NORTHWEST EMC

Welch Allyn Protocol, Inc.

Lamarr II

FCC 15.207:2016
FCC 15.407:2016

802.11a SISO Radio

Report # PROT0346

NVLAP Lab Code: 200630-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: March 11, 2016
Welch Allyn Protocol, Inc.
Model: Lamarr II

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2016	ANSI C63.10:2013
FCC 15.407:2016	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	AC - Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6, 12.7	Spurious Radiated Emissions	Yes	Pass	
6.8	Frequency Stability	Yes	Pass	
12.2	Duty Cycle	Yes	Pass	
12.4.1	Emission Bandwidth	No	N/A	Not required unless the EUT supports the 5.2, 5.3 or 5.6 GHz bands
12.4.2	Occupied Bandwidth	Yes	Pass	
12.4.2	Band Edge	No	N/A	Not required unless the EUT supports the 5.2 GHz band
12.3.2.4	Maximum Conducted Output Power	Yes	Pass	
12.5	Maximum Power Spectral Density	Yes	Pass	

Deviations From Test Standards

None

Approved By:

Kyle Holgate, Operations Manager

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

REVISION HISTORY

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

REV 2015.2.19

United States

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

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

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

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

European Union

European Commission – Validated by the European Commission as a Conformity Assessment Body (CAB) under the EMC directive and as a Notified Body under the R&TTE Directive.

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Israel

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

Hong Kong

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

Vietnam

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

SCOPE

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

MEASUREMENT UNCERTAINTY

TMU.2015.07.10

Measurement Uncertainty

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

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

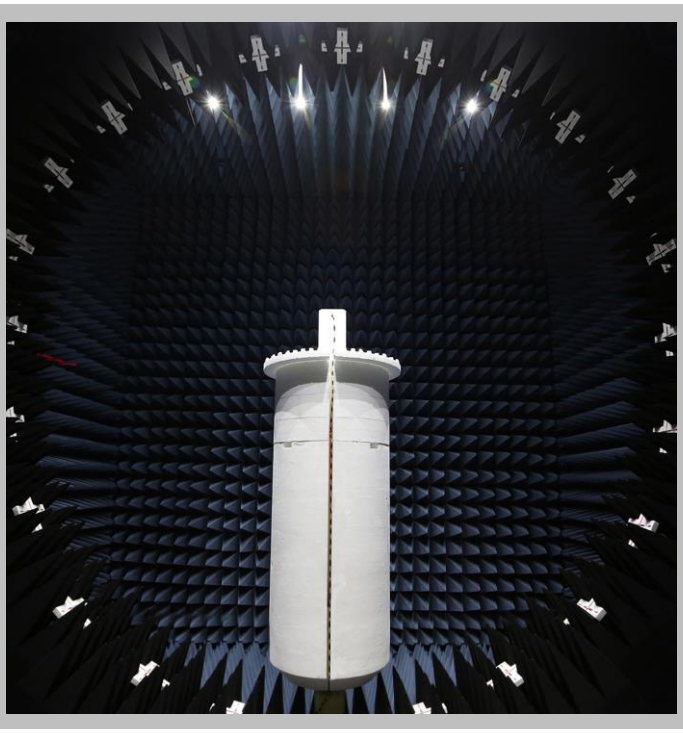
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

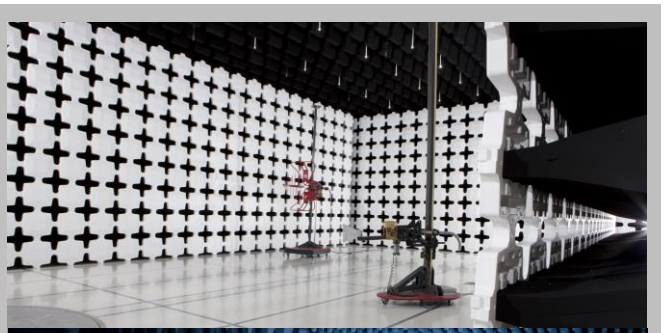
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%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

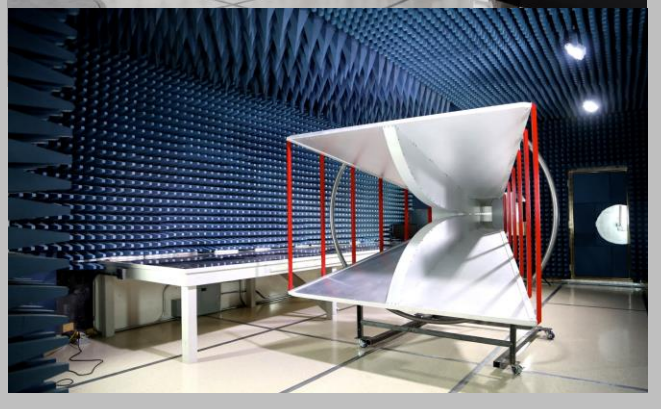
FACILITIES

REV 2015.2.19

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







PRODUCT DESCRIPTION

2014-12-10

Client and Equipment Under Test (EUT) Information

Company Name:	Welch Allyn Protocol, Inc.
Address:	8500 SW Creekside Place
City, State, Zip:	Beaverton, OR 97008-7107
Test Requested By:	Rob Berry
Model:	Lamarr II
First Date of Test:	February 22, 2016
Last Date of Test:	March 11, 2016
Receipt Date of Samples:	February 22, 2016
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
802.11(a/b/g) radio module. The implementation of the 802.11a radio is limited to operation in the 6 Mbps mode with a software controlled maximum duty cycle of 14%.

Testing Objective:
To demonstrate compliance of the 802.11a radio under FCC 15.407 for operation in the 5.8 GHz band.

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration PROT0346- 1

Software/Firmware Running during test	
Description	**Version**
Windows XP	
Prism Engineering Tool	V2.5.14.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Module	Welch Allyn Protocol, Inc	Lamarr II	MM409594

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
TCC Test Fixture	Welch Allyn Protocol, Inc	None	X7510075
AC/DC Adapter (Test Fixture)	TRIAD	WSU050-200	None
Laptop	Lenovo	T400	L3-CDX8E
AC/DC Adapter (lenovo)	Lenovo	42T4430	11S42T4430Z1ZGWE0891U8

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Ethernet Cable	No	2.2m	No	Laptop	Development Board
DC Power Cable Test Fixture	Unknown	2.0m	No	AC/DC Power Adapter	TCC Test Fixture
Serial to USB	Yes	3.0m	No	TCC Test Fixture	Laptop
DC Power Cable Laptop	Unknown	2.1m	Yes	Laptop	AC/DC Power Adapter Lenovo
AC Power Cable Laptop	No	3.0m	No	AC/DC Power Adapter Lenovo	AC mains

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration PROT0346- 3

Software/Firmware Running during test	
Description	**Version**
Windows XP	
Prism Engineering Tool	V2.5.14.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Module	Welch Allyn Protocol, Inc	Lamarr II	MM409594

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
TCC Test Fixture	Welch Allyn Protocol, Inc	None	X7510075
Antenna	Welch Allyn Protocol, Inc	030-0108-00	Rev A

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Lenovo	T400	L3-CDX8E
AC/DC Adapter (lenovo)	Lenovo	42T4430	11S42T4430Z1ZGWE0891U8

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Ethernet Cable	No	2.2m	No	Laptop	Development Board
Serial to USB	Yes	3.0m	No	TCC Test Fixture	Laptop
DC Power Cable Laptop	Unknown	2.1m	Yes	Laptop	AC/DC Power Adapter Lenovo
AC Power Cable Laptop	No	3.0m	No	AC/DC Power Adapter Lenovo	AC mains
DC Leads x2	No	0.7m	No	DC Power Supply	Test Fixture
u.fl Cable	No	0.1m	No	Wireless Module	Antenna

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration PROT0346- 4

Software/Firmware Running during test	
Description	**Version**
Windows XP	
Prism Engineering Tool	V2.5.14.0

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Wireless Module	Welch Allyn Protocol, Inc	Lamarr II	MM409594

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
TCC Test Fixture	Welch Allyn Protocol, Inc	None	X7510075
Antenna	Welch Allyn Protocol, Inc	030-0108-00	Rev A

Remote Equipment Outside of Test Setup Boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Laptop	Lenovo	T400	L3-CDX8E
AC/DC Adapter (lenovo)	Lenovo	42T4430	11S42T4430Z1ZGWE0891U8

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Ethernet Cable	No	2.2m	No	Laptop	Development Board
Serial to USB	Yes	3.0m	No	TCC Test Fixture	Laptop
DC Power Cable Laptop	Unknown	2.1m	Yes	Laptop	AC/DC Power Adapter Lenovo
AC Power Cable Laptop	No	3.0m	No	AC/DC Power Adapter Lenovo	AC mains
DC Leads x2	No	0.7m	No	DC Power Supply	Test Fixture
u.fl Cable	No	0.1m	No	Wireless Module	Antenna

MODIFICATIONS

NORTHWEST EMC
2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	2/22/2016	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	2/22/2016	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	2/22/2016	Maximum Conducted Output 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.
4	2/22/2016	Maximum 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	2/22/2016	Frequency Stability	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	2/24/2016	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.
7	3/11/2016	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE

XMit 2015.01.14

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Generator - Signal	Keysight	5182B	TFU	NCR	0
Cable	ESM Cable Corp.	TT	EV1	NCR	0
Attenuator	S.M. Electronics	SA26B-20	AWU	NCR	0
Block - DC	Fairview Microwave	SD3379	AMQ	6/18/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	12/1/2014	24

TEST DESCRIPTION

Per ANSI C63.10, all measurements are to be performed with the EUT operating at 100% duty cycle at its maximum power level. In the event the EUT cannot be operated at 100% duty cycle, the transmission pulse duration (T) and Duty Cycle (x) are required to be measured for each of the EUT operating modes.

The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used

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

If the transmit duty cycle < 98 percent, a duty cycle correction factor in dB can be calculated to add to power measurements if required in the test method guidance using the following formula

10 * LOG (1/D) = dB

Where D is duty cycle of the radio transmissions

DUTY CYCLE

NORTHWEST EMC

XMit 2015.01.14

EUT:	Lamarr II			**Work Order:**	PROT0346
Serial Number:	MM409594			**Date:**	02/22/16
Customer:	Welch Allyn Protocol, Inc.			**Temperature:**	23.8°C
Attendees:	None			**Humidity:**	35%
Project:	None			**Barometric Pres.:**	1022.6
Tested by:	Brandon Hobbs	**Power:**	5VDC Nominal	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.407:2016	ANSI C63.10:2013

COMMENTS

The EUT was operating at the maximum power setting of 21 dBm. This level was set using the client provided software.

DEVIATIONS FROM TEST STANDARD

None

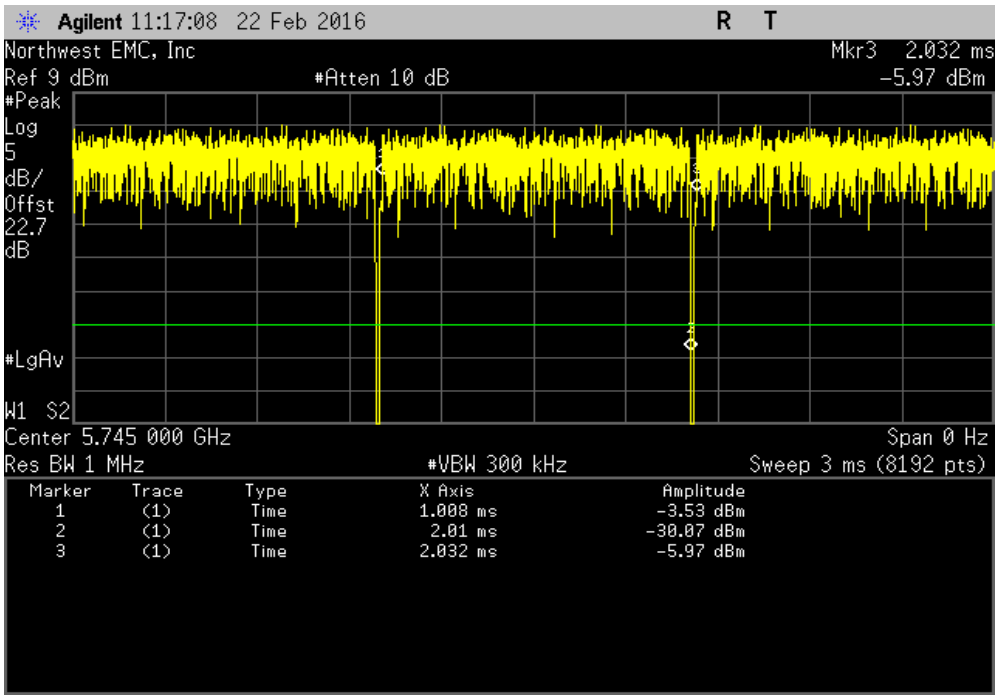
Configuration #	1	Signature

	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
5725 - 5785 MHz Band						
Low Channel, Ch 149 - 5745 MHz						
802.11(a) 6 Mbps	1.002 ms	1.024 ms	1	97.9	N/A	N/A
802.11(a) 6 Mbps	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, Ch 157 - 5785 MHz						
802.11(a) 6 Mbps	1.002 ms	1.024 ms	1	97.8	N/A	N/A
802.11(a) 6 Mbps	N/A	N/A	5	N/A	N/A	N/A
High Channel, Ch 165 - 5825 MHz						
802.11(a) 6 Mbps	1.002 ms	1.024 ms	1	97.9	N/A	N/A
802.11(a) 6 Mbps	N/A	N/A	5	N/A	N/A	N/A

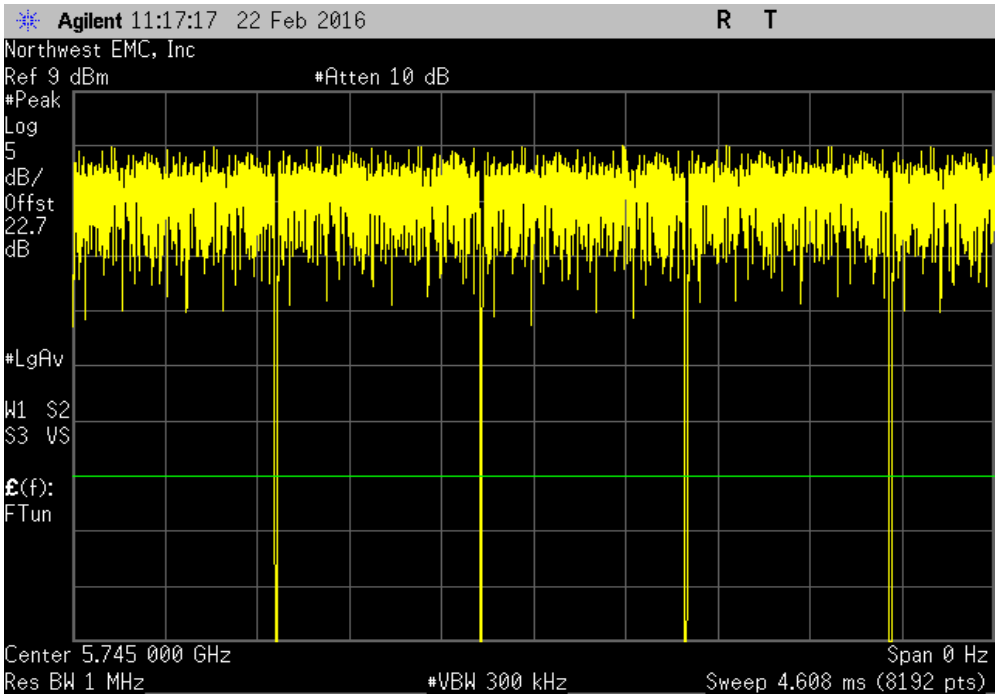
DUTY CYCLE

XMit 2015.01.14

5725 - 5785 MHz Band, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 6 Mbps						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.002 ms	1.024 ms	1	97.9	N/A	N/A



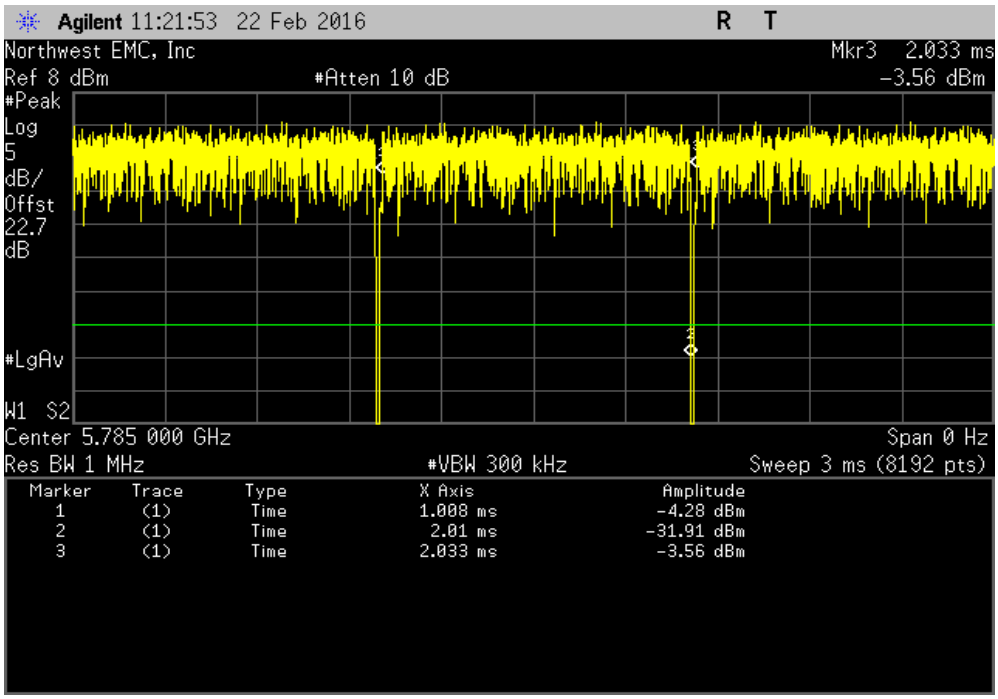
5725 - 5785 MHz Band, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 6 Mbps						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



