

FCC Test Report

Report No.: RF171115C16-1

FCC ID: YZKECWO5210L

Test Model: ECWO5210-L

Received Date: Sep. 15, 2017

Test Date: Sep. 17, 2017 ~ Oct. 06, 2017

Issued Date: Nov. 16, 2017

Applicant: Edgecore Networks Corporation

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

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(R.O.C)

Test Location: No. 19, Hwa Ya 2nd Rd, Wen Hwa Tsuen, Kwei Shan Hsiang, Taoyuan
Hsien 333, Taiwan, R.O.C.

FCC Registration /
Designation Number: 788550 / TW0003



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Release Control Record

| Issue No. | Description | Date Issued |
|---------------|------------------|---------------|
| RF171115C16-1 | Original Release | Nov. 16, 2017 |

1 Certificate of Conformity

Product: Access Point

Brand: Edgecore

Test Model: ECWO5210-L

Sample Status: Production Unit

Applicant: Edgecore Networks Corporation

Test Date: Sep. 17, 2017 ~ Oct. 06, 2017

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

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

Prepared by : Rona Chen, **Date:** Nov. 16, 2017
Rona Chen / Specialist

Approved by : Dylan Chiou, **Date:** Nov. 16, 2017
Dylan Chiou / 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 -12.15 dB at 0.42915 MHz. |
| 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 -1.15 dB at 5146 MHz. |
| 15.407(a)(1/2/3) | Max Average Transmit Power | Pass | Meet the requirement of limit. |
| --- | Occupied Bandwidth Measurement | - | Reference only |
| 15.407(a)(1/2/3) | Peak Power Spectral Density | Pass | Meet the requirement of limit. |
| 15.407(e) | 6 dB 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 | Refer to section 3.1 Note 2 of this report. |

*For U-NII-3 band compliance with rule part 15.407(b)(4)(i), the OOB test plots were recorded in Annex A.

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) (\pm) |
|------------------------------------|--------------------|--------------------------------------|
| Conducted Emissions at mains ports | 150 kHz ~ 30 MHz | 2.44 dB |
| Radiated Emissions up to 1 GHz | 30 MHz ~ 200 MHz | 2.93 dB |
| | 200 MHz ~ 1000 MHz | 2.95 dB |
| Radiated Emissions above 1 GHz | 1 GHz ~ 18 GHz | 2.26 dB |
| | 18 GHz ~ 40 GHz | 1.94 dB |

2.2 Modification Record

There were no modifications required for compliance.

3 General Information

3.1 General Description of EUT

| | |
|------------------------------|--|
| Product | Access Point |
| Brand | Edgecore |
| Test Model | ECWO5210-L |
| Status of EUT | Production Unit |
| Power Supply Rating | 12.0Vdc (Adapter) |
| Modulation Type | 256QAM, 64QAM, 16QAM, QPSK, BPSK |
| Modulation Technology | OFDM |
| Transfer Rate | 802.11a: 54.0/ 48.0/ 36.0/ 24.0/ 18.0/ 12.0/ 9.0/ 6.0 Mbps 802.11n: up to MCS7 802.11ac: up to V9 |
| Operating Frequency | 5180 ~ 5240 MHz, 5745 ~ 5805 MHz |
| Number of Channel | 5180 ~ 5240 MHz: 4 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) 1 for 802.11ac (VHT80) 5745 ~ 5805 MHz: 4 for 802.11a, 802.11n (HT20) 2 for 802.11n (HT40) 1 for 802.11ac (VHT80) |
| Output Power | 266.07 mW for 5180 ~ 5240 MHz 257.63 mW for 5745 ~ 5805 MHz |
| Antenna Type | Dipole antenna with 3.3 dBi gain (5180 ~ 5240 MHz) Dipole antenna with 5.01 dBi gain (5745 ~ 5805 MHz) |
| Antenna Connector | Refer to Note as below |
| Accessory Device | Refer to Note as below |
| Data Cable Supplied | Refer to Note as below |

Note:

- The EUT incorporates a MIMO function. Physically, the EUT provides 3 completed transmitters and 3 receivers.

| Modulation Mode | Tx Function |
|------------------|-------------|
| 802.11a | 1TX |
| 802.11n (HT20) | 3TX |
| 802.11n (HT40) | 3TX |
| 802.11ac (VHT80) | 3TX |

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

- The EUT contains following accessory devices.

| Product | Brand | Model | Description |
|---------|--------|----------------|---|
| Adapter | APD | WA-30B12 | I/P: 100-240Vac, 0.8A O/P: 12Vdc, 2.5A |
| Antenna | Cortec | AN2450-5003BRS | -- |

- The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or user's manual.

3.2 Description of Test Modes

For 5180 ~ 5240 MHz

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

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

2 channels are provided for 802.11n (HT40):

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

1 channel is provided for 802.11ac (VHT80):

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

For 5745 ~ 5825 MHz:

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

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

2 channels are provided for 802.11n (HT40):

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

1 channel is provided for 802.11ac (VHT80):

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

3.2.1 Test Mode Applicability and Tested Channel Detail

| EUT Configure Mode | Applicable To | | | | Description |
|--------------------|---------------|-------|-----|------|-------------|
| | RE \geq 1G | RE<1G | PLC | APCM | |
| - | √ | √ | √ | √ | - |

Where **RE \geq 1G**: Radiated Emission above 1 GHz

RE<1G: Radiated Emission below 1 GHz

PLC: Power Line Conducted Emission

APCM: Antenna Port Conducted Measurement

Note:

1. The EUT had been pre-tested on the positioned of each 3 axis. The worst case was found when positioned on **Z-plane**.

Radiated Emission Test (Above 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| - | 5180-5240 | 802.11a | 36 to 48 | 36, 44, 48 | OFDM | BPSK | 6.0 |
| | | 802.11n (HT20) | 36 to 48 | 36, 44, 48 | OFDM | BPSK | MCS0 |
| | | 802.11n (HT40) | 38 to 46 | 38, 46 | OFDM | BPSK | MCS0 |
| | | 802.11ac (VHT80) | 42 | 42 | OFDM | BPSK | MCS0 |
| - | 5745-5805 | 802.11a | 149 to 161 | 149, 157, 161 | OFDM | BPSK | 6.0 |
| | | 802.11n (HT20) | 149 to 161 | 149, 157, 161 | OFDM | BPSK | MCS0 |
| | | 802.11n (HT40) | 151 to 159 | 151, 159 | OFDM | BPSK | MCS0 |
| | | 802.11ac (VHT80) | 155 | 155 | OFDM | BPSK | MCS0 |

Radiated Emission Test (Below 1 GHz):

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| - | 5180-5240 | 802.11n (HT20) | 36 to 48 | 36 | OFDM | BPSK | MCS0 |
| | 5745-5805 | 802.11n (HT20) | 149 to 165 | 165 | OFDM | BPSK | MCS0 |

Power Line Conducted Emission Test:

☒ Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture).

☒ Following channel(s) was (were) selected for the final test as listed below.

| EUT Configure Mode | Frequency Band (MHz) | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|----------------|-------------------|----------------|-----------------------|-----------------|------------------|
| - | 5180-5240 | 802.11n (HT20) | 36 to 48 | 36 | OFDM | BPSK | MCS0 |

Antenna Port Conducted Measurement:

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

| EUT Configure Mode | Frequency Band (MHz) | Mode | Available Channel | Tested Channel | Modulation Technology | Modulation Type | Data Rate (Mbps) |
|--------------------|----------------------|------------------|-------------------|----------------|-----------------------|-----------------|------------------|
| - | 5180-5240 | 802.11a | 36 to 48 | 36, 44, 48 | OFDM | BPSK | 6.0 |
| | | 802.11n (HT20) | 36 to 48 | 36, 44, 48 | OFDM | BPSK | MCS0 |
| | | 802.11n (HT40) | 38 to 46 | 38, 46 | OFDM | BPSK | MCS0 |
| | | 802.11ac (VHT80) | 42 | 42 | OFDM | BPSK | MCS0 |
| - | 5745-5805 | 802.11a | 149 to 161 | 149, 157, 161 | OFDM | BPSK | 6.0 |
| | | 802.11n (HT20) | 149 to 161 | 149, 157, 161 | OFDM | BPSK | MCS0 |
| | | 802.11n (HT40) | 151 to 159 | 151, 159 | OFDM | BPSK | MCS0 |
| | | 802.11ac (VHT80) | 155 | 155 | OFDM | BPSK | MCS0 |

Test Condition:

| Applicable To | Environmental Conditions | Input Power | Tested by |
|---------------|--------------------------|--------------|---------------|
| RE \geq 1G | 25 deg. C, 65 % RH | 120Vac, 60Hz | Charles Hsiao |
| RE<1G | 25 deg. C, 65 % RH | 120Vac, 60Hz | Charles Hsiao |
| PLC | 25 deg. C, 65 % RH | 120Vac, 60Hz | Anson Lin |
| APCM | 25 deg. C, 65 % RH | 12Vdc | Wayne Lin |

3.3 Duty Cycle of Test Signal

MODULATION TYPE: BPSK

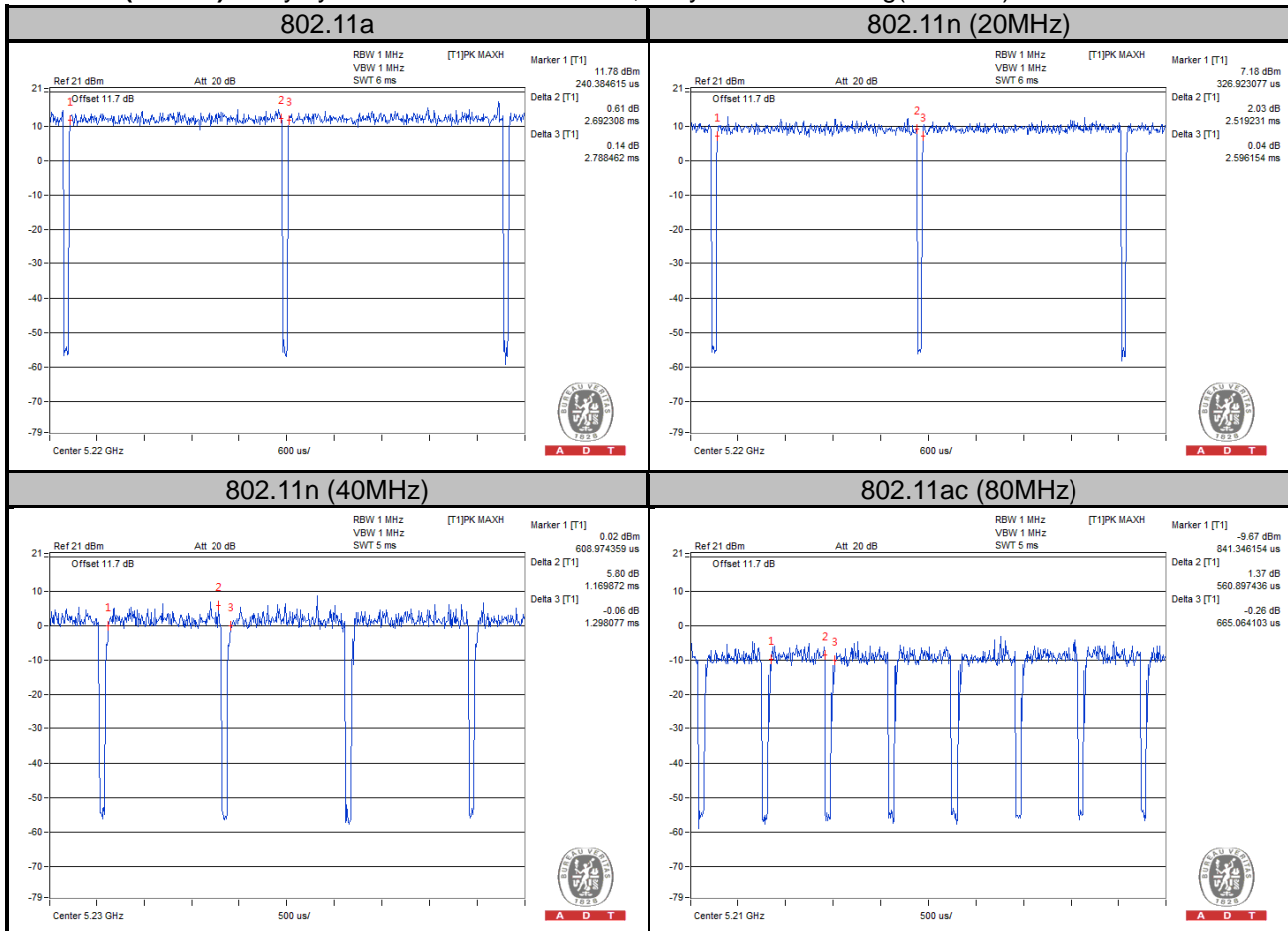
1Tx

802.11a: Duty cycle = $2.692/2.788 = 0.966$, Duty factor = $10 * \log(1/0.966) = 0.15$

802.11n (20MHz): Duty cycle = $2.519/2.596 = 0.970$, Duty factor = $10 * \log(1/0.970) = 0.13$

802.11n (40MHz): Duty cycle = $1.170/1.298 = 0.901$, Duty factor = $10 * \log(1/0.901) = 0.45$

802.11ac (80MHz): Duty cycle = $0.561/0.665 = 0.843$, Duty factor = $10 * \log(1/0.843) = 0.74$



2Tx

802.11n (20MHz): Duty cycle = $2.519/2.596 = 0.970$, Duty factor = $10 * \log(1/0.970) = 0.13$

802.11n (40MHz): Duty cycle = $1.186/1.298 = 0.914$, Duty factor = $10 * \log(1/0.914) = 0.39$

802.11ac (80MHz): Duty cycle = $0.561/0.673 = 0.833$, Duty factor = $10 * \log(1/0.833) = 0.79$



3Tx

802.11n (20MHz): Duty cycle = $2.519/2.596 = 0.970$, Duty factor = $10 * \log(1/0.970) = 0.13$

802.11n (40MHz): Duty cycle = $1.194/1.306 = 0.914$, Duty factor = $10 * \log(1/0.914) = 0.39$

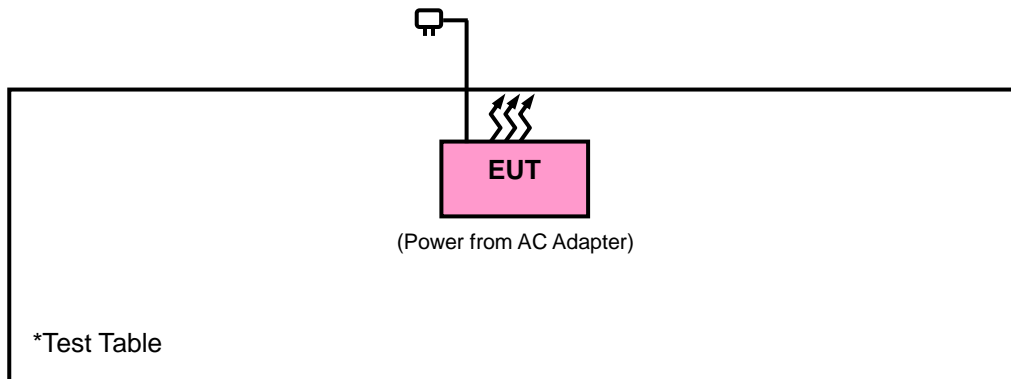
802.11ac (80MHz): Duty cycle = $0.569/0.673 = 0.845$, Duty factor = $10 * \log(1/0.845) = 0.73$



3.4 Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units.

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)

789033 D02 General UNII Test Procedures New Rules v01r04

644545 D01 Guidance for IEEE 802 11ac v01r02

662911 D01 Multiple Transmitter Output v02r01

ANSI C63.10-2013

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

Note: The EUT has been verified to comply with the requirements of FCC Part 15, Subpart B, Class B (DoC).
The test report has been issued separately.

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. Other emissions shall be at least 20 dB below the highest level of the desired power:

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

Note:

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

4.1.2 Limits of Unwanted Emission Out of the Restricted Bands

| Applicable To | | Limit | |
|---|------------------|---|---|
| 789033 D02 General UNII Test Procedures New Rules v01r04 | | Field Strength at 3 m | |
| | | PK: 74 (dBµV/m) | AV: 54 (dBµV/m) |
| Frequency Band | Applicable To | EIRP Limit | Equivalent Field Strength at 3 m |
| 5150~5250 MHz | 15.407(b)(1) | PK: -27 (dBm/MHz) | PK: 68.2 (dBµV/m) |
| 5250~5350 MHz | 15.407(b)(2) | | |
| 5470~5725 MHz | 15.407(b)(3) | | |
| 5725~5850 MHz | 15.407(b)(4)(i) | PK:-27 (dBm/MHz) ^{*1} PK:10 (dBm/MHz) ^{*2} PK:15.6 (dBm/MHz) ^{*3} PK:27 (dBm/MHz) ^{*4} | PK: 68.2 (dBµV/m) ^{*1} PK:105.2 (dBµV/m) ^{*2} PK: 110.8 (dBµV/m) ^{*3} PK:122.2 (dBµV/m) ^{*4} |
| | 15.407(b)(4)(ii) | Emission limits in section 15.247(d) | |

^{*1} beyond 75 MHz or more above of the band edge.

^{*2} below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above.

^{*3} below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above.

