

TEST REPORT

Applicant : Guangxi Dingfeng Renewable Resources Co., Ltd.
Address : Yang Zhonghua's house, Team 2, Xingang Village, Xishan Town,
Guiping City, Guigang City, Guangxi Zhuang Autonomous Region
Manufacturer : Ling'ai Innovation (Shenzhen) Technology Co., Ltd.
Address : No. 86, Rooms 308-309, Zone 1, Fifth Industrial Zone, Shangfen Co
mmunity, Minzhi Subdistrict, Longhua District, Shenzhen
Product Name : Personal Sound Amplifier
Model Number : ZS20, ZS20-01, ZS20-BT, ZS20-QS
Trademark : Aurimi
FCC ID : 2BXSP-ZS20
Test Date : Jul. 22, 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

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1. General Information

1.1. Description of Device (EUT)

EUT Name	:	Personal Sound Amplifier
Model No.	:	ZS20, ZS20-01, ZS20-BT, ZS20-QS
Model Difference	:	All the model are the same circuit and RF module, only the names and appearance are different. Test sample model: ZS20
Power supply	:	Headphones: INPUT: DC 5V/40mA OUTPUT: DC 3.7V/5mA Charging case: INPUT: DC 5V/300mA OUTPUT: DC 3.7V/100mA
Operation frequency	:	2402-2480MHz
Modulation	:	GFSK, $\pi/4$ DQPSK, 8DPSK
Antenna Type	:	Chip antenna, Maximum Gain is 2.58dBi
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	/	/	/	/
Laptop	DELL	Vostro 5490	/	/
Cable	/	/	/	/

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

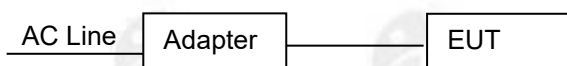
Note: Only the worst Data DH1/2DH1/3DH1 Record in the report

1.6. Test configuration

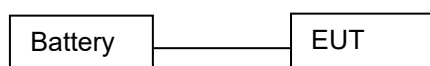
Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	
Test Software	FCC_assist_1.0.4
Power level setup	0 dBm

1.7. Block Diagram

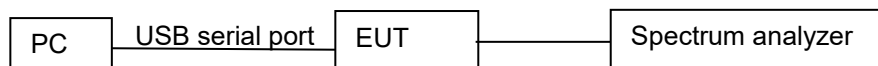
Conducted Emission



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	INPUT: DC 5V/40mA OUTPUT: DC 3.7V/5mA	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
Amplifier (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
Preamplifier (1GHz-18GHz)	BBV 9718D	0024	SCHWARZBECK	2025/9/8	2026/9/7
Spectrum Analyzer (10Hz-40GHz)	FSV 40	100952	Rohde & Schwarz	2025/9/8	2026/9/7
Preamplifier (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	MY505102 02	Agilent	2025/9/8	2026/9/7
MXG Vector Signal Generator	N5182A	MY501400 20	Agilent	2025/9/8	2026/9/7

MXG Analog Signal Generator	N5181A	MY474209 19	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

Conducted Test Site

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	HSRCE944	/	HTEC	2025/04/30	2028/04/29
EMI Test Receiver	ESCI	100881/003	ROHDE&SCHWARZ	2026/09/04	2027/09/03
LISN	AMN6500	101185	ROHDE&SCHWARZ	2026/09/04	2027/09/03
LISN	NNLK 8129	00603	SCHWARZBECK	2026/09/04	2027/09/03
Cable	RG223-2M	/	RG	2026/09/04	2027/09/03

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	2025/07/24	2028/07/23
EMI Test Receiver	ESPI	101018	ROHDE&SCHWARZ	2026/09/04	2027/09/03
Amplifi (30MHz-1GHz)	BBV 9745	00431	SCHWARZBECK	2026/09/04	2027/09/03
Bilog Antenna (30MHz-1GHz)	VULB9168	1858	SCHWARZBECK	2026/09/05	2027/09/04

Horn antenna (1GHz-18GHz)	BBHA 9120 D	02622	SCHWARZBECK	2026/09/05	2027/09/04
Pream plifier (1GHz-18GHz)	BBV 9718D	0024	SCHWARZBECK	2026/09/04	2027/09/03
Spectrum Analyze (10Hz-40GHz)	FSV 40	100952	ROHDE&SCHWA RZ	2026/09/04	2027/09/03
Pream plifier (18GHz-40GHz)	BBV 9721	0056	SCHWARZBECK	2026/09/04	2027/09/03
Double Ridge Guide Horn Antenna (18GHz-40GHz)	SAS-574	588	A.H.System	2026/09/05	2027/09/04
Loop Antenna (9KHz-30MHz)	FMZB 1513-60	00115	SCHWARZBECK	2026/09/04	2027/09/03
MXG Signal Analyzer	N9020A	MY49100730	Agilent	2026/09/04	2027/09/03
MXG Vector Signal Generator	N5182A	MY50144920	Agilent	2026/09/04	2027/09/03
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	/	ROHDE&SCHWA RZ	2026/09/07	2027/09/06
Power Sensor	MW100-RFC B-2	MW260105N TT-64	MWRFTtest	2026/09/04	2027/09/03
RF Swith	MW100-RFC B-1	MW260105N TT-64	MWRFTtest	2026/09/04	2027/09/03
Cable	RG223-3M	/	DA	2026/09/04	2027/09/03
Cable	RG223-12M	/	DA	2026/09/04	2027/09/03
Cable	SFT205-NM NMSW-2.5M	/	DA	2026/09/04	2027/09/03
Cable	SFT205-NM NM-12M	/	DA	2026/09/04	2027/09/03
Cable	UCA500-NJ WSM-1.5M	017	MWRFTtest	2026/09/04	2027/09/03

2. Conducted emission at the mains terminals test

2.1. Limit

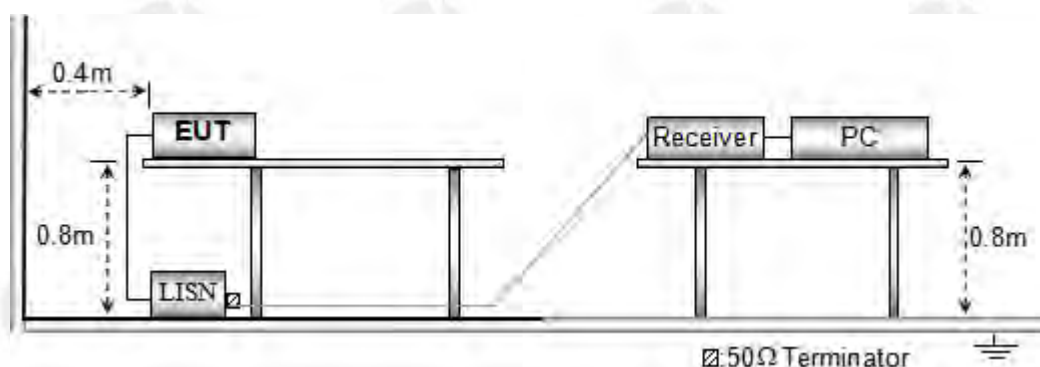
Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10-2020 + Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

Frequency MHz	Limits dB(μ V)	
	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

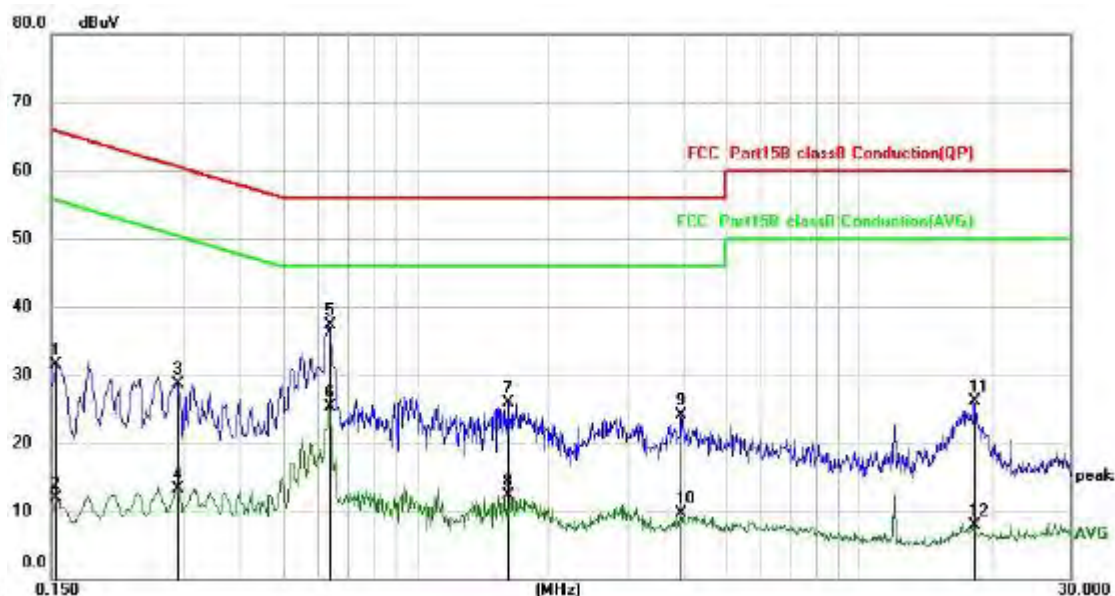


2.3. Test Procedure

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)



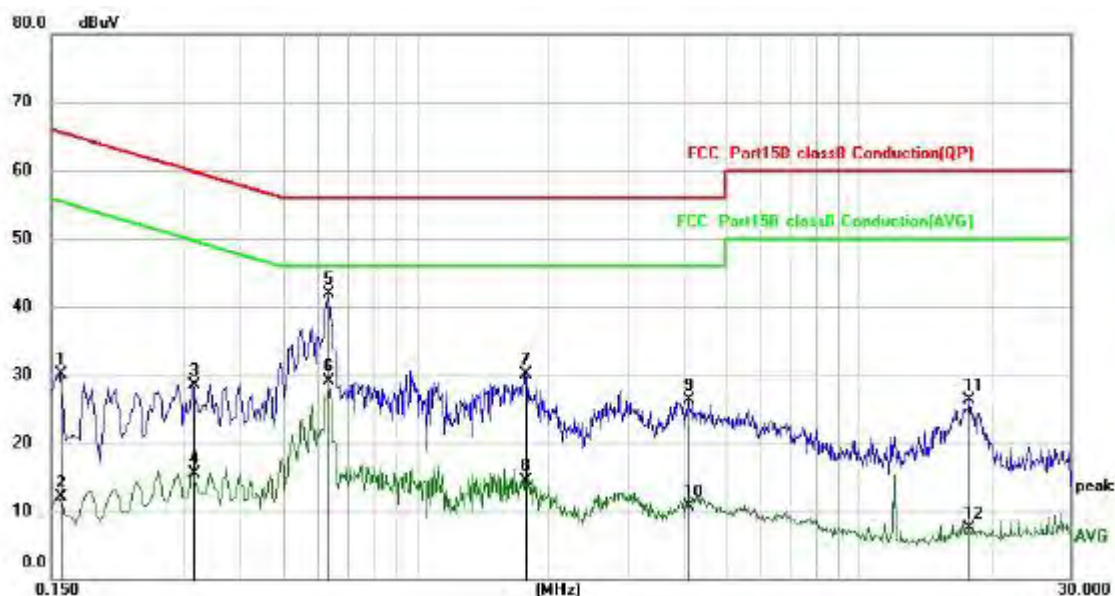
No. Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1	0.1539	20.67	10.87	31.54	65.79	-34.25	QP
2	0.1539	1.02	10.87	11.89	55.79	-43.90	AVG
3	0.2900	18.12	10.67	28.79	60.52	-31.73	QP
4	0.2900	2.66	10.67	13.33	50.52	-37.19	AVG
5 *	0.6380	26.79	10.46	37.25	56.00	-18.75	QP
6	0.6380	14.87	10.46	25.33	46.00	-20.67	AVG
7	1.6140	15.37	10.47	25.84	56.00	-30.16	QP
8	1.6140	1.90	10.47	12.37	46.00	-33.63	AVG
9	3.9620	13.55	10.50	24.05	56.00	-31.95	QP
10	3.9620	-0.72	10.50	9.78	46.00	-36.22	AVG
11	18.1460	15.30	10.85	26.15	60.00	-33.85	QP
12	18.1460	-3.03	10.85	7.82	50.00	-42.18	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°C	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	Measurement	Limit	Over	Detector
		MHz	dBuV	dB	dBuV	dBuV	dB	
1		0.1580	19.28	10.86	30.14	65.57	-35.43	QP
2		0.1580	1.32	10.86	12.18	55.57	-43.39	AVG
3		0.3140	17.85	10.65	28.50	59.86	-31.36	QP
4		0.3140	4.87	10.65	15.52	49.86	-34.34	AVG
5	*	0.6340	31.35	10.46	41.81	56.00	-14.19	QP
6		0.6340	18.73	10.46	29.19	46.00	-16.81	AVG
7		1.7700	19.58	10.47	30.05	56.00	-25.95	QP
8		1.7700	4.06	10.47	14.53	46.00	-31.47	AVG
9		4.1180	15.76	10.50	26.26	56.00	-29.74	QP
10		4.1180	0.13	10.50	10.63	46.00	-35.37	AVG
11		17.7180	15.47	10.82	26.29	60.00	-33.71	QP
12		17.7180	-3.24	10.82	7.58	50.00	-42.42	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 v05r02 April 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

