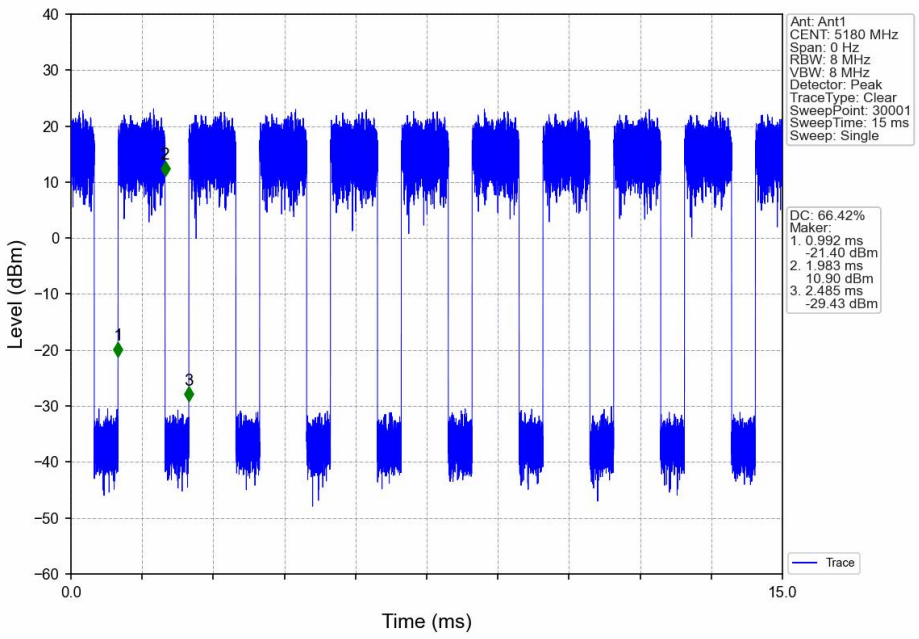
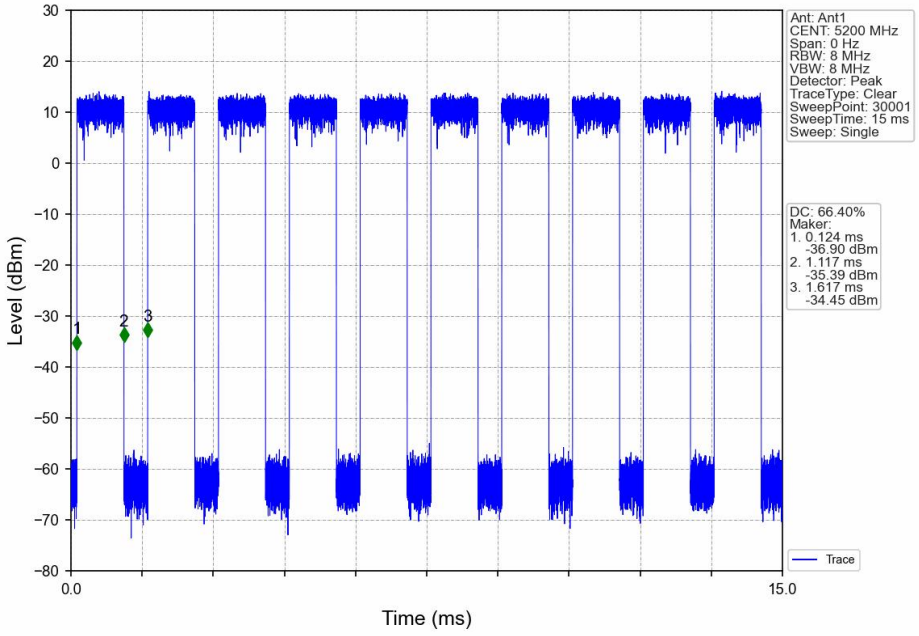
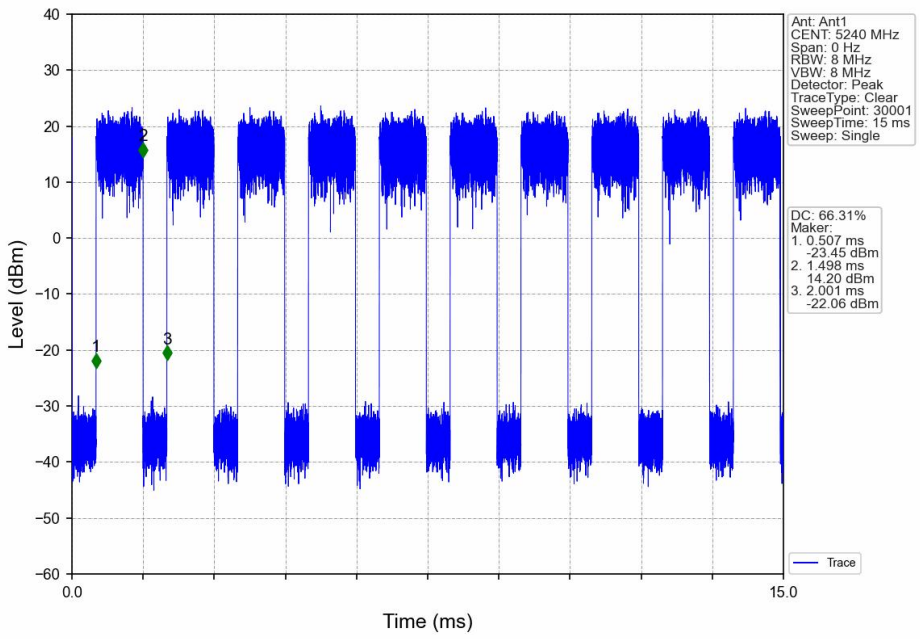
802.11ac(VHT20)_LCH_5180MHz_Ant1_NTNV



