



# RADIO TEST REPORT

For

MODEL NO.:1914

FCC ID: C3K1914

IC ID: 3048A-1914

Test Report No. R-TR623-FCCISED-UNII-3

Issue Date: June 10, 2020

FCC CFR47 Part 15 Subpart E  
Innovation, Science and Economic Development  
Canada RSS-247 Issue 2

*Prepared by*

Microsoft EMC Laboratory  
17760 NE 67th Ct,  
Redmond WA, 98052, U.S.A.  
425-421-8641

[dasalina@microsoft.com](mailto:dasalina@microsoft.com)



TESTING CERT #3472.01

## 1 Record of Revisions

Revision	Date	Section	Page(s)	Summary of Changes	Author/Revised By:
1.0	06/01/2020	All	All	Version 1.0	Vishwas Narayan
2.0	06/09/2020	9.5.5.1	42	Chain A+B changed to Chain A	Vishwas Narayan
		9.5.5.1	42	Added duty cycle column to test data summary table	
		9.5.5.2	43		
		9.5.5.3	50		
		9.5.5.4	51		
3.0	06/10/2020	9.5.5.2, 9.5.5.4	49,50,51,58,59, 60	Added UNII-3 500KHz PSD plots	Vishwas Narayan

## Table of Contents

1	Record of Revisions .....	2
2	Deviations from Standards .....	6
3	Facilities and Accreditations .....	6
3.1	Test Facility .....	6
3.2	Accreditations .....	6
3.3	Test Equipment .....	6
4	Measurement Uncertainty .....	6
5	Product Description .....	7
5.1	Test Configurations .....	7
5.2	Environmental Conditions .....	8
5.3	Antenna Requirements and Gain Information .....	8
5.4	Equipment Modifications .....	8
5.5	Dates of Testing .....	8
5.6	Test Engineers .....	8
6	Test Results Summary .....	9
7	Test Equipment List .....	11
8	Test Site Description .....	13
8.1	Radiated Emissions Test Site .....	13
8.1.1	Radiated Measurements in 9kHz- 30 MHz .....	13
8.1.2	Radiated Measurements in 30 MHz - 1000 MHz .....	13
8.1.3	Radiated Measurements above 1GHz .....	13
8.2	Antenna port conducted measurements .....	13
8.3	Test Setup Diagrams .....	14
9	Test Results- Conducted .....	17
9.1	26-dB Emission Bandwidth .....	17
9.1.1	Test Requirement: .....	17
9.1.2	Test Method: .....	17
9.1.3	Limits: .....	17
9.1.4	Test Results: .....	17
9.2	99% Occupied Bandwidth .....	18
9.2.1	Test Requirement: .....	18
9.2.2	Test Method: .....	18
9.2.3	Limits: .....	18

9.2.4	Test Results:	18
9.2.5	Test Data:	19
9.3	6-dB Bandwidth	33
9.3.1	Test Requirement:	33
9.3.2	Test Method:	33
9.3.3	Limits:	33
9.3.4	Test Results:	33
9.3.5	Test Data:	34
9.4	Maximum Conducted Output Power	38
9.4.1	Test Requirement:	38
9.4.2	Test Method:	38
9.4.3	Limits:	38
9.4.4	Test Results:	39
9.5	Power Spectral Density	40
9.5.1	Test Requirement:	40
9.5.2	Test Method:	40
9.5.3	Limits:	41
9.5.4	Test Results:	41
9.5.5	Test Data	42
9.6	Radiated Spurious and Band Edge Emissions	61
9.6.1	Test Requirement:	61
9.6.2	Test Method:	61
9.6.3	Limits:	63
9.6.4	Test Result:	63
9.6.5	Test Data:	64
9.7	AC Line Conducted Emissions	94
9.7.1	Test Requirements	94
9.7.2	Test Method	94
9.7.3	Limit	94
9.7.4	Test Result:	94
9.7.5	Test Data:	95

# Test Report Attestation

**Microsoft Corporation**

**Model:** 1914

**FCC ID:** C3K1914

**ISED ID:** 3048A-1914

## Applicable Standards

Specification	Test Result
FCC CFR47 Rule Parts 15.207, 15.209, 15.407	Pass
Innovation, Science and Economic Development Canada RSS-247 Issue 2, RSS-GEN Issue 5	Pass

Microsoft EMC Laboratory attests that the product model identified in this report has been tested to and meets the requirements identified in the above standards. The test results in this report solely pertains to the specific sample tested, under the conditions and operating modes as provided by the customer.

