



FCC Co-location 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 FCC Part 15

The product was received on Feb. 14, 2019, and testing was started from Nov. 07, 2019 and completed on Nov. 08, 2019. 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 ANSI C63.10-2013 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 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: Allen Lin

SPORTON INTERNATIONAL INC. EMC & Wireless Communications Laboratory

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



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APPENDIX A. TEST RESULTS OF RADIATED EMISSION CO-LOCATION	



History of this test report

Report No.	Version	Description	Issued Date
FR951623-10CO	01	Initial issue of report	Dec. 25, 2019



Summary of Test Result

Report Clause	Ref. Std. Clause	Test Items	Result (PASS/FAIL)	Remark
3.1	15.247(d)	Emissions in Restricted Frequency Bands	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:

None

Reviewed by: Sam Tsai

Report Producer: Debby Hung

1.1 Testing Applied Standards

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

- ♦ 47 CFR FCC Part 15
ANSI C63.10-2013

1.2 Testing Location Information

Testing Location			
<input checked="" type="checkbox"/>	HWA YA	ADD : No. 52, Huaya 1st Rd., Guishan Dist., Taoyuan City, Taiwan (R.O.C.)	
		TEL : 886-3-327-3456	FAX : 886-3-327-0973
Test site Designation No. TW1190 with FCC.			
<input type="checkbox"/>	JHUBEI	ADD : No.8, Ln. 724, Bo'ai St., Zhubei City, Hsinchu County, Taiwan (R.O.C.)	
		TEL : 886-3-656-9065	FAX : 886-3-656-9085
Test site Designation No. TW0006 with FCC.			

Test Condition	Test Site No.	Test Engineer	Test Environment	Test Date
Radiated	03CH02-HY	Streak	22.1~23.2°C / 50.5~51.3%	07/Nov/2019~08/Nov/2019

1.3 Measurement Uncertainty

ISO/IEC 17025 requires that an estimate of the measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor (k=2))


Test Items	Uncertainty	Remark
Radiated Emission (9kHz ~ 30MHz)	1.6 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	4.3 dB	Confidence levels of 95%
Radiated Emission (1GHz ~ 18GHz)	3.9 dB	Confidence levels of 95%
Radiated Emission (18GHz ~ 40GHz)	3.5 dB	Confidence levels of 95%
Temperature	0.7 °C	Confidence levels of 95%
Humidity	4 %	Confidence levels of 95%

2 Test Configuration of EUT

2.1 Test Condition

RF Conducted	Abbreviation	Remark
TnomVnom	Tnom	20°C
-	Vnom	120V

2.2 The Worst Case Measurement Configuration

The Worst Case Mode for Following Conformance Tests	
Tests Item	Emissions in Restricted Frequency Bands
Test Condition	Radiated measurement If EUT consist of multiple antenna assembly (multiple antenna are used in EUT regardless of spatial multiplexing MIMO configuration), the radiated test should be performed with highest antenna gain of each antenna type.
Operating Mode	CTX
1	PoE Mode
Orthogonal Planes of EUT	Y Plane
	
Worst Planes of EUT	V

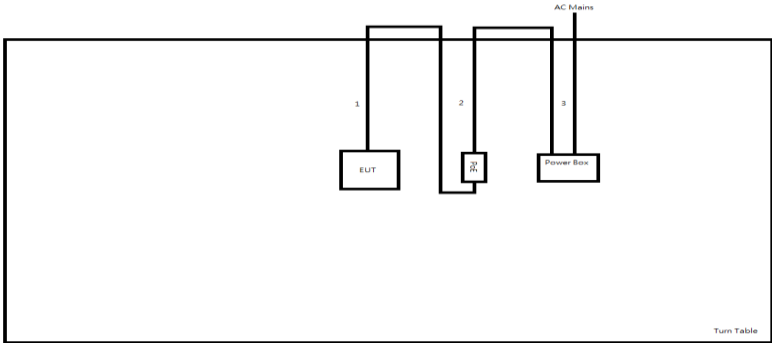
2.3 Accessories and Support Equipment

Accessories				
PoE Adapter	Brand Name	UBIQITI	Model Name	GP-V480-032G
	Manufacturer	UBIQITI	SN	-
	Power Rating	I/P: <u>100</u> - <u>240</u> Vac, <u>0.5</u> A,O/P: <u>48</u> Vdc, <u>0.32</u> A		

Reminder: Regarding to more detail and other information, please refer to user manual.

