



FCC TEST REPORT

FCC ID:2ANH2-M8

Report Number.: **ZKT-24082110261E-2**

Date of Test..... Aug. 21, 2024 to Oct. 18, 2024

Date of issue..... Oct. 18, 2024

Total number of pages 71

Test Result PASS

Testing Laboratory..... : Shenzhen ZKT Technology Co., Ltd.

Address 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

Applicant's name : Shenzhen Benton Technology Co. , Ltd

Address 17781 SKY PARK CIR STE F IRVINE CA 92614 IRVINE California United States 92614

Manufacturer's name : Shenzhen Benton Technology Co. , Ltd

Address 17781 SKY PARK CIR STE F IRVINE CA 92614 IRVINE California United States 92614

Test specification:

Standard FCC CFR Title 47 Part 15 Subpart C Section 15.247
ANSI C63.10:2013

Test procedure /

Non-standard test method N/A

Test Report Form No. : /

Test Report Form(s) Originator : ZKT Testing

Master TRF : Dated: 2020-01-06

This device described above has been tested by ZKT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Product name..... : Pico Projector

Trademark

aaaxa
TECHNOLOGIES

Model/Type reference M8

M8 UST, M8 Custom, M8 Laser, M800



Testing procedure and testing location:

Testing Laboratory..... : Shenzhen ZKT Technology Co., Ltd.

Address..... : 1/F, No. 101, Building B, No. 6, Tangwei Community
Industrial Avenue, Fuhai Street, Bao'an District,
Shenzhen, China

Tested by (name + signature) : Jim Liu

Reviewer (name + signature)..... : Jeff Fu

Approved (name + signature) : Lake Xie





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1. VERSION

Report No.	Version	Description	Approved
ZKT-24082110261E-2	Rev.01	Initial issue of report	Oct. 18, 2024



2. TEST SUMMARY

Test procedures according to the technical standards:

FCC Part15 (15.247) , Subpart C			
Standard Section	Test Item	Result	Remark
15.203/15.247 (c)	Antenna Requirement	PASS	
15.207	AC Power Line Conducted Emission	PASS	
15.247 (b)(1)	Conducted Peak Output Power	PASS	
15.247 (a)(1)	20dB Occupied Bandwidth	PASS	
15.247 (a)(1)	Carrier Frequencies Separation	PASS	
15.247 (a)(1)(iii)	Hopping Channel Number	PASS	
15.247 (a)(1)(iii)	Dwell Time	PASS	
15.205/15.209	Radiated Emission and Restricted Band	PASS	
15.247(d)	Conducted Unwanted emissions and Band Edge	PASS	

NOTE:

(1)" N/A" denotes test is not applicable in this Test Report

2.1 TEST FACILITY

Shenzhen ZKT Technology Co., Ltd.

Add. : 1/F, No. 101, Building B, No. 6, Tangwei Community Industrial Avenue, Fuhai Street, Bao'an District, Shenzhen, China

FCC Test Firm Registration Number: 692225

Designation Number: CN1299

IC Registered No.: 27033

CAB identifier: CN0110



2.2 MEASUREMENT UNCERTAINTY

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

No.	Item	Uncertainty
1	3m camber Radiated spurious emission(9KHz-30MHz)	U=4.5dB
2	3m camber Radiated spurious emission(30MHz-1GHz)	U=4.8dB
3	3m chamber Radiated spurious emission(1GHz-6GHz)	U=4.9dB
4	3m chamber Radiated spurious emission(6GHz-40GHz)	U=5.0dB
5	Conducted disturbance	U=3.2dB
6	RF Band Edge	U=1.68dB
7	RF power conducted	U=1.86dB
8	RF conducted Spurious Emission	U=2.2dB
9	RF Occupied Bandwidth	U=1.8MHz
10	RF Power Spectral Density	U=1.75dB
11	humidity uncertainty	U=5.3%
12	Temperature uncertainty	U=0.59°C



3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	Pico Projector
Model No.:	M8
Serial No.:	M1, M1S, M2, M2PRO, M3, M3S, M3PRO, M4, M4S, M4PRO, M5, M5S, M5PRO, X13, X14, X15, X16, X17, D14, D15, D16, D17, D18, E10, E11, E12, E13, E14
Model Different:	Only the model name is different.
Sample(s) Status:	Engineer sample
Channel numbers:	79
Operation Frequency:	2402MHz~2480MHz
Modulation technology:	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Antenna Type:	FPCB Antenna2
Antenna gain:	3.53dBi
Power supply:	Input: 19V  3.42A
AC/DC Adapter:	AC/DC Adapter Input: 100-240V ~ 50/60Hz, 1.5A Output: 19V  3.42A 64.98W
AC/DC Adapter Mode:	KA65E-1903420P

Operation Frequency each of channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
1	2402MHz	21	2422MHz	41	2442MHz	61	2462MHz
2	2403MHz	22	2423MHz	42	2443MHz	62	2463MHz
3	2404MHz	23	2424MHz	43	2444MHz	63	2464MHz
4	2405MHz	24	2425MHz	44	2445MHz	64	2465MHz
5	2406MHz	25	2426MHz	45	2446MHz	65	2466MHz
6	2407MHz	26	2427MHz	46	2447MHz	66	2467MHz
7	2408MHz	27	2428MHz	47	2448MHz	67	2468MHz
8	2409MHz	28	2429MHz	48	2449MHz	68	2469MHz
9	2410MHz	29	2430MHz	49	2450MHz	69	2470MHz
10	2411MHz	30	2431MHz	50	2451MHz	70	2471MHz
11	2412MHz	31	2432MHz	51	2452MHz	71	2472MHz
12	2413MHz	32	2433MHz	52	2453MHz	72	2473MHz
13	2414MHz	33	2434MHz	53	2454MHz	73	2474MHz
14	2415MHz	34	2435MHz	54	2455MHz	74	2475MHz
15	2416MHz	35	2436MHz	55	2456MHz	75	2476MHz
16	2417MHz	36	2437MHz	56	2457MHz	76	2477MHz
17	2418MHz	37	2438MHz	57	2458MHz	77	2478MHz
18	2419MHz	38	2439MHz	58	2459MHz	78	2479MHz
19	2420MHz	39	2440MHz	59	2460MHz	79	2480MHz



20	2421MHz	40	2441MHz	60	2461MHz	
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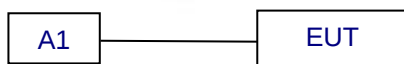
Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The Highest channel	2480MHz

3.2 Test Setup Configuration

Conducted Emission



Radiated Emission



Conducted Spurious



3.3 Support Equipment

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Pico Projector		M8	See page 8	EUT
A1	AC/DC Adapter	N/A	KA65E-1903420P	N/A	EUT

Item	Shielded Type	Ferrite Core	Length	Note

Note:

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 『Length』 column.



3.4 Test Mode

Transmitting mode	Keep the EUT in continuously transmitting mode.
Remark: During the test, the test voltage was tuned from 85% to 115% of the nominal rated supply voltage, and for battery operated equipment, the equipment tests shall be performed using a new battery.	
Test Software	CMD
Power level setup	Default



3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Conduction Test equipment

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	N/A	Nov. 14, 2023	Nov. 13, 2024
2	LISN	CYBERTEK	EM5040A	E1850400149	N/A	Nov. 02, 2023	Nov. 01, 2024
3	Test Cable	N/A	C-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
4	Test Cable	N/A	C-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
5	Test Cable	N/A	C-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
6	EMI Test Receiver	R&S	ESCI3	101393	4.42 SP3	Nov. 02, 2023	Nov. 01, 2024
7	Triple-Loop Antenna	N/A	RF300	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
8	Absorbing Clamp	DZ	ZN23201	15034	N/A	Nov. 07, 2023	Nov. 06, 2024
9	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	N/A	\	\

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	A.17.05	Nov. 02, 2023	Nov. 01, 2024
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Nov. 02, 2023	Nov. 01, 2024
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	101169	4.32	Nov. 02, 2023	Nov. 01, 2024
4	Bilog Antenna (30MHz-1500MHz)	Schwarzbeck	VULB9168	N/A	N/A	Nov. 13, 2023	Nov. 12, 2024
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	N/A	Nov. 13, 2023	Nov. 12, 2024
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	N/A	Nov. 13, 2023	Nov. 12, 2024
7	Loop Antenna	TESEQ	HLA6121	58357	N/A	Nov. 16, 2023	Nov. 15, 2024
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	060747	N/A	Nov. 02, 2023	Nov. 01, 2024
9	Amplifier (1GHz-26.5GHz)	Agilent	8449B	3008A00315	N/A	Nov. 02, 2023	Nov. 01, 2024
10	Amplifier (500MHz-40GHz)	QuanJuDa	DLE-161	097	N/A	Nov. 02, 2023	Nov. 01, 2024
11	Test Cable	N/A	R-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
12	Test Cable	N/A	R-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
13	Test Cable	N/A	R-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
14	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
15	EMC Software	Frad	EZ-EMC	Ver.EMC-CO N 3A1.1	N/A	\	\
16	Turntable	MF	MF-7802BS	N/A	N/A	\	\
17	Antenna tower	MF	MF-7802BS	N/A	N/A	\	\



RF Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Firmware Version	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	A.17.05	Nov. 02, 2023	Nov. 01, 2024
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSV40-N	100363	1.71 SP2	Nov. 02, 2023	Nov. 01, 2024
3	Test Cable	N/A	RF-01	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
4	Test Cable	N/A	RF-02	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
5	Test Cable	N/A	RF-03	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
6	ESG Signal Generator	Agilent	E4421B	N/A	B.03.84	Nov. 02, 2023	Nov. 01, 2024
7	Signal Generator	Agilent	N5182A	N/A	A.01.87	Nov. 02, 2023	Nov. 01, 2024
8	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	N/A	Nov. 16, 2023	Nov. 15, 2024
9	Wideband Radio Communication Test	R&S	CMW500	106504	V 3.7.22	Nov. 02, 2023	Nov. 01, 2024
10	MWRF Power Meter Test system	MW	MW100-RF CB	N/A	N/A	Nov. 02, 2023	Nov. 01, 2024
11	Power Meter	KEYSIGHT	N1912A P	N/A	A.05.00	Nov. 02, 2023	Nov. 01, 2024
12	D.C. Power Supply	LongWei	TPR-6405D	N/A	N/A	\	\
13	RF Software	MW	MTS8310	V2.0.0.0	N/A	\	\



4. EMC EMISSION TEST

4.1 Conducted emissions

Test Requirement:	FCC Part15 C Section 15.207
Test Method:	ANSI C63.10:2013
Test Frequency Range:	150KHz to 30MHz
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto

4.1.1 POWER LINE CONDUCTED EMISSION Limits

FREQUENCY (MHz)	Limit (dBuV)		Standard
	Quasi-peak	Average	
0.15 -0.5	66 - 56 *	56 - 46 *	FCC
0.50 -5.0	56.00	46.00	FCC
5.0 -30.0	60.00	50.00	FCC

Note:

(1) *Decreases with the logarithm of the frequency.

4.1.2 TEST PROCEDURE

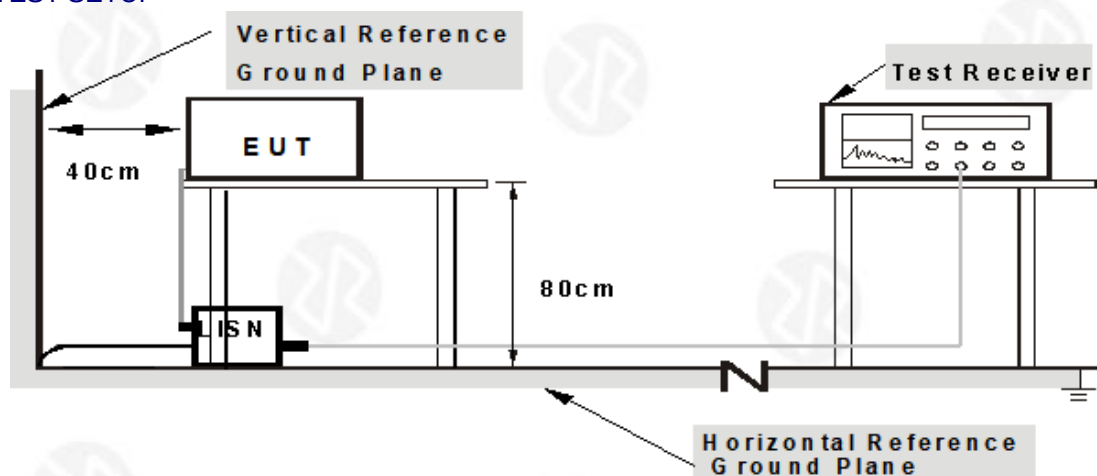
- The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- 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.
- 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.
- LISN at least 80 cm from nearest part of EUT chassis.
- For the actual test configuration, please refer to the related Item –EUT Test Photos.

4.1.3 DEVIATION FROM TEST STANDARD

No deviation



4.1.4 TEST SETUP



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

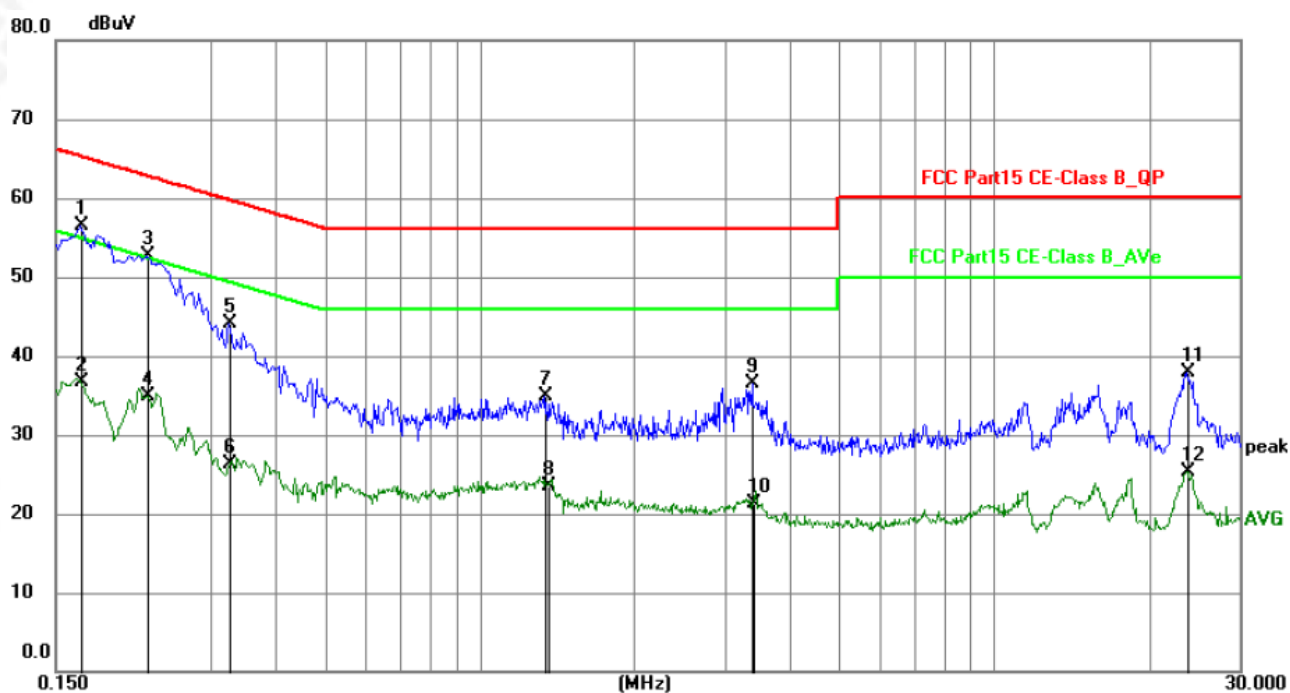
4.1.5 EUT OPERATING CONDITIONS

The EUT was configured for testing in a typical fashion (as a customer would normally use it). The EUT has been programmed to continuously transmit during test. This operating condition was tested and used to collect the included data.



4.1.6 Test Result

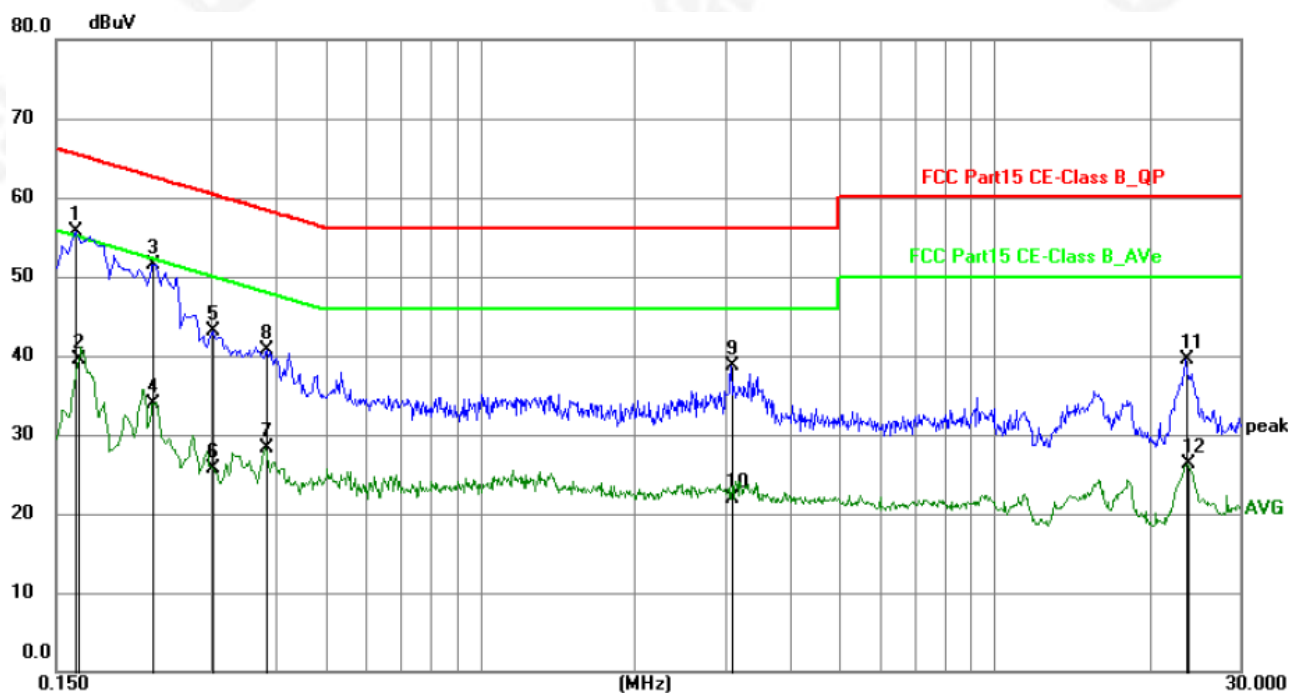
Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	L
Test Voltage:	AC 120V/60Hz	Test Mode :	TX GFSK - 2402MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1680	35.72	20.86	56.58	65.06	-8.48	QP	P
2	0.1680	15.88	20.86	36.74	55.06	-18.32	AVG	P
3	0.2265	31.83	20.93	52.76	62.58	-9.82	QP	P
4	0.2265	14.06	20.93	34.99	52.58	-17.59	AVG	P
5	0.3255	23.30	20.87	44.17	59.57	-15.40	QP	P
6	0.3267	5.41	20.87	26.28	49.53	-23.25	AVG	P
7	1.3424	14.16	20.78	34.94	56.00	-21.06	QP	P
8	1.3559	2.82	20.78	23.60	46.00	-22.40	AVG	P
9	3.3990	15.80	20.76	36.56	56.00	-19.44	QP	P
10	3.4125	0.56	20.76	21.32	46.00	-24.68	AVG	P
11	23.6535	17.30	20.68	37.98	60.00	-22.02	QP	P
12	23.6535	4.53	20.68	25.21	50.00	-24.79	AVG	P



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	N
Test Voltage:	AC 120V/60Hz	Test Mode :	TX GFSK - 2402MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F
1	0.1635	34.89	20.83	55.72	65.28	-9.56	QP	P
2	0.1658	18.58	20.83	39.41	55.17	-15.76	AVG	P
3	0.2310	30.60	20.91	51.51	62.41	-10.90	QP	P
4	0.2310	13.00	20.91	33.91	52.41	-18.50	AVG	P
5	0.3029	22.31	20.85	43.16	60.16	-17.00	QP	P
6	0.3034	4.76	20.85	25.61	50.15	-24.54	AVG	P
7	0.3840	7.52	20.85	28.37	48.19	-19.82	AVG	P
8	0.3850	19.81	20.85	40.66	58.17	-17.51	QP	P
9	3.0840	17.92	20.74	38.66	56.00	-17.34	QP	P
10	3.0840	1.25	20.74	21.99	46.00	-24.01	AVG	P
11	23.5229	18.91	20.66	39.57	60.00	-20.43	QP	P
12	23.6535	5.68	20.67	26.35	50.00	-23.65	AVG	P

Notes:

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Measurement Level = Reading level + Correct Factor
4. The test data shows only the worst case TX GFSK - 2402MHz.



4.2 Radiated emissions

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10:2013				
Test Frequency Range:	9kHz to 25GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	9KHz-150KHz	Quasi-peak	200Hz	MX5Hz	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

4.2.1 Radiated Emission Limits

Frequencies (MHz)	Field Strength (micorvolts/meter)	Measurement Distance (meters)
0.009~0.490	2400/F(KHz)	300
0.490~1.705	24000/F(KHz)	30
1.705~30.0	30	30
30~88	100	3
88~216	150	3
216~960	200	3
Above 960	500	3

LIMITS OF RADIATED EMISSION MEASUREMENT

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

4.2.2 TEST PROCEDURE

Below 1GHz test procedure as below:

- a. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.



- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

Above 1GHz test procedure as below:

- g. Different between above is the test site, change from Semi- Anechoic Chamber to fully Anechoic Chamber and change form table 0.8 metre to 1.5 metre(Above 18GHz the distance is 1 meter and table is 1.5 metre).
- h. Test the EUT in the lowest channel ,the middle channel ,the Highest channel

Note:

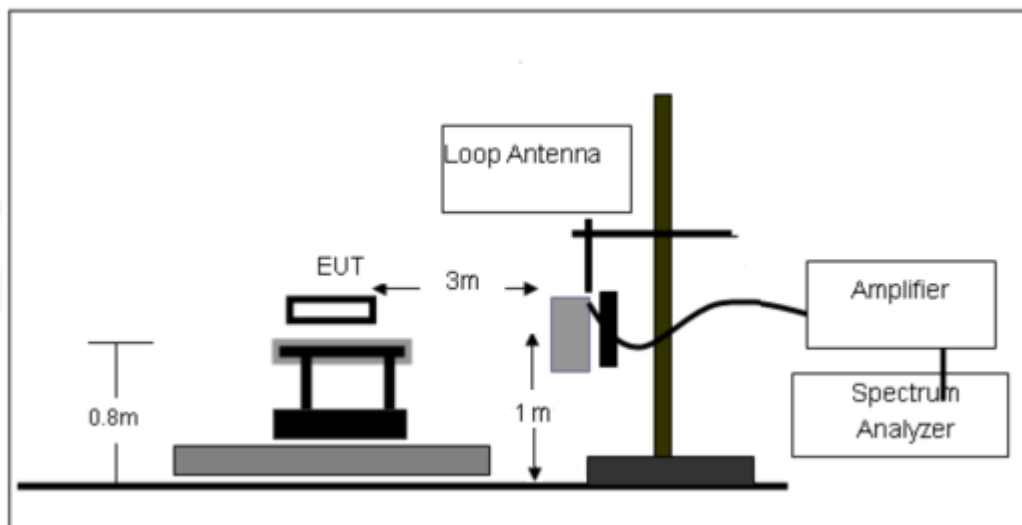
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

No deviation

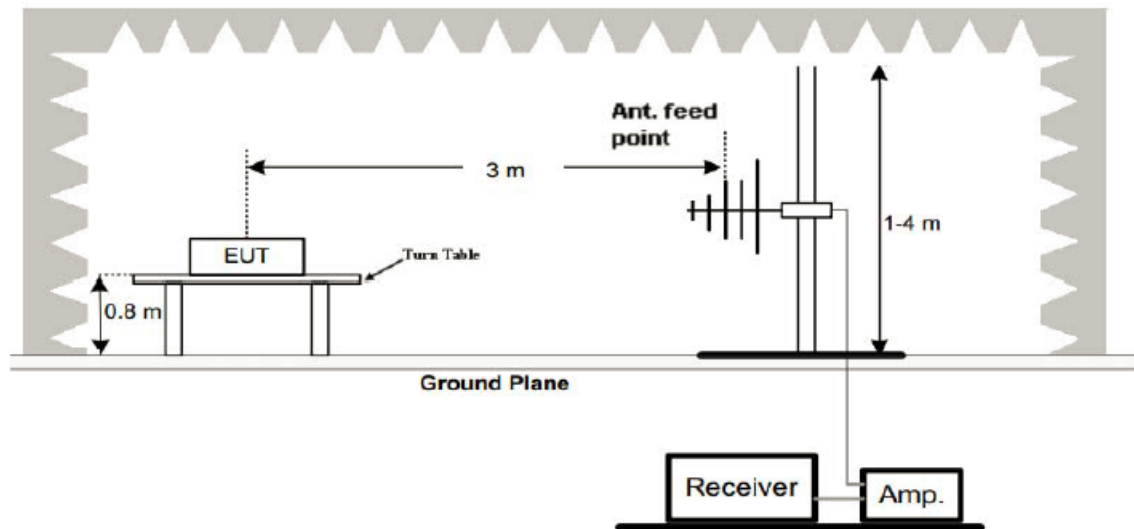
4.2.4 TEST SETUP

(A) Radiated Emission Test-Up Frequency Below 30MHz

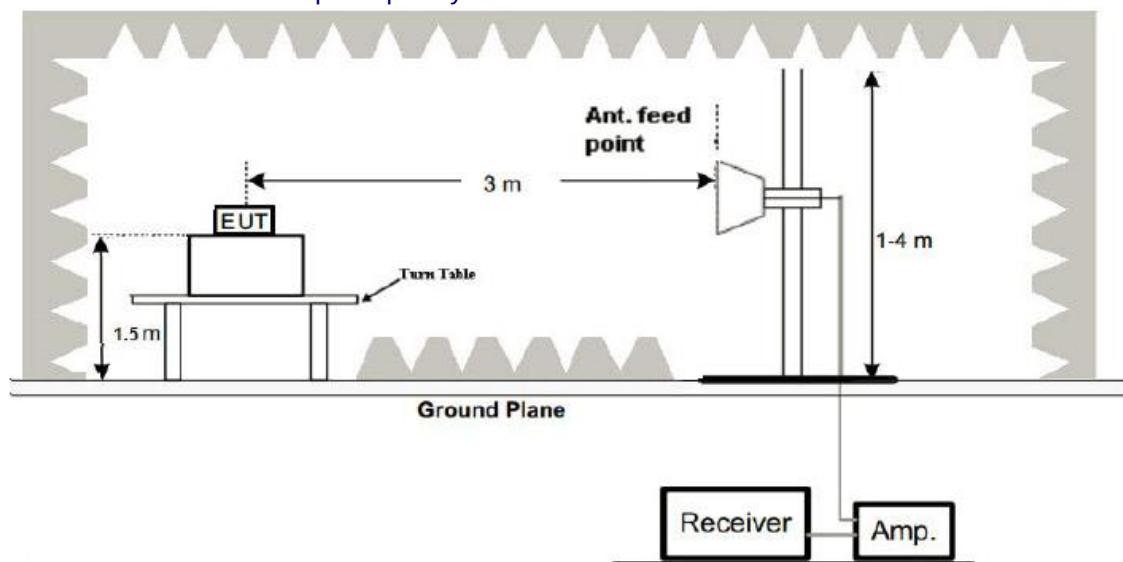




(B) Radiated Emission Test-Up Frequency 30MHz~1GHz



(C) Radiated Emission Test-Up Frequency Above 1GHz



4.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.4 Unless otherwise a special operating condition is specified in the follows during the testing.

4.2.6 TEST RESULTS

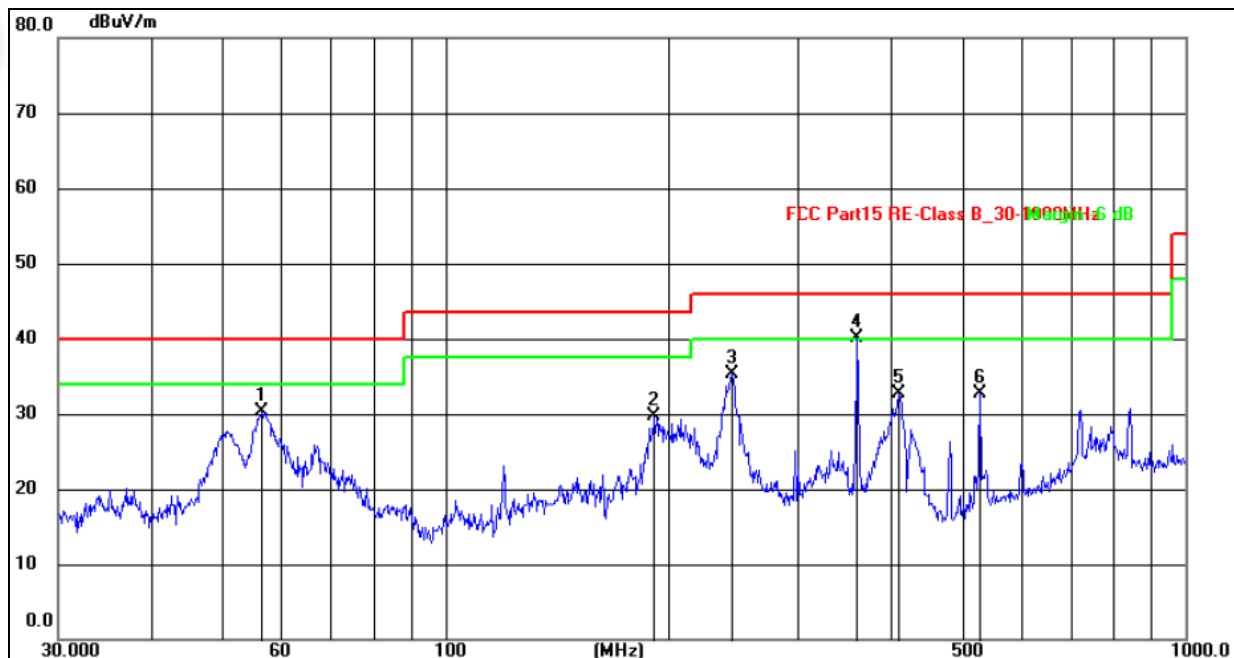
Between 9KHz – 30MHz

The emission from 9 kHz to 30MHz was pre-tested and found the result was 20dB lower than the limit, and according to 15.31(o) & RSS-Gen 6.13, the test result no need to reported.



Between 30MHz – 1GHz

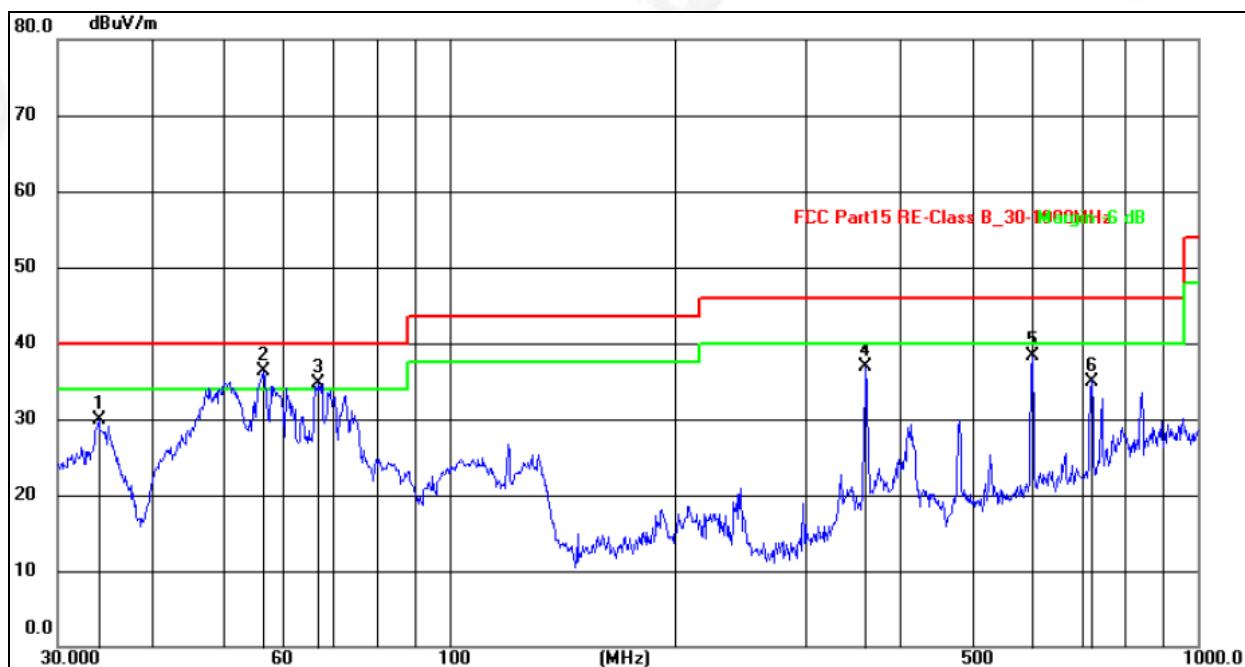
Temperature:	26°C	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 19V	Test Mode :	TX GFSK - 2402MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	56.5929	44.40	-14.18	30.22	40.00	-9.78	QP
2	191.7450	48.03	-18.40	29.63	43.50	-13.87	QP
3	244.2321	51.50	-16.12	35.38	46.00	-10.62	QP
4	360.4476	56.76	-16.73	40.03	46.00	-5.97	QP
5	410.3824	48.82	-16.06	32.76	46.00	-13.24	QP
6	528.2458	43.45	-10.83	32.62	46.00	-13.38	QP



Temperature:	26°C	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 19V	Test Mode :	TX GFSK - 2402MHz



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	34.0363	47.74	-17.76	29.98	40.00	-10.02	QP
2	56.3947	54.19	-17.95	36.24	40.00	-3.76	QP
3	66.9668	53.81	-19.04	34.77	40.00	-5.23	QP
4	360.4476	53.34	-16.34	37.00	46.00	-9.00	QP
5	601.4265	46.01	-7.76	38.25	46.00	-7.75	QP
6	721.7258	41.77	-6.77	35.00	46.00	-11.00	QP

Remarks:

- 1.Final Level =Receiver Read level + Antenna Factor + Cable Loss
- 2.The emission levels of other frequencies are very lower than the limit and not show in test report.
- 3.The test data shows only the worst case TX GFSK - 2402MHz.



1GHz~25GHz

GFSK

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:2402MHz									
V	4804.00	54.20	30.55	5.77	24.66	54.08	74.00	-19.92	PK
V	4804.00	43.03	30.55	5.77	24.66	42.91	54.00	-11.09	AV
V	7206.00	50.66	30.33	6.32	24.55	51.20	74.00	-22.80	PK
V	7206.00	43.51	30.33	6.32	24.55	44.05	54.00	-9.95	AV
V	9608.00	54.41	30.85	7.45	24.69	55.70	74.00	-18.30	PK
V	9608.00	43.61	30.85	7.45	24.69	44.90	54.00	-9.10	AV
V	12010.00	51.32	31.02	8.99	25.57	54.86	74.00	-19.14	PK
V	12010.00	43.92	31.02	8.99	25.57	47.46	54.00	-6.54	AV
H	4804.00	54.58	30.55	5.77	24.66	54.46	74.00	-19.54	PK
H	4804.00	43.70	30.55	5.77	24.66	43.58	54.00	-10.42	AV
H	7206.00	51.93	30.33	6.32	24.55	52.47	74.00	-21.53	PK
H	7206.00	43.01	30.33	6.32	24.55	43.55	54.00	-10.45	AV
H	9608.00	54.58	30.85	7.45	24.69	55.87	74.00	-18.13	PK
H	9608.00	43.25	30.85	7.45	24.69	44.54	54.00	-9.46	AV
H	12010.00	52.05	31.02	8.99	25.57	55.59	74.00	-18.41	PK
H	12010.00	43.25	31.02	8.99	25.57	46.79	54.00	-7.21	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:2441MHz									
V	4882.00	51.21	30.55	5.77	24.66	51.09	74.00	-22.91	PK
V	4882.00	43.02	30.55	5.77	24.66	42.90	54.00	-11.10	AV
V	7323.00	52.91	30.33	6.32	24.55	53.45	74.00	-20.55	PK
V	7323.00	43.79	30.33	6.32	24.55	44.33	54.00	-9.67	AV
V	9764.00	51.30	30.85	7.45	24.69	52.59	74.00	-21.41	PK
V	9764.00	43.36	30.85	7.45	24.69	44.65	54.00	-9.35	AV
V	12205.00	50.17	31.02	8.99	25.57	53.71	74.00	-20.29	PK
V	12205.00	43.47	31.02	8.99	25.57	47.01	54.00	-6.99	AV
H	4882.00	53.35	30.55	5.77	24.66	53.23	74.00	-20.77	PK
H	4882.00	43.17	30.55	5.77	24.66	43.05	54.00	-10.95	AV
H	7323.00	53.65	30.33	6.32	24.55	54.19	74.00	-19.81	PK
H	7323.00	43.35	30.33	6.32	24.55	43.89	54.00	-10.11	AV
H	9764.00	54.62	30.85	7.45	24.69	55.91	74.00	-18.09	PK
H	9764.00	43.29	30.85	7.45	24.69	44.58	54.00	-9.42	AV
H	12205.00	50.17	31.02	8.99	25.57	53.71	74.00	-20.29	PK
H	12205.00	43.93	31.02	8.99	25.57	47.47	54.00	-6.53	AV



Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:2480MHz									
V	4960.00	52.81	30.55	5.77	24.66	52.69	74.00	-21.31	PK
V	4960.00	43.73	30.55	5.77	24.66	43.61	54.00	-10.39	AV
V	7440.00	54.19	30.33	6.32	24.55	54.73	74.00	-19.27	PK
V	7440.00	43.57	30.33	6.32	24.55	44.11	54.00	-9.89	AV
V	9920.00	52.90	30.85	7.45	24.69	54.19	74.00	-19.81	PK
V	9920.00	43.47	30.85	7.45	24.69	44.76	54.00	-9.24	AV
V	12400.00	53.88	31.02	8.99	25.57	57.42	74.00	-16.58	PK
V	12400.00	43.56	31.02	8.99	25.57	47.10	54.00	-6.90	AV
H	4960.00	50.74	30.55	5.77	24.66	50.62	74.00	-23.38	PK
H	4960.00	43.51	30.55	5.77	24.66	43.39	54.00	-10.61	AV
H	7440.00	51.11	30.33	6.32	24.55	51.65	74.00	-22.35	PK
H	7440.00	43.59	30.33	6.32	24.55	44.13	54.00	-9.87	AV
H	9920.00	52.35	30.85	7.45	24.69	53.64	74.00	-20.36	PK
H	9920.00	43.85	30.85	7.45	24.69	45.14	54.00	-8.86	AV
H	12400.00	51.00	31.02	8.99	25.57	54.54	74.00	-19.46	PK
H	12400.00	43.42	31.02	8.99	25.57	46.96	54.00	-7.04	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



$\pi/4$ -DQPSK

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:2402MHz									
V	4804.00	51.75	30.55	5.77	24.66	51.63	74.00	-22.37	PK
V	4804.00	43.94	30.55	5.77	24.66	43.82	54.00	-10.18	AV
V	7206.00	54.99	30.33	6.32	24.55	55.53	74.00	-18.47	PK
V	7206.00	43.05	30.33	6.32	24.55	43.59	54.00	-10.41	AV
V	9608.00	54.77	30.85	7.45	24.69	56.06	74.00	-17.94	PK
V	9608.00	43.96	30.85	7.45	24.69	45.25	54.00	-8.75	AV
V	12010.00	50.00	31.02	8.99	25.57	53.54	74.00	-20.46	PK
V	12010.00	43.08	31.02	8.99	25.57	46.62	54.00	-7.38	AV
H	4804.00	53.06	30.55	5.77	24.66	52.94	74.00	-21.06	PK
H	4804.00	43.40	30.55	5.77	24.66	43.28	54.00	-10.72	AV
H	7206.00	54.77	30.33	6.32	24.55	55.31	74.00	-18.69	PK
H	7206.00	43.34	30.33	6.32	24.55	43.88	54.00	-10.12	AV
H	9608.00	54.98	30.85	7.45	24.69	56.27	74.00	-17.73	PK
H	9608.00	43.63	30.85	7.45	24.69	44.92	54.00	-9.08	AV
H	12010.00	51.15	31.02	8.99	25.57	54.69	74.00	-19.31	PK
H	12010.00	43.38	31.02	8.99	25.57	46.92	54.00	-7.08	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:2441MHz									
V	4882.00	51.44	30.55	5.77	24.66	51.32	74.00	-22.68	PK
V	4882.00	43.98	30.55	5.77	24.66	43.86	54.00	-10.14	AV
V	7323.00	53.86	30.33	6.32	24.55	54.40	74.00	-19.60	PK
V	7323.00	43.64	30.33	6.32	24.55	44.18	54.00	-9.82	AV
V	9764.00	54.86	30.85	7.45	24.69	56.15	74.00	-17.85	PK
V	9764.00	43.50	30.85	7.45	24.69	44.79	54.00	-9.21	AV
V	12205.00	52.98	31.02	8.99	25.57	56.52	74.00	-17.48	PK
V	12205.00	43.76	31.02	8.99	25.57	47.30	54.00	-6.70	AV
H	4882.00	50.94	30.55	5.77	24.66	50.82	74.00	-23.18	PK
H	4882.00	43.50	30.55	5.77	24.66	43.38	54.00	-10.62	AV
H	7323.00	54.93	30.33	6.32	24.55	55.47	74.00	-18.53	PK
H	7323.00	43.77	30.33	6.32	24.55	44.31	54.00	-9.69	AV
H	9764.00	52.73	30.85	7.45	24.69	54.02	74.00	-19.98	PK
H	9764.00	43.90	30.85	7.45	24.69	45.19	54.00	-8.81	AV
H	12205.00	50.28	31.02	8.99	25.57	53.82	74.00	-20.18	PK
H	12205.00	43.68	31.02	8.99	25.57	47.22	54.00	-6.78	AV



Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:2480MHz									
V	4960.00	53.16	30.55	5.77	24.66	53.04	74.00	-20.96	PK
V	4960.00	43.28	30.55	5.77	24.66	43.16	54.00	-10.84	AV
V	7440.00	50.50	30.33	6.32	24.55	51.04	74.00	-22.96	PK
V	7440.00	43.22	30.33	6.32	24.55	43.76	54.00	-10.24	AV
V	9920.00	51.29	30.85	7.45	24.69	52.58	74.00	-21.42	PK
V	9920.00	43.27	30.85	7.45	24.69	44.56	54.00	-9.44	AV
V	12400.00	51.97	31.02	8.99	25.57	55.51	74.00	-18.49	PK
V	12400.00	43.62	31.02	8.99	25.57	47.16	54.00	-6.84	AV
H	4960.00	52.16	30.55	5.77	24.66	52.04	74.00	-21.96	PK
H	4960.00	43.86	30.55	5.77	24.66	43.74	54.00	-10.26	AV
H	7440.00	51.27	30.33	6.32	24.55	51.81	74.00	-22.19	PK
H	7440.00	43.54	30.33	6.32	24.55	44.08	54.00	-9.92	AV
H	9920.00	54.10	30.85	7.45	24.69	55.39	74.00	-18.61	PK
H	9920.00	43.87	30.85	7.45	24.69	45.16	54.00	-8.84	AV
H	12400.00	50.32	31.02	8.99	25.57	53.86	74.00	-20.14	PK
H	12400.00	43.47	31.02	8.99	25.57	47.01	54.00	-6.99	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



8-DPSK

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Low Channel:2402MHz									
V	4804.00	54.61	30.55	5.77	24.66	54.49	74.00	-19.51	PK
V	4804.00	43.23	30.55	5.77	24.66	43.11	54.00	-10.89	AV
V	7206.00	52.99	30.33	6.32	24.55	53.53	74.00	-20.47	PK
V	7206.00	43.58	30.33	6.32	24.55	44.12	54.00	-9.88	AV
V	9608.00	54.86	30.85	7.45	24.69	56.15	74.00	-17.85	PK
V	9608.00	43.14	30.85	7.45	24.69	44.43	54.00	-9.57	AV
V	12010.00	53.69	31.02	8.99	25.57	57.23	74.00	-16.77	PK
V	12010.00	43.14	31.02	8.99	25.57	46.68	54.00	-7.32	AV
H	4804.00	53.14	30.55	5.77	24.66	53.02	74.00	-20.98	PK
H	4804.00	43.50	30.55	5.77	24.66	43.38	54.00	-10.62	AV
H	7206.00	53.05	30.33	6.32	24.55	53.59	74.00	-20.41	PK
H	7206.00	43.39	30.33	6.32	24.55	43.93	54.00	-10.07	AV
H	9608.00	53.62	30.85	7.45	24.69	54.91	74.00	-19.09	PK
H	9608.00	43.45	30.85	7.45	24.69	44.74	54.00	-9.26	AV
H	12010.00	53.71	31.02	8.99	25.57	57.25	74.00	-16.75	PK
H	12010.00	43.35	31.02	8.99	25.57	46.89	54.00	-7.11	AV

Polar (H/V)	Frequency	Meter Reading	Pre-ampl ifier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
Middle Channel:2441MHz									
V	4882.00	54.17	30.55	5.77	24.66	54.05	74.00	-19.95	PK
V	4882.00	43.48	30.55	5.77	24.66	43.36	54.00	-10.64	AV
V	7323.00	53.31	30.33	6.32	24.55	53.85	74.00	-20.15	PK
V	7323.00	43.56	30.33	6.32	24.55	44.10	54.00	-9.90	AV
V	9764.00	51.90	30.85	7.45	24.69	53.19	74.00	-20.81	PK
V	9764.00	43.94	30.85	7.45	24.69	45.23	54.00	-8.77	AV
V	12205.00	50.59	31.02	8.99	25.57	54.13	74.00	-19.87	PK
V	12205.00	43.25	31.02	8.99	25.57	46.79	54.00	-7.21	AV
H	4882.00	50.24	30.55	5.77	24.66	50.12	74.00	-23.88	PK
H	4882.00	43.53	30.55	5.77	24.66	43.41	54.00	-10.59	AV
H	7323.00	53.79	30.33	6.32	24.55	54.33	74.00	-19.67	PK
H	7323.00	43.10	30.33	6.32	24.55	43.64	54.00	-10.36	AV
H	9764.00	52.63	30.85	7.45	24.69	53.92	74.00	-20.08	PK
H	9764.00	43.12	30.85	7.45	24.69	44.41	54.00	-9.59	AV
H	12205.00	53.73	31.02	8.99	25.57	57.27	74.00	-16.73	PK
H	12205.00	43.76	31.02	8.99	25.57	47.30	54.00	-6.70	AV



Polar (H/V)	Frequency	Meter Reading	Pre-ampli fier	Cable Loss	Antenna Factor	Emission Level	Limits	Margin	Detector Type
	(MHz)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	(dB)	
High Channel:2480MHz									
V	4960.00	53.91	30.55	5.77	24.66	53.79	74.00	-20.21	PK
V	4960.00	43.05	30.55	5.77	24.66	42.93	54.00	-11.07	AV
V	7440.00	54.27	30.33	6.32	24.55	54.81	74.00	-19.19	PK
V	7440.00	43.83	30.33	6.32	24.55	44.37	54.00	-9.63	AV
V	9920.00	54.90	30.85	7.45	24.69	56.19	74.00	-17.81	PK
V	9920.00	43.15	30.85	7.45	24.69	44.44	54.00	-9.56	AV
V	12400.00	51.96	31.02	8.99	25.57	55.50	74.00	-18.50	PK
V	12400.00	43.44	31.02	8.99	25.57	46.98	54.00	-7.02	AV
H	4960.00	54.81	30.55	5.77	24.66	54.69	74.00	-19.31	PK
H	4960.00	43.13	30.55	5.77	24.66	43.01	54.00	-10.99	AV
H	7440.00	50.17	30.33	6.32	24.55	50.71	74.00	-23.29	PK
H	7440.00	43.35	30.33	6.32	24.55	43.89	54.00	-10.11	AV
H	9920.00	51.12	30.85	7.45	24.69	52.41	74.00	-21.59	PK
H	9920.00	43.24	30.85	7.45	24.69	44.53	54.00	-9.47	AV
H	12400.00	53.42	31.02	8.99	25.57	56.96	74.00	-17.04	PK
H	12400.00	43.59	31.02	8.99	25.57	47.13	54.00	-6.87	AV

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier,
Margin= Emission Level - Limit
2. If peak below the average limit, the average emission was no test.
3. The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.



