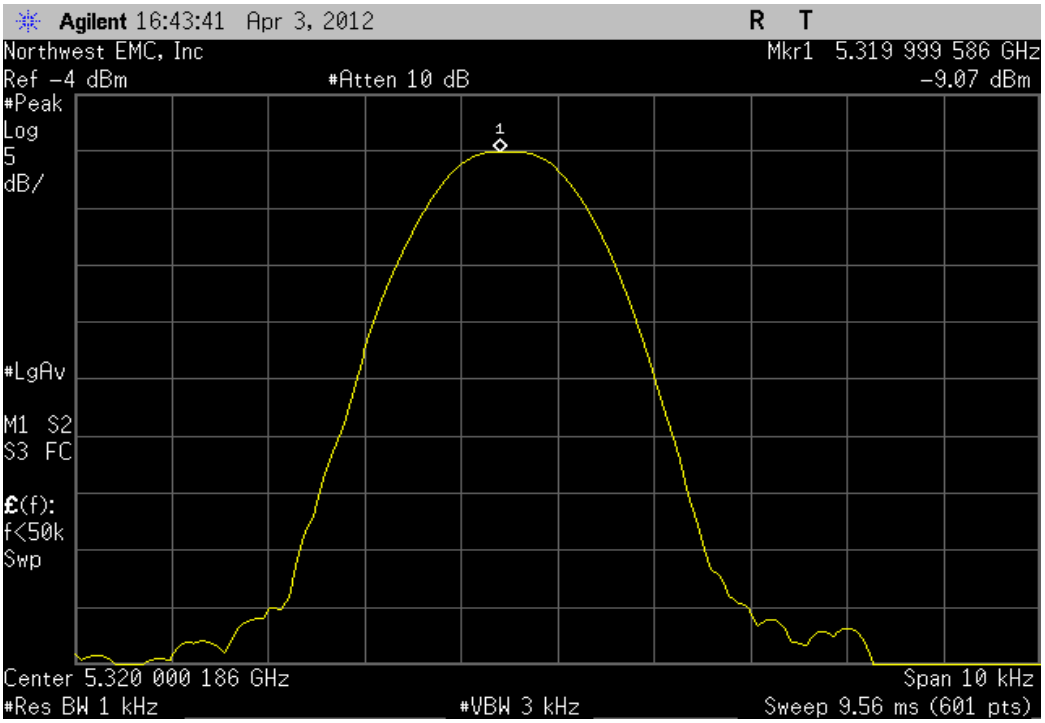
5250 MHz - 5350 MHz - High Channel, 5320 MHz, Temperature: +40°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5320.000423	5320	0.08	N/A	N/A



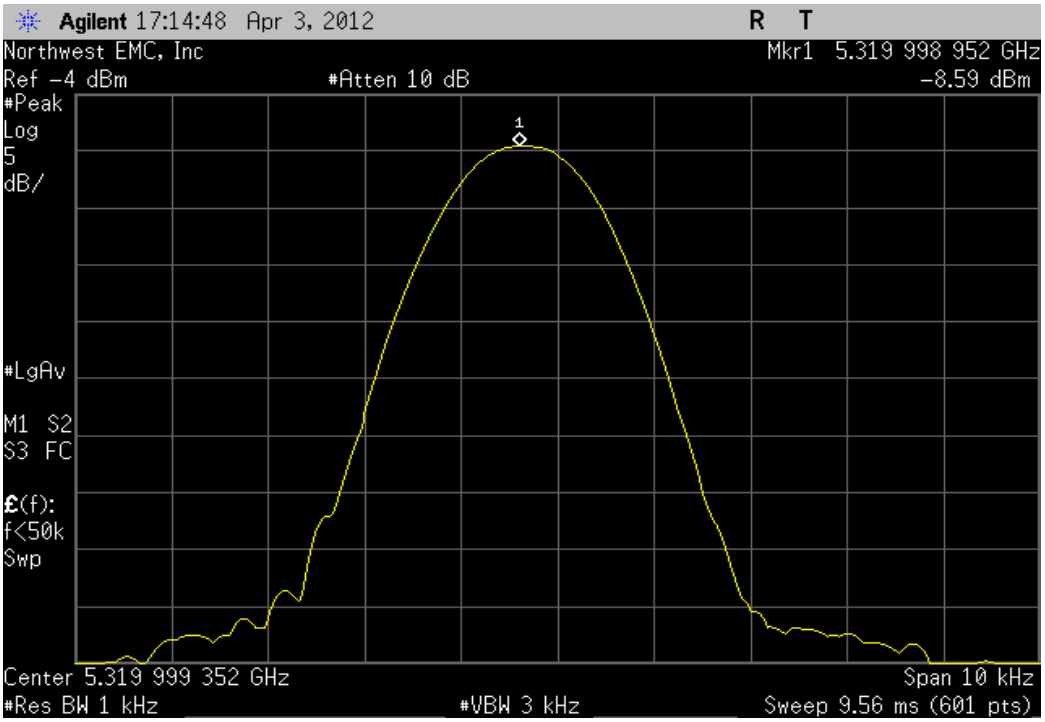
5250 MHz - 5350 MHz - High Channel, 5320 MHz, Temperature: +30°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5319.999888	5320	0.02	N/A	N/A



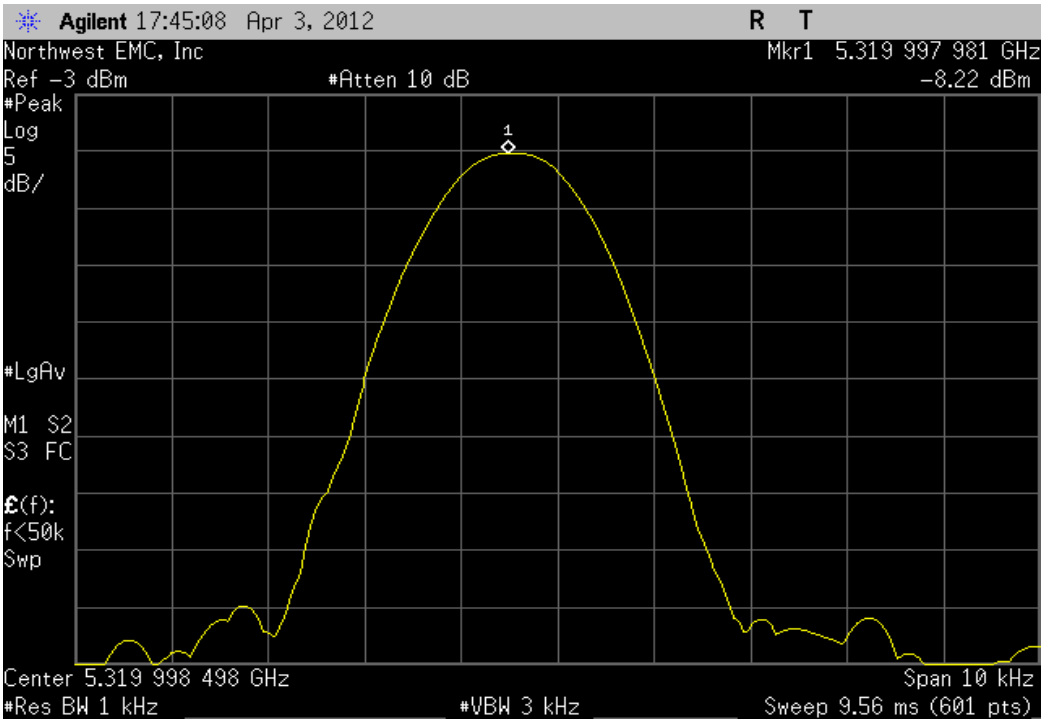
5250 MHz - 5350 MHz - High Channel, 5320 MHz, Temperature: +20°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5319.999586	5320	0.08	N/A	N/A



5250 MHz - 5350 MHz - High Channel, 5320 MHz, Temperature: +10°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5319.998952	5320	0.2	N/A	N/A

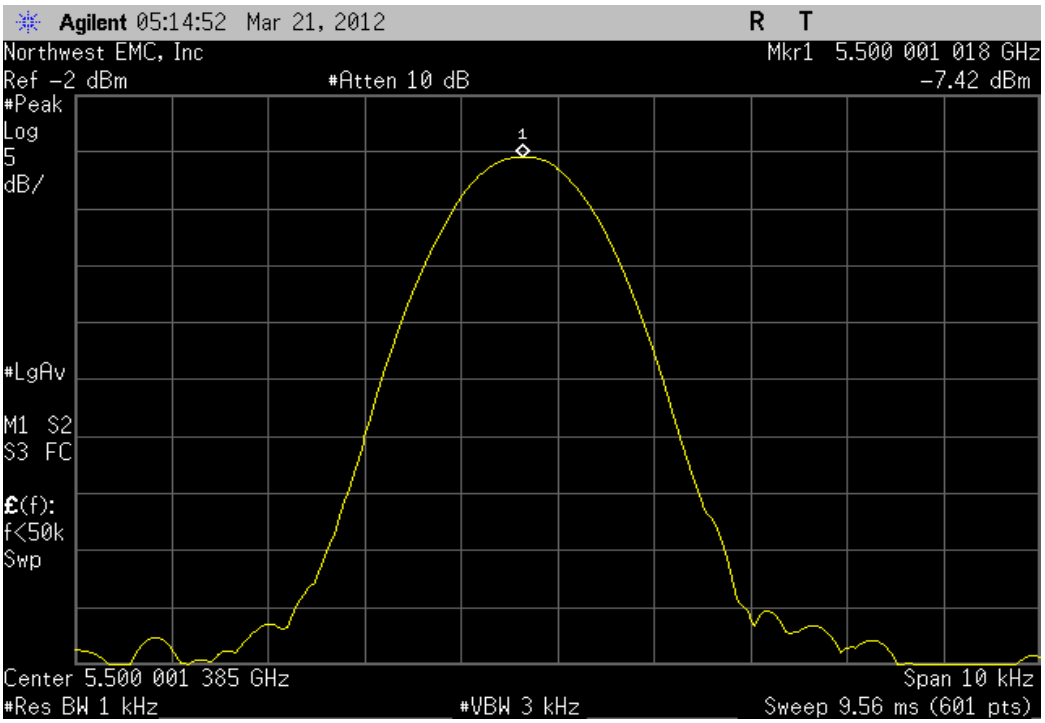


5250 MHz - 5350 MHz - High Channel, 5320 MHz, Temperature: 0°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5319.997981	5320	0.38	N/A	N/A

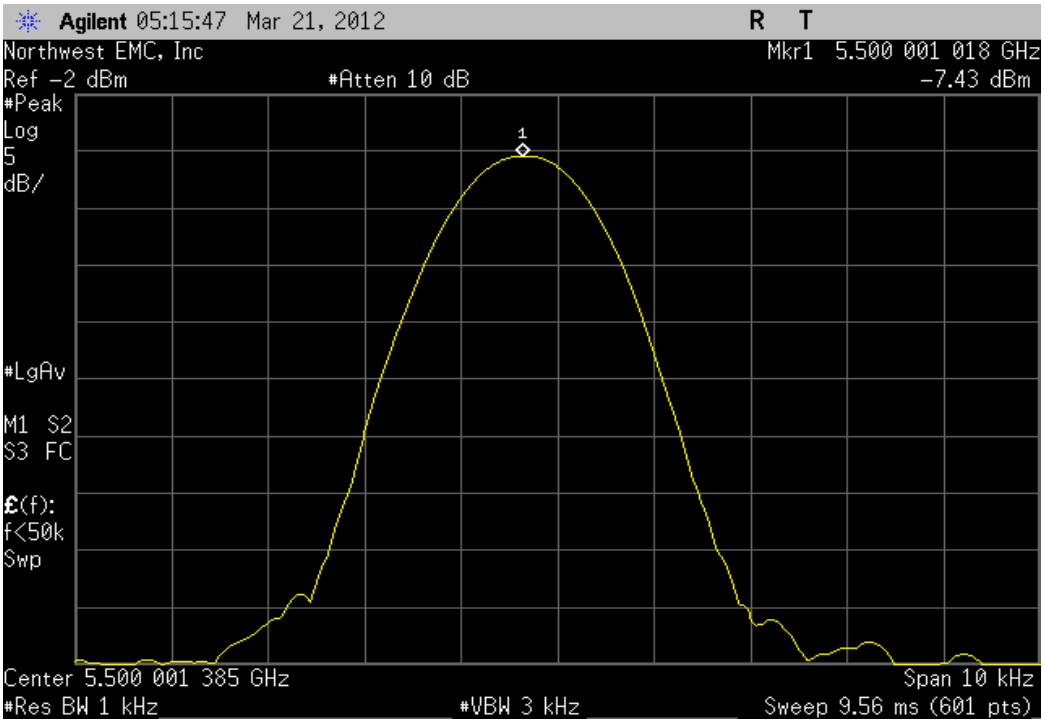


Frequency Stability

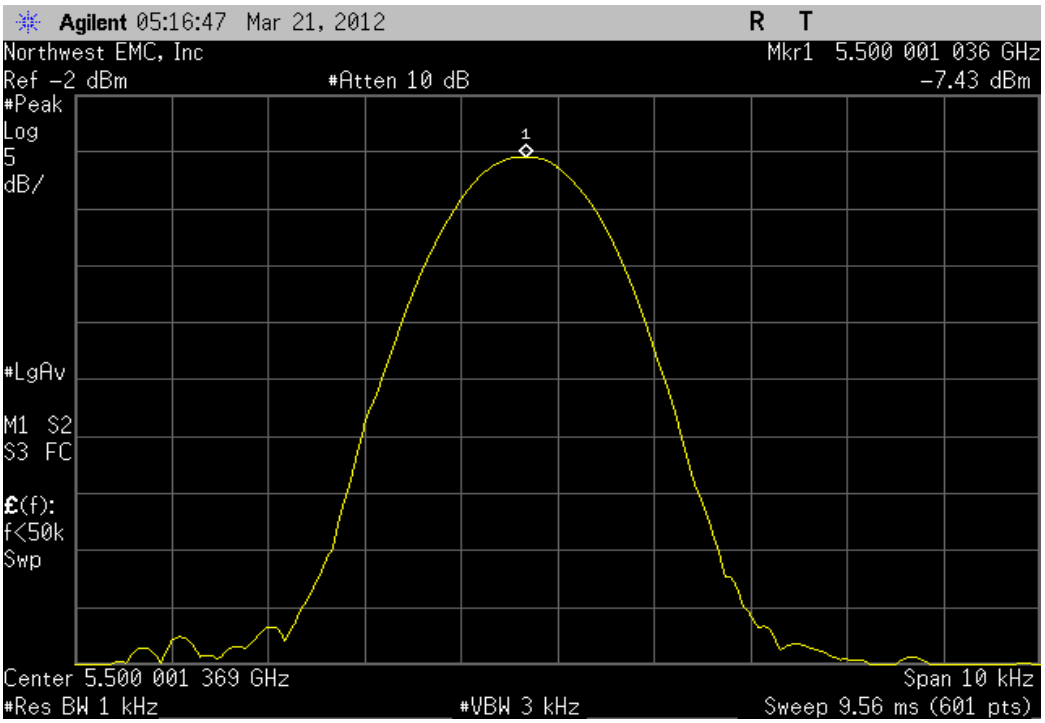
5470 MHz - 5725 MHz - Low Channel, 5500 MHz, Voltage +8.4VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5500.001018	5500	0.19	N/A	N/A



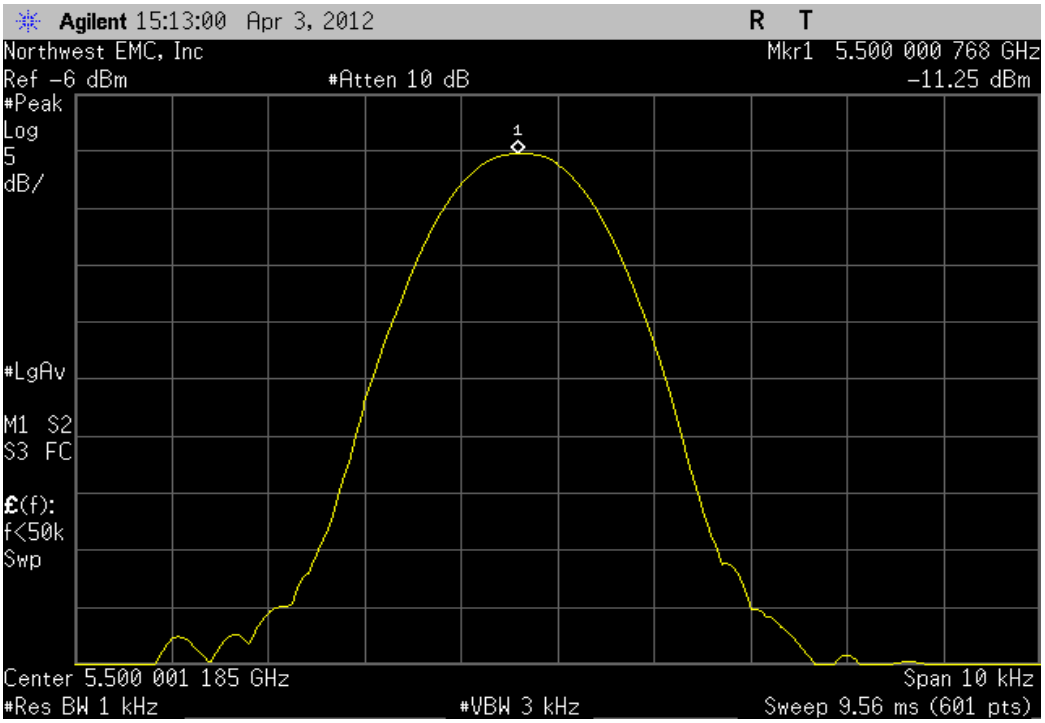
5470 MHz - 5725 MHz - Low Channel, 5500 MHz, Voltage +7.0VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5500.001018	5500	0.19	N/A	N/A



