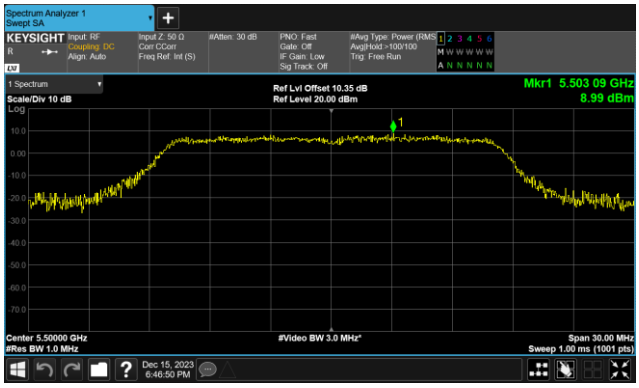
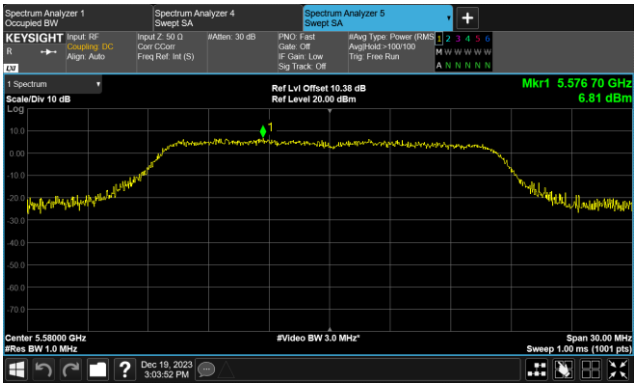
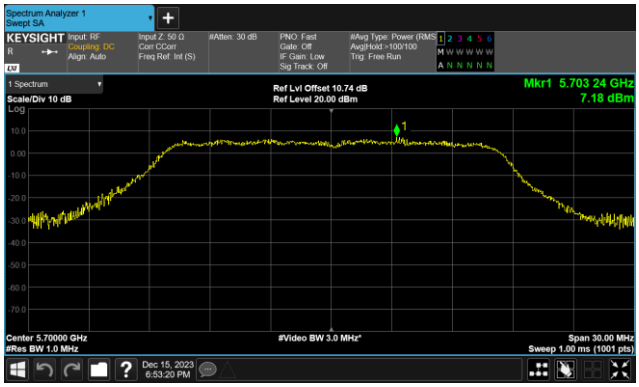
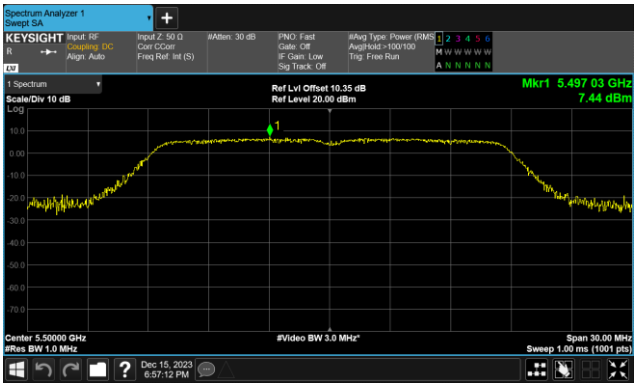
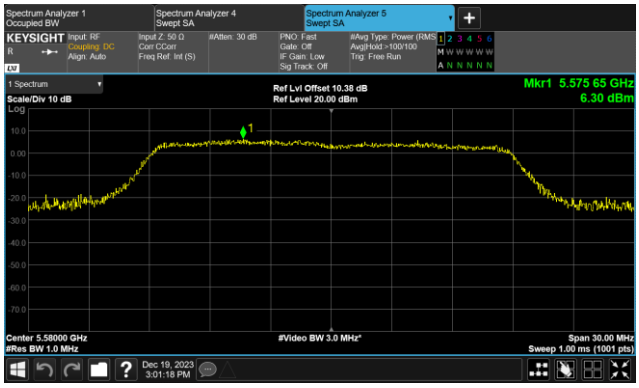
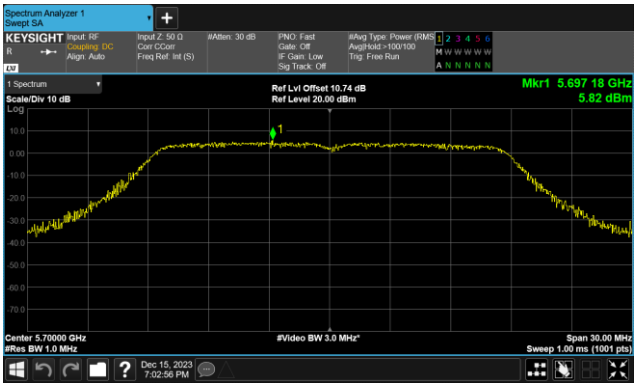
U-NII-2C	
IEEE 802.11a Low Channel	IEEE 802.11a Middle Channel
	
IEEE 802.11a High Channel	IEEE 802.11n(HT20) Low Channel_ANT 1
	
IEEE 802.11n(HT20) Middle Channel_ANT 1	IEEE 802.11n(HT20) High Channel_ANT 1
	

U-NII-2C	
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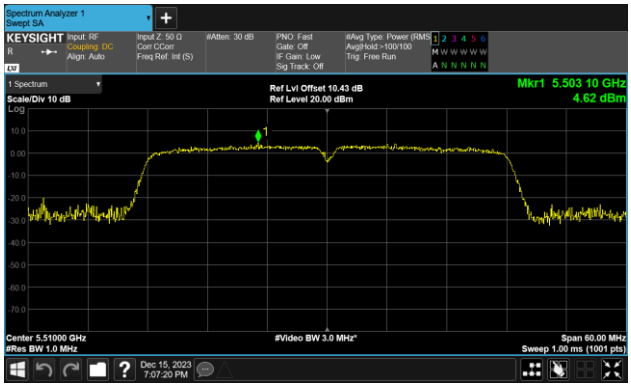	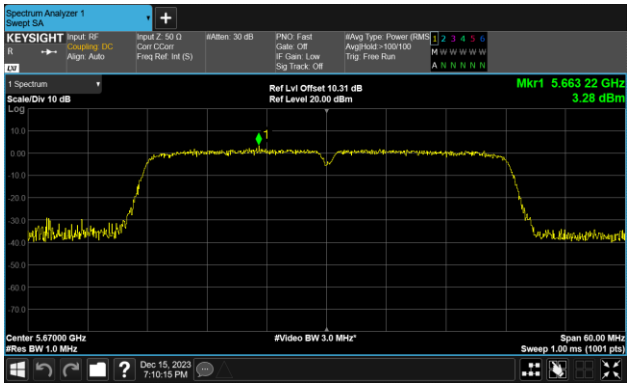

U-NII-3	
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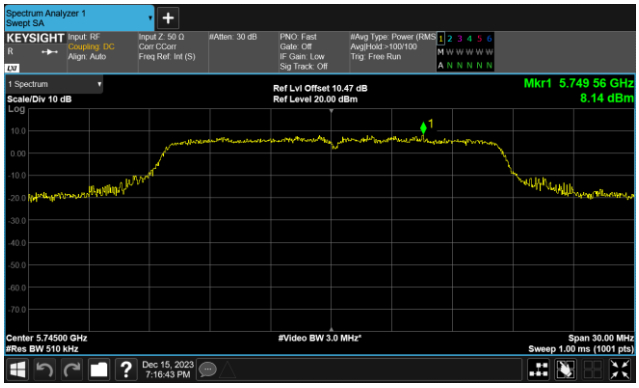	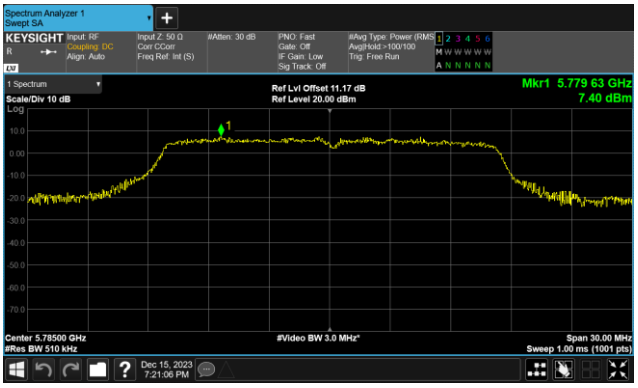
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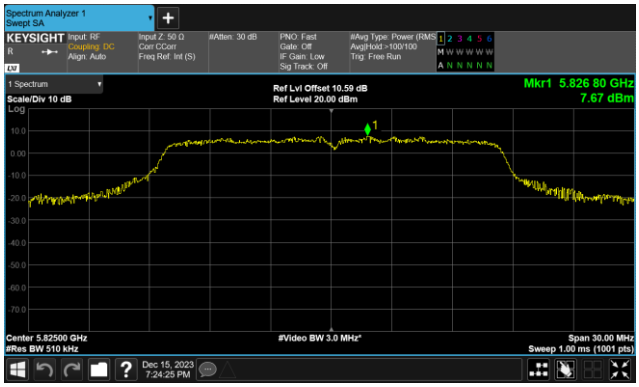
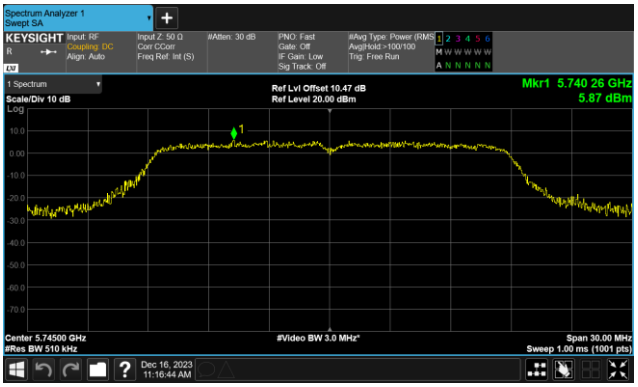
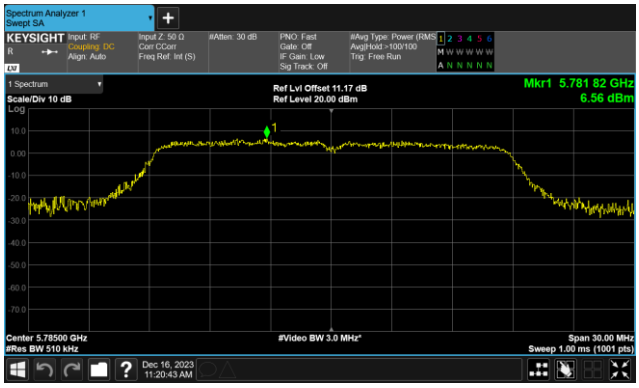
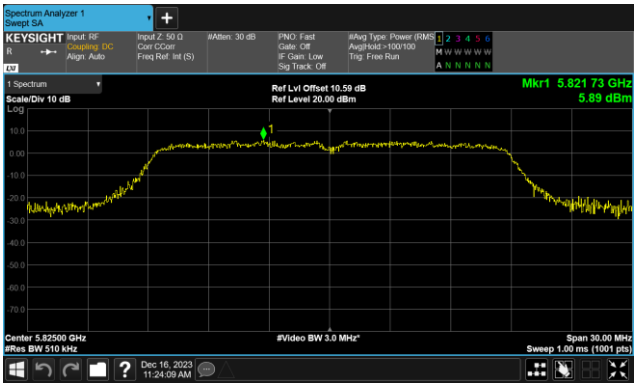
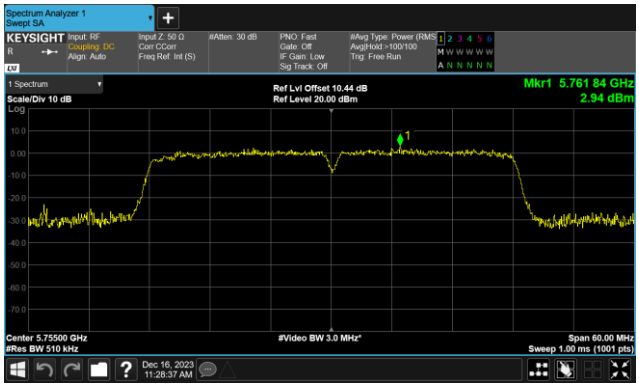
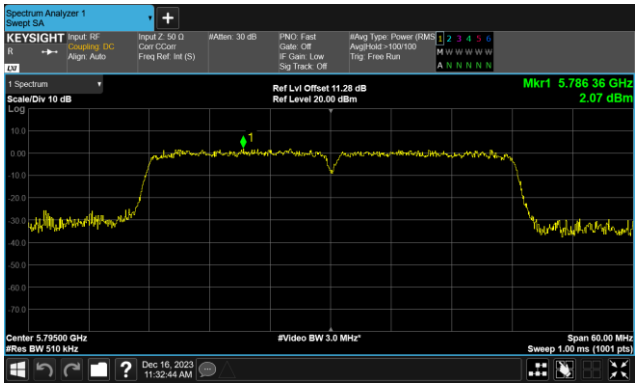
	
