

TEST REPORT

FCC ID: 2AKPYCWV100

Product: TiTAN VR

Model No.: CWV-100

Additional Model No.: CWV-101, CWV-102, CWV-103

Trade Mark: N/A

Report No.: TCT170925E039

Issued Date: Oct. 30, 2017

Issued for:

TiTANplatform Corp.

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Issued By:

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Appendix A: Photographs of Test Setup

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1. Test Certification

| | |
|------------------------------|---|
| Product: | TiTAN VR |
| Model No.: | CWV-100 |
| Additional Model No.: | CWV-101, CWV-102, CWV-103 |
| Trade Mark: | N/A |
| Applicant: | TiTANplatform Corp. |
| Address: | 7th floor, Hyunik Blg., 146 Teheran-ro P.O. Box 06236, Gangnam-gu, Seoul, 06236 South Korea |
| Manufacturer: | Shenzhen Sunchip Technology Co., Ltd |
| Address: | 2nd-3rd Floor, Building 4, Fuan Industry Area Phase 2, Dayang Development Zone, Fuyong, Baoan, Shenzhen. |
| Date of Test: | Sep. 26, 2017 – Oct. 27, 2017 |
| Applicable Standards: | FCC CFR Title 47 Part 15 Subpart E Section 15.407: 2016 KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General U-NII Test Procedures New Rules v01r04 |

The above equipment has been tested by Shenzhen Tongce Testing Lab. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product/system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:

Brews Xu

Date: Oct. 27. 2017

Brews Xu

Reviewed By:

Zen Zhou

Date: Oct. 30. 2017

Joe Zhou

Approved By:

Tomsin

Date: Oct. 30. 2017

Tomsin

2. Test Result Summary

| Requirement | CFR 47 Section | Result |
|---|-----------------------|--------|
| Antenna requirement | §15.203 | PASS |
| AC Power Line Conducted Emission | §15.207 | PASS |
| Maximum Conducted Output Power | §15.407(a) §2.1046 | PASS |
| 6dB Emission Bandwidth | §15.407(a) §2.1049 | PASS |
| 26dB Emission Bandwidth& 99% Occupied Bandwidth | §15.407(a) §2.1049 | PASS |
| Power Spectral Density | §15.407(a) | PASS |
| Restricted Bands around fundamental frequency | §15.407(a) | PASS |
| Radiated Emission | §15.407(a) §2.1053 | PASS |
| Frequency Stability | §15.407(g) §2.1055 | PASS |

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

3. EUT Description

| | |
|-------------------------------|---|
| Product: | TiTAN VR |
| Model No.: | CWV-100 |
| Additional Model No.: | CWV-101, CWV-102, CWV-103 |
| Trade Mark: | N/A |
| Operation Frequency: | Band I: 5180MHz~5240MHz Band III: 5745MHz~5825MHz |
| Channel Bandwidth: | 802.11a: 20MHz 802.11n: 20MHz |
| Modulation Technology: | Orthogonal Frequency Division Multiplexing(OFDM) |
| Modulation Type | 64QAM, 16QAM, BPSK, QPSK |
| Antenna Type: | Internal Antenna |
| Antenna Gain: | 4.86dBi |
| Power Supply: | Adapter Information: Model: FLD0710-5.0V2.50A Input: AC 100-240V, 50/60Hz, 0.3A Output: DC5.0V, 2.5A |
| Remark: | All models above are identical in interior structure, electrical circuits and components, and just model names are different for the marketing requirement. |

Band I (5150MHz~5250MHz) Power level setup in software

| Mode | Channel | Frequency | Soft set |
|-----------|---------|-----------|----------|
| 11n(HT20) | CH36 | 5180 | 40 |
| 11n(HT20) | CH40 | 5200 | 40 |
| 11n(HT20) | CH48 | 5240 | 40 |

Band III (5725 - 5850 MHz) Power level setup in software

| Mode | Channel | Frequency | Soft set |
|------------|---------|-----------|----------|
| 11n (HT20) | CH149 | 5745 | 45 |
| 11n (HT20) | CH157 | 5785 | 45 |
| 11n (HT20) | CH165 | 5825 | 45 |

Note: The Soft set value is the internal setting required to meet the requirements and does not necessarily mean the 'dBm' value

Operation Frequency each of channel

| 20MHz | |
|---------|-----------|
| Channel | Frequency |
| 36 | 5180 |
| 40 | 5200 |
| 44 | 5220 |
| 48 | 5240 |
| 149 | 5745 |
| 153 | 5765 |
| 157 | 5785 |
| 161 | 5805 |
| 165 | 5825 |

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

For 802.11a/n (HT20)

| Band I (5150 - 5250 MHz) | | | Band III (5725 - 5850 MHz) | | |
|--------------------------|---------|-----------------|----------------------------|---------|-----------------|
| Channel Number | Channel | Frequency (MHz) | Channel Number | Channel | Frequency (MHz) |
| 36 | Low | 5180 | 149 | Low | 5745 |
| 40 | Mid | 5200 | 157 | Mid | 5785 |
| 48 | High | 5240 | 165 | High | 5805 |

4. General Information

4.1. Test environment and mode

| Operating Environment: | |
|---|--|
| Temperature: | 25.0 °C |
| Humidity: | 56 % RH |
| Atmospheric Pressure: | 1010 mbar |
| Test Mode: | |
| Engineering mode: | Keep the EUT in continuous transmitting by select channel and modulations(The value of duty cycle is 100%) |
| The sample was placed 0.8m/1.5m for below/above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages. | |

We have verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Per-scan all kind of data rate in lowest channel, and found the follow list which it was worst case.

| Mode | Data rate |
|-----------------|-----------|
| 802.11a/n(HT20) | 6.5 Mbps |

Final Test Mode:

| | |
|-----------------|---|
| Operation mode: | Keep the EUT in continuous transmitting with modulation |
|-----------------|---|

4.2. Description of Support Units

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

| Equipment | Model No. | Serial No. | FCC ID | Trade Name |
|-----------|-----------|------------|--------|------------|
| / | / | / | / | / |

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, Emission Bandwidth, Power Spectral Density, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

5. Facilities and Accreditations

5.1. Facilities

The test facility is recognized, certified, or accredited by the following organizations:

- FCC - Registration No.: 645098

Shenzhen Tongce Testing Lab

The 3m Semi-anechoic chamber has been registered and fully described in a report with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files.

- IC - Registration No.: 10668A-1

The 3m Semi-anechoic chamber of Shenzhen TCT Testing Technology Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing

5.2. Location

Shenzhen Tongce Testing Lab

Address: 1B/F., Building 1, Yibaolai Industrial Park, Qiaotou, Fuyong, Baoan District, Shenzhen, Guangdong, China

TEL: +86-755-27673339

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

| No. | Item | MU |
|-----|-------------------------------|-------------------------|
| 1 | Conducted Emission | $\pm 2.56\text{dB}$ |
| 2 | RF power, conducted | $\pm 0.12\text{dB}$ |
| 3 | Spurious emissions, conducted | $\pm 0.11\text{dB}$ |
| 4 | All emissions, radiated(<1G) | $\pm 3.92\text{dB}$ |
| 5 | All emissions, radiated(>1G) | $\pm 4.28\text{dB}$ |
| 6 | Temperature | $\pm 0.1^\circ\text{C}$ |
| 7 | Humidity | $\pm 1.0\%$ |

6. Test Results and Measurement Data

6.1. Antenna requirement

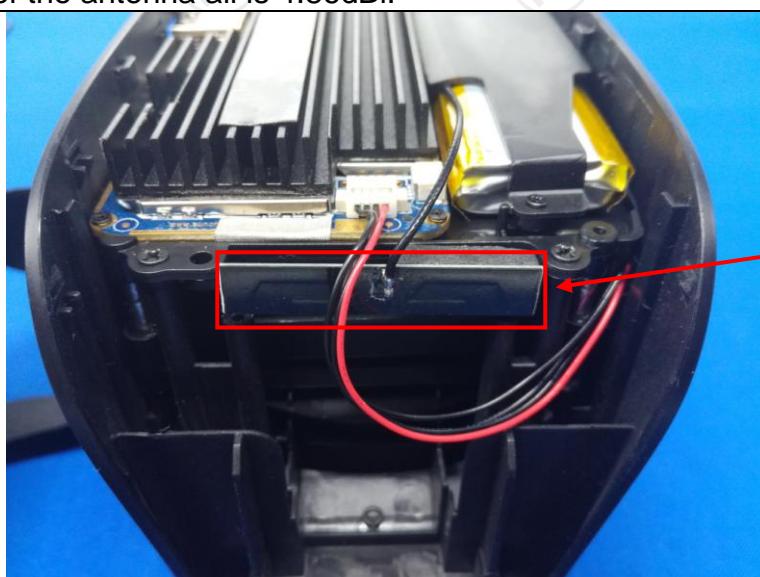
| | |
|------------------------------|-------------------------------------|
| Standard requirement: | FCC Part15 C Section 15.203 /247(c) |
|------------------------------|-------------------------------------|

15.203 requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

E.U.T Antenna:

The WIFI antenna is internal antenna which is only the antenna type used, and the best case gain of the antenna all is 4.86dBi.

**Antenna**

6.2. Conducted Emission

6.2.1. Test Specification

| Test Requirement: | FCC Part15 C Section 15.207 | | | | | | | | | | | | | | |
|--------------------------|--|--------------------------|--------------|--|------------|---------|----------|-----------|-----------|-------|----|----|------|----|----|
| Test Method: | ANSI C63.10:2013 | | | | | | | | | | | | | | |
| Frequency Range: | 150 kHz to 30 MHz | | | | | | | | | | | | | | |
| Receiver setup: | RBW=9 kHz, VBW=30 kHz, Sweep time=auto | | | | | | | | | | | | | | |
| Limits: | <table border="1"> <thead> <tr> <th rowspan="2">Frequency range (MHz)</th> <th colspan="2">Limit (dBuV)</th> </tr> <tr> <th>Quasi-peak</th> <th>Average</th> </tr> </thead> <tbody> <tr> <td>0.15-0.5</td> <td>66 to 56*</td> <td>56 to 46*</td> </tr> <tr> <td>0.5-5</td> <td>56</td> <td>46</td> </tr> <tr> <td>5-30</td> <td>60</td> <td>50</td> </tr> </tbody> </table> | Frequency range (MHz) | Limit (dBuV) | | Quasi-peak | Average | 0.15-0.5 | 66 to 56* | 56 to 46* | 0.5-5 | 56 | 46 | 5-30 | 60 | 50 |
| Frequency range (MHz) | Limit (dBuV) | | | | | | | | | | | | | | |
| | Quasi-peak | Average | | | | | | | | | | | | | |
| 0.15-0.5 | 66 to 56* | 56 to 46* | | | | | | | | | | | | | |
| 0.5-5 | 56 | 46 | | | | | | | | | | | | | |
| 5-30 | 60 | 50 | | | | | | | | | | | | | |
| Test Setup: | <p><i>Remark:</i> E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m</p> | | | | | | | | | | | | | | |
| Test Mode: | Tx Mode | | | | | | | | | | | | | | |
| Test Procedure: | <ol style="list-style-type: none"> The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10: 2013 on conducted measurement. | | | | | | | | | | | | | | |
| Test Result: | PASS | | | | | | | | | | | | | | |

6.2.2. Test Instruments

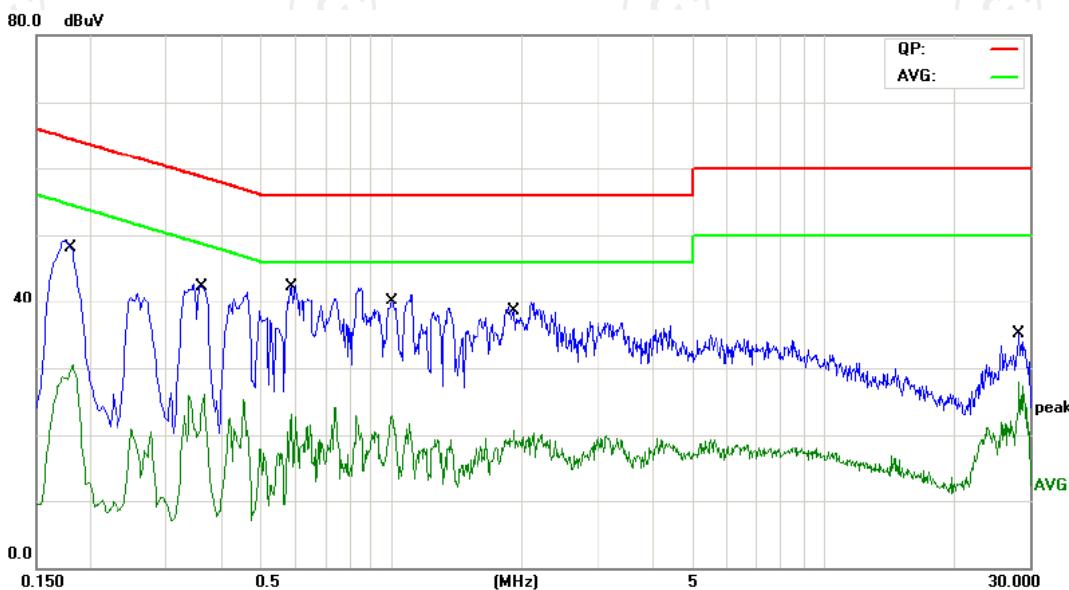
| Conducted Emission Shielding Room Test Site (843) | | | | |
|---|------------------------|-----------|---------------|-----------------|
| Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| Test Receiver | R&S | ESPI | 101401 | Jun. 12, 2018 |
| LISN | Schwarzbeck | NSLK 8126 | 8126453 | Sep. 27, 2018 |
| Coax cable (9KHz-30MHz) | TCT | CE-05 | N/A | Sep. 27, 2018 |
| EMI Test Software | Shurples Technology | EZ-EMC | N/A | N/A |

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.2.3. Test data

Please refer to following diagram for individual

Conducted Emission on Line Terminal of the power line (150 kHz to 30MHz)



| Site Chamber #2 | | | | Phase: L1 | | Temperature: 25 (C) | |
|--|-----|-----------|--------------------|---------------------|------------------|---------------------|------------|
| Limit: FCC Part 15B Class B Conduction(QP) | | | | Power: AC 120V/60Hz | | Humidity: 55 % | |
| No. | Mk. | Freq. MHz | Reading Level dBμV | Correct Factor dB | Measurement dBμV | Limit dBμV | Over |
| 1 | | 0.1815 | 37.74 | 11.46 | 49.20 | 64.41 | -15.21 QP |
| 2 | | 0.1815 | 18.99 | 11.46 | 30.45 | 54.41 | -23.96 AVG |
| 3 | | 0.3660 | 30.96 | 11.37 | 42.33 | 58.59 | -16.26 QP |
| 4 | | 0.3660 | 14.73 | 11.37 | 26.10 | 48.59 | -22.49 AVG |
| 5 * | | 0.5864 | 31.18 | 11.27 | 42.45 | 56.00 | -13.55 QP |
| 6 | | 0.5864 | 11.83 | 11.27 | 23.10 | 46.00 | -22.90 AVG |
| 7 | | 1.0048 | 29.85 | 11.20 | 41.05 | 56.00 | -14.95 QP |
| 8 | | 1.0048 | 11.64 | 11.20 | 22.84 | 46.00 | -23.16 AVG |
| 9 | | 1.9274 | 28.30 | 11.65 | 39.95 | 56.00 | -16.05 QP |
| 10 | | 1.9274 | 9.15 | 11.65 | 20.80 | 46.00 | -25.20 AVG |
| 11 | | 28.3920 | 24.43 | 10.65 | 35.08 | 60.00 | -24.92 QP |
| 12 | | 28.3920 | 17.15 | 10.65 | 27.80 | 50.00 | -22.20 AVG |

