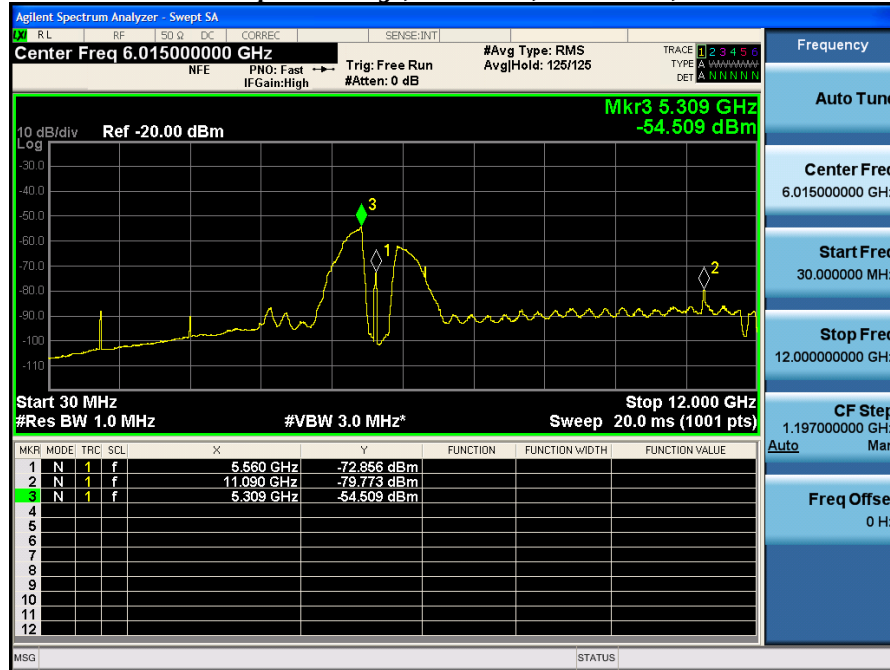
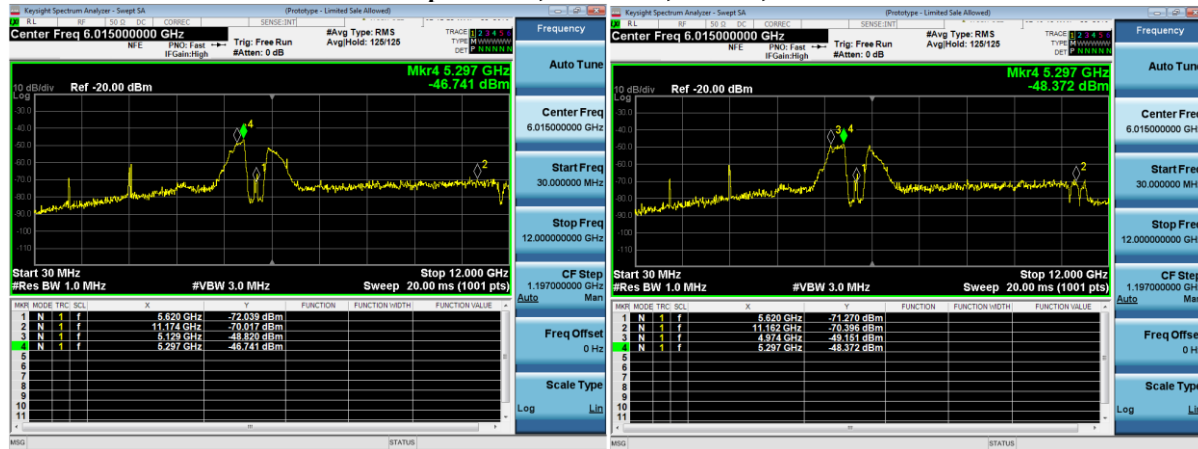


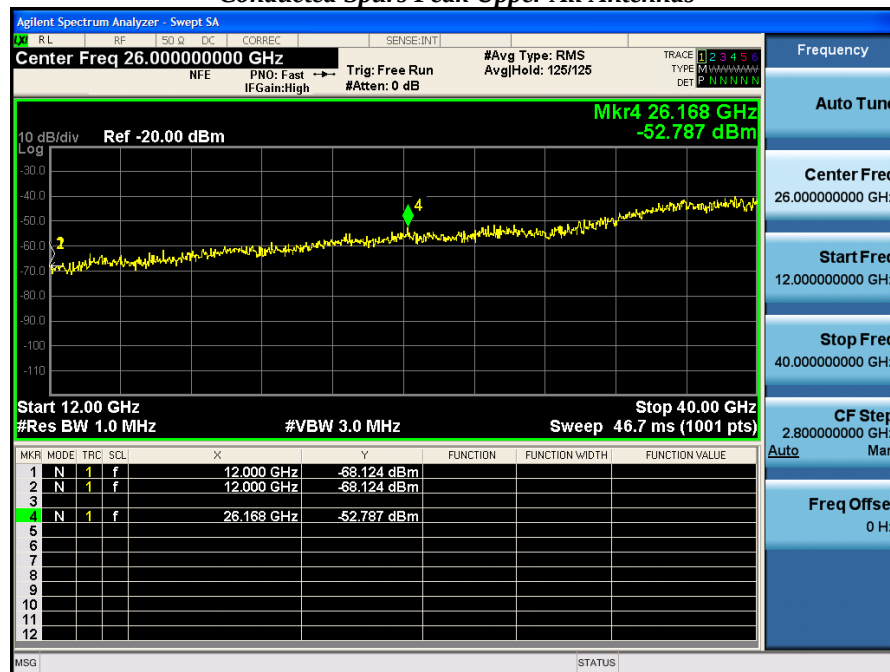
Antenna Gain 13dBi**Conducted Spurs Average, 5550 MHz, HT/VHT40, M0 to M7****Antenna A****Conducted Spurs Average Upper All Antennas**

Antenna Gain: 13dBi

Conducted Spurs Peak, 5610 MHz, VHT80, M0 to M9 1ss



Conducted Spurs Peak Upper All Antennas



A.6 Conducted Band edge

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

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

15.205 / 15.209 - 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

$$E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm}] - 20 \log(d[\text{meters}]) + 104.77, \text{ where } E = \text{field strength and } d = 3 \text{ meter}$$

- 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 v02r01

2. Unwanted Emissions that fall Outside of the Restricted Bands

- a) For all measurements, follow the requirements in II.G.3. *“General Requirements for Unwanted Emissions Measurements.”*
- b) At frequencies below 1000 MHz, use the procedure described in II.G.4. *“Procedure for Unwanted Emissions Measurements Below 1000 MHz.”*
- c) At frequencies above 1000 MHz, use the procedure for maximum emissions described in II.G.5., *“Procedure for Unwanted Emissions Measurements Above 1000 MHz.”*
- (i) Sections 15.407(b)(1-3) specifies the unwanted emissions limit for the U-NII-1 and U-NII-2 bands. As specified, emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz.³

Conducted Band Edge Test Procedure

KDB 789033 D02 General UNII Test Procedures New Rules v02r01

Ref. 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
3. Configure Spectrum analyzer as per test parameters below (be sure to enter all losses between the transmitter output and the spectrum analyzer).
4. Use the peak marker function to determine the maximum spurs amplitude level.
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. (see ANSI C63.10:2013 section 14.3.2.2)
6. Capture graphs and record pertinent measurement data.

Ref. ANSI C63.10: 2013 section 12.7.6 (Peak) and 12.7.7.2 (Average)

KDB 789033 D02 General UNII Test Procedures New Rules v02r01, Sec. 5 (Peak), Sec. 6 (Average Method AD)

Conducted Spurious Emissions

Test parameters

Peak RBW = 1 MHz VBW $\geq$ 3 MHz Sweep = Auto Detector = Peak Trace = Max Hold.	Average RBW = 1 MHz VBW $\geq$ 3 MHz Sweep = Auto Detector = RMS Power Averaging
--	--

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:

20-Nov-19 - 21-Nov-19

Test Result : PASS

Test Equipment

See Appendix B for list of test equipment

Note: Data with Highest and lowest Antenna gains were recorded as worst case

Conducted Bandedge Average Table

Antenna Gain: 7dBi									
Frequency (MHz)	Mode	Tx Paths	Correlated Antenna Gain (dBi)	Tx 1 Bandedge Level (dBm)	Tx 2 Bandedge Level (dBm)	Duty Cycle Correction (dB)	Total Tx Bandedge Level (dBm)	Limit (dBm)	Margin (dB)
5500	Non HT20, 6 to 54 Mbps	1	7	-50.8		0.0	-45.8	-41.25	4.52
	Non HT20, 6 to 54 Mbps	2	7	-57.7	-58.9	0.0	-50.2	-41.25	8.97
	Non HT20 Beam Forming, 6 to 54 Mbps	2	10	-57.7	-58.9	0.0	-47.2	-41.25	5.97
	HT/VHT20, M0 to M7	1	7	-50.9		0.0	-45.9	-41.25	4.61
	HT/VHT20, M0 to M7	2	7	-57.5	-58.9	0.0	-50.1	-41.25	8.84
	HT/VHT20, M8 to M15	2	7	-52.4	-54.5	0.0	-45.3	-41.25	4.02
	HT/VHT20 Beam Forming, M0 to M7	2	10	-57.5	-58.9	0.0	-47.1	-41.25	5.84
	HT/VHT20 Beam Forming, M8 to M15	2	7	-52.4	-54.5	0.0	-45.3	-41.25	4.02
	HT/VHT20 STBC, M0 to M7	2	7	-52.4	-54.5	0.0	-45.3	-41.25	4.02
5510	Non HT40, 6 to 54 Mbps	1	7	-47.4		0.0	-42.4	-41.25	1.12
	Non HT40, 6 to 54 Mbps	2	7	-49.6	-52.2	0.0	-42.7	-41.25	1.42
	HT/VHT40, M0 to M7	1	7	-47.6		0.1	-42.5	-41.25	1.30
	HT/VHT40, M0 to M7	2	7	-51.3	-53.1	0.1	-44.0	-41.25	2.80
	HT/VHT40, M8 to M15	2	7	-51.3	-53.1	0.1	-44.0	-41.25	2.80
	HT/VHT40 Beam Forming, M0 to M7	2	10	-53.5	-54.8	0.1	-43.0	-41.25	1.78
	HT/VHT40 Beam Forming, M8 to M15	2	7	-51.3	-53.1	0.1	-44.0	-41.25	2.80
	HT/VHT40 STBC, M0 to M7	2	7	-51.3	-53.1	0.1	-44.0	-41.25	2.80
5530	Non HT80, 6 to 54 Mbps	1	7	-48.8		0.0	-43.8	-41.25	2.52
	Non HT80, 6 to 54 Mbps	2	7	-48.8	-50.1	0.0	-41.4	-41.25	0.11
	VHT80, M0 to M9 1ss	1	7	-49.4		0.2	-44.2	-41.25	2.96
	VHT80, M0 to M9 1ss	2	7	-49.4	-50.6	0.2	-41.8	-41.25	0.51
	VHT80, M0 to M9 2ss	2	7	-49.4	-50.6	0.2	-41.8	-41.25	0.51
	VHT80 Beam Forming, M0 to M9 1ss	2	10	-52.9	-54.0	0.2	-42.2	-41.25	0.96
	VHT80 Beam Forming, M0 to M9 2ss	2	7	-49.4	-50.6	0.2	-41.8	-41.25	0.51
	VHT80 STBC, M0 to M9 1ss	2	7	-49.4	-50.6	0.2	-41.8	-41.25	0.51

Conducted Bandedge Peak Table

Antenna Gain: 7dBi								
Frequency (MHz)	Mode	Tx Paths	Correlated Antenna Gain (dBi)	Tx 1 Bandedge Level (dBm)	Tx 2 Bandedge Level (dBm)	Total Tx Bandedge Level (dBm)	Limit (dBm)	Margin (dB)
5500	Non HT20, 6 to 54 Mbps	1	7	-37.3		-32.3	-21.25	11.02
	Non HT20, 6 to 54 Mbps	2	7	-41.1	-43.8	-34.2	-21.25	12.95
	Non HT20 Beam Forming, 6 to 54 Mbps	2	10	-41.1	-43.8	-31.2	-21.25	9.95
	HT/VHT20, M0 to M7	1	7	-36.9		-31.9	-21.25	10.61
	HT/VHT20, M0 to M7	2	7	-37.4	-43.7	-31.4	-21.25	10.19
	HT/VHT20, M8 to M15	2	7	-38.6	-40.4	-31.4	-21.25	10.10
	HT/VHT20 Beam Forming, M0 to M7	2	10	-37.4	-43.7	-28.4	-21.25	7.19
	HT/VHT20 Beam Forming, M8 to M15	2	7	-38.6	-40.4	-31.4	-21.25	10.10
	HT/VHT20 STBC, M0 to M7	2	7	-38.6	-40.4	-31.4	-21.25	10.10
5510	Non HT40, 6 to 54 Mbps	1	7	-30.7		-25.7	-21.25	4.42
	Non HT40, 6 to 54 Mbps	2	7	-29.7	-40.1	-24.3	-21.25	3.04
	HT/VHT40, M0 to M7	1	7	-32.7		-27.6	-21.25	6.40
	HT/VHT40, M0 to M7	2	7	-38.9	-34.5	-28.1	-21.25	6.85
	HT/VHT40, M8 to M15	2	7	-38.9	-34.5	-28.1	-21.25	6.85
	HT/VHT40 Beam Forming, M0 to M7	2	10	-34.5	-35.3	-23.8	-21.25	2.56
	HT/VHT40 Beam Forming, M8 to M15	2	7	-38.9	-34.5	-28.1	-21.25	6.85
	HT/VHT40 STBC, M0 to M7	2	7	-38.9	-34.5	-28.1	-21.25	6.85
5530	Non HT80, 6 to 54 Mbps	1	7	-34.2		-29.2	-21.25	7.92
	Non HT80, 6 to 54 Mbps	2	7	-34.2	-40.0	-28.2	-21.25	6.90
	VHT80, M0 to M9 1ss	1	7	-39.2		-34.0	-21.25	12.76
	VHT80, M0 to M9 1ss	2	7	-39.2	-40.5	-31.6	-21.25	10.35
	VHT80, M0 to M9 2ss	2	7	-39.2	-40.5	-31.6	-21.25	10.35
	VHT80 Beam Forming, M0 to M9 1ss	2	10	-41.5	-38.4	-28.5	-21.25	7.23
	VHT80 Beam Forming, M0 to M9 2ss	2	7	-39.2	-40.5	-31.6	-21.25	10.35
	VHT80 STBC, M0 to M9 1ss	2	7	-39.2	-40.5	-31.6	-21.25	10.35

