



SPORTON International Inc.

No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.
Ph: 886-3-327-3456 / FAX: 886-3-327-0973 / www.sporton.com.tw

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.



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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 | <input checked="" type="checkbox"/> IP Based (Load Based) | <input type="checkbox"/> Frame Based |
| TPC Function | <input checked="" type="checkbox"/> With TPC | <input type="checkbox"/> Without TPC |
| Beamforming Function | <input type="checkbox"/> With beamforming | <input checked="" type="checkbox"/> Without beamforming |
| Operate Condition | <input checked="" type="checkbox"/> Indoor | <input checked="" type="checkbox"/> Outdoor |

Antenna and Bandwidth

| Antenna | Four (TX) | | |
|---------------|-----------|--------|--------|
| | 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

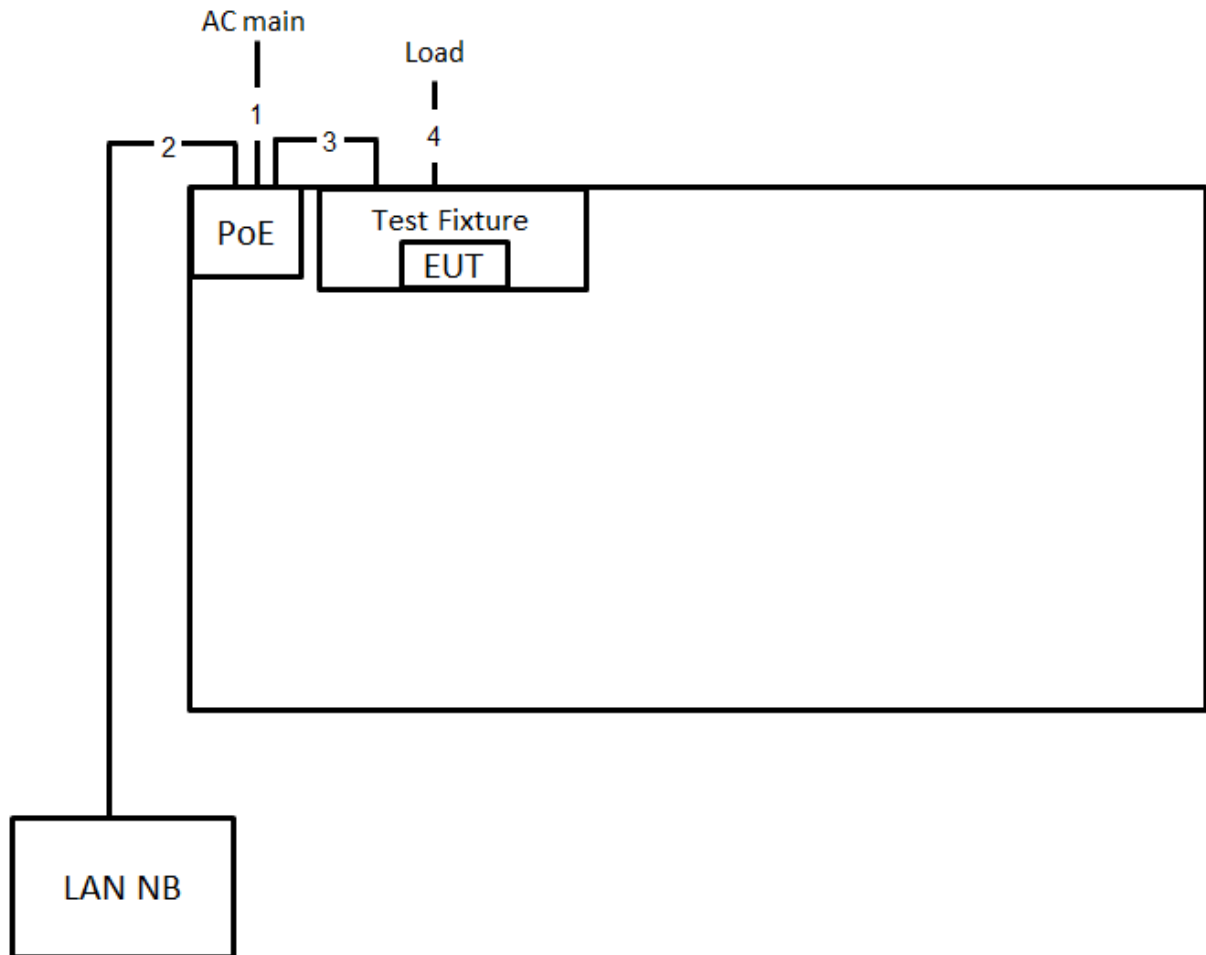
| Support Unit | Brand | Model | FCC ID |
|--------------|----------|--------------|--------|
| Notebook | DELL | E4300 | DoC |
| Test Fixture | UBIQUITI | UAP-AC-SHD | N/A |
| PoE | UBIQUITI | GP-C500-120G | DoC |