Note:

Freq. = Emission frequency in MHz

Reading level (dB μ V) = Receiver reading

Corr. Factor (dB) = Antenna factor + Cable loss

Measurement (dB μ V) = Reading level (dB μ V) + Corr. Factor (dB)

Limit (dB μ V) = Limit stated in standard

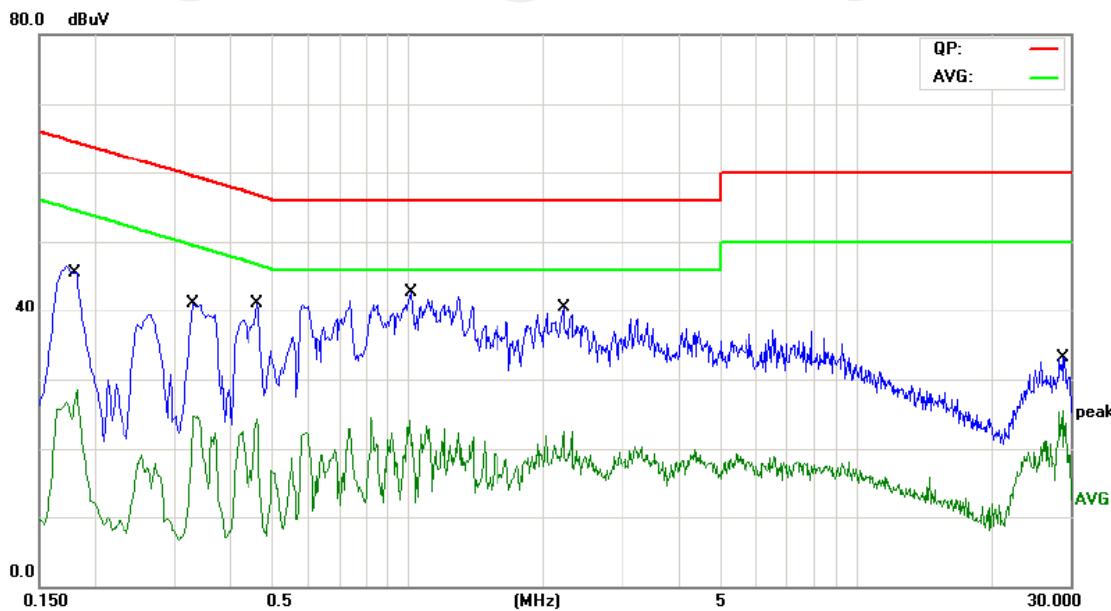
Margin (dB) = Measurement (dB μ V) – Limits (dB μ V)

Q.P. = Quasi-Peak

Avg = average

* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz

Conducted Emission on Neutral Terminal of the power line (150 kHz to 30MHz)



| Site Chamber #2 | | | | Phase: | N | Temperature: | 25 (C) |
|--|-----|---------|---------------|----------------|--------------|--------------|----------|
| Limit: FCC Part 15B Class B Conduction(QP) | | | | Power: | AC 120V/60Hz | Humidity: | 55 % |
| No. | Mk. | Freq. | Reading Level | Correct Factor | Measure-ment | Limit | Over |
| | | MHz | dB μ V | dB | dB μ V | dB | Detector |
| 1 | | 0.1814 | 34.97 | 11.46 | 46.43 | 64.42 | -17.99 |
| 2 | | 0.1814 | 16.99 | 11.46 | 28.45 | 54.42 | -25.97 |
| 3 | | 0.3300 | 29.74 | 11.38 | 41.12 | 59.45 | -18.33 |
| 4 | | 0.3300 | 13.28 | 11.38 | 24.66 | 49.45 | -24.79 |
| 5 | | 0.4605 | 29.76 | 11.32 | 41.08 | 56.68 | -15.60 |
| 6 | | 0.4605 | 13.04 | 11.32 | 24.36 | 46.68 | -22.32 |
| 7 | * | 1.0094 | 31.50 | 11.20 | 42.70 | 56.00 | -13.30 |
| 8 | | 1.0094 | 12.82 | 11.20 | 24.02 | 46.00 | -21.98 |
| 9 | | 2.2153 | 28.93 | 11.61 | 40.54 | 56.00 | -15.46 |
| 10 | | 2.2153 | 10.87 | 11.61 | 22.48 | 46.00 | -23.52 |
| 11 | | 28.7744 | 22.42 | 10.64 | 33.06 | 60.00 | -26.94 |
| 12 | | 28.7744 | 14.90 | 10.64 | 25.54 | 50.00 | -24.46 |

Note:

Freq. = Emission frequency in MHz

Reading level (dB μ V) = Receiver reading

Corr. Factor (dB) = attenuator factor + Cable loss

Measurement (dB μ V) = Reading level (dB μ V) + Corr. Factor (dB)

Limit (dB μ V) = Limit stated in standard

Margin (dB) = Measurement (dB μ V) – Limits (dB μ V)

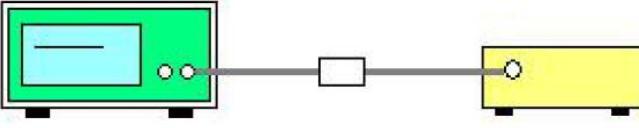
Q.P. = Quasi-Peak

AVG = average

* is meaning the worst frequency has been tested in the frequency range 150 kHz to 30MHz.

6.3. Maximum Conducted Output Power

6.3.1. Test Specification

| | | |
|--------------------------|---|----------------------------|
| Test Requirement: | FCC Part15 E Section 15.407(a)& Part 2 J Section 2.1046 | |
| Test Method: | KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section E | |
| Limit: | Frequency Band (MHz) | Limit |
| | 5150-5250 | 1W for indoor access point |
| | 5725-5850 | 1 W |
| | Note: Where "B" is the 26 dB emissions bandwidth in MHz. | |
| Test Setup: |  Power meter EUT | |
| Test Mode: | Transmitting mode with modulation | |
| Test Procedure: | <ol style="list-style-type: none"> 1. The testing follows the Measurement Procedure of KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section E, 3, a 2. The RF output of EUT was connected to the power meter by RF cable and attenuator. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 5. Measure the conducted output power and record the results in the test report. | |
| Test Result: | PASS | |
| Remark: | Conducted output power= measurement power + $10\log(1/x)$ X is duty cycle=1, so $10\log(1/1)=0$ Conducted output power= measurement power | |

6.3.2. Test Instruments

| RF Test Room | | | | |
|--------------------------|--------------|--------|---------------|-----------------|
| Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| Spectrum Analyzer | Agilent | N9020A | MY49100060 | Sep. 27, 2018 |
| Power Meter | Agilent | N1911A | MY45101557 | Sep. 27, 2018 |
| Power Sensor | Agilent | N1922A | MY44124432 | Sep. 27, 2018 |
| RF Cable (9KHz-40GHz) | TCT | RE-03 | N/A | Sep. 27, 2018 |
| Antenna Connector | TCT | RFC-03 | N/A | Sep. 27, 2018 |

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.3.3. Test Data

Configuration Band I (5150 - 5250 MHz)

| Mode | Test channel | Maximum Conducted (Average) Output Power (dBm) | | FCC Limit (dBm) | Result |
|-----------|--------------|--|---------|-----------------|--------|
| | | 802.11a | 802.11n | | |
| 11n(HT20) | CH36 | 6.32 | 6.07 | 30 | PASS |
| 11n(HT20) | CH40 | 6.25 | 5.73 | 30 | PASS |
| 11n(HT20) | CH48 | 4.92 | 5.40 | 30 | PASS |

Configuration Band III (5725 - 5850 MHz)

| Mode | Test channel | Maximum Conducted (Average) Output Power (dBm) | | FCC Limit (dBm) | Result |
|------------|--------------|--|---------|-----------------|--------|
| | | 802.11a | 802.11n | | |
| 11n (HT20) | CH149 | 6.05 | 5.23 | 30 | PASS |
| 11n (HT20) | CH157 | 6.01 | 4.75 | 30 | PASS |
| 11n (HT20) | CH165 | 5.97 | 5.61 | 30 | PASS |

Note : $G_{ANT} = 4.86 \text{ dBi} < 6 \text{ dBi}$ so limit=30dBm/MHz

6.4. 6dB Emission Bandwidth

6.4.1. Test Specification

| | |
|--------------------------|---|
| Test Requirement: | FCC CFR47 Part 15 Section 15.407(e)& Part 2 J Section 2.1049 |
| Test Method: | KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section C |
| Limit: | >500kHz |
| Test Setup: | <p style="text-align: center;">Spectrum Analyzer EUT</p> |
| Test Mode: | Transmitting mode with modulation |
| Test Procedure: | <ol style="list-style-type: none"> 1. KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section C 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. The 6dB bandwidth must be greater than 500 kHz. 4. Measure and record the results in the test report. |
| Test Result: | PASS |

6.4.2. Test Instruments

| RF Test Room | | | | |
|-----------------------|--------------|--------|---------------|-----------------|
| Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| Spectrum Analyzer | Agilent | N9020A | MY49100060 | Sep. 27, 2018 |
| RF Cable (9KHz-40GHz) | TCT | RE-03 | N/A | Sep. 27, 2018 |
| Antenna Connector | TCT | RFC-03 | N/A | Sep. 27, 2018 |

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.4.3. Test data**802.11a****Band III (5725 - 5850 MHz)**

| Mode | Test channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Limit (MHz) | Result |
|-----------|--------------|-----------------|----------------------|-------------|--------|
| 11n(HT20) | CH149 | 5745 | 15.12 | 0.5 | PASS |
| 11n(HT20) | CH157 | 5785 | 15.04 | 0.5 | PASS |
| 11n(HT20) | CH161 | 5825 | 15.29 | 0.5 | PASS |

802.11n**Band III (5725 - 5850 MHz)**

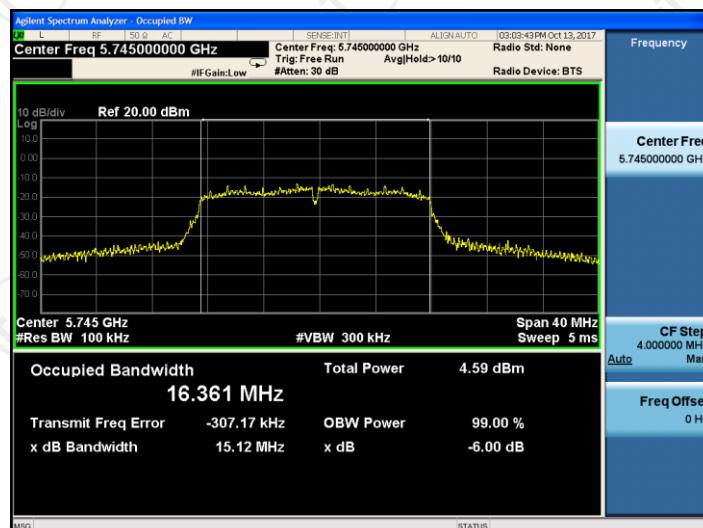
| Mode | Test channel | Frequency (MHz) | 6 dB Bandwidth (MHz) | Limit (MHz) | Result |
|-----------|--------------|-----------------|----------------------|-------------|--------|
| 11n(HT20) | CH149 | 5745 | 15.08 | 0.5 | PASS |
| 11n(HT20) | CH157 | 5785 | 16.03 | 0.5 | PASS |
| 11n(HT20) | CH161 | 5825 | 13.89 | 0.5 | PASS |

Test plots as follows:

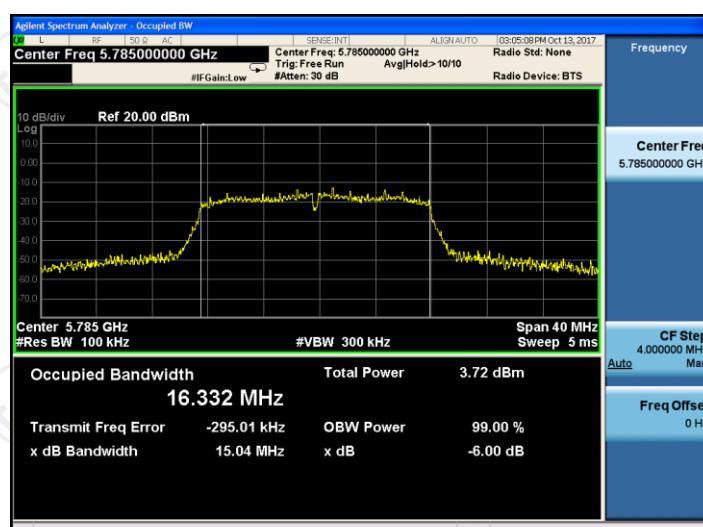
Band III (5725 – 5850 MHz)

11a(HT20)