5700	Non HT20, 6 to 54 Mbps	1	7	-28.6		-23.6	-21.25	2.32
	Non HT20, 6 to 54 Mbps	2	7	-43.0	-33.8	-28.3	-21.25	7.02
	Non HT20 Beam Forming, 6 to 54 Mbps	2	10	-43.0	-33.8	-25.3	-21.25	4.02
	HT/VHT20, M0 to M7	1	7	-28.2		-23.2	-21.25	1.91
	HT/VHT20, M0 to M7	2	7	-37.6	-38.3	-29.9	-21.25	8.63
	HT/VHT20, M8 to M15	2	7	-32.6	-34.4	-25.4	-21.25	4.10
	HT/VHT20 Beam Forming, M0 to M7	2	10	-37.6	-38.3	-26.9	-21.25	5.63
	HT/VHT20 Beam Forming, M8 to M15	2	7	-32.6	-34.4	-25.4	-21.25	4.10
	HT/VHT20 STBC, M0 to M7	2	7	-32.6	-34.4	-25.4	-21.25	4.10

Conducted Bandedge Average Table

Antenna Gain: 13dBi									
Frequency (MHz)	Mode	Tx Paths	Correlated Antenna Gain (dBi)	Tx 1 Bandedge Level (dBm)	Tx 2 Bandedge Level (dBm)	Duty Cycle Correction (dB)	Total Tx Bandedge Level (dBm)	Limit (dBm)	Margin (dB)
5500	Non HT20, 6 to 54 Mbps	1	13	-57.9		0.0	-44.9	-41.25	3.62
	Non HT20, 6 to 54 Mbps	2	13	-62.8	-63.5	0.0	-47.1	-41.25	5.84
	Non HT20 Beam Forming, 6 to 54 Mbps	2	16	-62.8	-63.5	0.0	-44.1	-41.25	2.84
	HT/VHT20, M0 to M7	1	13	-58.1		0.0	-45.1	-41.25	3.81
	HT/VHT20, M0 to M7	2	13	-62.8	-63.9	0.0	-47.3	-41.25	6.01
	HT/VHT20, M8 to M15	2	13	-61.1	-62.2	0.0	-45.6	-41.25	4.31
	HT/VHT20 Beam Forming, M0 to M7	2	16	-62.8	-63.9	0.0	-44.3	-41.25	3.01
	HT/VHT20 Beam Forming, M8 to M15	2	13	-61.1	-62.2	0.0	-45.6	-41.25	4.31
	HT/VHT20 STBC, M0 to M7	2	13	-61.1	-62.2	0.0	-45.6	-41.25	4.31
5510	Non HT40, 6 to 54 Mbps	1	13	-55.9		0.0	-42.9	-41.25	1.61
	Non HT40, 6 to 54 Mbps	2	13	-60.3	-61.4	0.0	-44.8	-41.25	3.51
	HT/VHT40, M0 to M7	1	13	-59.9		0.1	-46.8	-41.25	5.59
	HT/VHT40, M0 to M7	2	13	-59.9	-59.9	0.1	-43.8	-41.25	2.58
	HT/VHT40, M8 to M15	2	13	-59.9	-59.9	0.1	-43.8	-41.25	2.58
	HT/VHT40 Beam Forming, M0 to M7	2	16	-59.4	-63.5	0.1	-41.9	-41.25	0.67
	HT/VHT40 Beam Forming, M8 to M15	2	13	-59.9	-59.9	0.1	-43.8	-41.25	2.58
	HT/VHT40 STBC, M0 to M7	2	13	-59.9	-59.9	0.1	-43.8	-41.25	2.58
5530	Non HT80, 6 to 54 Mbps	1	13	-54.7		0.0	-41.7	-41.25	0.42
	Non HT80, 6 to 54 Mbps	2	13	-60.8	-60.8	0.0	-44.8	-41.25	3.51
	VHT80, M0 to M9 1ss	1	13	-54.5		0.2	-41.3	-41.25	0.05
	VHT80, M0 to M9 1ss	2	13	-57.1	-58.2	0.2	-41.4	-41.25	0.16
	VHT80, M0 to M9 2ss	2	13	-57.1	-58.2	0.2	-41.4	-41.25	0.16
	VHT80 Beam Forming, M0 to M9 1ss	2	16	-61.6	-63.4	0.2	-43.2	-41.25	1.95
	VHT80 Beam Forming, M0 to M9 2ss	2	13	-57.1	-58.2	0.2	-41.4	-41.25	0.16
	VHT80 STBC, M0 to M9 1ss	2	13	-57.1	-58.2	0.2	-41.4	-41.25	0.16

Conducted Band edge Peak Table

Frequency (MHz)	Mode	Tx Paths	Correlated Antenna Gain (dBi)	Tx 1 Bandedge Level (dBm)	Tx 2 Bandedge Level (dBm)	Total Tx Bandedge Level (dBm)	Limit (dBm)	Margin (dB)
5500	Non HT20, 6 to 54 Mbps	1	13	-44.4		-31.4	-21.25	10.12
	Non HT20, 6 to 54 Mbps	2	13	-50.2	-51.6	-34.8	-21.25	13.55
	Non HT20 Beam Forming, 6 to 54 Mbps	2	16	-50.2	-51.6	-31.8	-21.25	10.55
	HT/VHT20, M0 to M7	1	13	-44.0		-31.0	-21.25	9.71
	HT/VHT20, M0 to M7	2	13	-50.2	-49.3	-33.7	-21.25	12.42
	HT/VHT20, M8 to M15	2	13	-46.7	-49.0	-31.6	-21.25	10.40
	HT/VHT20 Beam Forming, M0 to M7	2	16	-50.2	-49.3	-30.7	-21.25	9.42
	HT/VHT20 Beam Forming, M8 to M15	2	13	-46.7	-49.0	-31.6	-21.25	10.40
	HT/VHT20 STBC, M0 to M7	2	13	-46.7	-49.0	-31.6	-21.25	10.40
5510	Non HT40, 6 to 54 Mbps	1	13	-41.2		-28.2	-21.25	6.91
	Non HT40, 6 to 54 Mbps	2	13	-36.3	-46.0	-22.8	-21.25	1.57
	HT/VHT40, M0 to M7	1	13	-39.7		-26.6	-21.25	5.39
	HT/VHT40, M0 to M7	2	13	-39.7	-42.4	-24.8	-21.25	3.53
	HT/VHT40, M8 to M15	2	13	-39.7	-42.4	-24.8	-21.25	3.53
	HT/VHT40 Beam Forming, M0 to M7	2	16	-44.4	-40.2	-22.7	-21.25	1.49
	HT/VHT40 Beam Forming, M8 to M15	2	13	-39.7	-42.4	-24.8	-21.25	3.53
	HT/VHT40 STBC, M0 to M7	2	13	-39.7	-42.4	-24.8	-21.25	3.53
5530	Non HT80, 6 to 54 Mbps	1	13	-43.6		-30.6	-21.25	9.32
	Non HT80, 6 to 54 Mbps	2	13	-48.1	-48.4	-32.2	-21.25	10.95
	VHT80, M0 to M9 1ss	1	13	-35.6		-22.4	-21.25	1.26
	VHT80, M0 to M9 1ss	2	13	-48.5	-45.5	-30.5	-21.25	9.29
	VHT80, M0 to M9 2ss	2	13	-48.5	-45.5	-30.5	-21.25	9.29
	VHT80 Beam Forming, M0 to M9 1ss	2	16	-45.9	-47.8	-27.5	-21.25	6.29
	VHT80 Beam Forming, M0 to M9 2ss	2	13	-48.5	-45.5	-30.5	-21.25	9.29
	VHT80 STBC, M0 to M9 1ss	2	13	-48.5	-45.5	-30.5	-21.25	9.29
70	Non HT20, 6 to 54 Mbps	1	13	-40.8		-27.8	-21.25	6.52

	Non HT20, 6 to 54 Mbps	2	13	-50.1	-43.0	-29.2	-21.25	7.94
	Non HT20 Beam Forming, 6 to 54 Mbps	2	16	-50.1	-43.0	-26.2	-21.25	4.94
	HT/VHT20, M0 to M7	1	13	-41.5		-28.5	-21.25	7.25
	HT/VHT20, M0 to M7	2	13	-40.5	-46.9	-26.6	-21.25	5.31
	HT/VHT20, M8 to M15	2	13	-48.0	-41.7	-27.7	-21.25	6.49
	HT/VHT20 Beam Forming, M0 to M7	2	16	-40.5	-46.9	-23.6	-21.25	2.31
	HT/VHT20 Beam Forming, M8 to M15	2	13	-48.0	-41.7	-27.7	-21.25	6.49
	HT/VHT20 STBC, M0 to M7	2	13	-48.0	-41.7	-27.7	-21.25	6.49

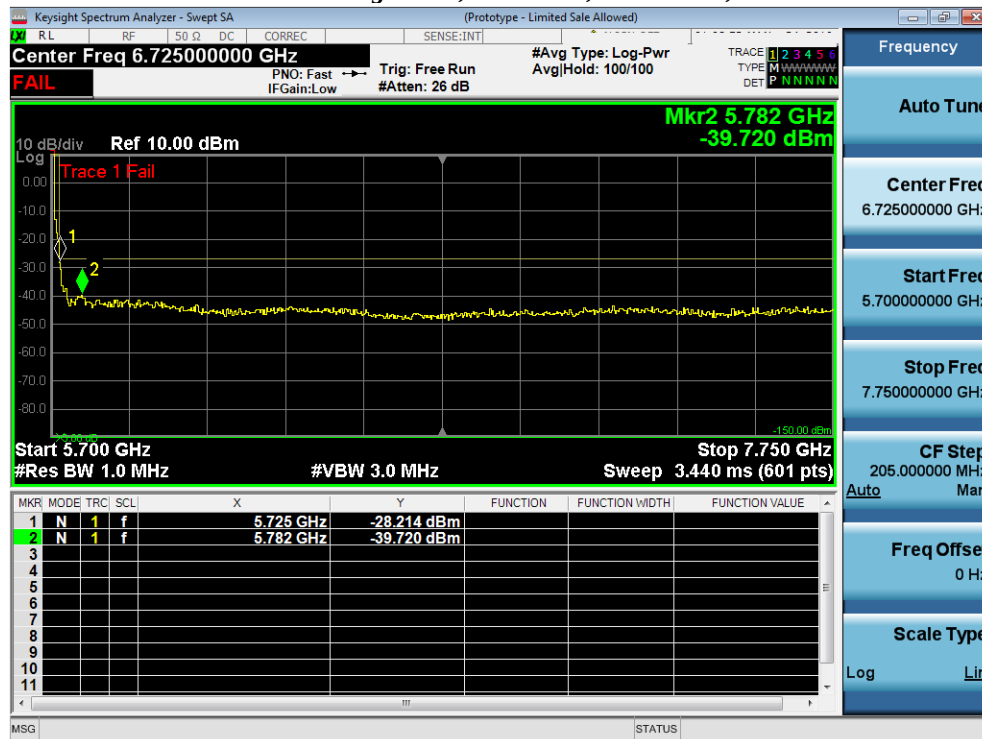
Antenna Gain: 7dBi

Conducted Bandedge Average, 5530 MHz, Non HT80, 6 to 54 Mbps



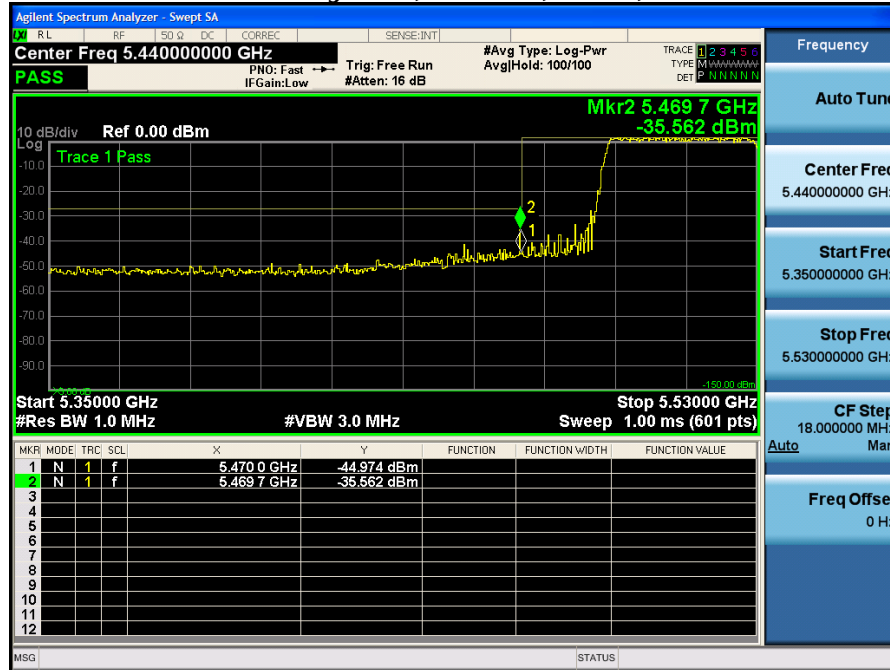
Antenna A

Antenna B

Antenna Gain: 7dBi**Conducted Bandedge Peak, 5510 MHz, HT/VHT40 Beam Forming, M0 to M7****Antenna A****Antenna B****Conducted Band edge Peak, 5700 MHz, HT/VHT20, M0 to M7****Antenna A**

