

RF Exposure Report

Report No.: SA190218E06A

FCC ID: XCNUBC1319

Test Model: UBC1319

Received Date: May 09, 2019

Test Date: July 22, 2019

Issued Date: Dec. 10, 2019

Applicant: Ubee Interactive Corp.

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**FCC Registration /
Designation Number:** 723255 / TW2022

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Table of Contents

Release Control Record	3
1 Certificate of Conformity	4
2 RF Exposure	5
2.1 Limits for Maximum Permissible Exposure (MPE)	5
2.2 MPE Calculation Formula	5
2.3 Classification	5
2.4 Antenna Gain	6
2.5 Calculation Result of Maximum Conducted Power	7

Release Control Record

Issue No.	Description	Date Issued
SA190218E06A	Original release.	Dec. 10, 2019

1 Certificate of Conformity

Product: DOCSIS 3.0 Wireless eMTA

Brand: Ubee

Test Model: UBC1319

Applicant: Ubee Interactive Corp.

Test Date: July 22, 2019

Standards: FCC Part 2 (Section 2.1091)

KDB 447498 D01 General RF Exposure Guidance v06

IEEE C95.1-1992

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.

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Approved by : Clark Lin, **Date:** Dec. 10, 2019
Clark Lin / Technical 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 ²)	Average Time (minutes)
Limits For General Population / Uncontrolled Exposure				
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f ²)*	30
30-300	27.5	0.073	0.2	30
300-1500	...	...	f/1500	30
1500-100,000	...	...	1.0	30

f = Frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Formula

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

where

Pd = power density in mW/cm²

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 30cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Antenna No	Transmitter Circuit	Antenna Net Gain (dBi)	Frequency Range (GHz)	Antenna Type	Connector Type	Cable Length (mm)
1	5GHz: Chain 0	2.93	5.15~5.25	Dipole	i-Pex	71
		2.5	5.25~5.35			
		2.04	5.47~5.725			
		2.04	5.725~5.85			
2	2.4GHz: Chain 2	1.67	2.4~2.4825	Dipole	i-Pex	132
	5GHz: Chain 1	1.99	5.15~5.25			
		3.2	5.25~5.35			
		2.99	5.47~5.725			
3	5GHz: Chain 2	3.17	5.725~5.85	Dipole	i-Pex	110
		2.47	2.4~2.4825			
		4.22	5.15~5.25			
		3.52	5.25~5.35			
4	5GHz: Chain 3	3.59	5.47~5.725	Dipole	i-Pex	90
		4.54	5.725~5.85			
		2.49	2.4~2.4825			
		3.82	5.15~5.25			
		2.88	5.25~5.35			
	2.4GHz: Chain 0	3.64	5.47~5.725	Dipole	i-Pex	90
		3.64	5.725~5.85			
		3.64	5.725~5.85			

2.5 Calculation Result of Maximum Conducted Power

For 2.4GHz, 5GHz (U-NII-1, U-NII-3) data was copied from the original test report (Report No.: SA190218E06)

Operation Mode	Evaluation Frequency (MHz)	Max Power (mW)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm ²)	Limit (mW/cm ²)
WLAN 2.4GHz	2412	631.707	6.99	30	0.27929	1
WLAN 5GHz (U-NII-1)	5200	447.454	9.3	30	0.33674	1
WLAN 5GHz (U-NII-2A)	5270	236.051	9.05	30	0.16771	1
WLAN 5GHz (U-NII-2C)	5610	239.7	9.11	30	0.17267	1
WLAN 5GHz (U-NII-3)	5755	788.288	9.41	30	0.60846	1

Note:

- Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
- 2.4GHz: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20})^2 / 3] = 6.99\text{dBi}$
5GHz:
U-NII-1: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 9.3\text{dBi}$
U-NII-2A: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 9.05\text{dBi}$
U-NII-2C: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 9.11\text{dBi}$
U-NII-3: The directional gain = $10 \log[(10^{G0/20} + 10^{G1/20} + 10^{G2/20} + 10^{G3/20})^2 / 4] = 9.41\text{dBi}$

Conclusion:

The formula of calculated the MPE is:

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

CPD = Calculation power density

LPD = Limit of power density

$$\text{WLAN 2.4GHz} + \text{WLAN 5GHz} = 0.27929 / 1 + 0.60846 / 1 = 0.88775$$

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

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