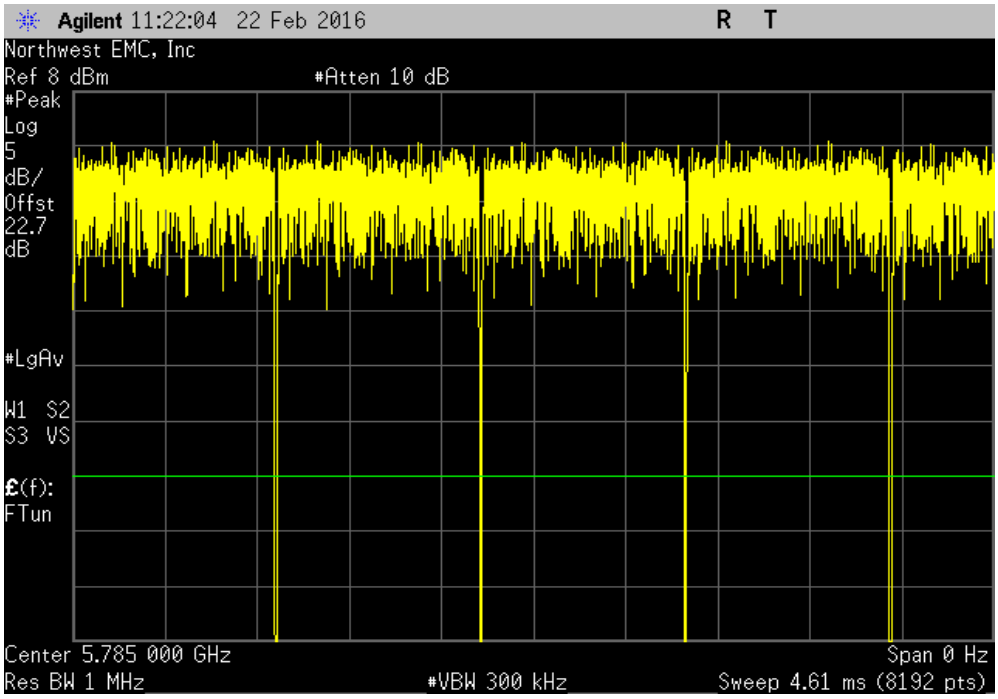
DUTY CYCLE

XMit 2015.01.14

5725 - 5785 MHz Band, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 6 Mbps						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.002 ms	1.024 ms	1	97.8	N/A	N/A



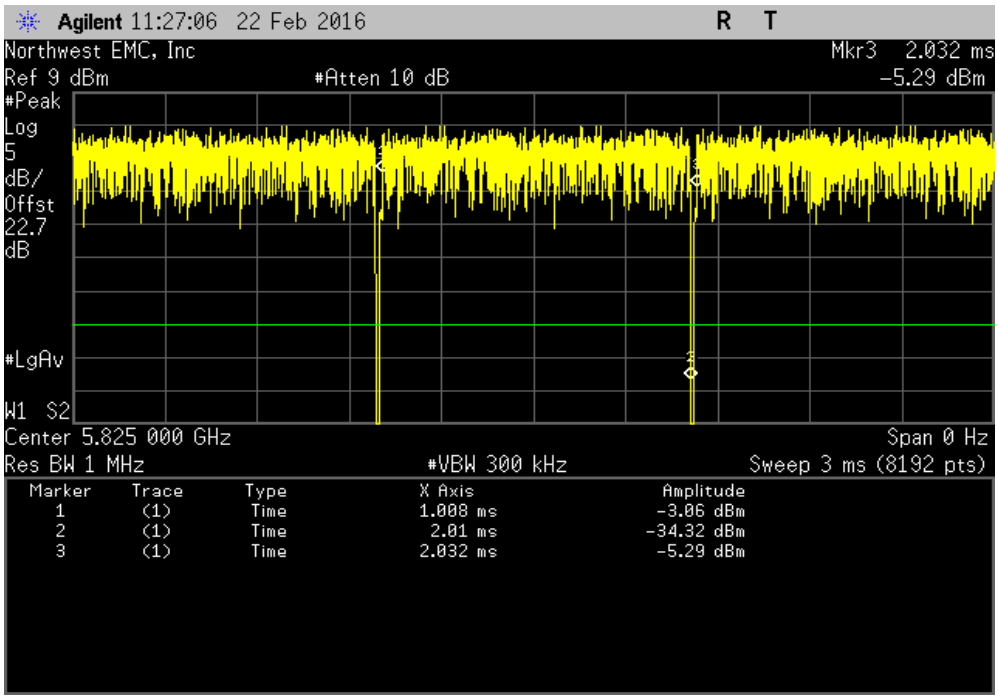
5725 - 5785 MHz Band, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 6 Mbps						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



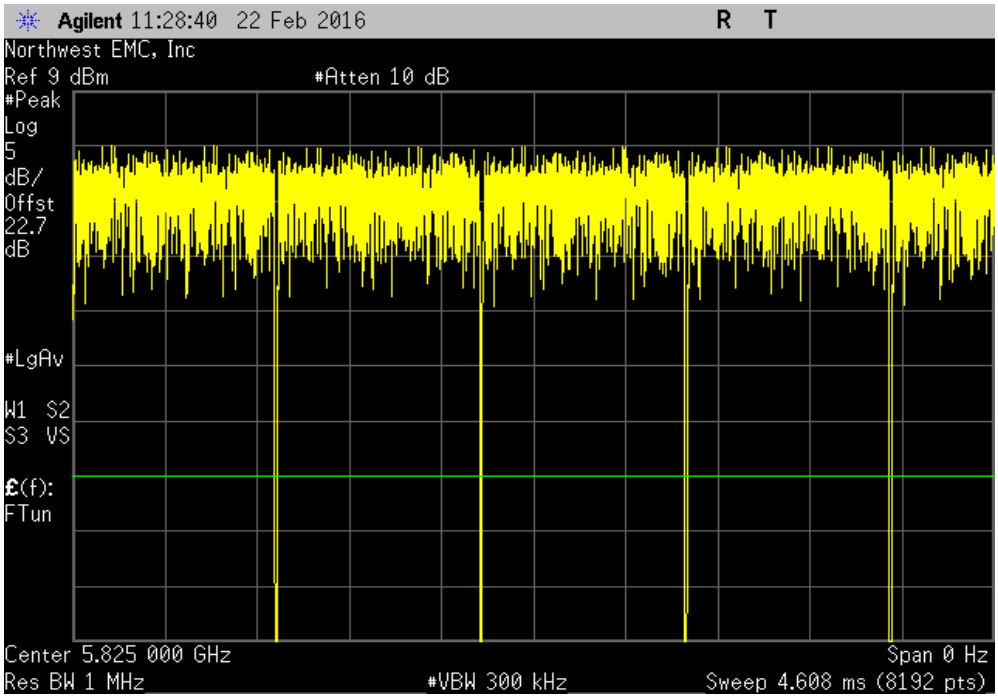
DUTY CYCLE

XMit 2015.01.14

5725 - 5785 MHz Band, High Channel, Ch 165 - 5825 MHz, 802.11(a) 6 Mbps						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	1.002 ms	1.024 ms	1	97.9	N/A	N/A



5725 - 5785 MHz Band, High Channel, Ch 165 - 5825 MHz, 802.11(a) 6 Mbps						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2015.01.14

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Generator - Signal	Keysight	5182B	TFU	NCR	0
Cable	ESM Cable Corp.	TT	EV1	NCR	0
Attenuator	S.M. Electronics	SA26B-20	AWU	NCR	0
Block - DC	Fairview Microwave	SD3379	AMQ	6/18/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	12/1/2014	24

TEST DESCRIPTION

The transmit frequencies and data rates listed in the datasheet were measured in each band utilized by the radio. 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.

Per ANSI C63.10, the spectrum analyzer settings were as follows:

-RBW = 100 kHz

-VBW = ≥ 3x RBW

-Detector = Peak

-Trace mode = max hold

The spectrum analyzer occupied bandwidth measurement function was then used to measure the 6 dB emission bandwidth.

The 99.9% (approximate 26 dB) emission bandwidth (EBW) was also measured at the same time to be used for setting the channel power integration bandwidth during conducted output power testing.

OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2015.01.14

EUT:	Lamarr II			**Work Order:**	PROT0346
Serial Number:	MM409594			**Date:**	02/22/16
Customer:	Welch Allyn Protocol, Inc.			**Temperature:**	23.8°C
Attendees:	None			**Humidity:**	35%
Project:	None			**Barometric Pres.:**	1022.6
Tested by:	Brandon Hobbs	**Power:**	5VDC Nominal	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.407:2016	ANSI C63.10:2013

COMMENTS

The EUT was operating at the maximum power setting of 21 dBm. This level was set using the client provided software.

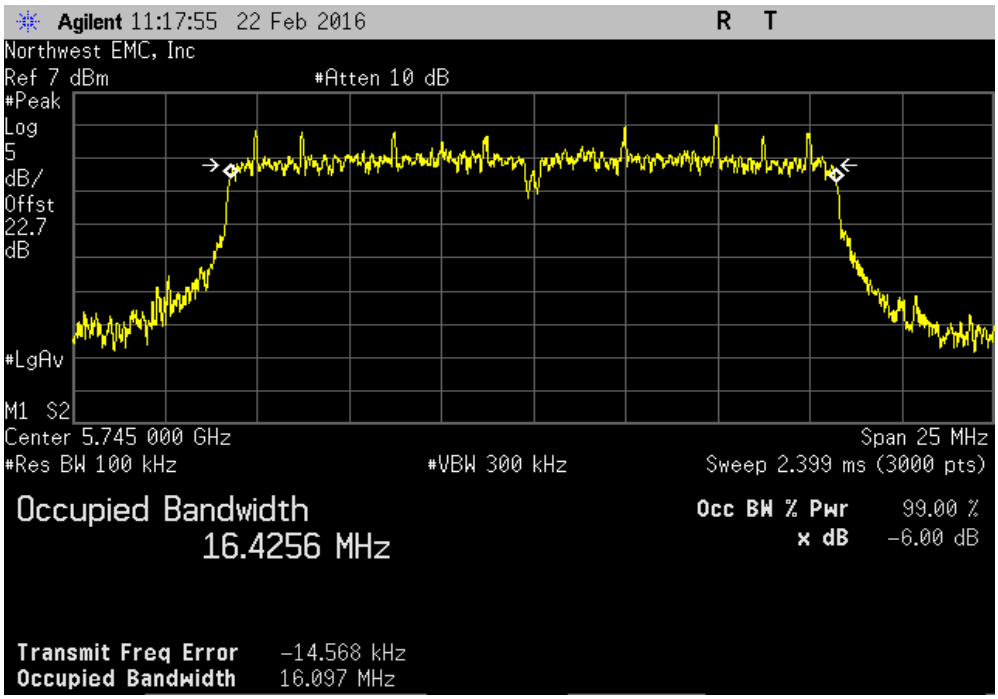
DEVIATIONS FROM TEST STANDARD

None

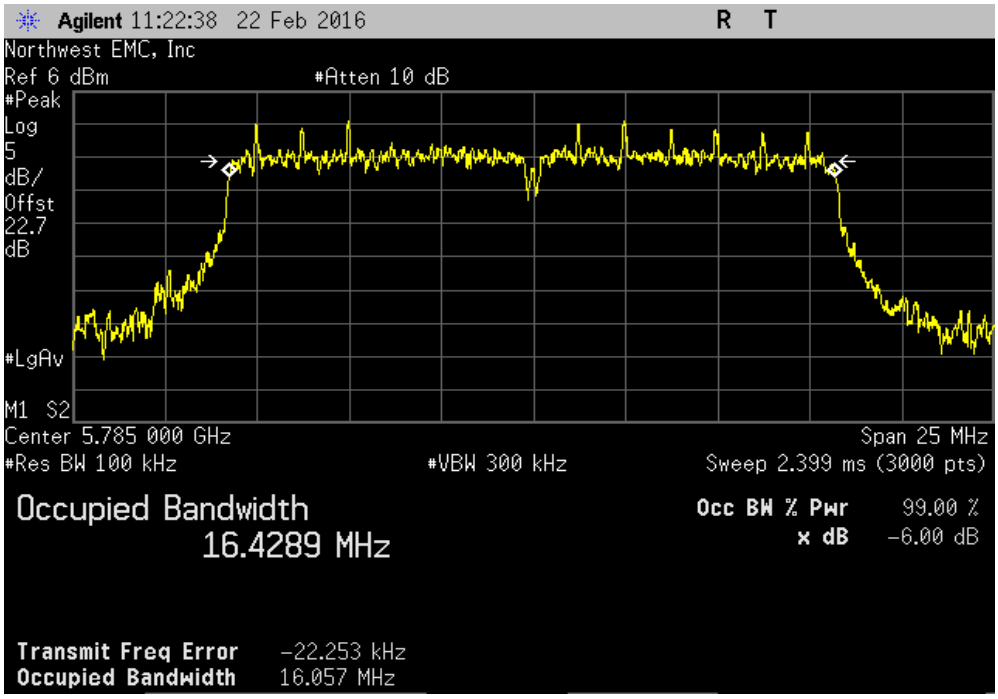
Configuration #	1	Signature

	Value	Limit (>)	Result
5725 - 5785 MHz Band			
Low Channel, Ch 149 - 5745 MHz			
802.11(a) 6 Mbps	16.097 MHz	500 kHz	Pass
Mid Channel, Ch 157 - 5785 MHz			
802.11(a) 6 Mbps	16.057 MHz	500 kHz	Pass
High Channel, Ch 165 - 5825 MHz			
802.11(a) 6 Mbps	15.961 MHz	500 kHz	Pass

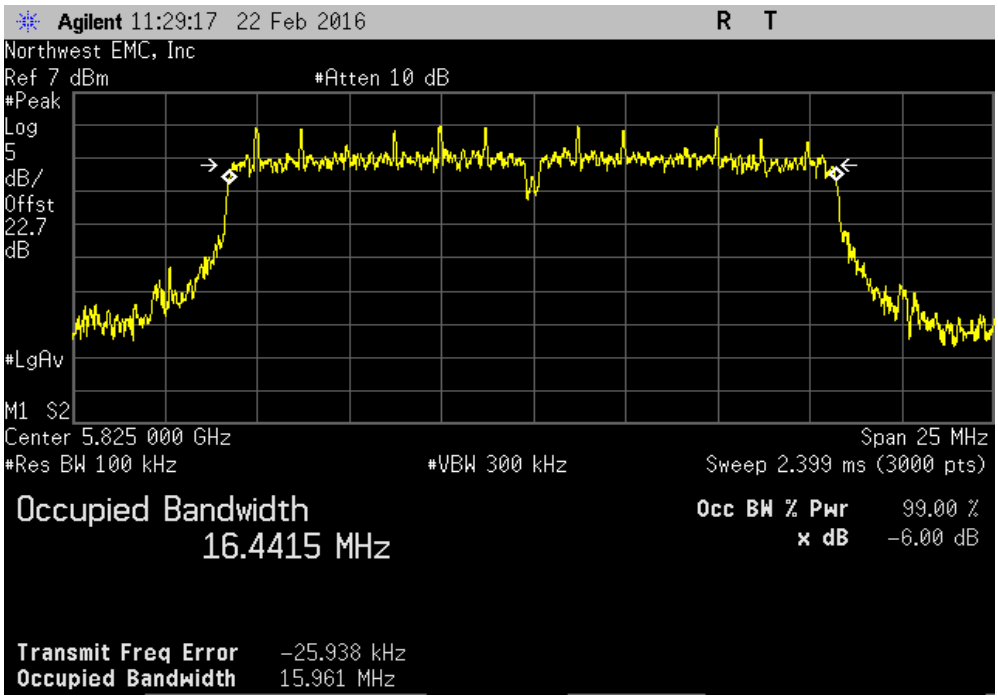
5725 - 5785 MHz Band, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 6 Mbps						
				Value	Limit (>)	Result
				16.097 MHz	500 kHz	Pass



5725 - 5785 MHz Band, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 6 Mbps						
				Value	Limit (>)	Result
				16.057 MHz	500 kHz	Pass



5725 - 5785 MHz Band, High Channel, Ch 165 - 5825 MHz, 802.11(a) 6 Mbps						
				Value	Limit (>)	Result
				15.961 MHz	500 kHz	Pass



MAXIMUM CONDUCTED OUTPUT POWER

NORTHWEST EMC

XMit 2015.01.14

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Generator - Signal	Keysight	5182B	TFU	NCR	0
Cable	ESM Cable Corp.	TT	EV1	NCR	0
Attenuator	S.M. Electronics	SA26B-20	AWU	NCR	0
Block - DC	Fairview Microwave	SD3379	AMQ	6/18/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	12/1/2014	24

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. The radio was operated in the modes as shown in the following data sheets.

A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Prior to measuring maximum transmit power; the emission bandwidth (B) and the transmission pulse duration (T) were measured. 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.

The maximum conducted output power was measured using ANSI C63.10, Method SA-1 (trace averaging with the EUT transmitting at full power throughout each sweep).

The spectrum analyzer settings were set per the guidance as well as the following specifics:

-RMS Detector

-Trace average 100 traces in power averaging mode.

