



# RF EXPOSURE REPORT

**REPORT NO.:** SA141029E01

**MODEL NO.:** DVW32G

**FCC ID:** XCNDVW32G

**RECEIVED:** Oct. 29, 2014

**TESTED:** Dec. 08, 2014

**ISSUED:** Dec. 23, 2014

**APPLICANT:** Ubee Interactive Corp.

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**ISSUED BY:** Bureau Veritas Consumer Products Services  
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## RELEASE CONTROL RECORD

ISSUE NO.	REASON FOR CHANGE	DATE ISSUED
SA141029E01	Original release	Dec. 23, 2014



A D T

## 1. CERTIFICATION

**PRODUCT:** Wireless eMTA  
**BRAND NAME:** Ubee  
**MODEL NO.:** DVW32G  
**TEST SAMPLE:** ENGINEERING SAMPLE  
**APPLICANT:** Ubee Interactive Corp.  
**TESTED:** Dec. 08, 2014  
**STANDARDS:** FCC Part 2 (Section 2.1091)  
KDB 447498 D03  
IEEE C95.1

The above equipment (Model: DVW32G) 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:** Dec. 23, 2014  
( Lori Chung, Specialist )

**Approved by :**  , **Date:** Dec. 23, 2014  
( May Chen, Manager )

## 2. RF EXPOSURE LIMIT

### 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)
<b>LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE</b>				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

### 3. MPE CALCULATION FORMULA

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

where

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

P<sub>out</sub> = 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

### 4. CLASSIFICATION

The antenna of this product, under normal use condition, is at least 28cm away from the body of the user. So, this device is classified as **Mobile Device**.

## 5. ANTENNA GAIN

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

Antenna set 1						
Antenna No.	Brand	Model	Gain (dBi) Including cable loss	Antenna Type	Connector Type	Frequency range (GHz to GHz)
1	WHA YU	NA	4.6	Dipole (PCB)	MHF	2.4~2.4835
			4.4			5.15~5.25
			6.3			5.725~5.850
2	WHA YU	NA	6	Dipole (PCB)	MHF	2.4~2.4835
			4.6			5.15~5.25
			5.8			5.725~5.850
3	WHA YU	NA	5.3	Dipole (PCB)	MHF	2.4~2.4835
			3.8			5.15~5.25
			4.2			5.725~5.850
Antenna set 2						
Antenna No.	Brand	Model	Gain (dBi) Including cable loss	Antenna Type	Connector Type	Frequency range (GHz to GHz)
1 (Black)	TONGDA	NA	4.453	Dipole (PCB)	MHF	2.4~2.4835
			4.289			5.15~5.25
			6.158			5.725~5.850
2 (Gray)	TONGDA	NA	5.989	Dipole (PCB)	MHF	2.4~2.4835
			4.442			5.15~5.25
			5.633			5.725~5.850
3 (White)	TONGDA	NA	5.120	Dipole (PCB)	MHF	2.4~2.4835
			3.508			5.15~5.25
			4.058			5.725~5.850

## 6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For 15.247(2.4GHz):

**CDD Mode:**

**802.11b:**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 ~ 2462	437.359	10.09	28	0.45322	1

NOTE: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.09\text{dBi}$

**802.11g:**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 ~ 2462	679.335	10.09	28	0.70397	1

NOTE: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.09\text{dBi}$

**VHT20:**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 ~ 2462	584.672	10.09	28	0.60588	1

NOTE: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.09\text{dBi}$

**VHT40:**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2422 ~ 2452	188.996	10.09	28	0.19585	1

NOTE: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.09\text{dBi}$

**Beamforming Mode:**

**VHT20:**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 ~ 2462	371.197	10.09	28	0.38466	1

NOTE: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.09\text{dBi}$

**VHT40:**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2422 ~ 2452	188.996	10.09	28	0.19585	1

NOTE: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.09\text{dBi}$

For 15.407(5GHz):

**CDD Mode:**

**802.11a:**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 – 5240	229.056	9.04	28	0.18639	1
5745 - 5825	251.281	10.25	28	0.27017	1

**NOTE:** 1. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.04\text{dBi}$

2. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.25\text{dBi}$

**802.11ac (VHT20)**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 – 5240	234.222	9.04	28	0.19059	1
5745 - 5825	233.531	10.25	28	0.25108	1

**NOTE:** 1. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.04\text{dBi}$

2. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.25\text{dBi}$

**802.11ac (VHT40)**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5190 – 5230	272.803	9.04	28	0.22198	1
5755 - 5795	214.379	10.25	28	0.23049	1

**NOTE:** 1. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.04\text{dBi}$

2. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.25\text{dBi}$

**802.11ac (VHT80)**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5210	90.092	9.04	28	0.07331	1
5775	143.433	10.25	28	0.15421	1

**NOTE:** 1. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.04\text{dBi}$

2. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.25\text{dBi}$



### Beamforming Mode:

#### 802.11ac (VHT20)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5180 – 5240	176.472	9.04	28	0.14360	1
5745 - 5825	225.239	10.25	28	0.24217	1

NOTE: 1. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.04\text{dBi}$

2. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.25\text{dBi}$

#### 802.11ac (VHT40)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5190 – 5230	176.734	9.04	28	0.14381	1
5755 - 5795	208.671	10.25	28	0.22435	1

NOTE: 1. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.04\text{dBi}$

2. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.25\text{dBi}$

#### 802.11ac (VHT80)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
5210	112.167	9.04	28	0.09127	1
5775	107.589	10.25	28	0.11568	1

NOTE: 1. 5150~5250MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 9.04\text{dBi}$

2. 5725~5850MHz: Directional gain =  $10 \log[(10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 3] = 10.25\text{dBi}$

### CONCLUSION:

Both of the 2.4GHz and 5GHz WLAN can transmit simultaneously, the formula of calculated the MPE is:

$$CPD_1 / LPD_1 + CPD_2 / LPD_2 + \dots \text{etc.} < 1$$

CPD = Calculation power density

LPD = Limit of power density

Therefore, the worst-case situation is  $0.70397 / 1 + 0.27017 / 1 = 0.974$ , which is less than "1". This confirmed that the device comply with FCC 1.1310 MPE limit.

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