FCC TEST REPORT

FCC ID: 2BFBY-MIDIMATE

Report No.	:	SSP24020047-1E
Applicant	:	Hua Yin Technology (Dongguan) Co., Ltd.
Product Name	:	MIDI MATE
Model Name	:	MIDI MATE OUT
Test Standard	:	FCC Part 15.249
Date of Issue	:	2024-04-03

Shenzhen CCUT Quality Technology Co., Ltd.
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This test report is limited to the above client company and the product model only. It may not be duplicated without prior permitted by Shenzhen CCUT Quality Technology Co., Ltd.

Test Report Basic Information

Applicant.....:	Hua Yin Technology (Dongguan) Co., Ltd.
Address of Applicant.....:	Room 101, No.16, Lianhe Road, Fulong, Dongguan City, Guangdong, China
Manufacturer.....:	Hua Yin Technology (Dongguan) Co., Ltd.
Address of Manufacturer.....:	Room 101, No.16, Lianhe Road, Fulong, Dongguan City, Guangdong, China
Product Name.....:	MIDI MATE
Brand Name.....:	PaintAudio
Main Model.....:	MIDI MATE OUT
Series Models.....:	MIDI MATE IN, MIDI CAPTAIN
Test Standard.....:	FCC Part 15 Subpart C ANSI C63.4-2014 ANSI C63.10-2013
Date of Test .....:	2024-02-28 to 2024-04-03
Test Result.....:	PASS
Tested By .....:	Walker Wu (Walker Wu)
Reviewed By.....:	Lieber Ouyang (Lieber Ouyang)
Authorized Signatory.....:	Lahm Peng (Lahm Peng)

Shenzhen CCUT Quality Technology Co., Ltd. APPROVED

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Revision History

Revision	Issue Date	Description	Revised By
V1.0	2024-04-03	Initial Release	Lahm Peng

1. General Information

1.1 Product Information

Product Name:	MIDI MATE
Trade Name:	PaintAudio
Main Model:	MIDI MATE OUT
Series Models:	MIDI MATE IN, MIDI CAPTAIN
Rated Voltage:	DC 3.3V
Hardware Version:	V1.0
Software Version:	V1.0
Note 1: The test data is gathered from a production sample, provided by the manufacturer. Note 2: The model name of series models listed are different from the main model, but the circuit and the electronic construction are the same, declared by the manufacturer.	

Wireless Specification	
Wireless Standard:	2.4GHz RF
Operating Frequency:	2402MHz ~2480MHz
Max. Field Strength:	94.88dBuV/m
Quantity of Channel:	79
Channel Separation:	1MHz
Modulation:	GFSK
Antenna Gain:	0dBi
Type of Antenna:	PCB Antenna
Type of Device:	☐ Portable Device ☐ Mobile Device ☒ Modular Device

1.2 Test Setup Information

List of Test Modes		
Test Mode	Description	Remark
TM1	Lowest Channel	2402MHz
TM2	Middle Channel	2441MHz
TM3	Highest Channel	2480MHz

List and Details of Auxiliary Cable			
Description	Length (cm)	Shielded/Unshielded	With/Without Ferrite
USB Cable	100	Unshielded	Without Ferrite
-	-	-	-

List and Details of Auxiliary Equipment			
Description	Manufacturer	Model	Serial Number
Adapter	Huawei	HW-100225C00	HC78E2H6A23645
Wireless Virtual Cable	PAINTAUDIO	MIDI MATE	-

List of Channels							
No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)	No. of Channel	Frequency (MHz)
01	2402	21	2422	41	2442	61	2462
02	2403	22	2423	42	2443	62	2463
03	2404	23	2424	43	2444	63	2464
04	2405	24	2425	44	2445	64	2465
05	2406	25	2426	45	2446	65	2466
~	~	~	~	~	~	~	~
16	2417	36	2437	56	2457	76	2477
17	2418	37	2438	57	2458	77	2478
18	2419	38	2439	58	2459	78	2479
19	2420	39	2440	59	2460	79	2480
20	2421	40	2441	60	2461		

1.3 Compliance Standards

Compliance Standards	
FCC Part 15 Subpart C	FEDERAL COMMUNICATIONS COMMISSION, RADIO FREQUENCY DEVICES, Intentional Radiators
All measurements contained in this report were conducted with all above standards	
According to standards for test methodology	
FCC Part 15 Subpart C	FEDERAL COMMUNICATIONS COMMISSION, RADIO FREQUENCY DEVICES, Intentional Radiators
ANSI C63.4-2014	American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.
ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices
Maintenance of compliance is the responsibility of the manufacturer or applicant. Any modification of the product, which result is lowering the emission, should be checked to ensure compliance has been maintained.	

1.4 Test Facilities

Laboratory Name:	**Shenzhen CCUT Quality Technology Co., Ltd.** 1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China
CNAS Laboratory No.:	L18863
A2LA Certificate No.:	6893.01
FCC Registration No:	583813
ISED Registration No.:	CN0164
All measurement facilities used to collect the measurement data are located at 1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China.	