2.4 Test Setup Diagram

Test Setup Diagram - Radiated Test



Turn Table

Item	Connection	Shielded	Length(m)	Remark
1	RJ45 Cable line	No	1.0	-
2	DC Power line	No	1.5	-
3	AC Power line	No	1.8	-



3 Co-location Test Result

3.1 Emissions in Restricted Frequency Bands

3.1.1 Emissions in Restricted Frequency Bands Limit

Restricted Band Emissions Limit			
Frequency Range (MHz)	Field Strength (uV/m)	Field Strength (dBuV/m)	Measure Distance (m)
0.009~0.490	2400/F(kHz)	48.5 - 13.8	300
0.490~1.705	24000/F(kHz)	33.8 - 23	30
1.705~30.0	30	29	30
30~88	100	40	3
88~216	150	43.5	3
216~960	200	46	3
Above 960	500	54	3

Note 1: Test distance for frequencies at or above 30 MHz, measurements may be performed at a distance other than the limit distance provided they are not performed in the near field and the emissions to be measured can be detected by the measurement equipment. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse of linear distance for field-strength measurements, inverse of linear distance-squared for power-density measurements).

Note 2: Test distance for frequencies at below 30 MHz, measurements may be performed at a distance closer than the EUT limit distance; however, an attempt should be made to avoid making measurements in the near field. When performing measurements below 30 MHz at a closer distance than the limit distance, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two or more distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). The test report shall specify the extrapolation method used to determine compliance of the EUT.

Note 3: Using the distance of 1m during the test for above 18 GHz, and the test value to correct for the distance factor at 3m.

