

FCC RADIO TEST REPORT

FCC ID: 2BCH6-S-68

Sample : S-68 Karaoke Machine

Trade Mark : N/A

Main Model : S-68

Additional Model : N/A

Report No. : UNIA24030409ER-62

Prepared for

Guangzhou Suoka Technology & Eletronics Co., LTD
No.10 North Street, Hengli Industry Zone, Renhe Town, Baiyun District,
Guangzhou, Guangdong, China

Prepared by

Shenzhen United Testing Technology Co., Ltd.
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Dalang Sub-District, Longhua District, Shenzhen, Guangdong, China

TEST RESULT CERTIFICATION

Applicant.....: Guangzhou Suoka Technology & Eletronics Co., LTD
Address.....: No.10 North Street, Hengli Industry Zone, Renhe Town, Baiyun District, Guangzhou, Guangdong, China
Manufacturer: Guangzhou Suoka Technology & Eletronics Co., LTD
Address.....: No.10 North Street, Hengli Industry Zone, Renhe Town, Baiyun District, Guangzhou, Guangdong, China

Product description

Product: S-68 Karaoke Machine
Trade Mark.....: N/A
Model Name.....: S-68

Test Methods: FCC Rules and Regulations Part 15 Subpart C Section 15.407
ANSI C63.10: 2013

This device described above has been tested by Shenzhen United Testing Technology Co., Ltd., and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.
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Date of Test

Date (s) of performance of tests: Mar. 06, 2024 ~ Mar. 18, 2024
Date of Issue: Mar. 19, 2024
Test Result.....: Pass

Prepared by:



Jason Ye/Editor

Reviewer:



Kelly Cheng/Supervisor

Approved & Authorized Signer:



Liuze/Manager

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1 TEST SUMMARY

1.1 TEST PROCEDURES AND RESULTS

Item	FCC Rules	Description Of Test	Result
1	FCC Part 15.407	6dB Bandwidth	Pass
2	FCC Part 15.407	Emission Bandwidth	Pass
3	FCC Part 15.407	Maximum conducted output power	Pass
4	FCC Part 15.407	Conducted Spurious Emission	Pass
5	FCC Part 15.407	Maximum Conducted Output Power Density	Pass
6	FCC Part 15.209	Radiated Emission	Pass
7	FCC Part 15.407	Band Edges	Pass
8	FCC Part 15.207	Line Conduction Emission	Pass
9	FCC Part 15.203	Antenna Requirement	Pass

Note:

“N/A” denotes test is not applicable in this Test Report.

1.2 TEST FACILITY

Test Firm : Shenzhen United Testing Technology Co., Ltd.
Address : D101&D401, No. 107, Kaicheng High-Tech Park, Taoyuan Community,
Dalang Sub-District, Longhua District, Shenzhen, Guangdong, China

The testing quality ability of our laboratory meet with "Quality Law of People's Republic of China" Clause 19. The testing quality system of our laboratory meets with ISO/IEC-17025 requirements. This approval result is accepted by MRA of APLAC.

Our test facility is recognized, certified, or accredited by the following organizations:

A2LA Certificate Number: 4747.01

The EMC Laboratory has been accredited by A2LA, and in compliance with ISO/IEC 17025:2017 General Requirements for testing Laboratories.

FCC Registration Number: 674885

The EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications commission.

IC Registration Number: 31584

The EMC Laboratory has been registered and fully described in a report filed with the (IC) Industry Canada.

1.3 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 %.

A. Conducted Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)
UNI	ANSI	9kHz ~ 150kHz	2.96
		150kHz ~ 30MHz	2.44

B. Radiated Measurement:

Test Site	Method	Measurement Frequency Range	U, (dB)
UNI	ANSI	9kHz ~ 30MHz	2.50
		30MHz ~ 1000MHz	4.80
		1000MHz ~ 18000MHz	4.13

C. RF Conducted Method:

Item	Measurement Uncertainty
Uncertainty of total RF power, conducted	$U_c = \pm 0.8$ dB
Uncertainty of RF power density, conducted	$U_c = \pm 2.6$ dB
Uncertainty of spurious emissions, conducted	$U_c = \pm 2$ %
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2$ %

1.4 ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15~35 °C
Relative Humidity:	30~60 %
Air Pressure:	950~1050 hPa

2 GENERAL INFORMATION

2.1 GENERAL DESCRIPTION OF EUT

Product:	S-68 Karaoke Machine
Trade Mark:	N/A
Main Model:	S-68
Additional Model:	N/A
Model Difference:	N/A
FCC ID:	2BCH6-S-68
Operation Frequency:	Band 1: 5150 MHz~5250MHz
Number of Channels:	7CH
Modulation Type:	OFDM
Maximum Peak Conducted Output Power:	Band 1: 12.945dBm;
Antenna Type:	Internal Antenna
Antenna Gain:	Band 1: 2.25dBi
Battery:	DC 12.8V, 8400mAh
Adapter:	Model: BYX3-1503000U Input: AC 100-240V, 50/60Hz, 1.0A Max Output: DC 15V, 3A
Power Source:	DC 15V from adapter or DC 12.8V from Li-battery

2.2 CARRIER FREQUENCY OF CHANNELS

Frequency Band	Channel Number	Frequency
5150 MHz ~ 5250MHz	36	5180 MHz
	38	5190 MHz
	40	5200 MHz
	42	5210 MHz
	44	5220 MHz
	46	5230 MHz
	48	5240 MHz

Note:

For 20MHz bandwidth system use Channel 36, 40, 48; For 40MHz bandwidth system use Channel 38, 46.

2.3 TEST MODE

Mode	Tested channel	Modulation	Date rate(Mbps)
802.11a/n20	36, 40, 48	OFDM	6Mbps/MCS0

Note:

1. The EUT has been set to operate continuously on tested channel individually, and the EUT is operating at its maximum duty cycle>or equal 98%.
2. All modes under which configure applicable have been tested and the worst mode test data recording in the test report, if no other mode data.

2.4 DESCRIPTION OF THE TEST MODES

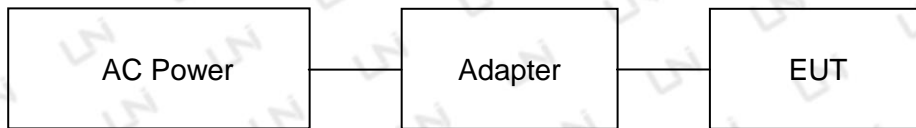
During the measurement the environmental conditions were within the listed ranges:

Voltage	Normal Voltage	DC 12.8V
	High Voltage	DC 14.08V
	Low Voltage	DC 11.52V
Other	Normal Temperature	24°C
	Relative Humidity	55 %
	Air Pressure	989 hPa

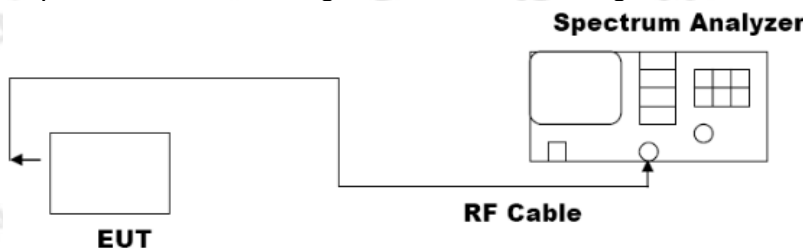
Note: All modes were test at Normal Voltage, High Voltage, and Low Voltage, only the worst results of Normal Voltage was reported in the test report.

2.5 TEST SETUP

Operation of EUT during Radiation testing:



Operation of EUT during RF Conducted testing:



2.6 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

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.	Cable Length(m)	Note
1	S-68 Karaoke Machine	S-68	--	EUT

Note:

1. The support equipment was authorized by Declaration of Confirmation.
2. All the above equipment/cables were placed in worse case positions to maximize emission signals during emission test.

2.7 MEASUREMENT INSTRUMENTS LIST

Item	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
Conduction Emissions Measurement					
1	Conducted Emission Test Software	EZ-EMC	Ver.CCS-3A1-CE	N/A	N/A
2	AMN	Schwarzbeck	NNLK8121	8121370	2024.06.11
3	AAN	TESEQ	T8-Cat6	38888	2024.06.11
4	Pulse Limiter	CYBRTEK	EM5010	E115010056	2024.06.11
5	EMI Test Receiver	Rohde&Schwarz	ESCI	101210	2024.06.11
Radiated Emissions Measurement					
1	Radiated Emission Test Software	EZ-EMC	Ver.CCS-03A1	N/A	N/A
2	Horn Antenna	Sunol	DRH-118	A101415	2025.07.14
3	Broadband Hybrid Antenna	Sunol	JB1	A090215	2025.07.28
4	PREAMP	HP	8449B	3008A00160	2024.06.11
5	PREAMP	HP	8447D	2944A07999	2024.06.11
6	EMI TEST RECEIVER	Rohde&Schwarz	ESR3	101891	2024.06.11
7	VECTOR Signal Generator	Rohde&Schwarz	SMU200A	101521	2024.06.11
8	Signal Generator	Agilent	E4421B	MY4335105	2024.06.11
9	MXA Signal Analyzer	Agilent	N9020A	MY50510140	2024.06.11
10	MXA Signal Analyzer	Keysight	N9020A	MY51110104	2024.06.11
11	RF Power sensor	DARE	RPR3006W	15I00041SNO88	2024.06.11
12	RF Power sensor	DARE	RPR3006W	15I00041SNO89	2024.06.11
13	RF power divider	Anritsu	K241B	992289	2024.06.11
14	Wideband radio communication tester	Rohde&Schwarz	CMW500	154987	2024.06.11
15	Active Loop Antenna	Com-Power	AL-130R	10160009	2024.06.11
16	Broadband Hybrid Antennas	Schwarzbeck	VULB9163	VULB9163#958	2024.09.22
17	Horn Antenna	Schwarzbeck	BBHA9120D	9120D-1680	2025.07.14
18	Horn Antenna	A-INFOMW	LB-180400-KF	J211060660	2024.07.14
19	Microwave Broadband Preamplifier	Schwarzbeck	BBV 9721	100472	2024.09.22
20	Signal Generator	Agilent	N5183A	MY47420153	2024.09.22
21	Spectrum Analyzer	Rohde&Schwarz	FSP 40	100501	2024.09.22
22	Power Meter	KEYSIGHT	N1911A	MY50520168	2024.09.22
23	Frequency Meter	VICTOR	VC2000	997406086	2024.09.22
24	DC Power Source	HYELEC	HY5020E	055161818	2024.09.22

3 CONDUCTED EMISSION

3.1 TEST LIMIT

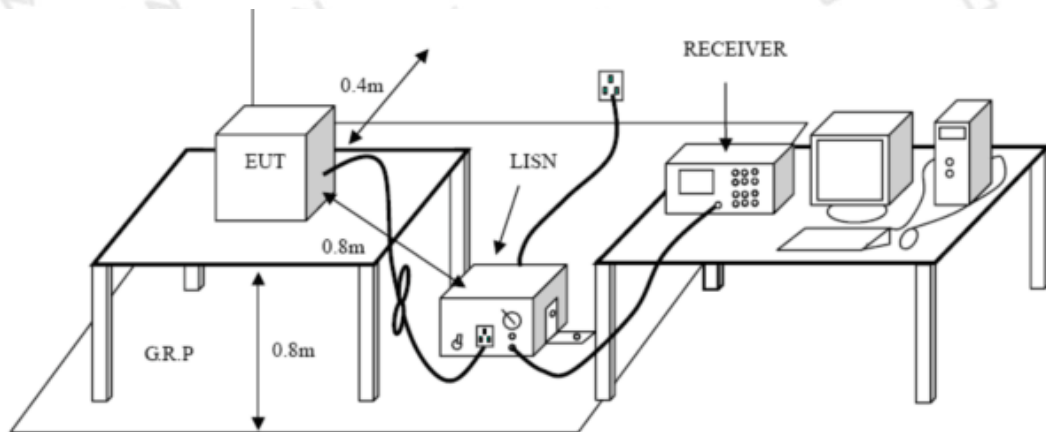
For unintentional device, according to § 15.207(a) Line Conducted Emission Limits is as following

Frequency (MHz)	Maximum RF Line Voltage (dB μ V)			
	CLASS A		CLASS B	
	Q.P.	Ave.	Q.P.	Ave.
0.15~0.50	79	66	66~56*	56~46*
0.50~5.00	73	60	56	46
5.00~30.0	73	60	60	50

* Decreasing linearly with the logarithm of the frequency.

For intentional device, according to §15.207(a) Line Conducted Emission Limit is same as above table.

3.2 TEST SETUP



3.3 TEST PROCEDURE

1. The equipment was set up as per the test configuration to simulate typical actual usage per the user's manual. The EUT is placed on a wooden table with a height of 0.8 meters is used and is placed on the ground plane as per ANSI C63.10.
2. Support equipment, if needed, was placed as per ANSI C63.10.
3. All I/O cables were positioned to simulate typical actual usage as per ANSI C63.10.
4. If a EUT received DC power from the USB Port of Notebook PC, the PC's adapter received AC120V/60Hz power through a Line Impedance Stabilization Network (LISN) which supplied power source and was grounded to the ground plane.
5. All support equipments received AC power from a second LISN, if any.
6. The EUT test program was started. Emissions were measured on each current carrying line of the EUT using a spectrum Analyzer / Receiver connected to the LISN powering the EUT. The LISN has two monitoring points: Line 1 (Hot Side) and Line 2 (Neutral Side). Two scans were taken: one with Line 1 connected to Analyzer / Receiver and Line 2 connected to a 50 ohm load; the second scan had Line 1 connected to a 50 ohm load and Line 2 connected to the Analyzer / Receiver.
7. Analyzer / Receiver scanned from 150 kHz to 30MHz for emissions in each of the test modes.

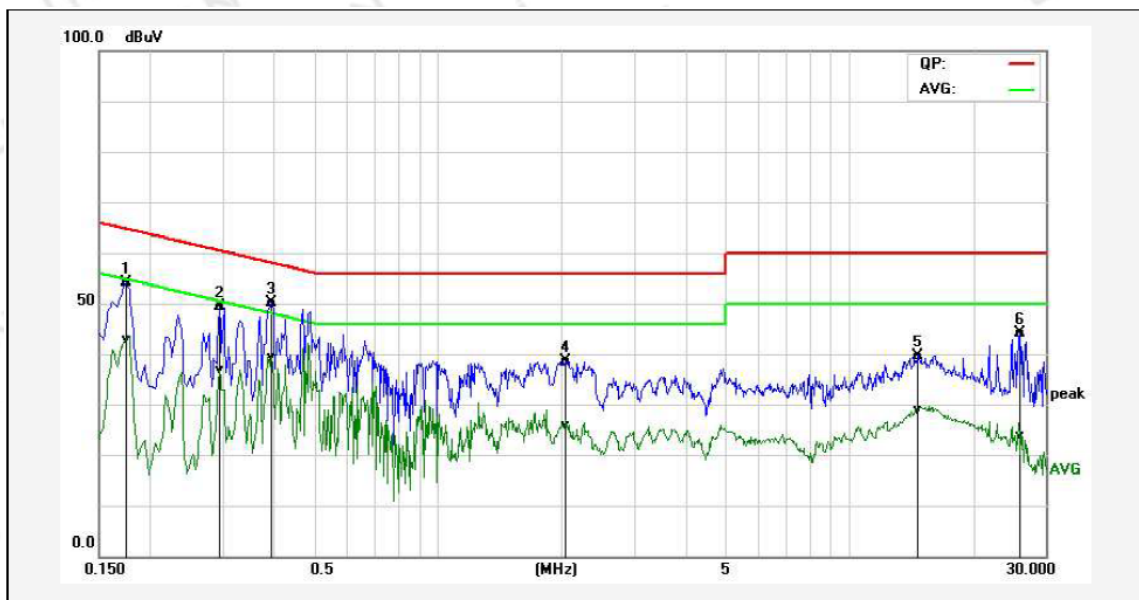
3.4 TEST RESULT

PASS

Remark:

1. All modes were test at Low, Middle, and High channel, only the worst result of Band 1 802.11a Low Channel was reported for below 1GHz test.
2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "X axis" position was the worst, and test data recorded in this report.

