TEST REPORT

Applicant	:	Shenzhen Clever bright Imp.&Exp.Co.,ltd
Address	:	Rm1701, ZhouYue Building, FuHua Yi Rd, FuTian Central Zone, Shenzhen,P.R. China
Manufacturer	:	Shenzhen Clever bright Imp.&Exp.Co.,ltd
Address	:	Rm1701, ZhouYue Building, FuHua Yi Rd, FuTian Central Zone, Shenzhen,P.R. China
Product Name	:	Wireless Headphone
Model Number	:	CB-PX11, RWH-20, RRWH-22, RRWH-25, RRWH-28, RRWH-30, RRWH-33, RRWH-35, RRWH-38, RRWH-40, RRWH-44, RRWH-45, RRWH-50, RRWH-55, RRWH-56, RRWH-57, RRWH-58, RRWH59, RRWH-60, RRWH-66, RRWH-74, RRWH-75, RRWH-76, RRWH-77, RRWH-80, RRWH-85, RRWH-88, TUNE-33, TUNE-40
Trademark	:	N/A
FCC ID	:	2AZ9D-CBPX11
Test Date	:	Jul. 21, 2026 to Sep. 12, 2026
Date of Report	:	Sep. 12, 2026
Test Result	:	This device described above has been tested by NTT, 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 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 KDB 558074 D01 15.247 Meas Guidance v05r02

Prepared by(Test Engineer):
Gary Lu

Reviewer(Supervisor):
Cindy Qin

Approved(Manager):
Abel Yu

Shenzhen NTT Testing Technology Co., Ltd. Special Seal for Inspection and Testing

TABLE OF CONTENT

1. General Information 5
1.1. Description of Device (EUT) 5
1.2. Channel List 5
1.3. Summary of test result 6
1.4. Special Accessories and Auxiliary Equipment 6
1.5. Test mode 6
1.6. Test configuration 7
1.7. Block Diagram 7
1.8. Test Conditions 7
1.9. Measurement Uncertainty (95% confidence levels, k=2) 8
1.10. Test Facility 8
1.11. Test Equipment 9
2. Conducted emission at the mains terminals test 11
2.1. Limit 11
2.2. Test Setup 11
2.3. Test Procedure 11
2.4. Test Result 12
3. Radiated Spurious Emissions 14
3.1. Limit 14
3.2. Test Setup 15
3.3. Test Procedure 17
3.4. Test Result 18
4. Maximum Peak Output Power 23
4.1. Limit 23
4.2. Test Setup 23
4.3. Test Procedure 23
4.4. Test Result 24
5. -20 dB Bandwidth Measurement 28
5.1. Limit 28
5.2. Test Setup 28
5.3. Test Procedure 28
5.4. Test Result 28
6. Carrier Frequency Separation Test 32
6.1. Limit 32
6.2. Test Setup 32
6.3. Test Procedure 32
6.4. Test Result 32
7. Number of Hopping Channel Test 36
7.1. Limit 36
7.2. Test Setup 36
7.3. Test Procedure 36
7.4. Test Result 36
8. Dwell Time Test 38
8.1. Limit 38
8.2. Test setup 38
8.3. Test Procedure 38
8.4. Test Result 38
9. Conducted Spurious Emissions and Band Edge Requirement 45
9.1. Limit 45

9.2. Test Setup 45
9.3. Test Procedure 45
9.4. Test Result 46
10. Antenna Requirement 53
10.1. Test Standard and Requirement 53
10.2. Antenna Connected Construction 53
11. TEST SETUP & EUT PHOTOGRAPH 54

Revision History of This Test Report		
Report Number	Description	Issued Date
SZNTT26038258E1-1	Initial Issue	2026-09-12

1. General Information

1.1. Description of Device (EUT)

EUT Name	:	Wireless Headphone
Model No.	:	CB-PX11, RWH-20, RRWH-22, RRWH-25, RRWH-28, RRWH-30, RRWH-33, RRWH-35, RRWH-38, RRWH-40, RRWH-44, RRWH-45, RRWH-50, RRWH-55, RRWH-56, RRWH-57, RRWH-58, RRWH59, RRWH-60, RRWH-66, RRWH-74, RRWH-75, RRWH-76, RRWH-77, RRWH-80, RRWH-85, RRWH-88, TUNE-33, TUNE-40
Model Difference	:	All the model are the same circuit and RF module, only the names are different. Test sample model: CB-PX11
Power supply	:	DC 5V charging from adapter DC 3.7V by battery
Operation frequency	:	2402-2480MHz
Modulation	:	GFSK, π/4 DQPSK, 8DPSK
Antenna Type	:	PCB antenna, Maximum Gain is 4.2dBi
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
Adapter	/	/	/	/

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 DH1/2DH1/3DH1 Record in the report			

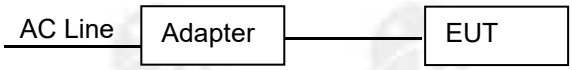
1.6. Test configuration

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.	

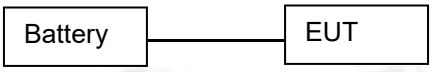
Test Software	FCC_assist_1.0.4
Power level setup	0 dBm

1.7. Block Diagram

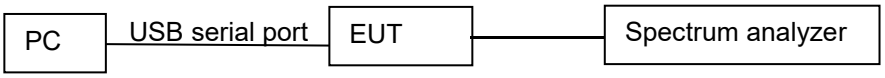
Conducted Emission



Radiated Emission



RF Conducted Test



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	AC 120V	N/A
Note: N/A is an abbreviation for Not Applicable.		

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

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)	±4.51dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Remark:When making a conformity declaration based on test results for regulations/standards or specifications,the default is to use Clause 4.2.1of ILAC-G8:09/2019 and the guidelines on decision rules and conformity declaration in IEC Guide 115:2023.	

1.10. Test Facility

Site Description		
Name of Firm	:	Shenzhen NTT Testing Technology Co.,Ltd.
Site Location	:	1B, Building 2, Factory Building & 103, Building 3, Factory Building, Dayang Industrial Park No.4, Industrial Avenue, Tangwei Community, Fuhai Sub-district, Bao 'an District, Shenzhen City, China
FCC Designation Number	:	CN3446
FCC Test Firm Registration Number	:	129414

1.11. Test Equipment

Conducted Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	HSRCE944	/	HTEC	2025/4/30	2028/4/29
EMI Test Receiver	ESPI	/	RS	2025/9/8	2026/9/7
LISN	NNLK 8129	00603	Schwarzbeck	2025/9/8	2026/9/7
LISN	NNHV 8123-400	00694	Schwarzbeck	2025/9/8	2026/9/7
LISN	NNHV 8123-400	00680	Schwarzbeck	2025/9/8	2026/9/7
Cable	RG223-1500MM	NA	RG	2025/9/8	2026/9/7

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

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2025/7/24	2028/7/23
EMI Test Receiver	ESCI	101018	RS	2025/9/8	2026/9/7
Amplifi（30MHz-1GHz）	BBV 9718D	00042	SCHWARZBECK	2025/9/8	2026/9/7
Bilog Antenna（30MHz-1GHz）	VULB9168	1858	SCHWARZBECK	2025/9/9	2026/9/8
Horn antenna（1GHz-18GHz）	BBHA 9120 D	02622	SCHWARZBECK	2025/9/9	2026/9/8
Pream plifier（1GHz-18GHz）	BBV 9718D	0024	SCHWARZBECK	2025/9/8	2026/9/7
Spectrum Analyze（10Hz-40GHz）	FSV 40	100952	Rohde & Schwarz	2025/9/8	2026/9/7
Pream plifier（18GHz-40GHz）	BBV 9721	0056	SCHWARZBECK	2025/9/8	2026/9/7
Double Ridge Guide Horn Antenna（18GHz-40GHz）	SAS-574	588	A.H.System	2025/9/8	2026/9/7
Loop Antenna (9KHz-30MHz)	FMZB1519B	014	SCHWARZBECK	2025/9/8	2026/9/7
Amplifier (9KHz-30MHz)	CVP 9222 C	00109	SCHWARZBECK	2025/9/8	2026/9/7
MXG Signal Analyzer	N9020A	MY50510202	Agilent	2025/9/8	2026/9/7

MXG Vector Signal Generator	N5182A	MY50140020	Agilent	2025/9/8	2026/9/7
MXG Analog Signal Generator	N5181A	MY47420919	Agilent	2025/9/8	2026/9/7
Power Sensor	TR1029-2	512364	Techoy	2025/9/8	2026/9/7
RF Swith	TR1029-1	512364	Techoy	2025/9/8	2026/9/7
Cable	DA800-4000MM	NA	DA	2025/9/8	2026/9/7
Cable	DA800-11000MM	NA	DA	2025/9/8	2026/9/7

Test software

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	FALA	EZ-EMC	Ver.EMC-CON 3A1.1+
2	EMC radiation test system	FALA	EZ-EMC	Ver.FA-03A2 RE+
3	RF test system	TACHOY	RFTest	V1.0.0
4	RF communication test system	TACHOY	RFTest	V1.0.0

2. Conducted emission at the mains terminals test

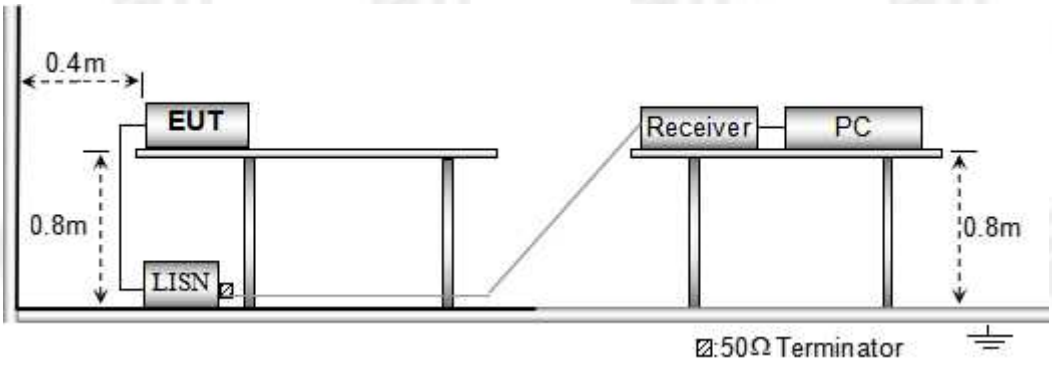
2.1. Limit

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
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

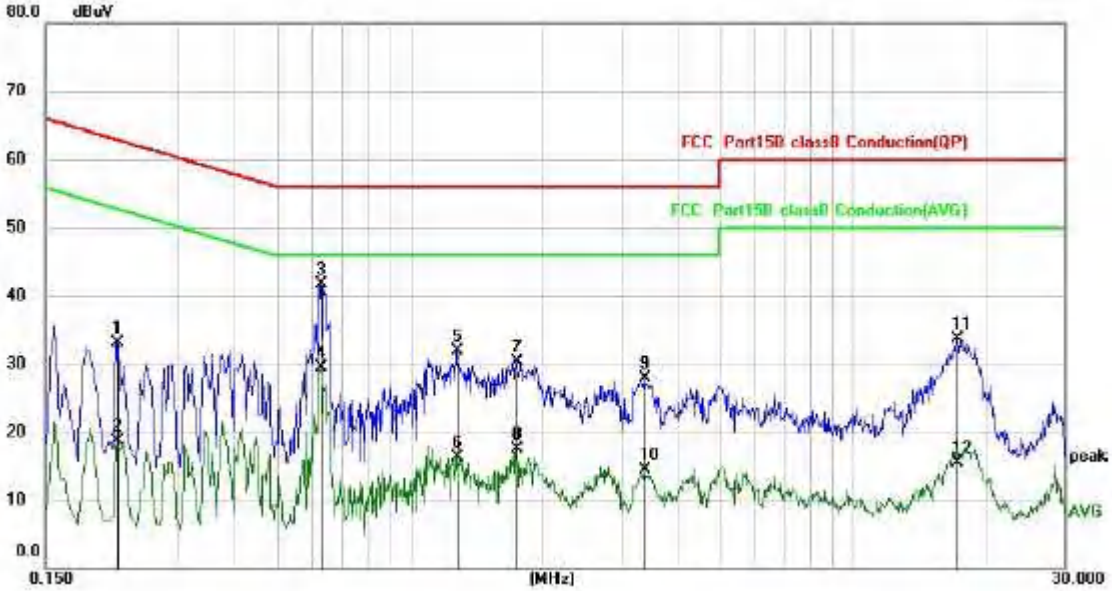


2.3. Test Procedure

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

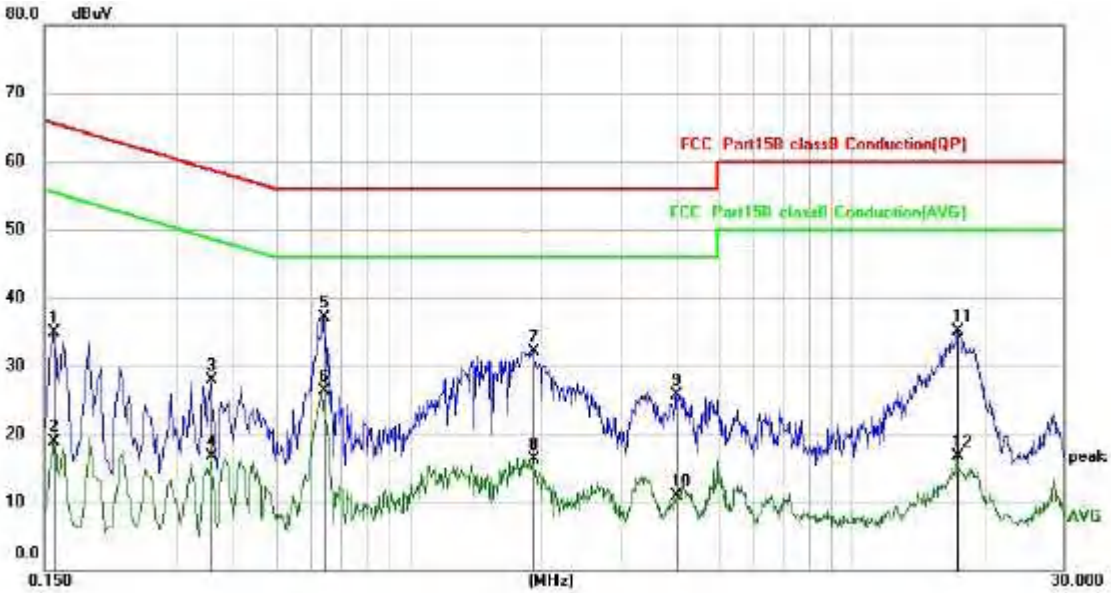
Conducted Emission At The Mains Terminals Test Data			
Temperature:	25.1℃	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Line
Test Voltage :	DC 5V from Adapter Input AC 120V/60Hz	Test Mode:	GFSK(CH00)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.2180	23.02	10.08	33.10	62.89	-29.79	QP
2		0.2180	8.64	10.08	18.72	52.89	-34.17	AVG
3	*	0.6300	31.61	10.10	41.71	56.00	-14.29	QP
4		0.6300	19.48	10.10	29.58	46.00	-16.42	AVG
5		1.2700	21.73	10.14	31.87	56.00	-24.13	QP
6		1.2700	6.26	10.14	16.40	46.00	-29.60	AVG
7		1.7420	20.12	10.16	30.28	56.00	-25.72	QP
8		1.7420	7.30	10.16	17.46	46.00	-28.54	AVG
9		3.3860	17.76	10.22	27.98	56.00	-28.02	QP
10		3.3860	4.19	10.22	14.41	46.00	-31.59	AVG
11		17.1420	22.96	10.83	33.79	60.00	-26.21	QP
12		17.1420	4.73	10.83	15.56	50.00	-34.44	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 :	DC 5V from Adapter Input AC 120V/60Hz	Test Mode:	GFSK(CH00)



