

TEST REPORT

of

FCC PART 15 SUBPART E

New Application; Class I PC; Class II PC

Product : IgniteNet Gateway AC1200, Dualband Enterprise AP (802.11ac)
Brand: IgniteNet
Model: GW-AC1200
Model Difference: N/A
FCC ID: HED-KER25U
FCC Rule Part: §15.407, Cat:NII
Applicant: Accton Technology Corporation
Address: No.1, Creation RD III, Science-based Industrial Park, Hsinchu 30077, Taiwan, R.O.C.

Test Performed by:

International Standards Laboratory

<Lung-Tan LAB>

*Side Registration No.

BSMI: SL2-IN-E-0013; MRA TW1036; TAF: 0997; IC: IC4067B-3;

*Address:

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Report No.: **ISL-14LR267FENII-R3**

Issue Date : **2016/07/26**

Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein.

This report MUST not be used to claim product endorsement by TAF, NVLAP or any agency of the Government.

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VERIFICATION OF COMPLIANCE

Applicant: Accton Technology Corporation
Product Description: IgniteNet Gateway AC1200, Dualband Enterprise AP (802.11ac)
Brand Name: IgniteNet
Model No.: GW-AC1200
Model Difference: N/A
FCC ID: HED-KER25U
FCC Rule Part: §15.407, Cat: NII
Date of test: 2016/07/06 ~ 2016/07/24
Date of EUT Received: 2016/07/06

We hereby certify that:

All the tests in this report have been performed and recorded in accordance with the standards described above and performed by an independent electromagnetic compatibility consultant, International Standards Laboratory.

The test results contained in this report accurately represent the measurements of the characteristics and the energy generated by sample equipment under test at the time of the test. The sample equipment tested as described in this report is in compliance with the limits of above standards.

| | | | |
|---------------------|---|--------------|---------------------|
| Test By: |  _____ <i>Dion Chang / Engineer</i> | Date: | 2016/07/26 _____ |
| Prepared By: |  _____ <i>Eva Kao / Technical Supervisor</i> | Date: | 2016/07/26 _____ |
| Approved By: |  _____ <i>Vincent Su / Technical Manager</i> | Date: | 2016/07/26 _____ |

Version

| Version No. | Date | Description |
|-------------|------------|--|
| 00 | 2014/11/17 | Initial creation of document |
| 01 | 2016/07/26 | new type of Dipole antenna and new AC/DC power adaptor |
| | | |

Table of Contents

| | |
|--|-----------|
| 1. GENERAL INFORMATION | 6 |
| 1.1. Product Description | 6 |
| 1.2. Related Submittal(s) / Grant (s) | 8 |
| 1.3. Test Methodology | 8 |
| 1.4. Test Facility..... | 8 |
| 1.5. Special Accessories | 8 |
| 1.6. Equipment Modifications..... | 8 |
| 2. SYSTEM TEST CONFIGURATION | 9 |
| 2.1. EUT Configuration | 9 |
| 2.2. EUT Exercise | 9 |
| 2.3. Test Procedure..... | 9 |
| 2.4. Configuration of Tested System..... | 10 |
| 3. SUMMARY OF TEST RESULT | 11 |
| 4. DESCRIPTION OF TEST MODES | 12 |
| 5. AC POWER LINE CONDUCTED EMISSION TEST | 13 |
| 5.1 Standard Applicable | 13 |
| 5.2 Measurement Equipment Used: | 13 |
| 5.3 EUT Setup:..... | 14 |
| 5.4 Measurement Procedure: | 14 |
| 5.5 Measurement Result: | 14 |
| 6. AVERAGE OUTPUT POWER / SPECTRAL DENSITY MEASUREMENT..... | 17 |
| 6.1 Standard Applicable | 17 |
| 6.2 Measurement Procedure..... | 19 |
| 6.3 Measurement Equipment Used: | 20 |
| 5.1 Measurement Equipment Used: | 20 |
| 6.4 Measurement Result..... | 21 |
| 7. UNDESIRABLE EMISSION - RADICTED MEASUREMENT | 23 |
| 7.1 Standard Applicable | 23 |
| 7.2 EUT Setup..... | 25 |
| 7.3 Measurement Procedure..... | 26 |
| 7.4 Test SET-UP (Block Diagram of Configuration) | 27 |
| 7.5 Measurement Equipment Used: | 28 |
| 7.6 Field Strength Calculation | 29 |
| 7.7 Measurement Result..... | 29 |

| | |
|--|-----------|
| 8. ANTENNA REQUIREMENT | 40 |
| 8.1 Standard Applicable | 40 |
| 8.2 Antenna Connected Construction | 40 |

1. GENERAL INFORMATION

1.1. Product Description

General:

| | | |
|-----------------------|---|------------------------|
| Product Name: | IgniteNet Gateway AC1200, Dualband Enterprise AP (802.11ac) | |
| Brand: | IgniteNet | |
| Model: | GW-AC1200 | |
| Model different: | N/A | |
| Adhoc Mode | No | |
| DFS Mode | N/A | |
| TPC | No | |
| Operation Environment | Indoor used | |
| USB port | one provided for Data link | |
| WAN port | one provided | |
| Gigabit LAN | four provided | |
| Power Supply: | 12Vdc from AC/DC adapter | |
| | Adapter: | Model : NBS18C120150VA |
| Antenna Designation: | Detachable revised SMA type, Dipole Antenna P/N: AOA160-221040-000000 WiFi 2.4G Antenna : 3.5 dBi WiFi 5G Antenna : 4.5 dBi (Max) According to KDB662911 D01 SM-MIMO signals could be considered uncorrelated for purposes of directional gain computation. Directional gain = GANT | |

2.4GHz WLAN: 2TX/2RX / 5GHz WLAN: 2TX/2RX , SM-MIMO

| Wi-Fi | Frequency Range (MHz) | Channels | Peak / Average Rated Power | Modulation Technology |
|------------------|--------------------------|--|----------------------------|-----------------------|
| 802.11b | 2412 – 2462(DTS) | 11 | 22.14dBm (PK) | DSSS |
| 802.11g | 2412 – 2462(DTS) | 11 | 24.85dBm (PK) | OFDM |
| 802.11n (2.4G) | HT20 2412 – 2462(DTS) | 11 | 27.65dBm (PK) | |
| | HT40 2422 – 2452(DTS) | 7 | 27.29dBm (PK) | |
| 802.11a | 5180 – 5240(NII) | 4 | 19.83dBm (AV) | |
| | 5745 – 5825(NII) | 5 | 17.29dBm (AV) | |
| 802.11n (5G) | HT20 5180 – 5240(NII) | 4 | 20.25dBm (AV) | |
| | HT20 5745 – 5825(NII) | 5 | 19.83 dBm (AV) | |
| | HT40 5190 – 5230(NII) | 3 | 19.90dBm (AV) | |
| | HT40 5755 – 5815(NII) | 4 | 17.58dBm (AV) | |
| 802.11ac | HT80 5210(NII) | 1 | 19.86dBm (AV) | |
| | HT80 5775(NII) | 1 | 16.84dBm (AV) | |
| Modulation type: | | CCK, DQPSK, DBPSK for DSSS 256QAM.64QAM. 16QAM, QPSK, BPSK for OFDM | | |

The EUT is compliance with IEEE 802.11 a/b/g/n/ac Standard.

This is a Class II Permission Change project applies for new type of Dipole antenna and new AC/DC power adaptor

Remark: The above DUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.

1.2. Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for **FCC ID: HED-KER25U** filing to comply with Section 15.407 of the FCC Part 15, Subpart E Rules. The composite system (digital device) is compliance with Subpart B is authorized under a DoC procedure.