IEEE 802.11n(HT20) Middle Channel_ANT 1	IEEE 802.11n(HT20) High Channel_ANT 1
	

U-NII-3	
IEEE 802.11n(HT40) Low Channel_ANT 1	IEEE 802.11n(HT40) High Channel_ANT 1
	

14.6 Band Edge

LIMITS

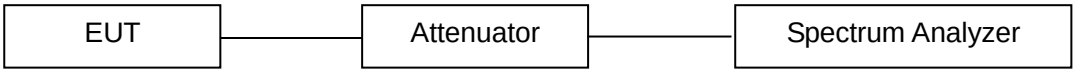
For transmitters operating in the 5.15-5.25 GHz band:
All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band:
All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

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.

For transmitters operating in the 5.725-5.85 GHz band:
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 25MHz 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 27dBm/MHz at the band edge.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

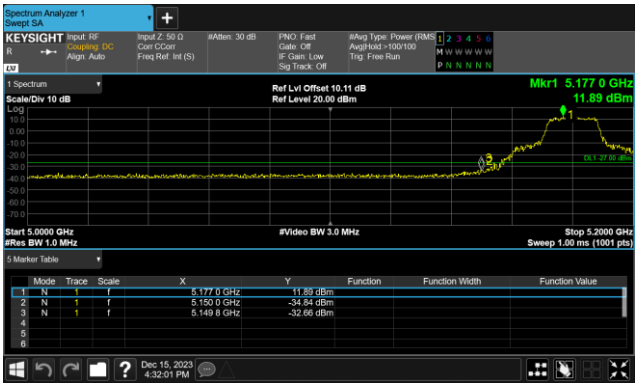
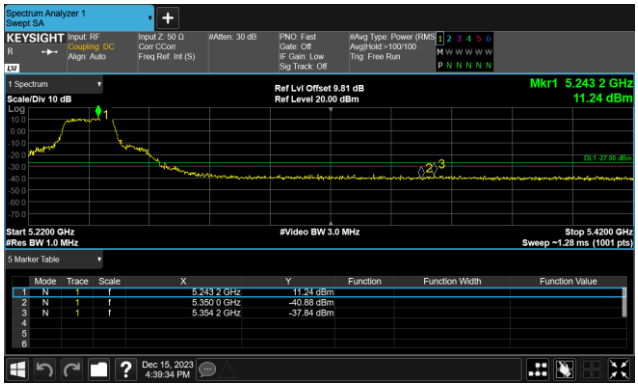
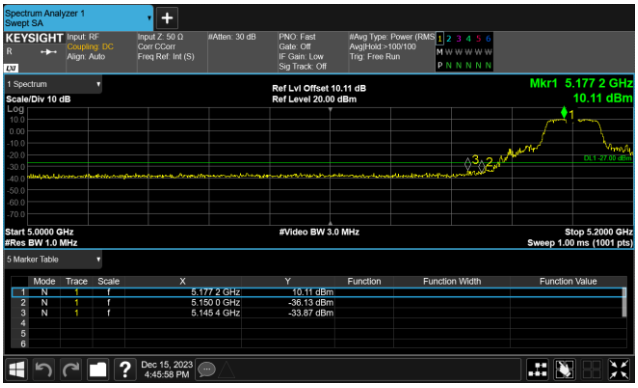
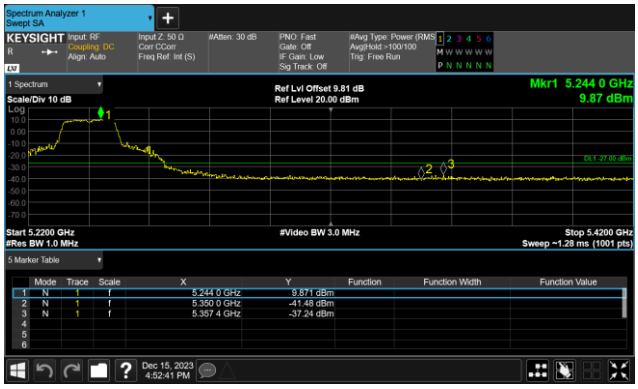
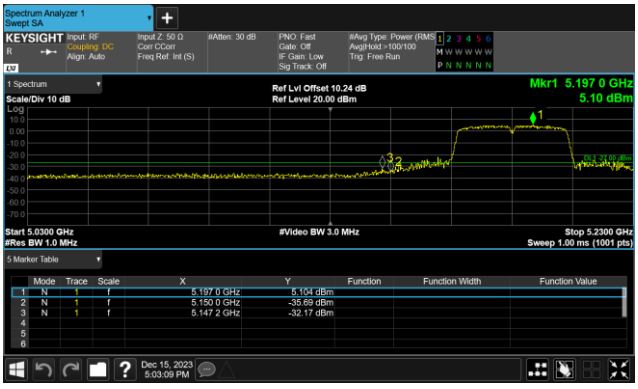
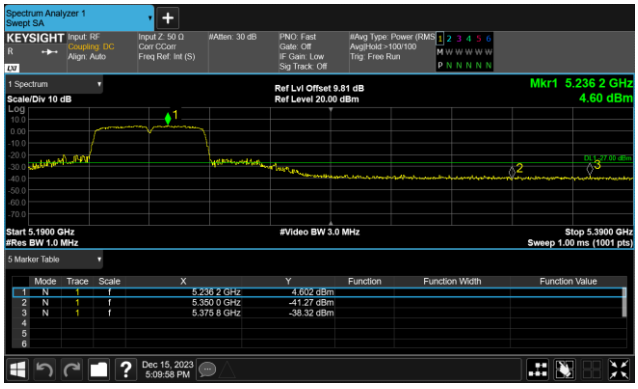
a. Check the calibration of the measuring instrument using either an internal calibration or a known signal from an external generator.
b. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable, then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
c. Set RBW to 1MHz and VBW to 3MHz of spectrum analyzer.
d. 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.
e. Repeat above procedures until all measured frequencies were complete.

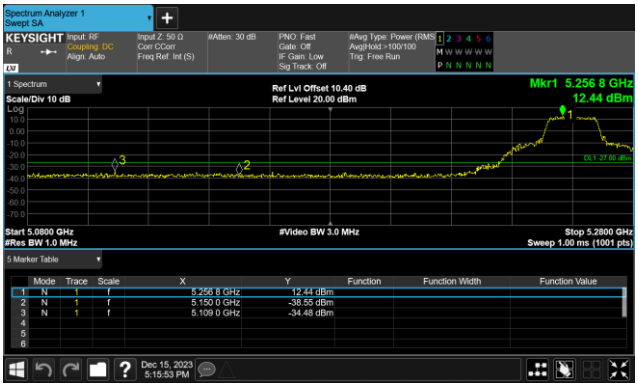
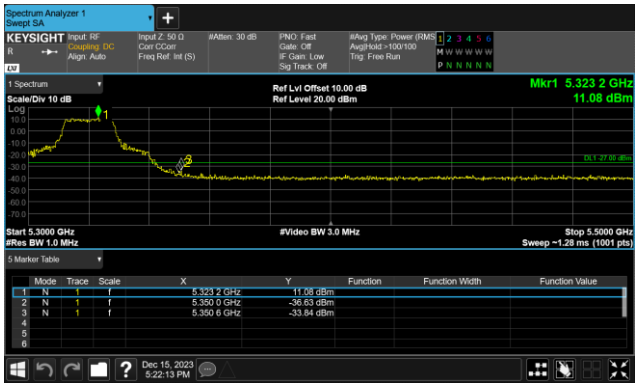
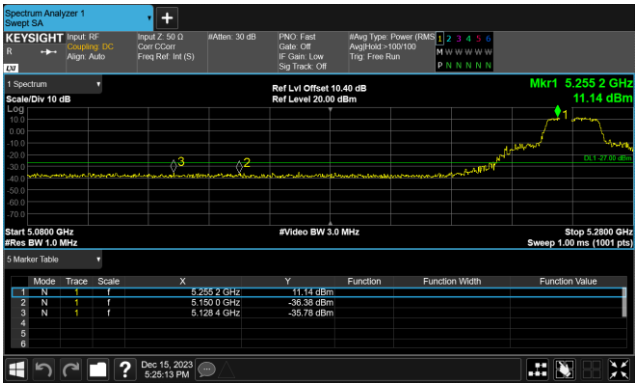
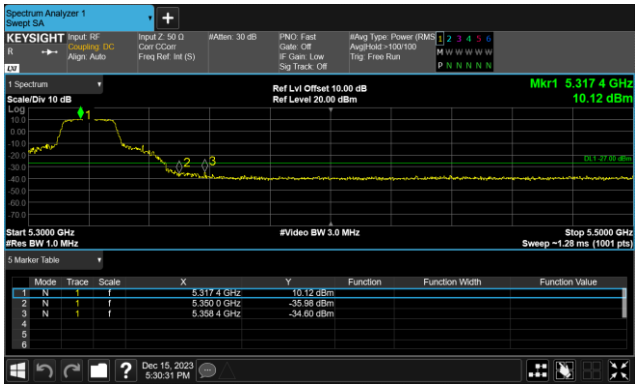
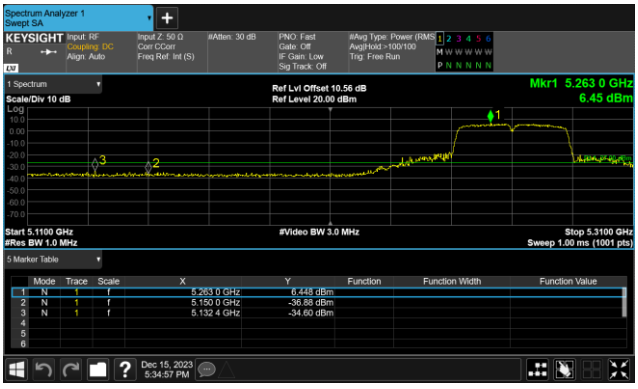
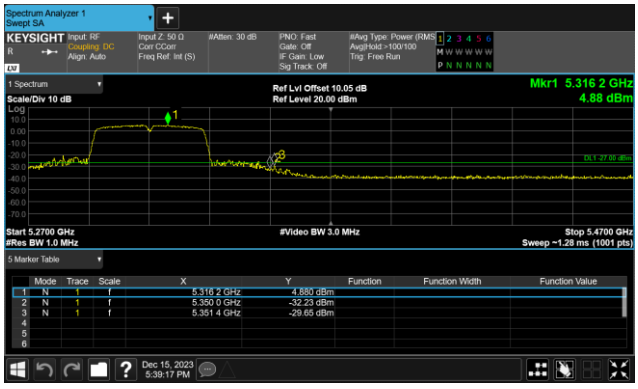
TEST RESULTS

