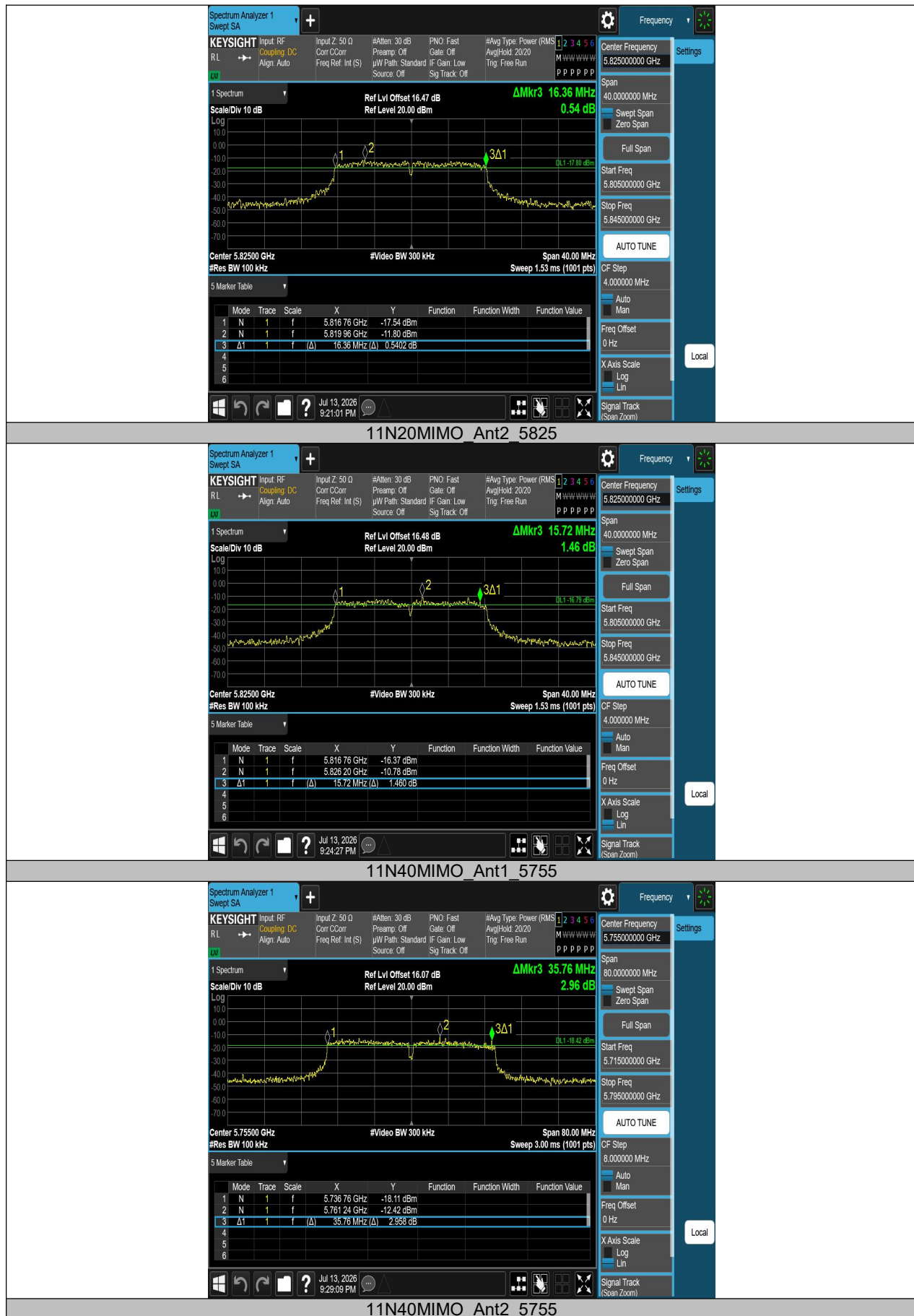








10. Maximum Output Power

10.1. Block Diagram of Test Setup

Same as section 8.1

10.2. Limits

FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Conducted Output Power	☐ Outdoor Access Point: 1 W (30 dBm)	5150-5250
	☐ Indoor Access Point: 1 W (30 dBm)	
	☐ Fixed Point-To-Point Access Points: 1 W (30 dBm)	
	☒ Client Devices: 250 mW (24 dBm)	
	Shall not exceed the lesser of 250 mW (24dBm) or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz.	5250-5350 5470-5725
	Shall not exceed 1 Watt (30 dBm).	5725-5850
Note: For 802.11n, the EUT incorporates a MIMO function. The Antenna directional gain is 8.64 dBi. The Maximum Output Power limit is the above limits-(8.64-6)		

Note: The above limits are based upon the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

10.3. Test Procedure

Method PM is Measurement using an RF average power meter. The procedure for this method is as follows:

- (1) Measurements may be performed using a wideband RF power meter with a thermocouple detector or equivalent if all of the following conditions are satisfied:
 - a) The EUT is configured to transmit continuously, or to transmit with a constant duty cycle.
 - b) At all times when the EUT is transmitting, it shall be transmitting at its maximum power control level.
 - c) The integration period of the power meter exceeds the repetition period of the transmitted signal by at least a factor of five.
- (2) If the transmitter does not transmit continuously, measure the duty cycle D of the transmitter output signal as described in 12.2.
- (3) Measure the average power of the transmitter. This measurement is an average over both the ON and OFF periods of the transmitter.
- (4) Correct the measurement in dBm by adding $[10 \log (1 / D)]$, where D is the duty cycle {e.g., $[10 \log (1 / 0.25)]$, if the duty cycle is 25%}.

