FCC Part 15C&RSS-247 TEST REPORT

FCC ID:2AD4XSUBGO

IC:12714A-SUBGO

Prepared for	:	LOUD Audio, LLC
Address	:	19820 North Creek Parkway, #201, Bothell, Washington 98011-8227, United States
Trade Name	:	
E.U.T	:	BATTERY-POWERED SUBWOOFER
Model Number	:	THUMP SUB GO
Prepared by	:	Keyway Testing Technology(Guangdong) Co., Ltd.
Address	:	Room 2102, Building 6, Dongyi Intelligent Equipment New Energy Vehicle Park, No.30 of Tangxia District, Dongshen Road, Tangxia Town, Dongguan, 523710, People's Republic of China
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Report No.	:	TR25050498-E-000
Date of Test:	:	May 21~Jul. 08, 2025
Date of Report	:	Jul. 15, 2025

Applicant:	LOUD Audio, LLC
Address:	19820 North Creek Parkway, #201, Bothell, Washington 98011-8227, United States
Manufacturer:	LOUD Audio, LLC
Address:	19820 North Creek Parkway, #201, Bothell, Washington 98011-8227, United States
E.U.T:	BATTERY-POWERED SUBWOOFER
Model Number:	THUMP SUB GO
Trade Name:	
Date of Receipt:	May 20, 2025
Date of Test:	May 21~Jul. 08, 2025
Test Specification :	FCC CFR47 Part 15 Section 15.247 RSS-247 Issue 3: August 2023 ANSI C63.10:2013 RSS-GEN Issue5, Amendment 2, February,2021
Test Result:	The equipment under test was found to be compliance with the requirements of the standards applied. **Issue Date: Jul. 15, 2025**

Tested by:	Reviewed by:	Authorized by:
Jacob Ouyang	Billy Zeng	Cherry Chen
Jacob Ouyang /Engineer	Billy Zeng / Supervisor	Cherry Chen / Manager

Abbreviations: OK/P=passed fail/F=failed N/A=not applicable E.U.T=equipment under tested

This device described above has been tested by Keyway, 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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Revision Record				
Version	Chapter	Date	Modifier	Remark
00		2025.7.15		Original

Contents

Page

1 Test Summary

Test Items	Test Requirement	Result
Radiated Spurious Emissions and Restricted Bandedge	15.205(a) 15.209 15.247(d) RSS-Gen.6.13 RSS-Gen.8.10	PASS
Conducted Unwanted emissions and Band edge	15.247(d) 15.205(a) RSS-247 5.5	PASS
Conduct Emission	15.207 RSS-Gen 8.8	PASS
20dB Bandwidth & 99% OCB	15.247(a)(1) RSS-247.5.1(b) RSS-Gen.6.7	PASS
Maximum Peak Output Power	15.247(b)(1) RSS-247.5.4(b)	PASS
Frequency Separation	15.247(a)(1) RSS-247.5.1(b)	PASS
Number of Hopping Frequency	15.247(a)(1)(iii) RSS-247.5.1(b)	PASS
Dwell time	15.247(a)(1)(iii) RSS-247.5.1(d)	PASS
Antenna Requirement	FCC part 15.203/15.247 (c) RSS-Gen 6.8	PASS

Remark:

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

2 TEST FACILITY

Lab Qualifications	:	Certificated by Nemko Registration No.: ELA 814 Date of registration: September 25, 2024 Certificated by CMA China Registration No.: 202319016955 Date of registration: July 23, 2024 Certificated by A2LA Certificate Number: 7404.01 Valid To: March 31, 2027
Name of Firm	:	Keyway Testing Technology(Guangdong) Co., Ltd.
Site Location	:	21st Floor, Building 6, Dongyi Intelligent Equipment New , Energy Vehicle Park, No.30 of Tangxia, District, Dongshen Road, Tangxia Town, Dongguan City, Guangdong province, China

3 General Information

3.1 General Description of E.U.T.

Product Name	:	BATTERY-POWERED SUBWOOFER
Model Name	:	THUMP SUB GO
Sample ID	:	250520062
Sample(s) Status:	:	Engineer sample
Additional model	:	N/A
Model difference	:	N/A
Operating frequency	:	2402-2480MHz
Numbers of Channel	:	79 channels
Antenna Type	:	PCB Antenna
Antenna Gain	:	3.54dBi
Type of Modulation	:	GFSK, π/4DQPSK, 8DPSK
Power supply	:	AC 100-240V ~ 50-60Hz, DC11.1V from battery
Hardware Version	:	A00
Software Version	:	1.8.9
Battery Information	:	Model:PY18650-3S4P Rated Capacity:8800mAh, 97.68Wh
Remark：the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.		

3.2 Channel List

The EUT has been tested under its typical operating condition. Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting. Only the worst case data were reported.

The EUT has been associated with peripherals pursuant to ANSI C63.10-2013 and configuration operated in a manner tended to maximize its emission characteristics in a typical application. Frequency range investigated: radiation (9 KHz to the 10th harmonics of the highest fundamental frequency or to 40 GHz, whichever is lower).

The EUT has been tested under TX operating condition.

This EUT is a FHSS system, were conducted to determine the final configuration from all possible combinations. We use software control the EUT, Let EUT hopping on and transmit with highest power, all the modes GFSK, π/4DQPSK, 8DPSK have been tested. 79 Channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for test.

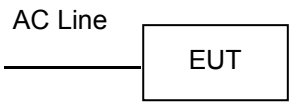
Channel List:

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	-	-

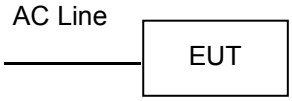
Channel	**Frequency(MHz)**
0	2402
39	2441
78	2480

3.3 Test Setup Configuration

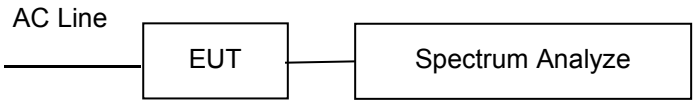
Conducted Emission



Radiated Emission



Conducted Spurious



3.4 Test Mode

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. For battery operated equipment, the equipment tests shall be performed using a new battery. So the report just shows that condition's data.	

