

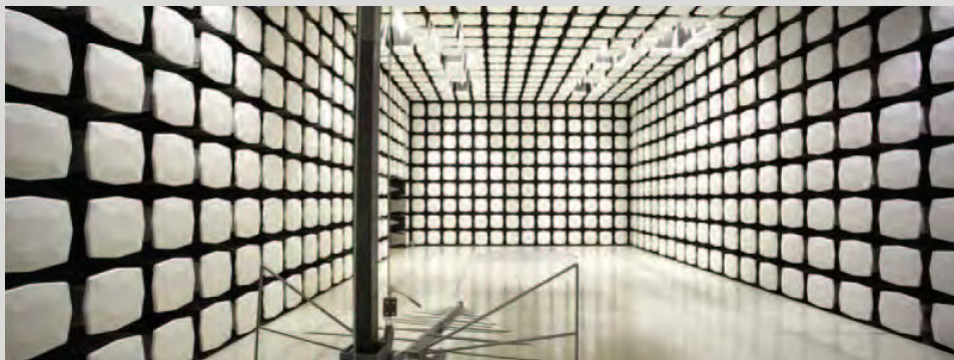


Microsoft Corporation

1514

FCC 15.247:2012

Report #: MCSO1633



Report Prepared By Northwest EMC Inc.

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

California – Minnesota – Oregon – New York – Washington

**Last Date of Test: November 20, 2012
Microsoft Corporation
Model: 1514**

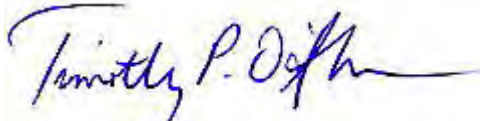
Emissions

Test Description	Specification	Test Method	Pass/Fail
Duty Cycle	FCC 15.247:2012	ANSI C63.10:2009	Pass
Channel Spacing	FCC 15.247:2012	ANSI C63.10:2009	Pass
Dwell Time	FCC 15.247:2012	ANSI C63.10:2009	Pass
Number of Hopping Frequencies	FCC 15.247:2012	ANSI C63.10:2009	Pass
Occupied Bandwidth	FCC 15.247:2012	ANSI C63.10:2009	Pass
Output Power	FCC 15.247:2012	ANSI C63.10:2009	Pass
Band Edge Compliance	FCC 15.247:2012	ANSI C63.10:2009	Pass
Spurious Conducted Emissions	FCC 15.247:2012	ANSI C63.10:2009	Pass
Spurious Radiated Emissions	FCC 15.247:2012	ANSI C63.10:2009	Pass
AC Power Line Conducted Emissions	FCC 15.207:2012	ANSI C63.10:2009	Pass

Deviations From Test Standards

None

Approved By:



Tim O'Shea, Operations Manager



NVLAP Lab Code: 200630-0

Test Facility

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

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124

Phone: (503) 844-4066 Fax: 844-3826

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

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

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



Revision History

Revision Number	Description	Date	Page Number
00	None		

United States

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

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

NVLAP - Each laboratory is accredited by NVLAP to ISO 17025. The scope includes radio, ITE, and medical standards from around the world. See: <http://www.nwemc.com/accreditations/>

Canada

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

European Union

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

Australia/New Zealand

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

Korea

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

Japan

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

Taiwan

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

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

Singapore

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

Hong Kong

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

Vietnam

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

Russia

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

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

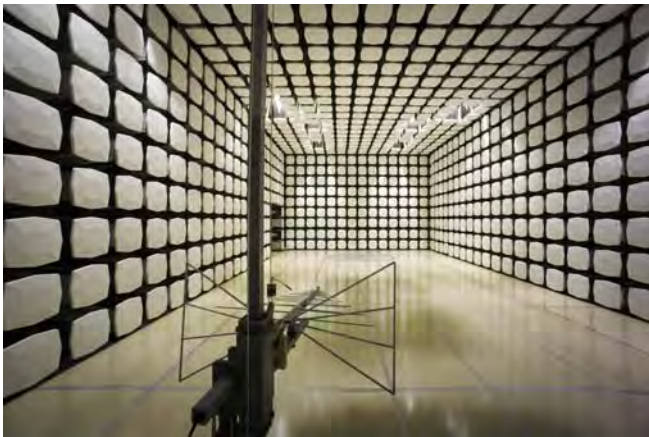
The following table represents the Measurement Uncertainty (MU) budgets for each of the tests that may be contained in this report.

Test	+ MU	- MU
Frequency Accuracy (Hz)	0.12	-0.01
Amplitude Accuracy (dB)	0.49	-0.49
Conducted Power (dB)	0.41	-0.41
Radiated Power via Substitution (dB)	0.69	-0.68
Temperature (degrees C)	0.81	-0.81
Humidity (% RH)	2.89	-2.89
Field Strength (dB)	4.00	-4.00
AC Powerline Conducted Emissions (dB)	2.70	-2.70

Revision 8/3/12



Oregon Labs EV01-EV12 22975 NW Evergreen Pkwy, #400 Hillsboro, OR 97124 (503) 844-4066	California Labs OC01-OC13 41 Tesla Irvine, CA 92618 (949) 861-8918	New York Labs WA01-WA04 4939 Jordan Rd. Elbridge, NY 13060 (315) 685-0796	Minnesota Labs MN01-MN08 9349 W Broadway Ave. Brooklyn Park, MN 55445 (763) 425-2281	Washington Labs SU01-SU07 14128 339 th Ave. SE Sultan, WA 98294 (360) 793-8675
VCCI				
A-0108	A-0029		A-0109	A-0110
Industry Canada				
2834D-1, 2834D-2	2834B-1, 2834B-2, 2834B-3		2834E-1	2834C-1





WTD 12.5.23

PRODUCT DESCRIPTION

Client and Equipment Under Test (EUT) Information

Company Name:	Microsoft Corporation
Address:	One Microsoft Way
City, State, Zip:	Redmond, WA 98052-6399
Test Requested By:	Mike Boucher
Model:	1514
First Date of Test:	October 29, 2012
Last Date of Test:	November 20, 2012
Receipt Date of Samples:	October 29, 2012
Equipment Design Stage:	Production
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test

Functional Description of the EUT (Equipment Under Test):

A Hand held computing device with 802.11b/g/a/n and Bluetooth radios.

Testing Objective:

To demonstrate compliance under FCC 15.247 for a Bluetooth transmitter in the hand held computing device.

Configuration MCSO1633- 1

Software/Firmware Running during test	
Description	Version
MS Windows	8
WiFi Tool	1.0.8.24

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Handheld Computing Device	Microsoft Corporation	1514	000012424053

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	Microsoft Corporation	PA-2480-06MX	0D21033282239
USB Ethernet Adapter	LinkSys	USB300M	CU906M703796

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Remote Laptop	Lenovo	4174-BB4	R9-PMLAF 12/06

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
Headphone	No	1.2m	No	Handheld Computing Device	Earbuds
AC Power	No	0.5m	No	AC Adapter	AC Mains
DC Power	No	1.5m	No	AC Adapter	Handheld Computing Device
USB	Yes	0.1m	No	USB Ethernet Adapter	Handheld Computing Device
Ethernet	No		No	Remote Laptop	USB Ethernet Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Configuration MCSO1633- 2

Software/Firmware Running during test	
Description	Version
MS Windows	8
WiFi Tool	1.0.8.24

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Handheld Computing Device	Microsoft Corporation	1514	000215624253

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
AC Adapter	Microsoft Corporation	PA-2480-06MX	0D21033282239
USB Ethernet Adapter	LinkSys	USB300M	CU906M703796

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Remote Laptop	Lenovo	4174-BB4	R9-PMLAF 12/06

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
AC Power	No	0.5m	No	AC Adapter	AC Mains
USB	Yes	0.1m	No	USB Ethernet Adapter	Handheld Computing Device
Ethernet	No		No	Remote Laptop	USB Ethernet Adapter

PA = Cable is permanently attached to the device. Shielding and/or presence of ferrite may be unknown.

Equipment Modifications

Item	Date	Test	Modification	Note	Disposition of EUT
1	10/29/2012	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	10/31/2012	Radiated Spurious 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	11/19/2012	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.
4	11/19/2012	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.
5	11/19/2012	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.
6	11/19/2012	Duty Cycle	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
7	11/19/2012	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.
8	11/19/2012	Number of Hopping Channels	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	11/19/2012	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.
10	11/19/2012	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.
11	11/19/2012	Power Spectral Density	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
12	11/19/2012	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.
13	11/20/2012	AC Power Line Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

DUTY CYCLE

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
40GHz DC Block	Miteq	DCB4000	AMD	6/25/2012	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/2/2012	12
Power Meter	Gigatronics	8651A	SPM	1/9/2012	24
MXG Vector Signal Generator	Agilent	N5182A	TIF	NCR	0
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/15/2011	12
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2012	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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.

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



DUTY CYCLE

EUT: 1514	Work Order: MCSO1638
Serial Number: 000109423753	Date: 11/02/12
Customer: Microsoft Corporation	Temperature: 22.3°C
Attendees: None	Humidity: 52%
Project: None	Barometric Pres.: 1013
Tested by: Brandon Hobbs/Rod Peloquin/Sabrina Sanders	Power: 110VAC/60Hz
	Job Site: EV06
TEST SPECIFICATIONS	
FCC 15.247:2012	Test Method
	ANSI C63.10:2009

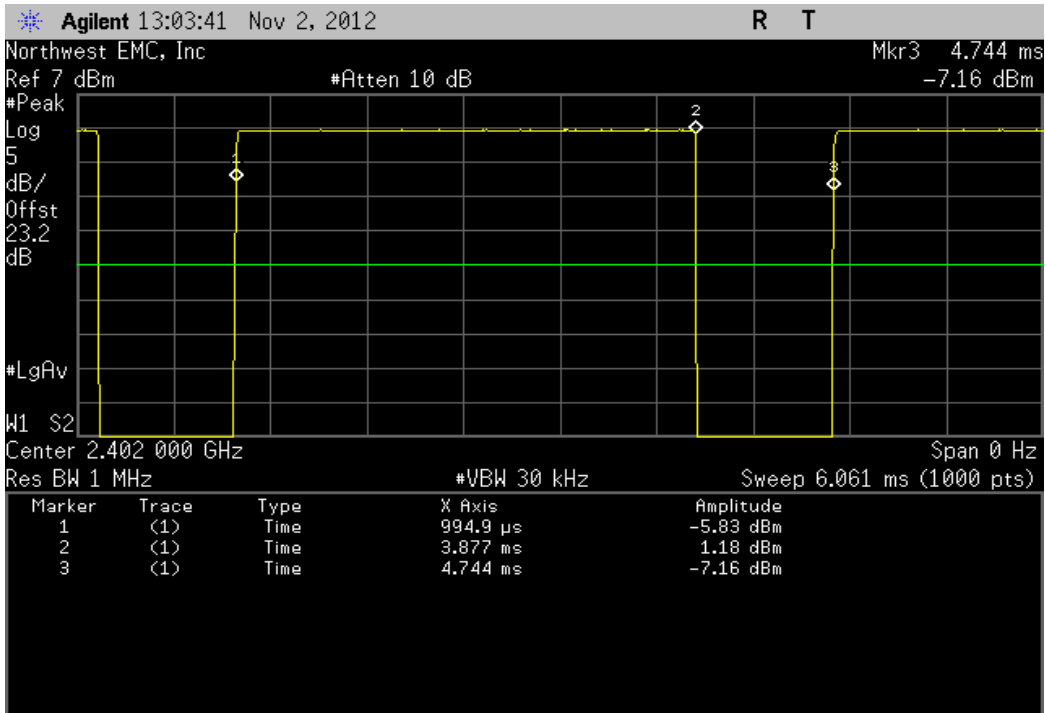
COMMENTS
All cable losses for 2.4GHz and 5.0GHz bands are accounted for in the analyzer offset calculations

DEVIATIONS FROM TEST STANDARD
None

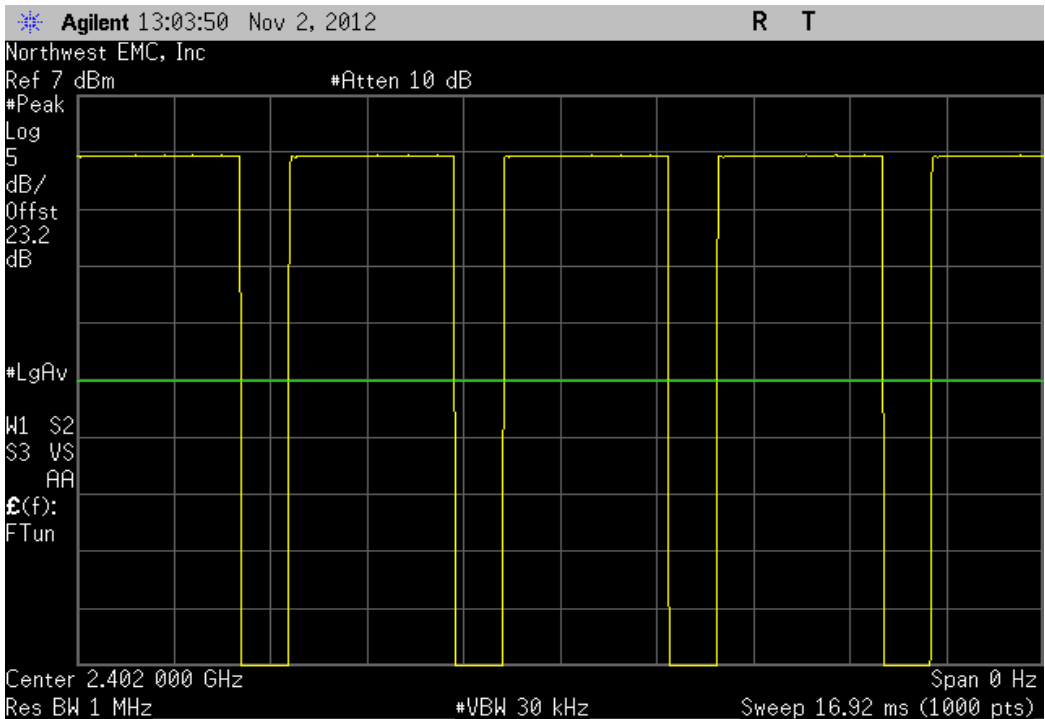
Configuration # 1
Signature *Robby W. Pelroy*

	Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result
Hopping Mode						
DH5, GFSK						
Low Channel, 2402 MHz	2.882 mS	3.749 mS	1	76.9	N/A	N/A
Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2441 MHz	2.882 mS	3.749 mS	1	76.9	N/A	N/A
Mid Channel, 2441 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel, 2480 MHz	2.882 mS	3.749 mS	1	76.9	N/A	N/A
High Channel, 2480 MHz	N/A	N/A	5	N/A	N/A	N/A
2DH5, pi/4-DQPSK						
Low Channel, 2402 MHz	2.882 mS	3.749 mS	1	76.9	N/A	N/A
Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2441 MHz	2.882 mS	3.749 mS	1	76.9	N/A	N/A
Mid Channel, 2441 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel, 2480 MHz	2.882 mS	3.749 mS	1	76.9	N/A	N/A
High Channel, 2480 MHz	N/A	N/A	5	N/A	N/A	N/A
3DH5, 8-DPSK						
Low Channel, 2402 MHz	2.882 mS	3.749 mS	1	76.9	N/A	N/A
Low Channel, 2402 MHz	N/A	N/A	5	N/A	N/A	N/A
Mid Channel, 2441 MHz	2.882 mS	3.749 mS	1	76.9	N/A	N/A
Mid Channel, 2441 MHz	N/A	N/A	5	N/A	N/A	N/A
High Channel, 2480 MHz	2.888 mS	3.755 mS	1	76.9	N/A	N/A
High Channel, 2480 MHz	N/A	N/A	5	N/A	N/A	N/A

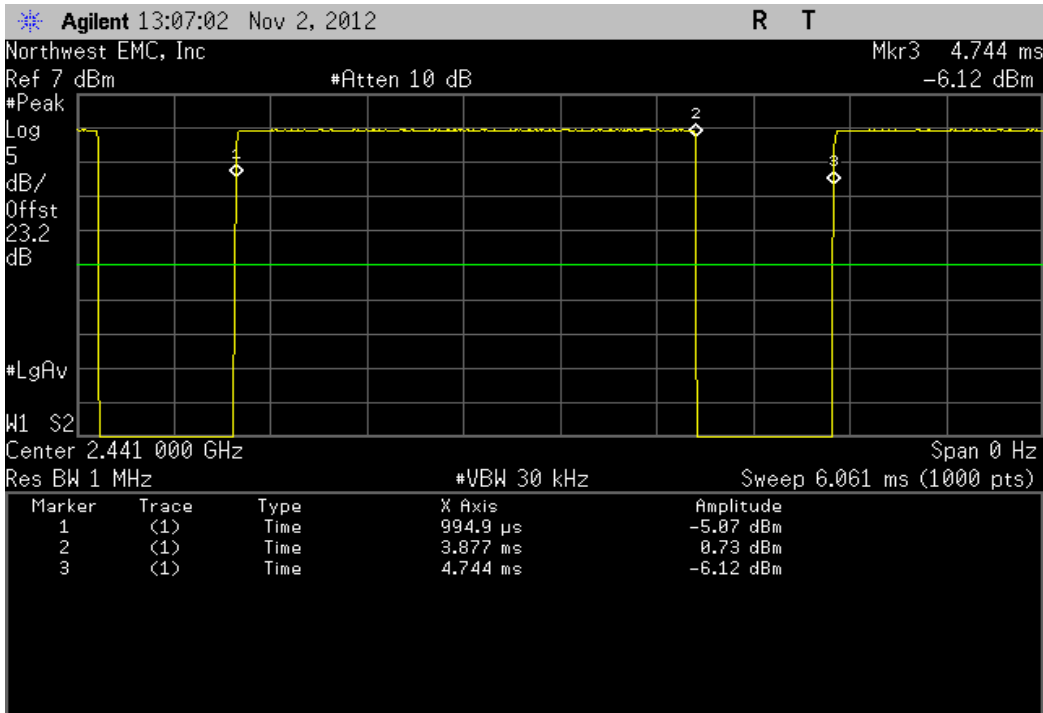
Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
2.882 mS	3.749 mS	1	76.9	N/A	N/A	



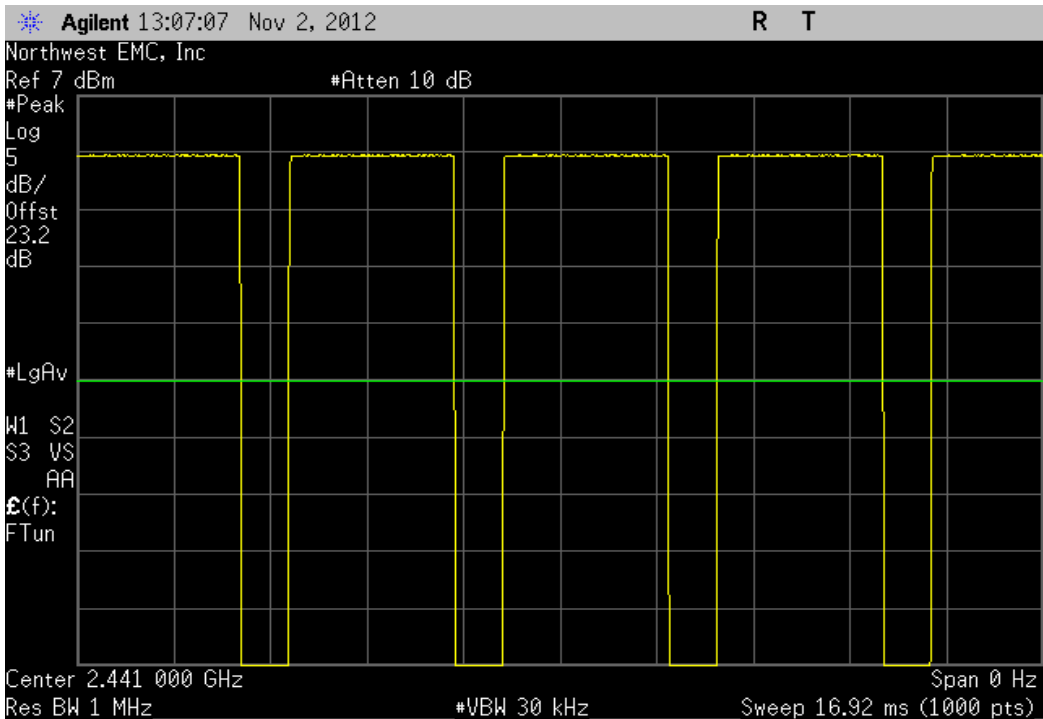
Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	



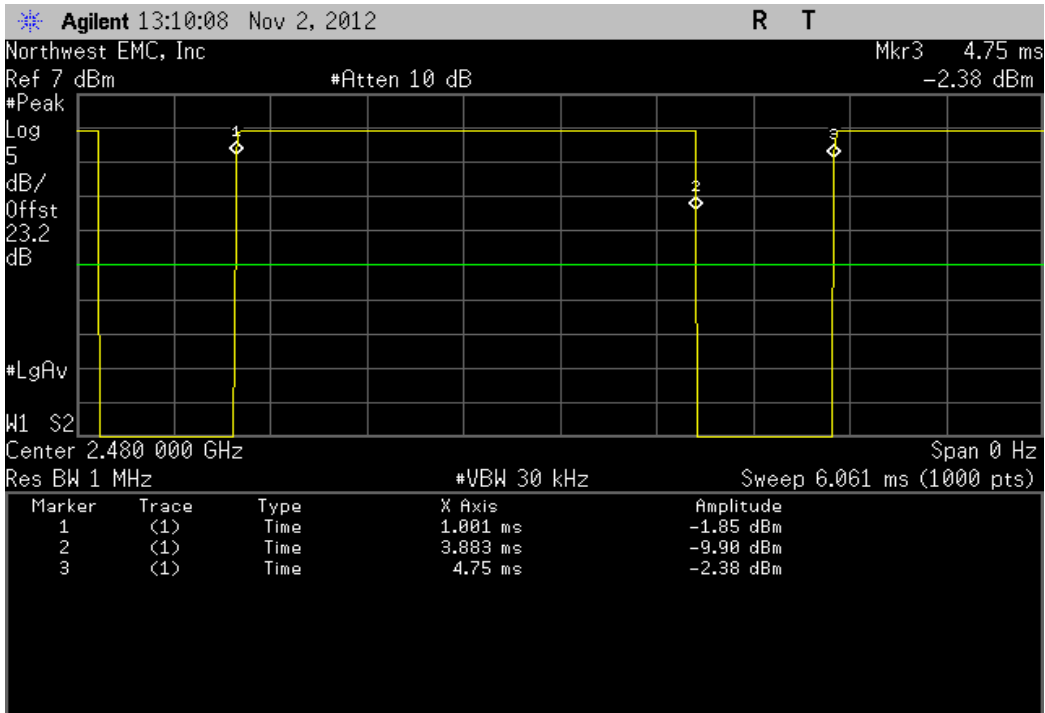
Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
2.882 mS	3.749 mS	1	76.9	N/A	N/A	



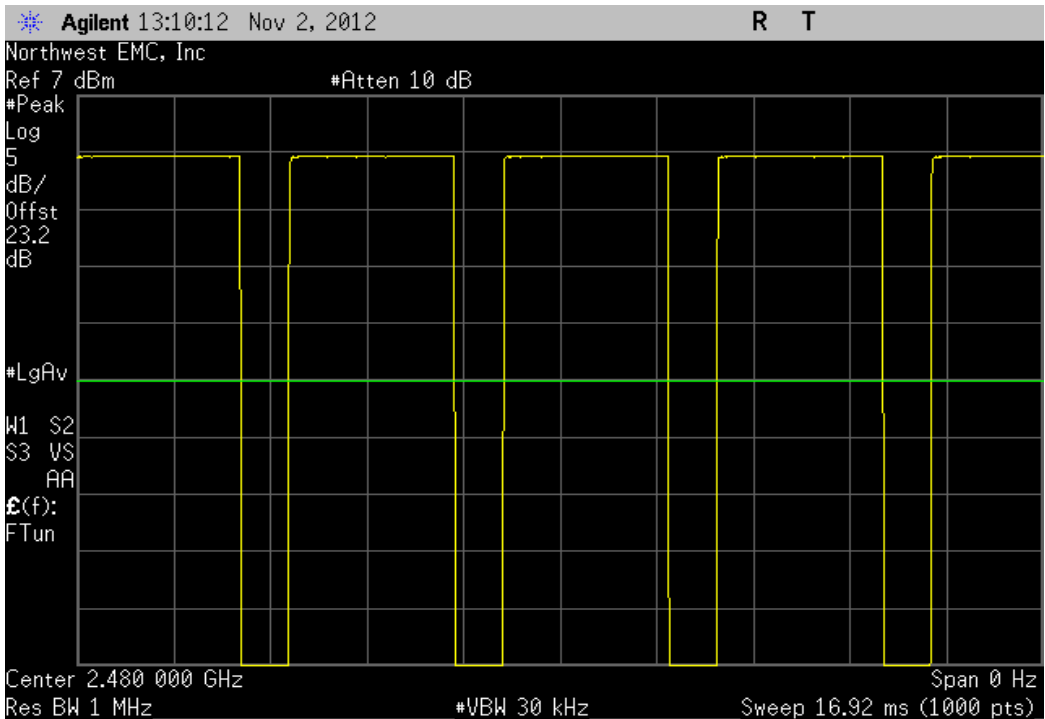
Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	



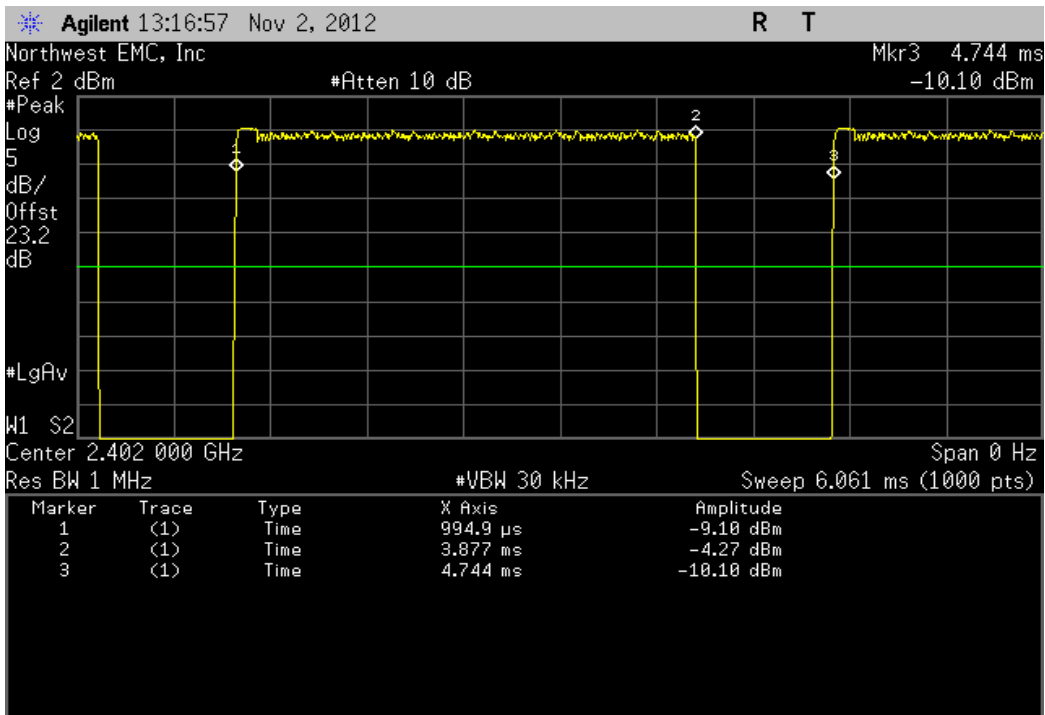
Hopping Mode, DH5, GFSK, High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
2.882 mS	3.749 mS	1	76.9	N/A	N/A	



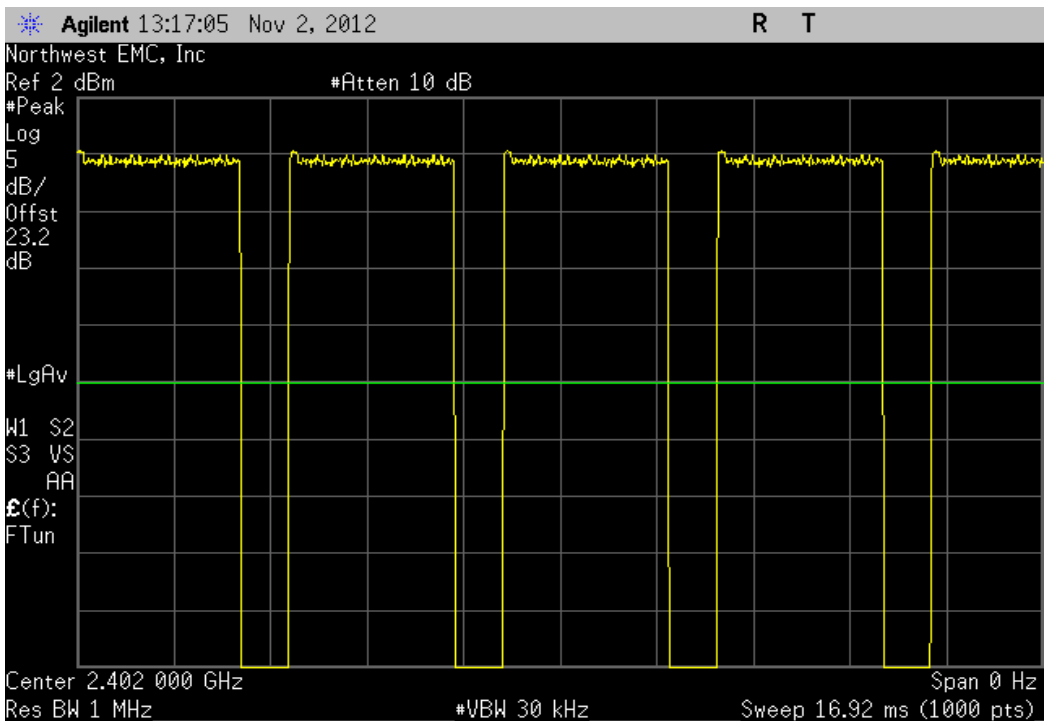
Hopping Mode, DH5, GFSK, High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	



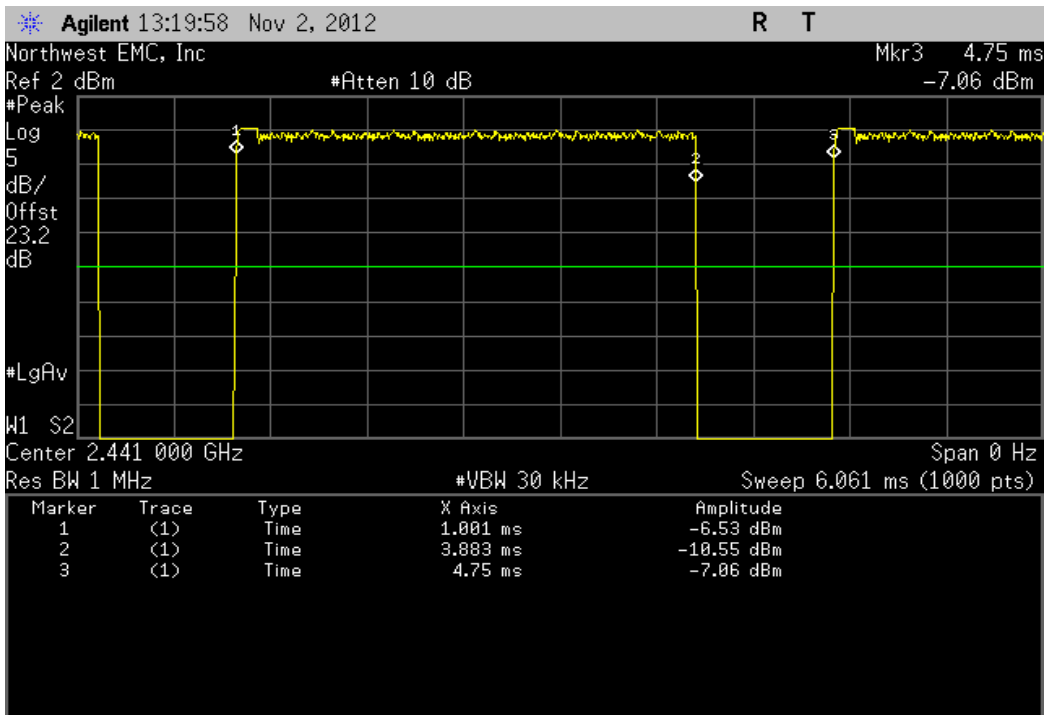
Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
2.882 mS	3.749 mS	1	76.9	N/A	N/A	



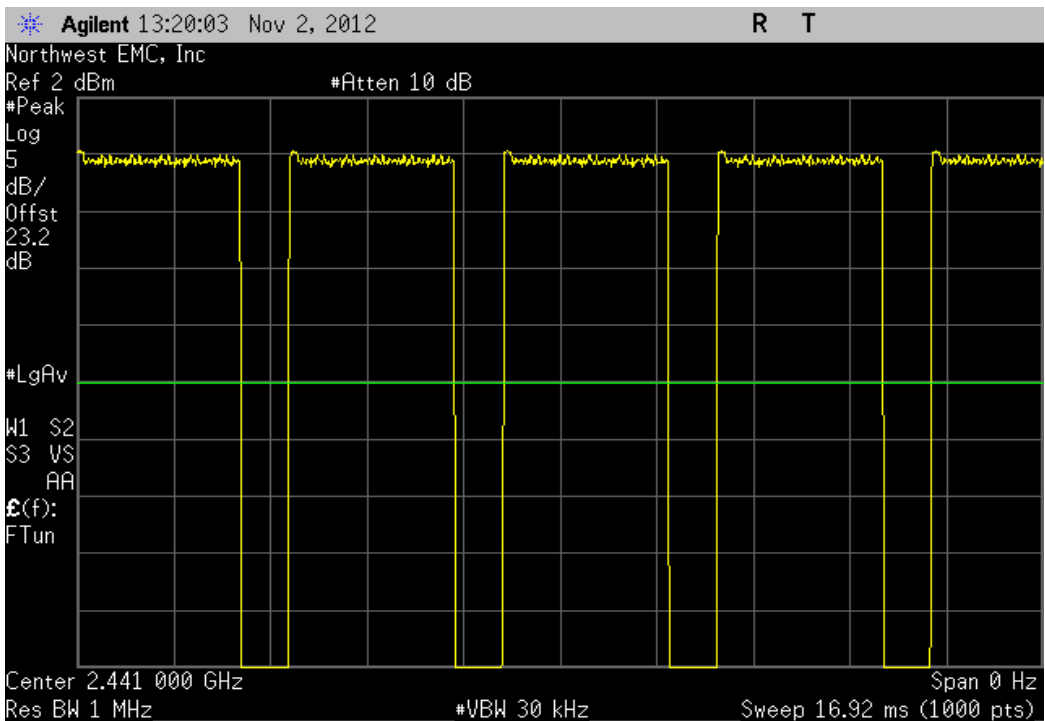
Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	