10.4. Test Result

Test Mode	Ant.	Freq. (MHz)	Channel Power (dBm)	DC Factor (dBm)	Result (dBm)	Limit (dBm)	Verdict
11A	Ant1	5180	0.44	0.13	0.57	≤23.98	PASS
	Ant2	5180	-2.20	0.16	-2.04	≤23.98	PASS
	Ant1	5200	1.44	0.16	1.60	≤23.98	PASS
	Ant2	5200	-2.43	0.16	-2.27	≤23.98	PASS
	Ant1	5240	2.18	0.16	2.34	≤23.98	PASS
	Ant2	5240	-2.39	0.16	-2.23	≤23.98	PASS
	Ant1	5745	4.61	0.13	4.74	≤30.00	PASS
	Ant2	5745	2.64	0.16	2.80	≤30.00	PASS
	Ant1	5785	3.78	0.16	3.94	≤30.00	PASS
	Ant2	5785	1.37	0.13	1.50	≤30.00	PASS
	Ant1	5825	2.18	0.16	2.34	≤30.00	PASS
	Ant2	5825	0.64	0.16	0.80	≤30.00	PASS

11N20MIMO	Ant1	5180	-0.18	0.17	-0.01	≤23.98	PASS
	Ant2	5180	-2.26	0.17	-2.09	≤23.98	PASS
	total	5180	---	---	2.08	≤21.34	PASS
	Ant1	5200	0.62	0.17	0.79	≤23.98	PASS
	Ant2	5200	-2.32	0.17	-2.15	≤23.98	PASS
	total	5200	---	---	2.57	≤21.34	PASS
	Ant1	5240	1.19	0.13	1.32	≤23.98	PASS
	Ant2	5240	-2.68	0.17	-2.51	≤23.98	PASS
	total	5240	---	---	2.82	≤21.34	PASS
	Ant1	5745	4.60	0.16	4.76	≤30.00	PASS
	Ant2	5745	2.98	0.13	3.11	≤30.00	PASS
	total	5745	---	---	7.02	≤27.36	PASS
	Ant1	5785	3.77	0.16	3.93	≤30.00	PASS
	Ant2	5785	2.61	0.16	2.77	≤30.00	PASS
	total	5785	---	---	6.40	≤27.36	PASS
11N40MIMO	Ant1	5825	2.45	0.16	2.61	≤30.00	PASS
	Ant2	5825	1.16	0.16	1.32	≤30.00	PASS
	total	5825	---	---	5.02	≤27.36	PASS
	Ant1	5190	1.79	0.20	1.99	≤23.98	PASS
	Ant2	5190	0.01	0.27	0.28	≤23.98	PASS
	total	5190	---	---	4.23	≤21.34	PASS
	Ant1	5230	2.78	0.27	3.05	≤23.98	PASS
	Ant2	5230	-0.72	0.20	-0.52	≤23.98	PASS
	total	5230	---	---	4.63	≤21.34	PASS
	Ant1	5755	2.74	0.20	2.94	≤30.00	PASS
	Ant2	5755	2.27	0.20	2.47	≤30.00	PASS
	total	5755	---	---	5.72	≤27.36	PASS
	Ant1	5795	2.27	0.27	2.54	≤30.00	PASS
	Ant2	5795	1.76	0.20	1.96	≤30.00	PASS
	total	5795	---	---	5.27	≤27.36	PASS

11. Power Spectral Density

11.1. Block Diagram of Test Setup

Same as section 8.1

11.2. Limits

CFR 47 FCC Part15, Subpart E		
Test Item	Limit	Frequency Range (MHz)
Power Spectral Density	☐ Outdoor Access Point: 17 dBm/MHz ☐ Indoor Access Point: 17 dBm/MHz ☐ Fixed Point-To-Point Access Points: 17 dBm/MHz ☒ Client Devices: 11 dBm/MHz	5150-5250
	11 dBm/MHz	5250-5350 5470-5725
	30 dBm/500 kHz	5725-5850
	Note: For 802.11n, the EUT incorporates a MIMO function. The Antenna directional gain is 8.64 dBi. The Power Spectral Density limit is the above limits-(8.64-6)	

Note: The above limits are based upon the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

11.3. Test Procedure

- a) Measure the duty cycle D of the transmitter output signal as described in 12.2.
- b) Set span to encompass the entire 99% OBW of the signal.
- c) Set RBW = 1 MHz.
- d) Set VBW $\geq$ 3 MHz.
- e) Number of points in sweep $\geq [2 \times \text{span} / \text{RBW}]$. (This gives bin-to-bin spacing $\leq \text{RBW} / 2$, so that narrowband signals are not lost between frequency bins.)
- f) Sweep time = auto.
- g) Detector = Power averaging (rms), if available. Otherwise, use sample detector mode.
- h) Do not use sweep triggering. Allow the sweep to "free run."
- i) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed such that the average accurately represents the true average over the ON and OFF periods of the transmitter. then add $[10 \log (1 / D)]$, where D is the duty cycle, to the peak of the spectrum.
- j) The procedure in item a) through item i) requires the use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified by some regulatory authorities.⁸⁵ This requirement also permits use of resolution bandwidths less than 1 MHz "provided that the measured power is integrated to show the total power over the measurement bandwidth" (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth, the following adjustments to the procedures apply:
 - 1) Set RBW $\geq 1 / T$.
 - 2) Set VBW $\geq [3 \times \text{RBW}]$.
 - 3) Care shall be taken such that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Connect the UUT to the spectrum analyzer and use the following settings:

5150 MHz~5250 MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	1MHz
VBW	$\geq 3 \times \text{RBW}$

Span	Encompass the entire emissions bandwidth (EBW) of the signal
Sweep time	Auto

5725 MHz-5850 MHz

Center Frequency	The centre frequency of the channel under test
Detector	RMS
RBW	500 kHz
VBW	$\geq 3 \times \text{RBW}$
Span	Encompass the entire emissions bandwidth (EBW) of the signal
Sweep time	Auto

Note:

1. For UNII-3, according to KdB publication 789033 D02 General U-NII Test Procedures New Rules v02r01, section II.F.5., it is acceptable to set RBW at 1 MHz and VBW at 3 MHz if the spectrum analyzer does not have 500 kHz RBW.

2. The Level measured with RBW=300kHz is to be added with $10\log(500\text{kHz}/300\text{kHz})$ which is 2.2dB. For example, if the measured Level is +30 dBm using RBW=300kHz (that is +30 dBm/300kHz), then the converted Level will be +32.2 dBm/1MHz.

3. Allow trace to fully stabilize and use the peak marker function to determine the maximum amplitude level within the RBW.