1.5 List of Measurement Instruments

Description	Manufacturer	Model	Serial Number	Cal. Date	Due. Date
Conducted Emissions					
AMN	ROHDE&SCHWARZ	ENV216	101097	2023-10-21	2024-10-20
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	100242	2023-07-31	2024-07-30
Radiated Emissions					
EMI Test Receiver	ROHDE&SCHWARZ	ESPI	100154	2023-07-31	2024-07-30
Spectrum Analyzer	KEYSIGHT	N9020A	MY48030972	2023-07-31	2024-07-30
Spectrum Analyzer	ROHDE&SCHWARZ	FSV40-N	101692	2023-07-31	2024-07-30
Amplifier	SCHWARZBECK	BBV 9743B	00251	2023-07-31	2024-07-30
Amplifier	HUABO	YXL0518-2.5-45	--	2023-07-31	2024-07-30
Amplifier	COM-MW	DLAN-18G-4G-02	10229104	2023-07-31	2024-07-30
Loop Antenna	DAZE	ZN30900C	21104	2023-08-07	2024-08-06
Broadband Antenna	SCHWARZBECK	VULB 9168	01320	2023-08-07	2024-08-06
Horn Antenna	SCHWARZBECK	BBHA 9120D	02553	2023-08-07	2024-08-06
Horn Antenna	COM-MW	ZLB7-18-40G-950	12221225	2023-08-07	2024-08-06
Conducted RF Testing					
RF Test System	MWRFTest	MW100-RFCB	220418SQS-37	2023-07-31	2024-07-30
Spectrum Analyzer	KEYSIGHT	N9020A	ATO-90521	2023-07-31	2024-07-30

1.6 Measurement Uncertainty

Test Item	Conditions	Uncertainty
Conducted Emissions	9kHz ~ 30MHz	±1.64 dB
Radiated Emissions	9kHz ~ 30MHz	±2.88 dB
	30MHz ~ 1GHz	±3.32 dB
	1GHz ~ 18GHz	±3.50 dB
	18GHz ~ 40GHz	±3.66 dB
Occupied Bandwidth	9kHz ~ 26GHz	±4.0 %

2. Summary of Test Results

FCC Rule	Description of Test Item	Result
FCC Part 15.203	Antenna Requirement	Passed
FCC Part 15.207	Conducted Emissions	Passed
FCC Part 15.209, 15.249(a)&(d)	Radiated Emissions	Passed
FCC Part 15.249(d)	Band-edge Emissions	Passed
FCC Part 15.215(c)	Occupied Bandwidth	Passed
Passed: The EUT complies with the essential requirements in the standard Failed: The EUT does not comply with the essential requirements in the standard N/A: Not applicable		

3. Antenna Requirement

3.1 Standard and Limit

According to FCC Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

3.2 Test Result

This product has an PCB antenna, fulfill the requirement of this section.

4. Conducted Emissions

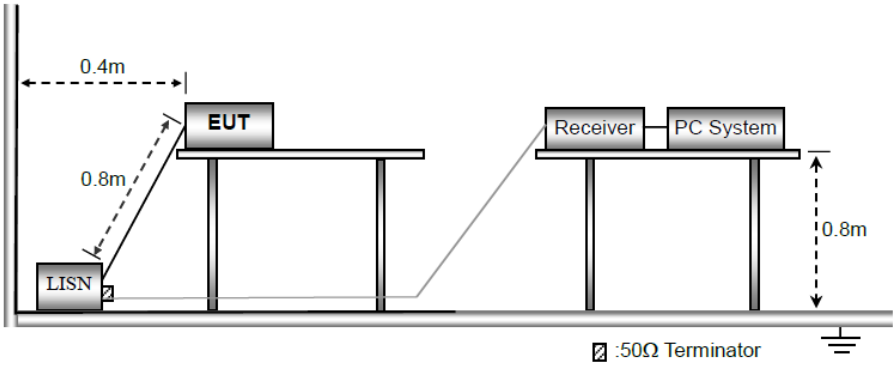
4.1 Standard and Limit

According to the rule FCC Part 15.207, Conducted emissions limit, the limit for a wireless device as below:

Frequency of Emission (MHz)	Conducted emissions (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56	56 to 46
0.5-5	56	46
5-30	60	50
Note 1: Decreases with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz Note 2: The lower limit applies at the band edges		

4.2 Test Procedure

Test is conducting under the description of ANSI C63.10 - 2013 section 6.2.



Test Setup Block Diagram

a) 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.

b) The following is the setting of the receiver
Attenuation: 10dB
Start Frequency: 0.15MHz
Stop Frequency: 30MHz
IF Bandwidth: 9kHz

c) 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 equipment powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.

d) 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.
e) 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.