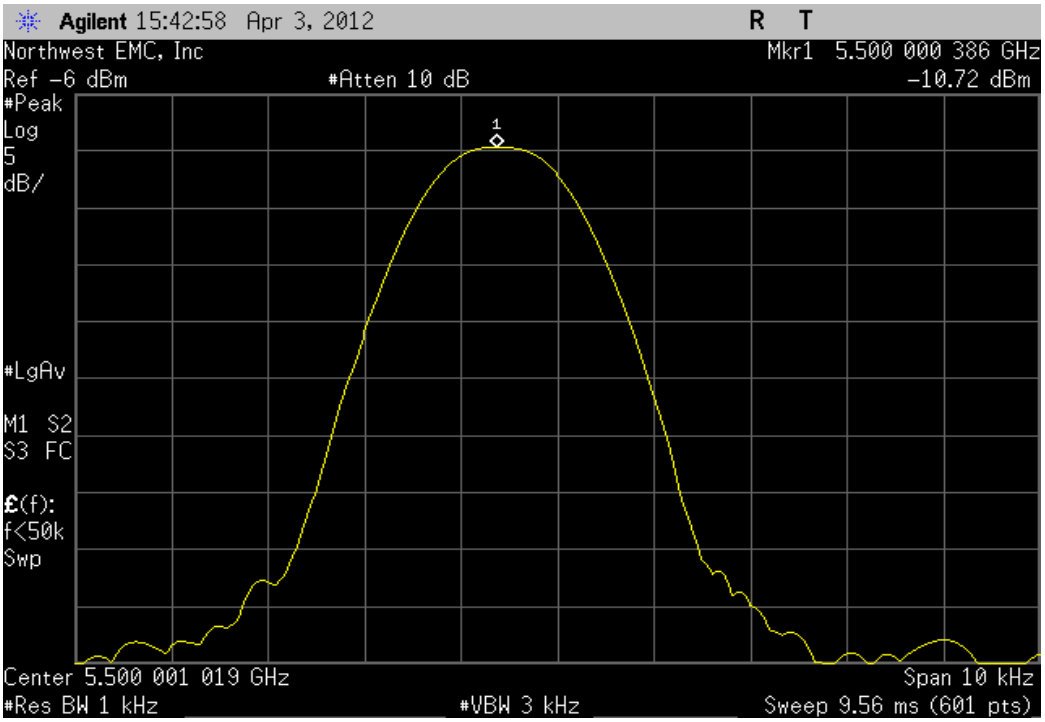
5470 MHz - 5725 MHz - Low Channel, 5500 MHz, Voltage +6.0VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5500.001036	5500	0.19	N/A	N/A



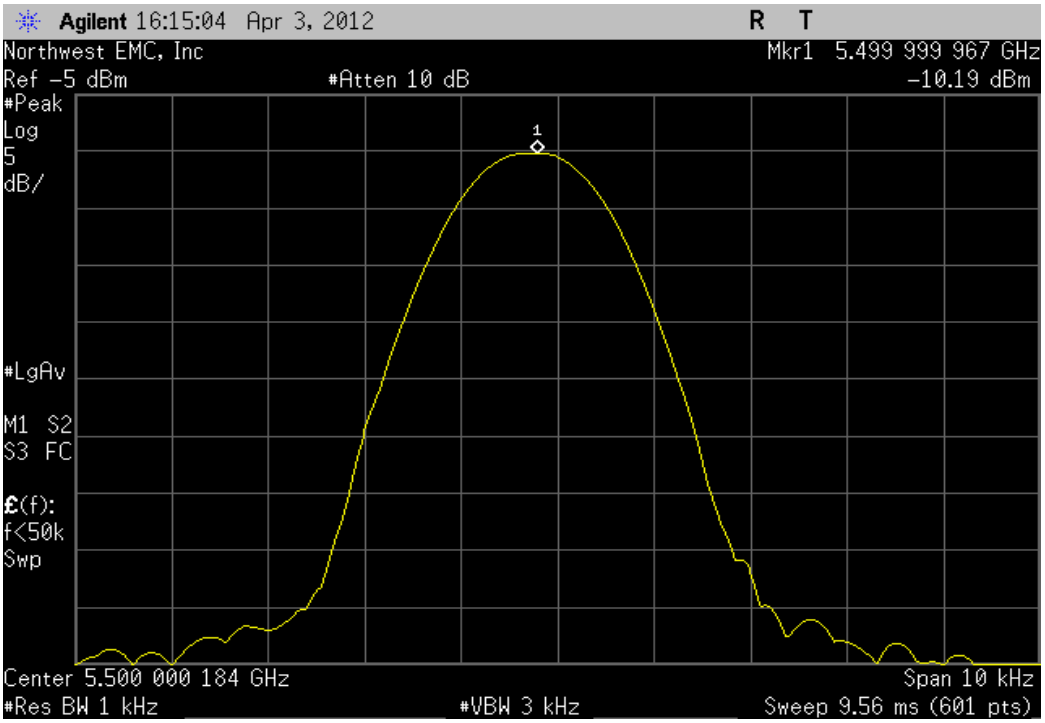
5470 MHz - 5725 MHz - Low Channel, 5500 MHz, Temperature: +50°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5500.000768	5500	0.14	N/A	N/A



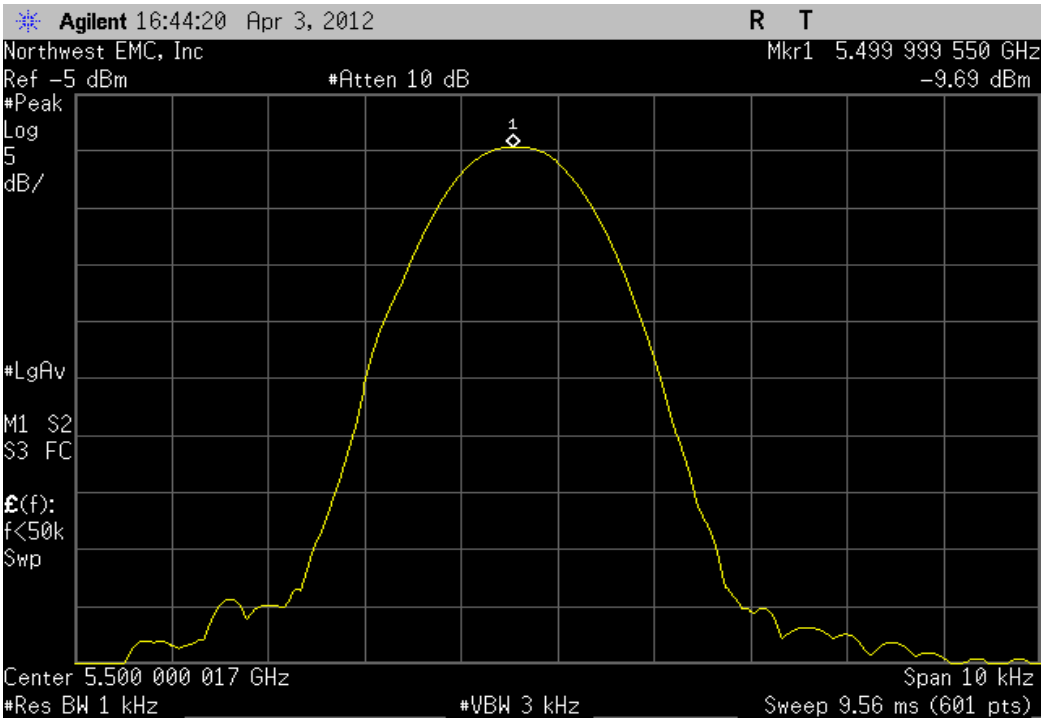
5470 MHz - 5725 MHz - Low Channel, 5500 MHz, Temperature: +40°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5500.000386	5500	0.07	N/A	N/A



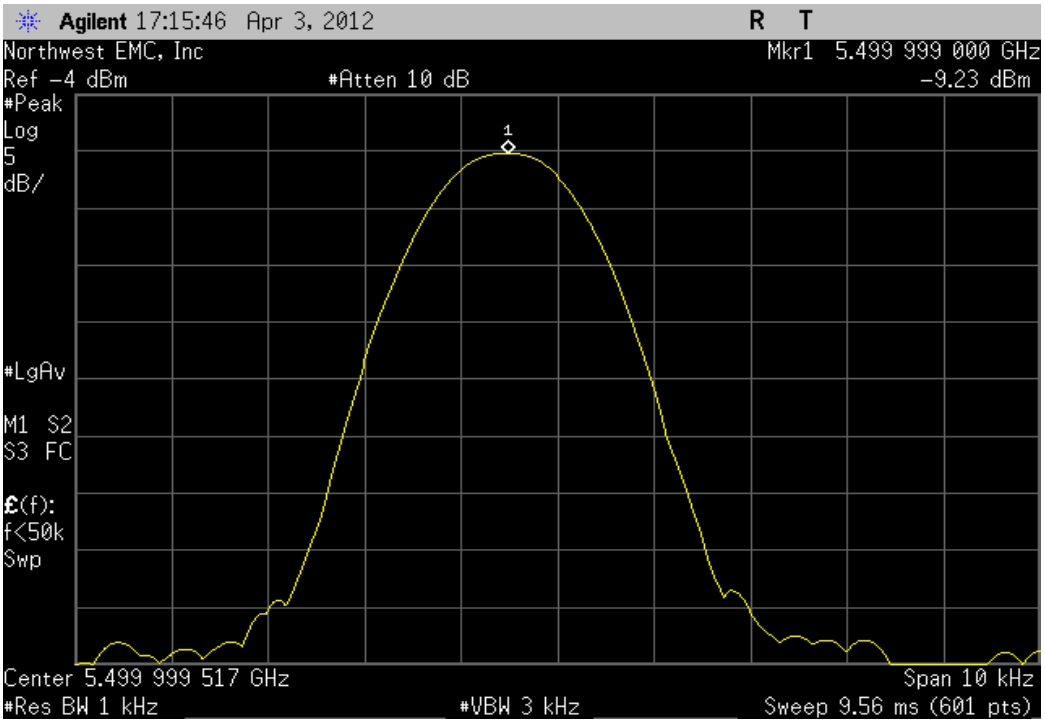
5470 MHz - 5725 MHz - Low Channel, 5500 MHz, Temperature: +30°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5499.999967	5500	0.01	N/A	N/A



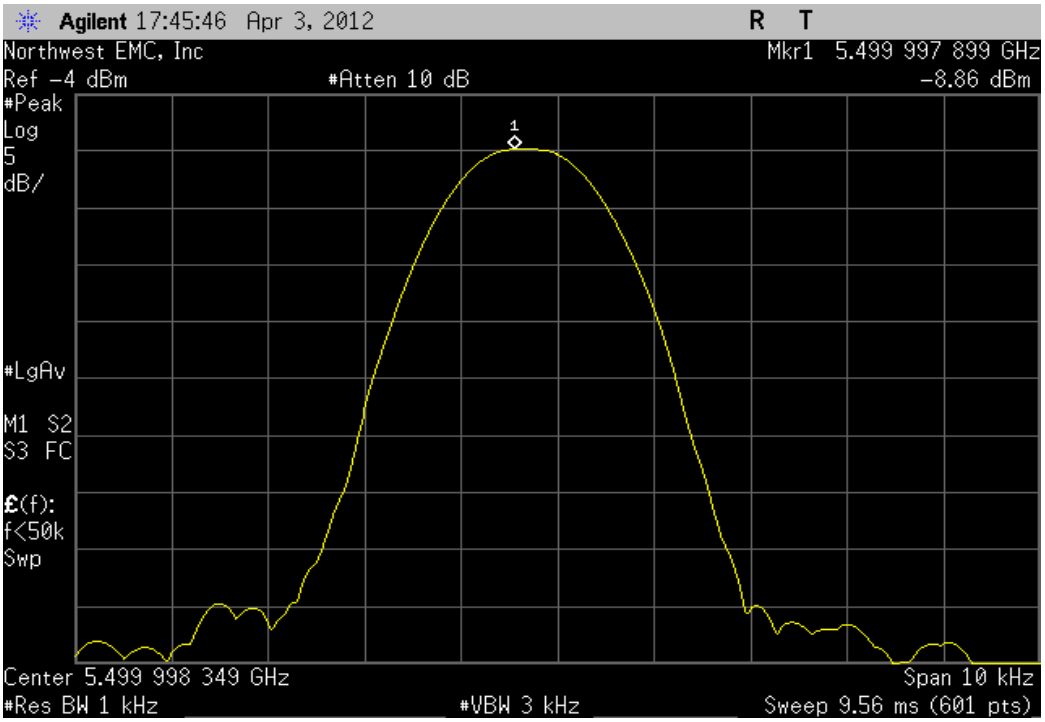
5470 MHz - 5725 MHz - Low Channel, 5500 MHz, Temperature: +20°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5499.99955	5500	0.08	N/A	N/A



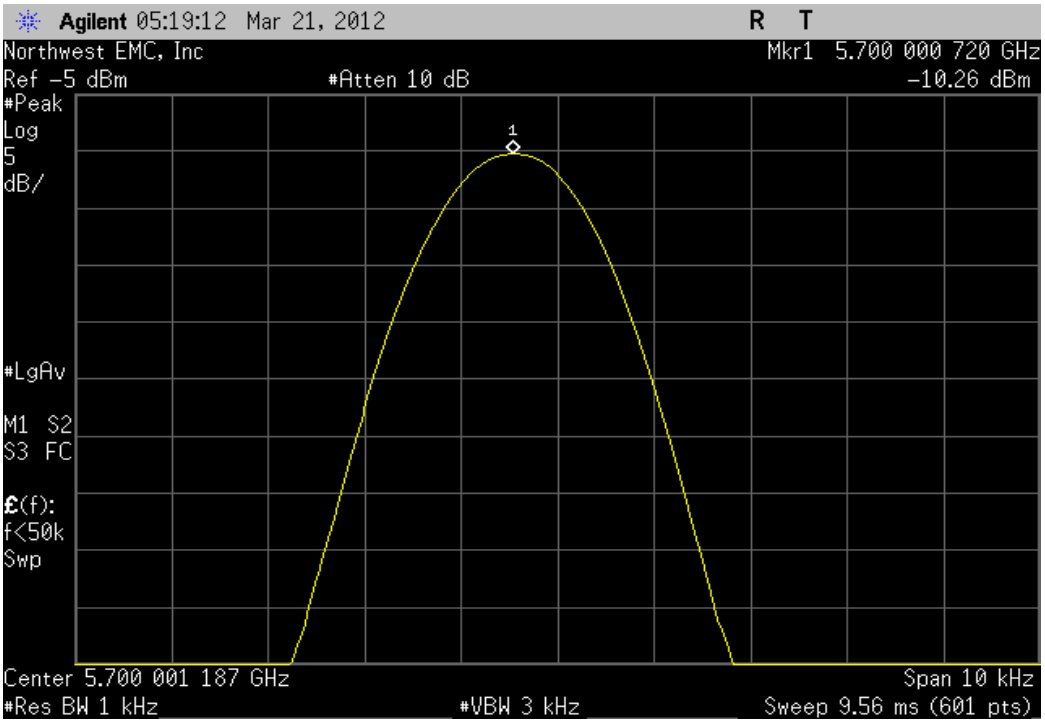
5470 MHz - 5725 MHz - Low Channel, 5500 MHz, Temperature: +10°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5499.999	5500	0.18	N/A	N/A



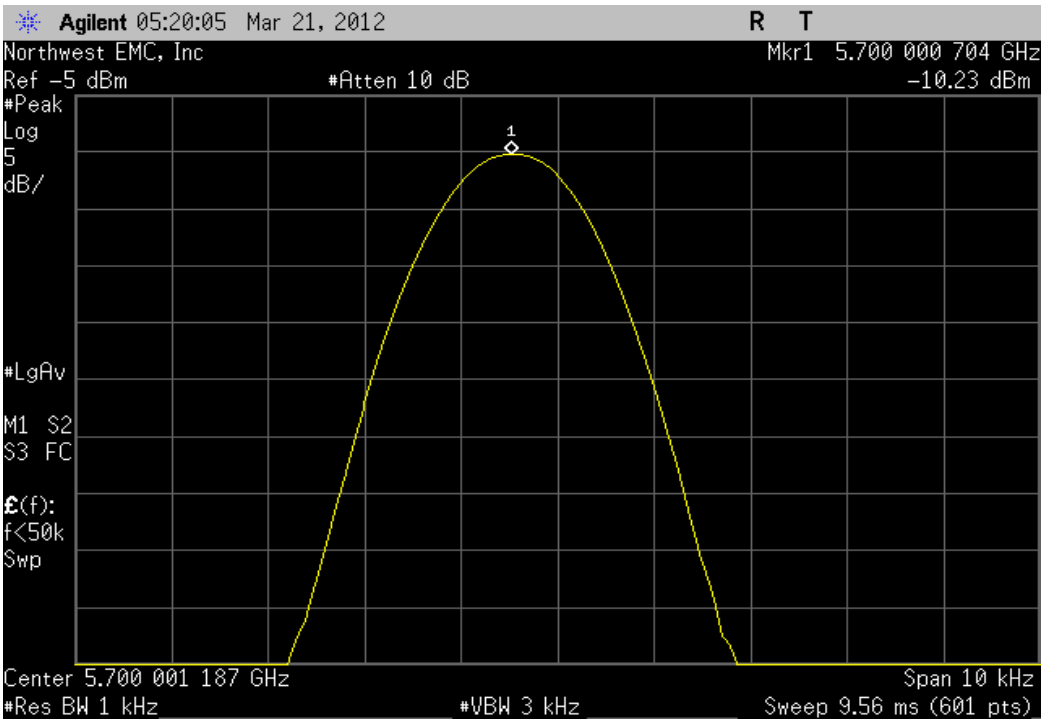
5470 MHz - 5725 MHz - Low Channel, 5500 MHz, Temperature: 0°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5499.997899	5500	0.38	N/A	N/A