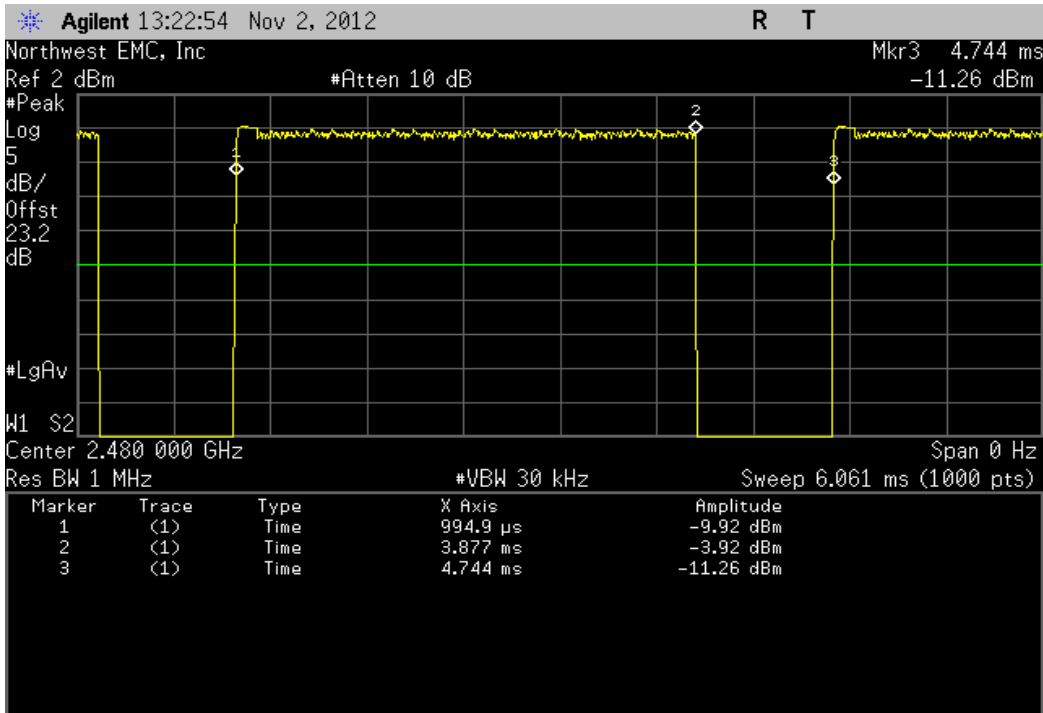
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
2.882 mS	3.749 mS	1	76.9	N/A	N/A	



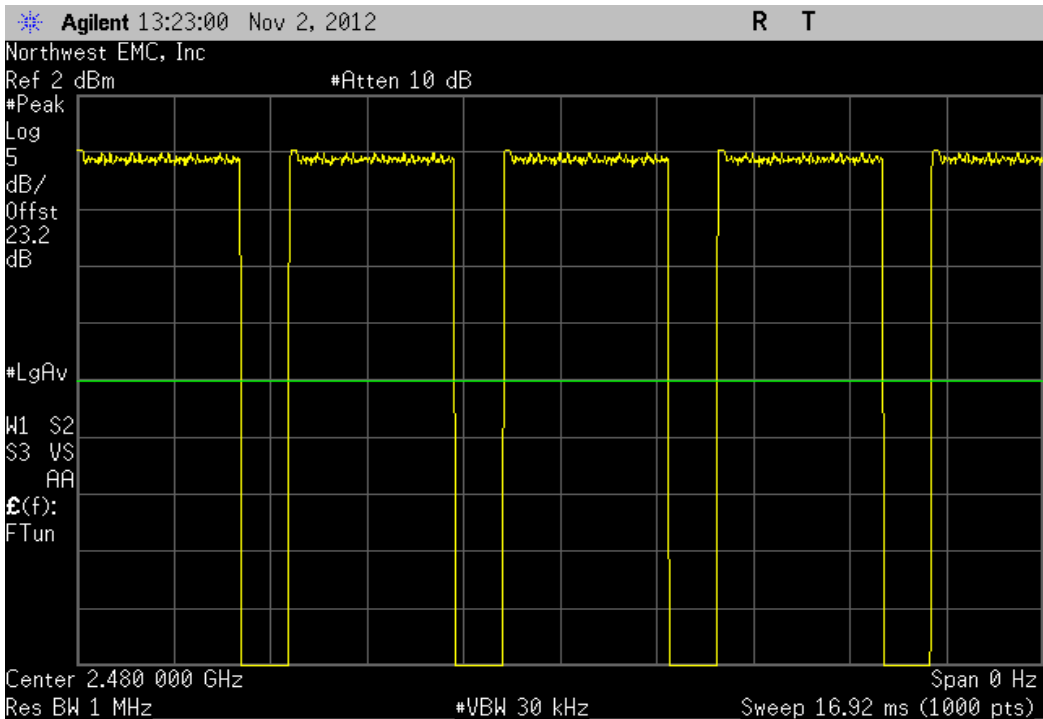
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	



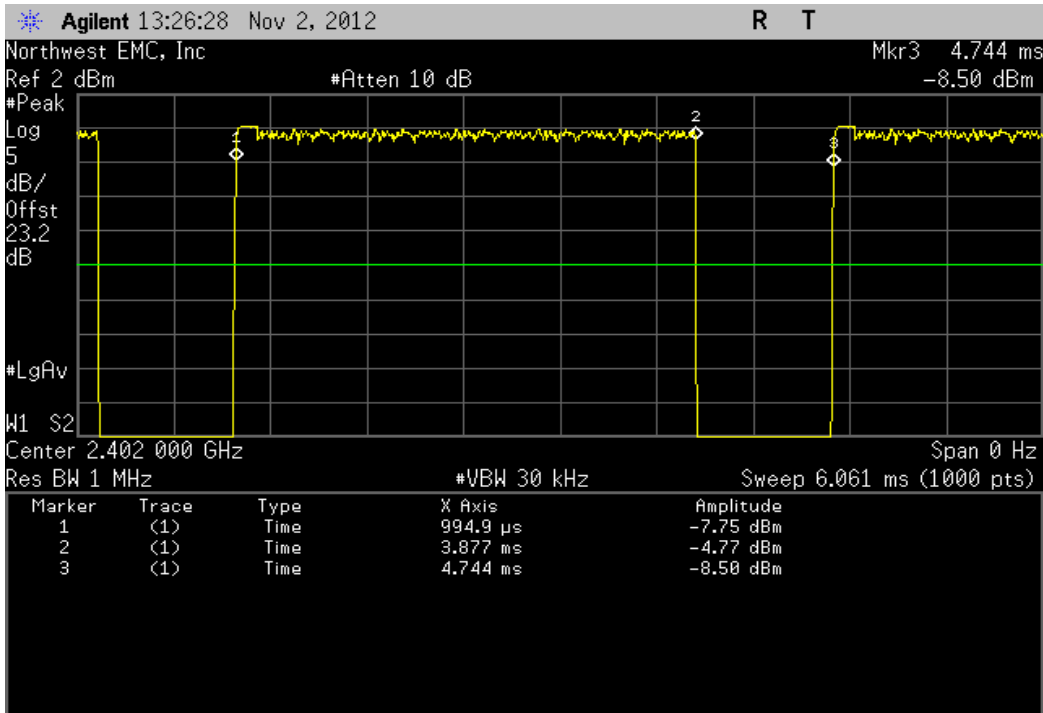
Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
2.882 mS	3.749 mS	1	76.9	N/A	N/A	



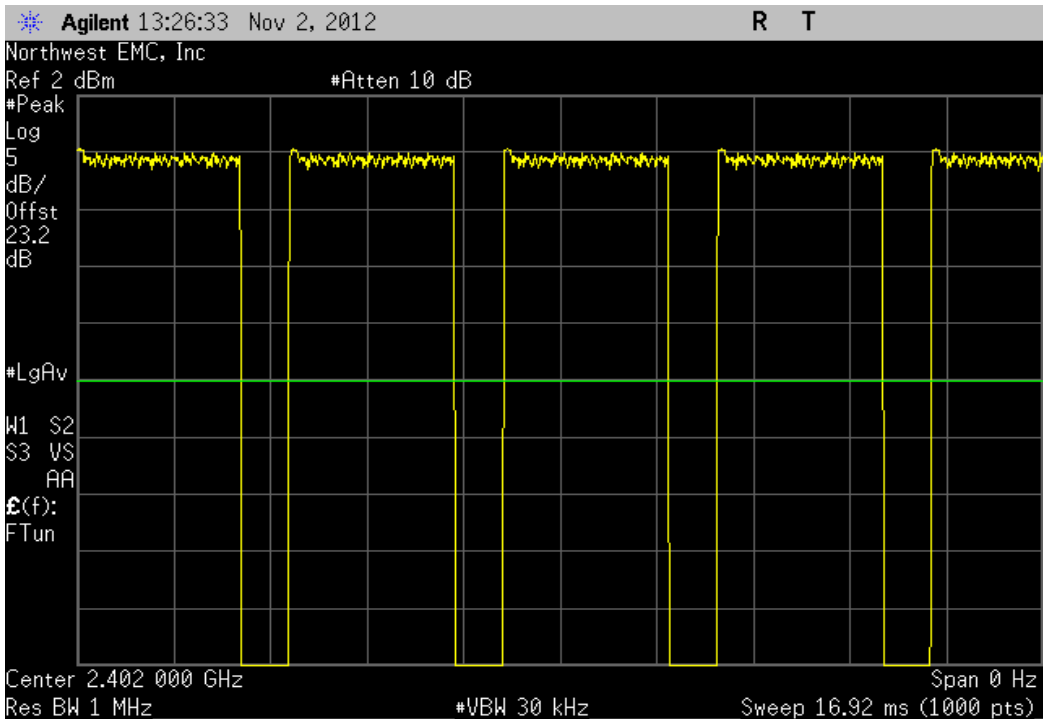
Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	



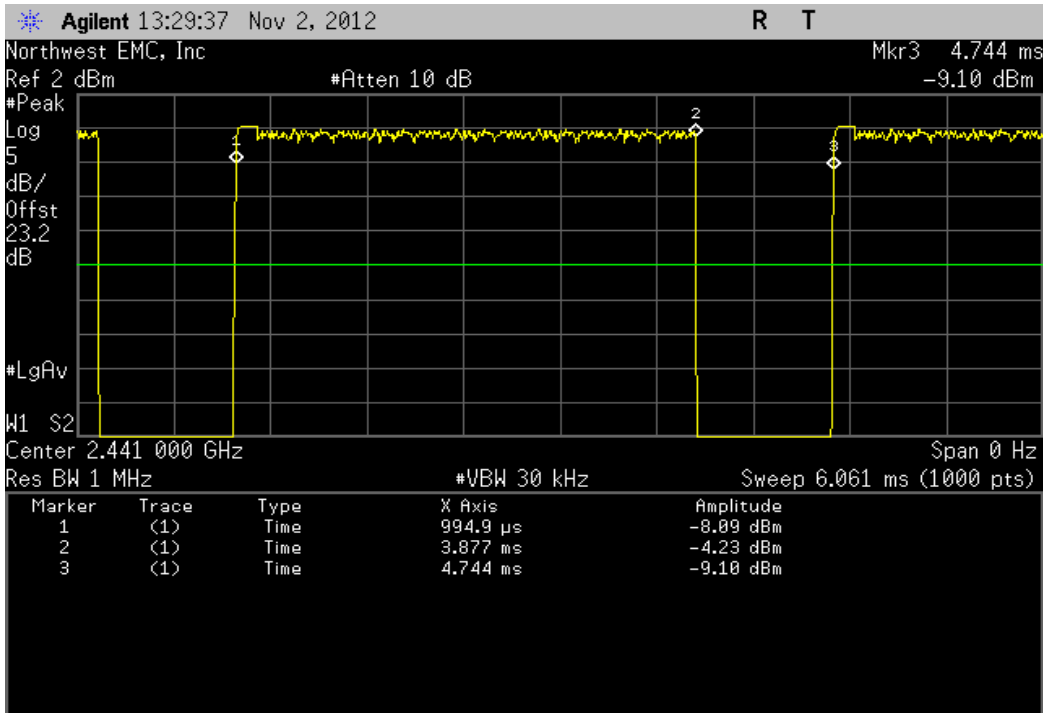
Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
2.882 mS	3.749 mS	1	76.9	N/A	N/A	



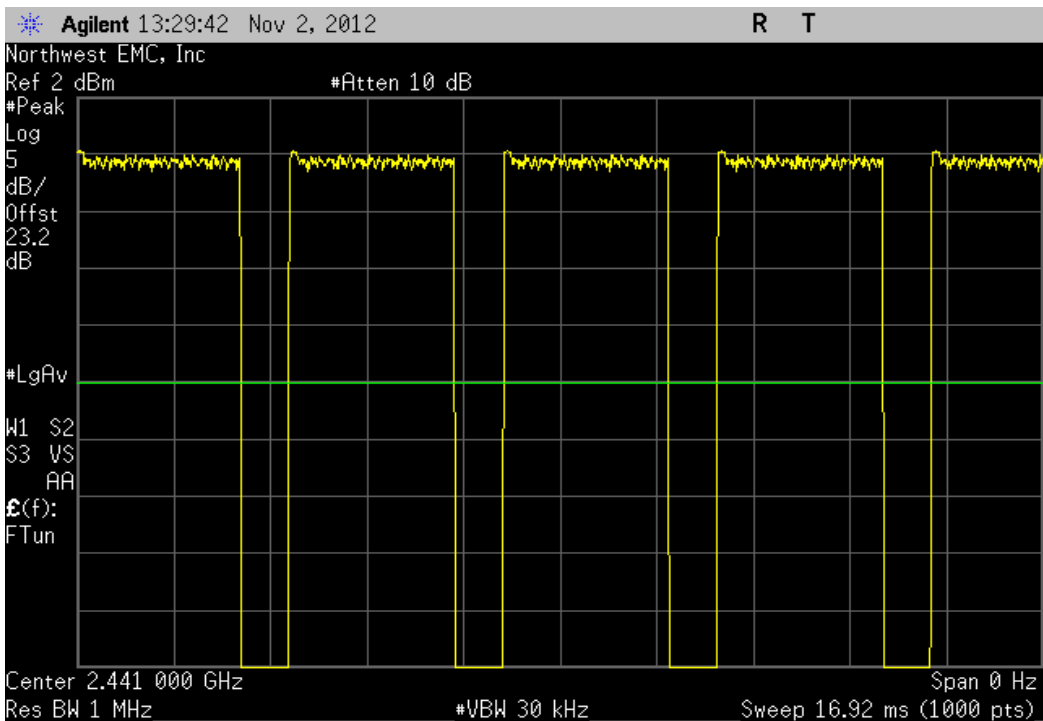
Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	



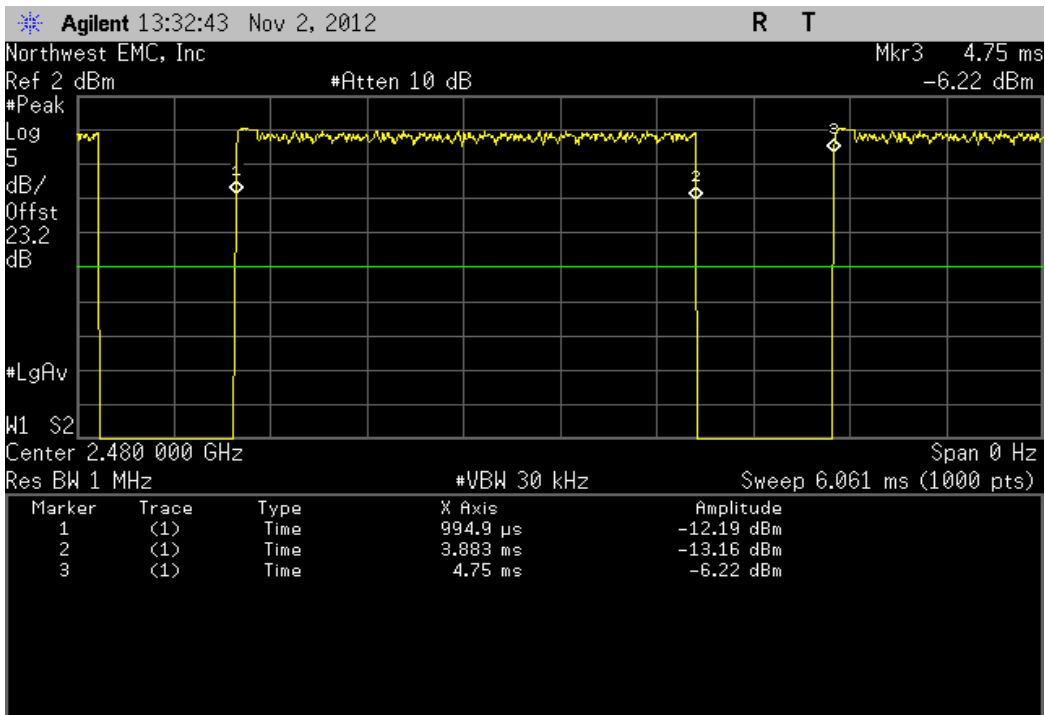
Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
2.882 mS	3.749 mS	1	76.9	N/A	N/A	



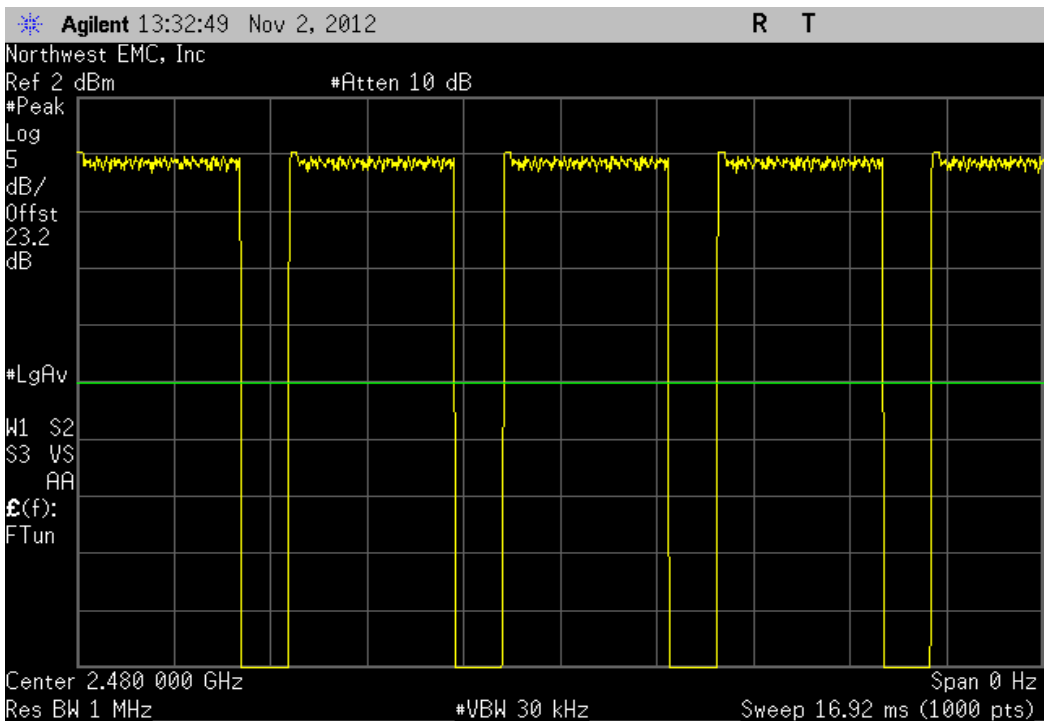
Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
2.888 mS	3.755 mS	1	76.9	N/A	N/A	



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz						
Pulse Width	Period	Number of Pulses	Value (%)	Limit	Result	
N/A	N/A	5	N/A	N/A	N/A	



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
40GHz DC Block	Miteq	DCB4000	AMD	6/25/2012	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/2/2012	12
Power Meter	Gigatronics	8651A	SPM	1/9/2012	24
MXG Vector Signal Generator	Agilent	N5182A	TIF	NCR	0
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/15/2011	12
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2012	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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.



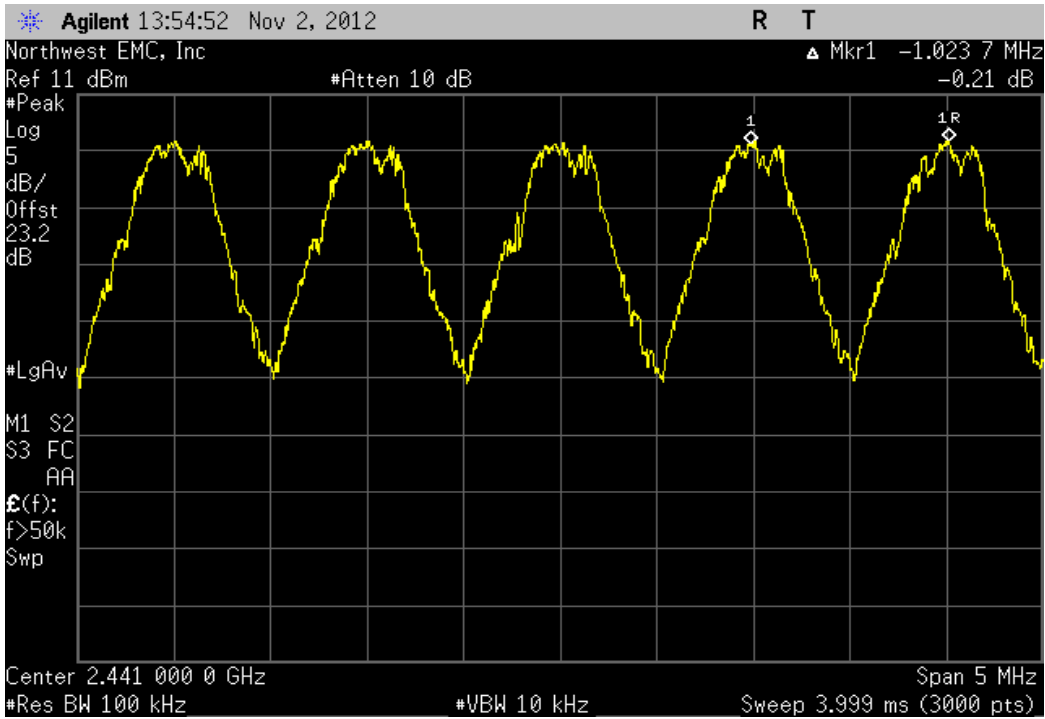
CHANNEL SPACING

XMit 2012.09.20
PsaTx 2012.09.10

EUT: 1514		Work Order: MCSO1638	
Serial Number: 000109423753		Date: 11/02/12	
Customer: Microsoft Corporation		Temperature: 22.3°C	
Attendees: None		Humidity: 52%	
Project: None		Barometric Pres.: 1013	
Tested by: Brandon Hobbs/Rod Peloquin/Sabrina Sanders		Power: 110VAC/60Hz	
		Job Site: EV06	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2012		ANSI C63.10:2009	
COMMENTS			
The EUT is operating at 100% duty cycle. All cable losses for 2.4GHz and 5.0GHz bands are accounted for in the analyzer offset calculations			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature <i>Brandon Hobbs</i>	
		Value	Limit
Hopping Mode			Result
DH5, GFSK		1.0 MHz	Pass
Mid Channel, 2441 MHz		≥ 1 MHz	

Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz

Value	Limit	Result
1.0 MHz	≥ 1 MHz	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
40GHz DC Block	Miteq	DCB4000	AMD	6/25/2012	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/2/2012	12
Power Meter	Gigatronics	8651A	SPM	1/9/2012	24
MXG Vector Signal Generator	Agilent	N5182A	TIF	NCR	0
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/15/2011	12
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2012	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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: 1514	Work Order: MCSO1638
Serial Number: 000109423753	Date: 11/02/12
Customer: Microsoft Corporation	Temperature: 22.3°C
Attendees: None	Humidity: 52%
Project: None	Barometric Pres.: 1013
Tested by: Brandon Hobbs/Rod Peloquin/Sabrina Sanders	Power: 110VAC/60Hz
	Job Site: EV06
TEST SPECIFICATIONS	Test Method
FCC 15.247:2012	ANSI C63.10:2009

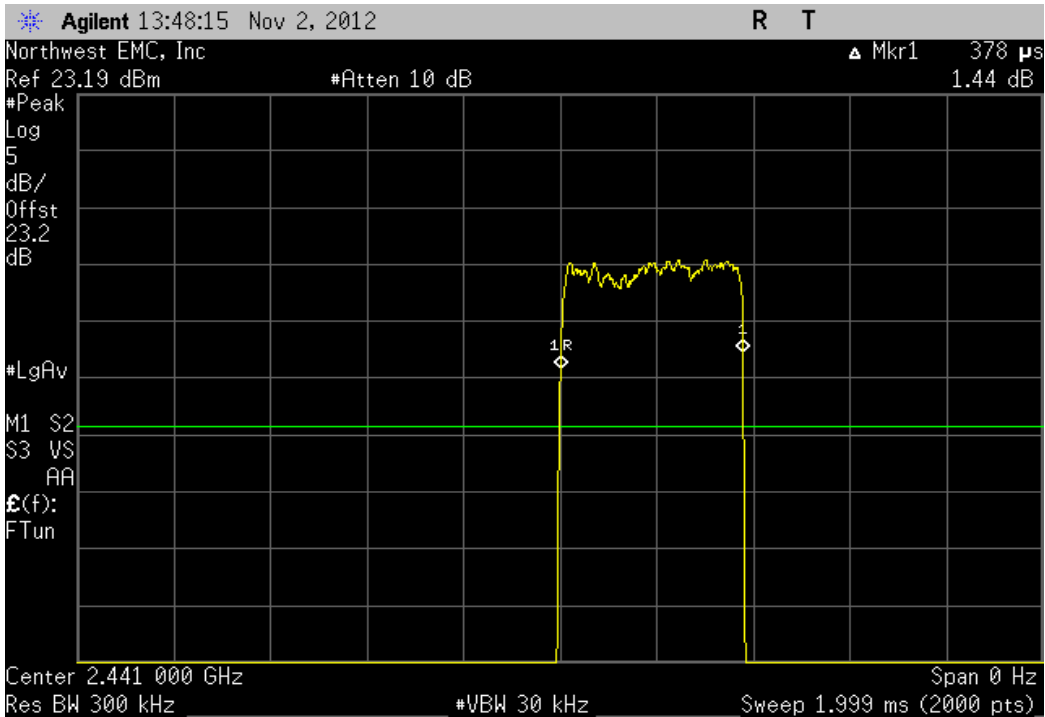
COMMENTS
All cable losses for 2.4GHz and 5.0GHz bands are accounted for in the analyzer offset calculations

DEVIATIONS FROM TEST STANDARD
None

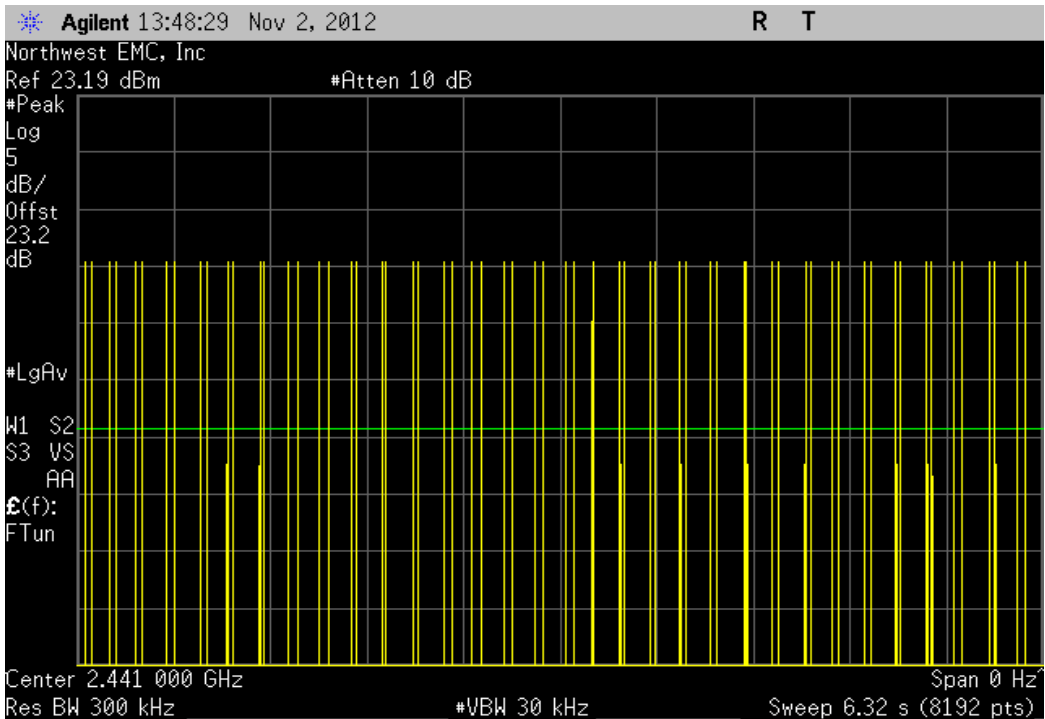
Configuration # 1
Signature *Brandon Hobbs*

	Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
Hopping Mode							
DH5, GFSK							
Mid Channel, 2441 MHz	0.378	N/A	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	64	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	64	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	64	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	64	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	0.378	N/A	64	5	120.96	400	Pass
2DH5, pi/4-DQPSK							
Mid Channel, 2441 MHz	2.883	N/A	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	22	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	23	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	23	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	20	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	2.883	N/A	22	5	317.13	400	Pass
3DH5, 8-DPSK							
Mid Channel, 2441 MHz	0.905	N/A	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	22	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	22	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	26	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	N/A	21	N/A	N/A	N/A	N/A	N/A
Mid Channel, 2441 MHz	0.905	N/A	22.75	5	102.94375	400	Pass

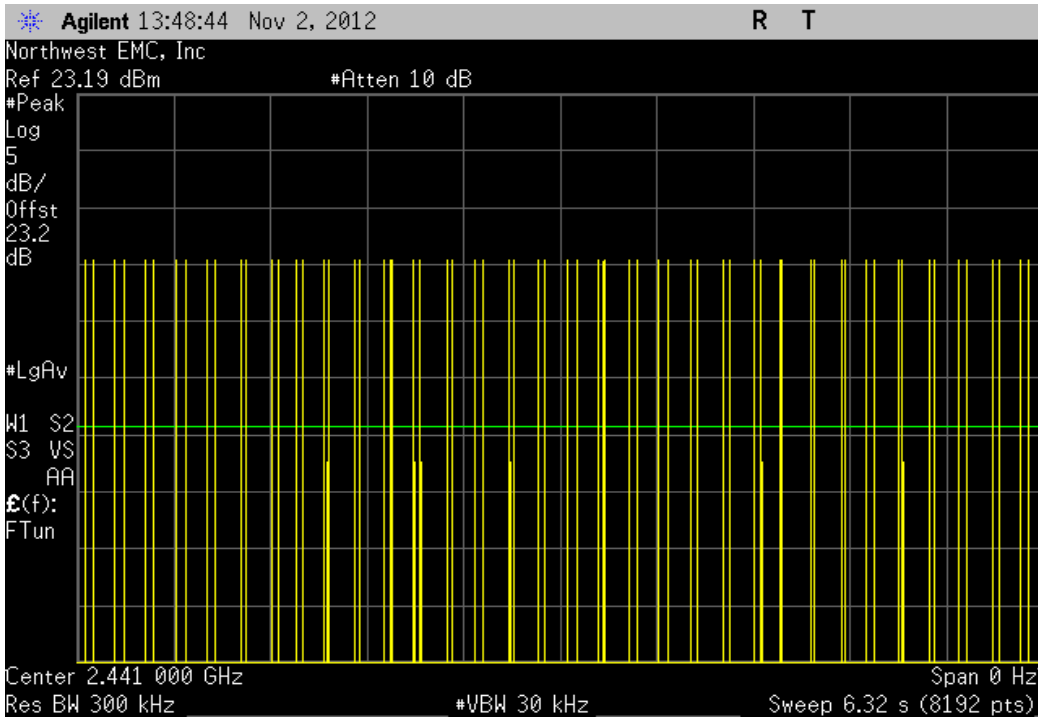
Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
0.378	N/A	N/A	N/A	N/A	N/A	N/A



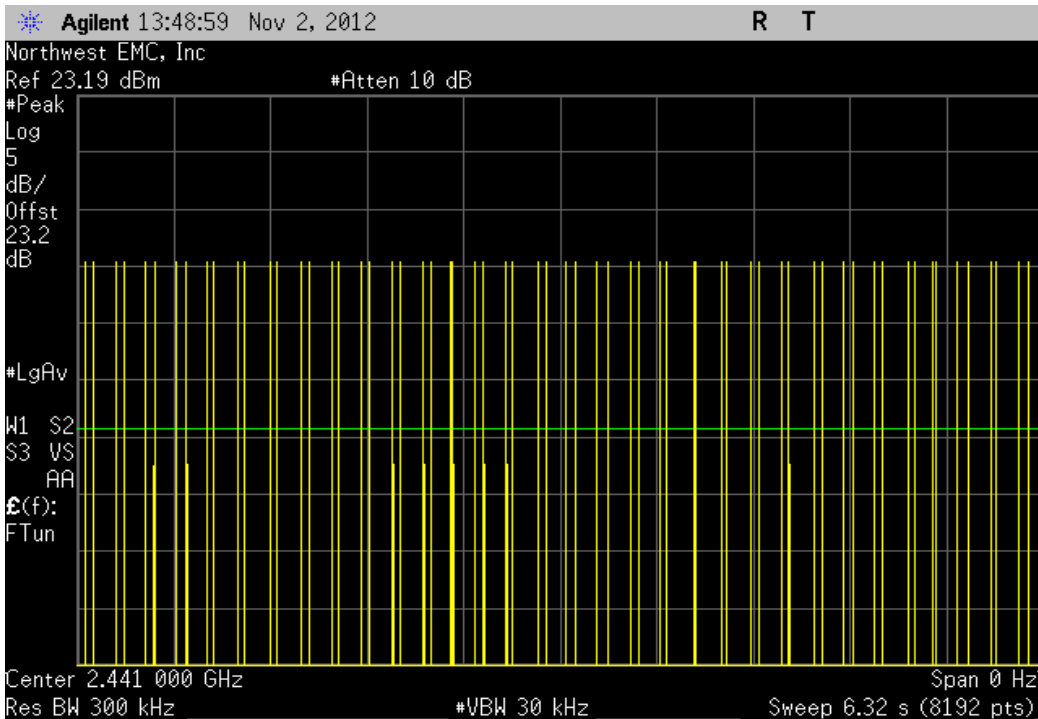
Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	64	N/A	N/A	N/A	N/A	N/A



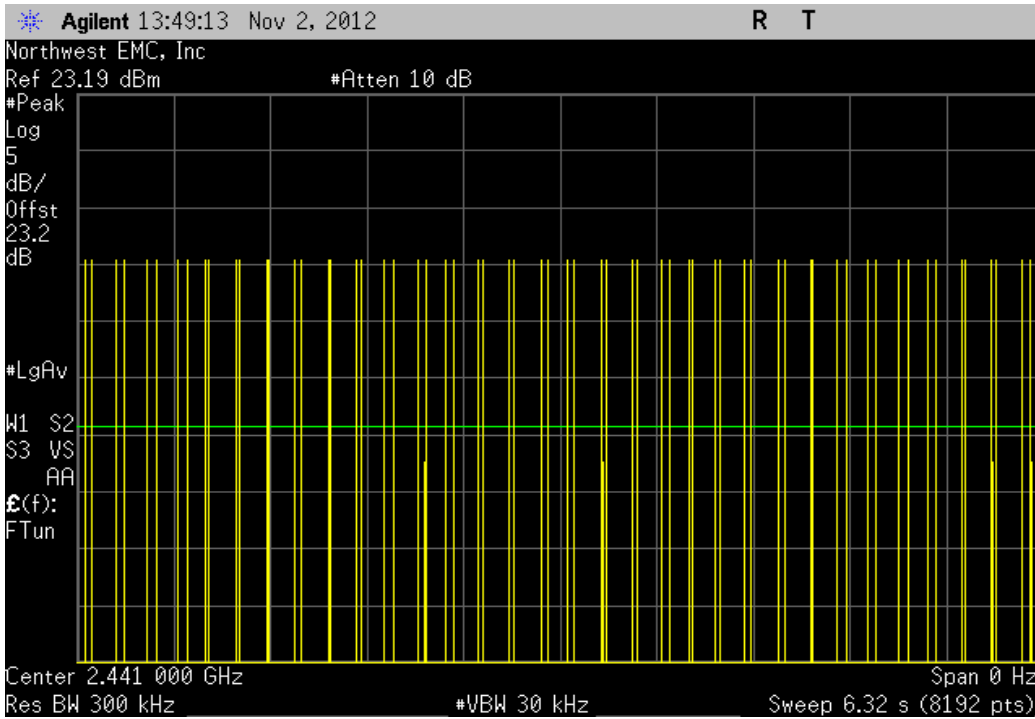
Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	64	N/A	N/A	N/A	N/A	N/A



Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	64	N/A	N/A	N/A	N/A	N/A



Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	64	N/A	N/A	N/A	N/A	N/A

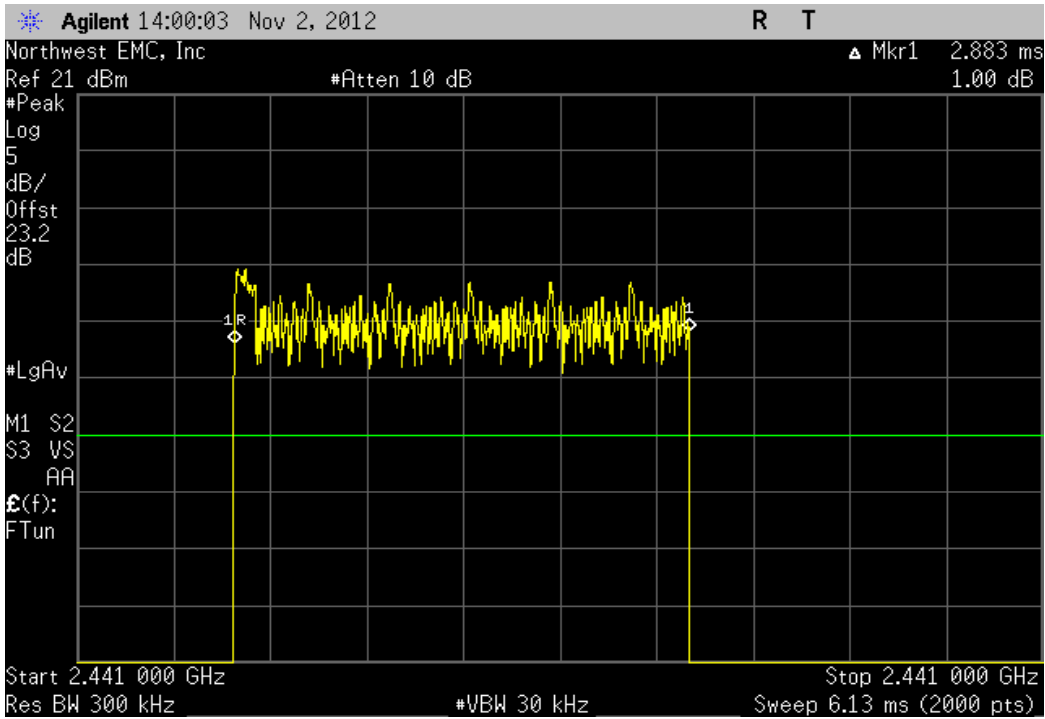


Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
0.378	N/A	64	5	120.96	400	Pass

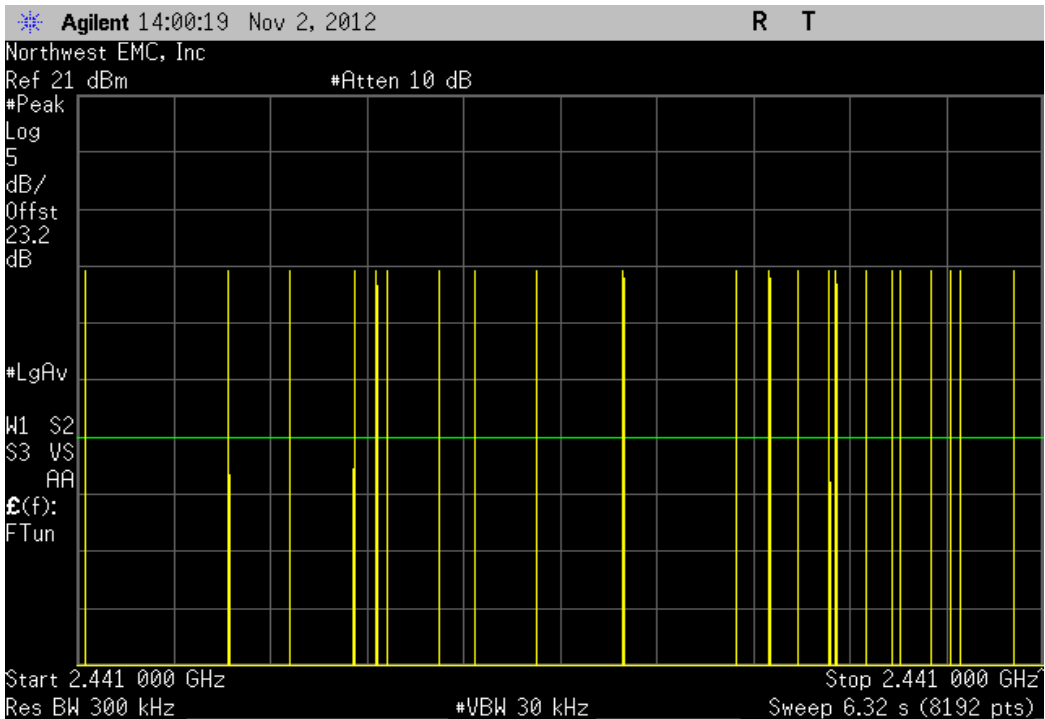
Calculation Only

No Screen Capture Required

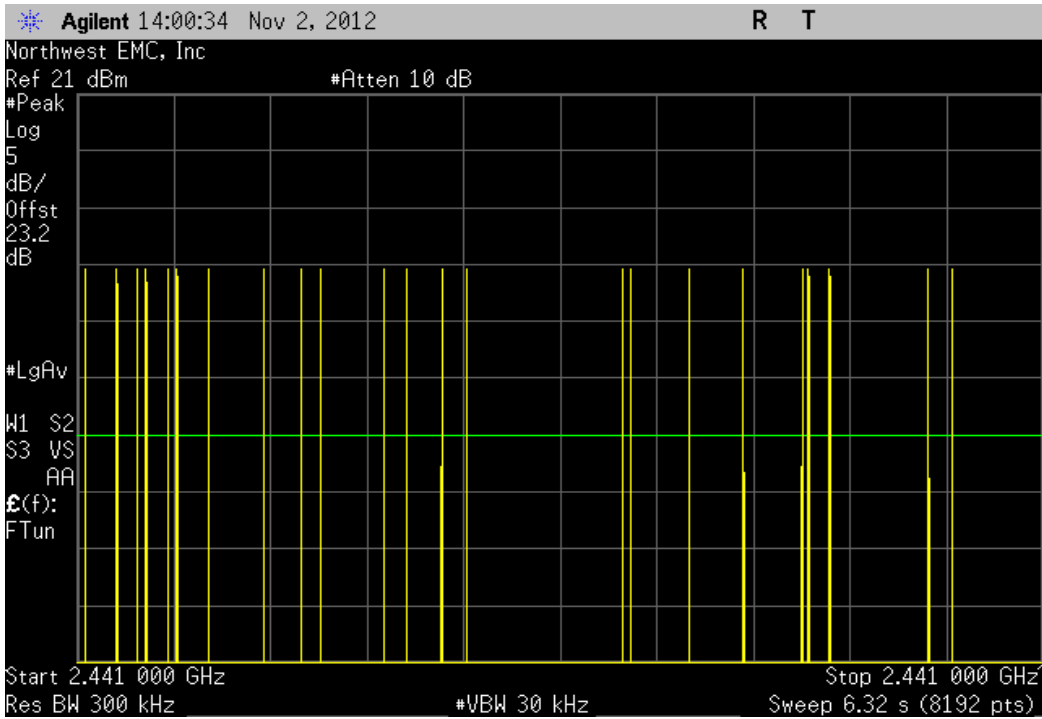
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
2.883	N/A	N/A	N/A	N/A	N/A	N/A



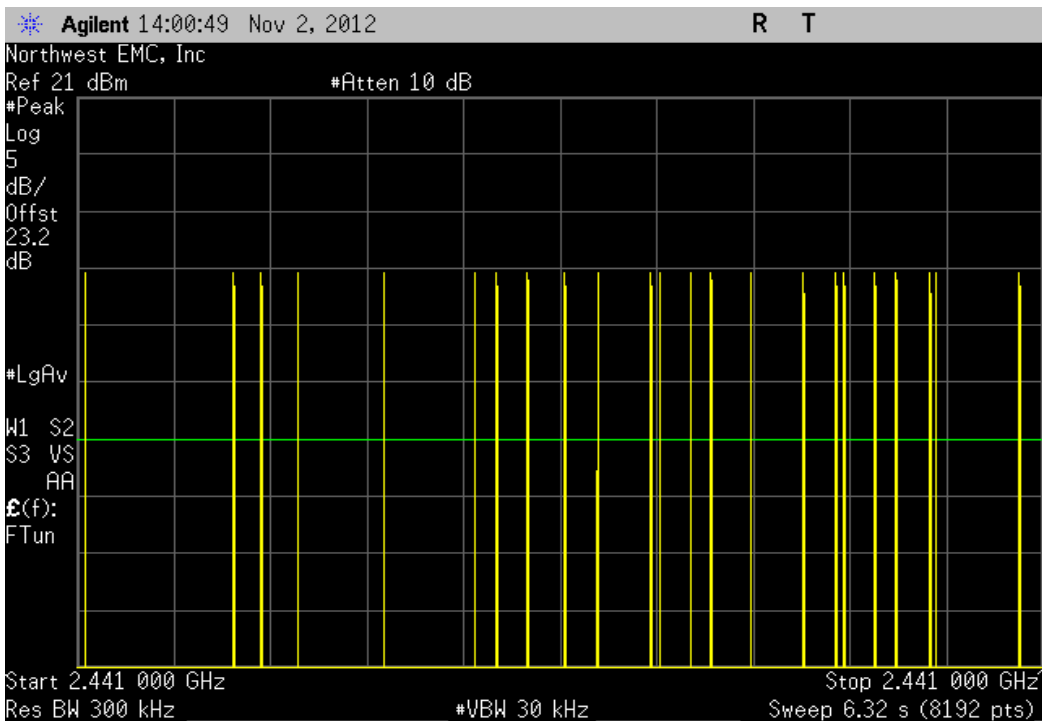
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	22	N/A	N/A	N/A	N/A	N/A



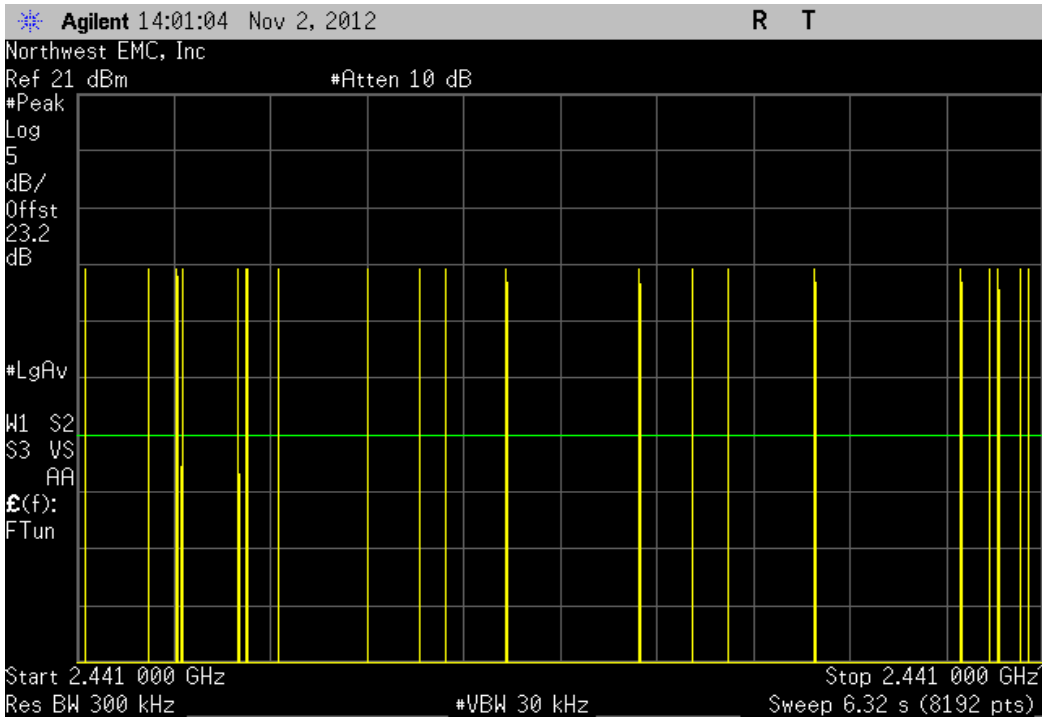
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	23	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	23	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	20	N/A	N/A	N/A	N/A	N/A

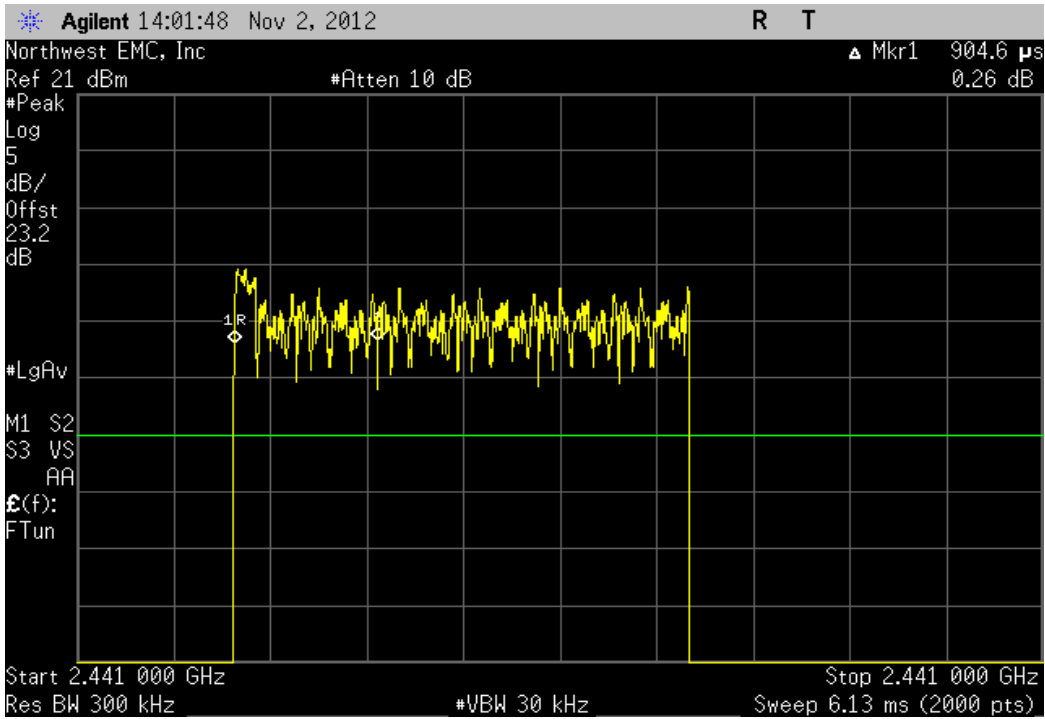


Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
2.883	N/A	22	5	317.13	400	Pass

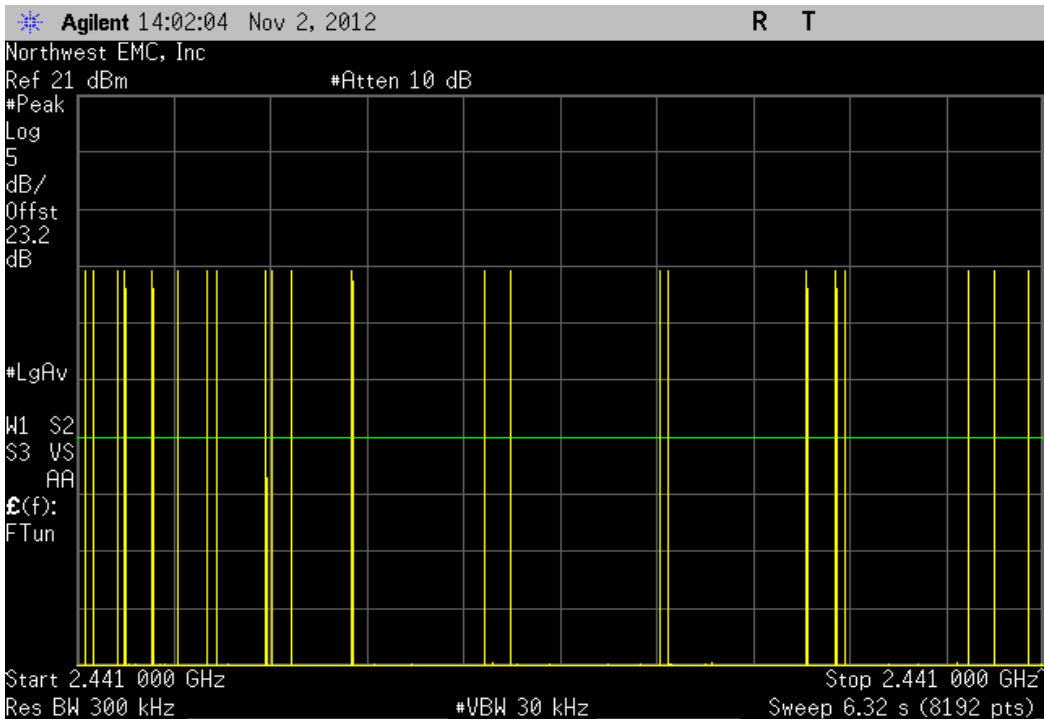
Calculation Only

No Screen Capture Required

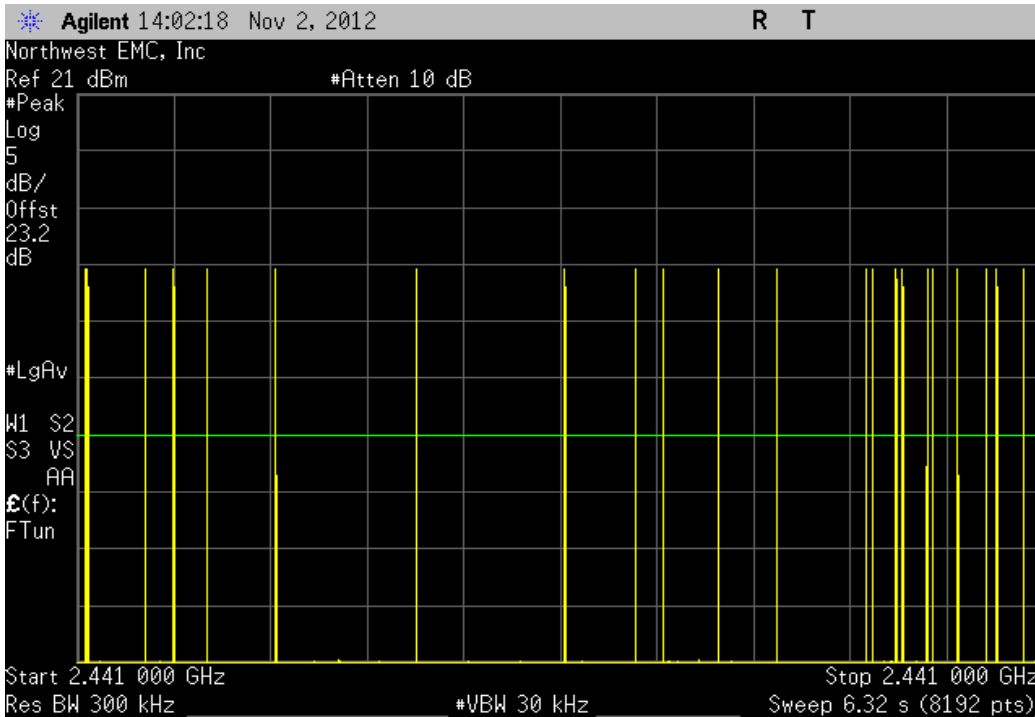
Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
0.905	N/A	N/A	N/A	N/A	N/A	N/A



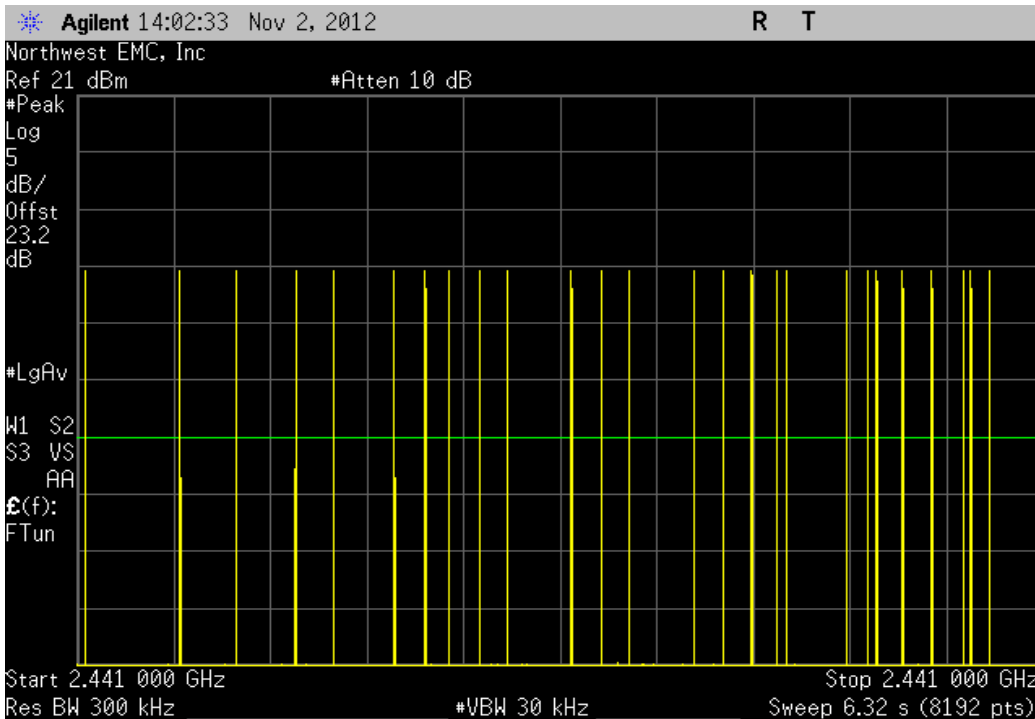
Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	22	N/A	N/A	N/A	N/A	N/A



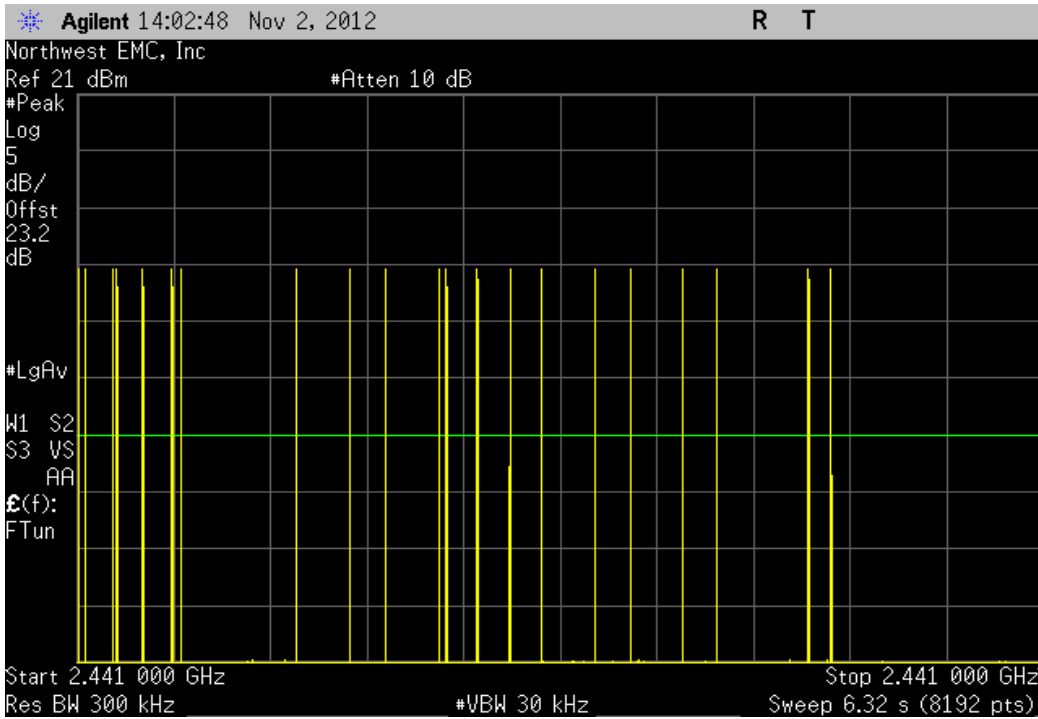
Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	22	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	26	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
N/A	21	N/A	N/A	N/A	N/A	N/A



Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz						
Pulse Width (mS)	Number of Pulses	Average No. of Pulses	Scale Factor	On Time (mS) During 31.6 S	Limit (mS)	Result
0.905	N/A	22.75	5	102.94375	400	Pass

Calculation Only

No Screen Capture Required

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
40GHz DC Block	Miteq	DCB4000	AMD	6/25/2012	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/2/2012	12
Power Meter	Gigatronics	8651A	SPM	1/9/2012	24
MXG Vector Signal Generator	Agilent	N5182A	TIF	NCR	0
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/15/2011	12
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2012	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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.

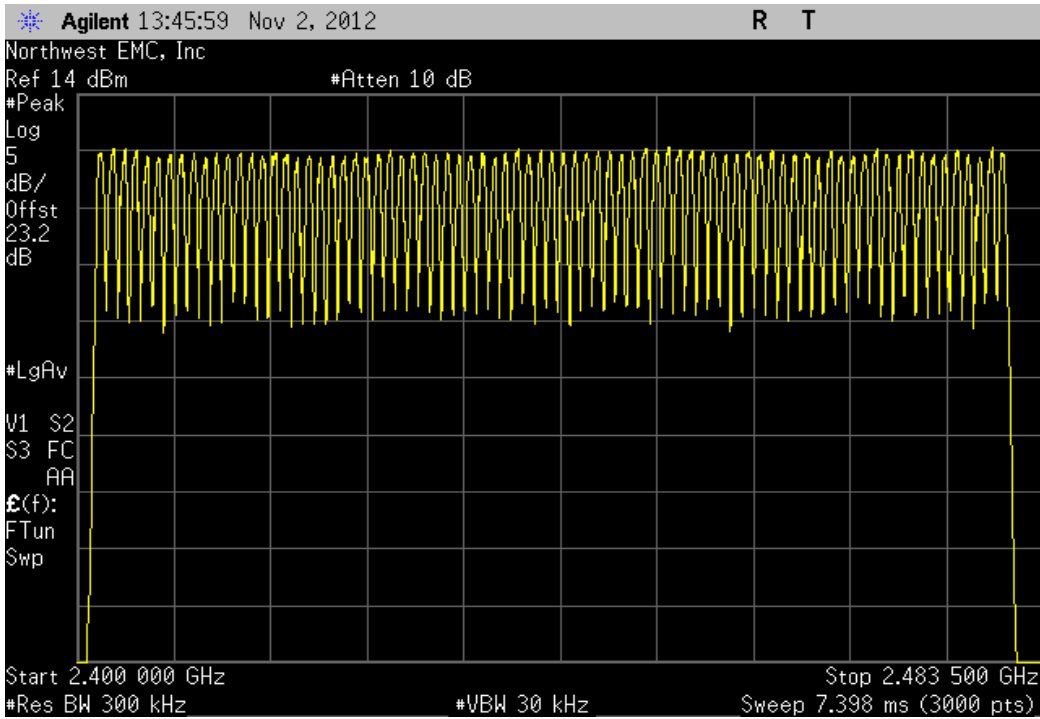


NUMBER OF HOPPING FREQUENCIES

XMit 2012.09.20
PsaTx 2012.09.10

EUT: 1514		Work Order: MCSO1638	
Serial Number: 000109423753		Date: 11/02/12	
Customer: Microsoft Corporation		Temperature: 22.3°C	
Attendees: None		Humidity: 52%	
Project: None		Barometric Pres.: 1013	
Tested by: Brandon Hobbs/Rod Peloquin/Sabrina Sanders		Power: 110VAC/60Hz	
		Job Site: EV06	
TEST SPECIFICATIONS		Test Method	
FCC 15.247:2012		ANSI C63.10:2009	
COMMENTS			
All cable losses for 2.4GHz and 5.0GHz bands are accounted for in the analyzer offset calculations			
DEVIATIONS FROM TEST STANDARD			
None			
Configuration #	1	Signature <i>Brandon Hobbs</i>	
		Number of Channels	Limit
Hopping Mode			Result
DH5, GFSK		79	≥ 15
Mid Channel, 2441 MHz			Pass

Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz			
	Number of Channels	Limit	Result
	79	≥ 15	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
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
40GHz DC Block	Miteq	DCB4000	AMD	6/25/2012	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/2/2012	12
Power Meter	Gigatronics	8651A	SPM	1/9/2012	24
MXG Vector Signal Generator	Agilent	N5182A	TIF	NCR	0
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/15/2011	12
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2012	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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

XMit 2012.09.20
PsaTx 2012.09.10

EUT: 1514	Work Order: MCSO1638
Serial Number: 000109423753	Date: 11/02/12
Customer: Microsoft Corporation	Temperature: 22.3°C
Attendees: None	Humidity: 52%
Project: None	Barometric Pres.: 1013
Tested by: Brandon Hobbs/Rod Peloquin/Sabrina Sanders	Power: 110VAC/60Hz
	Job Site: EV06
TEST SPECIFICATIONS	
FCC 15.247:2012	ANSI C63.10:2009

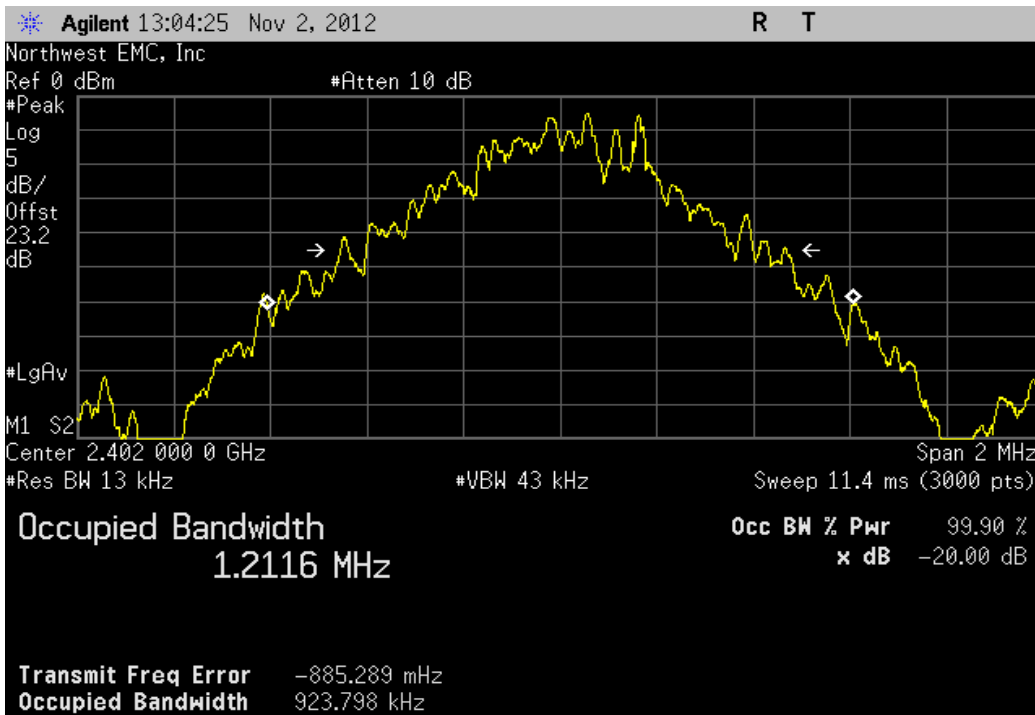
COMMENTS
All cable losses for 2.4GHz and 5.0GHz bands are accounted for in the analyzer offset calculations

DEVIATIONS FROM TEST STANDARD
None

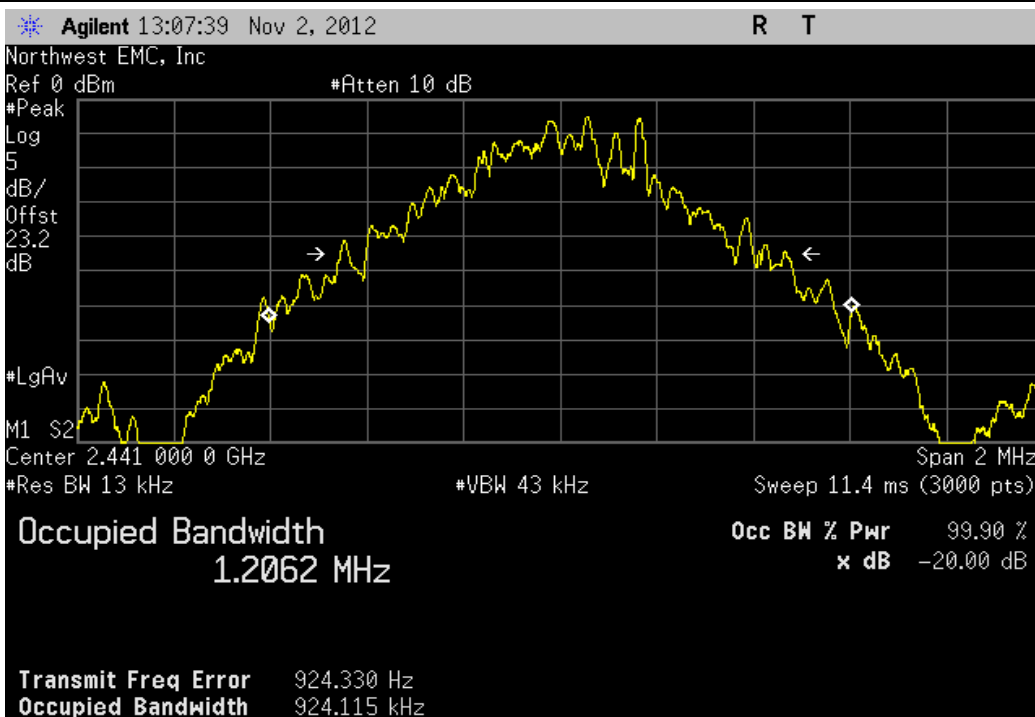
Configuration #	1	Signature <i>Brandon Hobbs</i>
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	Value	Limit	Result
Hopping Mode			
DH5, GFSK			
Low Channel, 2402 MHz	923.798 kHz	< 1.5 MHz	Pass
Mid Channel, 2441 MHz	924.116 kHz	< 1.5 MHz	Pass
High Channel, 2480 MHz	923.684 kHz	< 1.5 MHz	Pass
2DH5, pi/4-DQPSK			
Low Channel, 2402 MHz	1.323 MHz	< 1.5 MHz	Pass
Mid Channel, 2441 MHz	1.329 MHz	< 1.5 MHz	Pass
High Channel, 2480 MHz	1.33 MHz	< 1.5 MHz	Pass
3DH5, 8-DPSK			
Low Channel, 2402 MHz	1.329 MHz	< 1.5 MHz	Pass
Mid Channel, 2441 MHz	1.267 MHz	< 1.5 MHz	Pass
High Channel, 2480 MHz	1.274 MHz	< 1.5 MHz	Pass