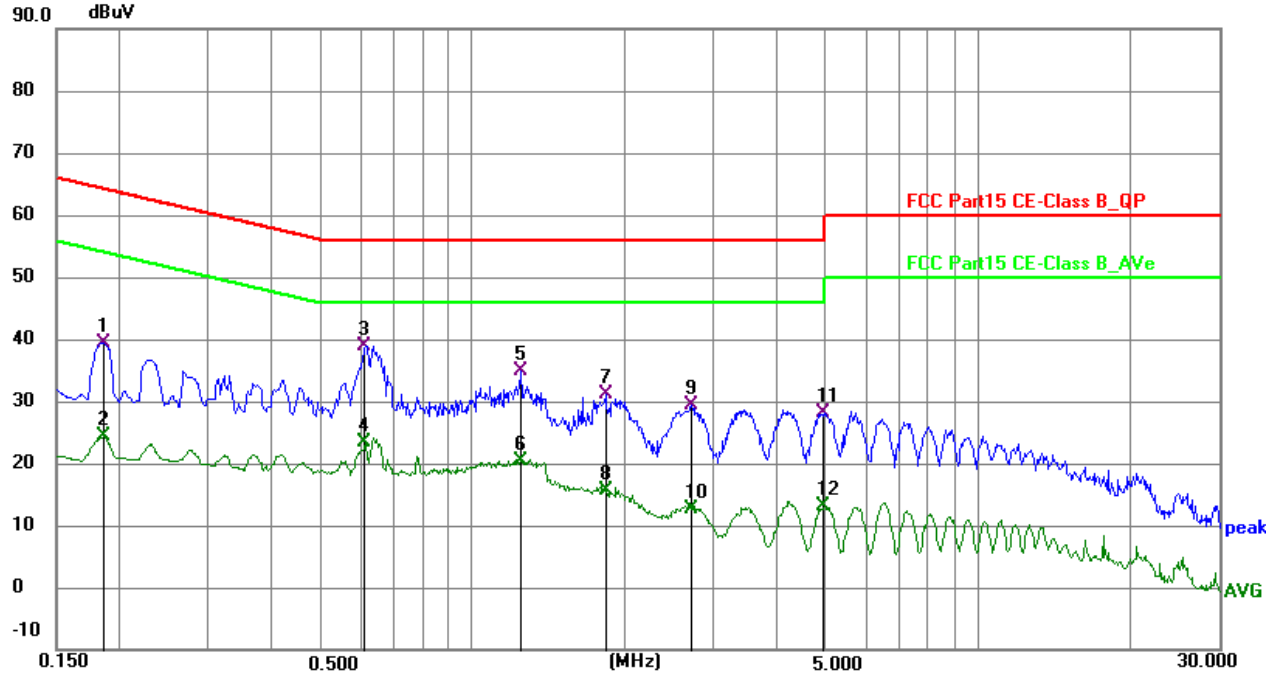
f) LISN is at least 80 cm from nearest part of EUT chassis.

g) For the actual test configuration, please refer to the related Item - photographs of the test setup.

4.3 Test Data and Results

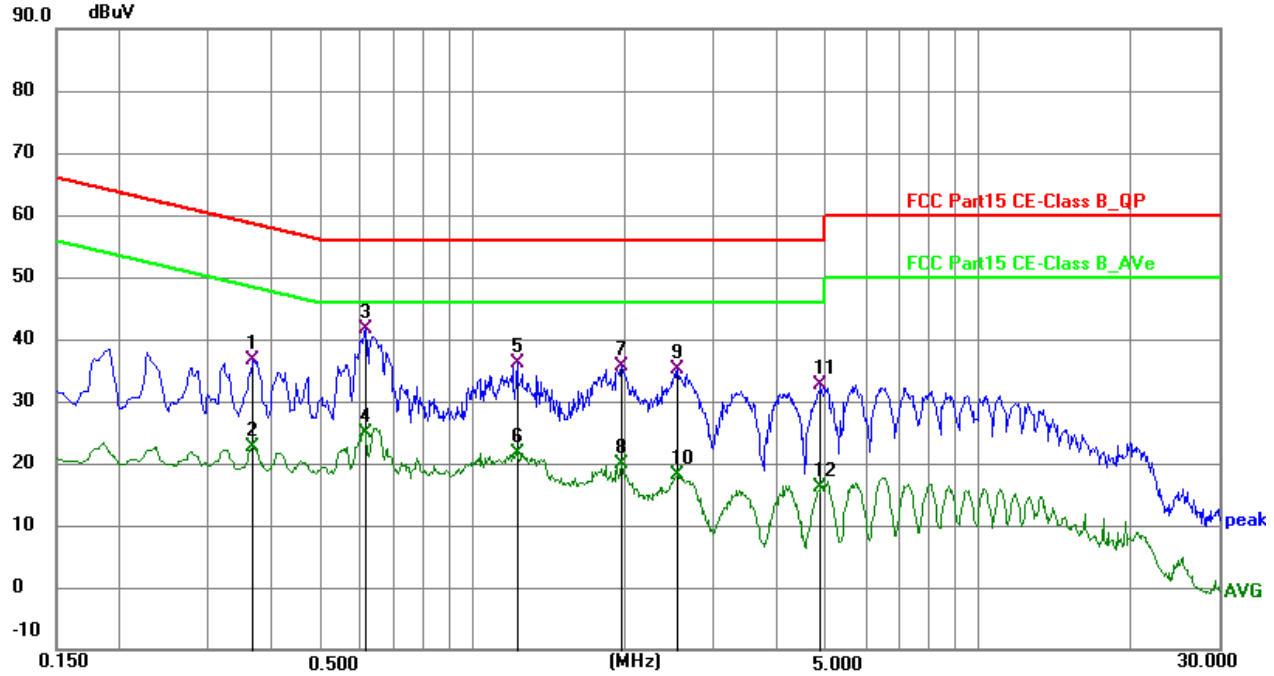
Based on all tested data, the EUT complied with the FCC Part 15.207 standard limit for a wireless device, and with the worst case as below:
Remark: Level = Reading + Factor, Margin = Level - Limit

Test Plots and Data of Conducted Emissions	
Tested Mode:	TM1
Test Voltage:	AC 120V/60Hz
Test Power Line:	Neutral
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1860	29.92	9.39	39.31	64.21	-24.90	QP	P	
2	0.1860	15.08	9.39	24.47	54.21	-29.74	AVG	P	
3 *	0.6134	29.19	9.70	38.89	56.00	-17.11	QP	P	
4	0.6134	13.62	9.70	23.32	46.00	-22.68	AVG	P	
5	1.2435	24.97	10.01	34.98	56.00	-21.02	QP	P	
6	1.2435	10.25	10.01	20.26	46.00	-25.74	AVG	P	
7	1.8330	20.99	10.04	31.03	56.00	-24.97	QP	P	
8	1.8330	5.63	10.04	15.67	46.00	-30.33	AVG	P	
9	2.7195	19.32	10.08	29.40	56.00	-26.60	QP	P	
10	2.7195	2.63	10.08	12.71	46.00	-33.29	AVG	P	
11	4.9694	18.00	10.22	28.22	56.00	-27.78	QP	P	
12	4.9694	2.82	10.22	13.04	46.00	-32.96	AVG	P	