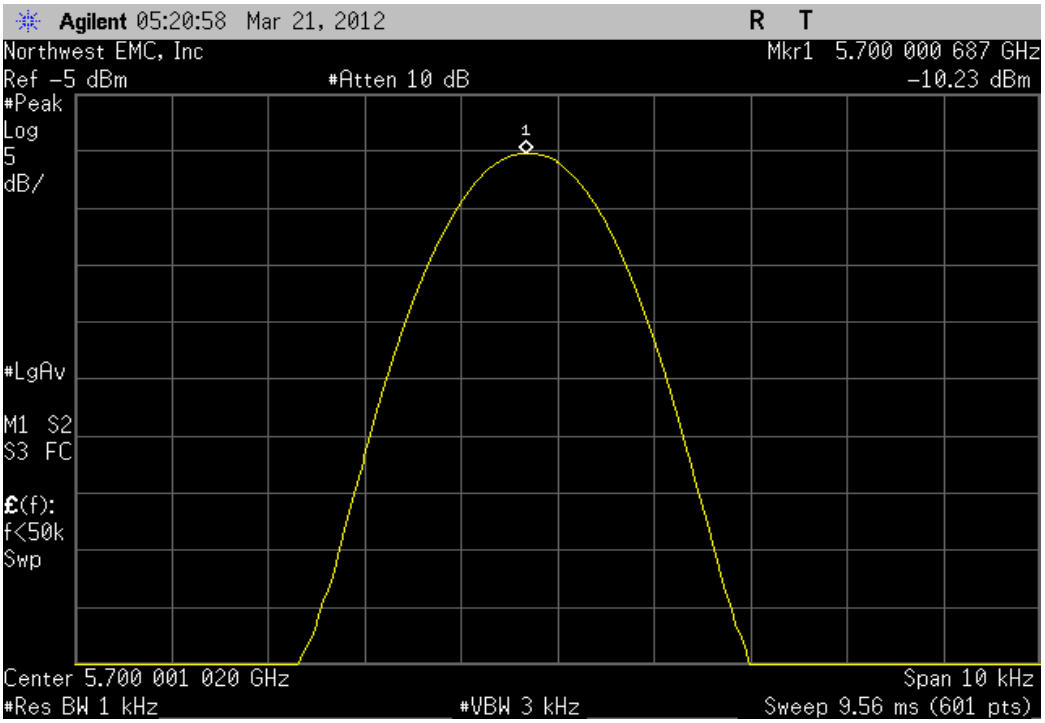
5470 MHz - 5725 MHz - High Channel, 5700 MHz, Voltage +8.4VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5700.00072	5700	0.13	N/A	N/A



5470 MHz - 5725 MHz - High Channel, 5700 MHz, Voltage +7.0VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5700.000704	5700	0.12	N/A	N/A

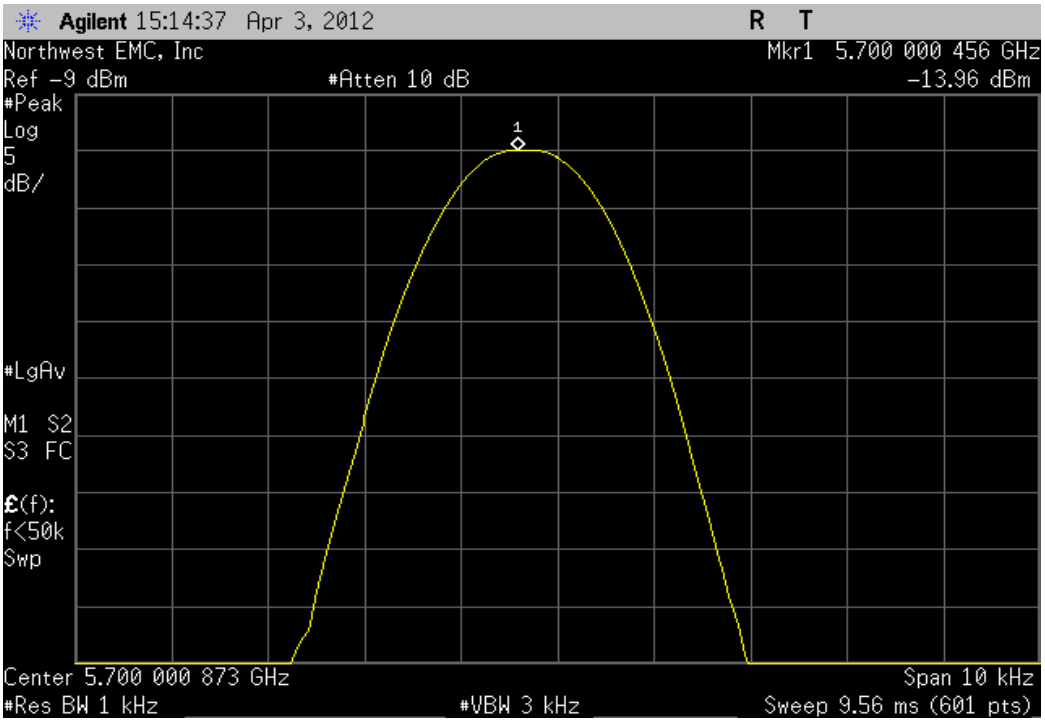


5470 MHz - 5725 MHz - High Channel, 5700 MHz, Voltage +6.0VDC						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5700.000687	5700	0.12	N/A	N/A

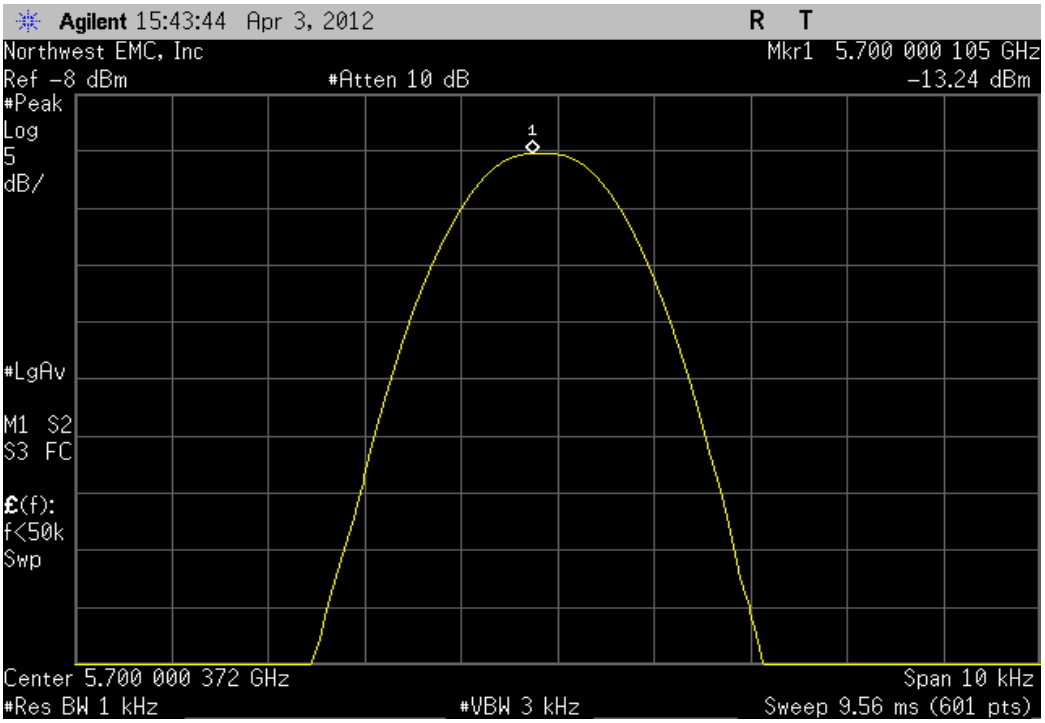


Frequency Stability

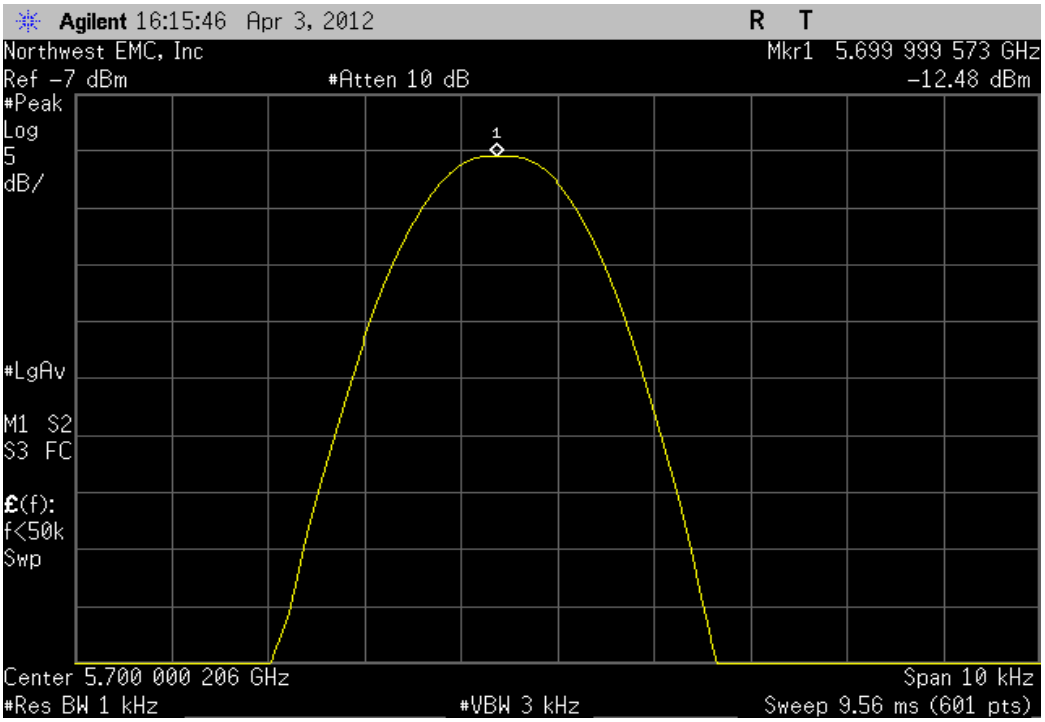
5470 MHz - 5725 MHz - High Channel, 5700 MHz, Temperature: +50°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5700.000456	5700	0.08	N/A	N/A



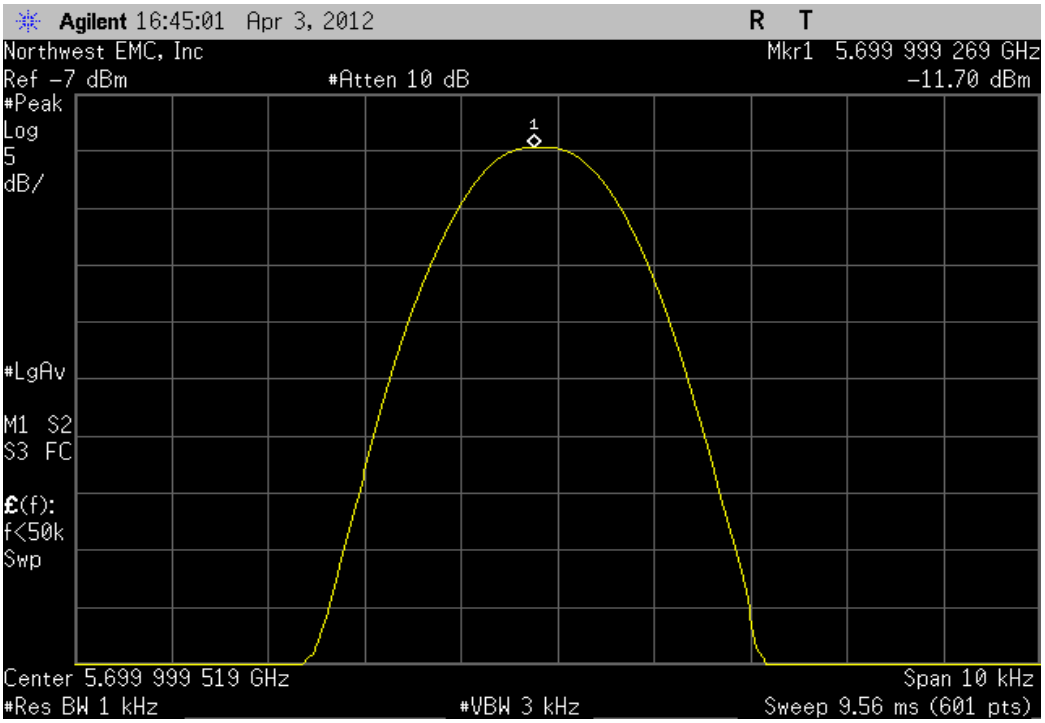
5470 MHz - 5725 MHz - High Channel, 5700 MHz, Temperature: +40°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5700.000105	5700	0.02	N/A	N/A



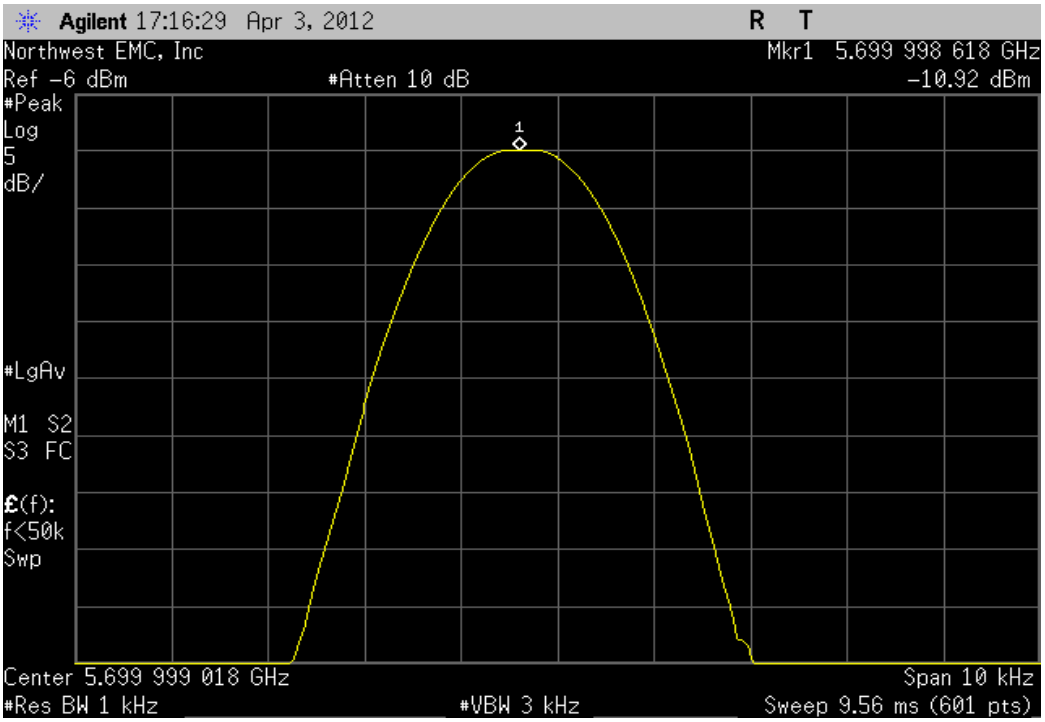
5470 MHz - 5725 MHz - High Channel, 5700 MHz, Temperature: +30°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5699.999573	5700	0.07	N/A	N/A



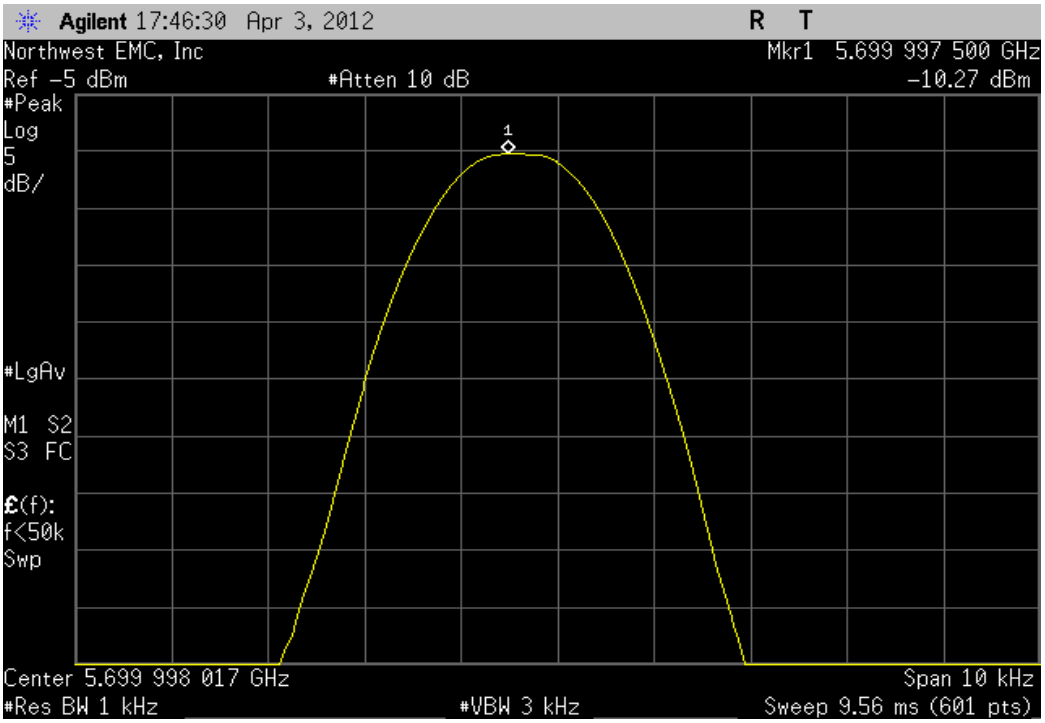
5470 MHz - 5725 MHz - High Channel, 5700 MHz, Temperature: +20°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5699.999269	5700	0.13	N/A	N/A



5470 MHz - 5725 MHz - High Channel, 5700 MHz, Temperature: +10°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5699.998618	5700	0.24	N/A	N/A



5470 MHz - 5725 MHz - High Channel, 5700 MHz, Temperature: 0°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Result
		5699.9975	5700	0.44	N/A	N/A



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 at 100% duty cycle. 6 Mbps, 36 Mbps, 54 Mbps at Ch 36, 48, 52, 64, 100: Pwr Level 50, Ch 120: Pwr Level 38, Ch 140: Pwr Level 47(see comments).