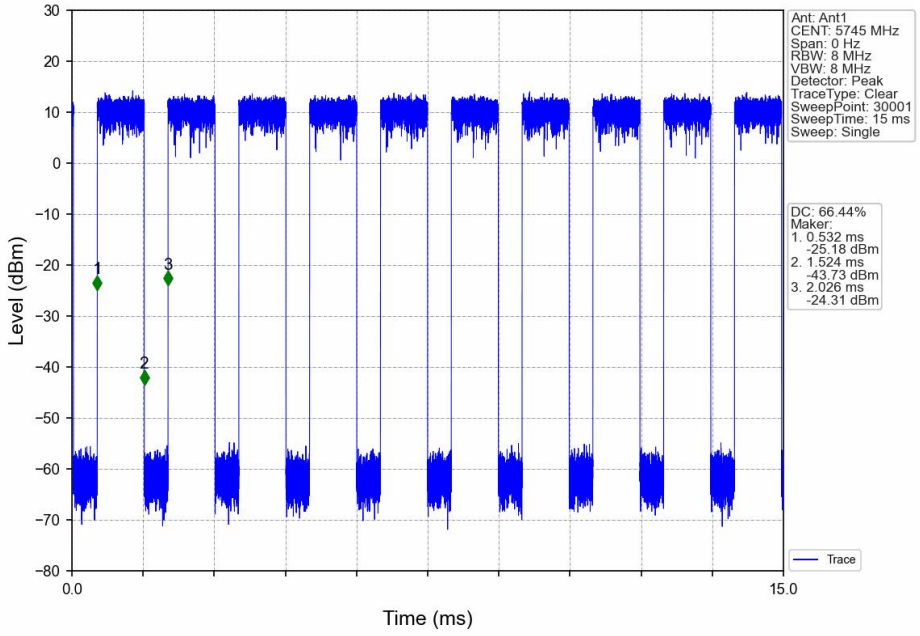
802.11ac(VHT20)_MCH_5200MHz_Ant1_NTNV



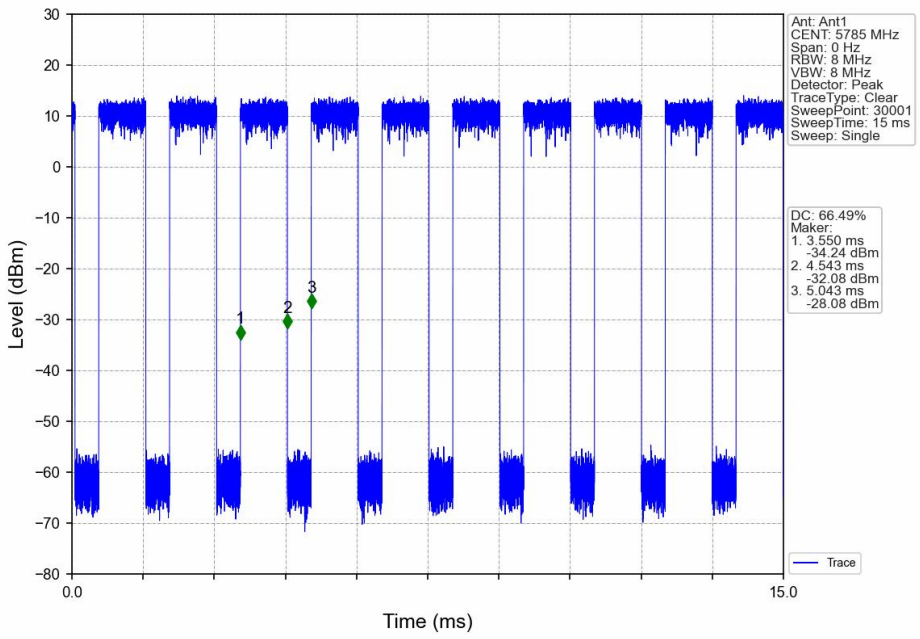
802.11ac(VHT20)_HCH_5240MHz_Ant1_NTNV



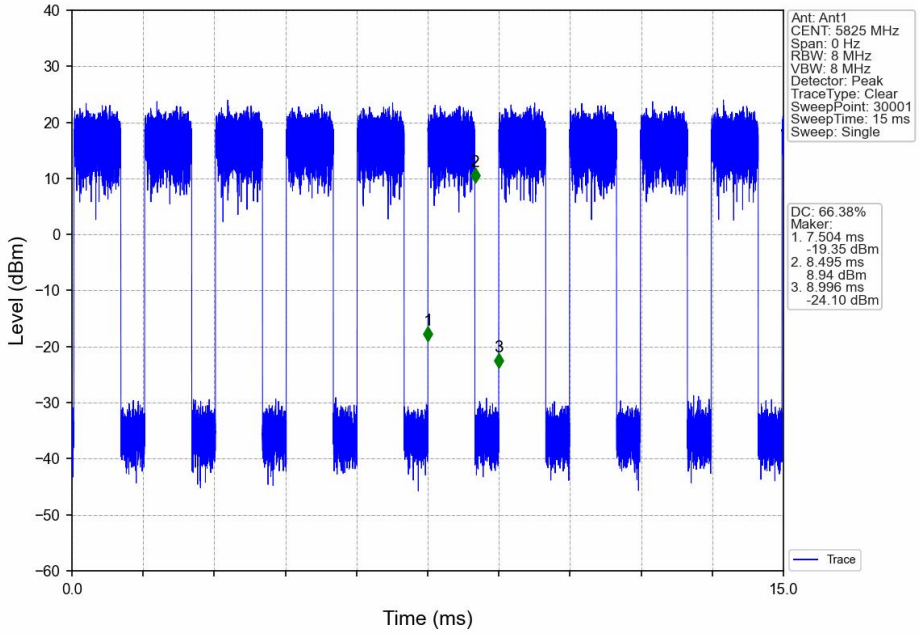
802.11ac(VHT20)_LCH_5745MHz_Ant1_NTNV



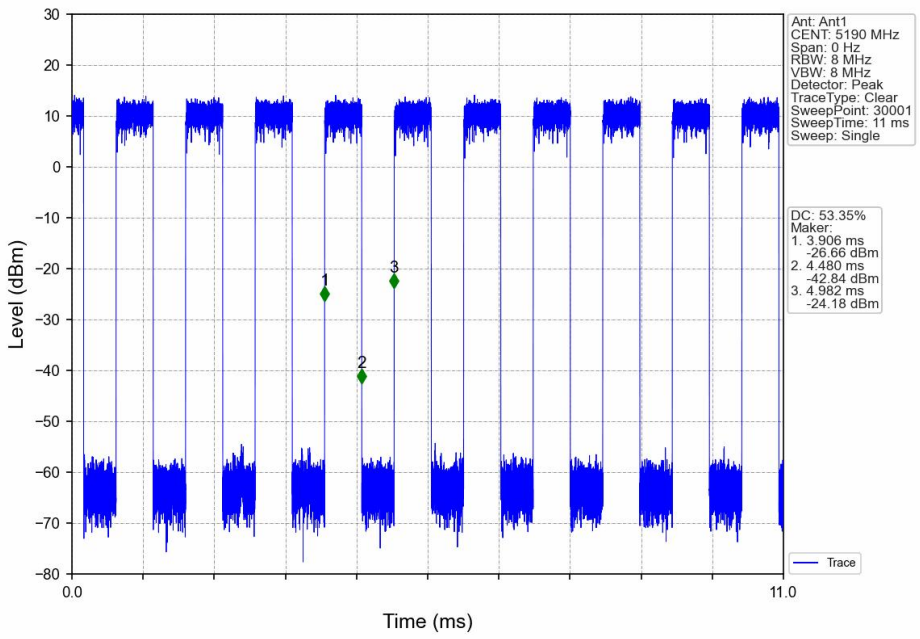
802.11ac(VHT20)_MCH_5785MHz_Ant1_NTNV



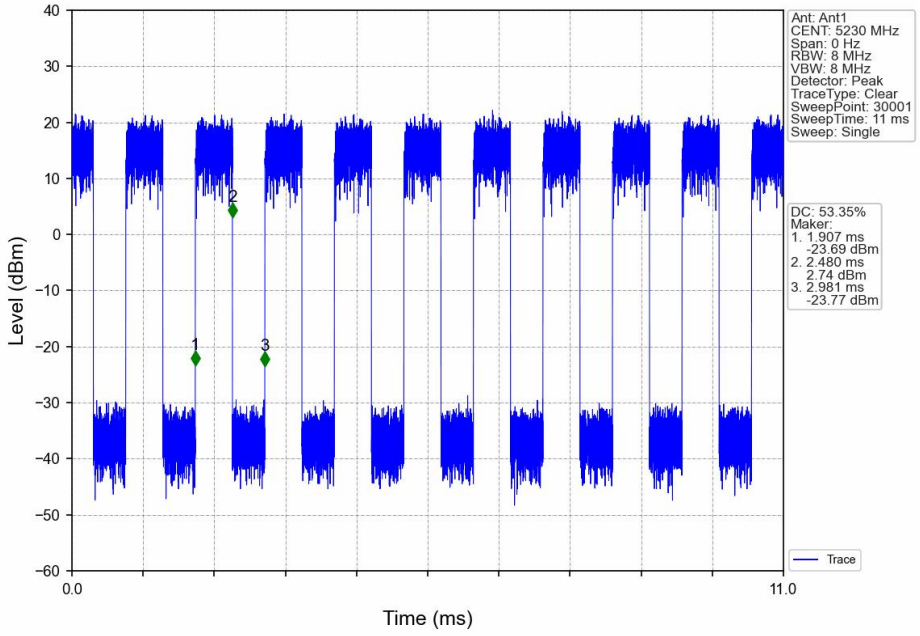
802.11ac(VHT20)_HCH_5825MHz_Ant1_NTNV



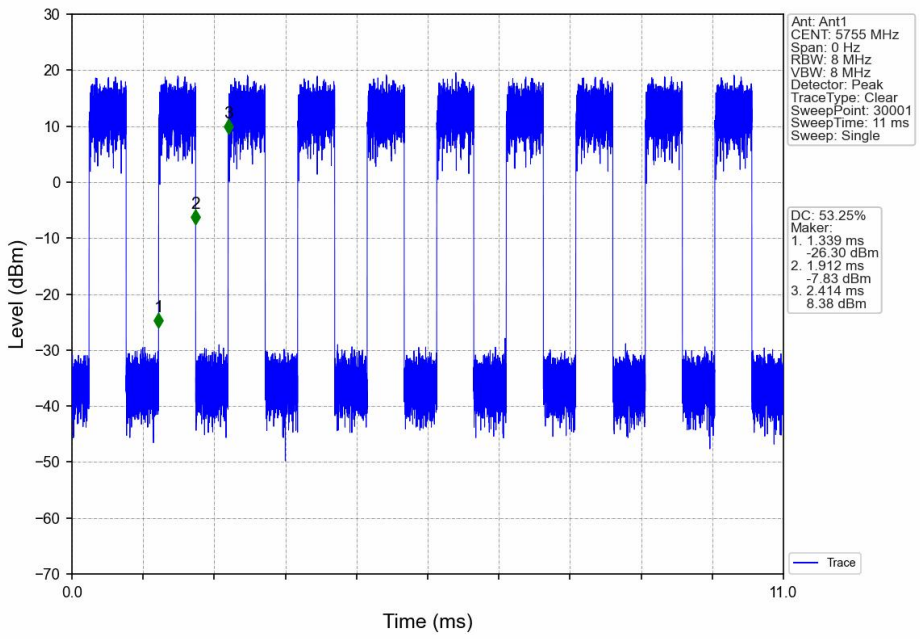