Test Plots and Data of Conducted Emissions	
Tested Mode:	TM1
Test Voltage:	AC 120V/60Hz
Test Power Line:	Live
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.3673	26.79	9.84	36.63	58.56	-21.93	QP	P	
2	0.3673	12.90	9.84	22.74	48.56	-25.82	AVG	P	
3 *	0.6140	31.58	9.94	41.52	56.00	-14.48	QP	P	
4	0.6140	14.89	9.94	24.83	46.00	-21.17	AVG	P	
5	1.2226	26.15	10.03	36.18	56.00	-19.82	QP	P	
6	1.2226	11.60	10.03	21.63	46.00	-24.37	AVG	P	
7	1.9697	25.65	10.05	35.70	56.00	-20.30	QP	P	
8	1.9697	9.71	10.05	19.76	46.00	-26.24	AVG	P	
9	2.5400	25.03	10.08	35.11	56.00	-20.89	QP	P	
10	2.5400	7.93	10.08	18.01	46.00	-27.99	AVG	P	
11	4.8738	22.34	10.22	32.56	56.00	-23.44	QP	P	
12	4.8738	5.85	10.22	16.07	46.00	-29.93	AVG	P	

5. Radiated Emissions

5.1 Standard and Limit

According to §15.249(a), the field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental frequency	Field strength of fundamental (milli-volts/meter)	Field strength of Harmonics (micro-volts/meter)
902-928 MHz	50	500
2400-2483.5 MHz	50	500
5725-5875 MHz	50	500
24.0-24.25 GHz	250	2500

According to §15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

According to the rule FCC Part 15.209, Radiated emission limit for a wireless device as below:

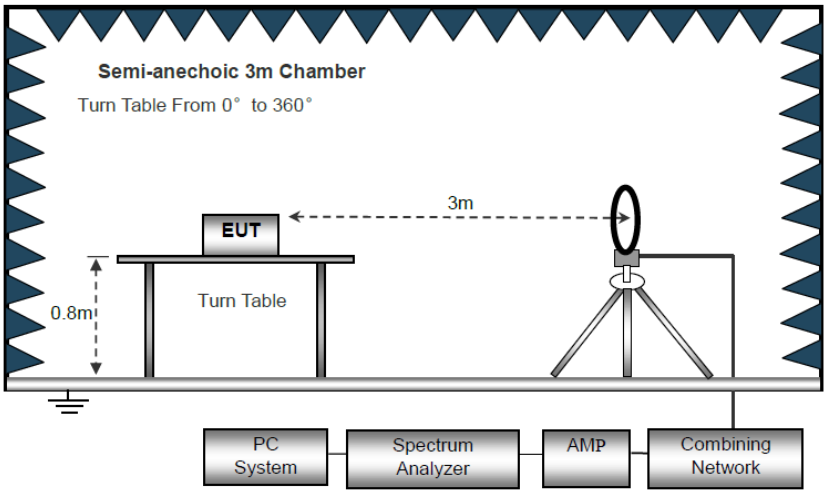
Frequency of emission (MHz)	Radiated emissions (3m)
	Quasi-peak (dBuV/m)
30-88	40
88-216	43.5
216-960	46
Above 960	54
Note: The more stringent limit applies at transition frequencies.	

The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in §15.35 for limiting peak emissions apply. Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

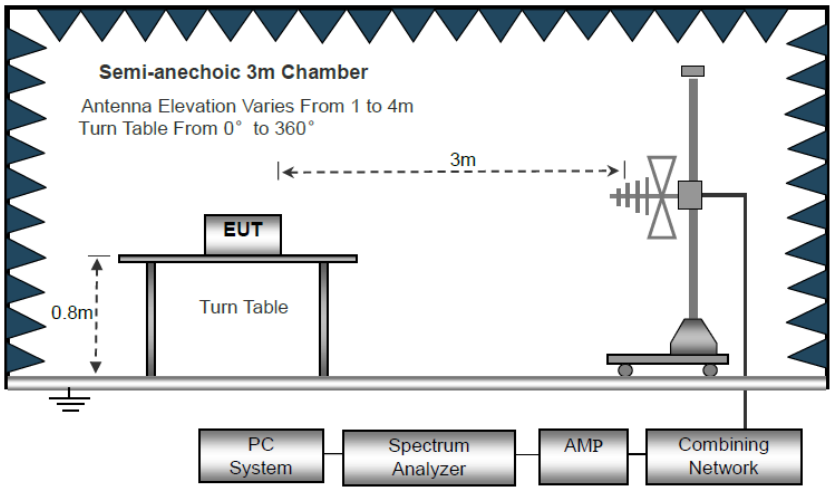
Note: Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

