



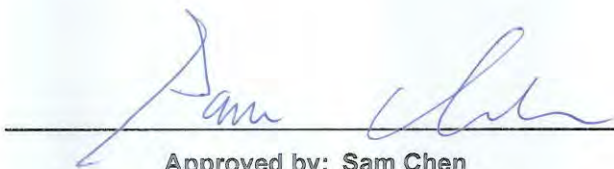
FCC RADIO EXPOSURE TEST REPORT

FCC ID : SWX-UBB
Equipment : UniFi Building Bridge
Brand Name : UBIQUITI
Model Name : UBB
Applicant : Ubiquiti Inc.
685 Third Avenue, New York, New York 10017 USA
Manufacturer : Ubiquiti Inc.
685 Third Avenue, New York, New York 10017 USA
Standard : 47 CFR Part 2.1091

The product was received on Feb. 11, 2020, and testing was started from Feb. 17, 2020 and completed on Feb. 28, 2020. We, SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, would like to declare that the tested sample has been evaluated in accordance with the procedures given in 47 CFR Part 2.1091 and shown compliance with the applicable technical standards.

The report must not be used by the client to claim product certification, approval, or endorsement by TAF or any agency of government.

The test results in this variant report apply exclusively to the tested model / sample. Without written approval of SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory, the test report shall not be reproduced except in full.


Approved by: Sam Chen

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)



Table of Contents

History of this test report.....	3
Summary of Test Result.....	4
1 General Description	5
1.1 EUT General Information	5
1.2 Table for Class II Change.....	5
1.3 Testing Location	6
2 Maximum Permissible Exposure	7
2.1 Limit of Maximum Permissible Exposure	7
2.2 MPE Calculation Method.....	7
2.3 Calculated Result and Limit.....	8
Photographs of EUT v01	



Summary of Test Result

Report Clause	Ref Std. Clause	Test Items	Result (PASS/FAIL)	Remark
2	-	Exposure evaluation	PASS	-

Declaration of Conformity:

The test results with all measurement uncertainty excluded are presented in accordance with the regulation limits or requirements declared by manufacturers.

Comments and Explanations:

The declared of product specification for EUT presented in the report are provided by the manufacturer, and the manufacturer takes all the responsibilities for the accuracy of product specification.

Reviewed by: Sam Chen

Report Producer: Wendy Pan



1 General Description

1.1 EUT General Information

RF General Information			
Evaluation Mode	Frequency Range (MHz)	Operating Frequency (MHz)	Modulation Type
2.4GHz WLAN	2400-2483.5	2412-2462	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
5GHz WLAN	5150-5250 5250-5350 5470-5725 5725-5850	5165-5240 5260-5320 5500-5700 5740-5835	802.11a/n: OFDM (BPSK, QPSK, 16QAM, 64QAM) 802.11ac: OFDM (BPSK, QPSK, 16QAM, 64QAM, 256QAM)
Bluetooth	2400-2483.5	2402-2480	LE: GFSK
60GHz	57000-71000	For Bandwidth: 2.16 GHz Channel 1: 58320 Channel 2: 64080 Channel 3: 62640 Channel 4: 64800 Channel 4.5: 65880 For Bandwidth: 1.08 GHz Channel 1: 58320 Channel 2: 59400 Channel 3: 60480 Channel 4: 61560 Channel 5: 62640 Channel 6: 63720 Channel 7: 64800 Channel 8: 65880	$\pi/2$ -BPSK, $\pi/2$ -QPSK, $\pi/2$ -16QAM

1.2 Table for Class II Change

This product is an extension of original one reported under Sporton project number: FA951623-09

Below is the table for the change of the product with respect to the original one.

Modifications	Performance Checking
1.Change the component and layout for PCB board of 60GHz. 2.Change the antenna for 60GHz.	60GHz MPE

Note: 2.4GHz / 5GHz WLAN and Bluetooth MPE results were based on original report.



1.3 Testing Location

Testing Location		
☐	HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 886-3-327-3456 FAX : 886-3-327-0973
☒	JHUBEI	ADD : No.8, Lane 724, Bo-ai St., Jhubei City, HsinChu County 302, Taiwan, R.O.C. TEL : 886-3-656-9065 FAX : 886-3-656-9085

Test site Designation No. TW0006 with FCC.

Test site registered number IC 4086D with Industry Canada.