5. RADIATED BAND EMISSION MEASUREMENT

5.1 Test Requirement:

Test Requirement:	FCC Part15 C Section 15.209 and 15.205				
Test Method:	ANSI C63.10: 2013				
Test Frequency Range:	All of the restrict bands were tested, only the worst band's (2390MHz to 2500MHz) data was showed.				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Value
	Above 1GHz	Peak	1MHz	3MHz	Peak
		Average	1MHz	3MHz	Average

LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

FREQUENCY (MHz)	Limit (dBuV/m) (at 3M)	
	PEAK	AVERAGE
Above 1000	74	54

Notes:

- (1) The limit for radiated test was performed according to FCC PART 15C.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBuV/m)=20log Emission level (uV/m).

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	2390MHz
Stop Frequency	2500MHz
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 3MHz for Average

5.2 TEST PROCEDURE

Above 1GHz test procedure as below:

- a. 1. The EUT was placed on the top of a rotating table 0.8meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.
- b. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
- f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
- g. Test the EUT in the lowest channel,the Highest channel

Note:

Both horizontal and vertical antenna polarities were tested and performed pretest to three orthogonal axis. The worst case emissions were reported

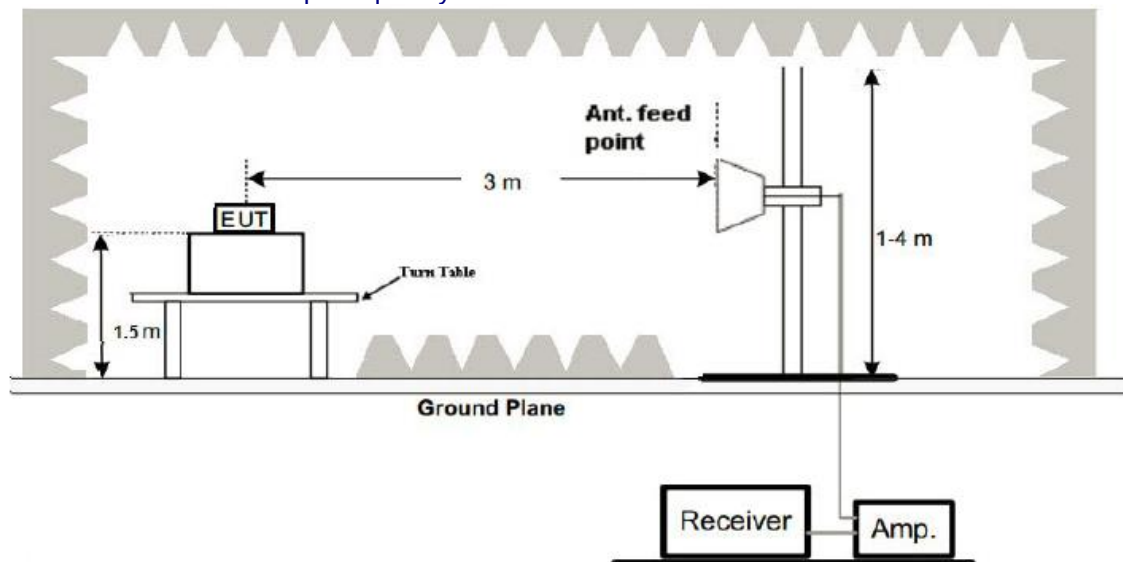


5.3 DEVIATION FROM TEST STANDARD

No deviation

5.4 TEST SETUP

Radiated Emission Test-Up Frequency Above 1GHz



5.5 EUT OPERATING CONDITIONS

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



5.6 TEST RESULT

	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)	Detec- tor Type	Result
GFSK	Low Channel: 2402MHz									
	H	2390.00	53.29	30.22	4.85	23.98	51.90	74.00	PK	PASS
	H	2390.00	44.90	30.22	4.85	23.98	43.51	54.00	AV	PASS
	H	2400.00	54.36	30.22	4.85	23.98	52.97	74.00	PK	PASS
	H	2400.00	44.01	30.22	4.85	23.98	42.62	54.00	AV	PASS
	V	2390.00	53.38	30.22	4.85	23.98	51.99	74.00	PK	PASS
	V	2390.00	44.93	30.22	4.85	23.98	43.54	54.00	AV	PASS
	V	2400.00	54.08	30.22	4.85	23.98	52.69	74.00	PK	PASS
	V	2400.00	44.82	30.22	4.85	23.98	43.43	54.00	AV	PASS
	High Channel: 2480MHz									
	H	2483.50	54.79	30.22	4.85	23.98	53.40	74.00	Pk	PASS
	H	2483.50	44.23	30.22	4.85	23.98	42.84	54.00	AV	PASS
	H	2500.00	53.02	30.22	4.85	23.98	51.63	74.00	Pk	PASS
	H	2500.00	44.46	30.22	4.85	23.98	43.07	54.00	AV	PASS
	V	2483.50	53.20	30.22	4.85	23.98	51.81	74.00	Pk	PASS
	V	2483.50	44.88	30.22	4.85	23.98	43.49	54.00	AV	PASS
	V	2500.00	53.62	30.22	4.85	23.98	52.23	74.00	Pk	PASS
	V	2500.00	44.78	30.22	4.85	23.98	43.39	54.00	AV	PASS
π/4-DQ PSK	Low Channel: 2402MHz									
	H	2390.00	53.49	30.22	4.85	23.98	52.10	74.00	PK	PASS
	H	2390.00	44.63	30.22	4.85	23.98	43.24	54.00	AV	PASS
	H	2400.00	54.33	30.22	4.85	23.98	52.94	74.00	PK	PASS
	H	2400.00	44.11	30.22	4.85	23.98	42.72	54.00	AV	PASS
	V	2390.00	54.59	30.22	4.85	23.98	53.20	74.00	PK	PASS
	V	2390.00	44.59	30.22	4.85	23.98	43.20	54.00	AV	PASS
	V	2400.00	54.46	30.22	4.85	23.98	53.07	74.00	PK	PASS
	V	2400.00	44.69	30.22	4.85	23.98	43.30	54.00	AV	PASS
	High Channel: 2480MHz									
	H	2483.50	54.76	30.22	4.85	23.98	53.37	74.00	PK	PASS
	H	2483.50	44.40	30.22	4.85	23.98	43.01	54.00	AV	PASS
	H	2500.00	53.96	30.22	4.85	23.98	52.57	74.00	PK	PASS
	H	2500.00	44.16	30.22	4.85	23.98	42.77	54.00	AV	PASS
	V	2483.50	54.43	30.22	4.85	23.98	53.04	74.00	PK	PASS
	V	2483.50	44.20	30.22	4.85	23.98	42.81	54.00	AV	PASS
	V	2500.00	53.24	30.22	4.85	23.98	51.85	74.00	PK	PASS
	V	2500.00	44.46	30.22	4.85	23.98	43.07	54.00	AV	PASS



8-DPSK	Low Channel: 2402MHz									
	H	2390.00	54.82	30.22	4.85	23.98	53.43	74.00	PK	PASS
	H	2390.00	44.53	30.22	4.85	23.98	43.14	54.00	AV	PASS
	H	2400.00	53.96	30.22	4.85	23.98	52.57	74.00	PK	PASS
	H	2400.00	44.46	30.22	4.85	23.98	43.07	54.00	AV	PASS
	V	2390.00	53.47	30.22	4.85	23.98	52.08	74.00	PK	PASS
	V	2390.00	44.77	30.22	4.85	23.98	43.38	54.00	AV	PASS
	V	2400.00	53.81	30.22	4.85	23.98	52.42	74.00	PK	PASS
	V	2400.00	44.08	30.22	4.85	23.98	42.69	54.00	AV	PASS
	High Channel: 2480MHz									
	H	2483.50	54.54	30.22	4.85	23.98	53.15	74.00	PK	PASS
	H	2483.50	44.85	30.22	4.85	23.98	43.46	54.00	AV	PASS
	H	2500.00	53.87	30.22	4.85	23.98	52.48	74.00	PK	PASS
	H	2500.00	44.18	30.22	4.85	23.98	42.79	54.00	AV	PASS
	V	2483.50	53.58	30.22	4.85	23.98	52.19	74.00	PK	PASS
	V	2483.50	44.27	30.22	4.85	23.98	42.88	54.00	AV	PASS
	V	2500.00	54.15	30.22	4.85	23.98	52.76	74.00	PK	PASS
	V	2500.00	44.92	30.22	4.85	23.98	43.53	54.00	AV	PASS
Remark: 1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit										



6. CONDUCTED BAND EDGE AND SPURIOUS EMISSION

Test Requirement:	FCC Part15 C Section 15.247 (d)
Test Method:	KDB558074 D0115.247 Meas Guidancev05r02

6.1 Limit

Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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) (see §15.205(c)).

6.2 Test Setup



6.3 Test procedure

Using the following spectrum analyzer setting:

- A) Set the RBW = 100KHz.
- B) Set the VBW = 300KHz.
- C) Sweep time = auto couple.
- D) Detector function = peak.
- E) Trace mode = max hold.
- F) Allow trace to fully stabilize.

6.4 DEVIATION FROM STANDARD

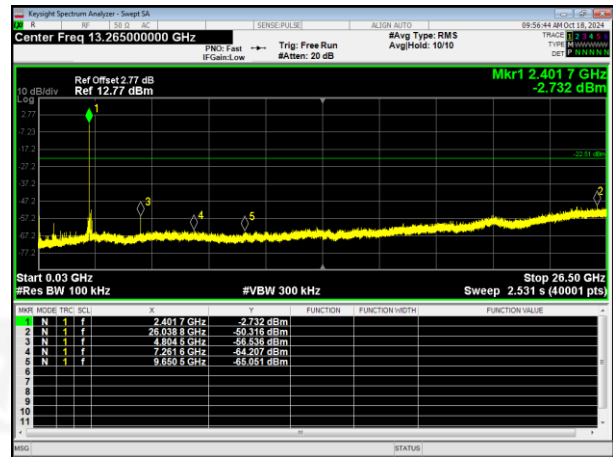
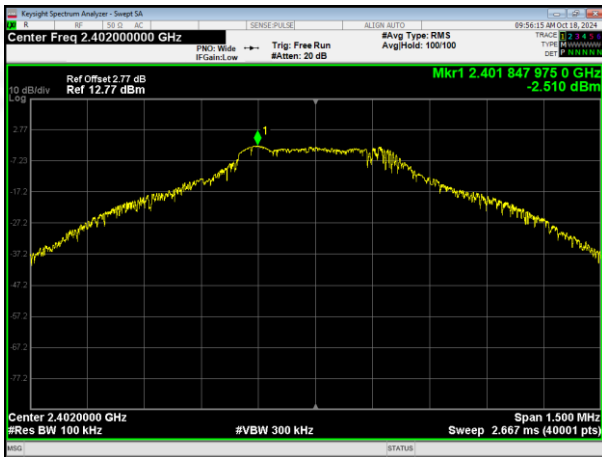
No deviation.



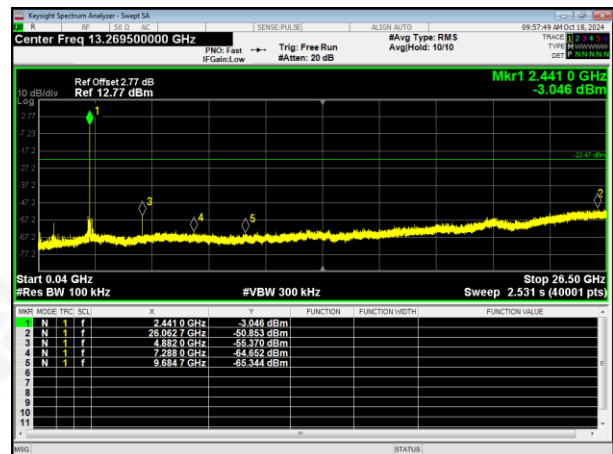
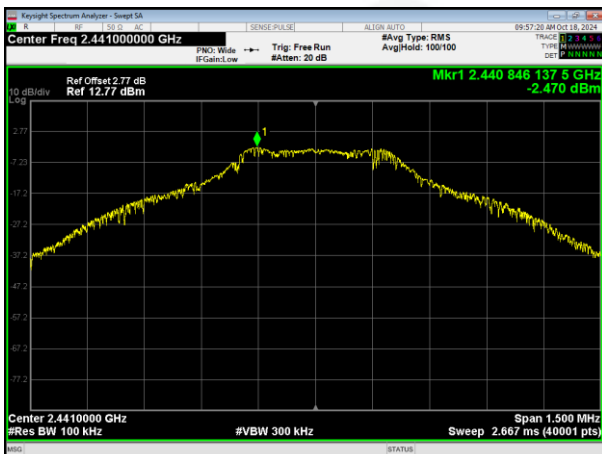
6.5 Test Result

GFSK mode:

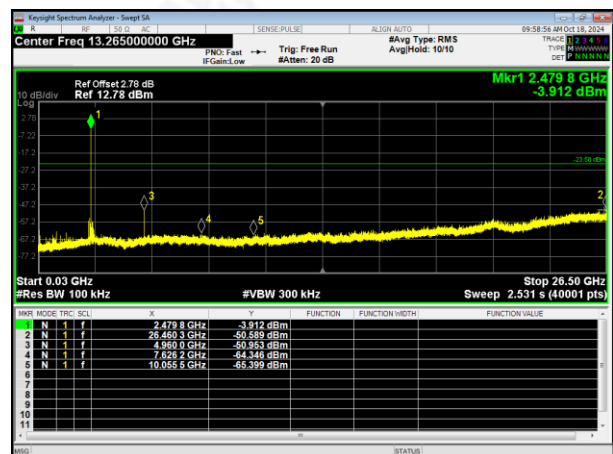
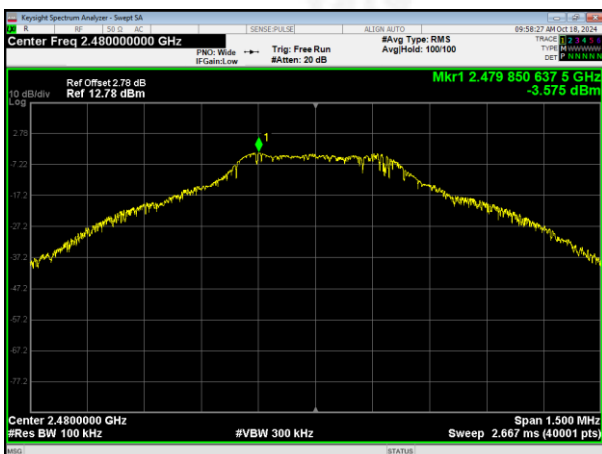
Lowest channel



Middle channel



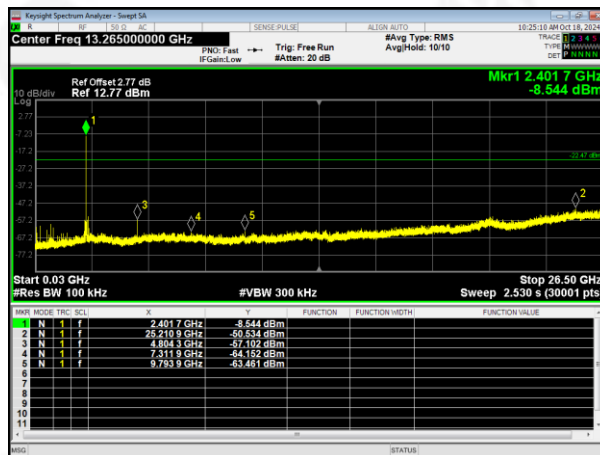
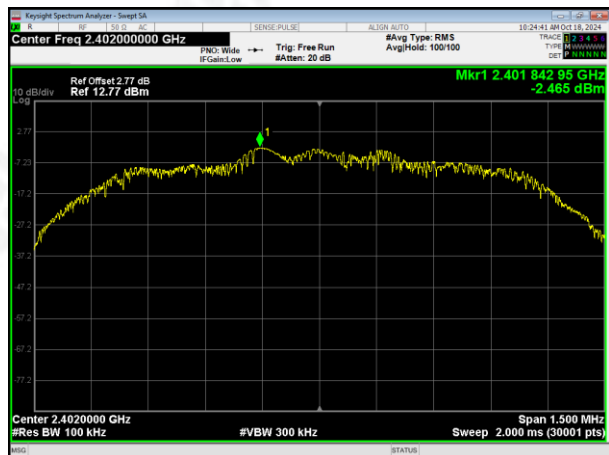
Highest channel



30MHz~26.5GHz



Lowest channel



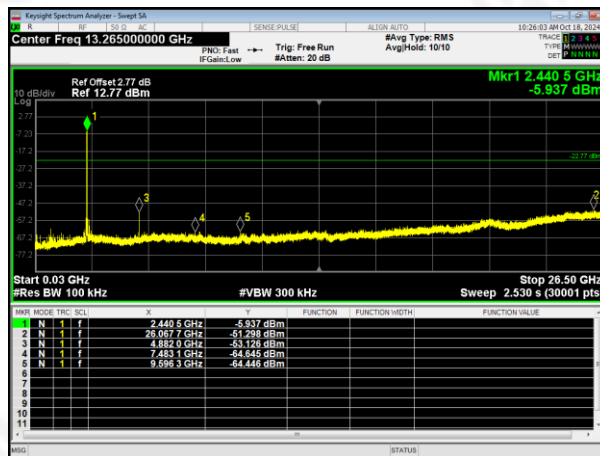
Keysight Spectrum Analyzer - Sweep 2A 10-25-24 AM Oct 18, 2024

Center Freq 2.44100000 GHz

PRF: Wide --- Trip: Free Run #Att: 20 dB

#Avg Type: RM5 AvgHold: 100/100

Trace 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100 101 102 103 104 105 106 107 108 109 110 111 112 113 114 115 116 117 118 119 120 121 122 123 124 125 126 127 128 129 130 131 132 133 134 135 136 137 138 139 140 141 142 143 144 145 146 147 148 149 150 151 152 153 154 155 156 157 158 159 160 161 162 163 164 165 166 167 168 169 170 171 172 173 174 175 176 177 178 179 180 181 182 183 184 185 186 187 188 189 190 191 192 193 194 195 196 197 198 199 200 201 202 203 204 205 206 207 208 209 210 211 212 213 214 215 216 217 218 219 220 221 222 223 224 225 226 227 228 229 230 231 232 233 234 235 236 237 238 239 240 241 242 243 244 245 246 247 248 249 250 251 252 253 254 255 256 257 258 259 260 261 262 263 264 265 266 267 268 269 270 271 272 273 274 275 276 277 278 279 280 281 282 283 284 285 286 287 288 289 290 291 292 293 294 295 296 297 298 299 300 301 302 303 304 305 306 307 308 309 310 311 312 313 314 315 316 317 318 319 320 321 322 323 324 325 326 327 328 329 330 331 332 333 334 335 336 337 338 339 340 341 342 343 344 345 346 347 348 349 350 351 352 353 354 355 356 357 358 359 360 361 362 363 364 365 366 367 368 369 370 371 372 373 374 375 376 377 378 379 380 381 382 383 384 385 386 387 388 389 390 391 392 393 394 395 396 397 398 399 400 401 402 403 404 405 406 407 408 409 410 411 412 413 414 415 416 417 418 419 420 421 422 423 424 425 426 427 428 429 430 431 432 433 434 435 436 437 438 439 440 441 442 443 444 445 446 447 448 449 450 451 452 453 454 455 456 457 458 459 460 461 462 463 464 465 466 467 468 469 470 471 472 473 474 475 476 477 478 479 480 481 482 483 484 485 486 487 488 489 490 491 492 493 494 495 496 497 498 499 500 501 502 503 504 505 506 507 508 509 510 511 512 513 514 515 516 517 518 519 520 521 522 523 524 525 526 527 528 529 530 531 532 533 534 535 536 537 538 539 540 541 542 543 544 545 546 547 548 549 550 551 552 553 554 555 556 557 558 559 560 561 562 563 564 565 566 567 568 569 570 571 572 573 574 575 576 577 578 579 580 581 582 583 584 585 586 587 588 589 590 591 592 593 594 595 596 597 598 599 600 601 602 603 604 605 606 607 608 609 610 611 612 613 614 615 616 617 618 619 620 621 622 623 624 625 626 627 628 629 630 631 632 633 634 635 636 637 638 639 640 641 642 643 644 645 646 647 648 649 650 651 652 653 654 655 656 657 658 659 660 661 662 663 664 665 666 667 668 669 670 671 672 673 674 675 676 677 678 679 680 681 682 683 684 685 686 687 688 689 690 691 692 693 694 695 696 697 698 699 700 701 702 703 704 705 706 707 708 709 710 711 712 713 714 715 716 717 718 719 720 721 722 723 724 725 726 727 728 729 730 731 732 733 734 735 736 737 738 739 740 741 742 743 744 745 746 747 748 749 750 751 752 753 754 755 756 757 758 759 760 761 762 763 764 765 766 767 768 769 770 771 772 773 774 775 776 777 778 779 780 781 782 783 784 785 786 787 788 789 790 791 792 793 794 795 796 797 798 799 800 801 802 803 804 805 806 807 808 809 810 811 812 813 814 815 816 817 818 819 820 821 822 823 824 825 826 827 828 829 830 831 832 833 834 835 836 837 838 839 840 841 842 843 844 845 846 847 848 849 850 851 852 853 854 855 856 857 858 859 860 861 862 863 864 865 866 867 868 869 870 871 872 873 874 875 876 877 878 879 880 881 882 883 884 885 886 887 888 889 890 891 892 893 894 895 896 897 898 899 900 901 902 903 904 905 906 907 908 909 910 911 912 913 914 915 916 917 918 919 920 921 922 923 924 925 926 927 928 929 930 931 932 933 934 935 936 937 938 939 940 941 942 943 944 945 946 947 948 949 950 951 952 953 954 955 956 957 958 959 960 961 962 963 964 965 966 967 968 969 970 971 972 973 974 975 9