5.2 Test Procedure

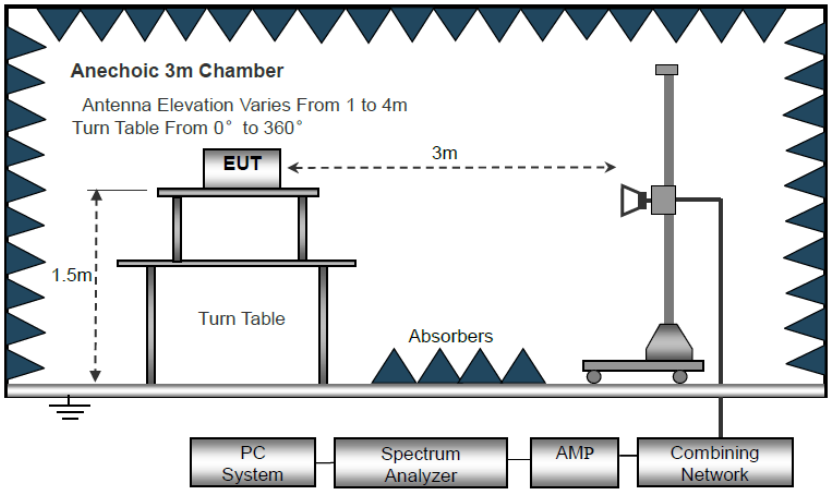
Test is conducting under the description of ANSI C63.10 - 2013 section 6.3 to 6.6.



Block Diagram of Radiated Emission Below 30MHz



Block Diagram of Radiated Emission From 30MHz to 1GHz



Block Diagram of Radiated Emission Above 1GHz

a) The EUT is placed on a turntable, which is 0.8m above ground plane for test frequency range blew 1GHz, and 1.5m above ground plane for test frequency range above 1GHz.

b) EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emissions.

c) Use the following spectrum analyzer settings:
Span = wide enough to fully capture the emission being measured
RBW = 1 MHz for f ≥ 1GHz, 100 kHz for f < 1 GHz, 10kHz for f < 30MHz
VBW ≥ RBW, Sweep = auto
Detector function = peak
Trace = max hold

d) Follow the guidelines in ANSI C63.4-2014 with respect to maximizing the emission by rotating the EUT, adjusting the measurement antenna height and polarization, etc. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, submit this data. Each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.

e) The peak level, once corrected, must comply with the limit specified in Section 15.209. Set the RBW = 1MHz, VBW = 10Hz, Detector = PK for AV value, while maintaining all of the other instrument settings.

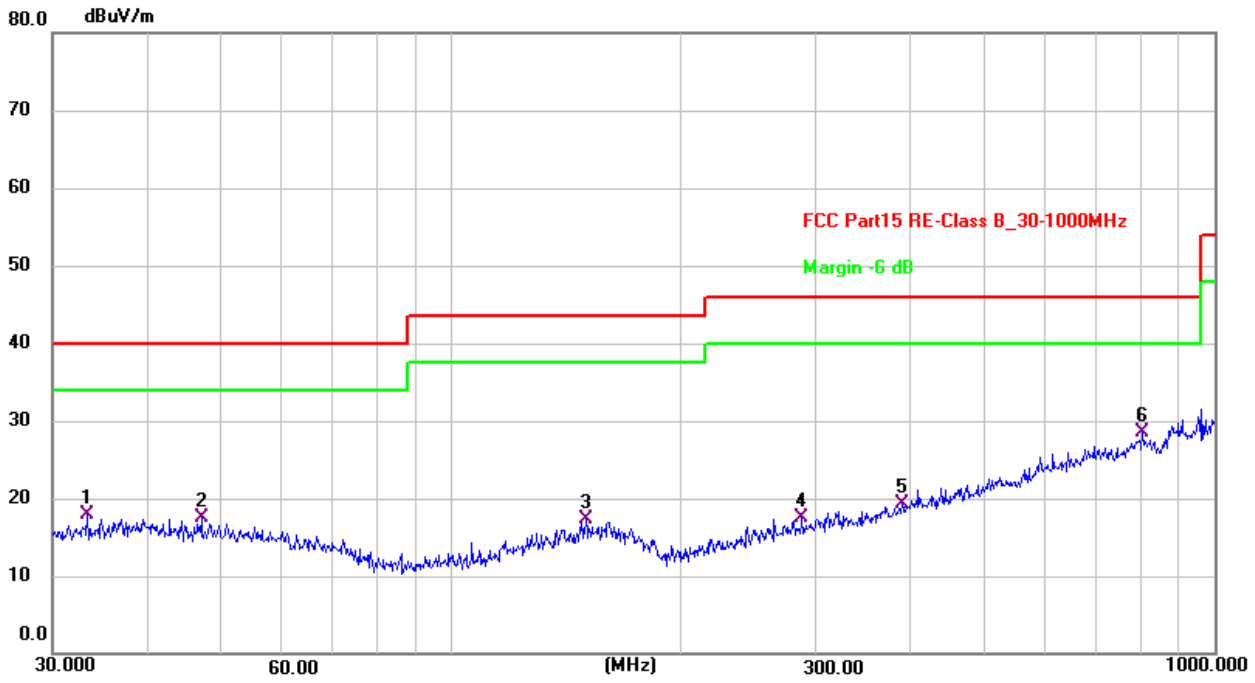
f) For the actual test configuration, please refer to the related item - EUT test photos.

