



**Microsoft Corporation**

**Model 1631**

**FCC 15.247:2014**

**FCC 15.207:2014**

**Report #: MCSO1698 PART 1 OF 7**



Report Prepared By Northwest EMC Inc.

NORTHWEST EMC – (888) 364-2378 – [www.nwemc.com](http://www.nwemc.com)

California – Minnesota – Oregon – New York – Washington

**Last Date of Test: April 23, 2014**  
**Microsoft Corporation**  
**Model: Model 1631**

## Emissions

Test Description	Specification	Test Method	Pass/Fail
Duty Cycle	FCC 15.247:2014	ANSI C63.10:2009	Pass
Occupied Bandwidth	FCC 15.247:2014	ANSI C63.10:2009	Pass
Output Power	FCC 15.247:2014	ANSI C63.10:2009	Pass
Power Spectral Density	FCC 15.247:2014	ANSI C63.10:2009	Pass
Band Edge Compliance	FCC 15.247:2014	ANSI C63.10:2009	Pass
Spurious Conducted Emissions	FCC 15.247:2014	ANSI C63.10:2009	Pass
Spurious Radiated Emissions	FCC 15.247:2014	ANSI C63.10:2009	Pass
Conducted Emissions	FCC 15.207:2014	ANSI C63.10:2009	Pass

## Deviations From Test Standards

None

**Approved By:**



Kyle Holgate, 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
00	None		

## Barometric Pressure

The recorded barometric pressure has been normalized to sea level.

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## 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

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## Canada

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

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## 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.

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## Australia/New Zealand

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

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## Korea

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

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## Japan

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

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## 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.

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## Singapore

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

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## Hong Kong

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

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## Vietnam

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

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## Russia

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

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## SCOPE

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

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

## Measurement Uncertainty

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

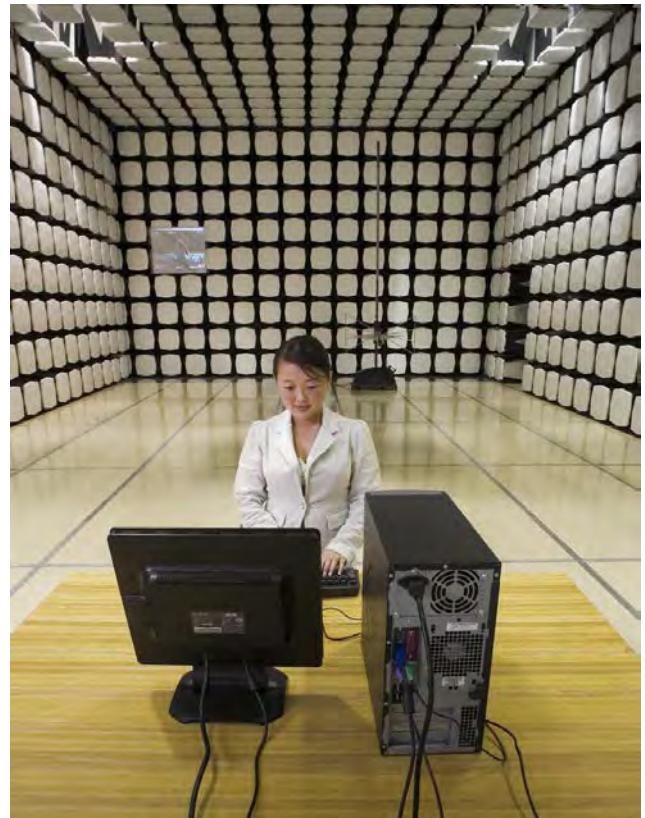
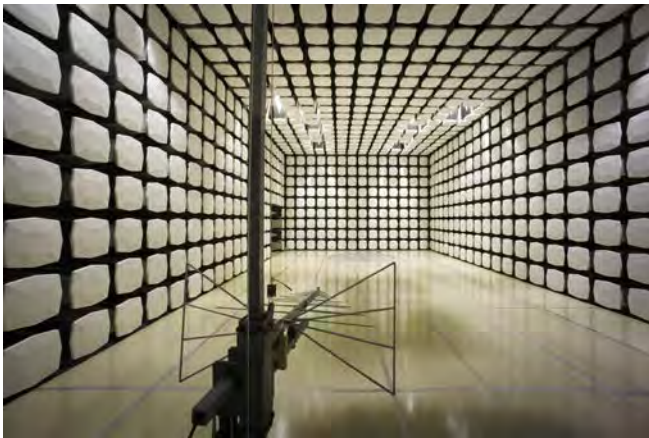
A measurement uncertainty estimation has been performed for each test per our internal quality document WP 342. The estimation is used to compare the measured result with its "true" or theoretically correct value. The expanded measurement uncertainty (K=2) for each test is listed below. Our measurement data meets or exceeds the measurement uncertainty requirements of the applicable specification; therefore, the test data can be compared directly to the specification limit to determine compliance. The calculations for estimating measurement uncertainty are based upon ETSI TR 100 028 (or CISPR 16-4-1 as applicable), and are available upon request.

