

Microsoft Corporation

Accessory Wireless Controller Model: 1470

Report No. MCSO1554 Rev. 1

Report Prepared By



www.nwemc.com

1-888-EMI-CERT

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EMC Test Report

Certificate of Test
Last Date of Test: May 30, 2011
Microsoft Corporation
Model: Accessory Wireless Controller

Emissions			
Test Description	Specification	Test Method	Pass/Fail
Carrier Frequency Separation	FCC 15.247:2011	ANSI C63.10:2009	Pass
Dwell Time	FCC 15.247:2011	ANSI C63.10:2009	Pass
Number of Hopping Frequencies	FCC 15.247:2011	ANSI C63.10:2009	Pass
Occupied Bandwidth	FCC 15.247:2011	ANSI C63.10:2009	Pass
Output Power	FCC 15.247:2011	ANSI C63.10:2009	Pass
Band Edge Compliance	FCC 15.247:2011	ANSI C63.10:2009	Pass
Spurious Conducted Emissions	FCC 15.247:2011	ANSI C63.10:2009	Pass
Power Spectral Density	FCC 15.247:2011	ANSI C63.10:2009	Pass
Spurious Radiated Emissions	FCC 15.247:2011	ANSI C63.10:2009	Pass

Modifications made to the product

See the Modifications section of this report

Test Facility

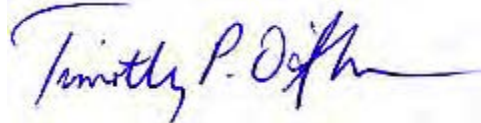
The measurement facility used to collect the data is located at:

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).

Approved By:



Tim O'Shea, Operations Manager



NVLAP Lab Code: 200630-0

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

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

Revision Number	Description	Date	Page Number
01	Updated last date of test of Certificate of Test and Product Description pages to reflect new testing.	7/1/2011	2, 7
01	Added item 10, Band Edge Compliance Hopping Mode, to Modifications page.	7/1/2011	9
01	Added Band Edge Compliance Hopping Mode test data to report.	7/1/2011	48-50

Barometric Pressure

The recorded barometric pressure has been normalized to sea level.



Accreditations and Authorizations

FCC

Accredited by NVLAP for performance of FCC radio, digital, and ISM device testing. Our Open Area Test Sites, certification chambers, and conducted measurement facilities have been fully described in reports filed with the FCC and accepted by the FCC in letters maintained in our files. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by the FCC as a Telecommunications Certification Body (TCB). This allows Northwest EMC to certify transmitters to FCC specifications in accordance with 47 CFR 2.960 and 2.962.

NVLAP

Northwest EMC, Inc. is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with the requirements of ISO/IEC 17025 for Testing Laboratories. NVLAP is administered by the National Institute of Standards and Technology (NIST), an agency of the U.S. Commerce Department. The NVLAP accreditation encompasses Electromagnetic Compatibility Testing in accordance with the European Union EMC Directive 2004/108/EC, and ANSI C63.4. Additionally, Northwest EMC is accredited by NVLAP to perform radio testing in accordance with the European Union R&TTE Directive 1999/5/EEC, the requirements of FCC, and the RSS radio standards for Industry Canada.

Industry Canada

Accredited by NVLAP for performance of Industry Canada RSS and ICES testing. Our Open Area Test Sites and certification chambers comply with RSS-Gen, Issue 2 and have been filed with Industry Canada and accepted. Northwest EMC has been accredited by ANSI to ISO / IEC Guide 65 as a product certifier. We have been designated by NIST and recognized by Industry Canada as a Certification Body (CB) per the APEC Mutual Recognition Arrangement (MRA). This allows Northwest EMC to certify transmitters to Industry Canada technical requirements. (*Site Filing Numbers - Hillsboro: 2834D-1, 2834D-2, Sultan: 2834C-1, Irvine: 2834B-1, 2834B-2, Brooklyn Park: 2834E-1*)

CAB

Designated by NIST and validated by the European Commission as a Conformity Assessment Body (CAB) to conduct tests and approve products to the EMC directive and transmitters to the R&TTE directive, as described in the U.S. - EU Mutual Recognition Agreement.

Australia/New Zealand

The National Association of Testing Authorities (NATA), Australia has been appointed by the ACA as an accreditation body to accredit test laboratories and competent bodies for EMC standards. Accredited test reports or assessments by competent bodies must carry the NATA logo. Test reports made by an overseas laboratory that has been accredited for the relevant standards by an overseas accreditation body that has a Mutual Recognition Agreement (MRA) with NATA are also accepted as technical grounds for product conformity. The report should be endorsed with the respective logo of the accreditation body (NVLAP).



Accreditations and Authorizations

VCCI

Accepted as an Associate Member to the VCCI, Acceptance No. 564. Conducted and radiated measurement facilities have been registered in accordance with Regulations for Voluntary Control Measures, Article 8. (*Registration Numbers. - Hillsboro: C-1071, R-1025, G-84, C-2687, T-1658, and R-2318, Irvine: R-1943, G-85, C-2766, and T-1659, Sultan: R-871, G-83, C-1784, and T-1511, Brooklyn Park: R-3125, G-86, G-141, C-3464, and T-1634.*)

BSMI

Northwest EMC has been designated by NIST and validated by C-Taipei (BSMI) as a CAB to conduct tests as described in the APEC Mutual Recognition Agreement (US0017).

GOST

Northwest EMC, Inc. has been assessed and accredited by the Russian Certification bodies Certinform VNIINMASH, CERTINFO, SAMTES, and Federal CHEC, to perform EMC and Hygienic testing for Information Technology Products. As a result of their laboratory assessment, they will accept test results from Northwest EMC, Inc. for product certification

KCC

Northwest EMC, Inc is a CAB designated by MRA partners and recognized by Korea. (*Assigned Lab Numbers: Hillsboro: US0017, Irvine: US0158, Sultan: US0157, Brooklyn Park: US0175*)

VIETNAM

Vietnam MIC has approved Northwest EMC as an accredited test lab. Per Decision No. 194/QD-QLCL (dated December 15, 2009), Northwest EMC test reports can be used for Vietnam approval submissions.

SCOPE

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

<http://www.nwemc.com/accreditations/>



Northwest EMC Locations



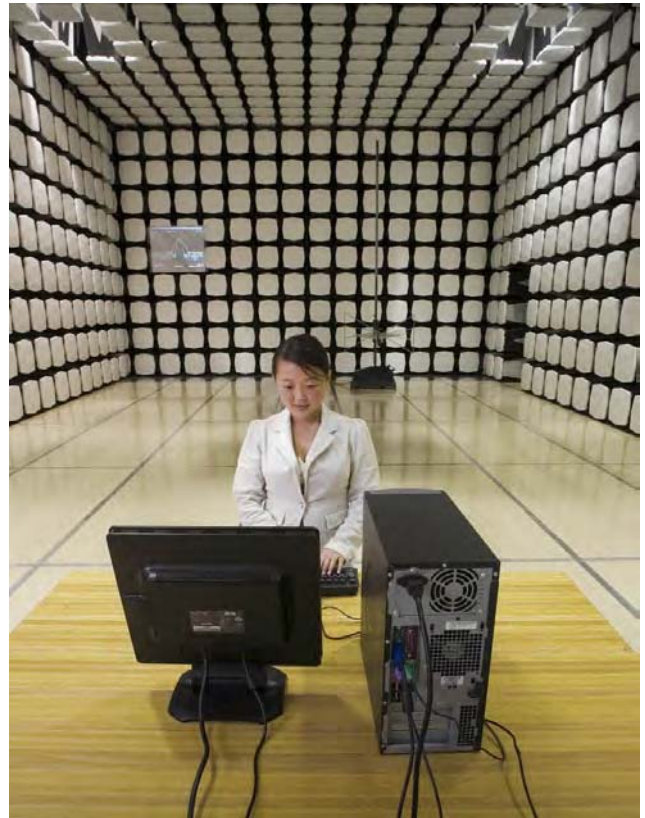
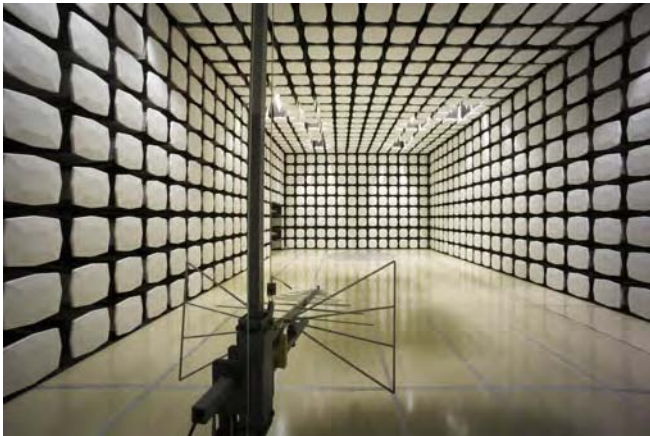
Oregon
Labs EV01-EV12
22975 NW Evergreen Pkwy
Suite 400
Hillsboro, OR 97124
(503) 844-4066

California
Labs OC01-OC13
41 Tesla
Irvine, CA 92618
(949) 861-8918

Minnesota
Labs MN01-MN08
9349 W Broadway Ave.
Brooklyn Park,
MN 55445
(763) 425-2281

Washington
Labs SU01-SU07
14128 339th Ave. SE
Sultan, WA 98294
(360) 793-8675

New York
Labs WA01-WA04
4939 Jordan Rd.
Elbridge, NY 13060
(315) 685-0796



Party Requesting the Test

Company Name:	Microsoft Corporation
Address:	One Microsoft Way
City, State, Zip:	Redmond, WA 98052-6399
Test Requested By:	Mike Boucher
Model:	Accessory Wireless Controller
First Date of Test:	May 11, 2011
Last Date of Test:	May 30, 2011
Receipt Date of Samples:	May 11, 2011
Equipment Design Stage:	Preproduction
Equipment Condition:	No Damage

Information Provided by the Party Requesting the Test**Functional Description of the EUT (Equipment Under Test):**

2.4 GHz radio

Testing Objective:

To demonstrate compliance to FCC 15.247 requirements.

CONFIGURATION 1 MCSO1554

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Accessory Wireless Controller	Microsoft	1470	BRI-B2-EV4-318

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Front Panel Module	Microsoft	1410	X821258-004-EV2C-IB045
USB / PSI convertor	Microsoft	Unknown	Unknown
DC Level convertor	Microsoft	Unknown	Unknown
Notebook PC	Lenovo	Unknown	Unknown

CONFIGURATION 2 MCSO1554

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Accessory Wireless Controller	Microsoft	1470	FAI-M-EV4-010

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Front Panel Module	Microsoft	1410	X821258-004-EV2C-IB045
USB / PSI convertor	Microsoft	Unknown	Unknown
DC Level convertor	Microsoft	Unknown	Unknown
Notebook PC	Lenovo	Unknown	Unknown

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
USB	Yes	1.2m	No	USB / PSI convertor	Notebook PC
SPI	Yes	1.2m	No	USB / PSI convertor	Notebook PC

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	5/11/2011	Number of Hopping Frequencies	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
2	5/11/2011	Carrier Frequency Separation	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
3	5/11/2011	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
4	5/11/2011	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.
5	5/11/2011	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.
6	5/11/2011	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.
7	5/11/2011	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.
8	5/11/2011	Dwell Time	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
9	5/12/2011	Spurious Radiated Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.
10	5/30/2011	Band Edge Compliance Hopping Mode	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.

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
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	24
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Signal Generator	Agilent	E8257D	TGX	3/22/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The carrier frequency separation was measured between each of 5 hopping channels 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.

EMC

CARRIER FREQUENCY SEPARATION

EUT: Accessory Wireless Controller		Work Order: MCSO1554
Serial Number: BRI-B2-EV4-318		Date: 05/11/11
Customer: Microsoft Corporation		Temperature: 22°C
Attendees: Andy Mitra		Humidity: 39%
Project: None		Barometric Pres.: 1011.8 mb
Tested by: Rod Peloquin	Power: USB	Job Site: EV06

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

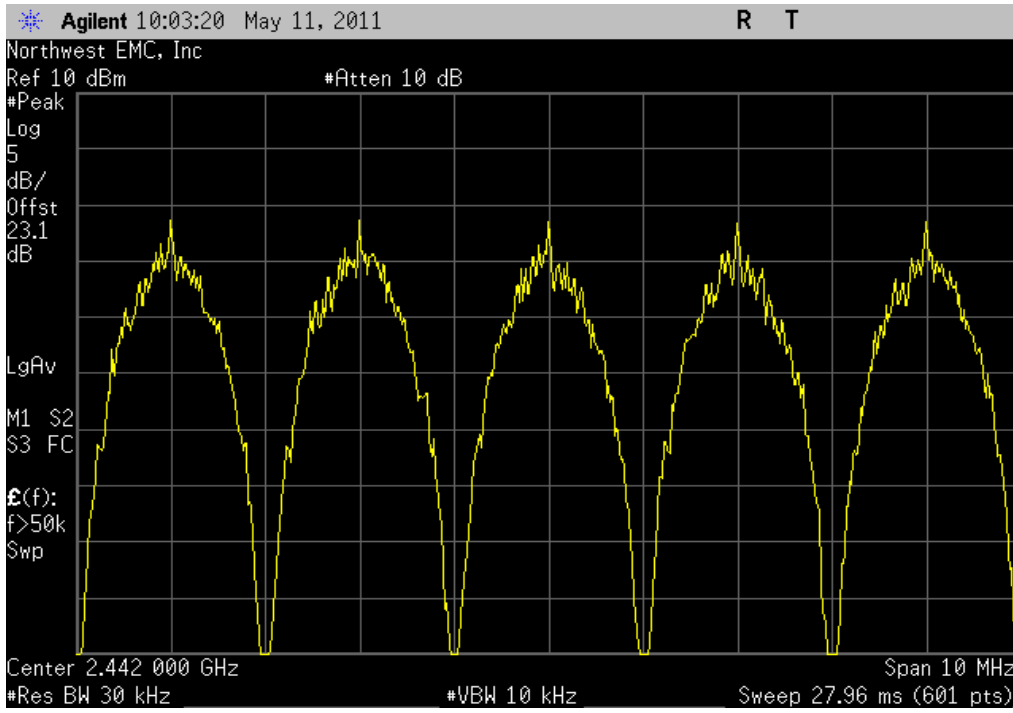
COMMENTS
 EUT hopping in a normal mode while bound to front panel module.

DEVIATIONS FROM TEST STANDARD
 No Deviations

Configuration #	1	<i>Rod Peloquin</i> Signature
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	Value	Limit	Results
Channel Separation	2 MHz	≥ 925 kHz	Pass

Channel Separation		
Result: Pass	Value: 2 MHz	Limit: ≥ 925 kHz



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
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	24
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Signal Generator	Agilent	E8257D	TGX	3/22/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

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 EUT uses a total of 41 hopping channels. The total allowable dwell time is 400 ms in a period of $.4 \times 41 = 16.4$ s

The pulse width of the transmission is .270 ms. The highest dwell time found was during a 250 ms sweep with 18 pulses

There are 65.6 250 ms periods in 16.4 s for a total of 1180.8 pulses of .27 ms for a total dwell time of .3188 ms.

EMC

DWELL TIME

EUT:	Accessory Wireless Controller	Work Order:	MCSO1554
Serial Number:	BRI-B2-EV4-318	Date:	05/11/11
Customer:	Microsoft Corporation	Temperature:	22°C
Attendees:	Andy Mitra	Humidity:	39%
Project:	None	Barometric Pres.:	1011.8 mb
Tested by:	Rod Peloquin	Power:	USB
		Job Site:	EV06

TEST SPECIFICATIONS		TEST METHOD	
FCC 15.247:2011		ANSI C63.10:2009	

COMMENTS

EUT hopping in a normal mode while bound to front panel module.

