# FCC Test Report

| | |
|---|---|
| **Report No.:** | RF190429C30B-1 |
| **FCC ID:** | MSQ-RTAC4A00 |
| **Test Model:** | RT-AC1200_V2 |
| **Series Model:** | RT-AC51, RT-AC750L, RT-AC1200RU, RT-AC1200L, RT-AC52 (refer to item 3.1 for more details) |
| **Received Date:** | Apr. 29, 2019 |
| **Test Date:** | May 07, 2019 and Jul. 30 ~ Aug. 01, 2019 |
| **Issued Date:** | Aug. 26, 2019 |
| **Applicant:** | ASUSTeK COMPUTER INC. |
| **Address:** | 4F, NO. 150, Li-Te Rd. Peitou, Taipei Taiwan |
| **Issued By:** | Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch<br>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 |

Testing Laboratory
2021

## Table of Contents

## Release Control Record

| Issue No. | Description | Date Issued |
|---|---|---|
| RF190429C30B-1 | Original release. | Aug. 26, 2019 |

## 1 Certificate of Conformity

| | |
|---|---|
| **Product:** | Wireless-AC1200 Dual Band Router |
| **Brand:** | ASUS |
| **Test Model:** | RT-AC1200_V2 |
| **Series Model:** | RT-AC51, RT-AC750L, RT-AC1200RU, RT-AC1200L, RT-AC52 (refer to item 3.1 for more details) |
| **Sample Status:** | Engineering sample |
| **Applicant:** | ASUSTeK COMPUTER INC. |
| **Test Date:** | May 07, 2019 and Jul. 30 ~ Aug. 01, 2019 |
| **Standards:** | 47 CFR FCC Part 15, Subpart E (Section 15.407)<br>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 :** Pettie Chen , **Date:** Aug. 26, 2019

Pettie Chen / Senior Specialist

**Approved by :** Bruce Chen , **Date:** Aug. 26, 2019

Bruce Chen / 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. Minimum passing margin is -24.19dB at 0.65439MHz. |
| 15.407(b) (1/2/3/4(i/ii)/6) | Radiated Emissions & Band Edge Measurement | Pass | Meet the requirement of limit. Minimum passing margin is -1.0dB at 5150.00MHz. |
| 15.407(a)(1/2/3) | Max Average Transmit Power | Pass | Meet the requirement of limit. |
| --- | Occupied Bandwidth Measurement | Pass | Meet the requirement of limit. |
| 15.407(a)(1/2/3) | Peak Power Spectral Density | Pass | Meet the requirement of limit. |
| 15.407(e) | 6dB bandwidth | Pass | Meet the requirement of limit. (U-NII-3 Band only) |
| 15.407(g) | Frequency Stability | Pass | Meet the requirement of limit. |
| 15.203 | Antenna Requirement | Pass | Antenna connector is i-pex(MHF) not a standard connector. |

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOBE test plots were recorded in Annex A.
Note: 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 (k=2) (±) |
|---|---|---|
| Conducted Emissions at mains ports | 150kHz ~ 30MHz | 2.94 dB |
| Radiated Emissions up to 1 GHz | 9kHz ~ 30MHz | 3.04 dB |
| | 30MHz ~ 200MHz | 3.59 dB |
| | 200MHz ~1000MHz | 3.60 dB |
| Radiated Emissions above 1 GHz | 1GHz ~ 18GHz | 2.29 dB |
| | 18GHz ~ 40GHz | 2.29 dB |

### 2.2 Modification Record

There were no modifications required for compliance.

## 3 General Information

### 3.1 General Description of EUT

| | |
|---|---|
| Product | Wireless-AC1200 Dual Band Router |
| Brand | ASUS |
| Test Model | RT-AC1200_V2 |
| Series Model | RT-AC51, RT-AC750L, RT-AC1200RU, RT-AC1200L, RT-AC52 |
| Model Difference | Refer to note |
| Sample Status | Engineering sample |
| Power Supply Rating | 12Vdc (adapter) |
| Modulation Type | 256QAM, 64QAM, 16QAM, QPSK, BPSK |
| Modulation Technology | OFDM |
| Transfer Rate | 802.11a: 54/48/36/24/18/12/9/6Mbps<br>802.11n: up to 300Mbps<br>802.11ac: up to 866.7Mbps |
| Operating Frequency | 5180~5240MHz, 5745~5825MHz |
| Number of Channel | 5180~5240MHz:<br>802.11a, 802.11n (HT20), 802.11ac (VHT20): 4<br>802.11n (HT40), 802.11ac (VHT40): 2<br>802.11ac (VHT80): 1<br>5745~5825MHz:<br>802.11a, 802.11n (HT20), 802.11ac (VHT20): 5<br>802.11n (HT40), 802.11ac (VHT40): 2<br>802.11ac (VHT80): 1 |
| Output Power | 5180~5240MHz:<br>CDD Mode: 142.036mW<br>Beamforming Mode: 142.036mW<br>5745~5825MHz:<br>CDD Mode: 259.900mW<br>Beamforming Mode: 259.900mW |
| Antenna Type | Refer to Note |
| Antenna Connector | Refer to Note |
| Accessory Device | NA |
| Cable Supplied | NA |

Note:

1. The following models are provided to this EUT. The model of the RT-AC1200_V2 was chosen for final test.

| Brand | Model | Description |
|---|---|---|
| ASUS | RT-AC1200_V2 | For marketing purpose. |
| | RT-AC51 | |
| | RT-AC750L | |
| | RT-AC1200RU | |
| | RT-AC1200L | |
| | RT-AC52 | |

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

| Modulation Mode | CDD Mode | Beamforming Mode | TX function |
|---|---|---|---|
| 802.11a | Not Support | Not Support | 1TX diversity |
| 802.11n (HT20) | Support | Support | 2TX |
| 802.11n (HT40) | Support | Support | 2TX |
| 802.11ac (VHT20) | Support | Support | 2TX |
| 802.11ac (VHT40) | Support | Support | 2TX |
| 802.11ac (VHT80) | Support | Support | 2TX |

* For 802.11a: Ant. 3 was for the final tests.

* The modulation and bandwidth are similar for 802.11n mode for 20MHz/40MHz and 802.11ac mode for 20MHz/40MHz, 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 and Beamforming mode are presented in power output test item. For other test items, CDD mode is the worst case for final tests after pretesting.

3. The EUT is powered by the following adapter.

| Adapter | |
|---|---|
| Brand | Shenzhen Gongjin Electronics Co., Ltd. |
| Model | S06AM2-120A050-C9 |
| Input Power | 100-240Vac~50/60Hz Max. 0.3A |
| Output Power | 12Vdc / 0.5A |
| Power Line | 1.45m DC cable without core attached on adapter |

4. The following antennas were provided to the EUT.

| Ant. No. | Antenna Gain(dBi) | Frequency range | Antenna Type | Connecter Type |
|---|---|---|---|---|
| 1 | 5dBi | 2.4~2.4835GHz | Dipole | i-pex(MHF) |
| 2 | 5dBi | 2.4~2.4835GHz | | |
| 3 | 5dBi | 5.15~5.85GHz | | |
| 4 | 5dBi | 5.15~5.85GHz | | |

### 3.2 Description of Test Modes

5180~5240MHz:

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

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

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

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

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency |
|---|---|
| 42 | 5210MHz |

5745~5825MHz:

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

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

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

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

1 channel is provided for 802.11ac (VHT80):

| Channel | Frequency |
|---|---|
| 155 | 5775MHz |

### 3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable to | | | | Description |
|---|---|---|---|---|---|
| | RE≥1G | RE<1G | PLC | APCM | |
| - | √ | √ | √ | √ | - |

Where RE≥1G: Radiated Emission above 1GHz & Bandedge Measurement RE<1G: Radiated Emission below 1GHz

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. Radiated emission test (below 1GHz) and power line conducted emission test items chosen the worst maximum power.

Radiated Emission Test (Above 1GHz):

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

Radiated Emission Test (Below 1GHz):

☒ 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 | Mode | Frequency Band (MHz) | Available Channel | Tested Channel | Modulation Technology | Data Rate (Mbps) |
|---|---|---|---|---|---|---|
| - | 802.11n (HT40) | 5180-5240 | 38 to 46 | 159 | OFDM | 13.5 |
| | | 5745-5825 | 151 to 159 | | OFDM | 13.5 |

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 | Mode | Frequency Band (MHz) | Available Channel | Tested Channel | Modulation Technology | Data Rate (Mbps) |
|---|---|---|---|---|---|---|
| - | 802.11n (HT40) | 5180-5240 | 38 to 46 | 159 | OFDM | 13.5 |
| | | 5745-5825 | 151 to 159 | | OFDM | 13.5 |

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

Test Condition:

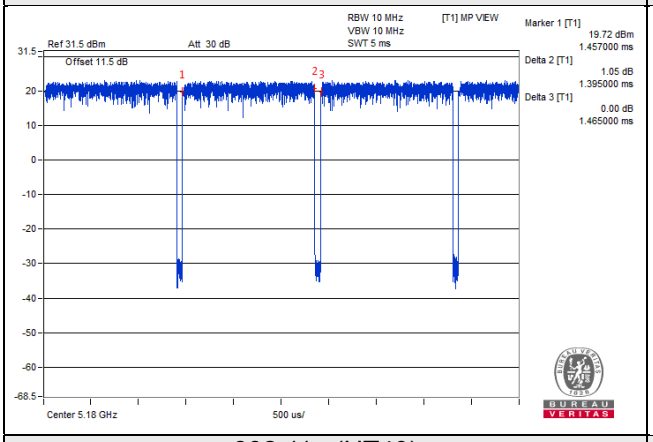
| Applicable to | Environmental Conditions | Input Power | Tested by |
|---|---|---|---|
| RE≥1G | 22 deg. C, 68% RH | 120Vac, 60Hz | Greg Lin<br>Han Wu |
| RE<1G | 22 deg. C, 68% RH | 120Vac, 60Hz | Han Wu |
| PLC | 25 deg. C, 75% RH | 120Vac, 60Hz | Greg Lin |
| APCM | 25 deg. C, 60% RH | 120Vac, 60Hz | Alan Wu |

### 3.3 Duty Cycle of Test Signal

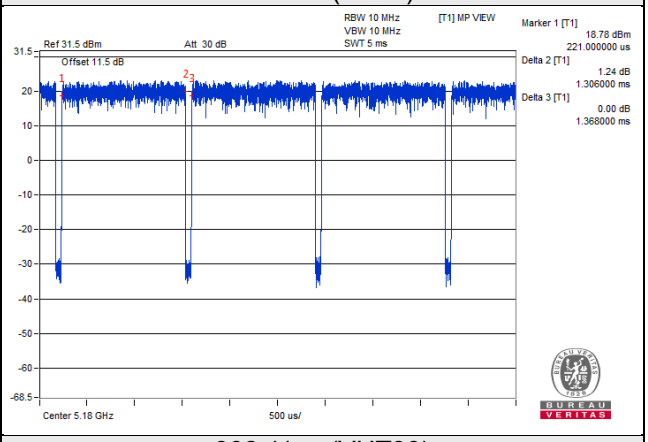
Duty cycle of test signal is < 98 %, duty factor is required

**802.11a:** Duty cycle = 1.395/1.465 = 0.952, Duty factor = 10 * log(1/0.952) = 0.21
**802.11n (HT20):** Duty cycle = 1.306/1.368 = 0.955, Duty factor = 10 * log(1/0.955) = 0.20
**802.11n (HT40):** Duty cycle = 0.647/0.709 = 0.913, Duty factor = 10 * log(1/0.913) = 0.40
**802.11ac (VHT80):** Duty cycle = 0.188/0.248 = 0.758, Duty factor = 10 * log(1/0.758) = 1.20

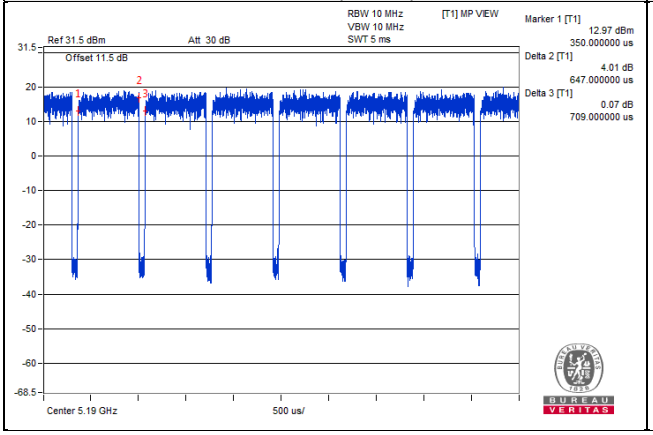
802.11a



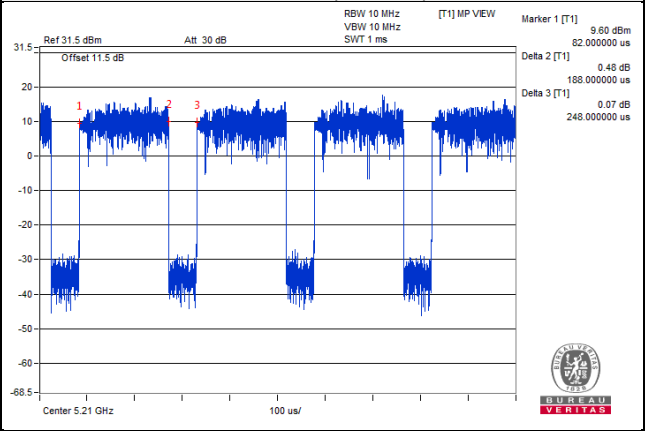

802.11n (HT20)




802.11n (HT40)




802.11ac (VHT80)



### 3.4 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.

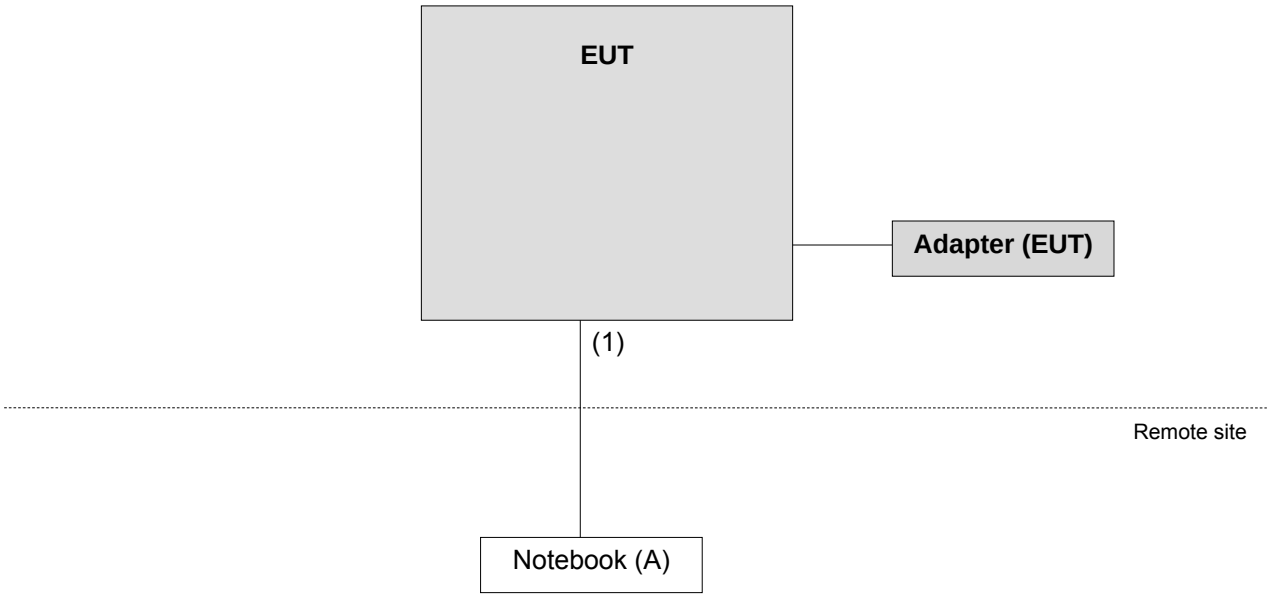
| ID | Product | Brand | Model No. | Serial No. | FCC ID | Remarks |
|---|---|---|---|---|---|---|
| A. | Notebook | Lenovo | 81A4 | YD02TWF5 | PPD-QCNFA435 | - |

Note:

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

| ID | Descriptions | Qty. | Length (m) | Shielding (Yes/No) | Cores (Qty.) | Remarks |
|---|---|---|---|---|---|---|
| 1. | RJ45, Cat5e | 1 | 10 | N | 0 | - |

#### 3.4.1 Configuration of System under Test




### 3.5 General Description of Applied Standards

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

**FCC Part 15, Subpart E (15.407)**
**KDB 789033 D02 General UNII Test Procedure New Rules v02r01**
**KDB 662911 D01 Multiple Transmitter Output v02r01**
ANSI C63.10:2013

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

## 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 1000MHz, 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 20dB under any condition of modulation.