1.3. Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.10: 2013. Radiated testing was performed at an antenna to EUT distance 3 meters.

789033 D02 General UNII Test Procedures New Rules v01r02r02

KDB 644545 D03 GUIDANCE FOR IEEE Std 802.11ac New Rules v01

KDB 662911 D01 Multiple Transmitter Output v02r01

FCC 14-30 Revision UNII

594280 D02 U-NII Device Security v01r02

1.4. Test Facility

The measurement facilities used to collect the 3m Radiated Emission and AC power line conducted data are located on the address of International Standards Laboratory <Lung-Tan LAB> No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan which are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2014, ANSI C63.10: 2013. FCC Registration Number is: 872200; Designation Number is: TW1036, Canada Registration Number: 4067B-3.

1.5. Special Accessories

Not available for this EUT intended for grant.

1.6. Equipment Modifications

Not available for this EUT intended for grant.

2. SYSTEM TEST CONFIGURATION

2.1. EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

2.2. EUT Exercise

The EUT (Transmitter) was operated in the engineering mode to fix the Tx frequency that was for the purpose of the measurements.

2.3. Test Procedure

2.3.1 Conducted Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section Section 5 and 7 of ANSI C63.10: 2013. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30 MHz using CISPR Quasi-Peak and Average detector mode.

2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m /1.5m(Frequency above 1GHz) above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter (EUT) was rotated through three orthogonal axes and measurement procedures for electric field radiated emissions above 1 GHz the EUT measurement is to be made “while keeping the antenna in the ‘cone of radiation’ from that area and pointed at the area both in azimuth and elevation, with polarization oriented for maximum response.” Is still within the 3Db illumination BW of the measurement antenna. According to the requirements in Section 6 and 11 of ANSI C63.10: 2013.

2.4. Configuration of Tested System

Fig. 2-1 Configuration of Tested System

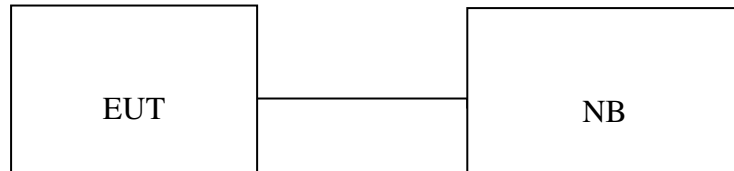


Table 1-1 Equipment Used in Tested System

| Item | Equipment | Mfr/Brand | Model/ Type No. | Series No. | Data Cable | Power Cord |
|-------------|------------------|------------------|----------------------------|-------------------|-------------------|-------------------|
| 1 | NB | HP | 440 | N/A | N/A | No- Shielding |

3. SUMMARY OF TEST RESULT

| FCC Rules | Description Of Test | Result |
|------------------|--|---------------|
| §15.207(a) | AC Power Line Conducted Emission | Compliant |
| §15.407(a)(2) | Average Output Power/ Spectral Density Measurement | Compliant |
| §15.407(a) | 26dB/99% Emission Bandwidth | N/A |
| §15.407(b) | Undesirable Emission – Radiated Measurement | Compliant |
| §15.407(c) | Transmission in case of Absence of Information | N/A |
| §15.407(g) | Frequency Stability | N/A |
| §15.407(a) | Antenna Requirement | Compliant |
| §15.407(h) | TPC and DFS Measurement | N/A |
| §15.407(i) | Device Security | N/A |

4. DESCRIPTION OF TEST MODES

The EUT has been tested under operating condition.

Test program used to control the EUT for staying in continuous transmitting mode is programmed.

5150MHz-5250MHz:

a mode: Channel lowest (5180MHz) 、Mid (5200MHz) and Highest (5240MHz) with lowest data rate is chosen for Average output power/Spectral Density, Radiated Undesirable Emission, band edge testing.

n HT 20 mode: Channel lowest (5180MHz) 、Mid (5200MHz) and Highest (5240MHz) with lowest data rate is chosen for Average output power/Spectral Density, Radiated Undesirable Emission, band edge testing.

n HT 40 mode: Channel lowest (5190MHz) 、Mid (5210MHz) and Highest (5230MHz) with lowest data rate is chosen for Average output power/Spectral Density, Radiated Undesirable Emission, band edge testing.

802.11 AC HT80: Channel (5210MHz) with lowest data rate is chosen for Average output power/Spectral Density, Radiated Undesirable Emission, band edge testing.

The worst case 802.11 HT20 was reported for Radiated Emission.

5725MHz-5850MHz:

802.11a mode: Channel low (5745MHz) 、mid (5785MHz) and high (5825MHz) with lowest data rate is chosen for Average output power/Spectral Density, Radiated Undesirable Emission, band edge testing.

802.11 n HT20: Channel low (5745MHz) 、mid (5785MHz) and high (5825MHz) with lowest data rate is chosen for Average output power/Spectral Density, Radiated Undesirable Emission, band edge testing.

802.11 n HT40: Channel low (5755MHz) 、mid (5775MHz) and high (5815MHz) with lowest data rate is chosen for Average output power/Spectral Density, Radiated Undesirable Emission, band edge testing.

802.11 AC HT80: Channel (5755MHz) with lowest data rate is chosen for Average output power/Spectral Density, Radiated Undesirable Emission, band edge testing.

The worst case 802.11 HT20 was reported for Radiated Emission.

5. AC POWER LINE CONDUCTED EMISSION TEST

5.1 Standard Applicable

According to §15.207, frequency range within 150 KHz to 30 MHz shall not exceed the Limit table as below.

| Frequency range MHz | Limits dB(uV) | |
|------------------------|------------------|----------|
| | Quasi-peak | Average |
| 0.15 to 0.50 | 66 to 56 | 56 to 46 |
| 0.50 to 5 | 56 | 46 |
| 5 to 30 | 60 | 50 |

Note

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

5.2 Measurement Equipment Used:

| Conducted Emission Test Site | | | | | |
|------------------------------|--------------------|-----------------------|------------------|--------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Conduction 04-3 Cable | WOKEN | CFD 300-NL | Conduction 04 -3 | 07/28/2015 | 07/27/2016 |
| EMI Receiver 17 | Rohde & Schwarz | ESCI 7 | 100887 | 09/08/2015 | 09/07/2016 |
| LISN 18 | ROHDE & SCHWARZ | ENV216 | 101424 | 02/11/2016 | 02/10/2017 |
| LISN 19 | ROHDE & SCHWARZ | ENV216 | 101425 | 03/12/2016 | 03/11/2017 |
| Test Software | Farad | EZEMC Ver:ISL-03A2 | N/A | N/A | N/A |

5.3 EUT Setup:

1. The conducted emission tests were performed in the test site, using the setup in accordance with the ANSI C63.4-2009.
2. The AC/DC Power adaptor of EUT was plug-in LISN. The EUT was placed flushed with the rear of the table.
3. The LISN was connected with 120Vac/60Hz power source.

5.4 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

5.5 Measurement Result:

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Note: Refer to next page for measurement data and plots.