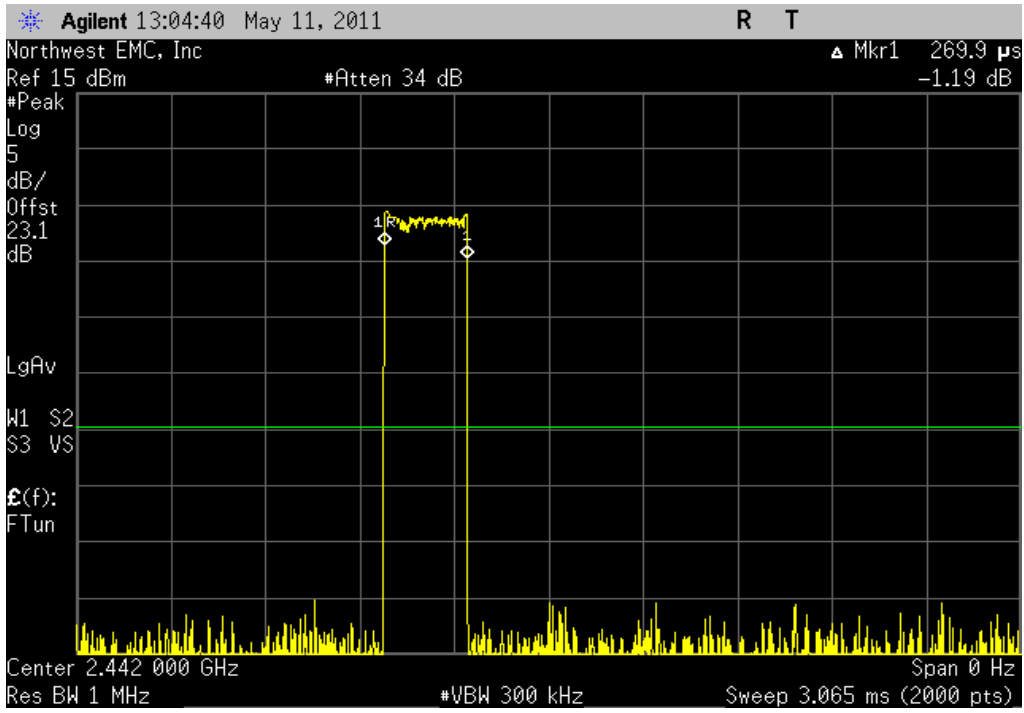
DEVIATIONS FROM TEST STANDARD

No Deviations

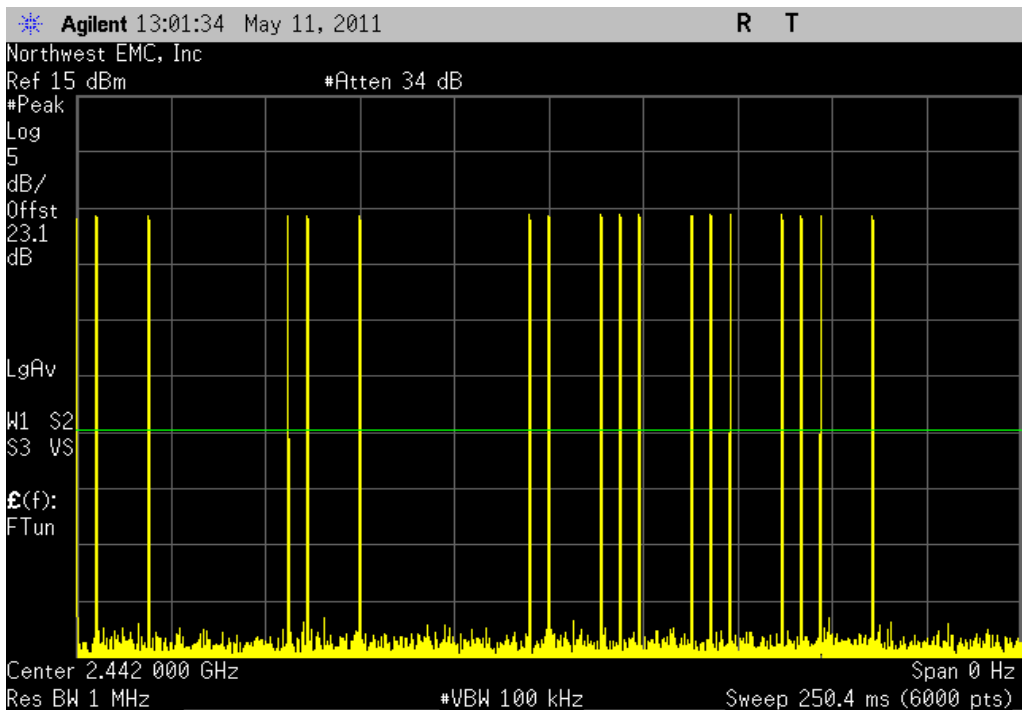
Configuration #	1	<i>Rod Peloquin</i> Signature
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	Value	Limit	Results
Pulse Width	0.270 ms	400 ms in 16.4 s	Pass
250 ms sweep	319 ms in 16.4 s	400 ms in 16.4 s	Pass

Pulse Width		
Result: Pass	Value: 0.270 ms	Limit: 400 ms in 16.4 s



250 ms sweep		
Result: Pass	Value: 319 ms in 16.4 s	Limit: 400 ms in 16.4 s



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
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	24
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Signal Generator	Agilent	E8257D	TGX	3/22/2011	12

MEASUREMENT UNCERTAINTY


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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

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.

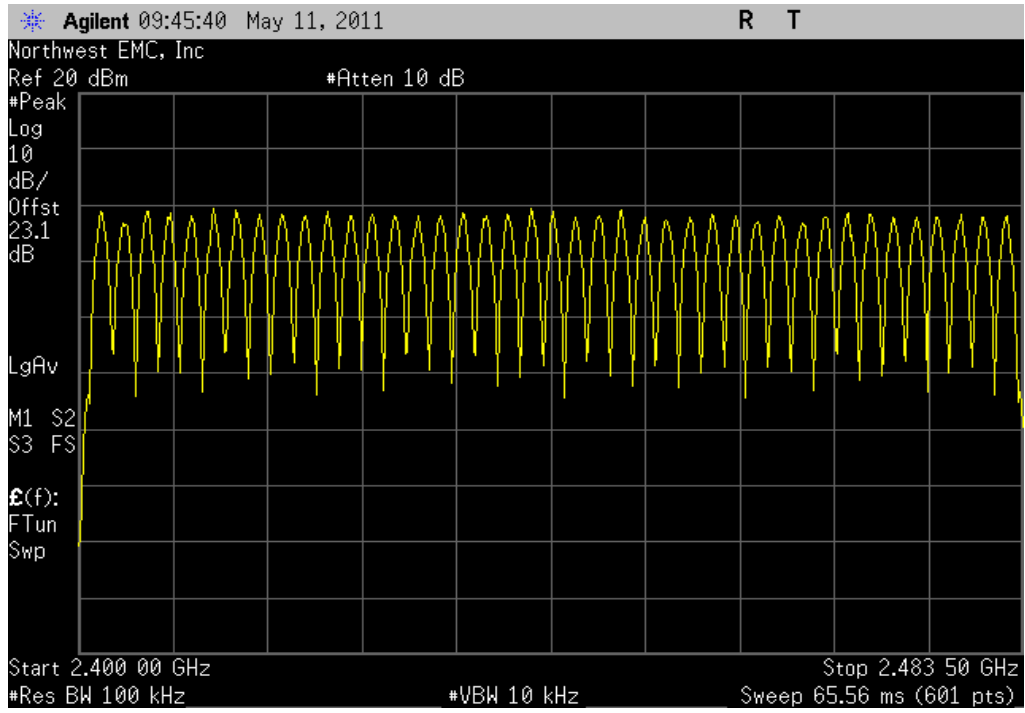
EMC

NUMBER OF HOPPING FREQUENCIES

EUT: Accessory Wireless Controller		Work Order: MCSO1554	
Serial Number: BRI-B2-EV4-318		Date: 05/11/11	
Customer: Microsoft Corporation		Temperature: 22°C	
Attendees: Andy Mitra		Humidity: 39%	
Project: None		Barometric Pres.: 1011.8 mb	
Tested by: Rod Peloquin		Power: USB	Job Site: EV06
TEST SPECIFICATIONS		TEST METHOD	
FCC 15.247:2011		ANSI C63.10:2009	
COMMENTS			
EUT hopping in a normal mode while bound to controller board.			
DEVIATIONS FROM TEST STANDARD			
No Deviations			
Configuration #	1	 Signature	
		Value	Limit
Number of Hopping Frequencies		41	> 15
			Results
			Pass

NUMBER OF HOPPING FREQUENCIES

Number of Hopping Frequencies		
Result: Pass	Value: 41	Limit: > 15



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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40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Signal Generator	Agilent	E8257D	TGX	3/22/2011	12

MEASUREMENT UNCERTAINTY

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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 its maximum data rate in a no hop mode.

OCCUPIED BANDWIDTH

EMC

EUT:	Accessory Wireless Controller	Work Order:	MCSO1554
Serial Number:	BRI-B2-EV4-318	Date:	05/11/11
Customer:	Microsoft Corporation	Temperature:	22°C
Attendees:	Andy Mitra	Humidity:	39%
Project:	None	Barometric Pres.:	1011.8 mb
Tested by:	Rod Peloquin	Power:	USB
		Job Site:	EV06

TEST SPECIFICATIONS

FCC 15.247:2011

TEST METHOD

ANSI C63.10:2009

COMMENTS

Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle.

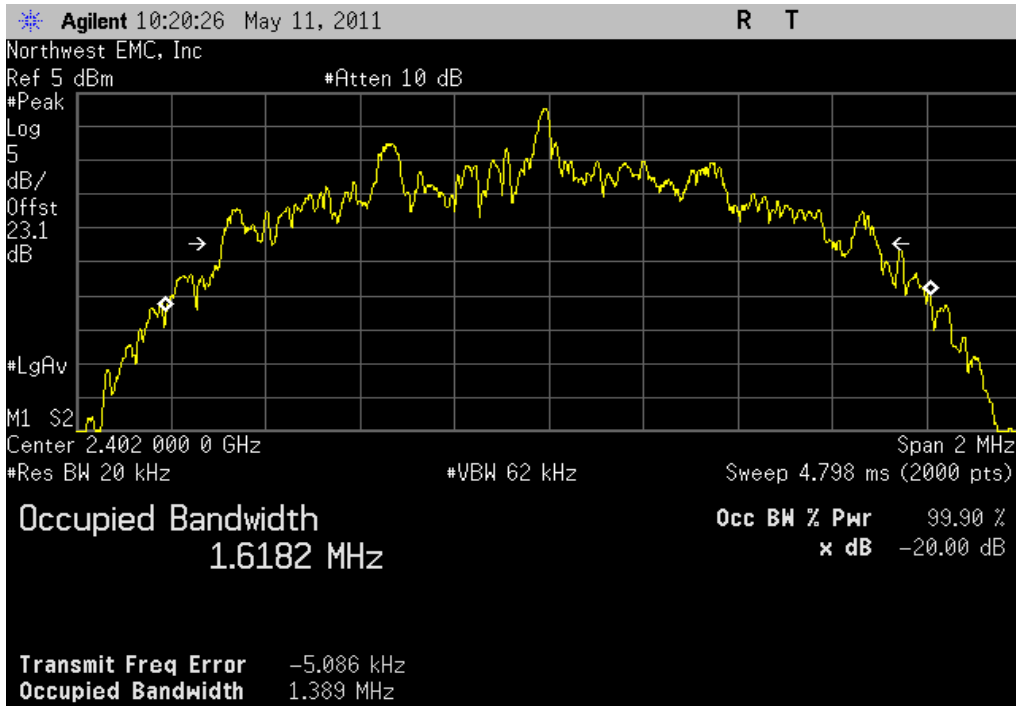
DEVIATIONS FROM TEST STANDARD

No Deviations

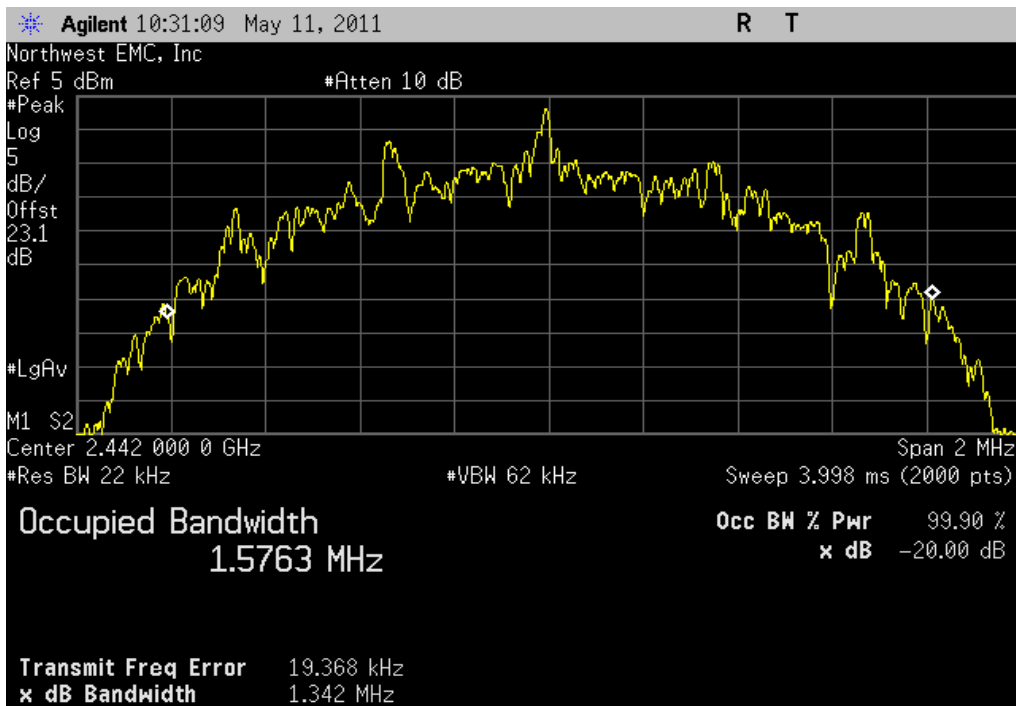
Configuration #	1	<i>Rod Peloquin</i> Signature
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	Value	Limit	Results
Low Channel	1.389 MHz	< 1.5 MHz	Pass
Mid Channel	1.342 MHz	< 1.5 MHz	Pass
High Channel	1.374 MHz	< 1.5 MHz	Pass

Low Channel		
Result: Pass	Value: 1.389 MHz	Limit: < 1.5 MHz



Mid Channel		
Result: Pass	Value: 1.342 MHz	Limit: < 1.5 MHz



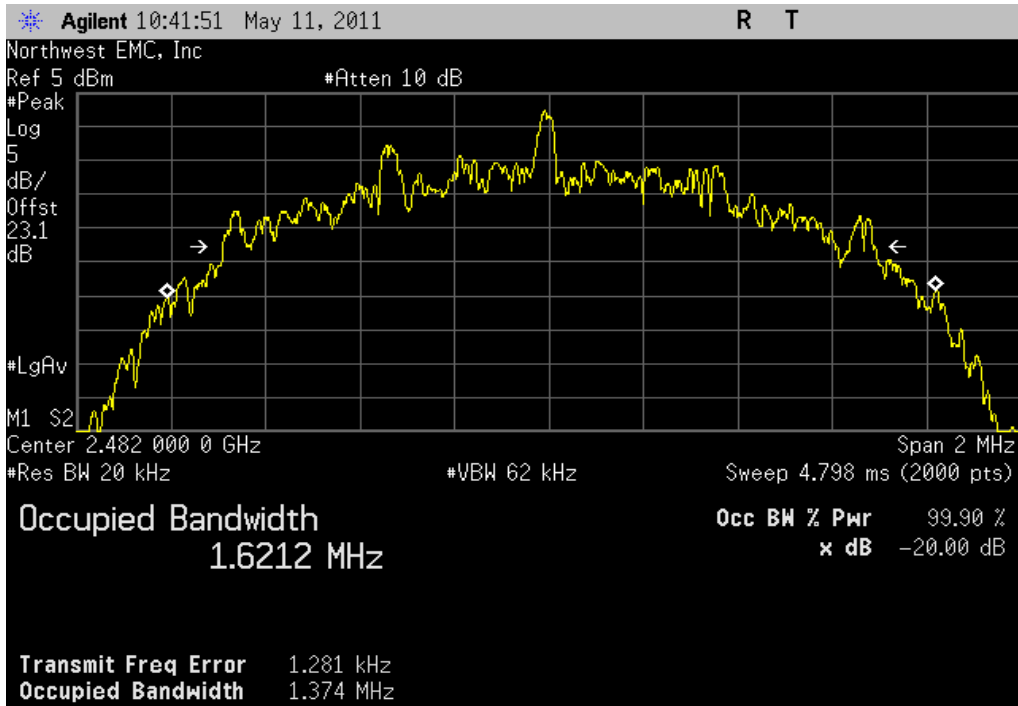
OCCUPIED BANDWIDTH

High Channel

Result: Pass

Value: 1.374 MHz

Limit: < 1.5 MHz



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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40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Signal Generator	Agilent	E8257D	TGX	3/22/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

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 at its maximum data rate in a no hop mode.

