FCC Test Report

APPLICANT	:	**Ubiquiti Networks, Inc.**
EQUIPMENT	:	**airCube ISP**
BRAND NAME	:	**UBIQUITI**
MODEL NAME	:	**ACB-ISP**
FCC ID	:	**SWX-ACBISP**
STANDARD	:	**FCC 47 CFR FCC Part 15 Subpart B**
CLASSIFICATION	:	**Certification**

The product was received on Sep. 05, 2017 and testing was completed on Sep. 27, 2017. We, SPORTON INTERNATIONAL INC., would like to declare that the tested sample has been evaluated in accordance with the test procedures given in ANSI C63.4-2014 and has been in compliance with the applicable technical standards.

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

Louis Wu

Reviewed by: Louis Wu / Manager

Jones Tsai

Approved by: Jones Tsai / Manager

Testing Laboratory 1190

SPORTON INTERNATIONAL INC.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C.

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REVISION HISTORY

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FC741927-01	Rev. 01	Initial issue of report	Oct. 17, 2017

SUMMARY OF TEST RESULT

Report Section	FCC Rule	Description	Limit	Result	Remark
3.1	15.107	AC Conducted Emission	< 15.107 limits	PASS	Under limit 10.60 dB at 0.566 MHz
3.2	15.109	Radiated Emission	< 15.109 limits	PASS	Under limit 3.49 dB at 106.680 MHz For Quasi-Peak

1. General Description

1.1. Applicant

Ubiquiti Networks, Inc.
685 Third Avenue, 27th Floor New York, New York 10017 USA

1.2. Manufacturer

Ubiquiti Networks, Inc.
685 Third Avenue, 27th Floor New York, New York 10017 USA

1.3. Product Feature of Equipment Under Test

Wi-Fi 2.4GHz 802.11b/g/n

Product Specification subjective to this standard	
Antenna Type	WLAN: Internal Antenna

1.4. Modification of EUT

No modifications are made to the EUT during all test items.

1.5. Test Location

Sporton Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code : 1190) and the FCC designation No. TW 1093 under the FCC 2.948(e) by Mutual Recognition Agreement (MRA) in FCC Test.

Test Site	SPORTON INTERNATIONAL INC.	
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Tao Yuan City, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978	
Test Site No.	**Sporton Site No.**	
	CO05-HY	03CH06-HY

1.6. Applicable Standards

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

- FCC 47 CFR FCC Part 15 Subpart B
- ANSI C63.4-2014

Remark: All test items were verified and recorded according to the standards and without any deviation during the test.

2. Test Configuration of Equipment Under Test

2.1. Test Mode

The EUT has been associated with peripherals pursuant to ANSI C63.4-2014 and configuration operated in a manner tended to maximize its emission characteristics in a typical application.

Frequency range investigated: conduction emission (150 kHz to 30 MHz), radiation emission (30MHz to the 5th harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower).