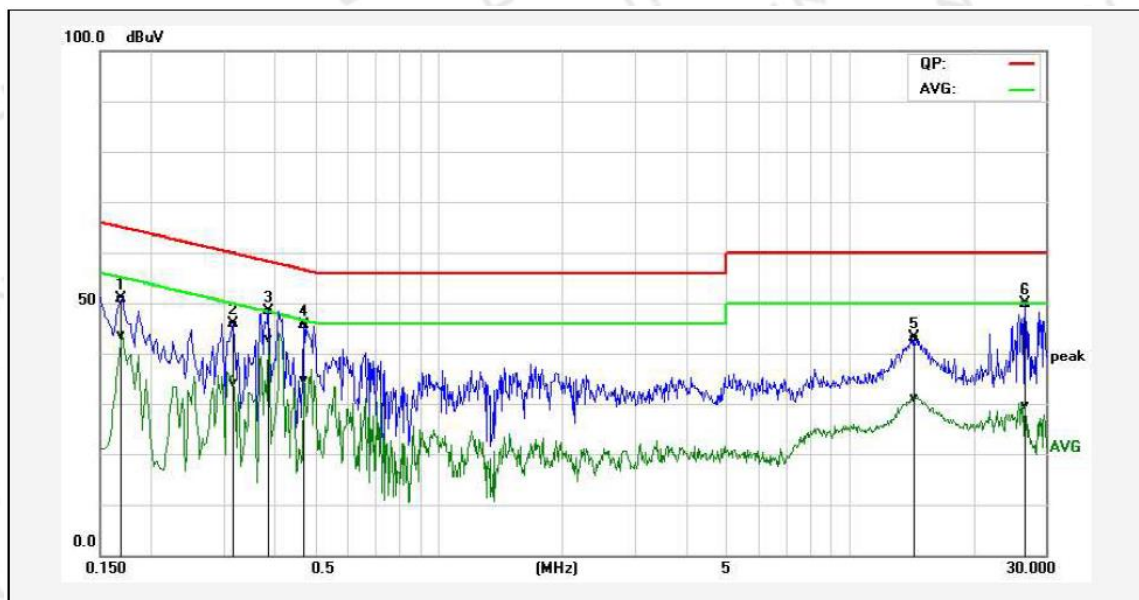
Temperature:	24℃	Relative Humidity:	48%
Test Date:	Mar. 04, 2024	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Line
Test Mode:	Transmitting mode of Band 1 802.11a 5180MHz		



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1P	0.1740	43.31	32.14	10.81	54.12	42.95	64.77	54.77	-10.65	-11.82	Pass
2P	0.2940	38.82	26.14	10.62	49.44	36.76	60.41	50.41	-10.97	-13.65	Pass
3*	0.3940	39.46	28.81	10.66	50.12	39.47	57.98	47.98	-7.86	-8.51	Pass
4P	2.0340	27.69	14.84	10.93	38.62	25.77	56.00	46.00	-17.38	-20.23	Pass
5P	14.6740	23.93	13.04	15.77	39.70	28.81	60.00	50.00	-20.30	-21.19	Pass
6P	25.8740	27.74	7.46	16.44	44.18	23.90	60.00	50.00	-15.82	-26.10	Pass

Remark: Factor = Insertion Loss + Cable Loss, Result = Reading + Factor, Margin = Result – Limit.

Temperature:	24℃	Relative Humidity:	48%
Test Date:	Mar. 04, 2024	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Neutral
Test Mode:	Transmitting mode of Band 1 802.11a 5180MHz		



No.	Frequency (MHz)	QuasiPeak reading (dBuV)	Average reading (dBuV)	Correction factor (dB)	QuasiPeak result (dBuV)	Average result (dBuV)	QuasiPeak limit (dBuV)	Average limit (dBuV)	QuasiPeak margin (dB)	Average margin (dB)	Remark
1P	0.1700	40.13	32.70	10.84	50.97	43.54	64.96	54.96	-13.99	-11.42	Pass
2P	0.3180	35.27	23.58	10.62	45.89	34.20	59.76	49.76	-13.87	-15.56	Pass
3*	0.3860	37.74	32.23	10.66	48.40	42.89	58.15	48.15	-9.75	-5.26	Pass
4P	0.4700	34.94	24.01	10.69	45.63	34.70	56.51	46.51	-10.88	-11.81	Pass
5P	14.3220	27.62	15.61	15.58	43.20	31.19	60.00	50.00	-16.80	-18.81	Pass
6P	26.7300	33.75	13.52	16.10	49.85	29.62	60.00	50.00	-10.15	-20.38	Pass

Remark: Factor = Insertion Loss + Cable Loss, Result = Reading + Factor, Margin = Result – Limit.

4 RADIATED EMISSION

4.1 TEST LIMIT

For unintentional device, according to §15.209(a), except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
0.009MHz-0.490MHz	2400/F (kHz)	-	Quasi-peak	300
0.490MHz-1.705MHz	24000/F (kHz)	-	Quasi-peak	30
1.705MHz-30MHz	30	-	Quasi-peak	30
30MHz-88MHz	100	40.0	Quasi-peak	3
88MHz-216MHz	150	43.5	Quasi-peak	3
216MHz-960MHz	200	46.0	Quasi-peak	3
960MHz-1GHz	500	54.0	Quasi-peak	3
Above 1GHz	500	54.0	Average	3
		74.0	Peak	3

Limit calculation and transfer to 3m distance as showed in the following table:

Frequency (MHz)	Limit (dBuV/m)	Distance (m)
0.009-0.490	$20\log(2400/F(KHz))+40\log(300/3)$	3
0.490-1.705	$20\log(24000/F(KHz))+40\log(30/3)$	3
1.705-30.0	69.5	3
30-88	40.0	3
88-216	43.5	3
216-960	46.0	3
Above 960	54.0	3

For intentional device, according to §15.209(a), the general requirement of field strength of radiated emissions from intentional radiators at a distance of 3 meters shall not exceed the above table.

Limits of unwanted emission out of the restricted bands

Frequency (MHz)	EIRP Limits (dBm)	Equivalent Field Strength at 3m (dBuV/m)
5150~5250	-27	68.2
5250~5350	-27	68.2
5470~5725	-27	68.2
5725~5850	-27(Note 2)	68.2
	10(Note 2)	105.2
	15.6(Note 2)	110.8
	27(Note 2)	122.2

NOTE:

1, The following formula is used to convert the equipment isotropic radiated power (eirp) to field strength:

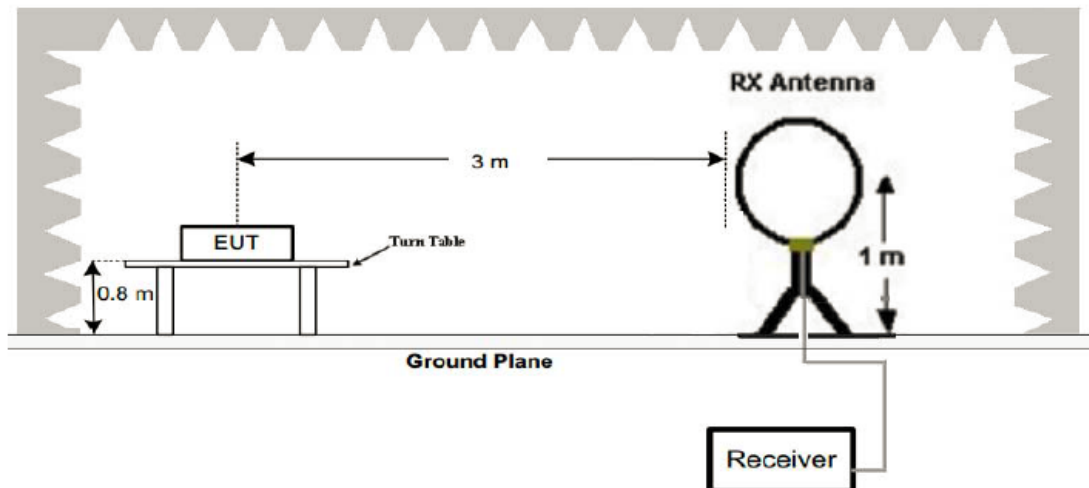
$$E = \frac{1000000 \sqrt{30P}}{3}$$

$E =$ uV/m, where P is the eirp (Watts)

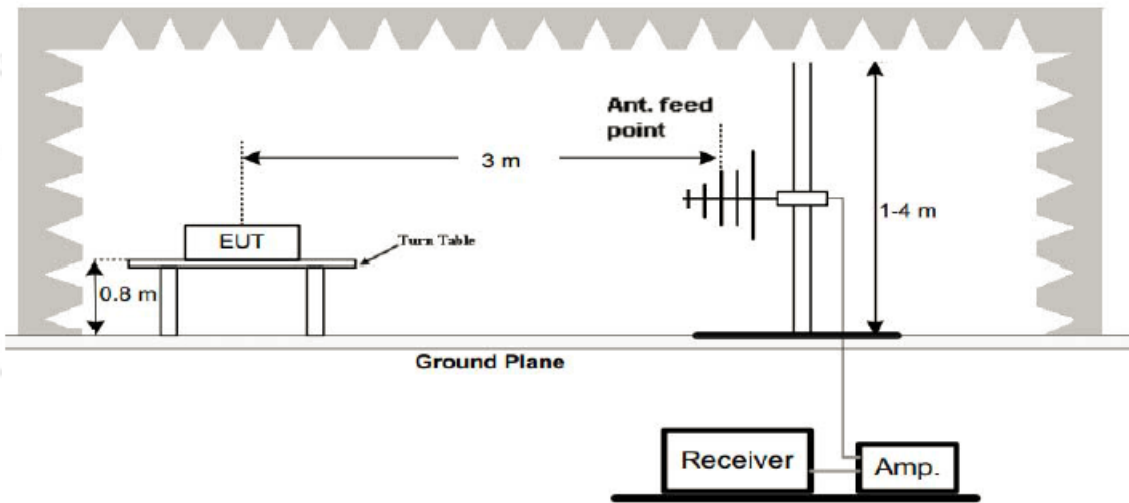
2, According to FCC 16-24, All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 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.

4.2 TEST SETUP

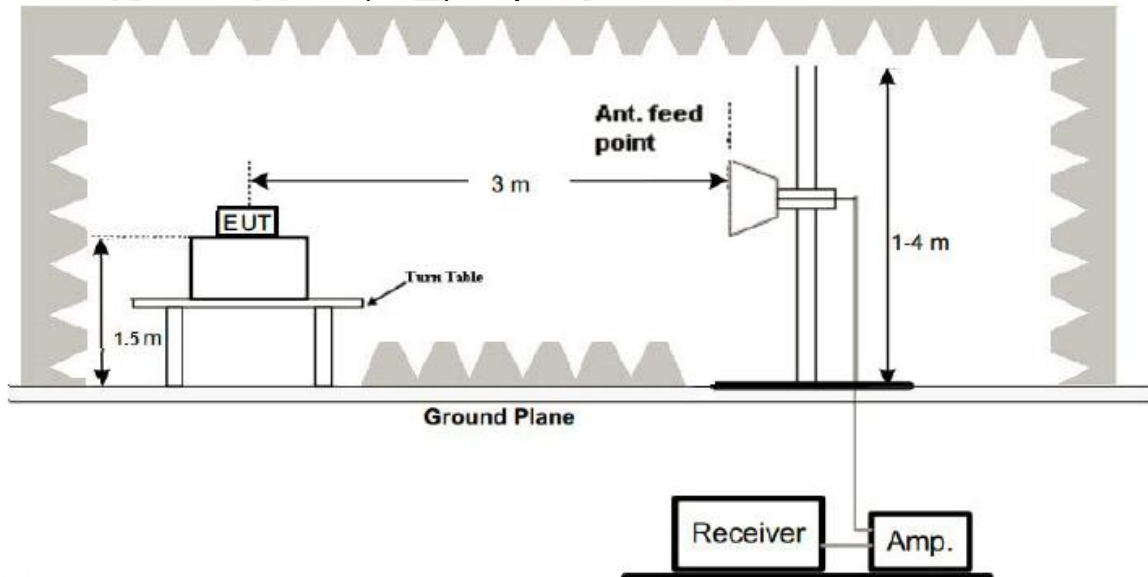
1. Radiated Emission Test-Up Frequency Below 30MHz



2. Radiated Emission Test-Up Frequency 30MHz~1GHz



3. Radiated Emission Test-Up Frequency Above 1GHz



4.3 TEST PROCEDURE

1. Below 1GHz measurement the EUT is placed on turntable which is 0.8m above ground plane. And above 1GHz measurement EUT was placed on low permittivity and low tangent turn table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The test frequency range from 9kHz to 25GHz per FCC PART 15.33(a).

Note: For battery operated equipment, the equipment tests shall be performed using a new battery.