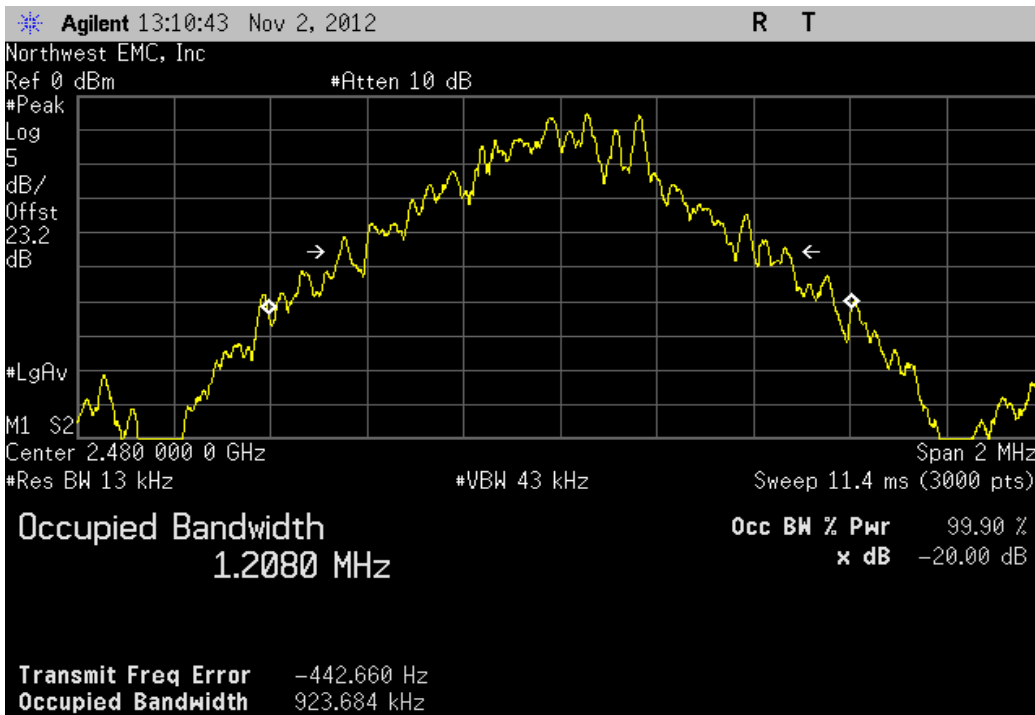
Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	923.798 kHz	< 1.5 MHz	Pass



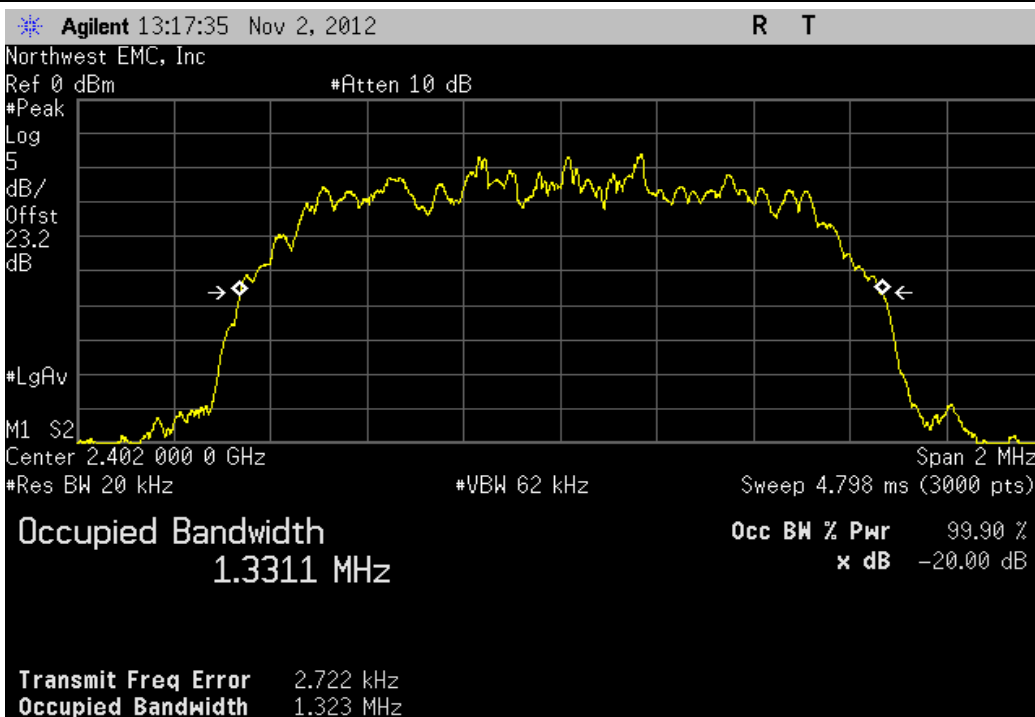
Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz			
	Value	Limit	Result
	924.116 kHz	< 1.5 MHz	Pass



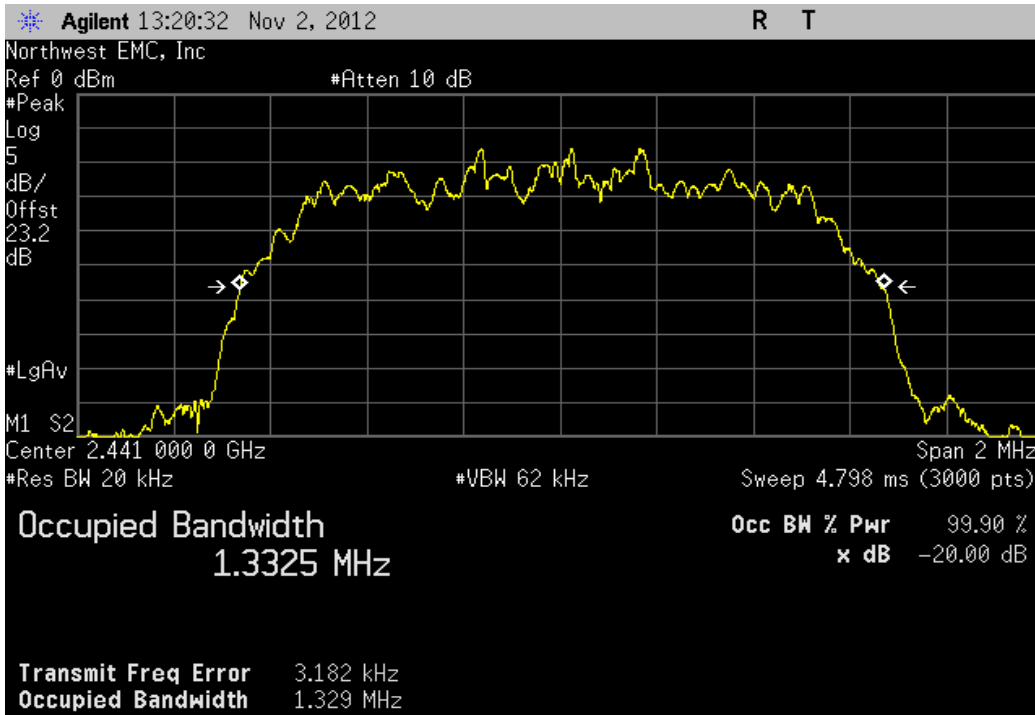
Hopping Mode, DH5, GFSK, High Channel, 2480 MHz			
	Value	Limit	Result
	923.684 kHz	< 1.5 MHz	Pass



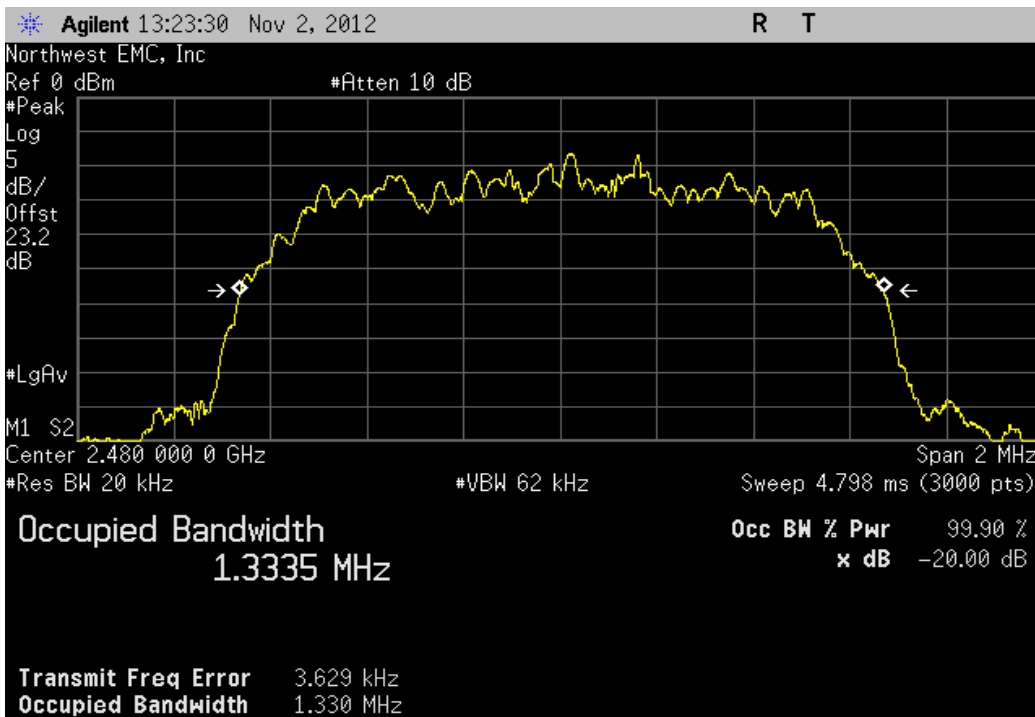
Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	1.323 MHz	< 1.5 MHz	Pass



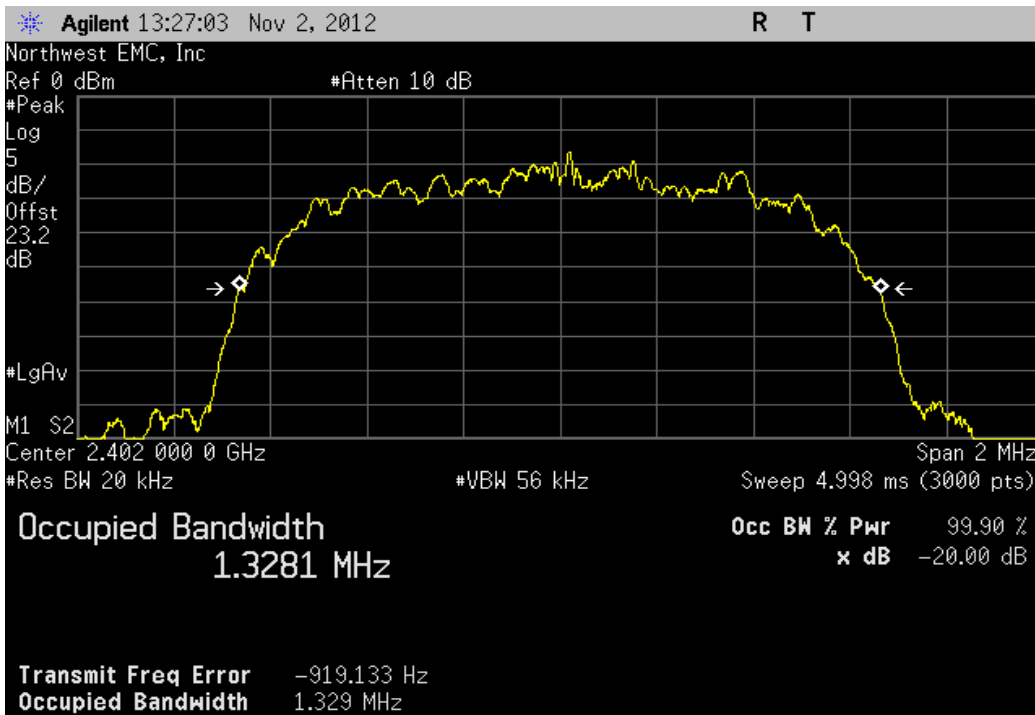
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz			
	Value	Limit	Result
	1.329 MHz	< 1.5 MHz	Pass



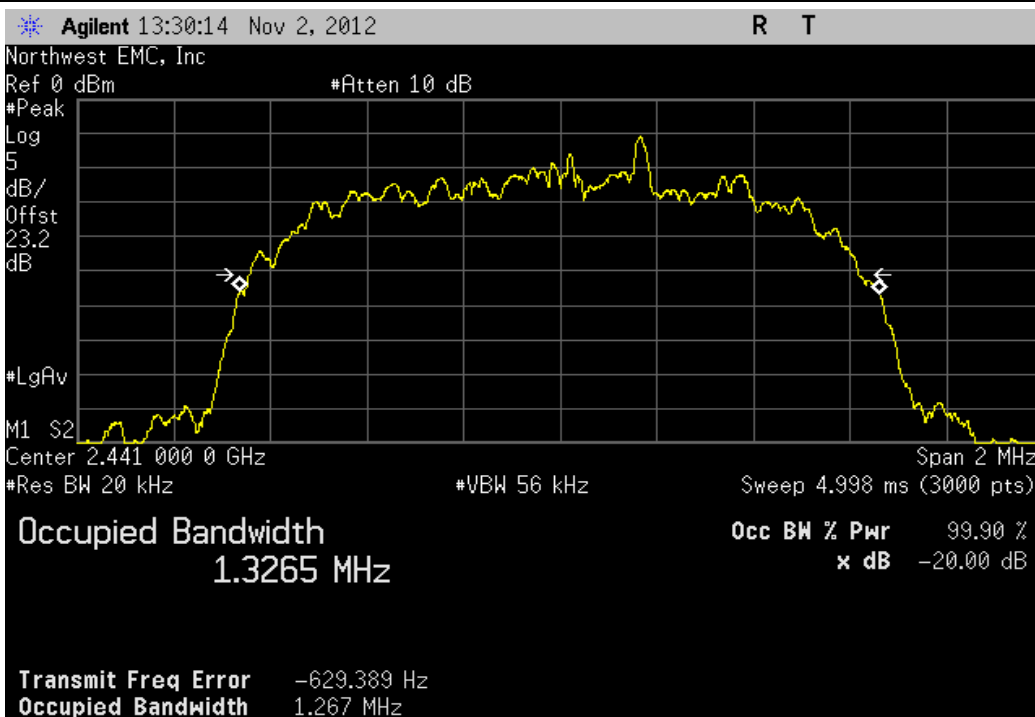
Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz			
	Value	Limit	Result
	1.33 MHz	< 1.5 MHz	Pass



Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	1.329 MHz	< 1.5 MHz	Pass

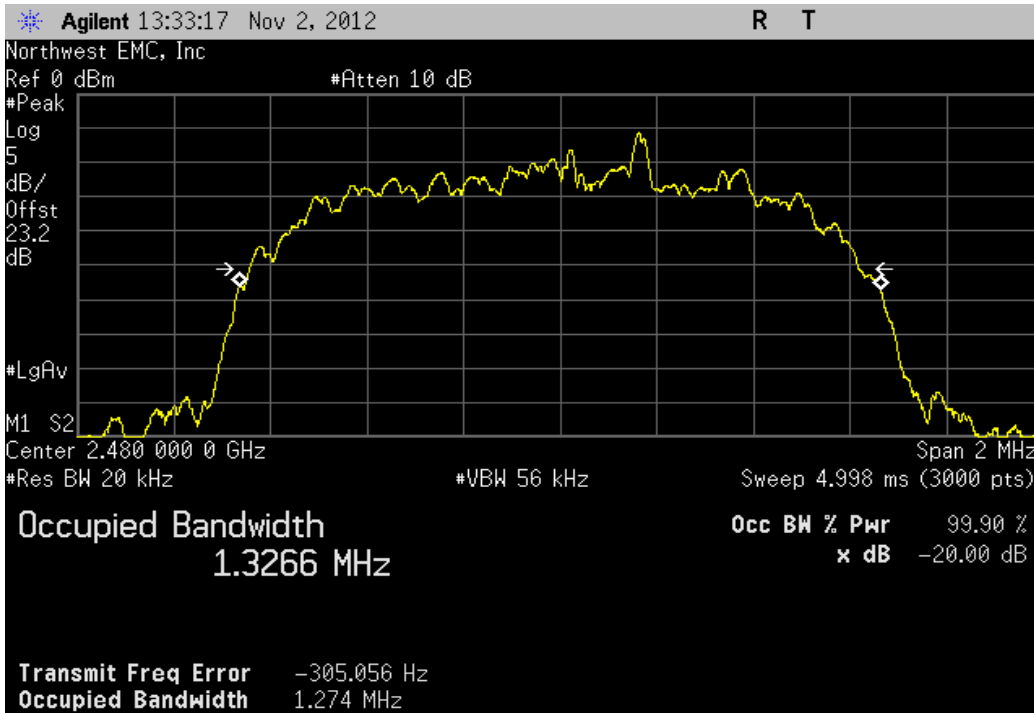


Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz			
	Value	Limit	Result
	1.267 MHz	< 1.5 MHz	Pass



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz

	Value	Limit	Result
	1.274 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

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Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/2/2012	12
Power Meter	Gigatronics	8651A	SPM	1/9/2012	24
MXG Vector Signal Generator	Agilent	N5182A	TIF	NCR	0
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/15/2011	12
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2012	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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

XMit 2012.09.20
PsaTx 2012.09.10

EUT: 1514	Work Order: MCSO1638
Serial Number: 000109423753	Date: 11/02/12
Customer: Microsoft Corporation	Temperature: 22.3°C
Attendees: None	Humidity: 52%
Project: None	Barometric Pres.: 1013
Tested by: Brandon Hobbs/Rod Peloquin/Sabrina Sanders	Power: 110VAC/60Hz
	Job Site: EV06
TEST SPECIFICATIONS	
FCC 15.247:2012	ANSI C63.10:2009

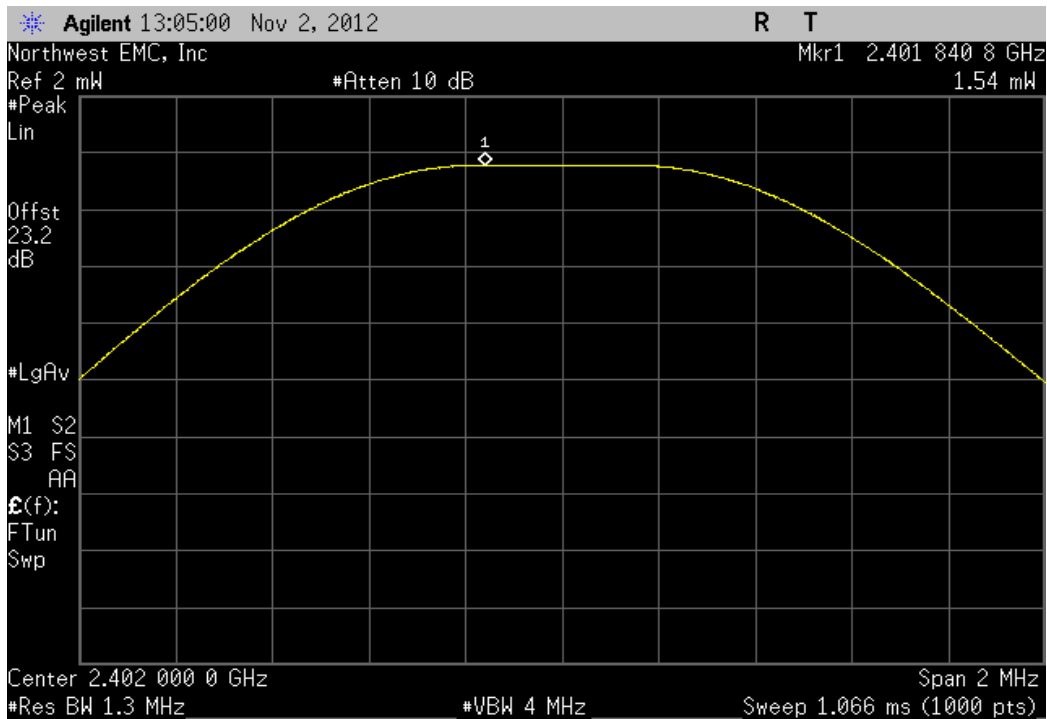
COMMENTS
All cable losses for 2.4GHz and 5.0GHz bands are accounted for in the analyzer offset calculations

DEVIATIONS FROM TEST STANDARD
None

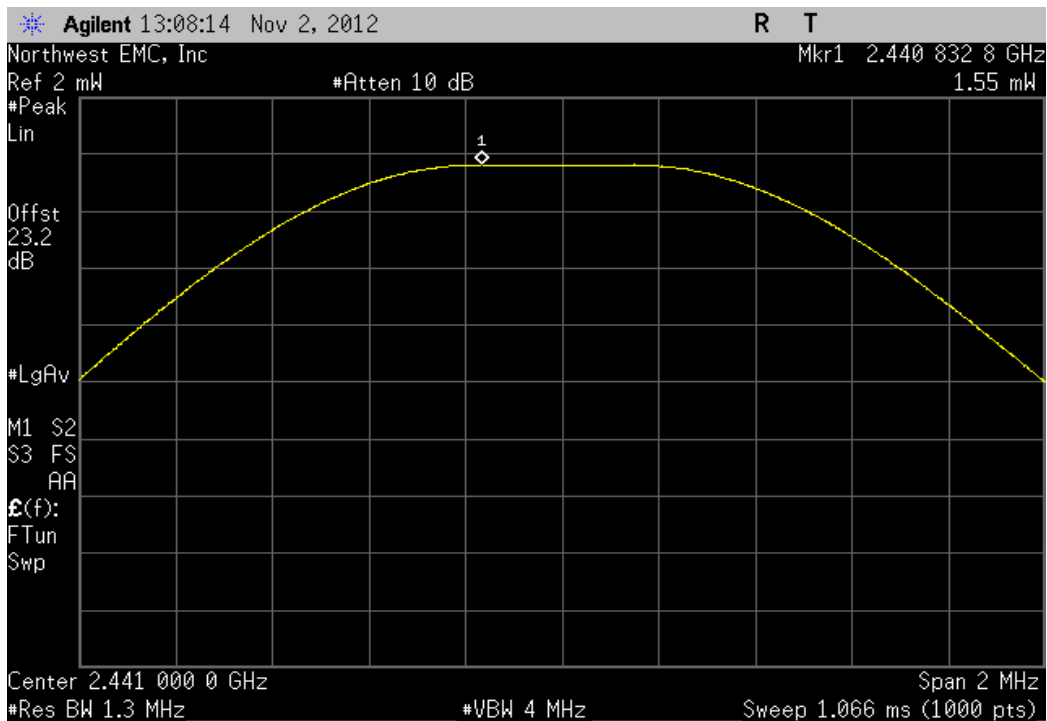
Configuration #	1	Signature <i>Brandon Hobbs</i>
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		Value	Limit	Result
Hopping Mode				
DH5, GFSK				
	Low Channel, 2402 MHz	1.543 mW	< 125 mW	Pass
	Mid Channel, 2441 MHz	1.555 mW	< 125 mW	Pass
	High Channel, 2480 MHz	1.532 mW	< 125 mW	Pass
2DH5, pi/4-DQPSK				
	Low Channel, 2402 MHz	919.602 uW	< 125 mW	Pass
	Mid Channel, 2441 MHz	919.39 uW	< 125 mW	Pass
	High Channel, 2480 MHz	905.316 uW	< 125 mW	Pass
3DH5, 8-DPSK				
	Low Channel, 2402 MHz	1.023 mW	< 125 mW	Pass
	Mid Channel, 2441 MHz	1.023 mW	< 125 mW	Pass
	High Channel, 2480 MHz	1.008 mW	< 125 mW	Pass

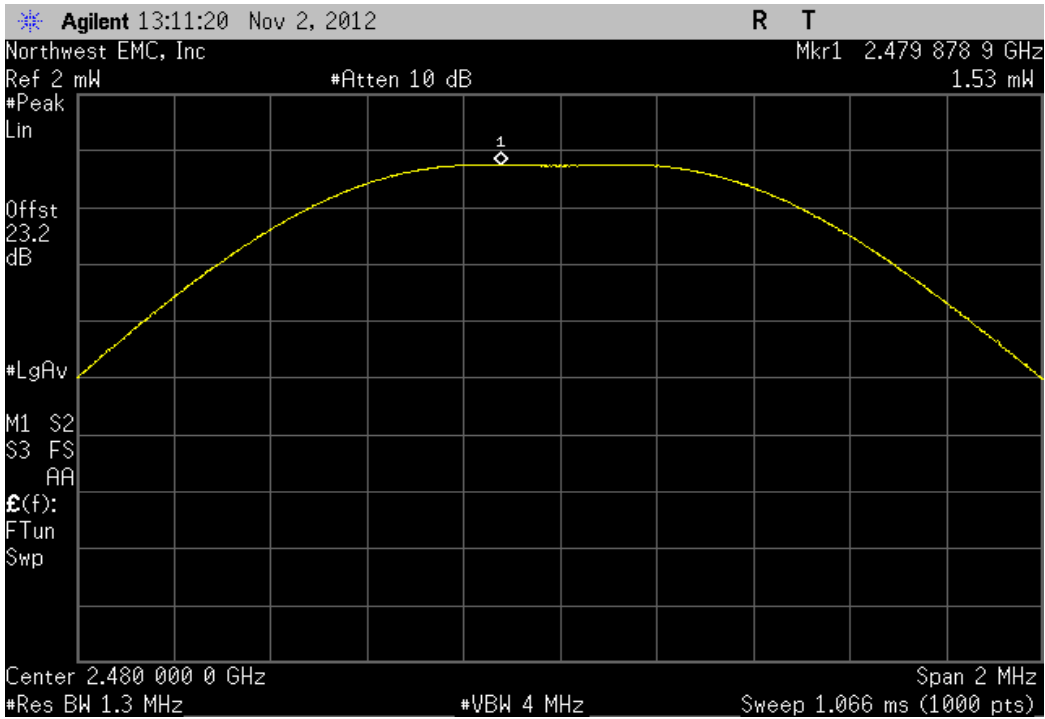
Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	1.543 mW	< 125 mW	Pass



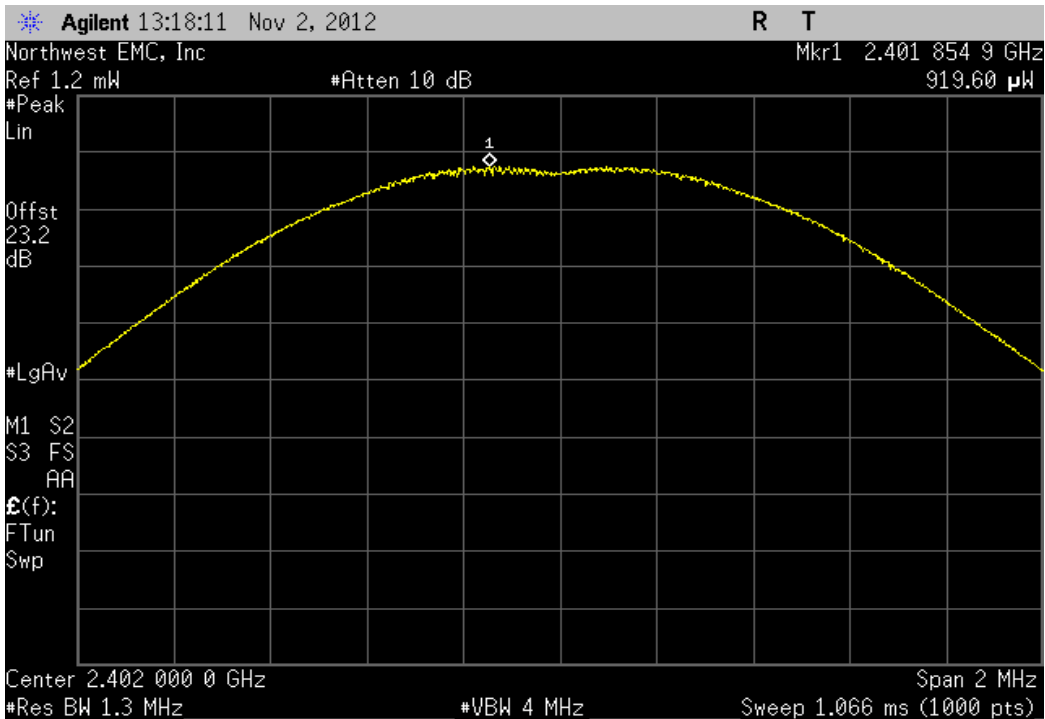
Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz			
	Value	Limit	Result
	1.555 mW	< 125 mW	Pass



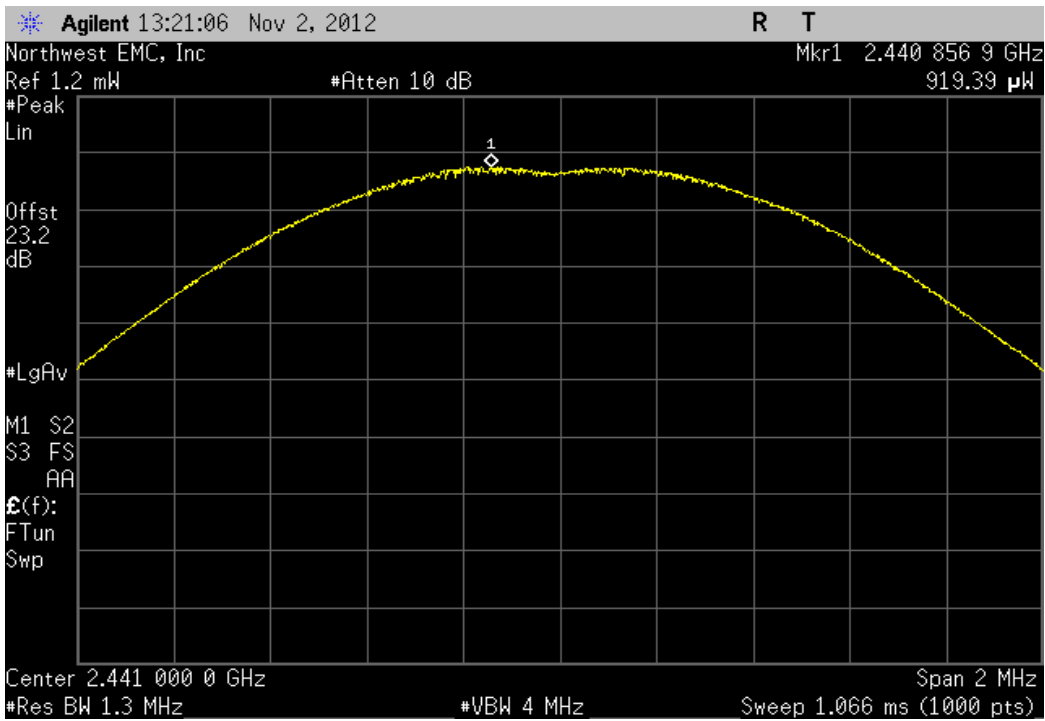
Hopping Mode, DH5, GFSK, High Channel, 2480 MHz			
	Value	Limit	Result
	1.532 mW	< 125 mW	Pass



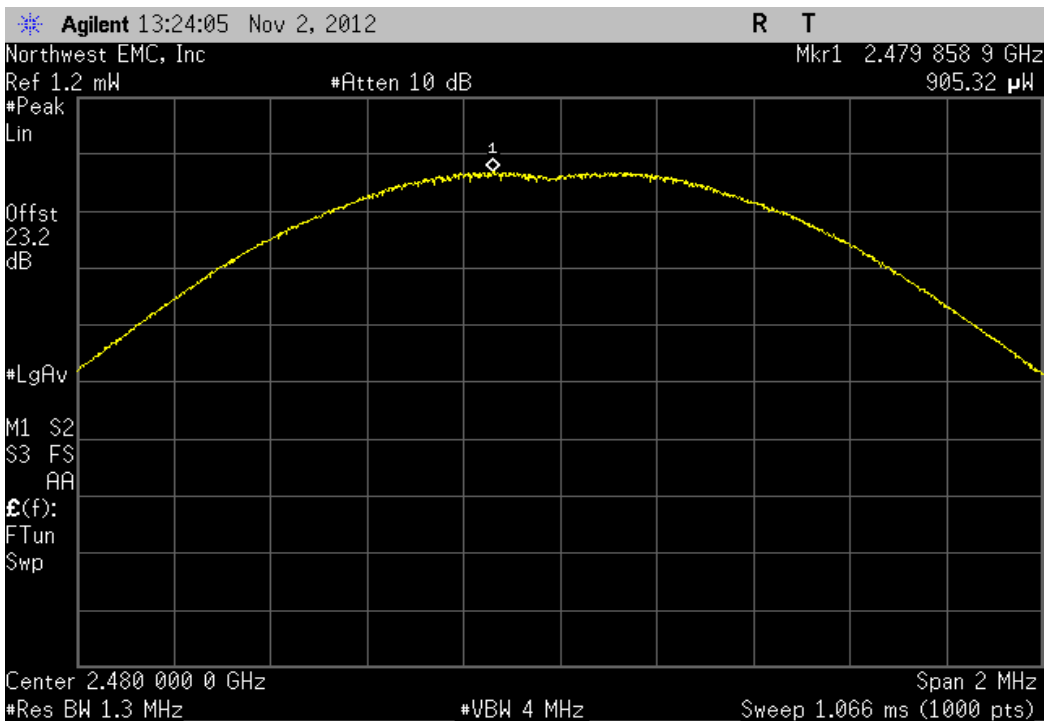
Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	919.602 uW	< 125 mW	Pass



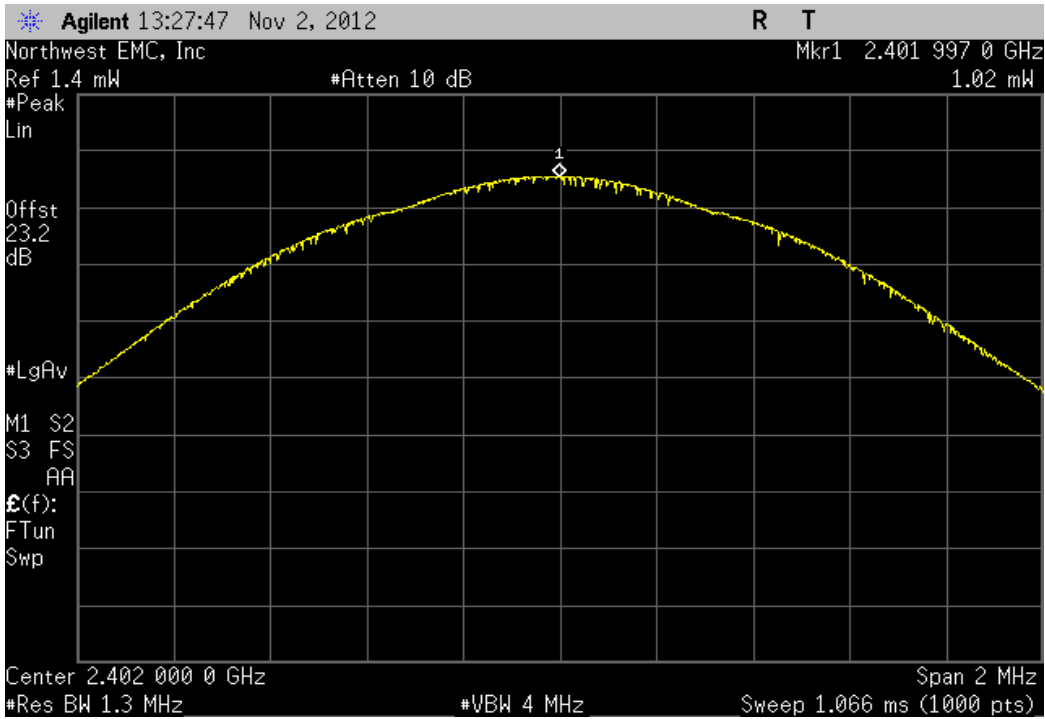
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz			
	Value	Limit	Result
	919.39 uW	< 125 mW	Pass



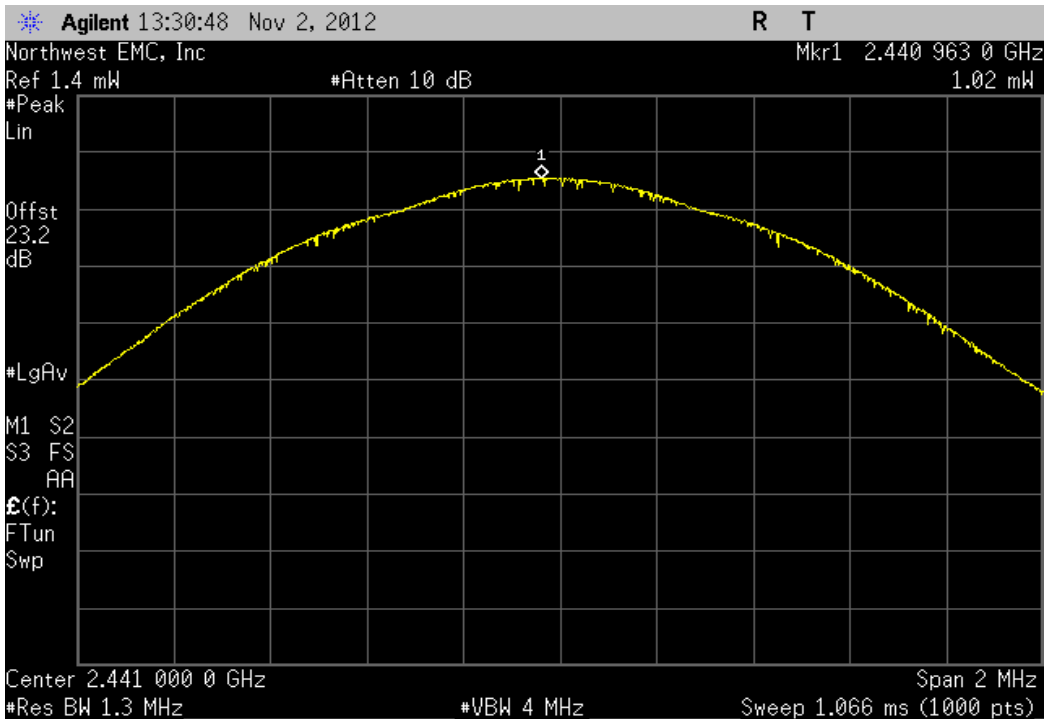
Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz			
	Value	Limit	Result
	905.316 uW	< 125 mW	Pass



Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	1.023 mW	< 125 mW	Pass

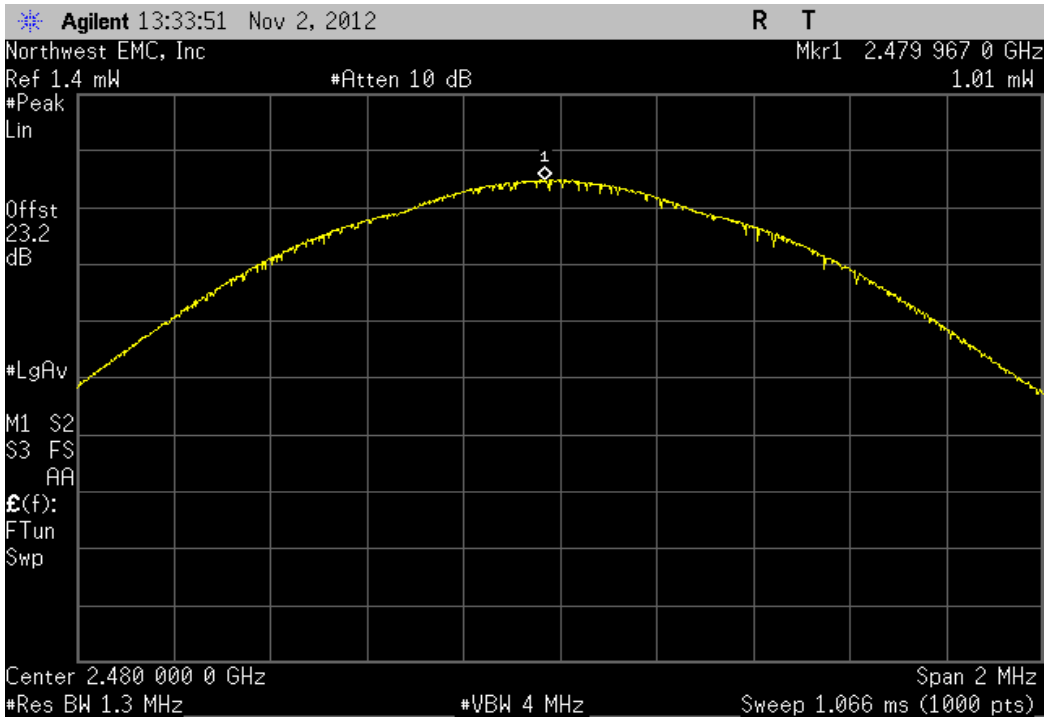


Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz			
	Value	Limit	Result
	1.023 mW	< 125 mW	Pass



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz

	Value	Limit	Result
	1.008 mW	< 125 mW	Pass



BAND EDGE COMPLIANCE

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
40GHz DC Block	Miteq	DCB4000	AMD	6/25/2012	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/2/2012	12
Power Meter	Gigatronics	8651A	SPM	1/9/2012	24
MXG Vector Signal Generator	Agilent	N5182A	TIF	NCR	0
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/15/2011	12
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2012	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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.