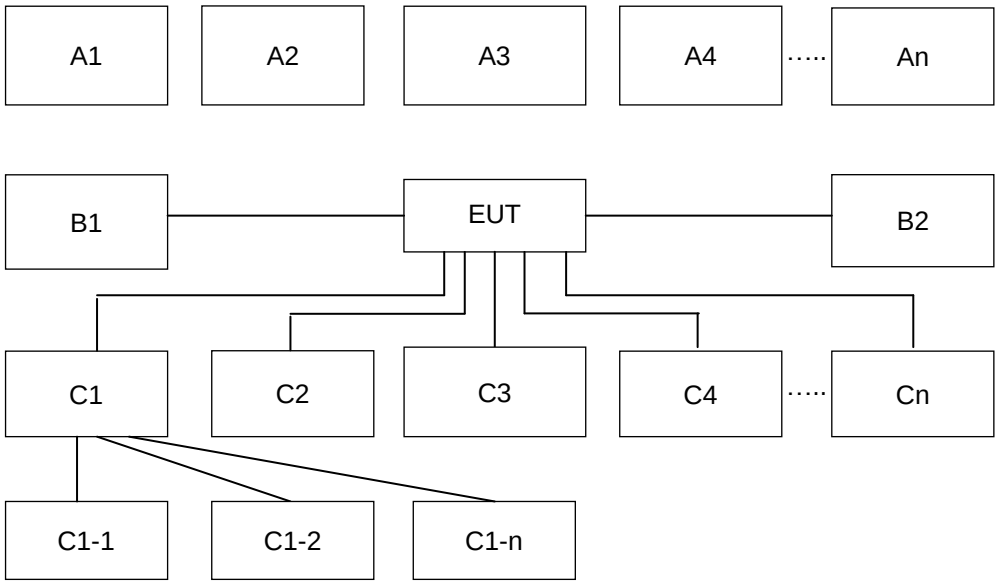
Test Items	Function Type
AC Conducted Emission	Mode 1: WLAN (2.4GHz) Idle + WAN Link + LAN Link + Charging from Notebook Mode 2: WLAN (2.4GHz) Idle + WAN Link + LAN Link + PoE
Radiated Emissions	Mode 1: WLAN (2.4GHz) Idle + WAN Link + LAN Link + Charging from Notebook Mode 2: WLAN (2.4GHz) Idle + WAN Link + LAN Link + PoE

Remark:

1. The worst case of AC is mode 2; only the test data of this mode was reported.

2. The worst case of RE is mode 2; only the test data of this mode was reported.

2.2.Connection Diagram of Test System



Conduction Test Setup										
No.	**Wireless Station**	**Connection Type**	**Test Mode**							
			1	**2**	**-**	**-**	**-**	**-**	**-**
A1	Notebook	WiFi	X	X					
No.	**Power Source**	**Connection Type**	**1**	**2**	**-**	**-**	**-**	**-**	**-**
B1	AC : 120V/60Hz	RJ 45Cable From POE Adapter		X					
No.	**Setup Peripherals**	**Connection Type**	**1**	**2**	**-**	**-**	**-**	**-**	**-**
C1	Switch	RJ-45 Cable	X	X					
C1-1	AP router	RJ-45 Cable	X	X					
C1-2	Notebook	RJ-45 Cable	X	X					
C2	Notebook	RJ-45 Cable	X	X					
C2-1	Ipod	USB Cable	X						
C2-2	AP router	RJ-45 Cable to C2	X						

Radiation Test Setup										
No.	Wireless Station	Connection Type	Test Mode							
			1	2	-	-	-	-	-	
A1	Notebook	WiFi	X	X						
No.	**Power Source**	**Connection Type**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	
B1	AC : 120V/60Hz	RJ 45Cable From POE Adapter		X						
No.	**Setup Peripherals**	**Connection Type**	**1**	**2**	**-**	**-**	**-**	**-**	**-**	
C1	Switch	RJ-45 Cable	X	X						
C1-1	Notebook	RJ-45 Cable	X	X						
C2	Notebook	RJ-45 Cable	X	X						
C2-1	iPod	USB Cable	X	X						
C2-2	Monitor	HDMI Cable	X	X						

2.3. Support Unit used in test configuration and system

Item	Equipment	Trade Name	Model Name	FCC ID	Data Cable	Power Cord
1.	WLAN AP	D-Link	DIR-628	KA2DIR628A2	N/A	Unshielded, 1.8 m
2.	iPod	Apple	A1285	DoC	Shielded, 1.0m	N/A
3.	Notebook	DELL	P20G	FCC DoC/ Contains FCC ID: QDS-BRCM1051	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
4.	Notebook	DELL	Latitude E3340	FCC DoC/ Contains FCC ID: PD97260NGU	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
5.	Notebook	DELL	Latitude E6320	FCC DoC/ Contains FCC ID: QDS-BRCM1054	N/A	AC I/P: Unshielded, 1.2 m DC O/P: Shielded, 1.8 m
6.	Switch Hub	Ubiquiti	US-8-60W	N/A	N/A	N/A

2.4. EUT Operation Test Setup

The EUT was attached to the WLAN AP, and execute ping.

