



Radio Test Report

ISR-1100 Series

C1111-4PWB, C1111-8PWB, C1111-8PLTEEAWB

FCC ID: LDKC11111696

5470-5725 MHz

Against the following Specifications:

CFR47 Part 15.407



Cisco Systems
170 West Tasman Drive
San Jose, CA 95134

| | |
|---|---|
| | |
| Author: Johanna Knudsen Tested By: Johanna Knudsen | Approved By: Gerard Thorpe Title: Manager, Engineering - EMC & Standards Operations Revision: See EDCS |

This report replaces any previously entered test report under EDCS – **11779336**. This test report has been electronically authorized and archived using the CISCO Engineering Document Control system. Test Report Template EDCS# 1526150.



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Section 1: Overview

1.1 Test Summary

The samples were assessed against the tests detailed in section 3 under the requirements of the following specifications:

| specifications |
|-----------------------|
| CFR47 Part 15.407 |

Measurements were made in accordance with

- ANSI C63.10:2013,
- KDB 789033 D02 General UNII Test Procedures New Rules v01r04
- KDB 662911 D01 Multiple Transmitter Output



Section 2: Assessment Information

2.1 General

This report contains an assessment of an apparatus against Radio Standards based upon tests carried out on the samples submitted. The testing was performed by and for the use of Cisco systems Inc:

With regard to this assessment, the following points should be noted:

- a) The results contained in this report relate only to the items tested and were obtained in the period between the date of the initial assessment and the date of issue of the report. Manufactured products will not necessarily give identical results due to production and measurement tolerances.
- b) The apparatus was set up and exercised using the configuration and modes of operation defined in this report only.
- c) Where relevant, the apparatus was only assessed using the susceptibility criteria defined in this report and the Test Assessment Plan (TAP).
- d) All testing was performed under the following environmental conditions:

| | |
|----------------------|--------------------------------------|
| Temperature | 15°C to 35°C (54°F to 95°F) |
| Atmospheric Pressure | 860mbar to 1060mbar (25.4" to 31.3") |
| Humidity | 10% to 75*% |
- e) All AC testing was performed at one or more of the following supply voltages:

| |
|---------------------|
| 110V 60 Hz (+/-20%) |
|---------------------|

2.2 Units of Measurement

The units of measurements defined in the appendices are reported in specific terms, which are test dependent. Where radiated measurements are concerned these are defined at a particular distance. Basic voltage measurements are defined in units of [dBuV]

As an example, the basic calculation for all measurements is as follows:

Emission level [dBuV] = Indicated voltage level [dBuV] + Cable Loss [dB] + Other correction factors [dB]

The combinations of correction factors are dependent upon the exact test configurations [see test equipment lists for further details] and may include:-

Antenna Factors, Pre Amplifier Gain, LISN Loss, Pulse Limiter Loss and Filter Insertion Loss..

Note: to convert the results from dBuV/m to uV/m use the following formula:-

Level in uV/m = Common Antilogarithm [(X dBuV/m)/20] = Y uV/m

Measurement Uncertainty Values



| | |
|-----------------------------------|------------------------|
| voltage and power measurements | ± 2 dB |
| conducted EIRP measurements | ± 1.4 dB |
| radiated measurements | ± 3.2 dB |
| frequency measurements | ± 2.4 10 ⁻⁷ |
| temperature measurements | ± 0.54°. |
| humidity measurements | ± 2.3% |
| DC and low frequency measurements | ± 2.5%. |

Where relevant measurement uncertainty levels have been estimated for tests performed on the apparatus. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Radiated emissions (expanded uncertainty, confidence interval 95%)

| | |
|--------------------|------------|
| 30 MHz - 300 MHz | +/- 3.8 dB |
| 300 MHz - 1000 MHz | +/- 4.3 dB |
| 1 GHz - 10 GHz | +/- 4.0 dB |
| 10 GHz - 18GHz | +/- 8.2 dB |
| 18GHz - 26.5GHz | +/- 4.1 dB |
| 26.5GHz - 40GHz | +/- 3.9 dB |

Conducted emissions (expanded uncertainty, confidence interval 95%)

| | |
|----------------|-------------|
| 30 MHz – 40GHz | +/- 0.38 dB |
|----------------|-------------|

A product is considered to comply with a requirement if the nominal measured value is below the limit line. The product is considered to not be in compliance in case the nominal measured value is above the limit line.

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**2.3 Date of testing (initial sample receipt date to last date of testing)**

27-JUN-2017 to 1-MAY-2018

2.4 Report Issue Date

Cisco uses an electronic system to issue, store and control the revision of test reports. This system is called the Engineering Document Control System (EDCS). The actual report issue date is embedded into the original file on EDCS. Any copies of this report, either electronic or paper, that are not on EDCS must be considered uncontrolled

2.5 Testing facilities

This assessment was performed by:

Testing Laboratory

Cisco Systems, Inc.
125 West Tasman Drive (Building P)
San Jose, CA 95134
USA

Headquarters

Cisco Systems, Inc.,
170 West Tasman Drive
San Jose, CA 95134,
USA

Registration Numbers for Industry Canada

| Cisco System Site | Site Identifier |
|--------------------------|------------------------|
| Building P, 10m Chamber | Company #: 2461N-2 |
| Building P, 5m Chamber | Company #: 2461N-1 |
| Building I, 5m Chamber | Company #: 2461M-1 |

Test Engineers

Johanna Knudsen, Marie Higa

2.6 Equipment Assessed (EUT)

C1111-4PW with ISR-AP1100AC-B



2.7 EUT Description

The Cisco ISR-AP1100AC Wi-Fi module supports the following modes of operation. The modes are further defined in the radio Theory of Operation. The modes included in this report represent the worst case data for all modes.

- 802.11a - Non HT20, One Antenna, 6 to 54 Mbps, 1ss
- 802.11a - Non HT20, Two Antennas, 6 to 54 Mbps, 1ss

- 802.11a - Non HT20 Beam Forming, Two Antennas, 6 to 54 Mbps, 1ss

- 802.11n/ac - HT/VHT20, One Antenna, M0 to M7, 1ss
- 802.11n/ac - HT/VHT20, Two Antennas, M0 to M7, 1ss
- 802.11n/ac - HT/VHT20, Two Antennas, M8 to M15, 2ss

- 802.11n/ac - HT/VHT20 Beam Forming, Two Antennas, M0 to M7, 1ss
- 802.11n/ac - HT/VHT20 Beam Forming, Two Antennas, M8 to M15, 2ss

- 802.11n/ac - HT/VHT20 STBC, Two Antennas, M0 to M7, 2ss

- 802.11a - Non HT40, One Antenna, 6 to 54 Mbps, 1ss
- 802.11a - Non HT40, Two Antennas, 6 to 54 Mbps, 1ss

- 802.11n/ac - HT/VHT40, One Antenna, M0 to M7, 1ss
- 802.11n/ac - HT/VHT40, Two Antennas, M0 to M7, 1ss
- 802.11n/ac - HT/VHT40, Two Antennas, M8 to M15, 2ss

- 802.11n/ac - HT/VHT40 Beam Forming, Two Antennas, M0 to M7, 1ss
- 802.11n/ac - HT/VHT40 Beam Forming, Two Antennas, M8 to M15, 2ss

- 802.11n/ac - HT/VHT40 STBC, Two Antennas, M0 to M7, 2ss

- 802.11a - Non HT80, One Antenna, 6 to 54 Mbps, 1ss
- 802.11a - Non HT80, Two Antennas, 6 to 54 Mbps, 1ss

- 802.11ac - VHT80, One Antenna, M0 to M9 1ss
- 802.11ac - VHT80, Two Antennas, M0 to M9 1ss
- 802.11ac - VHT80, Two Antennas, M0 to M9 2ss

- 802.11ac - VHT80 Beam Forming, Two Antennas, M0 to M9 1ss
- 802.11ac - VHT80 Beam Forming, Two Antennas, M0 to M9 2ss

- 802.11ac - VHT80 STBC, Two Antennas, M0 to M9 2ss

The following antennas are supported by this product series.

The data included in this report represent the worst case data for all antennas.

| Frequency | Part Number | Antenna Type | Antenna Gain (dBi) |
|--------------------|--------------|--------------|--------------------|
| 2.4 / 5 GHz | 2x2 Internal | AP Omni | 2 / 4 |



Section 3: Result Summary

3.1 Results Summary Table

Conducted emissions

| Basic Standard | Technical Requirements / Details | Result |
|--------------------------|---|--------|
| FCC 15.407 | <p>99% & 26 dB Bandwidth: The 99% occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. There is no limit for 99% OBW.</p> <p>The 26 dB emission is the width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 26 dB relative to the maximum level measured in the fundamental emission.</p> | Pass |
| FCC 15.407 | <p>Output Power: 15.407 (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> | Pass |
| FCC 15.407 | <p>Power Spectral Density 15.407 (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands...the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.</p> | Pass |
| FCC 15.407 | <p>Conducted Spurious Emissions / Band-Edge: 15.407 (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz..</p> | Pass |
| FCC 15.407 FCC 15.205 | <p>Restricted band: Unwanted emissions falling within the restricted bands, as defined in FCC 15.205 (a) must also comply with the radiated emission limits specified in FCC 15.209 (a)</p> | Pass |

Radiated Emissions (General requirements)

| Basic Standard | Technical Requirements / Details | Result |
|----------------|----------------------------------|--------|
|----------------|----------------------------------|--------|



| | | |
|------------|--|------|
| FCC 15.209 | TX Spurious Emissions: Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the field strength limits table in this section. | Pass |
| FCC 15.207 | AC conducted Emissions: Except when the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply, either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table in these sections. The more stringent limit applies at the frequency range boundaries. | Pass |



Section 4: Sample Details

Note: Each sample was evaluated to ensure that its condition was suitable to be used as a test sample prior to the commencement of testing. Please also refer to the “Justification for worst Case test Configuration” section of this report for further details on the selection of EUT samples.

4.1 Sample Details

| Sample No. | Equipment Details | Manufacturer | Hardware Rev. | Firmware Rev. | Software Rev. | Serial Number |
|------------|-----------------------------|------------------------|---------------------|---------------|---------------|--|
| S01 | C1111-4PW (TSN-M-P2A) | Cisco Systems, Inc | 74-114193-01 03 | NA | NA | FGL211421YH (board: FOC21124R20) |
| S02 | AC/DC Adapter ADP-66CR B | Delta Electronics, Inc | 341-100346-01 A0 | NA | NA | DAB2110G3CH |
| S03 | C1111-4PW (TSN-M-P2A) | Cisco Systems, Inc | 74-114193-01 03 | NA | NA | FGL211522GR (board: FOC21136DF1) |
| S04 | C1111-8PLTEW (TSN-H) | Cisco Systems, Inc | 74-111526-01 | NA | NA | FGL2123915E (board: FOC21193P24) |
| S05 | C1111-8PLTEEAWB (TSN-H) | Cisco Systems, Inc | 74-111526-01 | NA | NA | FGL2123915D |
| S06 | ADP-150BR B | Delta Electronics | 341-100399-01 | NA | NA | DAB2205X02C |

4.2 System Details

| System # | Description | Samples |
|----------|--|----------|
| 1 | Conducted Testing: EUT + Power Supply | S01, S02 |
| 2 | Conducted Testing: EUT + Power Supply | S02, S03 |
| 3 | RSE Testing: EUT + Power Supply | S02, S03 |
| 4 | RSE Testing: EUT + Power Supply | S02, S04 |
| 5 | AC Power Conducted Emissions: EUT + Power Supply | S05, S06 |

4.3 Mode of Operation Details

| Mode# | Description | Comments |
|-------|------------------------|--|
| 1 | Conducted Testing | Continuous TX mode. Image version 8.4.100.1 |
| 2 | Radiated Testing | Continuous TX mode. Image version 8.4.100.1 |
| 3 | AC Conducted Emissions | Wi-Fi operating in TX mode |

Appendix A: Emission Test Results



A.1 Duty Cycle

Duty Cycle Test Requirement

From KDB 789033 D02 General UNII Test Procedures New Rules v01r04

B. Duty Cycle (x), Transmission Duration (T), and Maximum Power Control Level

1. All measurements are to be performed with the EUT transmitting at 100 percent duty cycle at its maximum power control level; however, if 100 percent duty cycle cannot be achieved, measurements of duty cycle, x, and maximum-power transmission duration, T, are required for each tested mode of operation.

Duty Cycle Test Method

From KDB 789033 D02 General UNII Test Procedures New Rules v01r04:

B. Duty Cycle (x), Transmission Duration (T), and Maximum Power Control Level

The zero-span mode on a spectrum analyzer or EMI receiver, if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW \geq EBW if possible; otherwise, set RBW to the largest available value. Set VBW \geq RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are $> 50/T$, where T is defined in section II.B.1.a), and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

Duty Cycle Test Information

Tested By :
Johanna Knudsen

Date of testing:
July 7th, 2017

Test Result : N/A

Test Equipment

See Appendix C for list of test equipment

Samples, Systems, and Modes

| System Number | Description | Samples | System under test | Support equipment |
|---------------|---|-------------|-------------------------------------|--------------------------|
| 1 | Conducted testing: EUT + AC/DC Adapter | S01 and S02 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

**Duty Cycle Data Table**

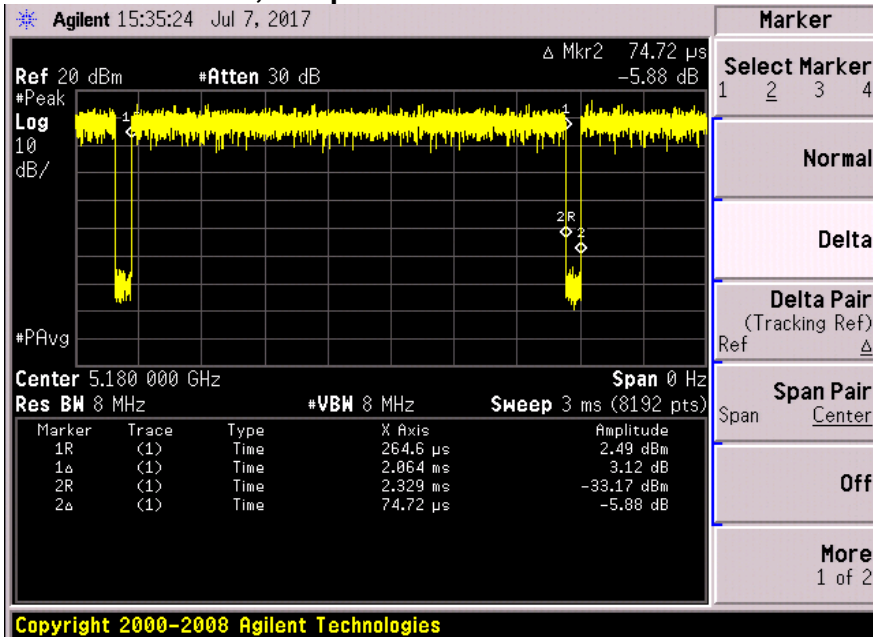
Duty Cycle table and screen captures are shown below for power/psd modes.

| Mode | Data Rate | On-time (ms) | Total Time (ms) | Duty Cycle (%) | Correction Factor (dB) |
|---------|-----------|--------------|-----------------|----------------|------------------------|
| NonHT20 | 6Mbps | 2.064 | 2.13872 | 96.5 | 0.2 |
| HT20 | M0 | 5.008 | 5.09307 | 98.3 | 0.1 |
| VHT20 | M8 | 2.528 | 2.61407 | 96.7 | 0.1 |
| NonHT40 | 6Mbps | 2.064 | 2.14238 | 96.3 | 0.2 |
| HT40 | M0 | 2.431 | 2.5222 | 96.4 | 0.2 |
| VHT40 | M8 | 3.628 | 3.7261 | 97.4 | 0.1 |
| NonHT80 | 6Mbps | 2.063 | 2.14406 | 96.2 | 0.2 |
| VHT80 | MOX1 | 3.352 | 4.0531 | 82.7 | 0.8 |
| VHT80 | MOX2 | 3.906 | 4.6093 | 84.7 | 0.7 |