The power levels for the EUT are as follows:

2.4GHz, 20MHz bandwidth = 16dBm

2.4GHz, 40MHz bandwidth = 12dBm

5.0GHz, 20/40MHz bandwidth = 13dBm



BAND EDGE COMPLIANCE

XMit 2012.09.20
PsaTx 2012.09.10

EUT: 1514	Work Order: MCSO1638
Serial Number: 000109423753	Date: 11/05/12
Customer: Microsoft Corporation	Temperature: 22.3°C
Attendees: None	Humidity: 52%
Project: None	Barometric Pres.: 1013
Tested by: Brandon Hobbs/Rod Peloquin	Power: 110VAC/60Hz
	Job Site: EV06
TEST SPECIFICATIONS	
FCC 15.247:2012	ANSI C63.10:2009

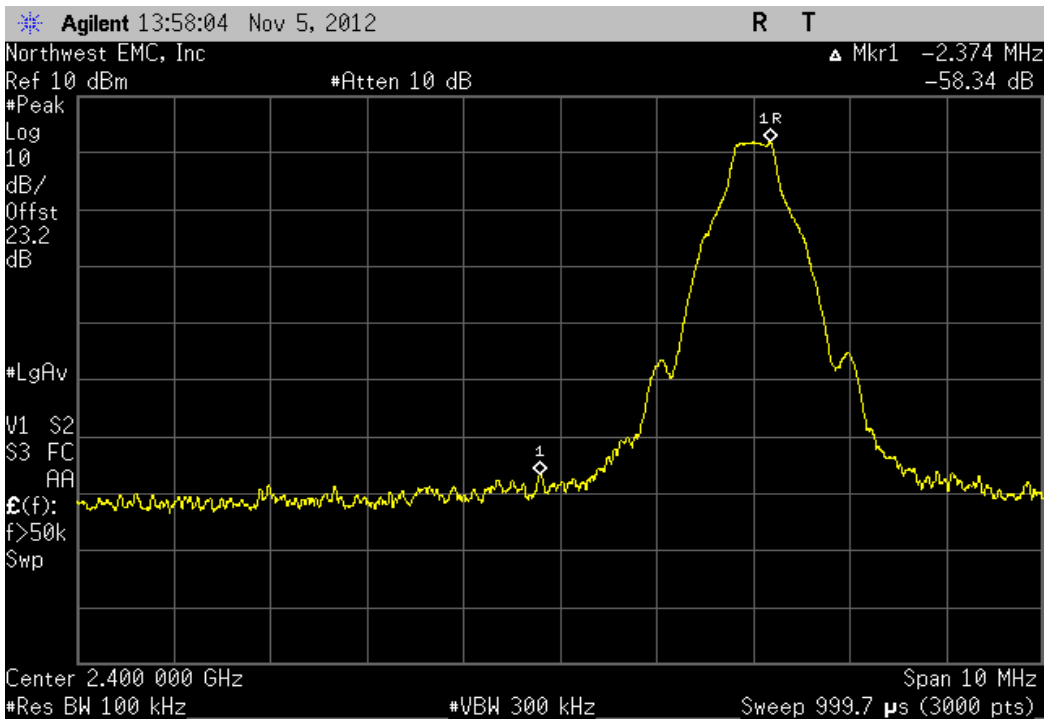
COMMENTS
All cable losses for 2.4GHz and 5.0GHz bands are accounted for in the analyzer offset calculations

DEVIATIONS FROM TEST STANDARD
None

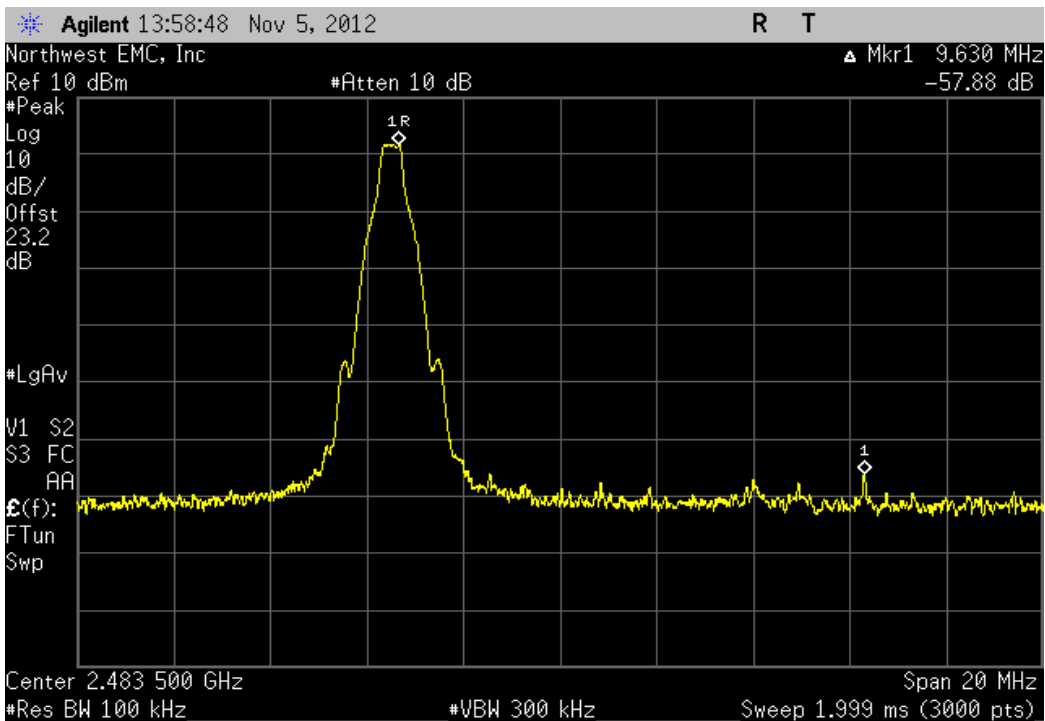
Configuration #	1	Signature <i>Brandon Hobbs</i>
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		Value	Limit	Result
Hopping Mode				
DH5, GFSK	Low Channel, 2402 MHz	-58.34 dBc	≤ -20 dBc	Pass
	High Channel, 2480 MHz	-57.88 dBc	≤ -20 dBc	Pass
2DH5, pi/4-DQPSK	Low Channel, 2402 MHz	-49.62 dBc	≤ -20 dBc	Pass
	High Channel, 2480 MHz	-56.87 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK	Low Channel, 2402 MHz	-48.28 dBc	≤ -20 dBc	Pass
	High Channel, 2480 MHz	-53.75 dBc	≤ -20 dBc	Pass

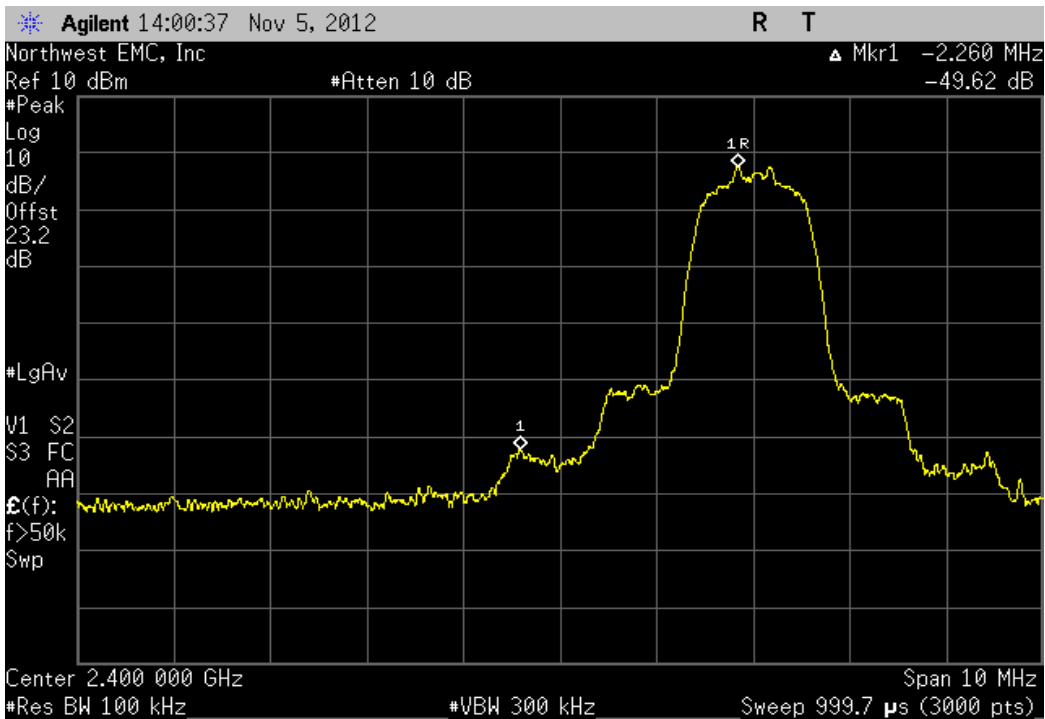
Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	-58.34 dBc	≤ -20 dBc	Pass



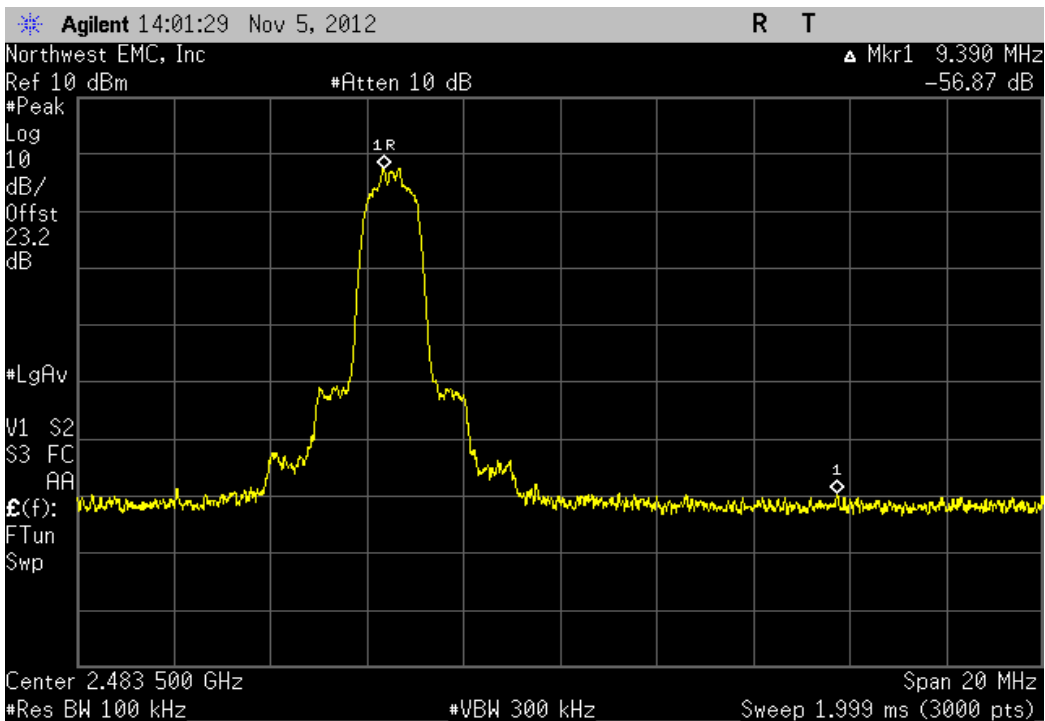
Hopping Mode, DH5, GFSK, High Channel, 2480 MHz			
	Value	Limit	Result
	-57.88 dBc	≤ -20 dBc	Pass



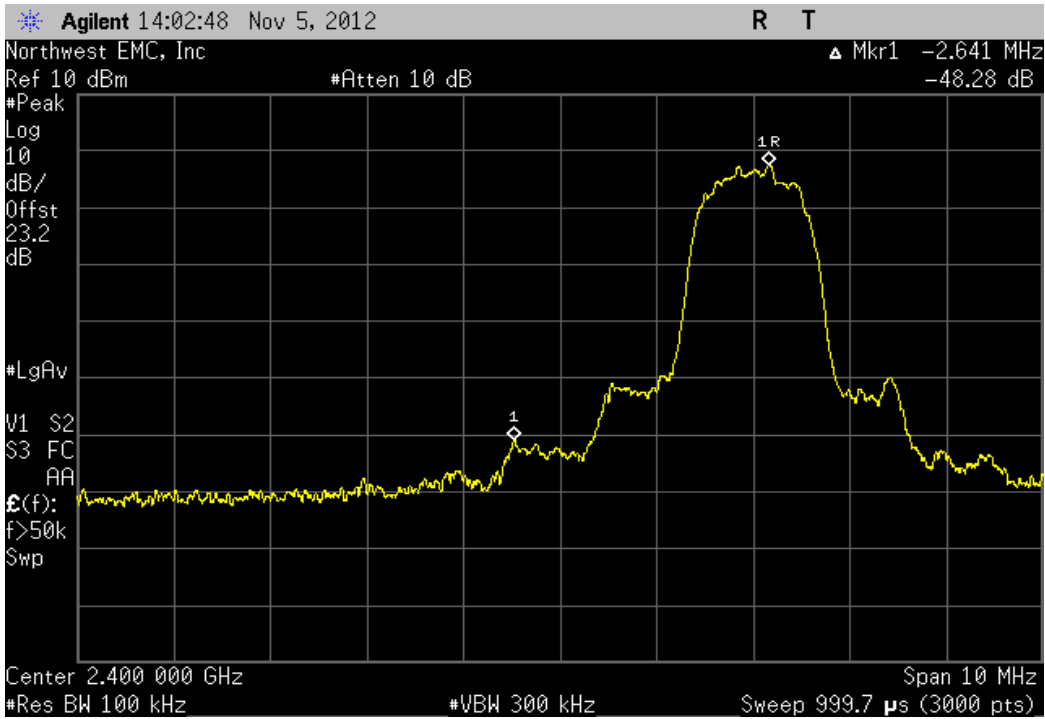
Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	-49.62 dBc	≤ -20 dBc	Pass



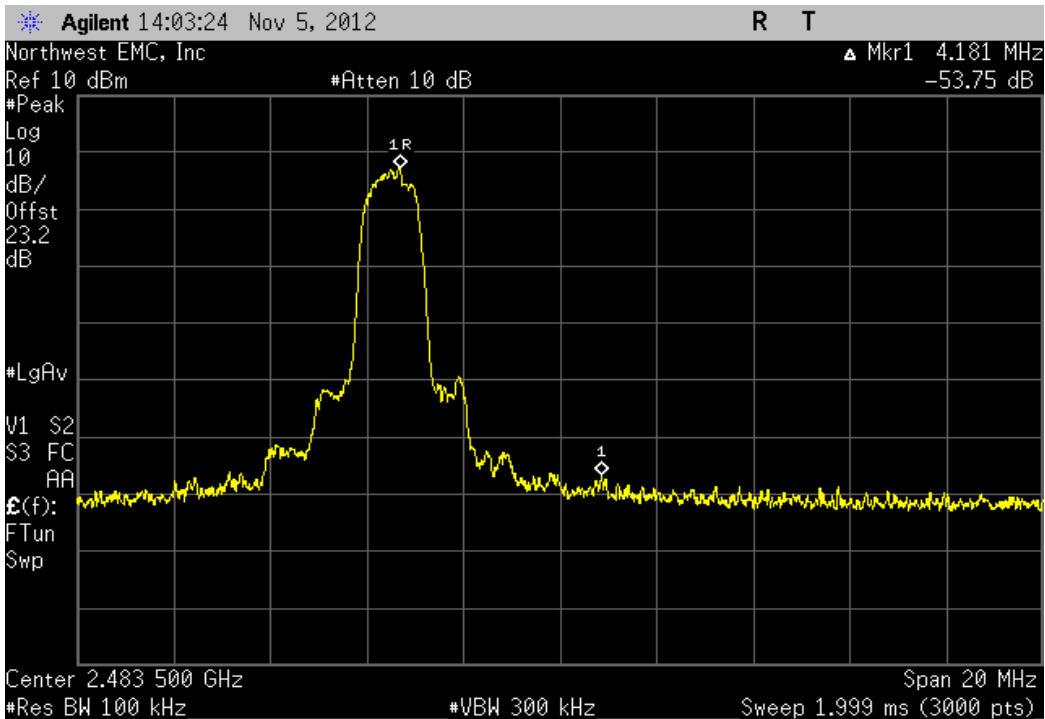
Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz			
	Value	Limit	Result
	-56.87 dBc	≤ -20 dBc	Pass



Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	-48.28 dBc	≤ -20 dBc	Pass



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz			
	Value	Limit	Result
	-53.75 dBc	≤ -20 dBc	Pass



BAND EDGE COMPLIANCE

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
Signal Generator	Benchforge Manufacturing	Colt	TIP	NCR	0
40GHz DC Block	Miteq	DCB4000	AMD	6/25/2012	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/2/2012	12
Power Meter	Gigatronics	8651A	SPM	1/9/2012	24
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/15/2011	12
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2012	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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

XMit 2012.09.20
PsaTx 2012.09.10

EUT: 1514	Work Order: MCSO1638
Serial Number: 000109423753	Date: 11/02/12
Customer: Microsoft Corporation	Temperature: 22.3°C
Attendees: None	Humidity: 52%
Project: None	Barometric Pres.: 1013
Tested by: Brandon Hobbs Rod Peloquin Sabrina Sanders	Power: 110VAC/60Hz
	Job Site: EV06
TEST SPECIFICATIONS	
FCC 15.247:2012	ANSI C63.10:2009

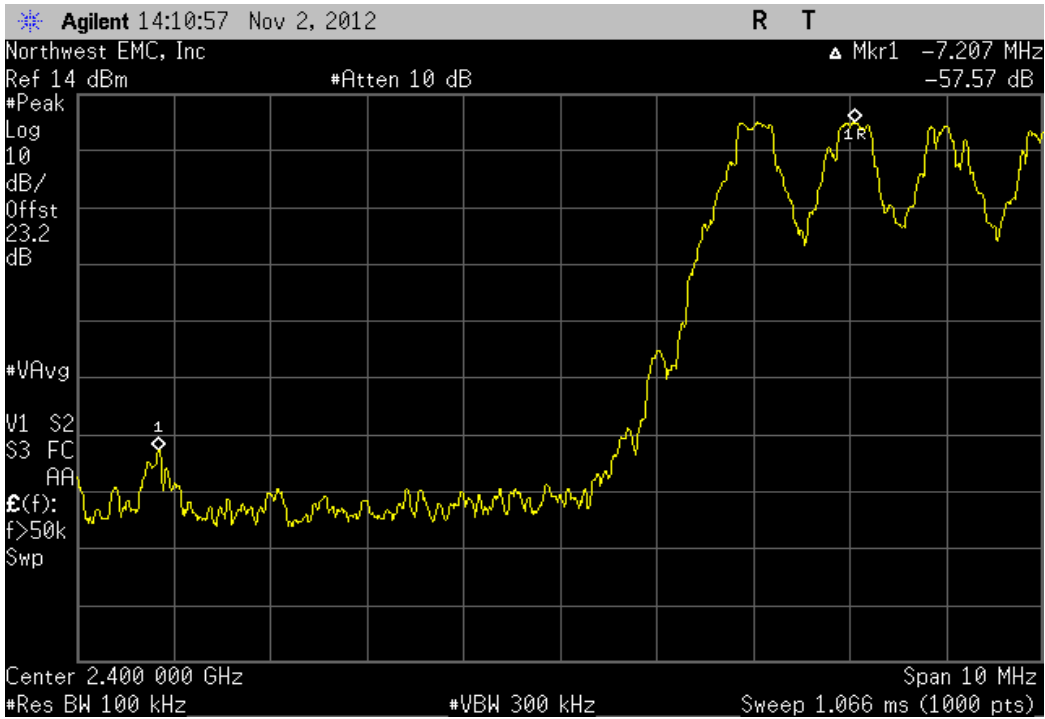
COMMENTS
All cable losses for 2.4GHz and 5.0GHz bands are accounted for in the analyzer offset calculations

DEVIATIONS FROM TEST STANDARD
None

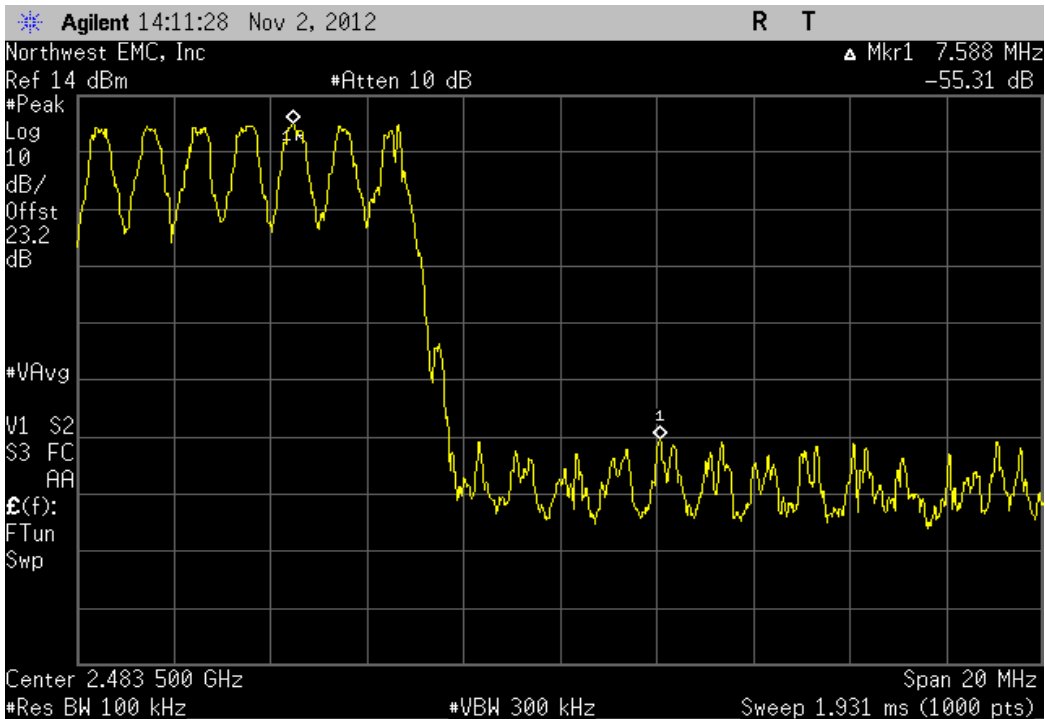
Configuration #	1	Signature <i>Brandon Hobbs</i>
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	Value	Limit	Result
Hopping Mode			
1DH5, GFSK			
Low Channel, 2402 MHz	-57.57 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz	-55.32 dBc	≤ -20 dBc	Pass
2DH5, pi/4-DQPSK			
Low Channel, 2402 MHz	-54.17 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz	-56.69 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK			
Low Channel, 2402 MHz	-51.2 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz	-59.72 dBc	≤ -20 dBc	Pass

Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	-57.57 dBc	≤ -20 dBc	Pass

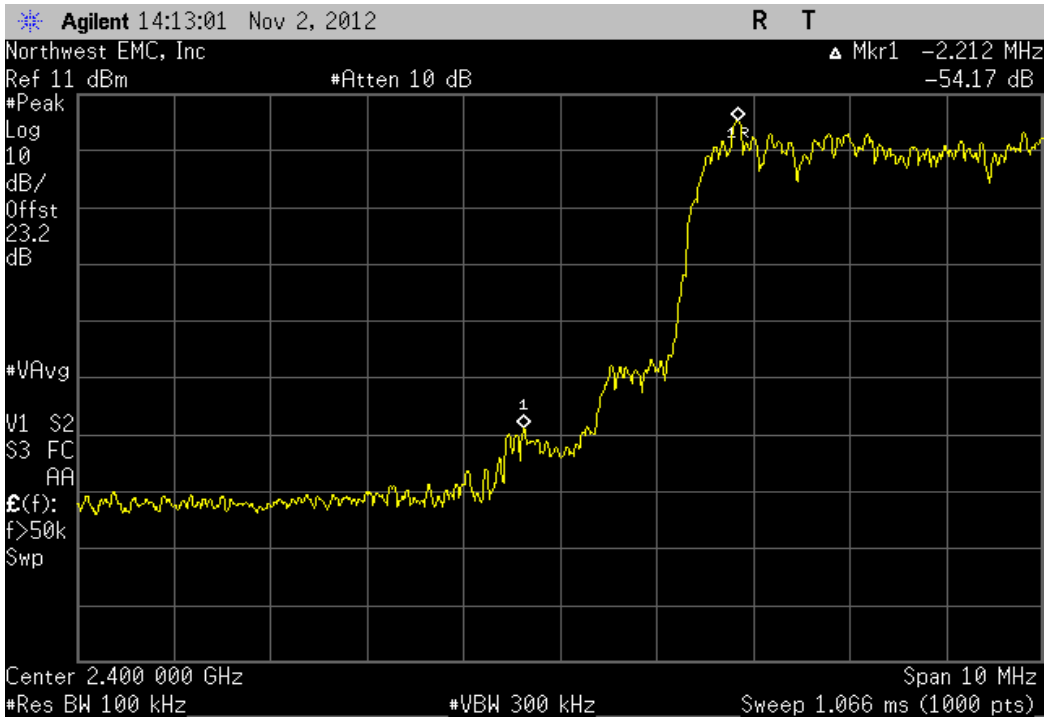


Hopping Mode, DH5, GFSK, High Channel, 2480 MHz			
	Value	Limit	Result
	-55.32 dBc	≤ -20 dBc	Pass



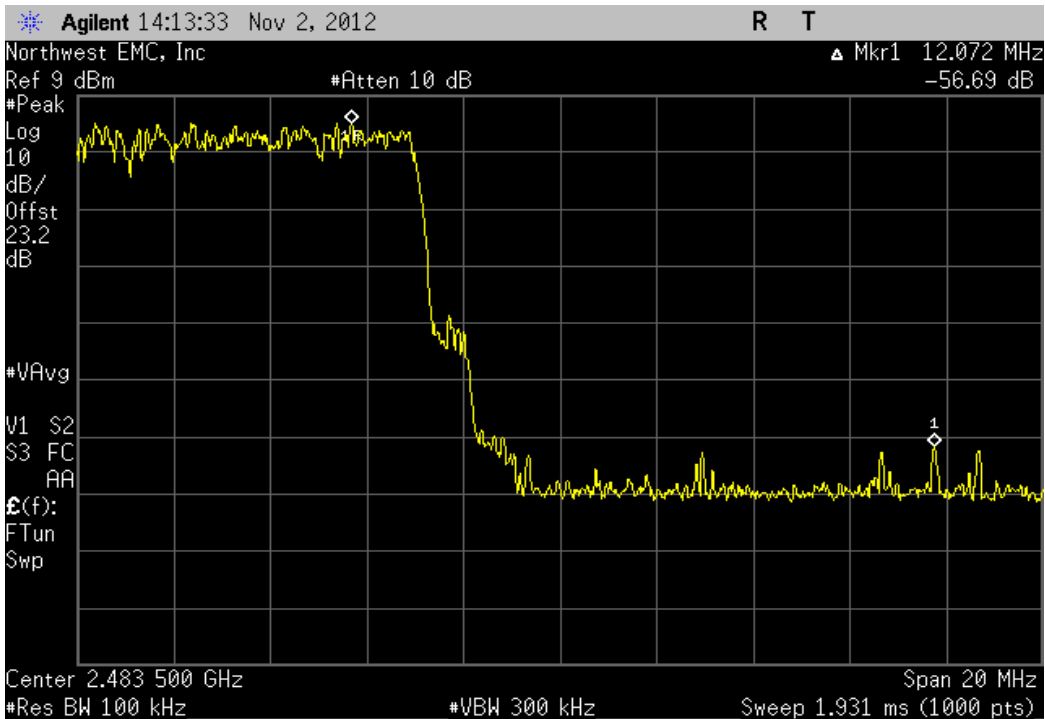
Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz

Value	Limit	Result
-54.17 dBc	≤ -20 dBc	Pass

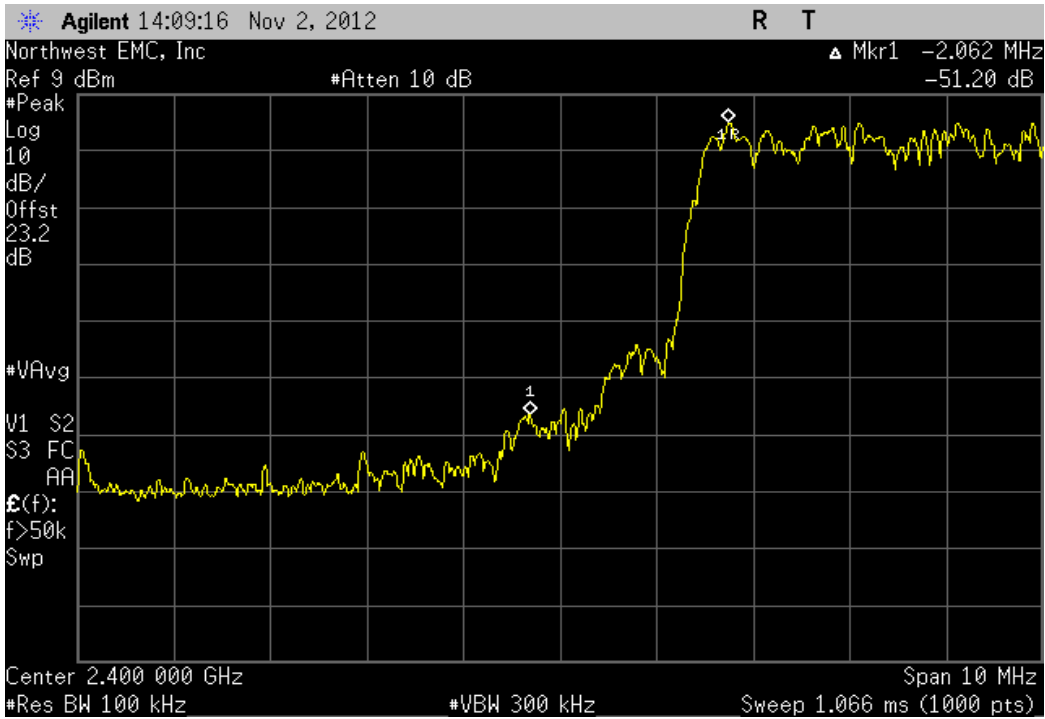


Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz

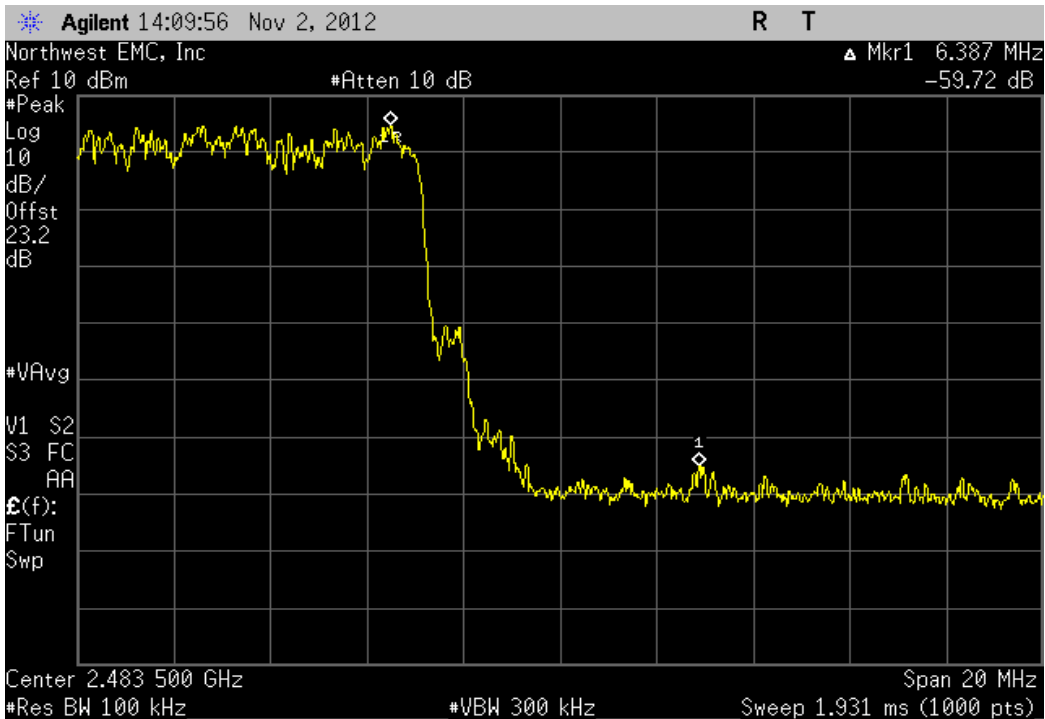
Value	Limit	Result
-56.69 dBc	≤ -20 dBc	Pass



Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz			
	Value	Limit	Result
	-51.2 dBc	≤ -20 dBc	Pass



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz			
	Value	Limit	Result
	-59.72 dBc	≤ -20 dBc	Pass



SPURIOUS CONDUCTED EMISSIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
40GHz DC Block	Miteq	DCB4000	AMD	6/25/2012	12
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/2/2012	12
Power Meter	Gigatronics	8651A	SPM	1/9/2012	24
MXG Vector Signal Generator	Agilent	N5182A	TIF	NCR	0
Attenuator, 'Precision N'	S.M. Electronics	SA18N-06/SM4032	REE	12/15/2011	12
Power Sensor	Gigatronics	80701A	SPL	7/8/2011	24
Spectrum Analyzer	Agilent	E4440A	AFD	7/5/2012	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0

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

XMit 2012.09.20
PsaTx 2012.09.10

EUT: 1514	Work Order: MCSO1638
Serial Number: 000109423753	Date: 11/02/12
Customer: Microsoft Corporation	Temperature: 22.3°C
Attendees: None	Humidity: 52%
Project: None	Barometric Pres.: 1013
Tested by: Brandon Hobbs Rod Peloquin Sabrina Sanders	Power: 110VAC/60Hz
	Job Site: EV06
TEST SPECIFICATIONS	
FCC 15.247:2012	ANSI C63.10:2009
TEST Method	

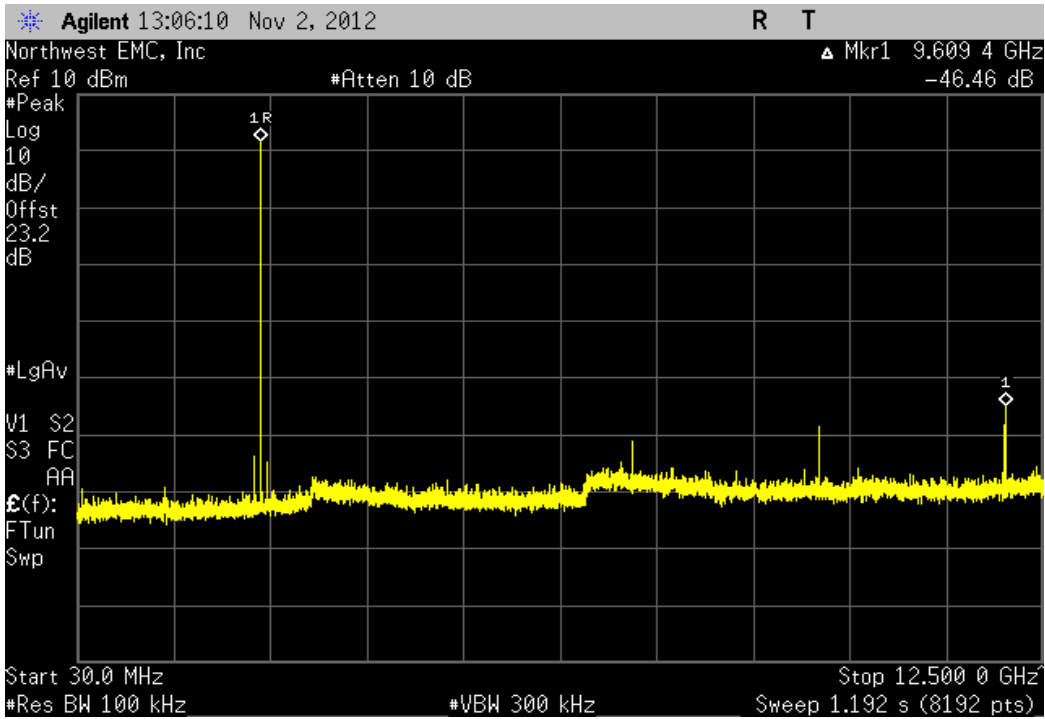
COMMENTS
All cable losses for 2.4GHz and 5.0GHz bands are accounted for in the analyzer offset calculations

DEVIATIONS FROM TEST STANDARD
None

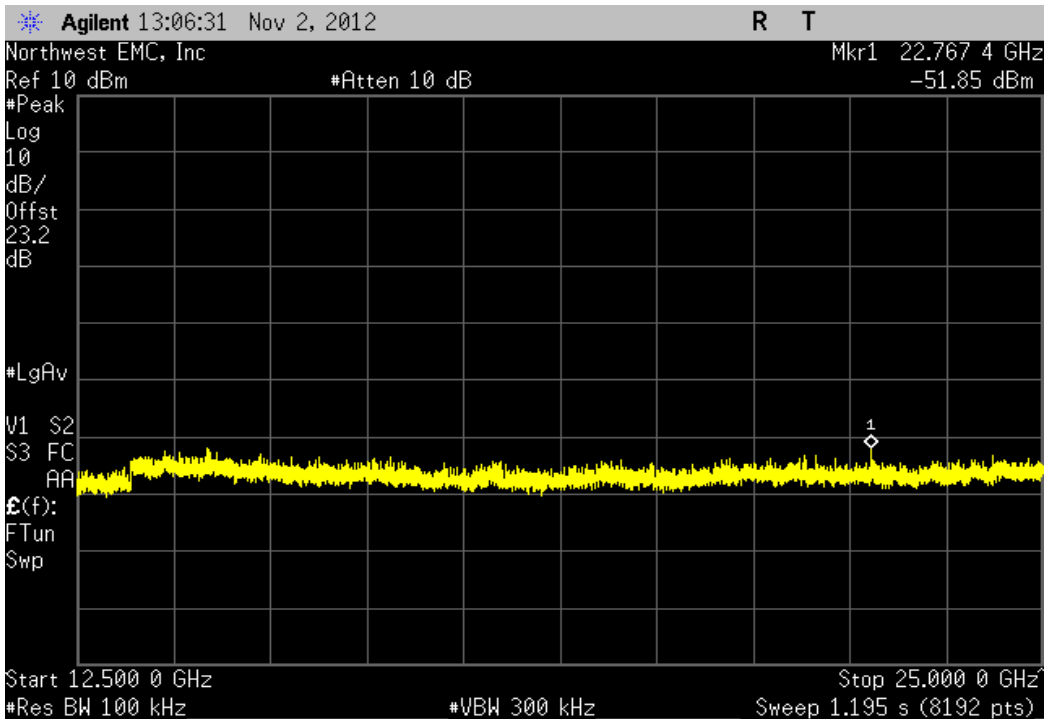
Configuration # 1
Signature *Brandon Hobbs*

Hopping Mode	Frequency Range	Value	Limit	Result
DH5, GFSK				
Low Channel, 2402 MHz	30 MHz - 12.5 GHz	-46.46 dBc	≤ -20 dBc	Pass
Low Channel, 2402 MHz	12.5 GHz - 25 GHz	-53.4 dBc	≤ -20 dBc	Pass
Mid Channel, 2441 MHz	30 MHz - 12.5 GHz	-46.55 dBc	≤ -20 dBc	Pass
Mid Channel, 2441 MHz	12.5 GHz - 25 GHz	-53.44 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz	30 MHz - 12.5 GHz	-45.16 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz	12.5 GHz - 25 GHz	-53.36 dBc	≤ -20 dBc	Pass
2DH5, pi/4-DQPSK				
Low Channel, 2402 MHz	30 MHz - 12.5 GHz	-39 dBc	≤ -20 dBc	Pass
Low Channel, 2402 MHz	12.5 GHz - 25 GHz	-46.69 dBc	≤ -20 dBc	Pass
Mid Channel, 2441 MHz	30 MHz - 12.5 GHz	-42.03 dBc	≤ -20 dBc	Pass
Mid Channel, 2441 MHz	12.5 GHz - 25 GHz	-47.18 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz	30 MHz - 12.5 GHz	-40.98 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz	12.5 GHz - 25 GHz	-45.62 dBc	≤ -20 dBc	Pass
3DH5, 8-DPSK				
Low Channel, 2402 MHz	30 MHz - 12.5 GHz	-43.69 dBc	≤ -20 dBc	Pass
Low Channel, 2402 MHz	12.5 GHz - 25 GHz	-46.85 dBc	≤ -20 dBc	Pass
Mid Channel, 2441 MHz	30 MHz - 12.5 GHz	-44.26 dBc	≤ -20 dBc	Pass
Mid Channel, 2441 MHz	12.5 GHz - 25 GHz	-48.39 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz	30 MHz - 12.5 GHz	-44.45 dBc	≤ -20 dBc	Pass
High Channel, 2480 MHz	12.5 GHz - 25 GHz	-47.74 dBc	≤ -20 dBc	Pass

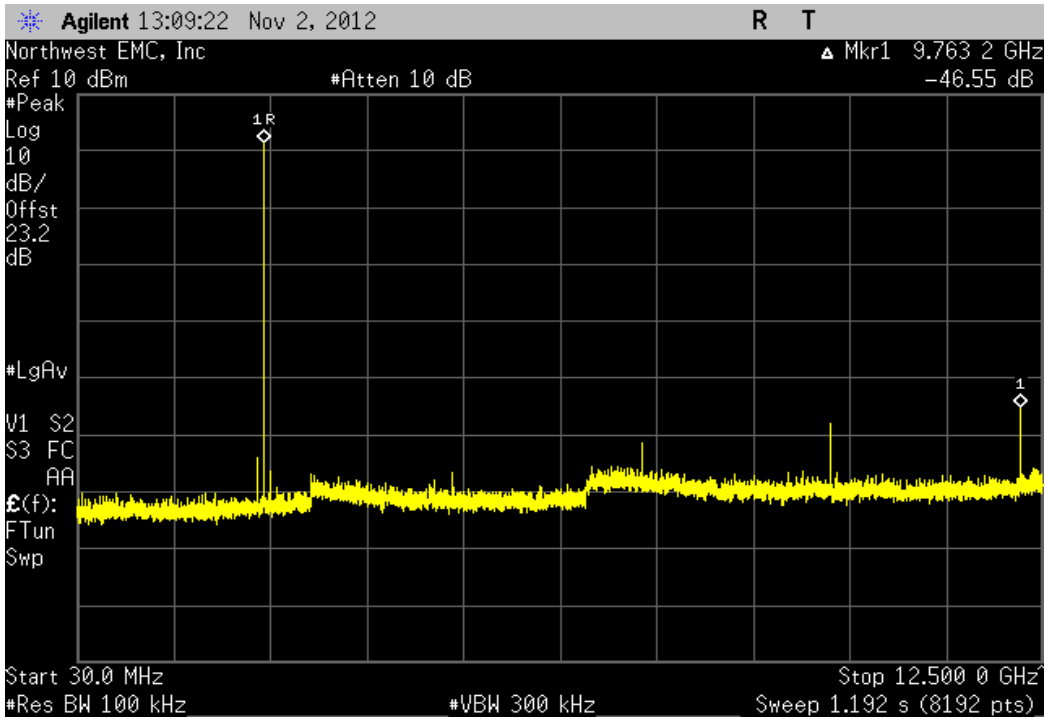
Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz			
Frequency Range	Value	Limit	Result
30 MHz - 12.5 GHz	-46.46 dBc	≤ -20 dBc	Pass



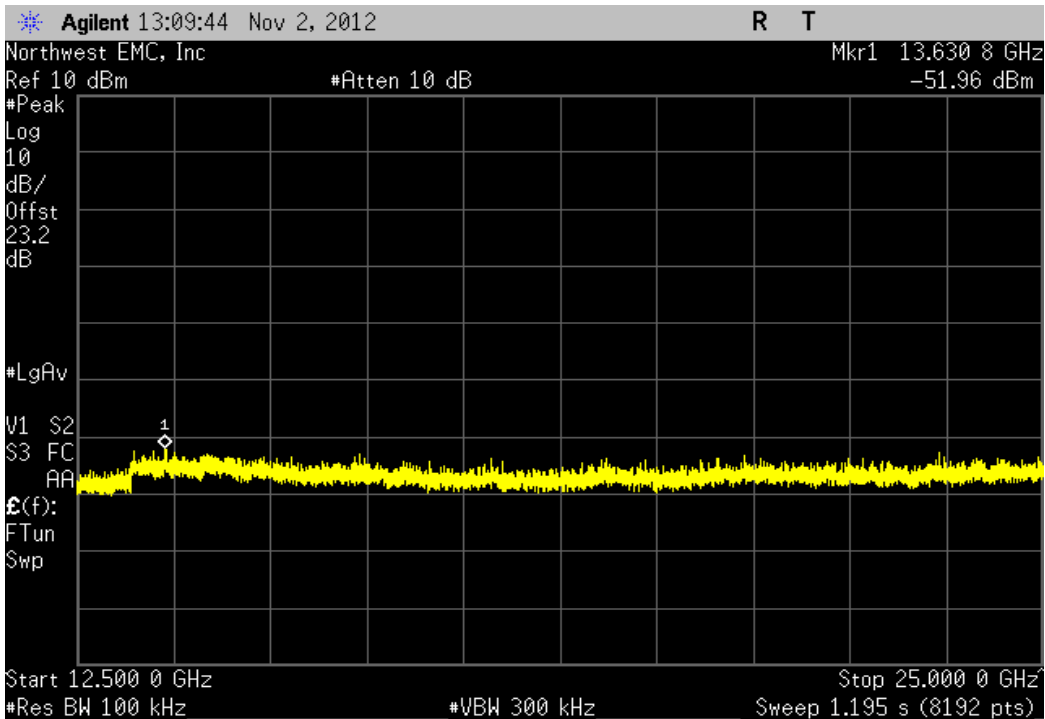
Hopping Mode, DH5, GFSK, Low Channel, 2402 MHz			
Frequency Range	Value	Limit	Result
12.5 GHz - 25 GHz	-53.4 dBc	≤ -20 dBc	Pass



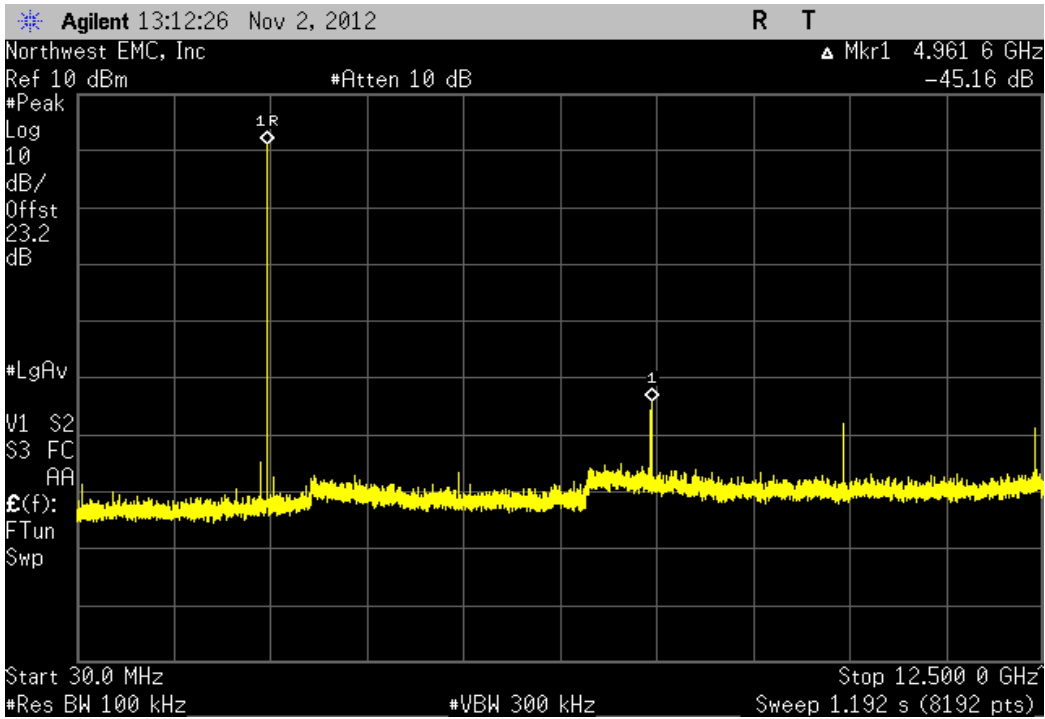
Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz			
Frequency Range	Value	Limit	Result
30 MHz - 12.5 GHz	-46.55 dBc	≤ -20 dBc	Pass



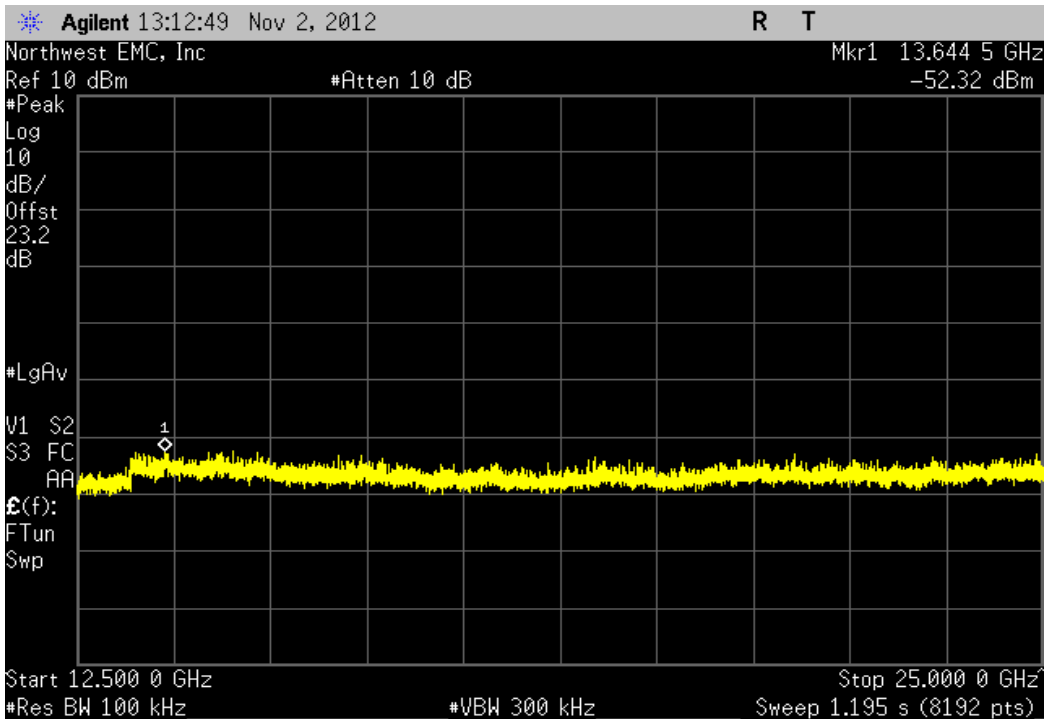
Hopping Mode, DH5, GFSK, Mid Channel, 2441 MHz			
Frequency Range	Value	Limit	Result
12.5 GHz - 25 GHz	-53.44 dBc	≤ -20 dBc	Pass



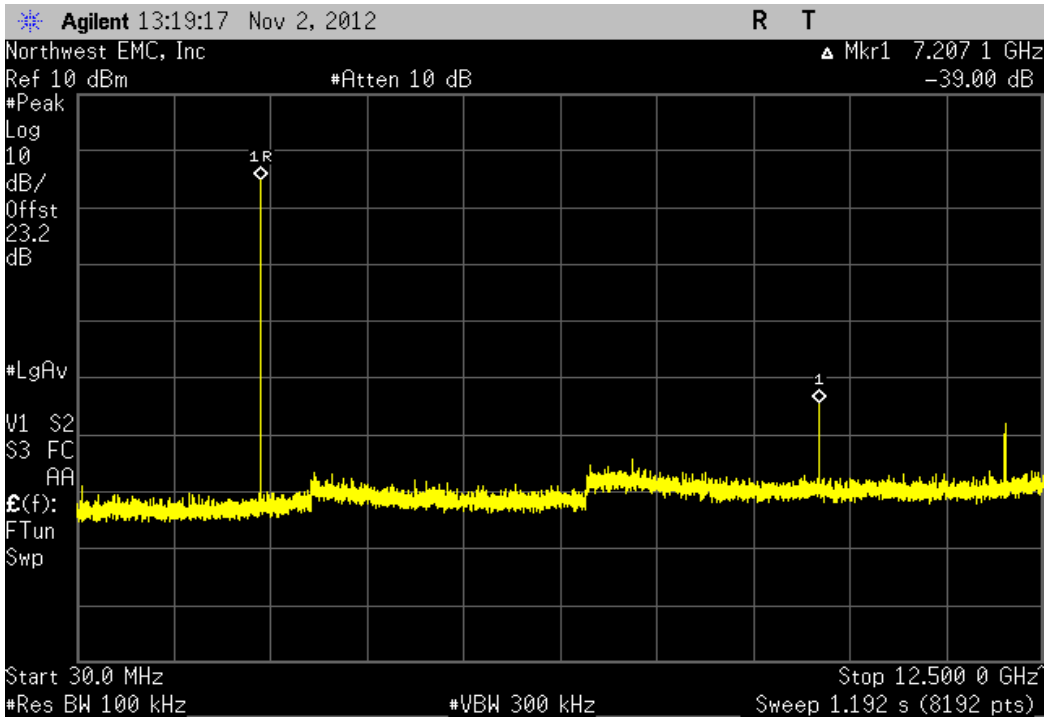
Hopping Mode, DH5, GFSK, High Channel, 2480 MHz			
Frequency Range	Value	Limit	Result
30 MHz - 12.5 GHz	-45.16 dBc	≤ -20 dBc	Pass



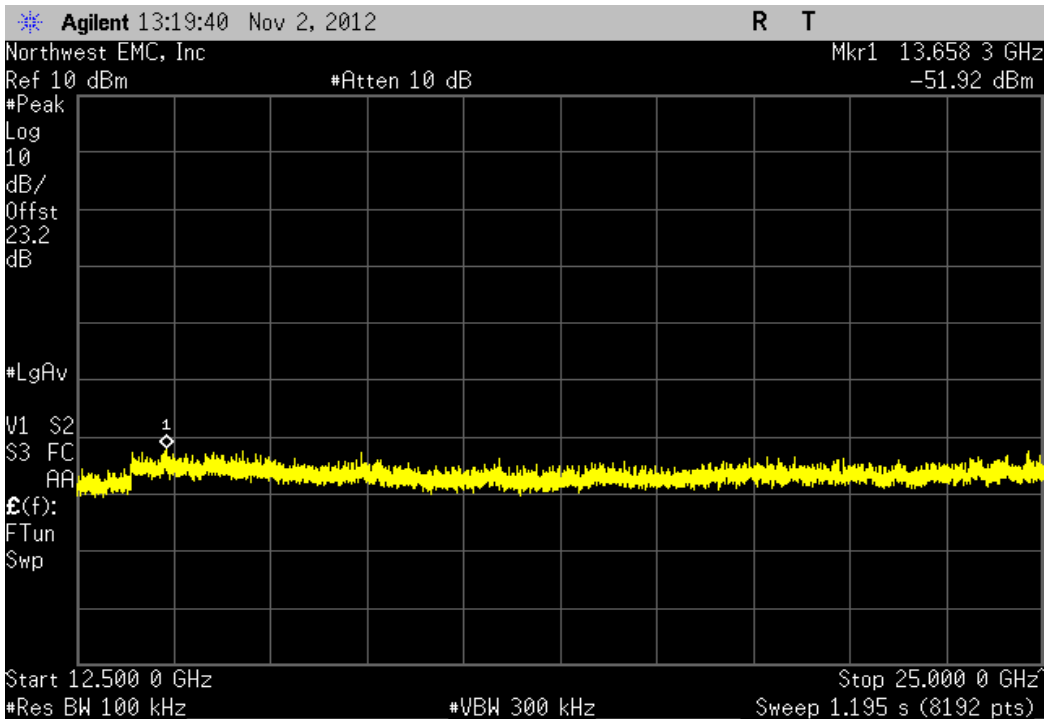
Hopping Mode, DH5, GFSK, High Channel, 2480 MHz			
Frequency Range	Value	Limit	Result
12.5 GHz - 25 GHz	-53.36 dBc	≤ -20 dBc	Pass



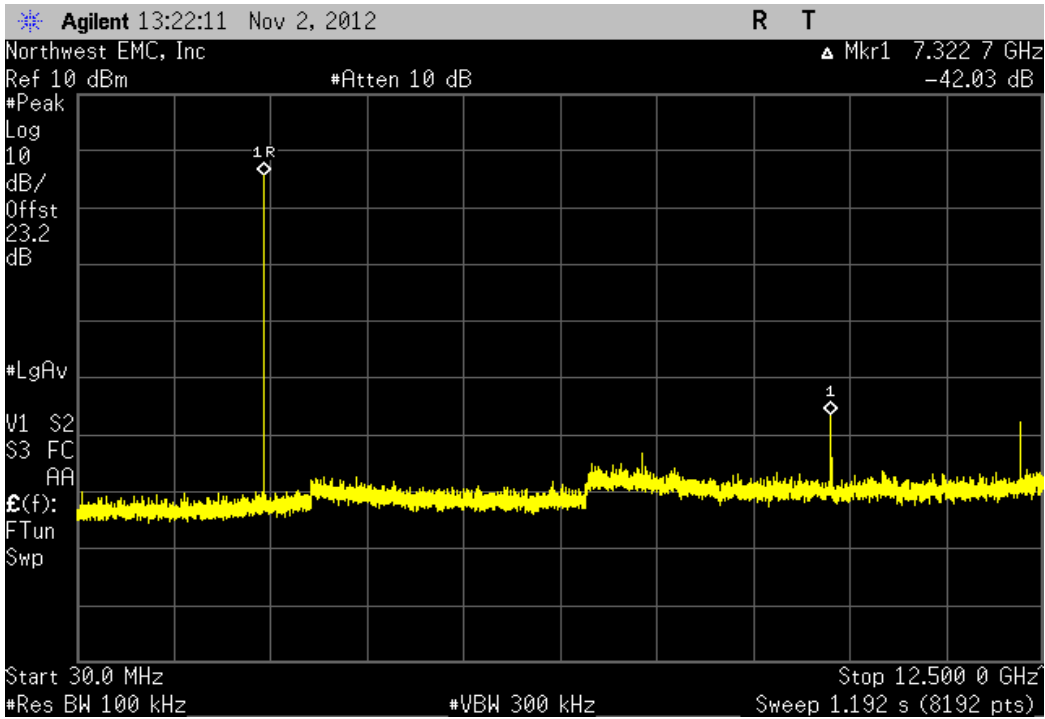
Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz			
Frequency Range	Value	Limit	Result
30 MHz - 12.5 GHz	-39 dBc	≤ -20 dBc	Pass



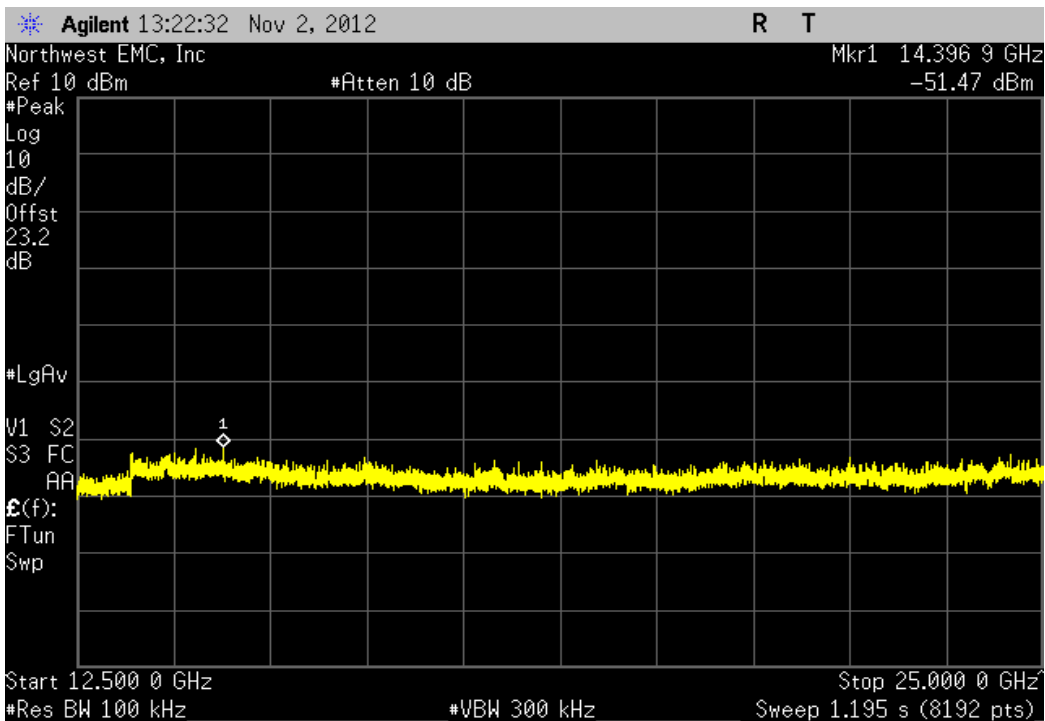
Hopping Mode, 2DH5, pi/4-DQPSK, Low Channel, 2402 MHz			
Frequency Range	Value	Limit	Result
12.5 GHz - 25 GHz	-46.69 dBc	≤ -20 dBc	Pass



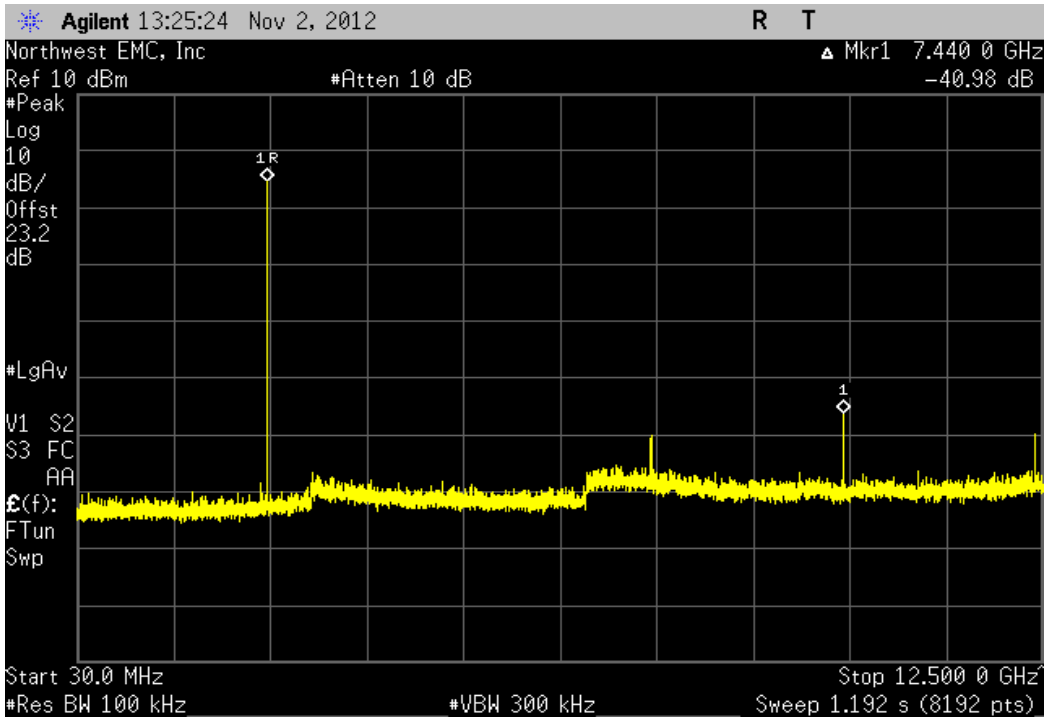
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz			
Frequency Range	Value	Limit	Result
30 MHz - 12.5 GHz	-42.03 dBc	≤ -20 dBc	Pass



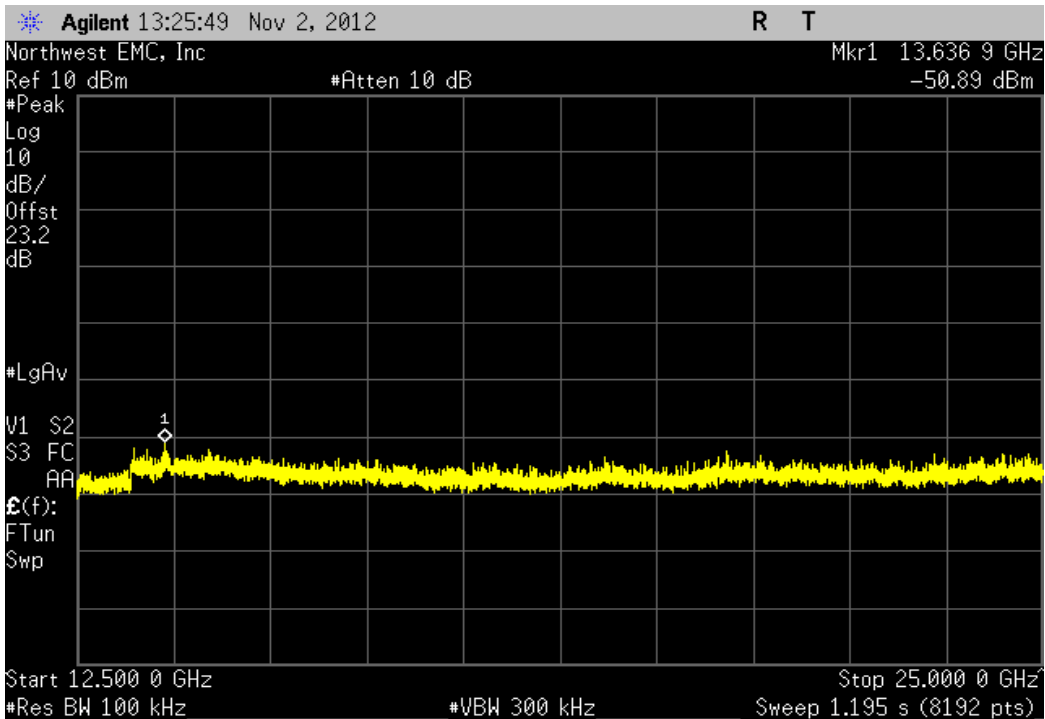
Hopping Mode, 2DH5, pi/4-DQPSK, Mid Channel, 2441 MHz			
Frequency Range	Value	Limit	Result
12.5 GHz - 25 GHz	-47.18 dBc	≤ -20 dBc	Pass



