Radio Test Report

AIR-AP1840I-B-K9

FCC ID: LDKSKMAA2017

5150-5250 MHz

Against the following Specifications:

CFR47 Part 15.407

Cisco Systems
170 West Tasman Drive
San Jose, CA 95134

Author: Julian Land **Tested By:** Julian Land	**Approved By:** Gerard Thorpe **Title:** Compliance Manager **Revision:** 1.0

This report replaces any previously entered test report under EDCS – 17660837**.** This test report has been electronically authorized and archived using the CISCO Engineering Document Control system. Test Report Template EDCS# 152614

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

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	± 0.54º.
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.

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

March 6, 2019 – May 16, 2019

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:

Headquarters

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

Testing Laboratory

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

Registration Numbers for Industry Canada

Cisco System Site	Address	Site Identifier
Building P, 10m Chamber	125 West Tasman Dr San Jose, CA 95134	Company #: 2461N-2
Building P, 5m Chamber	125 West Tasman Dr San Jose, CA 95134	Company #: 2461N-1
Building I, 5m Chamber	285 W. Tasman Drive San Jose, California 95134	Company #: 2461M-1
Building 7, 5m Chamber	425 E. Tasman Drive San Jose, California 95134	Company #: 2461N-3

Test Engineers

Julian Land

2.6 Equipment Assessed (EUT)

AIR-AP1840I-B-K9

2.7 EUT Description

AIR-AP1840I is a dual band wireless access point which supports 802.11 a, b, g, n, ac. It features a 2x2 2.4GHz radio, a 4x4 5GHz radio, and a BLE radio.

The following antennas are supported by this product series.

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

Frequency	Port	Antenna Type	Highest Antenna Gain (dBi)
2.4GHz / 5GHz	Antenna 1	Internal dual band omni directional	4.4/5.6
2.4GHz / 5GHz	Antenna 2	Internal dual band omni directional	4/5.7
BLE / 5GHz	Antenna 3	Internal dual band omni directional	4.1/5.6
5GHz	Antenna 4	Internal single band omni directional	5.4

	Supported Channel	Bandwidth
Low	5180MHz	20MHz
Mid	5200MHz	20MHz
High	5240MHz	20MHz
Low	5190MHz	40MHz
Mid	n/a	40MHz
High	5230MHz	40MHz
Low	n/a	80MHz
Mid	5210MHz	80MHz
High	n/a	80MHz
Low	n/a	160MHz
Mid	n/a	160MHz
High	n/a	160MHz

Section 3: Result Summary

3.1 Results Summary Table

3.1.1 Radio Port Emissions

Basic Standard	Technical Requirements / Details	Result
FCC 15.407	**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. The 26dB 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.	Pass
FCC 15.407	**Conducted Output Power:** (1) For the band 5.15-5.25 GHz. (i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. …If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power …shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm). (ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi. … If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. …Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional	Pass

	antennas are used exclusively for fixed, point-to-point operations. (iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1-megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	
FCC 15.407	**Power Spectral Density** 15.407 (i) For an outdoor access point operating in the band 5.15-5.25 GHz…the maximum power spectral density shall not exceed 17 dBm in any 1-megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm). (ii) For an indoor access point operating in the band 5.15-5.25 GHz… the maximum power spectral density shall not exceed 17 dBm in any 1-megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi. (iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz …the maximum power spectral density shall not exceed 17 dBm in any 1-megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23 dBi without any corresponding reduction in the … maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations. (iv) For mobile and portable client devices in the 5.15-5.25 GHz band…the maximum 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… the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.	Pass
FCC 15.407	**Conducted Spurious Emissions / Band-Edge:** For transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.	Pass
FCC 15.407 FCC 15.209	**Restricted band:** Unwanted emissions falling within the restricted bands, as defined in FCC 15.205 (a)	Pass

FCC 15.205	must also comply with the radiated emission limits specified in FCC 15.209 (a)	

3.1.2 Radiated Emissions and AC Conducted Emissions (General requirements)

Basic Standard	Technical Requirements / Details	Result
FCC 15.209 FCC 15.205	**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.	N/A (Unit is only powered by DC power – POE)

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.

4.1 Sample Details

Sample No.	Equipment Details	Manufacturer	Hardware Rev.	Firmware Rev.	Software Rev.	Serial Number
S01	AIR-AP1840I-B-K9	Cisco Systems, Inc.	V01	8cf8aa994fd2801c943d2471014f8c5f	8.8.1.10	PSZ22491KT9
S02	Catalyst 3850 48 PoE+	Cisco Systems, Inc.	T0	1.18	03.03.05SE	FCW1931C1U7

4.2 System Details

System #	Description	Samples
1	EUT and Power Supply (Conducted Tests)	S01 & S02

4.3 Mode of Operation Details

Mode#	Description	Comments
1	802.11a, OFDM	Receive and Transmit (1, 2, 3, or 4 chains)
2	Duplicate mode NonHT40	Receive and Transmit (1, 2, 3, or 4 chains)
3	Duplicate mode NonHT80	Receive and Transmit (1, 2, 3, or 4 chains)
4	802.11n20, OFDM	Receive and Transmit (1, 2, 3, or 4 chains)
5	802.11n40, OFDM	Receive and Transmit (1, 2, 3, or 4 chains)
6	802.11ac80, OFDM	Receive and Transmit (1, 2, 3, or 4 chains)

Section 5: Radio Port Emissions

5.1 Duty Cycle

5.1.1 Duty Cycle Test Requirement

From KDB 789033 D02 General UNII Test Procedures New Rules v01r02

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.

5.1.2 Duty Cycle Test Method

From KDB 789033 D02 General UNII Test Procedures New Rules v01r02:

> 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 ≥ EBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ 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 ≤ 16.7 microseconds.)

5.1.3 Duty Cycle Test Information

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	EUT	S01	☑	☐
	Support	S02	☐	☑

Tested By: Julian Land	**Date of testing:** March 8, 2019 – March 25, 2019
Test Result: Pass	

Test Equipment

See Appendix A for list of test equipment

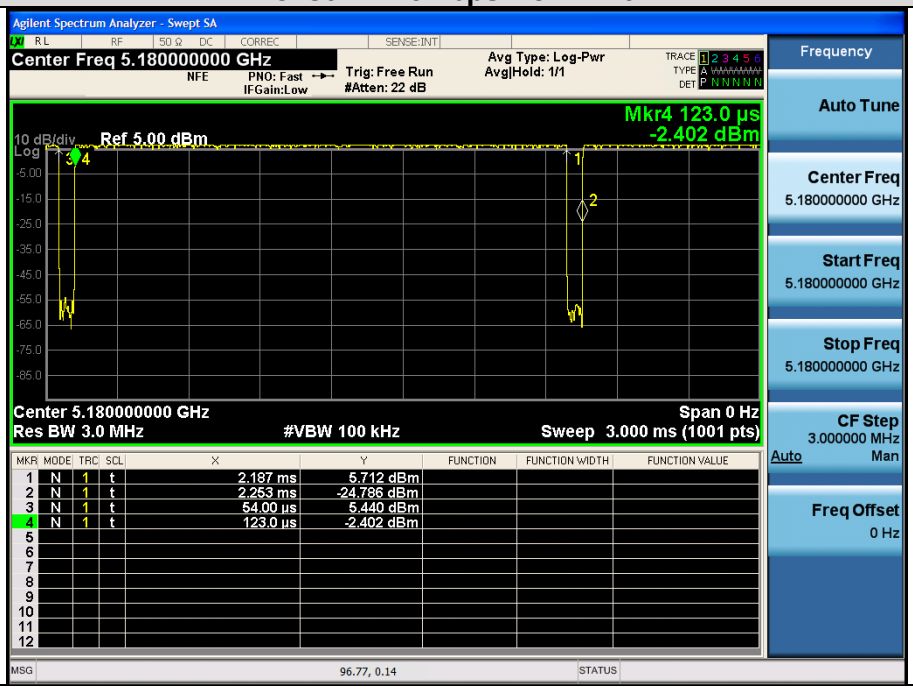
5.1.4 Duty Cycle Data Table

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

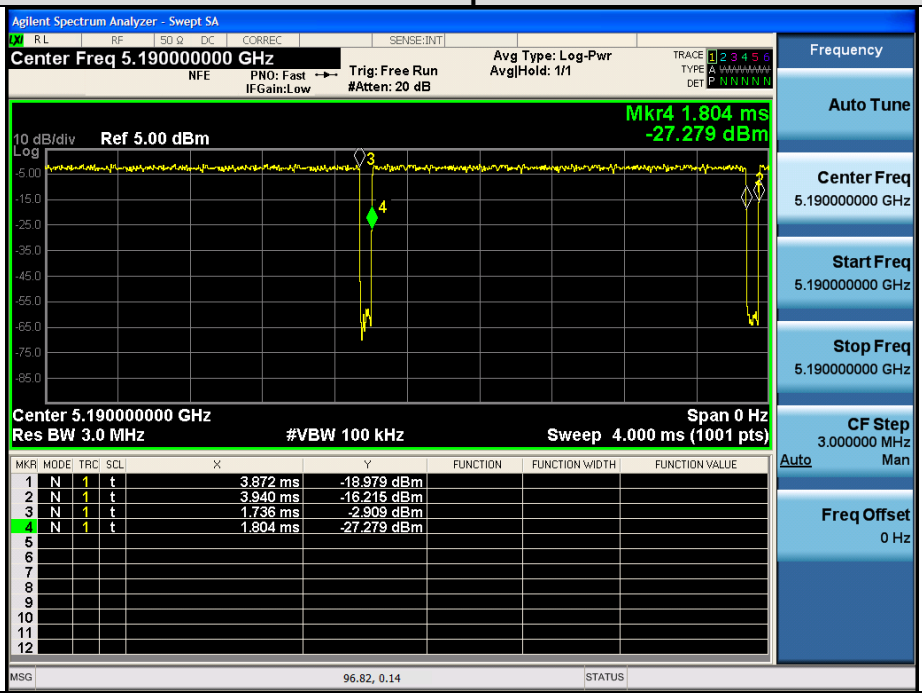
Mode	Data Rate	On-time (ms)	Total Time (ms)	Duty Cycle (%)	Correction Factor (dB)
NonHT20	6 to 54 Mbps	2.064	2.133	96.765	0.14
NonHT40	6 to 54 Mbps	2.068	2.136	96.816	0.14
NonHT80	6 to 54 Mbps	2.064	2.136	96.629	0.15
HT20/VHT20	M0 to M31	5.005	5.082	98.485	0.07
HT40/VHT40	M0 to M31	2.430	2.510	96.813	0.14
VHT80	M0.1 to M9.4	3.348	3.930	85.191	0.70

5.1.5 Duty Cycle Data Screenshots

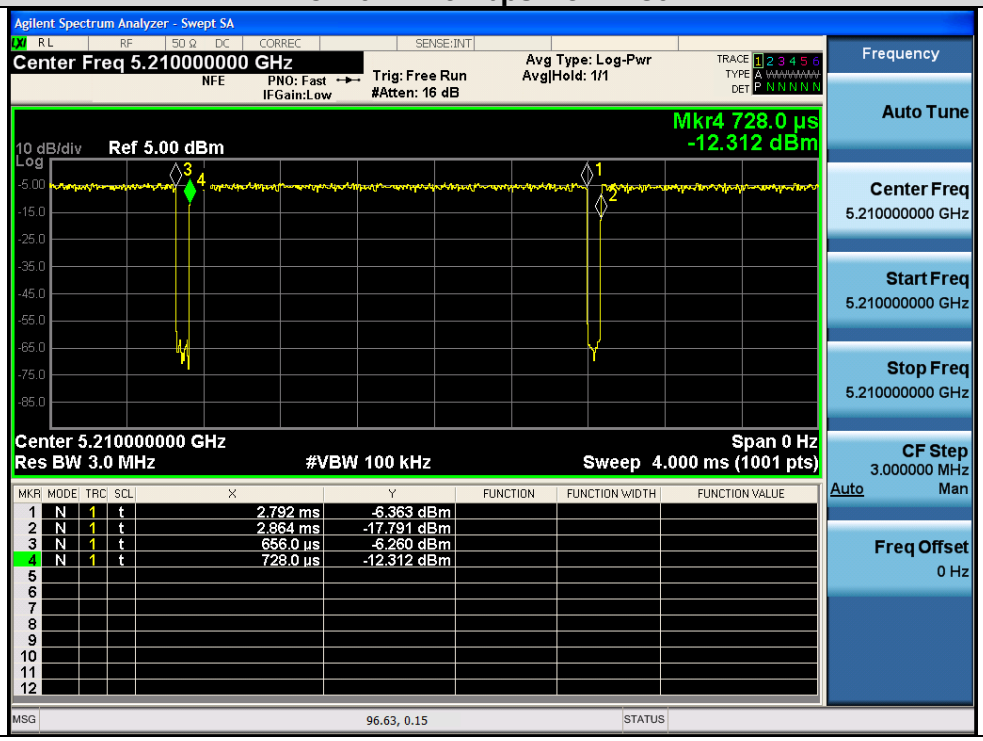
5180MHz 6Mbps NonHT20



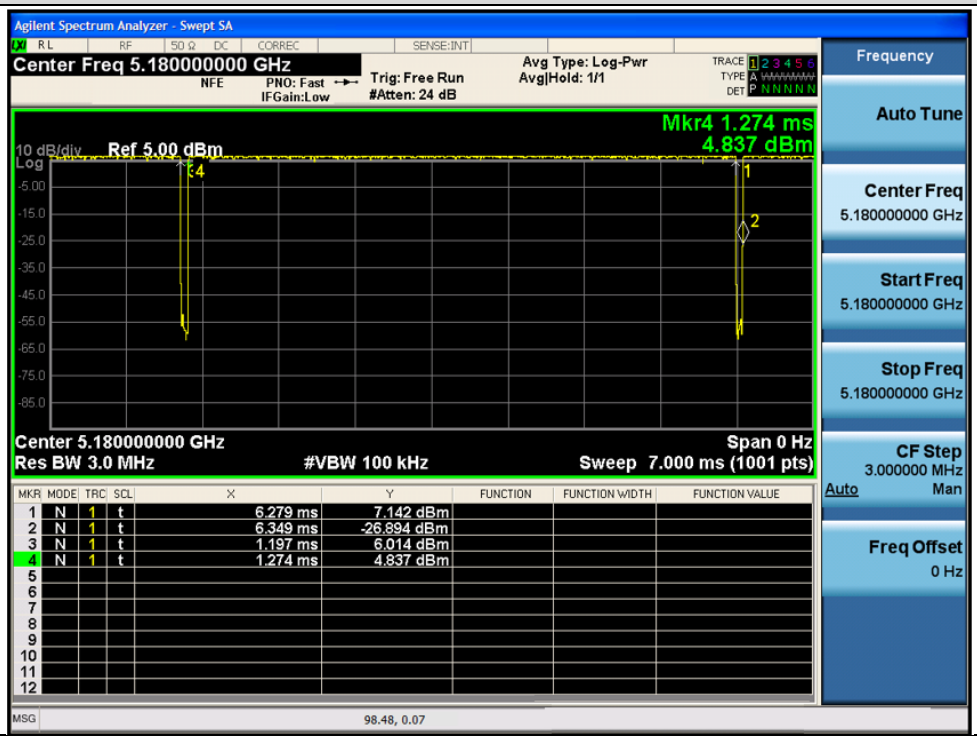
5190MHz 6Mbps NonHT40



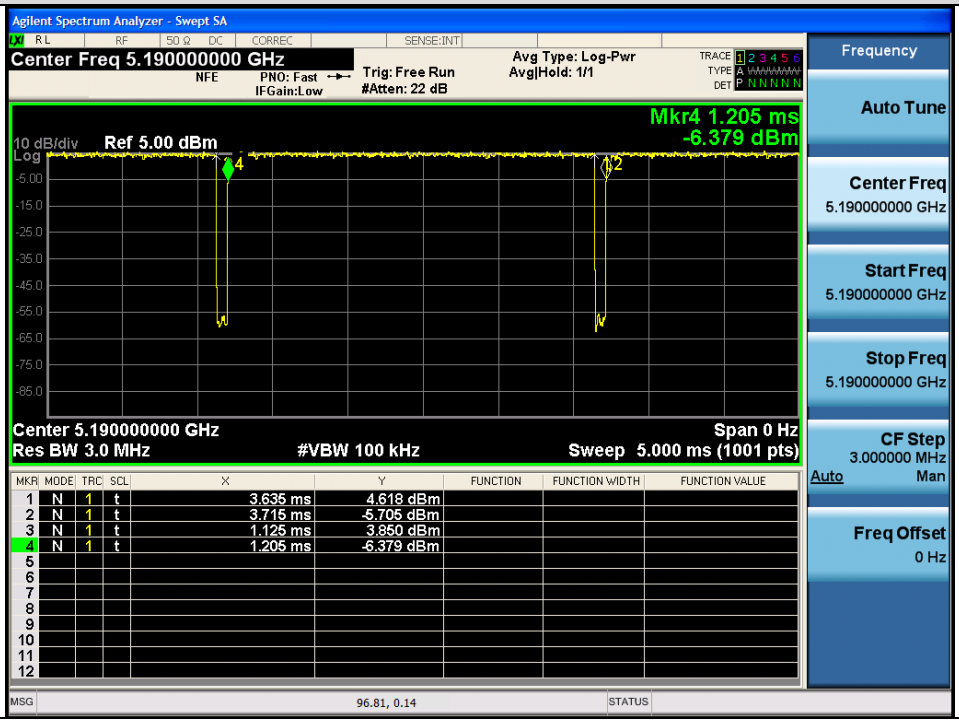
5210MHz 6Mbps NonHT80



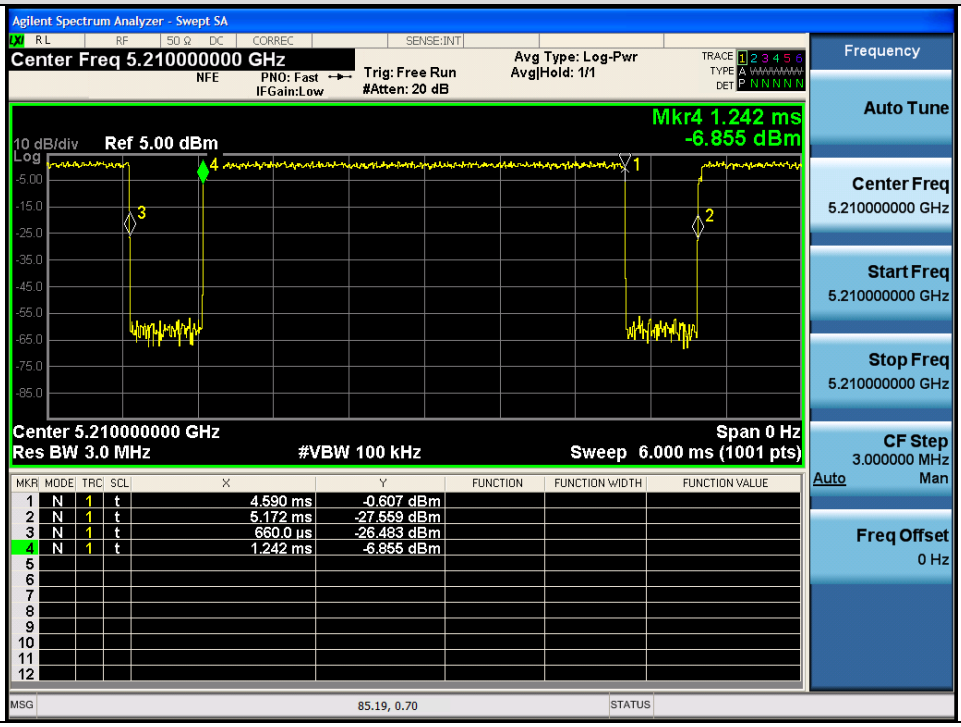
5180MHz M0 HT20/VHT20



5190MHz M0 HT40/VHT40



5210MHz M0x1 VHT80



5.2 99% and 26dB Bandwidth

5.2.1 99% and 26dB Bandwidth Test Requirement

For the FCC:

There is no requirement for the value of bandwidth.
Power measurements are made using the 99% Bandwidth as the integration bandwidth.

5.2.2 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
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 ≥ 3 · 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) 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%.