5.3 Test Data and Results

Based on all tested data, the EUT complied with the FCC Part 15.249 standard limit for a wireless device, and with the worst case as below:

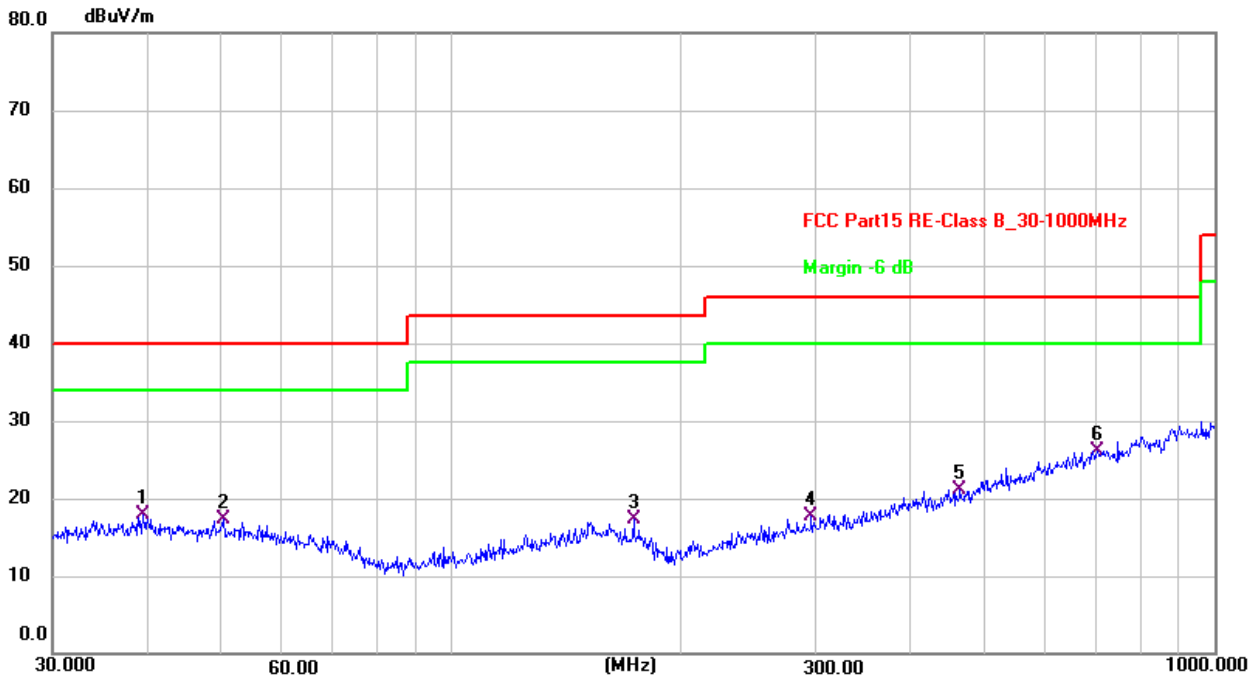
Remark: Level = Reading + Factor, Margin = Level - Limit

Radiated Emission Test Data (30MHz to 1GHz)	
Tested Mode:	TM1
Test Antenna Polarization:	Horizontal
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	33.3279	26.73	-8.79	17.94	40.00	-22.06	QP	100	94	P	
2	46.9948	26.64	-9.06	17.58	40.00	-22.42	QP	100	288	P	
3	150.0108	25.95	-8.65	17.30	43.50	-26.20	QP	100	63	P	
4	287.9904	26.15	-8.60	17.55	46.00	-28.45	QP	100	237	P	
5	389.3549	25.55	-6.29	19.26	46.00	-26.74	QP	100	359	P	
6 *	804.6028	26.16	2.32	28.48	46.00	-17.52	QP	100	206	P	

Radiated Emission Test Data (30MHz to 1GHz)	
Tested Mode:	TM1
Test Antenna Polarization:	Vertical
Remark:	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	39.4371	25.97	-8.04	17.93	40.00	-22.07	QP	100	83	P	
2	50.2324	25.94	-8.72	17.22	40.00	-22.78	QP	100	236	P	
3	173.2051	27.30	-9.95	17.35	43.50	-26.15	QP	100	348	P	
4	296.1836	26.05	-8.39	17.66	46.00	-28.34	QP	100	318	P	
5	463.9696	25.83	-4.71	21.12	46.00	-24.88	QP	100	83	P	
6 *	701.7610	25.53	0.63	26.16	46.00	-19.84	QP	100	123	P	

Radiated Emission Test Data (Above 1GHz)							
Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	H/V	PK/AV
Lowest Channel (2402MHz)							
2402	113.77	-20.89	92.88	114	-21.12	H	PK
2402	91.23	-20.89	70.34	94	-23.66	H	AV
4804	74.28	-14.72	59.56	74	-14.44	H	PK
4804	61.5	-14.72	46.78	54	-7.22	H	AV
7206	63.85	-8.41	55.44	74	-18.56	H	PK
7206	49.63	-8.41	41.22	54	-12.78	H	AV
2402	115.44	-20.89	94.55	114	-19.45	V	PK
2402	98.12	-20.89	77.23	94	-16.77	V	AV
4804	74.5	-14.72	59.78	74	-14.22	V	PK
4804	60.34	-14.72	45.62	54	-8.38	V	AV
7206	65.17	-8.41	56.76	74	-17.24	V	PK
7206	45.64	-8.41	37.23	54	-16.77	V	AV
Middle Channel (2441MHz)							
2441	112.86	-20.7	92.16	114	-21.84	H	PK
2441	85.88	-20.7	65.18	94	-28.82	H	AV
4882	74.26	-14.64	59.62	74	-14.38	H	PK
4882	61.07	-14.64	46.43	54	-7.57	H	AV
7323	64.2	-8.28	55.92	74	-18.08	H	PK
7323	50.78	-8.28	42.5	54	-11.5	H	AV
2441	114.44	-20.7	93.74	114	-20.26	V	PK
2441	96.47	-20.7	75.77	94	-18.23	V	AV
4882	74.26	-14.64	59.62	74	-14.38	V	PK
4882	59.73	-14.64	45.09	54	-8.91	V	AV
7323	62.86	-8.28	54.58	74	-19.42	V	PK
7323	49.7	-8.28	41.42	54	-12.58	V	AV