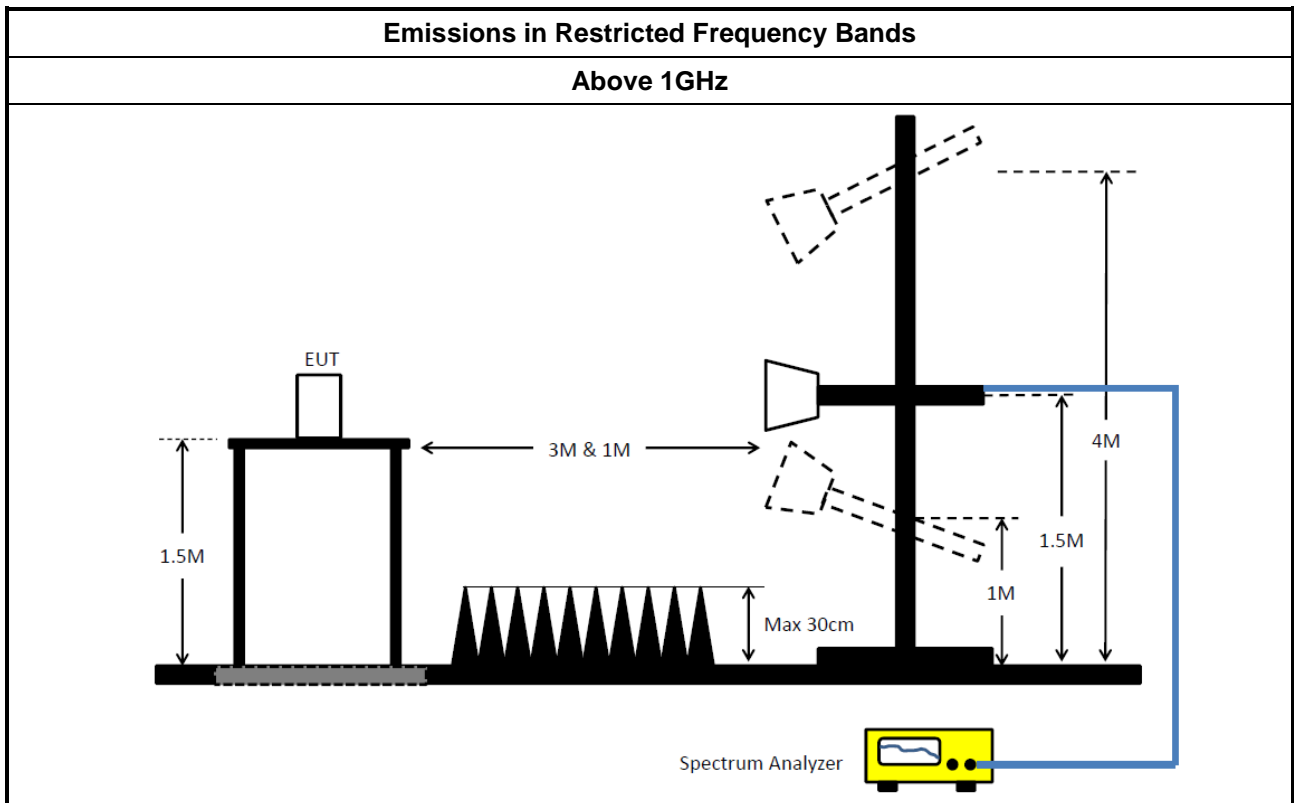
3.1.2 Measuring Instruments

Refer a test equipment and calibration data table in this test report.

3.1.3 Test Procedures

Test Method	
▪	The average emission levels shall be measured in [duty cycle \geq 98 or duty factor].
▪	For the transmitter unwanted emissions shall be measured using following options below:
▪	Refer as ANSI C63.10, clause 11.12 for restricted frequency bands.
▪	For radiated measurement.
▪	Refer as ANSI C63.10, clause 6.6 for radiated emissions above 1GHz.
▪	The any unwanted emissions level shall not exceed the fundamental emission level.
▪	All amplitude of spurious emissions that are attenuated by more than 20 dB below the permissible value has no need to be reported.
▪	Use the following spectrum analyzer settings:
▪	Set RBW=100 kHz for $f < 1$ GHz; VBW=3 * RBW; Sweep = auto; Detector function = peak; Trace = max hold.
▪	Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement. For average measurement, refer as 1.1.4.

3.1.4 Test Setup



3.1.5 Test Result of Emissions in Restricted Frequency Bands

Refer as Appendix A



4 Test Equipment and Calibration Data

Instrument for Radiated Test

Instrument	Manufacturer	Model No.	Serial No.	Spec.	Calibration Date	Calibration Due Date
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	30MHz ~ 1GHz 3m	29/Aug/2019	28/Aug/2020
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH02-HY	1GHz ~ 18GHz 3m	29/Aug/2019	28/Aug/2020
Amplifier	Agilent	8447D	2944A11149	100kHz ~ 1.3GHz	02/Jul/2019	01/Jul/2020
Microwave Preamplifier	Agilent	8449B	3008A02373	1GHz ~ 26.5GHz	16/Oct/2019	15/Oct/2020
Spectrum Analyzer	Rohde & Schwarz	FSP40	100593	9KHz - 40GHz	27/Dec/2018	26/Dec/2019
EMI Test Receiver	R&S	ESR3	102052	9kHz ~ 3.6GHz	09/Apr/2019	08/Apr/2020
RF Cable-R03m	Jye Bao	RG142	CB017	9kHz ~ 1GHz	26/Mar/2019	25/Mar/2020
RF Cable-high 6m	SUHNER	SUCOFLEX104	10567868 / SN805193/4	1GHz~40GHz	9/Apr/2019	8/Apr/2020
RF Cable-high 7m	SUHNER	SUCOFLEX104	10567868 / SN805192/4	1GHz~40GHz	9/Apr/2019	8/Apr/2020
Bilog Antenna & 5dB Attenuator	SCHAFFNER / MTJ	CBL 6112D / MTJ6102-05	2678 / 001	30MHz ~ 2GHz	06/Jul/2019	05/Jul/2020
Broadband Horn Antenna	SCHWARZBEC K	BBHA 9170	BBHA 9170221	15GHz ~ 40GHz	22/Mar/2019	21/Mar/2020
Preamplifier	MITEQ	TTA1840-35-H G	1864481	18GHz ~ 40GHz	05/Aug/2019	04/Aug/2020
Loop Antenna	TESEQ	HLA 6120	31244	9k-30MHz	15/Mar/2019	14/Mar/2020
Double Ridged Guide Horn Antenna	SCHWARZBEC K	BBHA 9120 D	BBHA 9120 D 01543	1GHz ~ 18GHz	03/Jun/2019	02/Jun/2020



