

FCC Part 15C Test Report

FCC ID: 2A3YA-O24

Applicant: Naviter d.o.o.
Address: PLANINA 3
Manufacturer: Naviter d.o.o.
Address: PLANINA 3
EUT: GPS NAVIGATOR
Trade Mark: NAVITER
Model Number: O24
O25, O26, O31, P71, P72
Prepared By: BTF Testing Lab (Shenzhen) Co., Ltd.
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Report Number: BTF240508R00301
FCC PART 15 C 15.407
Test Standards: ANSI C63.10:2013
KDB 789033 D02 v01r02
KDB 905462 D03 v01r02
Test Conclusion: Pass
Test Date: Apr. 23, 2024 – May. 23, 2024
Date of Issue: May. 23, 2024

Prepared By:



Elma.yang / Project Engineer

Date:

May 23, 2024

Approved By:


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Date: May. 23, 2024

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1. SUMMARY OF TEST RESULTS

Test procedures according to the technical standards:

FCC Part15 (15.407) , Subpart C			
Standard Section	Test Item	Judgment	Remark
15.207 15.407 (b)	Conducted Emission	PASS	
15.407(b), 15.209	Radiated Spurious Emission	PASS	
15.407 (b)	Band Edge Emission	PASS	
15.407 (a)	Peak Output Power	PASS	
15.407 (a)	Power Spectral Density	PASS	
15.407(a) 15.407(h)	26dB bandwidth and 99%dB Bandwidth 6dB bandwidth and 99%dB Bandwidth	PASS	
15.407(g)	Frequency Stability	PASS	
15.407(h)	Transmission in case of Absence of Information	PASS	
15.203	Antenna Requirement	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

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FCC Registration Number: 518915
Designation Number: CN1330

1.1 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	Uncertainty
1	Conducted Emission Test	$\pm 2.56\text{dB}$
2	RF power,conducted	$\pm 0.42\text{dB}$
3	Spurious emissions,conducted	$\pm 2.76\text{dB}$
4	All emissions,radiated(30MHz-1G)	$\pm 3.65\text{dB}$
5	All emissions,radiated(9kHz-30MHz)	$\pm 3.66\text{dB}$
6	All emissions,radiated(>1G)	$\pm 4.89\text{dB}$
7	Temperature	$\pm 0.5^{\circ}\text{C}$
8	Humidity	$\pm 2\%$
9	Frequency	$\pm 20\text{Hz}$
10	Bandwidth	$\pm 0.21\text{MHz}$

2. GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product Name:	GPS NAVIGATOR
Trademark	NAVITER
Model No.:	O24 O25, O26, O31, P71, P72
Model Difference	The product's different for model number and appearance color.
Operation Frequency:	5260-5320MHz(802.11a/ac/n(HT20)) 5270-5310MHz(802.11ac/n(HT40)) 5290MHz (802.11ac80)
Channel numbers:	See channel list
Channel separation:	20MHz for 802.11a/ac/n(HT20) 40MHz for 802.11ac/n(HT40) 80MHz for 802.11ac80
Modulation technology:	802.11a/n:OFDM(64QAM, 16QAM, QPSK, BPSK) 802.11ac: OFDM(256QAM, 64QAM, 16QAM, QPSK, BPSK)
Rate of Transmitter	802.11a: 6Mbps, 9Mbps, 12Mbps, 18Mbps, 24Mbps, 36Mbps, 48Mbps,54Mbps 802.11n: Up to 300Mbps 802.11ac: up to 867Mbps
Antenna Type:	Internal Antenna
Antenna gain:	3.25dBi
Power supply:	DC 5V from charger DC 3.7V from battery

Note:

- 1.For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.
- 2.The EUT's all information provided by client.

2. Channel List

U-NII-2A

802.11a/ac/n(HT20)			
Channel	Frequency (MHz)	Channel	Frequency (MHz)
52	5260	60	5300
56	5280	64	5320

802.11ac/n(HT40)				802.11ac(HT80)	
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
54	5270	62	5310	58	5290

2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

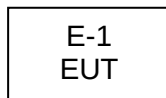
Description		
Pretest Mode	Channel	Band 2
Mode 1	802.11a/ac/n HT20	CH52, CH56, CH64
Mode 2	802.11n/ac HT40	CH54, CH62
Mode 3	802.11ac HT80	CH58
Mode 4	Other	Link Mode

For Radiated Emission		
Pretest Mode	Channel	Band 2
Mode 1	802.11a/ac/n HT20	CH52, CH56, CH64
Mode 2	802.11n/ac HT40	CH54, CH62
Mode 3	802.11ac HT80	CH58
Mode 4	Other	Link Mode

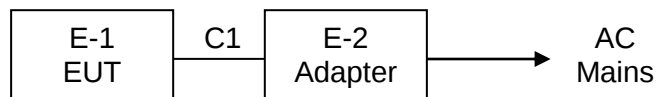
Note: 1. The measurements are performed at the highest, middle, lowest available channels.

2.3 BLOCK DIGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED

Radiated Spurious Emission Test



Conducted Spurious Emission Test



2.4 DESCRIPTION OF SUPPORT UNITS(CONDUCTED MODE)

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Model/Type No.	Series No.	Note
E-1	GPS NAVIGATOR	O24	N/A	EUT
E-2	Adapter	AD65G	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C1	No	No	0.5m	Mini USB Line

Note:

(1) For detachable type I/O cable should be specified the length in cm in 『Length』 column.

2.5 TABLE OF PARAMETERS OF TEST SOFTWARE SETTING

During testing, channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the end product.

Max output power Setting			
Test software Version	Test program: MT_RF_Test_CN		
Mode	802.11a/ac	802.11n HT20	802.11n HT40
Data Rate	MCS0	MSC0	MSC0
Power Setting of Softwave	45	45	45

2.6 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation test, Band-edge test and 6db bandwidth test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Signal Analyzer 9kHz-26.5GHz	Agilent	N9010B	MY60242508	Nov. 04, 2023	Nov. 03, 2024
2	Test Receiver 20kHz-40GHz	R&S	ESU 40	100372	Nov. 04, 2023	Nov. 03, 2024
3	Bilog Antenna (30MHz-1GHz)	SCHAFFNER	CBL6112B	2705	Nov. 04, 2023	Nov. 03, 2024
4	Horn Antenna (1GHz-18GHz)	Schwarzbeck	3115	10SL0060	Nov. 04, 2023	Nov. 03, 2024
5	Horn Antenna (18GHz-40GHz)	A.H. Systems	SAS-574	545	Nov. 04, 2023	Nov. 03, 2024
6	Amplifier (9KHz-6GHz)	HP	8447D	2727A05655	Nov. 04, 2023	Nov. 03, 2024
7	Amplifier (1GHz-26GHz)	Agilent	8449B	3008A4722	Nov. 04, 2023	Nov. 03, 2024
8	Amplifier (18GHz-40GHz)	Agilent	N/A	97	Nov. 04, 2023	Nov. 03, 2024
9	Loop Antenna (9KHz-30MHz)	R&S	HFH2-Z2	POS871398181	Nov. 04, 2023	Nov. 03, 2024
10	RF cables1 (9kHz-1GHz)	N/A	R01	N/A	Nov. 04, 2023	Nov. 03, 2024
11	RF cables2 (1GHz-40GHz)	N/A	R02	N/A	Nov. 04, 2023	Nov. 03, 2024
12	D.C. Power Supply	LongWei	PS-305	010964123	Nov. 04, 2023	Nov. 03, 2024

Conduction Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Shielded Room	FAZENG	844	844	Nov. 04, 2023	Nov. 03, 2024
2	EMI Receiver	R&S	ESU8	100372	Nov. 04, 2023	Nov. 03, 2024
3	LISN	Schwarzbeck	NNLK 8121	00847 7	Nov. 04, 2023	Nov. 03, 2024
4	843 Cable 1#	N/A	C01	N/A	Nov. 04, 2023	Nov. 03, 2024

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ_EMCC	EMC-CON 3A1.1
2	EMC radiation test system	FALA	EZ_EMCC	FA-03A2
3	RF test system	MAIWEI	MTS8310	2.0.0.0
4	RF communication test system	MAIWEI	MTS8200	2.0.0.0

3. EMC EMISSION TEST

3.1 CONDUCTED EMISSION MEASUREMENT

3.1.1 POWER LINE CONDUCTED EMISSION Limits (Frequency Range 150KHz-30MHz)

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.5 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

- (1) The tighter limit applies at the band edges.
- (2) The limit of " * " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.

The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

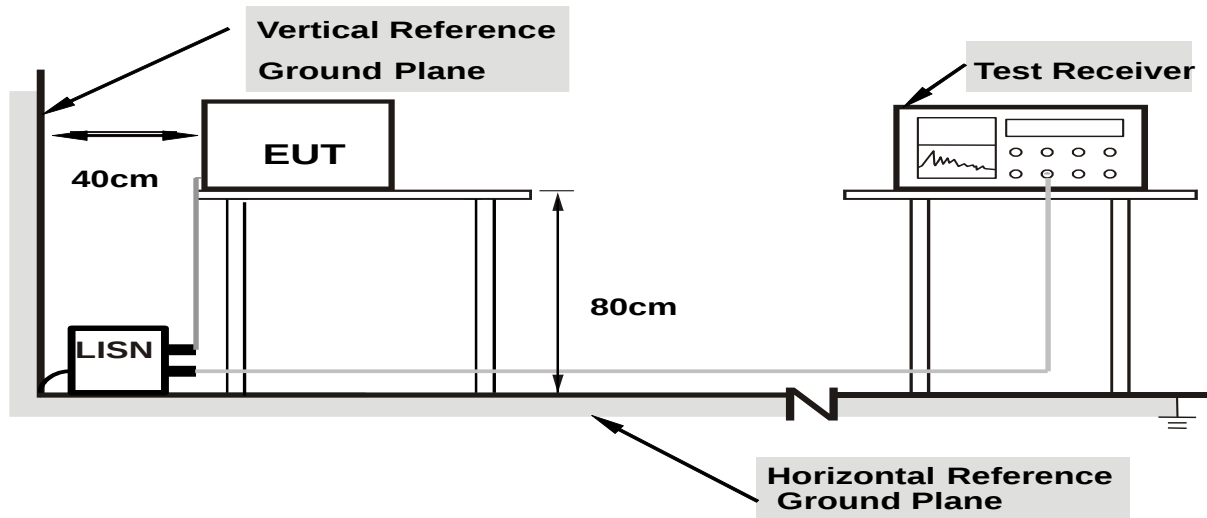
3.1.2 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item –EUT Test Photos.

3.1.3 DEVIATION FROM TEST STANDARD

No deviation

3.1.4 TEST SETUP



- Note:** 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

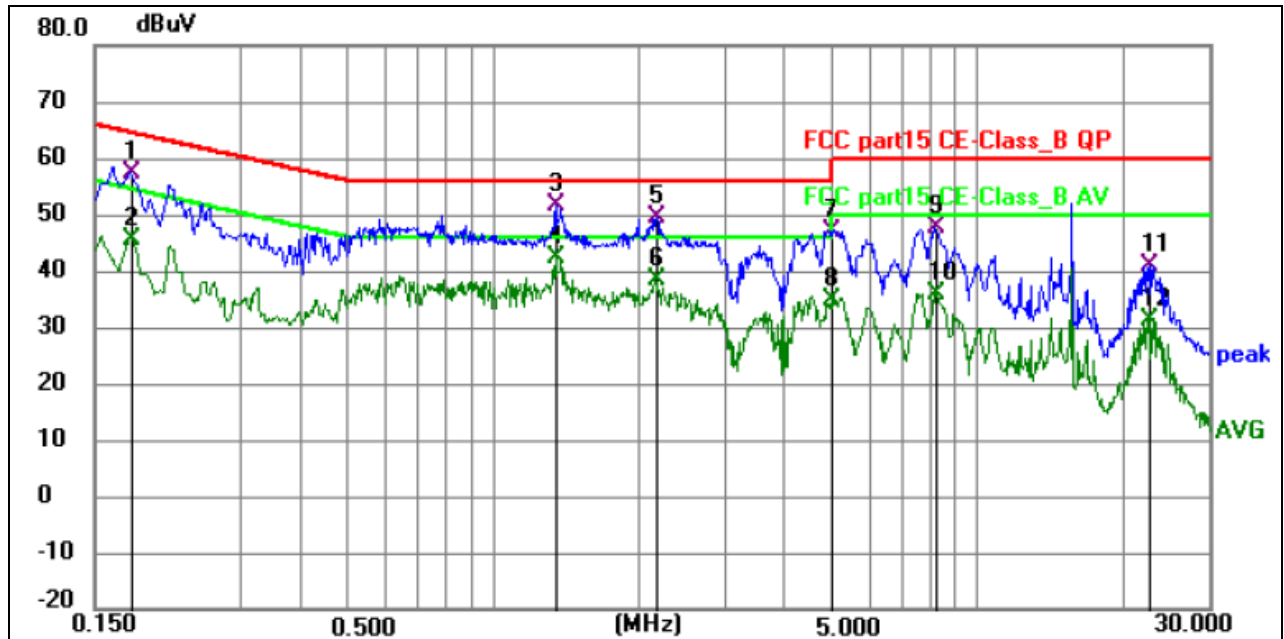
3.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.

We pretest AC 120V and AC 230V, the worst voltage was AC 120V and the data recording in the report.

3.1.6 TEST RESULTS

Temperature:	25 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	L
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 4

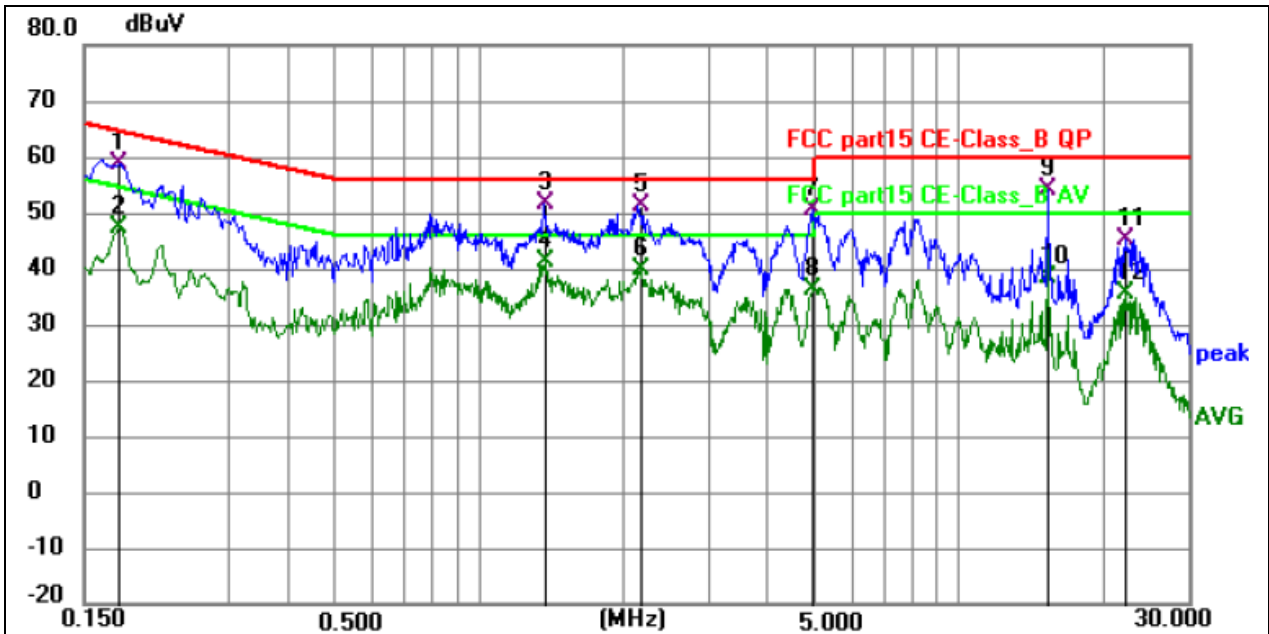


Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1805	47.54	9.92	57.46	64.46	-7.00	QP	P	
2	0.1805	35.60	9.92	45.52	54.46	-8.94	AVG	P	
3	1.3470	41.92	9.54	51.46	56.00	-4.54	QP	P	
4 *	1.3470	32.68	9.54	42.22	46.00	-3.78	AVG	P	
5	2.1794	39.51	9.92	49.43	56.00	-6.57	QP	P	
6	2.1794	28.40	9.92	38.32	46.00	-7.68	AVG	P	
7	4.9965	37.02	9.95	46.97	56.00	-9.03	QP	P	
8	4.9965	24.93	9.95	34.88	46.00	-11.12	AVG	P	
9	8.2185	37.62	10.04	47.66	60.00	-12.34	QP	P	
10	8.2185	25.86	10.04	35.90	50.00	-14.10	AVG	P	
11	22.6230	30.06	10.90	40.96	60.00	-19.04	QP	P	
12	22.6230	20.37	10.90	31.27	50.00	-18.73	AVG	P	

Temperature:	25 °C	Relative Humidity:	54%
Pressure:	1010hPa	Phase :	N
Test Voltage :	AC 120V/60Hz	Test Mode:	Mode 4



Remark:

Margin = Limit – Level, Correct Factor = Cable lose + LISN insertion loss, Level= Reading + Correct factor

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1770	49.08	9.59	58.67	64.63	-5.96	QP	P	
2	0.1770	37.79	9.59	47.38	54.63	-7.25	AVG	P	
3 *	1.3740	41.80	9.64	51.44	56.00	-4.56	QP	P	
4	1.3740	31.64	9.64	41.28	46.00	-4.72	AVG	P	
5	2.1793	41.46	9.95	51.41	56.00	-4.59	QP	P	
6	2.1793	29.85	9.95	39.80	46.00	-6.20	AVG	P	
7	4.9650	40.37	10.08	50.45	56.00	-5.55	QP	P	
8	4.9650	26.29	10.08	36.37	46.00	-9.63	AVG	P	
9	15.3420	43.86	10.39	54.25	60.00	-5.75	QP	P	
10	15.3420	28.06	10.39	38.45	50.00	-11.55	AVG	P	
11	22.4160	34.43	10.87	45.30	60.00	-14.70	QP	P	
12	22.4160	24.54	10.87	35.41	50.00	-14.59	AVG	P	

3.2 RADIATED EMISSION MEASUREMENT

3.2.1 RADIATED EMISSION LIMITS (Frequency Range 9kHz-1000MHz)

In case the emission fall within the restricted band specified on 15.205(a), then the 15.209(a) limit in the table below has to be followed.

