

## RF Exposure Report

**Report No.:** SA170807E03

**FCC ID:** TLZ-CU302

**Test Model:** AW-CU302

**Received Date:** Aug. 07, 2017

**Test Date:** Sep. 18, 2017

**Issued Date:** Sep. 27, 2017

**Applicant:** AzureWave Technologies, Inc.

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

**Test Location :** E-2, No.1, Li Hsin 1st Road, Hsinchu Science Park, Hsinchu City 300,  
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### Release Control Record

Issue No.	Description	Date Issued
SA170807E03	Original release.	Sep. 27, 2017

## 1 Certificate of Conformity

**Product:** IEEE 802.11 b/g/n + Bluetooth 4.2 LE WLAN/BT Microcontroller Module

**Brand:** AzureWave

**Test Model:** AW-CU302

**Sample Status:** ENGINEERING SAMPLE

**Applicant:** AzureWave Technologies, Inc.


**Test Date:** Sep. 18, 2017


**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 EMC characteristics under the conditions specified in this report.

**Prepared by :**  , **Date:** Sep. 27, 2017  
Claire Kuan / Specialist

**Approved by :**  , **Date:** Sep. 27, 2017  
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

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

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.

## 2.4 Antenna Gain

Antenna No.	Brand	Model	Antenna Net Gain(dBi)	Frequency range	Antenna Type	Connector Type	Cable Length
1(Internal)	AzureWave	AW-CU302 ANT	2.5	2.4~2.4835GHz	Chip	NA	NA
2(External)	TAOGLAS	FXP73.07.0100A	3	2.4~2.4835GHz	Monopole	I-PEX	100mm
3(External)	TAOGLAS	PC11.07.0100A	3	2.4~2.4835GHz	Dipole	I-PEX	100mm
4(External)	TAOGLAS	FXP74.07.0100A	4	2.4~2.4835GHz	PIFA	I-PEX	100mm
5(External)	TAOGLAS	PC17.07.0070A	0.9	2.4~2.4835GHz	PIFA	I-PEX	70mm
6(External)	TAOGLAS	GW.17.07.0250E	2.7	2.4~2.4835GHz	Dipole	I-PEX	250mm
7(External)	TAOGLAS	FXP840.07.0055B	2	2.4~2.4836GHz	PIFA	I-PEX	55mm
8(External)	TAOGLAS	FXP75.07.0045B	2.5	2.4~2.4836GHz	PIFA	I-PEX	45mm
9(External)	LAIRD	NanoBlue-IP4_MAF94045	2	2.4~2.4835GHz	Dipole	I-PEX	100mm
10(External)	LAIRD	EBL2400A1-23UFL	2.45	2.4~2.4835GHz	Dipole	I-PEX	230mm
11(External)	LAIRD	NanoBlade-IP04_CAF94505	2	2.4~2.4835GHz	Dipole	I-PEX	100mm
12(External)	MOLEX	1461530100	3	2.4~2.4835GHz	Dipole	I-PEX	100mm
13(External)	MOLEX	1461530150	2.8	2.4~2.4835GHz	Dipole	I-PEX	150mm
14(External)	MOLEX	1461530200	2.6	2.4~2.4835GHz	Dipole	I-PEX	200mm
15(External)	MOLEX	1461530250	2.4	2.4~2.4835GHz	Dipole	I-PEX	250mm
16(External)	MOLEX	1461530300	2.2	2.4~2.4835GHz	Dipole	I-PEX	300mm
17(External)	MOLEX	2042810050	2.2	2.4~2.4835GHz	Dipole	I-PEX	50mm
18(External)	MOLEX	2042810100	2	2.4~2.4835GHz	Dipole	I-PEX	100mm
19(External)	MOLEX	2042810150	1.8	2.4~2.4835GHz	Dipole	I-PEX	150mm
20(External)	MOLEX	2042810200	1.6	2.4~2.4835GHz	Dipole	I-PEX	200mm
21(External)	MOLEX	2042810250	1.4	2.4~2.4835GHz	Dipole	I-PEX	250mm
22(External)	MOLEX	2042810300	1.2	2.4~2.4835GHz	Dipole	I-PEX	300mm
23(External)	YAGEO	ANTX100F113B24003	2.9	2.4~2.4835GHz	PIFA	I-PEX	100mm
24(External)	YAGEO	ANTX100P113B24003	2.8	2.4~2.4835GHz	PIFA	I-PEX	100mm
25(External)	LYNWAVE	ALA110-052020	2	2.4~2.4835GHz	Dipole	I-PEX	50mm
26(External)	LYNWAVE	ALA120-052024	2	2.4~2.4835GHz	Dipole	I-PEX	160mm
27(External)	LYNWAVE	ALA150-052020	2	2.4~2.4835GHz	Dipole	I-PEX	85mm
28(External)	LYNWAVE	ALA140-05102J	2	2.4~2.4835GHz	Dipole	I-PEX	40mm
29(External)	LYNWAVE	ALA120-051020	2	2.4~2.4835GHz	Dipole	I-PEX	50mm
30(External)	LYNWAVE	ALA120-051022	2	2.4~2.4835GHz	Dipole	I-PEX	30mm
31(External)	LYNWAVE	ALA140-051020	1.88	2.4~2.4835GHz	Dipole	I-PEX	70mm
32(External)	LYNWAVE	ALA150-05102B	2	2.4~2.4835GHz	Dipole	I-PEX	10mm
33(External)	LYNWAVE	ALA150-05102C	2	2.4~2.4835GHz	Dipole	I-PEX	75mm
34(External)	LYNWAVE	ALA150-05102F	2	2.4~2.4835GHz	Dipole	I-PEX	140mm
35(External)	LYNWAVE	ALA150-05102J	2	2.4~2.4835GHz	Dipole	I-PEX	100mm
36(External)	LYNWAVE	ALA140-05102D	2	2.4~2.4835GHz	Dipole	I-PEX	95mm
37(External)	LYNWAVE	ALA150-051026	2	2.4~2.4835GHz	Dipole	I-PEX	150mm

From the above antennas, antenna 1, 2, 3, 4 were selected for the test and its data was recorded in this report.

### 3 Calculation Result of Maximum Conducted Power

#### WLAN

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2412-2462	290.402	4.00	20	0.14512	1

#### BT-LE

Frequency Band (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )
2402-2480	0.9183	4.00	20	0.00046	1

#### 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

WLAN + Bluetooth =  $0.14512 / 1 + 0.00046 / 1 = 0.14558$

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

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