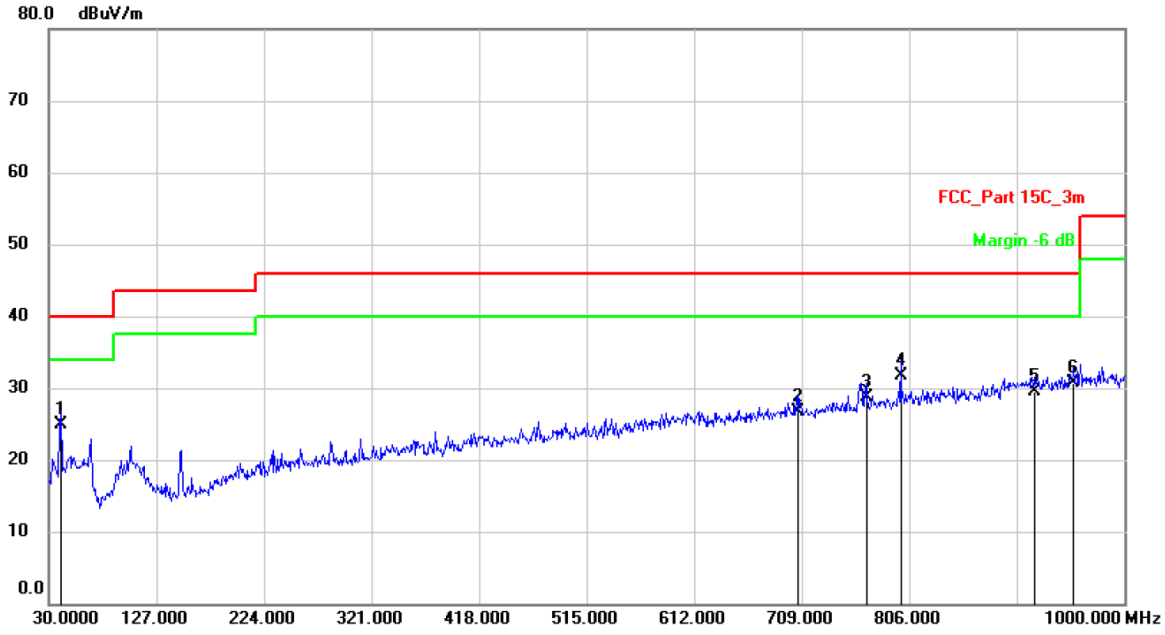
M/N: M010 V3	Testing Voltage: AC 120V 60Hz
Polarization: Horizontal	Detector: QP
Test Mode: 5	Distance: 3m

Radiated Emission Measurement

Date: 2024/3/18 Time: 17:12:50

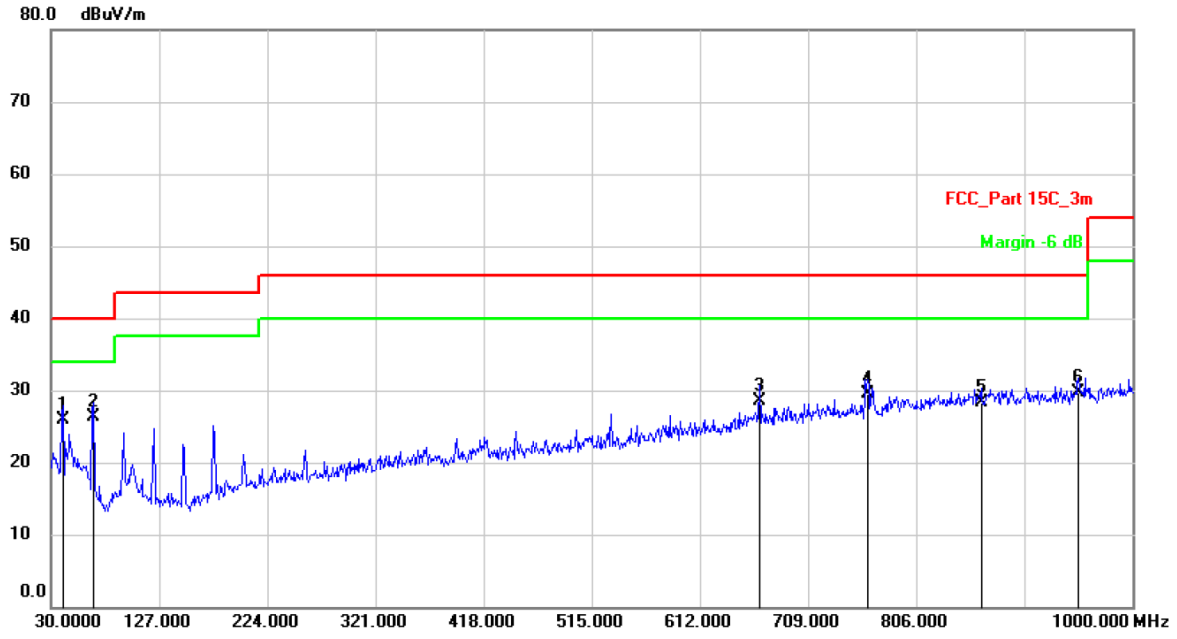


No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		40.6699	32.74	-7.84	24.90	40.00	-15.10	QP	
2		705.1200	24.53	2.27	26.80	46.00	-19.20	QP	
3		767.2000	25.34	3.36	28.70	46.00	-17.30	QP	
4	*	798.2400	27.88	3.92	31.80	46.00	-14.20	QP	
5		919.4900	23.27	6.23	29.50	46.00	-16.50	QP	
6		954.4100	24.52	6.28	30.80	46.00	-15.20	QP	

M/N: M010 V3	Testing Voltage: AC 120V 60Hz
Polarization: Vertical	Detector: QP
Test Mode: 5	Distance: 3m

Radiated Emission Measurement

Date: 2024/3/18 Time: 17:06:29



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB/m	dBuV/m	dBuV/m	dB	Detector	Comment
1		40.6699	33.74	-7.84	25.90	40.00	-14.10	QP	
2	*	67.8300	36.36	-10.06	26.30	40.00	-13.70	QP	
3		665.3500	27.03	1.57	28.60	46.00	-17.40	QP	
4		762.3500	26.24	3.26	29.50	46.00	-16.50	QP	
5		864.2000	23.40	4.90	28.30	46.00	-17.70	QP	
6		951.5000	24.62	5.08	29.70	46.00	-16.30	QP	

Modulation: 8DPSK (the worst case)					Test Result: PASS		Test frequency range: 1-25GHz			
Freq. (MHz)	Ant. Pol. (H/V)	Reading Level(dBuV)		Factor (dB/m)	Emission Level (dBuV/m)		Limit 3m (dBuV/m)		Margin (dB)	
		PK	AV		PK	AV	PK	AV	PK	AV
Operation Mode: TX Mode (Low) + NFC										
4804	H	44.92	33.28	6.30	51.22	39.58	74.00	54.00	-22.78	-14.42
7206	H	45.49	33.06	10.44	55.93	43.50	74.00	54.00	-18.07	-10.50

4804	V	46.17	34.03	6.30	52.47	40.33	74.00	54.00	-21.53	-13.67
7206	V	46.80	35.55	10.44	57.24	45.99	74.00	54.00	-16.76	-8.01

Operation Mode: TX Mode (Mid) + NFC										
4882	H	44.64	33.74	6.60	51.24	40.34	74.00	54.00	-22.76	-13.66
7323	H	44.87	31.93	10.55	55.42	42.48	74.00	54.00	-18.58	-11.52