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

EMC

OUTPUT POWER

EUT:	Accessory Wireless Controller	Work Order:	MCSO1554
Serial Number:	BRI-B2-EV4-318	Date:	05/11/11
Customer:	Microsoft Corporation	Temperature:	22°C
Attendees:	Andy Mitra	Humidity:	39%
Project:	None	Barometric Pres.:	1011.8 mb
Tested by:	Rod Peloquin	Power:	USB
		Job Site:	EV06

TEST SPECIFICATIONS

FCC 15.247:2011

TEST METHOD

ANSI C63.10:2009

COMMENTS

Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle.

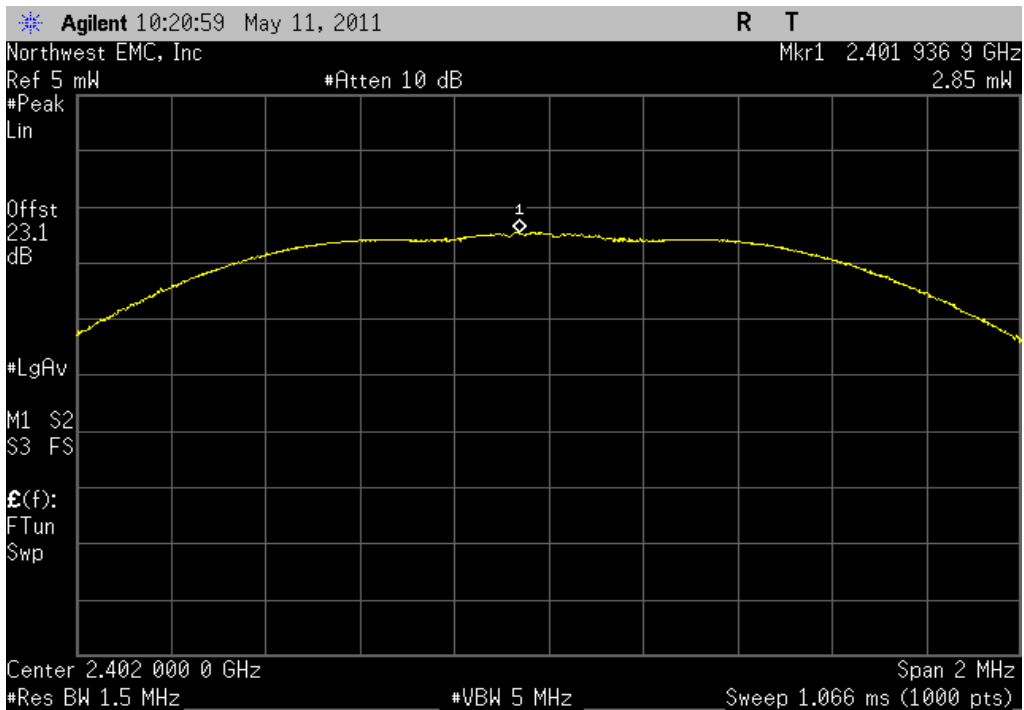
DEVIATIONS FROM TEST STANDARD

No Deviations

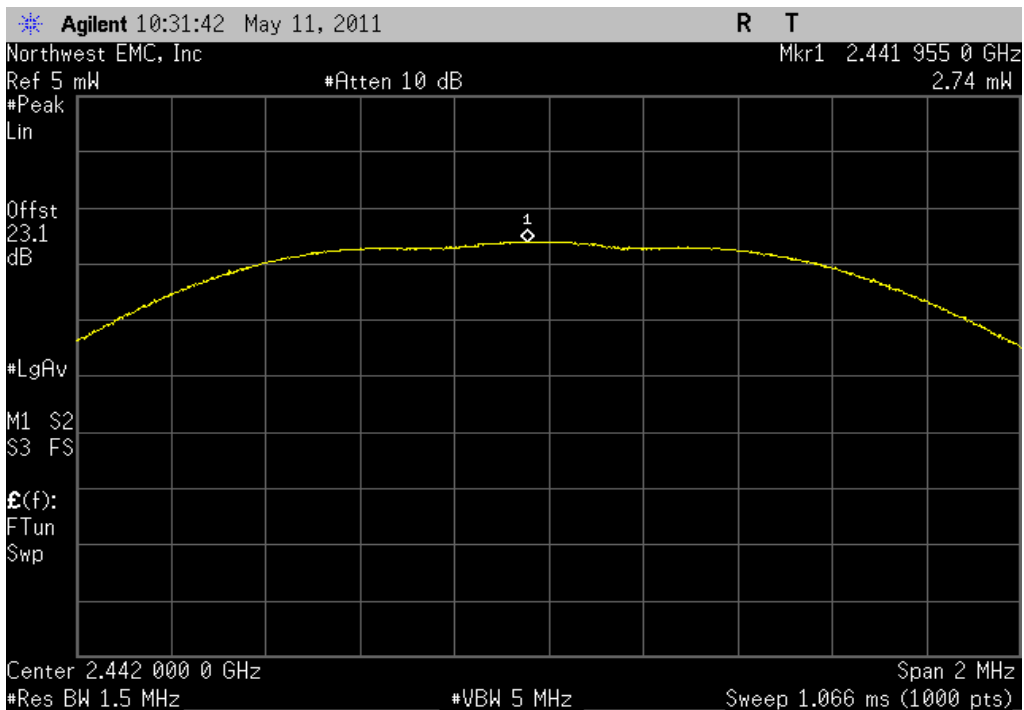
Configuration #	1	<i>Rod Peloquin</i> Signature
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	Value	Limit	Results
Low Channel	2.9 mW	125 mW	Pass
Mid Channel	2.7 mW	125 mW	Pass
High Channel	2.6 mW	125 mW	Pass

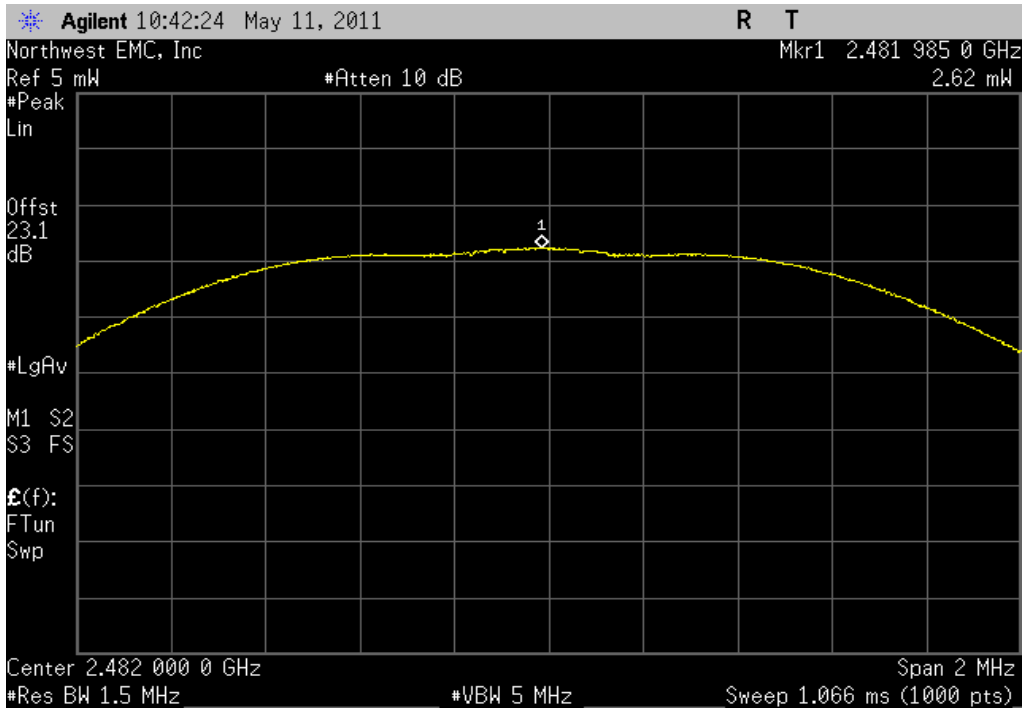
Low Channel		
Result: Pass	Value: 2.9 mW	Limit: 125 mW



Mid Channel		
Result: Pass	Value: 2.7 mW	Limit: 125 mW



High Channel		
Result: Pass	Value: 2.6 mW	Limit: 125 mW



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
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	24
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Signal Generator	Agilent	E8257D	TGX	3/22/2011	12

MEASUREMENT UNCERTAINTY

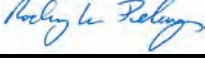
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

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 its maximum data rate in a no hop mode. The channels closest to the band edges were selected. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

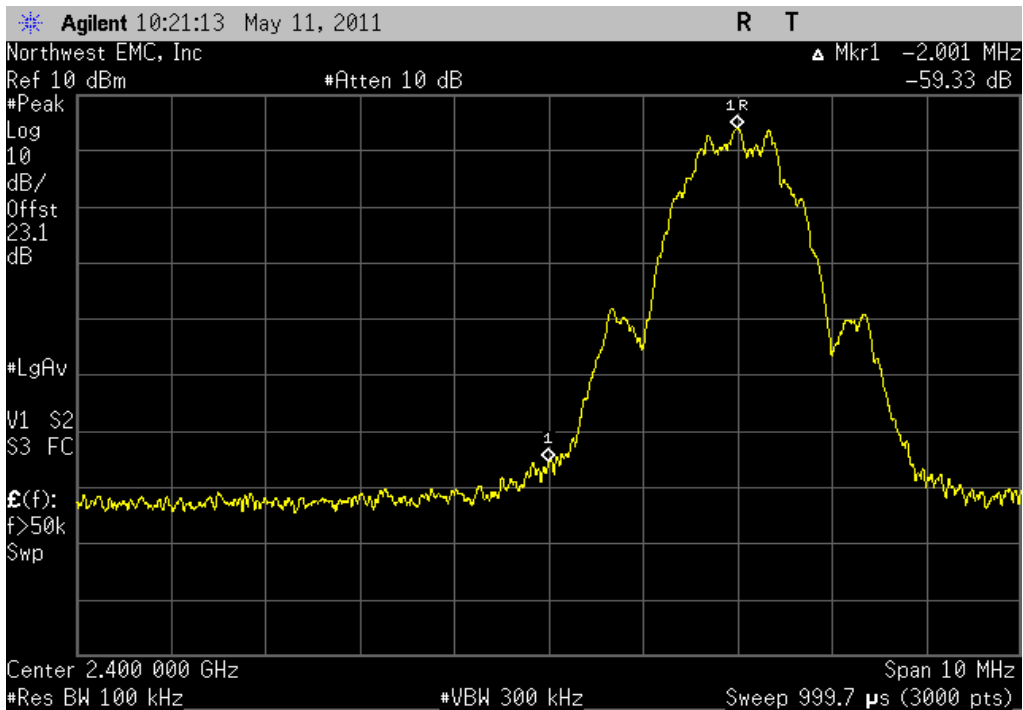
BAND EDGE COMPLIANCE

EMC

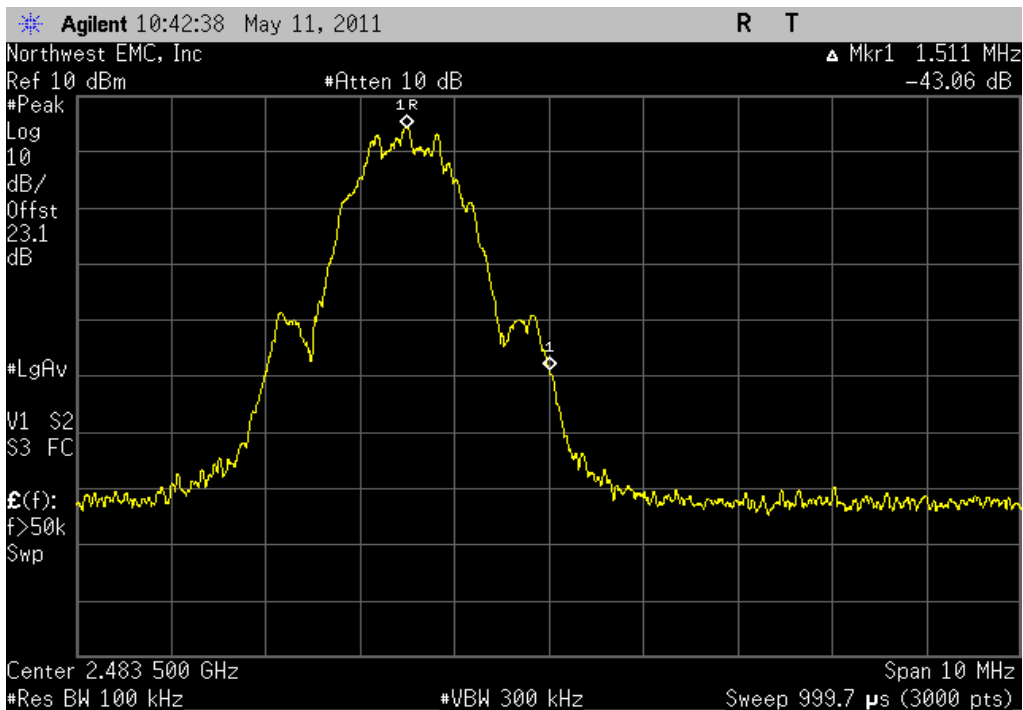
EUT: Accessory Wireless Controller		Work Order: MCSO1554	
Serial Number: BRI-B2-EV4-318		Date: 05/11/11	
Customer: Microsoft Corporation		Temperature: 22°C	
Attendees: Andy Mitra		Humidity: 39%	
Project: None		Barometric Pres.: 1011.8 mb	
Tested by: Rod Peloquin		Power: USB	Job Site: EV06
TEST SPECIFICATIONS		TEST METHOD	
FCC 15.247:2011		ANSI C63.10:2009	
COMMENTS			
Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle.			
DEVIATIONS FROM TEST STANDARD			
No Deviations			
Configuration #	1	 Signature	
		Value	Limit
Low Channel, 2402 MHz		-59.3 dBc	≤ -20 dBc
High Channel, 2482 MHz		-43.1 dBc	≤ -20 dBc
			Results
			Pass
			Pass

BAND EDGE COMPLIANCE

Low Channel, 2402 MHz		
Result: Pass	Value: -59.3 dBc	Limit: ≤ -20 dBc



High Channel, 2482 MHz		
Result: Pass	Value: -43.1 dBc	Limit: ≤ -20 dBc



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
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	24
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Signal Generator	Agilent	E8257D	TGX	3/22/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

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 its maximum data rate in a no hop mode. For each transmit frequency, the spectrum was scanned throughout the specified frequency.