Limits of unwanted emission out of the restricted bands

<table>
<tr><td colspan="3">Applicable To</td><td colspan="2">Limit</td></tr>
<tr><td colspan="3" rowspan="2">789033 D02 General UNII Test Procedure New Rules v02r01</td><td colspan="2">Field Strength at 3m</td></tr>
<tr><td>PK: 74 (dBµV/m)</td><td>AV: 54 (dBµV/m)</td></tr>
<tr><td>Frequency Band</td><td colspan="2">Applicable To</td><td>EIRP Limit</td><td>Equivalent Field Strength at 3m</td></tr>
<tr><td>5150~5250 MHz</td><td colspan="2">15.407(b)(1)</td><td rowspan="3">PK: -27 (dBm/MHz)</td><td rowspan="3">PK: 68.2(dBµV/m)</td></tr>
<tr><td>5250~5350 MHz</td><td colspan="2">15.407(b)(2)</td></tr>
<tr><td>5470~5725 MHz</td><td colspan="2">15.407(b)(3)</td></tr>
<tr><td rowspan="2">5725~5850 MHz</td><td>☒</td><td>15.407(b)(4)(i)</td><td>PK: -27 (dBm/MHz) *1<br>PK: 10 (dBm/MHz) *2<br>PK: 15.6 (dBm/MHz) *3<br>PK: 27 (dBm/MHz) *4</td><td>PK: 68.2 (dBµV/m) *1<br>PK: 105.2 (dBµV/m) *2<br>PK: 110.8 (dBµV/m) *3<br>PK: 122.2 (dBµV/m) *4</td></tr>
<tr><td>☐</td><td>15.407(b)(4)(ii)</td><td colspan="2">Emission limits in section 15.247(d)</td></tr>
<tr><td colspan="5">*1 beyond 75 MHz or more above of the band edge.<br>*2 below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.<br>*3 below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.<br>*4 from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.</td></tr>
</table>

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

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

### 4.1.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due |
|---|---|---|---|---|
| Test Receiver KEYSIGHT | N9038A | MY55420137 | Apr. 15, 2019 | Apr. 14, 2020 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100040 | Sep. 25, 2018 | Sep. 24, 2019 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-160 | Nov. 21, 2018 | Nov. 20, 2019 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-1169 | Nov. 25, 2018 | Nov. 24, 2019 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | BBHA9170241 | Nov. 25, 2018 | Nov. 24, 2019 |
| Preamplifier Agilent (Below 1GHz) | 8447D | 2944A10638 | Aug. 08, 2018 | Aug. 07, 2019 |
| | | | Jul. 11, 2019 | Jul. 10, 2020 |
| Preamplifier Agilent (Above 1GHz) | 8449B | 3008A02367 | Feb. 19, 2019 | Feb. 18, 2020 |
| RF signal cable HUBER+SUHNER&EMCI | SUCOFLEX 104 & EMC104-SM-SM8000 | CABLE-CH9-02 (248780+171006) | Jan. 19, 2019 | Jan. 18, 2020 |
| RF signal cable HUBER+SUHNER | SUCOFLEX 104 | CABLE-CH9-(250795/4) | Aug. 08, 2018 | Aug. 07, 2019 |
| | | | Jul. 11, 2019 | Jul. 10, 2020 |
| RF signal cable Woken | 8D-FB | Cable-CH9-01 | Jul. 31, 2018 | Jul. 30, 2019 |
| | | | Jul. 30, 2019 | Jul. 29, 2020 |
| Software BV ADT | ADT_Radiated_ V7.6.15.9.5 | NA | NA | NA |
| Antenna Tower EMCO | 2070/2080 | 512.835.4684 | NA | NA |
| Turn Table EMCO | 2087-2.03 | NA | NA | NA |
| Antenna Tower &Turn BV ADT | AT100 | AT93021705 | NA | NA |
| Turn Table BV ADT | TT100 | TT93021705 | NA | NA |
| Turn Table Controller BV ADT | SC100 | SC93021705 | NA | NA |
| Boresight Antenna Fixture | FBA-01 | FBA-SIP01 | NA | NA |
| USB Wideband Power Sensor KEYSIGHT | U2021XA | MY55050005/MY55190004/MY55190007/MY55210005 | Jul. 10, 2018 | Jul. 09, 2019 |
| | | | 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 30MHz**

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 9kHz at frequency below 30MHz.

**For Radiated emission above 30MHz**

a. The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) 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 detect 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:

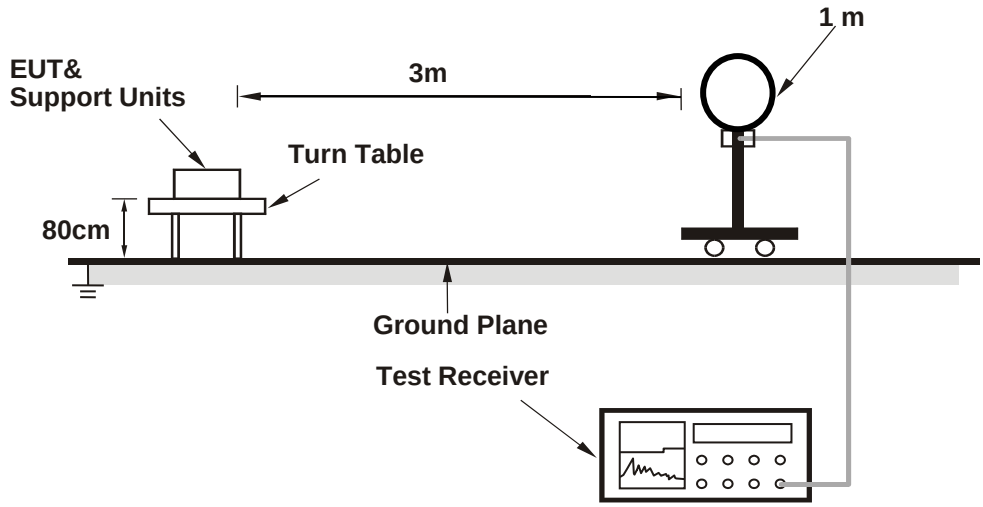
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is ≥ 1/T (Duty cycle < 98%) or 10Hz (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz. (802.11a: RBW = 1 MHz, VBW =1kHz ; 802.11n (HT20): RBW = 1 MHz, VBW = 1 kHz ; 802.11n (HT40): RBW = 1 MHz, VBW = 3kHz ; 802.11ac (VHT80): RBW = 1 MHz, VBW = 3kHz)
4. All modes of operation were investigated and the worst-case emissions are reported.

### 4.1.4 Deviation from Test Standard

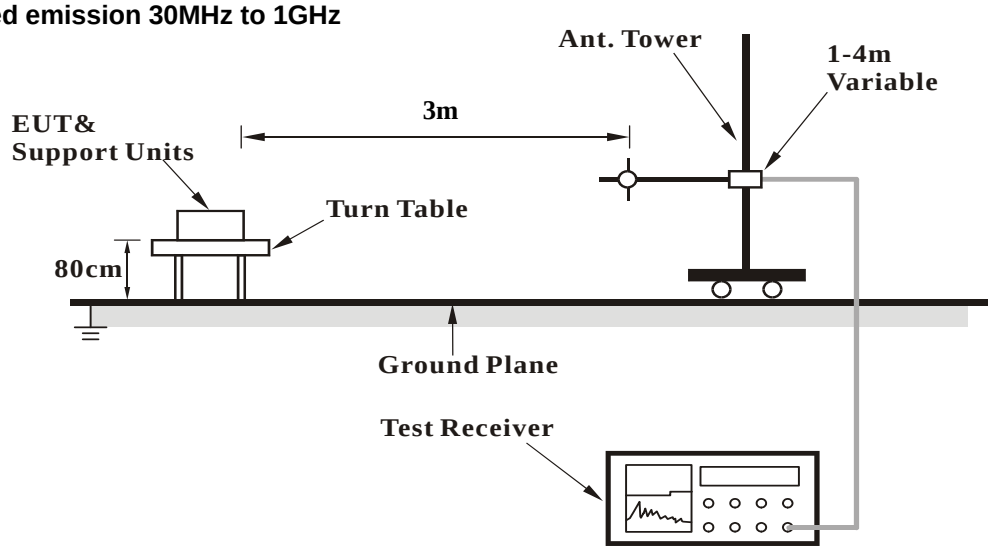
No deviation.

### 4.1.5 Test Setup

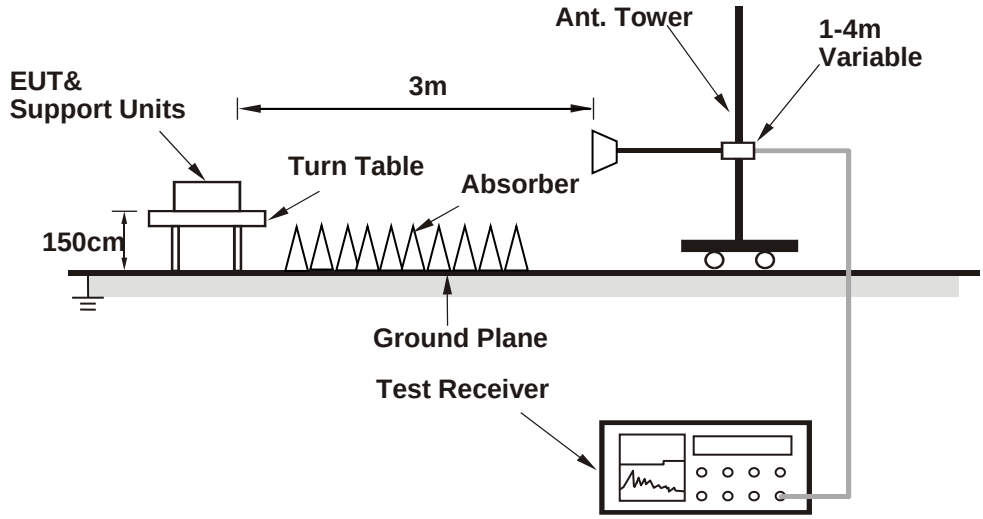
**For Radiated emission below 30MHz**




**For Radiated emission 30MHz to 1GHz**



**For Radiated emission above 1GHz**




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

### 4.1.6 EUT Operating Conditions

a. Placed the EUT on the testing table.
b. Prepared a notebook to act as a communication partner and placed it outside of testing area.
c. The communication partner connected with EUT via a RJ45 cable and ran a test program (provided by manufacturer) to enable EUT under transmission condition continuously at specific channel frequency.
d. The communication partner sent data to EUT by command "PING".

### 4.1.7 Test Results

Above 1GHz data:

802.11a

| CHANNEL | TX Channel 36 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 5150.00 | 67.3 PK | 74.0 | -6.7 | 1.32 H | 254 | 63.8 | 3.5 |
| 2 | 5150.00 | 49.6 AV | 54.0 | -4.4 | 1.32 H | 254 | 46.1 | 3.5 |
| 3 | *5180.00 | 103.3 PK | | | 1.32 H | 254 | 65.3 | 38.0 |
| 4 | *5180.00 | 93.1 AV | | | 1.32 H | 254 | 55.1 | 38.0 |
| 5 | #10360.00 | 55.8 PK | 68.2 | -12.4 | 1.43 H | 118 | 40.2 | 15.6 |
| 6 | 15540.00 | 62.9 PK | 74.0 | -11.1 | 1.13 H | 302 | 46.7 | 16.2 |
| 7 | 15540.00 | 48.5 AV | 54.0 | -5.5 | 1.13 H | 302 | 32.3 | 16.2 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 5150.00 | 68.8 PK | 74.0 | -5.2 | 1.53 V | 185 | 65.3 | 3.5 |
| 2 | 5150.00 | 52.8 AV | 54.0 | -1.2 | 1.53 V | 185 | 49.3 | 3.5 |
| 3 | *5180.00 | 116.4 PK | | | 1.53 V | 185 | 78.4 | 38.0 |
| 4 | *5180.00 | 106.0 AV | | | 1.53 V | 185 | 68.0 | 38.0 |
| 5 | #10360.00 | 57.7 PK | 68.2 | -10.5 | 2.02 V | 351 | 42.1 | 15.6 |
| 6 | 15540.00 | 66.7 PK | 74.0 | -7.3 | 2.01 V | 349 | 50.5 | 16.2 |
| 7 | 15540.00 | 52.0 AV | 54.0 | -2.0 | 2.01 V | 349 | 35.8 | 16.2 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *5200.00 | 103.2 PK | | | 1.27 H | 246 | 65.3 | 37.9 |
| 2 | *5200.00 | 93.1 AV | | | 1.27 H | 246 | 55.2 | 37.9 |
| 3 | #10400.00 | 56.1 PK | 68.2 | -12.1 | 1.52 H | 121 | 40.5 | 15.6 |
| 4 | 15600.00 | 62.5 PK | 74.0 | -11.5 | 1.19 H | 293 | 46.5 | 16.0 |
| 5 | 15600.00 | 48.4 AV | 54.0 | -5.6 | 1.19 H | 293 | 32.4 | 16.0 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *5200.00 | 116.2 PK | | | 1.58 V | 203 | 78.3 | 37.9 |
| 2 | *5200.00 | 106.0 AV | | | 1.58 V | 203 | 68.1 | 37.9 |
| 3 | #10400.00 | 58.2 PK | 68.2 | -10.0 | 1.97 V | 345 | 42.6 | 15.6 |
| 4 | 15600.00 | 65.1 PK | 74.0 | -8.9 | 1.93 V | 346 | 49.1 | 16.0 |
| 5 | 15600.00 | 51.6 AV | 54.0 | -2.4 | 1.93 V | 346 | 35.6 | 16.0 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 48 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *5240.00 | 104.5 PK | | | 1.29 H | 255 | 66.8 | 37.7 |
| 2 | *5240.00 | 94.3 AV | | | 1.29 H | 255 | 56.6 | 37.7 |
| 3 | 5350.00 | 55.2 PK | 74.0 | -18.8 | 1.29 H | 255 | 51.8 | 3.4 |
| 4 | 5350.00 | 42.2 AV | 54.0 | -11.8 | 1.29 H | 255 | 38.8 | 3.4 |
| 5 | #10480.00 | 56.2 PK | 68.2 | -12.0 | 1.52 H | 122 | 40.8 | 15.4 |
| 6 | 15720.00 | 62.8 PK | 74.0 | -11.2 | 1.05 H | 312 | 47.4 | 15.4 |
| 7 | 15720.00 | 48.7 AV | 54.0 | -5.3 | 1.05 H | 312 | 33.3 | 15.4 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *5240.00 | 117.3 PK | | | 1.61 V | 199 | 79.6 | 37.7 |
| 2 | *5240.00 | 107.1 AV | | | 1.61 V | 199 | 69.4 | 37.7 |
| 3 | 5350.00 | 56.5 PK | 74.0 | -17.5 | 1.61 V | 199 | 53.1 | 3.4 |
| 4 | 5350.00 | 43.0 AV | 54.0 | -11.0 | 1.61 V | 199 | 39.6 | 3.4 |
| 5 | #10480.00 | 58.6 PK | 68.2 | -9.6 | 1.92 V | 342 | 43.2 | 15.4 |
| 6 | 15720.00 | 65.7 PK | 74.0 | -8.3 | 2.01 V | 351 | 50.3 | 15.4 |
| 7 | 15720.00 | 51.7 AV | 54.0 | -2.3 | 2.01 V | 351 | 36.3 | 15.4 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 149 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5647.20 | 54.8 PK | 68.2 | -13.4 | 1.58 H | 311 | 50.7 | 4.1 |
| 2 | *5745.00 | 102.8 PK | | | 1.58 H | 311 | 64.3 | 38.5 |
| 3 | *5745.00 | 92.7 AV | | | 1.58 H | 311 | 54.2 | 38.5 |
| 4 | #5992.80 | 54.0 PK | 68.2 | -14.2 | 1.58 H | 311 | 49.3 | 4.7 |
| 5 | 11490.00 | 56.0 PK | 74.0 | -18.0 | 1.32 H | 124 | 40.3 | 15.7 |
| 6 | 11490.00 | 42.2 AV | 54.0 | -11.8 | 1.32 H | 124 | 26.5 | 15.7 |
| 7 | #17235.00 | 63.1 PK | 68.2 | -5.1 | 1.25 H | 317 | 41.2 | 21.9 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5648.80 | 57.0 PK | 68.2 | -11.2 | 2.15 V | 138 | 52.9 | 4.1 |
| 2 | *5745.00 | 115.7 PK | | | 2.15 V | 138 | 77.2 | 38.5 |
| 3 | *5745.00 | 105.6 AV | | | 2.15 V | 138 | 67.1 | 38.5 |
| 4 | #5935.20 | 55.6 PK | 68.2 | -12.6 | 2.15 V | 138 | 50.9 | 4.7 |
| 5 | 11490.00 | 57.9 PK | 74.0 | -16.1 | 1.86 V | 347 | 42.2 | 15.7 |
| 6 | 11490.00 | 44.0 AV | 54.0 | -10.0 | 1.86 V | 347 | 28.3 | 15.7 |
| 7 | #17235.00 | 65.9 PK | 68.2 | -2.3 | 2.07 V | 349 | 44.0 | 21.9 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 157 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5617.60 | 54.3 PK | 68.2 | -13.9 | 1.52 H | 306 | 50.4 | 3.9 |
| 2 | *5785.00 | 103.2 PK | | | 1.52 H | 306 | 64.5 | 38.7 |
| 3 | *5785.00 | 93.1 AV | | | 1.52 H | 306 | 54.4 | 38.7 |
| 4 | #5951.20 | 53.9 PK | 68.2 | -14.3 | 1.52 H | 306 | 49.2 | 4.7 |
| 5 | 11570.00 | 56.1 PK | 74.0 | -17.9 | 1.36 H | 106 | 40.6 | 15.5 |
| 6 | 11570.00 | 42.7 AV | 54.0 | -11.3 | 1.36 H | 106 | 27.2 | 15.5 |
| 7 | #17355.00 | 63.0 PK | 68.2 | -5.2 | 1.08 H | 287 | 41.2 | 21.8 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5623.20 | 55.4 PK | 68.2 | -12.8 | 1.82 V | 209 | 51.5 | 3.9 |
| 2 | *5785.00 | 116.0 PK | | | 1.82 V | 209 | 77.3 | 38.7 |
| 3 | *5785.00 | 105.9 AV | | | 1.82 V | 209 | 67.2 | 38.7 |
| 4 | #5930.40 | 53.7 PK | 68.2 | -14.5 | 1.82 V | 209 | 49.0 | 4.7 |
| 5 | 11570.00 | 57.9 PK | 74.0 | -16.1 | 1.97 V | 338 | 42.4 | 15.5 |
| 6 | 11570.00 | 43.7 AV | 54.0 | -10.3 | 1.97 V | 338 | 28.2 | 15.5 |
| 7 | #17355.00 | 65.8 PK | 68.2 | -2.4 | 2.10 V | 348 | 44.0 | 21.8 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 165 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5644.00 | 55.7 PK | 68.2 | -12.5 | 1.45 H | 313 | 51.6 | 4.1 |
| 2 | *5825.00 | 101.6 PK | | | 1.45 H | 313 | 62.8 | 38.8 |
| 3 | *5825.00 | 91.5 AV | | | 1.45 H | 313 | 52.7 | 38.8 |
| 4 | #5980.80 | 56.9 PK | 68.2 | -11.3 | 1.45 H | 313 | 52.2 | 4.7 |
| 5 | 11650.00 | 56.2 PK | 74.0 | -17.8 | 1.53 H | 107 | 40.8 | 15.4 |
| 6 | 11650.00 | 42.1 AV | 54.0 | -11.9 | 1.53 H | 107 | 26.7 | 15.4 |
| 7 | #17475.00 | 63.2 PK | 68.2 | -5.0 | 1.25 H | 292 | 40.6 | 22.6 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5608.80 | 55.3 PK | 68.2 | -12.9 | 1.88 V | 207 | 51.5 | 3.8 |
| 2 | *5825.00 | 114.5 PK | | | 1.88 V | 207 | 75.7 | 38.8 |
| 3 | *5825.00 | 104.4 AV | | | 1.88 V | 207 | 65.6 | 38.8 |
| 4 | #5977.60 | 56.7 PK | 68.2 | -11.5 | 1.88 V | 207 | 52.0 | 4.7 |
| 5 | 11650.00 | 58.2 PK | 74.0 | -15.8 | 2.03 V | 337 | 42.8 | 15.4 |
| 6 | 11650.00 | 43.8 AV | 54.0 | -10.2 | 2.03 V | 337 | 28.4 | 15.4 |
| 7 | #17475.00 | 66.0 PK | 68.2 | -2.2 | 2.00 V | 352 | 43.4 | 22.6 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (HT20)

