FreeWave Technologies, Inc.

GXM-T24

FCC 15.247:2013

Report #: FREW0012

Report Prepared By Northwest EMC Inc.

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

California – Minnesota – Oregon – New York – Washington

CERTIFICATE OF TEST

WTD 12.5.23

Last Date of Test: October 30, 2013
FreeWave Technologies, Inc.
Model: GXM-T24

Emissions

Test Description	Specification	Test Method	Pass/Fail
Duty Cycle	FCC 15.247:2013	ANSI C63.10:2009	Pass
Output Power	FCC 15.247:2013	ANSI C63.10:2009	Pass
Occupied Bandwidth	FCC 15.247:2013	ANSI C63.10:2009	Pass
Spurious Conducted Emissions	FCC 15.247:2013	ANSI C63.10:2009	Pass
Band Edge Compliance	FCC 15.247:2013	ANSI C63.10:2009	Pass
Band Edge Compliance-Hopping Mode	FCC 15.247:2013	ANSI C63.10:2009	Pass
Channel Spacing	FCC 15.247:2013	ANSI C63.10:2009	Pass
Number of Hopping Frequencies	FCC 15.247:2013	ANSI C63.10:2009	Pass
Dwell Time	FCC 15.247:2013	ANSI C63.10:2009	Pass
Spurious Radiated Emissions	FCC 15.247:2013	ANSI C63.10:2009	Pass
AC Powerline Conducted Emissions	FCC 15.207:2013	ANSI C63.10:2009	Pass

Deviations From Test Standards

None

Approved By:

Rod Munro, Operations Manager

NVLAP Lab Code: 200629-0

This report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government of the United States of America.

Product compliance is the responsibility of the client, therefore the tests and equipment modes of operation represented in this report were agreed upon by the client, prior to testing. This Report may only be duplicated in its entirety. The results of this test pertain only to the sample(s) tested. The specific description is noted in each of the individual sections of the test report supporting this certificate of test.

NORTHWEST EMC
REV 2012.08.02

REVISION HISTORY

Revision Number	Description	Date	Page Number
00	None		

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

NORTHWEST EMC

REV 2012.05.24

ACCREDITATIONS AND AUTHORIZATIONS

United States

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

A2LA - Accredited by A2LA to ISO / IEC Guide 65 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

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

European Union

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

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Hong Kong

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

Vietnam

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

Russia

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

SCOPE

For details on the Scopes of our Accreditations, please visit:
http://www.nwemc.com/accreditations/

MEASUREMENT UNCERTAINTY

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 listed below. 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 16-4-1 as applicable), and are available upon request.

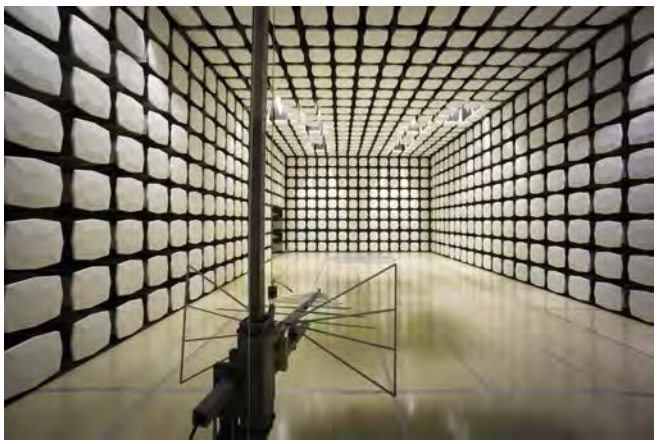
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy (Hz)	0.12	-0.01
Amplitude Accuracy (dB)	0.49	-0.49
Conducted Power (dB)	0.41	-0.41
Radiated Power via Substitution (dB)	0.69	-0.68
Temperature (degrees C)	0.81	-0.81
Humidity (% RH)	2.89	-2.89
Field Strength (dB)	3.80	-3.80
AC Powerline Conducted Emissions (dB)	2.94	-2.94

FACILITIES

REV 2013.06.28

Oregon	California	New York	Minnesota	Washington
Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Labs MN01-08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Labs NC01-05,SU02,SU07 19201 120th Ave. NE Bothell, WA 98011 (425) 984-6600
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-*2*	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1
NVLAP				
NVLAP Lab Code: 200630-0	NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200629-0



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

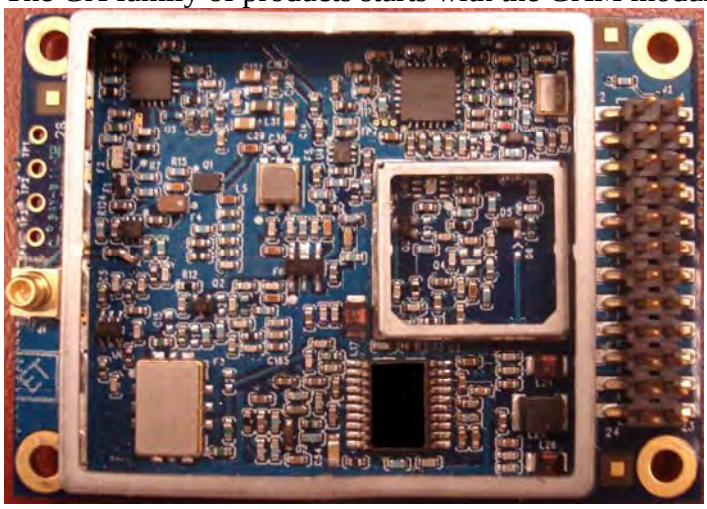
Company Name:	FreeWave Technologies, Inc.
Address:	5395 Pearl Parkway, Suite 100
City, State, Zip:	Boulder, CO 80301
Test Requested By:	Dean Busch
Model:	GXM-T24
First Date of Test:	October 29, 2013
Last Date of Test:	October 30, 2013
Receipt Date of Samples:	October 24, 2013
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):
2.4 GHz FHSS radio module with 2 antenna types.

Testing Objective:
To demonstrate compliance to FCC 15.247 requirements.

The GX family of products starts with the GXM module with RF Shield removed.



The family of the GXM models all consist of a GXM module and an interface as explained here after.

GXM-T14 or GXM-T24 Radio These devices are rated at 3.3-5VDC and are aimed at OEM markets. The only difference between these two radios is the interface connector. The GXM-T14 has a 14-pin interface connector, while the GXM-T24 has a 24-pin interface connector. The 14-pin connector provides Power and TTL data connections (in an RS-232 format) to the radio. The 24-pin and adds a diagnostic port and other control lines.

GXM-14 Top and Bottom (14-pin interface connector, 3.3-5VDC)

GXM-24 Top and Bottom (24-pin interface connector, 3.3-5VDC)

CONFIGURATIONS

Configuration FREW0012- 6

Software/Firmware Running during test	
Description	**Version**
Embedded	2.7 B

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Radio Module	FreeWave Technologies, Inc.	GXM-T24	245-4495

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adaptor	None	KSAC1200080W1US	None
Remote Laptop	Dell	E6520	1GZRDV1
Development Board	FreeWave Technologies, Inc.	MM2-DEVKIT-LT	856-9418

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
DC Power	No	1.8m	Yes	AC Adaptor	Test Board
Serial to USB	Yes	1.7m	No	Test Board	Remote PC
MMCX to SMA Jumper Cable	Yes	0.1m	No	Industrial Radio	Coaxial Connection
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

Configuration FREW0012- 7

Software/Firmware Running during test	
Description	**Version**
Embedded	2.7 B

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Radio Module	FreeWave Technologies, Inc.	GXM-T24	245-4495

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adaptor	None	KSAC1200080W1US	None
4dBi Yagi Antenna	FreeWave Technologies, Inc.	EAN 2400 YC	None
Development Board	FreeWave Technologies, Inc.	MM2-DEVKIT-LT	856-9418

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Coaxial Cable	Yes	6m	No	Industrial Radio	MAXRAD 2.4 GHz 8dB Gain Antenna
DC Power	No	1.8m	Yes	AC Adaptor	Enclosure
MMCX to SMA Jumper Cable	Yes	0.1m	No	Industrial Radio	Coaxial Connection
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

CONFIGURATIONS

Configuration FREW0012- 8

Software/Firmware Running during test	
Description	**Version**
Embedded	2.7 B

EUT			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
Radio Module	FreeWave Technologies, Inc.	GXM-T24	245-4495

Peripherals in test setup boundary			
Description	**Manufacturer**	**Model/Part Number**	**Serial Number**
AC Adaptor	None	KSAC1200080W1US	None
Development Board	FreeWave Technologies, Inc.	MM2-DEVKIT-LT	856-9418
5dBi Omni Directional Antenna	PCTEL	MAXC24505	None

Cables					
Cable Type	**Shield**	**Length (m)**	**Ferrite**	**Connection 1**	**Connection 2**
Coaxial Cable	Yes	6m	No	Industrial Radio	MAXRAD 2.4 GHz 8dB Gain Antenna
DC Power	No	1.8m	Yes	AC Adaptor	Enclosure
MMCX to SMA Jumper Cable	Yes	0.1m	No	Industrial Radio	Coaxial Connection
PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.					

MODIFICATIONS

WTD 12.5.23

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	10/29/2013	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	10/29/2013	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.
3	10/29/2013	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.
4	10/29/2013	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.
5	10/29/2013	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	10/29/2013	Channel 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.
7	10/29/2013	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.
8	10/29/2013	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.
9	10/29/2013	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.
10	10/29/2013	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
11	10/30/2013	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

Duty Cycle

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Signal Generator	Agilent	N5183A	TIA	1/27/2012	36
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	7/3/2013	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

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.

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

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

If the transmit duty cycle < 98 percent, burst gating was used during some of the other tests in this report to only measure during the burst duration.

EUT Output Power was set to 27dBm, and an attenuator and DC block were in line for all measurements.

Duty Cycle

EUT:	GXM-T24			**Work Order:**	FREW0012
Serial Number:	245-4495			**Date:**	10/29/13
Customer:	FreeWave Technologies, Inc.			**Temperature:**	24°C
Attendees:	Dean Busch			**Humidity:**	29%
Project:	None			**Barometric Pres.:**	1017
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.247:2013	ANSI C63.10:2009

COMMENTS

Non Hopping Mode. Adapter cable loss of 0.34dB added to reference level offsett. EUT output power set at 27dBm. Connected to development board and remote PC. EUT powered by 5 VDC supplied by development board via AC mains.

DEVIATIONS FROM TEST STANDARD

None

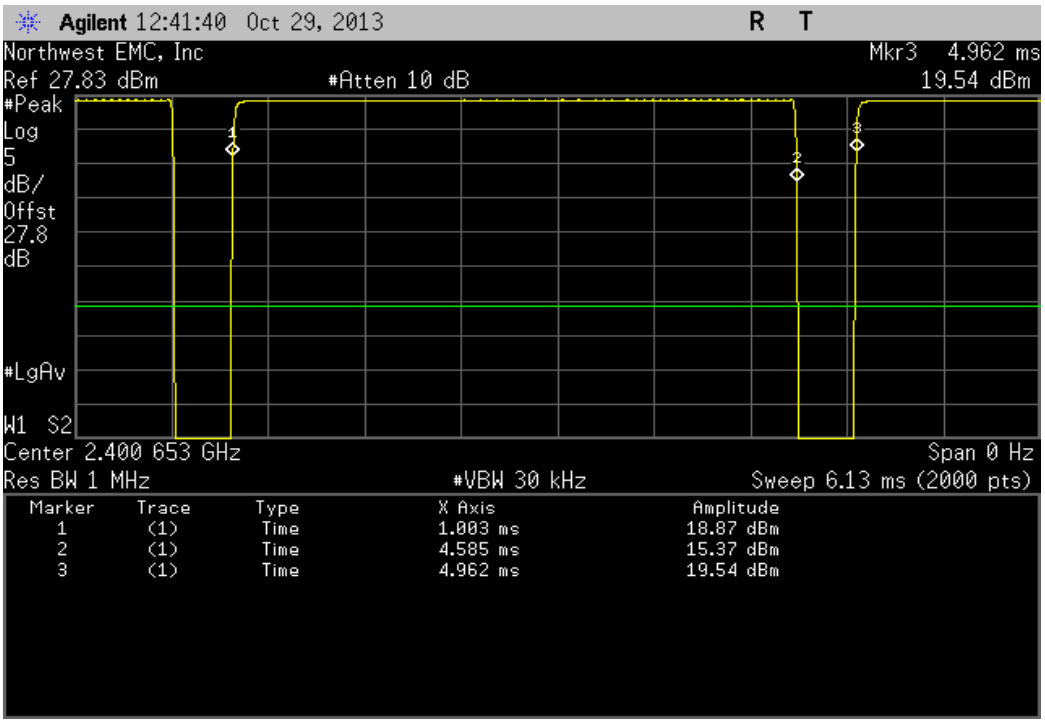
Configuration #	6	Signature

		Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
115.2 kbps, GFSK							
	Low Channel 1, 2400.6528 MHz	3.582 mS	3.959 mS	1	90.5	N/A	N/A
	Low Channel 1, 2400.6528 MHz	N/A	N/A	5	N/A	N/A	N/A
	Mid Channel 120, 2441.7792 MHz	3.582 mS	3.956 mS	1	90.5	N/A	N/A
	Mid Channel 120, 2441.7792 MHz	N/A	N/A	5	N/A	N/A	N/A
	High Channel 237, 2482.2144 MHz	3.582 mS	3.959 mS	1	90.5	N/A	N/A
	High Channel 237, 2482.2144 MHz	N/A	N/A	5	N/A	N/A	N/A
153.6 kbps, GFSK							
	Low Channel 1, 2400.6528 MHz	3.582 mS	3.959 mS	1	90.5	N/A	N/A
	Low Channel 1, 2400.6528 MHz	N/A	N/A	5	N/A	N/A	N/A
	Mid Channel 120, 2441.7792 MHz	3.582 mS	3.956 mS	1	90.5	N/A	N/A
	Mid Channel 120, 2441.7792 MHz	N/A	N/A	5	N/A	N/A	N/A
	High Channel 237, 2482.2144 MHz	3.582 mS	3.956 mS	1	90.5	N/A	N/A
	High Channel 237, 2482.2144 MHz	N/A	N/A	5	N/A	N/A	N/A

Duty Cycle

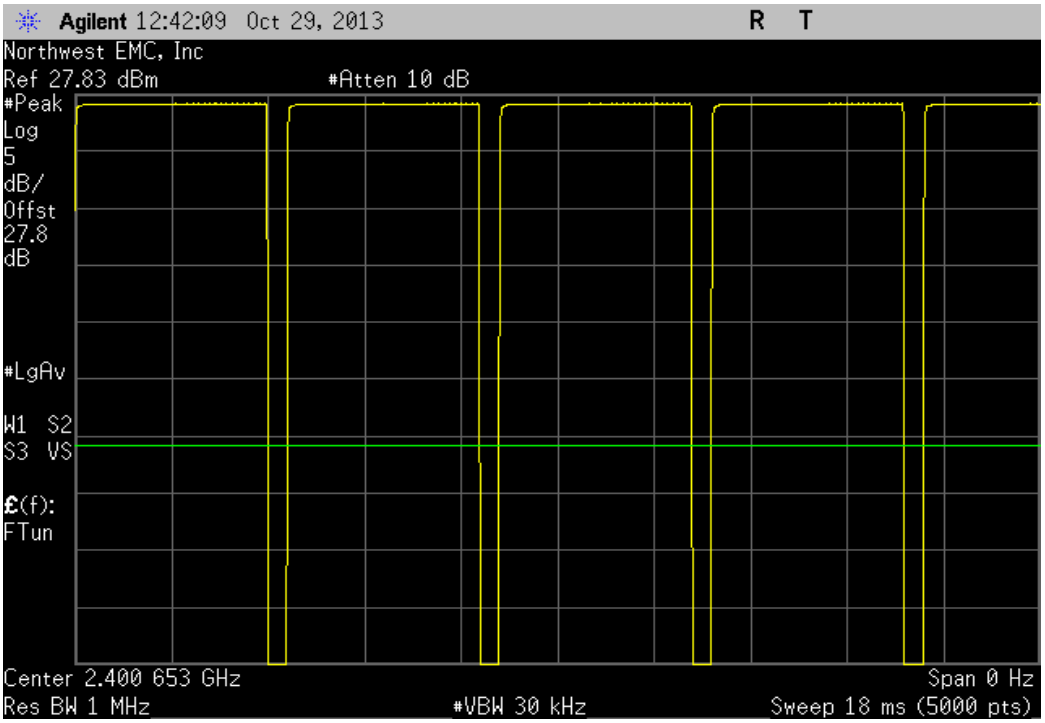
115.2 kbps, GFSK, Low Channel 1, 2400.6528 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
3.582 mS	3.959 mS	1	90.5	N/A	N/A



115.2 kbps, GFSK, Low Channel 1, 2400.6528 MHz

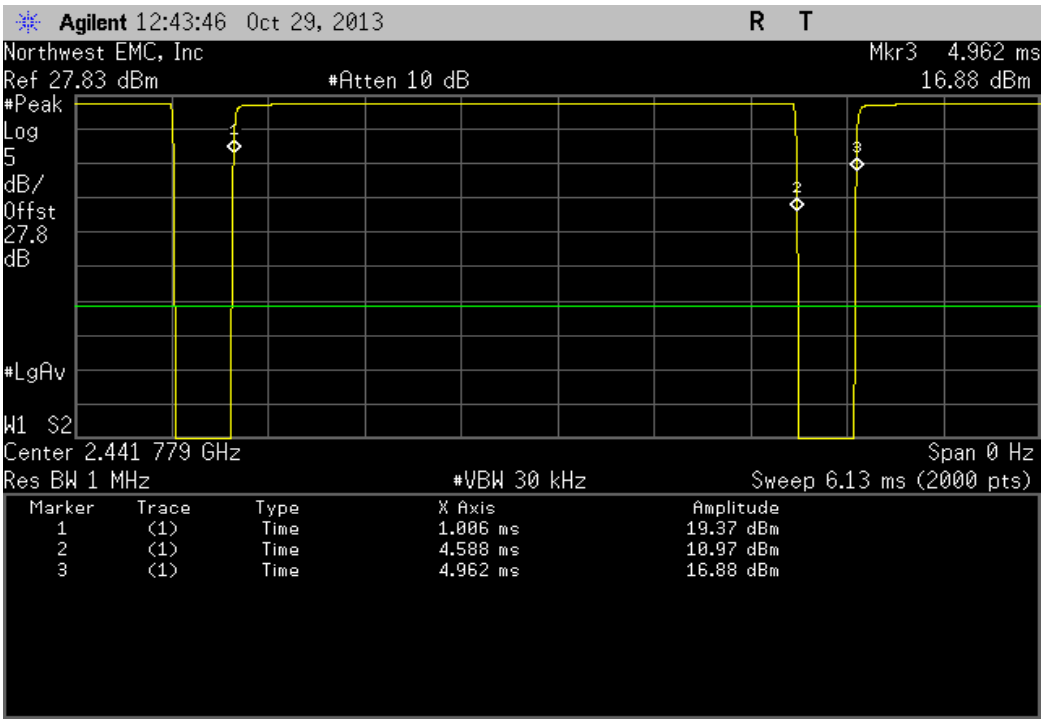
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
N/A	N/A	5	N/A	N/A	N/A



Duty Cycle

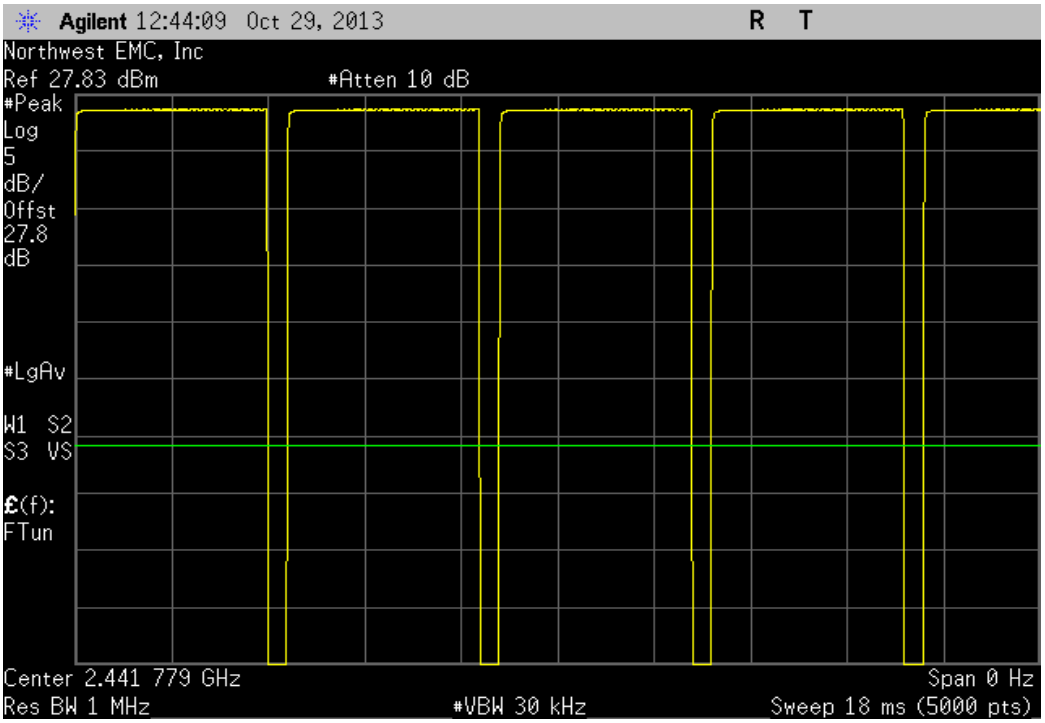
115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz

	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	3.582 mS	3.956 mS	1	90.5	N/A	N/A



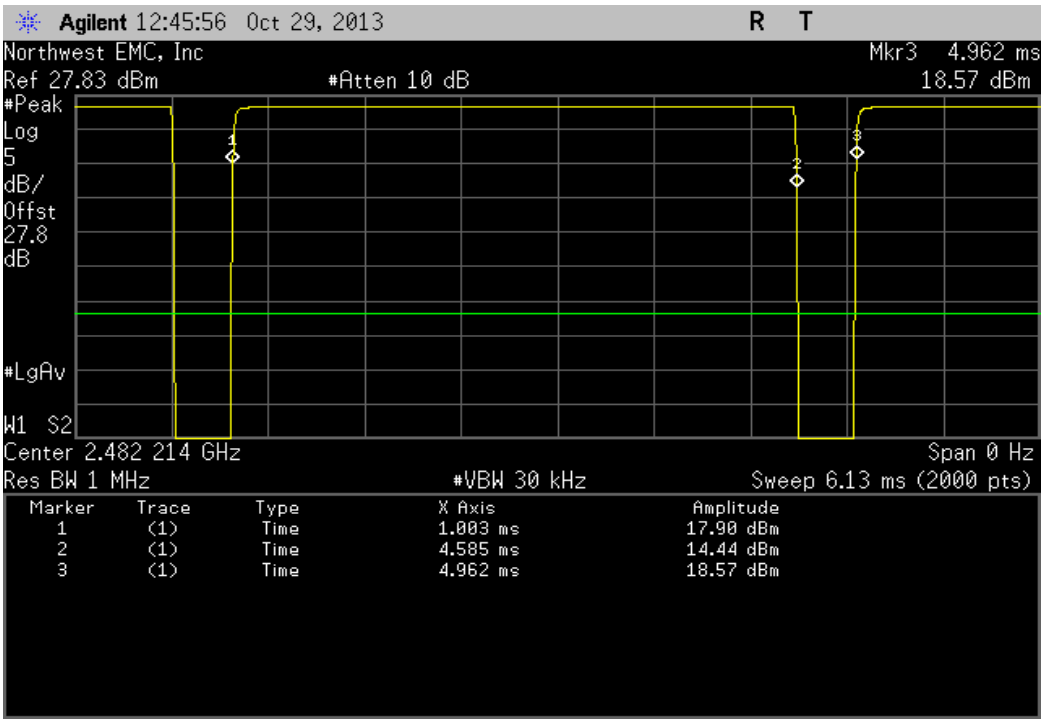
115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz

	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	N/A	N/A	5	N/A	N/A	N/A



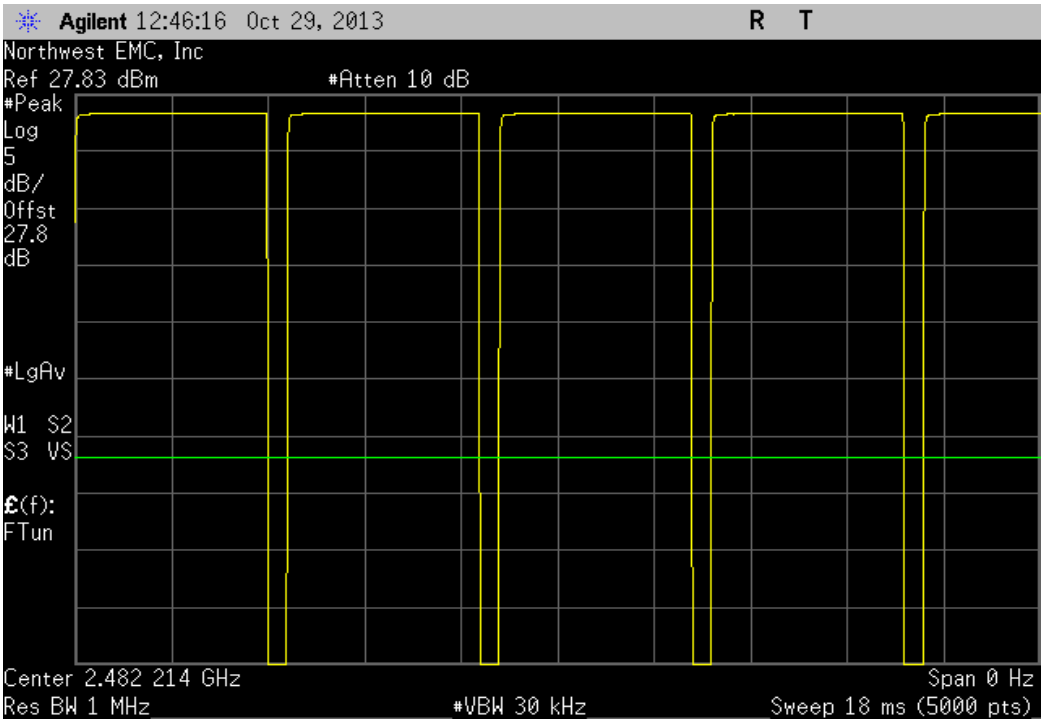
115.2 kbps, GFSK, High Channel 237, 2482.2144 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
3.582 mS	3.959 mS	1	90.5	N/A	N/A



115.2 kbps, GFSK, High Channel 237, 2482.2144 MHz

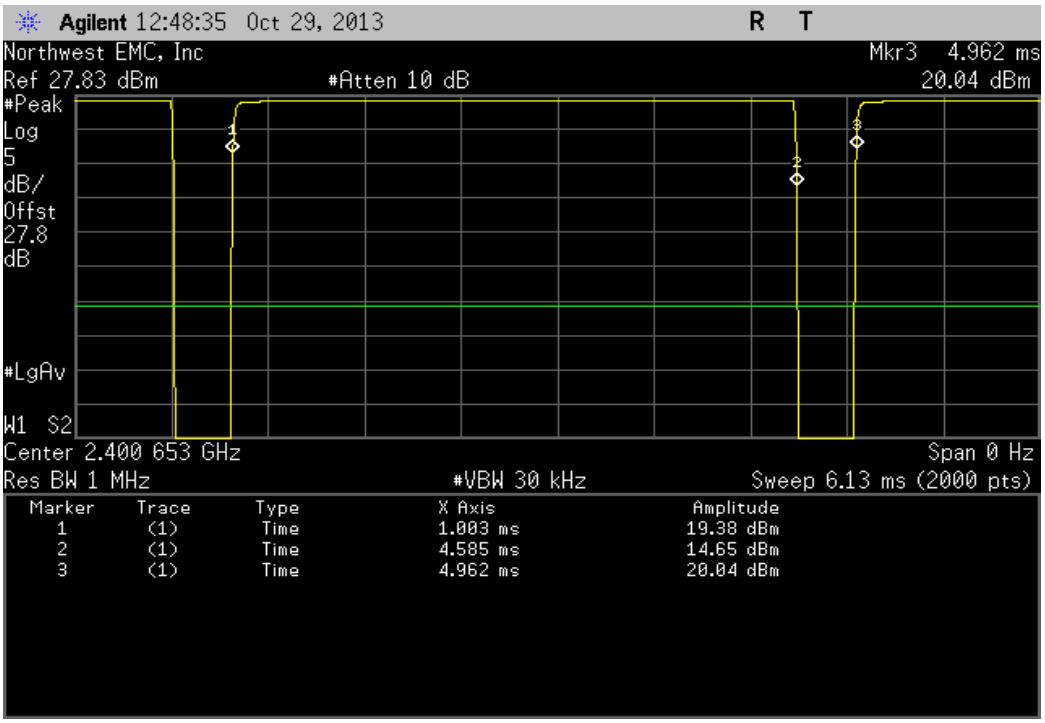
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
N/A	N/A	5	N/A	N/A	N/A



Duty Cycle

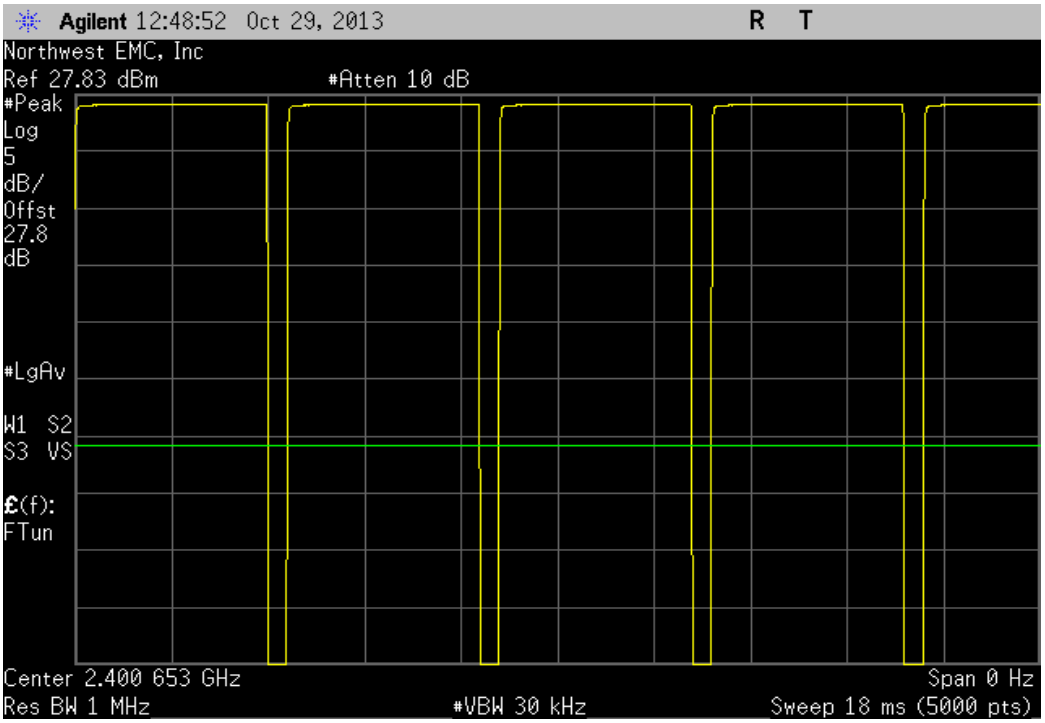
153.6 kbps, GFSK, Low Channel 1, 2400.6528 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
3.582 mS	3.959 mS	1	90.5	N/A	N/A



153.6 kbps, GFSK, Low Channel 1, 2400.6528 MHz

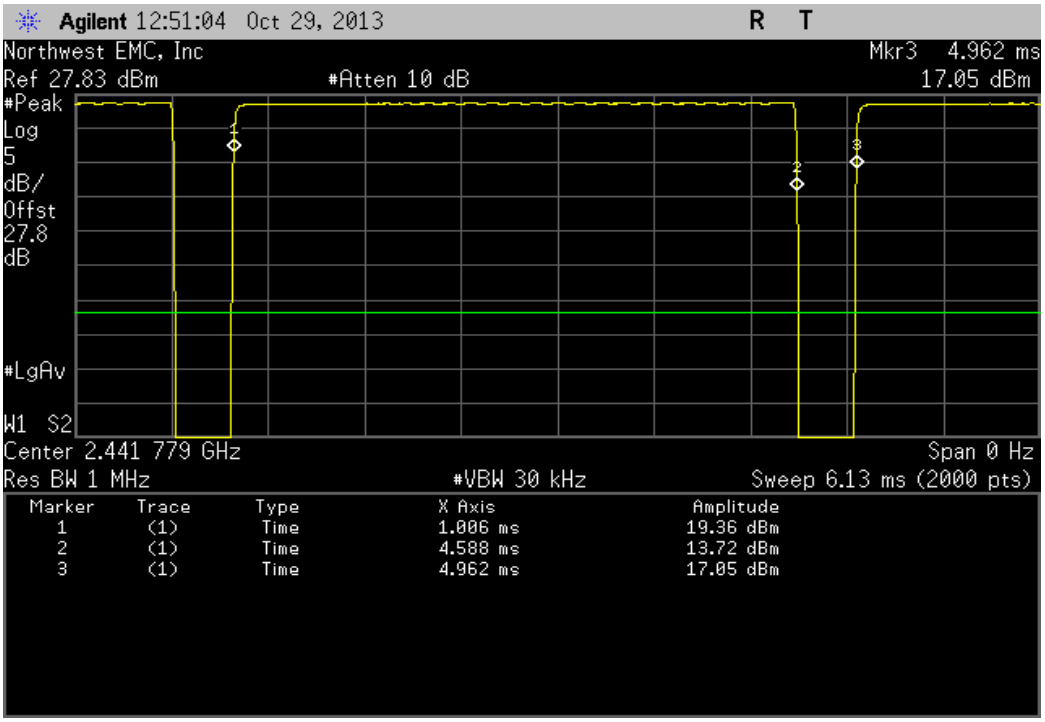
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
N/A	N/A	5	N/A	N/A	N/A



Duty Cycle

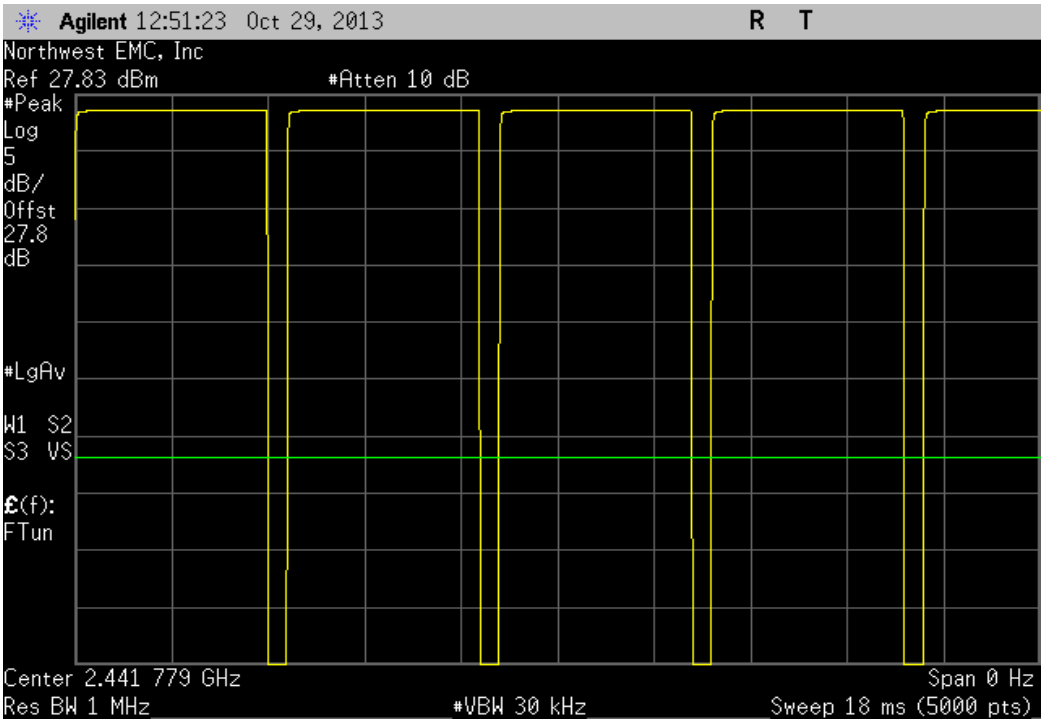
153.6 kbps, GFSK, Mid Channel 120, 2441.7792 MHz

Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
3.582 mS	3.956 mS	1	90.5	N/A	N/A



153.6 kbps, GFSK, Mid Channel 120, 2441.7792 MHz

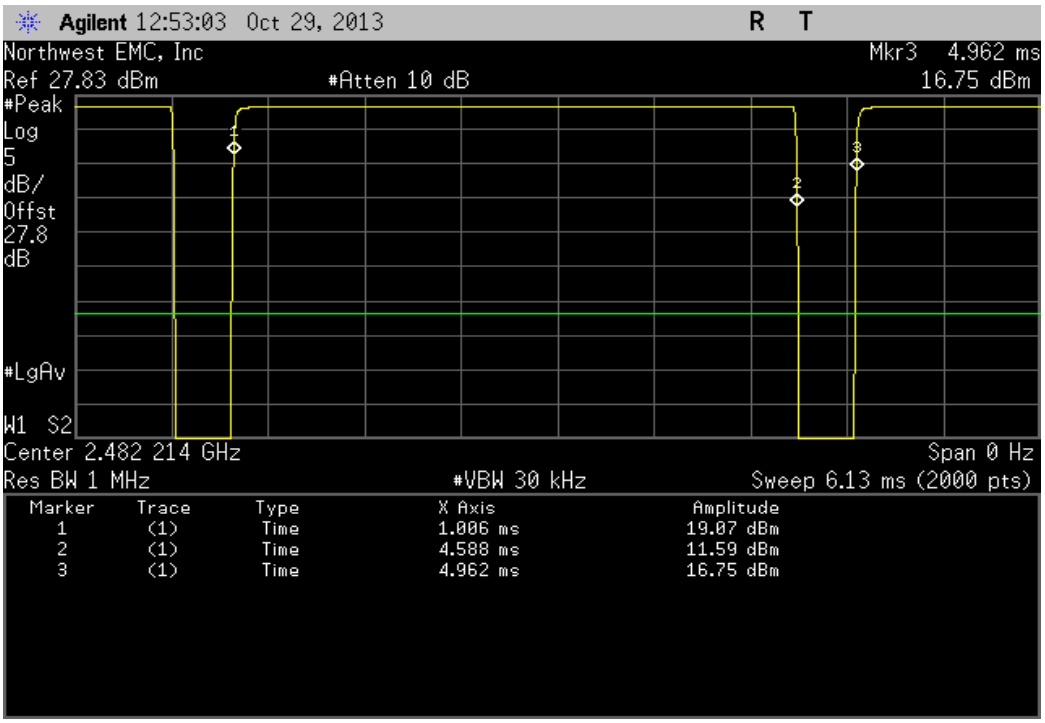
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
N/A	N/A	5	N/A	N/A	N/A



Duty Cycle

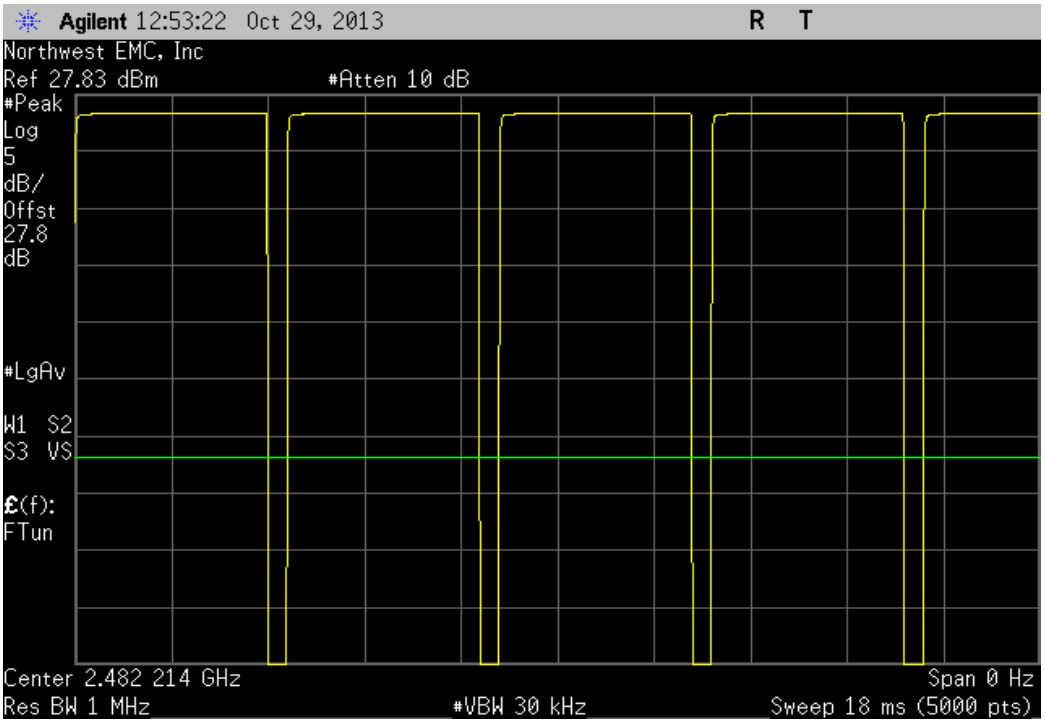
153.6 kbps, GFSK, High Channel 237, 2482.2144 MHz

	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	3.582 mS	3.956 mS	1	90.5	N/A	N/A



153.6 kbps, GFSK, High Channel 237, 2482.2144 MHz

	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
	N/A	N/A	5	N/A	N/A	N/A



Output Power

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Signal Generator	Agilent	N5183A	TIA	1/27/2012	36
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	7/3/2013	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

The transmit frequency was set to the required channels in each band. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. The reference level offset on the spectrum analyzer was adjusted to compensate for cable loss and the external attenuation used between the RF output and the spectrum analyzer input. EUT Output Power was set to 27dBm, and an attenuator and DC block were in line for all measurements.

Method Option 1 found in KDB 558074 DTS D01 Measurement Section 8.1.1 was used because the RBW on the analyzer was greater than the Emission Bandwidth of the radio.

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

Output Power

EUT:	GXM-T24			**Work Order:**	FREW0012
Serial Number:	245-4495			**Date:**	10/29/13
Customer:	FreeWave Technologies, Inc.			**Temperature:**	24°C
Attendees:	Dean Busch			**Humidity:**	29%
Project:	None			**Barometric Pres.:**	1017
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.247:2013	ANSI C63.10:2009

COMMENTS

Non Hopping Mode. Transmitting at max imum Duty Cycle. Adapter cable loss of 0.34dB added to reference level offsett. EUT output power set at 27dBm. Connected to development board and remote PC. EUT powered by 5 VDC supplied by development board via AC mains.

DEVIATIONS FROM TEST STANDARD

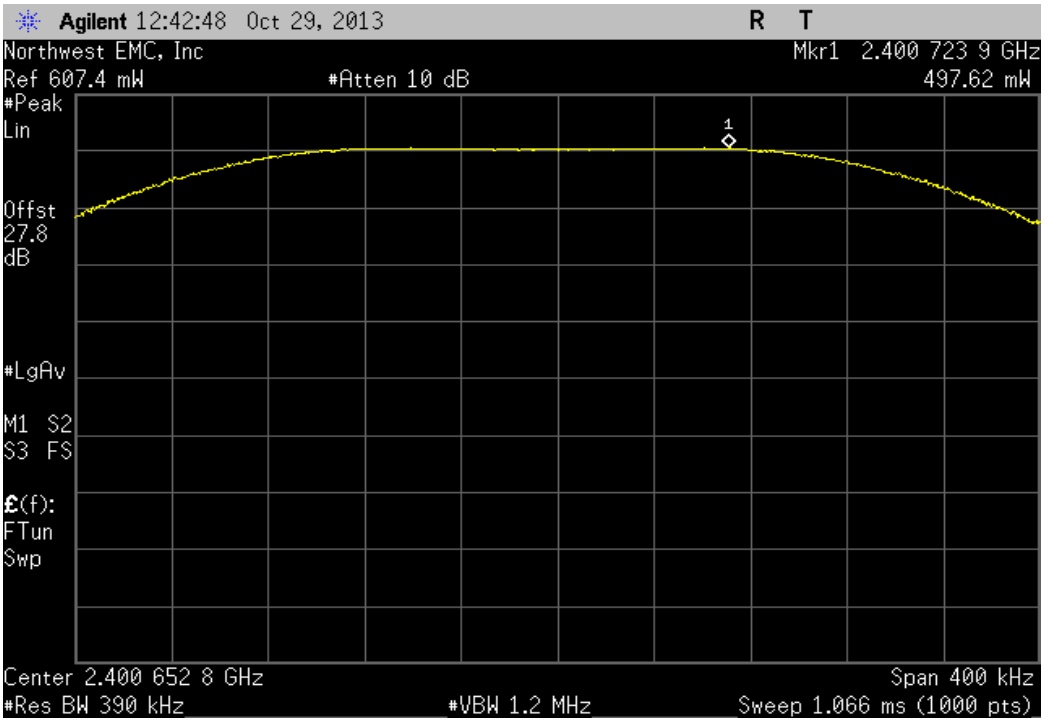
None

Configuration #	6	Signature

		Value	Limit	Result
115.2 kbps, GFSK				
	Low Channel 1, 2400.6528 MHz	497.622 mW	< 1 W	Pass
	Mid Channel 120, 2441.7792 MHz	445.759 mW	< 1 W	Pass
	High Channel 237, 2482.2144 MHz	413.428 mW	< 1 W	Pass
153.6 kbps, GFSK				
	Low Channel 1, 2400.6528 MHz	491.473 mW	< 1 W	Pass
	Mid Channel 120, 2441.7792 MHz	441.469 mW	< 1 W	Pass
	High Channel 237, 2482.2144 MHz	413.238 mW	< 1 W	Pass

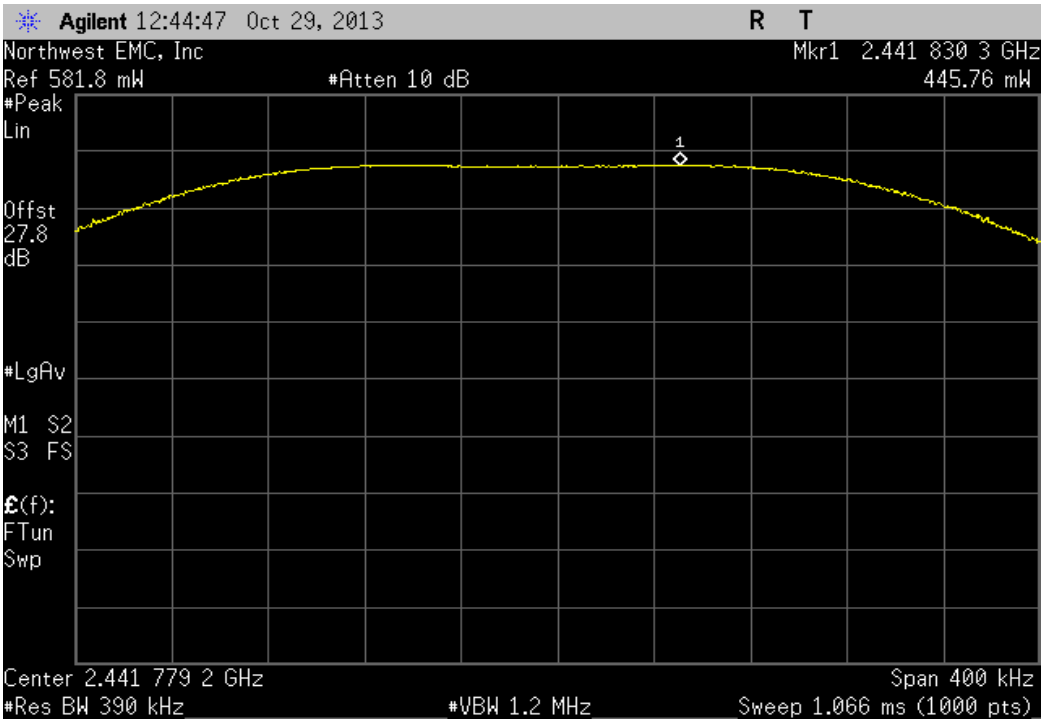
115.2 kbps, GFSK, Low Channel 1, 2400.6528 MHz

				Value	Limit	Result
				497.622 mW	< 1 W	Pass



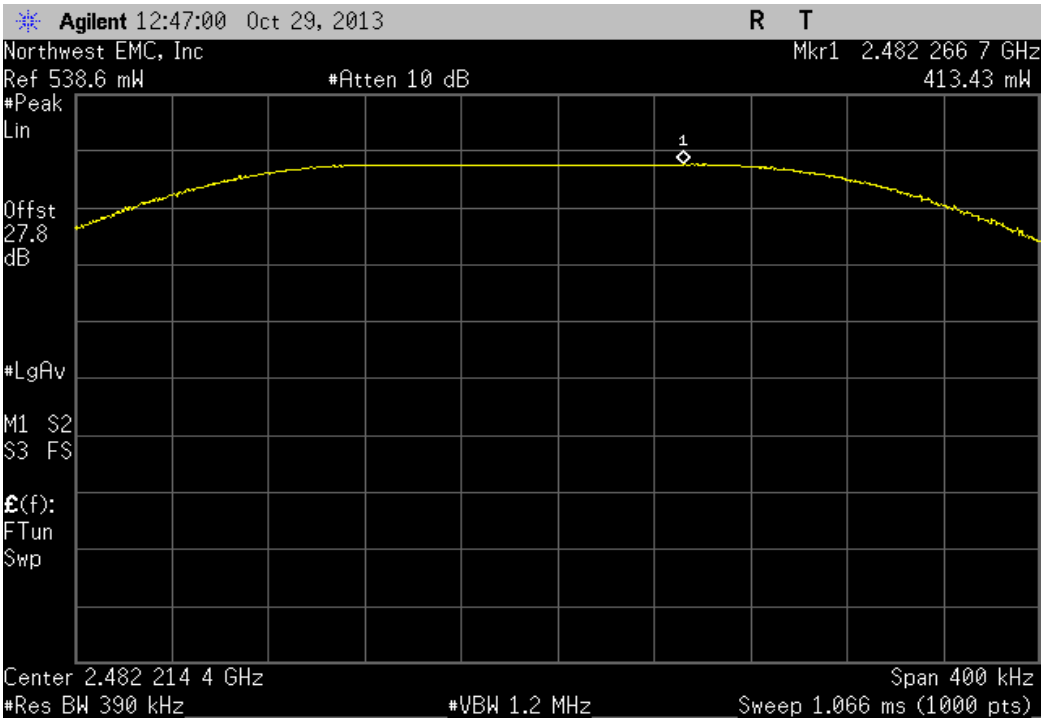
115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz

				Value	Limit	Result
				445.759 mW	< 1 W	Pass



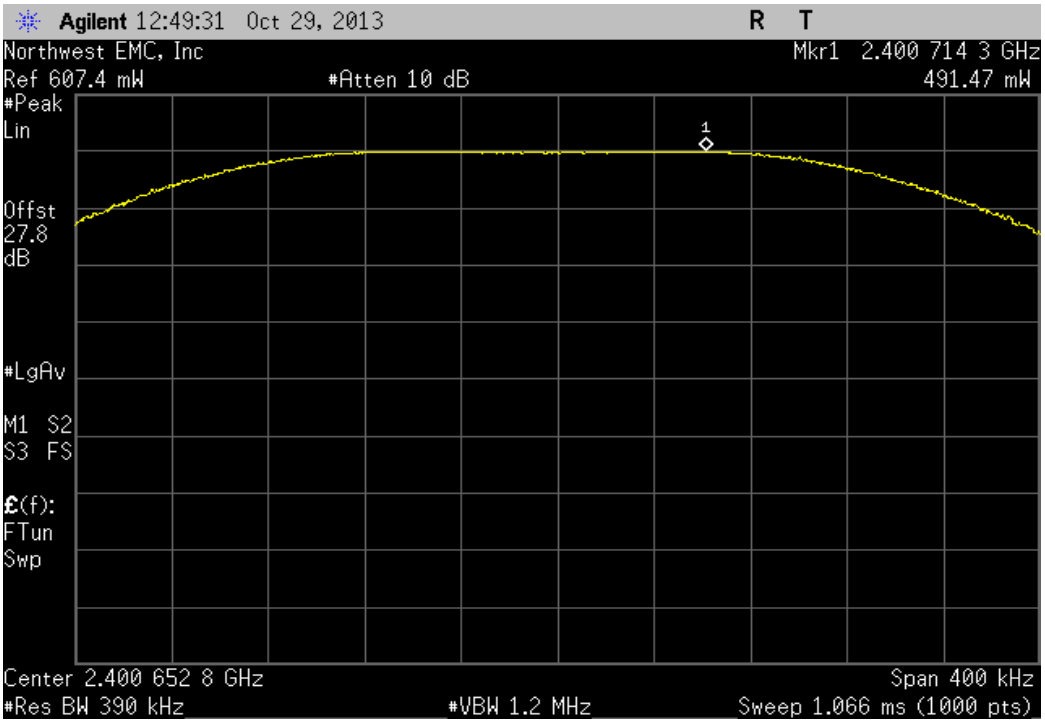
115.2 kbps, GFSK, High Channel 237, 2482.2144 MHz

				Value	Limit	Result
				413.428 mW	< 1 W	Pass



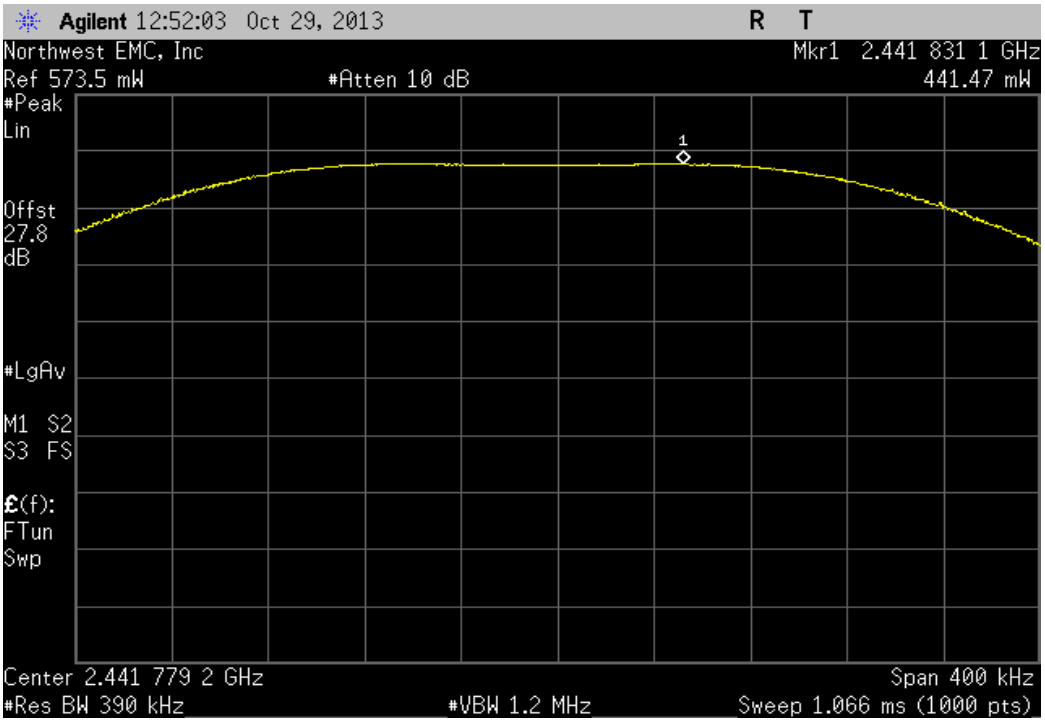
153.6 kbps, GFSK, Low Channel 1, 2400.6528 MHz

				Value	Limit	Result
				491.473 mW	< 1 W	Pass



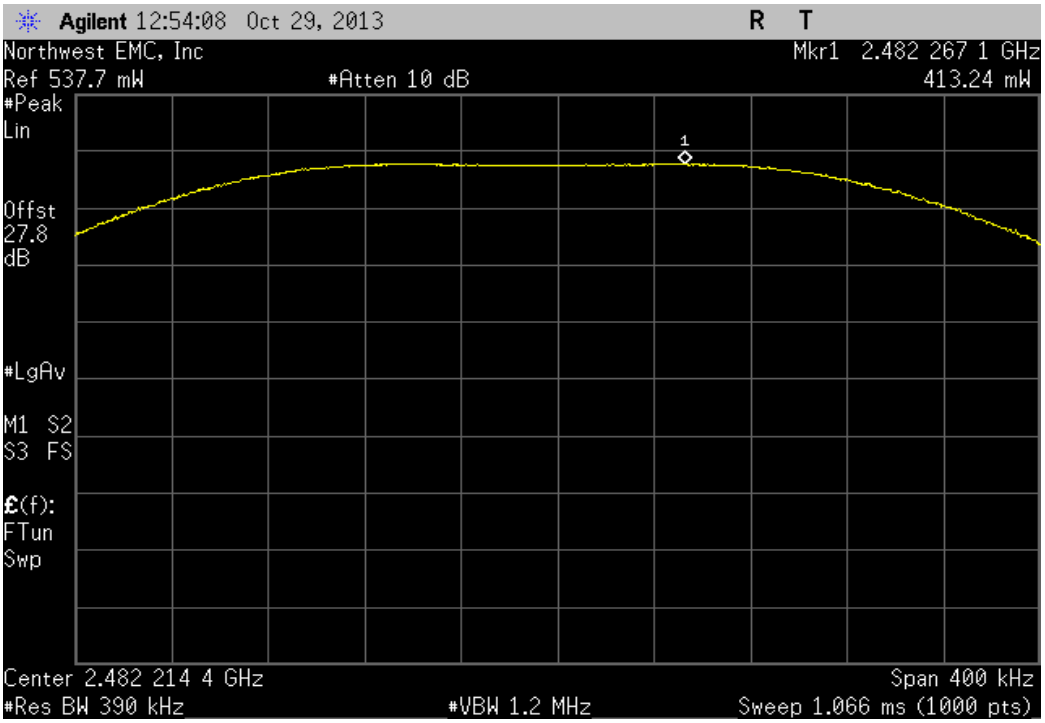
153.6 kbps, GFSK, Mid Channel 120, 2441.7792 MHz

				Value	Limit	Result
				441.469 mW	< 1 W	Pass



153.6 kbps, GFSK, High Channel 237, 2482.2144 MHz

				Value	Limit	Result
				413.238 mW	< 1 W	Pass



Occupied Bandwidth

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Signal Generator	Agilent	N5183A	TIA	1/27/2012	36
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	7/3/2013	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

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

EUT Output Power was set to 27dBm, and an attenuator and DC block were in line for all measurements.

Occupied Bandwidth

EUT:	GXM-T24			**Work Order:**	FREW0012
Serial Number:	245-4495			**Date:**	10/29/13
Customer:	FreeWave Technologies, Inc.			**Temperature:**	24°C
Attendees:	Dean Busch			**Humidity:**	29%
Project:	None			**Barometric Pres.:**	1017
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.247:2013	ANSI C63.10:2009

COMMENTS

Non Hopping Mode. Transmitting at max imum Duty Cycle. Adapter cable loss of 0.34dB added to reference level offsett. EUT output power set at 27dBm. Connected to development board and remote PC. EUT powered by 5 VDC supplied by development board via AC mains.

DEVIATIONS FROM TEST STANDARD

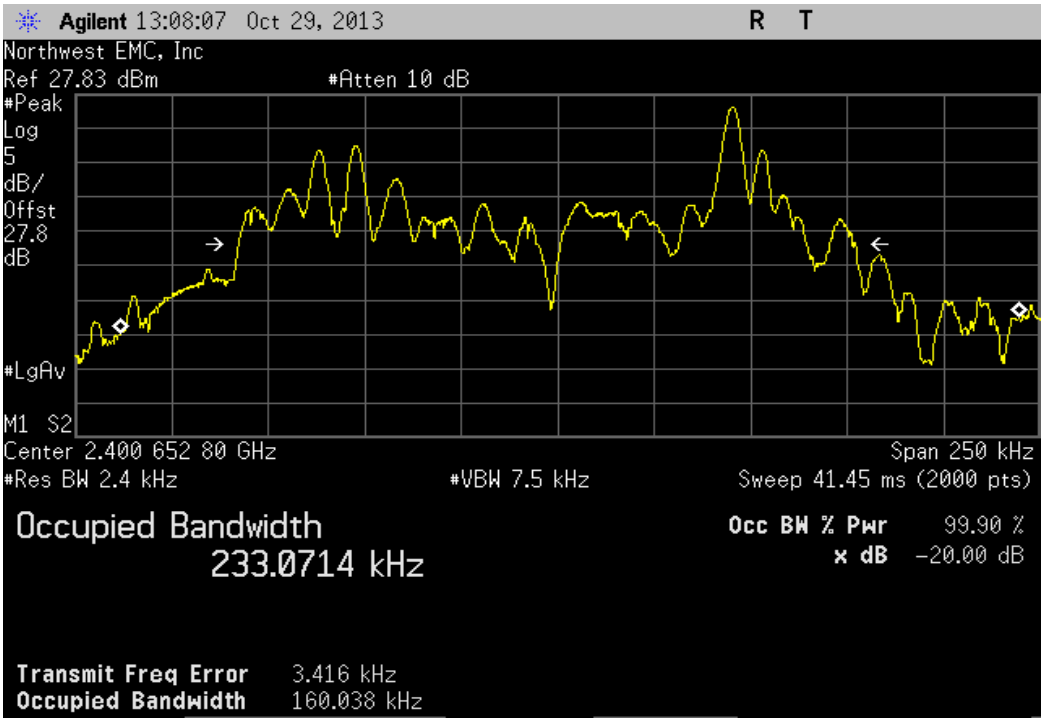
None

Configuration #	6	Signature

		Value	Limit	Result
115.2 kbps, GFSK				
	Low Channel 1, 2400.6528 MHz	160.038 kHz	< 1.0 MHz	Pass
	Mid Channel 120, 2441.7792 MHz	160.294 kHz	< 1.0 MHz	Pass
	High Channel 237, 2482.2144 MHz	158.293 kHz	< 1.0 MHz	Pass
153.6 kbps, GFSK				
	Low Channel 1, 2400.6528 MHz	153.204 kHz	< 1.0 MHz	Pass
	Mid Channel 120, 2441.7792 MHz	161.845 kHz	< 1.0 MHz	Pass
	High Channel 237, 2482.2144 MHz	156.087 kHz	< 1.0 MHz	Pass

115.2 kbps, GFSK, Low Channel 1, 2400.6528 MHz

				Value	Limit	Result
				160.038 kHz	< 1.0 MHz	Pass

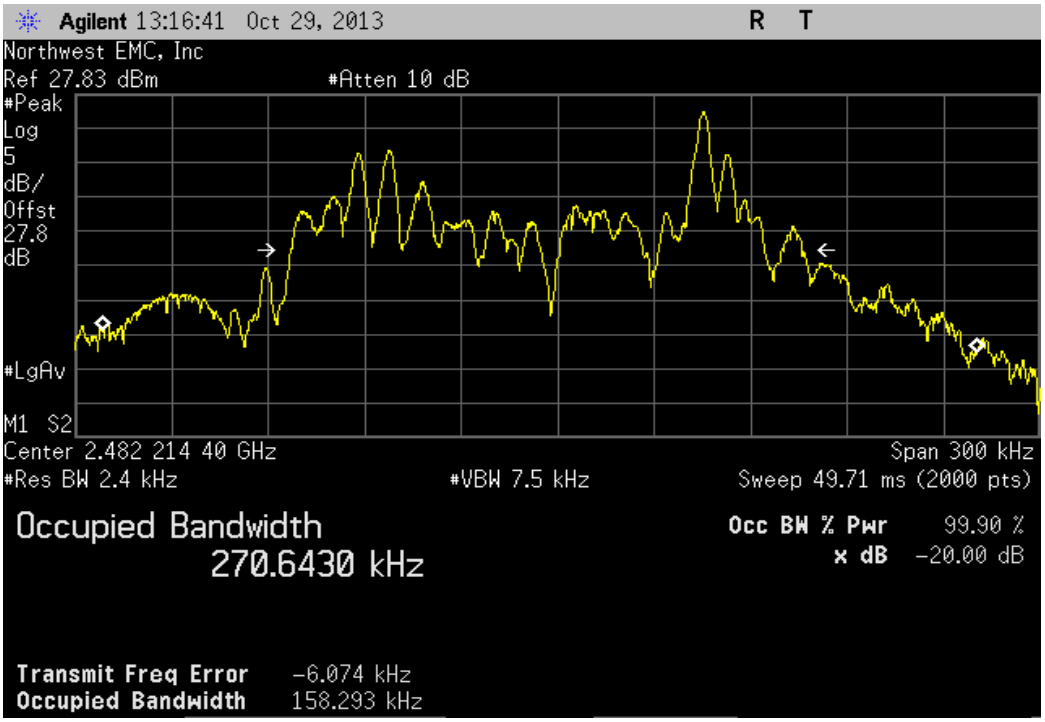


115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz

				Value	Limit	Result
				160.294 kHz	< 1.0 MHz	Pass

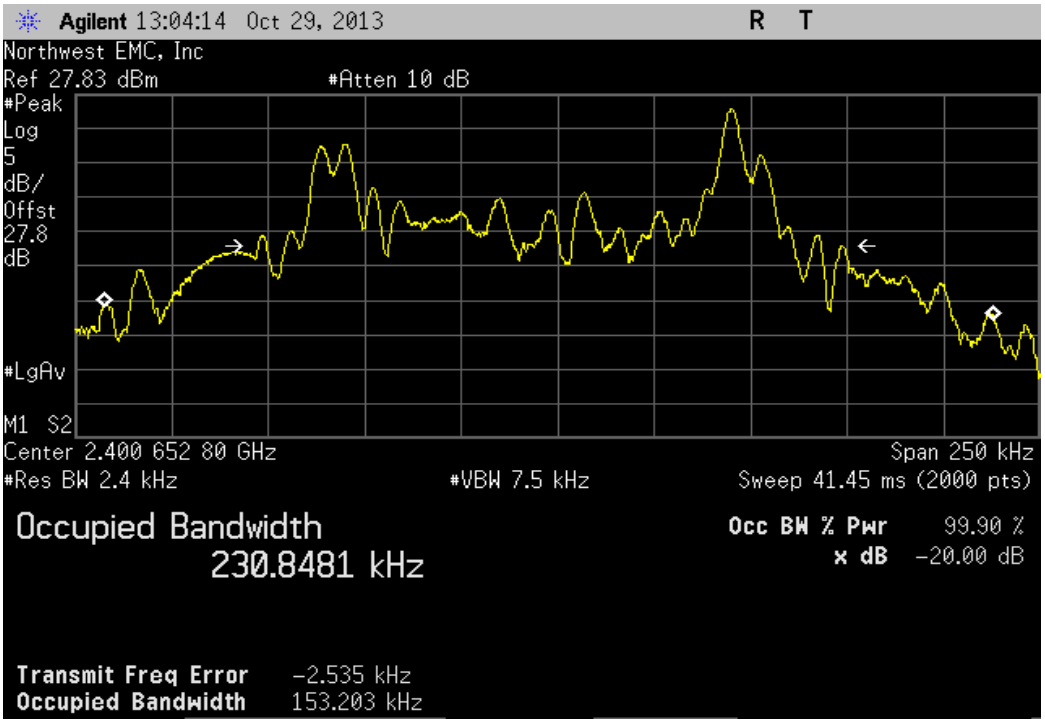
115.2 kbps, GFSK, High Channel 237, 2482.2144 MHz

				Value	Limit	Result
				158.293 kHz	< 1.0 MHz	Pass



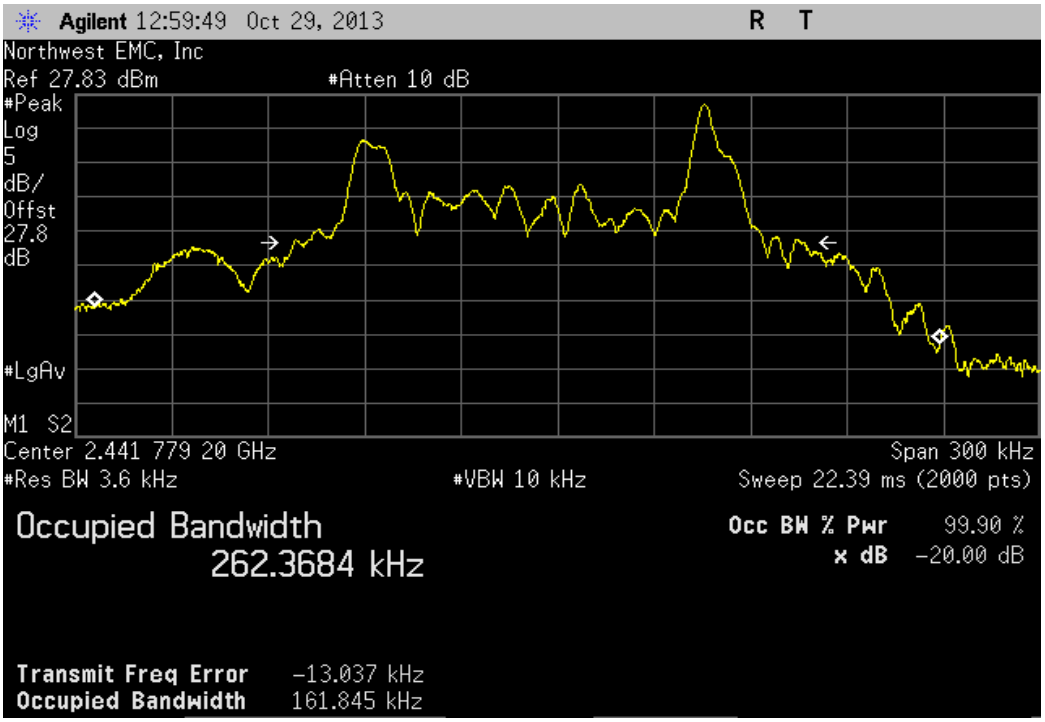
153.6 kbps, GFSK, Low Channel 1, 2400.6528 MHz

				Value	Limit	Result
				153.204 kHz	< 1.0 MHz	Pass



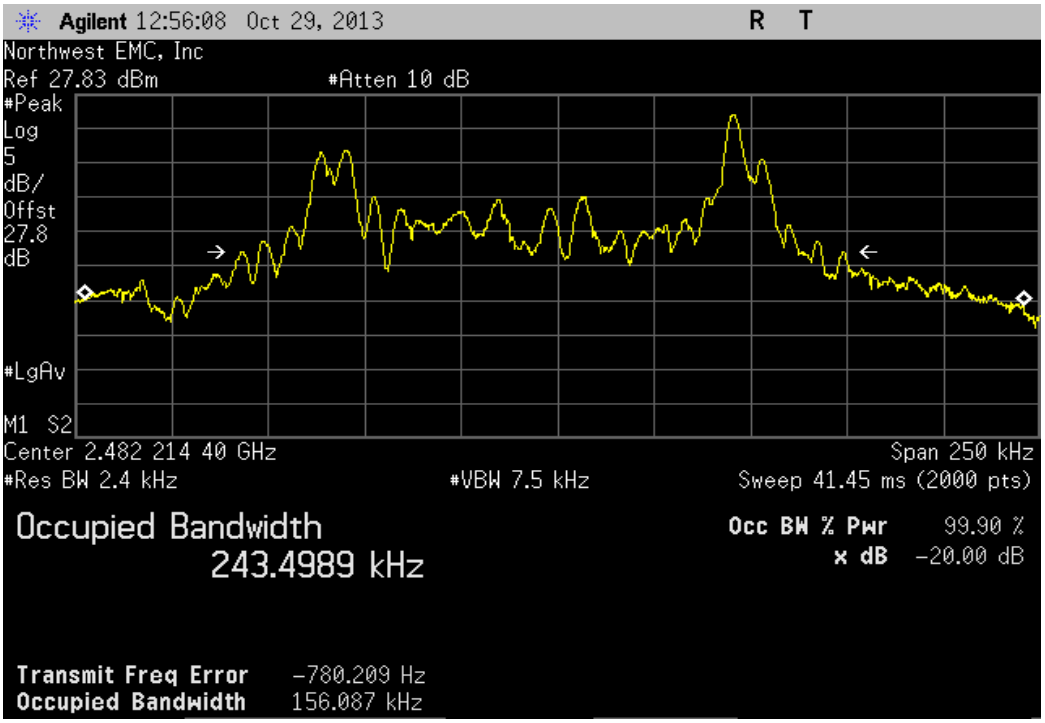
153.6 kbps, GFSK, Mid Channel 120, 2441.7792 MHz

Value	Limit	Result
161.845 kHz	< 1.0 MHz	Pass



153.6 kbps, GFSK, High Channel 237, 2482.2144 MHz

Value	Limit	Result
156.087 kHz	< 1.0 MHz	Pass



Spurious Conducted Emissions

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Signal Generator	Agilent	N5183A	TIA	1/27/2012	36
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	7/3/2013	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

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

EUT Output Power was set to 27dBm, and an attenuator and DC block were in line for all measurements.

