



SPORTON International Inc.

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FCC RADIO TEST REPORT

Applicant's company	Ubiquiti Networks, Inc.
Applicant Address	685 Third Avenue, 27th Floor New York, New York 10017 USA
FCC ID	SWX-M445GL
Manufacturer's company	Ubiquiti Networks, Inc.
Manufacturer Address	685 Third Avenue, 27th Floor New York, New York 10017 USA

Product Name	WiFi 5G Module
Brand Name	UBIQUITI
Model No.	4x4-5GL
Test Rule Part(s)	47 CFR FCC Part 15 Subpart E § 15.407
Test Freq. Range	5150 ~ 5350MHz
Received Date	Oct. 30, 2017
Final Test Date	Nov. 30, 2017
Submission Type	Class II Change

Statement

Test result included is for the IEEE 802.11n and IEEE 802.11a/ac of the product.

The test result in this report refers exclusively to the presented test model / sample.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

The measurements and test results shown in this test report were made in accordance with the procedures and found in compliance with the limit given in **ANSI C63.10-2013, 47 CFR FCC Part 15 Subpart E, KDB789033 D02 v02r01, KDB662911 D01 v02r01. ET Docket No. 13-49; FCC 16-24.**

The test equipment used to perform the test is calibrated and traceable to NML/ROC.



Table of Contents

1. VERIFICATION OF COMPLIANCE	1
2. SUMMARY OF THE TEST RESULT	2
3. GENERAL INFORMATION	3
3.1. Product Details.....	3
3.2. Accessories.....	4
3.3. Table for Filed Antenna.....	4
3.4. Table for Carrier Frequencies	5
3.5. Table for 80 + 80 MHz Mode.....	5
3.6. Table for Test Modes	5
3.7. Table for Testing Locations.....	6
3.8. Table for Class II Change	6
3.9. Table for Supporting Units	6
3.10. Test Configurations	7
4. TEST RESULT	9
4.1. AC Power Line Conducted Emissions Measurement.....	9
4.2. Radiated Emissions Measurement	13
4.3. Antenna Requirements	20
5. LIST OF MEASURING EQUIPMENTS	21
6. MEASUREMENT UNCERTAINTY.....	22
APPENDIX A. TEST PHOTOS	A1 ~ A5
PHOTOGRAPHS OF EUT V01	

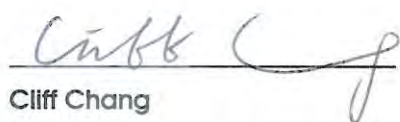
History of This Test Report

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FR661623-17	Rev. 01	Initial issue of report	Jan. 25, 2018

1. VERIFICATION OF COMPLIANCE

Product Name : WiFi 5G Module
Brand Name : UBIQUITI
Model No. : 4x4-5GL
Applicant : Ubiquiti Networks, Inc.
Test Rule Part(s) : 47 CFR FCC Part 15 Subpart E § 15.407

Sporton International as requested by the applicant to evaluate the EMC performance of the product sample received on Oct. 30, 2017 would like to declare that the tested sample has been evaluated and found to be in compliance with the tested rule parts. The data recorded as well as the test configuration specified is true and accurate for showing the sample's EMC nature.



Cliff Chang
SPORTON INTERNATIONAL INC.

2. SUMMARY OF THE TEST RESULT

Applied Standard: 47 CFR FCC Part 15 Subpart E			
Part	Rule Section	Description of Test	Result
4.1	15.207	AC Power Line Conducted Emissions	Complies
4.2	15.407(b)	Radiated Emissions	Complies
4.3	15.203	Antenna Requirements	Complies

3. GENERAL INFORMATION

3.1. Product Details

Items	Description
Product Type	WLAN 4TX, 4RX
Radio Type	Intentional Transceiver
Power Type	From host system
Modulation	IEEE 802.11a: OFDM IEEE 802.11n/ac: see the below table
Data Modulation	IEEE 802.11a/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) IEEE 802.11ac: OFDM (BPSK / QPSK / 16QAM / 64QAM / 256QAM)
Data Rate (Mbps)	IEEE 802.11a: OFDM (6/9/12/18/24/36/48/54) IEEE 802.11n/ac: see the below table
Frequency Range	5150 ~ 5350MHz
Channel Number	8 for 20MHz bandwidth ; 4 for 40MHz bandwidth 2 for 80MHz bandwidth
Carrier Frequencies	Please refer to section 3.4
Antenna	Please refer to section 3.3

Items	Description
Communication Mode	☒ IP Based (Load Based) ☐ Frame Based
TPC Function	☒ With TPC ☐ Without TPC
Beamforming Function	☐ With beamforming ☒ Without beamforming
Operate Condition	☒ Indoor ☒ Outdoor

Antenna and Bandwidth

Antenna	Four (TX)		
Bandwidth Mode	20 MHz	40 MHz	80 MHz
IEEE 802.11a	V	X	X
IEEE 802.11n	V	V	X
IEEE 802.11ac	V	V	V

IEEE 11n/ac Spec.