11.4. Test Result

Test Result for B1

Test Mode	Ant.	Freq. (MHz)	Raw Data (dBm/MHz)	DC Factor	Result (dBm/MHz)	Limit (dBm/MHz)	EIRP PSD (dBm/MHz)	EIRP PSD Limit (dBm/MHz)	Verdict
11A	Ant1	5180	-10.73	0.13	-10.60	≤ 11.00	-4.97	≤ 10.00	PASS
	Ant2	5180	-13.32	0.16	-13.16	≤ 11.00	-7.53	≤ 10.00	PASS
	Ant1	5200	-9.84	0.16	-9.68	≤ 11.00	-4.05	≤ 10.00	PASS
	Ant2	5200	-13.45	0.16	-13.29	≤ 11.00	-7.66	≤ 10.00	PASS
	Ant1	5240	-8.79	0.16	-8.63	≤ 11.00	-3.00	≤ 10.00	PASS
	Ant2	5240	-13.39	0.16	-13.23	≤ 11.00	-7.60	≤ 10.00	PASS
11N20MI MO	Ant1	5180	-11.11	0.17	-10.94	≤ 11.00	-5.31	≤ 10.00	PASS
	Ant2	5180	-13.75	0.17	-13.58	≤ 11.00	-7.95	≤ 10.00	PASS
	total	5180	---	---	-9.05	≤ 8.36	-0.41	≤ 10.00	PASS
	Ant1	5200	-10.48	0.17	-10.31	≤ 11.00	-4.68	≤ 10.00	PASS
	Ant2	5200	-13.49	0.17	-13.32	≤ 11.00	-7.69	≤ 10.00	PASS
	total	5200	---	---	-8.55	≤ 8.36	0.09	≤ 10.00	PASS
	Ant1	5240	-9.93	0.13	-9.80	≤ 11.00	-4.17	≤ 10.00	PASS
	Ant2	5240	-13.78	0.17	-13.61	≤ 11.00	-7.98	≤ 10.00	PASS
11N40MI MO	total	5240	---	---	-8.29	≤ 8.36	0.35	≤ 10.00	PASS
	Ant1	5190	-12.12	0.20	-11.92	≤ 11.00	-6.29	≤ 10.00	PASS
	Ant2	5190	-14.37	0.27	-14.10	≤ 11.00	-8.47	≤ 10.00	PASS
	total	5190	---	---	-9.86	≤ 8.36	-1.22	≤ 10.00	PASS
	Ant1	5230	-11.16	0.27	-10.89	≤ 11.00	-5.26	≤ 10.00	PASS
	Ant2	5230	-14.96	0.20	-14.76	≤ 11.00	-9.13	≤ 10.00	PASS
	total	5230	---	---	-9.40	≤ 8.36	-0.76	≤ 10.00	PASS

Note1: The EIRP = Result + Ant. Gain

Note2: Ant. Gain=8.64dBi

Note3: Offset=cable loss

Test Result for B4

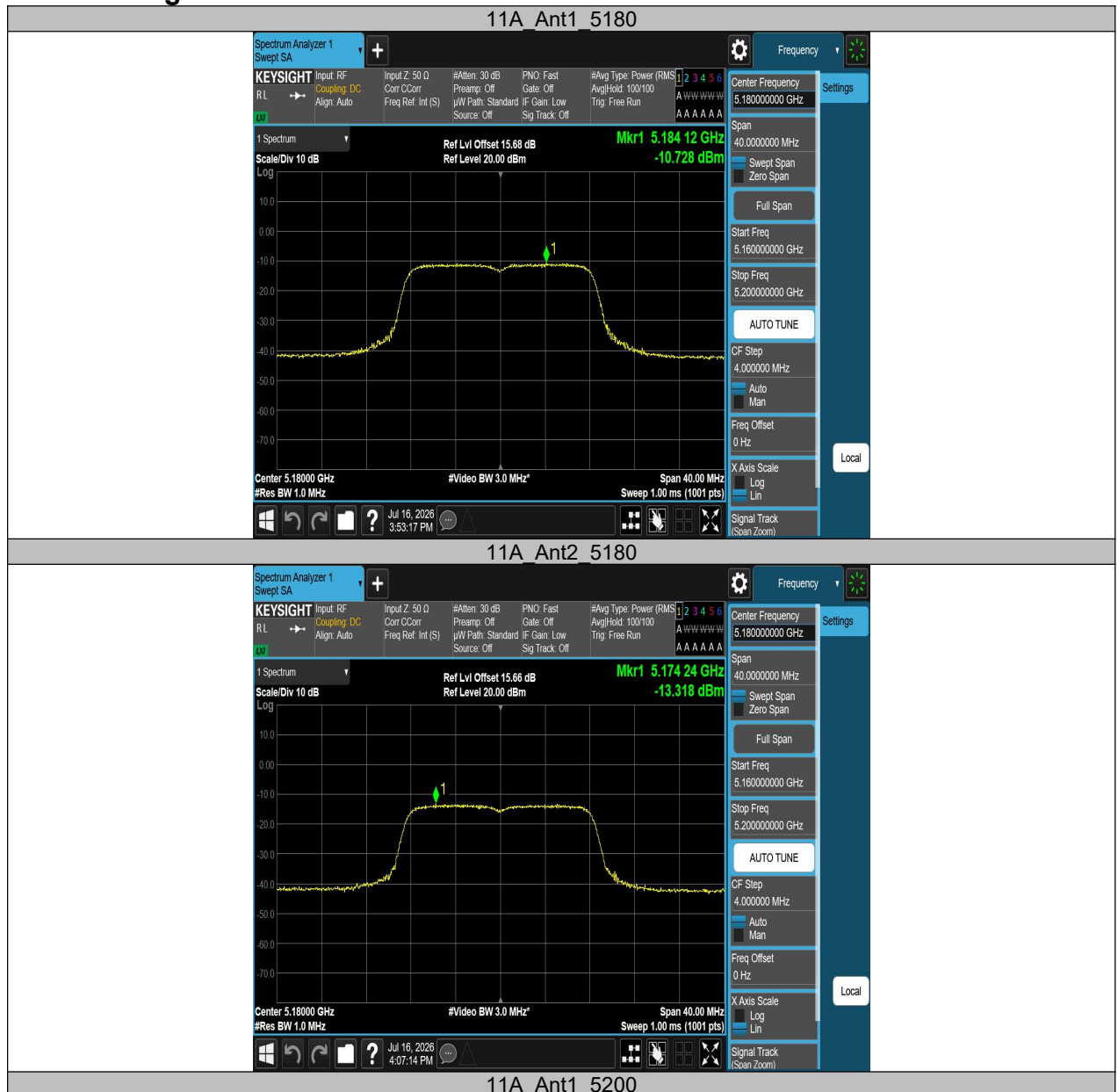
Test Mode	Ant.	Freq. (MHz)	Raw Data (dBm/300KHz)	DC Factor	RBW Factor	Result (dBm/500KHz)	Limit (dBm/500KHz)	Verdict
11A	Ant1	5745	-11.51	0.13	2.22	-9.16	≤ 30.00	PASS
	Ant2	5745	-13.32	0.16	2.22	-10.94	≤ 30.00	PASS
	Ant1	5785	-12.61	0.16	2.22	-10.23	≤ 30.00	PASS
	Ant2	5785	-14.95	0.13	2.22	-12.60	≤ 30.00	PASS