This report shall not be used to claim product certification, approval, or endorsement by A2LA or any agency of any Government. Reproduction, duplication or publication of extracts from this test report is prohibited and requires prior written approval of Microsoft EMC Laboratory.

This report replaces previously issued report number R-TR623-FCCISED-UNII-2 on 06/09/2020.



Written By: Vishwas Narayan  
RF Test Engineer



Reviewed/ Issued By: Daniel Salinas  
RF Lab Technical Manager

## 2 Deviations from Standards

None.

## 3 Facilities and Accreditations

### 3.1 Test Facility

All test facilities used to collect the test data are located at Microsoft EMC Laboratory,  
17760 NE 67<sup>th</sup> Ct,  
Redmond WA, 98052, USA

### 3.2 Accreditations

The lab is established and follows procedures as outlined in IEC/ISO 17025 and A2LA accreditation requirements.

A2LA Accredited Testing Certificate Number: 3472.01

FCC Registration Number: US1141

IC Site Registration Numbers: 3048A-3, 3048A-4

### 3.3 Test Equipment

The site and related equipment are constructed in conformance with the requirements of ANSI C63.4:2014 and other equivalent applicable standards.

Test site requirements for measurements above 1 GHz are in accordance with ANSI C63.4:2014.

ANSI C63.10:2013 and the appropriate KDB test methods were followed.

## 4 Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the product, as specified in ETSI TR 100 028. This represents an expanded uncertainty expressed at 95% confidence level using a coverage factor  $k=2$ . These levels are for reference only and not included to determine product compliance.

Expanded uncertainty calculations are available upon request.

Test item	Uncertainty	Unit
Radiated disturbance (9 KHz to 30 MHz)	5.99	dB
Radiated disturbance (1 GHz to 40 GHz)	5.12	dB
Conducted Disturbance at Mains Port	3.31	dB
Uncertainty for Conducted Power test	1.277	dB
Uncertainty for Conducted Spurious emission test	2.742	dB
Uncertainty for Bandwidth test	178	kHz
Uncertainty for DC power test	0.05	%
Uncertainty for test site temperature	0.5	°C
Uncertainty for test site Humidity	3	%
Uncertainty for time	0.189	%

## 5 Product Description

Company Name:	Microsoft Corporation
Address:	One Microsoft Way
City, State, Zip:	Redmond, WA 98052-6399
Customer Contact:	Kyle Chen
Functional Description of the EUT:	Wireless Input device with 802.11 g/a/n 20 MHz Accessory, and Bluetooth Low Energy Radios
Model:	1914
FCC ID:	C3K1914
IC ID:	3048A-1914
Radio under test:	IEEE 802.11a/n supporting 20 MHz Bandwidths 5150- 5250 MHz, 5250-5350 MHz, 5470-5725 MHz and 5725- 5850 MHz.
Modulation(s):	OFDM – BPSK, QPSK, 16-QAM, 64-QAM, 256-QAM
EUT Classification:	UNII
Equipment Design State:	Prototype/Production Equivalent (DV)
Equipment Condition:	Good
Test Sample Details:	RF Conducted Test Sample S/N: <b>0971000705012</b> RF Radiated Test Sample S/N: <b>09710001195012, 09710001075012</b>

### 5.1 Test Configurations

Test software “QA tool” (V0.0.1.63), Tera term (V4.102) and Tera term (V4.97) provided by the customer were used to program the EUT to transmit continuously.