Keyight Spectrum Analyzer - Screenshot

Center Freq 2.480000000 GHz

Ref Offset 2.78 dB
Ref 12.78 dBm

Probe: Wide
IF Gain: Low

Trig: Free Run
#Attenu: 20 dB

#Avg Type: RMS
Avg/Hold: 100/100

Trace 3.243.6
Type RF MAXIMUM
P 0.000000

10:26:34 AM Oct 18, 2024

Mkr1 2.479 846 40 GHz
-3.524 dBm

10 dB/div
Log

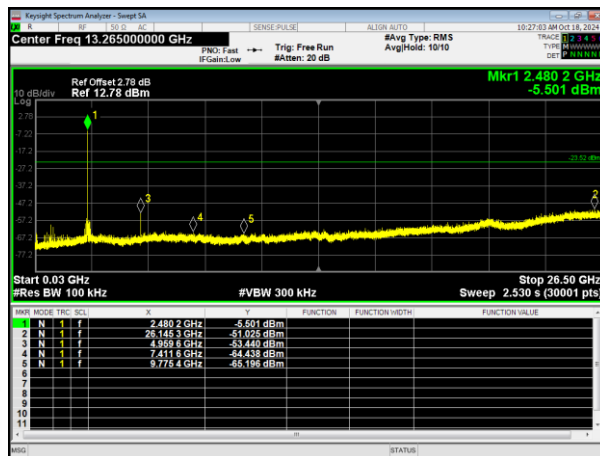
Center 2.48000000 GHz
#Res BW 100 kHz
#VBW 300 kHz

Span 1.500 MHz
Sweep 2.000 ms (30001 pts)

WSS

(STATUS)

The image shows a spectrum analyzer display. The main plot area shows a yellow trace representing the signal spectrum. The x-axis is frequency in GHz, ranging from approximately 2.475 to 2.485. The y-axis is power in dBm, ranging from -72 to 2.8. A prominent peak is visible at 2.479846 GHz, marked with a green '1' and a label 'Mkr1 2.479 846 40 GHz -3.524 dBm'. The trace shows a broad signal with some noise. Above the plot, various settings are displayed: Center Freq 2.480000000 GHz, Ref Offset 2.78 dB, Ref 12.78 dBm, Probe: Wide, IF Gain: Low, Trig: Free Run, #Attenu: 20 dB, #Avg Type: RMS, Avg/Hold: 100/100, Trace 3.243.6, Type RF MAXIMUM, P 0.000000, 10:26:34 AM Oct 18, 2024. At the bottom, additional settings are shown: Center 2.48000000 GHz, #Res BW 100 kHz, #VBW 300 kHz, Span 1.500 MHz, Sweep 2.000 ms (30001 pts). The bottom left corner has 'WSS' and the bottom right corner has '(STATUS)'.

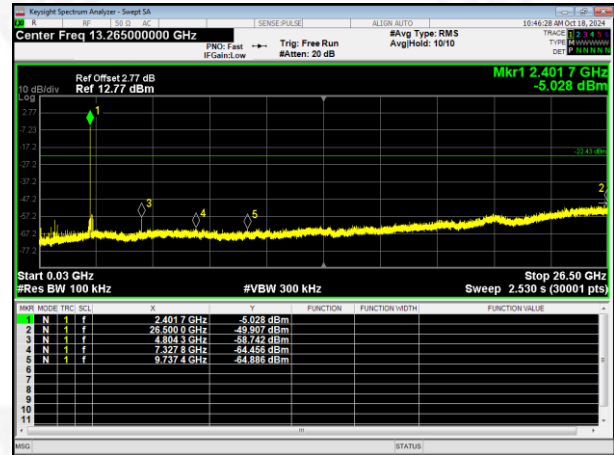
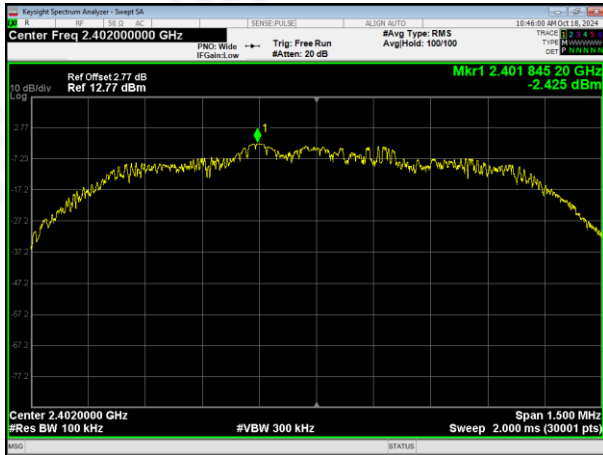


30MHz~26.5GHz

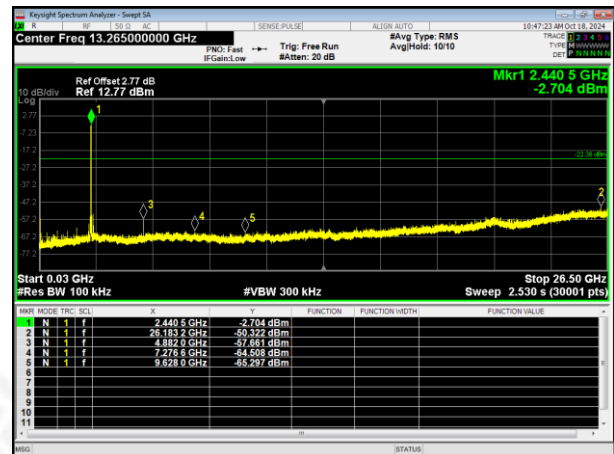
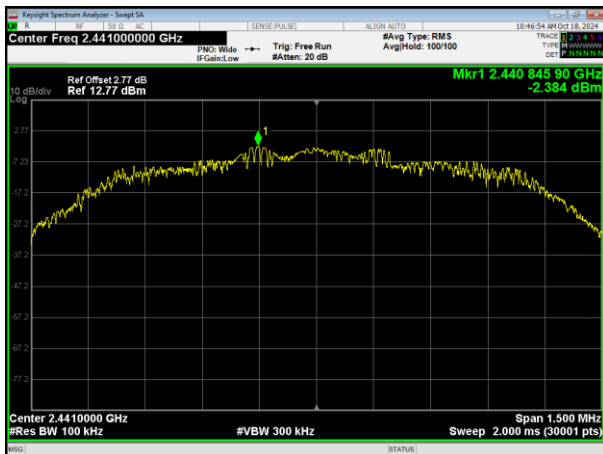


8-DPSK mode:

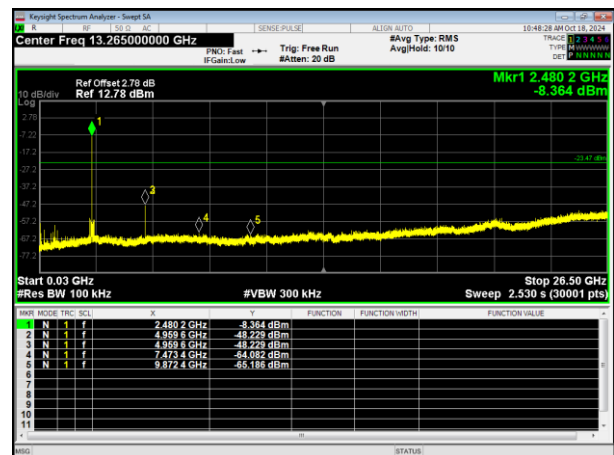
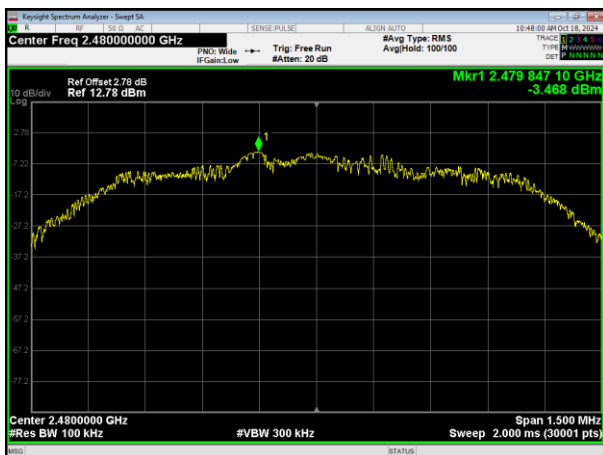
Lowest channel