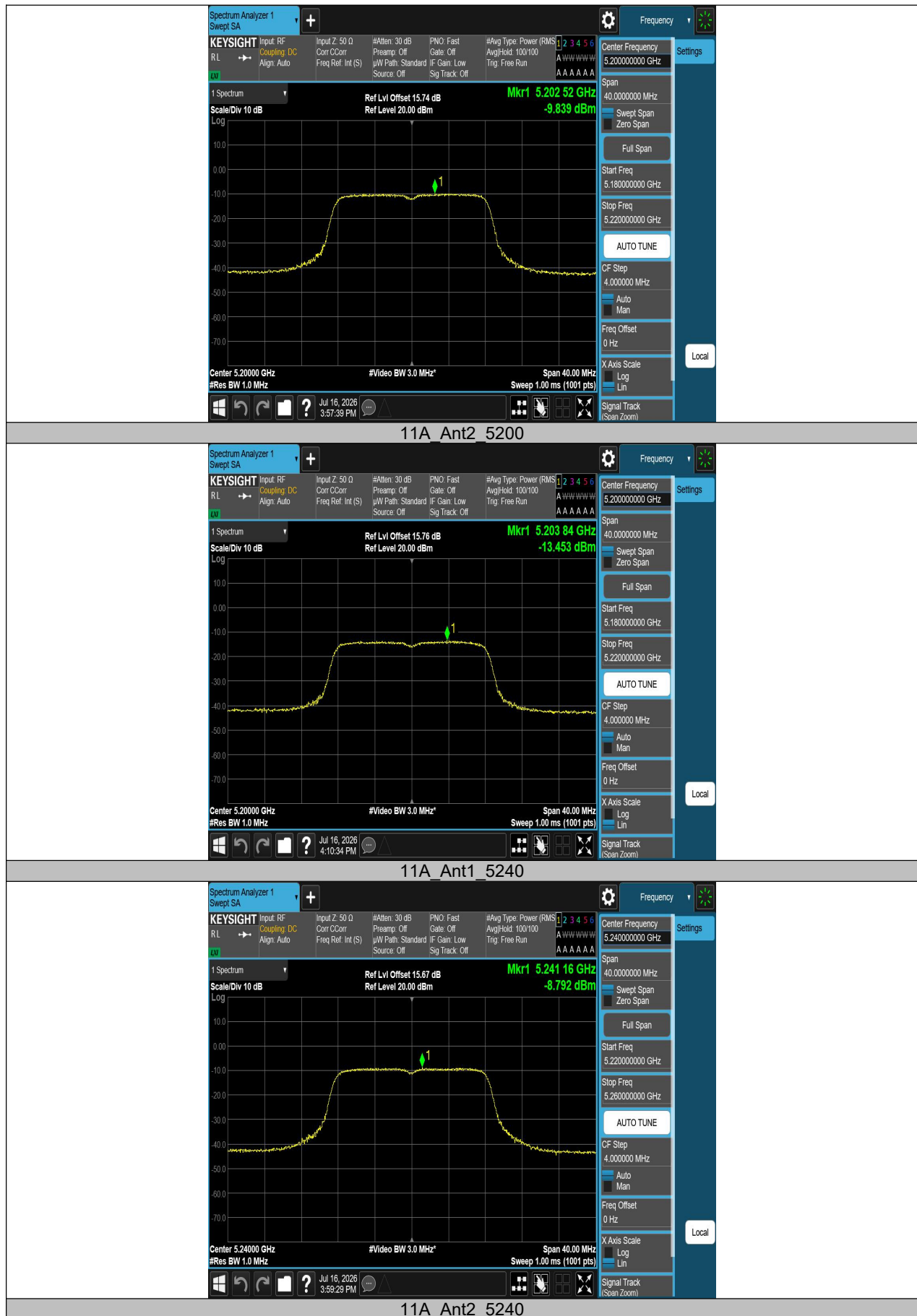
11N20MIMO	Ant1	5825	-14.2	0.16	2.22	-11.82	≤30.00	PASS
	Ant2	5825	-15.63	0.16	2.22	-13.25	≤30.00	PASS
	Ant1	5745	-11.41	0.16	2.22	-9.03	≤30.00	PASS
	Ant2	5745	-12.64	0.13	2.22	-10.29	≤30.00	PASS
	total	5745	---	---	---	-6.60	≤27.36	PASS
	Ant1	5785	-11.98	0.16	2.22	-9.60	≤30.00	PASS
	Ant2	5785	-13.71	0.16	2.22	-11.33	≤30.00	PASS
	total	5785	---	---	---	-7.37	≤27.36	PASS
	Ant1	5825	-13.97	0.16	2.22	-11.59	≤30.00	PASS
11N40MIMO	Ant2	5825	-14.78	0.16	2.22	-12.40	≤30.00	PASS
	total	5825	---	---	---	-8.97	≤27.36	PASS
	Ant1	5755	-16.48	0.20	2.22	-14.06	≤30.00	PASS
	Ant2	5755	-16.07	0.20	2.22	-13.65	≤30.00	PASS
	total	5755	---	---	---	-10.84	≤27.36	PASS
	Ant1	5795	-16.6	0.27	2.22	-14.11	≤30.00	PASS
	Ant2	5795	-16.92	0.20	2.22	-14.50	≤30.00	PASS
	total	5795	---	---	---	-11.29	≤27.36	PASS

Note1: .The Result and Limit Unit is dBm/500 kHz in the band 5.725–5.85 GHz.