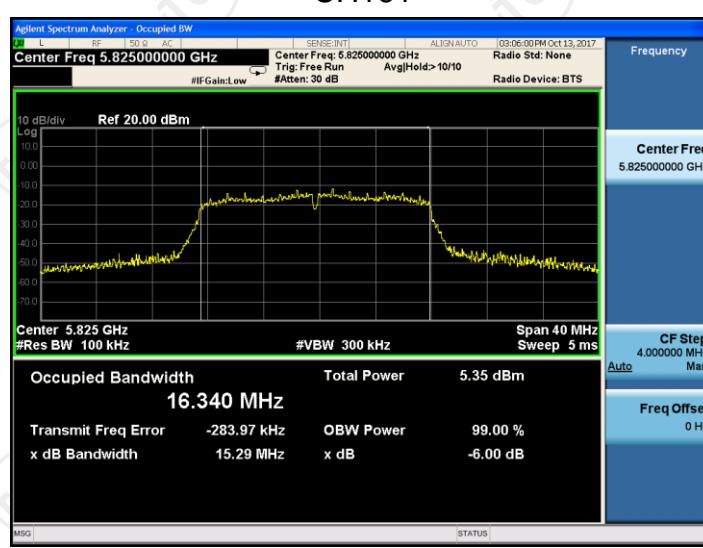
CH149



CH157

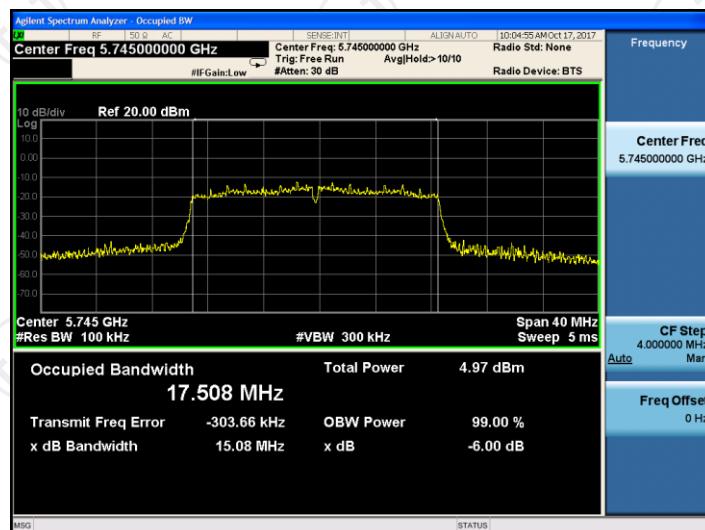


CH161

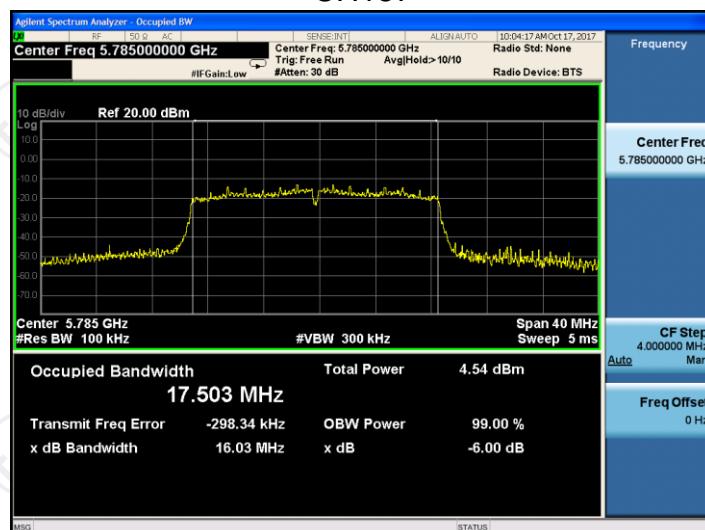


11n(HT20)

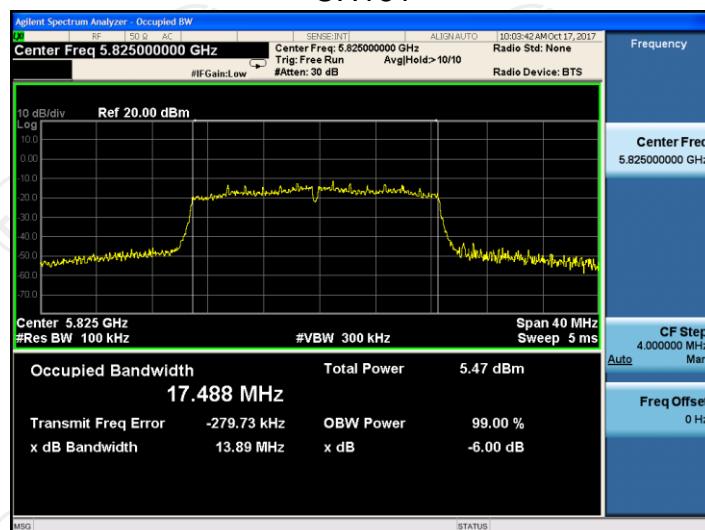
CH149



CH157

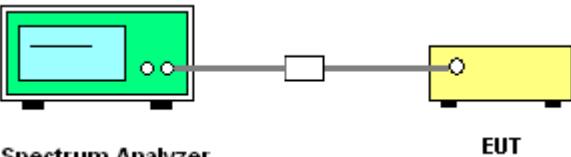


CH161



6.5. 26dB Bandwidth and 99% Occupied Bandwidth

6.5.1. Test Specification

| | |
|--------------------------|---|
| Test Requirement: | 47 CFR Part 15C Section 15.407 (a)& Part 2 J Section 2.1049 |
| Test Method: | KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section D |
| Limit: | No restriction limits |
| Test Setup: |  <p style="text-align: center;">Spectrum Analyzer EUT</p> |
| Test Mode: | Transmitting mode with modulation |
| Test Procedure: | <ol style="list-style-type: none"> 1. KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section D 2. Set to the maximum power setting and enable the EUT transmit continuously. 3. Make the measurement with the spectrum analyzer's resolution bandwidth (RBW) = 100 kHz. Set the Video bandwidth (VBW) = 300 kHz. In order to make an accurate measurement. 4. Measure and record the results in the test report. |
| Test Result: | PASS |

6.5.2. Test Instruments

| RF Test Room | | | | |
|-------------------------|--------------|--------|---------------|-----------------|
| Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| Spectrum Analyzer | Agilent | N9020A | MY49100060 | Sep. 27, 2018 |
| RF Cable (9KHz-26.5GHz) | TCT | RE-06 | N/A | Sep. 27, 2018 |
| Antenna Connector | TCT | RFC-01 | N/A | Sep. 27, 2018 |

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.5.3. Test data**802.11a****Band I**

| Mode | Test channel | Frequency (MHz) | 26 dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------|--------------|-----------------|-----------------------|---------------------|
| 11a(HT20) | CH36 | 5180 | 18.78 | 16.494 |
| 11a(HT20) | CH40 | 5200 | 18.85 | 16.467 |
| 11a(HT20) | CH48 | 5240 | 18.77 | 16.464 |

Band III

| Mode | Test channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|-----------|--------------|-----------------|---------------------|
| 11a(HT20) | CH149 | 5745 | 16.619 |
| 11a(HT20) | CH157 | 5785 | 16.501 |
| 11a(HT20) | CH161 | 5825 | 16.533 |

**802.11n
Band I**

| Mode | Test channel | Frequency (MHz) | 26 dB Bandwidth (MHz) | 99% Bandwidth (MHz) |
|-----------|--------------|-----------------|-----------------------|---------------------|
| 11n(HT20) | CH36 | 5180 | 19.12 | 17.483 |
| 11n(HT20) | CH40 | 5200 | 19.14 | 17.493 |
| 11n(HT20) | CH48 | 5240 | 19.04 | 17.491 |

Band III

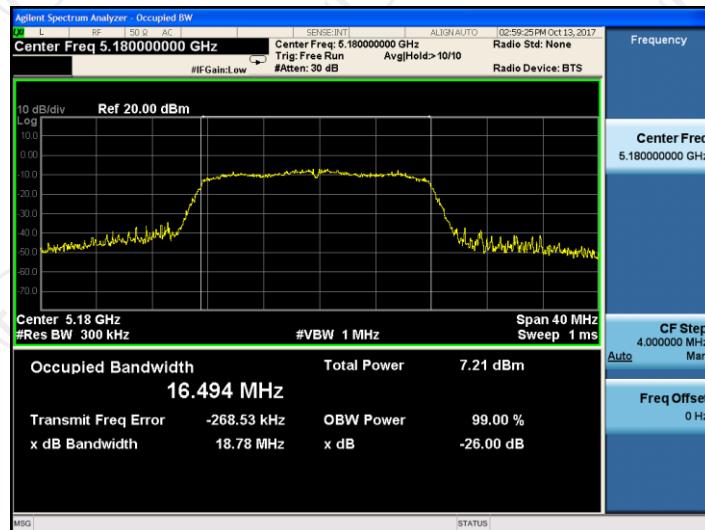
| Mode | Test channel | Frequency (MHz) | 99% Bandwidth (MHz) |
|-----------|--------------|-----------------|---------------------|
| 11n(HT20) | CH149 | 5745 | 17.531 |
| 11n(HT20) | CH157 | 5785 | 17.519 |
| 11n(HT20) | CH161 | 5825 | 17.500 |

Test plots as follows:

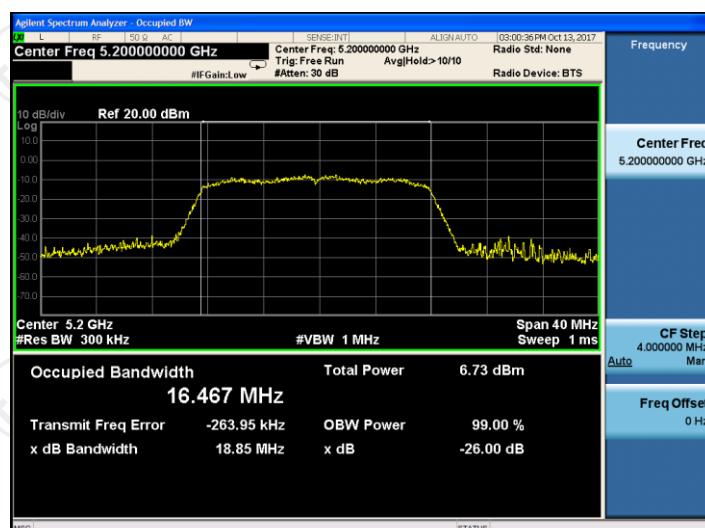
Band I (5150 – 5250 MHz)

11a(HT20)

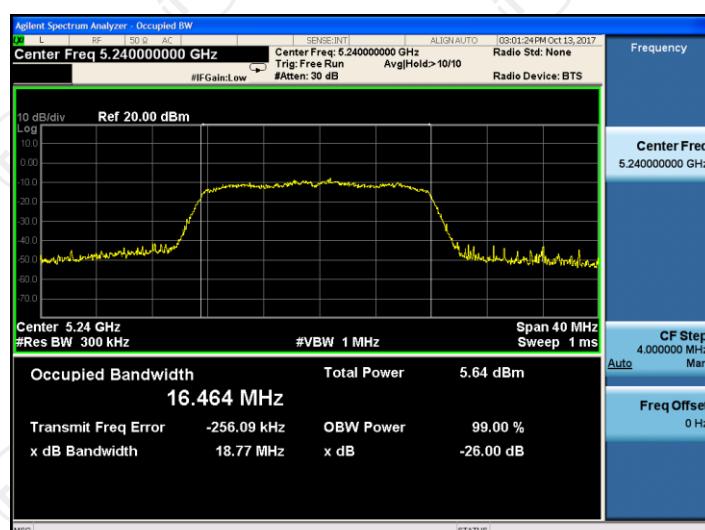
CH36



CH40



CH48



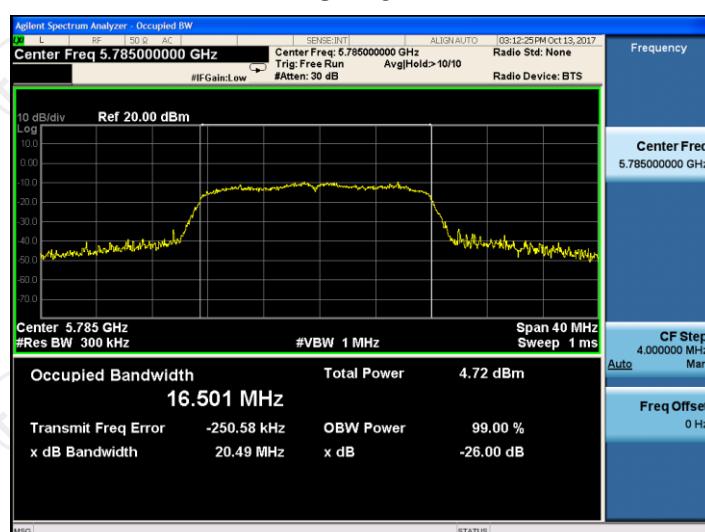
Band III (5725 – 5850 MHz)

11a(HT20)

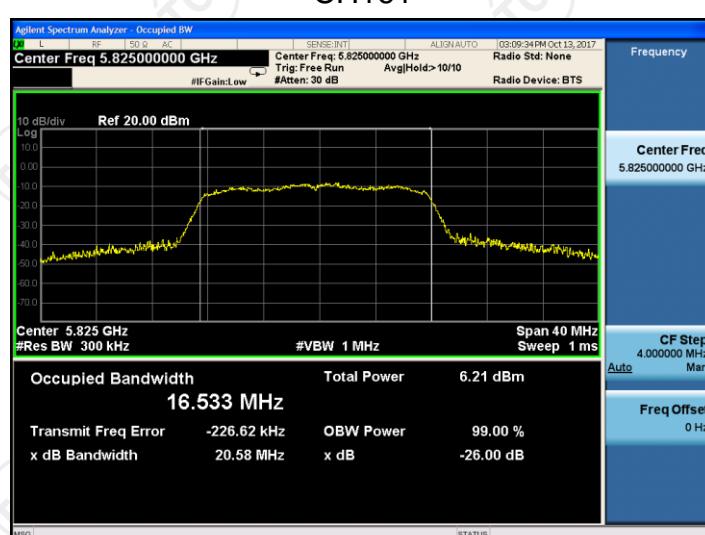
CH149



CH157



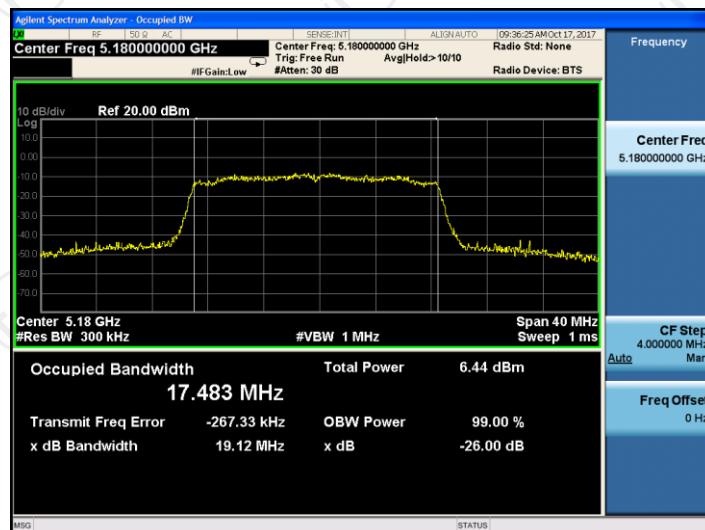
CH161



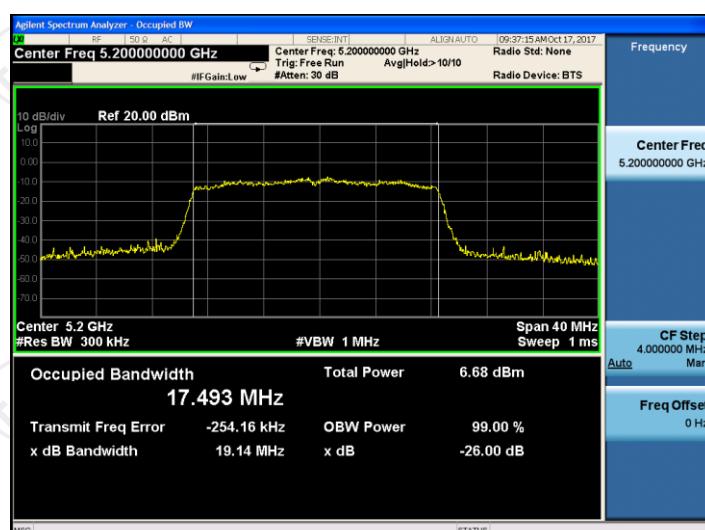
Band I (5150 – 5250 MHz)