5.2.3 99% and 26dB Bandwidth

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	EUT	S01	☑	☐
	Support	S02	☐	☑

Tested By:	Date of testing:
Julian Land	March 6, 2019 – March 26, 2019
Test Result: PASS	

Test Equipment

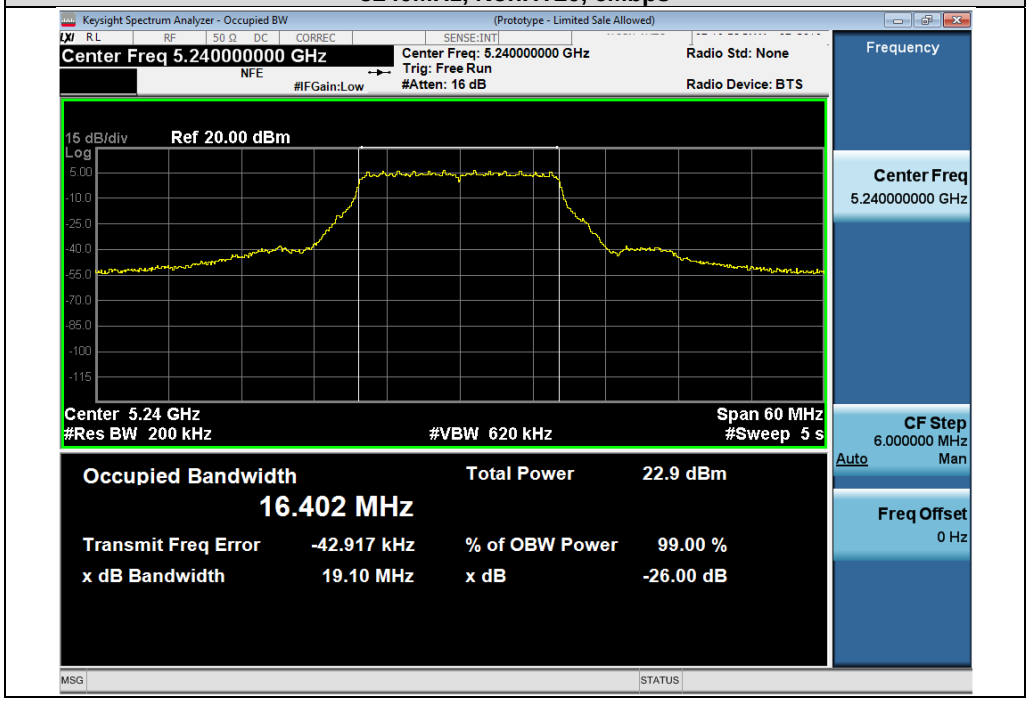
See Appendix A for list of test equipment

5.2.4 99% and 26dB Bandwidth Data Table

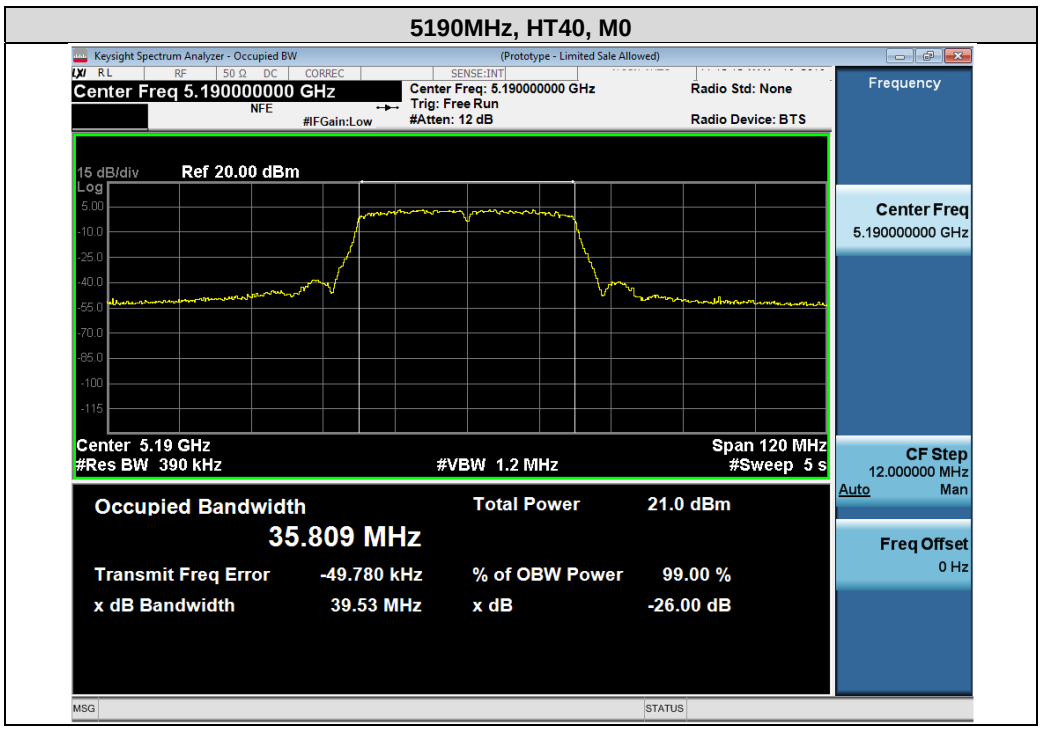
Frequency (MHz)	Mode	Data Rate (Mbps)	26dB BW (MHz)	99% BW (MHz)
5180	Non HT20, 6 to 54 Mbps	6	19	16.412
	HT/VHT20, M0 to M31	m0	20.1	17.581
5190	Non HT40, 6 to 54 Mbps	6	38.4	35.271
	HT/VHT40, M0 to M31	m0	39.5	35.809
5210	Non HT80, 6 to 54 Mbps	6	83.3	75.755
	VHT80, M0 to M9, M0 to M9 1-2ss	m0x1	83.5	76.016
5220	Non HT20, 6 to 54 Mbps	6	19.3	16.411
	HT/VHT20, M0 to M31	m0	20.1	17.582
5230	Non HT40, 6 to 54 Mbps	6	38.5	35.299
	HT/VHT40, M0 to M31	m0	39.6	35.875
5240	**Non HT20, 6 to 54 Mbps**	**6**	**19.1**	**16.402**
	HT/VHT20, M0 to M31	m0	20	17.573

5.2.5 99% and 26dB Bandwidth Data Screenshots

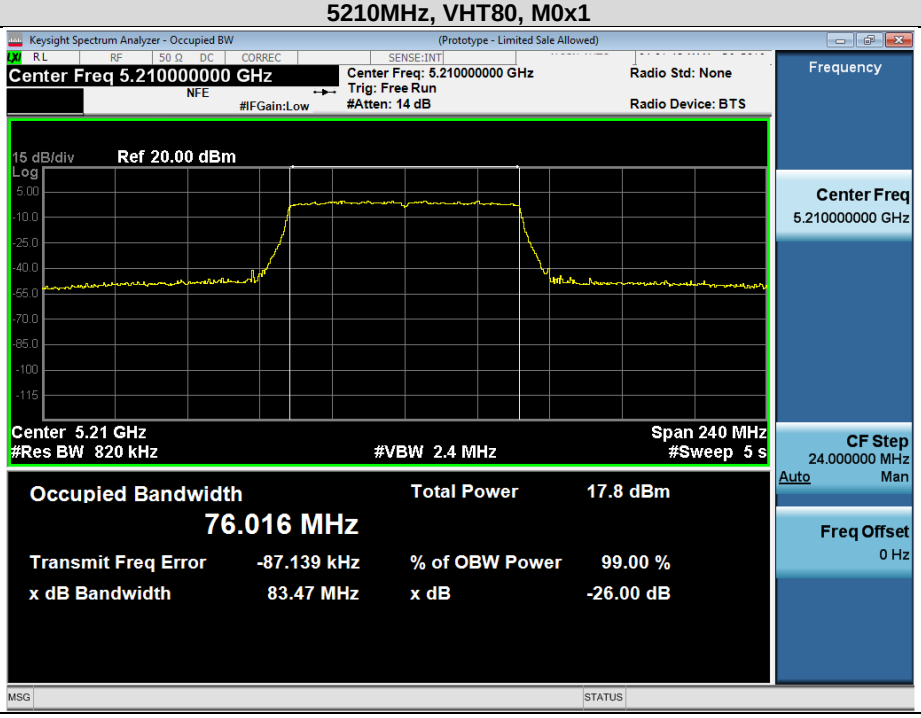
5240MHz, NonHT20, 6Mbps



5190MHz, HT40, M0



5210MHz, VHT80, M0x1



5.3 Maximum Conducted Output Power

5.3.1 Maximum Conducted Output Power Test Requirement

15.407 General technical requirements, (a) *Power limits:* (1) For the band 5.15-5.25 GHz.

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

15.407

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

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

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

5.3.2 Maximum Conducted Output Power Test Procedure

Ref. KDB 789033 D02 General UNII Test Procedures New Rules v01r02
ANSI C63.10: 2013

Maximum Conducted Output Power Test Procedure
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 v01r02
2. Measurement using a Spectrum Analyzer or EMI Receiver (SA), (d) Method SA-2

Maximum Conducted Output Power Test parameters
Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction). (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 = 1MHz. (iv) Set VBW ≥ 3MHz. (v) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ 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

5.3.3 Maximum Conducted Output Power Test Information

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	EUT	S01	☑	☐
	Support	S02	☐	☑

Tested By: Julian Land	**Date of testing:** March 6, 2019 - March 26, 2019
Test Result: PASS	

Test Equipment

See Appendix A for list of test equipment

5.3.4 Maximum Conducted Output Power Data Table

Frequency (MHz)	Mode	Tx Paths	Index Power (dBm)	Correlated Antenna Gain (dBi)	Duty Cycle (%)	Tx 1 Max Power (dBm)	Tx 2 Max Power (dBm)	Tx 3 Max Power (dBm)	Tx 4 Max Power (dBm)	Total Tx Channel Power (dBm)	Limit (dBm)	Margin (dB)
5180	Non HT20, 6 to 54 Mbps	1	17	6	96.77	16.5				16.6	30	13.4
	Non HT20, 6 to 54 Mbps	2	17	6	96.77	16.5	15.7			19.3	30	10.7
	Non HT20, 6 to 54 Mbps	3	17	6	96.77	16.5	15.7	15.6		20.9	30	9.1
	Non HT20, 6 to 54 Mbps	4	16	6	96.77	15.3	14.8	14.5	14.5	20.9	30	9.1
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	96.77	16.5	15.7			19.3	27	7.7
	Non HT20 Beam Forming, 6 to 54 Mbps	3	16	11	96.77	15.3	14.8	14.5		19.8	25	5.2
	Non HT20 Beam Forming, 6 to 54 Mbps	4	15	12	96.77	14.4	13.8	13.7	13.6	20	24	4
	HT/VHT20, M0 to M7	1	17	6	98.49	15.9				16	30	14
	HT/VHT20, M0 to M7	2	17	6	98.49	15.9	15.4			18.7	30	11.3
	HT/VHT20, M8 to M15	2	17	6	98.49	15.9	15.4			18.7	30	11.3
	HT/VHT20, M0 to M7	3	17	6	98.49	15.9	15.4	15.3		20.4	30	9.6
	HT/VHT20, M8 to M15	3	17	6	98.49	15.9	15.4	15.3		20.4	30	9.6
	HT/VHT20, M16 to M23	3	17	6	98.49	15.9	15.4	15.3		20.4	30	9.6
	HT/VHT20, M0 to M7	4	17	6	98.49	15.9	15.4	15.3	15	21.5	30	8.5
	HT/VHT20, M8 to M15	4	17	6	98.49	15.9	15.4	15.3	15	21.5	30	8.5
	HT/VHT20, M16 to M23	4	17	6	98.49	15.9	15.4	15.3	15	21.5	30	8.5
	HT/VHT20, M24 to M31	4	17	6	98.49	15.9	15.4	15.3	15	21.5	30	8.5
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	98.49	15.9	15.4			18.7	27	8.3
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	98.49	15.9	15.4			18.7	30	11.3
	HT/VHT20 Beam Forming, M0 to M7	3	15	11	98.49	13.9	13.6	13.3		18.4	25	6.6
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	98.49	15.9	15.4	15.3		20.4	28	7.6
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	98.49	15.9	15.4	15.3		20.4	30	9.6
	HT/VHT20 Beam Forming, M0 to M7	4	15	12	98.49	13.9	13.6	13.3	13.3	19.6	24	4.4
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	98.49	15.9	15.4	15.3	15	21.5	27	5.5
	HT/VHT20 Beam Forming, M16 to	4	17	7	98.49	15.9	15.4	15.3	15	21.5	29	7.5

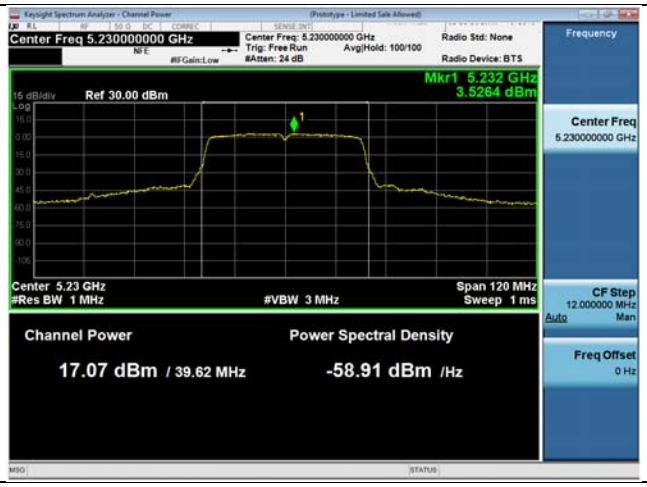
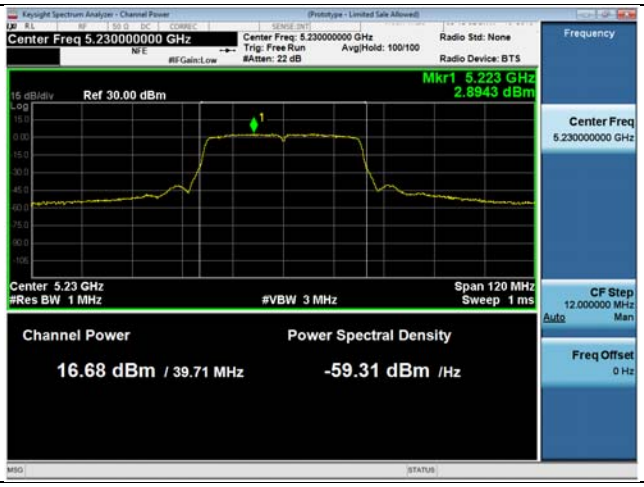
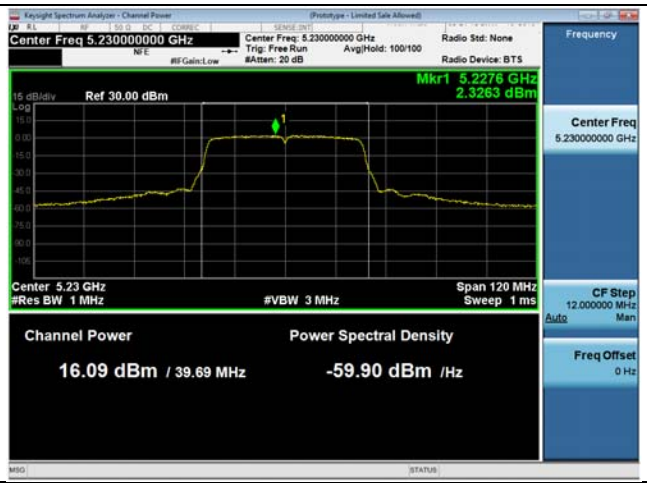
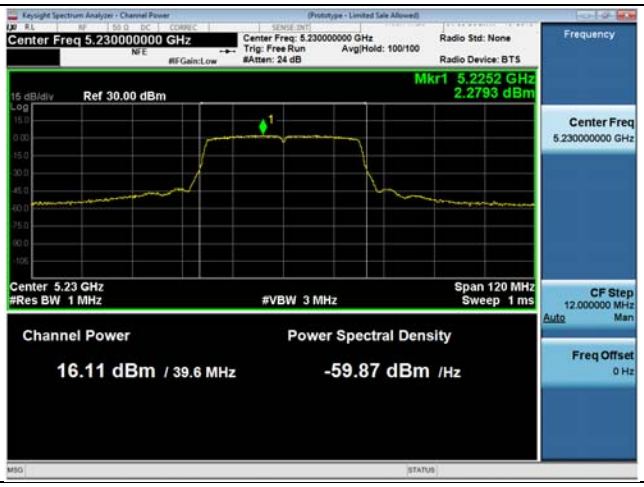
	M23											
	HT/VHT20 Beam Forming, M24 to M31	4	17	6	98.49	15.9	15.4	15.3	15	21.5	30	8.5
	HT/VHT20 STBC, M0 to M7	2	17	6	98.49	15.9	15.4			18.7	30	11.3
	HT/VHT20 STBC, M0 to M7	3	17	6	98.49	15.9	15.4	15.3		20.4	30	9.6
	HT/VHT20 STBC, M0 to M7	4	17	6	98.49	15.9	15.4	15.3	15	21.5	30	8.5
5190	Non HT40, 6 to 54 Mbps	1	17	6	96.82	16.5				16.6	30	13.4
	Non HT40, 6 to 54 Mbps	2	17	6	96.82	16.5	15.7			19.3	30	10.7
	Non HT40, 6 to 54 Mbps	3	17	6	96.82	16.5	15.7	15.6		20.9	30	9.1
	Non HT40, 6 to 54 Mbps	4	17	6	96.82	16.5	15.7	15.6	15.5	22	30	8
	HT/VHT40, M0 to M7	1	17	6	96.81	17.1				17.2	30	12.8
	HT/VHT40, M0 to M7	2	17	6	96.81	17.1	16.5			20	30	10
	HT/VHT40, M8 to M15	2	17	6	96.81	17.1	16.5			20	30	10
	HT/VHT40, M0 to M7	3	16	6	96.81	16	15.6	15.1		20.5	30	9.5
	HT/VHT40, M8 to M15	3	16	6	96.81	16	15.6	15.1		20.5	30	9.5
	HT/VHT40, M16 to M23	3	16	6	96.81	16	15.6	15.1		20.5	30	9.5
	HT/VHT40, M0 to M7	4	16	6	96.81	16	15.6	15.1	15.2	21.7	30	8.3
	HT/VHT40, M8 to M15	4	16	6	96.81	16	15.6	15.1	15.2	21.7	30	8.3
	HT/VHT40, M16 to M23	4	16	6	96.81	16	15.6	15.1	15.2	21.7	30	8.3
	HT/VHT40, M24 to M31	4	16	6	96.81	16	15.6	15.1	15.2	21.7	30	8.3
	HT/VHT40 Beam Forming, M0 to M7	2	15	9	96.81	15.1	14.5			18	27	9
	HT/VHT40 Beam Forming, M8 to M15	2	17	6	96.81	17.1	16.5			20	30	10
	HT/VHT40 Beam Forming, M0 to M7	3	13	11	96.81	13.1	12.4	12		17.4	25	7.6
	HT/VHT40 Beam Forming, M8 to M15	3	15	8	96.81	15.1	14.5	14.3		19.6	28	8.4
	HT/VHT40 Beam Forming, M16 to M23	3	16	6	96.81	16	15.6	15.1		20.5	30	9.5
	HT/VHT40 Beam Forming, M0 to M7	4	12	12	96.81	11.8	11.3	11.1	10.8	17.4	24	6.6
	HT/VHT40 Beam Forming, M8 to M15	4	14	9	96.81	14.2	13.6	13.3	13.2	19.8	27	7.2
	HT/VHT40 Beam Forming, M16 to M23	4	15	7	96.81	15.1	14.5	14.3	14.1	20.7	29	8.3
	HT/VHT40 Beam Forming, M24 to M31	4	16	6	96.81	16	15.6	15.1	15.2	21.7	30	8.3
	HT/VHT40 STBC, M0 to M7	2	17	6	96.81	17.1	16.5			20	30	10
	HT/VHT40 STBC, M0 to M7	3	16	6	96.81	16	15.6	15.1		20.5	30	9.5
	HT/VHT40 STBC, M0 to M7	4	16	6	96.81	16	15.6	15.1	15.2	21.7	30	8.3
5210	Non HT80, 6 to 54 Mbps	1	16	6	96.63	15.1				15.3	30	14.8
	Non HT80, 6 to 54 Mbps	2	15	6	96.63	14.2	13.8			17.2	30	12.8
	Non HT80, 6 to 54 Mbps	3	15	6	96.63	14.2	13.8	13.3		18.7	30	11.3
	Non HT80, 6 to 54 Mbps	4	14	6	96.63	13.2	12.7	12.4	12.2	18.8	30	11.2
	VHT80, M0 to M9 1ss	1	16	6	85.19	15.1				15.8	30	14.2