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

DGII0053 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	40 GHz

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
5G Notch Filter	Micro-Tronics	BRC50703	HHB	6/2/2011	24 mo
5G Notch Filter	Micro-Tronics	BRC50704	HHA	6/2/2011	24 mo
Signal Generator	Agilent	N5183A	TIA	1/27/2012	12 mo
Antenna, Horn	ETS	3115	AJA	5/13/2011	24 mo
Low Pass Filter	Micro-Tronics	LPM50004	HGK	7/9/2010	24 mo
Pre-Amplifier	Miteq	JSW45-26004000-40-5P	AVN	10/12/2011	12 mo
26-40GHz Cable	N/A	TTBJ141-KMKM-72	EVX	10/12/2011	12 mo
Antenna, Horn	ETS	3160-10	AIC	NCR	0 mo
Pre-Amplifier	Miteq	JSD4-18002600-26-8P	APU	2/6/2012	12 mo
MN05 Cables	N/A	18-26GHz Standard Gain Horn Cable	EVD	2/6/2012	12 mo
Antenna, Horn	ETS	3160-09	AHG	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVW	7/1/2011	12 mo
Antenna, Horn	ETS Lindgren	3160-08	AIQ	NCR	0 mo
MN05 Cables	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/1/2011	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	7/1/2011	12 mo
Antenna, Horn	ETS	3160-07	AXP	NCR	0 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVX	7/1/2011	12 mo
MN05 Cables	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	10/18/2011	12 mo
Antenna, Horn (DRG)	ETS Lindgren	3115	AIP	6/29/2011	24 mo
Pre-Amplifier	Miteq	AM-1616-1000	AVY	7/1/2011	12 mo
MN05 Cables	ESM Cable Corp.	Bilog Cables	MNH	1/24/2012	12 mo
Antenna X-Wing Bilog 30MHZ-2GHz	Teseq	CBL 6141B	AYD	12/19/2011	12 mo
Spectrum Analyzer	Agilent	E4446A	AAT	3/2/2012	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

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT were tested. The EUT was configured for the lowest, a middle, and the highest transmit frequency in each operational band. For each configuration, the spectrum was scanned throughout the specified range. Measurements were made to satisfy the three requirements of 47 CFR 15.407: Field strength under 1GHz, Restricted Bands of 47 CFR 15.205, and EIRP of 47 CFR 15.407. While scanning, emissions from the EUT were maximized by rotating the EUT on a turntable, adjusting the position of the EUT and EUT antenna in three orthogonal axis, and adjusting the measurement antenna height and polarization (per ANSI C63.10:2009). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

The amplitude and frequency of the highest emissions were noted. The EUT was then replaced with a ½ wave dipole that was successively tuned to each of the highest spurious emissions. A signal generator was connected to the dipole (horn antenna for frequencies above 1GHz), and its output was adjusted to match the level previously noted for each frequency. The output of the signal generator was recorded, and by factoring in the cable loss to the dipole antenna (or horn) and its gain (dBi); the effective radiated power for each radiated spurious emission was determined.

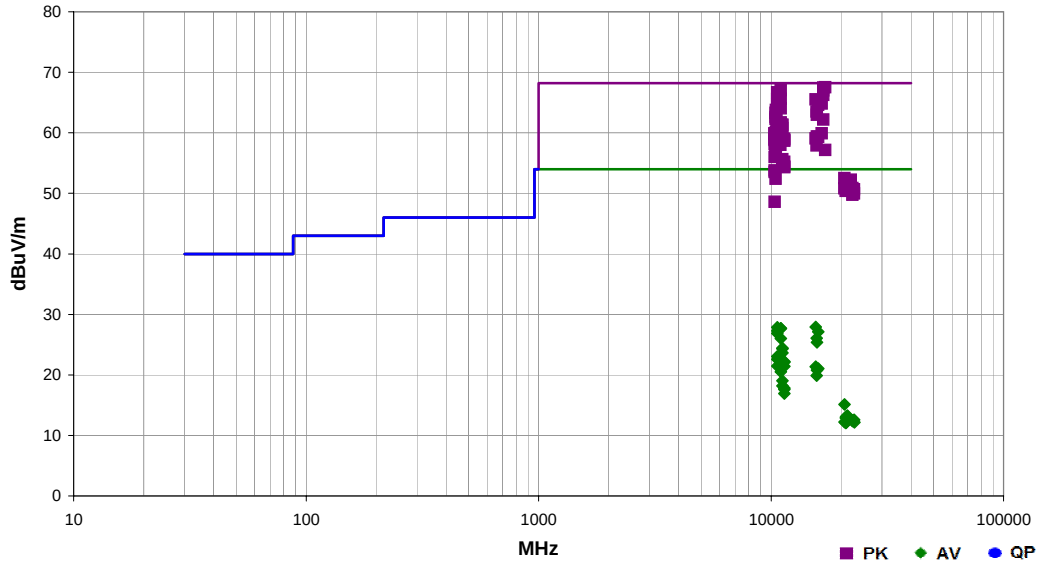
A duty cycle correction factor was applied to the average data. The customer states that the EUT will be limited by packet size and duty cycle. The worst case data rate was used to calculate the DCCF. DCCF = 20 * Log(Tx on time in 100ms/100m)

Spurious Radiated Emissions

Work Order:	DGII0053	**Date:**	03/15/12	Trevor Bulls	
Project:	None	**Temperature:**	22.56 °C		
Job Site:	MN05	**Humidity:**	22.5% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.6 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	1				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at 100% duty cycle. 6 Mbps, 36 Mbps, 54 Mbps at Ch 36, 48, 52, 64, 100: Pwr Level 50, Ch 120: Pwr Level 38, Ch 140: Pwr Level 47(see comments).				
Deviations:	None				
Comments:	Customer requested increased table height to simulate normal operation. Added second harmonic filter on 5GHz path (footprint exists on board for this filter). DCCF = 20 * Log (1.38ms * 3 / 100ms) = 27.7 dB				

Test Specifications	**Test Method**
FCC 15.407:2012	ANSI C63.10:2009

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



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
17105.690	63.8	3.7	1.2	285.0		0.0	Vert	PK	0.0	67.5	74.0	-6.5	Ch 140, 6Mbps, EUT Horizontal, Pwr 47
16801.640	64.0	3.5	1.6	281.0		0.0	Vert	PK	0.0	67.5	74.0	-6.5	Ch 120, 6Mbps, EUT Horizontal, Pwr 38
11002.620	75.6	-8.6	1.0	234.0		0.0	Vert	PK	0.0	67.0	74.0	-7.0	Ch 100, 6Mbps, EUT Horizontal
16800.390	63.5	3.5	1.6	281.0		0.0	Vert	PK	0.0	67.0	74.0	-7.0	Ch 120, 54Mbps, EUT Horizontal, Pwr 38
10640.090	74.9	-8.2	1.2	245.0		0.0	Vert	PK	0.0	66.7	74.0	-7.3	Ch 64, 6Mbps, EUT Horizontal
16800.860	62.8	3.5	1.6	281.0		0.0	Vert	PK	0.0	66.3	74.0	-7.7	Ch 120, 36Mbps, EUT Horizontal, Pwr 38
11001.530	74.2	-8.6	1.1	243.0		0.0	Vert	PK	0.0	65.6	74.0	-8.4	Ch 100, 54Mbps, EUT Horizontal
10640.920	73.8	-8.2	1.1	247.0		0.0	Vert	PK	0.0	65.6	74.0	-8.4	Ch 64, 36Mbps, EUT Horizontal
15536.550	62.7	2.8	1.9	250.0		0.0	Vert	PK	0.0	65.5	74.0	-8.5	Ch 36, 6Mbps, EUT Horizontal
16504.610	61.9	2.9	1.4	267.0		0.0	Vert	PK	0.0	64.8	74.0	-9.2	Ch 100, 6Mbps, EUT Horizontal
10641.920	72.9	-8.2	1.2	249.0		0.0	Vert	PK	0.0	64.7	74.0	-9.3	Ch 64, 54Mbps, EUT Horizontal
15954.660	61.0	3.6	1.8	274.0		0.0	Vert	PK	0.0	64.6	74.0	-9.4	Ch 64, 6Mbps, EUT Horizontal
11004.950	72.6	-8.6	1.4	233.0		0.0	Vert	PK	0.0	64.0	74.0	-10.0	Ch 100, 36Mbps, EUT Horizontal
10518.380	71.9	-8.1	1.1	245.0		0.0	Vert	PK	0.0	63.8	74.0	-10.2	Ch 52, 36Mbps, EUT Horizontal
15727.640	60.3	3.2	1.9	253.0		0.0	Vert	PK	0.0	63.5	74.0	-10.5	Ch 48, 6Mbps, EUT Horizontal
10479.330	71.4	-8.1	1.2	229.0		0.0	Vert	PK	0.0	63.3	74.0	-10.7	Ch 48, 6Mbps, EUT Horizontal
10523.030	71.3	-8.1	1.1	245.0		0.0	Vert	PK	0.0	63.2	74.0	-10.8	Ch 52, 54Mbps, EUT Horizontal
15774.640	59.7	3.3	1.5	257.0		0.0	Vert	PK	0.0	63.0	74.0	-11.0	Ch 52, 6Mbps, EUT Horizontal
10475.750	70.7	-8.1	1.2	240.0		0.0	Vert	PK	0.0	62.6	74.0	-11.4	Ch 48, 54Mbps, EUT Horizontal
10478.830	70.4	-8.1	1.2	238.0		0.0	Vert	PK	0.0	62.3	74.0	-11.7	Ch 48, 36Mbps, EUT Horizontal
16807.730	58.7	3.5	1.9	277.0		0.0	Horz	PK	0.0	62.2	74.0	-11.8	Ch 120, 6Mbps, EUT Horizontal, Pwr 50
10520.220	70.3	-8.1	1.7	221.0		0.0	Vert	PK	0.0	62.2	74.0	-11.8	Ch 52, 6Mbps, EUT Horizontal
11000.170	70.3	-8.6	1.9	64.0		0.0	Horz	PK	0.0	61.7	74.0	-12.3	Ch 100, 6Mbps, EUT Horizontal
11203.480	69.0	-7.7	1.0	243.0		0.0	Vert	PK	0.0	61.3	74.0	-12.7	Ch 120, 36Mbps, EUT Horizontal
11198.480	69.0	-7.7	1.0	242.0		0.0	Vert	PK	0.0	61.3	74.0	-12.7	Ch 120, 54Mbps, EUT Horizontal
10640.070	69.5	-8.2	2.0	68.0		0.0	Horz	PK	0.0	61.3	74.0	-12.7	Ch 64, 54Mbps, EUT Horizontal
11192.640	68.5	-7.7	1.1	243.0		0.0	Vert	PK	0.0	60.8	74.0	-13.2	Ch 120, 6Mbps, EUT Horizontal
10639.990	68.8	-8.2	1.4	63.0		0.0	Horz	PK	0.0	60.6	74.0	-13.4	Ch 64, 36Mbps, EUT Horizontal
10516.410	68.2	-8.1	1.2	62.0		0.0	Horz	PK	0.0	60.1	74.0	-13.9	Ch 52, 54Mbps, EUT Horizontal
10520.350	68.2	-8.1	1.7	64.0		0.0	Horz	PK	0.0	60.1	74.0	-13.9	Ch 52, 6Mbps, EUT Horizontal
16506.030	57.0	2.9	1.9	40.0		0.0	Horz	PK	0.0	59.9	74.0	-14.1	Ch 100, 6Mbps, EUT Horizontal
10361.970	68.1	-8.2	1.0	232.0		0.0	Vert	PK	0.0	59.9	74.0	-14.1	Ch 36, 6Mbps, EUT Horizontal
10361.640	68.1	-8.2	1.3	229.0		0.0	Vert	PK	0.0	59.9	74.0	-14.1	Ch 36, 54Mbps, EUT Horizontal
11003.920	68.4	-8.6	2.0	67.0		0.0	Horz	PK	0.0	59.8	74.0	-14.2	Ch 100, 54Mbps, EUT Horizontal

