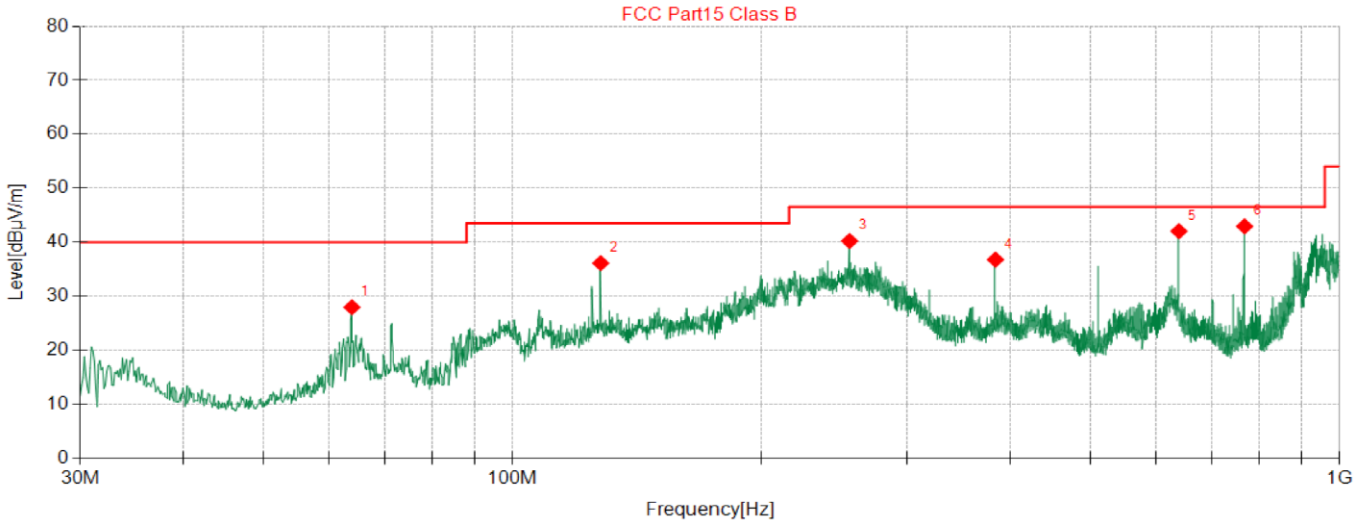
Horizontal



Suspected Data List							
NO.	Freq. [MHz]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Height [cm]	Angle [°]	Polarity
1	63.950	27.94	40.00	12.06	100	238	Horizontal
2	127.84	36.12	43.50	7.38	100	45	Horizontal
3	255.64	40.22	46.50	6.28	100	205	Horizontal
4	383.80	36.77	46.50	9.73	100	316	Horizontal
5	639.64	42.04	46.50	4.46	100	48	Horizontal
6	767.92	42.94	46.50	3.56	100	307	Horizontal

Note:

1) Pre-scan all modes and recorded the worst case results in this report (IEEE 802.11n HT40, 5190MHz).
2). Margin[dB] = Limit[dBµV/m] – Result Level[dBµV/m]

5.5.8. Results for Radiated Emissions (Above 1GHz)

Remark: Measured all modes and recorded worst case;

IEEE 802.11a

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.54	57.73	33.06	35.04	3.94	59.69	68.20	-8.51	Peak	Horizontal
15.54	42.55	33.06	35.04	3.94	44.51	54.00	-9.49	Average	Horizontal
15.54	57.43	33.06	35.04	3.94	59.39	68.20	-8.81	Peak	Vertical
15.54	41.09	33.06	35.04	3.94	43.05	54.00	-10.95	Average	Vertical

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.60	57.59	33.16	35.15	3.96	59.56	68.20	-8.64	Peak	Horizontal
15.60	41.61	33.16	35.15	3.96	43.58	54.00	-10.42	Average	Horizontal
15.60	54.79	33.16	35.15	3.96	56.76	68.20	-11.44	Peak	Vertical
15.60	40.37	33.16	35.15	3.96	42.34	54.00	-11.66	Average	Vertical

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.72	55.52	33.26	35.14	3.98	57.62	68.20	-10.58	Peak	Horizontal
15.72	41.16	33.26	35.14	3.98	43.26	54.00	-10.74	Average	Horizontal
15.72	54.65	33.26	35.14	3.98	56.75	68.20	-11.45	Peak	Vertical
15.72	39.98	33.26	35.14	3.98	42.08	54.00	-11.92	Average	Vertical

IEEE 802.11n-HT20

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.54	57.41	33.06	35.04	3.94	59.37	68.20	-8.83	Peak	Horizontal
15.54	44.64	33.06	35.04	3.94	46.60	54.00	-7.40	Average	Horizontal
15.54	55.75	33.06	35.04	3.94	57.71	68.20	-10.49	Peak	Vertical
15.54	43.63	33.06	35.04	3.94	45.59	54.00	-8.41	Average	Vertical

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.60	55.88	33.16	35.15	3.96	57.85	68.20	-10.35	Peak	Horizontal
15.60	43.25	33.16	35.15	3.96	45.22	54.00	-8.78	Average	Horizontal
15.60	56.91	33.16	35.15	3.96	58.88	68.20	-9.32	Peak	Vertical
15.60	41.25	33.16	35.15	3.96	43.22	54.00	-10.78	Average	Vertical

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.72	55.96	33.26	35.14	3.98	58.06	68.20	-10.14	Peak	Horizontal
15.72	44.38	33.26	35.14	3.98	46.48	54.00	-7.52	Average	Horizontal
15.72	56.69	33.26	35.14	3.98	58.79	68.20	-9.41	Peak	Vertical
15.72	42.72	33.26	35.14	3.98	44.82	54.00	-9.18	Average	Vertical

IEEE 802.11n HT40

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.57	57.35	33.06	35.04	3.94	59.31	68.20	-8.89	Peak	Horizontal
15.57	44.15	33.06	35.04	3.94	46.11	54.00	-7.89	Average	Horizontal
15.57	55.90	33.06	35.04	3.94	57.86	68.20	-10.34	Peak	Vertical
15.57	42.65	33.06	35.04	3.94	44.61	54.00	-9.39	Average	Vertical

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.69	56.25	33.16	35.15	3.96	58.22	68.20	-9.98	Peak	Horizontal
15.69	42.97	33.16	35.15	3.96	44.94	54.00	-9.06	Average	Horizontal
15.69	56.76	33.16	35.15	3.96	58.73	68.20	-9.47	Peak	Vertical
15.69	40.51	33.16	35.15	3.96	42.48	54.00	-11.52	Average	Vertical

IEEE 802.11ac VHT20

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.54	57.07	33.06	35.04	3.94	59.03	68.20	-9.17	Peak	Horizontal
15.54	43.49	33.06	35.04	3.94	45.45	54.00	-8.55	Average	Horizontal
15.54	56.12	33.06	35.04	3.94	58.08	68.20	-10.12	Peak	Vertical
15.54	44.80	33.06	35.04	3.94	46.76	54.00	-7.24	Average	Vertical

Freq	Read	Ant. Fac	Pre. Fac	Cab.Los	Measured	Limit	Over limit	Remark	Pol/Phase

GHz	Level dBuV	dB/m	dB	dB	Level dBuV	Line dBuV/m	dB		
15.60	55.05	33.16	35.15	3.96	57.02	68.20	-11.18	Peak	Horizontal
15.60	42.91	33.16	35.15	3.96	44.88	54.00	-9.12	Average	Horizontal
15.60	57.26	33.16	35.15	3.96	59.23	68.20	-8.97	Peak	Vertical
15.60	41.16	33.16	35.15	3.96	43.13	54.00	-10.87	Average	Vertical

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.72	55.29	33.26	35.14	3.98	57.39	68.20	-10.81	Peak	Horizontal
15.72	40.49	33.26	35.14	3.98	42.59	54.00	-11.41	Average	Horizontal
15.72	57.20	33.26	35.14	3.98	59.30	68.20	-8.90	Peak	Vertical
15.72	41.13	33.26	35.14	3.98	43.23	54.00	-10.77	Average	Vertical

IEEE 802.11ac VHT40

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.57	54.28	33.06	35.04	3.94	56.24	68.20	-11.96	Peak	Horizontal
15.57	41.38	33.06	35.04	3.94	43.34	54.00	-10.66	Average	Horizontal
15.57	57.07	33.06	35.04	3.94	59.03	68.20	-9.17	Peak	Vertical
15.57	41.19	33.06	35.04	3.94	43.15	54.00	-10.85	Average	Vertical

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.69	56.57	33.16	35.15	3.96	58.54	68.20	-9.66	Peak	Horizontal
15.69	41.04	33.16	35.15	3.96	43.01	54.00	-10.99	Average	Horizontal
15.69	54.81	33.16	35.15	3.96	56.78	68.20	-11.42	Peak	Vertical
15.69	40.34	33.16	35.15	3.96	42.31	54.00	-11.69	Average	Vertical

IEEE 802.11ac VHT80

Freq GHz	Read Level dBuV	Ant. Fac dB/m	Pre. Fac dB	Cab.Los dB	Measured Level dBuV	Limit Line dBuV/m	Over limit dB	Remark	Pol/Phase
15.63	56.77	33.06	35.04	3.94	58.73	68.20	-9.47	Peak	Horizontal
15.63	43.92	33.06	35.04	3.94	45.88	54.00	-8.12	Average	Horizontal
15.63	58.82	33.06	35.04	3.94	60.78	68.20	-7.42	Peak	Vertical
15.63	43.41	33.06	35.04	3.94	45.37	54.00	-8.63	Average	Vertical

