

## Partial FCC Test Report

### (Spot Check)

**Report No.:** RF200204C07-1

**FCC ID:** KA2BA3621PA1

**Test Model:** DBA-3621P

**Received Date:** Feb. 04, 2020

**Test Date:** May 27, 2020 ~ Jun. 09, 2020

**Issued Date:** Jun. 22, 2020

**Applicant:** D-Link Corporation

**Address:** 17595 Mt. Herrmann, Fountain Valley, California, United States, 92708

**Issued By:** Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch  
Lin Kou Laboratories

**Lab Address:** No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan

**Test Location:** No.19, Hwa Ya 2nd Rd., Wen Hwa Vil., Kwei Shan Dist., Taoyuan City  
33383, Taiwan

**FCC Registration /**  
**Designation Number:** 788550 / TW0003



This report is for your exclusive use. Any copying or replication of this report to or for any other person or entity, or use of our name or trademark, is permitted only with our prior written permission. This report sets forth our findings solely with respect to the test samples identified herein. The results set forth in this report are not indicative or representative of the quality or characteristics of the lot from which a test sample was taken or any similar or identical product unless specifically and expressly noted. Our report includes all of the tests requested by you and the results thereof based upon the information that you provided to us. You have 60 days from date of issuance of this report to notify us of any material error or omission caused by our negligence, provided, however, that such notice shall be in writing and shall specifically address the issue you wish to raise. A failure to raise such issue within the prescribed time shall constitute your unqualified acceptance of the completeness of this report, the tests conducted and the correctness of the report contents. Unless specific mention, the uncertainty of measurement has been explicitly taken into account to declare the compliance or non-compliance to the specification.

## Table of Contents

|                                                                                           |           |
|-------------------------------------------------------------------------------------------|-----------|
| <b>Release Control Record .....</b>                                                       | <b>3</b>  |
| <b>1 Certificate of Conformity .....</b>                                                  | <b>4</b>  |
| <b>2 Summary of Test Results.....</b>                                                     | <b>5</b>  |
| 2.1 Measurement Uncertainty.....                                                          | 6         |
| 2.2 Modification Record .....                                                             | 6         |
| <b>3 General Information .....</b>                                                        | <b>7</b>  |
| 3.1 General Description of EUT .....                                                      | 7         |
| 3.2 Description of Test Modes.....                                                        | 10        |
| 3.2.1 Test Mode Applicability and Tested Channel Detail.....                              | 11        |
| 3.3 Description of Support Units .....                                                    | 13        |
| 3.3.1 Configuration of System under Test .....                                            | 13        |
| 3.4 General Description of Applied Standards and References .....                         | 13        |
| <b>4 Test Types and Results .....</b>                                                     | <b>14</b> |
| 4.1 Radiated Emission and Bandedge Measurement .....                                      | 14        |
| 4.1.1 Limits of Radiated Emission and Bandedge Measurement .....                          | 14        |
| 4.1.2 Test Instruments .....                                                              | 16        |
| 4.1.3 Test Procedures.....                                                                | 17        |
| 4.1.4 Deviation from Test Standard .....                                                  | 17        |
| 4.1.5 Test Setup.....                                                                     | 18        |
| 4.1.6 EUT Operating Conditions.....                                                       | 19        |
| 4.1.7 Test Results .....                                                                  | 20        |
| 4.2 Conducted Emission Measurement.....                                                   | 26        |
| 4.2.1 Limits of Conducted Emission Measurement .....                                      | 26        |
| 4.2.2 Test Instruments .....                                                              | 26        |
| 4.2.3 Test Procedures.....                                                                | 27        |
| 4.2.4 Deviation from Test Standard .....                                                  | 27        |
| 4.2.5 Test Setup.....                                                                     | 27        |
| 4.2.6 EUT Operating Conditions.....                                                       | 27        |
| 4.2.7 Test Results .....                                                                  | 28        |
| 4.3 Transmit Power Measurement.....                                                       | 32        |
| 4.3.1 Limits of Transmit Power Measurement .....                                          | 32        |
| 4.3.2 Test Setup.....                                                                     | 32        |
| 4.3.3 Test Instruments .....                                                              | 32        |
| 4.3.4 Test Procedure .....                                                                | 32        |
| 4.3.5 Deviation from Test Standard .....                                                  | 32        |
| 4.3.6 EUT Operating Conditions.....                                                       | 32        |
| 4.3.7 Test Result .....                                                                   | 33        |
| <b>5 Pictures of Test Arrangements.....</b>                                               | <b>39</b> |
| <b>Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band) .....</b> | <b>40</b> |
| <b>Appendix – Information of the Testing Laboratories .....</b>                           | <b>41</b> |

### Release Control Record

| Issue No.     | Description      | Date Issued   |
|---------------|------------------|---------------|
| RF200204C07-1 | Original Release | Jun. 22, 2020 |

## 1 Certificate of Conformity

**Product:** Business Cloud Wave 2 Access Point / Nuclias Cloud-Managed AC1300 Wave 2 Outdoor Access Point

**Brand:** D-Link

**Test Model:** DBA-3621P

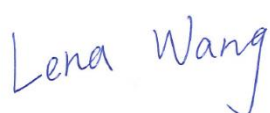
**Sample Status:** Engineering Sample

**Applicant:** D-Link Corporation

**Test Date:** May 27, 2020 ~ Jun. 09, 2020

**Standards:** 47 CFR FCC Part 15, Subpart E (Section 15.407)  
ANSI C63.10:2013

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by :  , Date: Jun. 22, 2020  
Lena Wang / Specialist

Approved by :  , Date: Jun. 22, 2020  
Dylan Chiou / Senior Project Engineer

## 2 Summary of Test Results

| 47 CFR FCC Part 15, Subpart E (Section 15.407) |                                            |        |                                                                                       |
|------------------------------------------------|--------------------------------------------|--------|---------------------------------------------------------------------------------------|
| FCC Clause                                     | Test Item                                  | Result | Remarks                                                                               |
| 15.407(b)(6)                                   | AC Power Conducted Emissions               | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -19.98 dB at 0.45716 MHz. |
| 15.407(b)<br>(1/2/3/4(i/ii)/6)                 | Radiated Emissions & Band Edge Measurement | Pass   | Meet the requirement of limit.<br>Minimum passing margin is -3.0 dB at 5641.03 MHz.   |
| 15.407(a)(1/2/3)                               | Max Average Transmit Power                 | Pass   | Meet the requirement of limit.                                                        |
| ---                                            | Occupied Bandwidth Measurement             | N/A    | Refer to Note                                                                         |
| 15.407(a)(1/2/3)                               | Peak Power Spectral Density                | N/A    | Refer to Note                                                                         |
| 15.407(e)                                      | 6 dB Bandwidth                             | N/A    | Refer to Note                                                                         |
| 15.407(g)                                      | Frequency Stability                        | N/A    | Refer to Note                                                                         |
| 15.203                                         | Antenna Requirement                        | N/A    | Refer to Note                                                                         |

Note:

1. This report is a supplementary report to the original BV CPS report no.: RF200116C09-1 (The difference compared with the report (RF200116C09-1) is changing test model (DBA-3621P), the model have the same appearance, circuit, layout, and RF characteristic with DWL-8720AP). Exhibit prepared for FCC Spot Check Verification report, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Therefore, only Output Power, AC Power Conducted Emission and Radiated Emissions were verified and recorded in this report. AC Power Conducted Emission and Radiated Emission tests according to original report radiated emission worst channel, 6 dB Bandwidth and Conducted power were re-test.
2. For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.
3. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.

## 2.1 Measurement Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2:

| Measurement                        | Frequency          | Expanded Uncertainty<br>(k=2) ( $\pm$ ) |
|------------------------------------|--------------------|-----------------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz   | 2.79 dB                                 |
| Radiated Emissions up to 1 GHz     | 9 kHz ~ 30 MHz     | 3.04 dB                                 |
|                                    | 30 MHz ~ 200 MHz   | 2.93 dB                                 |
|                                    | 200 MHz ~ 1000 MHz | 2.95 dB                                 |
| Radiated Emissions above 1 GHz     | 1 GHz ~ 18 GHz     | 2.26 dB                                 |
|                                    | 18 GHz ~ 40 GHz    | 1.94 dB                                 |

## 2.2 Modification Record

There were no modifications required for compliance.

### 3 General Information

#### 3.1 General Description of EUT

|                              |                                                                                                                                                                                                                                                                              |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Product</b>               | Business Cloud Wave 2 Access Point / Nuclias Cloud-Managed AC1300 Wave 2 Outdoor Access Point                                                                                                                                                                                |
| <b>Brand</b>                 | D-Link                                                                                                                                                                                                                                                                       |
| <b>Test Model</b>            | DBA-3621P                                                                                                                                                                                                                                                                    |
| <b>Status of EUT</b>         | Engineering Sample                                                                                                                                                                                                                                                           |
| <b>Power Supply Rating</b>   | 54 Vdc (POE)                                                                                                                                                                                                                                                                 |
| <b>Modulation Type</b>       | 256QAM, 64QAM, 16QAM, QPSK, BPSK                                                                                                                                                                                                                                             |
| <b>Modulation Technology</b> | OFDM                                                                                                                                                                                                                                                                         |
| <b>Transfer Rate</b>         | 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps<br>802.11n: up to 400.0 Mbps<br>802.11ac: up to 866.7 Mbps                                                                                                                                                        |
| <b>Operating Frequency</b>   | 5180 ~ 5240 MHz, 5745 ~ 5825 MHz                                                                                                                                                                                                                                             |
| <b>Number of Channel</b>     | 5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)<br>2 for 802.11n (HT40), 802.11ac (VHT40)<br>1 for 802.11ac (VHT80)<br>5745 ~ 5825 MHz: 5 for 802.11a, 802.11n (HT20), 802.11ac (VHT20)<br>2 for 802.11n (HT40), 802.11ac (VHT40)<br>1 for 802.11ac (VHT80) |
| <b>Output Power</b>          | CDD Mode:<br>438.635 mW for 5180 ~ 5240 MHz<br>381.26 mW for 5745 ~ 5825 MHz<br>Beamforming Mode:<br>219.333 mW for 5180 ~ 5240 MHz<br>190.643 mW for 5745 ~ 5825 MHz                                                                                                        |
| <b>Antenna Type</b>          | Refer to Note as below                                                                                                                                                                                                                                                       |
| <b>Antenna Connector</b>     | Refer to Note as below                                                                                                                                                                                                                                                       |
| <b>Accessory Device</b>      | Refer to Note as below                                                                                                                                                                                                                                                       |
| <b>Data Cable Supplied</b>   | Refer to Note as below                                                                                                                                                                                                                                                       |

#### Note:

1. This report is a supplementary report to the original BV CPS report no.: RF200116C09-1 (The difference compared with the report (RF200116C09-1) is changing test model (DBA-3621P), the model have the same appearance, circuit, layout, and RF characteristic with DWL-8720AP). Exhibit prepared for FCC Spot Check Verification report, the format, test items and amount of spot-check test data are decided by applicant's engineering judgment, for more details please refer to declaration letter exhibit. Therefore, only Output Power, AC Power Conducted Emission and Radiated Emissions were verified and recorded in this report. AC Power Conducted Emission and Radiated Emission tests according to original report radiated emission worst channel, 6 dB Bandwidth and Conducted power were re-test.