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	25GHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

3.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- The antenna height 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.
- 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) 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.
- If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
- Test the EUT in the lowest channel, the middle channel, the Highest channel

Note:

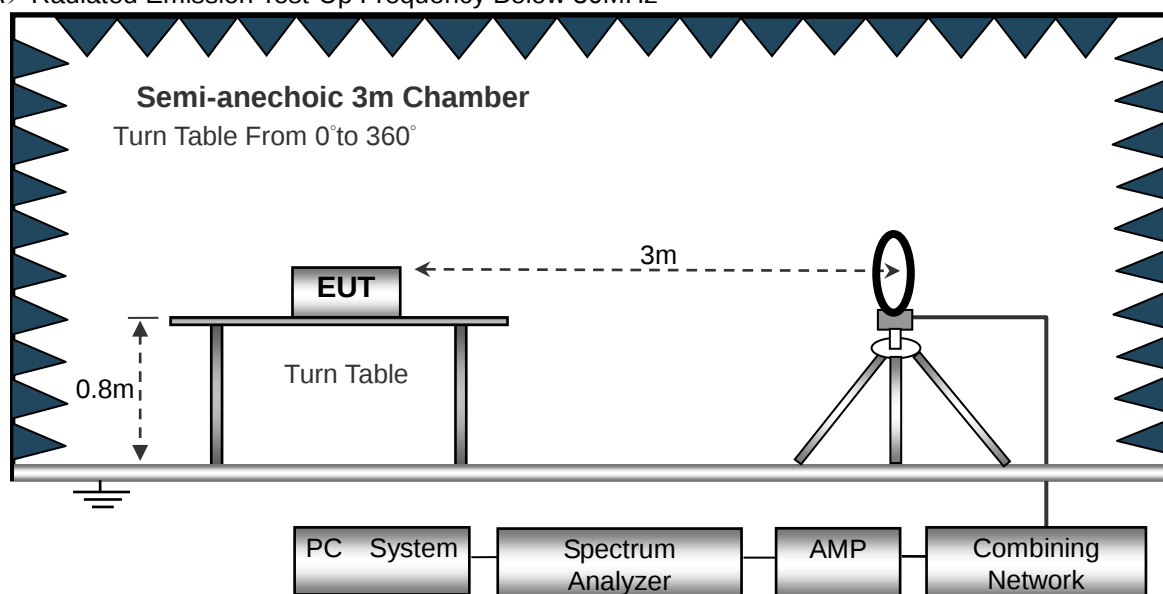
Both horizontal and vertical antenna polarities were tested and performed pretest to all antenna,. The worst case was antenna 1 and emissions were reported

3.2.3 DEVIATION FROM TEST STANDARD

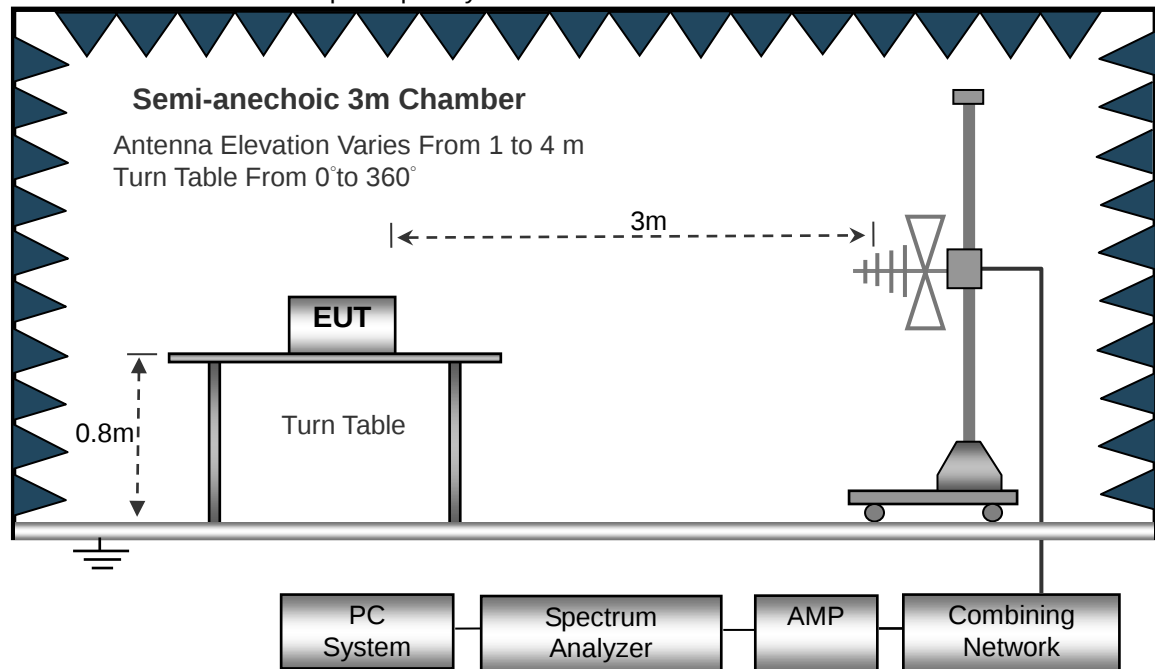
No deviation

3.2.4 TEST SETUP

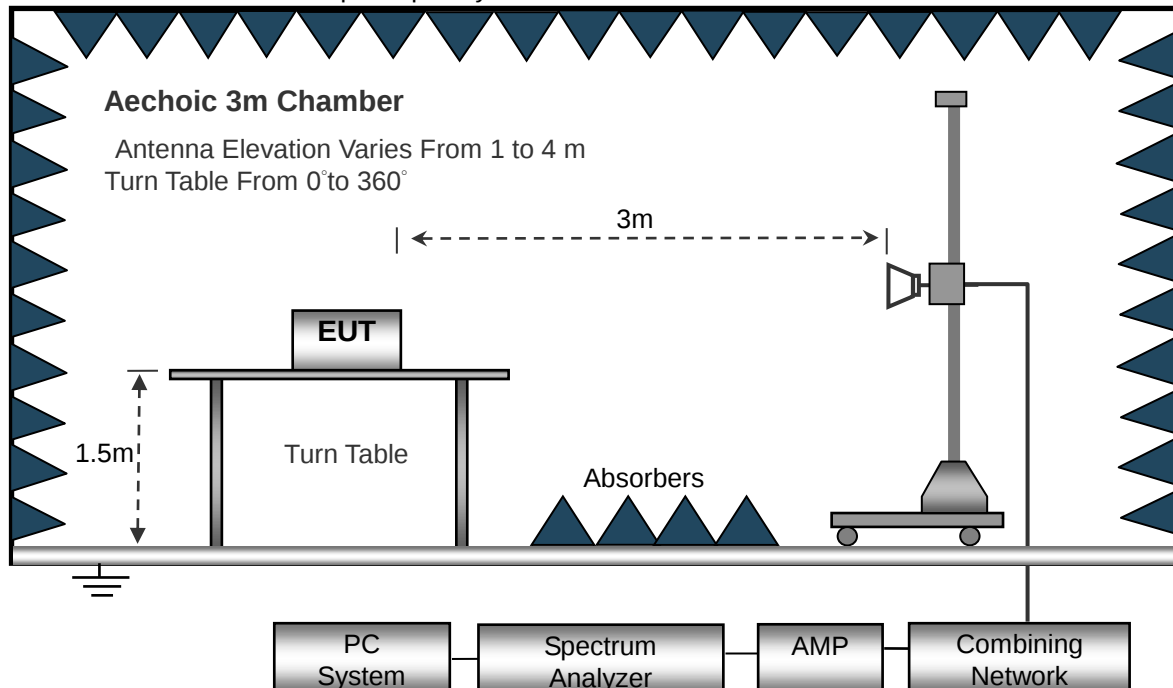
(A) Radiated Emission Test-Up Frequency Below 30MHz



(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (Between 9KHz – 30 MHz)

Temperature:	20℃	Relative Humidity:	48%
Pressure:	1010 hPa	Test Voltage :	DC 3.7V
Test Mode :	Mode 4	Polarization :	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	PASS
--	--	--	--	PASS

NOTE:

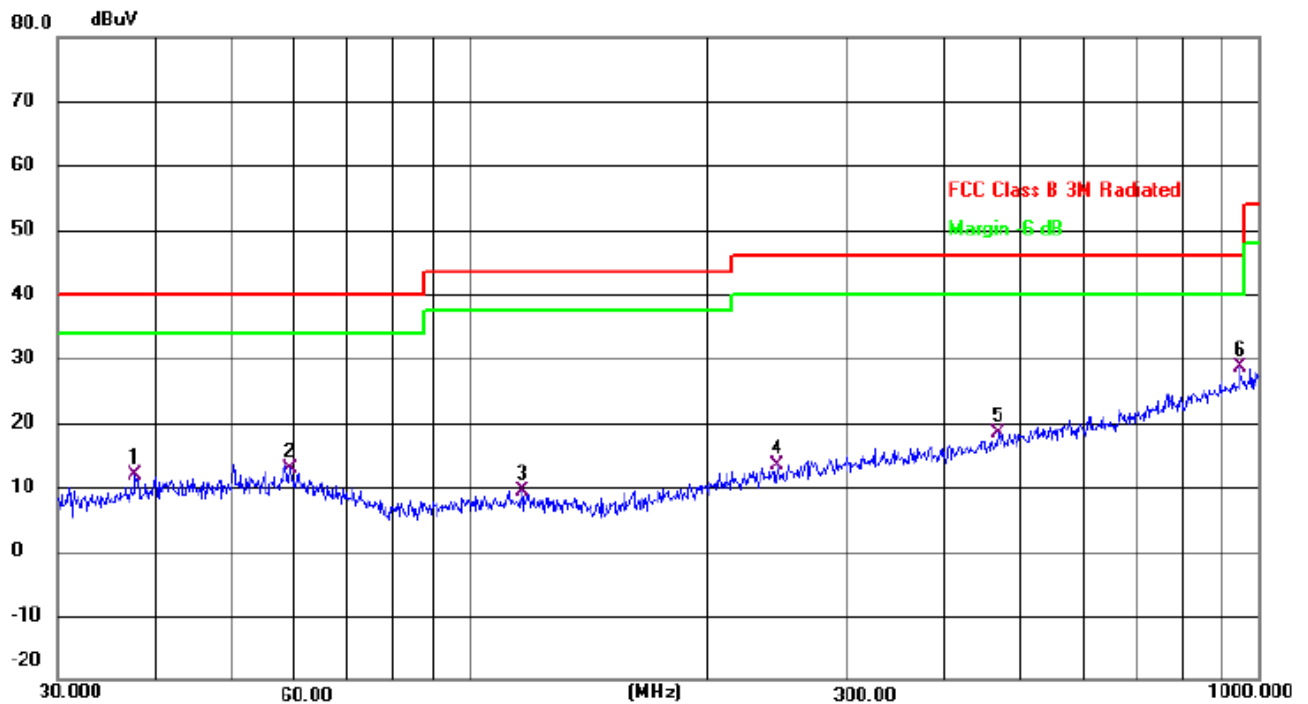
The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance/test distance})$ (dB);

Limit line = specific limits(dBuV) + distance extrapolation factor.

3.2.7 TEST RESULTS (Between 30MHz – 1GHz)

Temperature:	26°C	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Horizontal
Test Voltage :	DC 3.7V		
Test Mode :	Mode 4		



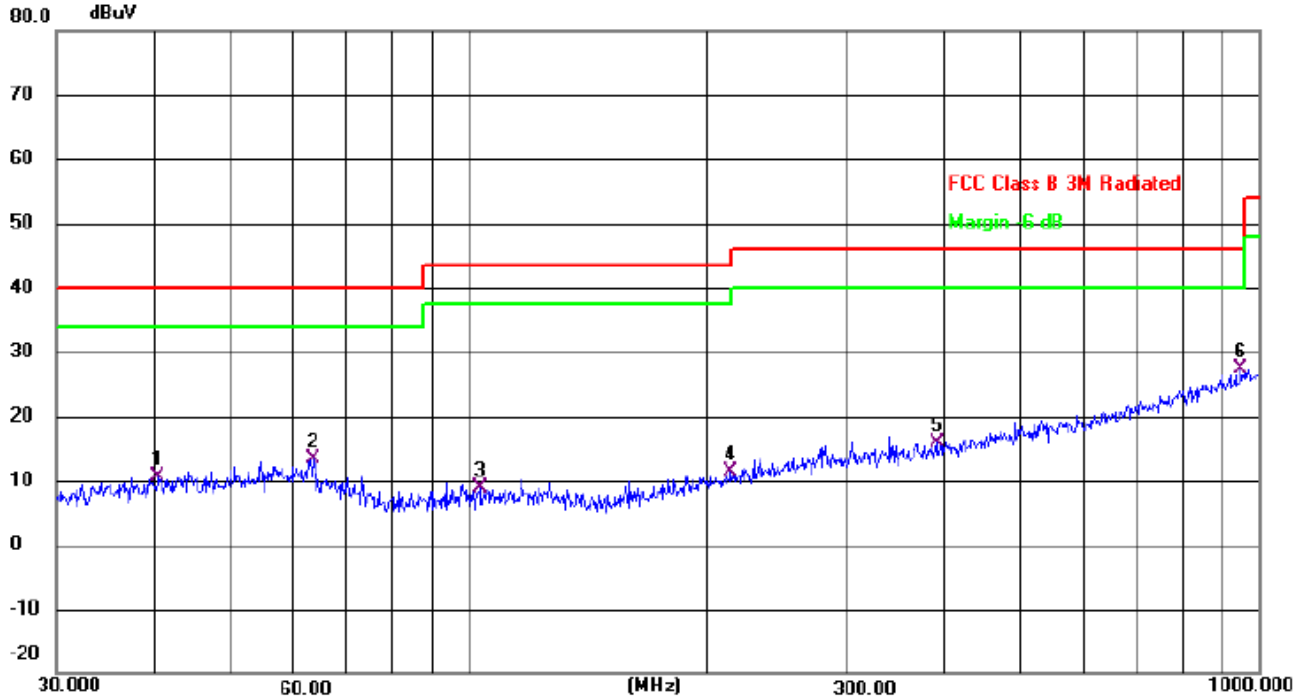
No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dB	Margin dB	Detector
1		37.6797	26.18	-14.34	11.84	40.00	-28.16	QP
2		59.2324	25.70	-12.74	12.96	40.00	-27.04	QP
3		116.5400	25.84	-16.50	9.34	43.50	-34.16	QP
4		245.0900	26.22	-12.93	13.29	46.00	-32.71	QP
5		467.2349	26.57	-8.28	18.29	46.00	-27.71	QP
6	*	948.7609	28.37	0.20	28.57	46.00	-17.43	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Limit – Level;

Temperature:	26℃	Relative Humidity:	54%
Pressure:	1010 hPa	Polarization :	Vertical
test voltage :	DC 3.7V		
Test Mode :	Mode 4		



No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dB	Margin dB	Detector
1	40.4170	24.48	-13.81	10.67	40.00	-29.33	QP
2	63.5356	26.95	-13.66	13.29	40.00	-26.71	QP
3	103.0800	25.50	-16.56	8.94	43.50	-34.56	QP
4	214.5142	25.57	-14.16	11.41	43.50	-32.09	QP
5	390.7225	25.83	-9.93	15.90	46.00	-30.10	QP
6 *	948.7609	27.29	0.20	27.49	46.00	-18.51	QP

Remark:

Correct Factor = Cable loss + Antenna factor – Preamplifier;

Level = Reading Level + Correct Factor; Margin = Limit – Level;

