RF Exposure Report

Report No.: SA150803E06D

FCC ID: C3K1682

Test Model: 1682

Received Date: Aug. 05, 2015

Test Date: Sep. 16, 2015

Issued Date: Sep. 19, 2016

Applicant: Microsoft Corporation

Address: One Microsoft Way Redmond WA 98052

Issued By: Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Hsin Chu Laboratory

Lab Address: E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300, Taiwan R.O.C.

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Release Control Record

Issue No.	Description	Date Issued
SA150803E06D	Original release.	Sep. 19, 2016

1 Certificate of Conformity

Product:	dual-band wireless accessory radio
Brand:	Microsoft
Test Model:	1682
Sample Status:	ENGINEERING SAMPLE
Applicant:	Microsoft Corporation
Test Date:	Sep. 16, 2015
Standards:	FCC Part 2 (Section 2.1091) KDB 447498 D01 General RF Exposure Guidance v06 IEEE C95.1-1992

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's EMC characteristics under the conditions specified in this report.

Prepared by : _____ , **Date:** Sep. 19, 2016

Wendy Wu / Specialist

Approved by : _____ , **Date:** Sep. 19, 2016

May Chen / Manager

2 RF Exposure

2.1 Limits For Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
300-1500	…	…	F/1500	30
1500-100,000	…	…	1.0	30

F = Frequency in MHz

2.2 MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Antenna No.	Brand	Model	Gain (dBi)	Antenna Type	Connector Type	Frequency range (GHz to GHz)	Function
Ant. 1 (for WLAN 2.4GHz)	Microsoft	NA	2.7	PCB	NA	2.4~2.4835	TX/RX
Ant. 2 (for BT)			0.12			2.4~2.4835	TX/RX
Ant. 3 (for WLAN 5GHz) Chan (0)			2.2			5.15~5.85	TX/RX
Ant. 4 (for WLAN 5GHz) Chan (1)			2.2			5.15~5.85	RX

2.5 Calculation Result

For 2.4GHz, 5GHz (U-NII-1 & UNII-3) BT-EDR and BT-LE data was copied from the original test report (Report No.: SA150803E06)

For WLAN

Frequency Band (MHz)	Max Power (dBm)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (W/cm^2)
2412-2462	23.00	199.526	2.7	20	0.07391	1
5180-5240	16.00	39.811	2.2	20	0.01314	1
5260-5320	16.00	39.811	2.2	20	0.01314	1
5500-5700	19.00	79.433	2.2	20	0.02623	1
5745-5825	19.00	79.433	2.2	20	0.02623	1

For BT-EDR

Frequency Band (MHz)	Max Power (dBm)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (W/cm^2)
2402-2480	10.50	11.22	0.12	20	0.00229	1

For BT-LE

Frequency Band (MHz)	Max Power (dBm)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (W/cm^2)
2402-2480	10.50	11.22	0.12	20	0.00229	1

NOTE: 1. This power included tune-up tolerance range (1.5dB) that specified by manufacturer.

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + BT = 0.07391 / 1 + 0.00229 / 1 = 0.0762

WLAN 5GHz + BT = 0.02623 / 1 + 0.00229 / 1 = 0.02852

Therefore the maximum calculations of above situations are less than the "1" limit.

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