| CHANNEL | TX Channel 36 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 5150.00 | 58.9 PK | 74.0 | -15.1 | 1.00 H | 258 | 55.4 | 3.5 |
| 2 | 5150.00 | 44.9 AV | 54.0 | -9.1 | 1.00 H | 258 | 41.4 | 3.5 |
| 3 | *5180.00 | 102.2 PK | | | 1.00 H | 258 | 64.2 | 38.0 |
| 4 | *5180.00 | 92.2 AV | | | 1.00 H | 258 | 54.2 | 38.0 |
| 5 | #10360.00 | 58.8 PK | 68.2 | -9.4 | 1.16 H | 174 | 43.2 | 15.6 |
| 6 | 15540.00 | 62.3 PK | 74.0 | -11.7 | 1.02 H | 295 | 46.1 | 16.2 |
| 7 | 15540.00 | 48.5 AV | 54.0 | -5.5 | 1.02 H | 295 | 32.3 | 16.2 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 5150.00 | 67.8 PK | 74.0 | -6.2 | 1.84 V | 128 | 64.3 | 3.5 |
| 2 | 5150.00 | 47.0 AV | 54.0 | -7.0 | 1.84 V | 128 | 43.5 | 3.5 |
| 3 | *5180.00 | 116.0 PK | | | 1.84 V | 128 | 78.0 | 38.0 |
| 4 | *5180.00 | 106.0 AV | | | 1.84 V | 128 | 68.0 | 38.0 |
| 5 | #10360.00 | 61.2 PK | 68.2 | -7.0 | 2.43 V | 37 | 45.6 | 15.6 |
| 6 | 15540.00 | 65.0 PK | 74.0 | -9.0 | 3.74 V | 31 | 48.8 | 16.2 |
| 7 | 15540.00 | 51.6 AV | 54.0 | -2.4 | 3.74 V | 31 | 35.4 | 16.2 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *5200.00 | 103.3 PK | | | 1.04 H | 253 | 65.4 | 37.9 |
| 2 | *5200.00 | 93.5 AV | | | 1.04 H | 253 | 55.6 | 37.9 |
| 3 | #10400.00 | 59.0 PK | 68.2 | -9.2 | 1.21 H | 172 | 43.4 | 15.6 |
| 4 | 15600.00 | 62.9 PK | 74.0 | -11.1 | 1.13 H | 287 | 46.9 | 16.0 |
| 5 | 15600.00 | 48.8 AV | 54.0 | -5.2 | 1.13 H | 287 | 32.8 | 16.0 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *5200.00 | 117.1 PK | | | 1.60 V | 187 | 79.2 | 37.9 |
| 2 | *5200.00 | 107.3 AV | | | 1.60 V | 187 | 69.4 | 37.9 |
| 3 | #10400.00 | 61.9 PK | 68.2 | -6.3 | 2.10 V | 39 | 46.3 | 15.6 |
| 4 | 15600.00 | 65.6 PK | 74.0 | -8.4 | 3.82 V | 359 | 49.6 | 16.0 |
| 5 | 15600.00 | 51.7 AV | 54.0 | -2.3 | 3.82 V | 359 | 35.7 | 16.0 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 48 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *5240.00 | 104.3 PK | | | 1.12 H | 253 | 66.6 | 37.7 |
| 2 | *5240.00 | 94.5 AV | | | 1.12 H | 253 | 56.8 | 37.7 |
| 3 | 5350.00 | 55.8 PK | 74.0 | -18.2 | 1.12 H | 253 | 52.4 | 3.4 |
| 4 | 5350.00 | 43.8 AV | 54.0 | -10.2 | 1.12 H | 253 | 40.4 | 3.4 |
| 5 | #10480.00 | 59.9 PK | 68.2 | -8.3 | 1.06 H | 184 | 44.5 | 15.4 |
| 6 | 15720.00 | 62.5 PK | 74.0 | -11.5 | 1.06 H | 301 | 47.1 | 15.4 |
| 7 | 15720.00 | 49.2 AV | 54.0 | -4.8 | 1.06 H | 301 | 33.8 | 15.4 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *5240.00 | 118.2 PK | | | 1.84 V | 158 | 80.5 | 37.7 |
| 2 | *5240.00 | 108.4 AV | | | 1.84 V | 158 | 70.7 | 37.7 |
| 3 | 5350.00 | 57.6 PK | 74.0 | -16.4 | 1.84 V | 158 | 54.2 | 3.4 |
| 4 | 5350.00 | 45.2 AV | 54.0 | -8.8 | 1.84 V | 158 | 41.8 | 3.4 |
| 5 | #10480.00 | 61.6 PK | 68.2 | -6.6 | 2.51 V | 42 | 46.2 | 15.4 |
| 6 | 15720.00 | 65.0 PK | 74.0 | -9.0 | 3.68 V | 9 | 49.6 | 15.4 |
| 7 | 15720.00 | 51.7 AV | 54.0 | -2.3 | 3.68 V | 9 | 36.3 | 15.4 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 149 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5640.00 | 53.2 PK | 68.2 | -15.0 | 2.12 H | 296 | 49.1 | 4.1 |
| 2 | *5745.00 | 101.9 PK | | | 2.12 H | 296 | 63.4 | 38.5 |
| 3 | *5745.00 | 91.9 AV | | | 2.12 H | 296 | 53.4 | 38.5 |
| 4 | #5936.80 | 53.1 PK | 68.2 | -15.1 | 2.12 H | 296 | 48.4 | 4.7 |
| 5 | 11490.00 | 56.3 PK | 74.0 | -17.7 | 1.52 H | 133 | 40.6 | 15.7 |
| 6 | 11490.00 | 42.9 AV | 54.0 | -11.1 | 1.52 H | 133 | 27.2 | 15.7 |
| 7 | #17325.00 | 63.7 PK | 68.2 | -4.5 | 1.53 H | 114 | 41.6 | 22.1 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5644.00 | 56.5 PK | 68.2 | -11.7 | 2.16 V | 117 | 52.4 | 4.1 |
| 2 | *5745.00 | 115.6 PK | | | 2.16 V | 117 | 77.1 | 38.5 |
| 3 | *5745.00 | 105.5 AV | | | 2.16 V | 117 | 67.0 | 38.5 |
| 4 | #5948.80 | 55.8 PK | 68.2 | -12.4 | 2.16 V | 117 | 51.1 | 4.7 |
| 5 | 11490.00 | 56.9 PK | 74.0 | -17.1 | 2.64 V | 28 | 41.2 | 15.7 |
| 6 | 11490.00 | 43.3 AV | 54.0 | -10.7 | 2.64 V | 28 | 27.6 | 15.7 |
| 7 | #17235.00 | 66.1 PK | 68.2 | -2.1 | 2.63 V | 39 | 44.2 | 21.9 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 157 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5615.20 | 53.6 PK | 68.2 | -14.6 | 2.13 H | 308 | 49.7 | 3.9 |
| 2 | *5785.00 | 103.5 PK | | | 2.13 H | 308 | 64.8 | 38.7 |
| 3 | *5785.00 | 93.4 AV | | | 2.13 H | 308 | 54.7 | 38.7 |
| 4 | #5944.00 | 54.1 PK | 68.2 | -14.1 | 2.13 H | 308 | 49.4 | 4.7 |
| 5 | 11570.00 | 55.1 PK | 74.0 | -18.9 | 1.53 H | 127 | 39.6 | 15.5 |
| 6 | 11570.00 | 42.3 AV | 54.0 | -11.7 | 1.53 H | 127 | 26.8 | 15.5 |
| 7 | #17355.00 | 63.5 PK | 68.2 | -4.7 | 1.62 H | 113 | 41.7 | 21.8 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5623.20 | 60.2 PK | 68.2 | -8.0 | 2.03 V | 124 | 56.3 | 3.9 |
| 2 | *5785.00 | 117.2 PK | | | 2.03 V | 124 | 78.5 | 38.7 |
| 3 | *5785.00 | 107.1 AV | | | 2.03 V | 124 | 68.4 | 38.7 |
| 4 | #5954.40 | 57.9 PK | 68.2 | -10.3 | 2.03 V | 124 | 53.2 | 4.7 |
| 5 | 11570.00 | 55.9 PK | 74.0 | -18.1 | 2.57 V | 17 | 40.4 | 15.5 |
| 6 | 11570.00 | 43.1 AV | 54.0 | -10.9 | 2.57 V | 17 | 27.6 | 15.5 |
| 7 | #17355.00 | 65.8 PK | 68.2 | -2.4 | 2.58 V | 41 | 44.0 | 21.8 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 165 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5624.00 | 52.7 PK | 68.2 | -15.5 | 2.09 H | 301 | 48.8 | 3.9 |
| 2 | *5825.00 | 102.4 PK | | | 2.09 H | 301 | 63.6 | 38.8 |
| 3 | *5825.00 | 92.2 AV | | | 2.09 H | 301 | 53.4 | 38.8 |
| 4 | #5933.60 | 53.7 PK | 68.2 | -14.5 | 2.09 H | 301 | 49.0 | 4.7 |
| 5 | 11650.00 | 55.7 PK | 74.0 | -18.3 | 1.59 H | 142 | 40.3 | 15.4 |
| 6 | 11650.00 | 42.5 AV | 54.0 | -11.5 | 1.59 H | 142 | 27.1 | 15.4 |
| 7 | #17475.00 | 64.4 PK | 68.2 | -3.8 | 1.43 H | 106 | 41.8 | 22.6 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5628.80 | 55.3 PK | 68.2 | -12.9 | 2.16 V | 124 | 51.4 | 3.9 |
| 2 | *5825.00 | 116.0 PK | | | 2.16 V | 124 | 77.2 | 38.8 |
| 3 | *5825.00 | 106.0 AV | | | 2.16 V | 124 | 67.2 | 38.8 |
| 4 | #5949.60 | 56.5 PK | 68.2 | -11.7 | 2.16 V | 124 | 51.8 | 4.7 |
| 5 | 11650.00 | 56.7 PK | 74.0 | -17.3 | 2.56 V | 38 | 41.3 | 15.4 |
| 6 | 11650.00 | 42.8 AV | 54.0 | -11.2 | 2.56 V | 38 | 27.4 | 15.4 |
| 7 | #17475.00 | 65.9 PK | 68.2 | -2.3 | 2.89 V | 33 | 43.3 | 22.6 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11n (HT40)