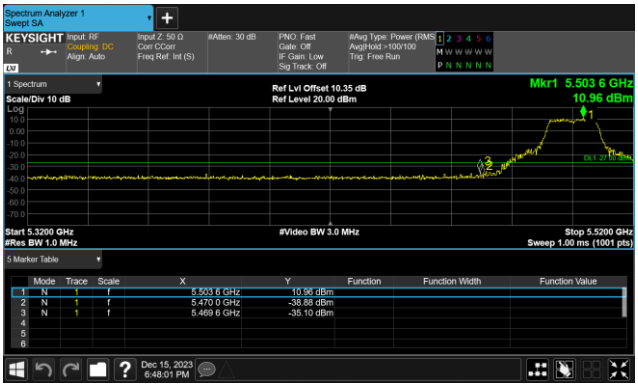
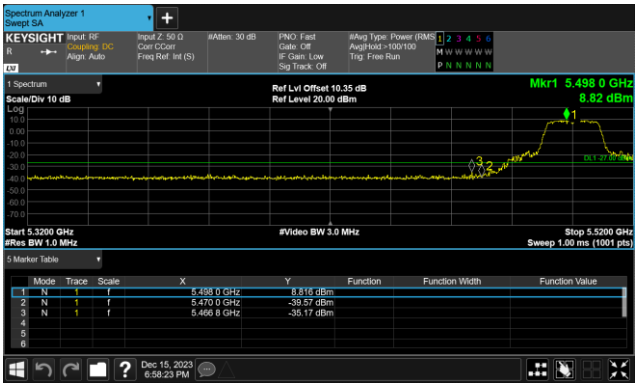
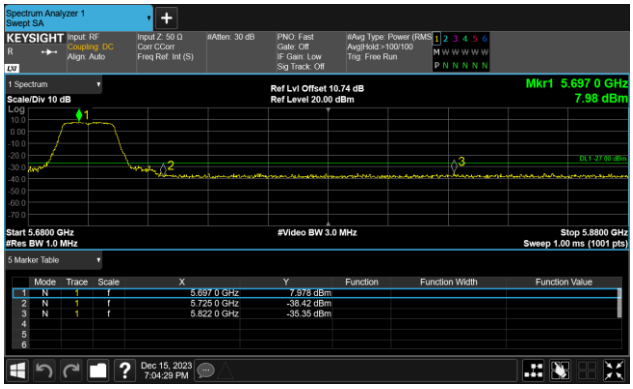
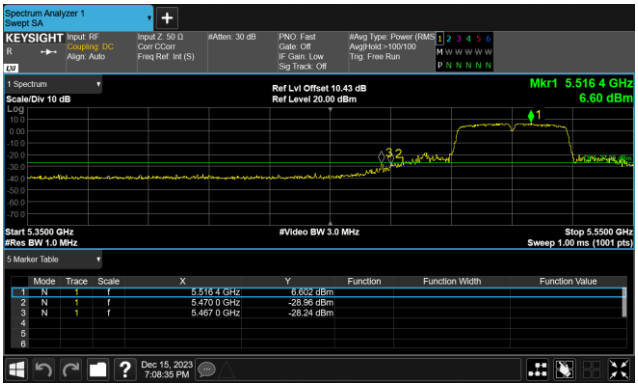
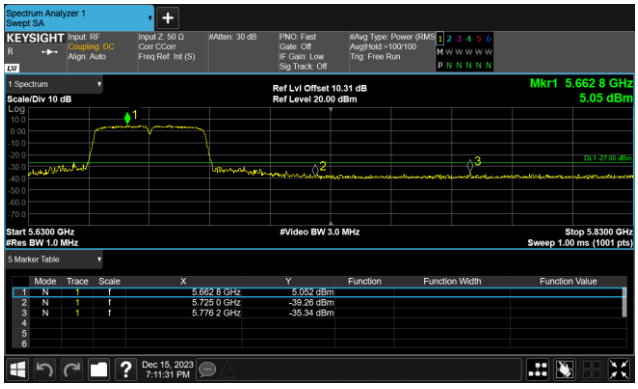
PASS

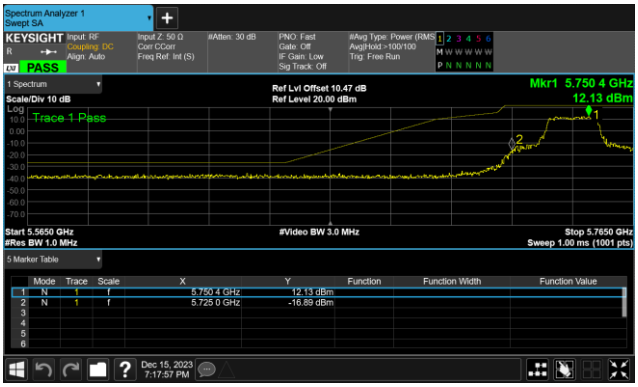
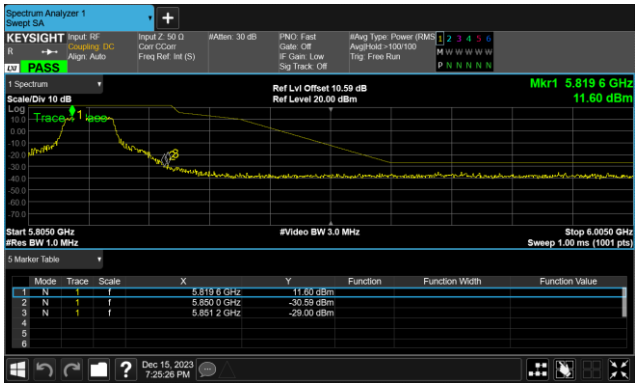
Please refer to following pages.

Note: Antenna gain was considered during the test.

