

## RF Exposure Report

**Report No.:** SA180223C02 R1

**FCC ID:** NKR-DHUME997

**Test Model:** Catapult ERM997-1

**Received Date:** Feb. 23, 2018

**Test Date:** Mar. 23 ~ May 07, 2018

**Issued Date:** Jul. 04, 2018

**Applicant:** Wistron NeWeb Corp.

**Address:** 20 Park Avenue II, Hsinchu Science Park, Hsinchu 308, Taiwan, R.O.C.

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

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan, R.O.C.

**Test Location:** No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN (R.O.C.)



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## Table of Contents

<b>Release Control Record</b> .....	<b>3</b>
<b>1 Certificate of Conformity</b> .....	<b>4</b>
<b>2 RF Exposure</b> .....	<b>5</b>
2.1 Limits for Maximum Permissible Exposure (MPE) .....	5
2.2 MPE Calculation Formula .....	5
2.3 Classification .....	5
<b>3 Calculation Result of Maximum Conducted Power</b> .....	<b>6</b>



### Release Control Record

Issue No.	Description	Date Issued
SA180223C02	Original release	May 14, 2018
SA180223C02 R1	Revising Test Model Name.	Jul. 04, 2018

## 1 Certificate of Conformity

**Product:** Marvell 88W8997 11ac 2x2 and BT Combo module

**Brand:** WNC

**Test Model:** Catapult ERM997-1

**Sample Status:** Engineering sample

**Applicant:** Wistron NeWeb Corp.

**Test Date:** Mar. 23 ~ May 07, 2018

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

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 RF characteristics under the conditions specified in this report.

**Prepared by :**                     *Rolly Chien*                     , **Date:**                     Jul. 04, 2018                      
Rolly Chien / Specialist

**Approved by :**                     *Bruce Chen*                     , **Date:**                     Jul. 04, 2018                      
Bruce Chen / Project Engineer

## 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

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

where

Pd = power density in mW/cm<sup>2</sup>

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**.

### 3 Calculation Result of Maximum Conducted Power

Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
WLAN: 2412-2462	19.39	6.52	20	<b>0.078</b>	1
WLAN: 5180-5240	17.24	9.26	20	0.089	1
WLAN: 5260-5320	17.29	9.26	20	0.090	1
WLAN: 5500-5700	17.74	9.26	20	0.100	1
WLAN: 5745-5825	17.88	9.26	20	<b>0.103</b>	1
BT EDR: 2402-2480	9.58	3.79	20	0.004	1
BT LE: 2402-2480	9.97	3.79	20	<b>0.005</b>	1

Note:

WLAN

2.4GHz Band: Directional gain =  $G_{ANT\ MAX} + 10 \log(N_{ANT}/N_{SS}) = 3.51\ dBi + 10 \log(2/1) = 6.52\ dBi$

5GHz Band: Directional gain =  $G_{ANT\ MAX} + 10 \log(N_{ANT}/N_{SS}) = 6.25\ dBi + 10 \log(2/1) = 9.26\ dBi$

BT: antenna gain: 3.79dBi

Frequency Band	Max Power (dBm)			Total Power (dBm)	Power Limit (dBm)
	WLAN	BT EDR	BT LE		
2.4GHz	19.39	9.58	-	19.82	30
2.4GHz	19.39	-	9.97	19.86	30

Conclusion:

\*The BT could transmit simultaneously either with WLAN 2.4GHz or 5GHz at the same time.

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + BT =  $0.078 + 0.005 = 0.083$

WLAN 5GHz + BT =  $0.103 + 0.005 = 0.108$

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

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