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

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 5150.00 | 64.6 PK | 74.0 | -9.4 | 1.12 H | 242 | 61.1 | 3.5 |
| 2 | 5150.00 | 50.9 AV | 54.0 | -3.1 | 1.12 H | 242 | 47.4 | 3.5 |
| 3 | *5190.00 | 98.5 PK | | | 1.12 H | 242 | 60.6 | 37.9 |
| 4 | *5190.00 | 88.2 AV | | | 1.12 H | 242 | 50.3 | 37.9 |
| 5 | #10380.00 | 60.2 PK | 68.2 | -8.0 | 1.28 H | 177 | 44.5 | 15.7 |
| 6 | 15570.00 | 59.9 PK | 74.0 | -14.1 | 1.17 H | 294 | 43.7 | 16.2 |
| 7 | 15570.00 | 47.4 AV | 54.0 | -6.6 | 1.17 H | 294 | 31.2 | 16.2 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 5150.00 | 66.3 PK | 74.0 | -7.7 | 1.65 V | 161 | 62.8 | 3.5 |
| 2 | 5150.00 | 52.7 AV | 54.0 | -1.3 | 1.65 V | 161 | 49.2 | 3.5 |
| 3 | *5190.00 | 112.2 PK | | | 1.65 V | 161 | 74.3 | 37.9 |
| 4 | *5190.00 | 101.9 AV | | | 1.65 V | 161 | 64.0 | 37.9 |
| 5 | #10380.00 | 63.1 PK | 68.2 | -5.1 | 2.36 V | 46 | 47.4 | 15.7 |
| 6 | 15570.00 | 62.6 PK | 74.0 | -11.4 | 3.68 V | 36 | 46.4 | 16.2 |
| 7 | 15570.00 | 49.7 AV | 54.0 | -4.3 | 3.68 V | 36 | 33.5 | 16.2 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 46 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *5230.00 | 102.3 PK | | | 1.16 H | 247 | 64.6 | 37.7 |
| 2 | *5230.00 | 91.8 AV | | | 1.16 H | 247 | 54.1 | 37.7 |
| 3 | 5350.00 | 56.7 PK | 74.0 | -17.3 | 1.16 H | 247 | 53.3 | 3.4 |
| 4 | 5350.00 | 43.6 AV | 54.0 | -10.4 | 1.16 H | 247 | 40.2 | 3.4 |
| 5 | #10460.00 | 62.9 PK | 68.2 | -5.3 | 1.24 H | 182 | 47.5 | 15.4 |
| 6 | 15690.00 | 63.1 PK | 74.0 | -10.9 | 1.05 H | 303 | 47.6 | 15.5 |
| 7 | 15690.00 | 50.0 AV | 54.0 | -4.0 | 1.05 H | 303 | 34.5 | 15.5 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | *5230.00 | 116.2 PK | | | 1.79 V | 129 | 78.5 | 37.7 |
| 2 | *5230.00 | 105.6 AV | | | 1.79 V | 129 | 67.9 | 37.7 |
| 3 | 5350.00 | 58.6 PK | 74.0 | -15.4 | 1.79 V | 129 | 55.2 | 3.4 |
| 4 | 5350.00 | 44.0 AV | 54.0 | -10.0 | 1.79 V | 129 | 40.6 | 3.4 |
| 5 | #10460.00 | 65.0 PK | 68.2 | -3.2 | 2.00 V | 40 | 49.6 | 15.4 |
| 6 | 15690.00 | 65.0 PK | 74.0 | -9.0 | 3.68 V | 32 | 49.5 | 15.5 |
| 7 | 15690.00 | 51.8 AV | 54.0 | -2.2 | 3.68 V | 32 | 36.3 | 15.5 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 151 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5624.80 | 53.4 PK | 68.2 | -14.8 | 2.06 H | 291 | 49.5 | 3.9 |
| 2 | *5755.00 | 102.4 PK | | | 2.06 H | 291 | 63.8 | 38.6 |
| 3 | *5755.00 | 91.9 AV | | | 2.06 H | 291 | 53.3 | 38.6 |
| 4 | #5960.00 | 54.2 PK | 68.2 | -14.0 | 2.06 H | 291 | 49.4 | 4.8 |
| 5 | 11510.00 | 56.2 PK | 74.0 | -17.8 | 1.49 H | 127 | 40.5 | 15.7 |
| 6 | 11510.00 | 42.6 AV | 54.0 | -11.4 | 1.49 H | 127 | 26.9 | 15.7 |
| 7 | #17265.00 | 63.9 PK | 68.2 | -4.3 | 1.56 H | 106 | 41.9 | 22.0 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5647.20 | 59.3 PK | 68.2 | -8.9 | 2.02 V | 112 | 55.2 | 4.1 |
| 2 | *5755.00 | 115.9 PK | | | 1.99 V | 112 | 77.3 | 38.6 |
| 3 | *5755.00 | 105.3 AV | | | 1.99 V | 112 | 66.7 | 38.6 |
| 4 | #5935.20 | 57.3 PK | 68.2 | -10.9 | 2.02 V | 112 | 52.6 | 4.7 |
| 5 | 11510.00 | 56.9 PK | 74.0 | -17.1 | 3.63 V | 27 | 41.2 | 15.7 |
| 6 | 11510.00 | 43.2 AV | 54.0 | -10.8 | 3.63 V | 27 | 27.5 | 15.7 |
| 7 | #17265.00 | 66.2 PK | 68.2 | -2.0 | 2.65 V | 37 | 44.2 | 22.0 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

| CHANNEL | TX Channel 159 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
|---|---|---|---|
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5601.60 | 52.6 PK | 68.2 | -15.6 | 1.83 H | 117 | 48.8 | 3.8 |
| 2 | *5795.00 | 104.5 PK | | | 1.83 H | 117 | 65.8 | 38.7 |
| 3 | *5795.00 | 94.6 AV | | | 1.83 H | 117 | 55.9 | 38.7 |
| 4 | #5926.40 | 52.4 PK | 68.2 | -15.8 | 1.83 H | 117 | 47.7 | 4.7 |
| 5 | 11590.00 | 57.0 PK | 74.0 | -17.0 | 1.56 H | 132 | 41.6 | 15.4 |
| 6 | 11590.00 | 43.0 AV | 54.0 | -11.0 | 1.56 H | 132 | 27.6 | 15.4 |
| 7 | #17385.00 | 64.0 PK | 68.2 | -4.2 | 1.63 H | 102 | 42.4 | 21.6 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5638.40 | 61.6 PK | 68.2 | -6.6 | 1.95 V | 67 | 57.6 | 4.0 |
| 2 | *5795.00 | 118.5 PK | | | 1.95 V | 67 | 79.8 | 38.7 |
| 3 | *5795.00 | 107.8 AV | | | 1.95 V | 67 | 69.1 | 38.7 |
| 4 | #5930.40 | 66.0 PK | 68.2 | -2.2 | 1.95 V | 67 | 61.3 | 4.7 |
| 5 | 11590.00 | 58.2 PK | 74.0 | -15.8 | 2.59 V | 19 | 42.8 | 15.4 |
| 6 | 11590.00 | 44.3 AV | 54.0 | -9.7 | 2.59 V | 19 | 28.9 | 15.4 |
| 7 | #17385.00 | 65.6 PK | 68.2 | -2.6 | 2.62 V | 39 | 44.0 | 21.6 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

802.11ac (VHT80)

| | | | |
|---|---|---|---|
| CHANNEL | TX Channel 42 | DETECTOR FUNCTION | Peak (PK)<br>Average (AV) |
| FREQUENCY RANGE | 1GHz ~ 40GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 5150.00 | 67.0 PK | 74.0 | -7.0 | 1.05 H | 266 | 63.5 | 3.5 |
| 2 | 5150.00 | 50.8 AV | 54.0 | -3.2 | 1.05 H | 266 | 47.3 | 3.5 |
| 3 | *5210.00 | 95.1 PK | | | 1.05 H | 266 | 57.3 | 37.8 |
| 4 | *5210.00 | 79.7 AV | | | 1.05 H | 266 | 41.9 | 37.8 |
| 5 | #10420.00 | 57.3 PK | 68.2 | -10.9 | 1.22 H | 171 | 41.7 | 15.6 |
| 6 | 15630.00 | 58.7 PK | 74.0 | -15.3 | 1.01 H | 285 | 42.8 | 15.9 |
| 7 | 15630.00 | 46.3 AV | 54.0 | -7.7 | 1.01 H | 285 | 30.4 | 15.9 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 5150.00 | 69.4 PK | 74.0 | -4.6 | 1.70 V | 168 | 65.9 | 3.5 |
| **2** | **5150.00** | **53.0 AV** | **54.0** | **-1.0** | **1.70 V** | **168** | **49.5** | **3.5** |
| 3 | *5210.00 | 108.9 PK | | | 1.70 V | 168 | 71.1 | 37.8 |
| 4 | *5210.00 | 93.5 AV | | | 1.70 V | 168 | 55.7 | 37.8 |
| 5 | #10420.00 | 58.1 PK | 68.2 | -10.1 | 2.07 V | 44 | 42.5 | 15.6 |
| 6 | 15630.00 | 60.9 PK | 74.0 | -13.1 | 3.65 V | 36 | 45.0 | 15.9 |
| 7 | 15630.00 | 47.6 AV | 54.0 | -6.4 | 3.65 V | 36 | 31.7 | 15.9 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

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

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5643.20 | 55.3 PK | 68.2 | -12.9 | 1.51 H | 327 | 51.2 | 4.1 |
| 2 | #5650.00 | 62.6 PK | 68.2 | -5.6 | 1.46 H | 318 | 58.5 | 4.1 |
| 3 | *5775.00 | 98.3 PK | | | 1.51 H | 327 | 59.7 | 38.6 |
| 4 | *5775.00 | 83.5 AV | | | 1.51 H | 327 | 44.9 | 38.6 |
| 5 | #5956.00 | 53.4 PK | 68.2 | -14.8 | 1.51 H | 327 | 48.7 | 4.7 |
| 6 | 11550.00 | 55.3 PK | 74.0 | -18.7 | 1.57 H | 131 | 39.7 | 15.6 |
| 7 | 11550.00 | 42.4 AV | 54.0 | -11.6 | 1.57 H | 131 | 26.8 | 15.6 |
| 8 | #17325.00 | 63.9 PK | 68.2 | -4.3 | 1.64 H | 101 | 41.8 | 22.1 |
| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | #5648.80 | 66.2 PK | 68.2 | -2.0 | 1.92 V | 122 | 62.1 | 4.1 |
| 2 | #5650.00 | 66.9 PK | 68.2 | -1.3 | 1.90 V | 134 | 62.8 | 4.1 |
| 3 | *5775.00 | 111.9 PK | | | 1.92 V | 122 | 73.3 | 38.6 |
| 4 | *5775.00 | 95.5 AV | | | 1.92 V | 122 | 56.9 | 38.6 |
| 5 | #5929.60 | 60.3 PK | 68.2 | -7.9 | 1.92 V | 122 | 55.6 | 4.7 |
| 6 | 11550.00 | 56.0 PK | 74.0 | -18.0 | 2.30 V | 50 | 40.4 | 15.6 |
| 7 | 11550.00 | 42.8 AV | 54.0 | -11.2 | 2.30 V | 50 | 27.2 | 15.6 |
| 8 | #17325.00 | 64.4 PK | 68.2 | -3.8 | 3.59 V | 55 | 42.3 | 22.1 |

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. The other emission levels were very low against the limit.
4. Margin value = Emission Level – Limit value
5. " * ": Fundamental frequency.
6. " # ": The radiated frequency is out of the restricted band.

Below 1GHz Worst-Case

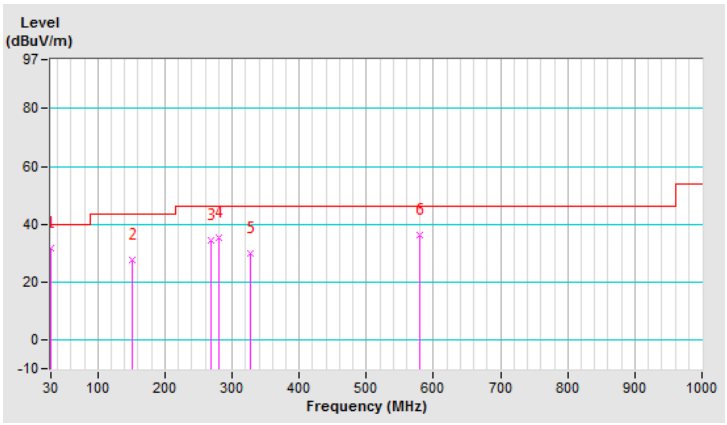
802.11n (HT40)

| CHANNEL | TX Channel 159 | DETECTOR FUNCTION | Quasi-Peak (QP) |
|---|---|---|---|
| FREQUENCY RANGE | 9kHz ~ 1GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: HORIZONTAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 30.00 | 31.6 QP | 40.0 | -8.4 | 1.50 H | 115 | 42.8 | -11.2 |
| 2 | 150.28 | 27.7 QP | 43.5 | -15.8 | 1.25 H | 123 | 37.1 | -9.4 |
| 3 | 267.65 | 34.4 QP | 46.0 | -11.6 | 1.00 H | 272 | 43.3 | -8.9 |
| 4 | 280.26 | 35.4 QP | 46.0 | -10.6 | 1.00 H | 262 | 43.7 | -8.3 |
| 5 | 326.82 | 30.1 QP | 46.0 | -15.9 | 1.50 H | 245 | 37.4 | -7.3 |
| 6 | 579.99 | 36.2 QP | 46.0 | -9.8 | 1.00 H | 336 | 39.1 | -2.9 |

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 emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB below the permissible value to be report.

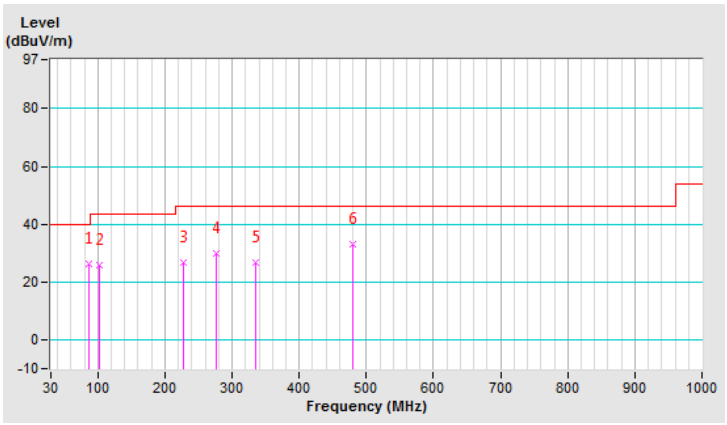


| CHANNEL | TX Channel 159 | DETECTOR FUNCTION | Quasi-Peak (QP) |
|---|---|---|---|
| FREQUENCY RANGE | 9kHz ~ 1GHz | | |

| ANTENNA POLARITY & TEST DISTANCE: VERTICAL AT 3 M | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| NO. | FREQ. (MHz) | EMISSION LEVEL (dBuV/m) | LIMIT (dBuV/m) | MARGIN (dB) | ANTENNA HEIGHT (m) | TABLE ANGLE (Degree) | RAW VALUE (dBuV) | CORRECTION FACTOR (dB/m) |
| 1 | 87.23 | 26.3 QP | 40.0 | -13.7 | 1.25 V | 229 | 41.0 | -14.7 |
| 2 | 101.78 | 25.6 QP | 43.5 | -17.9 | 1.50 V | 184 | 39.0 | -13.4 |
| 3 | 227.88 | 26.7 QP | 46.0 | -19.3 | 1.00 V | 50 | 37.7 | -11.0 |
| 4 | 277.35 | 29.8 QP | 46.0 | -16.2 | 1.00 V | 187 | 38.3 | -8.5 |
| 5 | 335.55 | 26.7 QP | 46.0 | -19.3 | 1.50 V | 268 | 33.9 | -7.2 |
| 6 | 480.08 | 32.9 QP | 46.0 | -13.1 | 1.25 V | 299 | 37.8 | -4.9 |

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 emission levels were very low against the limit of frequency range 9kHz~30MHz: the amplitude of spurious emissions attenuated more than 20dB 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 0.50MHz.

### 4.2.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due |
|---|---|---|---|---|
| Test Receiver<br>ROHDE & SCHWARZ | ESCI | 100613 | Dec. 10, 2018 | Dec. 09, 2019 |
| RF signal cable<br>Woken | 5D-FB | Cable-cond1-01 | Sep. 05, 2018 | Sep. 04, 2019 |
| LISN<br>ROHDE & SCHWARZ<br>(EUT) | ENV216 | 101826 | Feb. 21, 2019 | Feb. 20, 2020 |
| LISN<br>ROHDE & SCHWARZ<br>(Peripheral) | ESH3-Z5 | 100312 | Aug. 13, 2018 | Aug. 12, 2019 |
| | | | Aug. 13, 2019 | Aug. 12, 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.
3. The VCCI Site Registration No. is C-12040.

### 4.2.3 Test Procedures

a. 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.

b. Both lines of the power mains connected to the EUT were checked for maximum conducted interference.

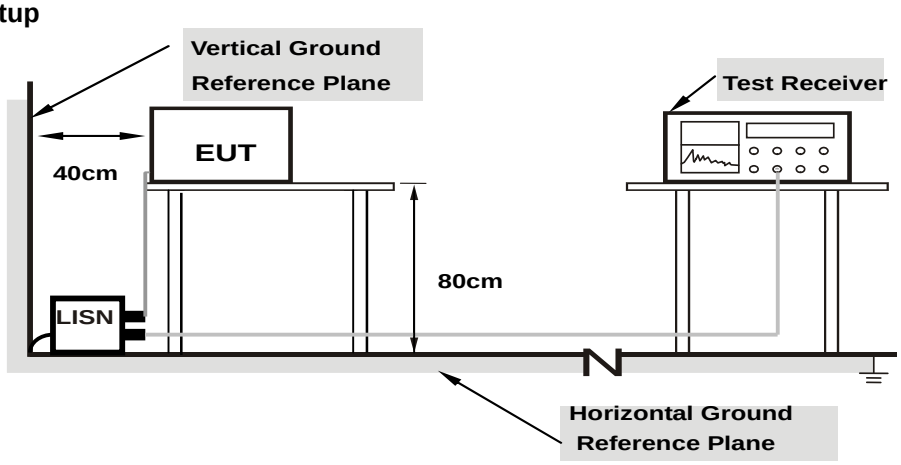
c. The frequency range from 150kHz to 30MHz was searched. Emission levels under (Limit - 20dB) was not recorded.