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector
1		0.1580	24.89	10.07	34.96	65.57	-30.61	QP
2		0.1580	8.92	10.07	18.99	55.57	-36.58	AVG
3		0.3580	17.82	10.09	27.91	58.77	-30.86	QP
4		0.3580	6.57	10.09	16.66	48.77	-32.11	AVG
5	*	0.6419	27.05	10.10	37.15	56.00	-18.85	QP
6		0.6419	16.11	10.10	26.21	46.00	-19.79	AVG
7		1.8980	22.02	10.17	32.19	56.00	-23.81	QP
8		1.8980	6.17	10.17	16.34	46.00	-29.66	AVG
9		4.0220	15.48	10.24	25.72	56.00	-30.28	QP
10		4.0220	0.65	10.24	10.89	46.00	-35.11	AVG
11		17.2460	24.27	10.83	35.10	60.00	-24.90	QP
12		17.2460	5.82	10.83	16.65	50.00	-33.35	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 v05r02April 2,2019; ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
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

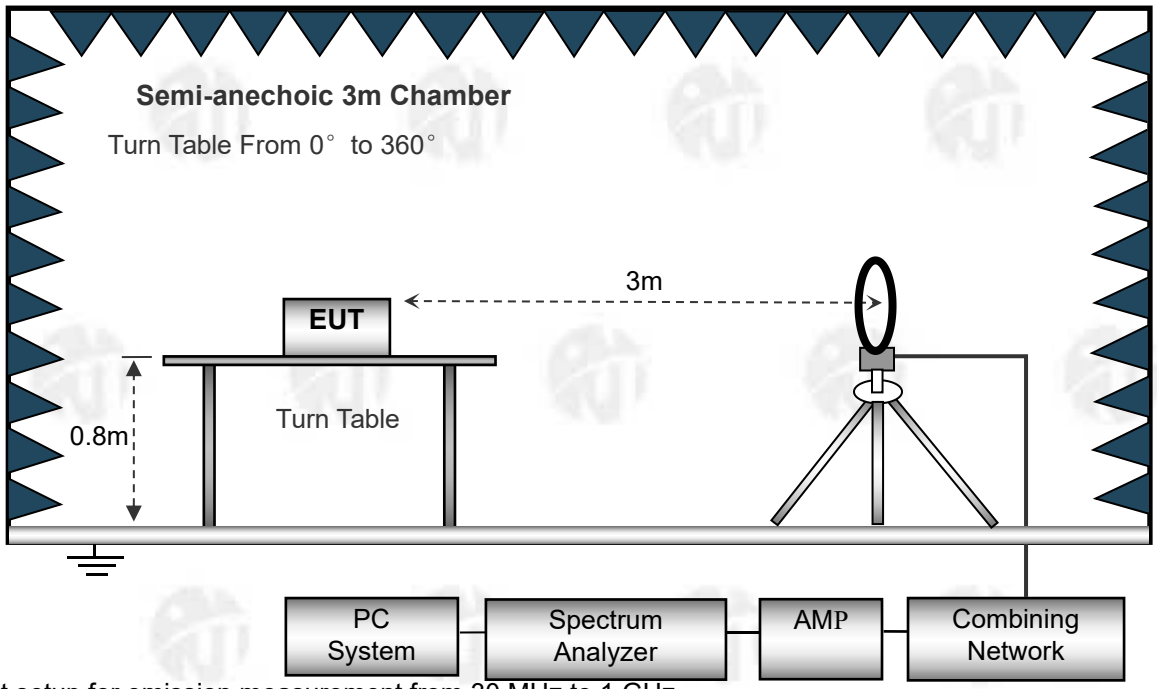
Limit:

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)

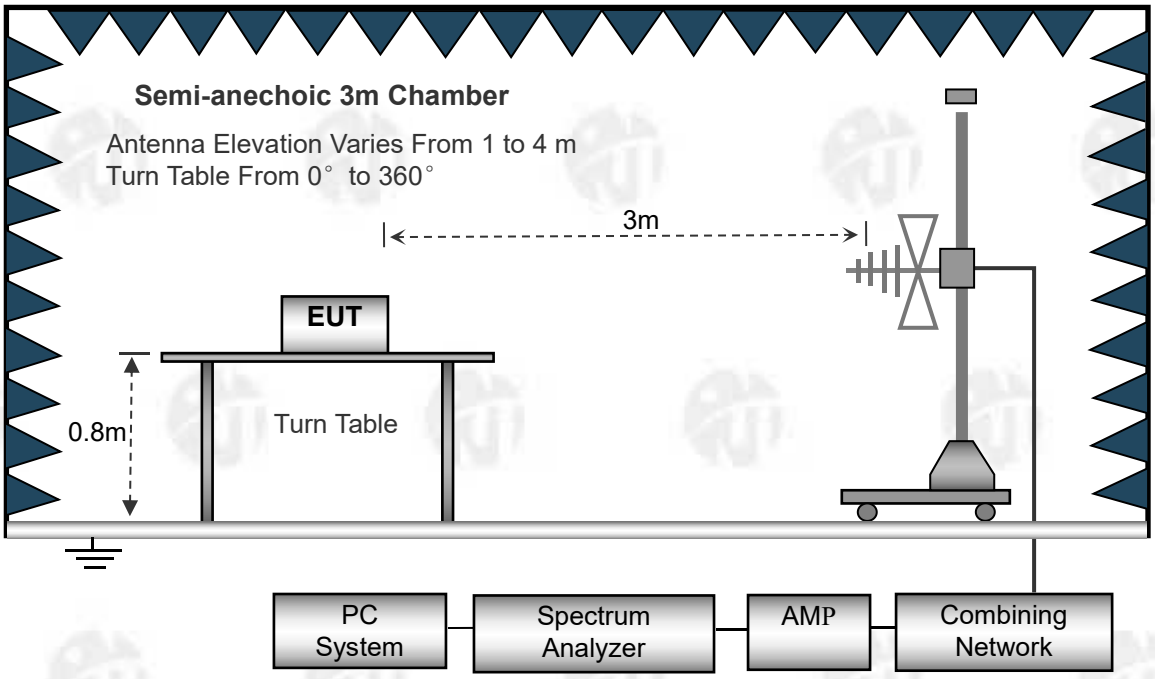
3.2. Test Setup

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

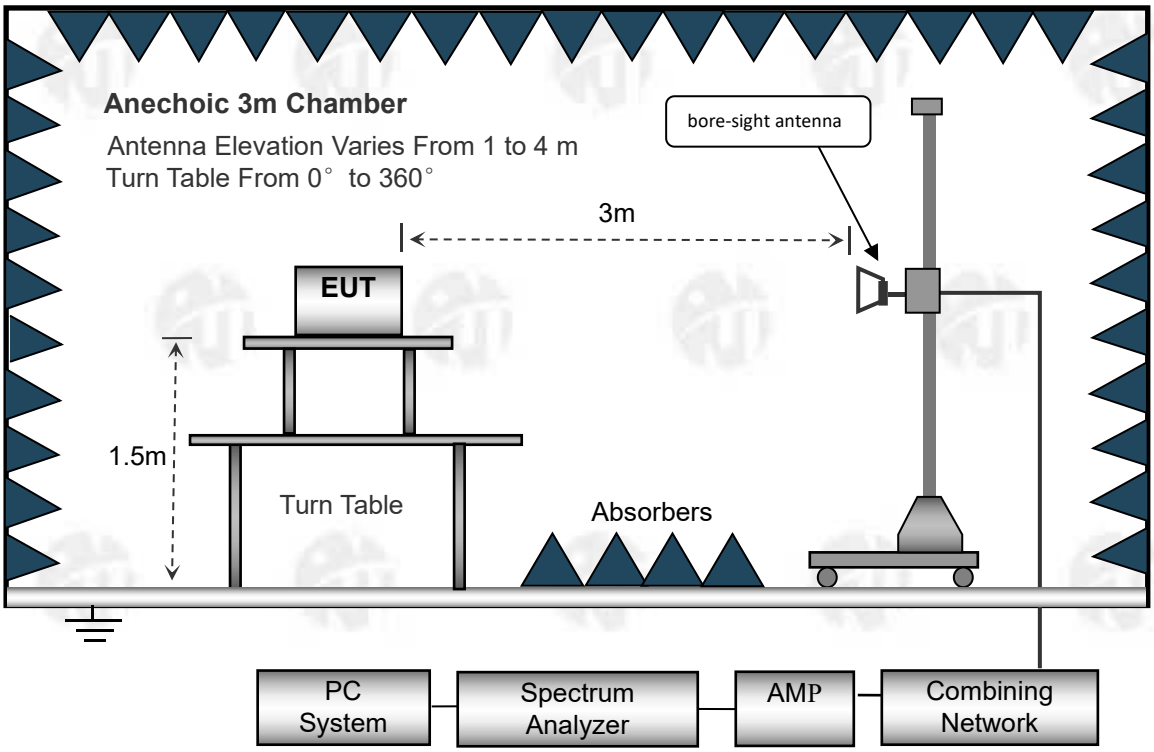
The test setup for emission measurement below 30MHz.

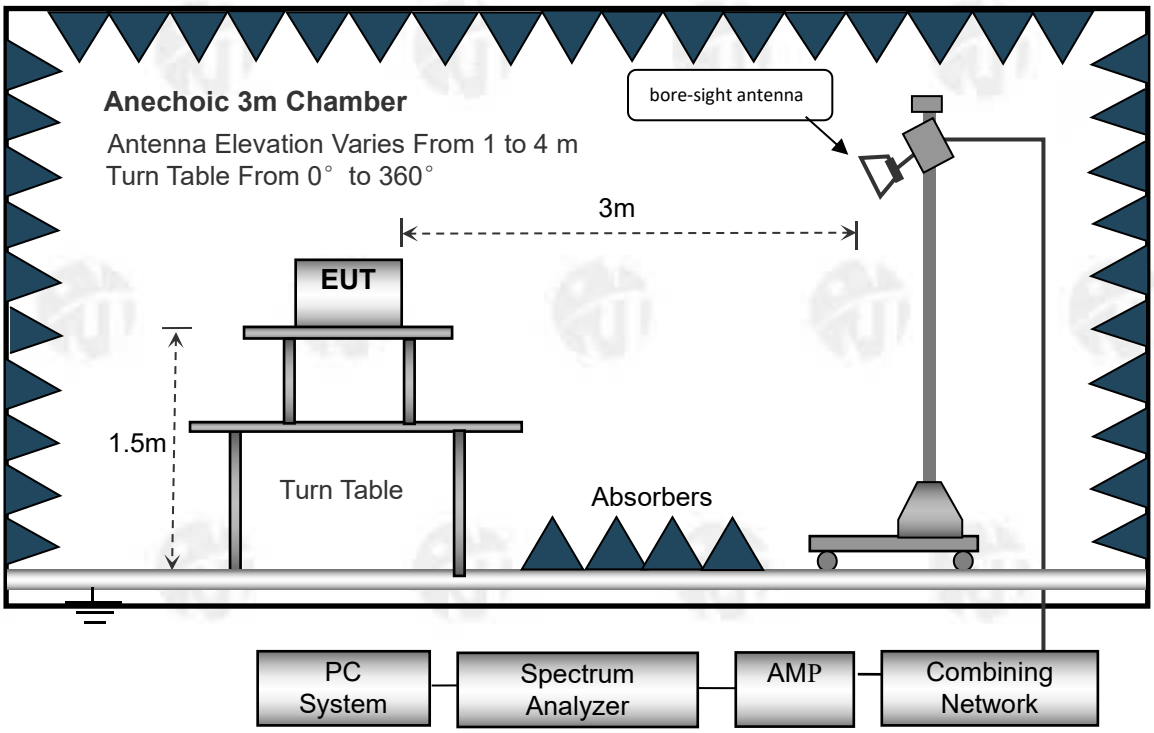


The test setup for emission measurement from 30 MHz to 1 GHz.



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.

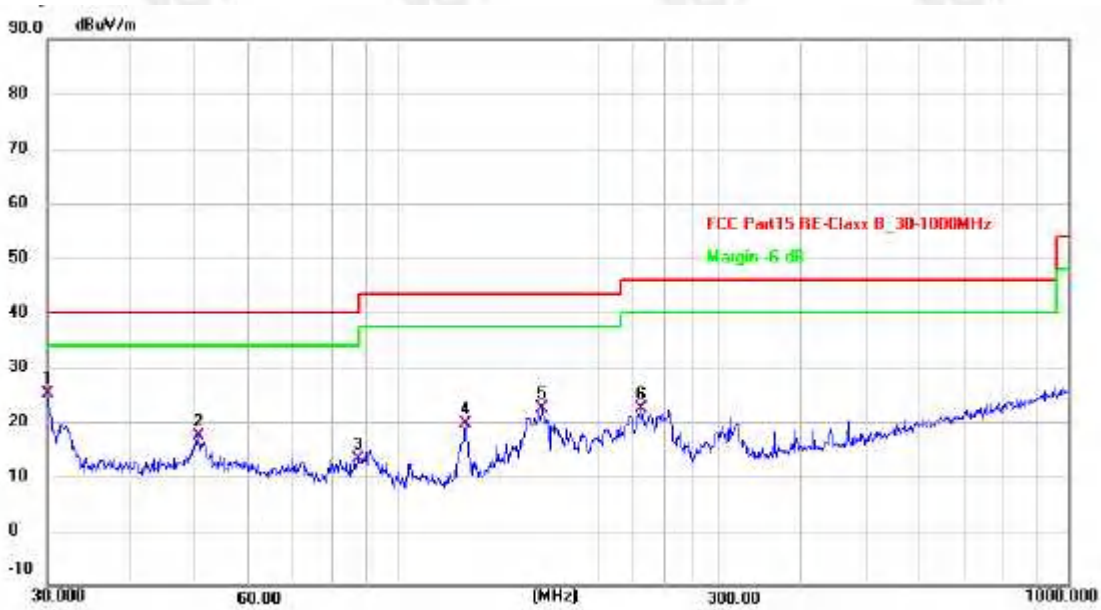
3.4. Test Result

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	GFSK(CH00)



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1 *	30.0000	38.68	-13.65	25.03	40.00	-14.97	QP
2	50.5860	30.56	-13.20	17.36	40.00	-22.64	QP
3	87.1116	30.49	-17.46	13.03	40.00	-26.97	QP
4	126.3285	34.94	-15.33	19.61	43.50	-23.89	QP
5	164.3301	34.80	-12.48	22.32	43.50	-21.18	QP
6	230.9067	37.08	-14.66	22.42	46.00	-23.58	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	GFSK(CH00)