Test Software	Optek MyPrint.exe
Power level setup	0dBm

4 Equipment During Test

4.1 Equipments List

Equipment	Manufacturer	Model No.	Serial No.	Date of Cal.	Valid until
For conducted emission at the mains terminals and signal port test 944 Shielded Room					
Test Software	FARAD	EZ-EMC Ver.FARAD-3A1+	KWET-089	/	/
EMI Test Receiver	Rohde&Schwarz	ESCI	101156	Apr 14, 25	Apr 13, 26
ArtificialMains Network	Rohde&Schwarz	ENV216	101314	Mar 05, 25	Mar 04, 26
RF Cable	FUJIKURA	3D-2W	KWET-030	Apr 14, 25	Apr 13, 26
Socket	Gongniu	KWET-003A1	KWET-003A1	Feb 21, 25	Feb 20, 26
For radiated emission test (30MHz-1GHz)966 Chamber 2					
Test Software	FARAD	EZ-EMC Ver.FARAD-3A1+	KWET-087	/	/
EMI Test Receiver	Rohde&Schwarz	ESCI	101178	Apr 14, 25	Apr 13, 26
TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	00829	May 10, 25	May 09, 26
3m Semi-anechoic Chamber	YIHENDIANZI	966	YH-KW-966-02	Mar 07, 26	Mar 06, 29
RF Cable	EMC Instruments	EMCCFD400-NM-NM-2000	240307	Apr 14, 25	Apr 13, 26
RF Cable	EMC Instruments	EMCCFD400-NM-NM-9000	240309	Apr 14, 25	Apr 13, 26
For radiated emission test (Above 1GHz)966 Chamber 2					
Test Software	FARAD	EZ-EMC Ver.FARAD-3A1+	KWET-087	/	/
EMI Test Receiver	Rohde&Schwarz	ESCI	101178	Apr 14, 25	Apr 13, 26
Spectrum Analyzer	Agilent	N9020A	MY56070279	Apr 14, 25	Apr 13, 26
Spectrum analyzer	R&S	FSV 40	101059	Nov 06, 25	Nov 05, 26

Horn Antenna	DAZE	ZN30701	11003	Jul 27, 25	Jul 26, 26
SHF-EHF Horn Antenna	SCHWARZBECK	BBHA 9170	1368	May 16, 25	May 15, 26
Signal Amplifier	WCS Technology	DLNA-18000-40000	KWET-138	Apr 19, 25	Apr 18, 26
3m anechoic Chamber	YIHENDIANZI	966	YH-KW-966-02	Mar 07, 25	Mar 06, 29
RF Cable(1G-18GHz)	EMC Instruments	EMC105-SM-SM-1000	240301	Apr 14, 25	Apr 13, 26
RF Cable(1G-18GHz)	EMC Instruments	EMC105-SM-SM-2000	240302	Apr 14, 25	Apr 13, 26
RF Cable(1G-18GHz)	EMC Instruments	EMC105-SM-SM-9000	240303	Apr 14, 25	Apr 13, 26
RF Cable(18G-40GHz)	WCS Technology	CA360P-29M29M-1M	W2415130001	Apr 14, 25	Apr 13, 26
RF Cable(18G-40GHz)	WCS Technology	CA360P-29M29M-9M	W2415110001	Apr 14, 25	Apr 13, 26
For conducted emission test（RF）					
MXG Signal Analyzer	Agilent	N9020A	MY56070279	Apr 14, 25	Apr 13, 26
RF SWITCH BOX	CSKJ	SMU-1003	KWET-047	Apr 14, 25	Apr 13, 26
Attenuator	R&S	ESH3-Z2	102696	Apr 14, 25	Apr 13, 26
Power meter	YOKOKAWA	WY210	27D528405	Apr 14, 25	Apr 13, 26
RF sma cable	Keysight	ULC-1m-SMSM+	1623	May 15, 25	May 14, 26
RF sma cable	Keysight	ULC-1m-SMSM+	1623	May 15, 25	May 14, 26
RF sma cable	Keysight	ULC-1.5FT-SMSM+	1623	May 15, 25	May 14, 26
RF sma cable	Keysight	ULC-1.5FT-SMSM+	1623	May 15, 25	May 14, 26
Coupler	Keysight	ZHDC-10-63-S+	SF331801603	May 15, 25	May 14, 26
Test Software	CSKJ	CS-305X	KWET-149	/	/

4.2 Measurement Uncertainty

The reported uncertainty of measurement **y** ± **U**,where expended uncertainty **U** is based on a standard uncertainty multiplied by a coverage factor of **k=2**,providing a level of confidence of approximately **95** %。

Parameter	**Uncertainty**
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 x 10^{-6}
Bandwidth	± 1.5 x 10^{-6}
Duty Cycle	±2%
Spurious emissions,conducted	±0.21dB
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(9KHz~30MHz)	±4.51dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Radiated Emission(25GHz~40GHz)	±3.38dB

4.3 Description of Support Units

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	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	BATTERY-POWERED SUBWOOFER		THUMP SUB GO	N/A	EUT
E-2	Notebook	lenovo	B40-80	MP07F6JD	Auxiliary

Note:

(1) The support equipment was authorized by Declaration of Confirmation.