4.4 TEST RESULT

PASS

Remark:

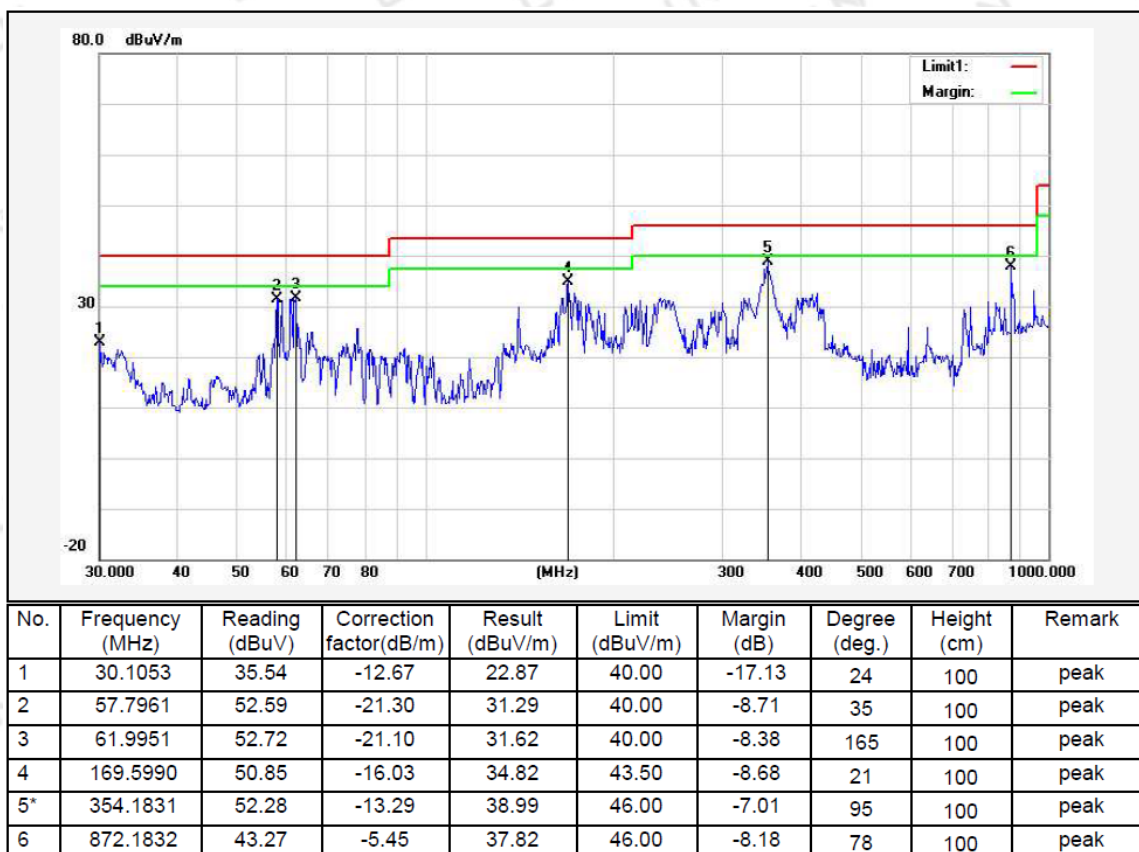
1. All modes were test at Low, Middle, and High channel, only the worst result of band 1 802.11a Low Channel was reported for below 1GHz test.
2. By preliminary testing and verifying three axis (X, Y and Z) position of EUT transmitted status, it was found that "X axis" position was the worst, and test data recorded in this report.

Radiated emission below 30MHz

The amplitude of spurious emissions from 9kHz to 30MHz which are attenuated more than 20 dB below the permissible value need not be reported.

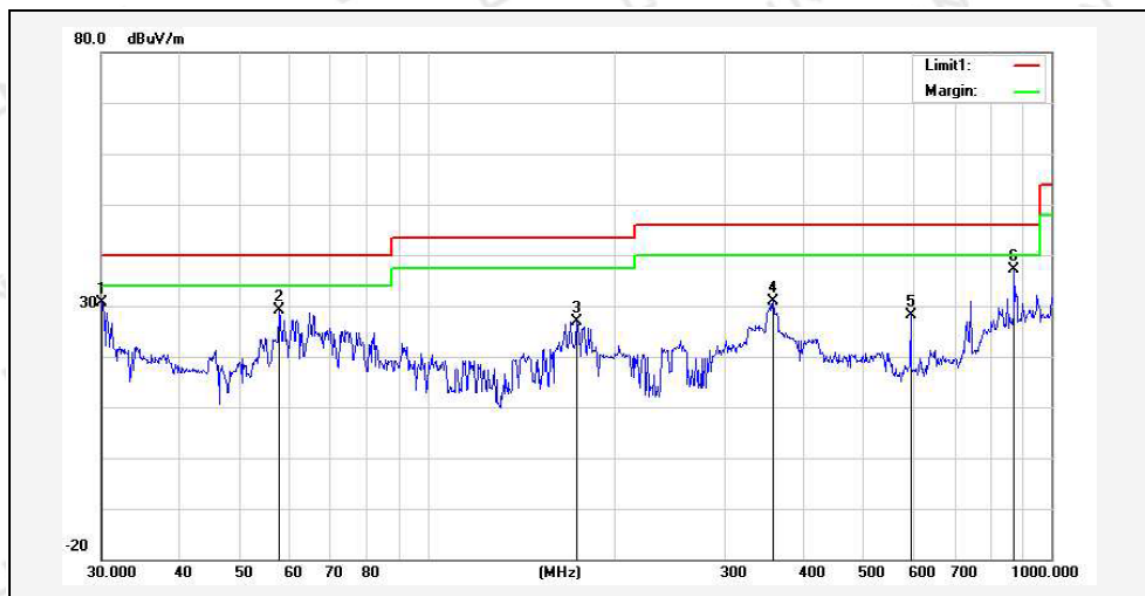
Below 1GHz Test Results:

Temperature:	24℃	Relative Humidity:	48%
Test Date:	Mar. 04, 2024	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Horizontal
Test Mode:	Transmitting mode of band 1 802.11a 5180MHz		



Remark: Result = Reading Level + Factor, Margin = Result– Limit
Factor = Ant. Factor + Cable Loss – Pre-amplifier

Temperature:	24℃	Relative Humidity:	48%
Test Date:	Mar. 04, 2024	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Vertical
Test Mode:	Transmitting mode of band 1 802.11a 5180MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	30.1053	43.38	-12.67	30.71	40.00	-9.29	89	100	peak
2	57.7961	50.31	-21.30	29.01	40.00	-10.99	110	100	peak
3	173.2050	43.18	-16.22	26.96	43.50	-16.54	54	100	peak
4	357.9286	44.21	-13.23	30.98	46.00	-15.02	32	100	peak
5	595.1328	38.00	-9.84	28.16	46.00	-17.84	46	100	peak
6*	872.1832	42.61	-5.45	37.16	46.00	-8.84	181	100	peak

Remark: Result = Reading Level + Factor, Margin = Result– Limit
Factor = Ant. Factor + Cable Loss – Pre-amplifier

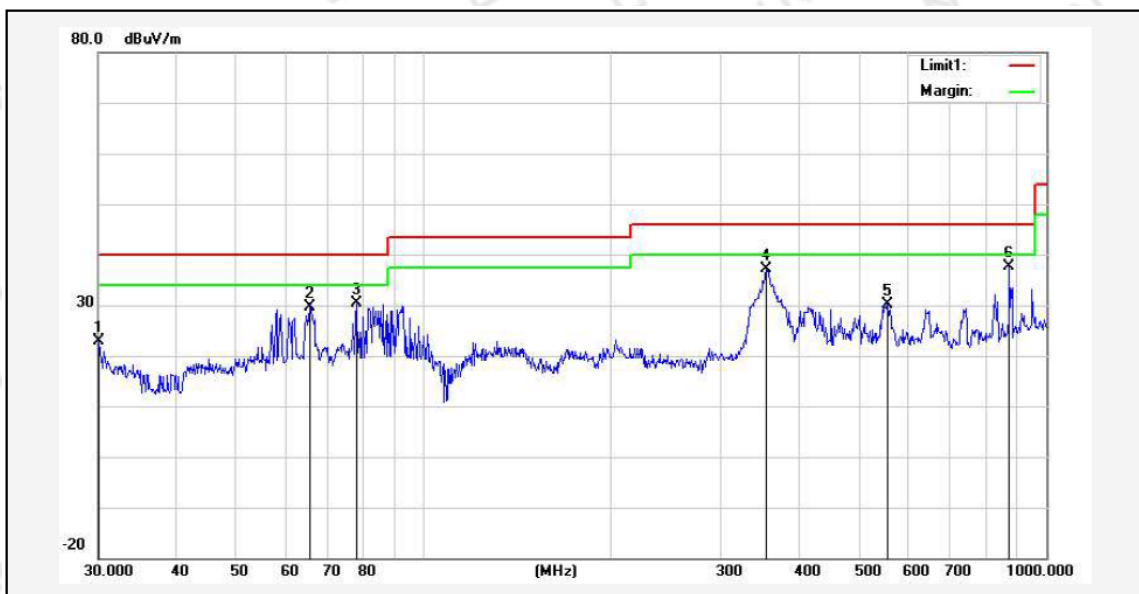
Temperature:	24℃	Relative Humidity:	48%
Test Date:	Mar. 04, 2024	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Horizontal
Test Mode:	Transmitting mode of band 1 802.11n20 5180MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	31.0705	35.71	-13.69	22.02	40.00	-17.98	73	100	peak
2	57.9992	53.60	-21.30	32.30	40.00	-7.70	69	100	peak
3	170.1947	48.69	-16.04	32.65	43.50	-10.85	138	100	peak
4*	355.4273	52.23	-13.27	38.96	46.00	-7.04	142	100	peak
5	645.1195	43.81	-9.16	34.65	46.00	-11.35	129	100	peak
6	872.1832	42.27	-5.45	36.82	46.00	-9.18	155	100	peak

Remark: Result = Reading Level + Factor, Margin = Result– Limit
Factor = Ant. Factor + Cable Loss – Pre-amplifier

Temperature:	24℃	Relative Humidity:	48%
Test Date:	Mar. 04, 2024	Pressure:	1010hPa
Test Voltage:	AC 120V, 60Hz	Phase:	Vertical
Test Mode:	Transmitting mode of band 1 802.11n20 5180MHz		



No.	Frequency (MHz)	Reading (dBuV)	Correction factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Degree (deg.)	Height (cm)	Remark
1	30.1053	35.57	-12.67	22.90	40.00	-17.10	139	100	peak
2	65.5726	50.64	-21.04	29.60	40.00	-10.40	88	100	peak
3	77.8653	50.90	-20.60	30.30	40.00	-9.70	56	100	peak
4	354.1831	50.44	-13.29	37.15	46.00	-8.85	144	100	peak
5	556.7744	40.46	-10.21	30.25	46.00	-15.75	74	100	peak
6*	872.1832	43.10	-5.45	37.65	46.00	-8.35	171	100	peak

Remark: Result = Reading Level + Factor, Margin = Result– Limit
Factor = Ant. Factor + Cable Loss – Pre-amplifier

Remark:

1. Radiated emission test from 9KHz to 10th harmonic of fundamental was verified, emission from 9kHz to 30MHz are more than 20dB below the limit, so it was not recorded in this report.
2. * denotes emission frequency which appearing within the Restricted Bands specified in provision of 15.205, then the general radiated emission limits in 15.209 apply.
3. The IF bandwidth of EMI Test Receiver between 30MHz to 1GHz was 120kHz, 1 MHz for measuring above 1 GHz, below 30MHz was 10kHz.

Radiated emission above 1GHz

Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a 5180MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10360.042	47.65	9.14	56.79	68.20	-11.41	peak
15540.063	41.51	10.22	51.73	74.00	-22.27	peak
15540.063	40.36	10.22	50.58	54.00	-3.42	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10360.042	46.95	9.14	56.09	68.20	-12.11	peak
15540.063	42.33	10.22	52.55	74.00	-21.45	peak
15540.063	31.84	10.22	42.06	54.00	-11.94	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a 5200MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10400.042	46.58	9.14	55.72	68.20	-12.48	peak
15600.063	41.64	10.22	51.86	74.00	-22.14	peak
15600.063	31.73	10.22	41.95	54.00	-12.05	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10400.042	46.29	9.14	55.43	68.20	-12.77	peak
15600.063	41.07	10.22	51.29	74.00	-22.71	peak
15600.063	32.65	10.22	42.87	54.00	-11.13	AVG

Remark:

Factor = Antenna Factor + Cable Loss – Pre-amplifier.

Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a 5240MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10480.042	46.56	9.27	55.83	68.20	-12.37	peak
15720.063	41.63	10.38	52.01	74.00	-21.99	peak
15720.063	33.54	10.38	43.92	54.00	-10.08	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10480.042	43.22	9.27	52.49	68.20	-15.71	peak
15720.063	41.87	10.38	52.25	74.00	-21.75	peak
15720.063	33.65	10.38	44.03	54.00	-9.97	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n20 5180MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10360.042	47.57	9.14	56.71	68.20	-11.49	peak
15540.063	41.48	10.22	51.70	74.00	-22.30	peak
15540.063	40.25	10.22	50.47	54.00	-3.53	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10360.042	46.98	9.14	56.12	68.20	-12.08	peak
15540.063	42.29	10.22	52.51	74.00	-21.49	peak
15540.063	31.77	10.22	41.99	54.00	-12.01	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n20 5200MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10400.042	46.54	9.14	55.68	68.20	-12.52	peak
15600.063	41.56	10.22	51.78	74.00	-22.22	peak
15600.063	31.68	10.22	41.90	54.00	-12.10	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10400.042	46.33	9.14	55.47	68.20	-12.73	peak
15600.063	41.11	10.22	51.33	74.00	-22.67	peak
15600.063	32.58	10.22	42.80	54.00	-11.20	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11n20 5240MHz	Antenna	Horizontal/Vertical

RADIATED EMISSION ABOVE 1GHZ–Horizontal

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10480.042	46.49	9.27	55.76	68.20	-12.44	peak
15720.063	41.57	10.38	51.95	74.00	-22.05	peak
15720.063	33.66	10.38	44.04	54.00	-9.96	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

RADIATED EMISSION ABOVE 1GHZ–Vertical

Frequency (MHz)	Meter Reading (dBμV)	Factor (dB)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Value Type
10480.042	43.28	9.27	52.55	68.20	-15.65	peak
15720.063	41.85	10.38	52.23	74.00	-21.77	peak
15720.063	33.59	10.38	43.97	54.00	-10.03	AVG
Remark:						
Factor = Antenna Factor + Cable Loss – Pre-amplifier.						

Note: All test channels had been tested. The 802.11a is the worst case and recorded in the test report.

Other frequencies radiation emission from 1GHz to 40GHz at least have 20dB margin and not recorded in the test report.

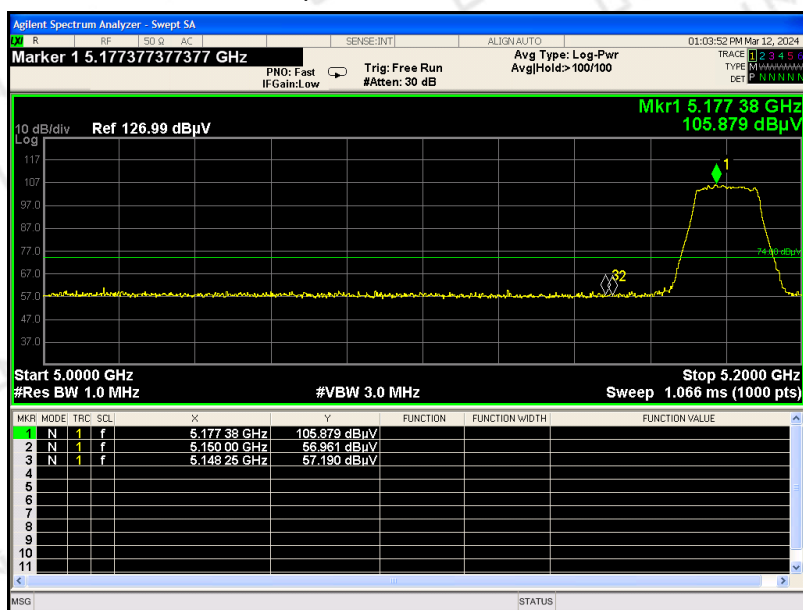
Factor = Antenna Factor + Cable loss - Amplifier gain, Margin= Limit-Level.