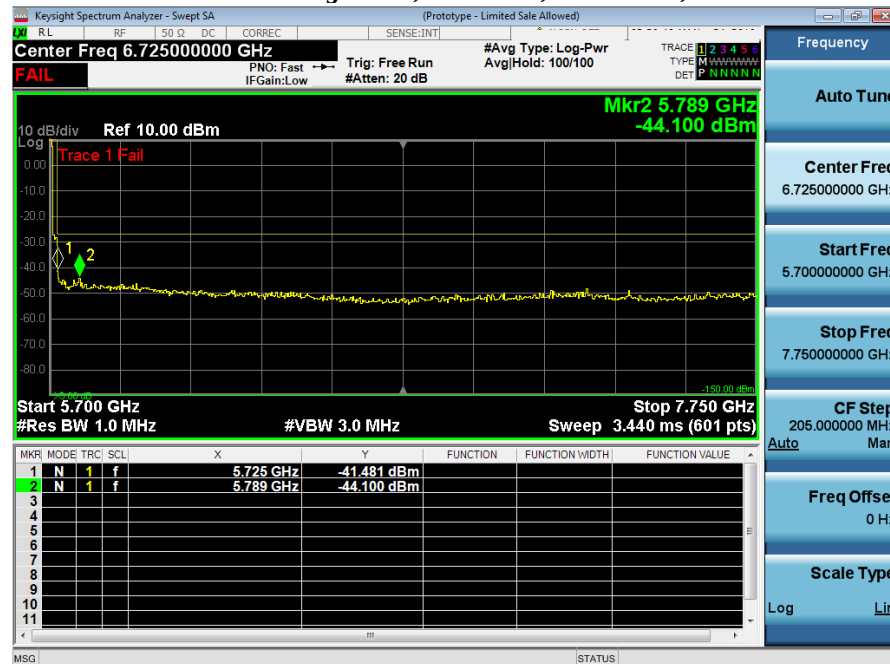
Antenna Gain: 13dBi

Conducted Band edge Peak, 5530 MHz, VHT80, M0 to M9 1ss



Antenna A

Conducted Band edge Peak, 5700 MHz, HT/VHT20, M0 to M7



Antenna A

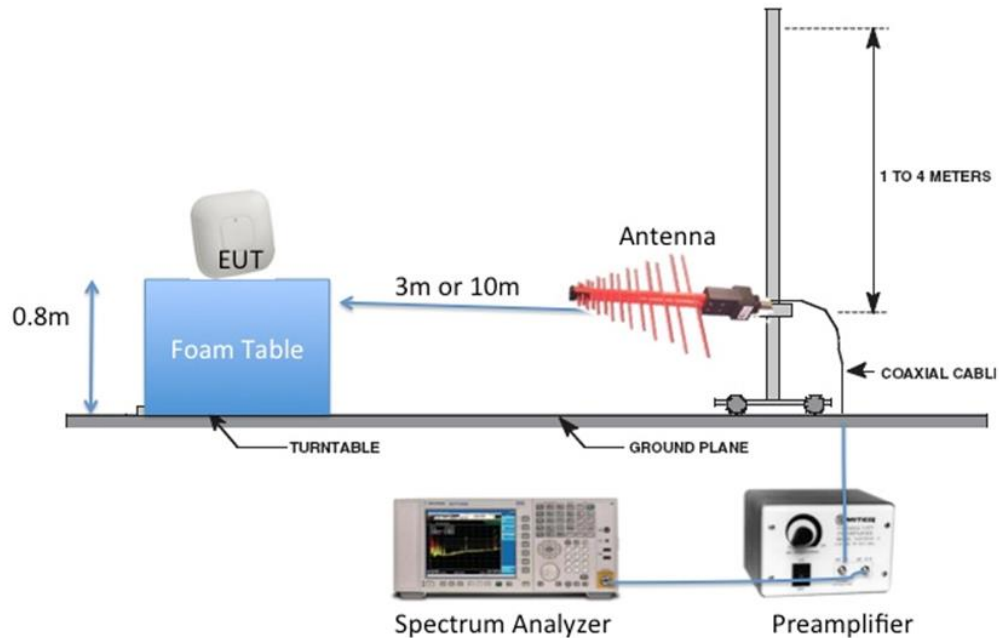
Appendix B: Radiated Spurious and AC Conducted Emissions

Testing Laboratory: Cisco Systems, Inc., 425 East Tasman Drive, San Jose, CA 95134, USA

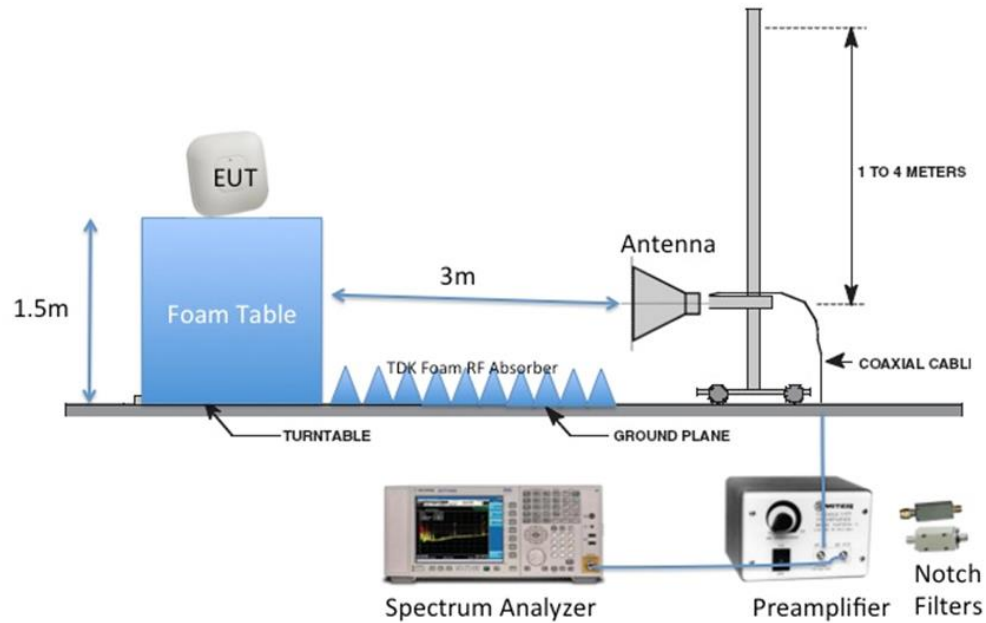
B.1 Radiated Spurious Emissions

B1.1 Setup Diagram

Below 1G (Preamp used is optional)



Above 1G



B1.2 Restricted Bands

15.407 (b) (7) The provisions of 15.205 apply to intentional radiators operating under this section

15.205 (b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. Refer to limit section for detailed limits.

Restricted Bands for LP0002			
MHz	MHz	MHz	MHz
0.090~0.110	108.00~138.00	1660.0~1785.0	8025.0~8500.0
0.490~0.510	149.90~150.05	1805.0~1880.0	9000.0~9200.0
2.172~2.198	156.70~156.90	1885.0~1900.0	9300.0~9500.0
3.013~3.033	162.01~167.17	1905.0~1985.0	10600~12700
4.115~4.198	167.72~173.20	2010.0~2025.0	13250~13400
5.670~5.690	240.00~285.00	2110.0~2170.0	14470~14500
6.200~6.300	322.00~335.40	2200.0~2300.0	15350~16200
8.230~8.400	399.90~410.00	2310.0~2390.0	17700~21400
12.265~12.600	485.00~510.00	2483.5~2900.0	22010~23120
13.340~13.430	608.00~614.00	3260.0~3267.0	23600~24000
14.965~15.020	703.00~748.00	3332.0~3339.0	31200~31800
16.700~16.755	758.00~803.00	3345.8~3358.0	36430~36500
19.965~20.020	825.00~915.00	3500.0~4400.0	Above 38600
25.500~25.700	930.00~1240.0	4500.0~5250.0	
37.475~38.275	1300.0~1427.0	5350.0~5460.0	
73.500~75.400	1435.0~1626.5	7250.0~7750.0	

RSS-Gen 8.10

(b) Unwanted emissions that fall into restricted bands of [Table 6](#) shall comply with the limits specified in RSS-Gen.

(c) Unwanted emissions that do not fall within the restricted frequency bands of [Table 6](#) shall comply either with the limits specified in the applicable RSS or with those specified in this RSS-Gen.

Table 6 Restricted Bands

MHz	MHz	GHz
0.090-0.110	74.8-75.2	9.0-9.2
2.1735-2.1905	108-138	9.3-9.5
3.020-3.026	156.52475-156.52525	10.6-12.7
4.125-4.128	156.7-156.9	13.25-13.4
4.17725-4.17775	240-285	14.47-14.5
4.20725-4.20775	322-335.4	15.35-16.2
5.677-5.683	399.9-410	17.7-21.4
6.215-6.218	608-614	22.01-23.12
6.26775-6.26825	960-1427	23.6-24.0
6.31175-6.31225	1435-1626.5	31.2-31.8
8.291-8.294	1645.5-1646.5	36.43-36.5
8.362-8.366	1660-1710	Above 38.6
8.37625-8.38675	1718.8-1722.2	*
8.41425-8.41475	2200-2300	
12.29-12.293	2310-2390	
12.51975-12.52025	2655-2900	
12.57675-12.57725	3260-3267	
13.36-13.41	3332-3339	
16.42-16.423	3345.8-3358	
16.69475-16.69525	3500-4400	
16.80425-16.80475	4500-5150	
25.5-25.67	5350-5460	
37.5-38.25	7250-7750	
73-74.6	8025-8500	

B1.3 Limits

Below 1 GHz

FCC 15.209

The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the table specified in the table in FCC§15.209(a).

FCC15.407

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

RSS-Gen 8.9: Except when the requirements applicable to a given device state otherwise, emissions from licence-exempt transmitters shall comply with the field strength limits shown in Table below. Additionally, the level of any transmitter emission shall not exceed the level of the transmitter's fundamental emission.

General Field Strength Limits Table			
Frequency (MHz)	Field strength (uV/meter)	Field strength (dBuV/meter)	Measurement distance (meters)
30-88	100**	40 Qp	3
88-216	150**	43.5 Qp	3
216-960	200**	46 Qp	3
Above 960	500	54 Av / 74 Pk	3

Above 1 GHz

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

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

RSS-247 6.2.3.2

Emissions outside the band 5470-5725 MHz shall not exceed -27 dBm/MHz e.i.r.p.

Limit Conversion (power to field strength)

The field strength limit in dBμV can be converted from power (logarithmic) by using the field strength (linear) approach formula as follows:

$$V/m = \frac{\sqrt{30 \times P_t \times g_t}}{d}$$

where: **pt** = transmitter output power in watts,
gt = numeric gain of the transmitting antenna (unit less),
E = electric field strength in V/m,
d = measurement distance in meters (m).

From the equation above, unit conversion from log => linear with a known power limit of -27 dBm.

(1) Conversion from dBm to Watt

$$\text{dBm to Watts } W = 10^{((\text{dBm} - 30)/10)}$$

$$\begin{aligned} P(W) &= 10^{(-27 - 30) / 10} \\ &= 10^{-5.7} \\ &= 1.995 \times 10^{-6} \end{aligned}$$

(2) Convert from Watt to field strength

- a. Convert from Watt to V/m @ 3m distance

$$\begin{aligned} V/m &= \frac{\sqrt{30 \times P_t \times g_t}}{3} \\ &= \frac{\sqrt{30 \times 0.000001995 \times 1}}{3} \\ &= 0.00257 \end{aligned}$$

- b. Convert field strength to power density (V/m to dBμV/m)

$$\begin{aligned} \text{dB}\mu\text{V/m} &= 20 \log (V/m) + 120 \\ &= 68.2 \end{aligned}$$

B1.4 Test Procedure**Ref.** ANSIC63.10-2013 section 6.5 & 6.6, Cisp16-1-1

ANSI C63.10: 2013 section 4.1.4 / section 12.7.5 (Quasi-Peak), section 12.7.6 (peak), section 12.7.7.3 (average)

Test parameters

- (i) Span = Entire frequency range or segment if necessary.
- (ii) Reference Level = 80 dBuV
- (iii) RBW = 100 kHz (less than or equal to 1 GHz); 1 MHz (above 1 GHz)
- (iv) VBW $\geq 3 \times$ RBW
- (v) Detector = Peak & Quasi-Peak (frequency range 30 MHz to 1 GHz);
Peak & Average (frequency range above 1 GHz); Change VBW to 10 Hz for average measurement
- (vi) Sweep Time = Couple

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

Terminate the access Point RF ports with 50 ohm loads.
Maximize Turntable (find worst case table angle), Maximize Antenna (find worst case height)

30MHz – 18GHz,

Save plots: Peak plot (Vertical and Horizontal) @3m

Above 18 GHz,

Save plots: Peak plot (Vertical and Horizontal) @1m

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.