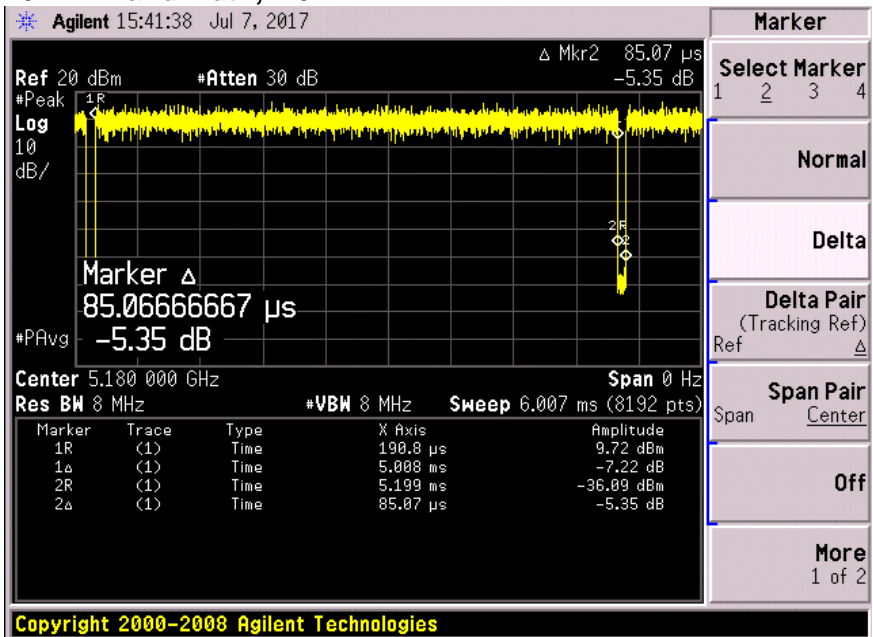


Duty Cycle Data Screenshots

20MHz Bandwidth, 6Mbps

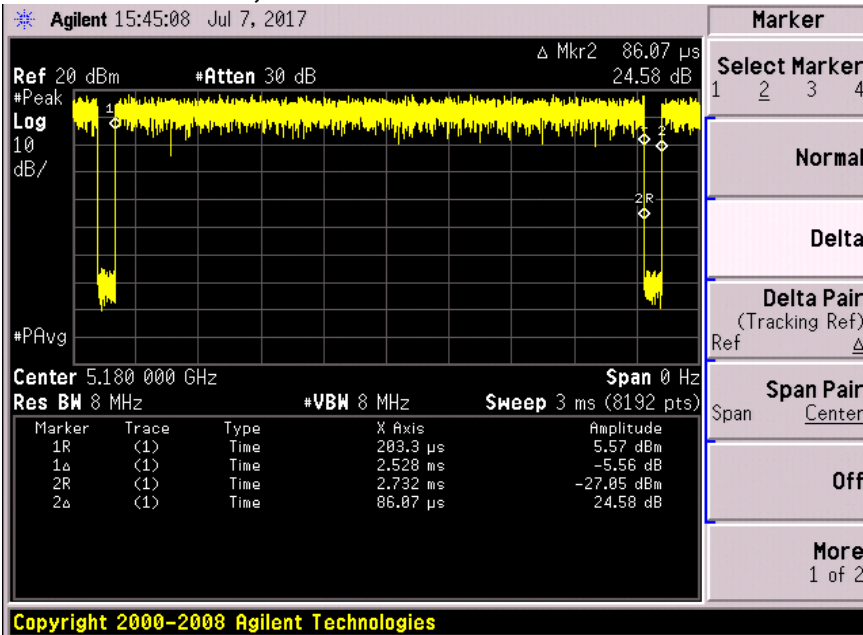


20MHz Bandwidth, M0

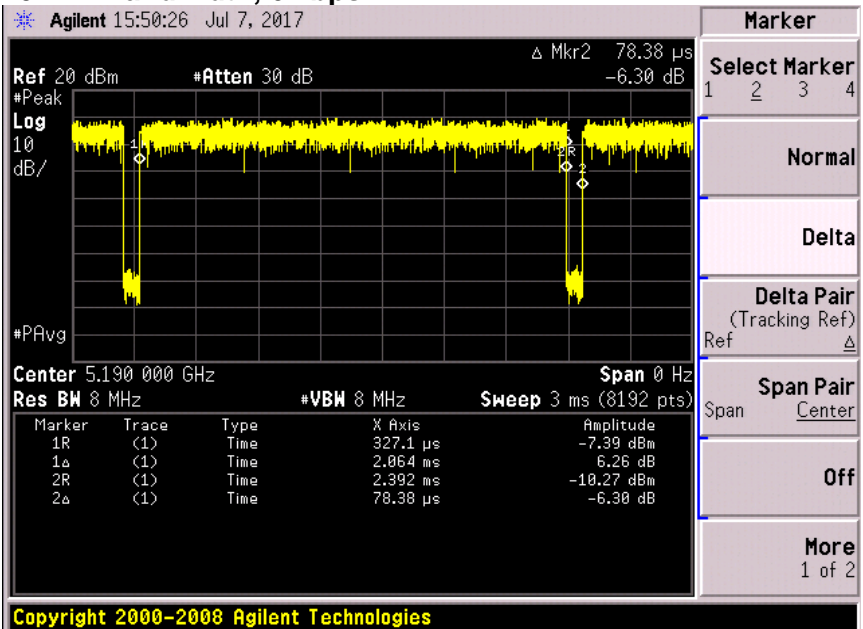




20MHz Bandwidth, M8

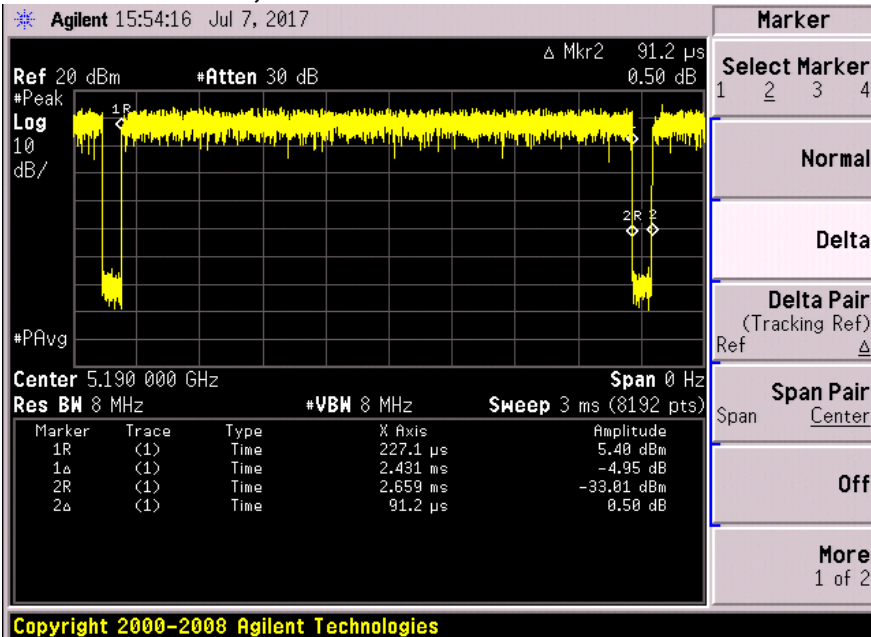


40MHz Bandwidth, 6Mbps

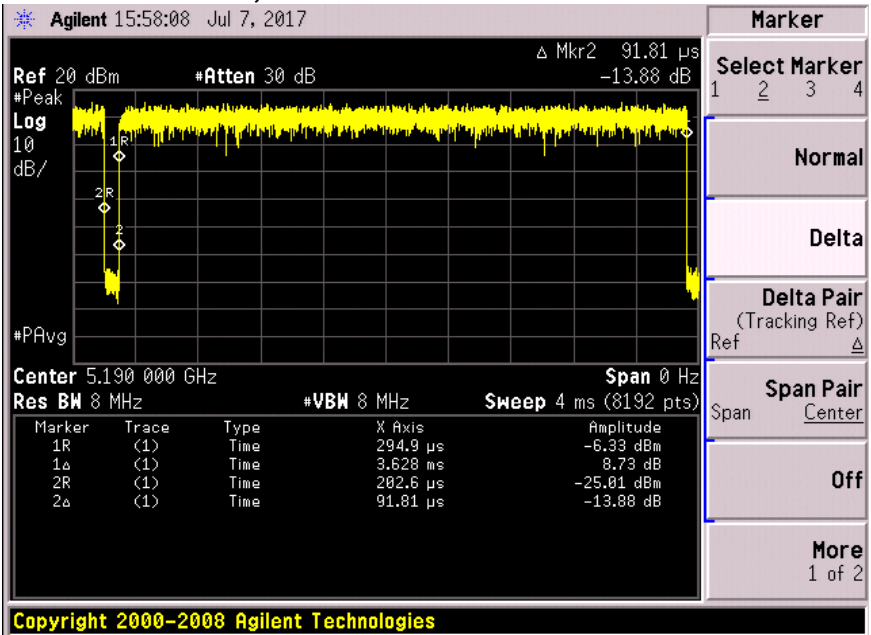




40MHz Bandwidth, M0

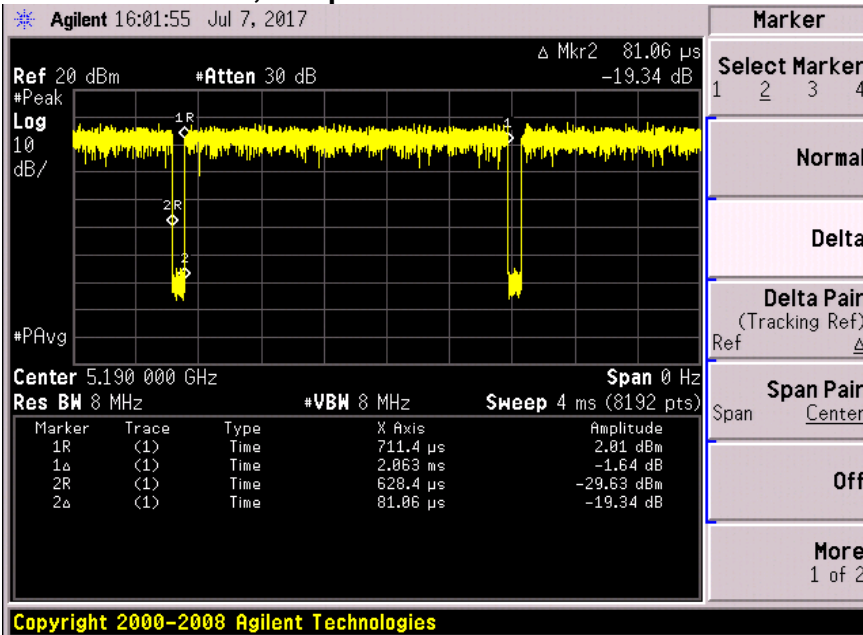


40MHz Bandwidth, M8

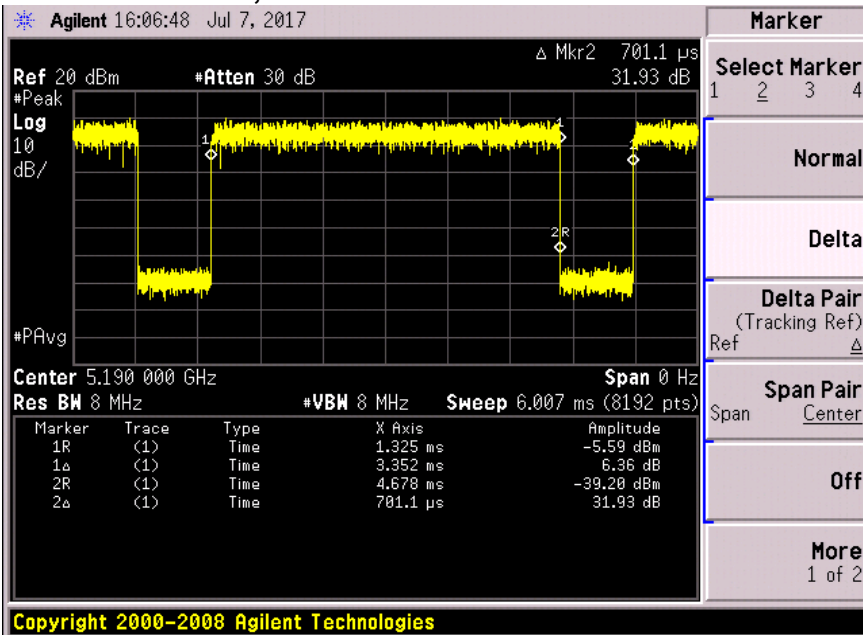




80MHz Bandwidth, 6Mbps

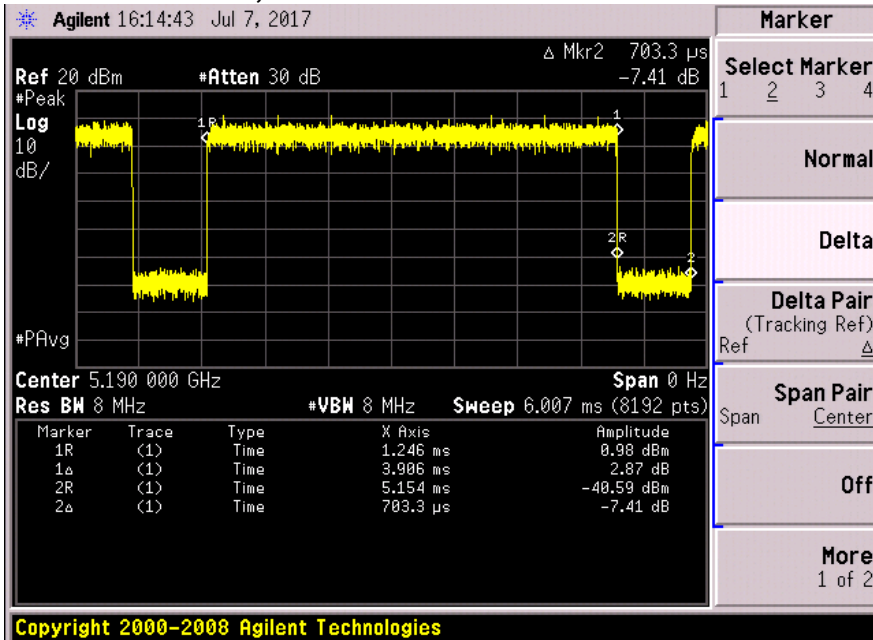


80MHz Bandwidth, MOX1





80MHz Bandwidth, M0X2





A.2 99% and 26dB Bandwidth

There is no requirement for the value of bandwidth.

However, the 26dB BW (EBW) is used to calculate the power limits in 15.407 (a) (2). Power measurements are made using the 99% Bandwidth as the integration bandwidth.

99% and 26dB Bandwidth Test Procedure

The 99-percent occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5 % of the total mean power of the given emission. Measurement of the 99-percent occupied bandwidth is required only as a condition for using the optional band-edge measurement techniques described in section II.G.3.d). Measurements of 99-percent occupied bandwidth may also optionally be used in lieu of the EBW to define the minimum frequency range over which the spectrum is integrated when measuring maximum conducted output power as described in section II.E. However, the EBW must be measured to determine bandwidth dependent limits on maximum conducted output power in accordance with 15.407(a).

Ref. KDB 789033 Section D. 99 Percent Occupied Bandwidth

| |
|--|
| 99% BW |
| Test Parameters |
| <ol style="list-style-type: none"> 1. Set center frequency to the nominal EUT channel center frequency. 2. Set span = 1.5 times to 5.0 times the OBW. 3. Set RBW = 1 % to 5 % of the OBW 4. Set VBW $\geq 3 \cdot$ RBW 5. Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max hold mode (until the trace stabilizes) shall be used. 6. Use the 99 % power bandwidth function of the instrument (if available). |

Ref KDB 789033 in Section C. Measurement Bandwidth, Section 1

| |
|---|
| 26 BW |
| Test parameters |
| X dB BW = -26dB (using the OBW function of the spectrum analyzer) |
| Emission Bandwidth (EBW) |
| <ol style="list-style-type: none"> a) Set RBW = approximately 1% of the emission bandwidth. b) Set the VBW > RBW. c) Detector = Peak. d) Trace mode = max hold. e) Measure the maximum width of the emission that is 26 dB down from the maximum 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%. |

Samples, Systems, and Modes

| System Number | Description | Samples | System under test | Support equipment |
|---------------|---|-------------|-------------------------------------|--------------------------|
| 2 | Conducted testing: EUT + AC/DC Adapter | S02 and S03 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |



Tested By :
Johanna Knudsen

Date of testing:
August 22, 2017 – August 25th, 2017

Test Result : PASS

Test Equipment

See Appendix C for list of test equipment

99% and 26dB Bandwidth Data Table

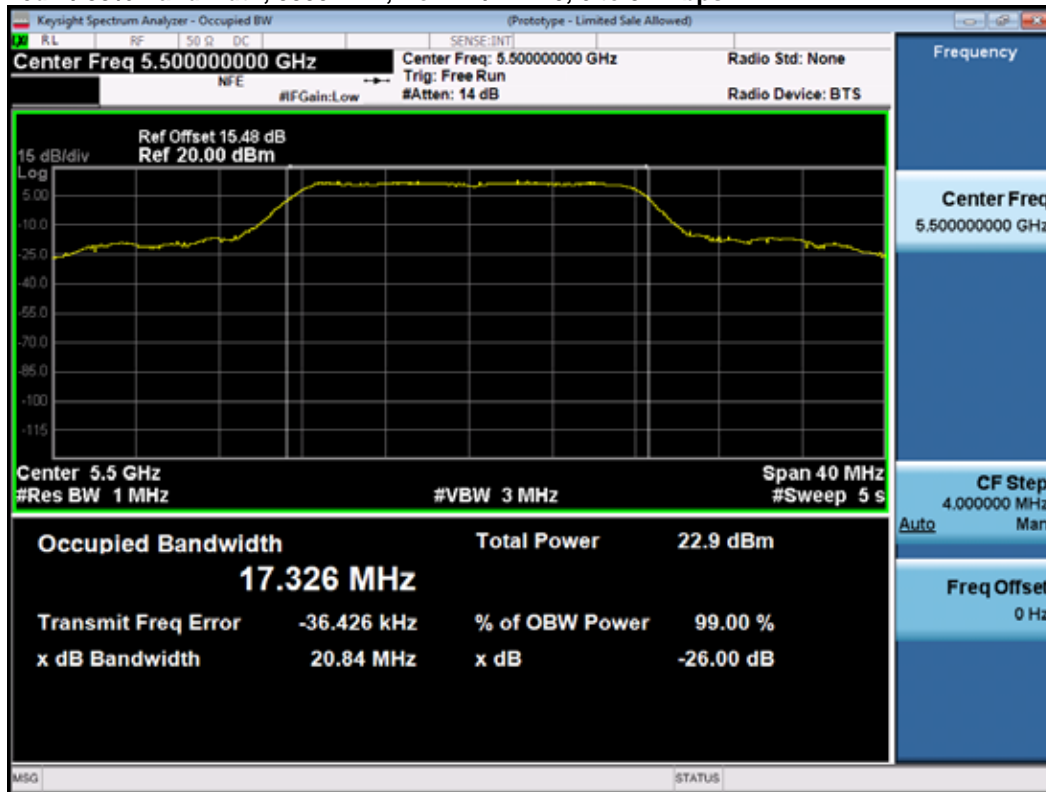
| Frequency (MHz) | Mode | Data Rate (Mbps) | 26dB BW (MHz) | 99% BW (MHz) |
|------------------------|---------------------------------|-------------------------|----------------------|---------------------|
| 5500 | Non HT20, 6 to 54 Mbps | 6 | 20.8 | 17.326 |
| | HT/VHT20, M0 to M15 | m0 | 21.6 | 18.298 |
| 5510 | Non HT40, 6 to 54 Mbps | 6 | 39.7 | 35.464 |
| | HT/VHT40, M0 to M15 | m0 | 40.4 | 36.038 |
| 5530 | Non HT80, 6 to 54 Mbps | 6 | 82.9 | 75.645 |
| | VHT80, M0 to M9, M0 to M9 1-1ss | m0x1 | 83.5 | 75.723 |
| 5550 | Non HT40, 6 to 54 Mbps | 6 | 40 | 35.74 |
| | HT/VHT40, M0 to M15 | m0 | 55.4 | 36.359 |
| 5560 | Non HT20, 6 to 54 Mbps | 6 | 22 | 17.402 |
| | HT/VHT20, M0 to M15 | m0 | 23 | 18.358 |
| 5610 | Non HT80, 6 to 54 Mbps | 6 | 86.8 | 75.862 |
| | VHT80, M0 to M9, M0 to M9 1-1ss | m0x1 | 93.1 | 76.05 |
| 5690 | Non HT80, 6 to 54 Mbps | 6 | 84.7 | 75.819 |
| | VHT80, M0 to M9, M0 to M9 1-1ss | m0x1 | 93.1 | 76.081 |
| 5710 | Non HT40, 6 to 54 Mbps | 6 | 39.9 | 35.637 |



| | | | | |
|------|------------------------|----|------|--------|
| | HT/VHT40, M0 to M15 | m0 | 46.2 | 36.249 |
| 5720 | Non HT20, 6 to 54 Mbps | 6 | 21.4 | 17.391 |
| | HT/VHT20, M0 to M15 | m0 | 22.4 | 18.342 |



26dB / 99% Bandwidth, 5500 MHz, Non HT/VHT20, 6 to 54 Mbps





A.3 Maximum Conducted Output Power

Maximum Conducted Output Power Test Requirement

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

Maximum Conducted Output Power Test Procedure

Ref. KDB 789033 D02 General UNII Test Procedures New Rules v01r04
ANSI C63.10: 2013

| |
|---|
| <p>Maximum Conducted Output Power Test Procedure</p> |
| <ol style="list-style-type: none"> 1. Set the radio in the continuous transmitting mode at full power 2. Compute power by integrating the spectrum across the EBW (or alternatively entire 99% OBW) of the signal using the instrument's band power measurement function. The integration shall be performed using the spectrum analyzer band-power measurement function with band limits set equal to the EBW or the OBW band edges. 3. Capture graphs and record pertinent measurement data. |

Ref. KDB 789033 D02 General UNII Test Procedures New Rules v01r04
2. Measurement using a Spectrum Analyzer or EMI Receiver (SA), (d) Method SA-2

| |
|--|
| <p>Maximum Conducted Output Power Test parameters</p> |
| <p>Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction).</p> <ol style="list-style-type: none"> (i) Measure the duty cycle, x, of the transmitter output signal as described in section II.B. (ii) Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal. (iii) Set RBW = 1 MHz. (iv) Set VBW \geq 3 MHz. (v) Number of points in sweep \geq 2 Span / RBW. (This ensures that bin-to-bin spacing is \leq RBW/2, so that narrowband signals are not lost between frequency bins.) (vi) Sweep time = auto. (vii) Detector = RMS (i.e., power averaging), if available. Otherwise, use sample detector mode. (viii) Do not use sweep triggering. Allow the sweep to "free run". (ix) Trace average at least 100 traces in power averaging (i.e., RMS) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter. (x) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) |

The "measure-and-sum technique" is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various



antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units. ANSI C63.10 section 14.3.2.2

Samples, Systems, and Modes

| System Number | Description | Samples | System under test | Support equipment |
|---------------|---|-------------|-------------------------------------|--------------------------|
| 2 | Conducted testing: EUT + AC/DC Adapter | S02 and S03 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Tested By :
Johanna Knudsen

Date of testing:
August 22, 2017 – August 25th, 2017

Test Result : PASS

Test Equipment
See Appendix C for list of test equipment



Maximum Conducted Output Power Data Table

| Frequency (MHz) | Mode | Tx Paths | Correlated Antenna Gain (dBi) | Tx 1 Max Power (dBm) | Tx 2 Max Power (dBm) | Total Tx Channel Power (dBm) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------------------|----------|-------------------------------|----------------------|----------------------|------------------------------|-------------|-------------|
| 5500 | Non HT20, 6 to 54 Mbps | 1 | 4 | 15.4 | | 15.4 | 23.4 | 8.0 |
| | Non HT20, 6 to 54 Mbps | 2 | 4 | 15.4 | 15.3 | 18.4 | 23.4 | 5.0 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | 14.6 | 14.5 | 17.6 | 22.4 | 4.8 |
| | HT/VHT20, M0 to M7 | 1 | 4 | 15.5 | | 15.5 | 23.6 | 8.1 |
| | HT/VHT20, M0 to M7 | 2 | 4 | 15.5 | 15.3 | 18.4 | 23.6 | 5.2 |
| | HT/VHT20, M8 to M15 | 2 | 4 | 15.5 | 15.3 | 18.4 | 23.6 | 5.2 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | 14.5 | 14.4 | 17.5 | 22.6 | 5.1 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | 15.5 | 15.3 | 18.4 | 23.6 | 5.2 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | 15.5 | 15.3 | 18.4 | 23.6 | 5.2 |
| 5510 | Non HT40, 6 to 54 Mbps | 1 | 4 | 13.3 | | 13.3 | 23.8 | 10.5 |
| | Non HT40, 6 to 54 Mbps | 2 | 4 | 12.4 | 12.2 | 15.3 | 23.8 | 8.5 |
| | HT/VHT40, M0 to M7 | 1 | 4 | 13.8 | | 13.8 | 23.8 | 10.0 |
| | HT/VHT40, M0 to M7 | 2 | 4 | 12.8 | 12.7 | 15.8 | 23.8 | 8.0 |
| | HT/VHT40, M8 to M15 | 2 | 4 | 12.8 | 12.7 | 15.8 | 23.8 | 8.0 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | 11.8 | 11.6 | 14.7 | 22.8 | 8.1 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | 12.8 | 12.7 | 15.8 | 23.8 | 8.0 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | 12.8 | 12.7 | 15.8 | 23.8 | 8.0 |
| 5530 | Non HT80, 6 to 54 Mbps | 1 | 4 | 13.5 | | 13.5 | 23.2 | 9.7 |
| | Non HT80, 6 to 54 Mbps | 2 | 4 | 12.4 | 12.6 | 15.5 | 23.2 | 7.7 |
| | VHT80, M0 to M9 1ss | 1 | 4 | 13.2 | | 13.2 | 23.2 | 10.0 |
| | VHT80, M0 to M9 1ss | 2 | 4 | 12.2 | 12.3 | 15.3 | 23.2 | 7.9 |
| | VHT80, M0 to M9 2ss | 2 | 4 | 12.2 | 12.3 | 15.3 | 23.2 | 7.9 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | 11.2 | 11.3 | 14.3 | 22.2 | 7.9 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | 12.2 | 12.3 | 15.3 | 23.2 | 7.9 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | 12.2 | 12.3 | 15.3 | 23.2 | 7.9 |
| 5550 | Non HT40, 6 to 54 Mbps | 1 | 4 | 15.1 | | 15.1 | 23.8 | 8.7 |
| | Non HT40, 6 to 54 Mbps | 2 | 4 | 15.1 | 15.4 | 18.3 | 23.8 | 5.5 |
| | HT/VHT40, M0 to M7 | 1 | 4 | 15.5 | | 15.5 | 23.8 | 8.3 |
| | HT/VHT40, M0 to M7 | 2 | 4 | 15.5 | 15.8 | 18.7 | 23.8 | 5.1 |
| | HT/VHT40, M8 to M15 | 2 | 4 | 15.5 | 15.8 | 18.7 | 23.8 | 5.1 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | 15.5 | 15.8 | 18.7 | 22.8 | 4.1 |