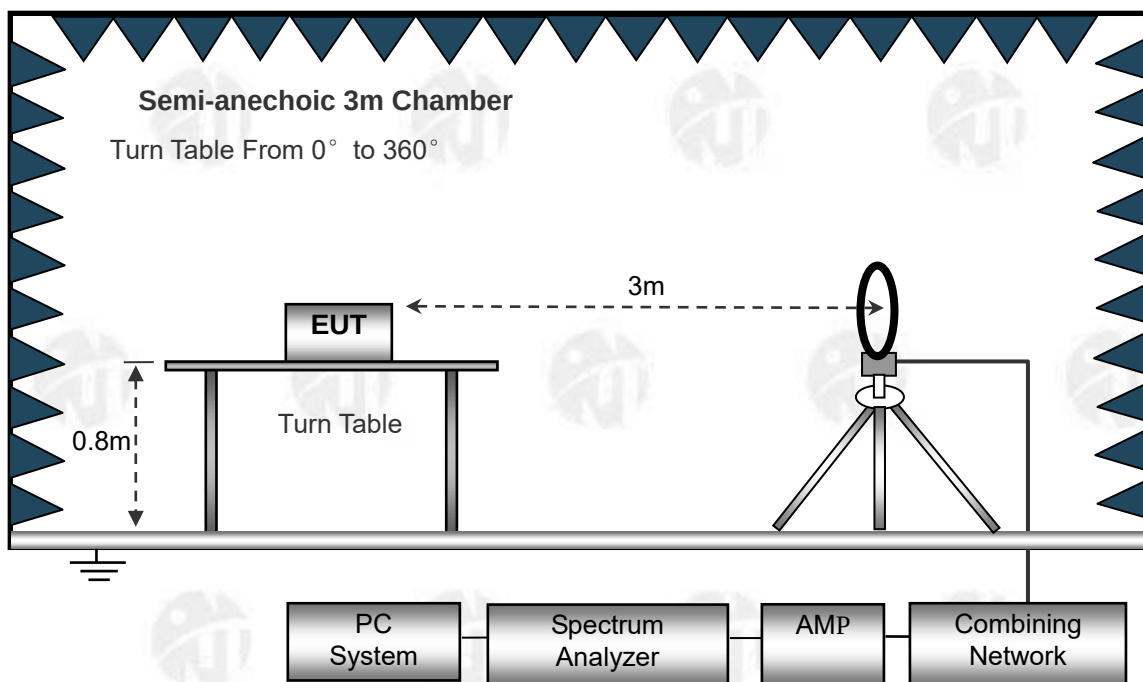
Limit:

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log(2400/F(\text{kHz})) + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log(24000/F(\text{kHz})) + 40$
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	$20\log(500)$

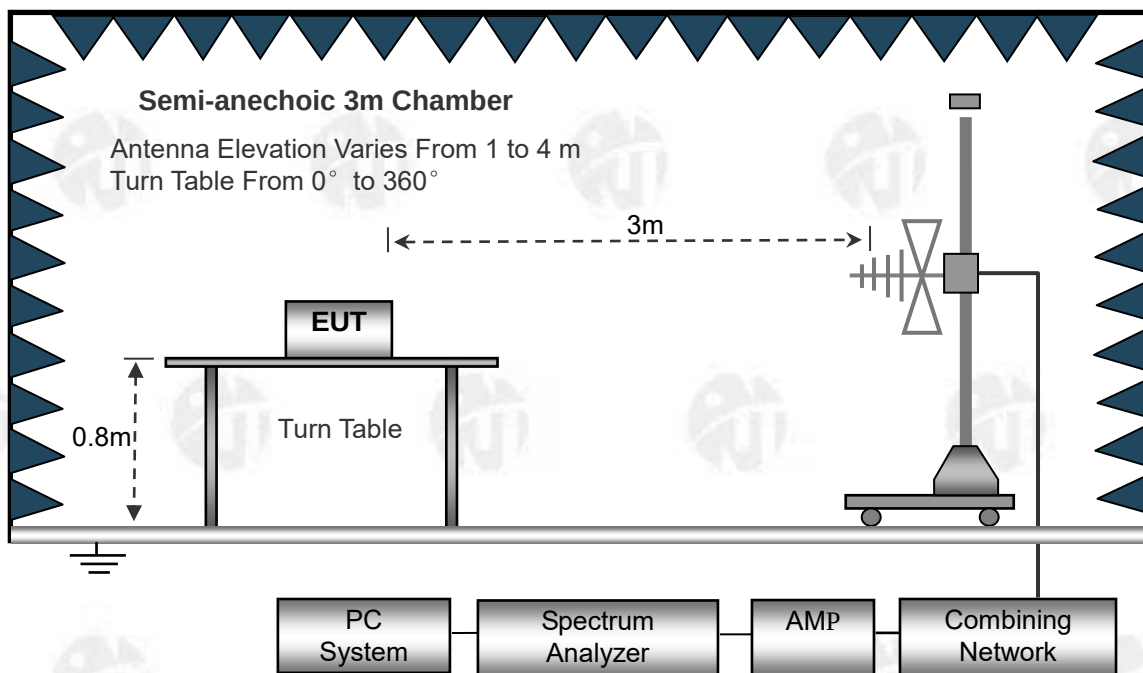
3.2. Test Setup

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

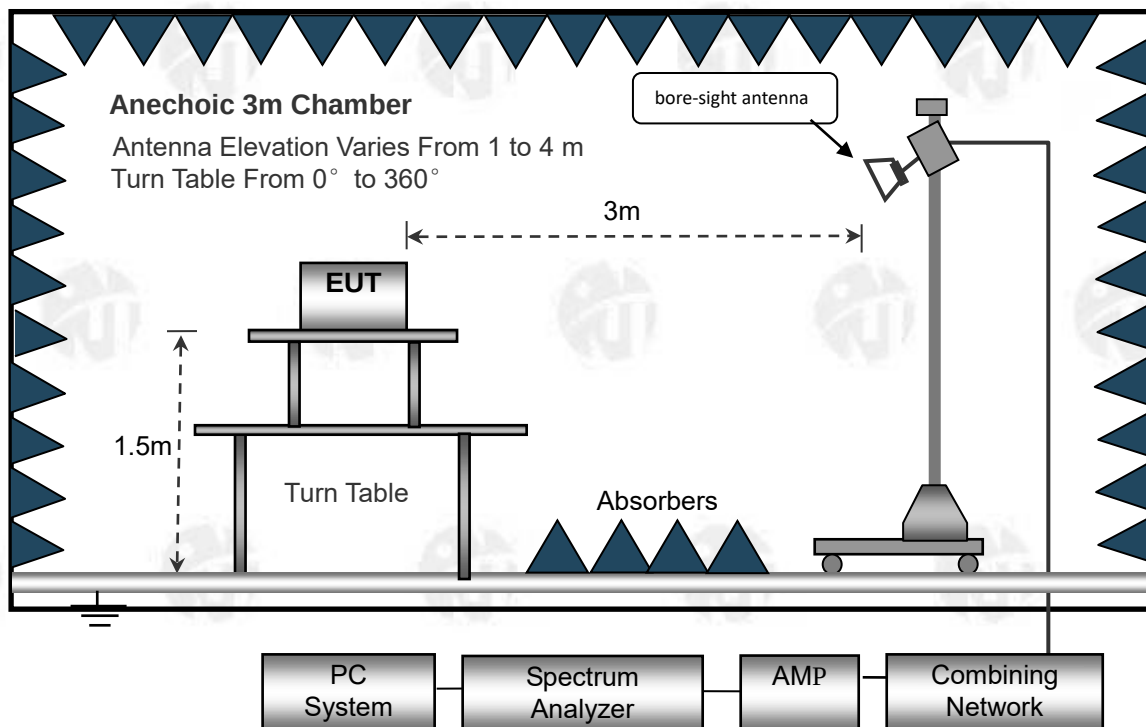
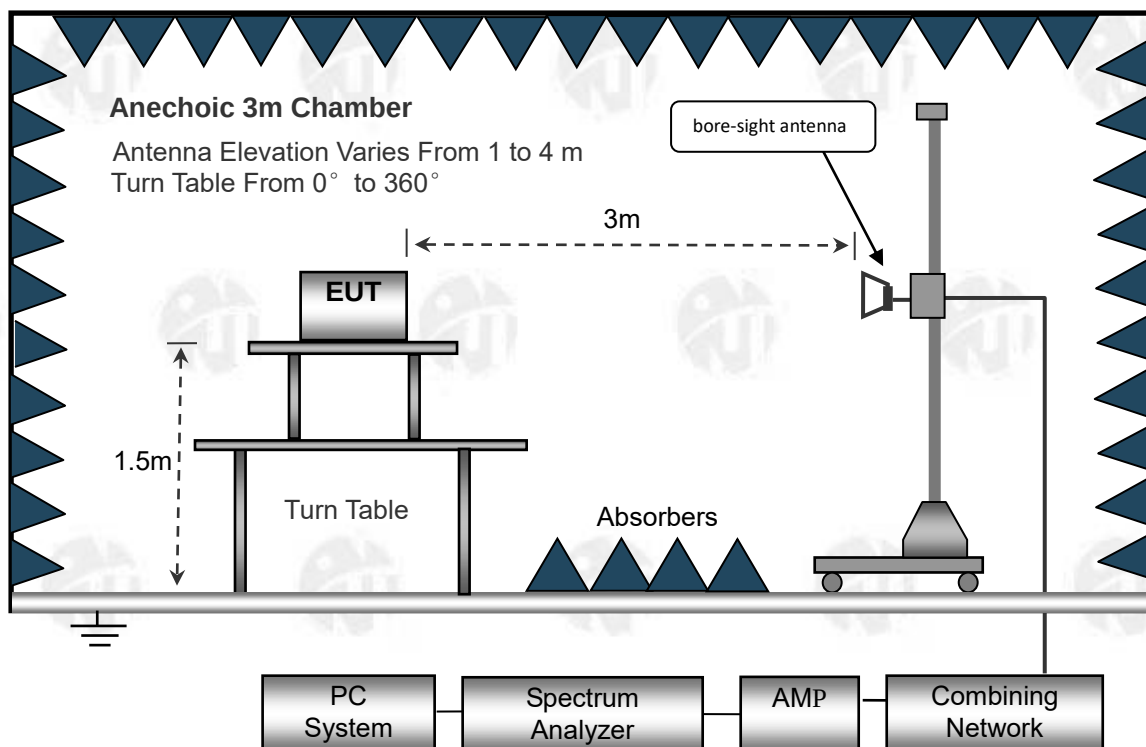
The test setup for emission measurement below 30MHz.