EMC

SPURIOUS CONDUCTED EMISSIONS

EUT: Accessory Wireless Controller	Work Order: MCSO1554
Serial Number: BRI-B2-EV4-318	Date: 05/11/11
Customer: Microsoft Corporation	Temperature: 22°C
Attendees: Andy Mitra	Humidity: 39%
Project: None	Barometric Pres.: 1011.8 mb
Tested by: Rod Peloquin	Power: USB
	Job Site: EV06

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

COMMENTS

Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle.

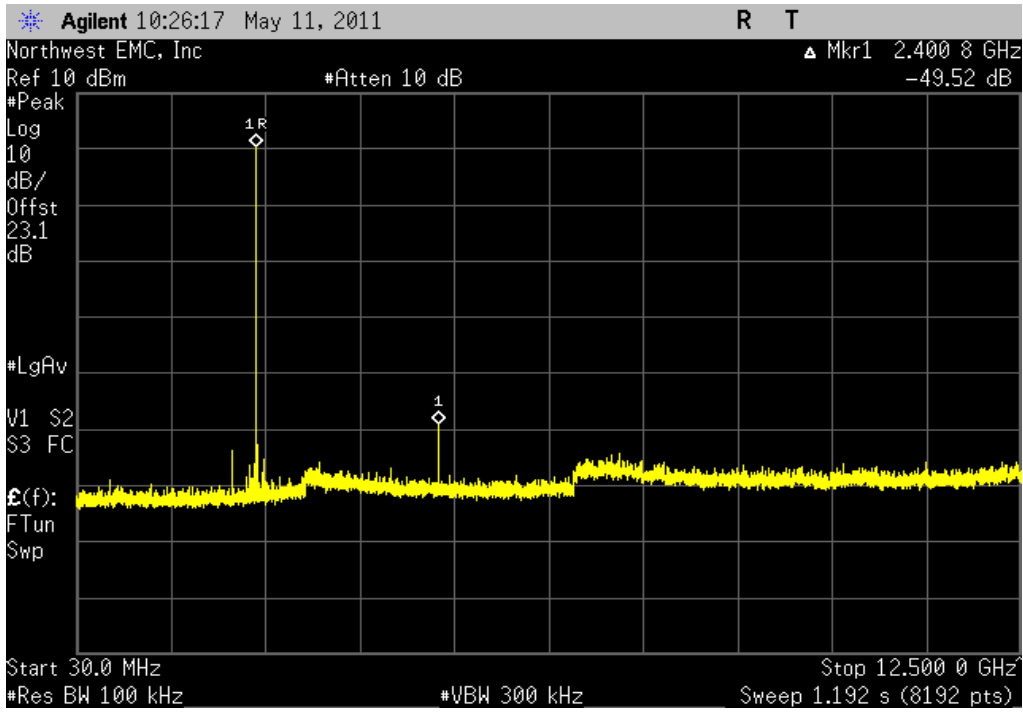
DEVIATIONS FROM TEST STANDARD

No Deviations

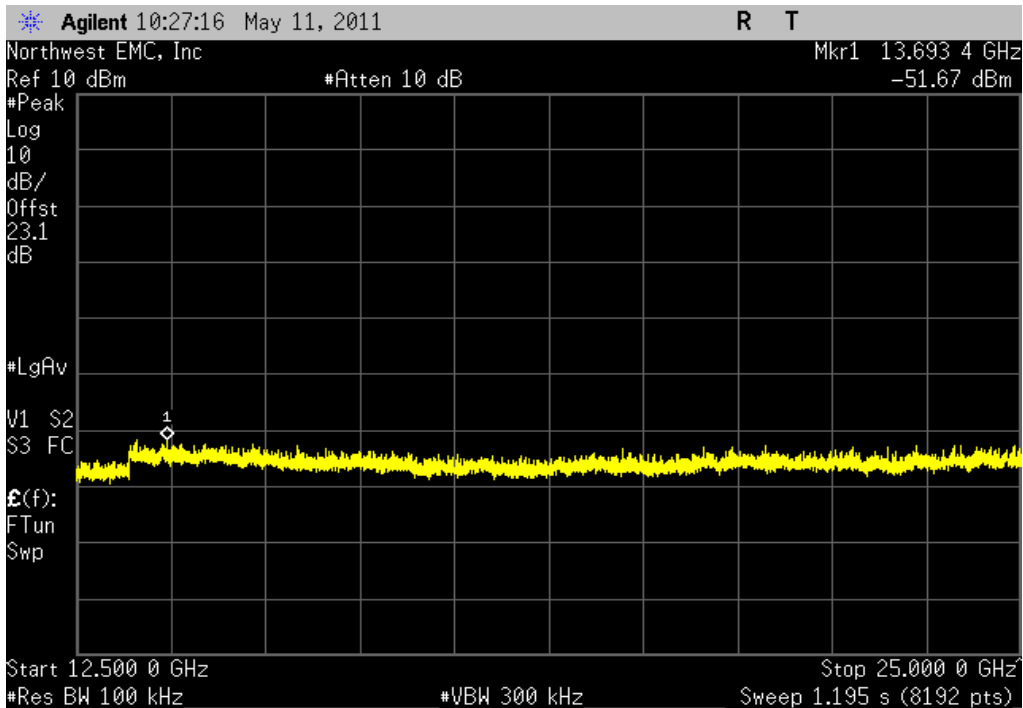
Configuration #	1	<i>Rod Peloquin</i> Signature
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		Value	Limit	Results
Low Channel, 2402 MHz	30 MHz - 12.5 GHz	-49.5 dBc	≤ -20 dBc	Pass
	12.5 GHz - 25 GHz	-52.1 dBc	≤ -20 dBc	Pass
Mid Channel, 2442 MHz	30 MHz - 12.5 GHz	-48.3 dBc	≤ -20 dBc	Pass
	12.5 GHz - 25 GHz	-52.8 dBc	≤ -20 dBc	Pass
High Channel, 2482 MHz	30 MHz - 12.5 GHz	-45.2 dBc	≤ -20 dBc	Pass
	12.5 GHz - 25 GHz	-51.8 dBc	≤ -20 dBc	Pass

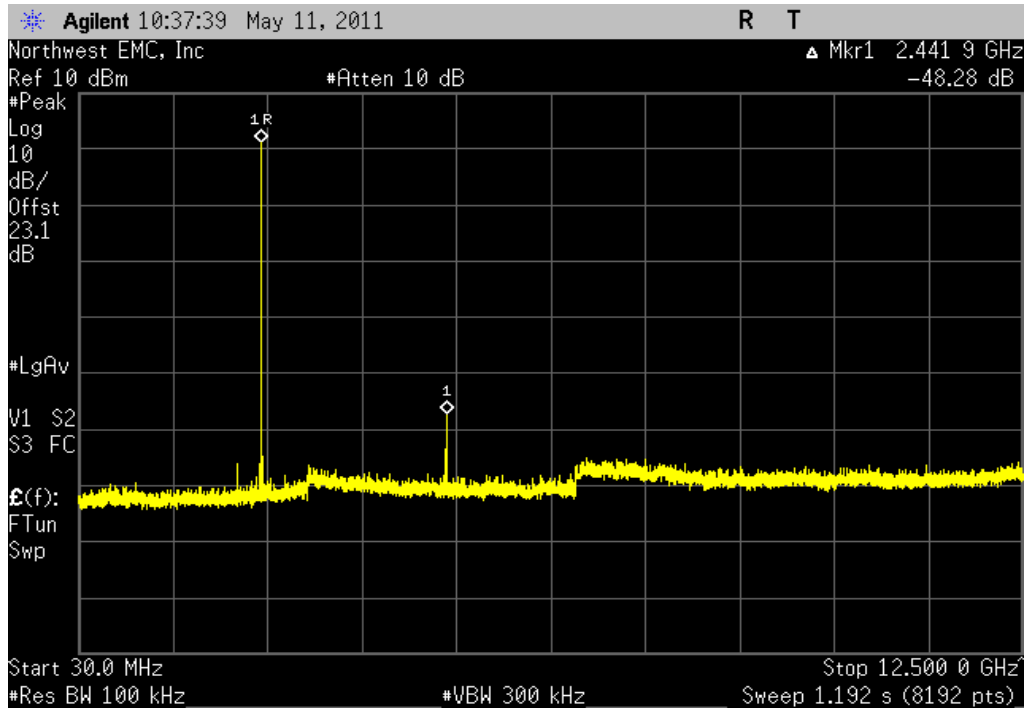
Low Channel, 2402 MHz, 30 MHz - 12.5 GHz
Result: Pass **Value:** -49.5 dBc **Limit:** ≤ -20 dBc



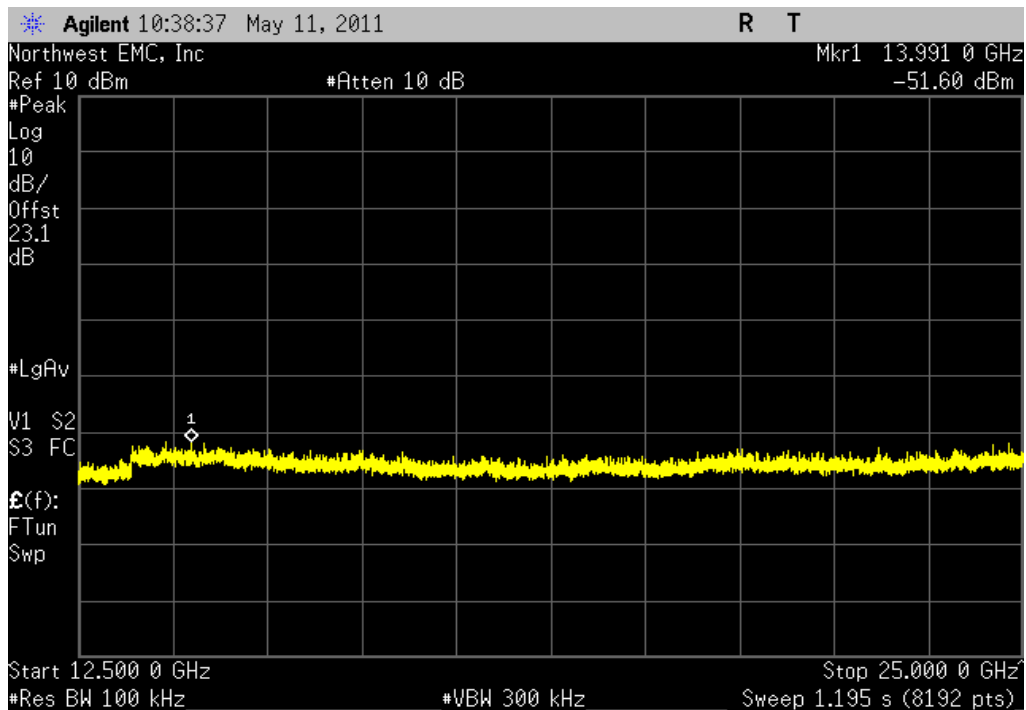
Low Channel, 2402 MHz, 12.5 GHz - 25 GHz
Result: Pass **Value:** -52.1 dBc **Limit:** ≤ -20 dBc



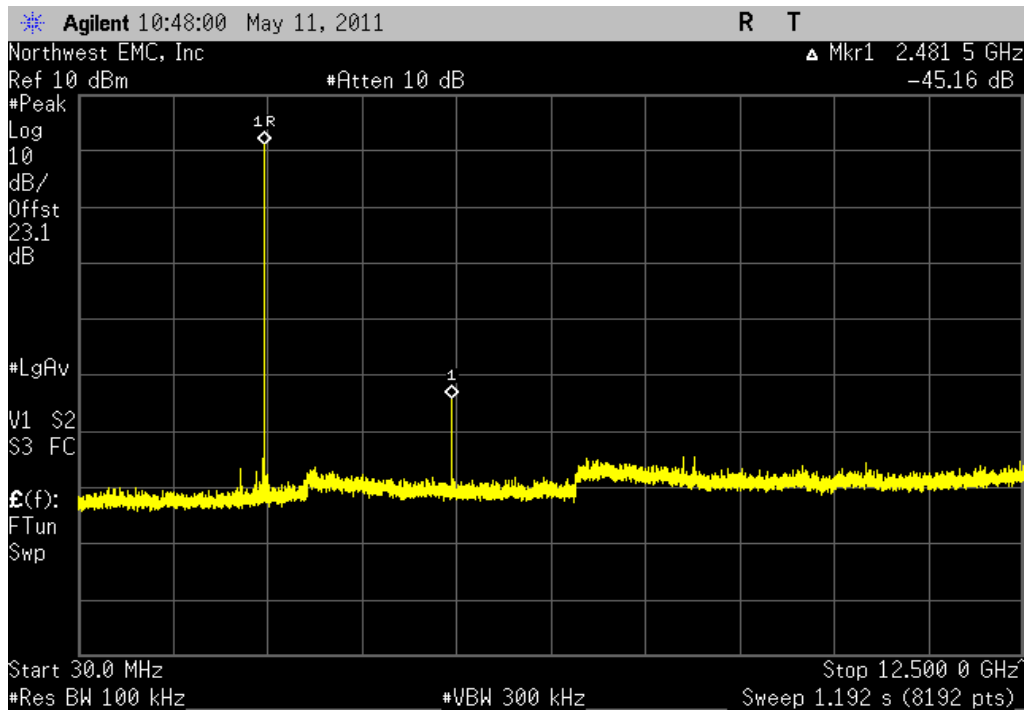
Mid Channel, 2442 MHz, 30 MHz - 12.5 GHz
Result: Pass **Value:** -48.3 dBc **Limit:** ≤ -20 dBc