Radiated Emission Test Data (Above 1GHz)							
Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	H/V	PK/AV
Highest Channel (2480MHz)							
2480	115.43	-20.55	94.88	114	-19.12	H	PK
2480	104.48	-20.55	83.93	94	-10.07	H	AV
4960	60.09	-14.53	45.56	54	-8.44	H	PK
4960	63.75	-8.13	55.62	74	-18.38	H	AV
7440	47.87	-8.13	39.74	54	-14.26	H	PK
7440	74.48	-14.53	59.95	74	-14.05	H	AV
2480	113.96	-20.55	93.41	114	-20.59	V	PK
2480	100.93	-20.55	80.38	94	-13.62	V	AV
4960	75.15	-14.53	60.62	74	-13.38	V	PK
4960	59.71	-14.53	45.18	54	-8.82	V	AV
7440	62.08	-8.13	53.95	74	-20.05	V	PK
7440	48.5	-8.13	40.37	54	-13.63	V	AV

Note 1: this EUT was tested in 3 orthogonal positions and the worst case position data was reported.

Note 2: Testing is carried out with frequency rang 9kHz to the tenth harmonics. The measurements greater than 20dB below the limit from 9kHz to 30MHz.

Note 3: Other emissions are attenuated 20dB below the limits from 9kHz to 30MHz, so it does not recorded report, 18GHz-26GHz not recorded for no spurious point have a margin of less than 6 dB with respect to the limits.

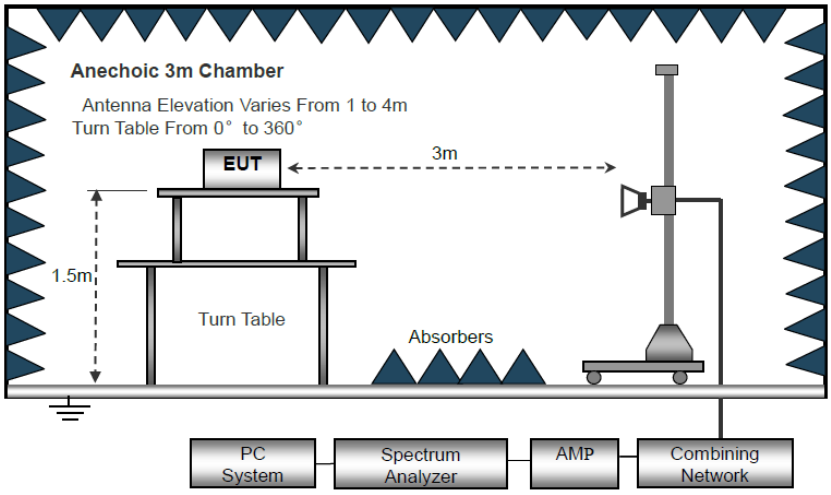
6. Band-edge Emissions

6.1 Standard and Limit

According to §15.249(d) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in §15.209, whichever is the lesser attenuation.

6.2 Test Procedure

Test is conducting under the description of ANSI C63.10 - 2013 section 6.3 to 6.6 and section 6.10.



Test Setup Block Diagram

As the radiated emissions testing, set the Lowest and Highest Transmitting Channel, observed the outside band of 2310MHz to 2400MHz and 2483.5MHz to 2500MHz, than mark the higher-level emission for comparing with the FCC rules.

6.3 Test Data and Results

Based on all tested data, the EUT complied with the FCC Part 15.249 standard limit, and with the worst case as below:

Test Mode	Frequency	Limit	Result
	MHz	dBuV/dBc	
Lowest	2310.00	<54 dBuV	Pass
	2390.00	<54 dBuV	Pass
Highest	2483.50	<54 dBuV	Pass
	2500.00	<54 dBuV	Pass

Radiated Emission Test Data (Band edge emissions)							
Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
MHz	dBuV/m	dB/m	dBuV/m	dBuV/m	dB	H/V	PK/AV
Lowest Channel GFSK (2402MHz)							
2310	67.31	-21.34	45.97	74	-28.03	H	PK
2310	52.09	-21.34	30.75	54	-23.25	H	AV
2390	68.08	-20.96	47.12	74	-26.88	H	PK
2390	51.39	-20.96	30.43	54	-23.57	H	AV
2400	72.41	-20.91	51.5	74	-22.5	H	PK
2400	55.78	-20.91	34.87	54	-19.13	H	AV
2310	68.38	-21.34	47.04	74	-26.96	V	PK
2310	52.78	-21.34	31.44	54	-22.56	V	AV
2390	68.63	-20.96	47.67	74	-26.33	V	PK
2390	52.53	-20.96	31.57	54	-22.43	V	AV
2400	73.21	-20.91	52.3	74	-21.7	V	PK
2400	53.48	-20.91	32.57	54	-21.43	V	AV
Highest Channel GFSK (2480MHz)							
2483.50	70.9	-20.51	50.39	74	-23.61	H	PK
2483.50	53.96	-20.51	33.45	54	-20.55	H	AV
2500	68.73	-20.43	48.3	74	-25.7	H	PK
2500	50.37	-20.43	29.94	54	-24.06	H	AV
2483.50	72.54	-20.51	52.03	74	-21.97	V	PK
2483.50	53.48	-20.51	32.97	54	-21.03	V	AV
2500	66.35	-20.43	45.92	74	-28.08	V	PK
2500	49.08	-20.43	28.65	54	-25.35	V	AV

