NORTHWEST EMC

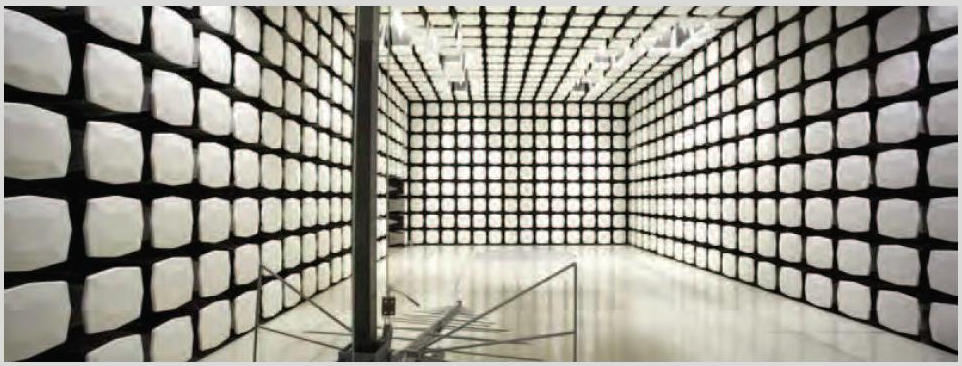
Multi-Tech Systems, Inc.

MTXDOT-NA1

FCC 15.207:2016
FCC 15.247:2016

902 – 928 MHz Transceiver

Report # MLTI0058.1



NVLAP Lab Code: 200881-0

CERTIFICATE OF TEST

NORTHWEST EMC
2014-12-10

Last Date of Test: October 6, 2016
Multi-Tech Systems, Inc.
Model: MTXDOT-NA1

Radio Equipment Testing

Standards

Specification	Method
FCC 15.207:2016	ANSI C63.10:2013
FCC 15.247:2016	

Results

Method Clause	Test Description	Applied	Results	Comments
6.2	Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
7.8.2	Carrier Frequency Separation	Yes	Pass	
7.8.3	Number of Hopping Frequencies	Yes	Pass	
7.8.4	Dwell Time	Yes	Pass	
7.8.6	Band Edge Compliance - Hopping Mode	Yes	Pass	
11.6	Duty Cycle	Yes	Pass	
11.8.2	Occupied Bandwidth	Yes	Pass	
11.9.2.2.4	Output Power	Yes	Pass	
11.10.5	Power Spectral Density	Yes	Pass	
11.11	Spurious Conducted Emissions	Yes	Pass	
11.11	Band Edge Compliance	Yes	Pass	

Deviations from Test Standards

None

Approved By:

Tim O'Shea, Operations Manager

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

REVISION HISTORY

NORTHWEST EMC
REV 2014.10.14

Revision Number	Description	Date	Page Number
00	None		

ACCREDITATIONS AND AUTHORIZATIONS

REV 2016.7.25

United States

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

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

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

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

European Union

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

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Israel

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

Hong Kong

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

Vietnam

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

SCOPE

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

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.

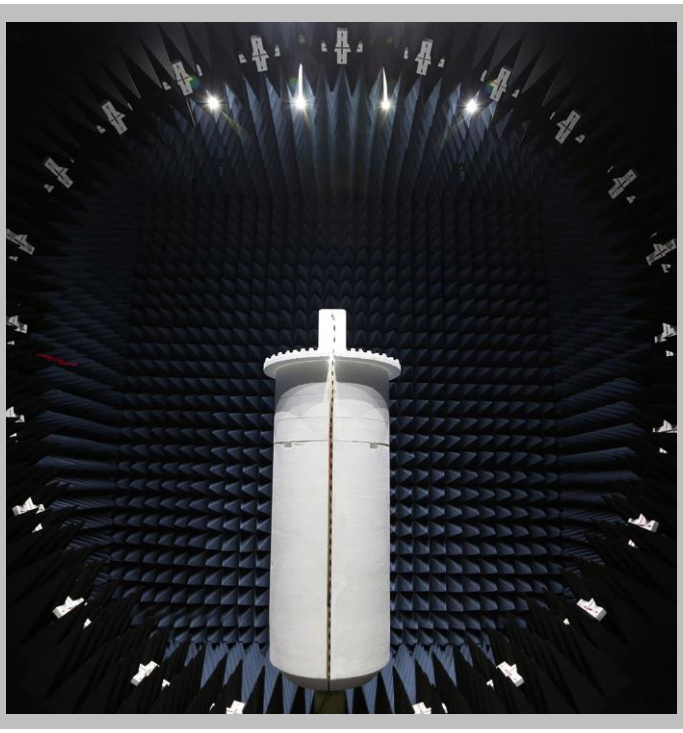
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

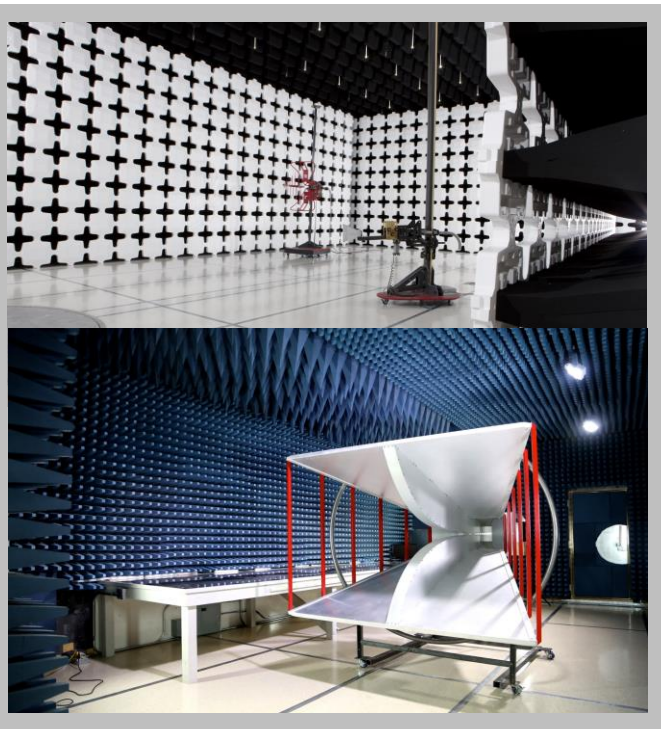
Test	+ MU	- MU
Frequency Accuracy (Hz)	0.0007%	-0.0007%
Amplitude Accuracy (dB)	1.2 dB	-1.2 dB
Conducted Power (dB)	0.3 dB	-0.3 dB
Radiated Power via Substitution (dB)	0.7 dB	-0.7 dB
Temperature (degrees C)	0.7°C	-0.7°C
Humidity (% RH)	2.5% RH	-2.5% RH
Voltage (AC)	1.0%	-1.0%
Voltage (DC)	0.7%	-0.7%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

FACILITIES

NORTHWEST EMC
REV 2016.7.25

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





PRODUCT DESCRIPTION

NORTHWEST EMC
2014-12-10

Client and Equipment Under Test (EUT) Information

Company Name:	Multi-Tech Systems, Inc.
Address:	2205 Woodale Drive
City, State, Zip:	Mounds View, MN 55112
Test Requested By:	Mike Lynch
Model:	MTXDOT-NA1
First Date of Test:	September 7, 2016
Last Date of Test:	October 6, 2016
Receipt Date of Samples:	August 26, 2016
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
Long Range 868/915 MHz ISM Radio Module.

Testing Objective:
Seeking to demonstrate compliance under FCC 15.247:2016 for operation in the 902 -928 MHz band. Additional radiated spurious emissions data is contained in the report to provide data showing compliance with an alternative power decoupling configuration for the RF chip and RF switch. No components in the RF path are affected by this alternative configuration.

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration MLTI0058- 1

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Transmitter Module (External Antenna)	Multi-Tech Systems, Inc.	MTXDOT-NA1	18865140

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Development Board (External Antenna)	Multi-Tech Systems, Inc.	MTMDK	None
External Antenna	Pulse	W1063	None
AC Adapter (Laptop)	Lenovo	42T4418	11S42T4418Z1ZGWG2985Y8

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	1.8m	No	Development Board	Laptop
U.FL Cable	No	0.1m	No	Transmitter Module	External Antenna
AC Cable (Laptop)	No	1.8m	No	AC Mains	AC Adapter (Laptop)
DC Cable (Laptop)	No	1.8m	Yes	AC Adapter (Laptop)	Laptop

Configuration MLTI0058- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Transmitter Module (915 MHz)	Multi-Tech Systems, Inc.	MTXDOT-NA1	18874459
Development Board (915 MHz Chip Antenna)	Multi-Tech Systems, Inc.	MTMDK	None

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adapter (Laptop)	Lenovo	42T4418	11S42T4418Z1ZGWG2985Y8
Chip Antenna	Ethertronics	M620710	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	1.8m	No	Development Board	Laptop
AC Cable (Laptop)	No	1.8m	No	AC Mains	AC Adapter (Laptop)
DC Cable (Laptop)	No	1.8m	Yes	AC Adapter (Laptop)	Laptop

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration MLTI0058- 3

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Transmitter Module (External Antenna)	Multi-Tech Systems, Inc.	MTXDOT-NA1-A00	18865140

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Development Board (External Antenna)	Multi-Tech Systems, Inc.	MTMDK	None
AC Adapter (Laptop)	Lenovo	42T4418	11S42T4418Z1ZGWG2985Y8

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	1.8m	No	Development Board	Laptop
AC Cable (Laptop)	No	1.8m	No	AC Mains	AC Adapter (Laptop)
DC Cable (Laptop)	No	1.8m	Yes	AC Adapter (Laptop)	Laptop

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration MLTI0058- 5

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Transmitter Module (915 MHz)	Multi-Tech Systems, Inc.	MTXDOT-NA1-A01	18874459
Development Board (915 MHz Chip Antenna)	Multi-Tech Systems, Inc.	MTMDK	None

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adapter (Laptop)	Lenovo	42T4418	11S42T4418Z1ZGWG2985Y8
Chip Antenna	Ethertronics	M620710	None
DC Power Supply	EZ	GP-4303D	TQK

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
USB Cable	Yes	1.8m	No	Development Board	Laptop
AC Cable (Laptop)	No	1.8m	No	AC Mains	AC Adapter (Laptop)
DC Cable (Laptop)	No	1.8m	Yes	AC Adapter (Laptop)	Laptop
AC Cable (DC Power Supply)	No	1.8m	No	DC Power Supply	AC Mains
DC Leads	No	1.0m	No	DC Power Supply	Transmitter Module

CONFIGURATIONS

NORTHWEST EMC 2014-12-10

Configuration MLTI0064- 2

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Transmitter Module (915 MHz)	Multi-Tech Systems, Inc.	MTXDOT-NA1	18874459

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adapter (Laptop)	Lenovo	42T4418	11S42T4418Z1ZGWG2985Y8
Chip Antenna	Ethertronics	M620710	None
Development Board (915 MHz Chip Antenna)	Multi-Tech Systems, Inc.	MTMDK	Unknown

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
AC Cable (Laptop)	No	1.8m	No	AC Adapter (Laptop)	AC Mains
DC Cable (Laptop)	No	1.8m	Yes	AC Adapter (Laptop)	Laptop
U.FL Cable	No	0.1m	No	Development Board	Transmitter Module
USB Cable	Yes	1.8m	No	Development Board	Laptop

MODIFICATIONS

NORTHWEST EMC
2014-12-10

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	9/7/2016	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	9/15/2016	Carrier Frequency Separation	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	9/15/2016	Number of Hopping Frequencies	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	9/15/2016	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.
5	9/15/2016	Band Edge Compliance – Hopping Mode	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	9/15/2016	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
7	9/15/2016	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.
8	9/15/2016	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
9	9/15/2016	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
10	9/15/2016	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
11	9/16/2016	Dwell Time	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.
12	9/16/2016	Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.
13	10/6/2016	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

POWERLINE CONDUCTED EMISSIONS

WTD.2016.05.18

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
Receiver	Rohde & Schwarz	ESR7	ARI	6/14/2016	6/14/2017
Cable - Conducted Cable Assembly	Northwest EMC	MNC, HGN, TYK	MNCA	1/29/2016	1/29/2017
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	3/21/2016	3/21/2017
LISN	Solar Electronics	9252-50-R-24-BNC	LIQ	11/3/2015	11/3/2016
Power Supply - DC	EZ Digital Co., Ltd.	GP-4030D	TQK	NCR	NCR

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

MLTI0058-5

MODES INVESTIGATED

Transmitting mid channel (908.7 MHz)

POWERLINE CONDUCTED EMISSIONS

EUT:	MTXDOT-NA1-A01	Work Order:	MLTI0058
Serial Number:	18874459	Date:	09/16/2016
Customer:	Multi-Tech Systems, Inc.	Temperature:	22.9°C
Attendees:	Marcus Glass	Relative Humidity:	57.5%
Customer Project:	None	Bar. Pressure:	1013 mb
Tested By:	Dustin Sparks	Job Site:	MN03
Power:	3.3VDC	Configuration:	MLTI0058-5

TEST SPECIFICATIONS

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

TEST PARAMETERS

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

COMMENTS

Module powered by 3.3VDC external power supply.

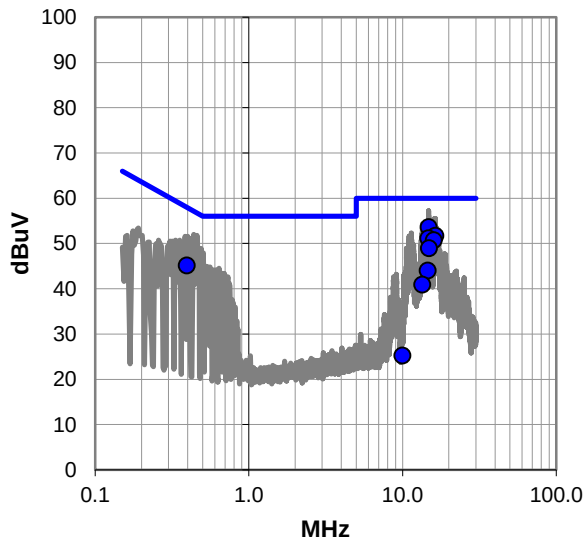
EUT OPERATING MODES

Transmitting mid channel (908.7 MHz)

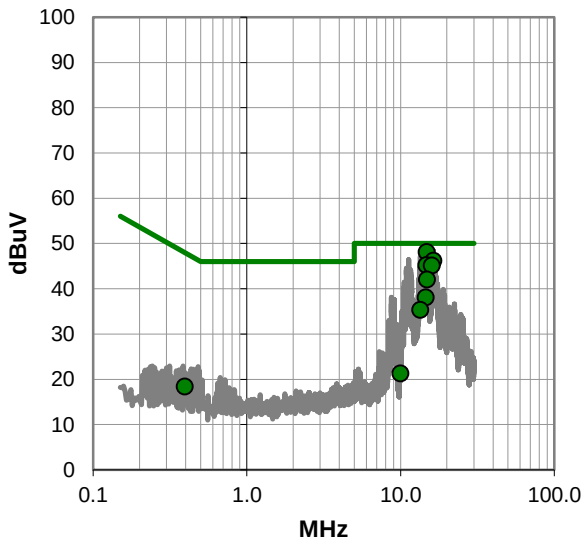
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2016.05.18

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
14.810	32.6	21.0	53.6	60.0	-6.4
16.363	30.5	21.2	51.7	60.0	-8.3
14.758	30.1	21.0	51.1	60.0	-8.9
15.955	29.6	21.1	50.7	60.0	-9.3
14.910	27.9	21.0	48.9	60.0	-11.1
0.394	24.9	20.2	45.1	58.0	-12.9
14.568	23.0	21.0	44.0	60.0	-16.0
13.461	20.0	20.9	40.9	60.0	-19.1
10.001	4.5	20.7	25.2	60.0	-34.8

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
14.810	27.1	21.0	48.1	50.0	-1.9
16.363	25.0	21.2	46.2	50.0	-3.8
14.758	24.2	21.0	45.2	50.0	-4.8
15.955	24.0	21.1	45.1	50.0	-4.9
14.910	21.0	21.0	42.0	50.0	-8.0
14.568	17.1	21.0	38.1	50.0	-11.9
13.461	14.4	20.9	35.3	50.0	-14.7
10.001	0.6	20.7	21.3	50.0	-28.7
0.394	-1.8	20.2	18.4	48.0	-29.6

CONCLUSION

Pass

Tested By

POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2016.05.18

EUT:	MTXDOT-NA1-A01	Work Order:	MLTI0058
Serial Number:	18874459	Date:	09/16/2016
Customer:	Multi-Tech Systems, Inc.	Temperature:	22.9°C
Attendees:	Marcus Glass	Relative Humidity:	57.5%
Customer Project:	None	Bar. Pressure:	1013 mb
Tested By:	Dustin Sparks	Job Site:	MN03
Power:	3.3VDC	Configuration:	MLTI0058-5

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

Module powered by 3.3VDC external power supply.

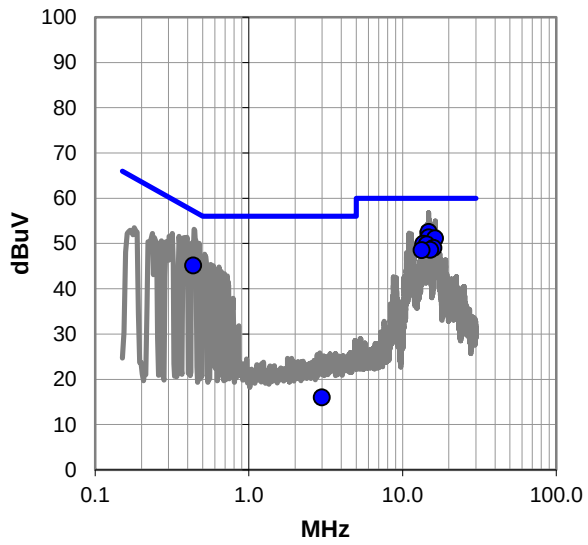
EUT OPERATING MODES

Transmitting mid channel (908.7 MHz)

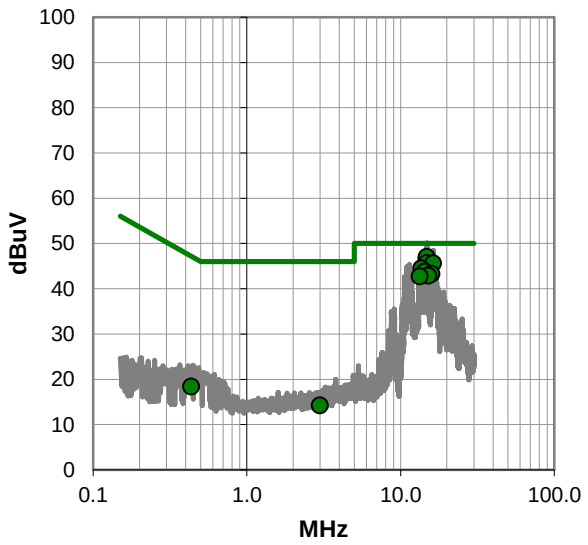
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



POWERLINE CONDUCTED EMISSIONS

NORTHWEST EMC
WTD.2016.05.18

RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
14.812	31.5	21.0	52.5	60.0	-7.5
14.791	30.3	21.0	51.3	60.0	-8.7
16.331	29.9	21.2	51.1	60.0	-8.9
13.668	29.0	20.9	49.9	60.0	-10.1
14.423	28.8	21.0	49.8	60.0	-10.2
15.946	27.9	21.1	49.0	60.0	-11.0
15.186	27.5	21.1	48.6	60.0	-11.4
13.296	27.6	20.9	48.5	60.0	-11.5
0.435	25.0	20.1	45.1	57.2	-12.1
2.992	-4.2	20.2	16.0	56.0	-40.0

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
14.812	26.0	21.0	47.0	50.0	-3.0
14.791	24.7	21.0	45.7	50.0	-4.3
16.331	24.4	21.2	45.6	50.0	-4.4
13.668	23.6	20.9	44.5	50.0	-5.5
14.423	22.8	21.0	43.8	50.0	-6.2
15.946	22.2	21.1	43.3	50.0	-6.7
15.186	21.8	21.1	42.9	50.0	-7.1
13.296	21.8	20.9	42.7	50.0	-7.3
0.435	-1.7	20.1	18.4	47.2	-28.8
2.992	-6.0	20.2	14.2	46.0	-31.8

CONCLUSION

Pass

Tested By

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.07.22

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 low channel (902.3 MHz), mid channel (908.7 MHz), and high channel (914.9 MHz); 125kHz and 500kHz bandwidth data rates. For 500kHz bandwidth, low channel is 903.0 MHz and high channel is 914.2 MHz.

POWER SETTINGS INVESTIGATED

3.3VDC

CONFIGURATIONS INVESTIGATED

MLTI0058 - 1
MLTI0058 - 2

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	12400 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
Cable	ESM Cable Corp.	Standard Gain Horn Cables	MNJ	7/29/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVV	3/1/2016	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AXP	NCR	0 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVT	3/1/2016	12 mo
Cable	ESM Cable Corp.	Double Ridge Guide Horn Cables	MNI	12/7/2015	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AJA	6/23/2016	24 mo
Analyzer - Spectrum Analyzer	Agilent	N9010A	AFI	1/27/2016	12 mo
Filter - Low Pass	Micro-Tronics	LPM50003	LFJ	10/21/2015	12 mo
Amplifier - Pre-Amplifier	Miteq	AM-1616-1000	AVO	12/10/2015	12 mo
Cable	ESM Cable Corp.	Bilog Cables	MNH	12/7/2015	12 mo
Antenna - Biconilog	Teseq	CBL 6141B	AYD	1/6/2016	24 mo
Filter - Band Pass/Notch	K&L Microwave	3TNF-500/1000-N/N	HGS	8/29/2016	12 mo
Filter - High Pass	Micro-Tronics	HPM50108	LFM	10/21/2015	12 mo
Attenuator	Fairview Microwave	SA18E-10	TYA	10/21/2015	12 mo
Attenuator	Fairview Microwave	SA18E-20	TWZ	10/21/2015	12 mo

MEASUREMENT BANDWIDTHS

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

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual 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 if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

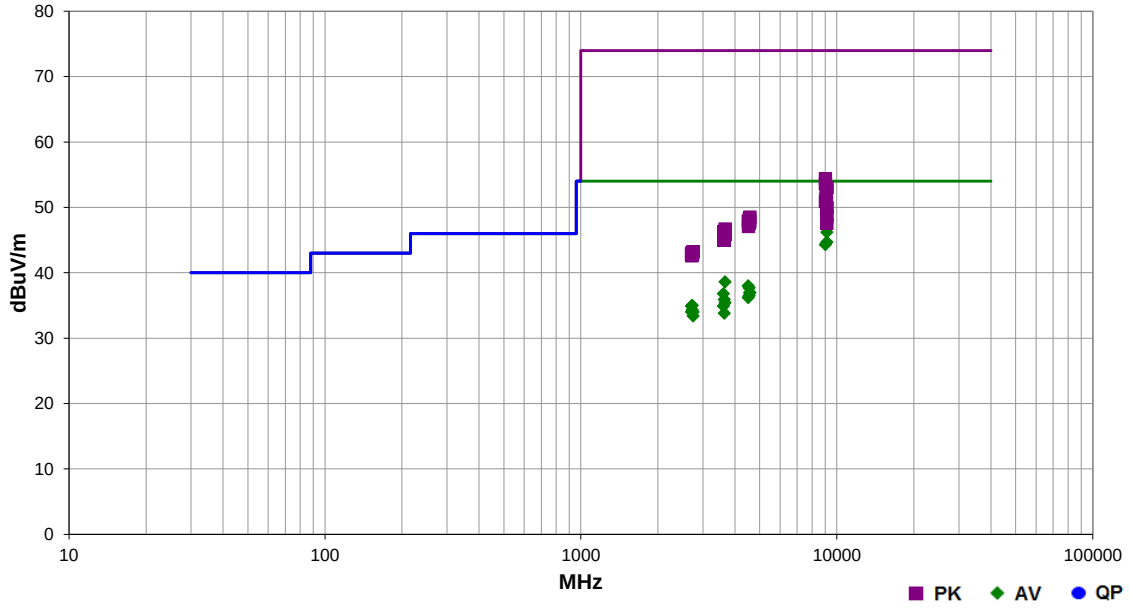
SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.07.22
EmiR5 2016.07.22.1

Work Order:	MLTI0058	**Date:**	09/07/16		
Project:	None	**Temperature:**	22.4 °C		
Job Site:	MN05	**Humidity:**	62.2% RH		
Serial Number:	18865140	**Barometric Pres.:**	1017 mbar	**Tested by:**	Dustin Sparks
EUT:	MTXDOT-NA1-A00				
Configuration:	1				
Customer:	Multi-Tech Systems, Inc.				
Attendees:	Marcus Glass				
EUT Power:	3.3VDC				
Operating Mode:	Transmitting low channel (902.3 MHz), mid channel (908.7 MHz), and high channel (914.9 MHz); 125kHz and 500kHz bandwidth data rates. For 500kHz bandwidth, low channel is 903.0 MHz and high channel is 914.2 MHz.				
Deviations:	None				
Comments:	Module powered by USB connection to laptop. External antenna				

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

Run #	74	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
9022.750	57.7	-4.7	2.3	60.0	3.0	0.0	Horz	AV	0.0	53.0	54.0	-1.0	Low ch, EUT vert, 125kHz BW
9022.517	56.8	-4.7	1.6	131.1	3.0	0.0	Vert	AV	0.0	52.1	54.0	-1.9	Low ch, EUT horz, 125kHz BW
9149.217	55.9	-4.4	2.3	56.0	3.0	0.0	Horz	AV	0.0	51.5	54.0	-2.5	High ch, EUT vert, 125kHz BW
9149.433	55.9	-4.4	2.2	286.9	3.0	0.0	Vert	AV	0.0	51.5	54.0	-2.5	High ch, EUT horz, 125kHz BW
9086.550	55.0	-4.4	1.4	100.0	3.0	0.0	Horz	AV	0.0	50.6	54.0	-3.4	Mid ch, EUT vert, 125kHz BW
9086.458	53.4	-4.4	1.5	140.0	3.0	0.0	Vert	AV	0.0	49.0	54.0	-5.0	Mid ch, EUT horz, 125kHz BW
9149.358	52.4	-4.4	1.2	113.1	3.0	0.0	Vert	AV	0.0	48.0	54.0	-6.0	High ch, EUT on side, 125kHz BW
9149.525	52.3	-4.4	2.0	60.0	3.0	0.0	Horz	AV	0.0	47.9	54.0	-6.1	High ch, EUT on side, 125kHz BW
9149.292	50.6	-4.4	1.0	90.0	3.0	0.0	Vert	AV	0.0	46.2	54.0	-7.8	High ch, EUT vert, 125kHz BW
9149.558	49.1	-4.4	2.0	129.0	3.0	0.0	Horz	AV	0.0	44.7	54.0	-9.3	High ch, EUT horz, 125kHz BW
9021.667	49.0	-4.7	1.7	95.1	3.0	0.0	Horz	AV	0.0	44.3	54.0	-9.7	Low ch, EUT vert, 500kHz BW
3659.758	37.4	1.2	2.1	66.1	3.0	0.0	Horz	AV	0.0	38.6	54.0	-15.4	High ch, EUT vert, 125kHz BW
4511.758	33.5	4.5	1.0	346.0	3.0	0.0	Horz	AV	0.0	38.0	54.0	-16.0	Low ch, EUT vert, 125kHz BW
4543.550	33.1	4.6	1.2	0.0	3.0	0.0	Horz	AV	0.0	37.7	54.0	-16.3	Mid ch, EUT vert, 125kHz BW
4576.958	32.3	4.7	1.0	336.0	3.0	0.0	Vert	AV	0.0	37.0	54.0	-17.0	High ch, EUT horz, 125kHz BW
4576.725	32.2	4.7	1.0	286.0	3.0	0.0	Horz	AV	0.0	36.9	54.0	-17.1	High ch, EUT vert, 125kHz BW
3609.350	36.0	0.8	1.2	62.1	3.0	0.0	Horz	AV	0.0	36.8	54.0	-17.2	Low ch, EUT vert, 125kHz BW
4545.950	31.9	4.6	1.9	343.9	3.0	0.0	Vert	AV	0.0	36.5	54.0	-17.5	Mid ch, EUT horz, 125kHz BW
4511.750	31.7	4.5	2.0	246.9	3.0	0.0	Vert	AV	0.0	36.2	54.0	-17.8	Low ch, EUT horz, 125kHz BW
3634.992	34.8	1.1	1.0	178.1	3.0	0.0	Horz	AV	0.0	35.9	54.0	-18.1	Mid ch, EUT vert, 125kHz BW
3659.617	34.2	1.2	1.0	161.0	3.0	0.0	Vert	AV	0.0	35.4	54.0	-18.6	High ch, EUT horz, 125kHz BW
2726.100	37.7	-2.7	1.0	49.0	3.0	0.0	Horz	AV	0.0	35.0	54.0	-19.0	Mid ch, EUT vert, 125kHz BW
2706.817	37.8	-2.9	1.1	76.1	3.0	0.0	Horz	AV	0.0	34.9	54.0	-19.1	Low ch, EUT vert, 125kHz BW

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
3609.283	34.1	0.8	1.0	208.0	3.0	0.0	Vert	AV	0.0	34.9	54.0	-19.1	Low ch, EUT horz, 125kHz BW
9023.075	59.1	-4.7	2.3	60.0	3.0	0.0	Horz	PK	0.0	54.4	74.0	-19.6	Low ch, EUT vert, 125kHz BW
2726.217	37.0	-2.7	1.0	171.0	3.0	0.0	Vert	AV	0.0	34.3	54.0	-19.7	Mid ch, EUT horz, 125kHz BW
2706.817	36.9	-2.9	1.0	182.0	3.0	0.0	Vert	AV	0.0	34.0	54.0	-20.0	Low ch, EUT horz, 125kHz BW
2744.625	36.5	-2.5	1.0	81.0	3.0	0.0	Horz	AV	0.0	34.0	54.0	-20.0	High ch, EUT vert, 125kHz BW
3637.192	32.7	1.1	1.0	56.0	3.0	0.0	Vert	AV	0.0	33.8	54.0	-20.2	Mid ch, EUT horz, 125kHz BW
9023.425	58.3	-4.7	1.6	131.1	3.0	0.0	Vert	PK	0.0	53.6	74.0	-20.4	Low ch, EUT horz, 125kHz BW
2744.692	35.9	-2.5	1.0	171.0	3.0	0.0	Vert	AV	0.0	33.4	54.0	-20.6	High ch, EUT horz, 125kHz BW
9148.842	57.4	-4.4	2.3	56.0	3.0	0.0	Horz	PK	0.0	53.0	74.0	-21.0	High ch, EUT vert, 125kHz BW
9148.650	57.4	-4.4	2.2	286.9	3.0	0.0	Vert	PK	0.0	53.0	74.0	-21.0	High ch, EUT horz, 125kHz BW
9086.650	56.7	-4.4	1.4	100.0	3.0	0.0	Horz	PK	0.0	52.3	74.0	-21.7	Mid ch, EUT vert, 125kHz BW
9086.475	55.4	-4.4	1.5	140.0	3.0	0.0	Vert	PK	0.0	51.0	74.0	-23.0	Mid ch, EUT horz, 125kHz BW
9023.892	55.6	-4.7	1.7	95.1	3.0	0.0	Horz	PK	0.0	50.9	74.0	-23.1	Low ch, EUT vert, 500kHz BW
9149.292	54.4	-4.4	1.2	113.1	3.0	0.0	Vert	PK	0.0	50.0	74.0	-24.0	High ch, EUT on side, 125kHz BW
9148.750	54.3	-4.4	2.0	60.0	3.0	0.0	Horz	PK	0.0	49.9	74.0	-24.1	High ch, EUT on side, 125kHz BW
9149.242	53.0	-4.4	1.0	90.0	3.0	0.0	Vert	PK	0.0	48.6	74.0	-25.4	High ch, EUT vert, 125kHz BW
4575.992	43.8	4.7	1.0	286.0	3.0	0.0	Horz	PK	0.0	48.5	74.0	-25.5	High ch, EUT vert, 125kHz BW
4542.967	43.6	4.6	1.9	343.9	3.0	0.0	Vert	PK	0.0	48.2	74.0	-25.8	Mid ch, EUT horz, 125kHz BW
4511.383	43.4	4.5	1.0	346.0	3.0	0.0	Horz	PK	0.0	47.9	74.0	-26.1	Low ch, EUT vert, 125kHz BW
4572.900	43.3	4.6	1.0	336.0	3.0	0.0	Vert	PK	0.0	47.9	74.0	-26.1	High ch, EUT horz, 125kHz BW
4545.800	43.0	4.6	1.2	0.0	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	Mid ch, EUT vert, 125kHz BW
9148.567	52.0	-4.4	2.0	129.0	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	High ch, EUT horz, 125kHz BW
4512.792	42.6	4.5	2.0	246.9	3.0	0.0	Vert	PK	0.0	47.1	74.0	-26.9	Low ch, EUT horz, 125kHz BW
3659.508	45.5	1.2	2.1	66.1	3.0	0.0	Horz	PK	0.0	46.7	74.0	-27.3	High ch, EUT vert, 125kHz BW
3609.792	45.5	0.8	1.2	62.1	3.0	0.0	Horz	PK	0.0	46.3	74.0	-27.7	Low ch, EUT vert, 125kHz BW
3634.742	44.7	1.1	1.0	178.1	3.0	0.0	Horz	PK	0.0	45.8	74.0	-28.2	Mid ch, EUT vert, 125kHz BW
3659.942	44.6	1.2	1.0	161.0	3.0	0.0	Vert	PK	0.0	45.8	74.0	-28.2	High ch, EUT horz, 125kHz BW
3632.475	43.9	1.1	1.0	56.0	3.0	0.0	Vert	PK	0.0	45.0	74.0	-29.0	Mid ch, EUT horz, 125kHz BW
3610.475	44.2	0.8	1.0	208.0	3.0	0.0	Vert	PK	0.0	45.0	74.0	-29.0	Low ch, EUT horz, 125kHz BW
2744.458	45.7	-2.5	1.0	81.0	3.0	0.0	Horz	PK	0.0	43.2	74.0	-30.8	High ch, EUT vert, 125kHz BW
2744.700	45.7	-2.5	1.0	171.0	3.0	0.0	Vert	PK	0.0	43.2	74.0	-30.8	High ch, EUT horz, 125kHz BW
2726.392	45.8	-2.7	1.0	49.0	3.0	0.0	Horz	PK	0.0	43.1	74.0	-30.9	Mid ch, EUT vert, 125kHz BW
2706.967	45.9	-2.9	1.1	76.1	3.0	0.0	Horz	PK	0.0	43.0	74.0	-31.0	Low ch, EUT vert, 125kHz BW
2726.708	45.4	-2.7	1.0	171.0	3.0	0.0	Vert	PK	0.0	42.7	74.0	-31.3	Mid ch, EUT horz, 125kHz BW
2707.217	45.5	-2.9	1.0	182.0	3.0	0.0	Vert	PK	0.0	42.6	74.0	-31.4	Low ch, EUT horz, 125kHz BW

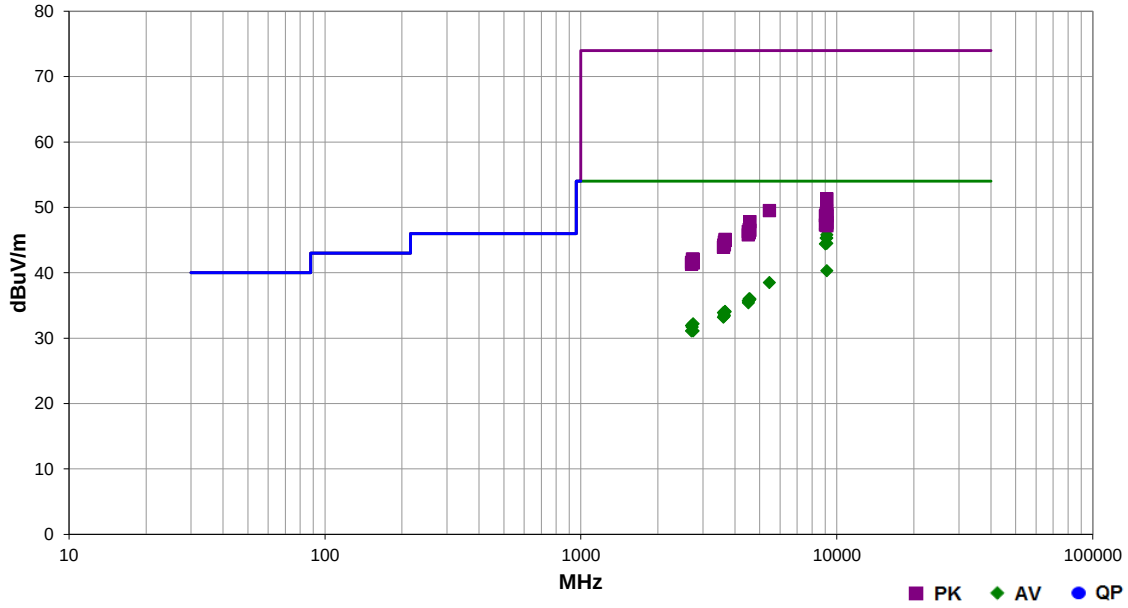
SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.07.22
EmiR5 2016.07.22.1

Work Order:	MLTI0058	**Date:**	09/09/16		
Project:	None	**Temperature:**	22.2 °C		
Job Site:	MN05	**Humidity:**	55.5% RH		
Serial Number:	18874459	**Barometric Pres.:**	1013 mbar	**Tested by:**	Dustin Sparks
EUT:	MTXDOT-NA1-A01				
Configuration:	2				
Customer:	Multi-Tech Systems, Inc.				
Attendees:	Marcus Glass				
EUT Power:	3.3VDC				
Operating Mode:	Transmitting low channel (902.3 MHz), mid channel (908.7 MHz), and high channel (914.9 MHz); 125kHz and 500kHz bandwidth data rates. For 500kHz bandwidth, low channel is 903.0 MHz and high channel is 914.2 MHz.				
Deviations:	None				
Comments:	Module powered by USB connection to laptop. Chip antenna				