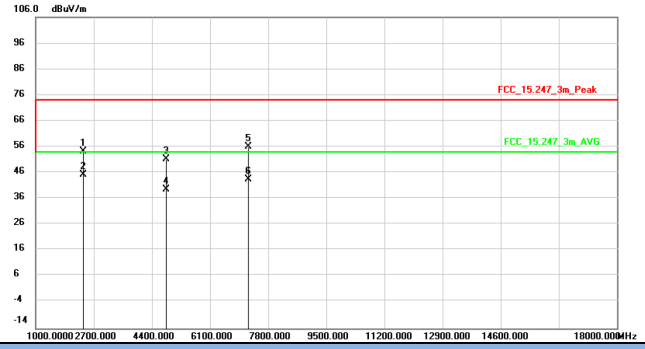
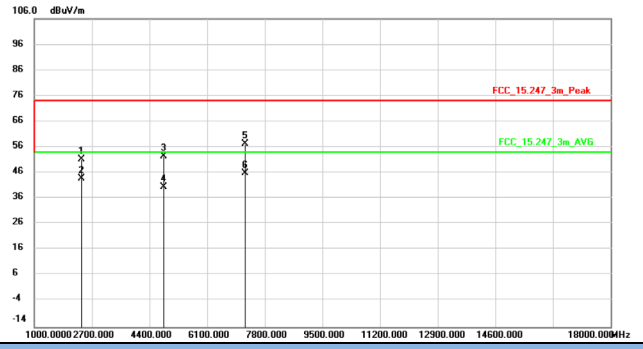
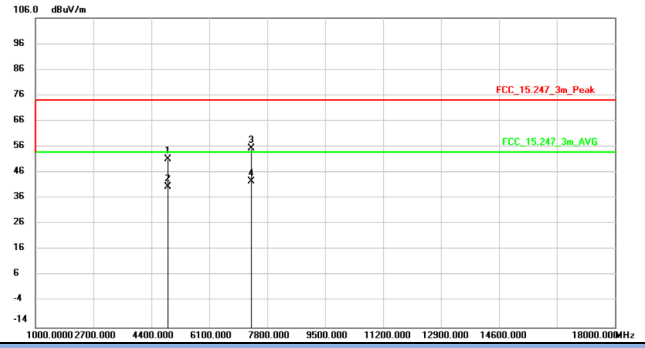
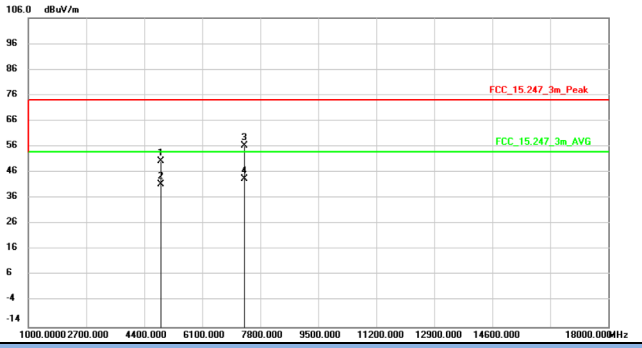
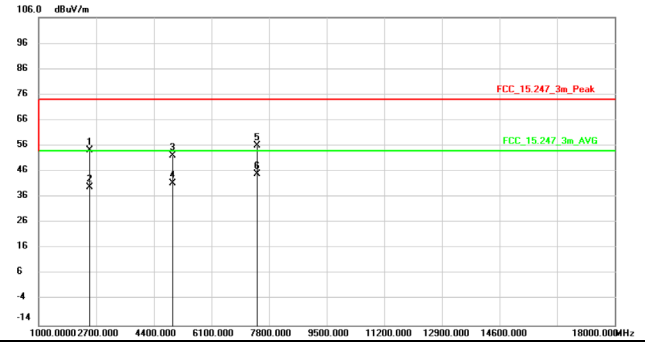
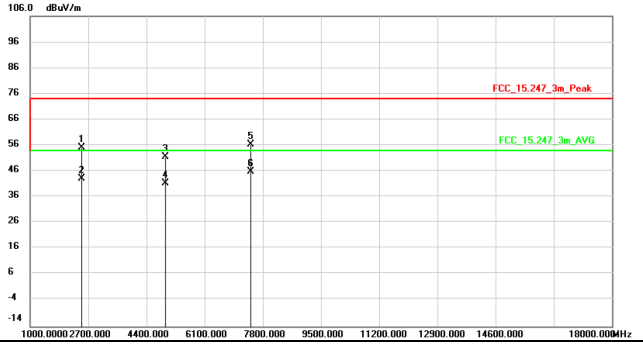
4882	V	43.71	34.87	6.60	50.31	41.47	74.00	54.00	-23.69	-12.53
7323	V	45.74	32.92	10.55	56.29	43.47	74.00	54.00	-17.71	-10.53

Operation Mode: TX Mode (High) + NFC										
4960	H	45.23	34.31	6.89	52.12	41.20	74.00	54.00	-21.88	-12.80
7440	H	45.51	34.36	10.60	56.11	44.96	74.00	54.00	-17.89	-9.04

4960	V	44.69	34.47	6.89	51.58	41.36	74.00	54.00	-22.42	-12.64
7440	V	45.67	35.38	10.60	56.27	45.98	74.00	54.00	-17.73	-8.02

Spurious Emission in restricted band:										
2390.000	H	54.03	45.30	0.09	54.12	45.39	74.00	54.00	-19.88	-8.61
2390.000	V	51.13	43.60	0.09	51.22	43.69	74.00	54.00	-22.78	-10.31
2483.500	H	54.01	39.64	0.34	54.35	39.98	74.00	54.00	-19.65	-14.02
2483.500	V	54.78	42.71	0.34	55.12	43.05	74.00	54.00	-18.88	-10.95

Remark: Data of measurement within this frequency range shown “---” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits.

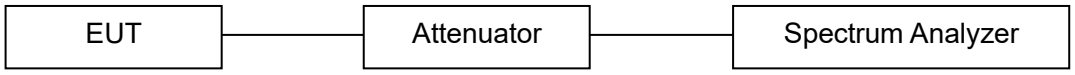
Operation Mode: TX Mode (Low) + NFC	
Horizontal	Vertical
	
Operation Mode: TX Mode (Mid) + NFC	
Horizontal	Vertical
	
Operation Mode: TX Mode (High) + NFC	
Horizontal	Vertical
	

13.3 Channel Separation test

LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

a. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

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

c. Enable the EUT hopping function.

d. Set spectrum analyzer and perform testing according to ANSI C63.10 clause 7.8.2.

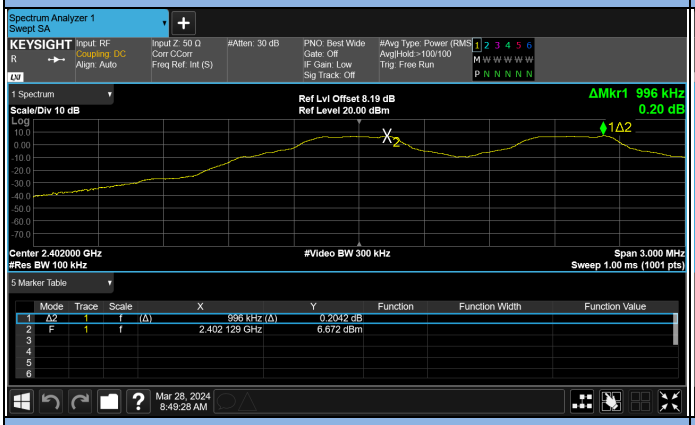
TEST RESULTS

PASS

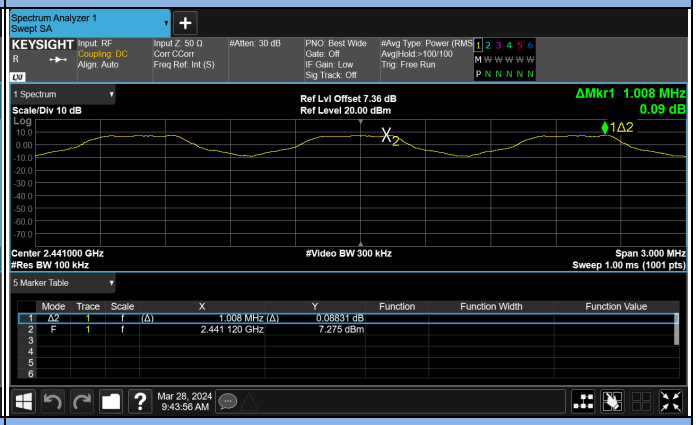
Please refer to the following tables.

Modulation	Channel	Frequency (MHz)	Hopping Separation Measurement (MHz)	Hopping Separation Limit (MHz)	Test Result
GFSK	Low	2402	0.996	>0.688	Pass
	Mid	2441	1.008	>0.685	Pass
	High	2480	1.002	>0.689	Pass
π/4-DQPSK	Low	2402	1.002	>0.904	Pass
	Mid	2441	0.999	>0.905	Pass
	High	2480	0.999	>0.907	Pass
8DPSK	Low	2402	0.999	>0.877	Pass
	Mid	2441	0.996	>0.878	Pass
	High	2480	1.002	>0.883	Pass

