

NORTHWEST EMC

Logic PD

DM3730 Torpedo + Wireless SOM -32

FCC 15.207:2015

FCC 15.247:2015

Report # LGPD0151.7



NVLAP Lab Code: 200881-0

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

CERTIFICATE OF TEST

Last Date of Test: May 08, 2015
Logic PD
Model: DM3730 Torpedo + Wireless SOM -32

Radio Equipment Testing

Standards

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

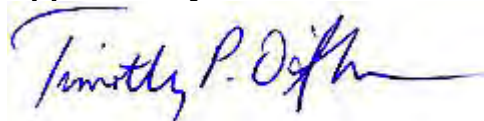
Results

Method Clause	Test Description	Applied	Results	Comments
6.2	AC Powerline Conducted Emissions	Yes	Pass	
6.5, 6.6	Spurious Radiated Emissions	Yes	Pass	
6.7	Spurious Conducted Emissions	Yes	Pass	
6.9.1	Occupied Bandwidth	Yes	Pass	
6.10.1	Output Power	Yes	Pass	
7.7.2	Channel Spacing	Yes	Pass	
7.7.3	Number of Hopping Frequencies	Yes	Pass	
7.7.4	Dwell Time	Yes	Pass	
7.5	Duty Cycle	No	N/A	Characterization of radio operation.
7.7.9	Band Edge Compliance	Yes	Pass	
7.7.9	Band Edge Compliance - Hopping Mode	Yes	Pass	

Deviations From Test Standards

None

Approved By:



Tim O'Shea, Operations Manager

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

REVISION HISTORY

Revision Number		Description	Date	Page Number
00		None		

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 17065 as a product certifier. This allows Northwest EMC to certify transmitters to FCC and IC specifications.

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025

Canada

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

European Union

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

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Israel

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

Hong Kong

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

Vietnam

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

SCOPE

For details on the Scopes of our Accreditations, please visit:

<http://www.nwemc.com/accreditations/>
<http://gsi.nist.gov/global/docs/cabs/designations.html>

MEASUREMENT UNCERTAINTY

Measurement Uncertainty

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

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

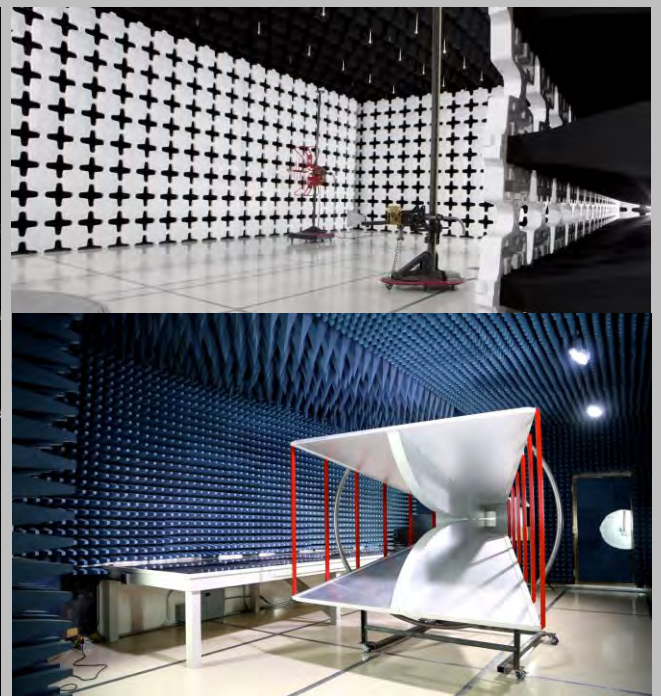
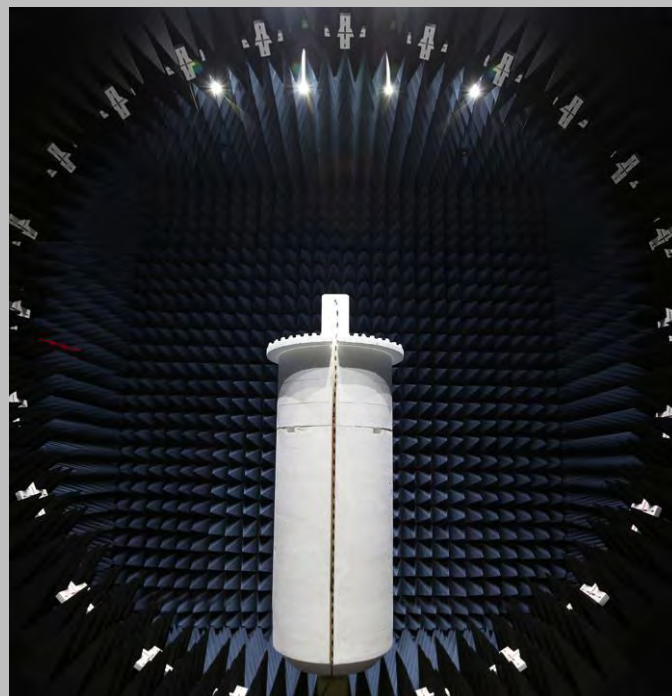
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

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

FACILITIES



California Labs OC01-13 41 Tesla Irvine, CA 92618 (949) 861-8918	Minnesota Labs MN01-08, MN10 9349 W Broadway Ave. Brooklyn Park, MN 55445 (612)-638-5136	New York Labs NY01-04 4939 Jordan Rd. Elbridge, NY 13060 (315) 554-8214	Oregon Labs EV01-12 22975 NW Evergreen Pkwy Hillsboro, OR 97124 (503) 844-4066	Texas Labs TX01-09 3801 E Plano Pkwy Plano, TX 75074 (469) 304-5255	Washington Labs NC01-05 19201 120 th Ave NE Bothell, WA 9801 (425)984-6600
NVLAP					
NVLAP Lab Code: 200676-0	NVLAP Lab Code: 200881-0	NVLAP Lab Code: 200761-0	NVLAP Lab Code: 200630-0	NVLAP Lab Code:201049-0	NVLAP Lab Code: 200629-0
Industry Canada					
2834B-1, 2834B-3	2834E-1	N/A	2834D-1, 2834D-2	2834G-1	2834F-1
BSMI					
SL2-IN-E-1154R	SL2-IN-E-1152R	N/A	SL2-IN-E-1017	SL2-IN-E-1158R	SL2-IN-E-1153R
VCCI					
A-0029	A-0109	N/A	A-0108	A-0201	A-0110
Recognized Phase I CAB for ACMA, BSMI, IDA, KCC/RRR, MIC, MOC, NCC, OFCA					
US0158	US0175	N/A	US0017	US0191	US0157



PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Logic PD
Address:	6201 Bury Drive
City, State, Zip:	Eden Prairie, MN 55346
Test Requested By:	Adam Ford
Model:	DM3730 Torpedo + Wireless SOM -32
First Date of Test:	April 24, 2015
Last Date of Test:	May 08, 2015
Receipt Date of Samples:	April 22, 2015
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT:
A system module with an ARM processor, wireless module that includes Wifi (802.11 a,b,g,n) module, GPS and Bluetooth.
Testing Objective:
To demonstrate compliance of the Bluetooth BR/EDR FHSS radio to FCC 15.247 requirements.

CONFIGURATIONS

Configuration LGPD0151- 4

Software/Firmware Running during test	
Description	Version
TeraTerm	Unknown

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
SOM 2	Logic PD	None	1215M00013
Dev Board	Logic PD	DM3730 Torpedo	2012M00624

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
DC Brick	Sceptre	PS2D-5038APL6A	None
Laptop	Lenovo	ThinkPad T400	001C25968CA1
Laptop Supply	Lenovo	92P1160	11S92P1160Z1ZBGH9338XW
GPS Antenna	Unknown	None	None
Isolated Magnetic Dipole Antennas (x2)	Ethertronics, Inc.	1000418	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Serial	Yes	> 3m	No	Dev Board	Laptop
Coax	Yes	3.0m	No	Dev Board	GPS Antenna
DC Power	No	1.5m	Yes	Dev Board	DC Brick
AC Power	No	1.8m	No	DC Brick	AC Mains
DC Power	No	1.8m	Yes	Laptop	Laptop Supply
AC Power	No	0.95m	No	Laptop Supply	AC Mains
Dipole Antenna Cables (x2)	No	0.1m	No	Isolated Magnetic Dipole Antennas	Wireless SOM

CONFIGURATIONS

Configuration LGPD0151- 5

Software/Firmware Running during test	
Description	Version
TeraTerm	Unknown

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
SOM 2	Logic PD	None	1215M00013
Dev Board	Logic PD	DM3730 Torpedo	2012M00624

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
DC Brick	Sceptre	PS2D-5038APL6A	None
Laptop	Lenovo	ThinkPad T400	001C25968CA1
Laptop Supply	Lenovo	92P1160	11S92P1160Z1ZBGH9338XW
GPS Antenna	Unknown	None	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Coax	Yes	3.0m	No	Dev Board	GPS Antenna
DC Power	No	1.5m	Yes	Dev Board	DC Brick
AC Power	No	1.8m	No	DC Brick	AC Mains
DC Power	No	1.8m	Yes	Laptop	Laptop Supply
AC Power	No	0.95m	No	Laptop Supply	AC Mains
Serial	Yes	2m	No	Dev Board	USB to Serial Adapter
USB to Serial Adapter	Unknown	.2m	No	Serial	Laptop

CONFIGURATIONS

Configuration LGPD0151- 6

Software/Firmware Running during test					
Description				Version	
TeraTerm				Unknown	

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
SOM 2	Logic PD	None	1215M00013
Dev Board 2	Logic PD	DM3730 Torpedo	2012M00634

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
DC Brick	Sceptre	PS2D-5038APL6A	None
Laptop	Lenovo	ThinkPad T400	001C25968CA1
Laptop Supply	Lenovo	92P1160	11S92P1160Z1ZBGH9338XW
GPS Antenna	Unknown	None	None

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Coax	Yes	3.0m	No	Dev Board	GPS Antenna
DC Power	No	1.5m	Yes	Dev Board	DC Brick
AC Power	No	1.8m	No	DC Brick	AC Mains
DC Power	No	1.8m	Yes	Laptop	Laptop Supply
AC Power	No	0.95m	No	Laptop Supply	AC Mains
Serial	Yes	2m	No	Dev Board	USB to Serial Adapter
USB to Serial Adapter	Unknown	.2m	No	Serial	Laptop

CONFIGURATIONS

Configuration LGPD0151- 8

Software/Firmware Running during test					
Description				Version	
TeraTerm				Unknown	

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
SOM 2	Logic PD	None	1215M00013
Dev Board	Logic PD	DM3730 Torpedo	2012M00624

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
GPS Antenna	Unknown	None	None

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Lenovo	ThinkPad T400	001C25968CA1
Laptop Supply	Lenovo	92P1160	11S92P1160Z1ZBGH9338XW

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Coax	Yes	3.0m	No	Dev Board	GPS Antenna
Serial	Yes	2m	No	Dev Board	USB to Serial Adapter
USB to Serial Adapter	Unknown	.2m	No	Serial	Laptop
DC Leads	No	1.2m	No	Dev Board	DC power supply
AC Power	No	1.5m	No	DC power Supply	AC mains

MODIFICATIONS

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	4/24/2015	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	5/7/2015	Spurious Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	5/7/2015	Occupied Bandwidth	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	5/7/2015	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.
5	5/7/2015	Band Edge Compliance	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
6	5/7/2015	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.
7	5/8/2015	Channel Spacing	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	5/8/2015	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.
9	5/8/2015	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.
10	5/8/2015	AC Powerline Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

AC POWERLINE CONDUCTED EMISSIONS

TEST DESCRIPTION

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Cal. Due
Spectrum Analyzer	Agilent	E4443A	AAS	3/24/2015	03/24/2016
LISN	Solar Electronics	9252-50-R-24-BNC	LIY	3/23/2015	03/23/2016
MN03 Cables	ESM Cable Corp.	Conducted Cables	MNC	11/20/2014	11/20/2015
Attenuator 20dB, BNC	Fairview Microwave	SA01B-20	AQP	7/22/2014	07/22/2015
High Pass Filter	TTE	H97-100K-50-720B	HGN	5/23/2014	05/23/2015
DC Power Supply	EZ Digital Co	GP-4303D	TPY	NCR	NCR

MEASUREMENT UNCERTAINTY

Description		
Expanded k=2	2.4 dB	-2.4 dB

CONFIGURATIONS INVESTIGATED

LGPD0151-8

MODES INVESTIGATED

On, Tx Continuous High Channel 2480MHz1DH5
On, Tx Continuous Low Channel 2402MHz 1DH5
On, Tx Continuous Mid Channel 2440MHz 1DH5

AC POWERLINE CONDUCTED EMISSIONS

EUT:	DM3730 Torpedo + Wireless SOM -32	Work Order:	LGPD0151
Serial Number:	See Configuration	Date:	05/08/2015
Customer:	Logic PD	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	47.2%
Customer Project:	None	Bar. Pressure:	1015.6 mb
Tested By:	Brandon Hobbs	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	LGPD0151-8

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	21	Line:	Neutral	Ext. Attenuation (dB):	20
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COMMENTS

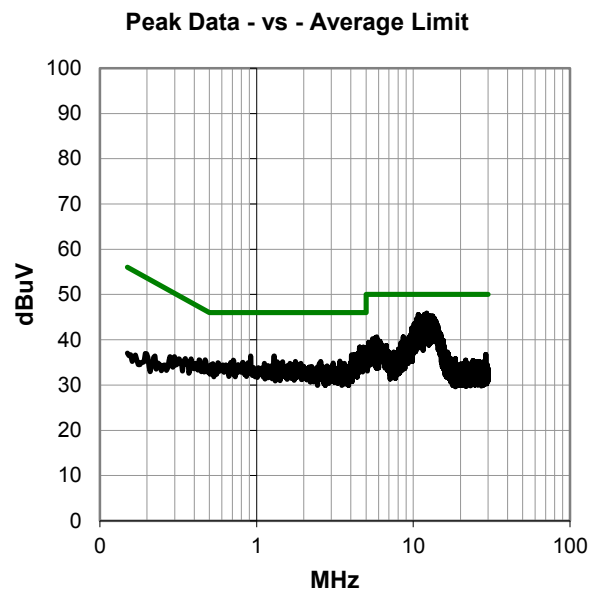
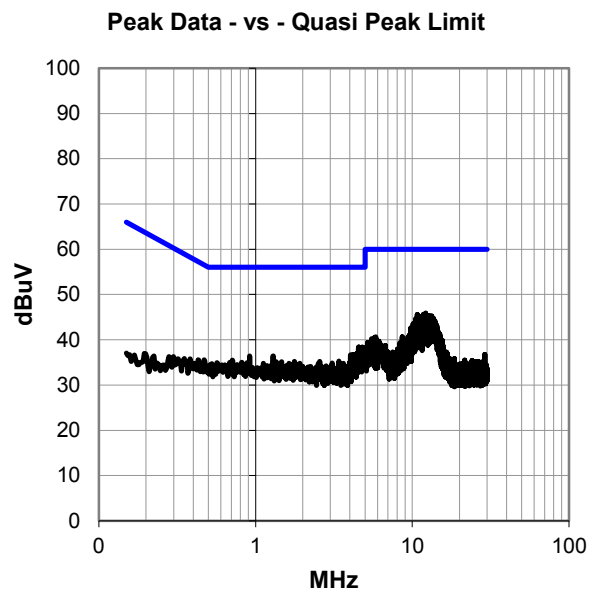
None

EUT OPERATING MODES

On, Tx Continuous Low Channel 2402MHz 1DH5

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #21

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
12.186	25.0	20.9	45.9	60.0	-14.1
10.775	24.8	20.8	45.6	60.0	-14.4
11.801	24.7	20.9	45.6	60.0	-14.4
12.555	24.5	20.9	45.4	60.0	-14.6
11.898	24.4	20.9	45.3	60.0	-14.7
11.674	24.4	20.9	45.3	60.0	-14.7
12.249	24.3	20.9	45.2	60.0	-14.8
12.995	24.3	20.9	45.2	60.0	-14.8
13.305	24.3	20.9	45.2	60.0	-14.8
11.984	24.2	20.9	45.1	60.0	-14.9
11.354	24.2	20.9	45.1	60.0	-14.9
12.428	24.1	20.9	45.0	60.0	-15.0
12.749	24.1	20.9	45.0	60.0	-15.0
11.738	24.1	20.9	45.0	60.0	-15.0
11.484	24.1	20.9	45.0	60.0	-15.0
11.204	24.1	20.8	44.9	60.0	-15.1
12.969	24.0	20.9	44.9	60.0	-15.1
11.857	24.0	20.9	44.9	60.0	-15.1
11.428	24.0	20.9	44.9	60.0	-15.1
12.719	23.9	20.9	44.8	60.0	-15.2
11.921	23.9	20.9	44.8	60.0	-15.2
13.633	23.8	20.9	44.7	60.0	-15.3
12.365	23.8	20.9	44.7	60.0	-15.3
11.548	23.8	20.9	44.7	60.0	-15.3
11.286	23.8	20.8	44.6	60.0	-15.4
13.693	23.7	20.9	44.6	60.0	-15.4

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
12.186	25.0	20.9	45.9	50.0	-4.1
10.775	24.8	20.8	45.6	50.0	-4.4
11.801	24.7	20.9	45.6	50.0	-4.4
12.555	24.5	20.9	45.4	50.0	-4.6
11.898	24.4	20.9	45.3	50.0	-4.7
11.674	24.4	20.9	45.3	50.0	-4.7
12.249	24.3	20.9	45.2	50.0	-4.8
12.995	24.3	20.9	45.2	50.0	-4.8
13.305	24.3	20.9	45.2	50.0	-4.8
11.984	24.2	20.9	45.1	50.0	-4.9
11.354	24.2	20.9	45.1	50.0	-4.9
12.428	24.1	20.9	45.0	50.0	-5.0
12.749	24.1	20.9	45.0	50.0	-5.0
11.738	24.1	20.9	45.0	50.0	-5.0
11.484	24.1	20.9	45.0	50.0	-5.0
11.204	24.1	20.8	44.9	50.0	-5.1
12.969	24.0	20.9	44.9	50.0	-5.1
11.857	24.0	20.9	44.9	50.0	-5.1
11.428	24.0	20.9	44.9	50.0	-5.1
12.719	23.9	20.9	44.8	50.0	-5.2
11.921	23.9	20.9	44.8	50.0	-5.2
13.633	23.8	20.9	44.7	50.0	-5.3
12.365	23.8	20.9	44.7	50.0	-5.3
11.548	23.8	20.9	44.7	50.0	-5.3
11.286	23.8	20.8	44.6	50.0	-5.4
13.693	23.7	20.9	44.6	50.0	-5.4

CONCLUSION

Pass



Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	DM3730 Torpedo + Wireless SOM -32	Work Order:	LGPD0151
Serial Number:	See Configuration	Date:	05/08/2015
Customer:	Logic PD	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	47.2%
Customer Project:	None	Bar. Pressure:	1015.6 mb
Tested By:	Brandon Hobbs	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	LGPD0151-8

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	22	Line:	High Line	Ext. Attenuation (dB):	20
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COMMENTS

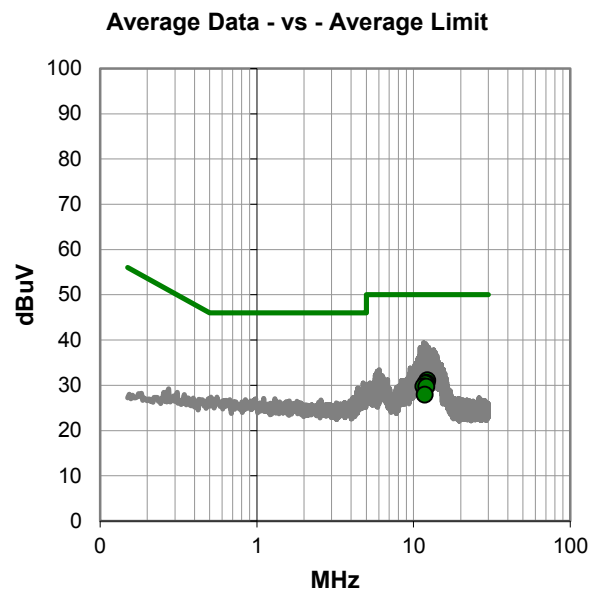
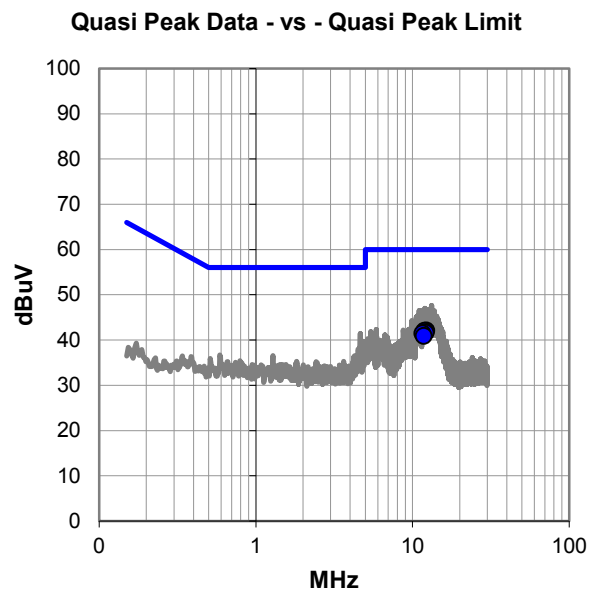
None

EUT OPERATING MODES

On, Tx Continuous Low Channel 2402MHz 1DH5

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #22

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
12.249	21.2	20.9	42.1	60.0	-17.9
11.926	21.1	20.9	42.0	60.0	-18.0
12.103	20.8	20.9	41.7	60.0	-18.3
12.176	20.7	20.9	41.6	60.0	-18.4
11.604	20.6	20.9	41.5	60.0	-18.5
11.785	20.0	20.9	40.9	60.0	-19.1

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
12.249	10.2	20.9	31.1	50.0	-18.9
12.176	9.6	20.9	30.5	50.0	-19.5
11.926	9.5	20.9	30.4	50.0	-19.6
11.604	8.9	20.9	29.8	50.0	-20.2
12.103	8.8	20.9	29.7	50.0	-20.3
11.785	7.0	20.9	27.9	50.0	-22.1

CONCLUSION

Pass



Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	DM3730 Torpedo + Wireless SOM -32	Work Order:	LGPD0151
Serial Number:	See Configuration	Date:	05/08/2015
Customer:	Logic PD	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	47.2%
Customer Project:	None	Bar. Pressure:	1015.6 mb
Tested By:	Brandon Hobbs	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	LGPD0151-8

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	23	Line:	High Line	Ext. Attenuation (dB):	20
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COMMENTS

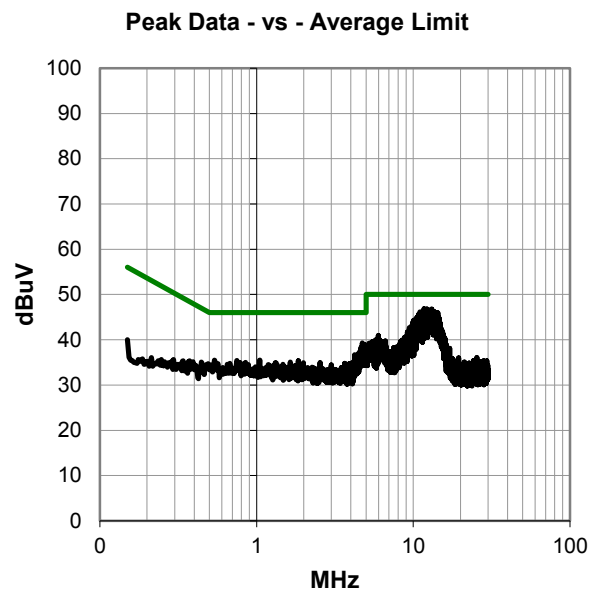
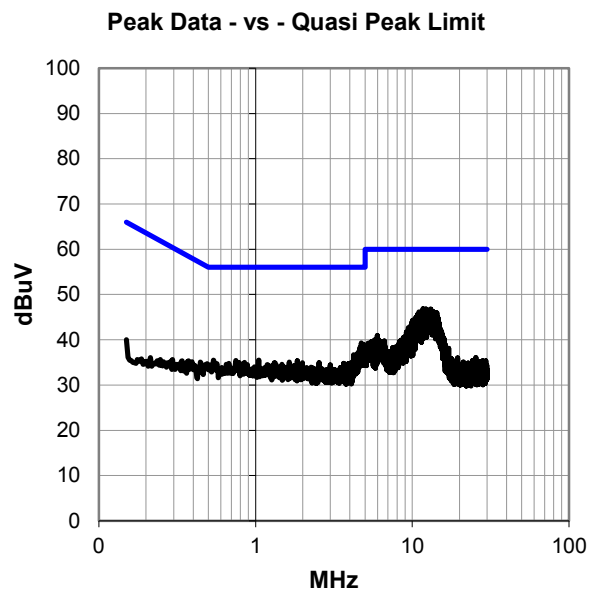
None

EUT OPERATING MODES

On, Tx Continuous Mid Channel 2440MHz 1DH5
--

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #23

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
11.738	26.0	20.9	46.9	60.0	-13.1
12.238	25.9	20.9	46.8	60.0	-13.2
13.096	25.9	20.9	46.8	60.0	-13.2
13.129	25.8	20.9	46.7	60.0	-13.3
12.074	25.5	20.9	46.4	60.0	-13.6
12.529	25.5	20.9	46.4	60.0	-13.6
12.790	25.5	20.9	46.4	60.0	-13.6
11.652	25.5	20.9	46.4	60.0	-13.6
12.380	25.4	20.9	46.3	60.0	-13.7
12.491	25.4	20.9	46.3	60.0	-13.7
12.592	25.4	20.9	46.3	60.0	-13.7
12.939	25.4	20.9	46.3	60.0	-13.7
13.372	25.4	20.9	46.3	60.0	-13.7
11.924	25.4	20.9	46.3	60.0	-13.7
12.174	25.3	20.9	46.2	60.0	-13.8
12.439	25.3	20.9	46.2	60.0	-13.8
13.488	25.3	20.9	46.2	60.0	-13.8
13.577	25.3	20.9	46.2	60.0	-13.8
11.861	25.3	20.9	46.2	60.0	-13.8
11.059	25.3	20.8	46.1	60.0	-13.9
11.980	25.2	20.9	46.1	60.0	-13.9
12.827	25.2	20.9	46.1	60.0	-13.9
12.342	25.1	20.9	46.0	60.0	-14.0
12.618	25.1	20.9	46.0	60.0	-14.0
12.898	25.1	20.9	46.0	60.0	-14.0
11.484	25.1	20.9	46.0	60.0	-14.0

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
11.738	26.0	20.9	46.9	50.0	-3.1
12.238	25.9	20.9	46.8	50.0	-3.2
13.096	25.9	20.9	46.8	50.0	-3.2
13.129	25.8	20.9	46.7	50.0	-3.3
12.074	25.5	20.9	46.4	50.0	-3.6
12.529	25.5	20.9	46.4	50.0	-3.6
12.790	25.5	20.9	46.4	50.0	-3.6
11.652	25.5	20.9	46.4	50.0	-3.6
12.380	25.4	20.9	46.3	50.0	-3.7
12.491	25.4	20.9	46.3	50.0	-3.7
12.592	25.4	20.9	46.3	50.0	-3.7
12.939	25.4	20.9	46.3	50.0	-3.7
13.372	25.4	20.9	46.3	50.0	-3.7
11.924	25.4	20.9	46.3	50.0	-3.7
12.174	25.3	20.9	46.2	50.0	-3.8
12.439	25.3	20.9	46.2	50.0	-3.8
13.488	25.3	20.9	46.2	50.0	-3.8
13.577	25.3	20.9	46.2	50.0	-3.8
11.861	25.3	20.9	46.2	50.0	-3.8
11.059	25.3	20.8	46.1	50.0	-3.9
11.980	25.2	20.9	46.1	50.0	-3.9
12.827	25.2	20.9	46.1	50.0	-3.9
12.342	25.1	20.9	46.0	50.0	-4.0
12.618	25.1	20.9	46.0	50.0	-4.0
12.898	25.1	20.9	46.0	50.0	-4.0
11.484	25.1	20.9	46.0	50.0	-4.0

CONCLUSION

Pass



Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	DM3730 Torpedo + Wireless SOM -32	Work Order:	LGPD0151
Serial Number:	See Configuration	Date:	05/08/2015
Customer:	Logic PD	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	47.2%
Customer Project:	None	Bar. Pressure:	1015.6 mb
Tested By:	Brandon Hobbs	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	LGPD0151-8

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	24	Line:	Neutral	Ext. Attenuation (dB):	20
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COMMENTS