| | | | | | | | | |
|------|--|----------|----------|-------------|-------------|-------------|-------------|------------|
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | 15.5 | 15.8 | 18.7 | 23.8 | 5.1 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | 15.5 | 15.8 | 18.7 | 23.8 | 5.1 |
| 5560 | Non HT20, 6 to 54 Mbps | 1 | 4 | 15.4 | | 15.4 | 23.4 | 8.0 |
| | Non HT20, 6 to 54 Mbps | 2 | 4 | 15.4 | 15.6 | 18.5 | 23.4 | 4.9 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | 15.4 | 15.6 | 18.5 | 22.4 | 3.9 |
| | HT/VHT20, M0 to M7 | 1 | 4 | 15.4 | | 15.4 | 23.6 | 8.2 |
| | HT/VHT20, M0 to M7 | 2 | 4 | 15.4 | 15.5 | 18.5 | 23.6 | 5.1 |
| | HT/VHT20, M8 to M15 | 2 | 4 | 15.4 | 15.5 | 18.5 | 23.6 | 5.1 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | 15.4 | 15.5 | 18.5 | 22.6 | 4.1 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | 15.4 | 15.5 | 18.5 | 23.6 | 5.1 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | 15.4 | 15.5 | 18.5 | 23.6 | 5.1 |
| 5610 | Non HT80, 6 to 54 Mbps | 1 | 4 | 15.0 | | 15.0 | 23.8 | 8.8 |
| | Non HT80, 6 to 54 Mbps | 2 | 4 | 15.0 | 15.2 | 18.1 | 23.8 | 5.7 |
| | VHT80, M0 to M9 1ss | 1 | 4 | 14.7 | | 14.7 | 23.8 | 9.1 |
| | VHT80, M0 to M9 1ss | 2 | 4 | 14.7 | 14.9 | 17.8 | 23.8 | 6.0 |
| | VHT80, M0 to M9 2ss | 2 | 4 | 14.7 | 14.9 | 17.8 | 23.8 | 6.0 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | 14.7 | 14.9 | 17.8 | 22.8 | 5.0 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | 14.7 | 14.9 | 17.8 | 23.8 | 6.0 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | 14.7 | 14.9 | 17.8 | 23.8 | 6.0 |
| 5690 | Non HT80, 6 to 54 Mbps | 1 | 4 | 14.6 | | 14.6 | 23.8 | 9.2 |
| | Non HT80, 6 to 54 Mbps | 2 | 4 | 14.6 | 14.6 | 17.6 | 23.8 | 6.2 |
| | VHT80, M0 to M9 1ss | 1 | 4 | 14.6 | | 14.6 | 23.8 | 9.2 |
| | VHT80, M0 to M9 1ss | 2 | 4 | 14.6 | 14.4 | 17.5 | 23.8 | 6.3 |
| | VHT80, M0 to M9 2ss | 2 | 4 | 14.6 | 14.4 | 17.5 | 23.8 | 6.3 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | 14.6 | 14.4 | 17.5 | 22.8 | 5.3 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | 14.6 | 14.4 | 17.5 | 23.8 | 6.3 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | 14.6 | 14.4 | 17.5 | 23.8 | 6.3 |
| 5710 | Non HT40, 6 to 54 Mbps | 1 | 4 | 14.4 | | 14.4 | 23.8 | 9.4 |
| | Non HT40, 6 to 54 Mbps | 2 | 4 | 14.4 | 14.4 | 17.4 | 23.8 | 6.4 |
| | HT/VHT40, M0 to M7 | 1 | 4 | 14.7 | | 14.7 | 23.8 | 9.1 |
| | HT/VHT40, M0 to M7 | 2 | 4 | 14.7 | 14.8 | 17.8 | 23.8 | 6.0 |
| | HT/VHT40, M8 to M15 | 2 | 4 | 14.7 | 14.8 | 17.8 | 23.8 | 6.0 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | 14.7 | 14.8 | 17.8 | 22.8 | 5.0 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | 14.7 | 14.8 | 17.8 | 23.8 | 6.0 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | 14.7 | 14.8 | 17.8 | 23.8 | 6.0 |



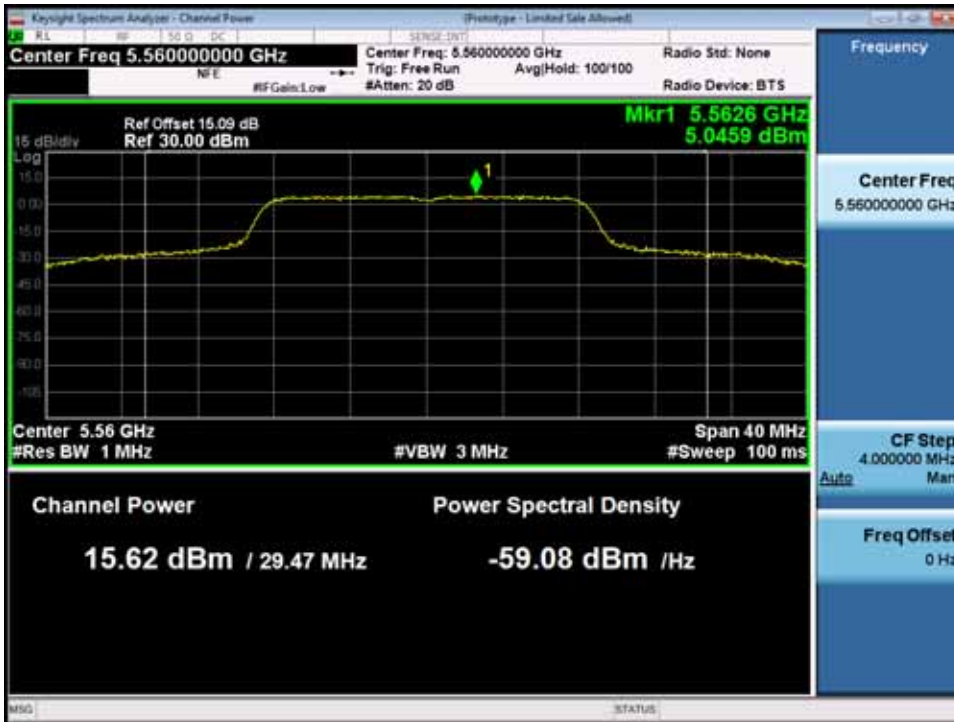
| | | | | | | | | |
|------|-------------------------------------|---|---|------|------|------|------|-----|
| 5720 | Non HT20, 6 to 54 Mbps | 1 | 4 | 14.7 | | 14.7 | 23.4 | 8.7 |
| | Non HT20, 6 to 54 Mbps | 2 | 4 | 14.7 | 14.5 | 17.6 | 23.4 | 5.8 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | 14.7 | 14.5 | 17.6 | 22.4 | 4.8 |
| | HT/VHT20, M0 to M7 | 1 | 4 | 14.7 | | 14.7 | 23.6 | 8.9 |
| | HT/VHT20, M0 to M7 | 2 | 4 | 14.7 | 14.6 | 17.7 | 23.6 | 5.9 |
| | HT/VHT20, M8 to M15 | 2 | 4 | 14.7 | 14.6 | 17.7 | 23.6 | 5.9 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | 14.7 | 14.6 | 17.7 | 22.6 | 4.9 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | 14.7 | 14.6 | 17.7 | 23.6 | 5.9 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | 14.7 | 14.6 | 17.7 | 23.6 | 5.9 |



Peak Power, 5180 MHz, 6 Mbps, Non HT-20 BF



Antenna A



Antenna B



A.4 Power Spectral Density

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

The "measure-and-sum technique" is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units. (ANSI C63.10: 2013, section 14.3.2.2)

Test Procedure

Ref. 789033 D02 General UNII Test Procedures New Rules v01r04
ANSI C63.10: 2013

| |
|---|
| Output Power |
| Test Procedure |
| <ol style="list-style-type: none"> 1. Set the radio in the continuous transmitting mode at full power 2. Compute power by integrating the spectrum across the EBW (or alternatively entire 99% OBW) of the signal using the instrument's band power measurement function. The integration shall be performed using the spectrum analyzer band-power measurement function with band limits set equal to the EBW or the OBW band edges. 3. Capture graphs and record pertinent measurement data. |

Ref. 789033 D02 General UNII Test Procedures New Rules v01r04
ANSI C63.10: 2013 section 12.3.2.4 Method SA-2

| |
|--|
| Output Power |
| Test parameters |
| Span = >1.5 times the OBW RBW = 1MHz VBW \geq 3 x RBW Sweep = Auto couple Detector = Sample Trace = Trace Average 100 |

**Samples, Systems, and Modes**

| System Number | Description | Samples | System under test | Support equipment |
|----------------------|---|----------------|-------------------------------------|--------------------------|
| 2 | Conducted testing: EUT + AC/DC Adapter | S02 and S03 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Tested By :
Johanna Knudsen

Date of testing:
August 22, 2017 – August 25th, 2017

Test Result : PASS

Test Equipment
See Appendix C for list of test equipment



Power Spectral Density Data Table

| Frequency (MHz) | Mode | Tx Paths | Correlated Antenna Gain (dBi) | Tx 1 PSD (dBm/MHz) | Tx 2 PSD (dBm/MHz) | Total PSD (dBm/MHz) | Limit (dBm/MHz) | Margin (dB) |
|-----------------|-------------------------------------|----------|-------------------------------|--------------------|--------------------|---------------------|-----------------|-------------|
| 5500 | Non HT20, 6 to 54 Mbps | 1 | 4 | 4.7 | | 4.7 | 10.8 | 6.1 |
| | Non HT20, 6 to 54 Mbps | 2 | 7 | 4.7 | 4.5 | 7.6 | 9.8 | 2.2 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | 3.8 | 3.9 | 6.9 | 9.8 | 2.9 |
| | HT/VHT20, M0 to M7 | 1 | 4 | 4.6 | | 4.6 | 10.8 | 6.2 |
| | HT/VHT20, M0 to M7 | 2 | 7 | 4.6 | 4.2 | 7.4 | 9.8 | 2.4 |
| | HT/VHT20, M8 to M15 | 2 | 4 | 4.6 | 4.2 | 7.4 | 10.8 | 3.4 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | 3.4 | 3.4 | 6.4 | 9.8 | 3.4 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | 4.6 | 4.2 | 7.4 | 10.8 | 3.4 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | 4.6 | 4.2 | 7.4 | 10.8 | 3.4 |
| 5510 | Non HT40, 6 to 54 Mbps | 1 | 4 | 1.2 | | 1.2 | 10.8 | 9.6 |
| | Non HT40, 6 to 54 Mbps | 2 | 7 | -0.3 | 0.0 | 2.9 | 9.8 | 6.9 |
| | HT/VHT40, M0 to M7 | 1 | 4 | 0.0 | | 0.0 | 10.8 | 10.8 |
| | HT/VHT40, M0 to M7 | 2 | 7 | -0.8 | -0.9 | 2.2 | 9.8 | 7.6 |
| | HT/VHT40, M8 to M15 | 2 | 4 | -0.8 | -0.9 | 2.2 | 10.8 | 8.6 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | -1.8 | -2.0 | 1.1 | 9.8 | 8.7 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | -0.8 | -0.9 | 2.2 | 10.8 | 8.6 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | -0.8 | -0.9 | 2.2 | 10.8 | 8.6 |
| 5530 | Non HT80, 6 to 54 Mbps | 1 | 4 | -3.0 | | -3.0 | 10.2 | 13.2 |
| | Non HT80, 6 to 54 Mbps | 2 | 7 | -3.9 | -3.9 | -0.9 | 9.2 | 10.1 |
| | VHT80, M0 to M9 1ss | 1 | 4 | -3.9 | | -3.9 | 10.2 | 14.1 |
| | VHT80, M0 to M9 1ss | 2 | 7 | -4.5 | -4.2 | -1.3 | 9.2 | 10.5 |
| | VHT80, M0 to M9 2ss | 2 | 4 | -4.5 | -4.2 | -1.3 | 10.2 | 11.5 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | -5.3 | -5.3 | -2.3 | 9.2 | 11.5 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | -4.5 | -4.2 | -1.3 | 10.2 | 11.5 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | -4.5 | -4.2 | -1.3 | 10.2 | 11.5 |
| 5550 | Non HT40, 6 to 54 Mbps | 1 | 4 | 2.2 | | 2.2 | 10.8 | 8.6 |
| | Non HT40, 6 to 54 Mbps | 2 | 7 | 2.2 | 3.0 | 5.6 | 9.8 | 4.2 |
| | HT/VHT40, M0 to M7 | 1 | 4 | 1.7 | | 1.7 | 10.8 | 9.1 |
| | HT/VHT40, M0 to M7 | 2 | 7 | 1.7 | 1.8 | 4.8 | 9.8 | 5.0 |
| | HT/VHT40, M8 to M15 | 2 | 4 | 1.7 | 1.8 | 4.8 | 10.8 | 6.0 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | 1.7 | 1.8 | 4.8 | 9.8 | 5.0 |



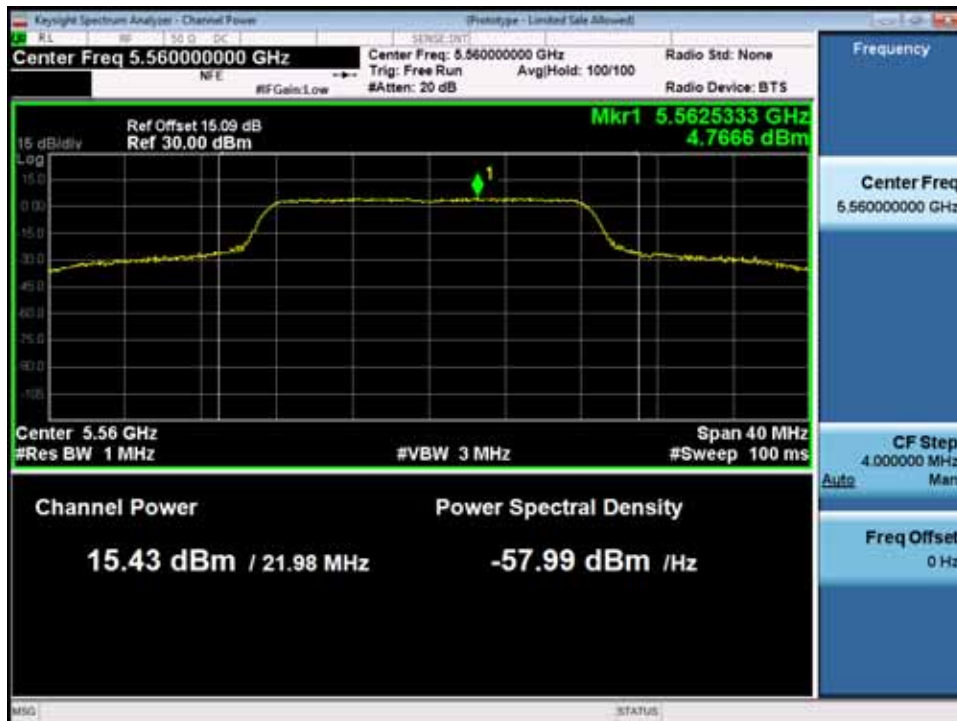
| | | | | | | | | |
|------|-------------------------------------|----------|----------|------------|------------|------------|------------|------------|
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | 1.7 | 1.8 | 4.8 | 10.8 | 6.0 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | 1.7 | 1.8 | 4.8 | 10.8 | 6.0 |
| 5560 | Non HT20, 6 to 54 Mbps | 1 | 4 | 4.8 | | 4.8 | 10.8 | 6.0 |
| | Non HT20, 6 to 54 Mbps | 2 | 7 | 4.8 | 5.0 | 7.9 | 9.8 | 1.9 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | 4.8 | 5.0 | 7.9 | 9.8 | 1.9 |
| | HT/VHT20, M0 to M7 | 1 | 4 | 4.2 | | 4.2 | 10.8 | 6.6 |
| | HT/VHT20, M0 to M7 | 2 | 7 | 4.2 | 4.8 | 7.5 | 9.8 | 2.3 |
| | HT/VHT20, M8 to M15 | 2 | 4 | 4.2 | 4.8 | 7.5 | 10.8 | 3.3 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | 4.2 | 4.8 | 7.5 | 9.8 | 2.3 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | 4.2 | 4.8 | 7.5 | 10.8 | 3.3 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | 4.2 | 4.8 | 7.5 | 10.8 | 3.3 |
| 5610 | Non HT80, 6 to 54 Mbps | 1 | 4 | -1.8 | | -1.8 | 10.8 | 12.6 |
| | Non HT80, 6 to 54 Mbps | 2 | 7 | -1.8 | -1.4 | 1.4 | 9.8 | 8.4 |
| | VHT80, M0 to M9 1ss | 1 | 4 | -2.4 | | -2.4 | 10.8 | 13.2 |
| | VHT80, M0 to M9 1ss | 2 | 7 | -2.4 | -1.8 | 0.9 | 9.8 | 8.9 |
| | VHT80, M0 to M9 2ss | 2 | 4 | -2.4 | -1.8 | 0.9 | 10.8 | 9.9 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | -2.4 | -1.8 | 0.9 | 9.8 | 8.9 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | -2.4 | -1.8 | 0.9 | 10.8 | 9.9 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | -2.4 | -1.8 | 0.9 | 10.8 | 9.9 |
| 5690 | Non HT80, 6 to 54 Mbps | 1 | 4 | -2.1 | | -2.1 | 10.8 | 12.9 |
| | Non HT80, 6 to 54 Mbps | 2 | 7 | -2.1 | -2.1 | 0.9 | 9.8 | 8.9 |
| | VHT80, M0 to M9 1ss | 1 | 4 | -2.6 | | -2.6 | 10.8 | 13.4 |
| | VHT80, M0 to M9 1ss | 2 | 7 | -2.6 | -2.9 | 0.3 | 9.8 | 9.5 |
| | VHT80, M0 to M9 2ss | 2 | 4 | -2.6 | -2.9 | 0.3 | 10.8 | 10.5 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | -2.6 | -2.9 | 0.3 | 9.8 | 9.5 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | -2.6 | -2.9 | 0.3 | 10.8 | 10.5 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | -2.6 | -2.9 | 0.3 | 10.8 | 10.5 |
| 5710 | Non HT40, 6 to 54 Mbps | 1 | 4 | 1.7 | | 1.7 | 10.8 | 9.1 |
| | Non HT40, 6 to 54 Mbps | 2 | 7 | 1.7 | 1.6 | 4.7 | 9.8 | 5.1 |
| | HT/VHT40, M0 to M7 | 1 | 4 | 0.9 | | 0.9 | 10.8 | 9.9 |
| | HT/VHT40, M0 to M7 | 2 | 7 | 0.9 | 1.2 | 4.1 | 9.8 | 5.7 |
| | HT/VHT40, M8 to M15 | 2 | 4 | 0.9 | 1.2 | 4.1 | 10.8 | 6.7 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | 0.9 | 1.2 | 4.1 | 9.8 | 5.7 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | 0.9 | 1.2 | 4.1 | 10.8 | 6.7 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | 0.9 | 1.2 | 4.1 | 10.8 | 6.7 |



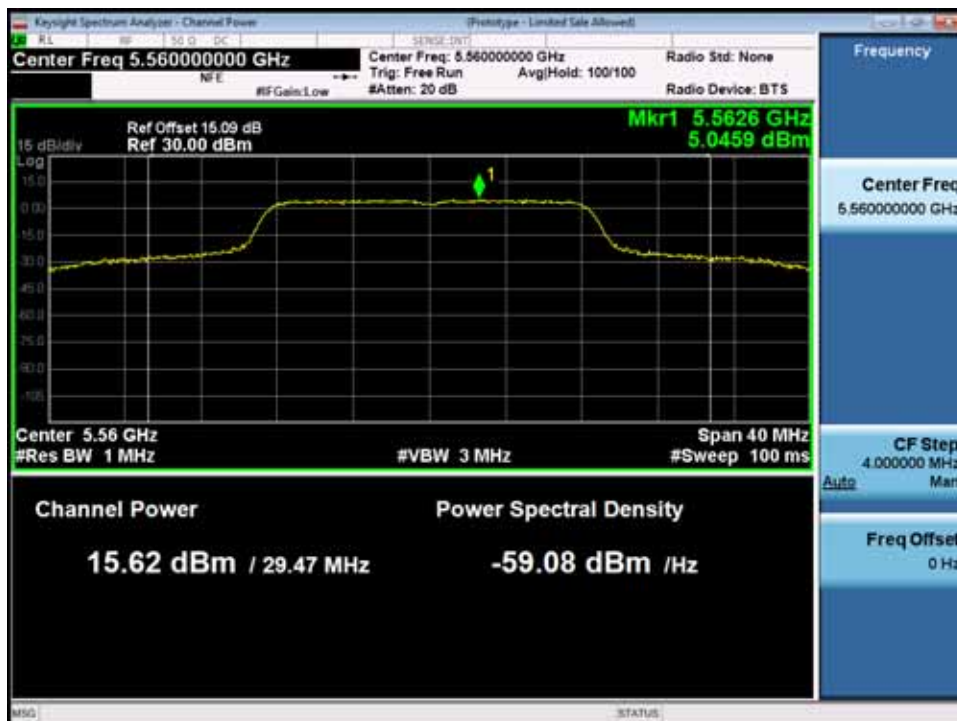
| | | | | | | | | |
|------|-------------------------------------|---|---|-----|-----|-----|------|-----|
| 5720 | Non HT20, 6 to 54 Mbps | 1 | 4 | 3.9 | | 3.9 | 10.8 | 6.9 |
| | Non HT20, 6 to 54 Mbps | 2 | 7 | 3.9 | 4.0 | 7.0 | 9.8 | 2.8 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | 3.9 | 4.0 | 7.0 | 9.8 | 2.8 |
| | HT/VHT20, M0 to M7 | 1 | 4 | 3.8 | | 3.8 | 10.8 | 7.0 |
| | HT/VHT20, M0 to M7 | 2 | 7 | 3.8 | 3.9 | 6.9 | 9.8 | 2.9 |
| | HT/VHT20, M8 to M15 | 2 | 4 | 3.8 | 3.9 | 6.9 | 10.8 | 3.9 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | 3.8 | 3.9 | 6.9 | 9.8 | 2.9 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | 3.8 | 3.9 | 6.9 | 10.8 | 3.9 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | 3.8 | 3.9 | 6.9 | 10.8 | 3.9 |



Power Spectral Density, 5560 MHz, 6 Mbps, Non HT-20



Antenna A



Antenna B



A.5 Conducted Spurious Emissions

15.407(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz..

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

(7) The provisions of §15.205 apply to intentional radiators operating under this section.