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	30.0000	45.76	-13.65	32.11	40.00	-7.89	QP
2 *	50.5860	45.47	-13.20	32.27	40.00	-7.73	QP
3	77.3210	41.52	-16.41	25.11	40.00	-14.89	QP
4	124.5690	37.65	-15.61	22.04	43.50	-21.46	QP
5	220.6171	39.42	-15.02	24.40	46.00	-21.60	QP
6	547.0976	28.15	-6.80	21.35	46.00	-24.65	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	53.58	30.55	5.77	24.66	53.46	74	-20.54	Pk
V	4804.00	38.96	30.55	5.77	24.66	38.84	54	-15.16	AV
V	7206.00	48.89	30.33	6.32	24.55	49.43	74	-24.57	Pk
V	7206.00	36.08	30.33	6.32	24.55	36.62	54	-17.38	AV
V	9608.00	48.87	30.85	7.45	24.69	50.16	74	-23.84	Pk
V	9608.00	34.48	30.85	7.45	24.69	35.77	54	-18.23	AV
V	12010.00	45.50	31.02	8.99	25.57	49.04	74	-24.96	Pk
V	12010.00	27.37	31.02	8.99	25.57	30.91	54	-23.09	AV
H	4804.00	48.61	30.55	5.77	24.66	48.49	74	-25.51	Pk
H	4804.00	40.77	30.55	5.77	24.66	40.65	54	-13.35	AV
H	7206.00	48.85	30.33	6.32	24.55	49.39	74	-24.61	Pk
H	7206.00	32.41	30.33	6.32	24.55	32.95	54	-21.05	AV
H	9608.00	46.79	30.85	7.45	24.69	48.08	74	-25.92	Pk
H	9608.00	30.84	30.85	7.45	24.69	32.13	54	-21.87	AV
H	12010.00	40.03	31.02	8.99	25.57	43.57	74	-30.43	Pk
H	12010.00	25.84	31.02	8.99	25.57	29.38	54	-24.62	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	49.16	30.55	5.77	24.66	49.04	74	-24.96	Pk
V	4882.00	39.67	30.55	5.77	24.66	39.55	54	-14.45	AV
V	7323.00	46.56	30.33	6.32	24.55	47.10	74	-26.90	Pk
V	7323.00	36.32	30.33	6.32	24.55	36.86	54	-17.14	AV
V	9764.00	42.66	30.85	7.45	24.69	43.95	74	-30.05	Pk
V	9764.00	30.27	30.85	7.45	24.69	31.56	54	-22.44	AV
V	12205.00	40.75	31.02	8.99	25.57	44.29	74	-29.71	Pk
V	12205.00	30.65	31.02	8.99	25.57	34.19	54	-19.81	AV
H	4882.00	49.61	30.55	5.77	24.66	49.49	74	-24.51	Pk
H	4882.00	38.70	30.55	5.77	24.66	38.58	54	-15.42	AV
H	7323.00	48.23	30.33	6.32	24.55	48.77	74	-25.23	Pk
H	7323.00	33.82	30.33	6.32	24.55	34.36	54	-19.64	AV
H	9764.00	43.69	30.85	7.45	24.69	44.98	74	-29.02	Pk
H	9764.00	30.66	30.85	7.45	24.69	31.95	54	-22.05	AV
H	12205.00	38.86	31.02	8.99	25.57	42.40	74	-31.60	Pk
H	12205.00	29.21	31.02	8.99	25.57	32.75	54	-21.25	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	49.08	30.55	5.77	24.66	48.96	74	-25.04	Pk
V	4960.00	35.44	30.55	5.77	24.66	35.32	54	-18.68	AV
V	7440.00	44.67	30.33	6.32	24.55	45.21	74	-28.79	Pk
V	7440.00	35.45	30.33	6.32	24.55	35.99	54	-18.01	AV
V	9920.00	40.80	30.85	7.45	24.69	42.09	74	-31.91	Pk
V	9920.00	31.05	30.85	7.45	24.69	32.34	54	-21.66	AV
V	12400.00	37.84	31.02	8.99	25.57	41.38	74	-32.62	Pk
V	12400.00	28.82	31.02	8.99	25.57	32.36	54	-21.64	AV
H	4960.00	48.48	30.55	5.77	24.66	48.36	74	-25.64	Pk
H	4960.00	37.84	30.55	5.77	24.66	37.72	54	-16.28	AV
H	7440.00	45.37	30.33	6.32	24.55	45.91	74	-28.09	Pk
H	7440.00	32.40	30.33	6.32	24.55	32.94	54	-21.06	AV
H	9920.00	40.21	30.85	7.45	24.69	41.50	74	-32.50	Pk
H	9920.00	27.55	30.85	7.45	24.69	28.84	54	-25.16	AV
H	12400.00	41.35	31.02	8.99	25.57	44.89	74	-29.11	Pk
H	12400.00	29.99	31.02	8.99	25.57	33.53	54	-20.47	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	59.63	35.17	3.48	27.49	55.43	74	-18.57	PK
	H	2390	50.22	35.17	3.48	27.49	46.02	54	-7.98	AV
	H	2400	60.74	35.16	3.49	27.52	56.59	74	-17.41	PK
	H	2400	51.37	35.16	3.49	27.52	47.22	54	-6.78	AV
	V	2390	58.70	35.17	3.48	27.49	54.50	74	-19.50	PK
	V	2390	52.60	35.17	3.48	27.49	48.40	54	-5.60	AV
	V	2400	60.18	35.16	3.49	27.52	56.03	74	-17.97	PK
	V	2400	50.29	35.16	3.49	27.52	46.14	54	-7.86	AV
	High Channel: 2480MHz									
	H	2483.5	58.05	35.11	3.56	27.75	54.25	74	-19.75	PK
	H	2483.5	50.15	35.11	3.56	27.75	46.35	54	-7.65	AV
	H	2500	61.64	35.1	3.57	27.8	57.91	74	-16.09	PK
	H	2500	50.92	35.1	3.57	27.8	47.19	54	-6.81	AV
	V	2483.5	58.98	35.11	3.56	27.75	55.18	74	-18.82	PK
	V	2483.5	52.51	35.11	3.56	27.75	48.71	54	-5.29	AV
	V	2500	57.62	35.1	3.57	27.8	53.89	74	-20.11	PK
	V	2500	50.57	35.1	3.57	27.8	46.84	54	-7.16	AV

π/4-DQPSK	Low Channel: 2402MHz									
	H	2390	58.38	35.17	3.48	27.49	54.18	74	-19.82	PK
	H	2390	49.23	35.17	3.48	27.49	45.03	54	-8.97	AV
	H	2400	59.84	35.16	3.49	27.52	55.69	74	-18.31	PK
	H	2400	49.10	35.16	3.49	27.52	44.95	54	-9.05	AV
	V	2390	58.29	35.17	3.48	27.49	54.09	74	-19.91	PK
	V	2390	52.17	35.17	3.48	27.49	47.97	54	-6.03	AV
	V	2400	61.19	35.16	3.49	27.52	57.04	74	-16.96	PK
	V	2400	51.11	35.16	3.49	27.52	46.96	54	-7.04	AV
	High Channel: 2480MHz									
	H	2483.5	59.67	35.11	3.56	27.75	55.87	74	-18.13	PK
	H	2483.5	49.28	35.11	3.56	27.75	45.48	54	-8.52	AV
	H	2500	59.56	35.1	3.57	27.8	55.83	74	-18.17	PK
	H	2500	48.99	35.1	3.57	27.8	45.26	54	-8.74	AV
	V	2483.5	59.69	35.11	3.56	27.75	55.89	74	-18.11	PK
	V	2483.5	52.52	35.11	3.56	27.75	48.72	54	-5.28	AV
	V	2500	59.73	35.1	3.57	27.8	56.00	74	-18.00	PK
	V	2500	50.65	35.1	3.57	27.8	46.92	54	-7.08	AV
8DPSK	Low Channel: 2402MHz									
	H	2390	57.80	35.17	3.48	27.49	53.60	74	-20.40	PK
	H	2390	49.06	35.17	3.48	27.49	44.86	54	-9.14	AV
	H	2400	59.40	35.16	3.49	27.52	55.25	74	-18.75	PK
	H	2400	49.30	35.16	3.49	27.52	45.15	54	-8.85	AV
	V	2390	58.29	35.17	3.48	27.49	54.09	74	-19.91	PK
	V	2390	51.66	35.17	3.48	27.49	47.46	54	-6.54	AV
	V	2400	59.98	35.16	3.49	27.52	55.83	74	-18.17	PK
	V	2400	50.99	35.16	3.49	27.52	46.84	54	-7.16	AV
	High Channel: 2480MHz									
	H	2483.5	57.89	35.11	3.56	27.75	54.09	74	-19.91	PK
	H	2483.5	50.73	35.11	3.56	27.75	46.93	54	-7.07	AV
	H	2500	60.04	35.1	3.57	27.8	56.31	74	-17.69	PK
	H	2500	48.98	35.1	3.57	27.8	45.25	54	-8.75	AV
	V	2483.5	59.17	35.11	3.56	27.75	55.37	74	-18.63	PK
	V	2483.5	52.50	35.11	3.56	27.75	48.70	54	-5.30	AV
	V	2500	58.04	35.1	3.57	27.8	54.31	74	-19.69	PK
	V	2500	51.68	35.1	3.57	27.8	47.95	54	-6.05	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 v05r02April 2,2019;
ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024

FCC Part15 (15.247) , Subpart C				
Section	Test Item	Limit	Frequency Range (MHz)	Result
15.247(b)(1)	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

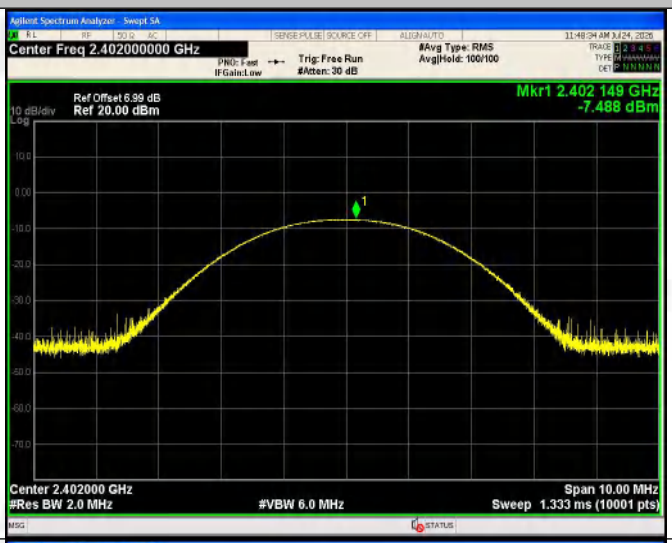
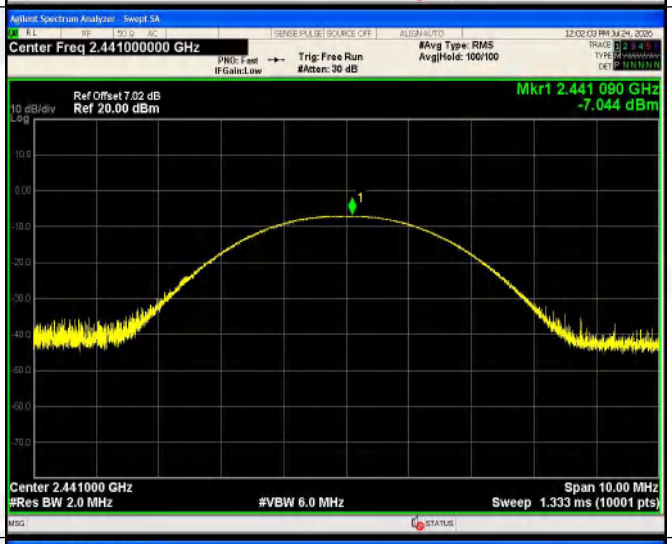
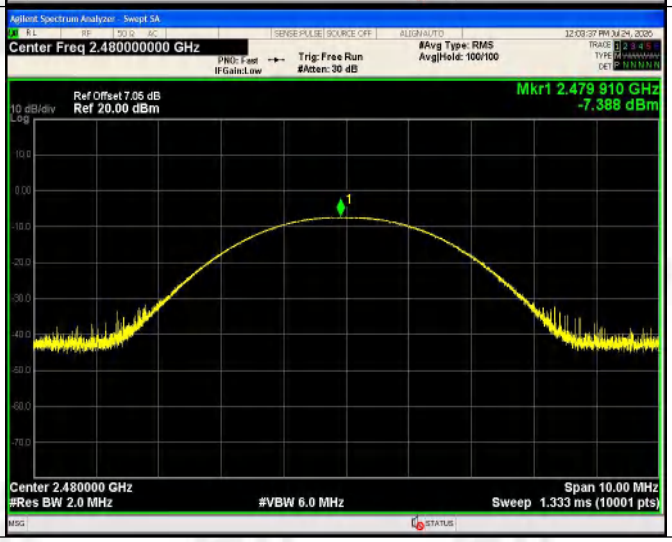
4.3. Test Procedure

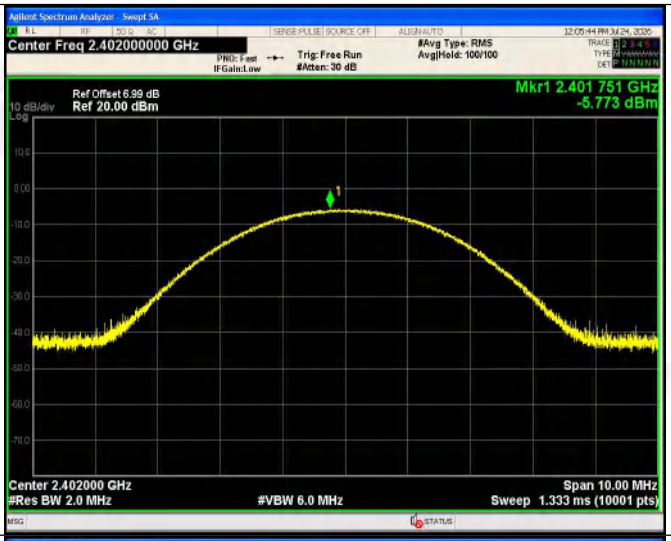
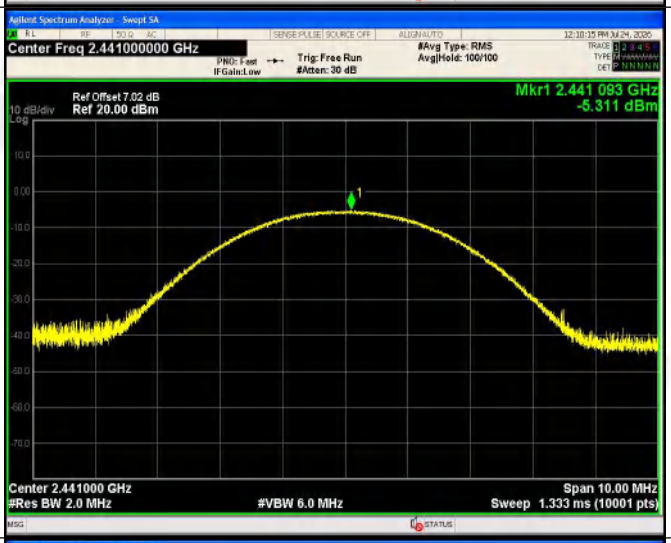
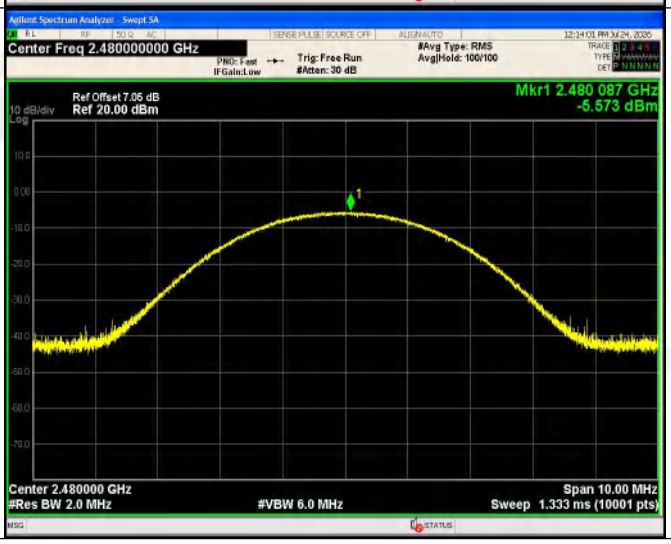
1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above,
2. Spectrum Setting:
   RBW > the 20 dB bandwidth of the emission being measured
   Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel
   VBW ≥ RBW
   Sweep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