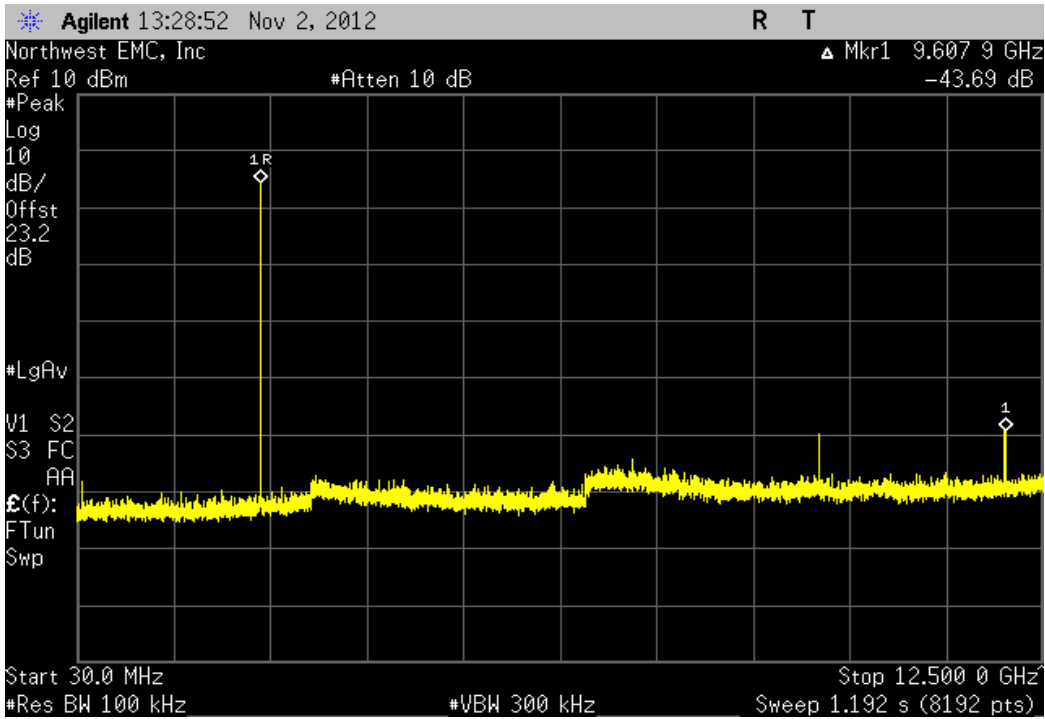
Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz			
Frequency Range	Value	Limit	Result
30 MHz - 12.5 GHz	-40.98 dBc	≤ -20 dBc	Pass



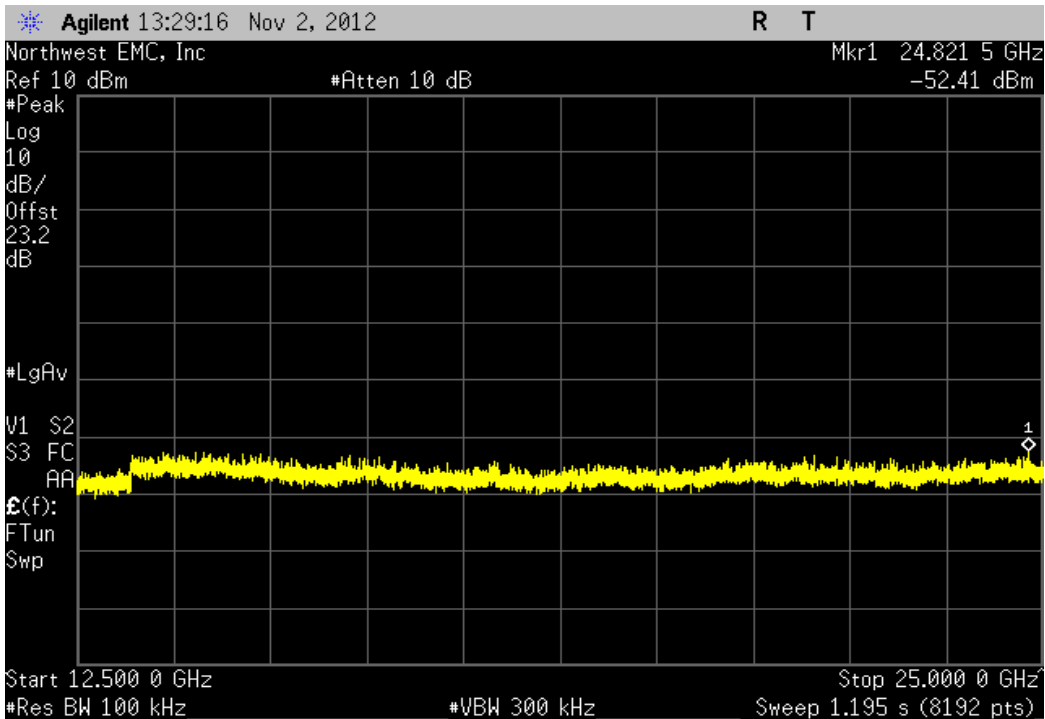
Hopping Mode, 2DH5, pi/4-DQPSK, High Channel, 2480 MHz			
Frequency Range	Value	Limit	Result
12.5 GHz - 25 GHz	-45.62 dBc	≤ -20 dBc	Pass



Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz			
Frequency Range	Value	Limit	Result
30 MHz - 12.5 GHz	-43.69 dBc	≤ -20 dBc	Pass

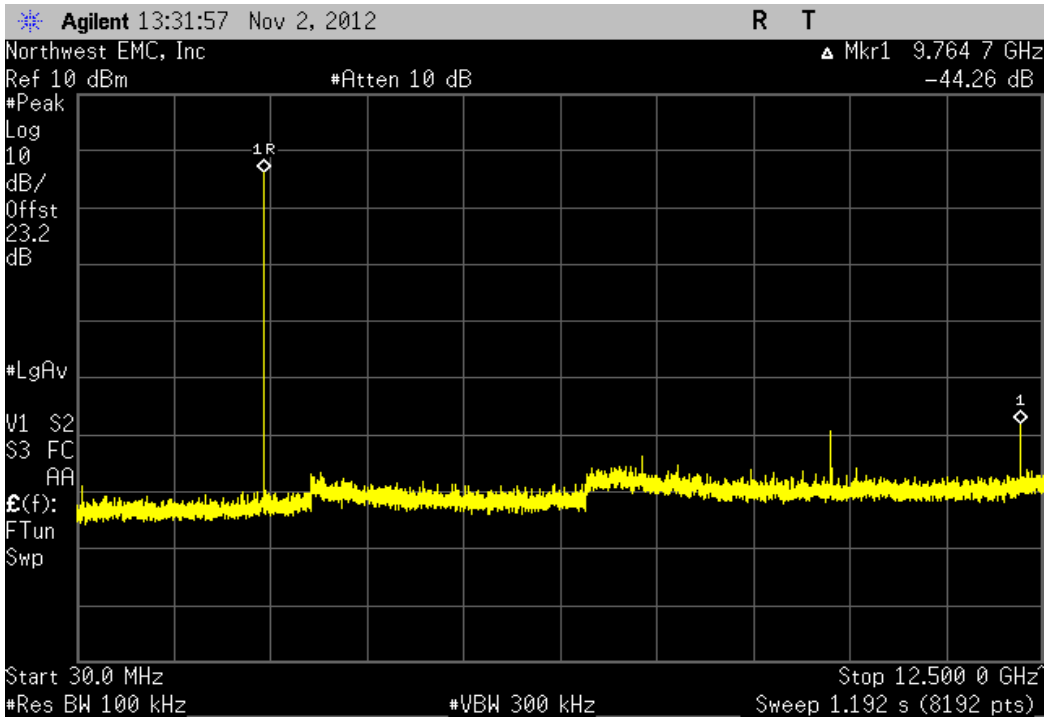


Hopping Mode, 3DH5, 8-DPSK, Low Channel, 2402 MHz			
Frequency Range	Value	Limit	Result
12.5 GHz - 25 GHz	-46.85 dBc	≤ -20 dBc	Pass



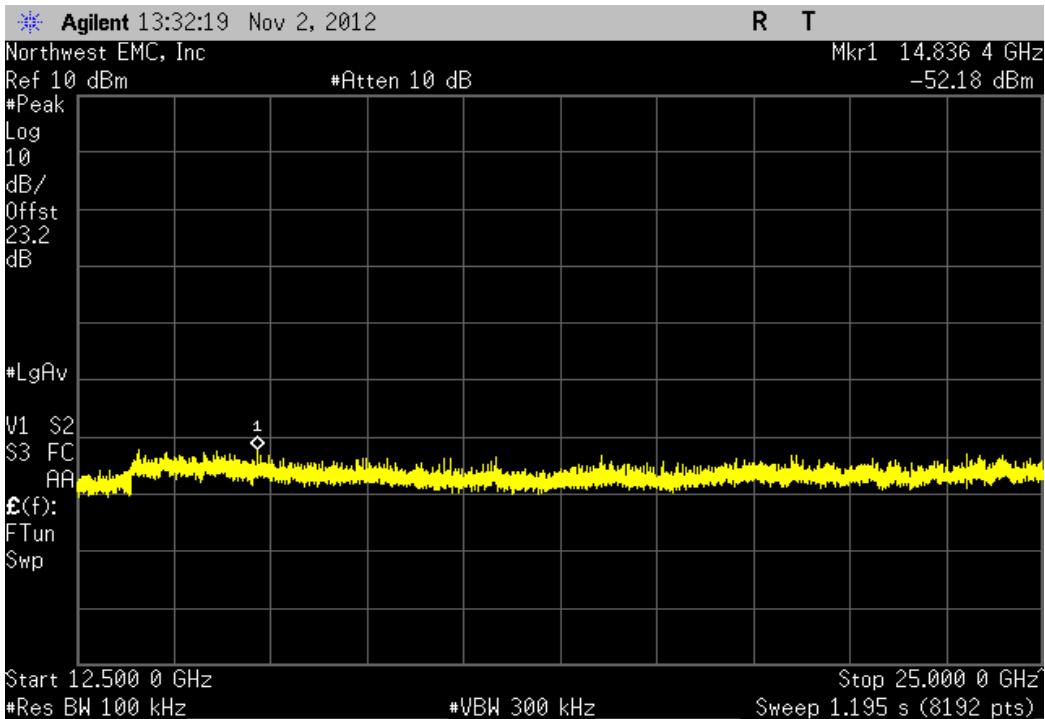
Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz

Frequency Range	Value	Limit	Result
30 MHz - 12.5 GHz	-44.26 dBc	≤ -20 dBc	Pass

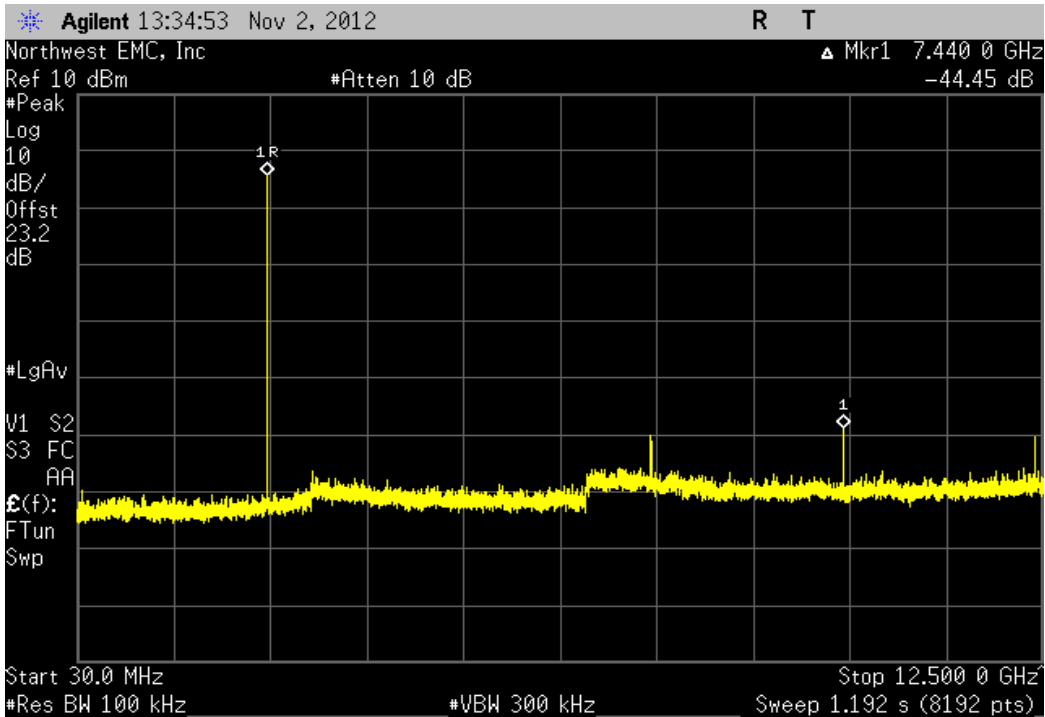


Hopping Mode, 3DH5, 8-DPSK, Mid Channel, 2441 MHz

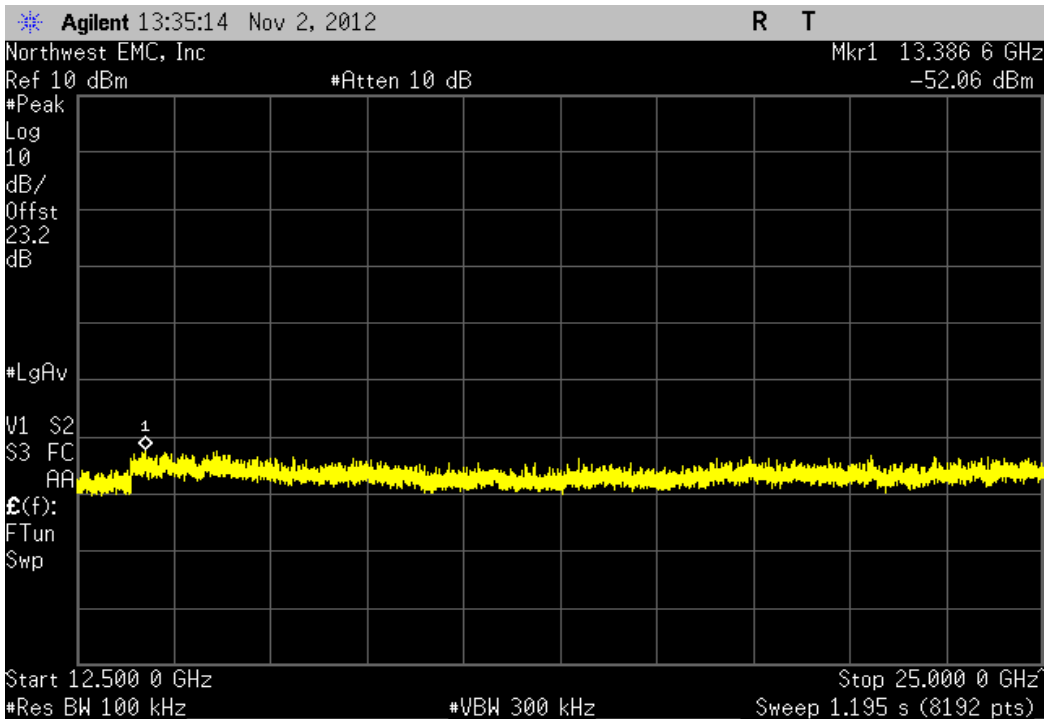
Frequency Range	Value	Limit	Result
12.5 GHz - 25 GHz	-48.39 dBc	≤ -20 dBc	Pass



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz			
Frequency Range	Value	Limit	Result
30 MHz - 12.5 GHz	-44.45 dBc	≤ -20 dBc	Pass



Hopping Mode, 3DH5, 8-DPSK, High Channel, 2480 MHz			
Frequency Range	Value	Limit	Result
12.5 GHz - 25 GHz	-47.74 dBc	≤ -20 dBc	Pass



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

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

MCSO1633 - 1

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	26.5 GHz
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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
Cable	ESM Cable Corp.	KMKM-72	EVY	9/11/2012	12 mo
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	9/11/2012	12 mo
Antenna, Horn	ETS Lindgren	3160-09	AIV	NCR	0 mo
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	2/28/2012	12 mo
Antenna, Horn	ETS	3160-08	AHV	NCR	0 mo
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	2/28/2012	12 mo
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	2/28/2012	12 mo
Antenna, Horn	ETS	3160-07	AHU	NCR	0 mo
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	6/27/2012	12 mo
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	6/27/2012	12 mo
Antenna, Horn	ETS	3115	AIZ	1/24/2011	24 mo
EV01 Cables	N/A	Bilog Cables	EVA	6/26/2012	12 mo
Pre-Amplifier	Miteq	AM-1616-1000	AOL	6/26/2012	12 mo
Antenna, Biconilog	EMCO	3141	AXG	4/10/2012	12 mo

MEASUREMENT BANDWIDTHS

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


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.



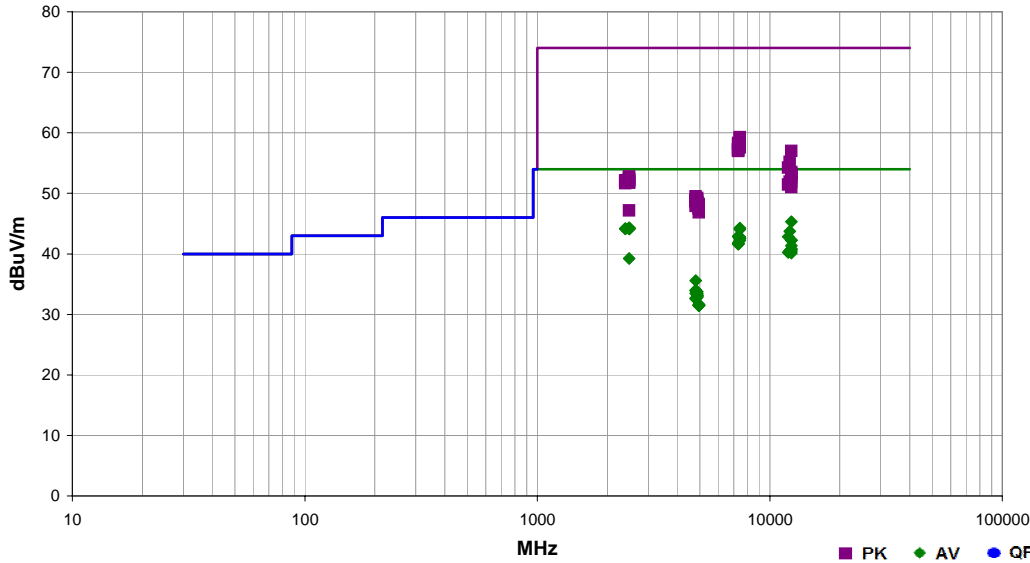
SPURIOUS RADIATED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	10/29/12	
Project:	None	Temperature:	21.9 °C	
Job Site:	EV01	Humidity:	55% RH	
Serial Number:	000012424053	Barometric Pres.:	1013 mbar	
EUT:	1514	Tested by: Dan Haas, Carl Engholm		
Configuration:	1			
Customer:	Microsoft Corporation			
Attendees:	Mike Boucher			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth			
Deviations:	None			
Comments:	See comments below for channel, EUT orientation, and data rate.			

Test Specifications	Test Method
FCC 15.247:2012	ANSI C63.10:2009

Run #	13	Test Distance (m)	3	Antenna Height(s)	1-4m	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
12400.010	48.2	-2.9	1.0	22.0	3.0	0.0	Vert	AV	0.0	45.3	54.0	-8.7	CH 78 (2480MHz), DH5, EUT Vertical
2485.383	22.4	1.9	1.5	157.0	3.0	20.0	Vert	AV	0.0	44.3	54.0	-9.7	CH 78 (2480MHz), DH5, EUT on Side
7440.013	24.8	19.5	1.3	348.0	3.0	0.0	Horz	AV	0.0	44.3	54.0	-9.7	CH 78 (2480MHz), DH5, EUT on Side
2484.240	22.4	1.9	1.0	221.0	3.0	20.0	Horz	AV	0.0	44.3	54.0	-9.7	CH 78 (2480MHz), DH5, EUT Horizontal
2483.860	22.4	1.9	1.0	302.0	3.0	20.0	Horz	AV	0.0	44.3	54.0	-9.7	CH 78 (2480MHz), DH5, EUT on Side
2483.650	22.4	1.9	2.1	338.0	3.0	20.0	Horz	AV	0.0	44.3	54.0	-9.7	CH 78 (2480MHz), 2DH5, EUT on Side
2485.500	22.3	1.9	1.0	166.0	3.0	20.0	Horz	AV	0.0	44.2	54.0	-9.8	CH 78 (2480MHz), DH5, EUT Vertical
2485.413	22.3	1.9	2.0	98.0	3.0	20.0	Horz	AV	0.0	44.2	54.0	-9.8	CH 78 (2480MHz), 3DH5, EUT on Side
2485.357	22.3	1.9	2.9	356.0	3.0	20.0	Vert	AV	0.0	44.2	54.0	-9.8	CH 78 (2480MHz), 3DH5, EUT on Side
2484.650	22.3	1.9	1.0	216.0	3.0	20.0	Vert	AV	0.0	44.2	54.0	-9.8	CH 78 (2480MHz), DH5, EUT Vertical
2483.967	22.3	1.9	1.0	22.0	3.0	20.0	Vert	AV	0.0	44.2	54.0	-9.8	CH 78 (2480MHz), 2DH5, EUT on Side
2389.300	22.6	1.5	1.0	296.0	3.0	20.0	Vert	AV	0.0	44.1	54.0	-9.9	CH 0 (2402MHz), DH5, EUT on Side
2390.223	22.6	1.5	1.0	242.0	3.0	20.0	Horz	AV	0.0	44.1	54.0	-9.9	CH 0 (2402MHz), DH5, EUT Horizontal
7439.973	24.6	19.5	2.0	5.0	3.0	0.0	Vert	AV	0.0	44.1	54.0	-9.9	CH 78 (2480MHz), DH5, EUT Vertical
12205.020	47.9	-4.2	1.0	18.0	3.0	0.0	Vert	AV	0.0	43.7	54.0	-10.3	CH 39 (2440MHz), DH5, EUT Vertical
7322.967	23.9	19.0	1.9	350.0	3.0	0.0	Horz	AV	0.0	42.9	54.0	-11.1	CH 39 (2441MHz), DH5, EUT on Side
7322.940	23.9	19.0	1.1	6.0	3.0	0.0	Vert	AV	0.0	42.9	54.0	-11.1	CH 39 (2441MHz), DH5, EUT Vertical
12009.990	48.3	-5.5	1.0	20.0	3.0	0.0	Vert	AV	0.0	42.8	54.0	-11.2	CH 0 (2402MHz), DH5, EUT Vertical
7440.080	23.3	19.5	1.3	348.0	3.0	0.0	Horz	AV	0.0	42.8	54.0	-11.2	CH 78 (2480MHz), 2DH5, EUT on Side
7440.020	23.1	19.5	2.0	5.0	3.0	0.0	Vert	AV	0.0	42.6	54.0	-11.4	CH 78 (2480MHz), 2DH5, EUT Vertical
7439.887	23.1	19.5	1.3	348.0	3.0	0.0	Horz	AV	0.0	42.6	54.0	-11.4	CH 78 (2480MHz), 3DH5, EUT on Side
7439.793	22.8	19.5	2.0	5.0	3.0	0.0	Vert	AV	0.0	42.3	54.0	-11.7	CH 78 (2480MHz), 3DH5, EUT Vertical
12400.030	45.1	-2.9	1.0	151.0	3.0	0.0	Horz	AV	0.0	42.2	54.0	-11.8	CH 78 (2480MHz), 2DH5, EUT on Side
12400.010	45.1	-2.9	1.0	154.0	3.0	0.0	Vert	AV	0.0	42.2	54.0	-11.8	CH 78 (2480MHz), DH5, EUT Horizontal
7323.000	22.8	19.0	1.1	6.0	3.0	0.0	Vert	AV	0.0	41.8	54.0	-12.2	CH 39 (2441MHz), 2DH5, EUT Vertical
7323.013	22.7	19.0	1.9	350.0	3.0	0.0	Horz	AV	0.0	41.7	54.0	-12.3	CH 39 (2441MHz), 2DH5, EUT on Side
7322.980	22.6	19.0	1.9	350.0	3.0	0.0	Horz	AV	0.0	41.6	54.0	-12.4	CH 39 (2441MHz), 3DH5, EUT on Side
7322.947	22.6	19.0	1.1	6.0	3.0	0.0	Vert	AV	0.0	41.6	54.0	-12.4	CH 39 (2441MHz), 3DH5, EUT Vertical
12400.020	44.2	-2.9	1.0	321.0	3.0	0.0	Horz	AV	0.0	41.3	54.0	-12.7	CH 78 (2480MHz), DH5, EUT Vertical
12399.990	43.7	-2.9	1.0	151.0	3.0	0.0	Horz	AV	0.0	40.8	54.0	-13.2	CH 78 (2480MHz), 3DH5, EUT on Side
12400.020	43.6	-2.9	1.1	190.0	3.0	0.0	Horz	AV	0.0	40.7	54.0	-13.3	CH 78 (2480MHz), DH5, EUT Horizontal



AC POWERLINE CONDUCTED EMISSIONS

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

MODES OF OPERATION

Transmitting Bluetooth LE

POWER SETTINGS INVESTIGATED

110VAC/60Hz

CONFIGURATIONS INVESTIGATED

MCSO1633 - 2

SAMPLE CALCULATIONS

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

TEST EQUIPMENT

Description	Manufacturer	Model	ID	Last Cal.	Interval
LISN	Solar	9252-50-R-24-BNC	LIN	4/16/2012	12 mo
Receiver	Rohde & Schwarz	ESCI	ARH	3/29/2012	12 mo
High Pass Filter	TTE	H97-100K-50-720B	HHD	2/1/2012	24 mo
Attenuator	Coaxicom	66702 2910-20	RBR	8/7/2012	12 mo
EV07 Cables	N/A	Conducted Cables	EVG	4/27/2012	12 mo

MEASUREMENT BANDWIDTHS

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

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


TEST DESCRIPTION

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

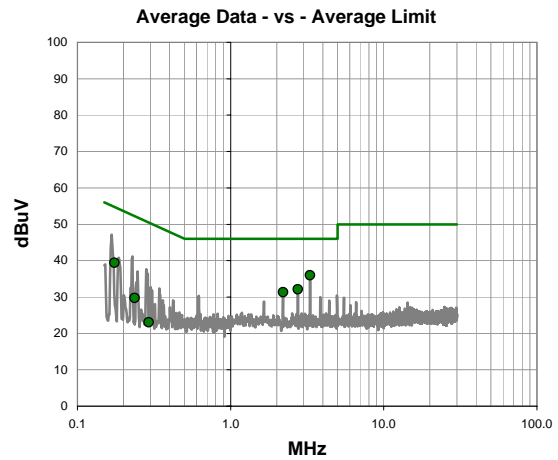
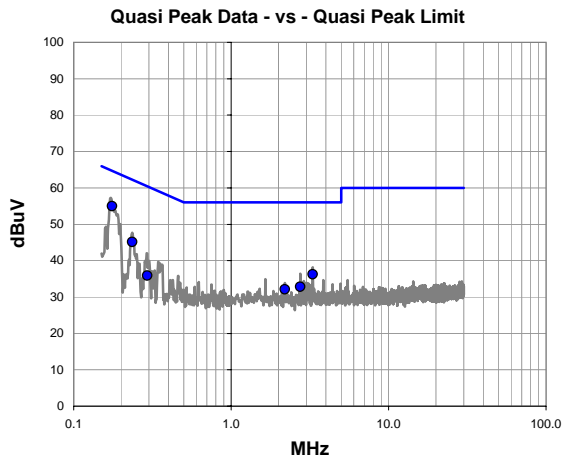


AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514	Tested by: Brandon Hobbs/Sabrina Sanders		
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	DH5 low channel FHSS			

Test Specifications	FCC 15.207:2012	Test Method	ANSI C63.10:2009		
Run #	2	Line: High Line	Ext. Attenuation: 20	Results	Pass



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.175	34.6	20.3	54.9	64.7	-9.8
0.236	24.8	20.3	45.1	62.2	-17.1
3.300	15.7	20.5	36.2	56.0	-19.8
2.752	12.3	20.5	32.8	56.0	-23.2
2.200	11.6	20.5	32.1	56.0	-23.9
0.293	15.6	20.3	35.9	60.4	-24.5

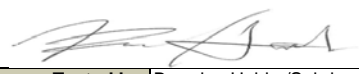
Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	15.4	20.5	35.9	46.0	-10.1
2.752	11.6	20.5	32.1	46.0	-13.9
2.200	10.8	20.5	31.3	46.0	-14.7
0.175	19.1	20.3	39.4	54.7	-15.3
0.236	9.4	20.3	29.7	52.2	-22.5
0.293	2.7	20.3	23.0	50.4	-27.4



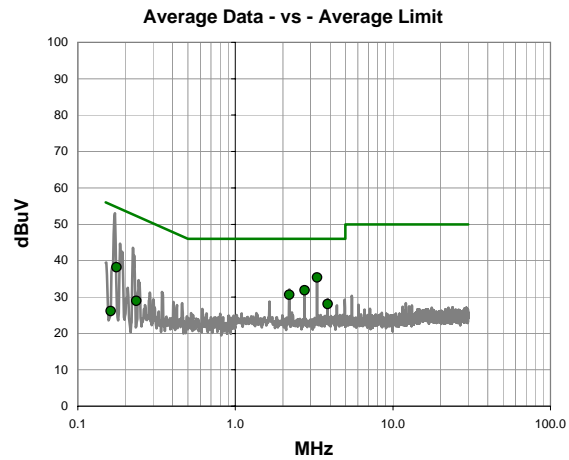
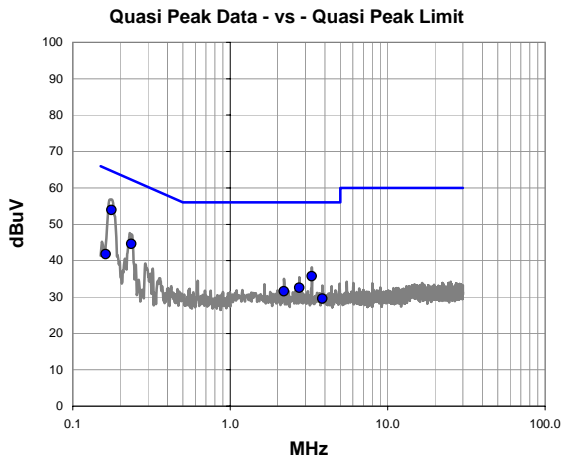
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	DH5 low channel FHSS			

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

Run #	3	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.176	33.6	20.3	53.9	64.7	-10.7
0.235	24.2	20.4	44.6	62.3	-17.7
3.300	15.2	20.5	35.7	56.0	-20.3
2.752	12.0	20.5	32.5	56.0	-23.5
0.162	21.4	20.4	41.8	65.4	-23.6
2.200	11.1	20.5	31.6	56.0	-24.4
3.852	8.9	20.6	29.5	56.0	-26.5


Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.8	20.5	35.3	46.0	-10.7
2.752	11.3	20.5	31.8	46.0	-14.2
2.200	10.1	20.5	30.6	46.0	-15.4
0.176	17.8	20.3	38.1	54.7	-16.5
3.852	7.4	20.6	28.0	46.0	-18.0
0.235	8.6	20.4	29.0	52.3	-23.3
0.162	5.8	20.4	26.2	55.4	-29.2



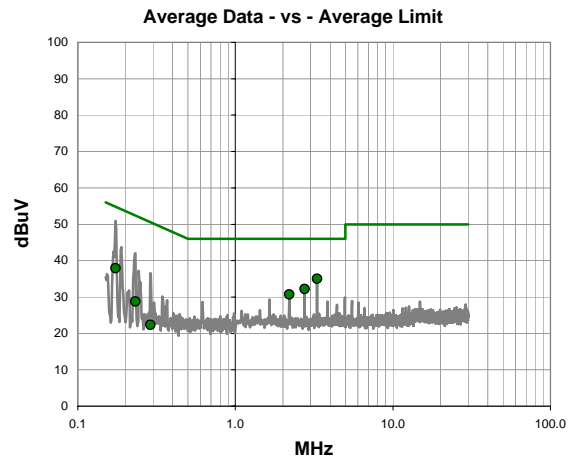
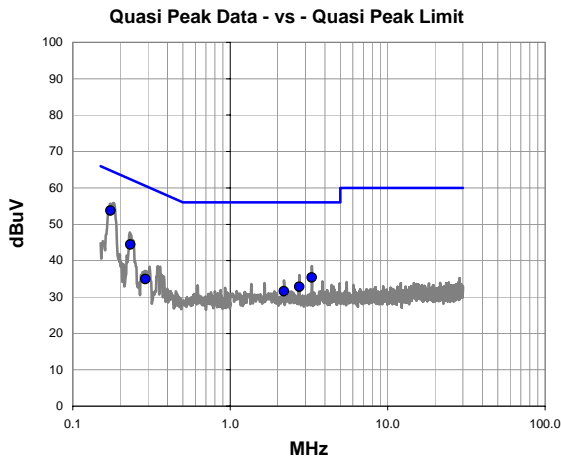
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	DH5 Mid channel FHSS			

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

Run #	4	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.174	33.4	20.3	53.7	64.8	-11.0
0.232	24.1	20.4	44.5	62.4	-17.9
3.300	14.8	20.5	35.3	56.0	-20.7
2.752	12.3	20.5	32.8	56.0	-23.2
2.200	11.1	20.5	31.6	56.0	-24.4
0.289	14.6	20.3	34.9	60.6	-25.6

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.5	20.5	35.0	46.0	-11.0
2.752	11.7	20.5	32.2	46.0	-13.8
2.200	10.2	20.5	30.7	46.0	-15.3
0.174	17.6	20.3	37.9	54.8	-16.8
0.232	8.4	20.4	28.8	52.4	-23.6
0.289	2.0	20.3	22.3	50.6	-28.2



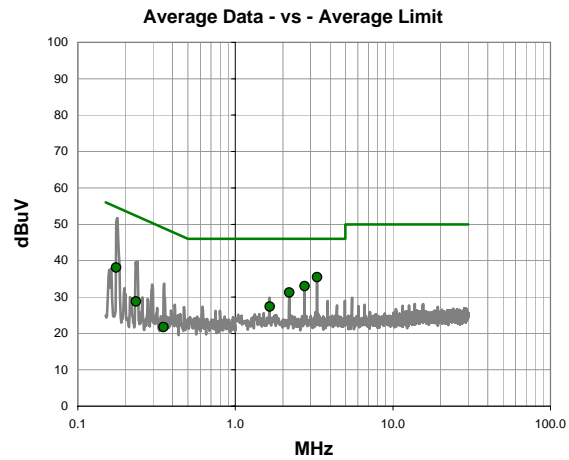
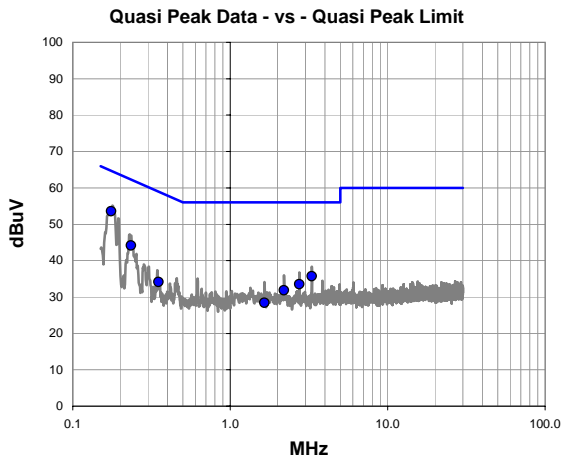
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	DH5 Mid channel FHSS			

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

Run #	5	Line:	High Line	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.175	33.2	20.3	53.5	64.7	-11.2
0.234	23.8	20.4	44.2	62.3	-18.2
3.300	15.2	20.5	35.7	56.0	-20.3
2.752	13.0	20.5	33.5	56.0	-22.5
2.200	11.4	20.5	31.9	56.0	-24.1
0.350	13.8	20.3	34.1	59.0	-24.9
1.652	8.0	20.4	28.4	56.0	-27.6

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.9	20.5	35.4	46.0	-10.6
2.752	12.5	20.5	33.0	46.0	-13.0
2.200	10.7	20.5	31.2	46.0	-14.8
0.175	17.7	20.3	38.0	54.7	-16.7
1.652	6.9	20.4	27.3	46.0	-18.7
0.234	8.4	20.4	28.8	52.3	-23.6
0.350	1.4	20.3	21.7	49.0	-27.3