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

MAXIMUM CONDUCTED OUTPUT POWER

NORTHWEST EMC

XMit 2015.01.14

EUT:	Lamarr II			**Work Order:**	PROT0346
Serial Number:	MM409594			**Date:**	02/22/16
Customer:	Welch Allyn Protocol, Inc.			**Temperature:**	23.8°C
Attendees:	None			**Humidity:**	35%
Project:	None			**Barometric Pres.:**	1022.6
Tested by:	Brandon Hobbs	**Power:**	5VDC Nominal	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.407:2016	ANSI C63.10:2013

COMMENTS

The EUT was operating at the maximum power setting of 21 dBm. This level was set using the client provided software.

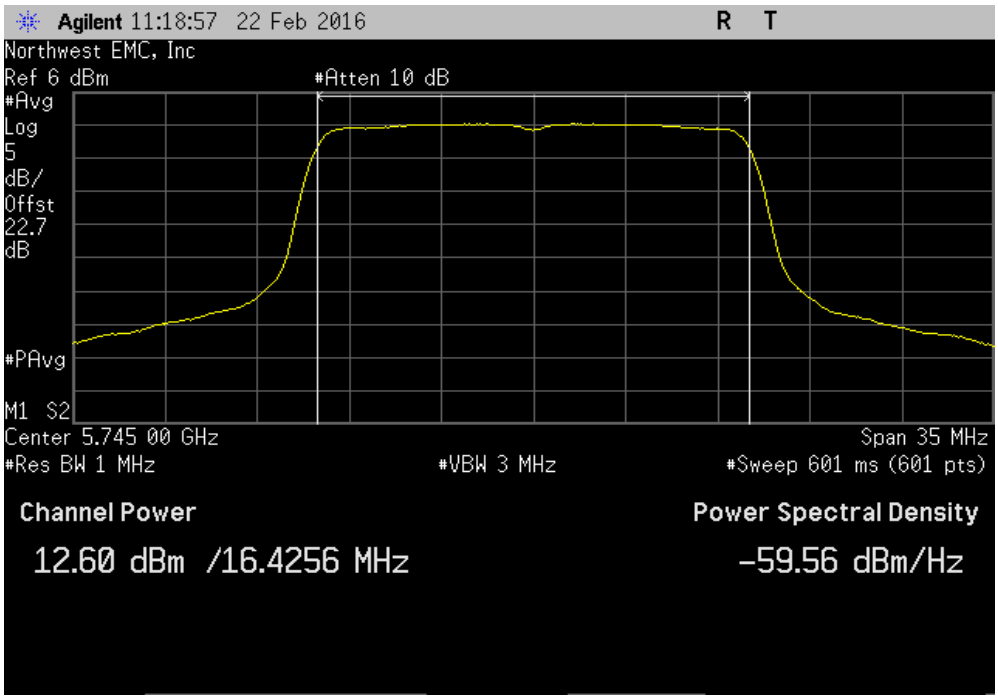
DEVIATIONS FROM TEST STANDARD

None

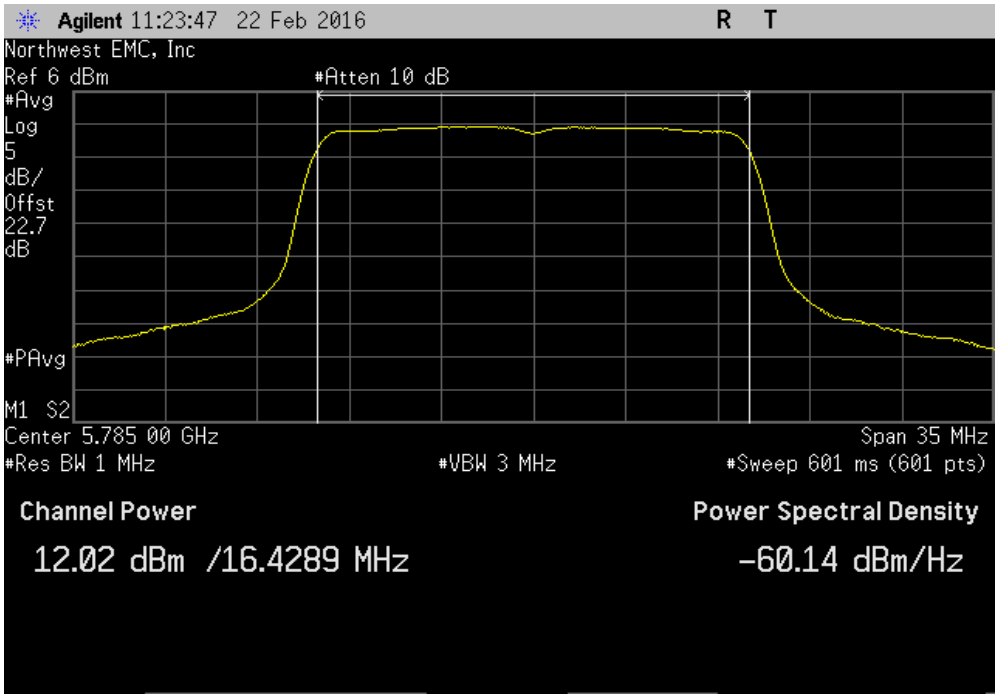
Configuration #	1	Signature

		Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Value (dBm)	Limit (dBm)	Results
5725 - 5785 MHz Band						
	Low Channel, Ch 149 - 5745 MHz					
	802.11(a) 6 Mbps	12.6	0.1	12.7	30	Pass
	Mid Channel, Ch 157 - 5785 MHz					
	802.11(a) 6 Mbps	12.015	0.1	12.1	30	Pass
	High Channel, Ch 165 - 5825 MHz					
	802.11(a) 6 Mbps	12.778	0.1	12.9	30	Pass

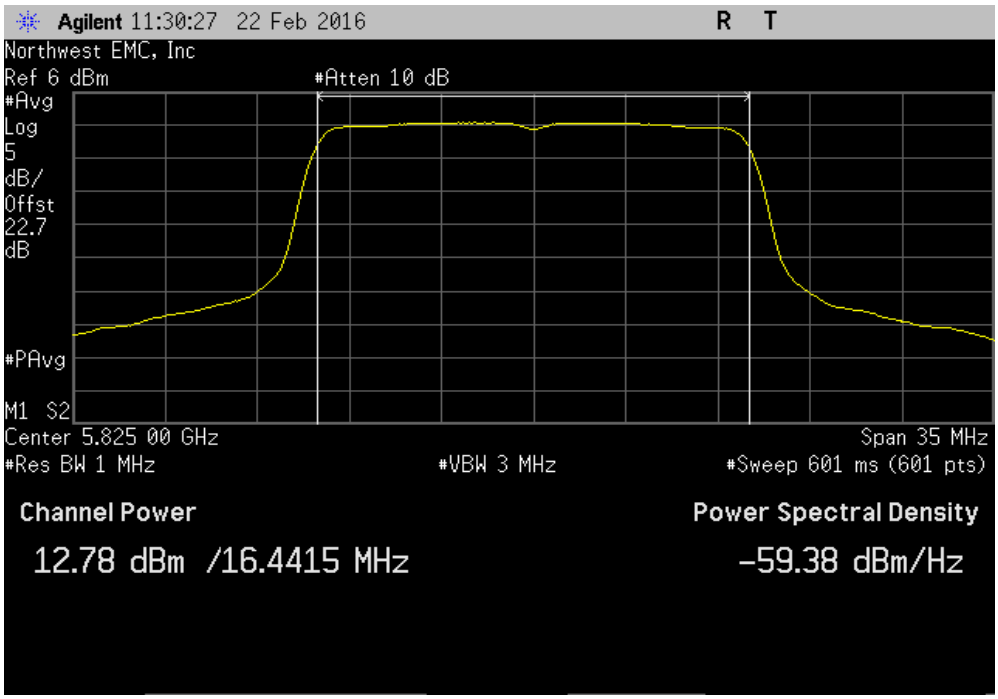
5725 - 5785 MHz Band, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 6 Mbps						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	12.6	0.1		12.7	30	Pass



5725 - 5785 MHz Band, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 6 Mbps						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	12.015	0.1		12.1	30	Pass



5725 - 5785 MHz Band, High Channel, Ch 165 - 5825 MHz, 802.11(a) 6 Mbps						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	12.778	0.1		12.9	30	Pass



MAXIMUM POWER SPECTRAL DENSITY

XMit 2015.01.14

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Generator - Signal	Keysight	5182B	TFU	NCR	0
Cable	ESM Cable Corp.	TT	EV1	NCR	0
Attenuator	S.M. Electronics	SA26B-20	AWU	NCR	0
Block - DC	Fairview Microwave	SD3379	AMQ	6/18/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	12/1/2014	24

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. The radio was operated in the modes as shown in the following data sheets.

A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input.

Prior to measuring maximum power spectral density, the emission bandwidth (B) was measured. The method of measuring the emission bandwidth and the associated data are found elsewhere in this test report

The maximum power spectral density was measured using ANSI C63.10, Method SA-2 (RMS detection and trace averaging across the on and off times of the EUT transmission and use of a duty cycle correction factor), consistent with the method used for maximum conducted output power.

The spectrum analyzer settings were set per the guidance as well as the following specifics:

-Resolution Bandwidth of 510 kHz

-RMS Detector

-Trace average 100 traces in power averaging mode

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

A duty cycle correction factor was added to the measurement using the results of the formula of 10*LOG(1/D) where D is the duty cycle.

MAXIMUM POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2015.01.14

EUT:	Lamarr II			**Work Order:**	PROT0346
Serial Number:	MM409594			**Date:**	02/22/16
Customer:	Welch Allyn Protocol, Inc.			**Temperature:**	23.8°C
Attendees:	None			**Humidity:**	35%
Project:	None			**Barometric Pres.:**	1022.6
Tested by:	Brandon Hobbs	**Power:**	5VDC Nominal	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.407:2016	ANSI C63.10:2013

COMMENTS

The EUT was operating at the maximum power setting of 21 dBm. This level was set using the client provided software.

DEVIATIONS FROM TEST STANDARD

None

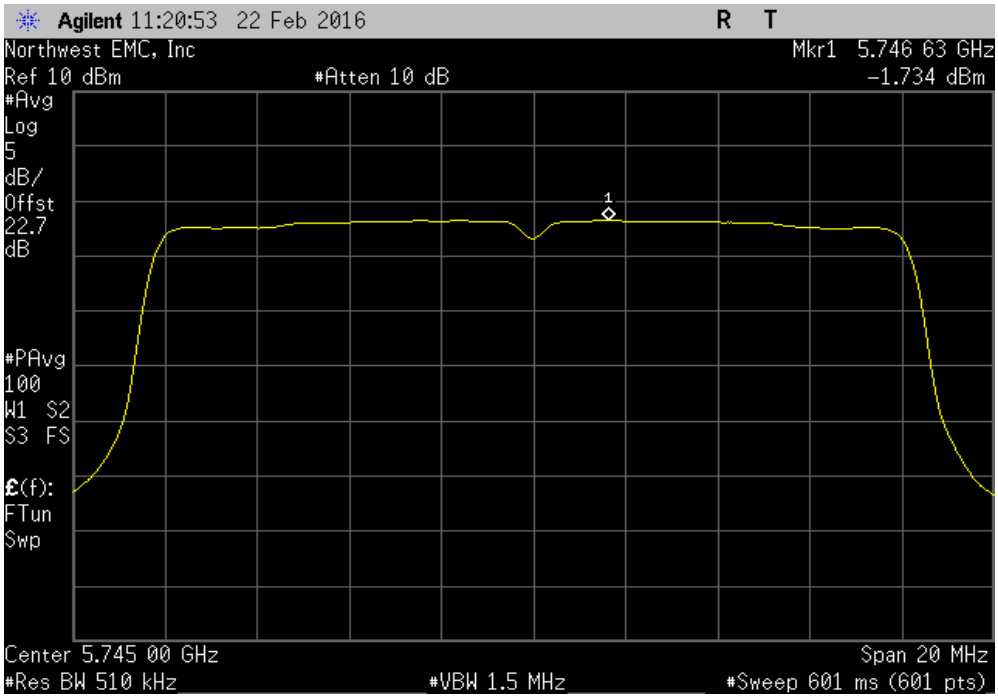
Configuration #	1	Signature

		Power (dBm/MHz)	Duty Cycle Factor (dB)	Density (dBm/MHz)	Limit ≤ (dBm / Ref BW)	Results
5725 - 5785 MHz Band						
	Low Channel, Ch 149 - 5745 MHz					
	802.11(a) 6 Mbps	-1.734	0.1	-1.6	30	Pass
	Mid Channel, Ch 157 - 5785 MHz					
	802.11(a) 6 Mbps	-2.365	0.1	-2.3	30	Pass
	High Channel, Ch 165 - 5825 MHz					
	802.11(a) 6 Mbps	-1.566	0.1	-1.5	30	Pass

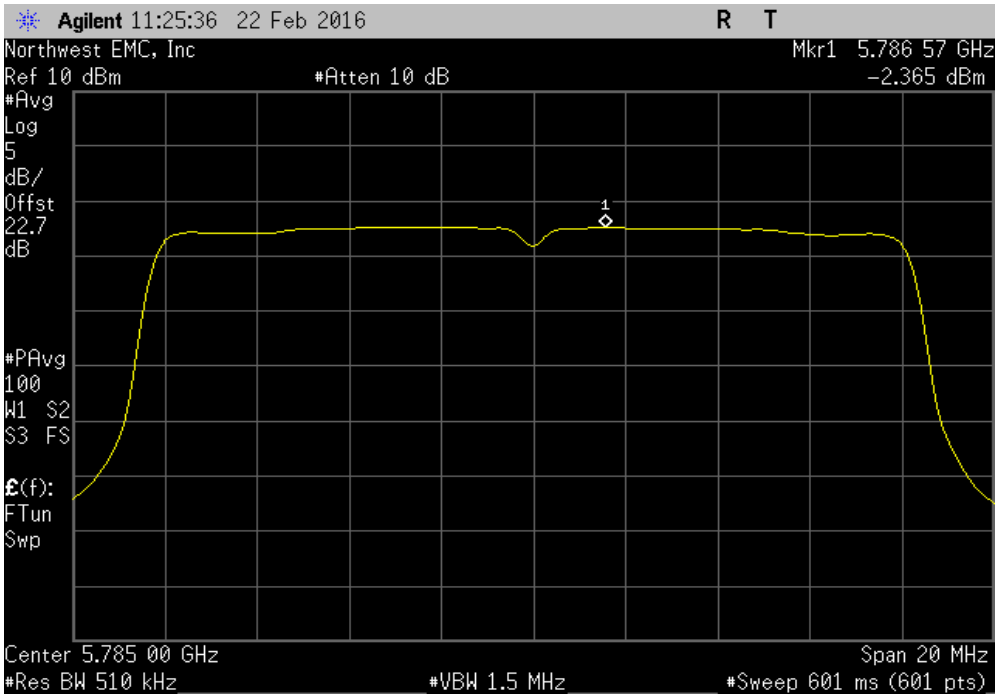
MAXIMUM POWER SPECTRAL DENSITY

NORTHWEST EMC
XMit 2015.01.14

5725 - 5785 MHz Band, Low Channel, Ch 149 - 5745 MHz, 802.11(a) 6 Mbps						
	Power (dBm/MHz)	Duty Cycle Factor (dB)		Density (dBm/MHz)	Limit (dBm / Ref BW	Results
	-1.734	0.1		-1.6	30	Pass



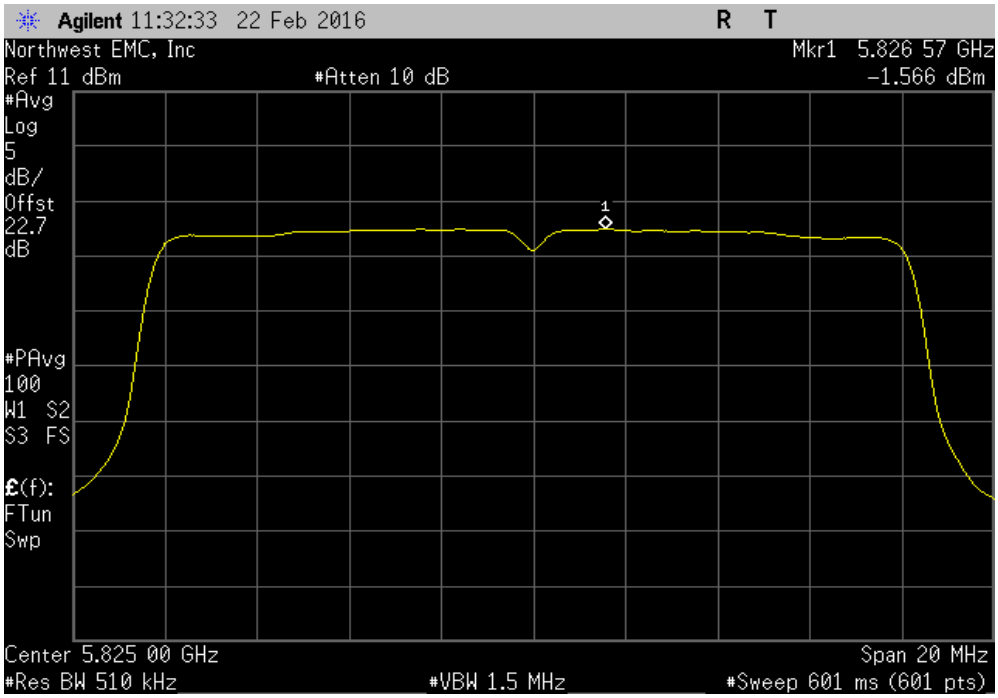
5725 - 5785 MHz Band, Mid Channel, Ch 157 - 5785 MHz, 802.11(a) 6 Mbps						
	Power (dBm/MHz)	Duty Cycle Factor (dB)		Density (dBm/MHz)	Limit (dBm / Ref BW	Results
	-2.365	0.1		-2.3	30	Pass



MAXIMUM POWER SPECTRAL DENSITY

XMit 2015.01.14

5725 - 5785 MHz Band, High Channel, Ch 165 - 5825 MHz, 802.11(a) 6 Mbps						
	Power (dBm/MHz)	Duty Cycle Factor (dB)		Density (dBm/MHz)	Limit (dBm / Ref BW	Results
	-1.566	0.1		-1.5	30	Pass



FREQUENCY STABILITY

XMit 2015.01.14

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Power Supply - DC	Topward	TPS-2000	TPD	NCR	0
Meter - Multimeter	Fluke	8846A	MMZ	10/22/2015	36
Generator - Signal	Keysight	5182B	TFU	NCR	0
Thermometer	Omegaette	HH311	DTY	1/21/2015	36
Chamber - Temperature/Humidity	Cincinnati Sub Zero (CSZ)	ZPH-8-2-SCT/AC	TBI	NCR	0
Cable	ESM Cable Corp.	TT	EV1	NCR	0
Attenuator	S.M. Electronics	SA26B-20	AWU	NCR	0
Block - DC	Fairview Microwave	SD3379	AMQ	6/18/2015	12
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAW	12/1/2014	24

TEST DESCRIPTION

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.