^{*4} from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

Note:

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

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

4.1.3 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Date of Calibration | Due Date of Calibration |
|--|----------------------|---------------------|---------------------|-------------------------|
| Test Receiver Agilent | N9038A | MY51210203 | Feb. 17, 2017 | Feb. 16, 2018 |
| Spectrum Analyzer Agilent | N9010A | MY52220314 | Dec. 16, 2016 | Dec. 15, 2017 |
| Spectrum Analyzer ROHDE & SCHWARZ | FSU43 | 101261 | Dec. 13, 2016 | Dec. 12, 2017 |
| BILOG Antenna SCHWARZBECK | VULB9168 | 9168-472 | Dec. 26, 2016 | Dec. 27, 2017 |
| HORN Antenna SCHWARZBECK | BBHA 9120 D | 9120D-969 | Dec. 12, 2016 | Dec. 13, 2017 |
| HORN Antenna SCHWARZBECK | BBHA 9170 | 9170-480 | Dec. 14, 2016 | Dec. 13, 2017 |
| Fixed Attenuator Mini-Circuits | MDCS18N-10 | MDCS18N-10-01 | Apr. 17, 2017 | Apr. 16, 2018 |
| Loop Antenna | HLA 6121 | 45745 | May 19, 2017 | May 18, 2018 |
| Preamplifier EMCI | EMC001340 | 980201 | Nov. 02, 2016 | Nov. 01, 2017 |
| Bluetooth Tester | CBT | 100946 | Jul. 29, 2016 | Jul. 28, 2018 |
| Preamplifier EMCI | EMC 012645 | 980115 | Oct. 21, 2016 | Oct. 20, 2017 |
| Preamplifier EMCI | EMC 184045 | 980116 | Oct. 21, 2016 | Oct. 20, 2017 |
| Preamplifier EMCI | EMC 330H | 980112 | Oct. 21, 2016 | Oct. 20, 2017 |
| Power Meter Anritsu | ML2495A | 1145013 | Mar. 07, 2017 | Mar. 06, 2018 |
| Power Sensor Anritsu | MA2411B | 1126085 | Mar. 07, 2017 | Mar. 06, 2018 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 309219/4 2950114 | Oct. 21, 2016 | Oct. 20, 2017 |
| RF signal cable HUBER+SUHNNER | SUCOFLEX 104 | 250130/4 | Oct. 21, 2016 | Oct. 20, 2017 |
| RF Coaxial Cable Worken | 8D-FB | Cable-Ch10-01 | Oct. 21, 2016 | Oct. 20, 2017 |
| Software BV ADT | E3 6.120103 | NA | NA | NA |
| Antenna Tower MF | MFA-440H | NA | NA | NA |
| Turn Table MF | MFT-201SS | NA | NA | NA |
| Antenna Tower & Turn Table Controller MF | MF-7802 | NA | NA | NA |
| Temperature & Humidity Chamber | GTH-120-40-CP-A R | MAA1306-019 | Sep. 08, 2017 | Sep. 07, 2018 |
| DC Power Supply Topward | 33010D | 807748 | Oct. 25, 2016 | Oct. 24, 2018 |
| Digital Multimeter Fluke | 87-III | 70360742 | Jun. 30, 2017 | Jun. 29, 2018 |

- Note:
1. The calibration interval of the above test instruments is 12 / 24 months and the calibrations are traceable to NML/ROC and NIST/USA.
 2. The test was performed in HwaYa Chamber 10.
 3. The horn antenna and preamplifier (model: EMC 184045) are used only for the measurement of emission frequency above 1 GHz if tested.
 4. The IC Site Registration No. is IC7450F-10.

4.1.4 Test Procedures

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

Note:

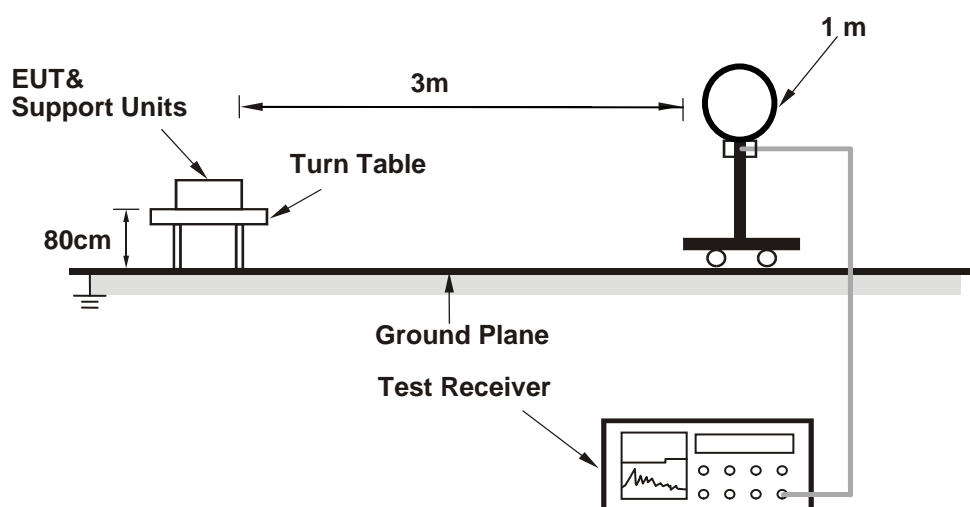
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120 kHz & 360 kHz for Quasi-peak detection (QP) at frequency below 1 GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1 GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 1/T for Average (Duty cycle < 98 %) detection at frequency above 1 GHz.
4. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 10 Hz (Duty cycle ≥ 98 %) for Average detection (AV) at frequency above 1 GHz.
5. All modes of operation were investigated and the worst-case emissions are reported.

4.1.5 Deviation from Test Standard

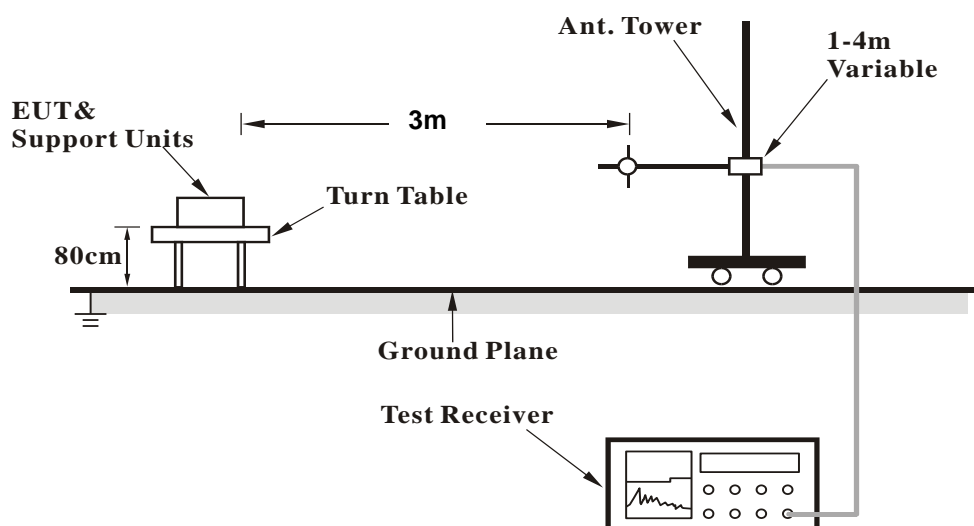
No deviation.

4.1.6 Test Set Up

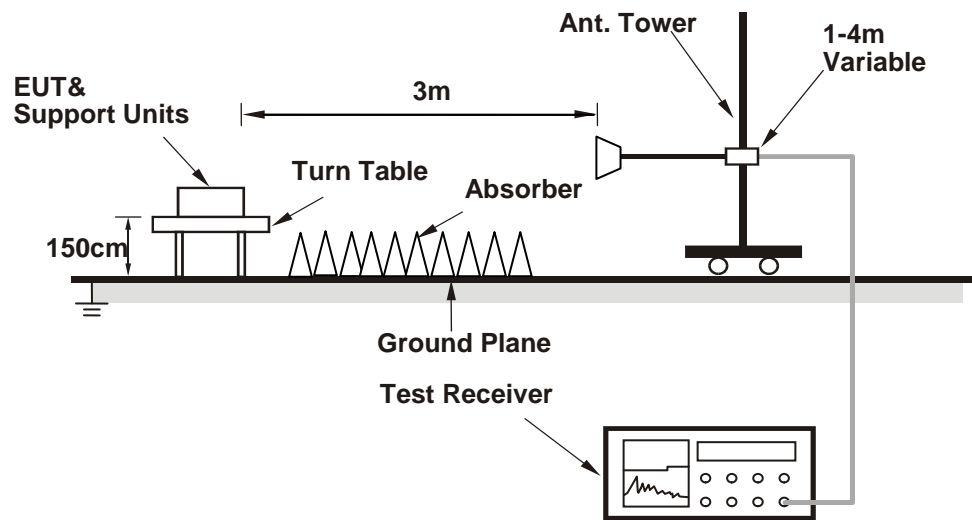
<Radiated emission below 30 MHz>



<Frequency Range below 1 GHz>



<Frequency Range above 1 GHz>



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

4.1.7 EUT Operating Conditions

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

4.1.8 Test Results

Above 1 GHz Data :

802.11a

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 36 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5148 | 45.55 | 37.3 | 54 | -8.45 | 34.12 | 8.13 | 34 | 116 | 248 | Average |
| 5148 | 64.04 | 55.79 | 74 | -9.96 | 34.12 | 8.13 | 34 | 116 | 248 | Peak |
| 5180 | 97.01 | 88.7 | | | 34.15 | 8.16 | 34 | 116 | 248 | Average |
| 5180 | 103.92 | 95.61 | | | 34.15 | 8.16 | 34 | 116 | 248 | Peak |
| 5390 | 43.22 | 34.54 | 54 | -10.78 | 34.31 | 8.41 | 34.04 | 116 | 248 | Average |
| 5390 | 63.25 | 54.57 | 74 | -10.75 | 34.31 | 8.41 | 34.04 | 116 | 248 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5150 | 52.55 | 44.3 | 54 | -1.45 | 34.12 | 8.13 | 34 | 106 | 73 | Average |
| 5150 | 65.04 | 56.79 | 74 | -8.96 | 34.12 | 8.13 | 34 | 106 | 73 | Peak |
| 5180 | 104.91 | 96.6 | | | 34.15 | 8.16 | 34 | 106 | 73 | Average |
| 5180 | 111.83 | 103.52 | | | 34.15 | 8.16 | 34 | 106 | 73 | Peak |
| 5458 | 44.07 | 35.25 | 54 | -9.93 | 34.36 | 8.51 | 34.05 | 106 | 73 | Average |
| 5458 | 63.37 | 54.55 | 74 | -10.63 | 34.36 | 8.51 | 34.05 | 106 | 73 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5180 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 44 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5032 | 43.03 | 34.97 | 54 | -10.97 | 34.03 | 8 | 33.97 | 116 | 233 | Average |
| 5032 | 62.94 | 54.88 | 74 | -11.06 | 34.03 | 8 | 33.97 | 116 | 233 | Peak |
| 5220 | 99 | 90.61 | | | 34.17 | 8.22 | 34 | 116 | 233 | Average |
| 5220 | 106.96 | 98.57 | | | 34.17 | 8.22 | 34 | 116 | 233 | Peak |
| 5378 | 43.12 | 34.44 | 54 | -10.88 | 34.31 | 8.41 | 34.04 | 116 | 233 | Average |
| 5378 | 63.33 | 54.65 | 74 | -10.67 | 34.31 | 8.41 | 34.04 | 116 | 233 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5112 | 44.79 | 36.59 | 54 | -9.21 | 34.09 | 8.1 | 33.99 | 104 | 73 | Average |
| 5112 | 63.42 | 55.22 | 74 | -10.58 | 34.09 | 8.1 | 33.99 | 104 | 73 | Peak |
| 5220 | 106 | 97.61 | | | 34.17 | 8.22 | 34 | 104 | 73 | Average |
| 5220 | 113.76 | 105.37 | | | 34.17 | 8.22 | 34 | 104 | 73 | Peak |
| 5452 | 44.47 | 35.65 | 54 | -9.53 | 34.36 | 8.51 | 34.05 | 104 | 73 | Average |
| 5452 | 64.33 | 55.51 | 74 | -9.67 | 34.36 | 8.51 | 34.05 | 104 | 73 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5220 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 48 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5038 | 43.24 | 35.17 | 54 | -10.76 | 34.04 | 8 | 33.97 | 116 | 248 | Average |
| 5038 | 63.47 | 55.4 | 74 | -10.53 | 34.04 | 8 | 33.97 | 116 | 248 | Peak |
| 5240 | 98.34 | 89.9 | | | 34.19 | 8.26 | 34.01 | 116 | 248 | Average |
| 5240 | 106.89 | 98.45 | | | 34.19 | 8.26 | 34.01 | 116 | 248 | Peak |
| 5440 | 43.42 | 34.63 | 54 | -10.58 | 34.35 | 8.48 | 34.04 | 116 | 248 | Average |
| 5440 | 62.83 | 54.04 | 74 | -11.17 | 34.35 | 8.48 | 34.04 | 116 | 248 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5100 | 45.15 | 36.99 | 54 | -8.85 | 34.08 | 8.07 | 33.99 | 104 | 73 | Average |
| 5100 | 62.56 | 54.4 | 74 | -11.44 | 34.08 | 8.07 | 33.99 | 104 | 73 | Peak |
| 5240 | 106.44 | 98 | | | 34.19 | 8.26 | 34.01 | 104 | 73 | Average |
| 5240 | 113.1 | 104.66 | | | 34.19 | 8.26 | 34.01 | 104 | 73 | Peak |
| 5414 | 43.98 | 35.25 | 54 | -10.02 | 34.33 | 8.44 | 34.04 | 104 | 73 | Average |
| 5414 | 63.11 | 54.38 | 74 | -10.89 | 34.33 | 8.44 | 34.04 | 104 | 73 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5240 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 149 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

<Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5745 | 95.32 | 94.05 | | | 31.99 | 6.75 | 37.47 | 136 | 127 | Average |
| 5745 | 104.73 | 103.46 | | | 31.99 | 6.75 | 37.47 | 136 | 127 | Peak |
| 11490 | 46.46 | 48.67 | 54 | -7.54 | 39.91 | 10.66 | 52.78 | 100 | 248 | Average |
| 11490 | 56.52 | 58.73 | 74 | -17.48 | 39.91 | 10.66 | 52.78 | 100 | 248 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5745 | 102.52 | 101.22 | | | 31.99 | 6.78 | 37.47 | 143 | 75 | Average |
| 5745 | 111.26 | 109.96 | | | 31.99 | 6.78 | 37.47 | 143 | 75 | Peak |
| 11490 | 45.72 | 47.98 | 54 | -8.28 | 39.91 | 10.66 | 52.83 | 135 | 139 | Average |
| 11490 | 56.31 | 58.57 | 74 | -17.69 | 39.91 | 10.66 | 52.83 | 135 | 139 | Peak |

<Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5629.8 | 52.54 | 51.47 | 68.2 | -15.66 | 31.79 | 6.56 | 37.28 | 136 | 127 | Peak |
| 5654.025 | 51.29 | 50.16 | 71.19 | -19.9 | 31.85 | 6.62 | 37.34 | 136 | 127 | Peak |
| 5923.35 | 52.22 | 50.42 | 69.42 | -17.2 | 32.29 | 7.01 | 37.5 | 136 | 127 | Peak |
| 5980.35 | 51.82 | 49.88 | 68.2 | -16.38 | 32.37 | 7.08 | 37.51 | 136 | 127 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5559.025 | 53.82 | 52.77 | 68.2 | -14.38 | 31.68 | 6.49 | 37.12 | 143 | 75 | Peak |
| 5652.125 | 52.66 | 51.47 | 69.78 | -17.12 | 31.85 | 6.62 | 37.28 | 143 | 75 | Peak |
| 5922.875 | 50.76 | 48.96 | 69.77 | -19.01 | 32.29 | 7.01 | 37.5 | 143 | 75 | Peak |
| 5952.8 | 53.28 | 51.38 | 68.2 | -14.92 | 32.32 | 7.08 | 37.5 | 143 | 75 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5745 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 157 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

<Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5785 | 99.38 | 98.06 | | | 32.04 | 6.82 | 37.54 | 136 | 126 | Average |
| 5785 | 108.45 | 107.13 | | | 32.04 | 6.82 | 37.54 | 136 | 126 | Peak |
| 11570 | 46.39 | 48.86 | 54 | -7.61 | 39.78 | 10.76 | 53.01 | 100 | 251 | Average |
| 11570 | 56.89 | 59.36 | 74 | -17.11 | 39.78 | 10.76 | 53.01 | 100 | 251 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5785 | 106.9 | 105.58 | | | 32.04 | 6.82 | 37.54 | 144 | 74 | Average |
| 5785 | 116.02 | 114.7 | | | 32.04 | 6.82 | 37.54 | 144 | 74 | Peak |
| 11570 | 45.96 | 48.75 | 54 | -8.04 | 39.78 | 10.76 | 53.33 | 131 | 139 | Average |
| 11570 | 56.61 | 59.4 | 74 | -17.39 | 39.78 | 10.76 | 53.33 | 131 | 139 | Peak |

<Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5630.75 | 52.91 | 51.84 | 68.2 | -15.29 | 31.79 | 6.56 | 37.28 | 136 | 126 | Peak |
| 5652.125 | 50.44 | 49.25 | 69.78 | -19.34 | 31.85 | 6.62 | 37.28 | 136 | 126 | Peak |
| 5923.35 | 50.57 | 48.77 | 69.42 | -18.85 | 32.29 | 7.01 | 37.5 | 136 | 126 | Peak |
| 5981.775 | 52.22 | 50.28 | 68.2 | -15.98 | 32.37 | 7.08 | 37.51 | 136 | 126 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5602.25 | 55.08 | 53.91 | 68.2 | -13.12 | 31.77 | 6.56 | 37.16 | 144 | 74 | Peak |
| 5652.6 | 54.54 | 53.35 | 70.13 | -15.59 | 31.85 | 6.62 | 37.28 | 144 | 74 | Peak |
| 5921.925 | 51.24 | 49.44 | 70.47 | -19.23 | 32.29 | 7.01 | 37.5 | 144 | 74 | Peak |
| 5950.9 | 54.43 | 52.53 | 68.2 | -13.77 | 32.32 | 7.08 | 37.5 | 144 | 74 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5785 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 161 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

<Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5805 | 99.34 | 97.96 | | | 32.1 | 6.82 | 37.54 | 136 | 126 | Average |
| 5805 | 108.44 | 107.06 | | | 32.1 | 6.82 | 37.54 | 136 | 126 | Peak |
| 11610 | 46.37 | 48.95 | 54 | -7.63 | 39.71 | 10.79 | 53.08 | 100 | 244 | Average |
| 11610 | 57.06 | 59.64 | 74 | -16.94 | 39.71 | 10.79 | 53.08 | 100 | 244 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5805 | 107.25 | 105.87 | | | 32.1 | 6.82 | 37.54 | 143 | 73 | Average |
| 5805 | 115.87 | 114.49 | | | 32.1 | 6.82 | 37.54 | 143 | 73 | Peak |
| 11610 | 45.94 | 48.85 | 54 | -8.06 | 39.71 | 10.79 | 53.41 | 133 | 144 | Average |
| 11610 | 56.98 | 59.89 | 74 | -17.02 | 39.71 | 10.79 | 53.41 | 133 | 144 | Peak |

<Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5563.775 | 52.58 | 51.53 | 68.2 | -15.62 | 31.68 | 6.49 | 37.12 | 136 | 126 | Peak |
| 5652.6 | 50.54 | 49.35 | 70.13 | -19.59 | 31.85 | 6.62 | 37.28 | 136 | 126 | Peak |
| 5921.925 | 50.35 | 48.55 | 70.47 | -20.12 | 32.29 | 7.01 | 37.5 | 136 | 126 | Peak |
| 6001.25 | 51.9 | 49.87 | 68.2 | -16.3 | 32.4 | 7.14 | 37.51 | 136 | 126 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5625.05 | 55.28 | 54.15 | 68.2 | -12.92 | 31.79 | 6.56 | 37.22 | 143 | 73 | Peak |
| 5652.6 | 54.07 | 52.88 | 70.13 | -16.06 | 31.85 | 6.62 | 37.28 | 143 | 73 | Peak |
| 5923.825 | 53.26 | 51.46 | 69.07 | -15.81 | 32.29 | 7.01 | 37.5 | 143 | 73 | Peak |
| 6018.825 | 55.24 | 53.15 | 68.2 | -12.96 | 32.45 | 7.14 | 37.5 | 143 | 73 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5805 MHz: Fundamental Frequency
- *: Out of Restricted Band

802.11n (HT20)

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 36 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5122 | 45.19 | 36.99 | 54 | -8.81 | 34.09 | 8.1 | 33.99 | 114 | 59 | Average |
| 5122 | 63.65 | 55.45 | 74 | -10.35 | 34.09 | 8.1 | 33.99 | 114 | 59 | Peak |
| 5180 | 100.04 | 91.73 | | | 34.15 | 8.16 | 34 | 100 | 135 | Average |
| 5180 | 107.12 | 98.81 | | | 34.15 | 8.16 | 34 | 100 | 135 | Peak |
| 5414 | 43.78 | 35.05 | 54 | -10.22 | 34.33 | 8.44 | 34.04 | 100 | 135 | Average |
| 5414 | 62.79 | 54.06 | 74 | -11.21 | 34.33 | 8.44 | 34.04 | 100 | 135 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5146 | 52.85 | 44.6 | 54 | -1.15 | 34.12 | 8.13 | 34 | 210 | 246 | Average |
| 5146 | 65.2 | 56.95 | 74 | -8.8 | 34.12 | 8.13 | 34 | 210 | 246 | Peak |
| 5180 | 109.41 | 101.1 | | | 34.15 | 8.16 | 34 | 208 | 40 | Average |
| 5180 | 115.61 | 107.3 | | | 34.15 | 8.16 | 34 | 208 | 40 | Peak |
| 5368 | 45.71 | 37.04 | 54 | -8.29 | 34.29 | 8.41 | 34.03 | 208 | 40 | Average |
| 5368 | 63.68 | 55.01 | 74 | -10.32 | 34.29 | 8.41 | 34.03 | 208 | 40 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5180 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 44 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5132 | 43.3 | 35.08 | 54 | -10.7 | 34.11 | 8.1 | 33.99 | 100 | 57 | Average |
| 5132 | 62.85 | 54.63 | 74 | -11.15 | 34.11 | 8.1 | 33.99 | 100 | 57 | Peak |
| 5220 | 100.8 | 92.41 | | | 34.17 | 8.22 | 34 | 100 | 57 | Average |
| 5220 | 108.37 | 99.98 | | | 34.17 | 8.22 | 34 | 100 | 57 | Peak |
| 5386 | 43.32 | 34.64 | 54 | -10.68 | 34.31 | 8.41 | 34.04 | 100 | 57 | Average |
| 5386 | 63.83 | 55.15 | 74 | -10.17 | 34.31 | 8.41 | 34.04 | 100 | 57 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5104 | 45.95 | 37.79 | 54 | -8.05 | 34.08 | 8.07 | 33.99 | 208 | 40 | Average |
| 5104 | 63.89 | 55.73 | 74 | -10.11 | 34.08 | 8.07 | 33.99 | 208 | 40 | Peak |
| 5220 | 109.87 | 101.48 | | | 34.17 | 8.22 | 34 | 208 | 40 | Average |
| 5220 | 116.07 | 107.68 | | | 34.17 | 8.22 | 34 | 208 | 40 | Peak |
| 5362 | 45.87 | 37.23 | 54 | -8.13 | 34.29 | 8.38 | 34.03 | 208 | 40 | Average |
| 5362 | 63.1 | 54.46 | 74 | -10.9 | 34.29 | 8.38 | 34.03 | 208 | 40 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5220 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 48 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5080 | 43.1 | 34.98 | 54 | -10.9 | 34.07 | 8.03 | 33.98 | 105 | 138 | Average |
| 5080 | 62.67 | 54.55 | 74 | -11.33 | 34.07 | 8.03 | 33.98 | 105 | 138 | Peak |
| 5240 | 99.84 | 91.4 | | | 34.19 | 8.26 | 34.01 | 105 | 138 | Average |
| 5240 | 107.69 | 99.25 | | | 34.19 | 8.26 | 34.01 | 105 | 138 | Peak |
| 5368 | 43.31 | 34.64 | 54 | -10.69 | 34.29 | 8.41 | 34.03 | 105 | 138 | Average |
| 5368 | 64.64 | 55.97 | 74 | -9.36 | 34.29 | 8.41 | 34.03 | 105 | 138 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5020 | 45.88 | 37.87 | 54 | -8.12 | 34.01 | 7.97 | 33.97 | 215 | 32 | Average |
| 5020 | 63.56 | 55.55 | 74 | -10.44 | 34.01 | 7.97 | 33.97 | 215 | 32 | Peak |
| 5240 | 108.14 | 99.7 | | | 34.19 | 8.26 | 34.01 | 215 | 32 | Average |
| 5240 | 115.66 | 107.22 | | | 34.19 | 8.26 | 34.01 | 215 | 32 | Peak |
| 5380 | 45.92 | 37.24 | 54 | -8.08 | 34.31 | 8.41 | 34.04 | 215 | 32 | Average |
| 5380 | 63.6 | 54.92 | 74 | -10.4 | 34.31 | 8.41 | 34.04 | 215 | 32 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5240 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 149 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

<Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5745 | 99.48 | 98.21 | | | 31.99 | 6.75 | 37.47 | 112 | 58 | Average |
| 5745 | 108.49 | 107.22 | | | 31.99 | 6.75 | 37.47 | 112 | 58 | Peak |
| 11490 | 46.02 | 48.23 | 54 | -7.98 | 39.91 | 10.66 | 52.78 | 100 | 253 | Average |
| 11490 | 56.07 | 58.28 | 74 | -17.93 | 39.91 | 10.66 | 52.78 | 100 | 253 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5745 | 107.58 | 106.28 | | | 31.99 | 6.78 | 37.47 | 188 | 69 | Average |
| 5745 | 114.91 | 113.61 | | | 31.99 | 6.78 | 37.47 | 188 | 69 | Peak |
| 11490 | 46.06 | 48.32 | 54 | -7.94 | 39.91 | 10.66 | 52.83 | 130 | 225 | Average |
| 11490 | 56.25 | 58.51 | 74 | -17.75 | 39.91 | 10.66 | 52.83 | 130 | 225 | Peak |

<Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5609.85 | 51.51 | 50.4 | 68.2 | -16.69 | 31.77 | 6.56 | 37.22 | 112 | 58 | Peak |
| 5650.225 | 51.66 | 50.47 | 68.37 | -16.71 | 31.85 | 6.62 | 37.28 | 112 | 58 | Peak |
| 5924.3 | 48.72 | 46.92 | 68.72 | -20 | 32.29 | 7.01 | 37.5 | 112 | 58 | Peak |
| 6015.5 | 51.78 | 49.69 | 68.2 | -16.42 | 32.45 | 7.14 | 37.5 | 112 | 58 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5561.4 | 55.98 | 54.93 | 68.2 | -12.22 | 31.68 | 6.49 | 37.12 | 188 | 69 | Peak |
| 5652.6 | 52.54 | 51.35 | 70.13 | -17.59 | 31.85 | 6.62 | 37.28 | 188 | 69 | Peak |
| 5922.4 | 51.8 | 50 | 70.12 | -18.32 | 32.29 | 7.01 | 37.5 | 188 | 69 | Peak |
| 5961.35 | 54.08 | 52.17 | 68.2 | -14.12 | 32.34 | 7.08 | 37.51 | 188 | 69 | Peak |

Remarks:

1. Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
2. 5745 MHz: Fundamental Frequency
3. *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 157 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

<Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5785 | 97.11 | 95.79 | | | 32.04 | 6.82 | 37.54 | 112 | 58 | Average |
| 5785 | 106.46 | 105.14 | | | 32.04 | 6.82 | 37.54 | 112 | 58 | Peak |
| 11570 | 45.76 | 48.23 | 54 | -8.24 | 39.78 | 10.76 | 53.01 | 132 | 224 | Average |
| 11570 | 55.86 | 58.33 | 74 | -18.14 | 39.78 | 10.76 | 53.01 | 132 | 224 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5785 | 106.55 | 105.23 | | | 32.04 | 6.82 | 37.54 | 188 | 62 | Average |
| 5785 | 114.34 | 113.02 | | | 32.04 | 6.82 | 37.54 | 188 | 62 | Peak |
| 11570 | 45.63 | 48.42 | 54 | -8.37 | 39.78 | 10.76 | 53.33 | 120 | 251 | Average |
| 11570 | 56.86 | 59.65 | 74 | -17.14 | 39.78 | 10.76 | 53.33 | 120 | 251 | Peak |

<Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5626.95 | 52.6 | 51.47 | 68.2 | -15.6 | 31.79 | 6.56 | 37.22 | 112 | 58 | Peak |
| 5651.65 | 49.9 | 48.71 | 69.43 | -19.53 | 31.85 | 6.62 | 37.28 | 112 | 58 | Peak |
| 5922.4 | 51.08 | 49.28 | 70.12 | -19.04 | 32.29 | 7.01 | 37.5 | 112 | 58 | Peak |
| 5943.775 | 53.12 | 51.22 | 68.2 | -15.08 | 32.32 | 7.08 | 37.5 | 112 | 58 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5630.275 | 56.62 | 55.55 | 68.2 | -11.58 | 31.79 | 6.56 | 37.28 | 188 | 62 | Peak |
| 5650.7 | 54.32 | 53.13 | 68.72 | -14.4 | 31.85 | 6.62 | 37.28 | 188 | 62 | Peak |
| 5921.925 | 53.36 | 51.56 | 70.47 | -17.11 | 32.29 | 7.01 | 37.5 | 188 | 62 | Peak |
| 5969.9 | 54.05 | 52.14 | 68.2 | -14.15 | 32.34 | 7.08 | 37.51 | 188 | 62 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5785 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 161 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

<Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5805 | 98.72 | 97.34 | | | 32.1 | 6.82 | 37.54 | 120 | 57 | Average |
| 5805 | 108.29 | 106.91 | | | 32.1 | 6.82 | 37.54 | 120 | 57 | Peak |
| 11610 | 45.76 | 48.34 | 54 | -8.24 | 39.71 | 10.79 | 53.08 | 100 | 259 | Average |
| 11610 | 55.57 | 58.15 | 74 | -18.43 | 39.71 | 10.79 | 53.08 | 100 | 259 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5805 | 107.01 | 105.63 | | | 32.1 | 6.82 | 37.54 | 194 | 55 | Average |
| 5805 | 115.02 | 113.64 | | | 32.1 | 6.82 | 37.54 | 194 | 55 | Peak |
| 11610 | 46.63 | 49.54 | 54 | -7.37 | 39.71 | 10.79 | 53.41 | 125 | 237 | Average |
| 11610 | 56.5 | 59.41 | 74 | -17.5 | 39.71 | 10.79 | 53.41 | 125 | 237 | Peak |

<Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5645.475 | 52.74 | 51.58 | 68.2 | -15.46 | 31.82 | 6.62 | 37.28 | 120 | 57 | Peak |
| 5653.55 | 51.61 | 50.42 | 70.84 | -19.23 | 31.85 | 6.62 | 37.28 | 120 | 57 | Peak |
| 5923.825 | 49.41 | 47.61 | 69.07 | -19.66 | 32.29 | 7.01 | 37.5 | 120 | 57 | Peak |
| 6013.6 | 52.33 | 50.24 | 68.2 | -15.87 | 32.45 | 7.14 | 37.5 | 120 | 57 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5604.15 | 56.86 | 55.75 | 68.2 | -11.34 | 31.77 | 6.56 | 37.22 | 194 | 55 | Peak |
| 5651.175 | 55.33 | 54.14 | 69.07 | -13.74 | 31.85 | 6.62 | 37.28 | 194 | 55 | Peak |
| 5921.925 | 52.6 | 50.8 | 70.47 | -17.87 | 32.29 | 7.01 | 37.5 | 194 | 55 | Peak |
| 5961.825 | 53.23 | 51.32 | 68.2 | -14.97 | 32.34 | 7.08 | 37.51 | 194 | 55 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5805 MHz: Fundamental Frequency
- *: Out of Restricted Band

802.11n (HT40)

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 38 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5128 | 44.2 | 35.98 | 54 | -9.8 | 34.11 | 8.1 | 33.99 | 107 | 135 | Average |
| 5128 | 64.24 | 56.02 | 74 | -9.76 | 34.11 | 8.1 | 33.99 | 107 | 135 | Peak |
| 5190 | 91.34 | 83 | | | 34.15 | 8.19 | 34 | 107 | 135 | Average |
| 5190 | 98.19 | 89.85 | | | 34.15 | 8.19 | 34 | 107 | 135 | Peak |
| 5365 | 43.27 | 34.63 | 54 | -10.73 | 34.29 | 8.38 | 34.03 | 107 | 135 | Average |
| 5365 | 63.99 | 55.35 | 74 | -10.01 | 34.29 | 8.38 | 34.03 | 107 | 135 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5110 | 50.95 | 42.75 | 54 | -3.05 | 34.09 | 8.1 | 33.99 | 210 | 40 | Average |
| 5110 | 64.61 | 56.41 | 74 | -9.39 | 34.09 | 8.1 | 33.99 | 210 | 40 | Peak |
| 5190 | 99.84 | 91.5 | | | 34.15 | 8.19 | 34 | 208 | 40 | Average |
| 5190 | 106.93 | 98.59 | | | 34.15 | 8.19 | 34 | 208 | 40 | Peak |
| 5376 | 44.71 | 36.05 | 54 | -9.29 | 34.29 | 8.41 | 34.04 | 208 | 40 | Average |
| 5376 | 63.13 | 54.47 | 74 | -10.87 | 34.29 | 8.41 | 34.04 | 208 | 40 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5190 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 46 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5066 | 42.89 | 34.79 | 54 | -11.11 | 34.05 | 8.03 | 33.98 | 128 | 51 | Average |
| 5066 | 63.17 | 55.07 | 74 | -10.83 | 34.05 | 8.03 | 33.98 | 128 | 51 | Peak |
| 5230 | 96.77 | 88.37 | | | 34.19 | 8.22 | 34.01 | 128 | 51 | Average |
| 5230 | 103.56 | 95.16 | | | 34.19 | 8.22 | 34.01 | 128 | 51 | Peak |
| 5400 | 43.36 | 34.64 | 54 | -10.64 | 34.32 | 8.44 | 34.04 | 128 | 51 | Average |
| 5400 | 62.87 | 54.15 | 74 | -11.13 | 34.32 | 8.44 | 34.04 | 128 | 51 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5036 | 46.53 | 38.47 | 54 | -7.47 | 34.03 | 8 | 33.97 | 210 | 246 | Average |
| 5036 | 64.31 | 56.25 | 74 | -9.69 | 34.03 | 8 | 33.97 | 210 | 246 | Peak |
| 5230 | 104.61 | 96.21 | | | 34.19 | 8.22 | 34.01 | 210 | 246 | Average |
| 5230 | 111.17 | 102.77 | | | 34.19 | 8.22 | 34.01 | 210 | 246 | Peak |
| 5460 | 46.07 | 37.25 | 54 | -7.93 | 34.36 | 8.51 | 34.05 | 210 | 246 | Average |
| 5460 | 64.08 | 55.26 | 74 | -9.92 | 34.36 | 8.51 | 34.05 | 210 | 246 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5230 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 151 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

<Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5755 | 94.56 | 93.27 | | | 32.01 | 6.75 | 37.47 | 121 | 59 | Average |
| 5755 | 103.35 | 102.06 | | | 32.01 | 6.75 | 37.47 | 121 | 59 | Peak |
| 11510 | 45.35 | 47.57 | 54 | -8.65 | 39.9 | 10.69 | 52.81 | 132 | 219 | Average |
| 11510 | 55.37 | 57.59 | 74 | -18.63 | 39.9 | 10.69 | 52.81 | 132 | 219 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5755 | 101.03 | 99.74 | | | 32.01 | 6.75 | 37.47 | 206 | 63 | Average |
| 5755 | 110.1 | 108.81 | | | 32.01 | 6.75 | 37.47 | 206 | 63 | Peak |
| 11510 | 46.17 | 48.65 | 54 | -7.83 | 39.9 | 10.69 | 53.07 | 125 | 244 | Average |
| 11510 | 56.08 | 58.56 | 74 | -17.92 | 39.9 | 10.69 | 53.07 | 125 | 244 | Peak |

<Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5648.8 | 51.87 | 50.71 | 68.2 | -16.33 | 31.82 | 6.62 | 37.28 | 121 | 59 | Peak |
| 5653.075 | 49.13 | 47.94 | 70.49 | -21.36 | 31.85 | 6.62 | 37.28 | 121 | 59 | Peak |
| 5923.35 | 50.69 | 48.89 | 69.42 | -18.73 | 32.29 | 7.01 | 37.5 | 121 | 59 | Peak |
| 5995.075 | 52.56 | 50.53 | 68.2 | -15.64 | 32.4 | 7.14 | 37.51 | 121 | 59 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5578.5 | 56.15 | 55.11 | 68.2 | -12.05 | 31.71 | 6.49 | 37.16 | 206 | 63 | Peak |
| 5651.65 | 54.51 | 53.32 | 69.43 | -14.92 | 31.85 | 6.62 | 37.28 | 206 | 63 | Peak |
| 5922.875 | 52.74 | 50.94 | 69.77 | -17.03 | 32.29 | 7.01 | 37.5 | 206 | 63 | Peak |
| 5943.775 | 55.06 | 53.16 | 68.2 | -13.14 | 32.32 | 7.08 | 37.5 | 206 | 63 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5755 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 159 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

<Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5795 | 92.66 | 91.31 | | | 32.07 | 6.82 | 37.54 | 120 | 54 | Average |
| 5795 | 101.89 | 100.54 | | | 32.07 | 6.82 | 37.54 | 120 | 54 | Peak |
| 11590 | 45.26 | 47.75 | 54 | -8.74 | 39.74 | 10.78 | 53.01 | 100 | 284 | Average |
| 11590 | 55.81 | 58.3 | 74 | -18.19 | 39.74 | 10.78 | 53.01 | 100 | 284 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5795 | 103.05 | 101.7 | | | 32.07 | 6.82 | 37.54 | 205 | 63 | Average |
| 5795 | 111.8 | 110.45 | | | 32.07 | 6.82 | 37.54 | 205 | 63 | Peak |
| 11590 | 46.18 | 48.99 | 54 | -7.82 | 39.74 | 10.78 | 53.33 | 125 | 265 | Average |
| 11590 | 56.72 | 59.53 | 74 | -17.28 | 39.74 | 10.78 | 53.33 | 125 | 265 | Peak |

<Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5636.45 | 51.84 | 50.74 | 68.2 | -16.36 | 31.82 | 6.56 | 37.28 | 120 | 54 | Peak |
| 5651.65 | 49.41 | 48.22 | 69.43 | -20.02 | 31.85 | 6.62 | 37.28 | 120 | 54 | Peak |
| 5922.4 | 50.09 | 48.29 | 70.12 | -20.03 | 32.29 | 7.01 | 37.5 | 120 | 54 | Peak |
| 6000.775 | 52.69 | 50.66 | 68.2 | -15.51 | 32.4 | 7.14 | 37.51 | 120 | 54 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5634.55 | 55.67 | 54.57 | 68.2 | -12.53 | 31.82 | 6.56 | 37.28 | 205 | 63 | Peak |
| 5650.7 | 53.98 | 52.79 | 68.72 | -14.74 | 31.85 | 6.62 | 37.28 | 205 | 63 | Peak |
| 5919.55 | 54.33 | 52.56 | 72.22 | -17.89 | 32.26 | 7.01 | 37.5 | 205 | 63 | Peak |
| 5940.925 | 53.86 | 51.96 | 68.2 | -14.34 | 32.32 | 7.08 | 37.5 | 205 | 63 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5795 MHz: Fundamental Frequency
- *: Out of Restricted Band

802.11ac (VHT80)

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 42 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5116 | 44.19 | 35.99 | 54 | -9.81 | 34.09 | 8.1 | 33.99 | 100 | 136 | Average |
| 5116 | 57.35 | 49.15 | 74 | -16.65 | 34.09 | 8.1 | 33.99 | 100 | 136 | Peak |
| 5210 | 86.13 | 77.77 | | | 34.17 | 8.19 | 34 | 100 | 136 | Average |
| 5210 | 93.95 | 85.59 | | | 34.17 | 8.19 | 34 | 100 | 136 | Peak |
| 5460 | 43.48 | 34.66 | 54 | -10.52 | 34.36 | 8.51 | 34.05 | 100 | 136 | Average |
| 5460 | 57.62 | 48.8 | 74 | -16.38 | 34.36 | 8.51 | 34.05 | 100 | 136 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5148 | 52.19 | 43.94 | 54 | -1.81 | 34.12 | 8.13 | 34 | 207 | 67 | Average |
| 5148 | 62.53 | 54.28 | 74 | -11.47 | 34.12 | 8.13 | 34 | 207 | 67 | Peak |
| 5210 | 93.78 | 85.42 | | | 34.17 | 8.19 | 34 | 207 | 67 | Average |
| 5210 | 101.21 | 92.85 | | | 34.17 | 8.19 | 34 | 207 | 67 | Peak |
| 5430 | 44.47 | 35.68 | 54 | -9.53 | 34.35 | 8.48 | 34.04 | 207 | 67 | Average |
| 5430 | 57.53 | 48.74 | 74 | -16.47 | 34.35 | 8.48 | 34.04 | 207 | 67 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5210 MHz: Fundamental Frequency
- *: Out of Restricted Band

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|---------------------------|
| Channel | Channel 155 | Frequency Range | 1 GHz ~ 40 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Average (AV) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

<Spurious Emission>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|---------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5775 | 87.64 | 86.28 | | | 32.04 | 6.82 | 37.5 | 113 | 57 | Average |
| 5775 | 96.39 | 95.03 | | | 32.04 | 6.82 | 37.5 | 113 | 57 | Peak |
| 11550 | 45.02 | 47.41 | 54 | -8.98 | 39.81 | 10.74 | 52.94 | 100 | 260 | Average |
| 11550 | 56.36 | 58.75 | 74 | -17.64 | 39.81 | 10.74 | 52.94 | 100 | 260 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5775 | 94.61 | 93.25 | | | 32.04 | 6.82 | 37.5 | 198 | 57 | Average |
| 5775 | 102.93 | 101.57 | | | 32.04 | 6.82 | 37.5 | 198 | 57 | Peak |
| 11550 | 45.64 | 48.33 | 54 | -8.36 | 39.81 | 10.74 | 53.24 | 120 | 245 | Average |
| 11550 | 56.06 | 58.75 | 74 | -17.94 | 39.81 | 10.74 | 53.24 | 120 | 245 | Peak |

<Out of Band Emission (OOBE)>

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5563.775 | 51.91 | 50.86 | 68.2 | -16.29 | 31.68 | 6.49 | 37.12 | 113 | 57 | Peak |
| 5651.65 | 50.32 | 49.13 | 69.43 | -19.11 | 31.85 | 6.62 | 37.28 | 113 | 57 | Peak |
| 5922.875 | 49.51 | 47.71 | 69.77 | -20.26 | 32.29 | 7.01 | 37.5 | 113 | 57 | Peak |
| 5978.925 | 52.37 | 50.43 | 68.2 | -15.83 | 32.37 | 7.08 | 37.51 | 113 | 57 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 5631.225 | 53.38 | 52.31 | 68.2 | -14.82 | 31.79 | 6.56 | 37.28 | 198 | 57 | Peak |
| 5654.5 | 51.98 | 50.85 | 71.54 | -19.56 | 31.85 | 6.62 | 37.34 | 198 | 57 | Peak |
| 5921.925 | 51.81 | 50.01 | 70.47 | -18.66 | 32.29 | 7.01 | 37.5 | 198 | 57 | Peak |
| 5973.225 | 53.36 | 51.42 | 68.2 | -14.84 | 32.37 | 7.08 | 37.51 | 198 | 57 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value
- 5775 MHz: Fundamental Frequency
- *: Out of Restricted Band

9 kHz ~ 30 MHz Data:

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

30 MHz ~ 1 GHz Worst-Case Data:

802.11n (HT20)

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel | Channel 36 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Quasi-peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 34.86 | 23.14 | 40.27 | 40 | -16.86 | 14.37 | 0.74 | 32.24 | 139 | 247 | Peak |
| 135.03 | 23.69 | 45.31 | 43.5 | -19.81 | 9.25 | 1.38 | 32.25 | 139 | 321 | Peak |
| 292.71 | 26.45 | 42.7 | 46 | -19.55 | 13.85 | 2.03 | 32.13 | 145 | 128 | Peak |
| 599.6 | 28.44 | 36.66 | 46 | -17.56 | 21.1 | 2.87 | 32.19 | 105 | 128 | Peak |
| 813.1 | 31.29 | 36.02 | 46 | -14.71 | 23.94 | 3.32 | 31.99 | 176 | 125 | Peak |
| 899.9 | 37.17 | 40.16 | 46 | -8.83 | 25 | 3.49 | 31.48 | 139 | 351 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 66.72 | 28.52 | 52.16 | 40 | -11.48 | 7.68 | 0.9 | 32.22 | 139 | 230 | Peak |
| 192.81 | 20.13 | 40.28 | 43.5 | -23.37 | 10.51 | 1.61 | 32.27 | 125 | 175 | Peak |
| 300 | 23.89 | 40.1 | 46 | -22.11 | 13.9 | 2.03 | 32.14 | 108 | 284 | Peak |
| 407.8 | 17.85 | 29.7 | 46 | -28.15 | 17.95 | 2.41 | 32.21 | 128 | 211 | Peak |
| 673.1 | 29.11 | 34.78 | 46 | -16.89 | 23.4 | 3.05 | 32.12 | 154 | 241 | Peak |
| 899.9 | 29.48 | 32.47 | 46 | -16.52 | 25 | 3.49 | 31.48 | 139 | 311 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value

802.11n (HT20)

| EUT Test Condition | | Measurement Detail | |
|--------------------------|--------------------|--------------------|------------------------------|
| Channel | Channel 165 | Frequency Range | 30 MHz ~ 1 GHz |
| Input Power | 120 Vac, 60 Hz | Detector Function | Peak (PK) Quasi-peak (QP) |
| Environmental Conditions | 25 deg. C, 65 % RH | Tested By | Charles Hsiao |

| Antenna Polarity & Test Distance: Horizontal at 3 m | | | | | | | | | | |
|---|-------------------------|-------------------|----------------|-------------|-----------------------|-----------------|--------------------|---------------------|----------------------|--------|
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 44.04 | 11.85 | 33.41 | 40 | -28.15 | 9.76 | 0.9 | 32.22 | 175 | 120 | Peak |
| 193.62 | 26.07 | 46.16 | 43.5 | -17.43 | 10.57 | 1.61 | 32.27 | 136 | 238 | Peak |
| 299.73 | 31.79 | 48 | 46 | -14.21 | 13.9 | 2.03 | 32.14 | 175 | 128 | Peak |
| 599.6 | 27.21 | 35.43 | 46 | -18.79 | 21.1 | 2.87 | 32.19 | 175 | 140 | Peak |
| 825 | 32.06 | 37.1 | 46 | -13.94 | 23.5 | 3.38 | 31.92 | 176 | 123 | Peak |
| 899.9 | 31.53 | 34.52 | 46 | -14.47 | 25 | 3.49 | 31.48 | 168 | 120 | Peak |
| Antenna Polarity & Test Distance: Vertical at 3 m | | | | | | | | | | |
| Frequency (MHz) | Emission Level (dBuV/m) | Read Level (dBuV) | Limit (dBuV/m) | Margin (dB) | Antenna Factor (dB/m) | Cable Loss (dB) | Preamp Factor (dB) | Antenna Height (cm) | Table Angle (Degree) | Remark |
| 58.08 | 27.82 | 52.17 | 40 | -12.18 | 6.98 | 0.9 | 32.23 | 170 | 121 | Peak |
| 193.35 | 19.98 | 40.07 | 43.5 | -23.52 | 10.57 | 1.61 | 32.27 | 142 | 122 | Peak |
| 300 | 27.24 | 43.45 | 46 | -18.76 | 13.9 | 2.03 | 32.14 | 139 | 140 | Peak |
| 599.6 | 28.72 | 36.94 | 46 | -17.28 | 21.1 | 2.87 | 32.19 | 115 | 120 | Peak |
| 750.8 | 30.01 | 35.73 | 46 | -15.99 | 23.2 | 3.22 | 32.14 | 138 | 104 | Peak |
| 899.9 | 32.28 | 35.27 | 46 | -13.72 | 25 | 3.49 | 31.48 | 175 | 140 | Peak |

Remarks:

- Emission Level = Read Level + Antenna Factor + Cable Loss - Preamp Factor
Margin value = Emission level – Limit value

4.2 Conducted Emission Measurement

4.2.1 Limits of Conducted Emission Measurement

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

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

4.2.2 Test Instruments

| Description & Manufacturer | Model No. | Serial No. | Date Of Calibration | Due Date Of Calibration |
|---|--------------------------|----------------|---------------------|-------------------------|
| Test Receiver ROHDE & SCHWARZ | ESCI | 100613 | Nov. 21, 2016 | Nov. 20, 2017 |
| RF signal cable (with 10dB PAD) Woken | 5D-FB | Cable-cond1-01 | Sep. 05, 2017 | Sep. 04, 2018 |
| LISN/AMN ROHDE & SCHWARZ (EUT) | ESH3-Z5 | 835239/001 | Mar. 10, 2017 | Mar. 09, 2018 |
| LISN/AMN ROHDE & SCHWARZ (Peripheral) | ENV216 | 101196 | Apr. 20, 2017 | Apr. 19, 2018 |
| Software ADT | BV ADT_Cond_ V7.3.7.3 | 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-2040.

4.2.3 Test Procedures

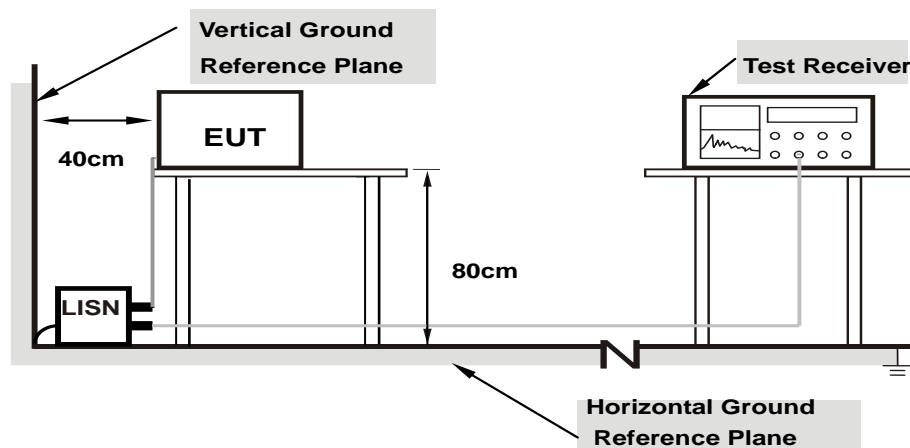
- The EUT was placed 0.4 meters from the conducting wall of the shielded room with EUT being connected to the power mains through a line impedance stabilization network (LISN). Other support units were connected to the power mains through another LISN. The two LISNs provide 50 ohm/ 50uH of coupling impedance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

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

4.2.4 Deviation from Test Standard

No deviation.