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 during 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.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		33.9174	26.59	-6.43	20.16	40.00	-19.84	QP
2	*	67.7939	27.77	-5.16	22.61	40.00	-17.39	QP
3		147.9214	26.23	-4.69	21.54	43.50	-21.96	QP
4		290.5262	25.59	-3.86	21.73	46.00	-24.27	QP
5		377.9211	26.21	-2.15	24.06	46.00	-21.94	QP
6		527.3205	25.25	0.31	25.56	46.00	-20.44	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°C	Relative Humidity:	56%
Pressure:	1008hPa	Phase :	Vertical
Test Voltage :	DC 3.7V	Test Mode	GFSK(CH00)



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		44.1202	27.16	-5.76	21.40	40.00	-18.60	QP
2		58.4074	27.41	-4.68	22.73	40.00	-17.27	QP
3	*	66.0342	29.49	-5.02	24.47	40.00	-15.53	QP
4		131.9889	26.31	-6.19	20.12	43.50	-23.38	QP
5		157.2829	26.12	-4.30	21.82	43.50	-21.68	QP
6		361.7139	25.91	-2.39	23.52	46.00	-22.48	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	53.55	30.55	5.77	24.66	53.43	74	-20.57	Pk
V	4804.00	39.00	30.55	5.77	24.66	38.88	54	-15.12	AV
V	7206.00	50.25	30.33	6.32	24.55	50.79	74	-23.21	Pk
V	7206.00	34.55	30.33	6.32	24.55	35.09	54	-18.91	AV
V	9608.00	48.88	30.85	7.45	24.69	50.17	74	-23.83	Pk
V	9608.00	33.30	30.85	7.45	24.69	34.59	54	-19.41	AV
V	12010.00	45.38	31.02	8.99	25.57	48.92	74	-25.08	Pk
V	12010.00	29.02	31.02	8.99	25.57	32.56	54	-21.44	AV
H	4804.00	48.63	30.55	5.77	24.66	48.51	74	-25.49	Pk
H	4804.00	39.66	30.55	5.77	24.66	39.54	54	-14.46	AV
H	7206.00	47.77	30.33	6.32	24.55	48.31	74	-25.69	Pk
H	7206.00	32.19	30.33	6.32	24.55	32.73	54	-21.27	AV
H	9608.00	48.08	30.85	7.45	24.69	49.37	74	-24.63	Pk
H	9608.00	29.54	30.85	7.45	24.69	30.83	54	-23.17	AV
H	12010.00	38.53	31.02	8.99	25.57	42.07	74	-31.93	Pk
H	12010.00	25.58	31.02	8.99	25.57	29.12	54	-24.88	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	50.26	30.55	5.77	24.66	50.14	74	-23.86	Pk
V	4882.00	39.43	30.55	5.77	24.66	39.31	54	-14.69	AV
V	7323.00	44.97	30.33	6.32	24.55	45.51	74	-28.49	Pk
V	7323.00	35.74	30.33	6.32	24.55	36.28	54	-17.72	AV
V	9764.00	43.81	30.85	7.45	24.69	45.10	74	-28.90	Pk
V	9764.00	31.68	30.85	7.45	24.69	32.97	54	-21.03	AV
V	12205.00	41.59	31.02	8.99	25.57	45.13	74	-28.87	Pk
V	12205.00	28.99	31.02	8.99	25.57	32.53	54	-21.47	AV
H	4882.00	48.64	30.55	5.77	24.66	48.52	74	-25.48	Pk
H	4882.00	39.92	30.55	5.77	24.66	39.80	54	-14.20	AV
H	7323.00	46.55	30.33	6.32	24.55	47.09	74	-26.91	Pk
H	7323.00	33.82	30.33	6.32	24.55	34.36	54	-19.64	AV
H	9764.00	41.87	30.85	7.45	24.69	43.16	74	-30.84	Pk
H	9764.00	29.94	30.85	7.45	24.69	31.23	54	-22.77	AV
H	12205.00	40.29	31.02	8.99	25.57	43.83	74	-30.17	Pk
H	12205.00	30.09	31.02	8.99	25.57	33.63	54	-20.37	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	49.13	30.55	5.77	24.66	49.01	74	-24.99	Pk
V	4960.00	35.27	30.55	5.77	24.66	35.15	54	-18.85	AV
V	7440.00	45.32	30.33	6.32	24.55	45.86	74	-28.14	Pk
V	7440.00	34.64	30.33	6.32	24.55	35.18	54	-18.82	AV
V	9920.00	41.36	30.85	7.45	24.69	42.65	74	-31.35	Pk
V	9920.00	31.40	30.85	7.45	24.69	32.69	54	-21.31	AV
V	12400.00	38.97	31.02	8.99	25.57	42.51	74	-31.49	Pk
V	12400.00	28.76	31.02	8.99	25.57	32.30	54	-21.70	AV
H	4960.00	47.07	30.55	5.77	24.66	46.95	74	-27.05	Pk
H	4960.00	38.19	30.55	5.77	24.66	38.07	54	-15.93	AV
H	7440.00	44.77	30.33	6.32	24.55	45.31	74	-28.69	Pk
H	7440.00	30.98	30.33	6.32	24.55	31.52	54	-22.48	AV
H	9920.00	41.16	30.85	7.45	24.69	42.45	74	-31.55	Pk
H	9920.00	27.24	30.85	7.45	24.69	28.53	54	-25.47	AV
H	12400.00	39.85	31.02	8.99	25.57	43.39	74	-30.61	Pk
H	12400.00	30.25	31.02	8.99	25.57	33.79	54	-20.21	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 or Type
GFSK	Low Channel: 2402MHz									
	H	2390	58.84	35.17	3.48	27.49	54.64	74	-19.36	PK
	H	2390	48.92	35.17	3.48	27.49	44.72	54	-9.28	AV
	H	2400	60.36	35.16	3.49	27.52	56.21	74	-17.79	PK
	H	2400	51.43	35.16	3.49	27.52	47.28	54	-6.72	AV
	V	2390	59.18	35.17	3.48	27.49	54.98	74	-19.02	PK
	V	2390	52.44	35.17	3.48	27.49	48.24	54	-5.76	AV
	V	2400	60.20	35.16	3.49	27.52	56.05	74	-17.95	PK
	V	2400	48.85	35.16	3.49	27.52	44.70	54	-9.30	AV
	High Channel: 2480MHz									
	H	2483.5	57.54	35.11	3.56	27.75	53.74	74	-20.26	PK
	H	2483.5	49.11	35.11	3.56	27.75	45.31	54	-8.69	AV
	H	2500	59.43	35.1	3.57	27.8	55.70	74	-18.30	PK
	H	2500	50.54	35.1	3.57	27.8	46.81	54	-7.19	AV
	V	2483.5	59.36	35.11	3.56	27.75	55.56	74	-18.44	PK
	V	2483.5	52.66	35.11	3.56	27.75	48.86	54	-5.14	AV
	V	2500	59.42	35.1	3.57	27.8	55.69	74	-18.31	PK
	V	2500	49.39	35.1	3.57	27.8	45.66	54	-8.34	AV

π/4-DQP SK	Low Channel: 2402MHz									
	H	2390	59.65	35.17	3.48	27.49	55.45	74	-18.55	PK
	H	2390	49.28	35.17	3.48	27.49	45.08	54	-8.92	AV
	H	2400	61.79	35.16	3.49	27.52	57.64	74	-16.36	PK
	H	2400	51.79	35.16	3.49	27.52	47.64	54	-6.36	AV
	V	2390	58.77	35.17	3.48	27.49	54.57	74	-19.43	PK
	V	2390	50.06	35.17	3.48	27.49	45.86	54	-8.14	AV
	V	2400	59.41	35.16	3.49	27.52	55.26	74	-18.74	PK
	V	2400	50.19	35.16	3.49	27.52	46.04	54	-7.96	AV
	High Channel: 2480MHz									
	H	2483.5	57.11	35.11	3.56	27.75	53.31	74	-20.69	PK
	H	2483.5	49.00	35.11	3.56	27.75	45.20	54	-8.80	AV
	H	2500	60.21	35.1	3.57	27.8	56.48	74	-17.52	PK
	H	2500	49.54	35.1	3.57	27.8	45.81	54	-8.19	AV
	V	2483.5	59.46	35.11	3.56	27.75	55.66	74	-18.34	PK
	V	2483.5	49.68	35.11	3.56	27.75	45.88	54	-8.12	AV
	V	2500	60.50	35.1	3.57	27.8	56.77	74	-17.23	PK
	V	2500	49.78	35.1	3.57	27.8	46.05	54	-7.95	AV
8DPSK	Low Channel: 2402MHz									
	H	2390	59.62	35.17	3.48	27.49	55.42	74	-18.58	PK
	H	2390	50.69	35.17	3.48	27.49	46.49	54	-7.51	AV
	H	2400	60.43	35.16	3.49	27.52	56.28	74	-17.72	PK
	H	2400	51.70	35.16	3.49	27.52	47.55	54	-6.45	AV
	V	2390	57.70	35.17	3.48	27.49	53.50	74	-20.50	PK
	V	2390	51.73	35.17	3.48	27.49	47.53	54	-6.47	AV
	V	2400	61.70	35.16	3.49	27.52	57.55	74	-16.45	PK
	V	2400	51.22	35.16	3.49	27.52	47.07	54	-6.93	AV
	High Channel: 2480MHz									
	H	2483.5	57.24	35.11	3.56	27.75	53.44	74	-20.56	PK
	H	2483.5	50.31	35.11	3.56	27.75	46.51	54	-7.49	AV
	H	2500	60.49	35.1	3.57	27.8	56.76	74	-17.24	PK
	H	2500	51.74	35.1	3.57	27.8	48.01	54	-5.99	AV
	V	2483.5	59.31	35.11	3.56	27.75	55.51	74	-18.49	PK
	V	2483.5	51.92	35.11	3.56	27.75	48.12	54	-5.88	AV
	V	2500	58.16	35.1	3.57	27.8	54.43	74	-19.57	PK
	V	2500	51.83	35.1	3.57	27.8	48.10	54	-5.90	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 v05r02 April 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)(3)	Peak Output Power	1 watt or 21dBm	2400-2483.5	PASS

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

RSS-247 § 5.4

For FHSs operating in the band 2400-2483.5 MHz, the maximum peak conducted output power shall not exceed 1.0 W if the hopset uses 75 or more hopping channels; the maximum peak conducted output power shall not exceed 0.125 W if the hopset uses less than 75 hopping channels. The e.i.r.p. shall not exceed 4 W.