The “Factor” value can be calculated automatically by software of measurement system.

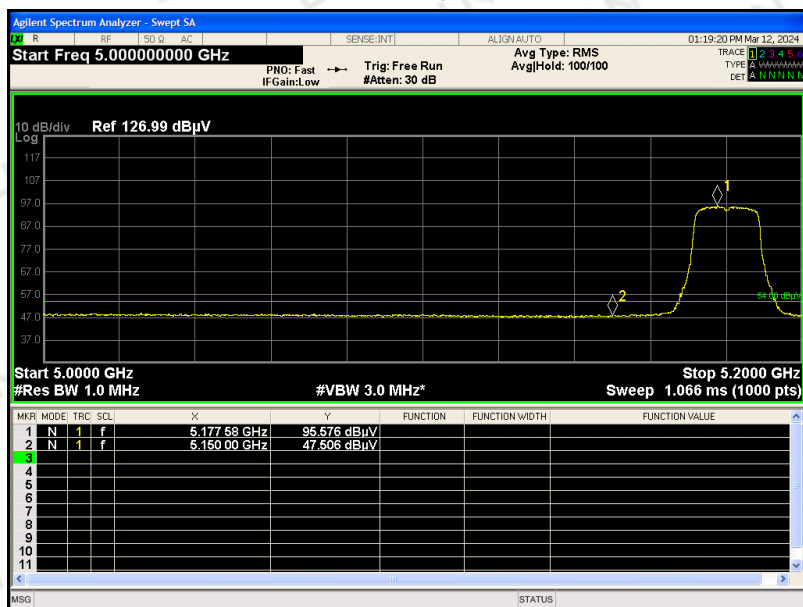
Test result for band edge emission at restricted bands

Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a 5180MHz	Antenna	Horizontal

Test Graph for Peak Measurement



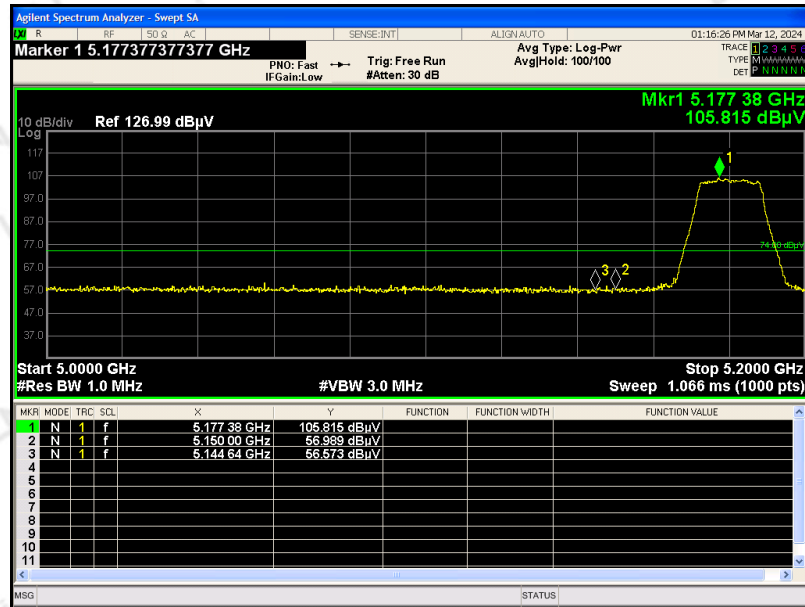
Test Graph for Average Measurement



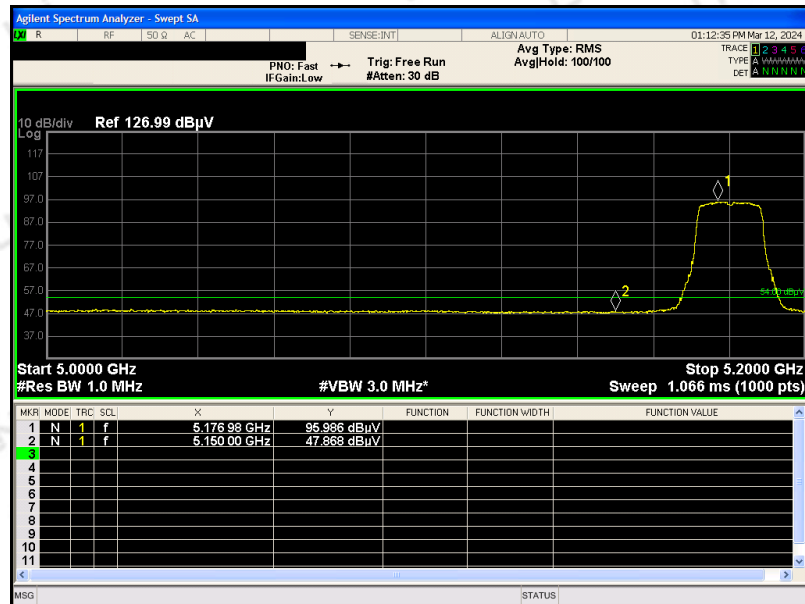
RESULT: PASS

Temperature	25°C	Relative Humidity	60%
Pressure	960hPa	Test Voltage	Normal Voltage
Test Mode	802.11a 5180MHz	Antenna	Vertical

Test Graph for Peak Measurement



Test Graph for Average Measurement



RESULT: PASS

- Note: 1. All the 20MHz bandwidth modulation had been tested, the 802.11a at 5180MHz was the worst case and record in his test report.
2. The factor had been edited in the "Input Correction" of the Spectrum Analyzer.
3. Only the data of band edge emission at the restricted band 4.5GHz-5.15GHz and 5.35GHz-5.46GHz record in the report. Other restricted band 7.25GHz-7.77GHz were considered as ambient noise. No recording in the test report.
4. The sideband standard of Band 4 frequency band is not defined, the transmitted signal does not fall in the restricted band, and the edge signal is far away from the edge of other restricted bands, and it is not recorded in the report.

5 OCCUPIED BANDWIDTH

5.1 TEST LIMIT

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in KDB 789033 D02, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

FCC Part 15 Subpart C(15.407)		
Test Item	Limit	Frequency Range(MHz)
26 dB Bandwidth	N/A	5150~5250
		5250~5350
		5470~5725
6 dB Bandwidth	>500kHz	5725~5850

5.2 TEST PROCEDURE

-6dB bandwidth (DTS bandwidth):

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on operation frequency individually.
3. Set RBW = 100kHz.
4. Set the VBW $\geq 3 \times$ RBW. Detector = Peak. Trace mode = max hold.
5. Measure the maximum width of the emission that is 6 dB down from the peak of the emission.

99% occupied bandwidth:

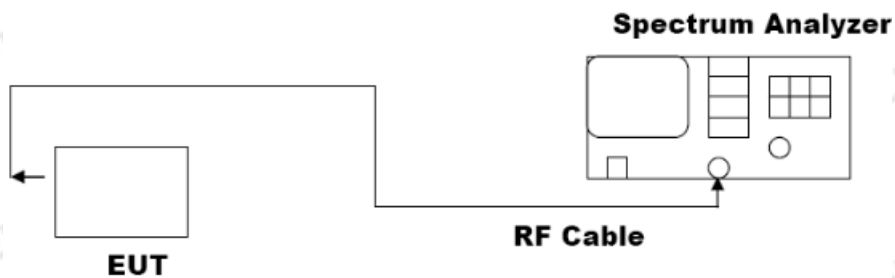
1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set Span = approximately 1.5 to 5 times the OBW, centered on a nominal channel
The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW; Sweep = auto; Detector function = peak
4. Set SPA Trace 1 Max hold, then View.

-26dB Bandwidth:

1. Set RBW = approximately 1% of the emission bandwidth.
2. Set the VBW > RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Measure the maximum width of the emission that is 26 dB down from the maximum of the emission.
Compare this with the RBW setting of the analyzer. Readjust RBW and repeat measurement as needed until the RBW/EBW ratio is approximately 1%.

Note: The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

5.3 TEST SET-UP

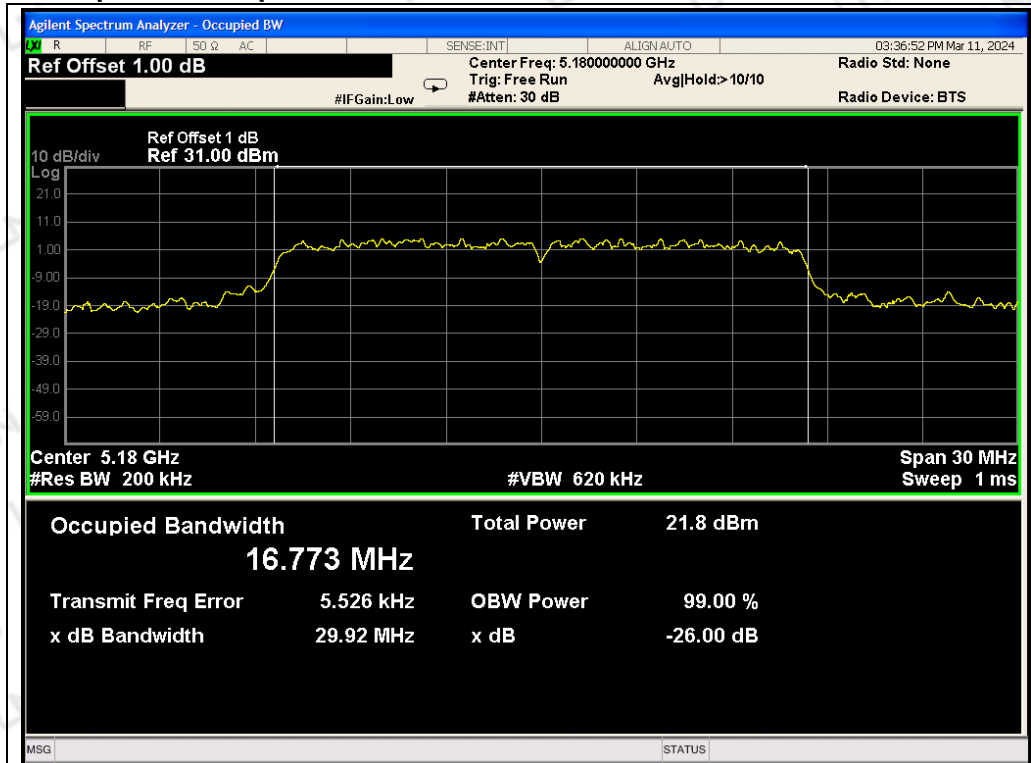


5.4 TEST RESULT

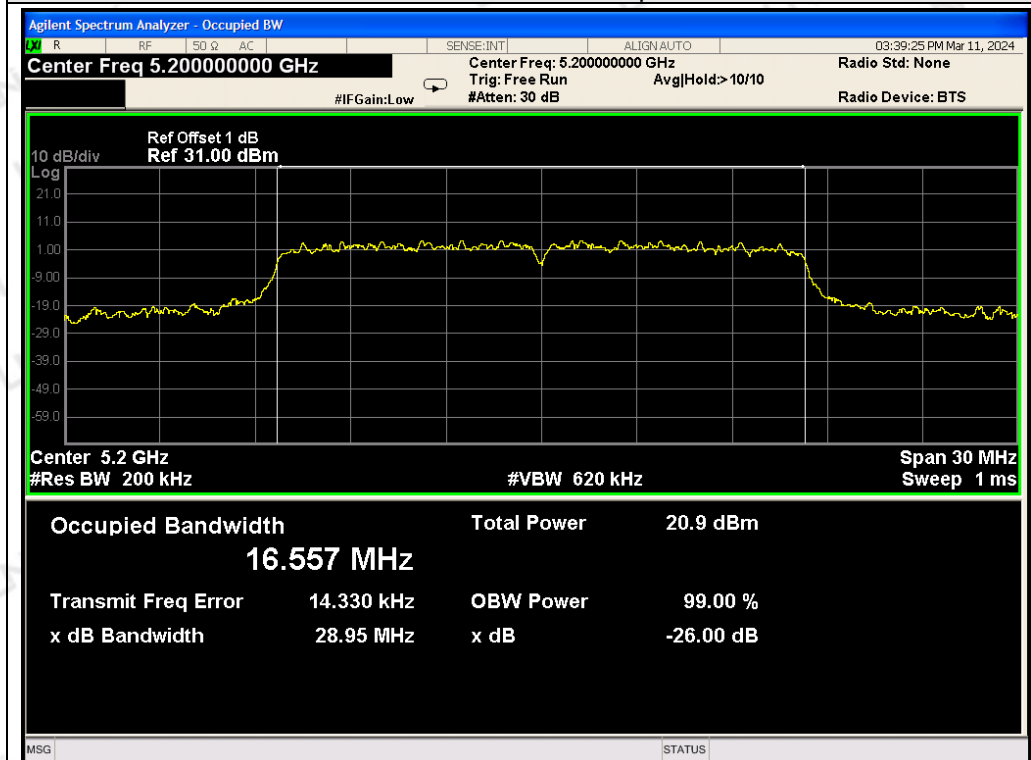
PASS

Test Data of Occupied Bandwidth and -26dB Bandwidth for band 5.15-5.25 GHz					
Test Mode	Test Channel (MHz)	99% Occupied Bandwidth (MHz)	-26dB Bandwidth (MHz)	Limits (MHz)	Pass or Fail
802.11a	5180	16.773	29.92	N/A	Pass
	5200	16.557	28.95	N/A	Pass
	5240	16.514	28.59	N/A	Pass
802.11n20	5180	17.705	29.69	N/A	Pass
	5200	17.663	27.82	N/A	Pass
	5240	17.706	26.65	N/A	Pass