AC POWER LINE CONDUCTED EMISSION TEST DATA

| | | | |
|-----------------|----------------|------------|------------|
| Operation Mode: | Operation Mode | Test Date: | 2016/07/14 |
| Test By: | Dino | | |

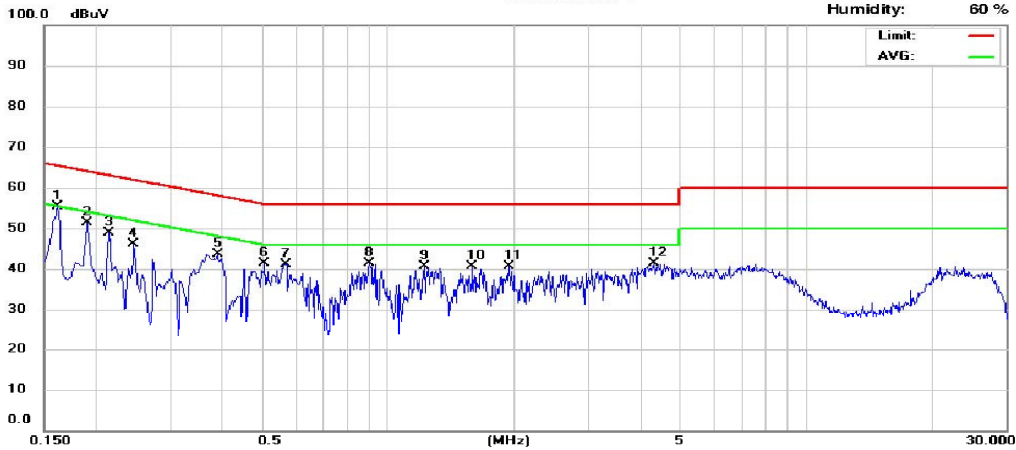


Address: No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel: 03-4071718

Conducted Emission Measurement

operator: Jiin Lee
Temperature: 26 °C
Humidity: 60 %

Date: 2016/7/14



Site: Conduction 03

Phase: L1

Limit: CISPR22 Class B Conduction

| No. | Frequency (MHz) | QP_R (dBuV) | AVG_R (dBuV) | Correct Factor (dB) | QP Emission (dBuV) | QP Limit (dBuV) | QP Margin (dB) | AVG Emission (dBuV) | AVG Limit (dBuV) | AVG Margin (dB) |
|-----|-----------------|-------------|--------------|---------------------|--------------------|-----------------|----------------|---------------------|------------------|-----------------|
| 1 | 0.162 | 40.70 | 25.29 | 9.69 | 50.39 | 65.36 | -14.97 | 34.98 | 55.36 | -20.38 |
| 2 | 0.190 | 38.01 | 21.68 | 9.69 | 47.70 | 64.04 | -16.34 | 31.37 | 54.04 | -22.67 |
| 3 | 0.214 | 34.61 | 21.31 | 9.70 | 44.31 | 63.05 | -18.74 | 31.01 | 53.05 | -22.04 |
| 4 | 0.246 | 32.83 | 19.01 | 9.70 | 42.53 | 61.89 | -19.36 | 28.71 | 51.89 | -23.18 |
| 5 | 0.390 | 32.45 | 23.70 | 9.69 | 42.14 | 58.06 | -15.92 | 33.39 | 48.06 | -14.67 |
| 6 | 0.506 | 28.23 | 19.45 | 9.70 | 37.93 | 56.00 | -18.07 | 29.15 | 46.00 | -16.85 |
| 7 | 0.570 | 28.90 | 19.42 | 9.70 | 38.60 | 56.00 | -17.40 | 29.12 | 46.00 | -16.88 |
| 8 | 0.902 | 28.41 | 19.74 | 9.72 | 38.13 | 56.00 | -17.87 | 29.46 | 46.00 | -16.54 |
| 9 | 1.218 | 27.74 | 19.74 | 9.73 | 37.47 | 56.00 | -18.53 | 29.47 | 46.00 | -16.53 |
| 10 | 1.590 | 26.73 | 19.21 | 9.75 | 36.48 | 56.00 | -19.52 | 28.96 | 46.00 | -17.04 |
| 11 | 1.946 | 25.88 | 18.19 | 9.76 | 35.64 | 56.00 | -20.36 | 27.95 | 46.00 | -18.05 |
| 12 | 4.318 | 26.94 | 20.00 | 9.81 | 36.75 | 56.00 | -19.25 | 29.81 | 46.00 | -16.19 |

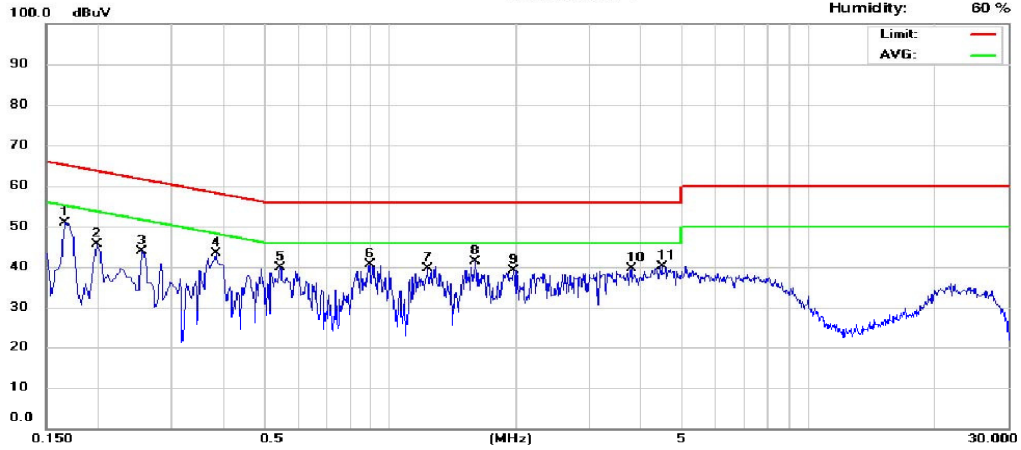


Address: No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist.,
Tao Yuan City 325, Taiwan.
Tel: 03-4071718

Conducted Emission Measurement

Date: 2016/7/14

operator: Jilin Lee
Temperature: 26 °C
Humidity: 60 %



Site: Conduction 03

Phase: N

Limit: CISPR22 Class B Conduction

| No. | Frequency (MHz) | QP_R (dBuV) | AVG_R (dBuV) | Correct Factor (dB) | QP Emission (dBuV) | QP Limit (dBuV) | QP Margin (dB) | AVG Emission (dBuV) | AVG Limit (dBuV) | AVG Margin (dB) |
|-----|-----------------|-------------|--------------|---------------------|--------------------|-----------------|----------------|---------------------|------------------|-----------------|
| 1 | 0.166 | 39.97 | 22.36 | 9.67 | 49.64 | 65.16 | -15.52 | 32.03 | 55.16 | -23.13 |
| 2 | 0.198 | 35.85 | 20.98 | 9.67 | 45.52 | 63.69 | -18.17 | 30.65 | 53.69 | -23.04 |
| 3 | 0.254 | 27.85 | 16.82 | 9.68 | 37.53 | 61.63 | -24.10 | 26.50 | 51.63 | -25.13 |
| 4 | 0.382 | 31.79 | 22.58 | 9.67 | 41.46 | 58.24 | -16.78 | 32.25 | 48.24 | -15.99 |
| 5 | 0.546 | 27.43 | 18.54 | 9.68 | 37.11 | 56.00 | -18.89 | 28.22 | 46.00 | -17.78 |
| 6 | 0.890 | 27.52 | 18.99 | 9.70 | 37.22 | 56.00 | -18.78 | 28.69 | 46.00 | -17.31 |
| 7 | 1.230 | 27.10 | 19.58 | 9.71 | 36.81 | 56.00 | -19.19 | 29.29 | 46.00 | -16.71 |
| 8 | 1.594 | 26.72 | 19.73 | 9.73 | 36.45 | 56.00 | -19.55 | 29.46 | 46.00 | -16.54 |
| 9 | 1.978 | 26.12 | 18.54 | 9.74 | 35.86 | 56.00 | -20.14 | 28.28 | 46.00 | -17.72 |
| 10 | 3.766 | 23.84 | 15.28 | 9.79 | 33.63 | 56.00 | -22.37 | 25.07 | 46.00 | -20.93 |
| 11 | 4.462 | 25.42 | 17.43 | 9.81 | 35.23 | 56.00 | -20.77 | 27.24 | 46.00 | -18.76 |

6. AVERAGE OUTPUT POWER / SPECTRAL DENSITY MEASUREMENT

6.1 Standard Applicable

According to §15.407(a) Power limits:

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

(ii) For an indoor access point operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 17 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(iii) For fixed point-to-point access points operating in the band 5.15 – 5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For mobile and portable client devices in the 5.15 – 5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm +10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

(3) For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. However, fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

NOTE TO PARAGRAPH (a)(3): The Commission strongly recommends that parties employing U-NII devices to provide critical communications services should determine if there are any nearby Government radar systems that could affect their operation.