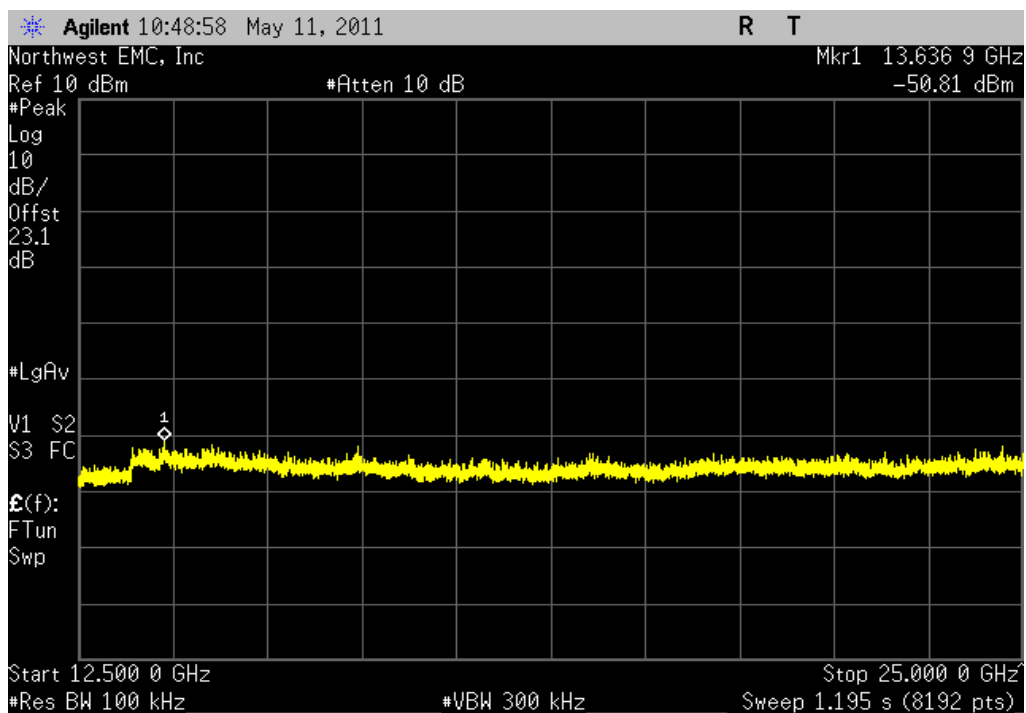
Mid Channel, 2442 MHz, 12.5 GHz - 25 GHz
Result: Pass **Value:** -52.8 dBc **Limit:** ≤ -20 dBc



High Channel, 2482 MHz, 30 MHz - 12.5 GHz
Result: Pass **Value:** -45.2 dBc **Limit:** ≤ -20 dBc



High Channel, 2482 MHz, 12.5 GHz - 25 GHz
Result: Pass **Value:** -51.8 dBc **Limit:** ≤ -20 dBc



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
Spectrum Analyzer	Agilent	E4440A	AFD	6/1/2009	24
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Signal Generator	Agilent	E8257D	TGX	3/22/2011	12

MEASUREMENT UNCERTAINTY

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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

TEST DESCRIPTION

The power spectral density measurements were measured with the EUT set to low, mid, 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 its maximum data rate in a hop mode. While the average output power was measured as defined in section ANSI C63.10:2009, Section 6.11.2.3 was followed.

The spectrum analyzer was set as follows:

The emission peak was located and zoomed in on within the passband.

- a) RBW = 3 kHz
- b) VBW = 10 kHz
- c) Span = 300 kHz
- d) Sweep time = 100s
- e) Trace set to MAX
- f) The 1 hz Marker Noise function on the analyzer was used. The data was corrected to 3 kHz by adding 34.8 dB to the reading.

EMC

POWER SPECTRAL DENSITY

EUT: Accessory Wireless Controller	Work Order: MCSO1554
Serial Number: BRI-B2-EV4-318	Date: 05/11/11
Customer: Microsoft Corporation	Temperature: 22°C
Attendees: Andy Mitra	Humidity: 39%
Project: None	Barometric Pres.: 1011.8 mb
Tested by: Rod Peloquin	Power: USB
	Job Site: EV06

TEST SPECIFICATIONS

FCC 15.247:2011

TEST METHOD

ANSI C63.10:2009

COMMENTS

Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle.

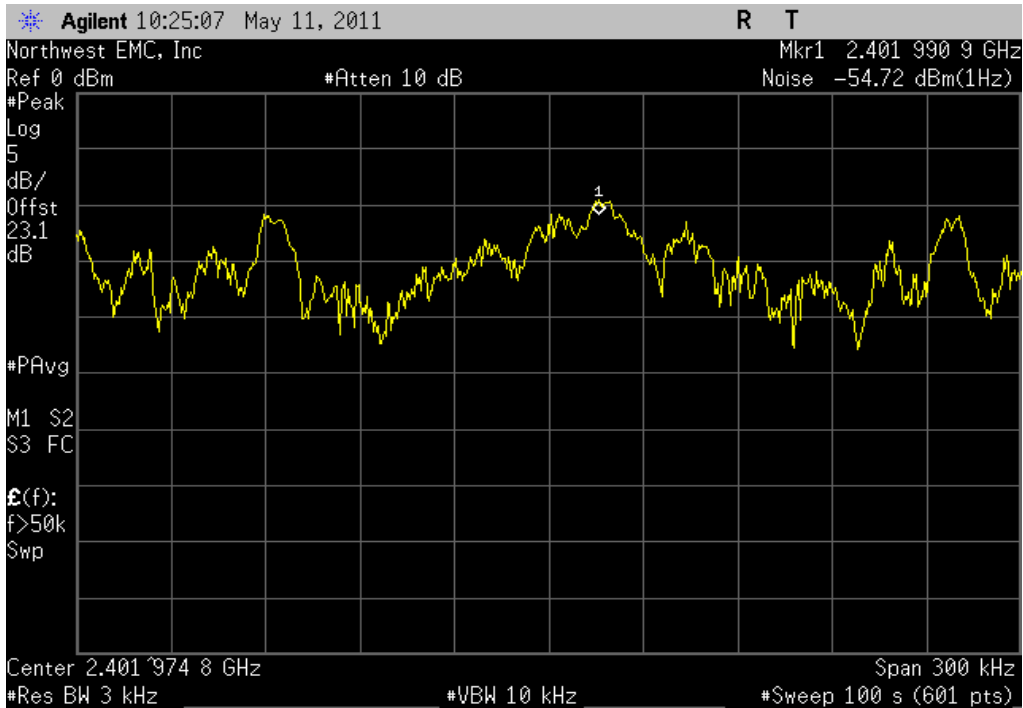
DEVIATIONS FROM TEST STANDARD

No Deviations

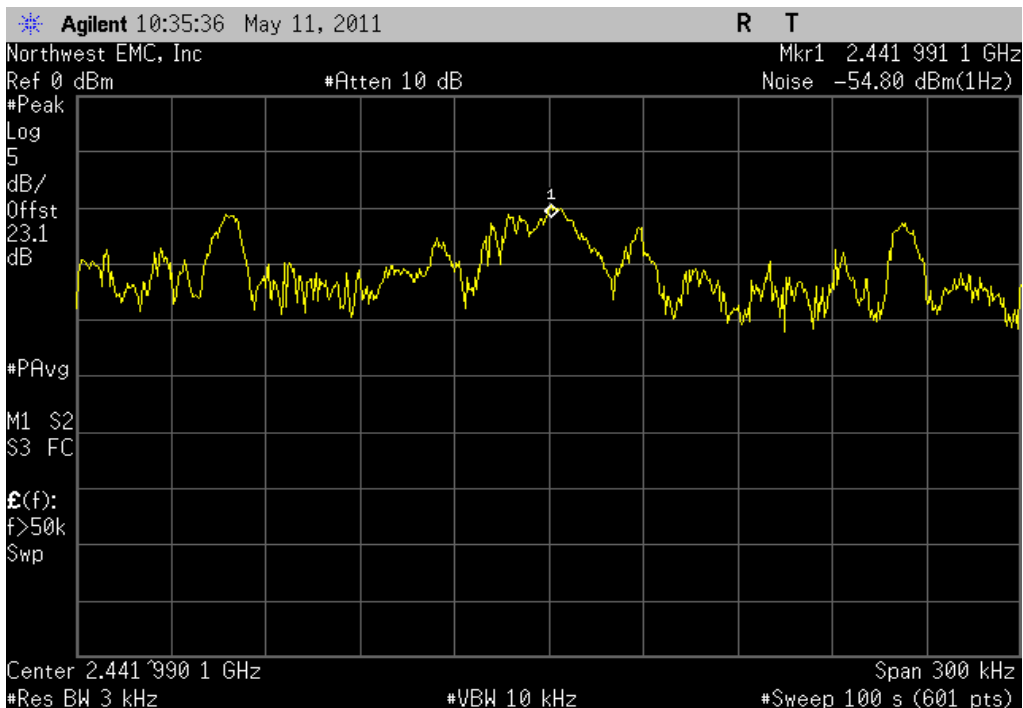
Configuration #	1	<i>Rod Peloquin</i> Signature
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	Value	Limit	Results
Low Channel, 2402 MHz	-20.0 dBm / kHz	8 dBm / 3 kHz	Pass
Mid Channel, 2442 MHz	-20.0 dBm / kHz	8 dBm / 3 kHz	Pass
High Channel, 2482 MHz	-20.2 dBm / kHz	8 dBm / 3 kHz	Pass

Low Channel, 2402 MHz
Result: Pass **Value:** -20.0 dBm / kHz **Limit:** 8 dBm / 3 kHz



Mid Channel, 2442 MHz
Result: Pass **Value:** -20.0 dBm / kHz **Limit:** 8 dBm / 3 kHz

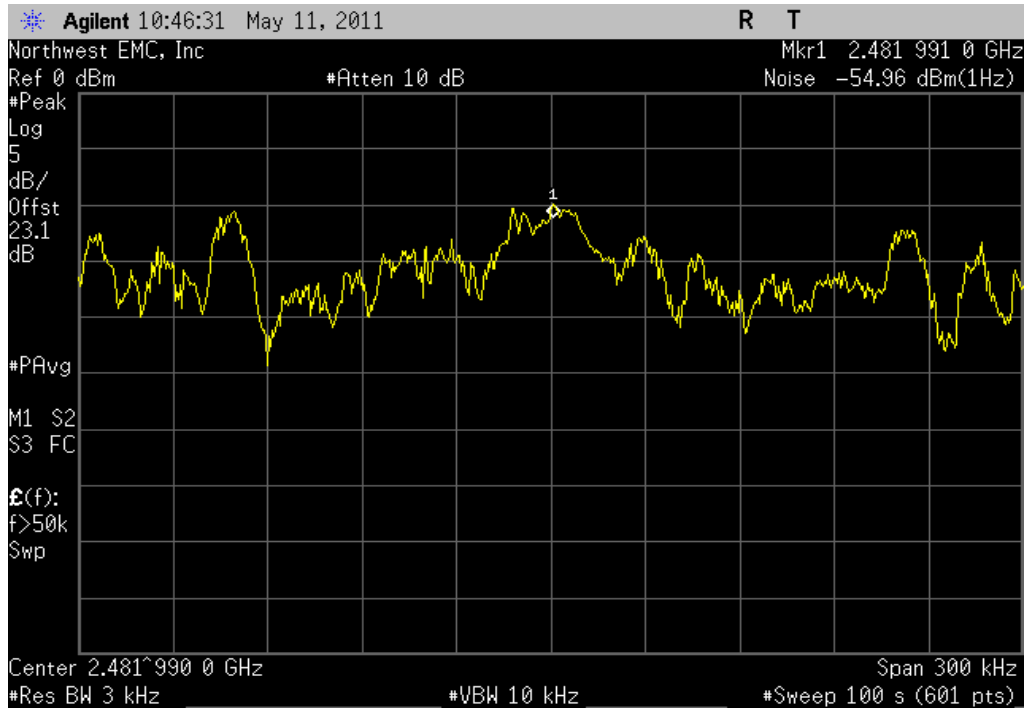


High Channel, 2482 MHz

Result: Pass

Value: -20.2 dBm / kHz

Limit: 8 dBm / 3 kHz



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 with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle, bound to remote Front Panel Controller

CHANNELS TESTED

Low Channel, 2402 MHz

Mid Channel, 2442 MHz

High Channel, 2482 MHz

POWER SETTINGS INVESTIGATED

Battery

FREQUENCY RANGE INVESTIGATED

Start Frequency	30 MHz	Stop Frequency	25 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
High Pass Filter	Micro-Tronics	HPM50111	HFO	8/9/2010	24
Spectrum Analyzer	Agilent	E4446A	AAQ	1/10/2011	12
Pre-Amplifier	Miteq	AM-1616-1000	AOL	8/9/2010	12
Antenna, Bilog	Teseq	CBL 6141B	AXR	11/29/2010	12
EV01 Cables	N/A	Bilog Cables	EVA	7/9/2010	12
Pre-Amplifier	Miteq	AMF-4D-010100-24-10P	APW	7/9/2010	12
Antenna, Horn	EMCO	3115	AHC	7/8/2010	24
EV01 Cables	N/A	Double Ridge Horn Cables	EVB	7/9/2010	12
Pre-Amplifier	Miteq	AMF-6F-12001800-30-10P	AVD	3/2/2011	12
Antenna, Horn	ETS	3160-07	AHU	NCR	0
EV01 Cables	N/A	Standard Gain Horns Cables	EVF	3/2/2011	12
Pre-Amplifier	Miteq	AMF-6F-08001200-30-10P	AVC	3/2/2011	12
Antenna, Horn	ETS	3160-08	AHV	NCR	0
Pre-Amplifier	Miteq	AMF-6F-18002650-25-10P	AVU	9/15/2010	12
Antenna, Horn	ETS Lindgren	3160-09	AIV	NCR	0
Cable	ESM Cable Corp.	KMKM-72	EVY	9/15/2010	12

MEASUREMENT BANDWIDTHS

	Frequency Range	Peak Data	Quasi-Peak Data	Average Data
	(MHz)	(kHz)	(kHz)	(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.

MEASUREMENT UNCERTAINTY

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. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4. The measurement uncertainty estimation is available upon request.

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, and manipulating the EUT antenna in 3 orthogonal planes (per ANSI C63.10:2009). A preamp and high pass filter were used for this test in order to provide sufficient measurement sensitivity.

EMC

SPURIOUS RADIATED EMISSIONS

EUT: Accessory Wireless Controller		Work Order: MCSO1554	
Serial Number: FAI-M-EV4-010		Date: 05/12/11	
Customer: Microsoft Corporation		Temperature: 23°C	
Attendees: Andy Mitra		Humidity: 35%	
Project: None		Barometric Pres.: 1024.10 mb	
Tested by: Rod Peloquin		Power: Battery	
		Job Site: EV01	

TEST SPECIFICATIONS		TEST METHOD	
FCC 15.247:2011		ANSI C63.10:2009	

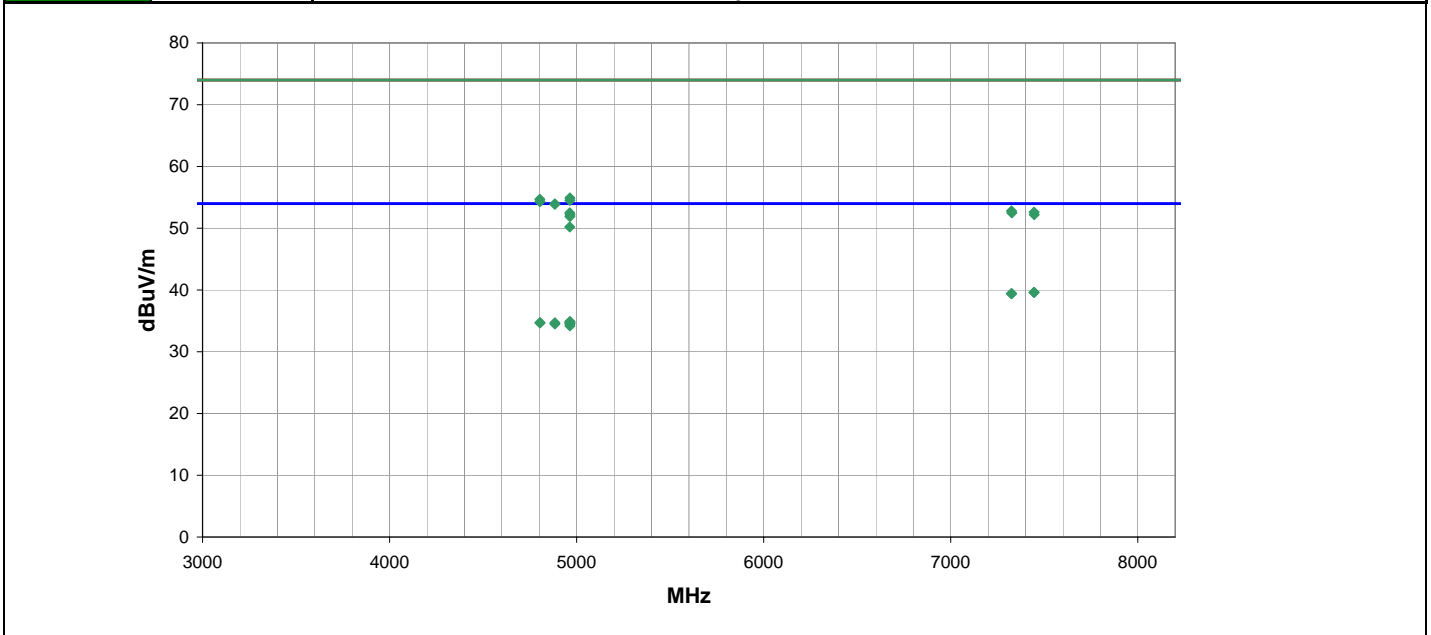
TEST PARAMETERS			
Antenna Height(s) (m)	1 - 4	Test Distance (m)	3

COMMENTS
Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle, bound to remote Front Panel Controller.