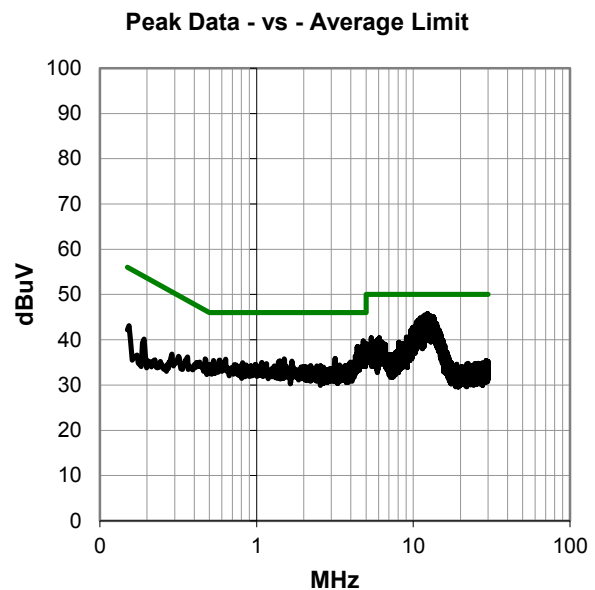
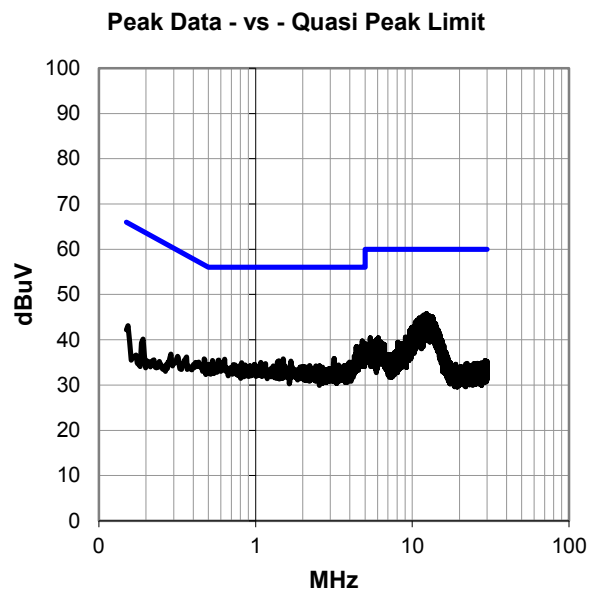
None

EUT OPERATING MODES

On, Tx Continuous Mid Channel 2440MHz 1DH5
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DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #24

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
12.365	24.9	20.9	45.8	60.0	-14.2
12.241	24.6	20.9	45.5	60.0	-14.5
11.924	24.6	20.9	45.5	60.0	-14.5
12.510	24.5	20.9	45.4	60.0	-14.6
12.006	24.4	20.9	45.3	60.0	-14.7
12.111	24.4	20.9	45.3	60.0	-14.7
12.842	24.4	20.9	45.3	60.0	-14.7
11.853	24.4	20.9	45.3	60.0	-14.7
11.734	24.4	20.9	45.3	60.0	-14.7
12.051	24.3	20.9	45.2	60.0	-14.8
12.312	24.3	20.9	45.2	60.0	-14.8
11.600	24.3	20.9	45.2	60.0	-14.8
13.059	24.2	20.9	45.1	60.0	-14.9
13.435	24.2	20.9	45.1	60.0	-14.9
11.671	24.1	20.9	45.0	60.0	-15.0
11.074	24.0	20.8	44.8	60.0	-15.2
12.741	23.9	20.9	44.8	60.0	-15.2
13.577	23.9	20.9	44.8	60.0	-15.2
11.480	23.8	20.9	44.7	60.0	-15.3
12.174	23.7	20.9	44.6	60.0	-15.4
13.308	23.7	20.9	44.6	60.0	-15.4
13.376	23.7	20.9	44.6	60.0	-15.4
11.529	23.7	20.9	44.6	60.0	-15.4
11.417	23.7	20.9	44.6	60.0	-15.4
11.283	23.7	20.8	44.5	60.0	-15.5
11.234	23.7	20.8	44.5	60.0	-15.5

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
12.365	24.9	20.9	45.8	50.0	-4.2
12.241	24.6	20.9	45.5	50.0	-4.5
11.924	24.6	20.9	45.5	50.0	-4.5
12.510	24.5	20.9	45.4	50.0	-4.6
12.006	24.4	20.9	45.3	50.0	-4.7
12.111	24.4	20.9	45.3	50.0	-4.7
12.842	24.4	20.9	45.3	50.0	-4.7
11.853	24.4	20.9	45.3	50.0	-4.7
11.734	24.4	20.9	45.3	50.0	-4.7
12.051	24.3	20.9	45.2	50.0	-4.8
12.312	24.3	20.9	45.2	50.0	-4.8
11.600	24.3	20.9	45.2	50.0	-4.8
13.059	24.2	20.9	45.1	50.0	-4.9
13.435	24.2	20.9	45.1	50.0	-4.9
11.671	24.1	20.9	45.0	50.0	-5.0
11.074	24.0	20.8	44.8	50.0	-5.2
12.741	23.9	20.9	44.8	50.0	-5.2
13.577	23.9	20.9	44.8	50.0	-5.2
11.480	23.8	20.9	44.7	50.0	-5.3
12.174	23.7	20.9	44.6	50.0	-5.4
13.308	23.7	20.9	44.6	50.0	-5.4
13.376	23.7	20.9	44.6	50.0	-5.4
11.529	23.7	20.9	44.6	50.0	-5.4
11.417	23.7	20.9	44.6	50.0	-5.4
11.283	23.7	20.8	44.5	50.0	-5.5
11.234	23.7	20.8	44.5	50.0	-5.5

CONCLUSION

Pass



Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	DM3730 Torpedo + Wireless SOM -32	Work Order:	LGPD0151
Serial Number:	See Configuration	Date:	05/08/2015
Customer:	Logic PD	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	47.2%
Customer Project:	None	Bar. Pressure:	1015.6 mb
Tested By:	Brandon Hobbs	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	LGPD0151-8

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	25	Line:	Neutral	Ext. Attenuation (dB):	20
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COMMENTS

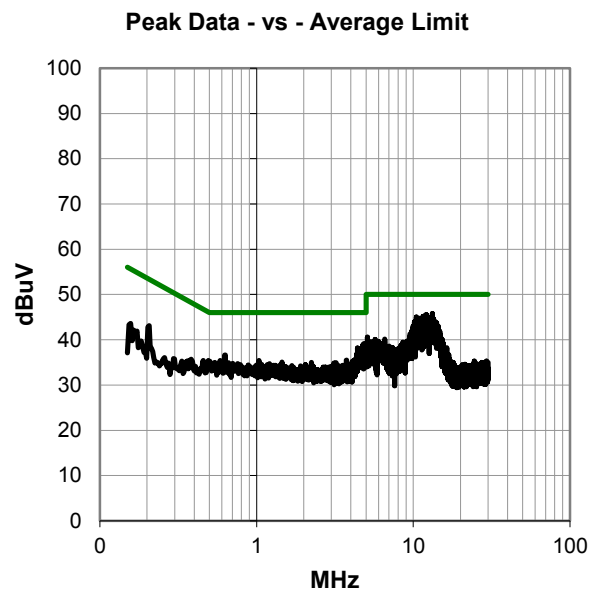
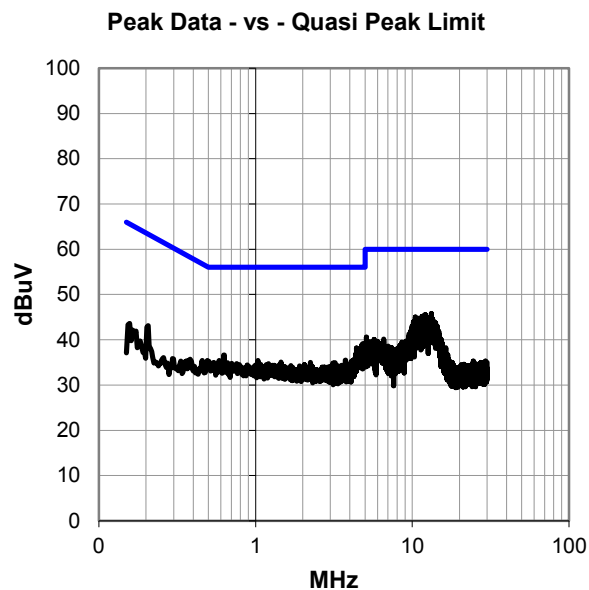
None

EUT OPERATING MODES

On, Tx Continuous High Channel 2480MHz1DH5

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #25

Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.249	24.9	20.9	45.8	60.0	-14.2
12.047	24.6	20.9	45.5	60.0	-14.5
12.137	24.6	20.9	45.5	60.0	-14.5
12.193	24.4	20.9	45.3	60.0	-14.7
11.865	24.4	20.9	45.3	60.0	-14.7
11.674	24.3	20.9	45.2	60.0	-14.8
11.548	24.3	20.9	45.2	60.0	-14.8
10.492	24.2	20.8	45.0	60.0	-15.0
11.988	24.0	20.9	44.9	60.0	-15.1
12.805	24.0	20.9	44.9	60.0	-15.1
11.473	24.0	20.9	44.9	60.0	-15.1
12.428	23.9	20.9	44.8	60.0	-15.2
12.954	23.9	20.9	44.8	60.0	-15.2
12.995	23.9	20.9	44.8	60.0	-15.2
11.921	23.9	20.9	44.8	60.0	-15.2
11.036	23.9	20.8	44.7	60.0	-15.3
12.555	23.8	20.9	44.7	60.0	-15.3
13.439	23.8	20.9	44.7	60.0	-15.3
11.283	23.8	20.8	44.6	60.0	-15.4
10.846	23.8	20.8	44.6	60.0	-15.4
12.775	23.7	20.9	44.6	60.0	-15.4
13.316	23.7	20.9	44.6	60.0	-15.4
13.350	23.7	20.9	44.6	60.0	-15.4
11.794	23.7	20.9	44.6	60.0	-15.4
11.727	23.7	20.9	44.6	60.0	-15.4
12.682	23.6	20.9	44.5	60.0	-15.5

Peak Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
13.249	24.9	20.9	45.8	50.0	-4.2
12.047	24.6	20.9	45.5	50.0	-4.5
12.137	24.6	20.9	45.5	50.0	-4.5
12.193	24.4	20.9	45.3	50.0	-4.7
11.865	24.4	20.9	45.3	50.0	-4.7
11.674	24.3	20.9	45.2	50.0	-4.8
11.548	24.3	20.9	45.2	50.0	-4.8
10.492	24.2	20.8	45.0	50.0	-5.0
11.988	24.0	20.9	44.9	50.0	-5.1
12.805	24.0	20.9	44.9	50.0	-5.1
11.473	24.0	20.9	44.9	50.0	-5.1
12.428	23.9	20.9	44.8	50.0	-5.2
12.954	23.9	20.9	44.8	50.0	-5.2
12.995	23.9	20.9	44.8	50.0	-5.2
11.921	23.9	20.9	44.8	50.0	-5.2
11.036	23.9	20.8	44.7	50.0	-5.3
12.555	23.8	20.9	44.7	50.0	-5.3
13.439	23.8	20.9	44.7	50.0	-5.3
11.283	23.8	20.8	44.6	50.0	-5.4
10.846	23.8	20.8	44.6	50.0	-5.4
12.775	23.7	20.9	44.6	50.0	-5.4
13.316	23.7	20.9	44.6	50.0	-5.4
13.350	23.7	20.9	44.6	50.0	-5.4
11.794	23.7	20.9	44.6	50.0	-5.4
11.727	23.7	20.9	44.6	50.0	-5.4
12.682	23.6	20.9	44.5	50.0	-5.5

CONCLUSION

Pass



Tested By

AC POWERLINE CONDUCTED EMISSIONS

EUT:	DM3730 Torpedo + Wireless SOM -32	Work Order:	LGPD0151
Serial Number:	See Configuration	Date:	05/08/2015
Customer:	Logic PD	Temperature:	22.3°C
Attendees:	None	Relative Humidity:	47.2%
Customer Project:	None	Bar. Pressure:	1015.6 mb
Tested By:	Brandon Hobbs	Job Site:	MN03
Power:	110VAC/60Hz	Configuration:	LGPD0151-8

TEST SPECIFICATIONS

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

TEST PARAMETERS

Run #:	26	Line:	High Line	Ext. Attenuation (dB):	20
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COMMENTS

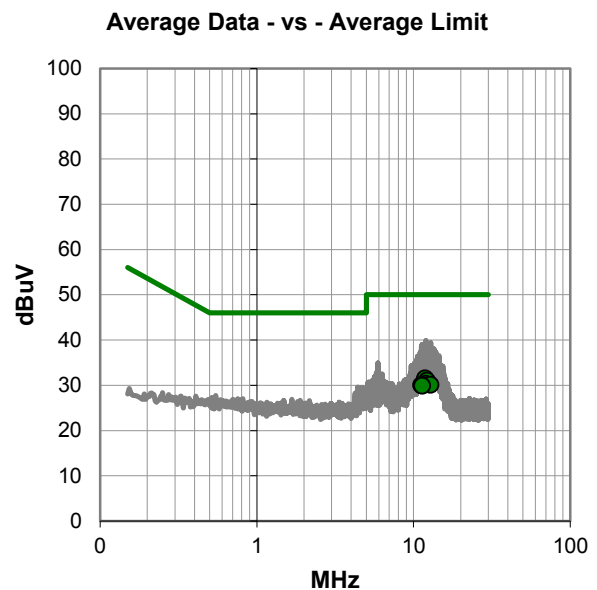
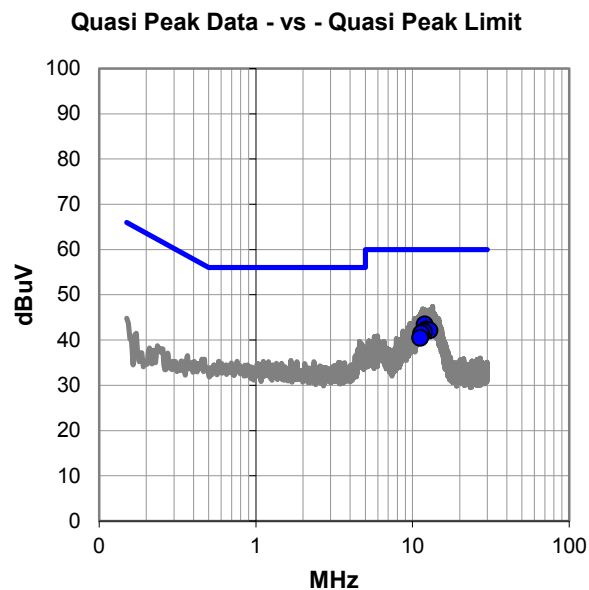
None

EUT OPERATING MODES

On, Tx Continuous High Channel 2480MHz1DH5

DEVIATIONS FROM TEST STANDARD

None



AC POWERLINE CONDUCTED EMISSIONS

RESULTS - Run #26

Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
11.985	22.5	20.9	43.4	60.0	-16.6
12.182	21.4	20.9	42.3	60.0	-17.7
12.874	21.2	20.9	42.1	60.0	-17.9
11.863	20.9	20.9	41.8	60.0	-18.2
11.355	20.6	20.9	41.5	60.0	-18.5
11.231	19.6	20.8	40.4	60.0	-19.6

Average Data - vs - Average Limit

Freq (MHz)	Amp. (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Margin (dB)
11.863	10.6	20.9	31.5	50.0	-18.5
12.182	10.1	20.9	31.0	50.0	-19.0
11.985	9.4	20.9	30.3	50.0	-19.7
12.874	9.2	20.9	30.1	50.0	-19.9
11.231	9.2	20.8	30.0	50.0	-20.0
11.355	9.0	20.9	29.9	50.0	-20.1

CONCLUSION

Pass



Tested By

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

MODES OF OPERATION

Transmitting Bluetooth BR/EDR - low channel (2402 MHz), mid channel (2440 MHz) and high channel (2480 MHz); DH5, 2DH5, and 3DH5 data rates.

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

LGPD0151 - 1

LGPD0151 - 4

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26500 MHz
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SAMPLE CALCULATIONS

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

TEST EQUIPMENT

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

MEASUREMENT BANDWIDTHS

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

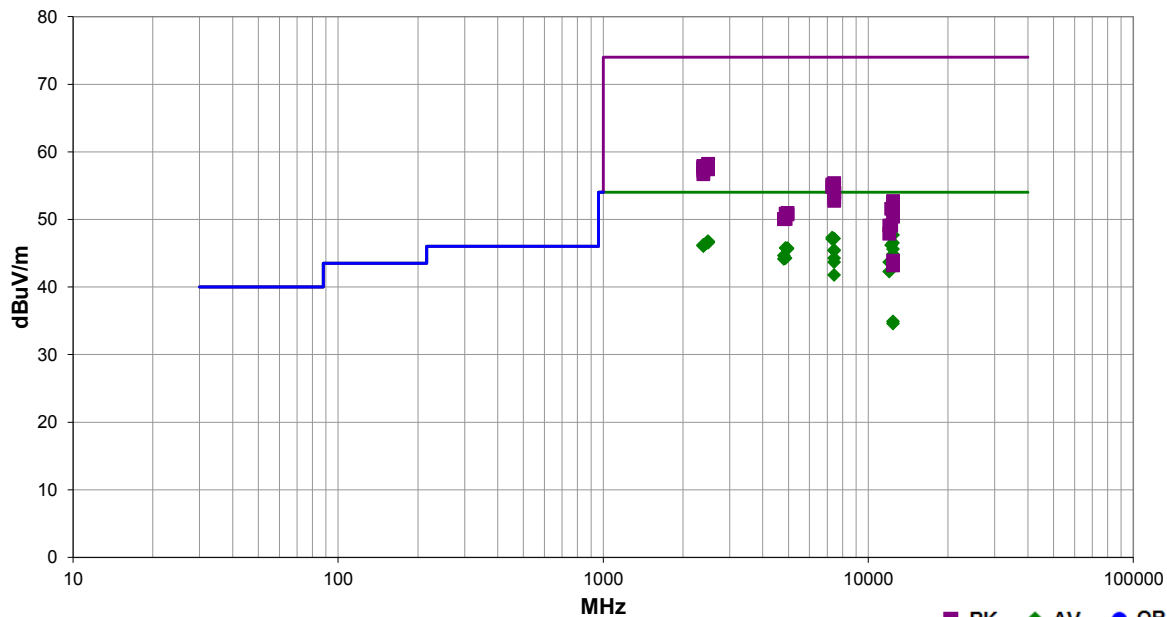
TEST DESCRIPTION

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

Work Order:	LGPD0151	Date:	04/24/15	<i>Dustin Sparks</i>
Project:	None	Temperature:	23.5 °C	
Job Site:	MN05	Humidity:	18.8% RH	
Serial Number:	See Configuration	Barometric Pres.:	983.8 mbar	Tested by: Dustin Sparks
EUT:	DM3730 Torpedo + Wireless SOM -32			
Configuration:	1			
Customer:	Logic PD			
Attendees:	Adam Ford			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth BR/EDR - low channel (2402 MHz), mid channel (2440 MHz) and high channel (2480 MHz); DH5, 2DH5, and 3DH5 data rates.			
Deviations:	None			
Comments:	Reference data comments for EUT channel, modulation rate and orientation. Chip Antenna.			

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

Run #	89	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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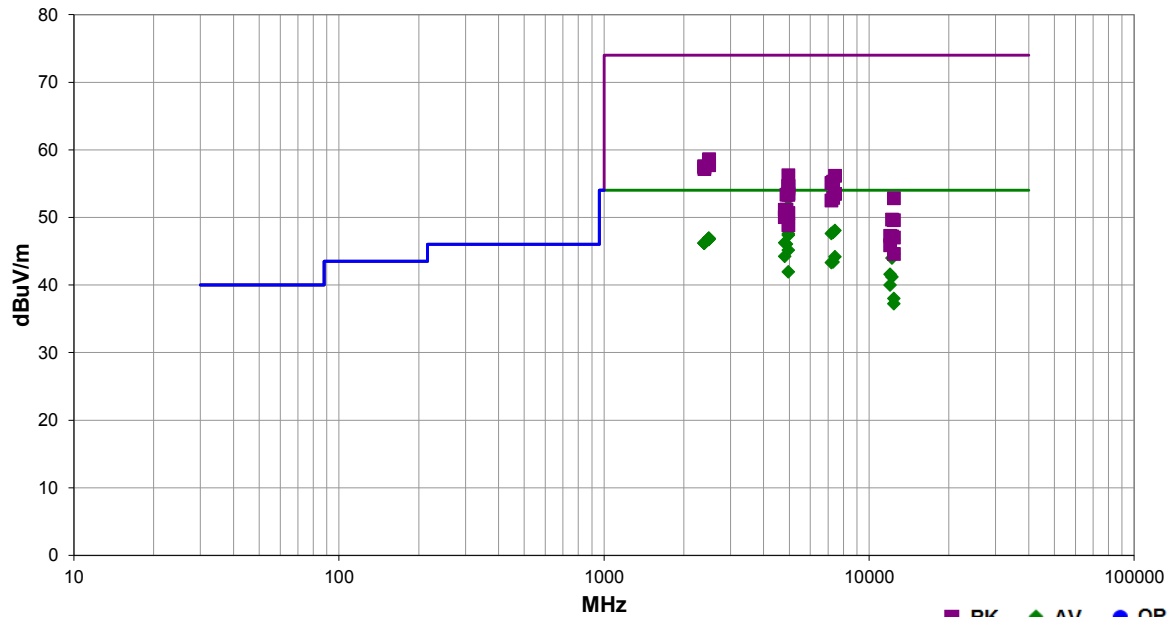
Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Antenna Height (meters)	Azimuth (degrees)	Test Distance (meters)	External Attenuation (dB)	Polarity/ Transducer Type	Detector	Distance Adjustment (dB)	Adjusted (dBuV/m)	Spec. Limit (dBuV/m)	Compared to Spec. (dB)	Comments
12399.280	52.4	-4.7	1.0	154.0	3.0	0.0	Horz	AV	0.0	47.7	54.0	-6.3	DH5, high ch, EUT vert
7320.217	34.5	12.8	1.3	43.0	3.0	0.0	Horz	AV	0.0	47.3	54.0	-6.7	DH5, mid ch, EUT vert
7439.700	33.9	13.3	1.3	268.0	3.0	0.0	Horz	AV	0.0	47.2	54.0	-6.8	DH5, high ch, EUT vert
7319.633	34.3	12.8	1.0	125.0	3.0	0.0	Vert	AV	0.0	47.1	54.0	-6.9	DH5, mid ch, EUT horz
2487.875	29.6	-2.9	3.0	57.0	3.0	20.0	Horz	AV	0.0	46.7	54.0	-7.3	3DH5, high ch, EUT horz
2487.142	29.6	-2.9	4.0	34.1	3.0	20.0	Horz	AV	0.0	46.7	54.0	-7.3	DH5, high ch, EUT horz
2486.833	29.6	-2.9	3.9	260.0	3.0	20.0	Vert	AV	0.0	46.7	54.0	-7.3	DH5, high ch, EUT horz
2486.258	29.6	-2.9	1.0	326.9	3.0	20.0	Vert	AV	0.0	46.7	54.0	-7.3	DH5, high ch, EUT vert
2486.008	29.6	-2.9	1.0	268.0	3.0	20.0	Horz	AV	0.0	46.7	54.0	-7.3	DH5, high ch, EUT vert
2487.892	29.5	-2.9	3.8	43.0	3.0	20.0	Horz	AV	0.0	46.6	54.0	-7.4	2DH5, high ch, EUT horz
2484.967	29.5	-2.9	1.0	50.0	3.0	20.0	Vert	AV	0.0	46.6	54.0	-7.4	DH5, high ch, EUT on side
12400.630	46.3	0.2	1.0	157.0	3.0	0.0	Horz	AV	0.0	46.5	54.0	-7.5	DH5, high ch, EUT vert
2485.008	29.4	-2.9	1.0	70.1	3.0	20.0	Horz	AV	0.0	46.5	54.0	-7.5	DH5, high ch, EUT on side
12199.200	50.9	-4.7	1.0	124.1	3.0	0.0	Horz	AV	0.0	46.2	54.0	-7.8	DH5, mid ch, EUT vert
2386.750	29.4	-3.2	1.0	133.0	3.0	20.0	Vert	AV	0.0	46.2	54.0	-7.8	2DH5, low ch, EUT horz
2386.917	29.4	-3.2	1.0	9.0	3.0	20.0	Vert	AV	0.0	46.2	54.0	-7.8	2DH5, low ch, EUT horz
2388.750	29.4	-3.2	3.6	128.0	3.0	20.0	Horz	AV	0.0	46.2	54.0	-7.8	DH5, low ch, EUT horz
2385.933	29.3	-3.2	1.0	41.1	3.0	20.0	Horz	AV	0.0	46.1	54.0	-7.9	3DH5, low ch, EUT horz
2388.808	29.3	-3.2	1.0	307.0	3.0	20.0	Horz	AV	0.0	46.1	54.0	-7.9	2DH5, low ch, EUT horz
2389.383	29.3	-3.2	4.0	258.9	3.0	20.0	Vert	AV	0.0	46.1	54.0	-7.9	DH5, low ch, EUT horz
4880.000	40.8	5.0	1.0	123.1	3.0	0.0	Horz	AV	0.0	45.8	54.0	-8.2	DH5, mid ch, EUT vert
4960.000	40.6	5.2	1.2	107.0	3.0	0.0	Vert	AV	0.0	45.8	54.0	-8.3	DH5, high ch, EUT horz
4959.958	40.5	5.1	1.1	116.1	3.0	0.0	Horz	AV	0.0	45.6	54.0	-8.4	DH5, high ch, EUT vert
12399.270	50.3	-4.7	1.1	144.0	3.0	0.0	Vert	AV	0.0	45.6	54.0	-8.4	DH5, high ch, EUT horz

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
7439.633	32.2	13.3	1.6	126.0	3.0	0.0	Vert	AV	0.0	45.5	54.0	-8.5	DH5, high ch, EUT horz
7439.708	32.1	13.3	1.6	325.0	3.0	0.0	Horz	AV	0.0	45.4	54.0	-8.6	DH5, high ch, EUT horz
12400.650	44.6	0.2	1.1	142.1	3.0	0.0	Vert	AV	0.0	44.8	54.0	-9.2	DH5, high ch, EUT horz
4804.042	39.5	5.1	1.0	117.0	3.0	0.0	Horz	AV	0.0	44.6	54.0	-9.4	DH5, low ch, EUT vert
7440.133	31.0	13.3	1.3	146.0	3.0	0.0	Horz	AV	0.0	44.3	54.0	-9.7	DH5, high ch, EUT on side
4880.008	39.3	5.0	1.2	83.1	3.0	0.0	Vert	AV	0.0	44.3	54.0	-9.7	DH5, mid ch, EUT horz
4804.033	39.0	5.1	1.0	84.1	3.0	0.0	Vert	AV	0.0	44.1	54.0	-9.9	DH5, low ch, EUT horz
12009.280	49.0	-5.3	1.0	111.0	3.0	0.0	Horz	AV	0.0	43.7	54.0	-10.3	DH5, low ch, EUT vert
7439.983	30.4	13.3	1.1	360.0	3.0	0.0	Vert	AV	0.0	43.7	54.0	-10.3	DH5, high ch, EUT on side
12199.270	48.3	-4.7	1.0	138.1	3.0	0.0	Vert	AV	0.0	43.6	54.0	-10.4	DH5, high ch, EUT horz
12009.240	47.6	-5.3	1.1	96.0	3.0	0.0	Vert	AV	0.0	42.3	54.0	-11.7	DH5, low ch, EUT horz
7439.850	28.5	13.3	1.3	268.9	3.0	0.0	Vert	AV	0.0	41.8	54.0	-12.2	DH5, high ch, EUT vert
2485.550	41.1	-2.9	3.8	43.0	3.0	20.0	Horz	PK	0.0	58.2	74.0	-15.8	2DH5, high ch, EUT horz
2483.967	40.9	-2.9	4.0	34.1	3.0	20.0	Horz	PK	0.0	58.0	74.0	-16.0	DH5, high ch, EUT horz
2486.058	40.8	-2.9	1.0	268.0	3.0	20.0	Horz	PK	0.0	57.9	74.0	-16.1	DH5, high ch, EUT vert
2386.917	41.1	-3.2	4.0	258.9	3.0	20.0	Vert	PK	0.0	57.9	74.0	-16.1	DH5, low ch, EUT horz
2388.308	41.1	-3.2	1.0	307.0	3.0	20.0	Horz	PK	0.0	57.9	74.0	-16.1	2DH5, low ch, EUT horz
2487.317	40.6	-2.9	1.0	70.1	3.0	20.0	Horz	PK	0.0	57.7	74.0	-16.3	DH5, high ch, EUT on side
2485.742	40.6	-2.9	3.0	57.0	3.0	20.0	Horz	PK	0.0	57.7	74.0	-16.3	3DH5, high ch, EUT horz
2386.533	40.9	-3.2	1.0	9.0	3.0	20.0	Vert	PK	0.0	57.7	74.0	-16.3	2DH5, low ch, EUT horz
2487.925	40.5	-2.9	1.0	326.9	3.0	20.0	Vert	PK	0.0	57.6	74.0	-16.4	DH5, high ch, EUT vert
2485.258	40.4	-2.9	1.0	50.0	3.0	20.0	Vert	PK	0.0	57.5	74.0	-16.5	DH5, high ch, EUT on side
2386.100	40.7	-3.2	1.0	133.0	3.0	20.0	Vert	PK	0.0	57.5	74.0	-16.5	3DH5, low ch, EUT horz
2487.358	40.3	-2.9	3.9	260.0	3.0	20.0	Vert	PK	0.0	57.4	74.0	-16.6	DH5, high ch, EUT horz
2386.408	40.4	-3.2	3.6	128.0	3.0	20.0	Horz	PK	0.0	57.2	74.0	-16.8	DH5, low ch, EUT horz
2385.600	39.9	-3.2	1.0	41.1	3.0	20.0	Horz	PK	0.0	56.7	74.0	-17.3	3DH5, low ch, EUT horz
7439.325	42.1	13.3	1.3	268.0	3.0	0.0	Horz	PK	0.0	55.4	74.0	-18.6	DH5, high ch, EUT vert
7320.342	42.4	12.8	1.3	43.0	3.0	0.0	Horz	PK	0.0	55.2	74.0	-18.8	DH5, mid ch, EUT vert
12399.980	39.6	-4.7	1.0	175.0	3.0	0.0	Horz	AV	0.0	34.9	54.0	-19.1	3DH5, high ch, EUT vert
7320.217	42.0	12.8	1.0	125.0	3.0	0.0	Vert	PK	0.0	54.8	74.0	-19.2	DH5, mid ch, EUT horz
12399.210	39.3	-4.7	1.1	173.1	3.0	0.0	Horz	AV	0.0	34.6	54.0	-19.4	2DH5, high ch, EUT vert
7439.983	40.7	13.3	1.3	146.0	3.0	0.0	Horz	PK	0.0	54.0	74.0	-20.0	DH5, high ch, EUT on side
7439.683	40.7	13.3	1.6	126.0	3.0	0.0	Vert	PK	0.0	54.0	74.0	-20.0	DH5, high ch, EUT horz
7439.942	40.6	13.3	1.6	325.0	3.0	0.0	Horz	PK	0.0	53.9	74.0	-20.1	DH5, high ch, EUT horz
7439.992	39.9	13.3	1.1	360.0	3.0	0.0	Vert	PK	0.0	53.2	74.0	-20.8	DH5, high ch, EUT on side
7439.433	39.5	13.3	1.3	268.9	3.0	0.0	Vert	PK	0.0	52.8	74.0	-21.2	DH5, high ch, EUT vert
12400.750	52.5	0.2	1.0	157.0	3.0	0.0	Horz	PK	0.0	52.7	74.0	-21.3	DH5, high ch, EUT vert
12399.250	57.2	-4.7	1.0	154.0	3.0	0.0	Horz	PK	0.0	52.5	74.0	-21.5	DH5, high ch, EUT vert
12200.760	56.3	-4.7	1.0	124.1	3.0	0.0	Horz	PK	0.0	51.6	74.0	-22.4	DH5, mid ch, EUT vert
12400.750	51.1	0.2	1.1	142.1	3.0	0.0	Vert	PK	0.0	51.3	74.0	-22.7	DH5, high ch, EUT horz
4960.208	45.8	5.2	1.1	116.1	3.0	0.0	Horz	PK	0.0	51.0	74.0	-23.0	DH5, high ch, EUT vert
4879.967	45.9	5.0	1.0	123.1	3.0	0.0	Horz	PK	0.0	50.9	74.0	-23.1	DH5, mid ch, EUT vert
4959.675	45.6	5.1	1.2	107.0	3.0	0.0	Vert	PK	0.0	50.7	74.0	-23.3	DH5, high ch, EUT horz
12399.160	55.1	-4.7	1.1	144.0	3.0	0.0	Vert	PK	0.0	50.4	74.0	-23.6	DH5, high ch, EUT horz
4880.217	45.1	5.0	1.2	83.1	3.0	0.0	Vert	PK	0.0	50.1	74.0	-23.9	DH5, mid ch, EUT horz
4803.908	44.9	5.1	1.0	84.1	3.0	0.0	Vert	PK	0.0	50.0	74.0	-24.0	DH5, low ch, EUT horz
4804.300	44.9	5.1	1.0	117.0	3.0	0.0	Horz	PK	0.0	50.0	74.0	-24.0	DH5, low ch, EUT vert
12199.180	53.8	-4.7	1.0	138.1	3.0	0.0	Vert	PK	0.0	49.1	74.0	-24.9	DH5, mid ch, EUT horz
12010.730	54.4	-5.3	1.0	111.0	3.0	0.0	Horz	PK	0.0	49.1	74.0	-24.9	DH5, low ch, EUT vert
12009.180	53.2	-5.3	1.1	96.0	3.0	0.0	Vert	PK	0.0	47.9	74.0	-26.1	DH5, low ch, EUT horz
12399.870	48.6	-4.7	1.0	175.0	3.0	0.0	Horz	PK	0.0	43.9	74.0	-30.1	3DH5, high ch, EUT vert
12399.300	47.9	-4.7	1.1	173.1	3.0	0.0	Horz	PK	0.0	43.2	74.0	-30.8	2DH5, high ch, EUT vert

Work Order:	LGPD0151	Date:	04/24/15	
Project:	None	Temperature:	23.1 °C	
Job Site:	MN05	Humidity:	18.5% RH	
Serial Number:	See Configuration	Barometric Pres.:	983 mbar	Tested by: Dustin Sparks
EUT:	DM3730 Torpedo + Wireless SOM -32			
Configuration:	4			
Customer:	Logic PD			
Attendees:	Adam Ford			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth BR/EDR - low channel (2402 MHz), mid channel (2440 MHz) and high channel (2480 MHz); DH5, 2DH5, and 3DH5 data rates.			
Deviations:	None			
Comments:	Reference data comments for EUT channel, modulation rate and orientation. Isolated Magnetic Dipole Antenna.			