Notes:

1. *Measuring frequencies from 9 KHz ~40 GHz, No emission found between lowest internal used/generated frequencies to 30MHz.*
2. *Radiated emissions measured in frequency range from 9 KHz ~40GHz were made with an instrument using Peak detector mode.*
3. *Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.*
4. *Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40*
5. *Measured[dBμv/m] = Reading[dBμv/m] + Ant. Fac.[dB/m] - Pre. Fac.[dB] + Cab. Loss[dB]; Margin[dB] = Limit[dBμV/m] –Measured Level[dBμV/m]*

5.6. Power line conducted emissions

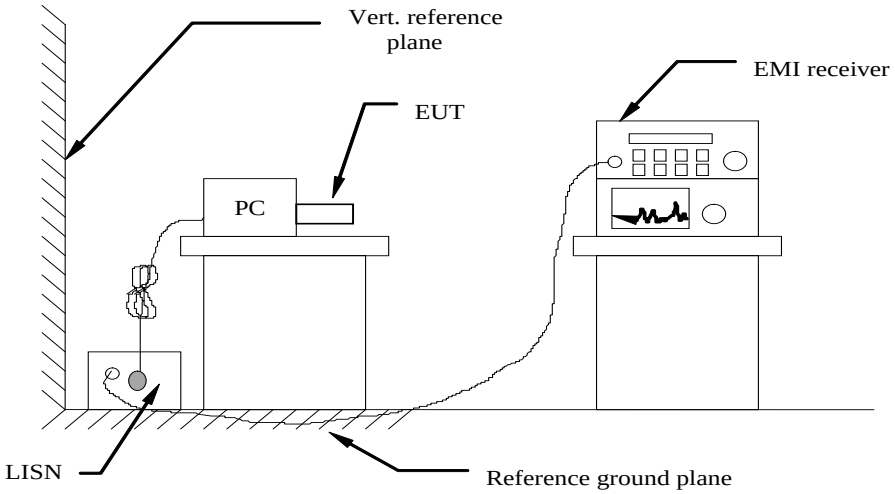
5.6.1 Standard Applicable

According to §15.207 (a): For an intentional radiator which 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 250 microvolts (The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz). The limits at specific frequency range are listed as follows:

Frequency Range (MHz)	Limits (dBμV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreasing linearly with the logarithm of the frequency

5.6.2 Block Diagram of Test Setup



5.6.3 Test Results

PASS.

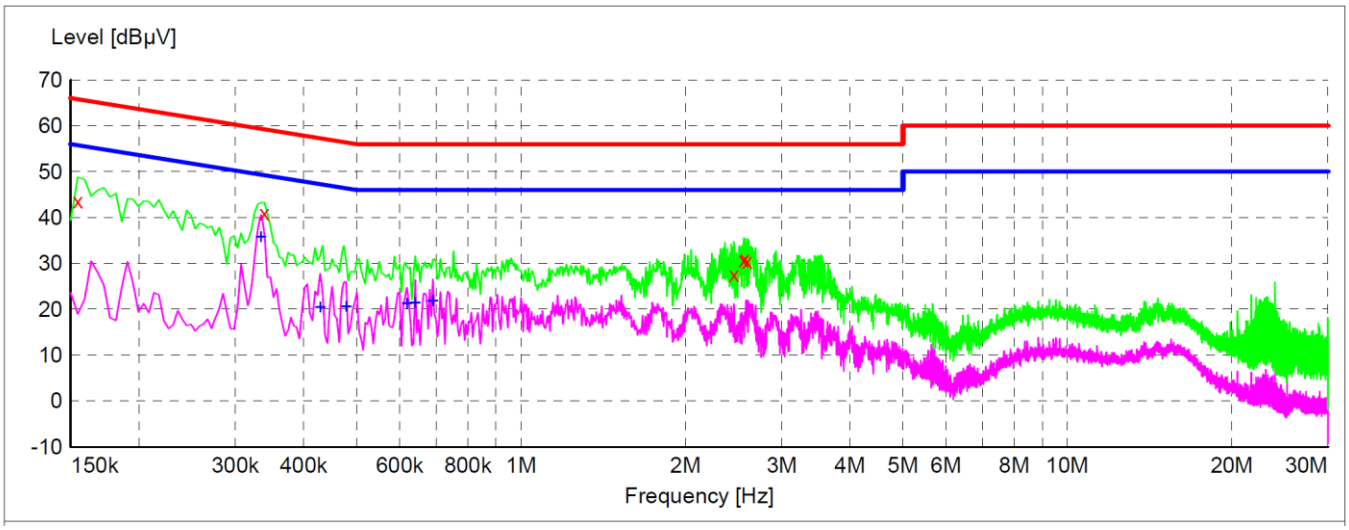
The test data please refer to following page.

Temperature	22.8℃	Humidity	50%
Test Engineer	Anna Hu	Configurations	BT

The test data please refer to following page.

The worst result for IEEE 802.11a, 5180MHz

Line

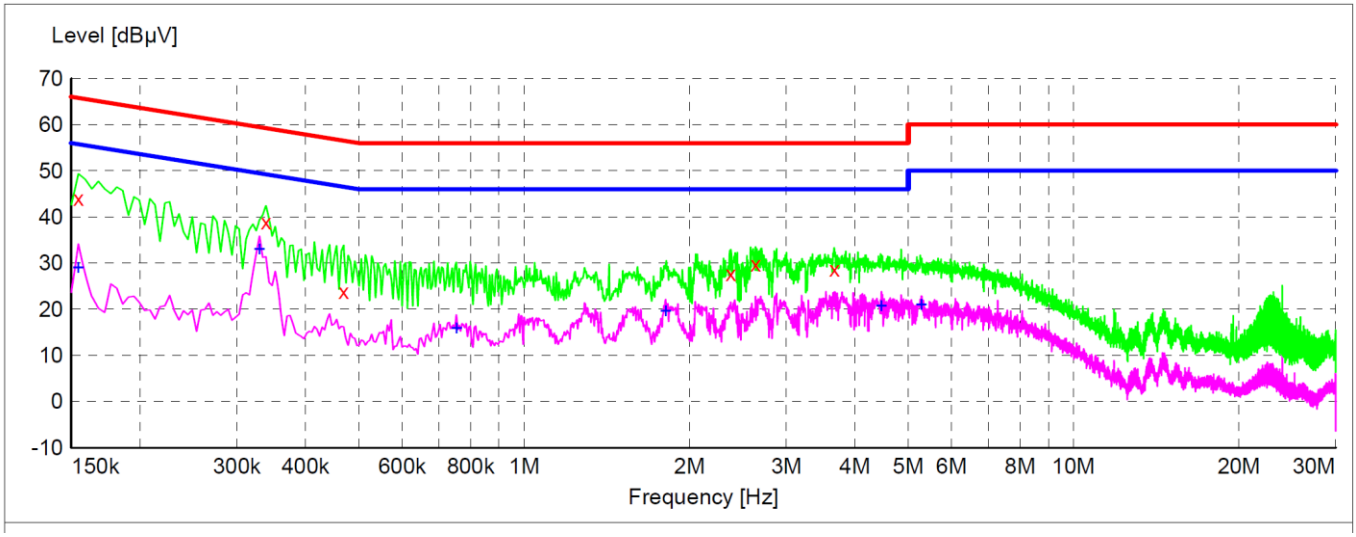


Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	43.60	9.9	66	22.2	QP	L1	GND
0.339000	41.00	10.1	59	18.2	QP	L1	GND
2.454000	27.50	9.7	56	28.5	QP	L1	GND
2.557500	30.70	9.7	56	25.3	QP	L1	GND
2.566500	31.00	9.7	56	25.0	QP	L1	GND
2.598000	30.40	9.7	56	25.6	QP	L1	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.334500	35.70	10.1	49	13.6	AV	L1	GND
0.429000	20.40	10.0	47	26.9	AV	L1	GND
0.478500	20.50	10.0	46	25.9	AV	L1	GND
0.618000	21.20	9.9	46	24.8	AV	L1	GND
0.640500	21.30	9.9	46	24.7	AV	L1	GND
0.690000	21.70	9.9	46	24.3	AV	L1	GND

Note:
1). Pre-scan all modes and recorded the worst case results in this report
2). Emission level (dBuV) = 20 log Emission level (uV).
3). Margin=Limit-Level

Neutral



Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	44.00	9.9	66	21.8	QP	N	GND
0.339000	38.90	10.1	59	20.3	QP	N	GND
0.469500	23.80	10.0	57	32.7	QP	N	GND
2.377500	27.70	9.7	56	28.3	QP	N	GND
2.638500	29.80	9.7	56	26.2	QP	N	GND
3.669000	28.70	9.7	56	27.3	QP	N	GND

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.154500	29.00	9.9	56	26.8	AV	N	GND
0.330000	32.90	10.1	50	16.6	AV	N	GND
0.753000	15.80	9.9	46	30.2	AV	N	GND
1.810500	19.60	9.7	46	26.4	AV	N	GND
4.470000	20.60	9.7	46	25.4	AV	N	GND
5.284500	20.90	9.8	50	29.1	AV	N	GND

Note:
1). Pre-scan all modes and recorded the worst case results in this report
2). Emission level (dBuV) = 20 log Emission level (uV).
3). Margin=Limit-Level

5.7 Undesirable Emissions Measurement

5.7.1 LIMIT

According to ξ15.407 (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:

(a) 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.