3.2.8 TEST RESULTS (1ghz~40ghZ)

BAND 2

802.11a

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5260									
V	10520	57.55	49.07	15.31	37.41	61.20	74	-12.80	PK
V	10520	46.12	49.07	15.31	37.41	49.77	54	-4.23	AV
V	15780	57.74	49.18	15.26	40.43	64.25	74	-9.75	PK
V	15780	44.39	49.18	15.26	40.43	50.90	54	-3.10	AV
H	10520	57.17	49.07	15.31	37.41	60.82	74	-13.18	PK
H	10520	46.28	49.07	15.31	37.41	49.93	54	-4.07	AV
H	15780	60.27	49.18	15.26	40.43	66.78	74	-7.22	PK
H	15780	43.90	49.18	15.26	40.43	50.41	54	-3.59	AV
operation frequency:5280									
V	10560	58.57	49.10	15.35	37.44	62.26	74	-11.74	PK
V	10560	46.18	49.10	15.35	37.44	49.87	54	-4.13	AV
V	15840	60.57	49.19	15.31	40.49	67.18	74	-6.82	PK
V	15840	43.94	49.19	15.31	40.49	50.55	54	-3.45	AV
H	10560	57.79	49.10	15.35	37.44	61.48	74	-12.52	PK
H	10560	46.62	49.10	15.35	37.44	50.31	54	-3.69	AV
H	15840	60.57	49.19	15.31	40.49	67.18	74	-6.82	PK
H	15840	44.18	49.19	15.31	40.49	50.79	54	-3.21	AV
operation frequency:5320									
V	10640	59.65	49.13	15.39	37.48	63.39	74	-10.61	PK
V	10640	46.20	49.13	15.39	37.48	49.94	54	-4.06	AV
V	15960	60.29	49.23	15.36	40.54	66.96	74	-7.04	PK
V	15960	44.19	49.23	15.36	40.54	50.86	54	-3.14	AV
H	10640	58.11	49.13	15.39	37.48	61.85	74	-12.15	PK
H	10640	46.42	49.13	15.39	37.48	50.16	54	-3.84	AV
H	15960	58.55	49.23	15.36	40.54	65.22	74	-8.78	PK
H	15960	43.37	49.23	15.36	40.54	50.04	54	-3.96	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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Polar (H/V)	Frequency (MHz)	Meter Reading (dBUV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector Type
operation frequency:5260									
V	10520	57.10	49.07	15.31	37.41	60.75	74	-13.25	PK
V	10520	45.76	49.07	15.31	37.41	49.41	54	-4.59	AV
V	15780	57.28	49.18	15.26	40.43	63.79	74	-10.21	PK
V	15780	44.04	49.18	15.26	40.43	50.55	54	-3.45	AV
H	10520	56.72	49.07	15.31	37.41	60.37	74	-13.63	PK
H	10520	45.92	49.07	15.31	37.41	49.57	54	-4.43	AV
H	15780	59.80	49.18	15.26	40.43	66.31	74	-7.69	PK
H	15780	43.56	49.18	15.26	40.43	50.07	54	-3.93	AV
operation frequency:5280									
V	10560	58.11	49.10	15.35	37.44	61.80	74	-12.20	PK
V	10560	45.82	49.10	15.35	37.44	49.51	54	-4.49	AV
V	15840	60.10	49.19	15.31	40.49	66.71	74	-7.29	PK
V	15840	43.60	49.19	15.31	40.49	50.21	54	-3.79	AV
H	10560	57.33	49.10	15.35	37.44	61.02	74	-12.98	PK
H	10560	46.26	49.10	15.35	37.44	49.95	54	-4.05	AV
H	15840	60.10	49.19	15.31	40.49	66.71	74	-7.29	PK
H	15840	43.84	49.19	15.31	40.49	50.45	54	-3.55	AV
operation frequency:5320									
V	10640	59.18	49.13	15.39	37.48	62.92	74	-11.08	PK
V	10640	45.84	49.13	15.39	37.48	49.58	54	-4.42	AV
V	15960	59.82	49.23	15.36	40.54	66.49	74	-7.51	PK
V	15960	43.85	49.23	15.36	40.54	50.52	54	-3.48	AV
H	10640	57.67	49.13	15.39	37.48	61.41	74	-12.59	PK
H	10640	46.05	49.13	15.39	37.48	49.79	54	-4.21	AV
H	15960	58.09	49.23	15.36	40.54	64.76	74	-9.24	PK
H	15960	43.03	49.23	15.36	40.54	49.70	54	-4.30	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

802.11n HT20

Polar (H/V)	Frequency (MHz)	Meter Reading (dBUV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector Type
operation frequency:5260									
V	10520	57.03	49.07	15.31	37.41	60.68	74	-13.32	PK
V	10520	45.91	49.07	15.31	37.41	49.56	54	-4.44	AV
V	15780	56.55	49.18	15.26	40.43	63.06	74	-10.94	PK
V	15780	43.57	49.18	15.26	40.43	50.08	54	-3.92	AV
H	10520	56.95	49.07	15.31	37.41	60.60	74	-13.40	PK
H	10520	45.56	49.07	15.31	37.41	49.21	54	-4.79	AV
H	15780	54.43	49.18	15.26	40.43	60.94	74	-13.06	PK
H	15780	44.58	49.18	15.26	40.43	51.09	54	-2.91	AV
operation frequency:5280									
V	10560	56.56	49.10	15.35	37.44	60.25	74	-13.75	PK
V	10560	45.01	49.10	15.35	37.44	48.70	54	-5.30	AV
V	15840	55.65	49.19	15.31	40.49	62.26	74	-11.74	PK
V	15840	43.66	49.19	15.31	40.49	50.27	54	-3.73	AV
H	10560	55.85	49.10	15.35	37.44	59.54	74	-14.46	PK
H	10560	43.56	49.10	15.35	37.44	47.25	54	-6.75	AV
H	15840	55.36	49.19	15.31	40.49	61.97	74	-12.03	PK
H	15840	43.44	49.19	15.31	40.49	50.05	54	-3.95	AV
operation frequency:5320									
V	10640	56.84	49.13	15.39	37.48	60.58	74	-13.42	PK
V	10640	44.87	49.13	15.39	37.48	48.61	54	-5.39	AV
V	15960	54.65	49.23	15.36	40.54	61.32	74	-12.68	PK
V	15960	43.70	49.23	15.36	40.54	50.37	54	-3.63	AV
H	10640	56.88	49.13	15.39	37.48	60.62	74	-13.38	PK
H	10640	44.88	49.13	15.39	37.48	48.62	54	-5.38	AV
H	15960	55.64	49.23	15.36	40.54	62.31	74	-11.69	PK
H	15960	44.48	49.23	15.36	40.54	51.15	54	-2.85	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

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Polar (H/V)	Frequency (MHz)	Meter Reading (dBUV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector Type
operation frequency:5270									
V	10540	58.03	49.07	15.31	37.41	61.68	74	-12.32	PK
V	10540	46.26	49.07	15.31	37.41	49.91	54	-4.09	AV
V	15810	57.50	49.18	15.26	40.43	64.01	74	-9.99	PK
V	15810	44.34	49.18	15.26	40.43	50.85	54	-3.15	AV
H	10540	57.89	49.07	15.31	37.41	61.54	74	-12.46	PK
H	10540	46.32	49.07	15.31	37.41	49.97	54	-4.03	AV
H	15810	55.86	49.18	15.26	40.43	62.37	74	-11.63	PK
H	15810	44.22	49.18	15.26	40.43	50.73	54	-3.27	AV
operation frequency:5310									
V	10620	58.46	49.13	15.39	37.48	62.20	74	-11.80	PK
V	10620	45.45	49.13	15.39	37.48	49.19	54	-4.81	AV
V	15930	55.63	49.23	15.36	40.54	62.30	74	-11.70	PK
V	15930	44.29	49.23	15.36	40.54	50.96	54	-3.04	AV
H	10620	58.63	49.13	15.39	37.48	62.37	74	-11.63	PK
H	10620	45.80	49.13	15.39	37.48	49.54	54	-4.46	AV
H	15930	56.60	49.23	15.36	40.54	63.27	74	-10.73	PK
H	15930	44.03	49.23	15.36	40.54	50.70	54	-3.30	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									

802.11n HT40

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
operation frequency:5270									
V	10540	57.36	49.07	15.31	37.41	61.01	74	-12.99	PK
V	10540	45.71	49.07	15.31	37.41	49.36	54	-4.64	AV
V	15810	56.83	49.18	15.26	40.43	63.34	74	-10.66	PK
V	15810	43.82	49.18	15.26	40.43	50.33	54	-3.67	AV
H	10540	57.23	49.07	15.31	37.41	60.88	74	-13.12	PK
H	10540	45.77	49.07	15.31	37.41	49.42	54	-4.58	AV
H	15810	55.21	49.18	15.26	40.43	61.72	74	-12.28	PK
H	15810	44.69	49.18	15.26	40.43	51.20	54	-2.80	AV
operation frequency:5310									
V	10620	57.78	49.13	15.39	37.48	61.52	74	-12.48	PK
V	10620	44.92	49.13	15.39	37.48	48.66	54	-5.34	AV
V	15930	54.98	49.23	15.36	40.54	61.65	74	-12.35	PK
V	15930	43.77	49.23	15.36	40.54	50.44	54	-3.56	AV
H	10620	57.95	49.13	15.39	37.48	61.69	74	-12.31	PK
H	10620	45.28	49.13	15.39	37.48	49.02	54	-4.98	AV
H	15930	55.94	49.23	15.36	40.54	62.61	74	-11.39	PK
H	15930	44.50	49.23	15.36	40.54	51.17	54	-2.83	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									

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Polar (H/V)	Frequency (MHz)	Meter Reading (dBUV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector Type
operation frequency:5290									
V	10580	57.32	49.09	15.34	37.42	60.99	74	-13.01	PK
V	10580	46.54	49.09	15.34	37.42	50.21	54	-3.79	AV
V	15870	57.18	49.18	15.29	40.47	63.76	74	-10.24	PK
V	15870	44.36	49.18	15.29	40.47	50.94	54	-3.06	AV
H	10580	57.76	49.09	15.34	37.42	61.43	74	-12.57	PK
H	10580	46.66	49.09	15.34	37.42	50.33	54	-3.67	AV
H	15870	55.87	49.18	15.29	40.47	62.45	74	-11.55	PK
H	15870	45.34	49.18	15.29	40.47	51.92	54	-2.08	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

3.3 CONDUCTED BAND EMISSION MEASUREMENT

3.3.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.407

- (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 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.

Spectrum Parameter	Setting	
Attenuation	Auto	
Start Frequency	5150MHz	5725MHz
Stop Frequency	5250MHz	5850MHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average	

3.3.2 TEST PROCEDURE

Test method: FCC KDB 789033 G)& Parts 15.407(b)(4) & 15.209(a)

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP



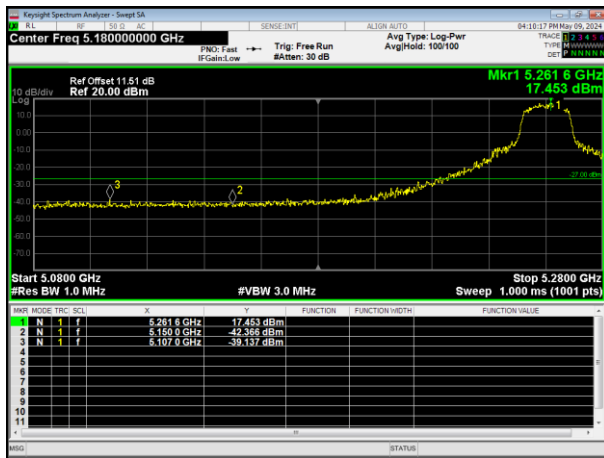
3.3.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

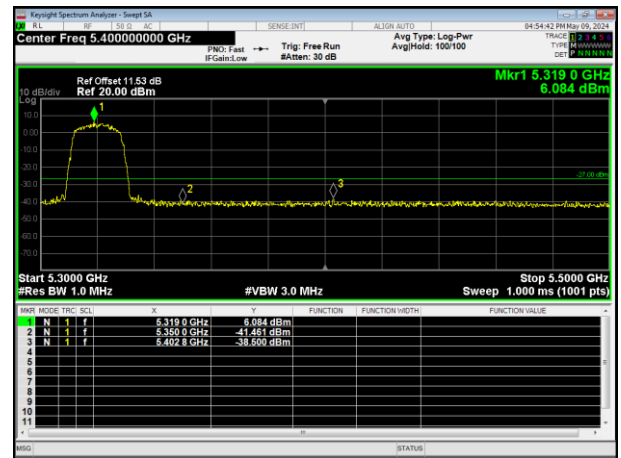
3.3.6 TEST RESULT

The antenna gain is compensated in the test data.