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

Run #	110	Test Distance (m)	3	Antenna Height(s)	1 to 4(m)	Results	Pass
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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
4960.033	47.6	5.2	1.0	76.1	3.0	0.0	Horz	AV	0.0	52.8	54.0	-1.2	DH5, high ch, EUT vert
4960.000	46.0	5.2	1.2	245.0	3.0	0.0	Vert	AV	0.0	51.2	54.0	-2.8	DH5, high ch, EUT horz
4959.983	45.7	5.1	1.0	340.0	3.0	0.0	Vert	AV	0.0	50.8	54.0	-3.2	DH5, high ch, EUT on side
4960.025	45.1	5.2	1.0	138.1	3.0	0.0	Horz	AV	0.0	50.3	54.0	-3.7	DH5, high ch, EUT horz
4880.067	44.6	5.0	1.1	71.0	3.0	0.0	Horz	AV	0.0	49.6	54.0	-4.4	DH5, mid ch, EUT vert
7440.308	34.8	13.3	1.5	91.1	3.0	0.0	Horz	AV	0.0	48.1	54.0	-5.9	DH5, high ch, EUT vert
7319.717	35.0	12.8	1.3	63.0	3.0	0.0	Horz	AV	0.0	47.8	54.0	-6.2	DH5, mid ch, EUT vert
7205.608	35.5	12.1	1.3	63.0	3.0	0.0	Horz	AV	0.0	47.6	54.0	-6.4	DH5, low ch, EUT vert
4960.142	42.4	5.2	1.0	38.0	3.0	0.0	Horz	AV	0.0	47.6	54.0	-6.4	2DH5, high ch, EUT vert
4960.108	42.2	5.2	1.0	38.0	3.0	0.0	Horz	AV	0.0	47.4	54.0	-6.6	3DH5, high ch, EUT vert
2484.475	29.8	-2.9	1.0	304.9	3.0	20.0	Vert	AV	0.0	46.9	54.0	-7.1	3DH5, high ch, EUT on side
2484.083	29.8	-2.9	1.0	214.1	3.0	20.0	Horz	AV	0.0	46.9	54.0	-7.1	DH5, high ch, EUT horz
2487.617	29.7	-2.9	1.0	216.0	3.0	20.0	Vert	AV	0.0	46.8	54.0	-7.2	DH5, high ch, EUT on side
2486.550	29.7	-2.9	1.0	149.1	3.0	20.0	Vert	AV	0.0	46.8	54.0	-7.2	2DH5, high ch, EUT on side
2485.383	29.7	-2.9	1.0	191.1	3.0	20.0	Vert	AV	0.0	46.8	54.0	-7.2	DH5, high ch, EUT horz
2485.142	29.7	-2.9	2.4	111.0	3.0	20.0	Horz	AV	0.0	46.8	54.0	-7.2	DH5, high ch, EUT on side
2485.075	29.7	-2.9	1.0	113.1	3.0	20.0	Horz	AV	0.0	46.8	54.0	-7.2	DH5, high ch, EUT vert
2486.458	29.6	-2.9	2.4	26.1	3.0	20.0	Vert	AV	0.0	46.7	54.0	-7.3	DH5, high ch, EUT vert
12400.670	46.4	0.2	1.0	26.1	3.0	0.0	Horz	AV	0.0	46.6	54.0	-7.4	DH5, high ch, EUT vert
4804.042	41.1	5.1	1.4	31.0	3.0	0.0	Horz	AV	0.0	46.2	54.0	-7.8	DH5, low ch, EUT horz
2387.942	29.4	-3.2	4.0	250.9	3.0	20.0	Horz	AV	0.0	46.2	54.0	-7.8	2DH5, low ch, EUT horz
2388.058	29.4	-3.2	1.0	104.0	3.0	20.0	Horz	AV	0.0	46.2	54.0	-7.8	DH5, low ch, EUT horz
2389.300	29.4	-3.2	1.0	99.0	3.0	20.0	Vert	AV	0.0	46.2	54.0	-7.8	DH5, low ch, EUT on side
2389.408	29.4	-3.2	1.0	192.1	3.0	20.0	Horz	AV	0.0	46.2	54.0	-7.8	3DH5, low ch, EUT horz

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
4880.050	41.1	5.0	1.2	250.0	3.0	0.0	Vert	AV	0.0	46.1	54.0	-7.9	DH5, mid ch, EUT horz
4959.992	40.0	5.1	1.0	290.9	3.0	0.0	Horz	AV	0.0	45.1	54.0	-8.9	DH5, high ch, EUT on side
12399.270	49.3	-4.7	1.0	38.0	3.0	0.0	Horz	AV	0.0	44.6	54.0	-9.4	DH5, high ch, EUT vert
4803.983	39.1	5.1	1.3	257.0	3.0	0.0	Vert	AV	0.0	44.2	54.0	-9.8	DH5, low ch, EUT horz
7439.908	30.9	13.3	1.0	271.0	3.0	0.0	Vert	AV	0.0	44.2	54.0	-9.8	DH5, low ch, EUT horz
12199.200	48.7	-4.7	1.0	29.1	3.0	0.0	Horz	AV	0.0	44.0	54.0	-10.0	DH5, mid ch, EUT vert
7320.042	30.6	12.8	1.0	257.0	3.0	0.0	Vert	AV	0.0	43.4	54.0	-10.6	DH5, mid ch, EUT horz
7206.300	31.2	12.1	1.5	274.0	3.0	0.0	Vert	AV	0.0	43.3	54.0	-10.7	DH5, low ch, EUT horz
4960.050	36.8	5.2	1.1	324.0	3.0	0.0	Vert	AV	0.0	42.0	54.0	-12.0	DH5, high ch, EUT vert
12009.260	46.9	-5.3	1.0	354.0	3.0	0.0	Horz	AV	0.0	41.6	54.0	-12.4	DH5, low ch, EUT vert
12199.300	45.9	-4.7	1.1	239.0	3.0	0.0	Vert	AV	0.0	41.2	54.0	-12.8	DH5, mid ch, EUT horz
12009.270	45.3	-5.3	1.1	142.1	3.0	0.0	Vert	AV	0.0	40.0	54.0	-14.0	DH5, low ch, EUT horz
2488.408	41.5	-2.9	1.0	304.9	3.0	20.0	Vert	PK	0.0	58.6	74.0	-15.4	3DH5, high ch, EUT on side
2486.192	41.4	-2.9	1.0	214.1	3.0	20.0	Horz	PK	0.0	58.5	74.0	-15.5	DH5, high ch, EUT horz
2484.733	41.3	-2.9	1.0	191.1	3.0	20.0	Vert	PK	0.0	58.4	74.0	-15.6	DH5, high ch, EUT horz
2488.200	41.0	-2.9	2.4	111.0	3.0	20.0	Horz	PK	0.0	58.1	74.0	-15.9	DH5, high ch, EUT on side
2484.108	41.0	-2.9	1.0	149.1	3.0	20.0	Vert	PK	0.0	58.1	74.0	-15.9	2DH5, high ch, EUT on side
12399.240	42.7	-4.7	1.1	253.0	3.0	0.0	Vert	AV	0.0	38.0	54.0	-16.0	DH5, high ch, EUT horz
2488.333	40.8	-2.9	1.0	113.1	3.0	20.0	Horz	PK	0.0	57.9	74.0	-16.1	DH5, high ch, EUT vert
2484.225	40.7	-2.9	1.0	216.0	3.0	20.0	Vert	PK	0.0	57.8	74.0	-16.2	DH5, high ch, EUT on side
2488.233	40.6	-2.9	2.4	26.1	3.0	20.0	Vert	PK	0.0	57.7	74.0	-16.3	DH5, high ch, EUT vert
2386.750	40.8	-3.2	4.0	250.9	3.0	20.0	Horz	PK	0.0	57.6	74.0	-16.4	2DH5, low ch, EUT horz
2387.025	40.7	-3.2	1.0	104.0	3.0	20.0	Horz	PK	0.0	57.5	74.0	-16.5	DH5, low ch, EUT horz
2389.133	40.6	-3.2	1.0	99.0	3.0	20.0	Vert	PK	0.0	57.4	74.0	-16.6	DH5, low ch, EUT on side
12400.630	37.0	0.2	1.0	247.9	3.0	0.0	Vert	AV	0.0	37.2	54.0	-16.8	DH5, high ch, EUT horz
2389.733	40.4	-3.2	1.0	192.1	3.0	20.0	Horz	PK	0.0	57.2	74.0	-16.8	3DH5, low ch, EUT horz
4960.283	51.1	5.2	1.0	76.1	3.0	0.0	Horz	PK	0.0	56.3	74.0	-17.7	DH5, high ch, EUT vert
7439.742	42.9	13.3	1.5	91.1	3.0	0.0	Horz	PK	0.0	56.2	74.0	-17.8	DH5, high ch, EUT vert
7320.250	42.5	12.8	1.3	63.0	3.0	0.0	Horz	PK	0.0	55.3	74.0	-18.7	DH5, mid ch, EUT vert
7205.692	43.0	12.1	1.3	63.0	3.0	0.0	Horz	PK	0.0	55.1	74.0	-18.9	DH5, low ch, EUT vert
4960.317	49.5	5.2	1.0	340.0	3.0	0.0	Vert	PK	0.0	54.7	74.0	-19.3	DH5, high ch, EUT on side
4959.717	49.5	5.1	1.2	245.0	3.0	0.0	Vert	PK	0.0	54.6	74.0	-19.4	DH5, high ch, EUT horz
4960.400	49.1	5.2	1.0	138.1	3.0	0.0	Horz	PK	0.0	54.3	74.0	-19.7	DH5, high ch, EUT horz
4960.392	48.4	5.2	1.0	38.0	3.0	0.0	Horz	PK	0.0	53.6	74.0	-20.4	2DH5, high ch, EUT vert
7440.333	40.2	13.3	1.0	271.0	3.0	0.0	Vert	PK	0.0	53.5	74.0	-20.5	DH5, high ch, EUT horz
4880.408	48.4	5.0	1.1	71.0	3.0	0.0	Horz	PK	0.0	53.4	74.0	-20.6	DH5, mid ch, EUT vert
4960.067	48.2	5.2	1.0	38.0	3.0	0.0	Horz	PK	0.0	53.4	74.0	-20.6	3DH5, high ch, EUT vert
7319.992	40.1	12.8	1.0	257.0	3.0	0.0	Vert	PK	0.0	52.9	74.0	-21.1	DH5, mid ch, EUT horz
12400.830	52.6	0.2	1.0	26.1	3.0	0.0	Horz	PK	0.0	52.8	74.0	-21.2	DH5, high ch, EUT vert
7206.542	40.4	12.1	1.5	274.0	3.0	0.0	Vert	PK	0.0	52.5	74.0	-21.5	DH5, low ch, EUT horz
4879.633	46.2	5.0	1.2	250.0	3.0	0.0	Vert	PK	0.0	51.2	74.0	-22.8	DH5, mid ch, EUT horz
4804.308	46.0	5.1	1.4	31.0	3.0	0.0	Horz	PK	0.0	51.1	74.0	-22.9	DH5, low ch, EUT vert
4960.392	45.5	5.2	1.0	290.9	3.0	0.0	Horz	PK	0.0	50.7	74.0	-23.3	DH5, high ch, EUT on side
4803.917	44.9	5.1	1.3	257.0	3.0	0.0	Vert	PK	0.0	50.0	74.0	-24.0	DH5, low ch, EUT horz
12199.140	54.4	-4.7	1.0	29.1	3.0	0.0	Horz	PK	0.0	49.7	74.0	-24.3	DH5, mid ch, EUT vert
12399.240	54.3	-4.7	1.0	38.0	3.0	0.0	Horz	PK	0.0	49.6	74.0	-24.4	DH5, high ch, EUT vert
4959.725	43.7	5.1	1.1	324.0	3.0	0.0	Vert	PK	0.0	48.8	74.0	-25.2	DH5, high ch, EUT vert
12010.710	52.6	-5.3	1.0	354.0	3.0	0.0	Horz	PK	0.0	47.3	74.0	-26.7	DH5, low ch, EUT vert
12199.300	51.9	-4.7	1.1	239.0	3.0	0.0	Vert	PK	0.0	47.2	74.0	-26.8	DH5, mid ch, EUT horz
12400.650	46.8	0.2	1.0	247.9	3.0	0.0	Vert	PK	0.0	47.0	74.0	-27.0	DH5, high ch, EUT horz
12010.980	51.2	-5.3	1.1	142.1	3.0	0.0	Vert	PK	0.0	45.9	74.0	-28.1	DH5, low ch, EUT horz
12399.050	49.3	-4.7	1.1	253.0	3.0	0.0	Vert	PK	0.0	44.6	74.0	-29.4	DH5, high ch, EUT horz

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 (mos)
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12
Attenuator, 20db, 'SMA'	SM Electronics	SA26B-20	RFW	3/10/2015	12
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12

TEST DESCRIPTION

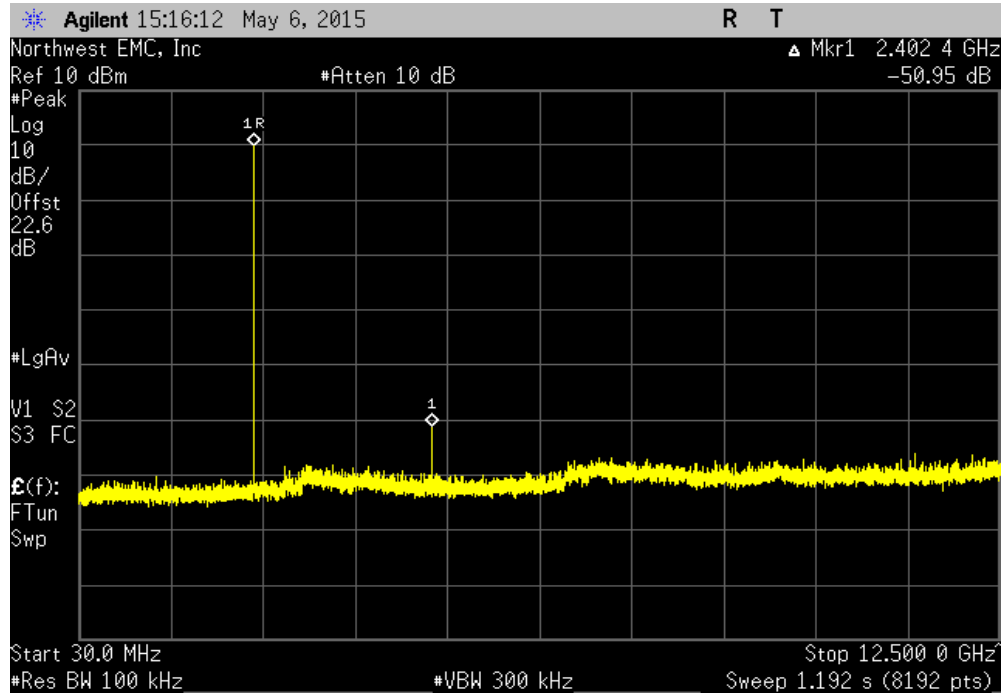
The spurious RF conducted emissions were measured with the EUT set to low, medium and high transmit frequencies. The measurements were made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop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

SPURIOUS CONDUCTED EMISSIONS

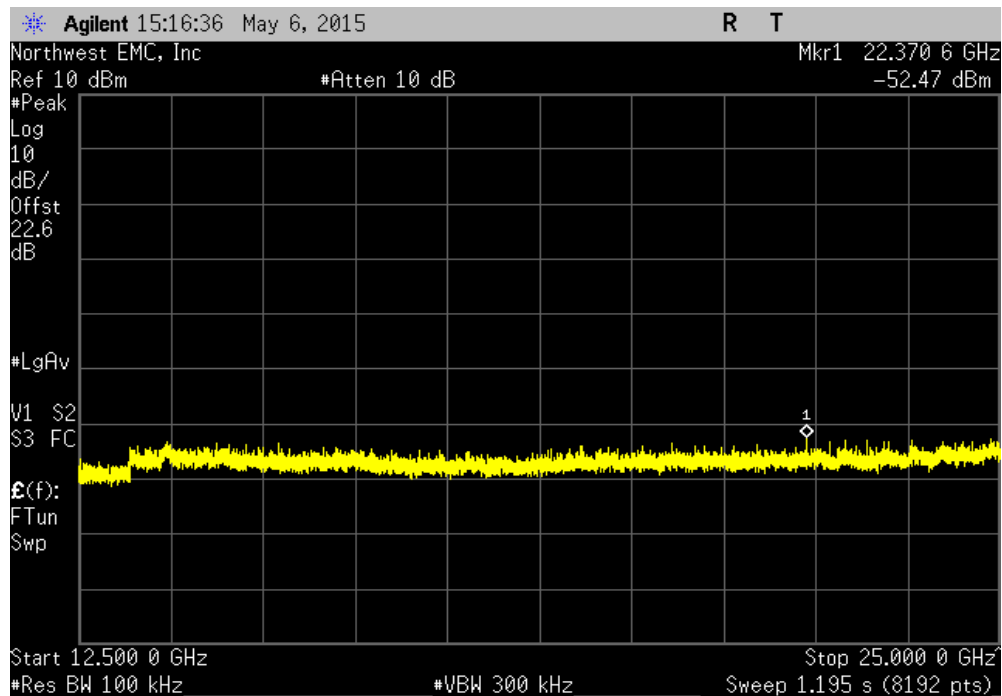
EUT: DM3730 Torpedo + Wireless SOM -32		Work Order: LGPD0151	
Serial Number: See Configuration		Date: 05/07/15	
Customer: Logic PD		Temperature: 23.1°C	
Attendees: Adam Ford		Humidity: 41%	
Project: None		Barometric Pres.: 1018.5	
Tested by: Brandon Hobbs		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2015		ANSI C63.10:2009	
COMMENTS			
The EUT was tested with the fundamental modulated while under test. The EUT was not operating in hopping mode. All cable losses were accounted for.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	5	Signature 	
		Frequency Range	Value (dBc) Limit ≤ (dBc) Result
DH5, GFSK			
	Low Channel 2402MHz	30 MHz - 12.5 GHz	-50.95 -20 Pass
	Low Channel 2402MHz	12.5 GHz - 25 GHz	-52.21 -20 Pass
	Mid Channel 2441MHz	30 MHz - 12.5 GHz	-49.94 -20 Pass
	Mid Channel 2441MHz	12.5 GHz - 25 GHz	-53.1 -20 Pass
	High Channel 2480MHz	30 MHz - 12.5 GHz	-49.07 -20 Pass
	High Channel 2480MHz	12.5 GHz - 25 GHz	-53.83 -20 Pass
2DH5, pi/4-DQPSK			
	Low Channel 2402MHz	30 MHz - 12.5 GHz	-44.23 -20 Pass
	Low Channel 2402MHz	12.5 GHz - 25 GHz	-44.9 -20 Pass
	Mid Channel 2441MHz	30 MHz - 12.5 GHz	-46.32 -20 Pass
	Mid Channel 2441MHz	12.5 GHz - 25 GHz	-44.86 -20 Pass
	High Channel 2480MHz	30 MHz - 12.5 GHz	-47.17 -20 Pass
	High Channel 2480MHz	12.5 GHz - 25 GHz	-47.03 -20 Pass
3DH5, 8-DPSK			
	Low Channel 2402MHz	30 MHz - 12.5 GHz	-44.54 -20 Pass
	Low Channel 2402MHz	12.5 GHz - 25 GHz	-44.69 -20 Pass
	Mid Channel 2441MHz	30 MHz - 12.5 GHz	-45.89 -20 Pass
	Mid Channel 2441MHz	12.5 GHz - 25 GHz	-45.21 -20 Pass
	High Channel 2480MHz	30 MHz - 12.5 GHz	-47.6 -20 Pass
	High Channel 2480MHz	12.5 GHz - 25 GHz	-47.29 -20 Pass

SPURIOUS CONDUCTED EMISSIONS

DH5, GFSK, Low Channel 2402MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-50.95	-20	Pass	

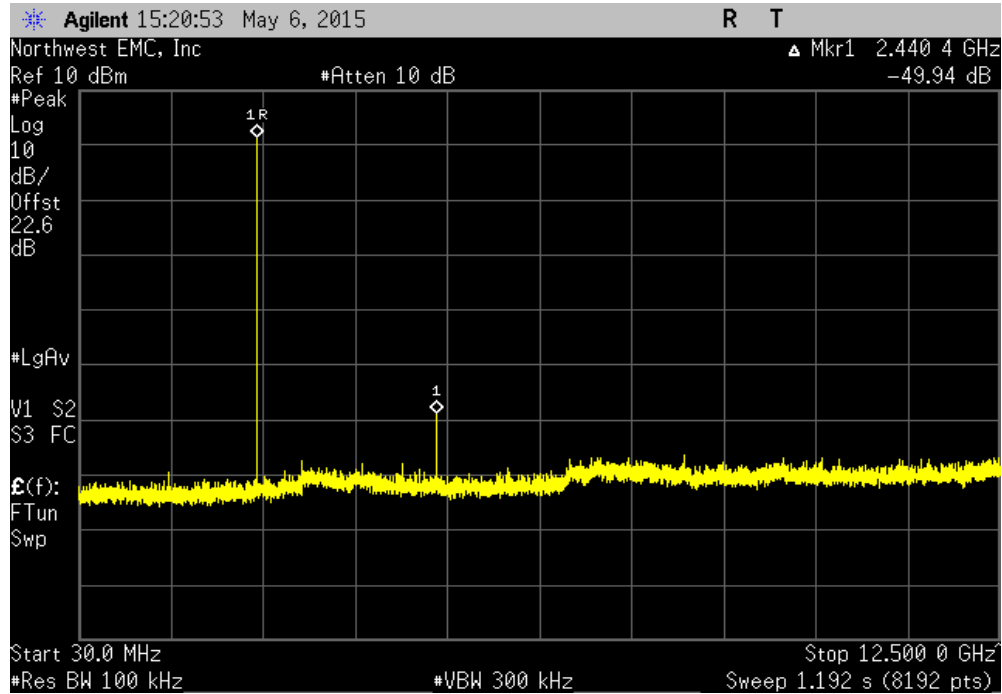


DH5, GFSK, Low Channel 2402MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-52.21	-20	Pass	

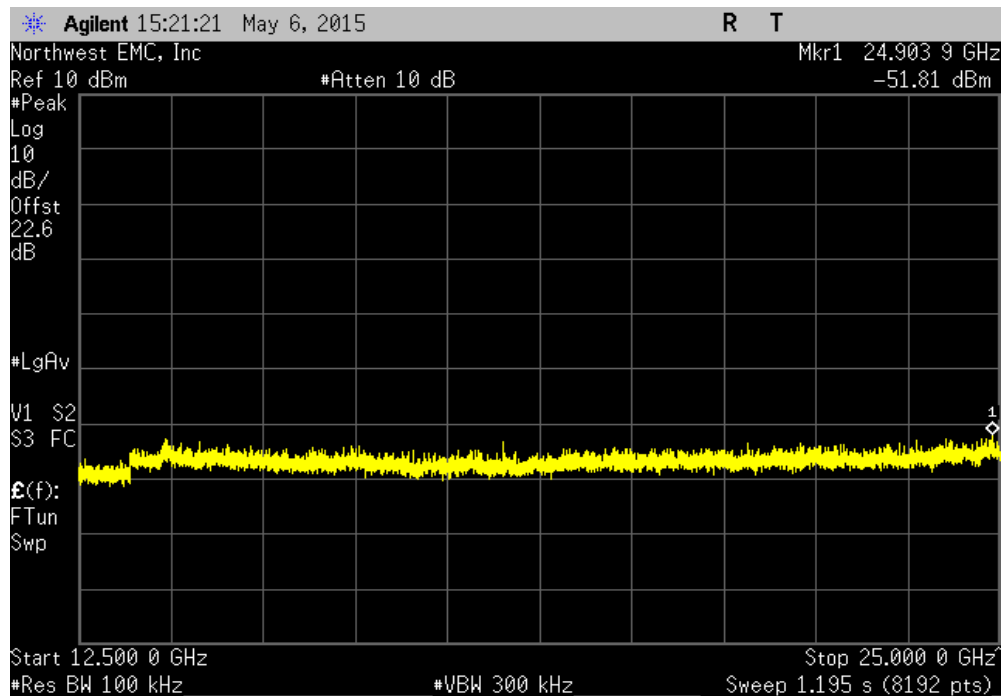


SPURIOUS CONDUCTED EMISSIONS

DH5, GFSK, Mid Channel 2441MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-49.94	-20	Pass	

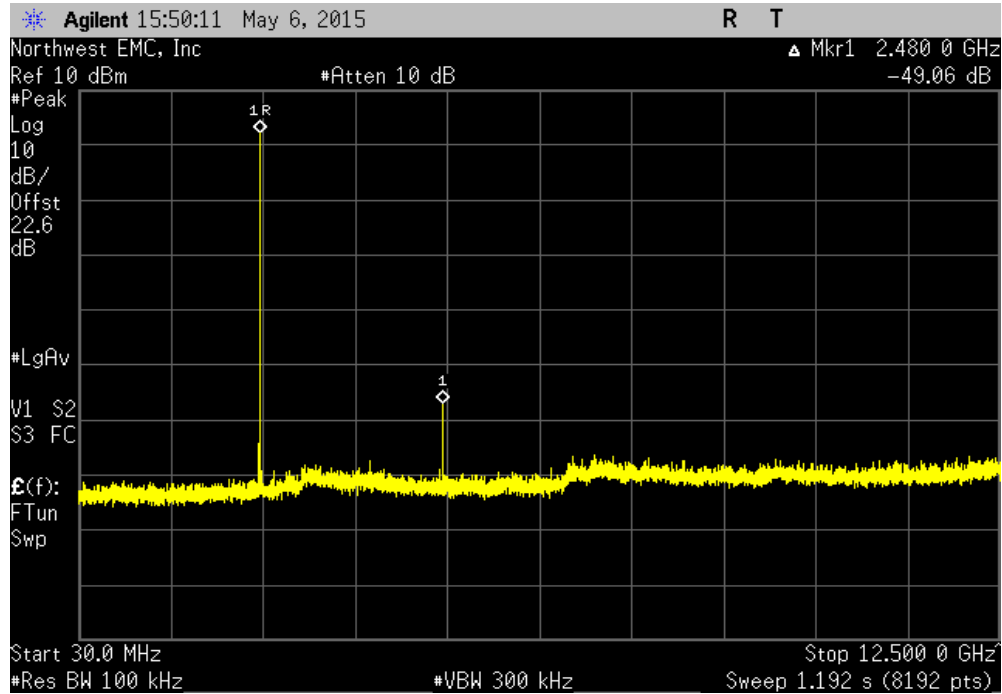


DH5, GFSK, Mid Channel 2441MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-53.1	-20	Pass	