Middle channel



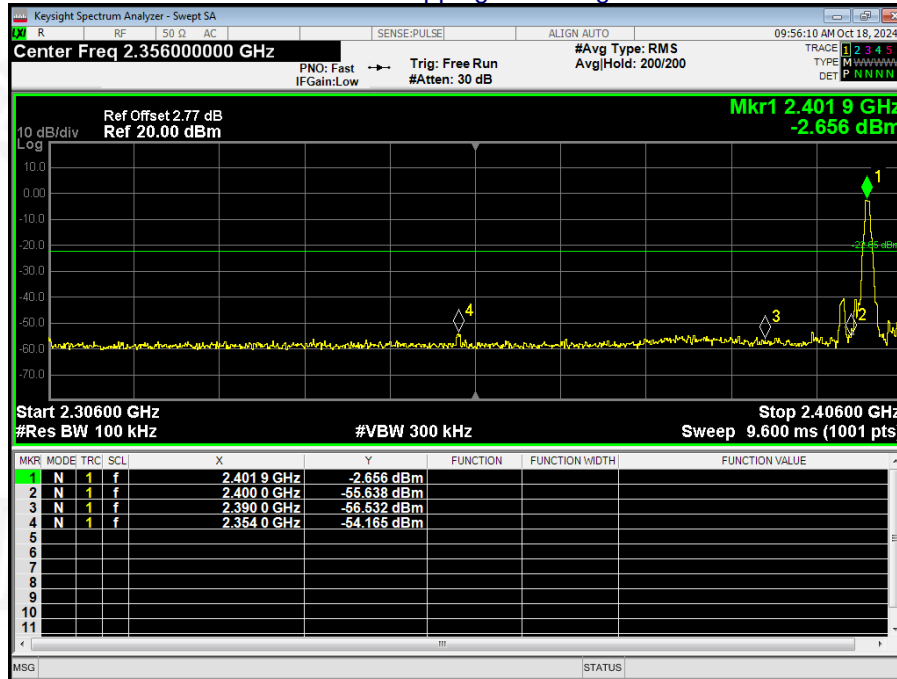
Highest channel



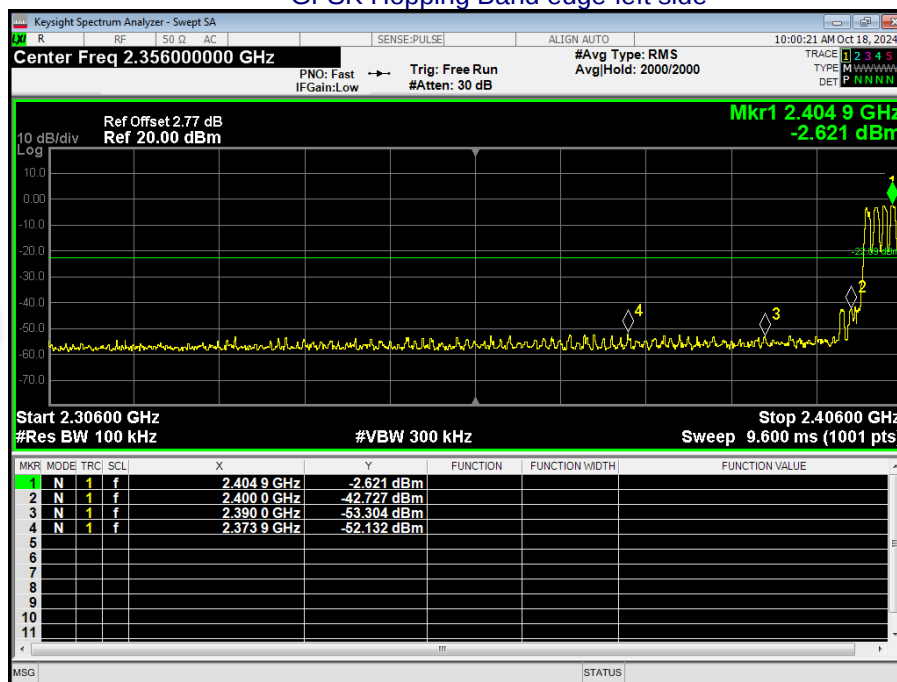
30MHz~26.5GHz



GFSK No-hopping Band edge-left side

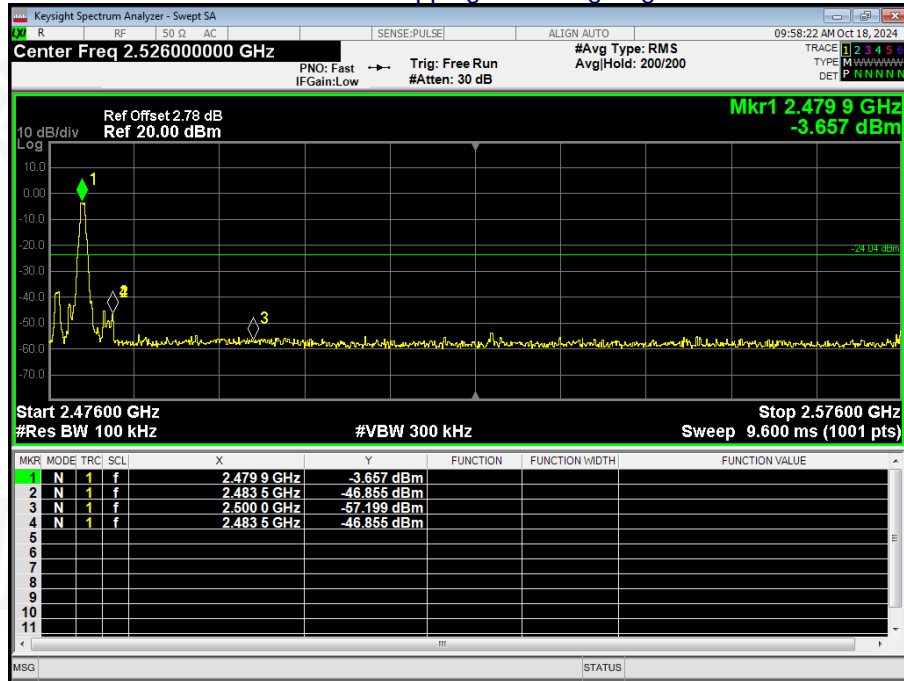


GFSK Hopping Band edge-left side

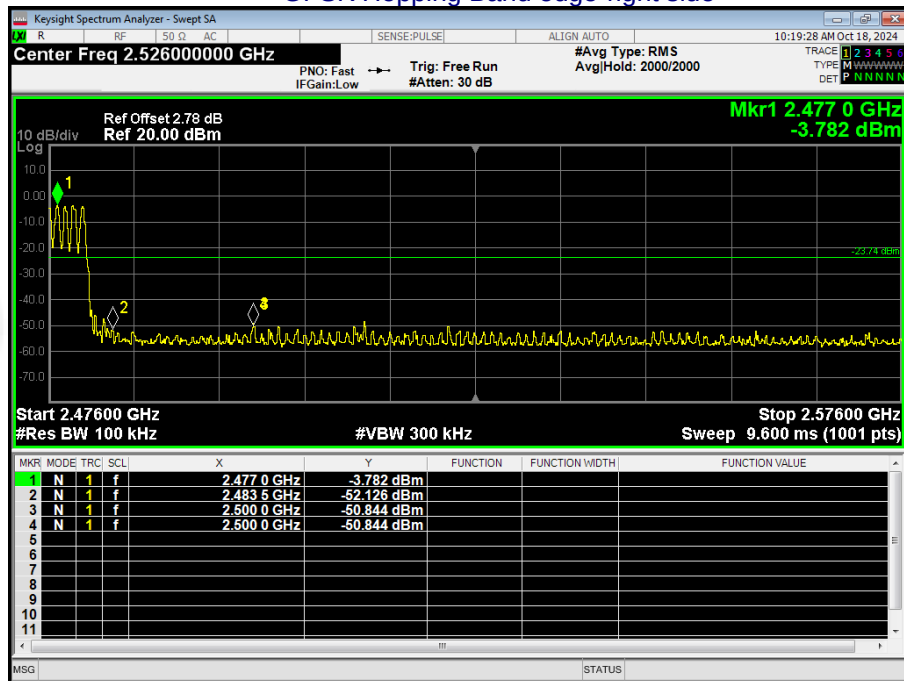




GFSK No-hopping Band edge-right side

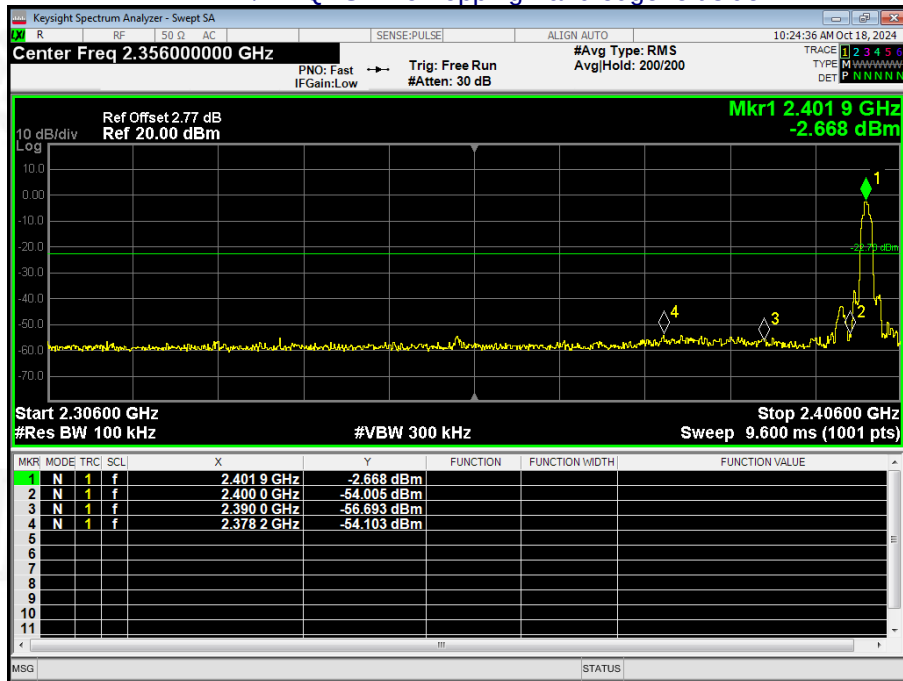


GFSK Hopping Band edge-right side

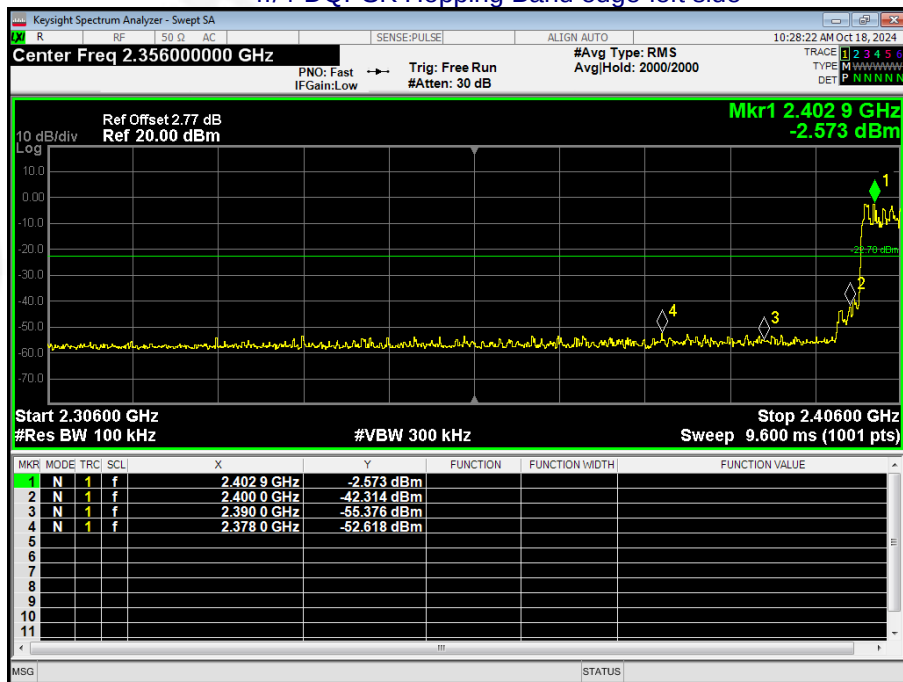




$\pi/4$ -DQPSK No-hopping Band edge-left side

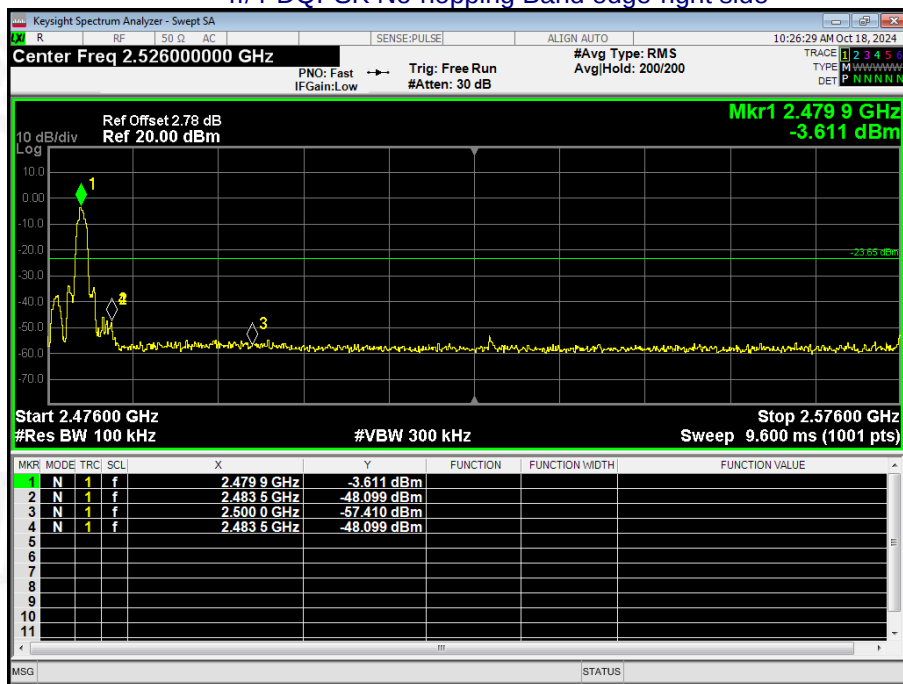


$\pi/4$ -DQPSK Hopping Band edge-left side

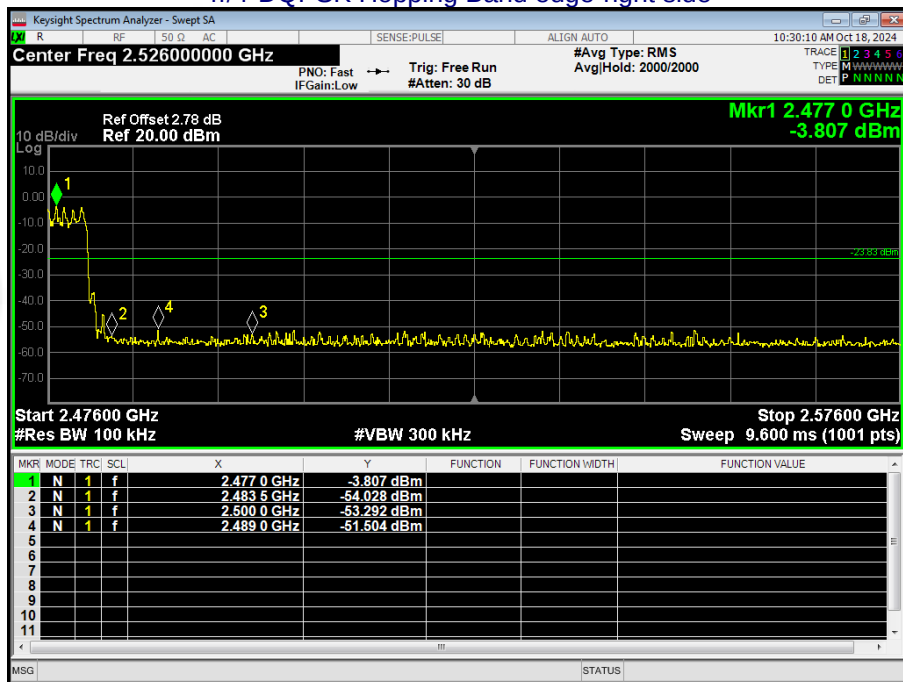




$\pi/4$ -DQPSK No-hopping Band edge-right side

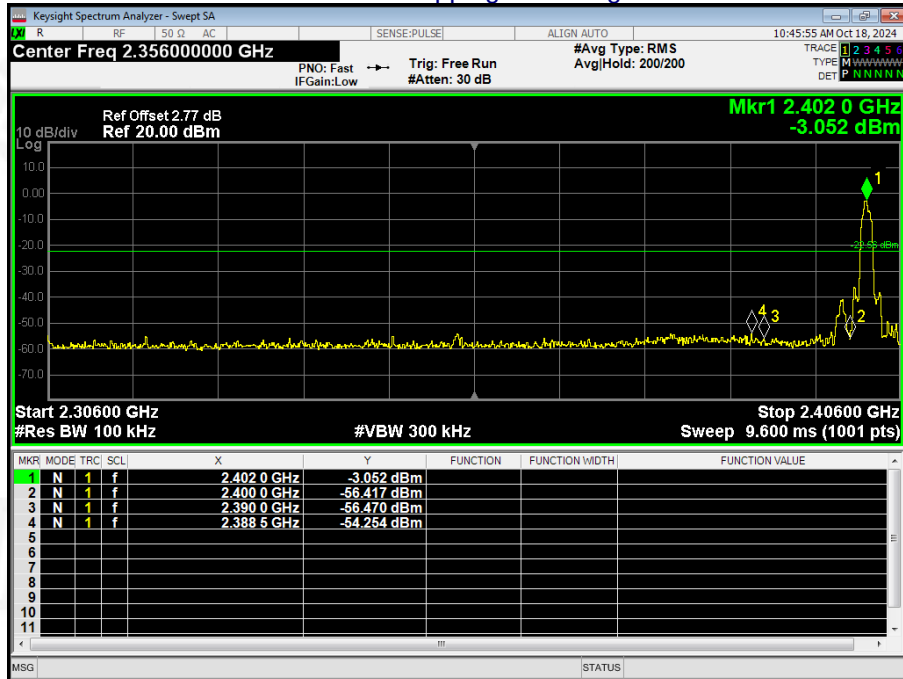


$\pi/4$ -DQPSK Hopping Band edge-right side

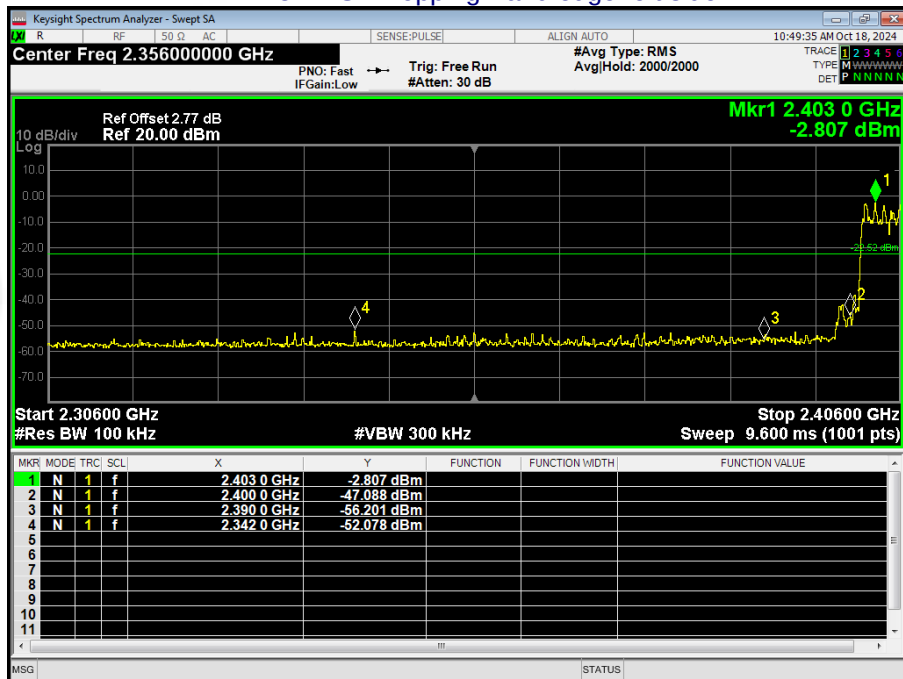




8-DPSK No-hopping Band edge-left side

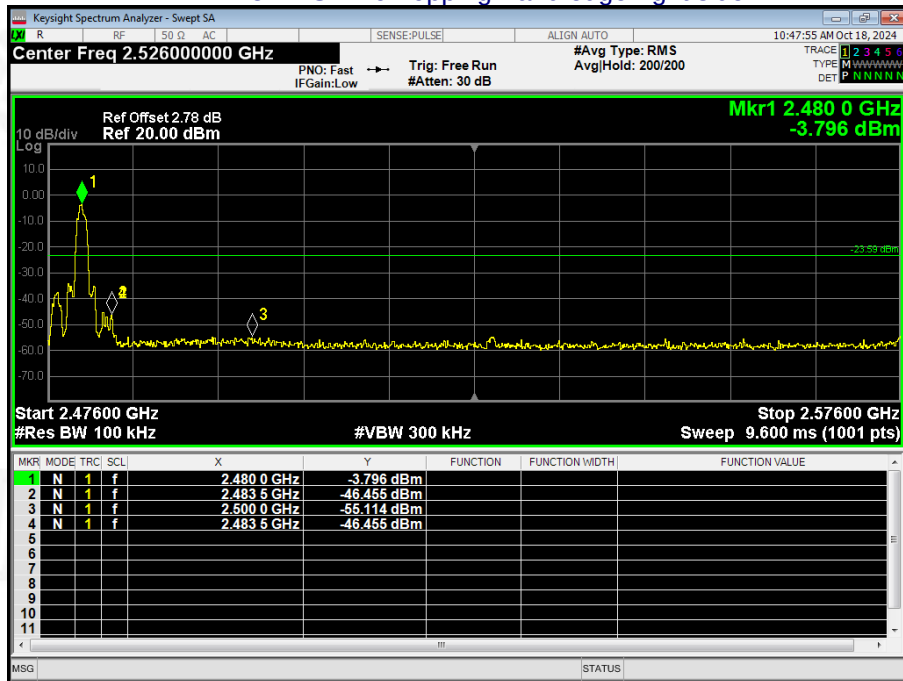


8-DPSK Hopping Band edge-left side

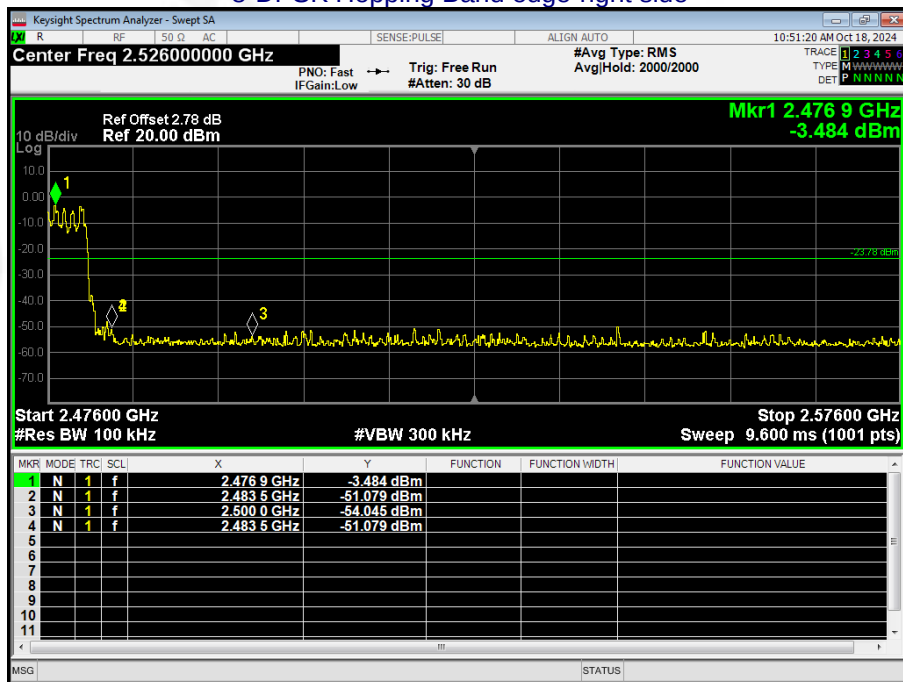




8-DPSK No-hopping Band edge-right side



8-DPSK Hopping Band edge-right side





7. 20DB OCCUPIED BANDWIDTH

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013

7.1 Test Setup



7.2 Limit

N/A

7.3 Test procedure

1. Set RBW = 30 kHz.
2. Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
3. Detector = Peak.
4. Trace mode = max hold.
5. Sweep = auto couple.
6. Allow the trace to stabilize.
7. Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

7.4 DEVIATION FROM STANDARD

No deviation.

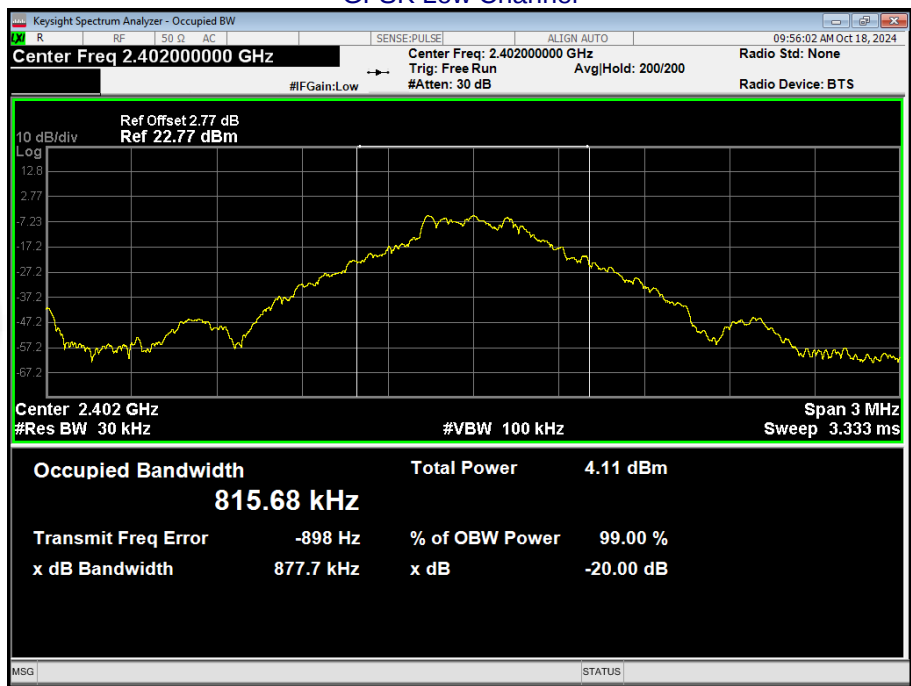


7.5 Test Result

Mode	Test channel	20dB Occupied Bandwidth (MHz)	Result
GFSK	Lowest	0.878	Pass
	Middle	0.861	
	Highest	0.869	
$\pi/4$ -DQPSK	Lowest	1.248	Pass
	Middle	1.257	
	Highest	1.272	
8-DPSK	Lowest	1.221	Pass
	Middle	1.213	
	Highest	1.222	