U-NII-1	
IEEE 802.11a Low Channel	IEEE 802.11a High Channel
	
IEEE 802.11n(HT20) Low Channel -ANT 1	IEEE 802.11n(HT20) High Channel -ANT 1
	
IEEE 802.11n(HT40) Low Channel -ANT 1	IEEE 802.11n(HT40) High Channel -ANT 1
	

U-NII-2A	
IEEE 802.11a Low Channel	IEEE 802.11a High Channel
	
IEEE 802.11n(HT20) Low Channel -ANT 1	IEEE 802.11n(HT20) High Channel -ANT 1
	
IEEE 802.11n(HT40) Low Channel -ANT 1	IEEE 802.11n(HT40) High Channel -ANT 1
	

U-NII-2C	
IEEE 802.11a Low Channel	IEEE 802.11a High Channel
	
IEEE 802.11n(HT20) Low Channel -ANT 1	IEEE 802.11n(HT20) High Channel -ANT 1
	
IEEE 802.11n(HT40) Low Channel -ANT 1	IEEE 802.11n(HT40) High Channel -ANT 1
	

U-NII-3	
IEEE 802.11a Low Channel	IEEE 802.11a High Channel
	
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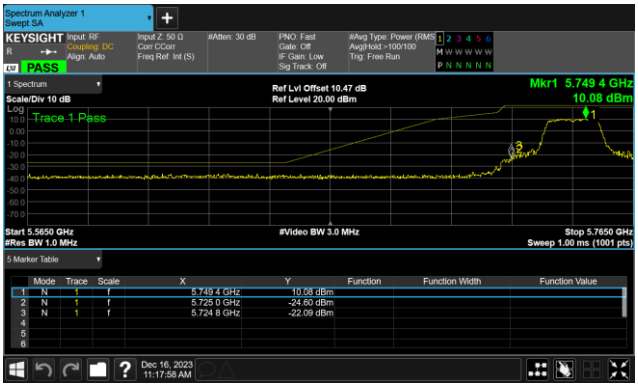	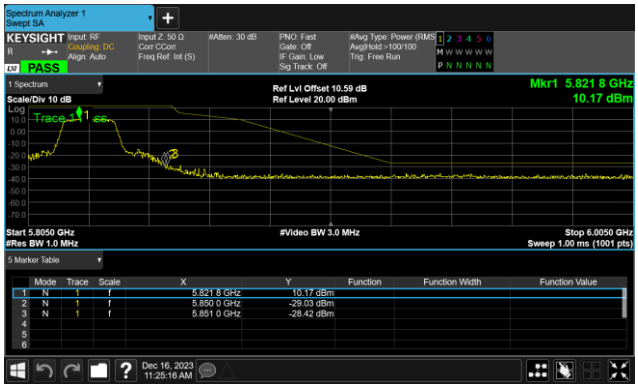
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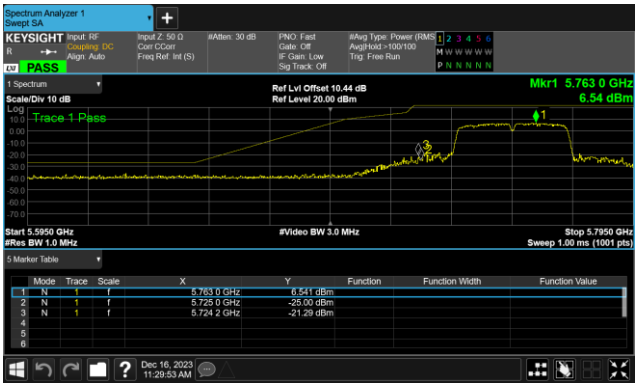
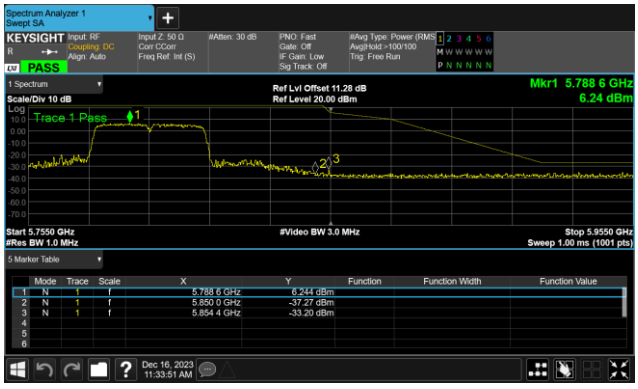
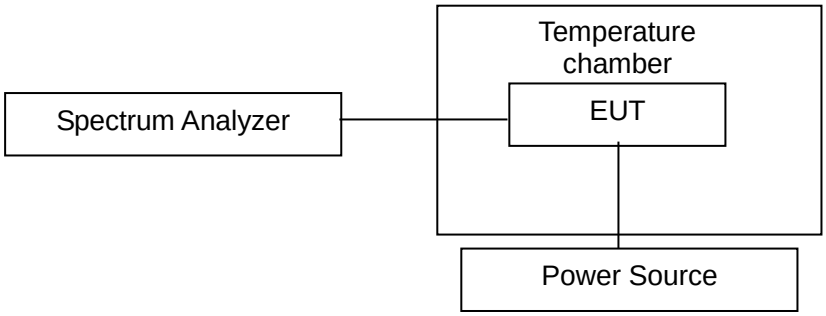
	

14.7 Frequency Stability

LIMITS

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.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

a. The EUT was placed inside the environmental test chamber and powered by Power source.

b. Turn the EUT on and couple its output to a spectrum analyzer.

c. Turn the EUT off and set the chamber to the highest temperature specified.

d. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT on and measure the operating frequency after 2, 5, and 10 minutes

e. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.

f. The chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

Note: The EUT set at un-modulation mode during frequency stability test.

TEST RESULTS

PASS

Please refer to the following pages.

U-NII-1						
Lowest channel / 5180MHz						
Temperature (℃)	Power Supplied (Vdc)	Measured Frequency (MHz)				Test Result
		0 Minute	2 Minute	5 Minute	10 Minute	
-10	Power Supplied (Vdc)	5180.100	5179.971	5179.973	5180.100	Pass
0		5179.978	5180.100	5179.981	5179.973	Pass
20		5180.100	5179.972	5180.100	5180.100	Pass
40		5179.978	5179.973	5179.975	5179.978	Pass
20	3.33	5180.100	5179.978	5180.100	5180.100	Pass
20	4.07	5179.979	5180.100	5180.100	5179.975	Pass
Highest channel / 5240MHz						
Temperature (℃)	Power Supplied (Vdc)	Measured Frequency (MHz)				Test Result
		0 Minute	2 Minute	5 Minute	10 Minute	
-10	Power Supplied (Vdc)	5240.100	5239.975	5240.101	5239.784	Pass
0		5240.100	5239.979	5240.100	5240.100	Pass
20		5239.978	5239.982	5239.979	5240.100	Pass
40		5240.100	5239.974	5240.100	5240.100	Pass
20	3.33	5239.982	5239.983	5239.979	5240.101	Pass
20	4.07	5240.100	5239.999	5239.980	5239.978	Pass

Note: EUT temperature working range is -10 to 40℃.

U-NII-2A						
Lowest channel / 5260MHz						
Temperature (℃)	Power Supplied (Vdc)	Measured Frequency (MHz)				Test Result
		0 Minute	2 Minute	5 Minute	10 Minute	
-10	Power Supplied (Vdc)	5260.100	5259.973	5259.974	5259.976	Pass
0		5260.101	5259.981	5260.100	5260.100	Pass
20		5259.996	5259.982	5260.100	5259.973	Pass
40		5259.998	5259.970	5260.100	5260.100	Pass
20	3.33	5260.100	5259.978	5259.978	5259.976	Pass
20	4.07	5259.998	5259.972	5259.981	5260.100	Pass
Highest channel / 5320MHz						
Temperature (℃)	Power Supplied (Vdc)	Measured Frequency (MHz)				Test Result
		0 Minute	2 Minute	5 Minute	10 Minute	
-10	Power Supplied (Vdc)	5320.080	5320.080	5319.978	5320.080	Pass
0		5319.996	5319.977	5319.979	5319.976	Pass
20		5319.995	5320.080	5320.080	5319.969	Pass
40		5319.998	5319.981	5319.979	5320.080	Pass
20	3.33	5320.080	5320.080	5320.080	5320.080	Pass
20	4.07	5319.983	5319.978	5319.981	5320.080	Pass

Note: EUT temperature working range is -10 to 40℃.

U-NII-2C						
Lowest channel / 5500MHz						
Temperature (℃)	Power Supplied (Vdc)	Measured Frequency (MHz)				Test Result
		0 Minute	2 Minute	5 Minute	10 Minute	
-10	Power Supplied (Vdc)	5500.100	5499.965	5499.980	5500.100	Pass
0		5499.971	5499.976	5500.100	5500.100	Pass
20		5500.100	5499.981	5500.100	5499.970	Pass
40		5499.976	5500.100	5500.100	5499.968	Pass
20	3.33	5500.100	5499.983	5499.963	5499.978	Pass
20	4.07	5499.982	5499.979	5499.980	5500.100	Pass
Highest channel / 5700MHz						
Temperature (℃)	Power Supplied (Vdc)	Measured Frequency (MHz)				Test Result
		0 Minute	2 Minute	5 Minute	10 Minute	
-10	Power Supplied (Vdc)	5700.100	5700.100	5699.964	5700.100	Pass
0		5699.968	5699.982	5699.985	5699.962	Pass
20		5700.100	5699.973	5700.100	5699.976	Pass
40		5700.100	5699.969	5700.100	5699.969	Pass
20	3.33	5699.984	5699.983	5699.972	5699.984	Pass
20	4.07	5700.100	5699.981	5700.100	5699.975	Pass

Note: EUT temperature working range is -10 to 40℃.

U-NII-3						
Lowest channel / 5745MHz						
Temperature (℃)	Power Supplied (Vdc)	Measured Frequency (MHz)				Test Result
		0 Minute	2 Minute	5 Minute	10 Minute	
-10	Power Supplied (Vdc)	5745.100	5744.976	5744.966	5745.100	Pass
0		5744.976	5744.969	5744.967	5745.100	Pass
20		5745.100	5744.966	5745.100	5744.980	Pass
40		5745.100	5745.100	5745.100	5745.100	Pass
20	3.33	5745.100	5745.100	5745.100	5744.977	Pass
20	4.07	5744.977	5744.982	5745.100	5745.100	Pass
Highest channel / 5825MHz						
Temperature (℃)	Power Supplied (Vdc)	Measured Frequency (MHz)				Test Result
		0 Minute	2 Minute	5 Minute	10 Minute	
-10	Power Supplied (Vdc)	5825.100	5824.974	5824.981	5824.988	Pass
0		5824.978	5824.962	5824.982	5824.979	Pass
20		5825.100	5824.975	5824.989	5824.985	Pass
40		5824.981	5825.100	5825.100	5824.981	Pass
20	3.33	5824.981	5824.988	5824.973	5825.100	Pass
20	4.07	5825.100	5824.991	5824.981	5825.100	Pass

Note: EUT temperature working range is -10 to 40℃.

14.8 Radiated Spurious Emissions and Restricted Bands Measurement and Band Edge

LIMIT of Restricted bands

In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below:

Frequency range MHz	Distance Meters	Field Strengths Limit (15.209)
		μV/m
0.009 ~ 0.490	300	2400/F(kHz)
0.490 ~ 1.705	30	24000/F(kHz)
1.705 ~ 30	30	30
30 ~ 88	3	100
88 ~ 216	3	150
216 ~ 960	3	200
Above 960	3	500

Remark: (1) Emission level (dB)μV = 20 log Emission level μV/m

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) As shown in 15.35(b), for frequencies above 1000MHz, the field strength limits are based on average detector, however, the peak field strength of any emission shall not exceed the maximum permitted average limits, specified above by more than 20dB under any condition of modulation.

(4) The frequency range scanned is from the lowest radio frequency signal generated in the device which is greater than 9 kHz to the tenth harmonic of the highest fundamental frequency or 40 GHz, whichever is lower.

(5) §15.407 specifies that emissions which fall in the restricted bands, as defined in §15.205 comply with radiated emission limits specified in §15.209.

LIMIT of Radiated Band Edges and non-restricted bands

For transmitters operating in the 5.15-5.25 GHz band:

All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.25-5.35 GHz band:

All emissions outside of the 5.15-5.35GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.47-5.725 GHz band:

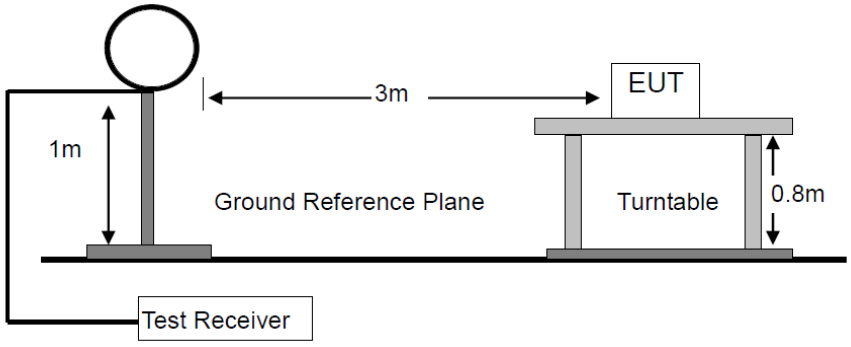
All emissions outside of the 5.47-5.725 GHz band shall not exceed an e.i.r.p. of −27 dBm/MHz.