6.2 Measurement Procedure

For Average Power

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the power meter
3. Record the max. reading.
4. Repeat above procedures until all frequency measured were complete.

For Peak Power Spectral Density

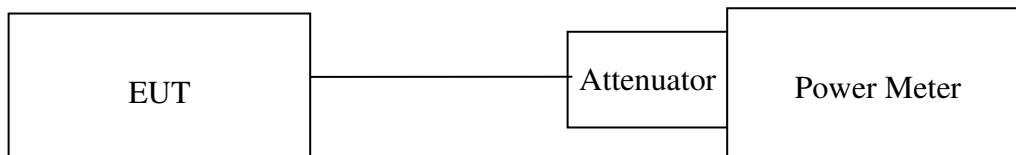
1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
3. Set RBW=1MHz,VBW=3MHz, Span=50MHz (Base Mode), Sweep time = Auto, traces 100 sweeps of video averaging for 5150-5725MHz;
4. Set RBW=500KHz,VBW=1.5MHz, Span=60MHz (Base Mode), Sweep time = Auto, traces 100 sweeps of video averaging for 5725-5850MHz;
5. Record the max. reading.
6. Repeat above procedures until all frequency measured were complete.

Refer to section E3 of KDB Document: 789033 D02 General UNII Test Procedures New Rules v01r02

6.3 Measurement Equipment Used:

| Conducted Emission Test Site | | | | | |
|------------------------------|---------|-----------------------------|-------------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Power Meter 05 | Anritsu | ML2495A | 1116010 | 07/29/2015 | 07/28/2016 |
| Power Sensor 05 | Anritsu | MA2411B | 34NKF50 | 07/29/2015 | 07/28/2016 |
| Power Sensor 06 | DARE | RPR3006W | 13I00030SNO3 3 | 11/03/2015 | 11/02/2016 |
| Power Sensor 07 | DARE | RPR3006W | 13I00030SNO3 4 | 11/03/2015 | 11/02/2016 |
| Temperature Chamber | KSON | THS-B4H100 | 2287 | 06/04/2016 | 06/03/2017 |
| DC Power supply | ABM | 8185D | N/A | 09/05/2015 | 09/04/2016 |
| AC Power supply | EXTECH | CFC105W | NA | 12/26/2015 | 12/25/2016 |
| Attenuator | Woken | Watt-65m3502 | 11051601 | NA | NA |
| Splitter | MCLI | PS4-199 | 12465 | 12/26/2015 | 12/25/2017 |
| Spectrum analyzer | Agilent | N9030A | MY51360021 | 10/02/2015 | 10/01/2016 |
| Test Software | DARE | Radimation Ver:2013.1.23 | NA | NA | NA |

5.1 Measurement Equipment Used:



6.4 Measurement Result

Band: 5150-5250 MHz

Average Power Measurement:

| Mode | Freq (MHz) | channel | power (dBm) | Limit (dBm) | result |
|---------|------------|---------|-------------|-------------|--------|
| 802.11a | 5180 | 36 | 18.32 | 30 | pass |
| | 5200 | 40 | 19.47 | 30 | pass |
| | 5240 | 48 | 19.61 | 30 | pass |

| Mode | Freq (MHz) | channel | Output Chain (dBm) | | Combine Output Power (dBm) | Limit (dBm) | Result |
|--------|------------|---------|--------------------|---------|----------------------------|-------------|--------|
| | | | Chain A | chain B | | | |
| N HT20 | 5180 | 36 | 16.03 | 16.25 | 19.15 | 30 | Pass |
| | 5200 | 40 | 15.74 | 16.63 | 19.22 | 30 | Pass |
| | 5240 | 48 | 17.31 | 16.87 | 20.11 | 30 | Pass |

| Mode | Freq (MHz) | channel | Output Chain (dBm) | | Combine Output Power (dBm) | Limit (dBm) | Result |
|--------|------------|---------|--------------------|---------|----------------------------|-------------|--------|
| | | | Chain A | chain B | | | |
| N HT40 | 5190 | 38 | 16.64 | 16.97 | 19.82 | 30 | Pass |
| | 5230 | 42 | 15.42 | 16.65 | 19.09 | 30 | Pass |
| | 5270 | 46 | 16.51 | 16.38 | 19.46 | 30 | Pass |

| Mode | Freq (MHz) | channel | Output Chain (dBm) | | Combine Output Power (dBm) | Limit (dBm) | Result |
|---------|------------|---------|--------------------|---------|----------------------------|-------------|--------|
| | | | Chain A | chain B | | | |
| AC HT80 | 5210 | 42 | 17.03 | 16.52 | 19.79 | 30 | Pass |

Band: 5725-5850 MHz

Average Power Measurement:

| Mode | Freq (MHz) | channel | power (dBm) | limit(dBm) | result |
|---------|------------|---------|-------------|------------|--------|
| 802.11a | 5745 | 149 | 16.64 | 30 | pass |
| | 5785 | 157 | 17.14 | 30 | pass |
| | 5825 | 165 | 17.12 | 30 | pass |

| Mode | Freq (MHz) | channel | Output Chain (dBm) | | Combine Output Power (dBm) | Limit (dBm) | Result |
|--------|------------|---------|--------------------|---------|----------------------------|-------------|--------|
| | | | Chain A | chain B | | | |
| N HT20 | 5745 | 149 | 16.13 | 17.27 | 19.75 | 30 | Pass |
| | 5785 | 157 | 16.02 | 17.04 | 19.57 | 30 | Pass |
| | 5825 | 165 | 16.02 | 16.31 | 19.18 | 30 | Pass |

| Mode | Freq (MHz) | channel | Output Chain (dBm) | | Combine Output Power (dBm) | Limit (dBm) | Result |
|--------|------------|---------|--------------------|---------|----------------------------|-------------|--------|
| | | | Chain A | chain B | | | |
| N HT40 | 5755 | 151 | 13.02 | 15.01 | 17.14 | 30 | Pass |
| | 5775 | 155 | 13.64 | 14.97 | 17.37 | 30 | Pass |
| | 5815 | 163 | 13.73 | 15.03 | 17.44 | 30 | Pass |

| Mode | Freq (MHz) | channel | Output Chain (dBm) | | Combine Output Power (dBm) | Limit (dBm) | Result |
|---------|------------|---------|--------------------|---------|----------------------------|-------------|--------|
| | | | Chain A | chain B | | | |
| AC HT80 | 5775 | 155 | 13.45 | 14.02 | 16.75 | 30 | Pass |

7. UNDESIRABLE EMISSION - RADICTED MEASUREMENT

7.1 Standard Applicable

According to §15.407(b),

According to §15.407(b), Undesirable Emission Limits: Except as shown in Paragraph (b)(7) of this section, the peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (2) For transmitters operating in the 5.25-5.35 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (3) For transmitters operating in the 5.47-5.725 GHz band: all emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (4) For transmitters operating in the 5.725-5.85 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (5) The above emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in Section 15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in Section 15.207.
- (7) The provisions of Section 15.205 of this part apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