Test plots

GFSK Low Channel

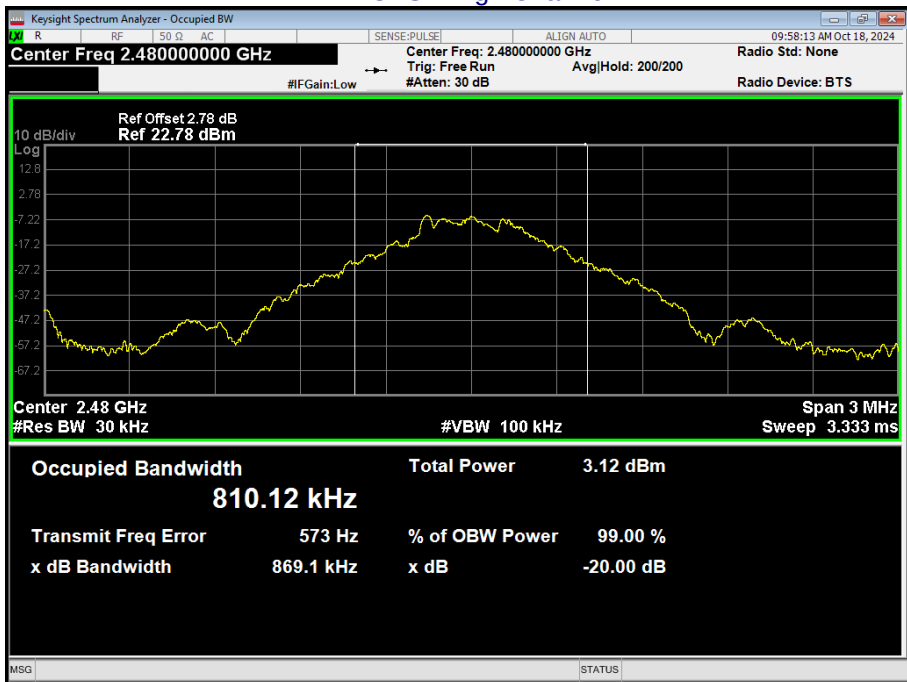




GFSK Middle Channel

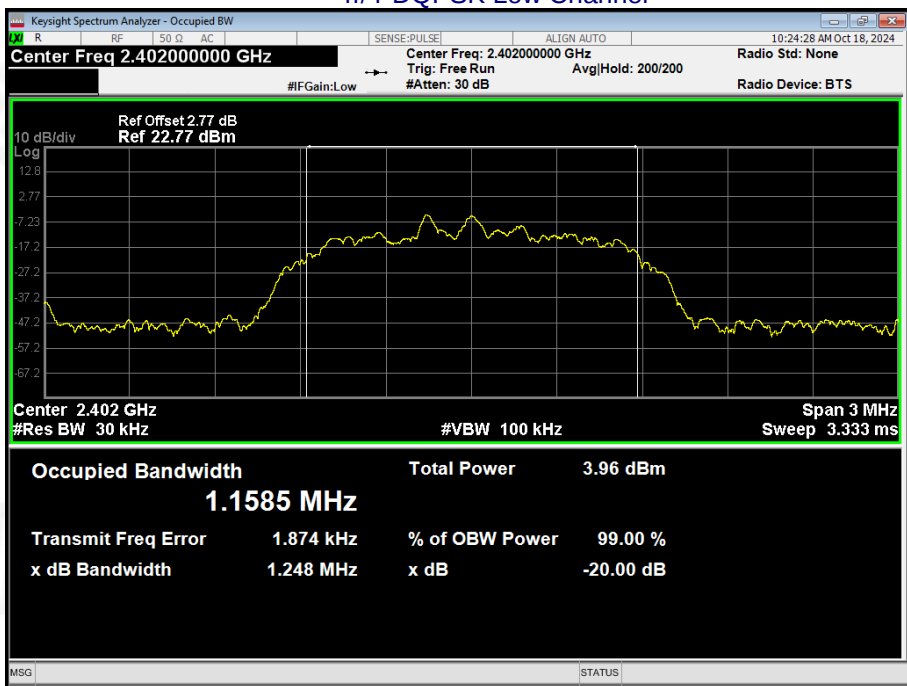


GFSK High Channel

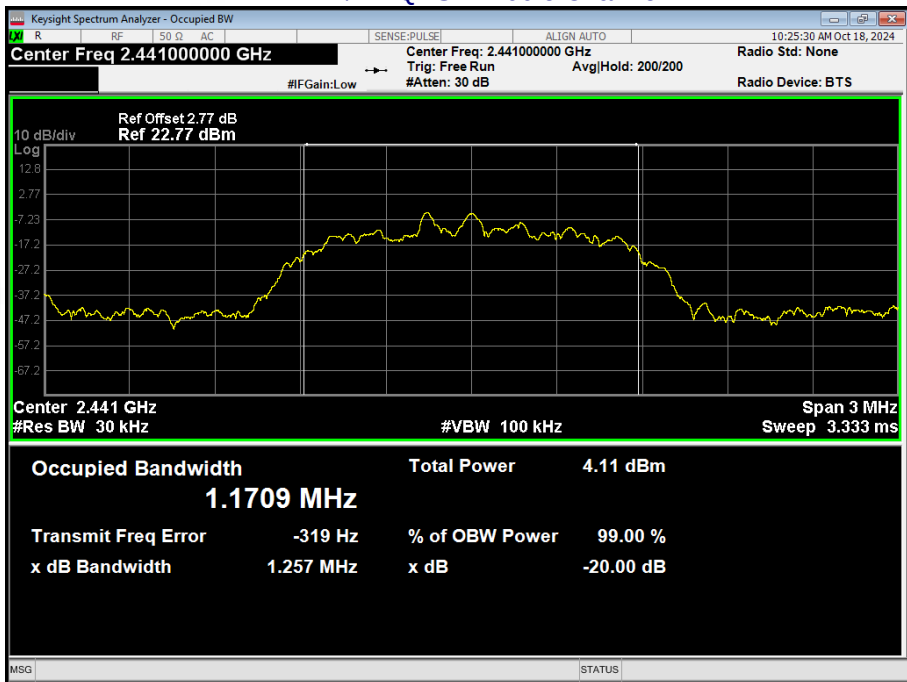




$\pi/4$ -DQPSK Low Channel

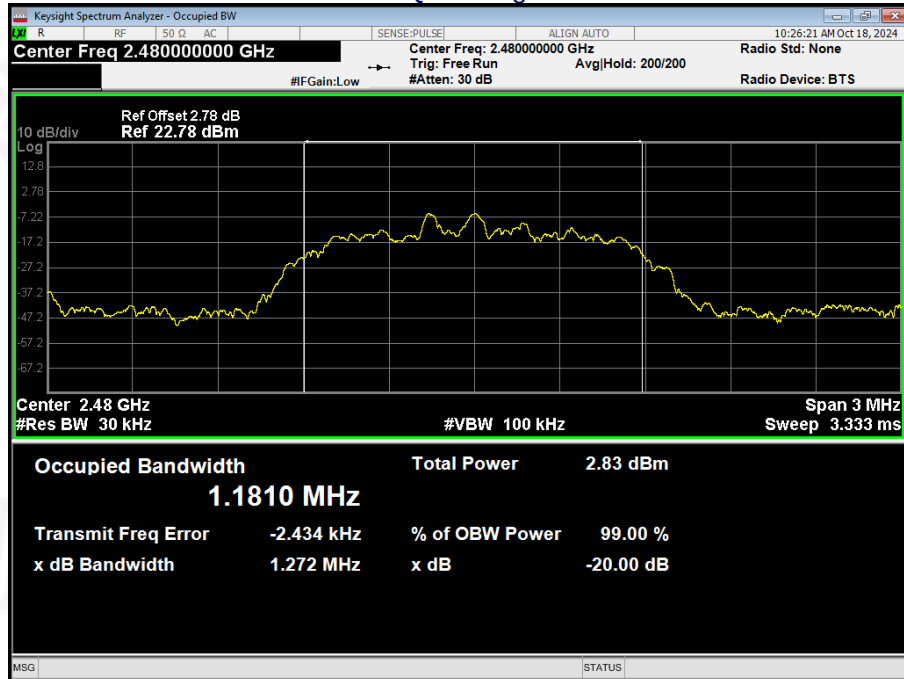


$\pi/4$ -DQPSK Middle Channel

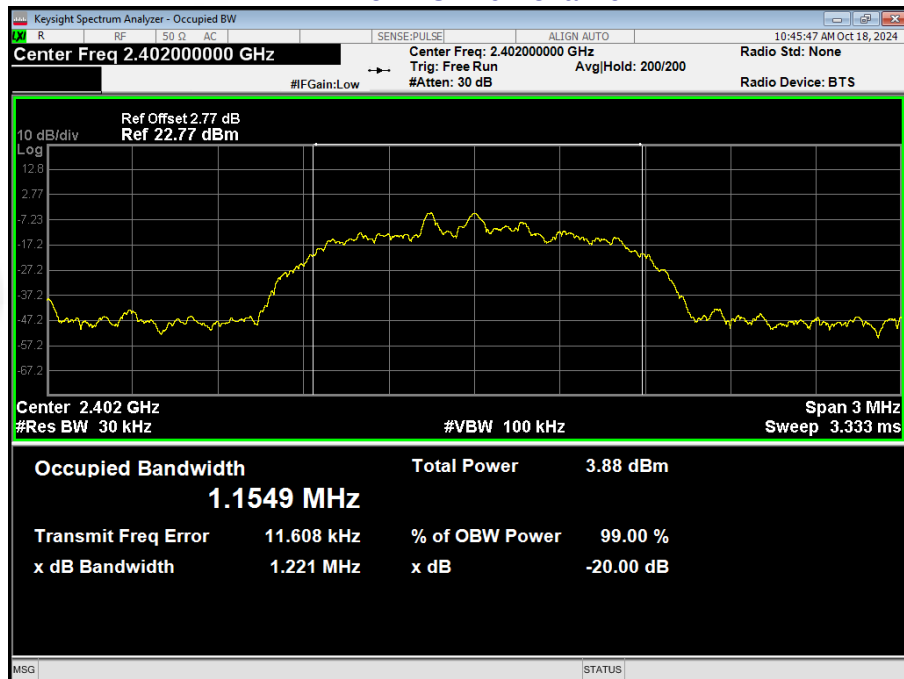




$\pi/4$ -DQPSK High Channel

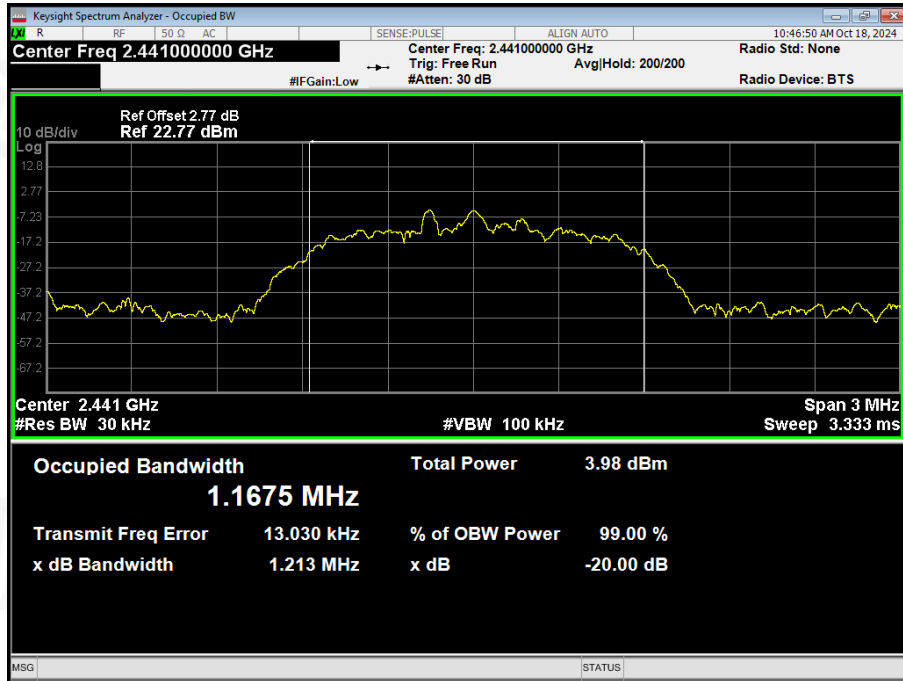


8-DPSK Low Channel

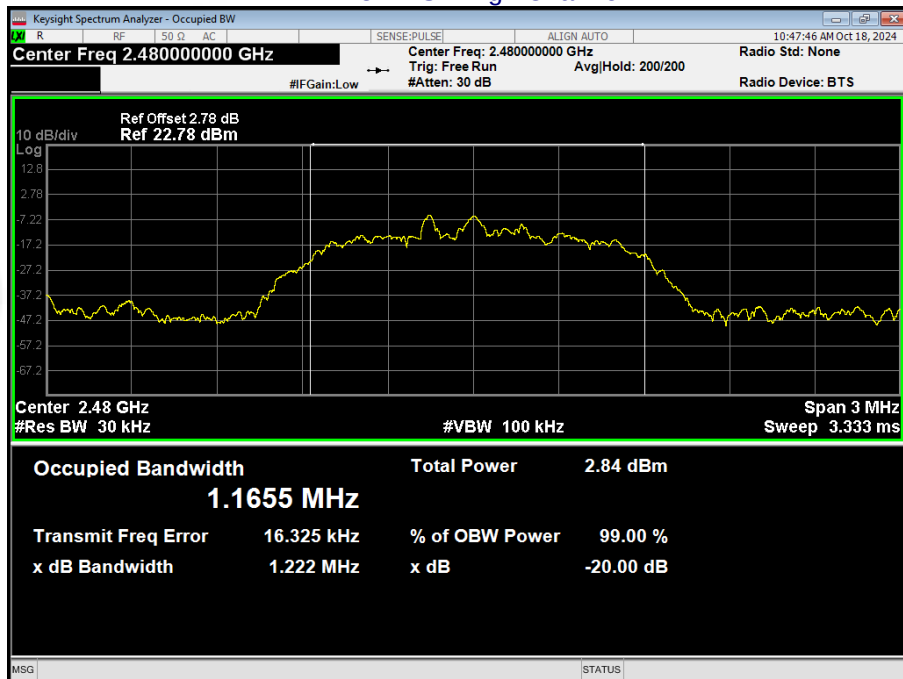




8-DPSK Middle Channel



8-DPSK High Channel





8. Maximum Peak Output Power

Test Requirement:	FCC Part15 C Section 15.247 (b)(1)
Test Method:	ANSI C63.10:2013
Limit:	GFSK:30 dBm $\pi/4$ -DQPSK & 8-DPSK:20.97 dBm

8.1 Block Diagram Of Test Setup



8.2 Limit

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

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

8.3 Test procedure

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 = 2MHz. VBW =6MHz. Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

8.4 DEVIATION FROM STANDARD

No deviation.

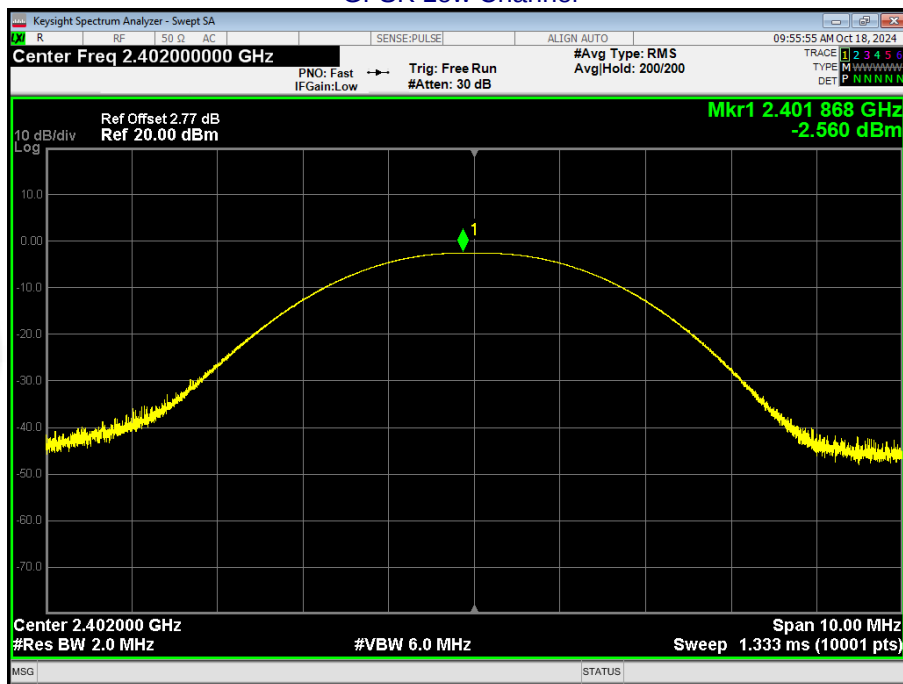


8.5 Test Result

Mode	Test channel	Peak Output Power (dBm)	FCC Limit (dBm)	Result
GFSK	Lowest	-2.560	30.00	Pass
	Middle	-2.479		
	Highest	-3.598		
$\pi/4$ -DQPSK	Lowest	-1.835	21.00	Pass
	Middle	-1.935		
	Highest	-3.134		
8-DPSK	Lowest	-1.433	21.00	Pass
	Middle	-1.672		
	Highest	-2.814		

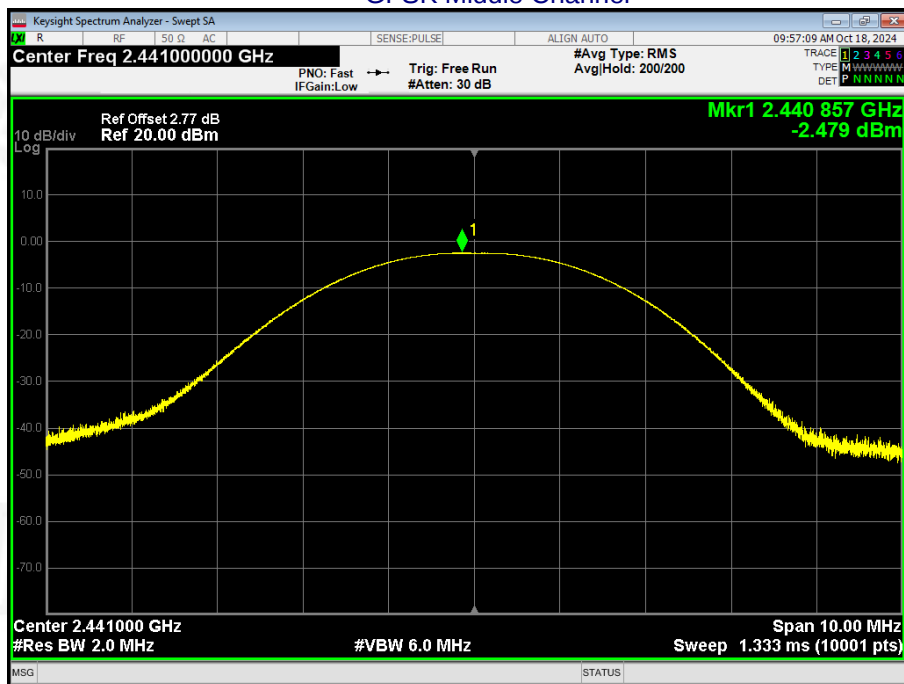
Test plots

GFSK Low Channel

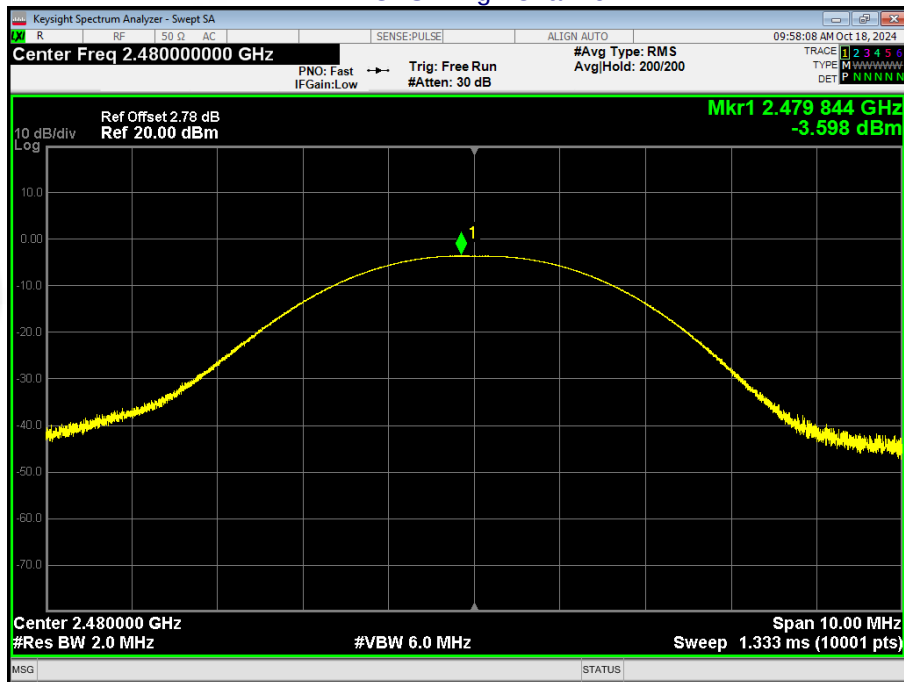




GFSK Middle Channel

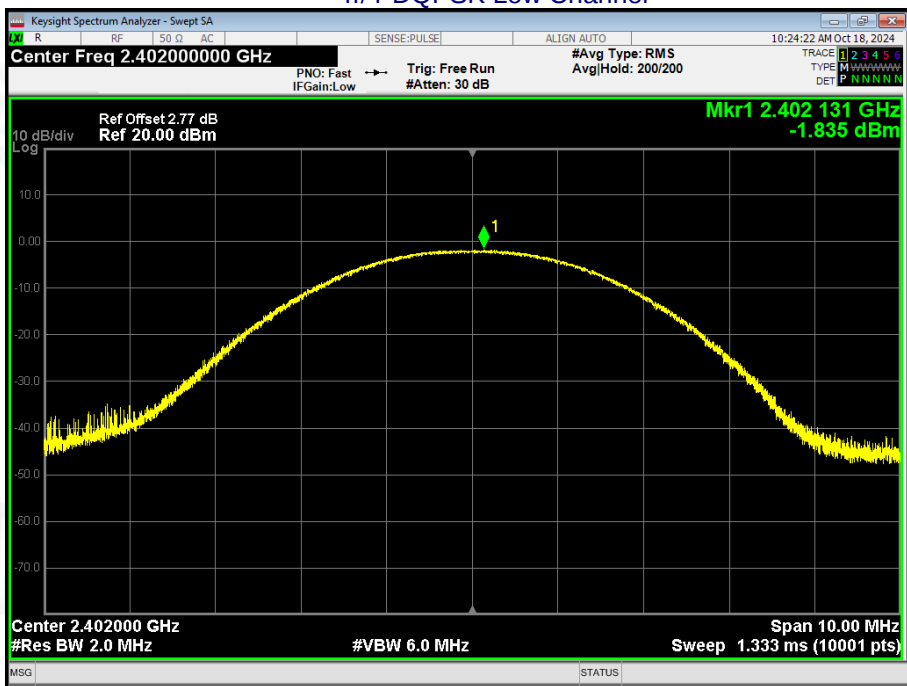


GFSK High Channel

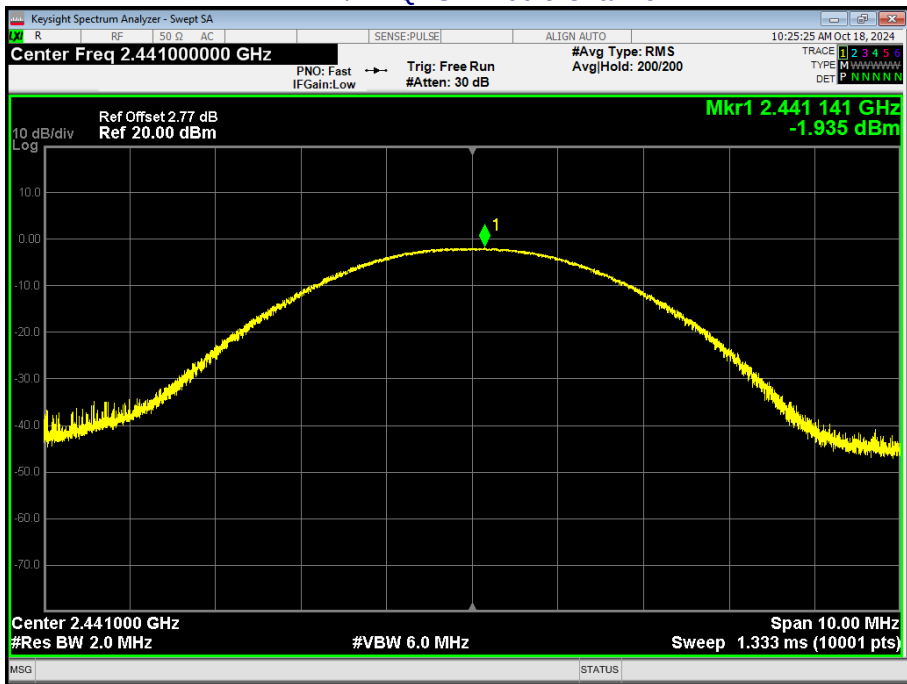




$\pi/4$ -DQPSK Low Channel

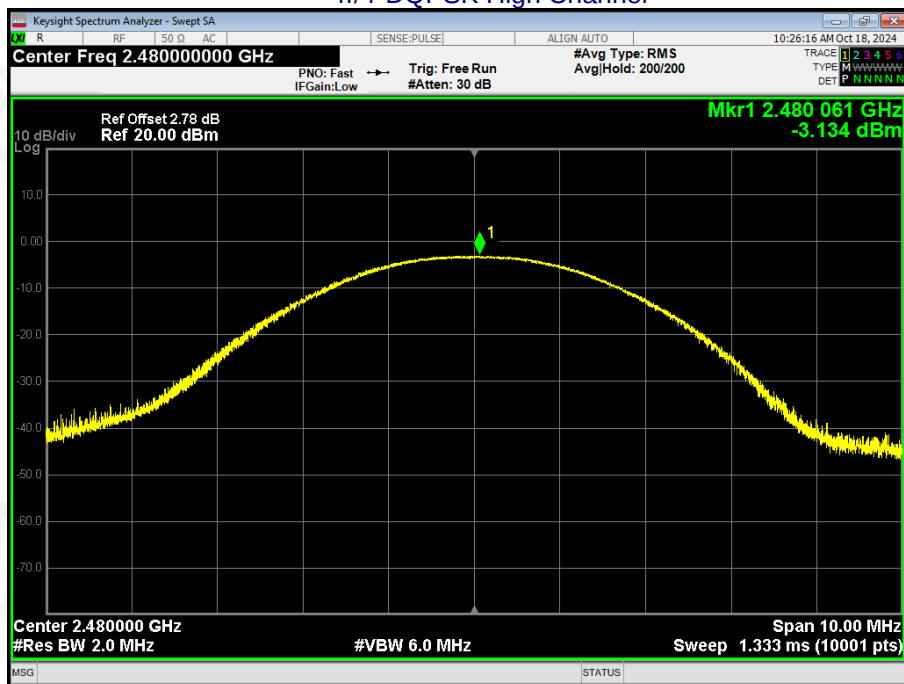


$\pi/4$ -DQPSK Middle Channel

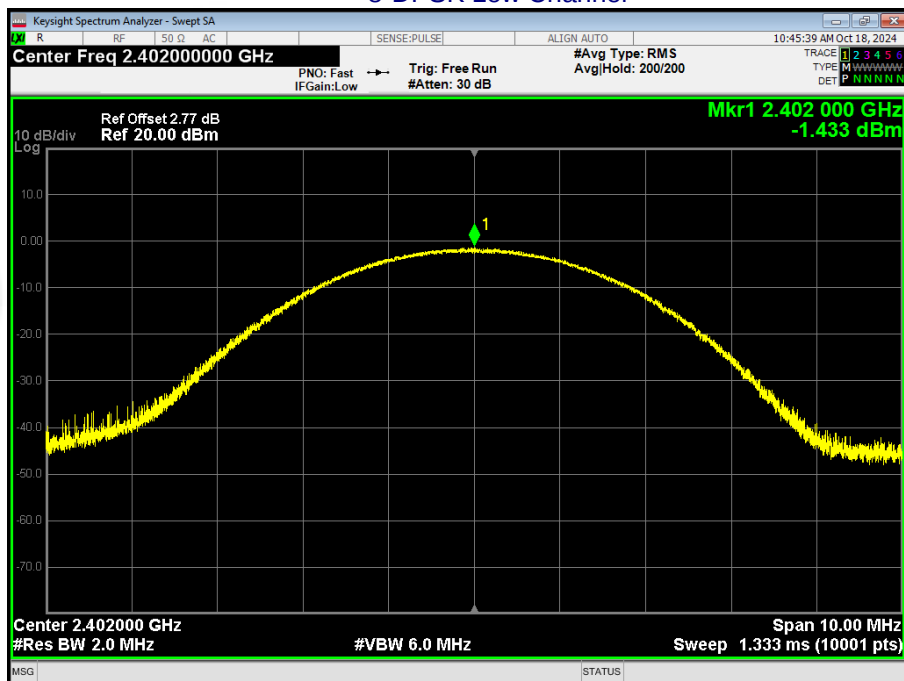




$\pi/4$ -DQPSK High Channel

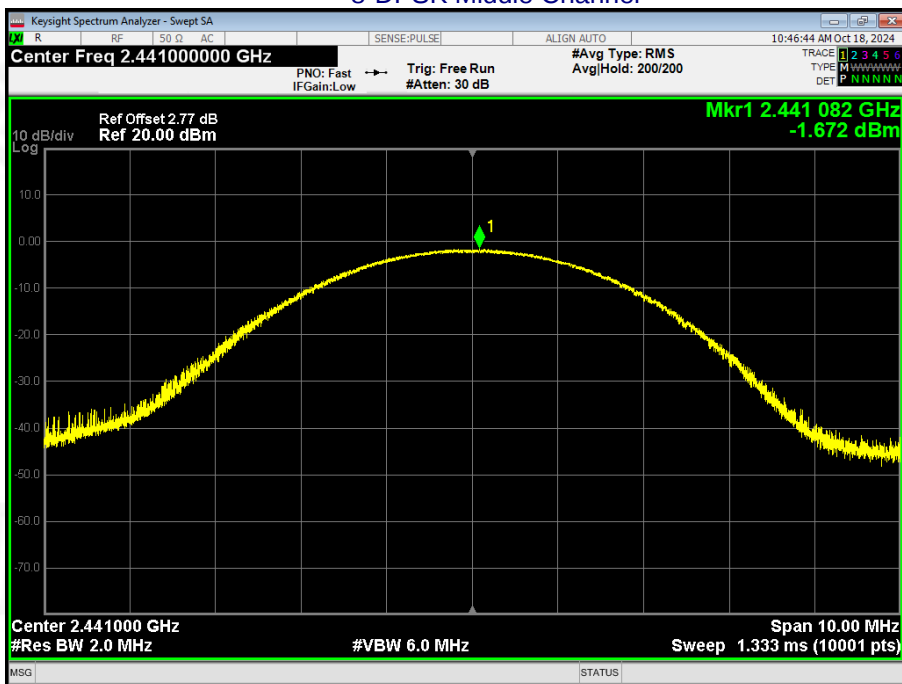


8-DPSK Low Channel

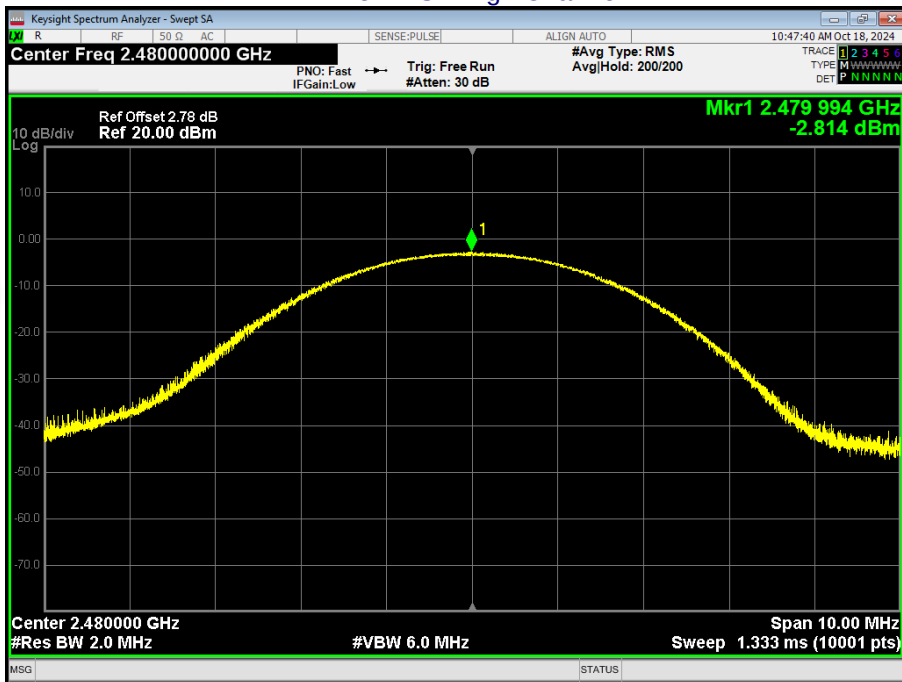




8-DPSK Middle Channel



8-DPSK High Channel





9. Hopping Channel Separation

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=30KHz, VBW=100KHz, detector=Peak
Limit:	GFSK: 20dB bandwidth $\pi/4$ -DQPSK & 8DSK: 0.025MHz or 2/3 of the 20dB bandwidth (whichever is greater)

9.1 Test Setup



9.2 Test procedure

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 = 30kHz. VBW = 100kHz , Span = 2.0MHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. The limit is specified in one of the subparagraphs of this Section Submit this plot.