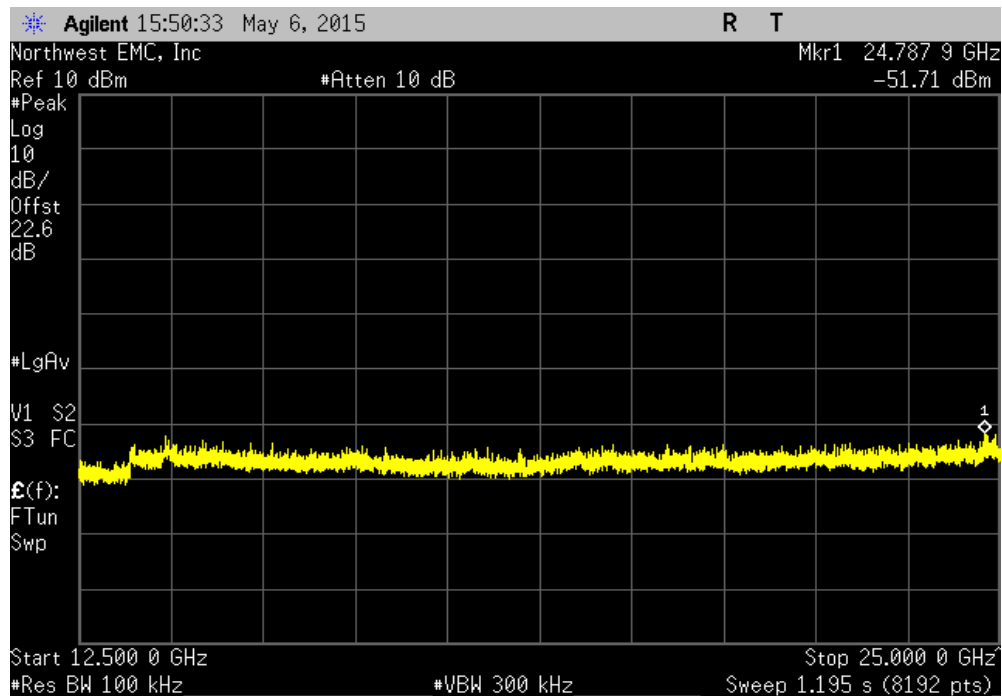


SPURIOUS CONDUCTED EMISSIONS

DH5, GFSK, High Channel 2480MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-49.07	-20	Pass	

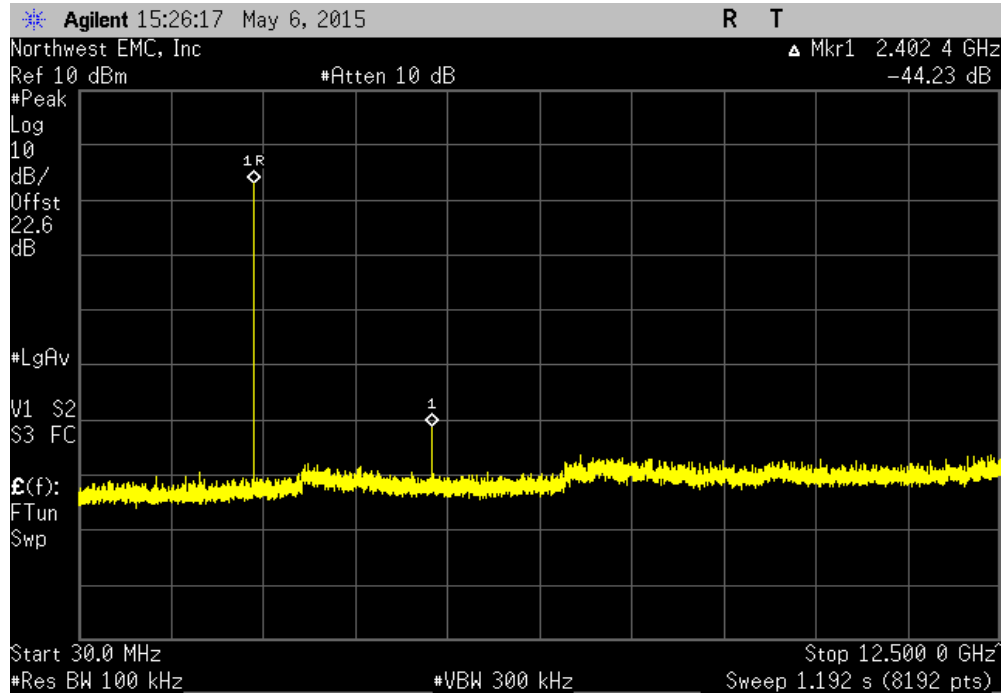


DH5, GFSK, High Channel 2480MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-53.83	-20	Pass	

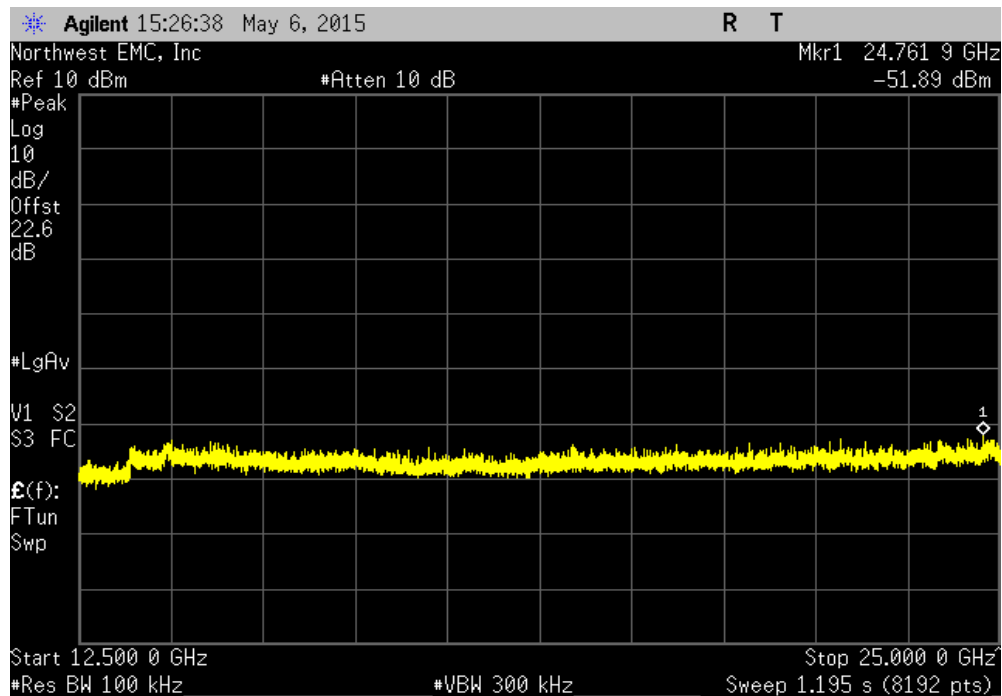


SPURIOUS CONDUCTED EMISSIONS

2DH5, pi/4-DQPSK, Low Channel 2402MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-44.23	-20	Pass	

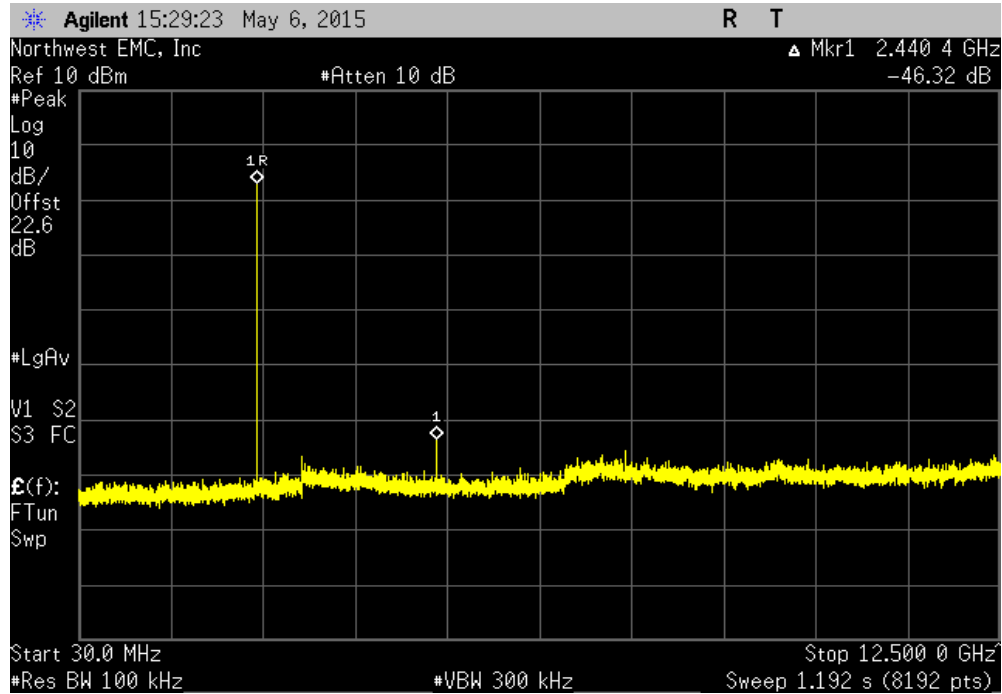


2DH5, pi/4-DQPSK, Low Channel 2402MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-44.9	-20	Pass	

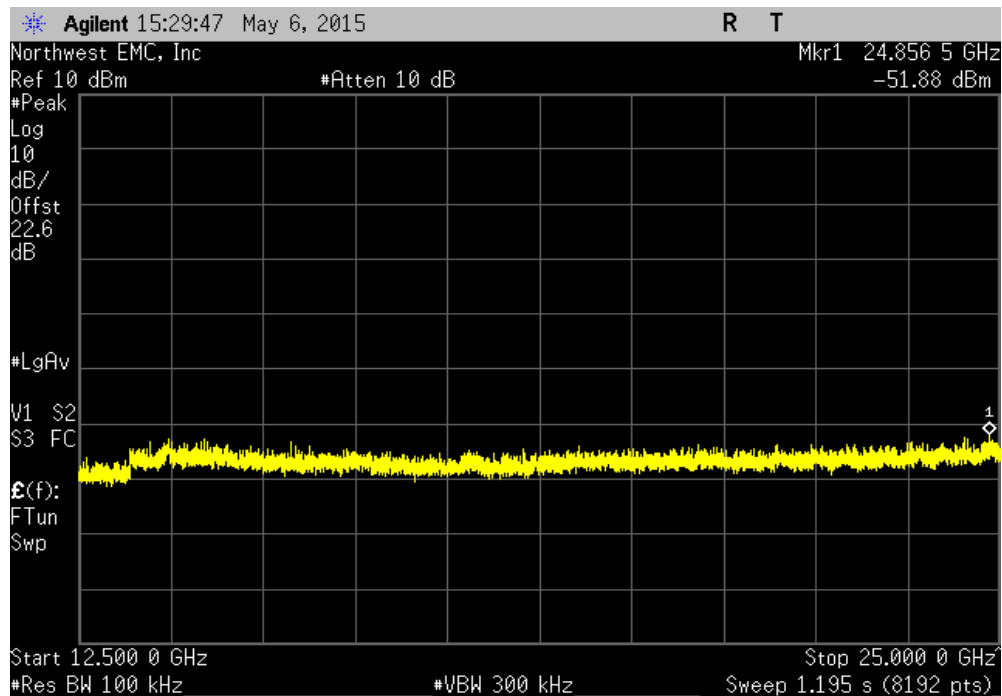


SPURIOUS CONDUCTED EMISSIONS

2DH5, pi/4-DQPSK, Mid Channel 2441MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-46.32	-20	Pass	

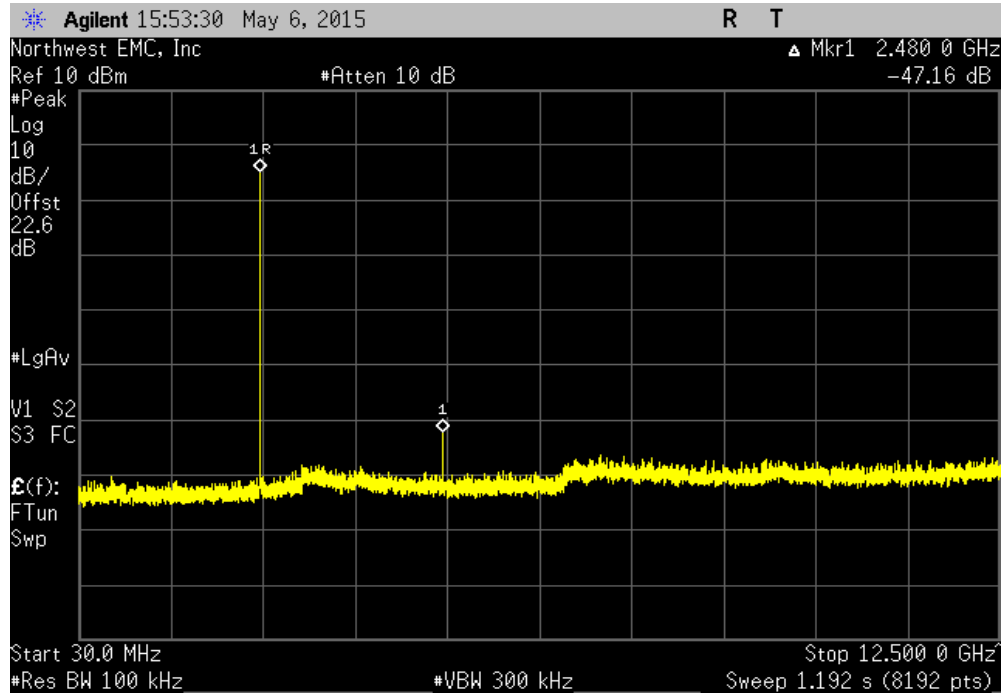


2DH5, pi/4-DQPSK, Mid Channel 2441MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-44.86	-20	Pass	

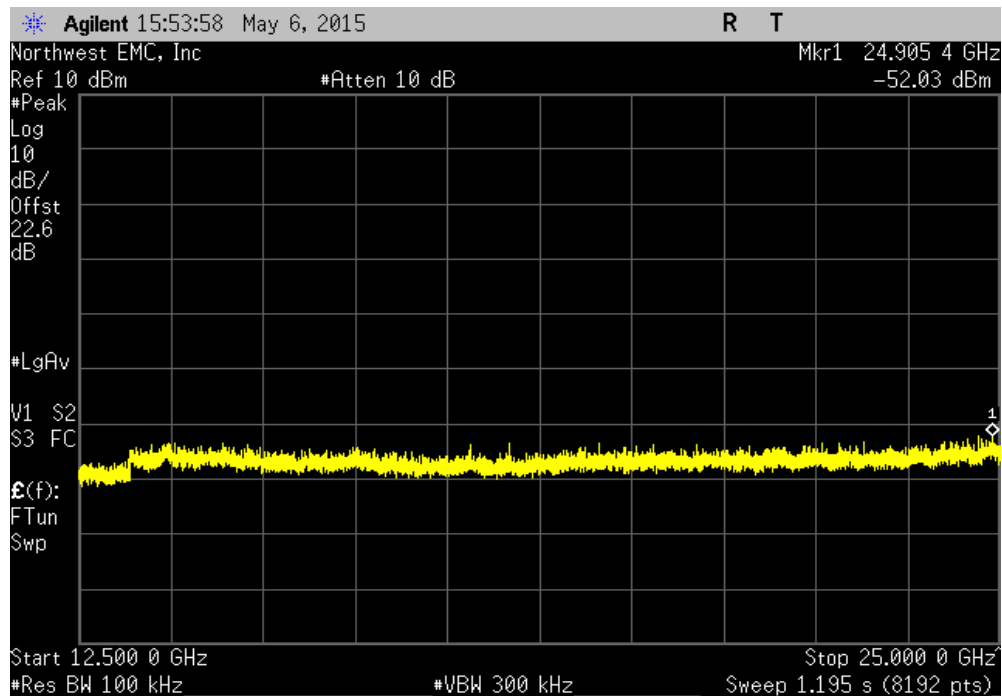


SPURIOUS CONDUCTED EMISSIONS

2DH5, pi/4-DQPSK, High Channel 2480MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-47.17	-20	Pass	

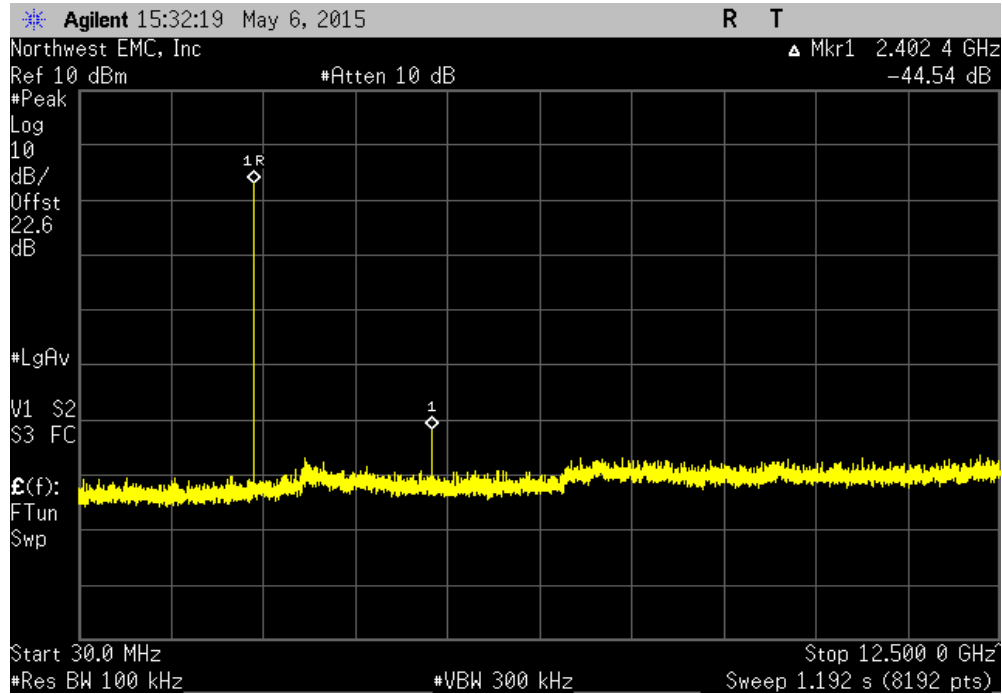


2DH5, pi/4-DQPSK, High Channel 2480MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-47.03	-20	Pass	

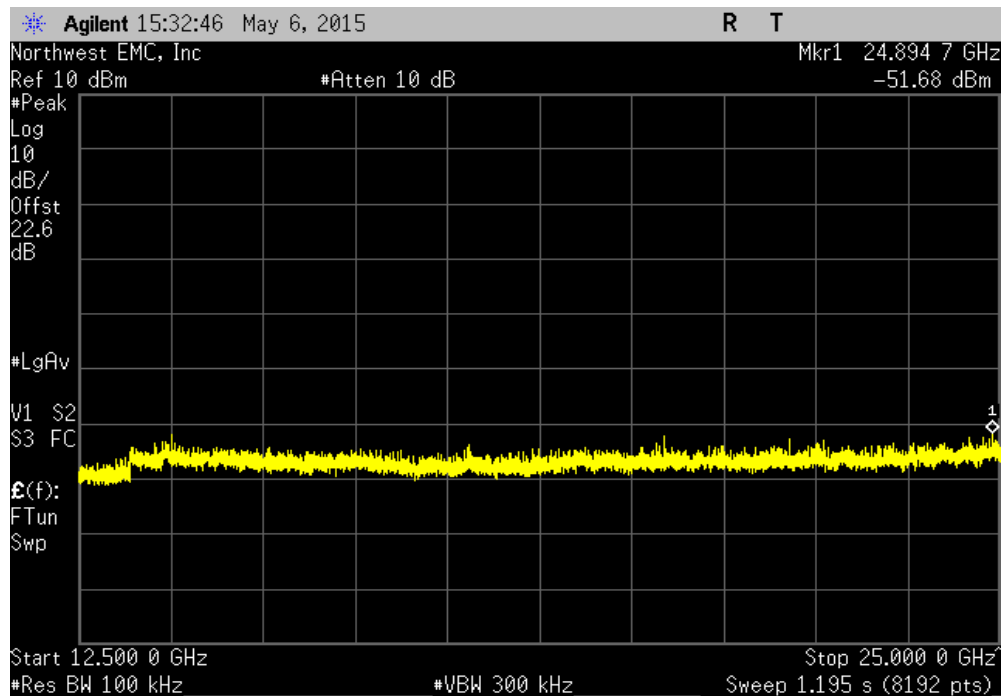


SPURIOUS CONDUCTED EMISSIONS

3DH5, 8-DPSK, Low Channel 2402MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-44.54	-20	Pass	

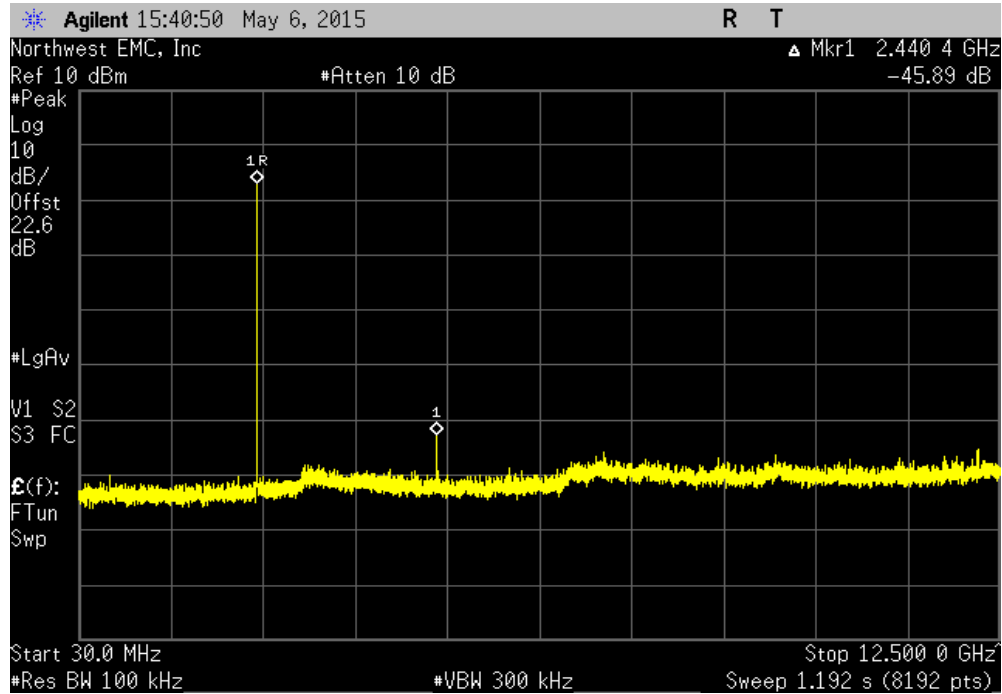


3DH5, 8-DPSK, Low Channel 2402MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-44.69	-20	Pass	

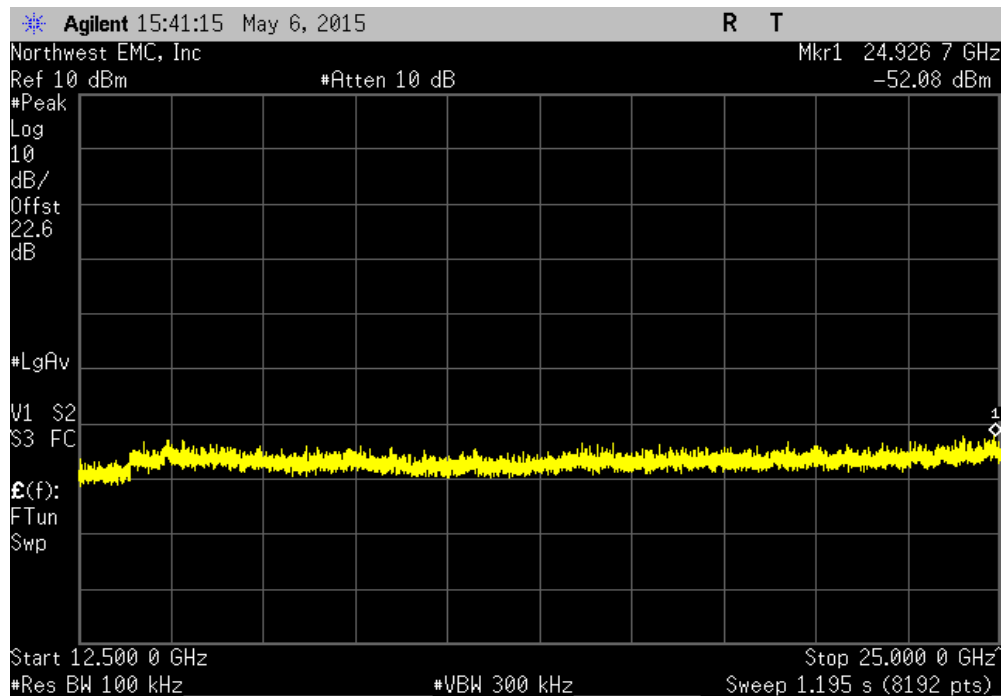


SPURIOUS CONDUCTED EMISSIONS

3DH5, 8-DPSK, Mid Channel 2441MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-45.89	-20	Pass	

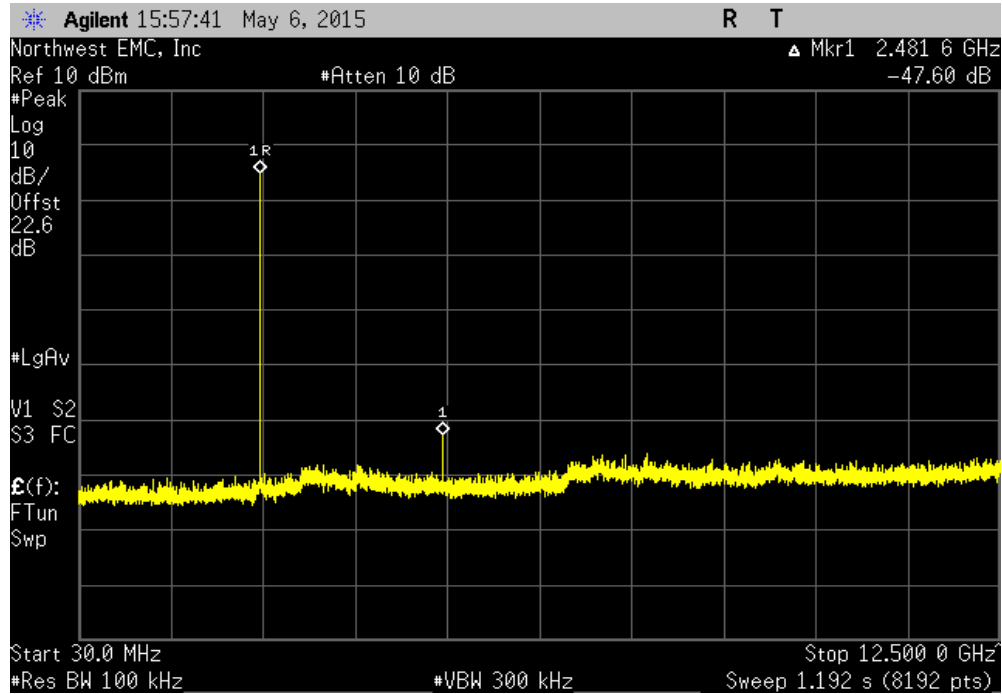


3DH5, 8-DPSK, Mid Channel 2441MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-45.21	-20	Pass	

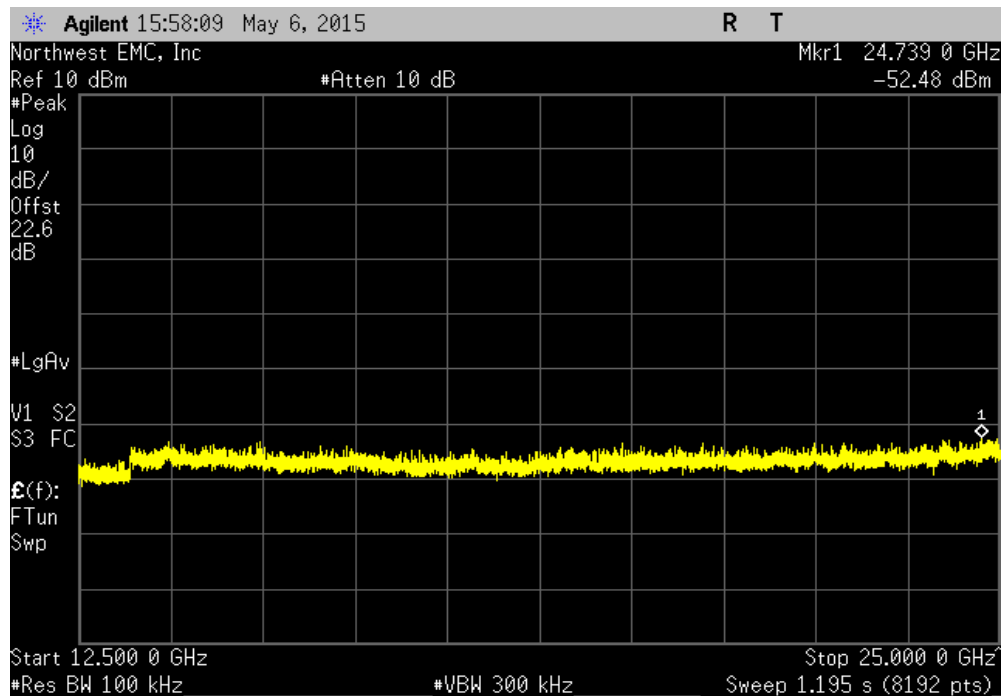


SPURIOUS CONDUCTED EMISSIONS

3DH5, 8-DPSK, High Channel 2480MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
30 MHz - 12.5 GHz	-47.6	-20	Pass	



3DH5, 8-DPSK, High Channel 2480MHz				
Frequency Range	Value (dBc)	Limit ≤ (dBc)	Result	
12.5 GHz - 25 GHz	-47.29	-20	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 (mos)
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
Attenuator, 20db, 'SMA'	SM Electronics	SA26B-20	RFW	3/10/2015	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12

TEST DESCRIPTION

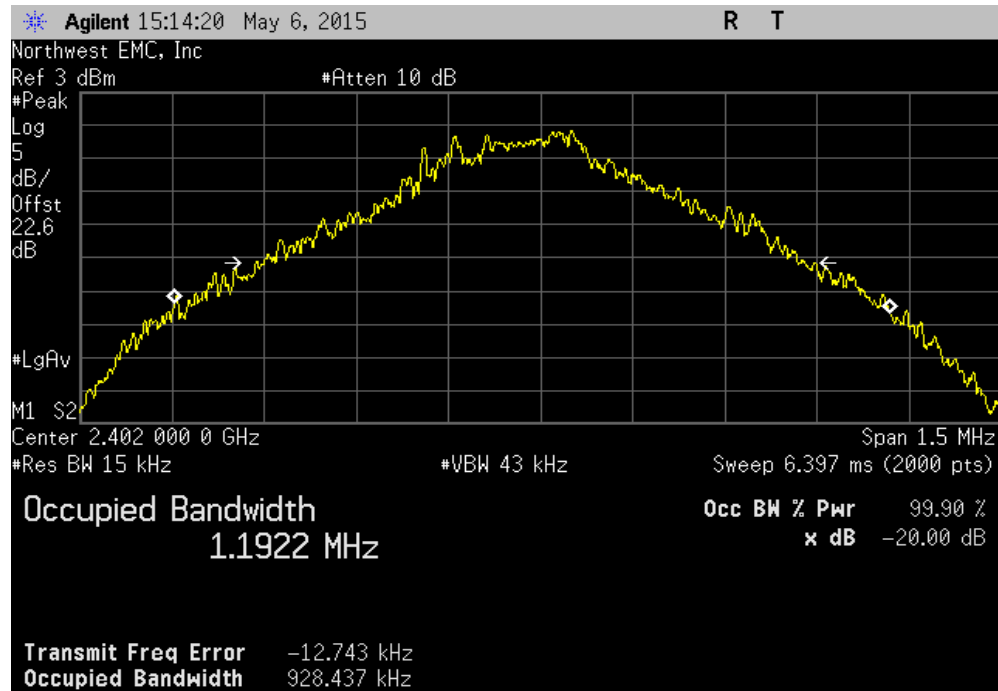
The occupied bandwidth was measured with the EUT set to low, medium and high transmit frequencies. The measurement was made using a direct connection between the RF output of the EUT and the spectrum analyzer. The EUT was transmitting at the data rate(s) listed in the datasheet in a no-hop mode.