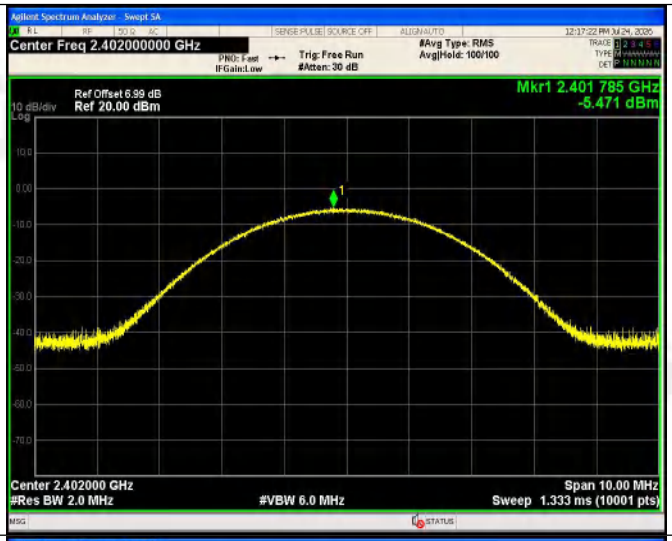
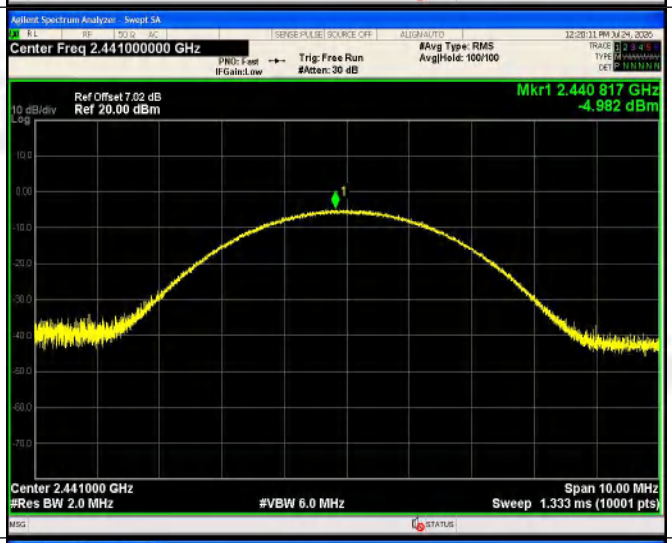
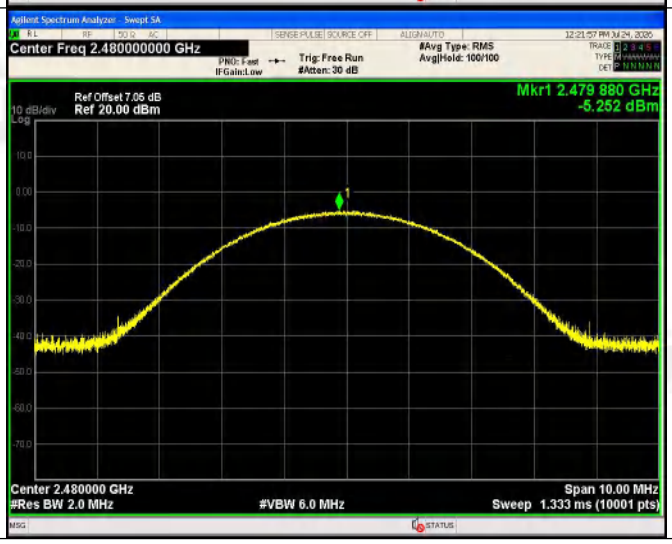
4.4. Test Result

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-7.49	20.97	PASS
	MCH	-7.04	20.97	PASS
	HCH	-7.39	20.97	PASS
π/4DQPSK	LCH	-5.77	20.97	PASS
	MCH	-5.31	20.97	PASS
	HCH	-5.57	20.97	PASS
8DPSK	LCH	-5.47	20.97	PASS
	MCH	-4.98	20.97	PASS
	HCH	-5.25	20.97	PASS

Test Graph:

Graphs			
GFSK/LCH			
GFSK/MCH			
GFSK/HCH			

π/4DQPSK/LCH			
π/4DQPSK/MCH			
π/4DQPSK/HCH			

8DPSK/LCH			
8DPSK /MCH			
8DPSK /HCH			

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 v05r02April 2,2019; ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024

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.

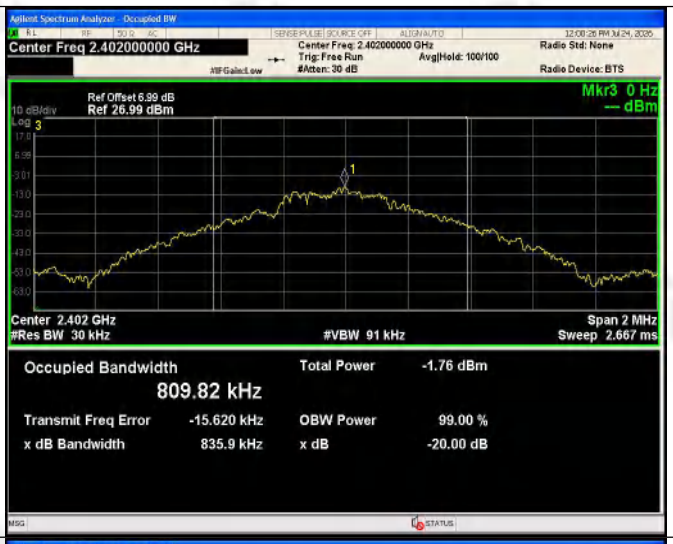
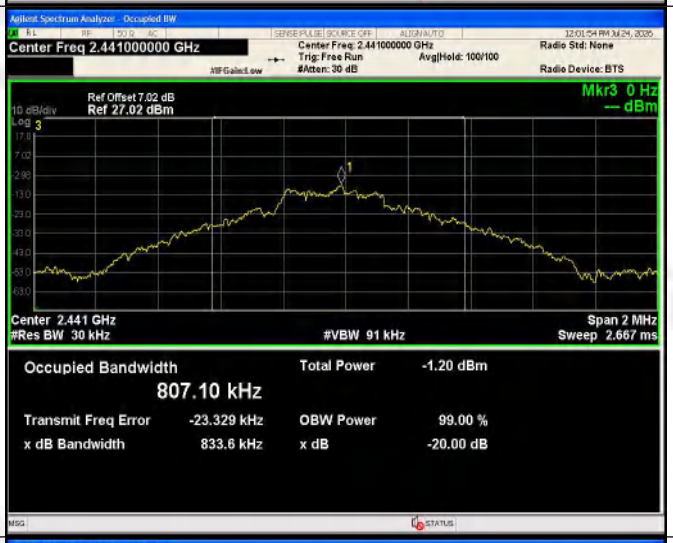
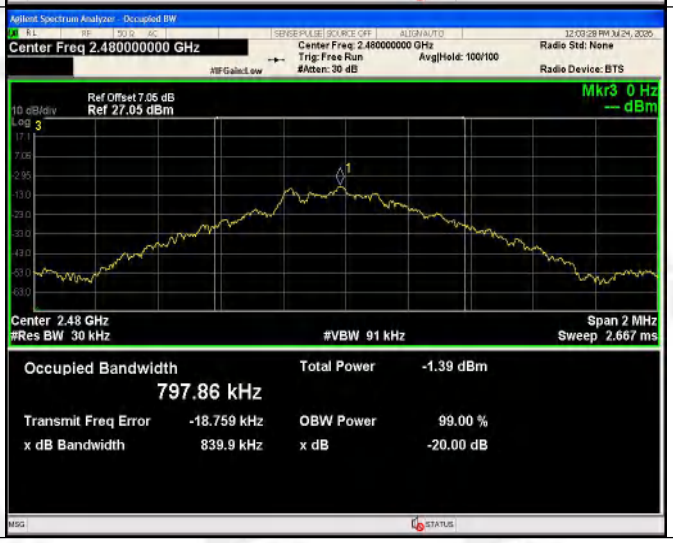
For 99% Bandwidth Measurement
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 1%-5% OBW, VBW ≥ 3RBW

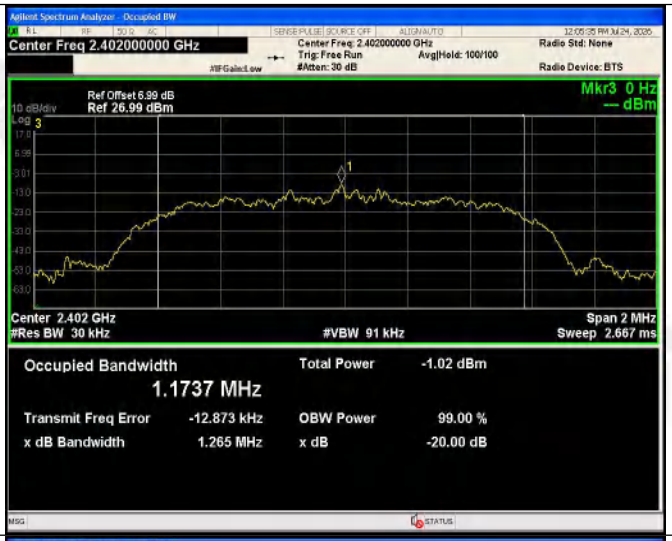
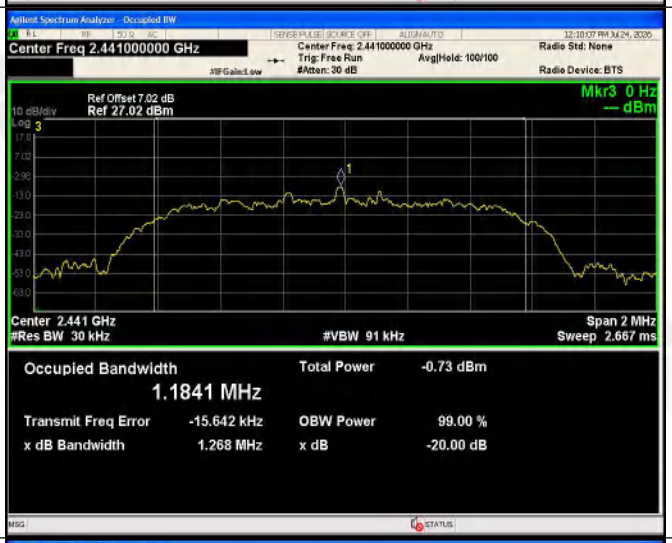
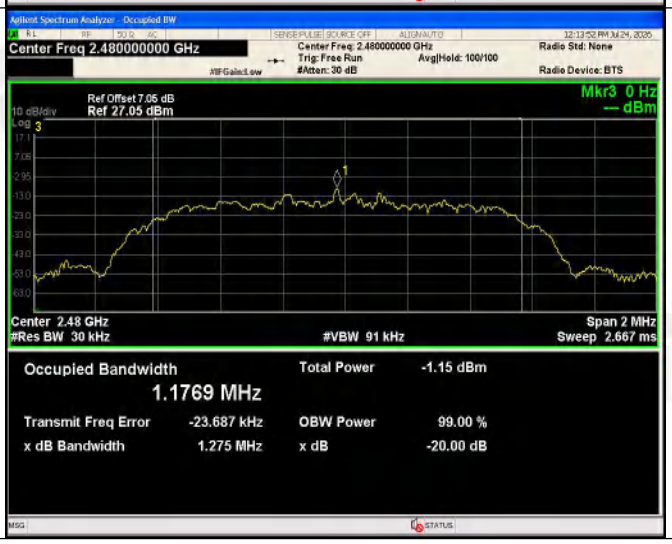
5.4. Test Result

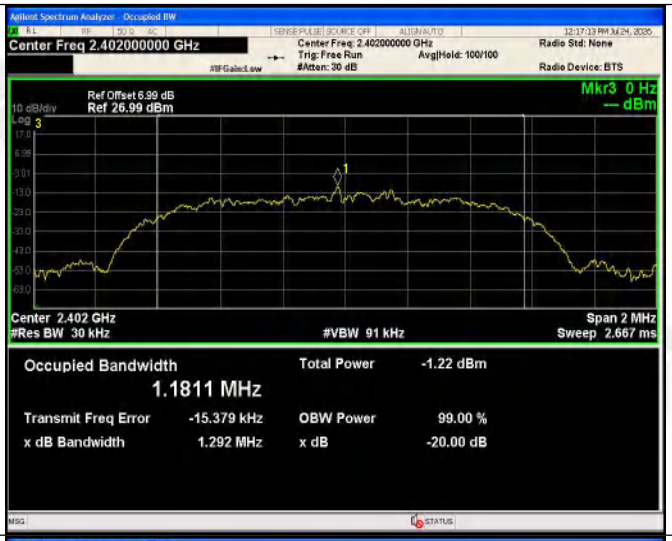
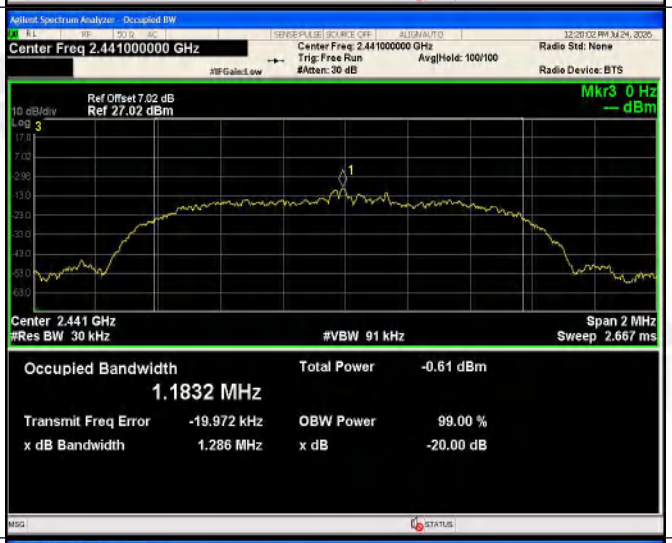
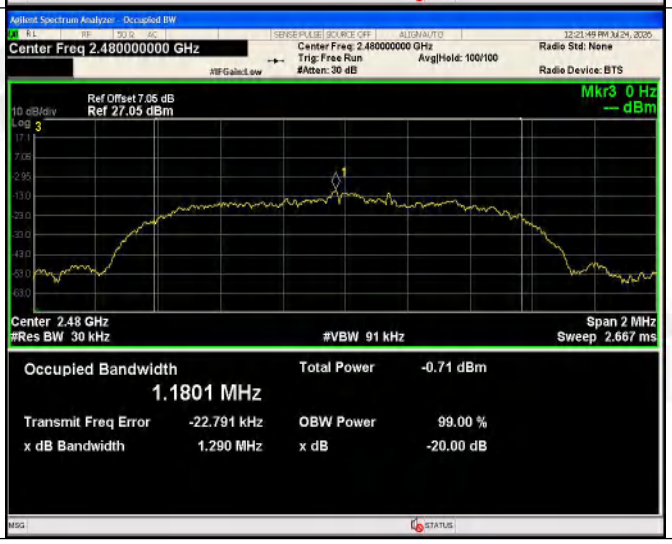
Test Mode	Frequency	20dB Bandwidth (MHz)	Result
GFSK	Low channel	0.836	**PASS**
	Mid channel	0.834	**PASS**
	High channel	0.840	**PASS**
π/4DQPSK	Low channel	1.265	**PASS**
	Mid channel	1.268	**PASS**
	High channel	1.275	**PASS**
8DPSK	Low channel	1.292	**PASS**
	Mid channel	1.286	**PASS**
	High channel	1.290	**PASS**

Note: All modes of operation were Pre-scan and the worst-case emissions are reported.