4.2. Test Setup



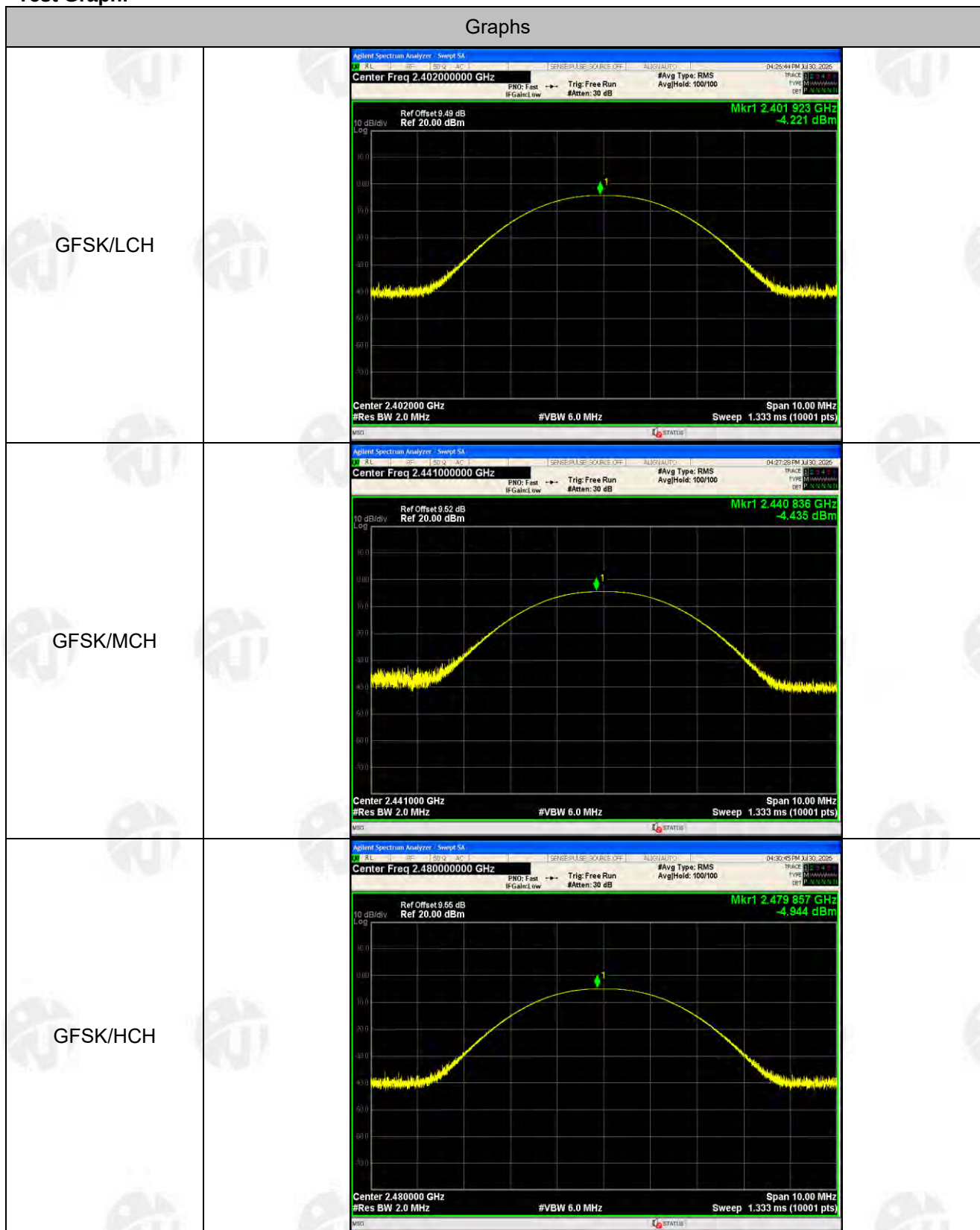
4.3. Test Procedure

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

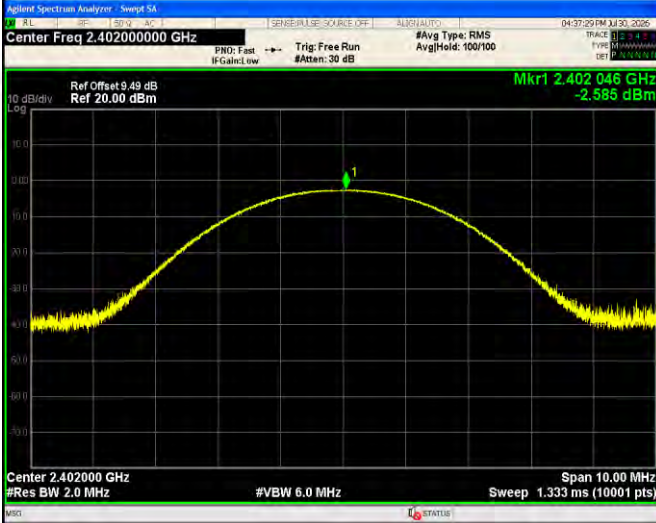
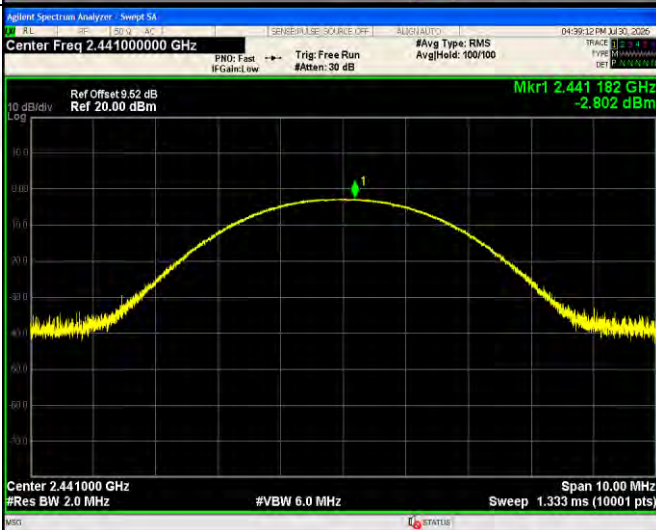
4.4. Test Result

Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-4.22	20.97	PASS
	MCH	-4.43	20.97	PASS
	HCH	-4.94	20.97	PASS
$\pi/4$ DQPSK	LCH	-2.53	20.97	PASS
	MCH	-2.72	20.97	PASS
	HCH	-3.17	20.97	PASS
8DPSK	LCH	-2.59	20.97	PASS
	MCH	-2.8	20.97	PASS
	HCH	-3.2	20.97	PASS

Test Graph:



$\pi/4$DQPSK/LCH		
$\pi/4$DQPSK/MCH		
$\pi/4$DQPSK/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 v05r02 April 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

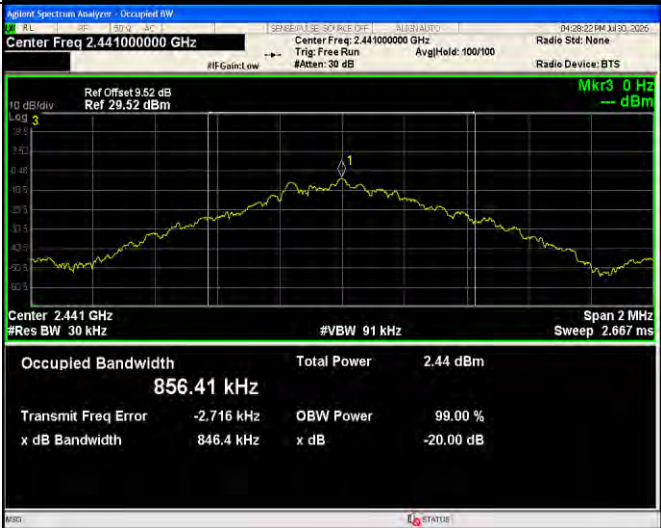
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 1%-5% OBW, VBW ≥ 3RBW

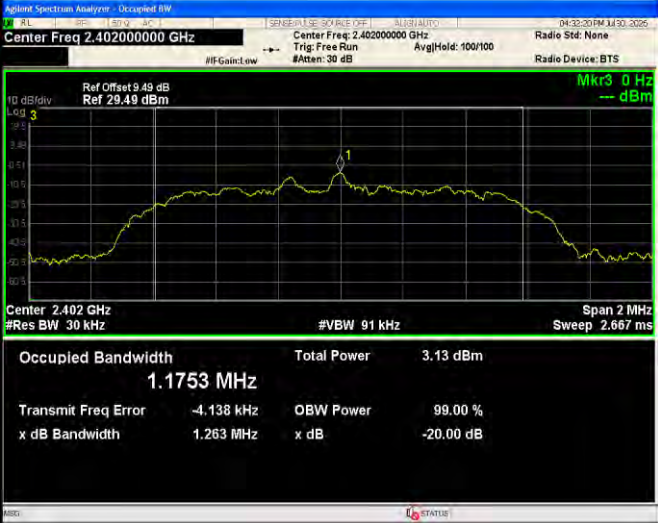
5.4. Test Result

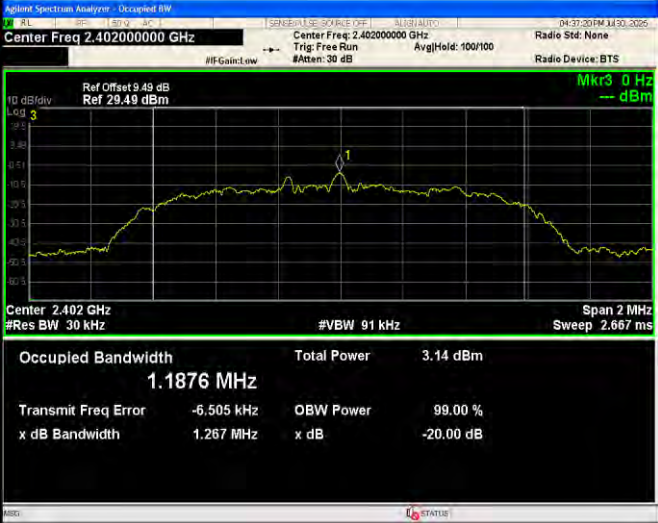
Test Mode	Frequency	20dB Bandwidth (MHz)	Result
GFSK	Low channel	0.854	PASS
	Mid channel	0.846	PASS
	High channel	0.854	PASS
π/4DQPSK	Low channel	1.263	PASS
	Mid channel	1.256	PASS
	High channel	1.263	PASS
8DPSK	Low channel	1.267	PASS
	Mid channel	1.310	PASS
	High channel	1.272	PASS

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

Test Graph:

GFSK Low channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.402000000 GHz Ref Offset 9.48 dB Ref 29.49 dBm Occupied Bandwidth 855.95 kHz Total Power 2.78 dBm Transmit Freq Error -2.713 kHz OBW Power 99.00 % x dB Bandwidth 854.0 kHz x dB -20.00 dB
GFSK Mid channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.441000000 GHz Ref Offset 9.52 dB Ref 29.52 dBm Occupied Bandwidth 856.41 kHz Total Power 2.44 dBm Transmit Freq Error -2.716 kHz OBW Power 99.00 % x dB Bandwidth 846.4 kHz x dB -20.00 dB
GFSK High channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.480000000 GHz Ref Offset 9.55 dB Ref 29.55 dBm Occupied Bandwidth 851.82 kHz Total Power 1.99 dBm Transmit Freq Error -6.883 kHz OBW Power 99.00 % x dB Bandwidth 854.2 kHz x dB -20.00 dB

$\pi/4$-DQPSK Low channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.402000000 GHz Ref Offset: 9.49 dB Ref: 29.49 dBm Occupied Bandwidth: 1.1753 MHz Total Power: 3.13 dBm Transmit Freq Error: -4.138 kHz OBW Power: 99.00 % x dB Bandwidth: 1.263 MHz x dB: -20.00 dB
$\pi/4$-DQPSK Mid channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.441000000 GHz Ref Offset: 9.52 dB Ref: 29.52 dBm Occupied Bandwidth: 1.1740 MHz Total Power: 2.91 dBm Transmit Freq Error: -4.667 kHz OBW Power: 99.00 % x dB Bandwidth: 1.256 MHz x dB: -20.00 dB
$\pi/4$-DQPSK High channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq: 2.480000000 GHz Ref Offset: 9.55 dB Ref: 29.55 dBm Occupied Bandwidth: 1.1730 MHz Total Power: 2.48 dBm Transmit Freq Error: -3.911 kHz OBW Power: 99.00 % x dB Bandwidth: 1.263 MHz x dB: -20.00 dB

8DPSK Low channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.402000000 GHz Ref Offset 9.49 dB Ref 29.49 dBm Occupied Bandwidth 1.1876 MHz Total Power 3.14 dBm Transmit Freq Error -6.505 kHz OBW Power 99.00 % x dB Bandwidth 1.267 MHz x dB -20.00 dB
8DPSK Mid channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.441000000 GHz Ref Offset 9.52 dB Ref 29.52 dBm Occupied Bandwidth 1.2144 MHz Total Power 1.86 dBm Transmit Freq Error -9.021 kHz OBW Power 99.00 % x dB Bandwidth 1.310 MHz x dB -20.00 dB
8DPSK High channel	 Agilent Spectrum Analyzer - Occupied BW Center Freq 2.480000000 GHz Ref Offset 9.56 dB Ref 29.55 dBm Occupied Bandwidth 1.1859 MHz Total Power 2.43 dBm Transmit Freq Error -2.843 kHz OBW Power 99.00 % x dB Bandwidth 1.272 MHz x dB -20.00 dB

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	0.569	PASS
GFSK	MCH	0.998	0.564	PASS
GFSK	HCH	0.996	0.569	PASS
$\pi/4$ DQPSK	LCH	1.002	0.842	PASS
$\pi/4$ DQPSK	MCH	0.998	0.837	PASS
$\pi/4$ DQPSK	HCH	1.002	0.842	PASS
8DPSK	LCH	1.006	0.845	PASS
8DPSK	MCH	1.002	0.874	PASS
8DPSK	HCH	0.998	0.848	PASS

Test Graph

Graphs

GFSK/LCH



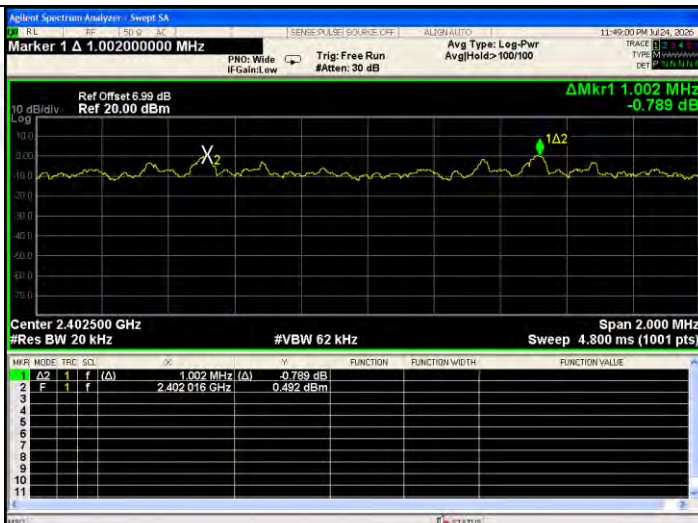
GFSK/MCH



GFSK/HCH



$\pi/4$ DQPSK/LCH



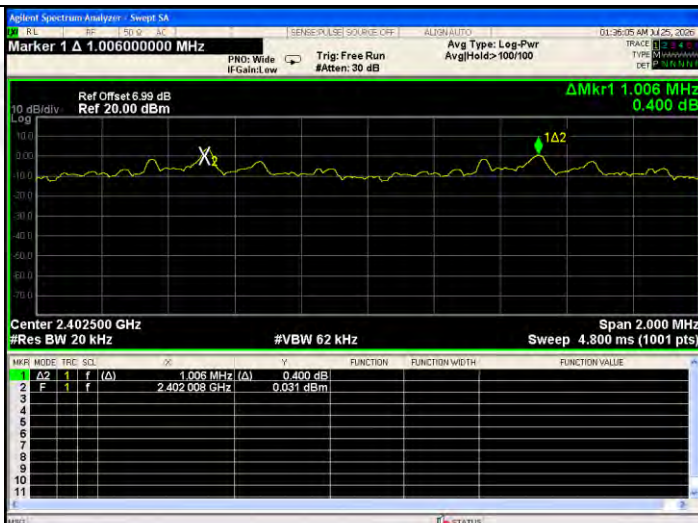
$\pi/4$ DQPSK/MCH



$\pi/4$ DQPSK/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.