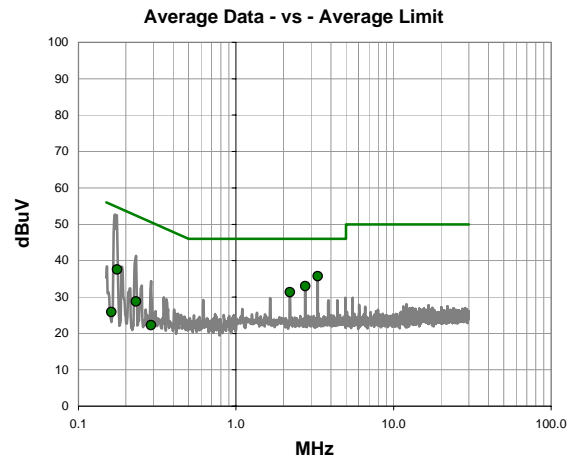
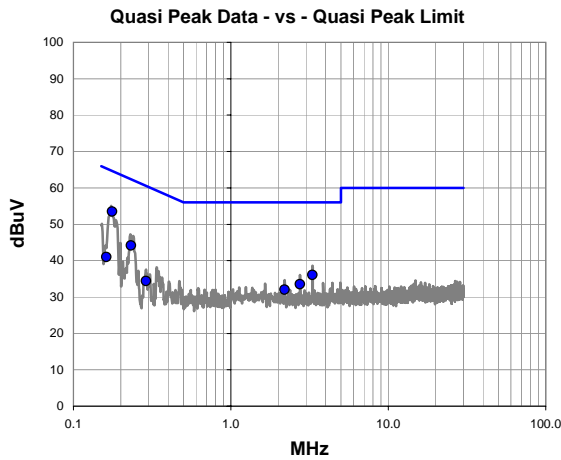
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	DH5 High channel FHSS			

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

Run #	6	Line:	High Line	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.176	33.1	20.3	53.4	64.7	-11.2
0.232	23.8	20.4	44.2	62.4	-18.2
3.300	15.5	20.5	36.0	56.0	-20.0
2.752	13.0	20.5	33.5	56.0	-22.5
2.200	11.5	20.5	32.0	56.0	-24.0
0.162	20.6	20.4	41.0	65.4	-24.4
0.289	14.1	20.3	34.4	60.6	-26.1


Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	15.2	20.5	35.7	46.0	-10.3
2.752	12.5	20.5	33.0	46.0	-13.0
2.200	10.8	20.5	31.3	46.0	-14.7
0.176	17.2	20.3	37.5	54.7	-17.1
0.232	8.4	20.4	28.8	52.4	-23.6
0.289	1.9	20.3	22.2	50.6	-28.3
0.162	5.5	20.4	25.9	55.4	-29.5

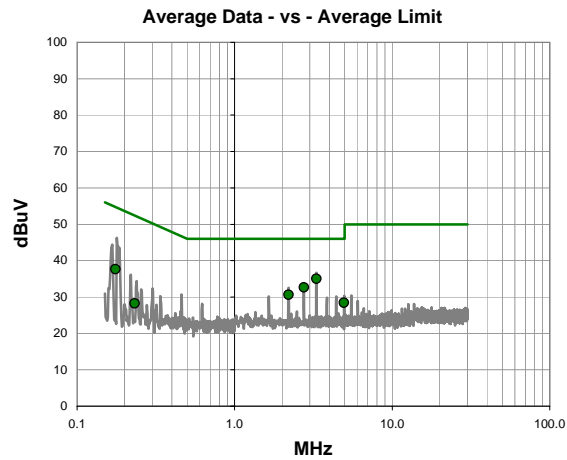
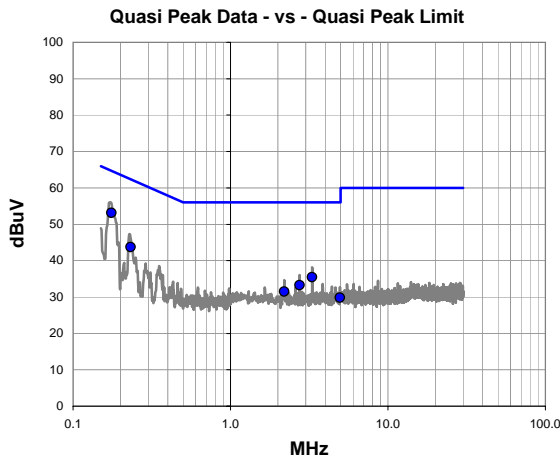


AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514	Tested by: Brandon Hobbs/Sabrina Sanders		
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	DH5 High channel FHSS			

Test Specifications	FCC 15.207:2012	Test Method	ANSI C63.10:2009
Run #	7	Line:	Neutral
Ext. Attenuation:	20	Results	Pass



Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.175	32.8	20.3	53.1	64.7	-11.6
0.232	23.4	20.4	43.8	62.4	-18.6
3.300	14.9	20.5	35.4	56.0	-20.6
2.752	12.7	20.5	33.2	56.0	-22.8
2.200	11.0	20.5	31.5	56.0	-24.5
4.952	9.1	20.7	29.8	56.0	-26.2

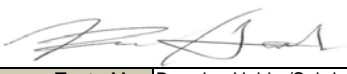
Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.5	20.5	35.0	46.0	-11.0
2.752	12.1	20.5	32.6	46.0	-13.4
2.200	10.1	20.5	30.6	46.0	-15.4
0.175	17.3	20.3	37.6	54.7	-17.1
4.952	7.7	20.7	28.4	46.0	-17.6
0.232	7.9	20.4	28.3	52.4	-24.1



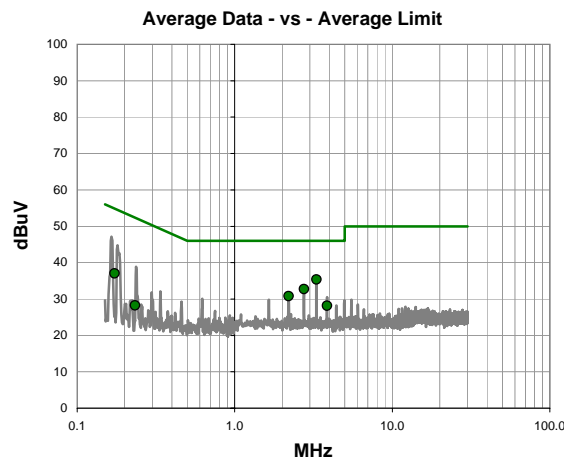
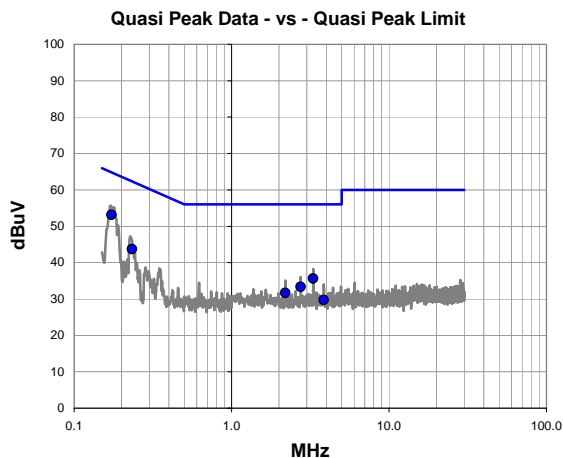
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	2DH5 Low channel FHSS			

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

Run #	8	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.173	32.8	20.3	53.1	64.8	-11.7
0.233	23.4	20.4	43.8	62.3	-18.6
3.300	15.1	20.5	35.6	56.0	-20.4
2.752	12.8	20.5	33.3	56.0	-22.7
2.200	11.2	20.5	31.7	56.0	-24.3
3.852	9.1	20.6	29.7	56.0	-26.3


Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.8	20.5	35.3	46.0	-10.7
2.752	12.2	20.5	32.7	46.0	-13.3
2.200	10.3	20.5	30.8	46.0	-15.2
0.173	16.7	20.3	37.0	54.8	-17.8
3.852	7.5	20.6	28.1	46.0	-17.9
0.233	7.9	20.4	28.3	52.3	-24.1



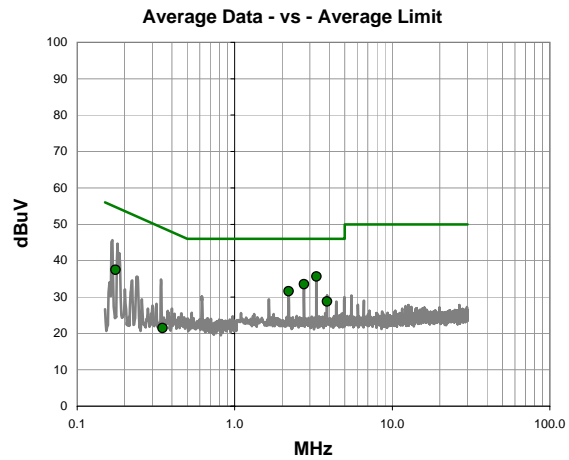
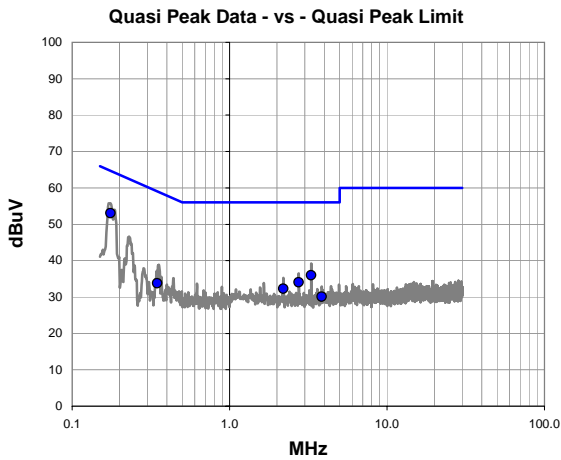
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	2DH5 Low channel FHSS			

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

Run #	9	Line:	High Line	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.175	32.7	20.3	53.0	64.7	-11.7
3.300	15.4	20.5	35.9	56.0	-20.1
2.752	13.5	20.5	34.0	56.0	-22.0
2.200	11.8	20.5	32.3	56.0	-23.7
0.348	13.5	20.3	33.8	59.0	-25.2
3.852	9.5	20.6	30.1	56.0	-25.9


Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	15.1	20.5	35.6	46.0	-10.4
2.752	13.0	20.5	33.5	46.0	-12.5
2.200	11.1	20.5	31.6	46.0	-14.4
0.175	17.1	20.3	37.4	54.7	-17.3
3.852	8.1	20.6	28.7	46.0	-17.3
0.348	1.2	20.3	21.5	49.0	-27.5



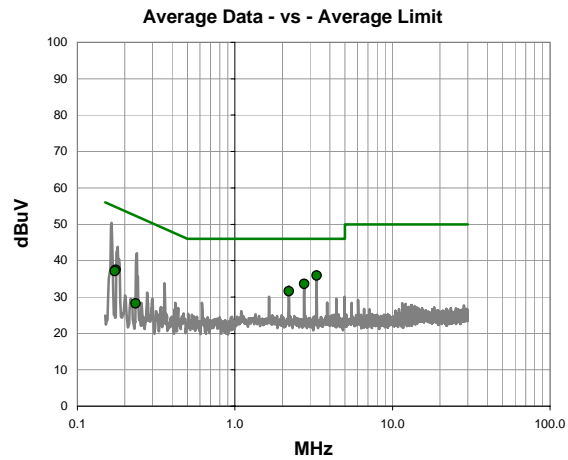
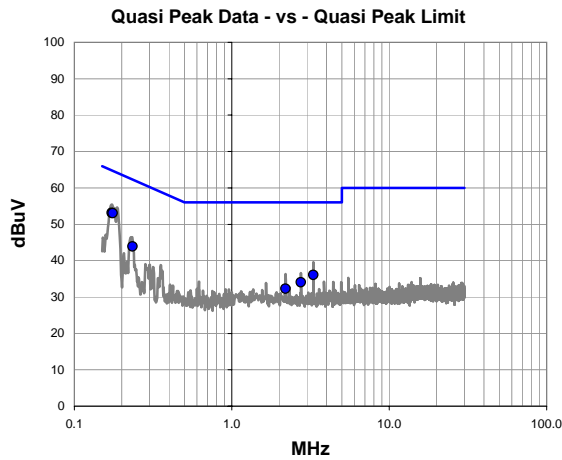
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	2DH5 Middle channel FHSS			

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

Run #	10	Line:	High Line	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.173	32.8	20.3	53.1	64.8	-11.7
0.175	32.7	20.3	53.0	64.7	-11.7
0.234	23.5	20.4	43.9	62.3	-18.5
3.300	15.5	20.5	36.0	56.0	-20.0
2.752	13.5	20.5	34.0	56.0	-22.0
2.200	11.8	20.5	32.3	56.0	-23.7


Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	15.3	20.5	35.8	46.0	-10.2
2.752	13.1	20.5	33.6	46.0	-12.4
2.200	11.1	20.5	31.6	46.0	-14.4
0.175	17.1	20.3	37.4	54.7	-17.3
0.173	16.8	20.3	37.1	54.8	-17.7
0.234	7.9	20.4	28.3	52.3	-24.1



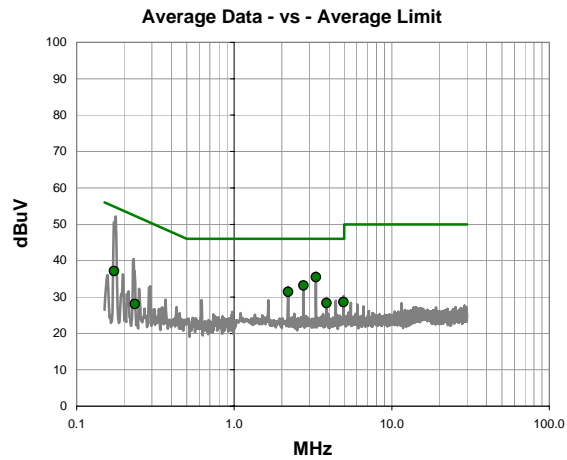
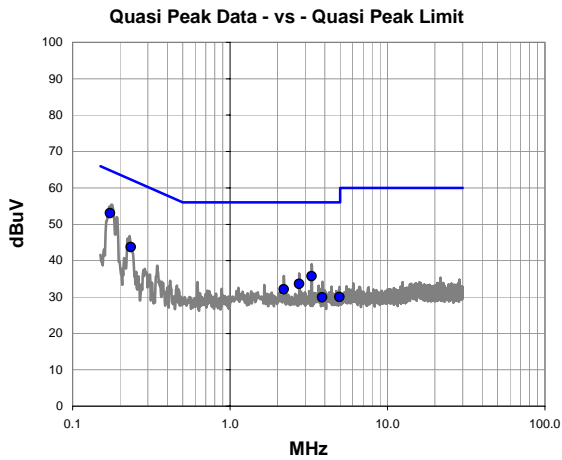
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	2DH5 Middle channel FHSS			

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

Run #	11	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.173	32.7	20.3	53.0	64.8	-11.8
0.234	23.4	20.4	43.8	62.3	-18.6
3.300	15.2	20.5	35.7	56.0	-20.3
2.752	13.1	20.5	33.6	56.0	-22.4
2.200	11.6	20.5	32.1	56.0	-23.9
4.952	9.3	20.7	30.0	56.0	-26.0
3.852	9.3	20.6	29.9	56.0	-26.1

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.9	20.5	35.4	46.0	-10.6
2.752	12.6	20.5	33.1	46.0	-12.9
2.200	10.9	20.5	31.4	46.0	-14.6
4.952	7.9	20.7	28.6	46.0	-17.4
0.173	16.8	20.3	37.1	54.8	-17.7
3.852	7.7	20.6	28.3	46.0	-17.7
0.234	7.7	20.4	28.1	52.3	-24.3



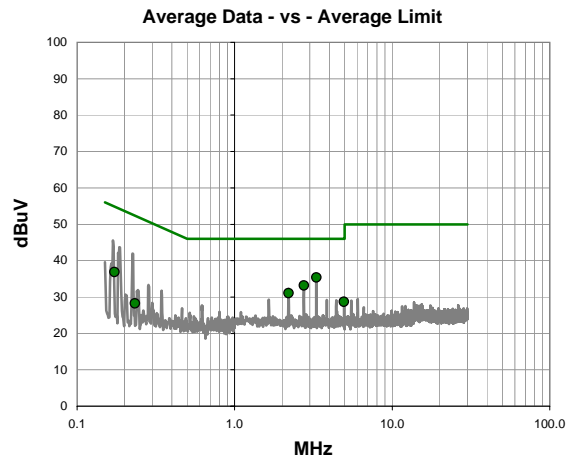
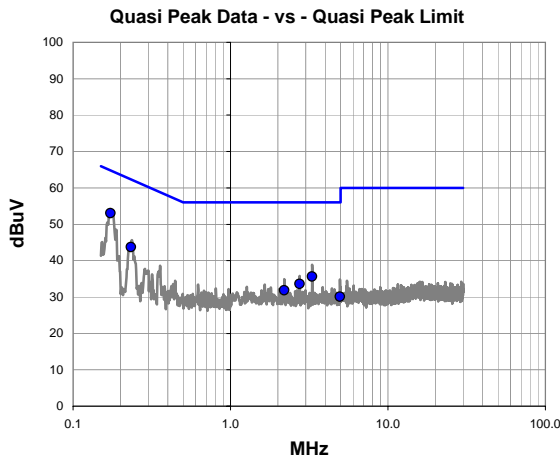
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	2DH5 High channel FHSS			

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

Run #	12	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.173	32.7	20.3	53.0	64.8	-11.8
0.233	23.4	20.4	43.8	62.3	-18.6
3.300	15.1	20.5	35.6	56.0	-20.4
2.752	13.1	20.5	33.6	56.0	-22.4
2.200	11.4	20.5	31.9	56.0	-24.1
4.952	9.4	20.7	30.1	56.0	-25.9


Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.8	20.5	35.3	46.0	-10.7
2.752	12.6	20.5	33.1	46.0	-12.9
2.200	10.6	20.5	31.1	46.0	-14.9
4.952	8.0	20.7	28.7	46.0	-17.3
0.173	16.5	20.3	36.8	54.8	-18.0
0.233	7.9	20.4	28.3	52.3	-24.1



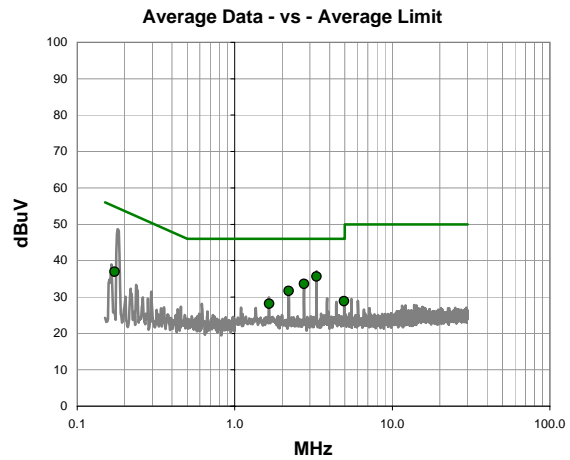
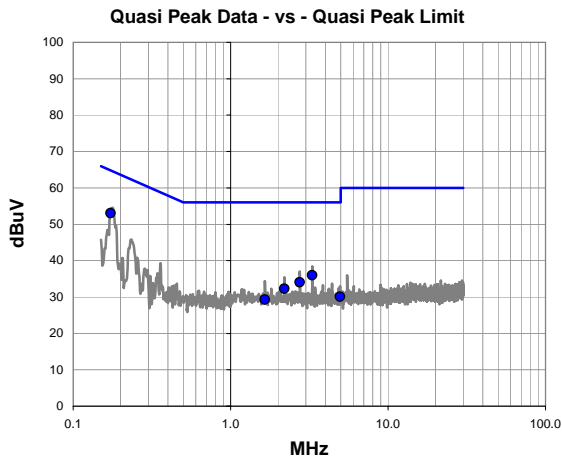
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	2DH5 High channel FHSS			

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

Run #	13	Line:	High Line	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.173	32.7	20.3	53.0	64.8	-11.8
3.300	15.4	20.5	35.9	56.0	-20.1
2.752	13.5	20.5	34.0	56.0	-22.0
2.200	11.8	20.5	32.3	56.0	-23.7
4.952	9.4	20.7	30.1	56.0	-25.9
1.652	8.8	20.4	29.2	56.0	-26.8


Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	15.1	20.5	35.6	46.0	-10.4
2.752	13.1	20.5	33.6	46.0	-12.4
2.200	11.2	20.5	31.7	46.0	-14.3
4.952	8.1	20.7	28.8	46.0	-17.2
1.652	7.7	20.4	28.1	46.0	-17.9
0.173	16.6	20.3	36.9	54.8	-17.9



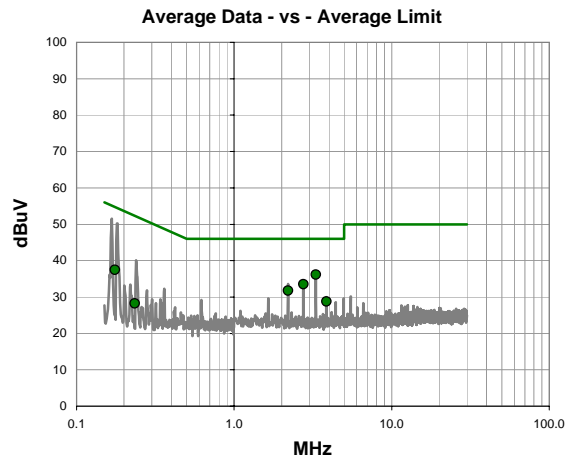
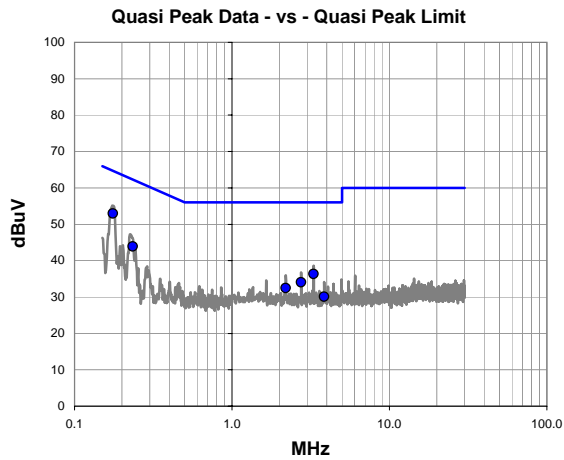
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	3DH5 Low channel FHSS			

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

Run #	14	Line:	High Line	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.175	32.6	20.3	52.9	64.7	-11.8
0.234	23.5	20.4	43.9	62.3	-18.5
3.300	15.8	20.5	36.3	56.0	-19.7
2.752	13.5	20.5	34.0	56.0	-22.0
2.200	12.0	20.5	32.5	56.0	-23.5
3.852	9.5	20.6	30.1	56.0	-25.9

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	15.6	20.5	36.1	46.0	-9.9
2.752	13.0	20.5	33.5	46.0	-12.5
2.200	11.3	20.5	31.8	46.0	-14.2
0.175	17.1	20.3	37.4	54.7	-17.3
3.852	8.1	20.6	28.7	46.0	-17.3
0.234	7.9	20.4	28.3	52.3	-24.1



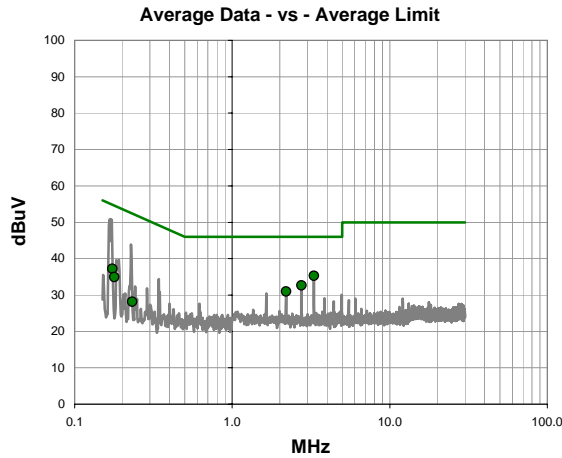
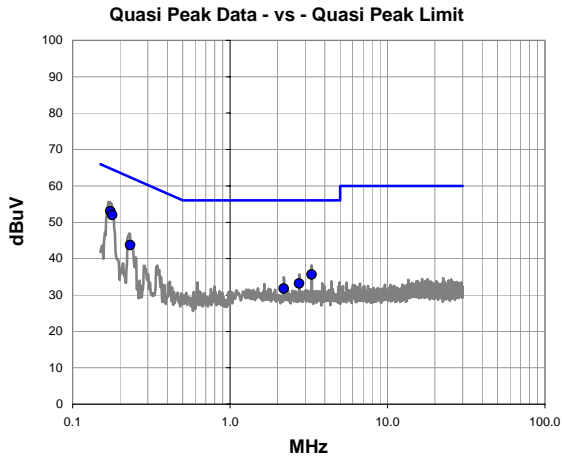
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	3DH5 Low channel FHSS			

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

Run #	15	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.174	32.7	20.3	53.0	64.8	-11.7
0.179	31.6	20.3	51.9	64.5	-12.6
0.232	23.4	20.4	43.8	62.4	-18.6
3.300	15.1	20.5	35.6	56.0	-20.4
2.752	12.6	20.5	33.1	56.0	-22.9
2.200	11.3	20.5	31.8	56.0	-24.2


Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.7	20.5	35.2	46.0	-10.8
2.752	12.1	20.5	32.6	46.0	-13.4
2.200	10.5	20.5	31.0	46.0	-15.0
0.174	16.9	20.3	37.2	54.8	-17.5
0.179	14.6	20.3	34.9	54.5	-19.6
0.232	7.8	20.4	28.2	52.4	-24.2



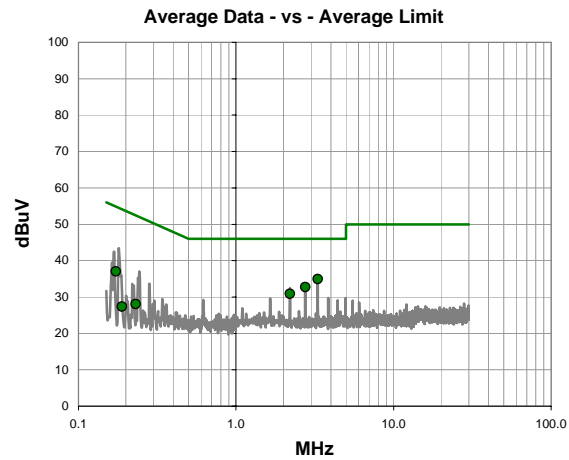
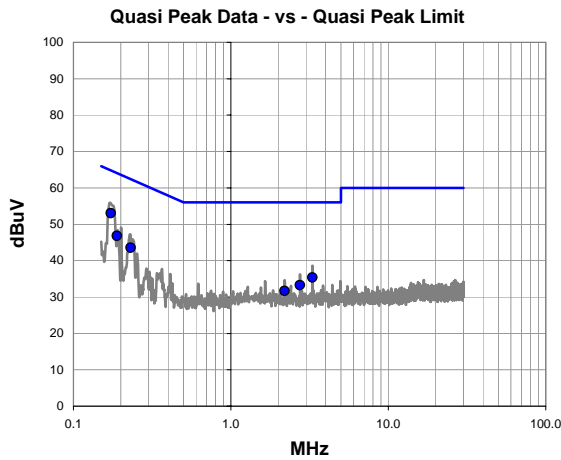
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	3DH5 Middle channel FHSS			

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

Run #	16	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.173	32.7	20.3	53.0	64.8	-11.8
0.189	26.4	20.3	46.7	64.1	-17.3
0.231	23.2	20.4	43.6	62.4	-18.9
3.300	14.8	20.5	35.3	56.0	-20.7
2.752	12.7	20.5	33.2	56.0	-22.8
2.200	11.2	20.5	31.7	56.0	-24.3


Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.4	20.5	34.9	46.0	-11.1
2.752	12.2	20.5	32.7	46.0	-13.3
2.200	10.4	20.5	30.9	46.0	-15.1
0.173	16.7	20.3	37.0	54.8	-17.8
0.231	7.7	20.4	28.1	52.4	-24.4
0.189	7.0	20.3	27.3	54.1	-26.7



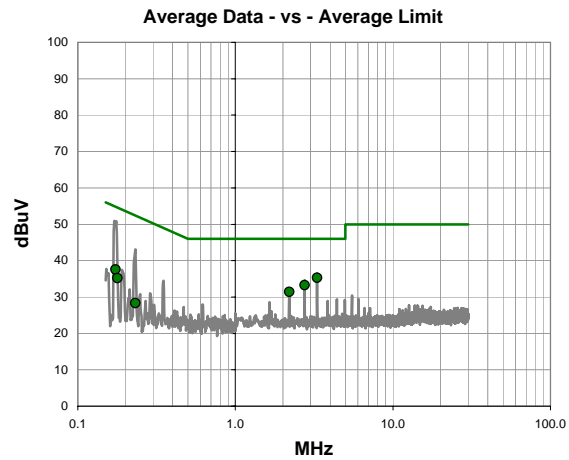
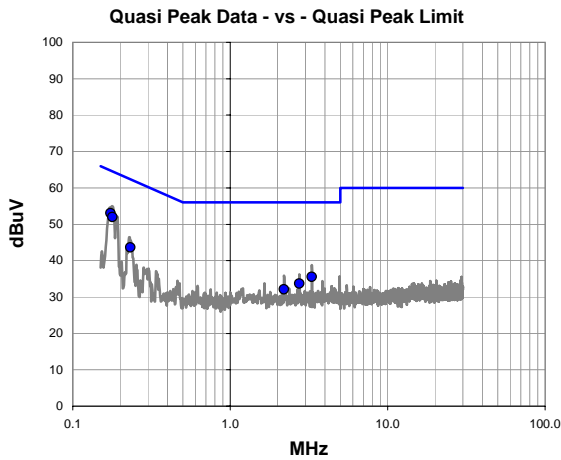
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	3DH5 Middle channel FHSS			

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

Run #	17	Line:	High Line	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.174	32.7	20.3	53.0	64.8	-11.7
0.179	31.6	20.3	51.9	64.5	-12.6
0.232	23.3	20.4	43.7	62.4	-18.7
3.300	15.0	20.5	35.5	56.0	-20.5
2.752	13.2	20.5	33.7	56.0	-22.3
2.200	11.6	20.5	32.1	56.0	-23.9


Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.7	20.5	35.2	46.0	-10.8
2.752	12.7	20.5	33.2	46.0	-12.8
2.200	10.9	20.5	31.4	46.0	-14.6
0.174	17.2	20.3	37.5	54.8	-17.2
0.179	14.8	20.3	35.1	54.5	-19.4
0.232	8.0	20.4	28.4	52.4	-24.0



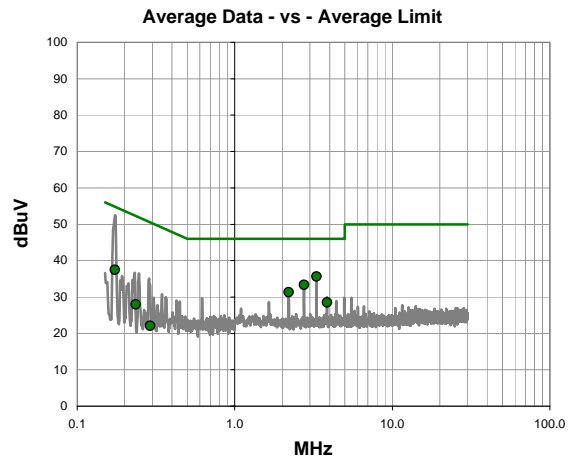
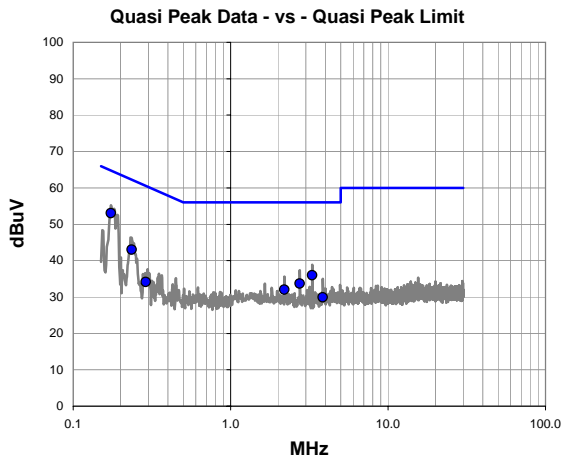
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	3DH5 High channel FHSS			

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

Run #	18	Line:	High Line	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.174	32.7	20.3	53.0	64.8	-11.7
0.235	22.7	20.4	43.1	62.3	-19.2
3.300	15.4	20.5	35.9	56.0	-20.1
2.752	13.2	20.5	33.7	56.0	-22.3
2.200	11.5	20.5	32.0	56.0	-24.0
3.852	9.3	20.6	29.9	56.0	-26.1
0.290	13.8	20.3	34.1	60.5	-26.4

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	15.1	20.5	35.6	46.0	-10.4
2.752	12.8	20.5	33.3	46.0	-12.7
2.200	10.8	20.5	31.3	46.0	-14.7
0.174	17.1	20.3	37.4	54.8	-17.3
3.852	7.9	20.6	28.5	46.0	-17.5
0.235	7.6	20.4	28.0	52.3	-24.3
0.290	1.8	20.3	22.1	50.5	-28.4



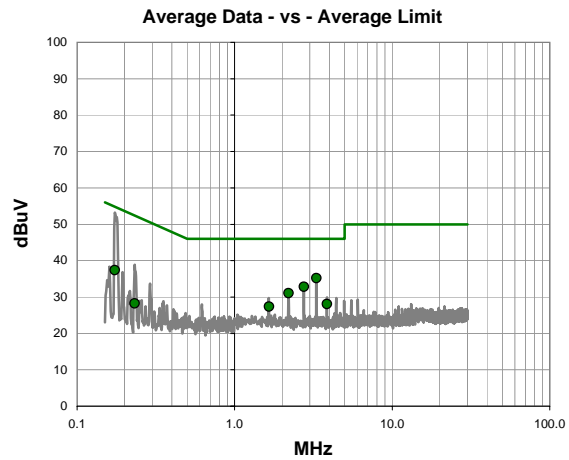
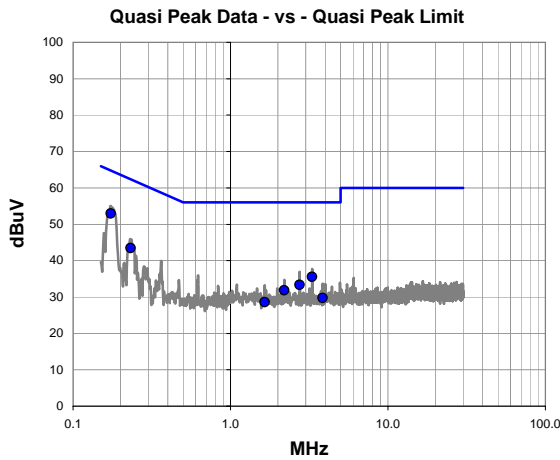
AC POWERLINE CONDUCTED EMISSIONS

PSA-ESCI 2012.09.25
PSA-ESCI Version 2011.12.21

Work Order:	MCSO1633	Date:	11/19/12	
Project:	None	Temperature:	20 °C	
Job Site:	EV12	Humidity:	53% RH	
Serial Number:	000215624253	Barometric Pres.:	1000 mbar	
EUT:	1514			
Configuration:	2			
Customer:	Microsoft Corporation			
Attendees:	None			
EUT Power:	110VAC/60Hz			
Operating Mode:	Transmitting Bluetooth LE			
Deviations:	None			
Comments:	3DH5 High channel FHSS			

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

Run #	19	Line:	Neutral	Ext. Attenuation:	20	Results	Pass
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Quasi Peak Data - vs - Quasi Peak Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
0.174	32.6	20.3	52.9	64.8	-11.8
0.232	23.1	20.4	43.5	62.4	-18.9
3.300	15.0	20.5	35.5	56.0	-20.5
2.752	12.8	20.5	33.3	56.0	-22.7
2.200	11.4	20.5	31.9	56.0	-24.1
3.852	9.1	20.6	29.7	56.0	-26.3
1.652	8.1	20.4	28.5	56.0	-27.5

Average Data - vs - Average Limit

Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Adjusted (dBuV)	Spec. Limit (dBuV)	Compared to Spec. (dB)
3.300	14.6	20.5	35.1	46.0	-10.9
2.752	12.3	20.5	32.8	46.0	-13.2
2.200	10.6	20.5	31.1	46.0	-14.9
0.174	17.0	20.3	37.3	54.8	-17.4
3.852	7.4	20.6	28.0	46.0	-18.0
1.652	6.9	20.4	27.3	46.0	-18.7
0.232	7.9	20.4	28.3	52.4	-24.1