Protocol	Number of Transmit Chains (NTX)	Data Rate / MCS
802.11n (HT20)	4	MCS 0-31
802.11n (HT40)	4	MCS 0-31
802.11ac (VHT20)	4	MCS 0-9/Nss1-4
802.11ac (VHT40)	4	MCS 0-9/Nss1-4
802.11ac (VHT80)	4	MCS 0-9/Nss1-4

Note 1: IEEE Std. 802.11n modulation consists of HT20 and HT40 (HT: High Throughput).

Then EUT supports HT20 and HT40.

Note 2: IEEE Std. 802.11ac modulation consists of VHT20, VHT40, VHT80 and VHT160 (VHT: Very High Throughput). Then EUT supports VHT20, VHT40 and VHT80.

Note 3: Modulation modes consist of below configuration:

HT20/HT40: IEEE 802.11n, VHT20/VHT40/VHT80: IEEE 802.11ac

3.2. Accessories

N/A

3.3. Table for Filed Antenna

Ant.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
1	-	-	PIFA Antenna	N/A	8
2	-	-	PIFA Antenna	N/A	8
3	-	-	PIFA Antenna	N/A	8
4	-	-	PIFA Antenna	N/A	8

Note: Ant. 1~Ant. 4 connect to chain 1~chain 4.

For IEEE 802.11a/n/ac mode (4TX/4RX):

Chain 1, Chain 2, Chain 3 and Chain 4 can be used as transmitting/receiving antenna.

Chain 1, Chain 2, Chain 3 and Chain 4 could transmit/receive simultaneously.

3.4. Table for Carrier Frequencies

There are three bandwidth systems.

For 20MHz bandwidth systems, use Channel 36, 40, 44, 48, 52, 56, 60, 64.

For 40MHz bandwidth systems, use Channel 38, 46, 54, 62.

For 80MHz bandwidth systems, use Channel 42, 58.

Frequency Band	Channel No.	Frequency	Channel No.	Frequency
5150~5250 MHz Band 1	36	5180 MHz	44	5220 MHz
	38	5190 MHz	46	5230 MHz
	40	5200 MHz	48	5240 MHz
	42	5210 MHz	-	-
5250~5350 MHz Band 2	52	5260 MHz	60	5300 MHz
	54	5270 MHz	62	5310 MHz
	56	5280 MHz	64	5320 MHz
	58	5290 MHz	-	-

3.5. Table for 80+80 MHz Mode

Type	Channel No.	Frequency
1	42+58	5210+5290 MHz

3.6. Table for Test Modes

Preliminary tests were performed in different data rate to find the worst radiated emission. The data rate shown in the table below is the worst-case rate with respect to the specific test item. The following table is a list of the test modes shown in this test report.

Test Items	Mode	Data Rate	Channel	Chain
AC Power Conducted Emission	CTX	-	-	-
Radiated Emission Below 1GHz	CTX	-	-	-

The following test modes were performed for all tests:

For Conducted Emission test:

Test Mode : CTX - EUT

For Radiated Emission Below 1GHz test:

According to the original test report (Test Report Number: FR661623-12), the EUT was performed at Y axis and Z axis position, and the worst case was found at Y axis. So the measurement will follow this same test configuration.

Test Mode : CTX - EUT in Y axis

3.7. Table for Testing Locations

Test Site Location					
Address:	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 No.	Site Category	Location	FCC Designation No.	IC File No.	VCCI Reg. No
03CH01-CB	SAC	Hsin Chu	TW0006	IC 4086D	-
CO01-CB	Conduction	Hsin Chu	TW0006	IC 4086D	-

Open Area Test Site (OATS); Semi Anechoic Chamber (SAC).

3.8. Table for Class II Change

This product is an extension of original one reported under Sporton project number: FR661623-15

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

Modifications	Performance Checking
1. Adding a PoE (Model name: GP-C500-120G) for the Supporting Units.	1. AC Power Line Conducted Emissions. 2. Radiated Emissions Below 1GHz.
2. Adding the master mode for DFS function.	No test case need redo for this test report.