4.2.5 Test Setup



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

2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

4.2.6 EUT Operating Conditions

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

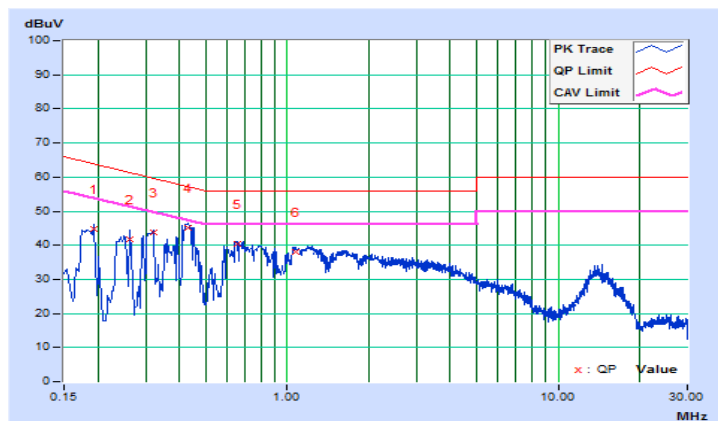
4.2.7 Test Results

| | | | |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 65%RH |
| Tested by | Getaz Yang | Test Date | 2017/10/6 |

| Phase Of Power : Line (L) | | | | | | | | | | |
|---------------------------|-----------------|------------------------|----------------------|--------------|-----------------------|--------------|--------------|--------------|---------------|---------------|
| No | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | | Emission Level (dBuV) | | Limit (dBuV) | | Margin (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.19400 | 10.39 | 34.37 | 23.41 | 44.76 | 33.80 | 63.86 | 53.86 | -19.10 | -20.06 |
| 2 | 0.26200 | 10.40 | 31.31 | 15.76 | 41.71 | 26.16 | 61.37 | 51.37 | -19.66 | -25.21 |
| 3 | 0.32118 | 10.40 | 33.26 | 21.32 | 43.66 | 31.72 | 59.68 | 49.68 | -16.02 | -17.96 |
| 4 | 0.42915 | 10.41 | 34.71 | 23.69 | 45.12 | 34.10 | 57.27 | 47.27 | -12.15 | -13.17 |
| 5 | 0.65761 | 10.41 | 29.90 | 17.49 | 40.31 | 27.90 | 56.00 | 46.00 | -15.69 | -18.10 |
| 6 | 1.07800 | 10.43 | 27.59 | 16.45 | 38.02 | 26.88 | 56.00 | 46.00 | -17.98 | -19.12 |

Remarks:

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

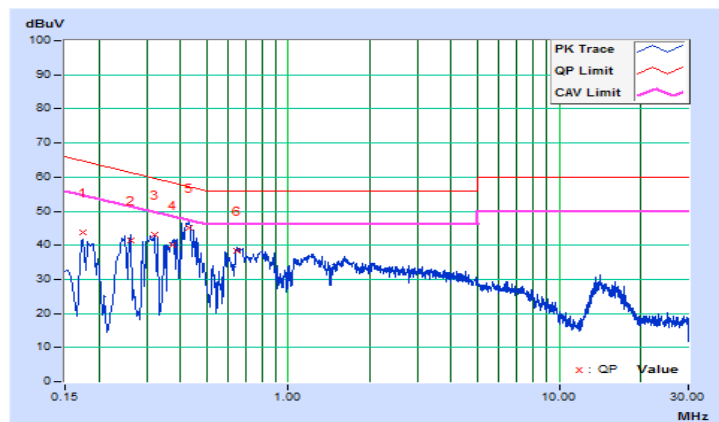


| | | | |
|-----------------|----------------|--|--------------------------------------|
| Frequency Range | 150kHz ~ 30MHz | Detector Function & Resolution Bandwidth | Quasi-Peak (QP) / Average (AV), 9kHz |
| Input Power | 120Vac, 60Hz | Environmental Conditions | 25°C, 65%RH |
| Tested by | Getaz Yang | Test Date | 2017/10/6 |

| Phase Of Power : Neutral (N) | | | | | | | | | | |
|------------------------------|-----------------|------------------------|----------------------|-------|-----------------------|-------|--------------|-------|-------------|--------|
| No | Frequency (MHz) | Correction Factor (dB) | Reading Value (dBuV) | | Emission Level (dBuV) | | Limit (dBuV) | | Margin (dB) | |
| | | | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. | Q.P. | AV. |
| 1 | 0.17400 | 10.16 | 33.51 | 20.14 | 43.67 | 30.30 | 64.77 | 54.77 | -21.10 | -24.47 |
| 2 | 0.26152 | 10.16 | 31.23 | 14.66 | 41.39 | 24.82 | 61.38 | 51.38 | -19.99 | -26.56 |
| 3 | 0.32118 | 10.17 | 32.79 | 20.14 | 42.96 | 30.31 | 59.68 | 49.68 | -16.72 | -19.37 |
| 4 | 0.37421 | 10.17 | 29.81 | 18.70 | 39.98 | 28.87 | 58.41 | 48.41 | -18.43 | -19.54 |
| 5 | 0.42802 | 10.17 | 34.89 | 24.10 | 45.06 | 34.27 | 57.29 | 47.29 | -12.23 | -13.02 |
| 6 | 0.65000 | 10.18 | 28.34 | 16.70 | 38.52 | 26.88 | 56.00 | 46.00 | -17.48 | -19.12 |

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) (Max. e.i.r.p \leq 125 mW (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 | 250 mW (24 dBm) |
| U-NII-2A | - | | 250 mW (24 dBm) or 11 dBm + 10 log B* |
| U-NII-2C | - | | 250 mW (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 $N_{ANT} \leq 4$;

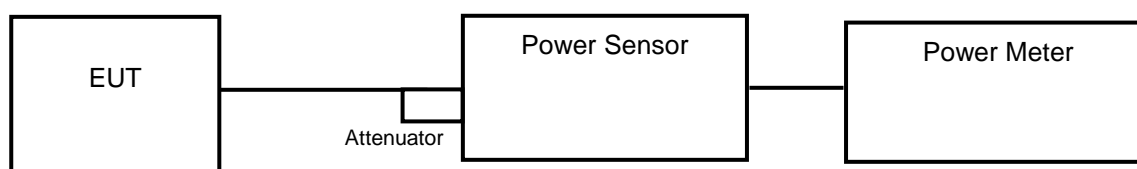
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;

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

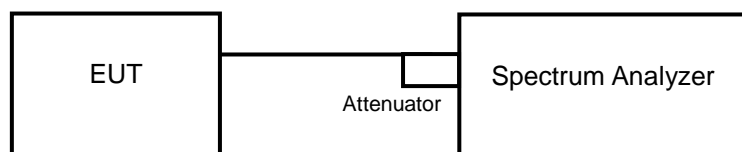
For power measurements on all other devices: Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB.

4.3.2 Test Setup

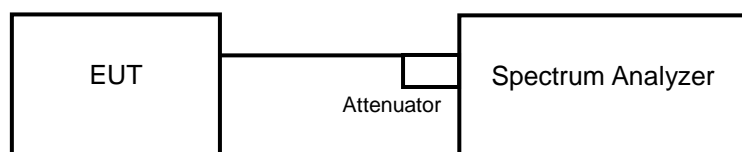
<Power Output Measurement>



or



<26 dB Bandwidth>



4.3.3 Test Instruments

Refer to section 4.1.2 to get information of above instrument.

4.3.4 Test Procedure

Average Power Measurement

<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. Duty factor is not added to measured value.

<802.11ac (VHT80)>

Method SA-1 is used to perform output power measurement, trigger and gating function of spectrum analyzer is enabled to measure max output power of TX on burst. Duty factor is not added to measured value.

26 dB 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:

802.11a

| Channel | Frequency (MHz) | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|------------------------------|-------------------------------|-------------------|-------------|
| 36 | 5180 | 81.85 | 19.13 | 30 | Pass |
| 44 | 5220 | 185.78 | 22.69 | 30 | Pass |
| 48 | 5240 | 176.20 | 22.46 | 30 | Pass |
| 149 | 5745 | 58.61 | 17.68 | 30 | Pass |
| 157 | 5785 | 173.38 | 22.39 | 30 | Pass |
| 161 | 5805 | 171.40 | 22.34 | 30 | Pass |

802.11n (HT20)

1Tx

| Channel | Frequency (MHz) | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|------------------------------|-------------------------------|-------------------|-------------|
| 36 | 5180 | 90.36 | 19.56 | 30 | Pass |
| 44 | 5220 | 107.65 | 20.32 | 30 | Pass |
| 48 | 5240 | 96.16 | 19.83 | 30 | Pass |
| 149 | 5745 | 93.11 | 19.69 | 30 | Pass |
| 157 | 5785 | 103.04 | 20.13 | 30 | Pass |
| 161 | 5805 | 98.17 | 19.92 | 30 | Pass |

2Tx

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 16.15 | 17.08 | 92.26 | 19.65 | 30 | Pass |
| 44 | 5220 | 16.61 | 17.94 | 108.04 | 20.34 | 30 | Pass |
| 48 | 5240 | 16.44 | 17.27 | 97.39 | 19.89 | 30 | Pass |
| 149 | 5745 | 16.04 | 17.36 | 94.629 | 19.76 | 30 | Pass |
| 157 | 5785 | 16.27 | 17.85 | 103.318 | 20.14 | 30 | Pass |
| 161 | 5805 | 16.37 | 17.50 | 99.585 | 19.98 | 30 | Pass |

3Tx

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | Chain 2 | | | | |
| 36 | 5180 | 14.23 | 15.65 | 14.78 | 93.27 | 19.70 | 30 | Pass |
| 44 | 5220 | 15.14 | 16.43 | 15.27 | 110.26 | 20.42 | 30 | Pass |
| 48 | 5240 | 14.84 | 16.16 | 14.35 | 99.01 | 19.96 | 30 | Pass |
| 149 | 5745 | 14.66 | 15.97 | 14.54 | 97.223 | 19.88 | 30 | Pass |
| 157 | 5785 | 15.08 | 16.38 | 15.37 | 110.097 | 20.42 | 30 | Pass |
| 161 | 5805 | 14.96 | 16.25 | 15.23 | 106.845 | 20.29 | 30 | Pass |

802.11n (HT40)
1Tx

| Channel | Frequency (MHz) | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|------------------------------|-------------------------------|-------------------|-------------|
| 38 | 5190 | 29.31 | 14.67 | 30 | Pass |
| 46 | 5230 | 84.33 | 19.26 | 30 | Pass |
| 151 | 5755 | 52.84 | 17.23 | 30 | Pass |
| 159 | 5795 | 58.75 | 17.69 | 30 | Pass |

2Tx

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | 11.26 | 12.09 | 29.55 | 14.71 | 30 | Pass |
| 46 | 5230 | 15.84 | 16.73 | 85.47 | 19.32 | 30 | Pass |
| 151 | 5755 | 13.64 | 14.89 | 53.953 | 17.32 | 30 | Pass |
| 159 | 5795 | 14.35 | 15.54 | 63.037 | 18.00 | 30 | Pass |

3Tx

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | Chain 2 | | | | |
| 38 | 5190 | 9.74 | 10.52 | 9.88 | 30.42 | 14.83 | 30 | Pass |
| 46 | 5230 | 14.25 | 15.75 | 14.32 | 91.23 | 19.60 | 30 | Pass |
| 151 | 5755 | 12.22 | 13.02 | 12.42 | 54.175 | 17.34 | 30 | Pass |
| 159 | 5795 | 12.80 | 14.04 | 12.83 | 63.593 | 18.03 | 30 | Pass |

802.11ac (VHT80)

1Tx

| Channel | Frequency (MHz) | Maximum Conducted Power (mW) | Maximum Conducted Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|------------------------------|-------------------------------|-------------------|-------------|
| 42 | 5210 | 13.43 | 11.28 | 30 | Pass |
| 155 | 5775 | 12.39 | 10.93 | 30 | Pass |

2Tx

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | 7.84 | 8.72 | 13.53 | 11.31 | 30 | Pass |
| 155 | 5775 | 7.92 | 8.16 | 12.741 | 11.05 | 30 | Pass |

3Tx

| Channel | Frequency (MHz) | Maximum Conducted Power (dBm) | | | Total Power (mW) | Total Power (dBm) | Power Limit (dBm) | Pass / Fail |
|---------|-----------------|-------------------------------|---------|---------|------------------|-------------------|-------------------|-------------|
| | | Chain 0 | Chain 1 | Chain 2 | | | | |
| 42 | 5210 | 6.23 | 7.31 | 6.42 | 13.97 | 11.45 | 30 | Pass |
| 155 | 5775 | 6.22 | 6.77 | 6.03 | 12.950 | 11.12 | 30 | Pass |

26 dB Bandwidth:
802.11a

| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) |
|---------|-----------------|------------------------|
| 36 | 5180 | 22.66 |
| 44 | 5220 | 23.67 |
| 48 | 5240 | 23.25 |

802.11n (HT20)
1Tx

| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) |
|---------|-----------------|------------------------|
| 36 | 5180 | 23.18 |
| 44 | 5220 | 23.28 |
| 48 | 5240 | 23.27 |

2Tx

| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) | |
|---------|-----------------|------------------------|---------|
| | | Chain 0 | Chain 1 |
| 36 | 5180 | 23.22 | 23.64 |
| 44 | 5220 | 23.03 | 23.60 |
| 48 | 5240 | 23.47 | 23.25 |

3Tx

| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) | | |
|---------|-----------------|------------------------|---------|---------|
| | | Chain 0 | Chain 1 | Chain 2 |
| 36 | 5180 | 23.67 | 24.33 | 23.27 |
| 44 | 5220 | 23.66 | 23.27 | 23.76 |
| 48 | 5240 | 23.17 | 23.61 | 23.43 |

802.11n (HT40)

1Tx

| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) |
|---------|-----------------|------------------------|
| 38 | 5190 | 47.29 |
| 46 | 5230 | 46.70 |

2Tx

| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) | |
|---------|-----------------|------------------------|---------|
| | | Chain 0 | Chain 1 |
| 38 | 5190 | 46.73 | 46.46 |
| 46 | 5230 | 47.17 | 46.91 |

3Tx

| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) | | |
|---------|-----------------|------------------------|---------|---------|
| | | Chain 0 | Chain 1 | Chain 2 |
| 38 | 5190 | 46.58 | 46.83 | 45.51 |
| 46 | 5230 | 47.15 | 46.65 | 45.10 |

802.11ac (VHT80)

1Tx

| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) |
|---------|-----------------|------------------------|
| 42 | 5210 | 89.65 |

2Tx

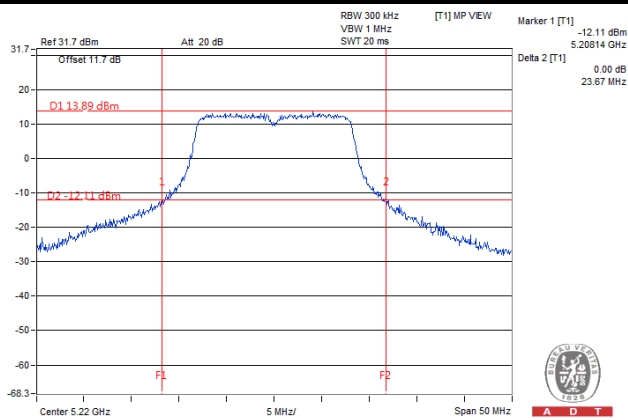
| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) | |
|---------|-----------------|------------------------|---------|
| | | Chain 0 | Chain 1 |
| 42 | 5210 | 91.60 | 88.88 |

3Tx

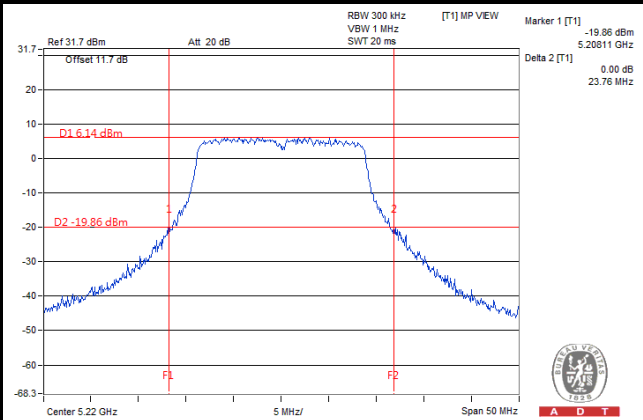
| Channel | Frequency (MHz) | 26 dBc Bandwidth (MHz) | | |
|---------|-----------------|------------------------|---------|---------|
| | | Chain 0 | Chain 1 | Chain 2 |
| 42 | 5210 | 91.19 | 91.36 | 93.73 |

Spectrum Plot of Worst Value

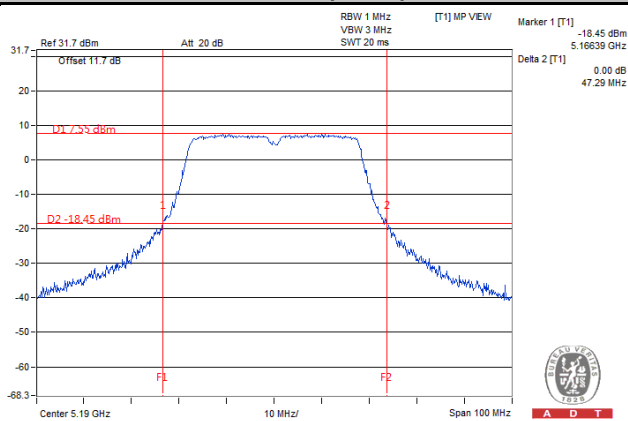
802.11a



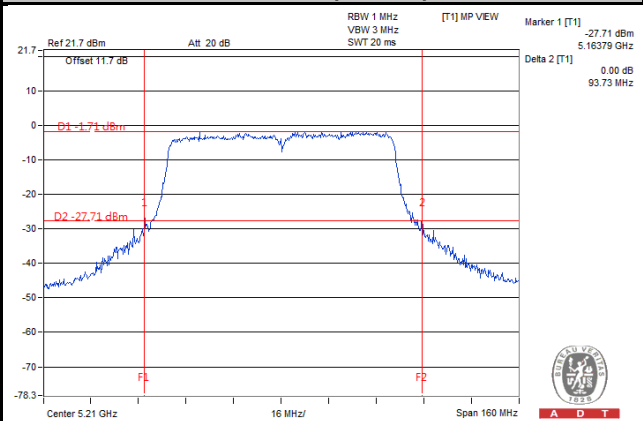
802.11n (HT20)



802.11n (HT40)

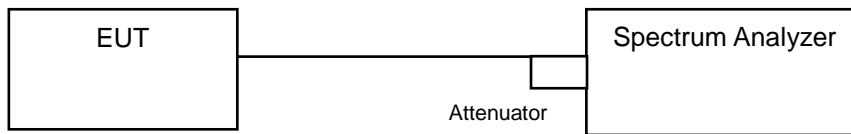


802.11ac (VHT80)



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 SAMPLE. 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 Results

802.11a

| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) |
|---------|-------------------------|--------------------------|
| 36 | 5180 | 16.83 |
| 40 | 5200 | 17.20 |
| 48 | 5240 | 16.97 |
| 149 | 5745 | 16.78 |
| 157 | 5785 | 16.75 |
| 161 | 5805 | 16.75 |

802.11n (HT20)

1Tx

| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) |
|---------|-------------------------|--------------------------|
| 36 | 5180 | 18.30 |
| 40 | 5200 | 17.98 |
| 48 | 5240 | 17.98 |
| 149 | 5745 | 17.84 |
| 157 | 5785 | 17.85 |
| 161 | 5805 | 17.90 |

2Tx

| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) | |
|---------|-------------------------|--------------------------|---------|
| | | Chain 0 | Chain 1 |
| 36 | 5180 | 18.80 | 17.93 |
| 40 | 5200 | 18.30 | 17.98 |
| 48 | 5240 | 18.80 | 17.98 |
| 149 | 5745 | 17.84 | 17.84 |
| 157 | 5785 | 17.90 | 17.90 |
| 161 | 5805 | 17.85 | 17.90 |