For transmitters operating in the 5.725-5.85 GHz band:

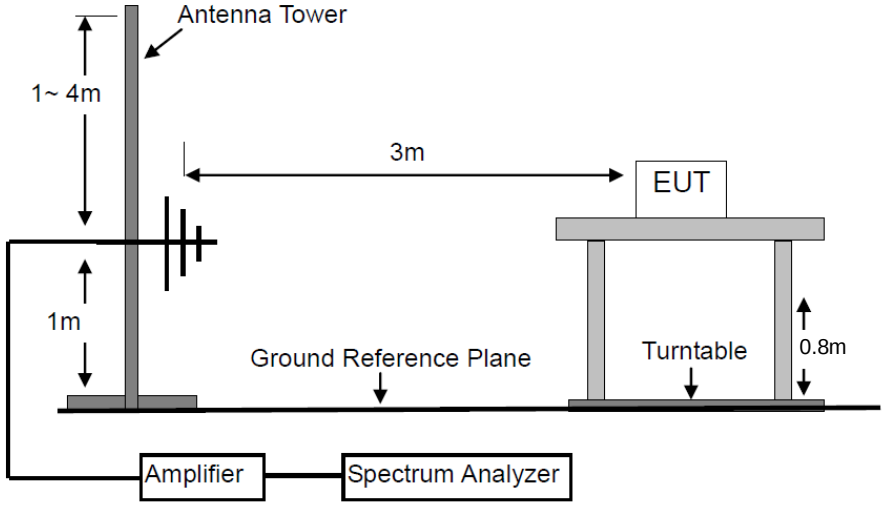
All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27dBm/MHz at the band edge.

BLOCK DIAGRAM OF TEST SETUP

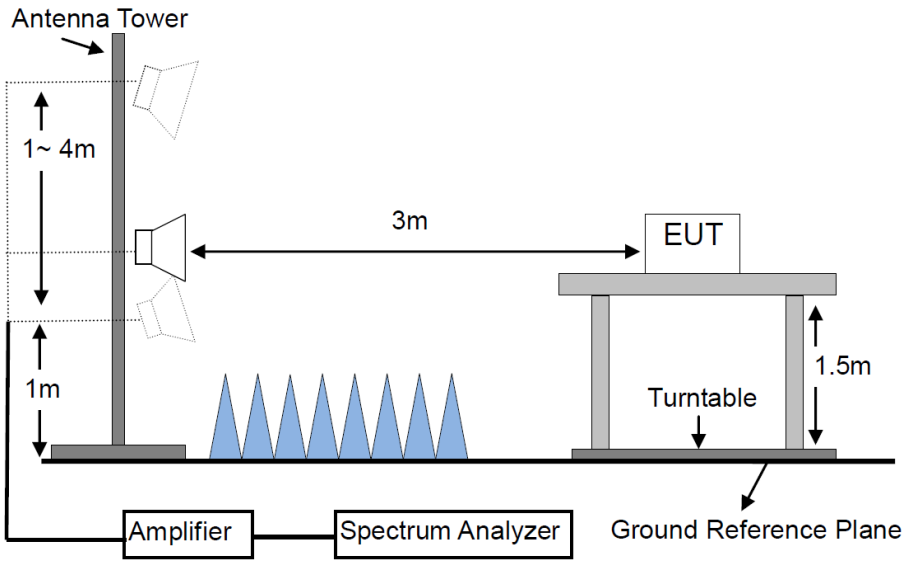
For Radiated Emission below 30MHz



For Radiated Emission 30-1000MHz



For Radiated Emission Above 1000MHz.



TEST PROCEDURES

a. Below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi- anechoic chamber room.

b. For the radiated emission test above 1GHz:

The EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter full anechoic chamber room. The table was rotated 360 degrees to determine the position of the highest radiation. Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

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

d. The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading. The test-receiver system was set to peak detect function and specified bandwidth with maximum hold mode.

f. A Quasi-peak measurement was then made for that frequency point for below 1GHz test. PK and AV for above 1GHz emission test.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Band (MHz)	Detector	Resolution Bandwidth	Video Bandwidth
30 to 1000	QP	120 kHz	300 kHz
Above 1000	Peak	1 MHz	3 MHz
	Average	1 MHz	10 Hz

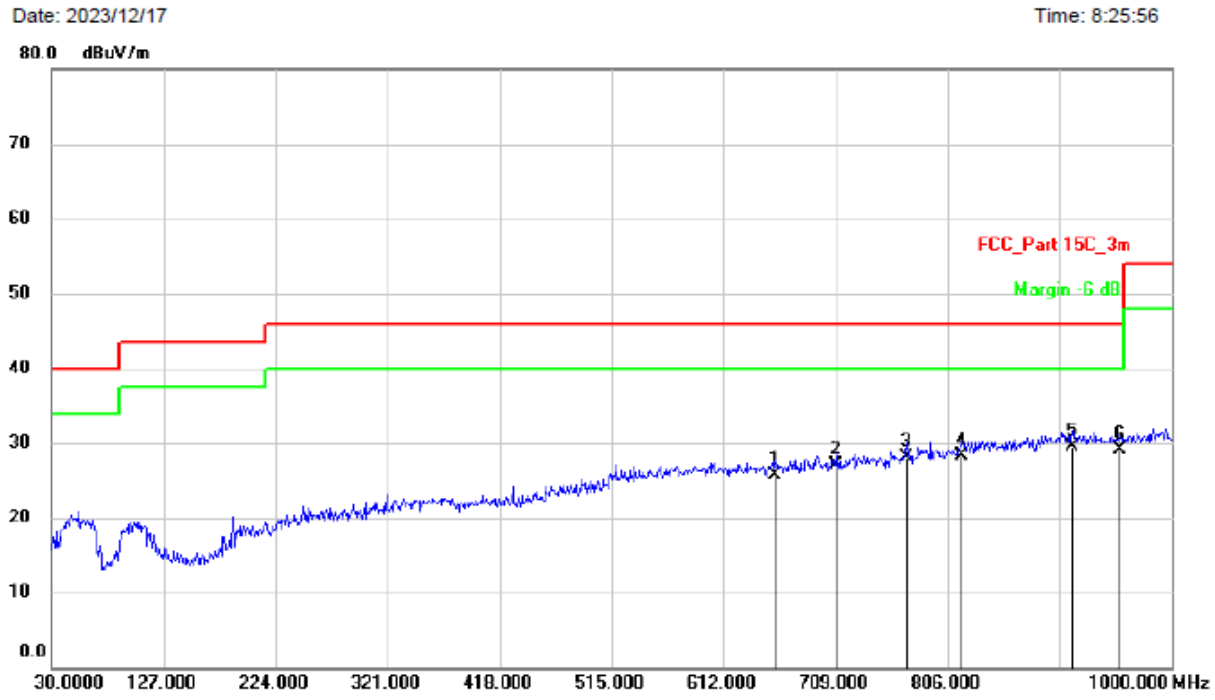
TEST RESULTS

PASS

Please refer to the following pages.

M/N: T8851US	Testing Voltage: DC 3.7V
Polarization: Horizontal	Detector: QP
Test Mode: 2	Distance: 3m

Radiated Emission Measurement

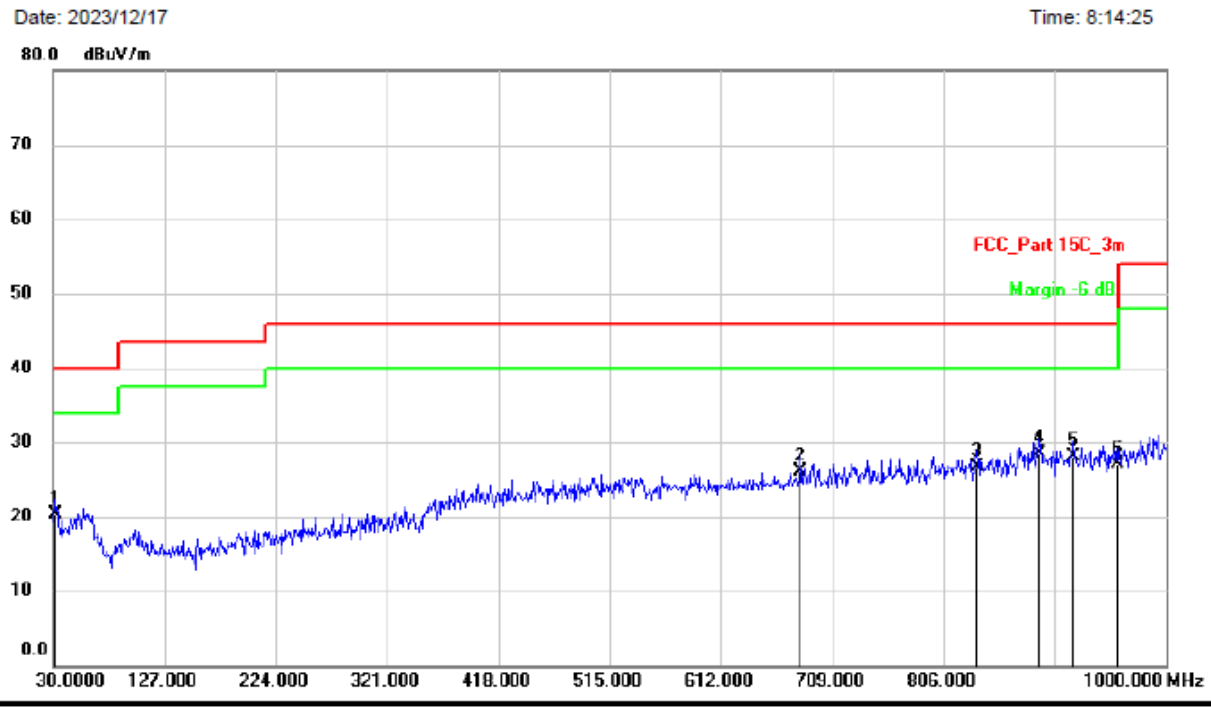


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		656.6200	24.39	1.41	25.80	46.00	-20.20	QP	
2		709.9699	24.75	2.35	27.10	46.00	-18.90	QP	
3		770.1100	24.69	3.41	28.10	46.00	-17.90	QP	
4		818.6100	24.00	4.30	28.30	46.00	-17.70	QP	
5	*	913.6700	23.38	6.22	29.60	46.00	-16.40	QP	
6		955.3800	22.81	6.29	29.10	46.00	-16.90	QP	

Note 1: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

M/N: T8851US	Testing Voltage: DC 3.7V
Polarization: Vertical	Detector: QP
Test Mode: 2	Distance: 3m

Radiated Emission Measurement



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		31.9400	30.00	-9.60	20.40	40.00	-19.60	QP	
2		680.8700	24.36	1.84	26.20	46.00	-19.80	QP	
3		835.1000	22.24	4.56	26.80	46.00	-19.20	QP	
4	*	889.4200	23.55	4.95	28.50	46.00	-17.50	QP	
5		919.4900	23.11	4.99	28.10	46.00	-17.90	QP	
6		957.3200	22.08	5.12	27.20	46.00	-18.80	QP	

Note 1: Below 30MHz, the emissions are lower than 20dB below the allowable limit.

