RF Exposure Report

Report No.:	SABERD-WTW-P20110669 R1
FCC ID:	COF-WMBACAT49
Test Model:	WM-BAC-AT-49
Received Date:	Nov. 21, 2020
Date of Evaluation:	Dec. 29, 2020
Issued Date:	Mar. 04, 2021
Applicant:	Universal Global Scientific Industrial Co., Ltd.
Address:	141, Lane 351, Sec. 1, Taiping Road., Tsaotuen, Nantou 54261, Taiwan
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
Test Location:	No. 19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City 33383, TAIWAN
FCC Registration / Designation Number:	788550 / TW0003

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Release Control Record

Issue No.	Description	Date Issued
SABERD-WTW-P20110669	Original Release	Dec. 31, 2020
SABERD-WTW-P20110669 R1	Revise antenna type	Mar. 04, 2021

1 Certificate of Conformity

Product:	802.11a/b/g/n/ac 2x2 MIMO + BT 5.1 Combo Module
Brand:	USI
Test Model:	WM-BAC-AT-49
Sample Status:	Engineering Sample
Applicant:	Universal Global Scientific Industrial Co., Ltd.
Date of Evaluation:	Dec. 29, 2020
Standards:	FCC Part 2 (Section 2.1091)
References Test Guidance :	KDB 447498 D01 General RF Exposure Guidance v06 IEEE C95.3 -2002

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 : Vera Huang , **Date:** Mar. 04, 2021

Vera Huang / Specialist

Approved by : , **Date:** Mar. 04, 2021

Dylan Chiou / Senior 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^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

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

where

Pd = power density in mW/cm^2

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 Calculation Result of Maximum Conducted Power

Band	Frequency Band (MHz)	Max Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WLAN <Dipole Antenna A>	2412-2462	18.71	3.15	20	0.031	1.00
	5180-5240	16.95	4.12	20	0.025	1.00
	5260-5320	16.93	4.12	20	0.025	1.00
	5500-5700	16.89	4.12	20	0.025	1.00
	5745-5825	16.92	4.12	20	0.025	1.00
WLAN <Dipole Antenna B>	2412-2462	20.00	6.19	20	0.083	1.00
	5180-5240	16.95	5.68	20	0.036	1.00
	5260-5320	16.93	5.68	20	0.036	1.00
	5500-5700	16.89	5.68	20	0.036	1.00
	5745-5825	16.92	5.68	20	0.036	1.00
BT <Dipole Antenna>	2402-2480	6.17	1.23	20	0.001	1.00

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible
3. **For Dipole Antenna A**
   2.4GHz: Directional gain = 0.14 dBi + 10log(2) = 3.15 dBi
   5.0GHz: Directional gain = 1.11dBi + 10log(2) = 4.12dBi
   For Dipole Antenna B
   2.4GHz: Directional gain = 3.18 dBi + 10log(2) = 6.19 dBi
   5.0GHz: Directional gain = 2.67dBi + 10log(2) = 5.68dBi

Conclusion:
The formula of calculated the MPE is:
CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1
CPD = Calculation power density
LPD = Limit of power density

WLAN 2.4GHz + BT = 0.083/1 + 0.001/1 = 0.084
WLAN 5GHz + BT = 0.036/1 + 0.001/1 = 0.037

The product WiFi 2.4G and WiFi 5G will not simultaneous transmissions , but 2.4G + BT & 5G + BT can operate at the simultaneous transmissions. The emission of the simultaneous operation has been evaluated and no non-compliance was found.

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

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