3.9. Table for Supporting Units

For Test Site No: 03CH01-CB

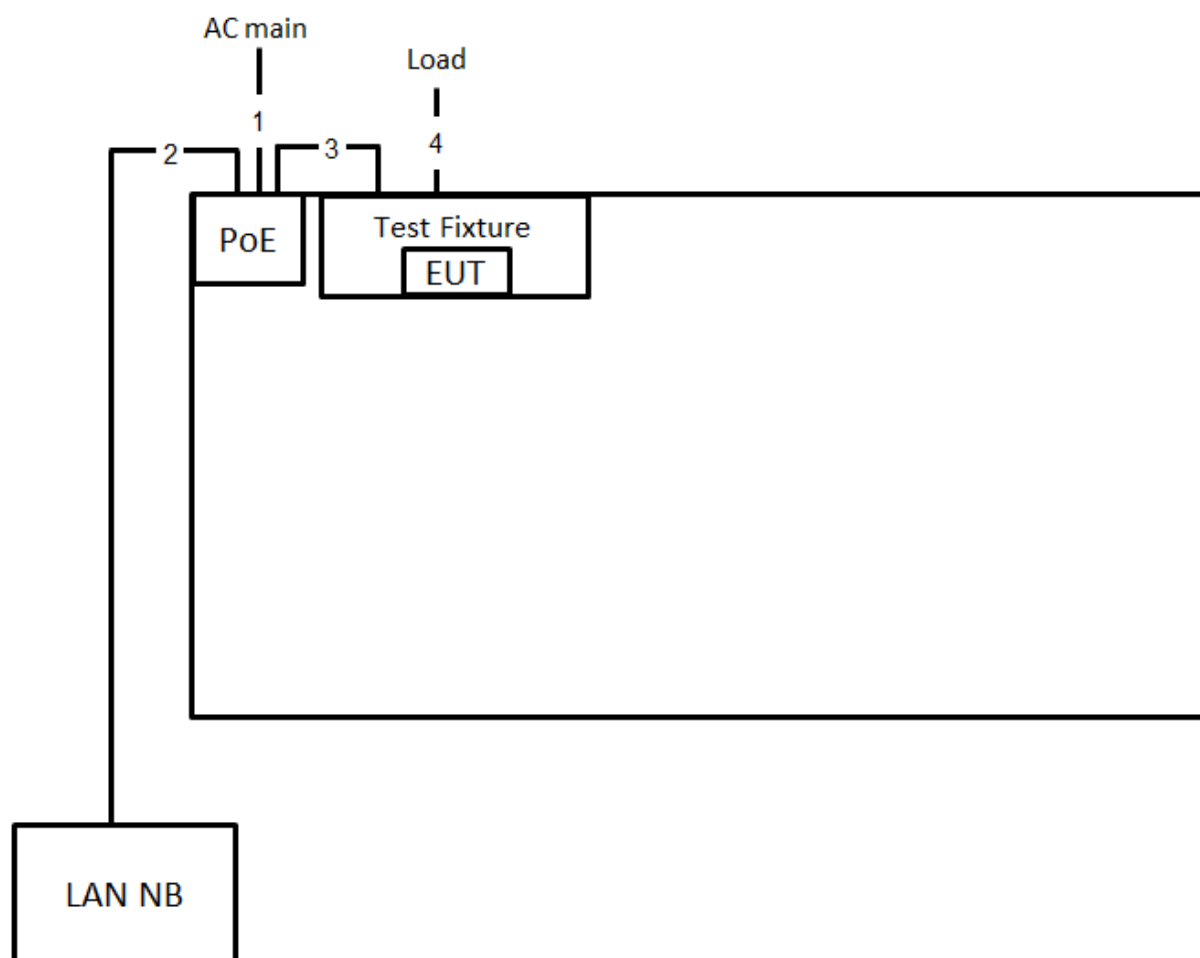
Support Unit	Brand	Model	FCC ID
Notebook	DELL	E4300	DoC
Test Fixture	UBIQUITI	UAP-AC-SHD	N/A
PoE	UBIQUITI	GP-C500-120G	DoC

For Test Site No: CO01-CB

Support Unit	Brand	Model	FCC ID
Notebook	DELL	E6430	DoC
Test Fixture	UBIQUITI	UAP-AC-SHD	N/A
PoE	UBIQUITI	GP-C500-120G	DoC