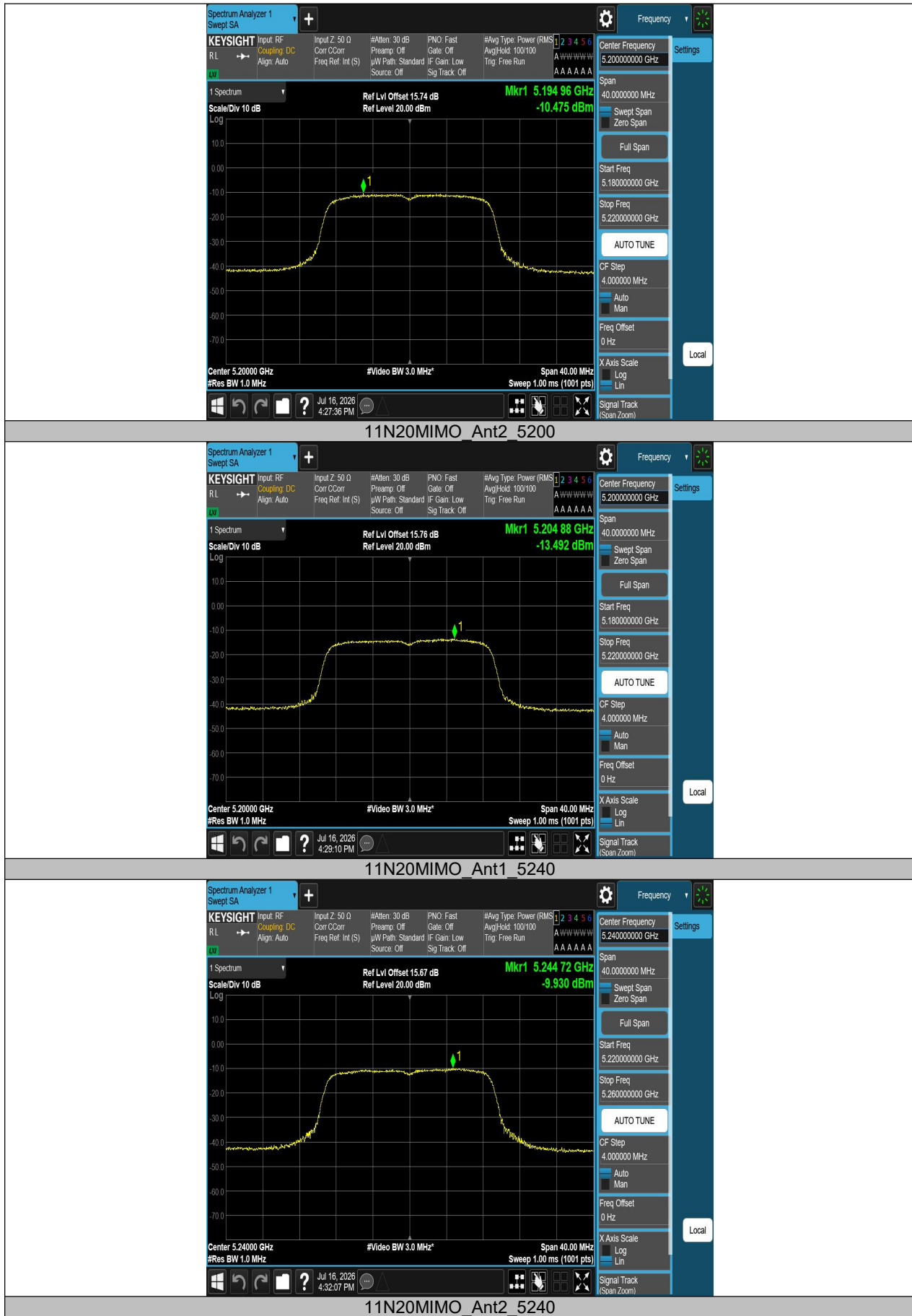
Note2: The Duty Cycle Factor and RBW Factor is compensated in the graph.

11.5. Original Test Data













12. Frequency Stability Measurement

12.1. Block Diagram of Test Setup

Same as section 8.1

12.2. Limit of Frequency Stability

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's manual.

12.3. Test Procedures

(1) To ensure emission at the band edge is maintained within the authorized band, those Levels shall be measured by radiation emissions at upper and lower frequency points, and finally compensated by frequency deviation as procedures below.

(2) The EUT was operated at the maximum output power, and connected to the spectrum analyzer, which is set to maximum hold function and peak detector. The peak Level of the power envelope was measured and noted. The upper and lower frequency points were respectively measured relatively 10 dB lower than the measured peak Level.

(3) The frequency deviation was calculated by adding the upper frequency point and the lower frequency point divided by two. Those detailed Levels of frequency deviation are provided in table below.

12.4. Test Result

Voltage								
Test Mode	Ant.	Freq. (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11N20MI MO	Ant1	5745	NV	NT	-49000.00	-8.529156	20	PASS
			LV	NT	-48000.00	-8.355091	20	PASS
			HV	NT	-47000.00	-8.181027	20	PASS
		5785	NV	NT	-43000.00	-7.433016	20	PASS
			LV	NT	-42000.00	-7.260156	20	PASS
			HV	NT	-42000.00	-7.260156	20	PASS
		5825	NV	NT	-42000.00	-7.210300	20	PASS
			LV	NT	-42000.00	-7.210300	20	PASS
			HV	NT	-42000.00	-7.210300	20	PASS
11N40MI MO	Ant1	5755	NV	NT	-42000.00	-7.298002	20	PASS
			LV	NT	-43000.00	-7.471764	20	PASS
			HV	NT	-43000.00	-7.471764	20	PASS
		5795	NV	NT	-42000.00	-7.247627	20	PASS
			LV	NT	-42000.00	-7.247627	20	PASS
			HV	NT	-43000.00	-7.420190	20	PASS