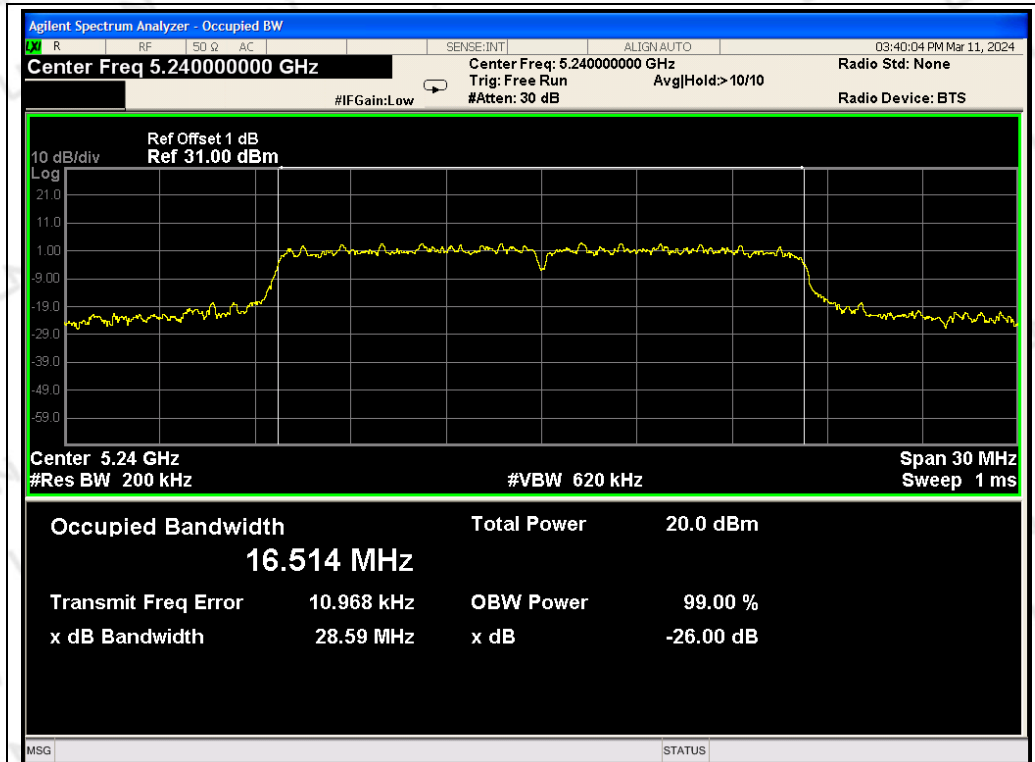
Test Graphs of Occupied Bandwidth and -26dB Bandwidth for band 5.15-5.25 GHz



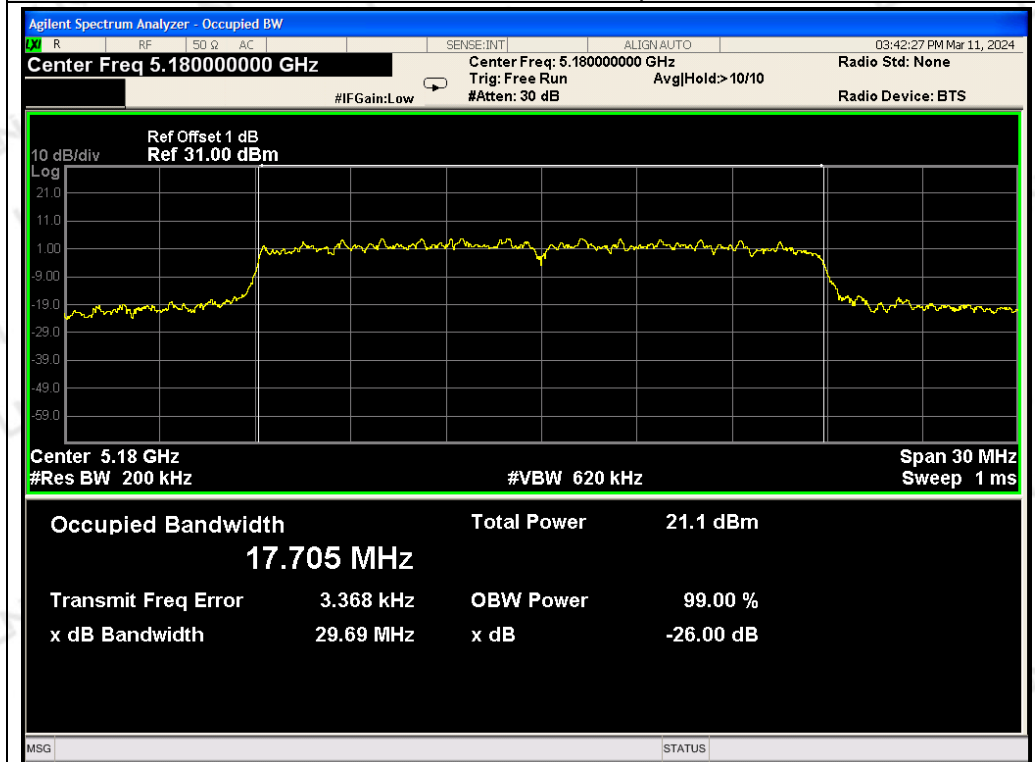
802.11a_ANT1_5180_6Mbps_OBW



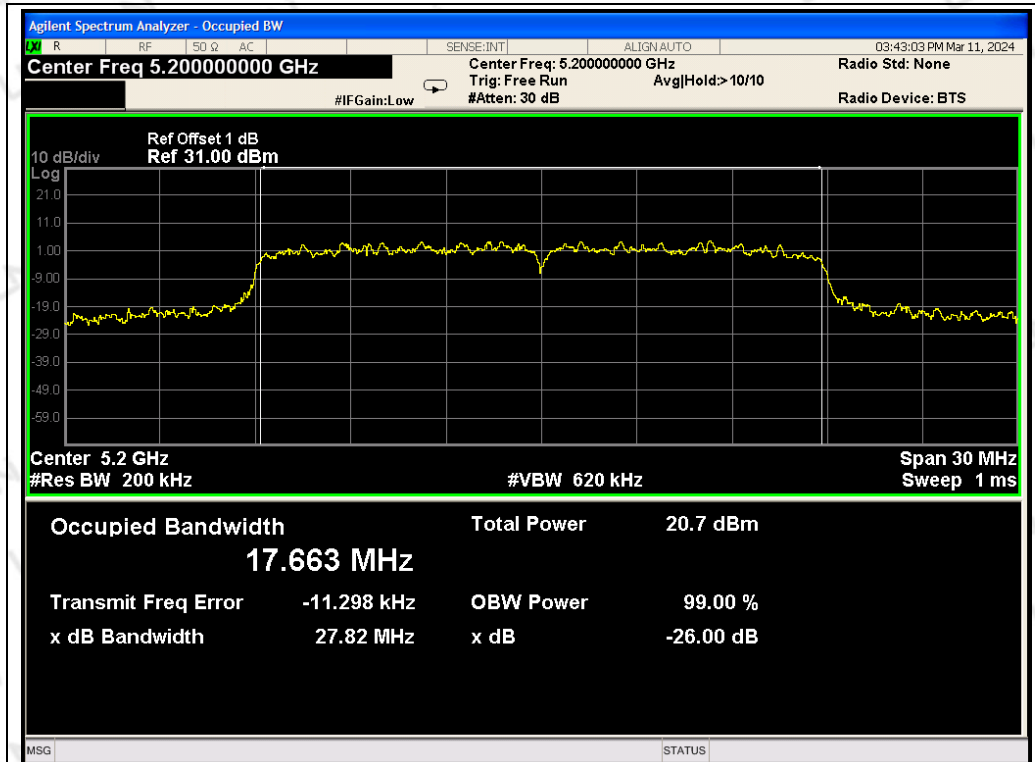
802.11a_ANT1_5200_6Mbps_OBW



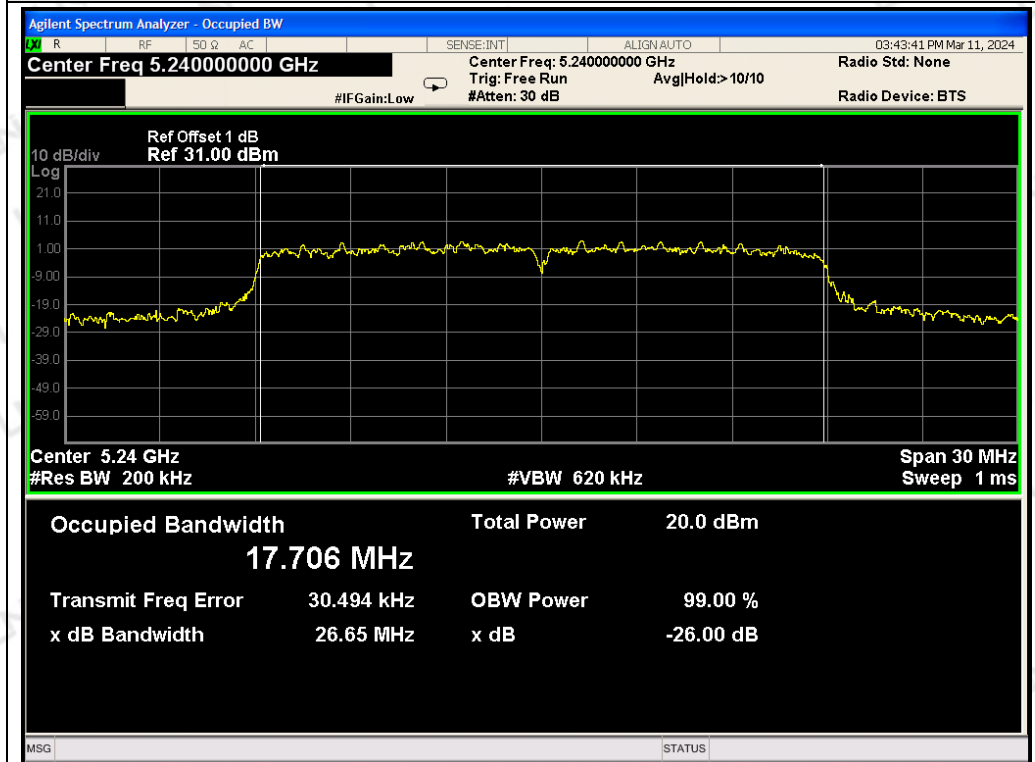
802.11a_ANT1_5240_6Mbps_OBW



802.11n20_ANT1_5180_MCS0_OBW



802.11n20_ANT1_5200_MCS0_OBW



802.11n20_ANT1_5240_MCS0_OBW

6 MAXIMUM CONDUCTED OUTPUT AVERAGE POWER SPECTRAL DENSITY

6.1 TEST LIMIT

FCC CFR Title 47 Part 15 Subpart E Section 15.407(a):

FCC Part 15 Subpart E(15.407)		
Test Item	Limit	Frequency Range(MHz)
Power Spectral Density	Other than Mobile and Portable : 17dBm/MHz Mobile and Portable : 11dBm/MHz	5150~5250
	11dBm/MHz	5250~5350
	11dBm/MHz	5470~5725
	30dBm/500kHz	5725~5850

6.2 TEST PROCEDURE

The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement is according to KDB 789033 D02 General UNII Test Procedures New Rules V02r01.

- (1) The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
- (2) Set analyser centre frequency to transmitting frequency.
- (3) Set the span to encompass the entire emissions bandwidth (EBW)(alternatively, the entire 99% OBW) of the signal.
- (4) Set the RBW to: 1 MHz
- (5) Set the VBW to: 3 MHz
- (6) Detector: RMS
- (7) Trace: Max Hold
- (7) Sweep time: auto
- (8) Trace average at least 100 traces in power averaging.
- (9) Use the peak marker function to determine the maximum amplitude level within the RBW. Apply correction to the result if different RBW is used.

NOTE: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

6.3 TEST SET-UP

Same as 5.3.

6.4 EQUIPMENT USED

Same as Radiated Emission Measurement.

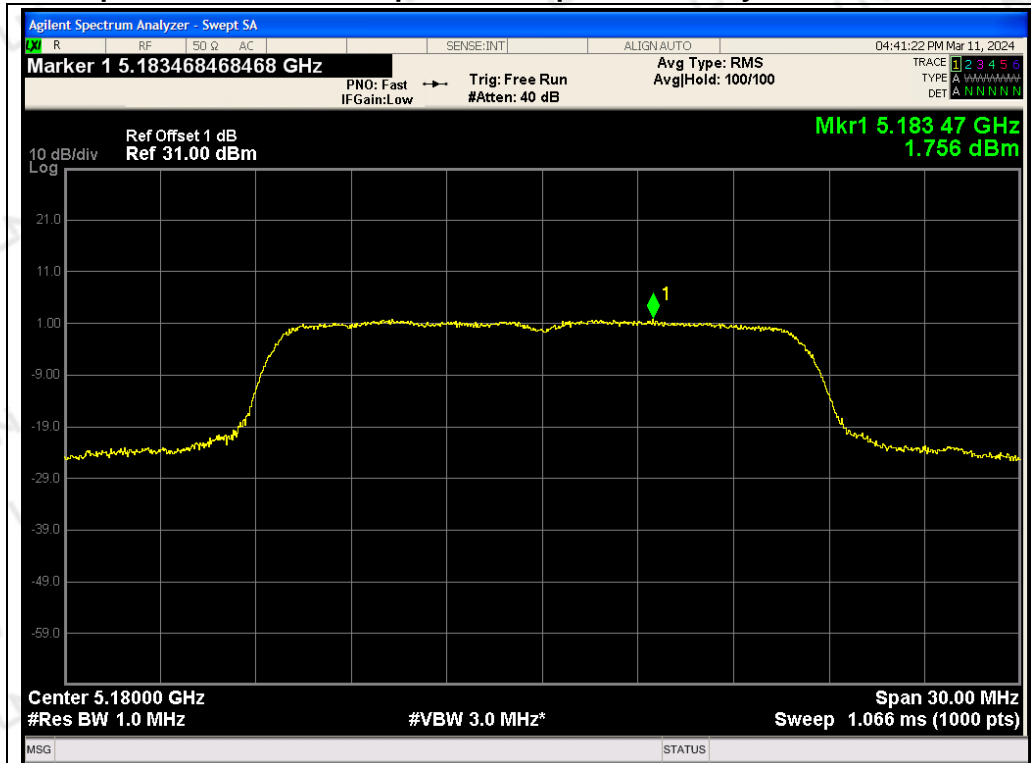
6.5 TEST RESULT

PASS

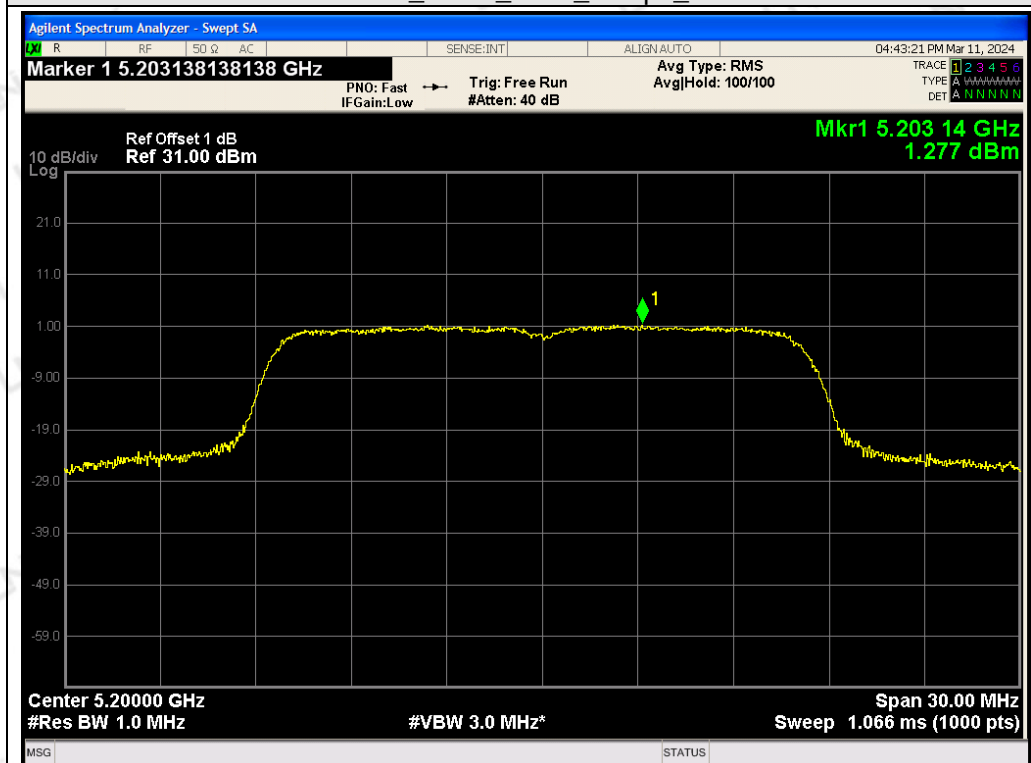
Test Data of Conducted Output Power Density for band 5.15-5.25 GHz				
Test Mode	Test Channel (MHz)	Average Power Density (dBm/MHz)	Limits (dBm/MHz)	Pass or Fail
802.11a	5180	1.756	11	Pass
	5200	1.277	11	Pass
	5240	1.023	11	Pass
802.11n20	5180	1.795	11	Pass
	5200	1.296	11	Pass
	5240	0.539	11	Pass

Note:1. Power density(dBm/500kHz) = Power density(dBm/100kHz) +10*log(500/100).

