

# RF EXPOSURE REPORT

**REPORT NO.:** SA140123E01

**MODEL NO.:** NFA-BAC-MR-02

**FCC ID:** COFNFABACMR02

**RECEIVED:** Jan. 23, 2014

**TESTED:** Feb. 07 to 11, 2014

**ISSUED:** Feb. 21, 2014

**APPLICANT:** UNIVERSAL GLOBAL SCIENTIFIC  
INDUSTRIAL CO., LTD.

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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
SA140123E01	Original release	Feb. 21, 2014

## 1. CERTIFICATION

**PRODUCT:** 802.11ac/a/b/g/n + BT Wireless Module

**BRAND NAME:** UG

**MODEL NO.:** NFA-BAC-MR-02

**TEST SAMPLE:** ENGINEERING SAMPLE

**APPLICANT:** UNIVERSAL GLOBAL SCIENTIFIC INDUSTRIAL CO., LTD.

**TESTED DATE:** Feb. 07 to 11, 2014

**STANDARDS:** FCC Part 2 (Section 2.1091)  
FCC OET Bulletin 65, Supplement C (01-01)  
IEEE C95.1

The above equipment (Model: NFA-BAC-MR-02) 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 :** Midoli Peng , **DATE:** Feb. 21, 2014  
( Midoli Peng, Specialist )

**APPROVED BY :** May Chen , **DATE:** Feb. 21, 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)
LIMITS FOR GENERAL POPULATION / UNCONTROLLED EXPOSURE				
300-1500	...	...	F/1500	30
1500-100,000	...	...	1.0	30

F = Frequency in MHz

### 3. 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

### 4. 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**.

## 5. ANTENNA GAIN

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

Transmitter Circuit	Brand	Model	Antenna Gain(dBi) <Including cable loss>	Frequency range (GHz to GHz)	Antenna Type	Connector Type	Cable Loss (dB)	Cable Length (mm)
Chain (0) Ant. 1 (WLAN Ant)	High-Tek Electronics Co.,Ltd	DC33001JB20	1.5	2.4~2.4835	PIFA	i-pex(MHF)	0.65	260
			0.68	5.15~5.35	PIFA	i-pex(MHF)	1.02	260
			2.77	5.47~5.75			1.07	
			2.72	5.75~5.85			1.09	
Chain (1) Ant. 2 (WLAN+BT Ant)	High-Tek Electronics Co.,Ltd	DC33001JB30	-1.55	2.4~2.4835	PIFA	i-pex(MHF)	0.98	390
			1.57	5.15~5.35	PIFA	i-pex(MHF)	1.53	390
			2.77	5.47~5.7			1.6	
			1.70	5.75~5.85			1.64	

**Note:** For 802. 11a/b/g mode: Max. antenna gain was chosen for final test.

## 6. CALCULATION RESULT OF MAXIMUM CONDUCTED POWER

For WLAN: 15.247(2.4GHz)

### 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	98.401	1.5	20	0.02765	1.00

### 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	470.977	1.5	20	0.13235	1.00

### 802.11n(HT20)

FREQUENCY BAND (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2412 - 2462	795.974	1.5	20	0.22368	1.00

### 802.11n(HT40)

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	531.246	1.5	20	0.14929	1.00

### BT-LE(GFSK)

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2402 - 2480	17.539	-1.55	20	0.00244	1.00

## For WLAN: 15.247(5GHz)

### 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> )
5745 - 5825	146.555	2.72	20	0.05454	1.00

### 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> )
5745 - 5825	299.047	2.72	20	0.11129	1.00

### 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> )
5755 - 5795	261.060	2.72	20	0.09716	1.00

### 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> )
5775	148.175	2.72	20	0.05514	1.00



### For WLAN: 15.407(5GHz, 5150MHz~5350MHz)

#### 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, 5260 - 5320	39.902	1.57	20	0.01140	1.00

#### 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, 5260 - 5320	67.900	1.57	20	0.01939	1.00

#### 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, 5270 - 5310	56.017	1.57	20	0.01600	1.00

#### 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, 5290	14.724	1.57	20	0.00420	1.00

**For WLAN: 15.407(5GHz, 5470MHz ~ 5600MHz & 5650MHz ~ 5725MHz)**

**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> )
5500 - 5580 & 5660 - 5700	40.832	2.77	20	0.01537	1.00

**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> )
5500 - 5580 & 5660 - 5700	74.158	2.77	20	0.02792	1.00

**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> )
5510 - 5550 & 5670	54.943	2.77	20	0.02068	1.00

**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> )
5530	14.047	2.77	20	0.00529	1.00

**For Bluetooth:**  
**GFSK**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2402-2480	12.050	-1.55	20	0.00168	1.00

**8DPSK**

FREQUENCY (MHz)	CONDUCTED POWER (mW)	ANTENNA GAIN (dBi)	DISTANCE (cm)	POWER DENSITY (mW/ cm <sup>2</sup> )	LIMIT (mW/cm <sup>2</sup> )
2402-2480	11.455	-1.55	20	0.00159	1.00

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