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

5 Conducted Emission

Test Requirement:	:	FCC CFR 47 Part 15 Section 15.207 & RSS-Gen [8.8]
Test Method:	:	ANSI C63.10:2013
Test Result:	:	PASS
Frequency Range:	:	150kHz to 30MHz
Class/Severity:	:	Class B
Detector:	:	Peak for pre-scan (9kHz Resolution Bandwidth)

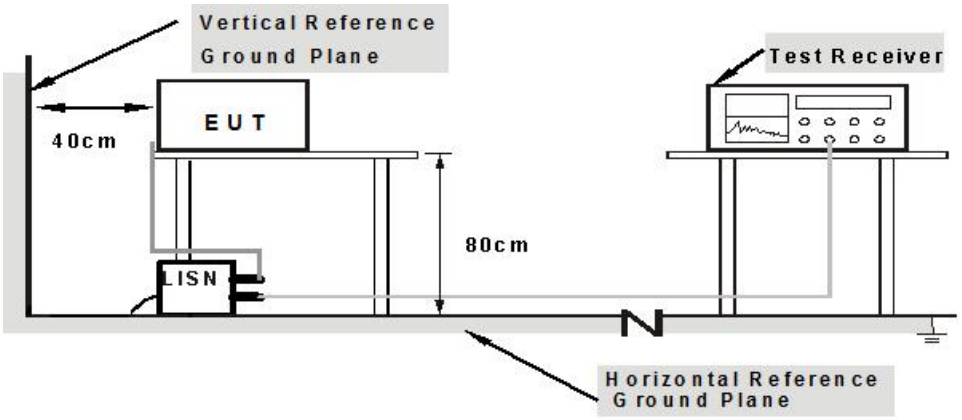
5.1 E.U.T. Operation

Operating Environment **:**

Temperature:	:	23.5°C
Humidity:	:	54 % RH
Atmospheric Pressure:	:	101.12 kPa
Test Voltage	:	AC 120V/60Hz

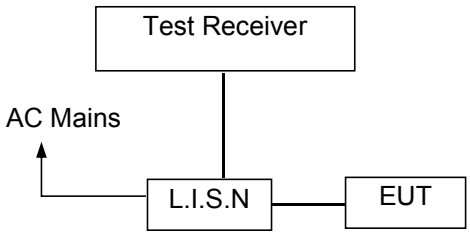
5.2 EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10: 2013



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

5.3 Test SET-UP (Block Diagram of Configuration)



5.4 Measurement Procedure:

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

5.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies

2.The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.6 Measurement Description

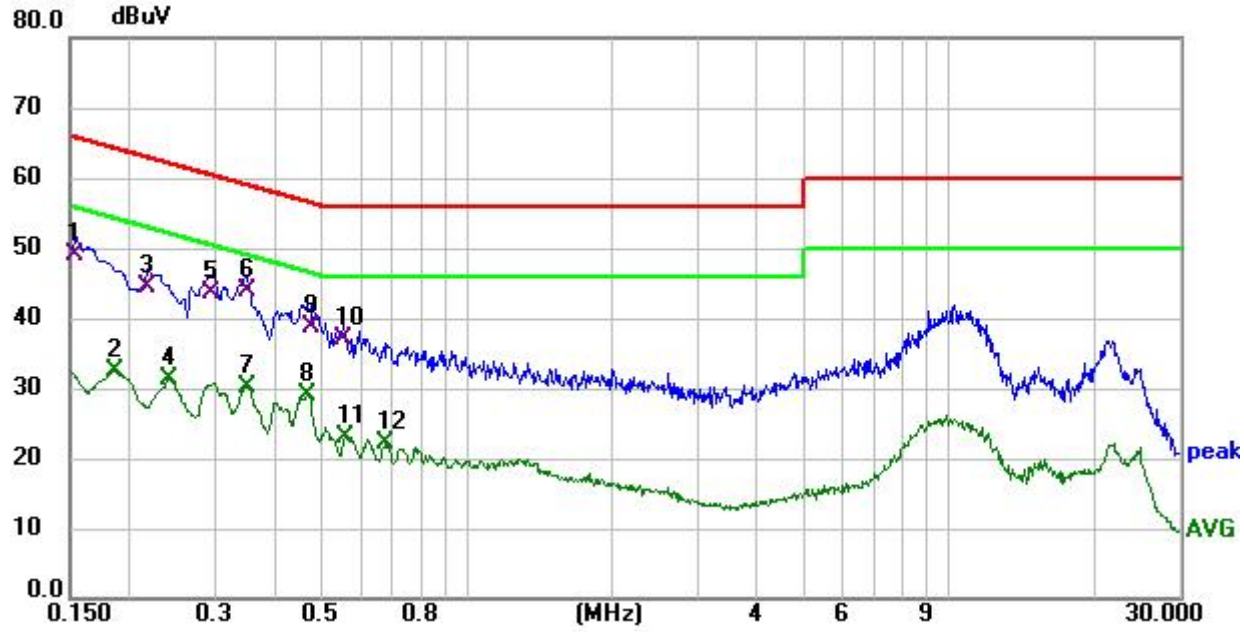
The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.7 Conducted Emission Test Result