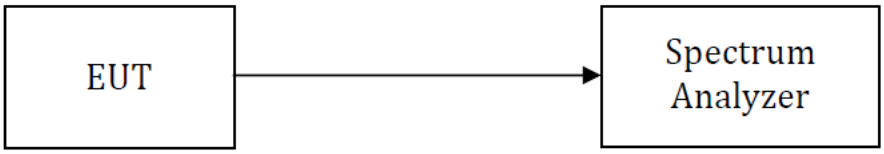
7. Occupied Bandwidth

7.1 Standard and Limit

According to 15.215 (c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated. The requirement to contain the designated bandwidth of the emission within the specified frequency band includes the effects from frequency sweeping, frequency hopping and other modulation techniques that may be employed as well as the frequency stability of the transmitter over expected variations in temperature and supply voltage. If a frequency stability is not specified in the regulations, it is recommended that the fundamental emission be kept within at least the central 80% of the permitted band in order to minimize the possibility of out-of-band operation.

7.2 Test Procedure

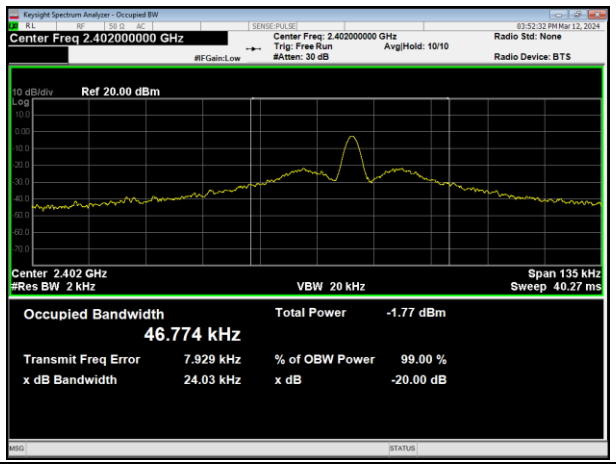
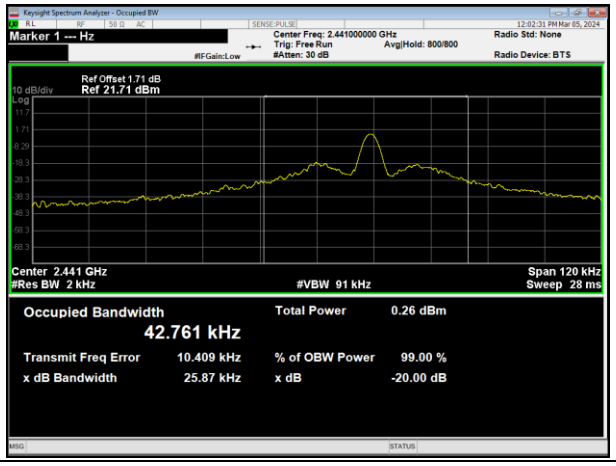
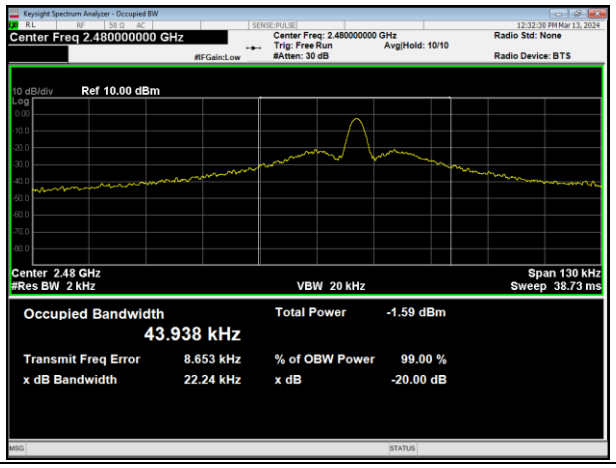
According to the ANSI 63.10-2013, section 6.9, the emission bandwidth test method as follows.
1) Remove the antenna from the EUT and connect to the spectrum analyzer via a low loss RF cable.
2) Set the spectrum analyzer to any one measured frequency within its operating range.
3) Set RBW = 2kHz, VBW = 20kHz, Sweep = Auto.
4) Set a reference level on the measuring instrument equal to the highest peak value.
5) Measure the frequency difference of two frequencies that were attenuated 20dB from the reference level. Record the frequency difference as the emission bandwidth.
6) Repeat the above procedures until all frequencies measured were complete.
All the trace to stabilize, use the marker-to-peak function to set the marker to the peak of the emission, use the marker-delta function to measure and record the 20dB down and 99% bandwidth of the emission.



Test Setup Block Diagram

7.3 Test Data and Results

Test Channel	Test Frequency	20dB Bandwidth (kHz)	99% Bandwidth (kHz)
Lowest Channel	2402MHz	24.03	46.774
Middle Channel	2441MHz	25.87	42.761
Highest Channel	2480MHz	22.24	43.938

Test Plots of Occupied Bandwidth
2402MHz 
2441MHz 
2480MHz 

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