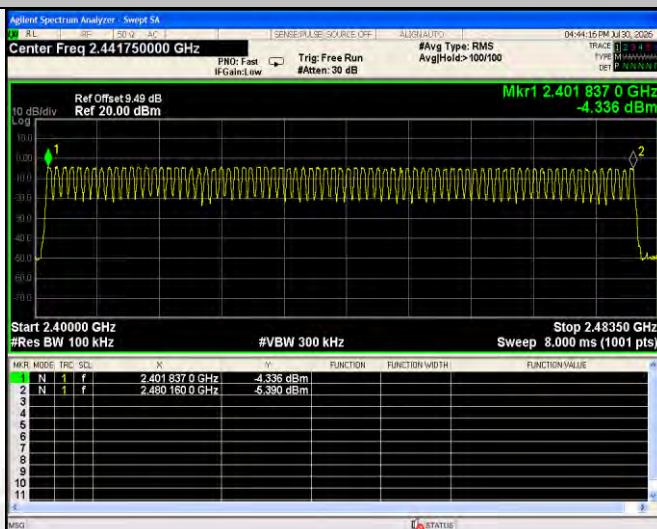
7.4. Test Result

Mode	Channel.	Number of Hopping Channel	Limit	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ DQPSK	Hop	79	≥ 15	PASS
8DPSK	Hop	79	≥ 15	PASS

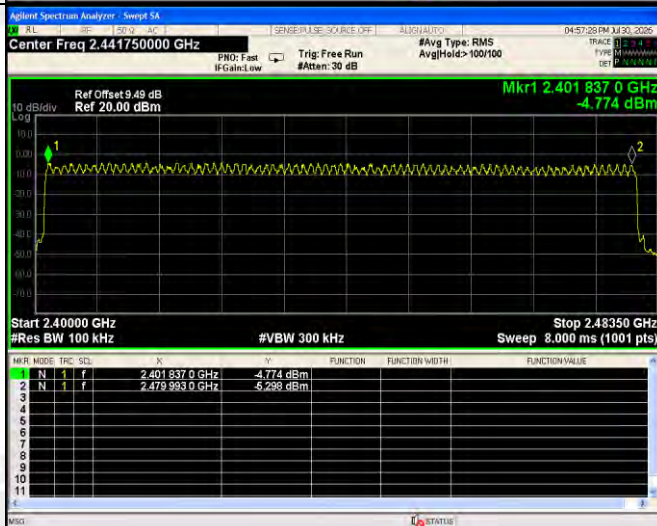
Test Graph

Graphs

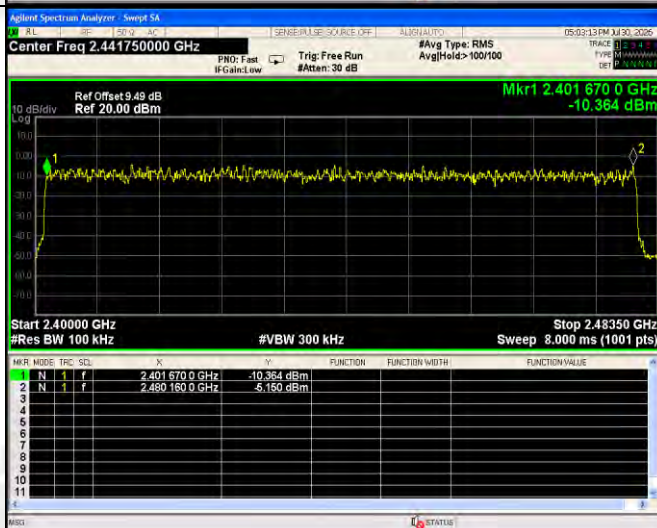
GFSK/Hop



$\pi/4$ DQPSK/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	0.395	319	126.005	400	PASS
DH1	MCH	0.395	319	126.005	400	PASS
DH1	HCH	0.395	319	126.005	400	PASS
2DH3	LCH	1.651	159	262.509	400	PASS
2DH3	MCH	1.652	160	264.32	400	PASS
2DH3	HCH	1.652	160	264.32	400	PASS
3DH5	LCH	2.902	107	310.514	400	PASS
3DH5	MCH	2.901	107	310.407	400	PASS
3DH5	HCH	2.902	106	307.612	400	PASS

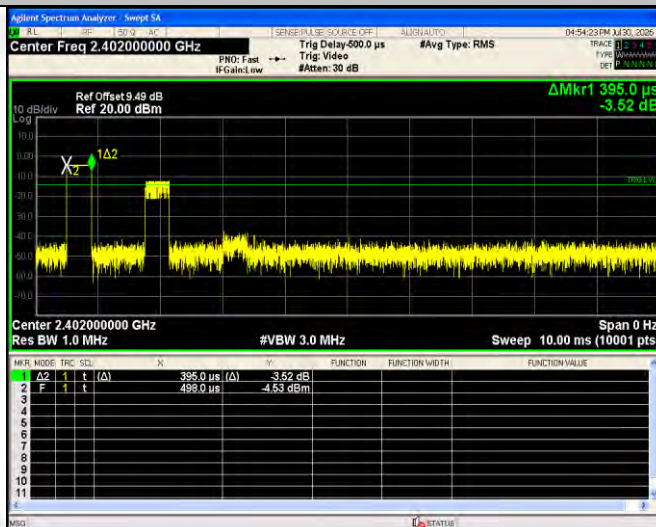
Remark: Dwell time = Pulse time * Total Hops

Remark: Mkr Delta is once pulse time.