Measurements were made at the edges of the main transmit bands as called out on the data sheets. Testing was done with an absence of modulation in a CW mode of operation.

The primary supply voltage was varied from 85 % to 115% of the nominal voltage Using a temperature chamber, the transmit frequency was recorded at the extremes of the specified temperature range (-30 ° to +50° C) and at 10°C intervals.

Per the requirements of FCC 15.407:

"Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual."

No specific limits are provided in either FCC 15.407, the product specific rule part, or FCC 2.1055, the equipment authorization procedure for testing frequency stability. While there are no limits called out, any results less than 100ppm will still allow the radio to be operating within the band.

FREQUENCY STABILITY

NORTHWEST EMC

XMit 2015.01.14

EUT:	Lamarr II			**Work Order:**	PROT0346
Serial Number:	MM409594			**Date:**	02/22/16
Customer:	Welch Allyn Protocol, Inc.			**Temperature:**	23.8°C
Attendees:	None			**Humidity:**	35%
Project:	None			**Barometric Pres.:**	1022.6
Tested by:	Brandon Hobbs	**Power:**	5VDC Nominal	**Job Site:**	EV06

TEST SPECIFICATIONS	Test Method
FCC 15.407:2016	ANSI C63.10:2013

COMMENTS

The EUT was operating at the maximum power setting of 21 dBm. This level was set using the client provided software.

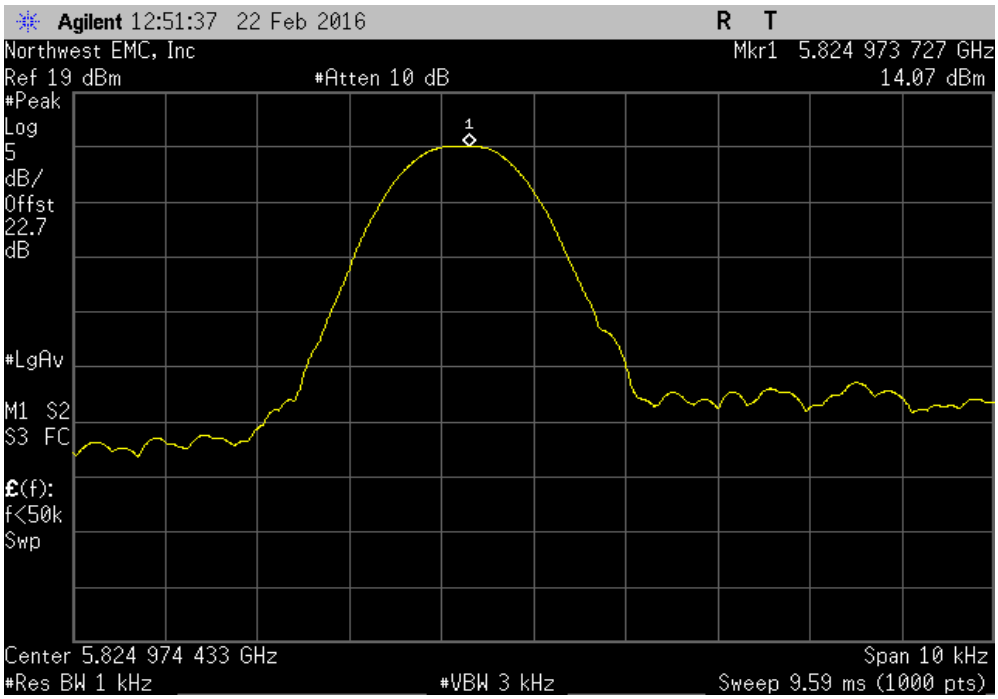
DEVIATIONS FROM TEST STANDARD

None

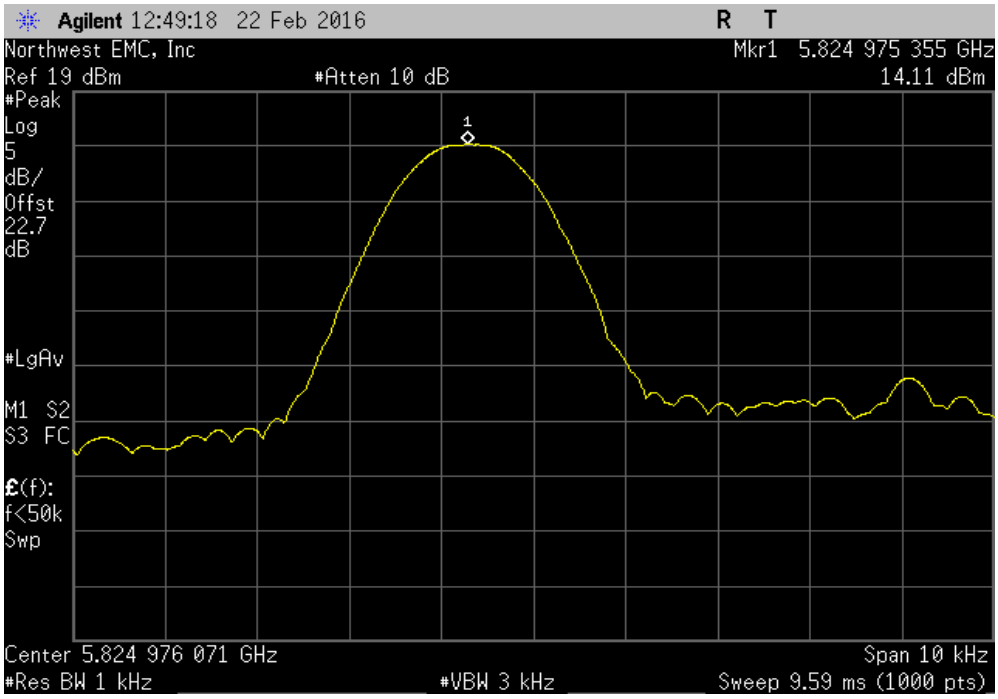
Configuration #	1	Signature

	Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
5725 MHz - 5850 MHz - High Channel, 5825 MHz					
Voltage: 115%	5824.973727	5825	4.5	100	Pass
Voltage: 100%	5824.975355	5825	4.3	100	Pass
Voltage: 85%	5824.972957	5825	4.6	100	Pass
Temperature: +50°	5824.965569	5825	5.9	100	Pass
Temperature: +40°	5824.96692	5825	5.7	100	Pass
Temperature: +30°	5824.975349	5825	4.2	100	Pass
Temperature: +20°	5824.988185	5825	2	100	Pass
Temperature: +10°	5825.005117	5825	0.9	100	Pass
Temperature: 0°	5825.015086	5825	2.6	100	Pass
Temperature: -10°	5825.015234	5825	2.6	100	Pass
Temperature: -20°	5825.005009	5825	0.9	100	Pass
Temperature: -30°	5824.980595	5825	3.3	100	Pass

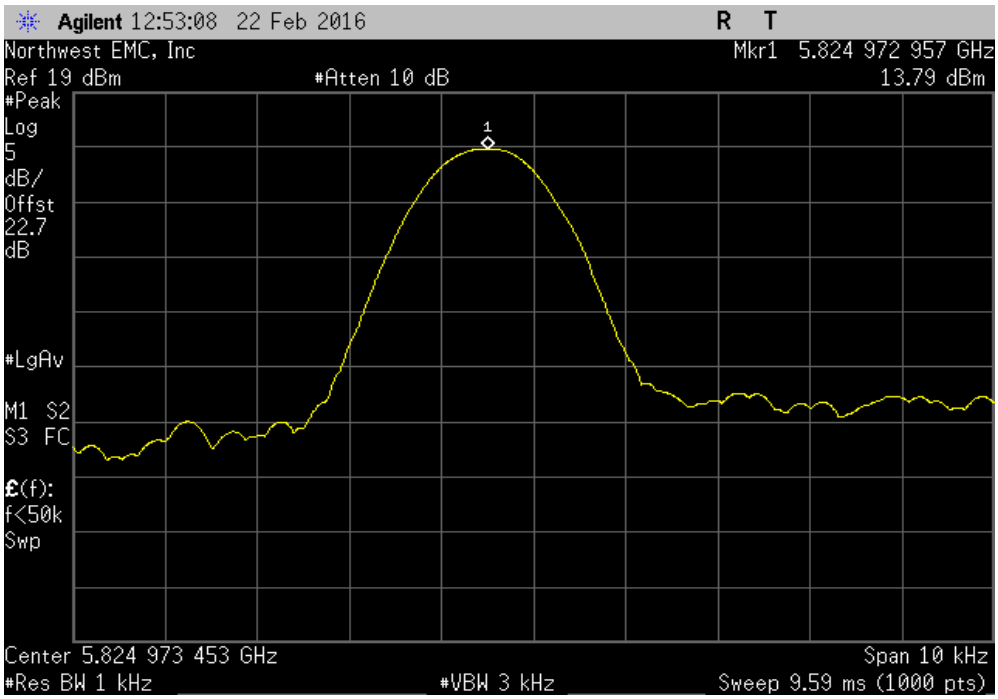
5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 115%						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5824.973727	5825	4.5	100	Pass



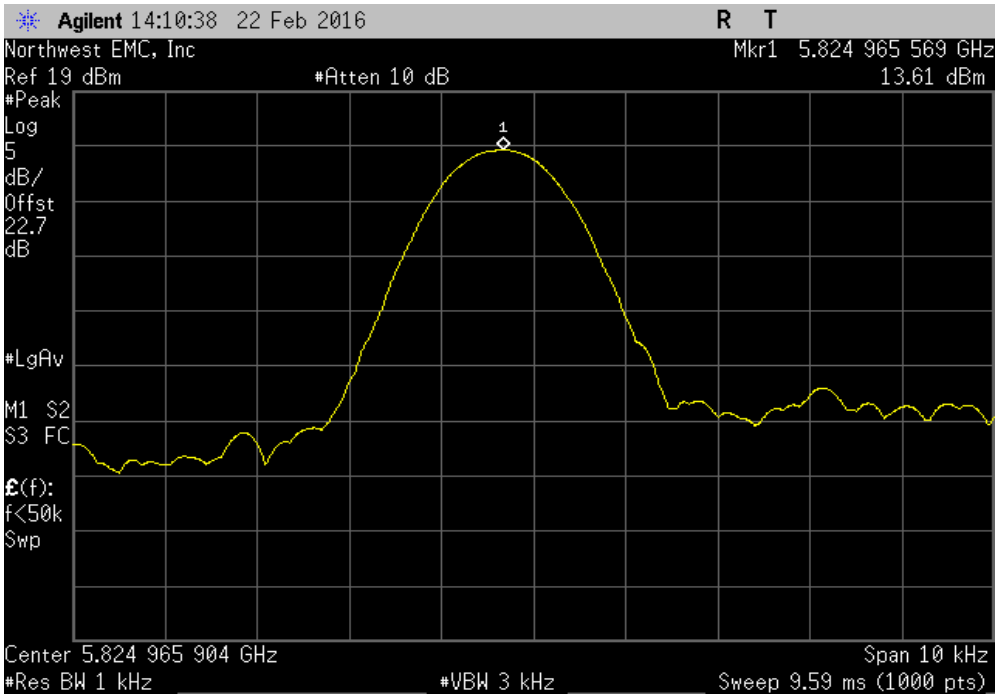
5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 100%						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5824.975355	5825	4.3	100	Pass



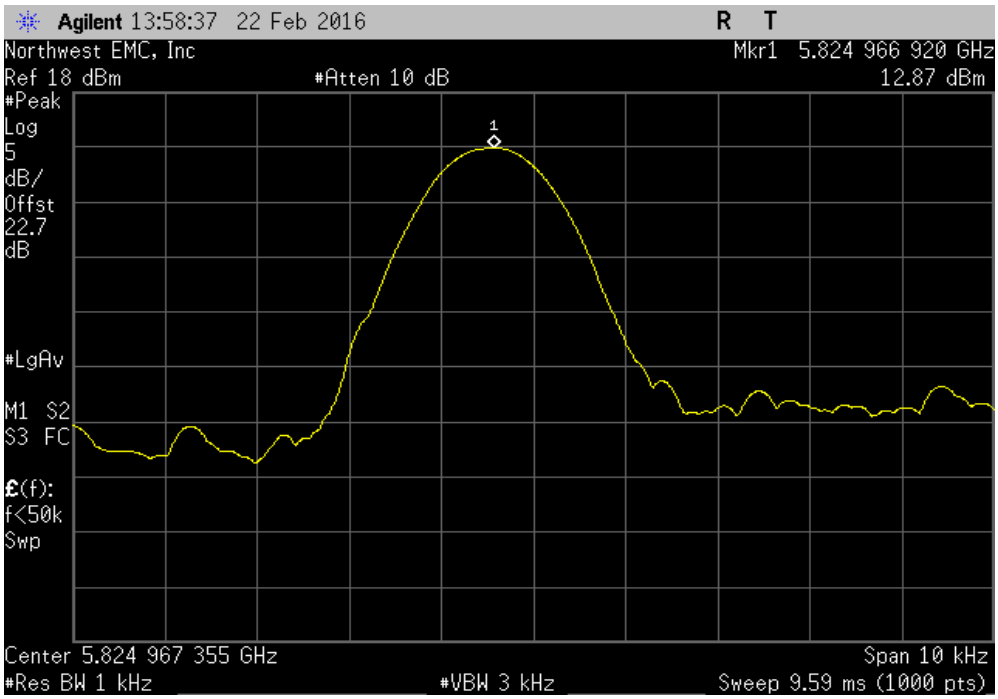
5725 MHz - 5850 MHz - High Channel, 5825 MHz, Voltage: 85%						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5824.972957	5825	4.6	100	Pass



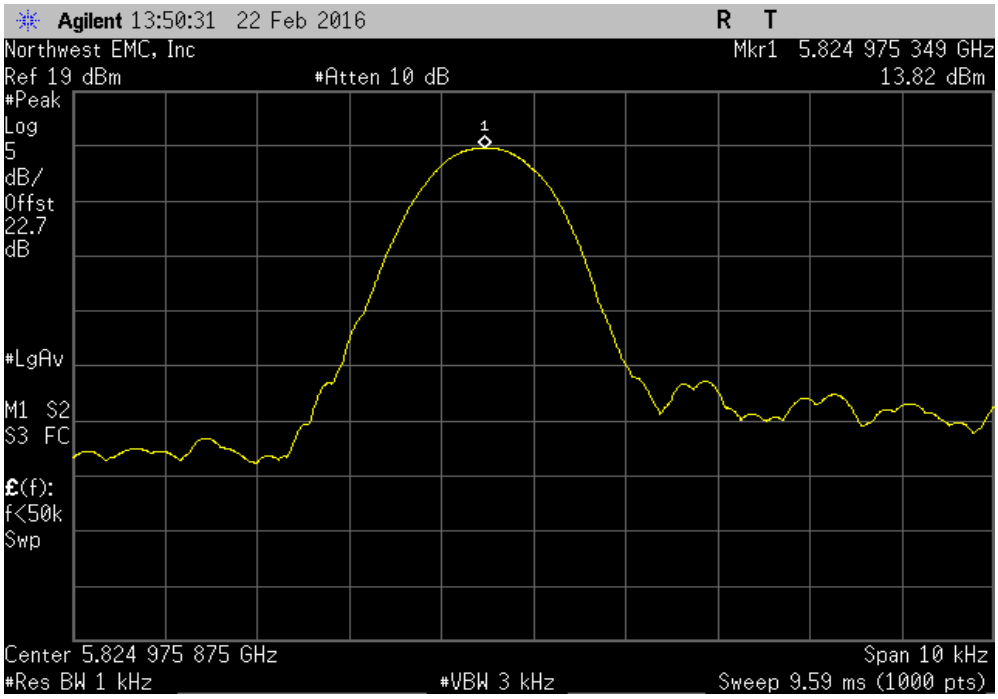
5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +50°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5824.965569	5825	5.9	100	Pass