3. Test Result

3.1. Test of AC Conducted Emission Measurement

3.1.1 Limits of AC Conducted Emission

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

Frequency of emission (MHz)	Conducted limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

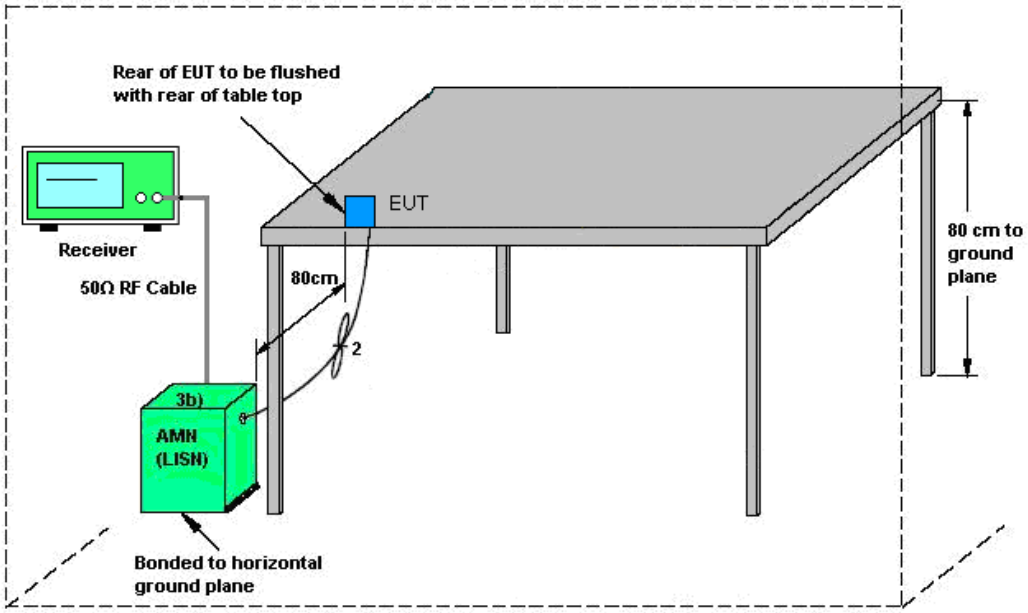
3.1.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.1.3 Test Procedure