2. The EUT incorporates a MIMO function. Physically, the EUT provides two completed transmitters and two receivers.

| Modulation Mode  | Beamformng Mode | Tx Function |
|------------------|-----------------|-------------|
| 802.11a          | Not Support     | 2TX         |
| 802.11n (HT20)   | Support         | 2TX         |
| 802.11n (HT40)   | Support         | 2TX         |
| 802.11ac (VHT20) | Support         | 2TX         |
| 802.11ac (VHT40) | Support         | 2TX         |
| 802.11ac (VHT80) | Support         | 2TX         |

\* The modulation and bandwidth are similar for 802.11n mode for HT20 / HT40 and 802.11ac mode for VHT20 / VHT40, therefore investigated worst case to representative mode in test report. (Final test mode refer section 3.2.1)

\* For 802.11n and 802.11ac, CDD mode is the worst case for final radiated emission and power line conducted emission tests after pretesting CDD mode and beamforming mode.

3. The following antennas were provided to the EUT.

| No. | Type   | Connector   | Gain (dBi) |          |          |          |          |          |          |          |
|-----|--------|-------------|------------|----------|----------|----------|----------|----------|----------|----------|
|     |        |             | 2400 MHz   | 2450 MHz | 2500 MHz | 4900 MHz | 5150 MHz | 5350 MHz | 5725 MHz | 5825 MHz |
| 1   | Dipole | R-N type(F) | 3.5        | 3.4      | 3.1      | 5.1      | 6.0      | 5.8      | 5.5      | 5.3      |
| 2   | Dipole | R-N type(F) | 3.5        | 3.4      | 3.1      | 5.1      | 6.0      | 5.8      | 5.5      | 5.3      |

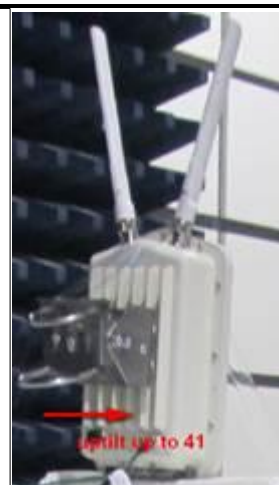
4. The EUT contains following accessory devices.

| Product       | Brand | Model | Description                               |
|---------------|-------|-------|-------------------------------------------|
| Console Cable | N/A   | N/A   | 1 m non-shielded without core             |
| GND Cable     | N/A   | N/A   | 1m non-shielded ground cable without core |

5. The test support unit which provided by client is listed as below.

| Product | Brand                   | Model           | Description                                                                                                       |
|---------|-------------------------|-----------------|-------------------------------------------------------------------------------------------------------------------|
| POE     | LEADER ELECTRONICS INC. | NU90-J540167-I1 | I/P: 100-240 Vac, 50/60 Hz, 1.2 A<br>O/P: 54 Vdc, 1.67 A<br>Power Cord: 1.5m non-shielded power cord without core |

6. The EUT will install at outdoor area, the highest antenna gain from the horizon above 30 degrees as below, for more detail information please refer to antenna specification and user manual.

|                                                                                                            |      |                                                                                       |
|------------------------------------------------------------------------------------------------------------|------|---------------------------------------------------------------------------------------|
| C107-511211-A                                                                                              | 6dBi |  |
| Due to device will restricted installation position as above photo, to the maximum antenna gain are chosen |      |                                                                                       |

**7. There're 2 configurations for the EUT listed as below.**

Mode A: Flat Type iron frame

Mode B: C Type iron frame

8. Spurious emission of the simultaneous operation (2.4GHz and 5GHz) has been evaluated and no non-compliance was found.
9. The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.
10. The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

### 3.2 Description of Test Modes

#### For 5180 ~ 5240 MHz

4 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 36      | 5180            | 44      | 5220            |
| 40      | 5200            | 48      | 5240            |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 38      | 5190            | 46      | 5230            |

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency (MHz) |
|---------|-----------------|
| 42      | 5210            |

#### For 5745 ~ 5825 MHz:

5 channels are provided for 802.11a, 802.11n (HT20), 802.11ac (VHT20):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 149     | 5745            | 161     | 5805            |
| 153     | 5765            | 165     | 5825            |
| 157     | 5785            |         |                 |

2 channels are provided for 802.11n (HT40), 802.11ac (VHT40):

| Channel | Frequency (MHz) | Channel | Frequency (MHz) |
|---------|-----------------|---------|-----------------|
| 151     | 5755            | 159     | 5795            |

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency (MHz) |
|---------|-----------------|
| 155     | 5775            |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable To |       |     |      | Description              |
|--------------------|---------------|-------|-----|------|--------------------------|
|                    | RE≥1G         | RE<1G | PLC | APCM |                          |
| A                  | √             | √     | √   | √    | For Flat Type iron frame |
| B                  | -             | √     | √   | -    | For C Type iron frame    |

Where **RE≥1G**: Radiated Emission above 1 GHz **RE<1G**: Radiated Emission below 1 GHz  
**PLC**: Power Line Conducted Emission **APCM**: Antenna Port Conducted Measurement

**Note:**

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.
2. "-" means no effect.

#### **Radiated Emission Test (Above 1 GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode             | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A                  | 5180-5240            | 802.11n (HT40)   | 38 to 46          | 38             | OFDM                  | BPSK            | 13.5             |
|                    | 5745-5825            | 802.11ac (VHT80) | 155               | 155            | OFDM                  | BPSK            | 29.3             |

#### **Radiated Emission Test (Below 1 GHz):**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode             | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A、B                | 5745-5825            | 802.11ac (VHT80) | 155               | 155            | OFDM                  | BPSK            | 29.3             |

#### **Power Line Conducted Emission Test:**

- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode             | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A、B                | 5745-5825            | 802.11ac (VHT80) | 155               | 155            | OFDM                  | BPSK            | 29.3             |

### Antenna Port Conducted Measurement:

- ☒ This item includes all test value of each mode, but only includes spectrum plot of worst value of each mode.
- ☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).
- ☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode             | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| A                  | 5180-5240            | 802.11a          | 36 to 48          | 36, 40, 48     | OFDM                  | BPSK            | 6.0              |
|                    |                      | 802.11n (HT20)   | 36 to 48          | 36, 40, 48     | OFDM                  | BPSK            | 6.5              |
|                    |                      | 802.11n (HT40)   | 38 to 46          | 38, 46         | OFDM                  | BPSK            | 13.5             |
|                    |                      | 802.11ac (VHT80) | 42                | 42             | OFDM                  | BPSK            | 29.3             |
|                    | 5745-5825            | 802.11a          | 149 to 165        | 149, 157, 165  | OFDM                  | BPSK            | 6.0              |
|                    |                      | 802.11n (HT20)   | 149 to 165        | 149, 157, 165  | OFDM                  | BPSK            | 6.5              |
|                    |                      | 802.11n (HT40)   | 151 to 159        | 151, 159       | OFDM                  | BPSK            | 13.5             |
|                    |                      | 802.11ac (VHT80) | 155               | 155            | OFDM                  | BPSK            | 29.3             |

### Test Condition:

| Applicable To | Environmental Conditions | Input Power    | Tested by    |
|---------------|--------------------------|----------------|--------------|
| RE≥1G         | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Titan Hsu    |
| RE<1G         | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Titan Hsu    |
| PLC           | 25 deg. C, 65 % RH       | 120 Vac, 60 Hz | Titan Hsu    |
| APCM          | 25 deg. C, 65 % RH       | 54 Vdc         | Jisyong Wang |

### 3.3 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

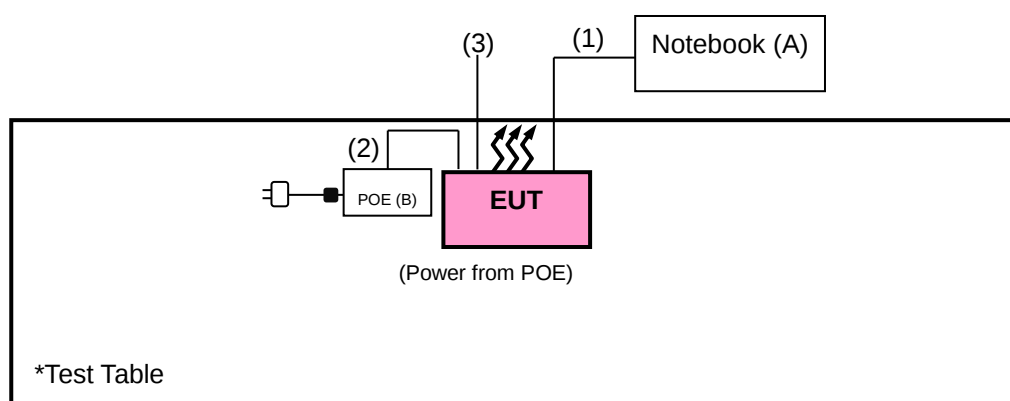
| No. | Product  | Brand                   | Model No.       | Serial No. | FCC ID           | Remarks            |
|-----|----------|-------------------------|-----------------|------------|------------------|--------------------|
| A   | Notebook | DELL                    | E5420           | 33MJMQ1    | FCC DoC Approved | Provided by Lab    |
| B   | POE      | LEADER ELECTRONICS INC. | NU90-J540167-I1 | N/A        | N/A              | Provided by Client |