Spurious Conducted Emissions

EUT:	GXM-T24			**Work Order:**	FREW0012
Serial Number:	245-4495			**Date:**	10/29/13
Customer:	FreeWave Technologies, Inc.			**Temperature:**	24°C
Attendees:	Dean Busch			**Humidity:**	29%
Project:	None			**Barometric Pres.:**	1017
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.247:2013	ANSI C63.10:2009

COMMENTS

Non Hopping Mode. Transmitting at max imum Duty Cycle. Adapter cable loss of 0.34dB added to reference level offsett. EUT output power set at 27dBm. Connected to development board and remote PC. EUT powered by 5 VDC supplied by development board via AC mains.

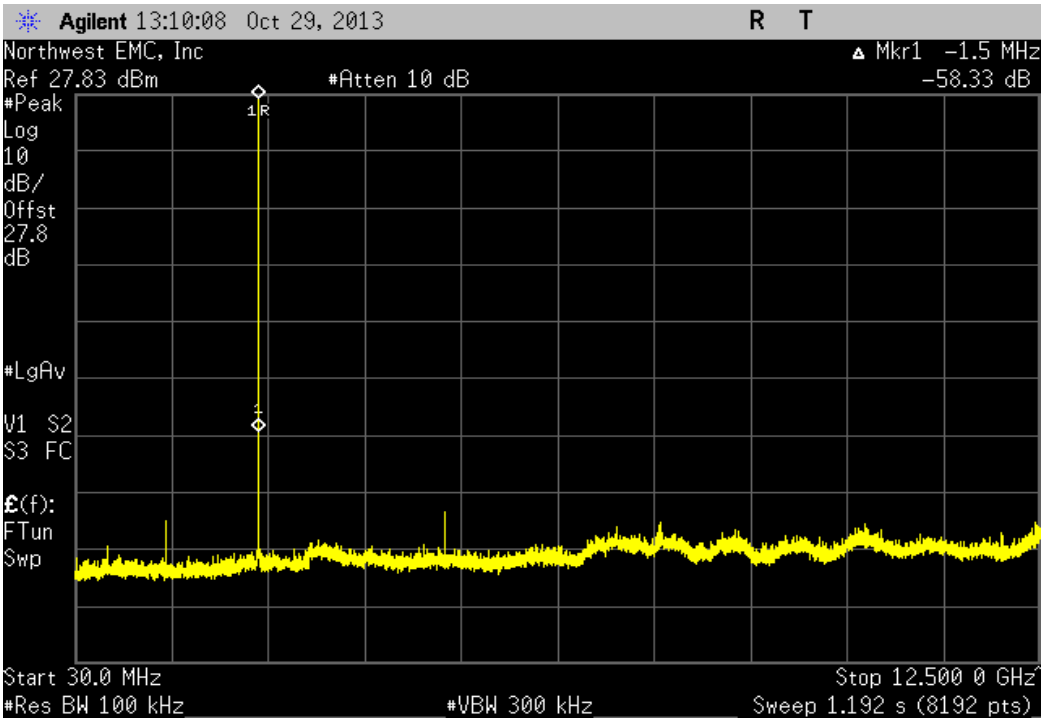
DEVIATIONS FROM TEST STANDARD

None

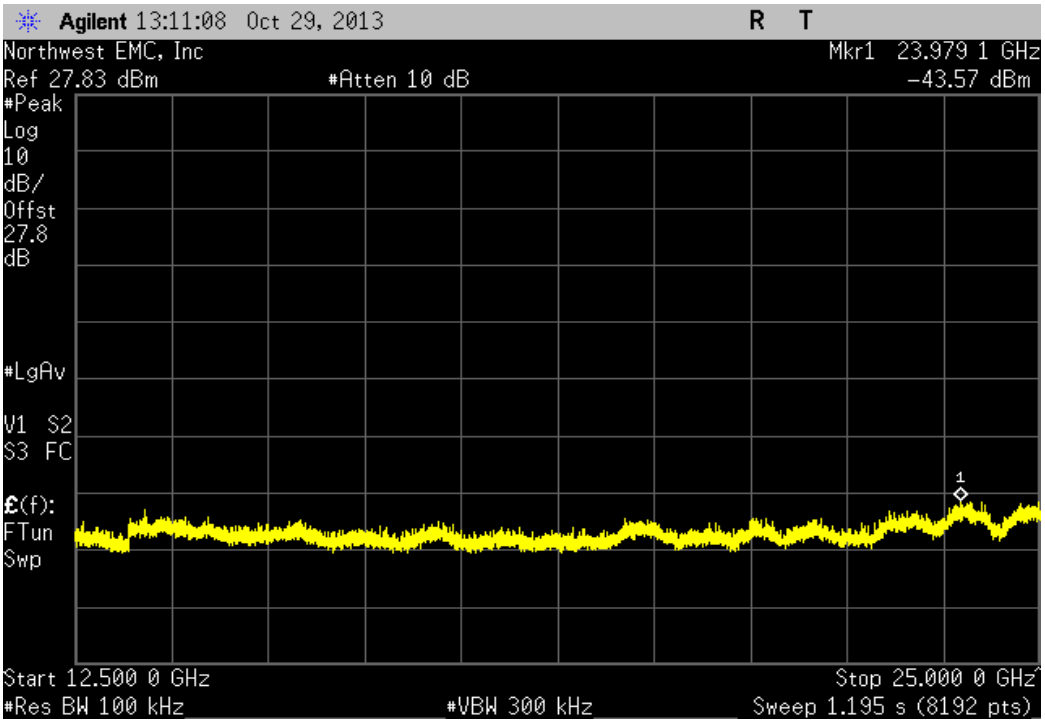
Configuration #	6	Signature

		Frequency Range	Value	Limit	Result
115.2 kbps, GFSK					
	Low Channel 1, 2400.6528 MHz	30 MHz - 12.5 GHz	-58.33 dBc	≤ -20 dBc	Pass
	Low Channel 1, 2400.6528 MHz	12.5 GHz - 25 GHz	-70.49 dBc	≤ -20 dBc	Pass
	Mid Channel 120, 2441.7792 MHz	30 MHz - 12.5 GHz	-74.63 dBc	≤ -20 dBc	Pass
	Mid Channel 120, 2441.7792 MHz	12.5 GHz - 25 GHz	-70.28 dBc	≤ -20 dBc	Pass
	High Channel 237, 2482.2144 MHz	30 MHz - 12.5 GHz	-69.36 dBc	≤ -20 dBc	Pass
	High Channel 237, 2482.2144 MHz	12.5 GHz - 25 GHz	-68.67 dBc	≤ -20 dBc	Pass
153.6 kbps, GFSK					
	Low Channel 1, 2400.6528 MHz	30 MHz - 12.5 GHz	-58.43 dBc	≤ -20 dBc	Pass
	Low Channel 1, 2400.6528 MHz	12.5 GHz - 25 GHz	-70.06 dBc	≤ -20 dBc	Pass
	Mid Channel 120, 2441.7792 MHz	30 MHz - 12.5 GHz	-74.19 dBc	≤ -20 dBc	Pass
	Mid Channel 120, 2441.7792 MHz	12.5 GHz - 25 GHz	-69.59 dBc	≤ -20 dBc	Pass
	High Channel 237, 2482.2144 MHz	30 MHz - 12.5 GHz	-70.52 dBc	≤ -20 dBc	Pass
	High Channel 237, 2482.2144 MHz	12.5 GHz - 25 GHz	-69.12 dBc	≤ -20 dBc	Pass

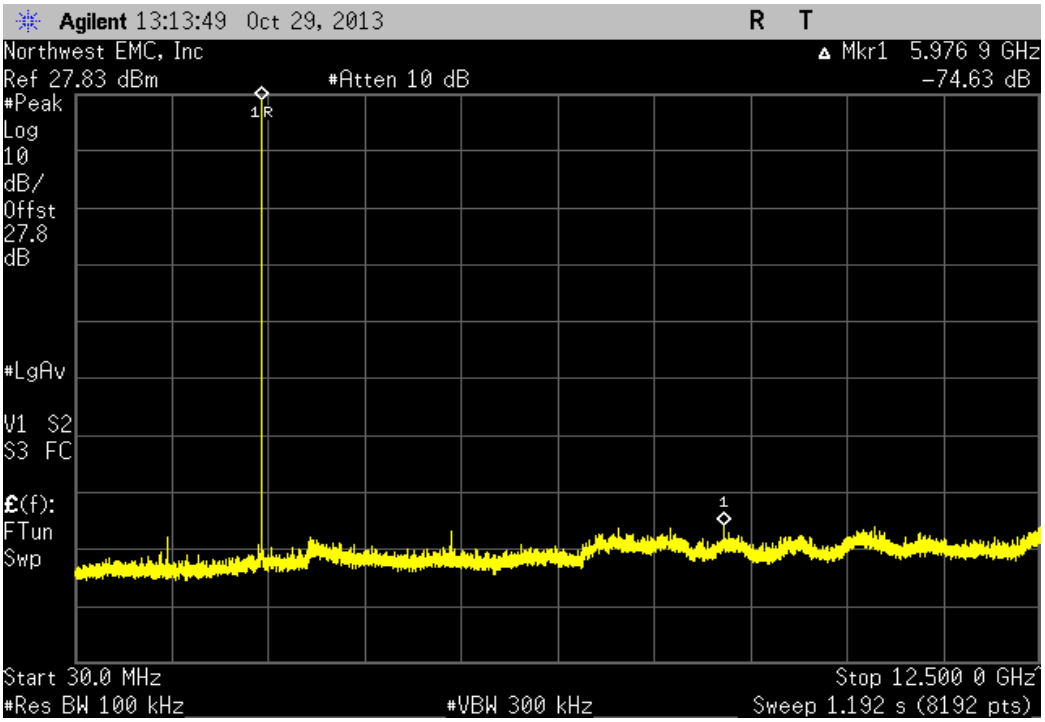
115.2 kbps, GFSK, Low Channel 1, 2400.6528 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-58.33 dBc	≤ -20 dBc	Pass



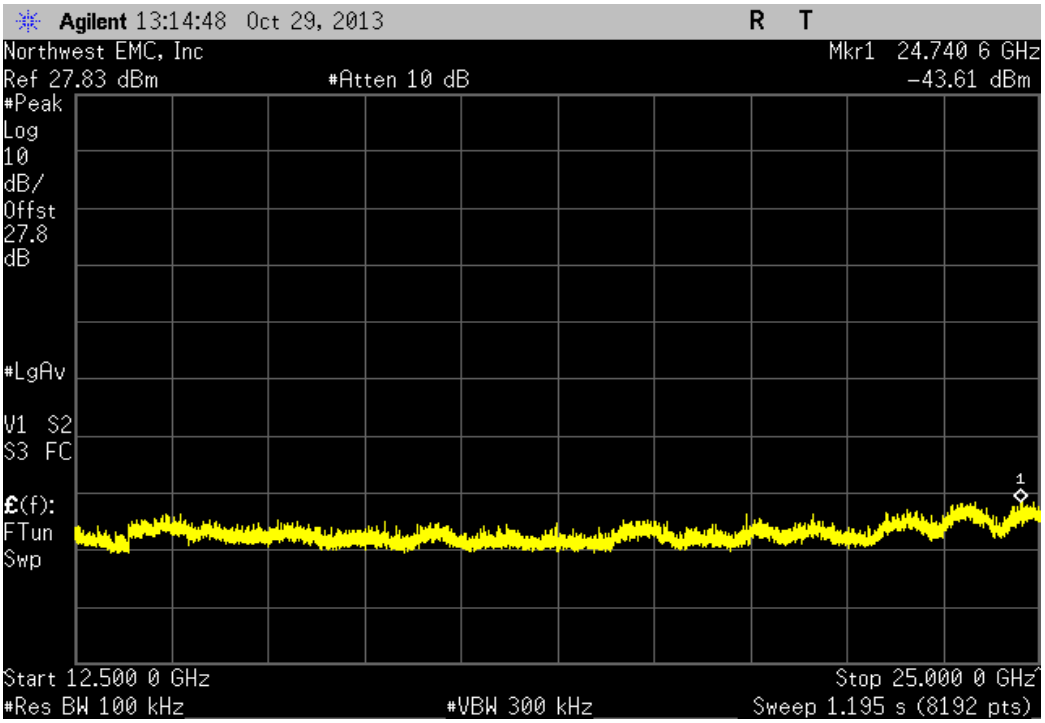
115.2 kbps, GFSK, Low Channel 1, 2400.6528 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-70.49 dBc	≤ -20 dBc	Pass



115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-74.63 dBc	≤ -20 dBc	Pass

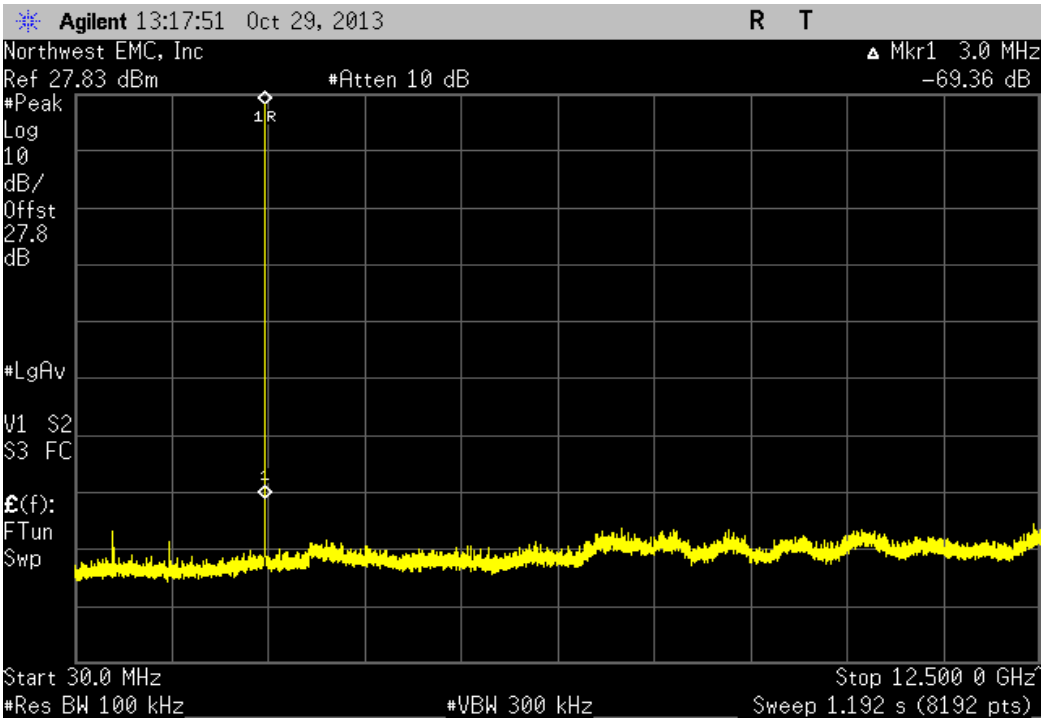


115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-70.28 dBc	≤ -20 dBc	Pass

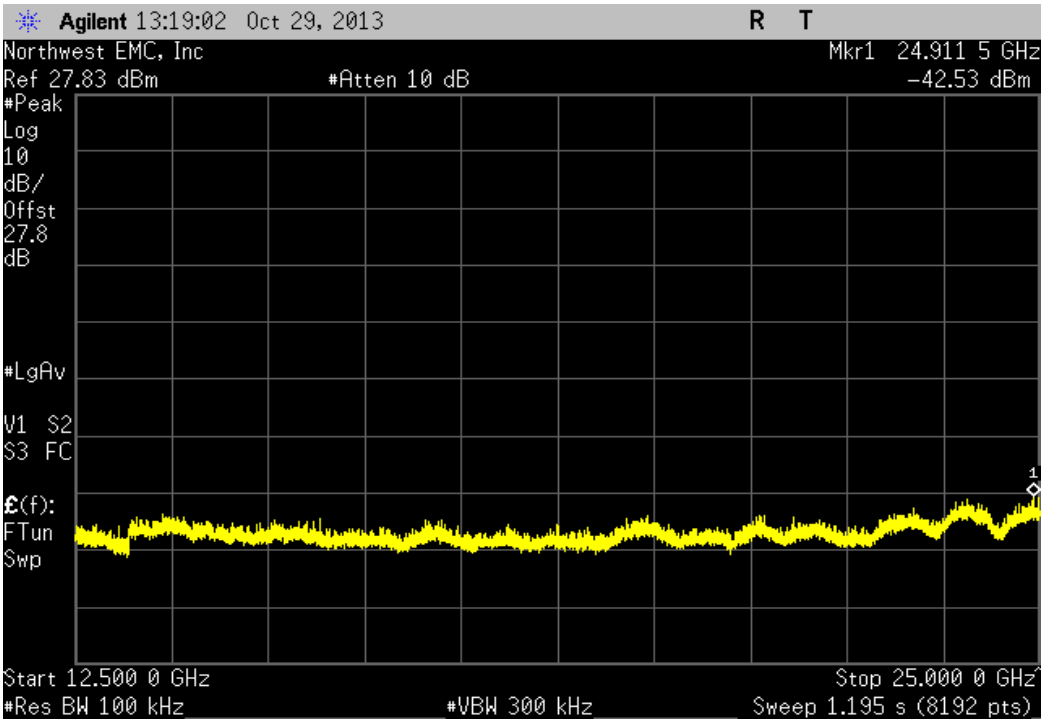


Spurious Conducted Emissions

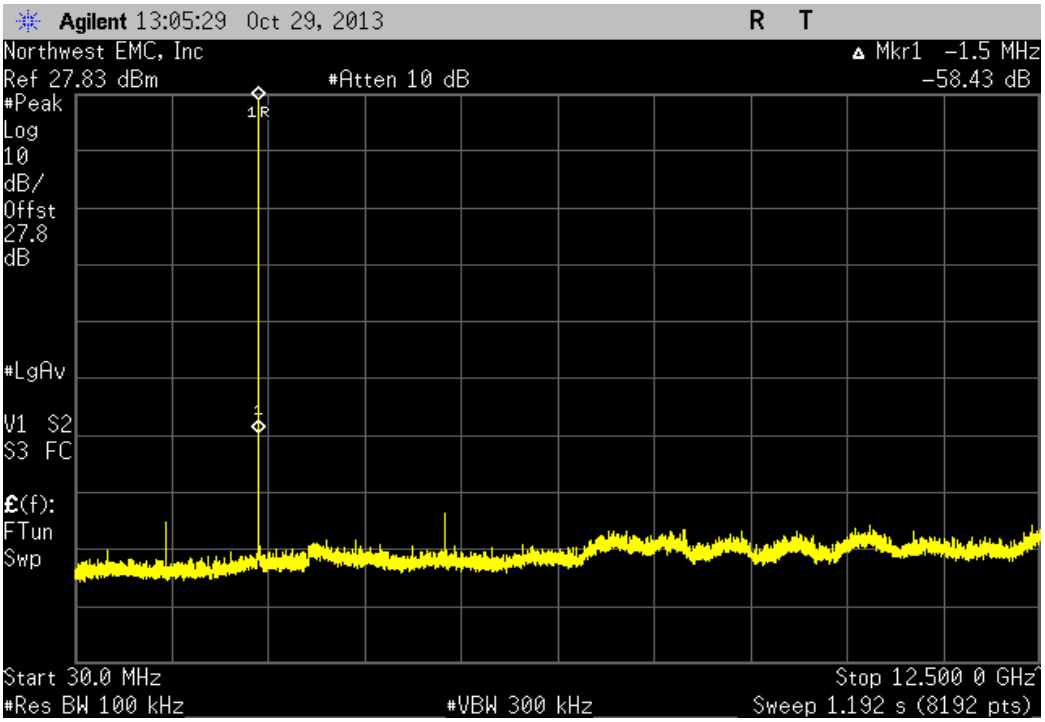
115.2 kbps, GFSK, High Channel 237, 2482.2144 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-69.36 dBc	≤ -20 dBc	Pass



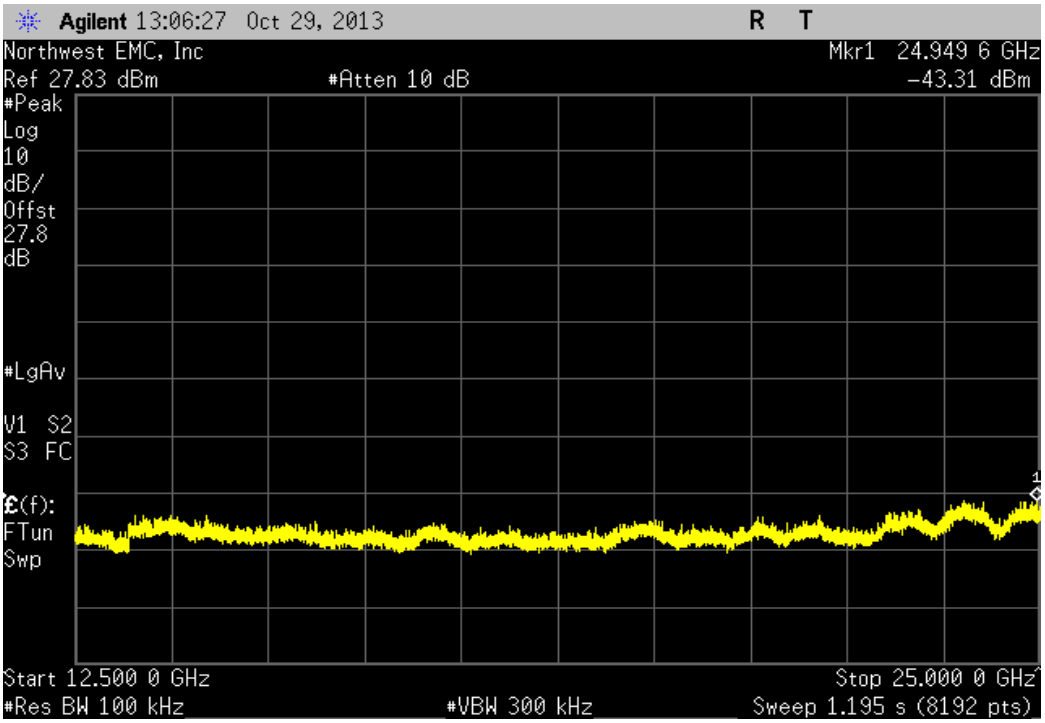
115.2 kbps, GFSK, High Channel 237, 2482.2144 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-68.67 dBc	≤ -20 dBc	Pass



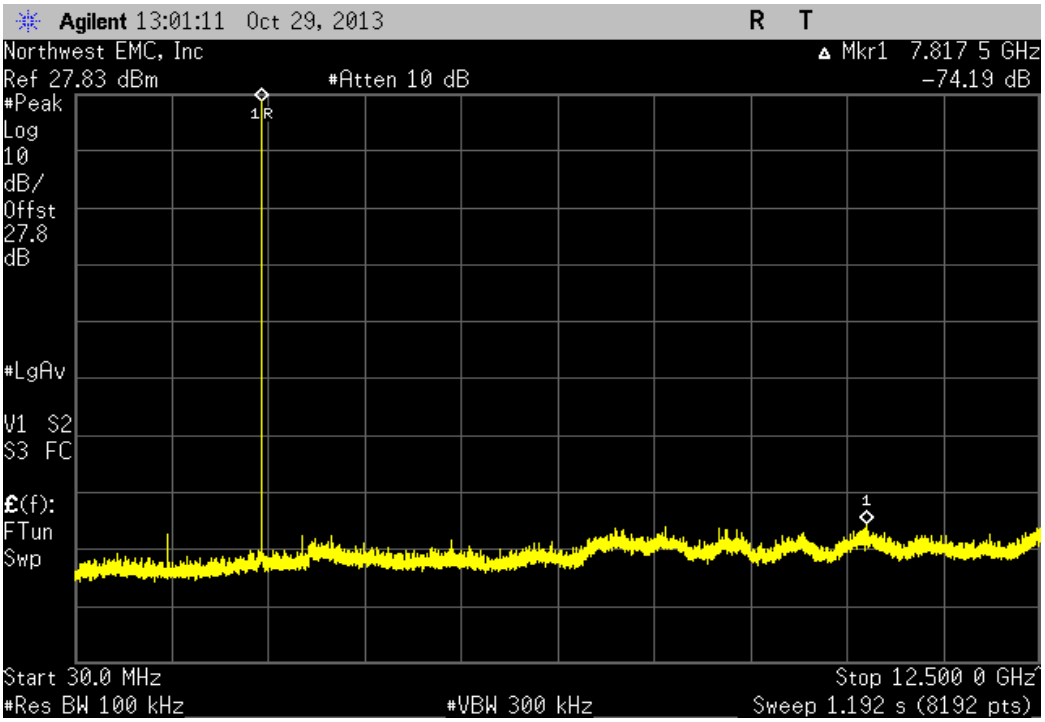
153.6 kbps, GFSK, Low Channel 1, 2400.6528 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-58.43 dBc	≤ -20 dBc	Pass



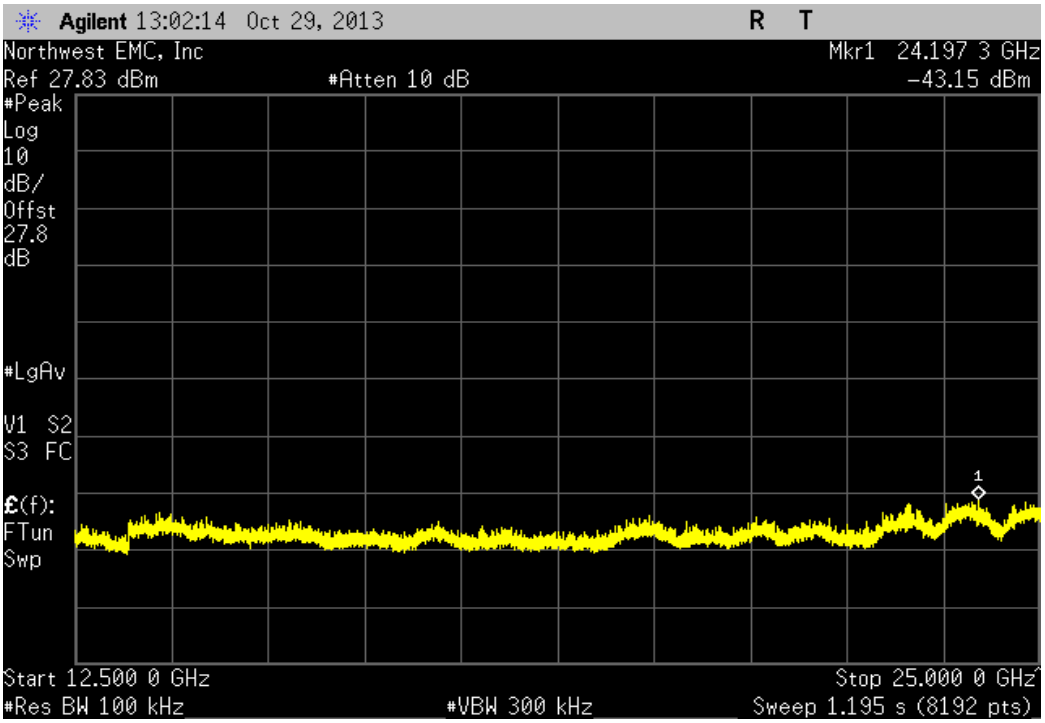
153.6 kbps, GFSK, Low Channel 1, 2400.6528 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-70.06 dBc	≤ -20 dBc	Pass



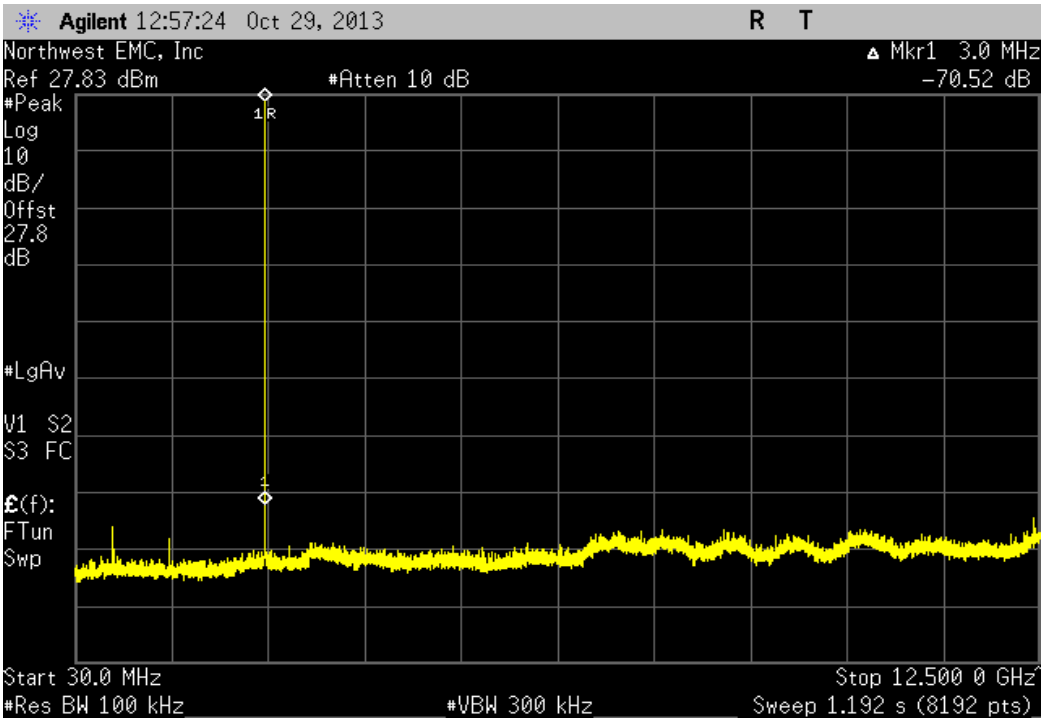
115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz				
Frequency Range		**Value**	**Limit**	**Result**
30 MHz - 12.5 GHz		-74.19 dBc	≤ -20 dBc	Pass



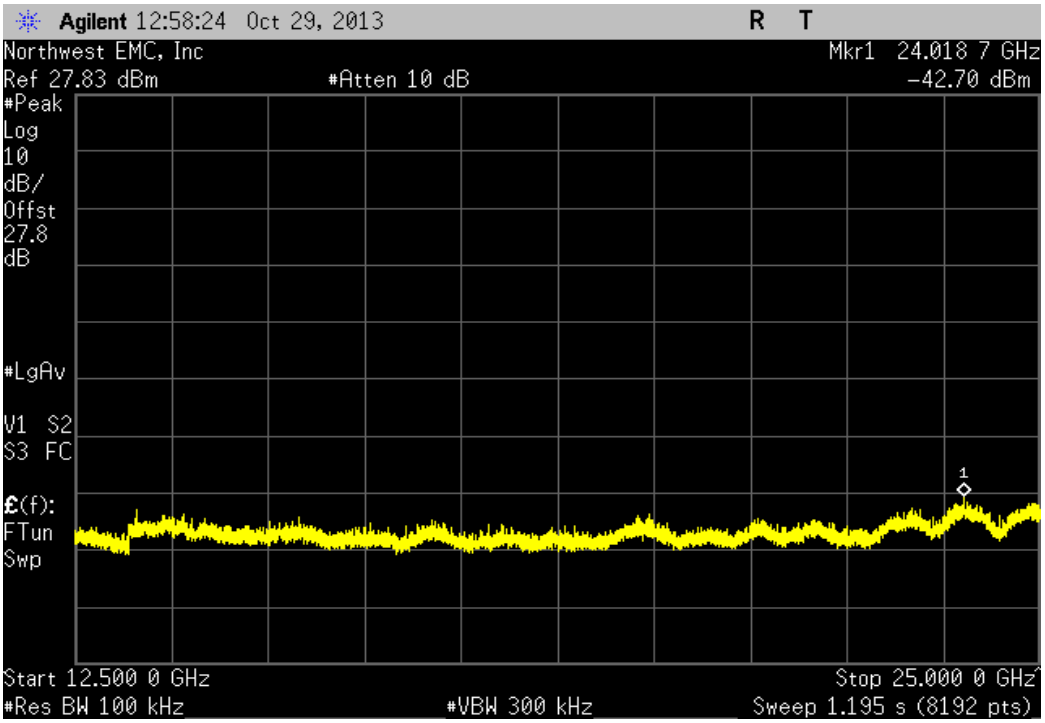
115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz				
Frequency Range		**Value**	**Limit**	**Result**
12.5 GHz - 25 GHz		-69.59 dBc	≤ -20 dBc	Pass



153.6 kbps, GFSK, High Channel 237, 2482.2144 MHz				
Frequency Range		Value	Limit	Result
30 MHz - 12.5 GHz		-70.52 dBc	≤ -20 dBc	Pass



153.6 kbps, GFSK, High Channel 237, 2482.2144 MHz				
Frequency Range		Value	Limit	Result
12.5 GHz - 25 GHz		-69.12 dBc	≤ -20 dBc	Pass



Band Edge Compliance

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Signal Generator	Agilent	N5183A	TIA	1/27/2012	36
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	7/3/2013	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

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 measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet in a no hop mode. The channels closest to the band edges were selected.

The spectrum was scanned below the lower band edge and above the higher band edge. EUT Output Power was set to 27dBm, and an attenuator and DC block were in line for all measurements.

Band Edge Compliance

EUT:	GXM-T24			**Work Order:**	FREW0012
Serial Number:	245-4495			**Date:**	10/29/13
Customer:	FreeWave Technologies, Inc.			**Temperature:**	24°C
Attendees:	Dean Busch			**Humidity:**	29%
Project:	None			**Barometric Pres.:**	1017
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.247:2013	ANSI C63.10:2009

COMMENTS

Non Hopping Mode. Transmitting at max imum Duty Cycle. Adapter cable loss of 0.34dB added to reference level offsett. EUT output power set at 27dBm. Connected to development board and remote PC. EUT powered by 5 VDC supplied by development board via AC mains.

