FCC TEST REPORT

FCC ID: 2A5EB-49PXIBT

IC：11078A-49PXIBT

Product Name	:	amplifier remote
Model Name	:	49PXIBT1002REM / PXIBT100.2
Brand Name	:	N/A
Report No.	:	PTC22012001101E-FC01
Sample ID	:	PTC22012001101-#1

Prepared for

Stillwater Designs & Audio, INC.

3100 N Husband St. Stillwater OK 74075 USA

Prepared by

Precise Testing & Certification Co., Ltd

Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China

1TEST RESULT CERTIFICATION

Applicant's name	:	Stillwater Designs & Audio, INC.
Address	:	3100 N Husband St. Stillwater OK 74075 USA
Manufacture's name	:	HANGZHOU NEWSOURCES ELECTRONICS CO., LTD
Address	:	No7. Houyang Rd. Anxi Industrial Zone, Liangzhu, Hangzhou 311113 China
Product name	:	amplifier remote
Model name	:	49PXIBT1002REM / PXIBT100.2
Standards	:	FCC CFR47 Part 15 Section 15.247; RSS-247 Issue 2 February 2017
Test procedure	:	ANSI C63.10:2013; RSS-Gen Issue 5, Apr. 2018
Test Date	:	Feb. 08, 2022 to Feb. 18, 2022
Date of Issue	:	Feb. 19, 2022
Test Result	:	Pass

This device described above has been tested by PTC, 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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Test Engineer:

Leo Yang / Engineer

Technical Manager:

Chris Du / Manager

Contents

2 Test Summary

Test Items	Test Requirement	Result
Radiated Spurious Emissions and Restricted Band edge	15.205(a) 15.209 15.247(d) ANSI C63.10:2013 RSS-247 Issue 2 RSS-Gen Issue 5	PASS
Conducted Spurious Emissions and band edge	15.247(d) 15.205(a) ANSI C63.10:2013 RSS-247 Issue 2 RSS-Gen Issue 5	PASS
Conduct Emission	15.207 ANSI C63.10:2013 RSS-Gen Issue 5	N/A
20dB Bandwidth and 99% Bandwidth	15.247(a)(1) ANSI C63.10:2013 RSS-247 Issue 2	PASS
Maximum Peak Output Power	15.247(b)(1) ANSI C63.10:2013 RSS-247 Issue 2	PASS
Frequency Separation	15.247(a)(1) ANSI C63.10:2013 RSS-247 Issue 2	PASS
Number of Hopping Frequency	15.247(a)(1)(iii) ANSI C63.10:2013 RSS-247 Issue 2	PASS
Dwell time	15.247(a)(1)(iii) ANSI C63.10:2013 RSS-247 Issue 2	PASS
Antenna Requirement	15.203 RSS-Gen Issue 5	PASS

3 TEST FACILITY

Precise Testing & Certification Co., Ltd.

Address: Building 1, No. 6, Tongxin Road, Dongcheng Street, Dongguan, Guangdong, China

FCC Registration Number: 790290

A2LA Certificate No.: 4408.01

IC Registration Number: 12191A-1

CAB identifier: CN0080

4 General Information

4.1 General Description of E.U.T.

Product Name	:	amplifier remote
Model Name	:	49PXIBT1002REM / PXIBT100.2
HVIN(s)	:	49PXIBT1002REM / PXIBT100.2
Bluetooth Version	:	BT 5.0 BR+EDR
Operating frequency	:	2402-2480MHz
Numbers of Channel	:	79 channels
Antenna Type	:	Internal PCB Antenna
Antenna Gain	:	0 dBi
Type of Modulation	:	GFSK, Π/4-DQPSK, 8DPSK
Data rate	:	1 Mbps, 2 Mbps, 3 Mbps
Power	:	DC 12V by battery
Hardware Version	:	V2.0.4
Software Version	:	V1.0

4.2 Test Mode

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).

Test software: BQB.EXE

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/4-DQPSK, 8DPSK have been tested. 79 Channels are provided by EUT. The 3 channels of lower, medium and higher were chosen for test.

Tested mode, channel, information		
Mode	Channel	Frequency (MHz)
GFSK hopping on Tx mode	CH0 to CH78	2402 to 2480
π/4-DQPSK hopping on Tx mode	CH0 to CH78	2402 to 2480
8DPSK hopping on Tx mode	CH0 to CH78	2402 to 2480
GFSK hopping off Tx mode	CH0	2402
	CH39	2441
	CH78	2480
π/4-DQPSK hopping off Tx mode	CH0	2402
	CH39	2441
	CH78	2480
8DPSK hopping off Tx mode	CH0	2402
	CH39	2441
	CH78	2480

Note: For π/4-DQPSK its same modulation type with 8DPSK, and based exploratory test, there is no significant difference of that two types test result, so except output power, except the RF output power, all other items final test was only performed with the worst case 8DPSK and GFSK.

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	-	-

5 Equipment During Test

5.1 Equipments List

RF Conducted Test

Name of Equipment	Manufacturer	Model	Serial No.	Last calibration	Calibration Due	Calibration period
MXA Signal Analyzer	Agilent	N9020A	MY56070279	Aug. 21, 2021	Aug. 20, 2022	1 year
Coaxial Cable	CDS	79254	46107086	Aug. 21, 2021	Aug. 20, 2022	1 year
Power Meter	Anritsu	ML2495A	0949003	Aug. 21, 2021	Aug. 20, 2022	1 year
Power Sensor	Anritsu	MA2411B	0917017	Aug. 21, 2021	Aug. 20, 2022	1 year
Spectrum Analyzer	Rohde&Schwarz	FSU26	1166.1660.26	Aug. 21, 2021	Aug. 20, 2022	1 year

Remark: The temporary antenna connector is soldered on the PCB board in order to perform conducted tests and this temporary antenna connector is listed in the equipment list.