	VHT80, M0 to M9 1ss	2	15	6	85.19	13.9	14			17.7	30	12.3
	VHT80, M0 to M9 2ss	2	15	6	85.19	13.9	14			17.7	30	12.3
	VHT80, M0 to M9 1ss	3	14	6	85.19	13	12.7	12.5		18.2	30	11.8
	VHT80, M0 to M9 2ss	3	14	6	85.19	13	12.7	12.5		18.2	30	11.8
	VHT80, M0 to M9 3ss	3	14	6	85.19	13	12.7	12.5		18.2	30	11.8
	VHT80, M0 to M9 1ss	4	14	6	85.19	13	12.7	12.5	12.5	19.4	30	10.6
	VHT80, M0 to M9 2ss	4	14	6	85.19	13	12.7	12.5	12.5	19.4	30	10.6
	VHT80, M0 to M9 3ss	4	14	6	85.19	13	12.7	12.5	12.5	19.4	30	10.6
	VHT80, M0 to M9 4ss	4	14	6	85.19	13	12.7	12.5	12.5	19.4	30	10.6
	VHT80 Beam Forming, M0 to M9 1ss	2	13	9	85.19	12.1	12			15.8	27	11.2
	VHT80 Beam Forming, M0 to M9 2ss	2	15	6	85.19	13.9	14			17.7	30	12.3
	VHT80 Beam Forming, M0 to M9 1ss	3	11	11	85.19	9.9	9.8	9.7		15.3	25	9.7
	VHT80 Beam Forming, M0 to M9 2ss	3	12	8	85.19	11.3	10.6	10.6		16.3	28	11.7
	VHT80 Beam Forming, M0 to M9 3ss	3	14	6	85.19	13	12.7	12.5		18.2	30	11.8
	VHT80 Beam Forming, M0 to M9 1ss	4	9	12	85.19	8.1	7.6	7.5	7.1	14.3	24	9.7
	VHT80 Beam Forming, M0 to M9 2ss	4	12	9	85.19	11.3	10.6	10.6	10.2	17.4	27	9.6
	VHT80 Beam Forming, M0 to M9 3ss	4	12	7	85.19	11.3	10.6	10.6	10.2	17.4	29	11.6
	VHT80 Beam Forming, M0 to M9 4ss	4	14	6	85.19	13	12.7	12.5	12.5	19.4	30	10.6
	VHT80 STBC, M0 to M9 1ss	2	15	6	85.19	13.9	14			17.7	30	12.3
	VHT80 STBC, M0 to M9 1ss	3	14	6	85.19	13	12.7	12.5		18.2	30	11.8
	VHT80 STBC, M0 to M9 1ss	4	14	6	85.19	13	12.7	12.5	12.5	19.4	30	10.6
5220	Non HT20, 6 to 54 Mbps	1	17	6	96.77	16.6				16.7	30	13.3
	Non HT20, 6 to 54 Mbps	2	17	6	96.77	16.6	16.1			19.5	30	10.5
	Non HT20, 6 to 54 Mbps	3	17	6	96.77	16.6	16.1	15.5		21	30	9
	Non HT20, 6 to 54 Mbps	4	16	6	96.77	15.6	15.3	14.6	14.5	21.2	30	8.8
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	96.77	16.6	16.1			19.5	27	7.5
	Non HT20 Beam Forming, 6 to 54 Mbps	3	17	11	96.77	16.6	16.1	15.5		21	25	4
	Non HT20 Beam Forming, 6 to 54 Mbps	4	16	12	96.77	15.6	15.3	14.6	14.5	21.2	24	2.8
	HT/VHT20, M0 to M7	1	17	6	98.49	16.1				16.2	30	13.8
	HT/VHT20, M0 to M7	2	17	6	98.49	16.1	15.7			19	30	11
	HT/VHT20, M8 to M15	2	17	6	98.49	16.1	15.7			19	30	11
	HT/VHT20, M0 to M7	3	17	6	98.49	16.1	15.7	15.1		20.5	30	9.5
	HT/VHT20, M8 to M15	3	17	6	98.49	16.1	15.7	15.1		20.5	30	9.5
	HT/VHT20, M16 to M23	3	17	6	98.49	16.1	15.7	15.1		20.5	30	9.5
	HT/VHT20, M0 to M7	4	17	6	98.49	16.1	15.7	15.1	15.1	21.6	30	8.4
	HT/VHT20, M8 to M15	4	17	6	98.49	16.1	15.7	15.1	15.1	21.6	30	8.4
	HT/VHT20, M16 to M23	4	17	6	98.49	16.1	15.7	15.1	15.1	21.6	30	8.4

	HT/VHT20, M24 to M31	4	17	6	98.49	16.1	15.7	15.1	15.1	21.6	30	8.4
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	98.49	16.1	15.7			19	27	8
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	98.49	16.1	15.7			19	30	11
	HT/VHT20 Beam Forming, M0 to M7	3	17	11	98.49	16.1	15.7	15.1		20.5	25	4.5
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	98.49	16.1	15.7	15.1		20.5	28	7.5
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	98.49	16.1	15.7	15.1		20.5	30	9.5
	HT/VHT20 Beam Forming, M0 to M7	4	17	12	98.49	16.1	15.7	15.1	15.1	21.6	24	2.4
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	98.49	16.1	15.7	15.1	15.1	21.6	27	5.4
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	98.49	16.1	15.7	15.1	15.1	21.6	29	7.4
	HT/VHT20 Beam Forming, M24 to M31	4	17	6	98.49	16.1	15.7	15.1	15.1	21.6	30	8.4
	HT/VHT20 STBC, M0 to M7	2	17	6	98.49	16.1	15.7			19	30	11
	HT/VHT20 STBC, M0 to M7	3	17	6	98.49	16.1	15.7	15.1		20.5	30	9.5
	HT/VHT20 STBC, M0 to M7	4	17	6	98.49	16.1	15.7	15.1	15.1	21.6	30	8.4
5230	Non HT40, 6 to 54 Mbps	1	17	6	96.82	16.6				16.7	30	13.3
	Non HT40, 6 to 54 Mbps	2	17	6	96.82	16.6	16.3			19.6	30	10.4
	Non HT40, 6 to 54 Mbps	3	17	6	96.82	16.6	16.3	15.8		21.2	30	8.8
	Non HT40, 6 to 54 Mbps	4	17	6	96.82	16.6	16.3	15.8	15.8	22.3	30	7.7
	HT/VHT40, M0 to M7	1	17	6	96.81	17.1				17.2	30	12.8
	HT/VHT40, M0 to M7	2	17	6	96.81	17.1	16.7			20.1	30	9.9
	HT/VHT40, M8 to M15	2	17	6	96.81	17.1	16.7			20.1	30	9.9
	HT/VHT40, M0 to M7	3	17	6	96.81	17.1	16.7	16.1		21.6	30	8.4
	HT/VHT40, M8 to M15	3	17	6	96.81	17.1	16.7	16.1		21.6	30	8.4
	HT/VHT40, M16 to M23	3	17	6	96.81	17.1	16.7	16.1		21.6	30	8.4
	HT/VHT40, M0 to M7	4	17	6	96.81	17.1	16.7	16.1	16.1	22.7	30	7.3
	HT/VHT40, M8 to M15	4	17	6	96.81	17.1	16.7	16.1	16.1	22.7	30	7.3
	HT/VHT40, M16 to M23	4	17	6	96.81	17.1	16.7	16.1	16.1	22.7	30	7.3
	HT/VHT40, M24 to M31	4	17	6	96.81	17.1	16.7	16.1	16.1	22.7	30	7.3
	HT/VHT40 Beam Forming, M0 to M7	2	17	9	96.81	17.1	16.7			20.1	27	6.9
	HT/VHT40 Beam Forming, M8 to M15	2	17	6	96.81	17.1	16.7			20.1	30	9.9
	HT/VHT40 Beam Forming, M0 to M7	3	17	11	96.81	17.1	16.7	16.1		21.6	25	3.4
	HT/VHT40 Beam Forming, M8 to M15	3	17	8	96.81	17.1	16.7	16.1		21.6	28	6.4
	HT/VHT40 Beam Forming, M16 to M23	3	17	6	96.81	17.1	16.7	16.1		21.6	30	8.4
	HT/VHT40 Beam Forming, M0 to M7	**4**	**17**	**12**	96.81	**17.1**	**16.7**	**16.1**	**16.1**	**22.7**	**24**	**1.3**
	HT/VHT40 Beam Forming, M8 to M15	4	17	9	96.81	17.1	16.7	16.1	16.1	22.7	27	4.3
	HT/VHT40 Beam Forming, M16 to M23	4	17	7	96.81	17.1	16.7	16.1	16.1	22.7	29	6.3
	HT/VHT40 Beam Forming, M24 to	4	17	6	96.81	17.1	16.7	16.1	16.1	22.7	30	7.3

	M31											
	HT/VHT40 STBC, M0 to M7	2	17	6	96.81	17.1	16.7			20.1	30	9.9
	HT/VHT40 STBC, M0 to M7	3	17	6	96.81	17.1	16.7	16.1		21.6	30	8.4
	HT/VHT40 STBC, M0 to M7	4	17	6	96.81	17.1	16.7	16.1	16.1	22.7	30	7.3
5240	Non HT20, 6 to 54 Mbps	1	17	6	96.77	16.5				16.6	30	13.4
	Non HT20, 6 to 54 Mbps	2	17	6	96.77	16.5	16.1			19.5	30	10.5
	Non HT20, 6 to 54 Mbps	3	17	6	96.77	16.5	16.1	15.6		21	30	9
	Non HT20, 6 to 54 Mbps	4	16	6	96.77	15.6	15	14.6	14.6	21.1	30	8.9
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	96.77	16.5	16.1			19.5	27	7.5
	Non HT20 Beam Forming, 6 to 54 Mbps	3	17	11	96.77	16.5	16.1	15.6		21	25	4
	Non HT20 Beam Forming, 6 to 54 Mbps	4	16	12	96.77	15.6	15	14.6	14.6	21.1	24	2.9
	HT/VHT20, M0 to M7	1	17	6	98.49	16.3				16.4	30	13.6
	HT/VHT20, M0 to M7	2	17	6	98.49	16.3	15.7			19.1	30	10.9
	HT/VHT20, M8 to M15	2	17	6	98.49	16.3	15.7			19.1	30	10.9
	HT/VHT20, M0 to M7	3	17	6	98.49	16.3	15.7	15.2		20.6	30	9.4
	HT/VHT20, M8 to M15	3	17	6	98.49	16.3	15.7	15.2		20.6	30	9.4
	HT/VHT20, M16 to M23	3	17	6	98.49	16.3	15.7	15.2		20.6	30	9.4
	HT/VHT20, M0 to M7	4	17	6	98.49	16.3	15.7	15.2	15.3	21.7	30	8.3
	HT/VHT20, M8 to M15	4	17	6	98.49	16.3	15.7	15.2	15.3	21.7	30	8.3
	HT/VHT20, M16 to M23	4	17	6	98.49	16.3	15.7	15.2	15.3	21.7	30	8.3
	HT/VHT20, M24 to M31	4	17	6	98.49	16.3	15.7	15.2	15.3	21.7	30	8.3
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	98.49	16.3	15.7			19.1	27	7.9
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	98.49	16.3	15.7			19.1	30	10.9
	HT/VHT20 Beam Forming, M0 to M7	3	17	11	98.49	16.3	15.7	15.2		20.6	25	4.4
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	98.49	16.3	15.7	15.2		20.6	28	7.4
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	98.49	16.3	15.7	15.2		20.6	30	9.4
	HT/VHT20 Beam Forming, M0 to M7	4	17	12	98.49	16.3	15.7	15.2	15.3	21.7	24	2.3
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	98.49	16.3	15.7	15.2	15.3	21.7	27	5.3
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	98.49	16.3	15.7	15.2	15.3	21.7	29	7.3
	HT/VHT20 Beam Forming, M24 to M31	4	17	6	98.49	16.3	15.7	15.2	15.3	21.7	30	8.3
	HT/VHT20 STBC, M0 to M7	2	17	6	98.49	16.3	15.7			19.1	30	10.9
	HT/VHT20 STBC, M0 to M7	3	17	6	98.49	16.3	15.7	15.2		20.6	30	9.4
	HT/VHT20 STBC, M0 to M7	4	17	6	98.49	16.3	15.7	15.2	15.3	21.7	30	8.3

5.3.5 Maximum Conducted Output Power Plots

5230MHz, HT40 Beam Forming, M0	
Antenna A	**Antenna B**
	
Antenna C	**Antenna D**
	

5.4 Power Spectral Density

5.4.1 Power Spectral Density Test Requirement

15.407 General technical requirements, (a) *Power limits:* (1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz … the maximum power spectral density shall not exceed 17 dBm in any 1-megahertz band. If transmitting antennas of directional gain greater than 6dBi 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 6dBi.

15.407

(ii) For an indoor access point operating in the band 5.15-5.25 GHz… the maximum power spectral density shall not exceed 17 dBm in any 1-megahertz band. If transmitting antennas of directional gain greater than 6dBi 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 6dBi.

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz…the maximum power spectral density shall not exceed 17 dBm in any 1-megahertz band. Fixed point-to-point U-NII devices may employ antennas with directional gain up to 23dBi without any corresponding reduction in the maximum conducted output power or maximum power spectral density. For fixed point-to-point transmitters that employ a directional antenna gain greater than 23dBi, a 1 dB reduction in maximum conducted output power and maximum power spectral density is required for each 1 dB of antenna gain in excess of 23dBi. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information. The operator of the U-NII device, or if the equipment is professionally installed, the installer, is responsible for ensuring that systems employing high gain directional antennas are used exclusively for fixed, point-to-point operations.

(iv) For client devices in the 5.15-5.25 GHz band, …. the maximum power spectral density shall not exceed 11 dBm in any 1-megahertz band. If transmitting antennas of directional gain greater than 6dBi 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 6dBi.

5.4.2 Power Spectral Density Test Procedure

Ref. KDB 789033 D02 General UNII Test Procedures New Rules v01r02
F. Maximum Power Spectral Density (PSD)

Power Spectral Density Test Procedure
The rules require "maximum power spectral density" measurements where the intent is to measure the maximum value of the time average of the power spectral density measured during a period of continuous transmission. 1. Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power…". (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.) 2. Use the peak search function on the instrument to find the peak of the spectrum and record its value. 3. Make the following adjustments to the peak value of the spectrum, if applicable: a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum. b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g) (viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging. 4. The result is the Maximum PSD over 1 MHz reference bandwidth.

Ref. KDB 789033 D02 General UNII Test Procedures New Rules v01r02
2. Measurement using a Spectrum Analyzer or EMI Receiver (SA), (d) Method SA-2

Power Spectral Density Test parameters
Method SA-2 (trace averaging across on and off times of the EUT transmissions, followed by duty cycle correction). (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 = 1MHz. (iv) Set VBW ≥ 3MHz. (v) Number of points in sweep ≥ 2 Span / RBW. (This ensures that bin-to-bin spacing is ≤ 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) **F. Maximum Power Spectral Density (PSD)** 2. Use the peak search function on the instrument to find the peak of the spectrum and record its value. 3. Make the following adjustments to the peak value of the spectrum, if applicable: a) If Method SA-2 or SA-2 Alternative was used, add 10 log(1/x), where x is the duty cycle, to the peak of the spectrum.

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

5.4.3 Power Spectral Density Test Information

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	EUT	S01	☑	☐
	Support	S02	☐	☑

Tested By:	Date of testing:
Julian Land	March 6, 2019 - March 26, 2019
Test Result: PASS	

Test Equipment

See Appendix A for list of test equipment

5.4.4 Power Spectral Density Data Table

Frequency (MHz)	Mode	Tx Paths	Index Power (dBm)	Correlated Antenna Gain (dBi)	Duty Cycle (%)	Tx 1 PSD (dBm/MHz)	Tx 2 PSD (dBm/MHz)	Tx 3 PSD (dBm/MHz)	Tx 4 PSD (dBm/MHz)	Total PSD (dBm/MHz)	Limit (dBm/MHz)	Margin (dB)
5180	Non HT20, 6 to 54 Mbps	1	17	6	96.77	5.6				5.7	17	11.3
	Non HT20, 6 to 54 Mbps	2	17	9	96.77	5.6	5			8.5	14	5.5
	Non HT20, 6 to 54 Mbps	3	17	11	96.77	5.6	5	4.7		10	12	2
	Non HT20, 6 to 54 Mbps	4	16	12	96.77	4.4	4.3	3.9	3.7	10.2	11	0.8
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	96.77	5.6	5			8.5	14	5.5
	Non HT20 Beam Forming, 6 to 54 Mbps	3	16	11	96.77	4.4	4.3	3.9		9.1	12	2.9
	Non HT20 Beam Forming, 6 to 54 Mbps	4	15	12	96.77	3.4	3	2.9	2.6	9.1	11	1.9
	HT/VHT20, M0 to M7	1	17	6	98.49	4.9				5	17	12
	HT/VHT20, M0 to M7	2	17	9	98.49	4.9	4.3			7.7	14	6.3
	HT/VHT20, M8 to M15	2	17	6	98.49	4.9	4.3			7.7	17	9.3
	HT/VHT20, M0 to M7	3	17	11	98.49	4.9	4.3	4.2		9.3	12	2.7
	HT/VHT20, M8 to M15	3	17	8	98.49	4.9	4.3	4.2		9.3	15	5.7
	HT/VHT20, M16 to M23	3	17	6	98.49	4.9	4.3	4.2		9.3	17	7.7
	HT/VHT20, M0 to M7	4	17	12	98.49	4.9	4.3	4.2	3.9	10.4	11	0.6
	HT/VHT20, M8 to M15	4	17	9	98.49	4.9	4.3	4.2	3.9	10.4	14	3.6
	HT/VHT20, M16 to M23	4	17	7	98.49	4.9	4.3	4.2	3.9	10.4	16	5.6
	HT/VHT20, M24 to M31	4	17	6	98.49	4.9	4.3	4.2	3.9	10.4	17	6.6
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	98.49	4.9	4.3			7.7	14	6.3
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	98.49	4.9	4.3			7.7	17	9.3
	HT/VHT20 Beam Forming, M0 to M7	3	15	11	98.49	3.3	2.7	2.5		7.7	12	4.3
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	98.49	4.9	4.3	4.2		9.3	15	5.7
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	98.49	4.9	4.3	4.2		9.3	17	7.7
	HT/VHT20 Beam Forming, M0 to M7	4	15	12	98.49	3.3	2.7	2.5	2.3	8.8	11	2.2
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	98.49	4.9	4.3	4.2	3.9	10.4	14	3.6
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	98.49	4.9	4.3	4.2	3.9	10.4	16	5.6
	HT/VHT20 Beam Forming, M24 to M31	4	17	6	98.49	4.9	4.3	4.2	3.9	10.4	17	6.6
	HT/VHT20 STBC, M0 to M7	2	17	6	98.49	4.9	4.3			7.7	17	9.3
	HT/VHT20 STBC, M0 to M7	3	17	8	98.49	4.9	4.3	4.2		9.3	15	5.7

