



## RF Exposure Report

**Report No.:** SA150803E06

**FCC ID:** C3K1682

**Test Model:** 1682

**Received Date:** Aug. 03, 2015

**Test Date:** Sep. 16 to 25, 2015

**Issued Date:** Nov. 11, 2015

**Applicant:** Microsoft Corporation

**Address:** One Microsoft Way Redmond WA 98052

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
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### Release Control Record

Issue No.	Description	Date Issued
SA150803E06	Original release.	Nov. 11, 2015



**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 to 25, 2015

**Standards:** FCC Part 2 (Section 2.1091)  
447498 D01 General RF Exposure Guidance v06  
IEEE Std C95.1-2005

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:** Nov. 11, 2015  
Midoli Peng / Specialist

**Approved by :**  , **Date:** Nov. 11, 2015  
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 <sup>2</sup> )	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

$$P_d = (P_{out} * G) / (4 * \pi * r^2)$$

where

$P_d$  = power density in mW/cm<sup>2</sup>

$P_{out}$  = 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**.

## 3 Antenna Gain

The antennas provided to the EUT, please refer to the following table:

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

#### 4 Calculation Result of Maximum Conducted Power

##### For WLAN

Frequency Band (MHz)	Max Power (dBm)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (W/cm <sup>2</sup> )
2412-2462	23.00	199.526	2.7	20	0.07391	1
5180-5240	16.00	39.811	2.2	20	0.01314	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 <sup>2</sup> )	Limit (W/cm <sup>2</sup> )
2402-2478	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 <sup>2</sup> )	Limit (W/cm <sup>2</sup> )
2402-2478	10.50	11.22	0.12	20	0.00229	1

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

#### Conclusion:

The formula of calculated the MPE is:

$$CPD1 / LPD1 + CPD2 / LPD2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

$$\text{WLAN 2.4GHz} + \text{BT} = 0.07391 + 0.00229 = 0.076$$

$$\text{WLAN 5GHz} + \text{BT} = 0.02623 + 0.00229 = 0.029$$

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

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