Test Procedure

Ref. 789033 D02 General UNII Test Procedures New Rules v01r04
ANSI C63.10: 2013

| Conducted Spurious Emissions |
|---|
| Test Procedure |
| <ol style="list-style-type: none"> 1. Connect the antenna port(s) to the spectrum analyzer input. 2. Place the radio in continuous transmit mode. Use the procedures in KDB 789033 D02 General UNII Test Procedures New Rules v01r04 to substitute conducted measurements in place of radiated measurements. 3. Configure Spectrum analyzer as per test parameters below (be sure to enter all losses between the transmitter output and the spectrum analyzer). 4. Record the marker waveform peak to spur difference. Also measure any emissions in the restricted bands.. 5. The “measure-and-sum technique” is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units. The worst case output is recorded. 6. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands 7. Capture graphs and record pertinent measurement data. |

Ref. 789033 D02 General UNII Test Procedures New Rules
ANSI C63.10: 2013 Section 12.7.6 (Peak), Section 12.7.7.2 (Method AD)

| Conducted Spurious Emissions | |
|---|---|
| Test parameters | |
| Peak Span = 30MHz to 26.5GHz / 26.5GHz to 40GHz RBW = 1 MHz VBW \geq 3 MHz Sweep = Auto couple Detector = Peak Trace = Max Hold. | Average Span = 30MHz to 26.5GHz / 26.5GHz to 40GHz RBW = 1 MHz VBW \geq 3 MHz Sweep = Auto couple Detector = RMS Power Averaging |

**Samples, Systems, and Modes**

| System Number | Description | Samples | System under test | Support equipment |
|----------------------|---|----------------|-------------------------------------|--------------------------|
| 1 | Conducted testing: EUT + AC/DC Adapter | S01 and S02 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Tested By :
Johanna Knudsen

Date of testing:
August 1, 2017 – August 1, 2017

Test Result : PASS

Test Equipment
See Appendix C for list of test equipment



Conducted Spurious Emissions Data Table - Average

| Frequency (MHz) | Mode | Tx Paths | Correlated Antenna Gain (dBi) | Conducted Spur TX path 1 (dBm/MHz) | Conducted Spur TX path 2 (dBm/MHz) | Total Conducted Spur (dBm/MHz) | Limit (dBm) | Margin (dB) |
|-----------------|---|----------|-------------------------------|------------------------------------|------------------------------------|--------------------------------|---------------|-------------|
| 5500 | Non HT20, 6 to 54 Mbps | 1 | 4 | -54.24 | | -50.24 | -41.5 | 8.74 |
| | Non HT20, 6 to 54 Mbps | 2 | 4 | -54.24 | -54.48 | -47.35 | -41.5 | 5.85 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | -54.24 | -54.48 | -44.35 | -41.5 | 2.85 |
| | HT/VHT20, M0 to M7 | 1 | 4 | -54.41 | | -50.41 | -41.5 | 8.91 |
| | HT/VHT20, M0 to M7 | 2 | 4 | -54.41 | -54.08 | -47.23 | -41.5 | 5.73 |
| | HT/VHT20, M8 to M15 | 2 | 4 | -54.31 | -53.85 | -47.06 | -41.5 | 5.56 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | -54.41 | -54.08 | -44.23 | -41.5 | 2.73 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | -54.31 | -53.85 | -47.06 | -41.5 | 5.56 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | -54.41 | -54.08 | -47.23 | -41.5 | 5.73 |
| 5510 | Non HT40, 6 to 54 Mbps | 1 | 4 | -54.28 | | -50.28 | -41.5 | 8.78 |
| | Non HT40, 6 to 54 Mbps | 2 | 4 | -54.28 | -54.2 | -47.23 | -41.5 | 5.73 |
| | HT/VHT40, M0 to M7 | 1 | 4 | -54.57 | | -50.57 | -41.5 | 9.07 |
| | HT/VHT40, M0 to M7 | 2 | 4 | -54.57 | -54.15 | -47.34 | -41.5 | 5.84 |
| | HT/VHT40, M8 to M15 | 2 | 4 | -53.64 | -54.11 | -46.86 | -41.5 | 5.36 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | -54.57 | -54.15 | -44.34 | -41.5 | 2.84 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | -53.64 | -54.11 | -46.86 | -41.5 | 5.36 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | -54.57 | -54.15 | -47.34 | -41.5 | 5.84 |
| 5530 | Non HT80, 6 to 54 Mbps | 1 | 4 | -54.24 | | -50.24 | -42.25 | 7.99 |
| | Non HT80, 6 to 54 Mbps | 2 | 4 | -54.24 | -53.9 | -47.06 | -42.25 | 4.81 |
| | VHT80, M0 to M9 1ss | 1 | 4 | -53.93 | | -49.93 | -42.25 | 7.68 |
| | VHT80, M0 to M9 1ss | 2 | 4 | -53.93 | -54.25 | -47.08 | -42.25 | 4.83 |
| | VHT80, M0 to M9 2ss | 2 | 4 | -54.23 | -54.27 | -47.24 | -42.25 | 4.99 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | -53.93 | -54.25 | -44.08 | -42.25 | 1.83 |



| | | | | | | | | |
|--|----------------------------------|---|---|--------|--------|--------|--------|------|
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | -54.23 | -54.27 | -47.24 | -42.25 | 4.99 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | -53.93 | -54.25 | -47.08 | -42.25 | 4.83 |

| | | | | | | | | |
|------|----------------------------------|---|---|--------|--------|--------|-------|------|
| 5550 | Non HT40, 6 to 54 Mbps | 1 | 4 | -54.4 | | -50.40 | -41.5 | 8.90 |
| | Non HT40, 6 to 54 Mbps | 2 | 4 | -54.4 | -54.24 | -47.31 | -41.5 | 5.81 |
| | HT/VHT40, M0 to M7 | 1 | 4 | -54.26 | | -50.26 | -41.5 | 8.76 |
| | HT/VHT40, M0 to M7 | 2 | 4 | -54.26 | -54.04 | -47.14 | -41.5 | 5.64 |
| | HT/VHT40, M8 to M15 | 2 | 4 | -53.66 | -53.81 | -46.72 | -41.5 | 5.22 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | -54.26 | -54.04 | -44.14 | -41.5 | 2.64 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | -53.66 | -53.81 | -46.72 | -41.5 | 5.22 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | -54.26 | -54.04 | -47.14 | -41.5 | 5.64 |

| | | | | | | | | |
|------|-------------------------------------|---|---|--------|--------|--------|-------|--------|
| 5560 | Non HT20, 6 to 54 Mbps | 1 | 4 | -54.86 | | 4.00 | -41.5 | -45.50 |
| | Non HT20, 6 to 54 Mbps | 2 | 4 | -54.86 | -54.18 | -47.50 | -41.5 | 6.00 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | -54.86 | -54.18 | -44.50 | -41.5 | 3.00 |
| | HT/VHT20, M0 to M7 | 1 | 4 | -54.55 | | -50.55 | -41.5 | 9.05 |
| | HT/VHT20, M0 to M7 | 2 | 4 | -54.55 | -54.35 | -47.44 | -41.5 | 5.94 |
| | HT/VHT20, M8 to M15 | 2 | 4 | -54.23 | -53.77 | -46.98 | -41.5 | 5.48 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | -54.55 | -54.35 | -44.44 | -41.5 | 2.94 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | -54.23 | -53.77 | -46.98 | -41.5 | 5.48 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | -54.55 | -54.35 | -47.44 | -41.5 | 5.94 |

| | | | | | | | | |
|------|----------------------------------|---|---|--------|--------|--------|--------|------|
| 5610 | Non HT80, 6 to 54 Mbps | 1 | 4 | -53.91 | | -49.91 | -42.25 | 7.66 |
| | Non HT80, 6 to 54 Mbps | 2 | 4 | -53.91 | -54.31 | -47.10 | -42.25 | 4.85 |
| | VHT80, M0 to M9 1ss | 1 | 4 | -54.26 | | -50.26 | -42.25 | 8.01 |
| | VHT80, M0 to M9 1ss | 2 | 4 | -54.26 | -54.36 | -47.30 | -42.25 | 5.05 |
| | VHT80, M0 to M9 2ss | 2 | 4 | -54.17 | -54.21 | -47.18 | -42.25 | 4.93 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | -54.26 | -54.36 | -44.30 | -42.25 | 2.05 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | -54.17 | -54.21 | -47.18 | -42.25 | 4.93 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | -54.26 | -54.36 | -47.30 | -42.25 | 5.05 |

| | | | | | | | | |
|------|------------------------|---|---|--------|--------|--------|--------|------|
| 5690 | Non HT80, 6 to 54 Mbps | 1 | 4 | -54.08 | | -50.08 | -42.25 | 7.83 |
| | Non HT80, 6 to 54 Mbps | 2 | 4 | -54.08 | -53.95 | -47.00 | -42.25 | 4.75 |
| | VHT80, M0 to M9 1ss | 1 | 4 | -54.27 | | -50.27 | -42.25 | 8.02 |
| | VHT80, M0 to M9 1ss | 2 | 4 | -54.27 | -54.43 | -47.34 | -42.25 | 5.09 |



| | | | | | | | | |
|--|----------------------------------|---|---|--------|--------|--------|--------|------|
| | VHT80, M0 to M9 2ss | 2 | 4 | -54.16 | -54.24 | -47.19 | -42.25 | 4.94 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | -54.27 | -54.43 | -44.34 | -42.25 | 2.09 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | -54.16 | -54.24 | -47.19 | -42.25 | 4.94 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | -54.27 | -54.43 | -47.34 | -42.25 | 5.09 |

| | | | | | | | | |
|------|----------------------------------|---|---|--------|--------|--------|-------|------|
| 5710 | Non HT40, 6 to 54 Mbps | 1 | 4 | -54.68 | | -50.68 | -41.5 | 9.18 |
| | Non HT40, 6 to 54 Mbps | 2 | 4 | -54.68 | -54.53 | -47.59 | -41.5 | 6.09 |
| | HT/VHT40, M0 to M7 | 1 | 4 | -54.51 | | -50.51 | -41.5 | 9.01 |
| | HT/VHT40, M0 to M7 | 2 | 4 | -54.51 | -54.21 | -47.35 | -41.5 | 5.85 |
| | HT/VHT40, M8 to M15 | 2 | 4 | -54.66 | -54.25 | -47.44 | -41.5 | 5.94 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | -54.51 | -54.21 | -44.35 | -41.5 | 2.85 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | -54.66 | -54.25 | -47.44 | -41.5 | 5.94 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | -54.51 | -54.21 | -47.35 | -41.5 | 5.85 |

| | | | | | | | | |
|------|-------------------------------------|---|---|--------|--------|--------|-------|------|
| 5720 | Non HT20, 6 to 54 Mbps | 1 | 4 | -53.94 | | -49.94 | -41.5 | 8.44 |
| | Non HT20, 6 to 54 Mbps | 2 | 4 | -53.94 | -53.74 | -46.83 | -41.5 | 5.33 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | -53.94 | -53.74 | -43.83 | -41.5 | 2.33 |
| | HT/VHT20, M0 to M7 | 1 | 4 | -54.35 | | -50.35 | -41.5 | 8.85 |
| | HT/VHT20, M0 to M7 | 2 | 4 | -54.35 | -54.1 | -47.21 | -41.5 | 5.71 |
| | HT/VHT20, M8 to M15 | 2 | 4 | -54.21 | -54.19 | -47.19 | -41.5 | 5.69 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | -54.35 | -54.1 | -44.21 | -41.5 | 2.71 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | -54.21 | -54.19 | -47.19 | -41.5 | 5.69 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | -54.35 | -54.1 | -47.21 | -41.5 | 5.71 |



Conducted Spurious Emissions Data Table – Peak

| Frequency (MHz) | Mode | Tx Paths | Correlated Antenna Gain (dBi) | Conducted Spur TX path 1 (dBm/MHz) | Conducted Spur TX path 2 (dBm/MHz) | Total Conducted Spur (dBm/MHz) | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------------------|----------|-------------------------------|------------------------------------|------------------------------------|--------------------------------|-------------|-------------|
| 5500 | Non HT20, 6 to 54 Mbps | 1 | 4 | -45.13 | | -41.13 | -21.5 | 19.63 |
| | Non HT20, 6 to 54 Mbps | 2 | 4 | -45.13 | -44.53 | -37.81 | -21.5 | 16.31 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | -45.13 | -44.53 | -34.81 | -21.5 | 13.31 |
| | HT/VHT20, M0 to M7 | 1 | 4 | -46.47 | | -42.47 | -21.5 | 20.97 |
| | HT/VHT20, M0 to M7 | 2 | 4 | -46.47 | -46.47 | -39.46 | -21.5 | 17.96 |
| | HT/VHT20, M8 to M15 | 2 | 4 | -45.46 | -46.53 | -38.95 | -21.5 | 17.45 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | -46.47 | -46.47 | -36.46 | -21.5 | 14.96 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | -45.46 | -46.53 | -38.95 | -21.5 | 17.45 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | -46.47 | -46.47 | -39.46 | -21.5 | 17.96 |
| 5510 | Non HT40, 6 to 54 Mbps | 1 | 4 | -48.19 | | -44.19 | -21.5 | 22.69 |
| | Non HT40, 6 to 54 Mbps | 2 | 4 | -48.19 | -45.58 | -39.68 | -21.5 | 18.18 |
| | HT/VHT40, M0 to M7 | 1 | 4 | -44.84 | | -40.84 | -21.5 | 19.34 |
| | HT/VHT40, M0 to M7 | 2 | 4 | -44.84 | -46.88 | -38.73 | -21.5 | 17.23 |
| | HT/VHT40, M8 to M15 | 2 | 4 | -44.38 | -46.39 | -38.26 | -21.5 | 16.76 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | -44.84 | -46.88 | -35.73 | -21.5 | 14.23 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | -44.38 | -46.39 | -38.26 | -21.5 | 16.76 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | -44.84 | -46.88 | -38.73 | -21.5 | 17.23 |
| 5530 | Non HT80, 6 to 54 Mbps | 1 | 4 | -46.54 | | -42.54 | -22.25 | 20.29 |
| | Non HT80, 6 to 54 Mbps | 2 | 4 | -46.54 | -46.31 | -39.41 | -22.25 | 17.16 |
| | VHT80, M0 to M9 1ss | 1 | 4 | -45.97 | | -41.97 | -22.25 | 19.72 |
| | VHT80, M0 to M9 1ss | 2 | 4 | -45.97 | -45.71 | -38.83 | -22.25 | 16.58 |
| | VHT80, M0 to M9 2ss | 2 | 4 | -45.84 | -46.77 | -39.27 | -22.25 | 17.02 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | -45.97 | -45.71 | -35.83 | -22.25 | 13.58 |



| | | | | | | | | |
|--|----------------------------------|---|---|--------|--------|--------|--------|-------|
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | -45.84 | -46.77 | -39.27 | -22.25 | 17.02 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | -45.97 | -45.71 | -38.83 | -22.25 | 16.58 |

| | | | | | | | | |
|------|----------------------------------|---|---|--------|--------|--------|-------|-------|
| 5550 | Non HT40, 6 to 54 Mbps | 1 | 4 | -47.52 | | -43.52 | -21.5 | 22.02 |
| | Non HT40, 6 to 54 Mbps | 2 | 4 | -47.52 | -46.82 | -40.15 | -21.5 | 18.65 |
| | HT/VHT40, M0 to M7 | 1 | 4 | -45.29 | | -41.29 | -21.5 | 19.79 |
| | HT/VHT40, M0 to M7 | 2 | 4 | -45.29 | -44.89 | -38.08 | -21.5 | 16.58 |
| | HT/VHT40, M8 to M15 | 2 | 4 | -47.12 | -46.55 | -39.82 | -21.5 | 18.32 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | -45.29 | -44.89 | -35.08 | -21.5 | 13.58 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | -47.12 | -46.55 | -39.82 | -21.5 | 18.32 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | -45.29 | -44.89 | -38.08 | -21.5 | 16.58 |

| | | | | | | | | |
|------|--|----------|----------|--------|--------|--------|-------|--------|
| 5560 | Non HT20, 6 to 54 Mbps | 1 | 4 | -46.41 | | -42.41 | -21.5 | 20.91 |
| | Non HT20, 6 to 54 Mbps | 2 | 4 | -46.41 | -46.18 | -39.28 | -21.5 | 17.78 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | -46.41 | -46.18 | -36.28 | -21.5 | 14.78 |
| | HT/VHT20, M0 to M7 | 1 | 4 | -46.21 | | -42.21 | -21.5 | 20.71 |
| | HT/VHT20, M0 to M7 | 2 | 4 | -46.21 | -45.18 | -38.65 | -21.5 | 17.15 |
| | HT/VHT20, M8 to M15 | 2 | 4 | -46.25 | -44.84 | -38.48 | -21.5 | 16.98 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | -46.21 | -45.18 | -35.65 | -21.5 | 14.15 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | -46.25 | -44.84 | -38.48 | -21.5 | 16.98 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | -46.21 | -45.18 | 4.00 | -21.5 | -25.50 |

| | | | | | | | | |
|------|----------------------------------|---|---|--------|--------|--------|--------|-------|
| 5610 | Non HT80, 6 to 54 Mbps | 1 | 4 | -47.31 | | -43.31 | -22.25 | 21.06 |
| | Non HT80, 6 to 54 Mbps | 2 | 4 | -47.31 | -47.22 | -40.25 | -22.25 | 18.00 |
| | VHT80, M0 to M9 1ss | 1 | 4 | -45.32 | | -41.32 | -22.25 | 19.07 |
| | VHT80, M0 to M9 1ss | 2 | 4 | -45.32 | -46.3 | -38.77 | -22.25 | 16.52 |
| | VHT80, M0 to M9 2ss | 2 | 4 | -46.37 | -45.87 | -39.10 | -22.25 | 16.85 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | -45.32 | -46.3 | -35.77 | -22.25 | 13.52 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | -46.37 | -45.87 | -39.10 | -22.25 | 16.85 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | -45.32 | -46.3 | -38.77 | -22.25 | 16.52 |

| | | | | | | | | |
|------|------------------------|---|---|--------|--------|--------|--------|-------|
| 5690 | Non HT80, 6 to 54 Mbps | 1 | 4 | -45.59 | | -41.59 | -22.25 | 19.34 |
| | Non HT80, 6 to 54 Mbps | 2 | 4 | -45.59 | -45.9 | -38.73 | -22.25 | 16.48 |
| | VHT80, M0 to M9 1ss | 1 | 4 | -45.07 | | -41.07 | -22.25 | 18.82 |
| | VHT80, M0 to M9 1ss | 2 | 4 | -45.07 | -45.28 | -38.16 | -22.25 | 15.91 |



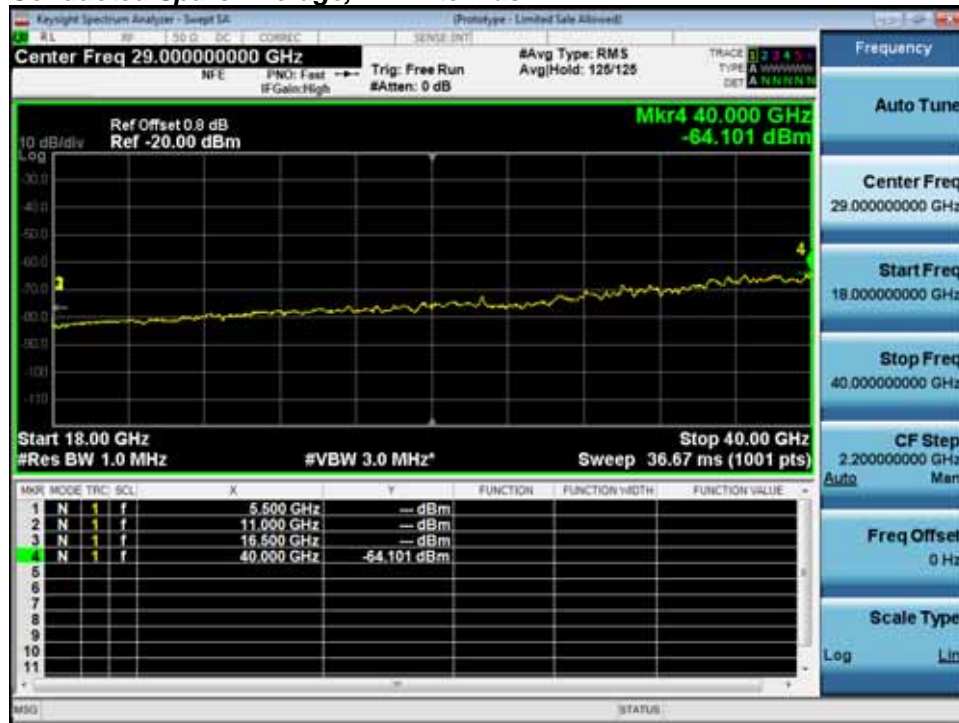
| | | | | | | | | |
|--|----------------------------------|---|---|--------|--------|--------|--------|-------|
| | VHT80, M0 to M9 2ss | 2 | 4 | -45.56 | -47.18 | -39.28 | -22.25 | 17.03 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 7 | -45.07 | -45.28 | -35.16 | -22.25 | 12.91 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 4 | -45.56 | -47.18 | -39.28 | -22.25 | 17.03 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 4 | -45.07 | -45.28 | -38.16 | -22.25 | 15.91 |

| | | | | | | | | |
|------|----------------------------------|---|---|--------|--------|--------|-------|-------|
| 5710 | Non HT40, 6 to 54 Mbps | 1 | 4 | -46.68 | | -42.68 | -21.5 | 21.18 |
| | Non HT40, 6 to 54 Mbps | 2 | 4 | -46.68 | -46.57 | -39.61 | -21.5 | 18.11 |
| | HT/VHT40, M0 to M7 | 1 | 4 | -45.13 | | -41.13 | -21.5 | 19.63 |
| | HT/VHT40, M0 to M7 | 2 | 4 | -45.13 | -45.21 | -38.16 | -21.5 | 16.66 |
| | HT/VHT40, M8 to M15 | 2 | 4 | -46.14 | -44.15 | -38.02 | -21.5 | 16.52 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 7 | -45.13 | -45.21 | -35.16 | -21.5 | 13.66 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 4 | -46.14 | -44.15 | -38.02 | -21.5 | 16.52 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 4 | -45.13 | -45.21 | -38.16 | -21.5 | 16.66 |