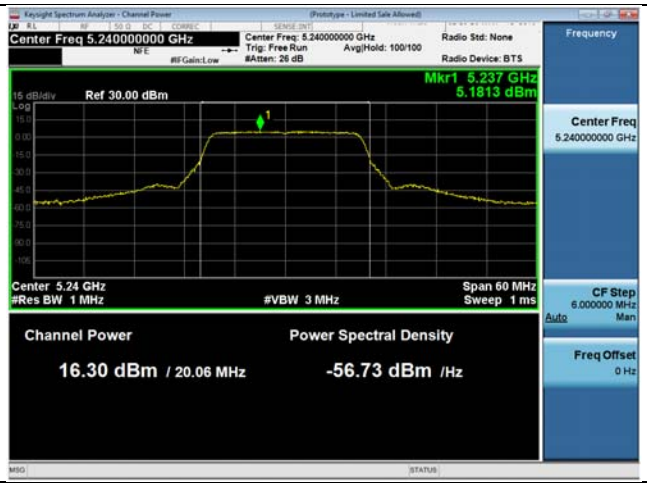
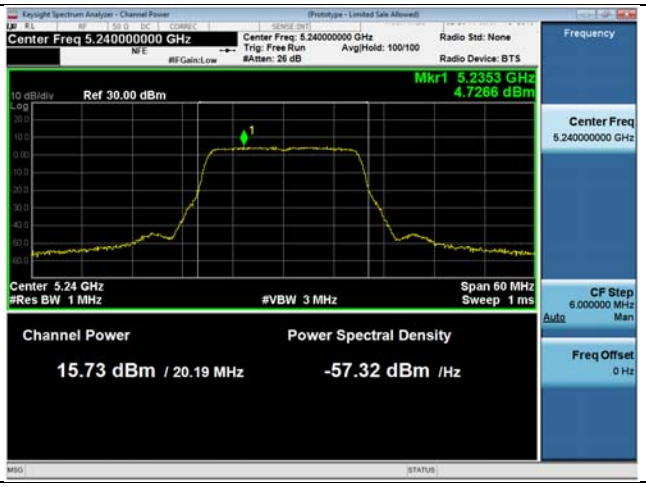
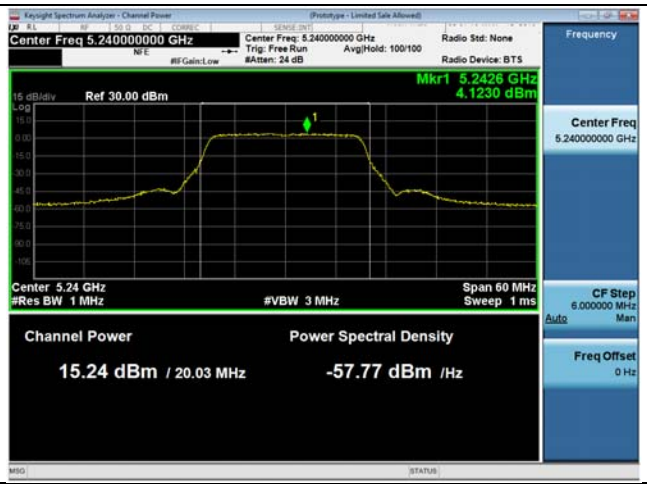
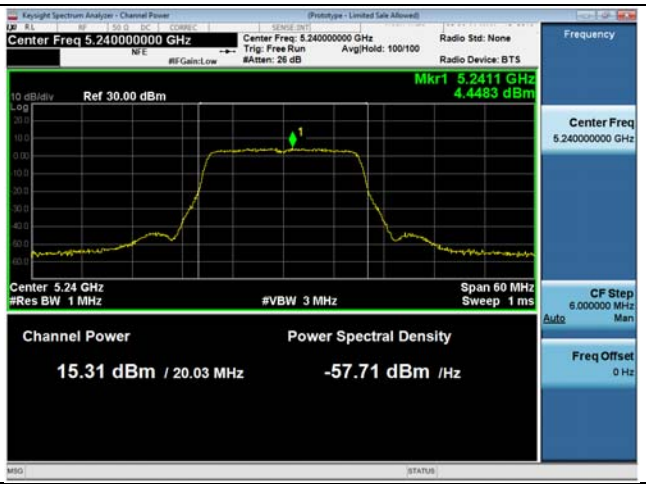
	HT/VHT20 STBC, M0 to M7	4	17	9	98.49	4.9	4.3	4.2	3.9	10.4	14	3.6
5190	Non HT40, 6 to 54 Mbps	1	17	6	96.82	3.5				3.6	17	13.4
	Non HT40, 6 to 54 Mbps	2	17	9	96.82	3.5	3.1			6.5	14	7.5
	Non HT40, 6 to 54 Mbps	3	17	11	96.82	3.5	3.1	3		8.1	12	3.9
	Non HT40, 6 to 54 Mbps	4	17	12	96.82	3.5	3.1	3	2.6	9.2	11	1.8
	HT/VHT40, M0 to M7	1	17	6	96.81	3.1				3.2	17	13.8
	HT/VHT40, M0 to M7	2	17	9	96.81	3.1	2.5			6	14	8
	HT/VHT40, M8 to M15	2	17	6	96.81	3.1	2.5			6	17	11
	HT/VHT40, M0 to M7	3	16	11	96.81	2.1	1.6	1.3		6.6	12	5.4
	HT/VHT40, M8 to M15	3	16	8	96.81	2.1	1.6	1.3		6.6	15	8.4
	HT/VHT40, M16 to M23	3	16	6	96.81	2.1	1.6	1.3		6.6	17	10.4
	HT/VHT40, M0 to M7	4	16	12	96.81	2.1	1.6	1.3	1.6	7.8	11	3.2
	HT/VHT40, M8 to M15	4	16	9	96.81	2.1	1.6	1.3	1.6	7.8	14	6.2
	HT/VHT40, M16 to M23	4	16	7	96.81	2.1	1.6	1.3	1.6	7.8	16	8.2
	HT/VHT40, M24 to M31	4	16	6	96.81	2.1	1.6	1.3	1.6	7.8	17	9.2
	HT/VHT40 Beam Forming, M0 to M7	2	15	9	96.81	1.3	0.6			4.1	14	9.9
	HT/VHT40 Beam Forming, M8 to M15	2	17	6	96.81	3.1	2.5			6	17	11
	HT/VHT40 Beam Forming, M0 to M7	3	13	11	96.81	-0.9	-1.3	-1.7		3.6	12	8.4
	HT/VHT40 Beam Forming, M8 to M15	3	15	8	96.81	1.3	0.6	0.7		5.8	15	9.2
	HT/VHT40 Beam Forming, M16 to M23	3	16	6	96.81	2.1	1.6	1.3		6.6	17	10.4
	HT/VHT40 Beam Forming, M0 to M7	4	12	12	96.81	-1.8	-2.6	-3	-3.1	3.6	11	7.4
	HT/VHT40 Beam Forming, M8 to M15	4	14	9	96.81	0.4	-0.3	-0.7	-0.7	5.9	14	8.1
	HT/VHT40 Beam Forming, M16 to M23	4	15	7	96.81	1.3	0.6	0.7	0.2	6.9	16	9.1
	HT/VHT40 Beam Forming, M24 to M31	4	16	6	96.81	2.1	1.6	1.3	1.6	7.8	17	9.2
	HT/VHT40 STBC, M0 to M7	2	17	6	96.81	3.1	2.5			6	17	11
	HT/VHT40 STBC, M0 to M7	3	16	8	96.81	2.1	1.6	1.3		6.6	15	8.4
	HT/VHT40 STBC, M0 to M7	4	16	9	96.81	2.1	1.6	1.3	1.6	7.8	14	6.2
5210	Non HT80, 6 to 54 Mbps	1	16	6	96.63	-1.3				-1.2	17	18.2
	Non HT80, 6 to 54 Mbps	2	15	9	96.63	-2.1	-3			0.6	14	13.4
	Non HT80, 6 to 54 Mbps	3	15	11	96.63	-2.1	-3	-3		2.2	12	9.8
	Non HT80, 6 to 54 Mbps	4	14	12	96.63	-3.2	-3.9	-4.2	-4.2	2.3	11	8.7
	VHT80, M0 to M9 1ss	1	16	6	85.19	-2.1				-1.4	17	18.4
	VHT80, M0 to M9 1ss	2	15	9	85.19	-3.3	-3.2			0.5	14	13.5
	VHT80, M0 to M9 2ss	2	15	6	85.19	-3.3	-3.2			0.5	17	16.5
	VHT80, M0 to M9 1ss	3	14	11	85.19	-4.3	-4.6	-4.9		0.9	12	11.1
	VHT80, M0 to M9 2ss	3	14	8	85.19	-4.3	-4.6	-4.9		0.9	15	14.1
	VHT80, M0 to M9 3ss	3	14	6	85.19	-4.3	-4.6	-4.9		0.9	17	16.1
	VHT80, M0 to M9 1ss	4	14	12	85.19	-4.3	-4.6	-4.9	-4.7	2.1	11	8.9

	VHT80, M0 to M9 2ss	4	14	9	85.19	-4.3	-4.6	-4.9	-4.7	2.1	14	11.9
	VHT80, M0 to M9 3ss	4	14	7	85.19	-4.3	-4.6	-4.9	-4.7	2.1	16	13.9
	VHT80, M0 to M9 4ss	4	14	6	85.19	-4.3	-4.6	-4.9	-4.7	2.1	17	14.9
	VHT80 Beam Forming, M0 to M9 1ss	2	13	9	85.19	-4.8	-5.4			-1.4	14	15.4
	VHT80 Beam Forming, M0 to M9 2ss	2	15	6	85.19	-3.3	-3.2			0.5	17	16.5
	VHT80 Beam Forming, M0 to M9 1ss	3	11	11	85.19	-7.4	-7.4	-7.5		-2	12	14
	VHT80 Beam Forming, M0 to M9 2ss	3	12	8	85.19	-5.6	-6.4	-6.6		-0.7	15	15.7
	VHT80 Beam Forming, M0 to M9 3ss	3	14	6	85.19	-4.3	-4.6	-4.9		0.9	17	16.1
	VHT80 Beam Forming, M0 to M9 1ss	4	9	12	85.19	-9.2	-9.7	-10	-10	-3	11	14
	VHT80 Beam Forming, M0 to M9 2ss	4	12	9	85.19	-5.6	-6.4	-6.6	-7.1	0.3	14	13.7
	VHT80 Beam Forming, M0 to M9 3ss	4	12	7	85.19	-5.6	-6.4	-6.6	-7.1	0.3	16	15.7
	VHT80 Beam Forming, M0 to M9 4ss	4	14	6	85.19	-4.3	-4.6	-4.9	-4.7	2.1	17	14.9
	VHT80 STBC, M0 to M9 1ss	2	15	6	85.19	-3.3	-3.2			0.5	17	16.5
	VHT80 STBC, M0 to M9 1ss	3	14	6	85.19	-4.3	-4.6	-4.9		0.9	17	16.1
	VHT80 STBC, M0 to M9 1ss	4	14	6	85.19	-4.3	-4.6	-4.9	-4.7	2.1	17	14.9
5220	Non HT20, 6 to 54 Mbps	1	17	6	96.77	5.9				6	17	11
	Non HT20, 6 to 54 Mbps	2	17	9	96.77	5.9	5.3			8.8	14	5.2
	Non HT20, 6 to 54 Mbps	3	17	11	96.77	5.9	5.3	4.6		10.2	12	1.8
	Non HT20, 6 to 54 Mbps	4	16	12	96.77	4.7	4.6	3.8	3.6	10.4	11	0.6
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	96.77	5.9	5.3			8.8	14	5.2
	Non HT20 Beam Forming, 6 to 54 Mbps	3	17	11	96.77	5.9	5.3	4.6		10.2	12	1.8
	Non HT20 Beam Forming, 6 to 54 Mbps	4	16	12	96.77	4.7	4.6	3.8	3.6	10.4	11	0.6
	HT/VHT20, M0 to M7	1	17	6	98.49	5				5.1	17	11.9
	HT/VHT20, M0 to M7	2	17	9	98.49	5	4.5			7.8	14	6.2
	HT/VHT20, M8 to M15	2	17	6	98.49	5	4.5			7.8	17	9.2
	HT/VHT20, M0 to M7	3	17	11	98.49	5	4.5	3.9		9.3	12	2.7
	HT/VHT20, M8 to M15	3	17	8	98.49	5	4.5	3.9		9.3	15	5.7
	HT/VHT20, M16 to M23	3	17	6	98.49	5	4.5	3.9		9.3	17	7.7
	HT/VHT20, M0 to M7	4	17	12	98.49	5	4.5	3.9	4	10.5	11	0.5
	HT/VHT20, M8 to M15	4	17	9	98.49	5	4.5	3.9	4	10.5	14	3.5
	HT/VHT20, M16 to M23	4	17	7	98.49	5	4.5	3.9	4	10.5	16	5.5
	HT/VHT20, M24 to M31	4	17	6	98.49	5	4.5	3.9	4	10.5	17	6.5
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	98.49	5	4.5			7.8	14	6.2
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	98.49	5	4.5			7.8	17	9.2
	HT/VHT20 Beam Forming, M0 to M7	3	17	11	98.49	5	4.5	3.9		9.3	12	2.7
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	98.49	5	4.5	3.9		9.3	15	5.7
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	98.49	5	4.5	3.9		9.3	17	7.7
	HT/VHT20 Beam Forming, M0 to M7	4	17	12	98.49	5	4.5	3.9	4	10.5	11	0.5
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	98.49	5	4.5	3.9	4	10.5	14	3.5

	HT/VHT20 Beam Forming, M16 to M23	4	17	7	98.49	5	4.5	3.9	4	10.5	16	5.5
	HT/VHT20 Beam Forming, M24 to M31	4	17	6	98.49	5	4.5	3.9	4	10.5	17	6.5
	HT/VHT20 STBC, M0 to M7	2	17	6	98.49	5	4.5			7.8	17	9.2
	HT/VHT20 STBC, M0 to M7	3	17	8	98.49	5	4.5	3.9		9.3	15	5.7
	HT/VHT20 STBC, M0 to M7	4	17	9	98.49	5	4.5	3.9	4	10.5	14	3.5
5230	Non HT40, 6 to 54 Mbps	1	17	6	96.82	3.9				4	17	13
	Non HT40, 6 to 54 Mbps	2	17	9	96.82	3.9	3.8			7	14	7
	Non HT40, 6 to 54 Mbps	3	17	11	96.82	3.9	3.8	2.9		8.5	12	3.5
	Non HT40, 6 to 54 Mbps	4	17	12	96.82	3.9	3.8	2.9	2.9	9.6	11	1.4
	HT/VHT40, M0 to M7	1	17	6	96.81	3.5				3.6	17	13.4
	HT/VHT40, M0 to M7	2	17	9	96.81	3.5	2.9			6.4	14	7.6
	HT/VHT40, M8 to M15	2	17	6	96.81	3.5	2.9			6.4	17	10.6
	HT/VHT40, M0 to M7	3	17	11	96.81	3.5	2.9	2.3		7.8	12	4.2
	HT/VHT40, M8 to M15	3	17	8	96.81	3.5	2.9	2.3		7.8	15	7.2
	HT/VHT40, M16 to M23	3	17	6	96.81	3.5	2.9	2.3		7.8	17	9.2
	HT/VHT40, M0 to M7	4	17	12	96.81	3.5	2.9	2.3	2.3	8.9	11	2.1
	HT/VHT40, M8 to M15	4	17	9	96.81	3.5	2.9	2.3	2.3	8.9	14	5.1
	HT/VHT40, M16 to M23	4	17	7	96.81	3.5	2.9	2.3	2.3	8.9	16	7.1
	HT/VHT40, M24 to M31	4	17	6	96.81	3.5	2.9	2.3	2.3	8.9	17	8.1
	HT/VHT40 Beam Forming, M0 to M7	2	17	9	96.81	3.5	2.9			6.4	14	7.6
	HT/VHT40 Beam Forming, M8 to M15	2	17	6	96.81	3.5	2.9			6.4	17	10.6
	HT/VHT40 Beam Forming, M0 to M7	3	17	11	96.81	3.5	2.9	2.3		7.8	12	4.2
	HT/VHT40 Beam Forming, M8 to M15	3	17	8	96.81	3.5	2.9	2.3		7.8	15	7.2
	HT/VHT40 Beam Forming, M16 to M23	3	17	6	96.81	3.5	2.9	2.3		7.8	17	9.2
	HT/VHT40 Beam Forming, M0 to M7	4	**17**	12	96.81	3.5	2.9	2.3	2.3	8.9	11	2.1
	HT/VHT40 Beam Forming, M8 to M15	4	17	9	96.81	3.5	2.9	2.3	2.3	8.9	14	5.1
	HT/VHT40 Beam Forming, M16 to M23	4	17	7	96.81	3.5	2.9	2.3	2.3	8.9	16	7.1
	HT/VHT40 Beam Forming, M24 to M31	4	17	6	96.81	3.5	2.9	2.3	2.3	8.9	17	8.1
	HT/VHT40 STBC, M0 to M7	2	17	6	96.81	3.5	2.9			6.4	17	10.6
	HT/VHT40 STBC, M0 to M7	3	17	8	96.81	3.5	2.9	2.3		7.8	15	7.2
	HT/VHT40 STBC, M0 to M7	4	17	9	96.81	3.5	2.9	2.3	2.3	8.9	14	5.1
5240	Non HT20, 6 to 54 Mbps	1	17	6	96.77	5.9				6	17	11
	Non HT20, 6 to 54 Mbps	2	17	9	96.77	5.9	5.1			8.7	14	5.3
	Non HT20, 6 to 54 Mbps	3	17	11	96.77	5.9	5.1	4.8		10.2	12	1.8
	Non HT20, 6 to 54 Mbps	4	16	12	96.77	4.9	4.1	4.1	3.5	10.3	11	0.7
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	96.77	5.9	5.1			8.7	14	5.3
	Non HT20 Beam Forming, 6 to 54 Mbps	3	17	11	96.77	5.9	5.1	4.8		10.2	12	1.8
	Non HT20 Beam Forming, 6 to 54 Mbps	4	16	12	96.77	4.9	4.1	4.1	3.5	10.3	11	0.7

	HT/VHT20, M0 to M7	1	17	6	98.49	5.2				5.3	17	11.7
	HT/VHT20, M0 to M7	2	17	9	98.49	5.2	4.7			8	14	6
	HT/VHT20, M8 to M15	2	17	6	98.49	5.2	4.7			8	17	9
	HT/VHT20, M0 to M7	3	17	11	98.49	5.2	4.7	4.1		9.5	12	2.5
	HT/VHT20, M8 to M15	3	17	8	98.49	5.2	4.7	4.1		9.5	15	5.5
	HT/VHT20, M16 to M23	3	17	6	98.49	5.2	4.7	4.1		9.5	17	7.5
	HT/VHT20, M0 to M7	**4**	17	**12**	98.49	**5.2**	**4.7**	**4.1**	**4.4**	**10.7**	**11**	**0.3**
	HT/VHT20, M8 to M15	4	17	9	98.49	5.2	4.7	4.1	4.4	10.7	14	3.3
	HT/VHT20, M16 to M23	4	17	7	98.49	5.2	4.7	4.1	4.4	10.7	16	5.3
	HT/VHT20, M24 to M31	4	17	6	98.49	5.2	4.7	4.1	4.4	10.7	17	6.3
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	98.49	5.2	4.7			8	14	6
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	98.49	5.2	4.7			8	17	9
	HT/VHT20 Beam Forming, M0 to M7	3	17	11	98.49	5.2	4.7	4.1		9.5	12	2.5
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	98.49	5.2	4.7	4.1		9.5	15	5.5
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	98.49	5.2	4.7	4.1		9.5	17	7.5
	HT/VHT20 Beam Forming, M0 to M7	4	17	12	98.49	5.2	4.7	4.1	4.4	10.7	11	0.3
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	98.49	5.2	4.7	4.1	4.4	10.7	14	3.3
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	98.49	5.2	4.7	4.1	4.4	10.7	16	5.3
	HT/VHT20 Beam Forming, M24 to M31	4	17	6	98.49	5.2	4.7	4.1	4.4	10.7	17	6.3
	HT/VHT20 STBC, M0 to M7	2	17	6	98.49	5.2	4.7			8	17	9
	HT/VHT20 STBC, M0 to M7	3	17	8	98.49	5.2	4.7	4.1		9.5	15	5.5
	HT/VHT20 STBC, M0 to M7	4	17	9	98.49	5.2	4.7	4.1	4.4	10.7	14	3.3

5.4.5 Power Spectral Density Plots

5240MHz, HT20, M0	
Antenna A	**Antenna B**
	
Antenna C	**Antenna D**
	

5.5 Conducted Spurious Emissions

5.5.1 Conducted Spurious Emissions Test Requirement

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:

(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1MHz.
(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.

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Use formula below to substitute conducted measurements in place of radiated measurements

E[dBμV/m] = EIRP [dBm] - 20 log(d[meters]) + 104.77, where E = field strength and d = 3 meter

1) Average Plot, Limit= -41.25 dBm eirp
2) Peak plot, Limit = -21.25 dBm eirp

KDB 789033 D02 General UNII Test Procedures New Rules v01r02

2. Unwanted Emissions that fall Outside of the Restricted Bands
c) At frequencies above 1000 MHz, use the procedure for maximum emissions described in section II.G.5., *"Procedure for Unwanted Maximum Unwanted Emissions Measurements Above 1000MHz."*
§ 15.407(b)(1)-(3) specifies that emissions outside of the respective U-NII bands are subject to a maximum emission limit of -27 dBm/MHz. § 15.407(b)(4) provides two requirement options for devices that operate in the 5.725 – 5.85 GHz band. If the option specified in § 15.407(b)(4)(ii) is exercised, then the procedures specified in Clause 11.11 of ANSI C63.10-2013 and/or in Section 11.0 of KDB Publication 558074 shall be utilized. In general, an out-of-band emission that complies with both the peak and average power limits of § 15.209 is not required to also satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

5.5.2 Conducted Spurious Emissions Test Procedure

Ref. 789033 D02 General UNII Test Procedures New Rules v01r02

Conducted Spurious Emissions Test Procedure
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 v01 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. 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. KDB 789033 D02 General UNII Test Procedures New Rules v01r02
Peak: KDB 789033 Section 5, Average: KDB 789033 Section 6

Conducted Spurious Emissions Test parameters
5. Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz a) Follow the requirements in section II.G.3., *"General Requirements for Unwanted Emissions Measurements"*. b) Maximum emission levels are measured by setting the analyzer as follows: (i) RBW = 1MHz. (ii) VBW ≥ 3MHz. (iii) Detector = Peak. (iv) Sweep time = auto. (v) Trace mode = max hold. (vi) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission. **6. Procedures for Average Unwanted Emissions Measurements above 1000 MHz** a) Follow the requirements in section II.G.3., *"General Requirements for Unwanted Emissions Measurements"*. b) Average emission levels shall be measured using one of the following two methods. d) **Method VB** (Averaging using reduced video bandwidth): Alternative method. (i) RBW = 1 MHz. (ii) Video bandwidth. • If the EUT is configured to transmit with duty cycle ≥ 98 percent, set VBW ≤ RBW/100 (*i.e.,* 10 kHz) but not less than 10 Hz. • If the EUT duty cycle is < 98 percent, set VBW ≥ 1/*T*, where *T* is defined in section II.B.1.a). (iii) Video bandwidth mode or display mode • The instrument shall be set to ensure that video filtering is applied in the power domain. Typically, this requires setting the detector mode to RMS and setting the Average-VBW Type to

Power (RMS).

• As an alternative, the analyzer may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some analyzers require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to “Voltage” regardless of the display mode.

(iv) Detector = Peak.
(v) Sweep time = auto.
(vi) Trace mode = max hold.
(vii) Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where x is the duty cycle. For example, use at least 200 traces if the duty cycle is 25 percent. (If a specific emission is demonstrated to be continuous—*i.e.,* 100 percent duty cycle—rather than turning on and off with the transmit cycle, at least 50 traces shall be averaged.)