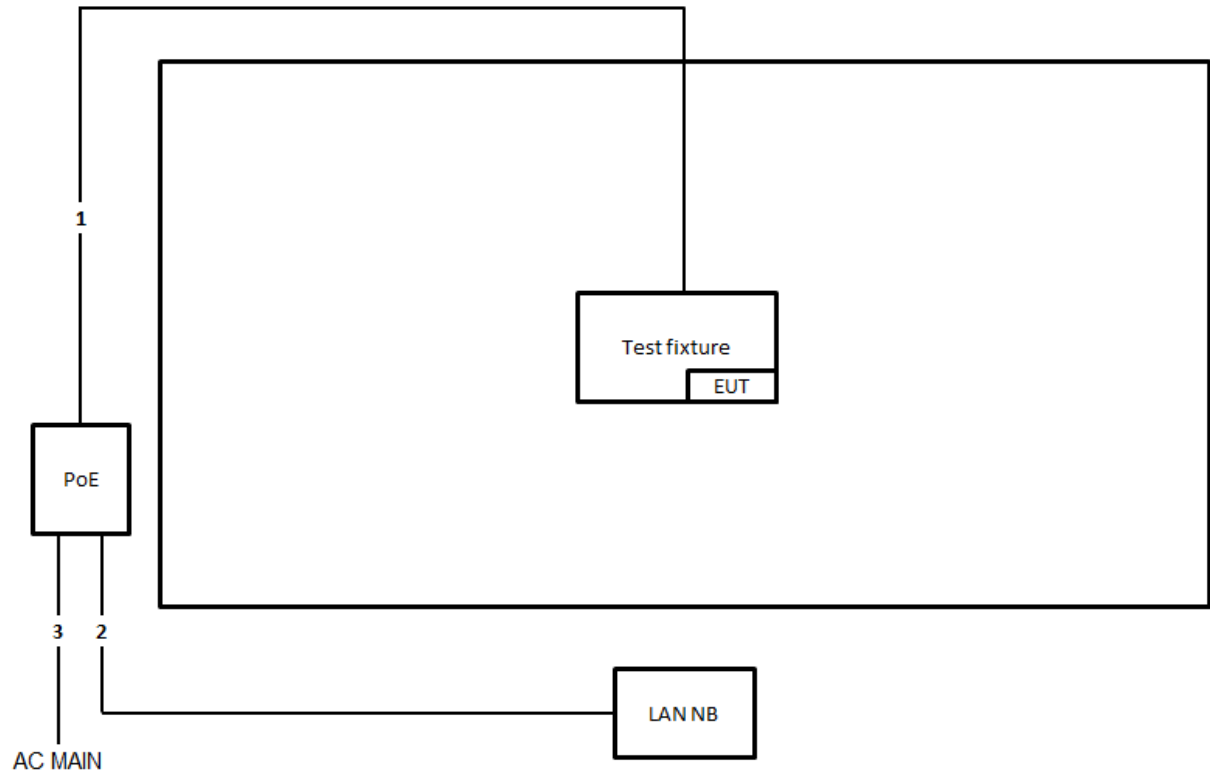
3.10. Test Configurations

3.10.1. AC Power Line Conduction Emissions Test Configuration



Item	Connection	Shielded	Length
1	Power cable	No	0.7m
2	RJ-45 cable	No	10m
3	RJ-45 cable	No	1.5m
4	RJ-45 cable	No	1.5m

3.10.2. Radiation Emissions Test Configuration



Item	Connection	Shielded	Length
1	RJ-45 cable	No	10m
2	RJ-45 cable	No	1.5m
3	Power cable	No	0.7m

4. TEST RESULT

4.1. AC Power Line Conducted Emissions Measurement

4.1.1. Limit

For this product that is designed to connect to the 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 below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

4.1.2. Measuring Instruments and Setting

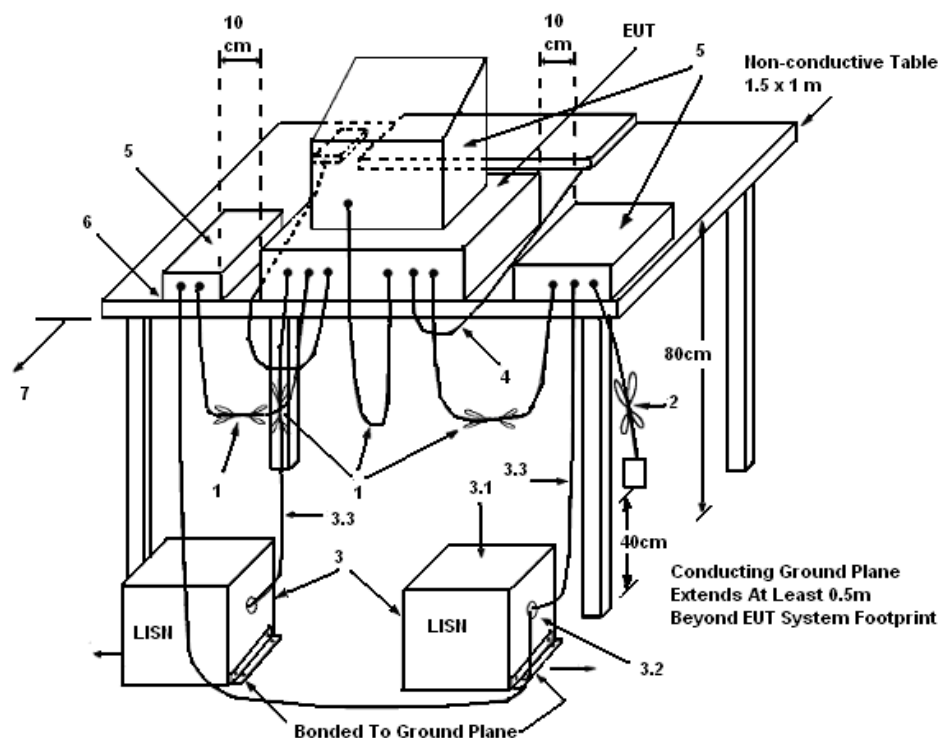
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

4.1.3. Test Procedures

1. Configure the EUT according to ANSI C63.10. The EUT or host of EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT or host of EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connected to the other LISNs. The LISN should provide 50uH/50ohms coupling impedance.
4. The frequency range from 150 kHz to 30 MHz was searched.
5. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
6. The measurement has to be done between each power line and ground at the power terminal.

4.1.4. Test Setup Layout



LEGEND:

(1) Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.

(2) I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.

(3) EUT connected to one LISN. Unused LISN measuring port connectors shall be terminated in 50 Ω . LISN can be placed on top of, or immediately beneath, reference ground plane.

(3.1) All other equipment powered from additional LISN(s).

(3.2) Multiple outlet strip can be used for multiple power cords of non-EUT equipment.

(3.3) LISN at least 80 cm from nearest part of EUT chassis.

(4) Cables of hand-operated devices, such as keyboards, mice, etc., shall be placed as for normal use.

(5) Non-EUT components of EUT system being tested.

(6) Rear of EUT, including peripherals, shall all be aligned and flush with rear of tabletop.

(7) Rear of tabletop shall be 40 cm removed from a vertical conducting plane that is bonded to the ground plane.