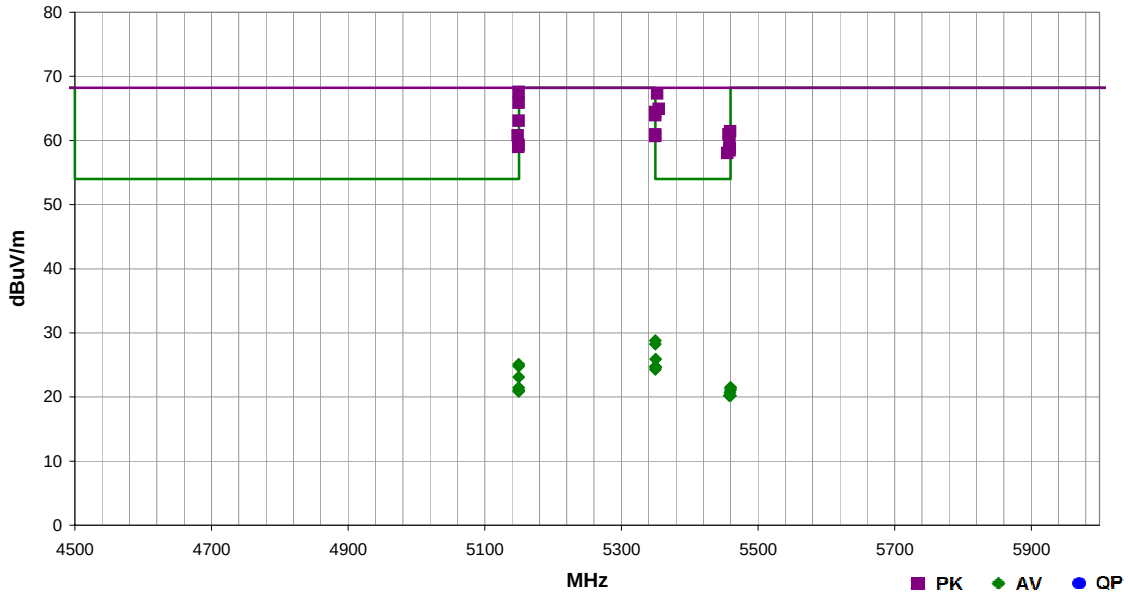
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
10356.310	68.0	-8.2	1.2	231.0		0.0	Vert	PK	0.0	59.8	74.0	-14.2	Ch 36, 36Mbps, EUT Horizontal
15781.610	56.1	3.3	1.0	233.0		0.0	Horz	PK	0.0	59.4	74.0	-14.6	Ch 52, 6Mbps, EUT Horizontal
15951.920	55.7	3.6	1.6	321.0		0.0	Horz	PK	0.0	59.3	74.0	-14.7	Ch 64, 6Mbps, EUT Horizontal
11200.040	66.9	-7.7	1.2	100.0		0.0	Horz	PK	0.0	59.2	74.0	-14.8	Ch 120, 54Mbps, EUT Horizontal
15539.690	56.2	2.8	1.0	306.0		0.0	Horz	PK	0.0	59.0	74.0	-15.0	Ch 36, 6Mbps, EUT Horizontal
11398.990	65.8	-6.8	1.1	33.0		0.0	Vert	PK	0.0	59.0	74.0	-15.0	Ch 140, 54Mbps, EUT Horizontal
10356.310	67.2	-8.2	1.2	10.0		0.0	Vert	PK	0.0	59.0	74.0	-15.0	Ch 36, 6Mbps, EUT on Side
10361.510	67.0	-8.2	1.5	235.0		0.0	Horz	PK	0.0	58.8	74.0	-15.2	Ch 36, 6Mbps, EUT Vertical
11406.650	65.5	-6.8	1.0	39.0		0.0	Vert	PK	0.0	58.7	74.0	-15.3	Ch 140, 36Mbps, EUT Horizontal
11395.490	65.5	-6.8	1.2	34.0		0.0	Vert	PK	0.0	58.7	74.0	-15.3	Ch 140, 6Mbps, EUT Horizontal
10360.680	66.4	-8.2	1.2	354.0		0.0	Horz	PK	0.0	58.2	74.0	-15.8	Ch 36, 6Mbps, EUT on Side
10646.320	66.4	-8.2	1.2	70.0		0.0	Horz	PK	0.0	58.2	74.0	-15.8	Ch 64, 6Mbps, EUT Horizontal
10996.170	66.6	-8.6	1.8	60.0		0.0	Horz	PK	0.0	58.0	74.0	-16.0	Ch 100, 36Mbps, EUT Horizontal
15721.050	54.7	3.2	1.0	230.0		0.0	Horz	PK	0.0	57.9	74.0	-16.1	Ch 48, 6Mbps, EUT Horizontal
10519.680	65.9	-8.1	1.2	62.0		0.0	Horz	PK	0.0	57.8	74.0	-16.2	Ch 52, 36Mbps, EUT Horizontal
17101.640	53.4	3.8	1.2	224.0		0.0	Horz	PK	0.0	57.2	74.0	-16.8	Ch 140, 6Mbps, EUT Horizontal, Pwr lvl 47
10481.180	64.9	-8.1	2.1	67.0		0.0	Horz	PK	0.0	56.8	74.0	-17.2	Ch 48, 54Mbps, EUT Horizontal
10478.680	64.3	-8.1	1.0	344.0		0.0	Horz	PK	0.0	56.2	74.0	-17.8	Ch 48, 36Mbps, EUT Horizontal
10357.640	64.2	-8.2	1.0	41.0		0.0	Vert	PK	0.0	56.0	74.0	-18.0	Ch 36, 6Mbps, EUT Vertical
11203.540	63.3	-7.7	1.4	110.0		0.0	Horz	PK	0.0	55.6	74.0	-18.4	Ch 120, 6Mbps, EUT Horizontal
11397.770	62.0	-6.8	1.2	81.0		0.0	Horz	PK	0.0	55.2	74.0	-18.8	Ch 140, 54Mbps, EUT Horizontal
11194.960	62.4	-7.7	1.0	96.0		0.0	Horz	PK	0.0	54.7	74.0	-19.3	Ch 120, 36Mbps, EUT Horizontal
11402.600	61.2	-6.8	1.2	82.0		0.0	Horz	PK	0.0	54.4	74.0	-19.6	Ch 140, 36Mbps, EUT Horizontal
11398.850	61.1	-6.8	1.2	79.0		0.0	Horz	PK	0.0	54.3	74.0	-19.7	Ch 140, 6Mbps, EUT Horizontal
10357.430	62.0	-8.2	1.2	349.0		0.0	Horz	PK	0.0	53.8	74.0	-20.2	Ch 36, 36Mbps, EUT Horizontal
10361.930	61.7	-8.2	1.2	350.0		0.0	Horz	PK	0.0	53.5	74.0	-20.5	Ch 36, 6Mbps, EUT Horizontal
20713.170	41.0	11.5	1.3	206.0		0.0	Horz	PK	0.0	52.5	74.0	-21.5	Ch 36, 6Mbps, EUT Horizontal
10482.600	60.5	-8.1	1.2	343.0		0.0	Horz	PK	0.0	52.4	74.0	-21.6	Ch 48, 6Mbps, EUT Horizontal
22016.330	40.3	12.0	1.2	0.0		0.0	Vert	PK	0.0	52.3	74.0	-21.7	Ch 100, 6Mbps, EUT Horizontal
21278.000	40.2	11.7	1.2	358.0		0.0	Horz	PK	0.0	51.9	74.0	-22.1	Ch 64, 6Mbps, EUT Horizontal
21038.810	40.2	11.6	1.2	349.0		0.0	Horz	PK	0.0	51.8	74.0	-22.2	Ch 52, 6Mbps, EUT Horizontal
21288.500	39.9	11.7	1.2	0.0		0.0	Vert	PK	0.0	51.6	74.0	-22.4	Ch 64, 6Mbps, EUT Horizontal
21041.770	39.6	11.6	1.2	0.0		0.0	Vert	PK	0.0	51.2	74.0	-22.8	Ch 52, 6Mbps, EUT Horizontal
20959.910	39.6	11.6	1.2	49.0		0.0	Horz	PK	0.0	51.2	74.0	-22.8	Ch 48, 6Mbps, EUT Horizontal
22003.420	39.0	12.0	1.2	359.0		0.0	Horz	PK	0.0	51.0	74.0	-23.0	Ch 100, 6Mbps, EUT Horizontal
22423.420	38.8	12.1	1.2	359.0		0.0	Horz	PK	0.0	50.9	74.0	-23.1	Ch 120, 6Mbps, EUT Horizontal, Pwr lvl 38
20720.910	39.3	11.5	1.3	358.0		0.0	Vert	PK	0.0	50.8	74.0	-23.2	Ch 36, 6Mbps, EUT Horizontal
22789.920	38.5	12.2	1.2	1.0		0.0	Vert	PK	0.0	50.7	74.0	-23.3	Ch 140, 6Mbps, EUT Horizontal, Pwr lvl 47
20959.290	38.8	11.6	1.2	242.0		0.0	Vert	PK	0.0	50.4	74.0	-23.6	Ch 48, 6Mbps, EUT Horizontal
22787.000	37.8	12.2	1.2	359.0		0.0	Horz	PK	0.0	50.0	74.0	-24.0	Ch 140, 6Mbps, EUT Horizontal, Pwr lvl 47
22411.250	37.7	12.1	1.2	1.0		0.0	Vert	PK	0.0	49.8	74.0	-24.2	Ch 120, 6Mbps, EUT Horizontal, Pwr lvl 38
10369.590	56.8	-8.2	1.2	297.0		0.0	Horz	PK	0.0	48.6	74.0	-25.4	Ch 36, 54Mbps, EUT Horizontal
15541.800	52.8	2.8	1.9	250.0	27.7	0.0	Vert	AV	0.0	27.9	54.0	-26.1	Ch 36, 6Mbps, EUT Horizontal
10640.250	63.8	-8.2	1.2	245.0	27.7	0.0	Vert	AV	0.0	27.9	54.0	-26.1	Ch 64, 6Mbps, EUT Horizontal
11001.530	64.0	-8.6	1.0	234.0	27.7	0.0	Vert	AV	0.0	27.7	54.0	-26.3	Ch 100, 6Mbps, EUT Horizontal
11001.700	63.9	-8.6	1.1	243.0	27.7	0.0	Vert	AV	0.0	27.6	54.0	-26.4	Ch 100, 54Mbps, EUT Horizontal
10640.340	63.2	-8.2	1.1	247.0	27.7	0.0	Vert	AV	0.0	27.3	54.0	-26.7	Ch 64, 36Mbps, EUT Horizontal
15964.080	51.2	3.6	1.8	274.0	27.7	0.0	Vert	AV	0.0	27.1	54.0	-26.9	Ch 64, 6Mbps, EUT Horizontal
10641.750	62.8	-8.2	1.2	249.0	27.7	0.0	Vert	AV	0.0	26.9	54.0	-27.1	Ch 64, 54Mbps, EUT Horizontal
15718.890	50.6	3.2	1.9	253.0	27.7	0.0	Vert	AV	0.0	26.1	54.0	-27.9	Ch 48, 6Mbps, EUT Horizontal
11001.780	62.3	-8.6	1.4	233.0	27.7	0.0	Vert	AV	0.0	26.0	54.0	-28.0	Ch 100, 36Mbps, EUT Horizontal
15779.140	49.8	3.3	1.5	257.0	27.7	0.0	Vert	AV	0.0	25.4	54.0	-28.6	Ch 52, 6Mbps, EUT Horizontal
11201.560	59.8	-7.7	1.0	243.0	27.7	0.0	Vert	AV	0.0	24.4	54.0	-29.6	Ch 120, 36Mbps, EUT Horizontal
11200.060	59.7	-7.7	1.1	243.0	27.7	0.0	Vert	AV	0.0	24.3	54.0	-29.7	Ch 120, 6Mbps, EUT Horizontal
11201.810	59.0	-7.7	1.0	242.0	27.7	0.0	Vert	AV	0.0	23.6	54.0	-30.4	Ch 120, 54Mbps, EUT Horizontal
10639.240	59.0	-8.2	2.0	68.0	27.7	0.0	Horz	AV	0.0	23.1	54.0	-30.9	Ch 64, 54Mbps, EUT Horizontal
10640.740	58.5	-8.2	1.4	63.0	27.7	0.0	Horz	AV	0.0	22.6	54.0	-31.4	Ch 64, 36Mbps, EUT Horizontal
11400.820	56.7	-6.8	1.1	33.0	27.7	0.0	Vert	AV	0.0	22.2	54.0	-31.8	Ch 140, 54Mbps, EUT Horizontal
11401.150	56.6	-6.8	1.0	39.0	27.7	0.0	Vert	AV	0.0	22.1	54.0	-31.9	Ch 140, 36Mbps, EUT Horizontal
11001.670	58.2	-8.6	2.0	67.0	27.7	0.0	Horz	AV	0.0	21.9	54.0	-32.1	Ch 100, 54Mbps, EUT Horizontal
11000.250	58.0	-8.6	1.9	64.0	27.7	0.0	Horz	AV	0.0	21.7	54.0	-32.3	Ch 100, 6Mbps, EUT Horizontal
10640.150	57.4	-8.2	1.2	70.0	27.7	0.0	Horz	AV	0.0	21.5	54.0	-32.5	Ch 64, 6Mbps, EUT Horizontal
11401.070	55.9	-6.8	1.2	34.0	27.7	0.0	Vert	AV	0.0	21.4	54.0	-32.6	Ch 140, 6Mbps, EUT Horizontal
15538.940	46.2	2.8	1.0	306.0	27.7	0.0	Horz	AV	0.0	21.3	54.0	-32.7	Ch 36, 6Mbps, EUT Horizontal
11201.130	56.7	-7.7	1.2	100.0	27.7	0.0	Horz	AV	0.0	21.3	54.0	-32.7	Ch 120, 54Mbps, EUT Horizontal
15961.510	45.1	3.6	1.6	321.0	27.7	0.0	Horz	AV	0.0	21.0	54.0	-33.0	Ch 64, 6Mbps, EUT Horizontal
15781.520	45.2	3.3	1.0	233.0	27.7	0.0	Horz	AV	0.0	20.8	54.0	-33.2	Ch 52, 6Mbps, EUT Horizontal
11000.750	56.8	-8.6	1.8	60.0	27.7	0.0	Horz	AV	0.0	20.5	54.0	-33.5	Ch 100, 36Mbps, EUT Horizontal
15724.130	44.4	3.2	1.0	230.0	27.7	0.0	Horz	AV	0.0	19.9	54.0	-34.1	Ch 48, 6Mbps, EUT Horizontal
11201.790	54.4	-7.7	1.4	110.0	27.7	0.0	Horz	AV	0.0	19.0	54.0	-35.0	Ch 120, 6Mbps, EUT Horizontal
11199.290	53.6	-7.7	1.0	96.0	27.7	0.0	Horz	AV	0.0	18.2	54.0	-35.8	Ch 120, 36Mbps, EUT Horizontal
11399.770	52.3	-6.8	1.2	81.0	27.7	0.0	Horz	AV	0.0	17.8	54.0	-36.2	Ch 140, 54Mbps, EUT Horizontal
11401.190	52.1	-6.8	1.2	82.0	27.7	0.0	Horz	AV	0.0	17.6	54.0	-36.4	Ch 140, 36Mbps, EUT Horizontal
11402.100	51.4	-6.8	1.2	79.0	27.7	0.0	Horz	AV	0.0	16.9	54.0	-37.1	Ch 140, 6Mbps, EUT Horizontal
20717.830	31.3	11.5	1.3	206.0	27.7	0.0	Horz	AV	0.0	15.1	54.0	-38.9	Ch 36, 6Mbps, EUT Horizontal
21299.170	29.3	11.7	1.2	358.0	27.7	0.0	Horz	AV	0.0	13.3	54.0	-40.7	Ch 64, 6Mbps, EUT Horizontal
21281.330	29.2	11.7	1.2	0.0	27.7	0.0	Vert	AV	0.0	13.2	54.0	-40.8	Ch 64, 6Mbps, EUT Horizontal
21048.330	29.2	11.6	1.2	349.0	27.7	0.0	Horz	AV	0.0	13.1	54.0	-40.9	Ch 52, 6Mbps, EUT Horizontal
20982.420	29.0	11.6	1.2	49.0	27.7	0.0	Horz	AV	0.0	12.9	54.0	-41.1	Ch 48, 6Mbps, EUT Horizontal
22795.330	28.1	12.2	1.2	1.0	27.7	0.0	Vert	AV	0.0	12.6	54.0	-41.4	Ch 140, 6Mbps, EUT Horizontal, Pwr lvl 47
22400.000	28.1	12.1	1.2	1.0	27.7	0.0	Vert	AV	0.0	12.5	54.0	-41.5	Ch 120, 6Mbps, EUT Horizontal, Pwr lvl 38
22396.170	28.0	12.1	1.2	359.0	27.7	0.0	Horz	AV	0.0	12.4	54.0	-41.6	Ch 120, 6Mbps, EUT Horizontal, Pwr lvl 38
20720.400	28.4	11.5	1.3	358.0	27.7	0.0	Vert	AV	0.0	12.2	54.0	-41.8	Ch 36, 6Mbps, EUT Horizontal
22820.330	27.7	12.2	1.2	359.0	27.7	0.0	Horz	AV	0.0	12.2	54.0	-41.8	Ch 140, 6Mbps, EUT Horizontal, Pwr lvl 47
21035.750	28.2	11.6	1.2	0.0	27.7	0.0	Vert	AV	0.0	12.1	54.0	-41.9	Ch 52, 6Mbps, EUT Horizontal
20976.000	28.2	11.6	1.2	242.0	27.7	0.0	Vert	AV	0.0	12.1	54.0	-41.9	Ch 48, 6Mbps, EUT Horizontal

Spurious Radiated Emissions

Work Order:	DGII0053	**Date:**	03/15/12		
Project:	None	**Temperature:**	22.56 °C		
Job Site:	MN05	**Humidity:**	22.5% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.6 mbar	**Tested by:**	Trevor Buls
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	1				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at 100% duty cycle. 6 Mbps, 36 Mbps, 54 Mbps at Ch 36, 48, 52, 64, 100: Pwr Level 50, Ch 120: Pwr Level 38, Ch 140: Pwr Level 47(see comments).				
Deviations:	None				
Comments:	Customer requested increased table height to simulate normal operation. Added second harmonic filter on 5GHz path (footprint exists on board for this filter). DCCF = 20 * Log (1.38ms * 3 / 100ms) = 27.7 dB				

Test Specifications	**Test Method**
FCC 15.407:2012	ANSI C63.10:2009

Run #	71	**Test Distance (m)**	1	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
5149.908	41.9	35.2	1.2	124.0		0.0	Horz	PK	-9.5	67.6	68.2	-0.6	Ch 36, 54Mbps, EUT Horizontal
5352.708	41.2	35.6	1.2	133.0		0.0	Horz	PK	-9.5	67.3	68.2	-0.9	Ch 64, 6Mbps, EUT Horizontal
5149.750	40.2	35.2	1.2	130.0		0.0	Horz	PK	-9.5	65.9	68.2	-2.3	Ch 36, 36Mbps, EUT Horizontal
5354.792	38.8	35.7	1.2	28.0		0.0	Vert	PK	-9.5	64.9	68.2	-3.3	Ch 64, 6Mbps, EUT Horizontal
5350.000	76.9	35.6	1.2	129.0		0.0	Horz	PK	-9.5	64.4	68.2	-3.8	Ch 64, 54Mbps, EUT Horizontal, MD
5350.000	76.1	35.6	1.2	116.0		0.0	Horz	PK	-9.5	64.0	68.2	-4.2	Ch 64, 36Mbps, EUT Horizontal, MD
5149.658	37.4	35.2	1.2	166.0		0.0	Horz	PK	-9.5	63.1	68.2	-5.1	Ch 36, 6Mbps, EUT Horizontal
5459.558	35.1	35.9	1.2	121.0		0.0	Horz	PK	-9.5	61.4	68.2	-6.8	Ch 100, 6Mbps, EUT Horizontal
5350.000	73.1	35.6	1.2	334.0		0.0	Vert	PK	-9.5	60.9	68.2	-7.3	Ch 64, 36Mbps, EUT Horizontal, MD
5457.008	34.6	35.9	1.2	119.0		0.0	Horz	PK	-9.5	60.9	68.2	-7.3	Ch 100, 36Mbps, EUT Horizontal
5148.242	35.1	35.2	1.2	10.0		0.0	Vert	PK	-9.5	60.8	68.2	-7.4	Ch 36, 6Mbps, EUT Horizontal
5350.000	73.2	35.6	1.2	19.0		0.0	Vert	PK	-9.5	60.7	68.2	-7.5	Ch 64, 54Mbps, EUT Horizontal, MD
5458.292	33.4	35.9	1.2	30.0		0.0	Vert	PK	-9.5	59.7	68.2	-8.5	Ch 100, 54Mbps, EUT Horizontal
5149.833	33.6	35.2	1.2	294.0		0.0	Vert	PK	-9.5	59.3	68.2	-8.9	Ch 36, 54Mbps, EUT Horizontal
5149.083	33.3	35.2	1.2	6.0		0.0	Vert	PK	-9.5	59.0	68.2	-9.2	Ch 36, 36Mbps, EUT Horizontal
5458.775	32.4	35.9	1.2	326.0		0.0	Horz	PK	-9.5	58.7	68.2	-9.5	Ch 100, 54Mbps, EUT Horizontal
5458.233	32.1	35.9	1.2	121.0		0.0	Vert	PK	-9.5	58.4	68.2	-9.8	Ch 100, 6Mbps, EUT Horizontal
5455.300	31.7	35.9	1.2	179.0		0.0	Vert	PK	-9.5	58.0	68.2	-10.2	Ch 100, 36Mbps, EUT Horizontal
5350.000	69.0	35.6	1.2	129.0	27.7	0.0	Horz	AV	-9.5	28.8	54.0	-25.2	Ch 64, 54Mbps, EUT Horizontal, MD
5350.000	68.1	35.6	1.2	116.0	27.7	0.0	Horz	AV	-9.5	28.2	54.0	-25.8	Ch 64, 36Mbps, EUT Horizontal, MD
5350.200	27.5	35.6	1.2	133.0	27.7	0.0	Horz	AV	-9.5	25.9	54.0	-28.1	Ch 64, 6Mbps, EUT Horizontal
5149.875	27.1	35.2	1.2	130.0	27.7	0.0	Horz	AV	-9.5	25.1	54.0	-28.9	Ch 36, 36Mbps, EUT Horizontal
5149.925	26.8	35.2	1.2	124.0	27.7	0.0	Horz	AV	-9.5	24.8	54.0	-29.2	Ch 36, 54Mbps, EUT Horizontal
5350.000	64.6	35.6	1.2	334.0	27.7	0.0	Vert	AV	-9.5	24.7	54.0	-29.3	Ch 64, 36Mbps, EUT Horizontal, MD
5350.292	26.2	35.6	1.2	28.0	27.7	0.0	Vert	AV	-9.5	24.6	54.0	-29.4	Ch 64, 6Mbps, EUT Horizontal
5350.000	64.5	35.6	1.2	19.0	27.7	0.0	Vert	AV	-9.5	24.3	54.0	-29.7	Ch 64, 54Mbps, EUT Horizontal, MD
5149.983	25.1	35.2	1.2	166.0	27.7	0.0	Horz	AV	-9.5	23.1	54.0	-30.9	Ch 36, 6Mbps, EUT Horizontal
5459.867	22.9	35.9	1.2	121.0	27.7	0.0	Horz	AV	-9.5	21.5	54.0	-32.5	Ch 100, 6Mbps, EUT Horizontal