11n(HT20)

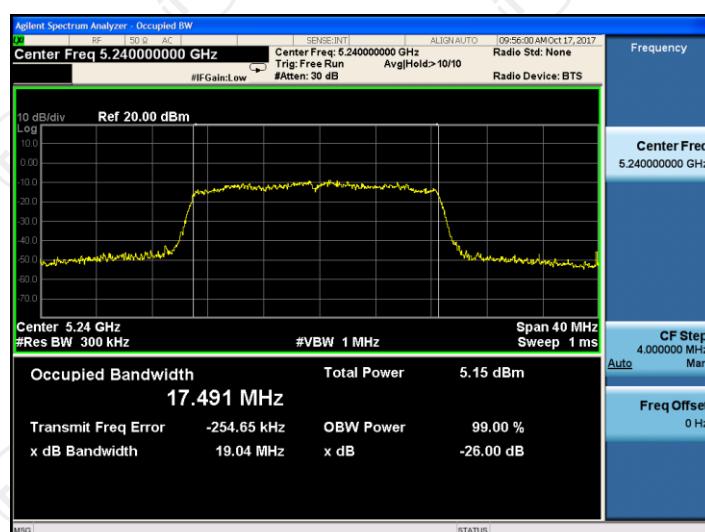
CH36



CH40



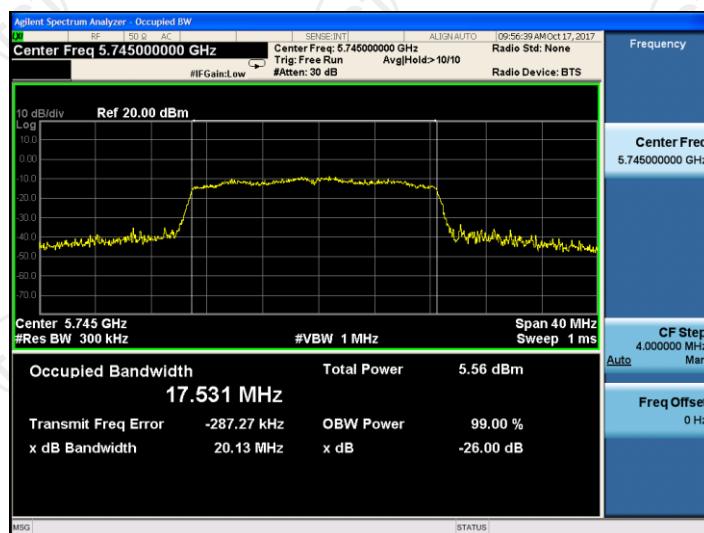
CH48



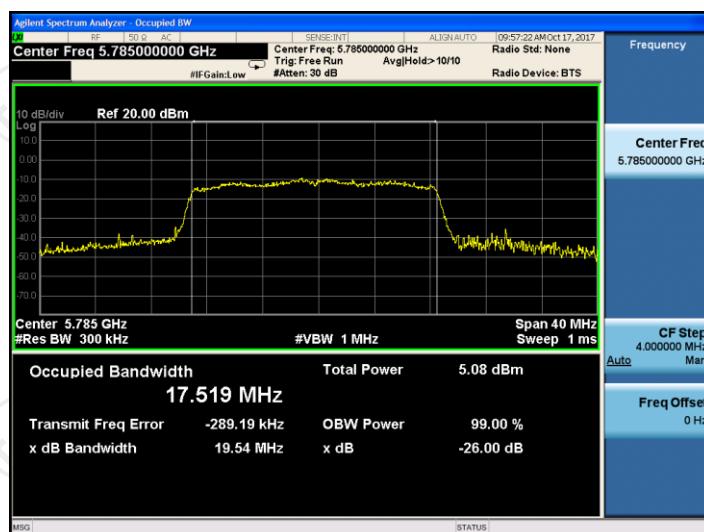
Band III (5725 – 5850 MHz)

11n(HT20)

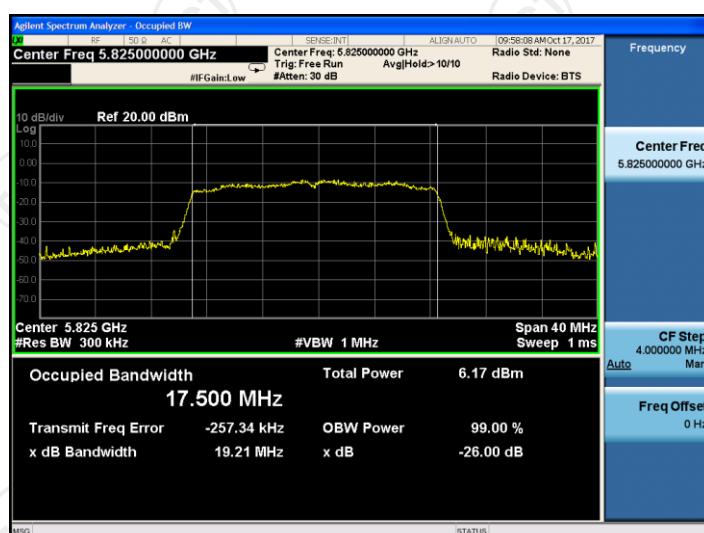
CH149



CH157



CH161



6.6. Power Spectral Density

6.6.1. Test Specification

| | |
|--------------------------|--|
| Test Requirement: | FCC Part15 E Section 15.407 (a) |
| Test Method: | KDB662911 D01 Multiple Transmitter Output v02r01 KDB789033 D02 General UNII Test Procedures New Rules v01r04 Section F |
| Limit: | ≤17.00dBm/MHz for Band I 5150MHz-5250MHz ≤30.00dBm/500KHz for Band III 5725MHz-5850MHz The e.i,r,p spectral density for Band I 5150MHz – 5250 MHz should not exceed 10dBm/MHz |
| Test Setup: |  <p style="text-align: center;">Spectrum Analyzer EUT</p> |
| Test Mode: | Transmitting mode with modulation |
| Test Procedure: | <ol style="list-style-type: none"> Set the spectrum analyzer or EMI receiver span to view the entire emission bandwidth. Set RBW = 510 kHz/1 MHz, VBW ≥ 3*RBW, Sweep time = Auto, Detector = RMS. Allow the sweeps to continue until the trace stabilizes. Use the peak marker function to determine the maximum amplitude level. The E.I.R.P spectral density used radiated test method. At a test site that has been validated using the procedures of ANSI C63.4 or the latest CISPR 16-1-4 for measurements above 1 GHz, so as to simulate a near free-space environment. |
| Test Result: | PASS |

6.6.2. Test Instruments

| RF Test Room | | | | |
|-----------------------|--------------|--------|---------------|-----------------|
| Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| Spectrum Analyzer | Agilent | N9020A | MY49100060 | Sep. 27, 2018 |
| RF Cable (9KHz-40GHz) | TCT | RE-03 | N/A | Sep. 27, 2018 |
| Antenna Connector | TCT | RFC-03 | N/A | Sep. 27, 2018 |

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.6.3. Test data

| Configuration Band I (5150 - 5250 MHz) | | | | | |
|---|--------------|------------------------|---------|--------------------|--------|
| Mode | Test channel | Power Spectral Density | | Limit (dBm/MHz) | Result |
| | | 802.11a | 802.11n | | |
| 11n(HT20) | CH36 | -0.882 | -1.385 | 17 | PASS |
| 11n(HT20) | CH40 | -0.700 | -1.352 | 17 | PASS |
| 11n(HT20) | CH48 | -1.642 | -1.824 | 17 | PASS |

Note: 1. All antennas have the same gain. $G_{ANT}=2\text{dBi}$, Array Gain=10log(N_{ANT}/N_{SS})=3.01dB

Directional Gain= G_{ANT} + Array Gain=5.01dB, 5.01dB < 6dB so limit=17dBm/MHz

2. The total PSD method used the sum spectra maxima across the outputs.

| Configuration Band III (5725 - 5850 MHz) | | | | | |
|---|--------------|------------------------|---------|-----------------------|--------|
| Mode | Test channel | Power Spectral Density | | Limit (dBm/500kHz) | Result |
| | | 802.11a | 802.11n | | |
| 11n(HT20) | CH149 | -4.940 | -6.012 | 30 | PASS |
| 11n(HT20) | CH157 | -6.007 | -6.391 | 30 | PASS |
| 11n(HT20) | CH161 | -5.632 | -6.040 | 30 | PASS |

Note: 1. All antennas have the same gain. $G_{ANT}=2\text{dBi}$, Array Gain=10log(N_{ANT}/N_{SS})=3.01dB

Directional Gain= G_{ANT} + Array Gain=5.01dB, 5.01dB < 6dB so limit=30dBm/MHz

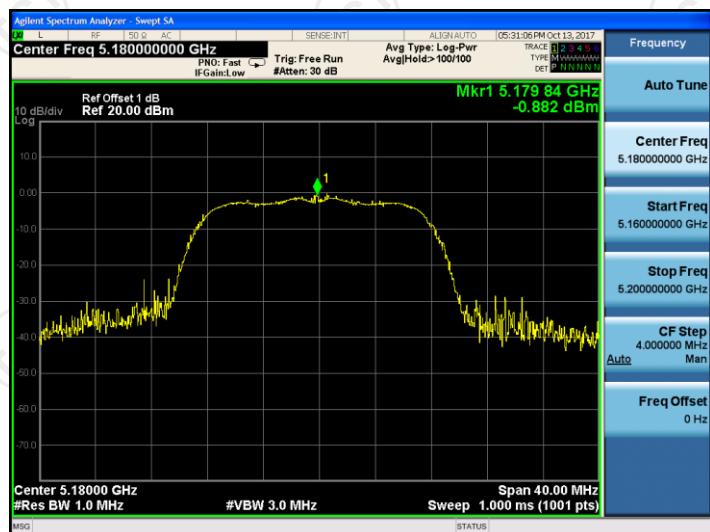
2. The total PSD method used the sum spectra maxima across the outputs.

Test plots as follows:

Band I (5150 – 5250 MHz)

11a(HT20)

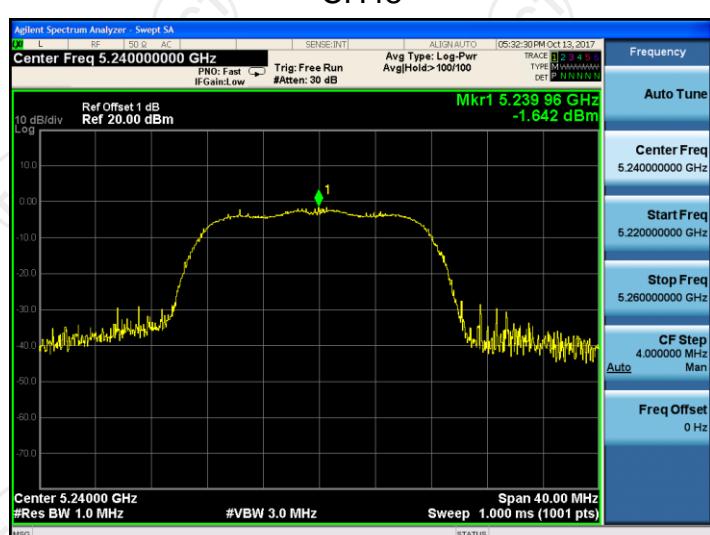
CH36



CH40



CH48



Band III (5725 – 5850 MHz)

11a(HT20)

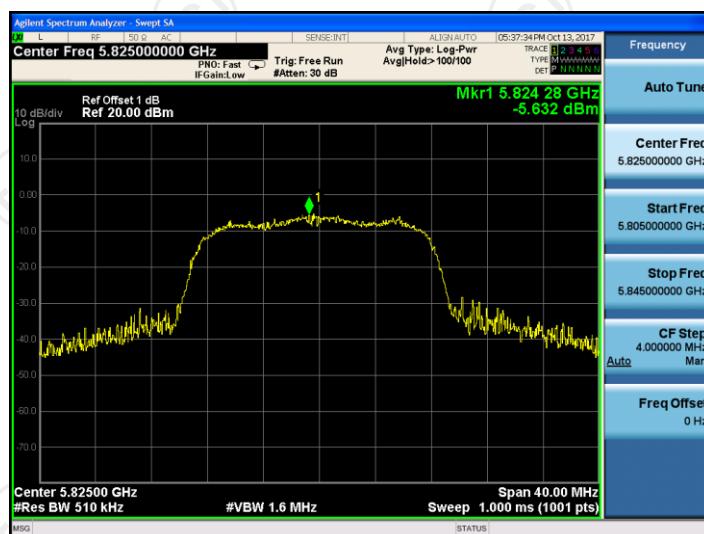
CH149



CH157



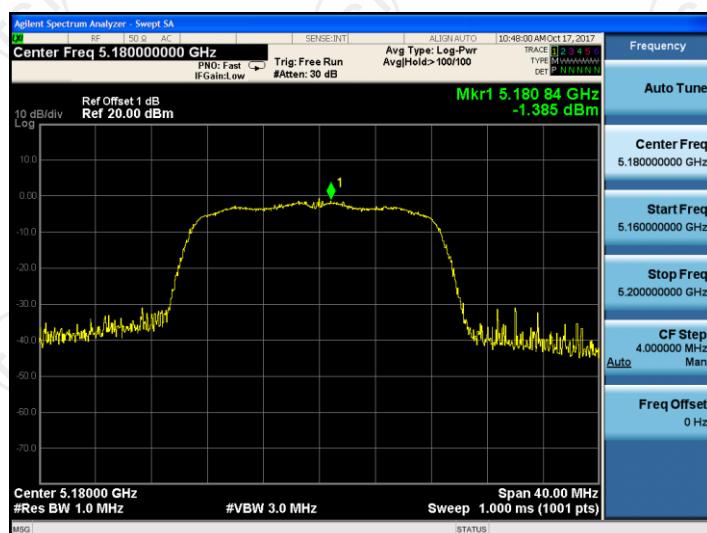
CH161



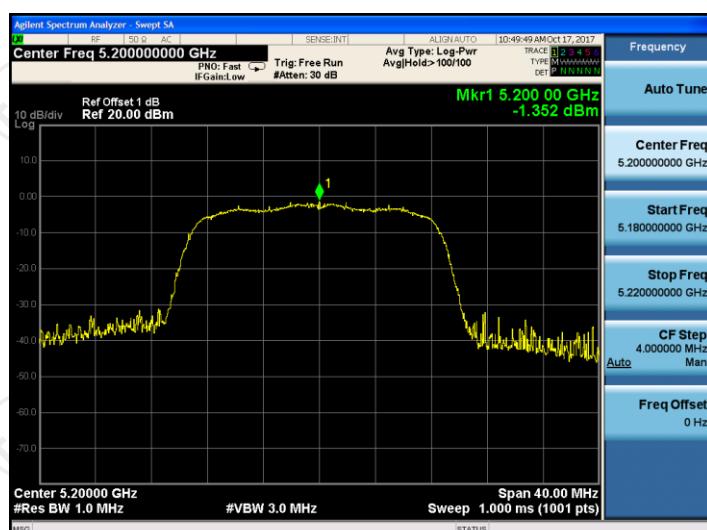
Band I (5150 – 5250 MHz)