802.11a

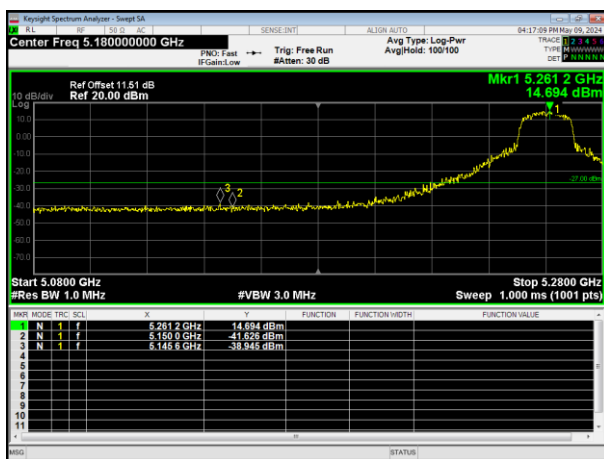


5260MHz

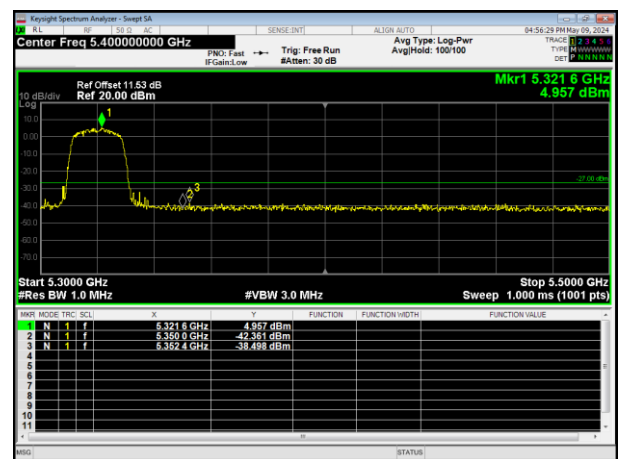


5320MHz

802.11n HT20

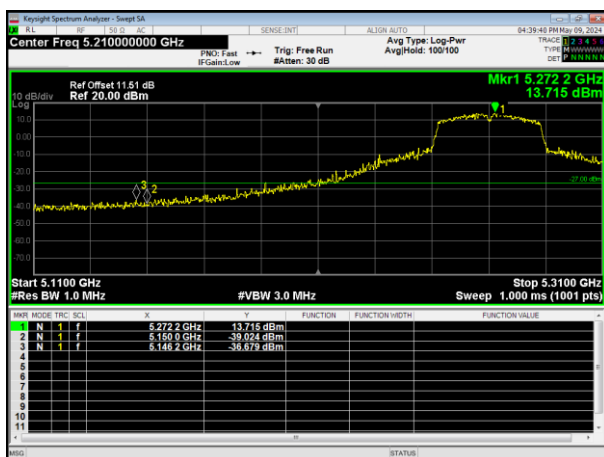


5260MHz

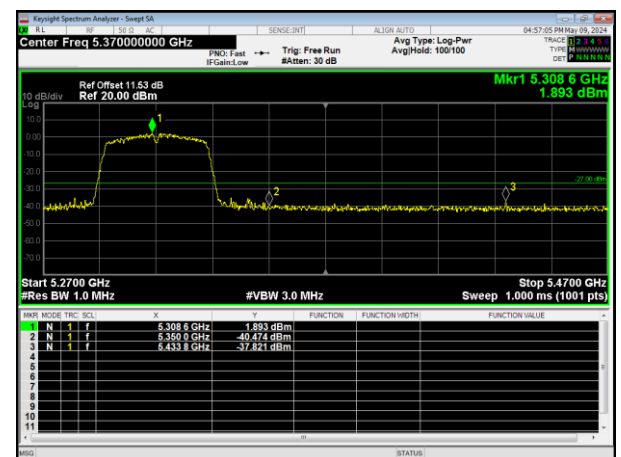


5320MHz

802.11n HT40

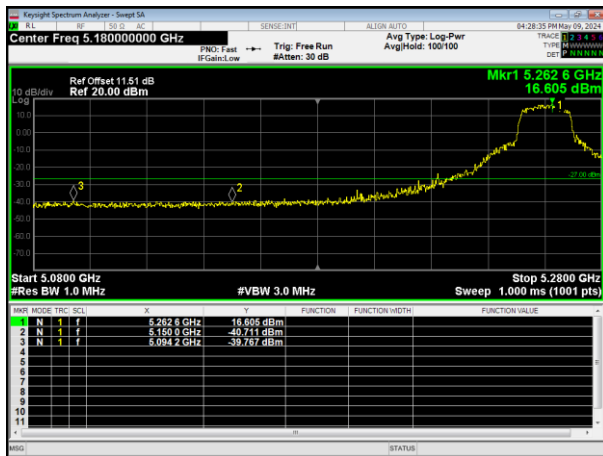


5270MHz

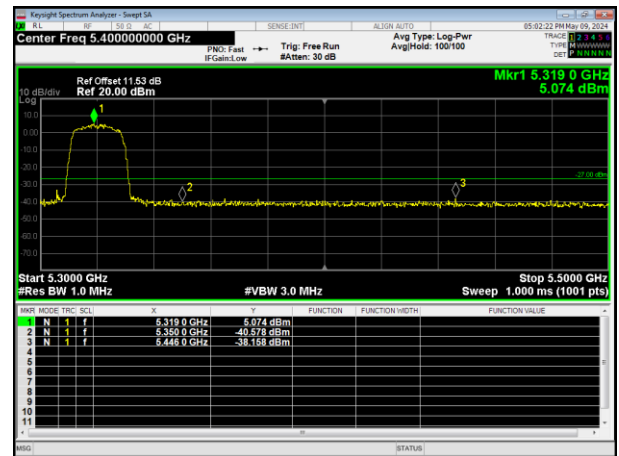


5310MHz

802.11ac HT20

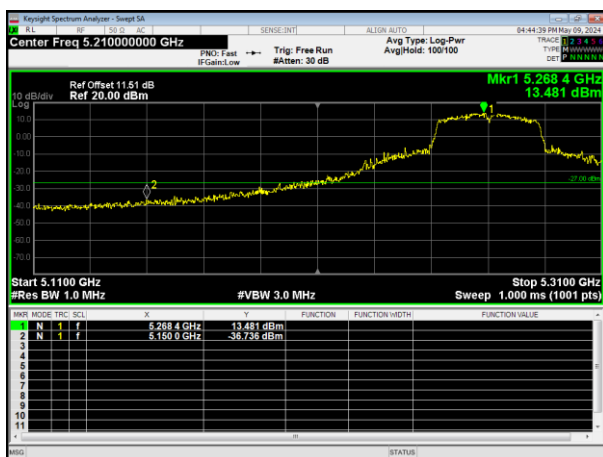


5260MHz

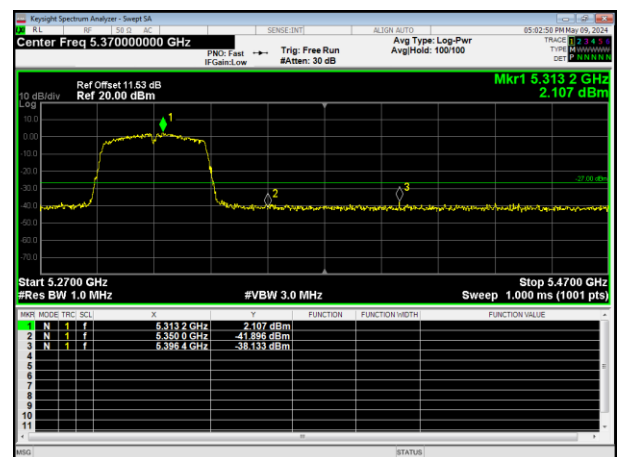


5320MHz

802.11ac HT40



5270MHz



5310MHz

802.11ac HT80



5290MHz

3.4 RADIATED BAND EMISSION MEASUREMENT

3.4.1 TEST REQUIREMENT:

FCC Part15 C Section 15.209 and 15.407

- (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 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.

Spectrum Parameter	Setting	
Attenuation	Auto	
Start Frequency	5150MHz	5725MHz
Stop Frequency	5250MHz	5850MHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz for Average	

3.3.2 TEST PROCEDURE

3.2.9 TEST PROCEDURE

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height 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.
- d. 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 (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
- h. Test the EUT in the lowest channel, the middle channel, the Highest channel

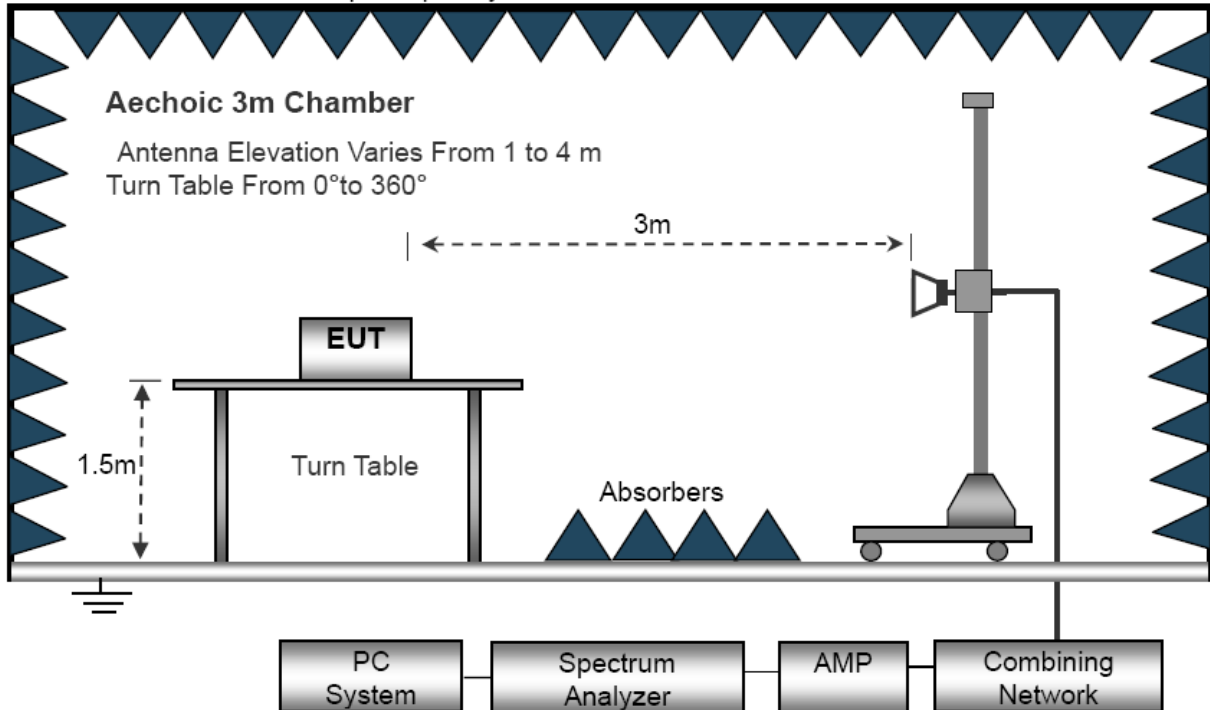
Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to all antenna,. The worst case was antenna 1 and emissions were reported

3.3.3 DEVIATION FROM TEST STANDARD

No deviation

3.3.4 TEST SETUP



3.3.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.6 TEST RESULT

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
802.11a operation frequency:5260									
V	5132.00	51.70	46.38	12.43	35.65	53.40	68.2	-14.80	PK
V	5132.00	40.25	46.38	12.43	35.65	41.95	54	-12.05	AV
V	5150.00	51.90	46.56	12.47	35.76	53.57	68.2	-14.63	PK
V	5150.00	40.52	46.56	12.47	35.76	42.19	54	-11.81	AV
H	5132.00	51.33	46.38	12.43	35.65	53.03	68.2	-15.17	PK
H	5132.00	40.42	46.38	12.43	35.65	42.12	54	-11.88	AV
H	5150.00	51.45	46.56	12.47	35.76	53.12	68.2	-15.08	PK
H	5150.00	40.03	46.56	12.47	35.76	41.70	54	-12.30	AV
802.11a operation frequency:5320									
V	5350.00	56.82	46.55	12.65	35.87	58.79	68.2	-9.41	PK
V	5350.00	42.34	46.55	12.65	35.87	44.31	54	-9.69	AV
V	5364.00	56.47	46.58	12.67	35.93	58.49	68.2	-9.71	PK
V	5364.00	42.32	46.58	12.67	35.93	44.34	54	-9.66	AV
H	5350.00	56.28	46.55	12.65	35.87	58.25	68.2	-9.95	PK
H	5350.00	42.56	46.55	12.65	35.87	44.53	54	-9.47	AV
H	5364.00	55.72	46.58	12.67	35.93	57.74	68.2	-10.46	PK
H	5364.00	42.49	46.58	12.67	35.93	44.51	54	-9.49	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre- amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
802.11ac20 operation frequency:5260									
V	5132.00	51.83	46.38	12.43	35.65	53.53	68.2	-14.67	PK
V	5132.00	40.36	46.38	12.43	35.65	42.06	54	-11.94	AV
V	5150.00	51.01	46.56	12.47	35.76	52.68	68.2	-15.52	PK
V	5150.00	41.61	46.56	12.47	35.76	43.28	54	-10.72	AV
H	5132.00	51.44	46.38	12.43	35.65	53.14	68.2	-15.06	PK
H	5132.00	40.52	46.38	12.43	35.65	42.22	54	-11.78	AV
H	5150.00	51.56	46.56	12.47	35.76	53.23	68.2	-14.97	PK
H	5150.00	40.11	46.56	12.47	35.76	41.78	54	-12.22	AV
802.11ac20 operation frequency:5320									
V	5350.00	55.94	46.55	12.65	35.87	57.91	68.2	-10.29	PK
V	5350.00	43.44	46.55	12.65	35.87	45.41	54	-8.59	AV
V	5364.00	55.58	46.58	12.67	35.93	57.60	68.2	-10.60	PK
V	5364.00	42.41	46.58	12.67	35.93	44.43	54	-9.57	AV
H	5350.00	55.40	46.55	12.65	35.87	57.37	68.2	-10.83	PK
H	5350.00	43.65	46.55	12.65	35.87	45.62	54	-8.38	AV
H	5364.00	55.84	46.58	12.67	35.93	57.86	68.2	-10.34	PK
H	5364.00	42.58	46.58	12.67	35.93	44.60	54	-9.40	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									

Polar (H/V)	Frequency (MHz)	Meter Reading (dBUV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector Type
802.11n HT20 operation frequency:5260									
V	5132.00	51.76	46.38	12.43	35.65	53.46	68.2	-14.74	PK
V	5132.00	40.51	46.38	12.43	35.65	42.21	54	-11.79	AV
V	5150.00	51.27	46.56	12.47	35.76	52.94	68.2	-15.26	PK
V	5150.00	40.12	46.56	12.47	35.76	41.79	54	-12.21	AV
H	5132.00	51.68	46.38	12.43	35.65	53.38	68.2	-14.82	PK
H	5132.00	40.14	46.38	12.43	35.65	41.84	54	-12.16	AV
H	5150.00	51.12	46.56	12.47	35.76	52.79	68.2	-15.41	PK
H	5150.00	40.15	46.56	12.47	35.76	41.82	54	-12.18	AV
802.11n HT20 operation frequency:5320									
V	5350.00	55.57	46.55	12.65	35.87	57.54	68.2	-10.66	PK
V	5350.00	43.45	46.55	12.65	35.87	45.42	54	-8.58	AV
V	5364.00	55.34	46.58	12.67	35.93	57.36	68.2	-10.84	PK
V	5364.00	43.26	46.58	12.67	35.93	45.28	54	-8.72	AV
H	5350.00	56.61	46.55	12.65	35.87	58.58	68.2	-9.62	PK
H	5350.00	43.46	46.55	12.65	35.87	45.43	54	-8.57	AV
H	5364.00	56.34	46.58	12.67	35.93	58.36	68.2	-9.84	PK
H	5364.00	43.05	46.58	12.67	35.93	45.07	54	-8.93	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
802.11ac 40 operation frequency:5270									
V	5132.00	51.78	46.38	12.43	35.65	53.48	68.2	-14.72	PK
V	5132.00	40.86	46.38	12.43	35.65	42.56	54	-11.44	AV
V	5150.00	51.23	46.56	12.47	35.76	52.90	68.2	-15.30	PK
V	5150.00	40.91	46.56	12.47	35.76	42.58	54	-11.42	AV
H	5132.00	51.64	46.38	12.43	35.65	53.34	68.2	-14.86	PK
H	5132.00	40.92	46.38	12.43	35.65	42.62	54	-11.38	AV
H	5150.00	51.58	46.56	12.47	35.76	53.25	68.2	-14.95	PK
H	5150.00	40.29	46.56	12.47	35.76	41.96	54	-12.04	AV
802.11ac 40 operation frequency:5310									
V	5350.00	56.21	46.55	12.65	35.87	58.18	68.2	-10.02	PK
V	5350.00	43.03	46.55	12.65	35.87	45.00	54	-9.00	AV
V	5364.00	56.33	46.58	12.67	35.93	58.35	68.2	-9.85	PK
V	5364.00	43.86	46.58	12.67	35.93	45.88	54	-8.12	AV
H	5350.00	55.38	46.55	12.65	35.87	57.35	68.2	-10.85	PK
H	5350.00	42.40	46.55	12.65	35.87	44.37	54	-9.63	AV
H	5364.00	55.32	46.58	12.67	35.93	57.34	68.2	-10.86	PK
H	5364.00	42.40	46.58	12.67	35.93	44.42	54	-9.58	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									

Polar (H/V)	Frequency (MHz)	Meter Reading (dBUV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector Type
802.11n HT40 operation frequency:5270									
V	5132.00	51.78	46.38	12.43	35.65	53.48	68.2	-14.72	PK
V	5132.00	40.86	46.38	12.43	35.65	42.56	54	-11.44	AV
V	5150.00	51.23	46.56	12.47	35.76	52.90	68.2	-15.30	PK
V	5150.00	40.91	46.56	12.47	35.76	42.58	54	-11.42	AV
H	5132.00	51.64	46.38	12.43	35.65	53.34	68.2	-14.86	PK
H	5132.00	40.92	46.38	12.43	35.65	42.62	54	-11.38	AV
H	5150.00	51.58	46.56	12.47	35.76	53.25	68.2	-14.95	PK
H	5150.00	40.29	46.56	12.47	35.76	41.96	54	-12.04	AV
802.11n HT40 operation frequency:5310									
V	5350.00	56.21	46.55	12.65	35.87	58.18	68.2	-10.02	PK
V	5350.00	43.03	46.55	12.65	35.87	45.00	54	-9.00	AV
V	5364.00	56.33	46.58	12.67	35.93	58.35	68.2	-9.85	PK
V	5364.00	43.86	46.58	12.67	35.93	45.88	54	-8.12	AV
H	5350.00	55.38	46.55	12.65	35.87	57.35	68.2	-10.85	PK
H	5350.00	42.40	46.55	12.65	35.87	44.37	54	-9.63	AV
H	5364.00	55.32	46.58	12.67	35.93	57.34	68.2	-10.86	PK
H	5364.00	42.40	46.58	12.67	35.93	44.42	54	-9.58	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									

Polar (H/V)	Frequency (MHz)	Meter Reading (dBUV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission Level (dBUV/m)	Limits (dBUV/m)	Margin (dB)	Detector Type
802.11ac 80 operation frequency:5290									
V	5132.00	51.78	46.38	12.43	35.65	57.53	68.2	-14.72	PK
V	5132.00	40.86	46.38	12.43	35.65	42.60	54	-11.44	AV
V	5150.00	51.23	46.56	12.47	35.76	56.95	68.2	-15.30	PK
V	5150.00	40.91	46.56	12.47	35.76	42.62	54	-11.42	AV
H	5132.00	51.64	46.38	12.43	35.65	57.39	68.2	-14.86	PK
H	5132.00	40.92	46.38	12.43	35.65	42.66	54	-11.38	AV
H	5150.00	51.58	46.56	12.47	35.76	57.30	68.2	-14.95	PK
H	5150.00	40.29	46.56	12.47	35.76	43.00	54	-12.04	AV
V	5350.00	55.41	46.55	12.65	35.87	59.18	68.2	-10.82	PK
V	5350.00	43.11	46.55	12.65	35.87	43.87	54	-8.92	AV
V	5364.00	55.30	46.58	12.67	35.93	61.99	68.2	-10.88	PK
V	5364.00	42.66	46.58	12.67	35.93	47.34	54	-9.32	AV
H	5350.00	55.43	46.55	12.65	35.87	53.05	68.2	-10.80	PK
H	5350.00	42.17	46.55	12.65	35.87	37.78	54	-9.86	AV
H	5364.00	56.02	46.58	12.67	35.93	62.71	68.2	-10.16	PK
H	5364.00	42.44	46.58	12.67	35.93	48.12	54	-9.54	AV
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit 2. If peak below the average limit, the average emission was no test. 3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.									