DEVIATIONS FROM TEST STANDARD

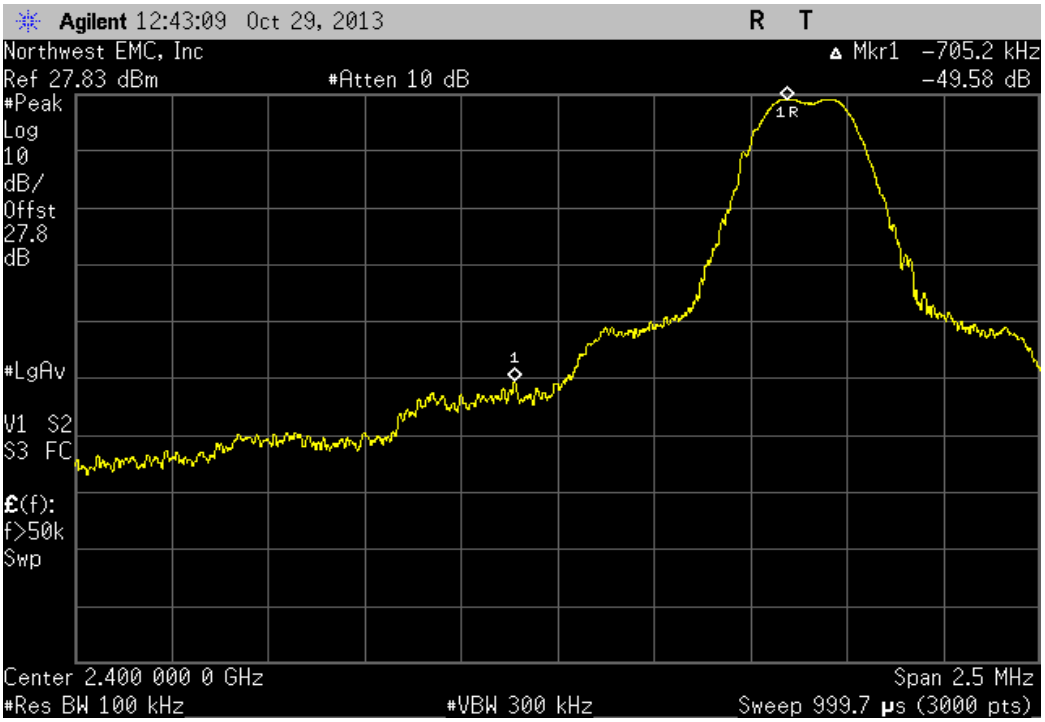
None

Configuration #	6	Signature 

		Value	Limit	Result
115.2 kbps, GFSK				
	Low Channel 1, 2400.6528 MHz	-49.58 dBc	≤ -20 dBc	Pass
	High Channel 237, 2482.2144 MHz	-58.67 dBc	≤ -20 dBc	Pass
153.6 kbps, GFSK				
	Low Channel 1, 2400.6528 MHz	-49.51 dBc	≤ -20 dBc	Pass
	High Channel 237, 2482.2144 MHz	-58.93 dBc	≤ -20 dBc	Pass

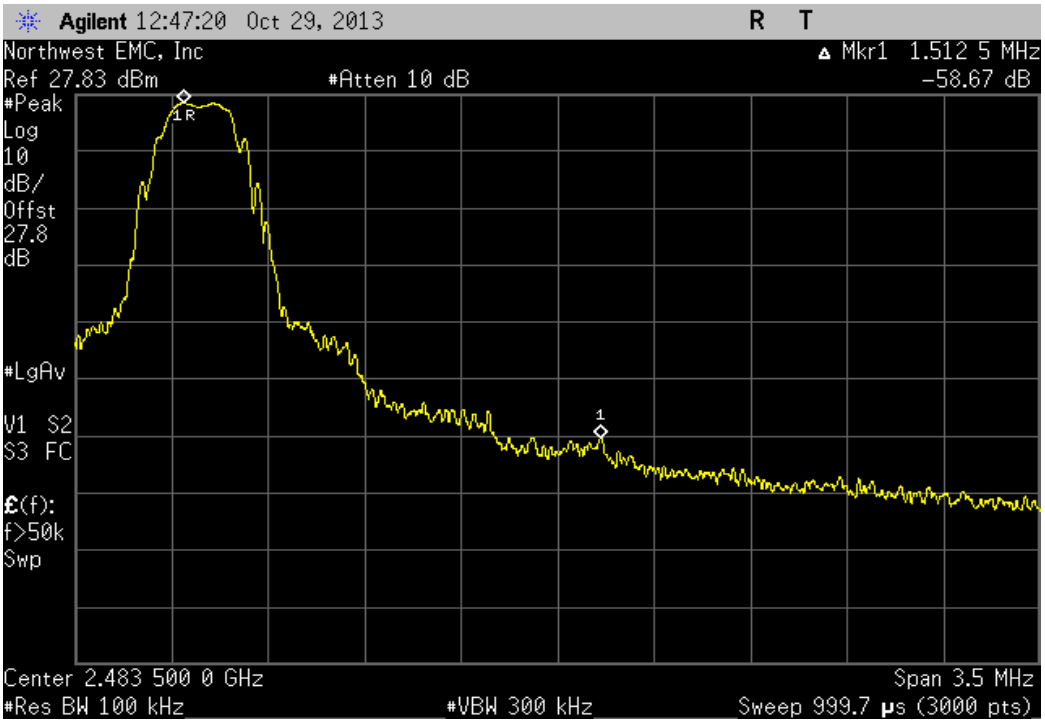
115.2 kbps, GFSK, Low Channel 1, 2400.6528 MHz

Value	Limit	Result
-49.58 dBc	≤ -20 dBc	Pass



115.2 kbps, GFSK, High Channel 237, 2482.2144 MHz

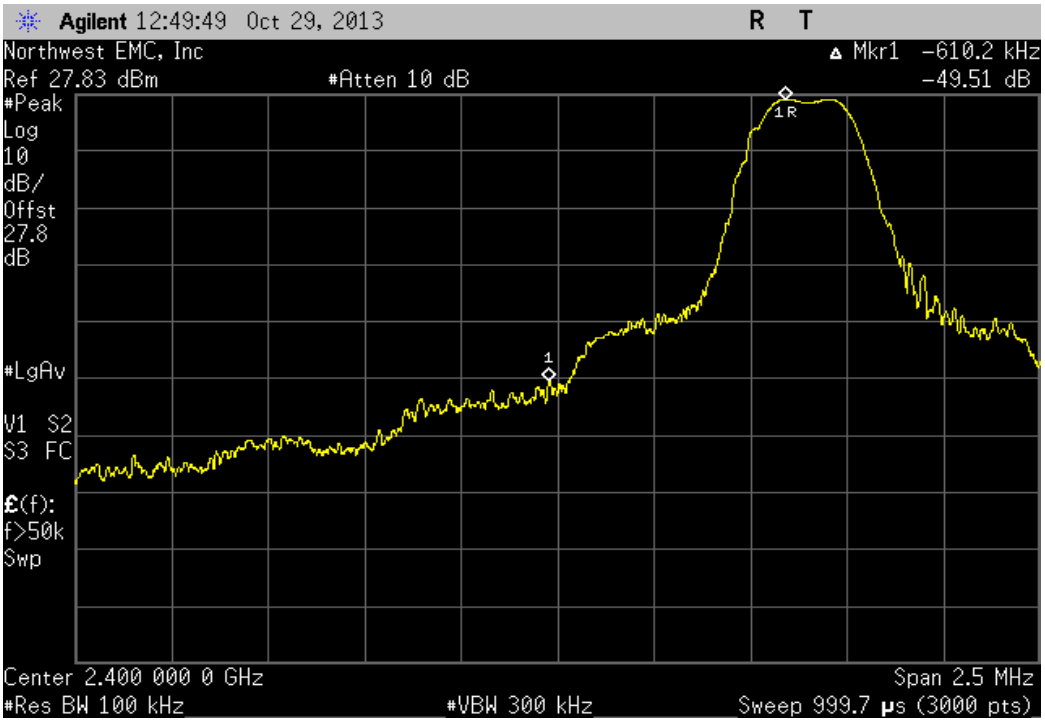
Value	Limit	Result
-58.67 dBc	≤ -20 dBc	Pass



Band Edge Compliance

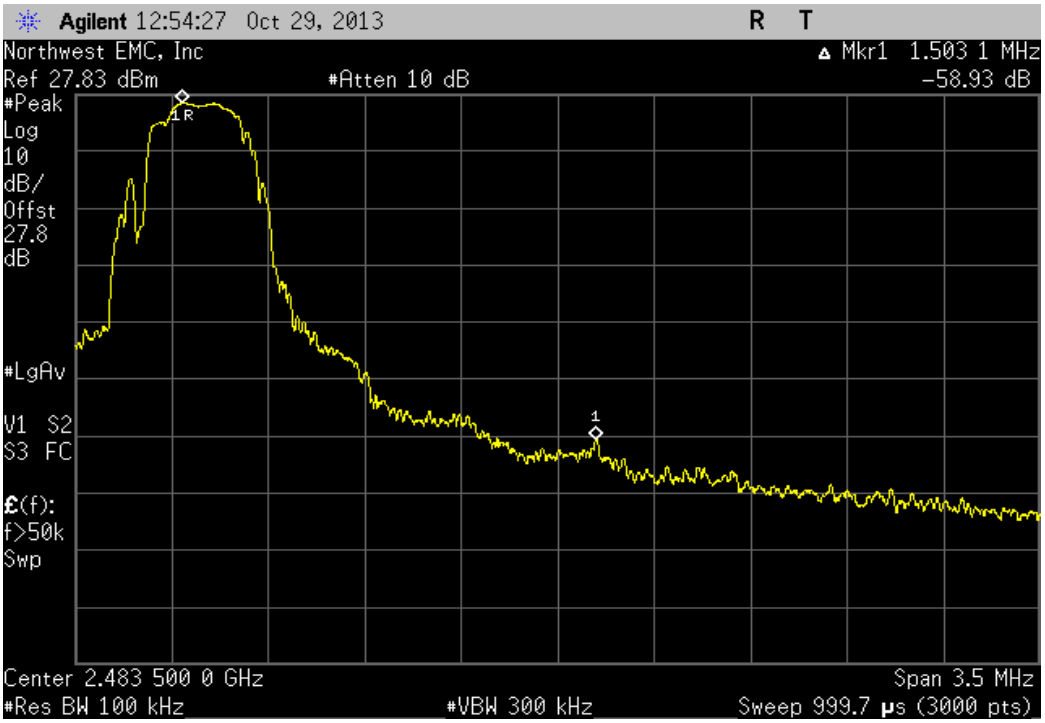
153.6 kbps, GFSK, Low Channel 1, 2400.6528 MHz

Value	Limit	Result
-49.51 dBc	≤ -20 dBc	Pass



153.6 kbps, GFSK, High Channel 237, 2482.2144 MHz

Value	Limit	Result
-58.93 dBc	≤ -20 dBc	Pass



Channel Separation

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Signal Generator	Agilent	N5183A	TIA	1/27/2012	36
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	7/3/2013	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

The channel carrier frequencies in the 2400-2483.5MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Or, if the output power is less than 125 mW, the channel separation can be 25 kHz or 2/3 of the 20dB bandwidth. 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.

EUT Output Power was set to 27dBm, and an attenuator and DC block were in line for all measurements.

Channel Separation

EUT:	GXM-T24			Work Order:	FREW0012
Serial Number:	245-4495			Date:	10/29/13
Customer:	FreeWave Technologies, Inc.			Temperature:	24°C
Attendees:	Dean Busch			Humidity:	29%
Project:	None			Barometric Pres.:	1017
Tested by:	Richard Mellroth	Power:	110VAC/60Hz	Job Site:	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.247:2013	ANSI C63.10:2009

COMMENTS

Hopping Mode. Adapter cable loss of 0.34dB added to reference level offsett. EUT output power set at 27dBm. Connected to development board and remote PC. EUT powered by 5 VDC supplied by development board via AC mains.

DEVIATIONS FROM TEST STANDARD

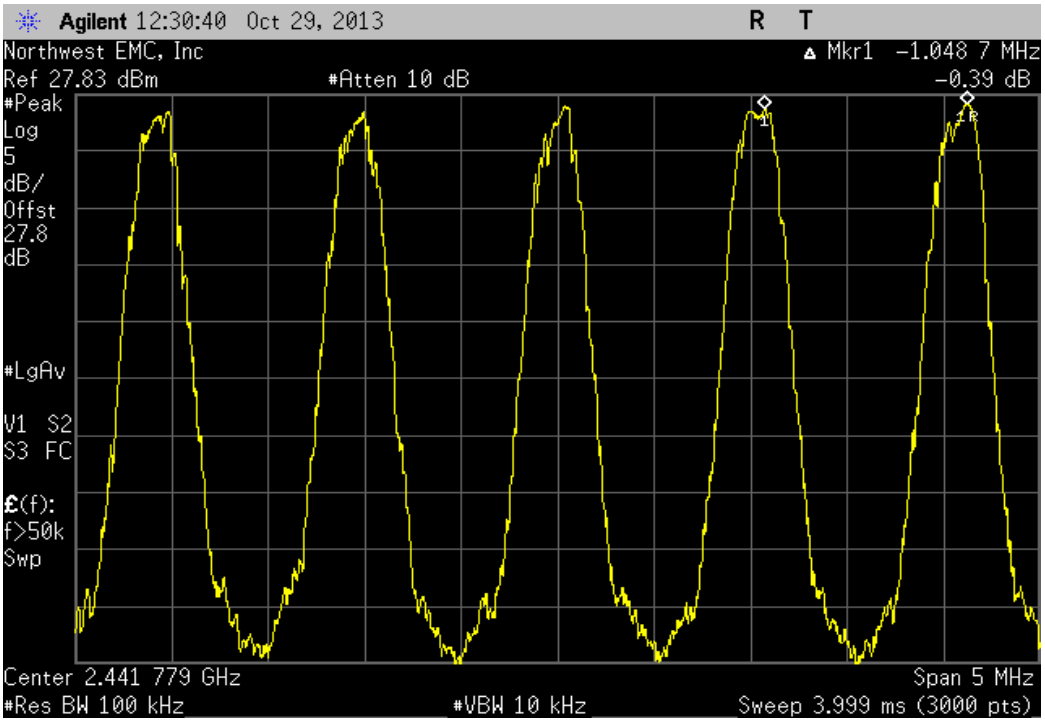
None

Configuration #	6	Signature

	Value	Limit	Result
Hopping Mode 0			
115.2 kbps, GFSK			
Mid Channel 120, 2441.7792 MHz	1.0 MHz	≥ 1 MHz	Pass

Channel Separation

Hopping Mode 0, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Value	Limit	Result
				1.0 MHz	≥ 1 MHz	Pass



Number of Hopping Frequencies

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Signal Generator	Agilent	N5183A	TIA	1/27/2012	36
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	7/3/2013	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

The number of hopping frequencies was measured across the authorized band. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The hopping function of the EUT was enabled. EUT Output Power was set to 27dBm, and an attenuator and DC block were in line for all measurements.

Number of Hopping Frequencies

EUT:	GXM-T24			**Work Order:**	FREW0012
Serial Number:	245-4495			**Date:**	10/29/13
Customer:	FreeWave Technologies, Inc.			**Temperature:**	24°C
Attendees:	Dean Busch			**Humidity:**	29%
Project:	None			**Barometric Pres.:**	1017
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.247:2013	ANSI C63.10:2009

COMMENTS

Hopping Mode. Adapter cable loss of 0.34dB added to reference level offsett. EUT output power set at 27dBm. Connected to development board and remote PC. EUT powered by 5 VDC supplied by development board via AC mains.

DEVIATIONS FROM TEST STANDARD

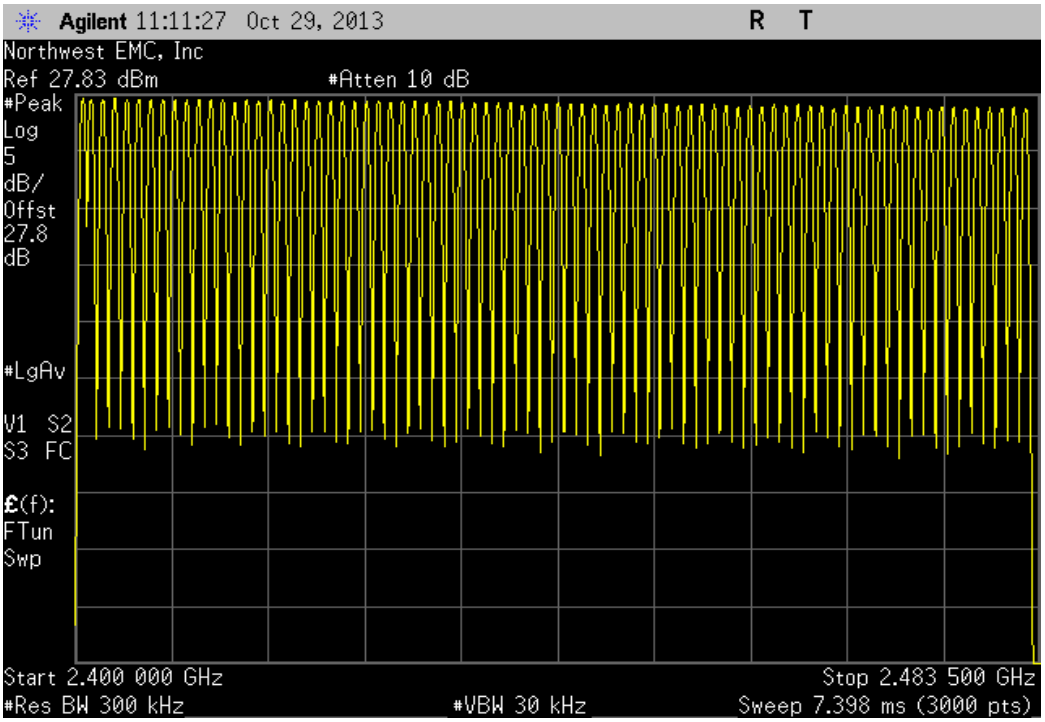
None

Configuration #	6	Signature

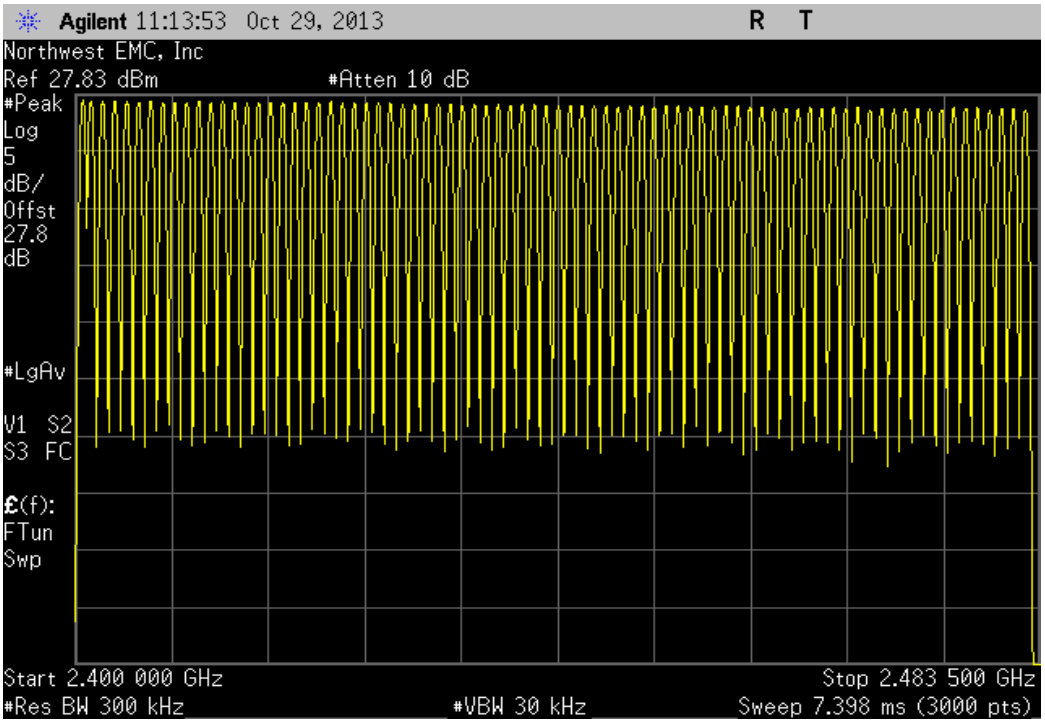
		Number of Channels	Limit	Result
Hopping Mode 0				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode 1				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode 2				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode 3				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode 4				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode 5				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode 6				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode 7				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode 8				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode 9				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode A				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode B				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode C				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode D				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass
Hopping Mode E				
	115.2 kbps, GFSK			
	Mid Channel 120, 2441.7792 MHz	80	≥ 15	Pass