Modulation: N-UII-1(5180-5240 MHz) TX (IEEE 802.11n(HT20) the worst case)				Test Result: PASS			Test frequency range: 1-40GHz			
Freq. (MHz)	Ant. Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV/m)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: TX Mode (Low)										
5150	V	35.24	25.52	6.91	42.15	32.43	68.20	54.00	-26.05	-21.57
10360	V	45.46	---	14.04	59.50	---	68.20	---	-8.70	---
15540	V	32.24	21.05	21.12	53.36	42.17	74.00	54.00	-20.64	-11.83

5150	H	38.14	25.23	6.91	45.05	32.14	68.20	54.00	-23.15	-21.86
10360	H	42.11	---	14.04	56.15	---	68.20	---	-12.05	---
15540	H	32.95	21.05	21.12	54.07	42.17	74.00	54.00	-19.93	-11.83

Operation Mode: TX Mode (Mid)										
10400	V	44.32	---	14.12	58.44	---	68.20	---	-9.76	---
15600	V	33.61	22.05	20.82	54.43	42.87	74.00	54.00	-19.57	-11.13

10400	H	38.96	---	14.12	53.08	---	68.20	---	-15.12	---
15600	H	33.15	21.43	20.82	53.97	42.25	74.00	54.00	-20.03	-11.75

Operation Mode: TX Mode (High)										
10480	V	39.00	---	14.29	53.29	---	68.20	---	-14.91	---
15720	V	34.08	21.82	20.20	54.28	42.02	74.00	54.00	-19.72	-11.98

10480	H	39.24	---	14.29	53.53	---	68.20	---	-14.67	---
15720	H	33.43	22.06	20.20	53.63	42.26	74.00	54.00	-20.37	-11.74

Remark: 1. 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.

Modulation: N-UII-2A(5260-5320 MHz) TX (IEEE 802.11n(HT20) the worst case)		Test Result: PASS					Test frequency range: 1-40GHz			
Freq. (MHz)	Ant. Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV/m)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: TX Mode (Low)										
10520	V	44.87	---	14.37	59.24	---	68.20	---	-8.96	---
15780	V	33.13	21.75	19.91	53.04	41.66	74.00	54.00	-20.96	-12.34

10520	H	40.41	---	14.37	54.78	---	68.20	---	-13.42	---
15780	H	32.49	21.37	19.91	52.40	41.28	74.00	54.00	-21.60	-12.72

Operation Mode: TX Mode (Mid)										
10600	V	38.89	---	14.48	53.37	---	68.20	---	-14.83	---
15900	V	32.19	21.87	19.29	51.48	41.16	74.00	54.00	-22.52	-12.84

10600	H	39.69	---	14.48	54.17	---	68.20	---	-14.03	---
15900	H	32.54	21.1	19.29	51.83	40.39	74.00	54.00	-22.17	-13.61

Operation Mode: TX Mode (High)										
5350	V	36.41	25.71	6.81	43.22	32.52	68.20	54.00	-24.98	-21.48
10640	V	43.28	---	14.53	57.81	---	68.20	---	-10.39	---
15960	V	31.75	21.91	18.99	50.74	40.90	74.00	54.00	-23.26	-13.10

5350	H	37.71	25.71	6.81	44.52	32.52	68.20	54.00	-23.68	-21.48
10640	H	39.37	---	14.53	53.90	---	68.20	---	-14.30	---
15960	H	32.05	21.77	18.99	51.04	40.76	74.00	54.00	-22.96	-13.24

Remark: 1. 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.

Modulation: N-UII-2C(5500-5700 MHz) TX (IEEE 802.11n(HT20) the worst case)				Test Result: PASS			Test frequency range: 1-40GHz			
Freq. (MHz)	Ant. Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV/m)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: TX Mode (Low)										
5460	V	40.60	28.69	6.81	47.41	35.50	68.20	54.00	-20.79	-18.50
11000	V	40.58	28.28	15.03	55.61	43.31	74.00	54.00	-18.39	-10.69
16500	V	33.32	---	19.64	52.96	---	68.20	---	-15.24	---

5460	H	43.79	28.87	6.81	50.60	35.68	68.20	54.00	-17.60	-18.32
11000	H	38.48	24.16	15.03	53.51	39.19	74.00	54.00	-20.49	-14.81
16500	H	33.17	---	19.64	52.81	---	68.20	---	-15.39	---

Operation Mode: TX Mode (Mid)										
11200	V	35.87	25.26	15.77	51.64	41.03	74.00	54.00	-22.36	-12.97
16800	V	33.58	---	20.73	54.31	---	68.20	---	-13.89	---

11200	H	34.88	21.97	15.77	50.65	37.74	74.00	54.00	-23.35	-16.26
16800	H	32.39	---	20.73	53.12	---	68.20	---	-15.08	---

Operation Mode: TX Mode (High)										
11400	V	33.30	21.03	16.52	49.82	37.55	74.00	54.00	-24.18	-16.45
17100	V	32.53	---	21.78	54.31	---	68.20	---	-13.89	---

11400	H	32.40	21.05	16.52	48.92	37.57	74.00	54.00	-25.08	-16.43
17100	H	32.68	---	21.78	54.46	---	68.20	---	-13.74	---

Remark: 1. 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.

Modulation: N-UII-3 (5745-5825 MHz) TX (IEEE 802.11n(HT20) the worst case)		Test Result: PASS					Test frequency range: 1-40GHz			
Freq. (MHz)	Ant. Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV/m)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: TX Mode (Low)										
11490	V	33.88	21.75	16.86	50.74	38.61	74.00	54.00	-23.26	-15.39
17235	V	33.29	---	22.28	55.57	---	68.20	---	-12.63	---

11490	H	33.05	22.05	16.86	49.91	38.91	74.00	54.00	-24.09	-15.09
17235	H	33.40	---	22.28	55.68	---	68.20	---	-12.52	---

Operation Mode: TX Mode (Mid)										
11570	V	35.77	24.68	17.01	52.78	41.69	74.00	54.00	-21.22	-12.31
17355	V	33.12	---	22.56	55.68	---	68.20	---	-12.52	---

11570	H	34.32	24.26	17.01	51.33	41.27	74.00	54.00	-22.67	-12.73
17355	H	33.61	---	22.56	56.17	---	68.20	---	-12.03	---

Operation Mode: TX Mode (High)										
11650	V	33.90	23.73	17.16	51.06	40.89	74.00	54.00	-22.94	-13.11
17475	V	31.88	---	23.01	54.89	---	68.20	---	-13.31	---

11650	H	36.24	25.15	17.16	53.40	42.31	74.00	54.00	-20.60	-11.69
17475	H	32.65	---	23.01	55.66	---	68.20	---	-12.54	---

Remark: 1. 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.

14.9 Dynamic Frequency Selection

List of Measurement and Examinations

EUT Operational mode:

DFS Operational mode	Operating Frequency Range	
	U-NII-2A	U-NII-2C
Slave without radar Interference detection function	√	√

Devices with radar detection

Maximum Transmit Power	Value (See Note 1 and 2)
≥200 mw	-64 dBm
EIRP < 200 mw and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 mw that do not meet the power spectral density requirement	-64 dBm

Note:
1. This is the level at the input of the receiver assuming a 0 dBi receive antenna.
2. Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response.
3. EIRP is based on the highest antenna gain. For MIMO devise refer to KDB Publication 662911 D01.

Applicability of DFS requirements prior to use of a channel

Requirement Radar	Operational Mode		
	Master	Client without Radar Detecion	Client with Radar Detection
Non-Occupancy Period	√	Not required	Yes
DFS Detection Threshold	√	Not required	Yes
Channel Availability Check Time	√	Not required	Not Required
U-NII Detection Bandwidth	√	Not required	Yes

Note: Regarding KDB 905462 D03 Client Without DFS New Rules section (b)(5/6), If the client moves with the master, the device is considered compliant if nothing appears in the client non- occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear. An analyzer plot that contains a single 30-minute sweep on the original channel.

Applicability of DFS requirements during normal operation

Requirement Radar	Operational Mode		
	Master	Client without Radar Detection	Client with Radar Detection
DFS Detection Threshold	√	Not required	Yes
Channel Closing Transmission Time	√	Yes	Yes
Channel Move Time	√	Yes	Yes
U-NII Detection Bandwidth	√	Not required	Yes
Note: Regarding KDB 905462 D03 Client Without DFS New Rules section (b)(5/6), If the client moves with the master, the device is considered compliant if nothing appears in the client non- occupancy period test. For devices that shut down (rather than moving channels), no beacons should appear. An analyzer plot that contains a single 30-minute sweep on the original channel.			

Additional requirements for devices with multiple bandwidth modes	Master or Client with radar detection	Client without radar detection
U-NII Detection Bandwidth and Statistical Performance Check	All BW modes must be tested	Not required
Channel Move Time and Channel Closing Channel Move Time and Channel Closing Transmission Time	Test using widest BW mode available	Test using the widest Test using the widest BW mode available for the link
All other	Any single BW mode	Not required
Note: Frequencies selected for statistical performance check (Section 7.8.4) should include several frequencies within the radar detection bandwidth and frequencies near the edge of the radar detection bandwidth. For 802.11 devices it is suggested to select frequencies in each of the bonded 20 MHz channels and the channel center frequency.		

DFS Radar Signal Parameter Values:

Parameter	Value
Non-occupancy period	Minimum 30 minutes
Channel Availability Check Time	60 seconds
Channel Move Time	10 seconds (See Note 1)
Channel Closing Transmission Time	200 milliseconds + an aggregate of 60ms over remaining 10 second period (See Notes 1 and 2)
U-NII Detection Bandwidth	Minimum 100% of the U-NII 99% transmission power bandwidth (See Note 3.)

Note:
1. Channel Move Time and the Channel Closing Transmission Time should be performed with Radar Type 0. The measurement timing begins at the end of the Radar Type 0 burst.
2. The Channel Closing Transmission Time is comprised of 200 milliseconds starting at the beginning of the Channel Move Time plus any additional intermittent control signals required to facilitate a Channel move (an aggregate of 60 milliseconds) during the remainder of the 10 second period. The aggregate duration of control signals will not count quiet periods in between transmissions.
3. During the U-NII Detection Bandwidth detection test, radar type 0 should be used. For each frequency step the minimum percentage of detection is 90 percent. Measurements are performed with no data traffic.