Test Graph

Graphs

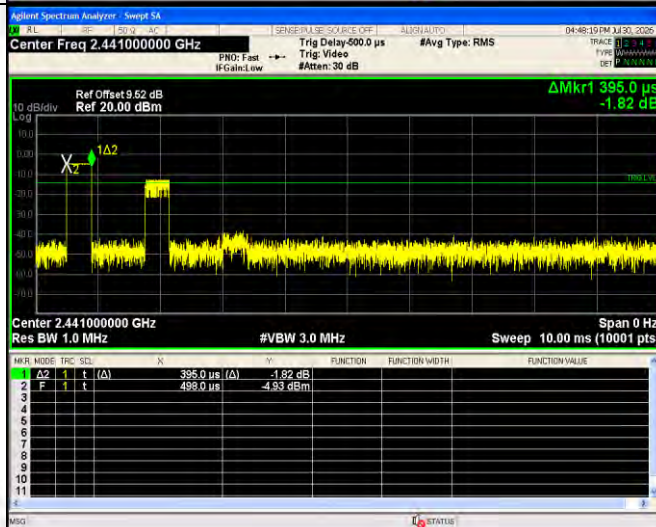
GFSK_1DH1/LCH-
One Burst

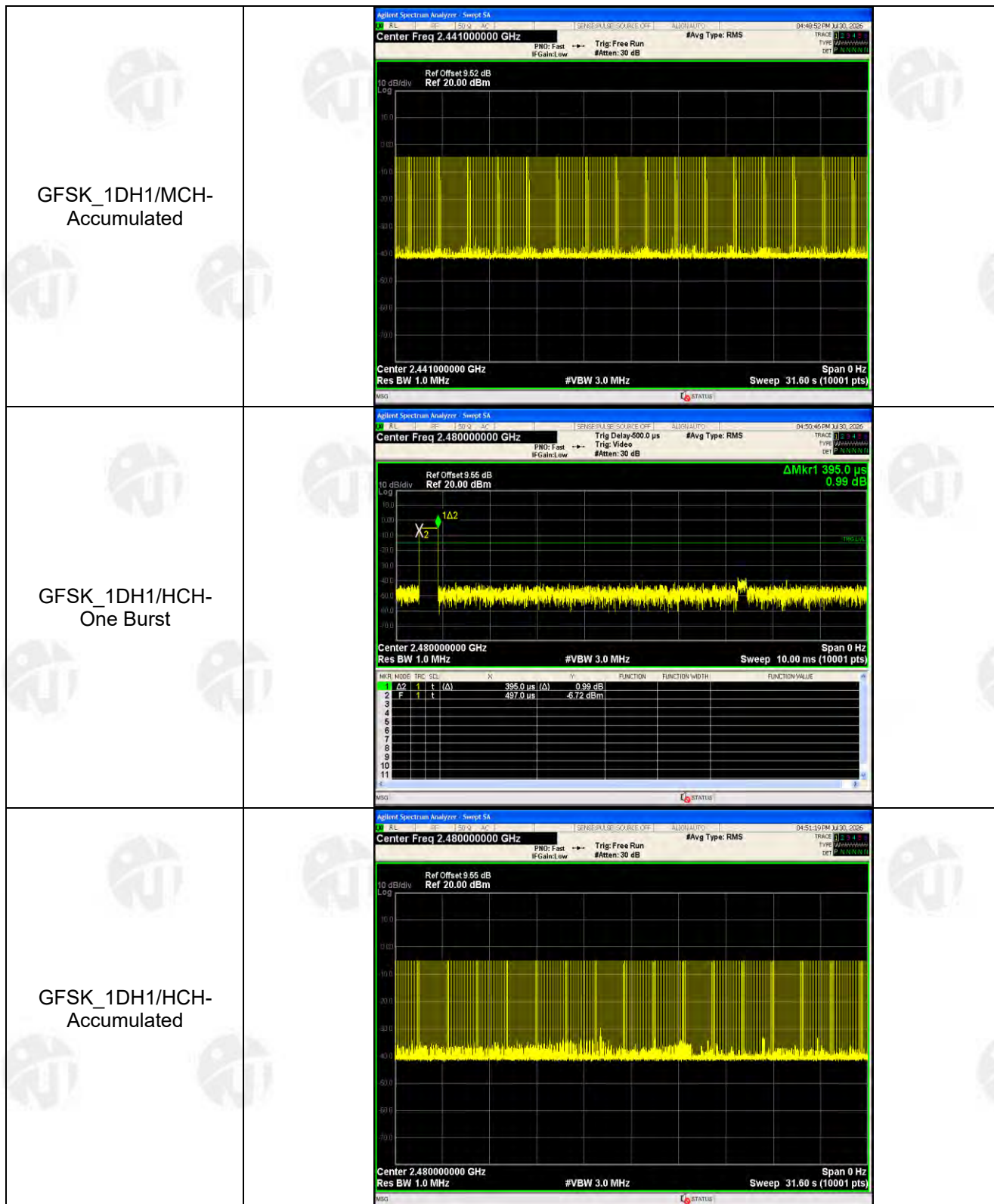


GFSK_1DH1/LCH-
Accumulated

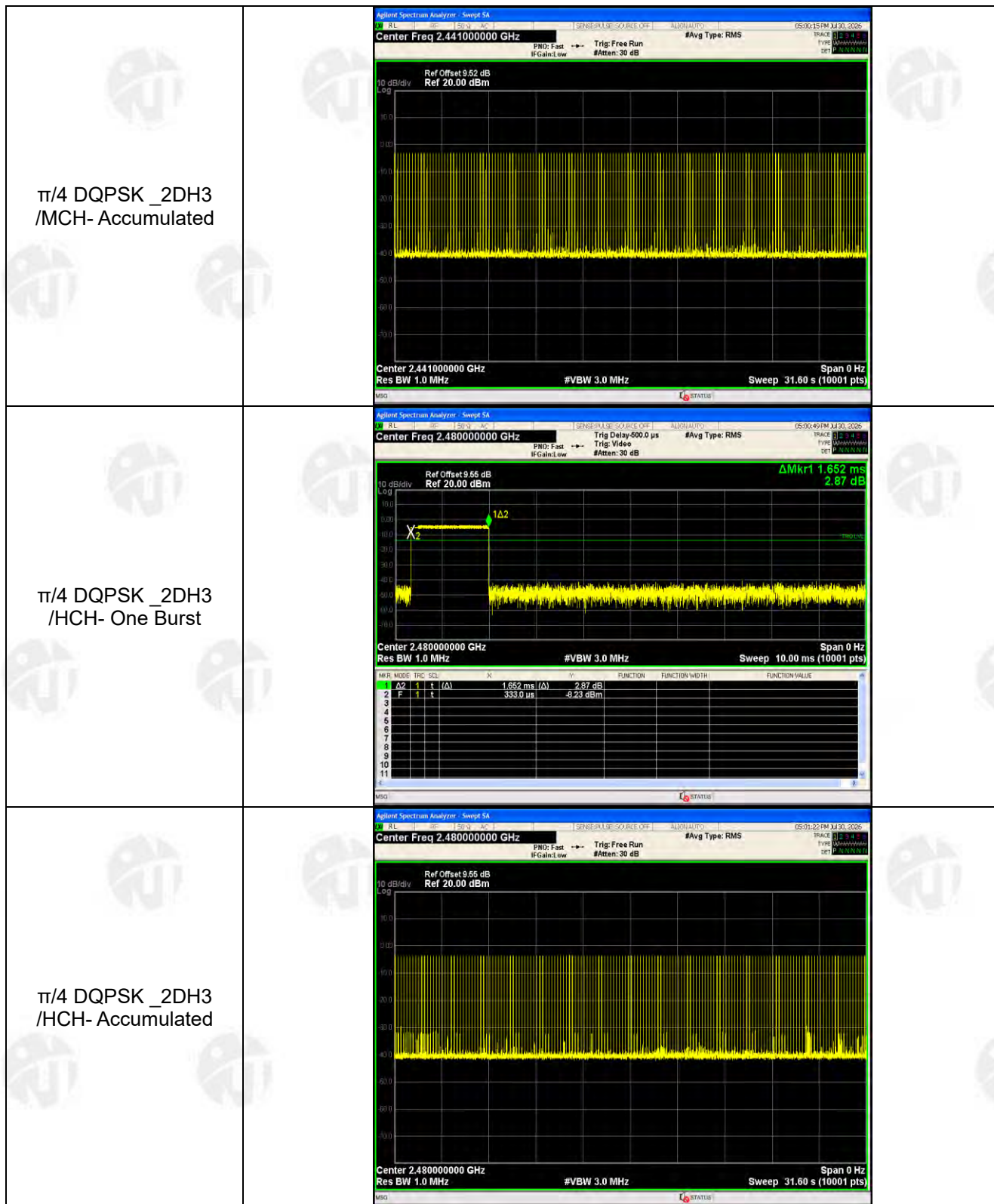


GFSK_1DH1/MCH-
One Burst

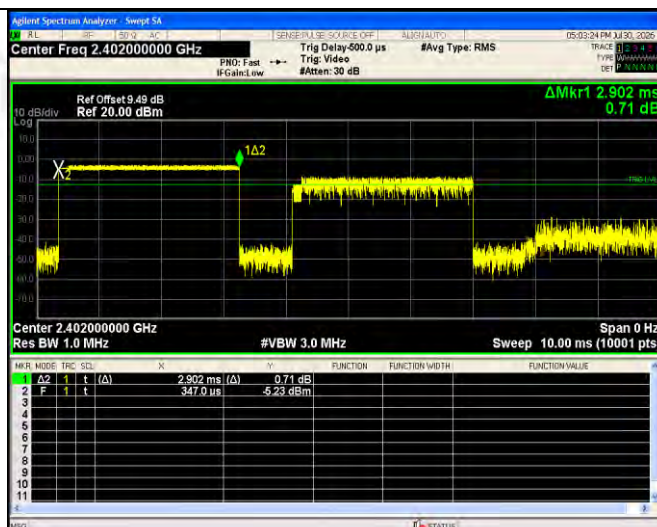




$\pi/4$ DQPSK_2DH3 /LCH- One Burst	Agilent Spectrum Analyzer - Sweep 5A Center Freq 2.402000000 GHz Ref Offset 9.48 dB Ref 20.00 dBm ΔMkr1 1.651 ms -0.13 dB Center 2.402000000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (10001 pts) <table><tr><th>MNR</th><th>MODE</th><th>TRC</th><th>SCN</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>t</td><td>(A)</td><td>1.651 ms (A)</td><td>-0.13 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td>(A)</td><td>348.0 μs</td><td>-4.43 dBm</td><td></td><td></td></tr></table>	MNR	MODE	TRC	SCN	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	A2	1	t	(A)	1.651 ms (A)	-0.13 dB			2	F	1	t	(A)	348.0 μ s	-4.43 dBm		
MNR	MODE	TRC	SCN	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE																				
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2	F	1	t	(A)	348.0 μ s	-4.43 dBm																						
$\pi/4$ DQPSK_2DH3 /LCH- Accumulated	Agilent Spectrum Analyzer - Sweep 5A Center Freq 2.402000000 GHz Ref Offset 9.48 dB Ref 20.00 dBm ΔMkr1 1.652 ms -1.61 dB Center 2.402000000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 31.60 s (10001 pts)																											
$\pi/4$ DQPSK_2DH3 /MCH- One Burst	Agilent Spectrum Analyzer - Sweep 5A Center Freq 2.441000000 GHz Ref Offset 9.52 dB Ref 20.00 dBm ΔMkr1 1.652 ms -1.61 dB Center 2.441000000 GHz Res BW 1.0 MHz #VBW 3.0 MHz Sweep 10.00 ms (10001 pts) <table><tr><th>MNR</th><th>MODE</th><th>TRC</th><th>SCN</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr><tr><td>1</td><td>A2</td><td>1</td><td>t</td><td>(A)</td><td>1.652 ms (A)</td><td>-1.61 dB</td><td></td><td></td></tr><tr><td>2</td><td>F</td><td>1</td><td>t</td><td>(A)</td><td>334.0 μs</td><td>-4.76 dBm</td><td></td><td></td></tr></table>	MNR	MODE	TRC	SCN	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	A2	1	t	(A)	1.652 ms (A)	-1.61 dB			2	F	1	t	(A)	334.0 μ s	-4.76 dBm		
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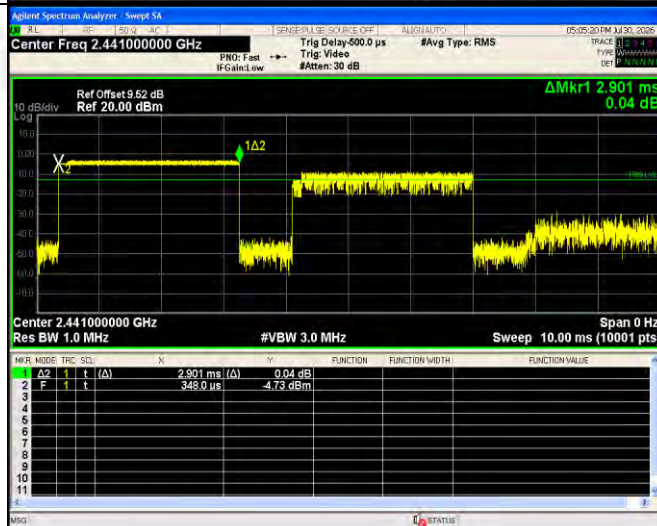
8DPSK_3DH5/LCH-
One Burst

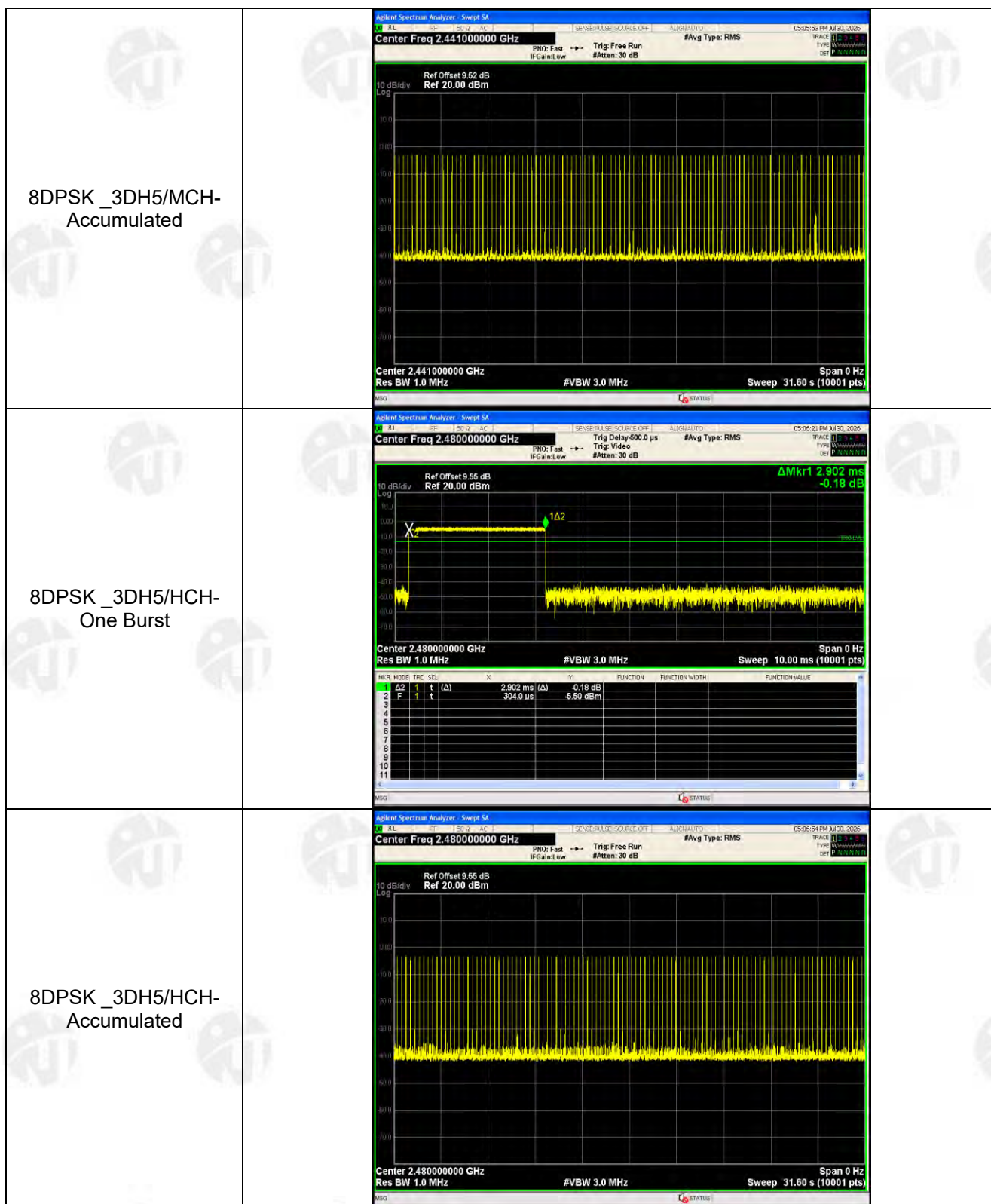


8DPSK_3DH5/LCH-
Accumulated



8DPSK_3DH5/MCH-
One Burst





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 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, 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