802.11ac(VHT40)_LCH_5190MHz_Ant1_NTNV



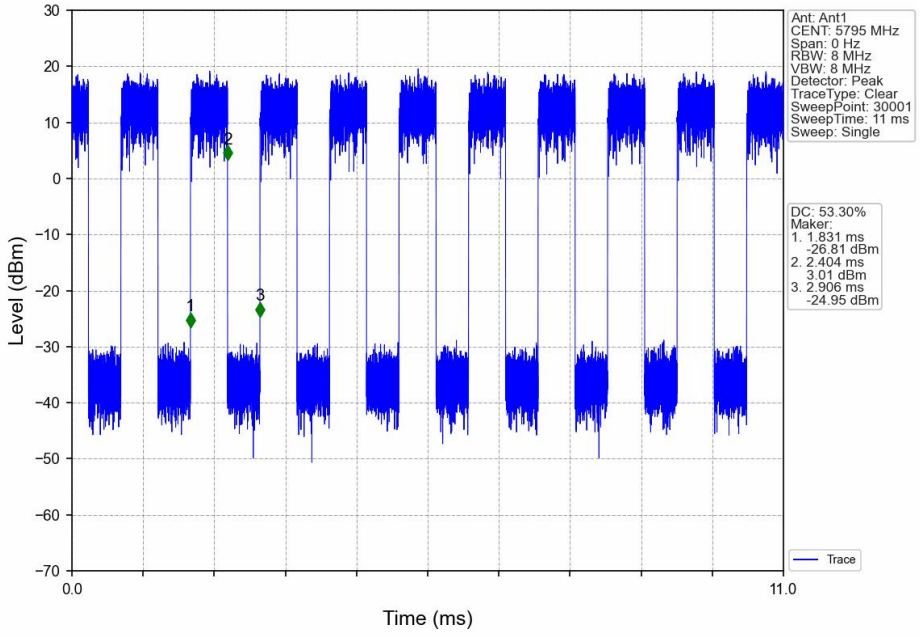
802.11ac(VHT40)_HCH_5230MHz_Ant1_NTNV



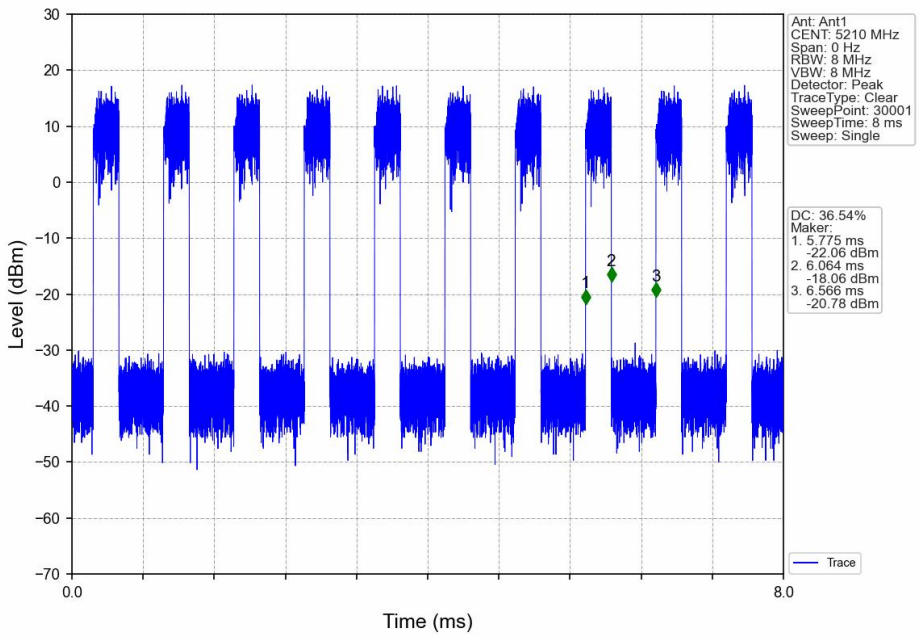
802.11ac(VHT40)_LCH_5755MHz_Ant1_NTNV



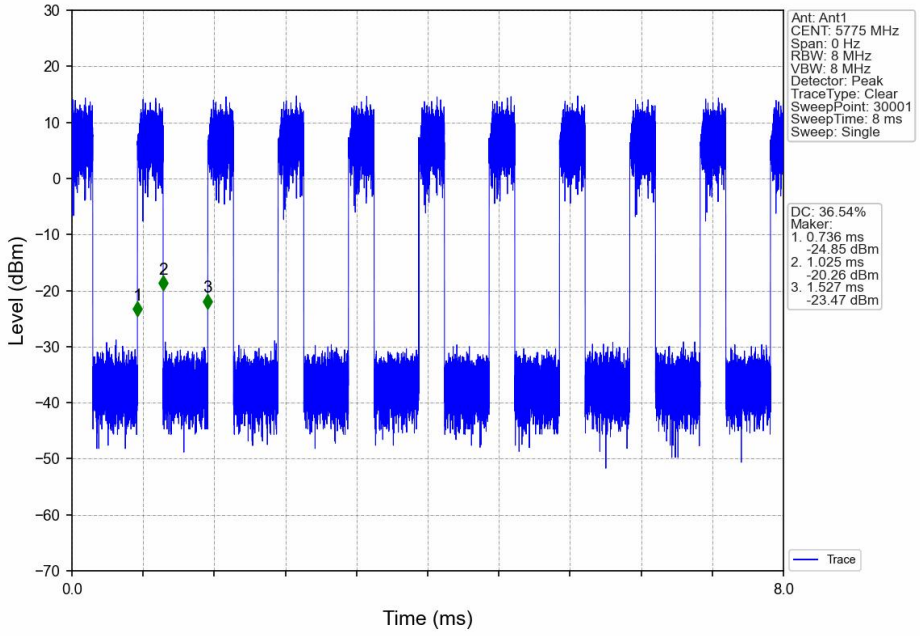
802.11ac(VHT40)_HCH_5795MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5210MHz_Ant1_NTNV



802.11ac(VHT80)_MCH_5775MHz_Ant1_NTNV



8.OUT OF BAND EMISSIONS

8.1 APPLICABLE STANDARD

According to FCC §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.

(2) For transmitters operating in the 5.725-5.85 GHz band: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of −17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of −27 dBm/MHz.

8.2 TEST PROCEDURE

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW of spectrum analyzer to 1 MHz with a convenient frequency span.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

8.3 DEVIATION FROM STANDARD

No deviation.

8.4 TEST SETUP

8.5 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

8.6 TEST RESULTS

N/A

9.SPURIOUS RF CONDUCTED EMISSIONS

9.1 CONFORMANCE LIMIT

Frequency Band (MHz)	Limit
5150 - 5250	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5250 - 5350	Outside of the 5.15-5.35 GHz band: e.i.r.p. -27 dBm
5470 - 5725	Outside of the 5.47-5.725 GHz band: e.i.r.p. -27 dBm
5725 - 5850	All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

9.2 MEASURING INSTRUMENTS

The Measuring equipment is listed in the section 6.3 of this test report.

9.3 TEST SETUP

9.4 TEST PROCEDURE

The Spurious RF conducted emissions compliance of RF radiated emission should be measured by following the guidance in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization etc. Set RBW=1MHz and VBW= 3MHz to measure the peak field strength, and measure frequency range from 30MHz to 26.5GHz.