(b) For transmitters operating in the 5.25-5.35 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.

(c) 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.

(d) For transmitters operating in the 5.725-5.85 GHz band:

(i) 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.

(ii) Devices certified before March 2, 2017 with antenna gain greater than 10 dBi may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease by March 2, 2018. Devices certified before March 2, 2018 with antenna gain of 10 dBi or less may demonstrate compliance with the emission limits in §15.247(d), but manufacturing, marketing and importing of devices certified under this alternative must cease before March 2, 2020.

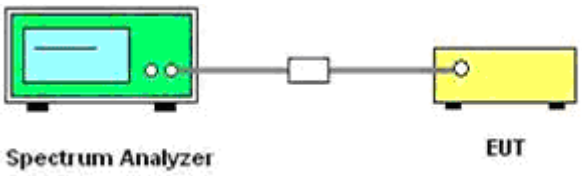
(e) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

(f) Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §15.207.

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

(h) 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.

5.7.2 TEST CONFIGURATION



5.7.3 TEST PROCEDURE

According to KDB789033 D02 General UNII Test Procedures New Rules v02r01 Section G: Unwanted Emission Measurement

1. Unwanted Emissions in the Restricted Bands

a) For all measurements, follow the requirements in section II.G.3. “General Requirements for Unwanted Emissions Measurements.”

b) At frequencies below 1000 MHz, use the procedure described in section II.G.4. “Procedure for Unwanted Emissions Measurements below 1000 MHz.”

c) At frequencies above 1000 MHz, measurements performed using the peak and average measurement procedures described in sections II.G.5. and II.G.6, respectively, must satisfy the respective peak and average limits. If all peak measurements satisfy the average limit, then average measurements are not required.

d) For conducted measurements above 1000 MHz, EIRP shall be computed as specified in section II.G.3.b) and then field strength shall be computed as follows (see KDB Publication 412172):

i) E[dBμV/m] = EIRP[dBm] - 20 log (d[meters]) + 104.77, where E = field strength and d = distance at which field strength limit is specified in the rules;

ii) E[dBμV/m] = EIRP[dBm] + 95.2, for d = 3 meters

e) For conducted measurements below 1000 MHz, the field strength shall be computed as specified in d), above, and then an additional 4.7 dB shall be added as an upper bound on the field strength that

would be observed on a test range with a ground plane for frequencies between 30 MHz and 1000 MHz, or an additional 6 dB shall be added for frequencies below 30 MHz.

2. Unwanted Emissions that fall Outside of the Restricted Bands

a) For all measurements, follow the requirements in section II.G.3. “General Requirements for Unwanted Emissions Measurements.”

b) At frequencies below 1000 MHz, use the procedure described in section 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 section II.G.5., “Procedure for Unwanted Maximum Unwanted Emissions Measurements Above 1000 MHz.”

d) Section 15.407(b) (1-3) specifies the unwanted emissions limit for the U-NII-1 and 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. However, an out-of-band emission that complies with both the average and peak limits of Section 15.209 is not required to satisfy the -27 dBm/MHz dBm/MHz peak emission limit.

i) Section 15.407(b) (4) specifies the unwanted emissions limit for the U-NII-3 band. A band emissions mask is specified in Section 15.407(b) (4) (i). An alternative to the band emissions mask is specified in Section 15.407(b) (4) (ii). The alternative limits are based on the highest antenna gain specified in the filing. There are also marketing and importation restrictions for the alternative limit.

e) If radiated measurements are performed, field strength is then converted to EIRP as follows:

i) EIRP = ((E×d) ^2) / 30

Where:

- E is the field strength in V/m;
- d is the measurement distance in meters;
- EIRP is the equivalent isotopically radiated power in watts;

ii) Working in dB units, the above equation is equivalent to:

EIRP [dBm] = E [dBµV/m] + 20 log (d [meters]) - 104.77

iii) Or, if d is 3 meters:

EIRP [dBm] = E [dBµV/m] - 95.23

3) Radiated versus Conducted Measurements.

The unwanted emission limits in both the restricted and non-restricted bands are based on radiated measurements; however, as an alternative, antenna-port conducted measurements in conjunction with cabinet emissions tests will be permitted to demonstrate compliance provided that the following steps are performed:

(i) Cabinet emissions measurements. A radiated test shall be performed to ensure that cabinet emissions are below the emission limits. For the cabinet-emission measurements the antenna may be replaced by a termination matching the nominal impedance of the antenna.

(ii) Impedance matching. Conducted tests shall be performed using equipment that matches the nominal impedance of the antenna assembly used with the EUT.

(iii) EIRP calculation. A value representative of an upper bound on out-of-band antenna gain (in dBi) shall be added to the measured antenna-port conducted emission power to compute EIRP within the specified measurement bandwidth. (For emissions in the restricted bands, additional calculations are required to convert EIRP to field strength at the specified distance.) The upper bound on antenna gain for a device with a single RF output shall be selected as the maximum in-band gain of the antenna across all operating bands or 2 dBi, whichever is greater.[3] However, for devices that operate in multiple bands using the same transmit antenna, the highest gain of the antenna within the operating band nearest to the out-of-band frequency being measured may be used in lieu of the overall highest gain when measuring emissions at frequencies within 20% of the absolute frequency at the nearest edge of that band, but in no case shall a value less than 2 dBi be selected.

(iv) EIRP adjustments for multiple outputs. For devices with multiple outputs occupying the same or overlapping frequency ranges in the same band (e.g., MIMO or beamforming devices), compute the total EIRP as follows:

- Compute EIRP for each output, as described in (iii), above.
- Follow the procedures specified in KDB Publication 662911 for summing emissions across the outputs or adjusting emission levels measured on individual outputs by 10 log (N_{ANT}), where N_{ANT} is the number of outputs.
- Add the array gain term specified in KDB Publication 662911 for out-of-band and spurious signals.

(v) Direction of maximum emission.

For all radiated emissions tests, measurements shall correspond to the direction of maximum emission level for each measured emission (see ANSI C63.10 for guidance).

5.7.4 TEST RESULT

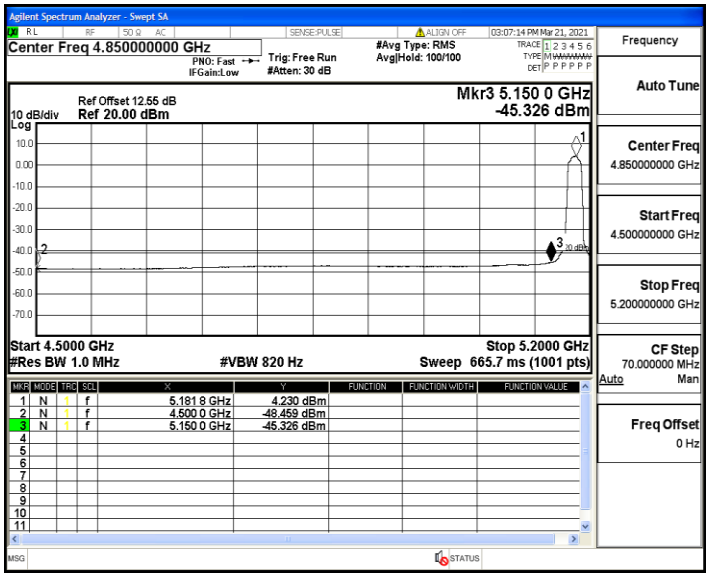
TestMode	Antenna	ChName	Channel	Detector	Freq [MHz]	EIRP [dBm]	Limit [dBm]	Verdict
11A	Ant1	Low	5180	AV	4500.000	-48.46	<=-41.20	PASS
				AV	5150.000	-45.33	<=-41.20	PASS
				Peak	4500.000	-41.25	<=-21.20	PASS
				Peak	5140.500	-36.97	<=-21.20	PASS
				Peak	5150.000	-39.58	<=-21.20	PASS
		High	5240	AV	5350.000	-46.04	<=-41.20	PASS
				AV	5357.040	-45.73	<=-41.20	PASS
				AV	5460.000	-47.13	<=-41.20	PASS
				Peak	5350.000	-36.87	<=-21.20	PASS
				Peak	5354.640	-35.82	<=-21.20	PASS
				Peak	5460.000	-40.34	<=-21.20	PASS
11N20SISO	Ant1	Low	5180	AV	4500.000	-48.6	<=-41.20	PASS
				AV	5148.200	-45.84	<=-41.20	PASS
				AV	5150.000	-45.93	<=-41.20	PASS
				Peak	4500.000	-40.69	<=-21.20	PASS
				Peak	4839.500	-36.67	<=-21.20	PASS
				Peak	5150.000	-39.33	<=-21.20	PASS
		High	5240	AV	5350.000	-45.97	<=-41.20	PASS
				AV	5352.240	-45.78	<=-41.20	PASS
				AV	5460.000	-47.15	<=-41.20	PASS
				Peak	5350.000	-38.69	<=-21.20	PASS
				Peak	5409.840	-36.45	<=-21.20	PASS
				Peak	5460.000	-40.59	<=-21.20	PASS
11N40SISO	Ant1	Low	5190	AV	4500.000	-48.02	<=-41.20	PASS
				AV	5148.200	-44.7	<=-41.20	PASS
				AV	5150.000	-44.74	<=-41.20	PASS
				Peak	4500.000	-41.23	<=-21.20	PASS
				Peak	4922.800	-36.31	<=-21.20	PASS
				Peak	5150.000	-37.32	<=-21.20	PASS
		High	5230	AV	5350.000	-45.53	<=-41.20	PASS
				AV	5351.320	-45.03	<=-41.20	PASS
				AV	5460.000	-46.56	<=-41.20	PASS
				Peak	5350.000	-40.16	<=-21.20	PASS
				Peak	5375.240	-36.75	<=-21.20	PASS
				Peak	5460.000	-40.17	<=-21.20	PASS
11AC20SISO	Ant1	Low	5180	AV	4500.000	-48.31	<=-41.20	PASS
				AV	5147.500	-44.93	<=-41.20	PASS
				AV	5150.000	-44.99	<=-41.20	PASS
				Peak	4500.000	-40.81	<=-21.20	PASS
				Peak	4857.000	-36.78	<=-21.20	PASS
				Peak	5150.000	-38.62	<=-21.20	PASS
		High	5240	AV	5350.000	-45.58	<=-41.20	PASS
				AV	5402.160	-45.07	<=-41.20	PASS
				AV	5460.000	-46.68	<=-41.20	PASS
				Peak	5350.000	-39.54	<=-21.20	PASS
				Peak	5372.160	-36.73	<=-21.20	PASS
				Peak	5460.000	-38.68	<=-21.20	PASS
11AC40SISO	Ant1	Low	5190	AV	4500.000	-47.46	<=-41.20	PASS
				AV	5145.400	-44.06	<=-41.20	PASS
				AV	5150.000	-44.18	<=-41.20	PASS
				Peak	4500.000	-41.99	<=-21.20	PASS
				Peak	5142.600	-37.09	<=-21.20	PASS
				Peak	5150.000	-37.91	<=-21.20	PASS
		High	5230	AV	5350.000	-45	<=-41.20	PASS
				AV	5359.120	-44.53	<=-41.20	PASS
				AV	5460.000	-46.08	<=-41.20	PASS
				Peak	5350.000	-38.85	<=-21.20	PASS
				Peak	5387.720	-35.56	<=-21.20	PASS
				Peak	5460.000	-39.93	<=-21.20	PASS
11AC80SISO	Ant1	Low	5210	AV	4500.000	-47.18	<=-41.20	PASS
				AV	5149.500	-42.04	<=-41.20	PASS
				AV	5150.000	-42.54	<=-41.20	PASS