Note:

1. All power cords of the above support units are non-shielded (1.8m).
2. Item A acted as communication partner to transfer data.

| ID | Cable Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks                          |
|----|--------------------|------|------------|--------------------|--------------|----------------------------------|
| 1. | LAN Cable          | 1    | 10         | N                  | 0            | RJ45, Cat5e                      |
| 2. | LAN Cable          | 1    | 1.5        | N                  | 0            | RJ45, Cat5e, Provided by client. |
| 3. | GND Cable          | 1    | 1          | N                  | 0            | Provided by client.              |

#### 3.3.1 Configuration of System under Test



### 3.4 General Description of Applied Standards and References

The EUT is a RF Product. According to the specifications of the manufacturer, it must comply with the requirements of the following standards and references:

#### Test Standard:

#### FCC Part 15, Subpart E (15.407)

ANSI C63.10-2013

All test items have been performed and recorded as per the above standards.

#### References Test Guidance:

#### KDB 789033 D02 General UNII Test Procedures New Rules v02r01

#### KDB 662911 D01 Multiple Transmitter Output v02r01

All test items have been performed as a reference to the above KDB test guidance.

## 4 Test Types and Results

### 4.1 Radiated Emission and Bandedge Measurement

#### 4.1.1 Limits of Radiated Emission and Bandedge Measurement

Radiated emissions which fall in the restricted bands must comply with the radiated emission limits specified as below table.

| Frequencies (MHz) | Field Strength (microvolts/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                             |

**Note:**

1. The lower limit shall apply at the transition frequencies.
2. Emission level (dBuV/m) = 20 log Emission level (uV/m).
3. For frequencies above 1000 MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20 dB under any condition of modulation.

# Limits f Unwanted Emission Out of the Restricted Bands

| Applicable To                                               |                                                     | Limit                                                                                                                               |                                                                                                                                           |
|-------------------------------------------------------------|-----------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------|
| 789033 D02 General UNII Test Procedures<br>New Rules v02r01 |                                                     | Field Strength at 3 m                                                                                                               |                                                                                                                                           |
|                                                             |                                                     | PK: 74 (dBμV/m)                                                                                                                     | AV: 54 (dBμV/m)                                                                                                                           |
| Frequency Band                                              | Applicable To                                       | EIRP Limit                                                                                                                          | Equivalent Field Strength at 3 m                                                                                                          |
| 5150~5250 MHz                                               | 15.407(b)(1)                                        | PK: -27 (dBm/MHz)                                                                                                                   | PK: 68.2 (dBμV/m)                                                                                                                         |
| 5250~5350 MHz                                               | 15.407(b)(2)                                        |                                                                                                                                     |                                                                                                                                           |
| 5470~5725 MHz                                               | 15.407(b)(3)                                        |                                                                                                                                     |                                                                                                                                           |
| 5725~5850 MHz                                               | <input checked="" type="checkbox"/> 15.407(b)(4)(i) | PK:-27 (dBm/MHz) <sup>*1</sup><br>PK:10 (dBm/MHz) <sup>*2</sup><br>PK:15.6 (dBm/MHz) <sup>*3</sup><br>PK:27 (dBm/MHz) <sup>*4</sup> | PK: 68.2 (dBμV/m) <sup>*1</sup><br>PK:105.2 (dBμV/m) <sup>*2</sup><br>PK: 110.8 (dBμV/m) <sup>*3</sup><br>PK:122.2 (dBμV/m) <sup>*4</sup> |
|                                                             | <input type="checkbox"/> 15.407(b)(4)(ii)           | Emission limits in section 15.247(d)                                                                                                |                                                                                                                                           |

<sup>\*1</sup> beyond 75 MHz or more above of the band edge.

<sup>\*2</sup> below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

<sup>\*3</sup> below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

<sup>\*4</sup> from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

## Note:

The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

$$E = \frac{1000000\sqrt{30P}}{3} \mu\text{V/m, where P is the eirp (Watts).}$$

#### 4.1.2 Test Instruments

| Description & Manufacturer               | Model No.                              | Serial No.                                          | Date of Calibration | Due Date of Calibration |
|------------------------------------------|----------------------------------------|-----------------------------------------------------|---------------------|-------------------------|
| Test Receiver<br>KEYSIGHT                | N9038A                                 | MY55420137                                          | Apr. 16, 2020       | Apr. 15, 2021           |
| Spectrum Analyzer<br>ROHDE & SCHWARZ     | FSP40                                  | 100039                                              | Jun. 12, 2019       | Jun. 11, 2020           |
| BILOG Antenna<br>SCHWARZBECK             | VULB9168                               | 9168-160                                            | Nov. 07, 2019       | Nov. 06, 2020           |
| HORN Antenna<br>SCHWARZBECK              | BBHA 9120 D                            | 9120D-1169                                          | Nov. 24, 2019       | Nov. 23, 2020           |
| HORN Antenna<br>SCHWARZBECK              | BBHA 9170                              | BBHA9170241                                         | Nov. 24, 2019       | Nov. 23, 2020           |
| Preamplifier<br>Agilent<br>(Below 1GHz)  | 8447D                                  | 2944A10638                                          | Jul. 11, 2019       | Jul. 10, 2020           |
| Preamplifier<br>Agilent<br>(Above 1GHz)  | 8449B                                  | 3008A02367                                          | Feb. 18, 2020       | Feb. 17, 2021           |
| RF signal cable<br>HUBER+SUHNER&EMCI     | SUCOFLEX 104 &<br>EMC104-SM-<br>SM8000 | CABLE-CH9-02<br>(248780+171006)                     | Jan. 18, 2020       | Jan. 17, 2021           |
| RF signal cable<br>HUBER+SUHNER          | SUCOFLEX 104                           | CABLE-CH9-<br>(250795/4)                            | Jul. 11, 2019       | Jul. 10, 2020           |
| RF signal cable<br>Woken                 | 8D-FB                                  | Cable-CH9-01                                        | Jul. 30, 2019       | Jul. 29, 2020           |
| Software<br>BV ADT                       | ADT_Radiated_<br>V7.6.15.9.5           | NA                                                  | NA                  | NA                      |
| Antenna Tower<br>EMCO                    | 2070/2080                              | 512.835.4684                                        | NA                  | NA                      |
| Turn Table<br>EMCO                       | 2087-2.03                              | NA                                                  | NA                  | NA                      |
| Antenna Tower & Turn<br>BV ADT           | AT100                                  | AT93021705                                          | NA                  | NA                      |
| Turn Table<br>BV ADT                     | TT100                                  | TT93021705                                          | NA                  | NA                      |
| Turn Table Controller<br>BV ADT          | SC100                                  | SC93021705                                          | NA                  | NA                      |
| Boresight Antenna Fixture                | FBA-01                                 | FBA-SIP01                                           | NA                  | NA                      |
| USB Wideband Power<br>Sensor<br>KEYSIGHT | U2021XA                                | MY55050005/MY55<br>190004/MY551900<br>07/MY55210005 | Jul. 15, 2019       | Jul. 14, 2020           |

Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The test was performed in HwaYa Chamber 9.

#### 4.1.3 Test Procedures

##### **For Radiated Emission below 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. Parallel, perpendicular, and ground-parallel orientations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

##### **Note:**

1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9 kHz at frequency below 30 MHz.

##### **For Radiated Emission above 30 MHz**

- a. The EUT was placed on the top of a rotating table 0.8 meters (for 30 MHz ~ 1 GHz) / 1.5 meters (for above 1 GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f. The test-receiver system was set to peak and average detected function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

##### **Note:**

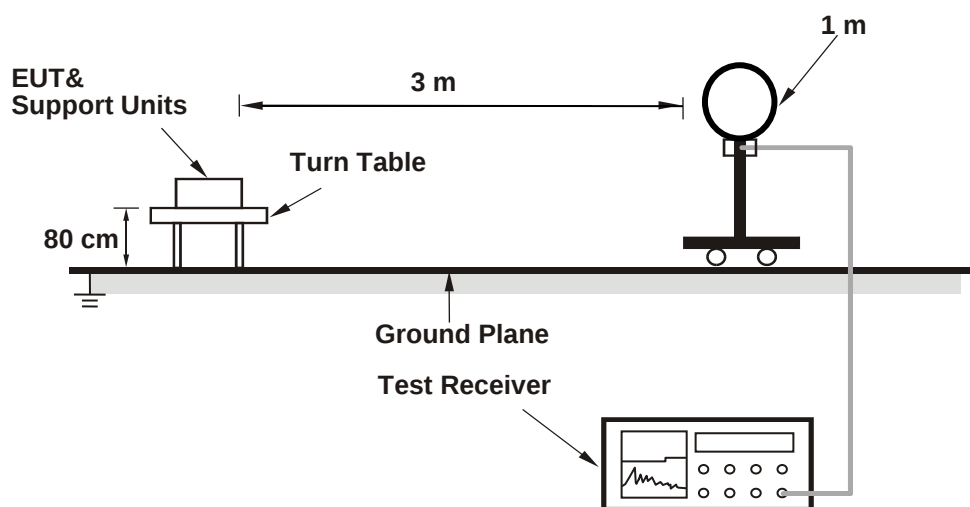
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz for Quasi-peak detection (QP) or Peak detection (PK) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle  $< 98\%$ ) or 10 Hz (Duty cycle  $\geq 98\%$ ) for Average detection (AV) at frequency above 1 GHz.  
(11a: RBW = 1 MHz, VBW = 1 kHz ; 11n (HT20): RBW = 1 MHz, VBW = 1 kHz ;  
11n (HT40): RBW = 1 MHz, VBW = 1 kHz ; 11ac (VHT80): RBW = 1 MHz, VBW = 1 kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