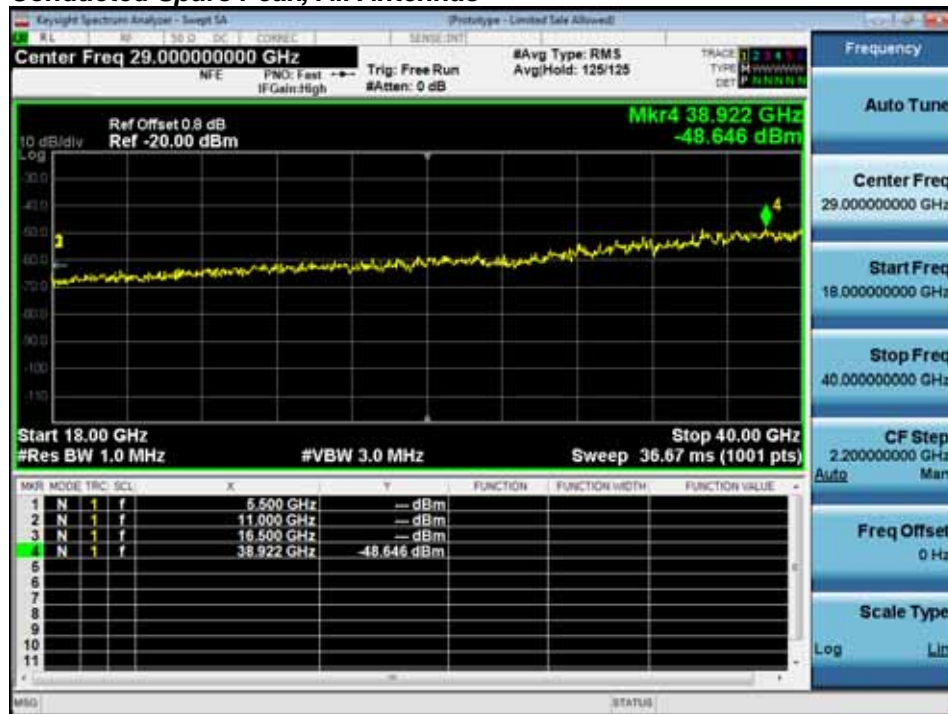
| | | | | | | | | |
|------|-------------------------------------|---|---|--------|--------|--------|-------|-------|
| 5720 | Non HT20, 6 to 54 Mbps | 1 | 4 | -44.59 | | -40.59 | -21.5 | 19.09 |
| | Non HT20, 6 to 54 Mbps | 2 | 4 | -44.59 | -44.12 | -37.34 | -21.5 | 15.84 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 7 | -44.59 | -44.12 | -34.34 | -21.5 | 12.84 |
| | HT/VHT20, M0 to M7 | 1 | 4 | -46.18 | | -42.18 | -21.5 | 20.68 |
| | HT/VHT20, M0 to M7 | 2 | 4 | -46.18 | -45.27 | -38.69 | -21.5 | 17.19 |
| | HT/VHT20, M8 to M15 | 2 | 4 | -45.55 | -45.11 | -38.31 | -21.5 | 16.81 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 7 | -46.18 | -45.27 | -35.69 | -21.5 | 14.19 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 4 | -45.55 | -45.11 | -38.31 | -21.5 | 16.81 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 4 | -46.18 | -45.27 | -38.69 | -21.5 | 17.19 |



Conducted Spurs Average, All Antennas

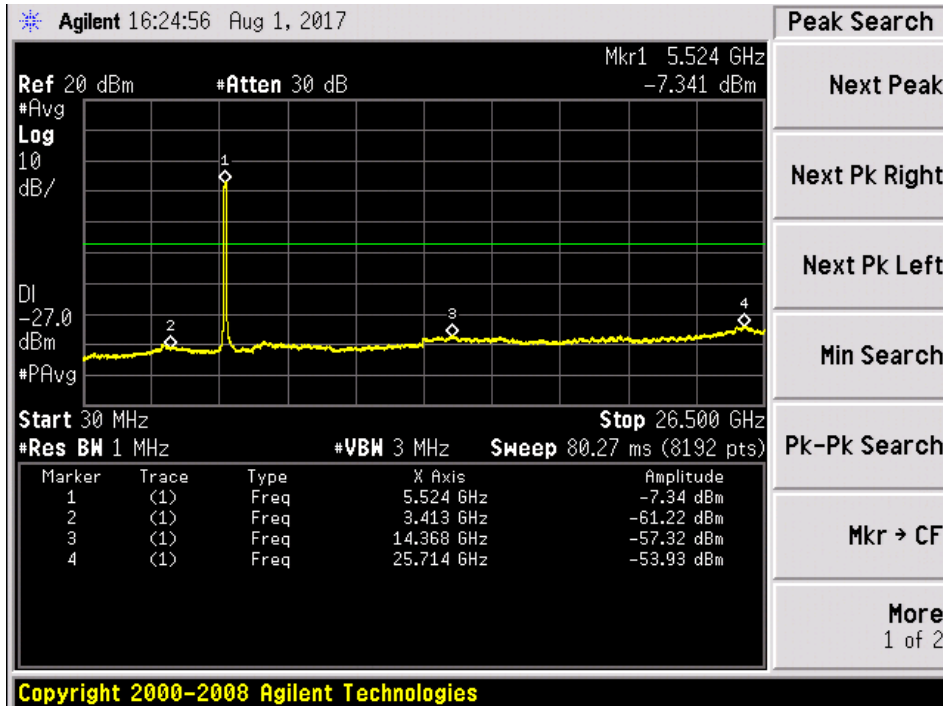


Conducted Spurs Peak, All Antennas

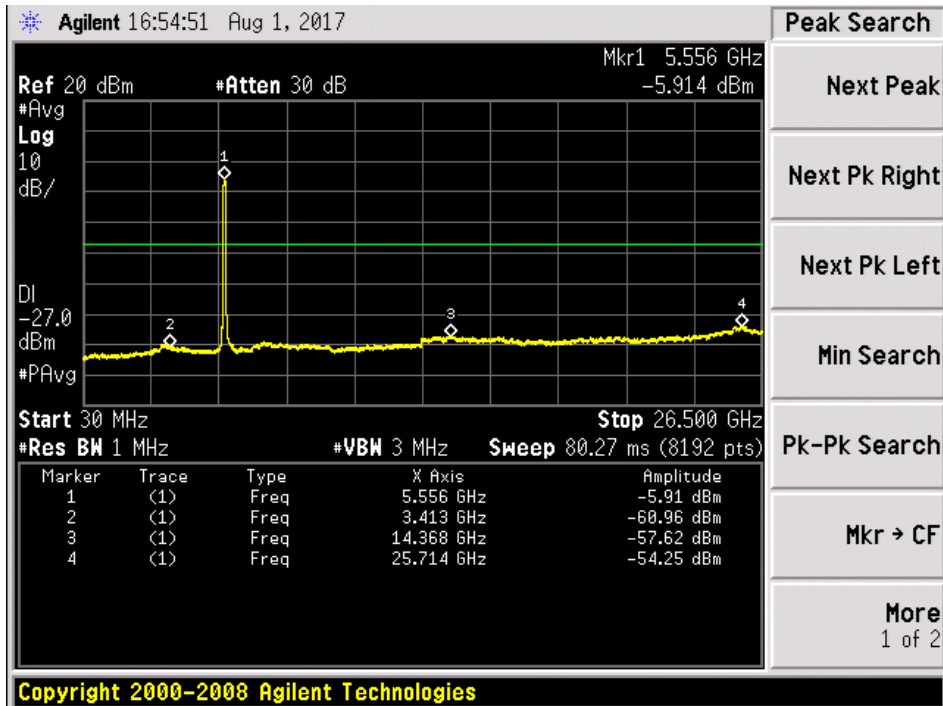




Conducted Spurs Average, 5530 MHz, VHT80, M0-M9 1ss



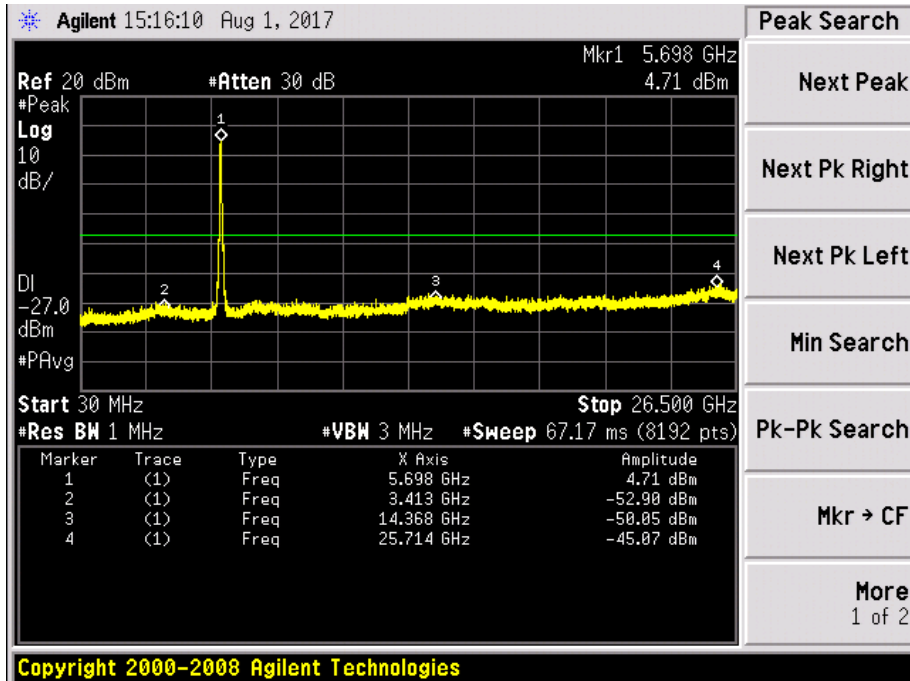
Antenna A



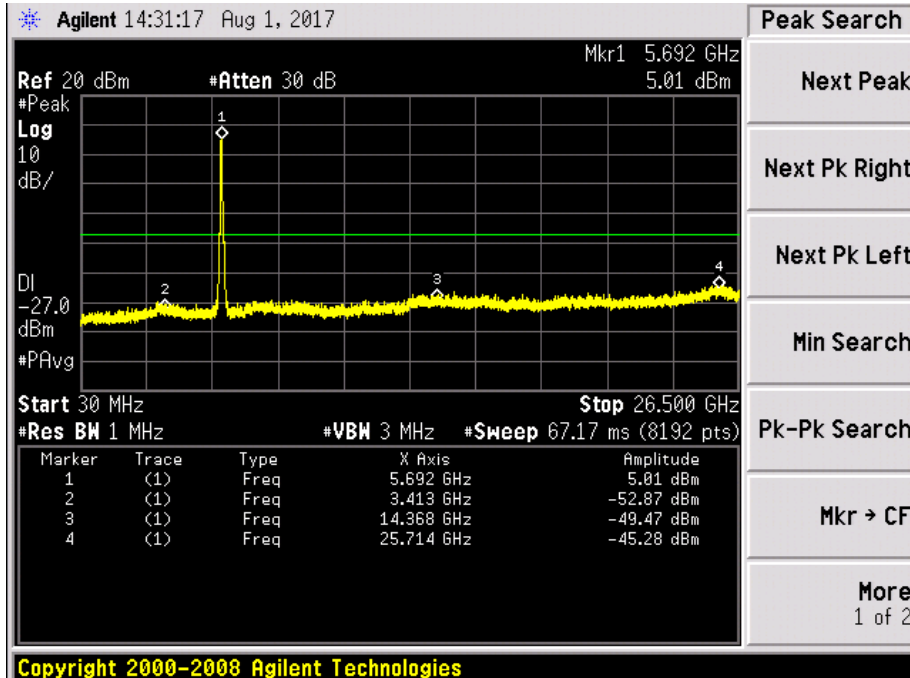
Antenna B



Conducted Spurs Peak, 5690 MHz, VHT80, BF, M0-M9 1ss



Antenna A



Antenna B



A.6 Conducted Band Edge

15.407(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz..
- (6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.
- (7) The provisions of §15.205 apply to intentional radiators operating under this section.
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits

Test Procedure

Ref. 789033 D02 General UNII Test Procedures New Rules v01r04
ANSI C63.10: 2013

| Conducted Band edge |
|---|
| Test Procedure |
| <ol style="list-style-type: none"> 1. Connect the antenna port(s) to the spectrum analyzer input. 2. Place the radio in continuous transmit mode. Use the procedures in 789033 D02 General UNII Test Procedures New Rules v01r04 to substitute conducted measurements in place of radiated measurements. 3. Configure Spectrum analyzer as per test parameters below (be sure to enter all losses between the transmitter output and the spectrum analyzer). 4. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. 5. The “measure-and-sum technique” is used for measuring in-band transmit power of a device. In the measure-and-sum approach, the conducted emission level is measured at each antenna port. The measured results at the various antenna ports are then summed mathematically to determine the total emission level from the device. Summing is performed in linear power units. The worst case output is recorded. 6. Place a marker at the end of the band edge closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands 7. Capture graphs and record pertinent measurement data. |

Ref. 789033 D02 General UNII Test Procedures New Rules
ANSI C63.10: 2013 Section 12.7.6 (Peak), Section 12.7.7.2 (Method AD)

| Conducted Spurious Emissions | |
|---|---|
| Test parameters | |
| Peak RBW = 1 MHz VBW \geq 3 MHz Sweep = Auto couple Detector = Peak Trace = Max Hold. | Average RBW = 1 MHz VBW \geq 3 MHz Sweep = Auto couple Detector = RMS Power Averaging |

Samples, Systems, and Modes

| System Number | Description | Samples | System under test | Support equipment |
|---------------|-------------|---------|-------------------|-------------------|
| | | | | |



| | | | | |
|---|---|-------------|-------------------------------------|--------------------------|
| 2 | Conducted testing: EUT + AC/DC Adapter | S02 and S03 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
|---|---|-------------|-------------------------------------|--------------------------|

Tested By :
Johanna Knudsen

Dates of testing:
April 9, 2018 – April 9, 2018 &
April 27, 2018 – May 1, 2018

Test Result : PASS

Test Equipment
See Appendix C for list of test equipment



Conducted Band Edge Emissions Data Table – Average

| Frequency (MHz) | Mode | Tx Paths | Duty Cycle | Correlated Antenna Gain (dBi) | Total Conducted Band Edge (dBm/MHz) - EIRP | Total Conducted Band Edge - corrected for duty cycle (dBm/MHz) - EIRP | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------------------|----------|------------|-------------------------------|--|---|-------------|-------------|
| 5500 | Non HT20, 6 to 54 Mbps | 1 | 96.5 | 4 | -42.90 | -42.75 | -41.25 | 1.50 |
| | Non HT20, 6 to 54 Mbps | 2 | 96.5 | 4 | -42.70 | -42.55 | -41.25 | 1.30 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 96.5 | 7 | -42.70 | -42.55 | -41.25 | 1.30 |
| | HT/VHT20, M0 to M7 | 1 | 98.3 | 4 | -42.40 | -42.33 | -41.25 | 1.08 |
| | HT/VHT20, M0 to M7 | 2 | 98.3 | 4 | -41.90 | -41.83 | -41.25 | 0.58 |
| | HT/VHT20, M8 to M15 | 2 | 96.7 | 4 | -42.40 | -42.25 | -41.25 | 1.00 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 98.3 | 7 | -41.80 | -41.73 | -41.25 | 0.48 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 96.7 | 4 | -42.60 | -42.45 | -41.25 | 1.20 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 98.3 | 4 | -41.90 | -41.83 | -41.25 | 0.58 |

| | | | | | | | | |
|------|----------------------------------|----------|-------------|----------|---------------|---------------|---------------|-------------|
| 5510 | Non HT40, 6 to 54 Mbps | 1 | 96.3 | 4 | -41.60 | -41.44 | -41.25 | 0.19 |
| | Non HT40, 6 to 54 Mbps | 2 | 96.3 | 4 | -42.60 | -42.44 | -41.25 | 1.19 |
| | HT/VHT40, M0 to M7 | 1 | 96.4 | 4 | -41.50 | -41.34 | -41.25 | 0.09 |
| | HT/VHT40, M0 to M7 | 2 | 96.4 | 4 | -42.30 | -42.14 | -41.25 | 0.89 |
| | HT/VHT40, M8 to M15 | 2 | 97.4 | 4 | -43.00 | -42.89 | -41.25 | 1.64 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 96.4 | 7 | -45.40 | -45.24 | -41.25 | 3.99 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 97.4 | 4 | -43.00 | -42.89 | -41.25 | 1.64 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 96.4 | 4 | -42.30 | -42.14 | -41.25 | 0.89 |

| | | | | | | | | |
|------|----------------------------------|---|------|---|--------|--------|--------|------|
| 5530 | Non HT80, 6 to 54 Mbps | 1 | 96.2 | 4 | -42.60 | -42.43 | -41.25 | 1.18 |
| | Non HT80, 6 to 54 Mbps | 2 | 96.2 | 4 | -43.20 | -43.03 | -41.25 | 1.78 |
| | VHT80, M0 to M9 1ss | 1 | 82.7 | 4 | -42.30 | -41.48 | -41.25 | 0.23 |
| | VHT80, M0 to M9 1ss | 2 | 82.7 | 4 | -43.00 | -42.18 | -41.25 | 0.93 |
| | VHT80, M0 to M9 2ss | 2 | 84.7 | 4 | -42.90 | -42.18 | -41.25 | 0.93 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 82.7 | 7 | -45.60 | -44.78 | -41.25 | 3.53 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 82.7 | 4 | -43.00 | -42.18 | -41.25 | 0.93 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 82.7 | 4 | -43.00 | -42.18 | -41.25 | 0.93 |

Conducted Band Edge Emissions Data Table – Peak



| Frequency (MHz) | Mode | Tx Paths | Duty Cycle | Correlated Antenna Gain (dBi) | Total Conducted Band Edge (dBm/MHz) - EIRP | Total Conducted Band Edge - corrected for duty cycle (dBm/MHz) - EIRP | Limit (dBm) | Margin (dB) |
|-----------------|-------------------------------------|----------|-------------|-------------------------------|--|---|-------------|-------------|
| 5500 | Non HT20, 6 to 54 Mbps | 1 | 96.5 | 4 | -27.50 | -27.35 | -21.25 | 6.10 |
| | Non HT20, 6 to 54 Mbps | 2 | 96.5 | 4 | -26.40 | -26.25 | -21.25 | 5.00 |
| | Non HT20 Beam Forming, 6 to 54 Mbps | 2 | 96.5 | 7 | -26.40 | -26.25 | -21.25 | 5.00 |
| | HT/VHT20, M0 to M7 | 1 | 98.3 | 4 | -27.50 | -27.43 | -21.25 | 6.18 |
| | HT/VHT20, M0 to M7 | 2 | 98.3 | 4 | -26.80 | -26.73 | -21.25 | 5.48 |
| | HT/VHT20, M8 to M15 | 2 | 96.7 | 4 | -27.50 | -27.35 | -21.25 | 6.10 |
| | HT/VHT20 Beam Forming, M0 to M7 | 2 | 98.3 | 7 | -26.60 | -26.53 | -21.25 | 5.28 |
| | HT/VHT20 Beam Forming, M8 to M15 | 2 | 96.7 | 4 | -27.10 | -26.95 | -21.25 | 5.70 |
| | HT/VHT20 STBC, M0 to M7 | 2 | 98.3 | 4 | -26.80 | -26.73 | -21.25 | 5.48 |

| | | | | | | | | |
|------|----------------------------------|----------|-------------|----------|---------------|---------------|---------------|-------------|
| 5510 | Non HT40, 6 to 54 Mbps | 1 | 96.3 | 4 | -28.10 | -27.94 | -21.25 | 6.69 |
| | Non HT40, 6 to 54 Mbps | 2 | 96.3 | 4 | -29.00 | -28.84 | -21.25 | 7.59 |
| | HT/VHT40, M0 to M7 | 1 | 96.4 | 4 | -25.00 | -24.84 | -21.25 | 3.59 |
| | HT/VHT40, M0 to M7 | 2 | 96.4 | 4 | -26.20 | -26.04 | -21.25 | 4.79 |
| | HT/VHT40, M8 to M15 | 2 | 97.4 | 4 | -27.60 | -27.49 | -21.25 | 6.24 |
| | HT/VHT40 Beam Forming, M0 to M7 | 2 | 96.4 | 7 | -30.30 | -30.14 | -21.25 | 8.89 |
| | HT/VHT40 Beam Forming, M8 to M15 | 2 | 97.4 | 4 | -27.70 | -27.59 | -21.25 | 6.34 |
| | HT/VHT40 STBC, M0 to M7 | 2 | 96.4 | 4 | -26.20 | -26.04 | -21.25 | 4.79 |

| | | | | | | | | |
|------|----------------------------------|---|------|---|--------|--------|--------|------|
| 5530 | Non HT80, 6 to 54 Mbps | 1 | 96.2 | 4 | -26.30 | -26.13 | -21.25 | 4.88 |
| | Non HT80, 6 to 54 Mbps | 2 | 96.2 | 4 | -27.90 | -27.73 | -21.25 | 6.48 |
| | VHT80, M0 to M9 1ss | 1 | 82.7 | 4 | -27.20 | -26.38 | -21.25 | 5.13 |
| | VHT80, M0 to M9 1ss | 2 | 82.7 | 4 | -28.10 | -27.28 | -21.25 | 6.03 |
| | VHT80, M0 to M9 2ss | 2 | 84.7 | 4 | -27.00 | -26.28 | -21.25 | 5.03 |
| | VHT80 Beam Forming, M0 to M9 1ss | 2 | 82.7 | 7 | -32.00 | -31.18 | -21.25 | 9.93 |
| | VHT80 Beam Forming, M0 to M9 2ss | 2 | 82.7 | 4 | -26.90 | -26.08 | -21.25 | 4.83 |
| | VHT80 STBC, M0 to M9 1ss | 2 | 82.7 | 4 | -28.10 | -27.28 | -21.25 | 6.03 |