NOTE: The resolution bandwidth and video bandwidth of test receiver is 9kHz for quasi-peak detection (QP) and average detection (AV) at frequency 0.15MHz-30MHz.

### 4.2.4 Deviation from Test Standard

No deviation.

### 4.2.5 Test Setup




**Note: 1.Support units were connected to second LISN.**

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

### 4.2.6 EUT Operating Conditions

Same as 4.1.6.

### 4.2.7 Test Results

Worst-case data:

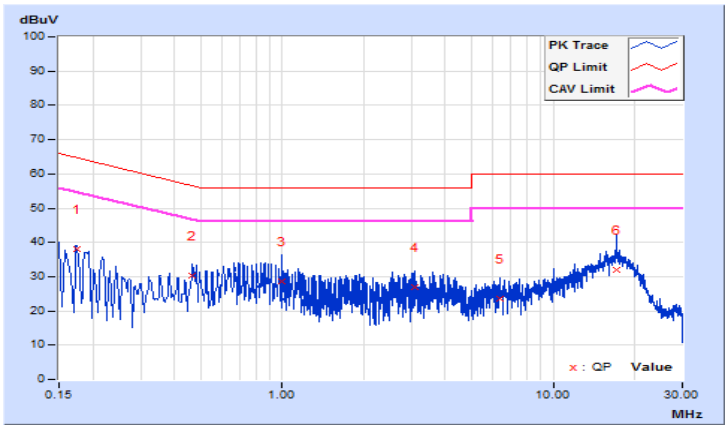
802.11n (HT40)

| Phase | Line (L) | Detector Function | Quasi-Peak (QP) / Average (AV) |
|---|---|---|---|
| Channel | TX Channel 159 | | |

| No | Freq. | Corr. Factor | Reading Value | | Emission Level | | Limit | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.17374 | 9.69 | 28.49 | 16.44 | 38.18 | 26.13 | 64.78 | 54.78 | -26.60 | -28.65 |
| 2 | 0.46301 | 9.68 | 20.59 | 9.69 | 30.27 | 19.37 | 56.64 | 46.64 | -26.37 | -27.27 |
| 3 | 1.00238 | 9.67 | 18.99 | 8.11 | 28.66 | 17.78 | 56.00 | 46.00 | -27.34 | -28.22 |
| 4 | 3.07077 | 9.73 | 17.22 | 6.68 | 26.95 | 16.41 | 56.00 | 46.00 | -29.05 | -29.59 |
| 5 | 6.36690 | 9.80 | 13.75 | 4.35 | 23.55 | 14.15 | 60.00 | 50.00 | -36.45 | -35.85 |
| 6 | 17.20933 | 9.92 | 22.09 | 10.24 | 32.01 | 20.16 | 60.00 | 50.00 | -27.99 | -29.84 |

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.

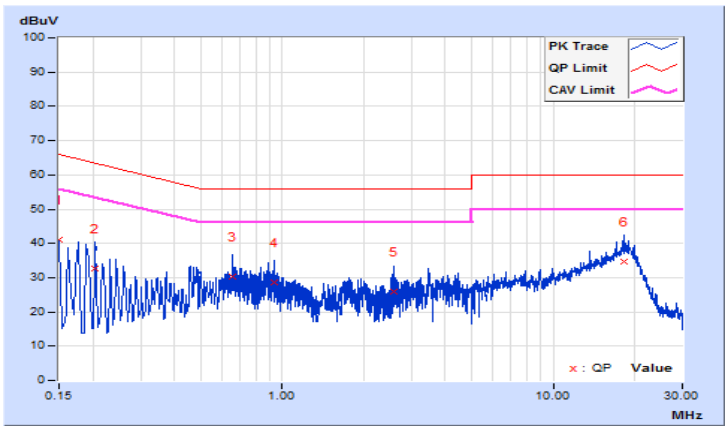


| Phase | Neutral (N) | Detector Function | Quasi-Peak (QP) / Average (AV) |
|---|---|---|---|
| Channel | TX Channel 159 | | |

| No | Freq. | Corr. Factor | Reading Value | | Emission Level | | Limit | | Margin | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | [dB (uV)] | | [dB (uV)] | | [dB (uV)] | | (dB) | |
| | [MHz] | (dB) | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.15000 | 9.66 | 31.35 | 18.43 | 41.01 | 28.09 | 66.00 | 56.00 | -24.99 | -27.91 |
| 2 | 0.20474 | 9.66 | 23.15 | 8.73 | 32.81 | 18.39 | 63.42 | 53.42 | -30.61 | -35.03 |
| **3** | **0.65439** | **9.65** | **20.72** | **12.16** | **30.37** | **21.81** | **56.00** | **46.00** | **-25.63** | **-24.19** |
| 4 | 0.93568 | 9.64 | 19.14 | 10.35 | 28.78 | 19.99 | 56.00 | 46.00 | -27.22 | -26.01 |
| 5 | 2.58984 | 9.68 | 16.36 | 7.68 | 26.04 | 17.36 | 56.00 | 46.00 | -29.96 | -28.64 |
| 6 | 18.24157 | 9.98 | 24.75 | 13.89 | 34.73 | 23.87 | 60.00 | 50.00 | -25.27 | -26.13 |

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

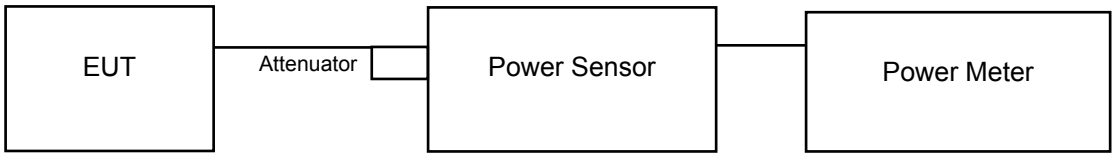
Per KDB 662911 Method of conducted output power measurement on IEEE 802.11 devices,

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 ≥ 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 $N_{ANT} \geq 5$.

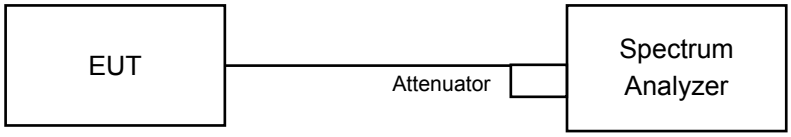
For power measurements on all other devices: Array Gain = 10 log($N_{ANT}$/$N_{SS}$) dB.

### 4.3.2 Test Setup

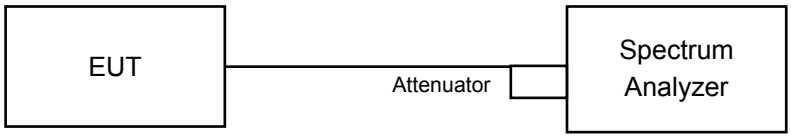
For Power Output
802.11a, 802.11n (HT20), 802.11n (HT40)




802.11ac (VHT80)




For Bandwidth



### 4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.3.4 Test Procedure

For Average Power Measurement

For 802.11a, 802.11n (HT20), 802.11n (HT40)
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 and set the detector to AVERAGE. Duty factor is not added to measured value.

For 802.11ac (VHT80)
1) Set span to encompass the entire 26 dB EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
2) Set sweep trigger to “free run”.
3) Set RBW = 1 MHz.
4) Set VBW ≥ 3 MHz.
5) Number of points in sweep ≥ 2 Span / RBW.
6) Sweep time ≤ (number of points in sweep) * T
7) Using emission bandwidth to determine the frequency span for integration the channel bandwidth.
8) Detector = RMS.
9) Trace mode = max hold.
10) Allow max hold to run for at least 60 seconds, or longer as needed to allow the trace to stabilize.
11) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument’s band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

For 26dB Bandwidth
1) Set RBW = approximately 1% of the emission bandwidth.
2) Set the VBW > RBW.
3) Detector = Peak.
4) Trace mode = max hold.
5) Measure the maximum width of the emission that is 26 dB down from the peak of the emission. Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

### 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

Power Output:

CDD Mode

802.11a

| Chan. | Freq. (MHz) | Conducted Power (mW) | Conducted Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|
| 36 | 5180 | 62.517 | 17.96 | 30.00 | Pass |
| 40 | 5200 | 70.632 | 18.49 | 30.00 | Pass |
| 48 | 5240 | 96.605 | 19.85 | 30.00 | Pass |
| 149 | 5745 | 63.680 | 18.04 | 30.00 | Pass |
| 157 | 5785 | 89.536 | 19.52 | 30.00 | Pass |
| 165 | 5825 | 64.863 | 18.12 | 30.00 | Pass |

802.11n (HT20)

| Chan. | Freq. (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 15.86 | 16.55 | 83.734 | 19.23 | 30.00 | Pass |
| 40 | 5200 | 16.88 | 17.17 | 100.872 | 20.04 | 30.00 | Pass |
| 48 | 5240 | 17.34 | 17.63 | 112.143 | 20.50 | 30.00 | Pass |
| 149 | 5745 | 17.17 | 17.31 | 105.946 | 20.25 | 30.00 | Pass |
| 157 | 5785 | 17.30 | 18.26 | 120.691 | 20.82 | 30.00 | Pass |
| 165 | 5825 | 17.14 | 17.23 | 104.606 | 20.20 | 30.00 | Pass |

802.11n (HT40)

| Chan. | Freq. (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 14.67 | 14.91 | 60.283 | 17.80 | 30.00 | Pass |
| 46 | 5230 | 18.23 | 18.78 | **142.036** | 21.52 | 30.00 | Pass |
| 151 | 5755 | 20.18 | 20.24 | 209.914 | 23.22 | 30.00 | Pass |
| 159 | 5795 | 20.67 | 21.56 | **259.900** | 24.15 | 30.00 | Pass |

802.11ac (VHT80)

| Chan. | Freq. (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | 13.54 | 14.21 | 48.957 | 16.90 | 30.00 | Pass |
| 155 | 5775 | 17.45 | 18.54 | 127.040 | 21.04 | 30.00 | Pass |

Beamforming Mode

802.11n (HT20)

| Chan. | Freq. (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 15.86 | 16.55 | 83.734 | 19.23 | 27.99 | Pass |
| 40 | 5200 | 16.88 | 17.17 | 100.872 | 20.04 | 27.99 | Pass |
| 48 | 5240 | 17.34 | 17.63 | 112.143 | 20.50 | 27.99 | Pass |
| 149 | 5745 | 17.17 | 17.31 | 105.946 | 20.25 | 27.99 | Pass |
| 157 | 5785 | 17.30 | 18.26 | 120.691 | 20.82 | 27.99 | Pass |
| 165 | 5825 | 17.14 | 17.23 | 104.606 | 20.20 | 27.99 | Pass |

*Directional gain = 5dBi+10log(2) = 8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

802.11n (HT40)

| Chan. | Freq. (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 14.67 | 14.91 | 60.283 | 17.80 | 27.99 | Pass |
| 46 | 5230 | 18.23 | 18.78 | **142.036** | 21.52 | 27.99 | Pass |
| 151 | 5755 | 20.18 | 20.24 | 209.914 | 23.22 | 27.99 | Pass |
| 159 | 5795 | 20.67 | 21.56 | **259.900** | 24.15 | 27.99 | Pass |

*Directional gain = 5dBi+10log(2) = 8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

802.11ac (VHT80)

| Chan. | Freq. (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | 13.54 | 14.21 | 48.957 | 16.90 | 27.99 | Pass |
| 155 | 5775 | 17.45 | 18.54 | 127.04 | 21.04 | 27.99 | Pass |

*Directional gain = 5dBi+10log(2) = 8.01dBi > 6dBi, so the power limit shall be reduced to 30-(8.01-6) = 27.99dBm.

26dB Bandwidth:

802.11a

| Channel | Frequency (MHz) | 26dBc Bandwidth (MHz) |
|---|---|---|
| 36 | 5180 | 21.47 |
| 40 | 5200 | 20.83 |
| 48 | 5240 | 29.05 |

802.11n (HT20)

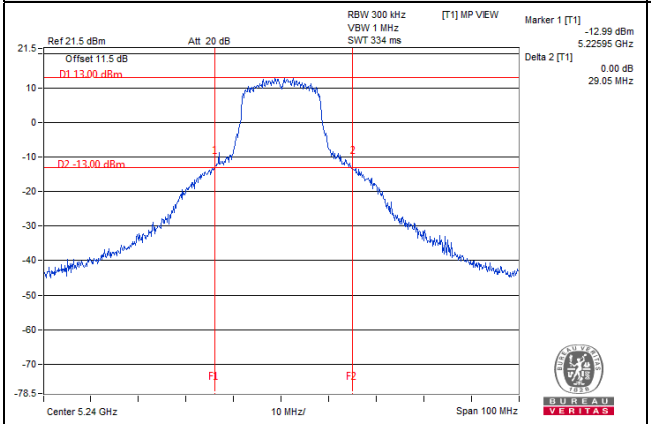
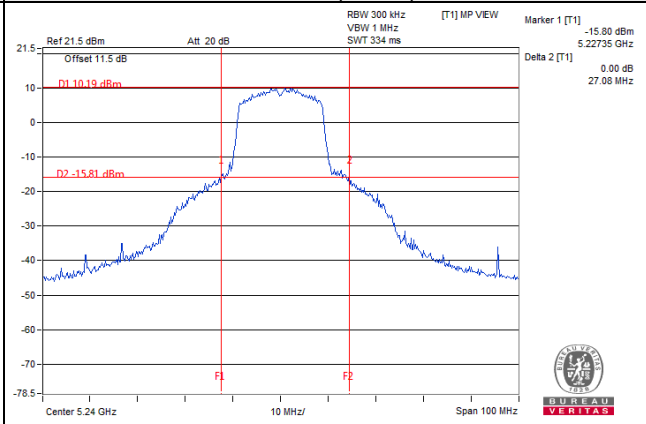
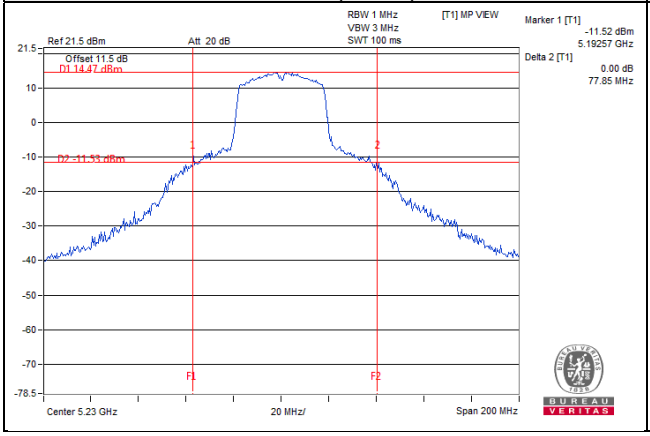
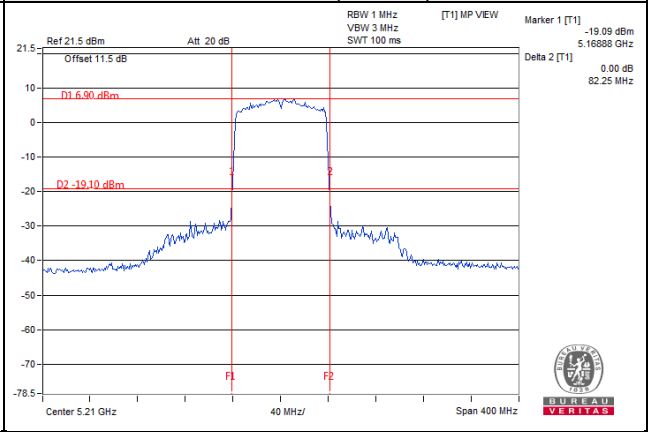
| Channel | Frequency (MHz) | 26dBc Bandwidth (MHz) | |
|---|---|---|---|
| | | Chain 0 | Chain 1 |
| 36 | 5180 | 20.65 | 20.78 |
| 40 | 5200 | 20.92 | 25.50 |
| 48 | 5240 | 21.63 | 27.08 |

802.11n (HT40)

| Channel | Frequency (MHz) | 26dBc Bandwidth (MHz) | |
|---|---|---|---|
| | | Chain 0 | Chain 1 |
| 38 | 5190 | 41.67 | 42.04 |
| 46 | 5230 | 64.82 | 77.85 |

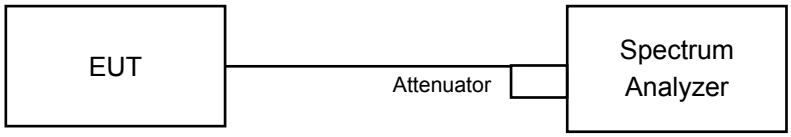
802.11ac (VHT80)

| Channel | Frequency (MHz) | 26dBc Bandwidth (MHz) | |
|---|---|---|---|
| | | Chain 0 | Chain 1 |
| 42 | 5210 | 81.74 | 82.25 |

| Spectrum Plot of Worst Value | |
|---|---|
| 802.11a | 802.11n (HT20) |
|  |  |
| 802.11n (HT40) | 802.11ac (VHT80) |
|  |  |

## 4.4 Occupied Bandwidth Measurement

### 4.4.1 Test Setup




### 4.4.2 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.4.3 Test Procedure

The transmitter output was connected to the spectrum analyzer through an attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with resolution bandwidth in the range of 1% to 5% of the anticipated emission bandwidth, and a video bandwidth at least 3x the resolution bandwidth and set the detector to sampling. The width of a frequency band such that, below the lower and above the upper frequency limits, the mean powers emitted are each equal to a specified percentage 0.5 %of the total mean power of a given emission.