Test Graph:

GFSK Low channel			
GFSK Mid channel			
GFSK High channel			

π/4-DQPSK Low channel			
π/4-DQPSK Mid channel			
π/4-DQPSK High channel			

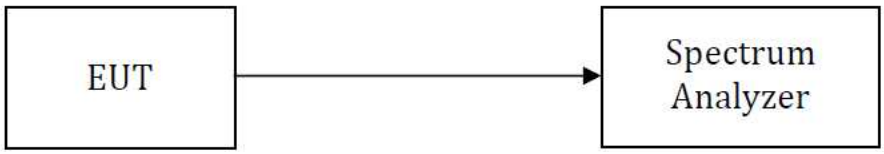
8DPSK Low channel			
8DPSK Mid channel			
8DPSK High channel			

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

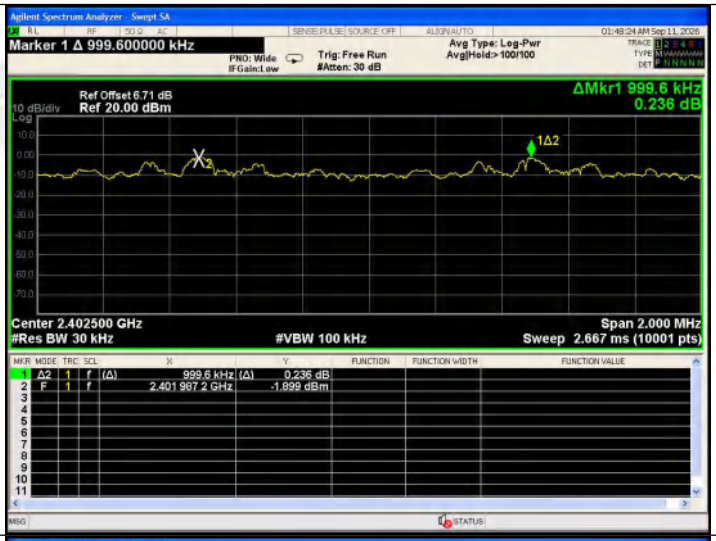
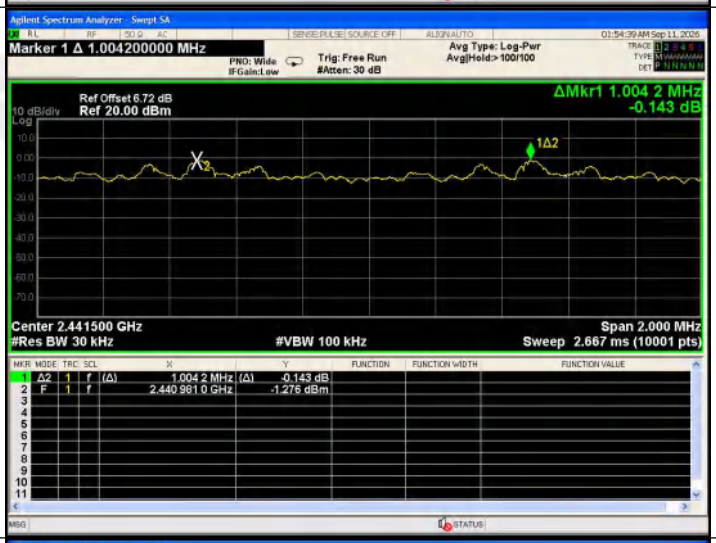
The EUT must have its hopping function enabled. Using the following spectrum analyzer settings:
1. Span= Wide enough to capture the peaks of two adjacent channels
2. Set the RBW = 300 kHz.
3. Set the VBW = 1 MHz.
4. Sweep time = auto couple.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow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

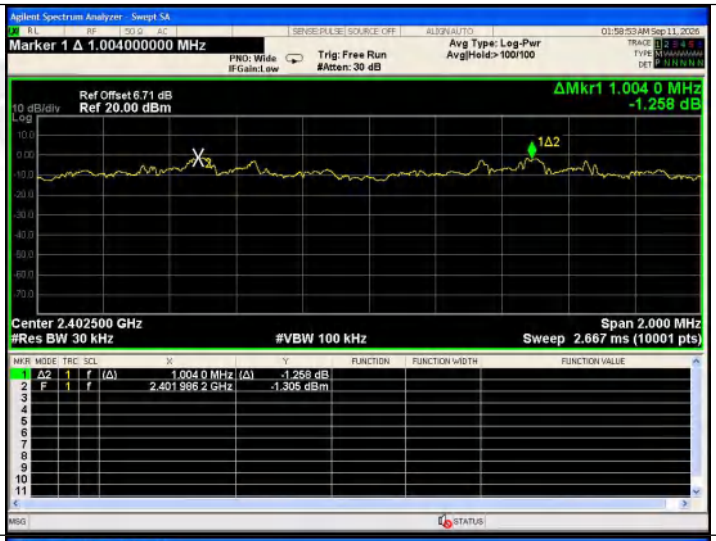
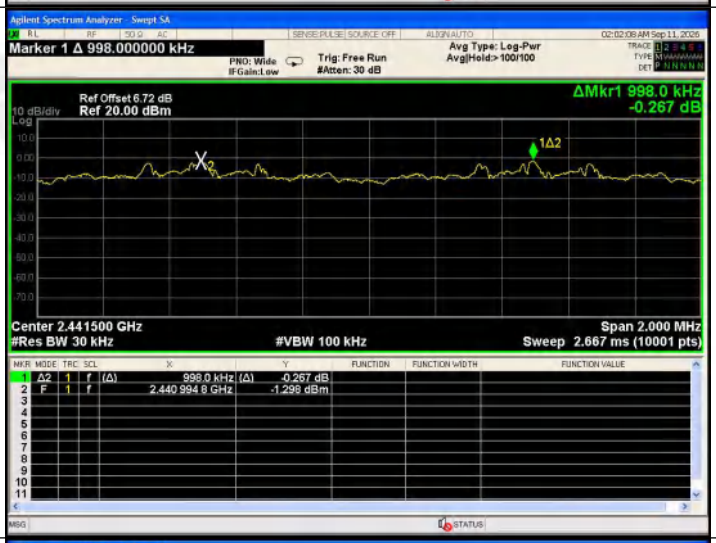
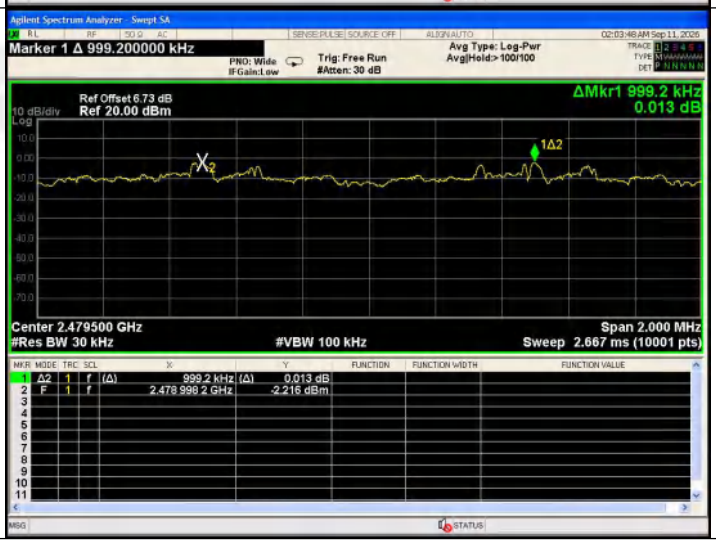
6.4. Test Result

Mode	Channel.	Carrier Frequency Separation [MHz]	Limit(2/3 of the 20dB bandwidth MHz)	Verdict
GFSK	LCH	1.000	0.557	PASS
GFSK	MCH	1.002	0.556	PASS
GFSK	HCH	1.000	0.560	PASS
π/4DQPSK	LCH	1.000	0.843	PASS
π/4DQPSK	MCH	1.004	0.846	PASS
π/4DQPSK	HCH	1.001	0.850	PASS
8DPSK	LCH	1.004	0.861	PASS
8DPSK	MCH	0.998	0.857	PASS
8DPSK	HCH	0.999	0.860	PASS

Test Graph

Graphs			
GFSK/LCH			
GFSK/MCH			
GFSK/HCH			

π/4DQPSK/LCH			
π/4DQPSK/MCH			
π/4DQPSK/HCH			

8DPSK/LCH			
8DPSK /MCH			
8DPSK /HCH			

7. Number of Hopping Channel Test

7.1. Limit

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

7.2. Test Setup

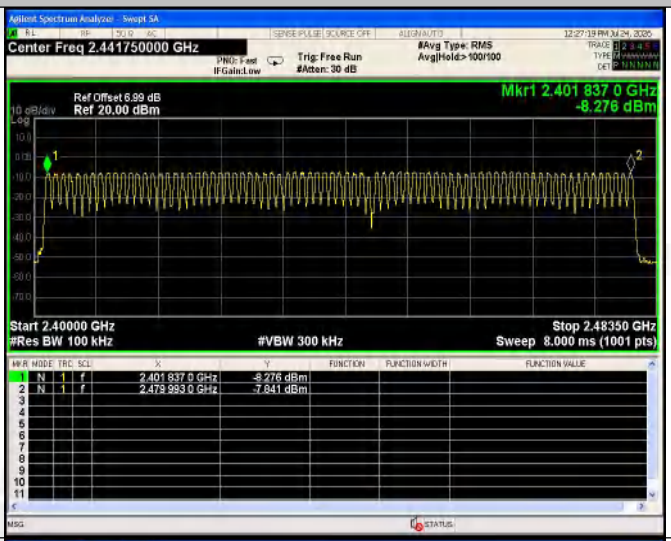
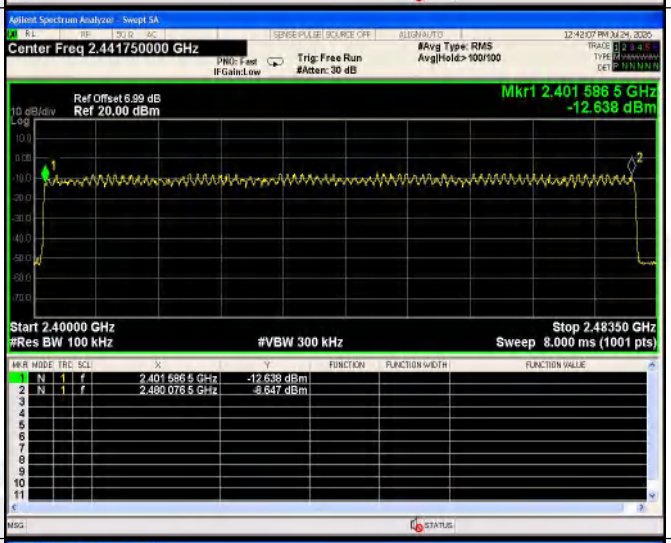
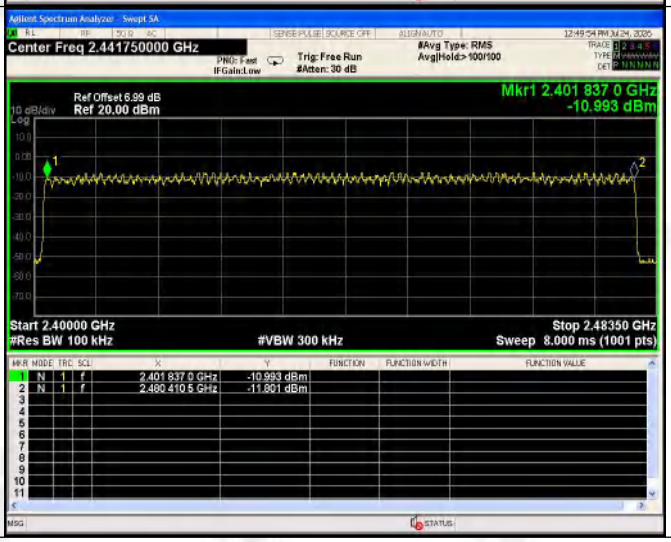
7.3. Test Procedure

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

Mode	Channel.	Number of Hopping Channel	Limit	Verdict
GFSK	Hop	79	⩾15	PASS
π/4DQPSK	Hop	79	⩾15	PASS
8DPSK	Hop	79	⩾15	PASS

Test Graph

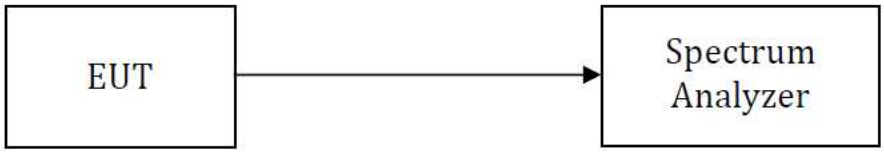
Graphs			
GFSK/Hop			
π/4DQPSK/Hop			
8DPSK/Hop			

8. Dwell Time Test

8.1. Limit

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

8.2. Test setup



8.3. Test Procedure

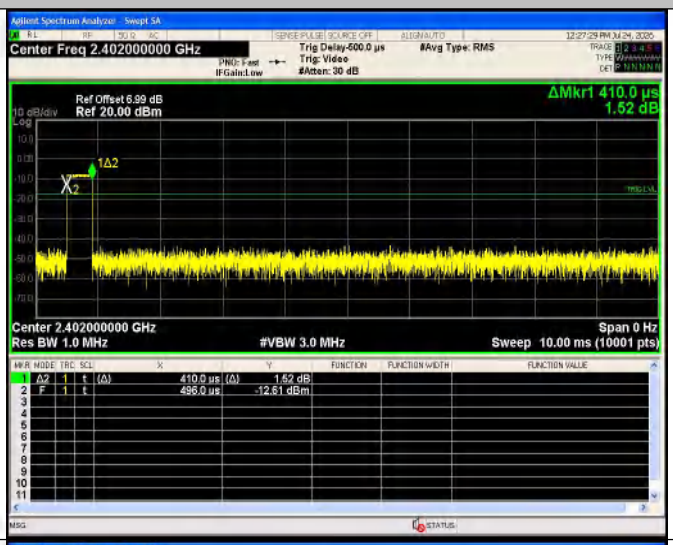
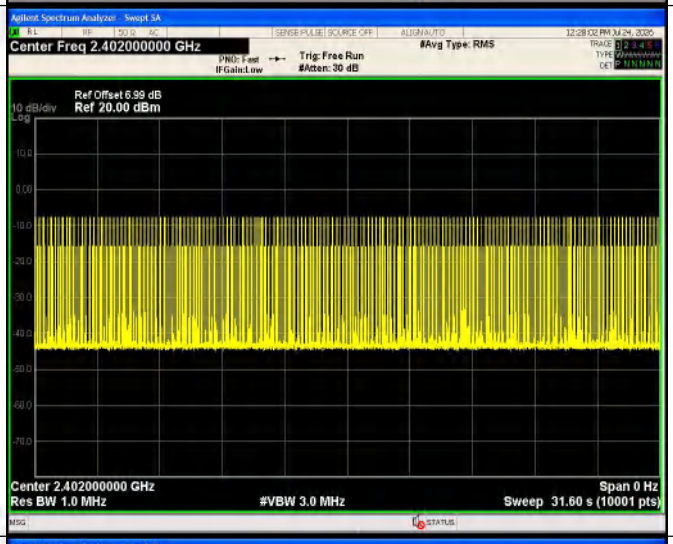
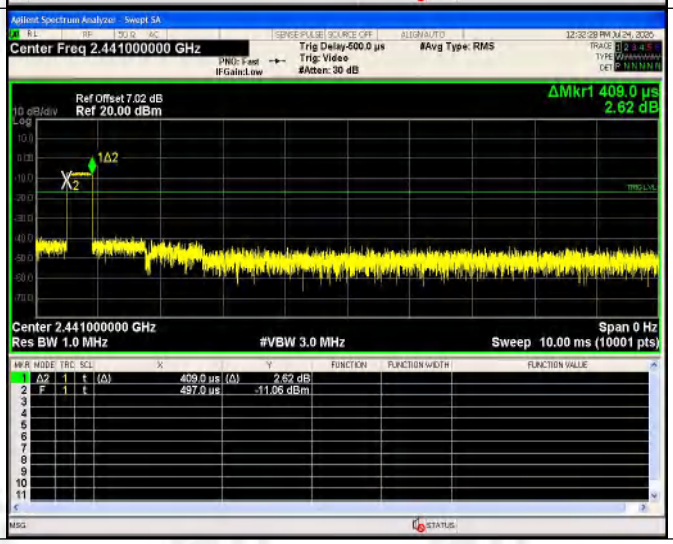
The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:
1. Span= zero span, centered on a hopping channel
2. Set the RBW = 1 MHz.
3. Set the VBW = 3 MHz.
4. Sweep time = as necessary to capture the entire dwell time per hopping channel.
5. Detector function = peak.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8.The burst width [ms/hop/ch], which is directly measured, refers to the duration on one channel hop.
The hops per second for all channels: The selected EUT Conf uses a slot type of 5-Tx&1-Rx and a Hopping rate of 1600 [ch*hop/s] for all channels. So the final hopping rate for all channels is 1600/6=266.67 [ch*hop/s]
The hops per second on one channel: 266.67 [ch*hops/s]/79 [ch]=3.38 [hop/s].
The total hops for all channels within the dwell time calculation
duration: 3.38 [hop/s]*31.6[s*ch]=106.67[hop*ch].
The dwell time for all channels hopping: 106.67 [hop*ch]*Burst Width [ms/hop/ch].
9.The duration for dwell time calculation: 0.4[s]*hopping number=0.4[s]*79[ch]=31.6[s*ch].
10.Pulse Time(ms)*Total Hops=Dwell Time