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

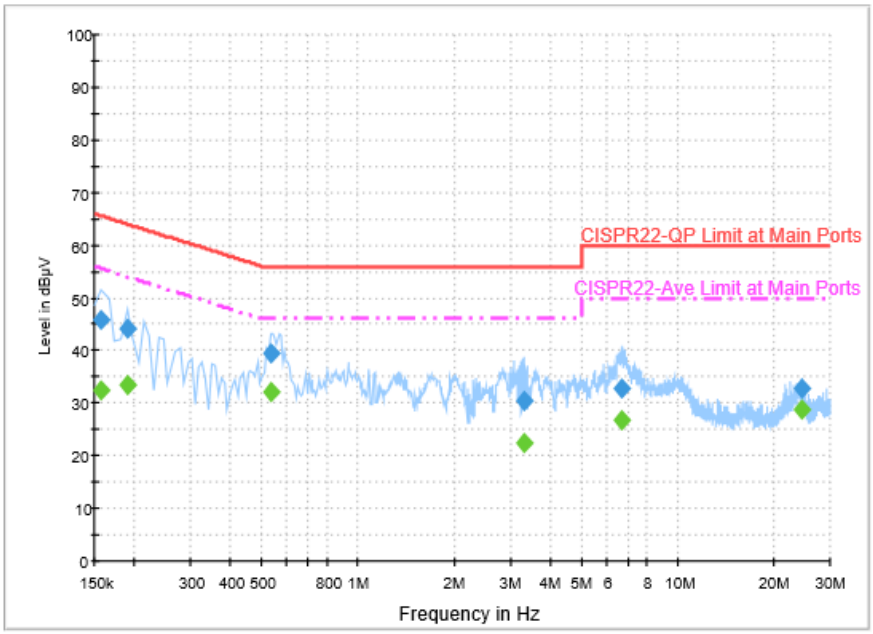
3.1.4 Test Setup



AMN = Artificial mains network (LISN)
AE = Associated equipment
EUT = Equipment under test
ISN = Impedance stabilization network

3.1.5 Test Result of AC Conducted Emission

Test Engineer :	Shareef Yu	**Temperature :**	26~27℃
		Relative Humidity :	58~62%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line



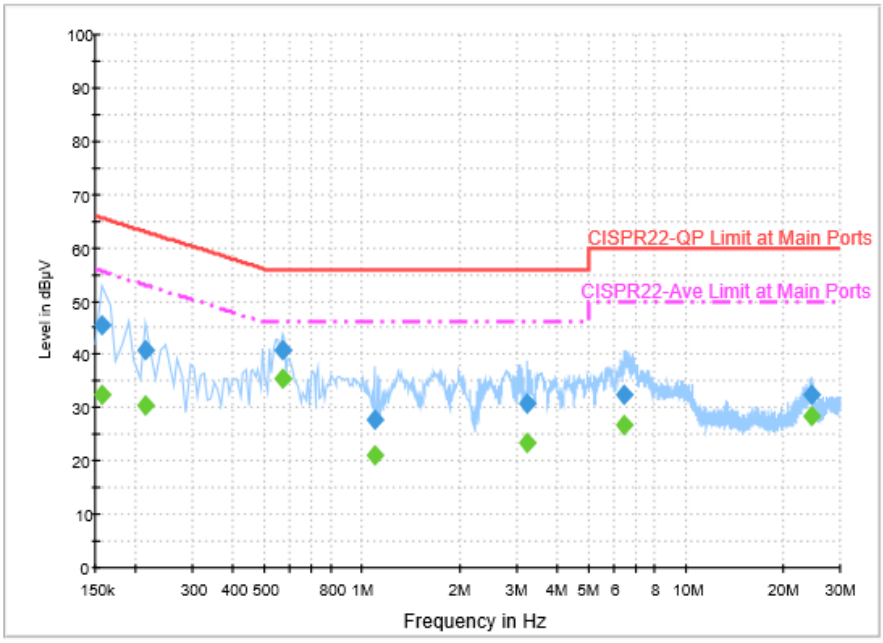
Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	45.9	Off	L1	19.5	19.7	65.6
0.190000	44.2	Off	L1	19.5	19.8	64.0
0.534000	39.5	Off	L1	19.5	16.5	56.0
3.302000	30.3	Off	L1	19.5	25.7	56.0
6.726000	32.7	Off	L1	19.6	27.3	60.0
24.574000	32.7	Off	L1	19.8	27.3	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	32.6	Off	L1	19.5	23.0	55.6
0.190000	33.3	Off	L1	19.5	20.7	54.0
0.534000	32.0	Off	L1	19.5	14.0	46.0
3.302000	22.6	Off	L1	19.5	23.4	46.0
6.726000	26.8	Off	L1	19.6	23.2	50.0
24.574000	28.7	Off	L1	19.8	21.3	50.0

Test Engineer :	Shareef Yu	**Temperature :**	26~27℃
		Relative Humidity :	58~62%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral



Final Result : Quasi-Peak

Frequency (MHz)	Quasi-Peak (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	45.5	Off	N	19.5	20.1	65.6
0.214000	40.6	Off	N	19.5	22.4	63.0
0.566000	40.7	Off	N	19.5	15.3	56.0
1.094000	27.7	Off	N	19.5	28.3	56.0
3.246000	30.8	Off	N	19.5	25.2	56.0
6.462000	32.4	Off	N	19.6	27.6	60.0

Final Result : Average

Frequency (MHz)	Average (dBµV)	Filter	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
0.158000	32.4	Off	N	19.5	23.2	55.6
0.214000	30.5	Off	N	19.5	22.5	53.0
0.566000	35.4	Off	N	19.5	10.6	46.0
1.094000	21.2	Off	N	19.5	24.8	46.0
3.246000	23.5	Off	N	19.5	22.5	46.0
6.462000	26.7	Off	N	19.6	23.3	50.0
24.574000	28.5	Off	N	19.9	21.5	50.0

3.2. Test of Radiated Emission Measurement

3.2.1. Limit of Radiated Emission

The emissions from an unintentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
30 – 88	100	3
88 – 216	150	3
216 - 960	200	3
Above 960	500	3

3.2.2. Measuring Instruments

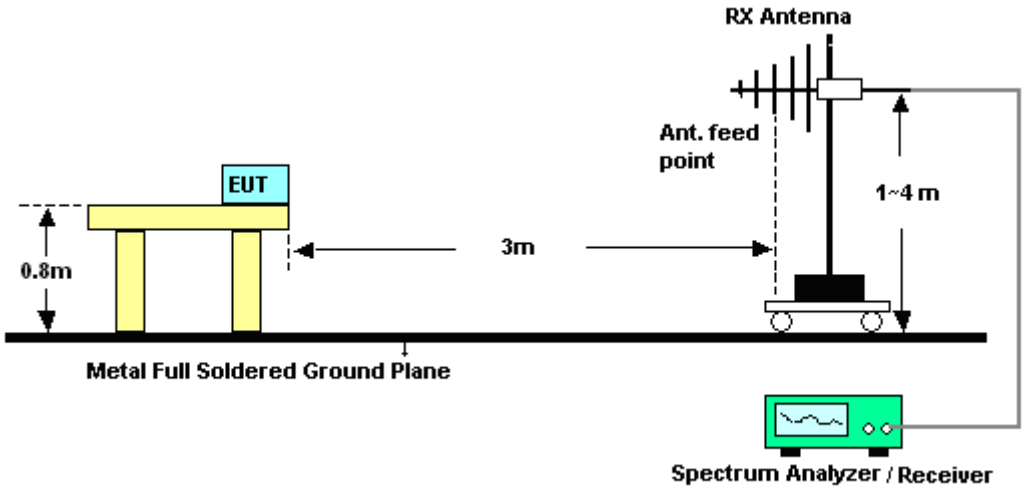
The measuring equipment is listed in the section 4 of this test report.