### 4.4.4 Test Result

802.11a

| Channel | Frequency (MHz) | Occupied Bandwidth (MHz) |
|---|---|---|
| 36 | 5180 | 16.92 |
| 40 | 5200 | 16.80 |
| 48 | 5240 | 17.48 |
| 149 | 5745 | 16.86 |
| 157 | 5785 | 17.04 |
| 165 | 5825 | 16.80 |

802.11n (HT20)

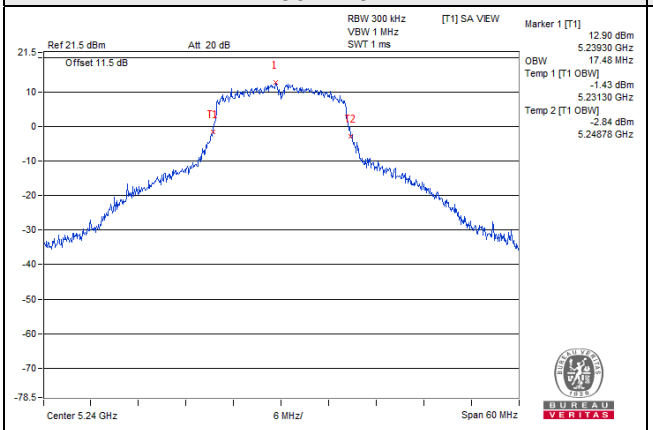
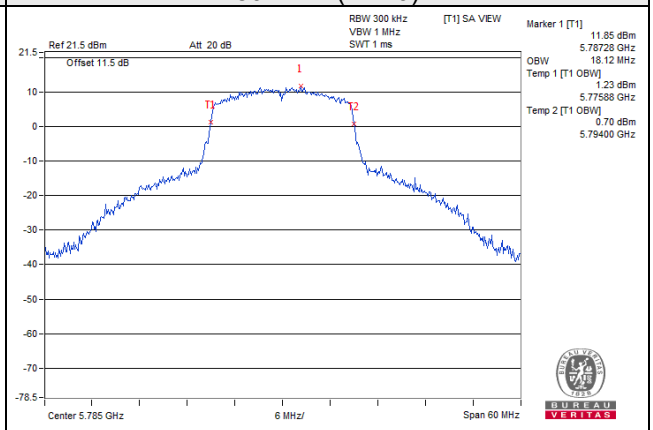
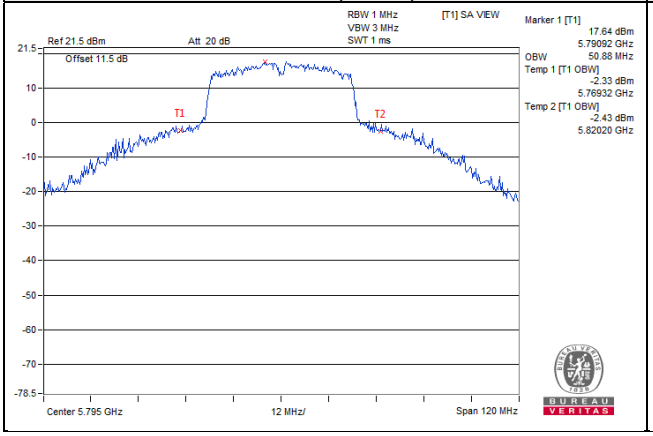
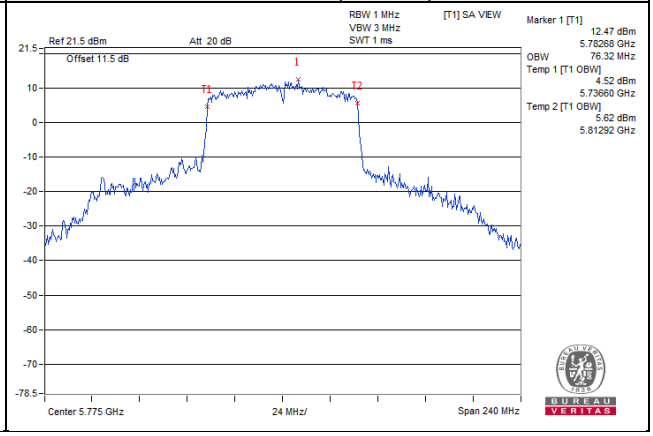
| Channel | Frequency (MHz) | Occupied Bandwidth (MHz) | |
|---|---|---|---|
| | | Chain 0 | Chain 1 |
| 36 | 5180 | 17.64 | 17.64 |
| 40 | 5200 | 17.64 | 17.88 |
| 48 | 5240 | 17.83 | 17.88 |
| 149 | 5745 | 17.65 | 17.88 |
| 157 | 5785 | 17.88 | 18.12 |
| 165 | 5825 | 17.76 | 17.88 |

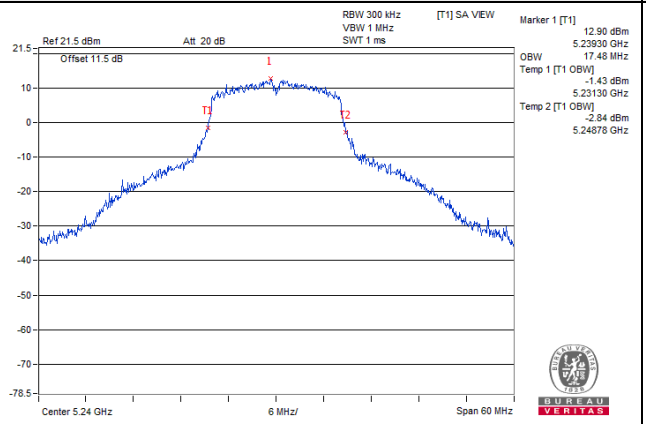
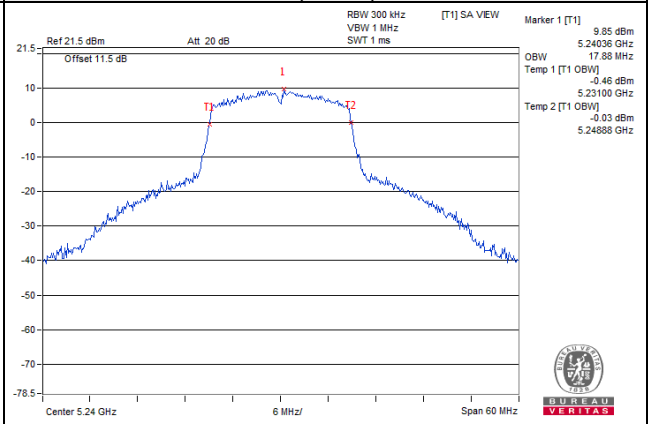
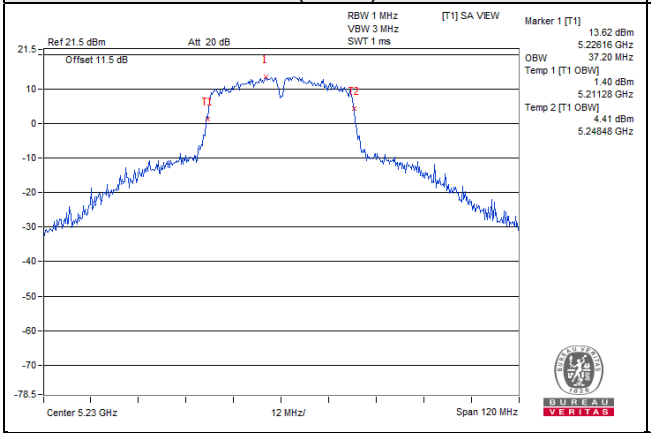
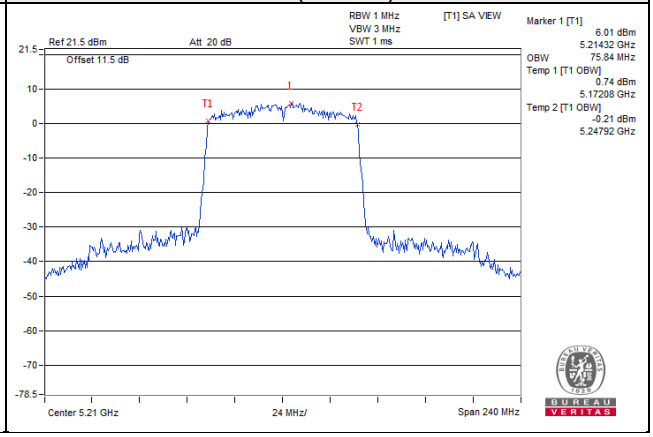
802.11n (HT40)

| Channel | Frequency (MHz) | Occupied Bandwidth (MHz) | |
|---|---|---|---|
| | | Chain 0 | Chain 1 |
| 38 | 5190 | 36.24 | 36.24 |
| 46 | 5230 | 36.96 | 37.20 |
| 151 | 5755 | 37.44 | 38.16 |
| 159 | 5795 | 50.88 | 49.44 |

802.11ac (VHT80)

| Channel | Frequency (MHz) | Occupied Bandwidth (MHz) | |
|---|---|---|---|
| | | Chain 0 | Chain 1 |
| 42 | 5210 | 75.36 | 75.84 |
| 155 | 5775 | 76.32 | 76.32 |

| Spectrum Plot of Worst Value | |
|---|---|
| 802.11a | 802.11n (HT20) |
|  |  |
| 802.11n (HT40) | 802.11ac (VHT80) |
|  |  |

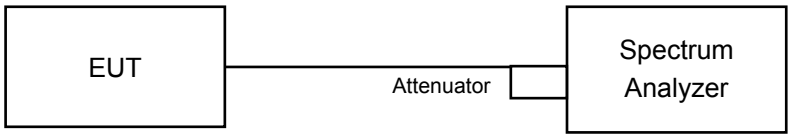
| Spectrum Plot of Worst Value | |
|---|---|
| 802.11a Ch 48 | 802.11n (HT20) Ch 48 |
|  |  |
| 802.11n (HT40) Ch 46 | 802.11ac (VHT80) Ch 42 |
|  |  |

## 4.5 Peak Power Spectral Density Measurement

### 4.5.1 Limits of Peak Power Spectral Density Measurement

| Operation Band | EUT Category | | LIMIT |
|---|---|---|---|
| U-NII-1 | | Outdoor Access Point | 17dBm/ MHz |
| | | Fixed point-to-point Access Point | |
| | √ | Indoor Access Point | |
| | | Mobile and Portable client device | 11dBm/ MHz |
| U-NII-2A | - | | 11dBm/ MHz |
| U-NII-2C | - | | 11dBm/ MHz |
| U-NII-3 | √ | | 30dBm/ 500kHz |

### 4.5.2 Test Setup




### 4.5.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.5.4 Test Procedures

For U-NII-1 band:
Duty cycle of test signal is ≥ 98%
Using method SA-1
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS.
3) Set Channel power measure = 1MHz.
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value.

Duty cycle of test signal is < 98%
Using method SA-2
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 1MHz, Set VBW ≥ 3 MHz, Detector = RMS.
3) Set Channel power measure = 1MHz.
4) Sweep time = auto, trigger set to “free run”.
5) Trace average at least 100 traces in power averaging mode.
6) Record the max value and add 10 log (1/duty cycle).

For U-NII-3 band:
Duty cycle of test signal is ≥ 98%
Using method SA-1
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS.
3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured 1) power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz).
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) Record the max value.

Duty cycle of test signal is < 98%
1) Set span to encompass the entire emission bandwidth (EBW) of the signal.
2) Set RBW = 300 kHz, Set VBW ≥ 1 MHz, Detector = RMS.
3) Use the peak marker function to determine the maximum power level in any 300 kHz band segment within the fundamental EBW.
4) Scale the observed power level to an equivalent value in 500 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where BWCF = 10log(500 kHz / 300 kHz).
5) Sweep time = auto, trigger set to “free run”.
6) Trace average at least 100 traces in power averaging mode.
7) Record the max value and add 10 log (1/duty cycle).

### 4.5.5 Deviation from Test Standard

No deviation.

### 4.5.6 EUT Operating Conditions

Same as 4.3.6.

### 4.5.7 Test Results

For U-NII-1 band:

802.11a

| Chan. | Freq. (MHz) | PSD W/O Duty Factor (dBm/MHz) | Duty Factor (dB) | PSD With Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---|---|---|---|---|---|---|
| 36 | 5180 | 6.07 | 0.21 | 6.28 | 17.00 | Pass |
| 40 | 5200 | 6.48 | 0.21 | 6.69 | 17.00 | Pass |
| 48 | 5240 | 7.87 | 0.21 | 8.08 | 17.00 | Pass |

Note:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-1:**
   Directional gain = 5dBi < 6dBi, so the power density limit no need to be reduced.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

| Chan. | Freq. (MHz) | PSD W/O Duty Factor (dBm/MHz) | | Duty Factor (dB) | Total PSD With Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 4.52 | 5.08 | 0.20 | 8.02 | 14.99 | Pass |
| 40 | 5200 | 5.15 | 4.99 | 0.20 | 8.28 | 14.99 | Pass |
| 48 | 5240 | 5.33 | 5.26 | 0.20 | 8.51 | 14.99 | Pass |

Note:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-1:**
   Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

| Chan. | Freq. (MHz) | PSD W/O Duty Factor (dBm/MHz) | | Duty Factor (dB) | Total PSD With Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | -1.35 | -0.67 | 0.40 | 2.41 | 14.99 | Pass |
| 46 | 5230 | 2.97 | 3.67 | 0.40 | 6.74 | 14.99 | Pass |

Note:

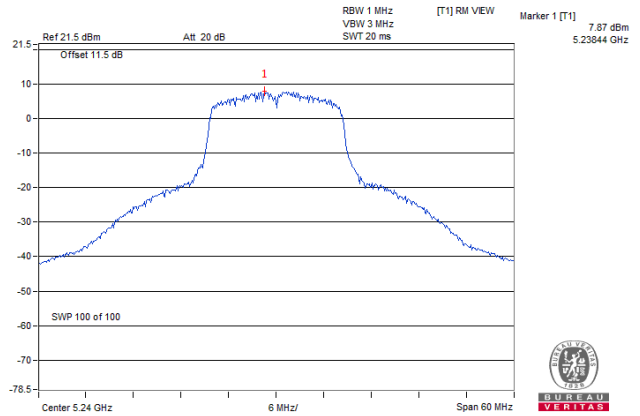
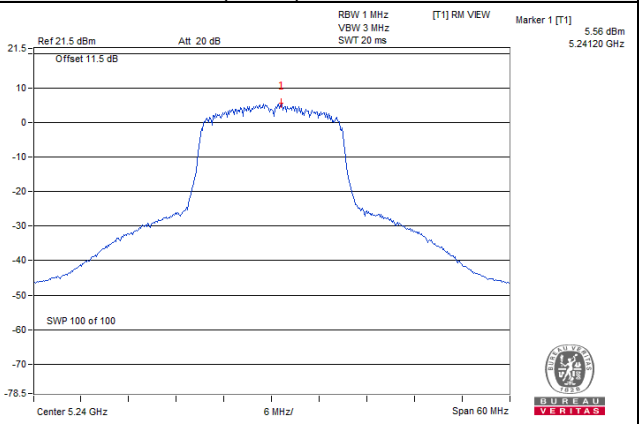
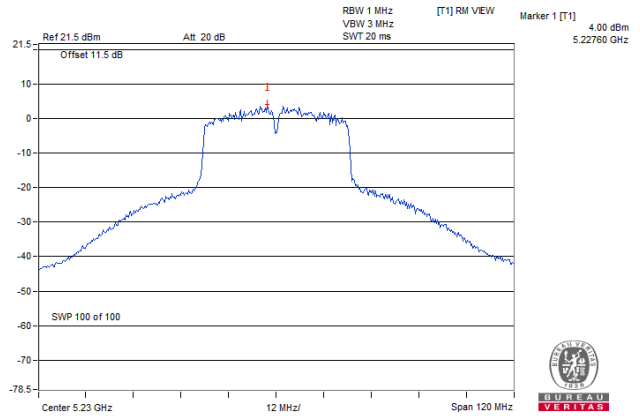
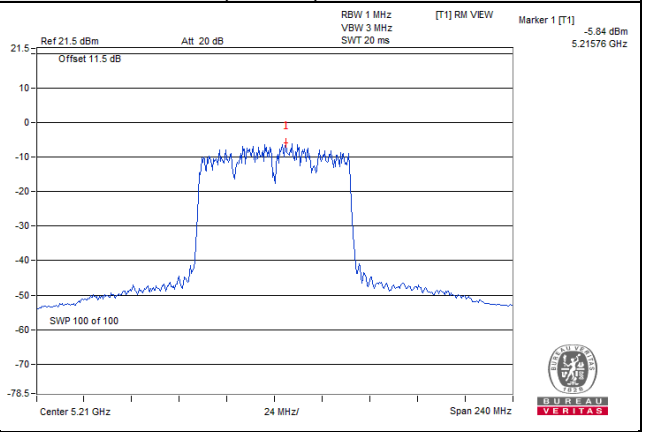
1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-1:**
   Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

| Chan. | Freq. (MHz) | PSD W/O Duty Factor (dBm/MHz) | | Duty Factor (dB) | Total PSD With Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | -5.84 | -8.17 | 1.20 | -2.64 | 14.99 | Pass |

Note:

1. Method E) 2) a) of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. **For U-NII-1:**
   Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 17-(8.01-6) = 14.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

| Spectrum Plot of Worst Value | |
|---|---|
| 802.11a / CH 48 | 802.11n (HT20) / Chain 0 / CH 48 |
|  |  |
| 802.11n (HT40) / Chain 1 / CH 46 | 802.11ac (VHT80) / Chain 0 / CH 42 |
|  |  |

For U-NII-3 band:

802.11a

| Chan. | Freq. (MHz) | PSD W/O Duty Factor | | Duty Factor (dB) | Total PSD With Duty Factor (dBm/500kHz) | Limit (dBm/500kHz) | Pass / Fail |
|---|---|---|---|---|---|---|---|
| | | (dBm/300kHz) | (dBm/500kHz) | | | | |
| 149 | 5745 | -1.81 | 0.41 | 0.21 | 0.62 | 30 | Pass |
| 157 | 5785 | -0.09 | 2.13 | 0.21 | 2.34 | 30 | Pass |
| 165 | 5825 | -1.70 | 0.52 | 0.21 | 0.73 | 30 | Pass |

Note: Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT20)

| TX chain | Chan. | Freq. (MHz) | PSD W/O Duty Factor | | 10 log (N=2) dB | Duty Factor (dB) | Total PSD With Duty Factor (dBm/500kHz) | Limit (dBm/ 500kHz) | Pass / Fail |
|---|---|---|---|---|---|---|---|---|---|
| | | | (dBm/300kHz) | (dBm/500kHz) | | | | | |
| 0 | 149 | 5745 | -3.26 | -1.04 | 3.01 | 0.20 | 2.17 | 27.99 | Pass |
| | 157 | 5785 | -1.23 | 0.99 | 3.01 | 0.20 | 4.20 | 27.99 | Pass |
| | 165 | 5825 | -2.25 | -0.03 | 3.01 | 0.20 | 3.18 | 27.99 | Pass |
| 1 | 149 | 5745 | -2.81 | -0.59 | 3.01 | 0.20 | 2.62 | 27.99 | Pass |
| | 157 | 5785 | -0.61 | 1.61 | 3.01 | 0.20 | 4.82 | 27.99 | Pass |
| | 165 | 5825 | -2.57 | -0.35 | 3.01 | 0.20 | 2.86 | 27.99 | Pass |

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

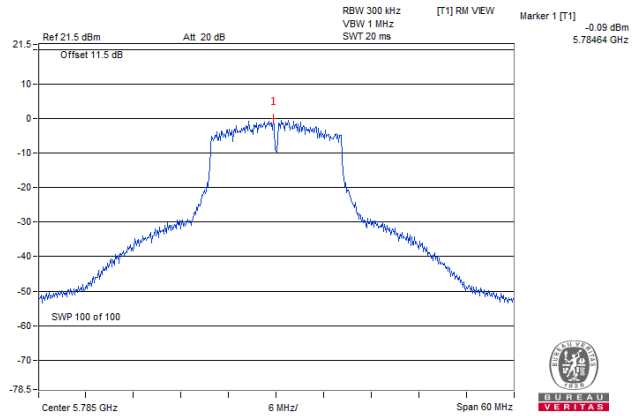
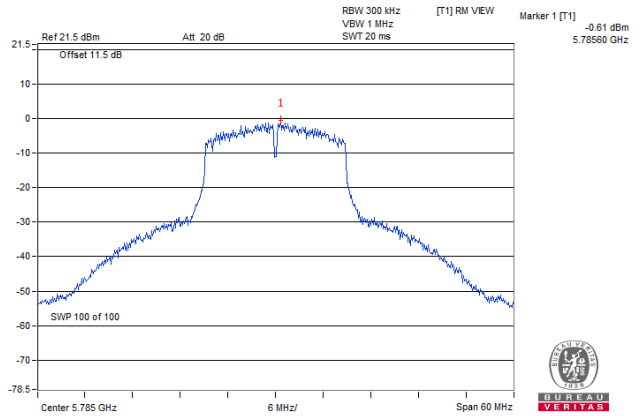
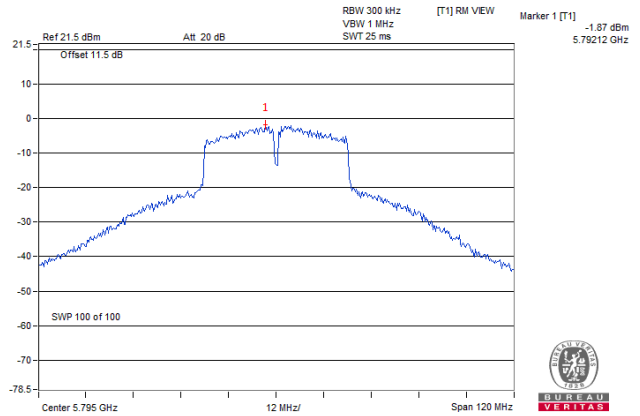
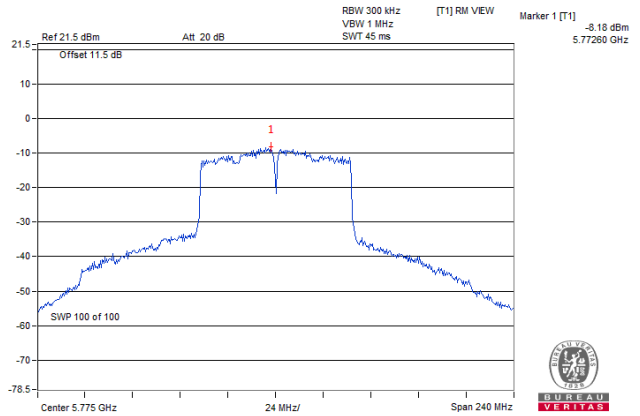
| TX chain | Chan. | Freq. (MHz) | PSD W/O Duty Factor | | 10 log (N=2) dB | Duty Factor (dB) | Total PSD With Duty Factor (dBm/500kHz) | Limit (dBm/ 500kHz) | Pass / Fail |
|---|---|---|---|---|---|---|---|---|---|
| | | | (dBm/300kHz) | (dBm/500kHz) | | | | | |
| 0 | 151 | 5755 | -3.97 | -1.75 | 3.01 | 0.40 | 1.66 | 27.99 | Pass |
| | 159 | 5795 | -1.90 | 0.32 | 3.01 | 0.40 | 3.73 | 27.99 | Pass |
| 1 | 151 | 5755 | -3.63 | -1.41 | 3.01 | 0.40 | 2.00 | 27.99 | Pass |
| | 159 | 5795 | -1.87 | 0.35 | 3.01 | 0.40 | 3.76 | 27.99 | Pass |

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

| TX chain | Chan. | Freq. (MHz) | PSD W/O Duty Factor | | 10 log (N=2) dB | Duty Factor (dB) | Total PSD With Duty Factor (dBm/500kHz) | Limit (dBm/ 500kHz) | Pass / Fail |
|---|---|---|---|---|---|---|---|---|---|
| | | | (dBm/300kHz) | (dBm/500kHz) | | | | | |
| 0 | 155 | 5775 | -8.29 | -6.07 | 3.01 | 1.20 | -1.86 | 27.99 | Pass |
| 1 | 155 | 5775 | -8.18 | -5.96 | 3.01 | 1.20 | -1.75 | 27.99 | Pass |

Note:
1. Method E) 2) c) of power density measurement of KDB 662911 is using for calculating total power density.
2. Directional gain = 5dBi +10log (2) = 8.01dBi > 6dBi, so the power density limit shall be reduced to 30-(8.01-6) = 27.99dBm.
3. Refer to section 3.3 for duty cycle spectrum plot.

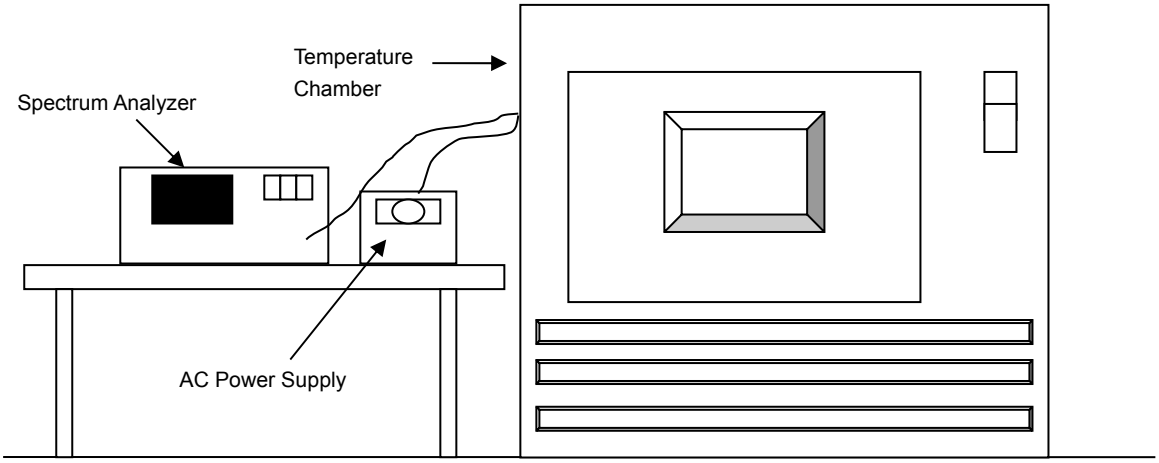
| Spectrum Plot of Worst Value | |
|---|---|
| 802.11a | 802.11n (HT20) |
|  |  |
| 802.11n (HT40) | 802.11ac (VHT80) |
|  |  |

## 4.6 Frequency Stability

### 4.6.1 Limits of Frequency Stability Measurement

The frequency of the carrier signal shall be maintained within band of operation

### 4.6.2 Test Setup




### 4.6.3 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Cal. Date | Cal. Due |
|---|---|---|---|---|
| Spectrum Analyzer ROHDE & SCHWARZ | FSP40 | 100040 | Sep. 25, 2018 | Sep. 26, 2019 |
| WIT Standard Temperature And Humidity Chamber | TH-4S-C | W981030 | Jun. 04, 2018 | Jun. 03, 2019 |
| | | | Jun. 03, 2019 | Jun. 02, 2020 |
| Digital Multimeter Fluke | 87-III | 70360742 | Jun. 29, 2018 | Jun. 28, 2019 |
| | | | Jun. 27, 2019 | Jun. 26, 2020 |
| AC Power Supply Extech | CFW-105 | E000603 | NA | NA |

### 4.6.4 Test Procedure

a. The EUT was placed inside the environmental test chamber and powered by nominal AC voltage.
b. Turn the EUT on and couple its output to a spectrum analyzer.
c. Turn the EUT off and set the chamber to the highest temperature specified.
d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes.
e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
f. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

### 4.6.5 Deviation from Test Standard

No deviation.

### 4.6.6 EUT Operating Condition

Set the EUT transmit at un-modulation mode to test frequency stability.

### 4.6.7 Test Results

| Frequency Stability Versus Temp. | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Operating Frequency: 5180MHz | | | | | | | | | |
| Temp. (℃) | Power Supply (Vac) | 0 Minute | | 2 Minute | | 5 Minute | | 10 Minute | |
| | | Measured Frequency (MHz) | Pass/Fail | Measured Frequency (MHz) | Pass/Fail | Measured Frequency (MHz) | Pass/Fail | Measured Frequency (MHz) | Pass/Fail |
| 40 | 120 | 5180.0236 | PASS | 5180.0200 | PASS | 5180.0216 | PASS | 5180.0221 | PASS |
| 30 | 120 | 5179.9838 | PASS | 5179.9860 | PASS | 5179.9856 | PASS | 5179.9836 | PASS |
| 20 | 120 | 5179.9782 | PASS | 5179.9768 | PASS | 5179.9792 | PASS | 5179.9782 | PASS |
| 10 | 120 | 5180.0231 | PASS | 5180.0246 | PASS | 5180.0218 | PASS | 5180.0223 | PASS |
| 0 | 120 | 5179.9971 | PASS | 5179.9947 | PASS | 5179.9955 | PASS | 5179.9949 | PASS |

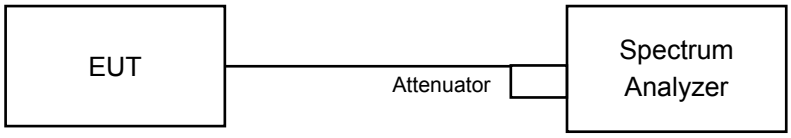
| Frequency Stability Versus Voltage | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Operating Frequency: 5180MHz | | | | | | | | | |
| Temp. (℃) | Power Supply (Vac) | 0 Minute | | 2 Minute | | 5 Minute | | 10 Minute | |
| | | Measured Frequency (MHz) | Pass/Fail | Measured Frequency (MHz) | Pass/Fail | Measured Frequency (MHz) | Pass/Fail | Measured Frequency (MHz) | Pass/Fail |
| 20 | 138 | 5180.0222 | PASS | 5180.0256 | PASS | 5180.0220 | PASS | 5180.0233 | PASS |
| | 120 | 5180.0231 | PASS | 5180.0246 | PASS | 5180.0218 | PASS | 5180.0223 | PASS |
| | 102 | 5180.0234 | PASS | 5180.0245 | PASS | 5180.0219 | PASS | 5180.0227 | PASS |

## 4.7 6dB Bandwidth Measurement

### 4.7.1 Limits of 6dB Bandwidth Measurement

The minimum of 6dB Bandwidth Measurement is 0.5MHz.

### 4.7.2 Test Setup




### 4.7.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

### 4.7.4 Test Procedure

**Measurement Procedure REF**

a. Set resolution bandwidth (RBW) = 100kHz
b. Set the video bandwidth (VBW) ≥ 3 x RBW, Detector = Peak.
c. Trace mode = max hold.
d. Sweep = auto couple.
e. Measure the maximum width of the emission that is constrained by the frequencies associated with the two amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission

### 4.7.5 Deviation from Test Standard

No deviation.