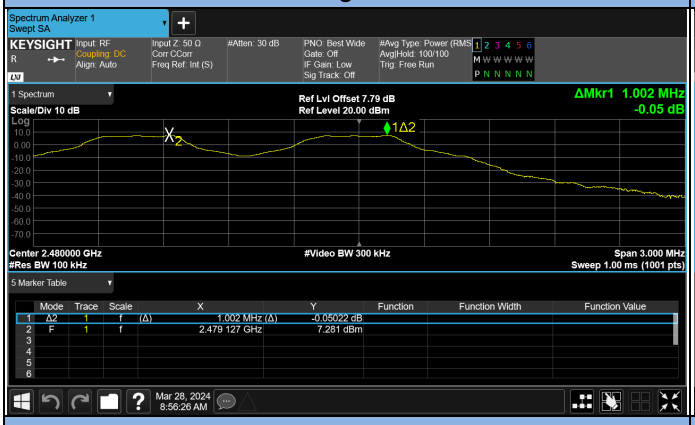
GFSK / Low Channel



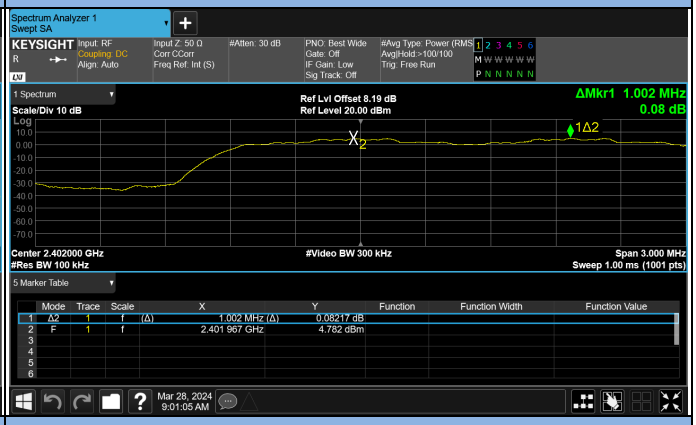
GFSK / Mid Channel



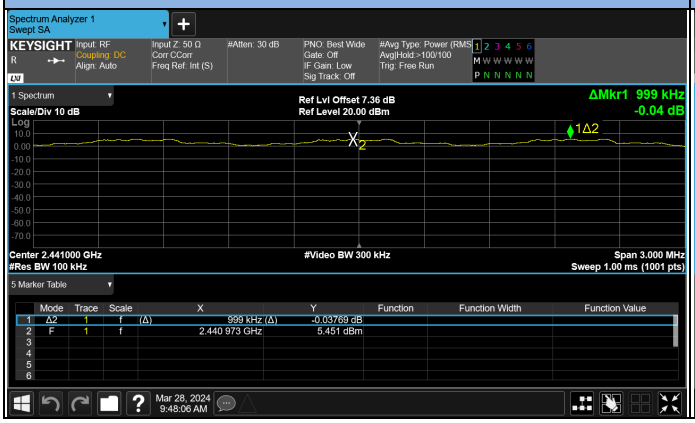
GFSK / High Channel



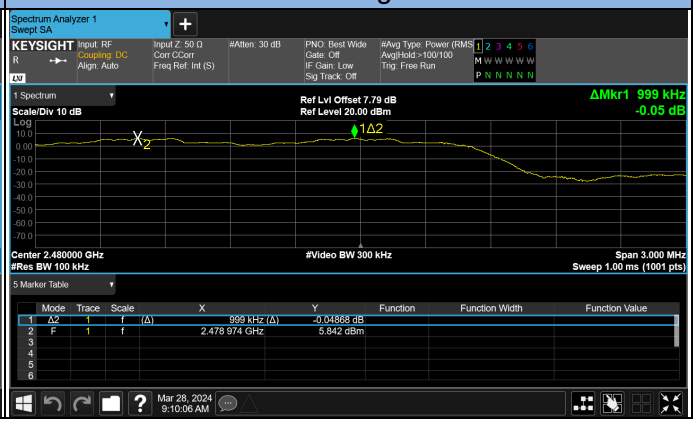
π/4-DQPSK / Low Channel

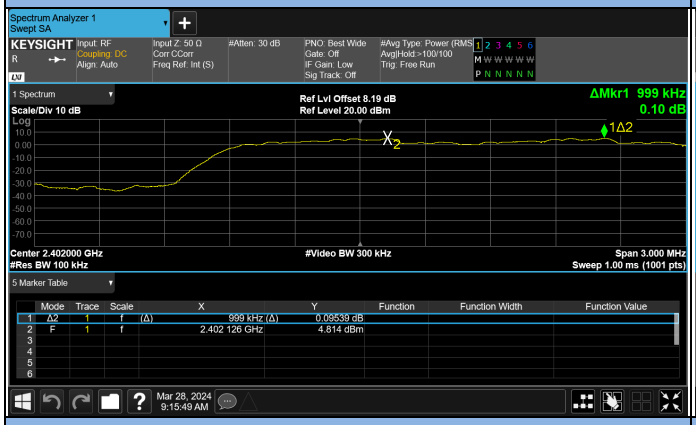
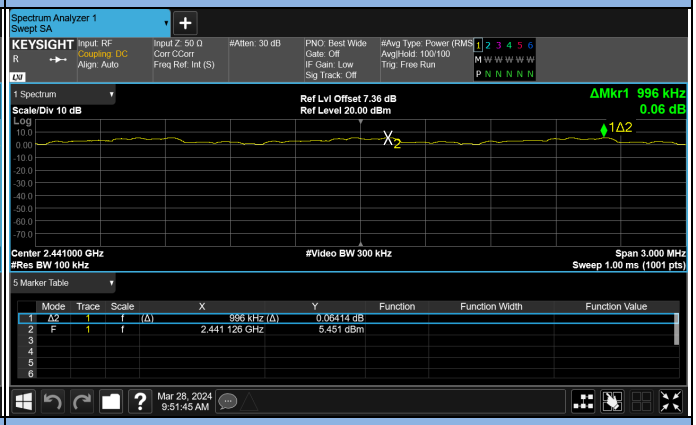
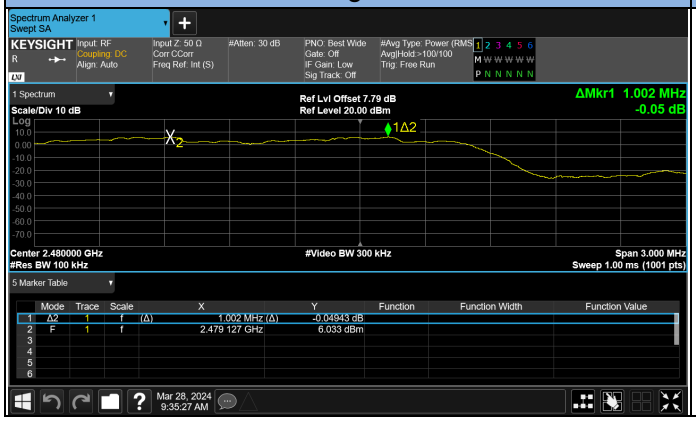


π/4-DQPSK / Mid Channel



π/4-DQPSK / High Channel



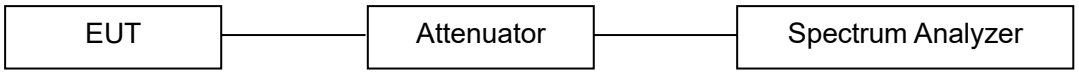
8DPSK / Low Channel	8DPSK / Mid Channel
	
8DPSK / High Channel	**---**
	---

13.4 20dB Bandwidth

LIMIT

N/A

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

a. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

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

c. Set spectrum analyzer and perform testing according to ANSI C63.10 clause 6.9.2.

TEST RESULTS

PASS

Please refer to the following tables.

Modulation	Channel	Frequency (MHz)	20dB Measurement (MHz)	Limit (MHz)	Remark
GFSK	Low	2402	1.032	N/A	Reporting only
	Mid	2441	1.028	N/A	
	High	2480	1.033	N/A	
π/4-DQPSK	Low	2402	1.356	N/A	
	Mid	2441	1.357	N/A	
	High	2480	1.361	N/A	
8DPSK	Low	2402	1.316	N/A	
	Mid	2441	1.317	N/A	
	High	2480	1.325	N/A	

GFSK / Low Channel

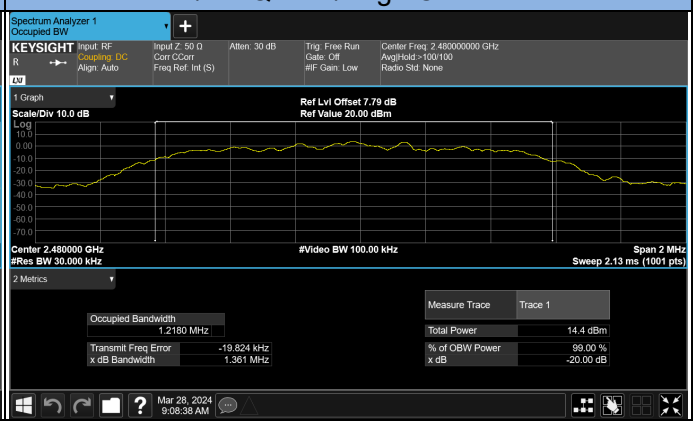
GFSK / Mid Channel

GFSK / High Channel

π/4-DQPSK / Low Channel

π/4-DQPSK / Mid Channel

π/4-DQPSK / High Channel



8DPSK / Low Channel

8DPSK / Mid Channel

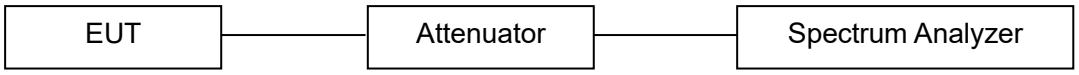
8DPSK / High Channel

13.5 Hopping Channel Number

LIMIT

Frequency hopping systems in the 2400-2483.5MHz band shall use at least 15 channels.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

a. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

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

c. Enable the EUT hopping function.