Radiated Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Last calibration	Calibration Due	Calibration period
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	Aug. 21, 2021	Aug. 20, 2022	1 year
Loop Antenna	Schwarzbeck	FMZB 1519	012	Aug. 21, 2021	Aug. 20, 2022	1 year
Bilog Antenna	SCHWARZBECK	VULB9160	9160-3355	Aug. 21, 2021	Aug. 20, 2022	1 year
Preamplifier (low frequency)	SCHWARZBECK	BBV 9475	9745-0013	Aug. 21, 2021	Aug. 20, 2022	1 year
Cable	Schwarzbeck	PLF-100	549489	Aug. 21, 2021	Aug. 20, 2022	1 year
Spectrum Analyzer	Agilent	E4407B	MY45109572	Aug. 21, 2021	Aug. 20, 2022	1 year
Horn Antenna	SCHWARZBECK	9120D	9120D-1246	Aug. 21, 2021	Aug. 20, 2022	1 year
Power Amplifier	LUNAR EM	LNA1G18-40	J10100000081	Aug. 21, 2021	Aug. 20, 2022	1 year
Horn Antenna	SCHWARZBECK	BBHA 9170	9170-181	Aug. 21, 2021	Aug. 20, 2022	1 year
Amplifier	SCHWARZBECK	BBV 9721	9721-205	Aug. 21, 2021	Aug. 20, 2022	1 year
Cable	H+S	CBL-26	N/A	Aug. 21, 2021	Aug. 20, 2022	1 year
RF Cable	R&S	R204	R21X	Aug. 21, 2021	Aug. 20, 2022	1 year

Conducted Emissions

Name of Equipment	Manufacturer	Model	Serial No.	Last calibration	Calibration Due	Calibration period
EMI Test Receiver	Rohde&Schwarz	ESCI	101417	Aug. 21, 2021	Aug. 20, 2022	1 year
Artificial Mains Network	Rohde&Schwarz	L2-16B	000WX31025	Aug. 21, 2021	Aug. 20, 2022	1 year
Artificial Mains Network	Rohde&Schwarz	ENV216	101342	Aug. 21, 2021	Aug. 20, 2022	1 year

5.2 Measurement Uncertainty

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}
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(9KHz~30MHz)	±2.54dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	

5.3 Description of Support Units

Equipment	Model No.	Series No.
battery	Model: 4AH-12V Output：12V 4A	N/A

6 Conducted Emission

Test Requirement:	:	FCC CFR 47 Part 15 Section 15.207
Test Method:	:	ANSI C63.10:2013; RSS-Gen Issue 5
Test Result:	:	PASS
Frequency Range:	:	150kHz to 30MHz
Class/Severity:	:	Class B
Detector:	:	Peak for pre-scan (9kHz Resolution Bandwidth)

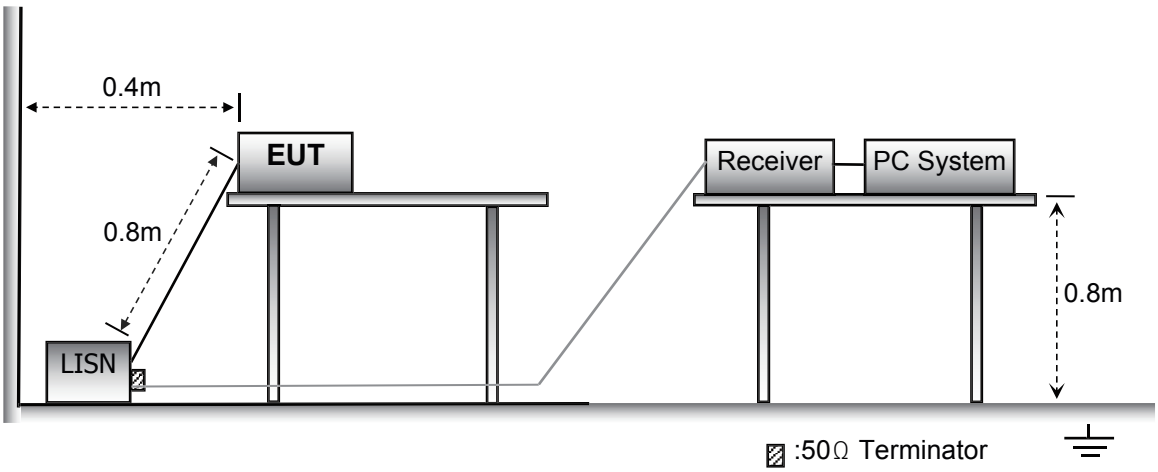
6.1 E.U.T. Operation

Operating Environment :

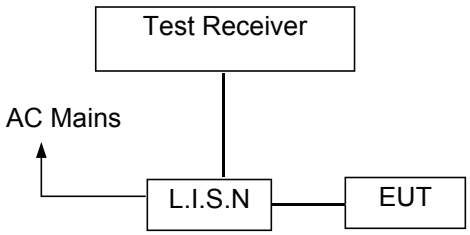
Temperature:	:	25.5 °C
Humidity:	:	51 % RH
Atmospheric Pressure:	:	101.2kPa

6.2 EUT Setup

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



6.3 Test SET-UP (Block Diagram of Configuration)



6.4 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.

6.5 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.

6.6 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.

6.7 Conducted Emission Test Result

The EUT is power by battery, so it is not need testing.
N/A.

7 Radiated Spurious Emissions

Test Requirement	:	FCC CFR47 Part 15 Section 15.209 & 15.247; RSS-247 Issue 2
Test Method	:	ANSI C63.10:2013; RSS-Gen Issue 5
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	$20\log^{(500)}$

7.1 EUT Operation

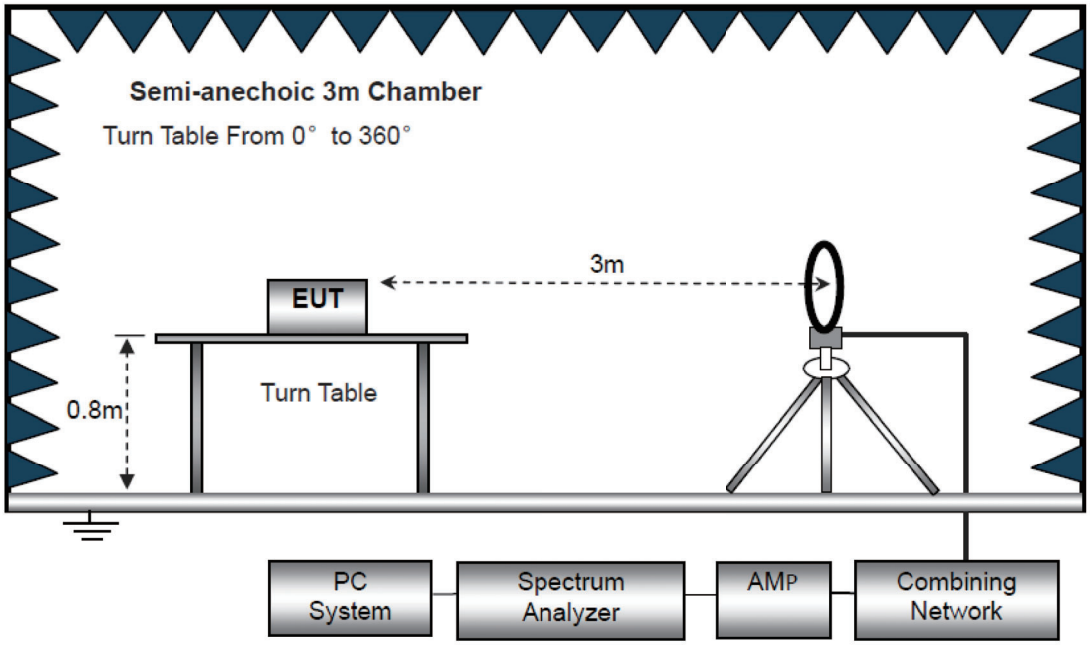
Operating Environment :