§15.205- RESTRICTED BANDS OF OPERATIONS

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

| MHz | MHz | MHz | GHz |
|----------------------------|---------------------|-----------------|------------------|
| 0.090 - 0.110 | 16.42 - 16.423 | 399.9 - 410 | 4.5 - 5.15 |
| ¹ 0.495 - 0.505 | 16.69475 - 16.69525 | 608 - 614 | 5.35 - 5.46 |
| 2.1735 - 2.1905 | 16.80425 - 16.80475 | 960 - 1240 | 7.25 - 7.75 |
| 4.125 - 4.128 | 25.5 - 25.67 | 1300 - 1427 | 8.025 - 8.5 |
| 4.17725 - 4.17775 | 37.5 - 38.25 | 1435 - 1626.5 | 9.0 - 9.2 |
| 4.20725 - 4.20775 | 73 - 74.6 | 1645.5 - 1646.5 | 9.3 - 9.5 |
| 6.215 - 6.218 | 74.8 - 75.2 | 1660 - 1710 | 10.6 - 12.7 |
| 6.26775 - 6.26825 | 108 - 121.94 | 1718.8 - 1722.2 | 13.25 - 13.4 |
| 6.31175 - 6.31225 | 123 - 138 | 2200 - 2300 | 14.47 - 14.5 |
| 8.291 - 8.294 | 149.9 - 150.05 | 2310 - 2390 | 15.35 - 16.2 |
| 8.362 - 8.366 | 156.52475 - | 2483.5 - 2500 | 17.7 - 21.4 |
| 8.37625 - 8.38675 | 156.52525 | 2655 - 2900 | 22.01 - 23.12 |
| 8.41425 - 8.41475 | 156.7 - 156.9 | 3260 - 3267 | 23.6 - 24.0 |
| 12.29 - 12.293 | 162.0125 - 167.17 | 3332 - 3339 | 31.2 - 31.8 |
| 12.51975 - 12.52025 | 167.72 - 173.2 | 3345.8 - 3358 | 36.43 - 36.5 |
| 12.57675 - 12.57725 | 240 - 285 | 3600 - 4400 | (²) |
| 13.36 - 13.41 | 322 - 335.4 | | |

¹ Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

² Above 38.6

(b) Except as provided in paragraphs (d) and (e), the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

§15.209- RADIATED EMISSION LIMITS: GENERAL REQUIREMENTS

FCC PART 15.209

| MEASURING DISTANCE OF 3 METER | | |
|-------------------------------|----------------------------------|----------------------------|
| FREQUENCY RANGE (MHz) | FIELD STRENGTH (Microvolts/m) | FIELD STRENGTH (dBuV/m) |
| 30-88 | 100 | 40 |
| 88-216 | 150 | 43.5 |
| 216-960 | 200 | 46 |
| Above 960 | 500 | 54 |

7.2 EUT Setup

1. The radiated emission tests were performed in the 3 meter open-test side, using the setup in accordance with the ANSI C63.10:2013.
2. The EUT was put in the front of the test table. The host PC system was placed on the center of the back edge on the test table. The peripherals like modem, monitor printer, K/B, and mouse were placed on the side of the host PC system. The rear of the EUT and peripherals were placed flushed with the rear of the tabletop.
3. The keyboard was placed directly in the front of the monitor, flushed with the front tabletop. The mouse was placed next to the Keyboard, flushed with the back of keyboard.
4. The spacing between the peripherals was 10 centimeters.
5. External I/O cables were draped along the edge of the test table and bundle when necessary.
6. The host PC system was connected with 120Vac/60Hz power source.

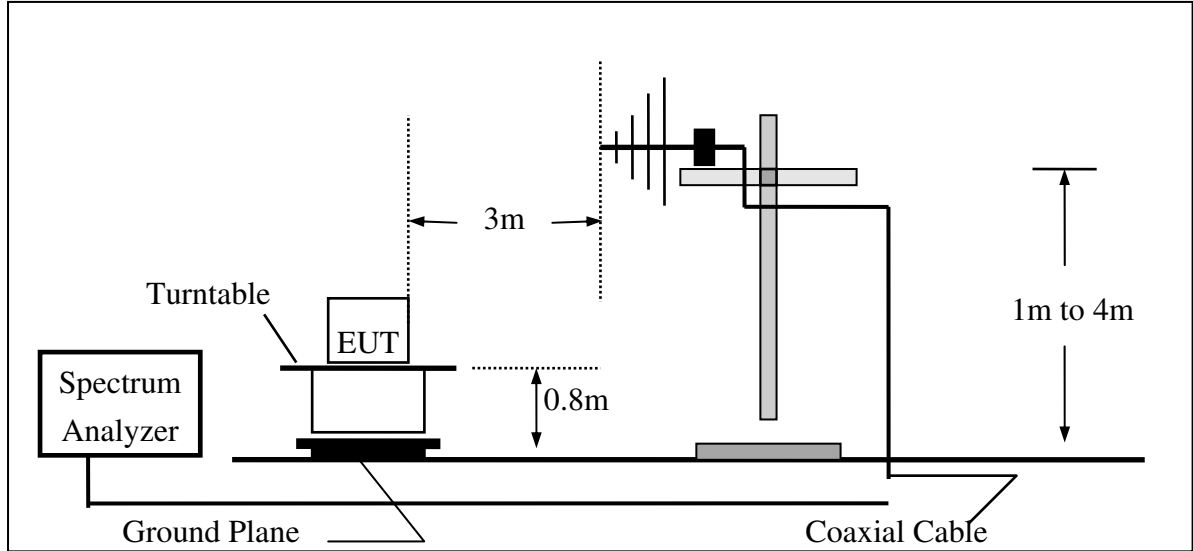
7.3 Measurement Procedure

1. The EUT was placed on a turn table which is 0.8/1.5m above ground plane.
2. The turn table shall rotate 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until all frequency measured were complete.

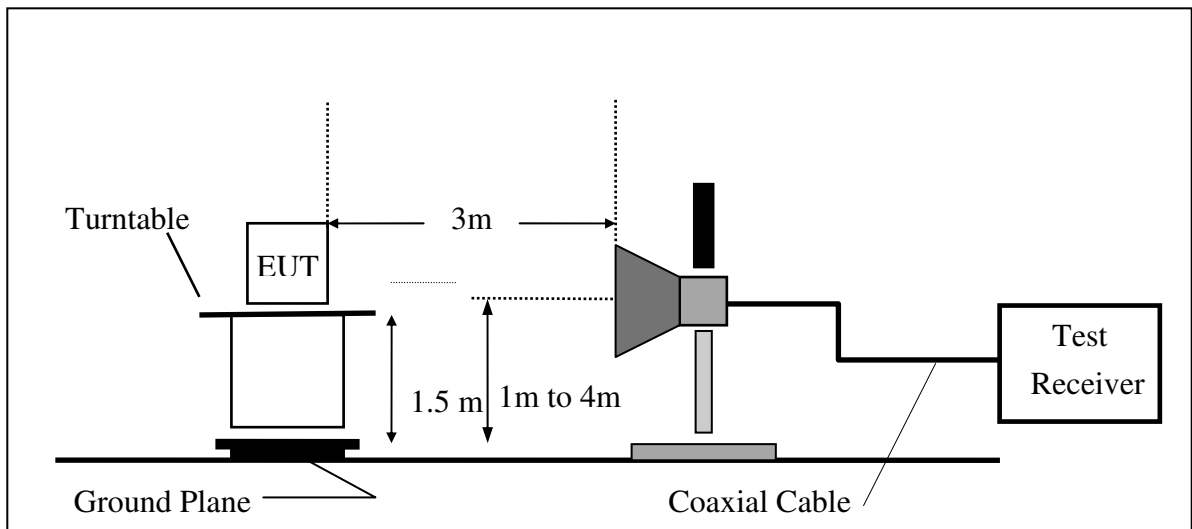
Refer to section G of KDB Document: 789033 D02 General UNII Test Procedures New Rules v01r02

