FCC TEST REPORT

FCC ID: 2AY3H-AJ159

Report No.	:	SSP24060110-1E
Applicant	:	Shenzhen Ajazz Tongchuang Electronic Technology Co., Ltd.
Product Name	:	GAME MOUSE
Model Name	:	AJ159
Test Standard	:	FCC Part 15.249
Date of Issue	:	2024-07-08
Prepared By		Shenzhen CCUT Quality Technology Co., Ltd.

Shenzhen CCUT Quality Technology Co., Ltd.
1F, Building 35, Changxing Technology Industrial Park, Yutang Street, Guangming District, Shenzhen, Guangdong, China; (Tel.:+86-755-23406590 website: www.ccuttest.com)

Test Report Basic Information

Applicant:	Shenzhen Ajazz Tongchuang Electronic Technology Co., Ltd.
Address of Applicant:	2104-1, Block A, CIMC Low Orbit Satellite Internet of Things Industrial Park, Dongkeng Community, Fenghuang Street, Guangming District, Shenzhen, Guangdong, China
Manufacturer:	Shenzhen Ajazz Tongchuang Electronic Technology Co., Ltd.
Address of Manufacturer:	2104-1, Block A, CIMC Low Orbit Satellite Internet of Things Industrial Park, Dongkeng Community, Fenghuang Street, Guangming District, Shenzhen, Guangdong, China
Product Name:	GAME MOUSE
Brand Name:	AJAZZ
Main Model:	AJ159
Series Models:	AJ159P, AJ159PRO, AJ159APEX, AJ179, AJ179P, AJ179PRO, AJ179APEX
Test Standard:	FCC Part 15 Subpart C ANSI C63.4-2014 ANSI C63.10-2013
Date of Test:	2024-06-15 to 2024-06-28
Test Result:	PASS

Tested By:	Colin Chen (Colin Chen)	Shenzhen CCUT Quality Technology Co., Ltd. APPROVED
Reviewed By:	Lieber Ouyang (Lieber Ouyang)	
Authorized Signatory:	Lahm Peng (Lahm Peng)	

Note : 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.. All test data presented in this test report is only applicable to presented test sample.

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Revision History

Revision	Issue Date	Description	Revised By
V1.0	2024-07-08	Initial Release	Lahm Peng

1. General Information

1.1 Product Information

Product Name:	GAME MOUSE
Trade Name:	AJAZZ
Main Model:	AJ159
Series Models:	AJ159P, AJ159PRO, AJ159APEX, AJ179, AJ179P, AJ179PRO, AJ179APEX
Rated Voltage:	DC 3.7V by battery, USB 5V Charging
Battery:	1.48Wh (3.7V, 400mAh)
Hardware Version:	1.0
Software Version:	1.0
Note 1: The test data is gathered from a production sample, provided by the manufacturer. Note 2: These model names, color of appearance are different, but the circuit and the electronic construction are the same from the main model, declared by the manufacturer.	

Wireless Specification	
Wireless Standard:	2.4GHz RF
Operating Frequency:	2402MHz ~2478MHz
Quantity of Channel:	39
Channel Separation:	2MHz
Modulation:	GFSK
Antenna Gain:	2.95dBi
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	Transmitting	2402/2440/2478MHz

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

List and Details of Auxiliary Equipment			
Description	Manufacturer	Model	Serial Number
Adapter	Huawei	HW-100225C00	HC78E2N6A23645
-	-	-	-

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	11	2422	21	2442	31	2462
02	2404	12	2424	22	2444	32	2464
03	2406	13	2426	23	2446	33	2466
04	2408	14	2428	24	2448	34	2468
05	2410	15	2430	25	2450	35	2470
06	2412	16	2432	26	2452	36	2472
07	2414	17	2434	27	2454	37	2474
08	2416	18	2436	28	2456	38	2476
09	2418	19	2438	29	2458	39	2478
10	2420	20	2440	30	2460	-	-