5.5.3 Conducted Spurious Emission Test Information

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	EUT	S01	☑	☐
	Support	S02	☐	☑

Tested By: Julian Land	**Date of testing:** March 6, 2019 - March 26, 2019, May 16, 2019
Test Result: PASS	

Test Equipment

See Appendix A for list of test equipment

5.5.4 Conducted Spurious Emissions Data Table – Peak

Frequency (MHz)	Mode	Tx Paths	Index Power (dBm)	Correlated Antenna Gain (dBi)	Tx 1 Spur Power (dBm)	Tx 2 Spur Power (dBm)	Tx 3 Spur Power (dBm)	Tx 4 Spur Power (dBm)	Total Conducted Spur (dBm)	Limit (dBm)	Margin (dB)
5180	Non HT20, 6 to 54 Mbps	1	17	6	-51.1				-45	-21.25	23.75
	Non HT20, 6 to 54 Mbps	2	17	6	-51.1	-50.7			-41.7	-21.25	20.45
	Non HT20, 6 to 54 Mbps	3	17	6	-51.1	-50.7	-50.3		-39.8	-21.25	18.55
	Non HT20, 6 to 54 Mbps	4	16	6	-54.4	-51.5	-51	-57.5	-40.8	-21.25	19.55
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	-51.1	-50.7			-38.7	-21.25	17.45
	Non HT20 Beam Forming, 6 to 54 Mbps	3	16	11	-54.4	-51.5	-51		-36.2	-21.25	14.95
	Non HT20 Beam Forming, 6 to 54 Mbps	4	15	12	-54.3	-54	-53.2	-56	-36.1	-21.25	14.85
	HT/VHT20, M0 to M7	1	17	6	-50.1				-44	-21.25	22.75
	HT/VHT20, M0 to M7	2	17	6	-50.1	-50.7			-41.3	-21.25	20.05
	HT/VHT20, M8 to M15	2	17	6	-50.1	-50.7			-41.3	-21.25	20.05
	HT/VHT20, M0 to M7	3	17	6	-50.1	-50.7	-50.8		-39.7	-21.25	18.45
	HT/VHT20, M8 to M15	3	17	6	-50.1	-50.7	-50.8		-39.7	-21.25	18.45
	HT/VHT20, M16 to M23	3	17	6	-50.1	-50.7	-50.8		-39.7	-21.25	18.45
	HT/VHT20, M0 to M7	4	17	6	-50.1	-50.7	-50.8	-52.2	-38.8	-21.25	17.55
	HT/VHT20, M8 to M15	4	17	6	-50.1	-50.7	-50.8	-52.2	-38.8	-21.25	17.55
	HT/VHT20, M16 to M23	4	17	6	-50.1	-50.7	-50.8	-52.2	-38.8	-21.25	17.55
	HT/VHT20, M24 to M31	4	17	6	-50.1	-50.7	-50.8	-52.2	-38.8	-21.25	17.55
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	-50.1	-50.7			-38.3	-21.25	17.05
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	-50.1	-50.7			-41.3	-21.25	20.05
	HT/VHT20 Beam Forming, M0 to M7	3	15	11	-54.3	-51.6	-54.1		-37.3	-21.25	16.05
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	-50.1	-50.7	-50.8		-37.7	-21.25	16.45
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	-50.1	-50.7	-50.8		-39.7	-21.25	18.45
	HT/VHT20 Beam Forming, M0 to M7	4	15	12	-54.3	-51.6	-54.1	-56.5	-35.7	-21.25	14.45
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	-50.1	-50.7	-50.8	-52.2	-35.8	-21.25	14.55
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	-50.1	-50.7	-50.8	-52.2	-37.8	-21.25	16.55
	HT/VHT20 Beam Forming, M24 to M31	4	17	6	-50.1	-50.7	-50.8	-52.2	-38.8	-21.25	17.55
	HT/VHT20 STBC, M0 to M7	2	17	6	-50.1	-50.7			-41.3	-21.25	20.05
	HT/VHT20 STBC, M0 to M7	3	17	6	-50.1	-50.7	-50.8		-39.7	-21.25	18.45
	HT/VHT20 STBC, M0 to M7	4	17	6	-50.1	-50.7	-50.8	-52.2	-38.8	-21.25	17.55

5190	Non HT40, 6 to 54 Mbps	1	17	6	-50.3				-44.2	-21.25	22.95
	Non HT40, 6 to 54 Mbps	2	17	6	-50.3	-50.7			-41.3	-21.25	20.05
	Non HT40, 6 to 54 Mbps	3	17	6	-50.3	-50.7	-51.1		-39.8	-21.25	18.55
	Non HT40, 6 to 54 Mbps	4	17	6	-50.3	-50.7	-51.1	-52.8	-39	-21.25	17.75
	HT/VHT40, M0 to M7	1	17	6	-50.9				-44.8	-21.25	23.55
	HT/VHT40, M0 to M7	2	17	6	-50.9	-49.9			-41.2	-21.25	19.95
	HT/VHT40, M8 to M15	2	17	6	-50.9	-49.9			-41.2	-21.25	19.95
	HT/VHT40, M0 to M7	3	16	6	-51.2	-50.6	-50.5		-39.8	-21.25	18.55
	HT/VHT40, M8 to M15	3	16	6	-51.2	-50.6	-50.5		-39.8	-21.25	18.55
	HT/VHT40, M16 to M23	3	16	6	-51.2	-50.6	-50.5		-39.8	-21.25	18.55
	HT/VHT40, M0 to M7	4	16	6	-51.2	-50.6	-50.5	-53.6	-39.2	-21.25	17.95
	HT/VHT40, M8 to M15	4	16	6	-51.2	-50.6	-50.5	-53.6	-39.2	-21.25	17.95
	HT/VHT40, M16 to M23	4	16	6	-51.2	-50.6	-50.5	-53.6	-39.2	-21.25	17.95
	HT/VHT40, M24 to M31	4	16	6	-51.2	-50.6	-50.5	-53.6	-39.2	-21.25	17.95
	HT/VHT40 Beam Forming, M0 to M7	2	15	9	-50.4	-50.2			-38.1	-21.25	16.85
	HT/VHT40 Beam Forming, M8 to M15	2	17	6	-50.9	-49.9			-41.2	-21.25	19.95
	HT/VHT40 Beam Forming, M0 to M7	3	13	11	-53.1	-54.9	-54.2		-38.1	-21.25	16.85
	HT/VHT40 Beam Forming, M8 to M15	3	15	8	-50.4	-50.2	-50.7		-37.5	-21.25	16.25
	HT/VHT40 Beam Forming, M16 to M23	3	16	6	-51.2	-50.6	-50.5		-39.8	-21.25	18.55
	HT/VHT40 Beam Forming, M0 to M7	4	12	12	-53.4	-54.8	-55.1	-57	-36.7	-21.25	15.45
	HT/VHT40 Beam Forming, M8 to M15	4	14	9	-53.7	-53.5	-50.7	-56.2	-37.9	-21.25	16.65
	HT/VHT40 Beam Forming, M16 to M23	4	15	7	-50.4	-50.2	-50.7	-53.3	-37.8	-21.25	16.55
	HT/VHT40 Beam Forming, M24 to M31	4	16	6	-51.2	-50.6	-50.5	-53.6	-39.2	-21.25	17.95
	HT/VHT40 STBC, M0 to M7	2	17	6	-50.9	-49.9			-41.2	-21.25	19.95
	HT/VHT40 STBC, M0 to M7	3	16	6	-51.2	-50.6	-50.5		-39.8	-21.25	18.55
	HT/VHT40 STBC, M0 to M7	4	16	6	-51.2	-50.6	-50.5	-53.6	-39.2	-21.25	17.95
5210	Non HT80, 6 to 54 Mbps	1	16	6	-51.2				-45.1	-21.25	23.85
	Non HT80, 6 to 54 Mbps	2	15	6	-50.8	-51.4			-41.9	-21.25	20.65
	Non HT80, 6 to 54 Mbps	3	15	6	-50.8	-51.4	-50.6		-40	-21.25	18.75
	Non HT80, 6 to 54 Mbps	4	14	6	-50.2	-51.5	-51.7	-52.4	-39.2	-21.25	17.95
	VHT80, M0 to M9 1ss	1	16	6	-50.8				-44.1	-21.25	22.85
	VHT80, M0 to M9 1ss	2	15	6	-51.6	-51.1			-41.6	-21.25	20.35
	VHT80, M0 to M9 2ss	2	15	6	-51.6	-51.1			-41.6	-21.25	20.35
	VHT80, M0 to M9 1ss	3	14	6	-51.6	-50.1	-50.9		-39.4	-21.25	18.15
	VHT80, M0 to M9 2ss	3	14	6	-51.6	-50.1	-50.9		-39.4	-21.25	18.15
	VHT80, M0 to M9 3ss	3	14	6	-51.6	-50.1	-50.9		-39.4	-21.25	18.15
	VHT80, M0 to M9 1ss	4	14	6	-51.6	-50.1	-50.9	-52.9	-38.5	-21.25	17.25
	VHT80, M0 to M9 2ss	4	14	6	-51.6	-50.1	-50.9	-52.9	-38.5	-21.25	17.25

	VHT80, M0 to M9 3ss	4	14	6	-51.6	-50.1	-50.9	-52.9	-38.5	-21.25	17.25
	VHT80, M0 to M9 4ss	4	14	6	-51.6	-50.1	-50.9	-52.9	-38.5	-21.25	17.25
	VHT80 Beam Forming, M0 to M9 1ss	2	13	9	-51.7	-51.6			-38.9	-21.25	17.65
	VHT80 Beam Forming, M0 to M9 2ss	2	15	6	-51.6	-51.1			-41.6	-21.25	20.35
	VHT80 Beam Forming, M0 to M9 1ss	3	11	11	-54.1	-54.4	-54.9		-38	-21.25	16.75
	VHT80 Beam Forming, M0 to M9 2ss	3	12	8	-53.9	-54.3	-51.4		-39.5	-21.25	18.25
	VHT80 Beam Forming, M0 to M9 3ss	3	14	6	-51.6	-50.1	-50.9		-39.4	-21.25	18.15
	VHT80 Beam Forming, M0 to M9 1ss	4	9	12	-55.2	-53.4	-55.1	-56.4	-36.2	-21.25	14.95
	VHT80 Beam Forming, M0 to M9 2ss	4	12	9	-53.9	-54.3	-51.4	-57.5	-38	-21.25	16.75
	VHT80 Beam Forming, M0 to M9 3ss	4	12	7	-53.9	-54.3	-51.4	-57.5	-40	-21.25	18.75
	VHT80 Beam Forming, M0 to M9 4ss	4	14	6	-51.6	-50.1	-50.9	-52.9	-38.5	-21.25	17.25
	VHT80 STBC, M0 to M9 1ss	2	15	6	-51.6	-51.1			-41.6	-21.25	20.35
	VHT80 STBC, M0 to M9 1ss	3	14	6	-51.6	-50.1	-50.9		-39.4	-21.25	18.15
	VHT80 STBC, M0 to M9 1ss	4	14	6	-51.6	-50.1	-50.9	-52.9	-38.5	-21.25	17.25
5220	Non HT20, 6 to 54 Mbps	1	17	6	-50.7				-44.6	-21.25	23.35
	Non HT20, 6 to 54 Mbps	2	17	6	-50.7	-51.8			-42.1	-21.25	20.85
	Non HT20, 6 to 54 Mbps	3	17	6	-50.7	-51.8	-50		-39.9	-21.25	18.65
	Non HT20, 6 to 54 Mbps	4	16	6	-54.6	-51.2	-53.7	-55.5	-41.3	-21.25	20.05
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	-50.7	-51.8			-39.1	-21.25	17.85
	Non HT20 Beam Forming, 6 to 54 Mbps	3	17	11	-50.7	-51.8	-50		-34.9	-21.25	13.65
	Non HT20 Beam Forming, 6 to 54 Mbps	4	16	12	-54.6	-51.2	-53.7	-55.5	-35.3	-21.25	14.05
	HT/VHT20, M0 to M7	1	17	6	-48.5				-42.4	-21.25	21.15
	HT/VHT20, M0 to M7	2	17	6	-48.5	-52.2			-40.9	-21.25	19.65
	HT/VHT20, M8 to M15	2	17	6	-48.5	-52.2			-40.9	-21.25	19.65
	HT/VHT20, M0 to M7	3	17	6	-48.5	-52.2	-49.7		-39	-21.25	17.75
	HT/VHT20, M8 to M15	3	17	6	-48.5	-52.2	-49.7		-39	-21.25	17.75
	HT/VHT20, M16 to M23	3	17	6	-48.5	-52.2	-49.7		-39	-21.25	17.75
	HT/VHT20, M0 to M7	4	17	6	-48.5	-52.2	-49.7	-51.8	-38.2	-21.25	16.95
	HT/VHT20, M8 to M15	4	17	6	-48.5	-52.2	-49.7	-51.8	-38.2	-21.25	16.95
	HT/VHT20, M16 to M23	4	17	6	-48.5	-52.2	-49.7	-51.8	-38.2	-21.25	16.95
	HT/VHT20, M24 to M31	4	17	6	-48.5	-52.2	-49.7	-51.8	-38.2	-21.25	16.95
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	-48.5	-52.2			-37.9	-21.25	16.65
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	-48.5	-52.2			-40.9	-21.25	19.65
	HT/VHT20 Beam Forming, M0 to M7	3	17	11	-48.5	-52.2	-49.7		-34	-21.25	12.75
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	-48.5	-52.2	-49.7		-37	-21.25	15.75
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	-48.5	-52.2	-49.7		-39	-21.25	17.75
	HT/VHT20 Beam Forming, M0 to M7	**4**	17	**12**	**-48.5**	**-52.2**	**-49.7**	**-51.8**	**-32.2**	**-21.25**	**10.95**
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	-48.5	-52.2	-49.7	-51.8	-35.2	-21.25	13.95
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	-48.5	-52.2	-49.7	-51.8	-37.2	-21.25	15.95

	HT/VHT20 Beam Forming, M24 to M31	4	17	6	-48.5	-52.2	-49.7	-51.8	-38.2	-21.25	16.95
	HT/VHT20 STBC, M0 to M7	2	17	6	-48.5	-52.2			-40.9	-21.25	19.65
	HT/VHT20 STBC, M0 to M7	3	17	6	-48.5	-52.2	-49.7		-39	-21.25	17.75
	HT/VHT20 STBC, M0 to M7	4	17	6	-48.5	-52.2	-49.7	-51.8	-38.2	-21.25	16.95
5230	Non HT40, 6 to 54 Mbps	1	17	6	-50.2				-44.1	-21.25	22.85
	Non HT40, 6 to 54 Mbps	2	17	6	-50.2	-50.3			-41.1	-21.25	19.85
	Non HT40, 6 to 54 Mbps	3	17	6	-50.2	-50.3	-50		-39.3	-21.25	18.05
	Non HT40, 6 to 54 Mbps	4	17	6	-50.2	-50.3	-50	-52.8	-38.5	-21.25	17.25
	HT/VHT40, M0 to M7	1	17	6	-50.6				-44.5	-21.25	23.25
	HT/VHT40, M0 to M7	2	17	6	-50.6	-52			-42.1	-21.25	20.85
	HT/VHT40, M8 to M15	2	17	6	-50.6	-52			-42.1	-21.25	20.85
	HT/VHT40, M0 to M7	3	17	6	-50.6	-52	-49.7		-39.8	-21.25	18.55
	HT/VHT40, M8 to M15	3	17	6	-50.6	-52	-49.7		-39.8	-21.25	18.55
	HT/VHT40, M16 to M23	3	17	6	-50.6	-52	-49.7		-39.8	-21.25	18.55
	HT/VHT40, M0 to M7	4	17	6	-50.6	-52	-49.7	-52.3	-38.9	-21.25	17.65
	HT/VHT40, M8 to M15	4	17	6	-50.6	-52	-49.7	-52.3	-38.9	-21.25	17.65
	HT/VHT40, M16 to M23	4	17	6	-50.6	-52	-49.7	-52.3	-38.9	-21.25	17.65
	HT/VHT40, M24 to M31	4	17	6	-50.6	-52	-49.7	-52.3	-38.9	-21.25	17.65
	HT/VHT40 Beam Forming, M0 to M7	2	17	9	-50.6	-52			-39.1	-21.25	17.85
	HT/VHT40 Beam Forming, M8 to M15	2	17	6	-50.6	-52			-42.1	-21.25	20.85
	HT/VHT40 Beam Forming, M0 to M7	3	17	11	-50.6	-52	-49.7		-34.8	-21.25	13.55
	HT/VHT40 Beam Forming, M8 to M15	3	17	8	-50.6	-52	-49.7		-37.8	-21.25	16.55
	HT/VHT40 Beam Forming, M16 to M23	3	17	6	-50.6	-52	-49.7		-39.8	-21.25	18.55
	HT/VHT40 Beam Forming, M0 to M7	4	**17**	12	-50.6	-52	-49.7	-52.3	-32.9	-21.25	11.65
	HT/VHT40 Beam Forming, M8 to M15	4	17	9	-50.6	-52	-49.7	-52.3	-35.9	-21.25	14.65
	HT/VHT40 Beam Forming, M16 to M23	4	17	7	-50.6	-52	-49.7	-52.3	-37.9	-21.25	16.65
	HT/VHT40 Beam Forming, M24 to M31	4	17	6	-50.6	-52	-49.7	-52.3	-38.9	-21.25	17.65
	HT/VHT40 STBC, M0 to M7	2	17	6	-50.6	-52			-42.1	-21.25	20.85
	HT/VHT40 STBC, M0 to M7	3	17	6	-50.6	-52	-49.7		-39.8	-21.25	18.55
	HT/VHT40 STBC, M0 to M7	4	17	6	-50.6	-52	-49.7	-52.3	-38.9	-21.25	17.65
5240	Non HT20, 6 to 54 Mbps	1	17	6	-49.9				-43.8	-21.25	22.55
	Non HT20, 6 to 54 Mbps	2	17	6	-49.9	-51.7			-41.6	-21.25	20.35
	Non HT20, 6 to 54 Mbps	3	17	6	-49.9	-51.7	-49.9		-39.5	-21.25	18.25
	Non HT20, 6 to 54 Mbps	4	16	6	-55	-52	-50.7	-56.1	-40.8	-21.25	19.55
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	-49.9	-51.7			-38.6	-21.25	17.35
	Non HT20 Beam Forming, 6 to 54 Mbps	3	17	11	-49.9	-51.7	-49.9		-34.5	-21.25	13.25
	Non HT20 Beam Forming, 6 to 54 Mbps	4	16	12	-55	-52	-50.7	-56.1	-34.8	-21.25	13.55
	HT/VHT20, M0 to M7	1	17	6	-50.7				-44.6	-21.25	23.35

	HT/VHT20, M0 to M7	2	17	6	-50.7	-51.6			-42	-21.25	20.75
	HT/VHT20, M8 to M15	2	17	6	-50.7	-51.6			-42	-21.25	20.75
	HT/VHT20, M0 to M7	3	17	6	-50.7	-51.6	-49.9		-39.8	-21.25	18.55
	HT/VHT20, M8 to M15	3	17	6	-50.7	-51.6	-49.9		-39.8	-21.25	18.55
	HT/VHT20, M16 to M23	3	17	6	-50.7	-51.6	-49.9		-39.8	-21.25	18.55
	HT/VHT20, M0 to M7	4	17	6	-50.7	-51.6	-49.9	-52.7	-39	-21.25	17.75
	HT/VHT20, M8 to M15	4	17	6	-50.7	-51.6	-49.9	-52.7	-39	-21.25	17.75
	HT/VHT20, M16 to M23	4	17	6	-50.7	-51.6	-49.9	-52.7	-39	-21.25	17.75
	HT/VHT20, M24 to M31	4	17	6	-50.7	-51.6	-49.9	-52.7	-39	-21.25	17.75
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	-50.7	-51.6			-39	-21.25	17.75
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	-50.7	-51.6			-42	-21.25	20.75
	HT/VHT20 Beam Forming, M0 to M7	3	17	11	-50.7	-51.6	-49.9		-34.8	-21.25	13.55
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	-50.7	-51.6	-49.9		-37.8	-21.25	16.55
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	-50.7	-51.6	-49.9		-39.8	-21.25	18.55
	HT/VHT20 Beam Forming, M0 to M7	4	17	12	-50.7	-51.6	-49.9	-52.7	-33	-21.25	11.75
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	-50.7	-51.6	-49.9	-52.7	-36	-21.25	14.75
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	-50.7	-51.6	-49.9	-52.7	-38	-21.25	16.75
	HT/VHT20 Beam Forming, M24 to M31	4	17	6	-50.7	-51.6	-49.9	-52.7	-39	-21.25	17.75
	HT/VHT20 STBC, M0 to M7	2	17	6	-50.7	-51.6			-42	-21.25	20.75
	HT/VHT20 STBC, M0 to M7	3	17	6	-50.7	-51.6	-49.9		-39.8	-21.25	18.55
	HT/VHT20 STBC, M0 to M7	4	17	6	-50.7	-51.6	-49.9	-52.7	-39	-21.25	17.75