TestMode	Antenna	ChName	Channel	Detector	Freq [MHz]	EIRP [dBm]	Limit [dBm]	Verdict
				Peak	4500.000	-42.63	<=-21.20	PASS
				Peak	4977.000	-36.04	<=-21.20	PASS
				Peak	5150.000	-38.66	<=-21.20	PASS
		High	5210	AV	5350.000	-45.29	<=-41.20	PASS
				AV	5360.040	-44.39	<=-41.20	PASS
				AV	5460.000	-45.8	<=-41.20	PASS
				Peak	5350.000	-40.01	<=-21.20	PASS
				Peak	5378.520	-36.5	<=-21.20	PASS
				Peak	5460.000	-40.77	<=-21.20	PASS

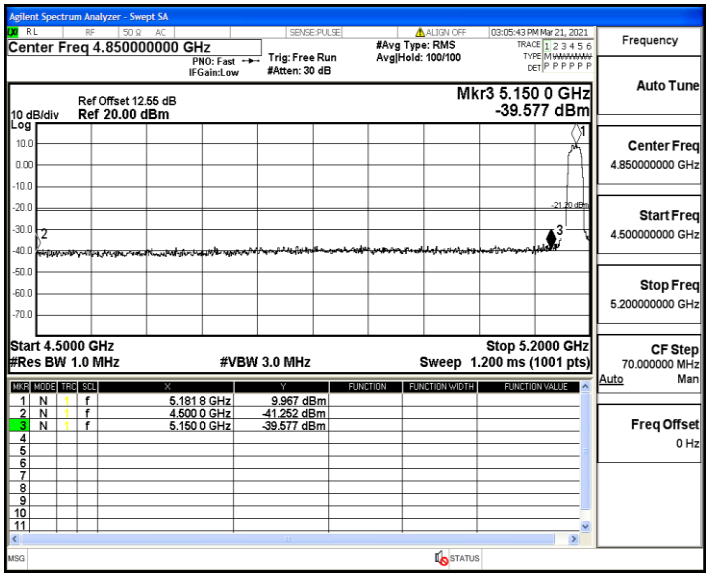
Remark:

1. *Measured Undesirable emission at difference data rate for each mode and recorded worst case for each mode.*
2. *Test results including cable loss;*
3. *Worst case data at 6Mbps at IEEE 802.11a; MCS0 at IEEE 802.11n HT20, IEEE 802.11n HT40*
4. *For MIMO with CCD technology device, The Directional Gain= Gain of individual transmit antennas (dBi) + Array gain;*
   Array gain = 10 log (N_{ant}), where N_{ant} is the number of transmit antennas.
5. *Covert Radiated E Level At 3m = Conducted average power + Directional Gain + 104.77-20*log(3);*
6. *Please refer to following test plots;*