EUT OPERATING MODES
Transmitting 10.1% duty cycle

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	2	 Signature
Configuration #	2	
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
7445.320	23.5	16.1	71.0	1.0	3.0	0.0	V-Horn	AV	0.0	39.6	54.0	-14.4	High Channel, EUT ends up (Y)
7445.700	23.5	16.1	124.0	1.0	3.0	0.0	H-Horn	AV	0.0	39.6	54.0	-14.4	High Channel, EUT on side (Z)
7324.440	23.7	15.7	266.0	1.0	3.0	0.0	H-Horn	AV	0.0	39.4	54.0	-14.6	Mid Channel, EUT on side (Z)
7325.960	23.7	15.7	201.0	1.0	3.0	0.0	V-Horn	AV	0.0	39.4	54.0	-14.6	Mid Channel, EUT ends up (Y)
4963.763	24.7	10.2	145.0	1.1	3.0	0.0	H-Horn	AV	0.0	34.9	54.0	-19.1	High Channel, EUT on side (Z)
4964.043	44.7	10.2	145.0	1.1	3.0	0.0	H-Horn	PK	0.0	54.9	74.0	-19.1	High Channel, EUT on side (Z)
4963.897	24.6	10.2	191.0	1.1	3.0	0.0	V-Horn	AV	0.0	34.8	54.0	-19.2	High Channel, EUT ends up (Y)
4803.970	25.3	9.4	181.0	1.2	3.0	0.0	V-Horn	AV	0.0	34.7	54.0	-19.3	Low Channel, EUT ends up (Y)
4804.063	25.3	9.4	155.0	1.0	3.0	0.0	H-Horn	AV	0.0	34.7	54.0	-19.3	Low Channel, EUT on side (Z)
4803.467	45.3	9.4	155.0	1.0	3.0	0.0	H-Horn	PK	0.0	54.7	74.0	-19.3	Low Channel, EUT on side (Z)
4883.860	25.0	9.7	191.0	1.0	3.0	0.0	V-Horn	AV	0.0	34.7	54.0	-19.3	Mid Channel, EUT ends up (Y)
4963.900	24.4	10.2	189.0	1.1	3.0	0.0	H-Horn	AV	0.0	34.6	54.0	-19.4	High Channel, EUT ends up (Y)
4964.013	24.4	10.2	177.0	1.1	3.0	0.0	V-Horn	AV	0.0	34.6	54.0	-19.4	High Channel, EUT horizontal (X)
4883.890	24.8	9.7	191.0	1.1	3.0	0.0	H-Horn	AV	0.0	34.5	54.0	-19.5	Mid Channel, EUT on side (Z)
4963.737	24.3	10.2	123.0	1.1	3.0	0.0	V-Horn	AV	0.0	34.5	54.0	-19.5	High Channel, EUT on side (Z)
4963.980	44.3	10.2	191.0	1.1	3.0	0.0	V-Horn	PK	0.0	54.5	74.0	-19.5	High Channel, EUT ends up (Y)
4804.037	44.9	9.4	181.0	1.2	3.0	0.0	V-Horn	PK	0.0	54.3	74.0	-19.7	Low Channel, EUT ends up (Y)
4963.660	24.0	10.2	116.0	1.1	3.0	0.0	H-Horn	AV	0.0	34.2	54.0	-19.8	High Channel, EUT horizontal (X)
4883.873	44.2	9.7	191.0	1.0	3.0	0.0	V-Horn	PK	0.0	53.9	74.0	-20.1	Mid Channel, EUT ends up (Y)
4883.937	44.2	9.7	191.0	1.1	3.0	0.0	H-Horn	PK	0.0	53.9	74.0	-20.1	Mid Channel, EUT on side (Z)
7325.030	37.1	15.7	266.0	1.0	3.0	0.0	H-Horn	PK	0.0	52.8	74.0	-21.2	Mid Channel, EUT on side (Z)
7445.703	36.5	16.1	124.0	1.0	3.0	0.0	H-Horn	PK	0.0	52.6	74.0	-21.4	High Channel, EUT on side (Z)
4963.377	42.3	10.2	189.0	1.1	3.0	0.0	H-Horn	PK	0.0	52.5	74.0	-21.5	High Channel, EUT ends up (Y)
7326.870	36.8	15.7	201.0	1.0	3.0	0.0	V-Horn	PK	0.0	52.5	74.0	-21.5	Mid Channel, EUT ends up (Y)
4964.637	42.0	10.2	177.0	1.1	3.0	0.0	V-Horn	PK	0.0	52.2	74.0	-21.8	High Channel, EUT horizontal (X)
7446.127	36.1	16.1	71.0	1.0	3.0	0.0	V-Horn	PK	0.0	52.2	74.0	-21.8	High Channel, EUT ends up (Y)
4964.177	41.7	10.2	123.0	1.1	3.0	0.0	V-Horn	PK	0.0	51.9	74.0	-22.1	High Channel, EUT on side (Z)
4963.257	40.0	10.2	116.0	1.1	3.0	0.0	H-Horn	PK	0.0	50.2	74.0	-23.8	High Channel, EUT horizontal (X)

EUT: Accessory Wireless Controller	Work Order: MCSO1554
Serial Number: FAI-M-EV4-010	Date: 05/12/11
Customer: Microsoft Corporation	Temperature: 23°C
Attendees: Andy Mitra	Humidity: 35%
Project: None	Barometric Pres.: 1011.8 mb
Tested by: Rod Peloquin	Power: Battery
	Job Site: EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

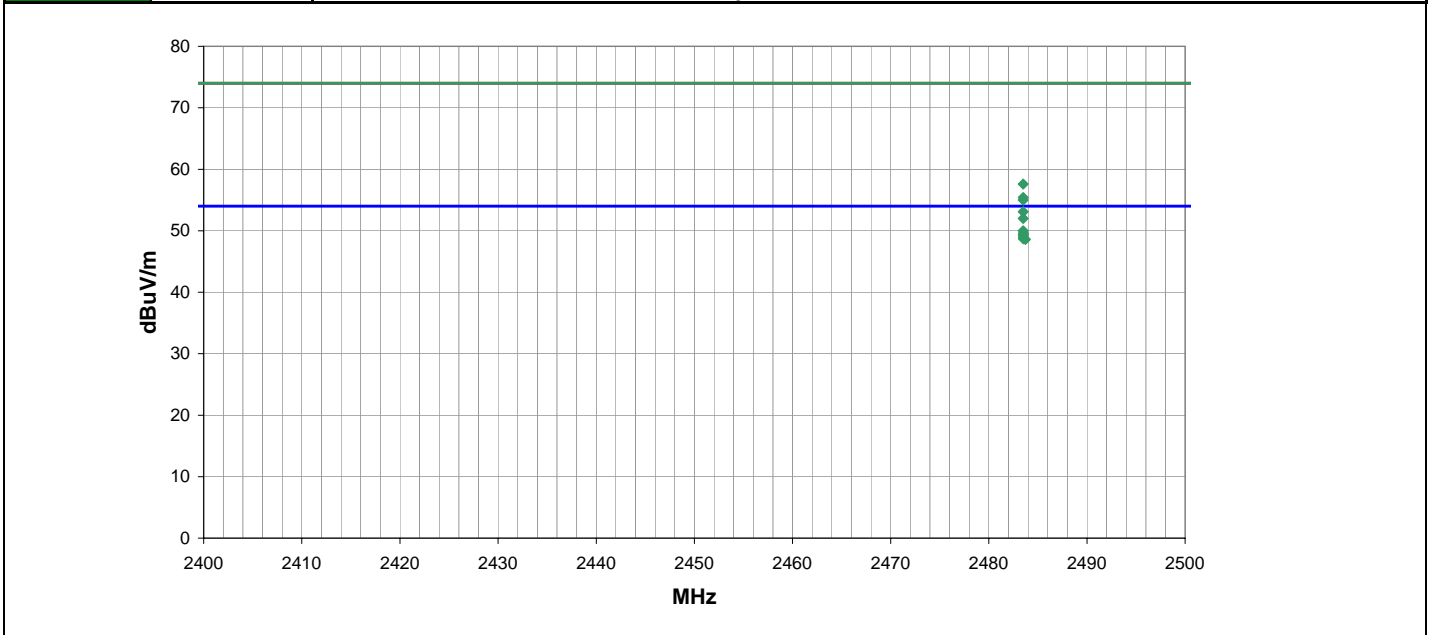
TEST PARAMETERS	
Antenna Height(s) (m)	1 - 4
Test Distance (m)	3

COMMENTS
Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle, bound to remote Front Panel Controller.

EUT OPERATING MODES
Transmitting 10.1% duty cycle, High channel

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	1	 Signature
Configuration #	2	
Results	Pass	



Freq (MHz)	Amplitude (dBuV)	Factor (dB)	Azimuth (degrees)	Height (meters)	Distance (meters)	External Attenuation (dB)	Polarity	Detector	Distance Adjustment (dB)	Adjusted dBuV/m	Spec. Limit dBuV/m	Compared to Spec. (dB)	Comments
2481.943	81.9	2.3	303.0	1.2	3.0	20.0	H-Horn	PK	0.0	104.2			Fundamental, EUT Ends up (Y)
2483.500			303.0	1.2	3.0	20.0	H-Horn	PK	0.0	57.6	74.0	-16.4	EUT Ends up (Y), Marker Delta Method: Peak 104.2 + -46.5 dBc = 57.6
2482.013	79.9	2.3	162.0	1.0	3.0	20.0	V-Horn	PK	0.0	102.2			Fundamental, EUT on side (Z)
2483.500			162.0	1.0	3.0	20.0	V-Horn	PK	0.0	55.4	74.0	-18.6	EUT on side (Z), Marker Delta Method: Peak 102.2 + -46.8 dBc = 55.4
2482.027	80.6	2.3	34.0	1.4	3.0	20.0	H-Horn	PK	0.0	102.9			Fundamental, EUT on side (Z)
2483.500			34.0	1.4	3.0	20.0	H-Horn	PK	0.0	55.0	74.0	-19.0	EUT on side (Z), Marker Delta Method: Peak 102.9 + -47.9 dBc = 55.0
2482.003	78.7	2.3	253.0	1.0	3.0	20.0	V-Horn	PK	0.0	101.0			Fundamental, EUT horizontal (X)
2483.500			253.0	1.0	3.0	20.0	V-Horn	PK	0.0	53.1	74.0	-20.9	EUT horizontal (X), Marker Delta Method: Peak 101.0 + -47.9 dBc = 53.1
2482.003	77.3	2.3	310.0	1.0	3.0	20.0	H-Horn	PK	0.0	99.6			Fundamental, EUT horizontal (X)
2483.500			310.0	1.0	3.0	20.0	H-Horn	PK	0.0	52.0	74.0	-22.0	EUT horizontal (X), Marker Delta Method: Peak 99.6 + -47.6 dBc = 52.0
2482.023	71.5	2.3	252.0	1.4	3.0	20.0	V-Horn	PK	0.0	93.8			Fundamental, EUT Ends up (Y)
2483.500			252.0	1.4	3.0	20.0	V-Horn	PK	0.0	50.0	74.0	-24.0	EUT Ends up (Y), Marker Delta Method: Peak 93.8 + -43.8 dBc = 50.0
2483.522	27.3	2.3	58.0	1.2	3.0	20.0	H-Horn	AV	0.0	49.6	54.0	-4.4	EUT on side (Z)
2483.517	27.1	2.3	142.0	1.0	3.0	20.0	V-Horn	AV	0.0	49.4	54.0	-4.6	EUT on side (Z)
2483.500	26.9	2.3	321.0	1.2	3.0	20.0	H-Horn	AV	0.0	49.2	54.0	-4.8	EUT Ends up (Y)
2483.515	26.6	2.3	342.0	1.7	3.0	20.0	V-Horn	AV	0.0	48.9	54.0	-5.1	EUT Ends up (Y)
2483.510	26.4	2.3	327.0	1.3	3.0	20.0	H-Horn	AV	0.0	48.7	54.0	-5.3	EUT horizontal (X)
2483.732	26.3	2.3	262.0	1.0	3.0	20.0	V-Horn	AV	0.0	48.6	54.0	-5.4	EUT horizontal (X)

EMC

SPURIOUS RADIATED EMISSIONS

EUT: Accessory Wireless Controller	Work Order: MCSO1554
Serial Number: FAI-M-EV4-010	Date: 05/12/11
Customer: Microsoft Corporation	Temperature: 23°C
Attendees: Andy Mitra	Humidity: 35%
Project: None	Barometric Pres.: 1011.8 mb
Tested by: Rod Peloquin	Power: Battery
	Job Site: EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	See data	Test Distance (m)	3

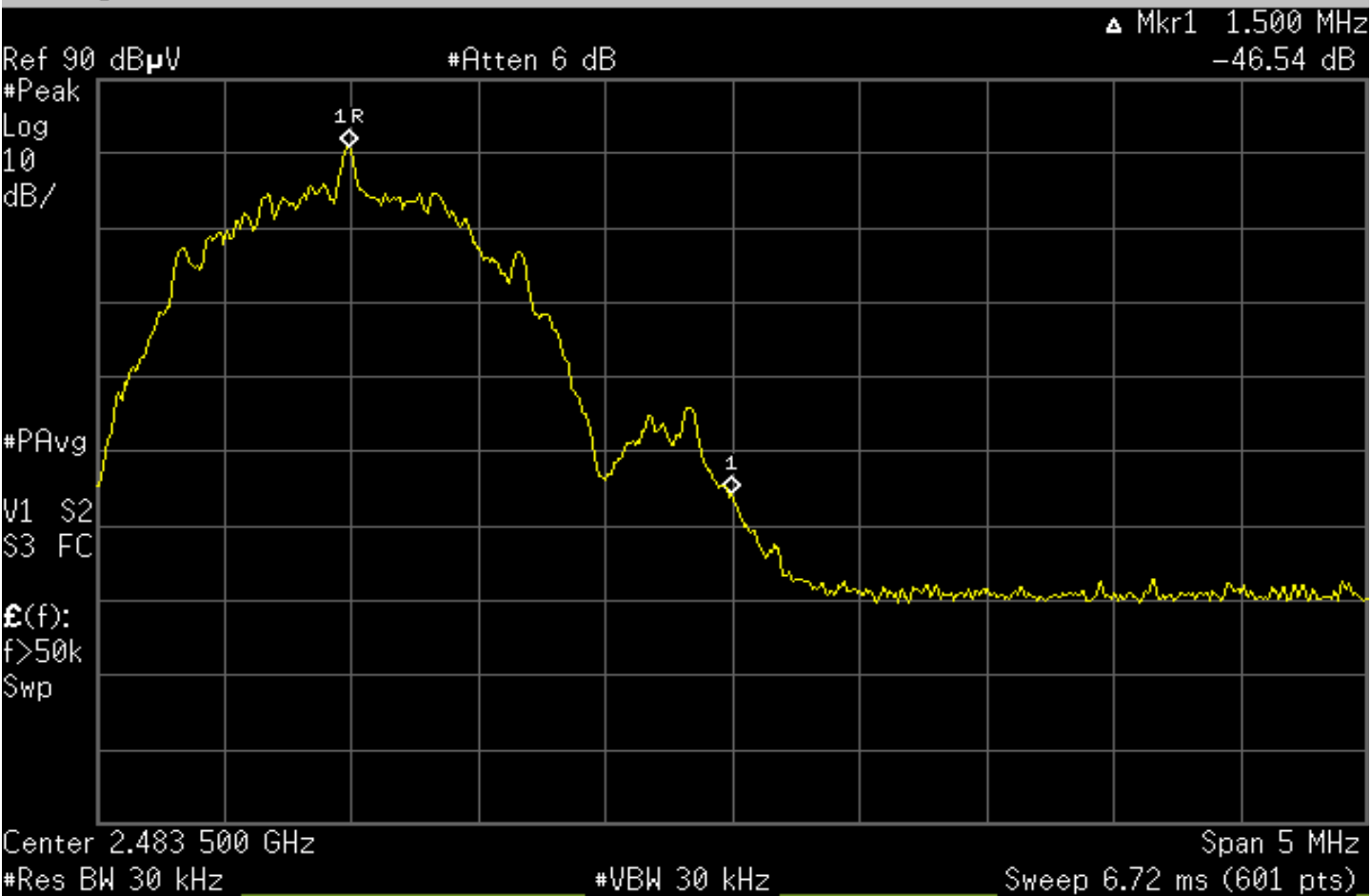
COMMENTS
Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle, bound to remote Front Panel Controller.

EUT OPERATING MODES
Transmitting 10.1% duty cycle, High Channel

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	1	EUT ends up (Y) - Horizontal Receive
Configuration #	2	
Results		

Agilent 10:24:28 May 12, 2011 R T



EMC

SPURIOUS RADIATED EMISSIONS

EUT: Accessory Wireless Controller	Work Order: MCSO1554
Serial Number: FAI-M-EV4-010	Date: 05/12/11
Customer: Microsoft Corporation	Temperature: 23°C
Attendees: Andy Mitra	Humidity: 35%
Project: None	Barometric Pres.: 1011.8 mb
Tested by: Rod Peloquin	Power: Battery
	Job Site: EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

TEST PARAMETERS
Antenna Height(s) (m) See data Test Distance (m) 3

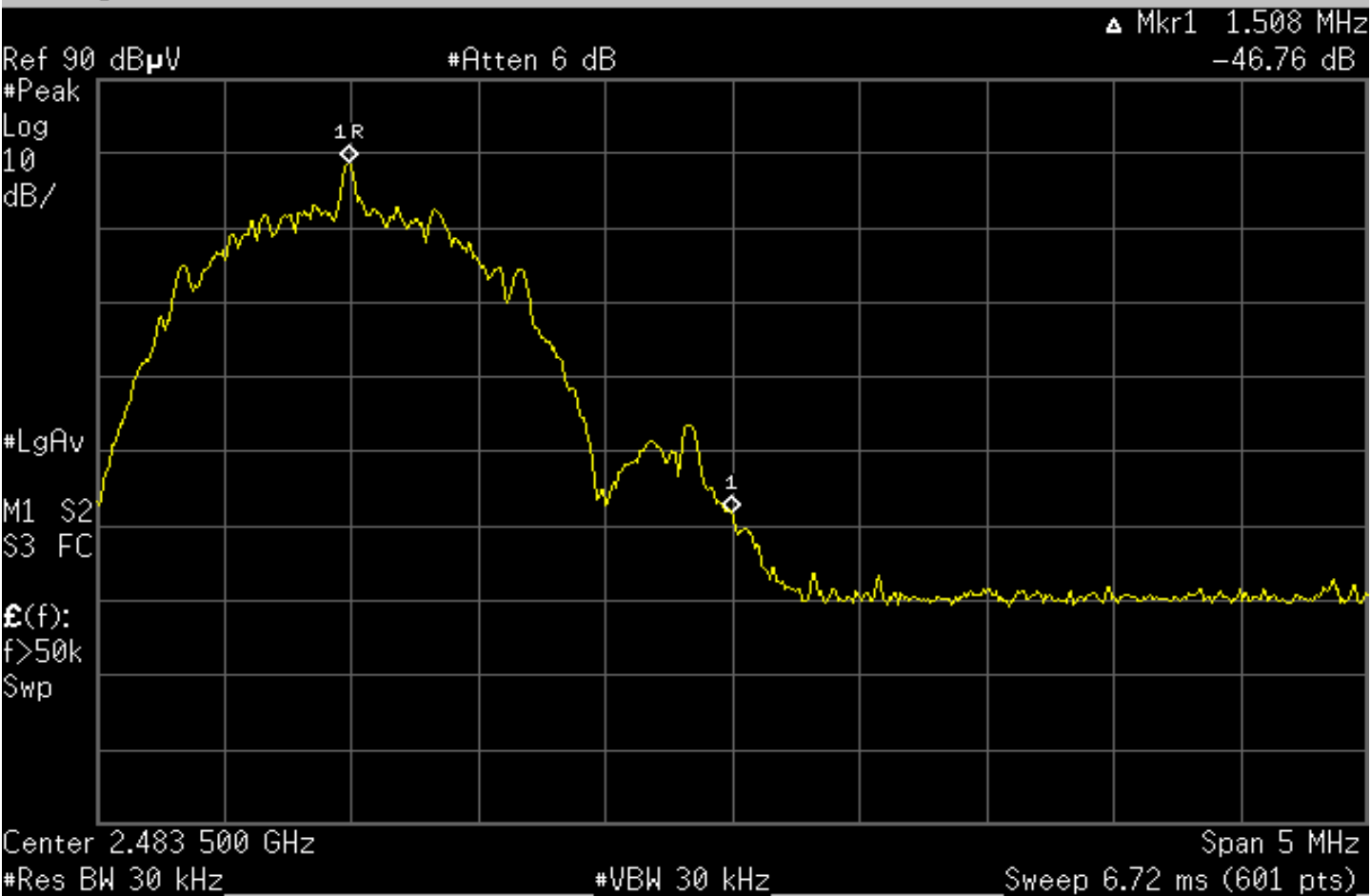
COMMENTS
Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle, bound to remote Front Panel Controller.

EUT OPERATING MODES
Transmitting 10.1% duty cycle, High Channel

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	1	EUT on side (Z) - Vertical Receive
Configuration #	2	
Results		

Agilent 12:48:41 May 12, 2011 R T



EMC

SPURIOUS RADIATED EMISSIONS

EUT: Accessory Wireless Controller	Work Order: MCSO1554
Serial Number: FAI-M-EV4-010	Date: 05/12/11
Customer: Microsoft Corporation	Temperature: 23°C
Attendees: Andy Mitra	Humidity: 35%
Project: None	Barometric Pres.: 1011.8 mb
Tested by: Rod Peloquin	Power: Battery
	Job Site: EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

TEST PARAMETERS
Antenna Height(s) (m) See data Test Distance (m) 3

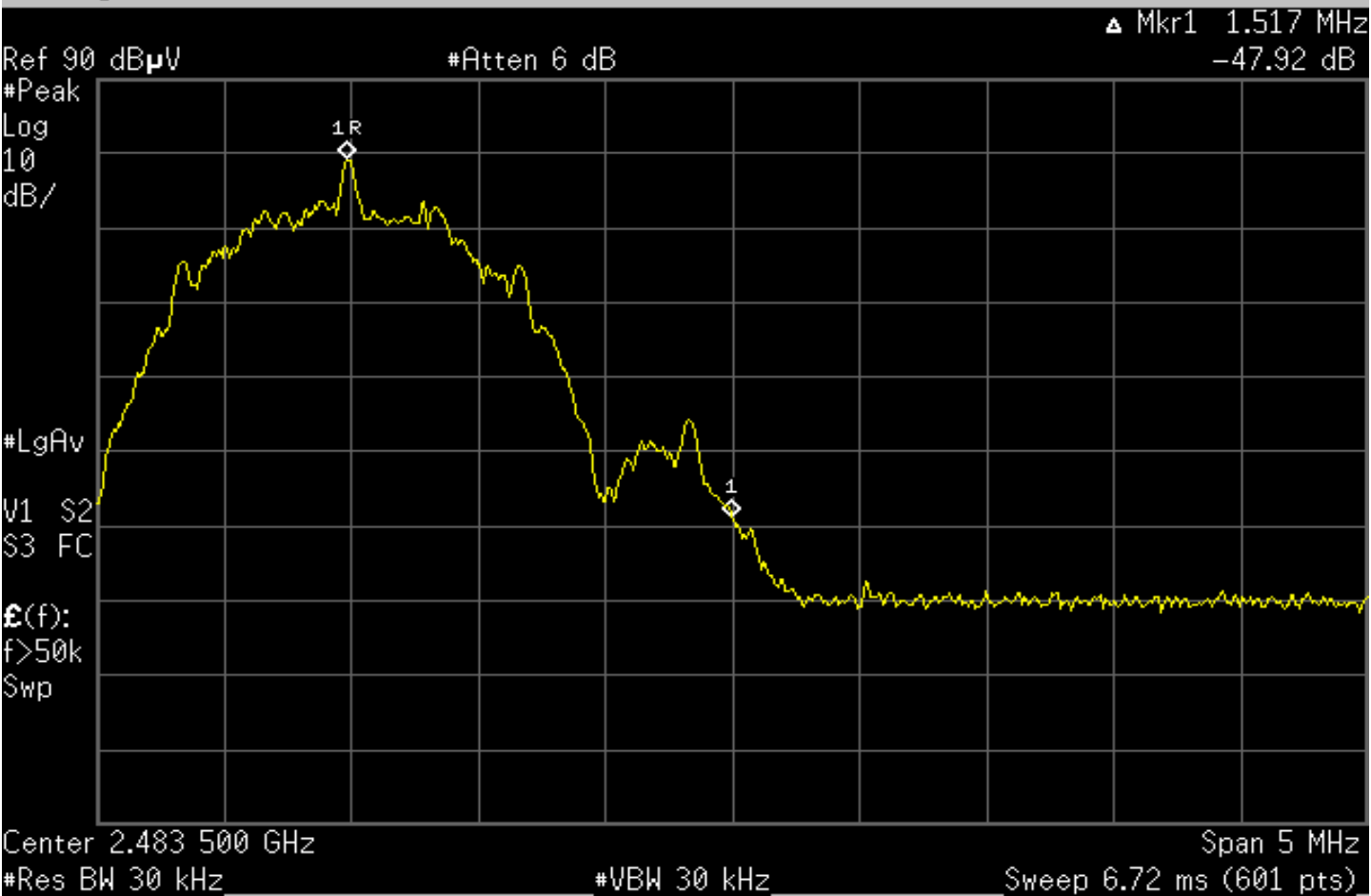
COMMENTS
Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle, bound to remote Front Panel Controller.

EUT OPERATING MODES
Transmitting 10.1% duty cycle, High Channel

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	1	EUT on side (Z) - Horizontal Receive
Configuration #	2	
Results		

Agilent 12:53:21 May 12, 2011 R T



EMC

SPURIOUS RADIATED EMISSIONS

EUT: Accessory Wireless Controller	Work Order: MCSO1554
Serial Number: FAI-M-EV4-010	Date: 05/12/11
Customer: Microsoft Corporation	Temperature: 23°C
Attendees: Andy Mitra	Humidity: 35%
Project: None	Barometric Pres.: 1011.8 mb
Tested by: Rod Peloquin	Power: Battery
	Job Site: EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

TEST PARAMETERS
Antenna Height(s) (m) See data Test Distance (m) 3

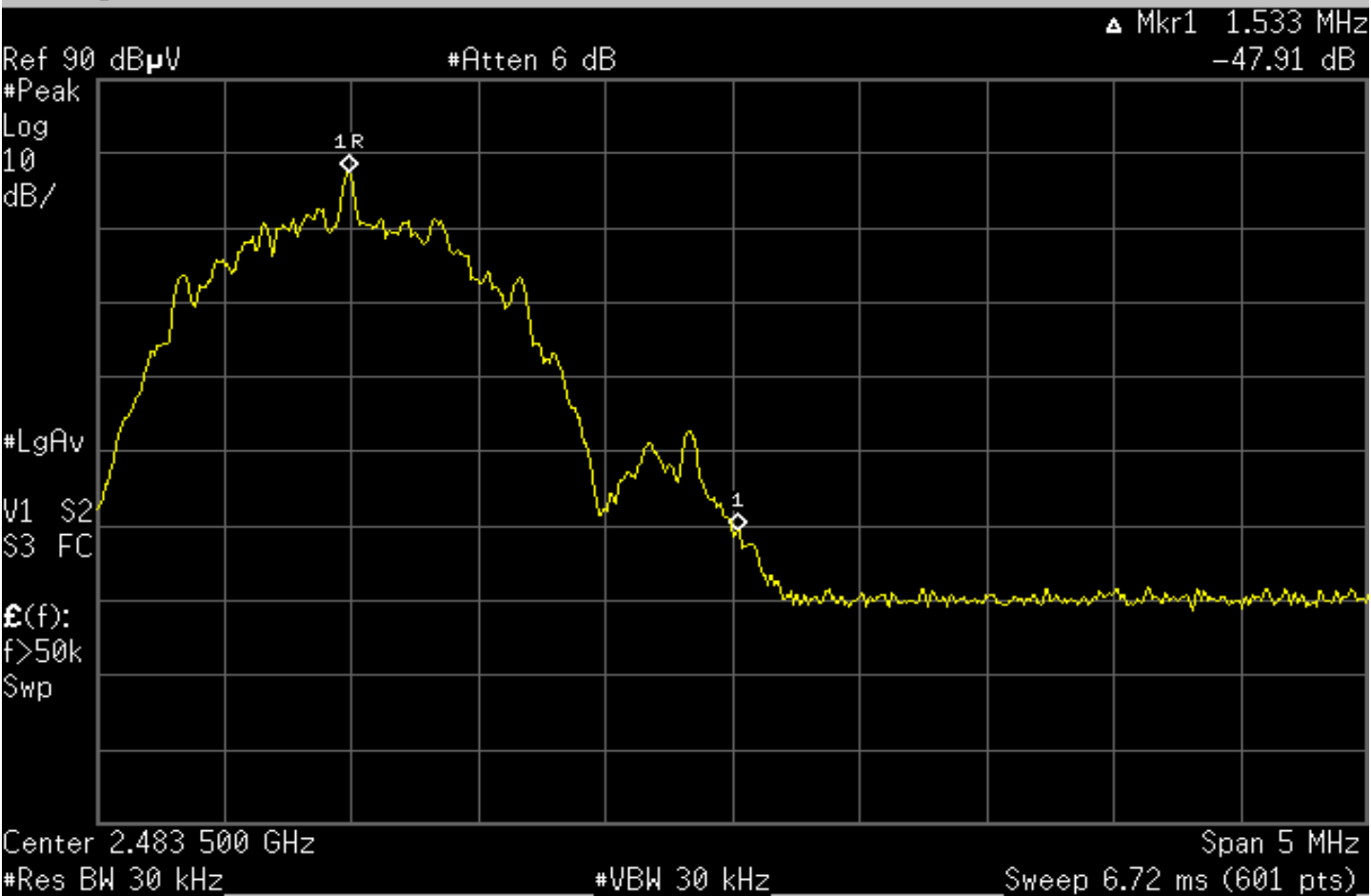
COMMENTS
Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle, bound to remote Front Panel Controller.