4. PEAK OUTPUT POWER

4.1 APPLIED PROCEDURES / LIMIT

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or $11 \text{ dBm} + 10 \log B$, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

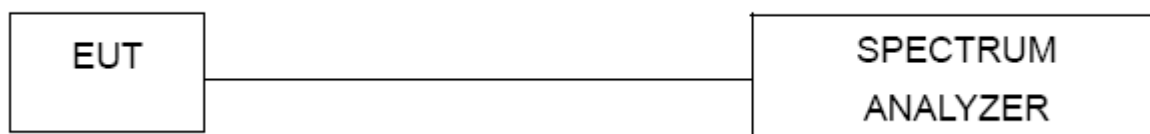
4.1.1 TEST PROCEDURE

- a. The EUT was directly connected to the power meter and antenna output port as show in the block diagram below,
- b. (i) Set span to encompass the entire emission bandwidth (EBW) (or, alternatively, the entire 99% occupied bandwidth) of the signal.
 - (ii) Set RBW = 1 MHz.
 - (iii) Set VBW $\geq$ 3 MHz.
 - (iv) Number of points in sweep $\geq 2 \times \text{span} / \text{RBW}$. (This ensures that bin-to-bin spacing is $\leq \text{RBW}/2$, so that narrowband signals are not lost between frequency bins.)
 - (v) Sweep time = auto.
 - (vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.
 - (vii) If transmit duty cycle $< 98\%$, use a video trigger with the trigger level set to enable triggering only on full power pulses. Transmitter must operate at maximum power control level for the entire duration of every sweep. If the EUT transmits continuously (i.e., with no off intervals) or at duty cycle $\geq 98\%$, and if each transmission is entirely at the maximum power control level, then the trigger shall be set to "free run."
 - (viii) Trace average at least 100 traces in power averaging (rms) mode.
 - (ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the spectrum.

4.1.2 DEVIATION FROM STANDARD

No deviation.

4.1.3 TEST SETUP



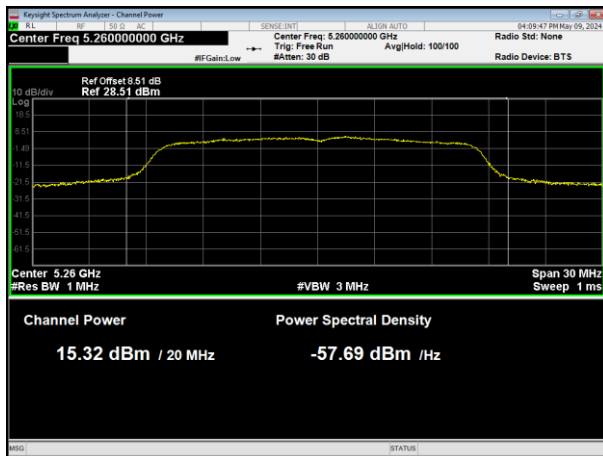
4.1.4 EUT OPERATION CONDITIONS

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

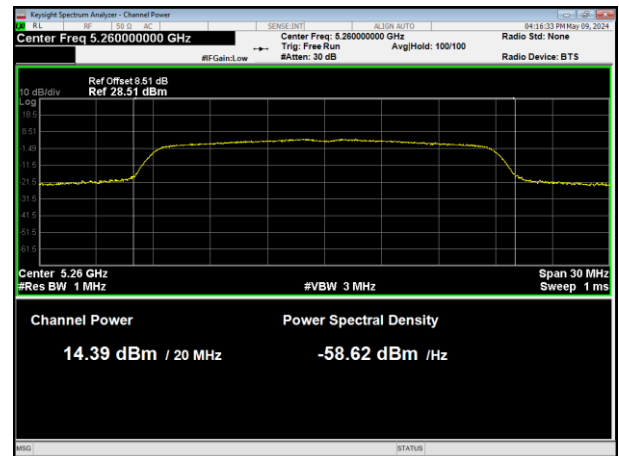
4.1.5 TEST RESULTS

Band	Mode	Test Channel	Average Output Power (dBm)	Duty factor (dB)	Total Output Power(dB)	LIMIT (dBm)
Band 2a	802.11a	Low	15.324	0.87	16.194	23.98
		Middle	14.01	0.87	14.88	23.98
		High	14.666	0.87	15.536	23.98
	802.11n HT20	Low	14.392	0.13	14.522	23.98
		Middle	14.562	0.13	14.692	23.98
		High	15.237	0.13	15.367	23.98
	802.11n HT40	Low	16.041	0.26	16.301	23.98
		High	16.513	0.33	16.843	23.98
	802.11ac HT20	Low	15.979	0.13	16.109	23.98
		Middle	15.766	0.16	15.926	23.98
		High	16.381	0.13	16.511	23.98
	802.11ac HT40	Low	15.995	0.26	16.255	23.98
		High	16.509	0.26	16.769	23.98
	802.11ac HT80	/	15.938	0.5	16.438	23.98

802.11a



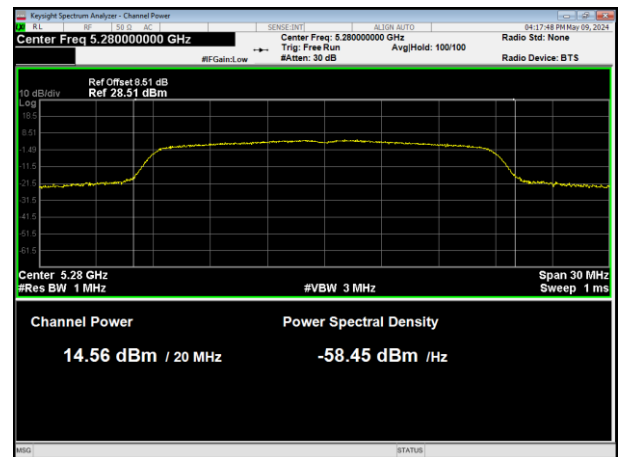
802.11n HT20



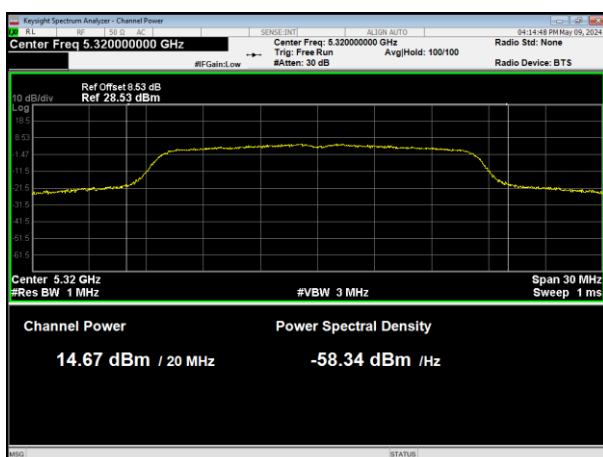
5260MHz



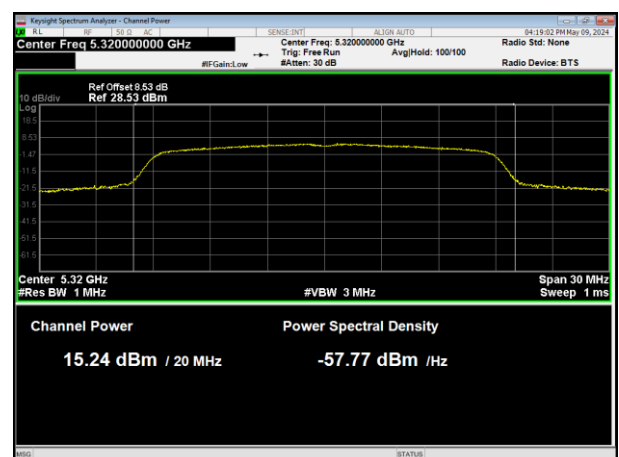
5260MHz



5280MHz

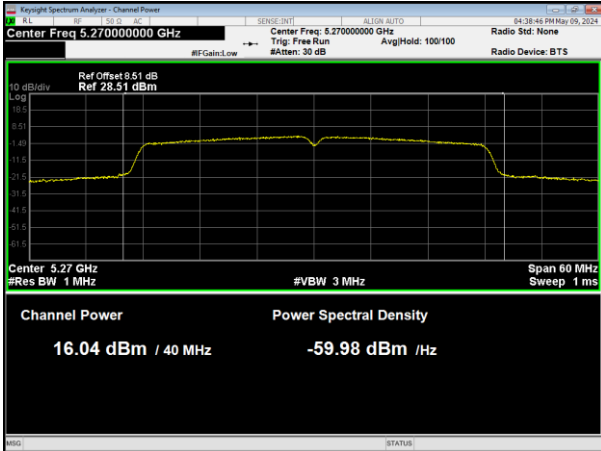
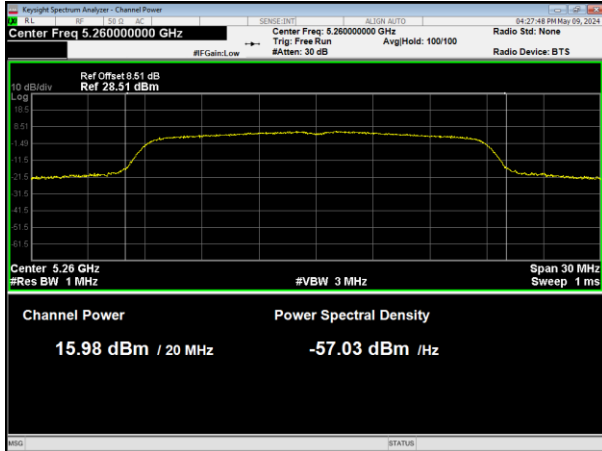
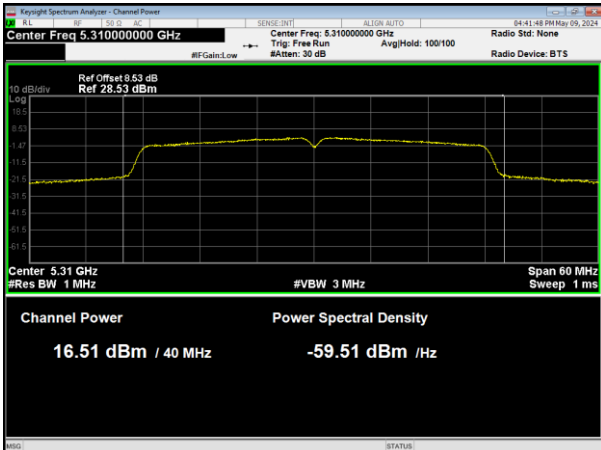
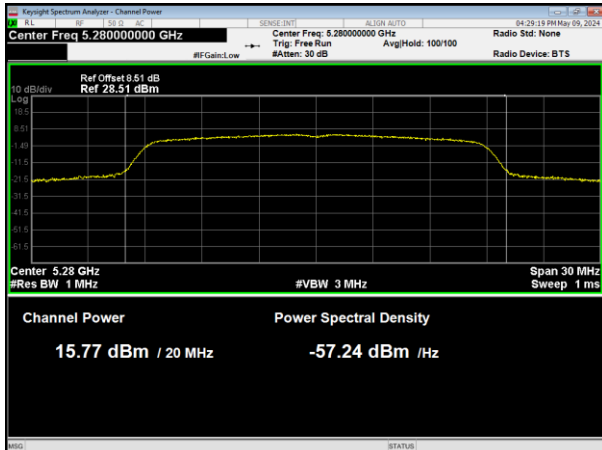
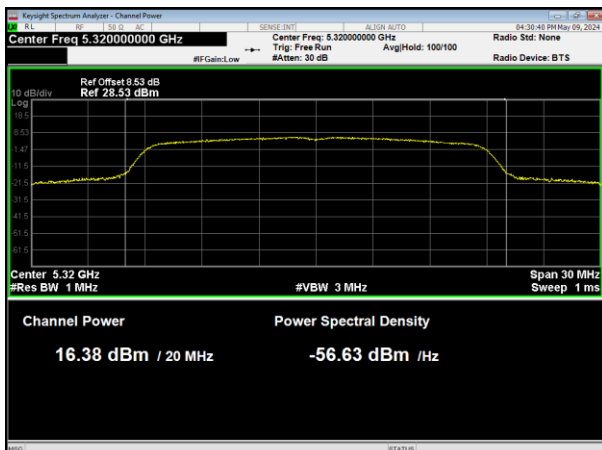


5280MHz

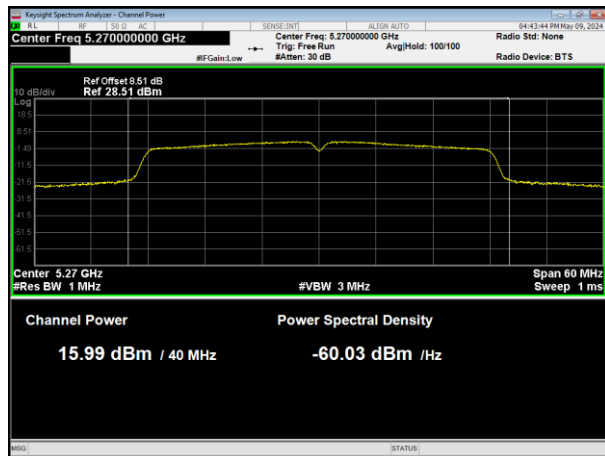


5320MHz

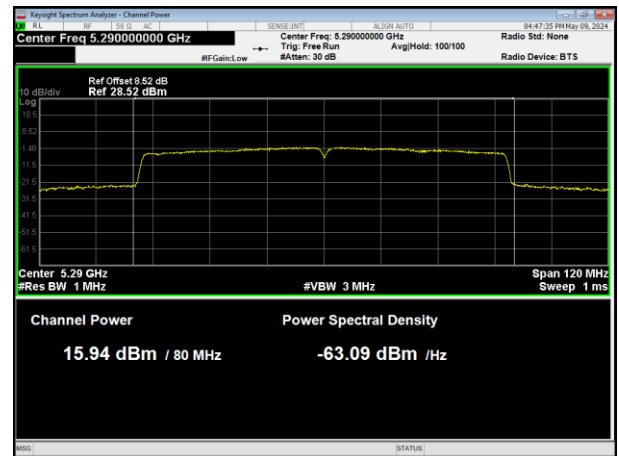
5320MHz

802.11n HT40 	802.11ac HT20 
5270MHz 	5260MHz 
5310MHz 	5280MHz  5320MHz

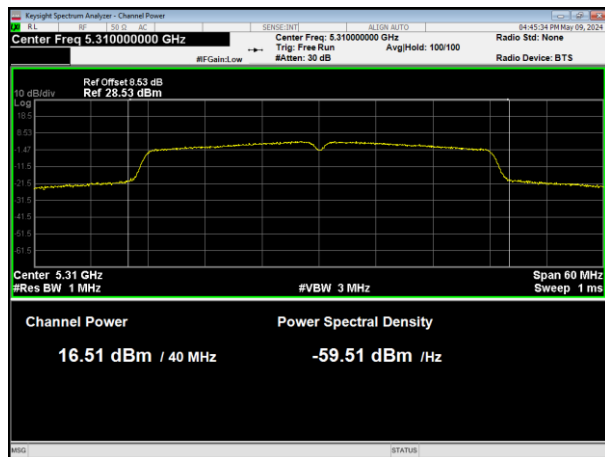
802.11ac HT40



802.11ac HT80



5270MHz



5290MHz

5310MHz

5. POWER SPECTRAL DENSITY TEST

5.1 APPLIED PROCEDURES / LIMIT

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Spectrum Parameters	Setting
Attenuation	Auto
Span Frequency	= the frequency band of operation
RB	RBW $\geq$ 1MHz for band 2 RBW $\geq$ 510KHz for Band 3
VB	VBW $\geq$ 3RBW
Detector	RMS (i.e., power averaging).
Trace	Averaging
Sweep Time	Auto

5.1.1 TEST PROCEDURE

1. Place the EUT on the table and set it in transmitting mode.
2. The testing follows FCC KDB 789033 D02.
3. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to Spectrum.
4. For U-NII1, U-NII-2A, U-NII-2C Band:
Set RBW=1MHz, VBW=3MHz, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
For U-NII-3 Band:
Set RBW=510 kHz, VBW=3*RBW, where span is enough to capture the entire bandwidth, Sweep time = Auto (601 pts), detector = sample, traces 100 sweeps of video averaging. (SA-2 with the omission of procedure x, the integration with 26dB EBW bandwidth)
5. User the cursor on spectrum to peak search the highest level of trace
6. Record the max. reading and add 10 log(1/duty cycle).
we test all antennas, the antenna 1 was worst mode and the data recording in the report.
7. Duty factor Reference is made to the test results in Section 7.1.5.

5.1.2 DEVIATION FROM STANDARD

No deviation.