3Tx

| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) | | |
|---------|-------------------------|--------------------------|---------|---------|
| | | Chain 0 | Chain 1 | Chain 2 |
| 36 | 5180 | 18.80 | 17.98 | 17.88 |
| 40 | 5200 | 17.98 | 17.93 | 17.93 |
| 48 | 5240 | 17.98 | 18.30 | 17.93 |
| 149 | 5745 | 17.93 | 17.93 | 17.88 |
| 157 | 5785 | 17.85 | 17.85 | 17.85 |
| 161 | 5805 | 17.90 | 17.90 | 17.85 |

802.11n (HT40)
1Tx

| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) |
|---------|-------------------------|--------------------------|
| 38 | 5190 | 37.44 |
| 46 | 5230 | 37.05 |
| 151 | 5755 | 36.70 |
| 159 | 5795 | 36.67 |

2Tx

| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) | |
|---------|-------------------------|--------------------------|---------|
| | | Chain 0 | Chain 1 |
| 38 | 5190 | 37.44 | 37.18 |
| 46 | 5230 | 37.44 | 37.18 |
| 151 | 5755 | 36.86 | 36.86 |
| 159 | 5795 | 37.00 | 36.83 |

3Tx

| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) | | |
|---------|-------------------------|--------------------------|---------|---------|
| | | Chain 0 | Chain 1 | Chain 2 |
| 38 | 5190 | 37.31 | 37.18 | 37.05 |
| 46 | 5230 | 37.44 | 37.18 | 37.31 |
| 151 | 5755 | 36.86 | 36.70 | 36.86 |
| 159 | 5795 | 36.67 | 36.67 | 36.67 |

802.11ac (VHT80)

1Tx

| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) |
|---------|-------------------------|--------------------------|
| 42 | 5210 | 76.12 |
| 155 | 5775 | 76.12 |

2Tx

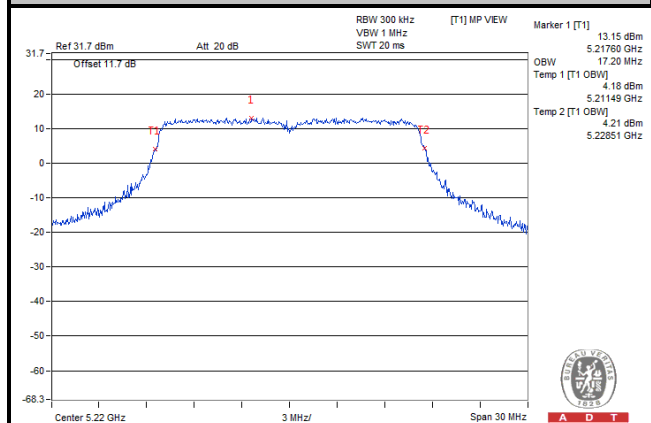
| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) | |
|---------|-------------------------|--------------------------|---------|
| | | Chain 0 | Chain 1 |
| 42 | 5210 | 76.12 | 76.12 |
| 155 | 5775 | 76.12 | 75.96 |

3Tx

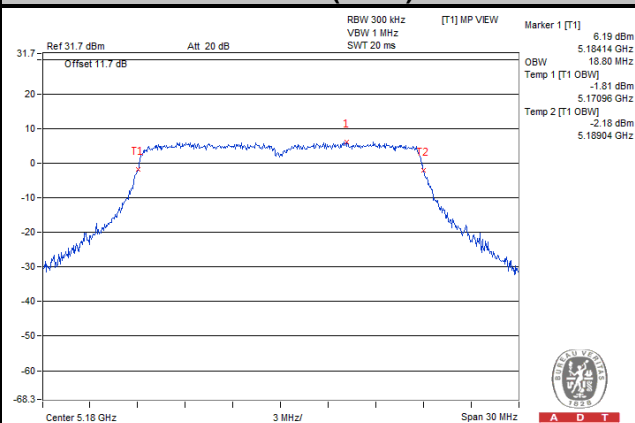
| Channel | Channel Frequency (MHz) | Occupied Bandwidth (MHz) | | |
|---------|-------------------------|--------------------------|---------|---------|
| | | Chain 0 | Chain 1 | Chain 2 |
| 42 | 5210 | 75.80 | 76.12 | 75.96 |
| 155 | 5775 | 76.12 | 76.28 | 76.12 |

Spectrum Plot of Worst Value

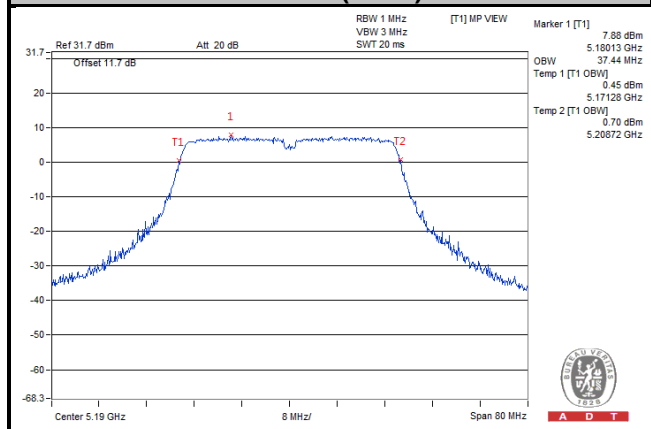
802.11a



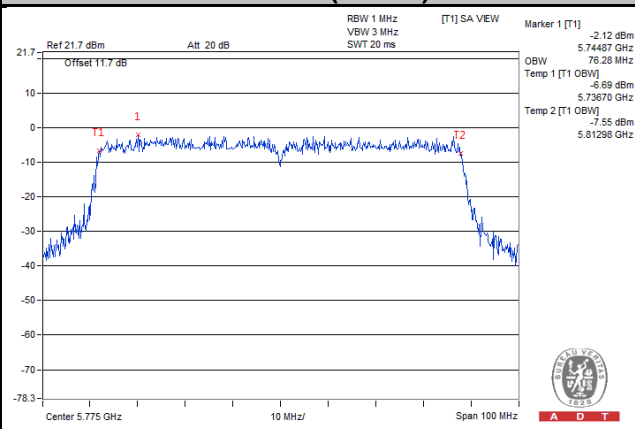
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

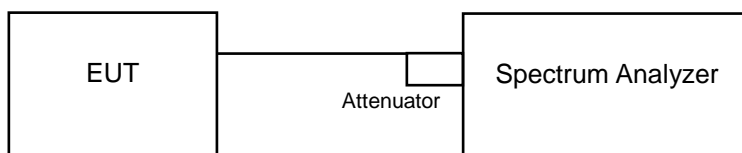


4.5 Peak Power Spectral Density Measurement

4.5.1 Limits of Peak Power Spectral Density Measurement

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

4.5.2 Test Setup



4.5.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.5.4 Test Procedures

For U-NII-1 band:

Using method SA-2

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

※For U-NII-3:

1. Set span to encompass the entire emission bandwidth (EBW) of the signal.
2. Set RBW = 500 kHz, Set VBW ≥ 3 RBW, Detector = RMS
3. Use the peak marker function to determine the maximum power level in any 500 kHz band segment within the fundamental EBW.
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)

4.5.5 Deviation from Test Standard

No deviation.

4.5.6 EUT Operating Conditions

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

4.5.7 Test Results

For U-NII-1 Band

802.11a

| Channel | Frequency (MHz) | PSD w/o Duty Factor (dBm/MHz) | Duty Factor (dB) | PSD with Duty Factor (dBm/MHz) | Maximum Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|-------------------------------|------------------|--------------------------------|-------------------------|-------------|
| 36 | 5180 | 6.18 | 0.15 | 6.33 | 17 | Pass |
| 44 | 5220 | 9.97 | 0.15 | 10.12 | 17 | Pass |
| 48 | 5240 | 9.72 | 0.15 | 9.87 | 17 | Pass |

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

802.11n (HT20)

1Tx

| Channel | Frequency (MHz) | PSD w/o Duty Factor (dBm/MHz) | Duty Factor (dB) | PSD with Duty Factor (dBm/MHz) | Maximum Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|-------------------------------|------------------|--------------------------------|-------------------------|-------------|
| 36 | 5180 | 6.28 | 0.13 | 6.41 | 17 | Pass |
| 44 | 5220 | 7.16 | 0.13 | 7.29 | 17 | Pass |
| 48 | 5240 | 6.56 | 0.13 | 6.69 | 17 | Pass |

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

2Tx

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 36 | 5180 | 2.91 | 4.89 | 0.13 | 7.15 | 16.69 | Pass |
| 44 | 5220 | 3.41 | 5.43 | 0.13 | 7.68 | 16.69 | Pass |
| 48 | 5240 | 3.33 | 5.17 | 0.13 | 7.49 | 16.69 | Pass |

Note:

- Method 1 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.
- Directional gain = $3.3\text{dBi} + 10\log(2) = 6.31\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (6.31 - 6) = 16.69\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

3Tx

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | Chain 2 | | | | |
| 36 | 5180 | 0.84 | 2.89 | 2.50 | 0.13 | 7.06 | 14.93 | Pass |
| 44 | 5220 | 1.89 | 3.81 | 2.66 | 0.13 | 7.76 | 14.93 | Pass |
| 48 | 5240 | 1.75 | 3.67 | 2.22 | 0.13 | 7.53 | 14.93 | Pass |

Note:

1. Method 1 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. Directional gain = $3.3\text{dBi} + 10\log(3) = 8.07\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(8.07-6) = 14.93\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

1Tx

| Channel | Frequency (MHz) | PSD w/o Duty Factor (dBm/MHz) | Duty Factor (dB) | PSD with Duty Factor (dBm/MHz) | Maximum Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|-------------------------------|------------------|--------------------------------|-------------------------|-------------|
| 38 | 5190 | -1.68 | 0.45 | -1.23 | 17 | Pass |
| 46 | 5230 | 3.16 | 0.45 | 3.61 | 17 | Pass |

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

2Tx

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 38 | 5190 | -5.34 | -3.44 | 0.39 | -0.89 | 16.69 | Pass |
| 46 | 5230 | -0.51 | 1.31 | 0.39 | 3.89 | 16.69 | Pass |

Note:

1. Method 1 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. Directional gain = $3.3\text{dBi} + 10\log(2) = 6.31\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(6.31-6) = 16.69\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

3Tx

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | Chain 2 | | | | |
| 38 | 5190 | -6.45 | -4.68 | -4.77 | 0.39 | -0.07 | 14.93 | Pass |
| 46 | 5230 | -1.63 | 0.33 | -0.41 | 0.39 | 4.66 | 14.93 | Pass |

Note:

1. Method 1 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. Directional gain = $3.3\text{dBi} + 10\log(3) = 8.07\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (8.07 - 6) = 14.93\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

1Tx

| Channel | Frequency (MHz) | PSD w/o Duty Factor (dBm/MHz) | Duty Factor (dB) | PSD with Duty Factor (dBm/MHz) | Maximum Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|-------------------------------|------------------|--------------------------------|-------------------------|-------------|
| 42 | 5210 | -9.82 | 0.74 | -9.08 | 17 | Pass |

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

2Tx

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | | | | |
| 42 | 5210 | -13.46 | -11.71 | 0.79 | -8.70 | 16.69 | Pass |

Note:

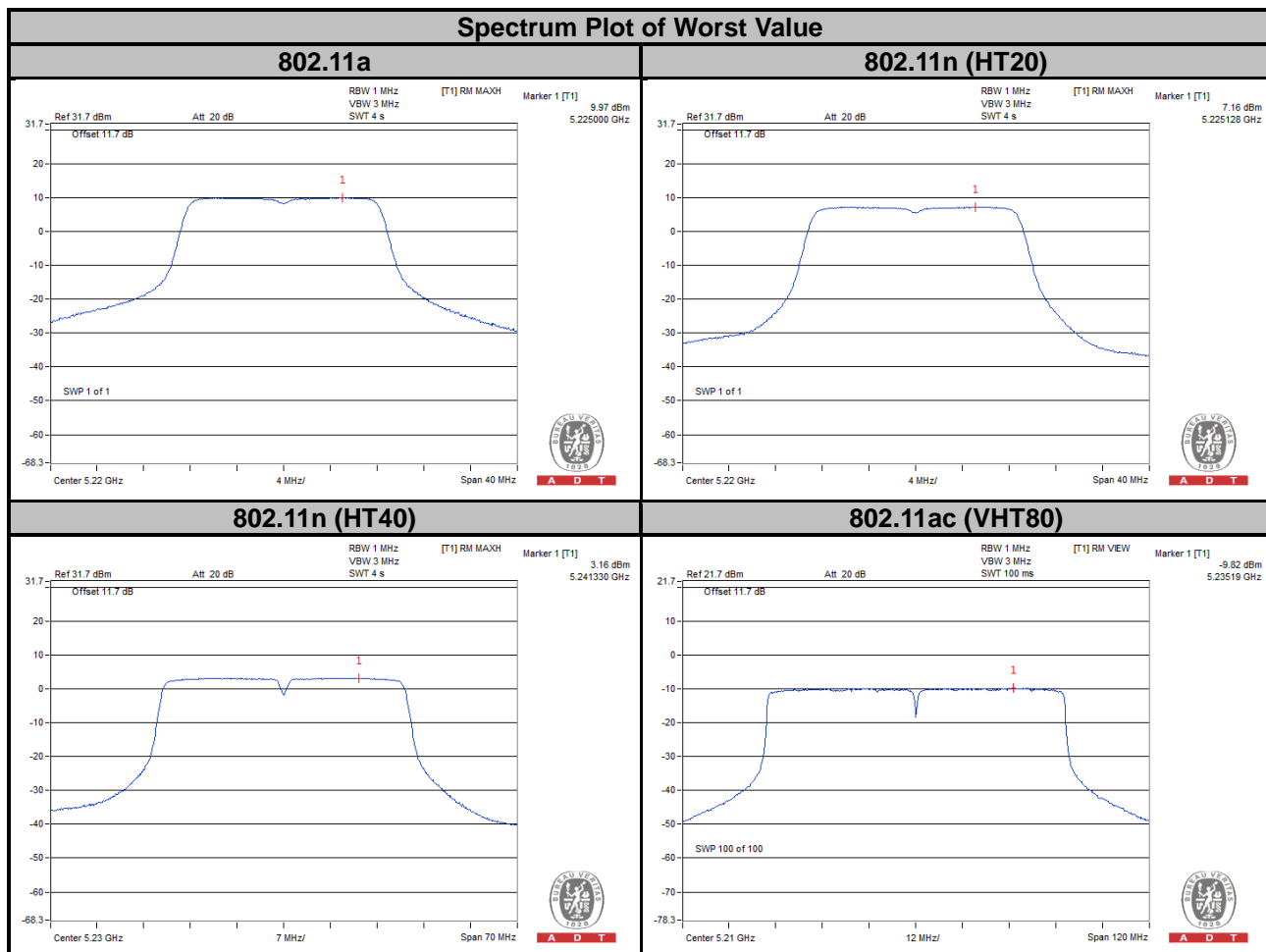
1. Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
2. Directional gain = $3.3\text{dBi} + 10\log(2) = 6.31\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17 - (6.31 - 6) = 16.69\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.

3Tx

| Channel | Frequency (MHz) | PSD (dBm/MHz) | | | Duty Factor (dB) | Total PSD with Duty Factor (dBm/MHz) | Max. Limit (dBm/MHz) | Pass / Fail |
|---------|-----------------|---------------|---------|---------|------------------|--------------------------------------|----------------------|-------------|
| | | Chain 0 | Chain 1 | Chain 2 | | | | |
| 42 | 5210 | -14.86 | -12.78 | -13.46 | 0.73 | -8.12 | 14.93 | Pass |

Note:

1. Method 1 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. Directional gain = $3.3\text{dBi} + 10\log(3) = 8.07\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $17-(8.07-6) = 14.93\text{dBm}$.
3. Refer to section 3.3 for duty cycle spectrum plot.