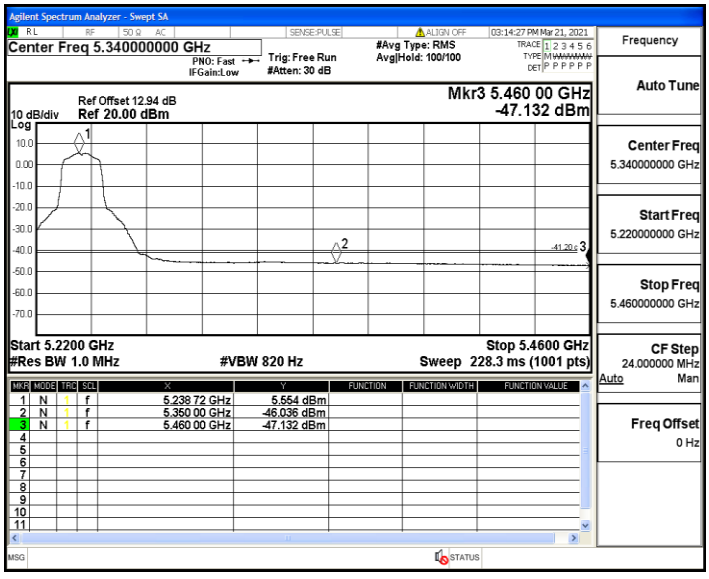
11A_Ant1_Low_5180_AV



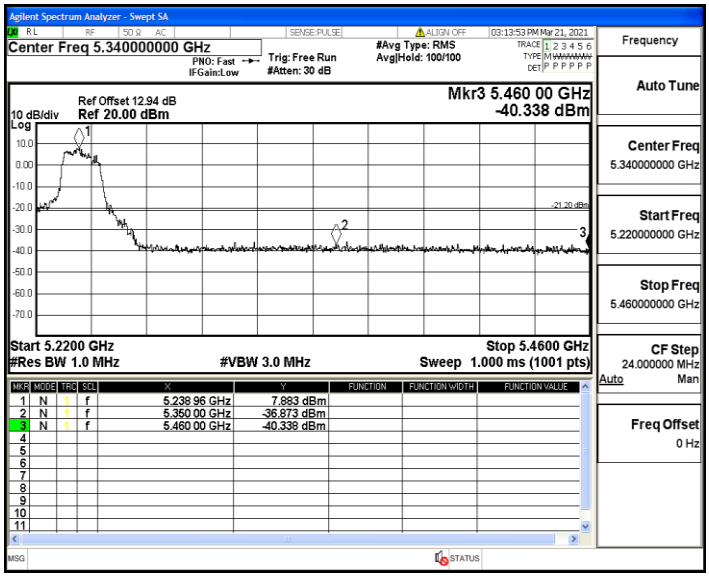
11A_Ant1_Low_5180_Peak



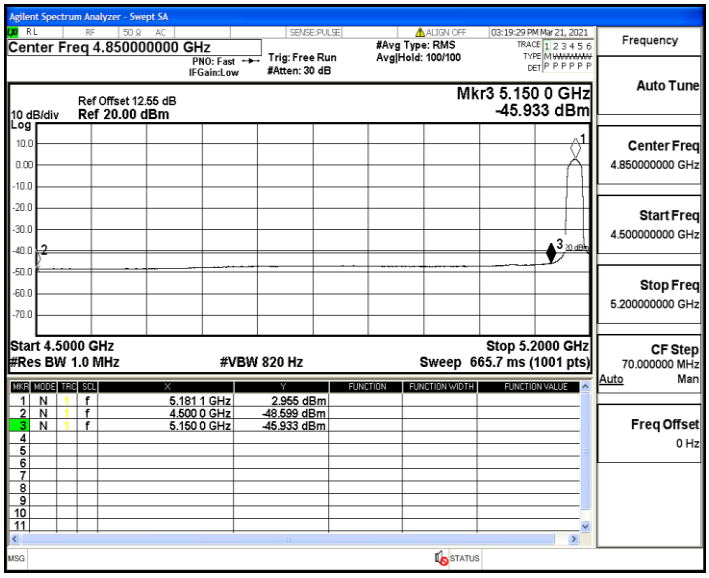
11A_Ant1_High_5240_AV



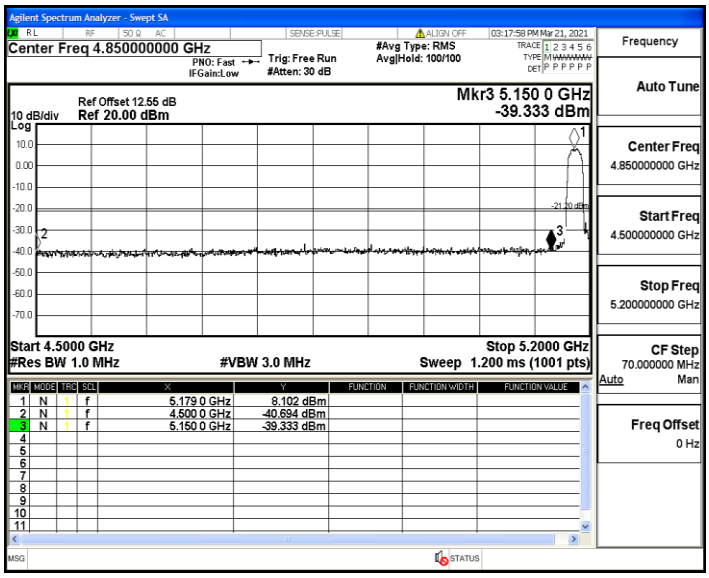
11A_Ant1_High_5240_Peak



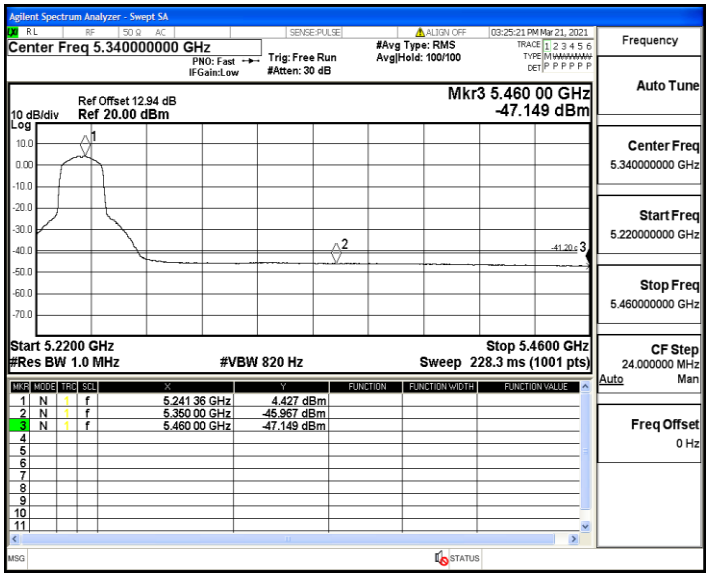
11N20SISO_Ant1_Low_5180_AV



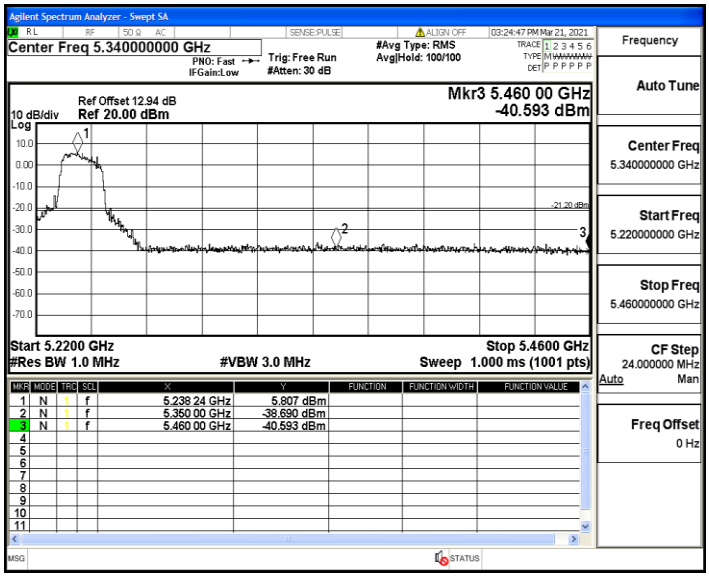
11N20SISO_Ant1_Low_5180_Peak



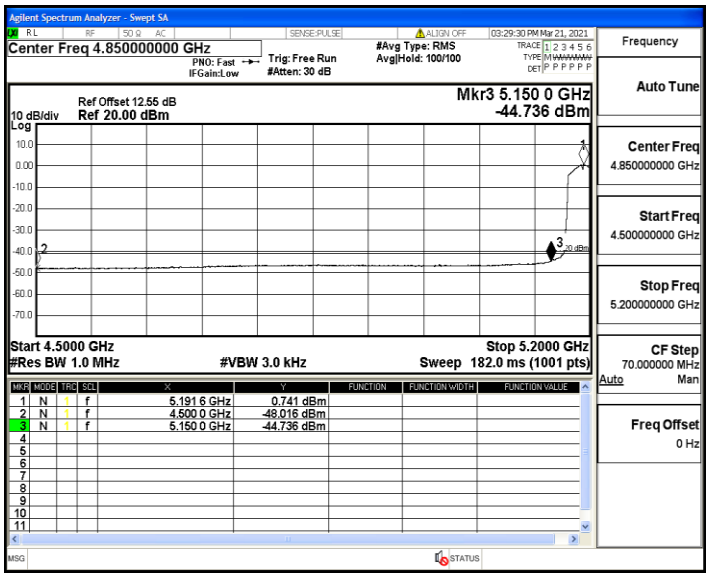
11N20SISO_Ant1_High_5240_AV



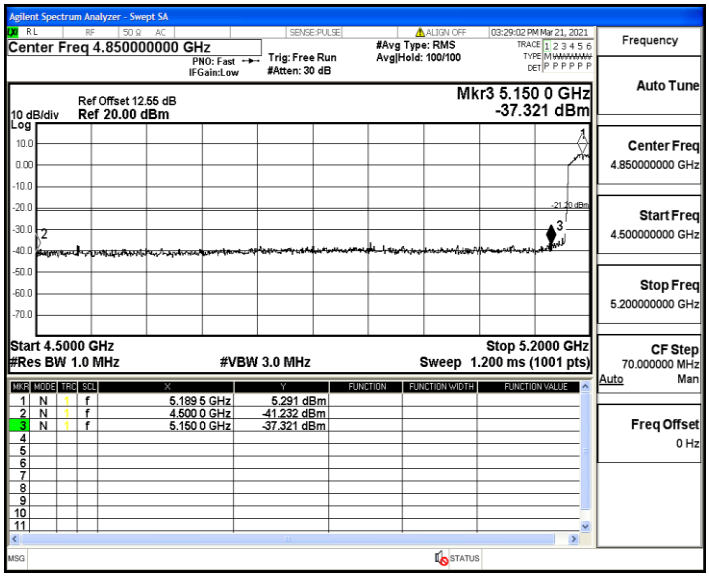
11N20SISO_Ant1_High_5240_Peak



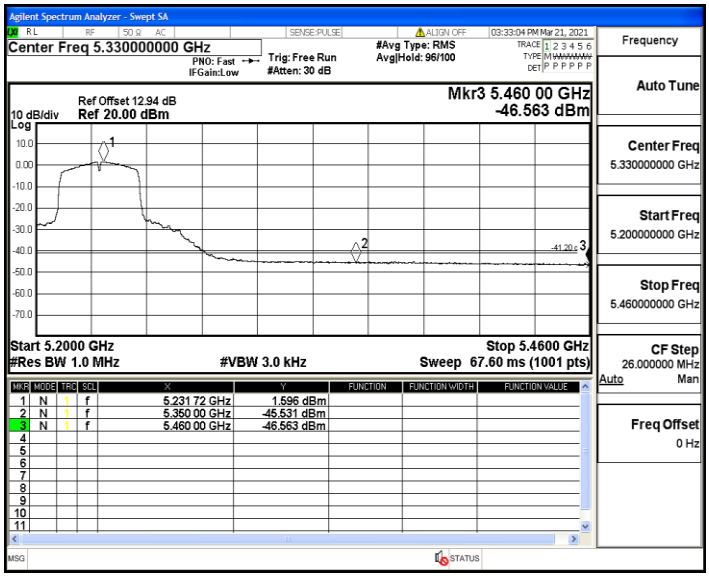
11N40SISO_Ant1_Low_5190_AV



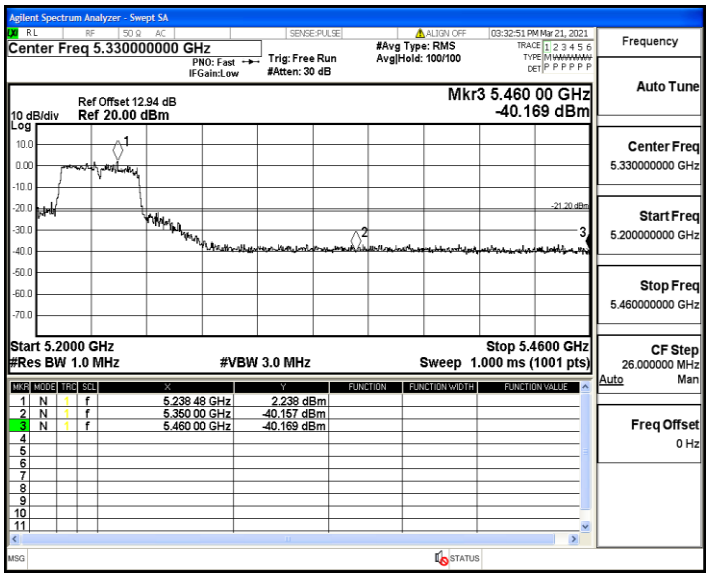
11N40SISO_Ant1_Low_5190_Peak



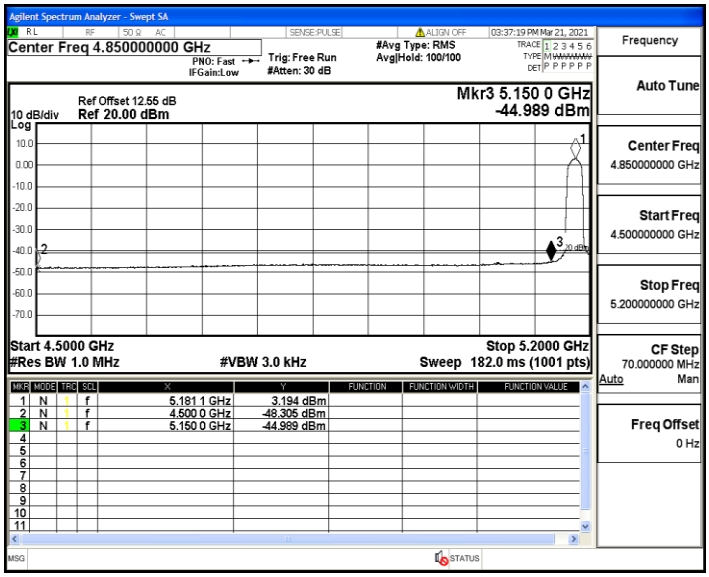
11N40SISO_Ant1_High_5230_AV