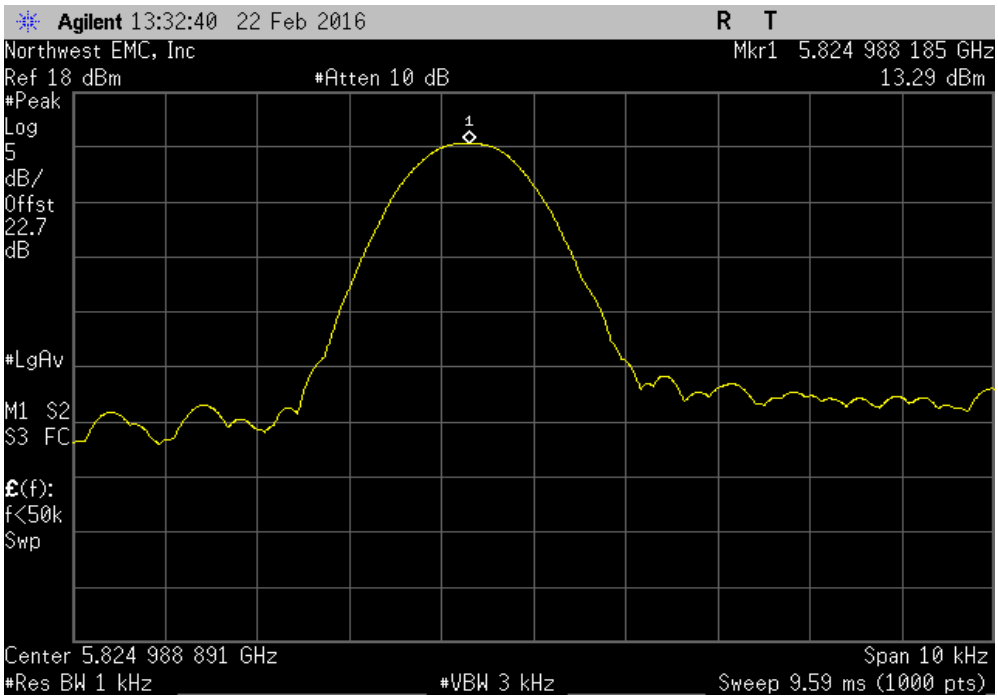
5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +40°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5824.96692	5825	5.7	100	Pass



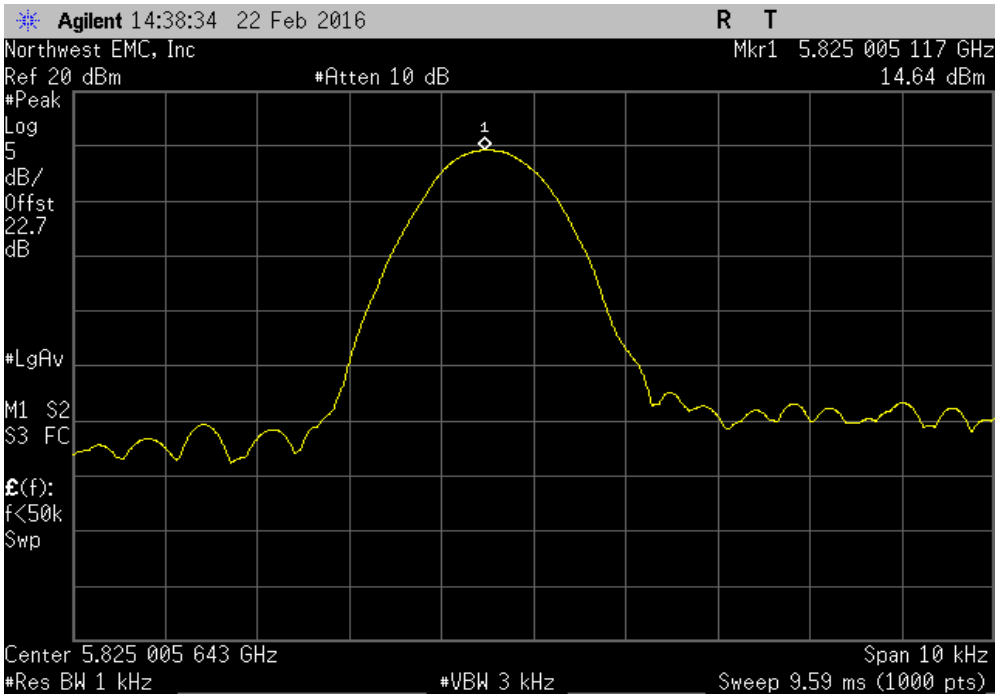
5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +30°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5824.975349	5825	4.2	100	Pass



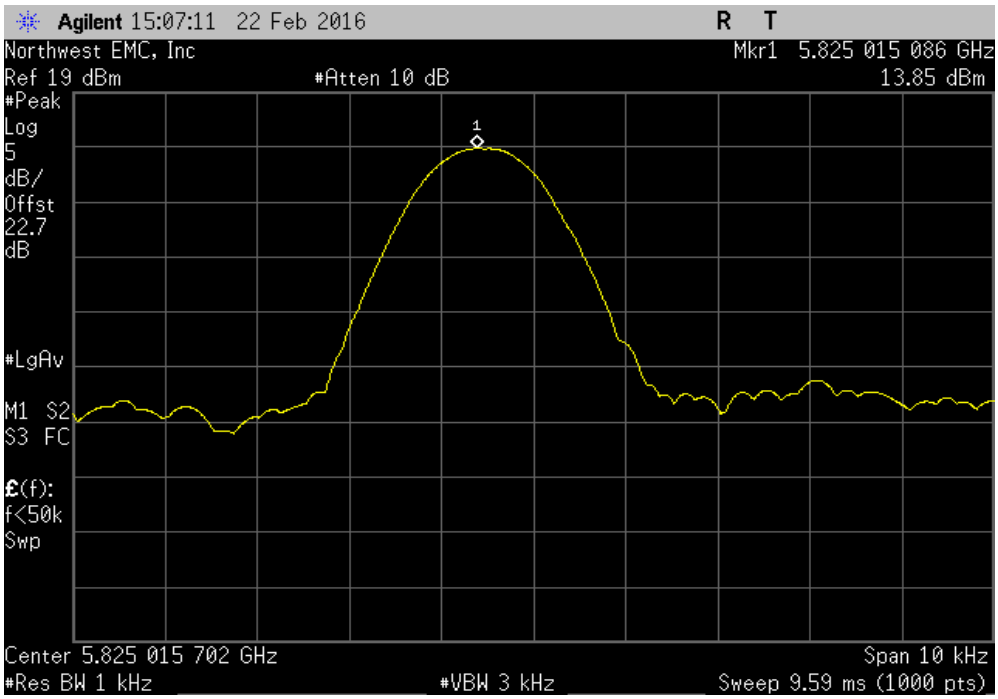
5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +20°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5824.988185	5825	2	100	Pass



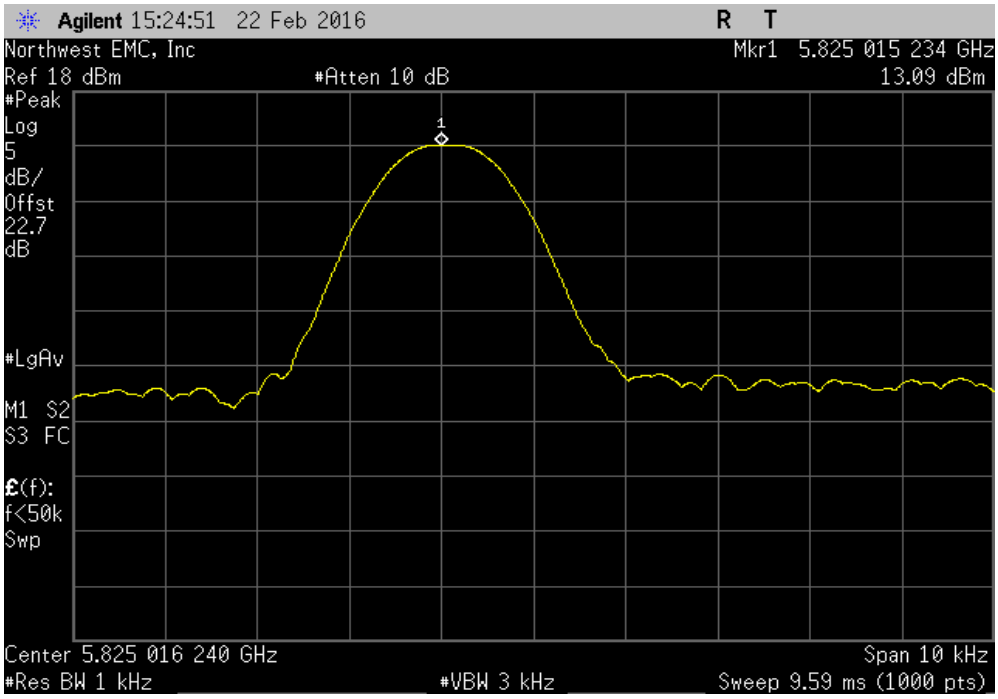
5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: +10°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5825.005117	5825	0.9	100	Pass



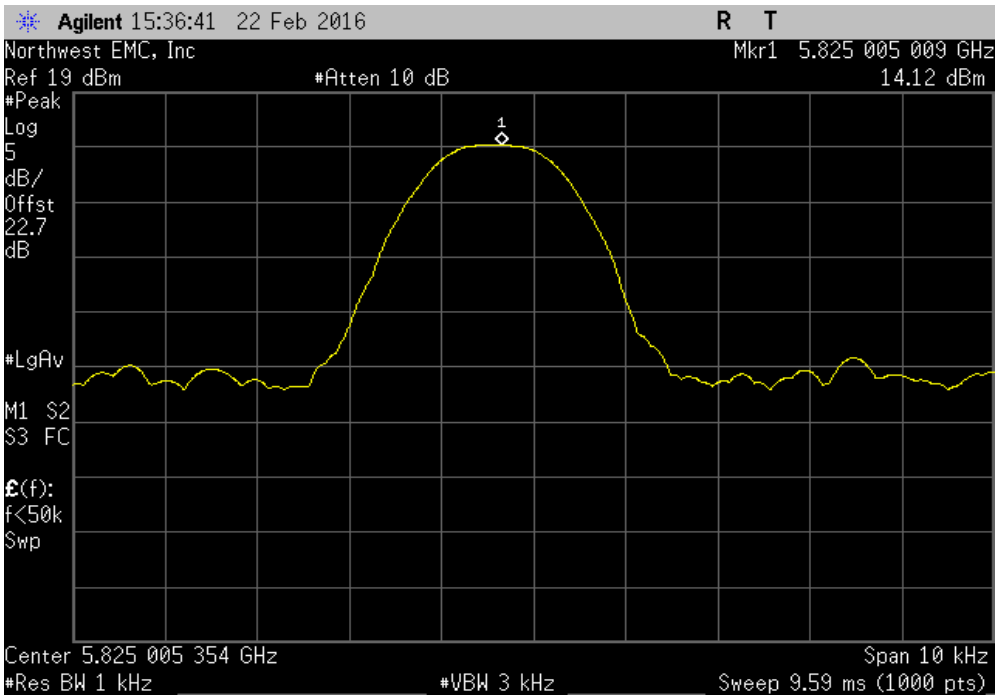
5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: 0°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5825.015086	5825	2.6	100	Pass



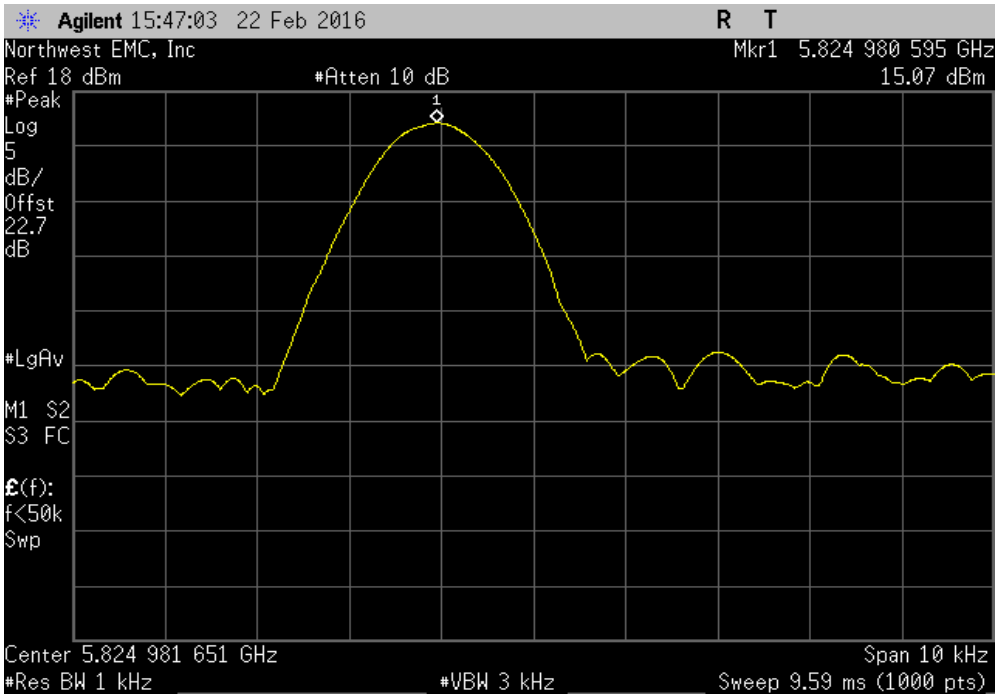
5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -10°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5825.015234	5825	2.6	100	Pass



5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -20°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5825.005009	5825	0.9	100	Pass



5725 MHz - 5850 MHz - High Channel, 5825 MHz, Temperature: -30°						
		Measured Value (MHz)	Assigned Value (MHz)	Error (ppm)	Limit (ppm)	Results
		5824.980595	5825	3.3	100	Pass



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

Continuous Tx, test mode is 98% Duty Cycle, 6Mbps Low Ch.149 5745 MHz
Continuous Tx, test mode is 98% Duty Cycle, 6Mbps Mid Ch.157 5785 MHz
Continuous Tx, test mode is 98% Duty Cycle, 6Mbps High Ch.165 5825MHz

POWER SETTINGS INVESTIGATED

5VDC via 110VAC/60Hz

CONFIGURATIONS INVESTIGATED

PROT0346 - 3

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	40000 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval (mo)
Cable	ESM Cable Corp.	KMKM-72	EVE	6/6/2015	12
Amplifier - Pre-Amplifier	Miteq	JSW45-26004000-40-5P	PAE	6/6/2015	12
Antenna - Standard Gain	ETS Lindgren	3160-10	AIW	NCR	0
Cable	ESM Cable Corp.	KMKM-72	EVY	11/4/2015	12
Amplifier - Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	11/4/2015	12
Antenna - Standard Gain	ETS Lindgren	3160-09	AIV	NCR	0
Amplifier - Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	4/16/2015	12
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	0
Cable	None	Standard Gain Horns Cable	EVF	4/20/2015	12
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	4/20/2015	12
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0
Cable	N/A	Double Ridge Horn Cables	EVB	4/16/2015	12
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	4/16/2015	12
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2/3/2016	24
Cable	ESM Cable Corp.	TTBJ-141-KMKM-72	EV3	6/24/2015	12
Antenna - Double Ridge	EMCO	3115	AHC	6/13/2014	24
Cable	N/A	Bilog Cables	EVA	1/29/2016	12
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AOL	1/29/2016	12
Meter - Power	Gigatronics	8651A	SPM	5/25/2015	12
Power Sensor	Gigatronics	80701A	SPL	5/25/2015	12
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2/3/2016	24
Generator - Signal	Keysight	N5182B	TFU	NCR	0
Attenuator	S.M. Electronics	SA18N-06/SM4032	REE	10/1/2015	12
Filter - Band Pass/Notch	Micro-Tronics	BRC50705	HGJ	1/11/2016	12
Antenna - Biconilog	EMCO	3141	AXE	8/29/2014	24

MEASUREMENT BANDWIDTHS

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

TEST DESCRIPTION

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. All average measurements were duty cycle corrected per ANSI C63.10:2013

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.

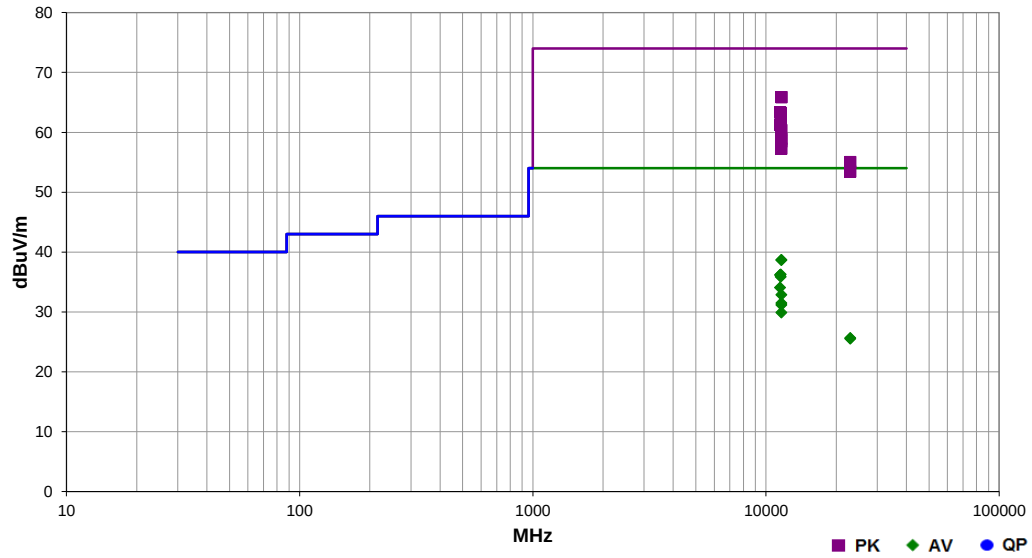
As the duty cycle of the radio operation during normal use will be software limited to 14%, a duty cycle correction factor of -17.1 dB was applied to the average measurements.

SPURIOUS RADIATED EMISSIONS

Work Order:	PROT0346	**Date:**	02/23/16		
Project:	None	**Temperature:**	20.8 °C		
Job Site:	EV01	**Humidity:**	33.4% RH		
Serial Number:	MM409594	**Barometric Pres.:**	1022 mbar	**Tested by:**	Brandon Hobbs
EUT:	Lamarr II				
Configuration:	3				
Customer:	Welch Allyn Protocol, Inc.				
Attendees:	None				
EUT Power:	5VDC via 110VAC/60Hz				
Operating Mode:	Continuous Tx, test mode is 98% Duty Cycle, normally operates at 14% duty cycle.				
Deviations:	None				
Comments:	Please reference the data comments for EUT orientation, Channel. Power level and frequency. The average measurements were duty cycle corrected per ANSI C63.10:2013				

Test Specifications	**Test Method**
FCC 15.407:2016	ANSI C63.10:2013

Run #	9	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



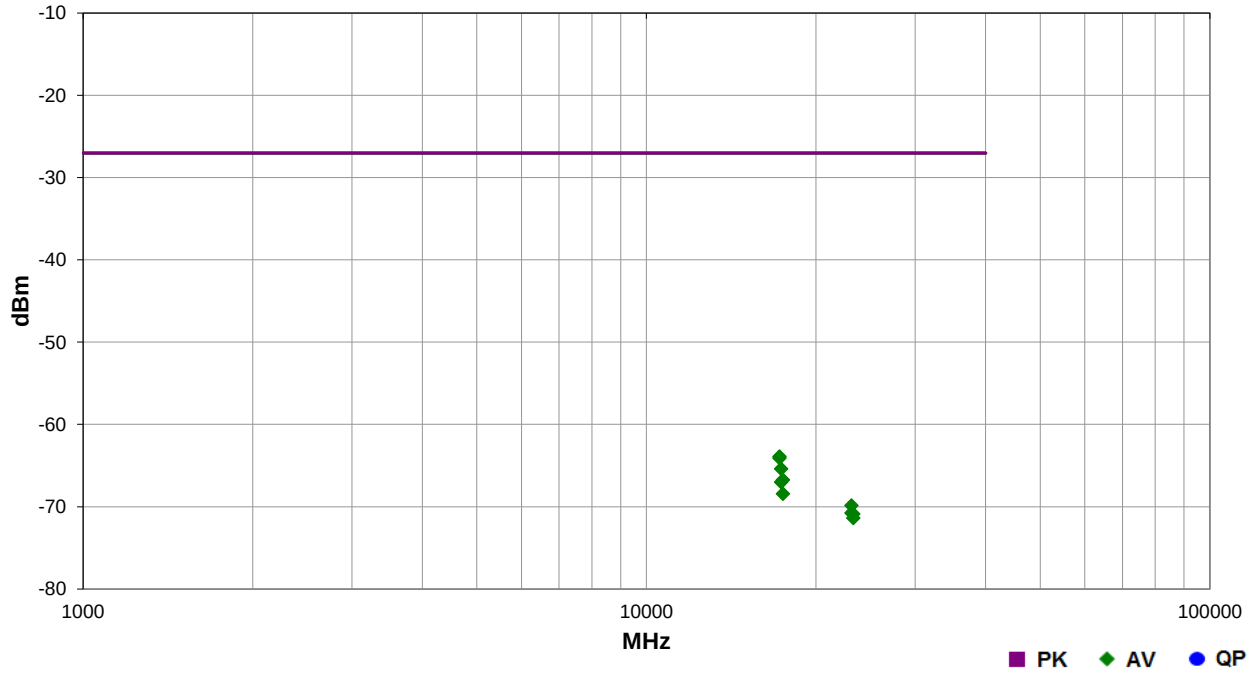
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Duty Cycle Correction Factor (dB)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
11651.650	67.6	-1.7	1.0	35.0	0.0	0.0	Horz	PK	0.0	65.9	74.0	-8.1	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT On Side
11651.250	67.6	-1.7	3.4	18.0	0.0	0.0	Vert	PK	0.0	65.9	74.0	-8.1	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT Vert
11491.300	66.5	-3.1	1.4	41.0	0.0	0.0	Horz	PK	0.0	63.4	74.0	-10.6	Low Ch.149 5745MHz, Pwr lvl 21dBm, EUT On Side
11571.300	65.6	-2.4	3.1	54.0	0.0	0.0	Horz	PK	0.0	63.2	74.0	-10.8	Mid Ch.157 5785MHz, Pwr lvl 21dBm, EUT On Side
11571.750	64.7	-2.4	3.9	0.0	0.0	0.0	Vert	PK	0.0	62.3	74.0	-11.7	Mid Ch.157 5785MHz, Pwr lvl 21dBm, EUT Vert
11491.200	64.4	-3.1	3.5	8.0	0.0	0.0	Vert	PK	0.0	61.3	74.0	-12.7	Low Ch.149 5745MHz, Pwr lvl 21dBm, EUT Vert
11651.300	62.1	-1.7	1.5	347.0	0.0	0.0	Vert	PK	0.0	60.4	74.0	-13.6	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT Horz
11651.500	60.6	-1.7	2.8	54.0	0.0	0.0	Vert	PK	0.0	58.9	74.0	-15.1	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT On Side
11650.050	57.5	-1.7	1.0	35.0	-17.1	0.0	Horz	AV	0.0	38.7	54.0	-15.3	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT On Side
11650.000	57.5	-1.7	3.4	18.0	-17.1	0.0	Vert	AV	0.0	38.7	54.0	-15.3	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT Vert
11651.600	60.2	-1.7	3.4	59.0	0.0	0.0	Horz	PK	0.0	58.5	74.0	-15.5	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT Vert
11650.900	59.0	-1.7	2.0	315.0	0.0	0.0	Horz	PK	0.0	57.3	74.0	-16.7	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT Horz
11570.000	55.8	-2.4	3.1	54.0	-17.1	0.0	Horz	AV	0.0	36.3	54.0	-17.7	Mid Ch.157 5785MHz, Pwr lvl 21dBm, EUT On Side
11490.050	56.4	-3.1	1.4	41.0	-17.1	0.0	Horz	AV	0.0	36.2	54.0	-17.8	Low Ch.149 5745MHz, Pwr lvl 21dBm, EUT On Side
11570.050	55.4	-2.4	3.9	0.0	-17.1	0.0	Vert	AV	0.0	35.9	54.0	-18.1	Mid Ch.157 5785MHz, Pwr lvl 21dBm, EUT Vert
22981.920	53.4	1.6	1.6	146.0	0.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	Low Ch.149 5745MHz, Pwr lvl 21dBm, EUT Vert
11490.050	54.3	-3.1	3.5	8.0	-17.1	0.0	Vert	AV	0.0	34.1	54.0	-19.9	Low Ch.149 5745MHz, Pwr lvl 21dBm, EUT Vert
22981.580	51.8	1.6	1.6	210.0	0.0	0.0	Horz	PK	0.0	53.4	74.0	-20.6	Low Ch.149 5745MHz, Pwr lvl 21dBm, EUT On Side
11650.000	51.7	-1.7	1.5	347.0	-17.1	0.0	Vert	AV	0.0	32.9	54.0	-21.1	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT Horz
11650.050	50.3	-1.7	2.8	54.0	-17.1	0.0	Vert	AV	0.0	31.5	54.0	-22.5	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT On Side
11650.000	50.0	-1.7	3.4	59.0	-17.1	0.0	Horz	AV	0.0	31.2	54.0	-22.8	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT Vert
11650.050	48.7	-1.7	2.0	315.0	-17.1	0.0	Horz	AV	0.0	29.9	54.0	-24.1	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT Horz
22980.040	41.1	1.6	1.6	146.0	-17.1	0.0	Vert	AV	0.0	25.6	54.0	-28.4	Low Ch.149 5745MHz, Pwr lvl 21dBm, EUT Vert
22979.960	41.0	1.6	1.6	210.0	-17.1	0.0	Horz	AV	0.0	25.5	54.0	-28.5	Low Ch.149 5745MHz, Pwr lvl 21dBm, EUT On Side

SPURIOUS RADIATED EMISSIONS

Work Order:	PROT0346	**Date:**	02/23/16		
Project:	None	**Temperature:**	22.2 °C		
Job Site:	EV01	**Humidity:**	39.8% RH		
Serial Number:	MM409594	**Barometric Pres.:**	1012.5 mbar	**Tested by:**	Brandon Hobbs
EUT:	Lamarr II				
Configuration:	3				
Customer:	Welch Allyn Protocol, Inc.				
Attendees:	None				
EUT Power:	5VDC via 110VAC/60Hz				
Operating Mode:	Continuous Tx, test mode is 98% Duty Cycle, normally operates at 14% duty cycle.				
Deviations:	None				
Comments:	Please reference the data comments for EUT orientation, Channel. Power level and frequency. The average measurements were duty cycle corrected per ANSI C63.10:2013				

Test Specifications	**Test Method**
FCC 15.407:2016	ANSI C63.10:2013

Run #	11	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



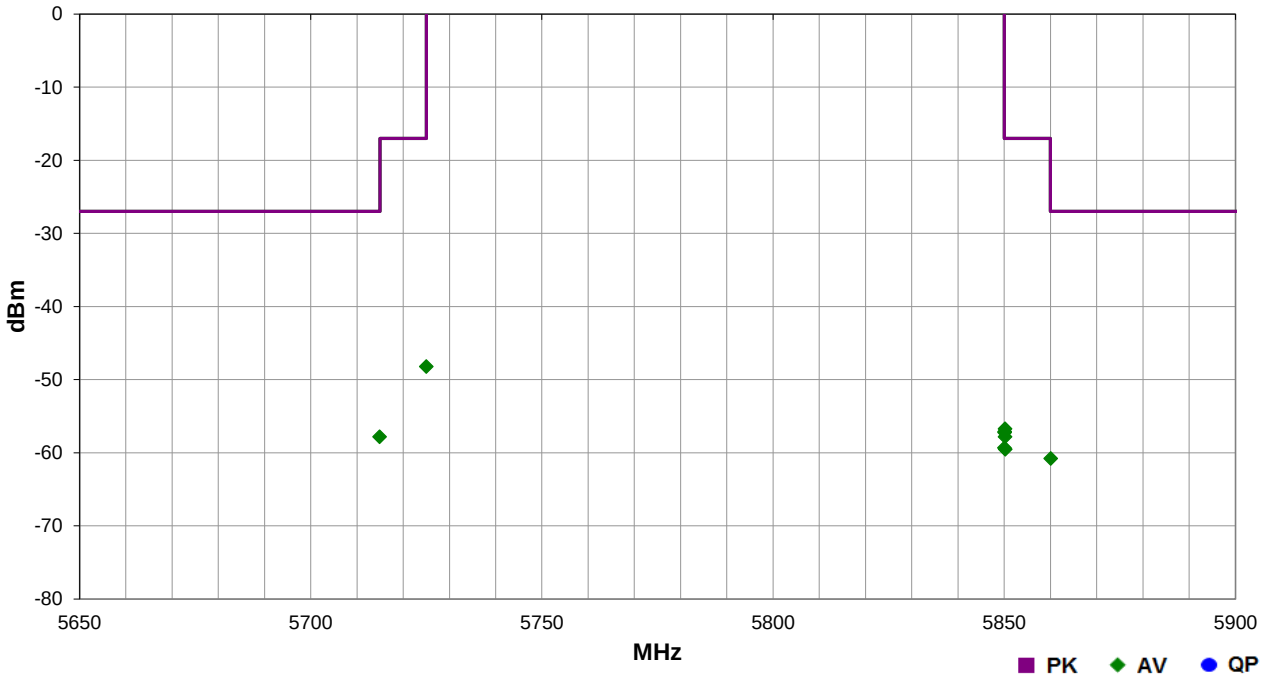
	Freq (MHz)	Antenna Height (meters)	Azimuth (degrees)	Polarity/ Transducer Type	Detector	EIRP (Watts)	EIRP (dBm)	Spec. Limit (dBm)	Compared to Spec. (dB)	Comments
	17234.500	4.0	360.0	Vert	AV	4.07E-10	-63.9	-27.0	-36.9	Low Ch.149 5745MHz, Pwr lvl 21dBm, EUT Vert
	17234.450	1.0	17.0	Horz	AV	3.89E-10	-64.1	-27.0	-37.1	Low Ch.149 5745MHz, Pwr lvl 21dBm, EUT On Side
	17354.300	1.0	17.0	Horz	AV	2.87E-10	-65.4	-27.0	-38.4	Mid Ch.157 5785MHz, Pwr lvl 21dBm, EUT On Side
	17474.200	1.0	17.0	Horz	AV	2.11E-10	-66.8	-27.0	-39.8	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT On Side
	17354.700	1.0	30.0	Vert	AV	1.99E-10	-67.0	-27.0	-40.0	Mid Ch.157 5785MHz, Pwr lvl 21dBm, EUT Vert
	17474.400	1.0	30.0	Vert	AV	1.43E-10	-68.5	-27.0	-41.5	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT Vert
	23140.000	1.6	147.0	Vert	AV	1.03E-10	-69.9	-27.0	-42.9	Mid Ch.157 5785MHz, Pwr lvl 21dBm, EUT Vert
	23139.750	1.6	211.0	Horz	AV	8.38E-11	-70.8	-27.0	-43.8	Mid Ch.157 5785MHz, Pwr lvl 21dBm, EUT On Side
	23300.080	1.6	219.0	Horz	AV	8.14E-11	-70.9	-27.0	-43.9	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT On Side
	23300.080	1.6	153.0	Vert	AV	7.26E-11	-71.4	-27.0	-44.4	High Ch.165 5825MHz, Pwr lvl 21dBm, EUT Vert

SPURIOUS RADIATED EMISSIONS

Work Order:	PROT0346	**Date:**	03/11/16		
Project:	None	**Temperature:**	22.2 °C		
Job Site:	EV01	**Humidity:**	41.2% RH		
Serial Number:	MM409594	**Barometric Pres.:**	1002.6 mbar	**Tested by:**	Brandon Hobbs
EUT:	Lamarr II				
Configuration:	3				
Customer:	Welch Allyn Protocol, Inc.				
Attendees:	None				
EUT Power:	5VDC via 110VAC/60Hz				
Operating Mode:	Continuous Tx, test mode is 98% Duty Cycle, normally operates at 14% duty cycle.				
Deviations:	None				
Comments:	Please reference the data comments for EUT orientation, Channel. Power level and frequency. The average measurements were duty cycle corrected per ANSI C63.10:2013				

Test Specifications	**Test Method**
FCC 15.407:2016	ANSI C63.10:2013

Run #	25	**Test Distance (m)**	1	**Antenna Height(s)**	1 to 4(m)	**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
	5714.923	1.6	3.0	Vert	AV	1.64E-09	-57.8	-27.0	-30.8	Low Ch.149, 5745MHz, Pwr Lvl 21, EUT On Side
	5724.997	1.6	4.0	Vert	AV	1.51E-08	-48.2	-17.0	-31.2	Low Ch.149, 5745MHz, Pwr Lvl 21, EUT On Side
	5860.087	1.6	5.0	Vert	AV	8.33E-10	-60.8	-27.0	-33.8	High Ch.165, 5825MHz, Pwr Lvl 21, EUT On Side
	5850.217	1.6	16.0	Vert	AV	2.12E-09	-56.7	-17.0	-39.7	High Ch.165, 5825MHz, Pwr Lvl 21, EUT On Side
	5850.113	1.6	76.0	Vert	AV	1.93E-09	-57.1	-17.0	-40.1	High Ch.165, 5825MHz, Pwr Lvl 21, EUT Vert
	5850.127	1.6	255.0	Horz	AV	1.89E-09	-57.2	-17.0	-40.2	High Ch.165, 5825MHz, Pwr Lvl 21, EUT Vert
	5850.213	1.6	341.0	Horz	AV	1.65E-09	-57.8	-17.0	-40.8	High Ch.165, 5825MHz, Pwr Lvl 21, EUT Horz
	5850.050	1.6	320.0	Horz	AV	1.17E-09	-59.3	-17.0	-42.3	High Ch.165, 5825MHz, Pwr Lvl 21, EUT On Side
	5850.250	1.6	207.0	Vert	AV	1.11E-09	-59.5	-17.0	-42.5	High Ch.165, 5825MHz, Pwr Lvl 21, EUT Horz

AC – POWERLINE CONDUCTED EMISSIONS

TEST DESCRIPTION

Using the mode of operation and configuration noted within this report, conducted emissions tests were performed. The frequency range investigated (scanned), is also noted in this report. Conducted power line measurements are made, unless otherwise specified, over the frequency range from 150 kHz to 30 MHz to determine the line-to-ground radio-noise voltage that is conducted from the EUT power-input terminals that are directly (or indirectly via separate transformer or power supplies) connected to a public power network. Per the standard, an insulating material was also added to ground plane between the EUT's power and remote I/O cables. Equipment is tested with power cords that are normally used or that have electrical or shielding characteristics that are the same as those cords normally used. Typically those measurements are made using a LISN (Line Impedance Stabilization Network), the 50ohm measuring port is terminated by a 50ohm EMI meter or a 50ohm resistive load. All 50ohm measuring ports of the LISN are terminated by 50ohm. The test data represents the configuration / operating mode/ model that produced the highest emission levels as compared to the specification limit.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Power Supply - DC	Topward	TPS-2000	TPD	NCR	NCR
Cable - Conducted Cable Assembly	Northwest EMC	EVG, HHD, RKA	EVGA	5/12/2015	5/12/2016
Receiver	Rohde & Schwarz	ESCI	ARH	3/11/2015	3/11/2016
LISN	Solar Electronics	9252-50-R-24-BNC	LIN	1/15/2016	1/15/2017
LISN	Solar Electronics	9252-50-R-24-BNC	LIR	10/22/2015	10/22/2016

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

PROT0346-4

MODES INVESTIGATED

Continuous Tx, High Ch.165 5825 MHz 6 Mbps
Continuous Tx, Low Ch.149 5745 MHz 6 Mbps
Continuous Tx, Mid Ch.157 5785 MHz 6 Mbps

AC – POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Lamarr II	Work Order:	PROT0346
Serial Number:	MM409594	Date:	02/24/2016
Customer:	Welch Allyn Protocol, Inc.	Temperature:	23.5°C
Attendees:	None	Relative Humidity:	34.7%
Customer Project:	None	Bar. Pressure:	1022.4 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	5VDC via 110VAC/60Hz	Configuration:	PROT0346-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	1	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

Power level set to 21 dBm

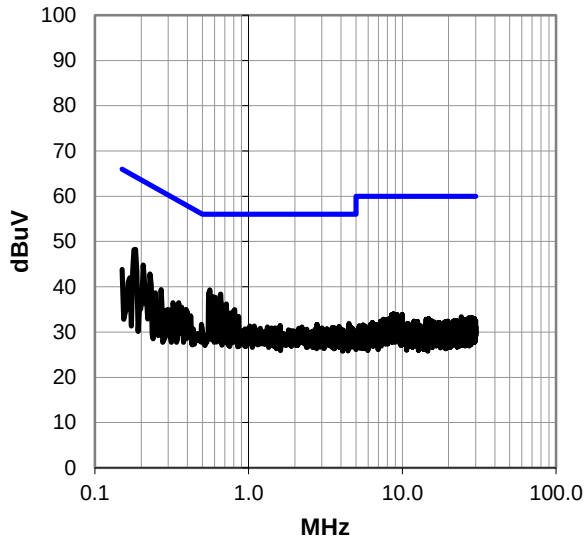
EUT OPERATING MODES

Continuous Tx, Low Ch.149 5745 MHz 6 Mbps

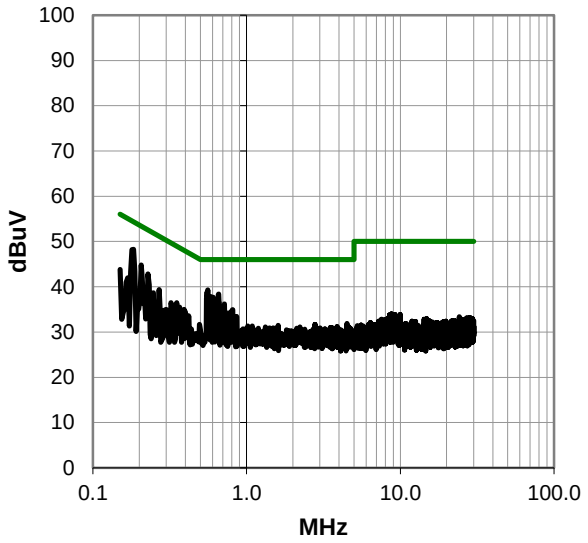
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC – POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #1

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.184	28.2	20.1	48.3	64.3	-16.0
0.560	19.3	20.0	39.3	56.0	-16.7
0.657	18.4	20.0	38.4	56.0	-17.6
0.587	17.8	20.0	37.8	56.0	-18.2
0.605	17.7	20.0	37.7	56.0	-18.3
0.206	24.7	20.1	44.8	63.4	-18.6
0.639	16.9	20.0	36.9	56.0	-19.1
0.628	16.7	20.0	36.7	56.0	-19.3
0.228	22.7	20.1	42.8	62.5	-19.7
0.717	16.2	20.0	36.2	56.0	-19.8
0.691	15.1	20.0	35.1	56.0	-20.9
0.814	14.9	20.0	34.9	56.0	-21.1
0.702	14.7	20.0	34.7	56.0	-21.3
0.728	14.4	20.0	34.4	56.0	-21.6
0.784	14.4	20.0	34.4	56.0	-21.6
0.269	19.4	20.0	39.4	61.1	-21.7
0.150	23.6	20.2	43.8	66.0	-22.2
0.351	16.5	20.0	36.5	58.9	-22.4
0.739	13.5	20.0	33.5	56.0	-22.5
0.863	13.4	20.1	33.5	56.0	-22.5
0.393	15.0	20.0	35.0	58.0	-23.0
0.169	21.9	20.1	42.0	65.0	-23.0
0.366	15.5	20.0	35.5	58.6	-23.1
0.322	16.5	20.0	36.5	59.7	-23.2
0.247	18.6	20.1	38.7	61.9	-23.2
0.400	14.4	20.0	34.4	57.9	-23.5

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.184	28.2	20.1	48.3	54.3	-6.0
0.560	19.3	20.0	39.3	46.0	-6.7
0.657	18.4	20.0	38.4	46.0	-7.6
0.587	17.8	20.0	37.8	46.0	-8.2
0.605	17.7	20.0	37.7	46.0	-8.3
0.206	24.7	20.1	44.8	53.4	-8.6
0.639	16.9	20.0	36.9	46.0	-9.1
0.628	16.7	20.0	36.7	46.0	-9.3
0.228	22.7	20.1	42.8	52.5	-9.7
0.717	16.2	20.0	36.2	46.0	-9.8
0.691	15.1	20.0	35.1	46.0	-10.9
0.814	14.9	20.0	34.9	46.0	-11.1
0.702	14.7	20.0	34.7	46.0	-11.3
0.728	14.4	20.0	34.4	46.0	-11.6
0.784	14.4	20.0	34.4	46.0	-11.6
0.269	19.4	20.0	39.4	51.1	-11.7
0.150	23.6	20.2	43.8	56.0	-12.2
0.351	16.5	20.0	36.5	48.9	-12.4
0.739	13.5	20.0	33.5	46.0	-12.5
0.863	13.4	20.1	33.5	46.0	-12.5
0.393	15.0	20.0	35.0	48.0	-13.0
0.169	21.9	20.1	42.0	55.0	-13.0
0.366	15.5	20.0	35.5	48.6	-13.1
0.322	16.5	20.0	36.5	49.7	-13.2
0.247	18.6	20.1	38.7	51.9	-13.2
0.400	14.4	20.0	34.4	47.9	-13.5

CONCLUSION

Pass

Tested By

AC – POWERLINE CONDUCTED EMISSIONS

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Lamarr II	Work Order:	PROT0346
Serial Number:	MM409594	Date:	02/24/2016
Customer:	Welch Allyn Protocol, Inc.	Temperature:	23.5°C
Attendees:	None	Relative Humidity:	34.7%
Customer Project:	None	Bar. Pressure:	1022.4 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	5VDC via 110VAC/60Hz	Configuration:	PROT0346-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	2	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

Power level set to 21 dBm

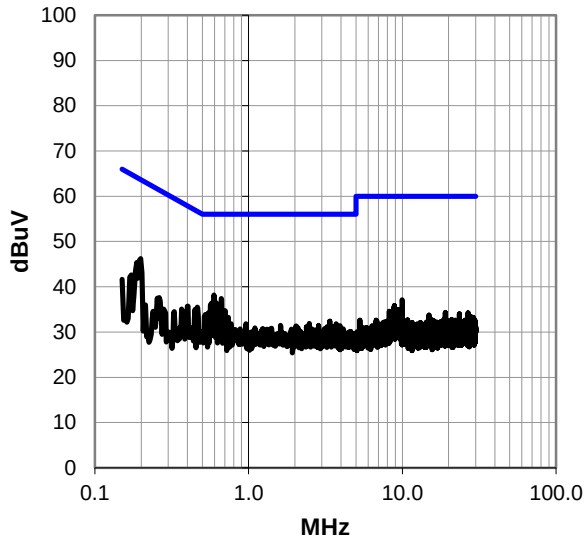
EUT OPERATING MODES

Continuous Tx, Low Ch.149 5745 MHz 6 Mbps

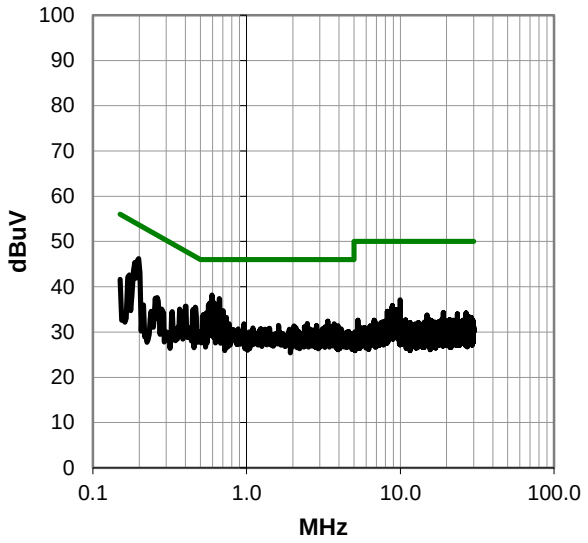
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC – POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #2

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.199	26.1	20.1	46.2	63.7	-17.5
0.594	18.2	20.0	38.2	56.0	-17.8
0.665	17.4	20.0	37.4	56.0	-18.6
0.187	25.3	20.1	45.4	64.2	-18.8
0.616	16.5	20.0	36.5	56.0	-19.5
0.575	16.4	20.0	36.4	56.0	-19.6
0.463	15.5	20.0	35.5	56.6	-21.1
0.702	14.7	20.0	34.7	56.0	-21.3
0.646	14.3	20.0	34.3	56.0	-21.7
0.545	14.2	20.0	34.2	56.0	-21.8
0.448	15.0	20.0	35.0	56.9	-21.9
0.523	13.9	20.0	33.9	56.0	-22.1
0.400	15.7	20.0	35.7	57.9	-22.2
0.172	22.5	20.1	42.6	64.8	-22.2
0.739	13.2	20.0	33.2	56.0	-22.8
9.996	16.6	20.5	37.1	60.0	-22.9
0.635	12.9	20.0	32.9	56.0	-23.1
0.366	15.1	20.0	35.1	58.6	-23.5
3.377	12.2	20.2	32.4	56.0	-23.6
0.262	17.6	20.0	37.6	61.4	-23.7
2.478	11.7	20.2	31.9	56.0	-24.1
8.884	15.4	20.4	35.8	60.0	-24.2
0.254	17.4	20.1	37.5	61.6	-24.2
0.769	11.8	20.0	31.8	56.0	-24.2
3.720	11.6	20.2	31.8	56.0	-24.2
0.963	11.7	20.1	31.8	56.0	-24.2

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.199	26.1	20.1	46.2	53.7	-7.5
0.594	18.2	20.0	38.2	46.0	-7.8
0.665	17.4	20.0	37.4	46.0	-8.6
0.187	25.3	20.1	45.4	54.2	-8.8
0.616	16.5	20.0	36.5	46.0	-9.5
0.575	16.4	20.0	36.4	46.0	-9.6
0.463	15.5	20.0	35.5	46.6	-11.1
0.702	14.7	20.0	34.7	46.0	-11.3
0.646	14.3	20.0	34.3	46.0	-11.7
0.545	14.2	20.0	34.2	46.0	-11.8
0.448	15.0	20.0	35.0	46.9	-11.9
0.523	13.9	20.0	33.9	46.0	-12.1
0.400	15.7	20.0	35.7	47.9	-12.2
0.172	22.5	20.1	42.6	54.8	-12.2
0.739	13.2	20.0	33.2	46.0	-12.8
9.996	16.6	20.5	37.1	50.0	-12.9
0.635	12.9	20.0	32.9	46.0	-13.1
0.366	15.1	20.0	35.1	48.6	-13.5
3.377	12.2	20.2	32.4	46.0	-13.6
0.262	17.6	20.0	37.6	51.4	-13.7
2.478	11.7	20.2	31.9	46.0	-14.1
8.884	15.4	20.4	35.8	50.0	-14.2
0.254	17.4	20.1	37.5	51.6	-14.2
0.769	11.8	20.0	31.8	46.0	-14.2
3.720	11.6	20.2	31.8	46.0	-14.2
0.963	11.7	20.1	31.8	46.0	-14.2

CONCLUSION

Pass

Tested By

AC – POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Lamarr II	Work Order:	PROT0346
Serial Number:	MM409594	Date:	02/24/2016
Customer:	Welch Allyn Protocol, Inc.	Temperature:	23.5°C
Attendees:	None	Relative Humidity:	34.7%
Customer Project:	None	Bar. Pressure:	1022.4 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	5VDC via 110VAC/60Hz	Configuration:	PROT0346-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	3	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

Power level set to 21 dBm

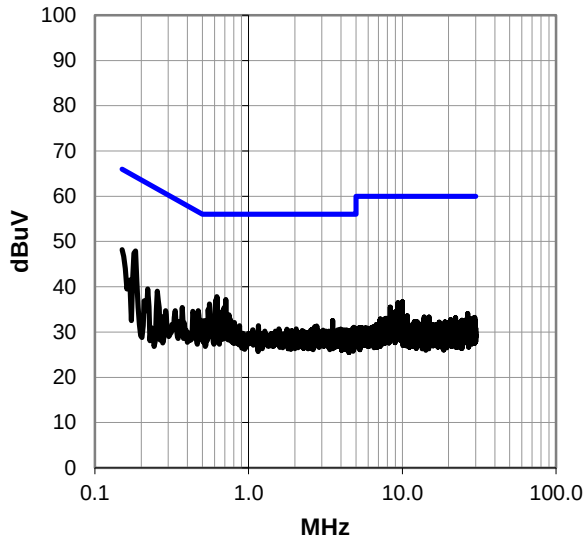
EUT OPERATING MODES

Continuous Tx, Mid Ch.157 5785 MHz 6 Mbps

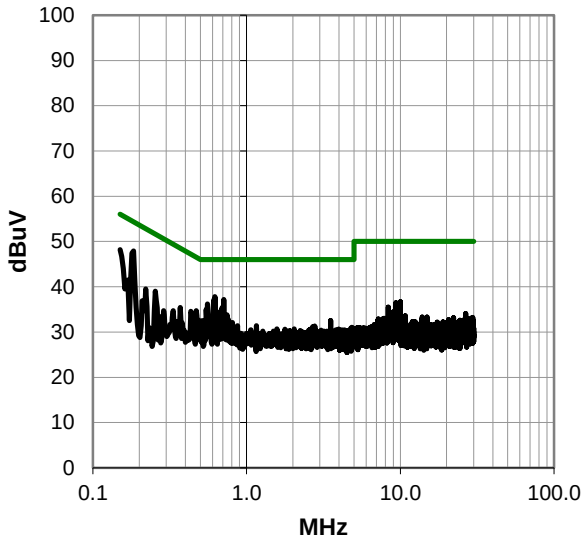
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC – POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #3

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.184	27.8	20.1	47.9	64.3	-16.4
0.150	28.0	20.2	48.2	66.0	-17.8
0.620	17.8	20.0	37.8	56.0	-18.2
0.710	17.2	20.0	37.2	56.0	-18.8
0.613	17.1	20.0	37.1	56.0	-18.9
0.557	16.2	20.0	36.2	56.0	-19.8
0.695	15.4	20.0	35.4	56.0	-20.6
0.680	14.7	20.0	34.7	56.0	-21.3
0.635	14.5	20.0	34.5	56.0	-21.5
0.471	14.7	20.0	34.7	56.5	-21.8
0.654	14.0	20.0	34.0	56.0	-22.0
0.747	13.8	20.0	33.8	56.0	-22.2
0.254	19.0	20.1	39.1	61.6	-22.6
0.434	14.6	20.0	34.6	57.2	-22.6
0.665	13.2	20.0	33.2	56.0	-22.8
0.370	15.4	20.0	35.4	58.5	-23.1
0.221	19.4	20.1	39.5	62.8	-23.3
10.010	16.2	20.5	36.7	60.0	-23.3
0.516	12.5	20.0	32.5	56.0	-23.5
3.523	12.3	20.2	32.5	56.0	-23.5
9.361	16.0	20.5	36.5	60.0	-23.5
0.490	12.6	20.0	32.6	56.2	-23.6
0.810	12.1	20.0	32.1	56.0	-23.9
8.339	15.1	20.4	35.5	60.0	-24.5
1.161	11.3	20.1	31.4	56.0	-24.6
0.874	11.3	20.1	31.4	56.0	-24.6

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.184	27.8	20.1	47.9	54.3	-6.4
0.150	28.0	20.2	48.2	56.0	-7.8
0.620	17.8	20.0	37.8	46.0	-8.2
0.710	17.2	20.0	37.2	46.0	-8.8
0.613	17.1	20.0	37.1	46.0	-8.9
0.557	16.2	20.0	36.2	46.0	-9.8
0.695	15.4	20.0	35.4	46.0	-10.6
0.680	14.7	20.0	34.7	46.0	-11.3
0.635	14.5	20.0	34.5	46.0	-11.5
0.471	14.7	20.0	34.7	46.5	-11.8
0.654	14.0	20.0	34.0	46.0	-12.0
0.747	13.8	20.0	33.8	46.0	-12.2
0.254	19.0	20.1	39.1	51.6	-12.6
0.434	14.6	20.0	34.6	47.2	-12.6
0.665	13.2	20.0	33.2	46.0	-12.8
0.370	15.4	20.0	35.4	48.5	-13.1
0.221	19.4	20.1	39.5	52.8	-13.3
10.010	16.2	20.5	36.7	50.0	-13.3
0.516	12.5	20.0	32.5	46.0	-13.5
3.523	12.3	20.2	32.5	46.0	-13.5
9.361	16.0	20.5	36.5	50.0	-13.5
0.490	12.6	20.0	32.6	46.2	-13.6
0.810	12.1	20.0	32.1	46.0	-13.9
8.339	15.1	20.4	35.5	50.0	-14.5
1.161	11.3	20.1	31.4	46.0	-14.6
0.874	11.3	20.1	31.4	46.0	-14.6

CONCLUSION

Pass

Tested By

AC – POWERLINE CONDUCTED EMISSIONS

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Lamarr II	Work Order:	PROT0346
Serial Number:	MM409594	Date:	02/24/2016
Customer:	Welch Allyn Protocol, Inc.	Temperature:	23.5°C
Attendees:	None	Relative Humidity:	34.7%
Customer Project:	None	Bar. Pressure:	1022.4 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	5VDC via 110VAC/60Hz	Configuration:	PROT0346-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	4	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