5.5.5 Conducted Spurious Emissions Plot – Peak 30MHz – 12GHz

HT20 Beam Forming, 5220MHz, M0	
Antenna A	**Antenna B**
	
Antenna C	**Antenna D**
	

5.5.6 Conducted Spurious Emissions Data Table – Average

Frequency (MHz)	Mode	Tx Paths	Index Power (dBm)	Correlated Antenna Gain (dBi)	Tx 1 Spur Power (dBm)	Tx 2 Spur Power (dBm)	Tx 3 Spur Power (dBm)	Tx 4 Spur Power (dBm)	Total Conducted Spur (dBm)	Limit (dBm)	Margin (dB)
5180	Non HT20, 6 to 54 Mbps	1	17	6	-62.7				-56.6	-41.25	15.3
	Non HT20, 6 to 54 Mbps	2	17	6	-62.7	-61.3			-52.8	-41.25	11.5
	Non HT20, 6 to 54 Mbps	3	17	6	-62.7	-61.3	-61.3		-50.8	-41.25	9.6
	Non HT20, 6 to 54 Mbps	4	16	6	-66	-61.4	-61	-67.5	-51	-41.25	9.7
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	-62.7	-61.3			-49.8	-41.25	8.5
	Non HT20 Beam Forming, 6 to 54 Mbps	3	16	11	-66	-61.4	-61		-46.4	-41.25	5.1
	Non HT20 Beam Forming, 6 to 54 Mbps	4	15	12	-66.1	-65.9	-64.9	-67.6	-47.9	-41.25	6.6
	HT/VHT20, M0 to M7	1	17	6	-62.4				-56.3	-41.25	15.1
	HT/VHT20, M0 to M7	2	17	6	-62.4	-61.2			-52.7	-41.25	11.4
	HT/VHT20, M8 to M15	2	17	6	-62.4	-61.2			-52.7	-41.25	11.4
	HT/VHT20, M0 to M7	3	17	6	-62.4	-61.2	-60.7		-50.5	-41.25	9.3
	HT/VHT20, M8 to M15	3	17	6	-62.4	-61.2	-60.7		-50.5	-41.25	9.3
	HT/VHT20, M16 to M23	3	17	6	-62.4	-61.2	-60.7		-50.5	-41.25	9.3
	HT/VHT20, M0 to M7	4	17	6	-62.4	-61.2	-60.7	-63.5	-49.7	-41.25	8.5
	HT/VHT20, M8 to M15	4	17	6	-62.4	-61.2	-60.7	-63.5	-49.7	-41.25	8.5
	HT/VHT20, M16 to M23	4	17	6	-62.4	-61.2	-60.7	-63.5	-49.7	-41.25	8.5
	HT/VHT20, M24 to M31	4	17	6	-62.4	-61.2	-60.7	-63.5	-49.7	-41.25	8.5
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	-62.4	-61.2			-49.7	-41.25	8.4
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	-62.4	-61.2			-52.7	-41.25	11.4
	HT/VHT20 Beam Forming, M0 to M7	3	15	11	-65.5	-65.6	-64.8		-49.4	-41.25	8.2
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	-62.4	-61.2	-60.7		-48.5	-41.25	7.3
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	-62.4	-61.2	-60.7		-50.5	-41.25	9.3
	HT/VHT20 Beam Forming, M0 to M7	4	15	12	-65.5	-65.6	-64.8	-67.6	-47.7	-41.25	6.4
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	-62.4	-61.2	-60.7	-63.5	-46.7	-41.25	5.5
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	-62.4	-61.2	-60.7	-63.5	-48.7	-41.25	7.5
	HT/VHT20 Beam Forming, M24 to M31	4	17	6	-62.4	-61.2	-60.7	-63.5	-49.7	-41.25	8.5
	HT/VHT20 STBC, M0 to M7	2	17	6	-62.4	-61.2			-52.7	-41.25	11.4
	HT/VHT20 STBC, M0 to M7	3	17	6	-62.4	-61.2	-60.7		-50.5	-41.25	9.3
	HT/VHT20 STBC, M0 to M7	4	17	6	-62.4	-61.2	-60.7	-63.5	-49.7	-41.25	8.5

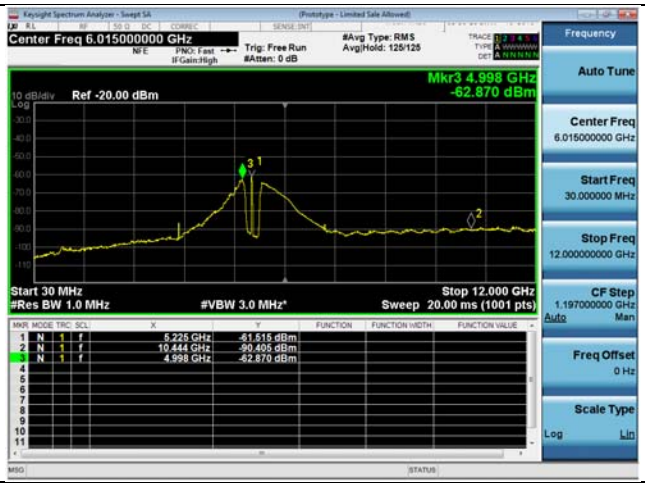
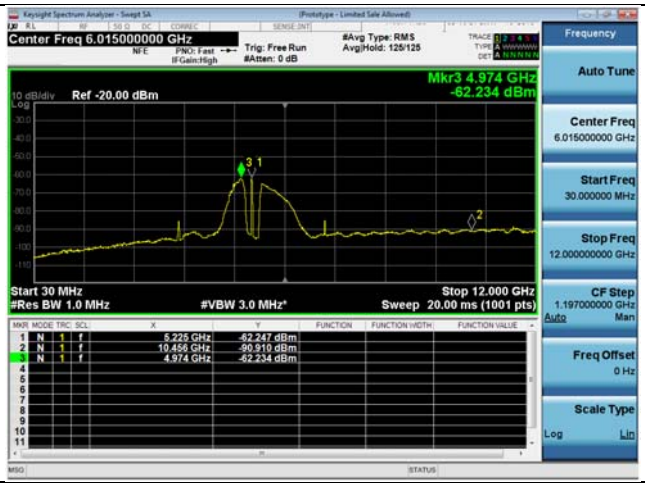
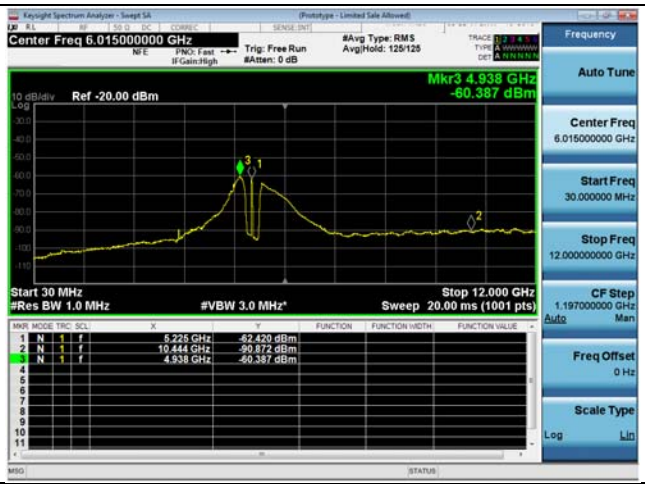
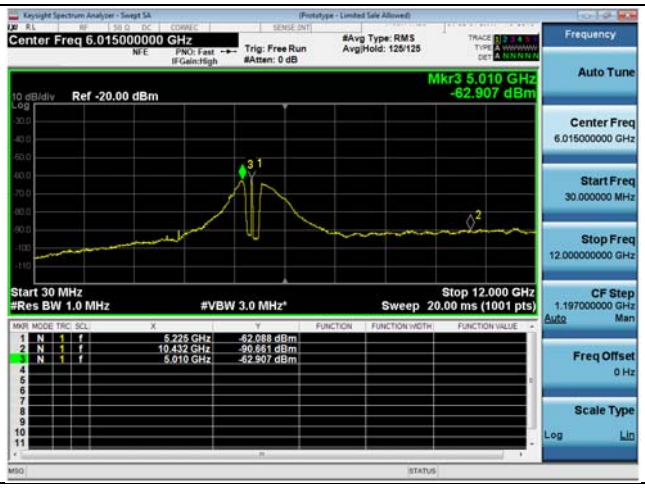
5190	Non HT40, 6 to 54 Mbps	1	17	6	-62.3				-56.2	-41.25	14.9
	Non HT40, 6 to 54 Mbps	2	17	6	-62.3	-61.5			-52.7	-41.25	11.5
	Non HT40, 6 to 54 Mbps	3	17	6	-62.3	-61.5	-61.2		-50.7	-41.25	9.5
	Non HT40, 6 to 54 Mbps	4	17	6	-62.3	-61.5	-61.2	-63.4	-49.9	-41.25	8.6
	HT/VHT40, M0 to M7	1	17	6	-63.1				-57	-41.25	15.7
	HT/VHT40, M0 to M7	2	17	6	-63.1	-61.3			-53	-41.25	11.7
	HT/VHT40, M8 to M15	2	17	6	-63.1	-61.3			-53	-41.25	11.7
	HT/VHT40, M0 to M7	3	16	6	-63.2	-61.3	-61.2		-50.9	-41.25	9.6
	HT/VHT40, M8 to M15	3	16	6	-63.2	-61.3	-61.2		-50.9	-41.25	9.6
	HT/VHT40, M16 to M23	3	16	6	-63.2	-61.3	-61.2		-50.9	-41.25	9.6
	HT/VHT40, M0 to M7	4	16	6	-63.2	-61.3	-61.2	-63.5	-50	-41.25	8.8
	HT/VHT40, M8 to M15	4	16	6	-63.2	-61.3	-61.2	-63.5	-50	-41.25	8.8
	HT/VHT40, M16 to M23	4	16	6	-63.2	-61.3	-61.2	-63.5	-50	-41.25	8.8
	HT/VHT40, M24 to M31	4	16	6	-63.2	-61.3	-61.2	-63.5	-50	-41.25	8.8
	HT/VHT40 Beam Forming, M0 to M7	2	15	9	-63.4	-61.3			-50.1	-41.25	8.8
	HT/VHT40 Beam Forming, M8 to M15	2	17	6	-63.1	-61.3			-53	-41.25	11.7
	HT/VHT40 Beam Forming, M0 to M7	3	13	11	-65.9	-65.8	-65.3		-49.7	-41.25	8.5
	HT/VHT40 Beam Forming, M8 to M15	3	15	8	-63.4	-61.3	-61.2		-48.9	-41.25	7.7
	HT/VHT40 Beam Forming, M16 to M23	3	16	6	-63.2	-61.3	-61.2		-50.9	-41.25	9.6
	HT/VHT40 Beam Forming, M0 to M7	4	12	12	-65.7	-66.1	-65.5	-67.7	-48	-41.25	6.8
	HT/VHT40 Beam Forming, M8 to M15	4	14	9	-66.5	-66	-60.9	-67.7	-49.2	-41.25	8
	HT/VHT40 Beam Forming, M16 to M23	4	15	7	-63.4	-61.3	-61.2	-63.7	-49.1	-41.25	7.8
	HT/VHT40 Beam Forming, M24 to M31	4	16	6	-63.2	-61.3	-61.2	-63.5	-50	-41.25	8.8
	HT/VHT40 STBC, M0 to M7	2	17	6	-63.1	-61.3			-53	-41.25	11.7
	HT/VHT40 STBC, M0 to M7	3	16	6	-63.2	-61.3	-61.2		-50.9	-41.25	9.6
	HT/VHT40 STBC, M0 to M7	4	16	6	-63.2	-61.3	-61.2	-63.5	-50	-41.25	8.8
5210	Non HT80, 6 to 54 Mbps	1	16	6	-62.6				-56.5	-41.25	15.2
	Non HT80, 6 to 54 Mbps	2	15	6	-62.7	-62.1			-53.2	-41.25	12
	Non HT80, 6 to 54 Mbps	3	15	6	-62.7	-62.1	-61.8		-51.3	-41.25	10
	Non HT80, 6 to 54 Mbps	4	14	6	-62.7	-62	-61.9	-63.4	-50.3	-41.25	9
	VHT80, M0 to M9 1ss	1	16	6	-62.9				-56.2	-41.25	15
	VHT80, M0 to M9 1ss	2	15	6	-63.4	-62.1			-53	-41.25	11.7
	VHT80, M0 to M9 2ss	2	15	6	-63.4	-62.1			-53	-41.25	11.7
	VHT80, M0 to M9 1ss	3	14	6	-63.1	-62.2	-62.1		-51	-41.25	9.7
	VHT80, M0 to M9 2ss	3	14	6	-63.1	-62.2	-62.1		-51	-41.25	9.7
	VHT80, M0 to M9 3ss	3	14	6	-63.1	-62.2	-62.1		-51	-41.25	9.7
	VHT80, M0 to M9 1ss	4	14	6	-63.1	-62.2	-62.1	-64.3	-50.1	-41.25	8.9
	VHT80, M0 to M9 2ss	4	14	6	-63.1	-62.2	-62.1	-64.3	-50.1	-41.25	8.9

	VHT80, M0 to M9 3ss	4	14	6	-63.1	-62.2	-62.1	-64.3	-50.1	-41.25	8.9
	VHT80, M0 to M9 4ss	4	14	6	-63.1	-62.2	-62.1	-64.3	-50.1	-41.25	8.9
	VHT80 Beam Forming, M0 to M9 1ss	2	13	9	-63.6	-62.4			-50.2	-41.25	9
	VHT80 Beam Forming, M0 to M9 2ss	2	15	6	-63.4	-62.1			-53	-41.25	11.7
	VHT80 Beam Forming, M0 to M9 1ss	3	11	11	-66.9	-66.8	-65.7		-50	-41.25	8.7
	VHT80 Beam Forming, M0 to M9 2ss	3	12	8	-66.9	-66.9	-62		-51.1	-41.25	9.9
	VHT80 Beam Forming, M0 to M9 3ss	3	14	6	-63.1	-62.2	-62.1		-51	-41.25	9.7
	VHT80 Beam Forming, M0 to M9 1ss	4	9	12	-67	-66.9	-66.2	-68.3	-48.3	-41.25	7.1
	VHT80 Beam Forming, M0 to M9 2ss	4	12	9	-66.9	-66.9	-62	-68.5	-49.6	-41.25	8.3
	VHT80 Beam Forming, M0 to M9 3ss	4	12	7	-66.9	-66.9	-62	-68.5	-51.6	-41.25	10.3
	VHT80 Beam Forming, M0 to M9 4ss	4	14	6	-63.1	-62.2	-62.1	-64.3	-50.1	-41.25	8.9
	VHT80 STBC, M0 to M9 1ss	2	15	6	-63.4	-62.1			-53	-41.25	11.7
	VHT80 STBC, M0 to M9 1ss	3	14	6	-63.1	-62.2	-62.1		-51	-41.25	9.7
	VHT80 STBC, M0 to M9 1ss	4	14	6	-63.1	-62.2	-62.1	-64.3	-50.1	-41.25	8.9
5220	Non HT20, 6 to 54 Mbps	1	17	6	-63				-56.9	-41.25	15.6
	Non HT20, 6 to 54 Mbps	2	17	6	-63	-62.1			-53.4	-41.25	12.1
	Non HT20, 6 to 54 Mbps	3	17	6	-63	-62.1	-60.5		-50.8	-41.25	9.6
	Non HT20, 6 to 54 Mbps	4	16	6	-66.9	-62.2	-63.8	-66.2	-52.2	-41.25	11
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	-63	-62.1			-50.4	-41.25	9.1
	Non HT20 Beam Forming, 6 to 54 Mbps	3	17	11	-63	-62.1	-60.5		-45.8	-41.25	4.6
	Non HT20 Beam Forming, 6 to 54 Mbps	4	16	12	-66.9	-62.2	-63.8	-66.2	-46.2	-41.25	5
	HT/VHT20, M0 to M7	1	17	6	-62.7				-56.6	-41.25	15.4
	HT/VHT20, M0 to M7	2	17	6	-62.7	-62.1			-53.3	-41.25	12.1
	HT/VHT20, M8 to M15	2	17	6	-62.7	-62.1			-53.3	-41.25	12.1
	HT/VHT20, M0 to M7	3	17	6	-62.7	-62.1	-60.8		-51	-41.25	9.7
	HT/VHT20, M8 to M15	3	17	6	-62.7	-62.1	-60.8		-51	-41.25	9.7
	HT/VHT20, M16 to M23	3	17	6	-62.7	-62.1	-60.8		-51	-41.25	9.7
	HT/VHT20, M0 to M7	4	17	6	-62.7	-62.1	-60.8	-62.9	-50	-41.25	8.7
	HT/VHT20, M8 to M15	4	17	6	-62.7	-62.1	-60.8	-62.9	-50	-41.25	8.7
	HT/VHT20, M16 to M23	4	17	6	-62.7	-62.1	-60.8	-62.9	-50	-41.25	8.7
	HT/VHT20, M24 to M31	4	17	6	-62.7	-62.1	-60.8	-62.9	-50	-41.25	8.7
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	-62.7	-62.1			-50.3	-41.25	9.1
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	-62.7	-62.1			-53.3	-41.25	12.1
	HT/VHT20 Beam Forming, M0 to M7	3	17	11	-62.7	-62.1	-60.8		-46	-41.25	4.7
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	-62.7	-62.1	-60.8		-49	-41.25	7.7
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	-62.7	-62.1	-60.8		-51	-41.25	9.7
	HT/VHT20 Beam Forming, M0 to M7	4	17	12	-62.7	-62.1	-60.8	-62.9	-44	-41.25	2.7
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	-62.7	-62.1	-60.8	-62.9	-47	-41.25	5.7
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	-62.7	-62.1	-60.8	-62.9	-49	-41.25	7.7

	HT/VHT20 Beam Forming, M24 to M31	4	17	6	-62.7	-62.1	-60.8	-62.9	-50	-41.25	8.7
	HT/VHT20 STBC, M0 to M7	2	17	6	-62.7	-62.1			-53.3	-41.25	12.1
	HT/VHT20 STBC, M0 to M7	3	17	6	-62.7	-62.1	-60.8		-51	-41.25	9.7
	HT/VHT20 STBC, M0 to M7	4	17	6	-62.7	-62.1	-60.8	-62.9	-50	-41.25	8.7
5230	Non HT40, 6 to 54 Mbps	1	17	6	-62.6				-56.5	-41.25	15.2
	Non HT40, 6 to 54 Mbps	2	17	6	-62.6	-62.3			-53.3	-41.25	12
	Non HT40, 6 to 54 Mbps	3	17	6	-62.6	-62.3	-60.3		-50.7	-41.25	9.4
	Non HT40, 6 to 54 Mbps	4	17	6	-62.6	-62.3	-60.3	-62.7	-49.7	-41.25	8.4
	HT/VHT40, M0 to M7	1	17	6	-62.9				-56.8	-41.25	15.5
	HT/VHT40, M0 to M7	2	17	6	-62.9	-62.2			-53.4	-41.25	12.1
	HT/VHT40, M8 to M15	2	17	6	-62.9	-62.2			-53.4	-41.25	12.1
	HT/VHT40, M0 to M7	3	17	6	-62.9	-62.2	-60.4		-50.8	-41.25	9.5
	HT/VHT40, M8 to M15	3	17	6	-62.9	-62.2	-60.4		-50.8	-41.25	9.5
	HT/VHT40, M16 to M23	3	17	6	-62.9	-62.2	-60.4		-50.8	-41.25	9.5
	HT/VHT40, M0 to M7	4	17	6	-62.9	-62.2	-60.4	-62.9	-49.8	-41.25	8.6
	HT/VHT40, M8 to M15	4	17	6	-62.9	-62.2	-60.4	-62.9	-49.8	-41.25	8.6
	HT/VHT40, M16 to M23	4	17	6	-62.9	-62.2	-60.4	-62.9	-49.8	-41.25	8.6
	HT/VHT40, M24 to M31	4	17	6	-62.9	-62.2	-60.4	-62.9	-49.8	-41.25	8.6
	HT/VHT40 Beam Forming, M0 to M7	2	17	9	-62.9	-62.2			-50.4	-41.25	9.1
	HT/VHT40 Beam Forming, M8 to M15	2	17	6	-62.9	-62.2			-53.4	-41.25	12.1
	HT/VHT40 Beam Forming, M0 to M7	3	17	11	-62.9	-62.2	-60.4		-45.8	-41.25	4.5
	HT/VHT40 Beam Forming, M8 to M15	3	17	8	-62.9	-62.2	-60.4		-48.8	-41.25	7.5
	HT/VHT40 Beam Forming, M16 to M23	3	17	6	-62.9	-62.2	-60.4		-50.8	-41.25	9.5
	HT/VHT40 Beam Forming, M0 to M7	**4**	**17**	**12**	**-62.9**	**-62.2**	**-60.4**	**-62.9**	**-43.8**	**-41.25**	**2.6**
	HT/VHT40 Beam Forming, M8 to M15	4	17	9	-62.9	-62.2	-60.4	-62.9	-46.8	-41.25	5.6
	HT/VHT40 Beam Forming, M16 to M23	4	17	7	-62.9	-62.2	-60.4	-62.9	-48.8	-41.25	7.6
	HT/VHT40 Beam Forming, M24 to M31	4	17	6	-62.9	-62.2	-60.4	-62.9	-49.8	-41.25	8.6
	HT/VHT40 STBC, M0 to M7	2	17	6	-62.9	-62.2			-53.4	-41.25	12.1
	HT/VHT40 STBC, M0 to M7	3	17	6	-62.9	-62.2	-60.4		-50.8	-41.25	9.5
	HT/VHT40 STBC, M0 to M7	4	17	6	-62.9	-62.2	-60.4	-62.9	-49.8	-41.25	8.6
5240	Non HT20, 6 to 54 Mbps	1	17	6	-62.6				-56.5	-41.25	15.2
	Non HT20, 6 to 54 Mbps	2	17	6	-62.6	-62.4			-53.3	-41.25	12.1
	Non HT20, 6 to 54 Mbps	3	17	6	-62.6	-62.4	-60.7		-50.9	-41.25	9.7
	Non HT20, 6 to 54 Mbps	4	16	6	-67.2	-62.3	-60.8	-66.4	-51.2	-41.25	10
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	-62.6	-62.4			-50.3	-41.25	9.1
	Non HT20 Beam Forming, 6 to 54 Mbps	3	17	11	-62.6	-62.4	-60.7		-45.9	-41.25	4.7
	Non HT20 Beam Forming, 6 to 54 Mbps	4	16	12	-67.2	-62.3	-60.8	-66.4	-45.2	-41.25	4
	HT/VHT20, M0 to M7	1	17	6	-62.7				-56.6	-41.25	15.4