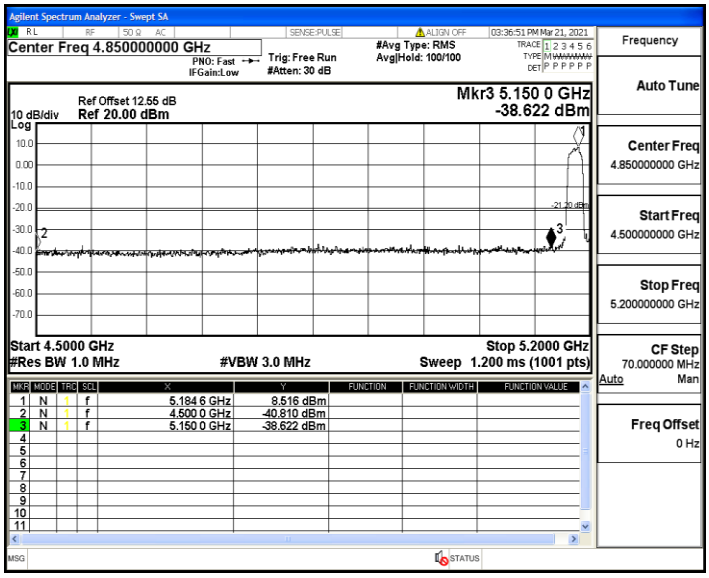
11N40SISO_Ant1_High_5230_Peak



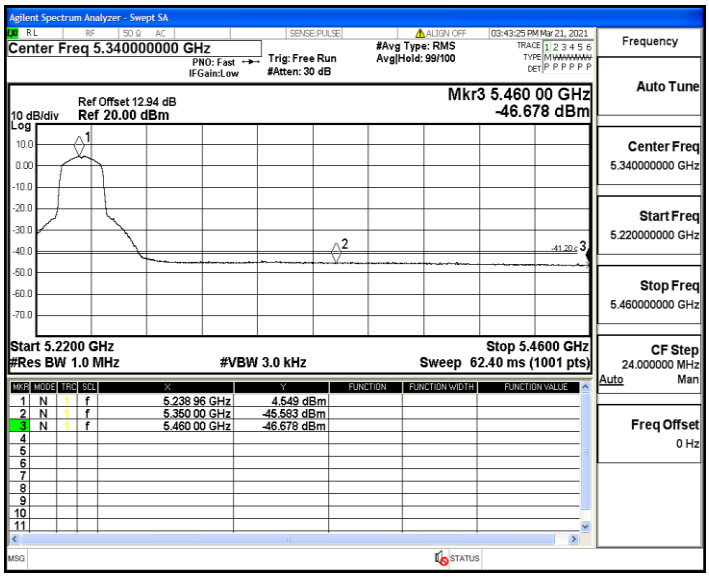
11AC20SISO_Ant1_Low_5180_AV



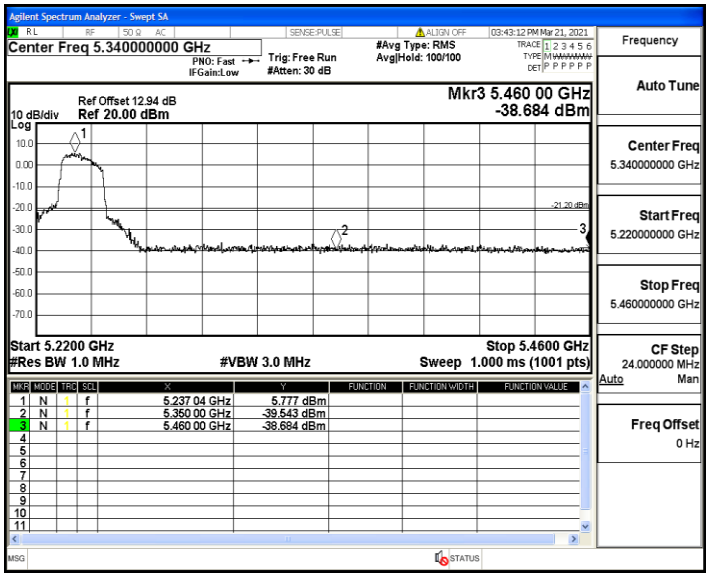
11AC20SISO_Ant1_Low_5180_Peak



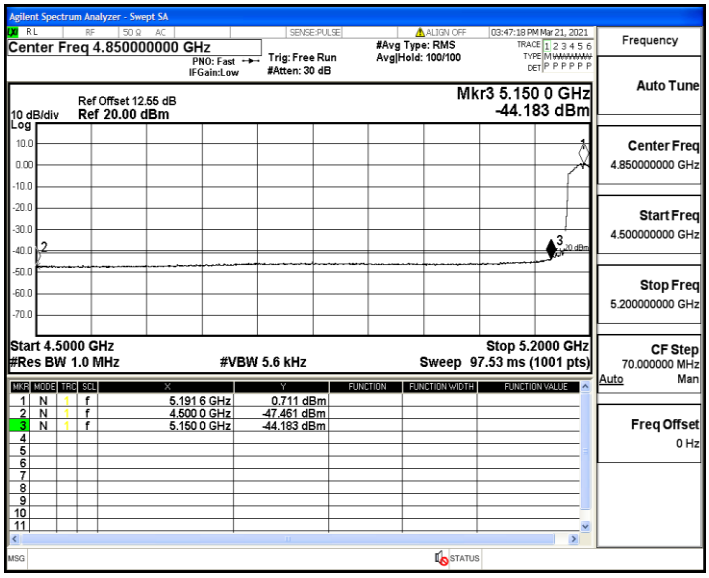
11AC20SISO_Ant1_High_5240_AV



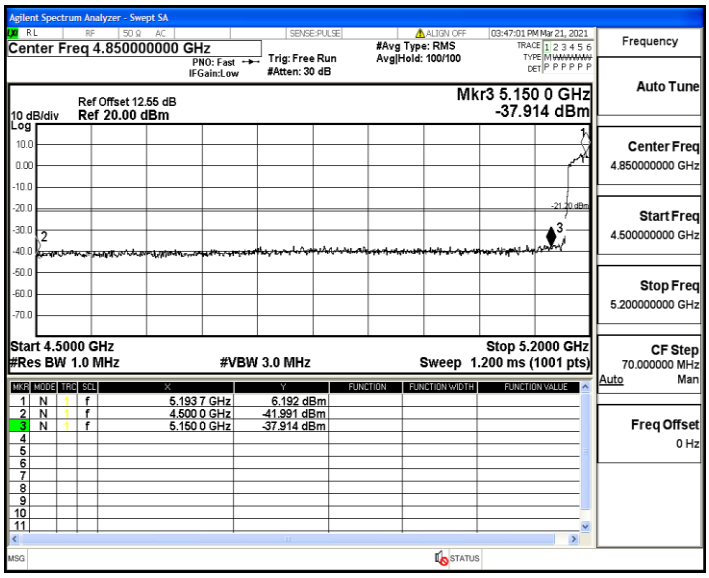
11AC20SISO_Ant1_High_5240_Peak



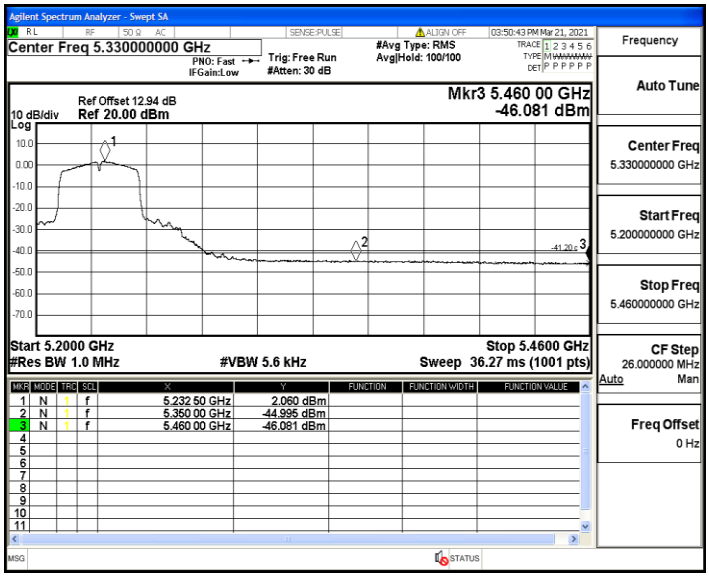
11AC40SISO_Ant1_Low_5190_AV



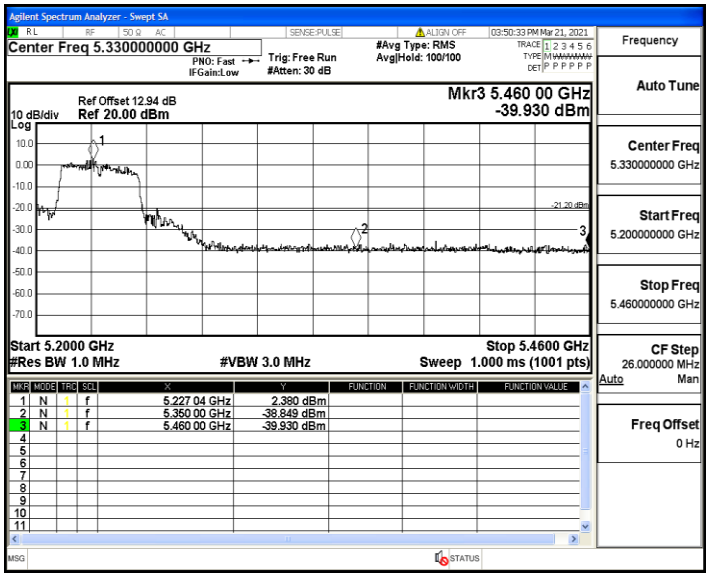
11AC40SISO_Ant1_Low_5190_Peak



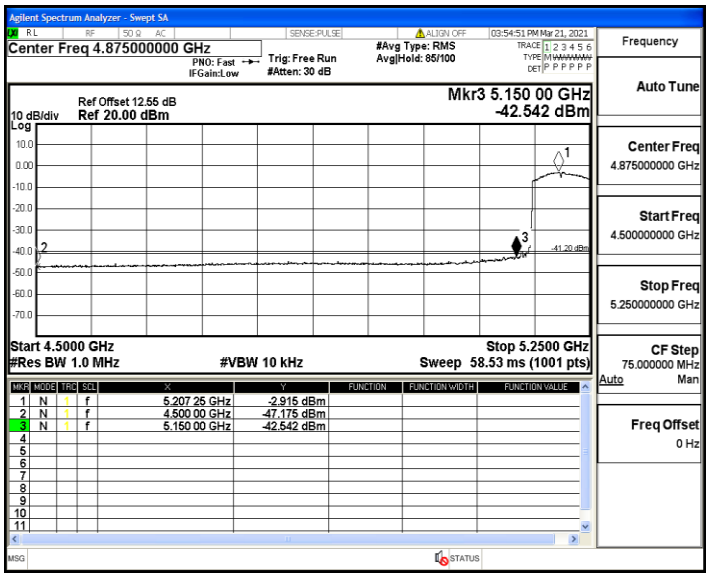
11AC40SISO_Ant1_High_5230_AV



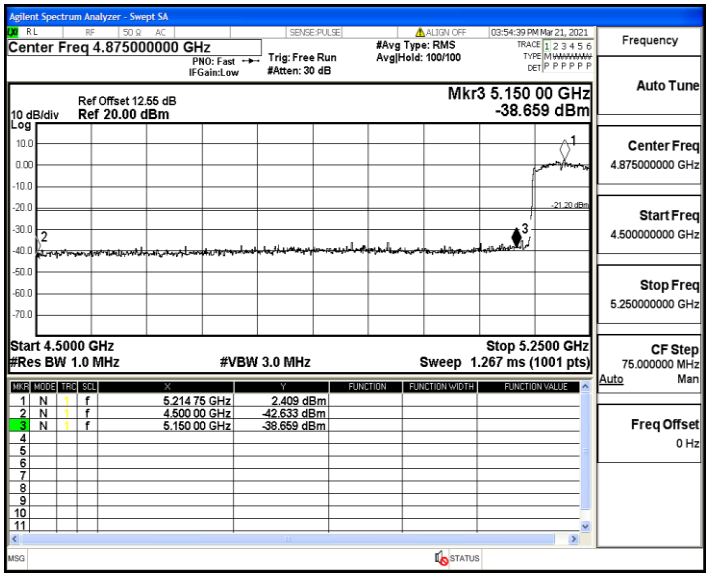
11AC40SISO_Ant1_High_5230_Peak



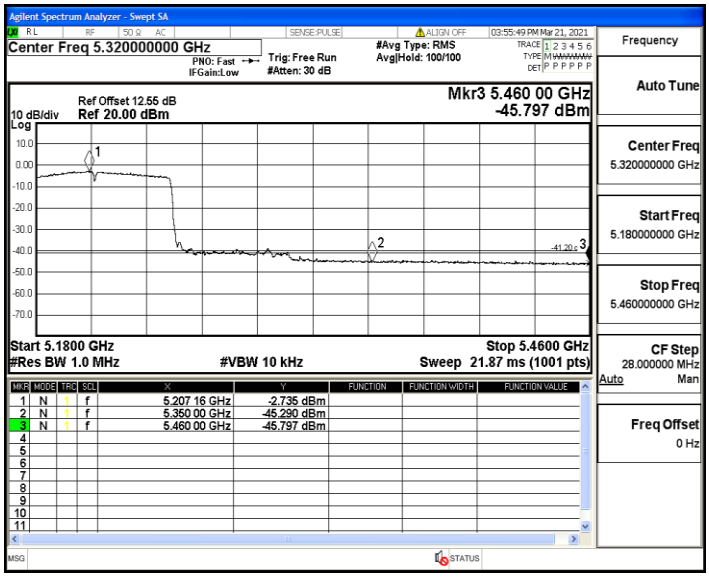
11AC80SISO_Ant1_Low_5210_AV



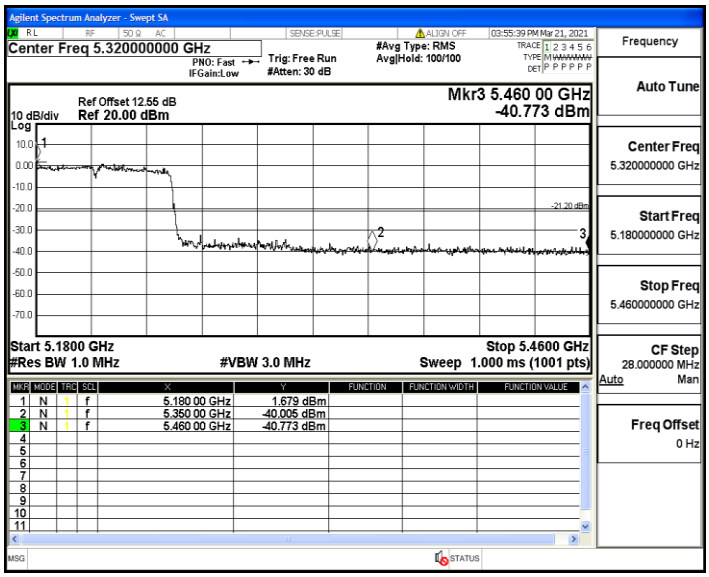
11AC80SISO_Ant1_Low_5210_Peak



11AC80SISO_Ant1_High_5210_AV



11AC80SISO_Ant1_High_5210_Peak



5.8. Antenna Requirements

5.8.1. Standard Applicable

For intentional device, according to FCC 47 CFR Section 15.203:

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
And according to FCC 47 CFR Section 15.407 (a), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

5.8.2. Antenna Connector Construction

The directional gains of antenna refer to section 1.1, and the antenna is an internal antenna connect to PCB board and no consideration of replacement. Please see EUT photo for details.

5.8.3. Results: Compliance.

5.9. Frequency Stability

5.9.1 Standard Applicable

According to FCC §15.407(g) “Manufacturers 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 manual.”