2 Maximum Permissible Exposure

2.1 Limit of Maximum Permissible Exposure

(A) Limits for Occupational / Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842 / f	4.89 / f	(900 / f)*	6
30-300	61.4	0.163	1.0	6
300-1500			F/300	6
1500-100,000			5	6

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/ cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2 MPE Calculation Method

The MPE was calculated at 22 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$E \text{ (V/m)} = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } Pd \text{ (W/m}^2\text{)} = \frac{E^2}{377}$$

E = Electric field (V/m)

P = RF output power (W)

G = EUT Antenna numeric gain (numeric)

d = Separation distance between radiator and human body (m)

The formula can be changed to

$$Pd = \frac{30 \times P \times G}{377 \times d^2}$$



2.3 Calculated Result and Limit

Exposure Environment: General Population / Uncontrolled Exposure

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)
2.4G;11b	2.00	20.83	22.83	0.00	22.83	0.19187	22	0.03155	1.00000
5.2G;11ac	10.00	25.80	35.80	0.00	35.80	3.80189	22	0.62508	1.00000
5.3G;11ac	10.00	18.69	28.69	0.00	28.69	0.73961	22	0.12160	1.00000
5.6G;11ac	10.00	19.48	29.48	0.00	29.48	0.88716	22	0.14586	1.00000
5.8G;11ac	10.00	25.96	35.96	0.00	35.96	3.94457	22	0.64854	1.00000
BT LE	2.00	-3.87	-1.87	0.00	-1.87	0.00065	22	0.00011	1.00000
58.32G	19.90	11.72	31.62	0.50	32.12	1.63026	22	0.26803	1.00000



Worst-case Integrated Band Power of Unwanted Emission (30MHz ~ 40GHz)						
Start (MHz)	Stop (MHz)	Limit (dBuV/m at 3m)	Limit (mW EIRP)	RBW (MHz)	Num Intervals	Integrated Band Power (mW)
30	88	40	3.01995E-06	0.1	580	0.002
88	216	43.5	6.76083E-06	0.1	1280	0.009
216	960	46	1.20226E-05	0.1	7440	0.089
960	1000	54	7.58578E-05	0.1	400	0.030
1000	40000	54	7.58578E-05	1	39000	2.958
Total						3.089

Total Integrated Band Power of All Emission (30MHz ~ 200GHz)				
Test Frequency (GHz)	30MHz ~ 40GHz Integrated Band Power (mW)	40 ~ 200GHz EIRP (dBm)	40 ~ 200GHz EIRP (mW)	30MHz ~ 200GHz Total Integrated Band Power (mW)
58.32	3.089	31.61	1449.88	1452.970
60.48		30.95	1245.66	1248.753
64.80		29.81	957.65	960.734

Maximum Permissible Exposure of Fundamental Emissions							
Separation Distance (cm)	22						
Maximum EIRP Power of Test Frequency (GHz)	Ant. Gain (dBi)	Average EIRP Power (dBm)	Tolerance (dB)	Tune-up Average EIRP Power (dBm)	Tune-up Average EIRP Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
58.32	19.9	31.61	0.50	32.11	1626.79	0.268	1.00

Maximum Permissible Exposure of Fundamental + Unwanted Emissions						
Separation Distance (cm)	22					
Maximum EIRP Power of Test Frequency (GHz)	Antenna Gain (dBi)	Average EIRP Power (mW)	Tolerance (dB)	Tune-up Average EIRP Power (mW)	Power Density (S) (mW/cm ²)	Limit of Power Density (S) (mW/cm ²)
58.32	19.9	1452.97	0.50	1630.26	0.268	1.00



Simultaneous Transmission Analysis Mode: WLAN 2.4GHz+WLAN 5GHz+BT LE+60GHz

Mode	DG (dBi)	Power (dBm)	EIRP (dBm)	Tolerance (dB)	Tune-up EIRP (dBm)	Tune-up EIRP (W)	Distance (cm)	S (mW/cm ²)	S Limit (mW/cm ²)	Ratio (S/Limit)
2.4G;11b	2.00	20.83	22.83	0.00	22.83	0.19187	22	0.03155	1.00000	0.03155
5.8G;11ac	10.00	25.96	35.96	0.00	35.96	3.94457	22	0.64854	1.00000	0.64854
BT-LE	2.00	-3.87	-1.87	0.00	-1.87	0.00065	22	0.00011	1.00000	0.00011
58.32G	19.90	11.72	31.62	0.50	32.12	1.63026	22	0.26803	1.00000	0.26803
									Sum Ratio	0.94823
									Ratio Limit	1

Note: The above antenna gain was declared by manufacturer.

————THE END————