9.3 DEVIATION FROM STANDARD

No deviation.



9.4 Test Result

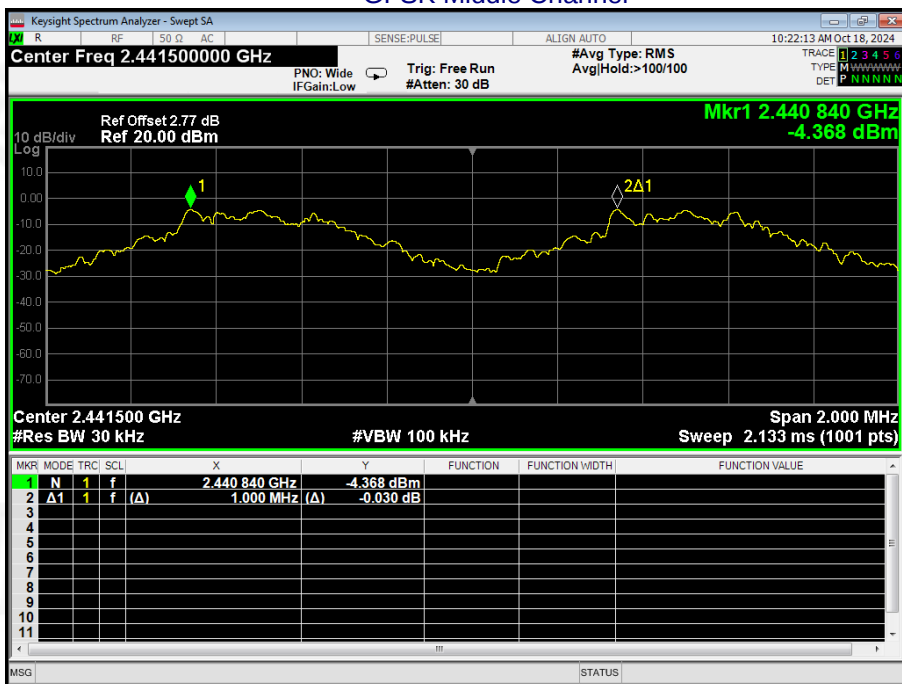
Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	1.004	0.878	PASS
GFSK	Middle	1.000	0.861	PASS
GFSK	High	1.006	0.869	PASS
$\pi/4$ -DQPSK	Low	0.998	0.832	PASS
$\pi/4$ -DQPSK	Middle	1.002	0.838	PASS
$\pi/4$ -DQPSK	High	1.002	0.848	PASS
8-DPSK	Low	0.996	0.814	PASS
8-DPSK	Middle	0.996	0.809	PASS
8-DPSK	High	1.010	0.815	PASS

Test plots
GFSK Low Channel

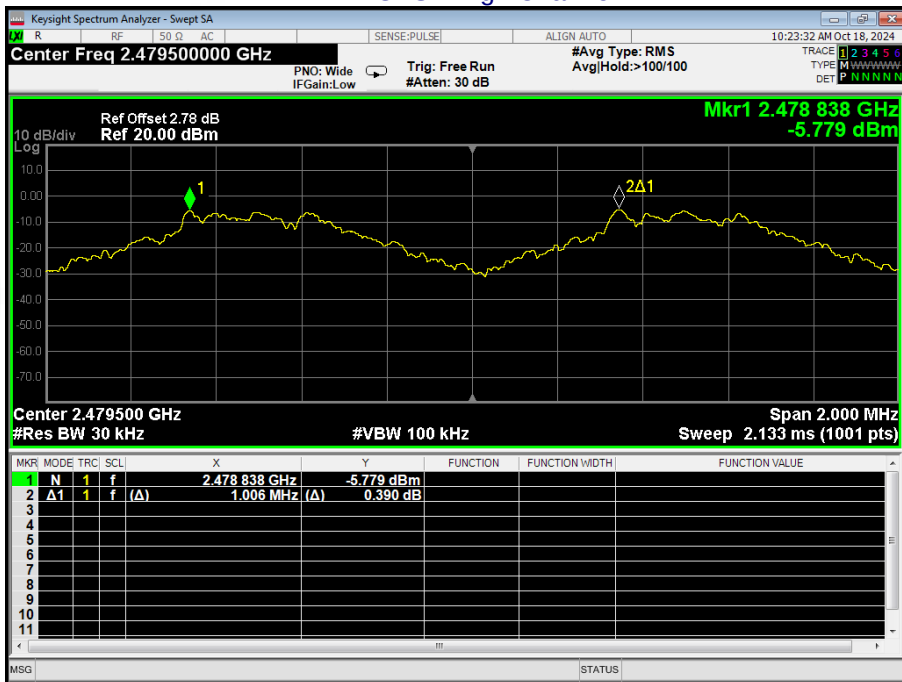




GFSK Middle Channel

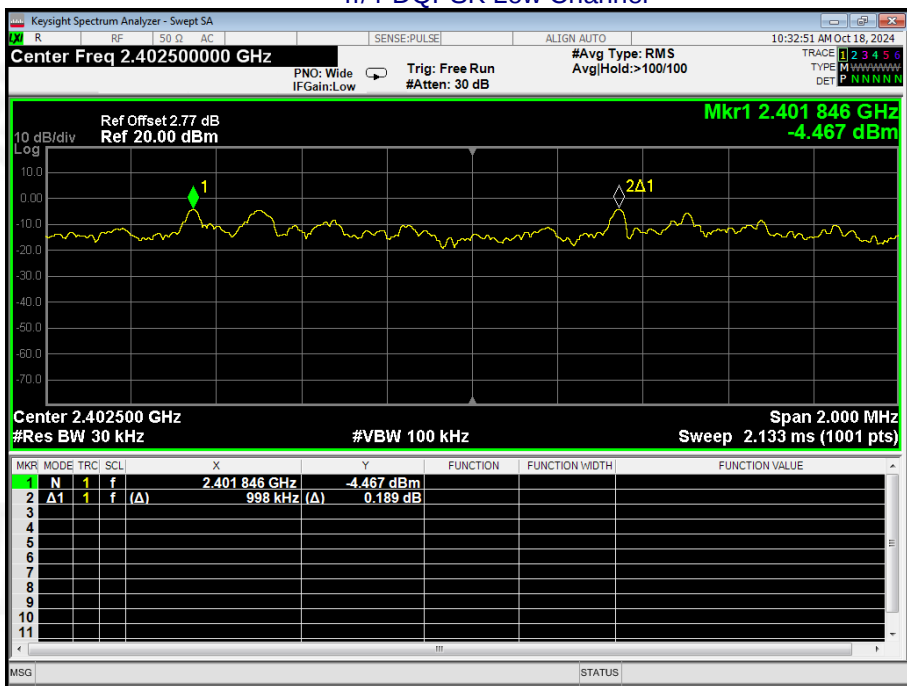


GFSK High Channel

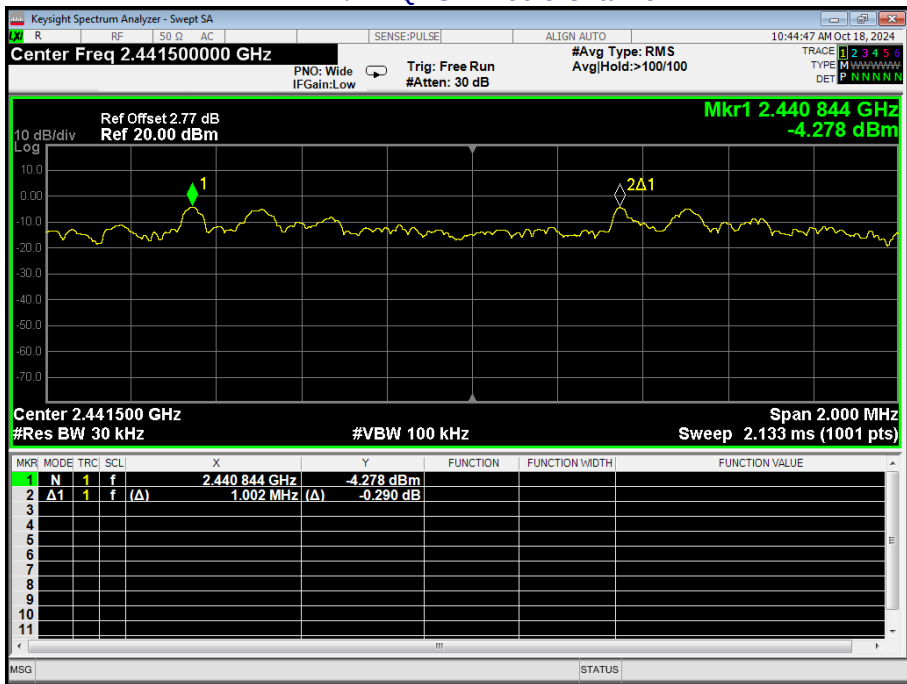




$\pi/4$ -DQPSK Low Channel

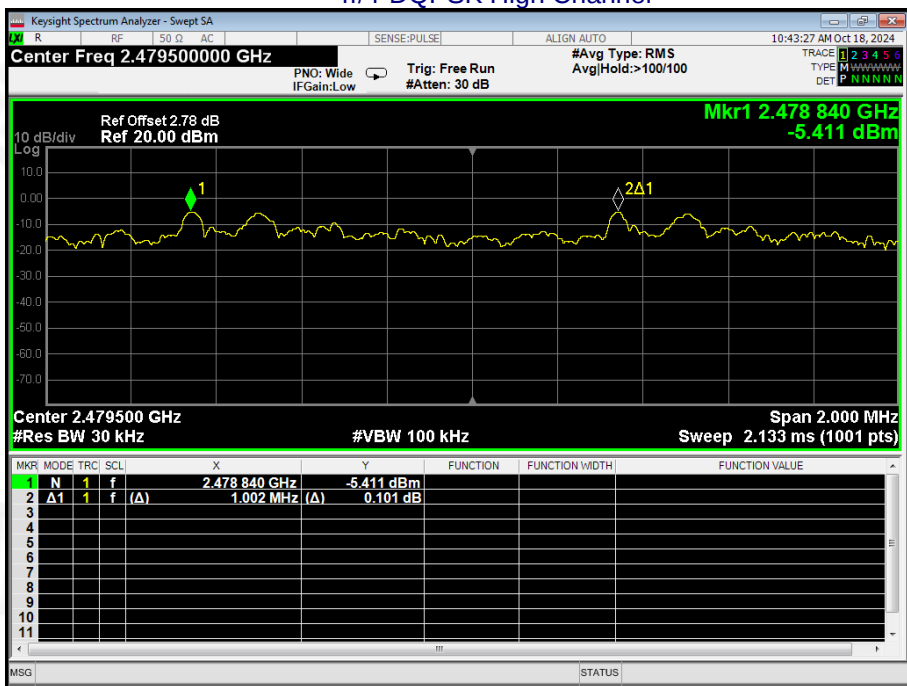


$\pi/4$ -DQPSK Middle Channel

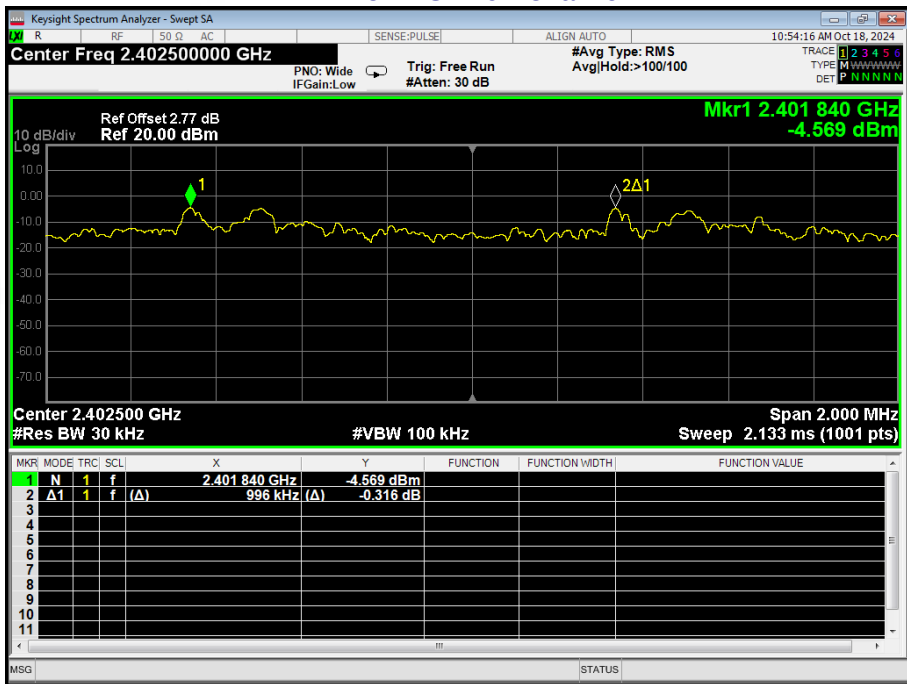




$\pi/4$ -DQPSK High Channel

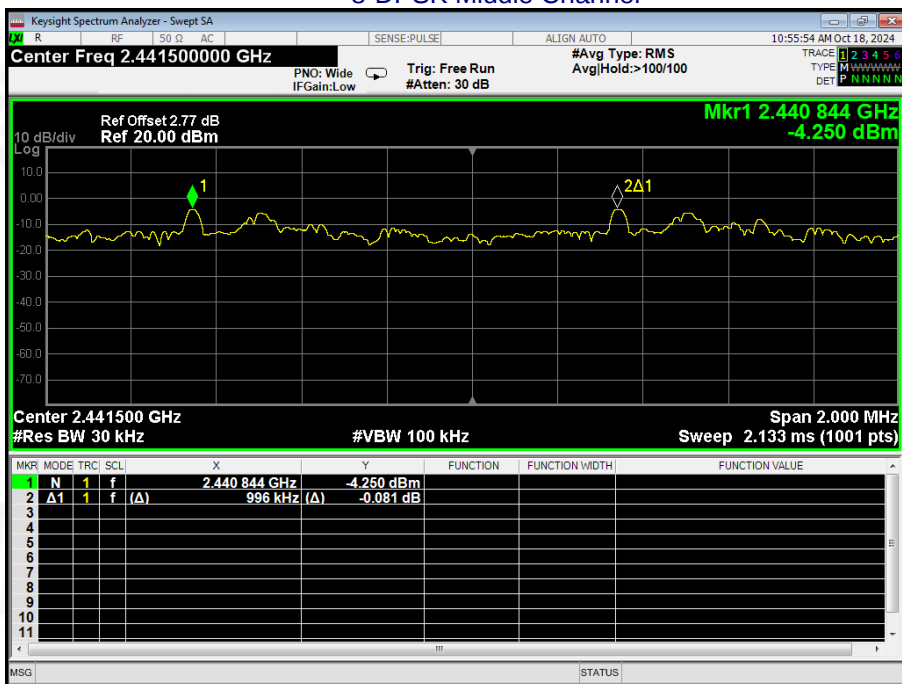


8-DPSK Low Channel

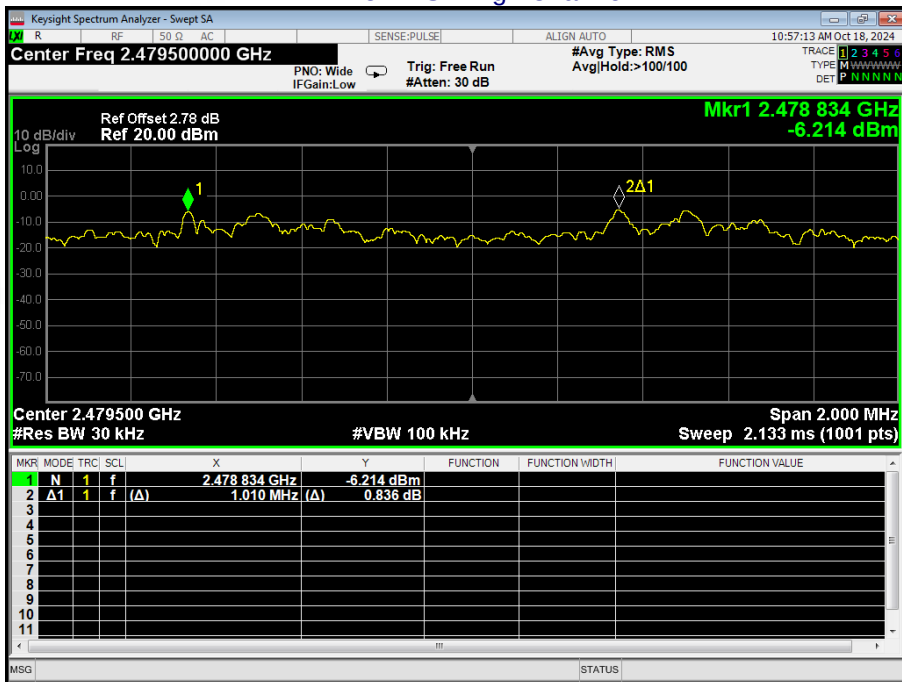




8-DPSK Middle Channel



8-DPSK High Channel





10. NUMBER OF HOPPING FREQUENCY

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=100kHz, VBW=300kHz, Frequency range=2400MHz-2483.5MHz, Detector=Peak
Limit:	15 channels

10.1 Test Setup



10.2 Test procedure

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 = 100kHz. VBW = 300kHz. Sweep = auto; Detector Function = Peak. Trace = Max hold.
3. Allow the trace to stabilize. It may prove necessary to break the span up to sections. in order to clearly show all of the hopping frequencies. The limit is specified in one of the subparagraphs of this Section.
4. Set the spectrum analyzer: Start Frequency = 2.4GHz, Stop Frequency = 2.4835GHz. Sweep=auto;

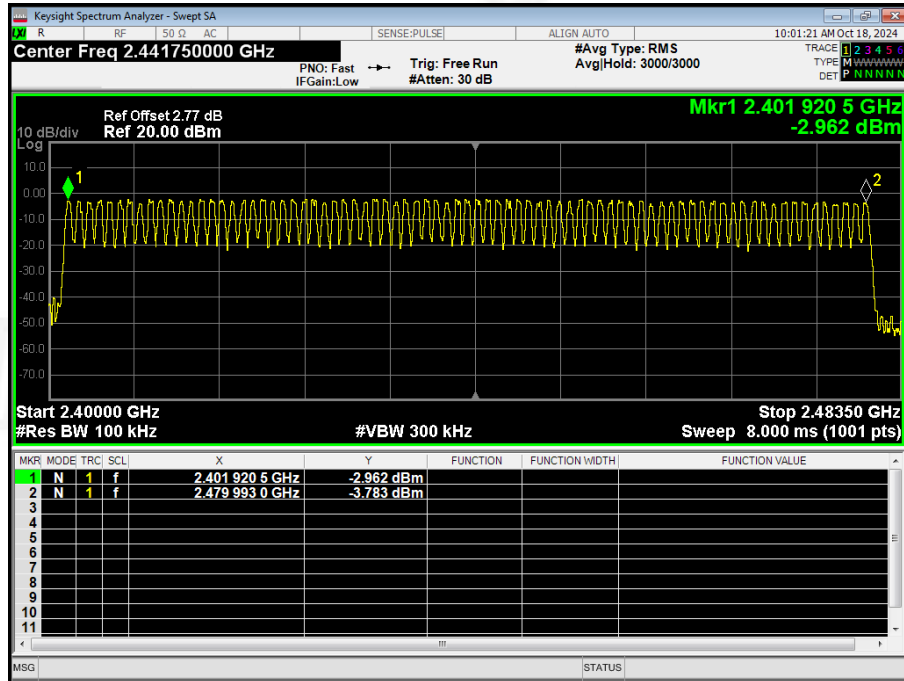
10.3 DEVIATION FROM STANDARD

No deviation.

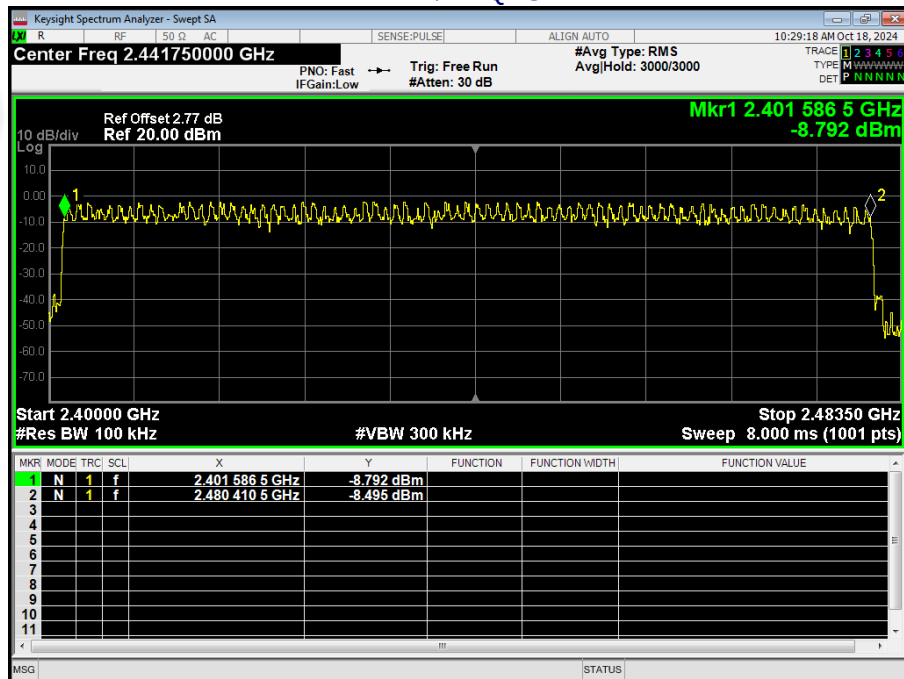


10.4 Test Result

Test Plots:
79 Channels in total
GFSK

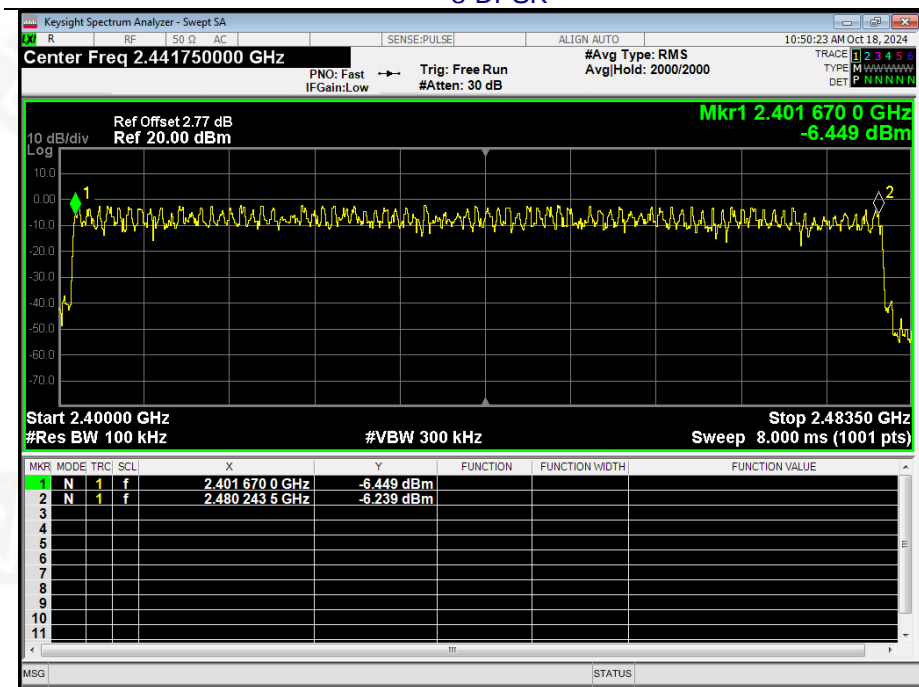


$\pi/4$ -DQPSK





8-DPSK





11. DWELL TIME

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)(iii)
Test Method:	ANSI C63.10:2013
Receiver setup:	RBW=1MHz, VBW=3MHz, Span=0Hz, Detector=Peak
Limit:	0.4 Second

11.1 Test Setup



11.2 Test procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set spectrum analyzer span = 0Hz;
3. Set RBW = 1MHz and VBW = 3MHz. Sweep = as necessary to capture the entire dwell time per hopping channel. Set the EUT for DH5, DH3 and DH1 packet transmitting.
4. Use the marker-delta function to determine the dwell time. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation. The limit is specified in one of the subparagraphs of this Section. Submit this plot(s).