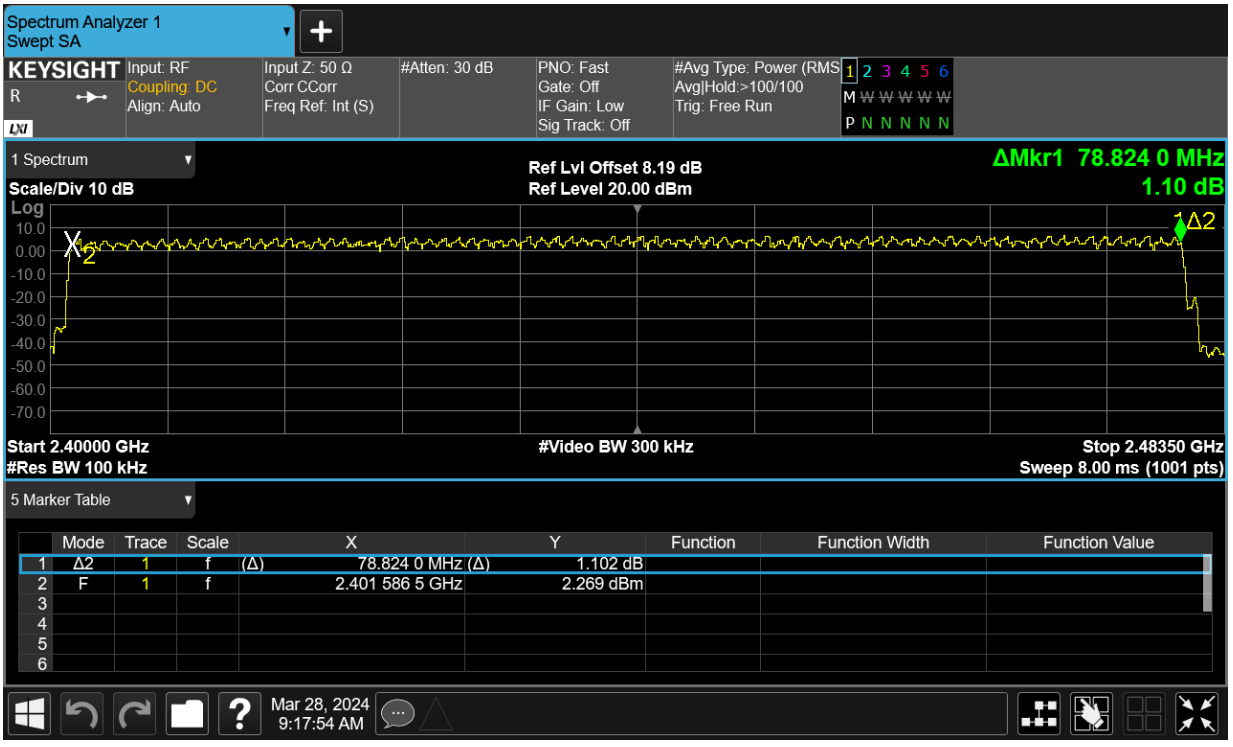
d. Set spectrum analyzer and perform testing according to ANSI C63.10 clause 7.8.3.

TEST RESULTS

PASS

Please refer to the following table.

Modulation	Number of Hopping Channels Measurement	Limit	Test Result
GFSK	79	≥15	PASS
π/4-DQPSK	79	≥15	PASS
8DPSK	79	≥15	PASS
The worst case: 8DPSK			

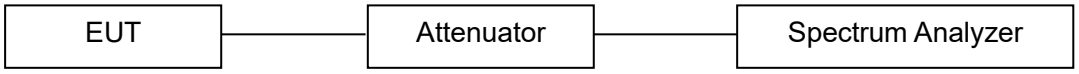


13.6 Time of Occupancy (Dwell Time)

LIMIT

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

a. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

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

c. Enable the EUT hopping function.

d. Set spectrum analyzer and perform testing according to ANSI C63.10 clause 7.8.4.

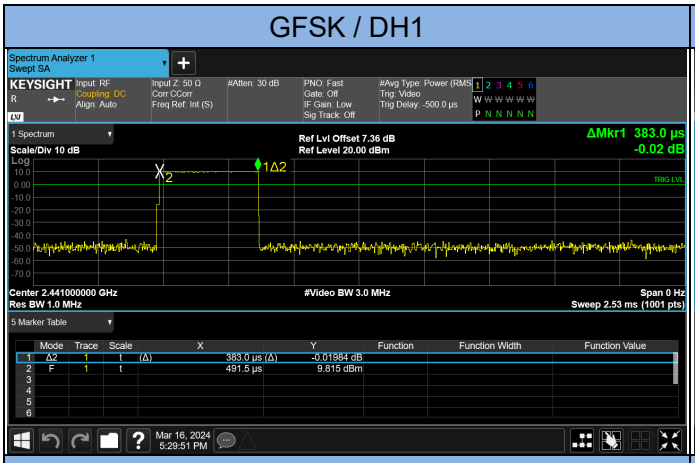
TEST RESULTS

PASS

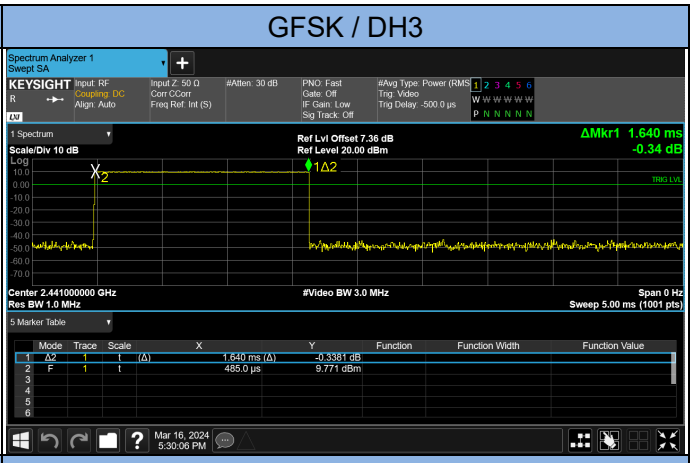
Please refer to the following table.

Modulation	Packet	Frequency (MHz)	Dwell Time Measurement (msec)	Limit (msec)	Test Result
GFSK	DH1	2441	0.383 (ms)*(1600/(2*79))*31.6= 122.56	400	Pass
	DH3	2441	1.640 (ms)*(1600/(4*79))*31.6= 262.40	400	Pass
	DH5	2441	2.885 (ms)*(1600/(6*79))*31.6= 307.73	400	Pass
π/4-DQPSK	2-DH1	2441	0.390 (ms)*(1600/(2*79))*31.6= 124.80	400	Pass
	2-DH3	2441	1.640 (ms)*(1600/(4*79))*31.6= 262.40	400	Pass
	2-DH5	2441	2.885 (ms)*(1600/(6*79))*31.6= 307.73	400	Pass
8DPSK	3-DH1	2441	0.390 (ms)*(1600/(2*79))*31.6= 124.80	400	Pass
	3-DH3	2441	1.640 (ms)*(1600/(4*79))*31.6= 262.40	400	Pass
	3-DH5	2441	2.893 (ms)*(1600/(6*79))*31.6= 308.59	400	Pass