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 |

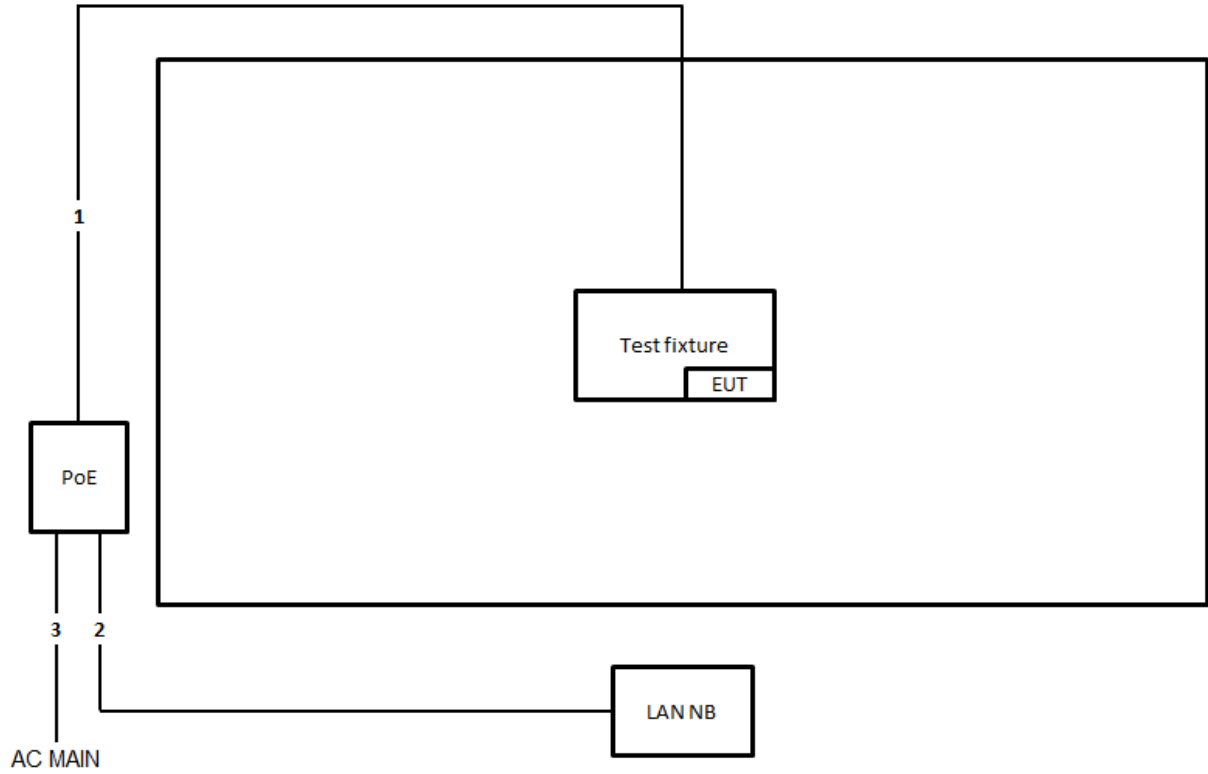
3.10. Test Configurations

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

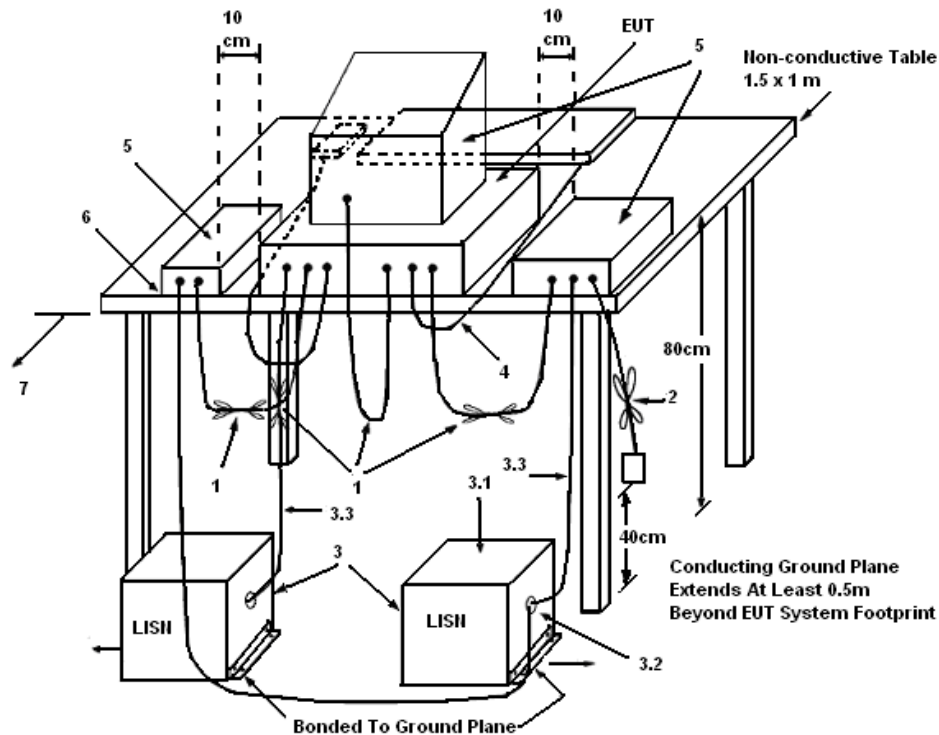
Please refer to section 5 of equipments list in this report. The following table is the setting of the receiver.