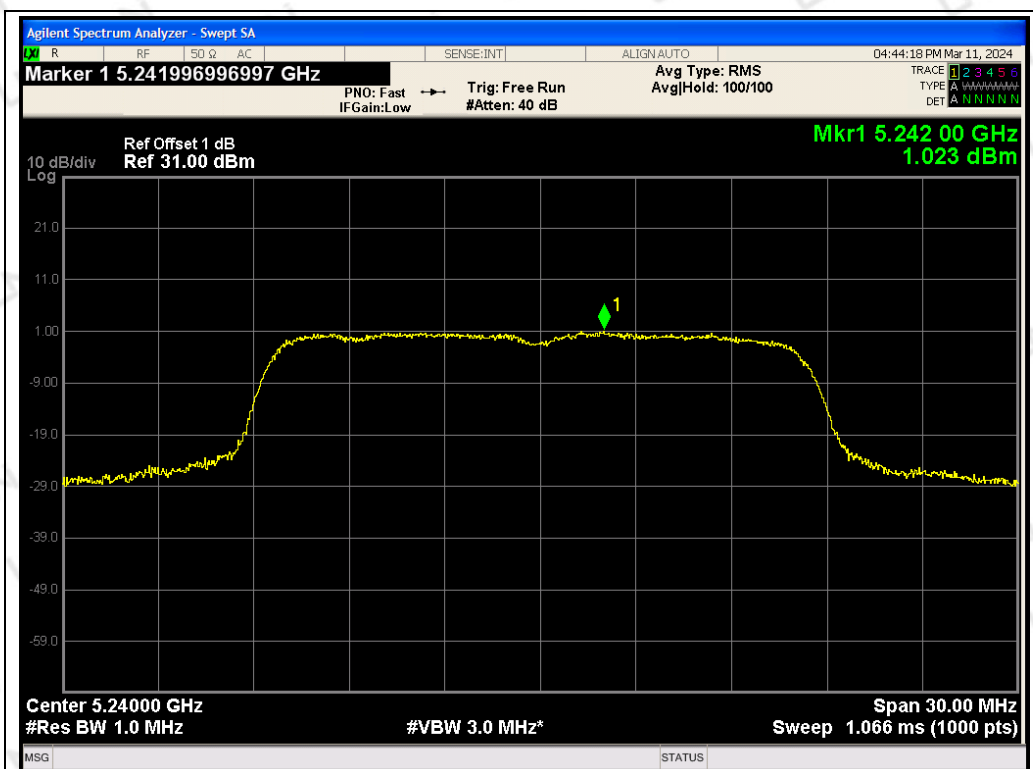
Test Graphs of Conducted Output Power Spectral Density for band 5.15-5.25 GHz



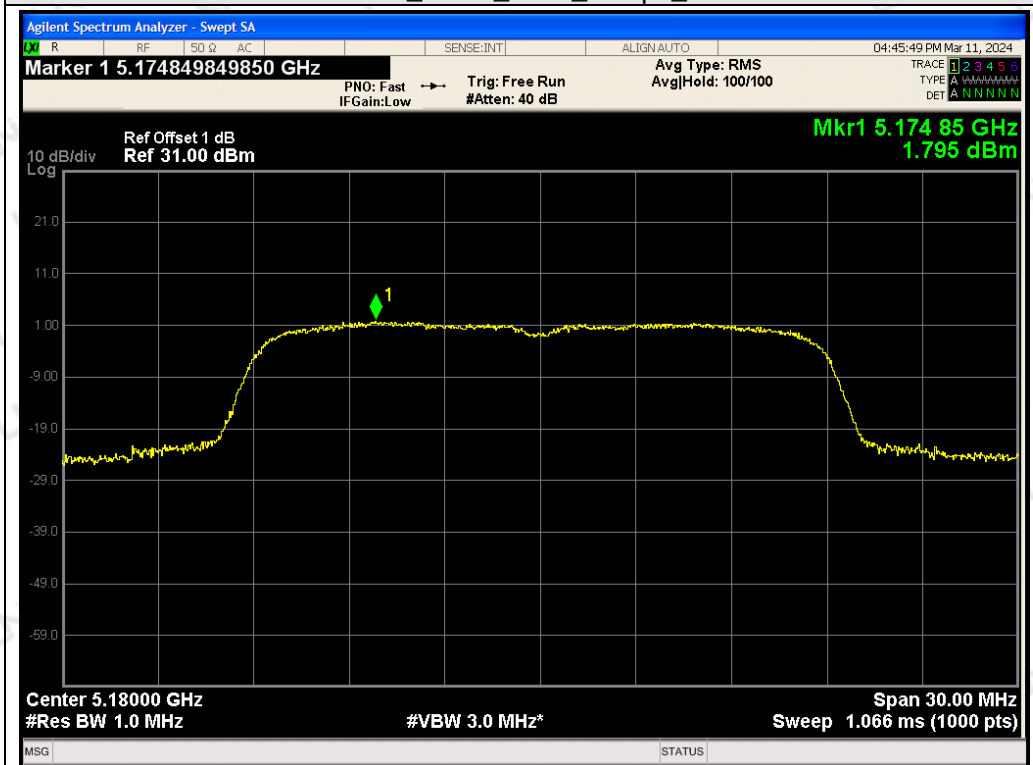
802.11a_ANT1_5180_6Mbps_PSD



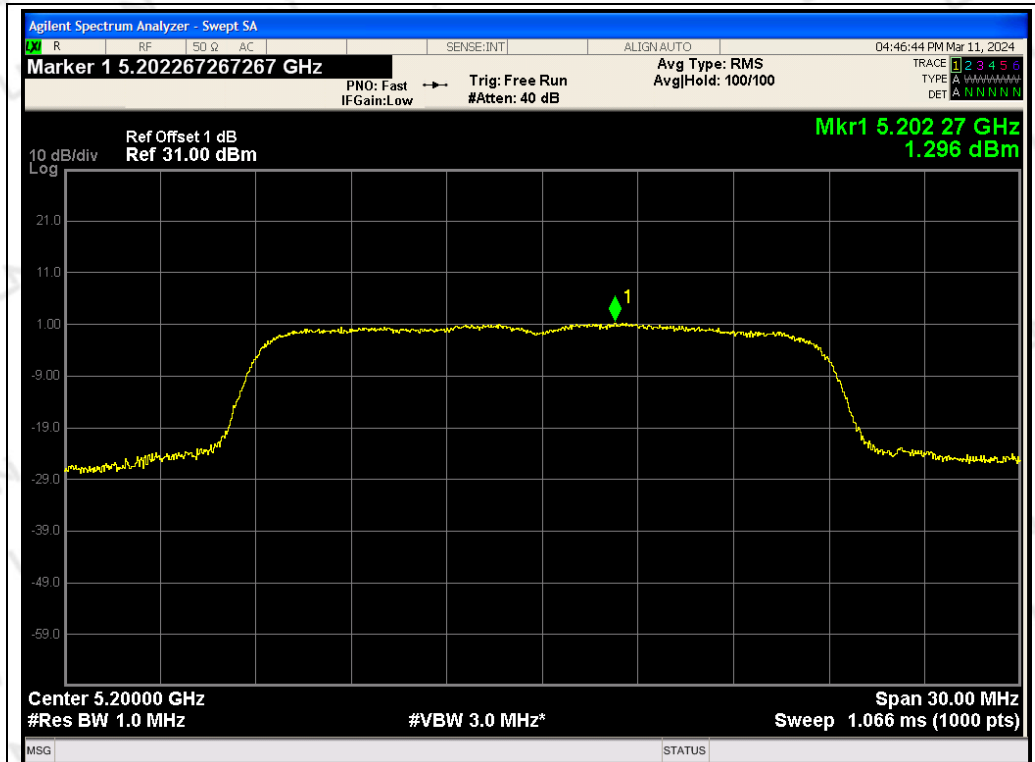
802.11a_ANT1_5200_6Mbps_PSD



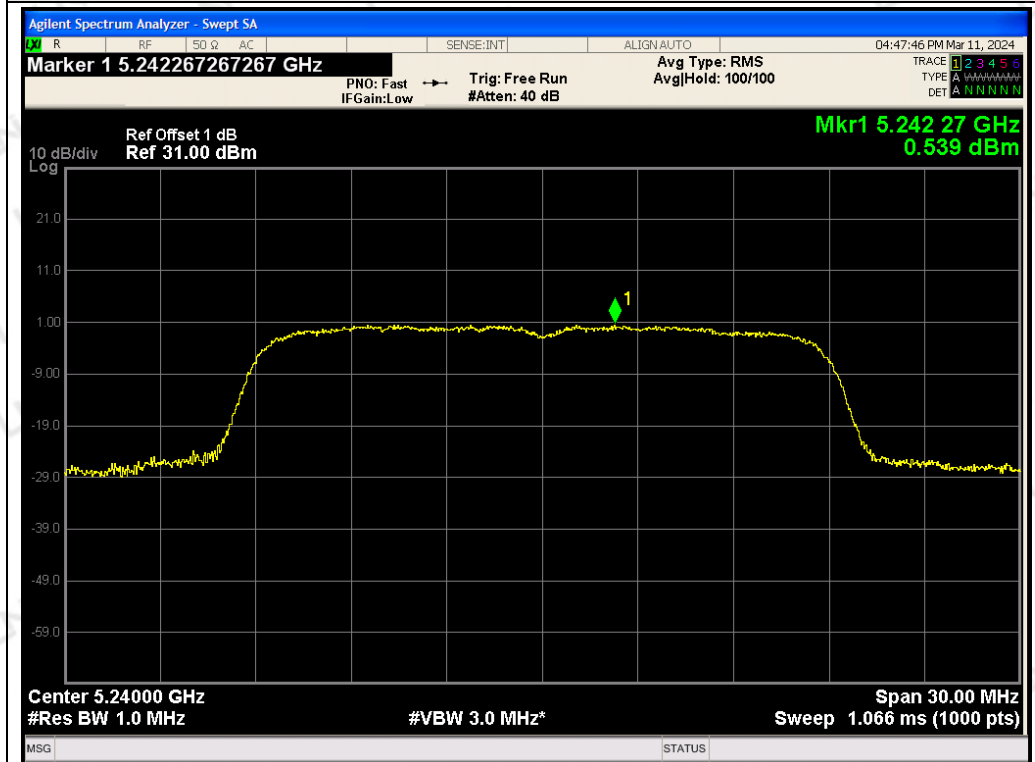
802.11a_ANT1_5240_6Mbps_PSD



802.11n20_ANT1_5180_MCS0_PSD



802.11n20_ANT1_5200_MCS0_PSD



802.11n20_ANT1_5240_MCS0_PSD

7 AVERAGE OUTPUT POWER

7.1 TEST LIMIT

FCC CFR Title 47 Part 15 Subpart E Section 15.407(a):

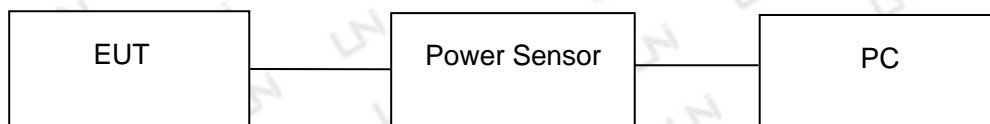
FCC Part 15 Subpart E(15.407)		
Test Item	Limit	Frequency Range(MHz)
Conducted Output Power	Fixed: 1 Watt (30dBm) Mobile and Portable: 250mW (24dBm)	5150~5250
	250mW (24dBm)	5250~5350
	250mW (24dBm)	5470~5725
	1 Watt (30dBm)	5725~5850

7.2 TEST PROCEDURE

- 1.The EUT was tested according to according to section 3 of KDB 789033 D02 General UNII Test Procedures New Rules V02r01.
- 2.The maximum conducted output power may be measured using a broadband AVG RF power meter.
3. Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor.
- 4.The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter.
- 5.Record the measurement data.

7.3 TEST SET-UP

AVERAGE POWER SETUP



7.4 EQUIPMENT USED

Same as Radiated Emission Measurement.

7.5 TEST RESULT

PASS

Test Data of Conducted Output Power for band 5.15-5.25 GHz				
Test Mode	Test Channel (MHz)	Average Power (dBm)	Limits (dBm)	Pass or Fail
802.11a	5180	12.945	23.98	Pass
	5200	11.724	23.98	Pass
	5240	11.199	23.98	Pass
802.11n20	5180	11.659	23.98	Pass
	5200	11.202	23.98	Pass
	5240	10.701	23.98	Pass

8 CONDUCTED SPURIOUS EMISSION

8.1 TEST LIMIT

Applicable Limits	Channel
-27dBm/MHz	5150MHz-5250MHz
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.	5725MHz-5850MHz

8.2 TEST SETUP

Same as 5.3

8.3 TEST PROCEDURE

1. Connect EUT RF output port to the Spectrum Analyzer through an RF attenuator
2. Set the EUT Work on the top, the middle and the bottom operation frequency individually.
3. Set SPA Trace 1 Max hold, then View.