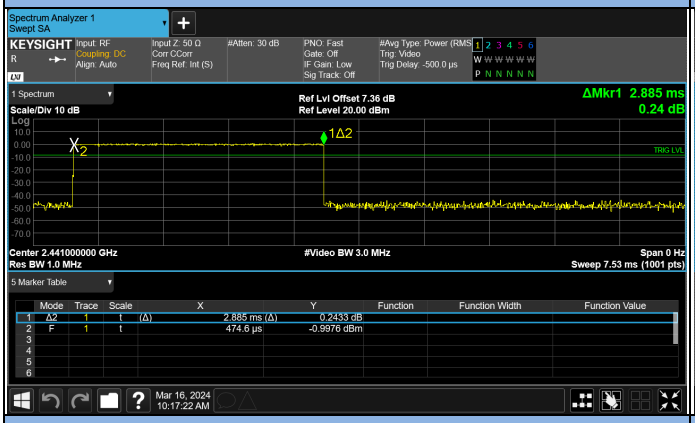
GFSK / DH1



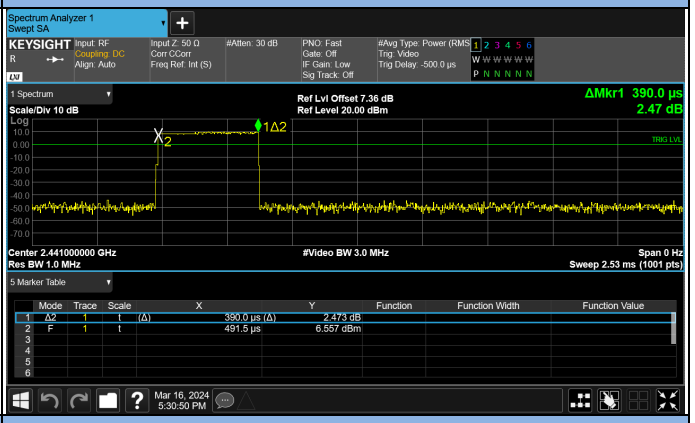
GFSK / DH3



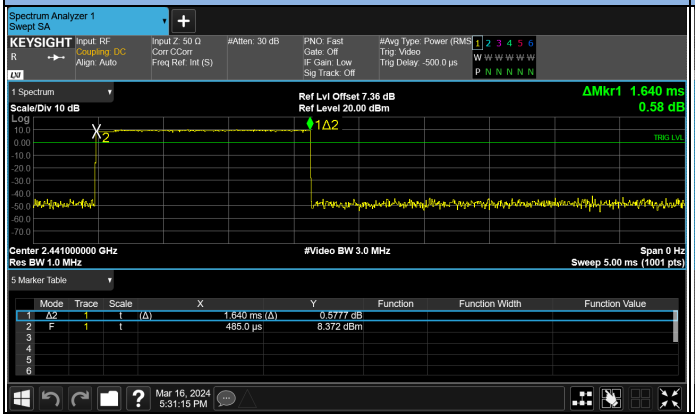
GFSK / DH5



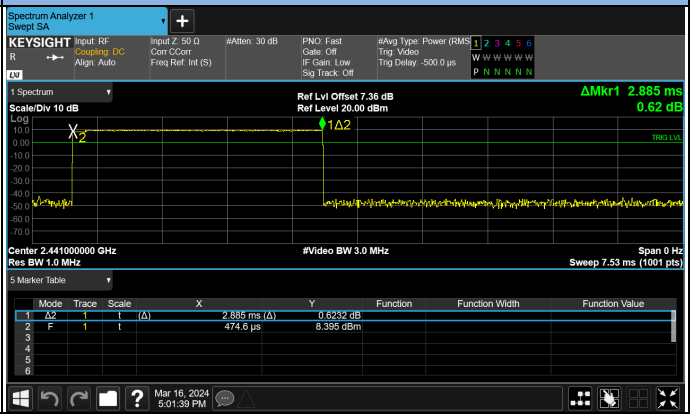
π/4-DQPSK / 2-DH1

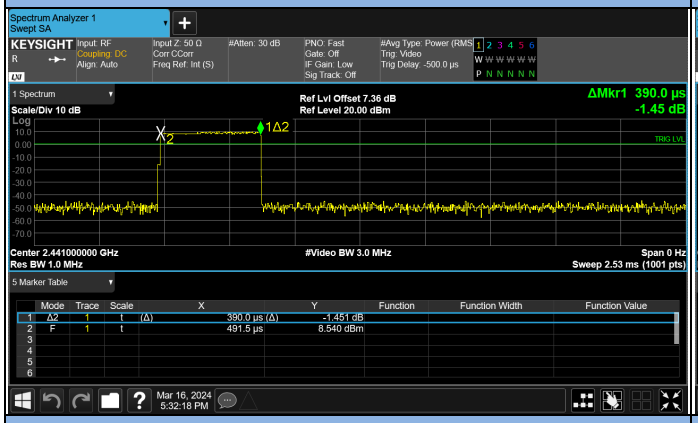
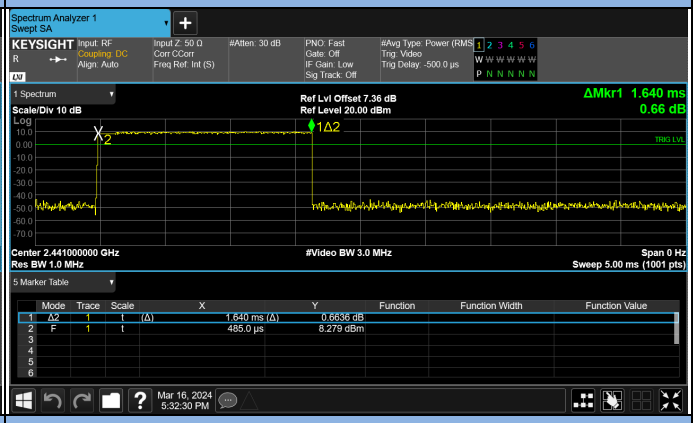
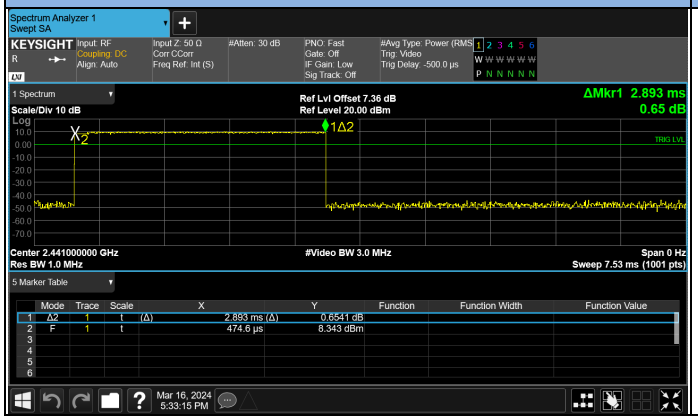


π/4-DQPSK / 2-DH3



π/4-DQPSK / 2-DH5



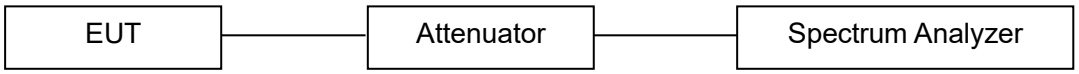
8DPSK / 3-DH1	8DPSK / 3-DH3
	
8DPSK / 3-DH5	**---**
	Blank

13.7 Maximum Peak Output Power

LIMIT

The maximum peak conducted output power of the intentional radiator shall not exceed the following: 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.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

a. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

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

c. Set spectrum analyzer and perform testing according to ANSI C63.10 clause 7.8.5.

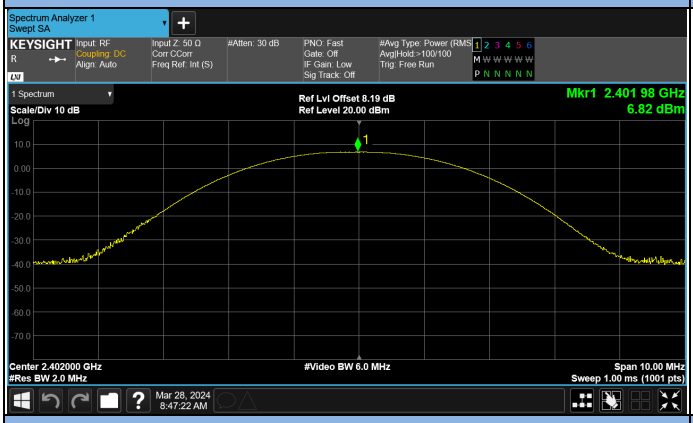
TEST RESULTS

PASS

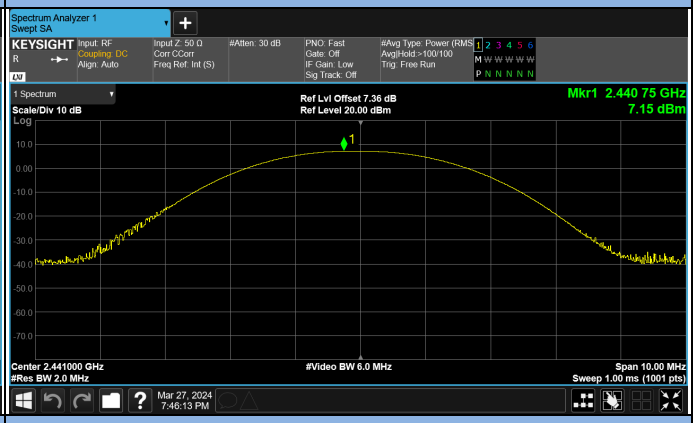
Please refer to the following tables.