Note: The data displayed on the plots detailed in the graphical test results section were measured using a 'Peak Detector'. Please refer to the results table for the detectors used during formal measurements.

This report represents the worst case data for all supported operating modes with antenna which has maximum gain.

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
1	EUT	IW-6300H with Air-ANT2513P4M-N antenna	☒	☐
	Support	IW-6300H-AC-X-K9 power supply	☐	☒

Mode Setting#	Wi-Fi Mode	Modulation	Data Rate
1 (single antenna)	802.11a*	BPSK	6 Mbps
8 (dual antenna)	802.11n (HT40)*	BPSK	27.0 Mbps (MCS0)

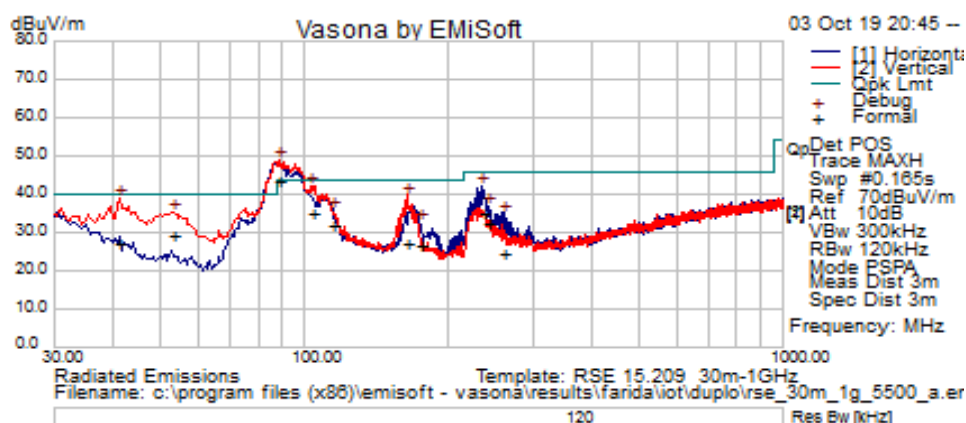
Tested By: Test Engineer(s): Farida Rahmanzai, Jose Huamani	Date of testing: 23-Sep-2019 – 14-Oct-2019
Test Result: PASS	

Test Equipment

See Appendix C for list of test equipment

B1.5 TX Radiated Spurious Emissions Graphical Data Results

Subtest Date:	03-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	30MHz - 1GHz
Comments on the above Test Results	802.11a, Tx Channel 100 (5500 MHz) (worst case)



Title: TX Spurious Emissions from 30MHz-1GHz – Ch100 (5500 MHz)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
88.5435	35.02	0.98	7.55	43.56	Quasi Max	H	391	127	53.5*	-9.94	Pass	See notes
40.982	13.33	0.66	13.21	27.21	Quasi Max	V	147	227	40	-12.79	Pass	
103.441	23.02	1.06	10.83	34.91	Quasi Max	H	398	274	43.5	-8.59	Pass	
163.2883	14.23	1.36	11.87	27.46	Quasi Max	V	159	172	43.5	-16.04	Pass	
235.1233	21.83	1.6	11.5	34.93	Quasi Max	H	107	226	46	-11.07	Pass	
53.27075	21.2	0.79	7.27	29.26	Quasi Max	V	108	258	40	-10.74	Pass	
113.961	18.11	1.12	12.99	32.23	Quasi Max	H	271	254	43.5	-11.27	Pass	
240.5625	19.1	1.62	11.7	32.42	Quasi Max	H	128	211	46	-13.58	Pass	
174.1113	14.35	1.4	11.1	26.85	Quasi Max	H	110	191	43.5	-16.65	Pass	
260.845	10.71	1.69	12.17	24.57	Quasi Max	V	101	144	46	-21.43	Pass	

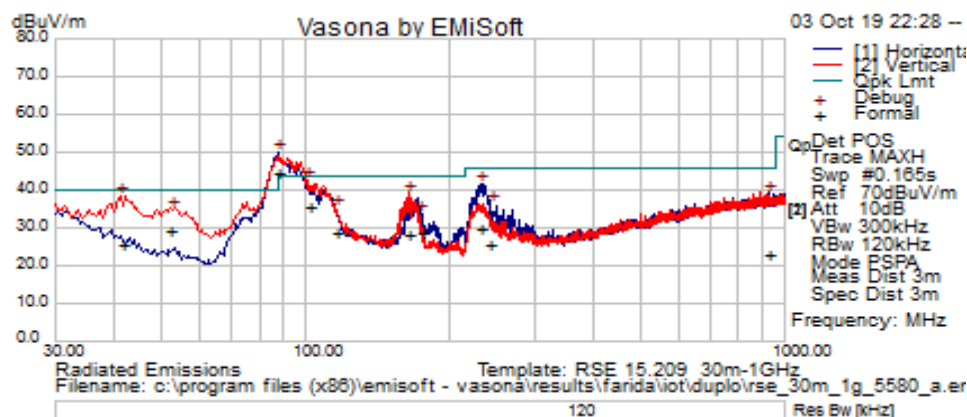
Note1: 88.54MHz is determined to be non-radio related signal. FCC part15.109 class A limit applied.

Also see FCC Part15.109 test report.

Note2: * means FCC part15.109 class A limit.

Subtest Date:	03-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani

Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	30MHz - 1GHz
Comments on the above Test Results	802.11a, Tx Channel 116 (5580 MHz) (worst case)



Title: TX Spurious Emissions from 30MHz-1GHz – Ch 116 (5580 MHz)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
87.5505	35.94	0.98	7.5	44.42	Quasi Max	H	226	119	50*	-5.58	Pass	See notes
101.0905	24.66	1.04	10.23	35.94	Quasi Max	H	223	222	43.5	-7.56	Pass	
41.17	12.03	0.66	13.08	25.77	Quasi Max	V	171	83	40	-14.23	Pass	
163.4268	15.33	1.36	11.86	28.54	Quasi Max	V	126	182	43.5	-14.96	Pass	
231.795	16.91	1.59	11.28	29.78	Quasi Max	H	118	179	46	-16.22	Pass	
52.157	21.02	0.79	7.47	29.27	Quasi Max	V	104	143	40	-10.73	Pass	
927.3338	-2.66	3.17	22.37	22.88	Quasi Max	H	352	239	46	-23.12	Pass	
115.5203	14.49	1.13	13.25	28.87	Quasi Max	H	260	193	43.5	-14.63	Pass	
242.7128	12.5	1.62	11.7	25.82	Quasi Max	H	150	189	46	-20.18	Pass	
173.58	16.16	1.4	11.14	28.7	Quasi Max	H	113	207	43.5	-14.8	Pass	

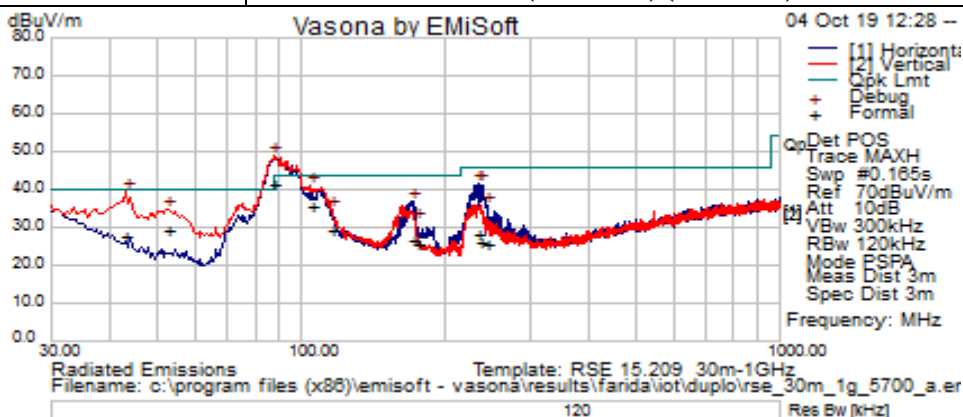
Note1: 87.55MHz is determined to be non-radio related signal. FCC part15.109 class A limit applied.

Also see FCC Part15.109 test report.

Note2: * means FCC part15.109 class A limit

Subtest Date:	04-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	30MHz - 1GHz
Comments on the above Test Results	802.11a, Tx Channel 140 (5700 MHz) (worst case)

Subtest Date:	04-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	30MHz - 1GHz
Comments on the above Test Results	802.11a, Tx Channel 140 (5700 MHz) (worst case)



Title: TX Spurious Emissions from 30MHz-1GHz – Ch140 (5700 MHz)

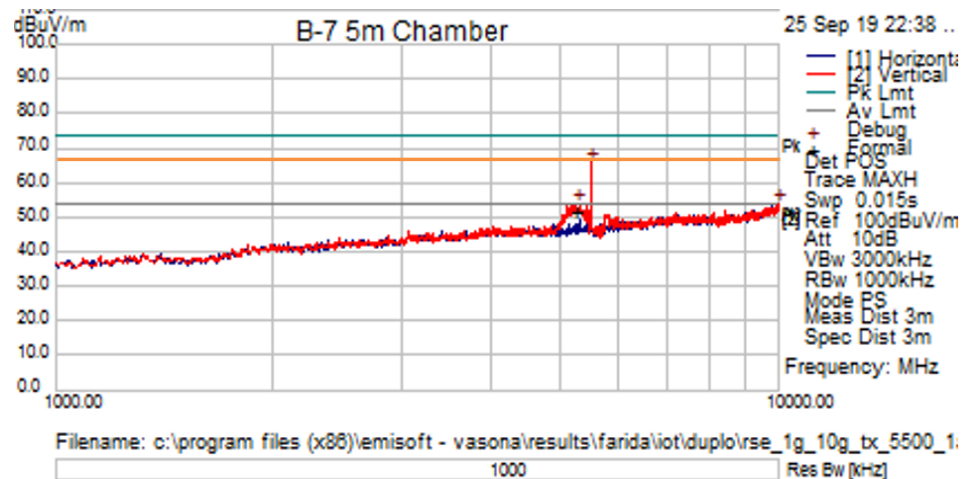
Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
87.5805	33.45	0.5	7.5	41.44	Quasi Max	H	171	289	50*	-8.56	Pass	See notes
42.86025	15.37	0.35	11.81	27.53	Quasi Max	V	169	128	40	-12.47	Pass	
104.7738	23.94	0.54	11.15	35.63	Quasi Max	V	128	114	43.5	-7.87	Pass	
234.1718	16.09	0.82	11.42	28.33	Quasi Max	H	155	257	46	-17.67	Pass	
235.7698	13.86	0.82	11.5	26.18	Quasi Max	V	188	28	46	-19.82	Pass	
52.651	21.56	0.4	7.37	29.33	Quasi Max	V	106	167	40	-10.67	Pass	
171.1903	14.9	0.71	11.3	26.9	Quasi Max	H	131	179	43.5	-16.6	Pass	
115.495	15.72	0.57	13.25	29.54	Quasi Max	H	278	241	43.5	-13.96	Pass	
244.3365	13.27	0.83	11.7	25.81	Quasi Max	H	106	258	46	-20.19	Pass	
174.1015	13.89	0.71	11.1	25.7	Quasi Max	H	153	191	43.5	-17.8	Pass	

Note1: 87.58MHz is determined to be non-radio related signal. FCC part15.109 class A limit applied.

Also see FCC Part15.109 test report.