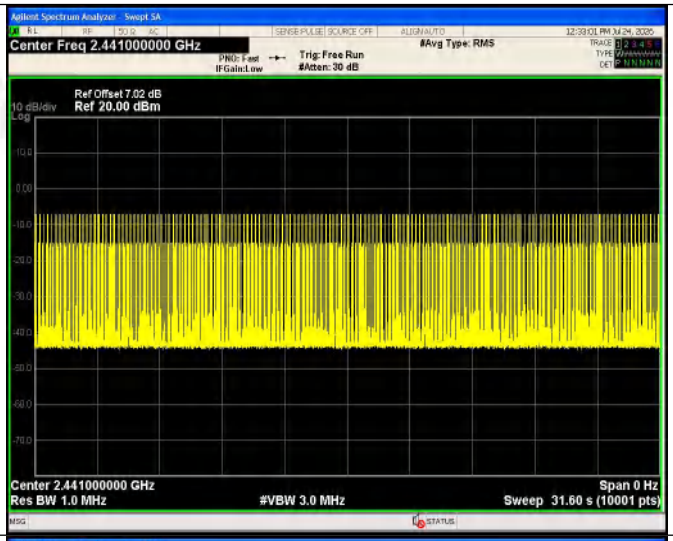
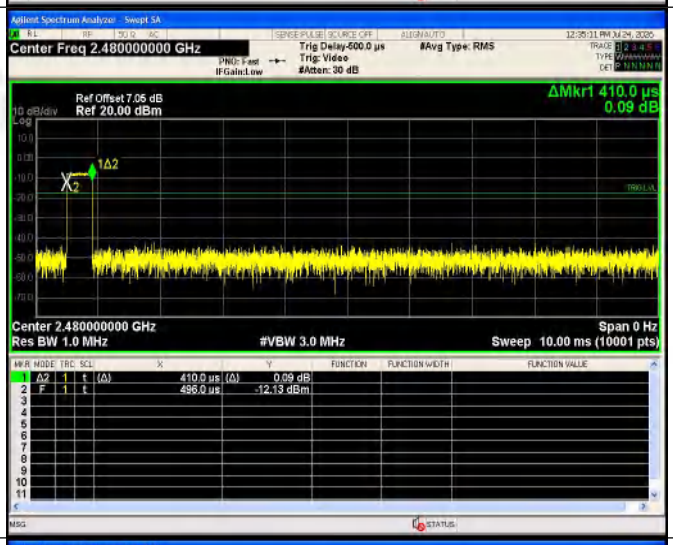
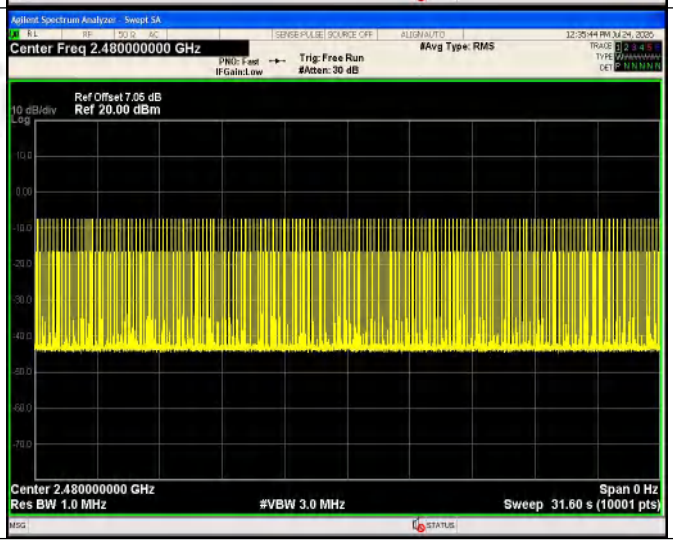
8.4. Test Result

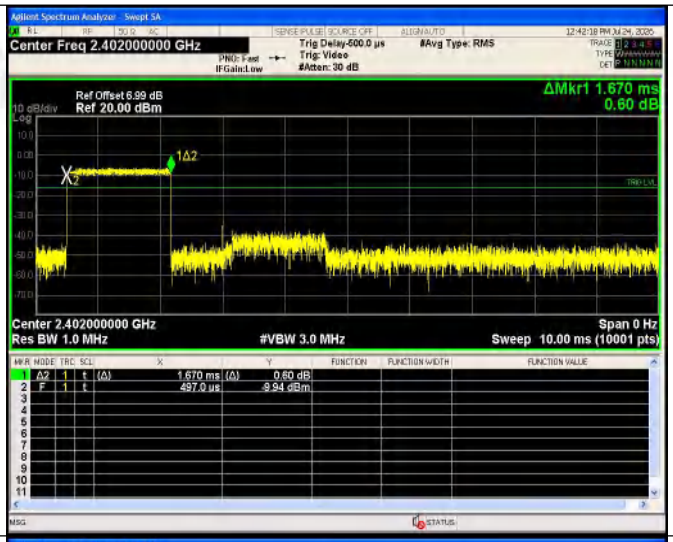
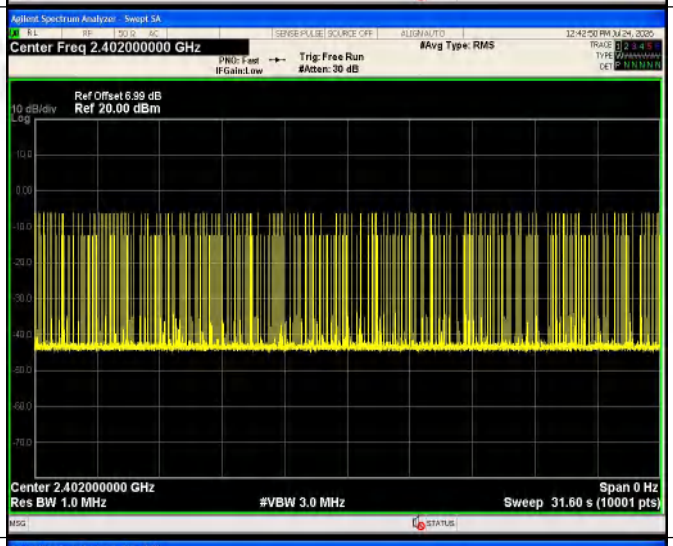
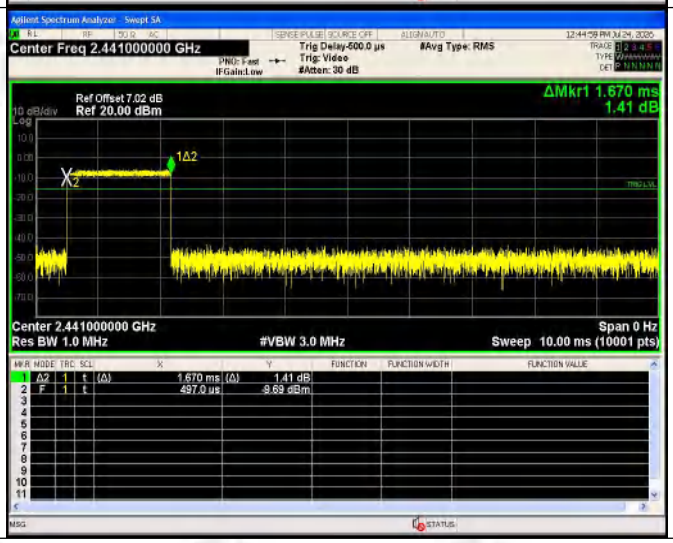
Packet	Channel	Pulse Time (ms)	Burst Count (Num)	Total Dwell Time (ms)	Limit (ms)	Verdict
DH1	LCH	0.41	318	130.38	400	PASS
DH1	MCH	0.409	316	129.244	400	PASS
DH1	HCH	0.41	315	129.15	400	PASS
2DH3	LCH	1.67	161	268.87	400	PASS
2DH3	MCH	1.67	162	270.54	400	PASS
2DH3	HCH	1.67	163	272.21	400	PASS
3DH5	LCH	2.921	113	330.073	400	PASS
3DH5	MCH	2.92	93	271.56	400	PASS
3DH5	HCH	2.921	102	297.942	400	PASS

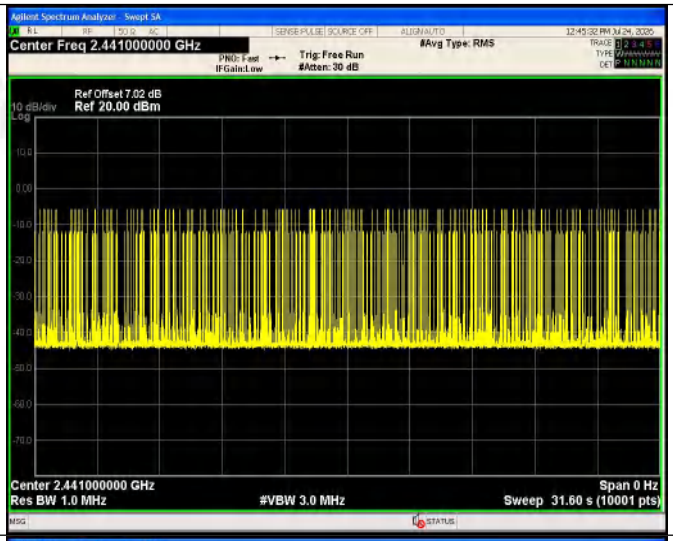
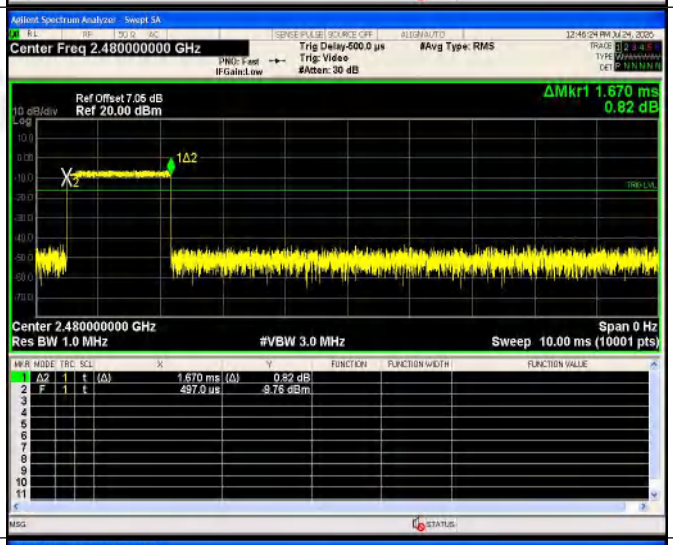
Remark: Dwell time = Pulse time * Total Hops
Remark: Mkr Delta is once pulse time.

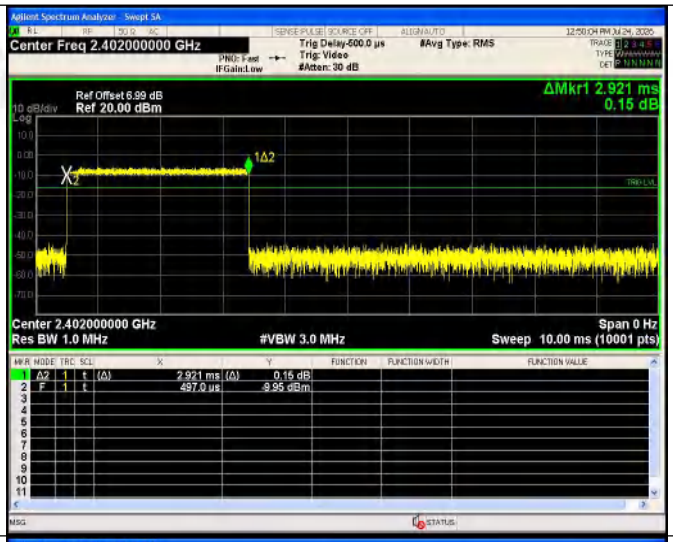
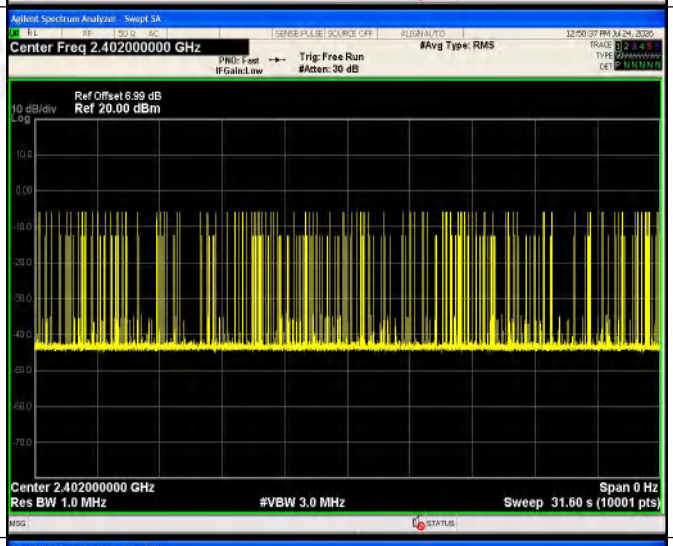
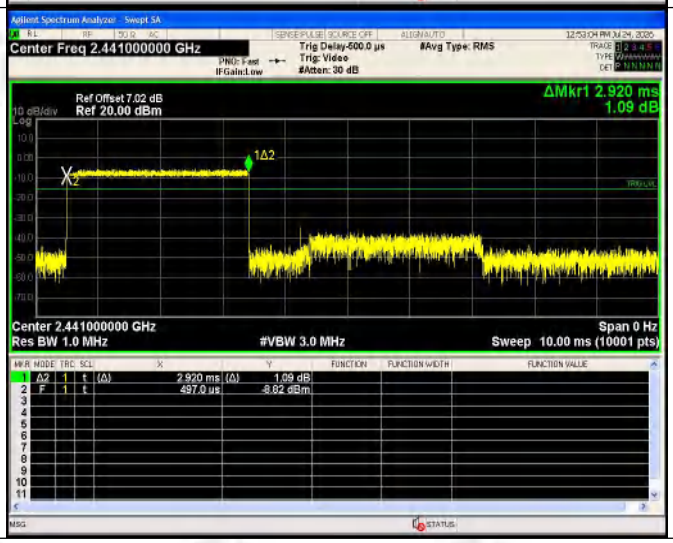
Test Graph