4.1.5. Test Deviation

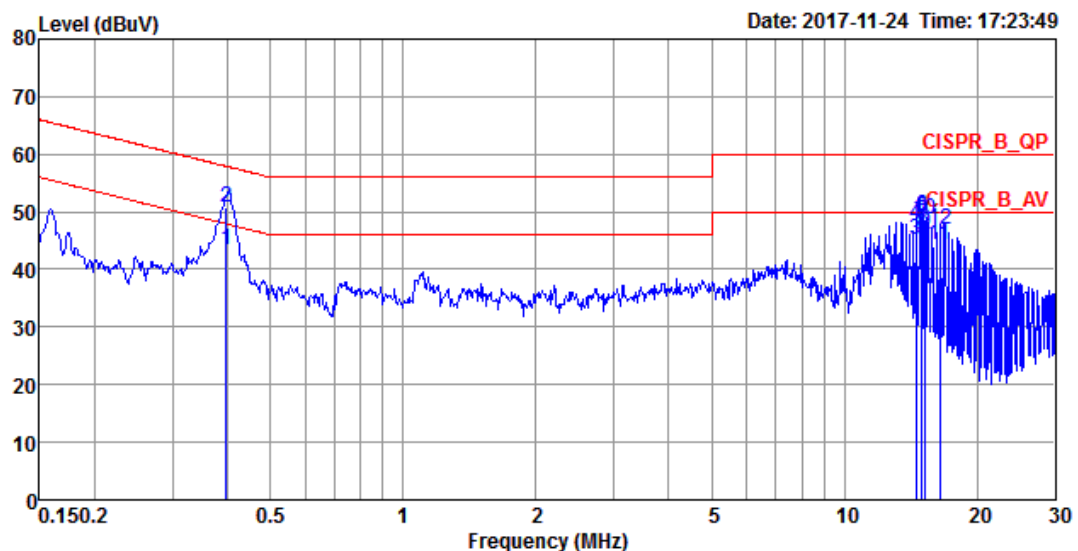
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

The EUT was placed on the test table and programmed in normal function.

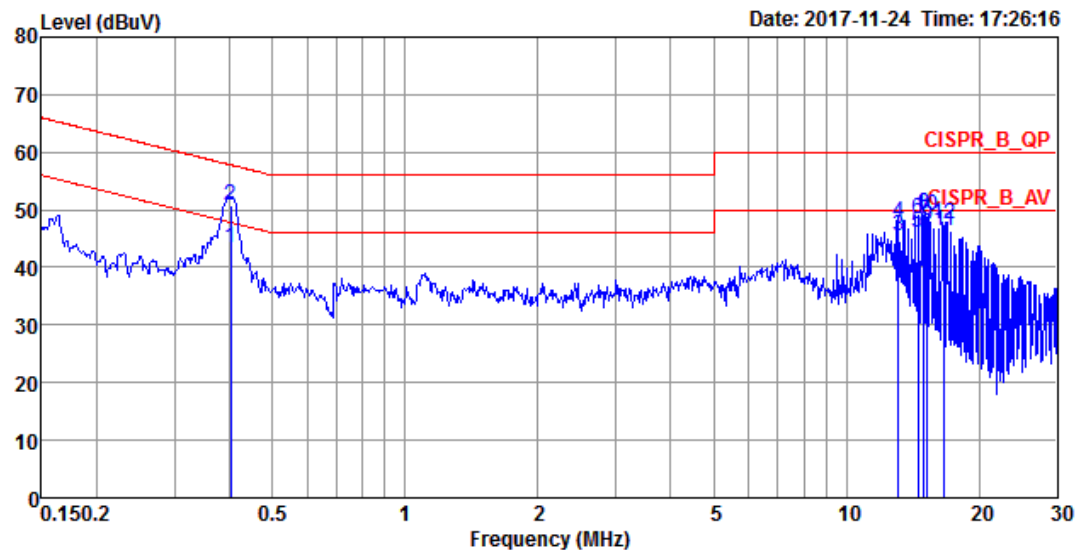
4.1.7. Results of AC Power Line Conducted Emissions Measurement

Temperature	25°C	Humidity	57%
Test Engineer	Rick Yeh	Phase	Line
Configuration	CTX		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
	MHz	dBuV	Limit	Line	Level	Factor	Loss		
			dB	dBuV	dBuV	dB	dB		
1	0.3971	43.54	-4.37	47.91	33.64	9.87	0.03	Average	LINE
2	0.3971	50.76	-7.15	57.91	40.86	9.87	0.03	QP	LINE
3	14.5357	45.13	-4.87	50.00	34.89	10.14	0.10	Average	LINE
4	14.5357	47.88	-12.12	60.00	37.64	10.14	0.10	QP	LINE
5	15.0151	47.78	-2.22	50.00	37.54	10.14	0.10	Average	LINE
6	15.0151	49.31	-10.69	60.00	39.07	10.14	0.10	QP	LINE
7	15.0156	47.72	-2.28	50.00	37.48	10.14	0.10	Average	LINE
8	15.0156	48.97	-11.03	60.00	38.73	10.14	0.10	QP	LINE
9	15.2540	46.42	-3.58	50.00	36.17	10.15	0.10	Average	LINE
10	15.2540	48.84	-11.16	60.00	38.59	10.15	0.10	QP	LINE
11	16.4466	44.38	-5.62	50.00	34.11	10.16	0.11	Average	LINE
12	16.4466	46.93	-13.07	60.00	36.66	10.16	0.11	QP	LINE