#### 4.1.4 Deviation from Test Standard

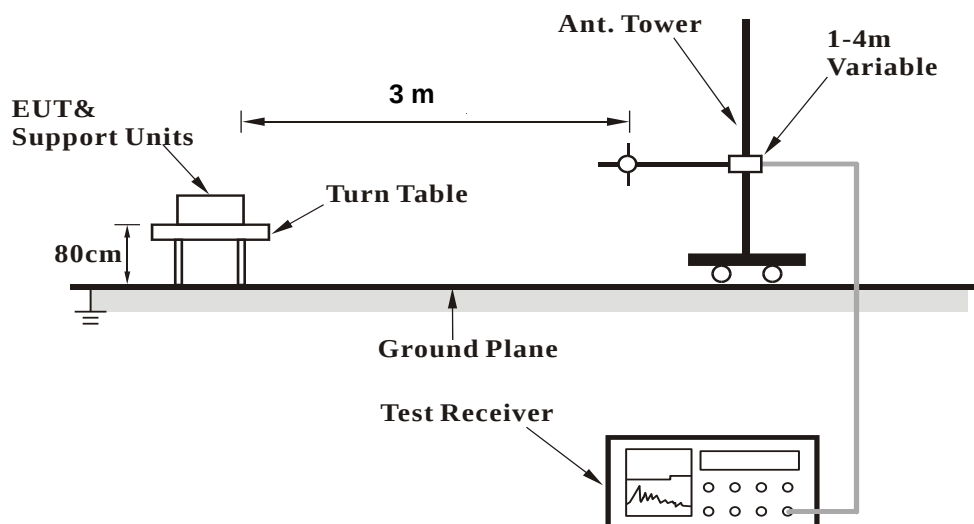
No deviation.

#### 4.1.5 Test Setup

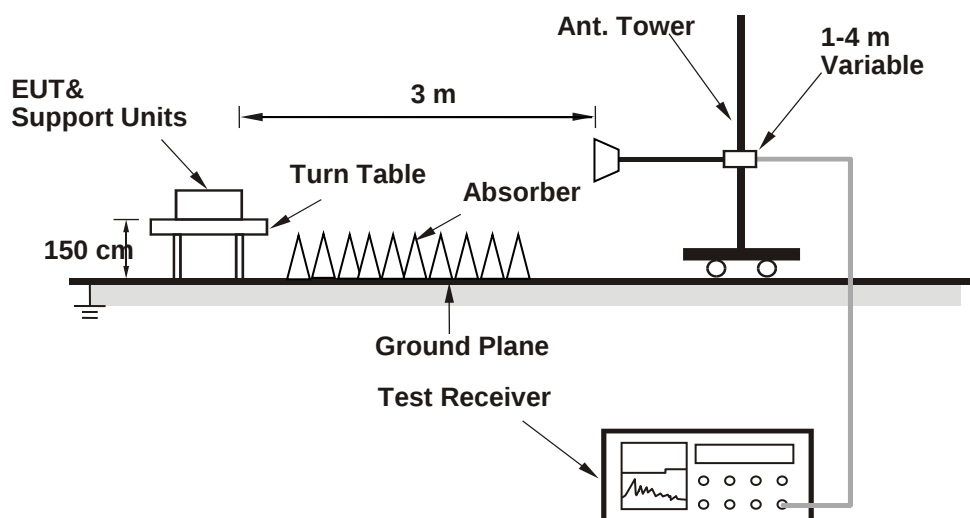
##### <Radiated Emission below 30 MHz>



##### <Radiated Emission 30 MHz to 1 GHz>



### <Radiated Emission above 1 GHz>



For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.1.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

#### 4.1.7 Test Results

##### Above 1 GHz Data :

##### 802.11n (HT40)

|                        |               |                              |              |
|------------------------|---------------|------------------------------|--------------|
| <b>CHANNEL</b>         | TX Channel 38 | <b>DETECTOR<br/>FUNCTION</b> | Peak (PK)    |
| <b>FREQUENCY RANGE</b> | 1GHz ~ 40GHz  |                              | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 5150.00        | 60.4 PK                       | 74.0              | -13.6          | 1.70 H                   | 5                          | 56.3                   | 4.1                            |
| 2                                                   | 5150.00        | 45.6 AV                       | 54.0              | -8.4           | 1.70 H                   | 5                          | 41.5                   | 4.1                            |
| 3                                                   | *5190.00       | 100.9 PK                      |                   |                | 1.70 H                   | 5                          | 61.6                   | 39.3                           |
| 4                                                   | *5190.00       | 91.6 AV                       |                   |                | 1.70 H                   | 5                          | 52.3                   | 39.3                           |
| 5                                                   | #10380.00      | 55.0 PK                       | 68.2              | -13.2          | 1.90 H                   | 141                        | 37.6                   | 17.4                           |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M   |                |                               |                   |                |                          |                            |                        |                                |
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 5150.00        | 67.0 PK                       | 74.0              | -7.0           | 2.23 V                   | 54                         | 62.9                   | 4.1                            |
| 2                                                   | 5150.00        | 50.7 AV                       | 54.0              | -3.3           | 2.23 V                   | 54                         | 46.6                   | 4.1                            |
| 3                                                   | *5190.00       | 111.5 PK                      |                   |                | 2.23 V                   | 54                         | 72.2                   | 39.3                           |
| 4                                                   | *5190.00       | 102.0 AV                      |                   |                | 2.23 V                   | 54                         | 62.7                   | 39.3                           |
| 5                                                   | #10380.00      | 54.0 PK                       | 68.2              | -14.2          | 1.79 V                   | 15                         | 36.6                   | 17.4                           |

#### REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* " : Fundamental frequency.
6. " # " : The radiated frequency is out of the restricted band.

# 802.11ac (VHT80)

|                 |                |                      |              |
|-----------------|----------------|----------------------|--------------|
| CHANNEL         | TX Channel 155 | DETECTOR<br>FUNCTION | Peak (PK)    |
| FREQUENCY RANGE | 1GHz ~ 40GHz   |                      | Average (AV) |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | *5775.00       | 99.1 PK                       |                   |                | 1.62 H                   | 332                        | 59.0                   | 40.1                           |
| 2                                                   | *5775.00       | 89.0 AV                       |                   |                | 1.62 H                   | 332                        | 48.9                   | 40.1                           |
| 3                                                   | #5937.18       | 57.2 PK                       | 68.2              | -11.0          | 1.62 H                   | 332                        | 51.9                   | 5.3                            |
| 4                                                   | 11550.00       | 55.0 PK                       | 74.0              | -19.0          | 1.82 H                   | 143                        | 36.3                   | 18.7                           |
| 5                                                   | 11550.00       | 42.8 AV                       | 54.0              | -11.2          | 1.82 H                   | 143                        | 24.1                   | 18.7                           |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|---------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                               | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                 | #5641.03       | 65.2 PK                       | 68.2              | -3.0           | 2.27 V                   | 73                         | 60.7                   | 4.5                            |
| 2                                                 | *5775.00       | 109.3 PK                      |                   |                | 2.27 V                   | 73                         | 69.2                   | 40.1                           |
| 3                                                 | *5775.00       | 99.5 AV                       |                   |                | 2.27 V                   | 73                         | 59.4                   | 40.1                           |
| 4                                                 | 11550.00       | 55.0 PK                       | 74.0              | -19.0          | 1.82 V                   | 6                          | 36.3                   | 18.7                           |
| 5                                                 | 11550.00       | 42.8 AV                       | 54.0              | -11.2          | 1.82 V                   | 6                          | 24.1                   | 18.7                           |

## REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit.
5. " \* ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

### 9 kHz ~ 30 MHz Data:

The amplitude of spurious emissions attenuated more than 20 dB below the permissible value is not required to be report.

### 30 MHz ~ 1 GHz Worst-Case Data:

802.11ac (VHT80)

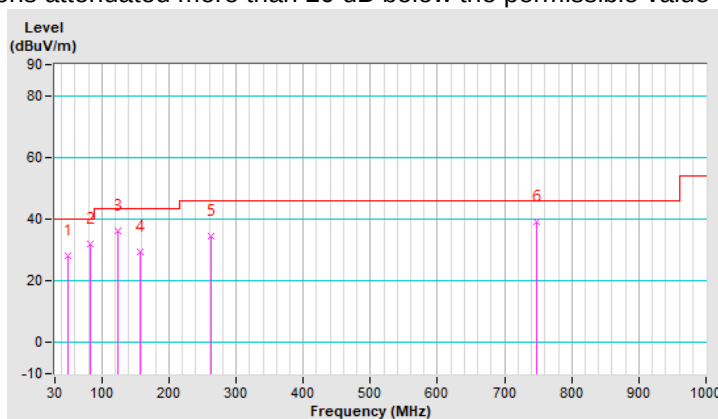
### Mode A

|                 |                |                      |                 |
|-----------------|----------------|----------------------|-----------------|
| CHANNEL         | TX Channel 155 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz   |                      |                 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 49.68          | 28.2 QP                       | 40.0              | -11.8          | 1.50 H                   | 109                        | 37.0                   | -8.8                           |
| 2                                                   | 82.01          | 31.9 QP                       | 40.0              | -8.1           | 1.50 H                   | 183                        | 45.5                   | -13.6                          |
| 3                                                   | 124.19         | 36.1 QP                       | 43.5              | -7.4           | 1.50 H                   | 250                        | 46.7                   | -10.6                          |
| 4                                                   | 157.93         | 29.3 QP                       | 43.5              | -14.2          | 1.50 H                   | 183                        | 37.8                   | -8.5                           |
| 5                                                   | 261.96         | 34.3 QP                       | 46.0              | -11.7          | 1.01 H                   | 15                         | 43.3                   | -9.0                           |
| 6                                                   | 746.96         | 39.2 QP                       | 46.0              | -6.8           | 1.50 H                   | 208                        | 36.4                   | 2.8                            |

### REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

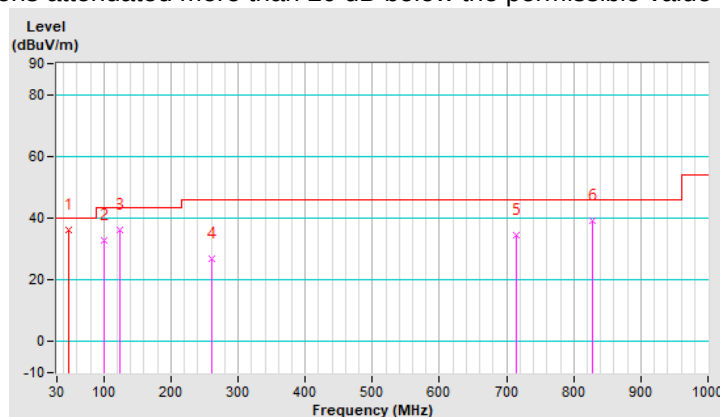


|                 |                |                      |                 |
|-----------------|----------------|----------------------|-----------------|
| CHANNEL         | TX Channel 155 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz   |                      |                 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|---------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                               | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                 | 47.83          | 36.3 QP                       | 40.0              | -3.7           | 1.50 V                   | 63                         | 45.0                   | -8.7                           |
| 2                                                 | 100.29         | 32.6 QP                       | 43.5              | -10.9          | 1.50 V                   | 116                        | 45.7                   | -13.1                          |
| 3                                                 | 124.19         | 36.0 QP                       | 43.5              | -7.5           | 1.00 V                   | 46                         | 46.6                   | -10.6                          |
| 4                                                 | 260.55         | 26.8 QP                       | 46.0              | -19.2          | 1.50 V                   | 269                        | 35.9                   | -9.1                           |
| 5                                                 | 714.62         | 34.6 QP                       | 46.0              | -11.4          | 1.00 V                   | 10                         | 32.4                   | 2.2                            |
| 6                                                 | 828.49         | 39.0 QP                       | 46.0              | -7.0           | 1.50 V                   | 10                         | 35.6                   | 3.4                            |

#### REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



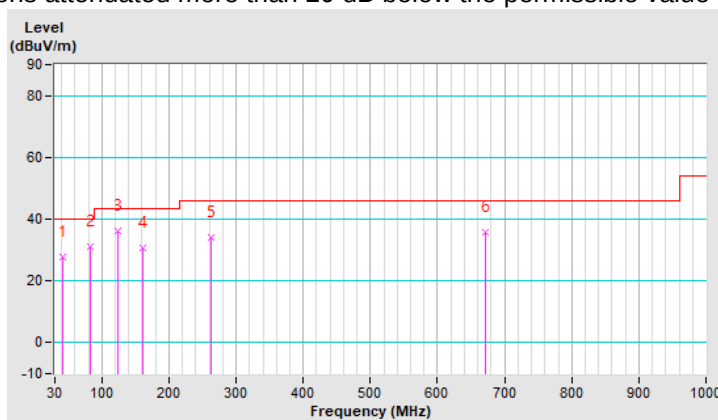
## Mode B

|                 |                |                      |                 |
|-----------------|----------------|----------------------|-----------------|
| CHANNEL         | TX Channel 155 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz   |                      |                 |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|-----------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                                 | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                   | 41.25          | 27.6 QP                       | 40.0              | -12.4          | 1.49 H                   | 130                        | 36.8                   | -9.2                           |
| 2                                                   | 82.01          | 31.1 QP                       | 40.0              | -8.9           | 1.00 H                   | 187                        | 44.7                   | -13.6                          |
| 3                                                   | 124.19         | 36.1 QP                       | 43.5              | -7.4           | 1.49 H                   | 256                        | 46.7                   | -10.6                          |
| 4                                                   | 160.74         | 30.7 QP                       | 43.5              | -12.8          | 1.49 H                   | 157                        | 39.3                   | -8.6                           |
| 5                                                   | 263.36         | 34.2 QP                       | 46.0              | -11.8          | 1.00 H                   | 46                         | 43.1                   | -8.9                           |
| 6                                                   | 671.04         | 35.6 QP                       | 46.0              | -10.4          | 1.00 H                   | 212                        | 33.9                   | 1.7                            |

## REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.

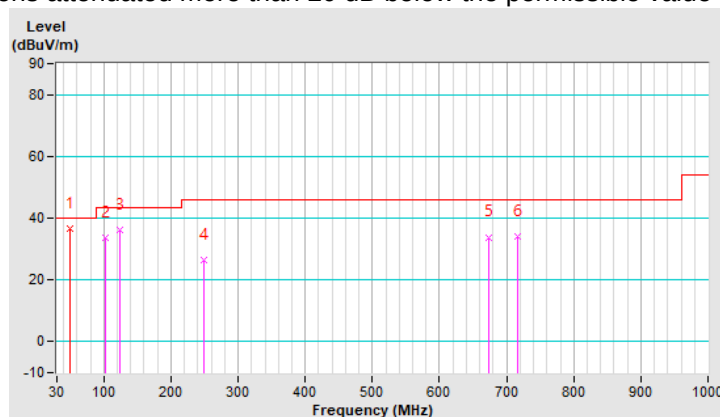


|                 |                |                      |                 |
|-----------------|----------------|----------------------|-----------------|
| CHANNEL         | TX Channel 155 | DETECTOR<br>FUNCTION | Quasi-Peak (QP) |
| FREQUENCY RANGE | 30MHz ~ 1GHz   |                      |                 |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M |                |                               |                   |                |                          |                            |                        |                                |
|---------------------------------------------------|----------------|-------------------------------|-------------------|----------------|--------------------------|----------------------------|------------------------|--------------------------------|
| NO.                                               | FREQ.<br>(MHz) | EMISSION<br>LEVEL<br>(dBuV/m) | LIMIT<br>(dBuV/m) | MARGIN<br>(dB) | ANTENNA<br>HEIGHT<br>(m) | TABLE<br>ANGLE<br>(Degree) | RAW<br>VALUE<br>(dBuV) | CORRECTION<br>FACTOR<br>(dB/m) |
| 1                                                 | 49.45          | 36.5 QP                       | 40.0              | -3.5           | 1.50 V                   | 352                        | 45.3                   | -8.8                           |
| 2                                                 | 101.70         | 33.8 QP                       | 43.5              | -9.7           | 1.01 V                   | 209                        | 46.7                   | -12.9                          |
| 3                                                 | 124.19         | 36.3 QP                       | 43.5              | -7.2           | 1.01 V                   | 15                         | 46.9                   | -10.6                          |
| 4                                                 | 249.30         | 26.6 QP                       | 46.0              | -19.4          | 1.01 V                   | 15                         | 36.1                   | -9.5                           |
| 5                                                 | 672.45         | 33.9 QP                       | 46.0              | -12.1          | 1.01 V                   | 207                        | 32.2                   | 1.7                            |
| 6                                                 | 716.03         | 34.0 QP                       | 46.0              | -12.0          | 1.50 V                   | 73                         | 31.8                   | 2.2                            |

#### REMARKS:

1. Emission Level(dBuV/m) = Raw Value(dBuV) + Correction Factor(dB/m)
2. Correction Factor(dB/m) = Antenna Factor(dB/m) + Cable Factor(dB) – Pre-Amplifier Factor(dB)
3. Margin value = Emission Level – Limit value
4. The other emission levels were very low against the limit of frequency range 30MHz~1000MHz.
5. The emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20 dB below the permissible value to be report.



## 4.2 Conducted Emission Measurement

### 4.2.1 Limits of Conducted Emission Measurement

| Frequency (MHz) | Conducted Limit (dBuV) |         |
|-----------------|------------------------|---------|
|                 | Quasi-Peak             | Average |
| 0.15 - 0.5      | 66 - 56                | 56 - 46 |
| 0.50 - 5.0      | 56                     | 46      |
| 5.0 - 30.0      | 60                     | 50      |

- Note: 1. The lower limit shall apply at the transition frequencies.  
 2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

### 4.2.2 Test Instruments

| Description & Manufacturer                  | Model No.                | Serial No.     | Date of Calibration | Due Date of Calibration |
|---------------------------------------------|--------------------------|----------------|---------------------|-------------------------|
| Test Receiver<br>ROHDE & SCHWARZ            | ESCI                     | 100613         | Dec. 11, 2019       | Dec. 10, 2020           |
| RF signal cable (with<br>10dB PAD)<br>Woken | 5D-FB                    | Cable-cond1-01 | Sep. 05, 2019       | Sep. 04, 2020           |
| LISN<br>ROHDE & SCHWARZ<br>(EUT)            | ENV216                   | 101826         | Feb. 20, 2020       | Feb. 19, 2021           |
| LISN<br>ROHDE & SCHWARZ<br>(Peripheral)     | ESH3-Z5                  | 100311         | Aug. 22, 2019       | Aug. 21, 2020           |
| Software<br>ADT                             | BV ADT_Cond_<br>V7.3.7.4 | NA             | NA                  | NA                      |

- Note: 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
 2. The test was performed in HwaYa Shielded Room 1 (Conduction 1).  
 3. The VCCI Site Registration No. is C-12040.