Pass

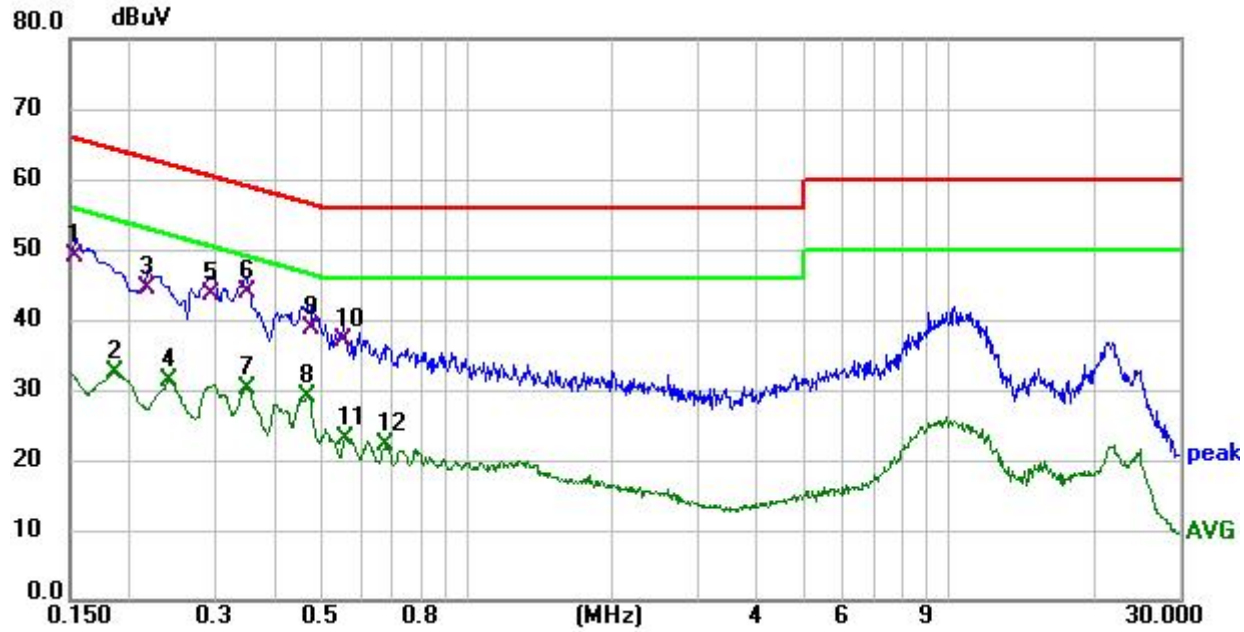
Conducted emission at both 120V & 240V is assessed, and emission at 120V represents the worst case. All the modulation modes were tested the data of the worst mode (GFSK) are recorded in the following pages and the others modulation methods do not exceed the limits.

Channel:	High	Phase :	L
Model:	THUMP SUB GO		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.168	37.59	10.09	47.68	65.06	-17.38	QP	P
2	0.186	22.22	10.05	32.27	54.21	-21.94	AVG	P
3	0.240	20.25	9.90	30.15	52.10	-21.95	AVG	P
4	0.289	30.63	9.93	40.56	60.55	-19.99	QP	P
5	0.298	19.94	9.95	29.89	50.30	-20.41	AVG	P
6	0.348	30.08	10.07	40.15	59.01	-18.86	QP	P
7	0.352	19.07	10.07	29.14	48.92	-19.78	AVG	P
8	0.469	30.34	9.98	40.32	56.53	-16.21	QP	P
9 *	0.469	20.41	9.98	30.39	46.53	-16.14	AVG	P
10	0.555	24.46	10.10	34.56	56.00	-21.44	QP	P
11	0.569	12.90	10.13	23.03	46.00	-22.97	AVG	P
12	0.816	24.34	10.35	34.69	56.00	-21.31	QP	P

Channel:	High	Phase :	N
Model:	THUMP SUB GO		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.154	38.73	10.23	48.96	65.79	-16.83	QP	P
2	0.186	22.47	10.05	32.52	54.21	-21.69	AVG	P
3	0.217	34.56	10.00	44.56	62.93	-18.37	QP	P
4	0.240	21.41	9.99	31.40	52.10	-20.70	AVG	P
5	0.294	33.61	9.97	43.58	60.41	-16.83	QP	P
6 *	0.348	33.73	10.01	43.74	59.01	-15.27	QP	P
7	0.348	20.17	10.01	30.18	49.01	-18.83	AVG	P
8	0.465	19.02	10.12	29.14	46.60	-17.46	AVG	P
9	0.474	28.53	10.12	38.65	56.44	-17.79	QP	P
10	0.555	26.71	10.16	36.87	56.00	-19.13	QP	P
11	0.559	12.88	10.16	23.04	46.00	-22.96	AVG	P
12	0.681	11.83	10.22	22.05	46.00	-23.95	AVG	P

Notes:
1.An initial pre-scan was performed on the line and neutral lines with peak detector.
2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3.Mesurement Level = Reading level + Correct Factor

6 Radiated Spurious Emissions

Test Requirement : FCC CFR47 Part 15 Section 15.209 & 15.247 & RSS-247 [5.5]

Test Method : ANSI C63.10:2013

Test Result : PASS

Measurement Distance : 3m

Limit : See the follow table

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)	$20\log^{(2400/F(kHz))}$ + 80
0.490 ~ 1.705	24000/F(kHz)	30	100 * 24000/F(kHz)	$20\log^{(24000/F(kHz))}$ + 40
1.705 ~ 30	30	30	100 * 30	$20\log^{(30)}$ + 40
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

6.1 EUT Operation

Operating Environment :