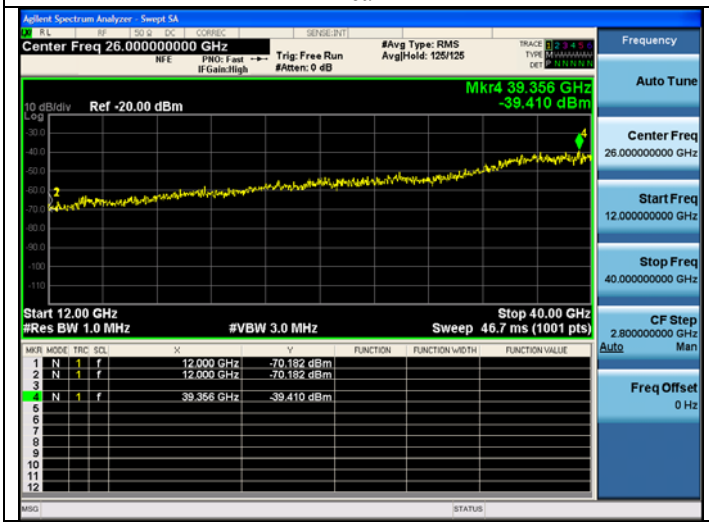
	HT/VHT20, M0 to M7	2	17	6	-62.7	-62.3			-53.4	-41.25	12.2
	HT/VHT20, M8 to M15	2	17	6	-62.7	-62.3			-53.4	-41.25	12.2
	HT/VHT20, M0 to M7	3	17	6	-62.7	-62.3	-60.4		-50.8	-41.25	9.6
	HT/VHT20, M8 to M15	3	17	6	-62.7	-62.3	-60.4		-50.8	-41.25	9.6
	HT/VHT20, M16 to M23	3	17	6	-62.7	-62.3	-60.4		-50.8	-41.25	9.6
	HT/VHT20, M0 to M7	4	17	6	-62.7	-62.3	-60.4	-63.1	-49.9	-41.25	8.7
	HT/VHT20, M8 to M15	4	17	6	-62.7	-62.3	-60.4	-63.1	-49.9	-41.25	8.7
	HT/VHT20, M16 to M23	4	17	6	-62.7	-62.3	-60.4	-63.1	-49.9	-41.25	8.7
	HT/VHT20, M24 to M31	4	17	6	-62.7	-62.3	-60.4	-63.1	-49.9	-41.25	8.7
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	-62.7	-62.3			-50.4	-41.25	9.2
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	-62.7	-62.3			-53.4	-41.25	12.2
	HT/VHT20 Beam Forming, M0 to M7	3	17	11	-62.7	-62.3	-60.4		-45.8	-41.25	4.6
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	-62.7	-62.3	-60.4		-48.8	-41.25	7.6
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	-62.7	-62.3	-60.4		-50.8	-41.25	9.6
	HT/VHT20 Beam Forming, M0 to M7	4	17	12	-62.7	-62.3	-60.4	-63.1	-43.9	-41.25	2.7
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	-62.7	-62.3	-60.4	-63.1	-46.9	-41.25	5.7
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	-62.7	-62.3	-60.4	-63.1	-48.9	-41.25	7.7
	HT/VHT20 Beam Forming, M24 to M31	4	17	6	-62.7	-62.3	-60.4	-63.1	-49.9	-41.25	8.7
	HT/VHT20 STBC, M0 to M7	2	17	6	-62.7	-62.3			-53.4	-41.25	12.2
	HT/VHT20 STBC, M0 to M7	3	17	6	-62.7	-62.3	-60.4		-50.8	-41.25	9.6
	HT/VHT20 STBC, M0 to M7	4	17	6	-62.7	-62.3	-60.4	-63.1	-49.9	-41.25	8.7

5.5.7 Conducted Spurious Emissions Plots – Average

5220MHz, HE20 Beam Forming, M0h1	
Antenna A	Antenna B
	
Antenna C	Antenna D
	

5.5.8 Conducted Spurious Emissions Plots 12-40GHz

Plots representative of all modes

Conducted Spurious 12GHz-40GHz index power 17dBm	
Peak	Average
	

5.6 Conducted Band Edge

5.6.1 Conducted Band Edge Test Requirement

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:
(1) For transmitters operating in the 5.15-5.25 GHz band: All emissions outside of the 5.15-5.35 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.
(5) The emission measurements shall be performed using a minimum resolution bandwidth of 1MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1MHz.
(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.

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Use formula below to substitute conducted measurements in place of radiated measurements

E[dBµV/m] = EIRP[dBm] - 20 log(d[meters]) + 104.77, where E = field strength and d = 3 meter

1) Average Plot, Limit= -41.25 dBm eirp
2) Peak plot, Limit = -21.25 dBm eirp

KDB 789033 D02 General UNII Test Procedures New Rules v01r02

2. Unwanted Emissions that fall Outside of the Restricted Bands

c) At frequencies above 1000 MHz, use the procedure for maximum emissions described in section II.G.5., "*Procedure for Unwanted Maximum Unwanted Emissions Measurements Above 1000MHz.*"

§ 15.407(b)(1)-(3) specifies that emissions outside of the respective U-NII bands are subject to a maximum emission limit of -27 dBm/MHz. § 15.407(b)(4) provides two requirement options for devices that operate in the 5.725 – 5.85 GHz band. If the option specified in § 15.407(b)(4)(ii) is exercised, then the procedures specified in Clause 11.11 of ANSI C63.10-2013 and/or in Section 11.0 of KDB Publication 558074 shall be utilized. In general, an out-of-band emission that complies with both the peak and average power limits of § 15.209 is not required to also satisfy the -27 dBm/MHz or -17 dBm/MHz maximum emission limit.

5.6.2 Conducted Band Edge Test Procedure

Ref. 789033 D02 General UNII Test Procedures New Rules v01r02
ANSI C63.10: 2013

Conducted Spurious Emissions Test Procedure
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 v01 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. 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. KDB 789033 D02 General UNII Test Procedures New Rules v01
Peak: KDB 789033 Section 5, Average: KDB 789033 Section 6

Conducted Spurious Emissions Test parameters
5. Procedure for Unwanted Maximum Emissions Measurements above 1000 MHz a) Follow the requirements in section II.G.3., *"General Requirements for Unwanted Emissions Measurements"*. b) Maximum emission levels are measured by setting the analyzer as follows: (i) RBW = 1MHz. (ii) VBW ≥ 3MHz. (iii) Detector = Peak. (iv) Sweep time = auto. (v) Trace mode = max hold. (vi) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately 1/x, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission. **6. Procedures for Average Unwanted Emissions Measurements above 1000 MHz** a) Follow the requirements in section II.G.3., *"General Requirements for Unwanted Emissions Measurements"*. b) Average emission levels shall be measured using one of the following two methods. d) **Method VB** (Averaging using reduced video bandwidth): Alternative method. (i) RBW = 1MHz. (ii) Video bandwidth. • If the EUT is configured to transmit with duty cycle ≥ 98 percent, set VBW ≤ RBW/100 (*i.e.*, 10 kHz) but not less than 10 Hz. • If the EUT duty cycle is < 98 percent, set VBW ≥ 1/*T*, where *T* is defined in section II.B.1.a). (iii) Video bandwidth mode or display mode • The instrument shall be set to ensure that video filtering is applied in the power domain. Typically, this requires setting the detector mode to RMS and setting the Average-VBW Type to

Power (RMS).

• As an alternative, the analyzer may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some analyzers require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to “Voltage” regardless of the display mode.

(iv) Detector = Peak.
(v) Sweep time = auto.
(vi) Trace mode = max hold.
(vii) Allow max hold to run for at least 50 traces if the transmitted signal is continuous or has at least 98 percent duty cycle. For lower duty cycles, increase the minimum number of traces by a factor of 1/x, where x is the duty cycle. For example, use at least 200 traces if the duty cycle is 25 percent. (If a specific emission is demonstrated to be continuous—*i.e.,* 100 percent duty cycle—rather than turning on and off with the transmit cycle, at least 50 traces shall be averaged.)

5.6.3 Conducted Band Edge Test Information

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	EUT	S01	☑	☐
	Support	S02	☐	☑

Tested By:	Date of testing:
Julian Land	March 6, 2019 - March 26, 2019
Test Result: PASS	

Test Equipment

See Appendix A for list of test equipment

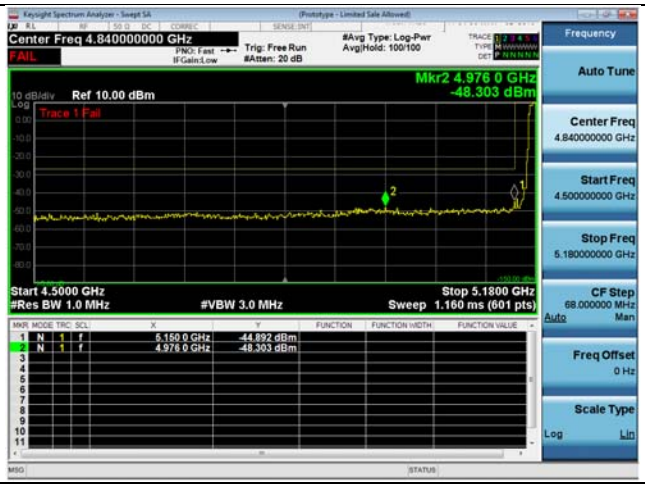
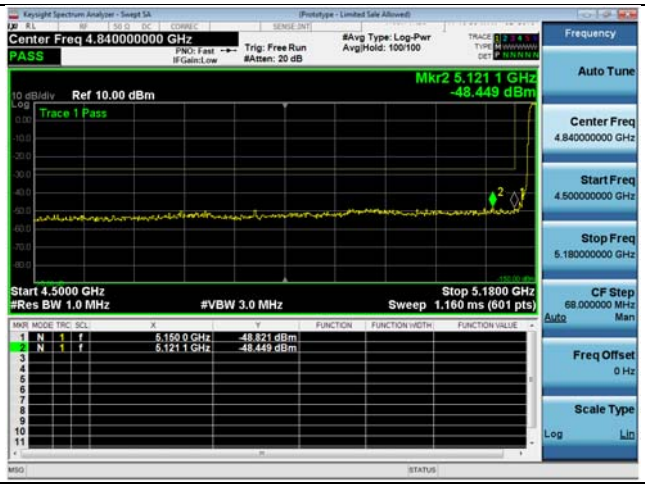
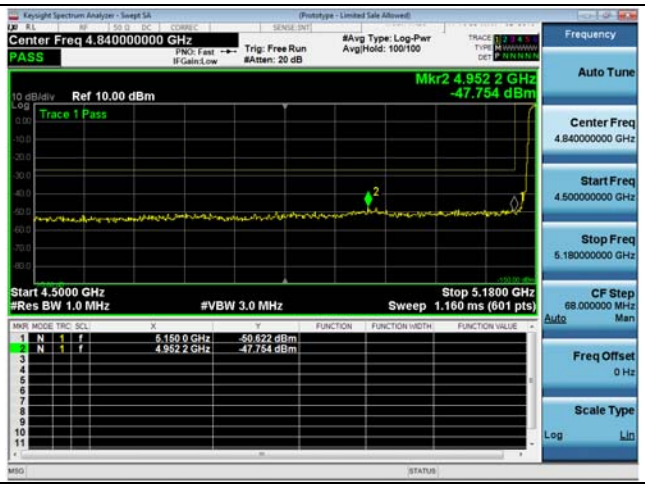
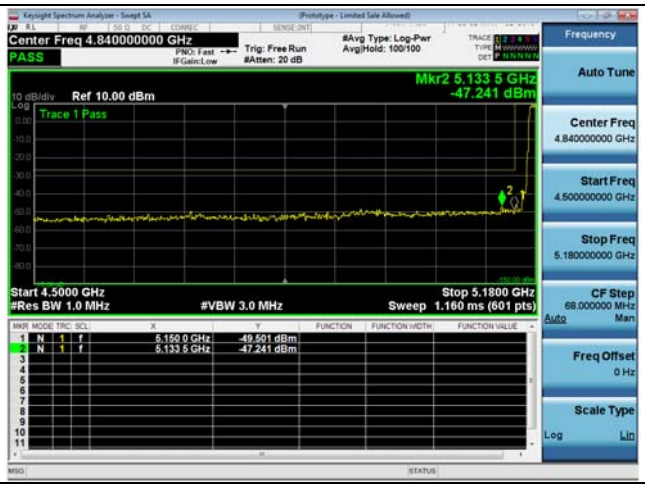
5.6.4 Conducted Band Edge Data Tables – Peak

Frequency (MHz)	Mode	Tx Paths	Index Power (dBm)	Correlated Antenna Gain (dBi)	Tx 1 Band edge Level (dBm)	Tx 2 Band edge Level (dBm)	Tx 3 Band edge Level (dBm)	Tx 4 Band edge Level (dBm)	Total Tx Band edge Level (dBm)	Limit (dBm)	Margin (dB)
5180	Non HT20, 6 to 54 Mbps	1	17	6	-46				-39.9	-21.25	18.65
	Non HT20, 6 to 54 Mbps	2	17	6	-46	-46.2			-36.9	-21.25	15.65
	Non HT20, 6 to 54 Mbps	3	17	6	-46	-46.2	-45.1		-34.8	-21.25	13.55
	Non HT20, 6 to 54 Mbps	4	16	6	-45.7	-45	-46.8	-48.6	-34.2	-21.25	12.95
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	-46	-46.2			-33.9	-21.25	12.65
	Non HT20 Beam Forming, 6 to 54 Mbps	3	16	11	-45.7	-45	-46.8		-29.9	-21.25	8.65
	Non HT20 Beam Forming, 6 to 54 Mbps	**4**	15	**12**	**-44.9**	**-48.4**	**-47.8**	**-47.2**	**-28.7**	**-21.25**	**7.45**
	HT/VHT20, M0 to M7	1	17	6	-45.3				-39.2	-21.25	17.95
	HT/VHT20, M0 to M7	2	17	6	-45.3	-46.1			-36.6	-21.25	15.35
	HT/VHT20, M8 to M15	2	17	6	-45.3	-46.1			-36.6	-21.25	15.35
	HT/VHT20, M0 to M7	3	17	6	-45.3	-46.1	-45.5		-34.8	-21.25	13.55
	HT/VHT20, M8 to M15	3	17	6	-45.3	-46.1	-45.5		-34.8	-21.25	13.55
	HT/VHT20, M16 to M23	3	17	6	-45.3	-46.1	-45.5		-34.8	-21.25	13.55
	HT/VHT20, M0 to M7	4	17	6	-45.3	-46.1	-45.5	-46.1	-33.6	-21.25	12.35
	HT/VHT20, M8 to M15	4	17	6	-45.3	-46.1	-45.5	-46.1	-33.6	-21.25	12.35
	HT/VHT20, M16 to M23	4	17	6	-45.3	-46.1	-45.5	-46.1	-33.6	-21.25	12.35
	HT/VHT20, M24 to M31	4	17	6	-45.3	-46.1	-45.5	-46.1	-33.6	-21.25	12.35
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	-45.3	-46.1			-33.6	-21.25	12.35
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	-45.3	-46.1			-36.6	-21.25	15.35
	HT/VHT20 Beam Forming, M0 to M7	3	15	11	-45.8	-48.4	-48.2		-31.5	-21.25	10.25
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	-45.3	-46.1	-45.5		-32.8	-21.25	11.55
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	-45.3	-46.1	-45.5		-34.8	-21.25	13.55
	HT/VHT20 Beam Forming, M0 to M7	4	15	12	-45.8	-48.4	-48.2	-47.8	-29.3	-21.25	8.05
	HT/VHT20 Beam Forming, M8 to M15	4	17	9	-45.3	-46.1	-45.5	-46.1	-30.6	-21.25	9.35
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	-45.3	-46.1	-45.5	-46.1	-32.6	-21.25	11.35

	HT/VHT20 Beam Forming, M24 to M31	4	17	6	-45.3	-46.1	-45.5	-46.1	-33.6	-21.25	12.35
	HT/VHT20 STBC, M0 to M7	2	17	6	-45.3	-46.1			-36.6	-21.25	15.35
	HT/VHT20 STBC, M0 to M7	3	17	6	-45.3	-46.1	-45.5		-34.8	-21.25	13.55
	HT/VHT20 STBC, M0 to M7	4	17	6	-45.3	-46.1	-45.5	-46.1	-33.6	-21.25	12.35
5190	Non HT40, 6 to 54 Mbps	1	17	6	-41.8				-35.7	-21.25	14.45
	Non HT40, 6 to 54 Mbps	2	17	6	-41.8	-45.9			-34.2	-21.25	12.95
	Non HT40, 6 to 54 Mbps	3	17	6	-41.8	-45.9	-45.4		-33	-21.25	11.75
	Non HT40, 6 to 54 Mbps	4	17	6	-41.8	-45.9	-45.4	-45.9	-32.2	-21.25	10.95
	HT/VHT40, M0 to M7	1	17	6	-39.4				-33.3	-21.25	12.05
	HT/VHT40, M0 to M7	2	17	6	-39.4	-44.5			-32.1	-21.25	10.85
	HT/VHT40, M8 to M15	2	17	6	-39.4	-44.5			-32.1	-21.25	10.85
	HT/VHT40, M0 to M7	3	16	6	-39	-44.6	-47.2		-31.3	-21.25	10.05
	HT/VHT40, M8 to M15	3	16	6	-39	-44.6	-47.2		-31.3	-21.25	10.05
	HT/VHT40, M16 to M23	3	16	6	-39	-44.6	-47.2		-31.3	-21.25	10.05
	HT/VHT40, M0 to M7	4	16	6	-39	-44.6	-47.2	-45.1	-30.6	-21.25	9.35
	HT/VHT40, M8 to M15	4	16	6	-39	-44.6	-47.2	-45.1	-30.6	-21.25	9.35
	HT/VHT40, M16 to M23	4	16	6	-39	-44.6	-47.2	-45.1	-30.6	-21.25	9.35
	HT/VHT40, M24 to M31	4	16	6	-39	-44.6	-47.2	-45.1	-30.6	-21.25	9.35
	HT/VHT40 Beam Forming, M0 to M7	2	15	9	-44.5	-45.8			-33	-21.25	11.75
	HT/VHT40 Beam Forming, M8 to M15	2	17	6	-39.4	-44.5			-32.1	-21.25	10.85
	HT/VHT40 Beam Forming, M0 to M7	3	13	11	-47.7	-48	-49.5		-32.4	-21.25	11.15
	HT/VHT40 Beam Forming, M8 to M15	3	15	8	-44.5	-45.8	-44.6		-32	-21.25	10.75
	HT/VHT40 Beam Forming, M16 to M23	3	16	6	-39	-44.6	-47.2		-31.3	-21.25	10.05
	HT/VHT40 Beam Forming, M0 to M7	4	12	12	-49.1	-50.8	-51	-51.1	-32.3	-21.25	11.05
	HT/VHT40 Beam Forming, M8 to M15	4	14	9	-45.4	-48.1	-45.7	-49.3	-31.7	-21.25	10.45
	HT/VHT40 Beam Forming, M16 to M23	4	15	7	-44.5	-45.8	-44.6	-46.3	-32.1	-21.25	10.85
	HT/VHT40 Beam Forming, M24 to M31	4	16	6	-39	-44.6	-47.2	-45.1	-30.6	-21.25	9.35
	HT/VHT40 STBC, M0 to M7	2	17	6	-39.4	-44.5			-32.1	-21.25	10.85
	HT/VHT40 STBC, M0 to M7	3	16	6	-39	-44.6	-47.2		-31.3	-21.25	10.05
	HT/VHT40 STBC, M0 to M7	4	16	6	-39	-44.6	-47.2	-45.1	-30.6	-21.25	9.35
5210	Non HT80, 6 to 54 Mbps	1	16	6	-39				-32.9	-21.25	11.65
	Non HT80, 6 to 54 Mbps	2	15	6	-39.8	-43			-32	-21.25	10.75
	Non HT80, 6 to 54 Mbps	3	15	6	-39.8	-43	-42.5		-30.6	-21.25	9.35
	Non HT80, 6 to 54 Mbps	4	14	6	-40.3	-45.3	-44.6	-43.7	-30.8	-21.25	9.55
	VHT80, M0 to M9 1ss	1	16	6	-39.7				-33	-21.25	11.75
	VHT80, M0 to M9 1ss	2	15	6	-41.7	-43.5			-32.8	-21.25	11.55