11.3 DEVIATION FROM STANDARD

No deviation.



11.4 Test Result

GFSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	DH1	120.32	400	Pass
2441MHz	DH3	261.28	400	Pass
2441MHz	DH5	307.307	400	Pass

Remarks:

The test period: $T = 0.4 \text{ Second/Channel} \times 79 \text{ Channel} = 31.6 \text{ s}$
Test channel: as blow
CH:2441MHz time slot= $0.376(\text{ms}) \times (1600 / (2 \times 79)) \times 31.6 = 120.320 \text{ms}$
CH:2441MHz time slot= $1.633(\text{ms}) \times (1600 / (4 \times 79)) \times 31.6 = 261.280 \text{ms}$
CH:2441MHz time slot= $2.881(\text{ms}) \times (1600 / (6 \times 79)) \times 31.6 = 307.307 \text{ms}$

$\pi/4$ -DQPSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	2DH1	123.52	400	Pass
2441MHz	2DH3	262.08	400	Pass
2441MHz	2DH5	307.20	400	Pass

Remarks:

The test period: $T = 0.4 \text{ Second/Channel} \times 79 \text{ Channel} = 31.6 \text{ s}$
Test channel: as blow
CH:2441MHz time slot= $0.386(\text{ms}) \times (1600 / (2 \times 79)) \times 31.6 = 123.520 \text{ms}$
CH:2441MHz time slot= $1.638(\text{ms}) \times (1600 / (4 \times 79)) \times 31.6 = 262.080 \text{ms}$
CH:2441MHz time slot= $2.880(\text{ms}) \times (1600 / (6 \times 79)) \times 31.6 = 307.200 \text{ms}$

8-DPSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	3DH1	124.16	400	Pass
2441MHz	3DH3	261.92	400	Pass
2441MHz	3DH5	308.16	400	Pass

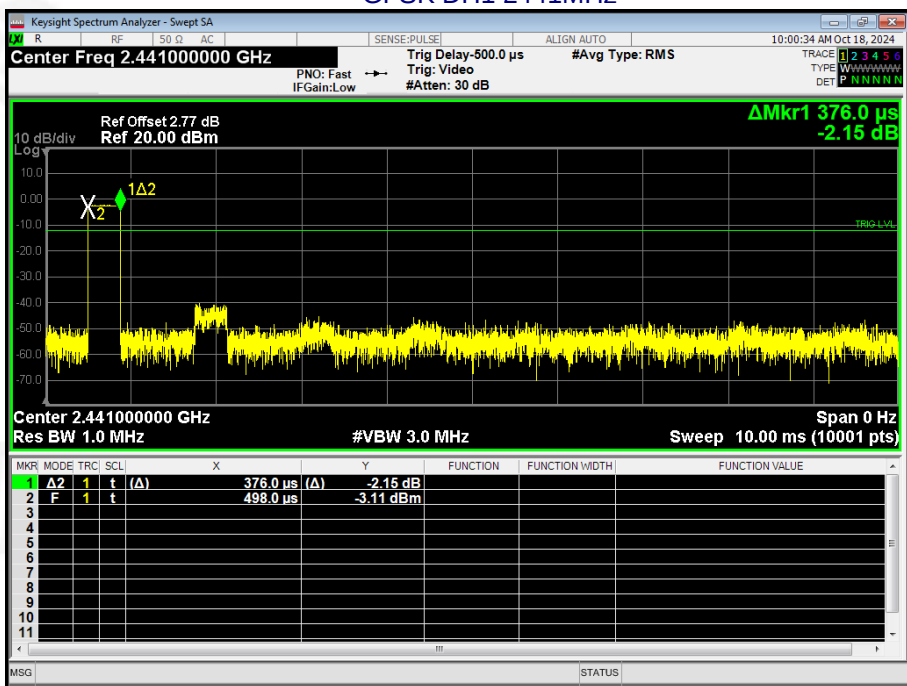
Remarks:

The test period: $T = 0.4 \text{ Second/Channel} \times 79 \text{ Channel} = 31.6 \text{ s}$
Test channel: as blow
CH:2441MHz time slot= $0.388(\text{ms}) \times (1600 / (2 \times 79)) \times 31.6 = 124.160 \text{ms}$
CH:2441MHz time slot= $1.637(\text{ms}) \times (1600 / (4 \times 79)) \times 31.6 = 261.920 \text{ms}$
CH:2441MHz time slot= $2.889(\text{ms}) \times (1600 / (6 \times 79)) \times 31.6 = 308.160 \text{ms}$

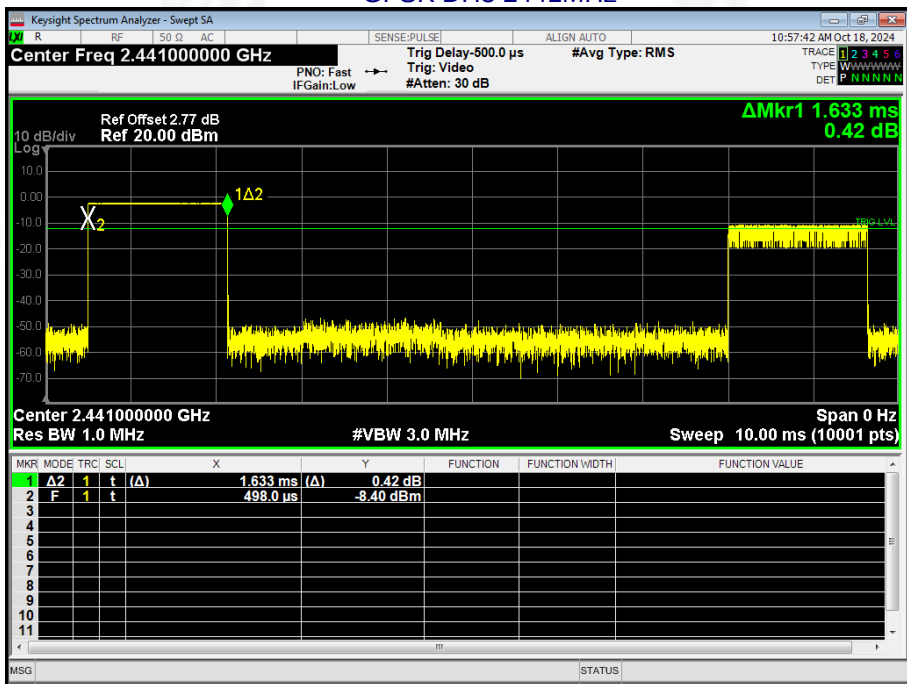


Test Plots

GFSK DH1 2441MHz

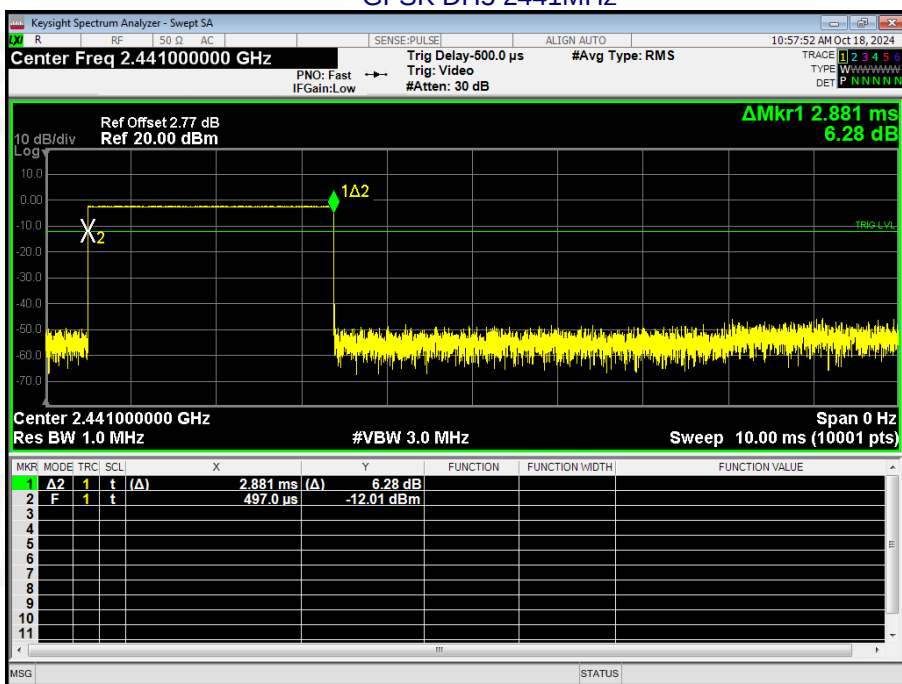


GFSK DH3 2441MHz

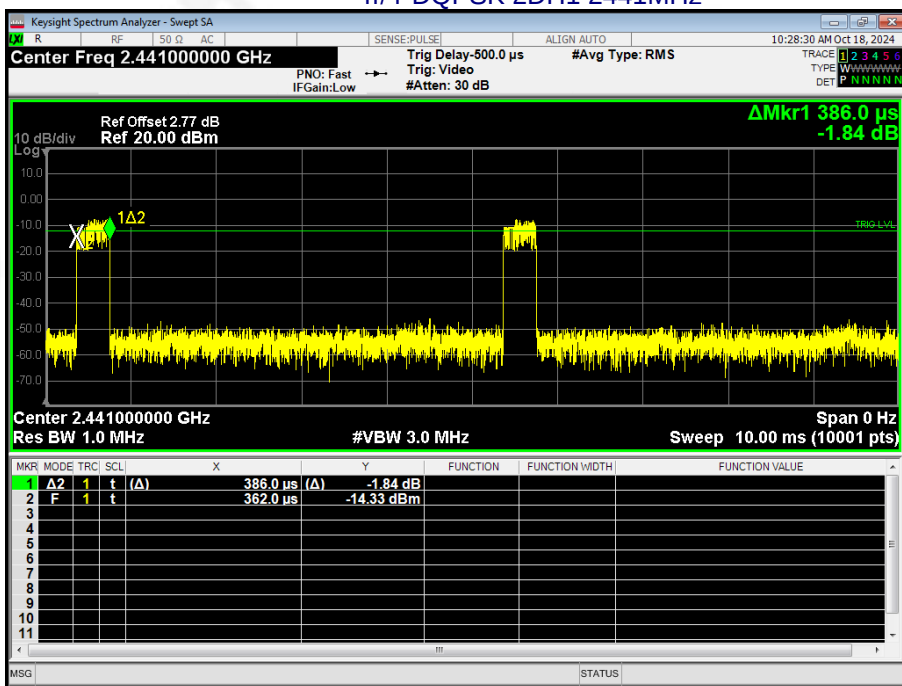




GFSK DH5 2441MHz

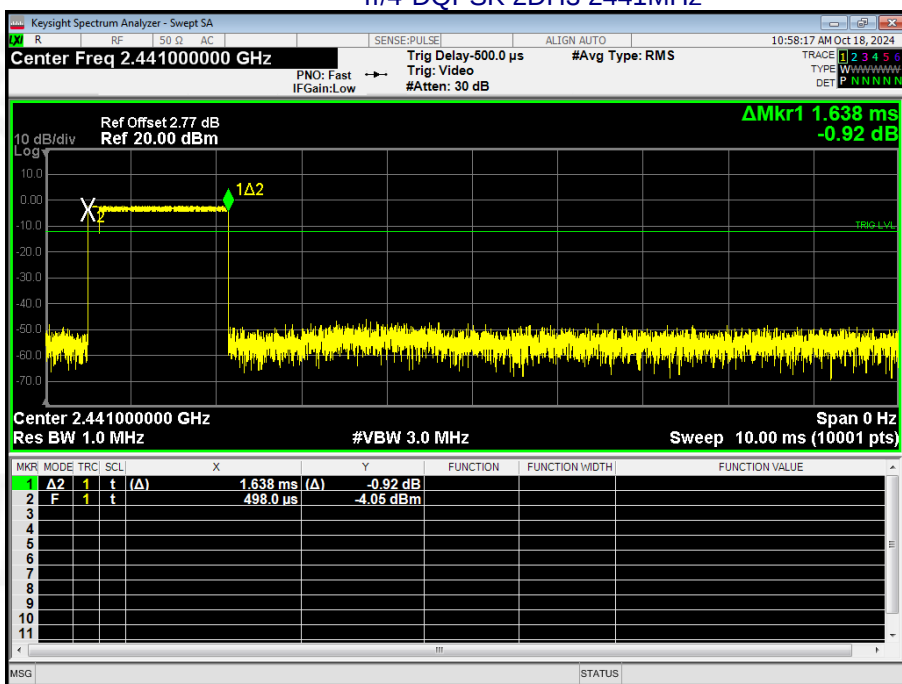


π/4-DQPSK 2DH1 2441MHz

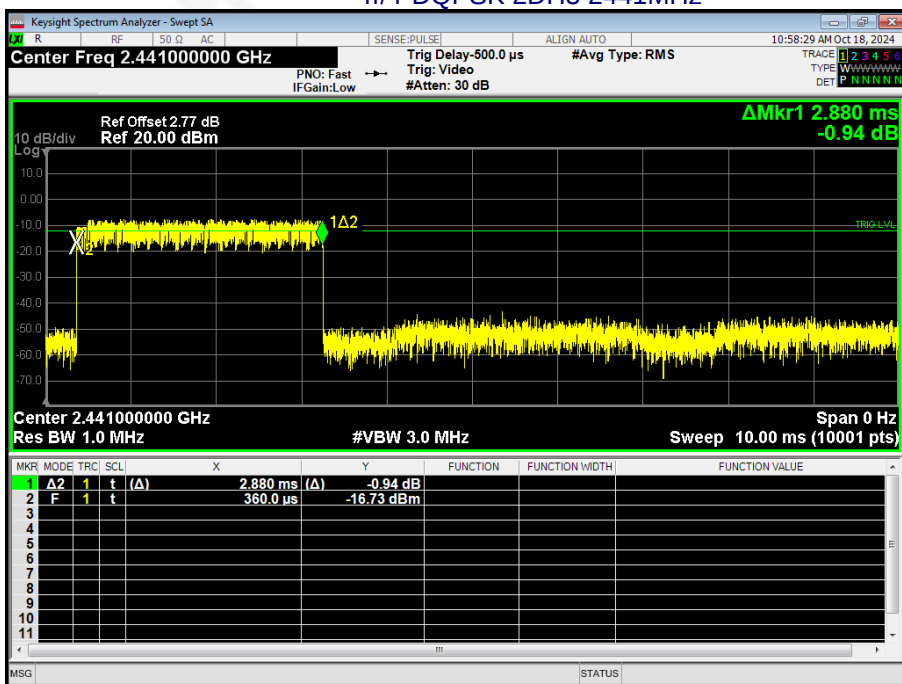




$\pi/4$ -DQPSK 2DH3 2441MHz

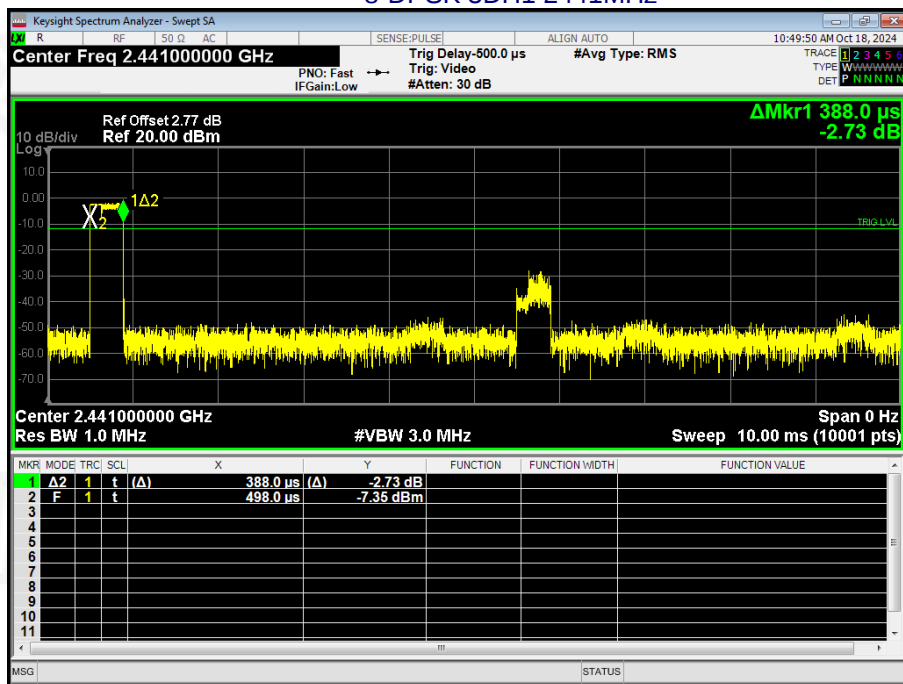


$\pi/4$ -DQPSK 2DH5 2441MHz

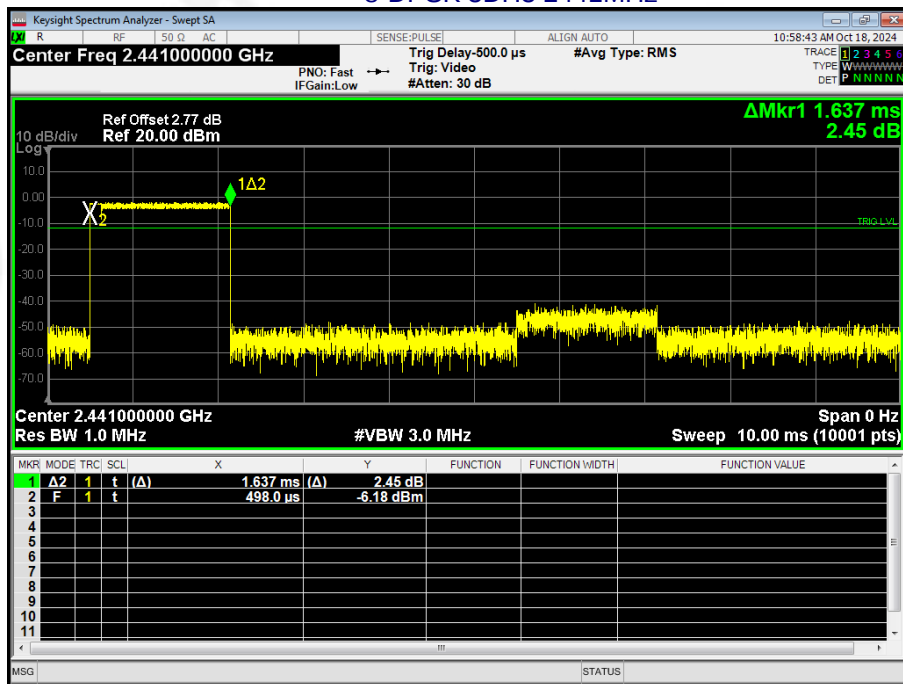


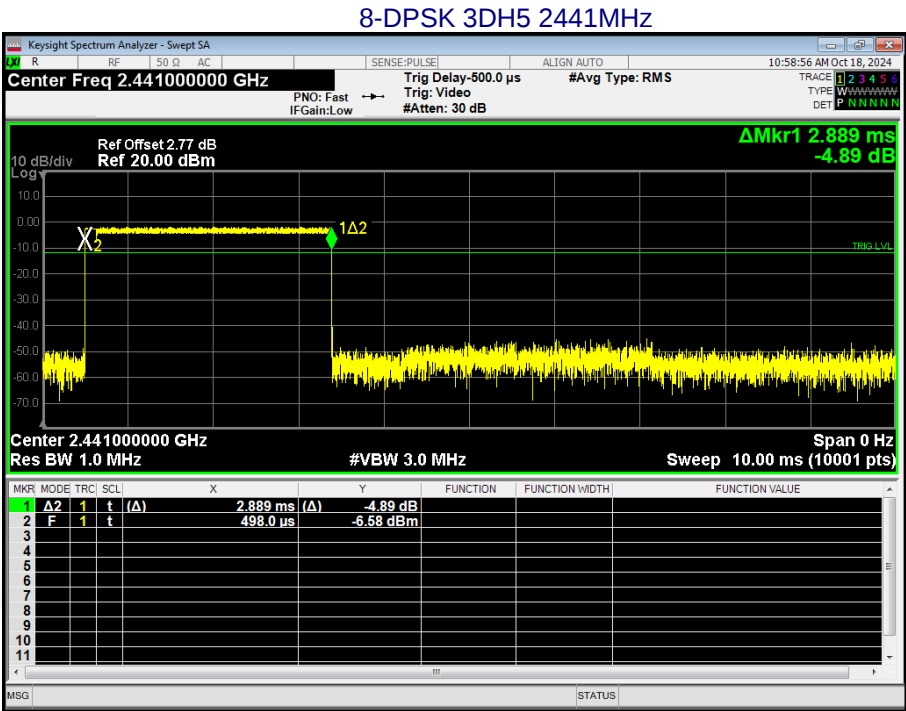


8-DPSK 3DH1 2441MHz



8-DPSK 3DH3 2441MHz







12. Antenna Requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
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. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
EUT Antenna:	
The antenna is FPC Antenna2, the best case gain of the antennas is 3.53dBi, reference to the appendix II for details	



13. Test Setup Photo

Reference to the appendix I for details.

14. EUT Constructional Details

Reference to the appendix II for details.

***** END OF REPORT *****