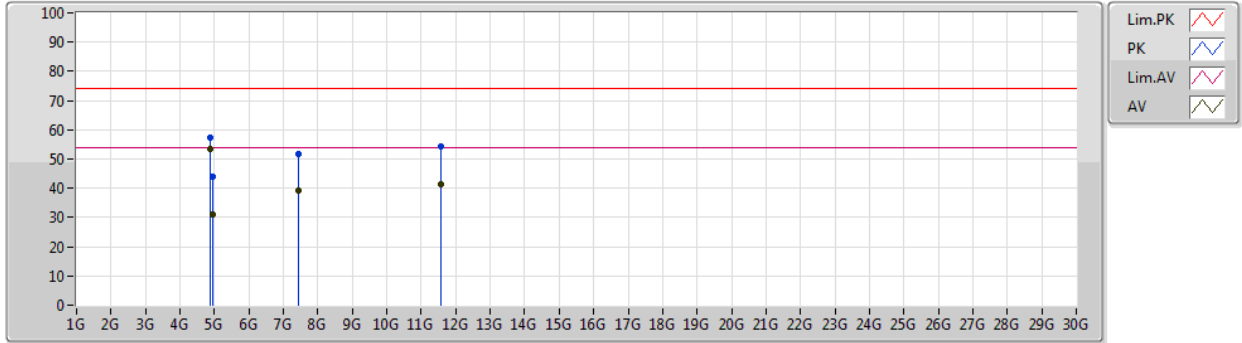
Summary

Mode	Result	Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Condition
Mode 1	Pass	AV	4.87394G	53.56	54.00	-0.44	4.41	Vertical



Mode 1

07/11/2019



Type	Freq (Hz)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Factor (dB)	Dist (m)	Condition	Azimuth (°)	Height (m)	Comment	Raw (dBuV)	AF (dB)	CL (dB)	PA (dB)
AV	4.87394G	53.56	54.00	-0.44	4.41	3	Vertical	350	1.67	-	49.15	31.47	6.81	33.87
AV	4.95953G	31.22	54.00	-22.78	4.64	3	Vertical	197	1.84	-	26.58	31.63	6.83	33.82
AV	7.43924G	39.23	54.00	-14.77	10.91	3	Vertical	237	1.80	-	28.32	36.34	8.68	34.11
AV	11.58108G	41.20	54.00	-12.80	16.29	3	Vertical	153	1.49	-	24.91	39.50	10.73	33.94
PK	4.874G	57.27	74.00	-16.73	4.41	3	Vertical	350	1.67	-	52.86	31.47	6.81	33.87
PK	4.9601G	43.95	74.00	-30.05	4.64	3	Vertical	197	1.84	-	39.31	31.63	6.83	33.82
PK	7.44012G	51.52	74.00	-22.48	10.91	3	Vertical	237	1.80	-	40.61	36.34	8.68	34.11
PK	11.58101G	54.25	74.00	-19.75	16.29	3	Vertical	153	1.49	-	37.96	39.50	10.73	33.94

Remark :

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Level (dBuV/m) = Raw(Read Level) + AF(Antenna Factor) + CL(Cable Loss) - PA(Preamp Factor)