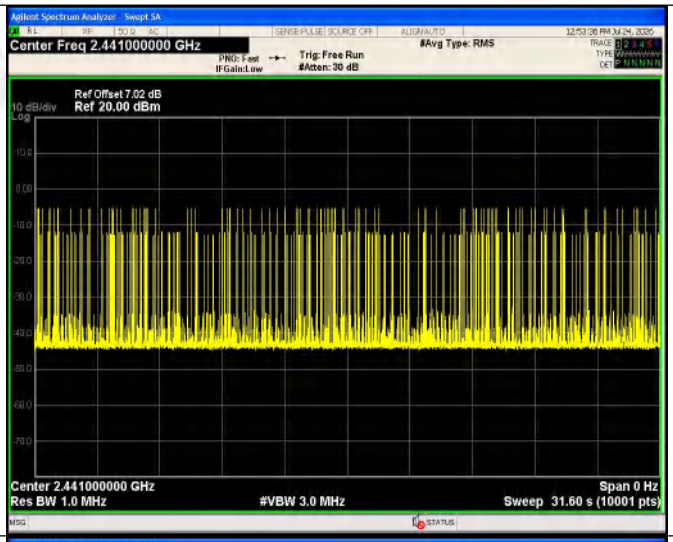
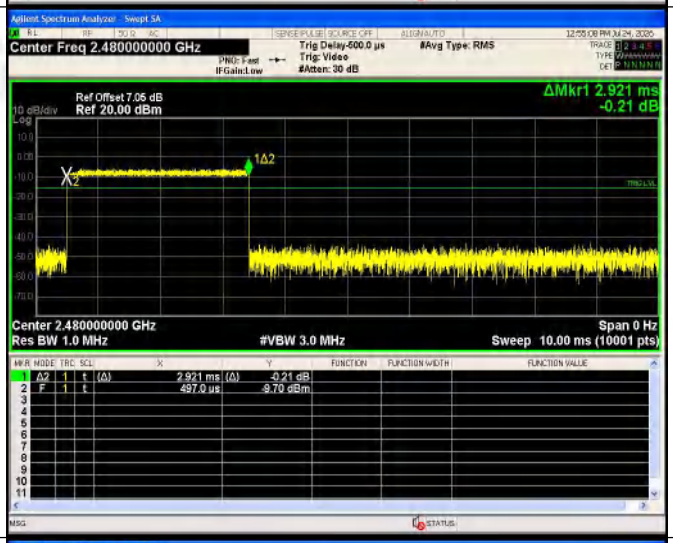
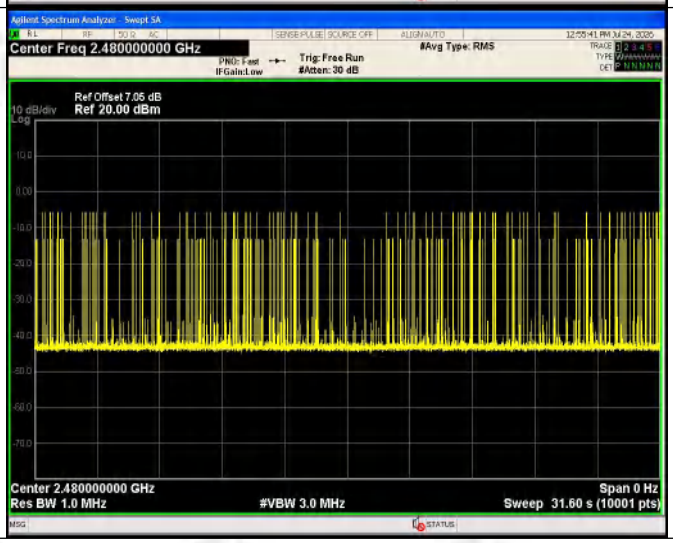
Graphs		
GFSK_1DH1/LCH-One Burst		
GFSK_1DH1/LCH-Accumulated		
GFSK_1DH1/MCH-One Burst		

GFSK_1DH1/MCH-Accumulated			
GFSK_1DH1/HCH-One Burst			
GFSK_1DH1/HCH-Accumulated			

π/4 DQPSK _2DH3 /LCH- One Burst			
π/4 DQPSK _2DH3 /LCH- Accumulated			
π/4 DQPSK _2DH3 /MCH- One Burst			

π/4 DQPSK _2DH3 /MCH- Accumulated			
π/4 DQPSK _2DH3 /HCH- One Burst			
π/4 DQPSK _2DH3 /HCH- Accumulated			

8DPSK _3DH5/LCH-One Burst			
8DPSK _3DH5/LCH-Accumulated			
8DPSK _3DH5/MCH-One Burst			

8DPSK _3DH5/MCH-Accumulated			
8DPSK _3DH5/HCH-One Burst			
8DPSK _3DH5/HCH-Accumulated			

9. Conducted Spurious Emissions and Band Edge Requirement

9.1. Limit

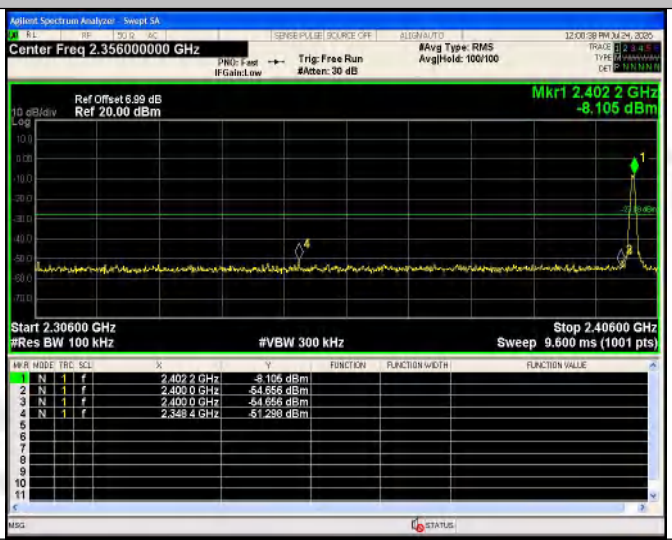
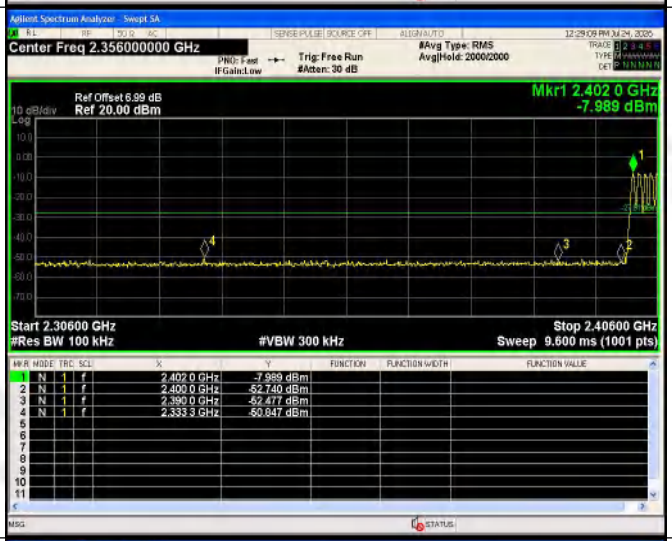
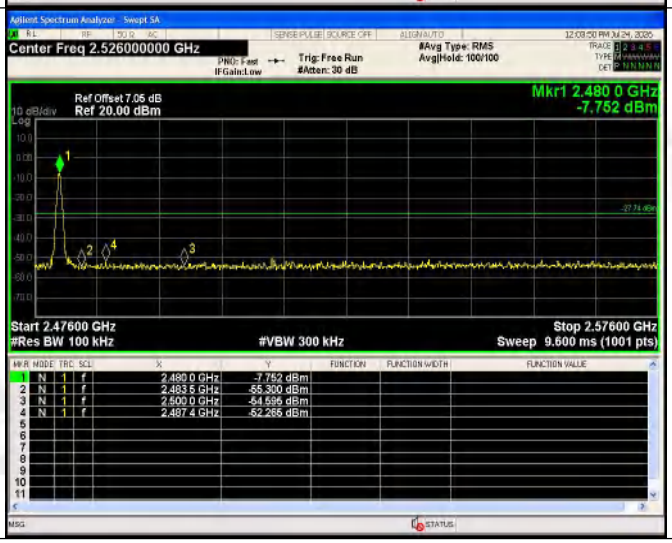
Test Standard	FCC Part15 C Section 15.247 (d)
Test Limit	in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator in operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth 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).

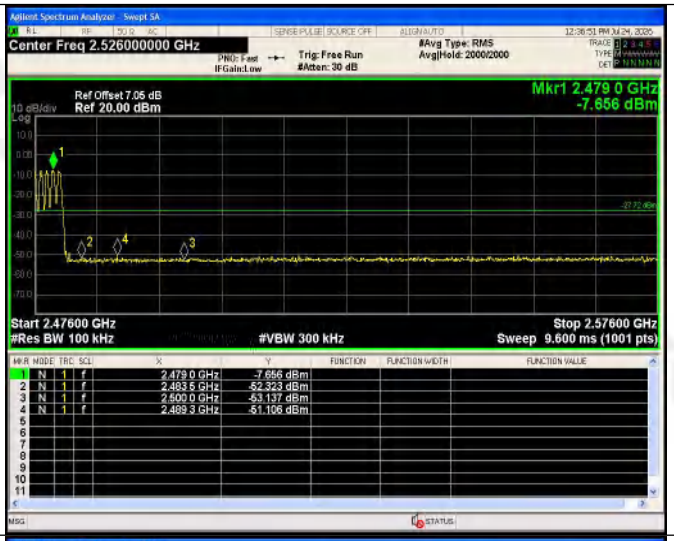
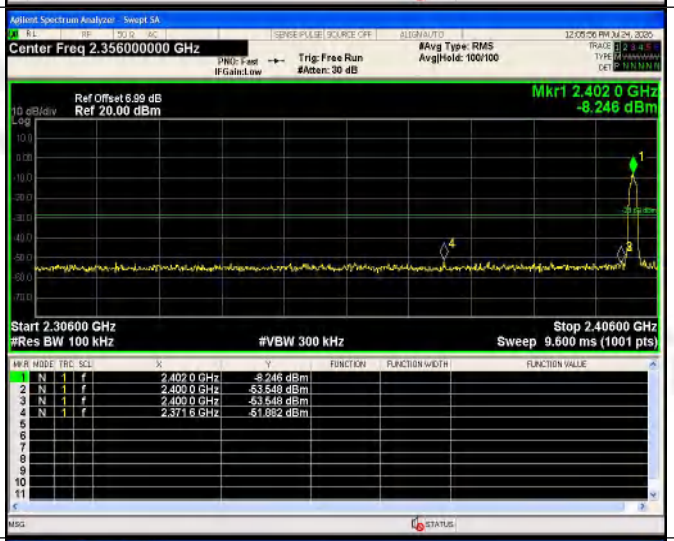
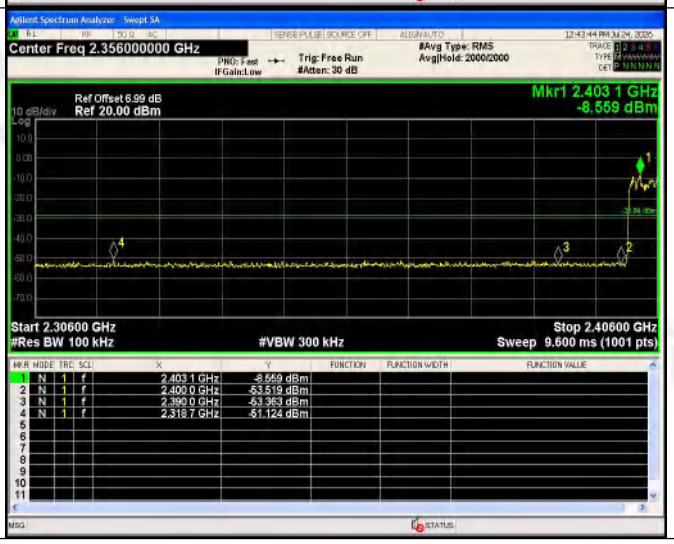
9.2. Test Setup

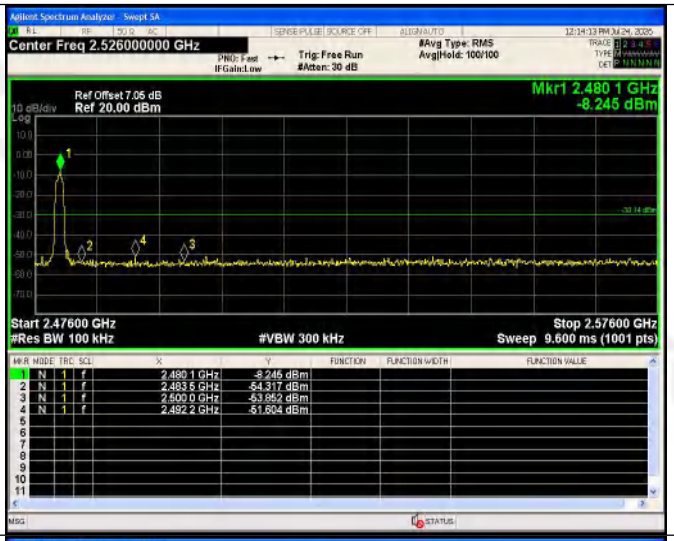
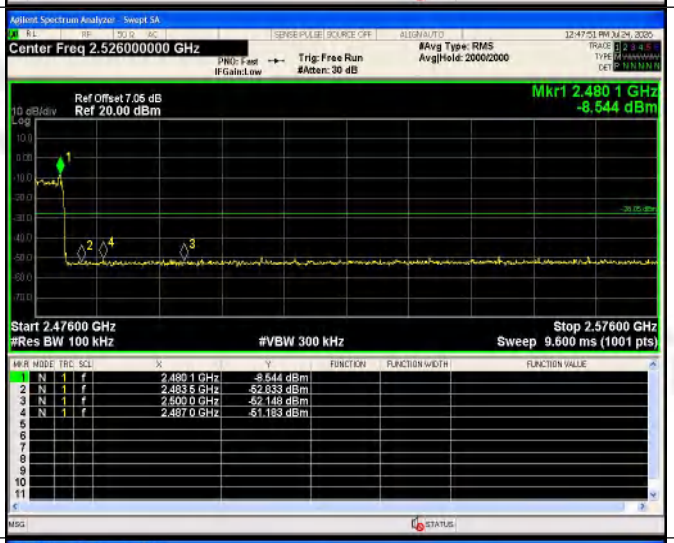
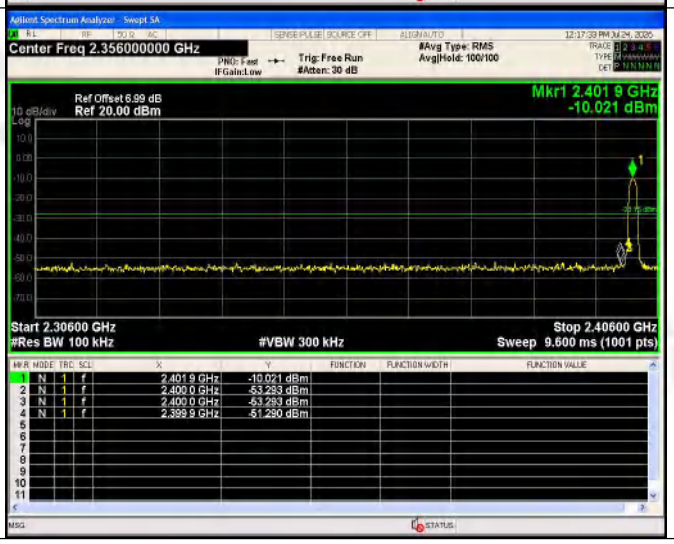
9.3. Test Procedure