For U-NII-3 Band

802.11a

| Channel | Frequency (MHz) | PSD w/o Duty Factor (dBm/500 kHz) | Duty Factor (dB) | PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|---------|-----------------|-----------------------------------|------------------|------------------------------------|---------------------|-------------|
| 149 | 5745 | 2.45 | 0.15 | 2.60 | 30 | Pass |
| 157 | 5785 | 7.12 | 0.15 | 7.27 | 30 | Pass |
| 161 | 5805 | 7.68 | 0.15 | 7.83 | 30 | Pass |

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

802.11n (HT20)

1Tx

| Channel | Frequency (MHz) | PSD w/o Duty Factor (dBm/500 kHz) | Duty Factor (dB) | PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|---------|-----------------|-----------------------------------|------------------|------------------------------------|---------------------|-------------|
| 149 | 5745 | 4.43 | 0.13 | 4.56 | 30 | Pass |
| 157 | 5785 | 4.73 | 0.13 | 4.86 | 30 | Pass |
| 161 | 5805 | 4.79 | 0.13 | 4.92 | 30 | Pass |

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

2Tx

| TX Chain | Channel | Frequency (MHz) | PSD (dBm/500 kHz) | 10 log (N=2) dB | Duty Factor (dB) | Total PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|----------|---------|-----------------|-------------------|-----------------|------------------|--|---------------------|-------------|
| 0 | 149 | 5745 | 0.71 | 3.01 | 0.13 | 3.85 | 27.98 | Pass |
| | 157 | 5785 | 1.15 | 3.01 | 0.13 | 4.29 | 27.98 | Pass |
| | 161 | 5805 | 1.45 | 3.01 | 0.13 | 4.59 | 27.98 | Pass |
| 1 | 149 | 5745 | 1.91 | 3.01 | 0.13 | 5.05 | 27.98 | Pass |
| | 157 | 5785 | 2.22 | 3.01 | 0.13 | 5.36 | 27.98 | Pass |
| | 161 | 5805 | 1.91 | 3.01 | 0.13 | 5.05 | 27.98 | Pass |

Note:

- Method 1 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.
- Directional gain = $5.01\text{dBi} + 10\log(2) = 8.02\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (8.02 - 6) = 27.98\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

3Tx

| TX Chain | Channel | Frequency (MHz) | PSD (dBm/500 kHz) | 10 log (N=3) dB | Duty Factor (dB) | Total PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|----------|---------|-----------------|-------------------|-----------------|------------------|--|---------------------|-------------|
| 0 | 149 | 5745 | -0.38 | 4.77 | 0.13 | 4.52 | 26.22 | Pass |
| | 157 | 5785 | 0.11 | 4.77 | 0.13 | 5.01 | 26.22 | Pass |
| | 161 | 5805 | 0.70 | 4.77 | 0.13 | 5.60 | 26.22 | Pass |
| 1 | 149 | 5745 | 0.38 | 4.77 | 0.13 | 5.28 | 26.22 | Pass |
| | 157 | 5785 | 0.77 | 4.77 | 0.13 | 5.67 | 26.22 | Pass |
| | 161 | 5805 | 1.12 | 4.77 | 0.13 | 6.02 | 26.22 | Pass |
| 2 | 149 | 5745 | -0.86 | 4.77 | 0.13 | 4.04 | 26.22 | Pass |
| | 157 | 5785 | 0.17 | 4.77 | 0.13 | 5.07 | 26.22 | Pass |
| | 161 | 5805 | 0.80 | 4.77 | 0.13 | 5.70 | 26.22 | Pass |

Note:

- Method 1 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.
- Directional gain = $5.01\text{dBi} + 10\log(3) = 9.78\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (9.78 - 6) = 26.22\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11n (HT40)

1Tx

| Channel | Frequency (MHz) | PSD w/o Duty Factor (dBm/500 kHz) | Duty Factor (dB) | PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|---------|-----------------|-----------------------------------|------------------|------------------------------------|---------------------|-------------|
| 151 | 5755 | -1.23 | 0.45 | -0.78 | 30 | Pass |
| 159 | 5795 | -0.33 | 0.45 | 0.12 | 30 | Pass |

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

2Tx

| TX Chain | Channel | Frequency (MHz) | PSD (dBm/500 kHz) | 10 log (N=2) dB | Duty Factor (dB) | Total PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|----------|---------|-----------------|-------------------|-----------------|------------------|--|---------------------|-------------|
| 0 | 151 | 5755 | -4.46 | 3.01 | 0.39 | -1.06 | 27.98 | Pass |
| | 159 | 5795 | -3.36 | 3.01 | 0.39 | 0.04 | 27.98 | Pass |
| 1 | 151 | 5755 | -3.84 | 3.01 | 0.39 | -0.44 | 27.98 | Pass |
| | 159 | 5795 | -2.63 | 3.01 | 0.39 | 0.77 | 27.98 | Pass |

Note:

- Method 1 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.
- Directional gain = $5.01\text{dBi} + 10\log(2) = 8.02\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (8.02 - 6) = 27.98\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

3Tx

| TX Chain | Channel | Frequency (MHz) | PSD (dBm/500 kHz) | 10 log (N=3) dB | Duty Factor (dB) | Total PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|----------|---------|-----------------|-------------------|-----------------|------------------|--|---------------------|-------------|
| 0 | 151 | 5755 | -5.93 | 4.77 | 0.39 | -0.77 | 26.22 | Pass |
| | 159 | 5795 | -4.82 | 4.77 | 0.39 | 0.34 | 26.22 | Pass |
| 1 | 151 | 5755 | -5.45 | 4.77 | 0.39 | -0.29 | 26.22 | Pass |
| | 159 | 5795 | -4.37 | 4.77 | 0.39 | 0.79 | 26.22 | Pass |
| 2 | 151 | 5755 | -6.19 | 4.77 | 0.39 | -1.03 | 26.22 | Pass |
| | 159 | 5795 | -5.21 | 4.77 | 0.39 | -0.05 | 26.22 | Pass |

Note:

- Method 1 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.
- Directional gain = $5.01\text{dBi} + 10\log(3) = 9.78\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (9.78 - 6) = 26.22\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

802.11ac (VHT80)

1Tx

| Channel | Frequency (MHz) | PSD w/o Duty Factor (dBm/500 kHz) | Duty Factor (dB) | PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|---------|-----------------|-----------------------------------|------------------|------------------------------------|---------------------|-------------|
| 155 | 5775 | -10.33 | 0.74 | -9.59 | 30 | Pass |

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

2Tx

| TX Chain | Channel | Frequency (MHz) | PSD (dBm/500 kHz) | 10 log (N=2) dB | Duty Factor (dB) | Total PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|----------|---------|-----------------|-------------------|-----------------|------------------|--|---------------------|-------------|
| 0 | 155 | 5775 | -12.88 | 3.01 | 0.79 | -9.08 | 27.98 | Pass |
| 1 | 155 | 5775 | -12.26 | 3.01 | 0.79 | -8.46 | 27.98 | Pass |

Note:

- Method 1 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.
- Directional gain = $5.01\text{dBi} + 10\log(2) = 8.02\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (8.02 - 6) = 27.98\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

3Tx

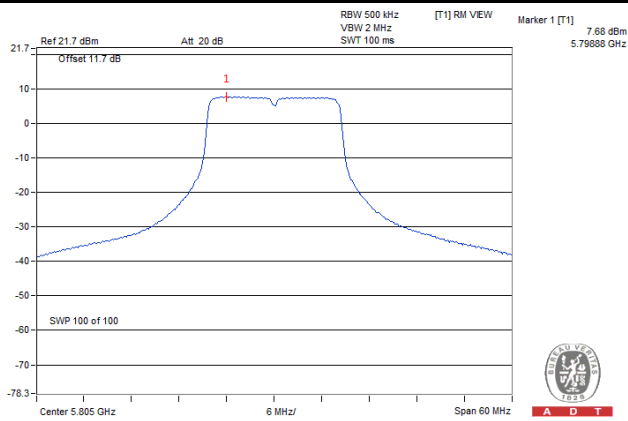
| TX Chain | Channel | Frequency (MHz) | PSD (dBm/500 kHz) | 10 log (N=3) dB | Duty Factor (dB) | Total PSD with Duty Factor (dBm/500 kHz) | Limit (dBm/500 kHz) | Pass / Fail |
|----------|---------|-----------------|-------------------|-----------------|------------------|--|---------------------|-------------|
| 0 | 155 | 5775 | -13.95 | 4.77 | 0.73 | -8.45 | 26.22 | Pass |
| 1 | 155 | 5775 | -13.57 | 4.77 | 0.73 | -8.07 | 26.22 | Pass |
| 2 | 155 | 5775 | -14.31 | 4.77 | 0.73 | -8.81 | 26.22 | Pass |

Note:

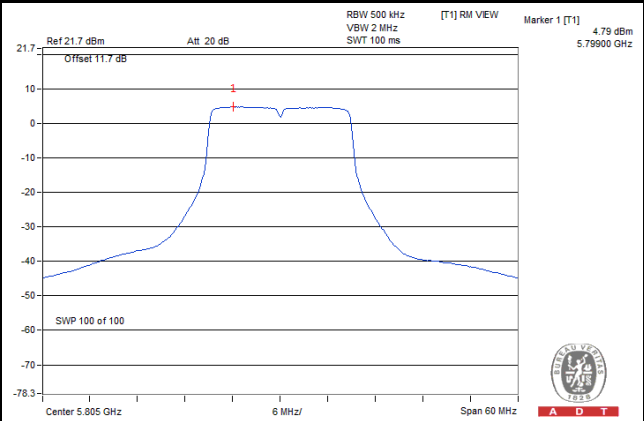
- Method 1 of power density measurement of KDB 662911 is using for calculating total power density. Total power density is summing entire spectra across corresponding frequency bins on the various outputs by computer.
- Directional gain = $5.01\text{dBi} + 10\log(3) = 9.78\text{dBi} > 6\text{dBi}$, so the power density limit shall be reduced to $30 - (9.78 - 6) = 26.22\text{dBm}$.
- Refer to section 3.3 for duty cycle spectrum plot.

Spectrum Plot of Worst Value

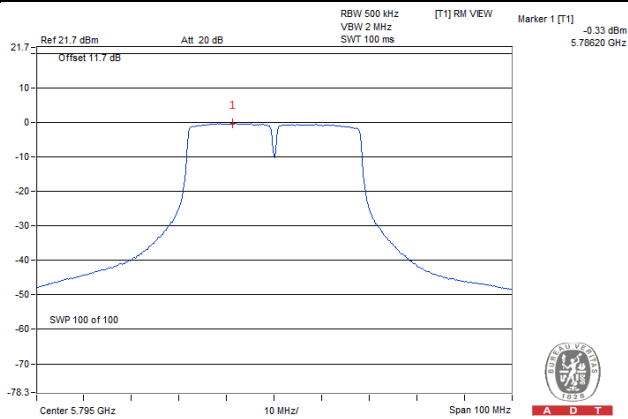
802.11a



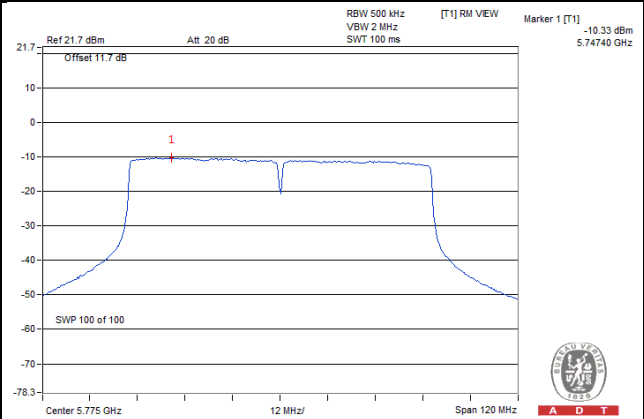
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

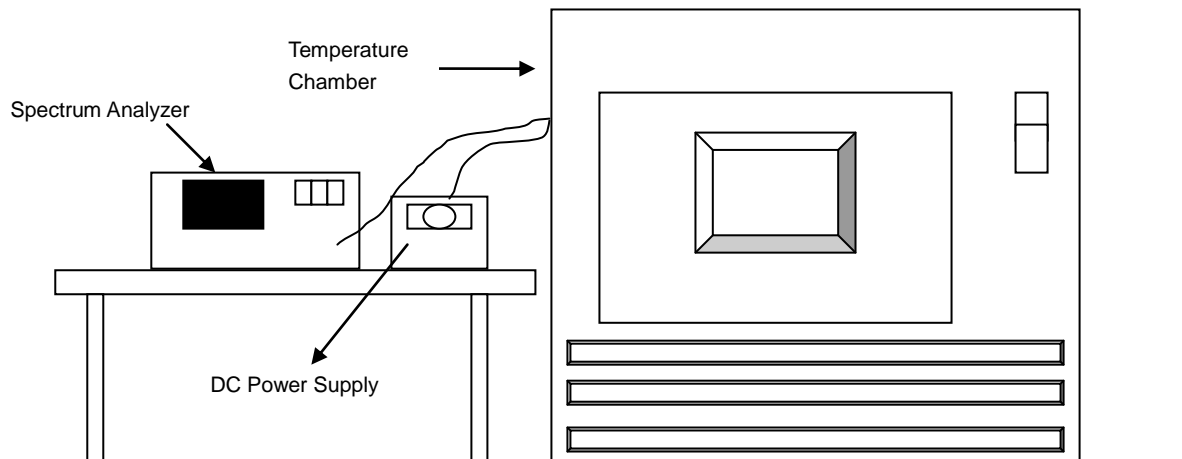


4.6 Frequency Stability

4.6.1 Limit 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

Refer to section 4.1.3 to get information of above instrument.

4.6.4 Test Procedure

- To ensure emission at the band edge is maintained within the authorized band, those values shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.
- The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak value of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10 dB lower than the measured peak value.
- The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed values of frequency deviation are provided in table below.

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: 5180 MHz | | | | | | | | | |
| Temp. (°C) | Power Supply (Vdc) | 0 Minute | | 2 Minute | | 5 Minute | | 10 Minute | |
| | | Measured Frequency (MHz) | Frequency Drift (ppm) | Measured Frequency (MHz) | Frequency Drift (ppm) | Measured Frequency (MHz) | Frequency Drift (ppm) | Measured Frequency (MHz) | Frequency Drift (ppm) |
| 50 | 12.0 | 5180.029476 | 5.690 | 5180.030019 | 5.795 | 5180.029603 | 5.715 | 5180.029823 | 5.757 |
| 40 | 12.0 | 5180.029962 | 5.784 | 5180.029576 | 5.710 | 5180.029805 | 5.754 | 5180.029944 | 5.781 |
| 30 | 12.0 | 5180.031252 | 6.033 | 5180.031032 | 5.991 | 5180.031191 | 6.021 | 5180.030951 | 5.975 |
| 20 | 12.0 | 5180.034239 | 6.610 | 5180.033928 | 6.550 | 5180.033935 | 6.551 | 5180.033890 | 6.542 |
| 10 | 12.0 | 5180.033685 | 6.503 | 5180.033889 | 6.542 | 5180.033361 | 6.440 | 5180.033382 | 6.444 |
| 0 | 12.0 | 5180.032349 | 6.245 | 5180.032201 | 6.216 | 5180.031990 | 6.176 | 5180.032067 | 6.191 |
| -10 | 12.0 | 5180.030700 | 5.927 | 5180.030828 | 5.951 | 5180.030664 | 5.920 | 5180.030394 | 5.868 |
| -20 | 12.0 | 5180.030476 | 5.883 | 5180.030280 | 5.846 | 5180.029902 | 5.773 | 5180.029969 | 5.786 |
| -30 | 12.0 | 5180.029146 | 5.627 | 5180.028812 | 5.562 | 5180.029164 | 5.630 | 5180.028769 | 5.554 |

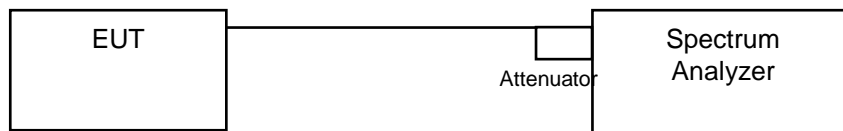
| Frequency Stability Versus Temp. | | | | | | | | | |
|----------------------------------|--------------------------|--------------------------------|--------------------------|--------------------------------|--------------------------|--------------------------------|--------------------------|--------------------------------|--------------------------|
| Operating Frequency: 5180 MHz | | | | | | | | | |
| Temp. (°C) | Power Supply (Vdc) | 0 Minute | | 2 Minute | | 5 Minute | | 10 Minute | |
| | | Measured Frequency (MHz) | Frequency Drift (ppm) | Measured Frequency (MHz) | Frequency Drift (ppm) | Measured Frequency (MHz) | Frequency Drift (ppm) | Measured Frequency (MHz) | Frequency Drift (ppm) |
| 20 | 11.4 | 5180.033505 | 6.468 | 5180.033658 | 6.498 | 5180.033879 | 6.540 | 5180.033986 | 6.561 |
| | 12.0 | 5180.034239 | 6.610 | 5180.033928 | 6.550 | 5180.033935 | 6.551 | 5180.033890 | 6.542 |
| | 12.6 | 5180.035216 | 6.798 | 5180.035176 | 6.791 | 5180.035219 | 6.799 | 5180.035696 | 6.891 |

4.7 6 dB Bandwidth Measurement

4.7.1 Limits of 6 dB Bandwidth Measurement

The minimum of 6 dB Bandwidth Measurement is 0.5 MHz.

4.7.2 Test Setup



4.7.3 Test Instruments

Refer to section 4.1.3 to get information of above instrument.