	VHT80, M0 to M9 2ss	2	15	6	-41.7	-43.5			-32.8	-21.25	11.55
	VHT80, M0 to M9 1ss	3	14	6	-43.3	-46.3	-45.7		-33.4	-21.25	12.15
	VHT80, M0 to M9 2ss	3	14	6	-43.3	-46.3	-45.7		-33.4	-21.25	12.15
	VHT80, M0 to M9 3ss	3	14	6	-43.3	-46.3	-45.7		-33.4	-21.25	12.15
	VHT80, M0 to M9 1ss	4	14	6	-43.3	-46.3	-45.7	-45.9	-32.4	-21.25	11.15
	VHT80, M0 to M9 2ss	4	14	6	-43.3	-46.3	-45.7	-45.9	-32.4	-21.25	11.15
	VHT80, M0 to M9 3ss	4	14	6	-43.3	-46.3	-45.7	-45.9	-32.4	-21.25	11.15
	VHT80, M0 to M9 4ss	4	14	6	-43.3	-46.3	-45.7	-45.9	-32.4	-21.25	11.15
	VHT80 Beam Forming, M0 to M9 1ss	2	13	9	-41.2	-43.9			-29.6	-21.25	8.35
	VHT80 Beam Forming, M0 to M9 2ss	2	15	6	-41.7	-43.5			-32.8	-21.25	11.55
	VHT80 Beam Forming, M0 to M9 1ss	3	11	11	-47.5	-50.9	-49.6		-32.6	-21.25	11.35
	VHT80 Beam Forming, M0 to M9 2ss	3	12	8	-46.1	-49.5	-48.3		-34.3	-21.25	13.05
	VHT80 Beam Forming, M0 to M9 3ss	3	14	6	-43.3	-46.3	-45.7		-33.4	-21.25	12.15
	VHT80 Beam Forming, M0 to M9 1ss	4	9	12	-48.2	-51.7	-51.2	-49.4	-31.2	-21.25	9.95
	VHT80 Beam Forming, M0 to M9 2ss	4	12	9	-46.1	-49.5	-48.3	-47.4	-31.9	-21.25	10.65
	VHT80 Beam Forming, M0 to M9 3ss	4	12	7	-46.1	-49.5	-48.3	-47.4	-33.9	-21.25	12.65
	VHT80 Beam Forming, M0 to M9 4ss	4	14	6	-43.3	-46.3	-45.7	-45.9	-32.4	-21.25	11.15
	VHT80 STBC, M0 to M9 1ss	2	15	6	-41.7	-43.5			-32.8	-21.25	11.55
	VHT80 STBC, M0 to M9 1ss	3	14	6	-43.3	-46.3	-45.7		-33.4	-21.25	12.15
	VHT80 STBC, M0 to M9 1ss	4	14	6	-43.3	-46.3	-45.7	-45.9	-32.4	-21.25	11.15

5.6.5 Conducted Band Edge Plot – Peak

5180MHz, NonHT20, 6Mbps	
Antenna A	Antenna B
	
Antenna C	Antenna C
	

Note: Traces say fail above because the transmitter is above an arbitrary line in the pass band

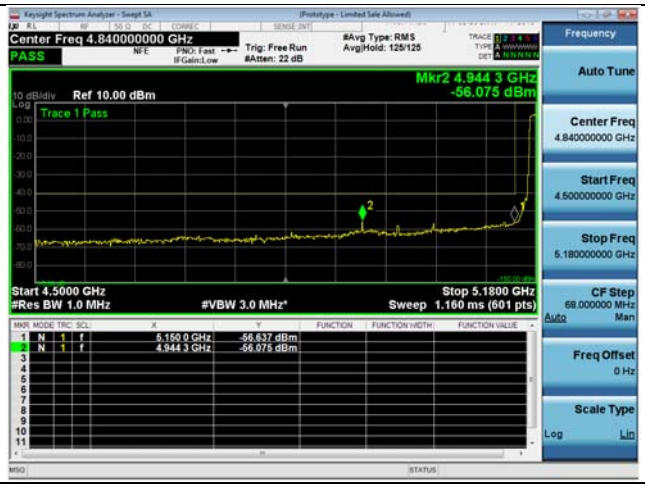
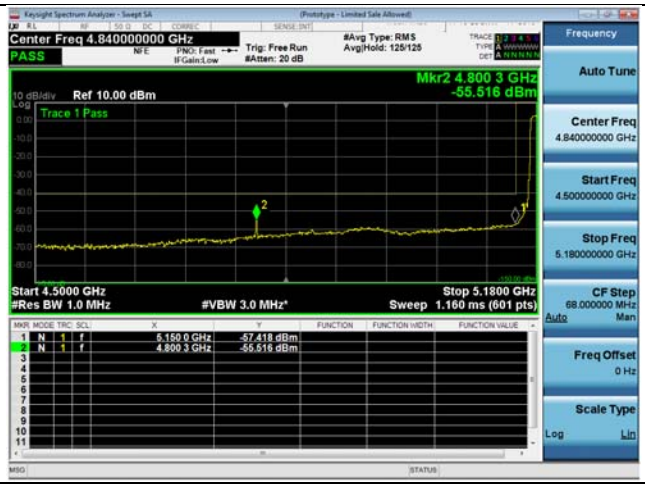
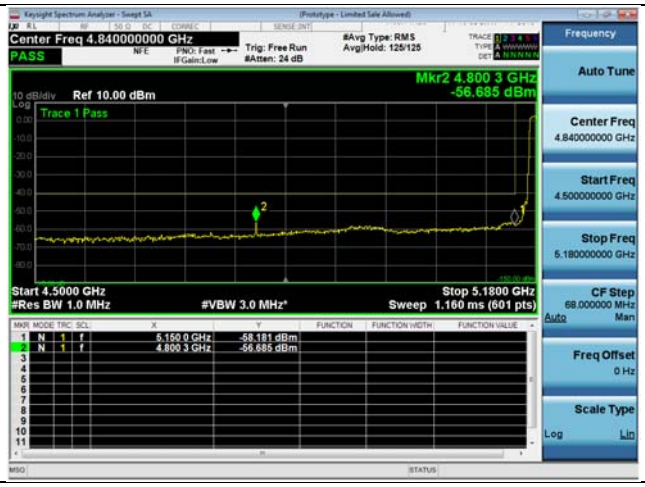
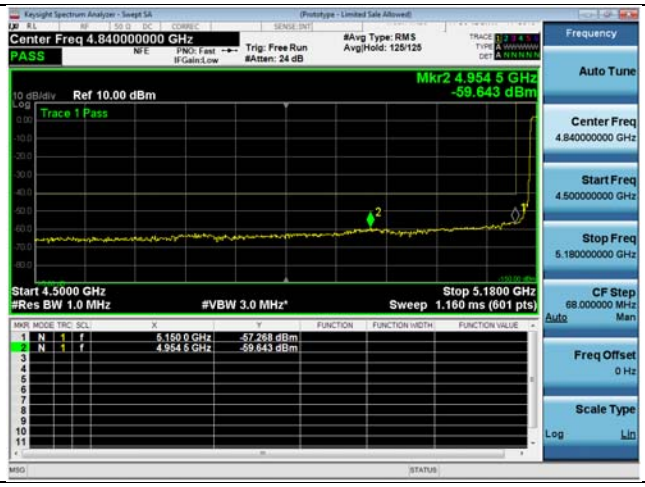
5.6.6 Conducted Band Edge Data Tables - Average

Frequency (MHz)	Mode	Tx Paths	Index Power (dBm)	Correlated Antenna Gain (dBi)	Tx 1 Band edge Level (dBm)	Tx 2 Band edge Level (dBm)	Tx 3 Band edge Level (dBm)	Tx 4 Band edge Level (dBm)	Total Tx Band edge Level (dBm)	Limit (dBm)	Margin (dB)
5180	Non HT20, 6 to 54 Mbps	1	17	6	-56.6				-50.5	-41.25	9.2
	Non HT20, 6 to 54 Mbps	2	17	6	-56.6	-56.4			-47.3	-41.25	6.1
	Non HT20, 6 to 54 Mbps	3	17	6	-56.6	-56.4	-58.1		-46.1	-41.25	4.8
	Non HT20, 6 to 54 Mbps	4	16	6	-59.9	-57.1	-58	-61.4	-46.6	-41.25	5.4
	Non HT20 Beam Forming, 6 to 54 Mbps	2	17	9	-56.6	-56.4			-44.3	-41.25	3.1
	Non HT20 Beam Forming, 6 to 54 Mbps	3	16	11	-59.9	-57.1	-58		-42.3	-41.25	1
	Non HT20 Beam Forming, 6 to 54 Mbps	4	15	12	-58.7	-59.6	-61	-61.6	-41.9	-41.25	0.7
	HT/VHT20, M0 to M7	1	17	6	-56.1				-50	-41.25	8.8
	HT/VHT20, M0 to M7	2	17	6	-56.1	-55.5			-46.7	-41.25	5.5
	HT/VHT20, M8 to M15	2	17	6	-56.1	-55.5			-46.7	-41.25	5.5
	HT/VHT20, M0 to M7	3	17	6	-56.1	-55.5	-56.7		-45.2	-41.25	4
	HT/VHT20, M8 to M15	3	17	6	-56.1	-55.5	-56.7		-45.2	-41.25	4
	HT/VHT20, M16 to M23	3	17	6	-56.1	-55.5	-56.7		-45.2	-41.25	4
	HT/VHT20, M0 to M7	4	17	6	-56.1	-55.5	-56.7	-57.3	-44.3	-41.25	3
	HT/VHT20, M8 to M15	4	17	6	-56.1	-55.5	-56.7	-57.3	-44.3	-41.25	3
	HT/VHT20, M16 to M23	4	17	6	-56.1	-55.5	-56.7	-57.3	-44.3	-41.25	3
	HT/VHT20, M24 to M31	4	17	6	-56.1	-55.5	-56.7	-57.3	-44.3	-41.25	3
	HT/VHT20 Beam Forming, M0 to M7	2	17	9	-56.1	-55.5			-43.7	-41.25	2.5
	HT/VHT20 Beam Forming, M8 to M15	2	17	6	-56.1	-55.5			-46.7	-41.25	5.5
	HT/VHT20 Beam Forming, M0 to M7	3	15	11	-60	-58.5	-59.3		-43.4	-41.25	2.1
	HT/VHT20 Beam Forming, M8 to M15	3	17	8	-56.1	-55.5	-56.7		-43.2	-41.25	2
	HT/VHT20 Beam Forming, M16 to M23	3	17	6	-56.1	-55.5	-56.7		-45.2	-41.25	4
	HT/VHT20 Beam Forming, M0 to M7	4	15	12	-60	-58.5	-59.3	-61	-41.5	-41.25	0.3
	HT/VHT20 Beam Forming, M8 to M15	**4**	17	**9**	**-56.1**	**-55.5**	**-56.7**	**-57.3**	**-41.3**	**-41.25**	**0**
	HT/VHT20 Beam Forming, M16 to M23	4	17	7	-56.1	-55.5	-56.7	-57.3	-43.3	-41.25	2

	HT/VHT20 Beam Forming, M24 to M31	4	17	6	-56.1	-55.5	-56.7	-57.3	-44.3	-41.25	3
	HT/VHT20 STBC, M0 to M7	2	17	6	-56.1	-55.5			-46.7	-41.25	5.5
	HT/VHT20 STBC, M0 to M7	3	17	6	-56.1	-55.5	-56.7		-45.2	-41.25	4
	HT/VHT20 STBC, M0 to M7	4	17	6	-56.1	-55.5	-56.7	-57.3	-44.3	-41.25	3
5190	Non HT40, 6 to 54 Mbps	1	17	6	-51.8				-45.7	-41.25	4.4
	Non HT40, 6 to 54 Mbps	2	17	6	-51.8	-56.1			-44.3	-41.25	3
	Non HT40, 6 to 54 Mbps	3	17	6	-51.8	-56.1	-54.4		-42.8	-41.25	1.6
	Non HT40, 6 to 54 Mbps	4	17	6	-51.8	-56.1	-54.4	-55	-41.9	-41.25	0.6
	HT/VHT40, M0 to M7	1	17	6	-49.1				-43	-41.25	1.7
	HT/VHT40, M0 to M7	2	17	6	-49.1	-55			-42	-41.25	0.7
	HT/VHT40, M8 to M15	2	17	6	-49.1	-55			-42	-41.25	0.7
	HT/VHT40, M0 to M7	3	16	6	-51.1	-55.3	-54.4		-42.3	-41.25	1
	HT/VHT40, M8 to M15	3	16	6	-51.1	-55.3	-54.4		-42.3	-41.25	1
	HT/VHT40, M16 to M23	3	16	6	-51.1	-55.3	-54.4		-42.3	-41.25	1
	HT/VHT40, M0 to M7	4	16	6	-51.1	-55.3	-54.4	-55	-41.4	-41.25	0.2
	HT/VHT40, M8 to M15	4	16	6	-51.1	-55.3	-54.4	-55	-41.4	-41.25	0.2
	HT/VHT40, M16 to M23	4	16	6	-51.1	-55.3	-54.4	-55	-41.4	-41.25	0.2
	HT/VHT40, M24 to M31	4	16	6	-51.1	-55.3	-54.4	-55	-41.4	-41.25	0.2
	HT/VHT40 Beam Forming, M0 to M7	2	15	9	-54.3	-55.1			-42.5	-41.25	1.3
	HT/VHT40 Beam Forming, M8 to M15	2	17	6	-49.1	-55			-42	-41.25	0.7
	HT/VHT40 Beam Forming, M0 to M7	3	13	11	-57.7	-59.1	-60.9		-43.1	-41.25	1.9
	HT/VHT40 Beam Forming, M8 to M15	3	15	8	-54.3	-55.1	-55.2		-41.9	-41.25	0.7
	HT/VHT40 Beam Forming, M16 to M23	3	16	6	-51.1	-55.3	-54.4		-42.3	-41.25	1
	HT/VHT40 Beam Forming, M0 to M7	4	12	12	-58.9	-60.6	-62.9	-60.9	-42.4	-41.25	1.2
	HT/VHT40 Beam Forming, M8 to M15	4	14	9	-56.2	-57.7	-56.6	-58.6	-42	-41.25	0.8
	HT/VHT40 Beam Forming, M16 to M23	4	15	7	-54.3	-55.1	-55.2	-55.5	-41.8	-41.25	0.6
	HT/VHT40 Beam Forming, M24 to M31	4	16	6	-51.1	-55.3	-54.4	-55	-41.4	-41.25	0.2
	HT/VHT40 STBC, M0 to M7	2	17	6	-49.1	-55			-42	-41.25	0.7
	HT/VHT40 STBC, M0 to M7	3	16	6	-51.1	-55.3	-54.4		-42.3	-41.25	1
	HT/VHT40 STBC, M0 to M7	4	16	6	-51.1	-55.3	-54.4	-55	-41.4	-41.25	0.2
5210	Non HT80, 6 to 54 Mbps	1	16	6	-48.6				-42.5	-41.25	1.2
	Non HT80, 6 to 54 Mbps	2	15	6	-50.4	-55.8			-43.1	-41.25	1.9
	Non HT80, 6 to 54 Mbps	3	15	6	-50.4	-55.8	-55.1		-42.1	-41.25	0.9
	Non HT80, 6 to 54 Mbps	4	14	6	-53.2	-55.8	-55.9	-55.2	-42.7	-41.25	1.5
	VHT80, M0 to M9 1ss	1	16	6	-48.3				-41.6	-41.25	0.4
	VHT80, M0 to M9 1ss	2	15	6	-50.4	-54.1			-42.2	-41.25	0.9
	VHT80, M0 to M9 2ss	2	15	6	-50.4	-54.1			-42.2	-41.25	0.9
	VHT80, M0 to M9 1ss	3	14	6	-52.9	-54.8	-54.5		-42.5	-41.25	1.3

	VHT80, M0 to M9 2ss	3	14	6	-52.9	-54.8	-54.5		-42.5	-41.25	1.3
	VHT80, M0 to M9 3ss	3	14	6	-52.9	-54.8	-54.5		-42.5	-41.25	1.3
	VHT80, M0 to M9 1ss	4	14	6	-52.9	-54.8	-54.5	-54.8	-41.5	-41.25	0.2
	VHT80, M0 to M9 2ss	4	14	6	-52.9	-54.8	-54.5	-54.8	-41.5	-41.25	0.2
	VHT80, M0 to M9 3ss	4	14	6	-52.9	-54.8	-54.5	-54.8	-41.5	-41.25	0.2
	VHT80, M0 to M9 4ss	4	14	6	-52.9	-54.8	-54.5	-54.8	-41.5	-41.25	0.2
	VHT80 Beam Forming, M0 to M9 1ss	2	13	9	-53.3	-55.1			-41.4	-41.25	0.1
	VHT80 Beam Forming, M0 to M9 2ss	2	15	6	-50.4	-54.1			-42.2	-41.25	0.9
	VHT80 Beam Forming, M0 to M9 1ss	3	11	11	-58.6	-59	-60.2		-42.7	-41.25	1.5
	VHT80 Beam Forming, M0 to M9 2ss	3	12	8	-56.6	-58.4	-56.8		-43.7	-41.25	2.5
	VHT80 Beam Forming, M0 to M9 3ss	3	14	6	-52.9	-54.8	-54.5		-42.5	-41.25	1.3
	VHT80 Beam Forming, M0 to M9 1ss	4	9	12	-59.8	-59.6	-61.3	-60.2	-41.5	-41.25	0.2
	VHT80 Beam Forming, M0 to M9 2ss	4	12	9	-56.6	-58.4	-56.8	-58.7	-41.8	-41.25	0.6
	VHT80 Beam Forming, M0 to M9 3ss	4	12	7	-56.6	-58.4	-56.8	-58.7	-43.8	-41.25	2.6
	VHT80 Beam Forming, M0 to M9 4ss	4	14	6	-52.9	-54.8	-54.5	-54.8	-41.5	-41.25	0.2
	VHT80 STBC, M0 to M9 1ss	2	15	6	-50.4	-54.1			-42.2	-41.25	0.9
	VHT80 STBC, M0 to M9 1ss	3	14	6	-52.9	-54.8	-54.5		-42.5	-41.25	1.3
	VHT80 STBC, M0 to M9 1ss	4	14	6	-52.9	-54.8	-54.5	-54.8	-41.5	-41.25	0.2

5.6.7 Conducted Band Edge Plots – Average

HT20 Beam Forming, 5180MHz, M0	
Antenna A	Antenna B
	
Antenna C	Antenna D
	

Section 6: Emission Test Results

6.1 Transmitter Radiated Spurious Emissions

Note: Results for Transmitter Radiated Spurious Emissions are in EDCS# 17643833.

6.2 AC Conducted Emissions

Note: Only DC power is supplied to the unit.

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

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due
RF Conducted test equipment 3/12/2019 – 4/29/2019				
53614	Keysight (Agilent/HP) / N9030A-550	PXA Signal Analyzer, 3Hz to 50GHz	17 Jul. 2018	17 Jul. 2019
57475	Cisco	Automated Radio Testing Station	Verify Before Use	Verify Before Use
54237	Keysight (Agilent/HP) / 8710-1765	Preset Torque Wrench, 8in/lbs	14 Feb. 2019	14 Feb. 2020
06325	Lufft / 5063-33W	Dial Hygrometer	27 Aug. 2018	27 Aug. 2019
49516	Keysight (Agilent/HP)	PXA Signal Analyzer, 3Hz to 50GHz	29 Nov. 2018	29 Nov. 2019
57238	NATIONAL INSTRUMENTS / PXI-8115	Embedded Controller	Cal. not required	Cal. not required
57247	NATIONAL INSTRUMENTS / PXI-2796	40 GHz Dual 6x1 Multiplexer (SP6T)	Verify Before Use	Verify Before Use
57248	NATIONAL INSTRUMENTS / PXI-2799	Switch 1x1	Verify Before Use	Verify Before Use
56092	NATIONAL INSTRUMENTS / PXI-2796	40 GHz Dual 6x1 Multiplexer (SP6T)	Verify Before Use	Verify Before Use
57479	Cisco	Automated Radio Testing Station	Verify Before Use	Verify Before Use
57233	NATIONAL INSTRUMENTS / PXI-8115	Embedded Controller	Cal. not required	Cal. not required
57253	NATIONAL INSTRUMENTS / PXI-2796	40 GHz Dual 6x1 Multiplexer (SP6T)	Verify Before Use	Verify Before Use
57254	NATIONAL INSTRUMENTS / PXI-2799	Switch 1x1	Verify Before Use	Verify Before Use
56089	NATIONAL INSTRUMENTS / PXI-2796	40 GHz Dual 6x1 Multiplexer (SP6T)	Verify Before Use	Verify Before Use

Appendix B: 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 C: Software Used to Perform Testing

Automated Testing Software: RF_Automation.vi version 46
Automated Testing Software: RF_Automation.vi version 49
Automated Testing Software: RF_Automation.vi version 51

Appendix D: Test Procedures

Measurements were made in accordance with

- KDB 789033 - D02 General UNII Test Procedures New Rules v01r02
- 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 E: 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 F: Test Assessment Plan

Test Plan EDCS# 13513665
Power Tables EDCS# 15952129