9.5 TEST RESULTS

N/A

10.Frequency Stability Measurement

10.1 LIMIT

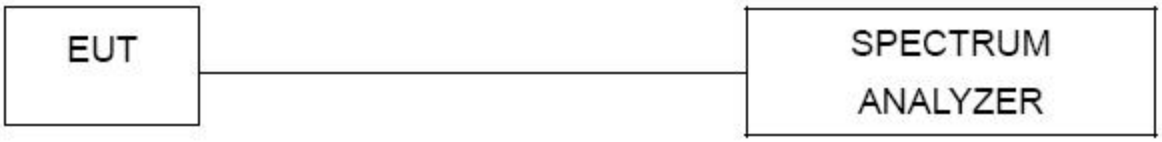
Manufactures of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

The transmitter center frequency tolerance shall be ± 20 ppm maximum for the 5 GHz band (IEEE 802.11n specification).

10.2 TEST PROCEDURES

1. The transmitter output (antenna port) was connected to the spectrum analyzer.
2. EUT have transmitted absence of modulation signal and fixed channelize.
3. Set the spectrum analyzer span to view the entire absence of modulation emissions bandwidth.
4. Set RBW = 10 kHz, VBW = 10 kHz with peak detector and maxhold settings.
5. fc is declaring of channel frequency. Then the frequency error formula is (fc-f)/fc × 106 ppm and the limit is less than ±20ppm (IEEE 802.11nspecification).
6. The test extreme voltage is to change the primary supply voltage from 85 to 115 percent of the nominal value
7. Extreme temperature is -20°C~70°C.

10.3 TEST SETUP LAYOUT



10.4 EUT OPERATION DURING TEST

The EUT was programmed to be in continuously un-modulation transmitting mode.

10.5 TEST RESULTS

Temperature:	26 ℃	Relative Humidity:	54%
Pressure:	1012 hPa	Test Voltage :	DC 3.67V
Test Mode :	TX		

5.2G

802.11a20

Reference Frequency(Middle Channel): 5200MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	22	0.00423
40	3.7	20	0.00384
30	3.7	31	0.00596
20	3.7	24	0.00462
10	3.7	11	0.00212
0	3.7	34	0.00654
-10	3.7	19	0.00365
-20	3.7	22	0.00423
-30	3.7	12	0.00231

802.11n_HT20

Reference Frequency(Middle Channel): 5200MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	12	0.00231
40	3.7	24	0.00462
30	3.7	31	0.00596
20	3.7	53	0.00102
10	3.7	41	0.00788
0	3.7	31	0.00596
-10	3.7	27	0.00519
-20	3.7	28	0.00538
-30	3.7	13	0.00250

802.11n_HT40

Reference Frequency(Middle Channel): 5190MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	43	0.00826
40	3.7	33	0.00634
30	3.7	35	0.00673
20	3.7	62	0.01192
10	3.7	51	0.00980
0	3.7	44	0.00846
-10	3.7	57	0.01096
-20	3.7	38	0.00730
-30	3.7	46	0.00884

802.11 ac20

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	33	0.00634
40	3.7	24	0.00461
30	3.7	26	0.00500
20	3.7	64	0.01230
10	3.7	52	0.01000
0	3.7	42	0.00807
-10	3.7	41	0.00788
-20	3.7	23	0.00442
-30	3.7	35	0.00673

802.11ac40

Reference Frequency(Middle Channel): 5190MHz

Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	43	0.00826
40	3.7	33	0.00634
30	3.7	23	0.00442
20	3.7	62	0.01192
10	3.7	51	0.00980
0	3.7	44	0.00846
-10	3.7	52	0.01000
-20	3.7	37	0.00711
-30	3.7	44	0.00846

802.11ac80

Reference Frequency(Middle Channel): 5210MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	42	0.00807
40	3.7	37	0.00711
30	3.7	33	0.00634
20	3.7	64	0.01230
10	3.7	53	0.01019
0	3.7	44	0.00846
-10	3.7	53	0.01019
-20	3.7	35	0.00673
-30	3.7	46	0.00884

So, Frequency Stability Versus Input Voltage is:

802.11a20

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	44	0.00846
	3.7	43	0.00826
	4.1	42	0.00807

802.11n_HT20

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	21	0.00403
	3.7	43	0.00826
	4.1	55	0.01057