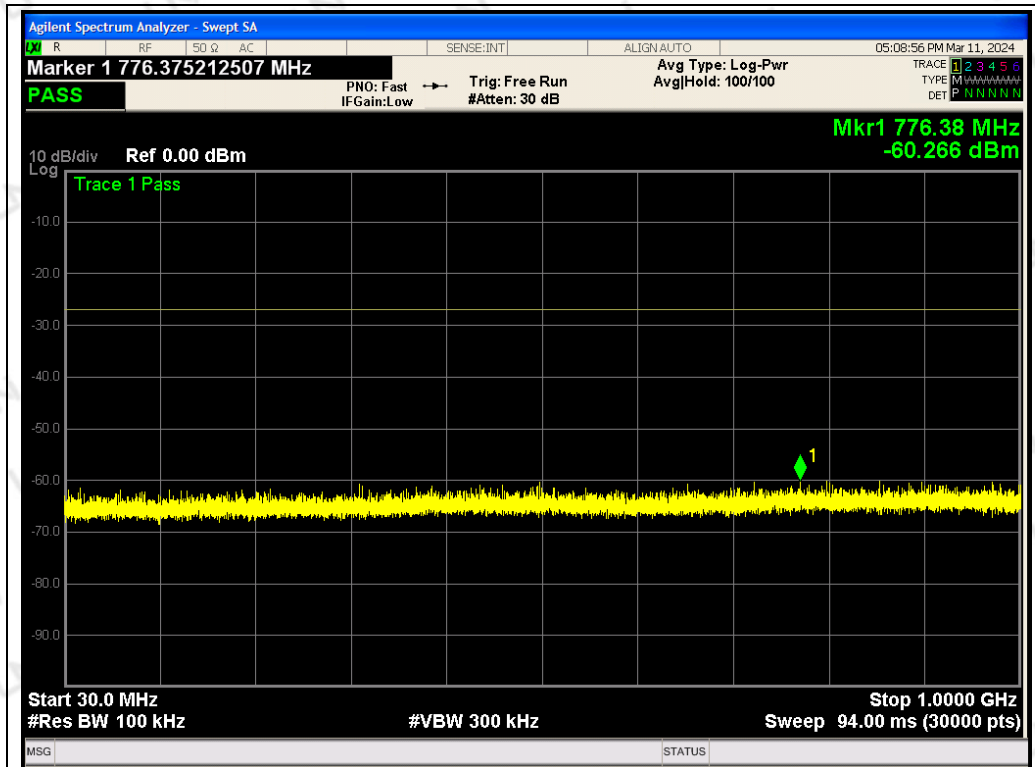
Note: The EUT was tested according to KDB 789033 for compliance to FCC 47CFR 15.407 requirements.

8.4 TEST RESULT

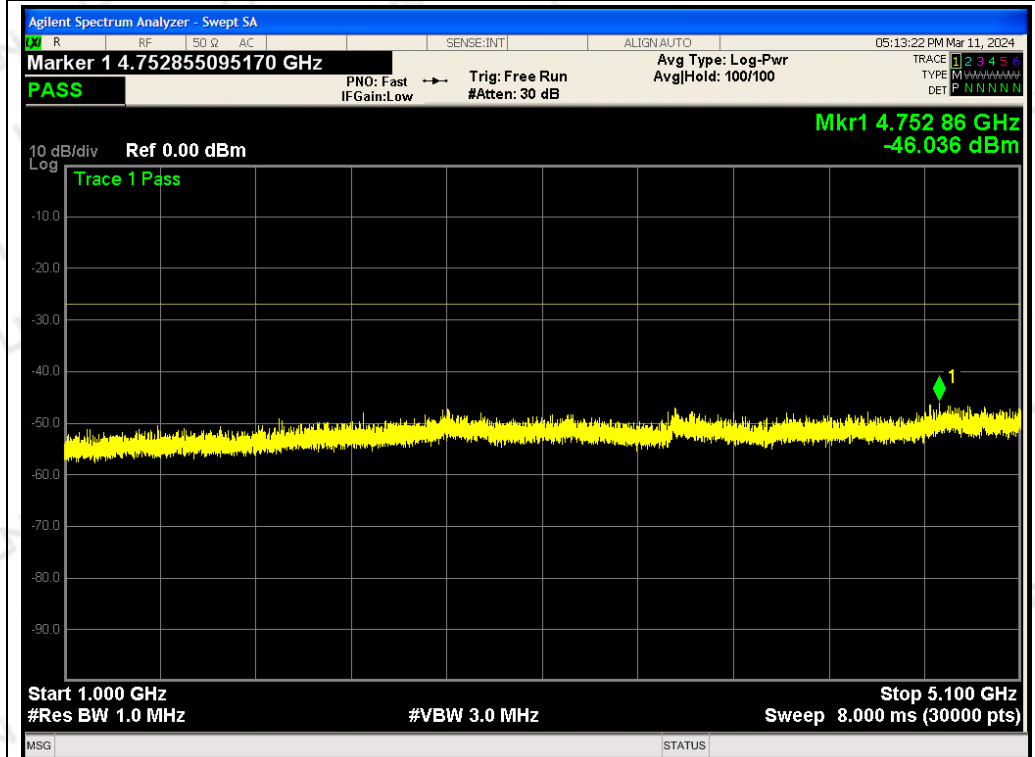
PASS

Note: All the 20MHz bandwidth modulation had been tested, the 802.11a was the worst case and record in this test report.

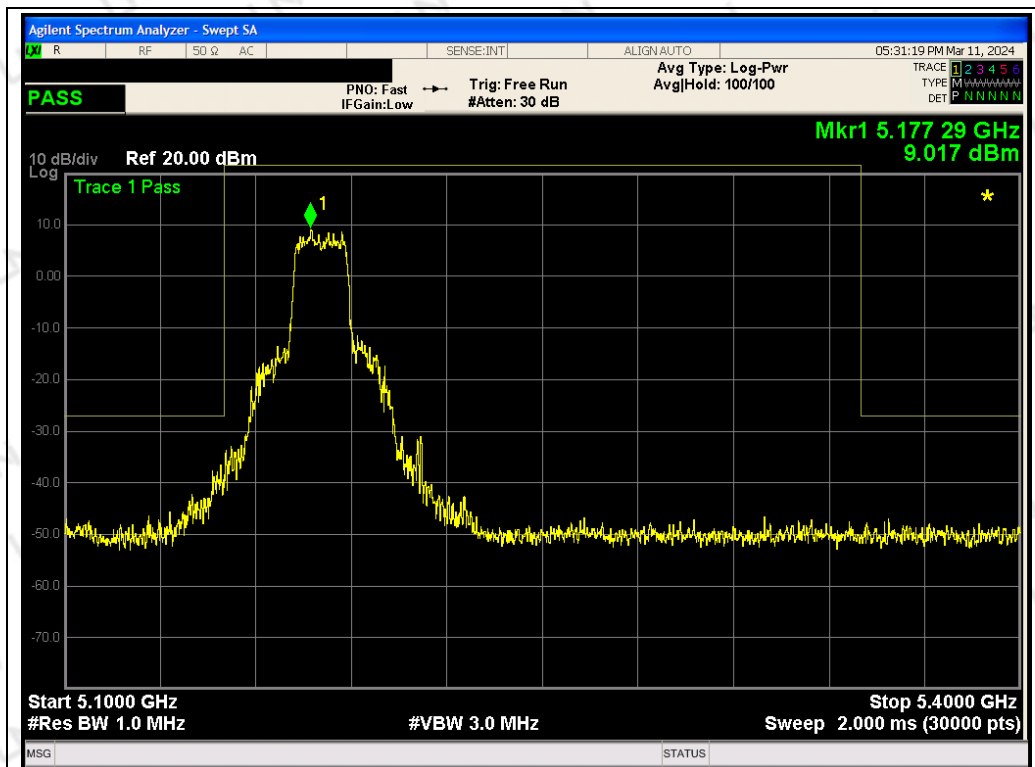
Test Graphs of Spurious Emissions outside of the 5.15-5.35 GHz band for transmitters operating in the 5.15-5.25 GHz band



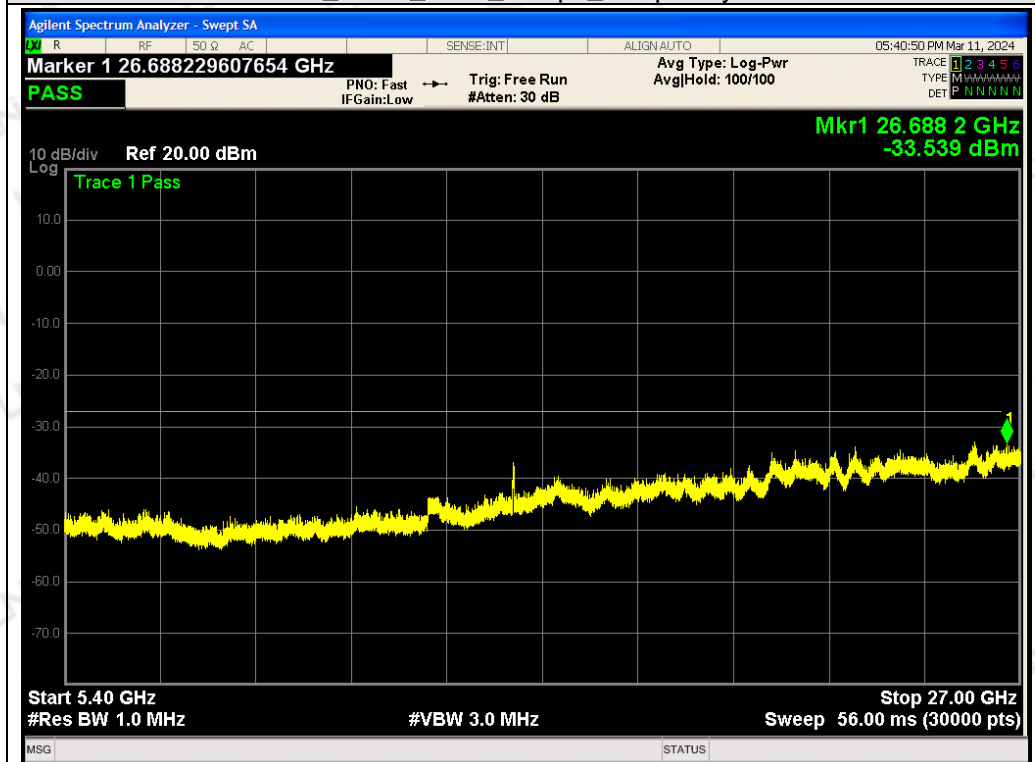
802.11a_ANT1_5180_6Mbps_Frequency Band 1



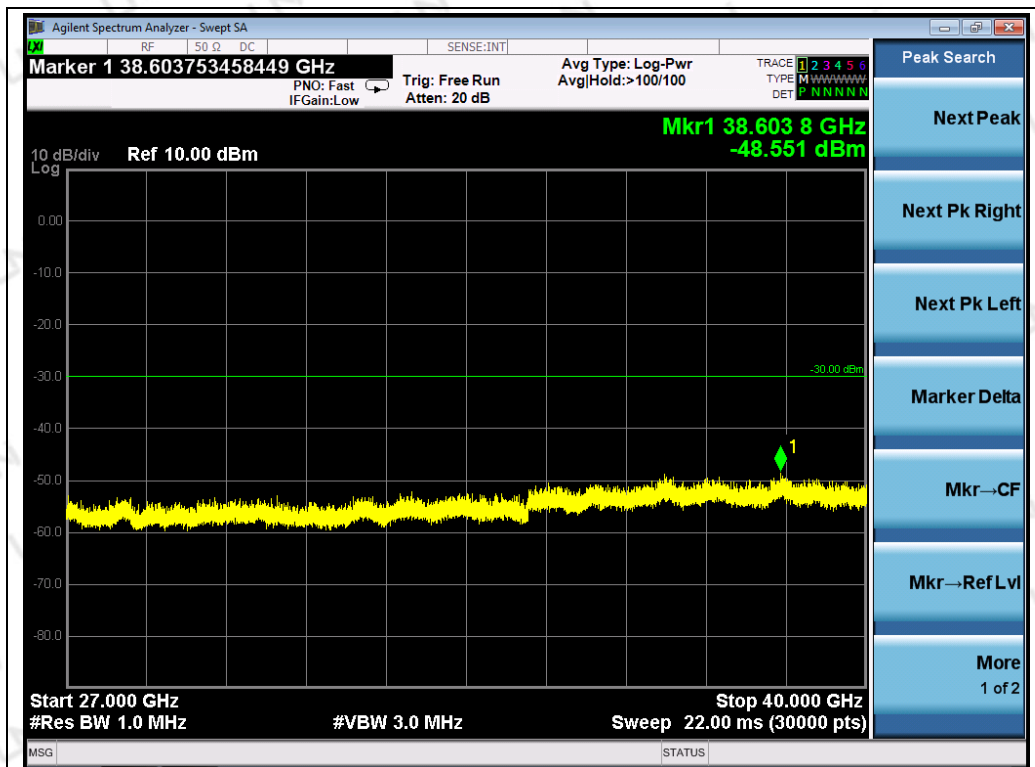
802.11a_ANT1_5180_6Mbps_Frequency Band 2



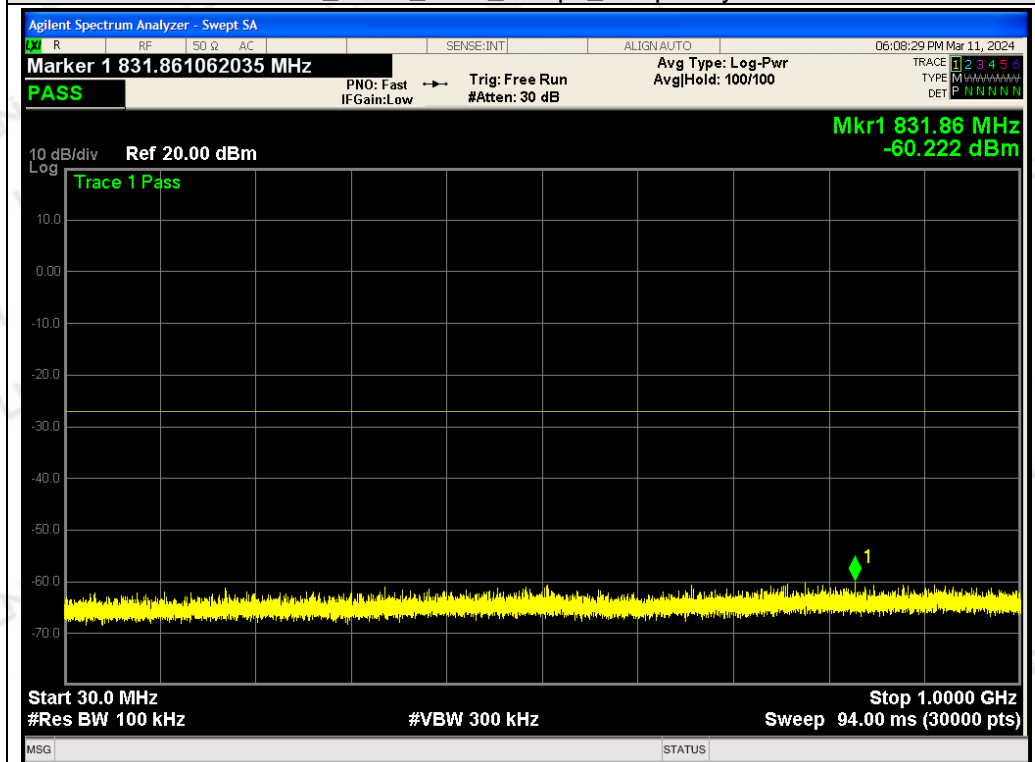
802.11a_ANT1_5180_6Mbps_Frequency Band 3