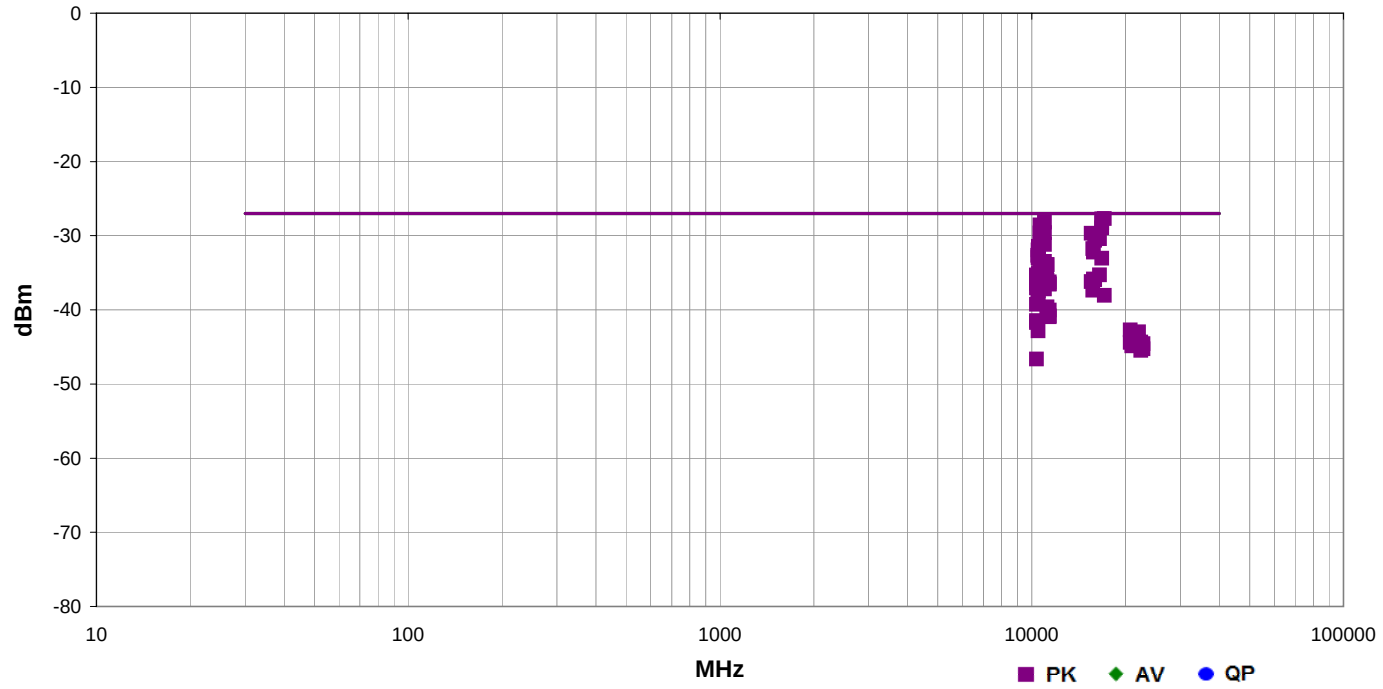
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
5149.983	23.5	35.2	1.2	10.0	27.7	0.0	Vert	AV	-9.5	21.5	54.0	-32.5	Ch 36, 6Mbps, EUT Horizontal
5459.958	22.8	35.9	1.2	119.0	27.7	0.0	Horz	AV	-9.5	21.4	54.0	-32.6	Ch 100, 36Mbps, EUT Horizontal
5459.758	22.5	35.9	1.2	30.0	27.7	0.0	Vert	AV	-9.5	21.1	54.0	-32.9	Ch 100, 54Mbps, EUT Horizontal
5149.925	23.1	35.2	1.2	294.0	27.7	0.0	Vert	AV	-9.5	21.1	54.0	-32.9	Ch 36, 54Mbps, EUT Horizontal
5149.933	22.9	35.2	1.2	6.0	27.7	0.0	Vert	AV	-9.5	20.9	54.0	-33.1	Ch 36, 36Mbps, EUT Horizontal
5459.058	22.1	35.9	1.2	326.0	27.7	0.0	Horz	AV	-9.5	20.7	54.0	-33.3	Ch 100, 54Mbps, EUT Horizontal
5459.883	21.6	35.9	1.2	121.0	27.7	0.0	Vert	AV	-9.5	20.2	54.0	-33.8	Ch 100, 6Mbps, EUT Horizontal
5457.867	21.6	35.9	1.2	179.0	27.7	0.0	Vert	AV	-9.5	20.2	54.0	-33.8	Ch 100, 36Mbps, EUT Horizontal

Spurious Radiated Emissions

Work Order:	DGII0053	**Date:**	03/15/12	Trevor Bulls	
Project:	None	**Temperature:**	22.56 °C		
Job Site:	MN05	**Humidity:**	22.5% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.6 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	1				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at 100% duty cycle. 6 Mbps, 36 Mbps, 54 Mbps at Ch 36, 48, 52, 64, 100: Pwr Level 50, Ch 120: Pwr Level 38, Ch 140: Pwr Level 47(see comments).				
Deviations:	None				
Comments:	Customer requested increased table height to simulate normal operation. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

Test Specifications	**Test Method**
FCC 15.407:2012	ANSI C63.10:2009

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



	Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments	
	17105.690	1.2	285.0	Vert	PK	1.71E-06	-27.7	-27.0	-0.7	Ch 140, 6Mbps, EUT Horizontal, Pwr 47	
	16801.640	1.6	281.0	Vert	PK	1.68E-06	-27.8	-27.0	-0.8	Ch 120, 6Mbps, EUT Horizontal, Pwr 38	
	11002.620	1.0	234.0	Vert	PK	1.52E-06	-28.2	-27.0	-1.2	Ch 100, 6Mbps, EUT Horizontal	
	16800.390	1.6	281.0	Vert	PK	1.50E-06	-28.3	-27.0	-1.3	Ch 120, 54Mbps, EUT Horizontal, Pwr 38	
	10640.090	1.2	245.0	Vert	PK	1.39E-06	-28.6	-27.0	-1.6	Ch 64, 6Mbps, EUT Horizontal	
	16800.860	1.6	281.0	Vert	PK	1.27E-06	-29.0	-27.0	-2.0	Ch 120, 36Mbps, EUT Horizontal, Pwr 38	
	11001.530	1.1	243.0	Vert	PK	1.10E-06	-29.6	-27.0	-2.6	Ch 100, 54Mbps, EUT Horizontal	
	10640.920	1.1	247.0	Vert	PK	1.08E-06	-29.7	-27.0	-2.7	Ch 64, 36Mbps, EUT Horizontal	
	15536.550	1.9	250.0	Vert	PK	1.07E-06	-29.7	-27.0	-2.7	Ch 36, 6Mbps, EUT Horizontal	
	16504.610	1.4	267.0	Vert	PK	9.12E-07	-30.4	-27.0	-3.4	Ch 100, 6Mbps, EUT Horizontal	
	10641.920	1.2	249.0	Vert	PK	8.78E-07	-30.6	-27.0	-3.6	Ch 64, 54Mbps, EUT Horizontal	
	15954.660	1.8	274.0	Vert	PK	8.67E-07	-30.6	-27.0	-3.6	Ch 64, 6Mbps, EUT Horizontal	
	11004.950	1.4	233.0	Vert	PK	7.61E-07	-31.2	-27.0	-4.2	Ch 100, 36Mbps, EUT Horizontal	
	10518.380	1.1	245.0	Vert	PK	7.17E-07	-31.4	-27.0	-4.4	Ch 52, 36Mbps, EUT Horizontal	
	15727.640	1.9	253.0	Vert	PK	6.70E-07	-31.7	-27.0	-4.7	Ch 48, 6Mbps, EUT Horizontal	

Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
10479.330	1.2	229.0	Vert	PK	6.39E-07	-31.9	-27.0	-4.9	Ch 48, 6Mbps, EUT Horizontal
10523.030	1.1	245.0	Vert	PK	6.24E-07	-32.0	-27.0	-5.0	Ch 52, 54Mbps, EUT Horizontal
15774.640	1.5	257.0	Vert	PK	5.95E-07	-32.3	-27.0	-5.3	Ch 52, 6Mbps, EUT Horizontal
10475.750	1.2	240.0	Vert	PK	5.43E-07	-32.6	-27.0	-5.6	Ch 48, 54Mbps, EUT Horizontal
10478.830	1.2	238.0	Vert	PK	5.08E-07	-32.9	-27.0	-5.9	Ch 48, 36Mbps, EUT Horizontal
16807.730	1.9	277.0	Horz	PK	4.97E-07	-33.0	-27.0	-6.0	Ch 120, 6Mbps, EUT Horizontal, Pwr 50
10520.220	1.7	221.0	Vert	PK	4.96E-07	-33.0	-27.0	-6.0	Ch 52, 6Mbps, EUT Horizontal
11000.170	1.9	64.0	Horz	PK	4.46E-07	-33.5	-27.0	-6.5	Ch 100, 6Mbps, EUT Horizontal
11203.480	1.0	243.0	Vert	PK	4.07E-07	-33.9	-27.0	-6.9	Ch 120, 36Mbps, EUT Horizontal
11198.480	1.0	242.0	Vert	PK	4.05E-07	-33.9	-27.0	-6.9	Ch 120, 54Mbps, EUT Horizontal
10640.070	2.0	68.0	Horz	PK	4.02E-07	-34.0	-27.0	-7.0	Ch 64, 54Mbps, EUT Horizontal
11192.640	1.1	243.0	Vert	PK	3.59E-07	-34.4	-27.0	-7.4	Ch 120, 6Mbps, EUT Horizontal
10639.990	1.4	63.0	Horz	PK	3.42E-07	-34.7	-27.0	-7.7	Ch 64, 36Mbps, EUT Horizontal
10516.410	1.2	62.0	Horz	PK	3.06E-07	-35.1	-27.0	-8.1	Ch 52, 54Mbps, EUT Horizontal
10520.350	1.7	64.0	Horz	PK	3.06E-07	-35.1	-27.0	-8.1	Ch 52, 6Mbps, EUT Horizontal
16506.030	1.9	40.0	Horz	PK	2.95E-07	-35.3	-27.0	-8.3	Ch 100, 6Mbps, EUT Horizontal
10361.970	1.0	232.0	Vert	PK	2.92E-07	-35.3	-27.0	-8.3	Ch 36, 6Mbps, EUT Horizontal
10361.640	1.3	229.0	Vert	PK	2.92E-07	-35.3	-27.0	-8.3	Ch 36, 54Mbps, EUT Horizontal
11003.920	2.0	67.0	Horz	PK	2.89E-07	-35.4	-27.0	-8.4	Ch 100, 54Mbps, EUT Horizontal
10356.310	1.2	231.0	Vert	PK	2.85E-07	-35.4	-27.0	-8.4	Ch 36, 36Mbps, EUT Horizontal
15781.610	1.0	233.0	Horz	PK	2.61E-07	-35.8	-27.0	-8.8	Ch 52, 6Mbps, EUT Horizontal
15951.920	1.6	321.0	Horz	PK	2.56E-07	-35.9	-27.0	-8.9	Ch 64, 6Mbps, EUT Horizontal
11200.040	1.2	100.0	Horz	PK	2.50E-07	-36.0	-27.0	-9.0	Ch 120, 54Mbps, EUT Horizontal
15539.690	1.0	306.0	Horz	PK	2.40E-07	-36.2	-27.0	-9.2	Ch 36, 6Mbps, EUT Horizontal
11398.990	1.1	33.0	Vert	PK	2.38E-07	-36.2	-27.0	-9.2	Ch 140, 54Mbps, EUT Horizontal
10356.310	1.2	10.0	Vert	PK	2.37E-07	-36.2	-27.0	-9.2	Ch 36, 6Mbps, EUT on Side
10361.510	1.5	235.0	Horz	PK	2.27E-07	-36.4	-27.0	-9.4	Ch 36, 6Mbps, EUT Vertical
11406.650	1.0	39.0	Vert	PK	2.24E-07	-36.5	-27.0	-9.5	Ch 140, 36Mbps, EUT Horizontal
11395.490	1.2	34.0	Vert	PK	2.21E-07	-36.5	-27.0	-9.5	Ch 140, 6Mbps, EUT Horizontal
10360.680	1.2	354.0	Horz	PK	1.97E-07	-37.0	-27.0	-10.0	Ch 36, 6Mbps, EUT on Side
10646.320	1.2	70.0	Horz	PK	1.96E-07	-37.1	-27.0	-10.1	Ch 64, 6Mbps, EUT Horizontal
10996.170	1.8	60.0	Horz	PK	1.90E-07	-37.2	-27.0	-10.2	Ch 100, 36Mbps, EUT Horizontal
15721.050	1.0	230.0	Horz	PK	1.84E-07	-37.4	-27.0	-10.4	Ch 48, 6Mbps, EUT Horizontal
10519.680	1.2	62.0	Horz	PK	1.80E-07	-37.4	-27.0	-10.4	Ch 52, 36Mbps, EUT Horizontal
17101.640	1.2	224.0	Horz	PK	1.56E-07	-38.1	-27.0	-11.1	Ch 140, 6Mbps, EUT Horizontal, Pwr lvl 47
10481.180	2.1	67.0	Horz	PK	1.43E-07	-38.4	-27.0	-11.4	Ch 48, 54Mbps, EUT Horizontal
10478.680	1.0	344.0	Horz	PK	1.25E-07	-39.0	-27.0	-12.0	Ch 48, 36Mbps, EUT Horizontal
10357.640	1.0	41.0	Vert	PK	1.19E-07	-39.2	-27.0	-12.2	Ch 36, 6Mbps, EUT Vertical
11203.540	1.4	110.0	Horz	PK	1.10E-07	-39.6	-27.0	-12.6	Ch 120, 6Mbps, EUT Horizontal
11397.770	1.2	81.0	Horz	PK	9.91E-08	-40.0	-27.0	-13.0	Ch 140, 54Mbps, EUT Horizontal
11194.960	1.0	96.0	Horz	PK	8.83E-08	-40.5	-27.0	-13.5	Ch 120, 36Mbps, EUT Horizontal
11402.600	1.2	82.0	Horz	PK	8.29E-08	-40.8	-27.0	-13.8	Ch 140, 36Mbps, EUT Horizontal
11398.850	1.2	79.0	Horz	PK	8.07E-08	-40.9	-27.0	-13.9	Ch 140, 6Mbps, EUT Horizontal
10357.430	1.2	349.0	Horz	PK	7.16E-08	-41.4	-27.0	-14.4	Ch 36, 36Mbps, EUT Horizontal
10361.930	1.2	350.0	Horz	PK	6.69E-08	-41.7	-27.0	-14.7	Ch 36, 6Mbps, EUT Horizontal
20713.170	1.3	206.0	Horz	PK	5.34E-08	-42.7	-27.0	-15.7	Ch 36, 6Mbps, EUT Horizontal
10482.600	1.2	343.0	Horz	PK	5.20E-08	-42.8	-27.0	-15.8	Ch 48, 6Mbps, EUT Horizontal
22016.330	1.2	0.0	Vert	PK	5.05E-08	-43.0	-27.0	-16.0	Ch 100, 6Mbps, EUT Horizontal
21278.000	1.2	358.0	Horz	PK	4.63E-08	-43.3	-27.0	-16.3	Ch 64, 6Mbps, EUT Horizontal
21038.810	1.2	349.0	Horz	PK	4.54E-08	-43.4	-27.0	-16.4	Ch 52, 6Mbps, EUT Horizontal
21288.500	1.2	0.0	Vert	PK	4.33E-08	-43.6	-27.0	-16.6	Ch 64, 6Mbps, EUT Horizontal
21041.770	1.2	0.0	Vert	PK	3.95E-08	-44.0	-27.0	-17.0	Ch 52, 6Mbps, EUT Horizontal
20959.910	1.2	49.0	Horz	PK	3.93E-08	-44.1	-27.0	-17.1	Ch 48, 6Mbps, EUT Horizontal
22003.420	1.2	359.0	Horz	PK	3.74E-08	-44.3	-27.0	-17.3	Ch 100, 6Mbps, EUT Horizontal
22423.420	1.2	359.0	Horz	PK	3.66E-08	-44.4	-27.0	-17.4	Ch 120, 6Mbps, EUT Horizontal, Pwr lvl 38
20720.910	1.3	358.0	Vert	PK	3.61E-08	-44.4	-27.0	-17.4	Ch 36, 6Mbps, EUT Horizontal
22789.920	1.2	1.0	Vert	PK	3.49E-08	-44.6	-27.0	-17.6	Ch 140, 6Mbps, EUT Horizontal, Pwr lvl 47
20959.290	1.2	242.0	Vert	PK	3.27E-08	-44.9	-27.0	-17.9	Ch 48, 6Mbps, EUT Horizontal
22787.000	1.2	359.0	Horz	PK	2.97E-08	-45.3	-27.0	-18.3	Ch 140, 6Mbps, EUT Horizontal, Pwr lvl 47
22411.250	1.2	1.0	Vert	PK	2.84E-08	-45.5	-27.0	-18.5	Ch 120, 6Mbps, EUT Horizontal, Pwr lvl 38
10369.590	1.2	297.0	Horz	PK	2.17E-08	-46.6	-27.0	-19.6	Ch 36, 54Mbps, EUT Horizontal

AC POWERLINE CONDUCTED 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.