DFS Radar Signal Parameter:

Radar Type 0 was used in the evaluation of the Client device for the purpose of measuring the Channel Move Time and the Channel Closing Transmission Time

Table 1: Short Pulse Radar Test Waveforms

Radar Type	Pulse Width (μsec)	PRI (μsec)	Number of Pulses	Minimum Percentage of Successful Detection	Minimum Trials
0	1	1428	18	See Note 1	See Note 1
1	1	Test A, Test B	$\text{Roundup}\left\{\left(\frac{1}{360}\right)\left(\frac{19\cdot 10^6}{\text{PRI}_{\mu sec}}\right)\right\}$	60%	30
2	1-5	150-230	23-29	60%	30
3	6-10	200-500	16-18	60%	30
4	11-20	200-500	12-16	60%	30
Aggregate (Radar Types 1-4)				80%	120

Note: Short Pulse Radar Type 0 should be used for the detection bandwidth test, channel move time, and channel closing time tests.

Test A: 15 unique PRI values randomly selected from the list of 23 PRI values in Table 5a

Test B: 15 unique PRI values randomly selected within the range of 518-3066 μsec, with a minimum increment of 1 μsec, excluding PRI values selected in Test A.

Remark1: A minimum of 30 unique waveforms are required for each of the Short Pulse Radar Types 2 through 4. If more than 30 waveforms are used for Short Pulse Radar Types 2 through 4, then each additional waveform must also be unique and not repeated from the previous waveforms.

Remark2: If more than 30 waveforms are used for Short Pulse Radar Type 1, then each additional waveform is generated with Test B and must also be unique and not repeated from the previous waveforms in Tests A or B.

Remark3: The aggregate is the average of the percentage of successful detections of short pulse radar types 1-4.

Table 2: Long Pulse Radar Test Waveform

Radar Type	Pulse Width (μsec)	Chirp Width (MHz)	PRI (μsec)	Number of Pulses per Burst	Number of Bursts	Minimum Percentage of Successful Detection	Minimum Trials
5	50-100	5-20	1000-2000	1-3	8-20	80%	30

Table 3: Frequency Hopping Radar Test Waveform

Radar Type	Pulse Width (μsec)	PRI (μsec)	Pulses per Hop	Hopping Rate (kHz)	Hopping Sequence Length (msec)	Minimum Percentage of Successful Detection	Minimum Trials
6	1	333	9	0.333	300	70%	30

In-Service Monitoring: Channel Move Time, Channel Closing Transmission Time and Non-Occupancy Period

Limit of In-Service Monitoring

Reference to DFS Radar Signal Parameter Values.

Test Procedures

One frequency will be chosen from the Operating Channels of the EUT within the 5250-5350 MHz or 5470-5725 MHz bands. For 802.11 devices, the test frequency must contain control signals. This can be verified by disabling channel loading and monitoring the spectrum analyzer. If no control signals are detected, another frequency must be selected within the emission bandwidth where control signals are detected.

In case the EUT is a Master Device, a U-NII device operating as a Client Device will be used and it is assumed that the Client will associate with the EUT (Master). For radiated tests, the emissions of the Radar Waveform generator will be directed towards the Master Device. If the Master Device has antenna gain, the main beam of the antenna will be directed toward the radar emitter. Vertical polarization is used for testing.

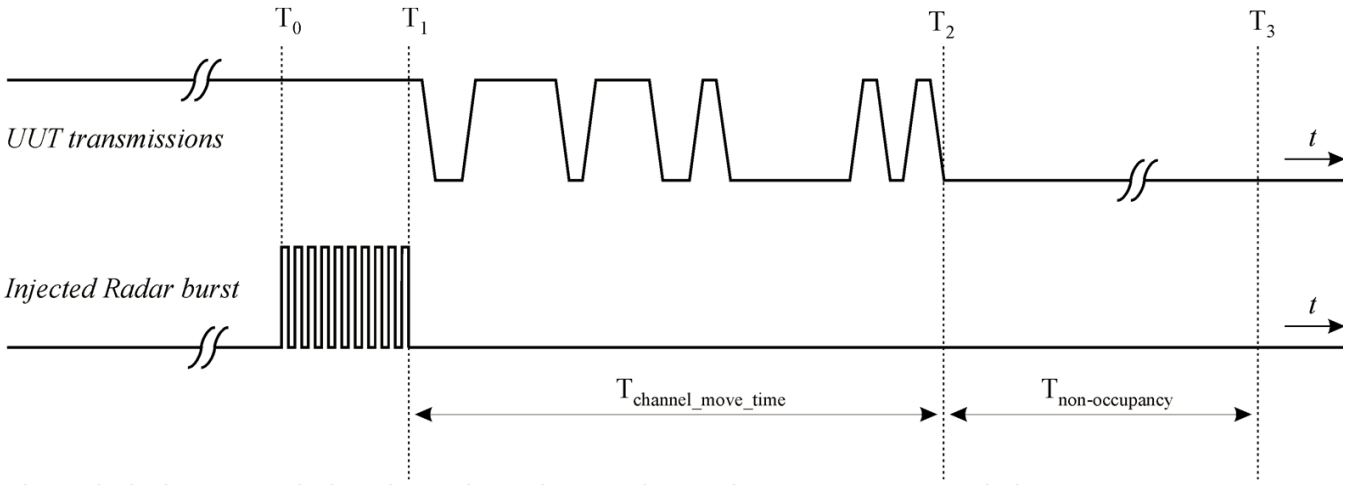
The TCP protocol unicast data stream was generated by the iperf software command line with at least 17% activity ratio over any 100ms period.

Timing plots are reported with calculations demonstrating a minimum channel loading of approximately 17% or greater. For example, channel loading can be estimated by setting the spectrum analyzer for zero span and approximate the Time On/ (Time On + Off Time).

At time T0 the Radar Waveform generator sends a Burst of pulses for one of the Short Pulse Radar Types 1-4 at DFS Detection Threshold levels on the Operating Channel. An additional 1dB is added to the radar test signal to ensure it is at or above the DFS Detection Threshold, accounting for equipment variations/errors.

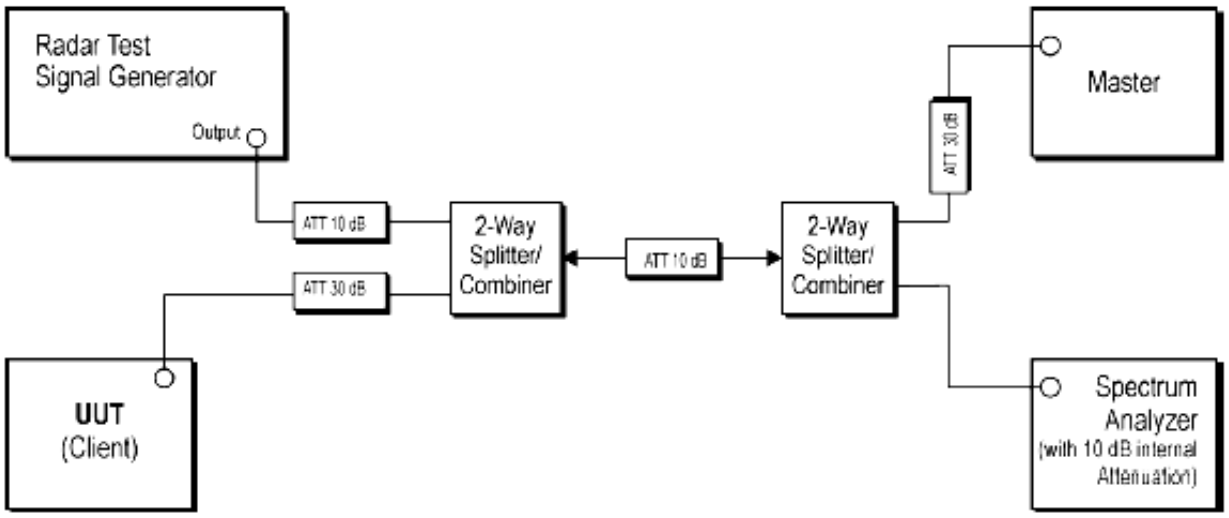
Observe the transmissions of the EUT at the end of the radar Burst on the Operating Channel for duration greater than 10 seconds. Measure and record the transmissions from the EUT during the observation time (Channel Move Time). Measure and record the Channel Move Time and Channel Closing Transmission Time if radar detection occurs.

When operating as a Master Device, monitor the EUT for more than 30 minutes following instant T2 to verify that the EUT does not resume any transmissions on this Channel. Perform this test once and record the measurement result.



Channel Closing Transmission Time, Channel Move Time and Non-Occupancy Period

Test Set-Up



Setup for Client with injection at the Master

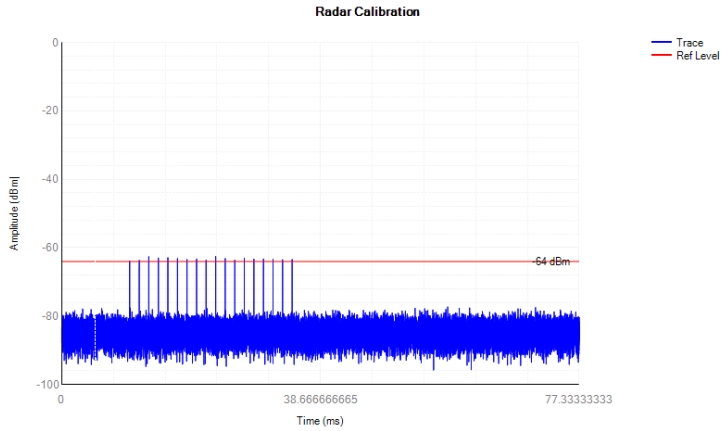
Measurement Results

Pass

Please refer to following plots of the worst case.