| 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

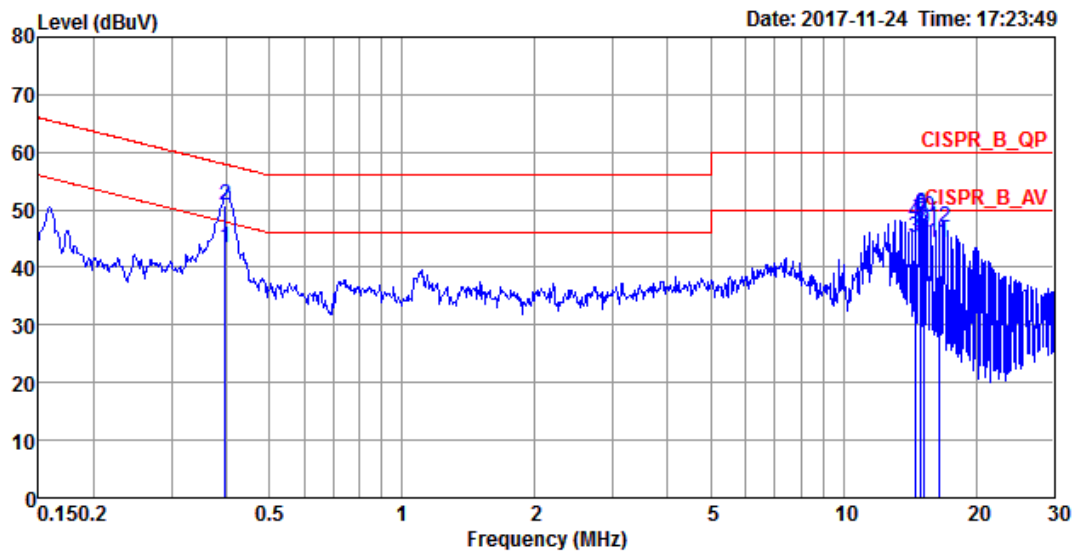
There is no deviation with the original standard.

4.1.6. EUT Operation during Test

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

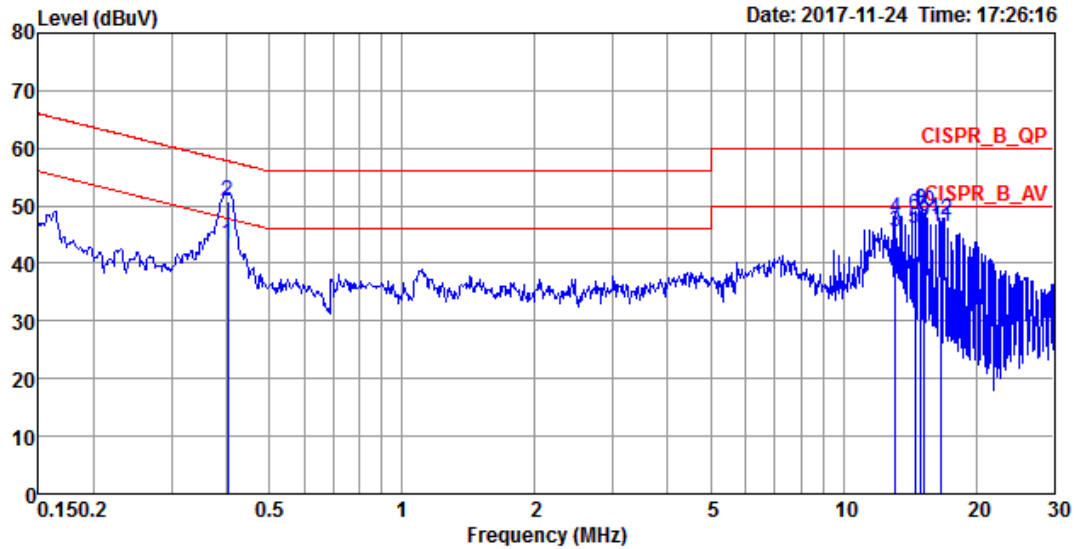
4.1.7. Results of AC Power Line Conducted Emissions Measurement