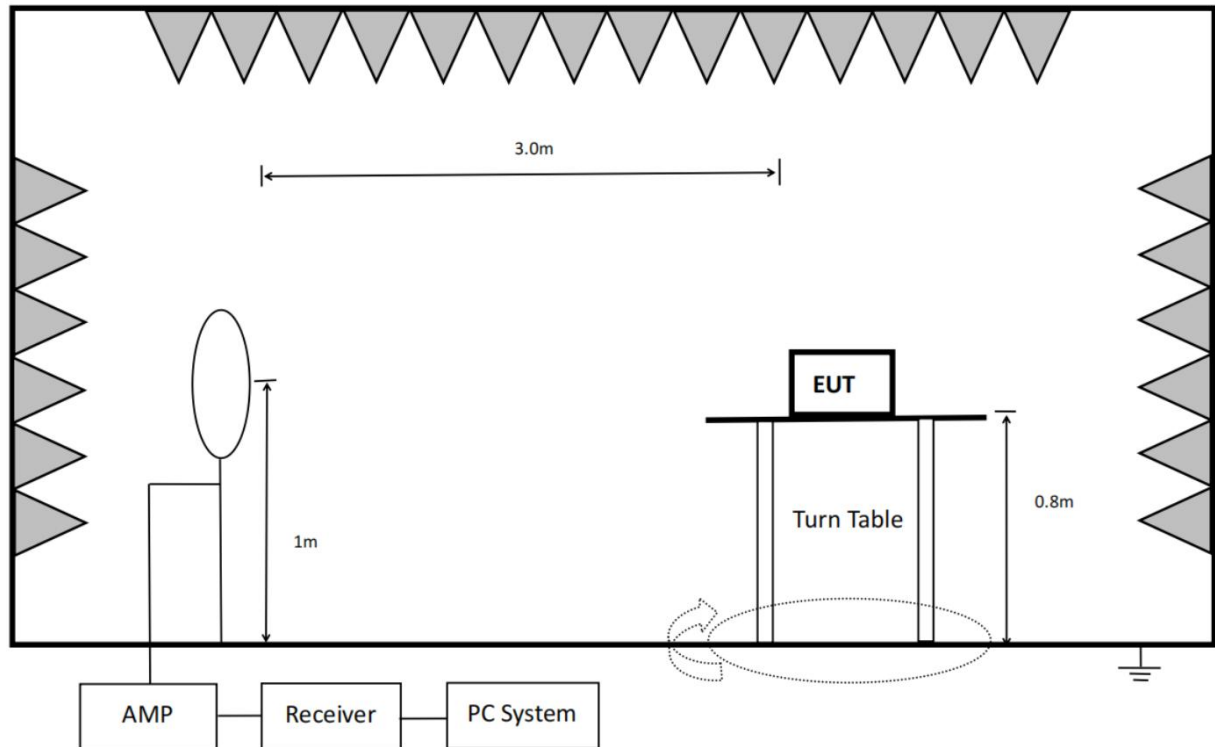
Temperature								
Test Mode	Ant.	Freq. (MHz)	Voltage (Vdc)	Temperature (°C)	Deviation (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
11N20MI MO	Ant1	5745	NV	-30	-47000.00	-8.181027	20	PASS
			NV	-20	-46000.00	-8.006963	20	PASS
			NV	-10	-45000.00	-7.832898	20	PASS
			NV	0	-45000.00	-7.832898	20	PASS
			NV	10	-44000.00	-7.658834	20	PASS
			NV	20	-43000.00	-7.484769	20	PASS
			NV	30	-43000.00	-7.484769	20	PASS
			NV	40	-42000.00	-7.310705	20	PASS
			NV	50	-41000.00	-7.136641	20	PASS
		5785	NV	-30	-42000.00	-7.260156	20	PASS
			NV	-20	-42000.00	-7.260156	20	PASS
			NV	-10	-42000.00	-7.260156	20	PASS
			NV	0	-42000.00	-7.260156	20	PASS
			NV	10	-42000.00	-7.260156	20	PASS
			NV	20	-41000.00	-7.087295	20	PASS

			NV	30	-41000.00	-7.087295	20	PASS
			NV	40	-41000.00	-7.087295	20	PASS
			NV	50	-41000.00	-7.087295	20	PASS
		5825	NV	-30	-42000.00	-7.210300	20	PASS
			NV	-20	-42000.00	-7.210300	20	PASS
			NV	-10	-42000.00	-7.210300	20	PASS
			NV	0	-42000.00	-7.210300	20	PASS
			NV	10	-42000.00	-7.210300	20	PASS
			NV	20	-42000.00	-7.210300	20	PASS
			NV	30	-42000.00	-7.210300	20	PASS
			NV	40	-42000.00	-7.210300	20	PASS
			NV	50	-41000.00	-7.038627	20	PASS
11N40MI MO	Ant1	5755	NV	-30	-43000.00	-7.471764	20	PASS
			NV	-20	-43000.00	-7.471764	20	PASS
			NV	-10	-43000.00	-7.471764	20	PASS
			NV	0	-42000.00	-7.298002	20	PASS
			NV	10	-42000.00	-7.298002	20	PASS
			NV	20	-42000.00	-7.298002	20	PASS
			NV	30	-42000.00	-7.298002	20	PASS
			NV	40	-42000.00	-7.298002	20	PASS
			NV	50	-41000.00	-7.124240	20	PASS
		5795	NV	-30	-42000.00	-7.247627	20	PASS
			NV	-20	-42000.00	-7.247627	20	PASS
			NV	-10	-42000.00	-7.247627	20	PASS
			NV	0	-42000.00	-7.247627	20	PASS
			NV	10	-42000.00	-7.247627	20	PASS
			NV	20	-42000.00	-7.247627	20	PASS
			NV	30	-42000.00	-7.247627	20	PASS
			NV	40	-41000.00	-7.075065	20	PASS
			NV	50	-41000.00	-7.075065	20	PASS