Temperature : 26 °C

Humidity : 54% RH

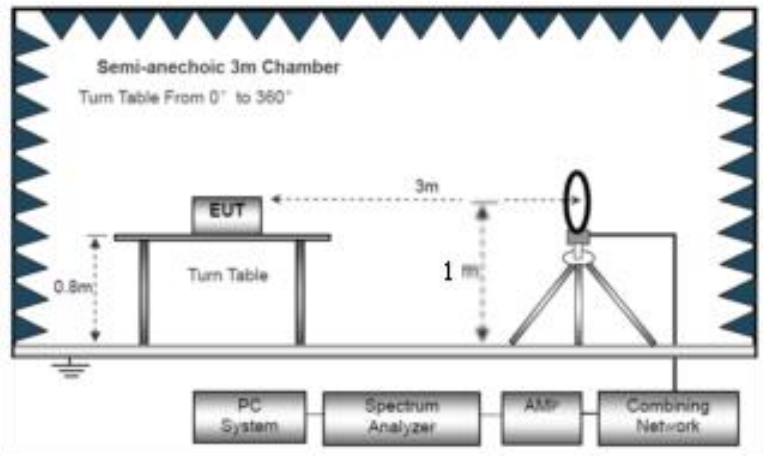
Atmospheric Pressure : 101.3kPa

Test Voltage : AC 120V60Hz

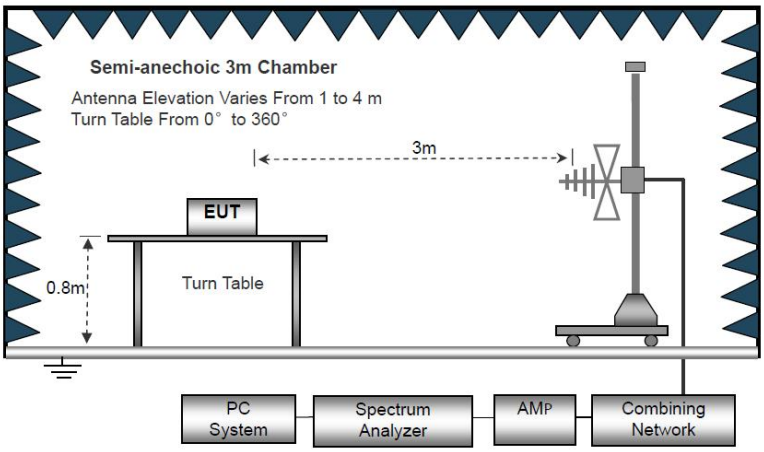
6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

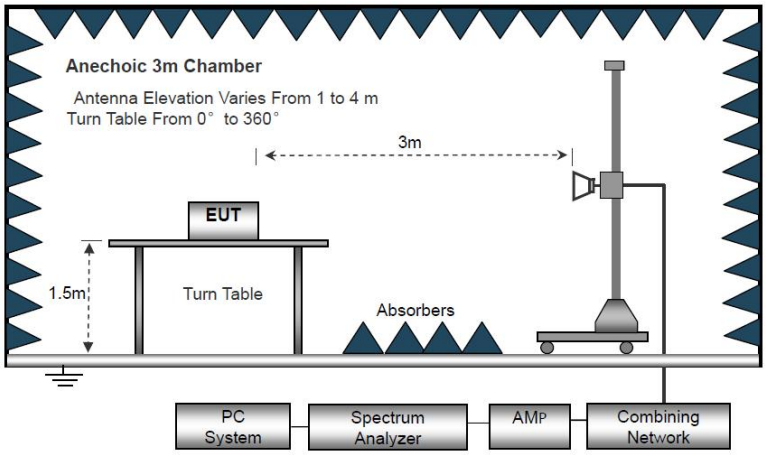
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



6.3 Spectrum Analyzer Setup

Below 30MHz			
IF Bandwidth	:	10kHz	
Resolution Bandwidth	:	10kHz	
Video Bandwidth	:	10kHz	
30MHz ~ 1GHz			
Detector	:	PK	QP
Resolution Bandwidth	:	100kHz	120kHz
Video Bandwidth	:	300kHz	300kHz
Above 1GHz			
Detector	:	PK	AV
Resolution Bandwidth	:	1MHz	1MHz
Video Bandwidth	:	3MHz	10Hz

6.4 Test Procedure

1. The testing follows the guidelines in Spurious Radiated Emissions of ANSI C63.10-2013.

2. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane. And above 1000MHz, The EUT was placed on a styrofoam table which is 0.8mm above ground plane.

3. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.

4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (From 1m to 4m) and turntable (from 0 degree to 360 degree) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.

5. Set to the maximum power setting and enable the EUT transmit continuously.

6. Final measurement (Above 1GHz): The frequency range will be divided into different sub ranges depending of the frequency range of the used horn antenna. The EMI Receiver set to peak and average mode and a resolution bandwidth of 1MHz. The measurement will be performed in horizontal and vertical polarization of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 degree to 360 degree in order to have the antenna inside the cone of radiation.

7. Test Procedure of measurement (For Above 1GHz):

1) Monitor the frequency range at horizontal polarization and move the antenna over all sides of the EUT(if necessary move the EUT to another orthogonal axis).

2) Change the antenna polarization and repeat 1) with vertical polarization.

3) Make a hardcopy of the spectrum.

4) Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.

5) Change the analyser mode to Clear/ Write and found the cone of emission.

6) Rotate and move the EUT, so that the measuring distance can be enlarged to 3m and the antenna will be still inside the cone of emission.

7) Measure the level of the detected frequency with the correct resolution bandwidth, with the antenna polarization and azimuth and the peak and average detector, which causes the maximum emission.

8) Repeat steps 1) to 7) for the next antenna spot if the EUT is larger than the antenna beamwidth.

8. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.

6.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq.	Ant.Pol.	Emission Level	Limit 3m	Over
(MHz)	H/V	(dBuV/m)	(dBuV/m)	(dB)
--	--	--	--	>20

Note:

The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

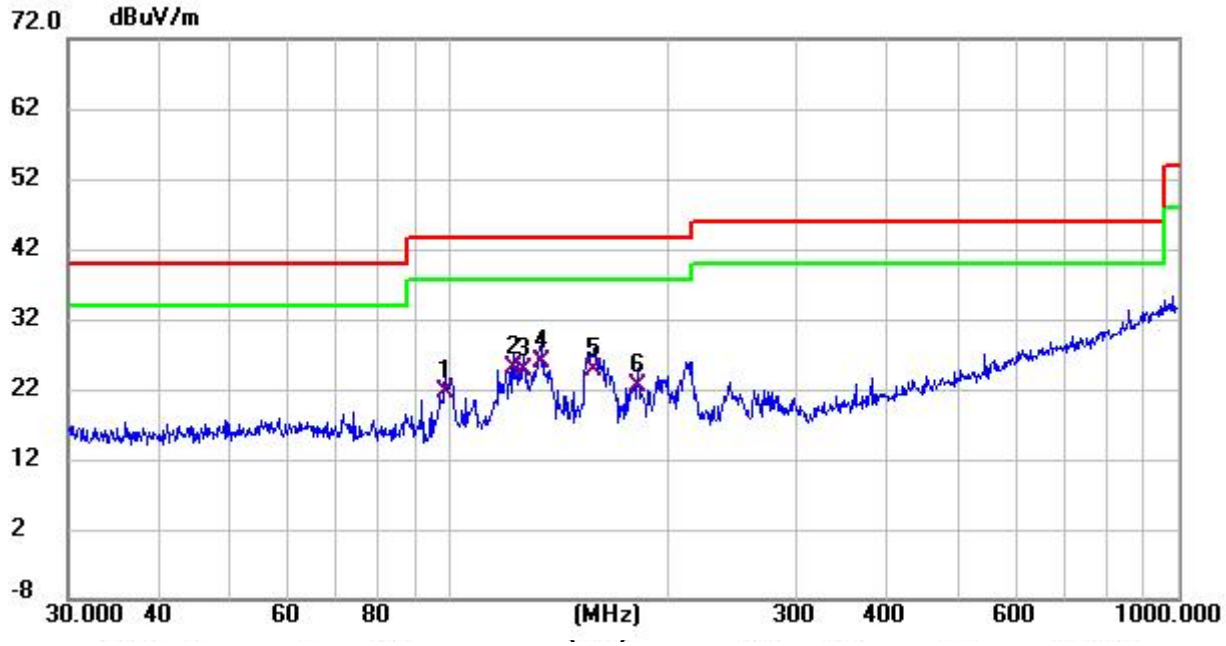
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

Please refer to the following test plots,High Channel (2480MHz) Worst case GFSK for record:

Model:	THUMP SUB GO

Test plot for Horizontal

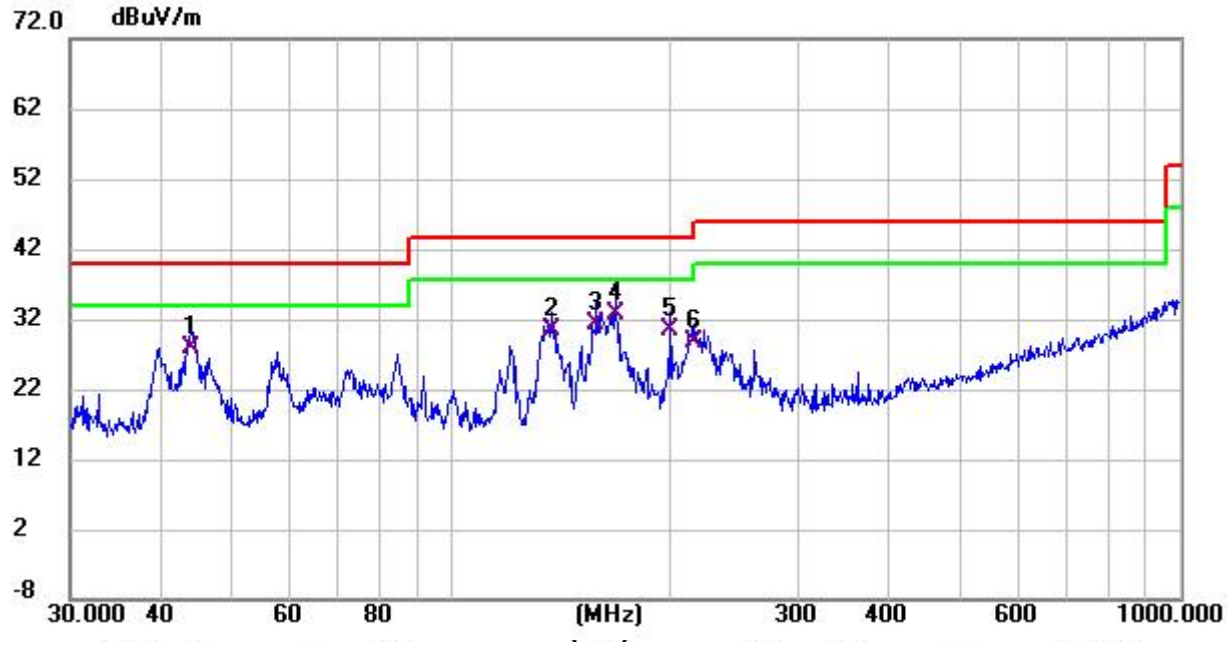


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	98.832	10.49	11.14	21.63	43.50	-21.87	QP
2	122.404	11.03	14.11	25.14	43.50	-18.36	QP
3	126.772	10.85	13.91	24.76	43.50	-18.74	QP
4 *	133.619	12.34	13.62	25.96	43.50	-17.54	QP
5	158.112	11.07	13.76	24.83	43.50	-18.67	QP
6	181.283	10.56	11.80	22.36	43.50	-21.14	QP

Remark:Emission Level=Reading+ Factor

Model:	THUMP SUB GO

Test plot for Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	44.120	14.65	13.31	27.96	40.00	-12.04	QP
2	137.903	19.29	11.27	30.56	43.50	-12.94	QP
3	158.112	17.85	13.57	31.42	43.50	-12.08	QP
4 *	167.824	19.68	13.06	32.74	43.50	-10.76	QP
5	199.986	19.91	10.65	30.56	43.50	-12.94	QP
6	215.268	17.41	11.28	28.69	43.50	-14.81	QP

Remark:Emission Level=Reading+Factor

Test Frequency 1GHz-25GHz

Bluetooth (GFSK, π/4DQPSK, 8DPSK)mode have been tested, and the worst result(GFSK) was report as below