Temperature	:	23.5 °C
Humidity	:	51.1 % RH
Atmospheric Pressure	:	101.2kPa

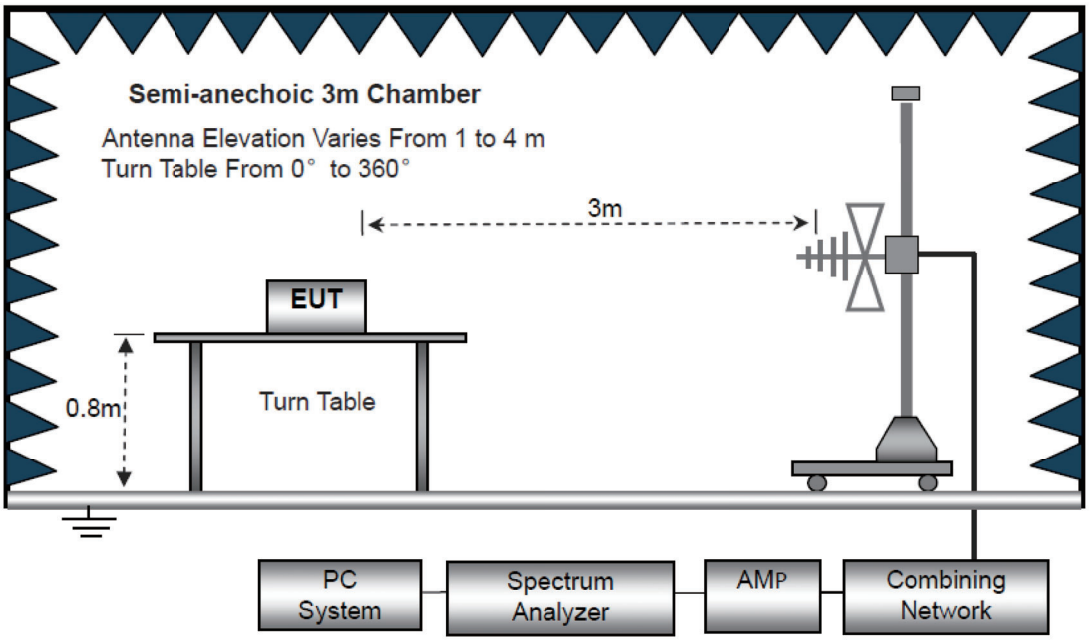
7.2 Test Setup

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

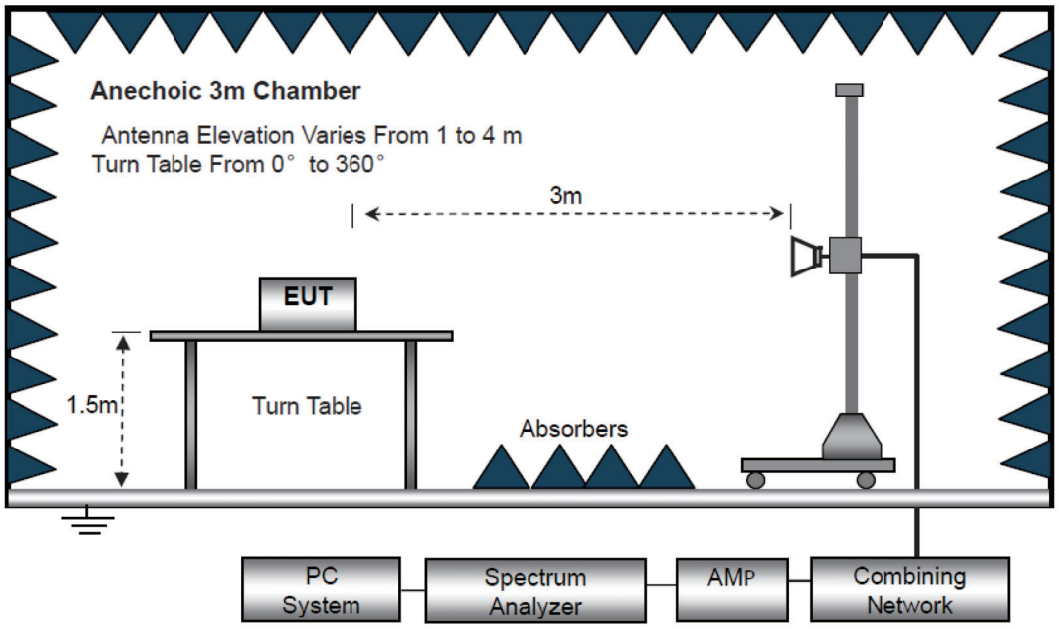
The test setup for emission measurement below 30MHz.



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



The test setup for emission measurement above 1 GHz.



7.3 Spectrum Analyzer Setup

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10th carrier harmonic
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / *10Hz* for Average

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB 200Hz for QP
Start ~ Stop Frequency	150kHz~30MHz / RB 9kHz for QP
Start ~ Stop Frequency	30MHz~1000MHz / RB 120kHz for QP

7.4 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 1.5m 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.

7. 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.