Modulation	Frequency (MHz)	Peak Power output Measurement (dBm)	Peak Power output Measurement (mW)	Peak Power Limit (dBm)	Test Result
GFSK	2402.00	6.82	4.81	21	Pass
	2441.00	7.15	5.19	21	Pass
	2480.00	7.03	5.05	21	Pass
π/4-DQPSK	2402.00	7.28	5.35	21	Pass
	2441.00	7.15	5.19	21	Pass
	2480.00	7.42	5.52	21	Pass
8DPSK	2402.00	7.59	5.74	21	Pass
	2441.00	7.59	5.74	21	Pass
	2480.00	7.66	5.83	21	Pass

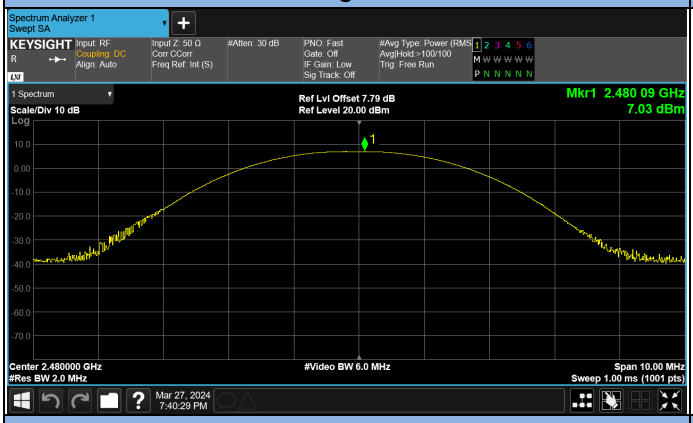
GFSK / Low Channel



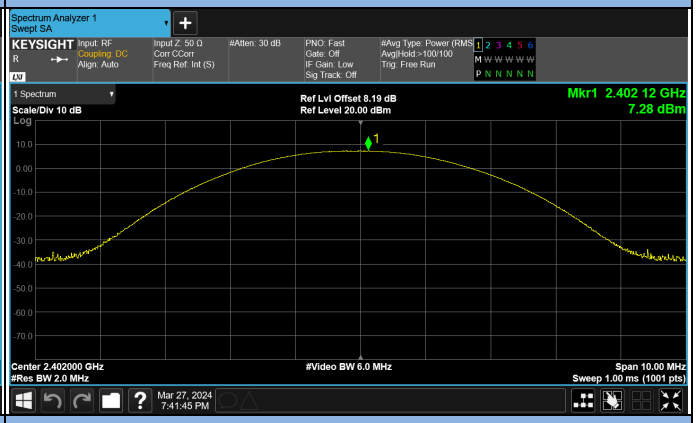
GFSK / Mid Channel



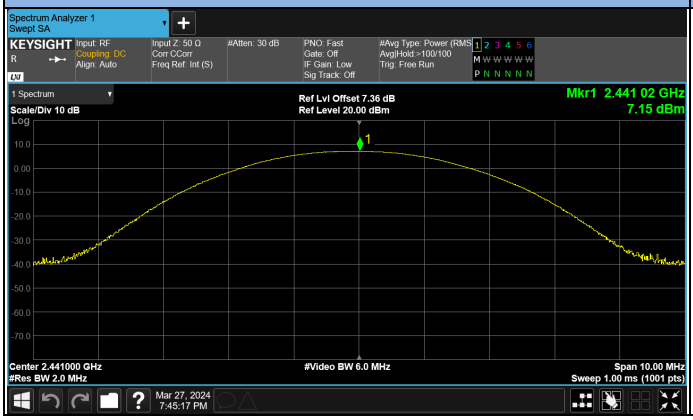
GFSK / High Channel



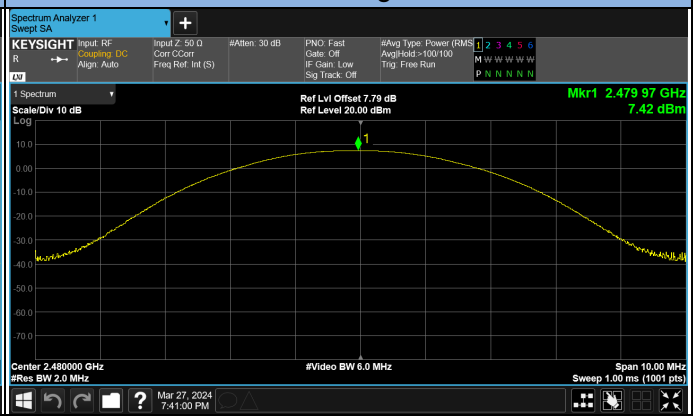
π/4-DQPSK / Low Channel

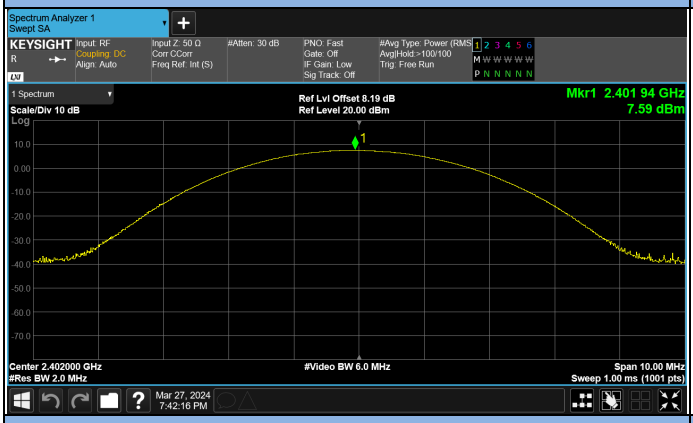
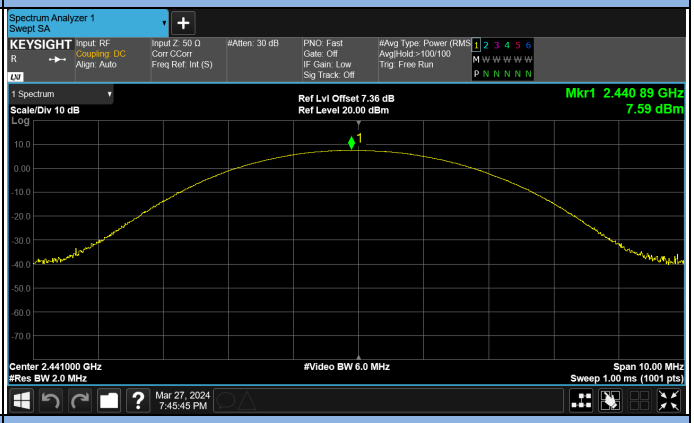
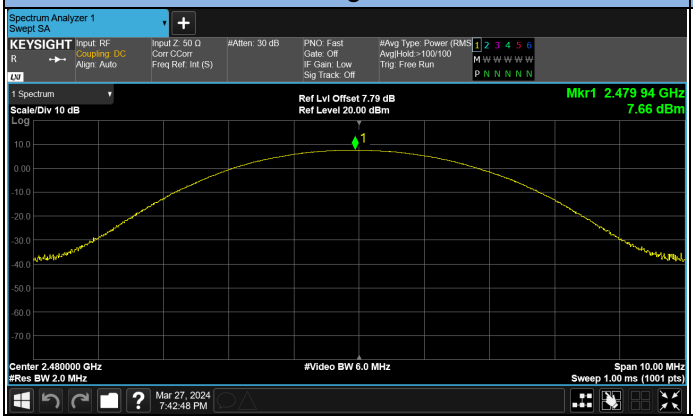


π/4-DQPSK / Mid Channel



π/4-DQPSK / High Channel



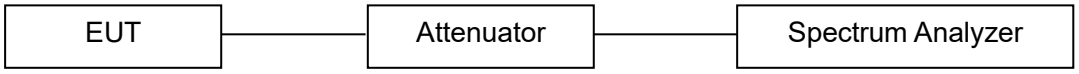
8DPSK / Low Channel	8DPSK / Mid Channel
	
8DPSK / High Channel	**---**
	Blank

13.8 Band Edge Conducted Spurious Emission Measurement

LIMIT

In any 100KHz bandwidth outside the frequency band 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, based on either an RF conducted or a radiated measurement.

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

a. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement.

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

c. Set spectrum analyzer and perform testing according to ANSI C63.10 clause 7.8.6 and 6.10.

d. Enable hopping function of the EUT and then repeat steps above.