OCCUPIED BANDWIDTH

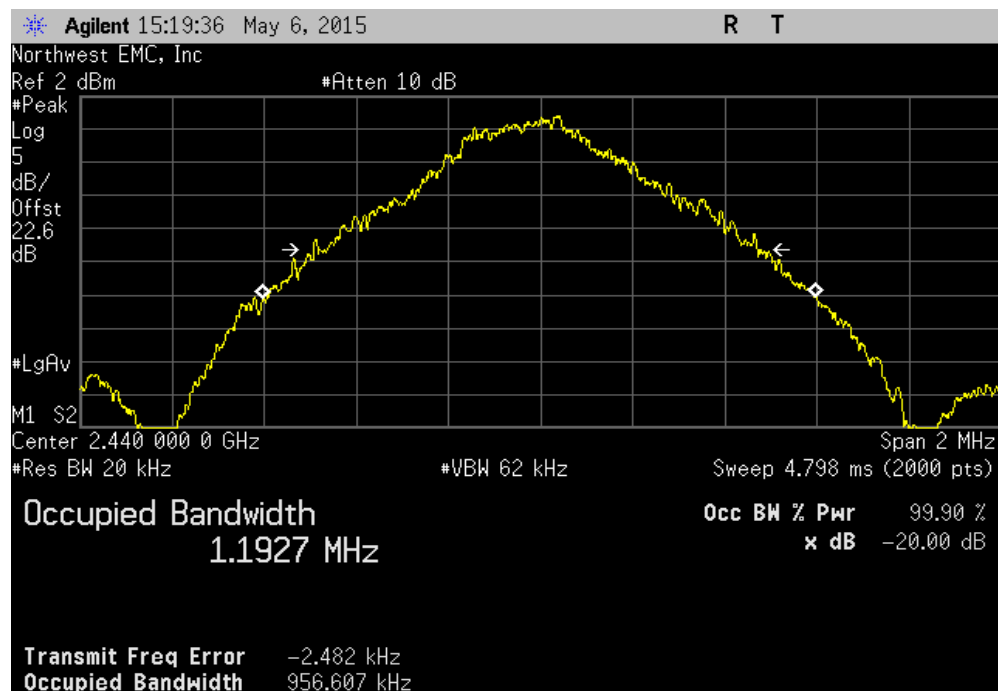
EUT: DM3730 Torpedo + Wireless SOM -32		Work Order: LGPD0151	
Serial Number: See Configuration		Date: 05/07/15	
Customer: Logic PD		Temperature: 23.1°C	
Attendees: Adam Ford		Humidity: 41%	
Project: None		Barometric Pres.: 1018.5	
Tested by: Brandon Hobbs		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2015		ANSI C63.10:2009	
COMMENTS			
The EUT was tested with the fundamental modulated while under test. The EUT was not operating in hopping mode. All cable losses were accounted for.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	5	Signature 	
		Value	Limit (<) Result
DH5, GFSK			
	Low Channel 2402MHz	928.437 kHz	1.5 MHz Pass
	Mid Channel 2441MHz	956.607 kHz	1.5 MHz Pass
	High Channel 2480MHz	897.26 kHz	1.5 MHz Pass
2DH5, pi/4-DQPSK			
	Low Channel 2402MHz	1.346 MHz	1.5 MHz Pass
	Mid Channel 2441MHz	1.352 MHz	1.5 MHz Pass
	High Channel 2480MHz	1.354 MHz	1.5 MHz Pass
3DH5, 8-DPSK			
	Low Channel 2402MHz	1.354 MHz	1.5 MHz Pass
	Mid Channel 2441MHz	1.358 MHz	1.5 MHz Pass
	High Channel 2480MHz	1.342 MHz	1.5 MHz Pass

OCCUPIED BANDWIDTH

DH5, GFSK, Low Channel 2402MHz						
				Value	Limit (<)	Result
				928.437 kHz	1.5 MHz	Pass

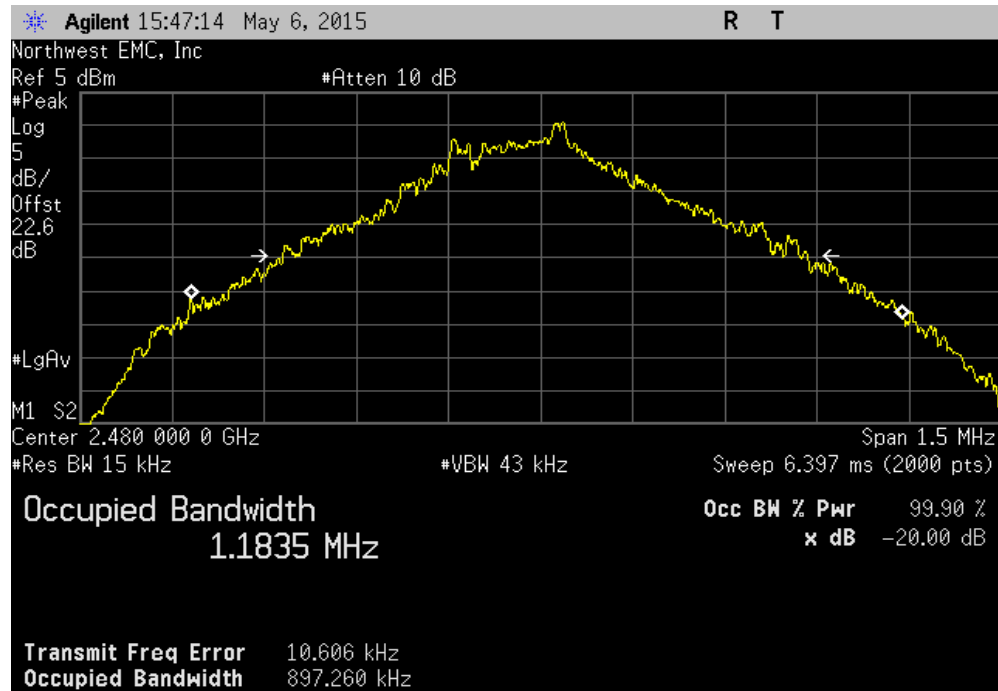


DH5, GFSK, Mid Channel 2441MHz						
				Value	Limit (<)	Result
				956.607 kHz	1.5 MHz	Pass

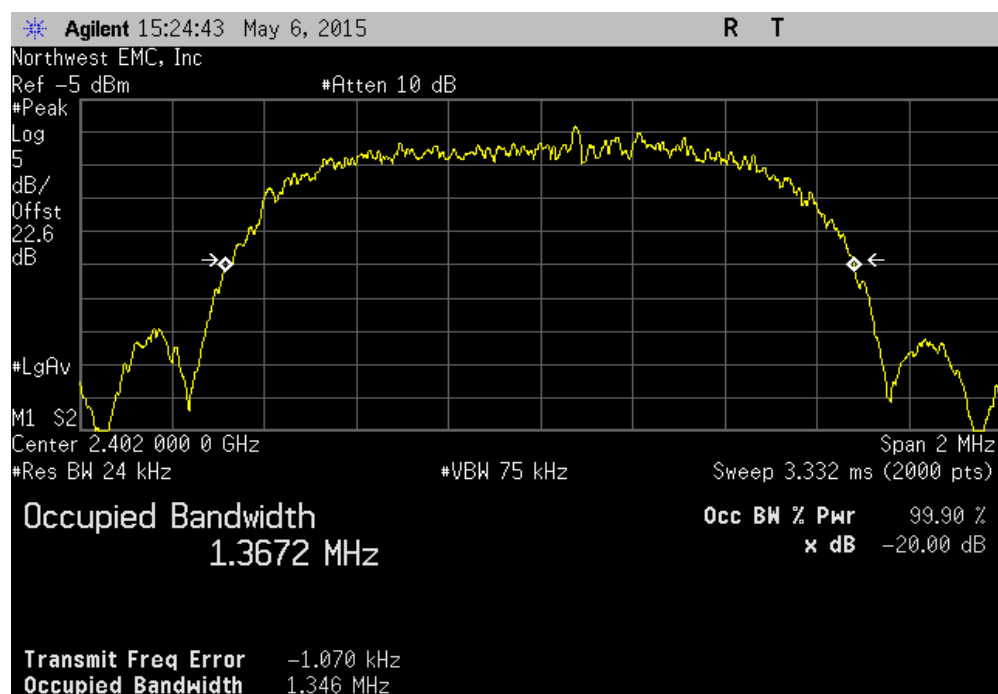


OCCUPIED BANDWIDTH

DH5, GFSK, High Channel 2480MHz						
				Value	Limit (<)	Result
				897.26 kHz	1.5 MHz	Pass

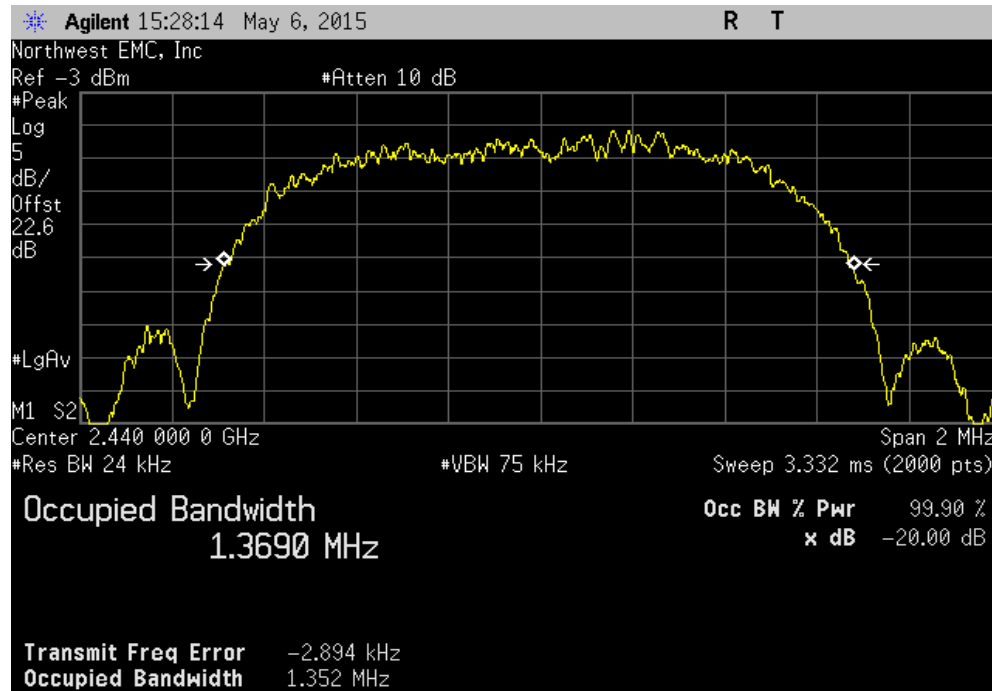


2DH5, pi/4-DQPSK, Low Channel 2402MHz						
				Value	Limit (<)	Result
				1.346 MHz	1.5 MHz	Pass

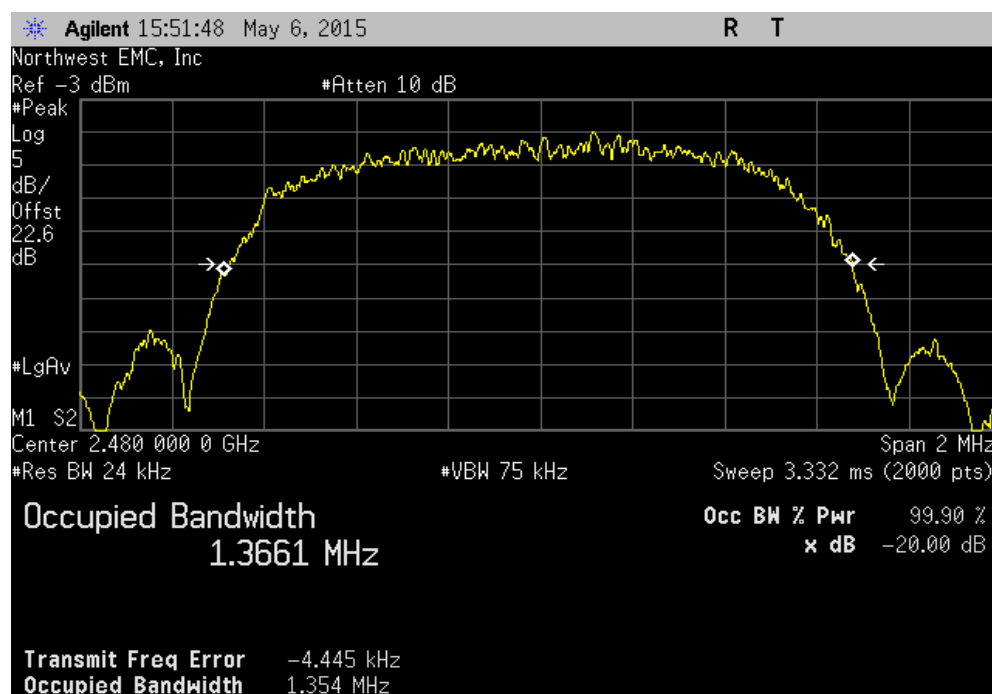


OCCUPIED BANDWIDTH

2DH5, pi/4-DQPSK, Mid Channel 2441MHz						
				Value	Limit (<)	Result
				1.352 MHz	1.5 MHz	Pass

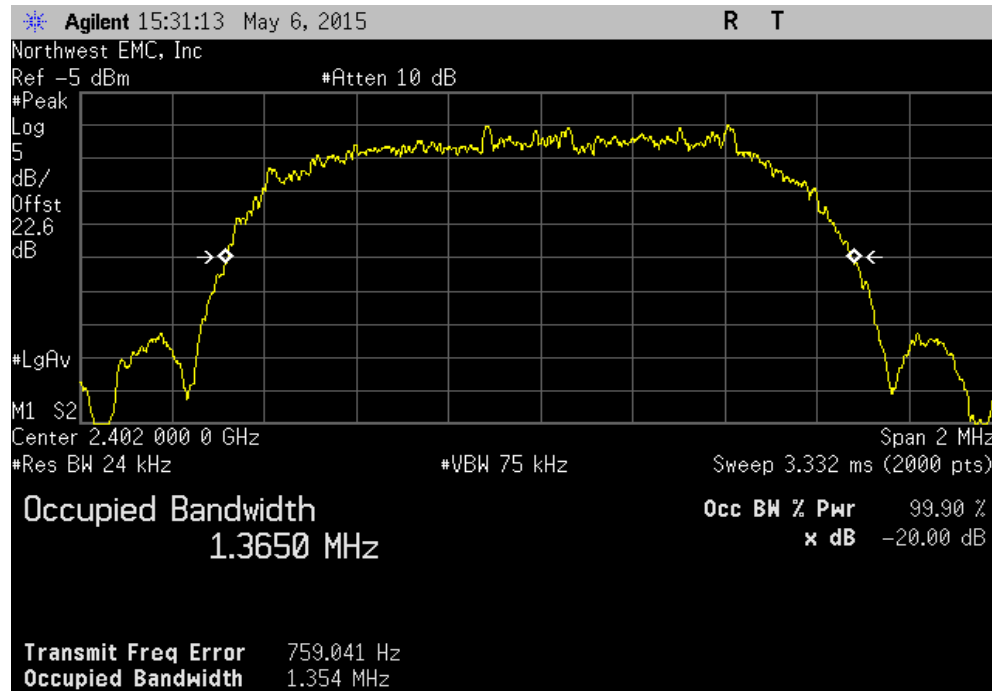


2DH5, pi/4-DQPSK, High Channel 2480MHz						
				Value	Limit (<)	Result
				1.354 MHz	1.5 MHz	Pass

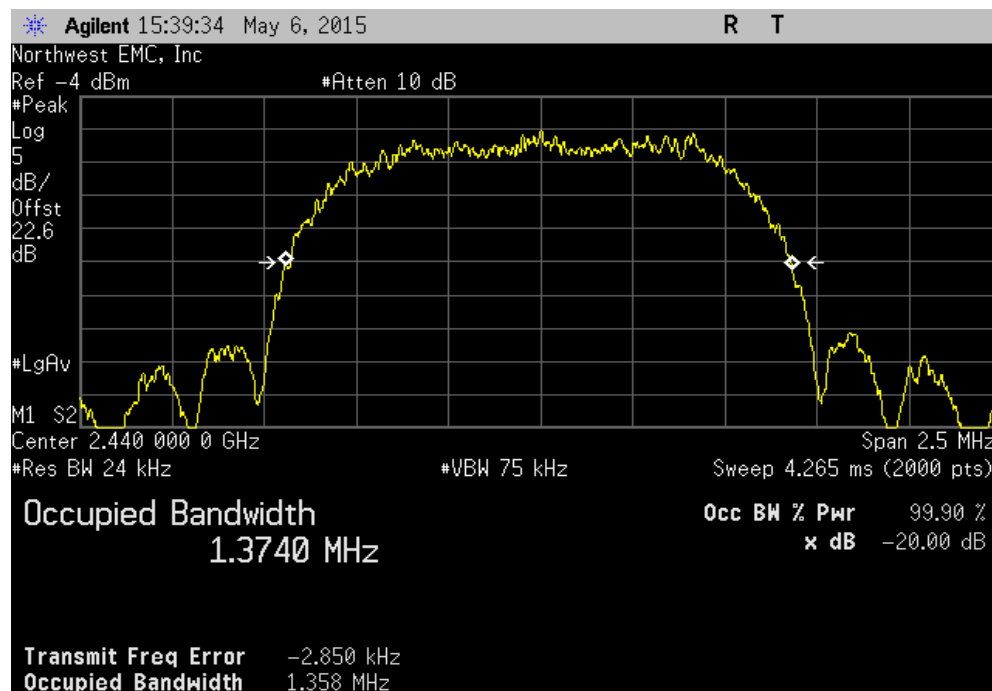


OCCUPIED BANDWIDTH

3DH5, 8-DPSK, Low Channel 2402MHz						
				Value	Limit (<)	Result
				1.354 MHz	1.5 MHz	Pass

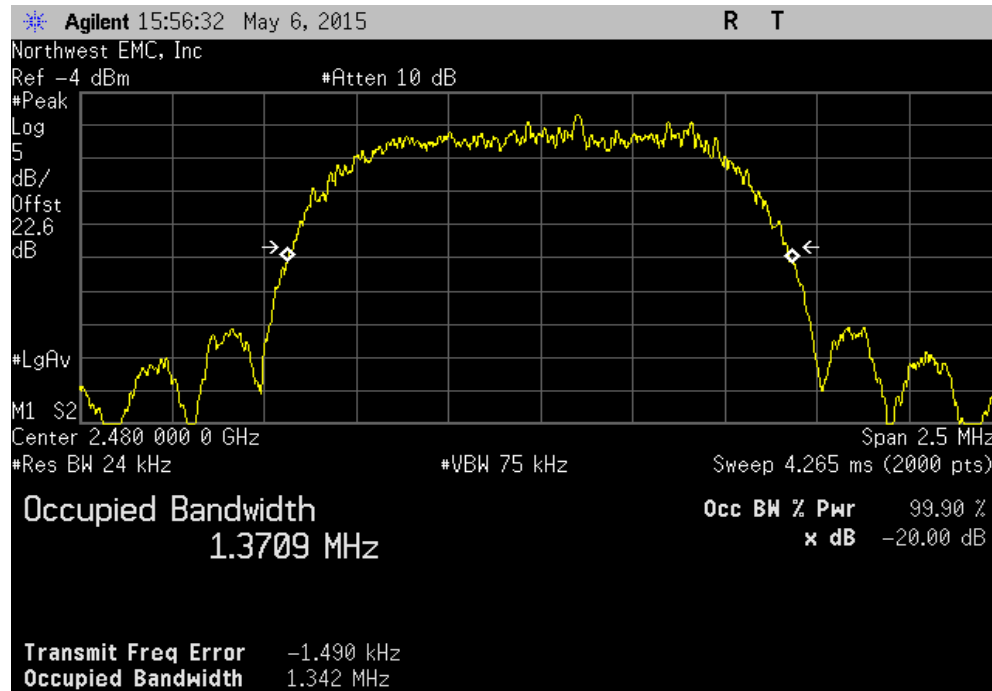


3DH5, 8-DPSK, Mid Channel 2441MHz						
				Value	Limit (<)	Result
				1.358 MHz	1.5 MHz	Pass



OCCUPIED BANDWIDTH

3DH5, 8-DPSK, High Channel 2480MHz						
				Value	Limit (<)	Result
				1.342 MHz	1.5 MHz	Pass



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 (mos)
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
Attenuator, 20db, 'SMA'	SM Electronics	SA26B-20	RFW	3/10/2015	12
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12

TEST DESCRIPTION

The peak output power 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 a spectrum analyzer. The EUT was transmitting in a no hop mode at the data rate(s) listed in the datasheet.

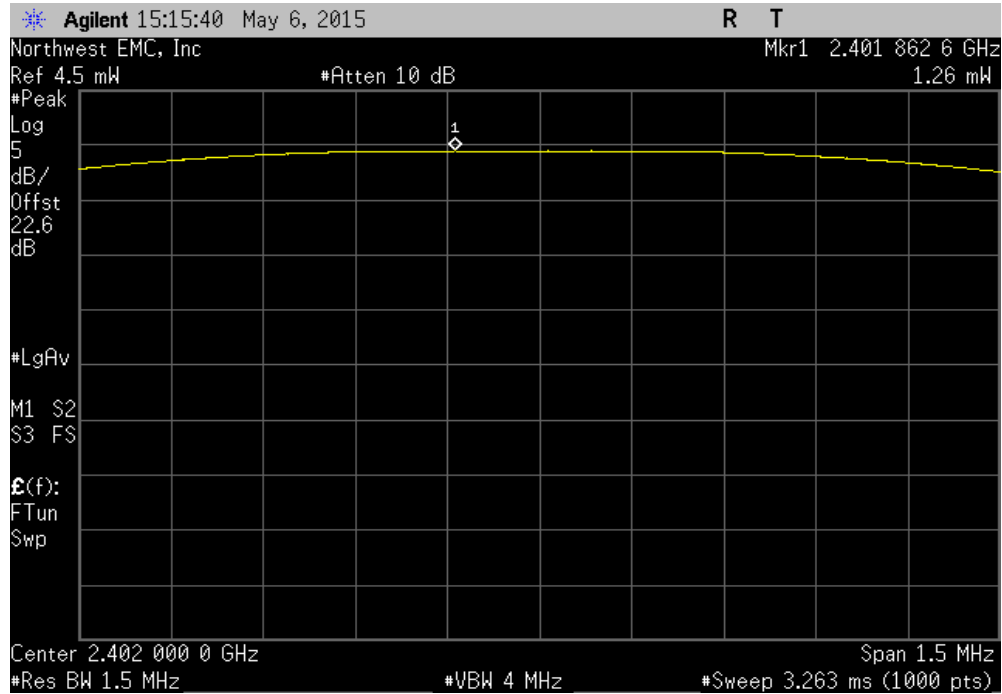
De Facto EIRP Limit: Per 47 CFR 15.247 (b)(1-3), the EUT meets the de facto EIRP limit of +27dBm.