11n(HT20)

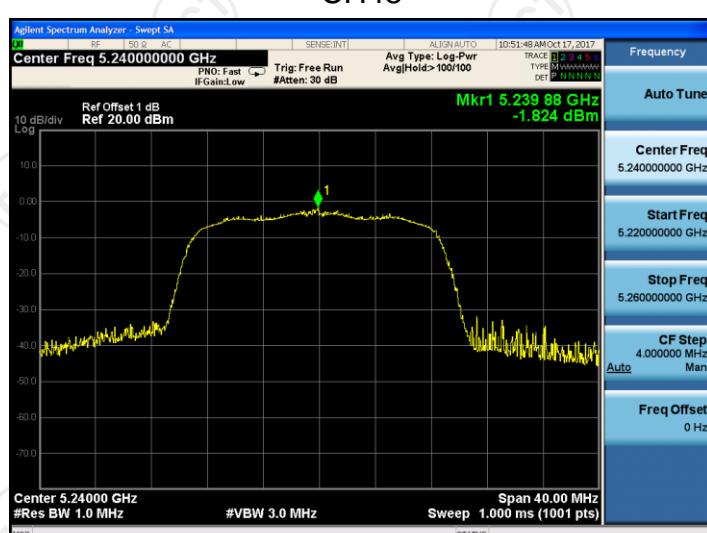
CH36



CH40



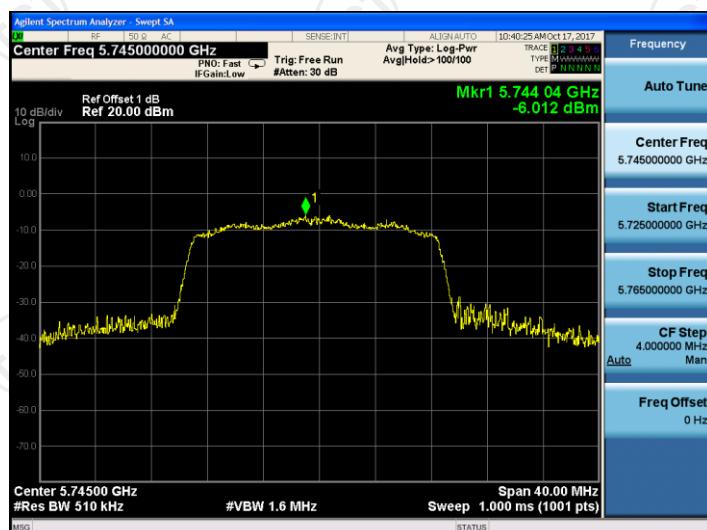
CH48



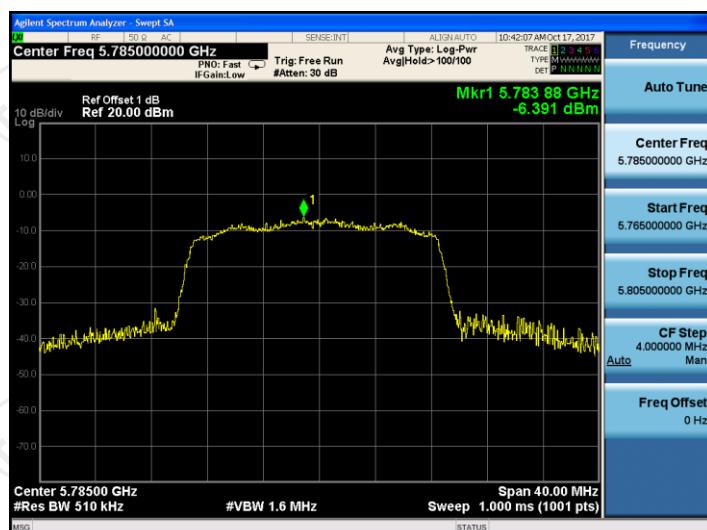
Band III (5725 – 5850 MHz)

11n(HT20)

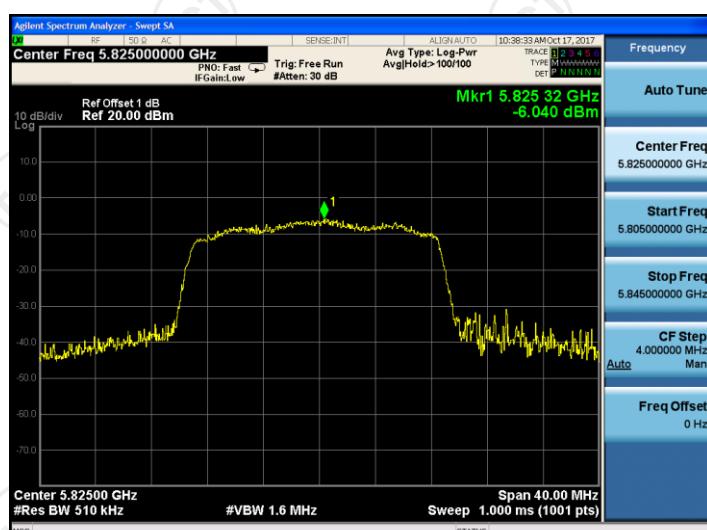
CH149



CH157



CH161



6.7. Band edge

6.7.1. Test Specification

| | |
|--------------------------|--|
| Test Requirement: | FCC CFR47 Part 15E Section 15.407 |
| Test Method: | ANSI C63.10 2013 |
| Limit: | <p>For band I&II&III: $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2 \text{ dB}\mu\text{V}/\text{m}$, for EIRP(dBm)= -27dBm</p> <p>For Band III(5715-5725MHz&5850-5860MHz): $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 78.2 \text{ dB}\mu\text{V}/\text{m}$, for EIRP(dBm)= -17dBm;</p> <p>For Band III(other un-restricted band): $E[\text{dB}\mu\text{V}/\text{m}] = \text{EIRP}[\text{dBm}] + 95.2 = 68.2 \text{ dB}\mu\text{V}/\text{m}$, for EIRP(dBm)= -27dBm</p> |
| Test Setup: | |
| Test Mode: | Transmitting mode with modulation |
| Test Procedure: | <ol style="list-style-type: none"> The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height 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. 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 rota table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have |

| | |
|---------------------|---|
| | 10dB margin would be re-tested one by one using peak, quasipeak or average method as specified and then reported in a data sheet. |
| Test Result: | PASS |

6.7.2. Test Instruments

| Radiated Emission Test Site (966) | | | | |
|-----------------------------------|------------------------------------|------------|---------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| Test Receiver | ROHDE&SCHW ARZ | ESVD | 100008 | Sep. 27, 2018 |
| Spectrum Analyzer | ROHDE&SCHW ARZ | FSQ | 200061 | Sep. 27, 2018 |
| Spectrum Analyzer | ROHDE&SCHW ARZ | FSP40 | 100056 | Sep. 27, 2018 |
| Spectrum Analyzer | Agilent | N9020A | MY49100060 | Sep. 27, 2018 |
| Pre-amplifier | EM Electronics Corporation CO.,LTD | EM30265 | 07032613 | Sep. 27, 2018 |
| Pre-amplifier | HP | 8447D | 2727A05017 | Sep. 27, 2018 |
| Loop antenna | ZHINAN | ZN30900A | 12024 | Sep. 27, 2018 |
| Broadband Antenna | Schwarzbeck | VULB9163 | 340 | Sep. 27, 2018 |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 631 | Sep. 27, 2018 |
| Horn Antenna | Schwarzbeck | BBH 9170 | 582 | Jun. 07, 2018 |
| Coax cable (9KHz-1GHz) | TCT | RE-low-01 | N/A | Sep. 27, 2018 |
| Coax cable (9KHz-40GHz) | TCT | RE-high-02 | N/A | Sep. 27, 2018 |
| Coax cable (9KHz-1GHz) | TCT | RE-low-03 | N/A | Sep. 27, 2018 |
| Coax cable (9KHz-40GHz) | TCT | RE-high-04 | N/A | Sep. 27, 2018 |
| Antenna Mast | Keleto | CC-A-4M | N/A | N/A |
| EMI Test Software | Shurple Technology | EZ-EMC | N/A | N/A |

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.7.3. Test Data

| 802.11a HT20 | CH | Freq. (MHz) | Read_level (dBuV/m) | Factor (dB) | Peak (dBuV/m) | Limit (dBuV/m) (Peak) | Limit (dBuV/m) (Avg) | Over | Ant. Pol. H/V |
|-----------------|---------|----------------|------------------------|----------------|------------------|-----------------------------|----------------------------|-------|---------------------|
| Band I | Lowest | 5150 | 45.21 | 5.82 | 51.03 | 68.2 | 54 | -2.97 | H |
| | | 5150 | 41.37 | 5.82 | 47.19 | 68.2 | 54 | -6.81 | V |
| | Highest | 5250 | 43.18 | 6.17 | 49.35 | 68.2 | 54 | -4.65 | H |
| | | 5250 | 39.32 | 6.17 | 45.49 | 68.2 | 54 | -8.51 | V |
| <hr/> | | | | | | | | | |
| Band III | Lowest | 5725 | 43.25 | 8.21 | 51.46 | 78.2 | 54 | -2.54 | H |
| | | 5725 | 43.21 | 8.21 | 51.42 | 78.2 | 54 | -2.58 | V |
| | Highest | 5850 | 42.27 | 8.87 | 51.14 | 78.2 | 54 | -2.86 | H |
| | | 5850 | 40.23 | 8.87 | 49.1 | 78.2 | 54 | -4.9 | V |

Remark: Factor(dB)=Ant. Factor+Cable Loss+Amp. Factor

| 802.11n HT20 | CH | Freq. (MHz) | Read_level (dBuV/m) | Factor (dB) | Peak (dBuV/m) | Limit (dBuV/m) (Peak) | Limit (dBuV/m) (Avg) | Over | Ant. Pol. H/V |
|-----------------|---------|----------------|------------------------|----------------|------------------|-----------------------------|----------------------------|-------|---------------------|
| Band I | Lowest | 5150 | 43.83 | 5.82 | 49.65 | 68.2 | 54 | -4.35 | H |
| | | 5150 | 38.35 | 5.82 | 44.17 | 68.2 | 54 | -9.83 | V |
| | Highest | 5250 | 45.34 | 6.17 | 51.51 | 68.2 | 54 | -2.49 | H |
| | | 5250 | 42.77 | 6.17 | 48.94 | 68.2 | 54 | -5.06 | V |
| <hr/> | | | | | | | | | |
| Band III | Lowest | 5725 | 43.68 | 8.21 | 51.89 | 78.2 | 54 | -2.11 | H |
| | | 5725 | 43.63 | 8.21 | 51.84 | 78.2 | 54 | -2.16 | V |
| | Highest | 5850 | 41.77 | 8.87 | 50.64 | 78.2 | 54 | -3.36 | H |
| | | 5850 | 39.45 | 8.87 | 48.32 | 78.2 | 54 | -5.68 | V |

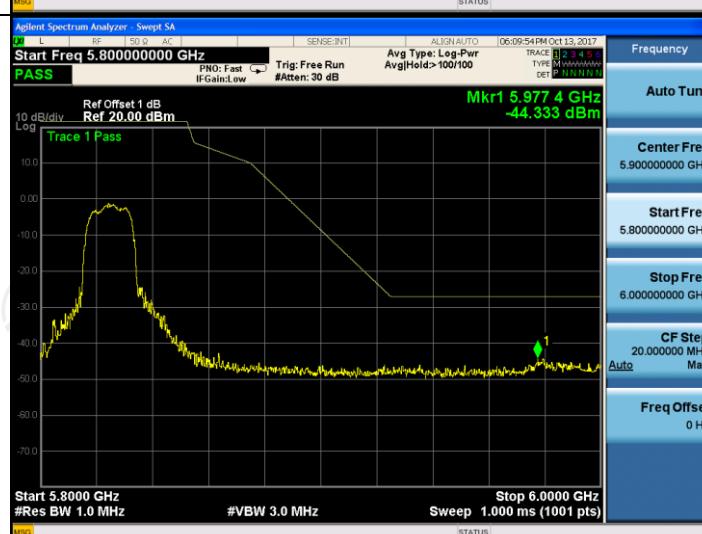
Remark: Factor(dB)=Ant. Factor+Cable Loss+Amp. Factor

Band III Band-edge for RF Conducted Emissions

802.11a
/LCH

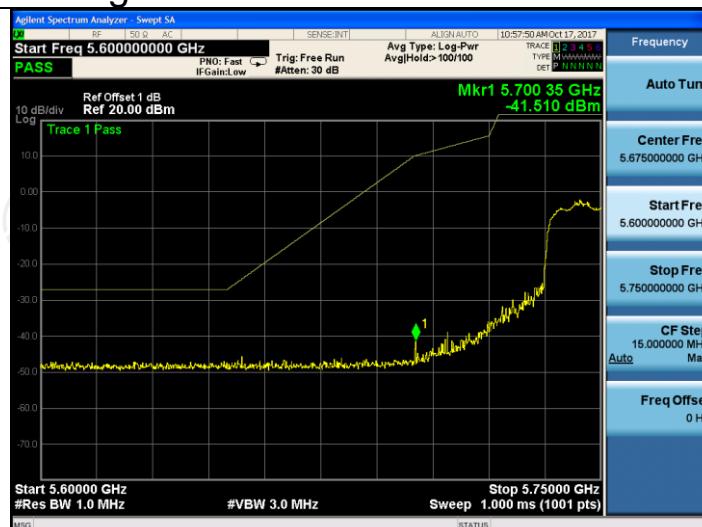


802.11a
/ HCH



Band III Band-edge for RF Conducted Emissions

802.11n
/LCH



802.11n
/ HCH



6.8. Spurious Emission

6.8.1. Restrict Bands Measurement

6.8.1.1. Test Specification

| Test Requirement: | FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205 | | | | | | | | | | | | | | | | | | | |
|------------------------------|---|---------------|------|---------------|--|-----------|--------------------------|--------|------------|--------|------------|------|------|---------------|------------|--|-----|------|------|---------------|
| Test Method: | KDB 789033 D02 v01r04 | | | | | | | | | | | | | | | | | | | |
| Frequency Range: | Band I & II: 4.5 GHz to 5.15 GHz and 5.35GHz to 5.46GHz Band III & IV: 5.35 GHz to 5.46 GHz | | | | | | | | | | | | | | | | | | | |
| Measurement Distance: | 3 m | | | | | | | | | | | | | | | | | | | |
| Antenna Polarization: | Horizontal & Vertical | | | | | | | | | | | | | | | | | | | |
| Operation mode: | Transmitting mode with modulation | | | | | | | | | | | | | | | | | | | |
| Receiver Setup: | <table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>Above 1GHz</td> <td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak Value</td> </tr> <tr> <td></td> <td>RMS</td> <td>1MHz</td> <td>3MHz</td> <td>Average Value</td> </tr> </tbody> </table> | | | | | Frequency | Detector | RBW | VBW | Remark | Above 1GHz | Peak | 1MHz | 3MHz | Peak Value | | RMS | 1MHz | 3MHz | Average Value |
| Frequency | Detector | RBW | VBW | Remark | | | | | | | | | | | | | | | | |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak Value | | | | | | | | | | | | | | | | |
| | RMS | 1MHz | 3MHz | Average Value | | | | | | | | | | | | | | | | |
| Limit: | <table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBuV/m @3m)</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>Above 1GHz</td> <td>74</td> <td>Peak Value</td> </tr> <tr> <td></td> <td>54</td> <td>Average Value</td> </tr> </tbody> </table> | | | | | Frequency | Limit (dBuV/m @3m) | Remark | Above 1GHz | 74 | Peak Value | | 54 | Average Value | | | | | | |
| Frequency | Limit (dBuV/m @3m) | Remark | | | | | | | | | | | | | | | | | | |
| Above 1GHz | 74 | Peak Value | | | | | | | | | | | | | | | | | | |
| | 54 | Average Value | | | | | | | | | | | | | | | | | | |
| Test setup: | <p>Above 1GHz</p> | | | | | | | | | | | | | | | | | | | |
| Test Procedure: | <ol style="list-style-type: none"> The testing follows FCC KDB Publication No. 789033 D02 General UNII Test Procedures New Rules v01r04. Section G) Unwanted emissions measurement. For the radiated emission test below 1GHz: The EUT was placed on a turntable with 0.8 meter above ground. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower. The EUT was arranged to its worst case and then tune | | | | | | | | | | | | | | | | | | | |