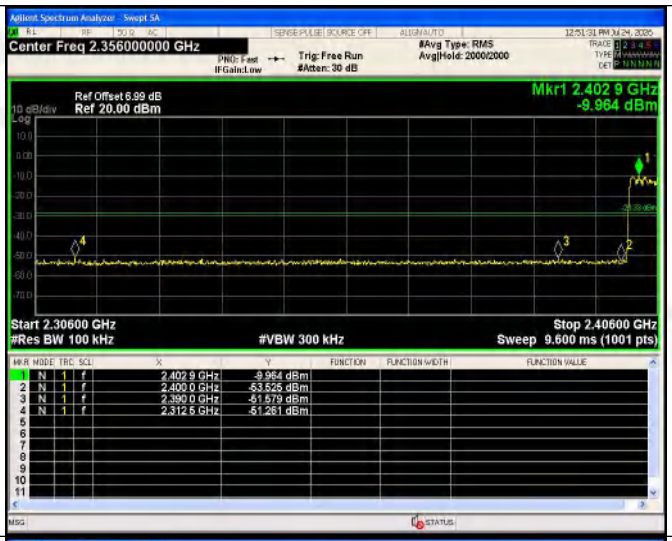
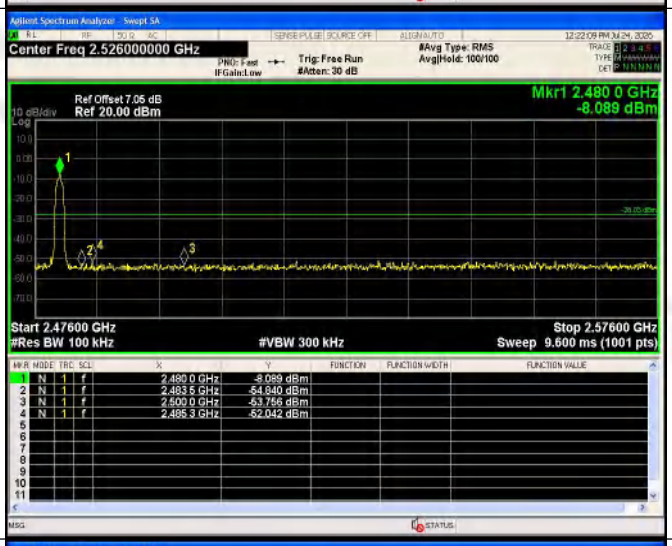
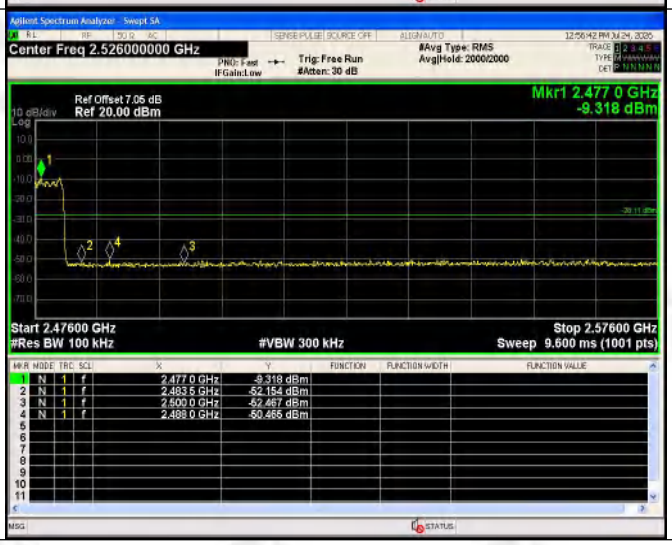
The EUT must have its hopping/Non-hopping function enabled. Using the following spectrum analyzer setting:
1. Set the RBW = 100kHz.
2. Set the VBW = 300kHz.
3. Sweep time = auto couple.
4. Detector function = peak.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.

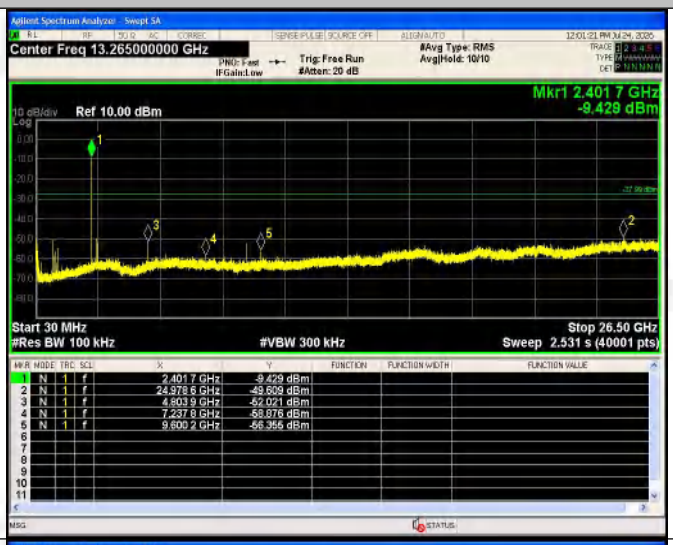
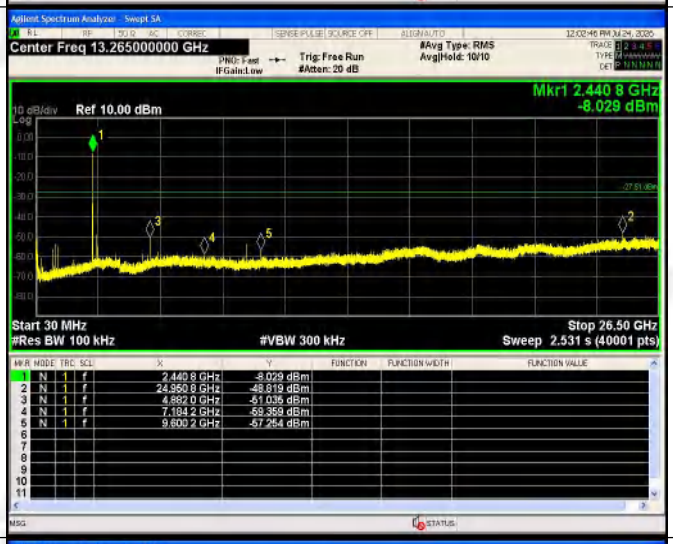
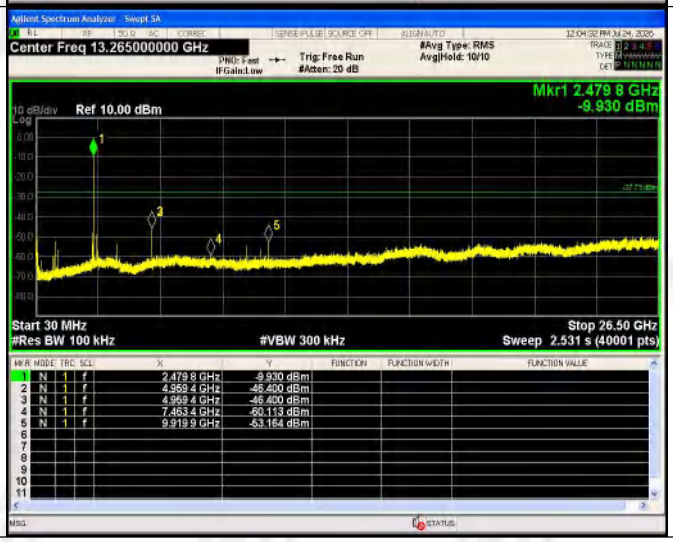
9.4. Test Result

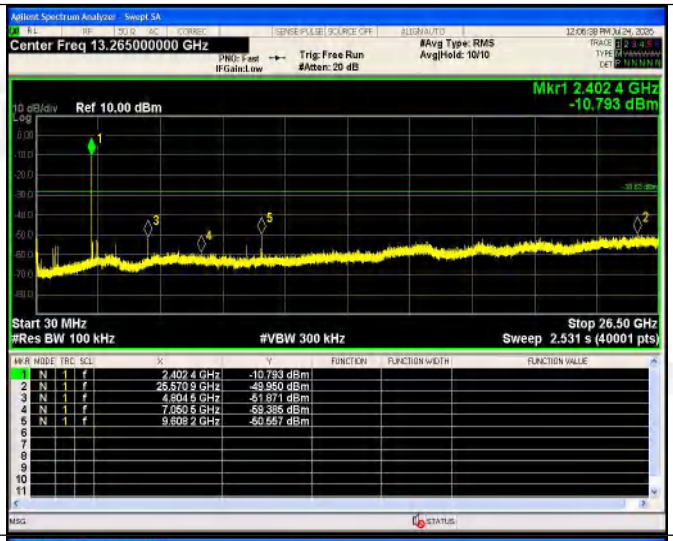
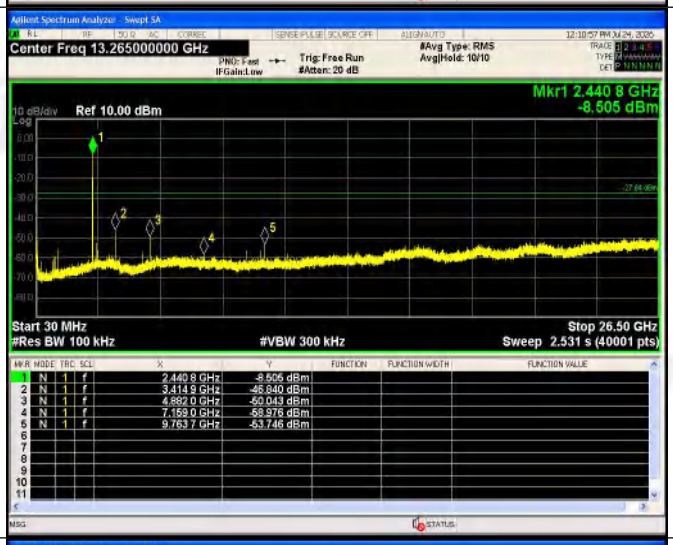
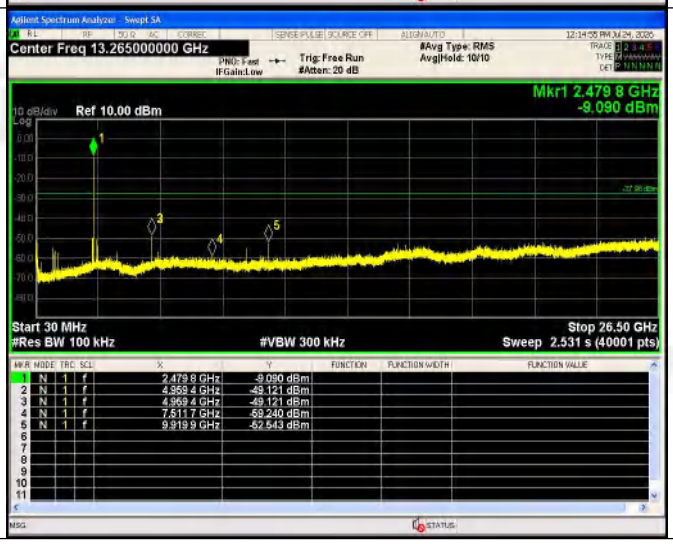
BAND EDGE Graphs			
GFSK/LCH/ No Hop			
GFSK/LCH/ Hop			
GFSK/HCH/ No Hop			

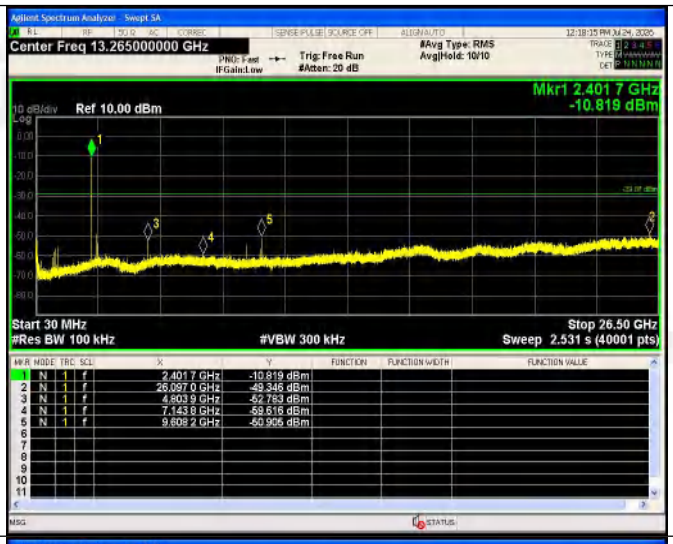
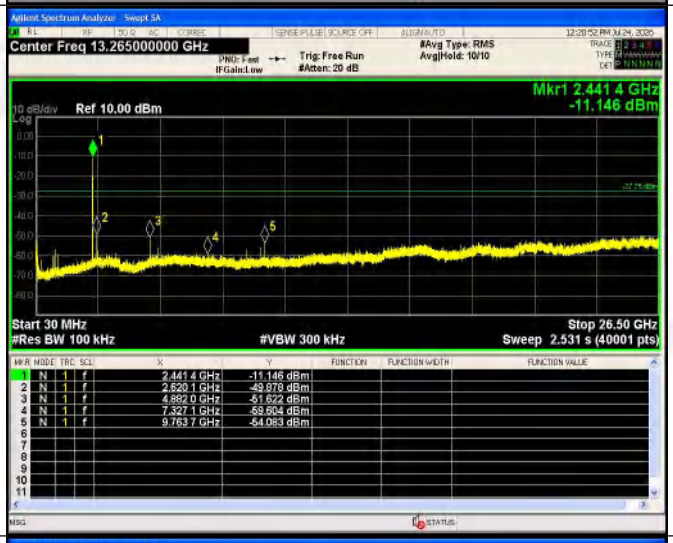
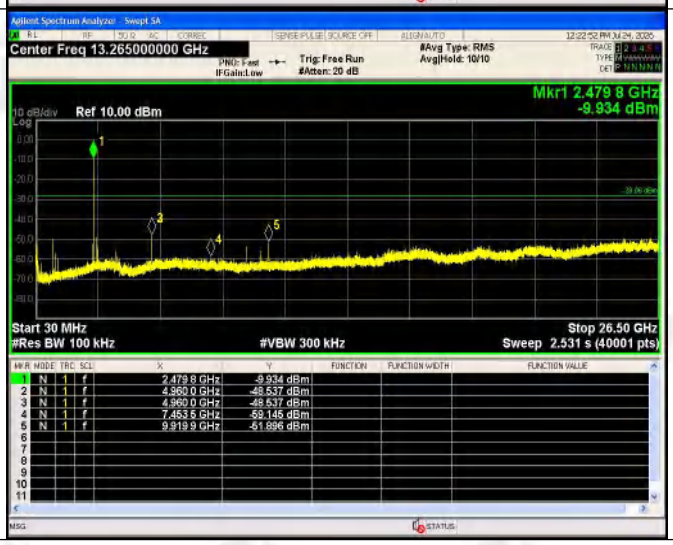
GFSK/HCH/ Hop			
π/4DQPSK/LCH/ No Hop			
π/4DQPSK/LCH/ Hop			

π/4DQPSK/HCH/ No Hop			
π/4DQPSK/HCH/ Hop			
8DPSK/LCH/No Hop			

8DPSK /LCH/Hop			
8DPSK /HCH/No Hop			
8DPSK /HCH/Hop			

RF Conducted Spurious Emissions Graphs			
GFSK/LCH			
GFSK/MCH			
GFSK/HCH			

π/4DQPSK /LCH			
π/4DQPSK/MCH			
π/4DQPSK/HCH			

8DPSK /LCH			
8DPSK /MCH			
8DPSK /HCH			

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 4.2dBi. It complies with the standard requirement.

11. TEST SETUP & EUT PHOTOGRAPH

Reference to Test set up and EUT photo attachment for details.

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