OUTPUT POWER

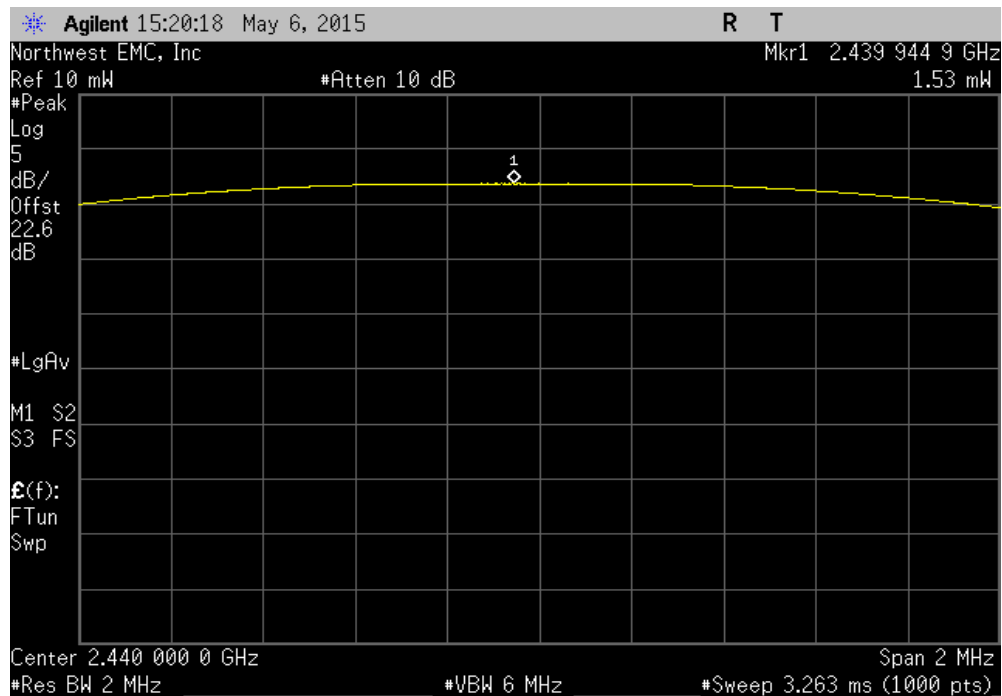
EUT: DM3730 Torpedo + Wireless SOM -32		Work Order: LGPD0151	
Serial Number: See Configuration		Date: 05/07/15	
Customer: Logic PD		Temperature: 23.1°C	
Attendees: Adam Ford		Humidity: 41%	
Project: None		Barometric Pres.: 1018.5	
Tested by: Brandon Hobbs	Power: 110VAC/60Hz	Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2015		ANSI C63.10:2009	
COMMENTS			
The EUT was tested with the fundamental modulated while under test. The EUT was not operating in hopping mode. All cable losses were accounted for.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	5	Signature 	
		Value	Limit (<) Result
DH5, GFSK			
	Low Channel 2402MHz	1.255 mW	125 mW Pass
	Mid Channel 2441MHz	1.531 mW	125 mW Pass
	High Channel 2480MHz	1.747 mW	125 mW Pass
2DH5, pi/4-DQPSK			
	Low Channel 2402MHz	590.337 uW	125 mW Pass
	Mid Channel 2441MHz	719.449 uW	125 mW Pass
	High Channel 2480MHz	854.28 uW	125 mW Pass
3DH5, 8-DPSK			
	Low Channel 2402MHz	682.81 uW	125 mW Pass
	Mid Channel 2441MHz	832.339 uW	125 mW Pass
	High Channel 2480MHz	985.372 uW	125 mW Pass

OUTPUT POWER

DH5, GFSK, Low Channel 2402MHz						
				Value	Limit (<)	Result
				1.255 mW	125 mW	Pass

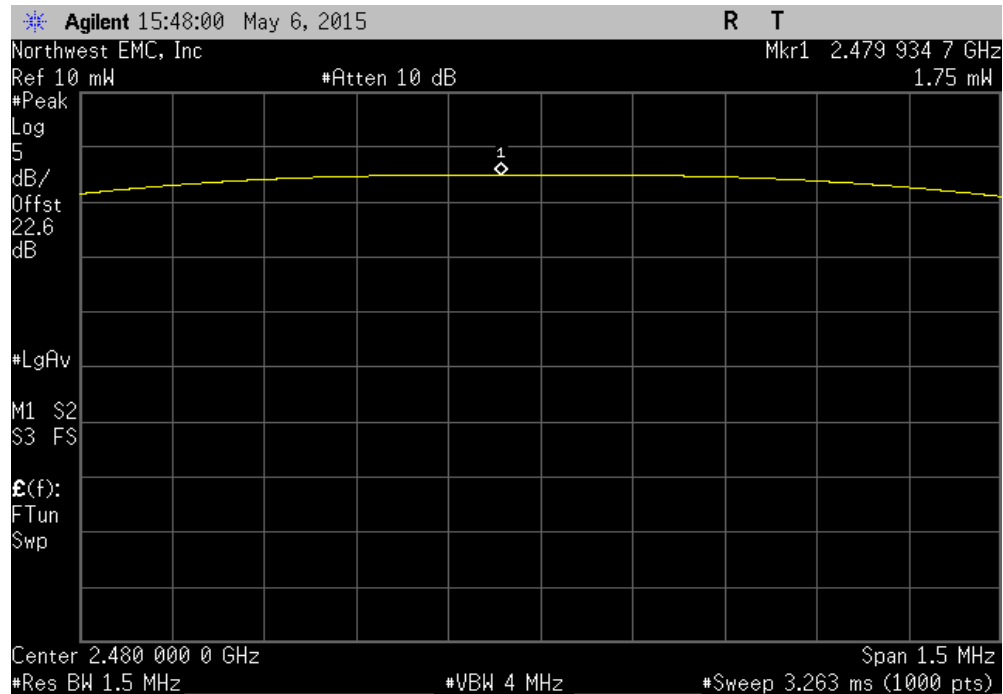


DH5, GFSK, Mid Channel 2441MHz						
				Value	Limit (<)	Result
				1.531 mW	125 mW	Pass

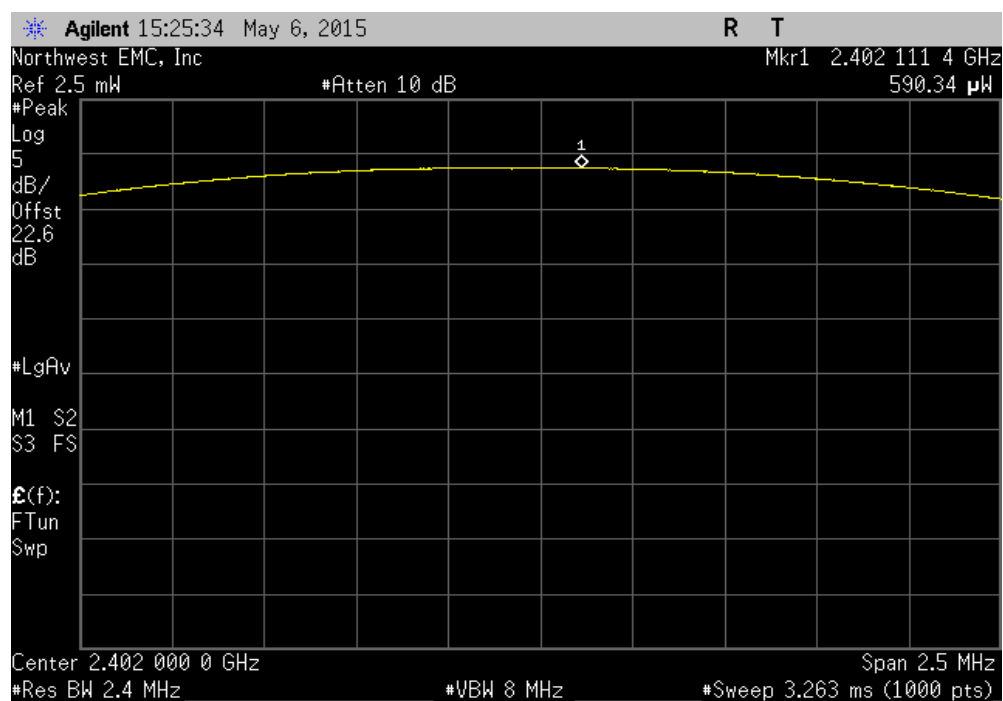


OUTPUT POWER

DH5, GFSK, High Channel 2480MHz						
				Value	Limit (<)	Result
				1.747 mW	125 mW	Pass

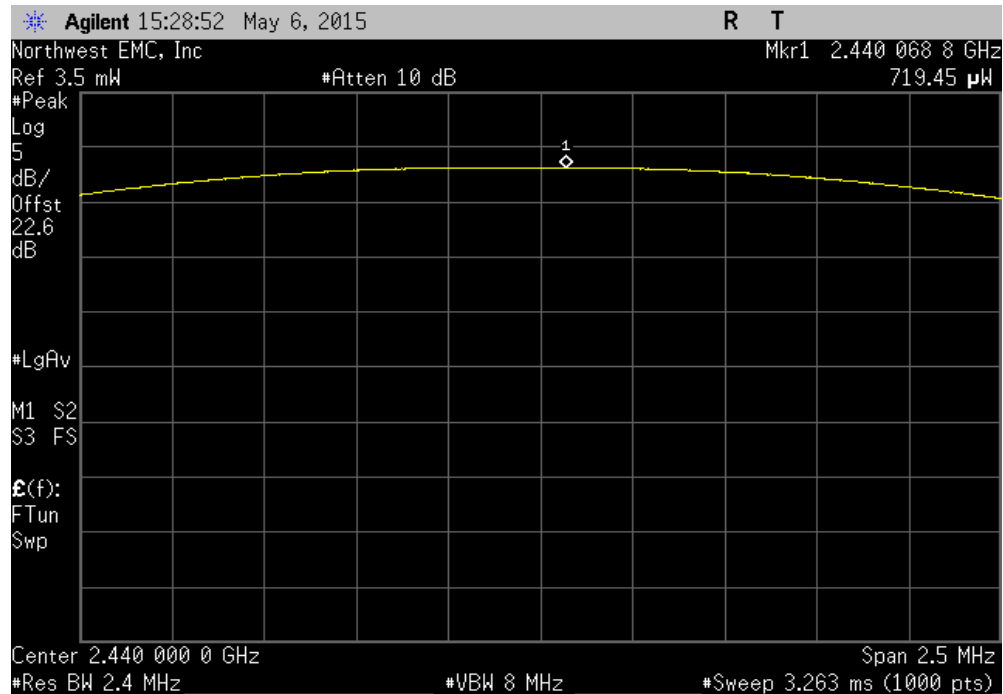


2DH5, pi/4-DQPSK, Low Channel 2402MHz						
				Value	Limit (<)	Result
				590.337 uW	125 mW	Pass

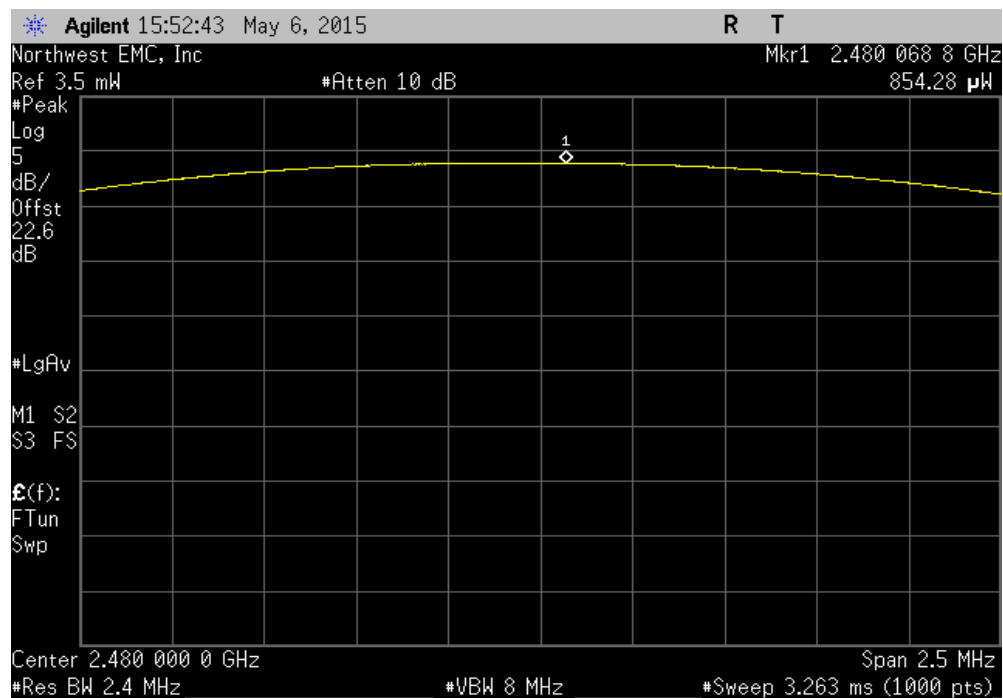


OUTPUT POWER

2DH5, pi/4-DQPSK, Mid Channel 2441MHz						
				Value	Limit (<)	Result
				719.449 uW	125 mW	Pass

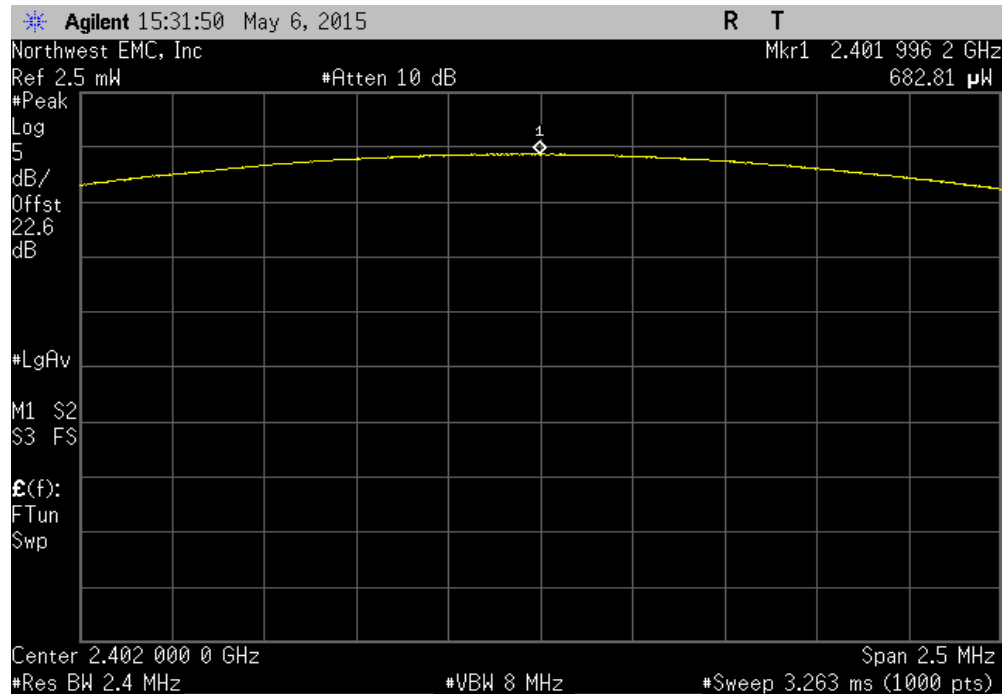


2DH5, pi/4-DQPSK, High Channel 2480MHz						
				Value	Limit (<)	Result
				854.28 uW	125 mW	Pass

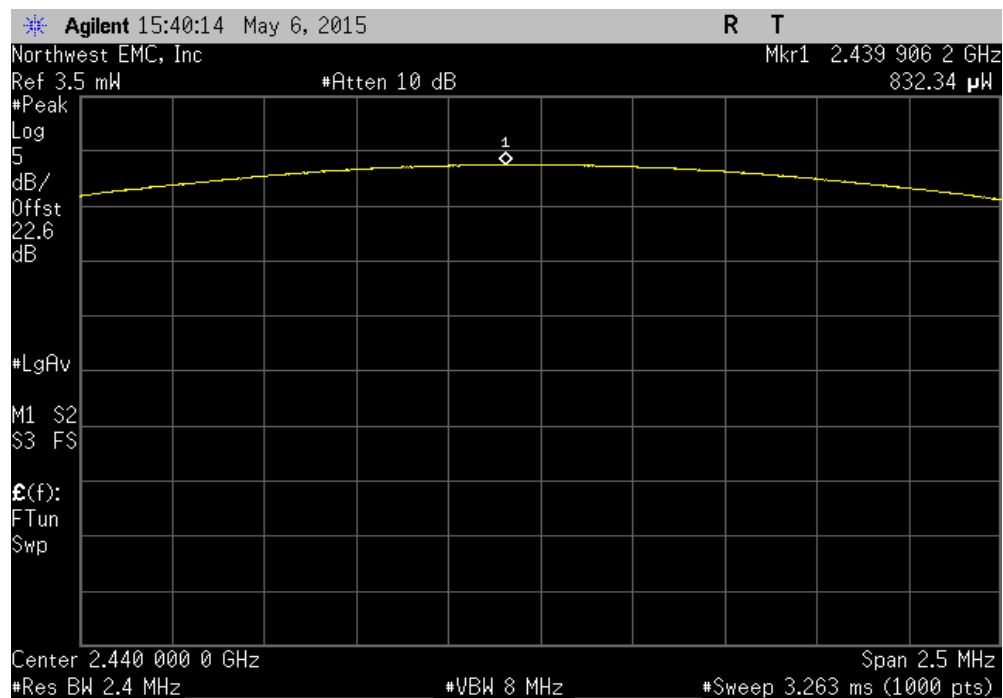


OUTPUT POWER

3DH5, 8-DPSK, Low Channel 2402MHz						
				Value	Limit (<)	Result
				682.81 uW	125 mW	Pass

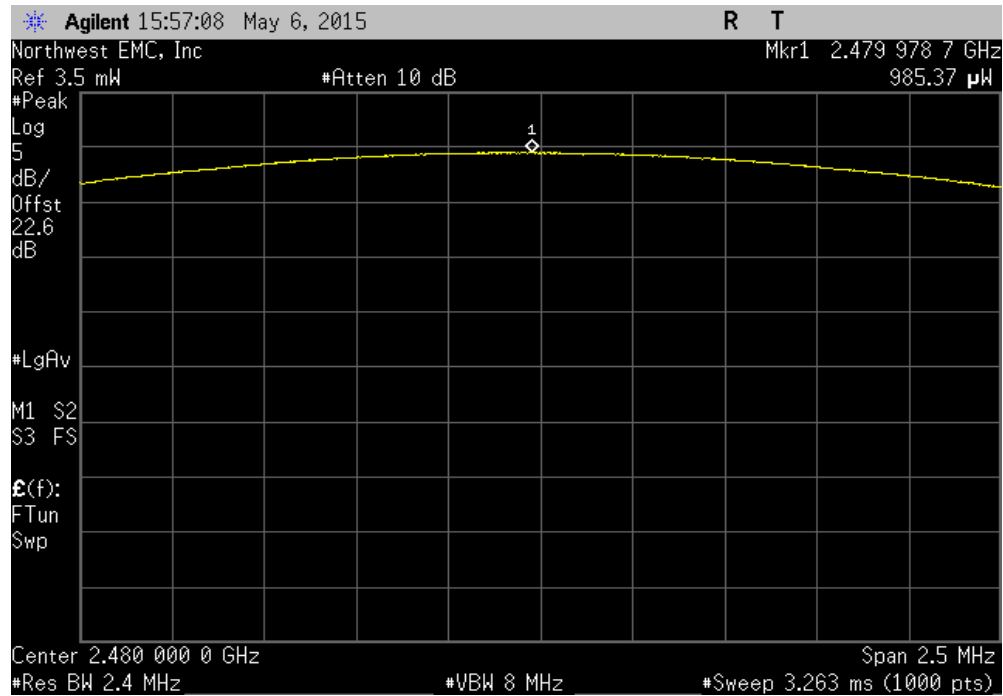


3DH5, 8-DPSK, Mid Channel 2441MHz						
				Value	Limit (<)	Result
				832.339 uW	125 mW	Pass



OUTPUT POWER

3DH5, 8-DPSK, High Channel 2480MHz						
Value				Limit (<)	Result	
985.372 uW				125 mW	Pass	



CHANNEL SPACING

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 (mos)
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
Attenuator, 20db, 'SMA'	SM Electronics	SA26B-20	RFW	3/10/2015	12
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12

TEST DESCRIPTION

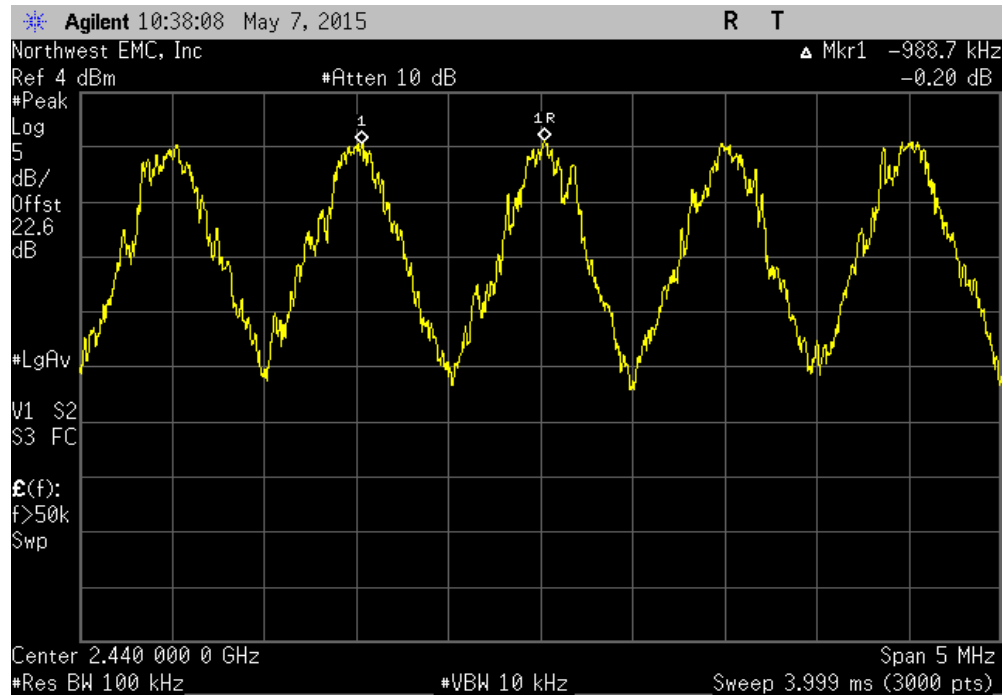
The channel carrier frequencies in the 2400-2483.5MHz band must be separated by 25 kHz or the 20dB bandwidth of the hopping channel, whichever is greater. Or, if the output power is less than 125 mW, the channel separation can be 25 kHz or 2/3 of the 20dB bandwidth. The EUT was operated in pseudorandom hopping mode. The spectrum was scanned across two adjacent peaks. The separation between the peaks of these channels was measured.

CHANNEL SPACING

EUT: DM3730 Torpedo + Wireless SOM -32		Work Order: LGPD0151	
Serial Number: See Configuration		Date: 05/08/15	
Customer: Logic PD		Temperature: 23.1°C	
Attendees: Adam Ford		Humidity: 41%	
Project: None		Barometric Pres.: 1018.5	
Tested by: Brandon Hobbs		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2015		ANSI C63.10:2009	
COMMENTS			
The EUT was tested with the fundamental modulated while under test. All cable losses were accounted for.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature 	
		Value	Limit (≥)
Hopping Mode			Results
DH5, GFSK		1.0 MHz	1 MHz
Mid Channel, 2440 MHz			Pass

CHANNEL SPACING

Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
				Value	Limit (≥)	Results
				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 (mos)
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12
Attenuator, 20db, 'SMA'	SM Electronics	SA26B-20	RFW	3/10/2015	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12

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.

NUMBER OF HOPPING FREQUENCIES

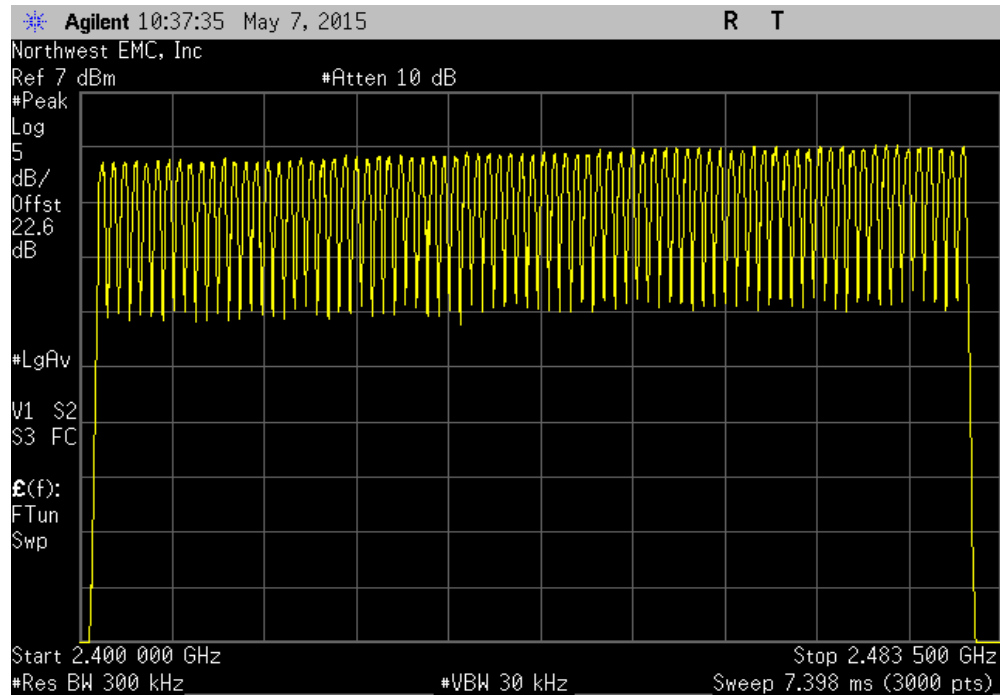


XMR 2015.01.14

EUT: DM3730 Torpedo + Wireless SOM -32		Work Order: LGPD0151	
Serial Number: See Configuration		Date: 05/08/15	
Customer: Logic PD		Temperature: 23.1°C	
Attendees: Adam Ford		Humidity: 41%	
Project: None		Barometric Pres.: 1018.5	
Tested by: Brandon Hobbs	Power: 110VAC/60Hz	Job Site: MN08	
TEST SPECIFICATIONS			
FCC 15.247:2015		Test Method	
		ANSI C63.10:2009	
COMMENTS			
The EUT was tested with the fundamental modulated while under test. All cable losses were accounted for.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature 	
		Number of Channels	Limit (>)
		Results	
Hopping Mode			
DH5, GFSK			
Mid Channel, 2440 MHz		79	15
			Pass

NUMBER OF HOPPING FREQUENCIES

Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
				Number of Channels	Limit (>)	Results
				79	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 (mos)
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
Attenuator, 20db, 'SMA'	SM Electronics	SA26B-20	RFW	3/10/2015	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12

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.

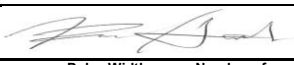
The dwell time limit is based on the Number of Hopping Channels * 400 mS. For Bluetooth this would be 79 Channels * 400mS = 31.6 Sec.

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

➤ Average Number of Pulses is based on 4 samples.

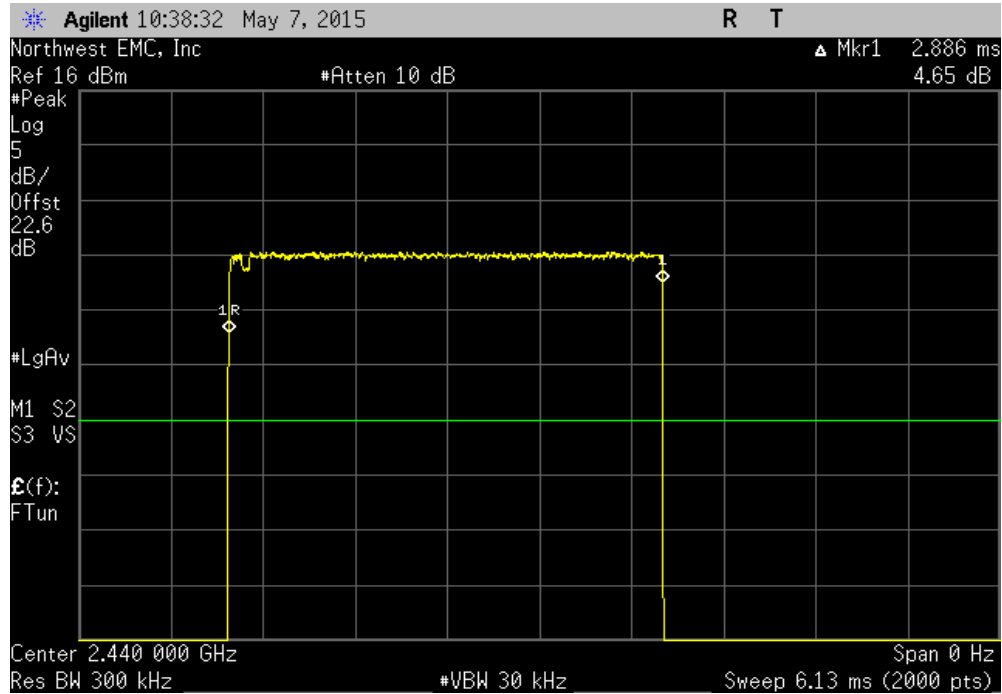
➤ Scale Factor = 31.6 Sec / Screen Capture Sweep Time = 31.6 Sec / 6.32 Sec = 5

DWELL TIME

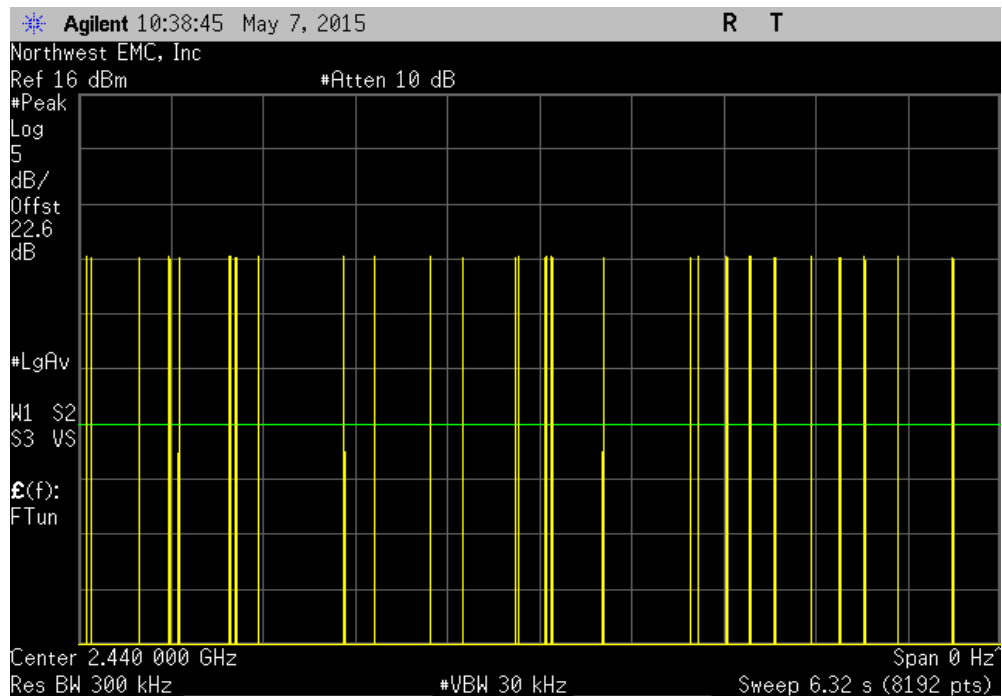
EUT: DM3730 Torpedo + Wireless SOM -32		Work Order: LGPD0151	
Serial Number: See configuration		Date: 05/08/15	
Customer: Logic PD		Temperature: 23.1°C	
Attendees: Adam Ford		Humidity: 41%	
Project: None		Barometric Pres.: 1018.5	
Tested by: Brandon Hobbs		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2015		ANSI C63.10:2009	
COMMENTS			
The EUT was tested with the fundamental modulated while under test. All cable losses were accounted for.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature 	
		Pulse Width (ms)	Number of Pulses
		Average No. of Pulses	Scale Factor
		On Time (ms) During 31.6 s	Limit (ms)
			Results
Hopping Mode			
DH5, GFSK			
	Mid Channel, 2440 MHz	2.886	N/A
	Mid Channel, 2440 MHz	N/A	27
	Mid Channel, 2440 MHz	N/A	18
	Mid Channel, 2440 MHz	N/A	24
	Mid Channel, 2440 MHz	N/A	22
	Mid Channel, 2440 MHz	2.886	N/A
	Mid Channel, 2440 MHz		22.75
			5
		328.28	400
			Pass
2DH5, pi/4-DQPSK			
	Mid Channel, 2440 MHz	2.892	N/A
	Mid Channel, 2440 MHz	N/A	23
	Mid Channel, 2440 MHz	N/A	19
	Mid Channel, 2440 MHz	N/A	18
	Mid Channel, 2440 MHz	N/A	21
	Mid Channel, 2440 MHz	2.892	N/A
	Mid Channel, 2440 MHz		20.25
			5
		292.82	400
			Pass
3DH5, 8-DPSK			
	Mid Channel, 2440 MHz	2.892	N/A
	Mid Channel, 2440 MHz	N/A	21
	Mid Channel, 2440 MHz	N/A	25
	Mid Channel, 2440 MHz	N/A	23
	Mid Channel, 2440 MHz	N/A	32
	Mid Channel, 2440 MHz	2.892	N/A
	Mid Channel, 2440 MHz		25.25
			5
		365.12	400
			Pass