All modes of operation were investigated initially, and full testing performed on the worst-case modes as described below-

802.11a: 6Mbps

802.11n HT20: MCS0

## 5.2 Environmental Conditions

Ambient air temperature of the test site was within the range of 10 °C to 40 °C (50 °F to 104 °F) unless the EUT specified testing over a different temperature range. Humidity levels were in the range of 10% to 90% relative humidity. Testing conditions were within tolerance, and any deviations required from the EUT are reported.

## 5.3 Antenna Requirements and Gain Information

The antennas are internal, permanently attached and there are no provisions for connection to an external antenna.

Frequency Band (MHz)	Chain A SISO Wi-Fi Antenna Peak Gain (dBi)
UNII Band 1- 5150 to 5250	3.77
UNII Band 2a – 5250 to 5350	4.40
UNII Band 2c – 5470 to 5725	4.12
UNII Band 3 – 5725 to 5850	3.71

## 5.4 Equipment Modifications

No modifications were made during testing.

## 5.5 Dates of Testing

Testing was performed from April 23, 2020 to May 20, 2020

## 5.6 Test Engineers

Test Case	Test Engineers
Radiated	Akshay Landge Nitin Kishore Kumar Nanda Gopal Jeevarathnam Paulami Roy Pooja Akhoury Shiny Amulya Yadiki
Conducted	Vishwas Narayan



## 6 Test Results Summary

Test Description	Applicable Bands (GHz)	FCC CFR 47/ISED Rule Part	Limit	Test Result
26dB Emission Bandwidth	5.15 – 5.25 5.25 – 5.35 5.47 – 5.725	15.407 (a) RSS-247 [6.2.1]	Reporting and Measurement Purposes	NA
99% bandwidth	5.15 – 5.25 5.25 – 5.35 5.47 – 5.725	RSS-247 [6.2]	Reporting and Measurement Purposes	NA
6 dB Bandwidth	5.725 – 5.85	15.407 (e) RSS-247 [6.2.4]	≥ 500kHz	Pass
Output Power	5.15 – 5.25	15.407 (a)(1)(iv)	≤ 250 mW or $10 + 10 \log_{10}B^*$ whichever is less	Pass
		RSS-247 [6.2.1]	≤ 200 mW or $10 + 10 \log_{10}B^*$ e.i.r.p whichever is less	Pass
	5.25 – 5.35 5.47 – 5.725	15.407 (a)(2) RSS-247 [6.2]	≤ 250 mW or $11 + 10 \log_{10}B^*$ whichever is less ≤ 1 W or $17 + 10 \log_{10}B^*$ e.i.r.p whichever is less	Pass
		5.725 – 5.85	15.407 (a)(3) RSS-247 [6.2]	≤ 1000 mW
Power Spectral Density	5.15 – 5.25	15.407 (a)(1)(iv)	≤ 11dBm/MHz	Pass
		RSS-247 [6.2]	≤ 10dBm/MHz e.i.r.p.	Pass
	5.25 – 5.35 5.47 – 5.725	15.407 (a)(2) RSS-247 [6.2]	≤ 11dBm/MHz	Pass
		5.725 – 5.85	15.407 (a)(3) RSS-247 [6.2]	≤ 30dBm/500kHz
Radiated Spurious Emissions/ Restricted Band Emissions	5.15 – 5.25 5.25 – 5.35 5.47 – 5.725 5.725 – 5.85	15.407 (b), 15.205, 15.209, RSS-Gen [8.9]	FCC CFR 47 15.209 limits RSS-Gen [8.9]	Pass

AC Power Line Conducted Emissions	5.15 – 5.25 5.25 – 5.35 5.47 – 5.725 5.725 – 5.85	15.407 (b), 15.207 RSS-Gen [8.8]	FCC CFR 47 15.207 limits RSS-Gen [8.8]	Pass
---	--	--	---	------

\* Note: **B**- FCC references 26dB bandwidth and ISED references 99% bandwidth.