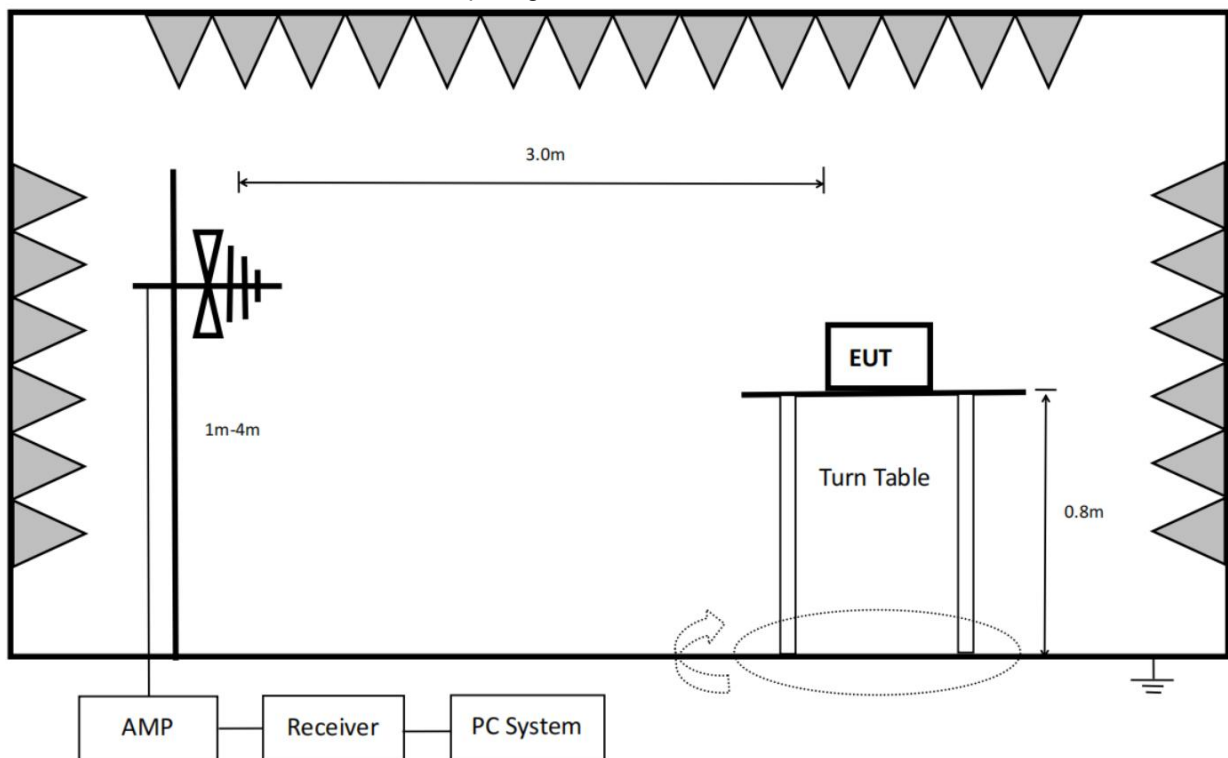
13. Radiated Emission

13.1. Block Diagram of Test Setup

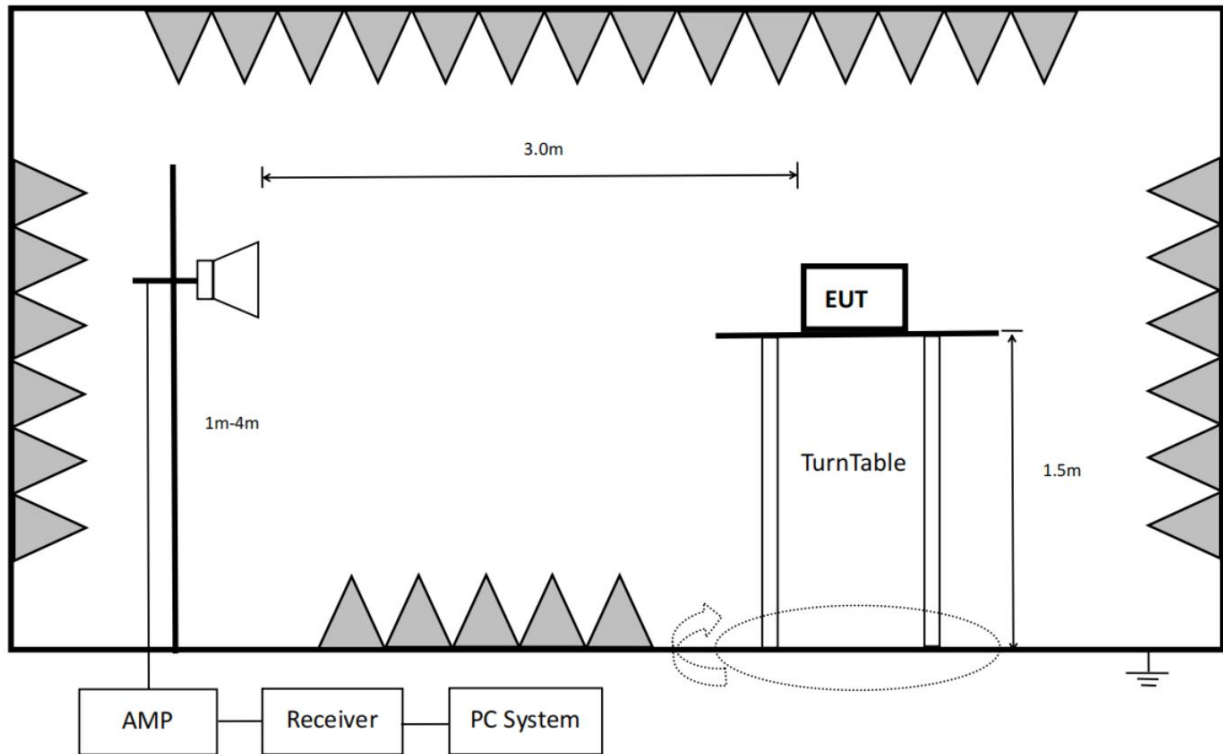
In 3 m Anechoic Chamber, test setup diagram for 9 kHz - 30 MHz:



In 3 m Anechoic Chamber, test setup diagram for 30 MHz - 1 GHz:



In 3 m Anechoic Chamber, test setup diagram for frequency above 1 GHz:



Note: For harmonic emissions test a band rejection filter was inserted in the input port of AMP.