DWELL TIME

Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.886	N/A	N/A	N/A	N/A	N/A	N/A

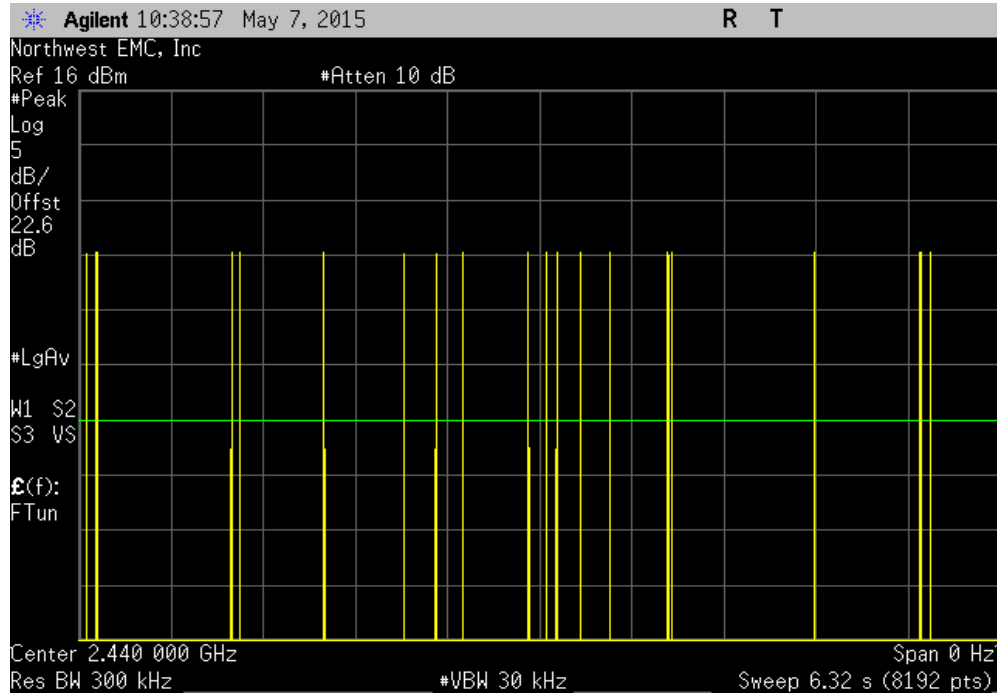


Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	27	N/A	N/A	N/A	N/A	N/A

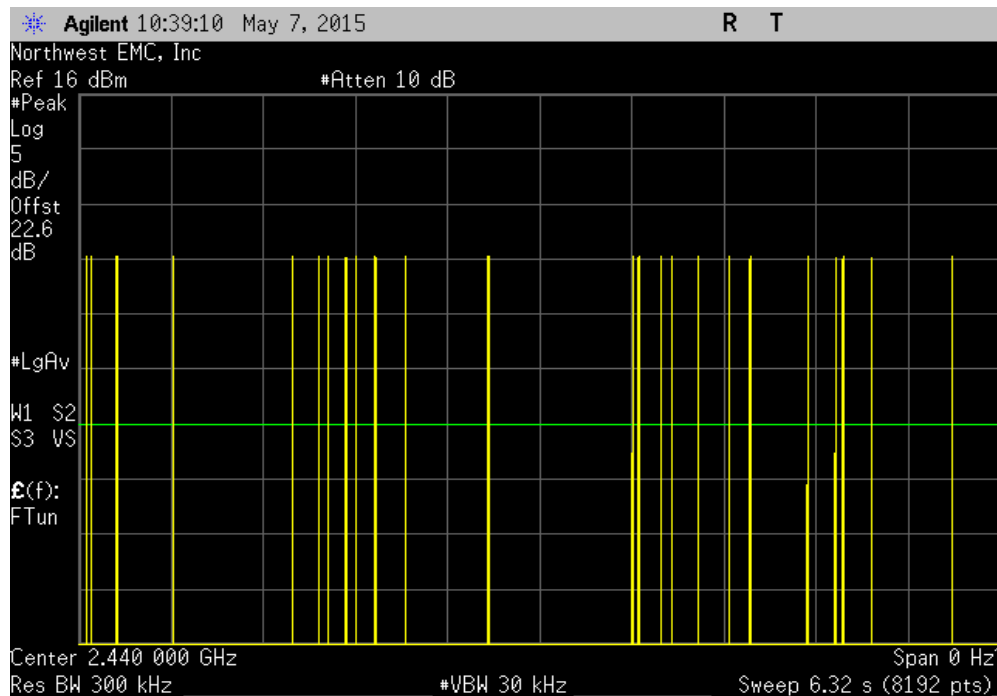


DWELL TIME

Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	18	N/A	N/A	N/A	N/A	N/A

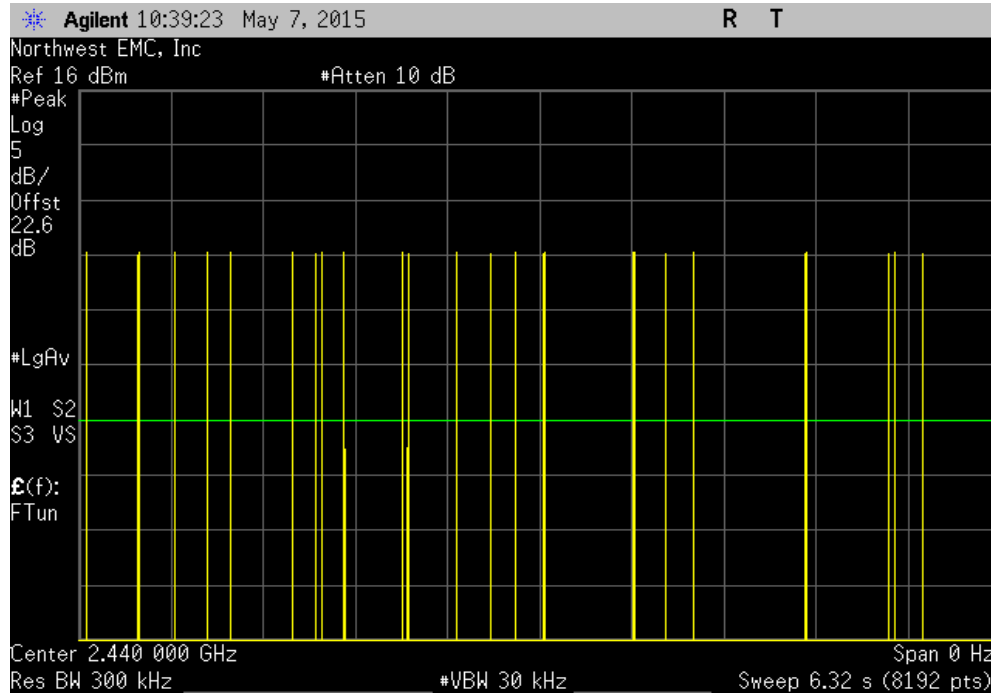


Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	24	N/A	N/A	N/A	N/A	N/A



DWELL TIME

Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	22	N/A	N/A	N/A	N/A	N/A



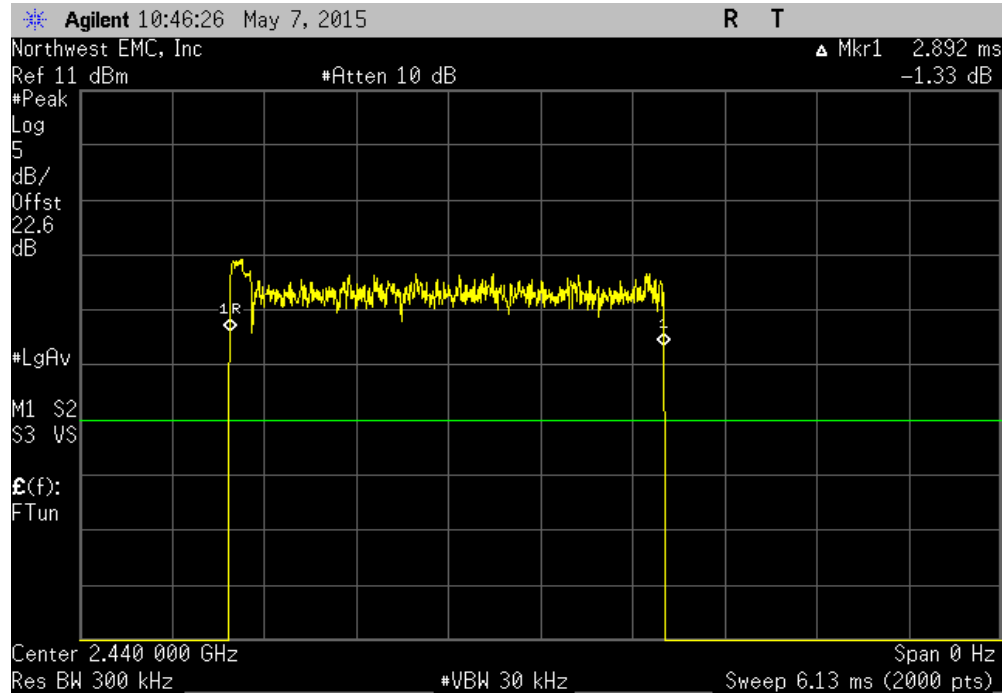
Hopping Mode, DH5, GFSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.886	N/A	22.75	5	328.28	400	Pass

Calculation Only

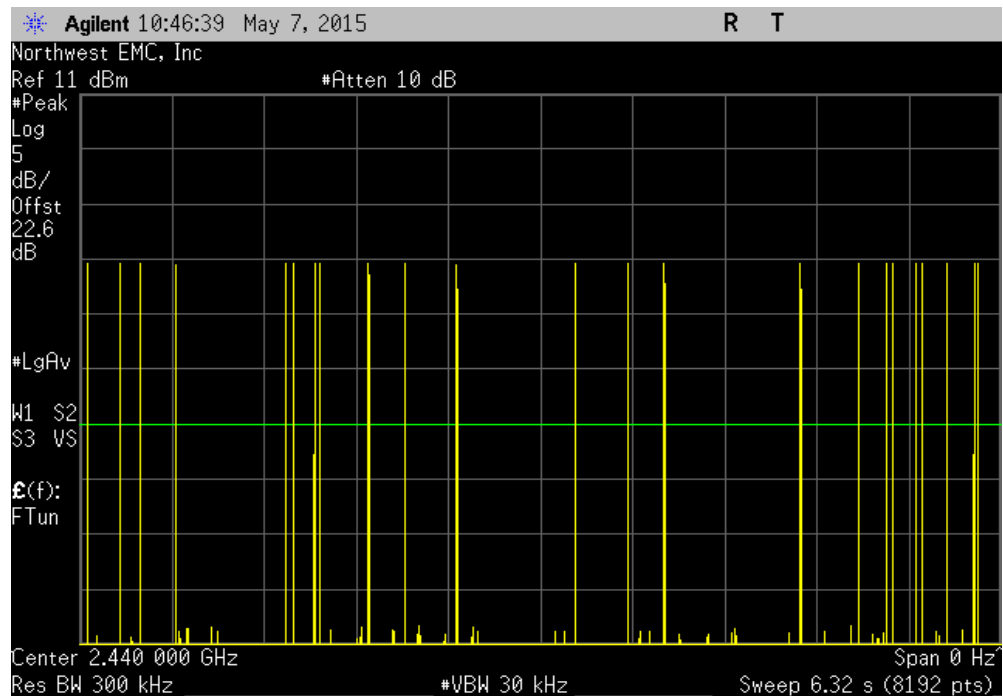
No Screen Capture Required

DWELL TIME

Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.892	N/A	N/A	N/A	N/A	N/A	N/A

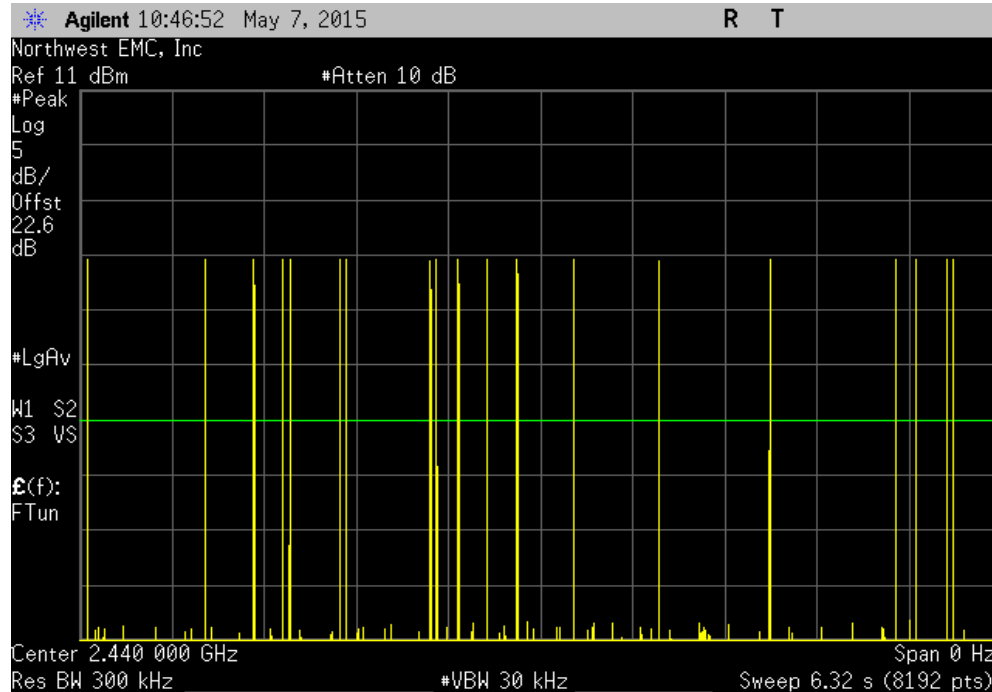


Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	23	N/A	N/A	N/A	N/A	N/A

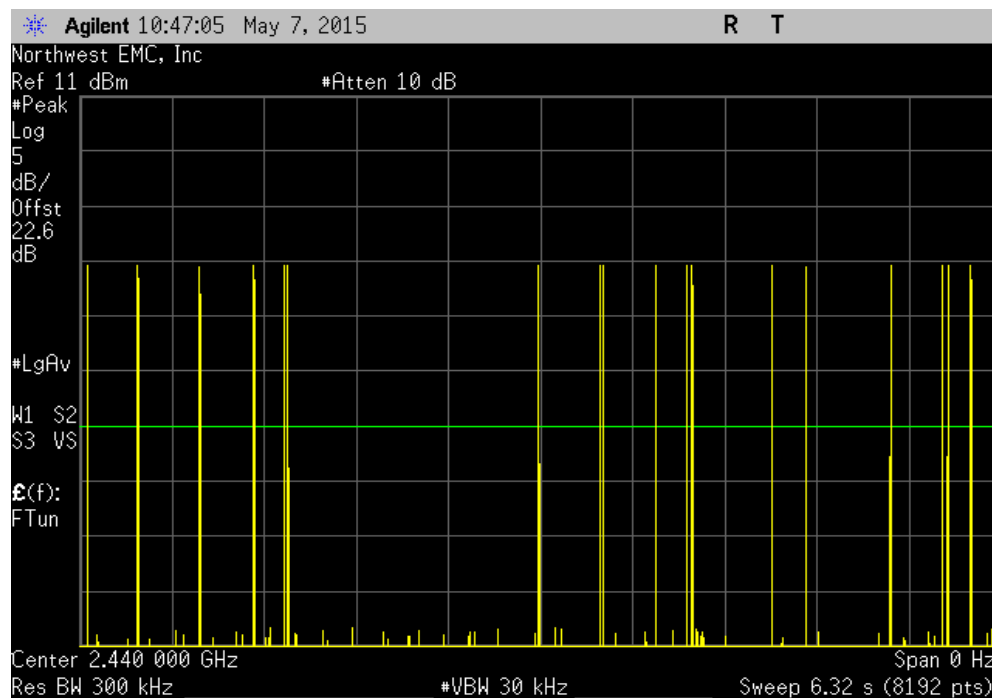


DWELL TIME

Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	19	N/A	N/A	N/A	N/A	N/A

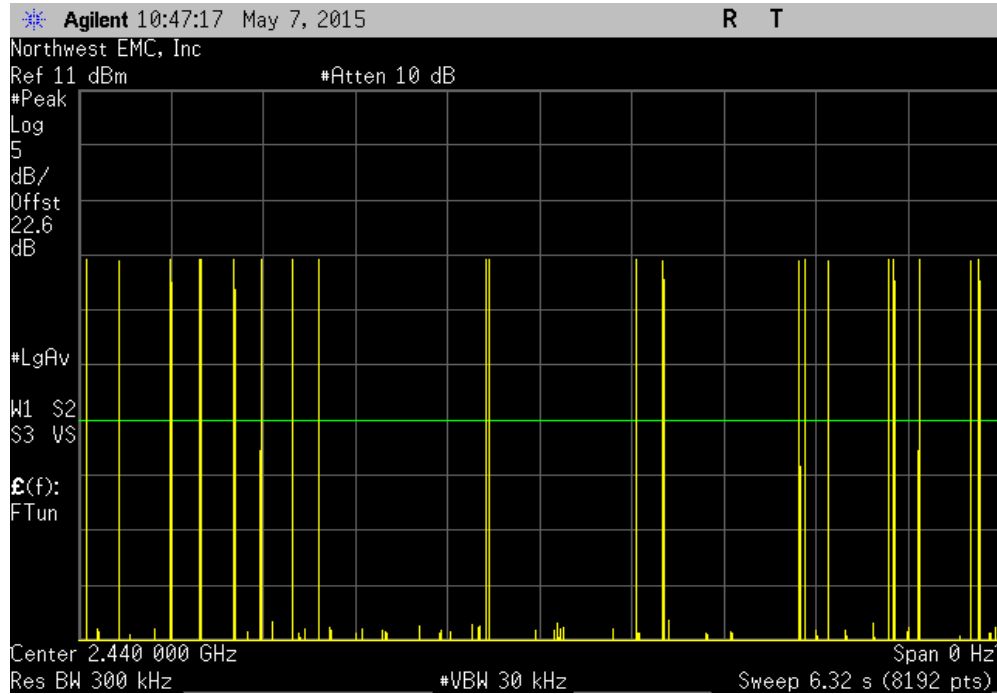


Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	18	N/A	N/A	N/A	N/A	N/A



DWELL TIME

Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	21	N/A	N/A	N/A	N/A	N/A



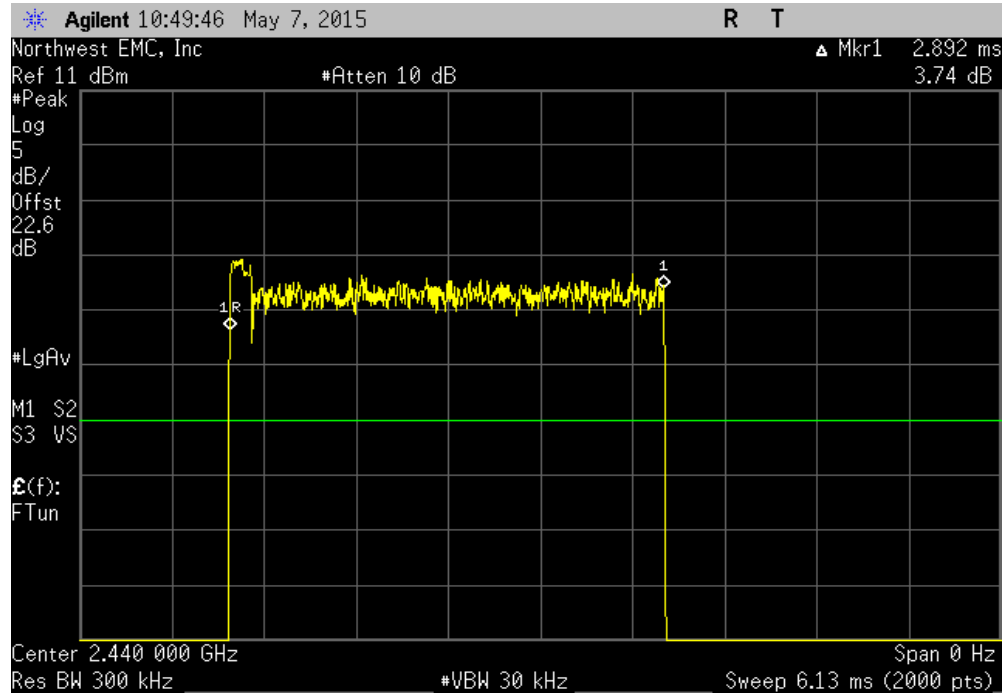
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.892	N/A	20.25	5	292.82	400	Pass

Calculation Only

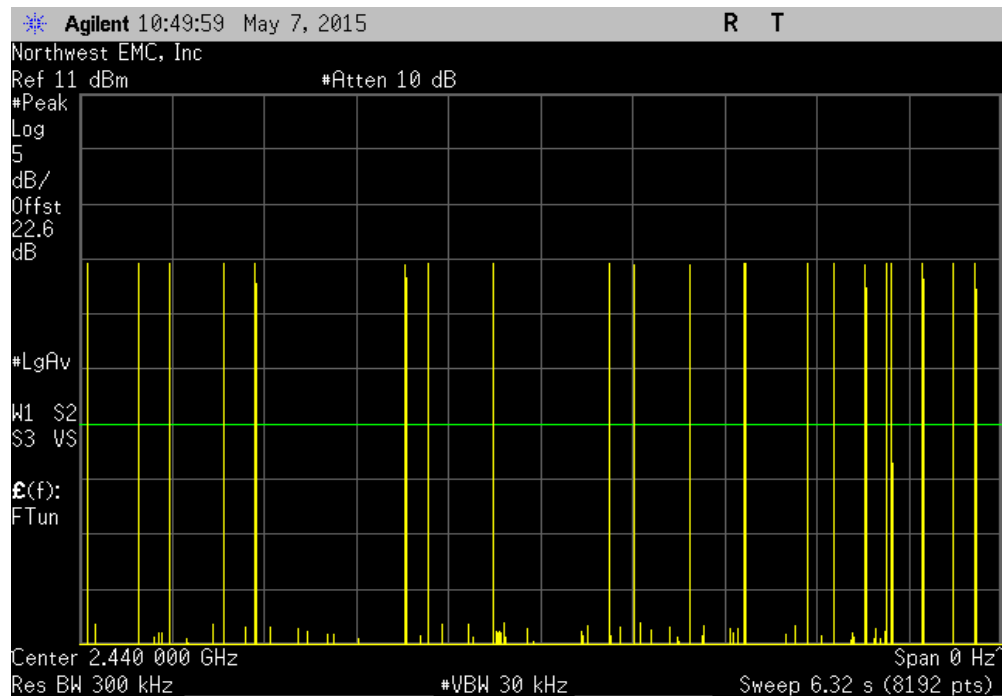
No Screen Capture Required

DWELL TIME

Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.892	N/A	N/A	N/A	N/A	N/A	N/A

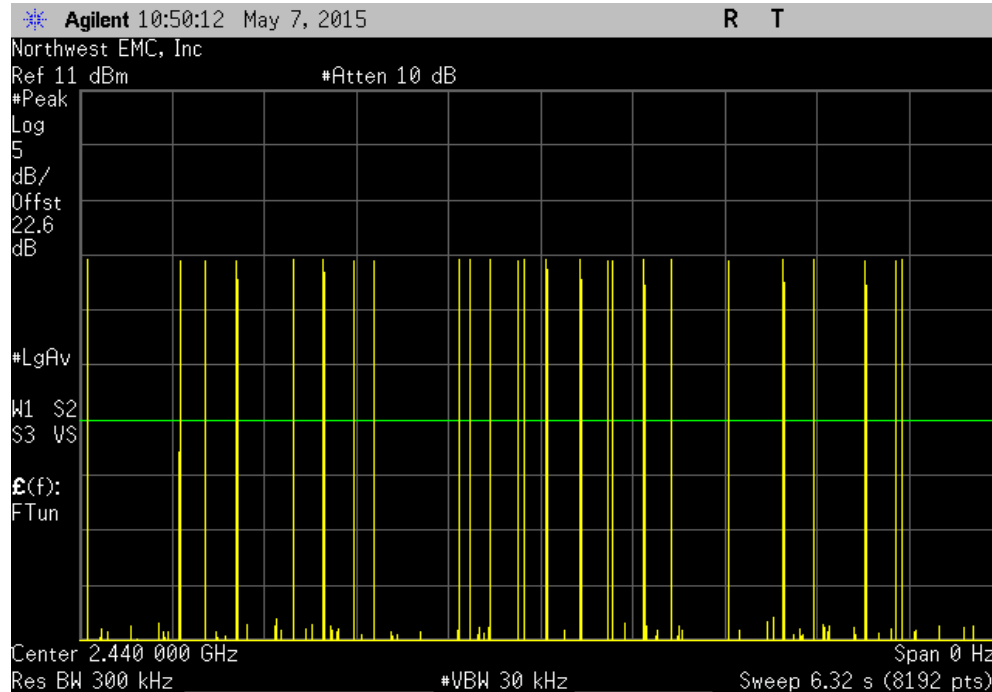


Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	21	N/A	N/A	N/A	N/A	N/A

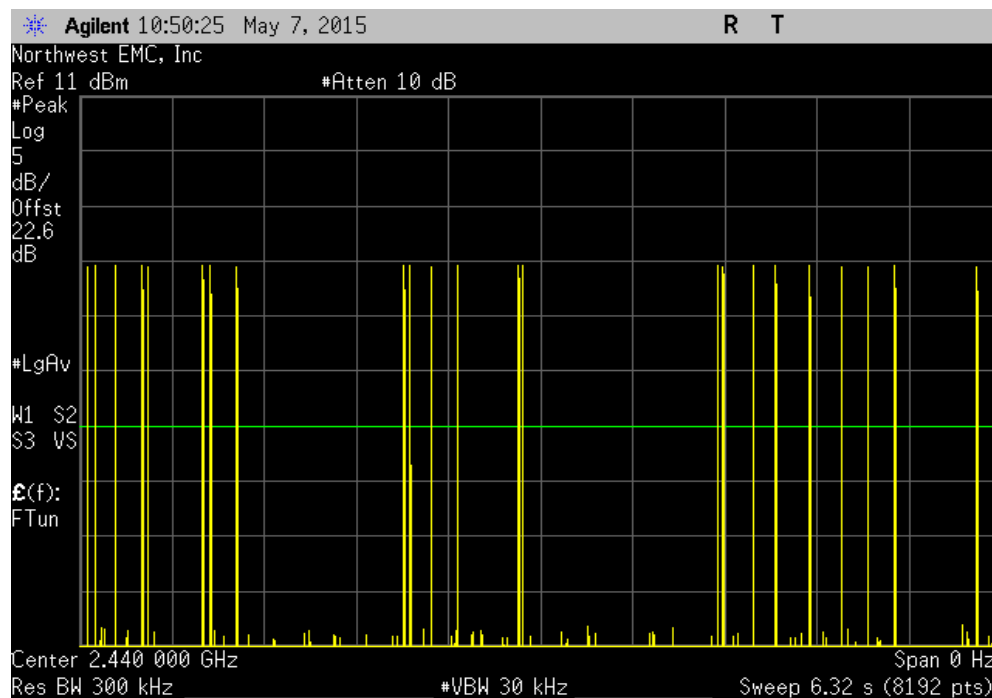


DWELL TIME

Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	25	N/A	N/A	N/A	N/A	N/A

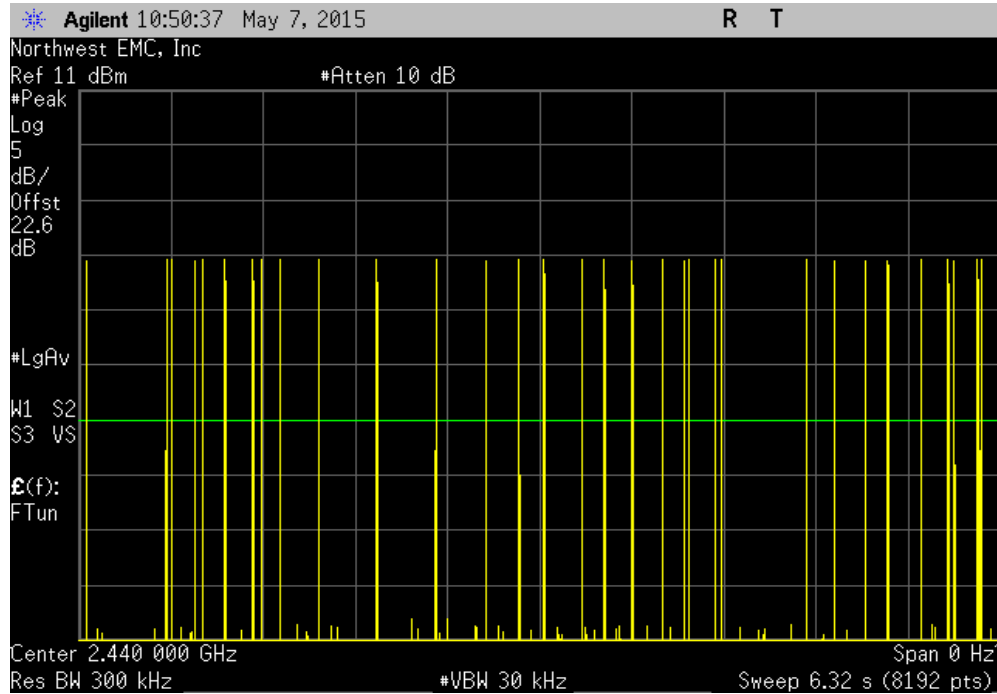


Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	23	N/A	N/A	N/A	N/A	N/A



DWELL TIME

Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
N/A	32	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2440 MHz						
Pulse Width (ms)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (ms) During 31.6 s	Limit (ms)	Results
2.892	N/A	25.25	5	365.12	400	Pass

Calculation Only

No Screen Capture Required

DUTY CYCLE

TEST DESCRIPTION

The Duty Cycle (x) were measured for each of the EUT operating modes. The measurements were made using a zero span on the spectrum analyzer to see the pulses in the time domain. The transmit power was set to its default maximum. A direct connection was made between the RF output of the EUT and a spectrum analyzer. Attenuation and a DC block were used

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

The EUT operates at 100% Duty Cycle.