#### 4.2.3 Test Procedures

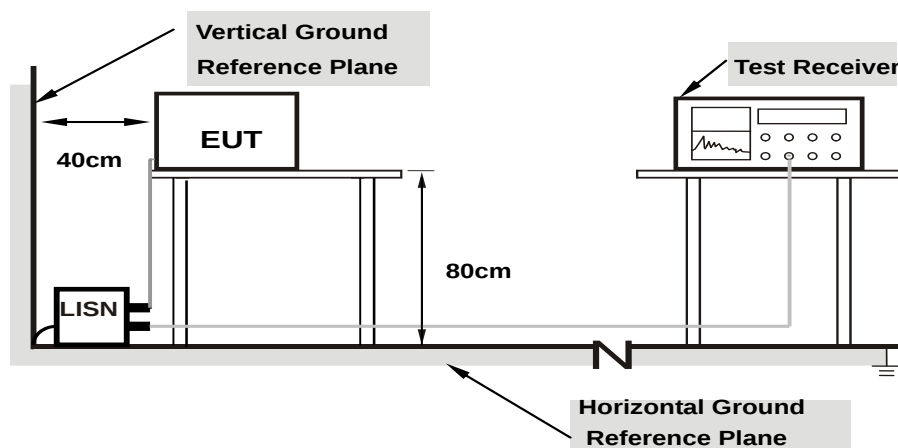
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance for the measuring instrument.
- Both lines of the power mains connected to the EUT were checked for maximum conducted interference.
- The frequency range from 150 kHz to 30 MHz was searched. Emission levels under (Limit -20 dB) was not recorded.

**Note:** All modes of operation were investigated and the worst-case emissions are reported.

#### 4.2.4 Deviation from Test Standard

No deviation.

#### 4.2.5 Test Setup



- Note:**
- Support units were connected to second LISN.
  - Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

For the actual test configuration, please refer to the attached file (Test Setup Photo).

#### 4.2.6 EUT Operating Conditions

- Placed the EUT on a testing table.
- Use the software to control the EUT under transmission condition continuously at specific channel frequency.

#### 4.2.7 Test Results

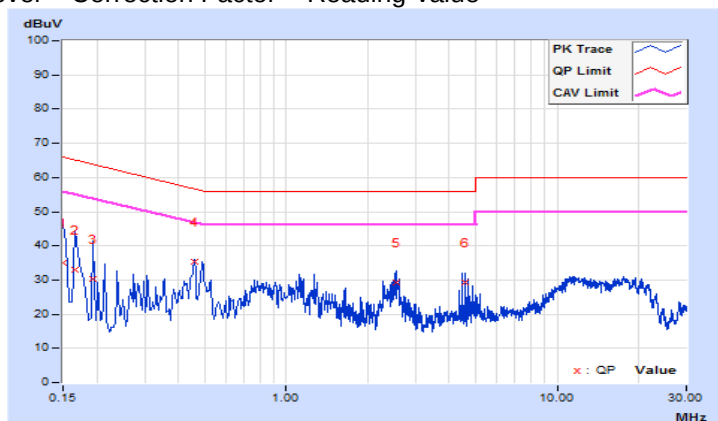
##### Mode A

|                 |                |                                          |                                      |
|-----------------|----------------|------------------------------------------|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 120Vac, 60Hz   | Environmental Conditions                 | 23°C, 66%RH                          |
| Tested by       | Titan Hsu      | Test Date                                | 2020/6/9                             |

| Phase Of Power : Line (L) |                 |                        |                      |       |                       |       |              |       |             |        |
|---------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                        | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                           |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                         | 0.15000         | 9.63                   | 25.53                | 8.22  | 35.16                 | 17.85 | 66.00        | 56.00 | -30.84      | -38.15 |
| 2                         | 0.16600         | 9.63                   | 23.20                | 3.20  | 32.83                 | 12.83 | 65.16        | 55.16 | -32.33      | -42.33 |
| 3                         | 0.19400         | 9.62                   | 20.68                | 5.33  | 30.30                 | 14.95 | 63.86        | 53.86 | -33.56      | -38.91 |
| 4                         | 0.45800         | 9.65                   | 25.69                | 16.84 | 35.34                 | 26.49 | 56.73        | 46.73 | -21.39      | -20.24 |
| 5                         | 2.53800         | 9.75                   | 19.54                | 5.26  | 29.29                 | 15.01 | 56.00        | 46.00 | -26.71      | -30.99 |
| 6                         | 4.57000         | 9.80                   | 19.48                | 4.51  | 29.28                 | 14.31 | 56.00        | 46.00 | -26.72      | -31.69 |

##### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

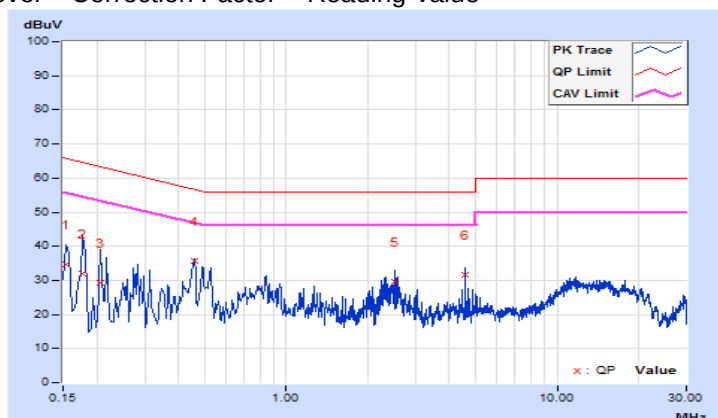


|                 |                |                                          |                                      |
|-----------------|----------------|------------------------------------------|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 120Vac, 60Hz   | Environmental Conditions                 | 23°C, 66%RH                          |
| Tested by       | Titan Hsu      | Test Date                                | 2020/6/9                             |

| Phase Of Power : Neutral (N) |                 |                        |                      |       |                       |       |              |       |             |        |
|------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                           | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                              |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                            | 0.15400         | 9.66                   | 24.91                | 3.85  | 34.57                 | 13.51 | 65.78        | 55.78 | -31.21      | -42.27 |
| 2                            | 0.17800         | 9.65                   | 22.19                | 11.14 | 31.84                 | 20.79 | 64.58        | 54.58 | -32.74      | -33.79 |
| 3                            | 0.20600         | 9.64                   | 19.65                | 2.97  | 29.29                 | 12.61 | 63.37        | 53.37 | -34.08      | -40.76 |
| 4                            | 0.45800         | 9.67                   | 26.05                | 16.96 | 35.72                 | 26.63 | 56.73        | 46.73 | -21.01      | -20.10 |
| 5                            | 2.53000         | 9.78                   | 19.71                | 5.29  | 29.49                 | 15.07 | 56.00        | 46.00 | -26.51      | -30.93 |
| 6                            | 4.56600         | 9.83                   | 21.71                | 6.20  | 31.54                 | 16.03 | 56.00        | 46.00 | -24.46      | -29.97 |

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



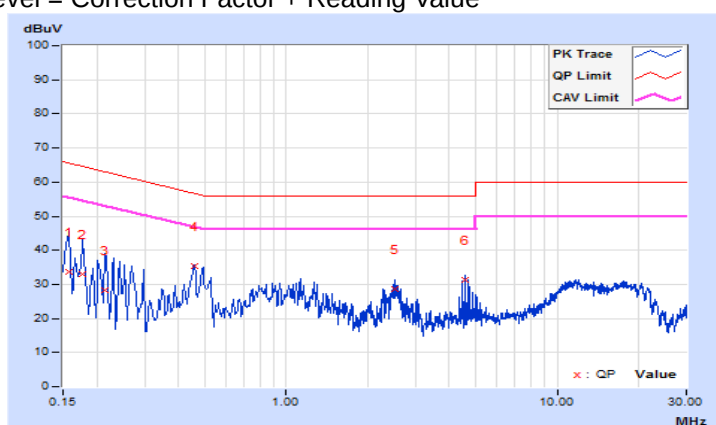
## Mode B

|                 |                |                                          |                                      |
|-----------------|----------------|------------------------------------------|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 120Vac, 60Hz   | Environmental Conditions                 | 23°C, 66%RH                          |
| Tested by       | Titan Hsu      | Test Date                                | 2020/6/9                             |

| Phase Of Power : Line (L) |                 |                        |                      |       |                       |       |              |       |             |        |
|---------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No                        | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |       | Emission Level (dBuV) |       | Limit (dBuV) |       | Margin (dB) |        |
|                           |                 |                        | Q.P.                 | AV.   | Q.P.                  | AV.   | Q.P.         | AV.   | Q.P.        | AV.    |
| 1                         | 0.15800         | 9.63                   | 24.18                | 2.91  | 33.81                 | 12.54 | 65.57        | 55.57 | -31.76      | -43.03 |
| 2                         | 0.17800         | 9.62                   | 23.40                | 13.89 | 33.02                 | 23.51 | 64.58        | 54.58 | -31.56      | -31.07 |
| 3                         | 0.21400         | 9.62                   | 18.65                | 2.28  | 28.27                 | 11.90 | 63.05        | 53.05 | -34.78      | -41.15 |
| 4                         | 0.45716         | 9.65                   | 25.65                | 16.94 | 35.30                 | 26.59 | 56.74        | 46.74 | -21.44      | -20.15 |
| 5                         | 2.53000         | 9.75                   | 18.91                | 5.32  | 28.66                 | 15.07 | 56.00        | 46.00 | -27.34      | -30.93 |
| 6                         | 4.56600         | 9.80                   | 21.41                | 5.74  | 31.21                 | 15.54 | 56.00        | 46.00 | -24.79      | -30.46 |

### Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value

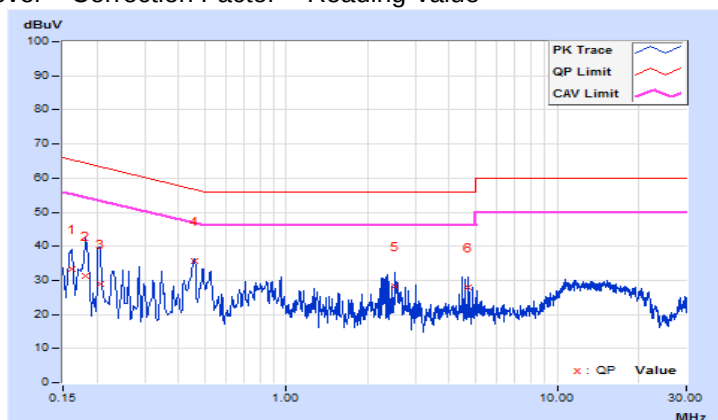


|                 |                |                                          |                                      |
|-----------------|----------------|------------------------------------------|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power     | 120Vac, 60Hz   | Environmental Conditions                 | 23°C, 66%RH                          |
| Tested by       | Titan Hsu      | Test Date                                | 2020/6/9                             |

| Phase Of Power : Neutral (N) |                 |                        |                      |              |                       |              |              |              |               |               |
|------------------------------|-----------------|------------------------|----------------------|--------------|-----------------------|--------------|--------------|--------------|---------------|---------------|
| No                           | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) |              | Emission Level (dBuV) |              | Limit (dBuV) |              | Margin (dB)   |               |
|                              |                 |                        | Q.P.                 | AV.          | Q.P.                  | AV.          | Q.P.         | AV.          | Q.P.          | AV.           |
| 1                            | 0.16190         | 9.66                   | 23.64                | 2.07         | 33.30                 | 11.73        | 65.37        | 55.37        | -32.07        | -43.64        |
| 2                            | 0.18180         | 9.65                   | 21.63                | 4.67         | 31.28                 | 14.32        | 64.40        | 54.40        | -33.12        | -40.08        |
| 3                            | 0.20523         | 9.64                   | 19.34                | 2.90         | 28.98                 | 12.54        | 63.40        | 53.40        | -34.42        | -40.86        |
| 4                            | <b>0.45716</b>  | <b>9.67</b>            | <b>26.01</b>         | <b>17.09</b> | <b>35.68</b>          | <b>26.76</b> | <b>56.74</b> | <b>46.74</b> | <b>-21.06</b> | <b>-19.98</b> |
| 5                            | 2.53400         | 9.78                   | 18.36                | 4.59         | 28.14                 | 14.37        | 56.00        | 46.00        | -27.86        | -31.63        |
| 6                            | 4.67400         | 9.83                   | 18.10                | 5.60         | 27.93                 | 15.43        | 56.00        | 46.00        | -28.07        | -30.57        |

Remarks:

1. Q.P. and AV. are abbreviations of quasi-peak and average individually.
2. The emission levels of other frequencies were very low against the limit.
3. Margin value = Emission level – Limit value
4. Correction factor = Insertion loss + Cable loss
5. Emission Level = Correction Factor + Reading Value



### 4.3 Transmit Power Measurement

#### 4.3.1 Limits of Transmit Power Measurement

| Operation Band | EUT Category |                                   | Limit                                                                                                                  |
|----------------|--------------|-----------------------------------|------------------------------------------------------------------------------------------------------------------------|
| U-NII-1        | √            | Outdoor Access Point              | 1 Watt (30 dBm)<br>(Max. e.i.r.p ≤ 125mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon) |
|                |              | Fixed point-to-point Access Point | 1 Watt (30 dBm)                                                                                                        |
|                | √            | Indoor Access Point               | 1 Watt (30 dBm)                                                                                                        |
|                |              | Mobile and Portable client device | 250mW (24 dBm)                                                                                                         |
| U-NII-2A       |              |                                   | 250mW (24 dBm) or 11 dBm+10 log B*                                                                                     |
| U-NII-2C       |              |                                   | 250mW (24 dBm) or 11 dBm+10 log B*                                                                                     |
| U-NII-3        |              | √                                 | 1 Watt (30 dBm)                                                                                                        |

\*B is the 26 dB emission bandwidth in megahertz

Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ;

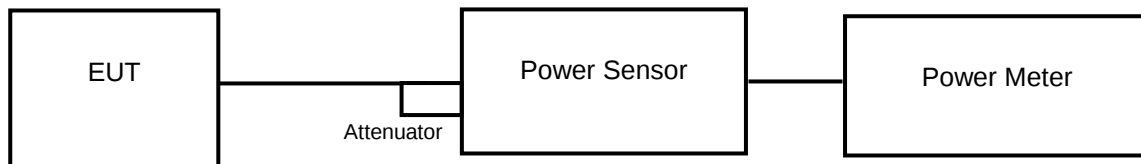
Array Gain = 0 dB (i.e., no array gain) for channel widths  $\geq 40$  MHz for any  $N_{ANT}$ ;

Array Gain =  $5 \log(N_{ANT}/N_{SS})$  dB or 3 dB, whichever is less for 20-MHz channel widths with  $N_{ANT} \geq 5$ .

For power measurements on all other devices: Array Gain =  $10 \log(N_{ANT}/N_{SS})$  dB.

#### 4.3.2 Test Setup

##### <Power Output Measurement>



#### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

#### 4.3.4 Test Procedure

Method PM is used to perform output power measurement, trigger and gating function of wide band power meter is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

#### 4.3.5 Deviation from Test Standard

No deviation.

#### 4.3.6 EUT Operating Conditions

The software provided by client to enable the EUT under transmission condition continuously at lowest, middle and highest channel frequencies individually.

#### 4.3.7 Test Result

For U-NII-1 band (Outdoor Access Point):

CCD Mode

802.11a

| Chan. | Freq.<br>(MHz) | Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Ant.<br>Gain<br>(dBi) | EIRP<br>(dBm) | EIRP<br>limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-----------------------|---------|------------------------|-------------------------|-------------------------|-----------------------|---------------|------------------------|----------------|
|       |                | Chain 0               | Chain 1 |                        |                         |                         |                       |               |                        |                |
| 36    | 5180           | 11.67                 | 11.87   | 30.071                 | 14.78                   | 30.00                   | 6                     | 20.78         | 21.00                  | Pass           |
| 40    | 5200           | 11.74                 | 11.92   | 30.488                 | 14.84                   | 30.00                   | 6                     | 20.84         | 21.00                  | Pass           |
| 48    | 5240           | 11.76                 | 11.94   | 30.628                 | 14.86                   | 30.00                   | 6                     | 20.86         | 21.00                  | Pass           |

Note:

1. Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.
2. EIRP = conducted power + (6dBi) + array gain = (0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ).

802.11n (HT20)

| Chan. | Freq.<br>(MHz) | Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Ant.<br>Gain<br>(dBi) | EIRP<br>(dBm) | EIRP<br>limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-----------------------|---------|------------------------|-------------------------|-------------------------|-----------------------|---------------|------------------------|----------------|
|       |                | Chain 0               | Chain 1 |                        |                         |                         |                       |               |                        |                |
| 36    | 5180           | 11.72                 | 11.93   | 30.455                 | 14.84                   | 30.00                   | 6                     | 20.84         | 21.00                  | Pass           |
| 40    | 5200           | 11.81                 | 11.94   | 30.802                 | 14.89                   | 30.00                   | 6                     | 20.89         | 21.00                  | Pass           |
| 48    | 5240           | 11.75                 | 11.83   | 30.203                 | 14.80                   | 30.00                   | 6                     | 20.80         | 21.00                  | Pass           |

Note:

1. Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.
2. EIRP = conducted power + (6dBi) + array gain = (0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ).

802.11n (HT40)

| Chan. | Freq.<br>(MHz) | Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Ant.<br>Gain<br>(dBi) | EIRP<br>(dBm) | EIRP<br>limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-----------------------|---------|------------------------|-------------------------|-------------------------|-----------------------|---------------|------------------------|----------------|
|       |                | Chain 0               | Chain 1 |                        |                         |                         |                       |               |                        |                |
| 38    | 5190           | 11.43                 | 11.51   | 28.057                 | 14.48                   | 30.00                   | 6                     | 20.48         | 21.00                  | Pass           |
| 46    | 5230           | 11.42                 | 11.54   | 28.124                 | 14.49                   | 30.00                   | 6                     | 20.49         | 21.00                  | Pass           |

Note:

1. Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.
2. EIRP = conducted power + (6dBi) + array gain = (0 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ).

### 802.11ac (VHT80)

| Chan. | Freq.<br>(MHz) | Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Ant.<br>Gain<br>(dBi) | EIRP<br>(dBm) | EIRP<br>limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-----------------------|---------|------------------------|-------------------------|-------------------------|-----------------------|---------------|------------------------|----------------|
|       |                | Chain 0               | Chain 1 |                        |                         |                         |                       |               |                        |                |
| 42    | 5210           | 11.50                 | 11.61   | 28.613                 | 14.57                   | 30.00                   | 6                     | 20.57         | 21.00                  | Pass           |

Note:

1. Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.
2. EIRP = conducted power + (6dBi) + array gain = (0dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ).

### Beamforming Mode

#### 802.11n (HT20)

| Chan. | Freq.<br>(MHz) | Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Ant.<br>Gain<br>(dBi) | EIRP<br>(dBm) | EIRP<br>limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-----------------------|---------|------------------------|-------------------------|-------------------------|-----------------------|---------------|------------------------|----------------|
|       |                | Chain 0               | Chain 1 |                        |                         |                         |                       |               |                        |                |
| 36    | 5180           | 8.71                  | 8.92    | 15.228                 | 11.83                   | 26.99                   | 9.01                  | 20.84         | 21.00                  | Pass           |
| 40    | 5200           | 8.80                  | 8.93    | 15.402                 | 11.88                   | 26.99                   | 9.01                  | 20.89         | 21.00                  | Pass           |
| 48    | 5240           | 8.74                  | 8.82    | 15.102                 | 11.79                   | 26.99                   | 9.01                  | 20.80         | 21.00                  | Pass           |

Note:

1. Antenna gain = 9.01dBi > 6dBi, so the power limit shall be reduced to  $30 - (9.01 - 6) = 26.99$  dBm.
2. EIRP = conducted power + (6dBi) + array gain = (3.01 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ).

#### 802.11n (HT40)

| Chan. | Freq.<br>(MHz) | Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Ant.<br>Gain<br>(dBi) | EIRP<br>(dBm) | EIRP<br>limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-----------------------|---------|------------------------|-------------------------|-------------------------|-----------------------|---------------|------------------------|----------------|
|       |                | Chain 0               | Chain 1 |                        |                         |                         |                       |               |                        |                |
| 38    | 5190           | 8.42                  | 8.50    | 14.03                  | 11.47                   | 26.99                   | 9.01                  | 20.48         | 21.00                  | Pass           |
| 46    | 5230           | 8.41                  | 8.53    | 14.063                 | 11.48                   | 26.99                   | 9.01                  | 20.49         | 21.00                  | Pass           |

Note:

1. Antenna gain = 9.01dBi > 6dBi, so the power limit shall be reduced to  $30 - (9.01 - 6) = 26.99$  dBm.
2. EIRP = conducted power + (6dBi) + array gain = (3.01 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ).

### 802.11ac (VHT80)

| Chan. | Freq.<br>(MHz) | Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Ant.<br>Gain<br>(dBi) | EIRP<br>(dBm) | EIRP<br>limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-----------------------|---------|------------------------|-------------------------|-------------------------|-----------------------|---------------|------------------------|----------------|
|       |                | Chain 0               | Chain 1 |                        |                         |                         |                       |               |                        |                |
| 42    | 5210           | 8.49                  | 8.60    | 8.49                   | 8.60                    | 11.56                   | 9.01                  | 20.57         | 21.00                  | Pass           |

Note:

1. Antenna gain = 9.01dBi > 6dBi, so the power limit shall be reduced to  $30 - (9.01 - 6) = 26.99$  dBm.
2. EIRP = conducted power + (6dBi) + array gain = (3.01 dB (i.e., no array gain) for  $N_{ANT} \leq 4$ ).

For U-NII-1 band (Indoor Access Point):

CCD Mode

802.11a

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 36    | 5180           | 19.95                         | 20.05   | 200.013                | 23.01                   | 30.00                   | Pass           |
| 40    | 5200           | 23.30                         | 23.39   | 432.069                | 26.36                   | 30.00                   | Pass           |
| 48    | 5240           | 23.27                         | 23.46   | 434.144                | 26.38                   | 30.00                   | Pass           |

Note: Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.

802.11n (HT20)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 36    | 5180           | 20.00                         | 20.07   | 201.625                | 23.05                   | 30.00                   | Pass           |
| 40    | 5200           | 23.33                         | 23.47   | 437.609                | 26.41                   | 30.00                   | Pass           |
| 48    | 5240           | 23.33                         | 23.49   | 438.635                | 26.42                   | 30.00                   | Pass           |

Note: Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.

802.11n (HT40)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 38    | 5190           | 18.25                         | 18.02   | 130.221                | 21.15                   | 30.00                   | Pass           |
| 46    | 5230           | 22.24                         | 22.07   | 328.559                | 25.17                   | 30.00                   | Pass           |

Note: Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.

802.11ac (VHT80)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 42    | 5210           | 16.17                         | 16.00   | 81.211                 | 19.10                   | 30.00                   | Pass           |

Note: Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.

## Beamforming Mode

### 802.11n (HT20)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 36    | 5180           | 16.99                         | 17.06   | 100.819                | 20.04                   | 26.99                   | Pass           |
| 40    | 5200           | 20.32                         | 20.46   | 218.82                 | 23.40                   | 26.99                   | Pass           |
| 48    | 5240           | 20.32                         | 20.48   | 219.333                | 23.41                   | 26.99                   | Pass           |

Note: Beamforming gain = 9.01dBi > 6dBi, so the power limit shall be reduced to  $30-(9.01-6) = 26.99\text{dBm}$ .

### 802.11n (HT40)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 38    | 5190           | 15.24                         | 15.01   | 65.115                 | 18.14                   | 26.99                   | Pass           |
| 46    | 5230           | 19.23                         | 19.06   | 164.291                | 22.16                   | 26.99                   | Pass           |

Note: Beamforming gain = 9.01dBi > 6dBi, so the power limit shall be reduced to  $30-(9.01-6) = 26.99\text{dBm}$ .

### 802.11ac (VHT80)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 42    | 5210           | 13.16                         | 12.99   | 40.608                 | 16.09                   | 26.99                   | Pass           |

Note: Beamforming gain = 9.01dBi > 6dBi, so the power limit shall be reduced to  $30-(9.01-6) = 26.99\text{dBm}$ .

For U-NII-3 band:

CCD Mode

802.11a

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 149   | 5745           | 22.34                         | 22.88   | 365.484                | 25.63                   | 30.00                   | Pass           |
| 157   | 5785           | 22.31                         | 22.82   | 361.641                | 25.58                   | 30.00                   | Pass           |
| 165   | 5825           | 22.30                         | 22.79   | 359.932                | 25.56                   | 30.00                   | Pass           |

Note: Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.

802.11n (HT20)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 149   | 5745           | 22.55                         | 23.04   | 381.26                 | 25.81                   | 30.00                   | Pass           |
| 157   | 5785           | 22.45                         | 23.08   | 379.028                | 25.79                   | 30.00                   | Pass           |
| 165   | 5825           | 22.46                         | 23.05   | 378.034                | 25.78                   | 30.00                   | Pass           |

Note: Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.

802.11n (HT40)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 151   | 5755           | 21.96                         | 22.59   | 338.588                | 25.30                   | 30.00                   | Pass           |
| 159   | 5795           | 22.45                         | 23.07   | 378.561                | 25.78                   | 30.00                   | Pass           |

Note: Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.

802.11ac (VHT80)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 155   | 5775           | 18.00                         | 18.56   | 134.875                | 21.30                   | 30.00                   | Pass           |

Note: Antenna gain = 6dBi = 6dBi, so the limit no need to be reduced.

## Beamforming Mode

### 802.11n (HT20)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 149   | 5745           | 19.54                         | 20.03   | 190.643                | 22.80                   | 26.99                   | Pass           |
| 157   | 5785           | 19.44                         | 20.07   | 189.527                | 22.78                   | 26.99                   | Pass           |
| 165   | 5825           | 19.45                         | 20.04   | 189.03                 | 22.77                   | 26.99                   | Pass           |

Note: Beamforming gain = 9.01 dBi > 6dBi, so the power limit shall be reduced to  $30-(9.01-6) = 26.99\text{dBm}$ .

### 802.11n (HT40)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 151   | 5755           | 18.95                         | 19.58   | 169.306                | 22.29                   | 26.99                   | Pass           |
| 159   | 5795           | 19.44                         | 20.06   | 189.293                | 22.77                   | 26.99                   | Pass           |

Note: Beamforming gain = 9.01 dBi > 6dBi, so the power limit shall be reduced to  $30-(9.01-6) = 26.99\text{dBm}$ .

### 802.11ac (VHT80)

| Chan. | Freq.<br>(MHz) | Maximum Conducted Power (dBm) |         | Total<br>Power<br>(mW) | Total<br>Power<br>(dBm) | Power<br>Limit<br>(dBm) | Pass /<br>Fail |
|-------|----------------|-------------------------------|---------|------------------------|-------------------------|-------------------------|----------------|
|       |                | Chain 0                       | Chain 1 |                        |                         |                         |                |
| 155   | 5775           | 14.99                         | 15.55   | 67.442                 | 18.29                   | 26.99                   | Pass           |

Note: Beamforming gain = 9.01 dBi > 6dBi, so the power limit shall be reduced to  $30-(9.01-6) = 26.99\text{dBm}$ .

## 5 Pictures of Test Arrangements

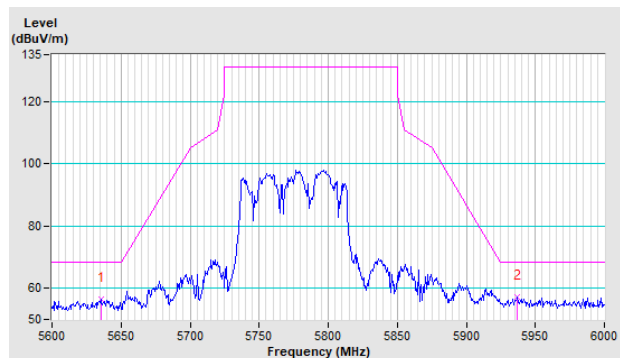
Please refer to the attached file (Test Setup Photo).

## Annex A- Radiated Out of Band Emission (OOBE) Measurement (For U-NII-3 band)

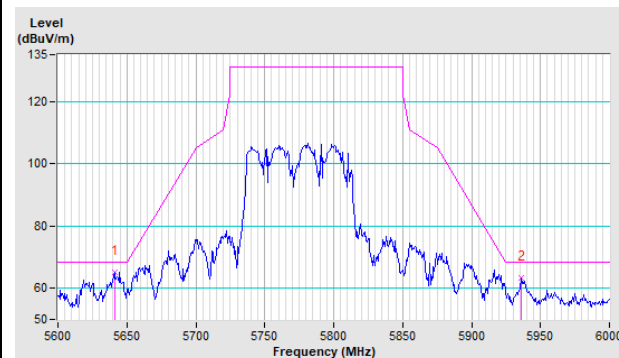
802.11ac (VHT80)

CH 155 5775 MHz

Horizontal



Vertical



## Appendix – Information of the Testing Laboratories

We, Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch, were founded in 1988 to provide our best service in EMC, Radio, Telecom and Safety consultation. Our laboratories are FCC recognized accredited test firms and accredited according to ISO/IEC 17025.

If you have any comments, please feel free to contact us at the following:

**Lin Kou EMC/RF Lab**

Tel: 886-2-26052180

Fax: 886-2-26051924

**Hsin Chu EMC/RF/Telecom Lab**

Tel: 886-3-6668565

Fax: 886-3-6668323

**Hwa Ya EMC/RF/Safety Lab**

Tel: 886-3-3183232

Fax: 886-3-3270892

**Email:** [service.adt@tw.bureauveritas.com](mailto:service.adt@tw.bureauveritas.com)

**Web Site:** [www.bureauveritas-adt.com](http://www.bureauveritas-adt.com)

The address and road map of all our labs can be found in our web site also.

--- END ---