7.4 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 1000MHz



(B) Radiated Emission Test Set-UP Frequency Over 1 GHz



7.5 Measurement Equipment Used:

| Chamber 14(966) | | | | | |
|----------------------------------|---------------|------------------------------|---------------------|------------|------------|
| EQUIPMENT TYPE | MFR | MODEL NUMBER | SERIAL NUMBER | LAST CAL. | CAL DUE. |
| Spectrum Analyzer 21(26.5GHz) | Agilent | N9010A | MY49060537 | 07/30/2015 | 07/29/2016 |
| Spectrum Analyzer 20(6.5GHz) | Agilent | E4443A | MY48250315 | 05/20/2016 | 05/19/2017 |
| Spectrum Analyzer 22(43GHz) | R&S | FSU43 | 100143 | 05/22/2016 | 05/21/2017 |
| Dipole antenna | SCHWARZBECK | VHAP,30-300 | 919 | 12/28/2015 | 12/27/2017 |
| Dipole antenna | SCHWARZBECK | UHAP,300-1000 | 1195 | 12/28/2015 | 12/27/2017 |
| Loop Antenna9K-30M | A.H.SYSTEM | SAS-564 | 294 | 06/17/2015 | 06/16/2017 |
| Bilog Antenna30-1G | SCHWARZBECK | VULB9168 | 644 | 03/02/2016 | 03/01/2017 |
| Horn antenna1-18G | ETS | 3117 | 00066665 | 11/30/2015 | 11/29/2016 |
| Horn antenna26-40G(05) | Com-power | AH-640 | 100A | 01/21/2015 | 01/20/2017 |
| Horn antenna18-26G(04) | Com-power | AH-826 | 081001 | 07/24/2015 | 07/23/2017 |
| Preamplifier9-1000M | HP | 8447D | NA | 03/11/2016 | 03/10/2017 |
| Preamplifier1-18G | MITEQ | AFS44-001018 00-25-10P-44 | 1329256 | 07/28/2015 | 07/27/2016 |
| Preamplifier1-26G | EM | EM01M26G | NA | 03/10/2016 | 03/09/2017 |
| Preamplifier26-40G | MITEQ | JS-26004000-2 7-5A | 818471 | 07/23/2015 | 07/22/2017 |
| Cable1-18G | HUBER SUHNER | Sucoflex 106 | NA | 11/25/2015 | 11/24/2016 |
| Cable UP to 1G | HUBER SUHNER | RG 214/U | NA | 10/02/2015 | 10/01/2016 |
| SUCOFLEX 1GHz~40GHz cable | HUBER SUHNER | Sucoflex 102 | 27963/2&3742 1/2 | 11/03/2015 | 11/02/2017 |
| Signal Generator | R&S | SMU200A | 102330 | 03/28/2016 | 03/27/2017 |
| Signal Generator | Anritsu | MG3692A | 20311 | 11/04/2015 | 11/03/2016 |
| 2.4G Filter | Micro-Tronics | Brm50702 | 76 | 12/26/2015 | 12/25/2016 |
| 5G Filter | Micro-Tronics | Brm50716 | 005 | 12/26/2015 | 12/25/2016 |
| Test Software | Audix | E3 Ver:6.12023 | N/A | N/A | N/A |

7.6 Field Strength Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor(if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

| | | |
|-------|------------------------|--|
| Where | FS = Field Strength | CL = Cable Attenuation Factor (Cable Loss) |
| | RA = Reading Amplitude | AG = Amplifier Gain |
| | AF = Antenna Factor | |

7.7 Measurement Result

Refer to attach tabular data sheets.

NOTE:

The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 100kHz for Peak detection (PK) and Quasi-peak detection (QP) at frequency below 1GHz. And RBW 1MHz for frequency above 1GHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

(worst case: Band 1, 802.11n_HT20)

| | | | |
|----------------|---------|-----------|------------|
| Operation Mode | TX mode | Test Date | 2016/07/18 |
| Channel Number | CH Low | Test By | Dino |
| Temperature | 25 °C | Humidity | 60 % |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 43.58 | 41.37 | -12.45 | 28.92 | 40.00 | -11.08 | Peak | VERTICAL |
| 2 | 104.69 | 47.80 | -16.31 | 31.49 | 43.50 | -12.01 | Peak | VERTICAL |
| 3 | 174.48 | 52.94 | -12.99 | 39.95 | 43.50 | -3.55 | Peak | VERTICAL |
| 4 | 399.57 | 40.28 | -9.03 | 31.25 | 46.00 | -14.75 | Peak | VERTICAL |
| 5 | 668.26 | 28.67 | -4.52 | 24.15 | 46.00 | -21.85 | Peak | VERTICAL |
| 6 | 965.08 | 27.68 | 0.60 | 28.28 | 54.00 | -25.72 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 45.52 | 42.63 | -12.34 | 30.29 | 40.00 | -9.71 | Peak | HORIZONTAL |
| 2 | 155.24 | 47.70 | -11.97 | 35.73 | 43.50 | -7.77 | Peak | HORIZONTAL |
| 3 | 199.29 | 53.89 | -14.78 | 39.11 | 43.50 | -4.39 | Peak | HORIZONTAL |
| 4 | 480.08 | 37.22 | -7.59 | 29.63 | 46.00 | -16.37 | Peak | HORIZONTAL |
| 5 | 591.63 | 29.72 | -5.57 | 24.15 | 46.00 | -21.85 | Peak | HORIZONTAL |
| 6 | 742.95 | 27.55 | -2.99 | 24.56 | 46.00 | -21.44 | Peak | HORIZONTAL |

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

| | | | |
|----------------|---------|-----------|------------|
| Operation Mode | TX mode | Test Date | 2016/07/18 |
| Channel Number | CH Mid | Test By | Dino |
| Temperature | 25 °C | Humidity | 60 % |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 104.69 | 48.58 | -16.31 | 32.27 | 43.50 | -11.23 | Peak | VERTICAL |
| 2 | 155.13 | 49.21 | -11.97 | 37.24 | 43.50 | -6.26 | Peak | VERTICAL |
| 3 | 174.22 | 52.60 | -12.96 | 39.64 | 43.50 | -3.86 | Peak | VERTICAL |
| 4 | 366.59 | 38.95 | -9.71 | 29.24 | 46.00 | -16.76 | Peak | VERTICAL |
| 5 | 480.08 | 34.23 | -7.59 | 26.64 | 46.00 | -19.36 | Peak | VERTICAL |
| 6 | 850.62 | 28.67 | -1.33 | 27.34 | 46.00 | -18.66 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 125.06 | 47.22 | -14.03 | 33.19 | 43.50 | -10.31 | Peak | HORIZONTAL |
| 2 | 199.23 | 54.29 | -14.78 | 39.51 | 43.50 | -3.99 | Peak | HORIZONTAL |
| 3 | 366.59 | 41.48 | -9.71 | 31.77 | 46.00 | -14.23 | Peak | HORIZONTAL |
| 4 | 399.57 | 42.46 | -9.03 | 33.43 | 46.00 | -12.57 | Peak | HORIZONTAL |
| 5 | 594.54 | 31.43 | -5.51 | 25.92 | 46.00 | -20.08 | Peak | HORIZONTAL |
| 6 | 935.98 | 27.98 | 0.19 | 28.17 | 46.00 | -17.83 | Peak | HORIZONTAL |