| | |
|----------------------|--|
| | <p>the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high PASS filter are used for the test in order to get better signal level.</p> <p>For the radiated emission test above 1GHz:</p> <p>Place the measurement antenna on a turntable with 1.5 meter above ground, which is away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.</p> <ol style="list-style-type: none"> 3. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level 4. For measurement below 1GHz, If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported. 5. Use the following spectrum analyzer settings: <ol style="list-style-type: none"> (1) Span shall wide enough to fully capture the emission being measured; (2) Set RBW=100 kHz for $f < 1$ GHz; VBW \geq RBW; Sweep = auto; Detector function = peak; Trace = max hold; (3) Set RBW = 1 MHz, VBW= 3MHz for $f > 1$ GHz for peak measurement. <p>For average measurement: VBW = 10 Hz, when duty cycle is no less than 98 percent. $VBW \geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.</p> <p>(4) A 5.8GHz high –PASS filter is used during radiated emissions above 1GHz measurement.</p> |
| Test results: | PASS |

6.8.1.1 Test Instruments

| Radiated Emission Test Site (966) | | | | |
|-----------------------------------|------------------------------------|------------|---------------|-----------------|
| Name of Equipment | Manufacturer | Model | Serial Number | Calibration Due |
| Test Receiver | ROHDE&SCHW ARZ | ESVD | 100008 | Sep. 27, 2018 |
| Spectrum Analyzer | ROHDE&SCHW ARZ | FSQ | 200061 | Sep. 27, 2018 |
| Spectrum Analyzer | ROHDE&SCHW ARZ | FSP40 | 100056 | Sep. 27, 2018 |
| Spectrum Analyzer | Agilent | N9020A | MY49100060 | Sep. 27, 2018 |
| Pre-amplifier | EM Electronics Corporation CO.,LTD | EM30265 | 07032613 | Sep. 27, 2018 |
| Pre-amplifier | HP | 8447D | 2727A05017 | Sep. 27, 2018 |
| Loop antenna | ZHINAN | ZN30900A | 12024 | Sep. 27, 2018 |
| Broadband Antenna | Schwarzbeck | VULB9163 | 340 | Sep. 27, 2018 |
| Horn Antenna | Schwarzbeck | BBHA 9120D | 631 | Sep. 27, 2018 |
| Horn Antenna | Schwarzbeck | BBH 9170 | 582 | Jun. 07, 2018 |
| Coax cable (9KHz-1GHz) | TCT | RE-low-01 | N/A | Sep. 27, 2018 |
| Coax cable (9KHz-40GHz) | TCT | RE-high-02 | N/A | Sep. 27, 2018 |
| Coax cable (9KHz-1GHz) | TCT | RE-low-03 | N/A | Sep. 27, 2018 |
| Coax cable (9KHz-40GHz) | TCT | RE-high-04 | N/A | Sep. 27, 2018 |
| Antenna Mast | Keleto | CC-A-4M | N/A | N/A |
| EMI Test Software | Shurple Technology | EZ-EMC | N/A | N/A |

Note: The calibration interval of the above test instruments is 12 months and the calibrations are traceable to international system unit (SI).

6.8.1.2 Test Data

Restrict band around fundamental

Band I

11a (HT20) CH36: 5180MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (Db μ V) | AV reading (dB μ V) | Correction Factor (Db/m) | Emission Level | | Peak limit (Db μ V/m) | AV limit (Db μ V/m) | Margin (Db) |
|-----------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| | | | | | Peak (Db μ V/m) | AV (Db μ V/m) | | | |
| 5142.20 | H | 42.41 | --- | 5.79 | 48.2 | --- | 74 | 54 | -5.8 |
| 5150.00 | H | 40.27 | --- | 5.82 | 46.09 | --- | 74 | 54 | -7.91 |
| 5142.20 | V | 41.86 | --- | 5.79 | 47.65 | --- | 74 | 54 | -6.35 |
| 5150.00 | V | 43.53 | --- | 5.82 | 49.35 | --- | 74 | 54 | -4.65 |

11a (HT20) CH40: 5200MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (Db μ V) | AV reading (dB μ V) | Correction Factor (Db/m) | Emission Level | | Peak limit (Db μ V/m) | AV limit (Db μ V/m) | Margin (Db) |
|-----------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| | | | | | Peak (Db μ V/m) | AV (Db μ V/m) | | | |
| 5135.50 | H | 43.27 | --- | 5.78 | 49.05 | --- | 74 | 54 | -4.95 |
| 5150.00 | H | 42.55 | --- | 5.82 | 48.37 | --- | 74 | 54 | -5.63 |
| 5135.50 | V | 40.44 | --- | 5.78 | 46.22 | --- | 74 | 54 | -7.78 |
| 5150.00 | V | 41.46 | --- | 5.82 | 47.28 | --- | 74 | 54 | -6.72 |

11a(HT20) CH48: 5240MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
|-----------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 5128.60 | H | 42.28 | --- | 5.75 | 48.03 | --- | 74 | 54 | -5.97 |
| 5150.00 | H | 40.32 | --- | 5.82 | 46.14 | --- | 74 | 54 | -7.86 |
| 5128.60 | V | 42.87 | --- | 5.75 | 48.62 | --- | 74 | 54 | -5.38 |
| 5150.00 | V | 41.62 | --- | 5.82 | 47.44 | --- | 74 | 54 | -6.56 |

Band III

11a (HT20) CH149: 5745MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (Db μ V) | AV reading (dB μ V) | Correction Factor (Db/m) | Emission Level | | Peak limit (Db μ V/m) | AV limit (Db μ V/m) | Margin (Db) |
|-----------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| | | | | | Peak (Db μ V/m) | AV (Db μ V/m) | | | |
| 5448.15 | H | 42.36 | --- | 6.87 | 49.23 | --- | 74 | 54 | -4.77 |
| 5460.00 | H | 43.55 | --- | 6.90 | 50.45 | --- | 74 | 54 | -3.55 |
| 5448.15 | V | 40.13 | --- | 6.87 | 47 | --- | 74 | 54 | -7 |
| 5460.00 | V | 42.67 | --- | 6.90 | 49.57 | --- | 74 | 54 | -4.43 |

11a (HT20) CH157: 5785MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (Db μ V) | AV reading (dB μ V) | Correction Factor (Db/m) | Emission Level | | Peak limit (Db μ V/m) | AV limit (Db μ V/m) | Margin (Db) |
|-----------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| | | | | | Peak (Db μ V/m) | AV (Db μ V/m) | | | |
| 5439.61 | H | 41.27 | --- | 6.83 | 48.1 | --- | 74 | 54 | -5.9 |
| 5460.00 | H | 42.15 | --- | 6.90 | 49.05 | --- | 74 | 54 | -4.95 |
| 5439.61 | V | 40.28 | --- | 6.83 | 47.11 | --- | 74 | 54 | -6.89 |
| 5460.00 | V | 42.73 | --- | 6.90 | 49.63 | --- | 74 | 54 | -4.37 |

11a(HT20) CH165: 5825MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
|-----------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 5446.24 | H | 42.65 | --- | 6.85 | 49.5 | --- | 74 | 54 | -4.5 |
| 5460.00 | H | 43.73 | --- | 6.90 | 50.63 | --- | 74 | 54 | -3.37 |
| 5446.24 | V | 41.17 | --- | 6.85 | 48.02 | --- | 74 | 54 | -5.98 |
| 5460.00 | V | 42.66 | --- | 6.90 | 49.56 | --- | 74 | 54 | -4.44 |

Band I
11n (HT20) CH36: 5180MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (Db/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (Db) |
|--------------------|------------------|---------------------------------|----------------------------|--------------------------------|------------------------|----------------------|------------------------------|----------------------------|----------------|
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 5142.20 | H | 42.94 | --- | 5.79 | 48.73 | --- | 74 | 54 | -5.27 |
| 5150.00 | H | 40.05 | --- | 5.82 | 45.87 | --- | 74 | 54 | -8.13 |
| 5142.20 | V | 41.86 | --- | 5.79 | 47.65 | --- | 74 | 54 | -6.35 |
| 5150.00 | V | 43.73 | --- | 5.82 | 49.55 | --- | 74 | 54 | -4.45 |

11n (HT20) CH40: 5200MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (Db/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (Db) |
|--------------------|------------------|---------------------------------|----------------------------|--------------------------------|------------------------|----------------------|------------------------------|----------------------------|----------------|
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 5135.50 | H | 43.16 | --- | 5.78 | 48.94 | --- | 74 | 54 | -5.06 |
| 5150.00 | H | 42.57 | --- | 5.82 | 48.39 | --- | 74 | 54 | -5.61 |
| 5135.50 | V | 40.24 | --- | 5.78 | 46.02 | --- | 74 | 54 | -7.98 |
| 5150.00 | V | 41.77 | --- | 5.82 | 47.59 | --- | 74 | 54 | -6.41 |

11n(HT20) CH48: 5240MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
|--------------------|------------------|---------------------------------|----------------------------|--------------------------------|------------------------|----------------------|------------------------------|----------------------------|----------------|
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 5128.60 | H | 42.54 | --- | 5.75 | 48.29 | --- | 74 | 54 | -5.71 |
| 5150.00 | H | 40.72 | --- | 5.82 | 46.54 | --- | 74 | 54 | -7.46 |
| 5128.60 | V | 42.86 | --- | 5.75 | 48.61 | --- | 74 | 54 | -5.39 |
| 5150.00 | V | 41.84 | --- | 5.82 | 47.66 | --- | 74 | 54 | -6.34 |

Band III
11n (HT20) CH149: 5745MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (Db/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (Db) |
|--------------------|------------------|---------------------------------|----------------------------|--------------------------------|------------------------|----------------------|------------------------------|----------------------------|----------------|
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 5448.15 | H | 42.47 | --- | 6.87 | 49.34 | --- | 74 | 54 | -4.66 |
| 5460.00 | H | 43.64 | --- | 6.90 | 50.54 | --- | 74 | 54 | -3.46 |
| 5448.15 | V | 40.13 | --- | 6.87 | 47 | --- | 74 | 54 | -7 |
| 5460.00 | V | 42.67 | --- | 6.90 | 49.57 | --- | 74 | 54 | -4.43 |

11n (HT20) CH157: 5785MHz

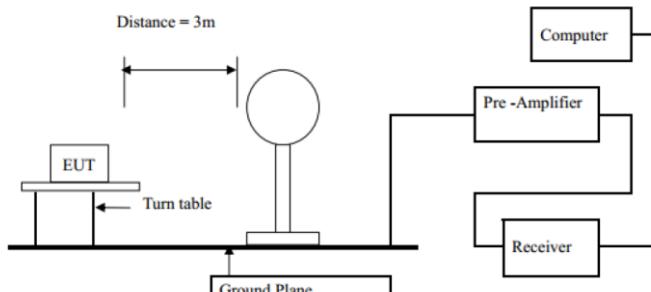
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (Db/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (Db) |
|--------------------|------------------|---------------------------------|----------------------------|--------------------------------|------------------------|----------------------|------------------------------|----------------------------|----------------|
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 5439.61 | H | 41.68 | --- | 6.83 | 48.51 | --- | 74 | 54 | -5.49 |
| 5460.00 | H | 42.61 | --- | 6.90 | 49.51 | --- | 74 | 54 | -4.49 |
| 5439.61 | V | 40.75 | --- | 6.83 | 47.58 | --- | 74 | 54 | -6.42 |
| 5460.00 | V | 42.43 | --- | 6.90 | 49.33 | --- | 74 | 54 | -4.67 |

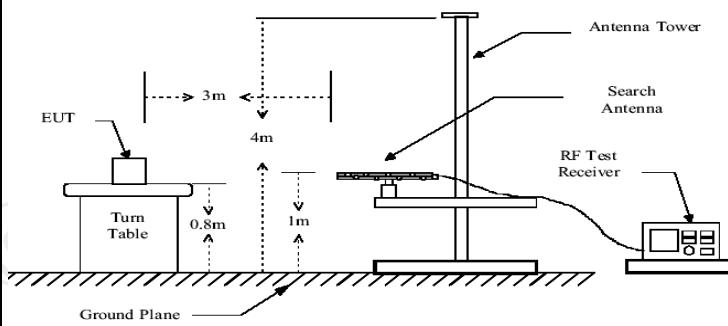
11n(HT20) CH165: 5825MHz

| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (Db/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (Db) |
|--------------------|------------------|---------------------------------|----------------------------|--------------------------------|------------------------|----------------------|------------------------------|----------------------------|----------------|
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 5446.24 | H | 42.11 | --- | 6.85 | 48.96 | --- | 74 | 54 | -5.04 |
| 5460.00 | H | 43.16 | --- | 6.90 | 50.06 | --- | 74 | 54 | -3.94 |
| 5446.24 | V | 41.38 | --- | 6.85 | 48.23 | --- | 74 | 54 | -5.77 |
| 5460.00 | V | 42.82 | --- | 6.90 | 49.72 | --- | 74 | 54 | -4.28 |

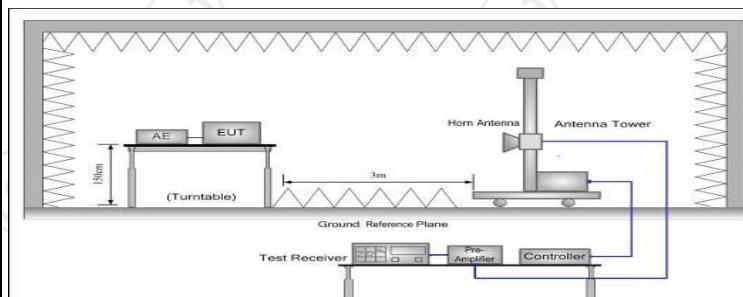
6.8.2. Unwanted Emissions out of the Restricted Bands