Note2: * means FCC part15.109 class A limit

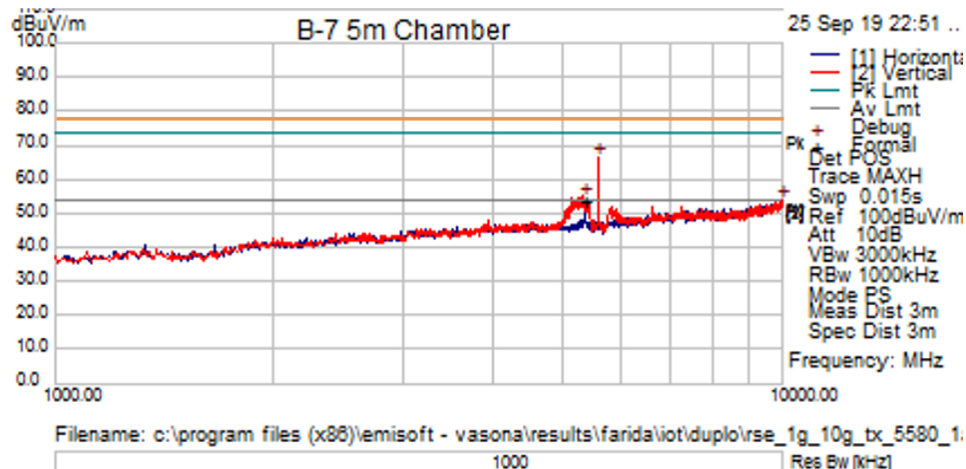
Subtest Date:	25-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	802.11a, Tx Channel 100 (5500 MHz)



Title: TX Spurious Emissions from 1GHz-1GHz – Ch100 (5500 MHz)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
5494.375	62.29	9.31	-5.3	66.3	Peak	V	100	14	N/A	N/A	Ignored	Fundamental
5233.138	48.77	9.08	-5.79	52.05	Peak	V	99	29	68.2	-16.15	Pass	Tx/Ch100

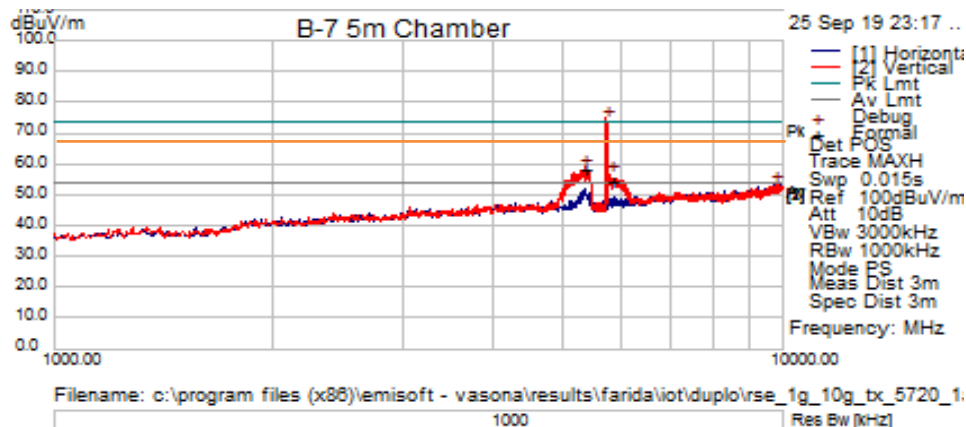
Subtest Date:	25-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	802.11a, Tx Channel 116 (5580 MHz)



Title: TX Spurious Emissions from 1GHz-10GHz – Ch116 (5580 MHz)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
5584.375	62.54	9.36	-5.37	66.53	Peak	V	100	15	N/A	N/A	Ignored	Fundamental
5346.948	50.1	9.2	-5.54	53.76	Peak	V	100	28	68.2	-14.44	Pass	50.1/Ch100 9.2

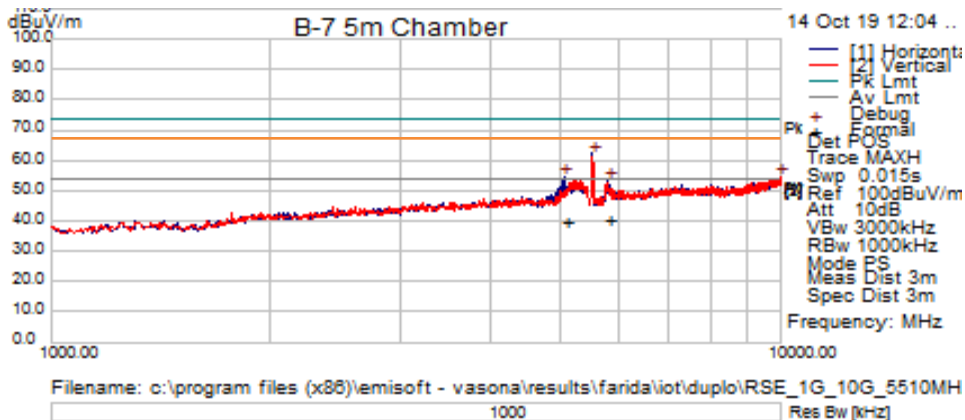
Subtest Date:	25-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	802.11a, Tx Channel 140 (5700 MHz)



Title: TX Spurious Emissions from 1GHz-10GHz – Ch140 (5700 MHz)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
5725	70.16	9.52	-4.98	74.71	Peak	V	100	25	N/A	N/A	Ignored	Fundamental
5336.875	55.25	9.19	-5.53	58.9	Peak	V	100	22	68.2	-9.30	Pass	Tx/Ch100
5337.633	54.76	9.19	-5.53	58.42	Peak	V	100	21	68.2	-9.78	Pass	
5798.125	51.88	9.59	-4.94	56.53	Peak	V	100	8	68.2	-11.67	Pass	
5802.645	49.76	9.59	-5.01	54.34	Peak	V	100	7	68.2	-13.86	Pass	

Subtest Date:	14-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	802.11n40, Tx Channel 102 (5510 MHz)

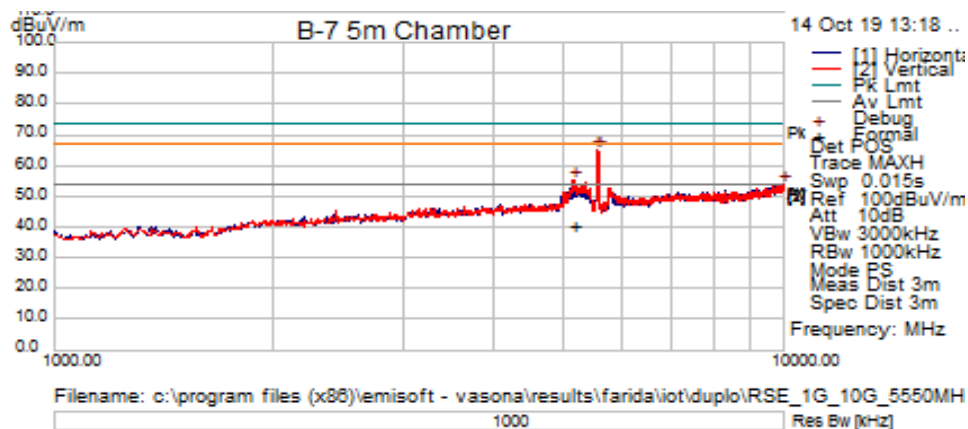


Title: TX Spurious Emissions from 1GHz-10GHz – Ch102 (5510 MHz)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
5516.875	58.01	9.75	-5.4	62.36	Peak [Scan]	H	150	342	N/A	N/A	Ignored	Fundamental
5044.375	51.47	9.24	-5.88	54.83	Peak [Scan]	H	175	349	68.2	-13.37	Pass	RB
5090.653	36.69	9.29	-5.86	40.12	Average	H	176	349	54	-13.88	Pass	RB
5792.50	48.36	10	-4.85	53.52	Peak [Scan]	H	125	354	68.2	-14.68	Pass	
5792.72	35.49	10	-4.85	40.64	Average	H	126	355	54	-13.36	Pass	

Note: RB means restricted band

Subtest Date:	14-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	802.11n40, Tx Channel 110 (5550 MHz)

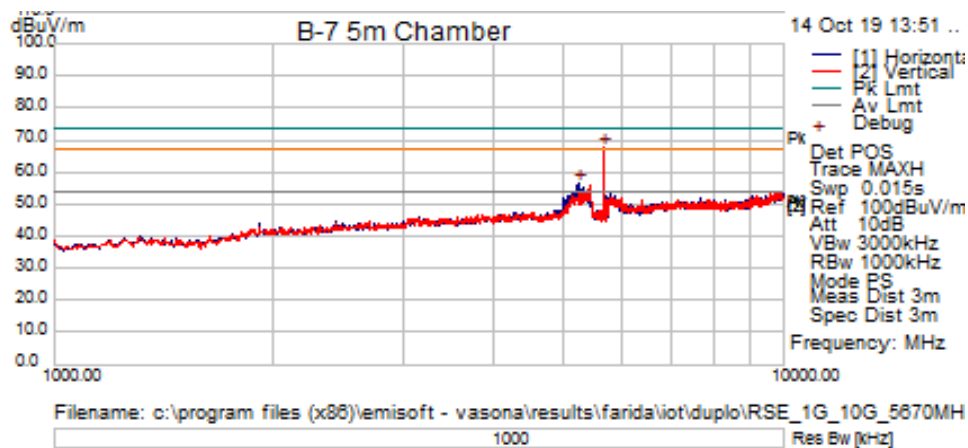


Title: TX Spurious Emissions from 1GHz-10GHz – Ch 110 (5550 MHz)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
5533.75	60.82	9.74	-5.28	65.28	Peak [Scan]	V	100	348	N/A	N/A	Ignored	Fundamental
5145.625	51.79	9.35	-5.78	55.36	Peak [Scan]	V	125	338	68.2	-12.84	Pass	RB
5144.965	36.77	9.35	-5.78	40.34	Average	V	125	337	54	-13.66	Pass	RB

Note: RB means restricted band

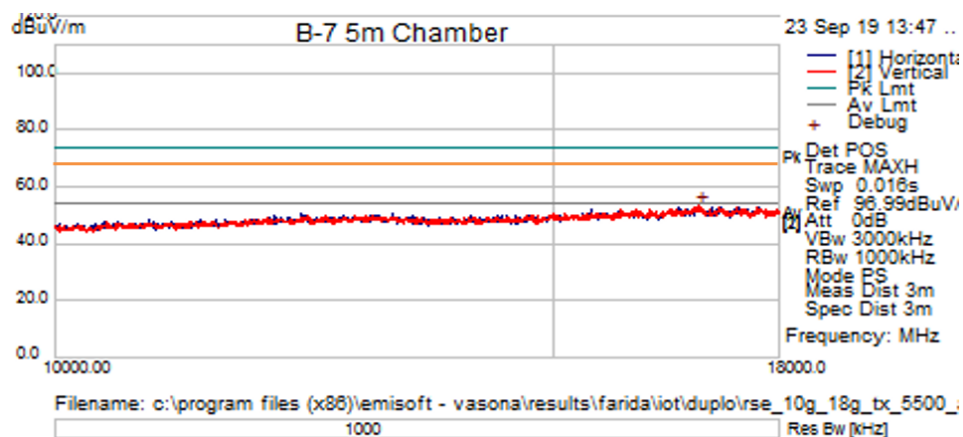
Subtest Date:	14-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	1GHz - 10GHz
Comments on the above Test Results	802.11n40, Tx Channel 134 (5670 MHz)



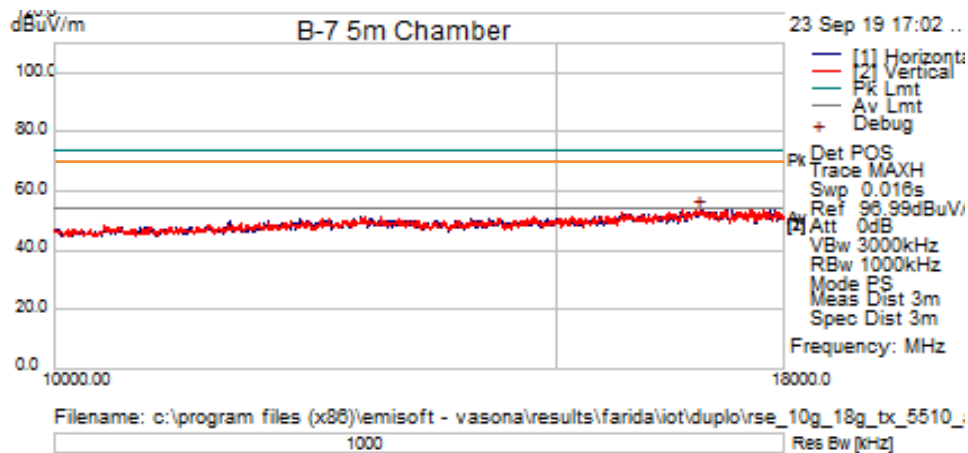
Title: TX Spurious Emissions from 1GHz-10GHz – Ch 134 (5670 MHz)

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	AF (dB)	Level (dBuV)	Detector	Polarity	Height (cm)	Azt (Deg)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
5668.75	59.05	12.32	-5.34	66.03	Peak	H	100	2	N/A	N/A	Ignored	Fundamental
5308.75	52.22	11.83	-5.55	58.5	Peak	V	100	360	68.2	-9.70	Pass	
5843.125	47.63	12.59	-5.06	55.17	Peak	V	100	355	68.2	-13.03	Pass	

Subtest Date:	23-Sep-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	10GHz - 18GHz
Comments on the above Test Results	802.11a , Tx Channel 100 (5500 MHz) 802.11n40 , Tx Channel 102 (5510 MHz)

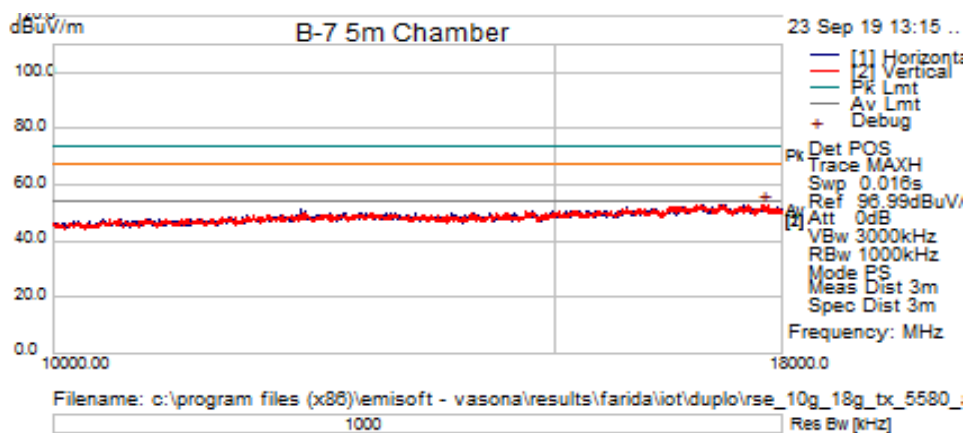


Title: TX Spurious Emissions from 10GHz-18GHz – Ch 100 (5500 MHz)