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (below 1GHz)

| | | | |
|----------------|---------|-----------|------------|
| Operation Mode | TX mode | Test Date | 2016/07/18 |
| Channel Number | CH High | Test By | Dino |
| Temperature | 25 °C | Humidity | 60 % |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 45.52 | 41.21 | -12.34 | 28.87 | 40.00 | -11.13 | Peak | VERTICAL |
| 2 | 104.69 | 48.43 | -16.31 | 32.12 | 43.50 | -11.38 | Peak | VERTICAL |
| 3 | 174.24 | 52.33 | -12.96 | 39.37 | 43.50 | -4.13 | Peak | VERTICAL |
| 4 | 250.19 | 45.81 | -12.84 | 32.97 | 46.00 | -13.03 | Peak | VERTICAL |
| 5 | 480.08 | 34.14 | -7.59 | 26.55 | 46.00 | -19.45 | Peak | VERTICAL |
| 6 | 742.95 | 30.68 | -2.99 | 27.69 | 46.00 | -18.31 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 44.55 | 43.53 | -12.39 | 31.14 | 40.00 | -8.86 | Peak | HORIZONTAL |
| 2 | 125.06 | 46.59 | -14.03 | 32.56 | 43.50 | -10.94 | Peak | HORIZONTAL |
| 3 | 199.64 | 54.12 | -14.80 | 39.32 | 43.50 | -4.18 | Peak | HORIZONTAL |
| 4 | 365.62 | 40.43 | -9.74 | 30.69 | 46.00 | -15.31 | Peak | HORIZONTAL |
| 5 | 480.08 | 37.33 | -7.59 | 29.74 | 46.00 | -16.26 | Peak | HORIZONTAL |
| 6 | 777.87 | 30.62 | -2.48 | 28.14 | 46.00 | -17.86 | Peak | HORIZONTAL |

Remark:

- 1 No further spurious emissions detected from the lowest internal frequency and 30MHz.
- 2 Measuring frequencies from the lowest internal frequency to the 1GHz.
- 3 Radiated emissions measured in frequency range from 9MHz to 1000MHz were made with an instrument detector setting 9-90KHz/110-490KHz using PK/AV and other Frequency Band using PK/QP
- 4 Measurement result within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 5 The IF bandwidth of SPA between 9kHz to 30MHz was 10kHz, VBW= 30kHz; between 30MHz to 1GHz was 100KHz, VBW=300KHz.

Radiated Spurious Emission Measurement Result (above 1GHz)

(worst case: Band 1, 802.11n_HT20)

| | | | |
|----------------|---------|-----------|------------|
| Operation Mode | TX mode | Test Date | 2016/07/18 |
| Channel Number | CH Low | Test By | Dino |
| Temperature | 25 °C | Pol | Ver./Hor |
| Humidity | 60 % | | |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 1994.24 | 59.26 | -12.22 | 47.04 | 74.00 | -26.96 | Peak | VERTICAL |
| 2 | 2141.81 | 55.23 | -11.66 | 43.57 | 74.00 | -30.43 | Peak | VERTICAL |
| 3 | 10360.00 | 33.19 | 7.59 | 40.78 | 74.00 | -33.22 | Average | VERTICAL |
| | | | | | | | | |
| 1 | 1112.23 | 59.04 | -16.15 | 42.89 | 74.00 | -31.11 | Peak | HORIZONTAL |
| 2 | 1994.16 | 57.65 | -12.22 | 45.43 | 74.00 | -28.57 | Peak | HORIZONTAL |
| 3 | 10360.00 | 34.84 | 7.59 | 42.43 | 74.00 | -31.57 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)

| | | | |
|----------------|---------|-----------|------------|
| Operation Mode | TX mode | Test Date | 2016/07/18 |
| Channel Number | CH Mid | Test By | Dino |
| Temperature | 25 °C | Pol | Ver./Hor |
| Humidity | 60 % | | |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 1994.54 | 59.40 | -12.21 | 47.19 | 74.00 | -26.81 | Peak | VERTICAL |
| 2 | 2078.37 | 58.21 | -11.89 | 46.32 | 74.00 | -27.68 | Peak | VERTICAL |
| 3 | 10400.00 | 32.87 | 7.66 | 40.53 | 74.00 | -33.47 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 1994.35 | 58.34 | -12.22 | 46.12 | 74.00 | -27.88 | Peak | HORIZONTAL |
| 2 | 2729.00 | 53.33 | -10.02 | 43.31 | 74.00 | -30.69 | Peak | HORIZONTAL |
| 3 | 10400.00 | 33.87 | 7.66 | 41.53 | 74.00 | -32.47 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Radiated Spurious Emission Measurement Result (above 1GHz) (worst case)

| | | | |
|----------------|---------|-----------|------------|
| Operation Mode | TX High | Test Date | 2016/07/18 |
| Channel Number | CH Low | Test By | Dino |
| Temperature | 25 °C | Pol | Ver./Hor |
| Humidity | 60 % | | |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|--------|------------|
| 1 | 1994.67 | 57.35 | -12.21 | 45.14 | 74.00 | -28.86 | Peak | VERTICAL |
| 2 | 2596.54 | 52.40 | -10.13 | 42.27 | 74.00 | -31.73 | Peak | VERTICAL |
| 3 | 10480.00 | 33.96 | 7.80 | 41.76 | 74.00 | -32.24 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 1112.32 | 58.27 | -16.15 | 42.12 | 74.00 | -31.88 | Peak | HORIZONTAL |
| 2 | 1994.38 | 54.14 | -12.21 | 41.93 | 74.00 | -32.07 | Peak | HORIZONTAL |
| 3 | 10480.00 | 34.33 | 7.80 | 42.13 | 74.00 | -31.87 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Band Edges test: Band 1, 802.11a mode

Operation Mode TX CH Low
Fundamental Frequency 5180 MHz
Temperature 25 °C

Test Date 2016/07/14
Test By Dino
Humidity 65 %

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 5150.00 | 43.51 | -2.50 | 41.01 | 54.00 | -12.99 | Average | VERTICAL |
| 2 | 5150.00 | 56.07 | -2.50 | 53.57 | 74.00 | -20.43 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 5150.00 | 47.96 | -2.50 | 45.46 | 54.00 | -8.54 | Average | HORIZONTAL |
| 2 | 5150.00 | 68.23 | -2.50 | 65.73 | 74.00 | -8.27 | Peak | HORIZONTAL |

Operation Mode TX CH High
Fundamental Frequency 5240MHz
Temperature 25 °C

Test Date 2016/07/14
Test By Dino
Humidity 65 %

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 5350.00 | 51.11 | -0.21 | 50.90 | 74.00 | -23.10 | Peak | VERTICAL |
| 2 | 5384.54 | 54.34 | -1.97 | 52.37 | 74.00 | -21.63 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 5350.00 | 52.29 | -2.05 | 50.24 | 74.00 | -23.76 | Peak | HORIZONTAL |
| 2 | 5401.67 | 42.17 | -1.93 | 40.24 | 54.00 | -13.76 | Average | HORIZONTAL |
| 3 | 5401.67 | 54.51 | -1.93 | 52.58 | 74.00 | -21.42 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Band Edges test: Band 1, 802.11n HT20 mode