7.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

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

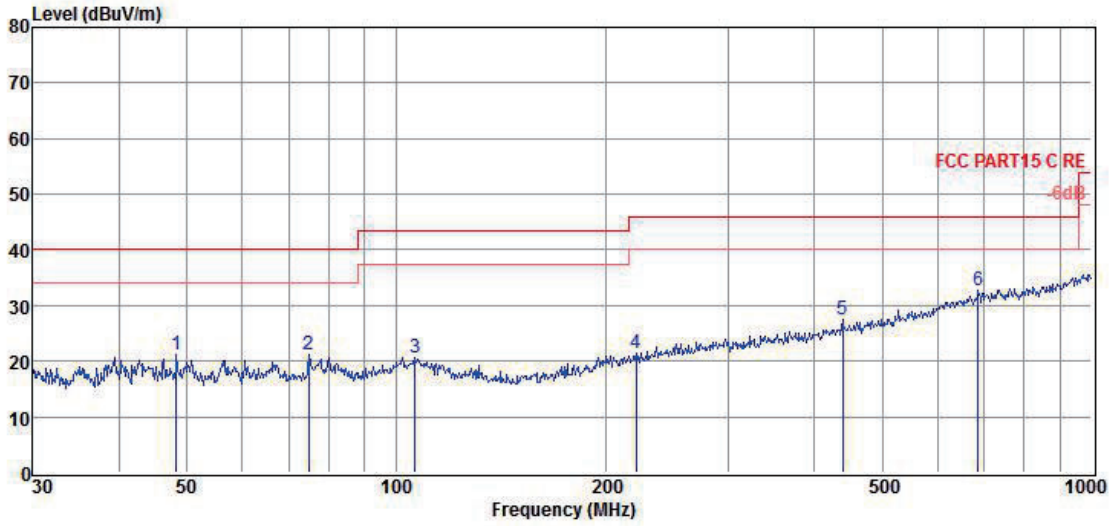
Distance extrapolation factor =40log(Specific distance/ test distance)(dB);
Limit line=Specific limits(dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

Please refer to the following test plots:

All the modulation modes were tested the data of the worst mode (DC 12V, GFSK TX 2402MHz) are recorded in the following pages and the others modulation methods do not exceed the limits.

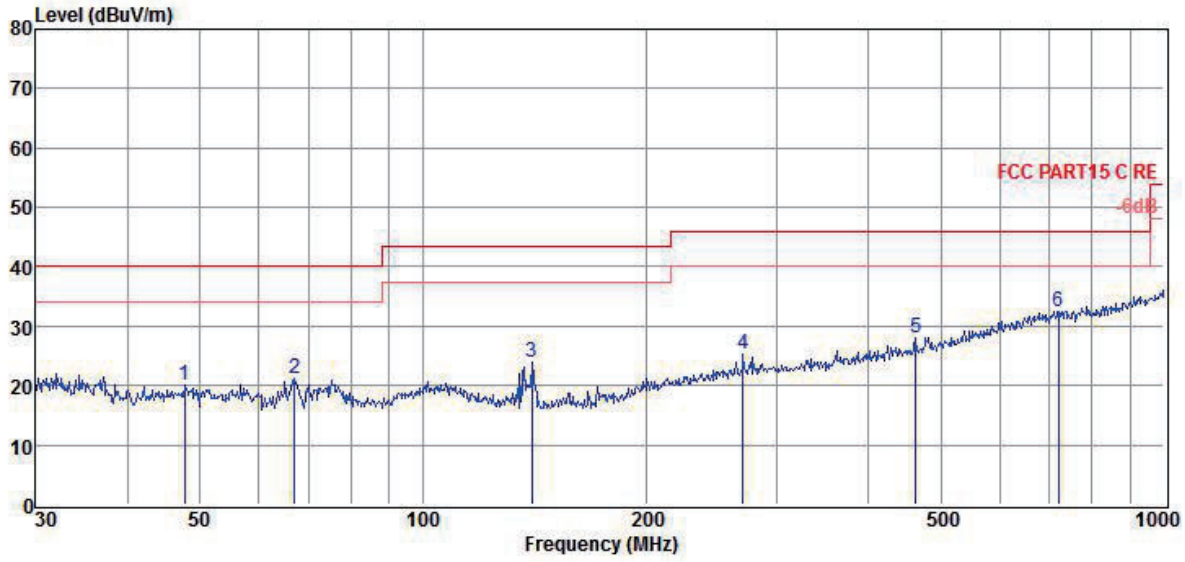
Test plot for Horizontal: GFSK(2402MHz)



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	48.33	2.82	14.42	3.85	21.09	40.00	-18.91	Peak	HORIZONTAL
2	74.92	7.94	9.19	4.05	21.18	40.00	-18.82	Peak	HORIZONTAL
3	106.39	4.61	11.76	4.24	20.61	43.50	-22.89	Peak	HORIZONTAL
4	221.39	4.49	12.05	4.89	21.43	46.00	-24.57	Peak	HORIZONTAL
5	438.66	5.51	16.22	5.64	27.37	46.00	-18.63	Peak	HORIZONTAL
6	687.15	6.41	19.91	6.34	32.66	46.00	-13.34	Peak	HORIZONTAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

Test plot for Vertical: GFSK(2402MHz)



Item (Mark)	Freq. (MHz)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss dB	Result Level (dBμV/m)	Limit Line (dBμV/m)	Over Limit (dB)	Detector	Polarization
1	47.66	1.94	14.34	3.85	20.13	40.00	-19.87	Peak	VERTICAL
2	67.20	7.08	10.00	4.00	21.08	40.00	-18.92	Peak	VERTICAL
3	140.34	10.90	8.69	4.44	24.03	43.50	-19.47	Peak	VERTICAL
4	270.38	6.75	13.33	5.08	25.16	46.00	-20.84	Peak	VERTICAL
5	462.35	5.84	16.57	5.71	28.12	46.00	-17.88	Peak	VERTICAL
6	721.73	5.85	20.24	6.44	32.53	46.00	-13.47	Peak	VERTICAL

Note: 1. Result Level = Read Level + Antenna Factor + Cable loss.
2. If Peak Result complies with QP limit, QP Result is deemed to comply with QP limit.
3. Test setup: RBW: 120 kHz, VBW: 300 kHz, Sweep time: auto.