Number of Hopping Frequencies

Hopping Mode 0, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

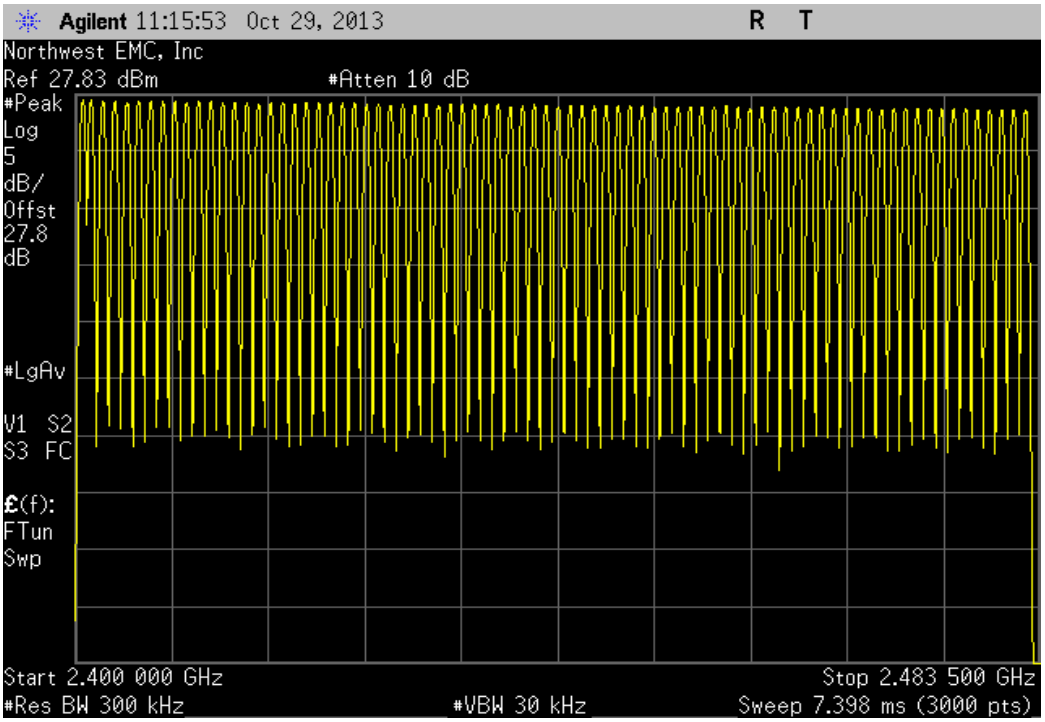


Hopping Mode 1, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

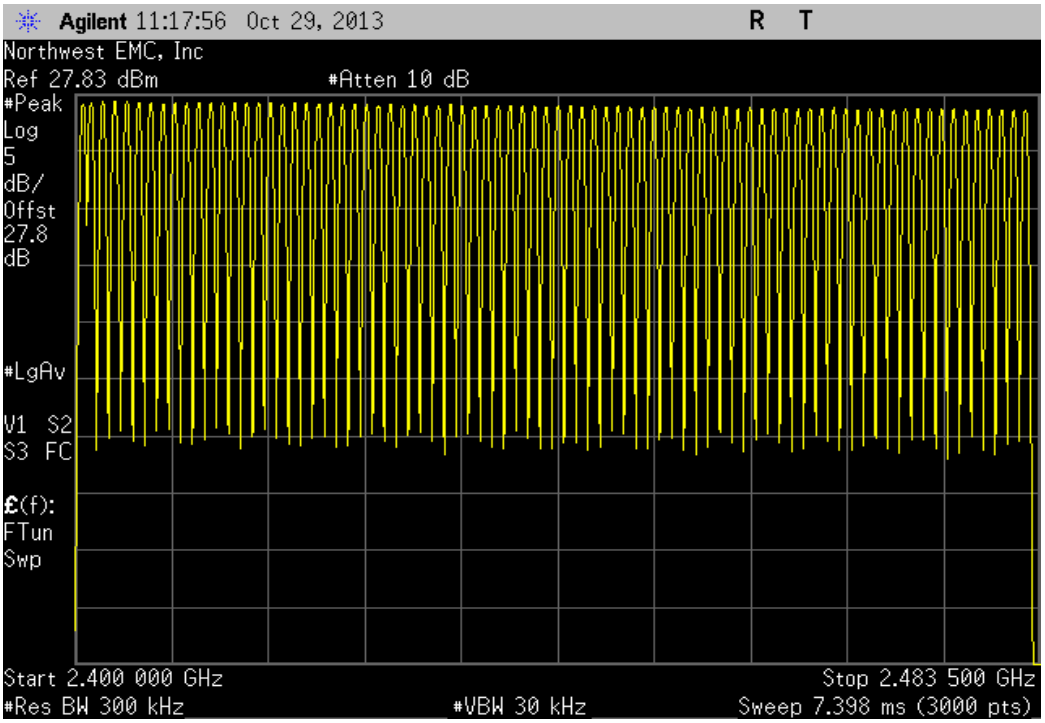


Number of Hopping Frequencies

Hopping Mode 2, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

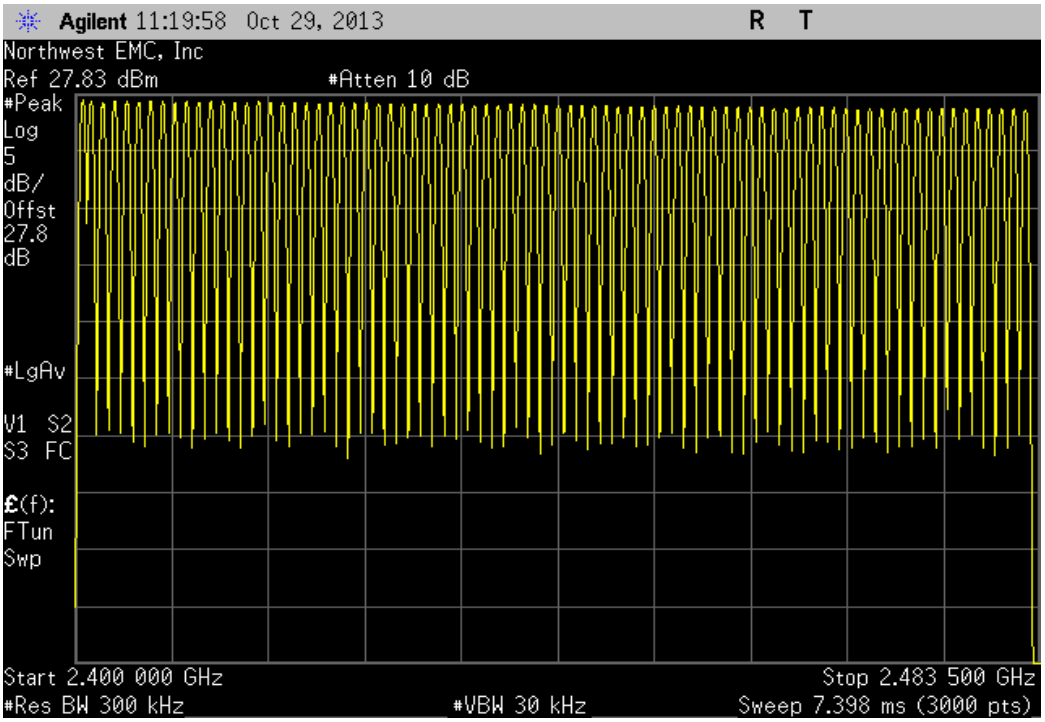


Hopping Mode 3, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

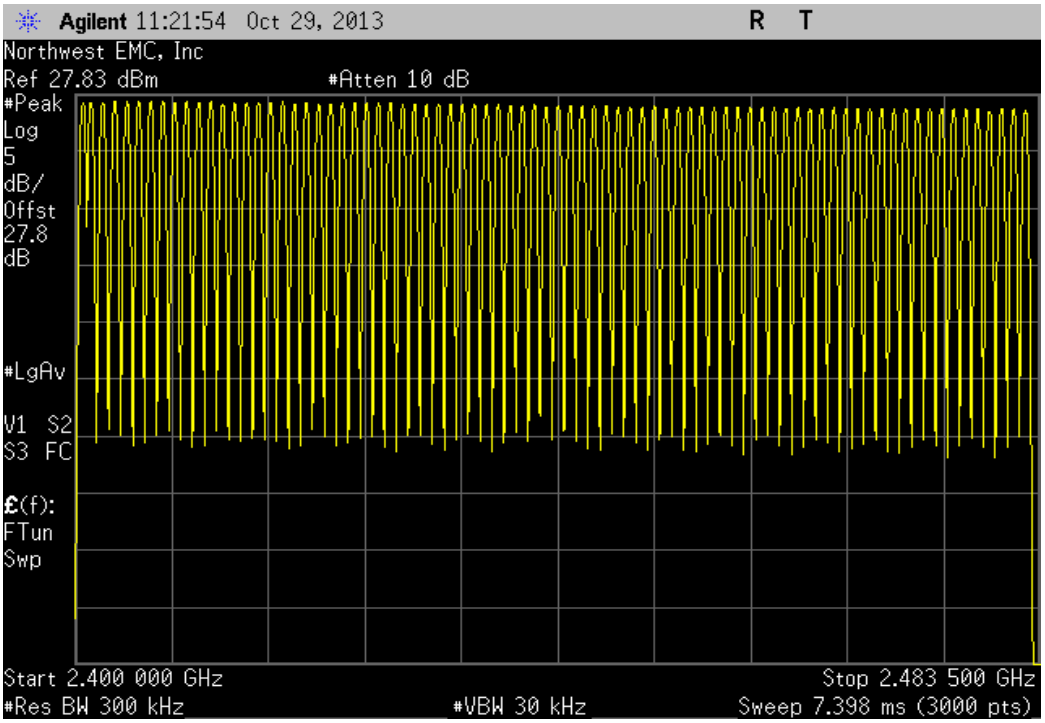


Number of Hopping Frequencies

Hopping Mode 4, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

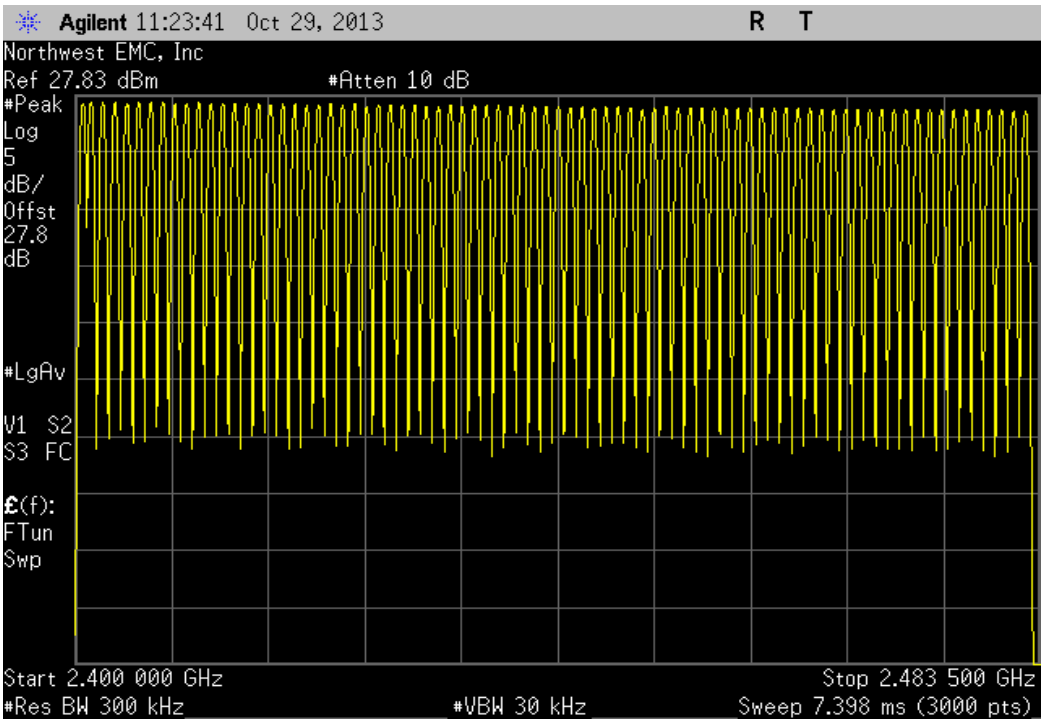


Hopping Mode 5, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

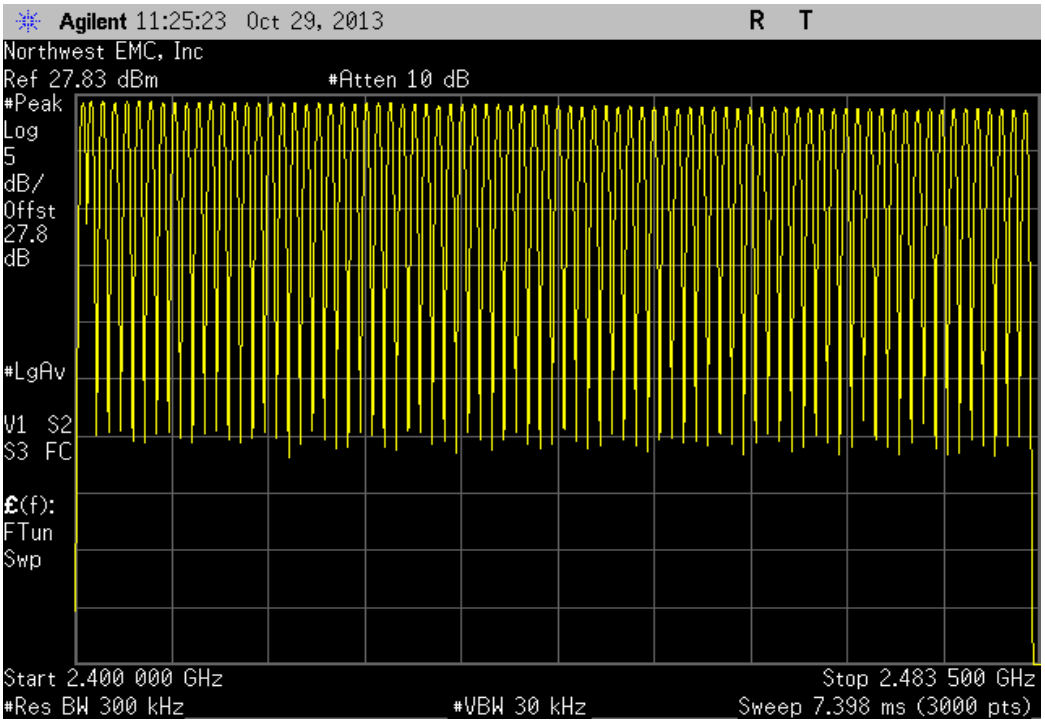


Number of Hopping Frequencies

Hopping Mode 6, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

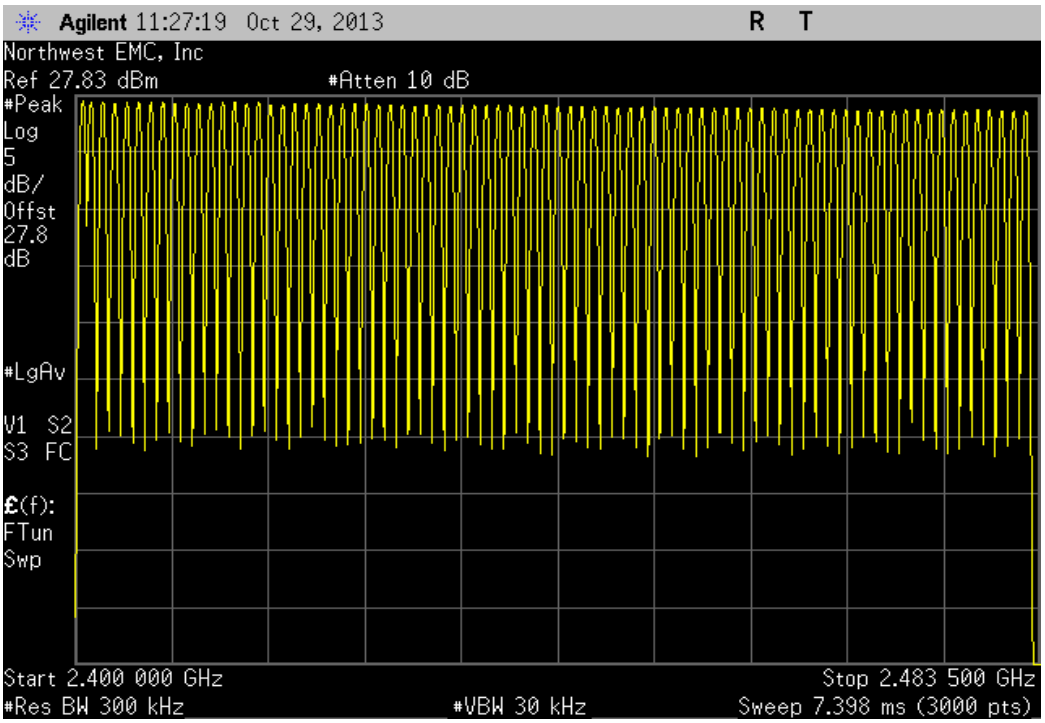


Hopping Mode 7, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

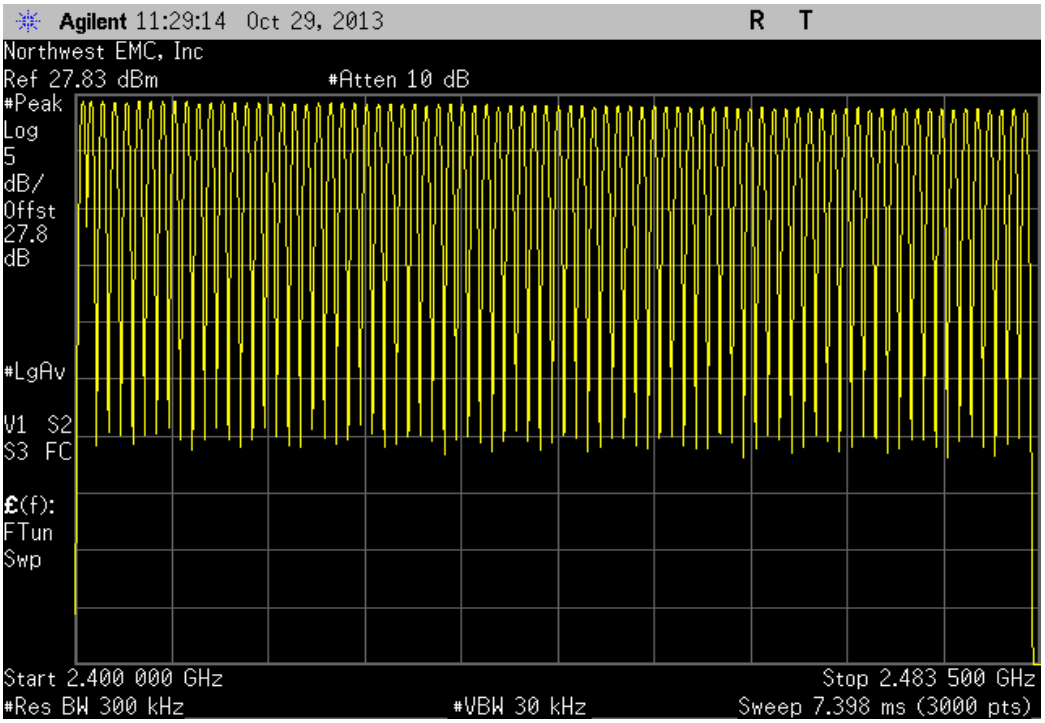


Number of Hopping Frequencies

Hopping Mode 8, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

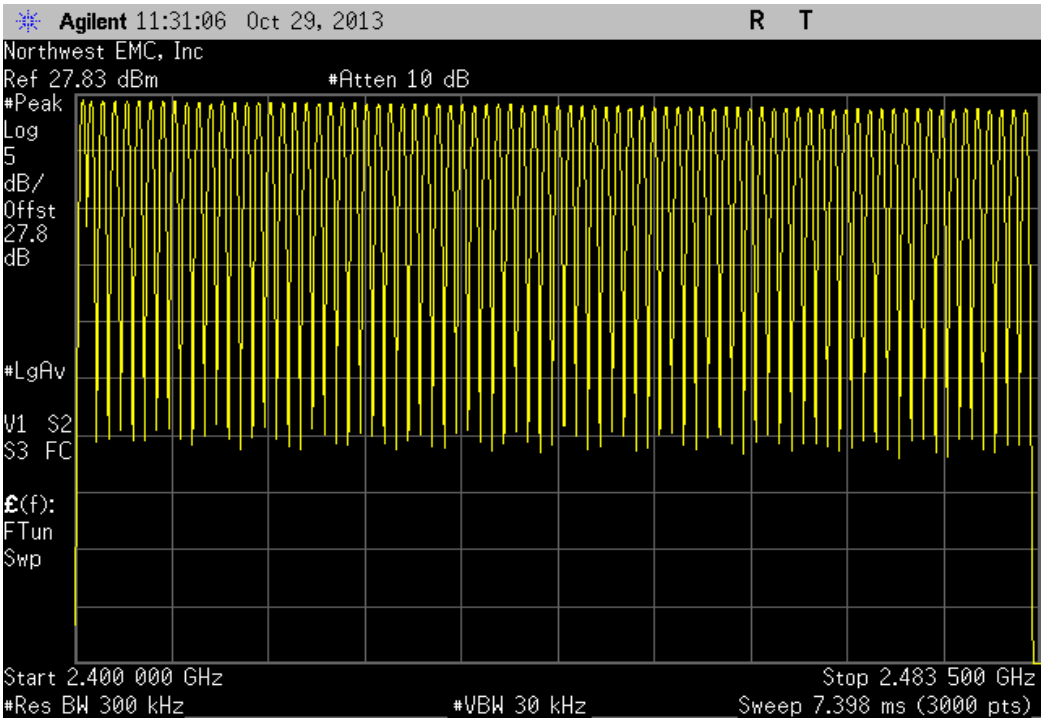


Hopping Mode 9, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

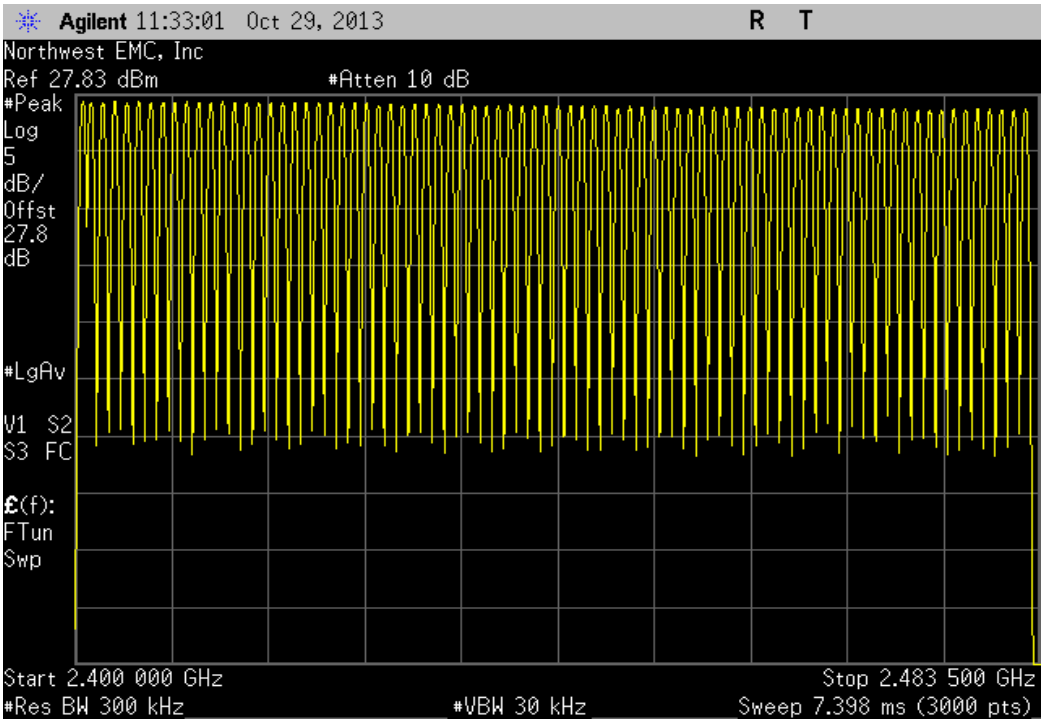


Number of Hopping Frequencies

Hopping Mode A, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

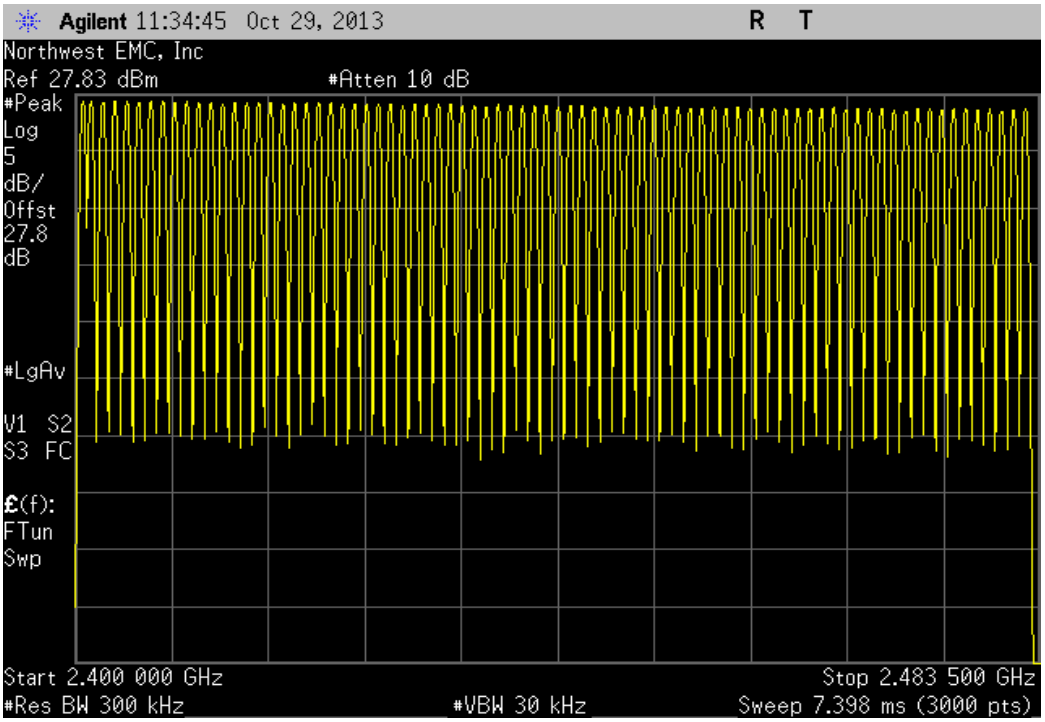


Hopping Mode B, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

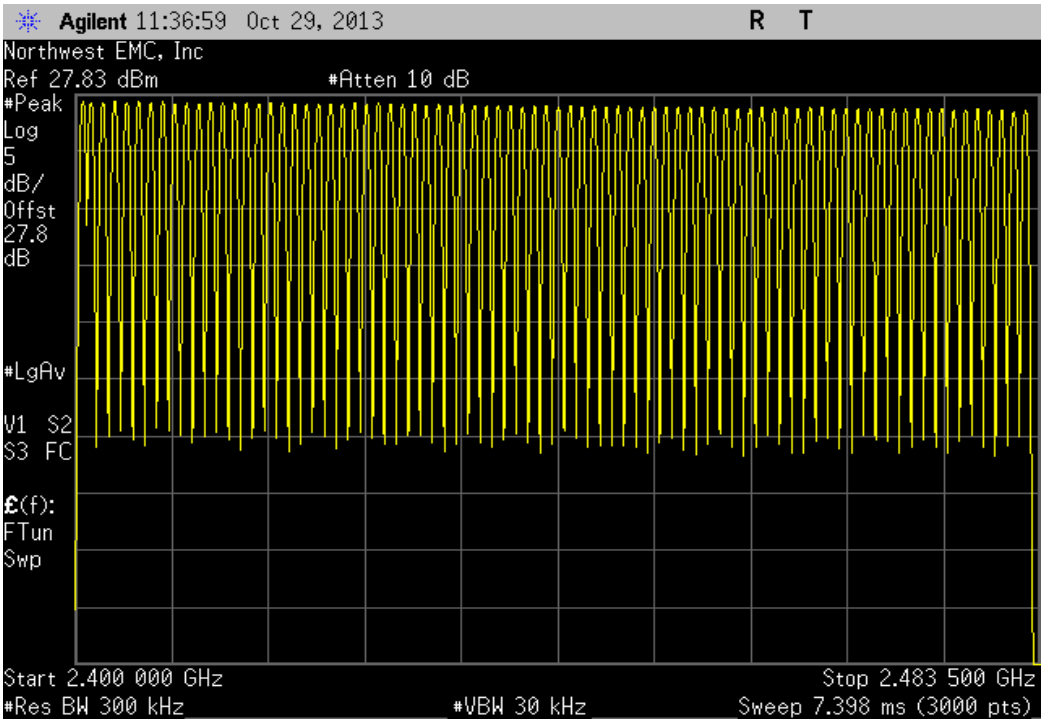


Number of Hopping Frequencies

Hopping Mode C, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass

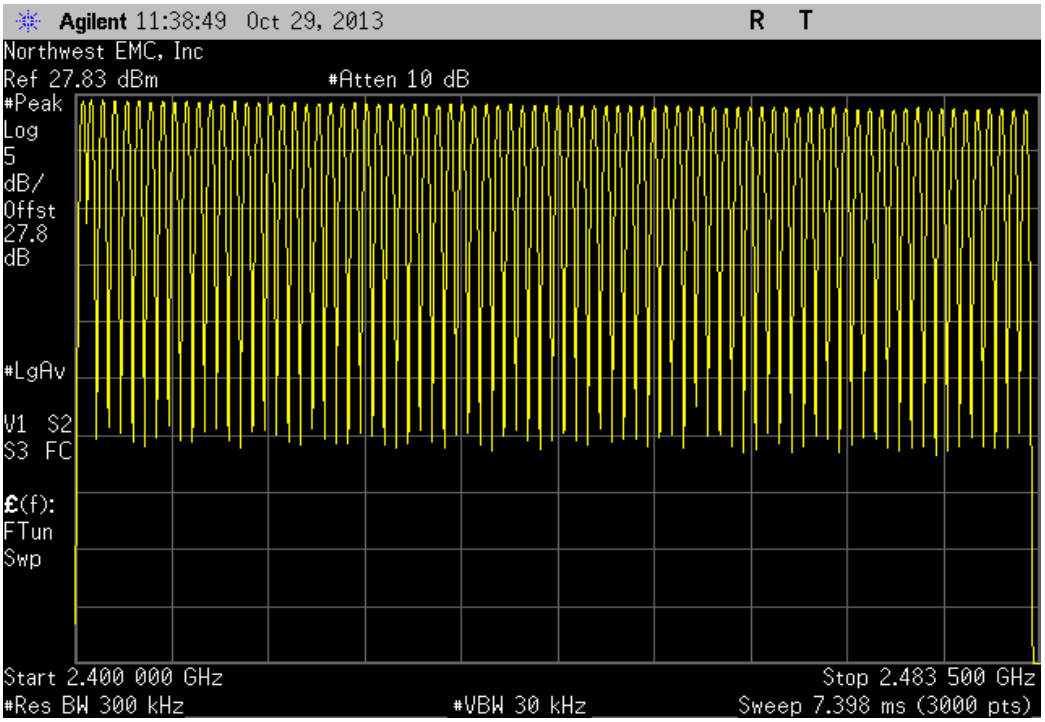


Hopping Mode D, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass



Number of Hopping Frequencies

Hopping Mode E, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
				Number of Channels	Limit	Result
				80	≥ 15	Pass



Dwell Time

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Signal Generator	Agilent	N5183A	TIA	1/27/2012	36
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	7/3/2013	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

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

The dwell time limit is based on the Number of Hopping Channels * 400 mS. For example, for Bluetooth this would be 79 Channels * 400mS = 31.6 Sec.

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

- Average Number of Pulses is based on 4 samples.

- Scale Factor = 31.6 Sec / Screen Capture Sweep Time = 31.6 Sec / 6.32 Sec = 5

EUT Output Power was set to 27dBm, and an attenuator and DC block were in line for all measurements.

Dwell Time

EUT:	GXM-T24			Work Order:	FREW0012
Serial Number:	245-4495			Date:	10/29/13
Customer:	FreeWave Technologies, Inc.			Temperature:	24°C
Attendees:	Dean Busch			Humidity:	29%
Project:	None			Barometric Pres.:	1017
Tested by:	Richard Mellroth	Power:	110VAC/60Hz	Job Site:	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.247:2013	ANSI C63.10:2009

COMMENTS

Hopping Mode. Adapter cable loss of 0.34dB added to reference level offsett. EUT output power set at 27dBm. Connected to development board and remote PC. EUT powered by 5 VDC supplied by development board via AC mains.

DEVIATIONS FROM TEST STANDARD

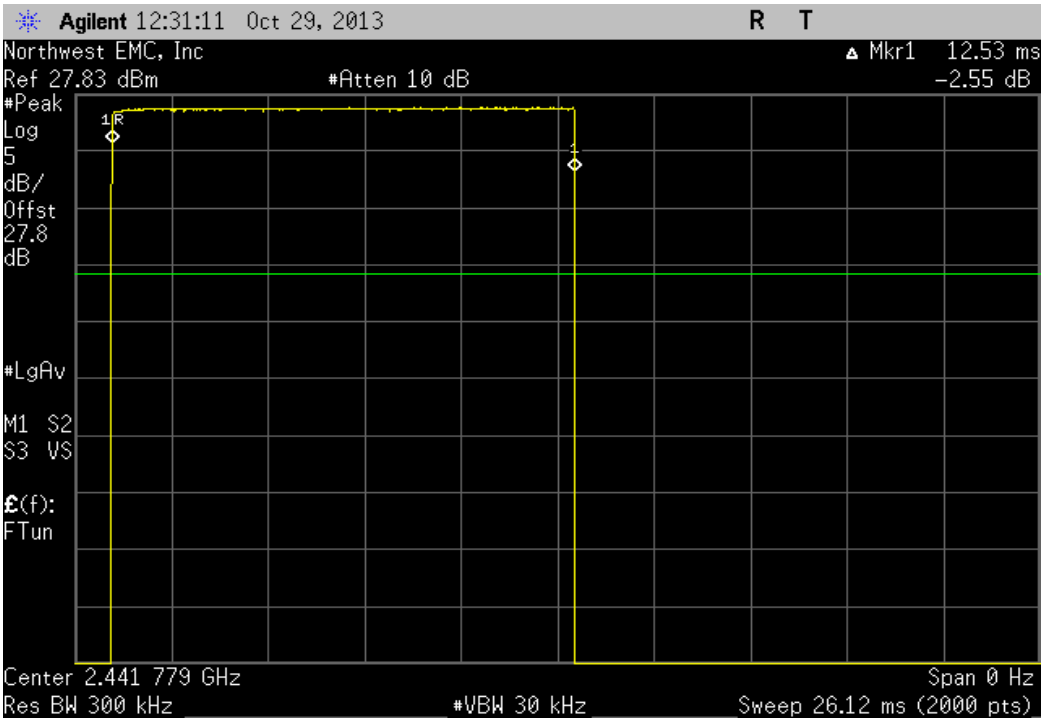
None

Configuration #	6	Signature

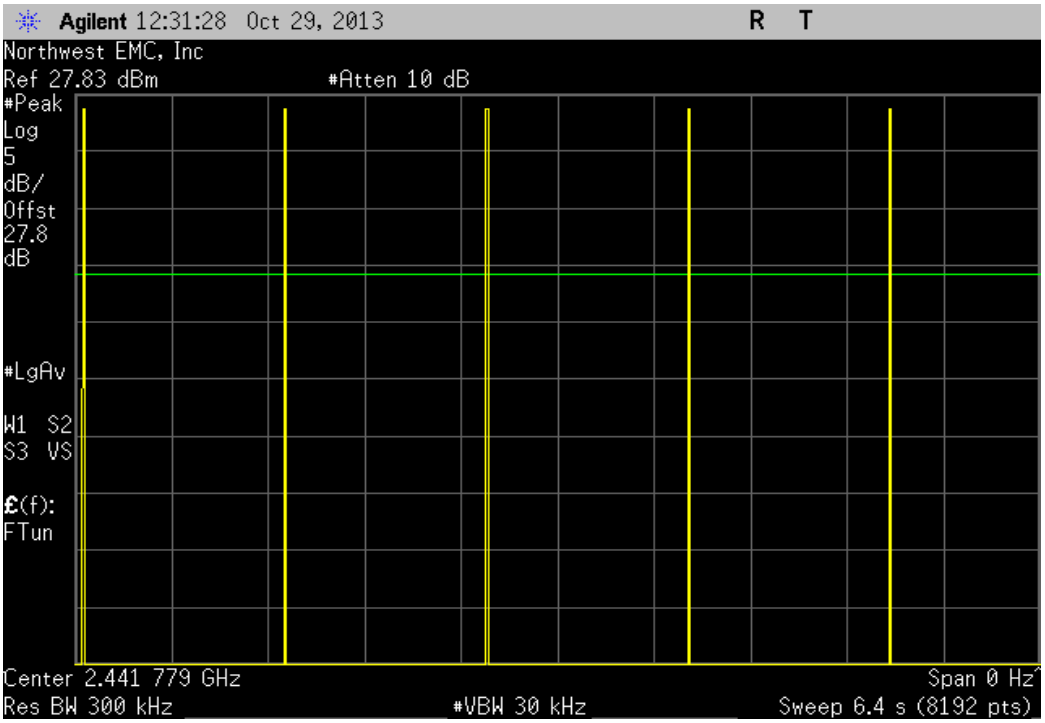
	Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 32 S	Limit (mS)	Result
Hopping Mode 0							
115.2 kbps, GFSK							
Mid Channel 120, 2441.7792 MHz	12.531	N/A	N/A	N/A	N/A	N/A	N/A
Mid Channel 120, 2441.7792 MHz	N/A	5	N/A	N/A	N/A	N/A	N/A
Mid Channel 120, 2441.7792 MHz	N/A	5	N/A	N/A	N/A	N/A	N/A
Mid Channel 120, 2441.7792 MHz	N/A	5	N/A	N/A	N/A	N/A	N/A
Mid Channel 120, 2441.7792 MHz	N/A	5	N/A	N/A	N/A	N/A	N/A
Mid Channel 120, 2441.7792 MHz	12.531	N/A	5	5	313.27	400	Pass

Dwell Time

Hopping Mode 0, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 32 S	Limit (mS)	Result
12.531	N/A	N/A	N/A	N/A	N/A	N/A

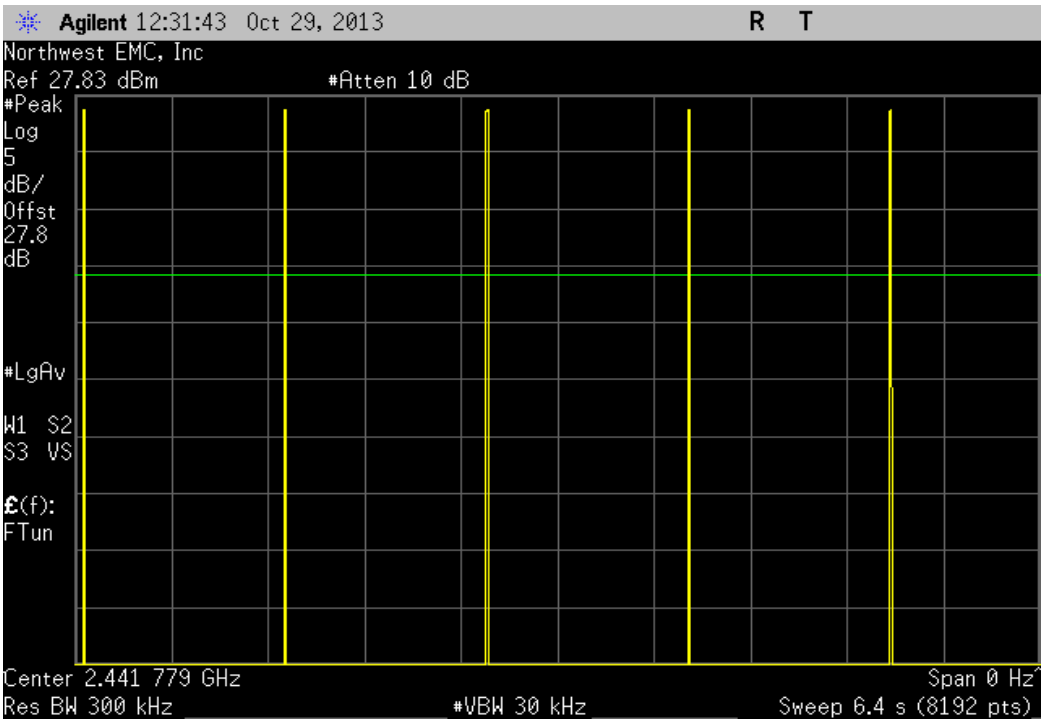


Hopping Mode 0, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 32 S	Limit (mS)	Result
N/A	5	N/A	N/A	N/A	N/A	N/A

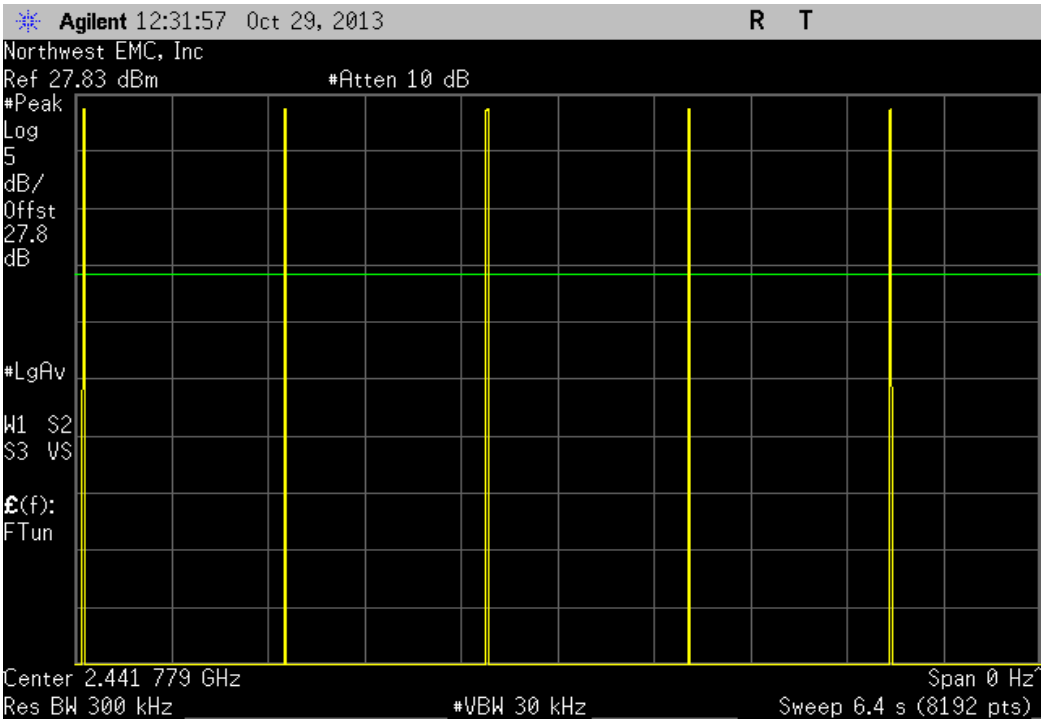


Dwell Time

Hopping Mode 0, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 32 S	Limit (mS)	Result
N/A	5	N/A	N/A	N/A	N/A	N/A

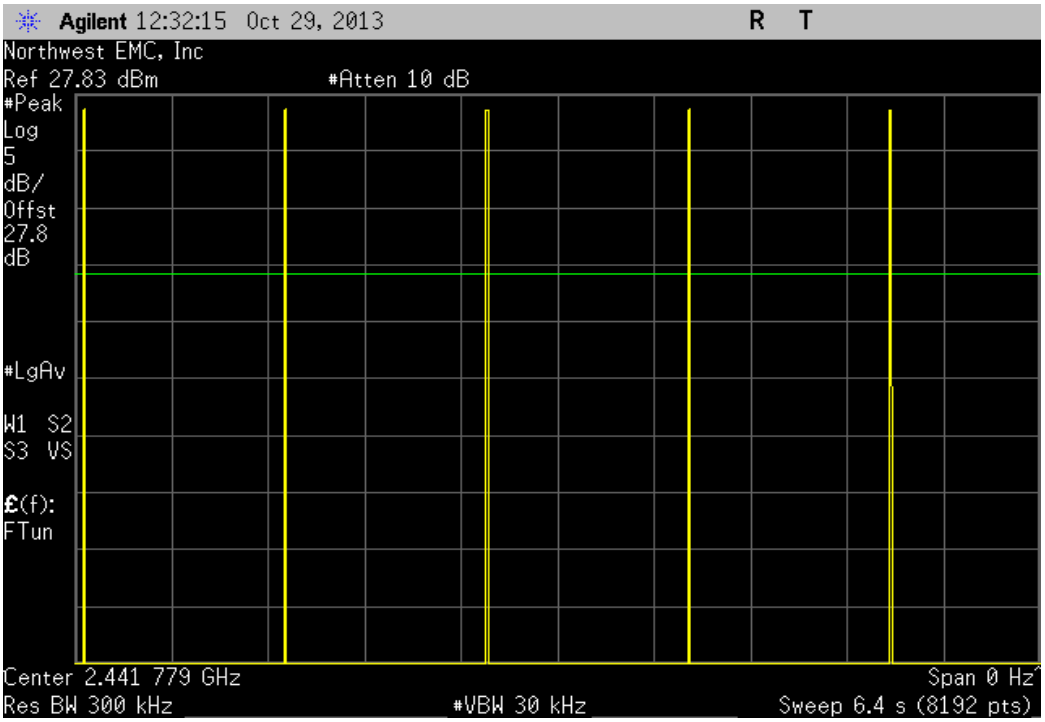


Hopping Mode 0, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 32 S	Limit (mS)	Result
N/A	5	N/A	N/A	N/A	N/A	N/A



Dwell Time

Hopping Mode 0, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 32 S	Limit (mS)	Result
N/A	5	N/A	N/A	N/A	N/A	N/A



Hopping Mode 0, 115.2 kbps, GFSK, Mid Channel 120, 2441.7792 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 32 S	Limit (mS)	Result
12.531	N/A	5	5	313.27	400	Pass

Calculation Only

No Screen Capture Required

Band Edge Compliance - Hopping Mode

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Signal Generator	Agilent	N5183A	TIA	1/27/2012	36
NC02 Cable	ESM Cable Corp.	TTBJ-141 KMKM-72	NC5	7/3/2013	12
Attenuator	Fairview Microwave	SA4014-20	TKE	2/12/2013	12
Spectrum Analyzer	Agilent	E4446A	AAT	6/28/2012	24

TEST DESCRIPTION

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 measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet.

The spectrum was scanned below the lower band edge and above the higher band edge. EUT Output Power was set to 27dBm, and an attenuator and DC block were in line for all measurements.

Band Edge Compliance - Hopping Mode

EUT:	GXM-T24			**Work Order:**	FREW0012
Serial Number:	245-4495			**Date:**	10/29/13
Customer:	FreeWave Technologies, Inc.			**Temperature:**	24°C
Attendees:	Dean Busch			**Humidity:**	29%
Project:	None			**Barometric Pres.:**	1017
Tested by:	Richard Mellroth	**Power:**	110VAC/60Hz	**Job Site:**	NC02

TEST SPECIFICATIONS	Test Method
FCC 15.247:2013	ANSI C63.10:2009

COMMENTS

Hopping Mode. Adapter cable loss of 0.34dB added to reference level offsett. EUT output power set at 27dBm. Connected to development board and remote PC. EUT powered by 5 VDC supplied by development board via AC mains.

DEVIATIONS FROM TEST STANDARD

None

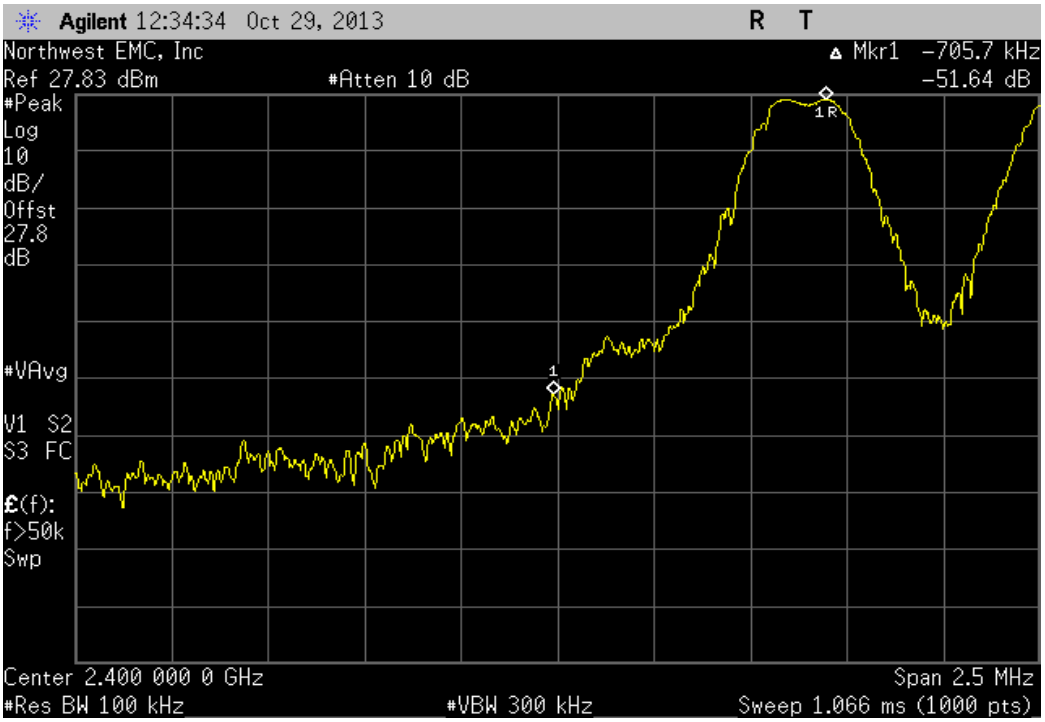
Configuration #	6	Signature

		Value	Limit	Result
Hopping Mode 0				
	115.2 kbps, GFSK			
	Low Channel 1, 2400.6528 MHz	-51.64 dBc	≤ -20 dBc	Pass
	High Channel 237, 2482.2144 MHz	-60.55 dBc	≤ -20 dBc	Pass
	153.6 kbps, GFSK			
	Low Channel 1, 2400.6528 MHz	-52.74 dBc	≤ -20 dBc	Pass
	High Channel 237, 2482.2144 MHz	-61.1 dBc	≤ -20 dBc	Pass

Band Edge Compliance - Hopping Mode

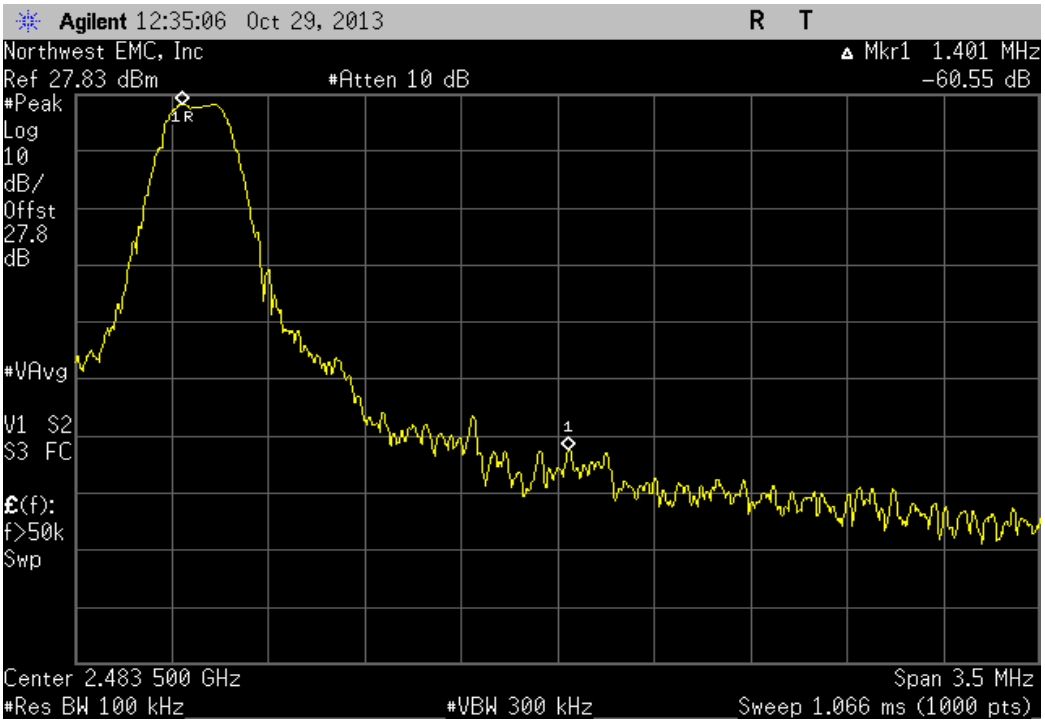
Hopping Mode 0, 115.2 kbps, GFSK, Low Channel 1, 2400.6528 MHz