4.7.4 Test Procedure

MEASUREMENT PROCEDURE REF

- Set resolution bandwidth (RBW) = 100 kHz
- Set the video bandwidth (VBW) $\geq 3 \times$ RBW, Detector = Peak.
- Trace mode = max hold.
- Sweep = auto couple.
- 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) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------------------|-------------|
| 149 | 5745 | 16.40 | 0.5 | Pass |
| 157 | 5785 | 16.40 | 0.5 | Pass |
| 161 | 5805 | 16.37 | 0.5 | Pass |

802.11n (HT20)

1Tx

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------------------|-------------|
| 149 | 5745 | 17.62 | 0.5 | Pass |
| 157 | 5785 | 17.61 | 0.5 | Pass |
| 161 | 5805 | 17.61 | 0.5 | Pass |

2Tx

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------|---------------------|-------------|
| | | Chain 0 | Chain 1 | | |
| 149 | 5745 | 17.62 | 17.59 | 0.5 | Pass |
| 157 | 5785 | 17.62 | 17.62 | 0.5 | Pass |
| 161 | 5805 | 17.60 | 17.61 | 0.5 | Pass |

3Tx

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | | | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------|---------|---------------------|-------------|
| | | Chain 0 | Chain 1 | Chain 2 | | |
| 149 | 5745 | 17.61 | 17.62 | 17.61 | 0.5 | Pass |
| 157 | 5785 | 17.62 | 17.62 | 17.63 | 0.5 | Pass |
| 161 | 5805 | 17.62 | 17.63 | 17.61 | 0.5 | Pass |

802.11n (HT40)

1Tx

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------------------|-------------|
| 151 | 5755 | 36.36 | 0.5 | Pass |
| 159 | 5795 | 36.23 | 0.5 | Pass |

2Tx

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------|---------------------|-------------|
| | | Chain 0 | Chain 1 | | |
| 151 | 5755 | 36.37 | 36.36 | 0.5 | Pass |
| 159 | 5795 | 36.45 | 36.40 | 0.5 | Pass |

3Tx

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | | | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------|---------|---------------------|-------------|
| | | Chain 0 | Chain 1 | Chain 2 | | |
| 151 | 5755 | 36.42 | 36.45 | 36.44 | 0.5 | Pass |
| 159 | 5795 | 36.42 | 36.43 | 36.44 | 0.5 | Pass |

802.11ac (VHT80)

1Tx

| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------------------|-------------|
| 155 | 5775 | 76.38 | 0.5 | Pass |

2Tx

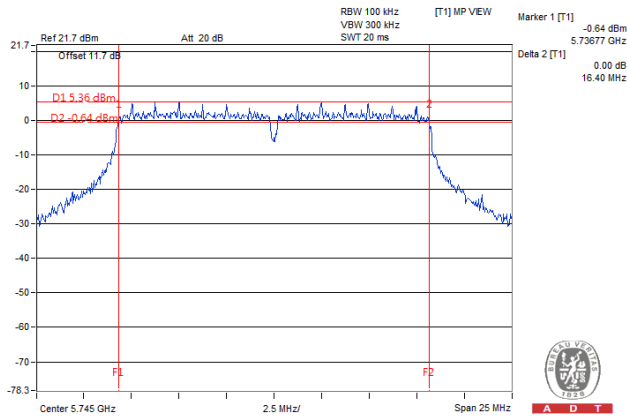
| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------|---------------------|-------------|
| | | Chain 0 | Chain 1 | | |
| 155 | 5775 | 75.89 | 76.48 | 0.5 | Pass |

3Tx

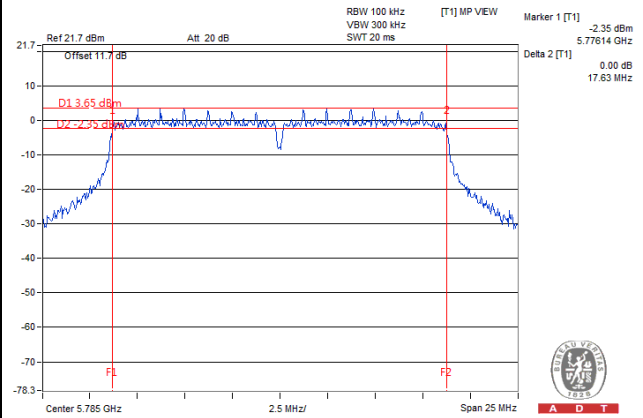
| Channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | | | Minimum Limit (MHz) | Pass / Fail |
|---------|-----------------|----------------------|---------|---------|---------------------|-------------|
| | | Chain 0 | Chain 1 | Chain 2 | | |
| 155 | 5775 | 75.88 | 76.46 | 76.51 | 0.5 | Pass |

Spectrum Plot of Worst Value

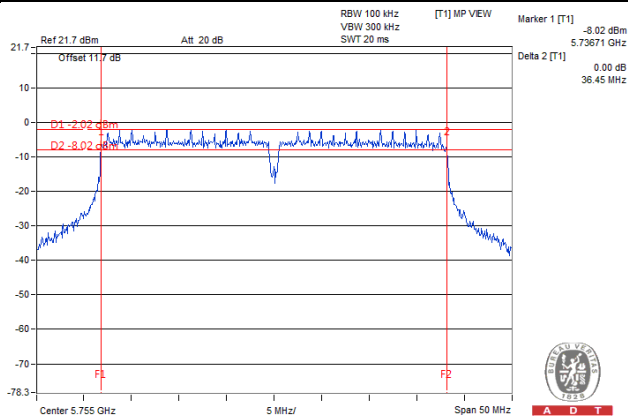
802.11a



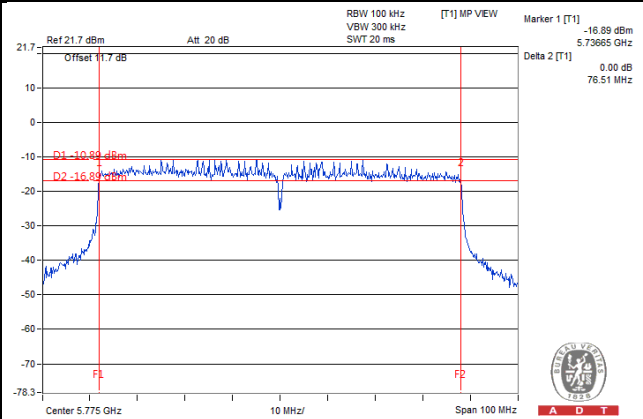
802.11n (HT20)



802.11n (HT40)



802.11ac (VHT80)

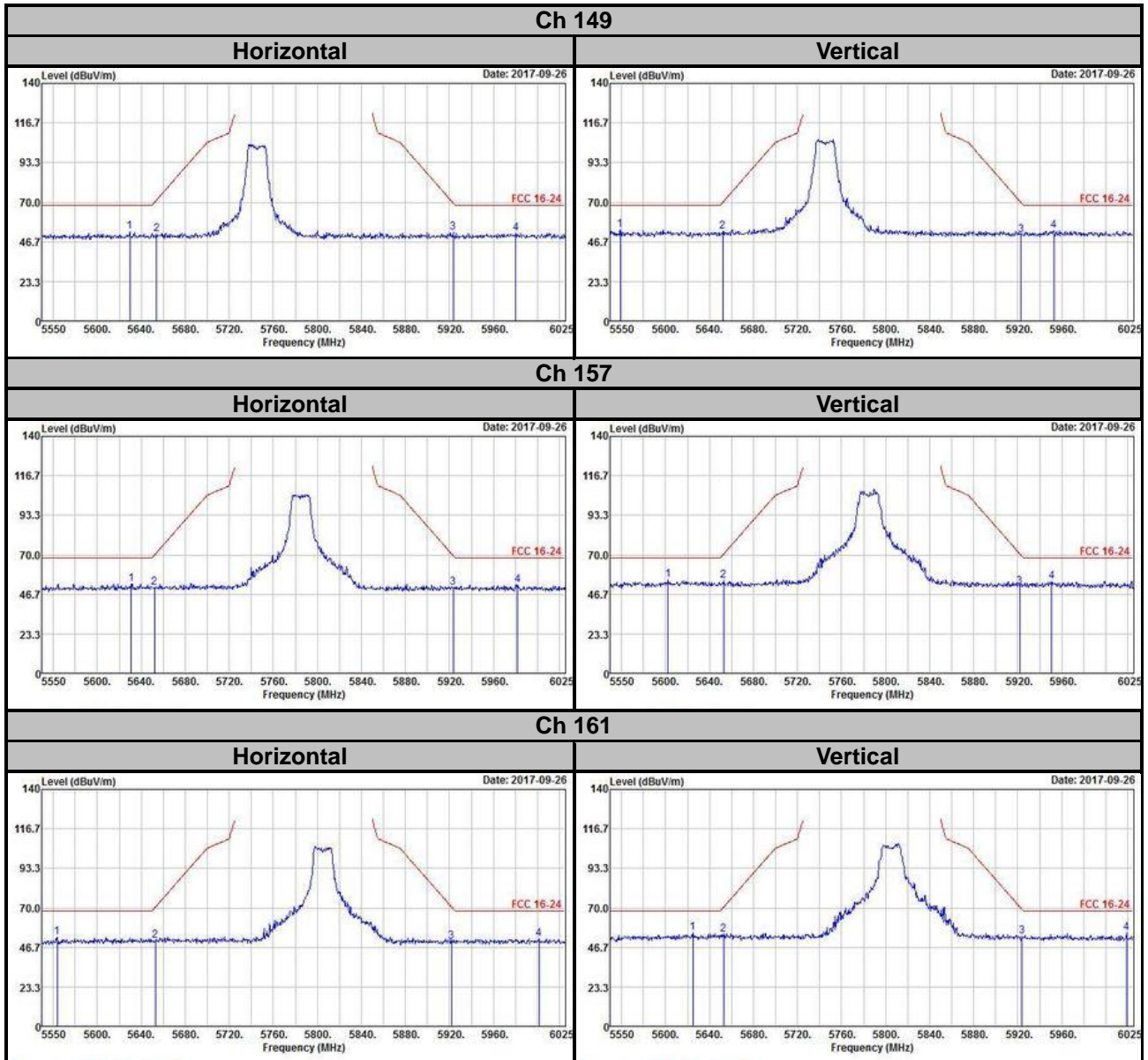


5 Pictures of Test Arrangements

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

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

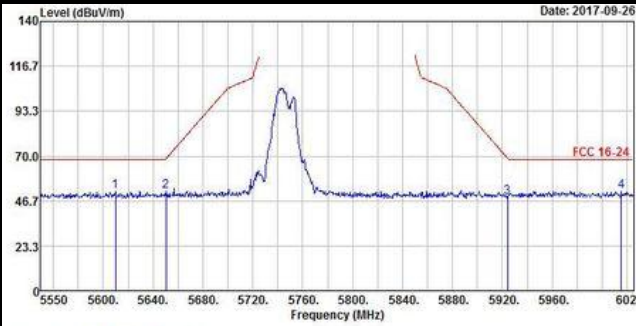
802.11a



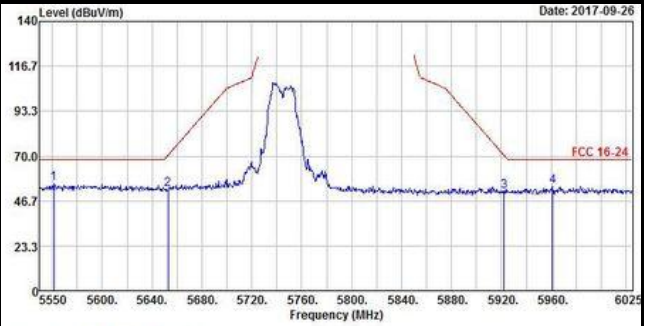
802.11n (HT20)

Ch 149

Horizontal

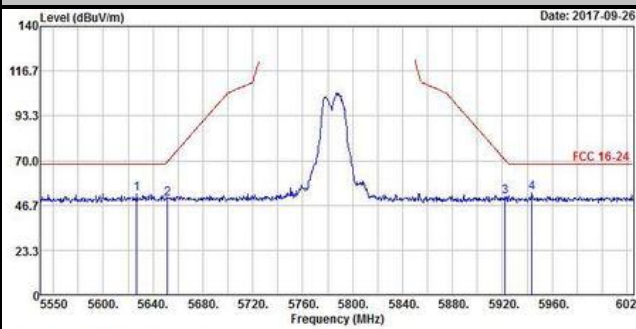


Vertical

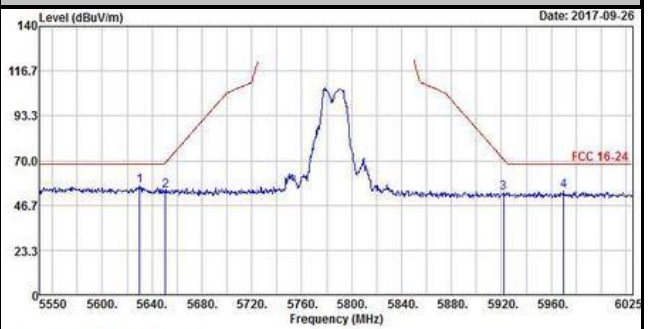


Ch 157

Horizontal

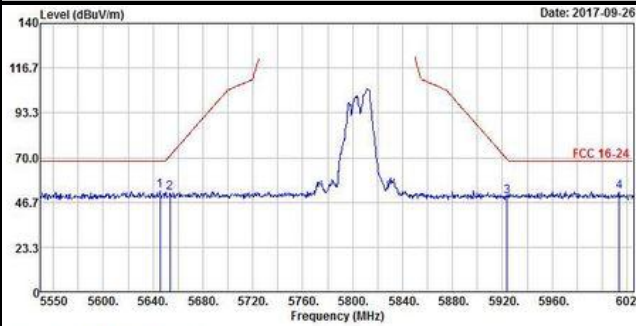


Vertical

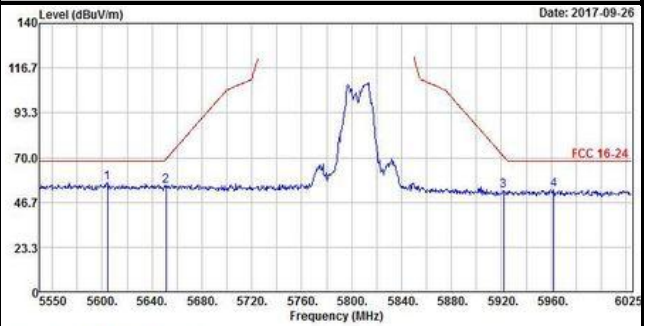


Ch 161

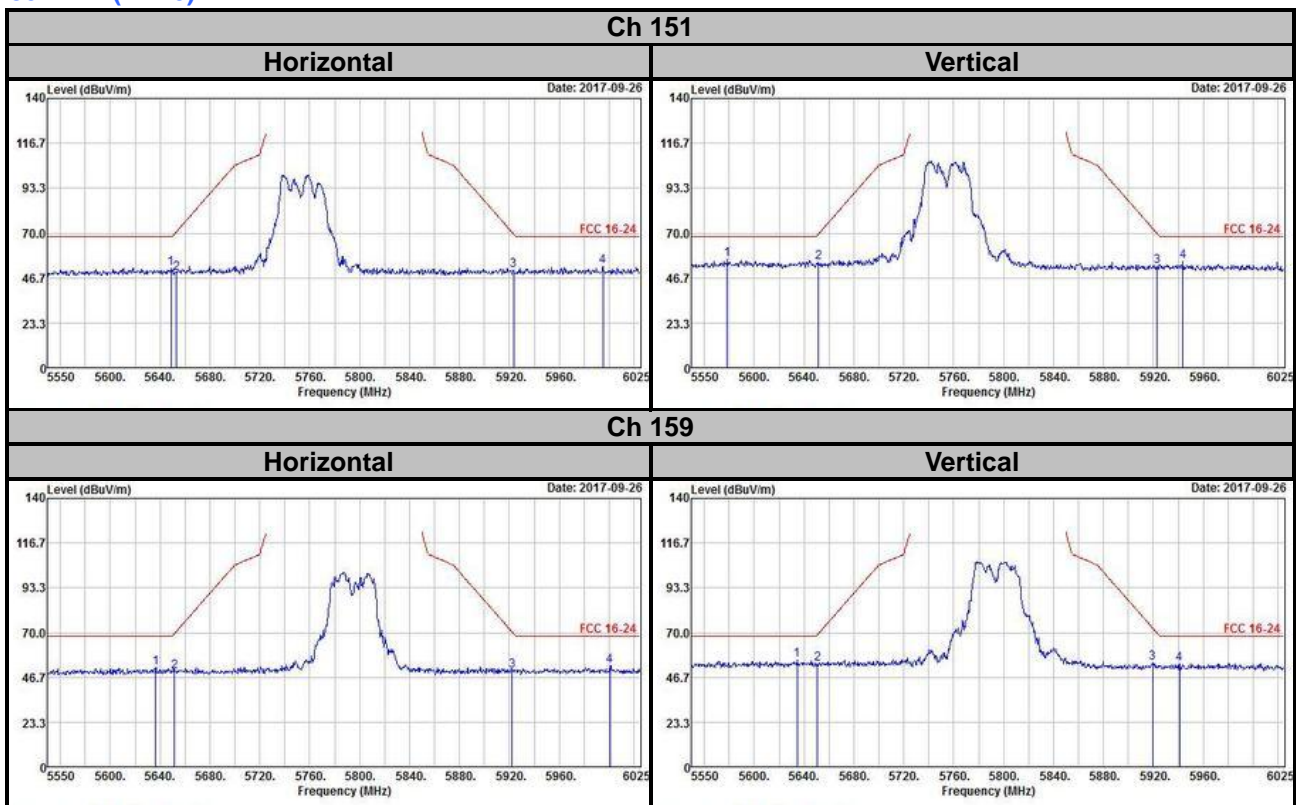
Horizontal



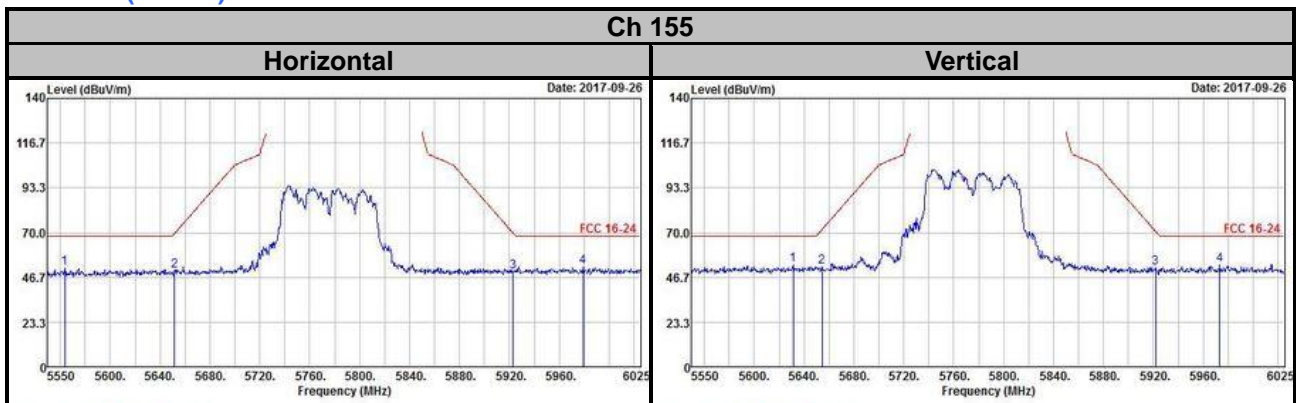
Vertical



802.11n (HT40)



802.11ac (VHT80)



Appendix – Information on the Testing Laboratories

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

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

Linko EMC/RF Lab

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Fax: 886-2-26051924

Hsin Chu EMC/RF/Telecom Lab

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Fax: 886-3-6668323

Hwa Ya EMC/RF/Safety

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 ---