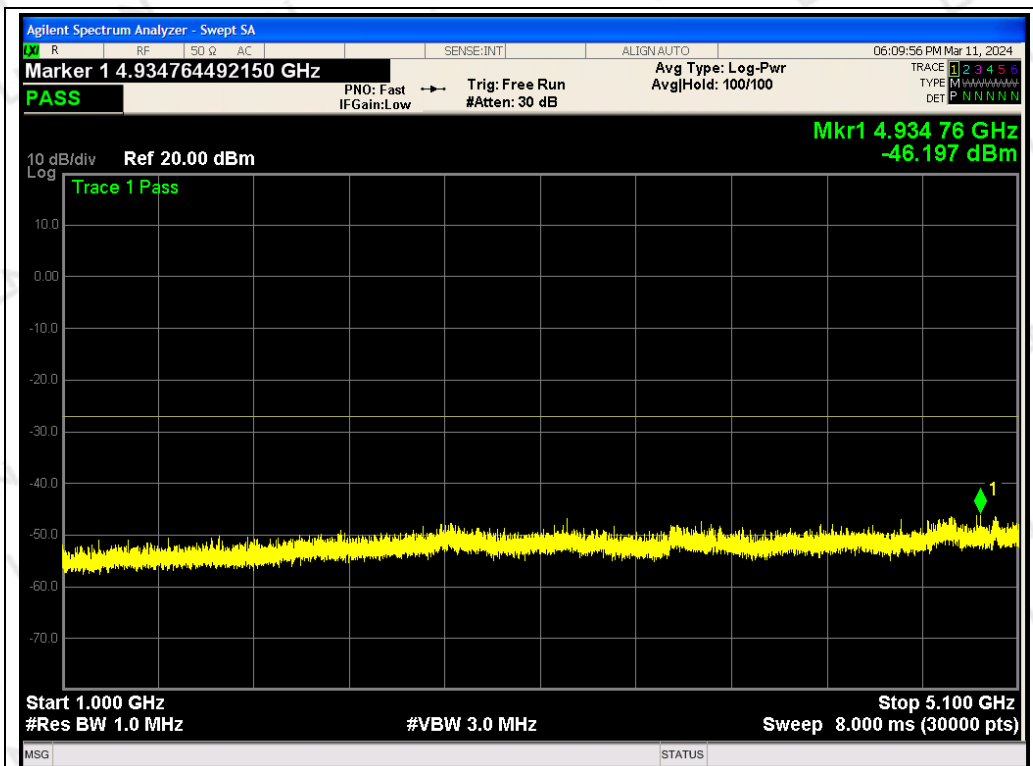
802.11a_ANT1_5180_6Mbps_Frequency Band 4



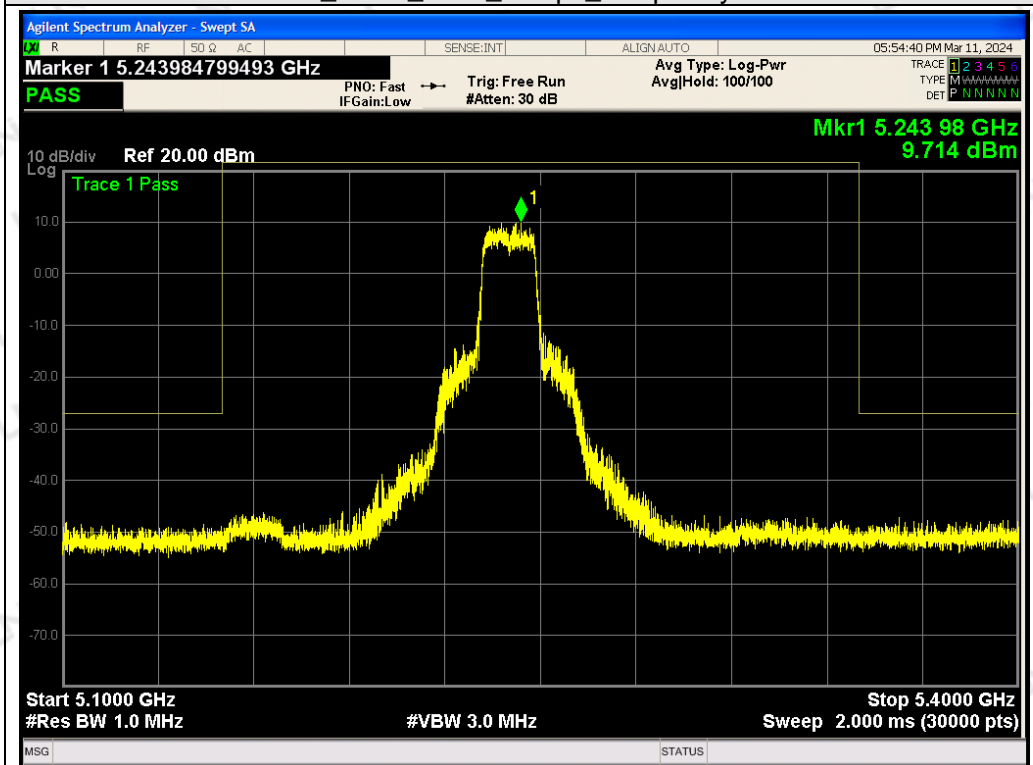
802.11a_ANT1_5180_6Mbps_Frequency Band 5



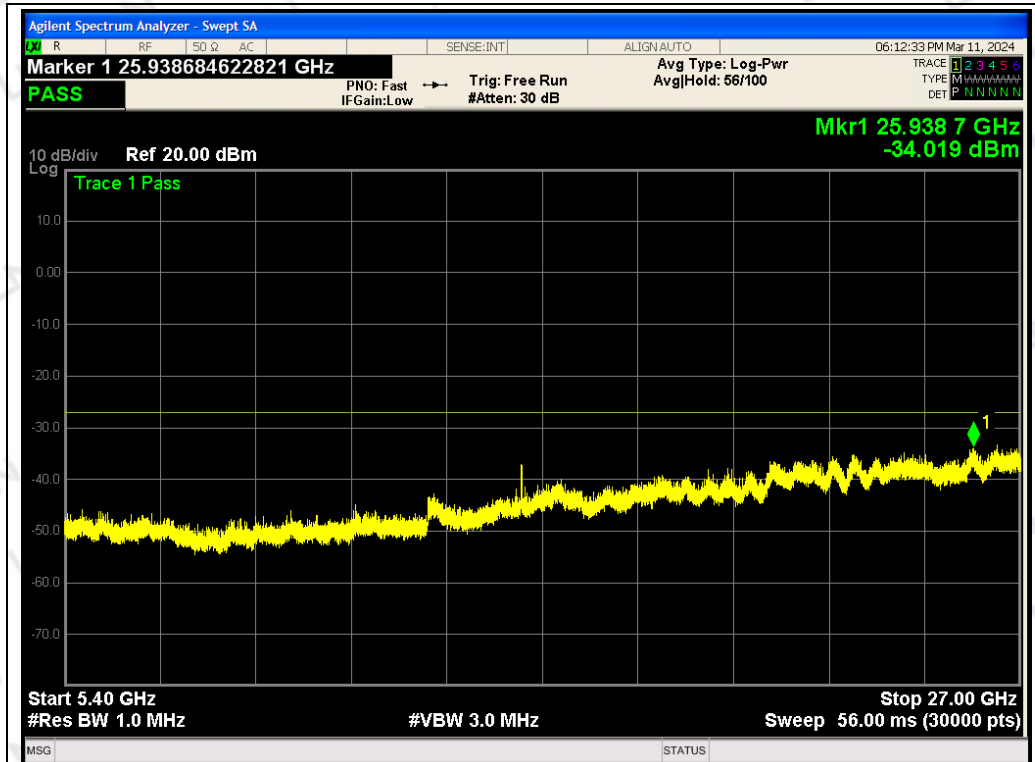
802.11a_ANT1_5240_6Mbps_Frequency Band 1



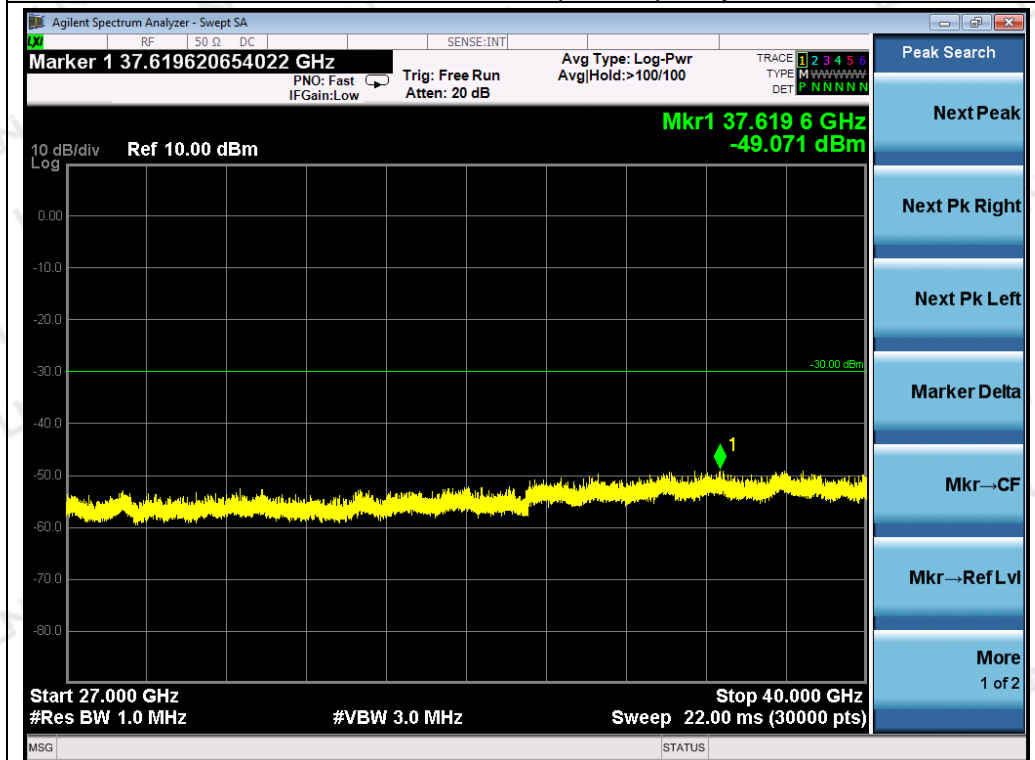
802.11a_ANT1_5240_6Mbps_Frequency Band 2



802.11a_ANT1_5240_6Mbps_Frequency Band 3



802.11a_ANT1_5240_6Mbps_Frequency Band 4



802.11a_ANT1_5240_6Mbps_Frequency Band 5

9 ANTENNA REQUIREMENT

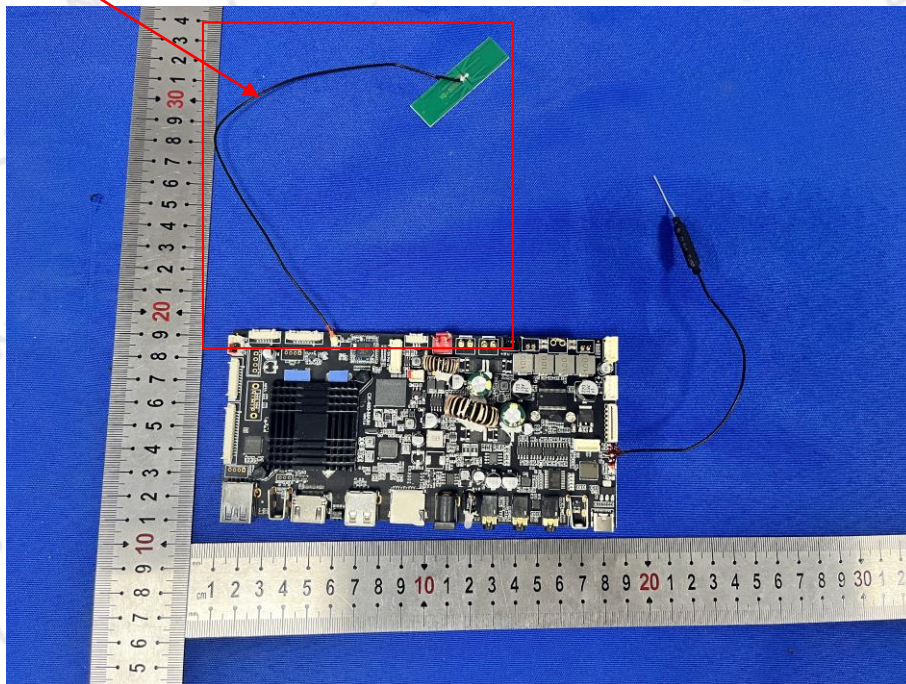
Standard Applicable:

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

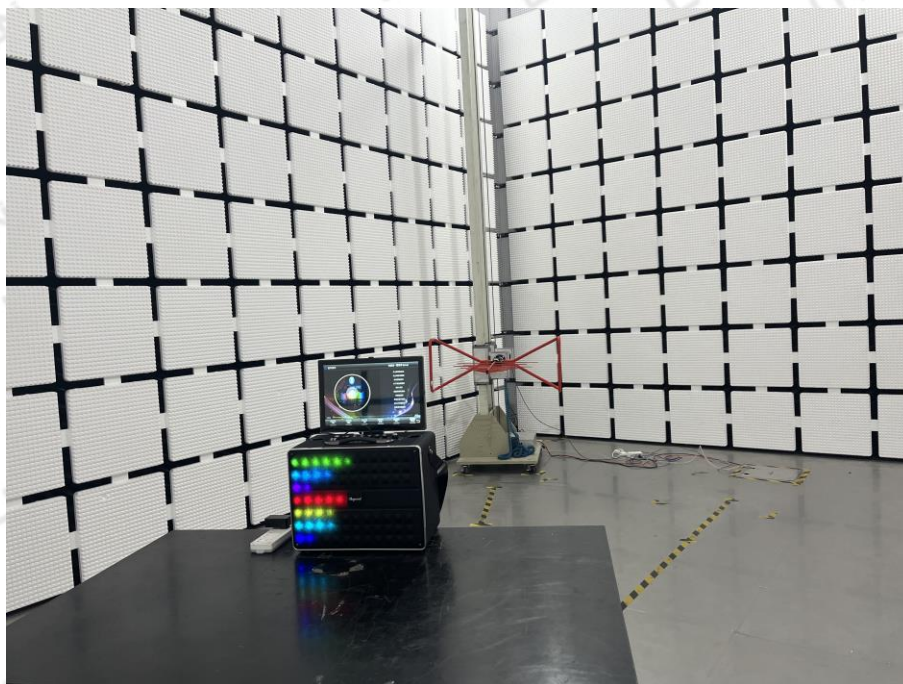
Antenna Connected Construction

The antenna used in this product is an Internal Antenna, The directional gains of antenna used for transmitting is 2.25dBi.

ANTENNA:



10 PHOTO OF TEST RADIATED EMISSION



30MHz-1000MHz



Above 1GHz

CONDUCTED EMISSION



RF CONDUCTED



End of Report