MODES OF OPERATION

Transmitting Ch. 140. 6Mbps. Power level 47
Transmitting Ch. 120. 6Mbps. Power level 38
Transmitting Ch. 100. 6Mbps. Power level 50
Transmitting Ch. 64. 6Mbps. Power level 50
Transmitting Ch. 52. 6Mbps. Power level 50
Transmitting Ch. 48. 6Mbps. Power level 50
Transmitting Ch. 36. 6Mbps. Power level 50

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

DGII0053 - 2

SAMPLE CALCULATIONS

Conducted Emissions: Adjusted Level = Measured Level + Transducer Factor + Cable Attenuation Factor + External Attenuator

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
LISN	Solar	9252-50-R-24-BNC	LIQ	2/17/2012	12 mo
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	7/5/2011	12 mo
MN03 Cables	ESM Cable Corp.	Conducted Cables	MNC	5/18/2011	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HGN	6/28/2010	24 mo
Attenuator, 20 dB	SM Electronics	SA01B-20	REF	12/21/2011	12 mo
Spectrum Analyzer	Agilent	E4443A	AAS	3/17/2011	14 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

Measurements were made using the bandwidths and detectors specified. No video filter was used.

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The EUT will be powered indirectly from the AC power line while operating in a host device. Therefore, conducted emissions measurements were made on the DC input of the EUT, or on the DC input of the device used to power the EUT. The AC power line conducted emissions were measured on a linear power supply providing DC power to the module while providing no filtering of the power inputs to the module.

The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band or bands. The EUT was transmitting in the mode which has the highest output power for the band. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10-2009.

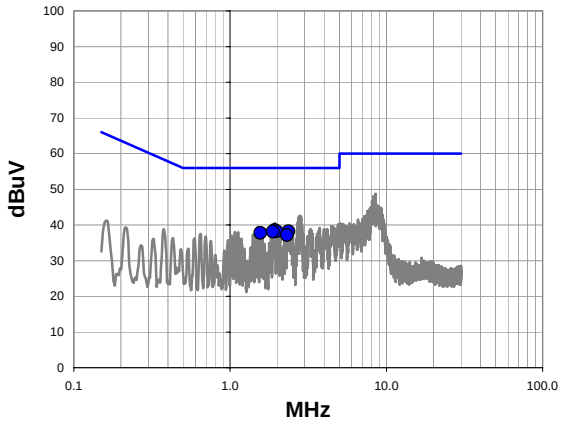
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 36. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

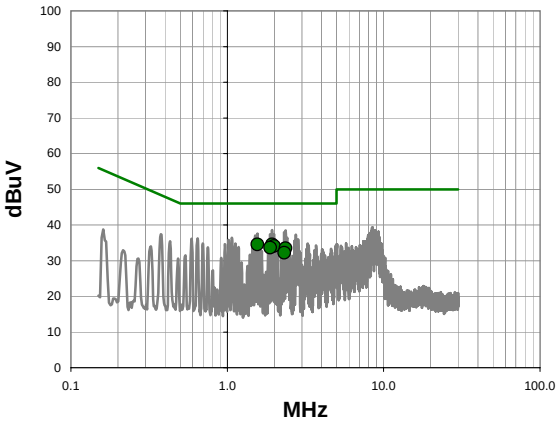
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	7	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.936	18.3	20.3	38.6	56.0	-17.4
2.366	17.9	20.3	38.2	56.0	-17.8
1.990	17.9	20.3	38.2	56.0	-17.8
1.881	17.8	20.3	38.1	56.0	-17.9
1.560	17.5	20.3	37.8	56.0	-18.2
2.315	16.8	20.3	37.1	56.0	-18.9

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.560	14.3	20.3	34.6	46.0	-11.4
1.936	14.2	20.3	34.5	46.0	-11.5
1.990	13.8	20.3	34.1	46.0	-11.9
1.881	13.3	20.3	33.6	46.0	-12.4
2.366	13.1	20.3	33.4	46.0	-12.6
2.315	11.9	20.3	32.2	46.0	-13.8

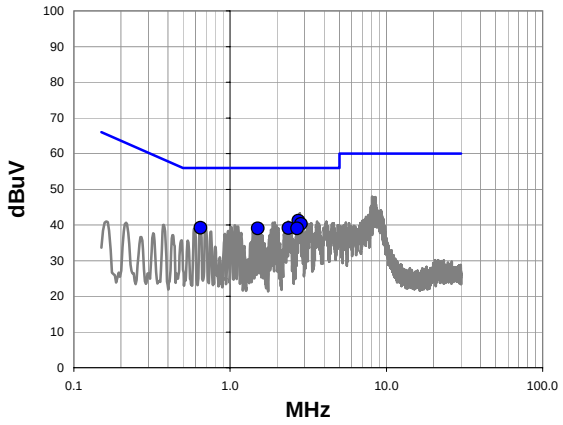
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 36. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

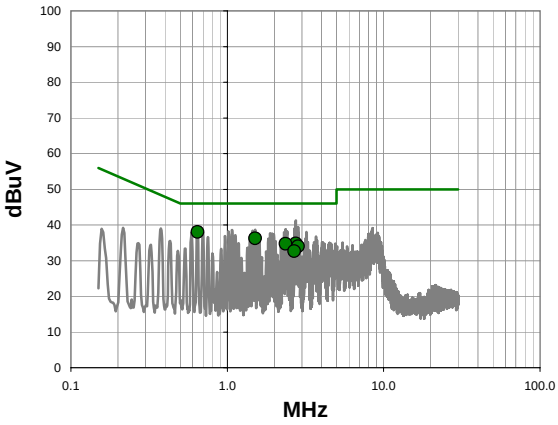
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	8	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.741	20.8	20.3	41.1	56.0	-14.9
2.839	19.9	20.3	40.2	56.0	-15.8
0.646	19.0	20.2	39.2	56.0	-16.8
2.362	18.8	20.3	39.1	56.0	-16.9
1.506	18.8	20.3	39.1	56.0	-16.9
2.683	18.7	20.3	39.0	56.0	-17.0

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.646	17.8	20.2	38.0	46.0	-8.0
1.506	16.0	20.3	36.3	46.0	-9.7
2.741	14.5	20.3	34.8	46.0	-11.2
2.362	14.4	20.3	34.7	46.0	-11.3
2.839	13.7	20.3	34.0	46.0	-12.0
2.683	12.3	20.3	32.6	46.0	-13.4

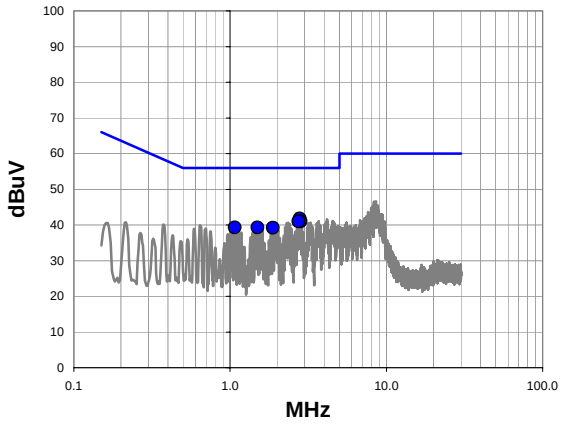
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 48. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

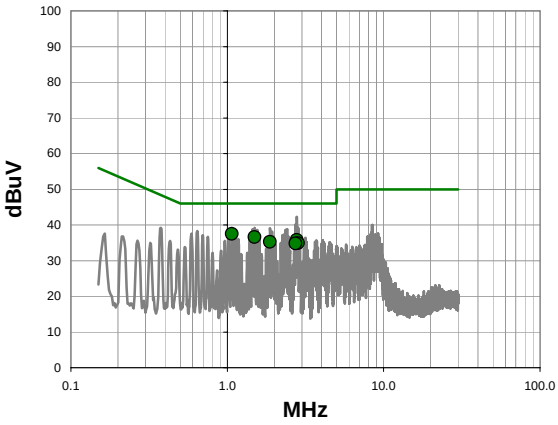
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	9	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.785	21.5	20.3	41.8	56.0	-14.2
2.836	20.7	20.3	41.0	56.0	-15.0
2.734	20.7	20.3	41.0	56.0	-15.0
1.072	19.1	20.2	39.3	56.0	-16.7
1.498	19.0	20.2	39.2	56.0	-16.8
1.877	18.9	20.3	39.2	56.0	-16.8

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.072	17.3	20.2	37.5	46.0	-8.5
1.498	16.3	20.2	36.5	46.0	-9.5
2.785	15.5	20.3	35.8	46.0	-10.2
1.877	15.0	20.3	35.3	46.0	-10.7
2.836	14.6	20.3	34.9	46.0	-11.1
2.734	14.5	20.3	34.8	46.0	-11.2

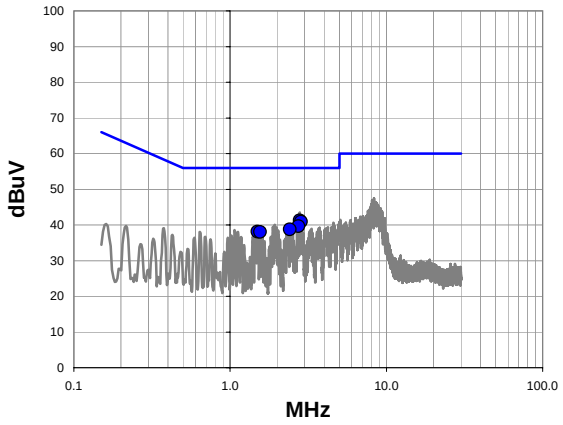
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 48. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

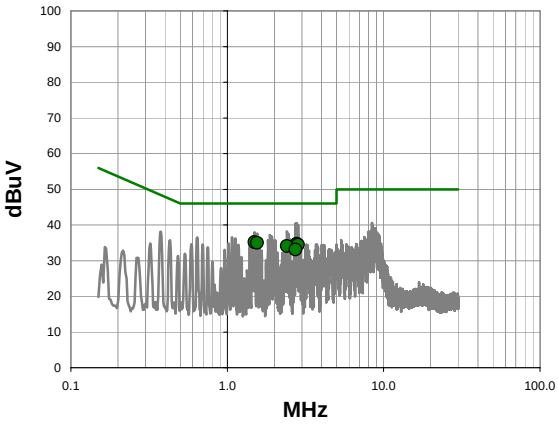
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	10	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.788	20.9	20.3	41.2	56.0	-14.8
2.839	20.6	20.3	40.9	56.0	-15.1
2.734	19.3	20.3	39.6	56.0	-16.4
2.409	18.4	20.3	38.7	56.0	-17.3
1.498	17.9	20.2	38.1	56.0	-17.9
1.553	17.8	20.3	38.1	56.0	-17.9

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.498	14.9	20.2	35.1	46.0	-10.9
1.553	14.7	20.3	35.0	46.0	-11.0
2.788	14.4	20.3	34.7	46.0	-11.3
2.839	14.1	20.3	34.4	46.0	-11.6
2.409	13.8	20.3	34.1	46.0	-11.9
2.734	12.8	20.3	33.1	46.0	-12.9

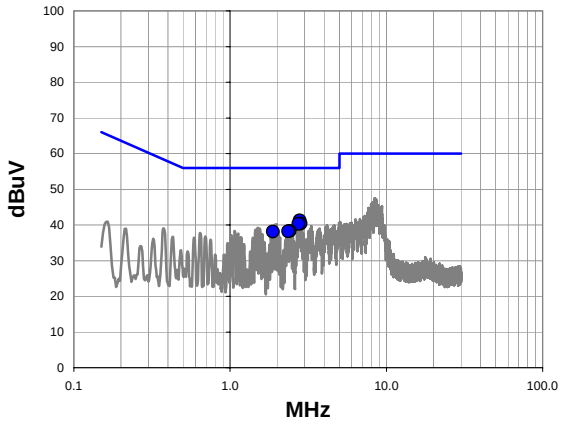
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 52. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

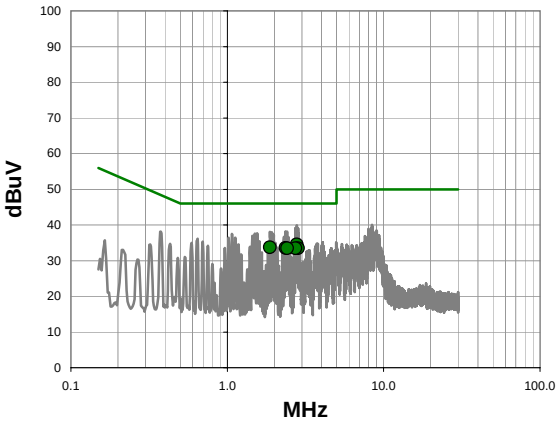
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	11	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.788	20.9	20.3	41.2	56.0	-14.8
2.836	20.0	20.3	40.3	56.0	-15.7
2.734	19.9	20.3	40.2	56.0	-15.8
2.413	18.0	20.3	38.3	56.0	-17.7
2.358	17.9	20.3	38.2	56.0	-17.8
1.874	17.8	20.3	38.1	56.0	-17.9

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.788	14.2	20.3	34.5	46.0	-11.5
1.874	13.4	20.3	33.7	46.0	-12.3
2.358	13.2	20.3	33.5	46.0	-12.5
2.836	13.1	20.3	33.4	46.0	-12.6
2.734	13.1	20.3	33.4	46.0	-12.6
2.413	13.1	20.3	33.4	46.0	-12.6

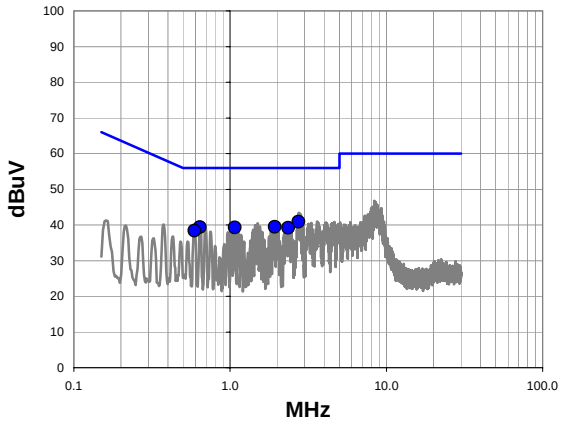
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 52. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

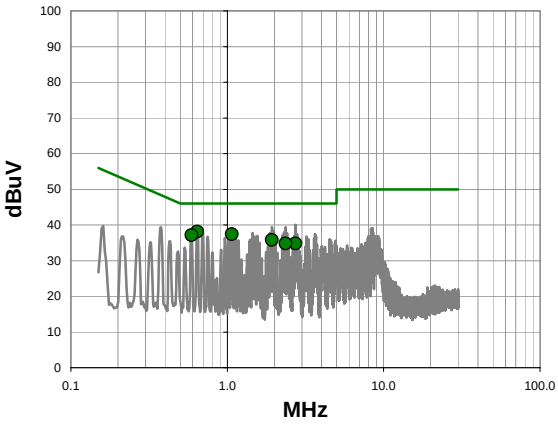
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	12	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.734	20.6	20.3	40.9	56.0	-15.1
1.932	19.2	20.3	39.5	56.0	-16.5
0.642	19.2	20.2	39.4	56.0	-16.6
1.072	19.1	20.2	39.3	56.0	-16.7
2.358	18.9	20.3	39.2	56.0	-16.8
0.591	18.2	20.2	38.4	56.0	-17.6

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.642	17.9	20.2	38.1	46.0	-7.9
1.072	17.2	20.2	37.4	46.0	-8.6
0.591	16.9	20.2	37.1	46.0	-8.9
1.932	15.5	20.3	35.8	46.0	-10.2
2.734	14.5	20.3	34.8	46.0	-11.2
2.358	14.5	20.3	34.8	46.0	-11.2

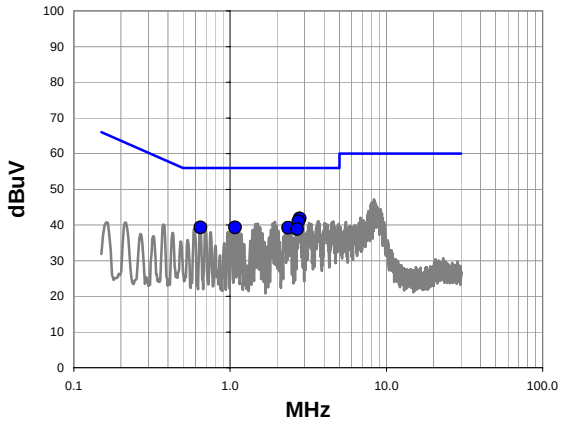
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 64. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

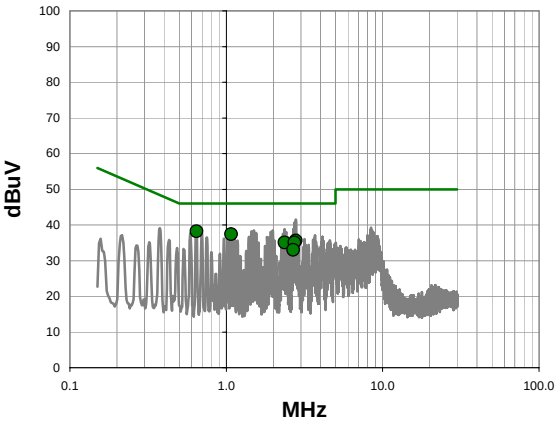
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	13	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.788	21.5	20.3	41.8	56.0	-14.2
2.734	20.7	20.3	41.0	56.0	-15.0
1.076	19.1	20.2	39.3	56.0	-16.7
0.646	19.1	20.2	39.3	56.0	-16.7
2.358	18.9	20.3	39.2	56.0	-16.8
2.683	18.5	20.3	38.8	56.0	-17.2