Operation Mode TX CH Low
Fundamental Frequency 5180 MHz
Temperature 25 °C

Test Date 2016/07/14
Test By Dino
Humidity 65 %

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 5150.00 | 50.13 | -2.50 | 47.63 | 54.00 | -6.37 | Average | VERTICAL |
| 2 | 5150.00 | 69.82 | -2.50 | 67.32 | 74.00 | -6.68 | Peak | VERTICAL |
| 1 | 5150.00 | 50.76 | -2.50 | 48.26 | 54.00 | -5.74 | Average | HORIZONTAL |
| 2 | 5150.00 | 71.33 | -2.50 | 68.83 | 74.00 | -5.17 | Peak | HORIZONTAL |

Operation Mode TX CH High
Fundamental Frequency 5240MHz
Temperature 25 °C

Test Date 2016/07/14
Test By Dino
Humidity 65 %

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 5350.00 | 52.08 | -2.05 | 50.03 | 74.00 | -23.97 | Peak | VERTICAL |
| 2 | 5406.57 | 54.14 | -1.93 | 52.21 | 74.00 | -21.79 | Peak | VERTICAL |
| 1 | 5350.00 | 52.89 | -2.05 | 50.84 | 74.00 | -23.16 | Peak | HORIZONTAL |
| 2 | 5420.77 | 42.21 | -1.89 | 40.32 | 54.00 | -13.68 | Average | HORIZONTAL |
| 3 | 5420.77 | 54.50 | -1.89 | 52.61 | 74.00 | -21.39 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Band Edges test: Band 1, 802.11n HT40 mode

| | | | |
|-----------------------|-----------|-----------|------------|
| Operation Mode | TX CH Low | Test Date | 2016/07/14 |
| Fundamental Frequency | 5190 MHz | Test By | Dino |
| Temperature | 25 °C | Humidity | 65 % |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 5148.59 | 49.28 | -2.50 | 46.78 | 54.00 | -7.22 | Average | VERTICAL |
| 2 | 5148.59 | 71.51 | -2.50 | 69.01 | 74.00 | -4.99 | Peak | VERTICAL |
| 3 | 5150.00 | 49.93 | -2.50 | 47.43 | 54.00 | -6.57 | Average | VERTICAL |
| 4 | 5150.00 | 71.04 | -2.50 | 68.54 | 74.00 | -5.46 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 5150.00 | 51.62 | -2.50 | 49.12 | 54.00 | -4.88 | Average | HORIZONTAL |
| 2 | 5150.00 | 73.63 | -2.50 | 71.13 | 74.00 | -2.87 | Peak | HORIZONTAL |

| | | | |
|-----------------------|------------|-----------|------------|
| Operation Mode | TX CH High | Test Date | 2016/07/14 |
| Fundamental Frequency | 5230MHz | Test By | Dino |
| Temperature | 25 °C | Humidity | 65 % |

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 5350.00 | 52.47 | -2.05 | 50.42 | 74.00 | -23.58 | Peak | VERTICAL |
| 2 | 5454.91 | 41.94 | -1.82 | 40.12 | 54.00 | -13.88 | Average | VERTICAL |
| 3 | 5454.91 | 54.44 | -1.82 | 52.62 | 74.00 | -21.38 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 5350.00 | 52.81 | -2.05 | 50.76 | 74.00 | -23.24 | Peak | HORIZONTAL |
| 2 | 5362.41 | 41.94 | -2.02 | 39.92 | 54.00 | -14.08 | Average | HORIZONTAL |
| 3 | 5362.41 | 55.24 | -2.02 | 53.22 | 74.00 | -20.78 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

Band Edges test: Band 1, 802.11AC HT80 mode

Operation Mode TX CH Low
Fundamental Frequency 5210 MHz
Temperature 25 °C

Test Date 2016/07/14
Test By Dino
Humidity 65 %

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 5146.51 | 49.36 | -2.51 | 46.85 | 54.00 | -7.15 | Average | VERTICAL |
| 2 | 5146.51 | 71.15 | -2.51 | 68.64 | 74.00 | -5.36 | Peak | VERTICAL |
| 3 | 5150.00 | 49.78 | -2.50 | 47.28 | 54.00 | -6.72 | Average | VERTICAL |
| 4 | 5150.00 | 70.96 | -2.50 | 68.46 | 74.00 | -5.54 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 5148.62 | 50.32 | -2.50 | 47.82 | 54.00 | -6.18 | Average | HORIZONTAL |
| 2 | 5148.62 | 74.63 | -2.50 | 72.13 | 74.00 | -1.87 | Peak | HORIZONTAL |
| 3 | 5150.00 | 52.07 | -2.50 | 49.57 | 54.00 | -4.43 | Average | HORIZONTAL |
| 4 | 5150.00 | 72.73 | -2.50 | 70.23 | 74.00 | -3.77 | Peak | HORIZONTAL |

Operation Mode TX CH High
Fundamental Frequency 5210MHz
Temperature 25 °C

Test Date 2016/07/14
Test By Dino
Humidity 65 %

| No | Freq MHz | Reading dBuV | Factor dB | Level dBuV/m | Limit dBuV/m | Over Limit dB | Remark | Pol V/H |
|----|-------------|-----------------|--------------|-----------------|-----------------|---------------------|---------|------------|
| 1 | 5350.00 | 52.62 | -2.05 | 50.57 | 74.00 | -23.43 | Peak | VERTICAL |
| 2 | 5364.76 | 41.92 | -2.01 | 39.91 | 54.00 | -14.09 | Average | VERTICAL |
| 3 | 5364.76 | 54.82 | -2.01 | 52.81 | 74.00 | -21.19 | Peak | VERTICAL |
| | | | | | | | | |
| 1 | 5350.00 | 41.93 | -2.05 | 39.88 | 54.00 | -14.12 | Average | HORIZONTAL |
| 2 | 5350.00 | 54.99 | -2.05 | 52.94 | 74.00 | -21.06 | Peak | HORIZONTAL |
| 3 | 5378.72 | 42.04 | -1.98 | 40.06 | 54.00 | -13.94 | Average | HORIZONTAL |
| 4 | 5378.72 | 55.63 | -1.98 | 53.65 | 74.00 | -20.35 | Peak | HORIZONTAL |

Remark:

- 1 Measuring frequencies from the lowest internal frequency to the 10th of fundamental frequency
- 2 Field strength limits for frequency above 1000MHz are based on average limits. However, Peak mode field strength shall not exceed the average limits specified plus 20dB.
- 3 Measurement of data within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- 4 Spectrum Peak mode IF bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, Sweep time= 200 ms., the VBW setting was 3 MHz.
- 5 Spectrum AV mode if bandwidth Setting : 1GHz- 40GHz, RBW= 1MHz, VBW= 10Hz, Sweep time= 200 ms.

8. ANTENNA REQUIREMENT

8.1 Standard Applicable

According to §15.203, Antenna requirement.

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of Sections 15.211, 15.213, 15.217, 15.219, or 15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with Section 15.31(d), must be measured at the installation side. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this Part are not exceeded.

8.2 Antenna Connected Construction

The directional gains of antenna used for transmitting is below table, and the antenna connector is designed with unique type RF connector and no consideration of replacement. Please see EUT photo and antenna spec. for details.

Antenna Designation:

| | P/N | Type | Gain (2.4GHz) | Gain (5GHz) |
|-----|----------------------|---|---------------|-------------|
| Ant | AOA160-221040-000000 | Detachable revised SMA type, Dipole Antenna | 3.5dBi | 4.5dBi |

According to KDB662911 D01 MU-MIMO signals could be considered uncorrelated for purposes of directional gain computation.

2Tx SM-MIMO,

Directional gain = G_{ANT} = 4.5dBi