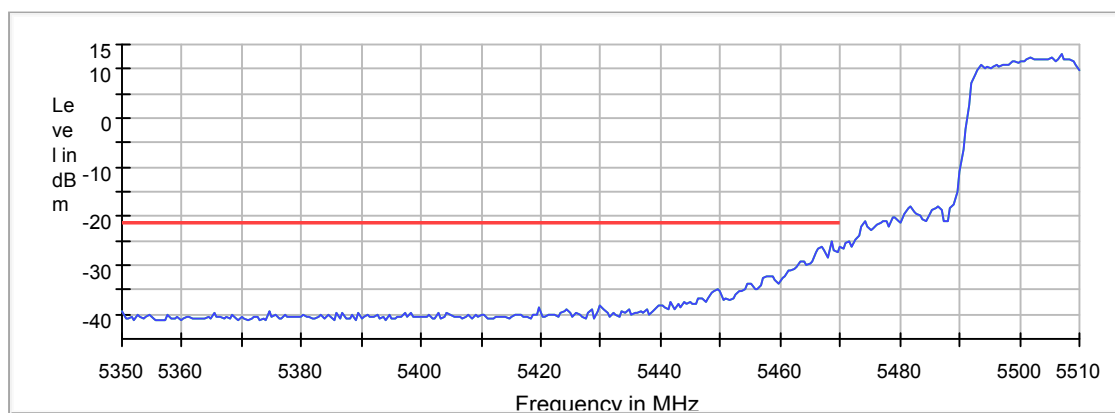
Conducted Band Edge Peak, 5510 MHz, M0-M7, HT/VHT40

Measurements



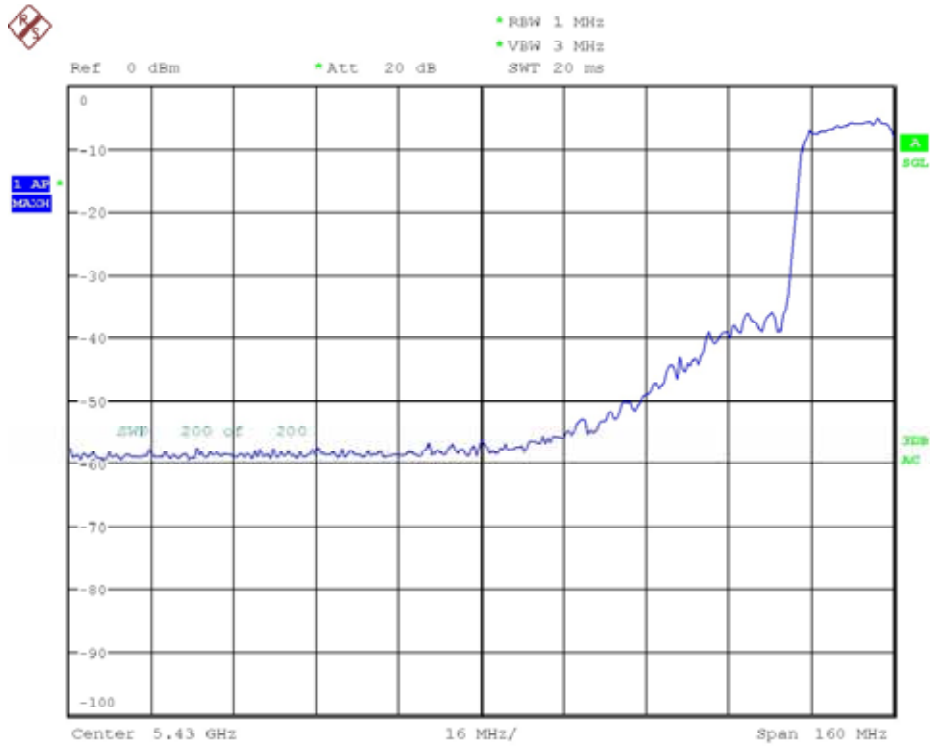
| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 5468.461538 | -25.0 | 3.7 | -21.2 | PASS |
| 5470.000000 | -26.2 | 4.9 | -21.2 | PASS |
| 5466.923077 | -26.2 | 4.9 | -21.2 | PASS |
| 5466.410256 | -26.6 | 5.4 | -21.2 | PASS |
| 5468.974359 | -26.9 | 5.6 | -21.2 | PASS |
| 5467.435897 | -26.9 | 5.7 | -21.2 | PASS |
| 5469.487179 | -27.2 | 6.0 | -21.2 | PASS |
| 5465.897436 | -27.3 | 6.1 | -21.2 | PASS |
| 5467.948718 | -28.5 | 7.3 | -21.2 | PASS |
| 5463.846154 | -29.1 | 7.9 | -21.2 | PASS |
| 5465.384615 | -29.1 | 7.9 | -21.2 | PASS |
| 5463.333333 | -29.4 | 8.2 | -21.2 | PASS |
| 5464.871795 | -29.7 | 8.4 | -21.2 | PASS |
| 5464.358974 | -30.0 | 8.7 | -21.2 | PASS |
| 5462.820513 | -30.5 | 9.2 | -21.2 | PASS |

Band Edge



Connector 1 Sum Level Limit Fail

Band Edge Connector 1_0



Date: 27.APR.2018 19:16:02

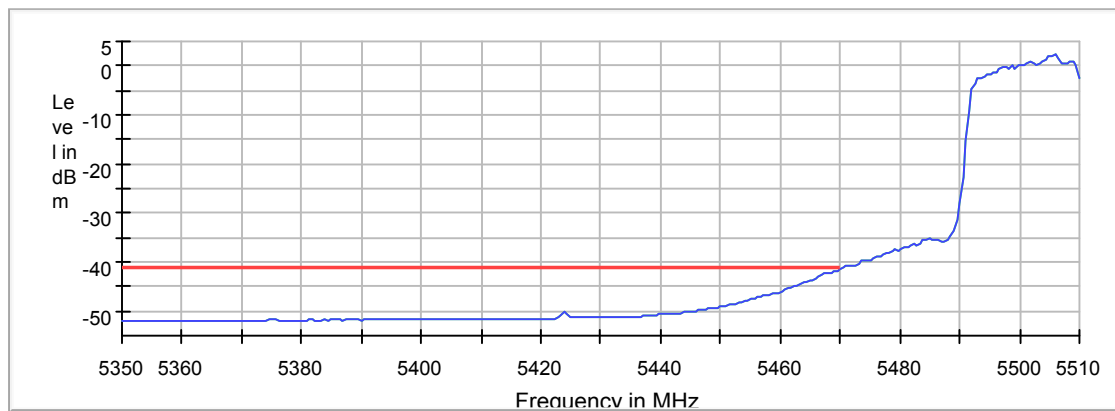


Conducted Band Edge Average, 5510 MHz, M0-M7, HT/VHT40

Measurements

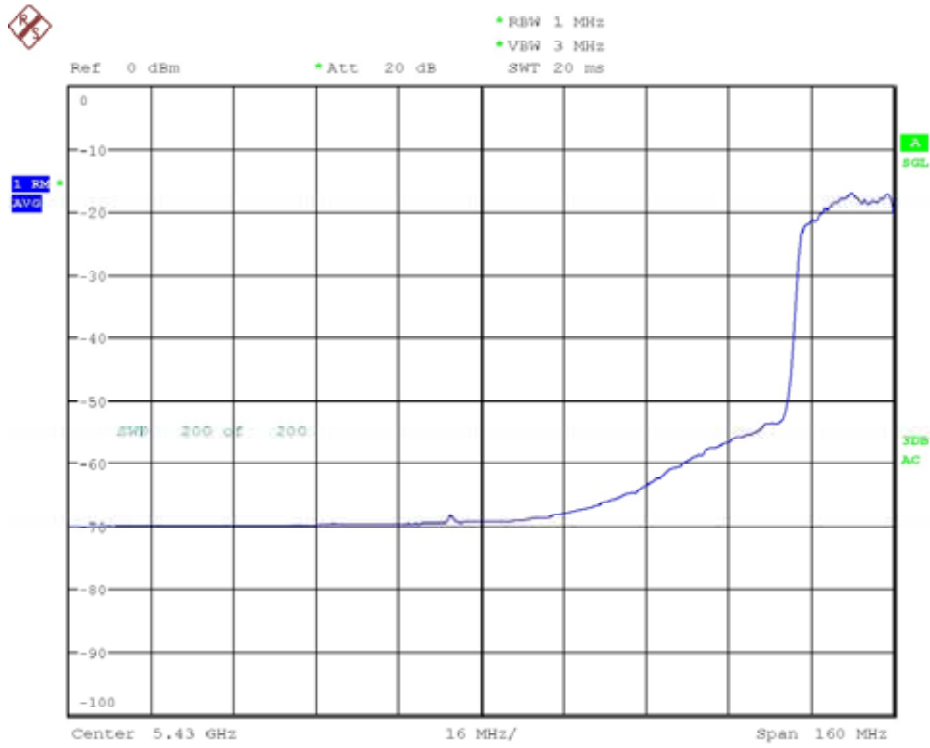
| Frequency (MHz) | Level (dBm) | Margin (dB) | Limit (dBm) | Result |
|-----------------|-------------|-------------|-------------|--------|
| 5470.000000 | -41.5 | 0.3 | -41.2 | PASS |
| 5469.487179 | -41.8 | 0.5 | -41.2 | PASS |
| 5468.974359 | -42.0 | 0.8 | -41.2 | PASS |
| 5467.948718 | -42.4 | 1.1 | -41.2 | PASS |
| 5468.461538 | -42.4 | 1.2 | -41.2 | PASS |
| 5467.435897 | -42.4 | 1.2 | -41.2 | PASS |
| 5466.923077 | -42.5 | 1.3 | -41.2 | PASS |
| 5466.410256 | -42.8 | 1.6 | -41.2 | PASS |
| 5465.897436 | -43.2 | 2.0 | -41.2 | PASS |
| 5465.384615 | -43.6 | 2.4 | -41.2 | PASS |
| 5464.871795 | -43.9 | 2.7 | -41.2 | PASS |
| 5464.358974 | -44.1 | 2.8 | -41.2 | PASS |
| 5463.846154 | -44.1 | 2.9 | -41.2 | PASS |
| 5463.333333 | -44.5 | 3.2 | -41.2 | PASS |
| 5462.820513 | -44.7 | 3.5 | -41.2 | PASS |

Band Edge



— Connector 1
 — Sum Level
 — Limit
 × Fail

Band Edge Connector 1_0



Date: 27.APR.2018 19:17:32



Appendix B: Emission Test Results

B.1 Radiated Spurious Emissions

15.407(b) Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

(3) For transmitters operating in the 5.47-5.725 GHz band: All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of -27 dBm/MHz..

15.205 / 15.209

(7) The provisions of §15.205 apply to intentional radiators operating under this section.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

Ref. ANSI C63.10: 2013 Section 12.7.6 (Peak), Section 12.7.7.2 (Method AD), and Section 6.6

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

| Radiated Spurious Emissions | |
|--|--|
| Test parameters | |
| Peak Span = 1-18GHz /18GHz-26.5GHz/26.5GHz-40GHz RBW = 1 MHz VBW \geq 3 MHz Sweep = Auto couple Detector = Peak Trace = Max Hold. | Average Span = 1-18GHz /18GHz-26.5GHz/26.5GHz-40GHz RBW = 1 MHz VBW \geq 3 MHz Sweep = Auto couple Detector = RMS Power Averaging |

Terminate the access Point RF ports with 50 ohm loads.

Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

Save 2 plots: 1) Average Plot (Vertical and Horizontal), Limit= 54dBuV/m @3m
 2) Peak plot (Vertical and Horizontal), Limit = 74dBuV/m @3m

Place a marker at the end of the restricted band closest to the transmit frequency to show compliance.
 Also measure any emissions in the restricted bands.

This report represents the worst case data for all supported operating modes and antennas. There were no spurious emissions in the range 1-18GHz. Please note, the emission at 1.377GHz was investigated and was not caused by the radio. The emission was present when the radio was not transmitting. There were no significant emissions above 18GHz.

**Samples, Systems, and Modes**

| System Number | Description | Samples | System under test | Support equipment |
|----------------------|--|----------------|-------------------------------------|--------------------------|
| 3 | Radiated Testing: EUT + AC/DC Adapter | S02 and S03 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 4 | Radiated Testing: EUT + AC/DC Adapter | S02 and S04 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Tested By :
Johanna Knudsen

Date of testing:
July 26, 2017 – July 26, 2017

Test Result : PASS

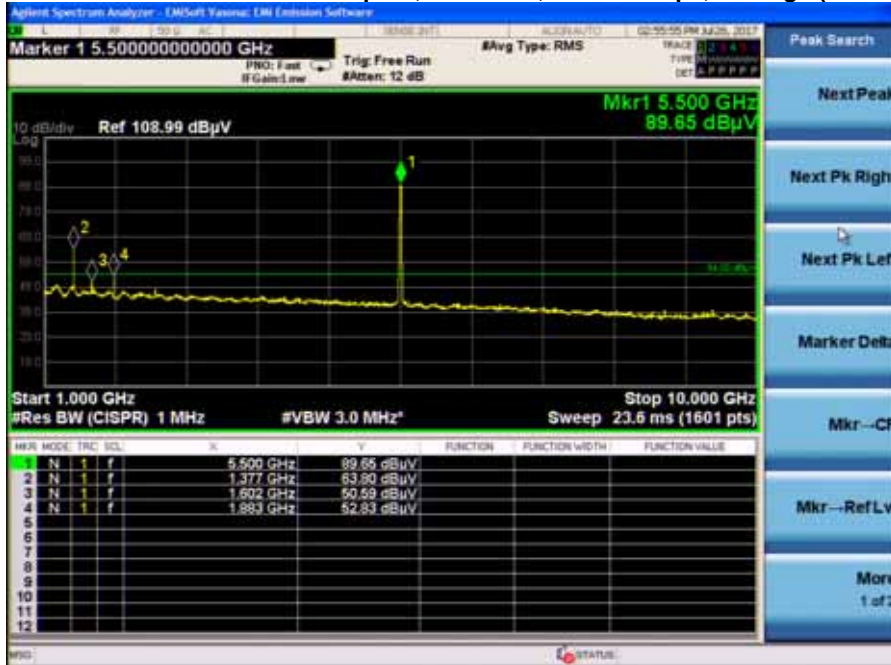
Test Equipment
See Appendix C for list of test equipment



B.1.A Transmitter Radiated Spurious Emissions-Average

This report represents the worst case data for all supported operating modes and antennas. There were no spurious emissions in the range 1-18GHz. Please note, the emission at 1.377GHz was investigated and was not caused by the radio. The emission was present when the radio was not transmitting.

B.1.A.1 Radiated Transmitter Spurs, 5500 MHz, 6 to 54 Mbps, Average (1-18GHz)





B.1.A.2 Radiated Transmitter Spurs, 5560 MHz, 6 to 54 Mbps, Average (1-18GHz)



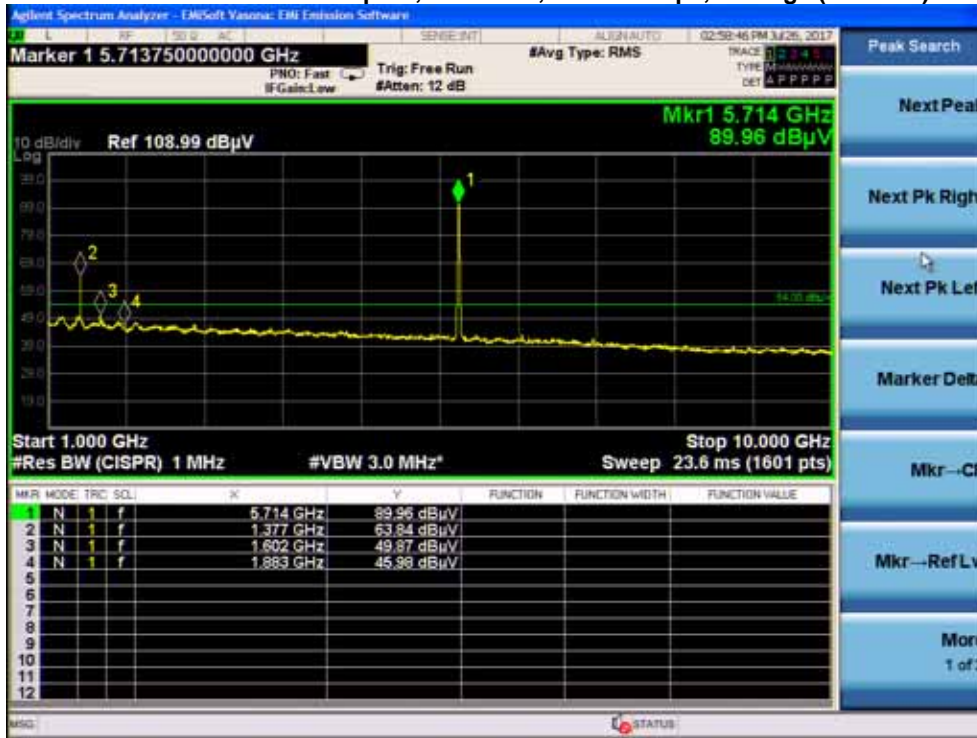


B.1.A.3 Radiated Transmitter Spurs, 5700 MHz, 6 to 54 Mbps, Average (1-18GHz)





B.1.A.4 Radiated Transmitter Spurs, 5720 MHz, 6 to 54 Mbps, Average (1-18GHz)



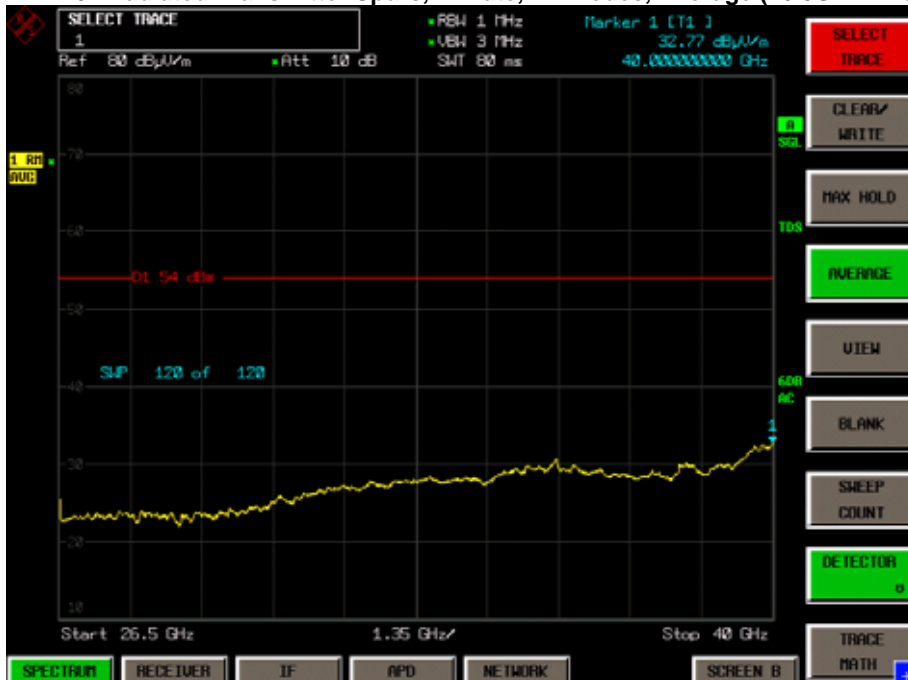


There were no significant emissions above 18GHz.

B.1.A.5 Radiated Transmitter Spurs, All rate, All modes, Average (18GHz – 26.5GHz) Horizontal & Vertical



B.1.A.6 Radiated Transmitter Spurs, All rate, All modes, Average (26.5GHz – 40GHz) Horizontal & Vertical

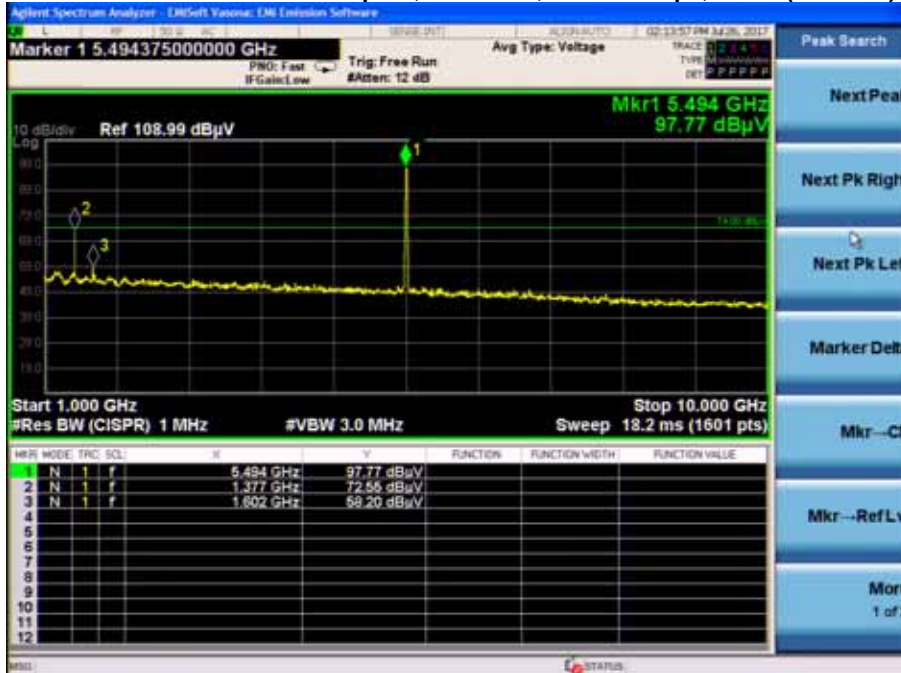




B.1.P Transmitter Radiated Spurious Emissions-Peak

This report represents the worst case data for all supported operating modes and antennas. There were no spurious emissions in the range 1-18GHz. Please note, the emission at 1.377GHz was investigated and was not caused by the radio. The emission was present when the radio was not transmitting.