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

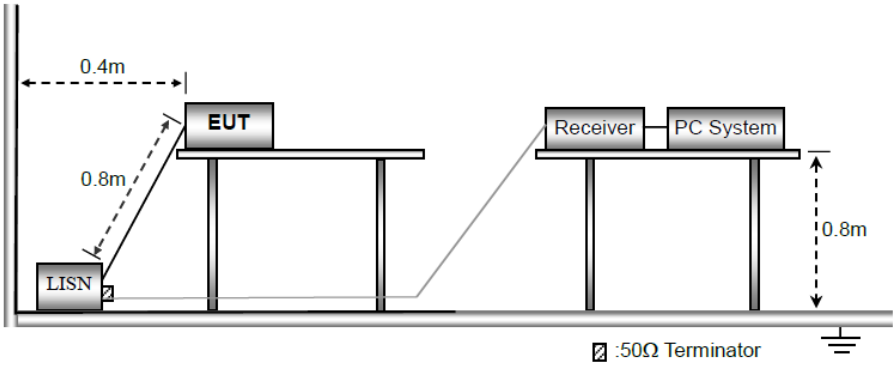
4.1 Standard and Limit

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.

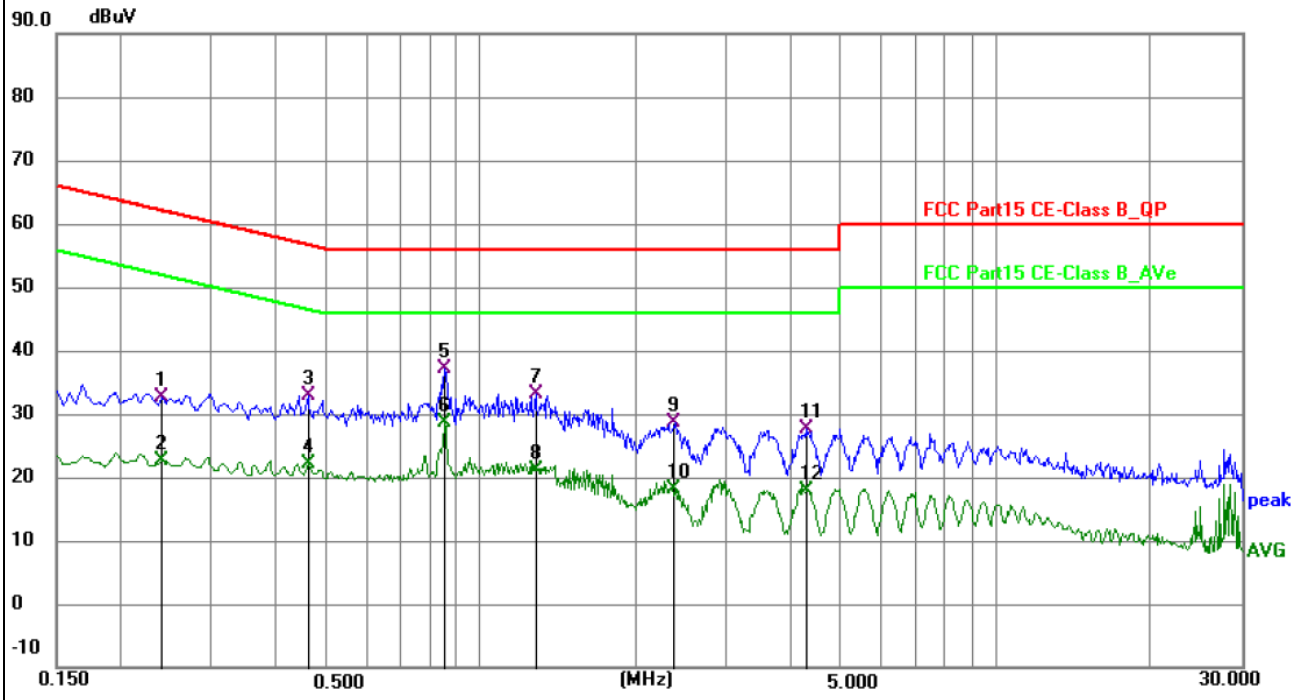
g) For the actual test configuration, please refer to the related Item - photographs of the test setup.

4.3 Test Data and Results

All of the 2.4G RF modes have been tested, the EUT complied with the FCC Part 15.249 standard limit for a wireless device, and with the worst case 2.4G RF_2402MHz as below:

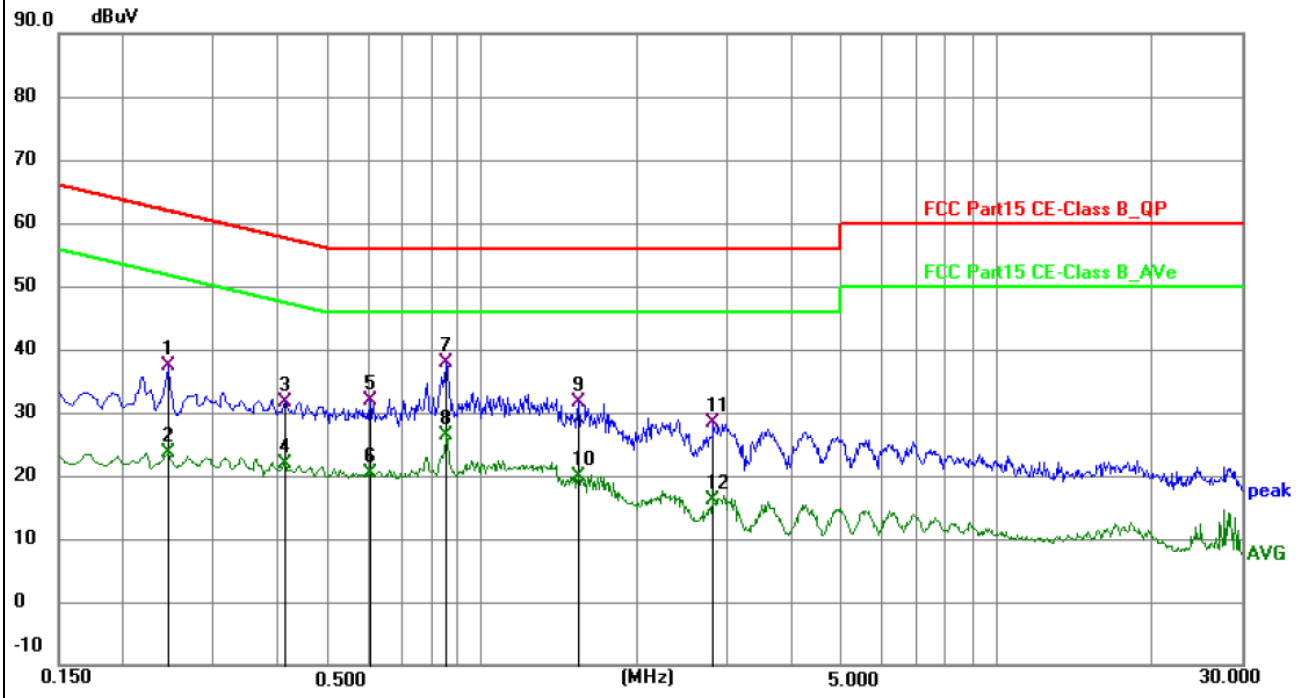
Remark: Level = Reading + Factor, Margin = Level - Limit

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	0.2400	23.08	9.66	32.74	62.10	-29.36	QP	P	
2	0.2400	13.06	9.66	22.72	52.10	-29.38	AVG	P	
3	0.4605	22.95	9.95	32.90	56.68	-23.78	QP	P	
4	0.4605	12.22	9.95	22.17	46.68	-24.51	AVG	P	
5	0.8520	27.55	9.60	37.15	56.00	-18.85	QP	P	
6 *	0.8520	19.05	9.60	28.65	46.00	-17.35	AVG	P	
7	1.2795	23.17	10.02	33.19	56.00	-22.81	QP	P	
8	1.2795	11.21	10.02	21.23	46.00	-24.77	AVG	P	
9	2.3909	18.62	10.07	28.69	56.00	-27.31	QP	P	
10	2.3909	8.06	10.07	18.13	46.00	-27.87	AVG	P	
11	4.2900	17.50	10.17	27.67	56.00	-28.33	QP	P	
12	4.2900	7.67	10.17	17.84	46.00	-28.16	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	0.2445	27.80	9.47	37.27	61.94	-24.67	QP	P	
2	0.2445	14.21	9.47	23.68	51.94	-28.26	AVG	P	
3	0.4110	21.62	9.94	31.56	57.63	-26.07	QP	P	
4	0.4110	11.93	9.94	21.87	47.63	-25.76	AVG	P	
5	0.6045	21.98	9.95	31.93	56.00	-24.07	QP	P	
6	0.6045	10.50	9.95	20.45	46.00	-25.55	AVG	P	
7 *	0.8520	27.98	9.79	37.77	56.00	-18.23	QP	P	
8	0.8520	16.55	9.79	26.34	46.00	-19.66	AVG	P	
9	1.5360	21.61	10.03	31.64	56.00	-24.36	QP	P	
10	1.5360	9.82	10.03	19.85	46.00	-26.15	AVG	P	
11	2.8230	18.31	10.10	28.41	56.00	-27.59	QP	P	
12	2.8230	5.91	10.10	16.01	46.00	-29.99	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:

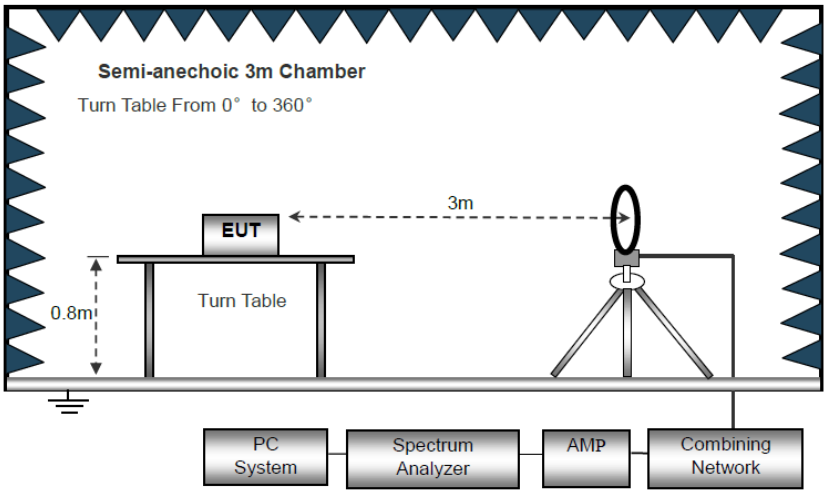
Frequency of emission (MHz)	Radiated emissions (3m)
	Quasi-peak (dBuV/m)
30-88	40
88-216	43.5
216-960	46
Above 960	54
Note: The more stringent limit applies at transition frequencies.	

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.

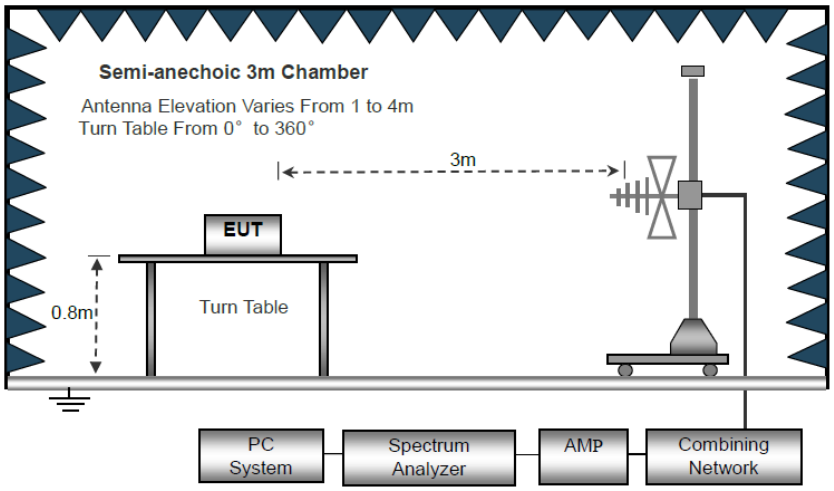
Note: Spurious Radiated Emissions measurements starting below or at the lowest crystal frequency.

5.2 Test Procedure

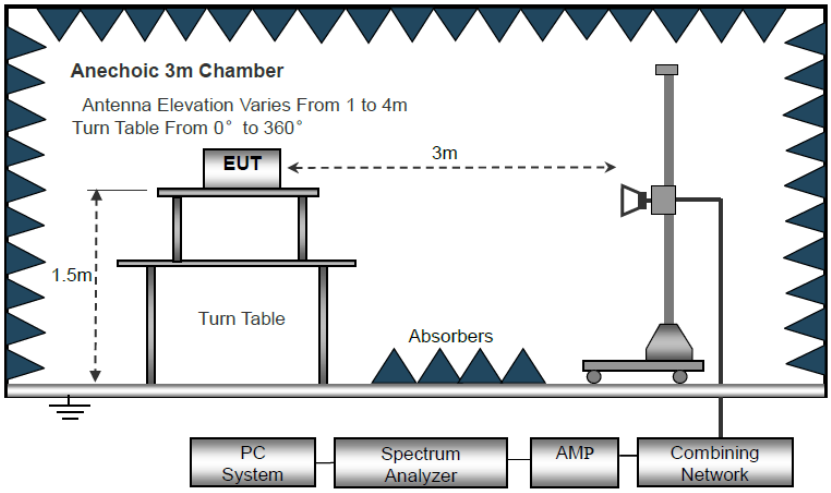
Test is conducting under the description of ANSI C63.10 - 2013 section 6.3 to 6.6.



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.

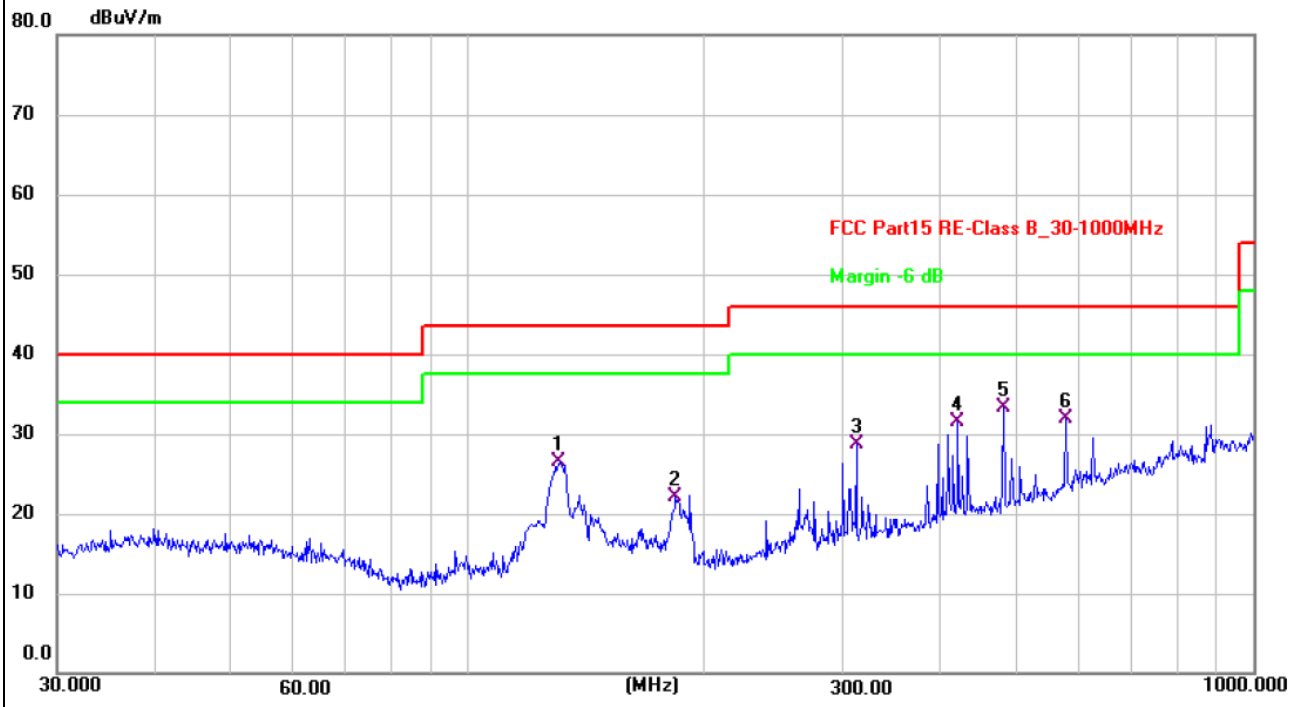
f) For the actual test configuration, please refer to the related item - EUT test photos.

5.3 Test Data and Results

All of the 2.4G RF modes have been tested, the EUT complied with the FCC Part 15.249 standard limit for a wireless device, and with the worst case 2.4G RF_2402MHz as below:

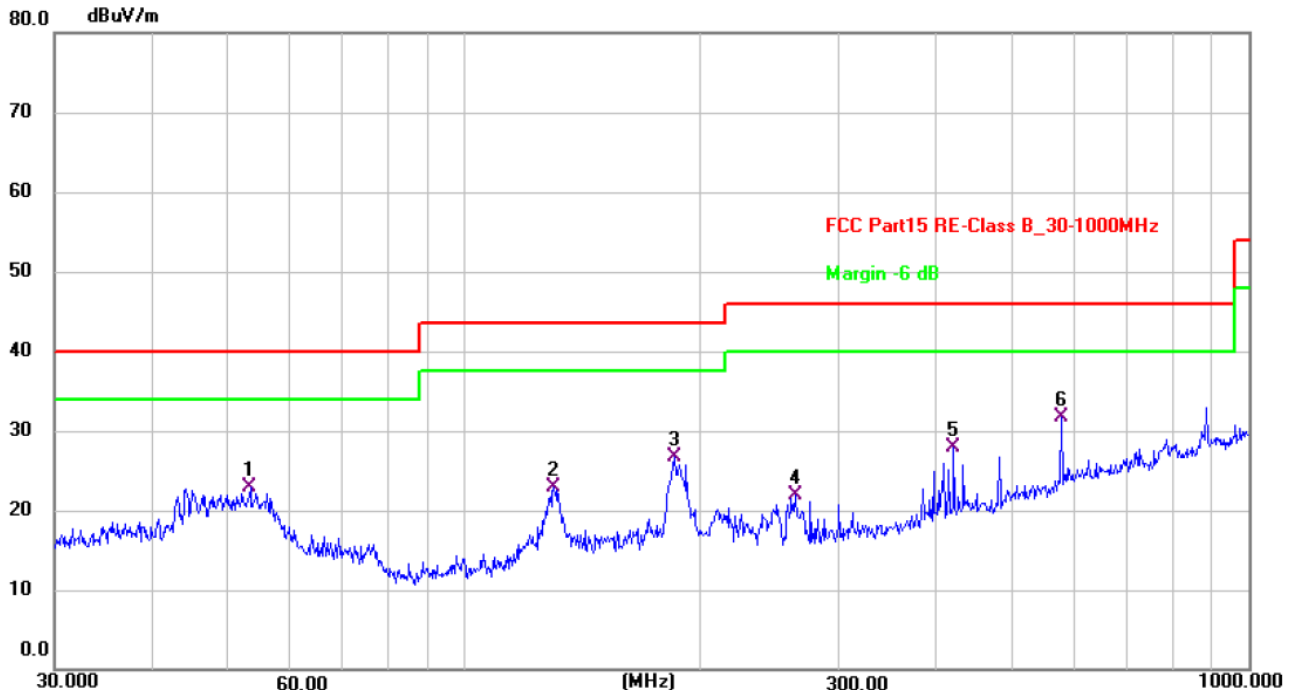
Remark: Level = Reading + Factor, Margin = Level - Limit

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	130.8369	36.29	-9.86	26.43	43.50	-17.07	QP	100	4	P	
2	183.8440	33.28	-11.26	22.02	43.50	-21.48	QP	100	276	P	
3	312.1794	36.88	-8.19	28.69	46.00	-17.31	QP	100	297	P	
4	420.5803	37.16	-5.65	31.51	46.00	-14.49	QP	100	152	P	
5 *	480.5276	37.60	-4.30	33.30	46.00	-12.70	QP	100	245	P	
6	576.6443	33.88	-1.90	31.98	46.00	-14.02	QP	100	173	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	53.3179	31.94	-9.09	22.85	40.00	-17.15	QP	100	208	P	
2	129.9226	32.82	-9.91	22.91	43.50	-20.59	QP	100	302	P	
3	185.1379	38.21	-11.47	26.74	43.50	-16.76	QP	100	75	P	
4	263.8190	31.26	-9.45	21.81	46.00	-24.19	QP	100	208	P	
5	420.5803	33.60	-5.65	27.95	46.00	-18.05	QP	100	323	P	
6 *	576.6443	33.51	-1.90	31.61	46.00	-14.39	QP	100	137	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	111.99	-20.89	91.1	114	-22.9	H	PK
2402	88.59	-20.89	67.7	94	-26.3	H	AV
4804	79.01	-14.72	64.29	74	-9.71	H	PK
4804	60.08	-14.72	45.36	54	-8.64	H	AV
7206	64.1	-8.41	55.69	74	-18.31	H	PK
7206	48.62	-8.41	40.21	54	-13.79	H	AV
2402	111.77	-20.89	90.88	114	-23.12	V	PK
2402	100.41	-20.89	79.52	94	-14.48	V	AV
4804	78.93	-14.72	64.21	74	-9.79	V	PK
4804	58.87	-14.72	44.15	54	-9.85	V	AV
7206	64.7	-8.41	56.29	74	-17.71	V	PK
7206	49.1	-8.41	40.69	54	-13.31	V	AV
Middle Channel (2440MHz)							
2440	104.24	-20.89	83.35	114	-30.65	H	PK
2440	98.3	-20.89	77.41	94	-16.59	H	AV
4880	74.66	-14.64	60.02	74	-13.98	H	PK
4880	62.51	-14.64	47.87	54	-6.13	H	AV
7320	65.66	-8.28	57.38	74	-16.62	H	PK
7320	49.8	-8.28	41.52	54	-12.48	H	AV
2440	102.33	-20.7	81.63	114	-32.37	V	PK
2440	99.96	-20.7	79.26	94	-14.74	V	AV
4880	78.13	-14.64	63.49	74	-10.51	V	PK
4880	60.95	-14.64	46.31	54	-7.69	V	AV
7320	62.72	-8.28	54.44	74	-19.56	V	PK
7320	45.21	-8.28	36.93	54	-17.07	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 (2478MHz)							
2478	109.68	-20.7	88.98	114	-25.02	H	PK
2478	100.92	-20.7	80.22	94	-13.78	H	AV
4956	77.78	-14.53	63.25	74	-10.75	H	PK
4956	59.87	-14.53	45.34	54	-8.66	H	AV
7434	65.18	-8.13	57.05	74	-16.95	H	PK
7434	49.91	-8.13	41.78	54	-12.22	H	AV
2478	109.49	-20.55	88.94	114	-25.06	V	PK
2478	100.19	-20.55	79.64	94	-14.36	V	AV
4956	76.99	-14.53	62.46	74	-11.54	V	PK
4956	58.8	-14.53	44.27	54	-9.73	V	AV
7434	64.28	-8.13	56.15	74	-17.85	V	PK
7434	45.27	-8.13	37.14	54	-16.86	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 in report. 18GHz-26GHz not recorded for no spurious point have a margin of less than 6 dB with respect to the limits.

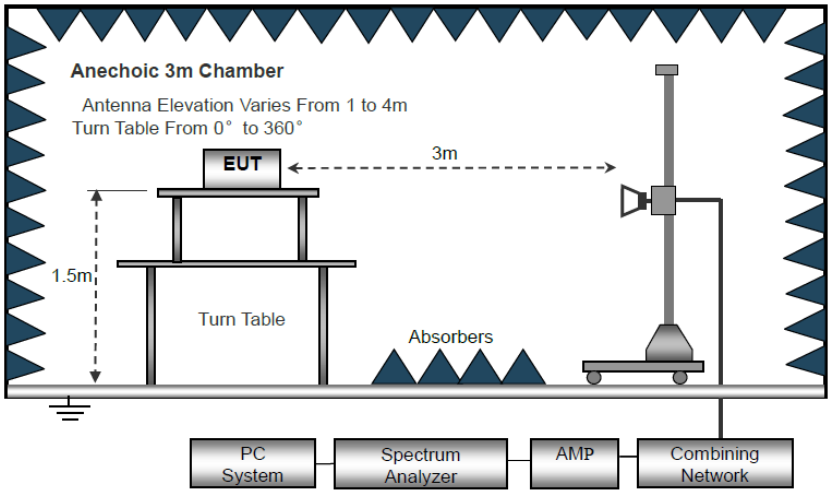
6. Band-edge Emissions

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	68.25	-21.34	46.91	74	-27.09	H	PK
2310	52.07	-21.34	30.73	54	-23.27	H	AV
2390	67.33	-20.96	46.37	74	-27.63	H	PK
2390	49.44	-20.96	28.48	54	-25.52	H	AV
2400	68.94	-20.91	48.03	74	-25.97	H	PK
2400	53.09	-20.91	32.18	54	-21.82	H	AV
2310	67.1	-21.34	45.76	74	-28.24	V	PK
2310	52.7	-21.34	31.36	54	-22.64	V	AV
2390	66.64	-20.96	45.68	74	-28.32	V	PK
2390	51.02	-20.96	30.06	54	-23.94	V	AV
2400	67.58	-20.91	46.67	74	-27.33	V	PK
2400	56.37	-20.91	35.46	54	-18.54	V	AV
Highest Channel GFSK (2478MHz)							
2483.50	67.43	-20.51	46.92	74	-27.08	H	PK
2483.50	52.32	-20.51	31.81	54	-22.19	H	AV
2500	68.8	-20.43	48.37	74	-25.63	H	PK
2500	51.03	-20.43	30.6	54	-23.4	H	AV
2483.50	67.11	-20.51	46.6	74	-27.4	V	PK
2483.50	52.13	-20.51	31.62	54	-22.38	V	AV
2500	67.06	-20.43	46.63	74	-27.37	V	PK
2500	50.73	-20.43	30.3	54	-23.7	V	AV

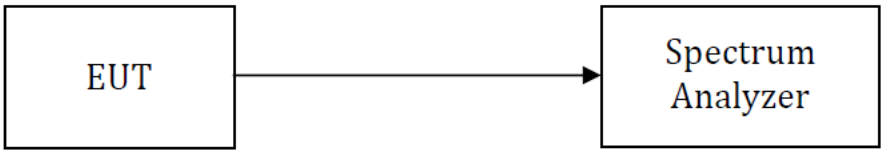
7. Occupied Bandwidth

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 = 20kHz, VBW = 62kHz, 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.



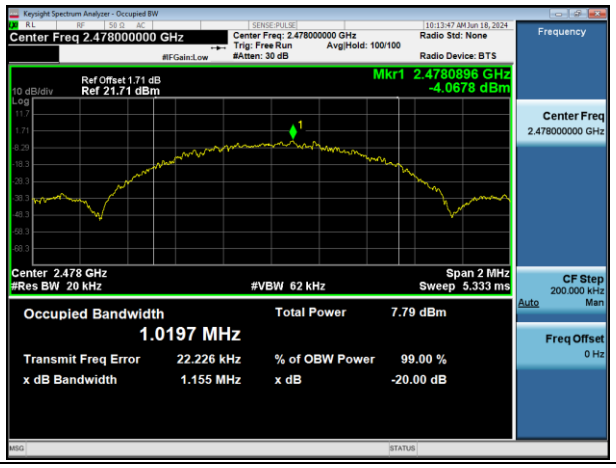
Test Setup Block Diagram

7.3 Test Data and Results

Test Channel	Test Frequency	20dB Bandwidth (MHz)	99% Bandwidth (MHz)
Lowest Channel	2402MHz	1.175	1.0241
Middle Channel	2440MHz	1.0208	1.189
Highest Channel	2478MHz	1.0197	1.155

Test Plots of Occupied Bandwidth
2402MHz

2440MHz

2478MHz


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