### 4.7.6 EUT Operating Condition

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

### 4.7.7 Test Results

802.11a

| Channel | Frequency (MHz) | 6dB Bandwidth (MHz) | Minimum Limit (MHz) | Pass / Fail |
|---|---|---|---|---|
| 149 | 5745 | 15.19 | 0.5 | Pass |
| 157 | 5785 | 15.16 | 0.5 | Pass |
| 165 | 5825 | 15.20 | 0.5 | Pass |

802.11n (HT20)

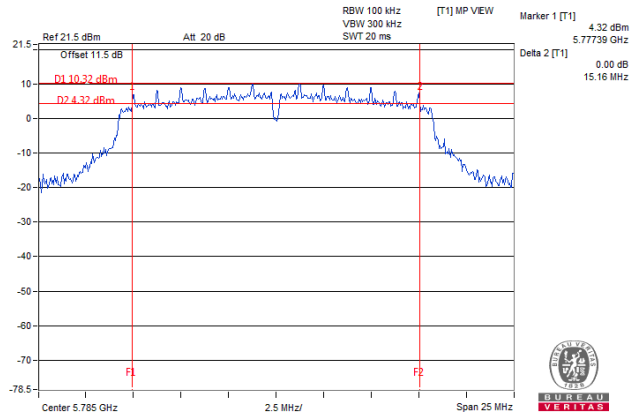
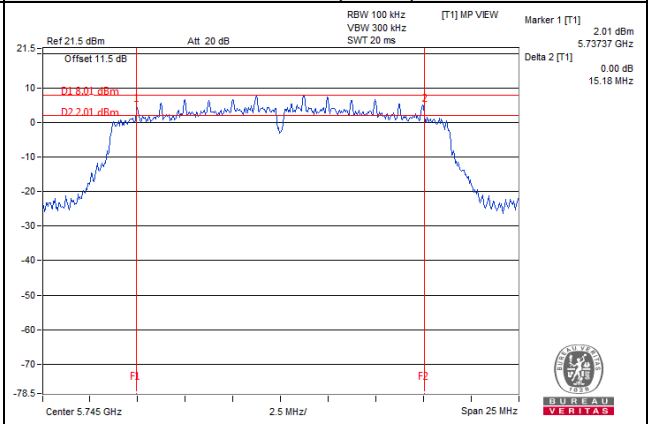
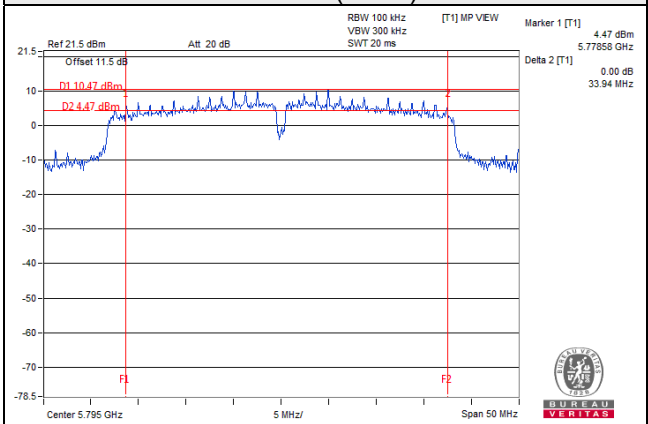
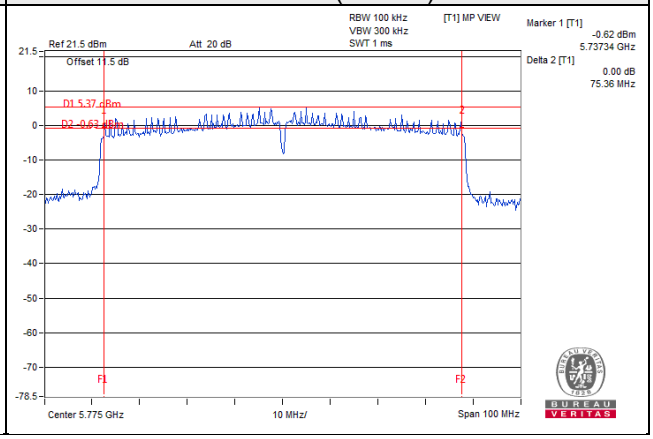
| Chan. | Freq. (MHz) | 6dB Bandwidth (MHz) | | Minimum Limit (MHz) | Pass / Fail |
|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | |
| 149 | 5745 | 15.74 | 15.18 | 0.5 | Pass |
| 157 | 5785 | 16.34 | 15.20 | 0.5 | Pass |
| 165 | 5825 | 16.33 | 15.18 | 0.5 | Pass |

802.11n (HT40)

| Chan. | Freq. (MHz) | 6dB Bandwidth (MHz) | | Minimum Limit (MHz) | Pass / Fail |
|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | |
| 151 | 5755 | 35.19 | 35.18 | 0.5 | Pass |
| 159 | 5795 | 35.14 | 33.94 | 0.5 | Pass |

802.11ac (VHT80)

| Chan. | Freq. (MHz) | 6dB Bandwidth (MHz) | | Minimum Limit (MHz) | Pass / Fail |
|---|---|---|---|---|---|
| | | Chain 0 | Chain 1 | | |
| 155 | 5775 | 75.39 | 75.36 | 0.5 | Pass |

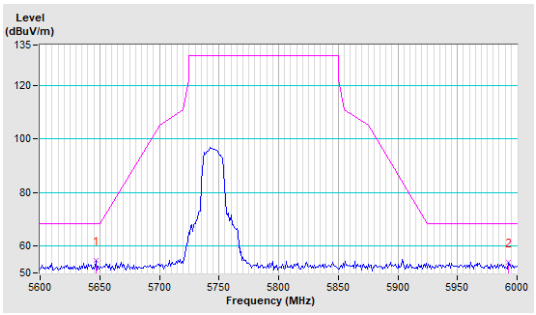
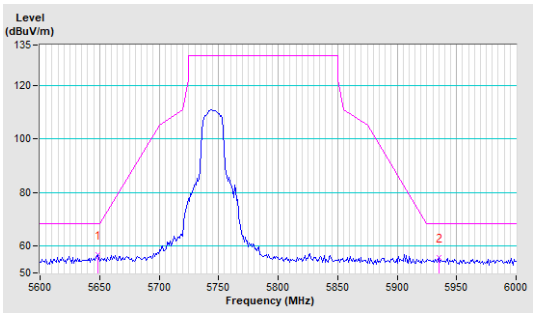
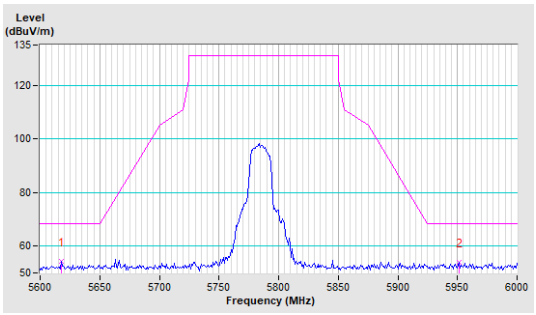
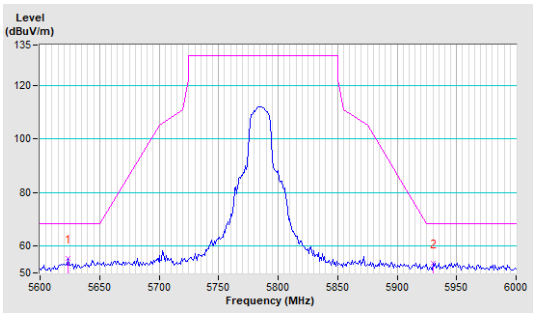
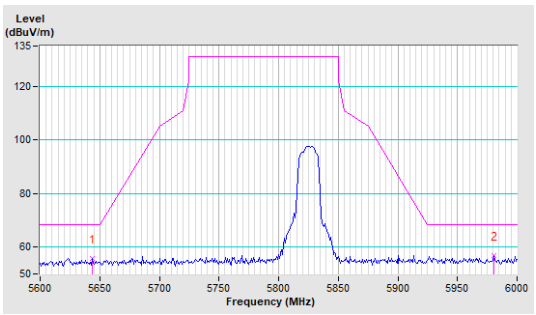
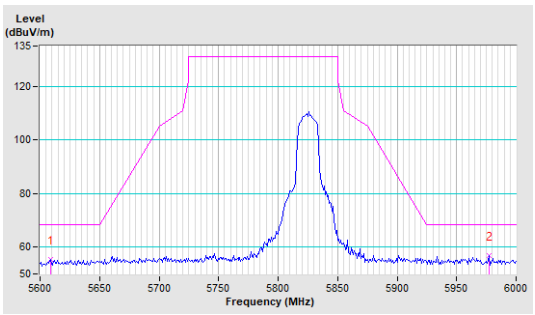
| Spectrum Plot of Worst Value | |
|---|---|
| 802.11a | 802.11n (HT20) |
|  |  |
| 802.11n (HT40) | 802.11ac (VHT80) |
|  |  |

## 5 Pictures of Test Arrangements

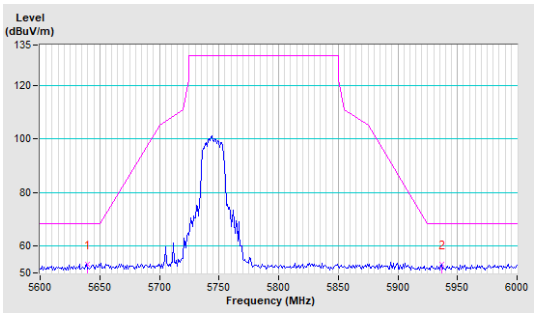
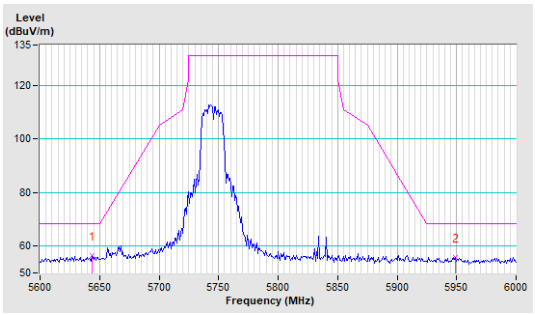
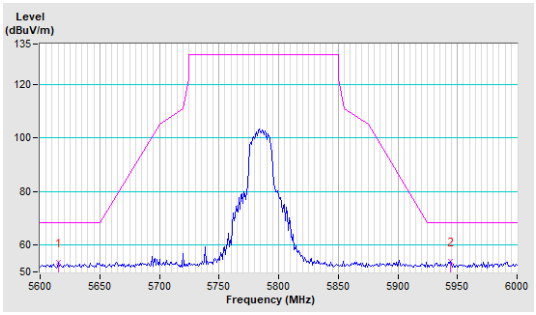
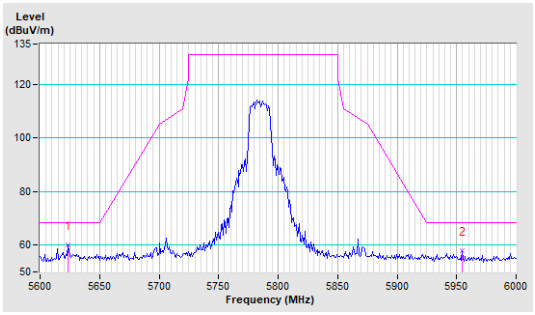
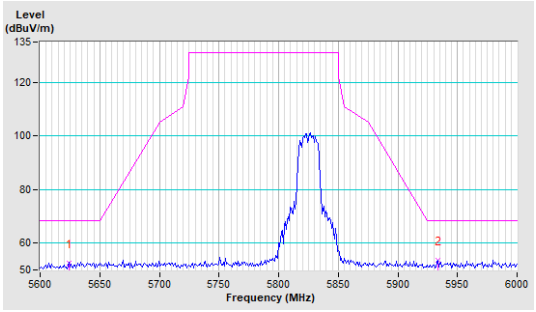
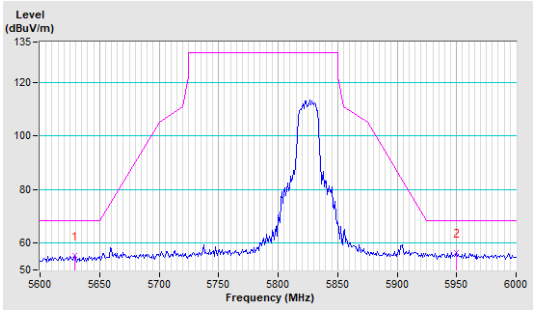
Please refer to the attached file (Test Setup Photo).

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

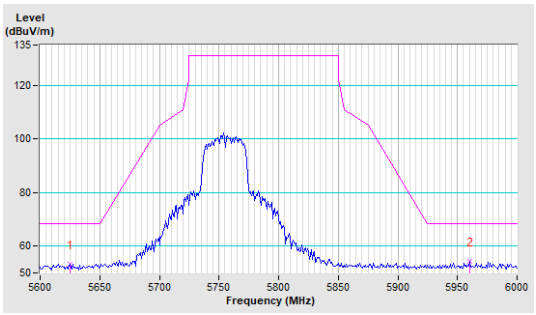
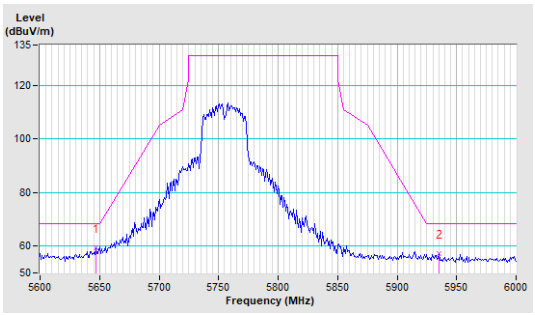
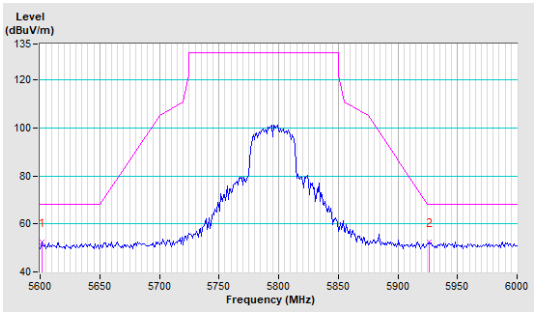
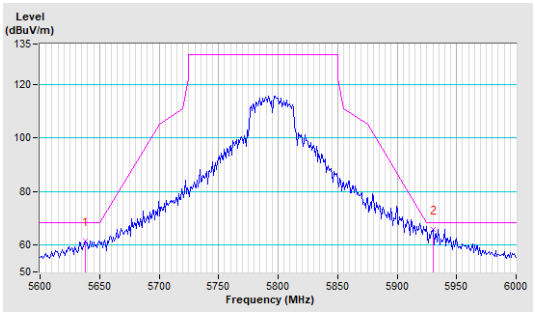
802.11a

| CH149 | |
|---|---|
| Horizontal | Vertical |
|  |  |
| CH157 | |
| Horizontal | Vertical |
|  |  |
| CH165 | |
| Horizontal | Vertical |
|  |  |

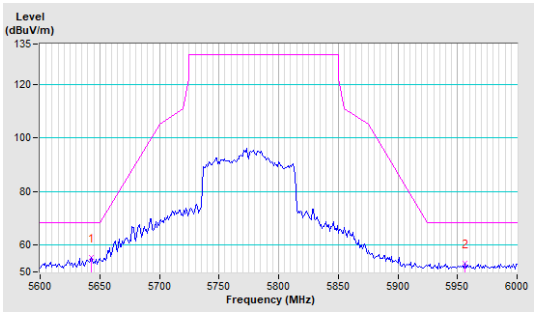
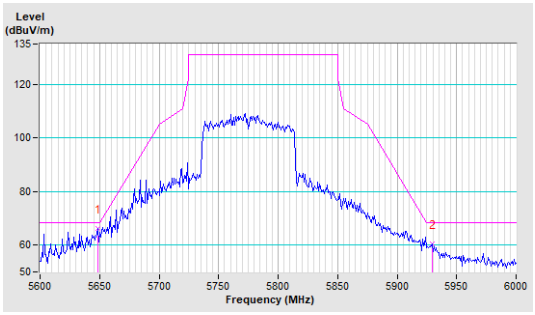
## 802.11n (HT20)

| CH149 | |
|---|---|
| Horizontal | Vertical |
|  |  |
| **CH157** | |
| Horizontal | Vertical |
|  |  |
| **CH165** | |
| Horizontal | Vertical |
|  |  |

## 802.11n (HT40)

| CH151 | |
|---|---|
| Horizontal | Vertical |
|  |  |
| CH159 | |
| Horizontal | Vertical |
|  |  |

## 802.11ac (VHT80)

| CH155 | |
|---|---|
| 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 and approved 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
**Web Site:** www.bureauveritas-adt.com


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

**--- END ---**