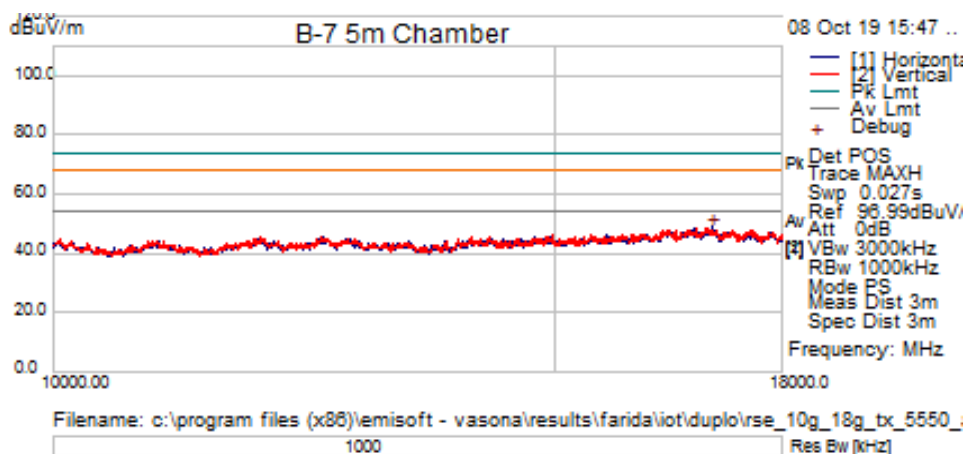


Title: TX Spurious Emissions from 10GHz-18GHz – Ch 102 (5510 MHz)

Subtest Date:	23-Sep-2019 – 08-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	10GHz - 18GHz
Comments on the above Test Results	802.11a, Tx Channel 116 (5580 MHz); 802.11n40, Tx Channel 110 (5550 MHz);



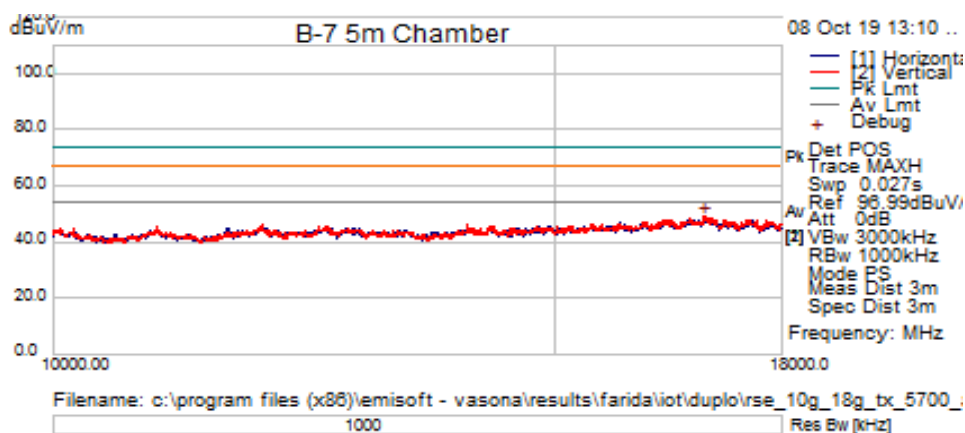
Title: TX Spurious Emissions from 10GHz-18GHz – Ch116 (5580 MHz)



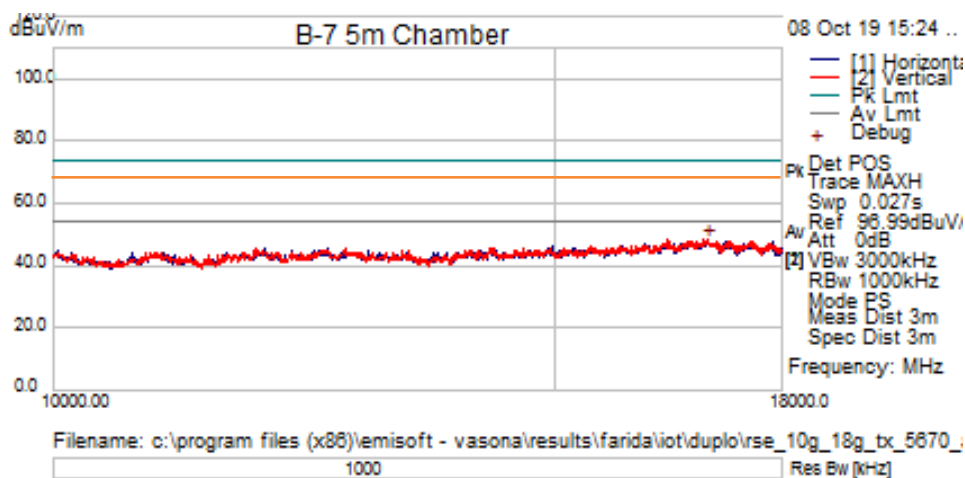
Title: TX Spurious Emissions from 10GHz-18GHz – Ch110 (5550 MHz)

Subtest Date:	08-Oct-2019
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Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions
Frequency Range	10GHz - 18GHz
Comments on the above Test Results	802.11a, Tx Channel 140 (5700 MHz); 802.11n40, Tx Channel 134(5670 MHz);



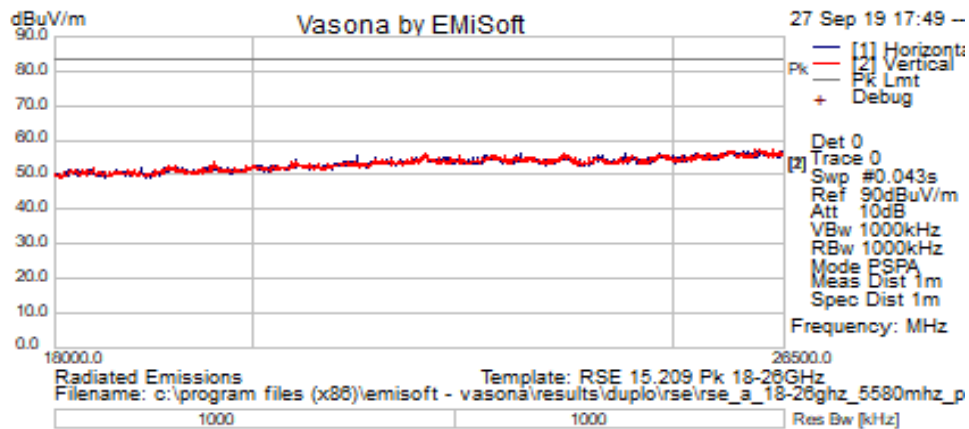
Title: TX Spurious Emissions from 10GHz-18GHz – Ch140 (5700 MHz)



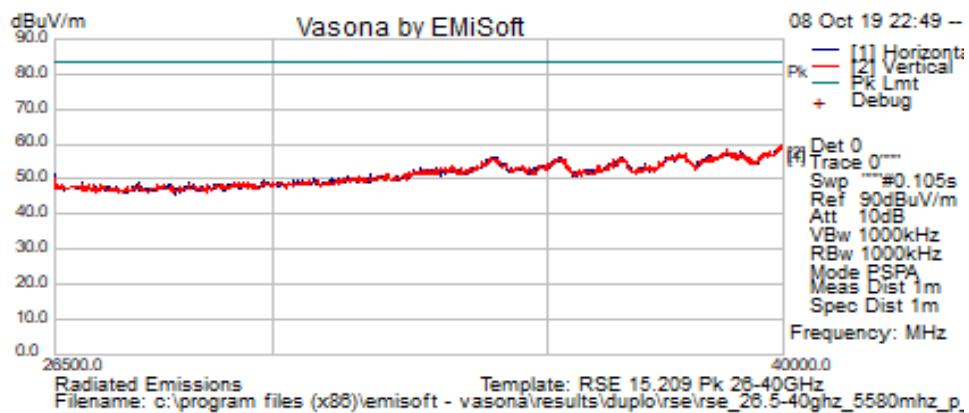
Title: TX Spurious Emissions from 10GHz-18GHz – Ch134 (5670 MHz)

Subtest Date:	27-Sep-2019 – 08-Oct-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, 5m Anechoic
Subtest Title	Transmitter Spurious Emissions

Frequency Range	18GHz - 40GHz
Comments on the above Test Results	802.11a, Tx Channel 116 (5580 MHz)



Title: TX Spurious Emissions from 18GHz-26.5GHz – Ch116 (55800 MHz)



Title: TX Spurious Emissions from 26.5GHz-40GHz – Ch116 (55800 MHz)

B.2 AC Conducted Emissions

B2.1 Limits

FCC 15.207: (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN).

Frequency of Emission (MHz)	Conducted Limits	
	Quasi-Peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

RSS-Gen 8.8: Unless stated otherwise in the applicable RSS, for radio apparatus that are designed to be connected to the public utility AC power network, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the range 150 kHz to 30 MHz shall not exceed the limits in table 4 (AC power-line conducted emissions limit), as measured using a 50 μ H / 50 Ω line impedance stabilization network. This requirement applies for the radio frequency voltage measured between each power line and the ground terminal of each AC power-line mains cable of the EUT.

B2.2 Test Procedures

Ref: C63.10:2013, section 6.2.2

Section 6.2.2 Measurement requirements

Measured levels of ac power-line conducted emission shall be the emission voltages from the voltage probe or across the 50 Ω LISN port (to which the EUT is connected), where permitted, terminated into a 50 Ω measuring instrument, or where permitted or required, the emission currents on the power line sensed by a current probe. All emission voltage and current measurements shall be made on each current-carrying conductor at the plug end of the EUT power cord by the use of mating plugs and receptacles on the LISN, if used. Equipment shall be tested with power cords that are normally supplied or recommended by the manufacturer, and that have electrical and shielding characteristics that are the same as those cords normally supplied or recommended by the manufacturer. For those measurements, using a LISN, the 50 Ω measuring port is terminated by a measuring instrument having a 50 Ω input impedance. All other ports are terminated in 50 Ω loads. Figure 5, Figure 6, and Figure 7 show typical test setups for ac power-line conducted emissions testing (see 6.13). For information about the use of a RF-shielded (screen) room, vertical conducting plane and voltage probe, see ANSI C63.4.

Tabletop devices shall be placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the reference ground plane. The vertical conducting plane or wall of an RF-shielded (screen) room shall be located 40 cm to the rear of the EUT. Floor-standing devices shall be placed either directly on the reference ground-plane or on insulating material as described in ANSI C63.4. All other surfaces of tabletop or floor standing EUTs shall be at least 80 cm from any other grounded conducting surface, including the case or cases of one or more LISNs.

Section 6.2.5 Final ac power-line conducted emission measurements

Based on the exploratory tests of the EUT performed in 6.2.4, the one EUT cable configuration and arrangement and mode of operation that produced the emission with the highest amplitude relative to the limit is selected for the final measurement, while applying the appropriate modulating signal to the EUT. If the EUT is relocated from an exploratory test site to a final test site, the highest emissions shall be remaximized at the final test location before final ac power-line conducted emission measurements are performed. The final test on all current-carrying conductors of all of the power cords to the equipment that comprises the EUT (but not the cords associated with other non-EUT equipment in the system) is then performed for the full frequency range for which the EUT is being tested for compliance without further variation of the EUT arrangement, cable positions, or EUT mode of operation. If the EUT is comprised of equipment units that have their own separate ac power connections, e.g., floor-standing equipment with independent power cords for each shelf that are able to connect directly to the ac power network, each current-carrying conductor of one unit is measured while the other units are connected to a second (or more) LISN(s). All units shall be separately measured. If a power strip is provided by the manufacturer, to supply all of the units making up the EUT, only the conductors in the power cord of the power strip shall be measured.

Record the six highest EUT emissions relative to the limit of each of the current-carrying conductors of the power cords of the equipment that comprises the EUT over the frequency range specified by the procuring or regulatory agency.

Ref. C63.10-2013 section 6.2

Test Procedure
1. Using Vasona software, configure the spectrum analyzer as shown above (be sure to enter all losses between the transmitter output and the spectrum analyzer).