Temperature	25°C	Humidity	57%
Test Engineer	Rick Yeh	Phase	Neutral
Configuration	CTX		



	Freq	Level	Over	Limit	Read	LISN	Cable	Remark	Pol/Phase
	MHz	dBuV	Limit	Line	Level	Factor	Loss		
			dB	dBuV	dBuV	dB	dB		
1	0.4017	43.53	-4.29	47.82	33.56	9.94	0.03	Average	NEUTRAL
2	0.4017	50.64	-7.18	57.82	40.67	9.94	0.03	QP	NEUTRAL
3	13.1070	45.40	-4.60	50.00	35.12	10.19	0.09	Average	NEUTRAL
4	13.1070	47.87	-12.13	60.00	37.59	10.19	0.09	QP	NEUTRAL
5	14.5388	45.95	-4.05	50.00	35.63	10.22	0.10	Average	NEUTRAL
6	14.5388	48.30	-11.70	60.00	37.98	10.22	0.10	QP	NEUTRAL
7	15.0154	48.04	-1.96	50.00	37.72	10.22	0.10	Average	NEUTRAL
8	15.0154	49.36	-10.64	60.00	39.04	10.22	0.10	QP	NEUTRAL
9	15.2532	47.25	-2.75	50.00	36.92	10.23	0.10	Average	NEUTRAL
10	15.2532	49.02	-10.98	60.00	38.69	10.23	0.10	QP	NEUTRAL
11	16.6833	46.23	-3.77	50.00	35.88	10.24	0.11	Average	NEUTRAL
12	16.6833	47.48	-12.52	60.00	37.13	10.24	0.11	QP	NEUTRAL

Note:

Level = Read Level + LISN Factor + Cable Loss.

4.2. Radiated Emissions Measurement

4.2.1. Limit

For transmitters operating in the 5.15-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.

In addition, In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(kHz)	300
0.490~1.705	24000/F(kHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

4.2.2. Measuring Instruments and Setting

Please refer to section 5 of equipments list in this report. The following table is the setting of spectrum analyzer and receiver.

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	40 GHz
RBW / VBW (Emission in restricted band)	1 MHz / 3MHz for Peak, 1 MHz / 1/T for Average
RBW / VBW (Emission in non-restricted band)	1 MHz / 3MHz for peak

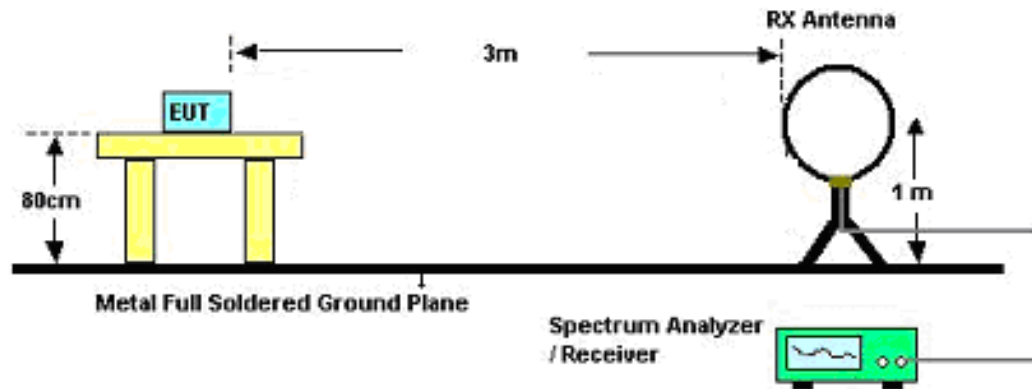
Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RBW 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RBW 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RBW 120kHz for QP

4.2.3. Test Procedures

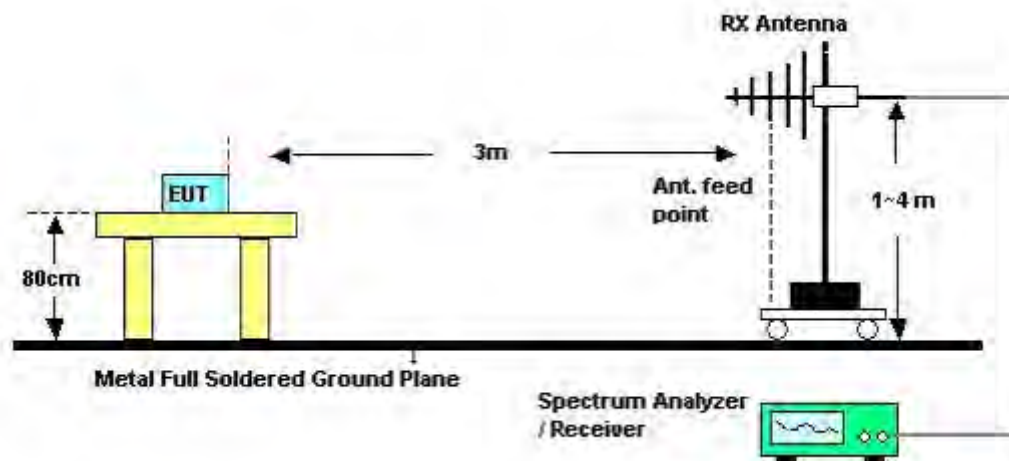
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting units. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emissions field strength of both horizontal and vertical polarization.
4. For each suspected emissions, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
6. For emissions above 1GHz, use 1MHz VBW and 3MHz RBW for peak reading. Then 1MHz RBW and 1/T VBW for average reading in spectrum analyzer.
7. If the emissions level of the EUT in peak mode was 3 dB lower than the average limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method for below 1GHz.
8. For testing above 1GHz, the emissions level of the EUT in peak mode was lower than average limit (that means the emissions level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
9. In case the emission is lower than 30MHz, loop antenna has to be used for measurement and the recorded data should be QP measured by receiver. High – Low scan is not required in this case.