5.1.3 TEST SETUP



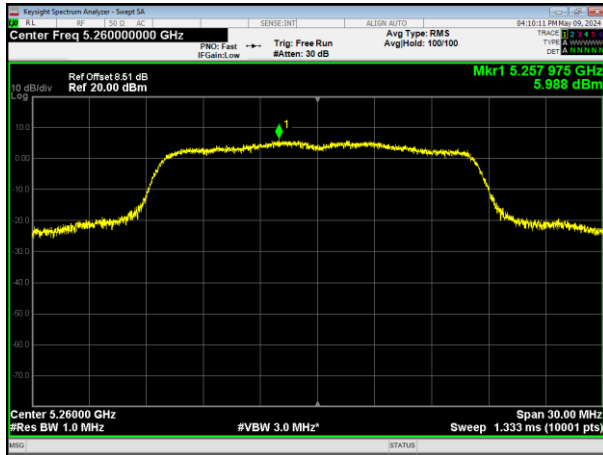
5.1.4 EUT OPERATION CONDITIONS

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

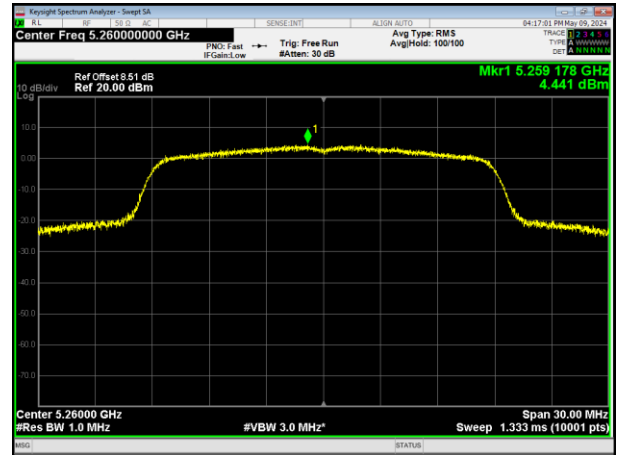
5.1.5 TEST RESULTS

	Mode	Test Channel	Reading Level (dBm)	Duty factor (dB)	PSD (dBm/MHz)	Limit (dBm)	Result
Band2a	802.11a	Low	5.988	0.87	6.858	11.00	PASS
		Middle	4.882	0.87	5.752	11.00	PASS
		High	5.075	0.87	5.945	11.00	PASS
	802.11n20	Low	4.441	0.13	4.571	11.00	PASS
		Middle	4.578	0.13	4.708	11.00	PASS
		High	5.467	0.13	5.597	11.00	PASS
	802.11n40	Low	3.368	0.26	3.628	11.00	PASS
		High	4.066	0.33	4.396	11.00	PASS
	802.11ac20	Low	6.557	0.13	6.687	11.00	PASS
		Middle	6.052	0.16	6.212	11.00	PASS
		High	6.471	0.13	6.601	11.00	PASS
	802.11ac40	Low	3.463	0.26	3.723	11.00	PASS
		High	3.773	0.26	4.033	11.00	PASS
	802.11ac80	/	0.072	0.5	0.572	11.00	PASS

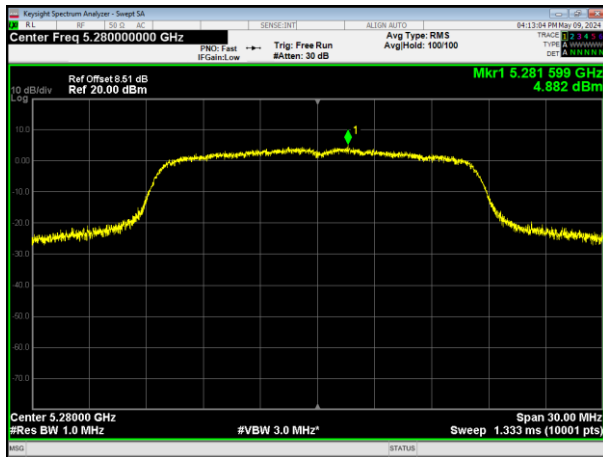
802.11a



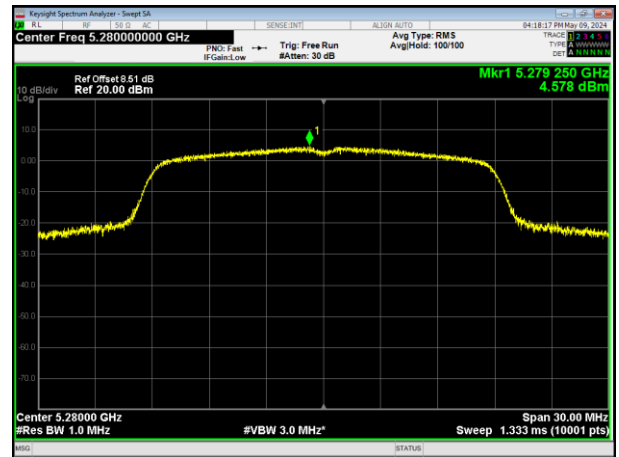
802.11n HT20



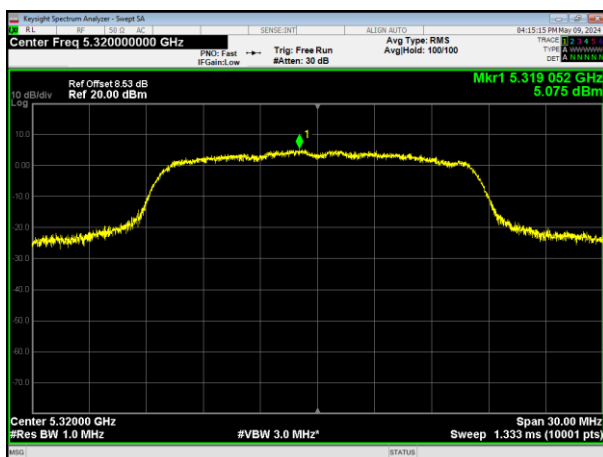
5260MHz



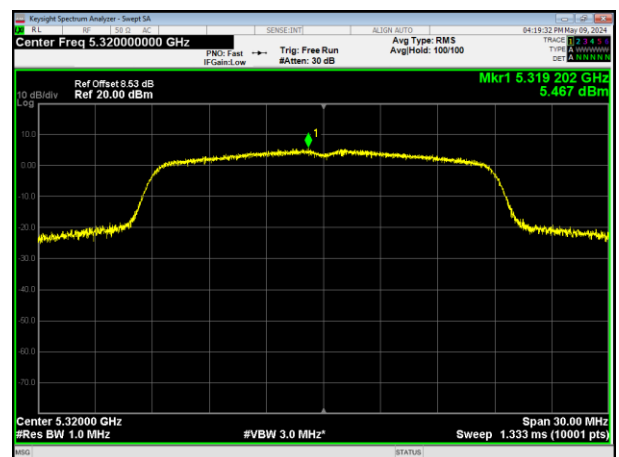
5260MHz



5280MHz



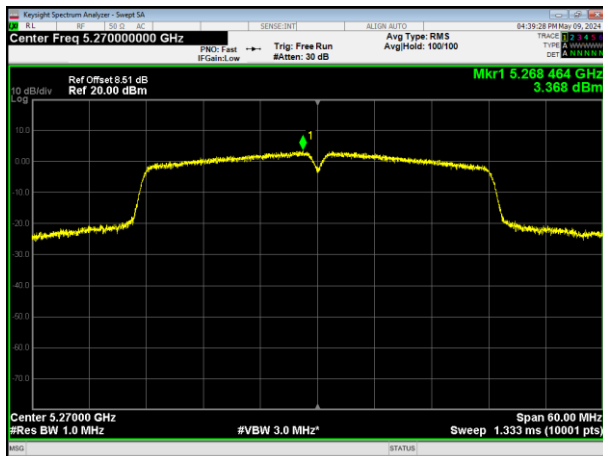
5280MHz



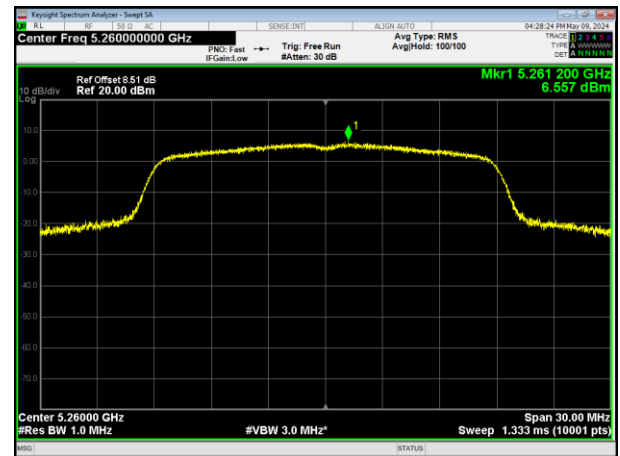
5320MHz

5320MHz

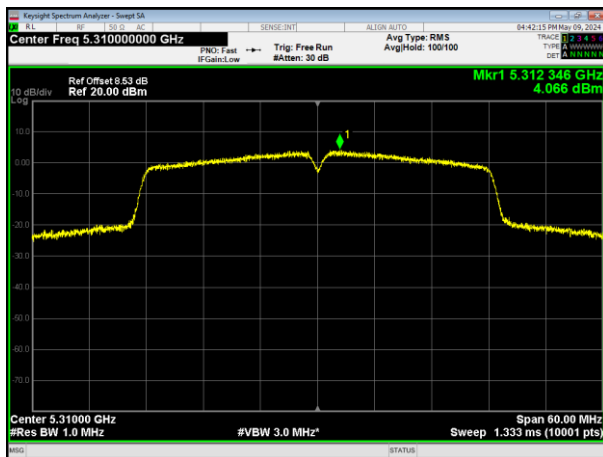
802.11n HT40



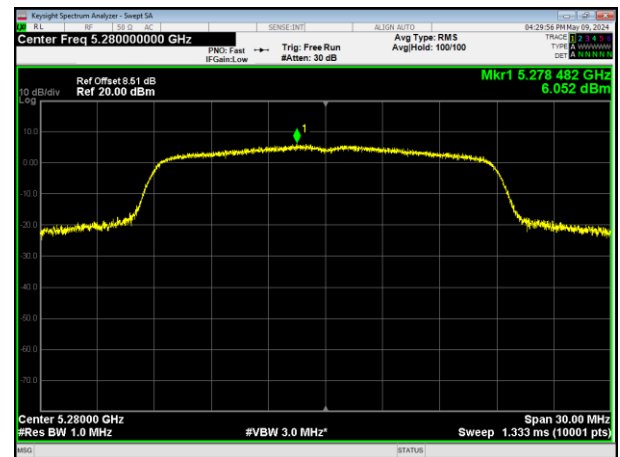
802.11ac HT20



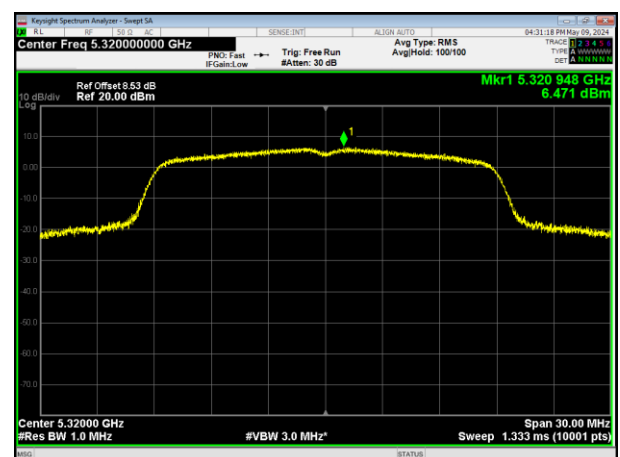
5270MHz



5260MHz



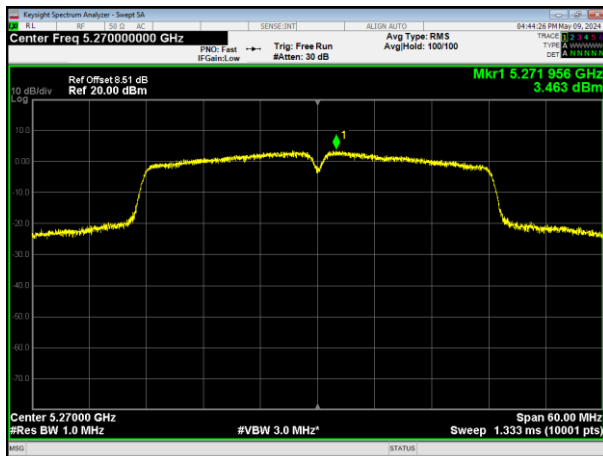
5310MHz



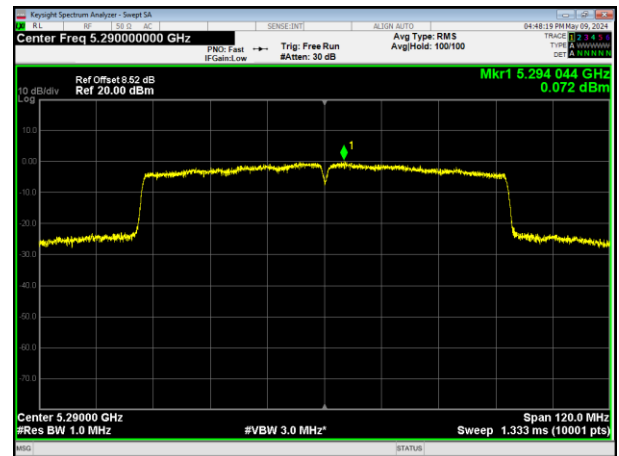
5280MHz

5320MHz

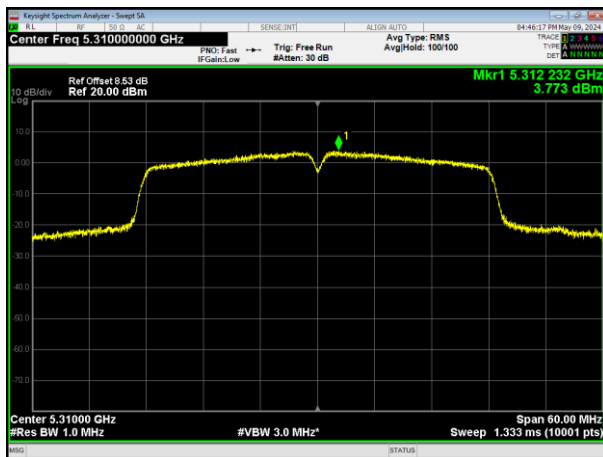
802.11ac HT40



802.11ac HT80



5270MHz



5290MHz

5310MHz

6. 26DB&99% BANDWIDTH TEST

6.1 APPLIED PROCEDURES / LIMIT

The 26 dB bandwidth is used to determine the conducted power limits.

There is no limit bandwidth for U-NII-1, U-NII-2-A and U-NII-2-C.

The minimum of 6dB Bandwidth measurement is 0.5 MHz for U-NII-3

6.1.1 TEST PROCEDURE

26dB Bandwidth	
Spectrum Parameters	Setting
RBW	approximately 1% of the emission bandwidth
VBW	>RBW
Span	30MHz(20MHz Bandwidth mode) 60MHz(40MHz Bandwidth mode) 120MHz(80MHz Bandwidth mode)
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

99% Occupied Bandwidth	
Spectrum Parameters	Setting
RBW	1% to 5% of the OBW
VBW	Approximately three times the RBW
Span	between 1.5 times and 5.0 times the OBW
Sweep Time	Auto
Detector	Peak
Trace Mode	Max Hold

6.1.2 DEVIATION FROM STANDARD

No deviation.