6.8.2.1. Test Specification

| Test Requirement: | FCC CFR47 Part 15 Section 15.407 & 15.209 & 15.205 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|---|-------------------------------|--------|------------------|--|-----------|-----------------------------------|-------------------------------|-------------|-------------|--------------|-------------|--------------|------|------------------|---------------|------------|-------|-------|------------------|------------|------------|--------|---------|------------------|------------|-----------|------|------|------------|--------------------|----------|----------|---------------|------|------|---------|
| Test Method: | KDB 789033 D02 v01r04 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Frequency Range: | 9kHz to 40GHz | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Measurement Distance: | 3 m | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Antenna Polarization: | Horizontal & Vertical | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Operation mode: | Transmitting mode with modulation | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Receiver Setup: | <table border="1"> <thead> <tr> <th>Frequency</th> <th>Detector</th> <th>RBW</th> <th>VBW</th> <th>Remark</th> </tr> </thead> <tbody> <tr> <td>9kHz- 150kHz</td> <td>Quasi-peak</td> <td>200Hz</td> <td>1kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td>150kHz- 30MHz</td> <td>Quasi-peak</td> <td>9kHz</td> <td>30kHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td>30MHz-1GHz</td> <td>Quasi-peak</td> <td>100KHz</td> <td>300KHz</td> <td>Quasi-peak Value</td> </tr> <tr> <td rowspan="2">Above 1GHz</td><td>Peak</td> <td>1MHz</td> <td>3MHz</td> <td>Peak Value</td> </tr> <tr> <td>Peak</td> <td>1MHz</td> <td>10Hz</td> <td>Average Value</td> </tr> </tbody> </table> | | | | | Frequency | Detector | RBW | VBW | Remark | 9kHz- 150kHz | Quasi-peak | 200Hz | 1kHz | Quasi-peak Value | 150kHz- 30MHz | Quasi-peak | 9kHz | 30kHz | Quasi-peak Value | 30MHz-1GHz | Quasi-peak | 100KHz | 300KHz | Quasi-peak Value | Above 1GHz | Peak | 1MHz | 3MHz | Peak Value | Peak | 1MHz | 10Hz | Average Value | | | |
| Frequency | Detector | RBW | VBW | Remark | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9kHz- 150kHz | Quasi-peak | 200Hz | 1kHz | Quasi-peak Value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 150kHz- 30MHz | Quasi-peak | 9kHz | 30kHz | Quasi-peak Value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30MHz-1GHz | Quasi-peak | 100KHz | 300KHz | Quasi-peak Value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Above 1GHz | Peak | 1MHz | 3MHz | Peak Value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | Peak | 1MHz | 10Hz | Average Value | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Limit: | <p>Unwanted spurious emissions fallen in restricted bands per FCC Part15.205 shall comply with the general field strength limits set forth in § 15.209 as below table,</p> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Field Strength (microvolts/meter)</th> <th>Measurement Distance (meters)</th> </tr> </thead> <tbody> <tr> <td>0.009-0.490</td> <td>2400/F(KHz)</td> <td>300</td> </tr> <tr> <td>0.490-1.705</td> <td>24000/F(KHz)</td> <td>30</td> </tr> <tr> <td>1.705-30</td> <td>30</td> <td>30</td> </tr> <tr> <td>30-88</td> <td>100</td> <td>3</td> </tr> <tr> <td>88-216</td> <td>150</td> <td>3</td> </tr> <tr> <td>216-960</td> <td>200</td> <td>3</td> </tr> <tr> <td>Above 960</td> <td>500</td> <td>3</td> </tr> </tbody> </table> <table border="1"> <thead> <tr> <th>Frequency</th> <th>Limit (dBuV/m @3m)</th> <th>Detector</th> </tr> </thead> <tbody> <tr> <td rowspan="2">Above 1G</td><td>74.0</td> <td>Peak</td> </tr> <tr> <td>54.0</td> <td>Average</td> </tr> </tbody> </table> | | | | | Frequency | 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 | 30 | 30 | 30-88 | 100 | 3 | 88-216 | 150 | 3 | 216-960 | 200 | 3 | Above 960 | 500 | 3 | Frequency | Limit (dBuV/m @3m) | Detector | Above 1G | 74.0 | Peak | 54.0 | Average |
| Frequency | 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 | 30 | 30 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30-88 | 100 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 88-216 | 150 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 216-960 | 200 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Above 960 | 500 | 3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Frequency | Limit (dBuV/m @3m) | Detector | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Above 1G | 74.0 | Peak | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| | 54.0 | Average | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Test setup: | <p>For radiated emissions below 30MHz</p>  <p>Distance = 3m</p> <p>EUT</p> <p>Turn table</p> <p>Ground Plane</p> <p>Computer</p> <p>Pre -Amplifier</p> <p>Receiver</p> <p>30MHz to 1GHz</p> | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |



Above 1GHz

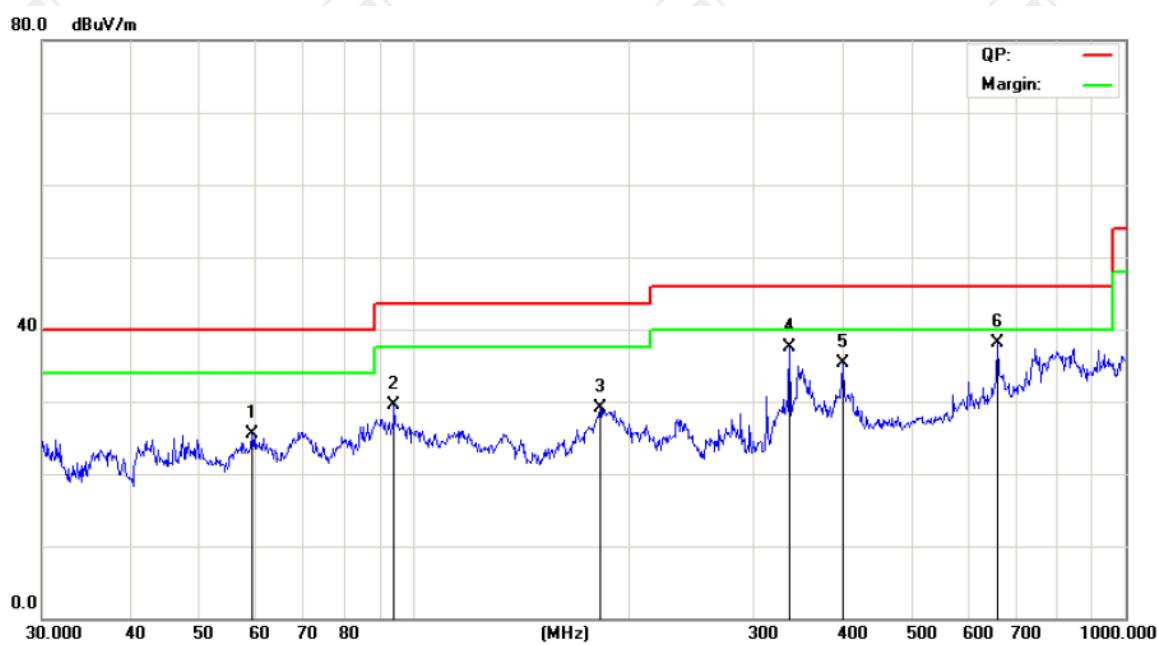


| | |
|------------------------|--|
| Test Procedure: | <ol style="list-style-type: none"> The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower. The antenna height 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. 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. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet. |
| Test results: | PASS |

6.8.3. Test Data

Please refer to following diagram for individual
Below 1GHz

Horizontal:



Site Chamber #2

Polarization: **Horizontal**

Temperature: 25 (C)

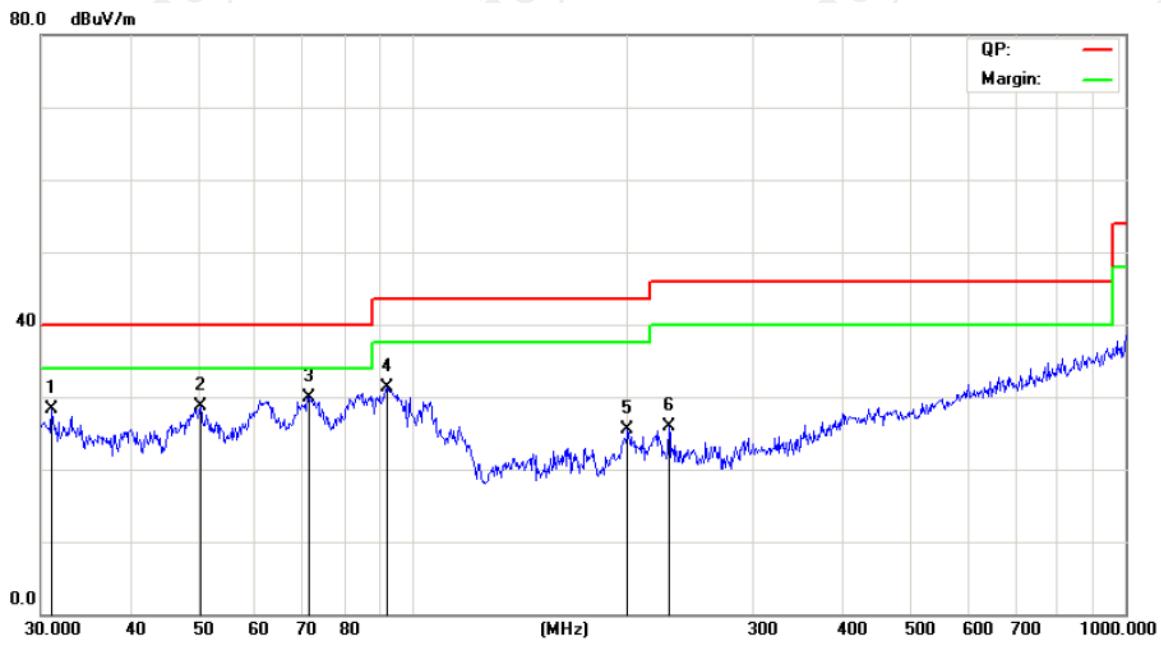
Limit: FCC Part 15B Class B 3M Radiation

Power: AC 120V/60Hz

Humidity: 55 %

| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Detector | Comment |
|-----|-----|----------|---------|---------|----------|--------|--------|----------|---------|
| | | | Level | Factor | ment | | | | |
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | |
| 1 | | 59.2325 | 32.93 | -7.39 | 25.54 | 40.00 | -14.46 | QP | |
| 2 | | 93.7685 | 36.85 | -7.31 | 29.54 | 43.50 | -13.96 | QP | |
| 3 | | 182.5592 | 38.90 | -9.88 | 29.02 | 43.50 | -14.48 | QP | |
| 4 | | 337.2155 | 41.30 | -3.84 | 37.46 | 46.00 | -8.54 | QP | |
| 5 | | 400.4318 | 36.86 | -1.47 | 35.39 | 46.00 | -10.61 | QP | |
| 6 | * | 661.1503 | 35.02 | 3.01 | 38.03 | 46.00 | -7.97 | QP | |

Vertical:



Site Chamber #2

 Polarization: **Vertical**

Temperature: 25 (C)

Limit: FCC Part 15B Class B 3M Radiation

Power: AC 120V/60Hz

Humidity: 55 %

| No. | Mk. | Freq. | Reading | Correct | Measure- | Limit | Over | Detector | Comment |
|-----|----------|-------|---------|---------|----------|--------|------|----------|---------|
| | | | Level | Factor | ment | | | | |
| | | MHz | dBuV | dB | dBuV/m | dBuV/m | dB | | |
| 1 | 31.0702 | 36.12 | -7.91 | 28.21 | 40.00 | -11.79 | QP | | |
| 2 | 50.2324 | 35.43 | -6.78 | 28.65 | 40.00 | -11.35 | QP | | |
| 3 * | 71.3298 | 41.01 | -11.10 | 29.91 | 40.00 | -10.09 | QP | | |
| 4 | 91.8161 | 38.95 | -7.58 | 31.37 | 43.50 | -12.13 | QP | | |
| 5 | 199.9856 | 34.55 | -9.08 | 25.47 | 43.50 | -18.03 | QP | | |
| 6 | 228.4901 | 34.93 | -9.07 | 25.86 | 46.00 | -20.14 | QP | | |

Note: 1. The low frequency, which started from 9KHz~30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported

2. Measurements were conducted in all three channels (high, middle, low) and all modulation (802.11a), and the worst case Mode (Low channel and 11n(HT20)) was submitted only.

| Modulation Type: Band I | | | | | | | | | |
|--------------------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| 11a (HT20) CH36: 5180MHz | | | | | | | | | |
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 10360 | H | 41.64 | --- | 8.02 | 49.66 | --- | 74 | 54 | -4.34 |
| 15540 | H | 42.58 | --- | 9.87 | 52.45 | --- | 74 | 54 | -1.55 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 10360 | V | 40.37 | --- | 8.02 | 48.39 | --- | 74 | 54 | -5.61 |
| 15540 | V | 42.31 | --- | 9.87 | 52.18 | --- | 74 | 54 | -1.82 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |
| 11a (HT20) CH40: 5200MHz | | | | | | | | | |
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 10400 | H | 40.73 | --- | 7.97 | 48.7 | --- | 74 | 54 | -5.3 |
| 15660 | H | 41.98 | --- | 9.83 | 51.81 | --- | 74 | 54 | -2.19 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 10400 | V | 41.46 | --- | 7.97 | 49.43 | --- | 74 | 54 | -4.57 |
| 15660 | V | 40.34 | --- | 9.83 | 50.17 | --- | 74 | 54 | -3.83 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |
| 11a (HT20) CH48: 5240MHz | | | | | | | | | |
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 10480 | H | 41.24 | --- | 9.18 | 50.42 | --- | 74 | 54 | -3.58 |
| 15720 | H | 40.63 | --- | 10.07 | 50.7 | --- | 74 | 54 | -3.3 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 10480 | V | 40.51 | --- | 9.18 | 49.69 | --- | 74 | 54 | -4.31 |
| 15720 | V | 42.68 | --- | 10.07 | 52.75 | --- | 74 | 54 | -1.25 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |

| Modulation Type: Band III | | | | | | | | | |
|---------------------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| 11a(HT20) CH149: 5745MHz | | | | | | | | | |
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 11490 | H | 42.75 | --- | 7.66 | 50.41 | --- | 74 | 54 | -3.59 |
| 17235 | H | 38.72 | --- | 9.5 | 48.22 | --- | 74 | 54 | -5.78 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 11490 | V | 41.96 | --- | 7.66 | 49.62 | --- | 74 | 54 | -4.38 |
| 17235 | V | 37.63 | --- | 9.5 | 47.13 | --- | 74 | 54 | -6.87 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |

| 11a(HT20) CH157: 5785MHz | | | | | | | | | |
|--------------------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 11570 | H | 41.07 | --- | 7.99 | 49.06 | --- | 74 | 54 | -4.94 |
| 17355 | H | 35.38 | --- | 9.85 | 45.23 | --- | 74 | 54 | -8.77 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 11570 | V | 43.26 | --- | 7.99 | 51.25 | --- | 74 | 54 | -2.75 |
| 17355 | V | 36.67 | --- | 9.85 | 46.52 | --- | 74 | 54 | -7.48 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |

| 11a(HT20) CH161: 5825MHz | | | | | | | | | |
|--------------------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 11650 | H | 42.89 | --- | 8.12 | 51.01 | --- | 74 | 54 | -2.99 |
| 17475 | H | 37.55 | --- | 9.5 | 47.05 | --- | 74 | 54 | -6.95 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 11650 | V | 40.93 | --- | 8.12 | 49.05 | --- | 74 | 54 | -4.95 |
| 17475 | V | 35.61 | --- | 9.5 | 45.11 | --- | 74 | 54 | -8.89 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |

| Modulation Type: Band I | | | | | | | | | |
|--------------------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| 11n (HT20) CH36: 5180MHz | | | | | | | | | |
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 10360 | H | 41.15 | --- | 8.02 | 49.17 | --- | 74 | 54 | -4.83 |
| 15540 | H | 42.57 | --- | 9.87 | 52.44 | --- | 74 | 54 | -1.56 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 10360 | V | 40.82 | --- | 8.02 | 48.84 | --- | 74 | 54 | -5.16 |
| 15540 | V | 42.08 | --- | 9.87 | 51.95 | --- | 74 | 54 | -2.05 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |
| 11n (HT20) CH40: 5200MHz | | | | | | | | | |
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 10400 | H | 40.86 | --- | 7.97 | 48.83 | --- | 74 | 54 | -5.17 |
| 15660 | H | 41.93 | --- | 9.83 | 51.76 | --- | 74 | 54 | -2.24 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 10400 | V | 41.47 | --- | 7.97 | 49.44 | --- | 74 | 54 | -4.56 |
| 15660 | V | 40.34 | --- | 9.83 | 50.17 | --- | 74 | 54 | -3.83 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |
| 11n (HT20) CH48: 5240MHz | | | | | | | | | |
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 10480 | H | 41.38 | --- | 9.18 | 50.56 | --- | 74 | 54 | -3.44 |
| 15720 | H | 40.61 | --- | 10.07 | 50.68 | --- | 74 | 54 | -3.32 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 10480 | V | 40.55 | --- | 9.18 | 49.73 | --- | 74 | 54 | -4.27 |
| 15720 | V | 42.42 | --- | 10.07 | 52.49 | --- | 74 | 54 | -1.51 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |

| Modulation Type: Band III | | | | | | | | | |
|---------------------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| 11n(HT20) CH149: 5745MHz | | | | | | | | | |
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 11490 | H | 42.52 | --- | 7.66 | 50.18 | --- | 74 | 54 | -3.82 |
| 17235 | H | 38.77 | --- | 9.5 | 48.27 | --- | 74 | 54 | -5.73 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 11490 | V | 41.97 | --- | 7.66 | 49.63 | --- | 74 | 54 | -4.37 |
| 17235 | V | 37.27 | --- | 9.5 | 46.77 | --- | 74 | 54 | -7.23 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |

| 11n(HT20) CH157: 5785MHz | | | | | | | | | |
|--------------------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 11570 | H | 41.74 | --- | 7.99 | 49.73 | --- | 74 | 54 | -4.27 |
| 17355 | H | 35.36 | --- | 9.85 | 45.21 | --- | 74 | 54 | -8.79 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 11570 | V | 43.49 | --- | 7.99 | 51.48 | --- | 74 | 54 | -2.52 |
| 17355 | V | 36.26 | --- | 9.85 | 46.11 | --- | 74 | 54 | -7.89 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |

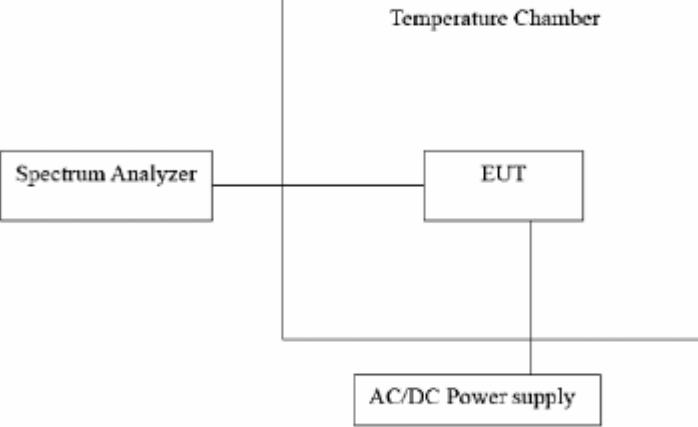
| 11n(HT20) CH161: 5825MHz | | | | | | | | | |
|--------------------------|---------------|---------------------------|-------------------------|--------------------------|---------------------|-------------------|---------------------------|-------------------------|-------------|
| Frequency (MHz) | Ant. Pol. H/V | Peak reading (dB μ V) | AV reading (dB μ V) | Correction Factor (dB/m) | Emission Level | | Peak limit (dB μ V/m) | AV limit (dB μ V/m) | Margin (dB) |
| | | | | | Peak (dB μ V/m) | AV (dB μ V/m) | | | |
| 11650 | H | 42.86 | --- | 8.12 | 50.98 | --- | 74 | 54 | -3.02 |
| 17475 | H | 37.52 | --- | 9.5 | 47.02 | --- | 74 | 54 | -6.98 |
| --- | H | --- | --- | --- | --- | --- | --- | --- | --- |
| 11650 | V | 40.97 | --- | 8.12 | 49.09 | --- | 74 | 54 | -4.91 |
| 17475 | V | 35.62 | --- | 9.5 | 45.12 | --- | 74 | 54 | -8.88 |
| --- | V | --- | --- | --- | --- | --- | --- | --- | --- |

Note:

1. Emission Level=Peak Reading + Correction Factor; Correction Factor= Antenna Factor + Cable loss – Pre-amplifier
2. Margin (dB) = Emission Level (Peak) (dB μ V/m)-Average limit (dB μ V/m)
3. The emission levels of other frequencies are very lower than the limit and not show in test report.
4. Measurements were conducted from 1 GHz to the 10th harmonic of highest fundamental frequency. The highest test frequency is 40GHz.
5. Data of measurement shown “---”in the above table mean that the reading of emissions is attenuated more than 20 dB below the limits or the field strength is too small to be measured.

6.9. Frequency Stability Measurement

6.9.1. Test Specification

| | |
|--------------------------|--|
| Test Requirement: | FCC Part15 Section 15.407(g) &Part2 J Section 2.1055 |
| Test Method: | ANSI C63.10: 2013 |
| Limit: | The frequency tolerance shall be maintained within the band of operation frequency over a temperature variation of 0 degrees to 35 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. |
| Test Setup: |  <pre> graph LR SA[Spectrum Analyzer] --- EUT[EUT] EUT --- AC[AC/DC Power supply] EUT --- TC[Temperature Chamber] </pre> |
| Test Procedure: | <p>The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage.</p> <ol style="list-style-type: none"> Turn the EUT on and couple its output to a spectrum analyzer. Turn the EUT off and set the chamber to the highest temperature specified. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record. |
| Test Result: | PASS |
| Remark: | Pre-scan was performed at Antenna 0 and Antenna 1, the worst case was found. Only the test data of Antenna 0 was shown in this report. |

Test plots as follows:

| Test mode: | | 802.11a(HT20) | Frequency(MHz): | 5180 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 5 | 5180.0083 | 8300 | PASS |
| 35 | | 5180.0066 | 6600 | PASS |
| 25 | | 5179.9873 | -12700 | PASS |
| 15 | | 5179.9986 | -1400 | PASS |
| 5 | | 5180.0033 | 3300 | PASS |
| 0 | | 5180.0047 | 4700 | PASS |
| 20 | | 5179.9832 | -16800 | PASS |
| | 5.5 | 5180.0032 | 3200 | PASS |
| | 4.5 | 5179.9825 | -17500 | PASS |

| Test mode: | | 802.11a(HT20) | Frequency(MHz): | 5200 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 5 | 5200.0094 | 9400 | PASS |
| 35 | | 5200.0087 | 8700 | PASS |
| 25 | | 5200.0073 | 7300 | PASS |
| 15 | | 5200.0043 | 4300 | PASS |
| 5 | | 5199.9985 | -1500 | PASS |
| 0 | | 5199.9876 | -12400 | PASS |
| 20 | | 5199.9952 | -4800 | PASS |
| | 5.5 | 5200.0034 | 3400 | PASS |
| | 4.5 | 5200.0026 | 2600 | PASS |

| Test mode: | | 802.11a(HT20) | Frequency(MHz): | 5240 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 5 | 5240.0042 | 4200 | PASS |
| 35 | | 5240.0021 | 2100 | PASS |
| 25 | | 5240.0024 | 2400 | PASS |
| 15 | | 5239.9995 | -500 | PASS |
| 5 | | 5239.9984 | -1600 | PASS |
| 0 | | 5239.9976 | -2400 | PASS |
| 20 | | 5240.0033 | 3300 | PASS |
| | 5 | 5240.0011 | 1100 | PASS |
| | 4.5 | 5239.9984 | -1600 | PASS |

| Test mode: | | 802.11a(HT20) | Frequency(MHz): | 5745 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 7.4 | 5745.0117 | 11700 | PASS |
| 35 | | 5745.0082 | 8200 | PASS |
| 25 | | 5745.0074 | 7400 | PASS |
| 15 | | 5745.0031 | 3100 | PASS |
| 5 | | 5744.9962 | -3800 | PASS |
| 0 | | 5744.9986 | -1400 | PASS |
| 20 | 8.4 | 5745.0013 | 1300 | PASS |
| | 7.4 | 5745.0014 | 1400 | PASS |
| | 6.4 | 5745.0026 | 2600 | PASS |

| Test mode: | | 802.11a(HT20) | Frequency(MHz): | 5785 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 7.4 | 5785.0086 | 8600 | PASS |
| 35 | | 5785.0025 | 2500 | PASS |
| 25 | | 5785.0021 | 2100 | PASS |
| 15 | | 5785.0007 | 700 | PASS |
| 5 | | 5785.0021 | 2100 | PASS |
| 0 | | 5785.0038 | 3800 | PASS |
| 20 | 8.4 | 5785.0037 | 3700 | PASS |
| | 7.4 | 5785.0013 | 1300 | PASS |
| | 6.4 | 5784.9976 | -2400 | PASS |

| Test mode: | | 802.11a(HT20) | Frequency(MHz): | 5825 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 7.4 | 5825.0095 | 9500 | PASS |
| 35 | | 5825.0047 | 4700 | PASS |
| 25 | | 5825.0022 | 2200 | PASS |
| 15 | | 5824.9989 | -1100 | PASS |
| 5 | | 5824.9977 | -2300 | PASS |
| 0 | | 5824.9965 | -3500 | PASS |
| 20 | 8.4 | 5825.0038 | 3800 | PASS |
| | 7.4 | 5825.0013 | 1300 | PASS |
| | 6.4 | 5825.0024 | 2400 | PASS |

| Test mode: | | 802.11n(HT20) | Frequency(MHz): | 5180 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 7.4 | 5180.0085 | 8500 | PASS |
| 35 | | 5180.0064 | 6400 | PASS |
| 25 | | 5179.9877 | -12300 | PASS |
| 15 | | 5179.9984 | -1600 | PASS |
| 5 | | 5180.0038 | 3800 | PASS |
| 0 | | 5180.0042 | 4200 | PASS |
| 20 | | 5179.9837 | -16300 | PASS |
| | 8.4 | 5180.0034 | 3400 | PASS |
| | 6.4 | 5179.9824 | -17600 | PASS |

| Test mode: | | 802.11n(HT20) | Frequency(MHz): | 5200 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 7.4 | 5200.0090 | 9000 | PASS |
| 35 | | 5200.0082 | 8200 | PASS |
| 25 | | 5200.0077 | 7700 | PASS |
| 15 | | 5200.0043 | 4300 | PASS |
| 5 | | 5199.9980 | -2000 | PASS |
| 0 | | 5199.9874 | -12600 | PASS |
| 20 | | 5199.9958 | -4200 | PASS |
| | 8.4 | 5200.0033 | 3300 | PASS |
| | 6.4 | 5200.0020 | 2000 | PASS |

| Test mode: | | 802.11n(HT20) | Frequency(MHz): | 5240 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 7.4 | 5240.0047 | 4700 | PASS |
| 35 | | 5240.0029 | 2900 | PASS |
| 25 | | 5240.0024 | 2400 | PASS |
| 15 | | 5239.9992 | -800 | PASS |
| 5 | | 5239.9987 | -1300 | PASS |
| 0 | | 5239.9976 | -2400 | PASS |
| 20 | | 5240.0035 | 3500 | PASS |
| | 8.4 | 5240.0012 | 1200 | PASS |
| | 6.4 | 5239.9981 | -1900 | PASS |

| Test mode: | | 802.11n(HT20) | Frequency(MHz): | 5745 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 7.4 | 5745.0117 | 11700 | PASS |
| 35 | | 5745.0082 | 8200 | PASS |
| 25 | | 5745.0079 | 7900 | PASS |
| 15 | | 5745.0032 | 3200 | PASS |
| 5 | | 5744.9965 | -3500 | PASS |
| 0 | | 5744.9981 | -1900 | PASS |
| 20 | 8.4 | 5745.0012 | 1200 | PASS |
| | 7.4 | 5745.0014 | 1400 | PASS |
| | 6.4 | 5745.0026 | 2600 | PASS |

| Test mode: | | 802.11n(HT20) | Frequency(MHz): | 5785 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 7.4 | 5785.0084 | 8400 | PASS |
| 35 | | 5785.0027 | 2700 | PASS |
| 25 | | 5785.0021 | 2100 | PASS |
| 15 | | 5785.0005 | 500 | PASS |
| 5 | | 5785.0028 | 2800 | PASS |
| 0 | | 5785.0032 | 3200 | PASS |
| 20 | 8.4 | 5785.0037 | 3700 | PASS |
| | 7.4 | 5785.0014 | 1400 | PASS |
| | 6.4 | 5784.9972 | -2800 | PASS |

| Test mode: | | 802.11n(HT20) | Frequency(MHz): | 5825 |
|------------------|--------------|----------------------------|---------------------|--------|
| Temperature (°C) | Voltage(VAC) | Measurement Frequency(MHz) | Delta Frequency(Hz) | Result |
| 45 | 7.4 | 5825.0096 | 9600 | PASS |
| 35 | | 5825.0048 | 4800 | PASS |
| 25 | | 5825.0023 | 2300 | PASS |
| 15 | | 5824.9987 | -1300 | PASS |
| 5 | | 5824.9971 | -2900 | PASS |
| 0 | | 5824.9964 | -3600 | PASS |
| 20 | 8.4 | 5825.0035 | 3500 | PASS |
| | 7.4 | 5825.0013 | 1300 | PASS |
| | 6.4 | 5825.0022 | 2200 | PASS |

Appendix B: Photographs of Test Setup

Refer to test report TCT170925E037

Appendix C: Photographs of EUT

Refer to test report TCT170925E037

*******END OF REPORT*******