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

Run #	103	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
9149.442	53.9	-4.4	2.0	319.9	3.0	0.0	Horz	AV	0.0	49.5	54.0	-4.5	High ch, EUT vert, 125kHz BW
9087.433	51.4	-4.4	2.0	311.0	3.0	0.0	Horz	AV	0.0	47.0	54.0	-7.0	Mid ch, EUT vert, 125kHz BW
9149.508	51.4	-4.4	1.0	336.0	3.0	0.0	Horz	AV	0.0	47.0	54.0	-7.0	High ch, EUT on side, 125kHz BW
9022.458	51.4	-4.7	1.9	286.0	3.0	0.0	Horz	AV	0.0	46.7	54.0	-7.3	Low ch, EUT vert, 125kHz BW
9149.258	50.9	-4.4	2.0	265.9	3.0	0.0	Horz	AV	0.0	46.5	54.0	-7.5	High ch, EUT horz, 125kHz BW
9149.417	50.2	-4.4	1.0	315.9	3.0	0.0	Vert	AV	0.0	45.8	54.0	-8.2	High ch, EUT on side, 125kHz BW
9086.558	49.7	-4.4	1.0	268.9	3.0	0.0	Vert	AV	0.0	45.3	54.0	-8.7	Low ch, EUT on side, 125kHz BW
9149.475	49.7	-4.4	1.0	257.9	3.0	0.0	Vert	AV	0.0	45.3	54.0	-8.7	High ch, EUT vert, 125kHz BW
9148.892	48.9	-4.4	1.0	56.0	3.0	0.0	Vert	AV	0.0	44.5	54.0	-9.5	High ch, EUT horz, 125kHz BW
9022.567	49.1	-4.7	1.0	272.9	3.0	0.0	Vert	AV	0.0	44.4	54.0	-9.6	Low ch, EUT on side, 125kHz BW
9150.200	44.8	-4.5	1.0	239.0	3.0	0.0	Horz	AV	0.0	40.3	54.0	-13.7	High ch, EUT vert, 500kHz BW
5452.392	30.9	7.6	1.0	326.9	3.0	0.0	Horz	AV	0.0	38.5	54.0	-15.5	Mid ch, EUT vert, 125kHz BW
4543.558	31.4	4.6	1.0	354.0	3.0	0.0	Horz	AV	0.0	36.0	54.0	-18.0	Mid ch, EUT vert, 125kHz BW
4575.000	31.3	4.7	4.0	271.9	3.0	0.0	Horz	AV	0.0	36.0	54.0	-18.0	High ch, EUT vert, 125kHz BW
4574.433	31.3	4.6	1.0	228.1	3.0	0.0	Vert	AV	0.0	35.9	54.0	-18.1	High ch, EUT on side, 125kHz BW
4545.700	31.2	4.6	2.1	329.0	3.0	0.0	Vert	AV	0.0	35.8	54.0	-18.2	Mid ch, EUT on side, 125kHz BW
4511.425	31.2	4.5	2.2	195.1	3.0	0.0	Horz	AV	0.0	35.7	54.0	-18.3	Low ch, EUT vert, 125kHz BW
4511.875	30.9	4.5	1.0	107.0	3.0	0.0	Vert	AV	0.0	35.4	54.0	-18.6	Low ch, EUT on side, 125kHz BW
3659.542	32.9	1.2	1.0	155.1	3.0	0.0	Vert	AV	0.0	34.1	54.0	-19.9	High ch, EUT on side, 125kHz BW
3657.650	32.8	1.2	1.0	204.0	3.0	0.0	Horz	AV	0.0	34.0	54.0	-20.0	High ch, EUT vert, 125kHz BW
3609.183	33.1	0.8	1.1	260.0	3.0	0.0	Vert	AV	0.0	33.9	54.0	-20.1	Low ch, EUT on side, 125kHz BW
3637.033	32.4	1.1	1.7	290.9	3.0	0.0	Vert	AV	0.0	33.5	54.0	-20.5	Mid ch, EUT on side, 125kHz BW
3634.358	32.3	1.1	1.5	263.0	3.0	0.0	Horz	AV	0.0	33.4	54.0	-20.6	Mid ch, EUT vert, 125kHz BW

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
3608.725	32.4	0.8	1.0	219.0	3.0	0.0	Horz	AV	0.0	33.2	54.0	-20.8	Low ch, EUT vert, 125kHz BW
2744.883	34.7	-2.5	1.0	131.1	3.0	0.0	Horz	AV	0.0	32.2	54.0	-21.8	High ch, EUT vert, 125kHz BW
2707.025	34.8	-2.9	1.0	50.0	3.0	0.0	Horz	AV	0.0	31.9	54.0	-22.1	Low ch, EUT vert, 125kHz BW
2726.150	34.4	-2.7	2.4	350.0	3.0	0.0	Vert	AV	0.0	31.7	54.0	-22.3	Mid ch, EUT on side, 125kHz BW
9149.567	55.7	-4.4	2.0	319.9	3.0	0.0	Horz	PK	0.0	51.3	74.0	-22.7	High ch, EUT vert, 125kHz BW
2706.800	34.0	-2.9	1.0	0.0	3.0	0.0	Vert	AV	0.0	31.1	54.0	-22.9	Low ch, EUT on side, 125kHz BW
2744.733	33.6	-2.5	1.0	92.0	3.0	0.0	Vert	AV	0.0	31.1	54.0	-22.9	High ch, EUT on side, 125kHz BW
5451.417	41.9	7.6	1.0	326.9	3.0	0.0	Horz	PK	0.0	49.5	74.0	-24.5	Mid ch, EUT vert, 125kHz BW
9149.458	53.8	-4.4	1.0	336.0	3.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	High ch, EUT on side, 125kHz BW
9087.075	53.5	-4.4	2.0	311.0	3.0	0.0	Horz	PK	0.0	49.1	74.0	-24.9	Mid ch, EUT vert, 125kHz BW
9149.550	53.4	-4.4	2.0	265.9	3.0	0.0	Horz	PK	0.0	49.0	74.0	-25.0	High ch, EUT horz, 125kHz BW
9023.658	53.4	-4.7	1.9	286.0	3.0	0.0	Horz	PK	0.0	48.7	74.0	-25.3	Low ch, EUT vert, 125kHz BW
9149.342	53.1	-4.4	1.0	315.9	3.0	0.0	Vert	PK	0.0	48.7	74.0	-25.3	High ch, EUT on side, 125kHz BW
9086.467	52.3	-4.4	1.0	268.9	3.0	0.0	Vert	PK	0.0	47.9	74.0	-26.1	Low ch, EUT on side, 125kHz BW
4572.092	43.2	4.6	4.0	271.9	3.0	0.0	Horz	PK	0.0	47.8	74.0	-26.2	High ch, EUT vert, 125kHz BW
9148.917	52.1	-4.4	1.0	257.9	3.0	0.0	Vert	PK	0.0	47.7	74.0	-26.3	High ch, EUT vert, 125kHz BW
9146.908	52.0	-4.4	1.0	239.0	3.0	0.0	Horz	PK	0.0	47.6	74.0	-26.4	High ch, EUT vert, 500kHz BW
9023.367	52.0	-4.7	1.0	272.9	3.0	0.0	Vert	PK	0.0	47.3	74.0	-26.7	Low ch, EUT on side, 125kHz BW
9148.783	51.6	-4.4	1.0	56.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	High ch, EUT horz, 125kHz BW
4543.708	42.0	4.6	1.0	354.0	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	Mid ch, EUT vert, 125kHz BW
4576.650	41.8	4.7	1.0	228.1	3.0	0.0	Vert	PK	0.0	46.5	74.0	-27.5	High ch, EUT on side, 125kHz BW
4511.733	41.8	4.5	2.2	195.1	3.0	0.0	Horz	PK	0.0	46.3	74.0	-27.7	Low ch, EUT vert, 125kHz BW
4545.358	41.5	4.6	2.1	329.0	3.0	0.0	Vert	PK	0.0	46.1	74.0	-27.9	Mid ch, EUT on side, 125kHz BW
4510.658	41.3	4.5	1.0	107.0	3.0	0.0	Vert	PK	0.0	45.8	74.0	-28.2	Low ch, EUT on side, 125kHz BW
3658.842	43.9	1.2	1.0	155.1	3.0	0.0	Vert	PK	0.0	45.1	74.0	-28.9	High ch, EUT on side, 125kHz BW
3657.458	43.8	1.2	1.0	204.0	3.0	0.0	Horz	PK	0.0	45.0	74.0	-29.0	High ch, EUT vert, 125kHz BW
3636.500	43.6	1.1	1.7	290.9	3.0	0.0	Vert	PK	0.0	44.7	74.0	-29.3	Mid ch, EUT on side, 125kHz BW
3634.150	43.2	1.1	1.5	263.0	3.0	0.0	Horz	PK	0.0	44.3	74.0	-29.7	Mid ch, EUT vert, 125kHz BW
3611.133	43.4	0.8	1.1	260.0	3.0	0.0	Vert	PK	0.0	44.2	74.0	-29.8	Low ch, EUT on side, 125kHz BW
3608.392	43.1	0.8	1.0	219.0	3.0	0.0	Horz	PK	0.0	43.9	74.0	-30.1	Low ch, EUT vert, 125kHz BW
2726.467	44.8	-2.7	2.4	350.0	3.0	0.0	Vert	PK	0.0	42.1	74.0	-31.9	Mid ch, EUT on side, 125kHz BW
2744.017	44.6	-2.5	1.0	131.1	3.0	0.0	Horz	PK	0.0	42.1	74.0	-31.9	High ch, EUT vert, 125kHz BW
2707.392	44.5	-2.9	1.0	50.0	3.0	0.0	Horz	PK	0.0	41.6	74.0	-32.4	Low ch, EUT vert, 125kHz BW
2744.292	44.0	-2.5	1.0	92.0	3.0	0.0	Vert	PK	0.0	41.5	74.0	-32.5	High ch, EUT on side, 125kHz BW
2707.058	44.2	-2.9	1.0	0.0	3.0	0.0	Vert	PK	0.0	41.3	74.0	-32.7	Low ch, EUT on side, 125kHz BW

SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.07.22

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

Transmit, High Channel 914.9 MHz, Band Width 125 kHz

POWER SETTINGS INVESTIGATED

3.3 VDC

CONFIGURATIONS INVESTIGATED

MLTI0064 - 2 (Power decoupliing change)

FREQUENCY RANGE INVESTIGATED

Start Frequency	1000 MHz	Stop Frequency	18000 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
Antenna - Standard Gain	ETS Lindgren	3160-08	AHV	NCR	0 mo
Cable	None	Standard Gain Horns Cable	EVF	3/11/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	3/11/2016	12 mo
Antenna - Standard Gain	ETS Lindgren	3160-07	AHU	NCR	0 mo
Cable	N/A	Double Ridge Horn Cables	EVB	3/11/2016	12 mo
Amplifier - Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	PAG	3/11/2016	12 mo
Antenna - Double Ridge	ETS Lindgren	3115	AIZ	2/3/2016	24 mo
Analyzer - Spectrum Analyzer	Agilent	E4446A	AAQ	4/22/2016	12 mo

MEASUREMENT BANDWIDTHS

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

TEST DESCRIPTION

The highest gain antenna of each type to be used with the EUT was tested. The EUT was configured for the required transmit frequencies and the modes as showed in the data sheets.

For each configuration, the spectrum was scanned throughout the specified range as part of the exploratory investigation of the emissions. These “pre-scans” are not included in the report. Final measurements on individual emissions were then made and included in this test report.

The individual 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 if required, and adjusting the measurement antenna height and polarization (per ANSI C63.10). A preamp and high pass filter (and notch filter) were used for this test in order to provide sufficient measurement sensitivity.

Measurements were made with the required detectors and annotated on the data for each individual point using the following annotation:

QP = Quasi-Peak Detector
PK = Peak Detector
AV = RMS Detector

Measurements were made to satisfy the specific requirements of the test specification for out of band emissions as well as the restricted band requirements.

If there are no detectable emissions above the noise floor, the data included may show noise floor measurements for reference only.

Measurements at the edges of the allowable band may be presented in an alternative method as provided for in the ANSI C63.10 Marker-Delta method. This method involves performing an in-band fundamental measurement followed by a screen capture of the fundamental and out-of-band emission using reduced measurement instrumentation bandwidths. The amplitude delta measured on this screen capture is applied to the fundamental emission value to show the out-of-band emission level as applied to the limit.

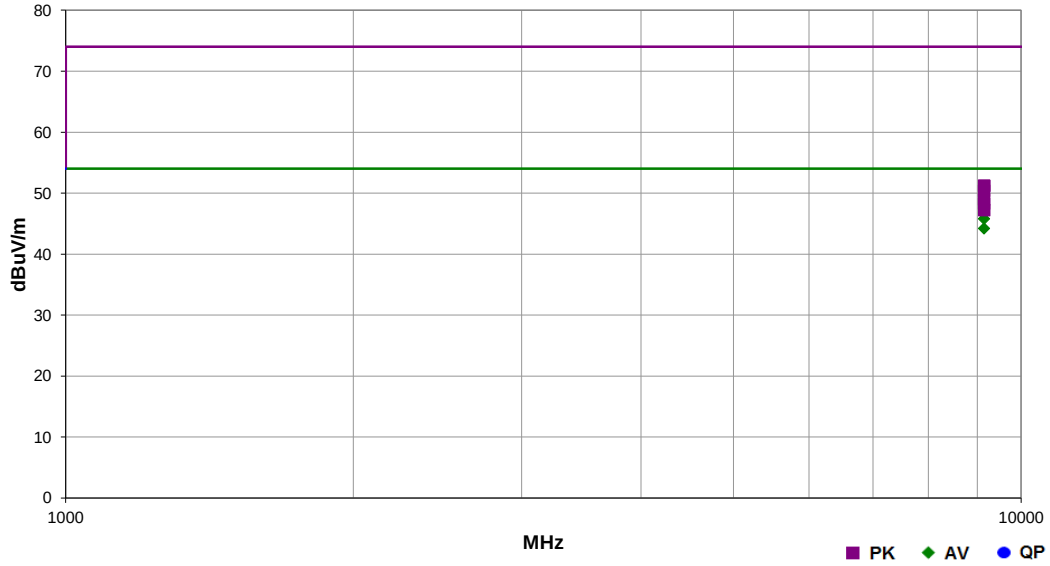
SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.07.22
EmiR5 2016.08.26

Work Order:	MLTI0064	**Date:**	10/06/16		
Project:	None	**Temperature:**	21.9 °C		
Job Site:	EV01	**Humidity:**	48.2% RH		
Serial Number:	D 915 MHz	**Barometric Pres.:**	1023 mbar	**Tested by:**	Jared Ison
EUT:	MTXDOT-NA1-A01				
Configuration:	2				
Customer:	Multi-Tech Systems, Inc.				
Attendees:	None				
EUT Power:	3.3 VDC				
Operating Mode:	Transmit				
Deviations:	None				
Comments:	Reference data comments for channel and EUT orientation. Power decoupliing changes. Chip Antenna.				

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

Run #	5	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
9148.445	55.9	-6.4	2.4	215.0	3.0	0.0	Horz	AV	0.0	49.5	54.0	-4.5	High Ch. 914.9 MHz,BW 125 kHz, EUT On Side
9148.765	55.8	-6.4	2.3	197.0	3.0	0.0	Vert	AV	0.0	49.4	54.0	-4.6	High Ch. 914.9 MHz,BW 125 kHz, EUT Horz
9148.860	54.4	-6.4	2.0	300.0	3.0	0.0	Horz	AV	0.0	48.0	54.0	-6.0	High Ch. 914.9 MHz,BW 125 kHz, EUT Horz
9148.430	53.0	-6.4	1.0	157.0	3.0	0.0	Horz	AV	0.0	46.6	54.0	-7.4	High Ch. 914.9 MHz,BW 125 kHz, EUT Vert
9148.370	52.2	-6.4	1.0	127.0	3.0	0.0	Vert	AV	0.0	45.8	54.0	-8.2	High Ch. 914.9 MHz,BW 125 kHz, EUT On Side
9148.425	50.6	-6.4	1.0	157.0	3.0	0.0	Vert	AV	0.0	44.2	54.0	-9.8	High Ch. 914.9 MHz,BW 125 kHz, EUT Vert
9148.935	57.6	-6.4	2.3	197.0	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	High Ch. 914.9 MHz,BW 125 kHz, EUT Horz
9149.250	57.6	-6.4	2.4	215.0	3.0	0.0	Horz	PK	0.0	51.2	74.0	-22.8	High Ch. 914.9 MHz,BW 125 kHz, EUT On Side
9148.590	56.8	-6.4	2.0	300.0	3.0	0.0	Horz	PK	0.0	50.4	74.0	-23.6	High Ch. 914.9 MHz,BW 125 kHz, EUT Horz
9148.970	55.4	-6.4	1.0	157.0	3.0	0.0	Horz	PK	0.0	49.0	74.0	-25.0	High Ch. 914.9 MHz,BW 125 kHz, EUT Vert
9148.895	54.7	-6.4	1.0	127.0	3.0	0.0	Vert	PK	0.0	48.3	74.0	-25.7	High Ch. 914.9 MHz,BW 125 kHz, EUT On Side
9149.380	53.6	-6.4	1.0	157.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	High Ch. 914.9 MHz,BW 125 kHz, EUT Vert

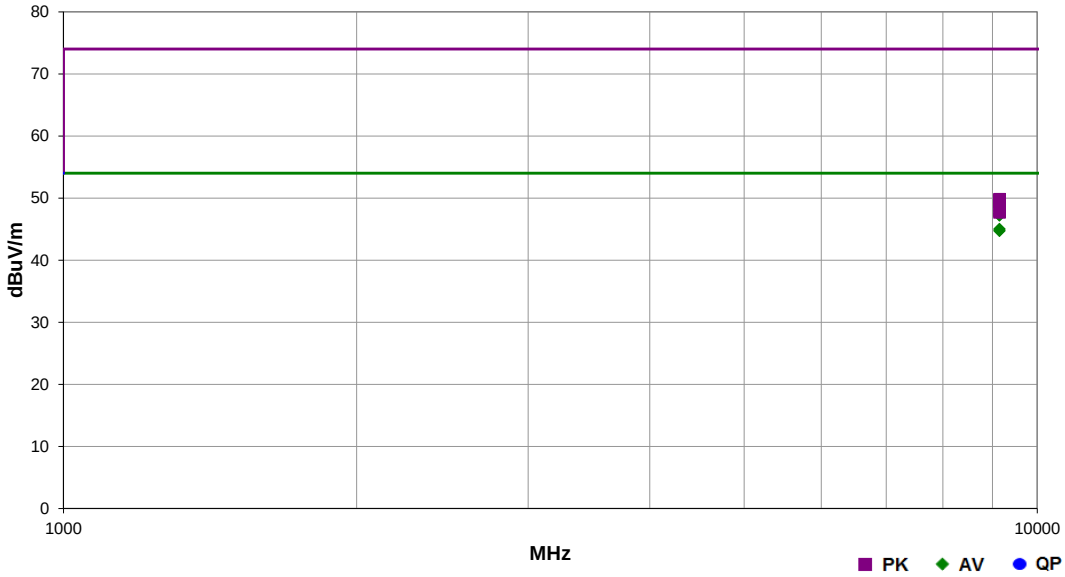
SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.07.22
EmiR5 2016.08.26

Work Order:	MLTI0064	**Date:**	10/06/16		
Project:	None	**Temperature:**	21.9 °C		
Job Site:	EV01	**Humidity:**	48.2% RH		
Serial Number:	3 915 MHz	**Barometric Pres.:**	1023 mbar	**Tested by:**	Jared Ison
EUT:	MTXDOT-NA1-A01				
Configuration:	2				
Customer:	Multi-Tech Systems, Inc.				
Attendees:	None				
EUT Power:	3.3 VDC				
Operating Mode:	Transmit				
Deviations:	None				
Comments:	Reference data comments for channel and EUT orientation. Power decoupliing changes. Chip Antenna.				

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

Run #	6	**Test Distance (m)**	3	**Antenna Height(s)**	1 to 4(m)	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
9148.470	54.3	-6.4	2.1	261.0	3.0	0.0	Horz	AV	0.0	47.9	54.0	-6.1	High Ch. 914.9 MHz,BW 125 kHz, EUT Horz
9148.575	53.9	-6.4	1.1	126.0	3.0	0.0	Vert	AV	0.0	47.5	54.0	-6.5	High Ch. 914.9 MHz,BW 125 kHz, EUT On Side
9148.515	53.8	-6.4	1.5	158.0	3.0	0.0	Horz	AV	0.0	47.4	54.0	-6.6	High Ch. 914.9 MHz,BW 125 kHz, EUT Vert
9148.500	53.6	-6.4	2.3	194.0	3.0	0.0	Vert	AV	0.0	47.2	54.0	-6.8	High Ch. 914.9 MHz,BW 125 kHz, EUT Horz
9148.545	51.4	-6.4	1.0	213.0	3.0	0.0	Horz	AV	0.0	45.0	54.0	-9.0	High Ch. 914.9 MHz,BW 125 kHz, EUT On Side
9148.610	51.1	-6.4	1.2	227.0	3.0	0.0	Vert	AV	0.0	44.7	54.0	-9.3	High Ch. 914.9 MHz,BW 125 kHz, EUT Vert
9149.170	56.2	-6.4	2.1	261.0	3.0	0.0	Horz	PK	0.0	49.8	74.0	-24.2	High Ch. 914.9 MHz,BW 125 kHz, EUT Horz
9148.345	56.1	-6.4	1.1	126.0	3.0	0.0	Vert	PK	0.0	49.7	74.0	-24.3	High Ch. 914.9 MHz,BW 125 kHz, EUT On Side
9148.465	56.0	-6.4	2.3	194.0	3.0	0.0	Vert	PK	0.0	49.6	74.0	-24.4	High Ch. 914.9 MHz,BW 125 kHz, EUT Horz
9149.300	55.8	-6.4	1.5	158.0	3.0	0.0	Horz	PK	0.0	49.4	74.0	-24.6	High Ch. 914.9 MHz,BW 125 kHz, EUT Vert
9148.525	54.3	-6.4	1.0	213.0	3.0	0.0	Horz	PK	0.0	47.9	74.0	-26.1	High Ch. 914.9 MHz,BW 125 kHz, EUT On Side
9148.475	54.1	-6.4	1.2	227.0	3.0	0.0	Vert	PK	0.0	47.7	74.0	-26.3	High Ch. 914.9 MHz,BW 125 kHz, EUT Vert

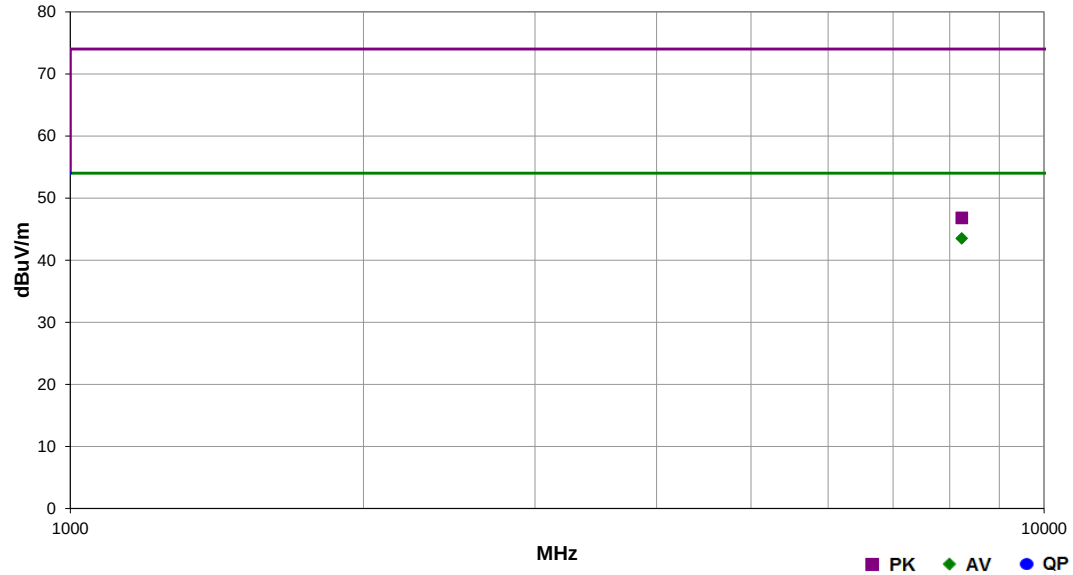
SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2016.07.22
EmiR5 2016.08.26

Work Order:	MLTI0064	**Date:**	10/06/16		
Project:	None	**Temperature:**	21.9 °C		
Job Site:	EV01	**Humidity:**	48.2% RH		
Serial Number:	3 915 MHz	**Barometric Pres.:**	1023 mbar	**Tested by:**	Jared Ison
EUT:	MTXDOT-NA1-A01				
Configuration:	2				
Customer:	Multi-Tech Systems, Inc.				
Attendees:	None				
EUT Power:	3.3 VDC				
Operating Mode:	Transmit				
Deviations:	None				
Comments:	Reference data comments for channel and EUT orientation. Power decoupliing changes. Chip Antenna.				

Test Specifications	**Test Method**
FCC 15.247:2016	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)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
8234.025	50.0	-6.5	2.2	310.0	3.0	0.0	Horz	AV	0.0	43.5	54.0	-10.5	High Ch. 914.9 MHz,BW 125 kHz, EUT Horz
8233.900	53.3	-6.5	2.2	310.0	3.0	0.0	Horz	PK	0.0	46.8	74.0	-27.2	High Ch. 914.9 MHz,BW 125 kHz, EUT Horz

CARRIER FREQUENCY SEPARATION

XMit 2016.05.06

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	11/26/2014	11/26/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/18/2015	9/18/2016
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/18/2015	9/18/2016
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The channel carrier frequencies in the 902-928MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. The EUT was operated in pseudorandom hopping mode. The spectrum was scanned across two adjacent peaks. The separation between the peaks of these channels was measured.

CARRIER FREQUENCY SEPARATION

NORTHWEST EMC

XMit 2016.05.06

EUT:	MTXDOT-NA1-A00			**Work Order:**	MLTI0058
Serial Number:	18865140			**Date:**	09/15/16
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	23 °C
Attendees:	Marcus Glass			**Humidity:**	49.9% RH
Project:	None			**Barometric Pres.:**	1023 mbar
Tested by:	Dustin Sparks	**Power:**	3.3VDC	**Job Site:**	MN08

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

COMMENTS

Module powered by USB connection to laptop. Limit is based on the occupied bandwidth of the transmitter.

DEVIATIONS FROM TEST STANDARD

None

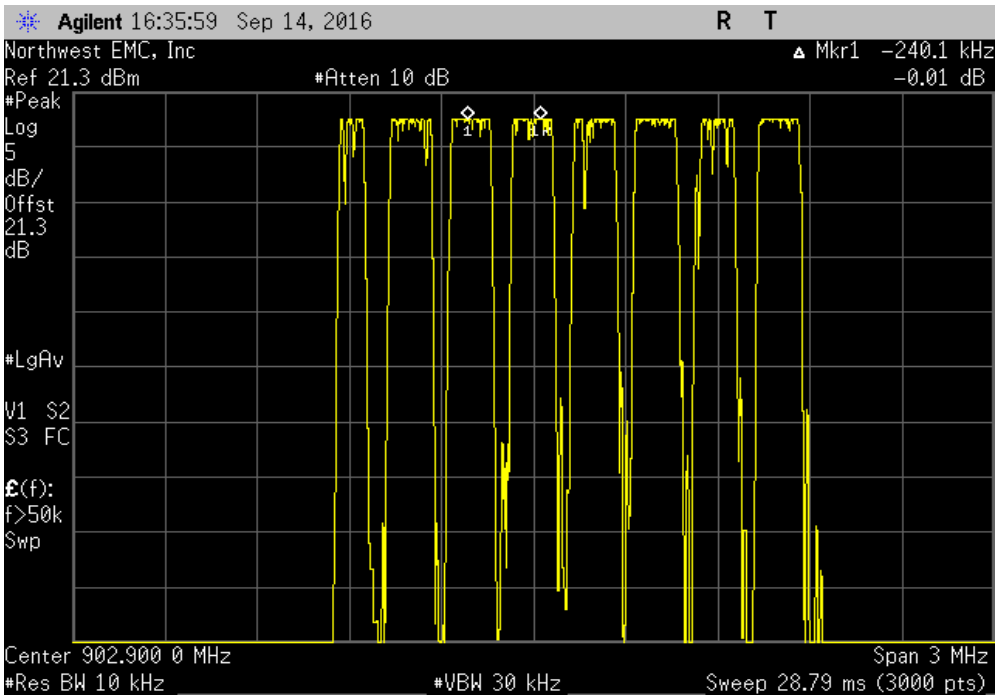
Configuration #	3	Signature Dustin Sparks

		Value	Limit (≥)	Results
Hopping Mode				
FSB1				
	Mid Channel, 902.9 MHz	240.1 kHz	133.6 kHz	Pass
FSB2				
	Mid Channel, 904.5 MHz	180.1 kHz	133.6 kHz	Pass
FSB3				
	Mid Channel, 906.1 MHz	203.5 kHz	133.6 kHz	Pass
FSB4				
	Mid Channel, 907.7 MHz	258.4 kHz	133.6 kHz	Pass
FSB5				
	Mid Channel, 909.3 MHz	238.0 kHz	133.6 kHz	Pass
FSB6				
	Mid Channel, 910.9 MHz	201.4 kHz	133.6 kHz	Pass
FSB7				
	Mid Channel, 912.5 MHz	196.4 kHz	133.6 kHz	Pass
FSB8				
	Mid Channel, 914.1 MHz	200.2 kHz	133.6 kHz	Pass

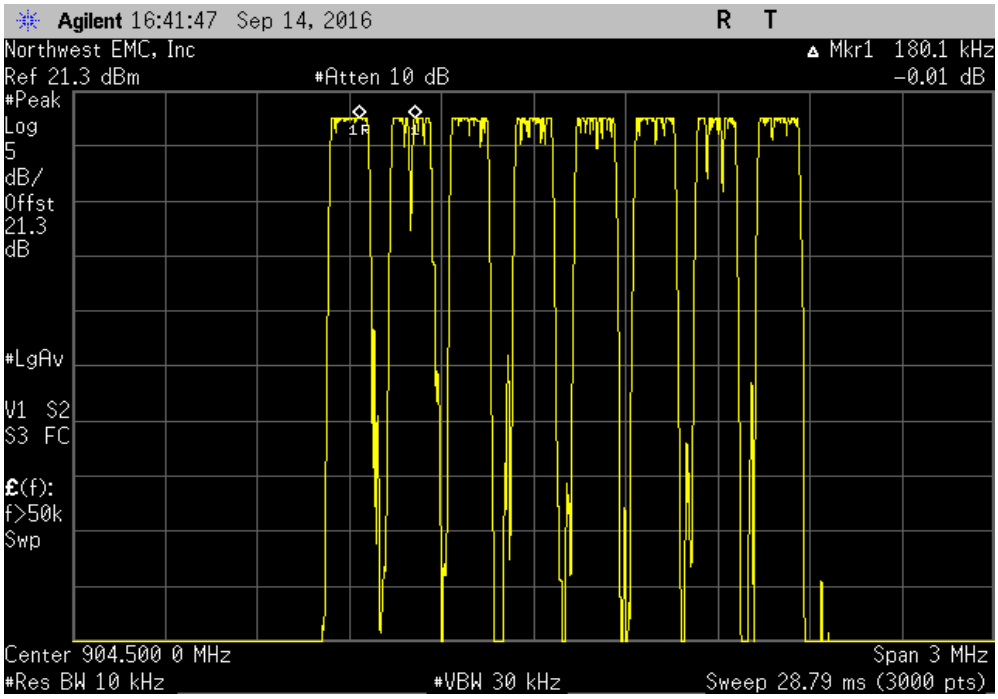
CARRIER FREQUENCY SEPARATION

XMit 2016.05.06

Hopping Mode, FSB1, Mid Channel, 902.9 MHz						
				Value	Limit (≥)	Results
				240.1 kHz	133.6 kHz	Pass



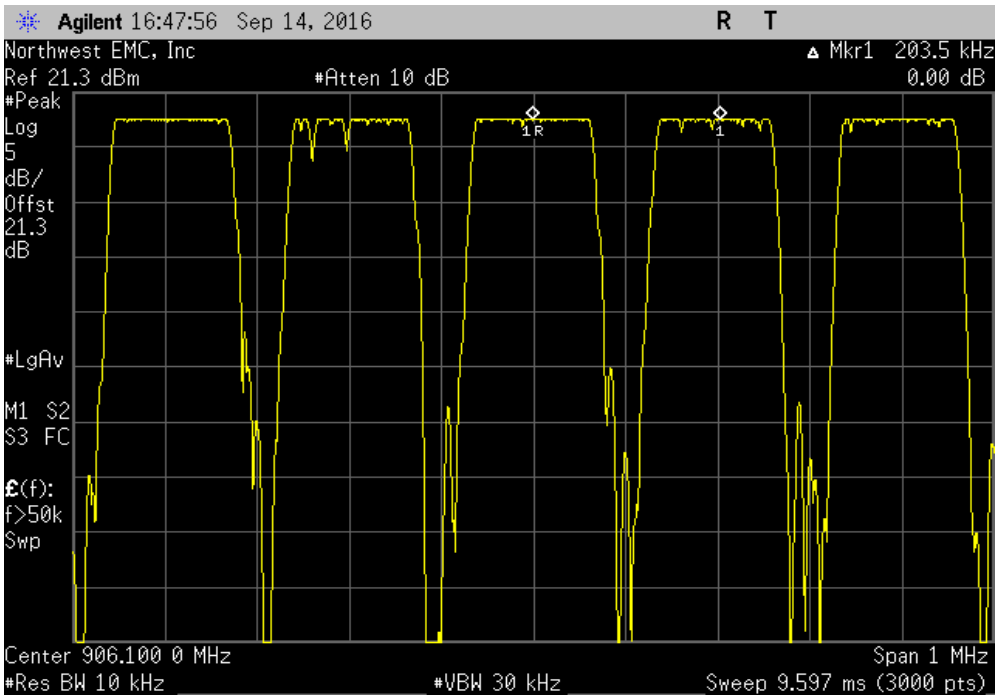
Hopping Mode, FSB2, Mid Channel, 904.5 MHz						
				Value	Limit (≥)	Results
				180.1 kHz	133.6 kHz	Pass



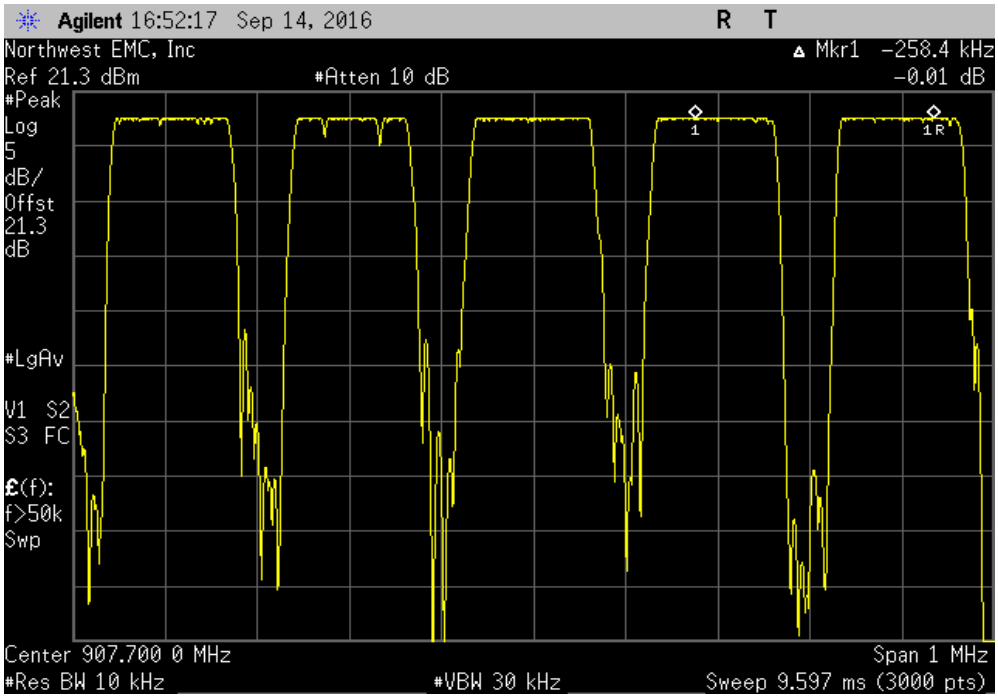
CARRIER FREQUENCY SEPARATION

XMit 2016.05.06

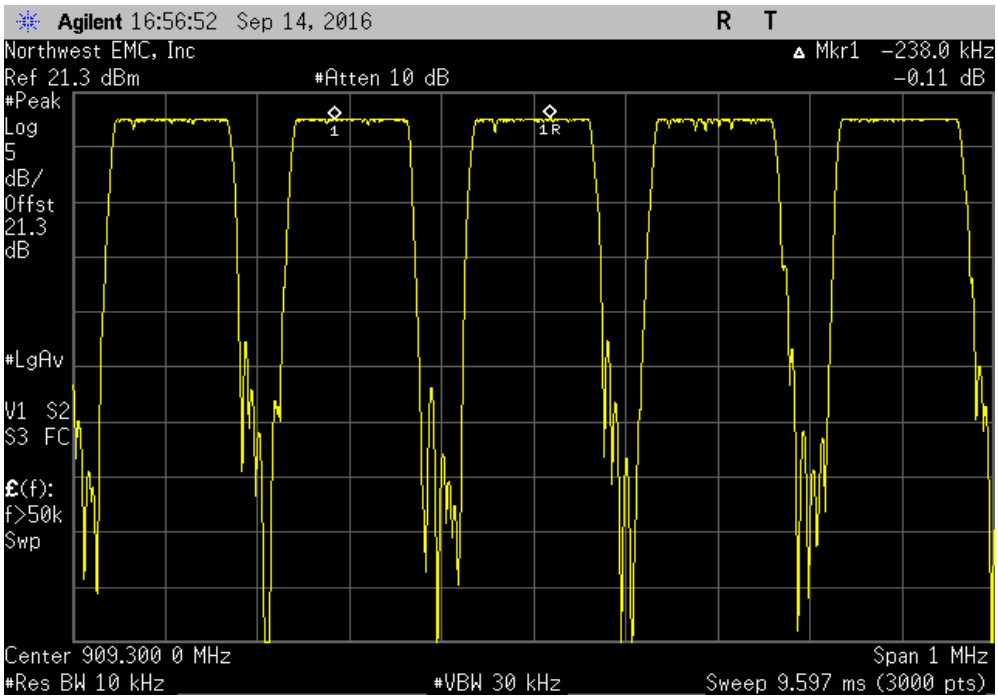
Hopping Mode, FSB3, Mid Channel, 906.1 MHz						
				Value	Limit (≥)	Results
				203.5 kHz	133.6 kHz	Pass



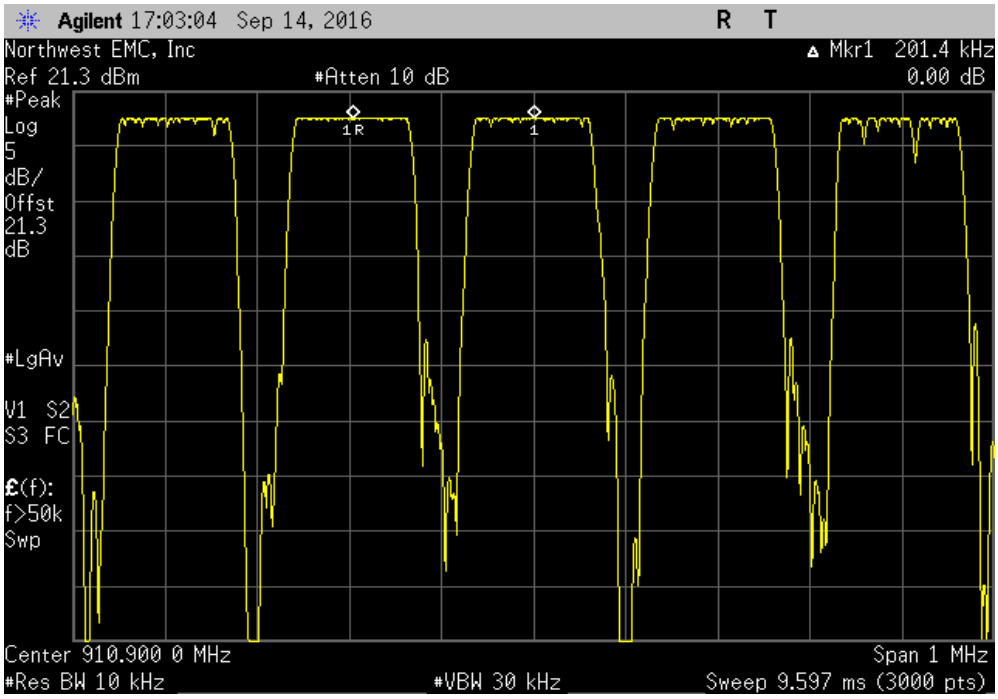
Hopping Mode, FSB4, Mid Channel, 907.7 MHz						
				Value	Limit (≥)	Results
				258.4 kHz	133.6 kHz	Pass



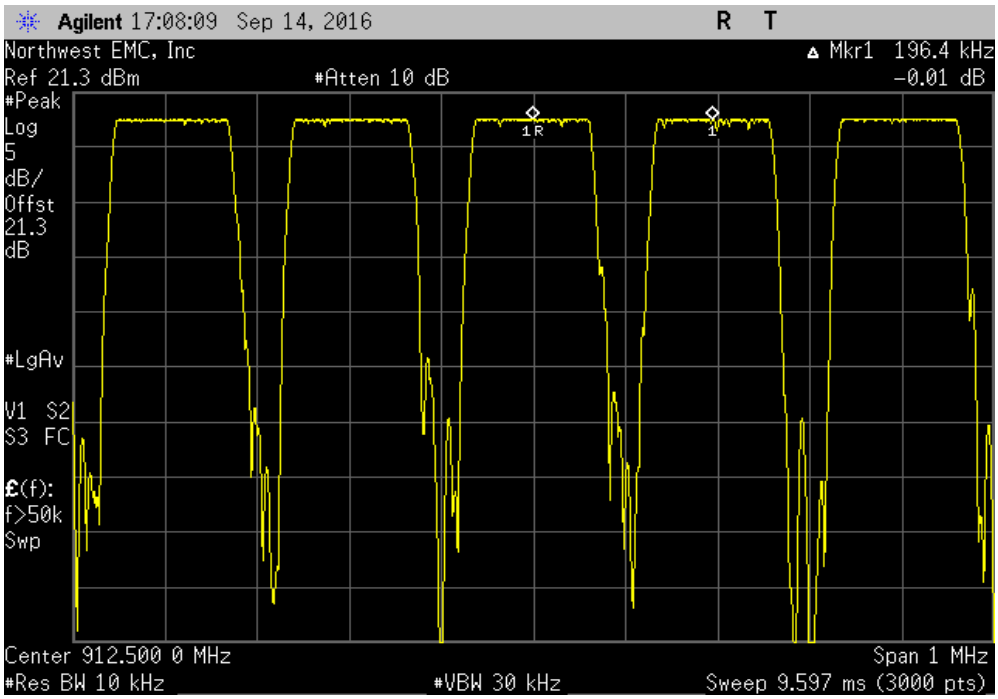
Hopping Mode, FSB5, Mid Channel, 909.3 MHz						
				Value	Limit (≥)	Results
				238.0 kHz	133.6 kHz	Pass



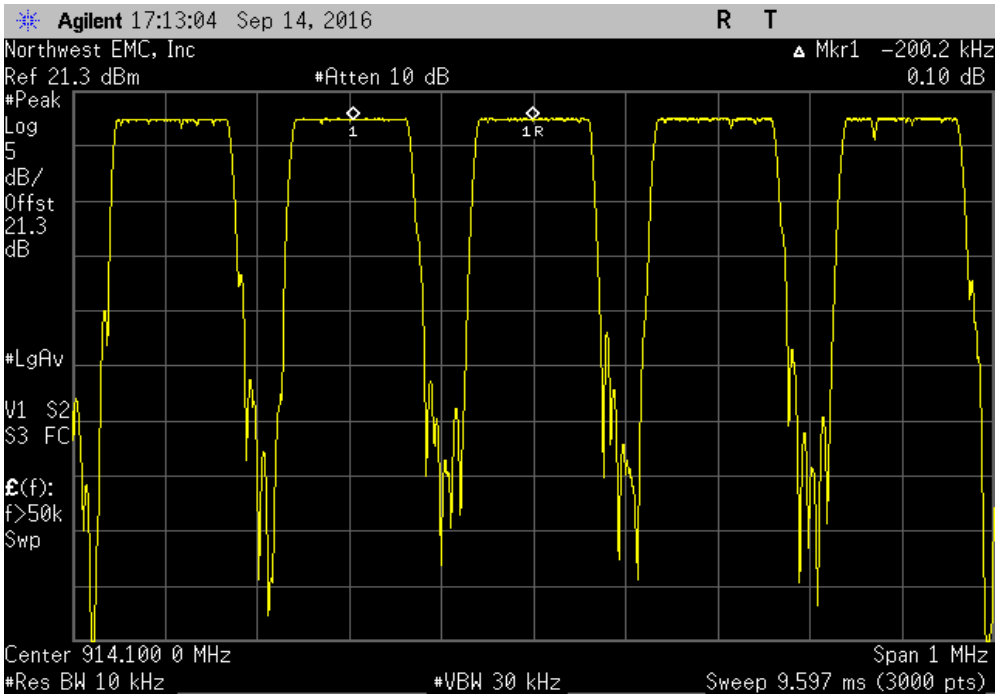
Hopping Mode, FSB6, Mid Channel, 910.9 MHz						
				Value	Limit (≥)	Results
				201.4 kHz	133.6 kHz	Pass



Hopping Mode, FSB7, Mid Channel, 912.5 MHz						
				Value	Limit (≥)	Results
				196.4 kHz	133.6 kHz	Pass



Hopping Mode, FSB8, Mid Channel, 914.1 MHz						
				Value	Limit (≥)	Results
				200.2 kHz	133.6 kHz	Pass



NUMBER OF HOPPING FREQUENCIES

XMit 2016.05.06

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	11/26/2014	11/26/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/18/2015	9/18/2016
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/18/2015	9/18/2016
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The number of hopping frequencies was measured across the authorized band. The hopping function of the EUT was enabled.