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

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



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



**Client and Equipment Under Test (EUT) Information**

<b>Company Name:</b>	Microsoft Corporation
<b>Address:</b>	One Microsoft Way
<b>City, State, Zip:</b>	Redmond, WA 98052-6399
<b>Test Requested By:</b>	Mike Boucher
<b>Model:</b>	Model 1631
<b>First Date of Test:</b>	February 26, 2014
<b>Last Date of Test:</b>	April 23, 2014
<b>Receipt Date of Samples:</b>	February 26, 2014
<b>Equipment Design Stage:</b>	Production
<b>Equipment Condition:</b>	No Damage

**Information Provided by the Party Requesting the Test**

**Functional Description of the EUT (Equipment Under Test):**  
 Portable Computing Device

**Testing Objective:**  
 To demonstrate compliance under FCC 15.247 for operation in the 2.4 GHz and 5.8 GHz bands.

## Configuration MCSO1698- 1

Software/Firmware Running during test	
Description	Version
WiFi tool	2.2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Portable Computing Device	Microsoft Corporation	1631	041148340753

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
AC/DC Adapter	Microsoft Corporation	X891182-003	0D130C01W1C42
Laptop	Lenovo	ThinkPad E545	MP-04RWZM
AC/DC Adapter (lenovo)	Lenovo	ADLX65NDT2A	11S36200289ZZ1003AWDKD
USB Adapter	CISCO	USB300M	CU906MC02251

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Power Cable	PA	2m	PA	AC/DC Power Adapter	Portable Computing Device
AC Power Cable	No	.5m	No	AC/DC Power Adapter	AC Mains
USB Adapter cable	No	.1m	No	Portable Computing Device	Cat 5 Cable
Cat 5 Cable	No	2m	No	Laptop	USB Adapter Cable
AC Power Cable (Lenovo)	No	1m	No	AC/DC Power Adapter	AC Mains
DC Power Cable (Lenovo)	PA	2m	Yes	AC/DC Power Adapter	Laptop

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



## Configuration MCSO1698- 3

Software/Firmware Running during test	
Description	Version
WiFi tool	2.2

EUT			
Description	Manufacturer	Model/Part Number	Serial Number
Portable Computing Device	Microsoft Corporation	1631	041151240753

Peripherals in test setup boundary			
Description	Manufacturer	Model/Part Number	Serial Number
AC/DC Adapter	Microsoft Corporation	X891182-003	0D130C01W1C42
AC/DC Adapter (lenovo)	Lenovo	ADLX65NDT2A	11S36200289ZZ1003AWDKD
Eye Buds	None	None	None
USB Adapter	CISCO	USB300M	CU906MC02251

Remote Equipment Outside of Test Setup Boundary			
Description	Manufacturer	Model/Part Number	Serial Number
Laptop	Lenovo	ThinkPad E545	MP-04RWZM

Cables					
Cable Type	Shield	Length (m)	Ferrite	Connection 1	Connection 2
DC Power Cable	PA	2m	PA	AC/DC Power Adapter	Portable Computing Device
AC Power Cable	No	.5m	No	AC/DC Power Adapter	AC Mains
USB Adapter cable	No	.1m	No	Portable Computing Device	Cat 5 Cable
AC Power Cable (Lenovo)	No	1m	No	AC/DC Power Adapter	AC Mains
DC Power Cable (Lenovo)	PA	2m	Yes	AC/DC Power Adapter	Laptop
Mini Display Port Adapter	Yes	2m	No	Portable Computing Device	Un-terminated
Cat 5 Cable	No	5m	No	Laptop	USB Adapter Cable

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

**Configuration MCSO1698- 4**

<b>Software/Firmware Running during test</b>	
<b>Description</b>	<b>Version</b>
WiFi tool	2.2

<b>EUT</b>			
<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
Portable Computing Device	Microsoft Corporation	1631	041148340753

<b>Peripherals in test setup boundary</b>			
<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
AC/DC Adapter	Microsoft Corporation	X891182-003	0D130C01W1C42
AC/DC Adapter (lenovo)	Lenovo	ADLX65NDT2A	11S36200289ZZ1003AWDKD
Eye Buds	None	None	None
USB Adapter	CISCO	USB300M	CU906MC02251

<b>Remote Equipment Outside of Test Setup Boundary</b>			
<b>Description</b>	<b>Manufacturer</b>	<b>Model/Part Number</b>	<b>Serial Number</b>
Laptop	Lenovo	ThinkPad E545	MP-04RWZM

<b>Cables</b>					
<b>Cable Type</b>	<b>Shield</b>	<b>Length (m)</b>	<b>Ferrite</b>	<b>Connection 1</b>	<b>Connection 2</b>
DC Power Cable	PA	2m	PA	AC/DC Power Adapter	Portable Computing Device
AC Power Cable	No	.5m	No	AC/DC Power Adapter	AC Mains
USB Adapter cable	No	.1m	No	Portable Computing Device	Cat 5 Cable
AC Power Cable (Lenovo)	No	1m	No	AC/DC Power Adapter	AC Mains
DC Power Cable (Lenovo)	PA	2m	Yes	AC/DC Power Adapter	Laptop
Eye Buds	PA	1.1m	No	Portable Computing Device	Un-terminated
Mini Display Port Adapter	Yes	2m	No	Portable Computing Device	Un-terminated
Cat 5 Cable	No	5m	No	Laptop	USB Adapter Cable

**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	3/19/2014	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	3/22/2014	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.
3	3/22/2014	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.
4	4/16/2014	Conducted Emissions	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	EUT remained at Northwest EMC following the test.
5	4/23/2014	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	4/23/2014	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	4/23/2014	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.
8	4/23/2014	Output Power	Tested as delivered to Test Station.	No EMI suppression devices were added or modified during this test.	Scheduled testing was completed.