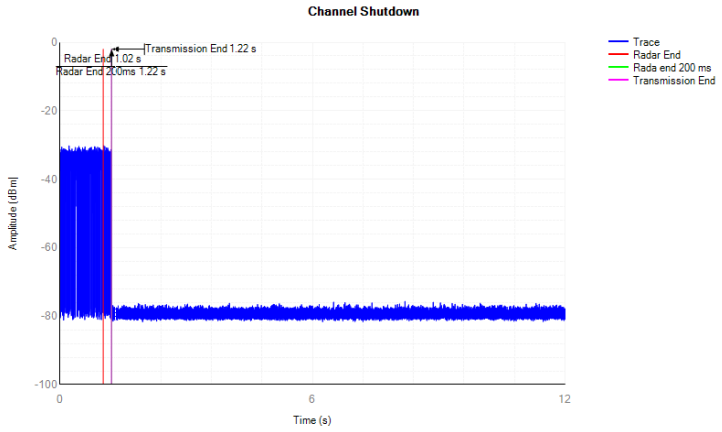
Channel	Test Item	Test Result	Limit	Pass/Fail
5280MHz	Channel Move Time	1.22 s	＜10s	Pass
	Channel Closing Transmission Time	188.1ms	＜200+60ms	Pass
	Non-Occupancy Period	No transmission	30 minutes	Pass

Radar Waveform Calibration Plot - 5280MHz

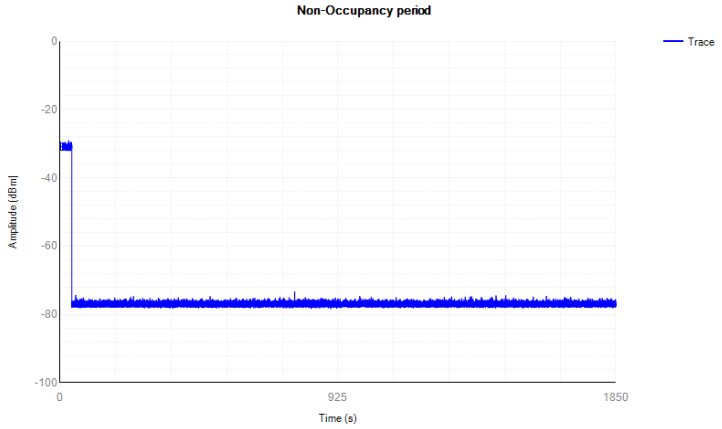


The Worst Case - 5280MHz

Channel Move Time & Channel Closing Transmission Time Plot

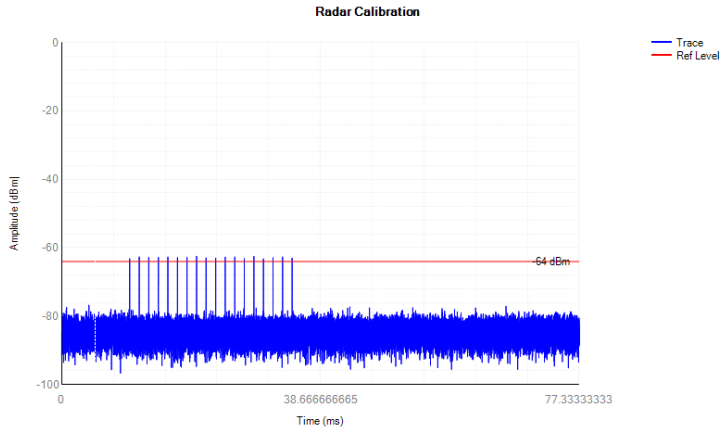


Non-Occupancy Period Plot



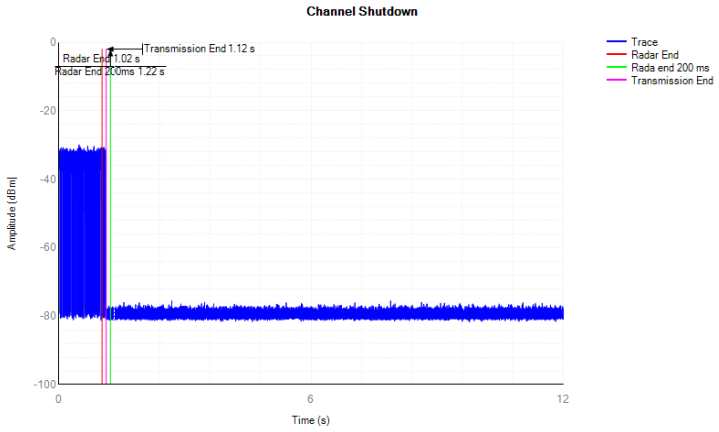
Channel	Test Item	Test Result	Limit	Pass/Fail
5290MHz	Channel Move Time	1.12 s	＜10s	Pass
	Channel Closing Transmission Time	92.7 ms	＜200+60ms	Pass
	Non-Occupancy Period	No transmission	30 minutes	Pass

Radar Waveform Calibration Plot - 5290MHz

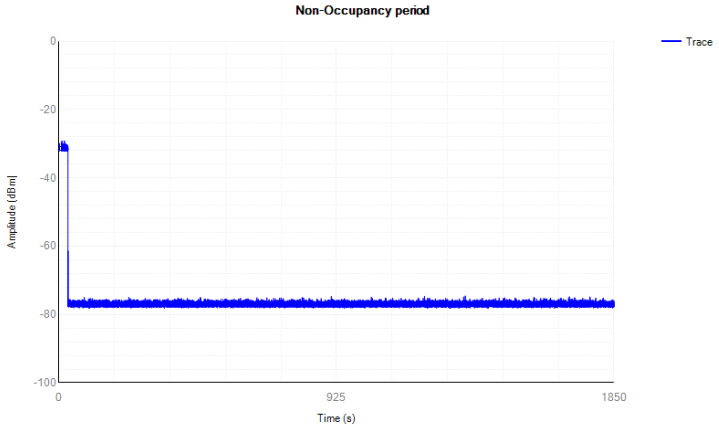


The Worst Case - 5290MHz

Channel Move Time & Channel Closing Transmission Time Plot

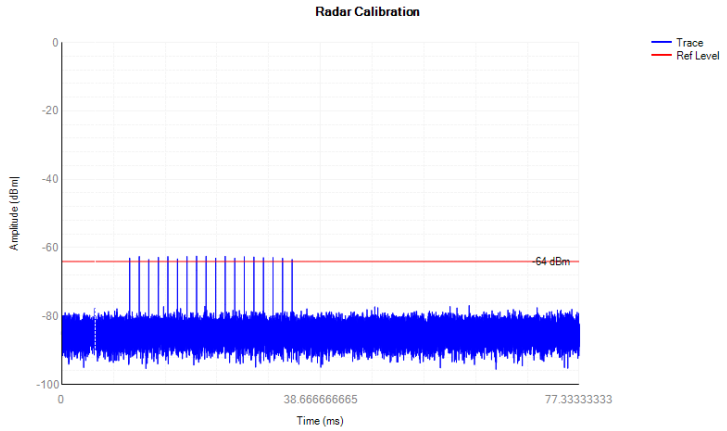


Non-Occupancy Period Plot



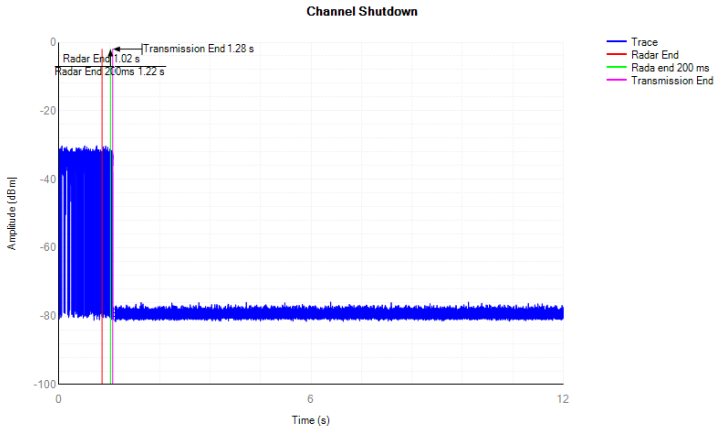
Channel	Test Item	Test Result	Limit	Pass/Fail
5530MHz	Channel Move Time	1.28 s	＜10s	Pass
	Channel Closing Transmission Time	241.8 ms	＜200+60ms	Pass
	Non-Occupancy Period	No transmission	30 minutes	Pass

Radar Waveform Calibration Plot - 5530MHz

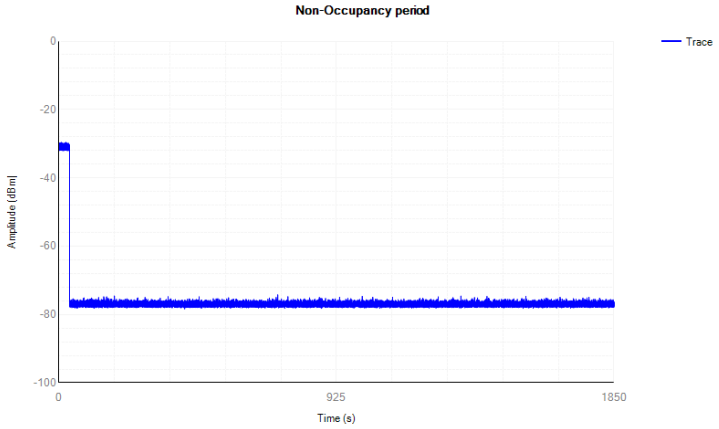


The Worst Case - 5530MHz

Channel Move Time & Channel Closing Transmission Time Plot



Non-Occupancy Period Plot



14.10 Antenna Requirement

STANDARD APPLICABLE

According to of FCC part 15C section 15.203:

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. The structure and application of the EUT were analyzed to determine compliance with section 15.203 of the rules.

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

ANTENNA CONNECTED CONSTRUCTION

The antenna is PCB antenna that no antenna other than furnished by the responsible party shall be used with the device, and the best case gain of the antenna is -1.81dBi, Therefore, the antenna is considered to meet the requirement.

15. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 13, 2023	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 23, 2022	2 Year
3.	Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 13, 2023	1 Year
4.	Spectrum Analyzer	Keysight	N9020A	MY54200831	Mar. 13, 2023	1 Year
5.	Spectrum Analyzer	Rohde & Schwarz	FSV40	101094	Mar. 13, 2023	1 Year
6.	Horn Antenna	Schwarzbeck	BBHA9170	9170-172	Mar. 23, 2022	2 Year
7.	Power Sensor	DARE	RPR3006W	15I00041SNO64	Mar. 13, 2023	1 Year
8.	Communication Tester	Rohde & Schwarz	CMW500	149004	Mar. 13, 2023	1 Year
9.	Horn Antenna	COM-Power	AH-118	071078	Mar. 23, 2022	2 Year
10.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 13, 2023	1 Year
11.	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 13, 2023	1 Year
12.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	Mar. 23, 2022	2 Year
13.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 13, 2023	1 Year
14.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2023	1 Year
15.	L.I.S.N	Rohde & Schwarz	ESH2-Z5	893606/014	Mar. 13, 2023	1 Year
16.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 13, 2023	1 Year
17.	Temperature & Humidity Chamber	REMAFEE	SYHR225L	N/A	Mar. 13, 2023	1 Year
18.	DC Source	Maynuo	MY8811	N/A	Mar. 13, 2023	1 Year
19.	Temporary antenna connector	TESCOM	SS402	N/A	N/A	N/A
20.	Chamber	SAEMC	9*7*7m	N/A	Apr. 21, 2023	2 Year
21.	Test Software	EZ	EZ_EMC	N/A	N/A	N/A
22.	Master AP	ZTE Corporation	ZXHN H198A (FCC ID: Q78-ZXHNH198A)	N/A	N/A	N/A

Note: For photographs of EUT and measurement, please refer to appendix in separate documents.

---End---