NUMBER OF HOPPING FREQUENCIES

NORTHWEST EMC

XMit 2016.05.06

EUT:	MTXDOT-NA1-A00			**Work Order:**	MLTI0058
Serial Number:	18865140			**Date:**	09/15/16
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	23.1 °C
Attendees:	Marcus Glass			**Humidity:**	50.3% RH
Project:	None			**Barometric Pres.:**	1022 mbar
Tested by:	Dustin Sparks	**Power:**	3.3VDC	**Job Site:**	MN08

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

COMMENTS

Module powered by USB connection to laptop. No channel limit for Hybrid devices.

DEVIATIONS FROM TEST STANDARD

None

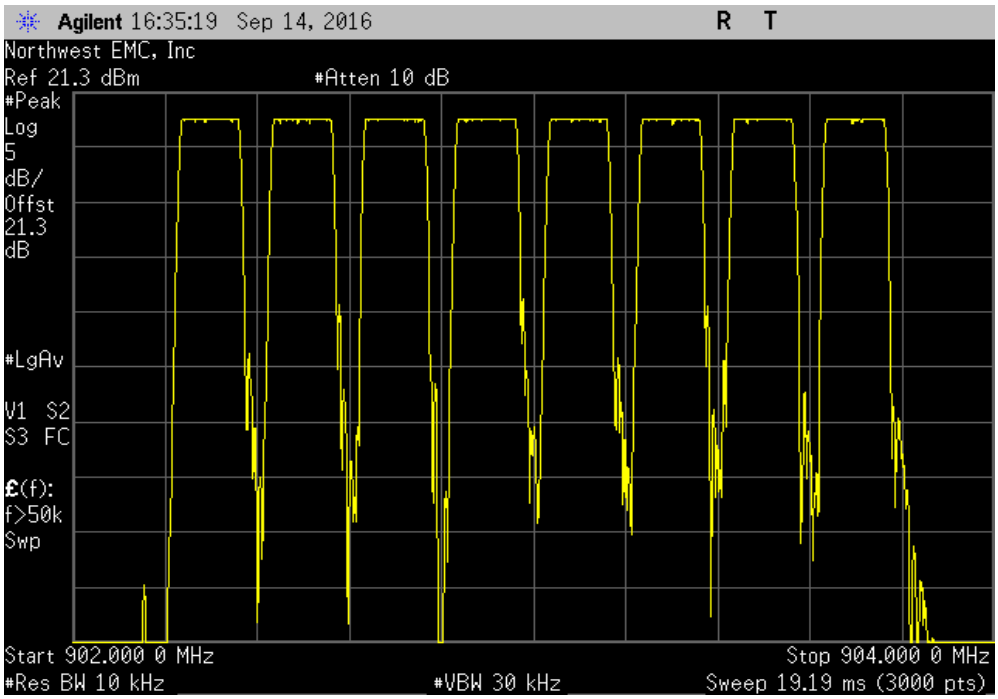
Configuration #	3	Signature Dustin Sparks

		Number of Channels	Limit	Results
Hopping Mode				
FSB1				
	Mid Channel	8	N/A	N/A
FSB2				
	Mid Channel	8	N/A	N/A
FSB3				
	Mid Channel	8	N/A	N/A
FSB4				
	Mid Channel	8	N/A	N/A
FSB5				
	Mid Channel	8	N/A	N/A
FSB6				
	Mid Channel	8	N/A	N/A
FSB7				
	Mid Channel	8	N/A	N/A
FSB8				
	Mid Channel	8	N/A	N/A

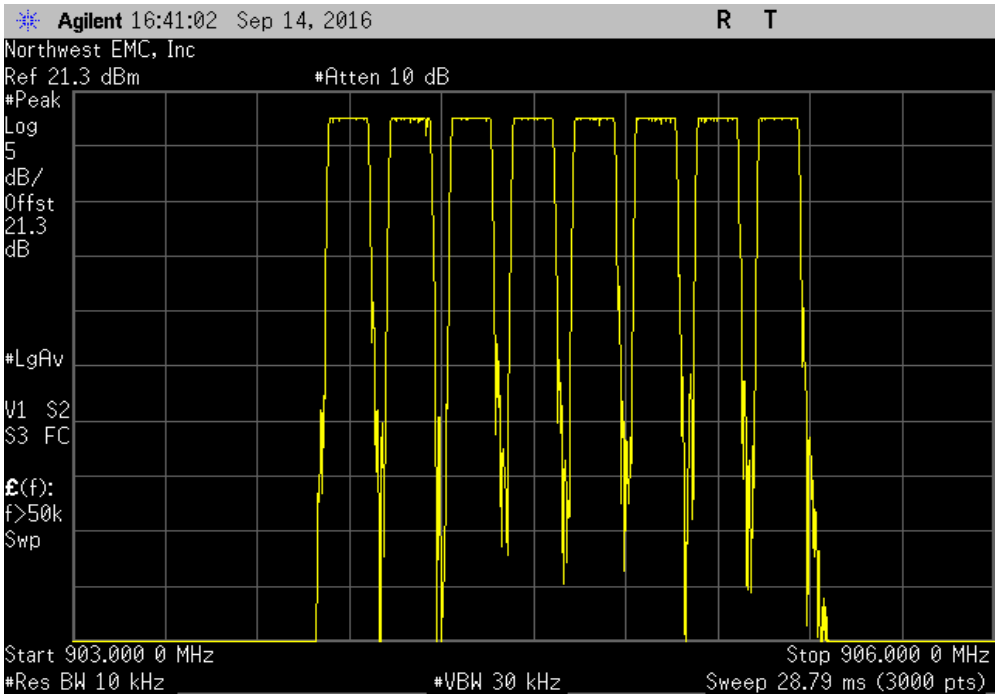
NUMBER OF HOPPING FREQUENCIES

XMit 2016.05.06

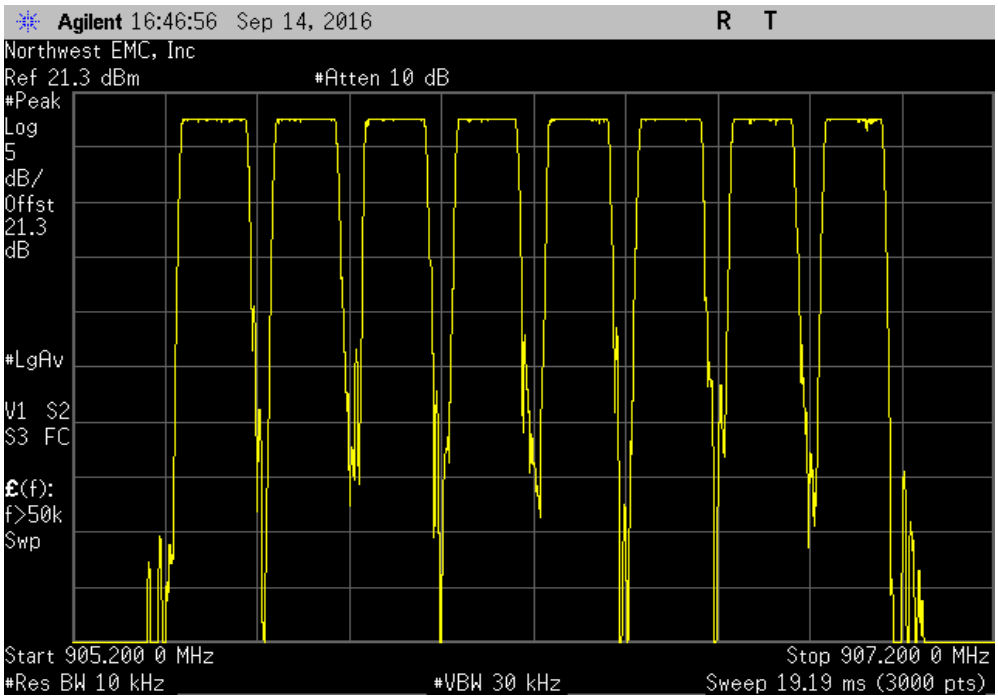
Hopping Mode, FSB1, Mid Channel						
				Number of Channels	Limit	Results
				8	N/A	N/A



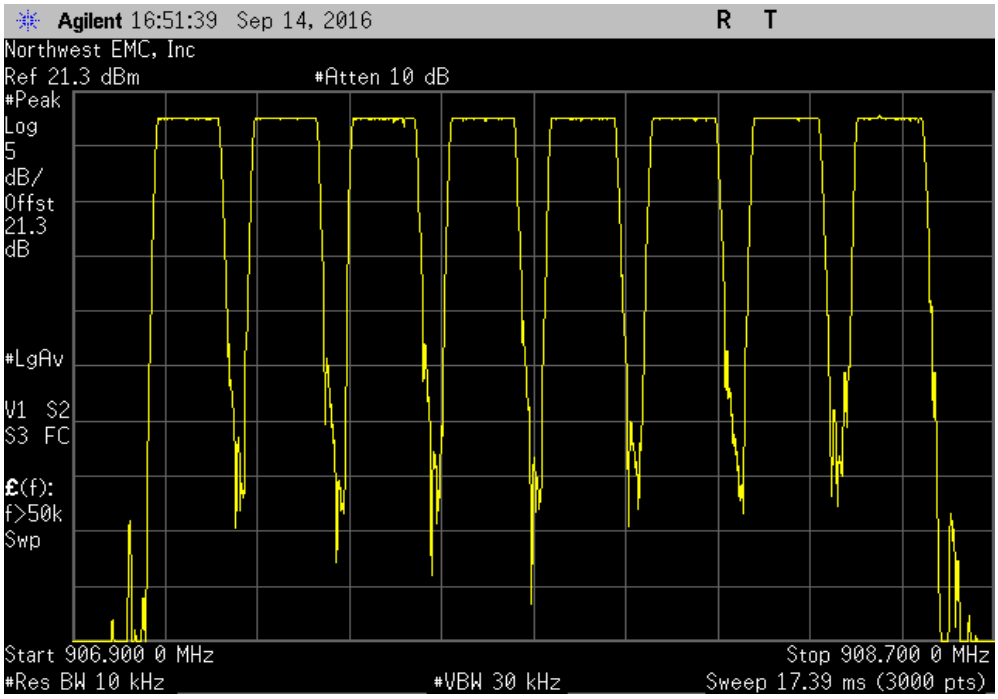
Hopping Mode, FSB2, Mid Channel						
				Number of Channels	Limit	Results
				8	N/A	N/A



Hopping Mode, FSB3, Mid Channel						
				Number of Channels	Limit	Results
				8	N/A	N/A



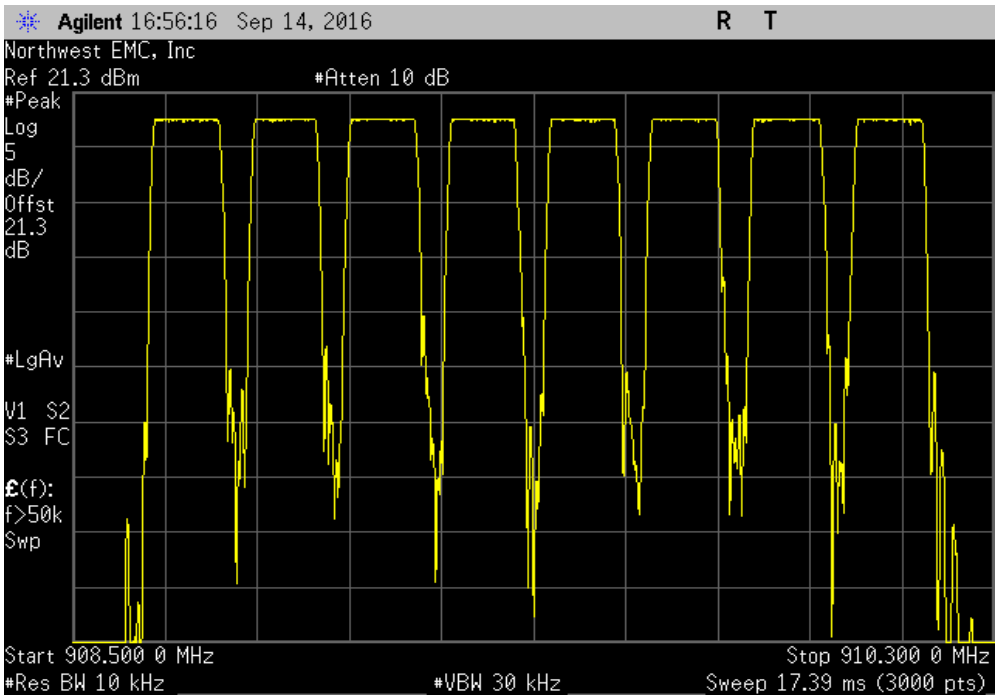
Hopping Mode, FSB4, Mid Channel						
				Number of Channels	Limit	Results
				8	N/A	N/A



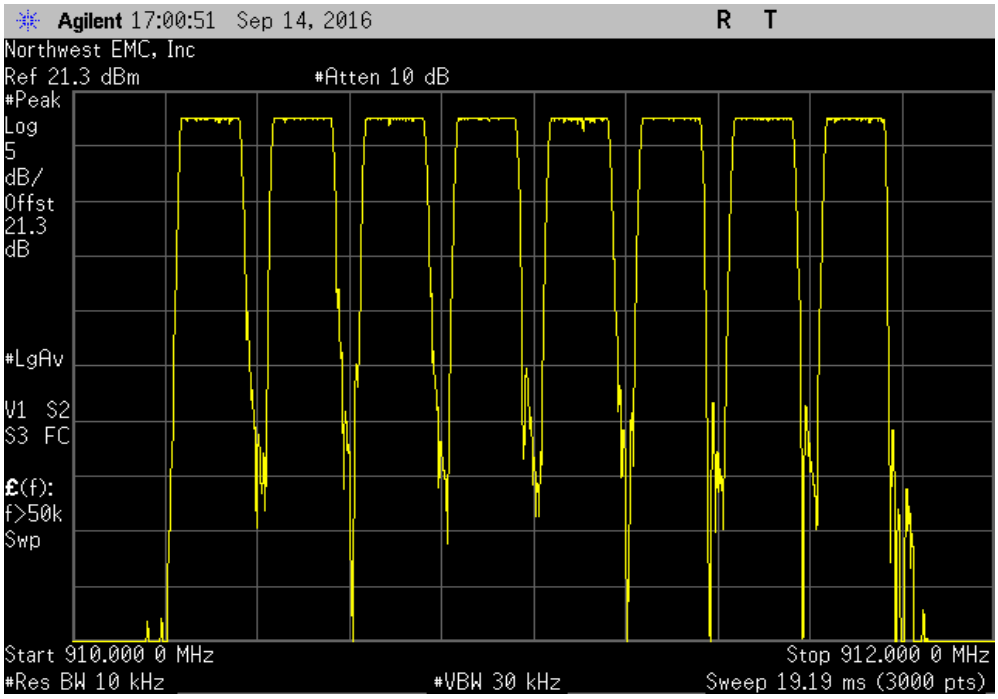
NUMBER OF HOPPING FREQUENCIES

XMit 2016.05.06

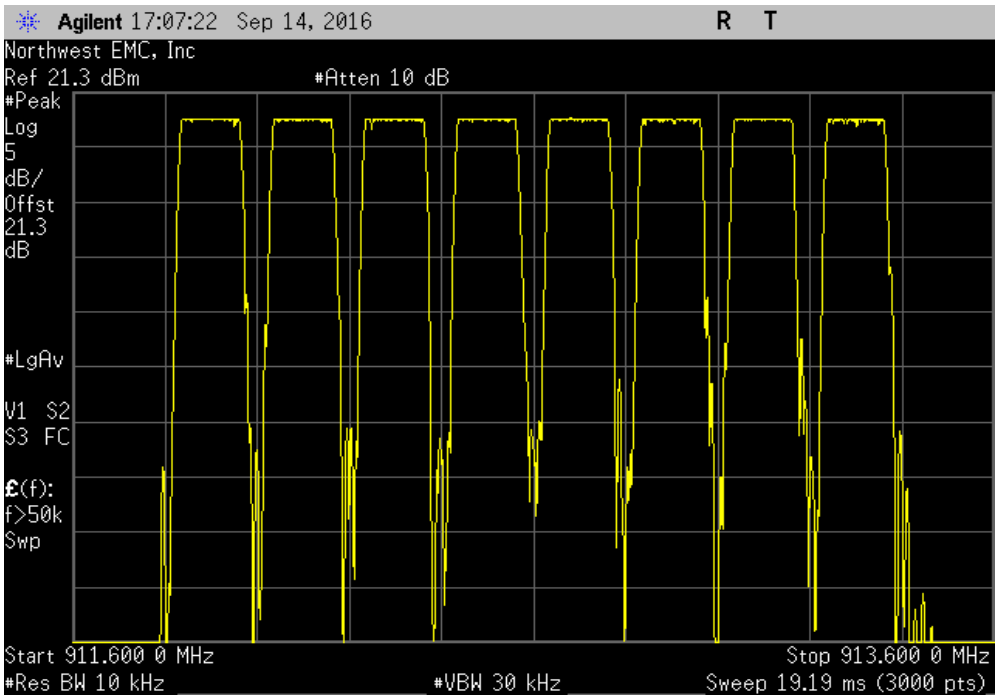
Hopping Mode, FSB5, Mid Channel						
				Number of Channels	Limit	Results
				8	N/A	N/A



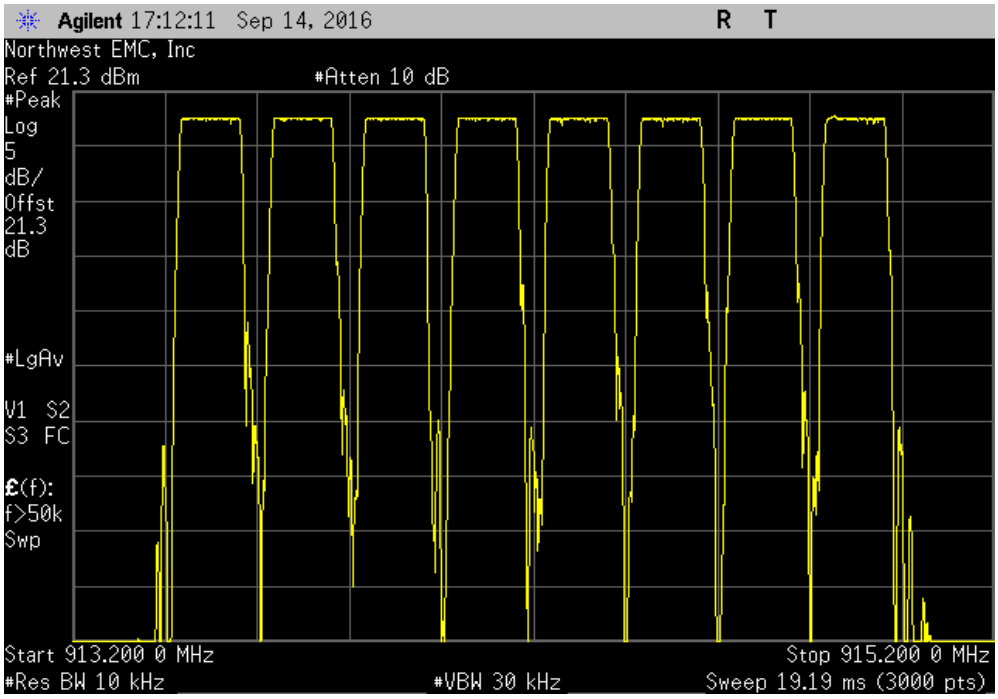
Hopping Mode, FSB6, Mid Channel						
				Number of Channels	Limit	Results
				8	N/A	N/A



Hopping Mode, FSB7, Mid Channel						
				Number of Channels	Limit	Results
				8	N/A	N/A



Hopping Mode, FSB8, Mid Channel						
				Number of Channels	Limit	Results
				8	N/A	N/A



DWELL TIME

XMit 2016.05.06

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TIK	10/17/2014	10/17/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/18/2015	9/18/2016
Block - DC	Fairview Microwave	SD3379	AMI	9/18/2015	9/18/2016
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Analyzer - Spectrum Analyzer	Agilent	E4440A	AFG	6/17/2016	6/17/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The average dwell time per hopping channel was measured at one hopping channel in the middle of the authorized band. The hopping function of the EUT was enabled.

The dwell time limit is based on the Number of Hopping Channels * 400 mS. For this radio, this would be 8 Channels * 400mS = 3.2 Sec.

On Time During 31.6 Sec = Pulse Width * Average Number of Pulses

➢Average Number of Pulses is based on 4 samples.

DWELL TIME

NORTHWEST EMC

XMit 2016.05.06

EUT:	MTXDOT-NA1-A00			**Work Order:**	MLTI0058
Serial Number:	18865140			**Date:**	09/16/16
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	22.9 °C
Attendees:	Marcus Glass			**Humidity:**	57.7% RH
Project:	None			**Barometric Pres.:**	1013 mbar
Tested by:	Dustin Sparks	**Power:**	3.3VDC	**Job Site:**	MN08

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

COMMENTS

Module powered by USB connection to laptop. Using worst-case dwell time data rate (DR1)

DEVIATIONS FROM TEST STANDARD

None

Configuration #	3	Signature

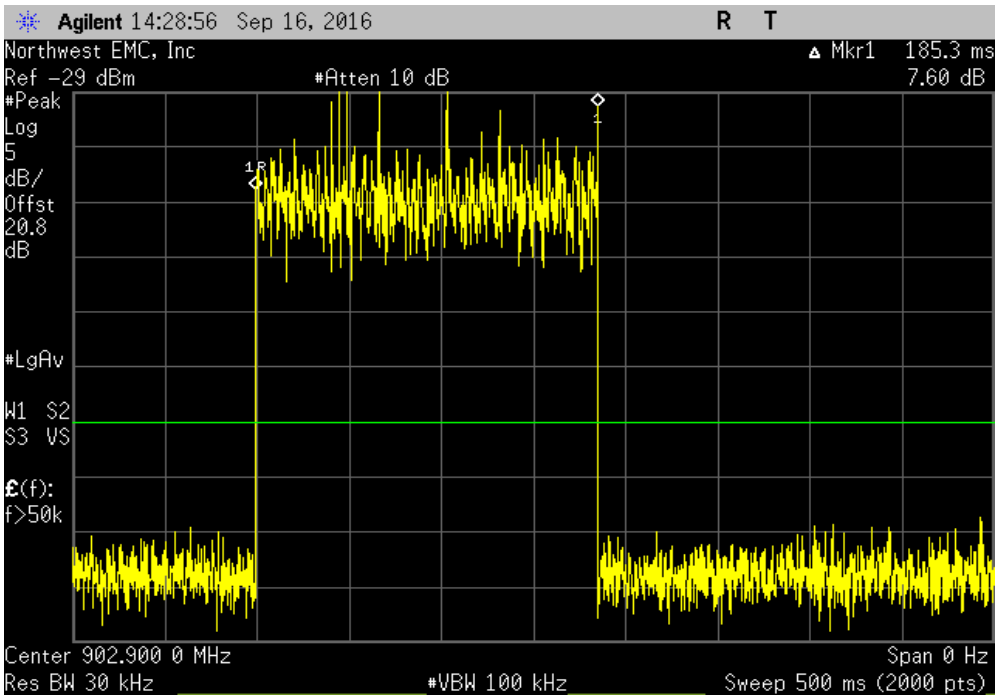
		Pulse Width (ms)	Number of Pulses	Average No. of Pulses	On Time (ms) During 3.2 s	Limit (ms)	Results
Hopping Mode							
	FSB1						
	Mid Channel	185.349	N/A	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	185.349	N/A	2	370.698	400	Pass
	FSB2						
	Mid Channel	185.349	N/A	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	185.349	N/A	2	370.698	400	Pass
	FSB3						
	Mid Channel	182.597	N/A	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	182.597	N/A	2	365.194	400	Pass
	FSB4						
	Mid Channel	185.349	N/A	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	185.349	N/A	2	370.698	400	Pass
	FSB5						
	Mid Channel	185.349	N/A	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	185.349	N/A	2	370.698	400	Pass
	FSB6						
	Mid Channel	185.349	N/A	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	185.349	N/A	2	370.698	400	Pass
	FSB7						
	Mid Channel	185.349	N/A	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	185.349	N/A	2	370.698	400	Pass
	FSB8						
	Mid Channel	185.349	N/A	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	N/A	2	N/A	N/A	N/A	N/A
	Mid Channel	185.349	N/A	2	370.698	400	Pass

DWELL TIME

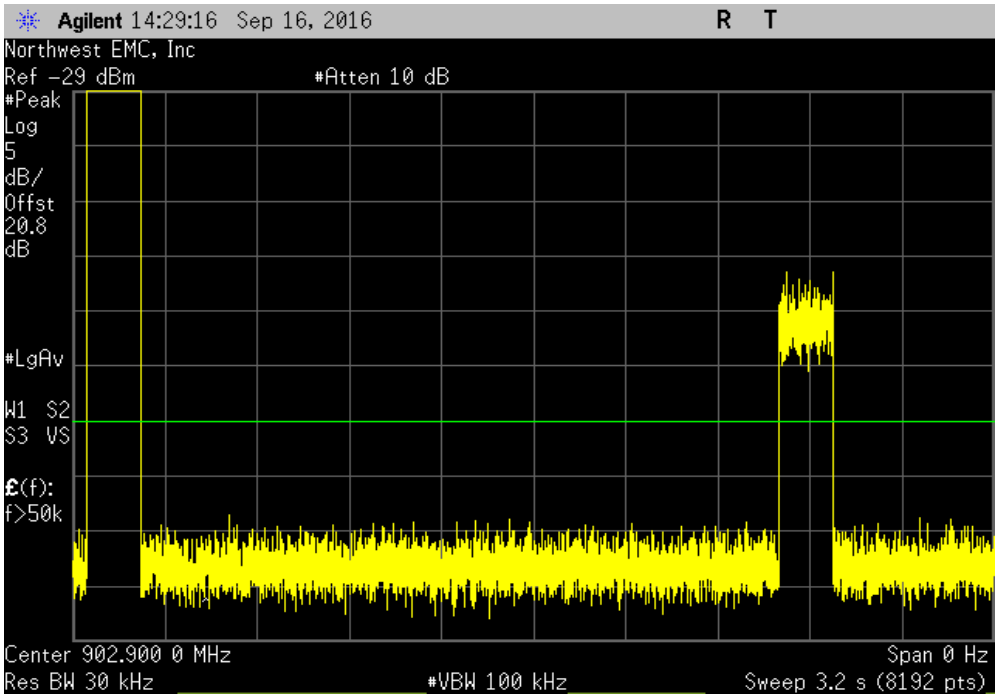
NORTHWEST EMC

XMit 2016.05.06

Hopping Mode, FSB1, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	N/A		N/A	N/A	N/A



Hopping Mode, FSB1, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A

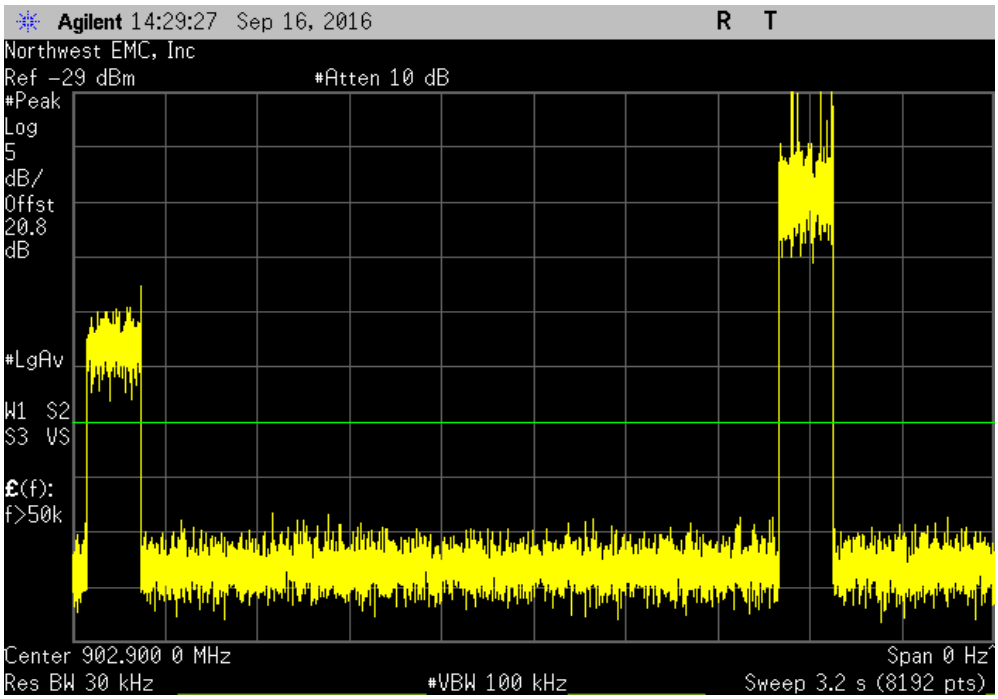


DWELL TIME

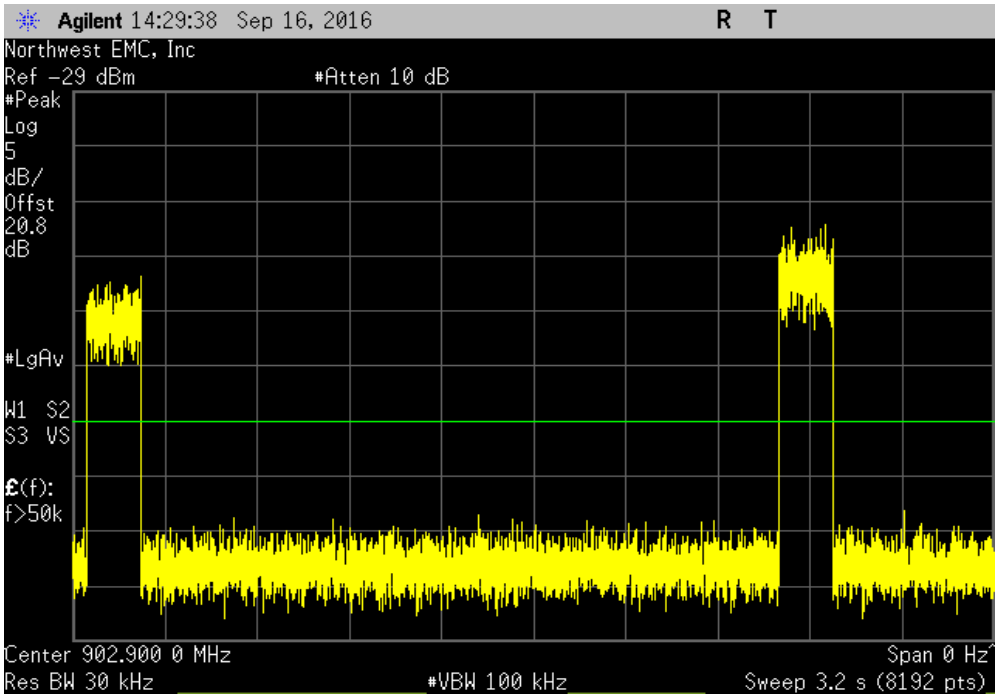
NORTHWEST EMC

XMit 2016.05.06

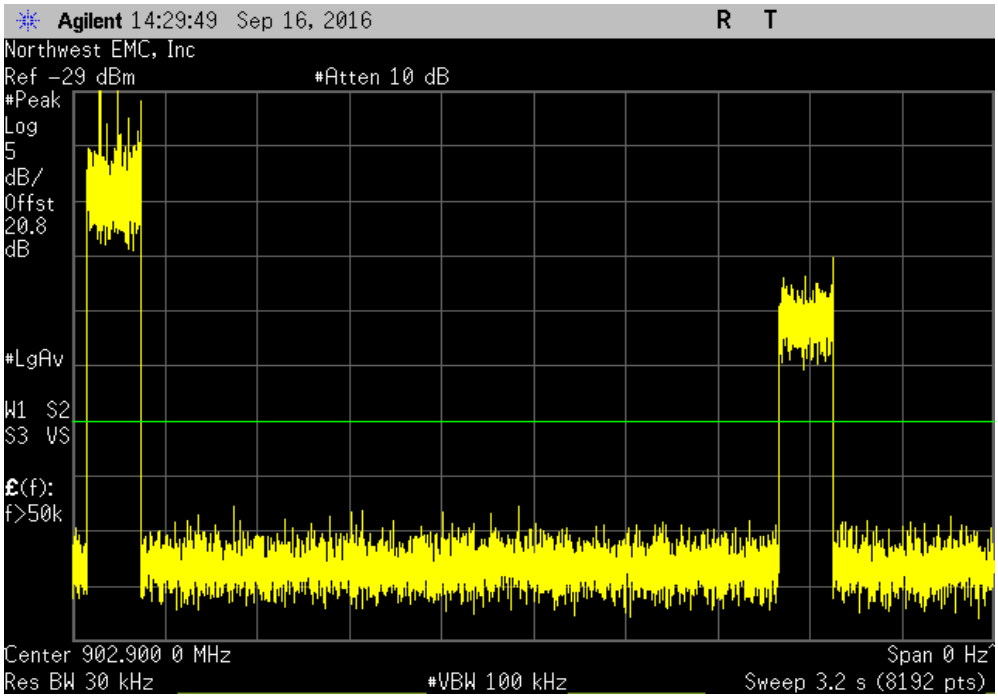
Hopping Mode, FSB1, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB1, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB1, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB1, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	2		370.698	400	Pass

Calculation Only

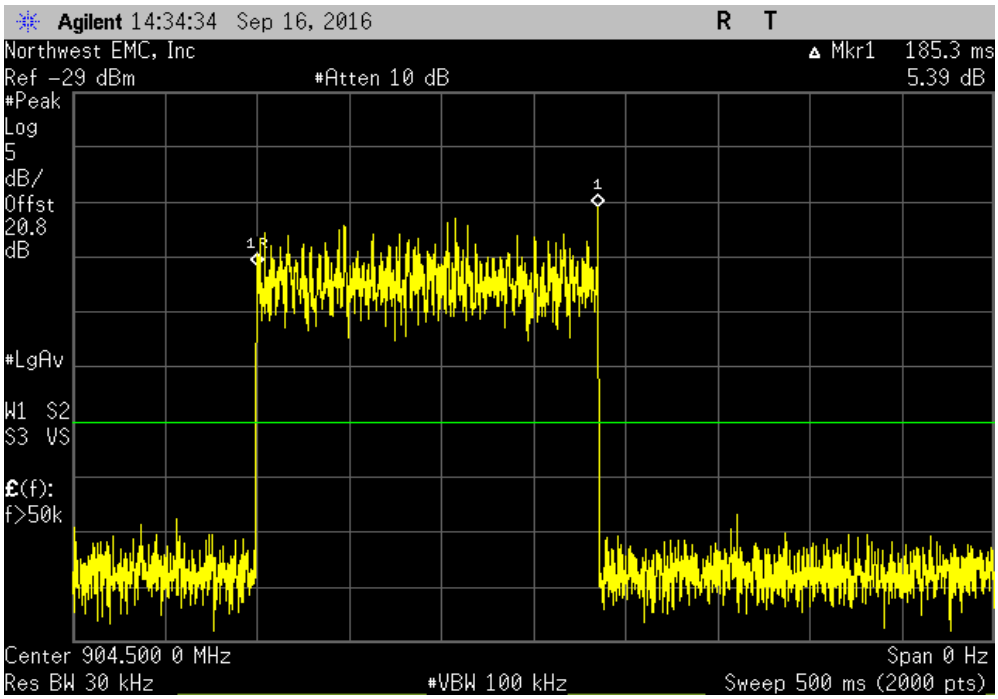
No Screen Capture Required

DWELL TIME

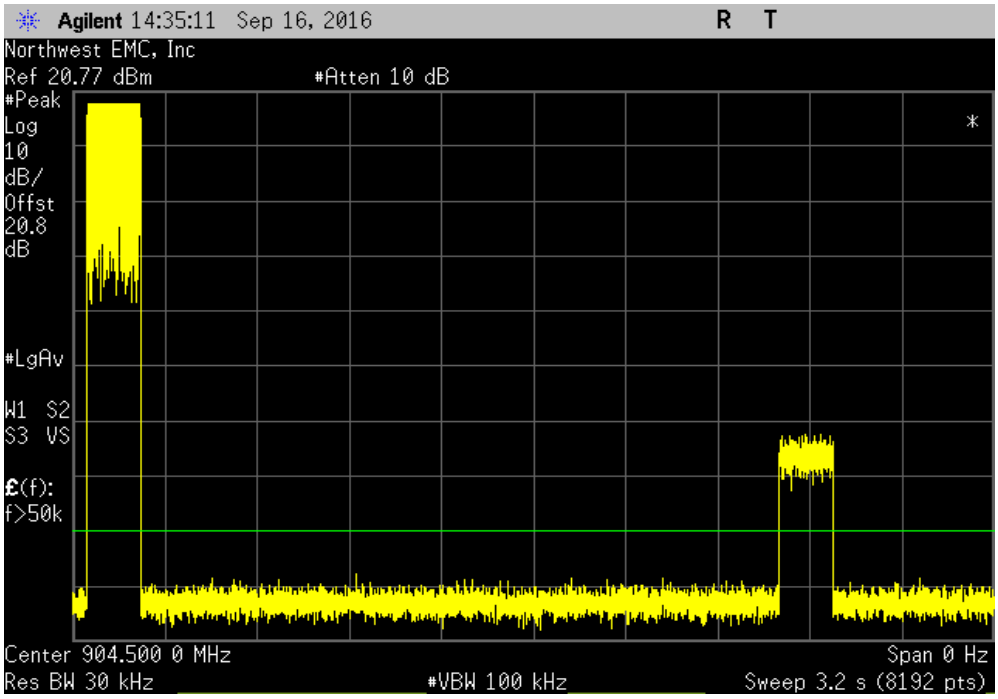
NORTHWEST EMC

XMit 2016.05.06

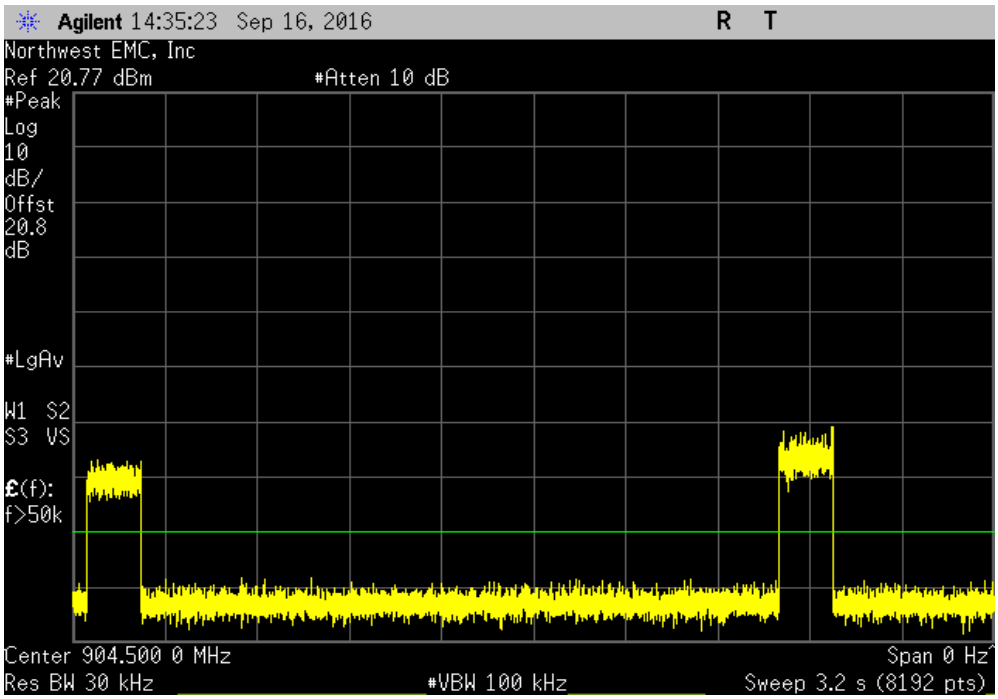
Hopping Mode, FSB2, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	N/A		N/A	N/A	N/A



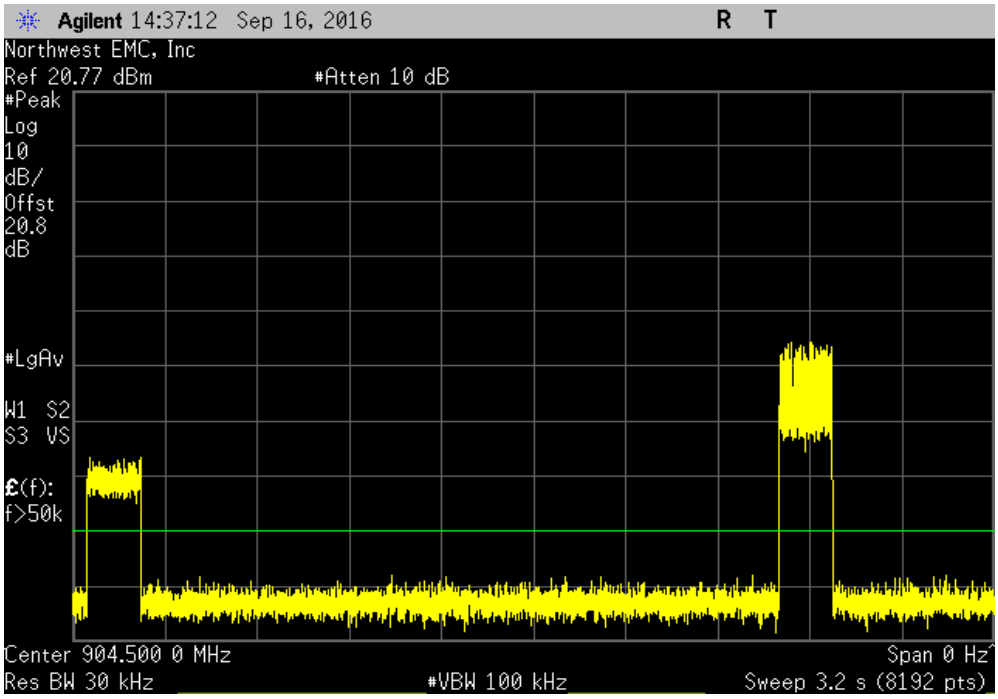
Hopping Mode, FSB2, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB2, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



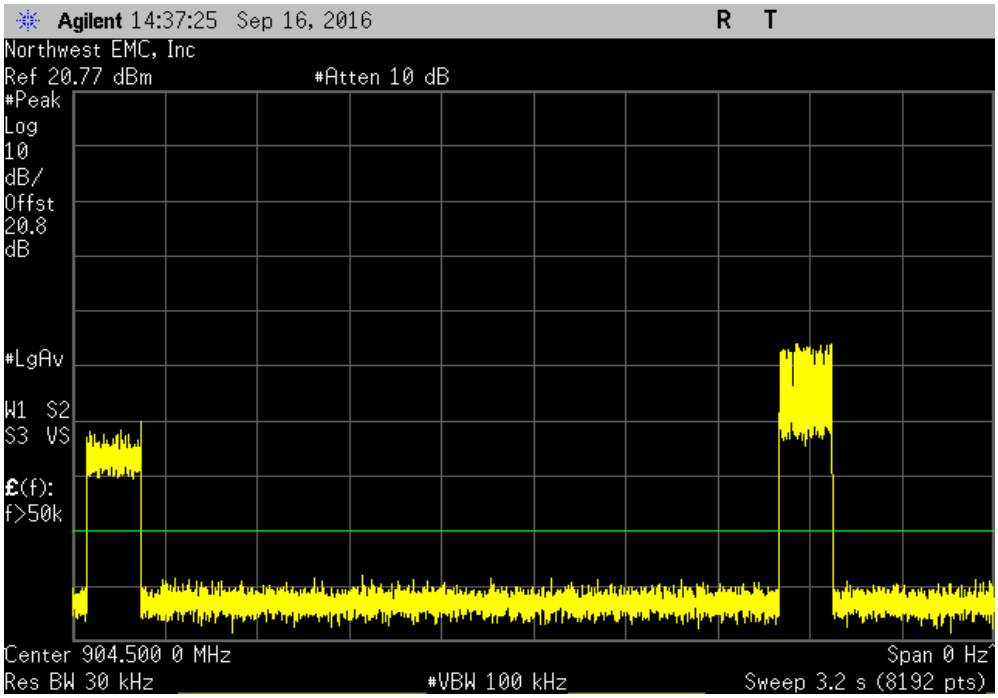
Hopping Mode, FSB2, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



DWELL TIME

XMit 2016.05.06

Hopping Mode, FSB2, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A

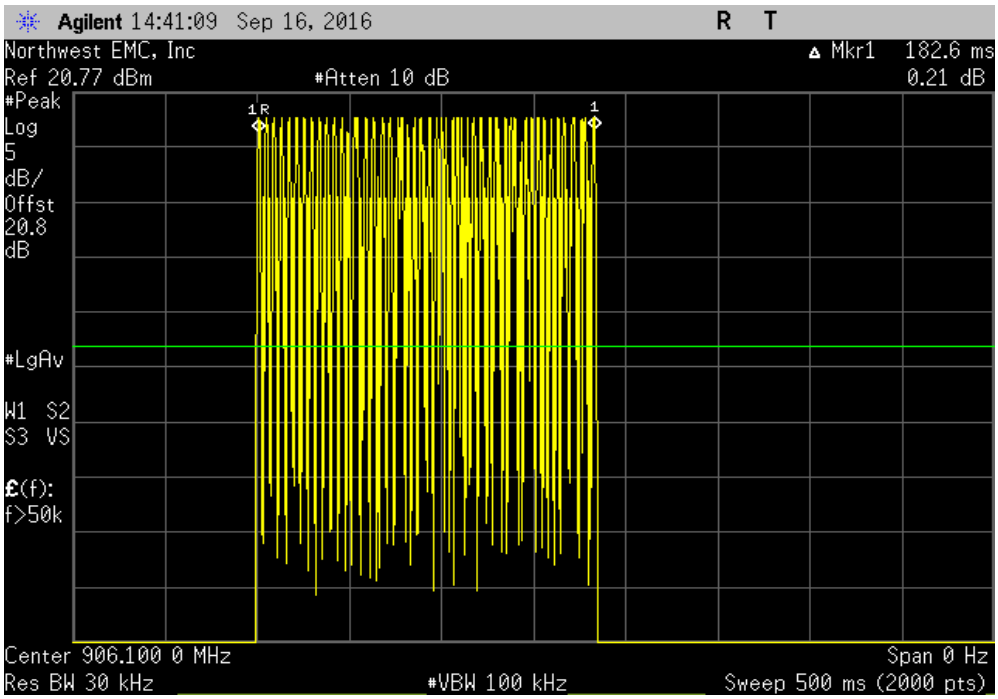


Hopping Mode, FSB2, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	2		370.698	400	Pass

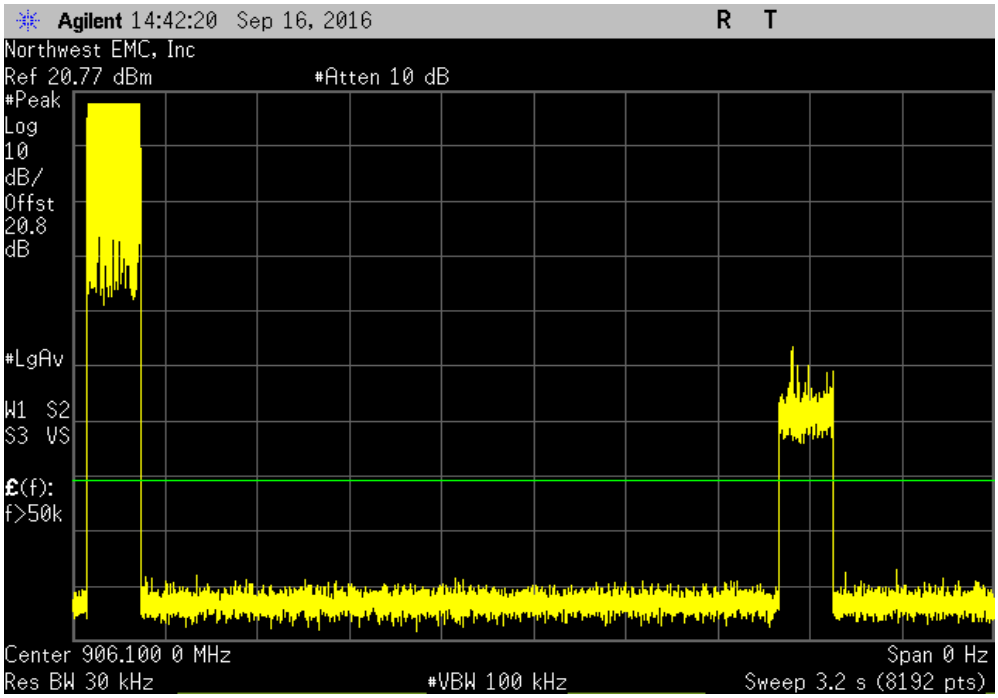
Calculation Only

No Screen Capture Required

Hopping Mode, FSB3, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
182.597	N/A	N/A		N/A	N/A	N/A



Hopping Mode, FSB3, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A

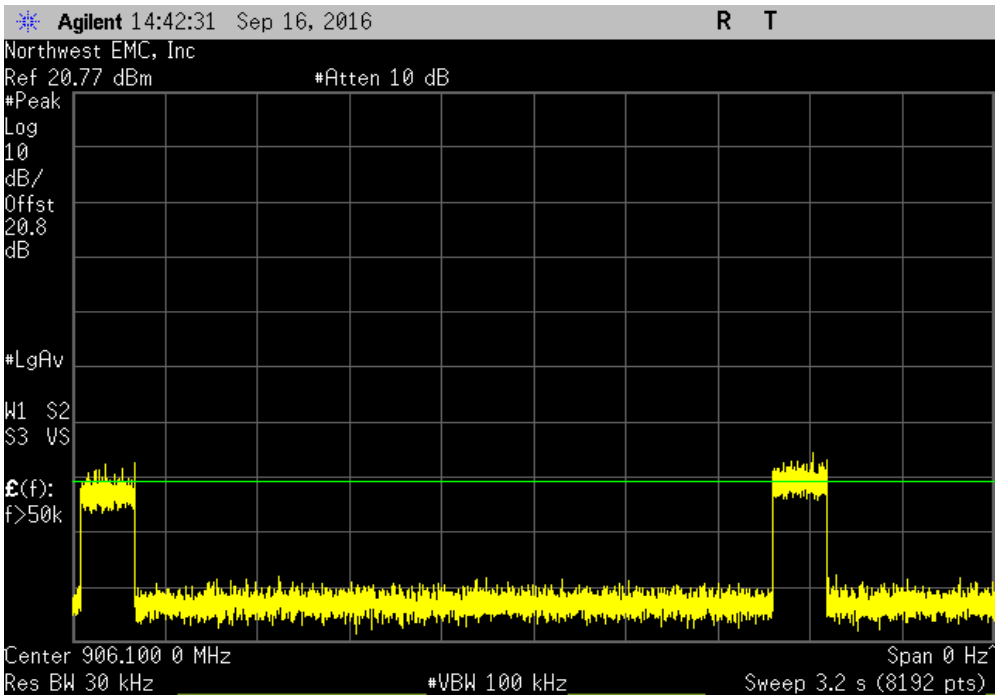


DWELL TIME

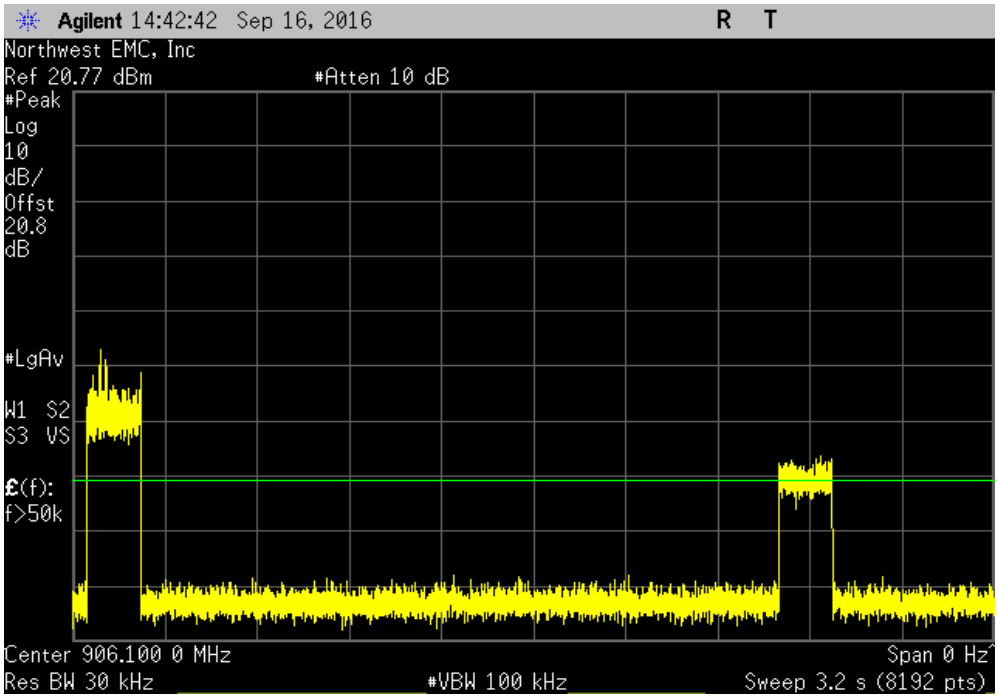
NORTHWEST EMC

XMit 2016.05.06

Hopping Mode, FSB3, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



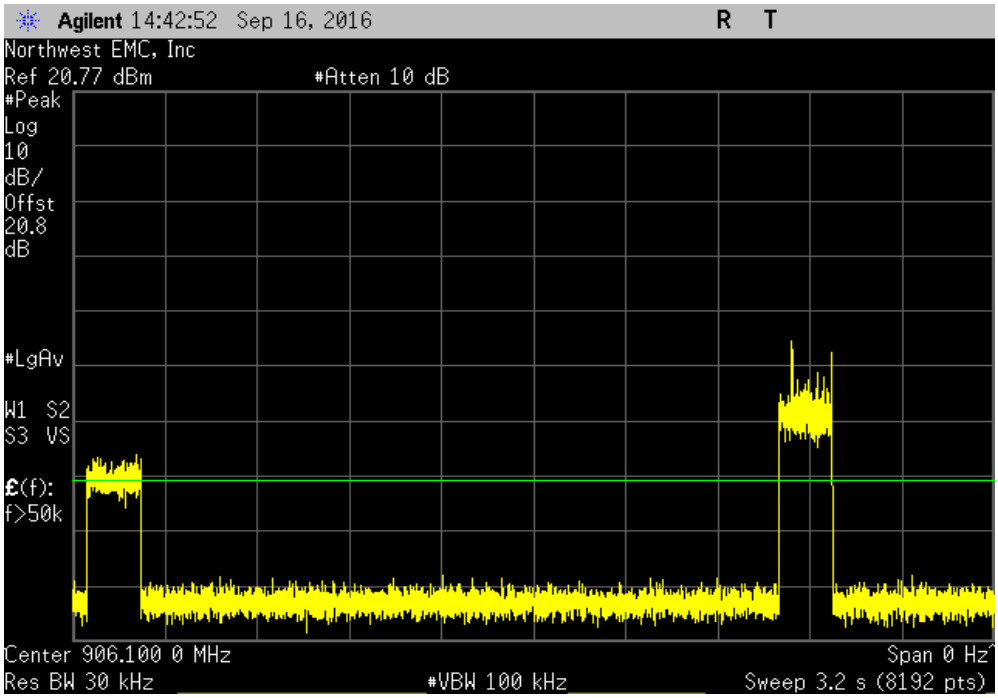
Hopping Mode, FSB3, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



DWELL TIME

XMit 2016.05.06

Hopping Mode, FSB3, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB3, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
182.597	N/A	2		365.194	400	Pass

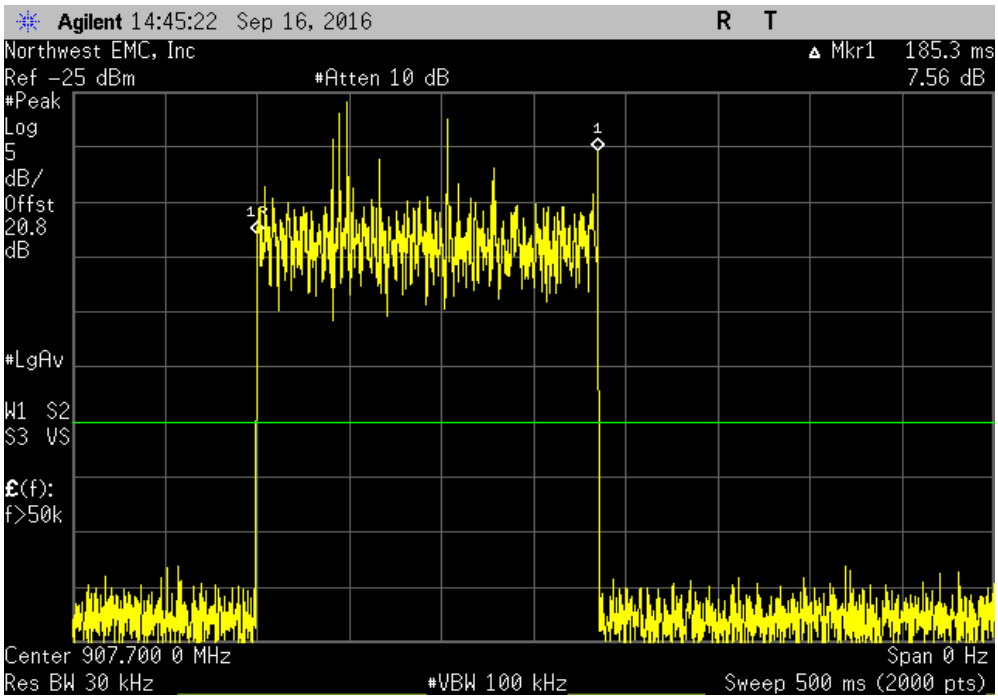
Calculation Only

No Screen Capture Required

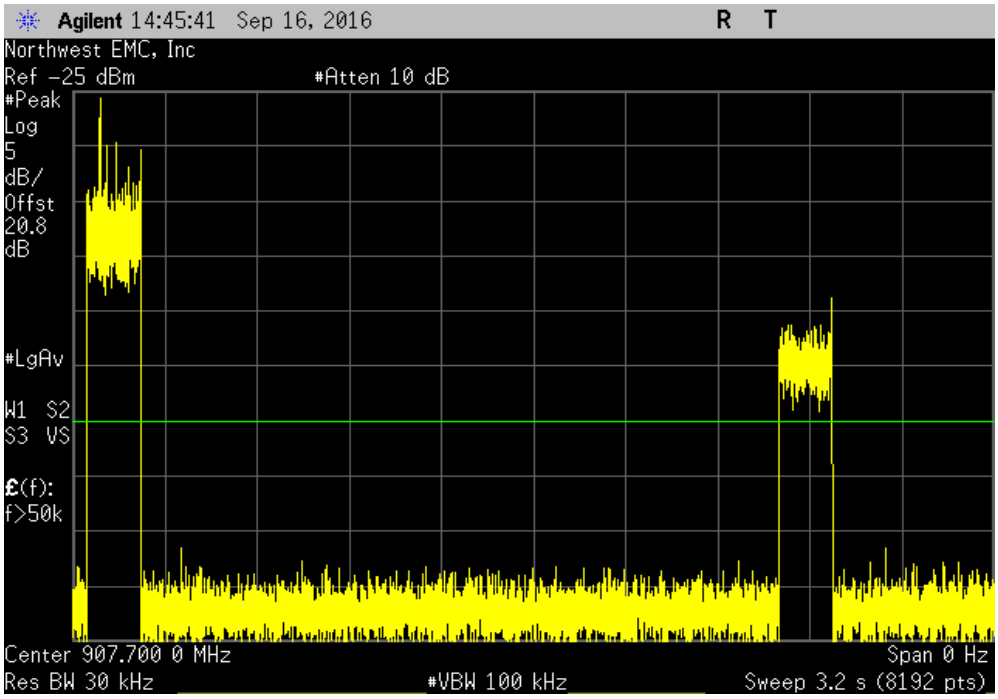
DWELL TIME

NORTHWEST EMC
XMit 2016.05.06

Hopping Mode, FSB4, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	N/A		N/A	N/A	N/A



Hopping Mode, FSB4, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A

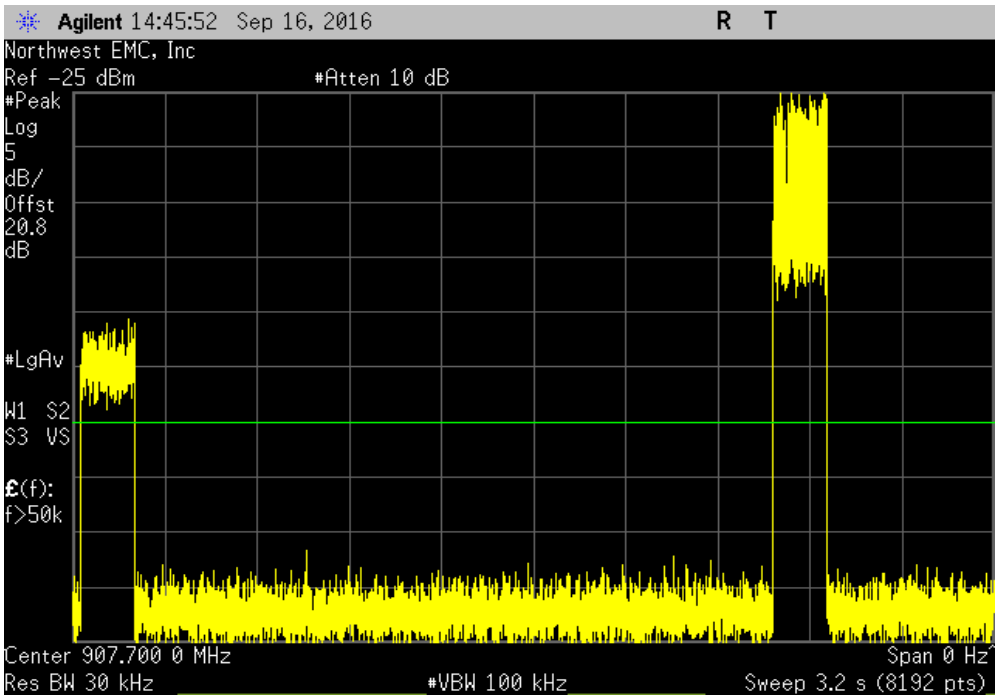


DWELL TIME

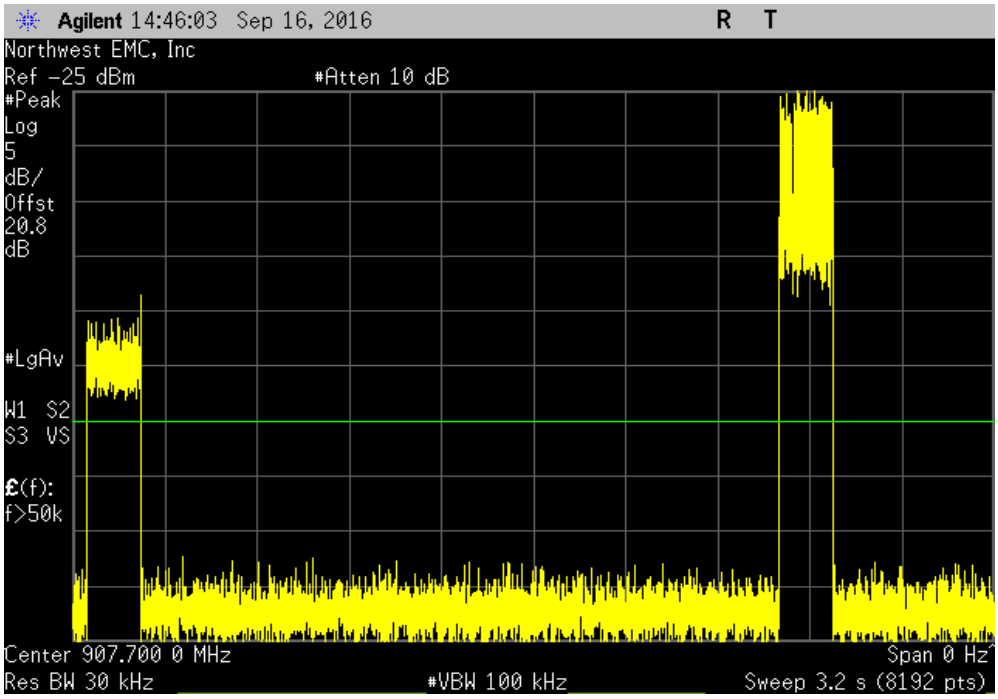
NORTHWEST EMC

XMit 2016.05.06

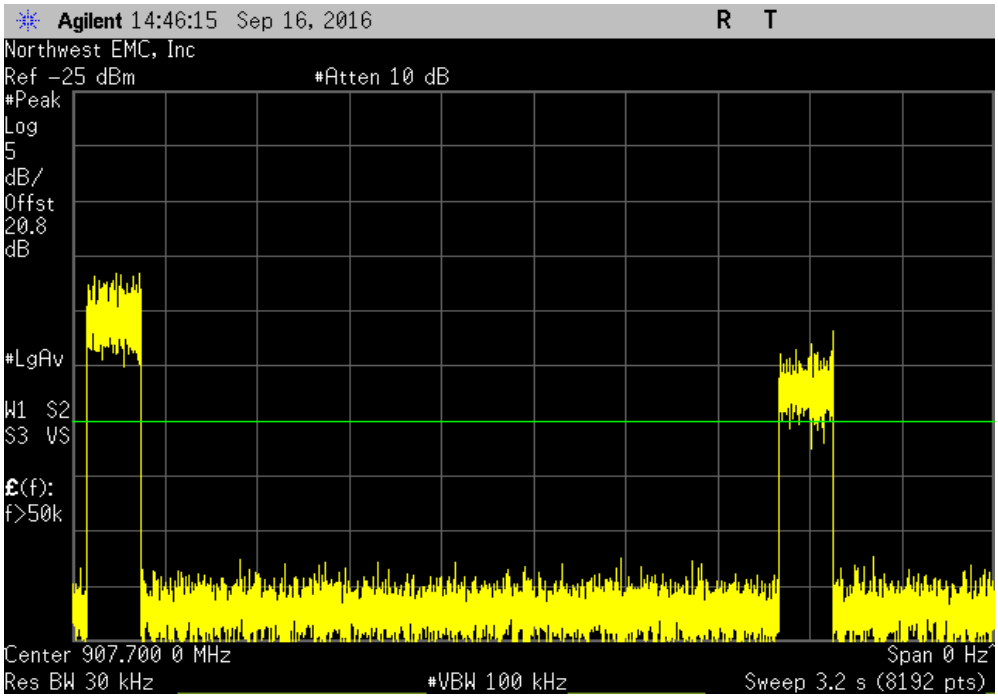
Hopping Mode, FSB4, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB4, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB4, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB4, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	2		370.698	400	Pass

Calculation Only

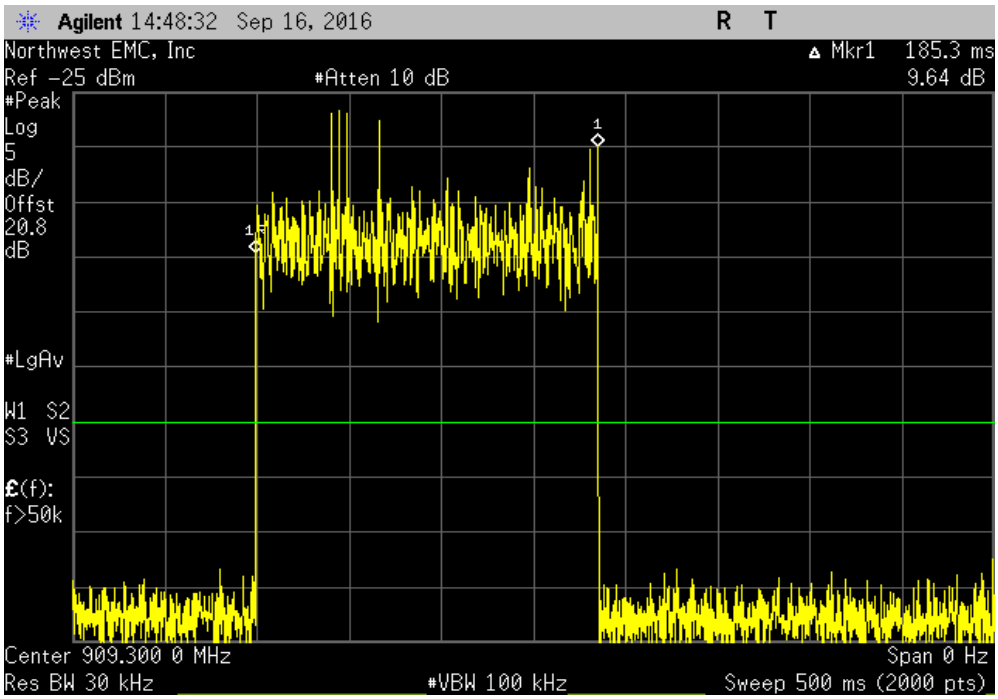
No Screen Capture Required

DWELL TIME

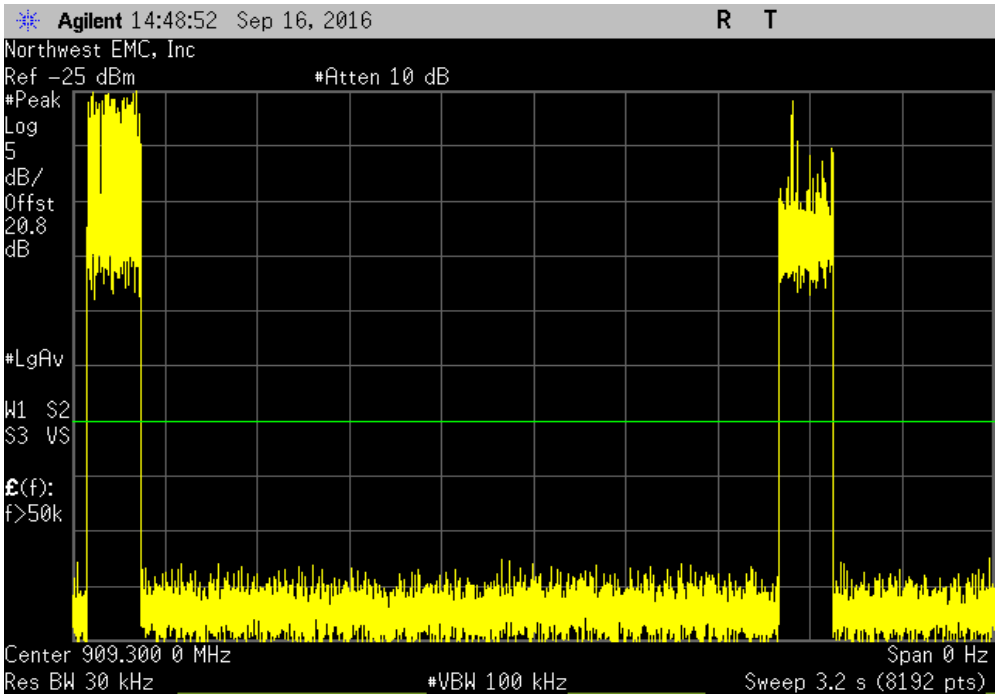
NORTHWEST EMC

XMit 2016.05.06

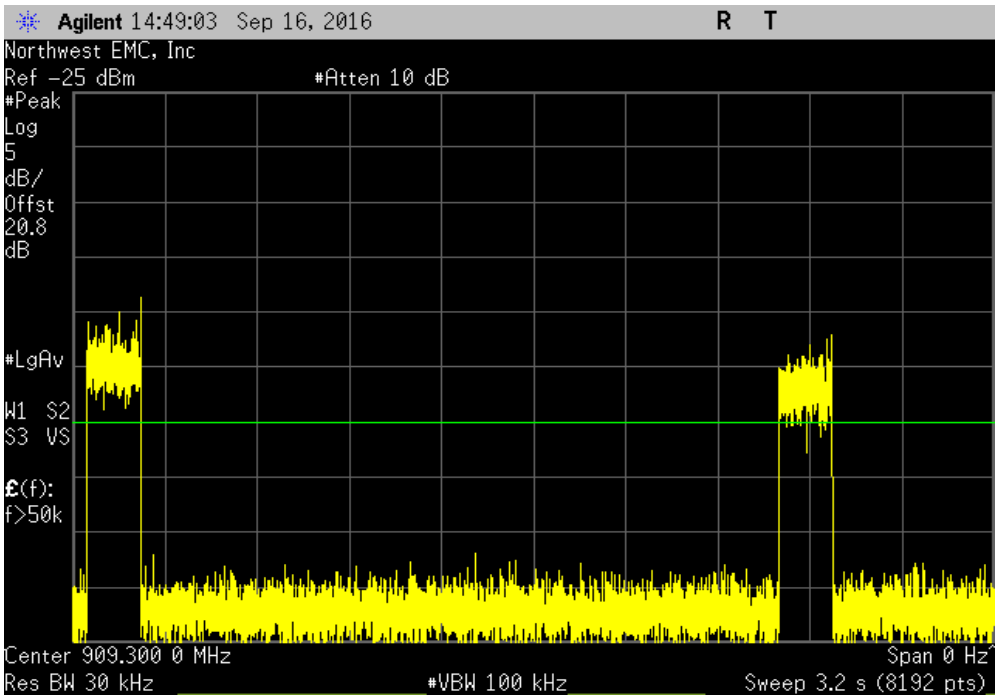
Hopping Mode, FSB5, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	N/A		N/A	N/A	N/A



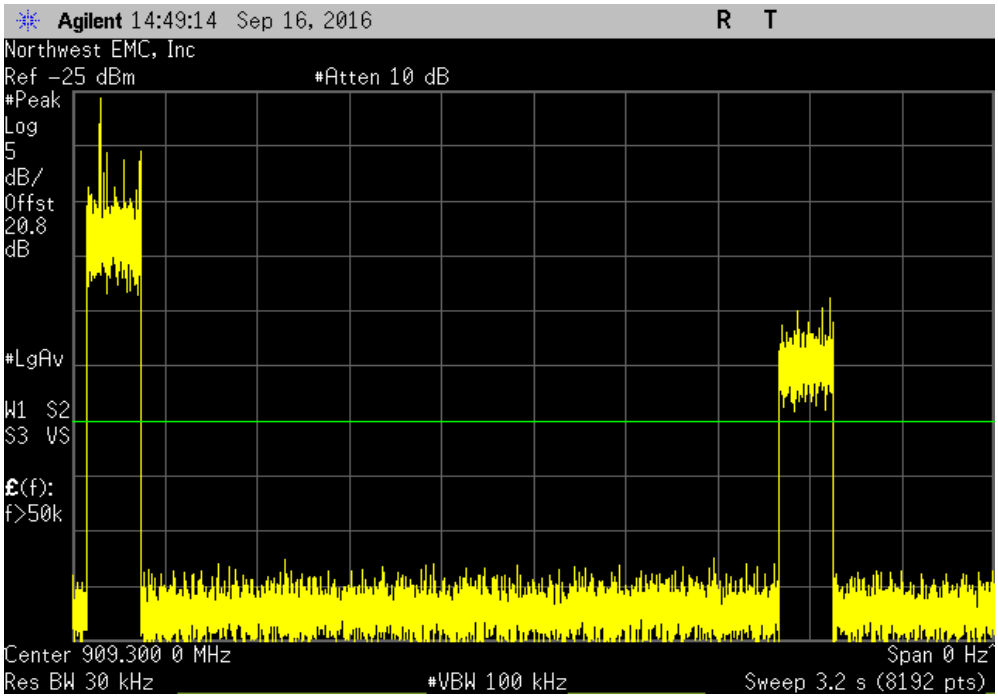
Hopping Mode, FSB5, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB5, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



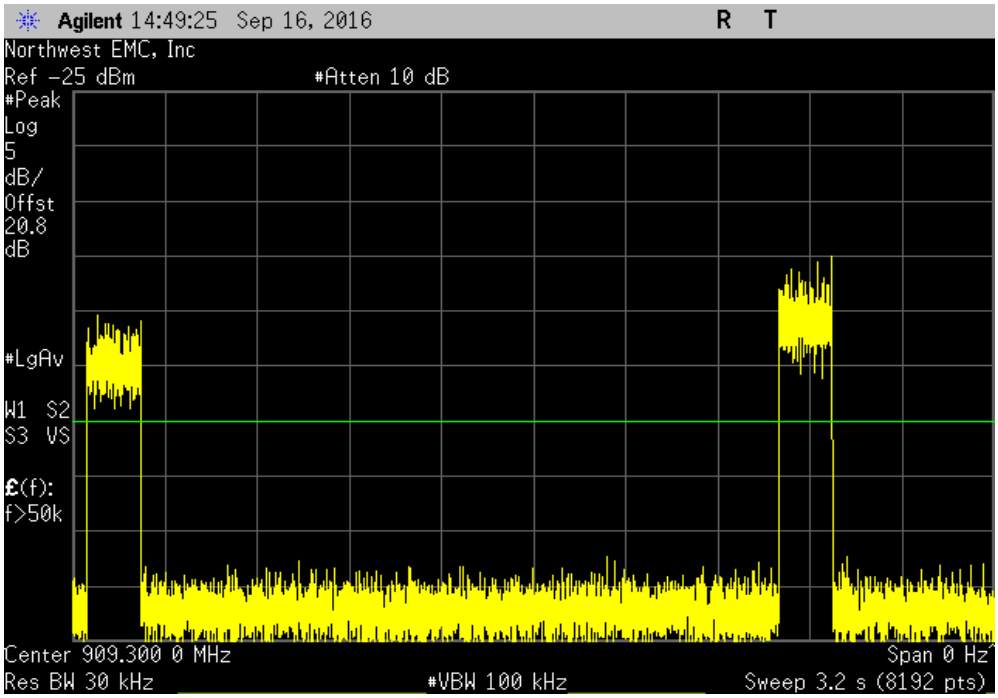
Hopping Mode, FSB5, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



DWELL TIME

XMit 2016.05.06

Hopping Mode, FSB5, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A

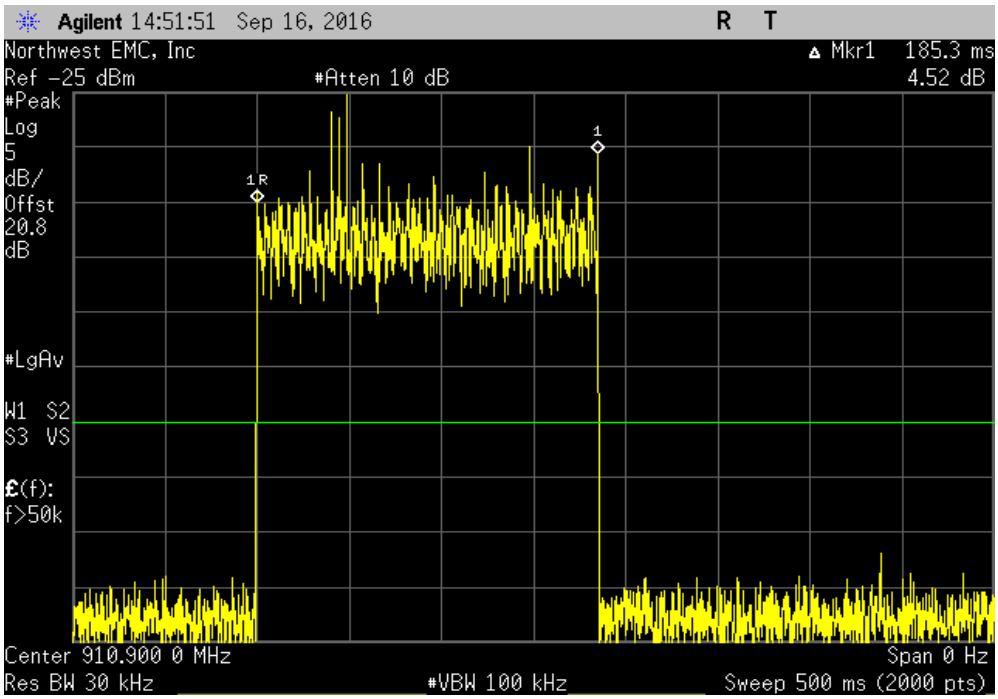


Hopping Mode, FSB5, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	2		370.698	400	Pass

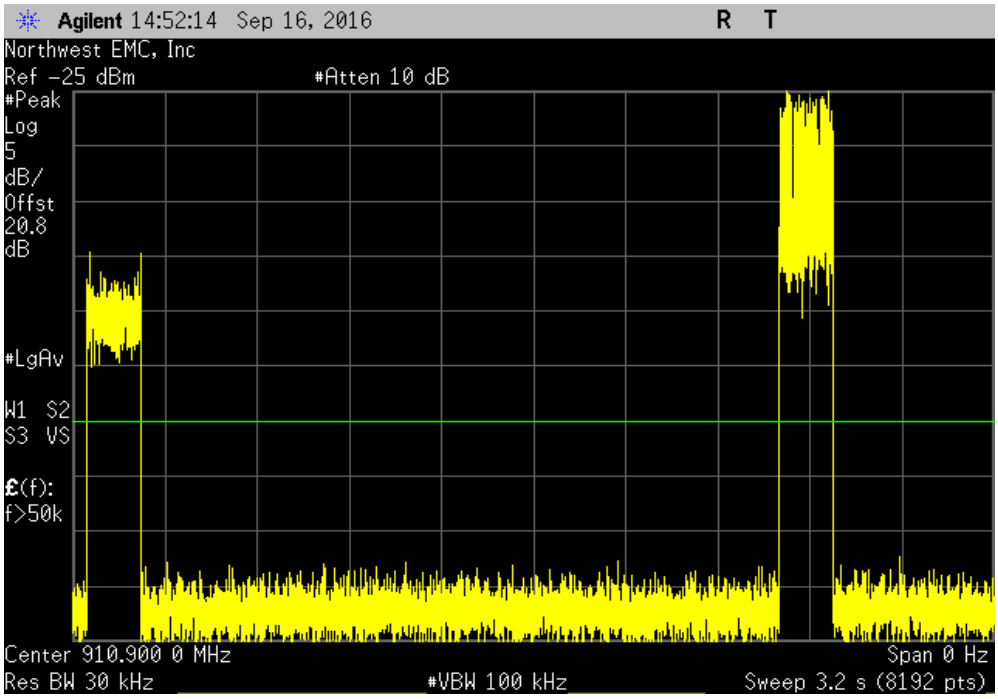
Calculation Only

No Screen Capture Required

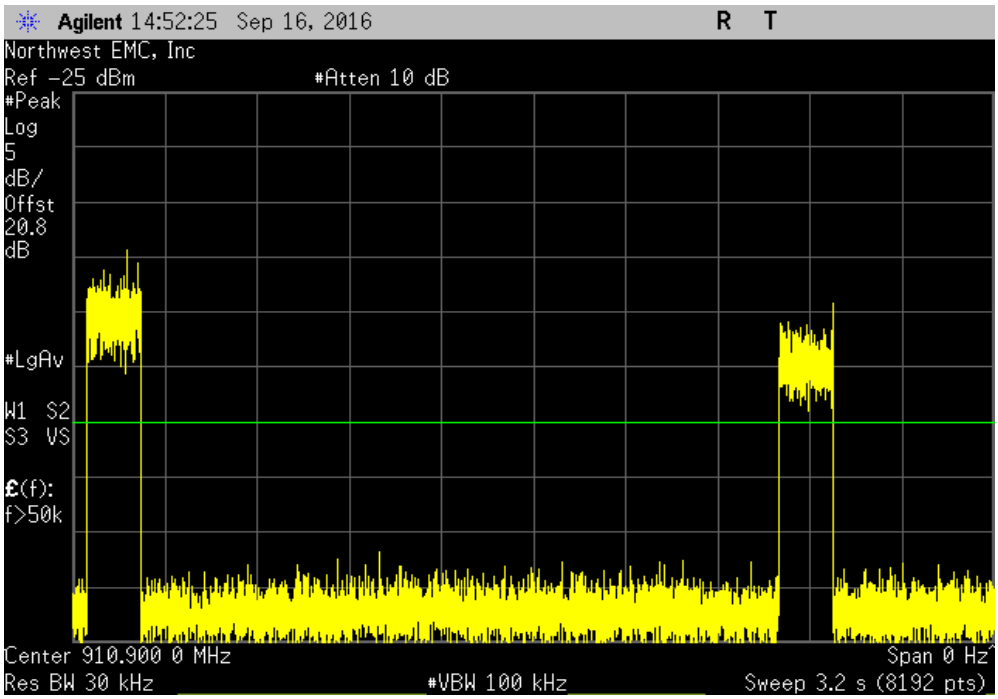
Hopping Mode, FSB6, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	N/A		N/A	N/A	N/A



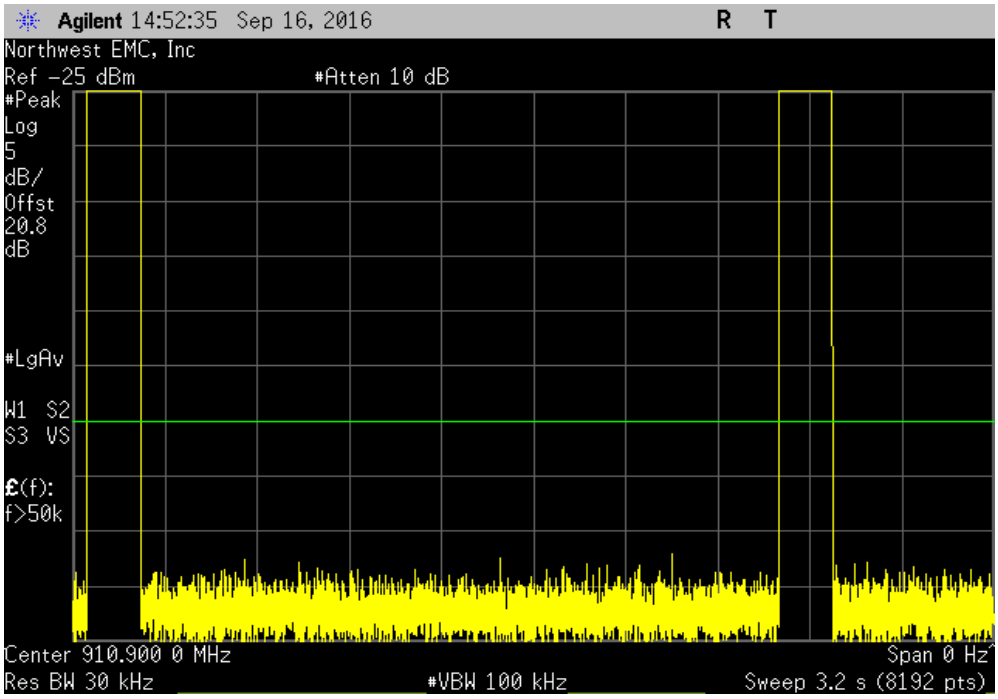
Hopping Mode, FSB6, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB6, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



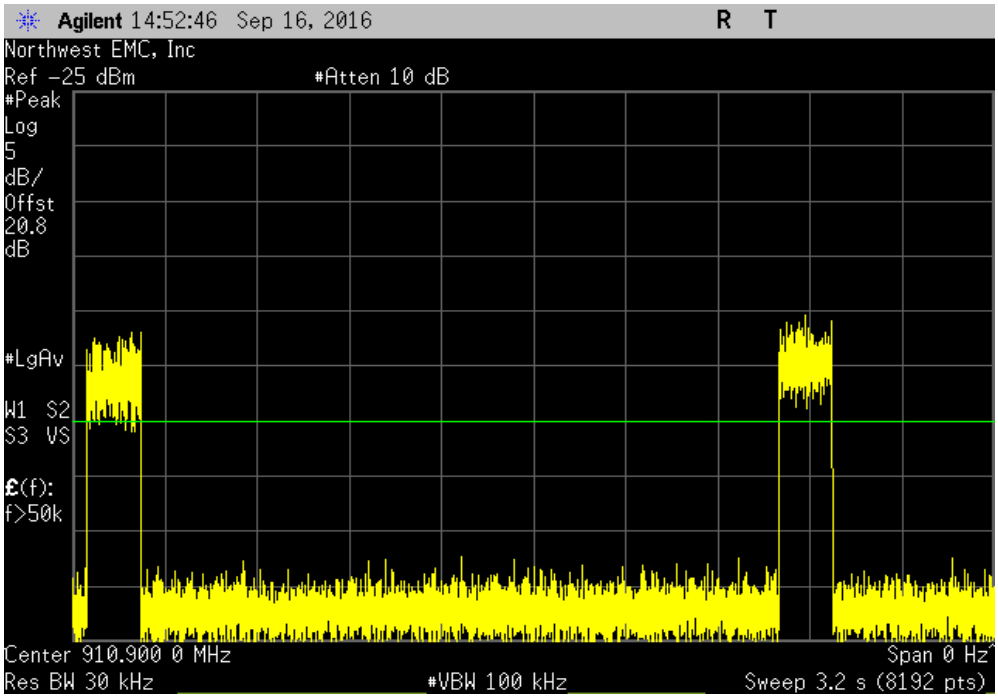
Hopping Mode, FSB6, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



DWELL TIME

XMit 2016.05.06

Hopping Mode, FSB6, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB6, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	2		370.698	400	Pass

Calculation Only

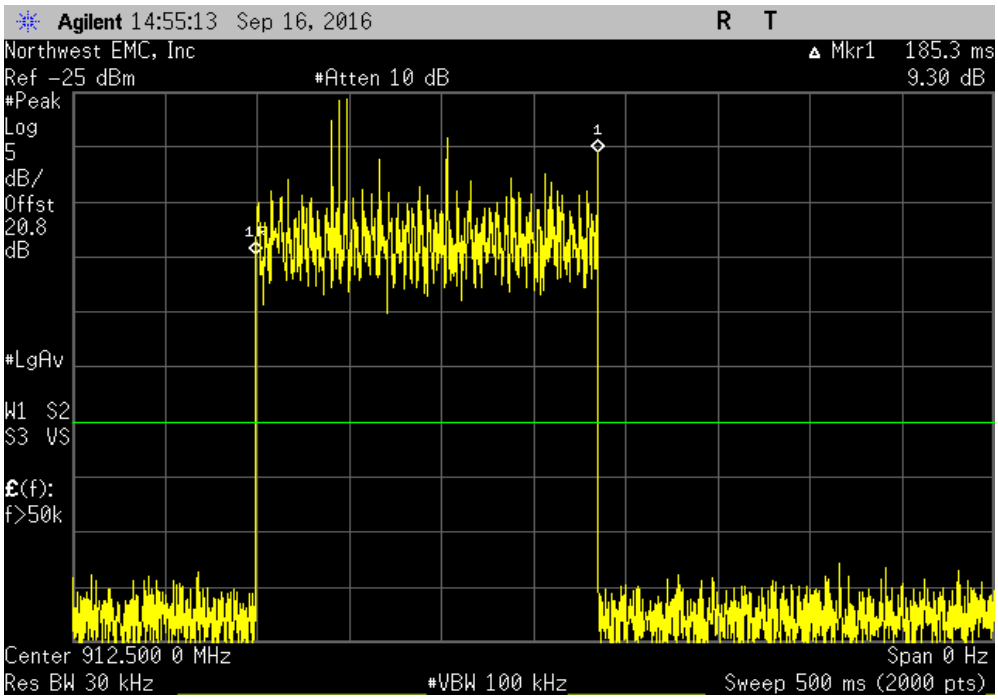
No Screen Capture Required

DWELL TIME

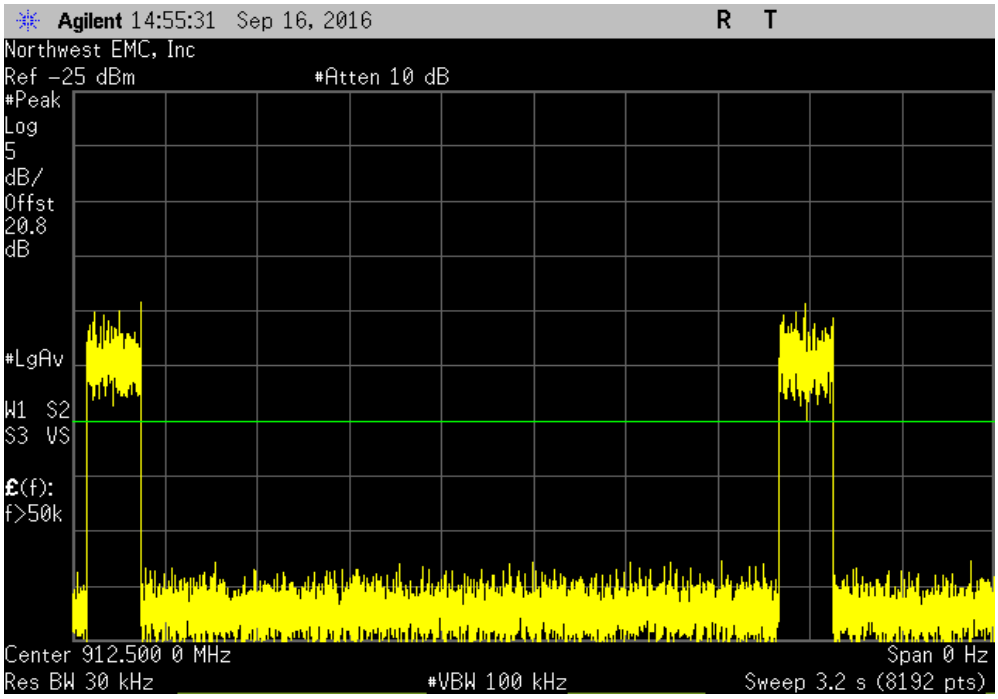
NORTHWEST EMC

XMit 2016.05.06

Hopping Mode, FSB7, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	N/A		N/A	N/A	N/A



Hopping Mode, FSB7, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A

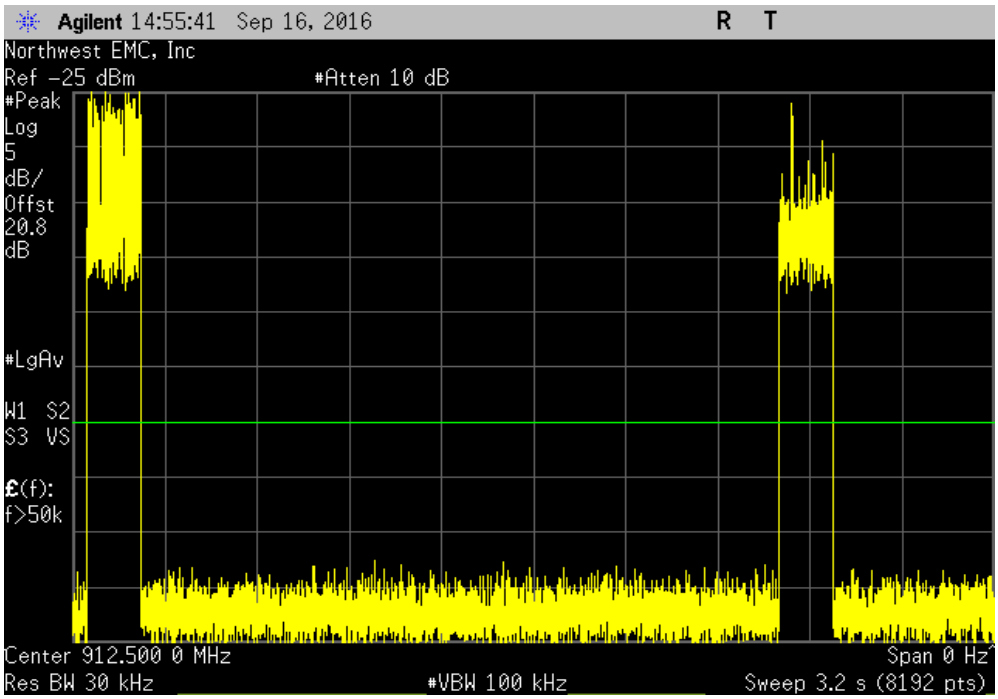


DWELL TIME

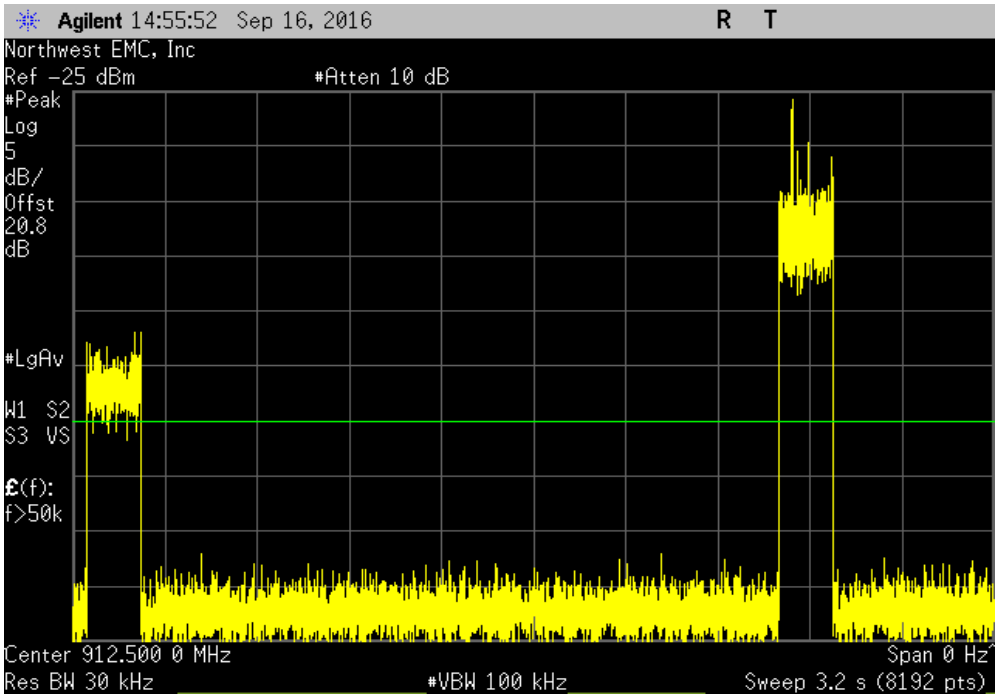
NORTHWEST EMC

XMit 2016.05.06

Hopping Mode, FSB7, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB7, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A

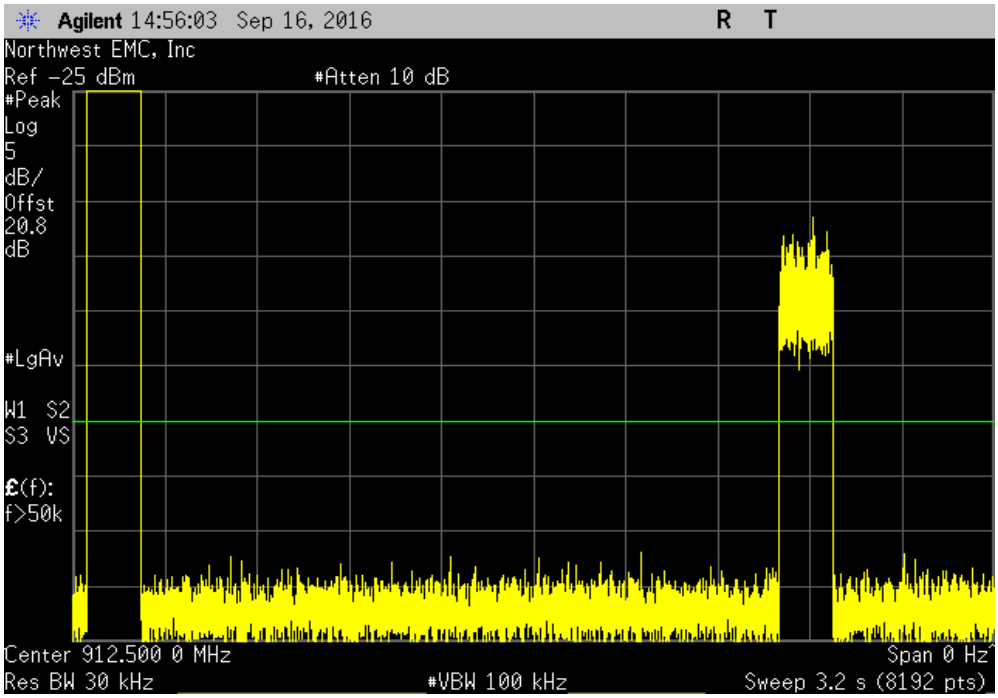


DWELL TIME

NORTHWEST EMC

XMit 2016.05.06

Hopping Mode, FSB7, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A

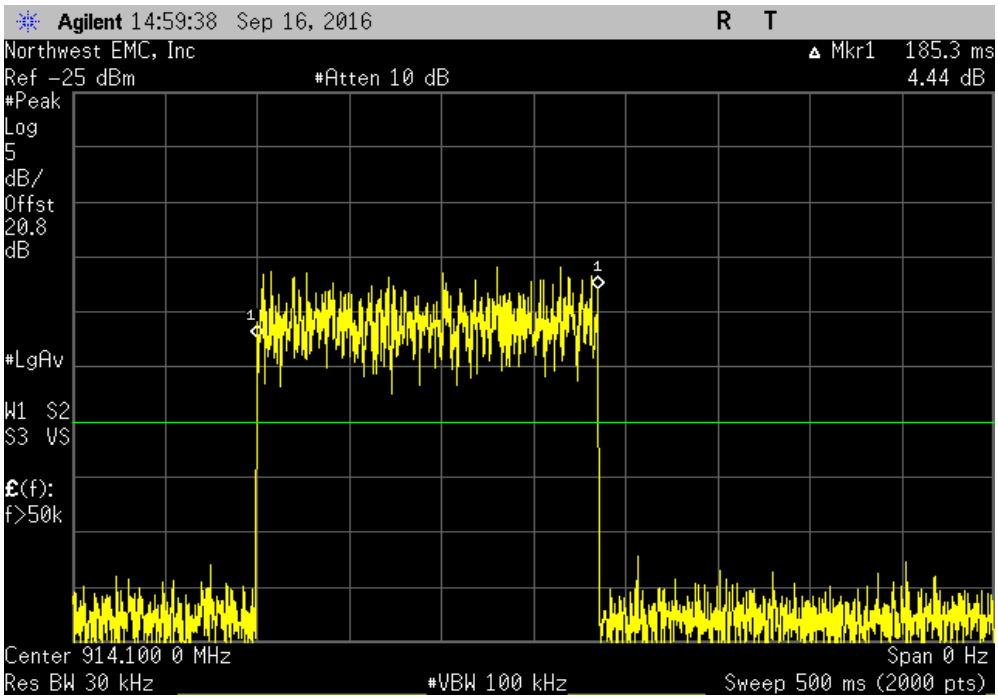


Hopping Mode, FSB7, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	2		370.698	400	Pass

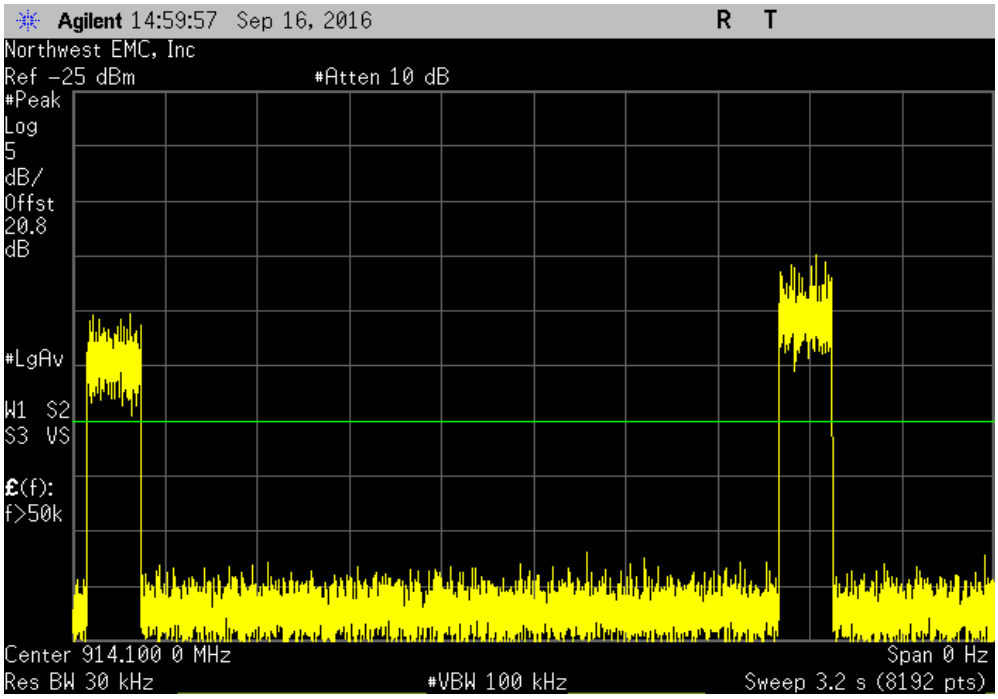
Calculation Only

No Screen Capture Required

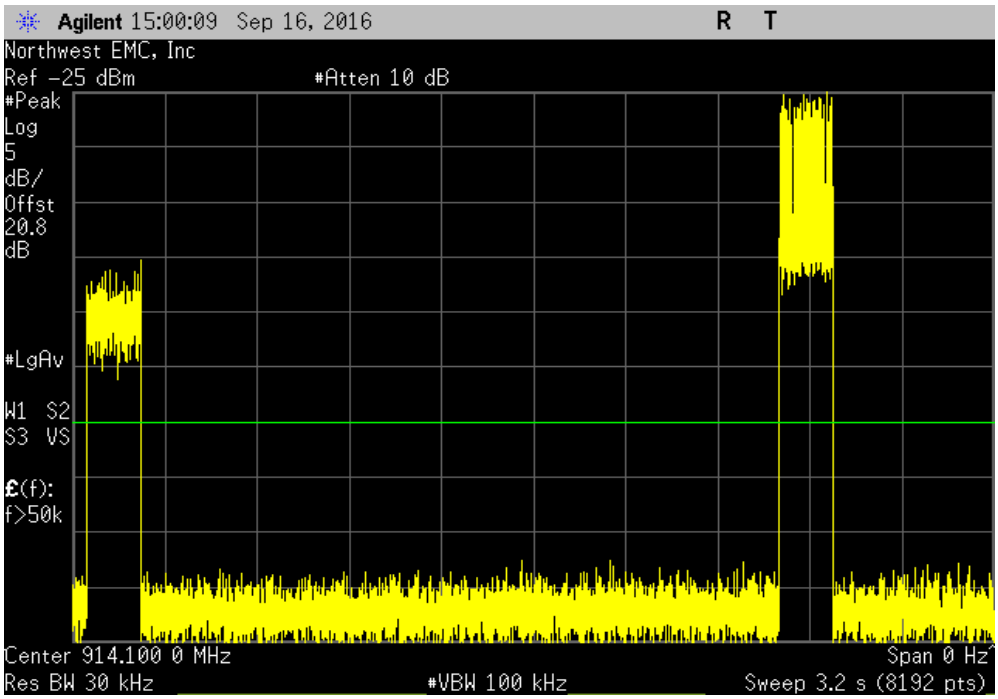
Hopping Mode, FSB8, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	N/A		N/A	N/A	N/A



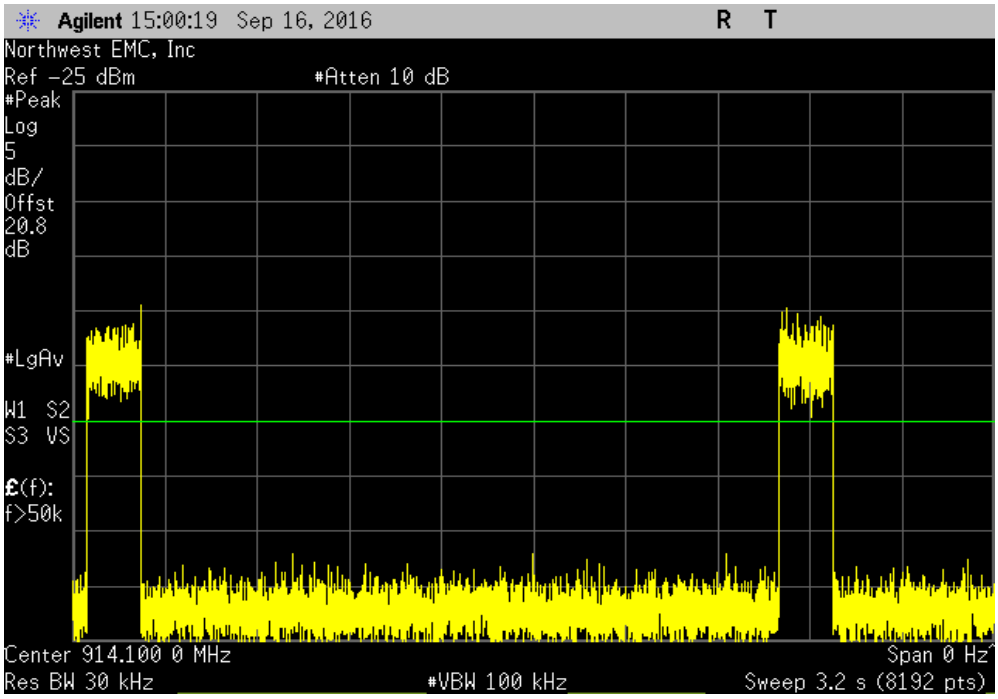
Hopping Mode, FSB8, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB8, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB8, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A

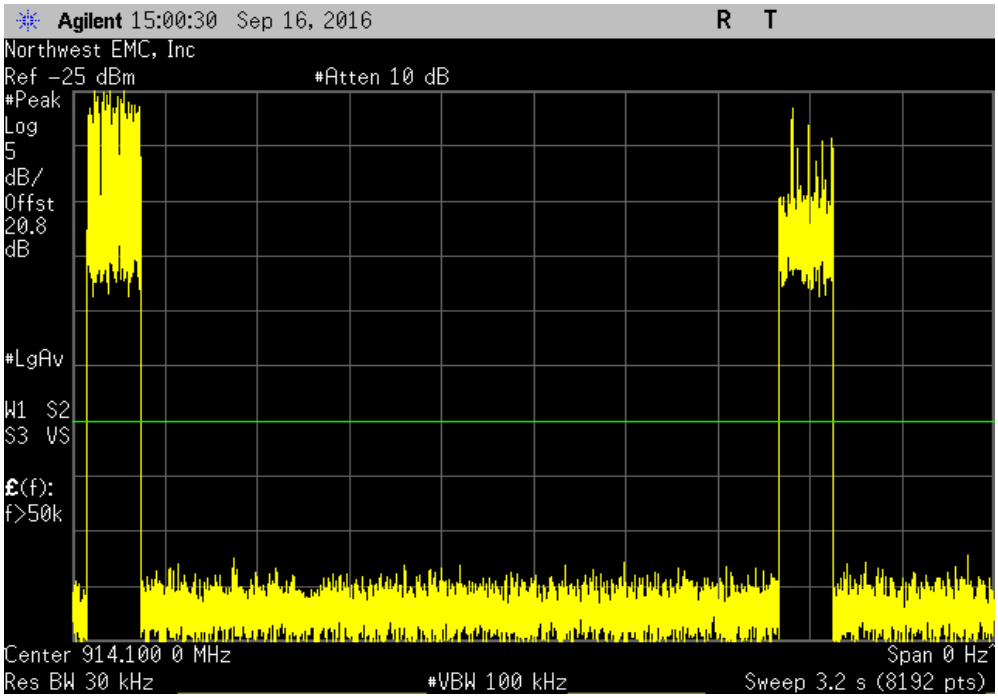


DWELL TIME

NORTHWEST EMC

XMit 2016.05.06

Hopping Mode, FSB8, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
N/A	2	N/A		N/A	N/A	N/A



Hopping Mode, FSB8, Mid Channel						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses		On Time (ms) During 3.2 s	Limit (ms)	Results
185.349	N/A	2		370.698	400	Pass

Calculation Only

No Screen Capture Required

BAND EDGE COMPLIANCE -HOPPING MODE

XMit 2016.05.06

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	11/26/2014	11/26/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/18/2015	9/18/2016
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/18/2015	9/18/2016
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to its normal pseudo-random hopping sequence. The EUT was transmitting at the data rate(s) listed in the datasheet.

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

BAND EDGE COMPLIANCE -HOPPING MODE

NORTHWEST EMC

XMit 2016.05.06

EUT:	MTXDOT-NA1-A00			**Work Order:**	MLTI0058
Serial Number:	18865140			**Date:**	09/15/16
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	23 °C
Attendees:	Marcus Glass			**Humidity:**	50% RH
Project:	None			**Barometric Pres.:**	1023 mbar
Tested by:	Dustin Sparks	**Power:**	3.3VDC	**Job Site:**	MN08

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

COMMENTS

Module powered by USB connection to laptop.

DEVIATIONS FROM TEST STANDARD

None

Configuration #	3	*Signature* Dustin Sparks

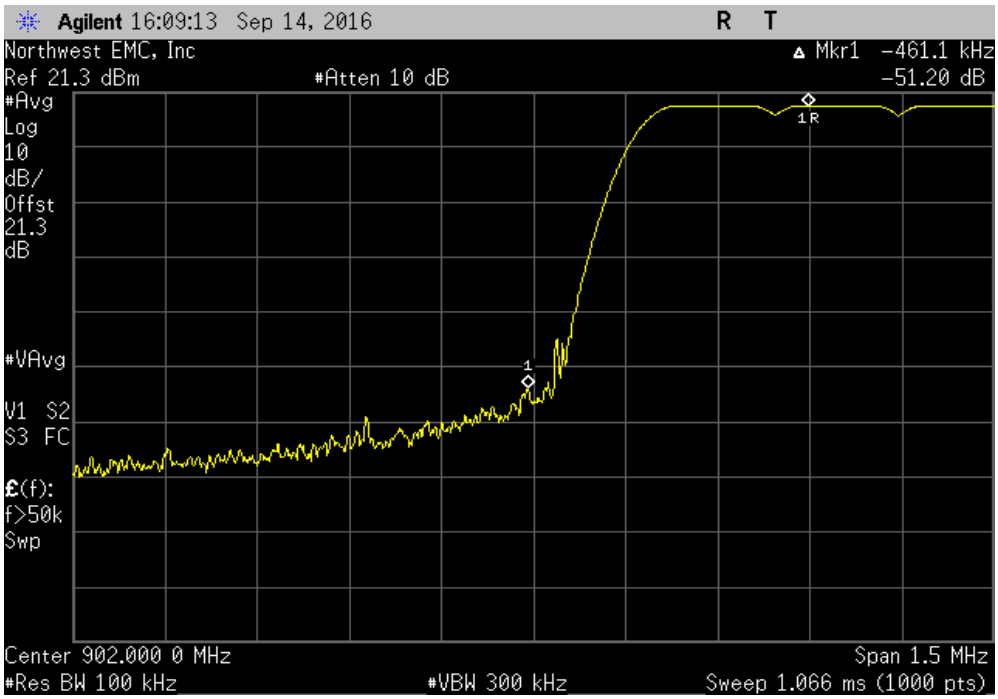
		Value (dBc)	Limit ≤ (dBc)	Result
Hopping Mode				
	FSB1			
	Low Channel, 902.3 MHz	-51.2	-30	Pass
	FSB8			
	High Channel, 914.9 MHz	-52.92	-30	Pass

BAND EDGE COMPLIANCE -HOPPING MODE

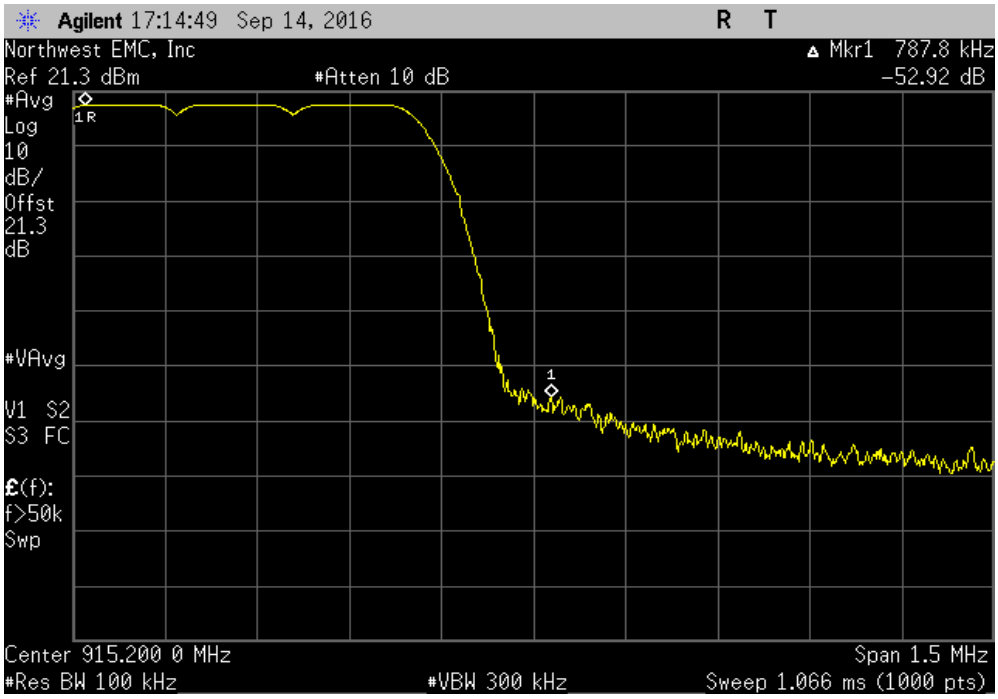
NORTHWEST EMC

XMit 2016.05.06

Hopping Mode, FSB1, Low Channel, 902.3 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-51.2	-30	Pass



Hopping Mode, FSB8, High Channel, 914.9 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-52.92	-30	Pass



DUTY CYCLE

XMit 2016.05.06

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	11/26/2014	11/26/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/18/2015	9/18/2016
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/18/2015	9/18/2016
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

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

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

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

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

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

DUTY CYCLE

NORTHWEST EMC

XMit 2016.05.06

EUT:	MTXDOT-NA1-A00			**Work Order:**	MLTI0058
Serial Number:	18865140			**Date:**	09/15/16
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	23.1 °C
Attendees:	Marcus Glass			**Humidity:**	50.3% RH
Project:	None			**Barometric Pres.:**	1023 mbar
Tested by:	Dustin Sparks	**Power:**	3.3VDC	**Job Site:**	MN08

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

COMMENTS

Module powered by USB connection to laptop.

DEVIATIONS FROM TEST STANDARD

None

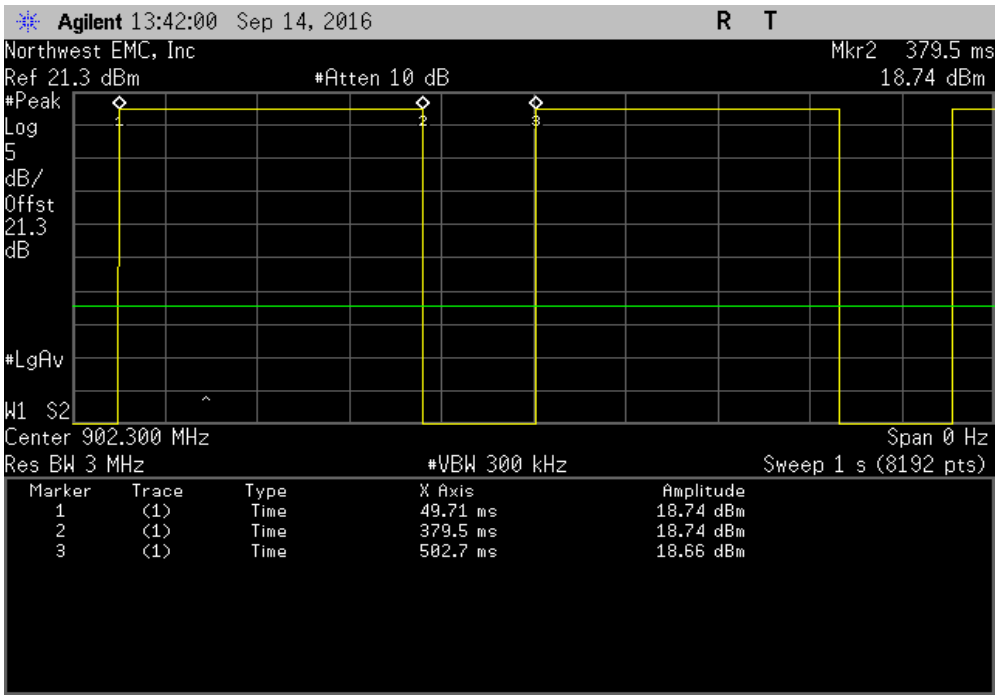
Configuration #	3	Signature

	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
125 kHz BW Data Rate						
Low Channel, 902.3 MHz	329.773 ms	452.979 ms	1	72.8	N/A	N/A
Low Channel, 902.3 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 908.7 MHz	329.651 ms	452.979 ms	1	72.8	N/A	N/A
Mid Channel, 908.7 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel, 914.9 MHz	329.651 ms	452.979 ms	1	72.8	N/A	N/A
High Channel, 914.9 MHz	N/A	N/A	5	N/A	N/A	N/A
500 kHz BW Data Rate						
Low Channel, 903.0 MHz	23.137 ms	143.007 ms	1	16.2	N/A	N/A
Low Channel, 903.0 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 909.4 MHz	23.084 ms	143 ms	1	16.1	N/A	N/A
Mid Channel, 909.4 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel, 914.2 MHz	23.145 ms	143.023 ms	1	16.2	N/A	N/A
High Channel, 914.2 MHz	N/A	N/A	5	N/A	N/A	N/A

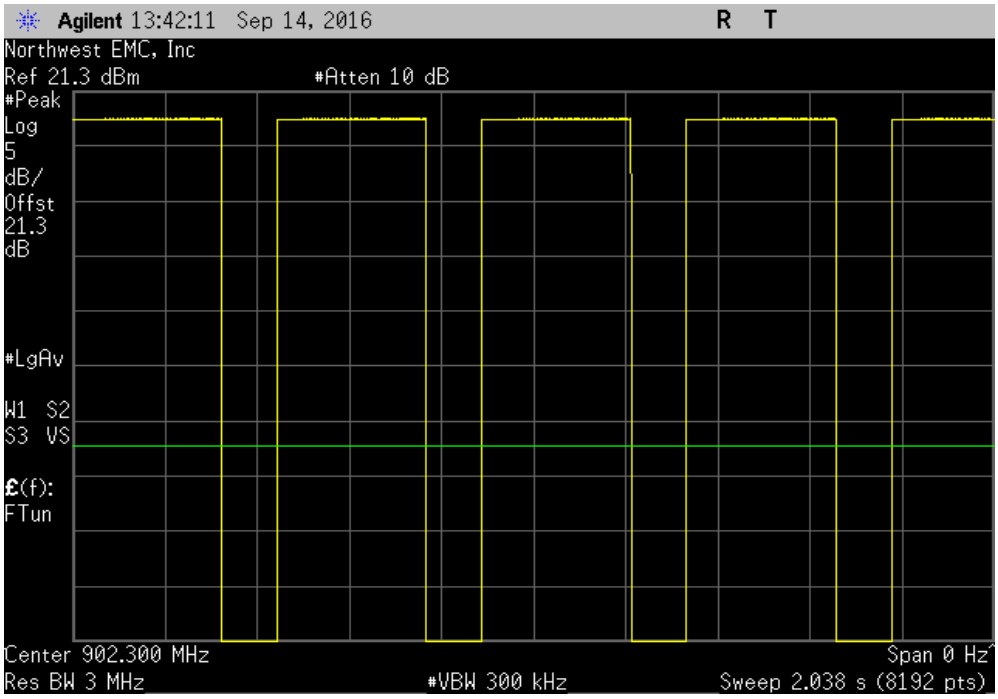
DUTY CYCLE

XMit 2016.05.06

125 kHz BW Data Rate, Low Channel, 902.3 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	329.773 ms	452.979 ms	1	72.8	N/A	N/A



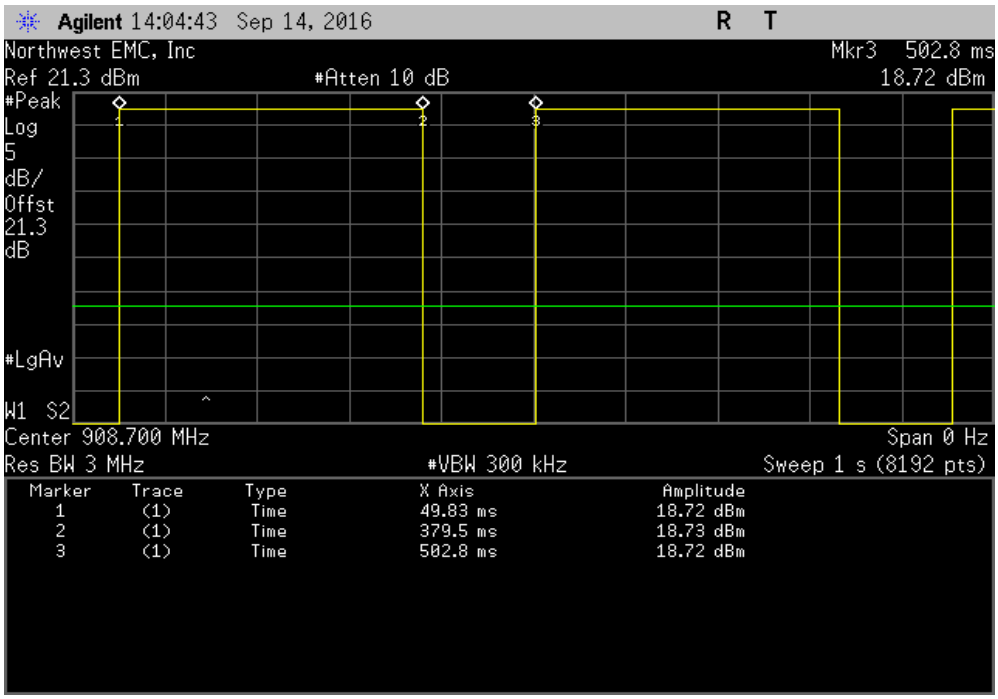
125 kHz BW Data Rate, Low Channel, 902.3 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



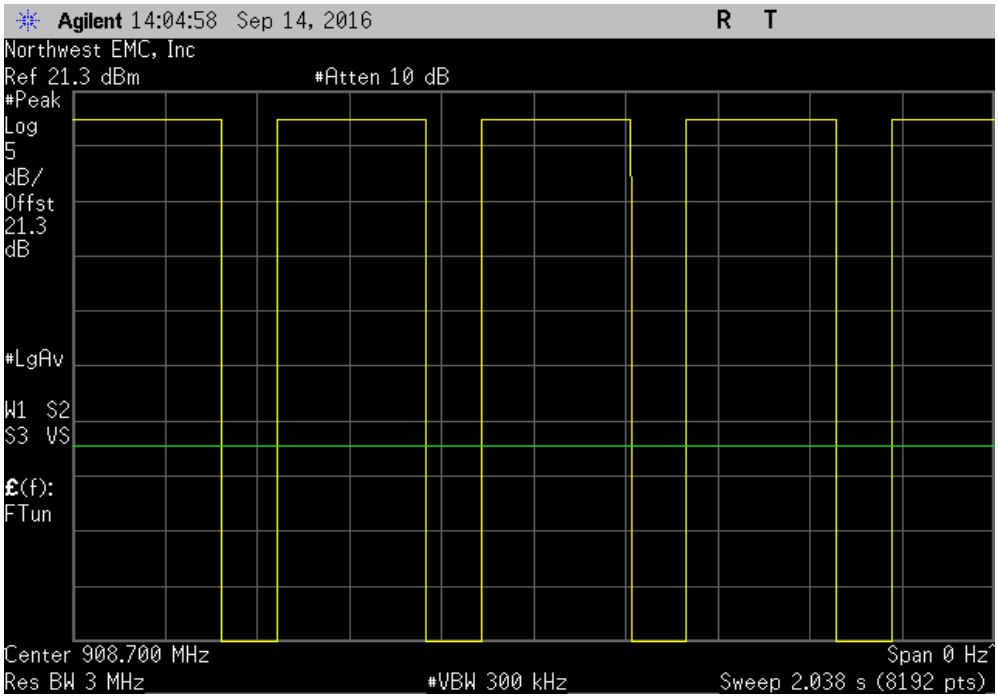
DUTY CYCLE

XMit 2016.05.06

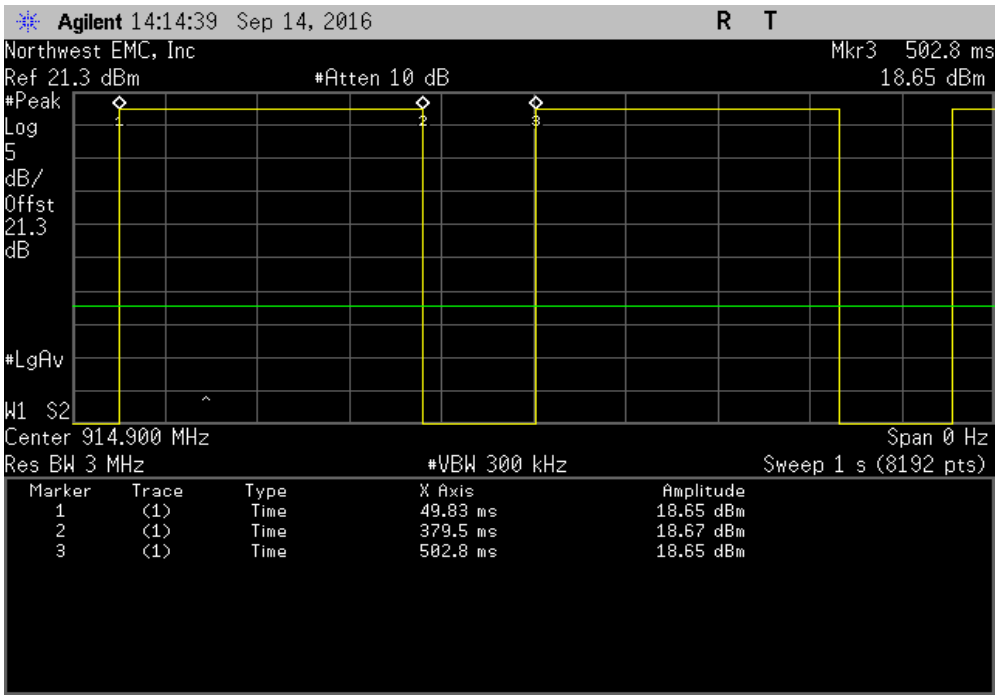
125 kHz BW Data Rate, Mid Channel, 908.7 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	329.651 ms	452.979 ms	1	72.8	N/A	N/A



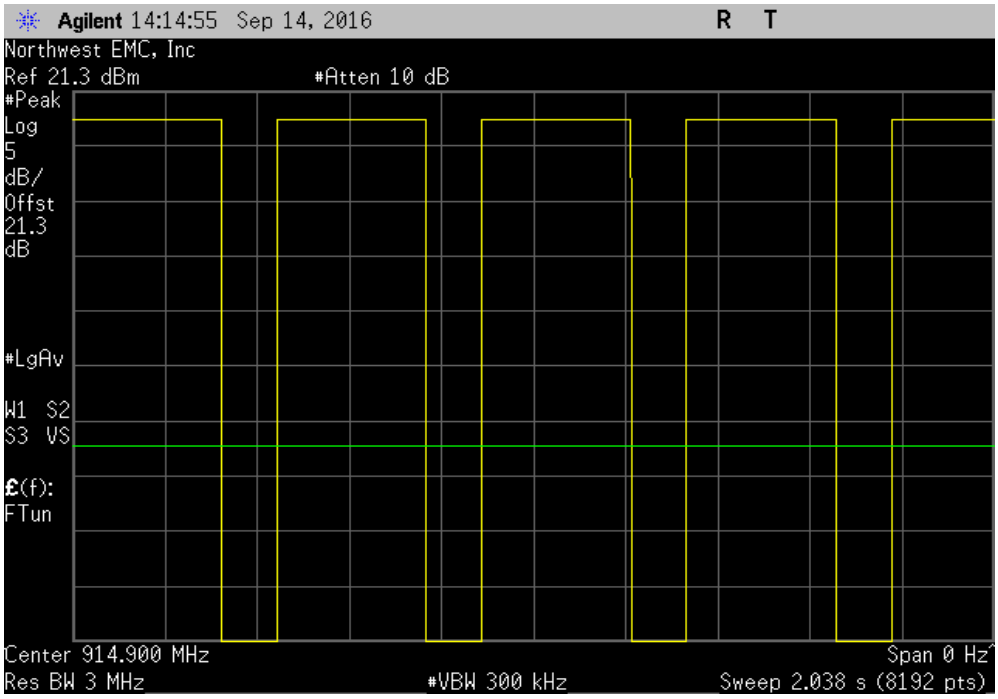
125 kHz BW Data Rate, Mid Channel, 908.7 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



125 kHz BW Data Rate, High Channel, 914.9 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	329.651 ms	452.979 ms	1	72.8	N/A	N/A



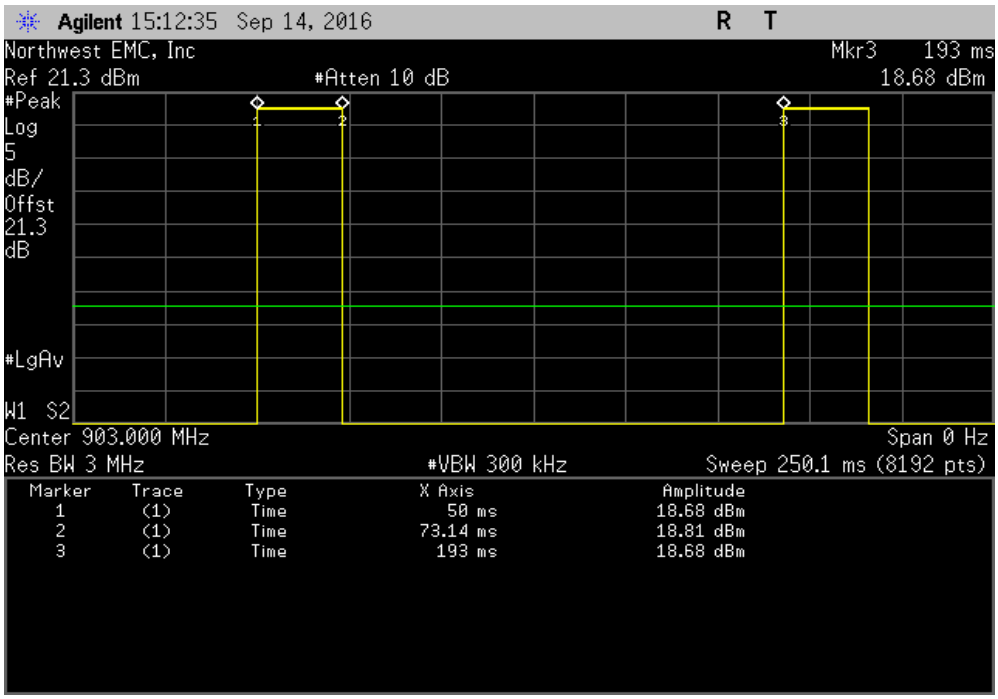
125 kHz BW Data Rate, High Channel, 914.9 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



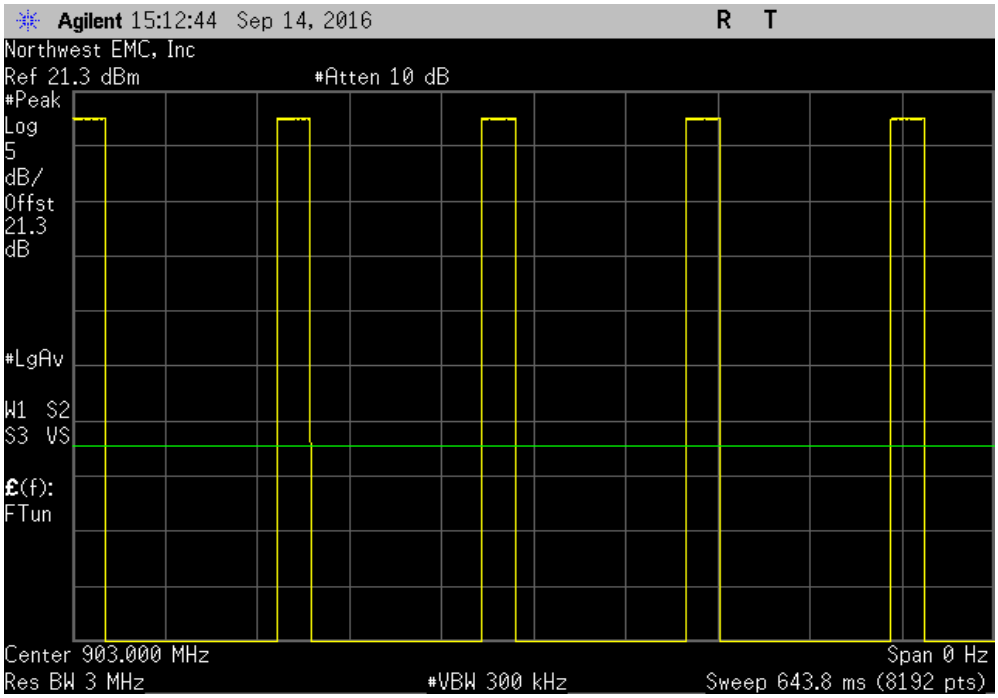
DUTY CYCLE

XMit 2016.05.06

500 kHz BW Data Rate, Low Channel, 903.0 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	23.137 ms	143.007 ms	1	16.2	N/A	N/A



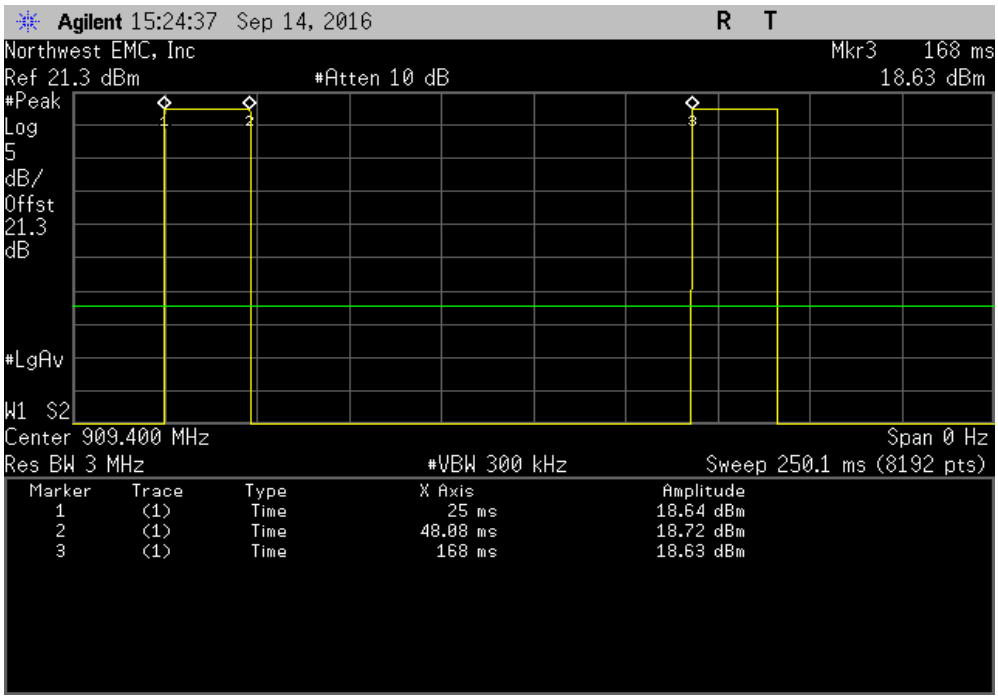
500 kHz BW Data Rate, Low Channel, 903.0 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



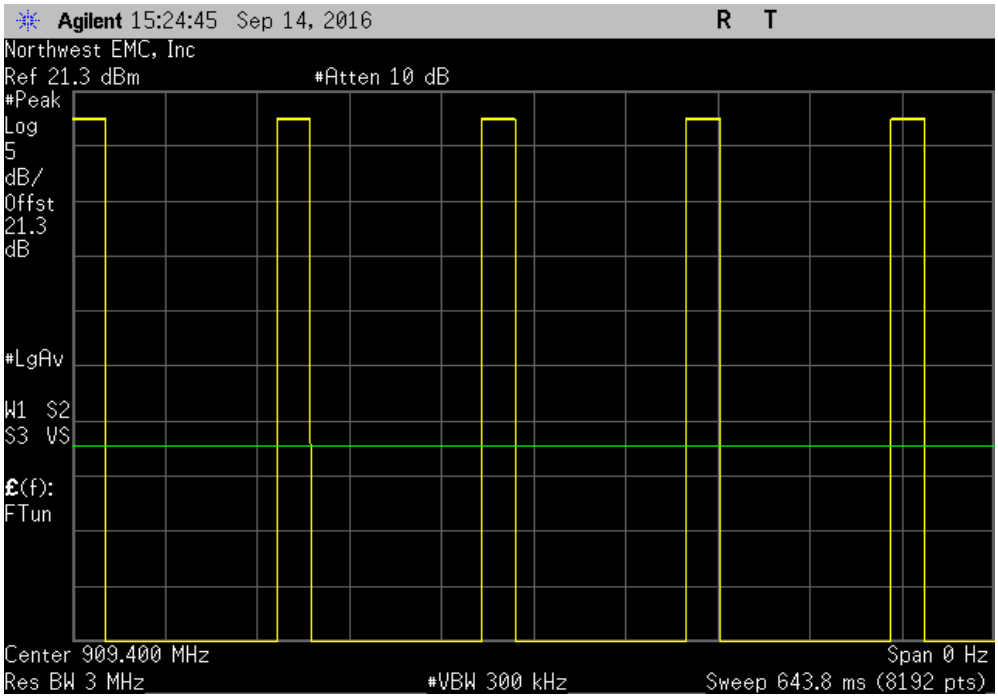
DUTY CYCLE

XMit 2016.05.06

500 kHz BW Data Rate, Mid Channel, 909.4 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	23.084 ms	143 ms	1	16.1	N/A	N/A



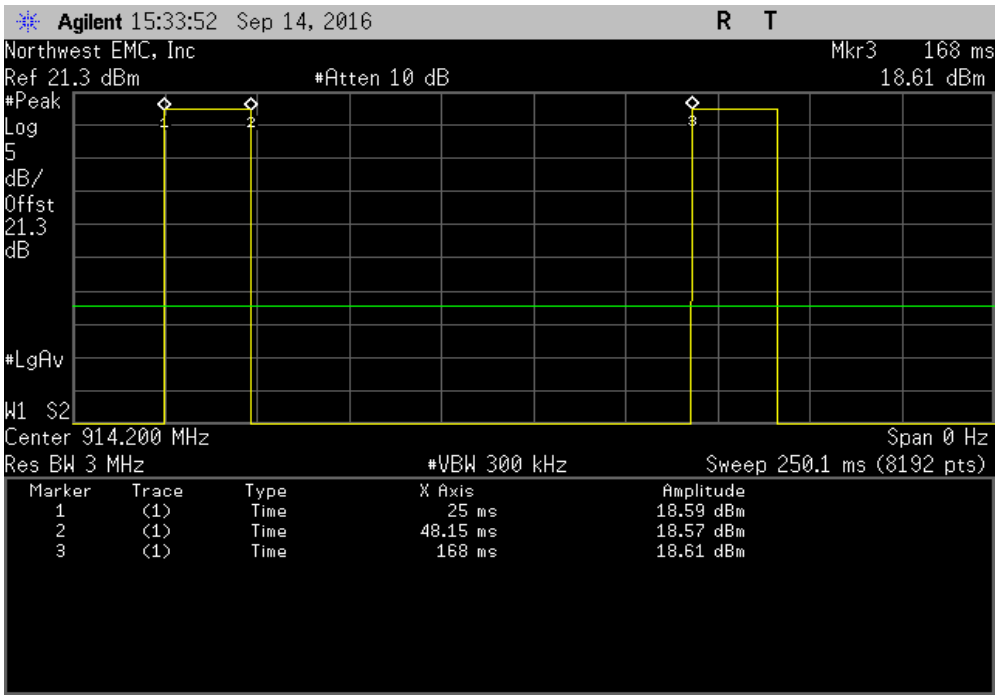
500 kHz BW Data Rate, Mid Channel, 909.4 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



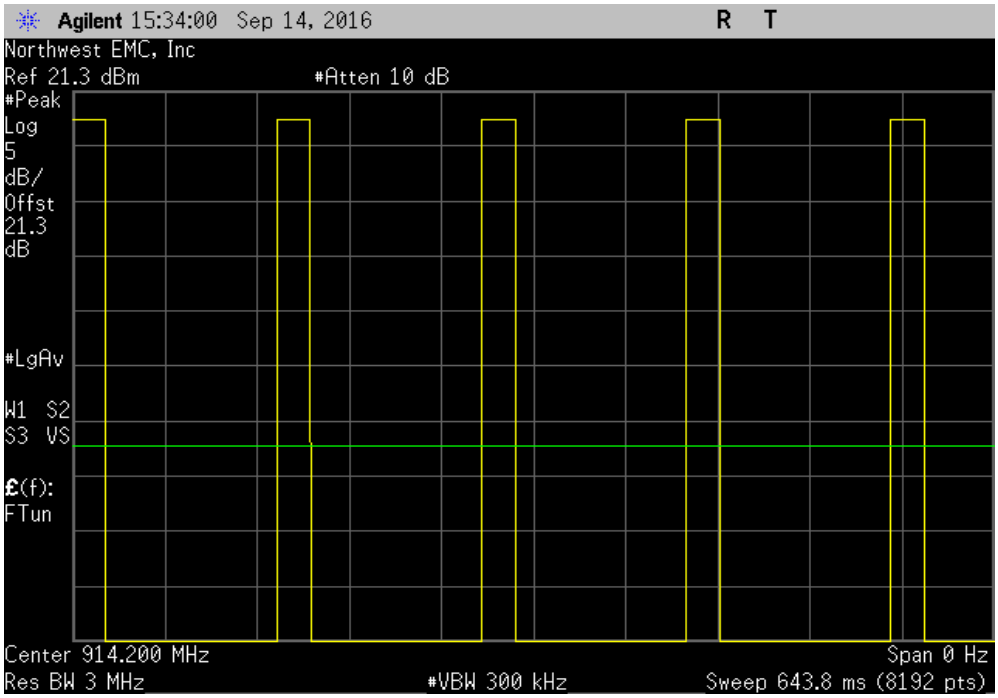
DUTY CYCLE

XMit 2016.05.06

500 kHz BW Data Rate, High Channel, 914.2 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	23.145 ms	143.023 ms	1	16.2	N/A	N/A



500 kHz BW Data Rate, High Channel, 914.2 MHz						
	Pulse Width	Period	Number of Pulses	Value (%)	Limit (%)	Results
	N/A	N/A	5	N/A	N/A	N/A



OCCUPIED BANDWIDTH

XMit 2016.05.06

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	11/26/2014	11/26/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/18/2015	9/18/2016
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/18/2015	9/18/2016
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The 20 dB occupied bandwidth was measured with the EUT set to low, medium and high transmit frequencies in the band. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode.

OCCUPIED BANDWIDTH

NORTHWEST EMC

XMit 2016.05.06

EUT:	MTXDOT-NA1			**Work Order:**	MLTI0058
Serial Number:	18865140			**Date:**	09/15/16
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	23.1 °C
Attendees:	Marcus Glass			**Humidity:**	49.4% RH
Project:	None			**Barometric Pres.:**	1023 mbar
Tested by:	Dustin Sparks	**Power:**	3.3VDC	**Job Site:**	MN08

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

COMMENTS

Module powered by USB connection to laptop. No limit for Hybrid devices.