Test Frequency 1GHz-25GHz

Low Channel (2402MHz) Worst case GFSK

Frequency (MHz)	S.A Reading (dBuV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4824	28.14	AV	V	8.13	8.26	7.46	37.07	54	-16.93
4824	29.35	AV	H	8.13	8.26	7.46	38.28	54	-15.72
4824	32.66	PK	V	8.13	8.26	7.46	41.59	74	-32.41
4824	35.28	PK	H	8.13	8.26	7.46	44.21	74	-29.79
15447	27.46	AV	V	9.14	9.57	8.62	37.55	54	-16.45
15447	28.28	AV	H	9.14	9.57	8.62	38.37	54	-15.63
15447	30.49	PK	V	9.14	9.57	8.62	40.58	74	-33.42
15447	32.58	PK	H	9.14	9.57	8.62	42.67	74	-31.33

Middle Channel (2441MHz) Worst case π/4-DQPSK

Frequency (MHz)	S.A Reading (dBuV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4882	26.43	AV	V	8.24	9.47	11.05	33.09	54	-20.91
4882	28.15	AV	H	8.24	9.47	11.05	34.81	54	-19.19
4882	30.26	PK	V	8.24	9.47	11.05	36.92	74	-37.08
4882	32.19	PK	H	8.24	9.47	11.05	38.85	74	-35.15
15483	28.49	AV	V	9.33	10.46	11.48	36.8	54	-17.2
15483	29.35	AV	H	9.33	10.46	11.48	37.66	54	-16.34
15483	31.45	PK	V	9.33	10.46	11.48	39.76	74	-34.24
15483	32.87	PK	H	9.33	10.46	11.48	41.18	74	-32.82

High Channel (2480MHz) Worst case GFSK

Frequency (MHz)	S.A Reading (dBuV)	Detector (PK/AV)	Polarity (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)
4960	25.46	AV	V	8.26	8.37	9.46	32.63	54	-21.37
4960	27.35	AV	H	8.26	8.37	9.46	34.52	54	-19.48
4960	30.15	PK	V	8.26	8.37	9.46	37.32	74	-36.68
4960	32.59	PK	H	8.26	8.37	9.46	39.76	74	-34.24
15386	28.43	AV	V	9.44	9.04	11.26	35.65	54	-18.35
15386	29.61	AV	H	9.44	9.04	11.26	36.83	54	-17.17
15386	31.48	PK	V	9.44	9.04	11.26	38.7	74	-35.3
15386	33.68	PK	H	9.44	9.04	11.26	40.9	74	-33.1

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

Test Mode: GFSK Frequency: Channel 0 2402MHz							
Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over (dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Over (dB)
2386.960	H	45.39	74	-28.61	32.59	54	-21.41
2384.160	V	44.01	74	-29.99	30.14	54	-23.86

Test Mode: GFSK Frequency: Channel 0 2402MHz							
Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over (dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Over (dB)
2484.259	H	42.15	74	-31.85	28.19	54	-25.81
2485.282	V	41.29	74	-32.71	26.58	54	-27.42

Test Mode: GFSK Frequency: Hopping							
Frequency (MHz)	Polarity H/V	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over (dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Over (dB)
2390.00	H	38.15	74	-35.85	27.15	54	-26.85
2483.50	H	45.69	74	-28.31	27.04	54	-26.96
2390.00	V	39.26	74	-34.74	24.13	54	-29.87
2483.50	V	46.28	74	-27.72	26.92	54	-27.08

8 CONDUCTED BAND EDGE AND SPURIOUS EMISSION

8.1 REQUIREMENT

According to FCC section 15.247(d)&RSS-247 Issue 2, in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is 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, based on either an RF conducted or a radiated measurement.

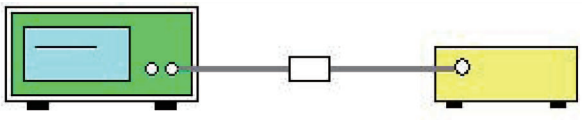
8.2 TEST PROCEDURE

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	30 MHz to 10th carrier harmonic
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

. For Band edge

Spectrum Parameter	Setting
Detector	Peak
Start/Stop Frequency	Lower Band Edge: 2300 – 2403 MHz Upper Band Edge: 2479 – 2500 MHz
RB / VB (emission in restricted band)	100 KHz/300 KHz
Trace-Mode:	Max hold

8.3 TEST SETUP



1. The transmitter output is connected to a spectrum analyzer. The resolution bandwidth is set to 100KHz. The video bandwidth is set to 300KHz.

2. The spectrum from 30MHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels.

8.4 EUT OPERATION CONDITIONS

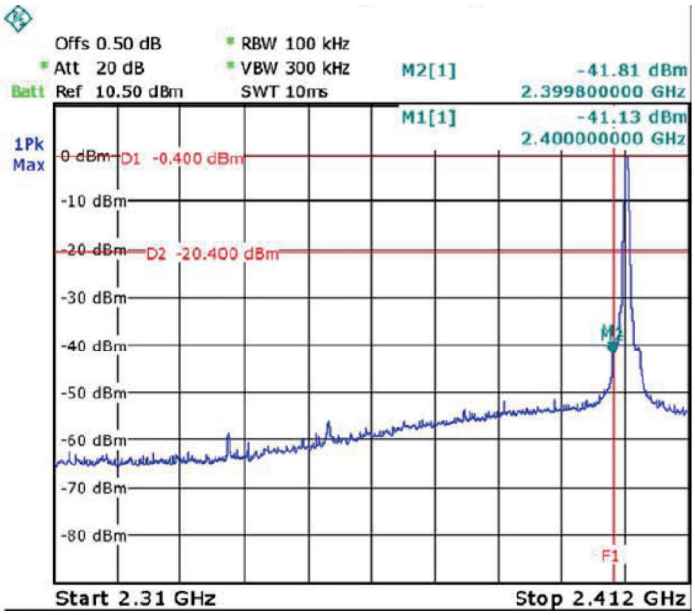
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

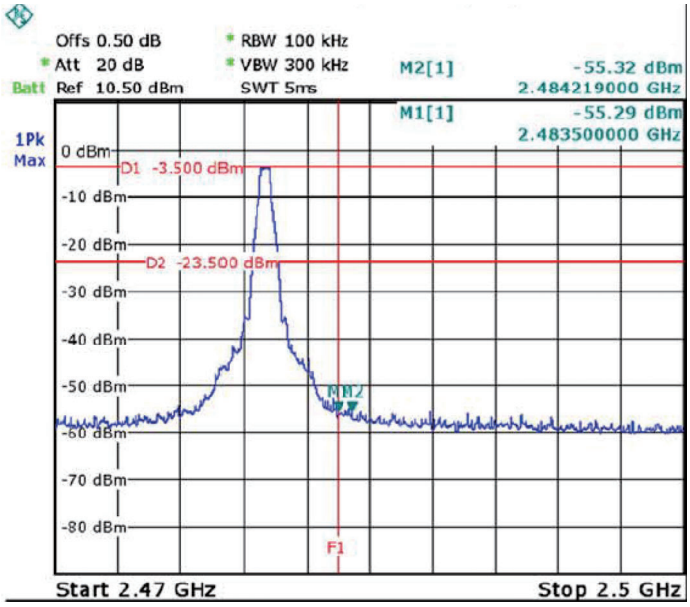
8.5 TEST RESULTS

BAND EDGE For Non-Hopping Mode:

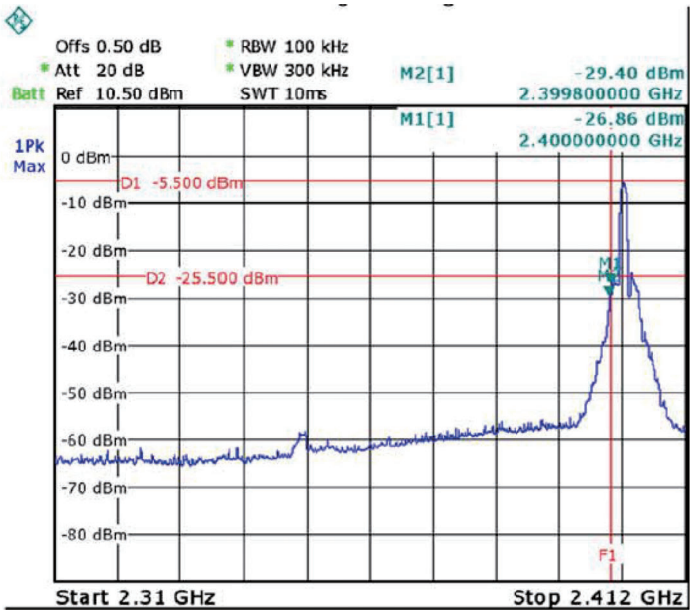
Mode	Freq. (MHz)	Conclusion
GFSK	Hopping off 2402	PASS
	Hopping off 2480	PASS
	Hopping on	PASS
8DPSK	Hopping off 2402	PASS
	Hopping off 2480	PASS
	Hopping on	PASS

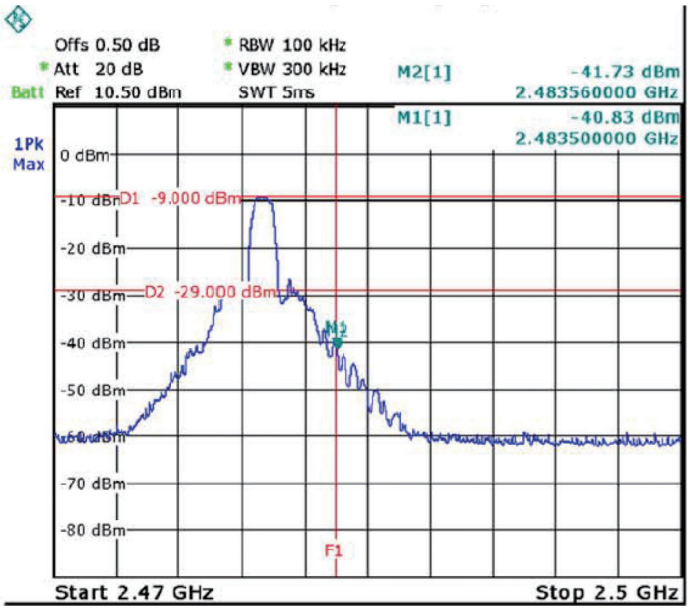
GFSK




Offs 0.50 dB
RBW 100 kHz
Att 20 dB
VBW 300 kHz
Batt Ref 10.50 dBm
SWT 5ms
M2[1]
-55.32 dBm
2.484219000 GHz
M1[1]
-55.29 dBm
2.483500000 GHz
1Pk
Max
0 dBm
D1 -3.500 dBm
-10 dBm
-20 dBm
D2 -23.500 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
F1
Start 2.47 GHz
Stop 2.5 GHz

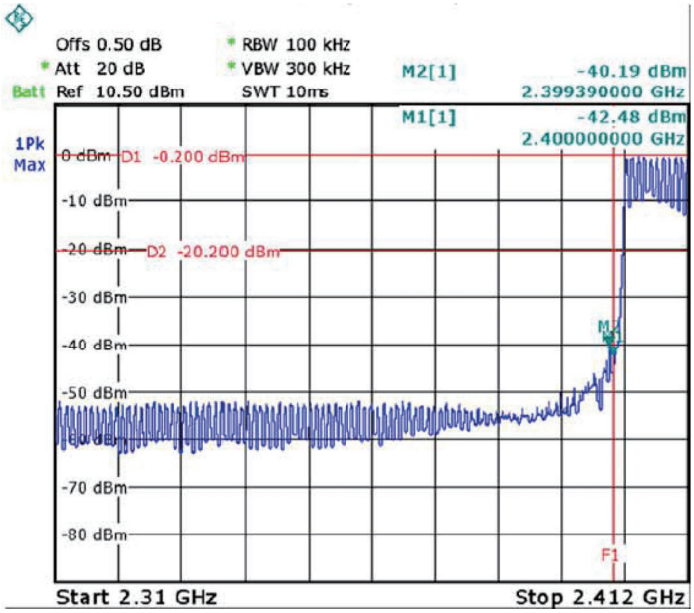
8DPSK

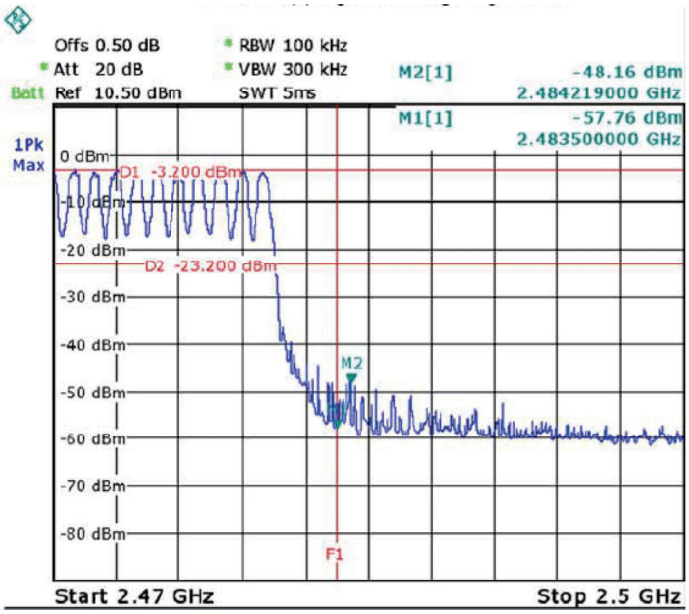

Offs 0.50 dB
RBW 100 kHz
Att 20 dB
VBW 300 kHz
Batt Ref 10.50 dBm
SWT 10ms
M2[1]
-29.40 dBm
2.399800000 GHz
M1[1]
-26.86 dBm
2.400000000 GHz
1Pk
Max
0 dBm
D1 -5.500 dBm
-10 dBm
-20 dBm
D2 -25.500 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
F1
Start 2.31 GHz
Stop 2.412 GHz