EUT OPERATING MODES
Transmitting 10.1% duty cycle, High Channel

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	1	EUT horizontal (X) - Vertical Receive
Configuration #	2	
Results		

Agilent 11:39:32 May 12, 2011 R T



EMC

SPURIOUS RADIATED EMISSIONS

EUT: Accessory Wireless Controller	Work Order: MCSO1554
Serial Number: FAI-M-EV4-010	Date: 05/12/11
Customer: Microsoft Corporation	Temperature: 23°C
Attendees: Andy Mitra	Humidity: 35%
Project: None	Barometric Pres.: 1011.8 mb
Tested by: Rod Peloquin	Power: Battery
	Job Site: EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

TEST PARAMETERS
Antenna Height(s) (m) See data Test Distance (m) 3

COMMENTS
Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle, bound to remote Front Panel Controller.

EUT OPERATING MODES

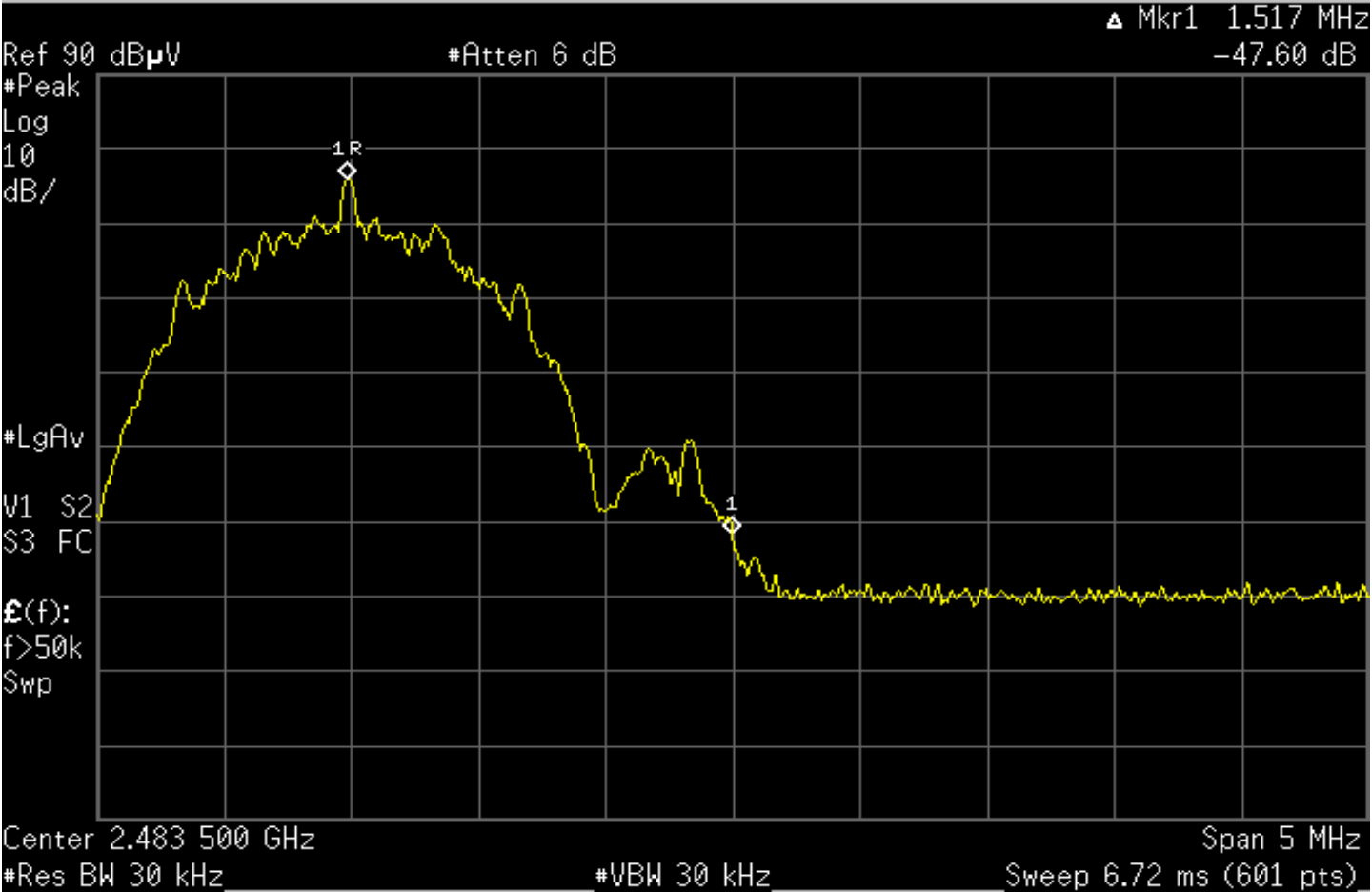
Transmitting 10.1% duty cycle, High Channel

DEVIATIONS FROM TEST STANDARD

No deviations.

Run #	1	EUT horizontal (X) - Horizontal Receive
Configuration #	2	
Results		

Agilent 11:29:47 May 12, 2011 R T



EMC

SPURIOUS RADIATED EMISSIONS

EUT: Accessory Wireless Controller	Work Order: MCSO1554
Serial Number: FAI-M-EV4-010	Date: 05/12/11
Customer: Microsoft Corporation	Temperature: 23°C
Attendees: Andy Mitra	Humidity: 35%
Project: None	Barometric Pres.: 1011.8 mb
Tested by: Rod Peloquin	Power: Battery
	Job Site: EV01

TEST SPECIFICATIONS	TEST METHOD
FCC 15.247:2011	ANSI C63.10:2009

TEST PARAMETERS			
Antenna Height(s) (m)	See data	Test Distance (m)	3

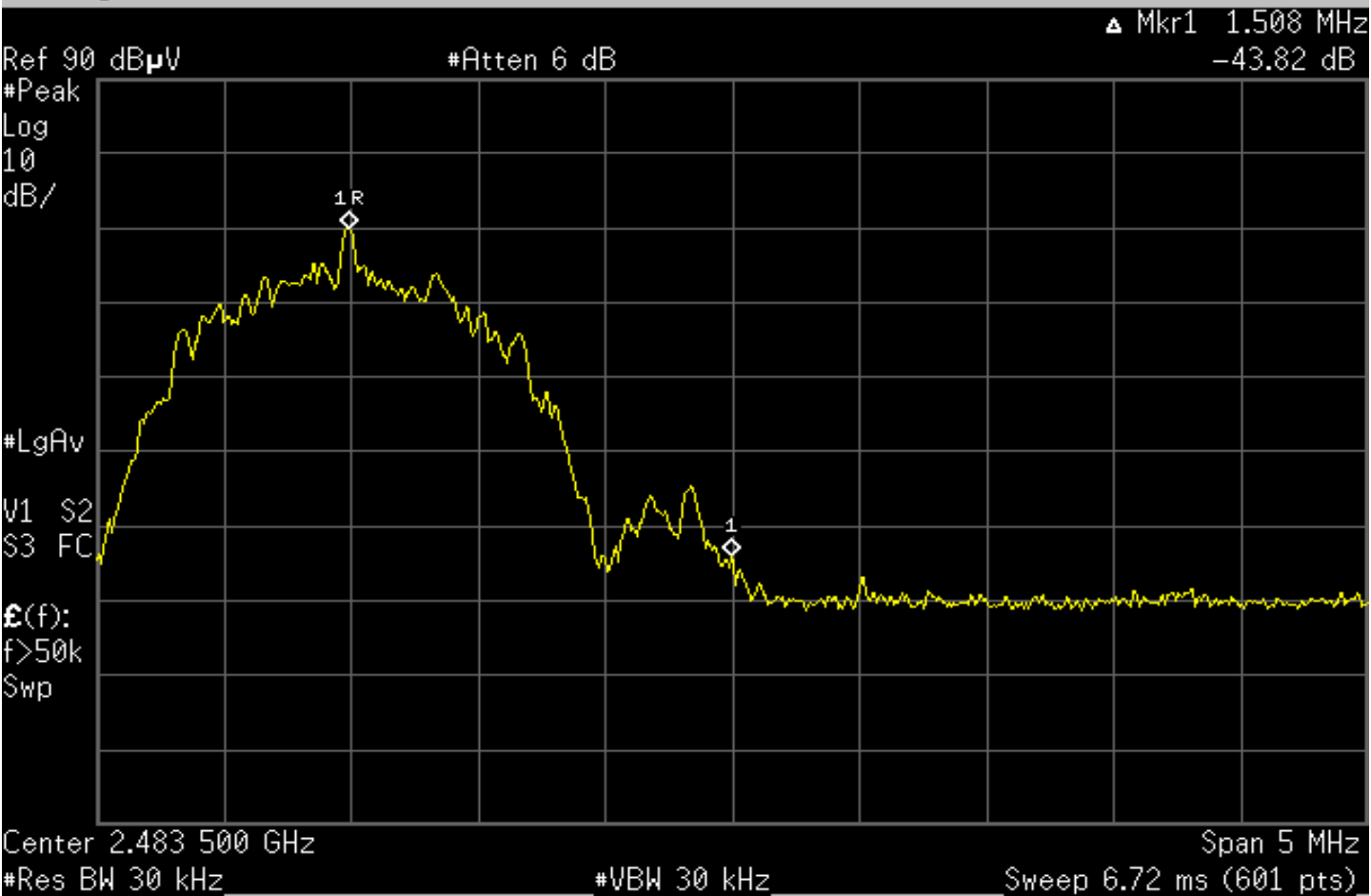
COMMENTS
Transmitting with standard mode of 3 pulses of 270 uS duration in an 8 ms period for a 10.1% duty cycle, bound to remote Front Panel Controller.

EUT OPERATING MODES
Transmitting 10.1% duty cycle, High Channel

DEVIATIONS FROM TEST STANDARD
No deviations.

Run #	1	EUT ends up (Y) - Vertical Receive
Configuration #	2	
Results		

Agilent 10:55:38 May 12, 2011 R T



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
Spectrum Analyzer	Agilent	E4446A	1304123D	2/21/2011	24
40GHz DC Block	Miteq	DCB4000	AMD	8/5/2010	13
Attenuator 20 dB, SMA M/F 26GHz	S.M. Electronics	SA26B-20	AUY	8/6/2010	12
EV06 Direct Connect Cable	ESM Cable Corp.	TT	ECA	NCR	0
Signal Generator	Agilent	E8257D	TGX	3/22/2011	12

MEASUREMENT UNCERTAINTY


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 for radiated emissions measurements is less than +/- 4 dB, and for conducted emissions measurements is less than +/- 2.7 dB. Our measurement data meets or exceeds the measurement uncertainty requirements of CISPR 16-4; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for measurement uncertainty are available upon request.

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 its maximum data rate in a hopping mode on all channels. The spectrum was scanned across each band edge from 5 MHz below the band edge to 5 MHz above the band edge.

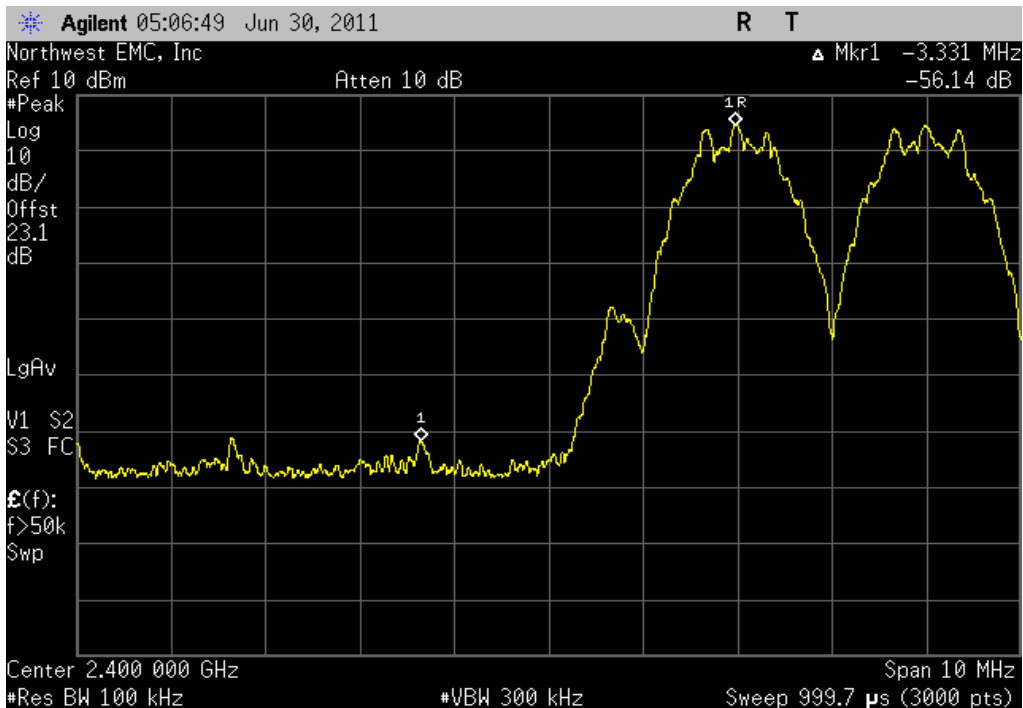
BAND EDGE COMPLIANCE

EMC

EUT: Accessory Wireless Controller		Work Order: MCSO1554	
Serial Number: BRI-B2-EV4-318		Date: 06/30/11	
Customer: Microsoft Corporation		Temperature: 23.5°C	
Attendees: None		Humidity: 40%	
Project: None		Barometric Pres.: 1020.6 mb	
Tested by: Rod Peloquin		Power: USB	Job Site: EV06
TEST SPECIFICATIONS		TEST METHOD	
FCC 15.247:2011		ANSI C63.10:2009	
COMMENTS			
Transmitting in continuous hopping mode while bound to front panel controller radio.			
DEVIATIONS FROM TEST STANDARD			
No Deviations			
Configuration #	1	 Signature	
		Value	Limit
Low band edge, 2400 MHz		-56.1 dBc	≤ -20 dBc
High band edge, 2483.5 MHz		-43.1 dBc	≤ -20 dBc
			Results
			Pass
			Pass

BAND EDGE COMPLIANCE

Low band edge, 2400 MHz		
Result: Pass	Value: -56.1 dBc	Limit: ≤ -20 dBc



High band edge, 2483.5 MHz		
Result: Pass	Value: -43.1 dBc	Limit: ≤ -20 dBc