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 (mos)
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
Attenuator, 20db, 'SMA'	SM Electronics	SA26B-20	RFW	3/10/2015	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12

TEST DESCRIPTION

The spurious RF conducted emissions 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.

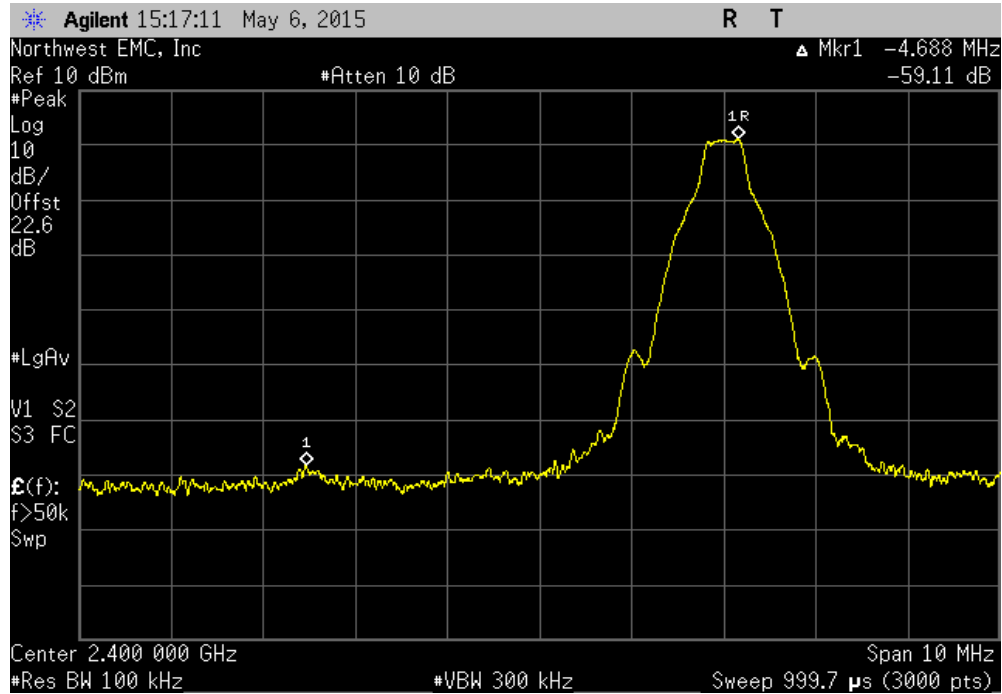
The spectrum was scanned below the lower band edge and above the higher band edge.

BAND EDGE COMPLIANCE

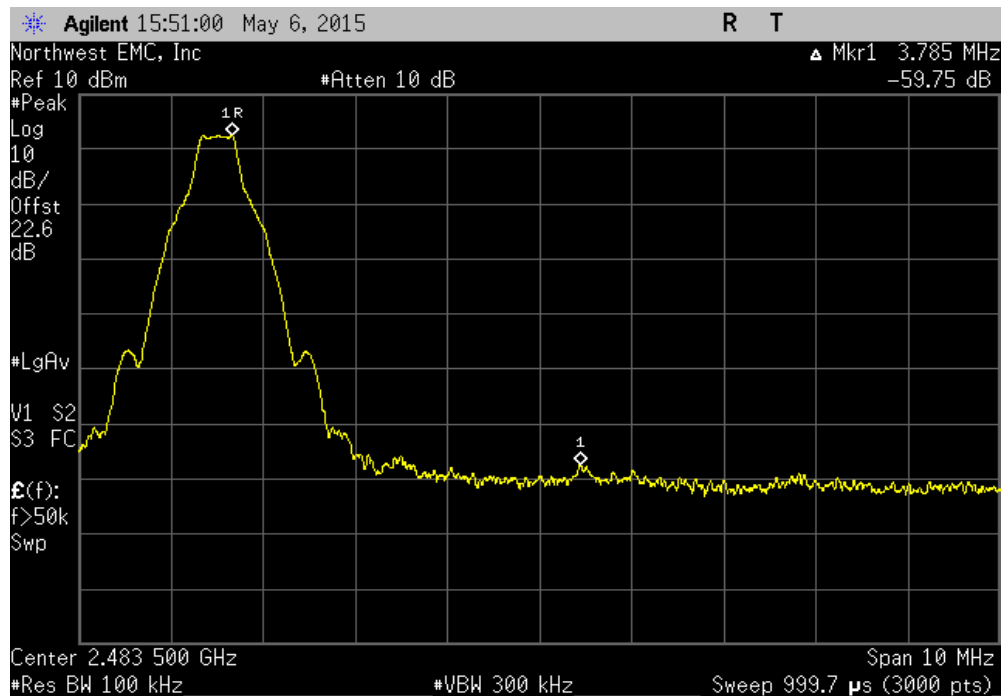
EUT: DM3730 Torpedo + Wireless SOM -32		Work Order: LGPD0151	
Serial Number: See configuration		Date: 05/07/15	
Customer: Logic PD		Temperature: 23.1°C	
Attendees: Adam Ford		Humidity: 41%	
Project: None		Barometric Pres.: 1018.5	
Tested by: Brandon Hobbs		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2015		ANSI C63.10:2009	
COMMENTS			
The EUT was tested with the fundamental modulated while under test. The EUT was not operating in hopping mode. All cable losses were accounted for.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	5	Signature 	
		Value (dBc)	Limit ≤ (dBc) Result
DH5, GFSK			
Low Channel 2402MHz		-59.11	-20 Pass
High Channel 2480MHz		-59.75	-20 Pass
2DH5, pi/4-DQPSK			
Low Channel 2402MHz		-49.02	-20 Pass
High Channel 2480MHz		-54.2	-20 Pass
3DH5, 8-DPSK			
Low Channel 2402MHz		-49.71	-20 Pass
High Channel 2480MHz		-53.69	-20 Pass

BAND EDGE COMPLIANCE

DH5, GFSK, Low Channel 2402MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-59.11	-20	Pass

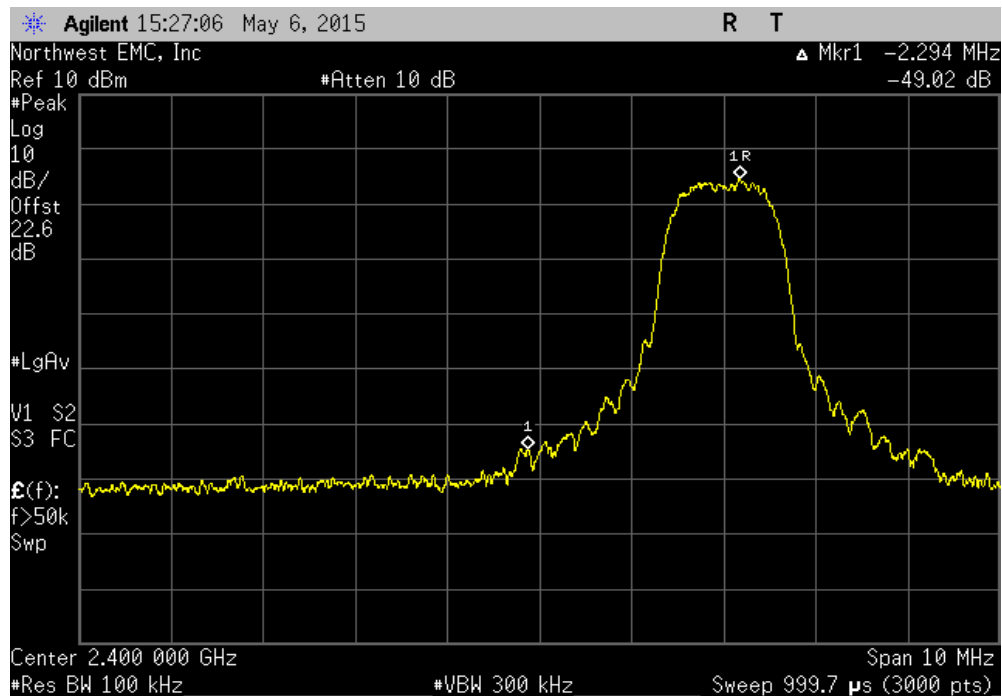


DH5, GFSK, High Channel 2480MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-59.75	-20	Pass

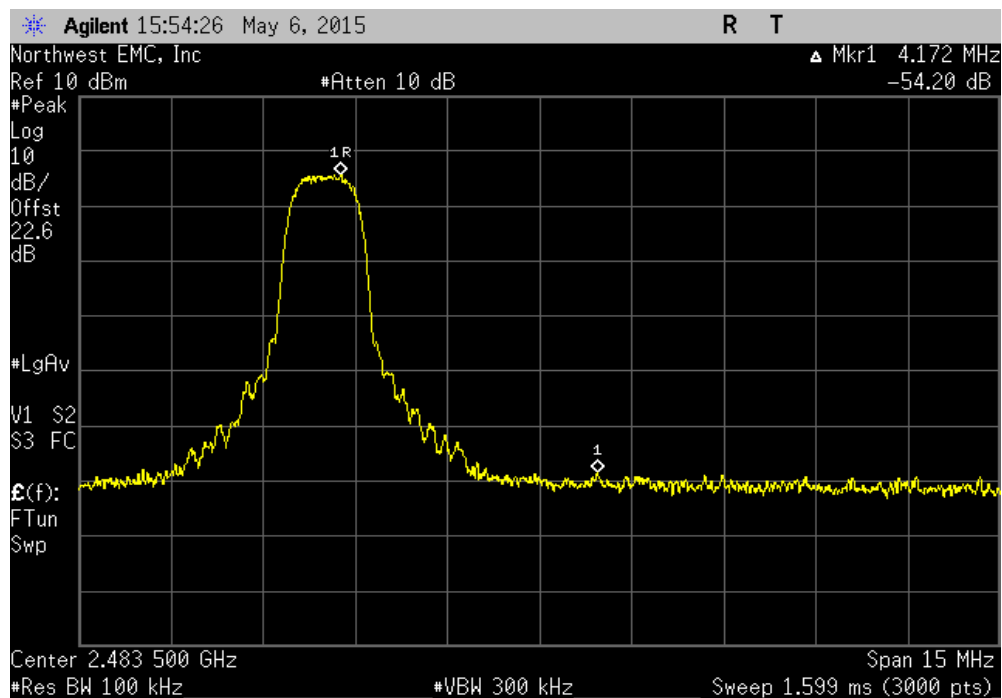


BAND EDGE COMPLIANCE

2DH5, pi/4-DQPSK, Low Channel 2402MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-49.02	-20	Pass

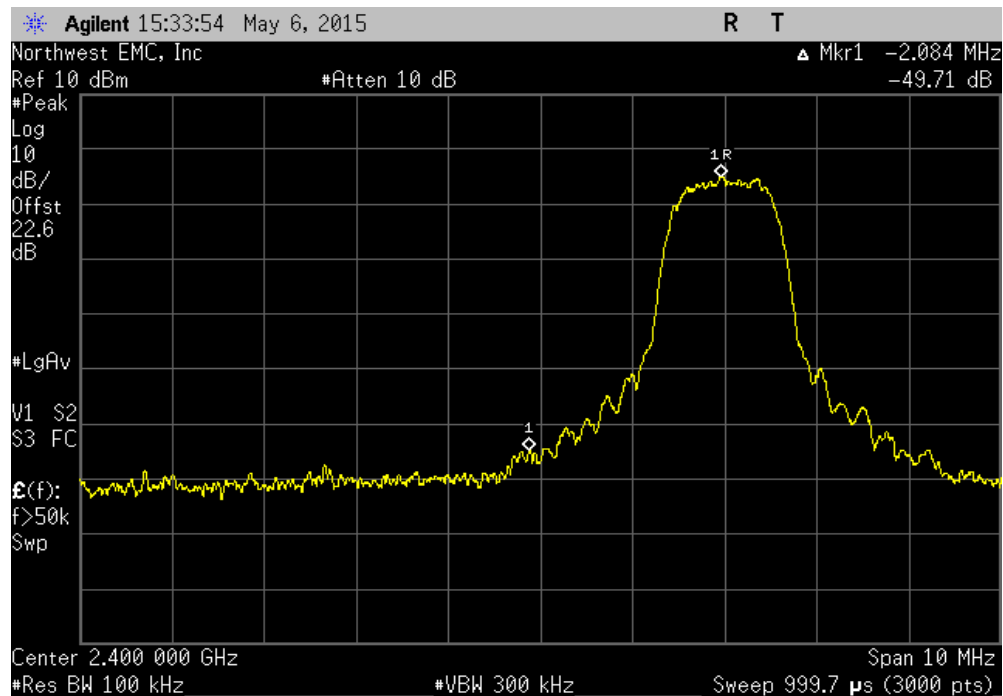


2DH5, pi/4-DQPSK, High Channel 2480MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-54.2	-20	Pass

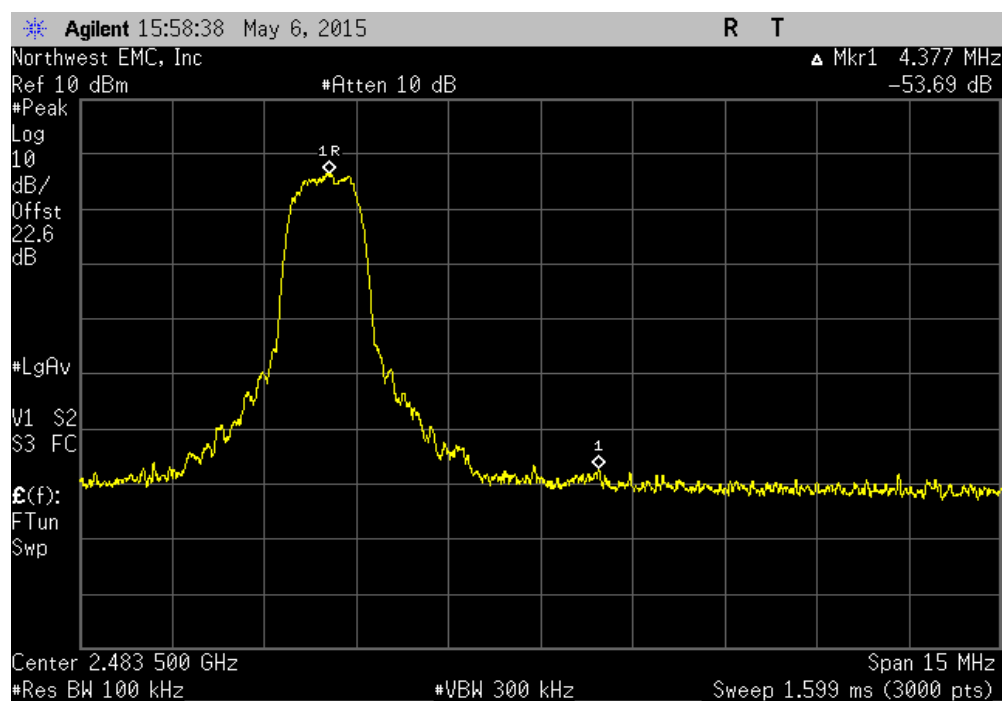


BAND EDGE COMPLIANCE

3DH5, 8-DPSK, Low Channel 2402MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-49.71	-20	Pass



3DH5, 8-DPSK, High Channel 2480MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-53.69	-20	Pass



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 (mos)
Attenuator, 20db, 'SMA'	SM Electronics	SA26B-20	RFW	3/10/2015	12
Spectrum Analyzer	Agilent	E4440A	AAX	4/20/2015	12
Signal Generator MXG	Agilent	N5183A	TIK	10/17/2014	36
MN08 Direct Connect Cable	ESM Cable Corp.	TTBJ141 KMKM-72	MNU	10/2/2014	12
DC Block, 40 GHz	Fairview Microwave	SD3379	AMI	10/2/2014	12

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.

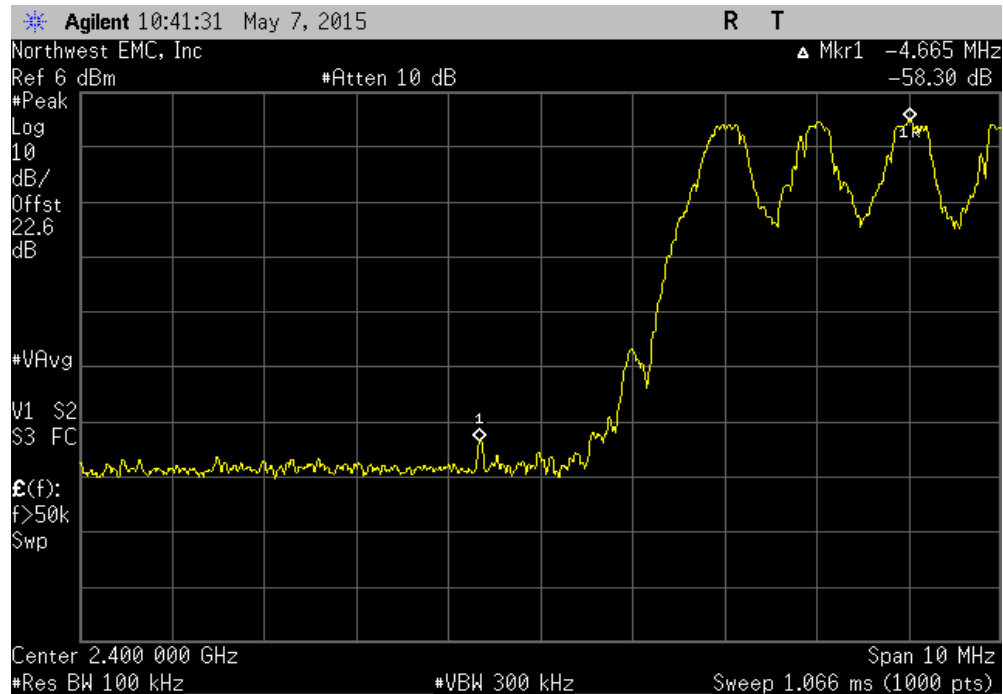
The spectrum was scanned below the lower band edge and above the higher band edge.

BAND EDGE COMPLIANCE -HOPPING MODE

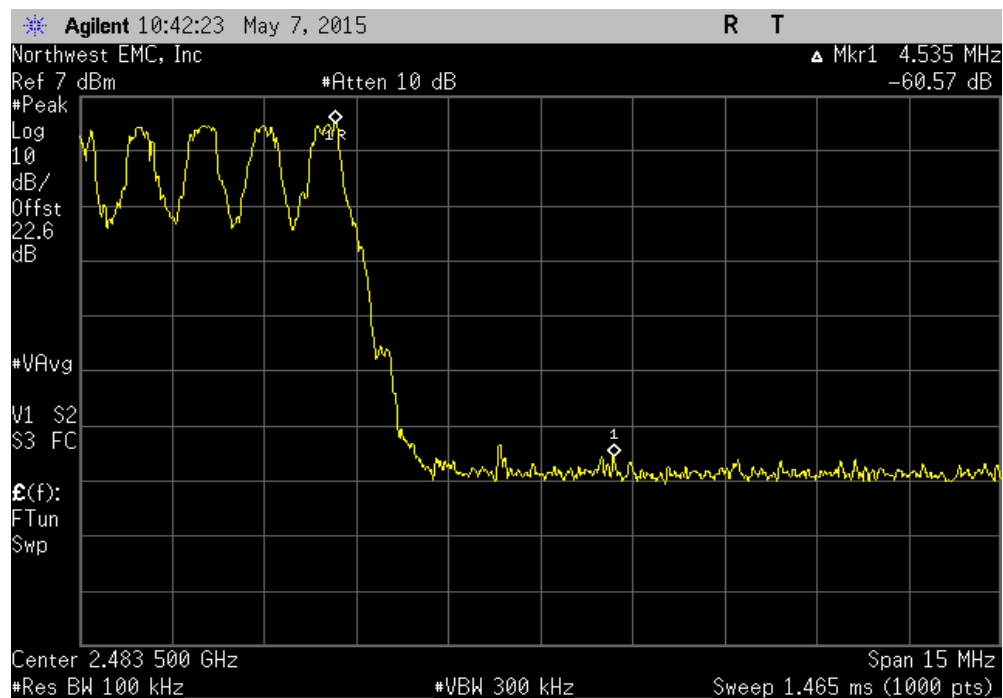
EUT: DM3730 Torpedo + Wireless SOM -32		Work Order: LGPD0151	
Serial Number: See configuration		Date: 05/07/15	
Customer: Logic PD		Temperature: 23.1°C	
Attendees: Adam Ford		Humidity: 41%	
Project: None		Barometric Pres.: 1018.5	
Tested by: Brandon Hobbs		Power: 110VAC/60Hz	
		Job Site: MN08	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2015		ANSI C63.10:2009	
COMMENTS			
The EUT was tested with the fundamental modulated while under test. All cable losses were accounted for.			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	6	Signature 	
		Value (dBc)	Limit ≤ (dBc) Result
Hopping Mode			
DH5, GFSK			
Low Channel, 2402 MHz		-58.3	-20 Pass
High Channel, 2480 MHz		-60.57	-20 Pass
2DH5, pi/4-DQPSK			
Low Channel, 2402 MHz		-53	-20 Pass
High Channel, 2480 MHz		-54.78	-20 Pass
3DH5, 8-DPSK			
Low Channel, 2402 MHz		-50.04	-20 Pass
High Channel, 2480 MHz		-55.21	-20 Pass

BAND EDGE COMPLIANCE -HOPPING MODE

Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-58.3	-20	Pass

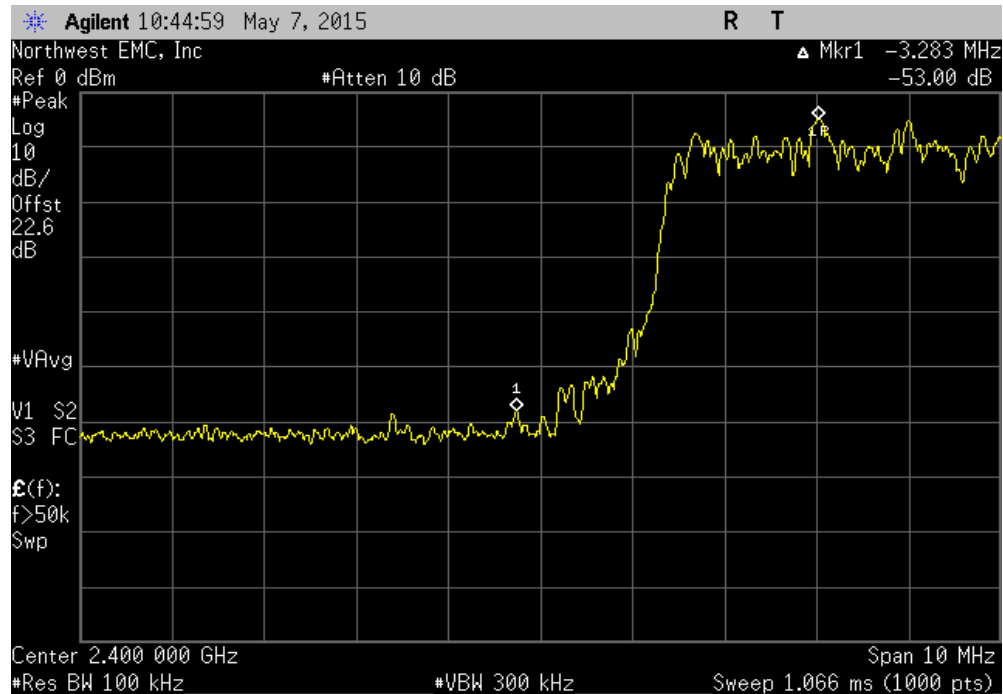


Hopping Mode, DH5, GFSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-60.57	-20	Pass

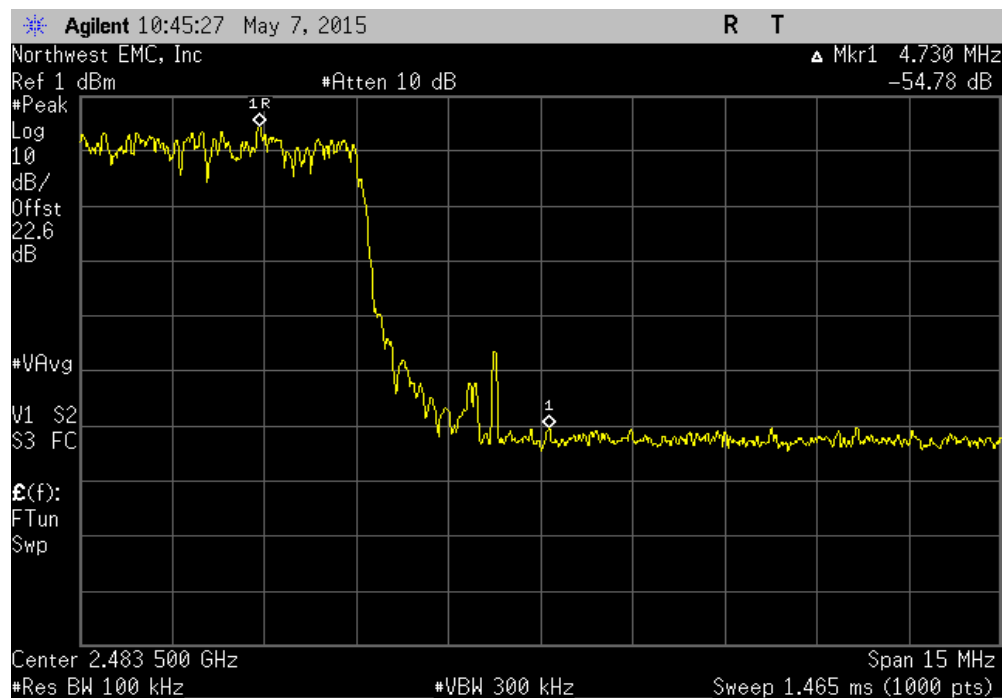


BAND EDGE COMPLIANCE -HOPPING MODE

Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-53	-20	Pass

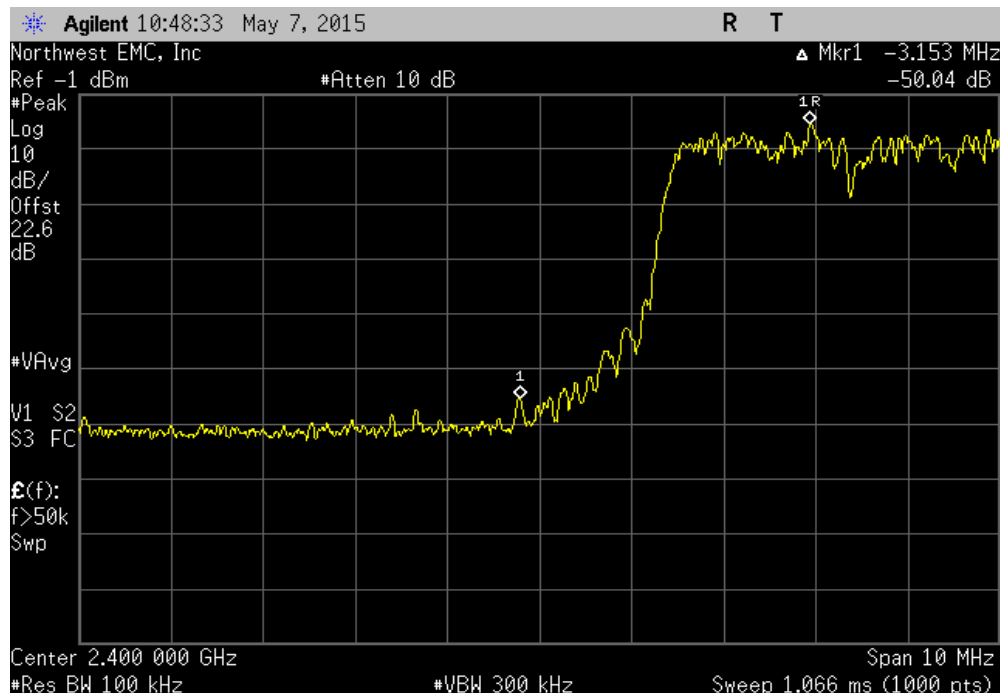


Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-54.78	-20	Pass



BAND EDGE COMPLIANCE -HOPPING MODE

Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-50.04	-20	Pass



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz						
				Value (dBc)	Limit ≤ (dBc)	Result
				-55.21	-20	Pass