Value	Limit	Result
-51.64 dBc	≤ -20 dBc	Pass



Hopping Mode 0, 115.2 kbps, GFSK, High Channel 237, 2482.2144 MHz

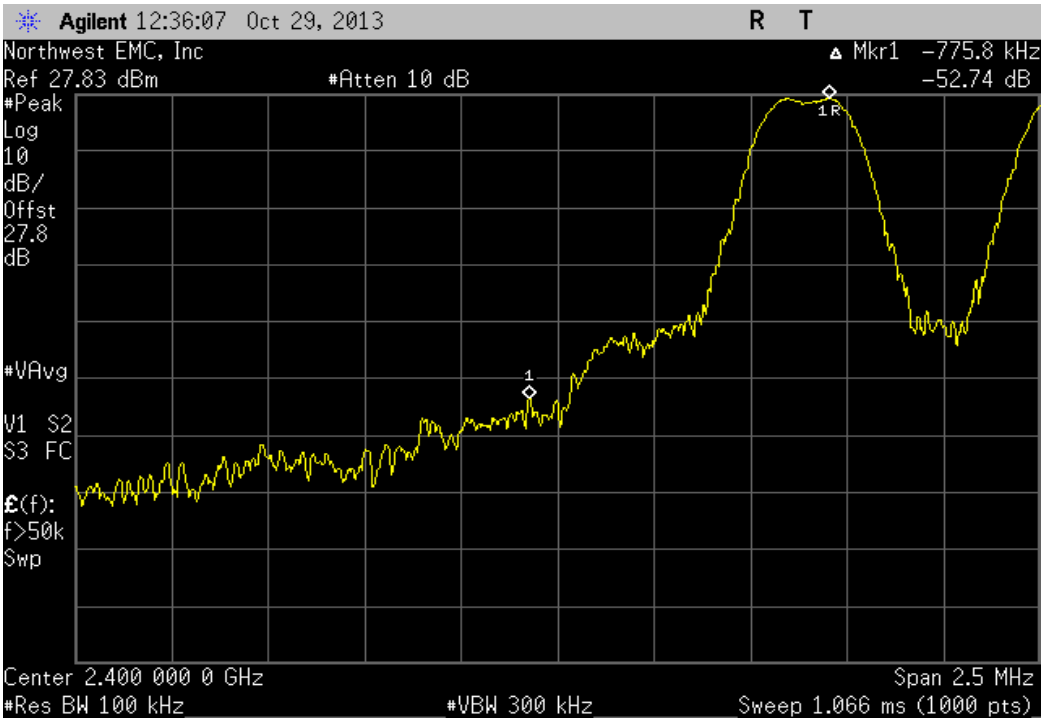
Value	Limit	Result
-60.55 dBc	≤ -20 dBc	Pass



Band Edge Compliance - Hopping Mode

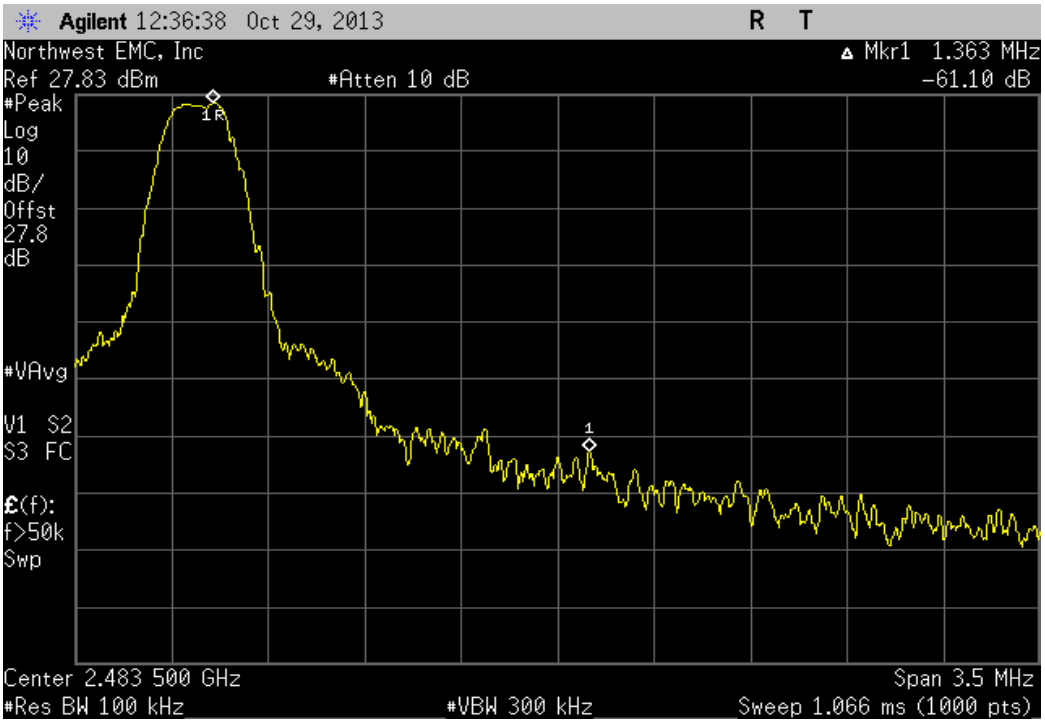
Hopping Mode 0, 153.6 kbps, GFSK, Low Channel 1, 2400.6528 MHz

Value	Limit	Result
-52.74 dBc	≤ -20 dBc	Pass



Hopping Mode 0, 153.6 kbps, GFSK, High Channel 237, 2482.2144 MHz

Value	Limit	Result
-61.1 dBc	≤ -20 dBc	Pass



SPURIOUS RADIATED EMISSIONS

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

MODES OF OPERATION, 2.4 GHz BAND

115.2 kbps, GFSK
153.6 kbps, GFSK

CHANNELS TESTED, 2.4 GHz BAND

Low Channel 1, 2400.6528 MHz
Mid Channel 120, 2441.7792 MHz.
High Channel 237, 2482.2144 MHz

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

FREW0012 - 7
FREW0012 - 8

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26000 MHz

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Attenuator, 10db, 'N'	S.M. Electronics	SA3N-10	REI	1/17/2013	12 mo
HP Filter	Micro-Tronics	HPM50111	HHI	1/18/2013	24 mo
Attenuator	Fairview Microwave	SA18E-20	AQV	1/18/2013	12 mo
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AOD	7/10/2013	12 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AOJ	12/14/2012	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AOK	12/14/2012	12 mo
Pre-Amplifier	Miteq	AMF-3D-00100800-32-13P	AVZ	12/13/2012	12 mo
Pre-Amplifier	Miteq	AM-1616-1000	PAB	12/13/2012	12 mo
Cable I	N/A	N/A	SUM	7/10/2013	12 mo
NC01 Cables	N/A	Standard Gain Horn Cable	NC3	12/14/2012	12 mo
NC01 Cables	N/A	3115 Horn Cable	NC2	12/13/2012	12 mo
NC01 Cables	N/A	Bilog Cables	NC1	12/13/2012	12 mo
Antenna, Horn	ETS	3160-09	AIY	NCR	0 mo
Antenna, Horn	EMCO	3160-08	AHO	NCR	0 mo
Antenna, Horn	EMCO	3160-07	AHP	NCR	0 mo
Antenna, Horn	EMCO	3115	AHM	6/19/2012	24 mo
Antenna, Biconilog	EMCO	3142	AXJ	5/16/2012	36 mo
Spectrum Analyzer	Agilent	E4440A	AAW	2/21/2013	24 mo

MEASUREMENT BANDWIDTHS

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

TEST DESCRIPTION

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

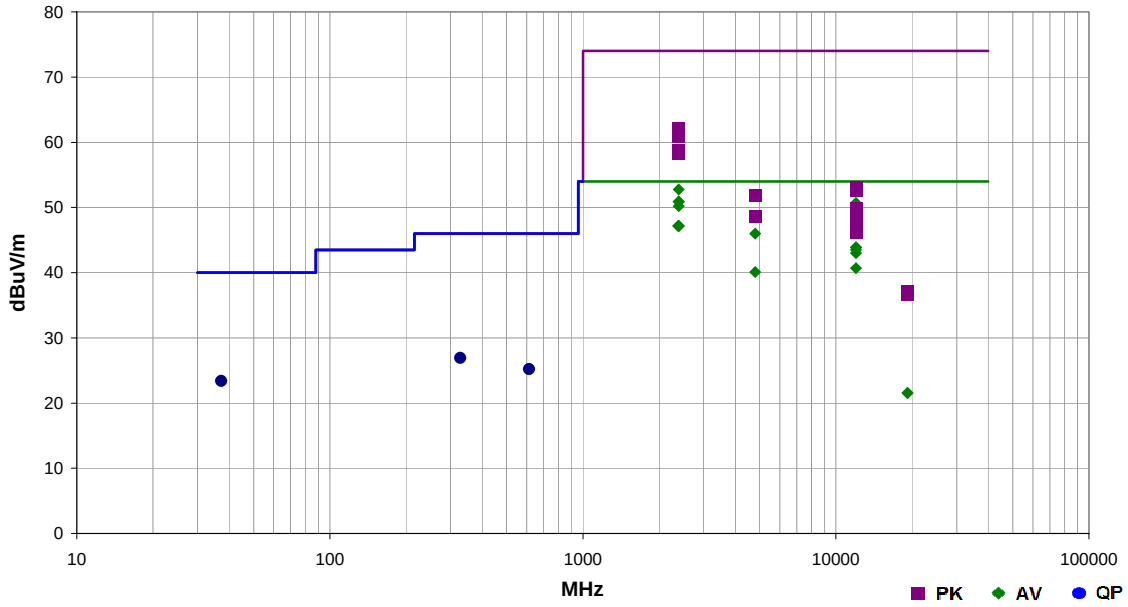
The power level used while under test for the 2.4 GHz band was set at 27 dBm. All average measurements above 1 GHz were performed using a RMS Average Detector, except for measurements noted by 10Hz Avg, indicating the use of a 10Hz VBW average detector as per FCC KDB 913591. The EUT was transmitting at its maximum (>90%) duty cycle for the duration of the test.

SPURIOUS RADIATED EMISSIONS

Work Order:	FREW0012	**Date:**	10/30/13		
Project:	None	**Temperature:**	23 °C		
Job Site:	NC01	**Humidity:**	31% RH		
Serial Number:	245-4495	**Barometric Pres.:**	1013 mbar	**Tested by:**	Richard Mellroth
EUT:	GXM-T24				
Configuration:	7				
Customer:	FreeWave Technologies, Inc.				
Attendees:	Dean Busch				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at maximum duty cycle, Low channel 1, 2400.6528 MHz. See comments below for EUT orientation and data rate.				
Deviations:	None				
Comments:	EUT connected to development board. EUT powered by 5 VDC supplied by development board via AC mains.				

Test Specifications	**Test Method**
FCC 15.247:2013	ANSI C63.10:2009

Run #	27-30,60	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**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
2390.000	35.0	-2.2	1.0	263.0	3.0	20.0	Horz	AV	0.0	52.8	54.0	-1.2	Ch 1, EUT Flat, 153.6 kbps
2389.993	33.1	-2.2	1.0	256.0	3.0	20.0	Horz	AV	0.0	50.9	54.0	-3.1	Ch 1, EUT Horz, 115.2 kbps, 10Hz Avg
2389.997	33.1	-2.2	1.0	258.0	3.0	20.0	Horz	AV	0.0	50.9	54.0	-3.1	Ch 1, EUT Flat, 115.2 kbps, 10Hz Avg
12003.190	54.3	-3.6	1.4	52.0	3.0	0.0	Horz	AV	0.0	50.7	54.0	-3.3	Ch 1, EUT Horz, 115.2 kbps
2389.983	32.4	-2.2	1.0	258.0	3.0	20.0	Horz	AV	0.0	50.2	54.0	-3.8	Ch 1, EUT Vert, 115.2 kbps, 10Hz Avg
12003.280	53.7	-3.6	1.2	319.0	3.0	0.0	Horz	AV	0.0	50.1	54.0	-3.9	Ch 1, EUT Horz, 153.6 kbps
2389.240	29.4	-2.2	1.0	264.0	3.0	20.0	Vert	AV	0.0	47.2	54.0	-6.8	Ch 1, EUT Vert, 115.2 kbps
2389.107	29.4	-2.2	1.0	230.0	3.0	20.0	Vert	AV	0.0	47.2	54.0	-6.8	Ch 1, EUT Horz, 115.2 kbps
2388.267	29.4	-2.2	2.7	104.0	3.0	20.0	Vert	AV	0.0	47.2	54.0	-6.8	Ch 1, EUT Flat, 153.6 kbps
2388.093	29.4	-2.2	1.5	0.0	3.0	20.0	Vert	AV	0.0	47.2	54.0	-6.8	Ch 1, EUT Flat, 115.2 kbps
12003.210	50.0	-3.6	1.2	230.0	3.0	0.0	Vert	AV	0.0	46.4	54.0	-7.6	Ch 1, EUT Flat, 115.2 kbps
4801.320	38.8	7.2	1.0	307.0	3.0	0.0	Horz	AV	0.0	46.0	54.0	-8.0	Ch 1, EUT Horz, 115.2 kbps
12003.150	47.5	-3.6	1.0	324.0	3.0	0.0	Vert	AV	0.0	43.9	54.0	-10.1	Ch 1, EUT Horz, 115.2 kbps
12003.230	47.5	-3.6	1.1	13.0	3.0	0.0	Vert	AV	0.0	43.9	54.0	-10.1	Ch 1, EUT Vert, 115.2 kbps
12003.250	47.1	-3.6	1.7	261.0	3.0	0.0	Horz	AV	0.0	43.5	54.0	-10.5	Ch 1, EUT Vert, 115.2 kbps
12003.200	46.6	-3.6	1.3	192.0	3.0	0.0	Horz	AV	0.0	43.0	54.0	-11.0	Ch 1, EUT Flat, 115.2 kbps
2389.853	44.4	-2.2	1.0	258.0	3.0	20.0	Horz	PK	0.0	62.2	74.0	-11.8	Ch 1, EUT Vert, 115.2 kbps
2389.883	44.0	-2.2	1.0	258.0	3.0	20.0	Horz	PK	0.0	61.8	74.0	-12.2	Ch 1, EUT Flat, 115.2 kbps
2389.877	43.9	-2.2	1.0	256.0	3.0	20.0	Horz	PK	0.0	61.7	74.0	-12.3	Ch 1, EUT Horz, 115.2 kbps
2389.960	43.1	-2.2	1.0	263.0	3.0	20.0	Horz	PK	0.0	60.9	74.0	-13.1	Ch 1, EUT Flat, 153.6 kbps
12003.200	44.3	-3.6	1.2	160.0	3.0	0.0	Vert	AV	0.0	40.7	54.0	-13.3	Ch 1, EUT Horz, 153.6 kbps
4801.305	32.9	7.2	1.2	20.0	3.0	0.0	Vert	AV	0.0	40.1	54.0	-13.9	Ch 1, EUT Flat, 115.2 kbps
2389.327	40.9	-2.2	1.5	0.0	3.0	20.0	Vert	PK	0.0	58.7	74.0	-15.3	Ch 1, EUT Flat, 115.2 kbps
2389.057	40.8	-2.2	2.7	104.0	3.0	20.0	Vert	PK	0.0	58.6	74.0	-15.4	Ch 1, EUT Flat, 153.6 kbps
2389.353	40.7	-2.2	1.0	230.0	3.0	20.0	Vert	PK	0.0	58.5	74.0	-15.5	Ch 1, EUT Horz, 115.2 kbps
2388.100	40.5	-2.2	1.0	264.0	3.0	20.0	Vert	PK	0.0	58.3	74.0	-15.7	Ch 1, EUT Vert, 115.2 kbps
37.302	24.8	-1.5	1.0	139.0	3.0	0.0	Vert	QP	0.0	23.3	40.0	-16.7	Ch 1, EUT Horz, 115.2 kbps

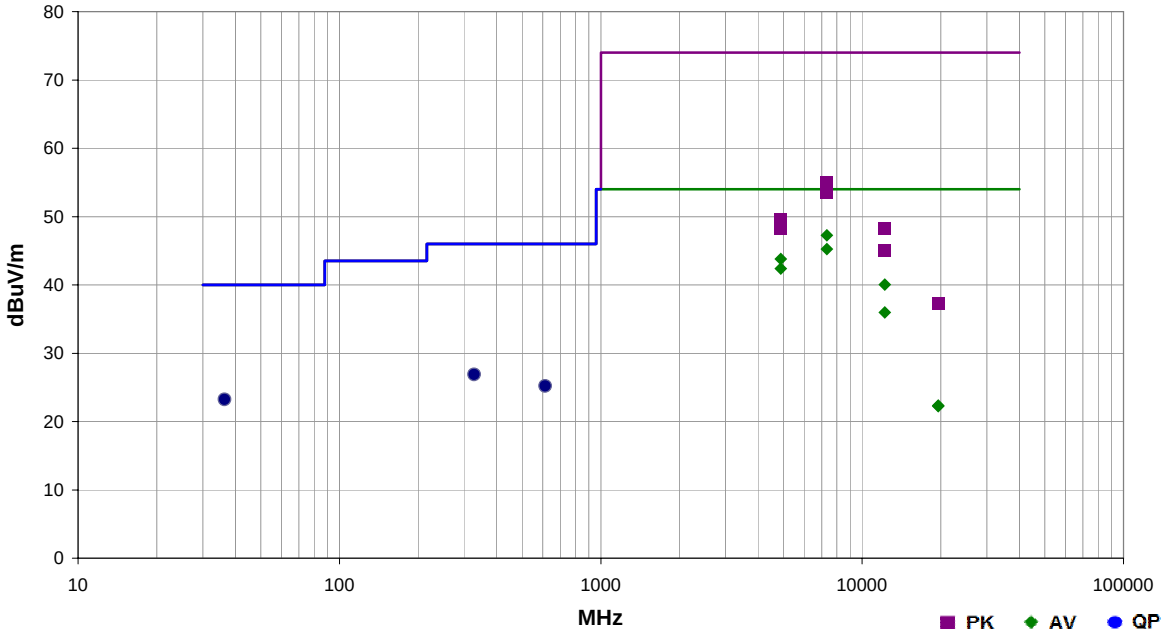
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
328.510	25.9	1.0	1.0	267.0	3.0	0.0	Horz	QP	0.0	26.9	46.0	-19.1	Ch 1, EUT Horz, 115.2 kbps
613.123	16.4	8.8	3.5	200.0	3.0	0.0	Horz	QP	0.0	25.2	46.0	-20.8	Ch 1, EUT Horz, 115.2 kbps
12003.480	56.7	-3.6	1.4	52.0	3.0	0.0	Horz	PK	0.0	53.1	74.0	-20.9	Ch 1, EUT Horz, 115.2 kbps
12003.580	56.2	-3.6	1.2	319.0	3.0	0.0	Horz	PK	0.0	52.6	74.0	-21.4	Ch 1, EUT Horz, 153.6 kbps
4801.305	44.6	7.2	1.0	307.0	3.0	0.0	Horz	PK	0.0	51.8	74.0	-22.2	Ch 1, EUT Horz, 115.2 kbps
12003.430	53.5	-3.6	1.2	230.0	3.0	0.0	Vert	PK	0.0	49.9	74.0	-24.1	Ch 1, EUT Flat, 115.2 kbps
4801.425	41.4	7.2	1.2	20.0	3.0	0.0	Vert	PK	0.0	48.6	74.0	-25.4	Ch 1, EUT Flat, 115.2 kbps
12003.460	51.8	-3.6	1.1	13.0	3.0	0.0	Vert	PK	0.0	48.2	74.0	-25.8	Ch 1, EUT Vert, 115.2 kbps
12002.990	51.5	-3.6	1.7	261.0	3.0	0.0	Horz	PK	0.0	47.9	74.0	-26.1	Ch 1, EUT Vert, 115.2 kbps
12002.860	51.5	-3.6	1.0	324.0	3.0	0.0	Vert	PK	0.0	47.9	74.0	-26.1	Ch 1, EUT Horz, 115.2 kbps
12003.470	51.0	-3.6	1.3	192.0	3.0	0.0	Horz	PK	0.0	47.4	74.0	-26.6	Ch 1, EUT Flat, 115.2 kbps
12003.430	49.7	-3.6	1.2	160.0	3.0	0.0	Vert	PK	0.0	46.1	74.0	-27.9	Ch 1, EUT Horz, 153.6 kbps
19207.120	21.6	-0.1	1.2	85.0	3.0	0.0	Horz	AV	0.0	21.5	54.0	-32.5	Ch 1, EUT Flat, 115.2 kbps
19206.040	21.6	-0.1	1.2	280.0	3.0	0.0	Vert	AV	0.0	21.5	54.0	-32.5	Ch 1, EUT Flat, 115.2 kbps
19207.130	37.2	-0.1	1.2	280.0	3.0	0.0	Vert	PK	0.0	37.1	74.0	-36.9	Ch 1, EUT Flat, 115.2 kbps
19207.040	36.8	-0.1	1.2	85.0	3.0	0.0	Horz	PK	0.0	36.7	74.0	-37.3	Ch 1, EUT Flat, 115.2 kbps

SPURIOUS RADIATED EMISSIONS

Work Order:	FREW0012	**Date:**	10/30/13		
Project:	None	**Temperature:**	23 °C		
Job Site:	NC01	**Humidity:**	31% RH		
Serial Number:	245-4495	**Barometric Pres.:**	1013 mbar	**Tested by:**	Richard Mellroth
EUT:	GXM-T24				
Configuration:	7				
Customer:	FreeWave Technologies, Inc.				
Attendees:	Dean Busch				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at maximum duty cycle, Mid channel 120, 2441.7792 MHz. See comments below for EUT orientation and data rate.				
Deviations:	None				
Comments:	EUT connected to development board. EUT powered by 5 VDC supplied by development board via AC mains.				

Test Specifications	**Test Method**
FCC 15.247:2013	ANSI C63.10:2009

Run #	31-33,60	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



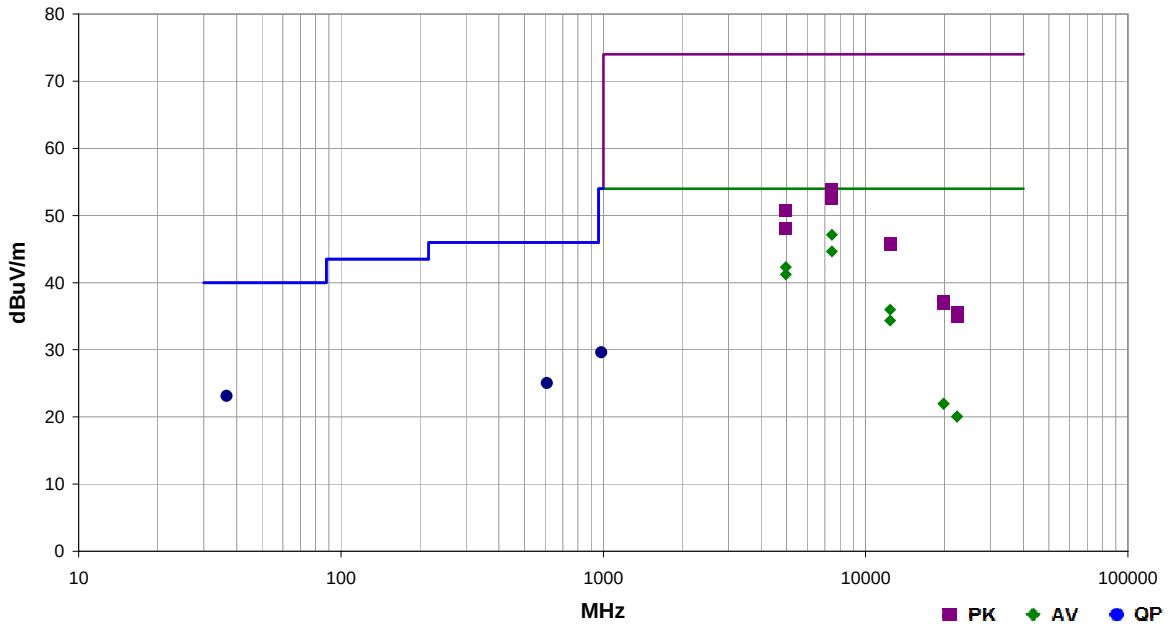
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7325.390	35.0	12.2	1.4	175.0	3.0	0.0	Vert	AV	0.0	47.2	54.0	-6.8	Ch 120, EUT Flat, 115.2 kbps
7325.375	33.0	12.2	1.2	169.0	3.0	0.0	Horz	AV	0.0	45.2	54.0	-8.8	Ch 120, EUT Flat, 115.2 kbps
4883.600	36.5	7.3	1.0	234.0	3.0	0.0	Vert	AV	0.0	43.8	54.0	-10.2	Ch 120, EUT Flat, 115.2 kbps
4883.525	35.1	7.3	1.1	219.0	3.0	0.0	Horz	AV	0.0	42.4	54.0	-11.6	Ch 120, EUT Flat, 115.2 kbps
12208.900	43.6	-3.5	1.2	227.0	3.0	0.0	Vert	AV	0.0	40.1	54.0	-13.9	Ch 120, EUT Flat, 115.2 kbps
36.417	24.4	-1.2	1.0	85.0	3.0	0.0	Vert	QP	0.0	23.2	40.0	-16.8	Ch 120, EUT Flat, 115.2 kbps
12208.880	39.5	-3.5	1.0	125.0	3.0	0.0	Horz	AV	0.0	36.0	54.0	-18.0	Ch 120, EUT Flat, 115.2 kbps
7325.445	42.7	12.2	1.4	175.0	3.0	0.0	Vert	PK	0.0	54.9	74.0	-19.1	Ch 120, EUT Flat, 115.2 kbps
328.083	25.9	1.0	1.0	295.0	3.0	0.0	Horz	QP	0.0	26.9	46.0	-19.1	Ch 120, EUT Flat, 115.2 kbps
7325.325	41.3	12.2	1.2	169.0	3.0	0.0	Horz	PK	0.0	53.5	74.0	-20.5	Ch 120, EUT Flat, 115.2 kbps
613.127	16.4	8.8	1.9	4.0	3.0	0.0	Vert	QP	0.0	25.2	46.0	-20.8	Ch 120, EUT Flat, 115.2 kbps
4883.440	42.2	7.3	1.0	234.0	3.0	0.0	Vert	PK	0.0	49.5	74.0	-24.5	Ch 120, EUT Flat, 115.2 kbps
12208.900	51.8	-3.5	1.2	227.0	3.0	0.0	Vert	PK	0.0	48.3	74.0	-25.7	Ch 120, EUT Flat, 115.2 kbps
4883.590	40.9	7.3	1.1	219.0	3.0	0.0	Horz	PK	0.0	48.2	74.0	-25.8	Ch 120, EUT Flat, 115.2 kbps
12208.790	48.5	-3.5	1.0	125.0	3.0	0.0	Horz	PK	0.0	45.0	74.0	-29.0	Ch 120, EUT Flat, 115.2 kbps
19531.580	22.0	0.3	1.2	283.0	3.0	0.0	Horz	AV	0.0	22.3	54.0	-31.7	Ch 120, EUT Flat, 115.2 kbps
19531.930	21.9	0.3	1.2	126.0	3.0	0.0	Vert	AV	0.0	22.2	54.0	-31.8	Ch 120, EUT Flat, 115.2 kbps
19532.520	37.0	0.3	1.2	126.0	3.0	0.0	Vert	PK	0.0	37.3	74.0	-36.7	Ch 120, EUT Flat, 115.2 kbps
19535.500	36.9	0.3	1.2	283.0	3.0	0.0	Horz	PK	0.0	37.2	74.0	-36.8	Ch 120, EUT Flat, 115.2 kbps

SPURIOUS RADIATED EMISSIONS

Work Order:	FREW0012	**Date:**	10/30/13		
Project:	None	**Temperature:**	23 °C		
Job Site:	NC01	**Humidity:**	31% RH		
Serial Number:	245-4495	**Barometric Pres.:**	1013 mbar	**Tested by:**	Richard Mellroth
EUT:	GXM-T24				
Configuration:	7				
Customer:	FreeWave Technologies, Inc.				
Attendees:	Dean Busch				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at maximum duty cycle, High channel 237, 2482.2144 MHz. See comments below for EUT orientation and data rate.				
Deviations:	None				
Comments:	EUT connected to development board. EUT powered by 5 VDC supplied by development board via AC mains.				

Test Specifications	**Test Method**
FCC 15.247:2013	ANSI C63.10:2009

Run #	24-26,60	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



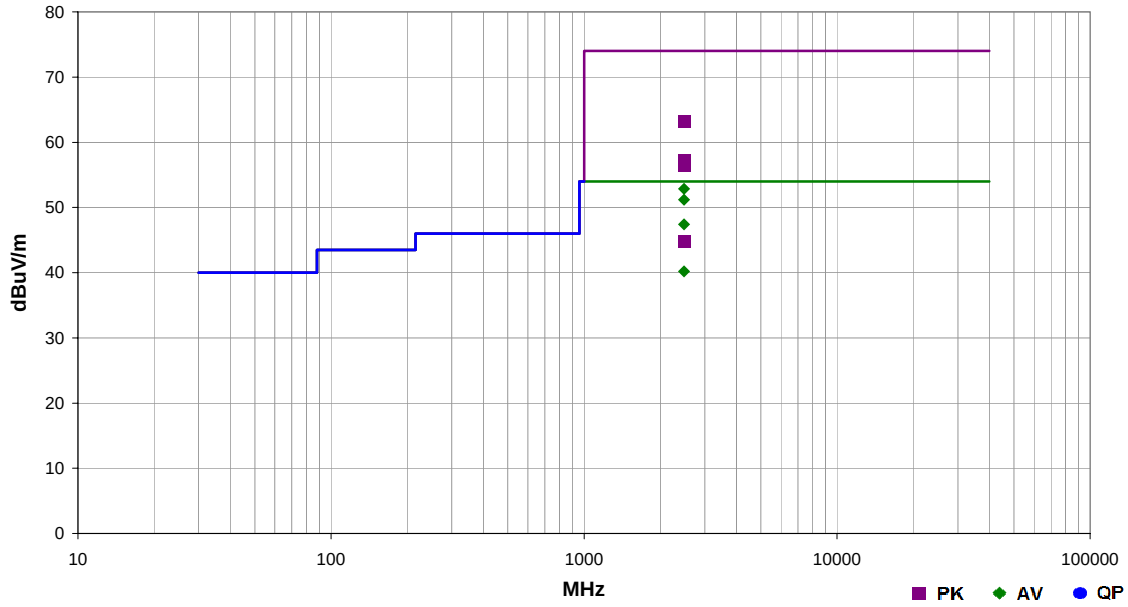
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7446.640	34.4	12.7	1.2	34.0	3.0	0.0	Vert	AV	0.0	47.1	54.0	-6.9	Ch 237, EUT Vert, 115.2 kbps
7446.600	31.9	12.7	1.2	200.0	3.0	0.0	Horz	AV	0.0	44.6	54.0	-9.4	Ch 237, EUT Flat, 115.2 kbps
4964.400	34.8	7.5	1.2	323.0	3.0	0.0	Vert	AV	0.0	42.3	54.0	-11.7	Ch 237, EUT Vert, 115.2 kbps
4964.395	33.7	7.5	1.4	42.0	3.0	0.0	Horz	AV	0.0	41.2	54.0	-12.8	Ch 237, EUT Flat, 115.2 kbps
36.747	24.4	-1.3	1.0	68.0	3.0	0.0	Vert	QP	0.0	23.1	40.0	-16.9	Ch 237, EUT Flat, 115.2 kbps
12411.050	33.5	2.5	1.0	13.0	3.0	0.0	Vert	AV	0.0	36.0	54.0	-18.0	Ch 237, EUT Vert, 115.2 kbps
12411.060	31.9	2.5	1.0	135.0	3.0	0.0	Horz	AV	0.0	34.4	54.0	-19.6	Ch 237, EUT Flat, 115.2 kbps
7446.280	41.1	12.7	1.2	34.0	3.0	0.0	Vert	PK	0.0	53.8	74.0	-20.2	Ch 237, EUT Vert, 115.2 kbps
610.018	16.4	8.6	1.0	37.0	3.0	0.0	Vert	QP	0.0	25.0	46.0	-21.0	Ch 237, EUT Flat, 115.2 kbps
7446.525	39.8	12.7	1.2	200.0	3.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	Ch 237, EUT Flat, 115.2 kbps
4964.600	43.3	7.5	1.2	323.0	3.0	0.0	Vert	PK	0.0	50.8	74.0	-23.2	Ch 237, EUT Vert, 115.2 kbps
986.015	16.3	13.3	3.5	35.0	3.0	0.0	Vert	QP	0.0	29.6	54.0	-24.4	Ch 237, EUT Flat, 115.2 kbps
4964.775	40.6	7.5	1.4	42.0	3.0	0.0	Horz	PK	0.0	48.1	74.0	-25.9	Ch 237, EUT Flat, 115.2 kbps
12410.830	43.4	2.5	1.0	13.0	3.0	0.0	Vert	PK	0.0	45.9	74.0	-28.1	Ch 237, EUT Vert, 115.2 kbps
12411.230	43.2	2.5	1.0	135.0	3.0	0.0	Horz	PK	0.0	45.7	74.0	-28.3	Ch 237, EUT Flat, 115.2 kbps
19855.680	21.8	0.1	1.2	302.0	3.0	0.0	Vert	AV	0.0	21.9	54.0	-32.1	Ch 237, EUT Flat, 115.2 kbps
19855.980	21.8	0.1	1.2	51.0	3.0	0.0	Horz	AV	0.0	21.9	54.0	-32.1	Ch 237, EUT Flat, 115.2 kbps
22338.810	22.0	-2.0	1.2	3.0	3.0	0.0	Vert	AV	0.0	20.0	54.0	-34.0	Ch 237, EUT Flat, 115.2 kbps
22342.030	22.0	-2.0	1.2	0.0	3.0	0.0	Horz	AV	0.0	20.0	54.0	-34.0	Ch 237, EUT Flat, 115.2 kbps
19857.030	37.1	0.1	1.2	51.0	3.0	0.0	Horz	PK	0.0	37.2	74.0	-36.8	Ch 237, EUT Flat, 115.2 kbps
19857.900	36.7	0.1	1.2	302.0	3.0	0.0	Vert	PK	0.0	36.8	74.0	-37.2	Ch 237, EUT Flat, 115.2 kbps
22339.810	37.5	-2.0	1.2	0.0	3.0	0.0	Horz	PK	0.0	35.5	74.0	-38.5	Ch 237, EUT Flat, 115.2 kbps
22341.040	36.9	-2.0	1.2	3.0	3.0	0.0	Vert	PK	0.0	34.9	74.0	-39.1	Ch 237, EUT Flat, 115.2 kbps

SPURIOUS RADIATED EMISSIONS

Work Order:	FREW0012	**Date:**	10/30/13		
Project:	None	**Temperature:**	23 °C		
Job Site:	NC01	**Humidity:**	31% RH		
Serial Number:	245-4495	**Barometric Pres.:**	1013 mbar	**Tested by:**	Richard Mellroth
EUT:	GXM-T24				
Configuration:	7				
Customer:	FreeWave Technologies, Inc.				
Attendees:	Dean Busch				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at maximum duty cycle, High channel 237, 2482.2144 MHz. See comments below for EUT orientation and data rate.				
Deviations:	None				
Comments:	EUT connected to development board. EUT powered by 5 VDC supplied by development board via AC mains. Marker-Delta measurements at 2483.5 MHz restricted band edge				

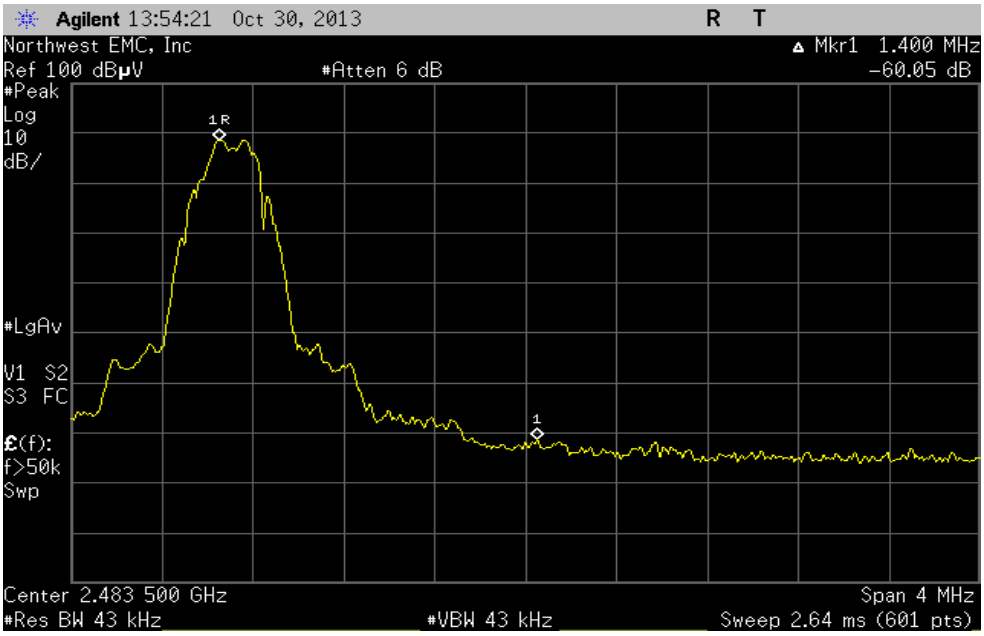
Test Specifications	**Test Method**
FCC 15.247:2013	ANSI C63.10:2009