2. Set the radio in continuous transmit mode.
3. Connect cable end to LISN Hot port and other cable end to the spectrum Analyzer/EMC receiver RF input port. Terminate the LISN neutral port with a 50 Ω impedance terminator.
4. Sweep the frequency range from 150 kHz to 30 MHz (segment if necessary)
5. Use the peak marker function to determine the maximum amplitude level.
6. Center marker frequency and perform final measurement using applicable detector (Quasi-Pk/Average).
7. Record at least 6 highest reading for the worst case operating modes in Quasi-peak/Average.
8. Repeat the test on Neutral lead.
9. Repeat step 3 – 7 with the radio sets in the Receiver mode.
10. Record at least 6 highest reading in Quasi-peak/Average

Ref. C63.10-2013 section 4 / CISPR16-1-1**Test Parameters**

Span = Entire frequency range or segment if necessary.
Reference Level = 70 dBuV
RBW = 9 kHz
VBW $\geq$ 3 x RBW
Sweep Time = Couple
Detector = Quasi-Peak & Average

Samples, Systems, and Modes

System Number	Description	Samples	System under test	Support equipment
2	EUT	IW-6300H with Air-ANT2513P4M-N antenna	☒	☐
	Support	IW-6300H-AC-X-K9 power supply	☐	☒

Mode Setting#	Wi-Fi Mode	Modulation	Data Rate
1 (single antenna)	802.11a*	BPSK	6 Mbps

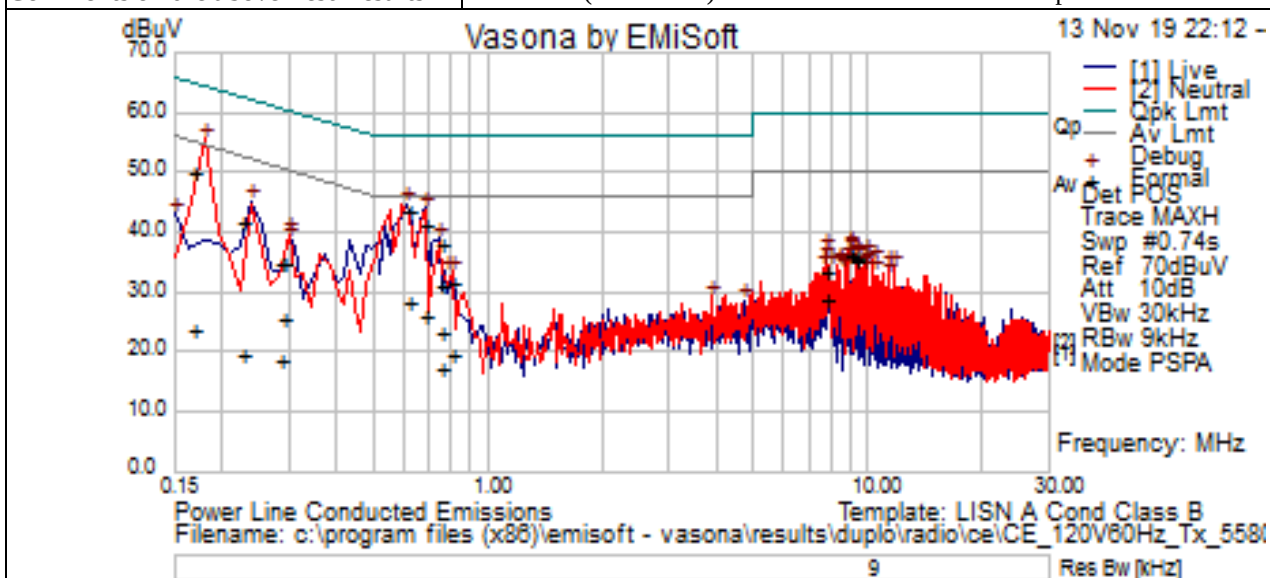
Tested By: Test Engineer(s): Farida Rahmanzai, Jose Huamani	Date of testing: 13-Nov-2019
Test Result: PASS	

Test Equipment

See Appendix C for list of test equipment

B2.3 AC Conducted Emissions Test Data and Graphical Test Results

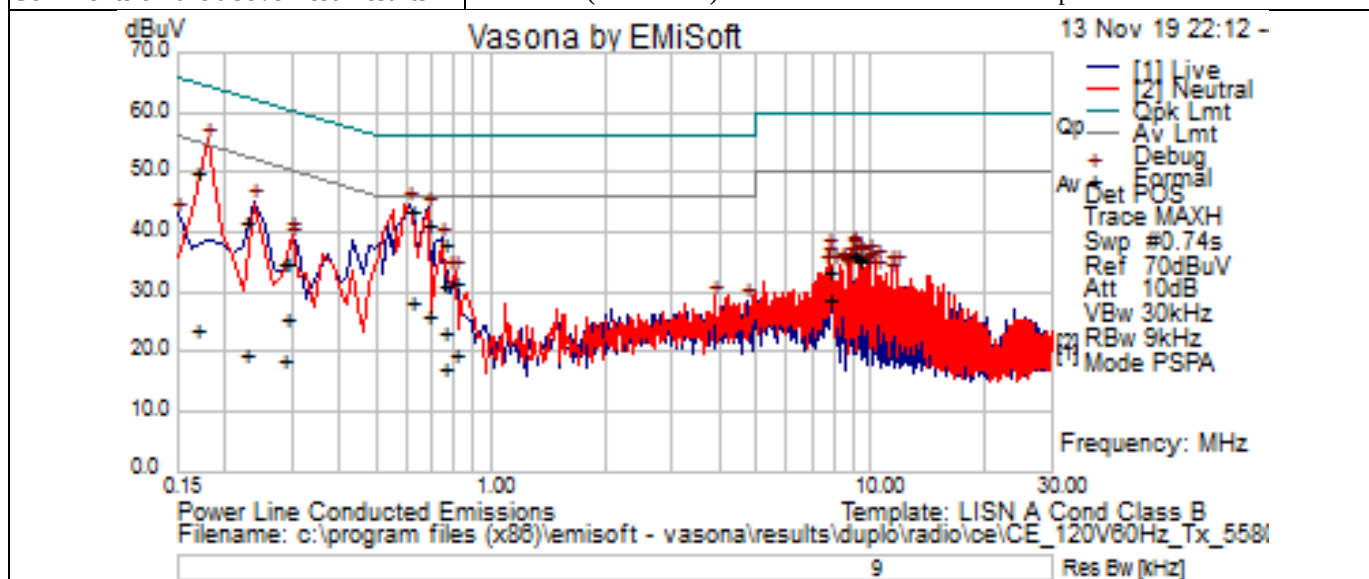
Subtest Date:	13-Nov-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, formal immunity room
Subtest Title	Conducted Emissions
Frequency Range	150 kHz - 30 MHz
Comments on the above Test Results	TX Ch116 (5580 MHz) with BPSK modulation – 6 Mbps



AC Conducted Emissions Test Result Tables for 802.11a / TX Ch116

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	Factors (dB)	Level (dBuV)	Detector	Lines (Live/Neutral)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
0.225132	21.08	20.75	0.09	41.92	Quasi Peak	Live	62.63	-20.71	Pass	TX / Ch116
0.225132	-1.17	20.75	0.09	19.68	Average	Live	52.63	-32.95	Pass	TX / Ch116
0.288234	14.38	20.48	0.08	34.93	Quasi Peak	Live	60.58	-25.64	Pass	TX / Ch116
0.288234	5.28	20.48	0.08	25.83	Average	Live	50.58	-24.74	Pass	TX / Ch116
0.623277	23.62	19.98	0.06	43.65	Quasi Peak	Live	56	-12.35	Pass	TX / Ch116
0.623277	8.34	19.98	0.06	28.37	Average	Live	46	-17.63	Pass	TX / Ch116
0.686958	21.26	19.98	0.06	41.3	Quasi Peak	Live	56	-14.7	Pass	TX / Ch116
0.686958	5.94	19.98	0.06	25.98	Average	Live	46	-20.02	Pass	TX / Ch116
0.75015	18.11	19.98	0.07	38.16	Quasi Peak	Live	56	-17.84	Pass	TX / Ch116
0.75015	3.33	19.98	0.07	23.37	Average	Live	46	-22.63	Pass	TX / Ch116
0.758904	10.97	19.98	0.07	31.02	Quasi Peak	Live	56	-24.98	Pass	TX / Ch116
0.758904	-2.78	19.98	0.07	17.27	Average	Live	46	-28.73	Pass	TX / Ch116
0.167466	29	21.09	0.1	50.19	Quasi Peak	Neutral	65.09	-14.89	Pass	TX / Ch116
0.167466	2.5	21.09	0.1	23.69	Average	Neutral	55.09	-31.4	Pass	TX / Ch116
0.28359	14.13	20.5	0.08	34.7	Quasi Peak	Neutral	60.71	-26.01	Pass	TX / Ch116
0.28359	-2.07	20.5	0.08	18.51	Average	Neutral	50.71	-32.2	Pass	TX / Ch116

Subtest Date:	13-Nov-2019
Engineer	Farida Rahmanzai Jose Huamani
Lab Information	Building 7, formal immunity room
Subtest Title	Conducted Emissions
Frequency Range	150 kHz - 30 MHz
Comments on the above Test Results	TX Ch116 (5580 MHz) with BPSK modulation – 6 Mbps



AC Conducted Emissions Test Result Tables for 802.11a / TX Ch116

Frequency (MHz)	Raw (dBuV)	Cab Loss (dB)	Factors (dB)	Level (dBuV)	Detector	Lines (Live/Neutral)	Limit (dBuV)	Margin (dB)	Results Pass / Fail	Comments
0.811956	11.65	19.97	0.08	31.7	Quasi Peak	Neutral	56	-24.3	Pass	TX / Ch116
0.811956	-0.46	19.97	0.08	19.59	Average	Neutral	46	-26.41	Pass	TX / Ch116
7.766232	13.27	20.1	0.1	33.47	Quasi Peak	Neutral	60	-26.53	Pass	TX / Ch116
7.766232	8.72	20.1	0.1	28.92	Average	Neutral	50	-21.08	Pass	TX / Ch116
8.918445	16.28	20.14	0.1	36.52	Quasi Peak	Neutral	60	-23.48	Pass	TX / Ch116
8.918445	16.19	20.14	0.1	36.42	Average	Neutral	50	-13.58	Pass	TX / Ch116
9.349758	15.57	20.14	0.11	35.82	Quasi Peak	Neutral	60	-24.18	Pass	TX / Ch116
9.349758	15.29	20.14	0.11	35.54	Average	Neutral	50	-14.46	Pass	TX / Ch116

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

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due
RF Conducted at output antenna port				
7329	OMEGA/CT485B	Chart Recorder	18 Feb. 2019	18 Feb. 2020
49516	Keysight (Agilent/HP) / N9030A	PXA Signal Analyzer, 3Hz to 50GHz	29 Nov. 2019	29 Nov. 2019
55097	Nattional Instruments / PXI-1042	Chassis PXI	Cal Not Required	Cal Not Required
56089	National Instruments / PXI-2796	40GHz Dual 6x1 Multiplexer (SP6T)	Verify Before Use	Verify Before Use
56328	Pasternack / PE5019-1	Torque Wrench	13 Feb. 2019	13 Feb. 2020
57233	Nattional Instruments / PXI-8115	Embedded Controller	Cal Not Required	Cal Not Required
57253	National Instruments / PXI-2796	40GHz Dual 6x1 Multiplexer (SP6T)	Verify Before Use	Verify Before Use
57254	National Instruments / PXI-2799	Switch 1x1	Verify Before Use	Verify Before Use
57479	CISCO / ATIL	Automation Test Insertion Loss System	Verify Before Use	Verify Before Use

Equip#	Manufacturer/ Model	Description	Last Cal	Next Due	Test Item
Test Equipment used for Radiated Emissions					
CIS008113	Cisco/NSA 5m Chamber	NSA 5m Chamber	01-Oct-19	01-Oct-20	B1
CIS037581	ETS Lindgren / 3117	Double Ridged Guide Horn Antenna	25-Jan-19	25-Jan-20	B1
CIS039131	Cisco / TH0118	Mast Mount Preamplifier Array, 1-18GHz	25-Feb-19	25-Feb-20	B1
CIS038404	Sunol Sciences / JB1	Combination Bi-Log Antenna, 30MHz-2GHz	31-Jan-19	31-Jan-20	B1
CIS036710	Cisco/1840	18-40GHz EMI Test Head/Verification Fixture	12-Aug-19	12-Aug-20	B1
CIS018231	Rohde & Schwarz /ESI 40(ESIB 40)	EMI RECEIVER TEST 20Hz-40GHz	07-Mar-19	07-Mar-20	B1
CIS042012	Rohde & Schwarz / ESCI	EMI Test Receiver	12-Aug-19	12-Aug-20	B1
CIS040604	Agilent / E4440A	Precision Spectrum Analyzer	19-Oct-18	19-Oct-20	B1
CIS047311	Huber+ Suhner/Sucoflex 106PA	RF Coaxial Cable, to 18GHz, 8.5 m	30-Sep-19	30-Sep-20	B1
CIS055178	Huber+ Suhner/Sucoflex 106PA	RF Coaxial Cable, to 18GHz, 8.5 m	30-Sep-19	30-Sep-20	B1
CIS025660	Micro-Coax / UFB311A-1-0840-504504	RF Coaxial Cable, to 18GHz, 8.5 m	30-Sep-19	30-Sep-20	B1
CIS025640	Micro-Coax / UFB311A-0-2720-520520	Coaxial Cable, 272.0 in. to 18GHz	30-Sep-19	30-Sep-20	B1
CIS056057	Wainwright Instruments/ WRCJV16-5440-5470-5725-5755 -40SS	SMA Band Reject Filter 5.470GHz to 5.725GHz	10-Jul-19	10-Jul-20	B1
Test Equipment used for AC Conducted Emissions					
CIS41955	Rohde & Schwarz / ESCI	EMI Test Receiver	25-Apr-19	25-Apr-20	B2
CIS08187	Fisher Custom Com / FCC-450B-2.4-N	Pulse Limiter	15-May-19	15-May-20	B2
CIS019210	TTE / H785-150K-50-21378	High Pass Filter 150KHz	25-Feb-19	25-Feb-20	B2
CIS05039	Fisher Custom Com / 50/250-50-2-02	LISN (9kHz-30MHz)	21-Feb-19	21-Feb-20	B2
CIS034158	Fisher Custom Com / 50-2-RA-NEMA-5-20R	LISN Receptacle Adaptor	21-Feb-19	21-Feb-20	B2
CIS040532	Coleman / RG-223	25 ft RG-223 Cable	04-Dec-18	04-Dec-19	B2
51663	Bird / 5-T-MB	50Ω termination	04-Dec-18	04-Dec-19	B2