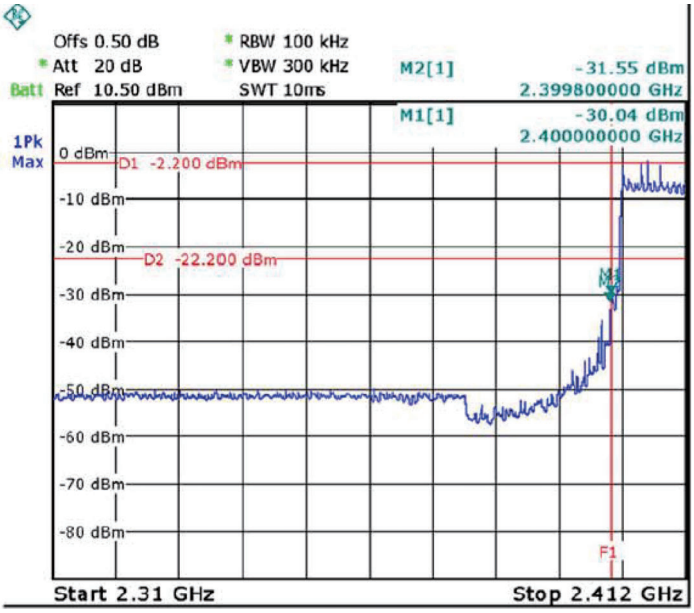
For Hopping Mode:

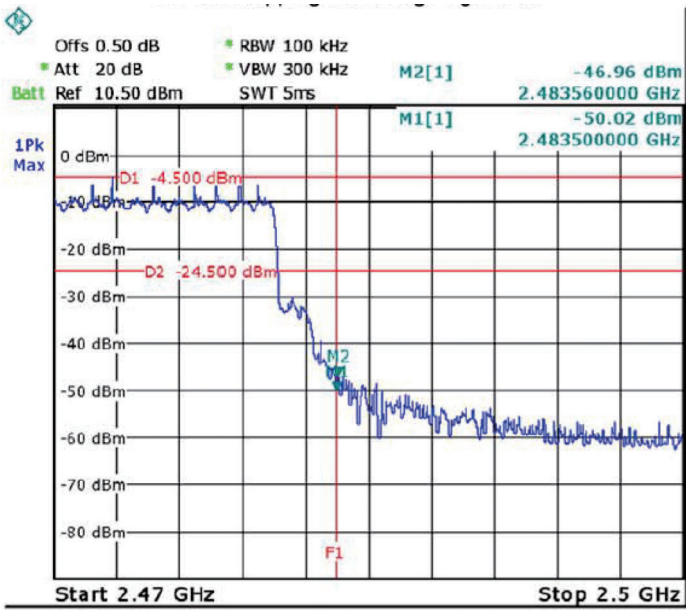
GFSK




Offs 0.50 dB
RBW 100 kHz
Att 20 dB
VBW 300 kHz
Batt Ref 10.50 dBm
SWT 5ms
M2[1]
-48.16 dBm
2.484219000 GHz
M1[1]
-57.76 dBm
2.483500000 GHz
1Pk
Max
0 dBm
D1 -3.200 dBm
-10 dBm
-20 dBm
D2 -23.200 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M2
F1
Start 2.47 GHz
Stop 2.5 GHz

8DPSK

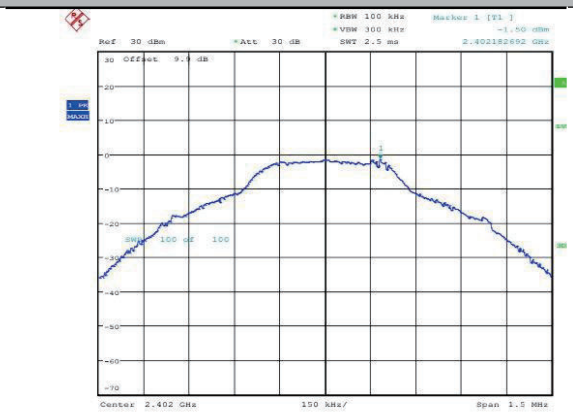

Offs 0.50 dB
RBW 100 kHz
Att 20 dB
VBW 300 kHz
Batt Ref 10.50 dBm
SWT 10ms
M2[1]
-31.55 dBm
2.399800000 GHz
M1[1]
-30.04 dBm
2.400000000 GHz
1Pk
Max
0 dBm
D1 -2.200 dBm
-10 dBm
-20 dBm
D2 -22.200 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
F1
Start 2.31 GHz
Stop 2.412 GHz


Offs 0.50 dB
RBW 100 kHz
Att 20 dB
VBW 300 kHz
Batt Ref 10.50 dBm
SWT 5ms
M2[1]
-46.96 dBm
2.483560000 GHz
M1[1]
-50.02 dBm
2.483500000 GHz
1Pk
Max
0 dBm
D1 -4.500 dBm
-10 dBm
-20 dBm
D2 -24.500 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
M2
F1
Start 2.47 GHz
Stop 2.5 GHz

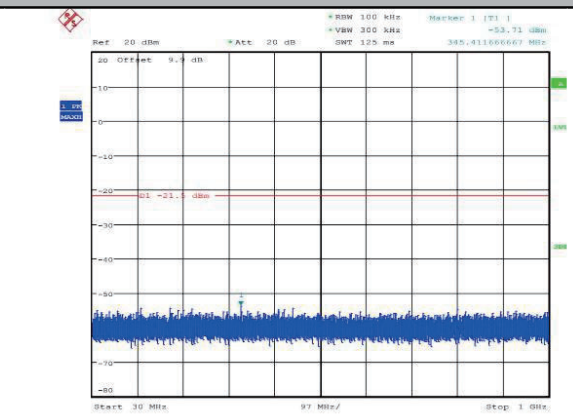
RF Conducted Spurious Emissions :