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



| | Freq | Level | Over Limit | Limit Line | Read Level | LISN Factor | Cable Loss | Remark | Pol/Phase |
|----|---------|-------|------------|------------|------------|-------------|------------|---------|-----------|
| | MHz | dBuV | 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 | Limit Line | Read Level | LISN Factor | Cable Loss | Remark | Pol/Phase |
|----|---------|-------|------------|------------|------------|-------------|------------|---------|-----------|
| | MHz | dBuV | 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 (micровolts/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 |

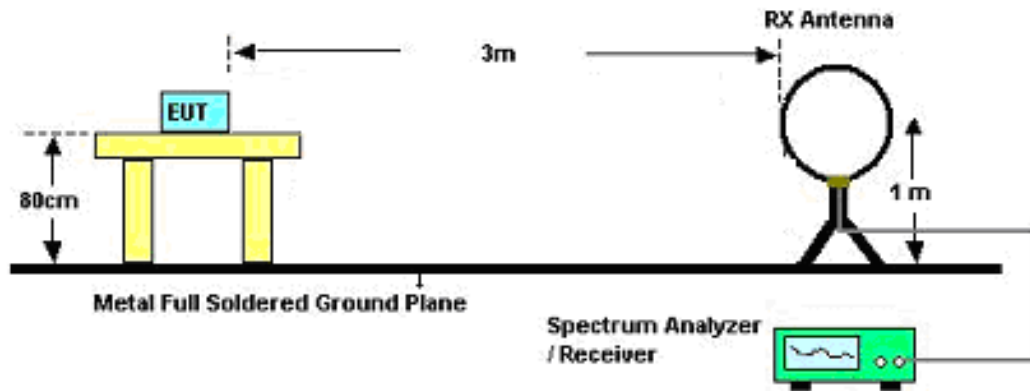
| Receiver Parameter | Setting |
|------------------------|-----------------------------------|
| Attenuation | Auto |
| Start ~ Stop Frequency | 9kHz~150kHz / RBW 200Hz for QP |
| Start ~ Stop Frequency | 150kHz~30MHz / RBW 9kHz for QP |
| Start ~ Stop Frequency | 30MHz~1000MHz / RBW 120kHz for QP |

4.2.3. Test Procedures

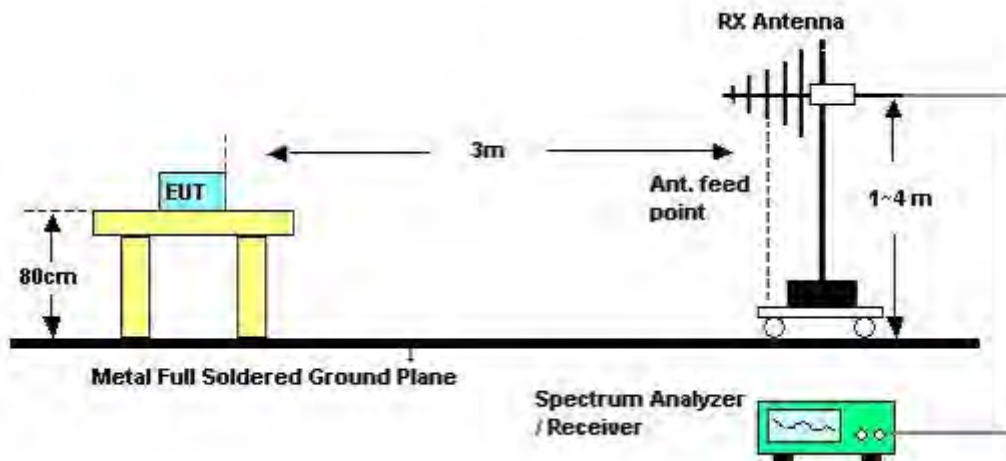
1. Configure the EUT according to ANSI C63.10. The EUT was placed on the top of the turntable 1.5 meter above ground. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 1m & 3m far away from the turntable.
2. Power on the EUT and all the supporting 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.