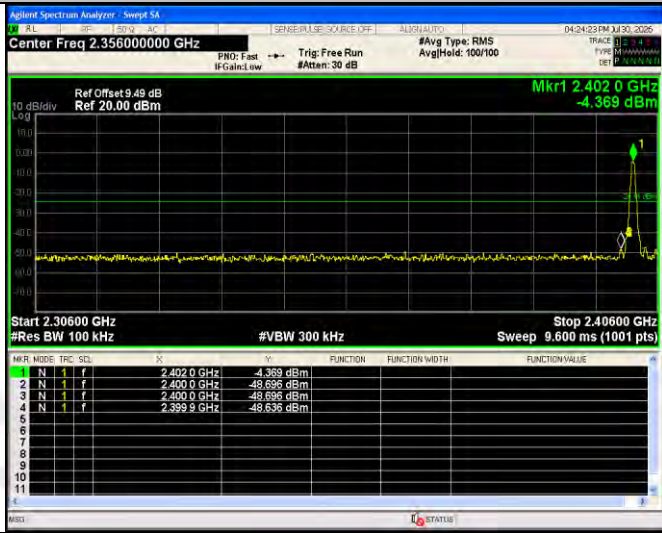
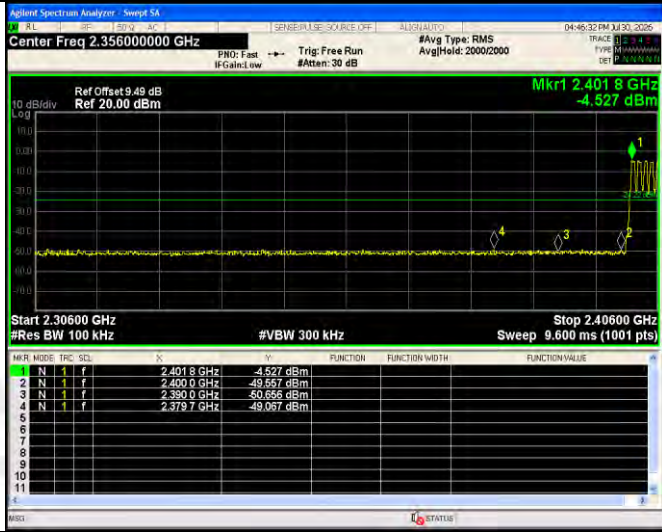
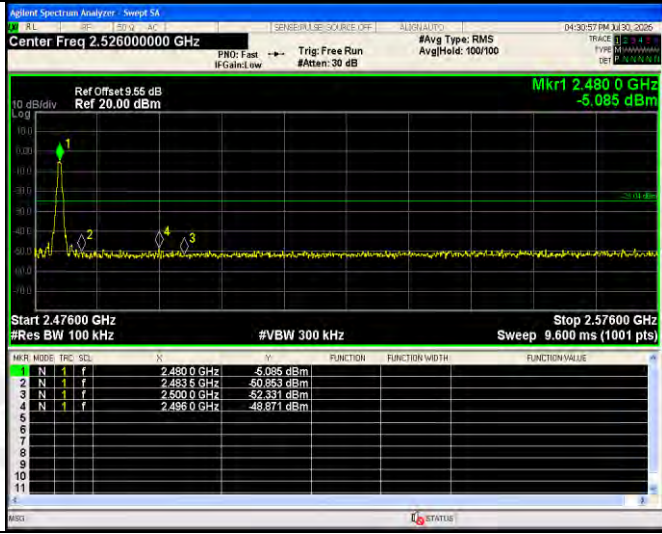


9.3. Test Procedure

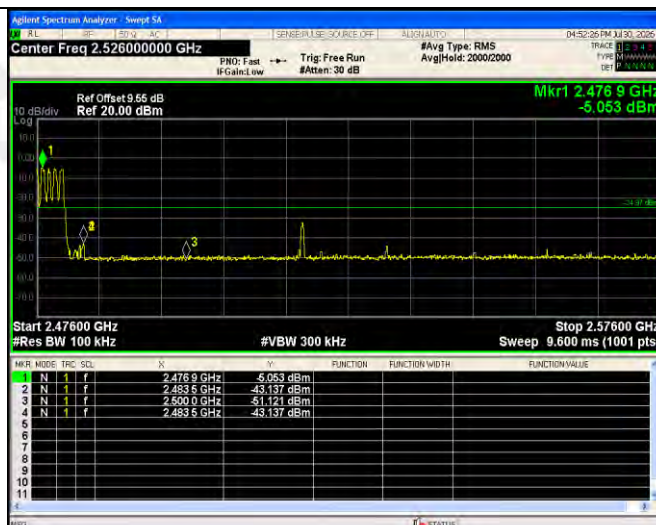
The EUT must have its hopping/Non-hopping function enabled. Using the following spectrum analyzer setting:

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.

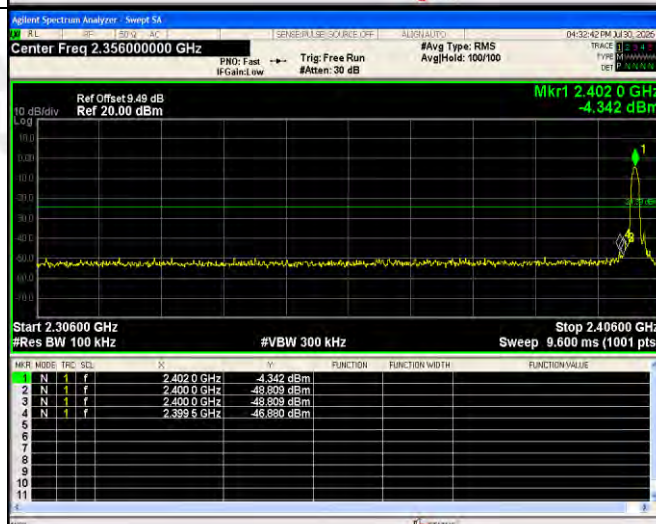
9.4. Test Result

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

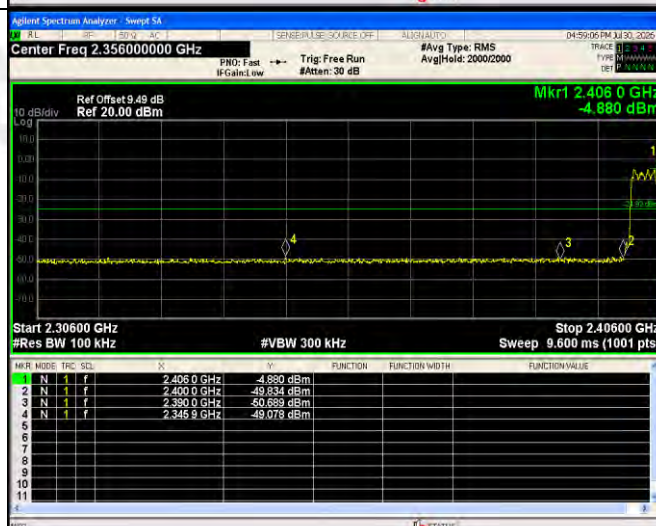
GFSK/HCH/
Hop



π /4DQPSK/LCH/
No Hop

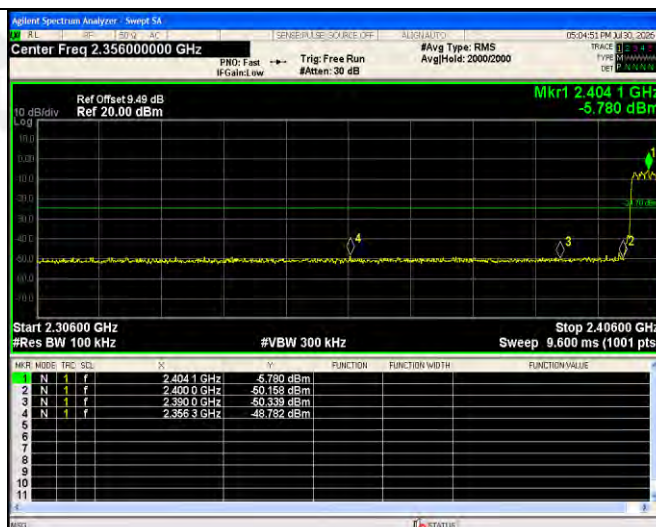


π /4DQPSK/LCH/
Hop

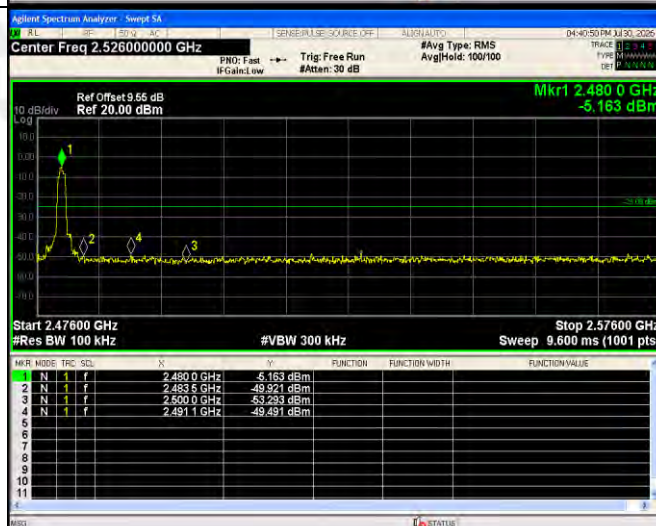


$\pi/4$ DQPSK/HCH/ No Hop	Agilent Spectrum Analyzer - Sweep SA Center Freq 2.526000000 GHz Ref Offset 9.55 dB Ref 20.00 dBm Mkr1 2.480 0 GHz -4.948 dBm Start 2.47600 GHz #Res BW 100 kHz Stop 2.57600 GHz #VBW 300 kHz Sweep 9.600 ms (1001 pts) <table><thead><tr><th>MNR</th><th>MODE</th><th>TRG</th><th>SQL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.480 0 GHz</td><td>-4.948 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.483 6 GHz</td><td>-49.307 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.500 0 GHz</td><td>-52.643 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.494 4 GHz</td><td>-47.739 dBm</td><td></td><td></td><td></td></tr></tbody></table>	MNR	MODE	TRG	SQL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.480 0 GHz	-4.948 dBm				2	N	1	f	2.483 6 GHz	-49.307 dBm				3	N	1	f	2.500 0 GHz	-52.643 dBm				4	N	1	f	2.494 4 GHz	-47.739 dBm			
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$\pi/4$ DQPSK/HCH/ Hop	Agilent Spectrum Analyzer - Sweep SA Center Freq 2.526000000 GHz Ref Offset 9.55 dB Ref 20.00 dBm Mkr1 2.479 0 GHz -5.507 dBm Start 2.47600 GHz #Res BW 100 kHz Stop 2.57600 GHz #VBW 300 kHz Sweep 9.600 ms (1001 pts) <table><thead><tr><th>MNR</th><th>MODE</th><th>TRG</th><th>SQL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.479 0 GHz</td><td>-5.507 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.483 6 GHz</td><td>-50.504 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.500 0 GHz</td><td>-48.999 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.496 4 GHz</td><td>-48.784 dBm</td><td></td><td></td><td></td></tr></tbody></table>	MNR	MODE	TRG	SQL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.479 0 GHz	-5.507 dBm				2	N	1	f	2.483 6 GHz	-50.504 dBm				3	N	1	f	2.500 0 GHz	-48.999 dBm				4	N	1	f	2.496 4 GHz	-48.784 dBm			
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8DPSK/LCH/No Hop	Agilent Spectrum Analyzer - Sweep SA Center Freq 2.356000000 GHz Ref Offset 9.49 dB Ref 20.00 dBm Mkr1 2.402 0 GHz -4.398 dBm Start 2.30600 GHz #Res BW 100 kHz Stop 2.40600 GHz #VBW 300 kHz Sweep 9.600 ms (1001 pts) <table><thead><tr><th>MNR</th><th>MODE</th><th>TRG</th><th>SQL</th><th>X</th><th>Y</th><th>FUNCTION</th><th>FUNCTION WIDTH</th><th>FUNCTION VALUE</th></tr></thead><tbody><tr><td>1</td><td>N</td><td>1</td><td>f</td><td>2.402 0 GHz</td><td>-4.398 dBm</td><td></td><td></td><td></td></tr><tr><td>2</td><td>N</td><td>1</td><td>f</td><td>2.400 0 GHz</td><td>-48.452 dBm</td><td></td><td></td><td></td></tr><tr><td>3</td><td>N</td><td>1</td><td>f</td><td>2.400 0 GHz</td><td>-48.452 dBm</td><td></td><td></td><td></td></tr><tr><td>4</td><td>N</td><td>1</td><td>f</td><td>2.399 6 GHz</td><td>-47.074 dBm</td><td></td><td></td><td></td></tr></tbody></table>	MNR	MODE	TRG	SQL	X	Y	FUNCTION	FUNCTION WIDTH	FUNCTION VALUE	1	N	1	f	2.402 0 GHz	-4.398 dBm				2	N	1	f	2.400 0 GHz	-48.452 dBm				3	N	1	f	2.400 0 GHz	-48.452 dBm				4	N	1	f	2.399 6 GHz	-47.074 dBm			
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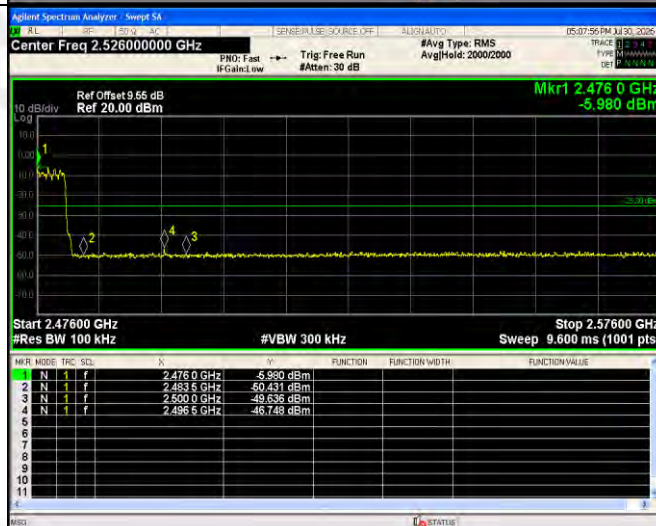
8DPSK
/LCH/Hop