6.1.3 TEST SETUP



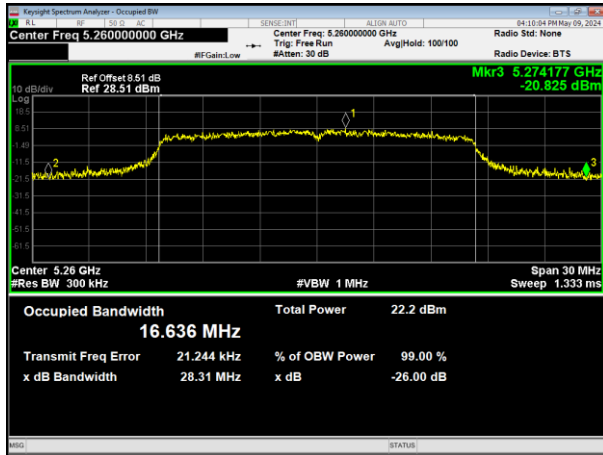
6.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

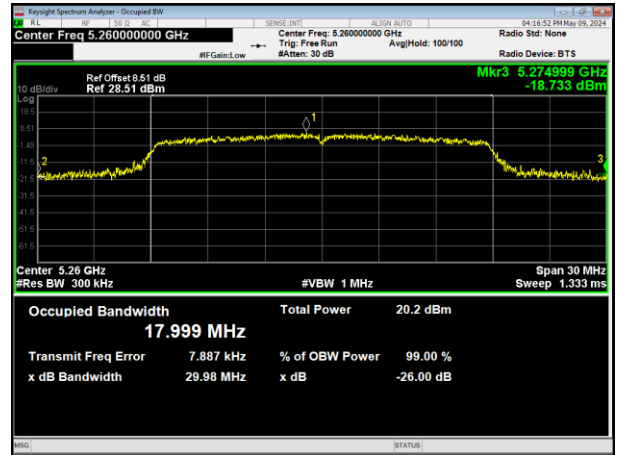
6.1.5 TEST RESULTS

		Test Channel	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	Result
Band 2a	802.11a	Low	28.312	16.636	Pass
		Middle	26.673	16.699	Pass
		High	28.427	16.694	Pass
	802.11n HT20	Low	29.983	17.999	Pass
		Middle	29.954	17.962	Pass
		High	29.714	17.997	Pass
	802.11n HT40	Low	59.655	36.291	Pass
		High	59.949	36.251	Pass
	802.11ac HT20	Low	29.614	17.911	Pass
		Middle	30.000	17.976	Pass
		High	29.881	17.974	Pass
	802.11ac HT40	Low	59.838	36.340	Pass
		High	59.286	36.246	Pass
	802.11ac HT80	/	119.995	76.015	Pass

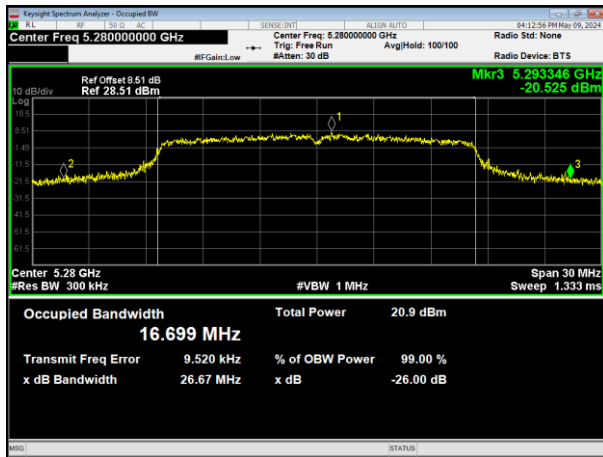
802.11a



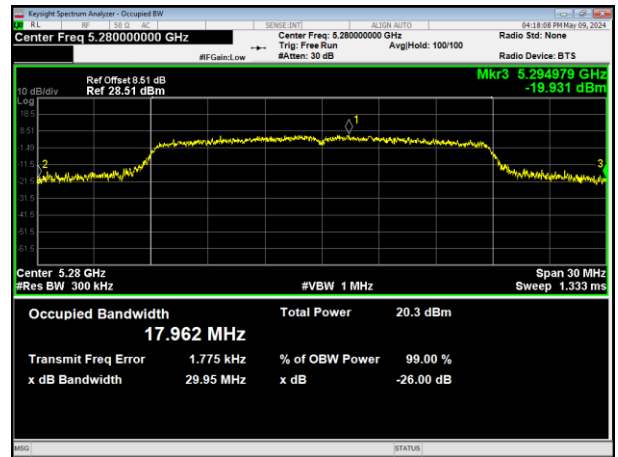
802.11n HT20



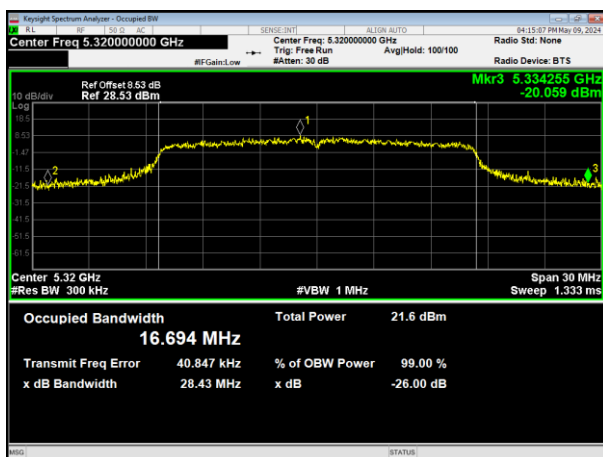
5260MHz



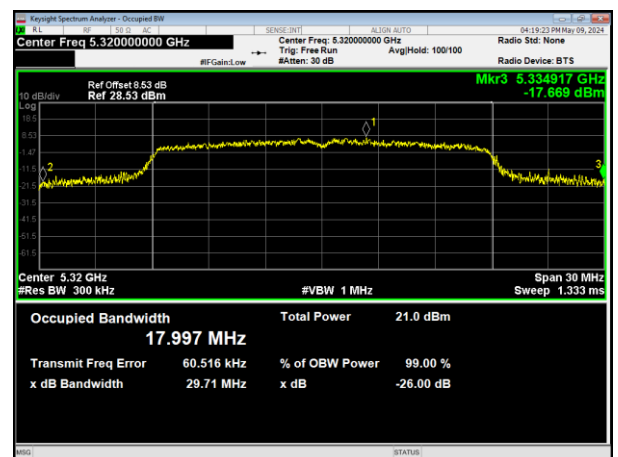
5260MHz



5280MHz



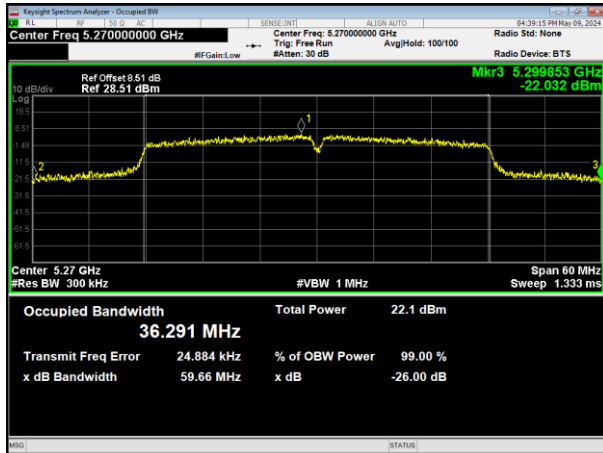
5280MHz



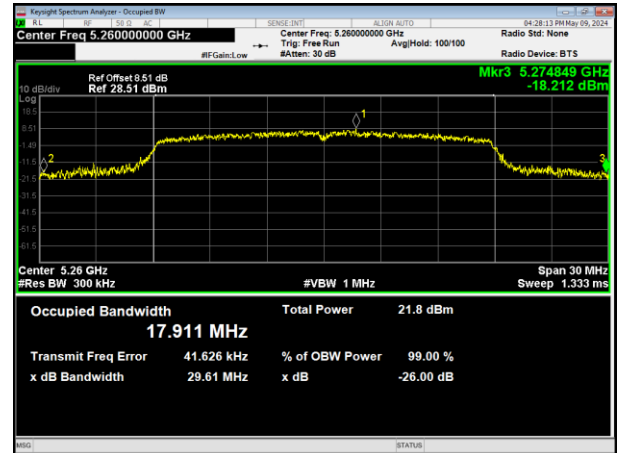
5320MHz

5320MHz

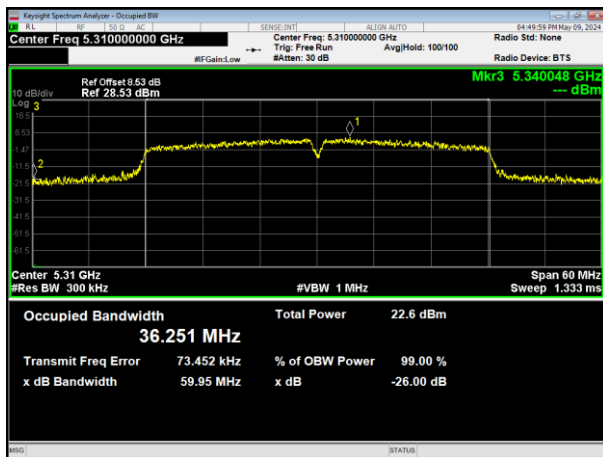
802.11n HT40



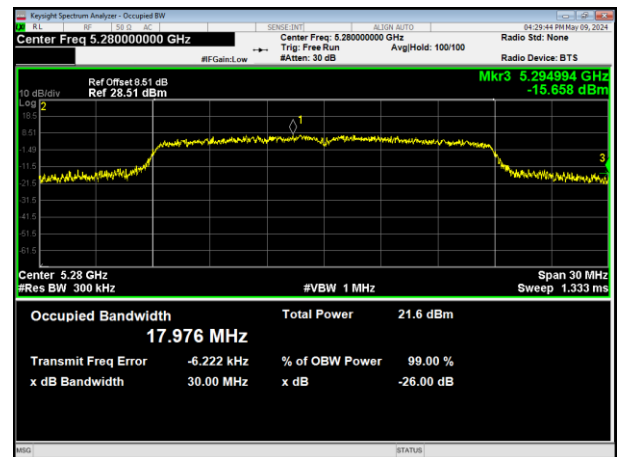
802.11ac HT20



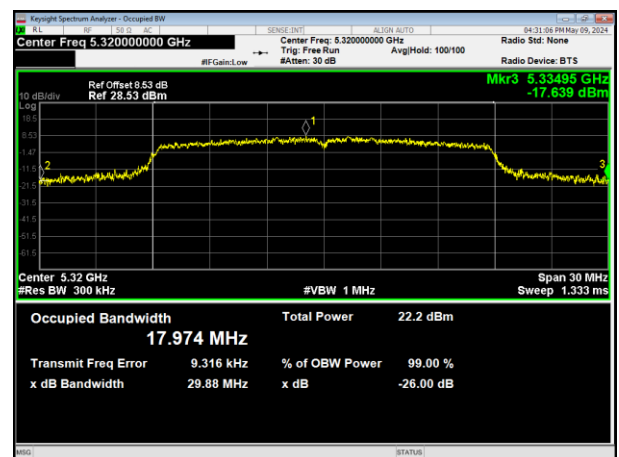
5270MHz



5260MHz

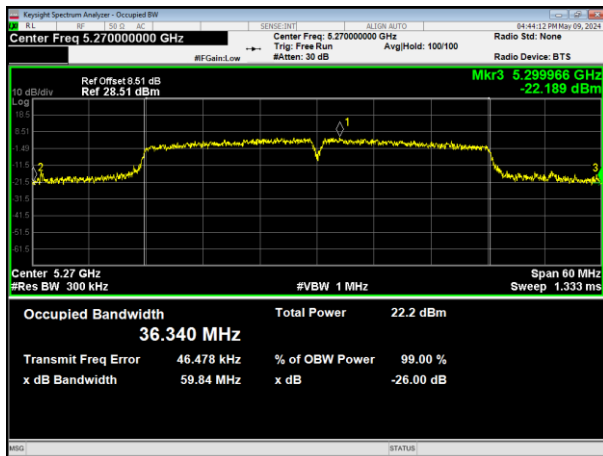


5310MHz

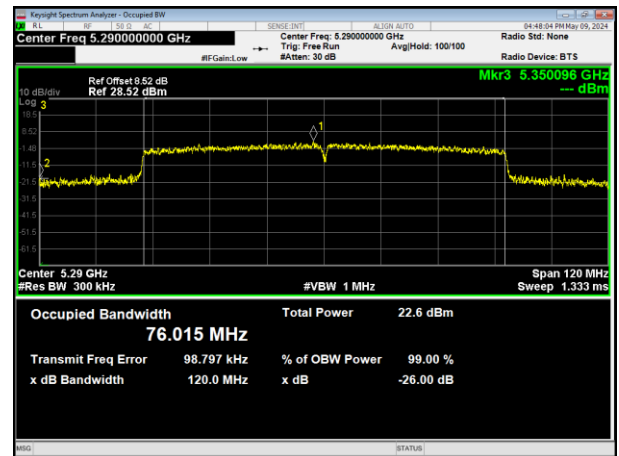


5320MHz

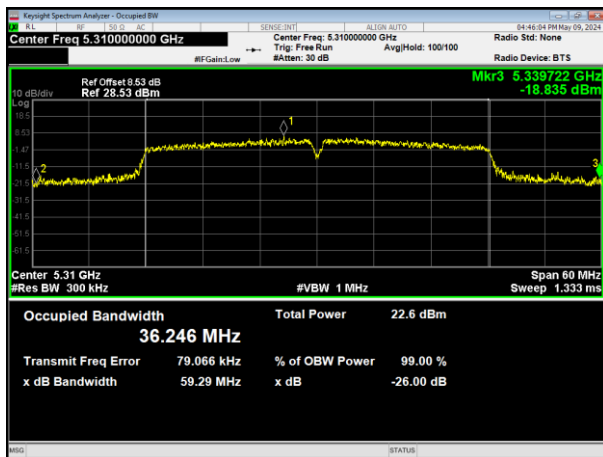
802.11ac HT40



802.11ac HT80



5270MHz



5290MHz

5310MHz

7. DUTY CYCLE TEST SIGNAL

7.1 APPLIED PROCEDURES / LIMIT

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle. All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage.

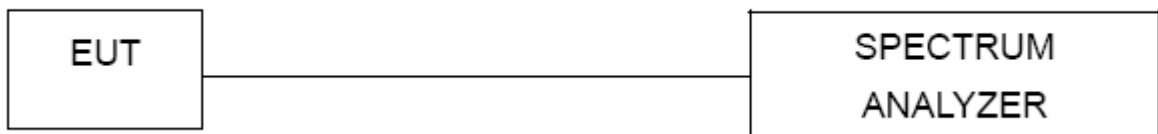
7.1.1 TEST PROCEDURE

1. Set RBW = 1 MHz.
2. Set the video bandwidth (VBW) $\geq$ RBW.
3. Detector = Peak.
4. Sweep = auto couple.
5. Allow the trace to stabilize.
6. Span=0

7.1.2 DEVIATION FROM STANDARD

No deviation.

7.1.3 TEST SETUP



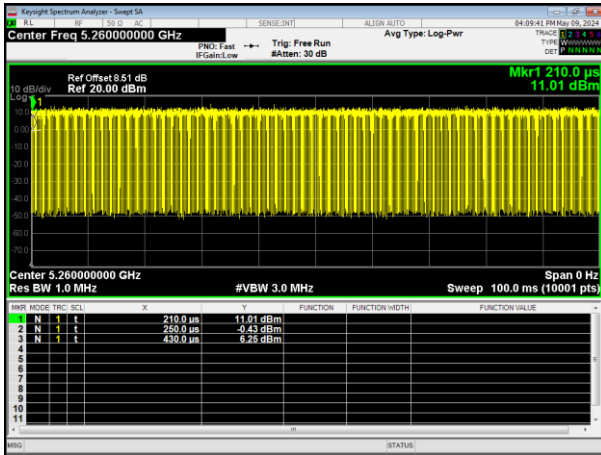
7.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

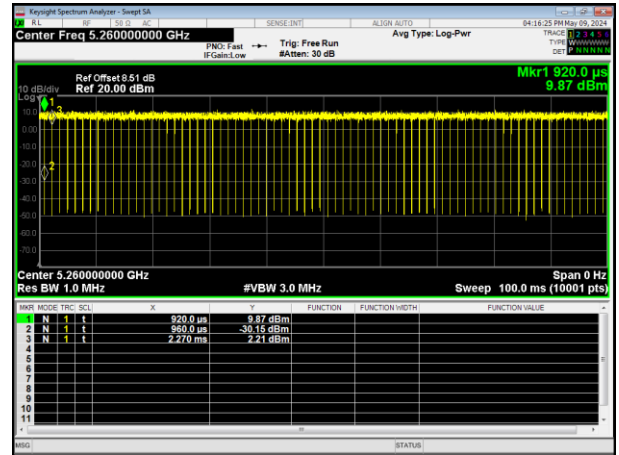
7.1.5 TEST RESULTS

Operation Mode		Duty Cycle(%)	Duty Fator (dB) 10 * log (1/ Duty cycle)
Band 1	802.11a	85.35	0.69
	802.11n(HT20)	97.61	0.11
	802.11n(HT40)	95.36	0.21
	802.11ac(HT20)	97.63	0.1
	802.11ac(HT40)	95.36	0.21
	802.11ac(HT80)	91.22	0.4