Power level set to 21 dBm

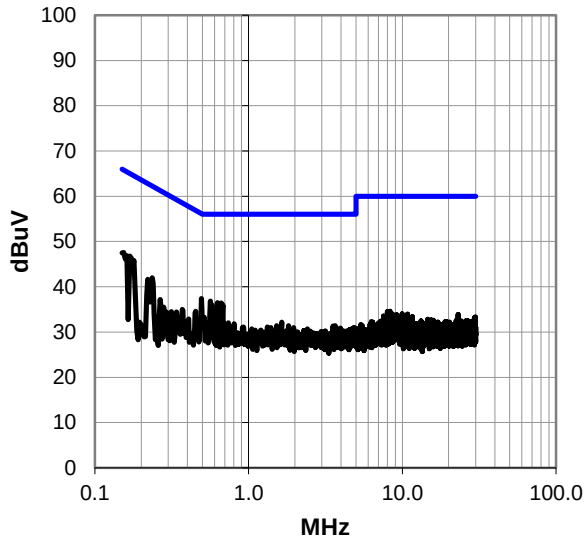
EUT OPERATING MODES

Continuous Tx, Mid Ch.157 5785 MHz 6 Mbps

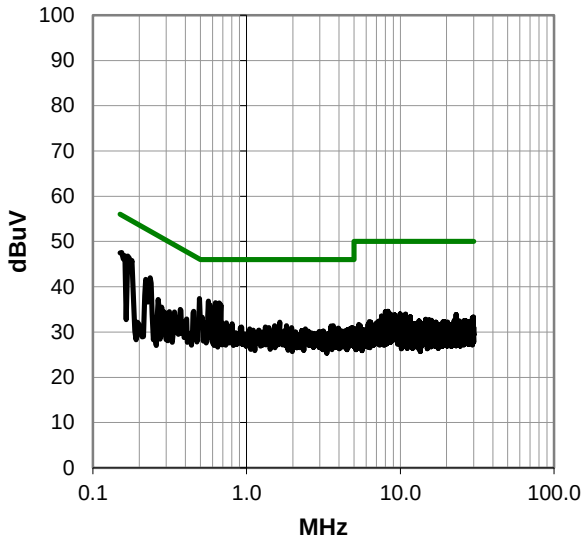
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC – POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #4

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.154	27.4	20.2	47.6	65.8	-18.2
0.169	26.7	20.1	46.8	65.0	-18.2
0.493	17.4	20.0	37.4	56.1	-18.7
0.564	16.8	20.0	36.8	56.0	-19.2
0.628	16.5	20.0	36.5	56.0	-19.5
0.661	16.4	20.0	36.4	56.0	-19.6
0.579	16.0	20.0	36.0	56.0	-20.0
0.680	16.0	20.0	36.0	56.0	-20.0
0.236	21.9	20.1	42.0	62.2	-20.2
0.221	21.5	20.1	41.6	62.8	-21.2
0.594	14.2	20.0	34.2	56.0	-21.8
0.452	14.6	20.0	34.6	56.8	-22.2
0.370	15.0	20.0	35.0	58.5	-23.5
1.642	12.1	20.1	32.2	56.0	-23.8
0.542	12.1	20.0	32.1	56.0	-23.9
0.687	12.1	20.0	32.1	56.0	-23.9
0.739	12.0	20.0	32.0	56.0	-24.0
0.266	17.2	20.0	37.2	61.3	-24.0
0.807	11.8	20.0	31.8	56.0	-24.2
0.698	11.7	20.0	31.7	56.0	-24.3
0.728	11.7	20.0	31.7	56.0	-24.3
1.523	11.3	20.1	31.4	56.0	-24.6
1.818	11.3	20.1	31.4	56.0	-24.6
3.653	11.2	20.2	31.4	56.0	-24.6
3.549	11.1	20.2	31.3	56.0	-24.7
0.340	14.4	20.0	34.4	59.2	-24.8

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.154	27.4	20.2	47.6	55.8	-8.2
0.169	26.7	20.1	46.8	55.0	-8.2
0.493	17.4	20.0	37.4	46.1	-8.7
0.564	16.8	20.0	36.8	46.0	-9.2
0.628	16.5	20.0	36.5	46.0	-9.5
0.661	16.4	20.0	36.4	46.0	-9.6
0.579	16.0	20.0	36.0	46.0	-10.0
0.680	16.0	20.0	36.0	46.0	-10.0
0.236	21.9	20.1	42.0	52.2	-10.2
0.221	21.5	20.1	41.6	52.8	-11.2
0.594	14.2	20.0	34.2	46.0	-11.8
0.452	14.6	20.0	34.6	46.8	-12.2
0.370	15.0	20.0	35.0	48.5	-13.5
1.642	12.1	20.1	32.2	46.0	-13.8
0.542	12.1	20.0	32.1	46.0	-13.9
0.687	12.1	20.0	32.1	46.0	-13.9
0.739	12.0	20.0	32.0	46.0	-14.0
0.266	17.2	20.0	37.2	51.3	-14.0
0.807	11.8	20.0	31.8	46.0	-14.2
0.698	11.7	20.0	31.7	46.0	-14.3
0.728	11.7	20.0	31.7	46.0	-14.3
1.523	11.3	20.1	31.4	46.0	-14.6
1.818	11.3	20.1	31.4	46.0	-14.6
3.653	11.2	20.2	31.4	46.0	-14.6
3.549	11.1	20.2	31.3	46.0	-14.7
0.340	14.4	20.0	34.4	49.2	-14.8

CONCLUSION

Pass

Tested By

AC – POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Lamarr II	Work Order:	PROT0346
Serial Number:	MM409594	Date:	02/24/2016
Customer:	Welch Allyn Protocol, Inc.	Temperature:	23.5°C
Attendees:	None	Relative Humidity:	34.7%
Customer Project:	None	Bar. Pressure:	1022.4 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	5VDC via 110VAC/60Hz	Configuration:	PROT0346-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	5	Line:	High Line	Add. Ext. Attenuation (dB):	0

COMMENTS

Power level set to 21 dBm

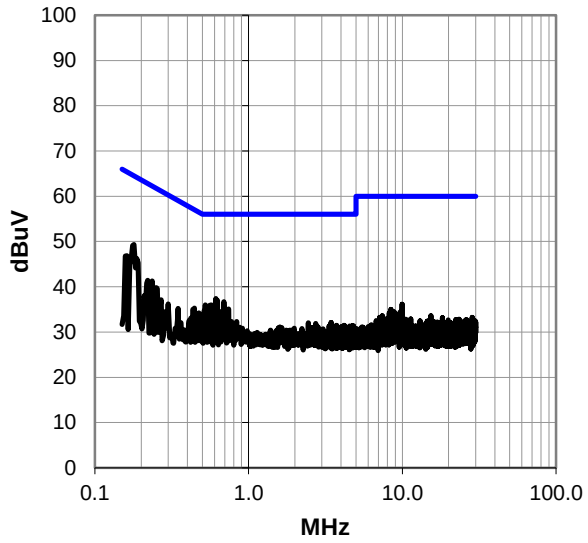
EUT OPERATING MODES

Continuous Tx, High Ch.165 5825 MHz 6 Mbps

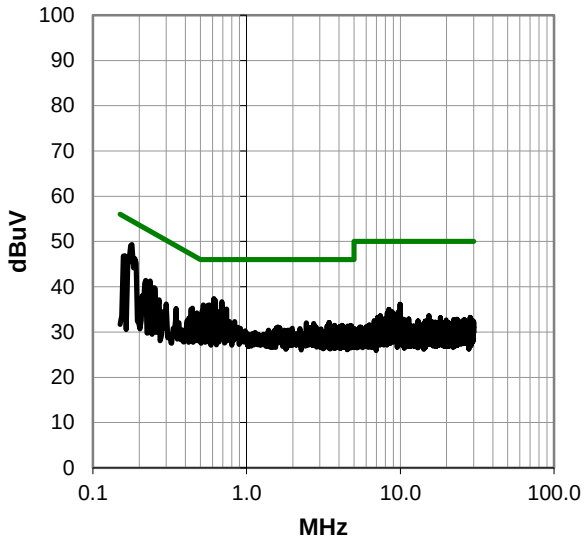
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC – POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #5

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.180	29.2	20.1	49.3	64.5	-15.2
0.161	26.7	20.1	46.8	65.4	-18.6
0.613	17.4	20.0	37.4	56.0	-18.6
0.628	17.0	20.0	37.0	56.0	-19.0
0.691	16.7	20.0	36.7	56.0	-19.3
0.523	16.0	20.0	36.0	56.0	-20.0
0.572	16.0	20.0	36.0	56.0	-20.0
0.560	15.9	20.0	35.9	56.0	-20.1
0.598	15.2	20.0	35.2	56.0	-20.8
0.739	15.1	20.0	35.1	56.0	-20.9
0.236	21.2	20.1	41.3	62.2	-20.9
0.221	21.3	20.1	41.4	62.8	-21.4
0.650	14.5	20.0	34.5	56.0	-21.5
0.445	15.3	20.0	35.3	57.0	-21.7
0.251	19.7	20.1	39.8	61.7	-22.0
0.497	13.9	20.0	33.9	56.1	-22.2
0.475	14.2	20.0	34.2	56.4	-22.2
0.665	13.6	20.0	33.6	56.0	-22.4
0.713	13.1	20.0	33.1	56.0	-22.9
0.545	12.7	20.0	32.7	56.0	-23.3
0.836	12.3	20.0	32.3	56.0	-23.7
0.676	12.3	20.0	32.3	56.0	-23.7
0.773	12.3	20.0	32.3	56.0	-23.7
0.348	15.2	20.0	35.2	59.0	-23.8
9.988	15.6	20.5	36.1	60.0	-23.9
0.758	12.1	20.0	32.1	56.0	-23.9

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.180	29.2	20.1	49.3	54.5	-5.2
0.161	26.7	20.1	46.8	55.4	-8.6
0.613	17.4	20.0	37.4	46.0	-8.6
0.628	17.0	20.0	37.0	46.0	-9.0
0.691	16.7	20.0	36.7	46.0	-9.3
0.523	16.0	20.0	36.0	46.0	-10.0
0.572	16.0	20.0	36.0	46.0	-10.0
0.560	15.9	20.0	35.9	46.0	-10.1
0.598	15.2	20.0	35.2	46.0	-10.8
0.739	15.1	20.0	35.1	46.0	-10.9
0.236	21.2	20.1	41.3	52.2	-10.9
0.221	21.3	20.1	41.4	52.8	-11.4
0.650	14.5	20.0	34.5	46.0	-11.5
0.445	15.3	20.0	35.3	47.0	-11.7
0.251	19.7	20.1	39.8	51.7	-12.0
0.497	13.9	20.0	33.9	46.1	-12.2
0.475	14.2	20.0	34.2	46.4	-12.2
0.665	13.6	20.0	33.6	46.0	-12.4
0.713	13.1	20.0	33.1	46.0	-12.9
0.545	12.7	20.0	32.7	46.0	-13.3
0.836	12.3	20.0	32.3	46.0	-13.7
0.676	12.3	20.0	32.3	46.0	-13.7
0.773	12.3	20.0	32.3	46.0	-13.7
0.348	15.2	20.0	35.2	49.0	-13.8
9.988	15.6	20.5	36.1	50.0	-13.9
0.758	12.1	20.0	32.1	46.0	-13.9

CONCLUSION

Pass

Tested By

AC – POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

EUT:	Lamarr II	Work Order:	PROT0346
Serial Number:	MM409594	Date:	02/24/2016
Customer:	Welch Allyn Protocol, Inc.	Temperature:	23.5°C
Attendees:	None	Relative Humidity:	34.7%
Customer Project:	None	Bar. Pressure:	1022.4 mb
Tested By:	Brandon Hobbs	Job Site:	EV07
Power:	5VDC via 110VAC/60Hz	Configuration:	PROT0346-4

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2016	ANSI C63.10:2013

TEST PARAMETERS

Run #:	6	Line:	Neutral	Add. Ext. Attenuation (dB):	0

COMMENTS

Power level set to 21 dBm

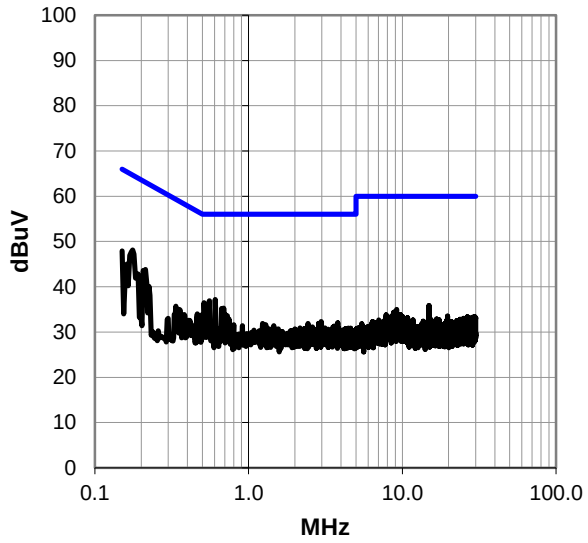
EUT OPERATING MODES

Continuous Tx, High Ch.165 5825 MHz 6 Mbps

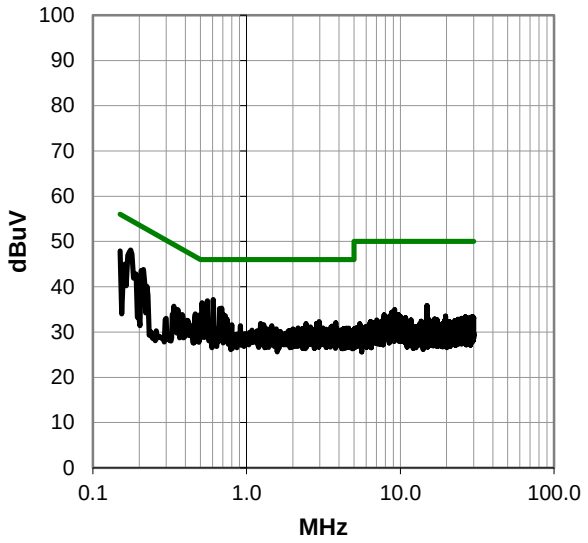
DEVIATIONS FROM TEST STANDARD

None

Peak Data - vs - Quasi Peak Limit



Peak Data - vs - Average Limit



AC – POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC

WTD.2015.12.01
PSA-ESCI 2015.07.01, EmiR5 2015.11.06

RESULTS - Run #6

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.176	28.0	20.1	48.1	64.7	-16.6
0.150	27.7	20.2	47.9	66.0	-18.1
0.605	17.2	20.0	37.2	56.0	-18.8
0.557	16.9	20.0	36.9	56.0	-19.1
0.213	23.7	20.1	43.8	63.1	-19.3
0.512	16.5	20.0	36.5	56.0	-19.5
0.161	24.9	20.1	45.0	65.4	-20.4
0.545	15.5	20.0	35.5	56.0	-20.5
0.687	15.3	20.0	35.3	56.0	-20.7
0.669	15.2	20.0	35.2	56.0	-20.8
0.710	13.8	20.0	33.8	56.0	-22.2
0.497	13.8	20.0	33.8	56.1	-22.3
0.225	20.0	20.1	40.1	62.6	-22.5
0.463	14.0	20.0	34.0	56.6	-22.6
0.747	12.9	20.0	32.9	56.0	-23.1
0.337	15.7	20.0	35.7	59.3	-23.6
2.970	12.1	20.2	32.3	56.0	-23.7
0.355	15.0	20.0	35.0	58.8	-23.8
3.810	11.8	20.2	32.0	56.0	-24.0
1.232	11.8	20.1	31.9	56.0	-24.1
2.433	11.7	20.2	31.9	56.0	-24.1
2.851	11.7	20.2	31.9	56.0	-24.1
14.905	15.1	20.7	35.8	60.0	-24.2
1.251	11.6	20.1	31.7	56.0	-24.3
0.381	13.9	20.0	33.9	58.3	-24.4
0.799	11.6	20.0	31.6	56.0	-24.4

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.176	28.0	20.1	48.1	54.7	-6.6
0.150	27.7	20.2	47.9	56.0	-8.1
0.605	17.2	20.0	37.2	46.0	-8.8
0.557	16.9	20.0	36.9	46.0	-9.1
0.213	23.7	20.1	43.8	53.1	-9.3
0.512	16.5	20.0	36.5	46.0	-9.5
0.161	24.9	20.1	45.0	55.4	-10.4
0.545	15.5	20.0	35.5	46.0	-10.5
0.687	15.3	20.0	35.3	46.0	-10.7
0.669	15.2	20.0	35.2	46.0	-10.8
0.710	13.8	20.0	33.8	46.0	-12.2
0.497	13.8	20.0	33.8	46.1	-12.3
0.225	20.0	20.1	40.1	52.6	-12.5
0.463	14.0	20.0	34.0	46.6	-12.6
0.747	12.9	20.0	32.9	46.0	-13.1
0.337	15.7	20.0	35.7	49.3	-13.6
2.970	12.1	20.2	32.3	46.0	-13.7
0.355	15.0	20.0	35.0	48.8	-13.8
3.810	11.8	20.2	32.0	46.0	-14.0
1.232	11.8	20.1	31.9	46.0	-14.1
2.433	11.7	20.2	31.9	46.0	-14.1
2.851	11.7	20.2	31.9	46.0	-14.1
14.905	15.1	20.7	35.8	50.0	-14.2
1.251	11.6	20.1	31.7	46.0	-14.3
0.381	13.9	20.0	33.9	48.3	-14.4
0.799	11.6	20.0	31.6	46.0	-14.4

CONCLUSION

Pass

Tested By