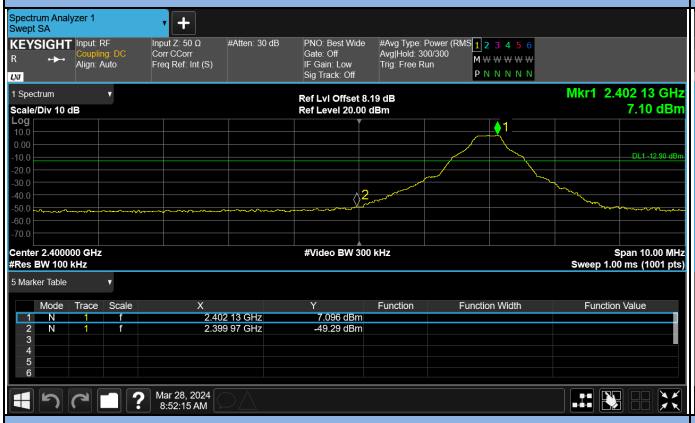
TEST RESULTS

PASS

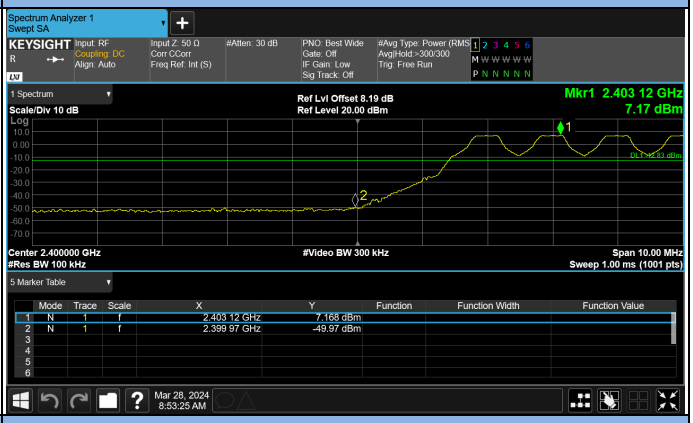
Please refer to the following test plots.