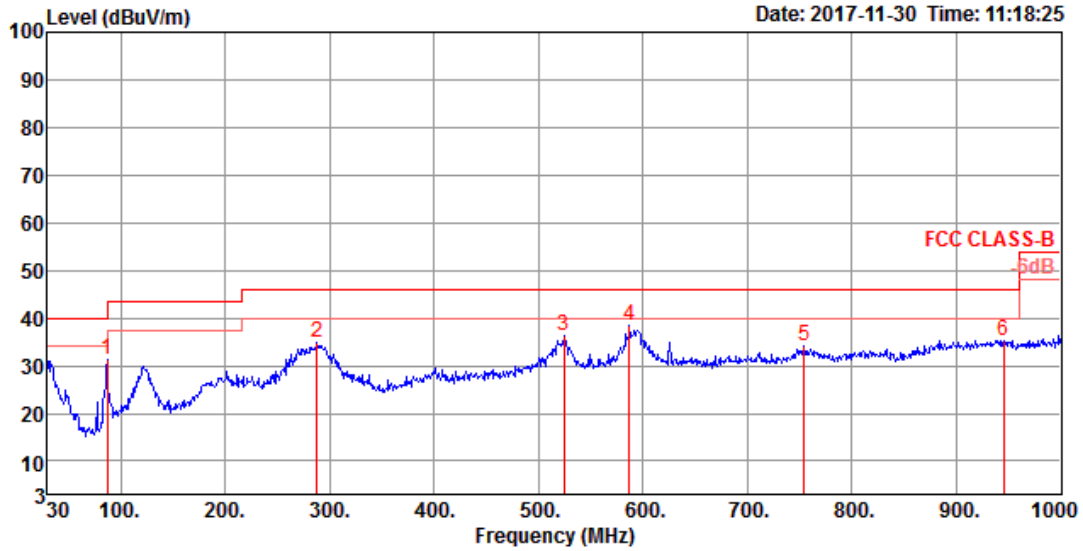
Distance extrapolation factor = $40 \log(\text{specific distance} / \text{test distance})$ (dB);

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

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

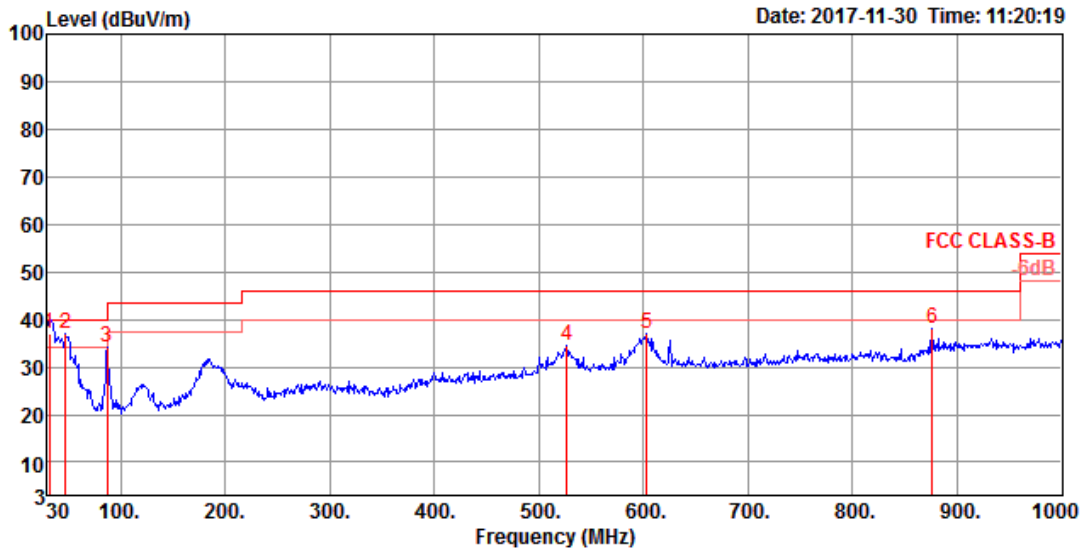
| | | | |
|---------------|----------|----------------|-----|
| Temperature | 22°C | Humidity | 54% |
| Test Engineer | Cola Fan | Configurations | CTX |

Horizontal



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

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% |