Run #	23,34	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass

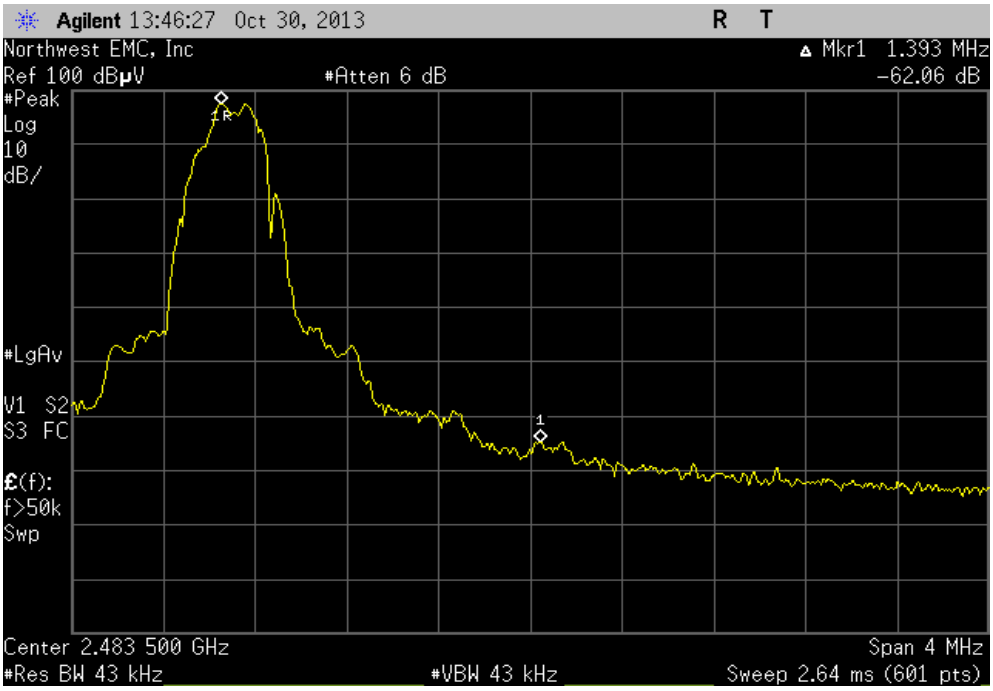


Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2482.260	86.9	-2.0	1.0	270.0	3.0	30.0	Horz	AV	0.0	114.9	-	-	Fundamental Measurement Ch 237, EUT Flat, 153.6 kbps Marker Delta: -62.06 dBc
2483.547	-	-	1.0	270.0	3.0	30.0	Horz	AV	0.0	52.8	54.0	-1.2	Avg = 114.9 - 62.06 = 52.8 dBuV/m
2482.260	94.6	-2.0	1.0	161.0	3.0	20.0	Vert	AV	0.0	112.6	-	-	Fundamental Measurement Ch 237, EUT Vert, 115.2 kbps Marker Delta: -61.37 dBc
2483.647	-	-	1.0	161.0	3.0	20.0	Vert	AV	0.0	51.2	54.0	-2.8	Avg = 112.6 - 61.37 = 51.2 dBuV/m
2482.193	79.4	-2.0	1.2	155.0	3.0	30.0	Vert	AV	0.0	107.4	-	-	Fundamental Measurement Ch 237, EUT Vert, 153.6 kbps Marker Delta: -60.05 dBc
2483.553	-	-	1.2	155.0	3.0	30.0	Vert	AV	0.0	47.4	54.0	-6.4	Avg = 107.4 - 60.05 = 47.4 dBuV/m
2482.243	97.3	-2.0	1.0	270.0	3.0	30.0	Horz	PK	0.0	125.3	-	-	Fundamental Measurement Ch 237, EUT Flat, 153.6 kbps Marker Delta: -62.06 dBc
2483.547	-	-	1.0	270.0	3.0	30.0	Horz	PK	0.0	63.2	74.0	-10.8	PK = 125.3 - 62.06 = 63.2 dBuV/m
2482.268	77.0	-2.0	1.0	266.0	3.0	20.0	Horz	AV	0.0	95.0	-	-	Fundamental Measurement Ch 237, EUT Flat, 115.2 kbps Marker Delta: -54.82 dBc
2484.107	-	-	1.0	266.0	3.0	20.0	Horz	AV	0.0	40.2	54.0	-13.8	Avg = 95.0 - 54.82 = 40.2 dBuV/m
2482.268	100.6	-2.0	1.0	161.0	3.0	20.0	Vert	PK	0.0	118.6	-	-	Fundamental Measurement Ch 237, EUT Vert, 115.2 kbps Marker Delta: -61.37 dBc
2483.647	-	-	1.0	161.0	3.0	20.0	Vert	PK	0.0	57.2	74.0	-16.8	PK = 118.6 - 61.37 dBc = 57.2 dBuV/m
2482.135	88.5	-2.0	1.2	155.0	3.0	30.0	Vert	PK	0.0	116.5	-	-	Fundamental Measurement Ch 237, EUT Vert, 153.6 kbps Marker Delta: -60.05 dBc

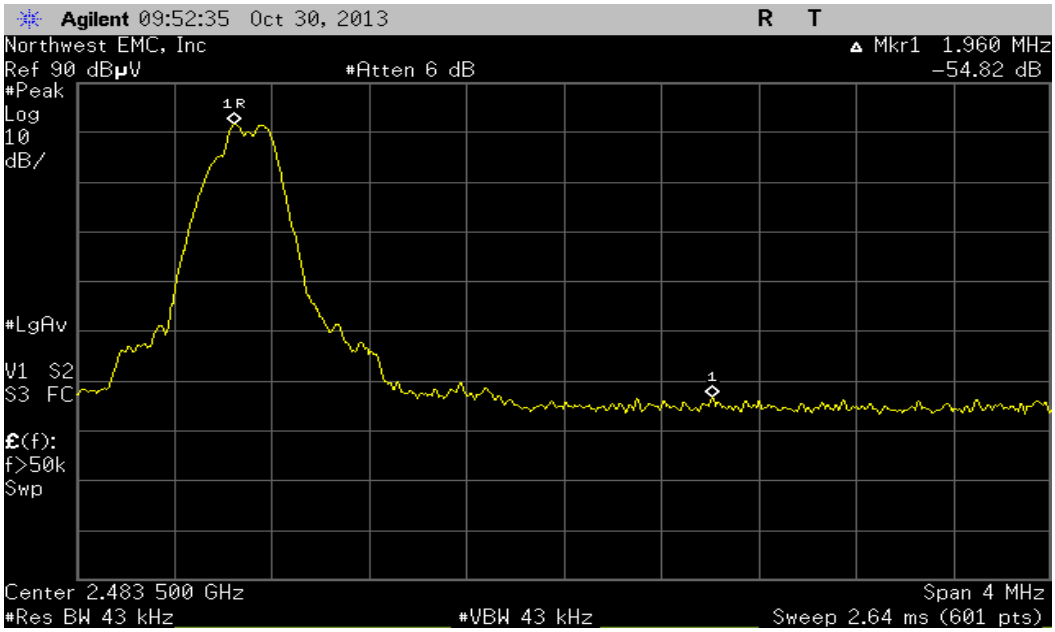
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2483.553	-	-	1.2	155.0	3.0	30.0	Vert	PK	0.0	56.5	74.0	-17.5	PK = 116.5 - 60.05 = 56.5 dBuV/m
2482.235	81.5	-2.0	1.0	266.0	3.0	20.0	Horz	PK	0.0	99.5	-	-	Fundamental Measurement Ch 237, EUT Flat, 115.2 kbps Marker Delta: -54.82 dBc
2484.107	-	-	1.0	266.0	3.0	20.0	Horz	PK	0.0	44.7	74.0	-29.3	PK = 99.5 - 54.82 = 44.7 dBuV/m



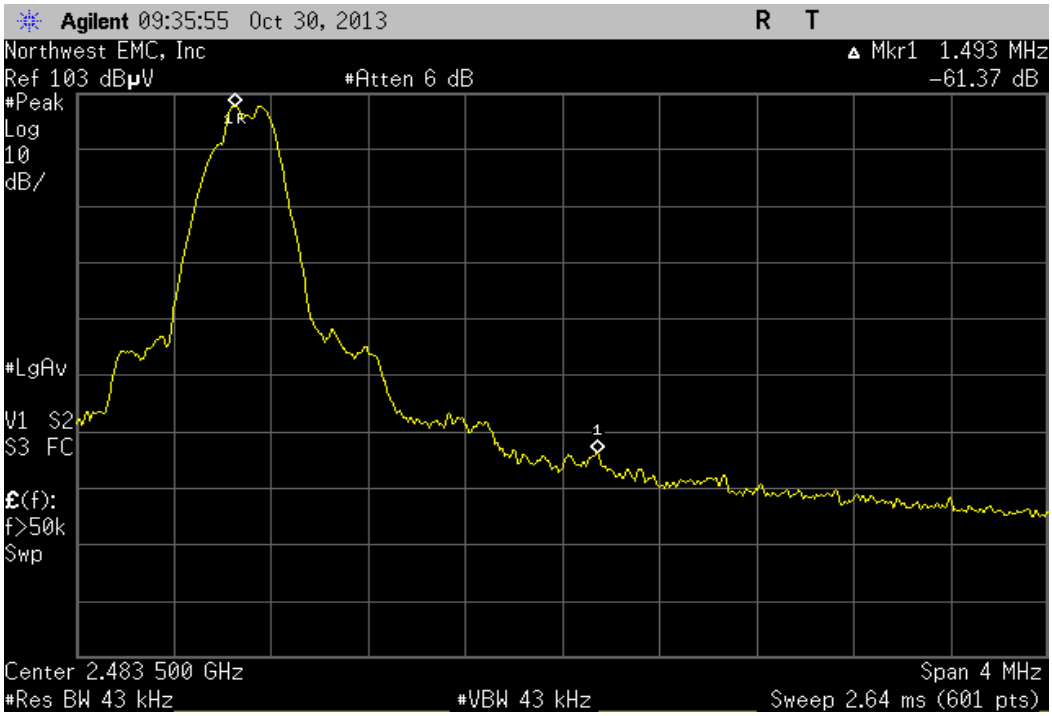
Ch 237, EUT Vert, 153.6 kbps



Ch 237, EUT Flat, 153.6 kbps



Ch 237, EUT Flat, 115.2 kbps



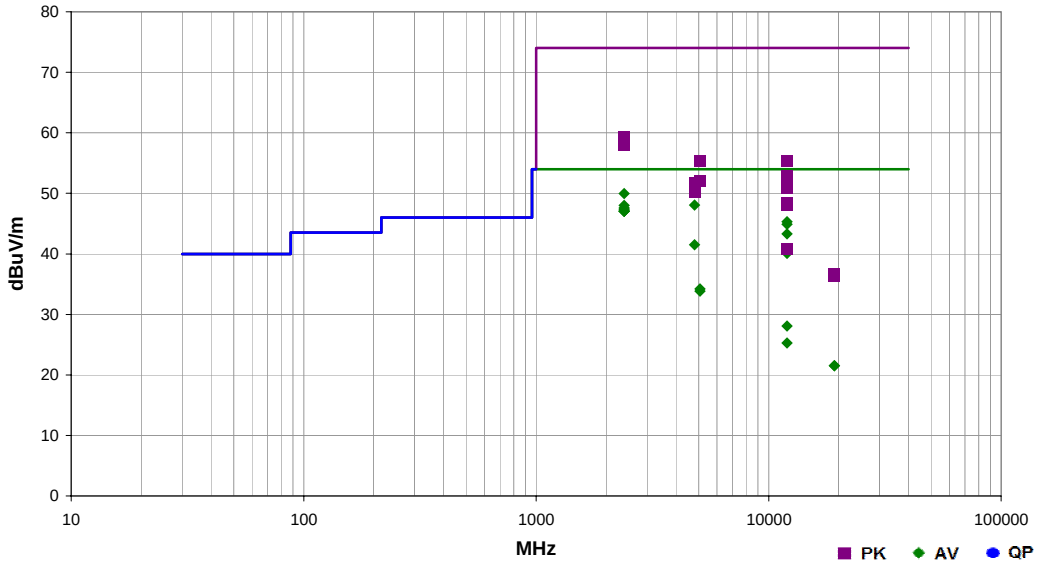
Ch 237, EUT Vert, 115.2 kbps

SPURIOUS RADIATED EMISSIONS

Work Order:	FREW0012	**Date:**	10/30/13		
Project:	None	**Temperature:**	23 °C		
Job Site:	NC01	**Humidity:**	31% RH		
Serial Number:	245-4495	**Barometric Pres.:**	1013 mbar	**Tested by:**	Richard Mellroth
EUT:	GXM-T24				
Configuration:	8				
Customer:	FreeWave Technologies, Inc.				
Attendees:	Dean Busch				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at maximum duty cycle, Low channel 1, 2400.6528 MHz. See comments below for EUT orientation and data rate.				
Deviations:	None				
Comments:	EUT connected to development board. EUT powered by 5 VDC supplied by development board via AC mains.				

Test Specifications	**Test Method**
FCC 15.247:2013	ANSI C63.10:2009

Run #	49,51-52,57	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2389.953	32.2	-2.2	1.0	347.0	3.0	20.0	Vert	AV	0.0	50.0	54.0	-4.0	Ch 1, EUT Vert, 153.6 kbps
12003.310	51.8	-3.6	1.3	320.0	3.0	0.0	Horz	AV	0.0	48.2	54.0	-5.8	Ch 1, EUT Horz, 115.2 kbps
4801.310	40.9	7.2	1.2	193.0	3.0	0.0	Vert	AV	0.0	48.1	54.0	-5.9	Ch 1, EUT Flat, 115.2 kbps
2389.987	30.2	-2.2	1.0	232.0	3.0	20.0	Vert	AV	0.0	48.0	54.0	-6.0	Ch 1, EUT Vert, 115.2 kbps
2389.957	29.8	-2.2	1.0	15.0	3.0	20.0	Horz	AV	0.0	47.6	54.0	-6.4	Ch 1, EUT Vert, 115.2 kbps
2389.960	29.6	-2.2	1.0	240.0	3.0	20.0	Vert	AV	0.0	47.4	54.0	-6.6	Ch 1, EUT Horz, 115.2 kbps
2389.220	29.3	-2.2	1.0	142.0	3.0	20.0	Horz	AV	0.0	47.1	54.0	-6.9	Ch 1, EUT Horz, 115.2 kbps
2388.520	29.3	-2.2	1.0	232.0	3.0	20.0	Horz	AV	0.0	47.1	54.0	-6.9	Ch 1, EUT Vert, 153.6 kbps
2388.380	29.3	-2.2	3.8	161.0	3.0	20.0	Vert	AV	0.0	47.1	54.0	-6.9	Ch 1, EUT Flat, 115.2 kbps
2388.227	29.3	-2.2	1.0	57.0	3.0	20.0	Horz	AV	0.0	47.1	54.0	-6.9	Ch 1, EUT Flat, 115.2 kbps
12003.240	48.9	-3.6	1.1	216.0	3.0	0.0	Vert	AV	0.0	45.3	54.0	-8.7	Ch 1, EUT Flat, 115.2 kbps
12003.230	48.5	-3.6	1.2	292.0	3.0	0.0	Horz	AV	0.0	44.9	54.0	-9.1	Ch 1, EUT Horz, 153.6 kbps
12003.290	46.9	-3.6	1.2	9.0	3.0	0.0	Vert	AV	0.0	43.3	54.0	-10.7	Ch 1, EUT Vert, 115.2 kbps
4801.425	34.3	7.2	1.1	299.0	3.0	0.0	Horz	AV	0.0	41.5	54.0	-12.5	Ch 1, EUT Horz, 115.2 kbps
12003.240	44.4	-3.6	1.2	304.0	3.0	0.0	Vert	AV	0.0	40.8	54.0	-13.2	Ch 1, EUT Horz, 115.2 kbps
12003.270	43.7	-3.6	1.1	152.0	3.0	0.0	Horz	AV	0.0	40.1	54.0	-13.9	Ch 1, EUT Flat, 115.2 kbps
2389.950	41.5	-2.2	1.0	347.0	3.0	20.0	Vert	PK	0.0	59.3	74.0	-14.7	Ch 1, EUT Vert, 153.6 kbps
2388.757	41.3	-2.2	1.0	232.0	3.0	20.0	Horz	PK	0.0	59.1	74.0	-14.9	Ch 1, EUT Vert, 153.6 kbps
2388.580	41.1	-2.2	1.0	142.0	3.0	20.0	Horz	PK	0.0	58.9	74.0	-15.1	Ch 1, EUT Horz, 115.2 kbps
2388.317	41.1	-2.2	1.0	232.0	3.0	20.0	Vert	PK	0.0	58.9	74.0	-15.1	Ch 1, EUT Vert, 115.2 kbps
2388.510	40.9	-2.2	1.0	240.0	3.0	20.0	Vert	PK	0.0	58.7	74.0	-15.3	Ch 1, EUT Horz, 115.2 kbps
2389.600	40.6	-2.2	3.8	161.0	3.0	20.0	Vert	PK	0.0	58.4	74.0	-15.6	Ch 1, EUT Flat, 115.2 kbps
2389.517	40.5	-2.2	1.0	15.0	3.0	20.0	Horz	PK	0.0	58.3	74.0	-15.7	Ch 1, EUT Vert, 115.2 kbps
2388.063	40.3	-2.2	1.0	57.0	3.0	20.0	Horz	PK	0.0	58.1	74.0	-15.9	Ch 1, EUT Flat, 115.2 kbps
5067.675	47.6	7.8	1.2	304.0	3.0	0.0	Horz	PK	0.0	55.4	74.0	-18.6	Ch 1, EUT Horz, 115.2 kbps
12003.630	59.0	-3.6	1.3	320.0	3.0	0.0	Horz	PK	0.0	55.4	74.0	-18.6	Ch 1, EUT Horz, 115.2 kbps
5067.595	26.4	7.8	1.2	304.0	3.0	0.0	Horz	AV	0.0	34.2	54.0	-19.8	Ch 1, EUT Horz, 115.2 kbps, 10 Hz Avg
5067.635	26.0	7.8	1.2	276.0	3.0	0.0	Vert	AV	0.0	33.8	54.0	-20.2	Ch 1, EUT Flat, 115.2 kbps, 10Hz Avg
12002.960	56.5	-3.6	1.1	216.0	3.0	0.0	Vert	PK	0.0	52.9	74.0	-21.1	Ch 1, EUT Flat, 115.2 kbps
5067.795	44.2	7.8	1.2	276.0	3.0	0.0	Vert	PK	0.0	52.0	74.0	-22.0	Ch 1, EUT Flat, 115.2 kbps
12003.560	55.6	-3.6	1.2	292.0	3.0	0.0	Horz	PK	0.0	52.0	74.0	-22.0	Ch 1, EUT Horz, 153.6 kbps
4801.435	44.6	7.2	1.2	193.0	3.0	0.0	Vert	PK	0.0	51.8	74.0	-22.2	Ch 1, EUT Flat, 115.2 kbps
12003.460	54.5	-3.6	1.2	9.0	3.0	0.0	Vert	PK	0.0	50.9	74.0	-23.1	Ch 1, EUT Vert, 115.2 kbps
4801.445	43.0	7.2	1.1	299.0	3.0	0.0	Horz	PK	0.0	50.2	74.0	-23.8	Ch 1, EUT Horz, 115.2 kbps

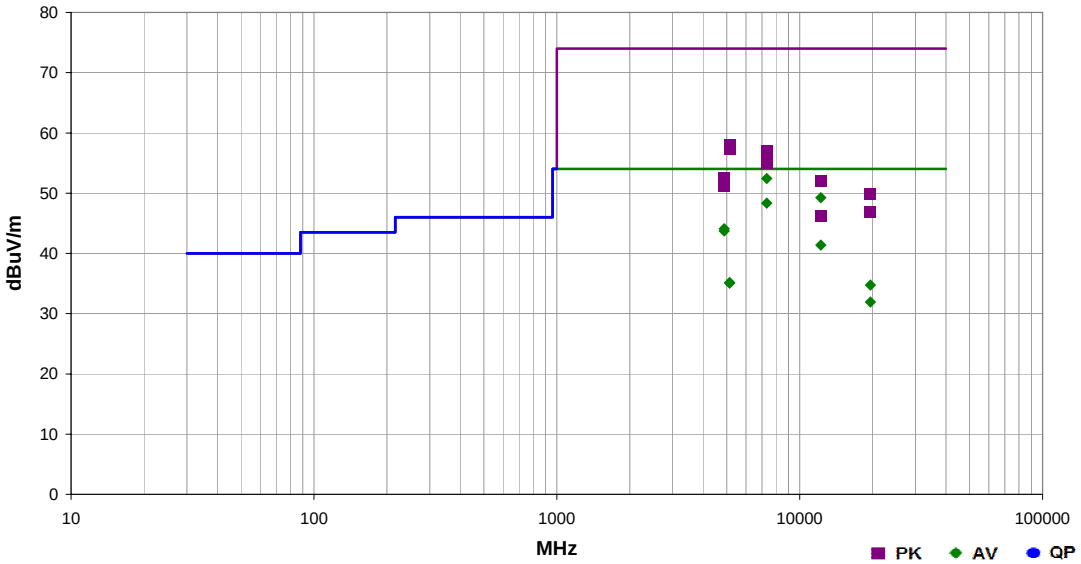
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12003.290	52.1	-3.6	1.2	304.0	3.0	0.0	Vert	PK	0.0	48.5	74.0	-25.5	Ch 1, EUT Horz, 115.2 kbps
12003.530	52.0	-3.6	1.1	152.0	3.0	0.0	Horz	PK	0.0	48.4	74.0	-25.6	Ch 1, EUT Flat, 115.2 kbps
12003.270	31.7	-3.6	1.2	350.0	3.0	0.0	Horz	AV	0.0	28.1	54.0	-25.9	Ch 1, EUT Vert, 115.2 kbps
12003.150	51.7	-3.6	1.2	350.0	3.0	0.0	Horz	PK	0.0	48.1	74.0	-25.9	Ch 1, EUT Vert, 115.2 kbps
12003.280	28.9	-3.6	1.2	237.0	3.0	0.0	Vert	AV	0.0	25.3	54.0	-28.7	Ch 1, EUT Flat, 153.6 kbps
19207.330	21.6	-0.1	1.2	227.0	3.0	0.0	Vert	AV	0.0	21.5	54.0	-32.5	Ch 1, EUT Flat, 115.2 kbps
19205.300	21.6	-0.1	1.2	33.0	3.0	0.0	Horz	AV	0.0	21.5	54.0	-32.5	Ch 1, EUT Flat, 115.2 kbps
12003.110	44.4	-3.6	1.2	237.0	3.0	0.0	Vert	PK	0.0	40.8	74.0	-33.2	Ch 1, EUT Flat, 153.6 kbps
19207.320	36.7	-0.1	1.2	33.0	3.0	0.0	Horz	PK	0.0	36.6	74.0	-37.4	Ch 1, EUT Flat, 115.2 kbps
19206.730	36.4	-0.1	1.2	227.0	3.0	0.0	Vert	PK	0.0	36.3	74.0	-37.7	Ch 1, EUT Flat, 115.2 kbps

SPURIOUS RADIATED EMISSIONS

Work Order:	FREW0012	**Date:**	10/30/13		
Project:	None	**Temperature:**	23 °C		
Job Site:	NC01	**Humidity:**	31% RH		
Serial Number:	245-4495	**Barometric Pres.:**	1013 mbar	**Tested by:**	Richard Mellroth
EUT:	GXM-T24				
Configuration:	8				
Customer:	FreeWave Technologies, Inc.				
Attendees:	Dean Busch				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at maximum duty cycle, Mid channel 120, 2441.7792 MHz. See comments below for EUT orientation and data rate.				
Deviations:	None				
Comments:	EUT connected to development board. EUT powered by 5 VDC supplied by development board via AC mains.				

Test Specifications	**Test Method**
FCC 15.247:2013	ANSI C63.10:2009

Run #	49,51,57	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



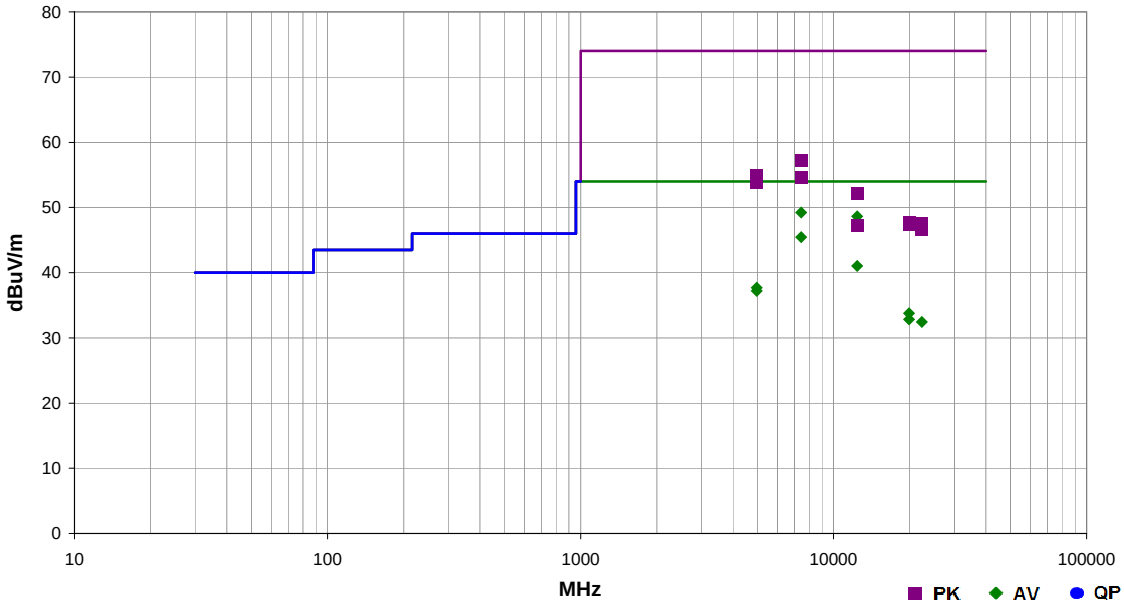
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7325.365	40.2	12.2	1.1	36.0	3.0	0.0	Horz	AV	0.0	52.4	54.0	-1.6	Ch 120, EUT Horz, 115.2 kbps
12208.970	52.8	-3.5	1.3	46.0	3.0	0.0	Horz	AV	0.0	49.3	54.0	-4.7	Ch 120, EUT Horz, 115.2 kbps
7325.330	36.1	12.2	1.3	226.0	3.0	0.0	Vert	AV	0.0	48.3	54.0	-5.7	Ch 120, EUT Flat, 115.2 kbps
4883.600	36.8	7.3	1.2	306.0	3.0	0.0	Horz	AV	0.0	44.1	54.0	-9.9	Ch 120, EUT Horz, 115.2 kbps
4883.530	36.4	7.3	1.2	310.0	3.0	0.0	Vert	AV	0.0	43.7	54.0	-10.3	Ch 120, EUT Flat, 115.2 kbps
12208.850	44.9	-3.5	1.1	163.0	3.0	0.0	Vert	AV	0.0	41.4	54.0	-12.6	Ch 120, EUT Flat, 115.2 kbps
5149.880	49.9	8.2	1.5	17.0	3.0	0.0	Horz	PK	0.0	58.1	74.0	-15.9	Ch 120, EUT Horz, 115.2 kbps
5149.800	49.1	8.2	1.2	265.0	3.0	0.0	Vert	PK	0.0	57.3	74.0	-16.7	Ch 120, EUT Flat, 115.2 kbps
7325.615	44.8	12.2	1.1	36.0	3.0	0.0	Horz	PK	0.0	57.0	74.0	-17.0	Ch 120, EUT Horz, 115.2 kbps
5149.945	27.0	8.2	1.5	17.0	3.0	0.0	Horz	AV	0.0	35.2	54.0	-18.8	Ch 120, EUT Horz, 115.2 kbps, 10Hz Avg
5149.950	26.9	8.2	1.2	265.0	3.0	0.0	Vert	AV	0.0	35.1	54.0	-18.9	Ch 120, EUT Flat, 115.2 kbps, 10Hz Avg
7325.510	42.8	12.2	1.3	226.0	3.0	0.0	Vert	PK	0.0	55.0	74.0	-19.0	Ch 120, EUT Flat, 115.2 kbps
19534.430	34.4	0.3	1.2	153.0	3.0	0.0	Vert	AV	0.0	34.7	54.0	-19.3	Ch 120, EUT Flat, 115.2 kbps
4883.700	45.3	7.3	1.2	306.0	3.0	0.0	Horz	PK	0.0	52.6	74.0	-21.4	Ch 120, EUT Horz, 115.2 kbps
12208.680	55.5	-3.5	1.3	46.0	3.0	0.0	Horz	PK	0.0	52.0	74.0	-22.0	Ch 120, EUT Horz, 115.2 kbps
19534.130	31.6	0.3	1.2	129.0	3.0	0.0	Horz	AV	0.0	31.9	54.0	-22.1	Ch 120, EUT Flat, 115.2 kbps
4883.485	43.9	7.3	1.2	310.0	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	Ch 120, EUT Flat, 115.2 kbps
19534.210	49.5	0.3	1.2	153.0	3.0	0.0	Vert	PK	0.0	49.8	74.0	-24.2	Ch 120, EUT Flat, 115.2 kbps
19535.740	46.5	0.3	1.2	129.0	3.0	0.0	Horz	PK	0.0	46.8	74.0	-27.2	Ch 120, EUT Flat, 115.2 kbps
12208.990	49.7	-3.5	1.1	163.0	3.0	0.0	Vert	PK	0.0	46.2	74.0	-27.8	Ch 120, EUT Flat, 115.2 kbps

SPURIOUS RADIATED EMISSIONS

Work Order:	FREW0012	**Date:**	10/30/13		
Project:	None	**Temperature:**	23 °C		
Job Site:	NC01	**Humidity:**	31% RH		
Serial Number:	245-4495	**Barometric Pres.:**	1013 mbar	**Tested by:**	Richard Mellroth
EUT:	GXM-T24				
Configuration:	8				
Customer:	FreeWave Technologies, Inc.				
Attendees:	Dean Busch				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at maximum duty cycle, High channel 237, 2482.2144 MHz. See comments below for EUT orientation and data rate.				
Deviations:	None				
Comments:	EUT connected to development board. EUT powered by 5 VDC supplied by development board via AC mains.				

Test Specifications	**Test Method**
FCC 15.247:2013	ANSI C63.10:2009

Run #	50-51,57	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



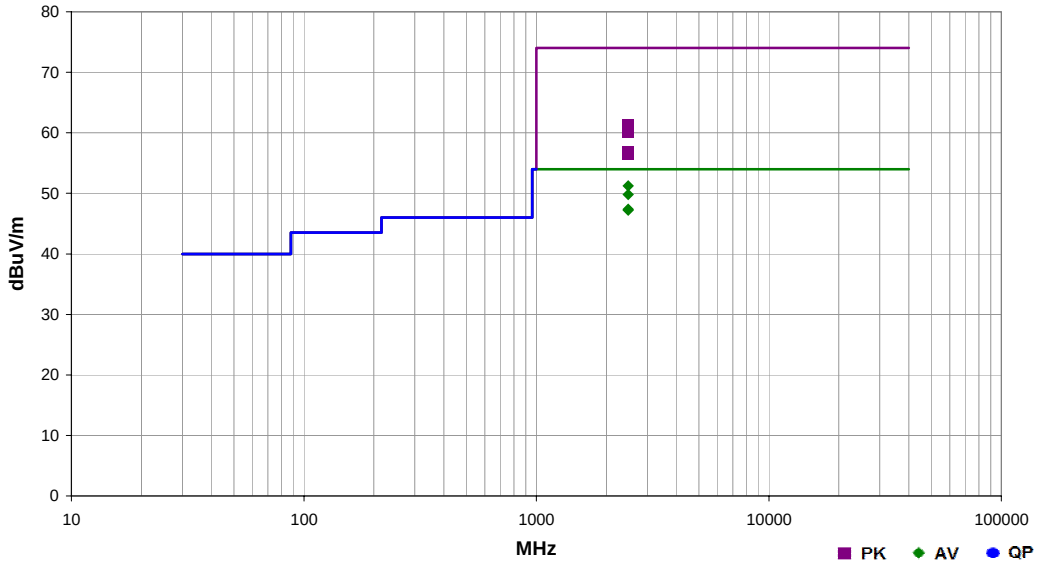
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
7446.665	36.5	12.7	1.2	329.0	3.0	0.0	Horz	AV	0.0	49.2	54.0	-4.8	Ch 237, EUT Horz, 115.2 kbps
12411.040	46.2	2.5	1.6	46.0	3.0	0.0	Horz	AV	0.0	48.7	54.0	-5.3	Ch 237, EUT Horz, 115.2 kbps
7446.605	32.7	12.7	1.0	229.0	3.0	0.0	Vert	AV	0.0	45.4	54.0	-8.6	Ch 237, EUT Flat, 115.2 kbps
12410.990	38.6	2.5	1.5	116.0	3.0	0.0	Vert	AV	0.0	41.1	54.0	-12.9	Ch 237, EUT Flat, 115.2 kbps
4964.480	30.2	7.5	1.3	311.0	3.0	0.0	Vert	AV	0.0	37.7	54.0	-16.3	Ch 237, EUT Flat, 115.2 kbps
4964.440	29.7	7.5	1.5	297.0	3.0	0.0	Horz	AV	0.0	37.2	54.0	-16.8	Ch 237, EUT Horz, 115.2 kbps
7446.875	44.4	12.7	1.2	329.0	3.0	0.0	Horz	PK	0.0	57.1	74.0	-16.9	Ch 237, EUT Horz, 115.2 kbps
4964.165	47.4	7.5	1.5	297.0	3.0	0.0	Horz	PK	0.0	54.9	74.0	-19.1	Ch 237, EUT Horz, 115.2 kbps
7446.745	41.9	12.7	1.0	229.0	3.0	0.0	Vert	PK	0.0	54.6	74.0	-19.4	Ch 237, EUT Flat, 115.2 kbps
4964.065	46.3	7.5	1.3	311.0	3.0	0.0	Vert	PK	0.0	53.8	74.0	-20.2	Ch 237, EUT Flat, 115.2 kbps
19858.030	33.6	0.1	1.2	164.0	3.0	0.0	Vert	AV	0.0	33.7	54.0	-20.3	Ch 237, EUT Flat, 115.2 kbps
19858.090	32.7	0.1	1.2	155.0	3.0	0.0	Horz	AV	0.0	32.8	54.0	-21.2	Ch 237, EUT Flat, 115.2 kbps
22340.280	34.4	-2.0	1.2	127.0	3.0	0.0	Vert	AV	0.0	32.4	54.0	-21.6	Ch 237, EUT Flat, 115.2 kbps
12411.080	49.6	2.5	1.6	46.0	3.0	0.0	Horz	PK	0.0	52.1	74.0	-21.9	Ch 237, EUT Horz, 115.2 kbps
22341.970	33.9	-2.0	1.2	313.0	3.0	0.0	Horz	AV	0.0	31.9	54.0	-22.1	Ch 237, EUT Flat, 115.2 kbps
19857.620	47.5	0.1	1.2	164.0	3.0	0.0	Vert	PK	0.0	47.6	74.0	-26.4	Ch 237, EUT Flat, 115.2 kbps
22338.460	49.5	-2.0	1.2	127.0	3.0	0.0	Vert	PK	0.0	47.5	74.0	-26.5	Ch 237, EUT Flat, 115.2 kbps
19857.730	47.2	0.1	1.2	155.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	Ch 237, EUT Flat, 115.2 kbps
12411.590	44.8	2.5	1.5	116.0	3.0	0.0	Vert	PK	0.0	47.3	74.0	-26.7	Ch 237, EUT Flat, 115.2 kbps
22340.620	48.6	-2.0	1.2	313.0	3.0	0.0	Horz	PK	0.0	46.6	74.0	-27.4	Ch 237, EUT Flat, 115.2 kbps