4.2.4. Test Setup Layout

For Radiated Emissions: 9kHz ~30MHz



For Radiated Emissions: 30MHz~1GHz



4.2.5. Test Deviation

There is no deviation with the original standard.

4.2.6. EUT Operation during Test

The EUT was programmed to be in continuously transmitting mode.

4.2.7. Results of Radiated Emissions (9kHz~30MHz)

Temperature	22°C	Humidity	54%
Test Engineer	Cola Fan	Configurations	CTX
Test Date	Nov. 30, 2017		

Freq. (MHz)	Level (dBuV)	Over Limit (dB)	Limit Line (dBuV)	Remark
-	-	-	-	See Note

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

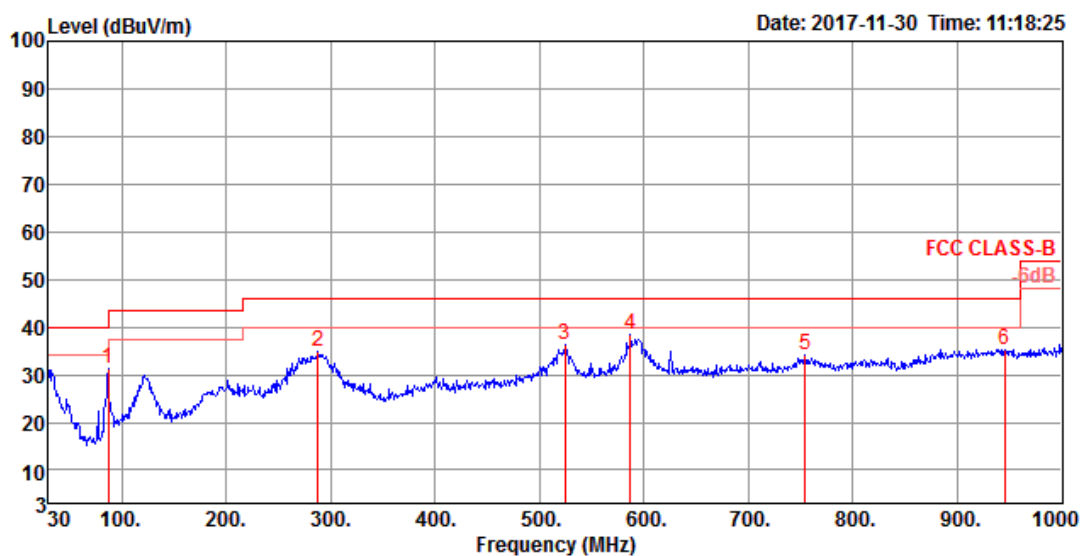
Distance extrapolation factor = $40 \log (\text{specific distance} / \text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

4.2.8. Results of Radiated Emissions (30MHz~1GHz)

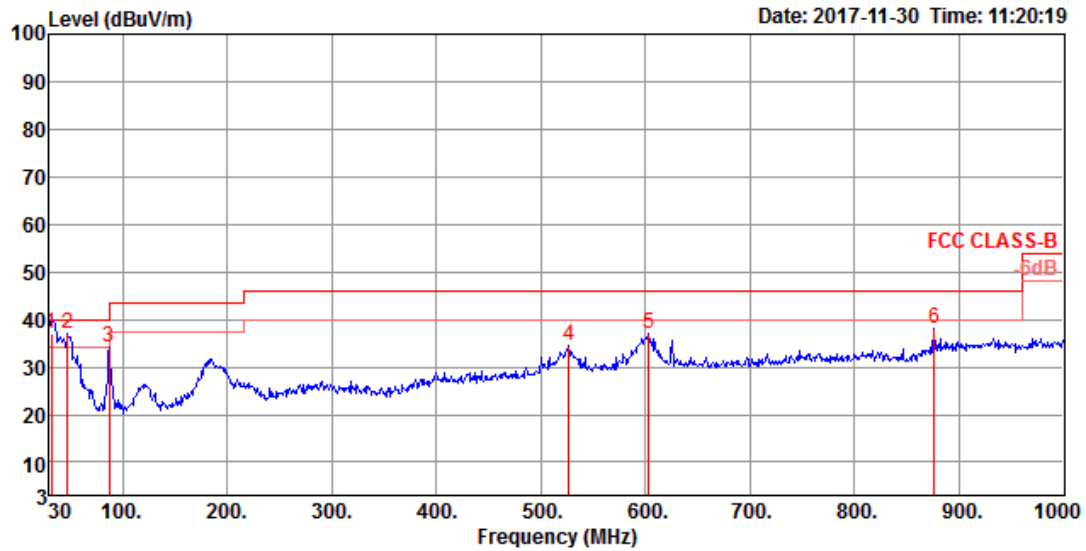
Temperature	22°C	Humidity	54%
Test Engineer	Cola Fan	Configurations	CTX