B.1.P.1 Radiated Transmitter Spurs, 5500 MHz, 6 to 54 Mbps, Peak (1-18GHz)



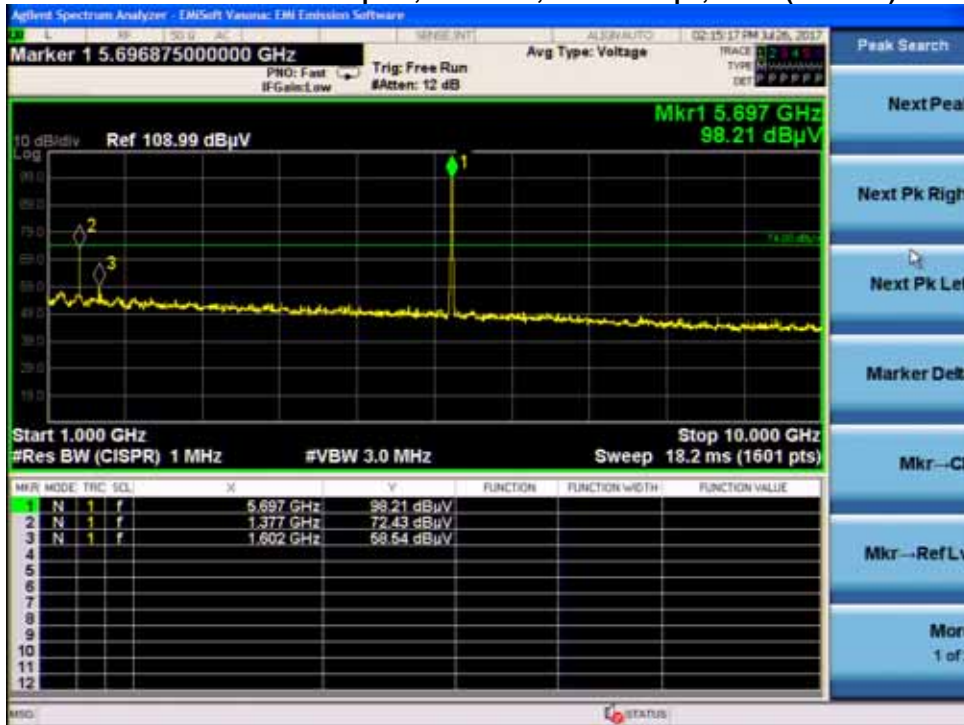


B.1.P.2 Radiated Transmitter Spurs, 5560 MHz, 6 to 54 Mbps, Peak (1-18GHz)



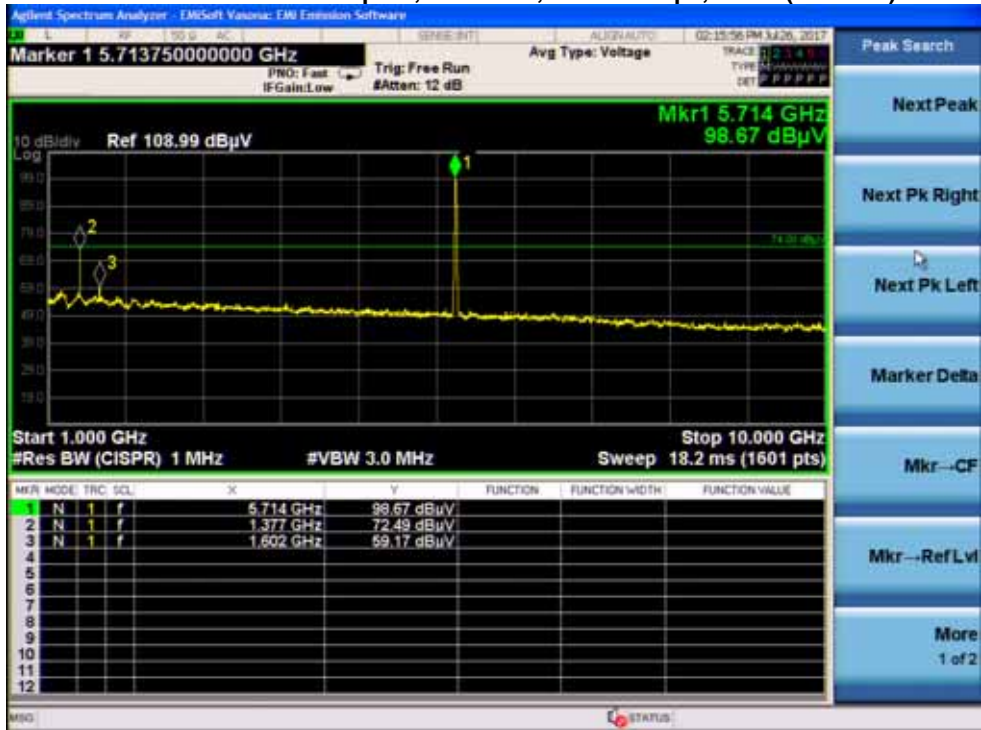


B.1.P.3 Radiated Transmitter Spurs, 5700 MHz, 6 to 54 Mbps, Peak (1-18GHz)





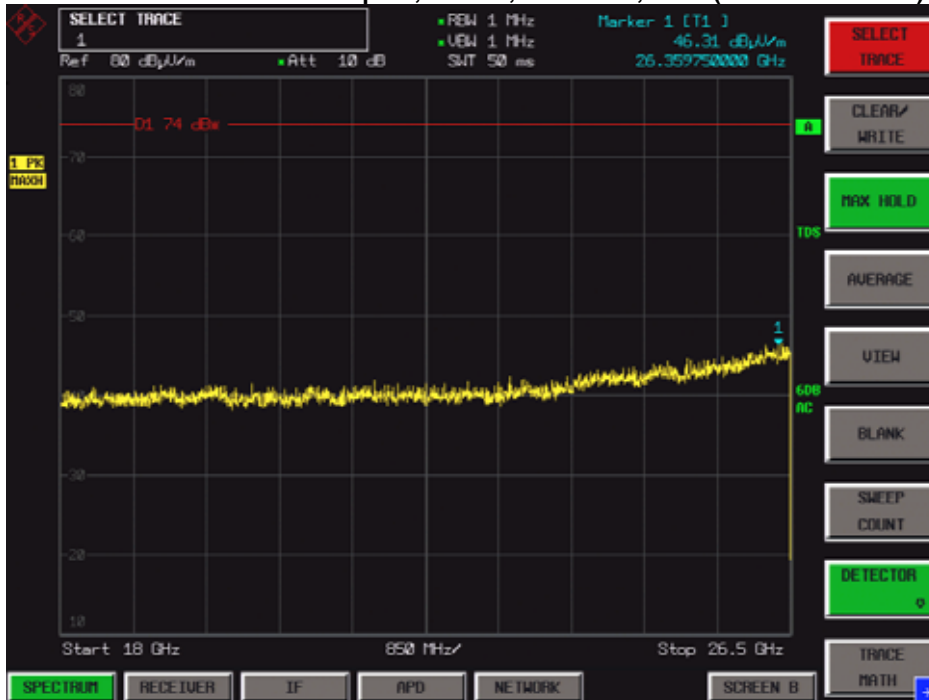
B.1.P.4 Radiated Transmitter Spurs, 5720 MHz, 6 to 54 Mbps, Peak (1-18GHz)



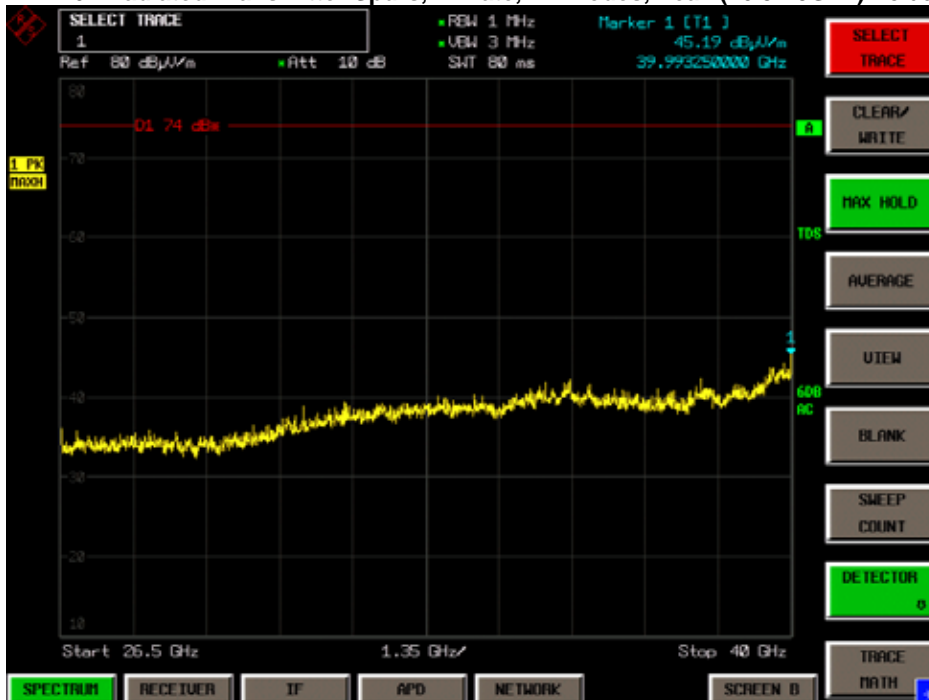


There were no significant emissions above 18GHz.

B.1.P.5 Radiated Transmitter Spurs, All rate, All modes, Peak (18GHz – 26.5GHz) Horizontal & Vertical



B.1.P.6 Radiated Transmitter Spurs, All rate, All modes, Peak (26.5-40GHz) Vertical & Horizontal





B.2 Radiated Emissions 30MHz to 1GHz

15.205 / 15.209

(7) The provisions of §15.205 apply to intentional radiators operating under this section.

(6) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209.

Ref. ANSI C63.10: 2013 section 12.7 sec 6.5

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

| | |
|-----------------------|--------------|
| Span: | 30MHz – 1GHz |
| Reference Level: | 80 dBuV |
| Attenuation: | 10 dB |
| Sweep Time: | Coupled |
| Resolution Bandwidth: | 100kHz |
| Video Bandwidth: | 300kHz |
| Detector: | Quasi-Peak |

Terminate the access Point RF ports with 50 ohm loads.

Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

This report represents the worst case data for all supported operating modes and antennas.

Samples, Systems, and Modes

| System Number | Description | Samples | System under test | Support equipment |
|---------------|--|-------------|-------------------------------------|--------------------------|
| 4 | Radiated Testing: EUT + AC/DC Adapter | S02 and S04 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

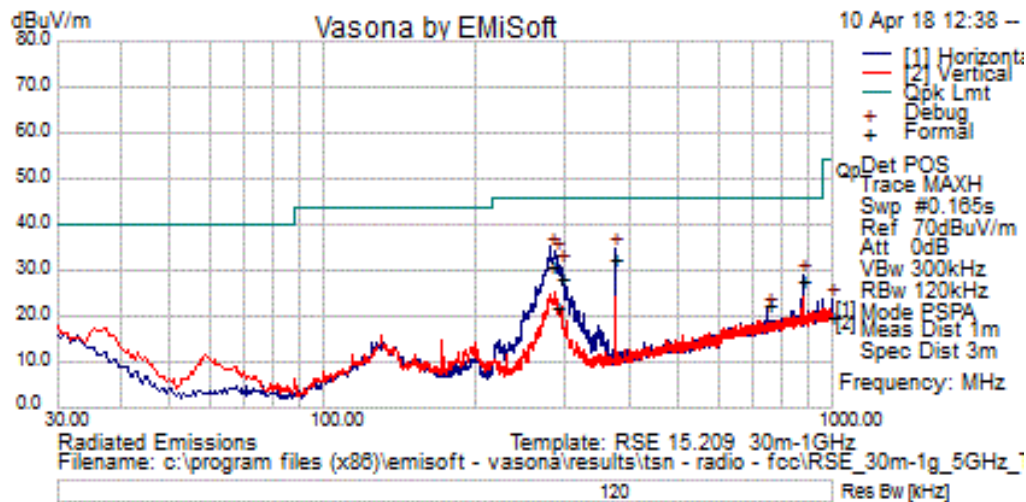
| | |
|---------------------------------------|---|
| Tested By : Johanna Knudsen | Date of testing: April 10 th , 2018- April 11 th , 2018 |
| Test Result : PASS | |

Test Equipment

See Appendix C for list of test equipment



Transmitter Radiated Emission

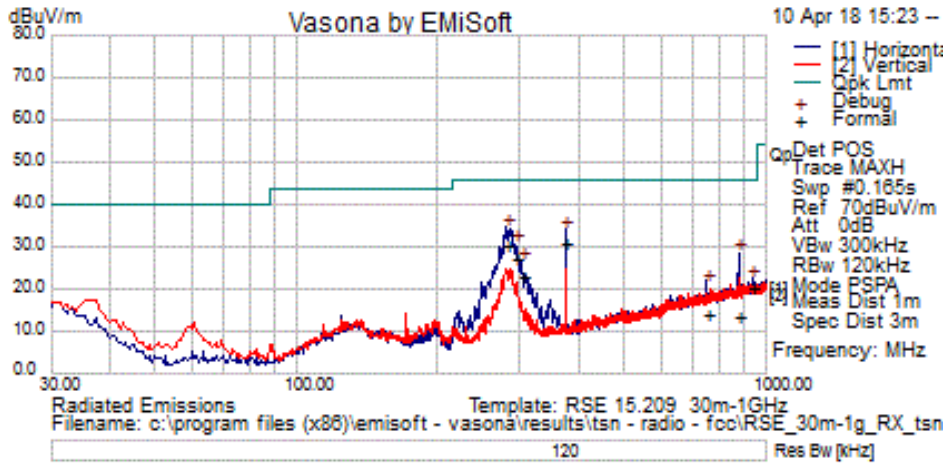


Formal Data

| No | Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
|----|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| 1 | 280.072 | 25.7 | 1.4 | 3.9 | 31.0 | Quasi Max | H | 109 | 328 | 46.0 | -15.1 | Pass | |
| 2 | 286.363 | 16.5 | 1.4 | 3.8 | 21.8 | Quasi Max | V | 107 | 255 | 46.0 | -24.2 | Pass | |
| 3 | 293.225 | 22.9 | 1.4 | 3.8 | 28.2 | Quasi Max | H | 112 | 334 | 46.0 | -17.9 | Pass | |
| 4 | 374.993 | 25.4 | 1.6 | 5.6 | 32.6 | Quasi Max | H | 106 | 112 | 46.0 | -13.4 | Pass | |
| 5 | 749.989 | 8.9 | 2.4 | 11.3 | 22.5 | Quasi Max | H | 120 | 330 | 46.0 | -23.5 | Pass | |
| 6 | 874.993 | 12.9 | 2.5 | 12.5 | 27.9 | Quasi Max | H | 109 | 305 | 46.0 | -18.1 | Pass | |



Receiver Radiated Emission



| Formal Data | | | | | | | | | | | | | |
|-------------|---------------|----------|------------|-------|--------------|------------------|-----|--------|---------|--------------|-----------|------------|----------|
| No | Frequency MHz | Raw dBuV | Cable Loss | AF dB | Level dBuV/m | Measurement Type | Pol | Hgt cm | Azt Deg | Limit dBuV/m | Margin dB | Pass /Fail | Comments |
| 1 | 280.436 | 25.0 | 1.4 | 3.9 | 30.2 | Quasi Max | H | 102 | 142 | 46.0 | -15.8 | Pass | |
| 2 | 375.008 | 23.7 | 1.6 | 5.6 | 30.9 | Quasi Max | H | 102 | 112 | 46.0 | -15.1 | Pass | |
| 3 | 293.386 | 21.9 | 1.4 | 3.8 | 27.1 | Quasi Max | H | 102 | 333 | 46.0 | -18.9 | Pass | |
| 4 | 875.105 | -1.6 | 2.5 | 12.5 | 13.4 | Quasi Max | H | 102 | 297 | 46.0 | -32.6 | Pass | |
| 5 | 302.719 | 17.8 | 1.4 | 3.9 | 23.2 | Quasi Max | H | 102 | 339 | 46.0 | -22.8 | Pass | |
| 6 | 937.490 | 4.4 | 2.6 | 13.2 | 20.2 | Quasi Max | H | 102 | 359 | 46.0 | -25.8 | Pass | |



B.3 AC Conducted Emissions

FCC 15.207 (a)

Except when the requirements applicable to a given device state otherwise, for any radio apparatus equipped to operate from the public utility AC power supply, either directly or indirectly (such as with a battery charger), the radio frequency voltage of emissions conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in the table in these sections. The more stringent limit applies at the frequency range boundaries.

Measurement Procedure

Accordance with ANSI C64.10:2013 section 6.2

Using Vasona, configure the spectrum analyzer as shown below (be sure to enter all losses between the transmitter output and the spectrum analyzer). Place the radio in continuous transmit mode.

| | |
|-----------------------|----------------------|
| Span: | 150 KHz – 30 MHz |
| Attenuation: | 10 dB |
| Sweep Time: | Coupled |
| Resolution Bandwidth: | 9 KHz |
| Video Bandwidth: | 30 KHz |
| Detector: | Quasi-Peak / Average |

Samples, Systems, and Modes

| System Number | Description | Samples | System under test | Support equipment |
|---------------|---|-------------|-------------------------------------|--------------------------|
| 5 | AC Power Conducted Emissions: EUT + Power Supply | S05 and S06 | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Tested By :

Marie Higa

Date of testing:

April 19, 2017 - April 19, 2017

Test Result : PASS

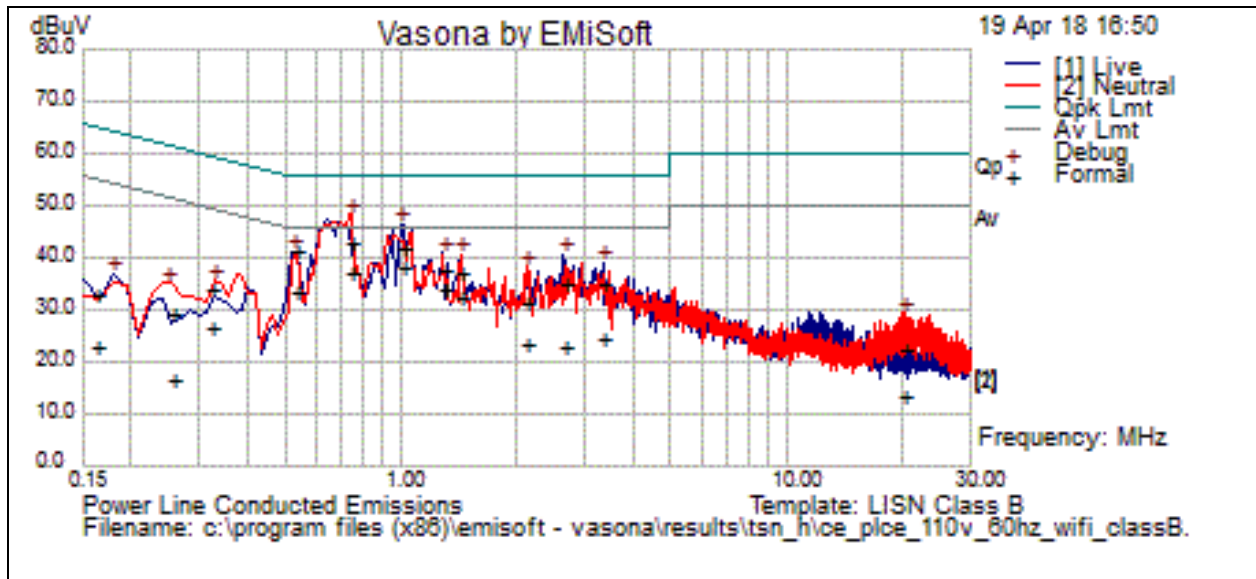
Test Equipment

See Appendix C for list of test equipment

| Environmental Conditions: | |
|---------------------------|---------------------|
| Temperature: (59 to 95)F | 70.8 deg F |
| Humidity: (10 to 75)%: | 43.3% |
| Comments: | No further comments |

Graphical Test Results

Note that the data displayed on the plots detailed in this appendix were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements



Wi-Fi TX mode

Test Results Table

| No | Frequency MHz | Raw dBuV | Cable Loss | Factors dB | Level dBuV | Measurement Type | Line | Limit dBuV | Margin dB | Pass /Fail | Comments |
|----|---------------|----------|------------|------------|------------|------------------|---------|------------|-----------|------------|----------|
| 1 | 1.013 | 18.5 | 19.9 | .0 | 38.4 | Average | Live | 46.0 | -7.6 | Pass | |
| 2 | .743 | 17.3 | 19.9 | .0 | 37.3 | Average | Neutral | 46.0 | -8.7 | Pass | |
| 3 | 1.284 | 13.9 | 19.9 | .0 | 33.8 | Average | Live | 46.0 | -12.2 | Pass | |
| 4 | .539 | 13.6 | 19.9 | .0 | 33.6 | Average | Live | 46.0 | -12.4 | Pass | |
| 5 | .743 | 22.9 | 19.9 | .0 | 42.8 | Quasi Peak | Neutral | 56.0 | -13.2 | Pass | |
| 6 | 1.434 | 12.3 | 19.9 | .0 | 32.3 | Average | Neutral | 46.0 | -13.7 | Pass | |
| 7 | 1.013 | 22.0 | 19.9 | .0 | 42.0 | Quasi Peak | Live | 56.0 | -14.0 | Pass | |
| 8 | .539 | 21.4 | 19.9 | .0 | 41.4 | Quasi Peak | Live | 56.0 | -14.6 | Pass | |
| 9 | 1.284 | 17.7 | 19.9 | .0 | 37.7 | Quasi Peak | Live | 56.0 | -18.4 | Pass | |
| 10 | 1.434 | 17.4 | 19.9 | .0 | 37.3 | Quasi Peak | Neutral | 56.0 | -18.7 | Pass | |
| 11 | 2.652 | 15.1 | 20.0 | .1 | 35.2 | Quasi Peak | Live | 56.0 | -20.8 | Pass | |
| 12 | 3.363 | 15.0 | 20.0 | .1 | 35.1 | Quasi Peak | Live | 56.0 | -20.9 | Pass | |
| 13 | 3.363 | 4.3 | 20.0 | .1 | 24.3 | Average | Live | 46.0 | -21.7 | Pass | |
| 14 | 2.114 | 3.4 | 20.0 | .1 | 23.4 | Average | Neutral | 46.0 | -22.6 | Pass | |
| 15 | .323 | 6.4 | 20.3 | .1 | 26.7 | Average | Neutral | 49.6 | -22.9 | Pass | |
| 16 | 2.652 | 2.9 | 20.0 | .1 | 22.9 | Average | Live | 46.0 | -23.1 | Pass | |
| 17 | 2.114 | 11.6 | 20.0 | .1 | 31.6 | Quasi Peak | Neutral | 56.0 | -24.4 | Pass | |
| 18 | .323 | 13.9 | 20.3 | .1 | 34.3 | Quasi Peak | Neutral | 59.6 | -25.4 | Pass | |
| 19 | .256 | 9.0 | 20.5 | .1 | 29.6 | Quasi Peak | Neutral | 61.6 | -32.0 | Pass | |
| 20 | .163 | 2.2 | 21.0 | .1 | 23.2 | Average | Live | 55.3 | -32.1 | Pass | |
| 21 | .163 | 12.1 | 21.0 | .1 | 33.2 | Quasi Peak | Live | 65.3 | -32.2 | Pass | |
| 22 | .256 | -4.0 | 20.5 | .1 | 16.6 | Average | Neutral | 51.6 | -34.9 | Pass | |



| No | Frequency MHz | Raw dBuV | Cable Loss | Factors dB | Level dBuV | Measurement Type | Line | Limit dBuV | Margin dB | Pass /Fail | Comments |
|----|------------------|-------------|---------------|---------------|---------------|---------------------|---------|---------------|--------------|------------|----------|
| 23 | 20.118 | -7.4 | 20.4 | .2 | 13.2 | Average | Neutral | 50.0 | -36.8 | Pass | |
| 24 | 20.118 | 2.0 | 20.4 | .2 | 22.7 | Quasi Peak | Neutral | 60.0 | -37.3 | Pass | |



Appendix C: List of Test Equipment Used to perform the test

Equipment used for Conducted Tests (99%/26dB Bandwidth, Maximum Conducted Output Power, and PSD)

| Equip# | Manufacturer/ Model | Description | Last Cal | Next Due |
|--------|-----------------------|--|---------------|---------------|
| 55109 | Keysight (Agilent/HP) | N9030A-550 / PXA Signal Analyzer, 3Hz to 50GHz | 29-Sep-17 | 29-Sep-18 |
| 55093 | NATIONAL INSTRUMENTS | PXI-1042 / CHASSIS, PXI | Cal not Req'd | Cal not Req'd |
| 56092 | NATIONAL INSTRUMENTS | PXI-2796 / 40 GHz Dual 6x1 Multiplexer (SP6T) | Cal not Req'd | Cal not Req'd |
| 45384 | Keysight (Agilent/HP) | N5182A / MXG Vector Signal Generator | 10-Oct-17 | 10-Oct-18 |
| 54663 | MEGAPHASE | F120-S1S1-48 / SMA Cable | 3-Aug-17 | 3-Aug-18 |
| 55557 | MINI-CIRCUITS | ZFSC-2-10G / SPLITTER, 2-10GHZ | 27-Jul-17 | 27-Jul-18 |
| 51801 | HUBER + SUHNER | Sucoflex101PE / 40 GHz Cable, K-Type | 16 Nov 2016 | 16 Nov 2017 |
| 55365 | PULSAR | PS4-09-452/4S / SPLITTER | 12-Apr-17 | 12-Apr-18 |
| 55901 | DYNAWAVE | SMSM-A2PH-018 / SMA Cable, 18 IN | 10-Oct-16 | 10-Oct-17 |
| 55892 | DYNAWAVE | SMSM-A2PH-018 / SMA Cable, 18 IN | 10-Oct-16 | 10-Oct-17 |
| 54677 | MEGAPHASE | RA08-S1S1-12 / SMA Cable | 3-Aug-17 | 3-Aug-18 |
| 54653 | Micro-Tronics | BRM50702-02 / Band Reject Filter | 3-Aug-17 | 3-Aug-18 |
| 54676 | MEGAPHASE | RA08-S1S1-12 / SMA Cable | 3-Aug-17 | 3-Aug-18 |
| 54674 | MEGAPHASE | RA08-S1S1-12 / SMA Cable | 3-Aug-17 | 3-Aug-18 |
| 54654 | Micro-Tronics | BRC50703-02 / Notch Filter | 3-Aug-17 | 3-Aug-18 |



| | | | | |
|-------|----------------------|--------------------------------------|---------------|---------------|
| 54671 | MEGAPHASE | RA08-S1S1-12 / SMA Cable | 3-Aug-17 | 3-Aug-18 |
| 54675 | MEGAPHASE | RA08-S1S1-12 / SMA Cable | 3-Aug-17 | 3-Aug-18 |
| 54656 | Micro-Tronics | BRC50705-02 / Notch Filter | 3-Aug-17 | 3-Aug-18 |
| 54678 | MEGAPHASE | RA08-S1S1-12 / SMA Cable | 3-Aug-17 | 3-Aug-18 |
| 54670 | MEGAPHASE | RA08-S1S1-12 / SMA Cable | 3-Aug-17 | 3-Aug-18 |
| 54655 | Micro-Tronics | BRC50704-02 / Notch Filter | 3-Aug-17 | 3-Aug-18 |
| 54673 | MEGAPHASE | RA08-S1S1-12 / SMA Cable | 3-Aug-17 | 3-Aug-18 |
| 54662 | MEGAPHASE | SF18-S1S1-36 / Coaxial Cable 36 inch | 3-Aug-17 | 3-Aug-18 |
| 55586 | AEROFLEX | BWS30-W2 / 30dB SMA Attenuator | 3-Aug-17 | 3-Aug-18 |
| 54601 | IXIA | XM100GE4CXP / Plug-In Module | Cal not Req'd | Cal not Req'd |
| 54608 | DITOM | D3C2060 / Splitter | 14-Nov-16 | 14-Nov-17 |
| 55863 | DYNAWAVE | SMSM-A2PH-012 / SMA Cable 12 IN | 29 Sep 2016 | 29 Sep 2017 |
| 42630 | Pasternack / PE6072 | SMA 50 Ohm Termination | 08 Mar 2017 | 08 Mar 2018 |
| 42629 | Pasternack / PE6072 | SMA 50 Ohm Termination | 08 Mar 2017 | 08 Mar 2018 |
| 54235 | PASTERNAK / PE5011-1 | PRESET TORQUE WRENCH, 8 IN/LBS | 21-Feb-17 | 21-Feb-18 |
| 6335 | LUFFT / 5063-33W | DIAL HYGROMETER | 16 Aug 2017 | 16 Aug 2018 |

Equipment used for Conducted Tests (Conducted Spurious Emissions)

| | | | | |
|-------|--------------------------------|-------------------------------|-----------|-----------|
| 40603 | Keysight (Agilent/HP) / E4440A | Spectrum Analyzer 3Hz-26.5GHz | 20-Oct-16 | 20-Oct-17 |
|-------|--------------------------------|-------------------------------|-----------|-----------|



| | | | | |
|-------|-----------------------------|----------------------------------|-------------|-------------|
| 55965 | DYNAWAVE / N-Type 12 in/lbs | Pre-Set Torque Wrench, 12 in/lbs | 29-Sep-16 | 29-Sep-17 |
| 54235 | PASTERNAK / PE5011-1 | PRESET TORQUE WRENCH, 8 IN/LBS | 21-Feb-17 | 21-Feb-18 |
| 42624 | PASTERNAK / PE6072 | SMA 50 Ohm Termination | 8-Mar-17 | 8-Mar-18 |
| 6335 | LUFFT / 5063-33W | DIAL HYGROMETER | 16 Aug 2017 | 16 Aug 2018 |

Equipment used for Conducted Tests (Conducted Band Edge)

| Equip# | Manufacturer/ Model | Description | Last Cal | Next Due |
|--------|--------------------------------|--------------------------|-------------|-------------|
| 51702 | ROHDE & SCHWARZ / TS8997 | TS8997 ETSI Test System | 07 Feb 2017 | 31 May 2018 |
| 40641 | ROHDE & SCHWARZ / ESU26 | EMI Test Receiver, 26GHZ | 10 Jul 2017 | 10 Jul 2018 |
| 51703 | ROHDE & SCHWARZ / OSP120 | OSP120 Base Unit | 25 Jan 2018 | 25 Jan 2019 |
| 51704 | ROHDE & SCHWARZ / OSP-B157 | OSP Module | 25 Jan 2018 | 25 Jan 2019 |
| 56114 | PASTERNAK / PE6072 | SMA 50 Ohm Termination | 01 Dec 2017 | 01 Dec 2018 |
| 56120 | PASTERNAK / PE6072 | SMA 50 Ohm Termination | 01 Dec 2017 | 01 Dec 2018 |
| 46694 | BIRD / 5-T-MN | TERMINATION | 28 Nov 2017 | 28 Nov 2018 |
| 46693 | BIRD / 5-T-MN | TERMINATION | 28 Nov 2017 | 28 Nov 2018 |
| 55604 | Mini-Circuits / BW-S10-2W263 | SMA 10dB Attenuator | 05 Sep 2017 | 05 Sep 2018 |
| 54412 | HUBER + SUHNER / Sucoflex 102E | 40GHz Cable K Connector | 24 Apr 2018 | 24 Apr 2019 |
| 55601 | Mini-Circuits / BW-S10-2W263 | SMA 10dB Attenuator | 05 Sep 2017 | 05 Sep 2018 |
| 54411 | HUBER + SUHNER / Sucoflex 102E | 40GHz Cable K Connector | 24 Apr 2018 | 24 Apr 2019 |



| | | | | |
|-------|----------------------|----------------|-------------|-------------|
| 7329 | Omega / CT485B | CHART RECORDER | 26 Jan 2018 | 26 Jan 2019 |
| 56330 | PASTERNAK / PE5019-1 | Torque Wrench | 28 Feb 2018 | 28 Feb 2019 |

Equipment used for Radiated Tests

30MHz-1GHz

| Equip# | Manufacturer/ Model | Description | Last Cal | Next Due |
|--------|------------------------------------|--|---------------|---------------|
| 45050 | ROHDE & SCHWARZ / ESCI | EMI Test Receiver | 16 Nov 2017 | 16 Nov 2018 |
| 56154 | HUBER + SUHNER / Sucoflex 104PEA | Sucoflex N Type blue 7ft cable | 18 Jan 2018 | 18 Jan 2019 |
| 20975 | MICRO-COAX / UFB311A-0-1344-520520 | Coaxial Cable-18Ghz | 19-Feb-18 | 19-Feb-19 |
| 55936 | HUBER + SUHNER / Sucoflex 106PEA | RF Type N Antenna Cable 18 GHz 8.5m | 19-Oct-17 | 19-Oct-18 |
| 32806 | SUNOL SCIENCES / JB1 | Combination Antenna, 30MHz-2GHz | 7-Jun-17 | 7-Jun-18 |
| 41929 | NEWPORT / iBTHP-5-DB9 | 5 inch Temp/RH/Press Sensor w/20ft cable | 28 Dec 2017 | 28 Dec 2018 |
| 27233 | York | CNE V / Comparison Noise Emitter | Cal not Req'd | Cal not Req'd |
| 35235 | LUFKIN / HY1035CME | Tape measure | Cal not Req'd | Cal not Req'd |
| 56330 | PASTERNAK / PE5011-1 | PRESET TORQUE WRENCH, 8 IN/LBS | 28 Feb 2018 | 28 Feb 2019 |
| 42630 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 8-Mar-18 | 8-Mar-19 |



| | | | | |
|-------|-----------|---------------------------------|----------|----------|
| 56112 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 1-Dec-17 | 1-Dec-18 |
| 56129 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 1-Dec-17 | 1-Dec-18 |

1GHz-18GHz

| | | | | |
|-------|------------------------------------|--|---------------|---------------|
| 56052 | MITEQ | TTA1800-30-HG / SMA 18GHz Pre Amplifier | 9-Feb-17 | 9-Feb-18 |
| 35618 | Micro-Tronics / HPM50112-02 | Notch Filter | 26-Jun-17 | 26-Jun-18 |
| 21117 | MICRO-COAX / UFB311A-0-2484-520520 | Coaxial Cable-18Ghz | 16-Aug-17 | 16-Aug-18 |
| 49563 | HUBER + SUHNER / Sucoflex 106A | Coaxial Cable, 8m | 21-Aug-17 | 21-Aug-18 |
| 25662 | Micro-COAX / UFB311A-1-0840-504504 | Coaxial Cable, 84.0 in. to 18GHz | 21 Feb 2017 | 21 Feb 2018 |
| 36716 | CISCO / RF Coaxial Cable-SMA | Radio Test Cable, SMA-SMA | 13-Jan-17 | 13-Jan-18 |
| 36717 | CISCO / RF Coaxial Cable-SMA | Radio Test Cable, SMA-SMA | 13-Jan-17 | 13-Jan-18 |
| 32544 | ETS Lindgren / 3117 | Double Ridged Horn Antenna | 12-Jul-17 | 12-Jul-18 |
| 45166 | Stanley | 33-428 / 26' TAPE MEASURE | Cal Not Req'd | Cal Not Req'd |
| 34075 | SCHAFFNER | RSG 2000 / Reference Spectrum Generator, 1-18GHz | Cal Not Req'd | Cal Not Req'd |
| 4883 | EMCO | 3115 / Horn Antenna | Cal Not Req'd | Cal Not Req'd |
| 8171 | Keysight (Agilent/HP) | 8491B Opt 010 / ATTENUATOR | 26-Apr-17 | 26-Apr-18 |
| 47300 | Keysight (Agilent/HP) | N9038A / EMI Receiver | 28-Mar-17 | 28-Mar-18 |
| 54230 | Newport | iBTHP-5-DB9 / 5 inch Temp/RH/Press Sensor w/20ft cable | 11-Feb-17 | 11-Feb-18 |



| | | | | |
|-------|----------------------|---------------------------------|-----------|-----------|
| 42629 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 8-Mar-17 | 8-Mar-18 |
| 42638 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 8-Mar-17 | 8-Mar-18 |
| 42634 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 8-Mar-17 | 8-Mar-18 |
| 42630 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 8-Mar-17 | 8-Mar-18 |
| 54235 | PASTERNAK / PE5011-1 | PRESET TORQUE WRENCH, 8 IN/LBS | 21-Feb-17 | 21-Feb-18 |

18GHz-40GHz

| | | | | |
|-------|-------------------------|--|---------------|---------------|
| 41979 | CISCO / 1840 | 18-40GHz EMI Test Head/Verification Fixture | 30-Aug-17 | 30-Aug-18 |
| 44940 | ROHDE & SCHWARZ / ESU40 | EMI RECEIVER, 40GHZ | 14-Nov-16 | 11/14/2017 |
| 37236 | JFW / 50CB-015 | Control Box, GPIB | Cal Not Req'd | Cal Not Req'd |
| 54230 | Newport | iBTHP-5-DB9 / 5 inch Temp/RH/Press Sensor w/20ft cable | 11-Feb-17 | 11-Feb-18 |
| 42629 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 8-Mar-17 | 8-Mar-18 |
| 42638 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 8-Mar-17 | 8-Mar-18 |
| 42634 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 8-Mar-17 | 8-Mar-18 |
| 42630 | PASTERNAK | PE6072 / SMA 50 Ohm Termination | 8-Mar-17 | 8-Mar-18 |
| 54235 | PASTERNAK / PE5011-1 | PRESET TORQUE WRENCH, 8 IN/LBS | 21-Feb-17 | 21-Feb-18 |
| 30486 | Keysight (Agilent/HP) | E8257C / SIGNAL GENERATOR | 15-Dec-16 | 15-Dec-17 |

Equipment used for AC Power Conducted Emissions

| Equip# | Manufacturer/ Model | Description | Last Cal | Next Due |
|-----------|--|-------------------------|-----------|-----------|
| CIS008496 | Fischer Custom Communications / FCC-450B-2.4-N | Instrumentation Limiter | 16-MAY-17 | 16-MAY-18 |



| | | | | |
|-----------|---|---|---------------------|-----------|
| CIS018963 | York / CNE V | Comparison Noise Emitter, 30 - 1000MHz | Cal Not Required | N/A |
| CIS035235 | Lufkin / HY1035CME | 5 Meter Tape Measure | Cal Not Required | N/A |
| CIS037229 | Coleman / RG-223 | 25ft BNC cable | 13-APR-18 | 13-APR-19 |
| CIS037239 | Rohde & Schwarz / ESCI | ESCI EMI Test Receiver | 02-MAY-17 | 02-MAY-18 |
| CIS044023 | Fischer Custom Communications / FCC-801-M2-32A | Power Line Coupling Decoupling Network | 09-NOV-17 | 09-NOV-18 |
| CIS045990 | Fischer Custom Communications / F-090527-1009-1 | Line Impedance Stabilization Network | 15-JUN-17 | 15-JUN-18 |
| CIS045991 | Fischer Custom Communications / F-090527-1009-2 | Lisn Adapter | 15-JUN-17 | 15-JUN-18 |
| CIS049479 | Coleman / RG223 | BNC 2ft Cable | 05-MAR-18 | 05-MAR-19 |
| CIS049531 | TTE / H785-150K-50-21378 | High Pass Filter | 03-MAY-17 | 03-MAY-18 |
| CIS049558 | Bird / 5-T-MB | 5W 50 Ohm BNC Termination 4GHz | 10-AUG-17 | 10-AUG-18 |
| CIS054231 | Newport / iBTHP-5-DB9 | 5 inch Temp/RH/Press Sensor w/20ft cable | 09-FEB-18 | 09-FEB-19 |



Appendix D: Abbreviation Key and Definitions

The following table defines abbreviations used within this test report.

| Abbreviation | Description | Abbreviation | Description |
|--------------|--|--------------|------------------------------------|
| EMC | Electro Magnetic Compatibility | °F | Degrees Fahrenheit |
| EMI | Electro Magnetic Interference | °C | Degrees Celsius |
| EUT | Equipment Under Test | Temp | Temperature |
| ITE | Information Technology Equipment | S/N | Serial Number |
| TAP | Test Assessment Schedule | Qty | Quantity |
| ESD | Electro Static Discharge | emf | Electromotive force |
| EFT | Electric Fast Transient | RMS | Root mean square |
| EDCS | Engineering Document Control System | Qp | Quasi Peak |
| Config | Configuration | Av | Average |
| CIS# | Cisco Number (unique identification number for Cisco test equipment) | Pk | Peak |
| Cal | Calibration | kHz | Kilohertz (1x10 ³) |
| EN | European Norm | MHz | MegaHertz (1x10 ⁶) |
| IEC | International Electro technical Commission | GHz | Gigahertz (1x10 ⁹) |
| CISPR | International Special Committee on Radio Interference | H | Horizontal |
| CDN | Coupling/Decoupling Network | V | Vertical |
| LISN | Line Impedance Stabilization Network | dB | decibel |
| PE | Protective Earth | V | Volt |
| GND | Ground | kV | Kilovolt (1x10 ³) |
| L1 | Line 1 | μV | Microvolt (1x10 ⁻⁶) |
| L2 | Line2 | A | Amp |
| L3 | Line 3 | μA | Micro Amp (1x10 ⁻⁶) |
| DC | Direct Current | mS | Milli Second (1x10 ⁻³) |
| RAW | Uncorrected measurement value, as indicated by the measuring device | μS | Micro Second (1x10 ⁻⁶) |
| RF | Radio Frequency | μS | Micro Second (1x10 ⁻⁶) |
| SLCE | Signal Line Conducted Emissions | m | Meter |
| Meas dist | Measurement distance | Spec dist | Specification distance |
| N/A or NA | Not Applicable | SL | Signal Line (or Telecom Line) |
| P | Power Line | L | Live Line |
| N | Neutral Line | R | Return |
| S | Supply | AC | Alternating Current |



Appendix E: Photographs of Test Setups

| |
|--|
| |
| Title: Radiated Emissions Configuration Photograph 30MHz-1GHz |

| |
|---|
| |
| Title: Radiated Emissions Configuration Photograph 1-18GHz |

| |
|--|
| |
| Title: Radiated Emissions Configuration Photograph 18-40GHz |

| |
|--|
| |
| Title: AC Power Conducted Emissions |

| |
|---|
| |
| Title: Conducted Setup (Band Edge) |

| |
|---|
| |
| Title: Conducted Setup (Bandwidth, Power, PSD) |

| |
|--|
| |
| Title: Conducted Setup (Conducted Spurious Emissions) |



Appendix F: Software Used to Perform Testing

TS8997 Test System, Software: WMS32 version 10.20

Radiated Spurious Emissions, Conducted Spurious Emissions, Software: EMIsoft Vasona, version 6.031

Conducted Power, Bandwidth, PSD: RF Automation Main



Appendix G: Test Procedures

Measurements were made in accordance with

- KDB 789033 - D02 General UNII Test Procedures New Rules v01r04
- KDB 662911 - MIMO
- ANSI C63.4 2014 Unintentional Radiators
- ANSI C63.10 2013 Intentional Radiators

Test procedures are summarized below:

| | |
|------------------------------|----------------|
| FCC 5GHz Test Procedures | EDCS # 1445048 |
| FCC 5GHz RSE Test Procedures | EDCS # 1511600 |



Appendix H: Scope of Accreditation (A2LA certificate number 1178-01)

The scope of accreditation of Cisco Systems, Inc. can be found on the A2LA web page at:

<http://www.a2la.org/scopepdf/1178-01.pdf>



Appendix I: Test Assessment Plan

Compliance Test Plan (Excel) EDCS# 11811301

Target Power Tables EDCS# 11759869

Appendix J: Worst Case Justification

Test modes were determined from the Compliance Test Plan EDCS# 11811301.

All formal data can be found in EDCS# 11811303.