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.646	18.0	20.2	38.2	46.0	-7.8
1.076	17.2	20.2	37.4	46.0	-8.6
2.788	15.3	20.3	35.6	46.0	-10.4
2.358	14.8	20.3	35.1	46.0	-10.9
2.734	14.7	20.3	35.0	46.0	-11.0
2.683	12.7	20.3	33.0	46.0	-13.0

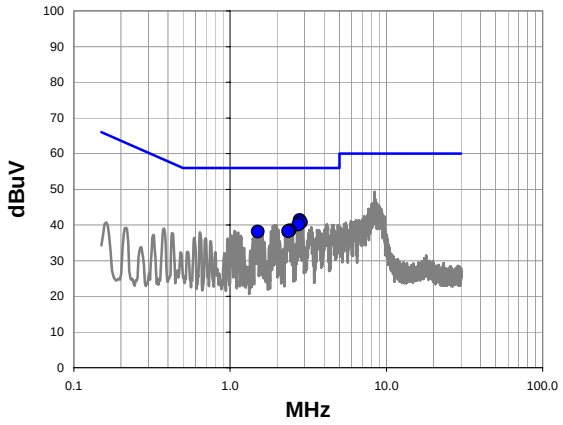
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 64. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

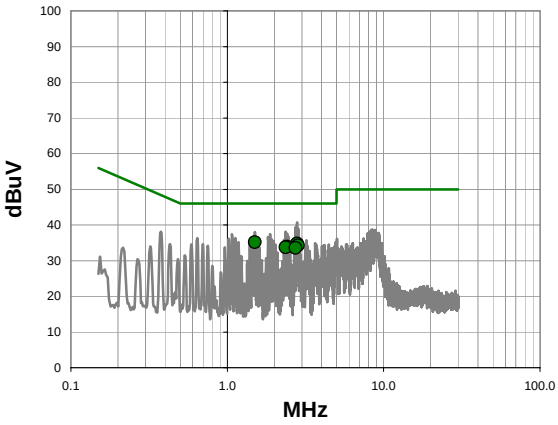
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	14	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.792	21.0	20.3	41.3	56.0	-14.7
2.843	20.4	20.3	40.7	56.0	-15.3
2.734	19.8	20.3	40.1	56.0	-15.9
2.413	18.2	20.3	38.5	56.0	-17.5
2.358	17.9	20.3	38.2	56.0	-17.8
1.502	17.9	20.3	38.2	56.0	-17.8

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.502	14.9	20.3	35.2	46.0	-10.8
2.792	14.5	20.3	34.8	46.0	-11.2
2.843	13.9	20.3	34.2	46.0	-11.8
2.413	13.6	20.3	33.9	46.0	-12.1
2.358	13.4	20.3	33.7	46.0	-12.3
2.734	13.2	20.3	33.5	46.0	-12.5

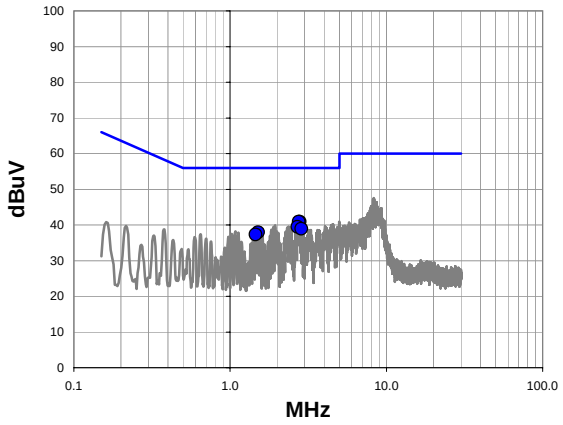
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 100. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

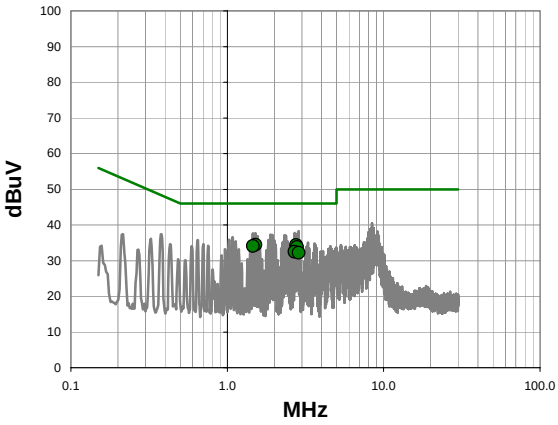
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	15	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.796	20.6	20.3	40.9	56.0	-15.1
2.752	20.6	20.3	40.9	56.0	-15.1
2.697	19.1	20.3	39.4	56.0	-16.6
2.858	18.6	20.3	38.9	56.0	-17.1
1.513	17.7	20.3	38.0	56.0	-18.0
1.458	17.1	20.2	37.3	56.0	-18.7

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.513	14.2	20.3	34.5	46.0	-11.5
2.752	14.0	20.3	34.3	46.0	-11.7
1.458	13.8	20.2	34.0	46.0	-12.0
2.796	13.5	20.3	33.8	46.0	-12.2
2.697	12.1	20.3	32.4	46.0	-13.6
2.858	11.9	20.3	32.2	46.0	-13.8

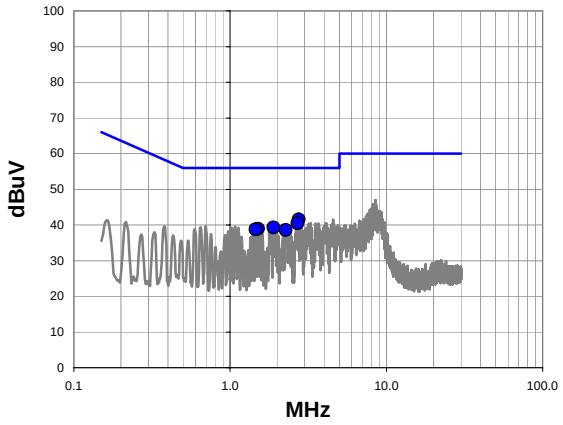
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 100. 6Mbps. Power level 50				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

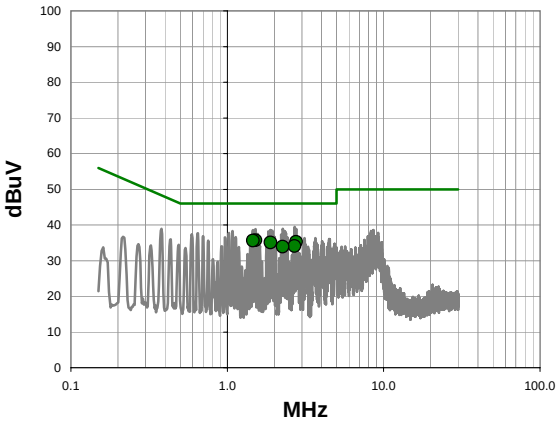
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	16	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.756	21.2	20.3	41.5	56.0	-14.5
2.697	20.1	20.3	40.4	56.0	-15.6
1.892	19.0	20.3	39.3	56.0	-16.7
1.513	18.7	20.3	39.0	56.0	-17.0
1.458	18.5	20.2	38.7	56.0	-17.3
2.267	18.3	20.3	38.6	56.0	-17.4

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.513	15.4	20.3	35.7	46.0	-10.3
1.458	15.4	20.2	35.6	46.0	-10.4
2.756	14.9	20.3	35.2	46.0	-10.8
1.892	14.8	20.3	35.1	46.0	-10.9
2.697	13.8	20.3	34.1	46.0	-11.9
2.267	13.6	20.3	33.9	46.0	-12.1

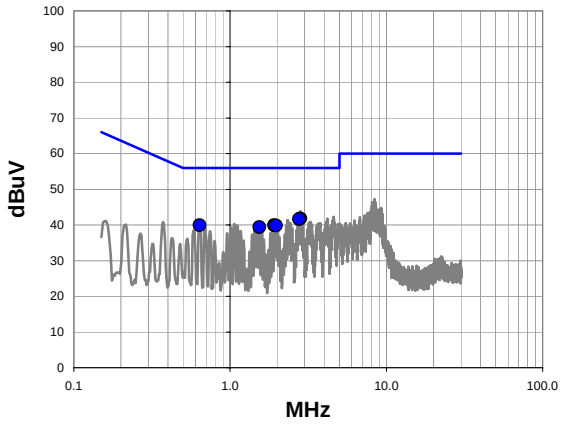
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 120. 6Mbps. Power level 38				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

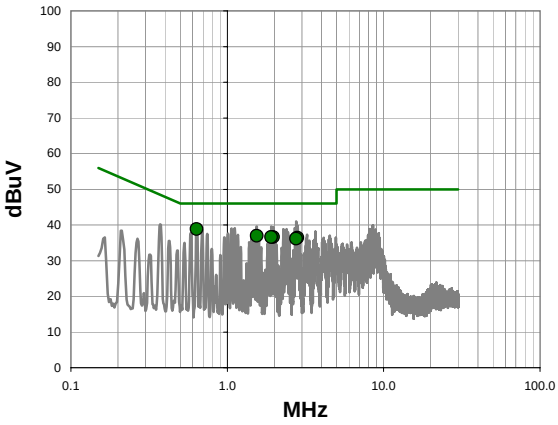
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	17	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.814	21.5	20.3	41.8	56.0	-14.2
2.763	21.3	20.3	41.6	56.0	-14.4
0.638	19.7	20.2	39.9	56.0	-16.1
1.914	19.6	20.3	39.9	56.0	-16.1
1.965	19.5	20.3	39.8	56.0	-16.2
1.542	19.1	20.3	39.4	56.0	-16.6

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.638	18.6	20.2	38.8	46.0	-7.2
1.542	16.7	20.3	37.0	46.0	-9.0
1.965	16.3	20.3	36.6	46.0	-9.4
1.914	16.3	20.3	36.6	46.0	-9.4
2.814	16.1	20.3	36.4	46.0	-9.6
2.763	15.8	20.3	36.1	46.0	-9.9

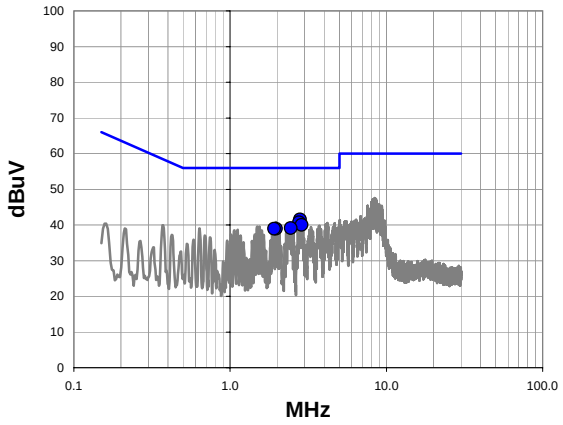
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 120. 6Mbps. Power level 38				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

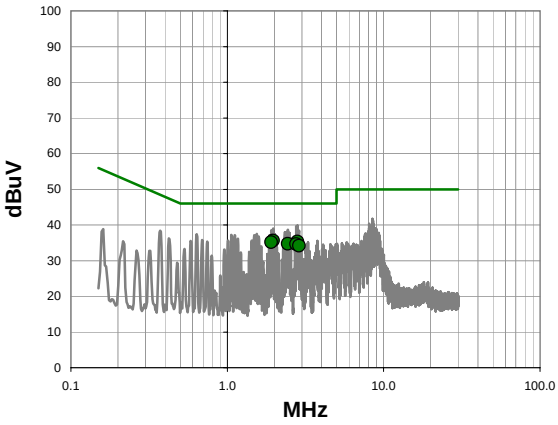
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	18	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.810	21.2	20.3	41.5	56.0	-14.5
2.763	20.4	20.3	40.7	56.0	-15.3
2.872	19.7	20.3	40.0	56.0	-16.0
2.446	18.8	20.3	39.1	56.0	-16.9
1.965	18.6	20.3	38.9	56.0	-17.1
1.914	18.6	20.3	38.9	56.0	-17.1

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.965	15.3	20.3	35.6	46.0	-10.4
2.810	15.0	20.3	35.3	46.0	-10.7
1.914	14.9	20.3	35.2	46.0	-10.8
2.446	14.4	20.3	34.7	46.0	-11.3
2.763	14.3	20.3	34.6	46.0	-11.4
2.872	13.8	20.3	34.1	46.0	-11.9

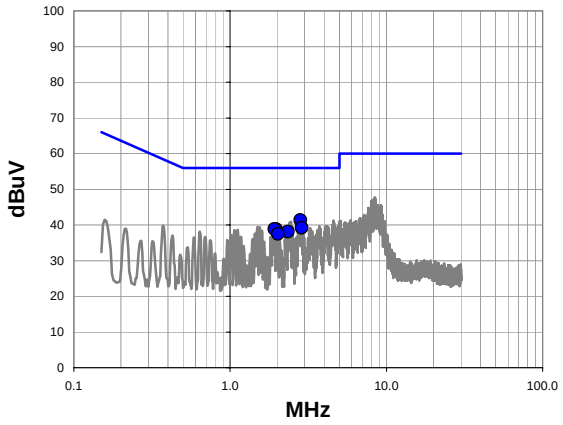
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 140. 6Mbps. Power level 47				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

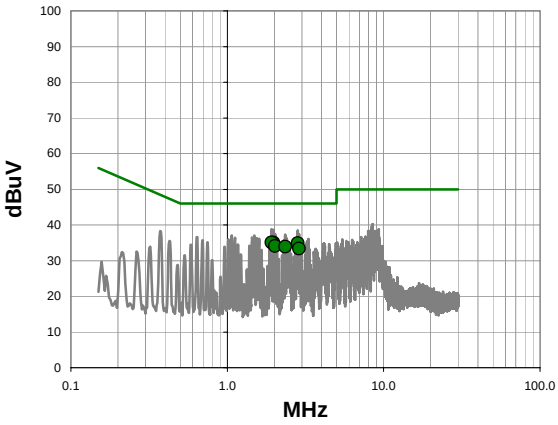
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	19	**Line:**	Neutral	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.821	21.0	20.3	41.3	56.0	-14.7
2.876	18.9	20.3	39.2	56.0	-16.8
1.972	18.5	20.3	38.8	56.0	-17.2
1.921	18.5	20.3	38.8	56.0	-17.2
2.347	17.8	20.3	38.1	56.0	-17.9
2.023	17.2	20.3	37.5	56.0	-18.5

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.972	14.8	20.3	35.1	46.0	-10.9
1.921	14.8	20.3	35.1	46.0	-10.9
2.821	14.6	20.3	34.9	46.0	-11.1
2.023	13.8	20.3	34.1	46.0	-11.9
2.347	13.6	20.3	33.9	46.0	-12.1
2.876	13.0	20.3	33.3	46.0	-12.7

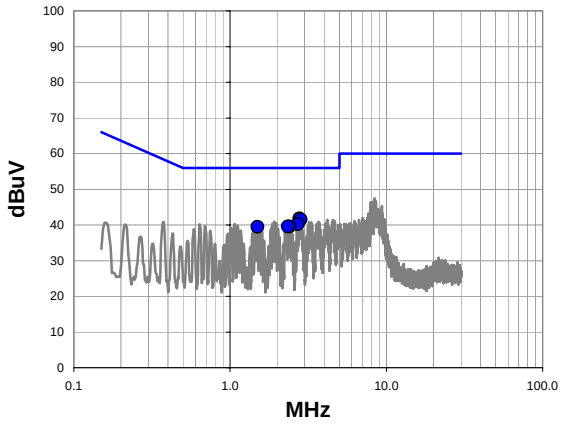
AC POWERLINE CONDUCTED EMISSIONS

Work Order:	DGII0053	**Date:**	03/21/12		
Project:	None	**Temperature:**	22.83 °C		
Job Site:	MN03	**Humidity:**	51% RH		
Serial Number:	7.06	**Barometric Pres.:**	1016.7 mbar	**Tested by:**	Johnathan Lee
EUT:	Sigma Pumps Integrated 802.11abg Module				
Configuration:	2				
Customer:	Digi International				
Attendees:	None				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting Ch. 140. 6Mbps. Power level 47				
Deviations:	None				
Comments:	Customer requested increased table height. Added second harmonic filter on 5GHz path (footprint exists on board for this filter).				

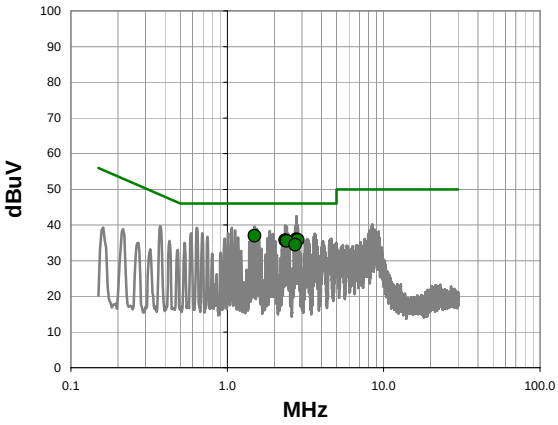
Test Specifications	**Test Method**
FCC 15.207:2012	ANSI C63.10:2009

Run #	20	**Line:**	High Line	**Ext. Attenuation:**	20	**Results**	Pass

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
2.774	21.5	20.3	41.8	56.0	-14.2
2.829	21.2	20.3	41.5	56.0	-14.5
2.719	19.9	20.3	40.2	56.0	-15.8
2.398	19.2	20.3	39.5	56.0	-16.5
2.347	19.2	20.3	39.5	56.0	-16.5
1.495	19.2	20.2	39.4	56.0	-16.6

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
1.495	16.7	20.2	36.9	46.0	-9.1
2.774	15.6	20.3	35.9	46.0	-10.1
2.829	15.5	20.3	35.8	46.0	-10.2
2.347	15.4	20.3	35.7	46.0	-10.3
2.398	15.2	20.3	35.5	46.0	-10.5
2.719	14.1	20.3	34.4	46.0	-11.6