Appendix C: 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 D: Photographs of Test Setups

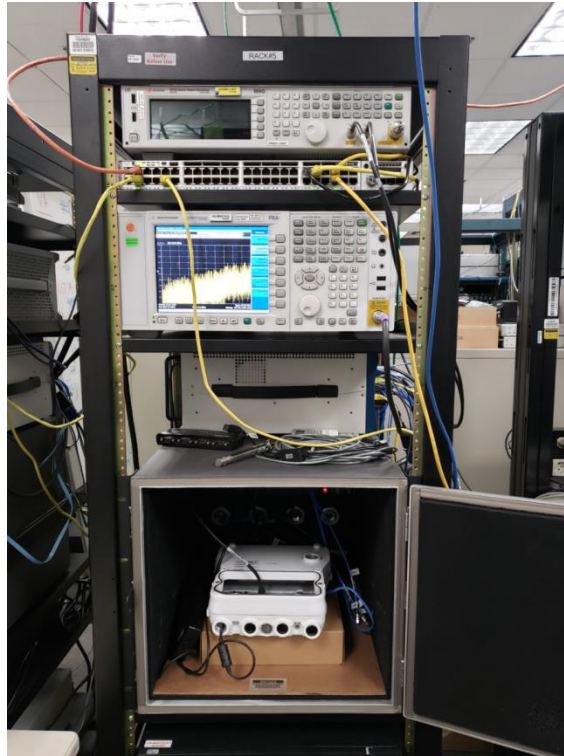
Title: EUT Pictures





Appendix E: Photographs of Test Setups

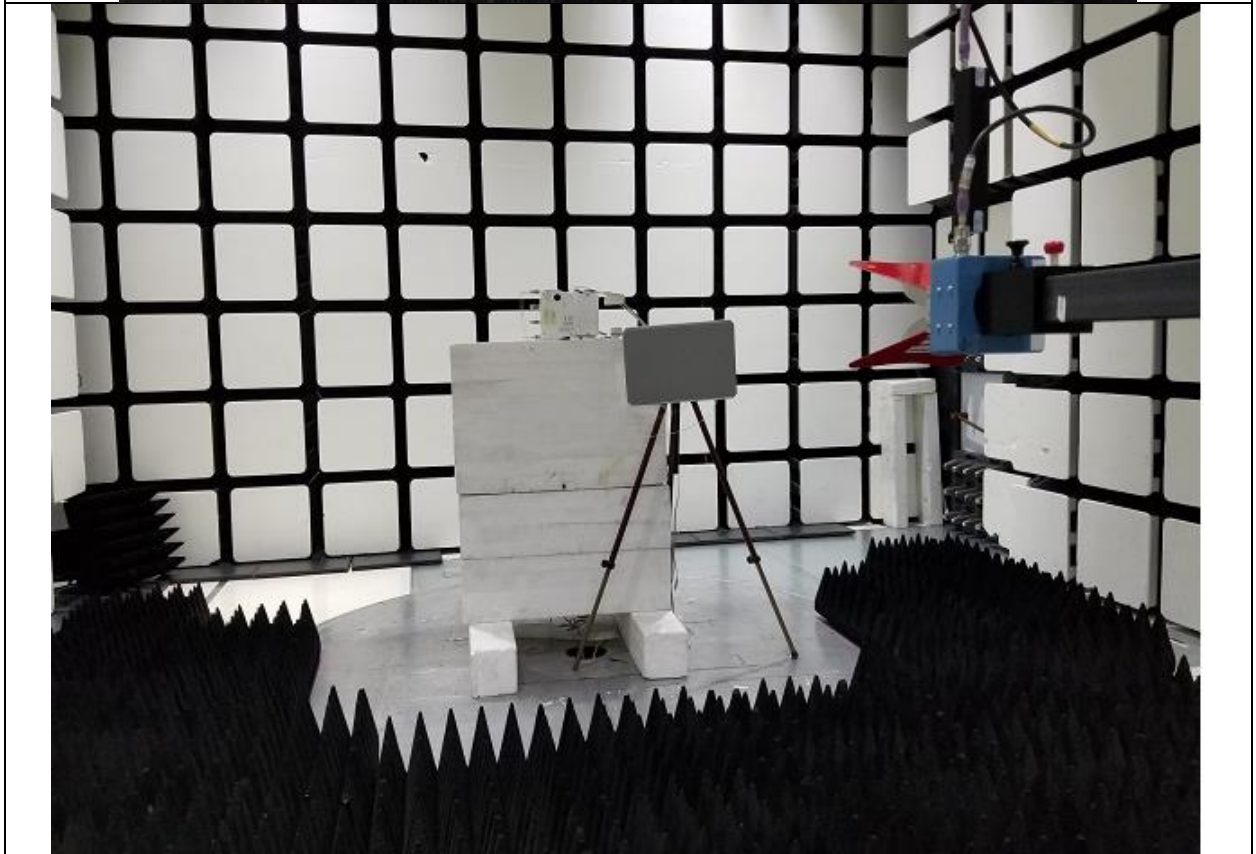
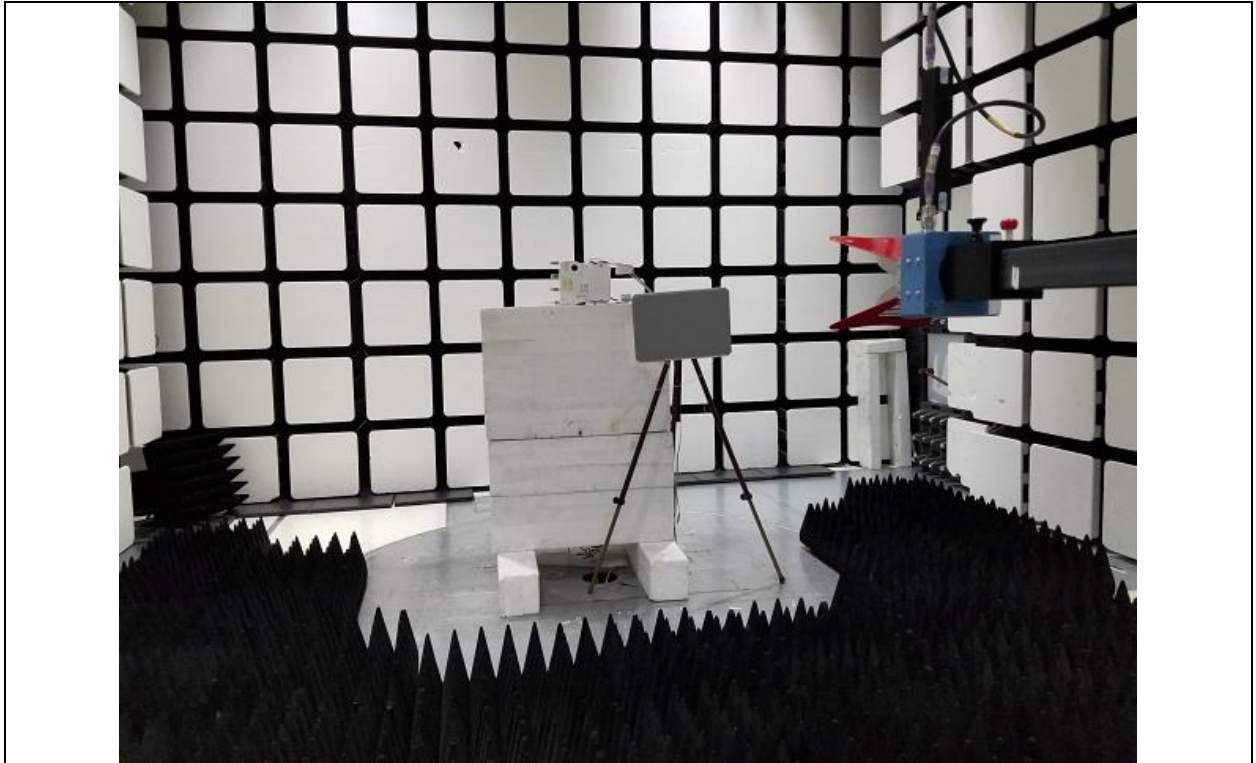
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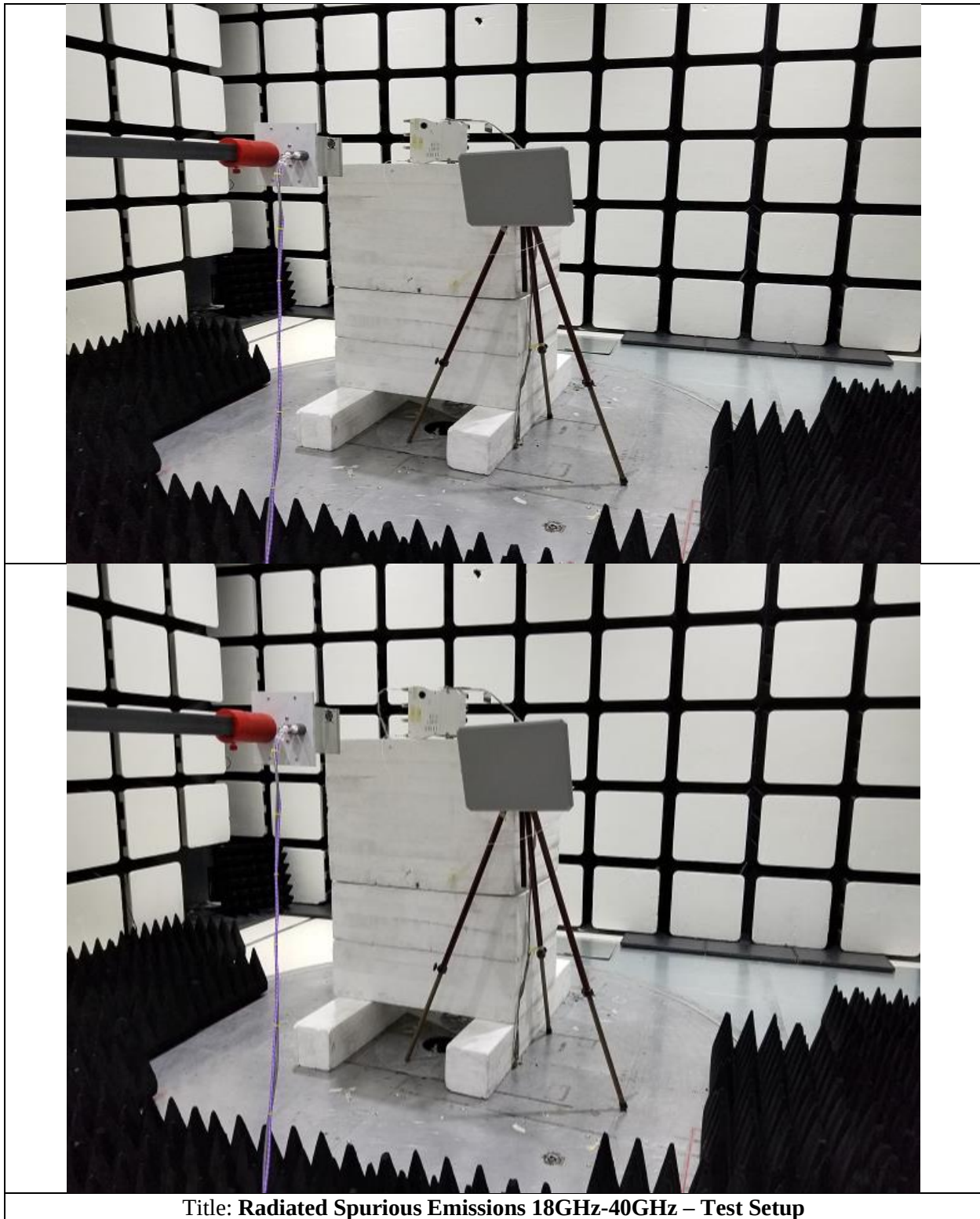
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Title: Radiated Spurious Emissions 30MHz-1GHz – Test Setup



Title: Radiated Spurious Emissions 1GHz-18GHz – Test Setup



Title: Radiated Spurious Emissions 18GHz-40GHz – Test Setup



Title: Conducted Emissions 150KHz-30MHz – Test Setup

Appendix F: Software Used to Perform Testing

EMIssoft Vasona, version 6.024

Appendix G: Test Procedures

Measurements were made in accordance with

- KDB 789033 - D02 General UNII Test Procedures New Rules v02r01
- KDB 662911 - MIMO
- ANSI C63.4 2014 Unintentional Radiators
- ANSI C63.10 2013 Intentional Radiators

Test procedures are summarized below:

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

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

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

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

Appendix I: Test Assessment Plan

Compliance Test Plan (Excel) EDCS# 18357550

Target Power Tables EDCS# 18295686

Appendix J: Worst Case Justification

All 3 orientations (Z, Y, Z) of the EUT were assessed by performing pre-scan.
The Z orientation was determined to be the worst-case orientation.

Also see Appendix A the test report.

End