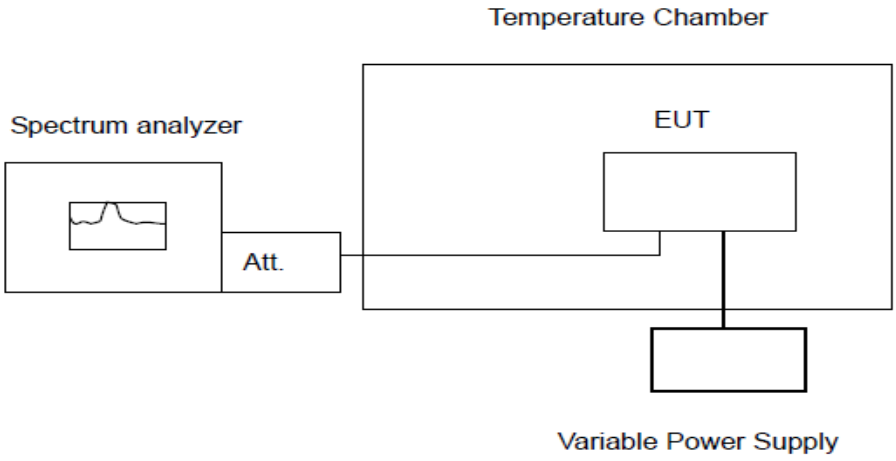
According to FCC §2.1055(a) “The frequency stability shall be measured with variation of ambient temperature as follows:”

(1) From −30° to + 50° centigrade for all equipment except that specified in paragraphs (a) (2) and (3) of this section.

(2) From −20° to + 50° centigrade for equipment to be licensed for use in the Maritime Services under part 80 of this chapter, except for Class A, B, and S Emergency Position Indicating Radiobeacons (EPIRBS), and equipment to be licensed for use above 952 MHz at operational fixed stations in all services, stations in the Local Television Transmission Service and Point-to-Point Microwave Radio Service under part 21 of this chapter, equipment licensed for use aboard aircraft in the Aviation Services under part 87 of this chapter, and equipment authorized for use in the Family Radio Service under part 95 of this chapter.

(3) From 0° to + 50° centigrade for equipment to be licensed for use in the Radio Broadcast Services under part 73 of this chapter.

5.9.2 Test Configuration



5.9.3 Test Procedure

The equipment under test was connected to an external AC or DC power supply and input rated voltage. RF output was connected to a frequency counter or spectrum anzlyer via feed through attenators. The EUT was placed inside the temperature chamber. Set the spectrum analyzer RBW low engouh to obtain the desired frequency resoluation and measure EUT 20 degree operating frequency as reference frequency. Turn EUT off and set the chamber temperature to -30 degree. After the temperature stabilized for approximately 30 minutes recorded the frequency. Repeat step measure wuth 10 degree increased per stage until the highest temperature of +50 degree reached.

5.9.4 Test Results

PASS

Remark:

1. *Measured all conditions and recorded worst case.*

IEEE 802.11a Mode / 5180 – 5240 MHz / 5180 MHz

Environment Temperature (Degree)	Voltage (VDC)	Measured Frequency (MHz)	Limit Range (MHz)	Test Results
20	13.2	5179.979872	5150 – 5250	PASS
20	10.8	5179.910264	5150 – 5250	PASS
50	12.0	5179.935444	5150 – 5250	PASS
40	12.0	5180.051222	5150 – 5250	PASS
30	12.0	5179.959943	5150 – 5250	PASS
20	12.0	5180.069315	5150 – 5250	PASS
10	12.0	5179.975079	5150 – 5250	PASS
0	12.0	5179.995988	5150 – 5250	PASS
-10	12.0	5180.075761	5150 – 5250	PASS
-20	12.0	5180.004257	5150 – 5250	PASS
-30	12.0	5179.917543	5150 – 5250	PASS

IEEE 802.11a Mode / 5180 – 5240 MHz / 5200 MHz

Environment Temperature (Degree)	Voltage (VDC)	Measured Frequency (MHz)	Limit Range (MHz)	Test Results
20	13.2	5200.043252	5150 – 5250	PASS
20	10.8	5200.067006	5150 – 5250	PASS
50	12.0	5199.915443	5150 – 5250	PASS
40	12.0	5199.967515	5150 – 5250	PASS
30	12.0	5199.948230	5150 – 5250	PASS
20	12.0	5199.917451	5150 – 5250	PASS
10	12.0	5199.941342	5150 – 5250	PASS
0	12.0	5199.973103	5150 – 5250	PASS
-10	12.0	5199.925467	5150 – 5250	PASS
-20	12.0	5199.990870	5150 – 5250	PASS
-30	12.0	5200.029903	5150 – 5250	PASS

IEEE 802.11a Mode / 5180 – 5240 MHz / 5240 MHz

Environment Temperature (Degree)	Voltage (VAC)	Measured Frequency (MHz)	Limit Range (MHz)	Test Results
20	13.2	5239.979694	5150 – 5250	PASS
20	10.8	5240.004335	5150 – 5250	PASS
50	12.0	5239.981043	5150 – 5250	PASS
40	12.0	5239.911615	5150 – 5250	PASS
30	12.0	5239.928616	5150 – 5250	PASS
20	12.0	5240.094093	5150 – 5250	PASS
10	12.0	5239.911738	5150 – 5250	PASS
0	12.0	5240.077208	5150 – 5250	PASS
-10	12.0	5239.973474	5150 – 5250	PASS
-20	12.0	5240.008153	5150 – 5250	PASS
-30	12.0	5239.971167	5150 – 5250	PASS

IEEE 802.11a Mode / 5180 – 5240 MHz / 5190 MHz

Environment Temperature (Degree)	Voltage (VDC)	Measured Frequency (MHz)	Limit Range (MHz)	Test Results
20	13.2	5189.953782	5150 – 5250	PASS
20	10.8	5190.044583	5150 – 5250	PASS
50	12.0	5189.940827	5150 – 5250	PASS
40	12.0	5190.079696	5150 – 5250	PASS
30	12.0	5190.013031	5150 – 5250	PASS
20	12.0	5190.016976	5150 – 5250	PASS
10	12.0	5189.985494	5150 – 5250	PASS
0	12.0	5189.992556	5150 – 5250	PASS
-10	12.0	5189.940559	5150 – 5250	PASS
-20	12.0	5189.972597	5150 – 5250	PASS
-30	12.0	5190.097788	5150 – 5250	PASS

IEEE 802.11a Mode / 5180 – 5240 MHz / 5230 MHz

Environment Temperature (Degree)	Voltage (VDC)	Measured Frequency (MHz)	Limit Range (MHz)	Test Results
20	13.2	5229.958789	5150 – 5250	PASS
20	10.8	5230.084910	5150 – 5250	PASS
50	12.0	5229.960297	5150 – 5250	PASS
40	12.0	5229.914796	5150 – 5250	PASS
30	12.0	5230.097569	5150 – 5250	PASS
20	12.0	5230.091755	5150 – 5250	PASS
10	12.0	5229.900814	5150 – 5250	PASS
0	12.0	5229.969284	5150 – 5250	PASS
-10	12.0	5229.975807	5150 – 5250	PASS
-20	12.0	5230.057354	5150 – 5250	PASS
-30	12.0	5229.972843	5150 – 5250	PASS

IEEE 802.11a Mode / 5180 – 5240 MHz / 5210 MHz

Environment Temperature (Degree)	Voltage (VDC)	Measured Frequency (MHz)	Limit Range (MHz)	Test Results
20	13.2	5210.029111	5150 – 5250	PASS
20	10.8	5210.018654	5150 – 5250	PASS
50	12.0	5209.918881	5150 – 5250	PASS
40	12.0	5210.083920	5150 – 5250	PASS
30	12.0	5210.051677	5150 – 5250	PASS
20	12.0	5209.970205	5150 – 5250	PASS
10	12.0	5210.073524	5150 – 5250	PASS
0	12.0	5209.967871	5150 – 5250	PASS
-10	12.0	5210.053891	5150 – 5250	PASS
-20	12.0	5210.073506	5150 – 5250	PASS
-30	12.0	5210.011167	5150 – 5250	PASS

6. LIST OF MEASURING EQUIPMENTS

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Calibration Date	Calibration Due Date
1	MXA Signal Analyzer	Keysight	N9020A	MY52091623	2021/1/4	2022/1/3
2	Power Sensor	Agilent	U2021XA	MY5365004	2021/1/4	2022/1/3
3	Power Meter	Agilent	U2531A	TW53323507	2021/1/4	2022/1/3
4	Wideband Antenna	schwarzbeck	VULB 9163	958	2019/11/16	2022/11/15
5	Horn Antenna	schwarzbeck	9120D-1141	1574	2019/11/16	2022/11/15
6	EMI Test Receiver	R&S	ESCI	100849/003	2021/1/4	2022/1/3
7	Controller	MF	MF7802	N/A	N/A	N/A
8	Amplifier	schwarzbeck	BBV 9743	209	2021/1/4	2022/1/3
9	Amplifier	Tonscend	TSAMP-0518SE	--	2021/1/4	2022/1/3
10	RF Cable(below 1GHz)	HUBER+SUHNER	RG214	N/A	2021/1/4	2022/1/3
11	RF Cable(above 1GHz)	HUBER+SUHNER	RG214	N/A	2021/1/4	2022/1/3
12	Artificial Mains	ROHDE & SCHWARZ	ENV 216	101333-IP	2021/1/4	2022/1/3
12	EMI Test Software	ROHDE & SCHWARZ	ESK1	V1.71	N/A	N/A
14	RE test software	Tonscend	JS32-RE	V2.0.2.0	N/A	N/A
15	Test Software	Tonscend	JS1120-3	V2.5.77.0418	N/A	N/A
16	Horn Antenna	A-INFO	LB-180400-KF	J211020657	2019/11/16	2022/11/15
17	Amplifier	CDSA	PAP-1840	17021	2020/03/24	2021/03/23

----------THE END OF REPORT----------