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	49.16	34.12	5.03	32.39	52.46	74	-21.54	Pk
V	4804	39.68	34.12	5.03	32.39	42.98	54	-11.02	AV
V	7206	41.16	32.54	6.29	35.86	50.77	74	-23.23	Pk
V	7206	32.50	32.54	6.29	35.86	42.11	54	-11.89	AV
V	9608	42.26	32.98	7.55	38.4	55.23	74	-18.77	Pk
V	9608	29.78	32.98	7.55	38.4	42.75	54	-11.25	AV
V	12010	38.04	32.09	8.93	39	53.88	74	-20.12	Pk
V	12010	30.14	32.09	8.93	39	45.98	54	-8.02	AV
H	4804	50.18	34.12	5.03	32.39	53.48	74	-20.52	Pk
H	4804	40.46	34.12	5.03	32.39	43.76	54	-10.24	AV
H	7206	42.58	32.54	6.29	35.86	52.19	74	-21.81	Pk
H	7206	33.40	32.54	6.29	35.86	43.01	54	-10.99	AV
H	9608	41.56	32.98	7.55	38.4	54.53	74	-19.47	Pk
H	9608	31.40	32.98	7.55	38.4	44.37	54	-9.63	AV
H	12010	40.63	32.09	8.93	39	56.47	74	-17.53	Pk
H	12010	29.87	32.09	8.93	39	45.71	54	-8.29	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	49.77	34.07	5.09	32.59	53.38	74	-20.62	Pk
V	4882	39.38	34.07	5.09	32.59	42.99	54	-11.01	AV
V	7323	42.77	32.63	6.34	35.96	52.44	74	-21.56	Pk
V	7323	32.35	32.63	6.34	35.96	42.02	54	-11.98	AV
V	9764	42.84	32.92	7.59	38.4	55.91	74	-18.09	Pk
V	9764	33.28	32.92	7.59	38.4	46.35	54	-7.65	AV
V	12205	39.65	31.96	8.88	39.04	55.61	74	-18.39	Pk
V	12205	30.73	31.96	8.88	39.04	46.69	54	-7.31	AV
H	4882	50.89	34.07	5.09	32.59	54.50	74	-19.50	Pk
H	4882	40.29	34.07	5.09	32.59	43.90	54	-10.10	AV
H	7323	43.36	32.63	6.34	35.96	53.03	74	-20.97	Pk
H	7323	34.96	32.63	6.34	35.96	44.63	54	-9.37	AV
H	9764	42.56	32.92	7.59	38.4	55.63	74	-18.37	Pk
H	9764	32.44	32.92	7.59	38.4	45.51	54	-8.49	AV
H	12205	39.67	31.96	8.88	39.04	55.63	74	-18.37	Pk
H	12205	28.80	31.96	8.88	39.04	44.76	54	-9.24	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	50.17	34.02	5.15	32.8	54.10	74	-19.90	Pk
V	4960	40.68	34.02	5.15	32.8	44.61	54	-9.39	AV
V	7440	43.09	32.71	6.4	36.05	52.83	74	-21.17	Pk
V	7440	33.19	32.71	6.4	36.05	42.93	54	-11.07	AV
V	9920	42.38	32.86	7.62	38.4	55.54	74	-18.46	Pk
V	9920	30.58	32.86	7.62	38.4	43.74	54	-10.26	AV
V	12400	39.86	31.82	8.84	39.08	55.96	74	-18.04	Pk
V	12400	29.38	31.82	8.84	39.08	45.48	54	-8.52	AV
H	4960	51.23	34.02	5.15	32.8	55.16	74	-18.84	Pk
H	4960	41.89	34.02	5.15	32.8	45.82	54	-8.18	AV
H	7440	43.29	32.71	6.4	36.05	53.03	74	-20.97	Pk
H	7440	35.21	32.71	6.4	36.05	44.95	54	-9.05	AV
H	9920	42.20	32.86	7.62	38.4	55.36	74	-18.64	Pk
H	9920	31.25	32.86	7.62	38.4	44.41	54	-9.59	AV
H	12400	39.46	31.82	8.84	39.08	55.56	74	-18.44	Pk
H	12400	28.74	31.82	8.84	39.08	44.84	54	-9.16	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

Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

Bluetooth (GFSK, π/4DQPSK, 8DPSK)mode have been tested, and the worst result(GFSK) was report as below

	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	Result
GFSK	Low Channel: 2402MHz										
	H	2390.00	56.33	35.17	3.48	27.49	52.13	74	-21.87	PK	PASS
	H	2390.00	46.06	35.17	3.48	27.49	41.86	54	-12.14	AV	PASS
	H	2400.00	57.49	35.16	3.49	27.52	53.34	74	-20.66	PK	PASS
	H	2400.00	45.45	35.16	3.49	27.52	41.30	54	-12.70	AV	PASS
	V	2390.00	56.38	35.17	3.48	27.49	52.18	74	-21.82	PK	PASS
	V	2390.00	48.35	35.17	3.48	27.49	44.15	54	-9.85	AV	PASS
	V	2400.00	56.75	35.16	3.49	27.52	52.60	74	-21.40	PK	PASS
	V	2400.00	47.62	35.16	3.49	27.52	43.47	54	-10.53	AV	PASS
	High Channel: 2480MHz										
	H	2483.50	55.01	35.11	3.56	27.75	51.21	74	-22.79	PK	PASS
	H	2483.50	47.18	35.11	3.56	27.75	43.38	54	-10.62	AV	PASS
	H	2500.00	56.67	35.1	3.57	27.8	52.94	74	-21.06	PK	PASS
	H	2500.00	46.15	35.1	3.57	27.8	42.42	54	-11.58	AV	PASS
	V	2483.50	57.60	35.11	3.56	27.75	53.80	74	-20.20	PK	PASS
	V	2483.50	46.23	35.11	3.56	27.75	42.43	54	-11.57	AV	PASS
	V	2500.00	56.12	35.1	3.57	27.8	52.39	74	-21.61	PK	PASS
	V	2500.00	45.49	35.1	3.57	27.8	41.76	54	-12.24	AV	PASS

Remark:

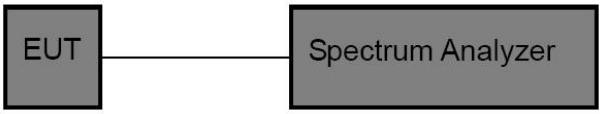
1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

7 Maximum Peak Output Power Test

7.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (b)(1) & RSS-247.5.4(b)
Test Limit	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. 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.