3.2.3. Test Procedures

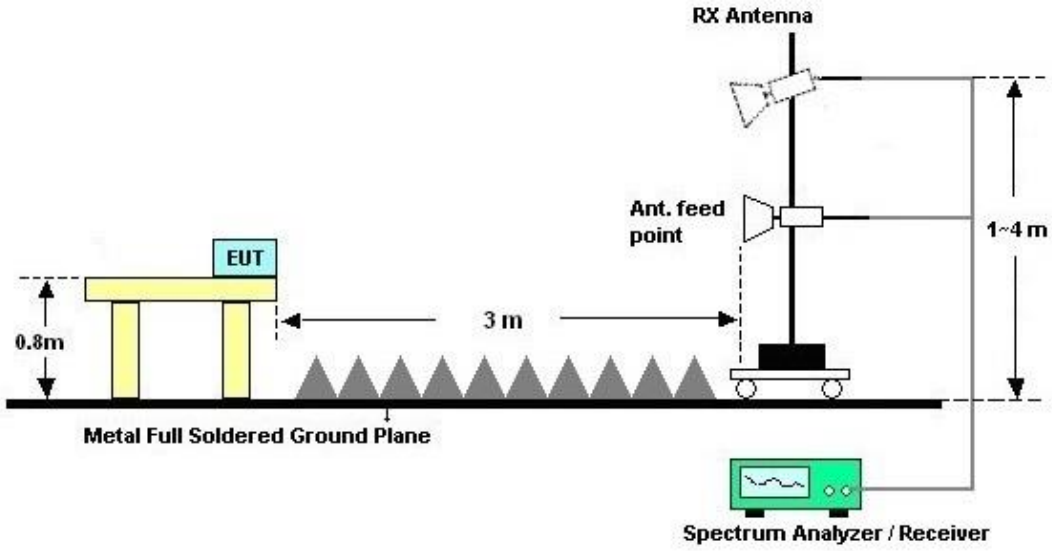
1. The EUT was placed on a turntable with 0.8 meter above ground.
2. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
3. The table was rotated 360 degrees to determine the position of the highest radiation.
4. The antenna is a Bi-Log antenna and its height is adjusted between one to four meters above ground to find the maximum value of the field strength for both horizontal polarization and vertical polarization of the antenna.
5. For each suspected emission, the EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading.
6. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode (RBW=120kHz/VBW=300kHz for frequency below 1GHz; RBW=1MHz VBW=3MHz (Peak), RBW=1MHz/VBW=10Hz (Average) for frequency above 1GHz).
7. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, peak values of EUT will be reported. Otherwise, the emission will be repeated by using the quasi-peak method and reported.
8. Emission level (dBμV/m) = 20 log Emission level (μV/m)
9. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level