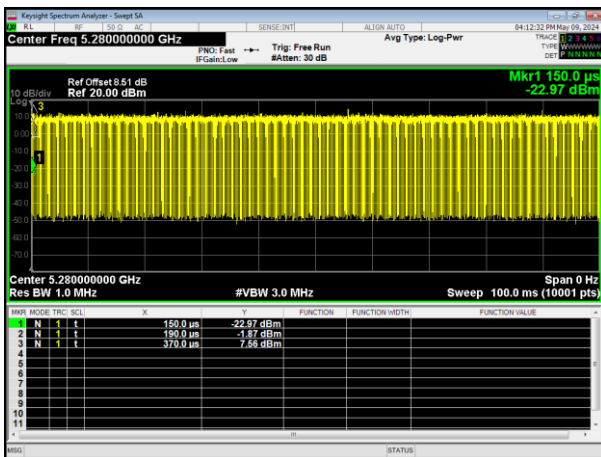
802.11a



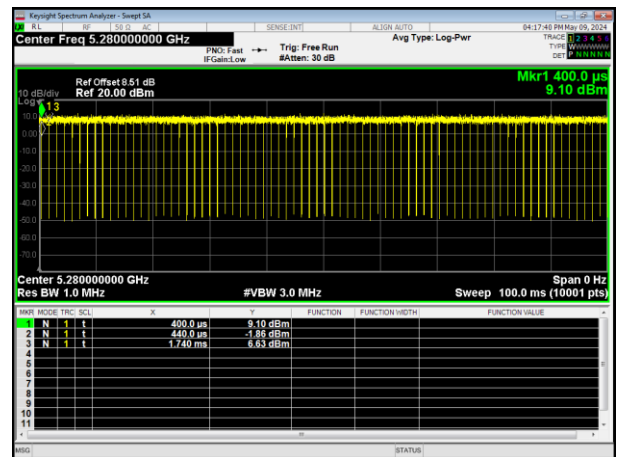
802.11n HT20



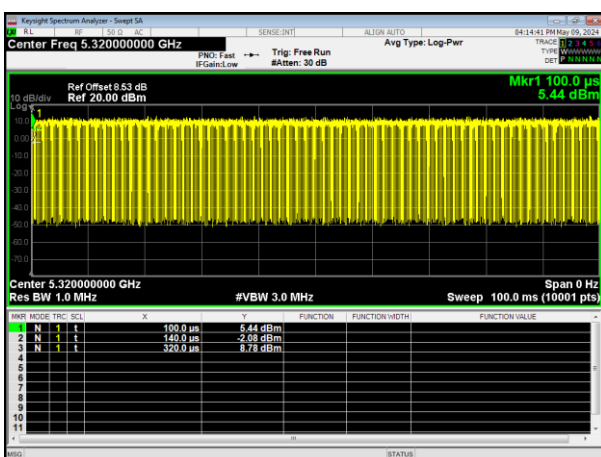
5260MHz



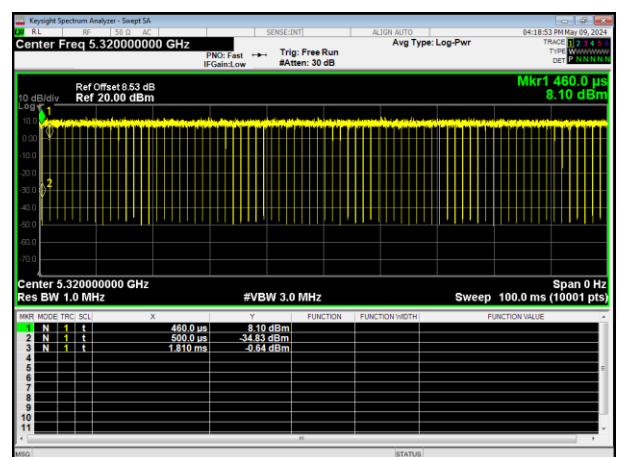
5260MHz



5280MHz



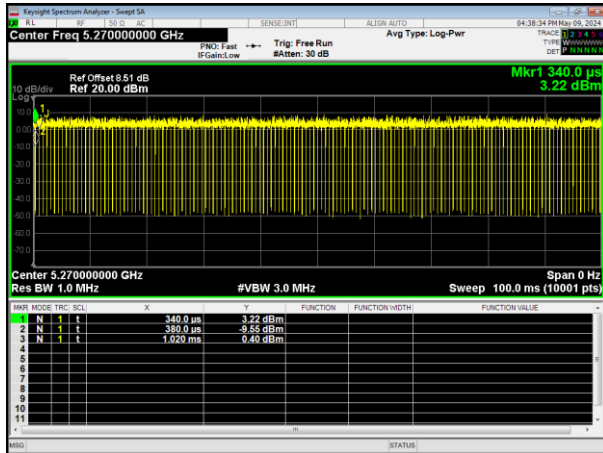
5280MHz



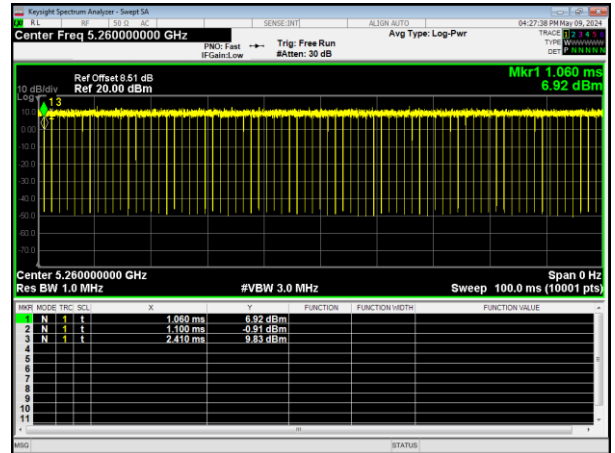
5320MHz

5320MHz

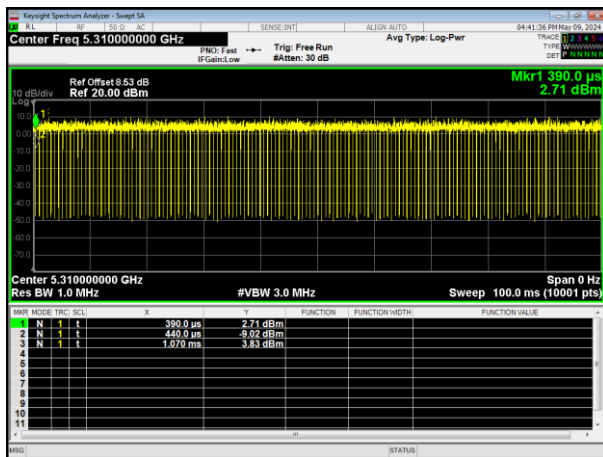
802.11n HT40



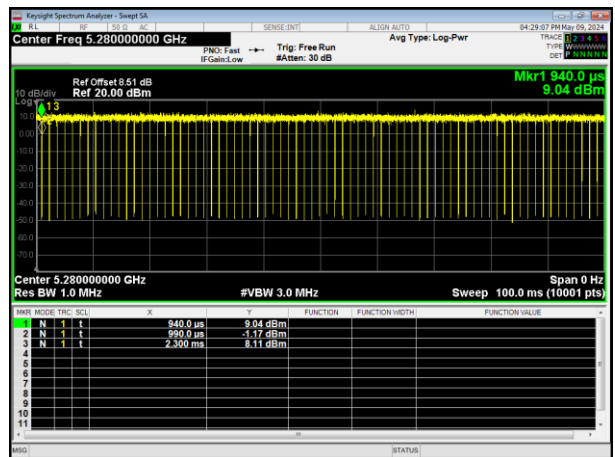
802.11ac HT20



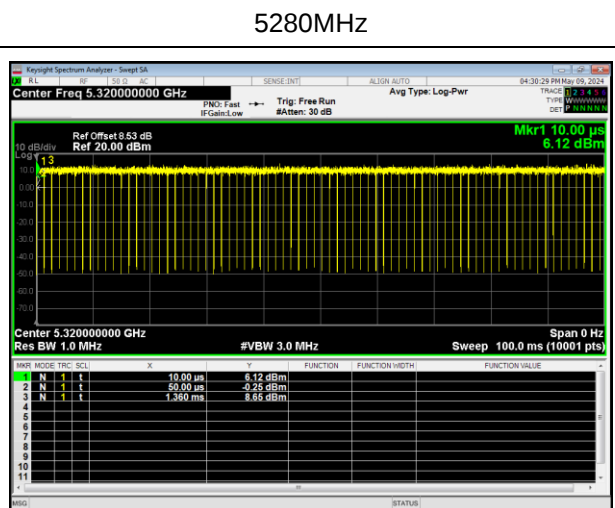
5270MHz



5260MHz



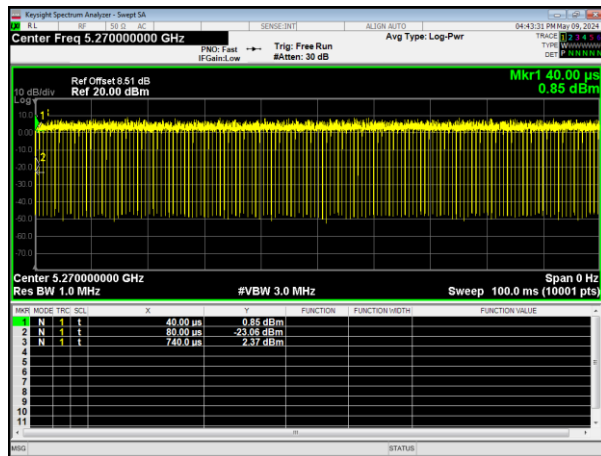
5310MHz



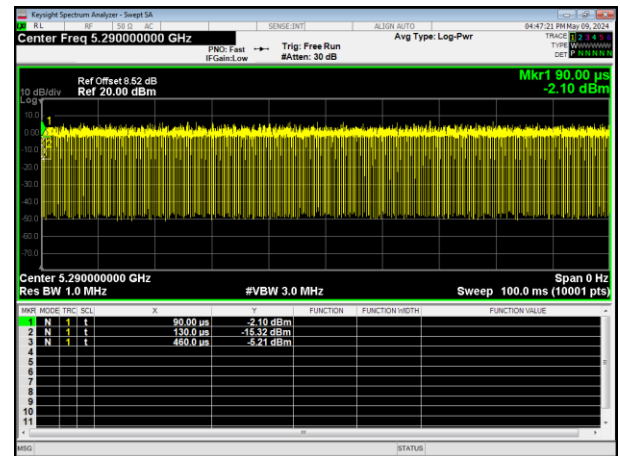
5280MHz

5320MHz

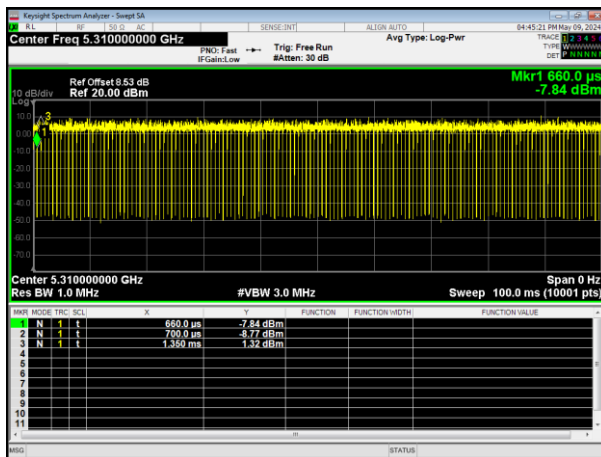
802.11ac HT40



802.11ac HT80



5270MHz



5290MHz

5310MHz

8. FREQUENCY STABILITY

8.1 APPLIED PROCEDURES / LIMIT

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.

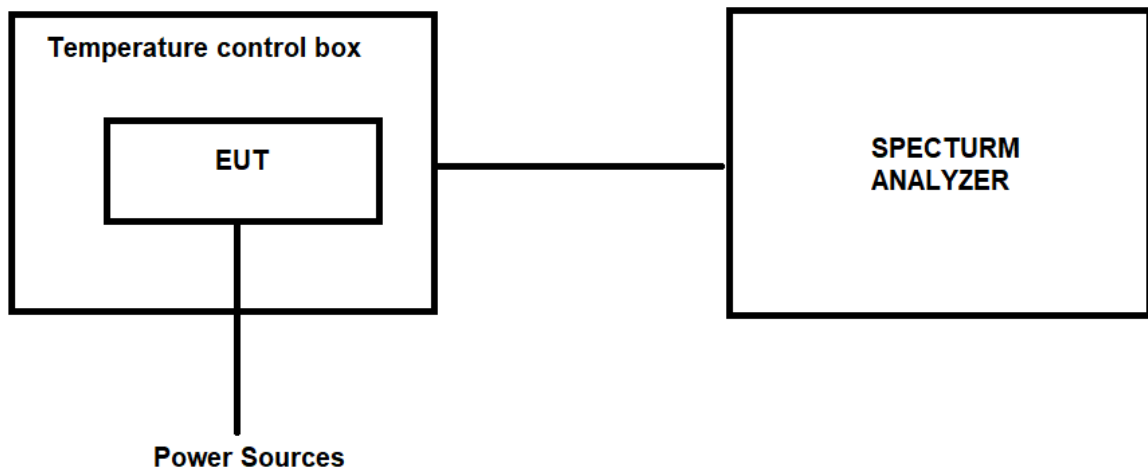
8.1.1 TEST PROCEDURE

1. The EUT was placed inside temperature chamber and powered and powered by nominal DC voltage.
2. Set EUT as normal operation.
3. Turn the EUT on and couple its output to spectrum.
4. Turn the EUT off and set the chamber to the highest temperature specified.
5. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize, turn the EUT and measure the operating frequency.
6. Repeat step with the temperature chamber set to the lowest temperature.

8.1.2 DEVIATION FROM STANDARD

No deviation.

8.1.3 TEST SETUP



8.1.4 EUT OPERATION CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

8.1.5 TEST RESULTS

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)		ΔFrequency (MHz)	
			802.11a	802.11n HT20	802.11a	802.11n HT20
4.07V	-20℃	5260.0000	5260.0239	5260.0119	-0.0239	-0.0119
		5280.0000	5280.0280	5280.0195	-0.0280	-0.0195
		5320.0000	5320.0230	5320.0095	-0.0230	-0.0095
3.33V		5260.0000	5260.0309	5260.0139	-0.0309	-0.0139
		5280.0000	5280.0239	5280.0728	-0.0239	-0.0728
		5320.0000	5320.0174	5320.0395	-0.0174	-0.0395
3.7V	25℃	5260.0000	5260.0240	5260.0305	-0.0240	-0.0305
		5280.0000	5280.0289	5280.0395	-0.0289	-0.0395
		5320.0000	5320.0241	5320.0284	-0.0241	-0.0284
4.07V	50℃	5260.0000	5260.0261	5260.0230	-0.0261	-0.0230
		5280.0000	5280.0241	5280.0117	-0.0241	-0.0117
		5320.0000	5320.0260	5320.0141	-0.0260	-0.0141
3.33V		5260.0000	5260.0241	5260.0284	-0.0241	-0.0284
		5280.0000	5280.0260	5280.0150	-0.0260	-0.0150
		5320.0000	5320.0141	5320.0130	-0.0141	-0.0130

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	ΔFrequency (MHz)
			802.11ac 20	802.11ac 20
4.07V	-20℃	5260.0000	5260.0208	-0.0208
		5280.0000	5280.0165	-0.0165
		5320.0000	5320.0016	-0.0016
3.33V		5260.0000	5260.0097	-0.0097
		5280.0000	5280.0205	-0.0205
		5320.0000	5320.0216	-0.0216
3.7V	25℃	5260.0000	5260.0407	-0.0407
		5280.0000	5280.0086	-0.0086
		5320.0000	5320.0085	-0.0085
4.07V	50℃	5260.0000	5260.0206	-0.0206
		5280.0000	5280.0137	-0.0137
		5320.0000	5320.0305	-0.0305
3.33V		5260.0000	5260.0308	-0.0308
		5280.0000	5280.0259	-0.0259
		5320.0000	5320.0308	-0.0308

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)		ΔFrequency (MHz)	
			802.11ac 40	802.11n HT40	802.11ac 40	802.11n HT40
4.07V	-20℃	5270.000	5270.0161	5270.0319	-0.0161	-0.0319
		5310.000	5310.0302	5310.0430	-0.0302	-0.0430
3.33V		5270.000	5270.0210	5270.0350	-0.0210	-0.0350
		5310.000	5310.0275	5310.0252	-0.0275	-0.0252
3.7V	25℃	5270.000	5270.0194	5270.0430	-0.0194	-0.0430
		5310.000	5310.0613	5310.0496	-0.0613	-0.0496
4.07V	50℃	5270.000	5270.0594	5270.0617	-0.0594	-0.0617
		5310.000	5310.0506	5310.0474	-0.0506	-0.0474
3.33V		5270.000	5270.0496	5270.0341	-0.0496	-0.0341
		5310.000	5310.0305	5310.0374	-0.0305	-0.0374

Test Voltage	Test Temp.	Measured Frequency (MHz)	Spectrum Frequency (MHz)	Δ Frequency (MHz)
			802.11ac 80	802.11ac 80
4.07V	-20°C	5290.0000	5290.0228	-0.0228
3.33V		5290.0000	5290.0341	-0.0341
3.7V	25°C	5290.0000	5290.0620	-0.0620
4.07V	50°C	5290.0000	5290.0648	-0.0648
3.33V		5290.0000	5290.0422	-0.0422

9. TRANSMISSION IN THE ABSENCE OF DATA

9.1 STANDARD REQUIREMENT

According to §15.407(c)

The device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the use of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application for equipment authorization a description of how this requirement is met.

9.2 TEST RESULT

No non-compliance noted:
Refer to the theory of operation.

10. ANTENNA REQUIREMENT

10.1 STANDARD REQUIREMENT

15.203 requirement: For intentional device, according to 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.

10.2 EUT ANTENNA

The EUT antenna is equipped unique antenna connector and antenna gain less than 6dBi, It comply with the standard requirement.

11. TEST SEUUP PHOTO

Reference to the appendix I for details.

12. EUT PHOTO

Reference to the appendix II for details.

***** END OF REPORT *****