DEVIATIONS FROM TEST STANDARD

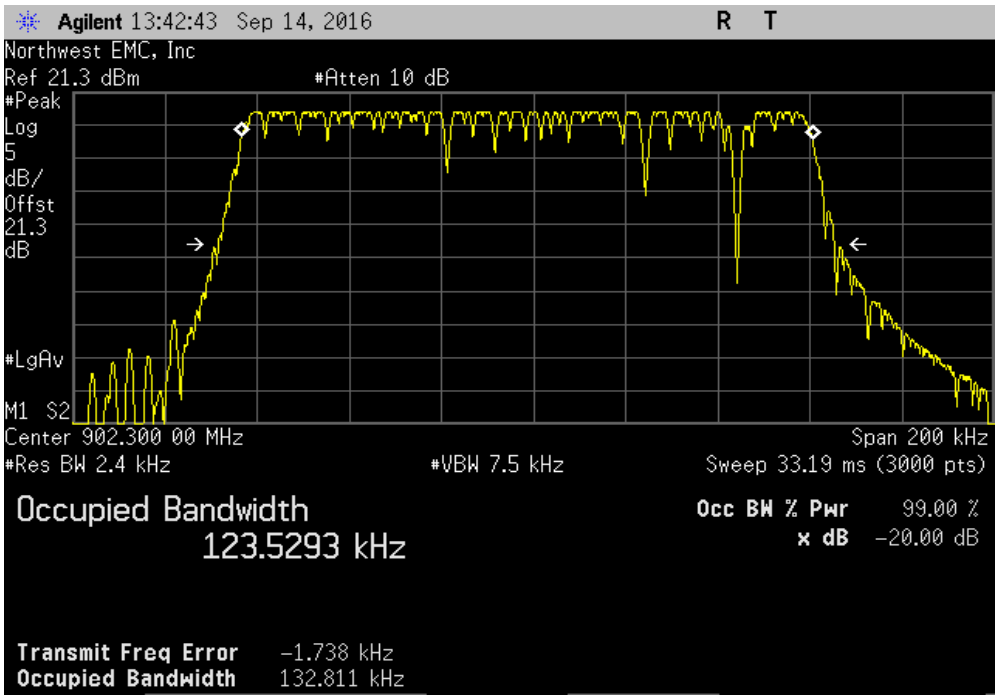
None

Configuration #	3	Signature Dustin Sparks

	Value	Limit	Result
125 kHz BW Data Rate			
Low Channel, 902.3 MHz	132.811 kHz	N/A	N/A
Mid Channel, 908.7 MHz	131.017 kHz	N/A	N/A
High Channel, 914.9 MHz	133.605 kHz	N/A	N/A
500 kHz BW Data Rate			
Low Channel, 903.0 MHz	669.804 kHz	N/A	N/A
Mid Channel, 909.4 MHz	606.487 kHz	N/A	N/A
High Channel, 914.2 MHz	643.135 kHz	N/A	N/A

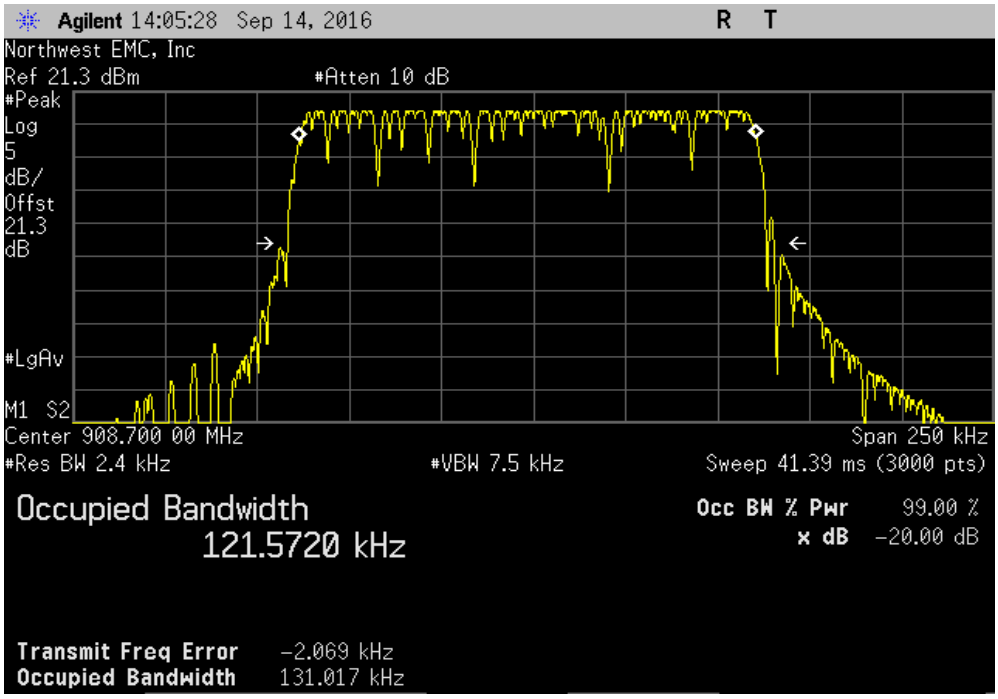
125 kHz BW Data Rate, Low Channel, 902.3 MHz

				Value	Limit	Result
				132.811 kHz	N/A	N/A



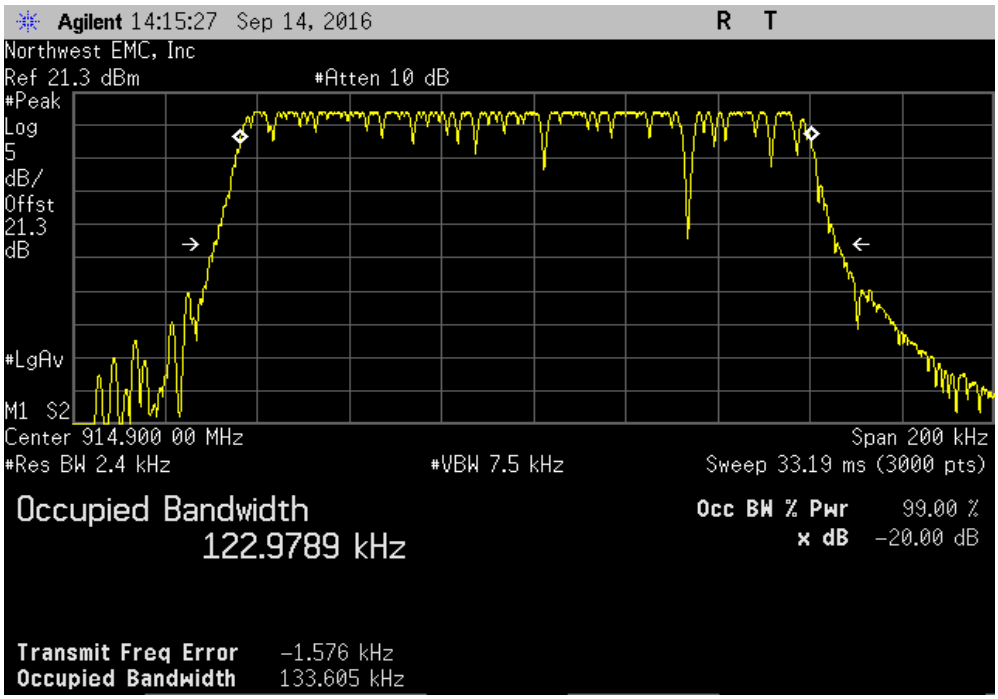
125 kHz BW Data Rate, Mid Channel, 908.7 MHz

				Value	Limit	Result
				131.017 kHz	N/A	N/A



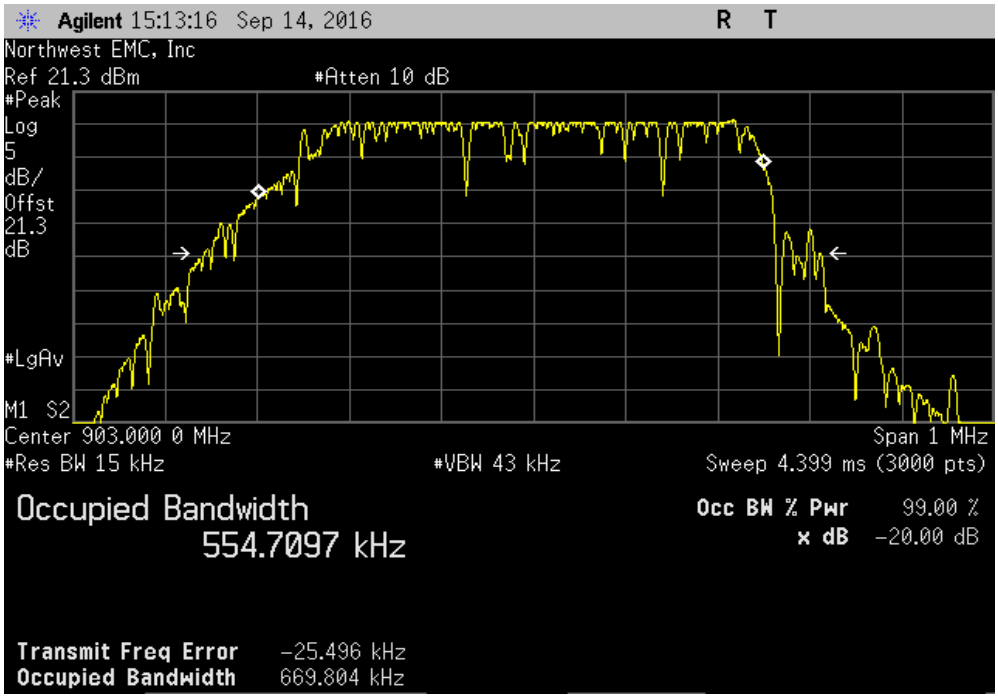
125 kHz BW Data Rate, High Channel, 914.9 MHz

				Value	Limit	Result
				133.605 kHz	N/A	N/A



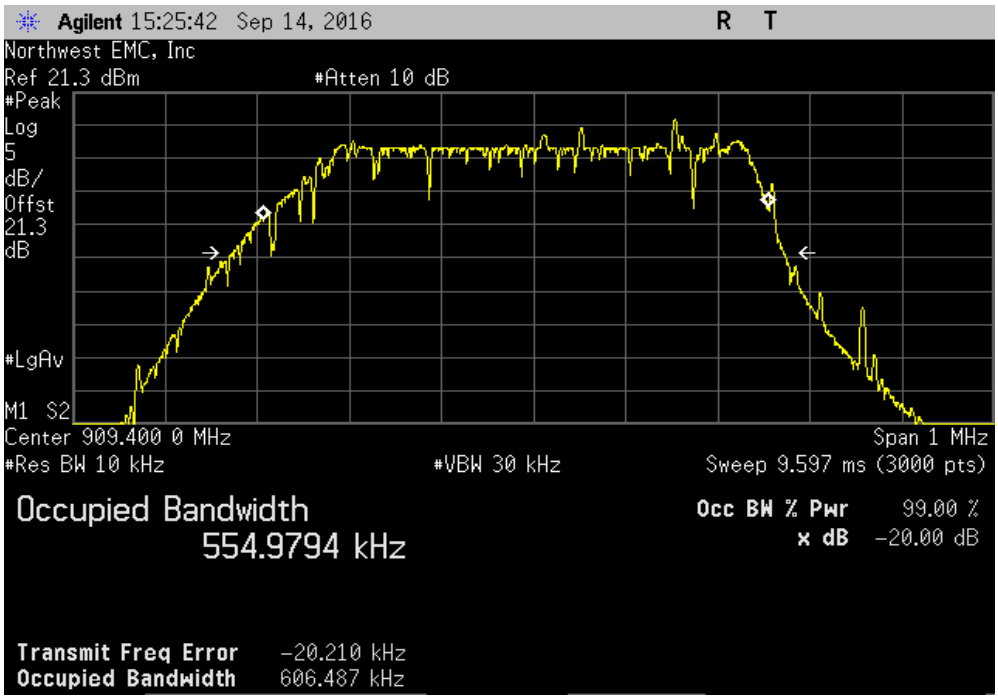
500 kHz BW Data Rate, Low Channel, 903.0 MHz

				Value	Limit	Result
				669.804 kHz	N/A	N/A



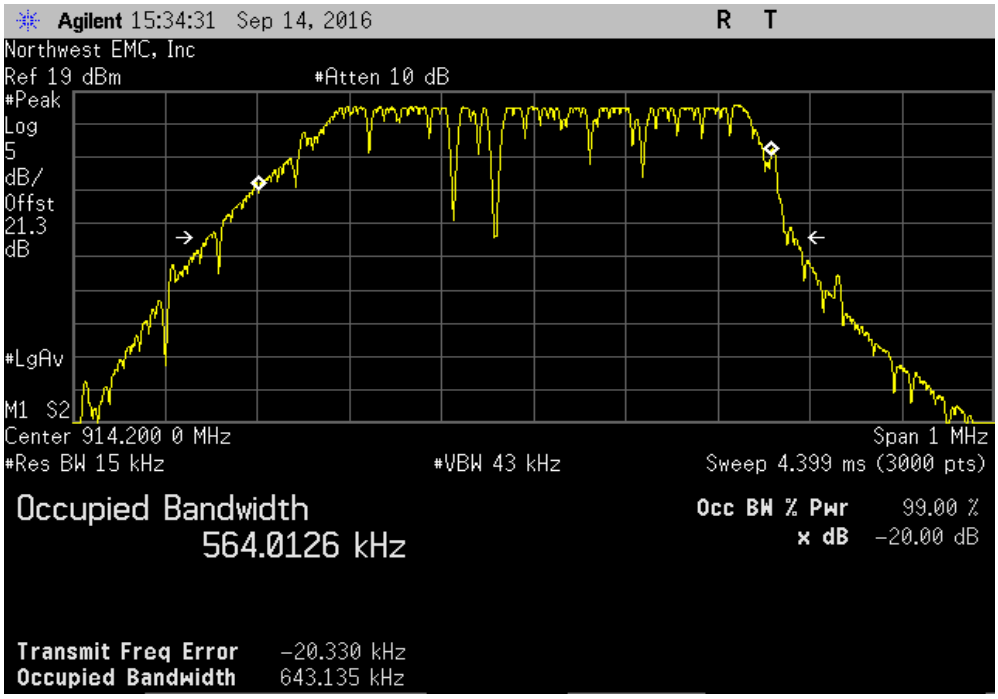
500 kHz BW Data Rate, Mid Channel, 909.4 MHz

				Value	Limit	Result
				606.487 kHz	N/A	N/A



500 kHz BW Data Rate, High Channel, 914.2 MHz

				Value	Limit	Result
				643.135 kHz	N/A	N/A



OUTPUT POWER

XMit 2016.05.06

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	11/26/2014	11/26/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/18/2015	9/18/2016
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/18/2015	9/18/2016
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The fundamental emission output power (maximum average conducted output power) was measured using the channels and modes as called out on the following data sheets. The transmit power was set to its default maximum.

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

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

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

OUTPUT POWER

NORTHWEST EMC

XMit 2016.05.06

EUT:	MTXDOT-NA1-A00			**Work Order:**	MLTI0058
Serial Number:	18865140			**Date:**	09/15/16
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	23.1 °C
Attendees:	Marcus Glass			**Humidity:**	49.6% RH
Project:	None			**Barometric Pres.:**	1023 mbar
Tested by:	Dustin Sparks	**Power:**	3.3VDC	**Job Site:**	MN08

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

COMMENTS

Module powered by USB connection to laptop.

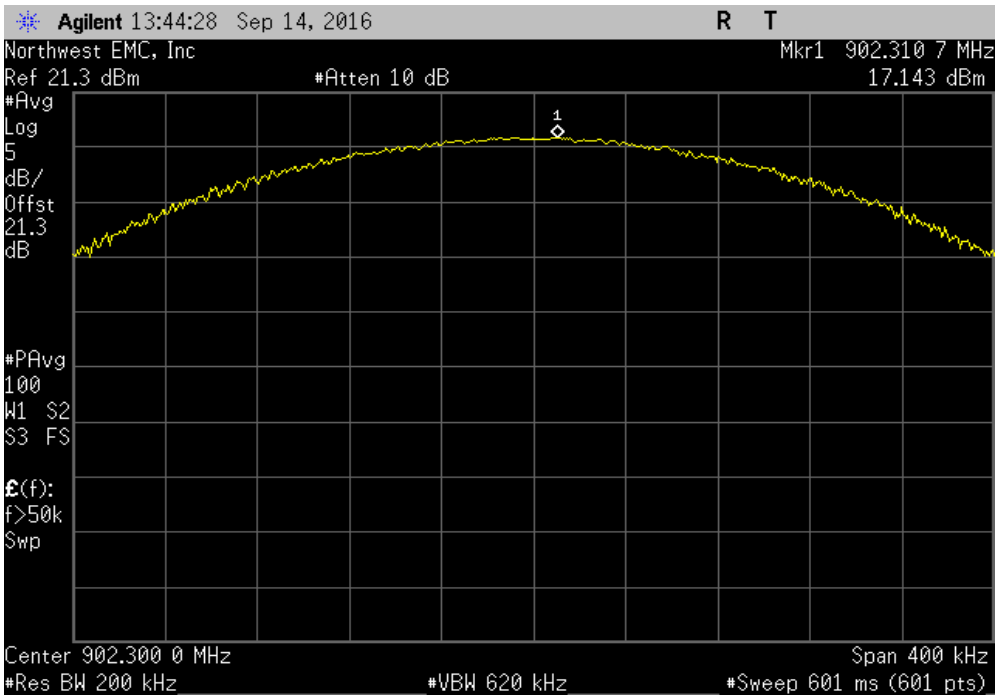
DEVIATIONS FROM TEST STANDARD

None

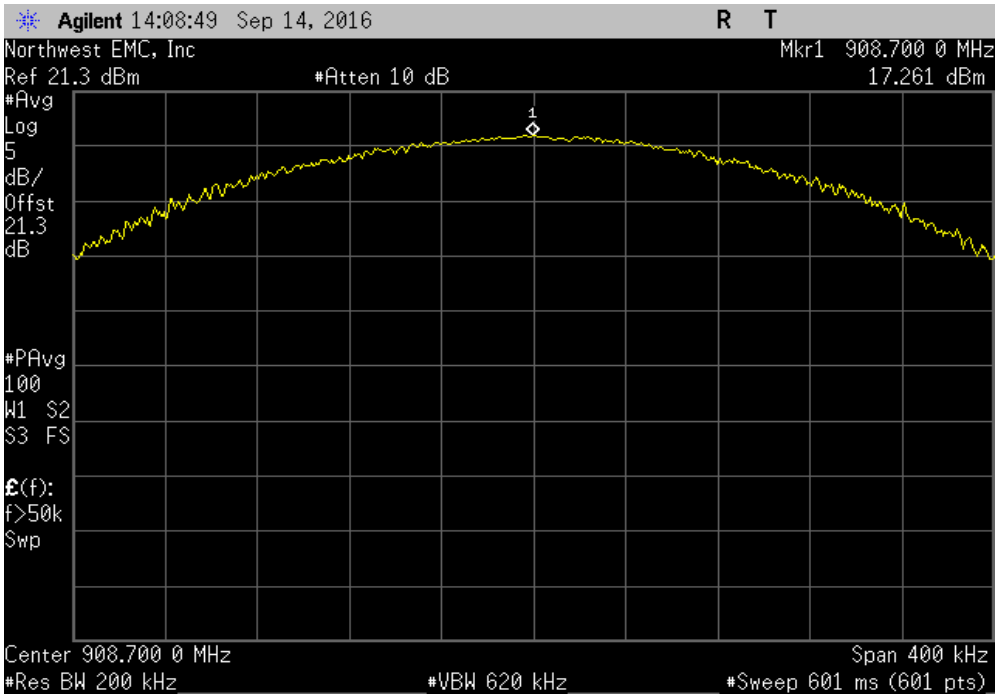
Configuration #	3	Signature

	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)	Value (dBm)	Limit (dBm)	Results
125 kHz BW Data Rate					
Low Channel, 902.3 MHz	17.143	1.4	18.5	30	Pass
Mid Channel, 908.7 MHz	17.261	1.4	18.6	30	Pass
High Channel, 914.9 MHz	17.065	1.4	18.4	30	Pass
500 kHz BW Data Rate					
Low Channel, 903.0 MHz	11.406	7.9	19.3	30	Pass
Mid Channel, 909.4 MHz	11.508	7.9	19.4	30	Pass
High Channel, 914.2 MHz	11.11	7.9	19	30	Pass

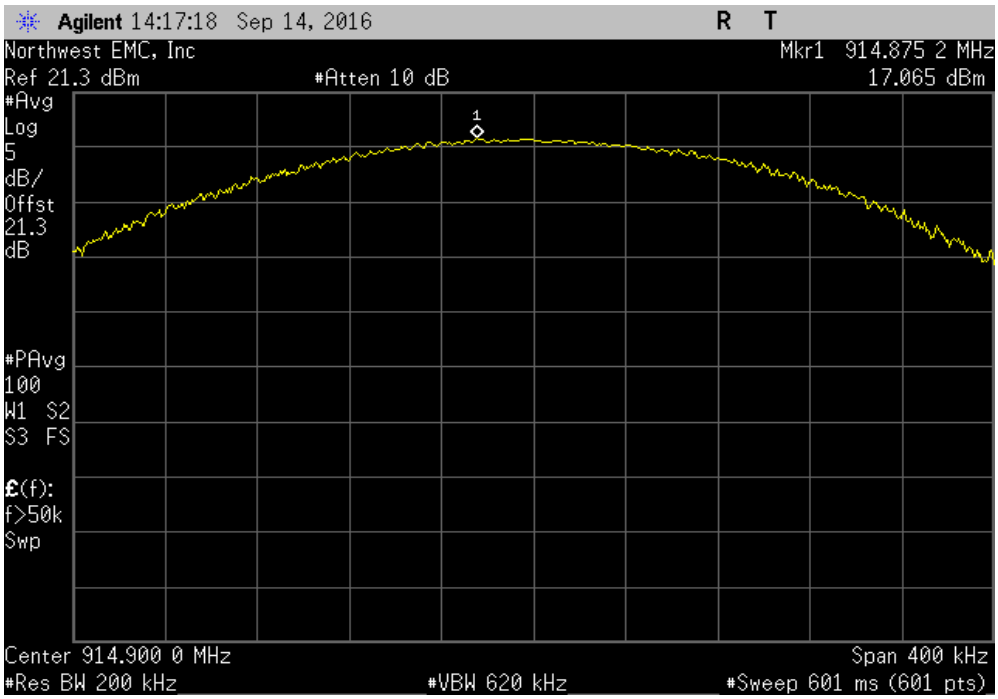
125 kHz BW Data Rate, Low Channel, 902.3 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	17.143	1.4		18.5	30	Pass



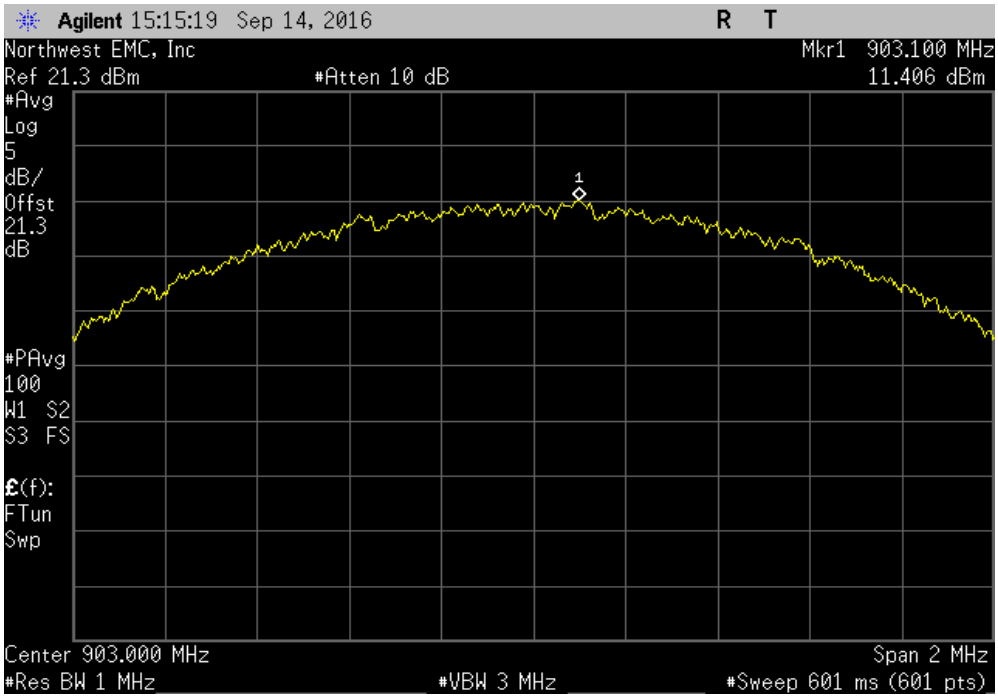
125 kHz BW Data Rate, Mid Channel, 908.7 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	17.261	1.4		18.6	30	Pass



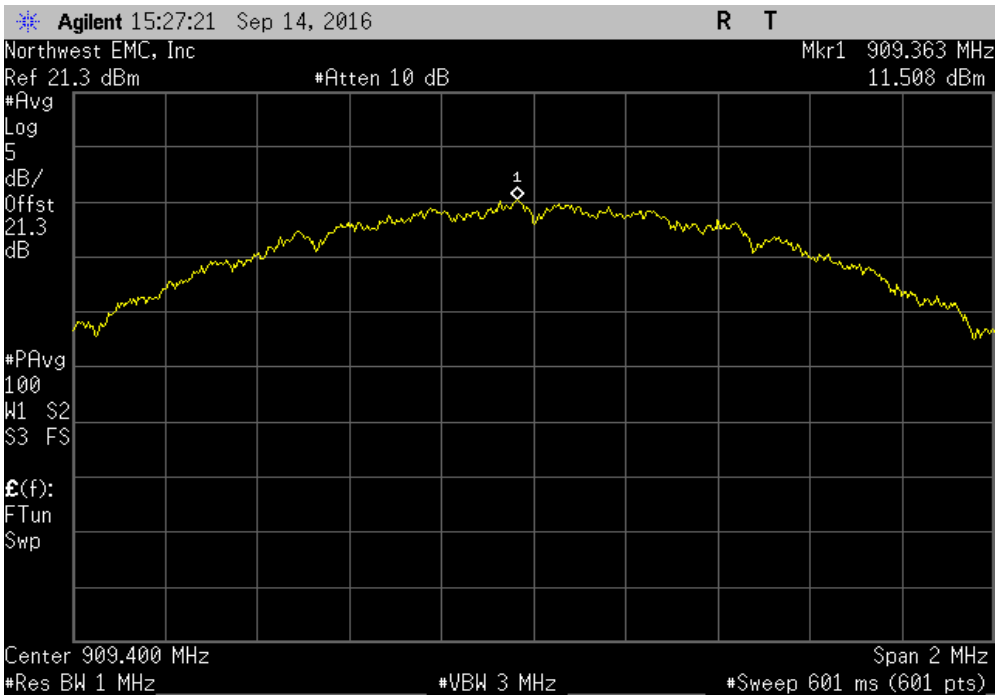
125 kHz BW Data Rate, High Channel, 914.9 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	17.065	1.4		18.4	30	Pass



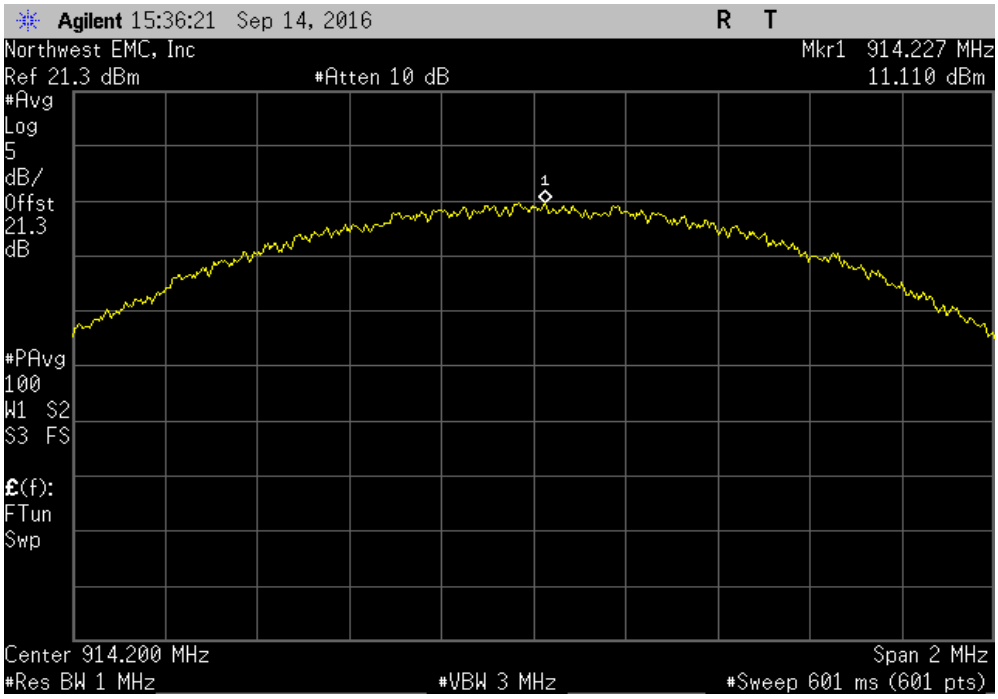
500 kHz BW Data Rate, Low Channel, 903.0 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	11.406	7.9		19.3	30	Pass



500 kHz BW Data Rate, Mid Channel, 909.4 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	11.508	7.9		19.4	30	Pass



500 kHz BW Data Rate, High Channel, 914.2 MHz						
	Avg Cond Pwr (dBm)	Duty Cycle Factor (dB)		Value (dBm)	Limit (dBm)	Results
	11.11	7.9		19	30	Pass



POWER SPECTRAL DENSITY

XMit 2016.05.06

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	11/26/2014	11/26/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/18/2015	9/18/2016
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/18/2015	9/18/2016
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

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

Per the AVGPSD-2 method outlined in FCC KDB 558074 D01, the average power spectral density was measured in a 3 kHz RBW with a duty cycle correction factor.

POWER SPECTRAL DENSITY

NORTHWEST EMC

XMit 2016.05.06

EUT:	MTXDOT-NA1-A00			**Work Order:**	MLTI0058
Serial Number:	18865140			**Date:**	09/15/16
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	23 °C
Attendees:	Marcus Glass			**Humidity:**	49.6% RH
Project:	None			**Barometric Pres.:**	1023 mbar
Tested by:	Dustin Sparks	**Power:**	3.3VDC	**Job Site:**	MN08

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

COMMENTS

Module powered by USB connection to laptop.

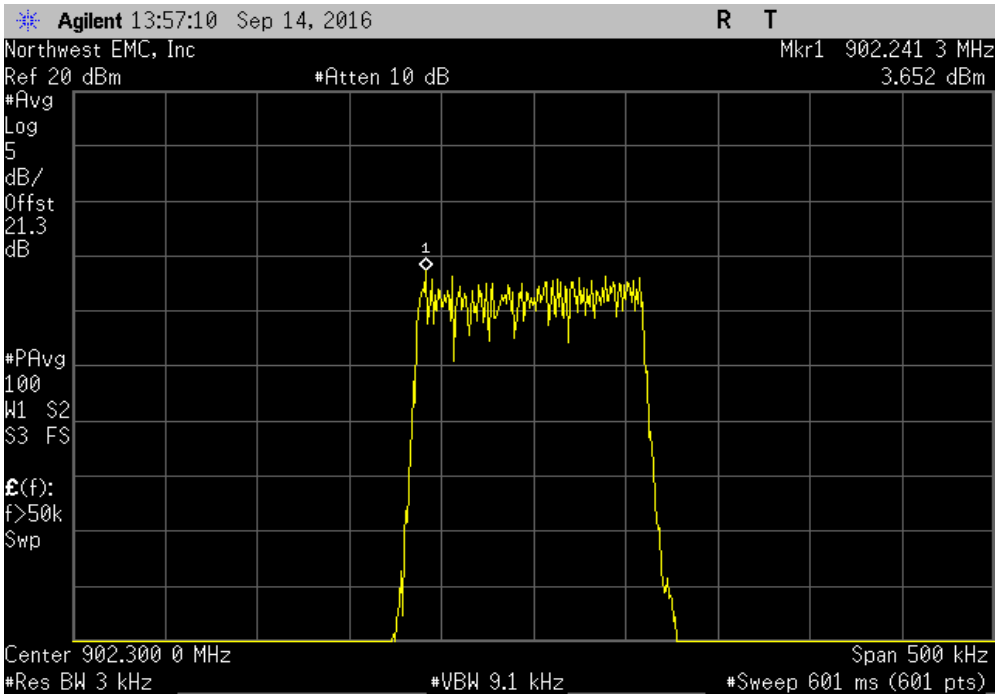
DEVIATIONS FROM TEST STANDARD

None

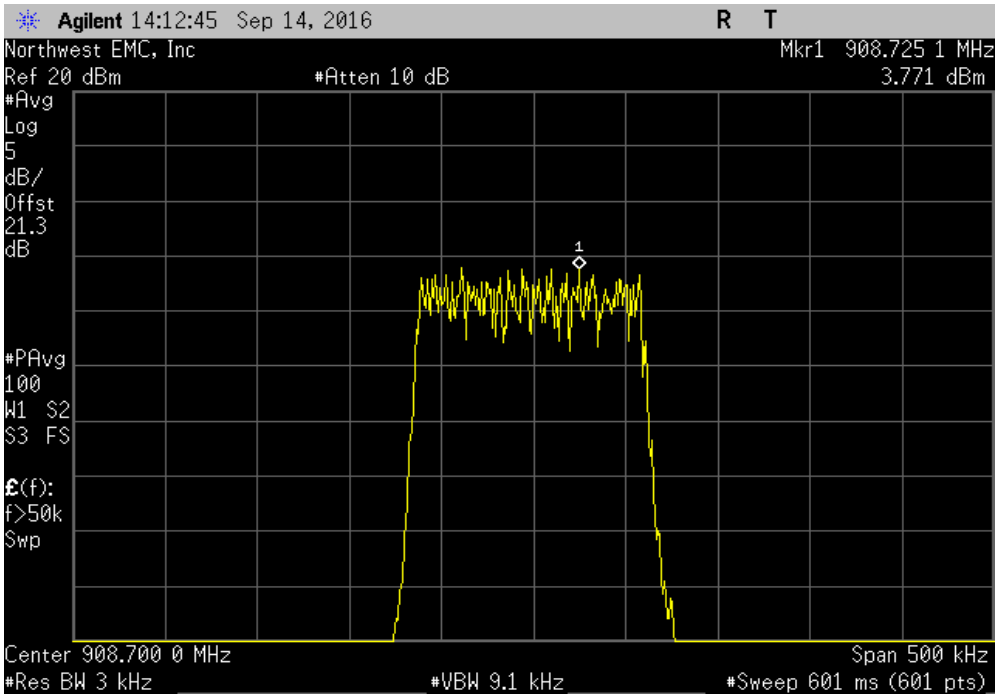
Configuration #	**3**	*Signature* Dustin Sparks

	Power (dBm/MHz)	Duty Cycle Factor (dB)	Density (dBm/MHz)	Limit ≤ (dBm / 3 kHz)	Results
125 kHz BW Data Rate					
Low Channel, 902.3 MHz	3.652	1.4	5	8	Pass
Mid Channel, 908.7 MHz	3.771	1.4	5.1	8	Pass
High Channel, 914.9 MHz	4.293	1.4	5.7	8	Pass
500 kHz BW Data Rate					
Low Channel, 903.0 MHz	-7.998	7.9	-0.1	8	Pass
Mid Channel, 909.4 MHz	-9.128	7.9	-1.2	8	Pass
High Channel, 914.2 MHz	-9.484	7.9	-1.6	8	Pass

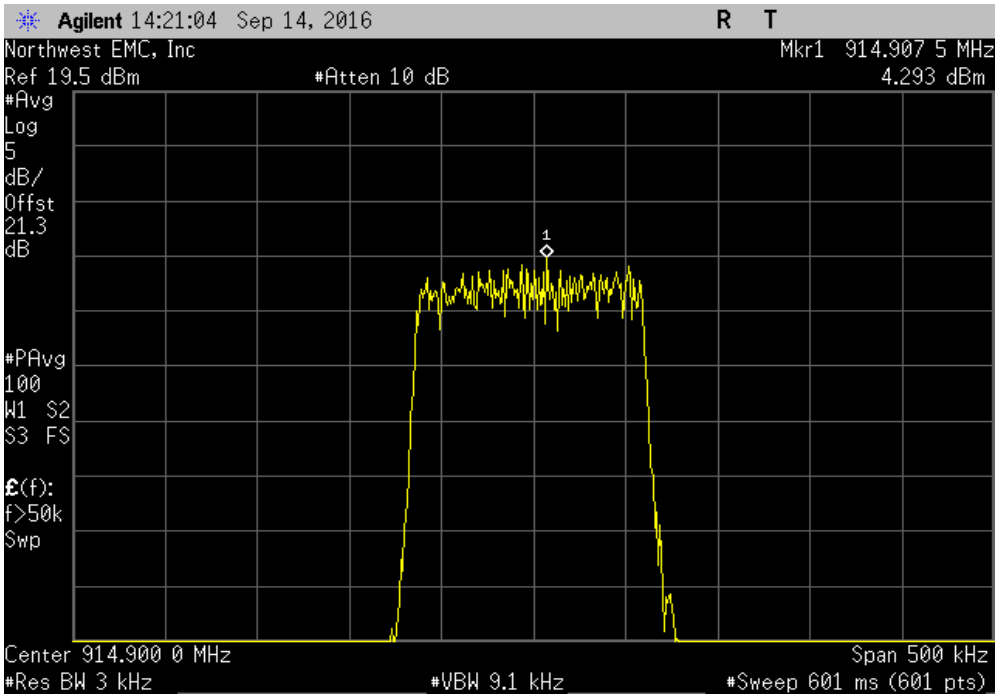
125 kHz BW Data Rate, Low Channel, 902.3 MHz						
	Power (dBm/MHz)	Duty Cycle Factor (dB)		Density (dBm/MHz)	Limit ≤ (dBm / 3 kHz)	Results
	3.652	1.4		5	8	Pass



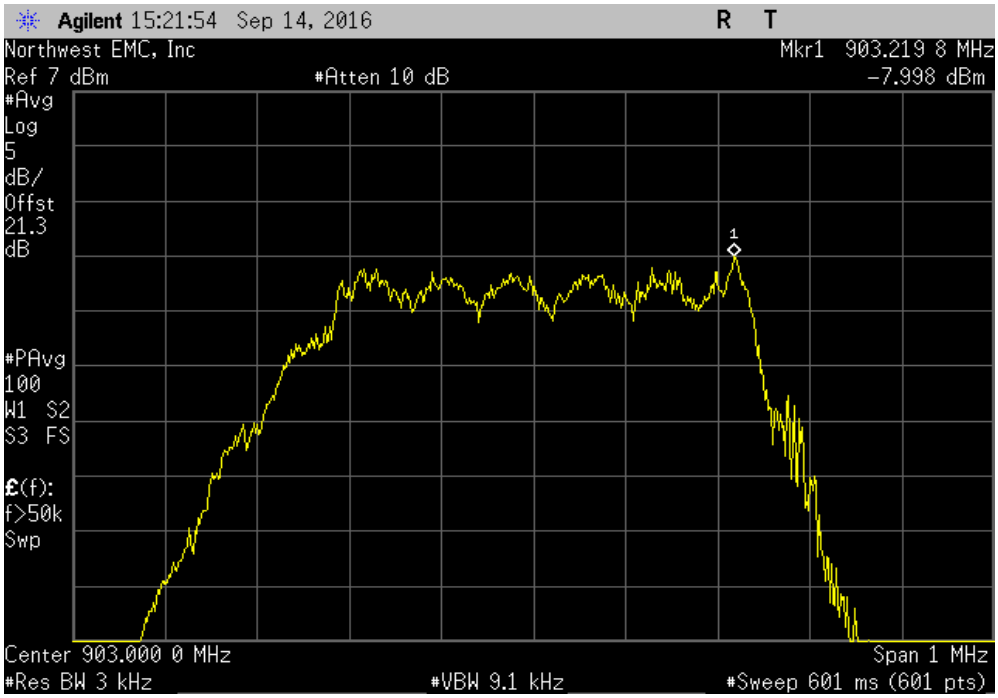
125 kHz BW Data Rate, Mid Channel, 908.7 MHz						
	Power (dBm/MHz)	Duty Cycle Factor (dB)		Density (dBm/MHz)	Limit ≤ (dBm / 3 kHz)	Results
	3.771	1.4		5.1	8	Pass



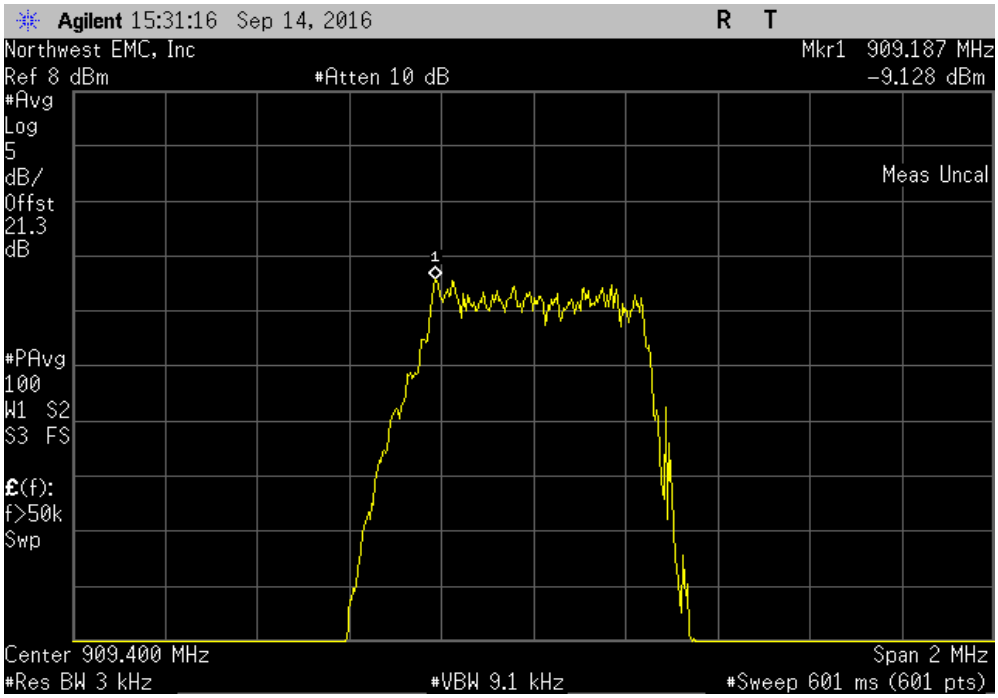
125 kHz BW Data Rate, High Channel, 914.9 MHz						
	Power (dBm/MHz)	Duty Cycle Factor (dB)		Density (dBm/MHz)	Limit ≤ (dBm / 3 kHz)	Results
	4.293	1.4		5.7	8	Pass



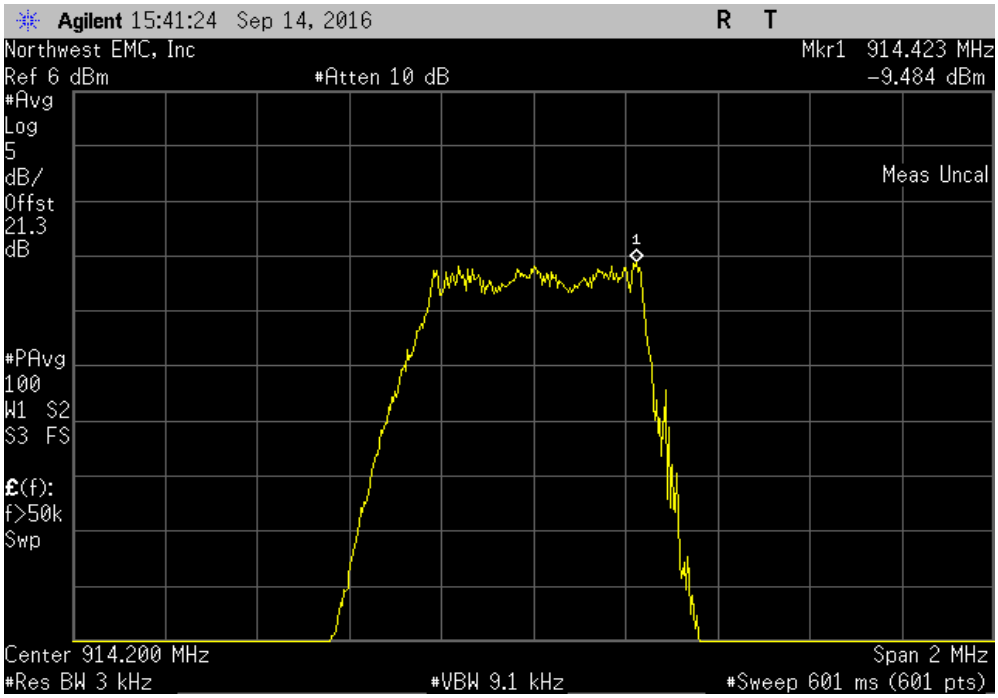
500 kHz BW Data Rate, Low Channel, 903.0 MHz						
	Power (dBm/MHz)	Duty Cycle Factor (dB)		Density (dBm/MHz)	Limit ≤ (dBm / 3 kHz)	Results
	-7.998	7.9		-0.1	8	Pass



500 kHz BW Data Rate, Mid Channel, 909.4 MHz						
	Power (dBm/MHz)	Duty Cycle Factor (dB)		Density (dBm/MHz)	Limit ≤ (dBm / 3 kHz)	Results
	-9.128	7.9		-1.2	8	Pass



500 kHz BW Data Rate, High Channel, 914.2 MHz						
	Power (dBm/MHz)	Duty Cycle Factor (dB)		Density (dBm/MHz)	Limit ≤ (dBm / 3 kHz)	Results
	-9.484	7.9		-1.6	8	Pass



SPURIOUS CONDUCTED EMISSIONS

XMit 2016.05.06

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	11/26/2014	11/26/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/18/2015	9/18/2016
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/18/2015	9/18/2016
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency range.

SPURIOUS CONDUCTED EMISSIONS

NORTHWEST EMC

XMit 2016.05.06

EUT:	MTXDOT-NA1-A00			**Work Order:**	MLTI0058
Serial Number:	18865140			**Date:**	09/15/16
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	23.1 °C
Attendees:	Marcus Glass			**Humidity:**	50.2% RH
Project:	None			**Barometric Pres.:**	1023 mbar
Tested by:	Dustin Sparks	**Power:**	3.3VDC	**Job Site:**	MN08

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

COMMENTS

Module powered by USB connection to laptop.

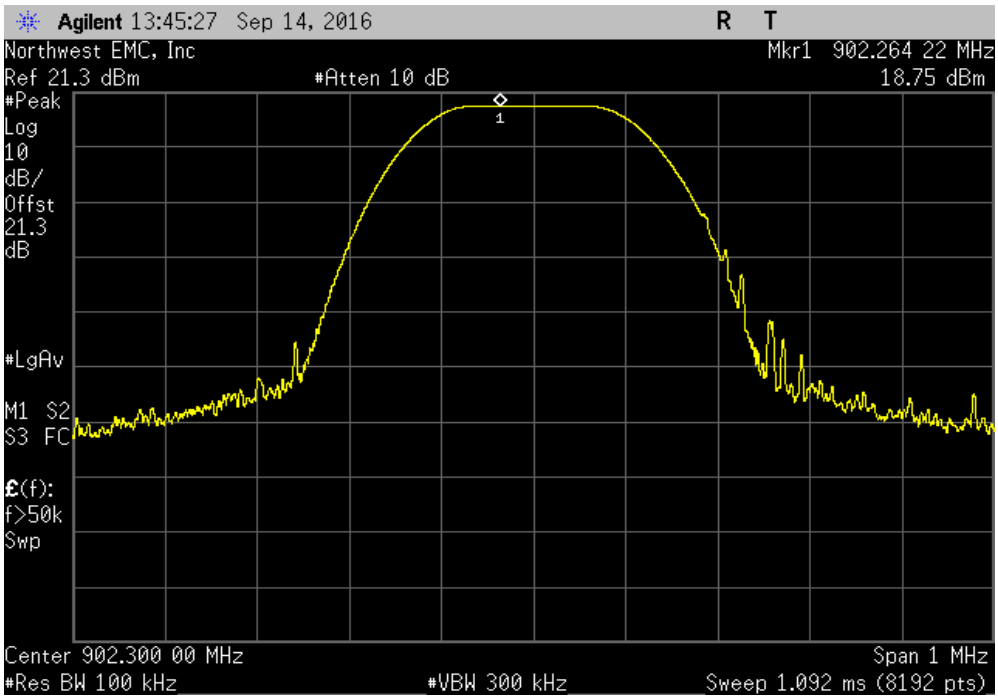
DEVIATIONS FROM TEST STANDARD

None

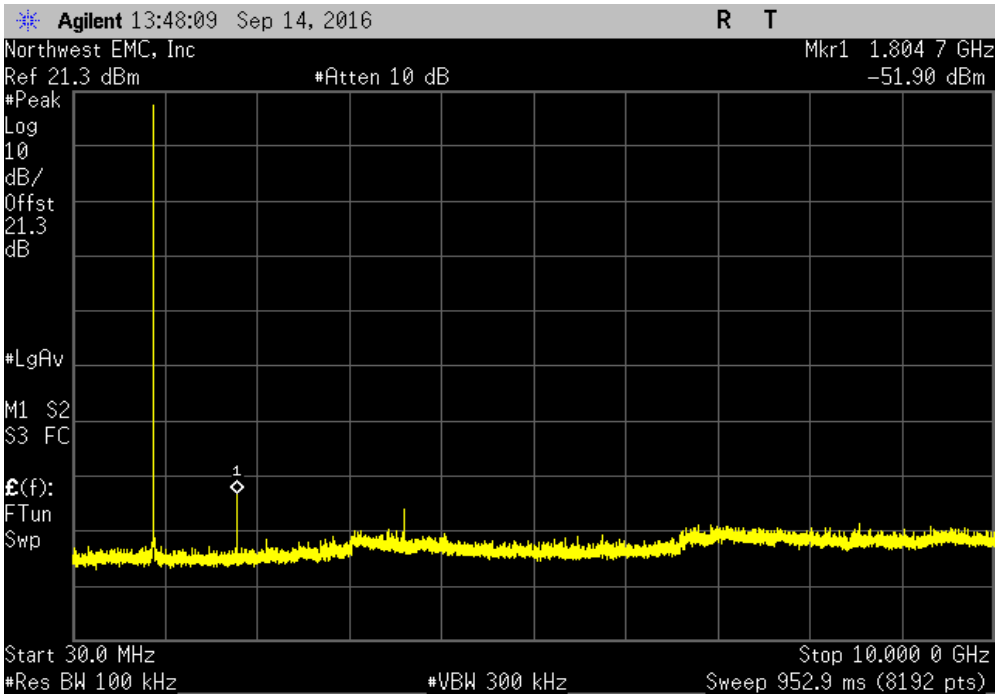
Configuration #	3	Signature: Dustin Sparks

	Frequency Range	Max Value (dBc)	Limit ≤ (dBc)	Result
125 kHz BW Data Rate				
Low Channel, 902.3 MHz	Fundamental	N/A	N/A	N/A
Low Channel, 902.3 MHz	30 MHz - 10 GHz	-70.65	-30	Pass
Mid Channel, 908.7 MHz	Fundamental	N/A	N/A	N/A
Mid Channel, 908.7 MHz	30 MHz - 10 GHz	-71.33	-30	Pass
High Channel, 914.9 MHz	Fundamental	N/A	N/A	N/A
High Channel, 914.9 MHz	30 MHz - 10 GHz	-71.58	-30	Pass
500 kHz BW Data Rate				
Low Channel, 903.0 MHz	Fundamental	N/A	N/A	N/A
Low Channel, 903.0 MHz	30 MHz - 10 GHz	-72.19	-30	Pass
Mid Channel, 909.4 MHz	Fundamental	N/A	N/A	N/A
Mid Channel, 909.4 MHz	30 MHz - 10 GHz	-72.43	-30	Pass
High Channel, 914.2 MHz	Fundamental	N/A	N/A	N/A
High Channel, 914.2 MHz	30 MHz - 10 GHz	-73.3	-30	Pass

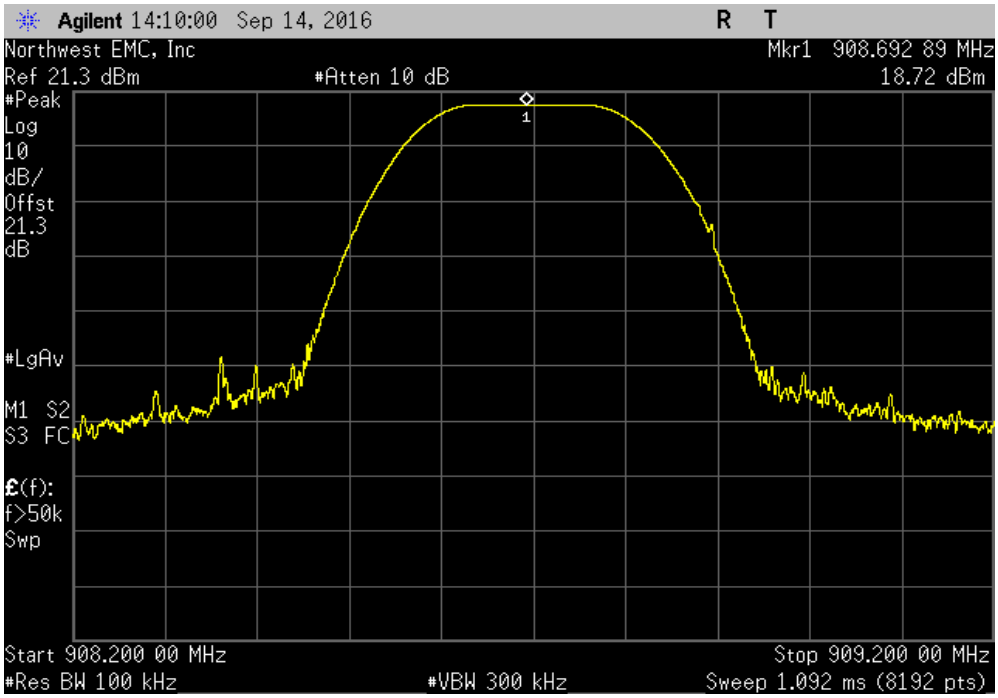
125 kHz BW Data Rate, Low Channel, 902.3 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



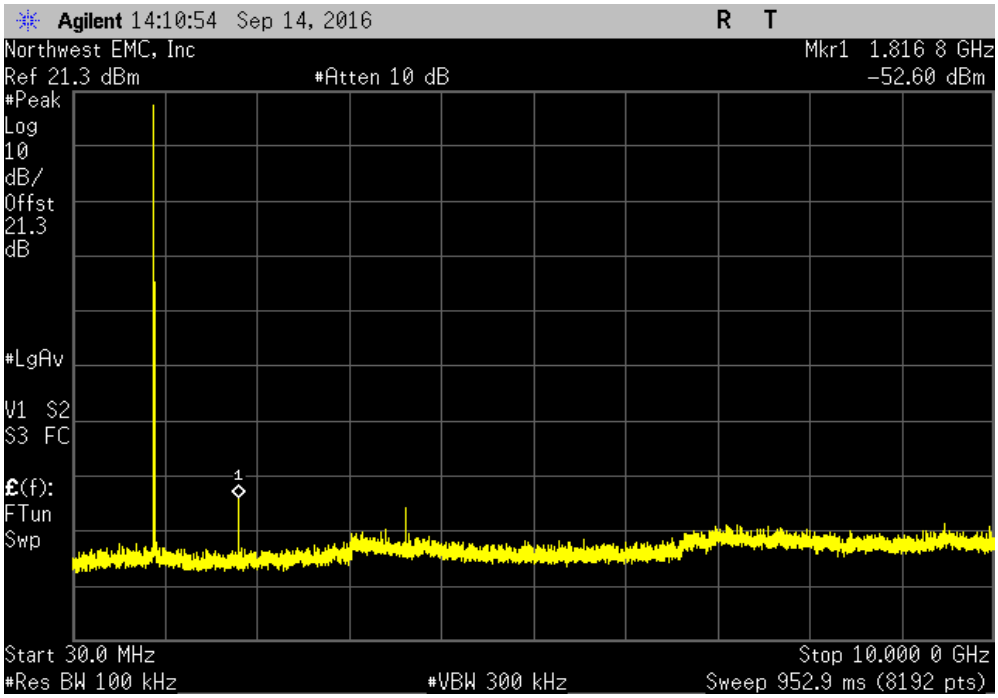
125 kHz BW Data Rate, Low Channel, 902.3 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 10 GHz			-70.65	-30	Pass



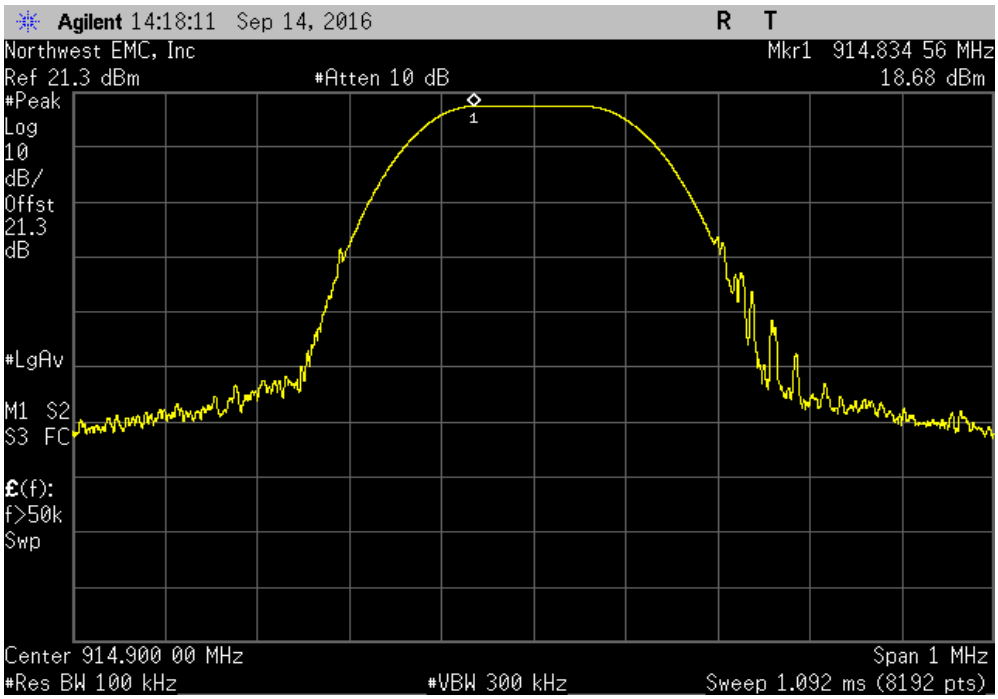
125 kHz BW Data Rate, Mid Channel, 908.7 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



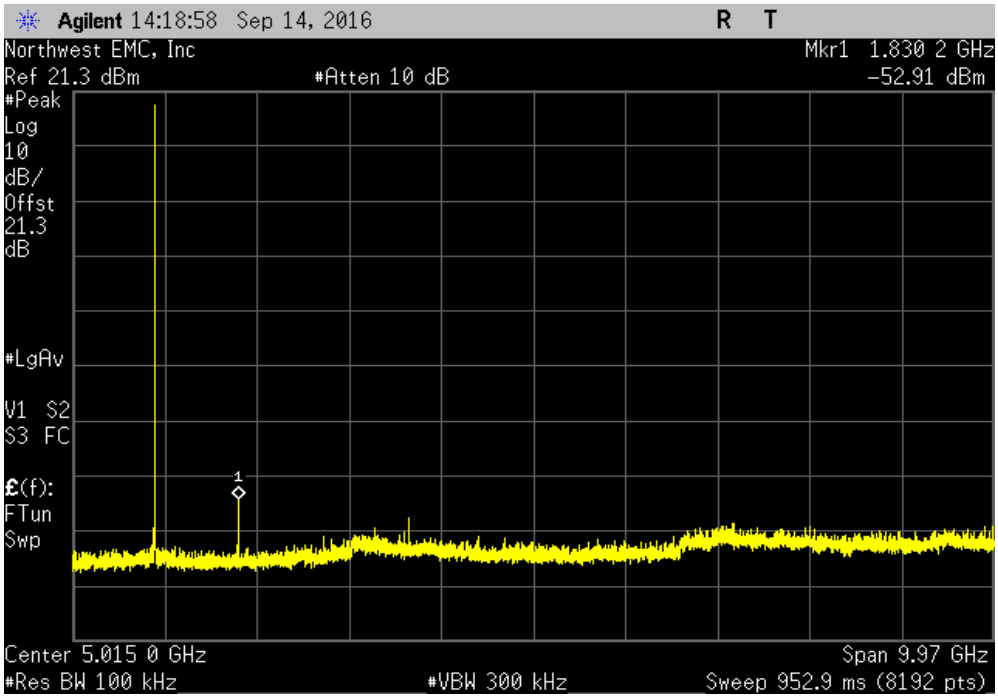
125 kHz BW Data Rate, Mid Channel, 908.7 MHz					
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 10 GHz		-71.33	-30	Pass	



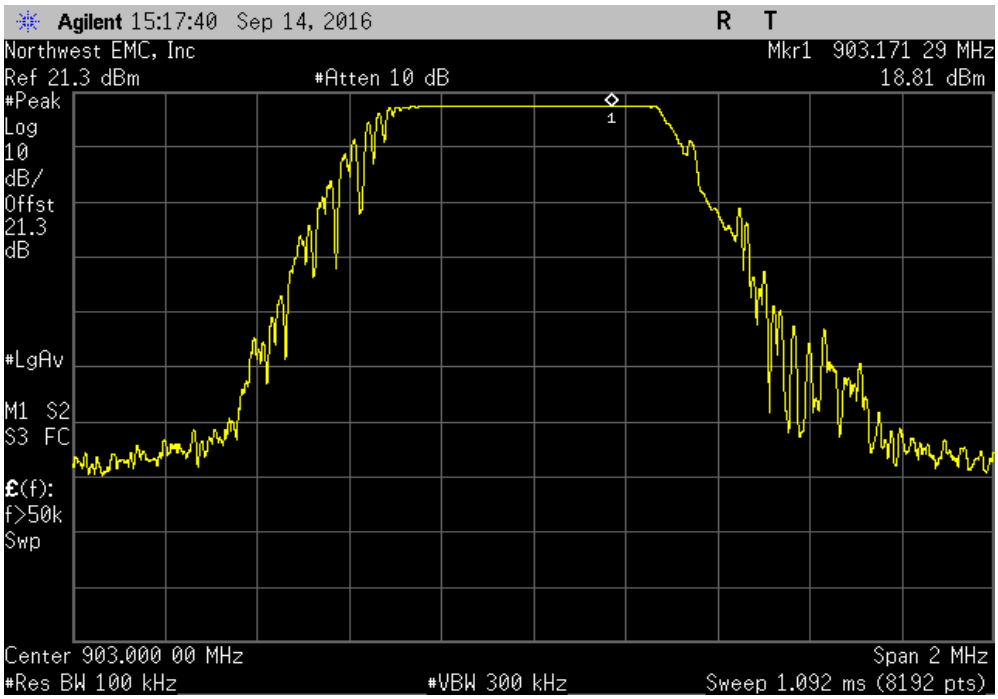
125 kHz BW Data Rate, High Channel, 914.9 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



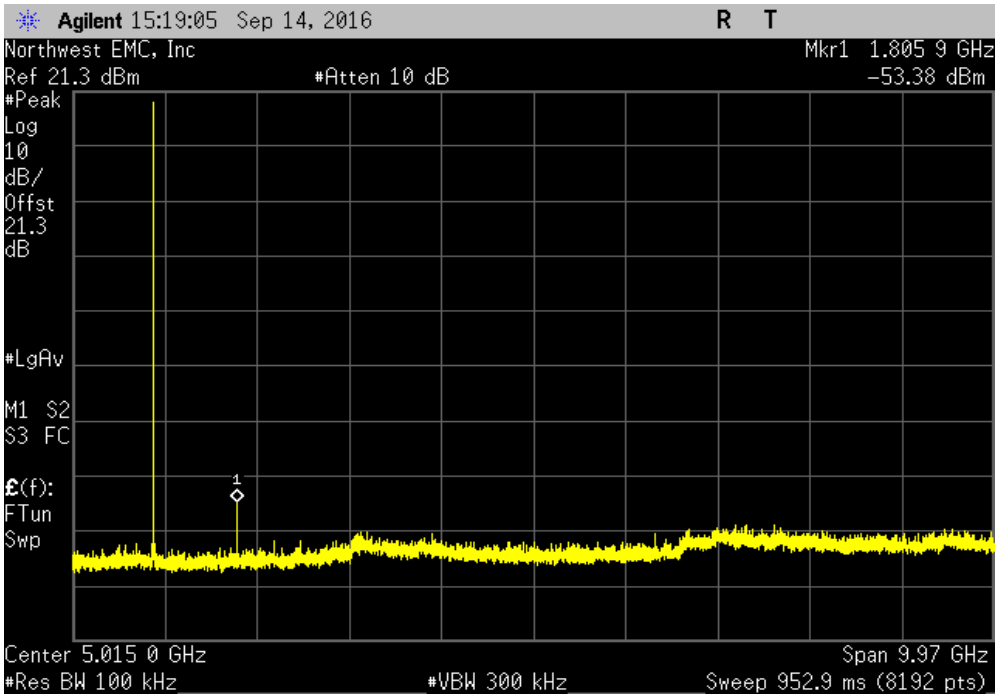
125 kHz BW Data Rate, High Channel, 914.9 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 10 GHz			-71.58	-30	Pass



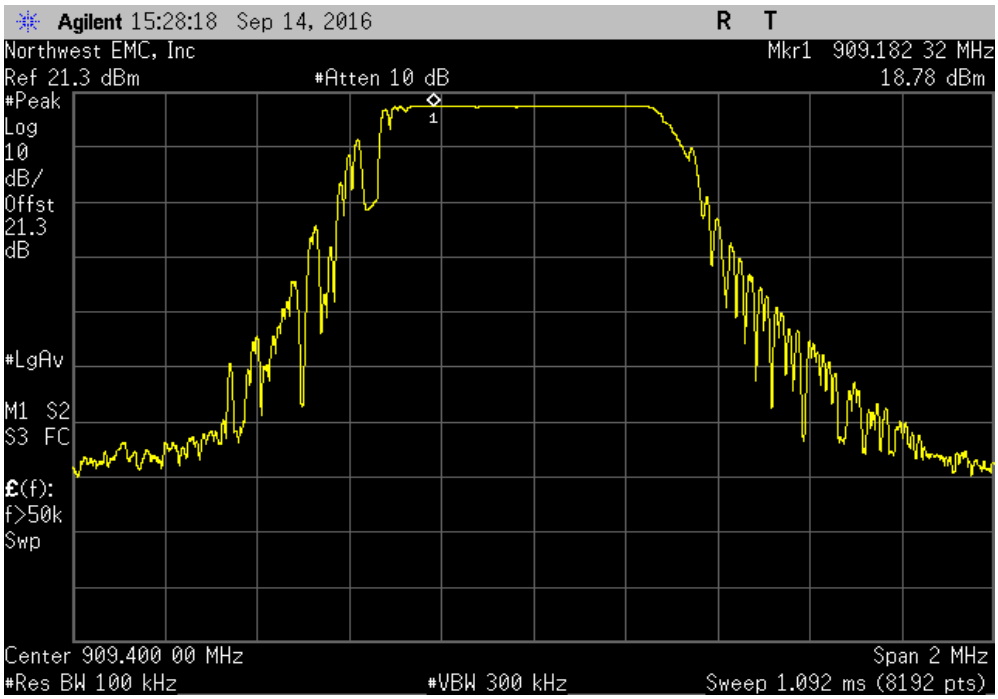
500 kHz BW Data Rate, Low Channel, 903.0 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



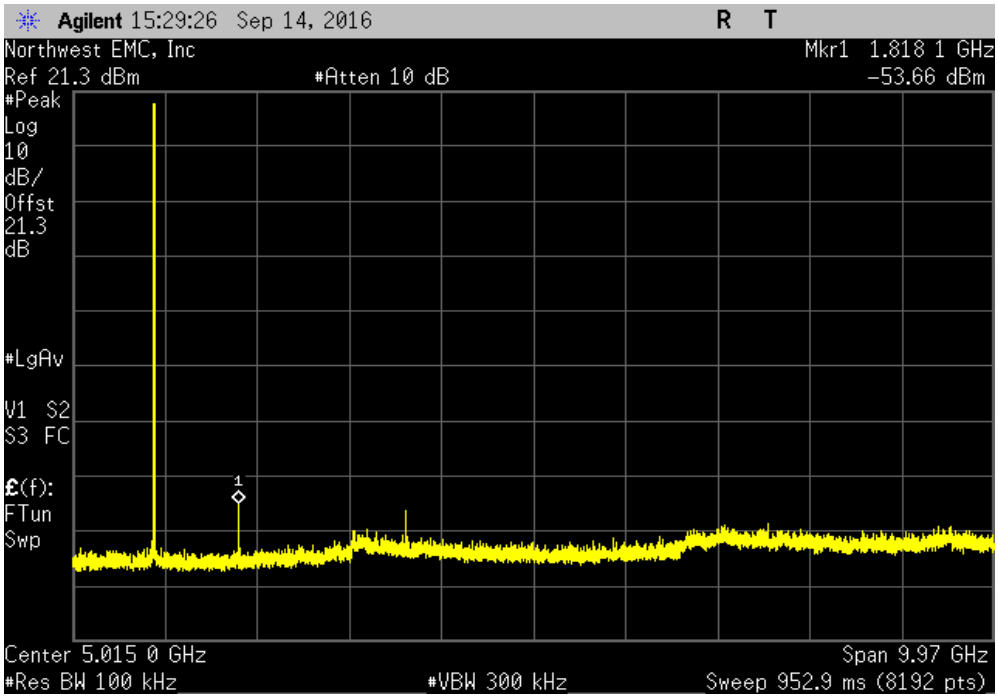
500 kHz BW Data Rate, Low Channel, 903.0 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 10 GHz			-72.19	-30	Pass



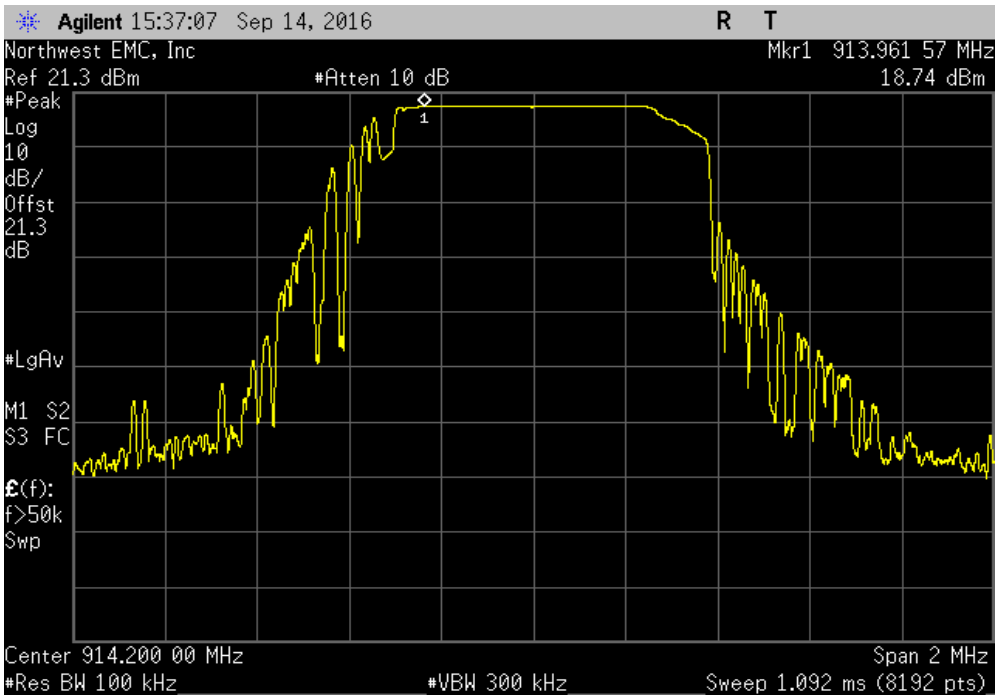
500 kHz BW Data Rate, Mid Channel, 909.4 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



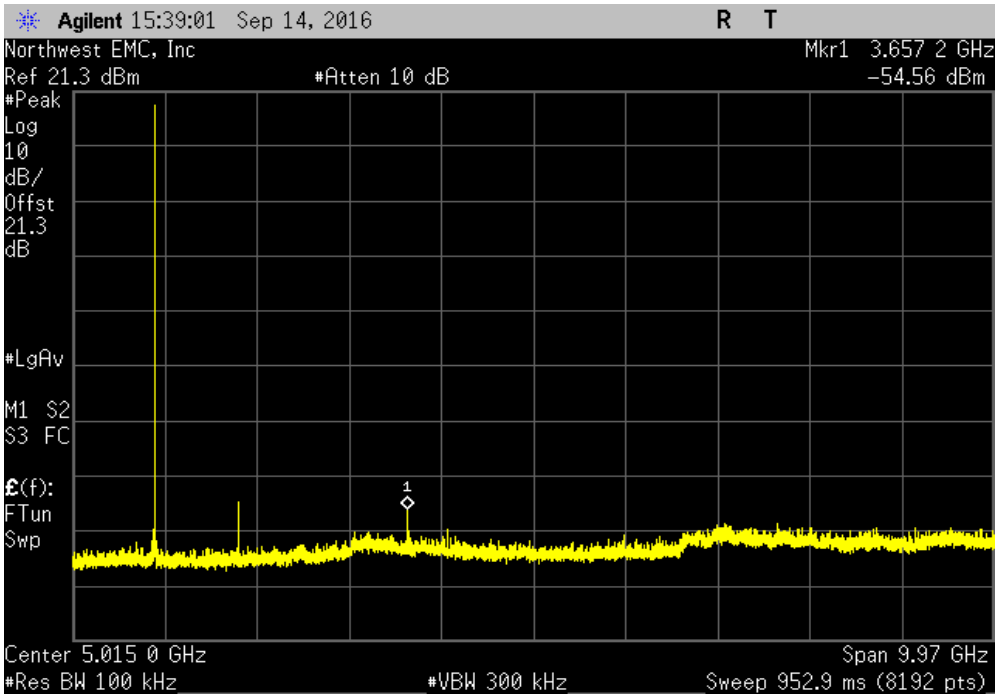
500 kHz BW Data Rate, Mid Channel, 909.4 MHz					
Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 10 GHz			-72.43	-30	Pass



500 kHz BW Data Rate, High Channel, 914.2 MHz						
	Frequency Range			Max Value (dBc)	Limit ≤ (dBc)	Result
	Fundamental			N/A	N/A	N/A



500 kHz BW Data Rate, High Channel, 914.2 MHz					
Frequency Range		Max Value (dBc)	Limit ≤ (dBc)	Result
30 MHz - 10 GHz		-73.3	-30	Pass



BAND EDGE COMPLIANCE

XMit 2016.05.06

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Generator - Signal	Agilent	N5183A	TID	11/26/2014	11/26/2017
Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	9/18/2015	9/18/2016
Attenuator	S.M. Electronics	SA26B-20	RFW	2/26/2016	2/26/2017
Block - DC	Fairview Microwave	SD3379	AMI	9/18/2015	9/18/2016
Analyzer - Spectrum Analyzer	Agilent	E4440A	AAX	3/24/2016	3/24/2017

TEST DESCRIPTION

The measurement was made using a direct connection between the RF output of the EUT and a spectrum analyzer. The spurious RF conducted emissions at the edges of the authorized band were measured with the EUT set to low and high transmit frequencies. The EUT was transmitting at the data rate(s) listed in the datasheet in a no hop mode. The channels closest to the band edges were selected.

BAND EDGE COMPLIANCE

NORTHWEST EMC

XMit 2016.05.06

EUT:	MTXDOT-NA1-A00			**Work Order:**	MLTI0058
Serial Number:	18865140			**Date:**	09/15/16
Customer:	Multi-Tech Systems, Inc.			**Temperature:**	23.2 °C
Attendees:	Marcus Glass			**Humidity:**	49% RH
Project:	None			**Barometric Pres.:**	1024 mbar
Tested by:	Dustin Sparks	**Power:**	3.3VDC	**Job Site:**	MN08

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

COMMENTS

Module powered by USB connection to laptop.

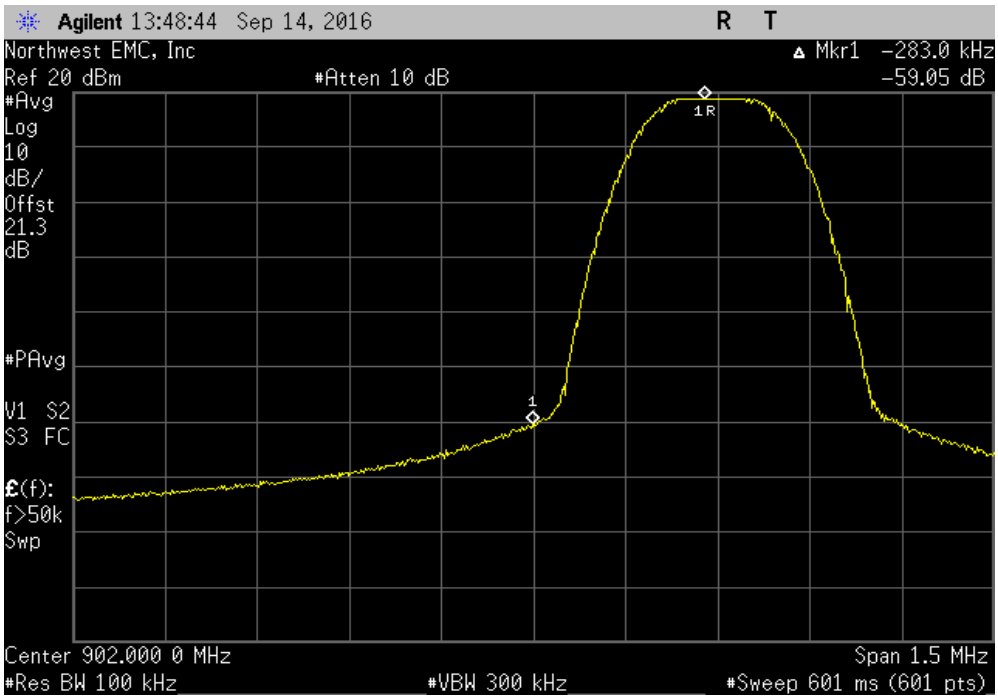
DEVIATIONS FROM TEST STANDARD

None

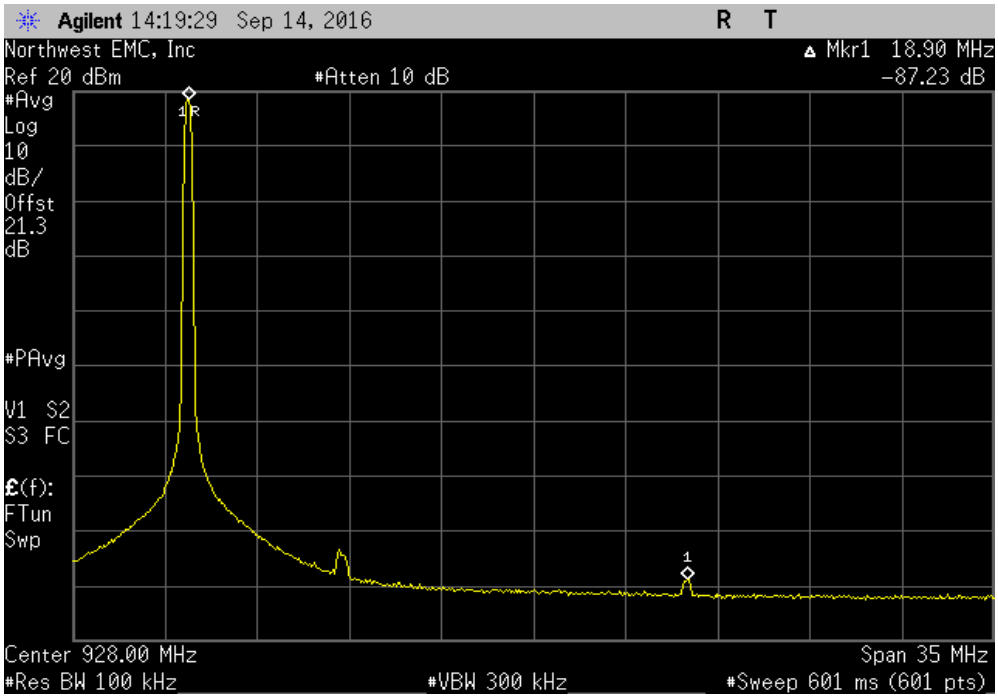
Configuration #	3	Signature Dustin Sparks

	Value (dBc)	Limit ≤ (dBc)	Result
125 kHz BW Data Rate			
Low Channel, 902.3 MHz	-59.05	-30	Pass
High Channel, 914.9 MHz	-87.23	-30	Pass
500 kHz BW Data Rate			
Low Channel, 903.0 MHz	-67.27	-30	Pass
High Channel, 914.2 MHz	-84.21	-30	Pass

125 kHz BW Data Rate, Low Channel, 902.3 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-59.05	-30	Pass



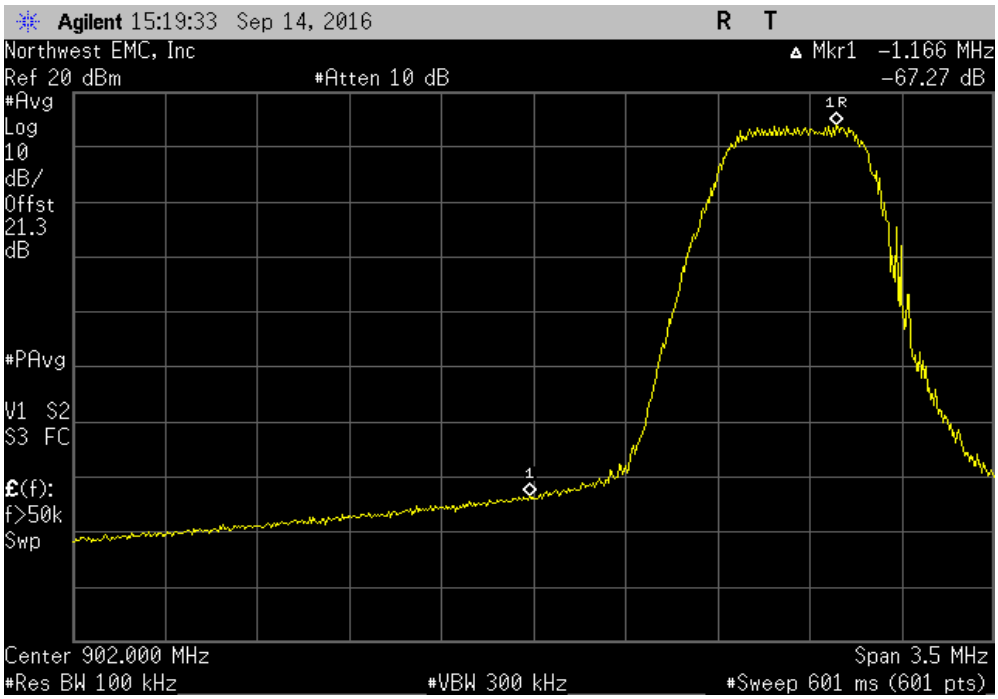
125 kHz BW Data Rate, High Channel, 914.9 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-87.23	-30	Pass



BAND EDGE COMPLIANCE

XMit 2016.05.06

500 kHz BW Data Rate, Low Channel, 903.0 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-67.27	-30	Pass



500 kHz BW Data Rate, High Channel, 914.2 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-84.21	-30	Pass