3.2.4. Test Setup of Radiated Emission

For radiated emissions from 30MHz to 1GHz

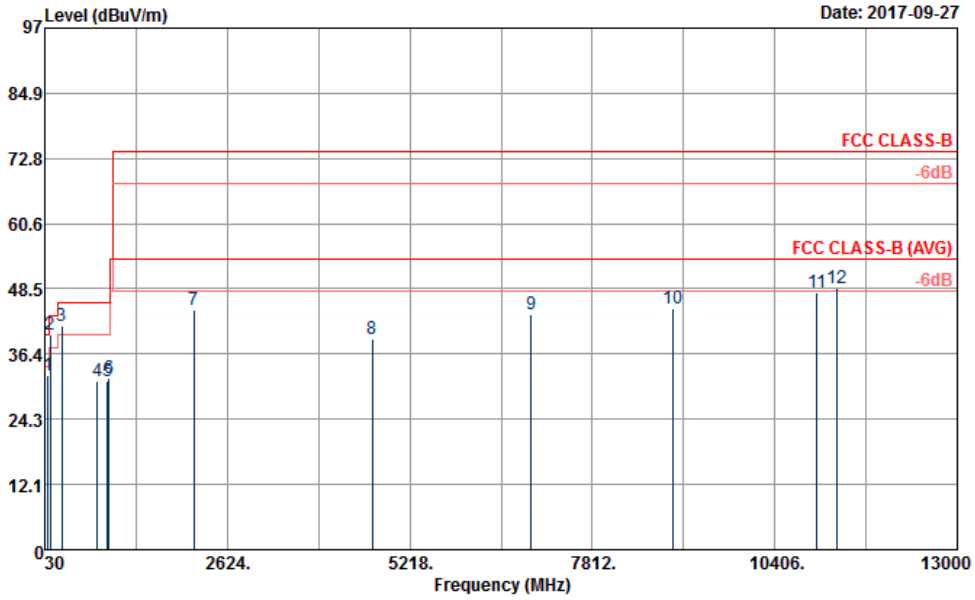


For radiated emissions above 1GHz



3.2.5. Test Result of Radiated Emission

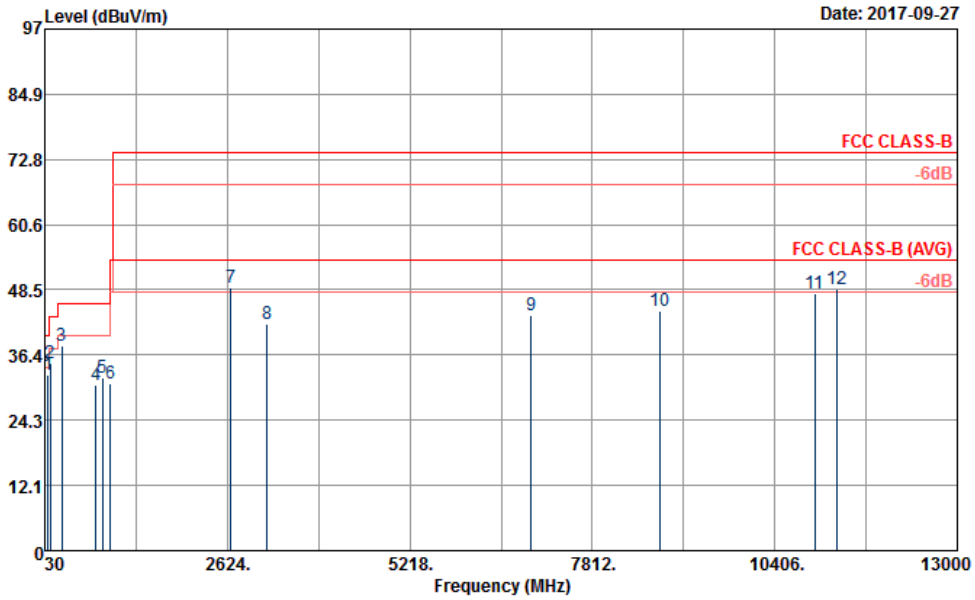
Test Engineer :	Shareef Yu	**Temperature :**	26~27°C
		Relative Humidity :	58~62%
Test Distance :	3m	**Polarization :**	Horizontal



Site : 03CH06-HY
Condition : FCC CLASS-B 3m 9120D_1156_170915 HORIZONTAL
Project : 741927-01
Power : POE 24V
Memo : Mode 2

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	81.03	32.37	-7.63	40.00	48.72	13.36	2.11	31.82	---	---	Peak
2	106.68	40.01	-3.49	43.50	53.10	16.70	2.02	31.81	286	75	QP
3	268.95	41.69	-4.31	46.00	51.79	19.41	2.24	31.75	---	---	Peak
4	782.30	31.26	-14.74	46.00	31.67	28.22	3.37	32.00	---	---	Peak
5	926.50	31.32	-14.68	46.00	29.06	30.37	3.21	31.32	---	---	Peak
6	944.00	31.81	-14.19	46.00	29.07	30.81	3.09	31.16	---	---	Peak
7	2148.00	44.68	-29.32	74.00	72.92	26.21	6.55	61.00	---	---	Peak
8	4688.00	39.30	-34.70	74.00	58.03	30.86	10.30	59.89	---	---	Peak
9	6938.00	43.88	-30.12	74.00	55.09	35.32	12.70	59.23	---	---	Peak
10	8954.00	44.91	-29.09	74.00	51.56	36.90	14.80	58.35	---	---	Peak
11	11000.00	47.74	-26.26	74.00	48.35	40.13	16.26	57.00	---	---	Peak
12	11286.00	48.61	-25.39	74.00	49.11	39.68	16.53	56.71	100	139	Peak

Test Engineer :	Shareef Yu	**Temperature :**	26~27°C
		Relative Humidity :	58~62%
Test Distance :	3m	**Polarization :**	Vertical



Site : 03CH06-HY
Condition : FCC CLASS-B 3m 9120D_1156_170915 VERTICAL
Project : 741927-01
Power : POE 24V
Memo : Mode 2