13.2. Limit

(1) FCC 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.1772&4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.2072&4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6

(2) FCC 15.209 Limit.

Frequency MHz	Distance Meters	Field strengths limit	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
0.009 ~ 0.490	300	$2400/\text{F}(\text{kHz})$	$67.6-20\log(\text{F})$
0.490 ~ 1.705	30	$24000/\text{F}(\text{kHz})$	$87.6-20\log(\text{F})$
1.705 ~ 30.0	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

(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 5.25-5.35 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.

(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.

(4) 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.

(5) 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.

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

-27 dBm/MHz Limit= $95.2+\text{EIRP}(\text{dBm})=95.2-27=68.2 \text{ dB}\mu\text{V}/\text{m}$

Note:

(1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3\text{m}}(\text{dB}\mu\text{V}/\text{m}) = \text{Limit}_{30\text{m}}(\text{dB}\mu\text{V}/\text{m}) + 40\log(30\text{m}/3\text{m})$$

(3) Limit for this EUT

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions or comply with 15.209 limits.

13.3. Test Procedure

Below 30 MHz:

The setting of the spectrum Analyzer

RBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
VBW	200 Hz (From 9 kHz to 0.15 MHz)/ 9 kHz (From 0.15 MHz to 30 MHz)
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2020

2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both Horizontal, Face-on and Face-off polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm meter above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of 1 meter height antenna tower.

5. The radiated emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

6. For measurement below 1 GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

7. Although these tests were performed other than open field site, adequate comparison measurements were confirmed against 30m open field site. Therefore, sufficient tests were made to demonstrate that the alternative site produces results that correlate with the ones of tests made in an open field site based on KdB 414788.

Below 1 GHz and above 30 MHz:

The setting of the spectrum Analyzer

RBW	120 kHz
VBW	300 kHz
Sweep	Auto
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2020.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 80 cm above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

Above 1 GHz:

RBW	1 MHz
VBW	PEAK: 3 MHz AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2020.

2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a band rejection filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

3. The EUT was placed on a turntable with 1.5m above ground.

4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.

6. For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video

bandwidth with peak detector for AVG measurements. For the Duty Cycle please refer to clause 8.1.ON TIME AND DUTY CYCLE.

7. Restriction band: Investigated frequency range from 5.15-5.25 GHz, 5250-5350 GHz, 5470-5725 GHz, 5.725-5.85 GHz.

All restriction band should comply with 15.209, other emission should be at least 20 dB below the fundamental.

Note 1: For all radiated test, EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

Note 2: The EUT does not support simultaneous transmission.

Note 3: The EUT was fully exercised with external accessories during the test. In the case of multiple accessory external ports, an external accessory shall be connected to one of each type of port.

13.4. Test Result

PASS. (See below detailed test result)

All the emissions except fundamental emission from 9kHz to 40GHz were comply with 15.209 limit.

Note1: According exploratory test, the emission levels are 20 dB below the limit detected from 9 kHz to 30 MHz, so the final test was performed with frequency range from 30 MHz to 40 GHz and recorded in below.

Note2: For emissions below 1 GHz, according exploratory explorer test, when change Tx mode and channel, have no distinct influence on emissions level, so for emissions below 1 GHz, the final test was only performed with EUT working in 11N20 mode.

Note3: For below test data, when the limit tabular marked “/” means this frequency point is the fundamental emission and no need comply with this limit.

Note 4: As specified in 15.407(b), emissions above 1000 MHz that are outside of the restricted bands are subject to a peak emission limit of -27 dBm/MHz (or -17 dBm/MHz as specified in 15.407(b)(4)). However, an out-of-band emission that complies with both the average and peak limits of 15.209 is not required to satisfy the -27 dBm/MHz or -17 dBm/MHz peak emission limit

Note 5: For emissions Above 1 GHz, all mode have been tested, 11N20 mode is worse case and recorded in report.

Note 6: For emissions Above 18 GHz, the all the emission is ambient noise, so only show the worse case channel and recorded in report.

For upper edge of the 26 dB bandwidth and 5350 MHz unwanted emission data reference bellow:

Test Mode	Ant.	Channel (MHz)	Power (dBm)	Frequency Range	Frequency (MHz)	Result (dBm)	Limit (dBm)	Verdict
11A	Ant1	5180	6.20	5190.64~5350	5190.74	-26.53	≤-19.8	PASS
	Ant2	5180	3.59	5190.48~5350	5190.86	-28.66	≤-22.41	PASS
	Ant1	5240	7.97	5250.8~5350	5251.44	-26.26	≤-18.03	PASS
	Ant2	5240	3.40	5250.08~5350	5250.17	-28.26	≤-22.6	PASS
11N20MIMO	Ant1	5180	5.62	5191.6~5350	5191.62	-29.53	≤-20.38	PASS
	Ant2	5180	3.54	5190.64~5350	5191.02	-28.12	≤-22.46	PASS
	Ant1	5240	6.95	5251.12~5350	5251.37	-26.82	≤-19.05	PASS
	Ant2	5240	3.12	5251.6~5350	5251.87	-32.03	≤-22.88	PASS
11N40MIMO	Ant1	5190	7.62	5212.72~5350	5213.85	-33.65	≤-18.38	PASS
	Ant2	5190	5.91	5212~5350	5212.19	-32.63	≤-20.09	PASS
	Ant1	5230	8.68	5252.72~5350	5252.78	-28.87	≤-17.32	PASS
	Ant2	5230	5.11	5252.96~5350	5253.41	-34.62	≤-20.89	PASS

Note: This test only for 26dB bandwidth fall in 5250MHz ~ 5350MHz mode, So this is the conducted testing method used in this test and Diagram of test setup same as section 8.1.

13.5. Original Test Data

Below 1 GHz and above 30 MHz test data Refer to appendix A

Above 1 GHz test data Refer to appendix B

For upper edge of the 26 dB bandwidth and 5350 MHz unwanted emission reference bellow:



