TEST REPORT

Applicant	:	NINGBO MASCUGE IMPORT AND EXPORT CO.,LTD
Address	:	Room 605-1, No.45, Lane 578, Tiantong South Road, Yinzhou District, Ningbo City, Zhejiang Province, China
Manufacturer	:	NINGBO MASCUGE IMPORT AND EXPORT CO.,LTD
Address	:	Room 605-1, No.45, Lane 578, Tiantong South Road, Yinzhou District, Ningbo City, Zhejiang Province, China
Product Name	:	SOCCER BEATS RECHARGEABLE LED SPEAKER
Model Number	:	MG045
Trademark	:	/
FCC ID	:	2BTUZ-MG045
Test Date	:	Nov. 29, 2025 to Jan. 13, 2026
Date of Report	:	Jan. 13, 2026
Test Result	:	This device described above has been tested by BKC, and the test results show that the equipment under test (EUT) is in compliance with the Standard requirements. And it is applicable only to the tested sample identified in the report.

Test Procedure Used:

Standards	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247 ANSI C63.10:2020

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Sten Huang

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Approved(Manager):
Jerry Liao

SHENZHEN BKC TESTING CO., LTD. APPROVED

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Revision History of This Test Report		
Report Number	Description	Issued Date
BKC26010482AE-1	Initial Issue	2026-01-15

1. General Information

1.1. Description of Device (EUT)

EUT Name	:	SOCCER BEATS RECHARGEABLE LED SPEAKER
Model No.	:	MG045
Model Difference	:	/
Power supply	:	Input:DC 5V or Battery DC 3.7V
Operation frequency	:	2402-2480MHz
Max. RF output power:	:	2.91dBm
Modulation	:	GFSK, Π/4-DQPSK, 8DPSK
Antenna Type	:	PCB antenna, Maximum Gain is -0.58 dBi
Intend use environment	:	Residential, commercial and light industrial environment

1.2. Channel List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	1	2403	2	2404	3	2405
4	2406	5	2407	6	2408	7	2409
8	2410	9	2411	10	2412	11	2413
12	2414	13	2415	14	2416	15	2417
16	2418	17	2419	18	2420	19	2421
20	2422	21	2423	22	2424	23	2425
24	2426	25	2427	26	2428	27	2429
28	2430	29	2431	30	2432	31	2433
32	2434	33	2435	34	2436	35	2437
36	2438	37	2439	38	2440	39	2441
40	2442	41	2443	42	2444	43	2445
44	2446	45	2447	46	2448	47	2449
48	2450	49	2451	50	2452	51	2453
52	2454	53	2455	54	2456	55	2457
56	2458	57	2459	58	2460	59	2461
60	2462	61	2463	62	2464	63	2465
64	2466	65	2467	66	2468	67	2469
68	2470	69	2471	70	2472	71	2473
72	2474	73	2475	74	2476	75	2477
76	2478	77	2479	78	2480	-	-

1.3. Summary of test result

RF PART		
Test Items	**Test Requirement**	**Result**
Radiated Spurious Emissions	15.205(a) 15.209 15.247(d)	PASS
Band edge	15.247(d) 15.205(a)	PASS
Conduct Emission	15.207	PASS
20dB Bandwidth 99% Occupied Bandwidth	15.247(a)(1)	PASS
Maximum Peak Output Power	15.247(b)(1)	PASS
Frequency Separation	15.247(a)(1)	PASS
Number of Hopping Frequency	15.247(a)(1)(iii)	PASS
Dwell time	15.247(a)(1)(iii)	PASS
Antenna Requirement	15.203	PASS
Remark: N/A is an abbreviation for Not Applicable. Measurement Uncertainty is not taken into account for conformity statement		

1.4. Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Hardware Version	Software Version
/	/	/	/	/

1.5. Test mode

The special RF test software was used to control EUT work in Continuous BT TX mode, and select test channel, wireless mode.

Test mode	Low channel	Middle channel	High channel
GFSK	2402MHz	2441MHz	2480MHz
Π/4-DQPSK	2402MHz	2441MHz	2480MHz
8DPSK	2402MHz	2441MHz	2480MHz
Note：Only the worst Data DH5/2DH5/3DH5 Record in the report			

1.6. Test configuration

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Test Software	FCC_assist_1.0.2.2
Power level setup	0 dBm

1.7. Block Diagram

Conducted Emission

DC Line — EUT

Radiated Emission

EUT

Conducted Spurious

EUT

1.8. Test Conditions

Category	Normal Conditions	Extreme Conditions
Temperature range	15-35℃	N/A
Humidity range	20-75%	N/A
Pressure range	86-106kPa	N/A
Power supply	DC 5V or Battery DC 3.7V	N/A
Note: N/A is an abbreviation for Not Applicable.		

1.9. Measurement Uncertainty (95% confidence levels, k=2)

Item	MU	Remark
Uncertainty for radio frequency	±7×10-8	
Conducted Emissions (150kHz~30MHz)	±2.54dB	
Radiated Emission(9KHz~30MHz)	±1.6 dB	
Radiated Emission(30MHz~1GHz)	Vertical:±4.14dB Horizontal:±4.25dB	
Radiated Emission(1GHz~6GHz)	±3.9dB	
Radiated Emission(6GHz~18GHz)	±4.3dB	
Radiated Emission(18GHz~40GHz)	±3.38dB	
Uncertainty for conducted RF Power	±0.20dB	
Conducted spurious emissions	±0.24dB	
Uncertainty for temperature	0.6℃	
Uncertainty for humidity	1%	
Bandwidth	± 1.5 x 10-6	
Time	±2%	
Duty Cycle	±2%	
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%		

1.10. Test Facility

Site Description		
Name of Firm	:	Shenzhen BKC Testing Co., Ltd.
Site Location	:	Room 103, 1/F, Huaya Building, Huaya Industrial Park, Longhua Community, Longhua District, Shenzhen, Guangdong, China.
ISED CAB identifier	:	CN0188
ISED Company Number	:	34333
FCC Designation Number	:	CN1416
FCC Test Firm Registration Number	:	701543

1.11. Test Equipment

Conducted Test Site

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	102762	Mar. 10. 2025	Mar. 09. 2026
2	EMI Test Receiver	R&S	ESCI	101424	Mar. 10. 2025	Mar. 09. 2026
3	Rf cables	HTEC	HCE 2M-CE	N/A	Mar. 10. 2025	Mar. 09. 2026
4	Coupling/ Decoupling Network	Diamond	CX210	N/A	Mar. 10. 2025	Mar. 09. 2026
5	CE Testing software	EZ	EZ-EMC	/	/	/

Radiated Test Site(Below 1G and Above 1G)

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Antenna	Schwarzbeck	VULB 9168	01321	Mar. 20. 2025	Mar. 19. 2028
2	EMI Test Receiver	R&S	ESRP	101478	Mar. 10. 2025	Mar. 09. 2026
3	Preamplifier	HP	8447D	2727A05345	Mar. 10. 2025	Mar. 09. 2026
4	Double Ridged Broadband	SCHWARZBECK	BBHA 9120D	02621	Mar. 10. 2025	Mar. 19. 2028
5	Preamplifier	Schwarzbeck	BBV 9718D	00041	Mar. 10. 2025	Mar. 09. 2026
6	Rf cables	HUBER+SUHNER	8M-RE	N/A	Mar. 10. 2025	Mar. 09. 2026
7	Rf cables	HUBER+SUHNER	1.5M-RE	N/A	Mar. 10. 2025	Mar. 09. 2026
8	Rf cables	HUBER+SUHNER	1.5M-AP-RE	N/A	Mar. 10. 2025	Mar. 09. 2026
9	Loop antenna	TESEQ	HLA6121	58357	Mar. 09. 2025	Mar. 10. 2026
10	Spectrum analyzer	R&S	FSP40	200061	Feb. 13. 2025	Feb. 12. 2026
11	Double Ridged Broadband Horn	COM-POWER	AH-1840	10100009	Mar. 10. 2025	Mar. 09. 2026

	Antenna					
12	Spectrum	Agilent	N9020A	MY50510311	Mar. 09. 2025	Mar. 10. 2026
13	Band Stop Filter	Bafang	BSF5G	2024052610	Mar. 09. 2025	Mar. 10.2026
14	RE Testing software	EZ	EZ-EMC	/		/

RF Test Site

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum	Agilent	N9020A	MY50510311	Mar. 09. 2025	Mar. 10. 2026
2	Vector source	Agilent	N5182A	MY47420223	Mar. 09. 2025	Mar. 10. 2026
3	All instrument	Rohde & Schwarz	CMW 500	101131	Mar. 09. 2025	Mar. 10. 2026
4	control unit	MW	MW100-RFCB	MW200411BK-34	Mar. 09. 2025	Mar. 10. 2026
5	RF Testing software	MW	MTS 8310	/	Mar. 09. 2025	/
6	Spectrum analyzer	R&S	FSP40	200061	Feb. 13. 2025	Feb. 12. 2026

Test software

Software name	RF Testing software
Software version	2.0.0.0
Software name	RE Testing software
Software version	EMEC-03A2 RE+
Software name	CE Testing software
Software version	EMEC-3A1+

2. Conducted emission at the mains terminals test

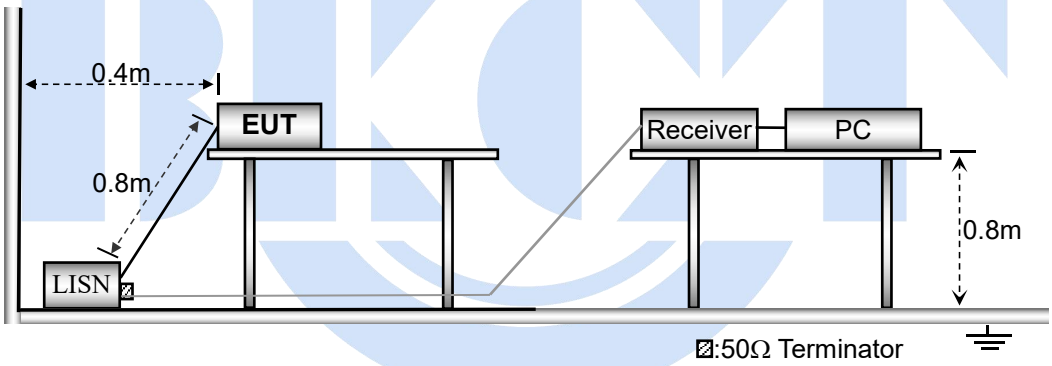
2.1. Limit

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2020
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

Frequency MHz	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	66 ~ 56*	56 ~ 46*
0.50 ~ 5.00	56	46
5.00 ~ 30.00	60	50

Notes: 1. *Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

2.2. Test Setup

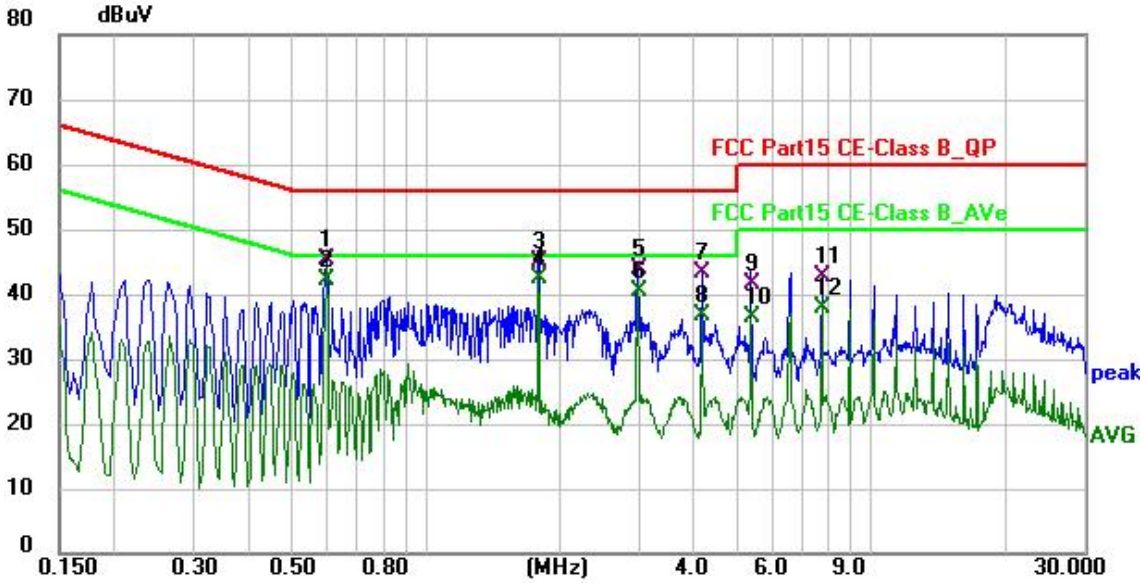


2.3. Test Procedure

1. The EUT was placed 0.1 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
2. 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.
3. 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.
4. LISN at least 80 cm from nearest part of EUT chassis.
5.For the actual test configuration, please refer to the related Item – EUT Test Photos.

2.4. Test Result

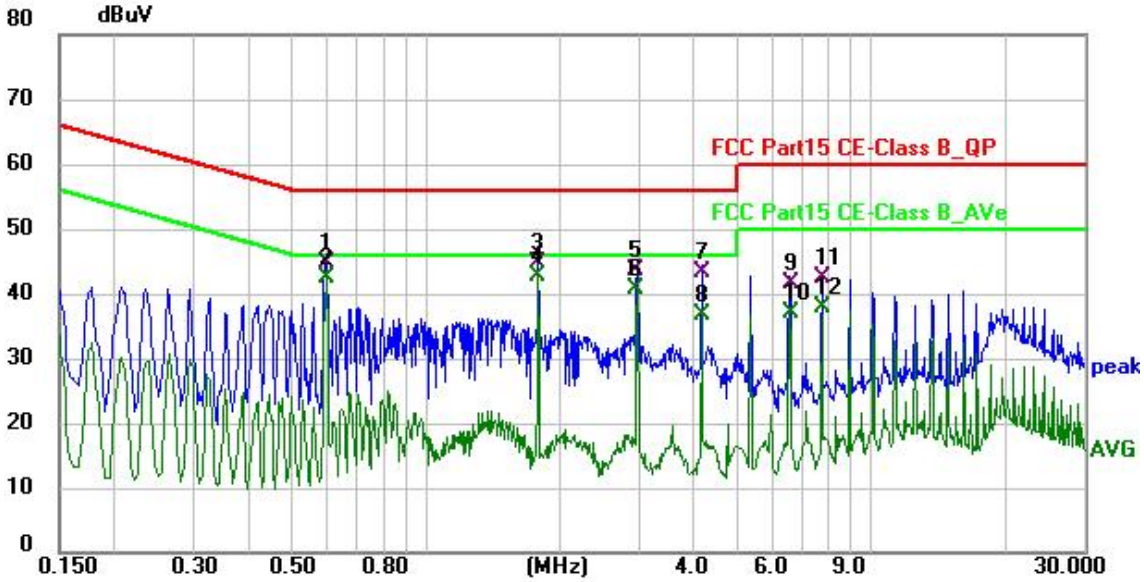
Conducted Emission At The Mains Terminals Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Line
Test Voltage :	AC 120V/60Hz	Test Mode:	GFSK(CH00)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.5964	25.63	19.53	45.16	56.00	-10.84	QP
2	0.5964	22.66	19.53	42.19	46.00	-3.81	AVG
3	1.7884	25.50	19.40	44.90	56.00	-11.10	QP
4 *	1.7884	23.14	19.40	42.54	46.00	-3.46	AVG
5	2.9793	24.38	19.36	43.74	56.00	-12.26	QP
6	2.9793	21.09	19.36	40.45	46.00	-5.55	AVG
7	4.1727	23.87	19.36	43.23	56.00	-12.77	QP
8	4.1727	17.34	19.36	36.70	46.00	-9.30	AVG
9	5.3649	22.17	19.44	41.61	60.00	-18.39	QP
10	5.3649	17.04	19.44	36.48	50.00	-13.52	AVG
11	7.7428	23.09	19.55	42.64	60.00	-17.36	QP
12	7.7428	18.31	19.55	37.86	50.00	-12.14	AVG

Note:
1. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
2. Margin = Reading level + Correct Factor - Limit
3. All the modes have tested and recorded the worst mode(GFSK) in the report

Conducted Emission At The Mains Terminals Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Neutral
Test Voltage :	AC 120V/60Hz	Test Mode:	GFSK(CH00)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.5960	25.18	19.47	44.65	56.00	-11.35	QP
2	0.5960	22.90	19.47	42.37	46.00	-3.63	AVG
3	1.7867	25.12	19.55	44.67	56.00	-11.33	QP
4 *	1.7867	23.20	19.55	42.75	46.00	-3.25	AVG
5	2.9768	24.01	19.53	43.54	56.00	-12.46	QP
6	2.9768	21.09	19.53	40.62	46.00	-5.38	AVG
7	4.1703	23.86	19.53	43.39	56.00	-12.61	QP
8	4.1703	17.19	19.53	36.72	46.00	-9.28	AVG
9	6.5483	21.94	19.53	41.47	60.00	-18.53	QP
10	6.5483	17.35	19.53	36.88	50.00	-13.12	AVG
11	7.7375	23.00	19.53	42.53	60.00	-17.47	QP
12	7.7375	18.31	19.53	37.84	50.00	-12.16	AVG

Note:
1. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
2. Margin = Reading level + Correct Factor - Limit
3. All the modes have tested and recorded the worst mode(GFSK) in the report

3. Radiated Spurious Emissions

3.1. Limit

Test Requirement: FCC CFR47 Part 15 Section 15.209 & 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018; ANSI C63.10:2020
Test Result: PASS
Measurement Distance: 3m

Frequency	Detector	RBW	VBW	Value
9KHz-150KHz	Quasi-peak	200Hz	600Hz	Quasi-peak
150KHz-30MHz	Quasi-peak	9KHz	30KHz	Quasi-peak
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak
Above 1GHz	Peak	1MHz	3MHz	Peak
	Peak	1MHz	10Hz	Average

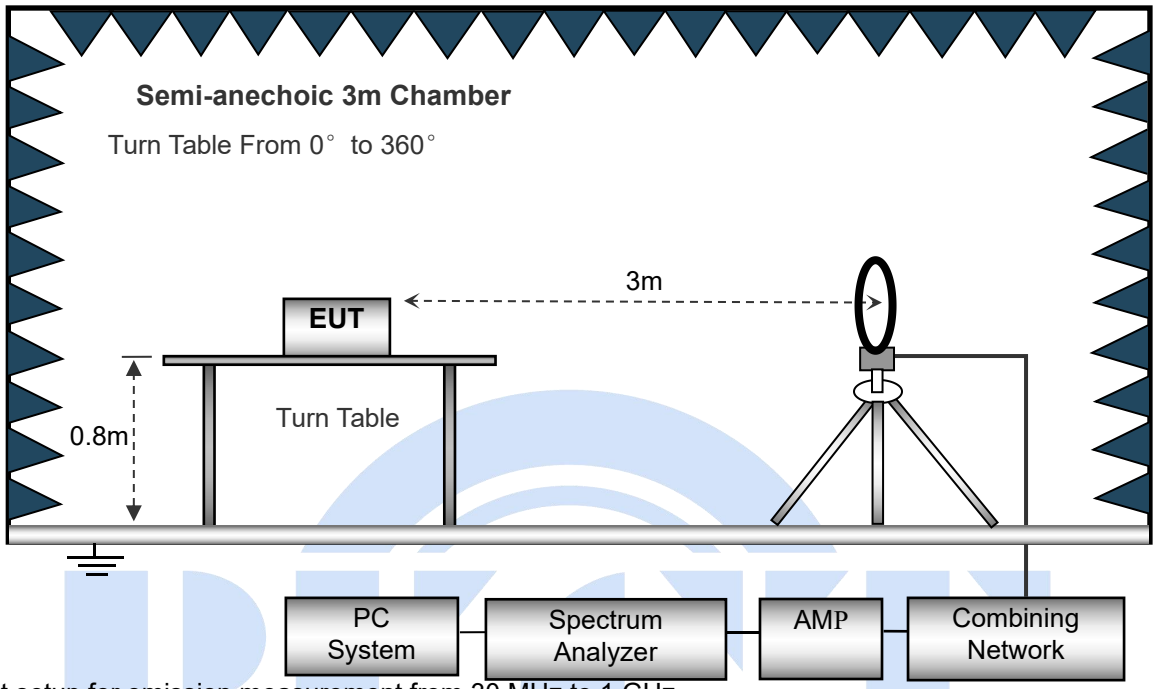
Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	2400/F(kHz)	300	10000 * 2400/F(kHz)	20log(2400/F(kHz)) + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	20log(24000/F(kHz)) + 40
1.705 ~ 30	30	30	100 * 30	20log(30) + 40
30 ~ 88	100	3	100	20log(100)
88 ~ 216	150	3	150	20log(150)
216 ~ 960	200	3	200	20log(200)
Above 960	500	3	500	20log(500)

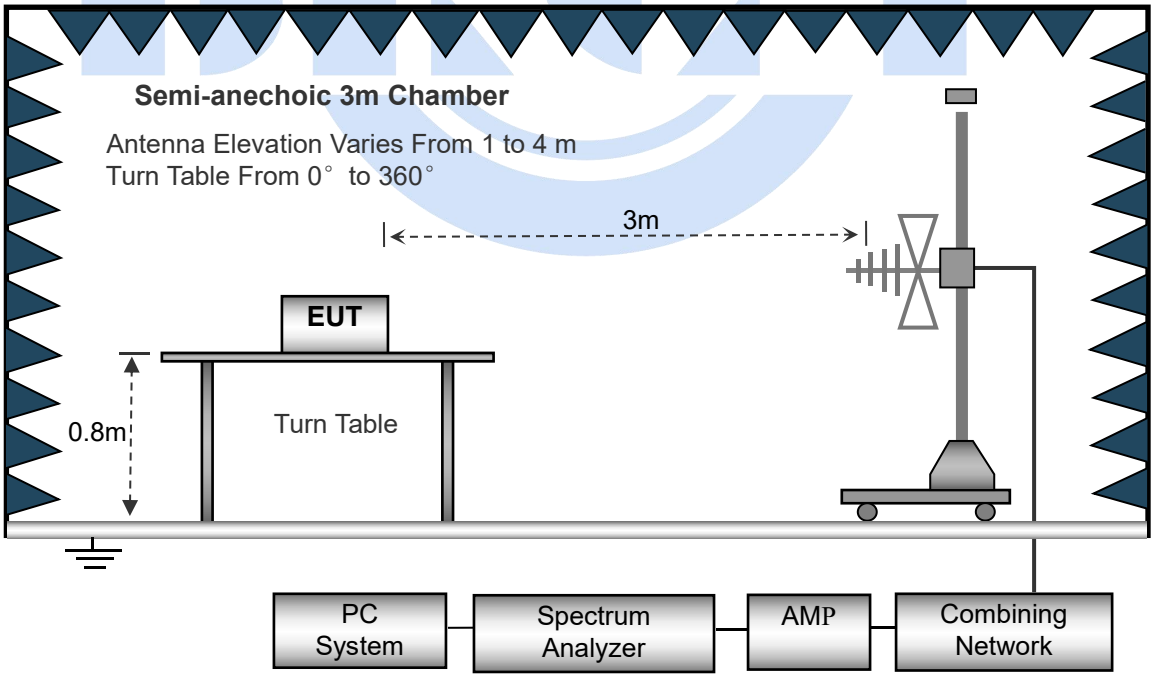
3.2. Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site, using the setup accordance with the ANSI C63.10.

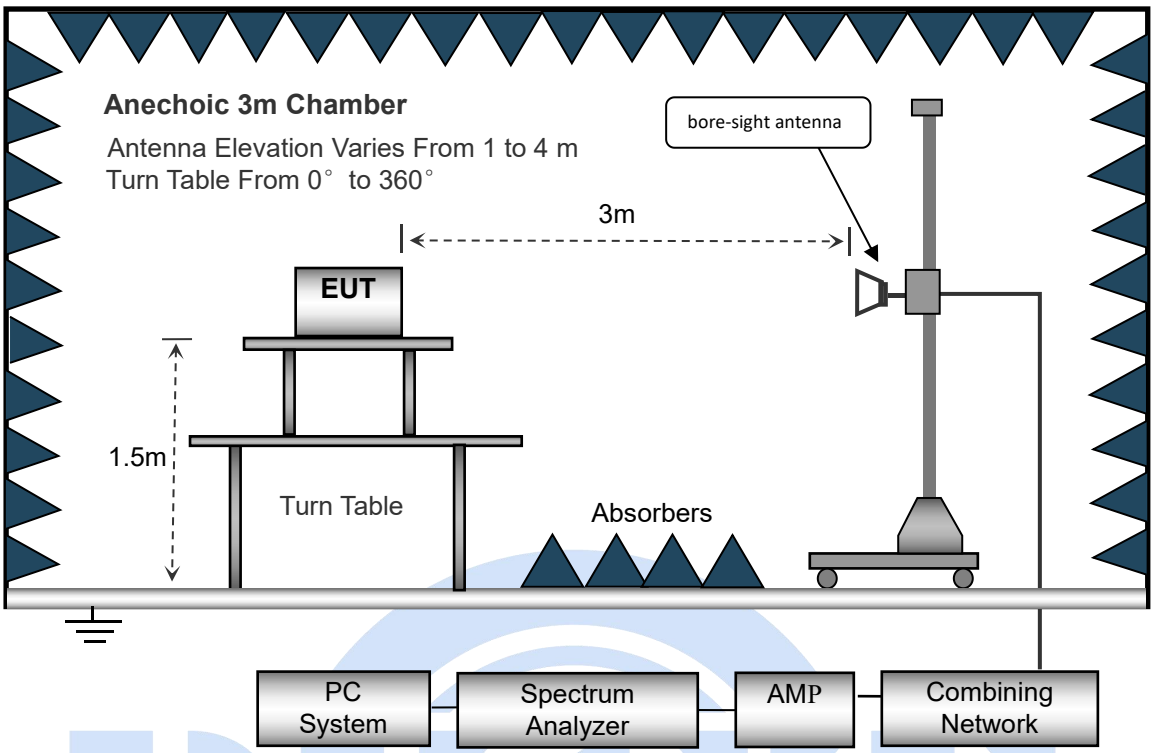
The test setup for emission measurement below 30MHz.

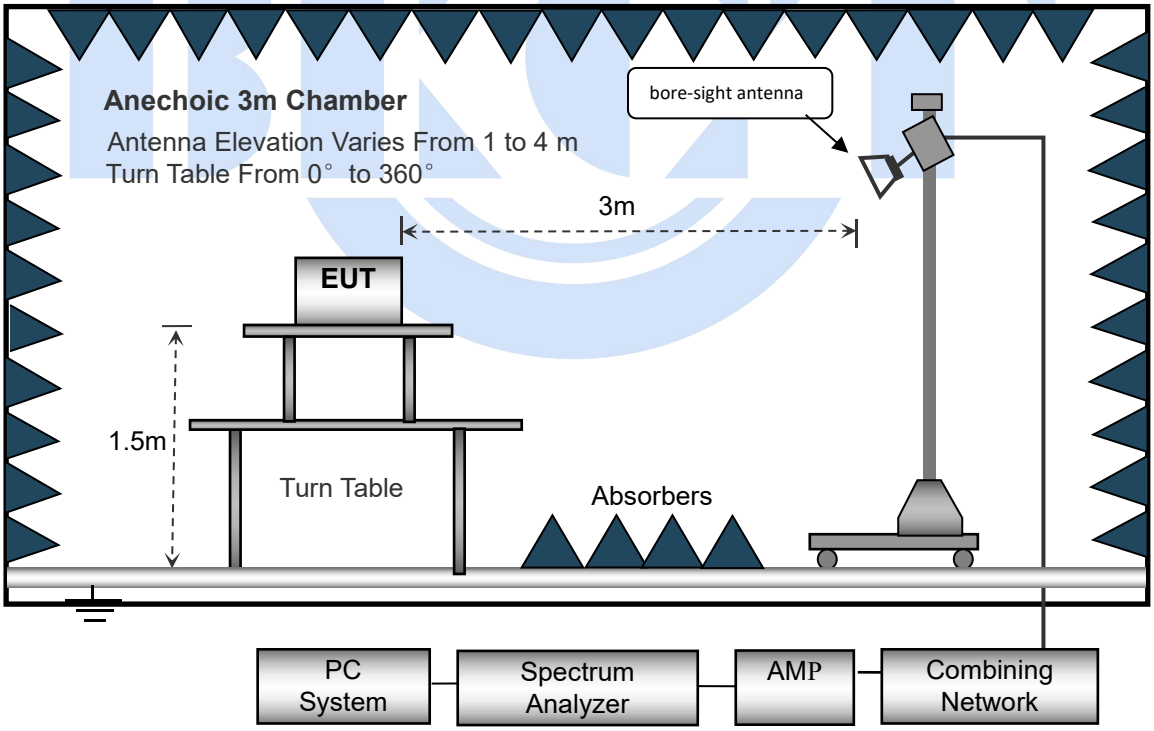


The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz.





3.3. Test Procedure

1. The EUT is placed on a turntable, which is 0.8m above ground plane for below 1GHz and 1.5m for above 1GHz.

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 moved from 1m to 4m to find out the maximum 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 radiation measurements are performed in X,Y and Z axis positioning(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand),the worst condition was tested putting the eut in Z axis,so the worst data were shown as follow.

8. A 2.4GHz high - pass filter is used druing radiated emissions above 1GHz measurement.

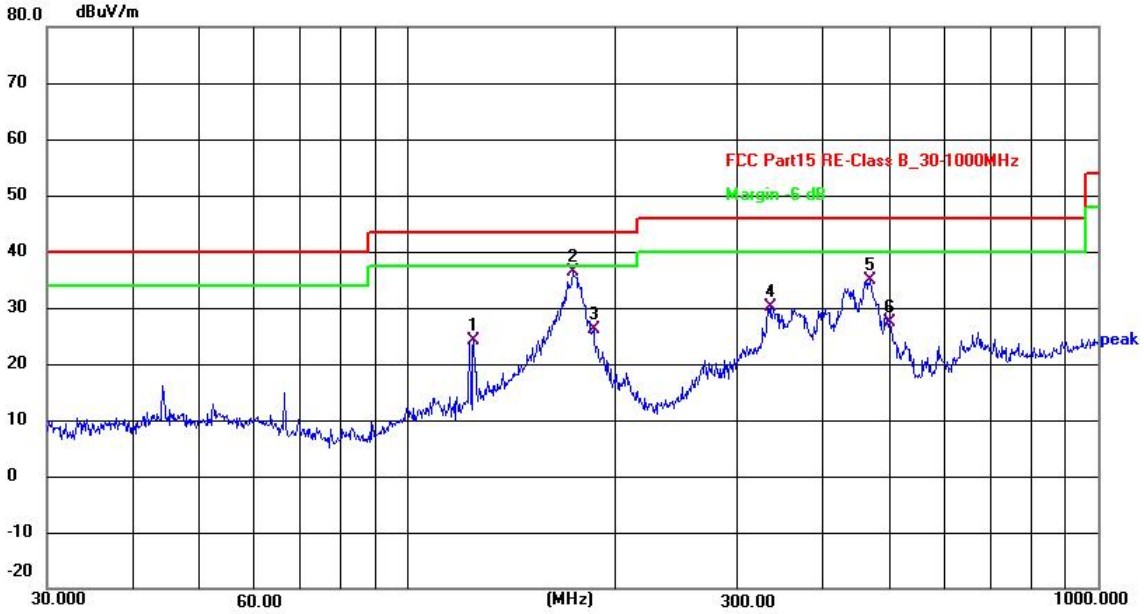
3.4. Test Result

Test Frequency: 9KHz~30MHz

The measurements were more than 20 dB below the limit and not reported.

Test Frequency : 30MHz ~ 1GHz

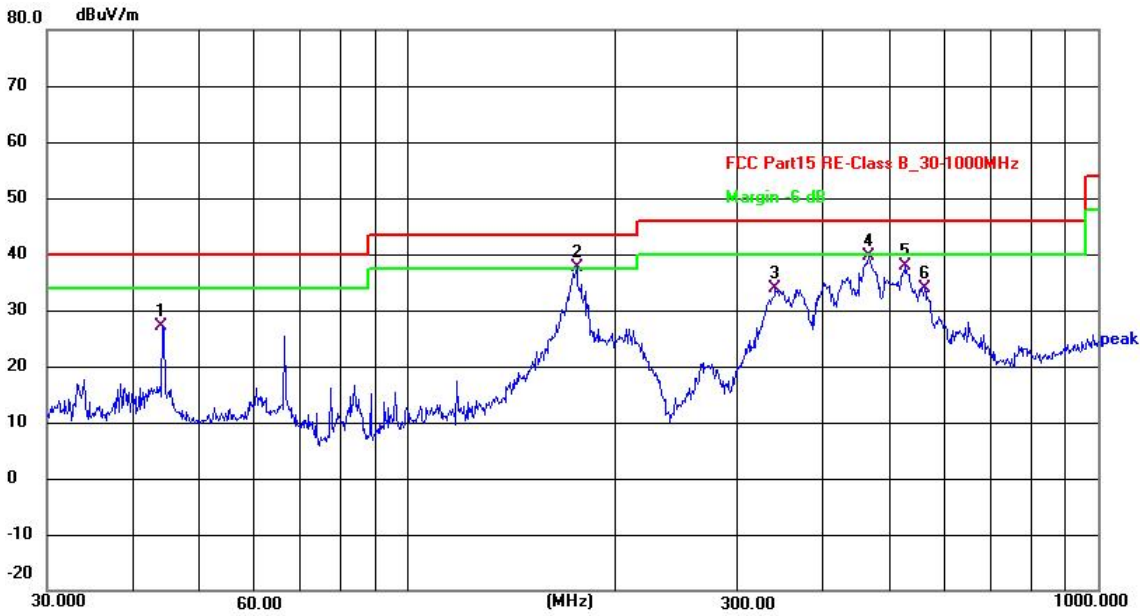
Radiation Emission Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Horizontal
Test Voltage :	DC 3.7V	Test Mode	Working



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	124.5690	42.22	-18.09	24.13	43.50	-19.37	QP
2	173.2050	54.59	-18.30	36.29	43.50	-7.21	QP
3	185.7880	43.20	-17.11	26.09	43.50	-17.41	QP
4	336.0350	43.10	-13.04	30.06	46.00	-15.94	QP
5	467.2350	45.10	-10.12	34.98	46.00	-11.02	QP
6	499.4245	36.94	-9.62	27.32	46.00	-18.68	QP

Note:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Emission Level = Reading + Factor
Margin=Emission Level-Limit
2. All the modes have tested and recorded the worst mode(GFSK) in the report

Radiation Emission Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Vertical
Test Voltage :	DC 3.7V	Test Mode	Working



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	44.1200	41.65	-14.45	27.20	40.00	-12.80	QP
2	175.6516	55.55	-18.00	37.55	43.50	-5.95	QP
3	340.7816	46.79	-12.90	33.89	46.00	-12.11	QP
4	465.5994	49.68	-10.14	39.54	46.00	-6.46	QP
5	526.3967	46.99	-9.22	37.77	46.00	-8.23	QP
6	560.6928	42.84	-8.89	33.95	46.00	-12.05	QP

Note:
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Emission Level = Reading + Factor
Margin=Emission Level-Limit
2. All the modes have tested and recorded the worst mode(GFSK) in the report

GFSK

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Low Channel:2402MHz									
V	4804.00	47.33	34.12	5.03	32.39	50.63	74.00	-23.37	Pk
V	4804.00	38.26	34.12	5.03	32.39	41.56	54.00	-12.44	AV
V	7206.00	46.08	32.54	6.29	35.86	55.69	74.00	-18.31	Pk
V	7206.00	38.27	32.54	6.29	35.86	47.88	54.00	-6.12	AV
V	9608.00	45.55	32.98	7.55	38.40	58.52	74.00	-15.48	Pk
V	9608.00	31.78	32.98	7.55	38.40	44.75	54.00	-9.25	AV
V	12010.00	44.32	32.09	8.93	39.00	60.16	74.00	-13.84	Pk
V	12010.00	28.68	32.09	8.93	39.00	44.52	54.00	-9.48	AV
H	4804.00	47.00	34.12	5.03	32.39	50.30	74.00	-23.70	Pk
H	4804.00	38.66	34.12	5.03	32.39	41.96	54.00	-12.04	AV
H	7206.00	43.14	32.54	6.29	35.86	52.75	74.00	-21.25	Pk
H	7206.00	36.27	32.54	6.29	35.86	45.88	54.00	-8.12	AV
H	9608.00	45.61	32.98	7.55	38.40	58.58	74.00	-15.42	Pk
H	9608.00	31.53	32.98	7.55	38.40	44.50	54.00	-9.50	AV
H	12010.00	37.74	32.09	8.93	39.00	53.58	74.00	-20.42	Pk
H	12010.00	26.08	32.09	8.93	39.00	41.92	54.00	-12.08	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
Middle Channel:2441MHz									
V	4882.00	47.30	34.07	5.09	32.59	50.91	74.00	-23.09	Pk
V	4882.00	35.39	34.07	5.09	32.59	39.00	54.00	-15.00	AV
V	7323.00	44.35	32.63	6.34	35.96	54.02	74.00	-19.98	Pk
V	7323.00	35.39	32.63	6.34	35.96	45.06	54.00	-8.94	AV
V	9764.00	40.90	32.92	7.59	38.40	53.97	74.00	-20.03	Pk
V	9764.00	25.48	32.92	7.59	38.40	38.55	54.00	-15.45	AV
V	12205.00	39.76	31.96	8.88	39.04	55.72	74.00	-18.28	Pk
V	12205.00	27.67	31.96	8.88	39.04	43.63	54.00	-10.37	AV
H	4882.00	48.18	34.07	5.09	32.59	51.79	74.00	-22.21	Pk
H	4882.00	36.23	34.07	5.09	32.59	39.84	54.00	-14.16	AV
H	7323.00	42.49	32.63	6.34	35.96	52.16	74.00	-21.84	Pk
H	7323.00	33.51	32.63	6.34	35.96	43.18	54.00	-10.82	AV
H	9764.00	37.82	32.92	7.59	38.40	50.89	74.00	-23.11	Pk
H	9764.00	26.69	32.92	7.59	38.40	39.76	54.00	-14.24	AV
H	12205.00	36.96	31.96	8.88	39.04	52.92	74.00	-21.08	Pk
H	12205.00	28.88	31.96	8.88	39.04	44.84	54.00	-9.16	AV

Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Detector Type
High Channel:2480MHz									
V	4960.00	47.37	34.02	5.15	32.80	51.30	74.00	-22.70	Pk
V	4960.00	37.34	34.02	5.15	32.80	41.27	54.00	-12.73	AV
V	7440.00	44.58	32.71	6.40	36.05	54.32	74.00	-19.68	Pk
V	7440.00	31.57	32.71	6.40	36.05	41.31	54.00	-12.69	AV
V	9920.00	41.28	32.86	7.62	38.40	54.44	74.00	-19.56	Pk
V	9920.00	30.75	32.86	7.62	38.40	43.91	54.00	-10.09	AV
V	12400.00	40.35	31.82	8.84	39.08	56.45	74.00	-17.55	Pk
V	12400.00	28.68	31.82	8.84	39.08	44.78	54.00	-9.22	AV
H	4960.00	50.11	34.02	5.15	32.80	54.04	74.00	-19.96	Pk
H	4960.00	40.17	34.02	5.15	32.80	44.10	54.00	-9.90	AV
H	7440.00	46.46	32.71	6.40	36.05	56.20	74.00	-17.80	Pk
H	7440.00	33.70	32.71	6.40	36.05	43.44	54.00	-10.56	AV
H	9920.00	39.71	32.86	7.62	38.40	52.87	74.00	-21.13	Pk
H	9920.00	29.02	32.86	7.62	38.40	42.18	54.00	-11.82	AV
H	12400.00	40.24	31.82	8.84	39.08	56.34	74.00	-17.66	Pk
H	12400.00	26.28	31.82	8.84	39.08	42.38	54.00	-11.62	AV

Note: 1. The testing has been conformed to 10*2480MHz=24800MHz.
2. All other emissions more than 30dB below the limit.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Emission Level = Reading + Factor
Margin=Emission Level-Limit
4. All the modes have tested and recorded the worst mode(GFSK) in the report

Radiated Band Emission Measurement:

	Polar (H/V)	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector Type
GFSK	Low Channel: 2402MHz									
	H	2390	58.40	35.17	3.48	27.49	54.20	74.00	-19.80	PK
	H	2390	49.38	35.17	3.48	27.49	45.18	54.00	-8.82	AV
	H	2400	59.98	35.16	3.49	27.52	55.83	74.00	-18.17	PK
	H	2400	49.97	35.16	3.49	27.52	45.82	54.00	-8.18	AV
	V	2390	58.20	35.17	3.48	27.49	54.00	74.00	-20.00	PK
	V	2390	50.00	35.17	3.48	27.49	45.80	54.00	-8.20	AV
	V	2400	59.75	35.16	3.49	27.52	55.60	74.00	-18.40	PK
	V	2400	49.83	35.16	3.49	27.52	45.68	54.00	-8.32	AV
	High Channel: 2480MHz									
	H	2483.5	57.69	35.11	3.56	27.75	53.89	74.00	-20.11	PK
	H	2483.5	49.25	35.11	3.56	27.75	45.45	54.00	-8.55	AV
	H	2500	58.84	35.10	3.57	27.80	55.11	74.00	-18.89	PK
	H	2500	49.90	35.10	3.57	27.80	46.17	54.00	-7.83	AV
	V	2483.5	58.91	35.11	3.56	27.75	55.11	74.00	-18.89	PK
	V	2483.5	49.99	35.11	3.56	27.75	46.19	54.00	-7.81	AV

	V	2500	58.80	35.10	3.57	27.80	55.07	74.00	-18.93	PK
	V	2500	49.32	35.10	3.57	27.80	45.59	54.00	-8.41	AV
π/4-DQPSK	Low Channel: 2402MHz									
	H	2390	57.88	35.17	3.48	27.49	53.45	74.00	-20.55	PK
	H	2390	49.74	35.17	3.48	27.49	45.54	54.00	-8.46	AV
	H	2400	58.61	35.16	3.49	27.52	54.46	74.00	-19.54	PK
	H	2400	49.73	35.16	3.49	27.52	45.58	54.00	-8.42	AV
	V	2390	56.99	35.17	3.48	27.49	52.79	74.00	-21.21	PK
	V	2390	48.88	35.17	3.48	27.49	44.68	54.00	-9.32	AV
	V	2400	58.80	35.16	3.49	27.52	54.65	74.00	-19.35	PK
	V	2400	48.85	35.16	3.49	27.52	44.70	54.00	-9.30	AV
	High Channel: 2480MHz									
	H	2483.5	57.34	35.11	3.56	27.75	53.54	74.00	-20.46	PK
	H	2483.5	48.45	35.11	3.56	27.75	44.65	54.00	-9.35	AV
	H	2500	58.93	35.10	3.57	27.80	55.20	74.00	-18.80	PK
	H	2500	49.11	35.10	3.57	27.80	45.38	54.00	-8.62	AV
	V	2483.5	57.25	35.11	3.56	27.75	53.45	74.00	-20.55	PK
	V	2483.5	49.97	35.11	3.56	27.75	46.17	54.00	-7.83	AV
	V	2500	57.91	35.10	3.57	27.80	54.18	74.00	-19.82	PK
	V	2500	49.03	35.10	3.57	27.80	45.30	54.00	-8.70	AV
8-DPSK	Low Channel: 2402MHz									
	H	2390	57.95	35.17	3.48	27.49	53.75	74.00	-20.25	PK
	H	2390	49.80	35.17	3.48	27.49	45.60	54.00	-8.40	AV
	H	2400	60.49	35.16	3.49	27.52	56.34	74.00	-17.66	PK
	H	2400	49.55	35.16	3.49	27.52	45.40	54.00	-8.60	AV
	V	2390	57.38	35.17	3.48	27.49	53.18	74.00	-20.82	PK
	V	2390	50.43	35.17	3.48	27.49	46.23	54.00	-7.77	AV
	V	2400	59.47	35.16	3.49	27.52	55.32	74.00	-18.68	PK
	V	2400	49.95	35.16	3.49	27.52	45.80	54.00	-8.20	AV
	High Channel: 2480MHz									
	H	2483.5	57.70	35.11	3.56	27.75	53.90	74.00	-20.10	PK
	H	2483.5	48.73	35.11	3.56	27.75	44.93	54.00	-9.07	AV
	H	2500	59.61	35.10	3.57	27.80	55.88	74.00	-18.12	PK
	H	2500	49.76	35.10	3.57	27.80	46.03	54.00	-7.97	AV
	V	2483.5	58.61	35.11	3.56	27.75	54.81	74.00	-19.19	PK
	V	2483.5	49.54	35.11	3.56	27.75	45.74	54.00	-8.26	AV
	V	2500	58.31	35.10	3.57	27.80	54.58	74.00	-19.42	PK
	V	2500	50.04	35.10	3.57	27.80	46.31	54.00	-7.69	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

4. Maximum Peak Output Power

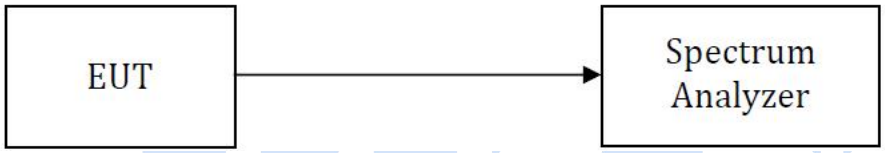
4.1. Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018;
ANSI C63.10:2020

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(3)	Peak Output Power	1 watt or 21dBm	2400-2483.5	PASS

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
RSS-247 § 5.4
For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W.

4.2. Test Setup



4.3. Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above,
2. Spectrum Setting:
   RBW > the 20 dB bandwidth of the emission being measured
   Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
   VBW ≥ RBW
   Sweep = auto
   Detector function = peak
   Trace = max hold

4.4. Test Result

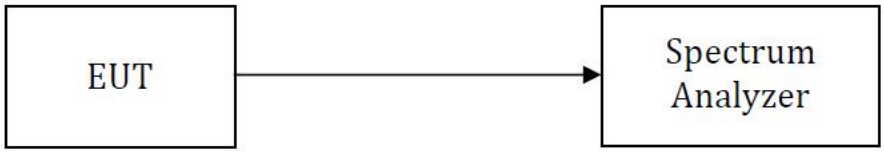
Please see the attachment for data.

5. -20 dB Bandwidth Measurement

5.1. Limit

Test Requirement: FCC CFR47 Part 15 Section 15.247
Test Method: KDB 558074 D01 15.247 Meas Guidance v05 August 24, 2018; ANSI C63.10:2020

5.2. Test Setup



5.3. Test Procedure

For 20dB Bandwidth Measurement
Using the following spectrum analyzer settings:
1. Span= approximately 2 to 3 times the 20dB bandwidth, centered on a hopping channel.
2. Set the RBW = 30 kHz.
3. Set the VBW = 100 kHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

For 99% Bandwidth Measurement
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 1%-5% OBW, VBW ≥ 3RBW

5.4. Test Result

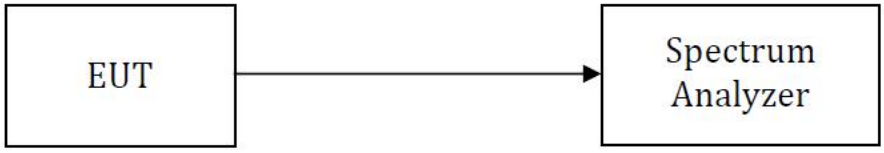
Please see the attachment for data.

6. Carrier Frequency Separation Test

6.1. Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)
Test Limit	>25KHz or >two-thirds of the 20 dB bandwidth

6.2. Test Setup



6.3. Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer settings:
1. Span= Wide enough to capture the peaks of two adjacent channels
2. Set the RBW = 300 kHz.
3. Set the VBW = 1 MHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

6.4. Test Result

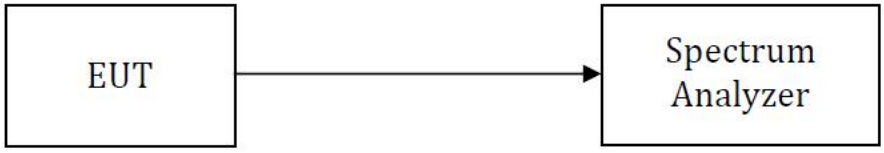
Please see the attachment for data.

7. Number of Hopping Channel Test

7.1. Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)
Test Limit	>15 channels

7.2. Test Setup



7.3. Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer settings:
1. Span= Wide enough to capture the peaks of two adjacent channels
2. Set the RBW = 100 kHz.
3. Set the VBW = 300 kHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

7.4. Test Result

Please see the attachment for data.

8. Dwell Time Test

8.1. Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1)
Test Limit	0.4 sec

8.2. Test setup

8.3. Test Procedure

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
1. Span= zero span, centered on a hopping channel
2. Set the RBW = 1 MHz.
3. Set the VBW = 1 MHz.
4. Sweep time = as necessary to capture the entire dwell time per hopping channel.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.

8.4. Test Result

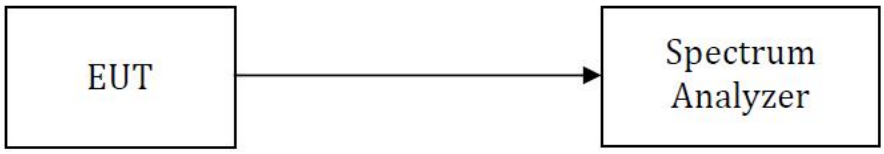
Please see the attachment for data.

9. Conducted Spurious Emissions and Band Edge Requirement

9.1. Limit

Test Standard	FCC Part15 C Section 15.247 (d)
Test Limit	in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

9.2. Test Setup



9.3. Test Procedure

The EUT must have its hopping/Non-hopping function enabled. Using the following spectrum analyzer setting:
1. Set the RBW = 100kHz.
2. Set the VBW = 300kHz.
3. Sweep time = auto couple.
4. Detector function = peak.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.

9.4. Test Result

Please see the attachment for data.

10. Antenna Requirement

10.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /247(b)(4)
Requirement	1) 15.203 requirement: 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, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. 2) 15.247(b) (4) requirement: The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

10.2. Antenna Connected Construction

The antenna is PCB antenna which permanently attached, and the best case gain of the antenna is -0.58 dBi. It complies with the standard requirement.

11. TEST SETUP & EUT PHOTOGRAPH

Please see the attachment for details.

---------- End of Report ----------