802.11n_HT40

Reference Frequency(Middle Channel): 5190 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	44	0.00846
	3.7	42	0.00807
	4.1	42	0.00807

802.11ac20

Reference Frequency(Middle Channel): 5200 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	32	0.00615
	3.7	33	0.00634
	4.1	34	0.00653

802.11ac40

Reference Frequency(Middle Channel): 5190 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	32	0.00615
	3.7	42	0.00807
	4.1	42	0.00807

802.11ac80

Reference Frequency(Middle Channel): 5210 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	44	0.00846
	3.7	42	0.00807
	4.1	33	0.00634

5.8G

802.11a20

Reference Frequency(Middle Channel): 5785MHz

Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	24	0.00461
40	3.7	42	0.00807
30	3.7	12	0.00230
20	3.7	13	0.00250
10	3.7	12	0.00230
0	3.7	32	0.00615
-10	3.7	13	0.00250
-20	3.7	13	0.00250
-30	3.7	24	0.00461

802.11n_HT20

Reference Frequency(Middle Channel): 5785MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	24	0.00461
40	3.7	13	0.00250
30	3.7	12	0.00230
20	3.7	42	0.00807
10	3.7	24	0.00461
0	3.7	32	0.00615
-10	3.7	32	0.00615
-20	3.7	13	0.00250
-30	3.7	21	0.00403

802.11n_HT40

Reference Frequency(Middle Channel): 5795MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	44	0.00846
40	3.7	34	0.00653
30	3.7	32	0.00615
20	3.7	61	0.01173
10	3.7	54	0.01038
0	3.7	42	0.00807
-10	3.7	51	0.00980
-20	3.7	34	0.00653
-30	3.7	42	0.00807

802.11ac20

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	26	0.00500
40	3.7	23	0.00442
30	3.7	26	0.00500
20	3.7	43	0.00826
10	3.7	51	0.00980
0	3.7	23	0.00442
-10	3.7	26	0.00500
-20	3.7	22	0.00423
-30	3.7	36	0.00692

802.11ac40

Reference Frequency(Middle Channel): 5795MHz

Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	24	0.00461
40	3.7	34	0.00653
30	3.7	32	0.00615
20	3.7	61	0.01173
10	3.7	24	0.00461
0	3.7	32	0.00615
-10	3.7	32	0.00615
-20	3.7	34	0.00653
-30	3.7	34	0.00653

802.11ac80

Reference Frequency(Middle Channel): 5775MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		MCF	Error (ppm)
50	3.7	41	0.00788
40	3.7	36	0.00692
30	3.7	32	0.00615
20	3.7	52	0.01000
10	3.7	41	0.00788
0	3.7	43	0.00826
-10	3.7	52	0.01000
-20	3.7	34	0.00653
-30	3.7	32	0.00615

So, Frequency Stability Versus Input Voltage is:

802.11a20

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	33	0.00634
	3.7	43	0.00826
	4.1	32	0.00615

802.11n_HT20

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	21	0.00403
	3.7	43	0.00826
	4.1	33	0.00634

802.11n_HT40

Reference Frequency(Middle Channel): 5795 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	44	0.00846
	3.7	43	0.00826
	4.1	42	0.00807

802.11ac20

Reference Frequency(Middle Channel): 5785 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	32	0.00615
	3.7	33	0.00634
	4.1	55	0.01057

802.11ac40

Reference Frequency(Middle Channel): 5795 MHz

Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	33	0.00634
	3.7	43	0.00826
	4.1	32	0.00615

802.11ac80

Reference Frequency(Middle Channel): 5775 MHz			
Environment Temperature (°C)	Power Supplied (VDC)	Frequency Measure with Time Elapsed	
		Frequency	Error (ppm)
20	3.3	44	0.00846
	3.7	42	0.00807
	4.1	43	0.00826

11.ANTENNA REQUIREMENT

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
EUT Antenna:	
The antenna is FPCB Antenna, the best case gain of the antenna is dBi, reference to the appendix II for details	

12. TEST SETUP PHOTO

Reference to the appendix I for details.

13. EUT CONSTRUCTIONAL DETAILS

Reference to the appendix II for details.

※※※※※ END OF REPORT ※※※※※