7.2 Test Setup



7.3 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

7.4 Test Data

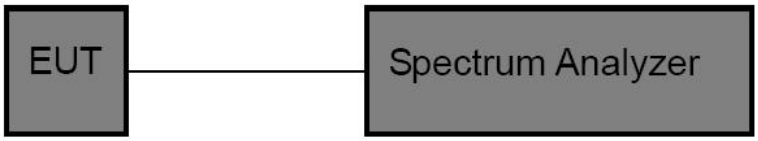
Please see the appendix III Bluetooth_(Class Bluetooth)_Test data.

8 20DB Occupy Bandwidth & 99% OCB Test

8.1 Test Standard

Test Standard	FCC Part15 C Section 15.247 (a)(1)

8.2 Test Setup



8.3 Test Procedure

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 = 91 kHz.

4. Sweep time = auto couple.

5. Detector function = peak.

6. Trace mode = max hold.

7. Allow trace to fully stabilize.

8.4 Test Data

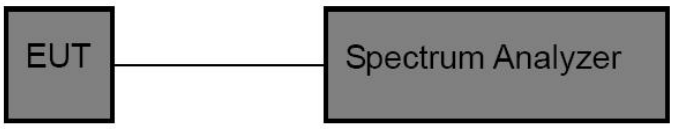
Please see the appendix III Bluetooth_(Class Bluetooth)_Test data.

9 Carrier Frequency Separation Test

9.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1) & RSS-247.5.1(b)
Test Limit	GFSK: 20dB bandwidth π /4DQPSK & 8DPSK: 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)

9.2 Test Setup



9.3 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.

9.4 Test Data

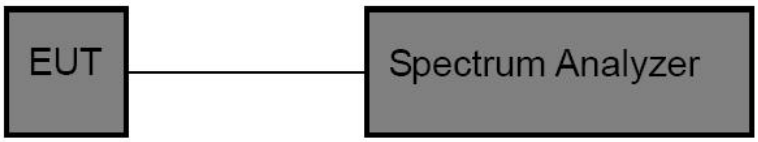
Please see the appendix III Bluetooth_(Class Bluetooth)_Test data.

10 Number of Hopping Channel Test

10.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1) & RSS-247.5.1(b)
Test Limit	≥15 channels

10.2 Test Setup



10.3 Test Procedure

The EUT must have its hopping function enabled. Using the following spectrum analyzer setting:

1. Span= the frequency band of operation

2. Set the RBW = 100kHz.

3. Set the VBW = 300kHz.

4. Sweep time = auto couple.

5. Detector function = peak.

6. Trace mode = max hold.

7. Allow trace to fully stabilize.

10.4 Test Data

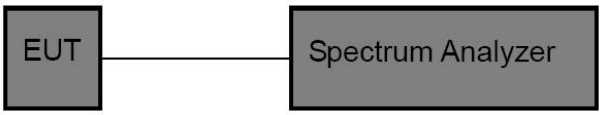
Please see the appendix III Bluetooth_(Class Bluetooth)_Test data.

12 Dwell Time Test

12.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (a)(1) & RSS-247.5.1(d)
Test Limit	0.4 sec

12.2 Test Setup



12.3 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 = 3 MHz.

4. Sweep time = as necessary to capture the entire dwell time per hopping channel.

5. Detector function = clear write.

6. Trace mode = normal.

7. Allow trace to fully stabilize.

12.4 Test Data

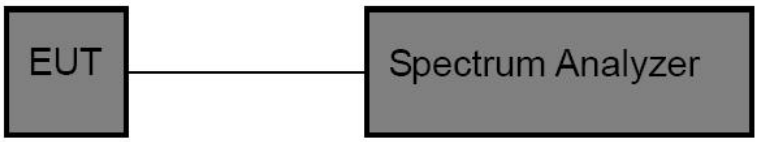
Please see the appendix III Bluetooth_(Class Bluetooth)_Test data.

13 100kHz Bandwidth of Frequency Band Edge Requirement

13.1 Test Standard and Limit

Test Standard	FCC Part15 C Section 15.247 (d) & RSS-247 5.5
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).

13.2 Test Setup



13.3 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.

13.4 Test Data

Please see the appendix III Bluetooth_(Class Bluetooth)_Test data.

14 Antenna Requirement

14.1 Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203 /247(c) & RSS-Gen 6.8
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(c) (1)(i) requirement: Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi. 3) RSS-Gen 6.8 The applicant for equipment certification shall provide a list of all antenna types that may be used with the transmitter, where applicable (i.e. for transmitters with detachable antenna), indicating the maximum permissible antenna gain (in dBi) and the required impedance for each antenna. The test report shall demonstrate the compliance of the transmitter with the limit for maximum equivalent isotropically radiated power (e.i.r.p.) specified in the applicable RSS, when the transmitter is equipped with any antenna type, selected from this list. For expediting the testing, measurements may be performed using only the antenna with highest gain of each combination of transmitter and antenna type, with the transmitter output power set at the maximum level. However, the transmitter shall comply with the applicable requirements under all operational conditions and when in combination with any type of antenna from the list provided in the test report (and in the notice to be included in the user manual, provided below). When measurements at the antenna port are used to determine the RF output power, the effective gain of the device's antenna shall be stated, based on a measurement or on data from the antenna's manufacturer. The test report shall state the RF power, output power setting and spurious emission measurements with each antenna type that is used with the transmitter being tested.

14.2 Antenna Connected Construction

The antenna is PCB Antenna which permanently attached, and the best case gain of the antenna is 1.7dBi. It complies with the standard requirement.

15 APPENDIX I -- TEST SETUP PHOTOGRAPH

Please see the attachment for details.

16 APPENDIX II -- EUT PHOTOGRAPH

Please see the attachment for details.

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