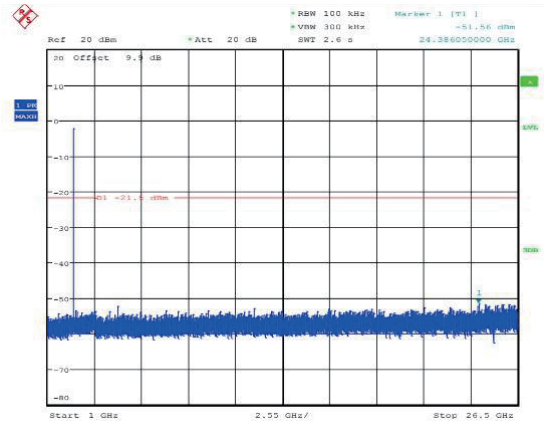
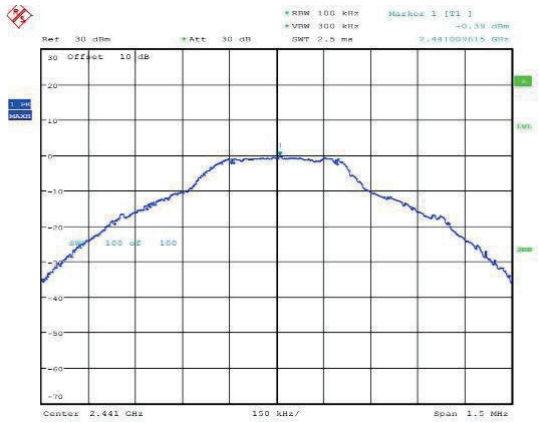
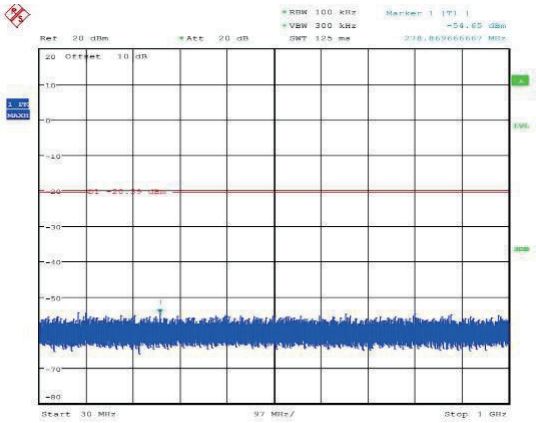
Mode	Freq. (MHz)	Conclusion
GFSK	Hopping off 2402	PASS
	Hopping off 2441	PASS
	Hopping off 2480	PASS
8DPSK	Hopping off 2402	PASS
	Hopping off 2441	PASS
	Hopping off 2480	PASS

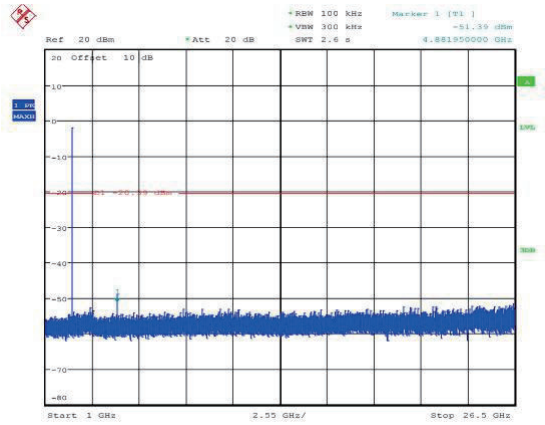
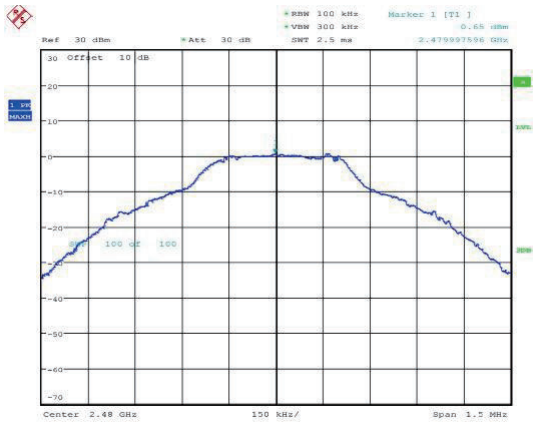
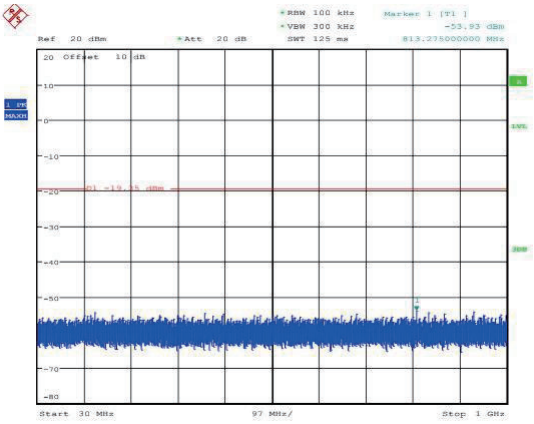
GFSK_2402



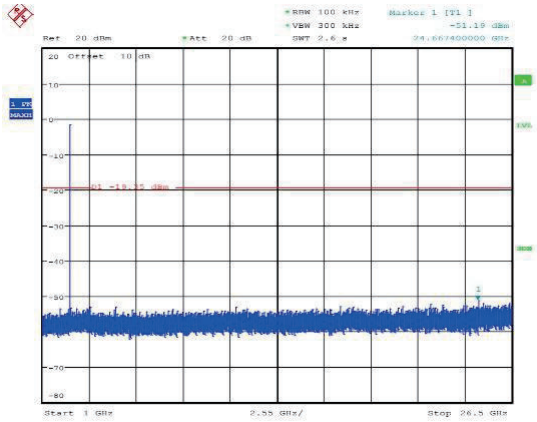
GFSK_2402_30~1000



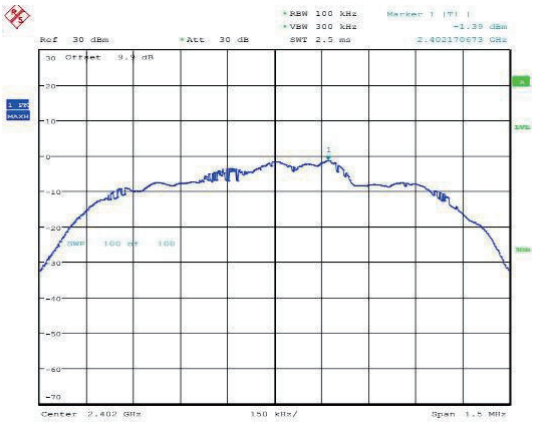
GFSK__2402_1000~26500

GFSK__2441

GFSK__2441_30~1000


GFSK__2441__1000~26500

GFSK__2480

GFSK__2480_30~1000


GFSK__2480_1000~26500



8DPSK__2402



8DPSK__2402_30~1000