SPURIOUS RADIATED EMISSIONS

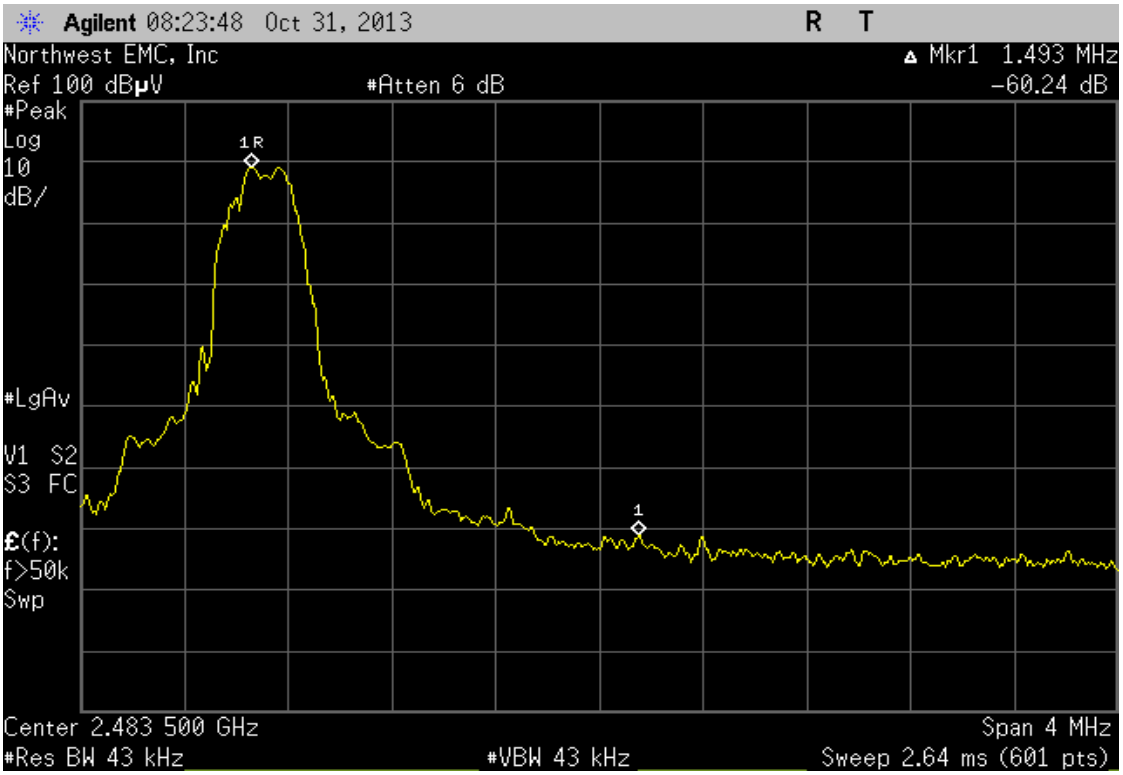
Work Order:	FREW0012	**Date:**	10/30/13		
Project:	None	**Temperature:**	23 °C		
Job Site:	NC01	**Humidity:**	31% RH		
Serial Number:	245-4495	**Barometric Pres.:**	1013 mbar	**Tested by:**	Richard Mellroth
EUT:	GXM-T24				
Configuration:	8				
Customer:	FreeWave Technologies, Inc.				
Attendees:	Dean Busch				
EUT Power:	110VAC/60Hz				
Operating Mode:	Transmitting at maximum duty cycle, High channel 237, 2482.2144 MHz. See comments below for EUT orientation and data rate.				
Deviations:	None				
Comments:	EUT connected to development board. EUT powered by 5 VDC supplied by development board via AC mains. Marker-Delta measurements at 2483.5 MHz restricted band edge				

Test Specifications	**Test Method**
FCC 15.247:2013	ANSI C63.10:2009

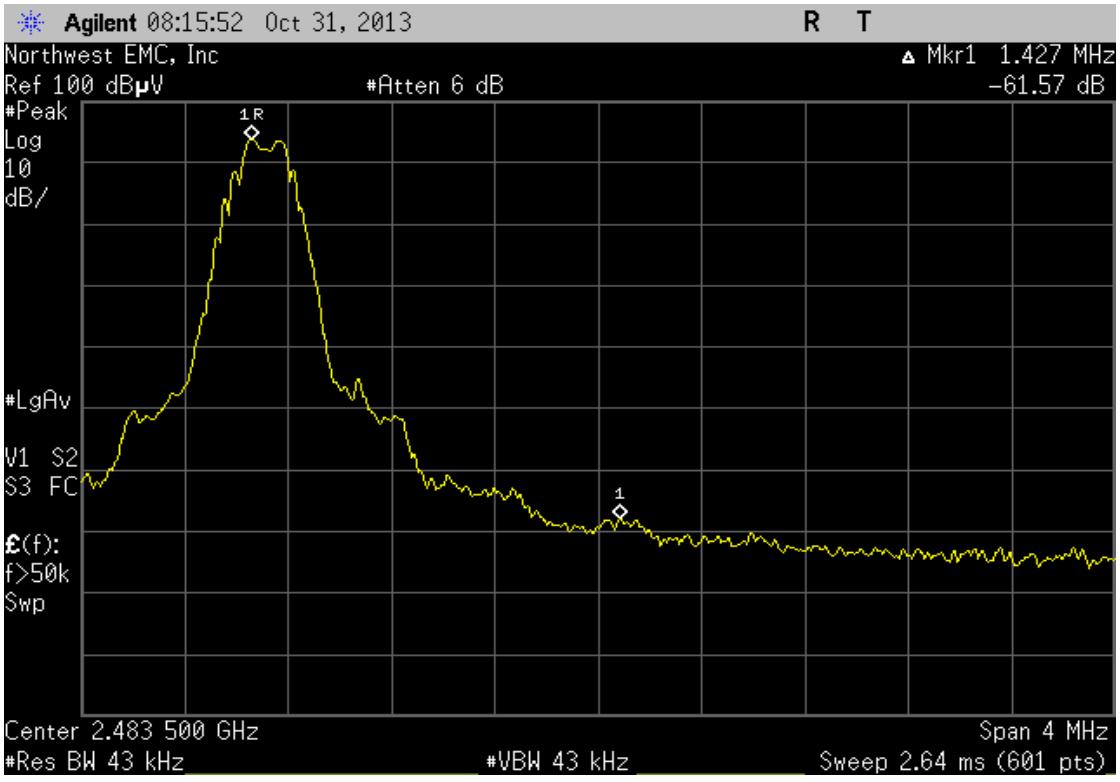
Run #	53-54	**Test Distance (m)**	3	**Antenna Height(s)**	1-4m	**Results**	Pass



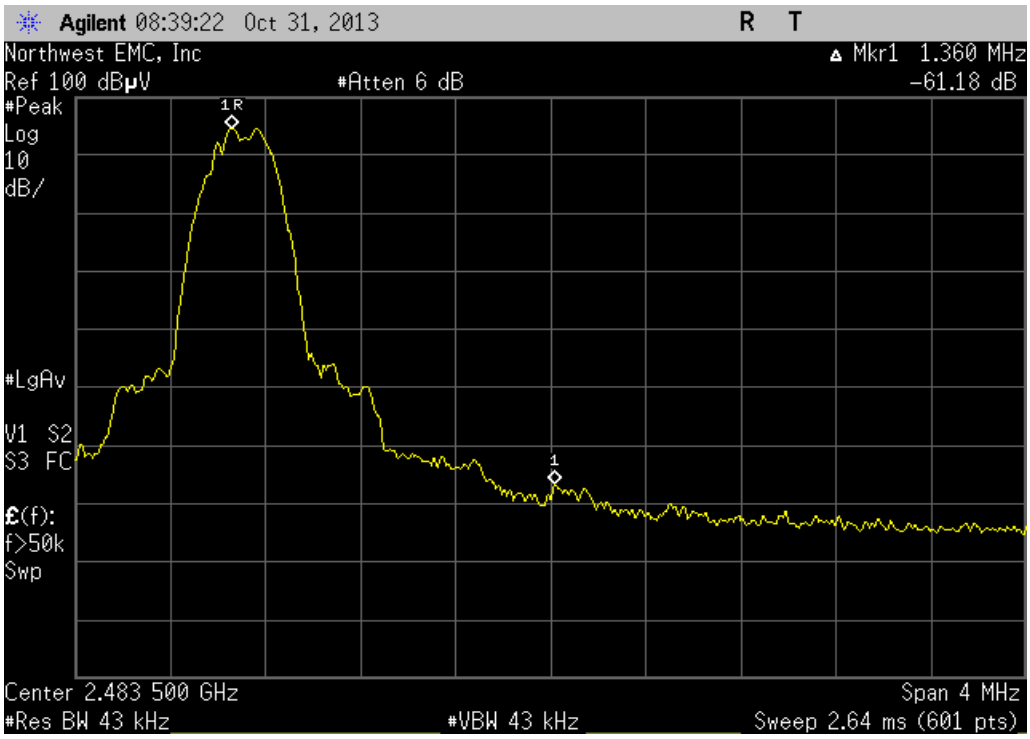
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
2482.235	84.4	-2.0	1.0	218.0	3.0	30.0	Vert	AV	0.0	112.4	-	-	Fundamental Measurement Ch 237, EUT Horz, 153.6 kbps Marker Delta: -61.18 dBc
2483.520	-	-	1.0	218.0	3.0	30.0	Vert	AV	0.0	51.2	54.0	-2.8	Avg = 112.4 - 61.18 = 51.22 dBuV/m
2482.268	83.4	-2.0	1.0	228.0	3.0	30.0	Vert	AV	0.0	111.4	-	-	Fundamental Measurement Ch 237, EUT Horz, 115.2 kbps Marker Delta: -61.57 dBc
2483.587	-	-	1.0	228.0	3.0	30.0	Vert	AV	0.0	49.8	54.0	-4.2	Avg = 111.4 - 61.57 = 49.8 dBuV/m
2482.235	79.6	-2.0	1.0	41.0	3.0	30.0	Horz	AV	0.0	107.6	-	-	Fundamental Measurement Ch 237, EUT Vert, 153.6 kbps Marker Delta: -60.20 dBc
2483.533	-	-	1.0	41.0	3.0	30.0	Horz	AV	0.0	47.4	54.0	-6.6	Avg = 107.6 - 60.20 = 47.4 dBuV/m
2482.227	79.4	-2.0	1.0	39.0	3.0	30.0	Horz	AV	0.0	107.4	-	-	Fundamental Measurement Ch 237, EUT Vert, 115.2 kbps Marker Delta: -60.24 dBc
2483.653	-	-	1.0	39.0	3.0	30.0	Horz	AV	0.0	47.2	54.0	-6.8	Avg = 107.4 - 60.24 = 47.2 dBuV/m
2482.252	94.4	-2.0	1.0	218.0	3.0	30.0	Vert	PK	0.0	122.4	-	-	Fundamental Measurement Ch 237, EUT Horz, 153.6 kbps Marker Delta: -61.18 dBc
2483.520	-	-	1.00	218.00	3.00	30.00	Vert	PK	0.00	61.2	74.0	-12.8	PK = 122.4 - 61.18 = 61.22 dBuV/m
2482.152	93.7	-2.0	1.0	228.0	3.0	30.0	Vert	PK	0.0	121.7	-	-	Fundamental Measurement Ch 237, EUT Horz, 115.2 kbps Marker Delta: -61.57 dBc
2483.587	-	-	1.0	228.0	3.0	30.0	Vert	PK	0.0	60.1	74.0	-13.9	PK = 121.7 - 61.57 = 60.1 dBuV/m
2482.168	89.0	-2.0	1.0	39.0	3.0	30.0	Horz	PK	0.0	117.0	-	-	Fundamental Measurement Ch 237, EUT Vert, 115.2 kbps Marker Delta: -60.24 dBc
2483.653	-	-	1.00	39.00	3.00	30.00	Horz	PK	0.00	56.8	74.0	-17.2	PK = 117 - 60.24 = 56.8 dBuV/m
2482.127	88.8	-2.0	1.0	41.0	3.0	30.0	Horz	PK	0.0	116.8	-	-	Fundamental Measurement Ch 237, EUT Vert, 153.6 kbps Marker Delta: -60.20 dBc
2483.533	-	-	1.00	41.00	3.00	30.00	Horz	PK	0.00	56.6	74.0	-17.4	PK = 116.8 - 60.20 = 56.6 dBuV/m



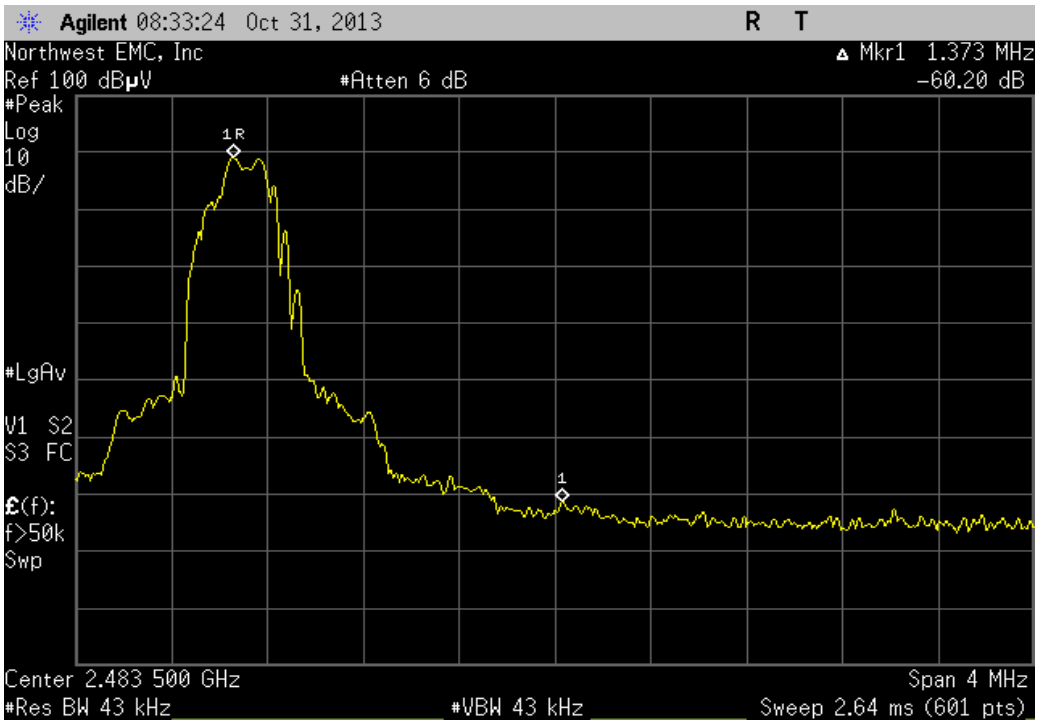
Ch 237, EUT Vert, 115.2 kbps



Ch 237, EUT Horz, 115.2 kbps



Ch 237, EUT Horz, 153.6 kbps



Ch 237, EUT Vert, 153.6 kbps

AC POWERLINE CONDUCTED EMISSIONS

TEST DESCRIPTION

The EUT will be powered either directly or indirectly from the AC power line. Therefore, conducted emissions measurements were made on the AC input of the EUT, or on the AC input of the device used to power the EUT. The AC power line conducted emissions were measured with the EUT operating at the lowest, the highest, and a middle channel in the operational band. The EUT was transmitting at its maximum data rate. For each mode, the spectrum was scanned from 150 kHz to 30 MHz. The test setup and procedures were in accordance with ANSI C63.10-2009.

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
LISN	Solar	9252-50-R-24-BNC	LIM	01/16/2013	12 mo
NC05 Cables	N/A	Conducted / NF Probe Cable	NC4	12/14/2012	12 mo
Receiver	Rohde & Schwarz	ESCI	ARE	05/30/2013	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HHF	02/01/2012	24 mo

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.94 dB	-2.94 dB

CONFIGURATIONS INVESTIGATED

FREW0012-6

MODES INVESTIGATED

Low channel 1, 2400.6528 MHz, 115.2 kbps
Mid channel 120, 2441.7792 MHz, 115.2 kbps
High channel 237, 2482.2144 MHz, 115.2 kbps

AC POWERLINE CONDUCTED EMISSIONS

EUT:	GXM-T24	Work Order:	FREW0012
Serial Number:	245-4495	Date:	10/29/2013
Customer:	FreeWave Technologies, Inc.	Temperature:	23°C
Attendees:	Dean Busch	Relative Humidity:	29%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	FREW0012-6

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2013	ANSI C63.10:2009

TEST PARAMETERS

Run #:	3	Line:	High Line	Ext. Attenuation (dB):	20

COMMENTS

Transmitting at maximum duty cycle. Connected to development board and remote PC. Antenna port terminated. EUT powered by 5 VDC supplied by development board via AC mains.

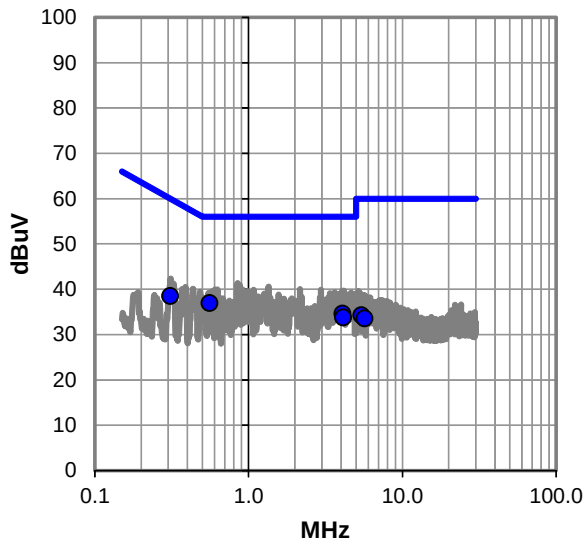
EUT OPERATING MODES

Low channel 1, 2400.6528 MHz, 115.2 kbps.

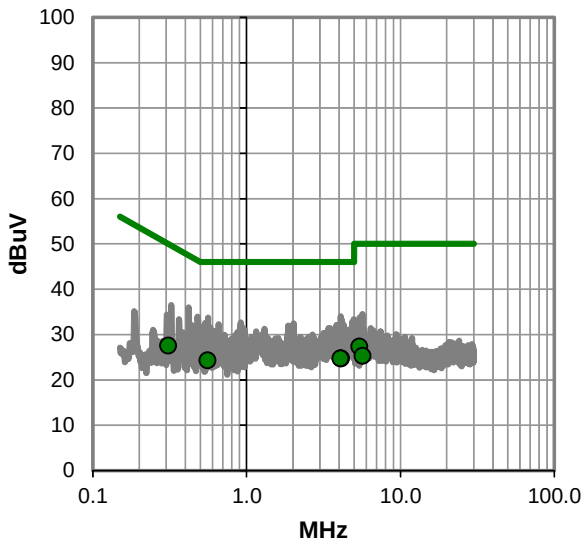
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



NORTHWEST EMC

WTD.2013.06.13, PSA-ESCI 2012.12.14, PSA-ESCI Version 2013.2.20

AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #3

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.557	16.7	20.2	36.9	56.0	-19.1
4.088	14.2	20.4	34.6	56.0	-21.4
5.408	13.7	20.6	34.3	60.0	-25.7
4.124	13.3	20.4	33.7	56.0	-22.3
5.664	13.0	20.6	33.6	60.0	-26.4
0.310	18.2	20.3	38.5	60.0	-21.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
5.408	6.8	20.6	27.4	50.0	-22.6
5.664	4.7	20.6	25.3	50.0	-24.7
4.124	4.3	20.4	24.7	46.0	-21.3
4.088	4.3	20.4	24.7	46.0	-21.3
0.557	4.1	20.2	24.3	46.0	-21.7
0.310	7.3	20.3	27.6	50.0	-22.4

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	GXM-T24	Work Order:	FREW0012
Serial Number:	245-4495	Date:	10/29/2013
Customer:	FreeWave Technologies, Inc.	Temperature:	23°C
Attendees:	Dean Busch	Relative Humidity:	29%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	FREW0012-6

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2013	ANSI C63.10:2009

TEST PARAMETERS

Run #:	4	Line:	Neutral	Ext. Attenuation (dB):	20

COMMENTS

Transmitting at maximum duty cycle. Connected to development board and remote PC. Antenna port terminated. EUT powered by 5 VDC supplied by development board via AC mains.

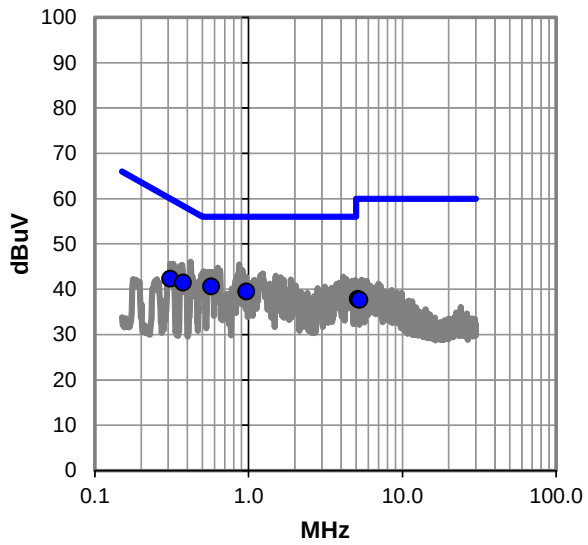
EUT OPERATING MODES

Low channel 1, 2400.6528 MHz, 115.2 kbps.

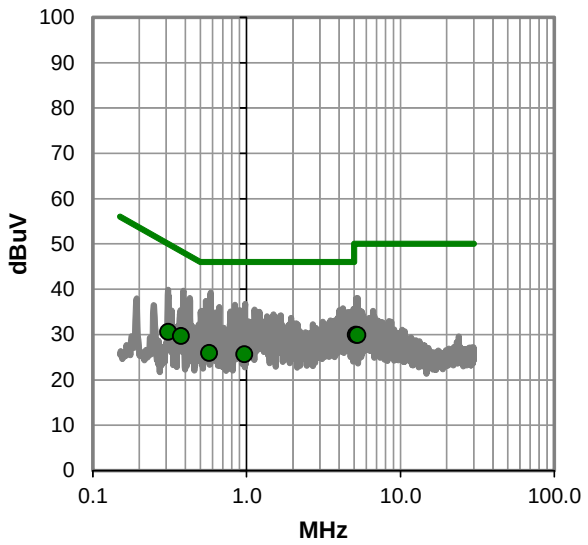
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #4

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.572	20.4	20.2	40.6	56.0	-15.4
0.966	19.2	20.3	39.5	56.0	-16.5
5.142	17.3	20.6	37.9	60.0	-22.1
5.268	17.1	20.6	37.7	60.0	-22.3
0.310	22.0	20.3	42.3	60.0	-17.7
0.374	21.2	20.3	41.5	58.4	-16.9

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
5.142	9.4	20.6	30.0	50.0	-20.0
5.268	9.3	20.6	29.9	50.0	-20.1
0.572	5.7	20.2	25.9	46.0	-20.1
0.966	5.4	20.3	25.7	46.0	-20.3
0.310	10.3	20.3	30.6	50.0	-19.4
0.374	9.4	20.3	29.7	48.4	-18.7

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	GXM-T24	Work Order:	FREW0012
Serial Number:	245-4495	Date:	10/29/2013
Customer:	FreeWave Technologies, Inc.	Temperature:	23°C
Attendees:	Dean Busch	Relative Humidity:	29%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	FREW0012-6

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2013	ANSI C63.10:2009

TEST PARAMETERS

Run #:	5	Line:	High Line	Ext. Attenuation (dB):	20

COMMENTS

Transmitting at maximum duty cycle. Connected to development board and remote PC. Antenna port terminated. EUT powered by 5 VDC supplied by development board via AC mains.

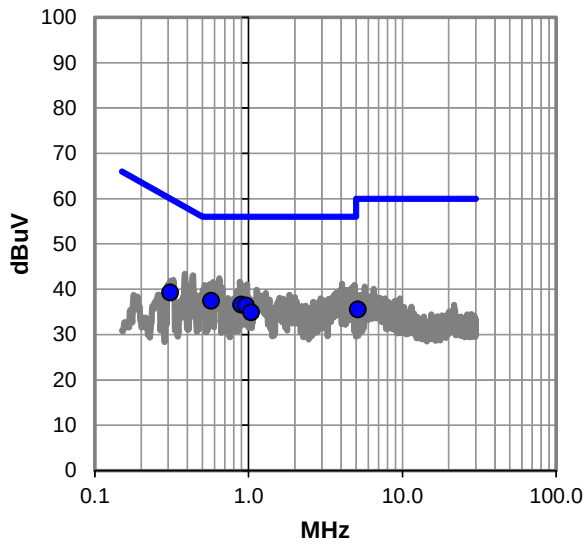
EUT OPERATING MODES

Mid channel 120, 2441.7792 MHz, 115.2 kbps.

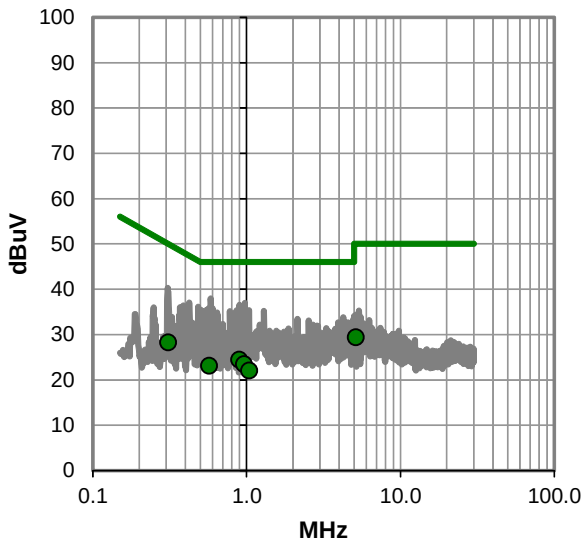
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #5

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.572	17.2	20.2	37.4	56.0	-18.6
0.898	16.3	20.3	36.6	56.0	-19.4
0.964	16.1	20.3	36.4	56.0	-19.6
0.310	19.0	20.3	39.3	60.0	-20.7
1.040	14.6	20.3	34.9	56.0	-21.1
5.126	15.0	20.6	35.6	60.0	-24.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
5.126	8.8	20.6	29.4	50.0	-20.6
0.898	4.2	20.3	24.5	46.0	-21.5
0.310	8.0	20.3	28.3	50.0	-21.7
0.964	3.2	20.3	23.5	46.0	-22.5
0.572	2.9	20.2	23.1	46.0	-22.9
1.040	1.8	20.3	22.1	46.0	-23.9

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

WTD.2013.06.13, PSA-ESCI 2012.12.14, PSA-ESCI Version 2013.2.20

EUT:	GXM-T24	Work Order:	FREW0012
Serial Number:	245-4495	Date:	10/29/2013
Customer:	FreeWave Technologies, Inc.	Temperature:	23°C
Attendees:	Dean Busch	Relative Humidity:	29%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	FREW0012-6

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2013	ANSI C63.10:2009

TEST PARAMETERS

Run #:	6	Line:	Neutral	Ext. Attenuation (dB):	20

COMMENTS

Transmitting at maximum duty cycle. Connected to development board and remote PC. Antenna port terminated. EUT powered by 5 VDC supplied by development board via AC mains.

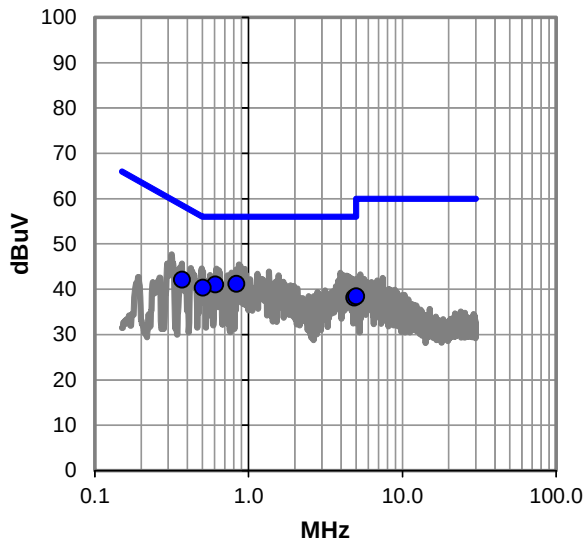
EUT OPERATING MODES

Mid channel 120, 2441.7792 MHz, 115.2 kbps.

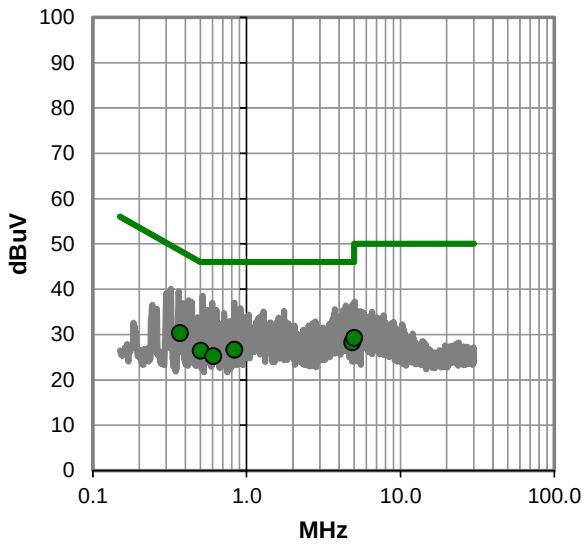
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #6

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.836	20.9	20.3	41.2	56.0	-14.8
0.609	20.8	20.2	41.0	56.0	-15.0
0.505	20.1	20.2	40.3	56.0	-15.7
0.369	21.8	20.3	42.1	58.5	-16.4
4.876	17.6	20.6	38.2	56.0	-17.9
5.004	17.9	20.6	38.5	60.0	-21.5

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.876	7.7	20.6	28.3	46.0	-17.8
0.369	10.0	20.3	30.3	48.5	-18.2
0.836	6.4	20.3	26.7	46.0	-19.3
0.505	6.2	20.2	26.4	46.0	-19.6
5.004	8.7	20.6	29.3	50.0	-20.7
0.609	5.0	20.2	25.2	46.0	-20.8

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	GXM-T24	Work Order:	FREW0012
Serial Number:	245-4495	Date:	10/29/2013
Customer:	FreeWave Technologies, Inc.	Temperature:	23°C
Attendees:	Dean Busch	Relative Humidity:	29%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	FREW0012-6

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2013	ANSI C63.10:2009

TEST PARAMETERS

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

COMMENTS

Transmitting at maximum duty cycle. Connected to development board and remote PC. Antenna port terminated. EUT powered by 5 VDC supplied by development board via AC mains.

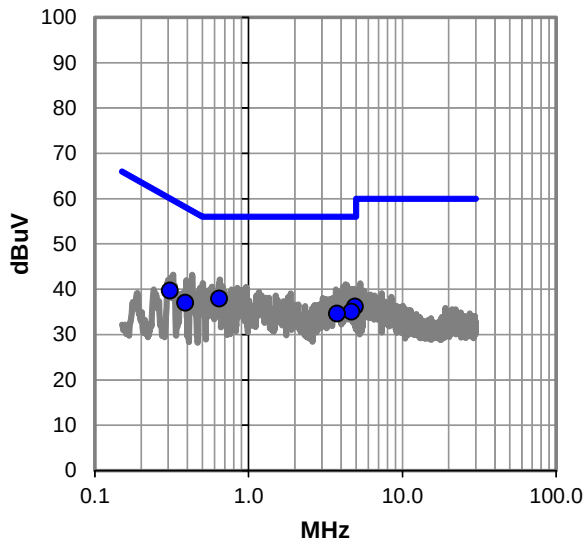
EUT OPERATING MODES

High channel 237, 2482.2144 MHz, 115.2 kbps.

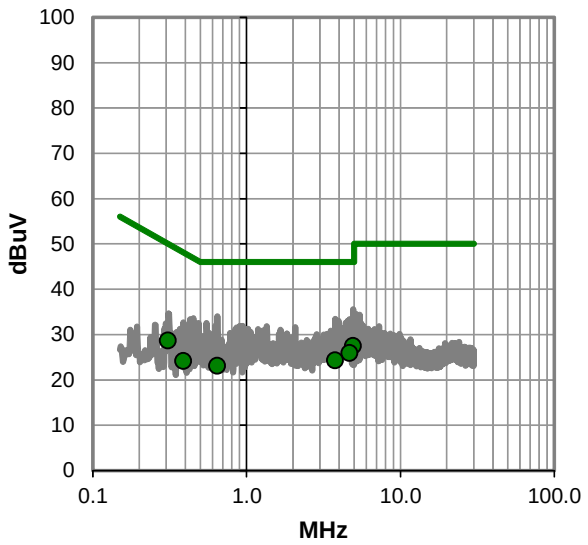
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #7

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.645	17.7	20.2	37.9	56.0	-18.1
4.928	15.6	20.6	36.2	56.0	-19.8
0.308	19.4	20.3	39.7	60.0	-20.4
4.672	14.5	20.6	35.1	56.0	-21.0
0.388	16.7	20.3	37.0	58.1	-21.1
3.764	14.2	20.4	34.6	56.0	-21.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
4.928	6.9	20.6	27.5	46.0	-18.5
4.672	5.4	20.6	26.0	46.0	-20.1
0.308	8.4	20.3	28.7	50.0	-21.4
3.764	3.9	20.4	24.3	46.0	-21.7
0.645	2.9	20.2	23.1	46.0	-22.9
0.388	3.9	20.3	24.2	48.1	-23.9

CONCLUSION

Pass

Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	GXM-T24	Work Order:	FREW0012
Serial Number:	245-4495	Date:	10/29/2013
Customer:	FreeWave Technologies, Inc.	Temperature:	23°C
Attendees:	Dean Busch	Relative Humidity:	29%
Customer Project:	None	Bar. Pressure:	1017 mb
Tested By:	Richard Mellroth	Job Site:	NC05
Power:	110VAC/60Hz	Configuration:	FREW0012-6

TEST SPECIFICATIONS

Specification:	Method:
FCC 15.207:2013	ANSI C63.10:2009

TEST PARAMETERS

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

COMMENTS

Transmitting at maximum duty cycle. Connected to development board and remote PC. Antenna port terminated. EUT powered by 5 VDC supplied by development board via AC mains.

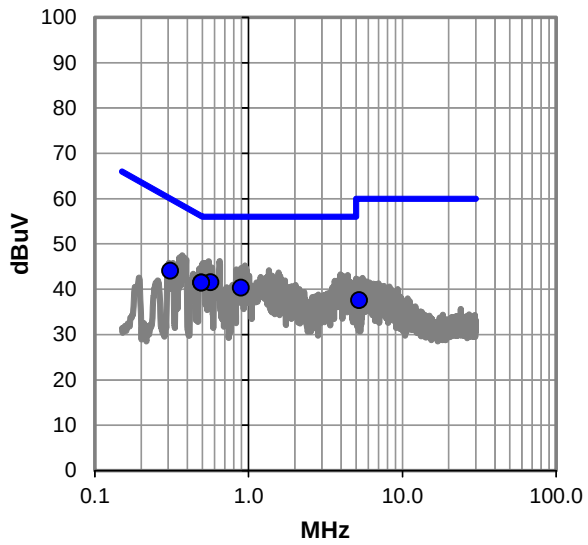
EUT OPERATING MODES

High channel 237, 2482.2144 MHz, 115.2 kbps.

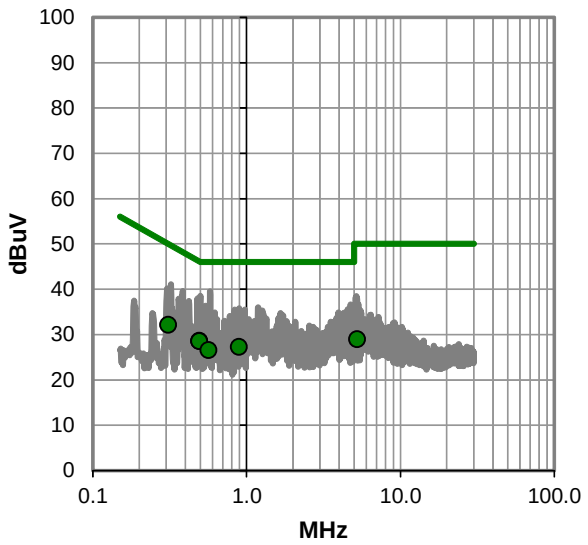
DEVIATIONS FROM TEST STANDARD

None

Quasi Peak Data - vs - Quasi Peak Limit



Average Data - vs - Average Limit



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #8

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.566	21.3	20.2	41.5	56.0	-14.5
0.492	21.2	20.2	41.4	56.1	-14.7
0.492	21.2	20.2	41.4	56.1	-14.7
0.892	20.1	20.3	40.4	56.0	-15.6
0.310	23.8	20.3	44.1	60.0	-15.9
5.238	17.0	20.6	37.6	60.0	-22.4

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
0.492	8.4	20.2	28.6	46.1	-17.5
0.492	8.3	20.2	28.5	46.1	-17.6
0.310	11.9	20.3	32.2	50.0	-17.8
0.892	7.0	20.3	27.3	46.0	-18.7
0.566	6.3	20.2	26.5	46.0	-19.5
5.238	8.4	20.6	29.0	50.0	-21.0

CONCLUSION

Pass

Tested By