Horizontal



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	Limit	Level	Loss	Factor	Factor	cm	deg	
1	87.23	31.43	40.00	-8.57	48.35	0.76	14.71	32.39	200	296	Peak
2	288.02	34.73	46.00	-11.27	44.97	2.57	19.46	32.27	100	261	Peak
3	524.70	36.41	46.00	-9.59	41.77	2.84	24.15	32.35	150	1	Peak
4	586.78	38.45	46.00	-7.55	43.96	2.07	24.80	32.38	125	0	Peak
5	754.59	34.20	46.00	-11.80	36.52	3.75	26.16	32.23	100	218	Peak
6	945.68	35.26	46.00	-10.74	34.50	4.07	27.87	31.18	150	354	Peak

Vertical



	Freq	Level	Limit	Over	Read	CableAntenna	Preamp	A/Pos	T/Pos	Remark	Pol/Phase
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB/m	dB	cm	deg	
1	31.94	36.97	40.00	-3.03	44.00	0.99	24.41	32.43	100	2 QP	VERTICAL
2	47.46	36.94	40.00	-3.06	52.05	1.41	15.90	32.42	100	286 Peak	VERTICAL
3	87.23	34.18	40.00	-5.82	51.10	0.76	14.71	32.39	150	303 Peak	VERTICAL
4	526.64	34.38	46.00	-11.62	39.73	2.83	24.17	32.35	100	33 Peak	VERTICAL
5	603.27	37.14	46.00	-8.86	42.59	2.00	24.94	32.39	100	147 Peak	VERTICAL
6	875.84	37.99	46.00	-8.01	38.74	3.60	27.35	31.70	125	163 Peak	VERTICAL

Note:

The amplitude of spurious emissions that are attenuated by more than 20dB below the permissible value has no need to be reported.

Emission level (dBuV/m) = 20 log Emission level (uV/m).

Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level.

4.3. Antenna Requirements

4.3.1. Limit

Except for special regulations, the Low-power Radio-frequency Devices must not be equipped with any jacket for installing an antenna with extension cable. An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that the user can replace a broken antenna, but the use of a standard antenna jack or electrical connector is prohibited. Further, this requirement does not apply to intentional radiators that must be professionally installed.

4.3.2. Antenna Connector Construction

Please refer to section 3.3 in this test report; antenna connector complied with the requirements.

5. LIST OF MEASURING EQUIPMENTS

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Calibration Due Date	Remark
EMI Receiver	Agilent	N9038A	My52260123	9kHz ~ 8.45GHz	Jan. 23, 2017	Jan. 22, 2018	Conduction (CO01-CB)
LISN	F.C.C.	FCC-LISN-50-16-2	04083	150kHz ~ 100MHz	Dec. 14, 2016	Dec. 13, 2017	Conduction (CO01-CB)
LISN	Schwarzbeck	NSLK 8127	8127647	9kHz ~ 30MHz	Dec. 21, 2016	Dec. 20, 2017	Conduction (CO01-CB)
COND Cable	Woken	Cable	01	150kHz ~ 30MHz	May 23, 2017	May 22, 2018	Conduction (CO01-CB)
Software	Audix	E3	6.120210n	-	N.C.R.	N.C.R.	Conduction (CO01-CB)
BILOG ANTENNA with 6dB Attenuator	TESEQ & EMCI	CBL6112D & N-6-06	37880 & AT-N0609	20MHz ~ 2GHz	Aug. 30, 2017	Aug. 29, 2018	Radiation (03CH01-CB)
Loop Antenna	Teseq	HLA 6120	24155	9kHz - 30 MHz	Mar. 16, 2016*	Mar. 15, 2018*	Radiation (03CH01-CB)
Pre-Amplifier	EMCI	EMC330N	980332	20MHz ~ 3GHz	May 02, 2017	May 01, 2018	Radiation (03CH01-CB)
Signal analyzer	Agilent	N9010A	MY52220519	10kHz~44GHz	Jan. 16, 2017	Jan. 15, 2018	Radiation (03CH01-CB)
EMI Test	R&S	ESCS	100355	9kHz ~ 2.75GHz	May 06, 2017	May 05, 2018	Radiation (03CH01-CB)
RF Cable-low	Woken	Low Cable-16+17	N/A	30 MHz ~ 1 GHz	Oct. 11, 2017	Oct. 10, 2018	Radiation (03CH01-CB)
Test Software	Audix	E3	6.2009-10-7	N/A	N/A	N/A	Radiation (03CH01-CB)

Note: Calibration Interval of instruments listed above is one year.

“*” Calibration Interval of instruments listed above is two years.

N.C.R. means Non-Calibration required.

6. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Conducted Emission (150kHz ~ 30MHz)	3.2 dB	Confidence levels of 95%
Radiated Emission (30MHz ~ 1,000MHz)	3.6 dB	Confidence levels of 95%