	Freq	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	A/Pos	T/Pos	Remark
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB/m	dB	dB	cm	deg	
1	81.03	32.56	-7.44	40.00	48.91	13.36	2.11	31.82	100	144	Peak
2	106.68	34.83	-8.67	43.50	47.92	16.70	2.02	31.81	---	---	Peak
3	268.68	37.96	-8.04	46.00	48.06	19.41	2.24	31.75	---	---	Peak
4	762.00	30.71	-15.29	46.00	31.07	28.28	3.39	32.03	---	---	Peak
5	853.70	32.05	-13.95	46.00	31.05	29.43	3.32	31.75	---	---	Peak
6	958.00	31.10	-14.90	46.00	28.02	31.06	3.06	31.04	---	---	Peak
7	2674.00	49.00	-25.00	74.00	75.04	27.77	7.30	61.11	100	150	Peak
8	3188.00	42.16	-31.84	74.00	66.78	28.68	8.04	61.34	---	---	Peak
9	6942.00	43.79	-30.21	74.00	54.96	35.36	12.70	59.23	---	---	Peak
10	8778.00	44.53	-29.47	74.00	51.05	36.79	14.83	58.14	---	---	Peak
11	10970.00	47.81	-26.19	74.00	48.55	40.09	16.24	57.07	---	---	Peak
12	11292.00	48.56	-25.44	74.00	49.04	39.68	16.55	56.71	---	---	Peak

4. List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
AC Power Source	ChainTek	APC-1000W	N/A	N/A	N/A	Sep. 22, 2017	N/A	Conduction (CO05-HY)
EMI Test Receiver	Rohde & Schwarz	ESCI 7	100724	9kHz~7GHz	Sep. 20, 2017	Sep. 22, 2017	Sep. 19, 2018	Conduction (CO05-HY)
Hygrometer	Testo	608-H1	34913912	N/A	May 02, 2017	Sep. 22, 2017	May 01, 2018	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100080	9kHz~30MHz	Nov. 29, 2016	Sep. 22, 2017	Nov. 28, 2017	Conduction (CO05-HY)
LISN	Rohde & Schwarz	ENV216	100081	9kHz~30MHz	Dec. 06, 2016	Sep. 22, 2017	Dec. 05, 2017	Conduction (CO05-HY)
Bilog Antenna	Schaffner	CBL6111C&N-6-06	2725&AT-N0601	30MHz~1GHz	Oct. 15, 2016	Sep. 27, 2017	Oct. 14, 2017	Radiation (03CH06-HY)
EMI Test Receiver	Rohde & Schwarz	ESU26	100472	20Hz~26.5GHz	Dec. 29, 2016	Sep. 27, 2017	Dec. 28, 2017	Radiation (03CH06-HY)
Horn Antenna	SCHWARZBECK	BBHA 9120 D	9120D-1156	1GHz~18GHz	Aug. 08, 2017	Sep. 27, 2017	Aug. 07, 2018	Radiation (03CH06-HY)
Preamplifier	SONOMA	310N	186713	9kHz~1GHz	Apr. 25, 2017	Sep. 27, 2017	Apr. 24, 2018	Radiation (03CH06-HY)
Preamplifier	MITEQ	AMF-7D-00101800-30-10P	1850117	1GHz ~ 18GHz	May 22, 2017	Sep. 27, 2017	May 21, 2018	Radiation (03CH06-HY)
Antenna Mast	MF	MF-7802	MF780208212	1m~4m	N/A	Sep. 27, 2017	N/A	Radiation (03CH06-HY)
Turn Table	INN-CO	DS2000	420/650/00	0-360 degree	N/A	Sep. 27, 2017	N/A	Radiation (03CH06-HY)

5. Uncertainty of Evaluation

Uncertainty of Conducted Emission Measurement (150 kHz ~ 30 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.7**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**3.9**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.7**