8DPSK /HCH/No
Hop

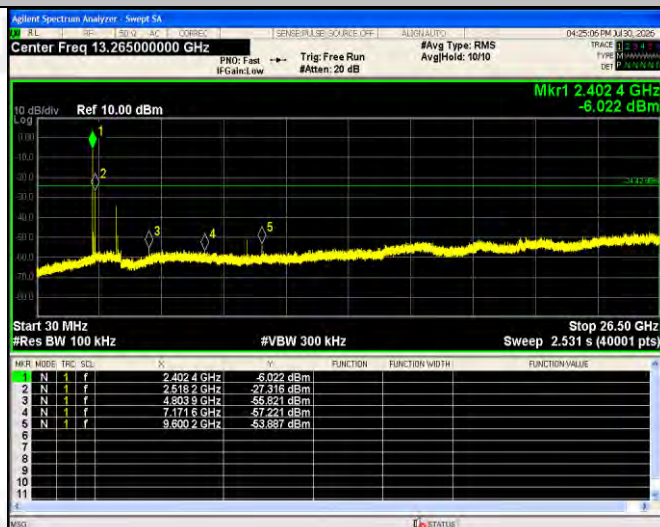


8DPSK
/HCH/Hop

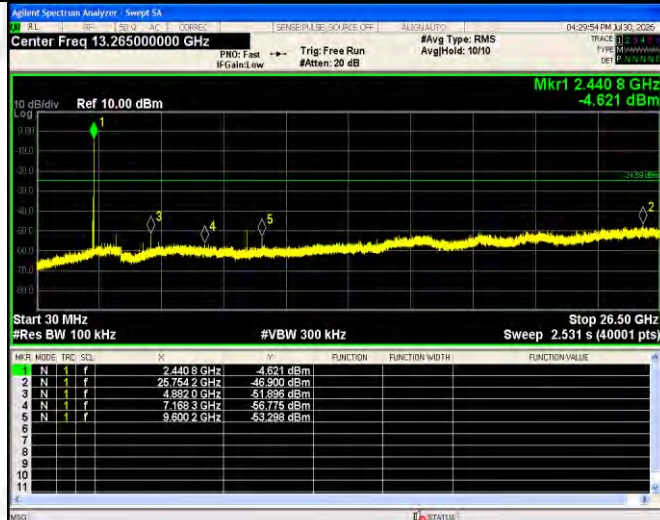


RF Conducted Spurious Emissions Graphs

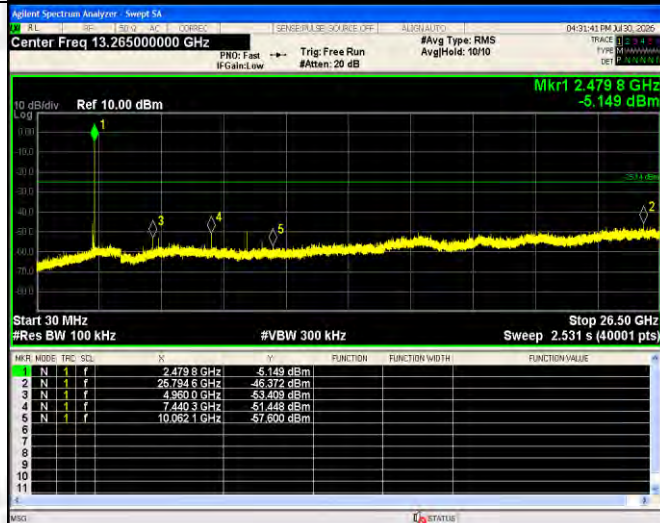
GFSK/LCH



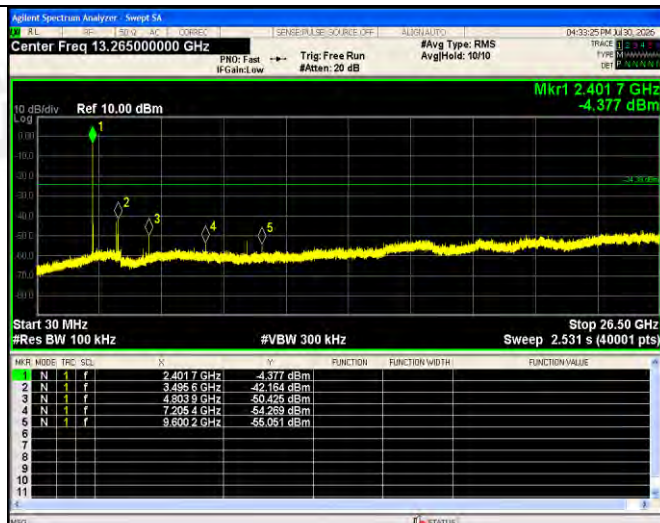
GFSK/MCH



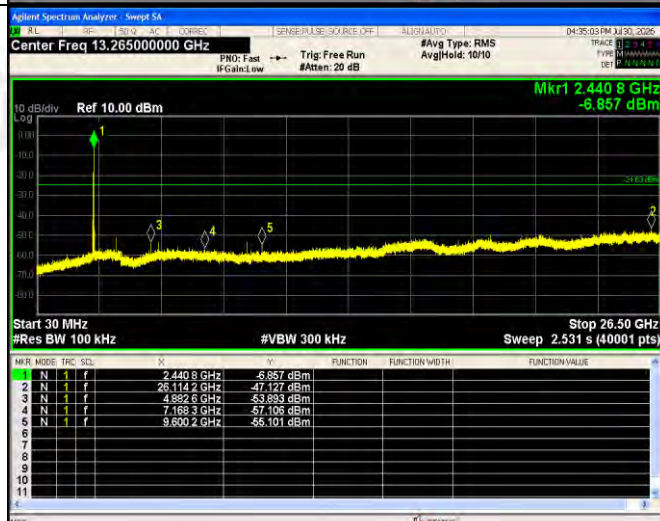
GFSK/HCH



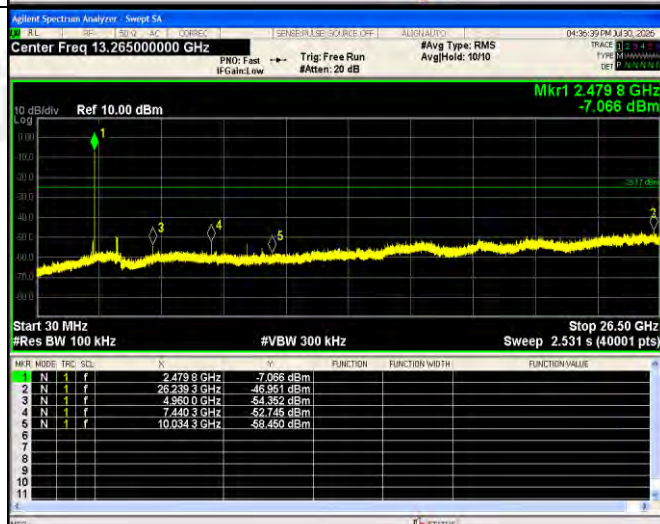
$\pi/4$ DQPSK /LCH



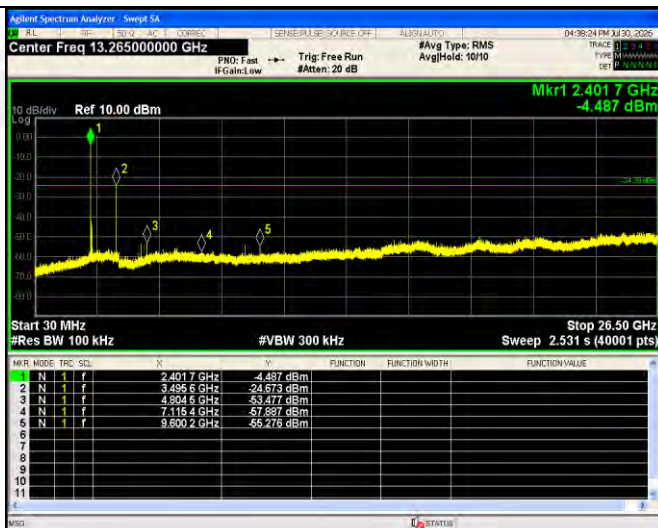
$\pi/4$ DQPSK/MCH



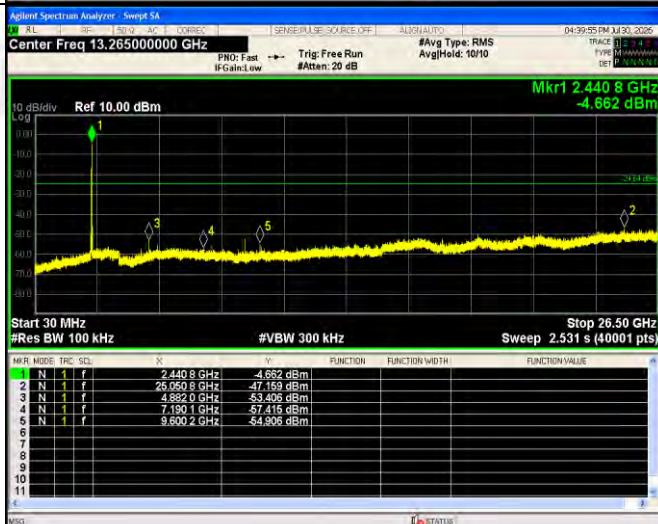
$\pi/4$ DQPSK/HCH



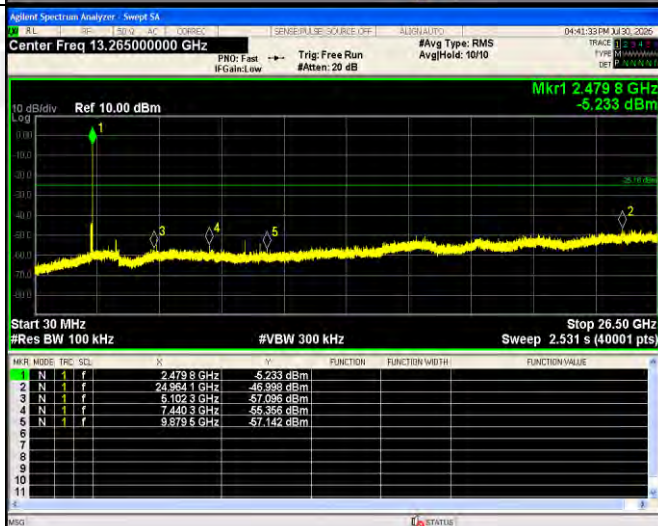
8DPSK /LCH



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 Chip antenna which permanently attached, and the best case gain of the antenna is 2.58dBi. It complies with the standard requirement.

11. TEST SETUP & EUT PHOTOGRAPH

Reference to EUT photo attachment for details.

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