Band Edge

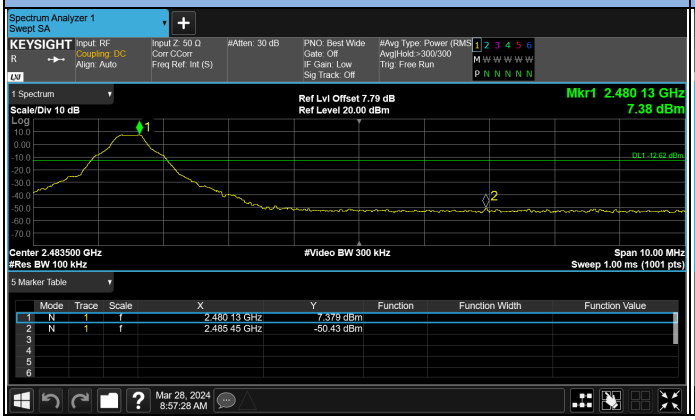
GFSK / Low / 2402



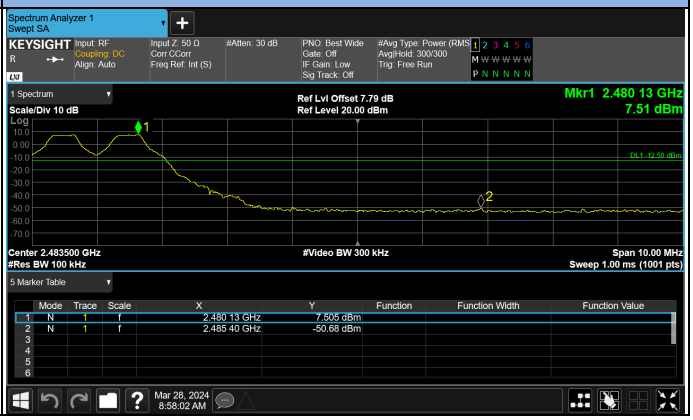
GFSK / Hopping



GFSK / High Channel / 2480

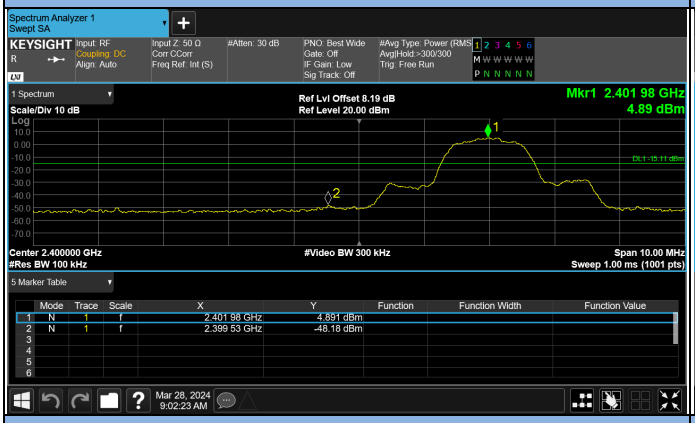


GFSK / Hopping



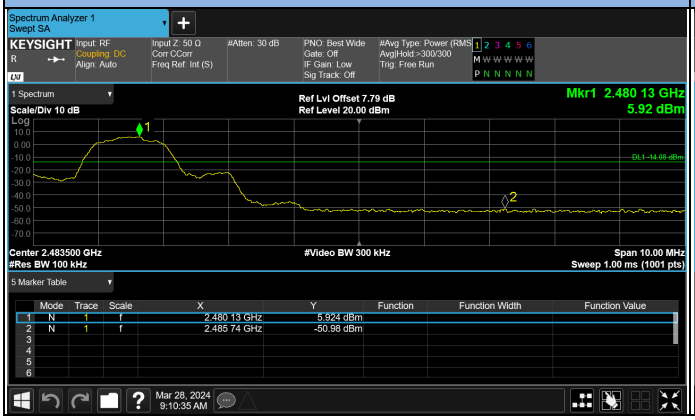
Band Edge

π/4-DQPSK / Low / 2402

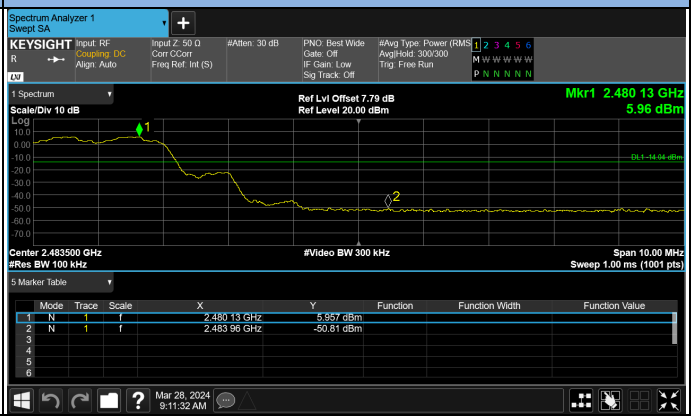


π/4-DQPSK / Hopping

π/4-DQPSK / High / 2480

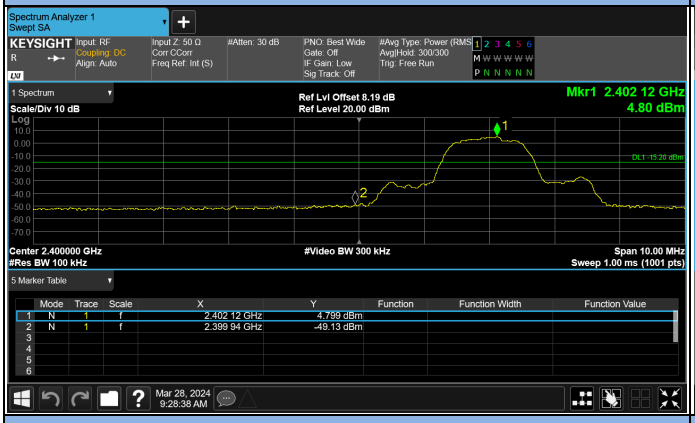


π/4-DQPSK / Hopping



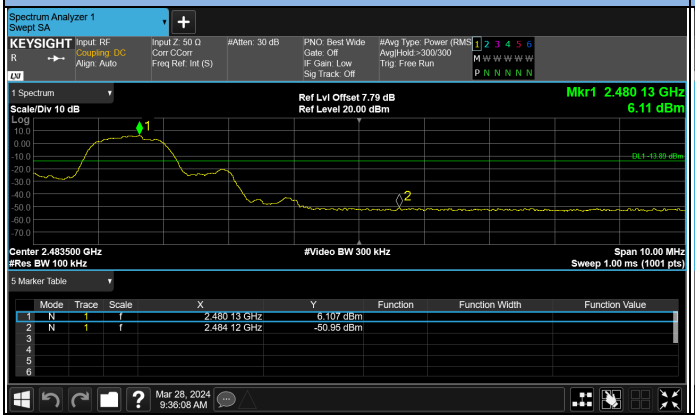
Band Edge

8DPSK / Low / 2402

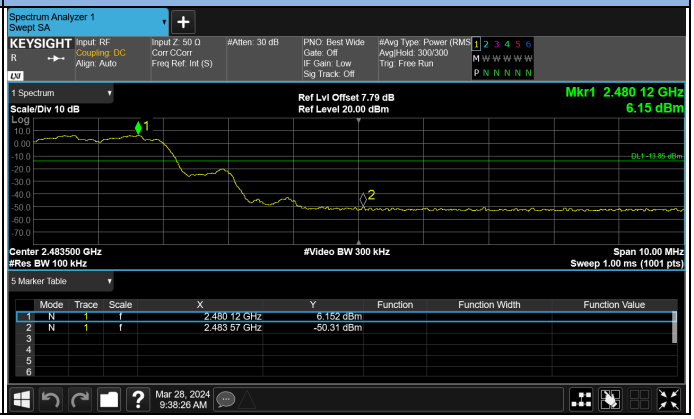


8DPSK / Hopping

8DPSK / High / 2480

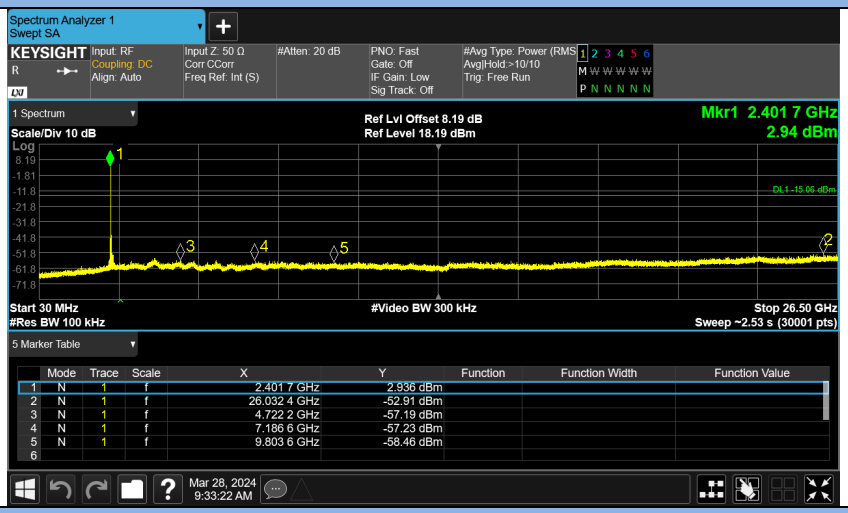


8DPSK / Hopping

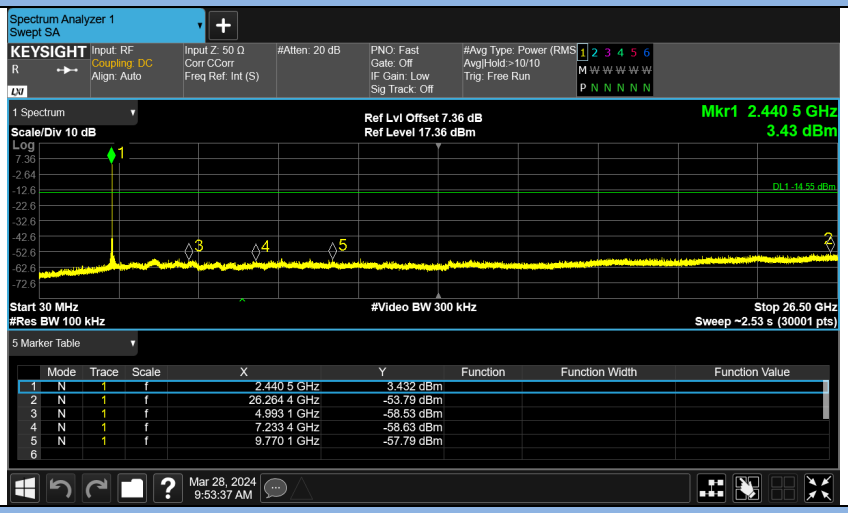


Conducted Spurious Emission (the worst case)

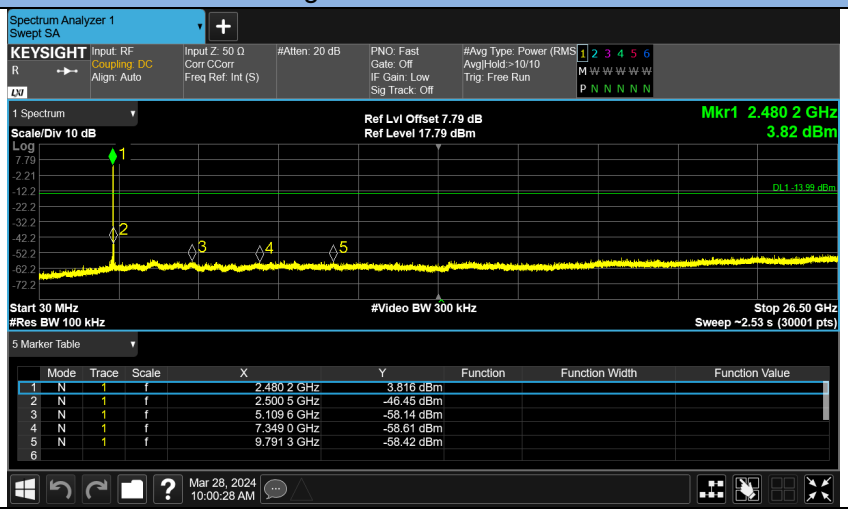
8DPSK / Low Channel / 30MHz~26.5GHz



8DPSK / Mid Channel / 30MHz~26.5GHz



8DPSK / High Channel / 30MHz~26.5GHz



13.9 Antenna Requirement

STANDARD APPLICABLE

According to of FCC part 15C section 15.203 and 15.247:

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.

Systems operating in the 2400-2483.5MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum peak output power of the intentional radiator is reduced by 1dB for every 3dB that the directional gain of the antenna exceeds 6dBi.

ANTENNA CONNECTED CONSTRUCTION

The antenna is Chip antenna that no antenna other than furnished by the responsible party shall be used with the device, and the best case gain of the antenna is 3.50dBi, Therefore, the antenna is considered to meet the requirement.

14. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	The time before last Cal.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESCI7	100837	Mar. 13, 2023	Mar. 12, 2024	1 Year
2.	Antenna	Schwarzbeck	VULB9162	9162-010	Mar. 24, 2022	Mar. 23, 2024	2 Year
3.	Spectrum Analyzer	Keysight	N9020A	MY54200831	Mar. 13, 2023	Mar. 12, 2024	1 Year
4.	Spectrum Analyzer	Keysight	N9010B	MY62170254	Aug. 08, 2022	Aug. 07, 2023	1 Year
5.	Horn Antenna+Pre-Amplifier	COM-POWER	AH-840	10100020	Mar. 24, 2022	Mar. 23, 2024	2 Year
6.	Power Sensor	DARE	RPR3006W	15I00041SNO64	Mar. 13, 2023	Mar. 12, 2024	1 Year
7.	Horn Antenna	COM-Power	AH-118	071078	Mar. 24, 2022	Mar. 23, 2024	2 Year
8.	Pre-Amplifier	HP	HP 8449B	3008A00964	Mar. 13, 2023	Mar. 12, 2024	1 Year
9.	Pre-Amplifier	HP	HP 8447D	1145A00203	Mar. 13, 2023	Mar. 12, 2024	1 Year
10.	Loop Antenna	Schwarzbeck	FMZB 1513	1513-272	Mar. 24, 2022	Mar. 23, 2024	2 Year
11.	Test Receiver	Rohde & Schwarz	ESCI	101152	Mar. 13, 2023	Mar. 12, 2024	1 Year
12.	L.I.S.N	Rohde & Schwarz	ENV 216	101317	Mar. 13, 2023	Mar. 12, 2024	1 Year
13.	L.I.S.N	Rohde & Schwarz	ESH2-Z5	893606/014	Mar. 13, 2023	Mar. 12, 2024	1 Year
14.	RF Switching Unit	Compliance Direction Systems Inc.	RSU-M2	38311	Mar. 13, 2023	Mar. 12, 2024	1 Year
15.	Temperature & Humidity Chamber	WANSHUN	SS-HWHS-80	N/A	Mar. 13, 2023	Mar. 12, 2024	1 Year
16.	DC Source	Maynuo	MY8811	N/A	Mar. 13, 2023	Mar. 12, 2024	1 Year
17.	Temporary antenna connector	TESCOM	SS402	N/A	N/A	N/A	N/A
18.	Chamber	SAEMC	9*7*7m	N/A	Apr. 22, 2021	Apr. 21, 2023	2 Year
19.	Test Software	EZ	EZ_EMC NTC-3A1.1	N/A	N/A	N/A	N/A

Note: For photographs of EUT and measurement, please refer to appendix in separate documents.

---End---