Shenzhen Huaxin Information Technology Service Co., Ltd

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TEST REPORT

Report No. ·····:	**HX250801R003**
FCC ID·····:	**2BQVP-ZPHD-0320**
Applicant·····:	**Dongguan Zhiping Interactive Technology Co., LTD**
Address·····:	Room 301, Building 5, No.30, Lianxing Road, Wulian Village, Fenggang Town, Dongguan City, Guangdong Province, China
Manufacturer·····:	Dongguan Zhiping Interactive Technology Co., LTD
Address·····:	Room 301, Building 5, No.30, Lianxing Road, Wulian Village, Fenggang Town, Dongguan City, Guangdong Province, China
Product Name·····:	**Mobile smart screen**
Trade Mark·····:	/
Model/Type reference·····:	ZPHD-0320
Listed Model(s) ·····:	/
Standard·····:	**FCC CFR Title 47 Part 15 Subpart C Section 15.247**
Date of receipt of test sample…:	Jul. 10, 2025
Date of testing……..:	Jul. 11, 2025 ~ Aug. 04, 2025
Date of issue……....:	Aug. 05, 2025
Result……:	**PASS**

Compiled by: (Printed name + signature)	Terry Su	Terry Su
Approved by: (Printed name + signature)	Michael Wu	Michael wu

SHENZHEN HUAXIN INFORMATION TECHNOLOGY SERVICE CO., LTD H X

Testing Laboratory Name……:	**Shenzhen Huaxin Information Technology Service Co., Ltd**
Address……..:	101, R & D Building, No.3 guansheng 4th Road, Luhu Community, Guanhu Street, Longhua District, Shenzhen, Guangdong, China

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1. TEST SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

FCC Rules Part 15.247: Operation within the bands of 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz.
RSS-247 Issue 3: Standard Specifications for Frequency Hopping Systems (FHSs) and Digital Transmission Systems (DTSs) Operating in the Bands 902-928MHz, 2400-2483.5MHz and 5725-5850MHz.
ANSI C63.10-2013: American National Standard for Testing Unlicensed Wireless Devices.
RSS-Gen Issue 5: General Requirements for Compliance of Radio Apparatus.

1.2. Report version

Revised No.	Date of issue	Description
01	Aug. 05, 2025	Original

1.3. Test Description

FCC Part 15 Subpart C (15.247)/ RSS-247 Issue 3				
Test Item	Standard Section		Result	Test Engineer
	FCC	IC		
Antenna Requirement	15.203& 15.247(b)(4)	/	Pass	Sain Liao
Conducted Emission	15.207	RSS-Gen 8.8	Pass	Ann Lu
Restricted Bands	15.205	RSS-Gen 8.10	Pass	Sain Liao
Hopping Channel Separation	15.247(a)(1)	RSS 247 5.1 (b)	Pass	Sain Liao
Dwell Time	15.247(a)(1)(iii)	RSS 247 5.1 (d)	Pass	Sain Liao
Peak Output Power	15.247(b)(1)	RSS 247 5.4 (b)	Pass	Sain Liao
Number of Hopping Frequency	15.247(a)(1)(iii)	RSS 247 5.1 (d)	Pass	Sain Liao
Conducted Band Edge and Spurious Emissions	15.247(d)	RSS 247 5.5	Pass	Sain Liao
Radiated Emissions Restricted Band and Radiated Spurious Emissions	15.205&15.209& 15.247(d)	RSS 247 5.5	Pass	Sain Liao
Radiated Spurious Emission	15.247(d)&15.209	RSS 247 5.5& RSS-Gen 8.9	Pass	Sain Liao
20dB Bandwidth	15.247(a)(1)	RSS 247 5.1 (b)	Pass	Sain Liao

Note: The measurement uncertainty is not included in the test result.

1.4. Test Facility

Shenzhen Huaxin Information Technology Service Co., Ltd

Add: 101, R & D Building, No.3 guansheng 4th Road, Luhu Community, Guanhu Street, Longhua District, Shenzhen, Guangdong, China

Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No.: 6855.01

Shenzhen Huaxin Information Technology Service Co., Ltd EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025: 2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Company Number: 31786, CAB Identifier: CN0147)

Shenzhen Huaxin Information Technology Service Co., Ltd EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 31786.

FCC (Registration No.: 932271, Designation Number CN1344)

Shenzhen Huaxin Information Technology Service Co., Ltd EMC Laboratory has been registered and fully described in a report filed with the (FCC)Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration NO.: 932271.

1.5. Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to TR-100028-01" Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2 " and is documented in the Shenzhen Huaxin Information Technology Service Co., Ltd quality system acc. to DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

Below is the best measurement capability for Shenzhen Huaxin Information Technology Service Co., Ltd

Test Items	Measurement Uncertainty	Notes
20dB Emission Bandwidth	±3.70%	(1)
Carrier Frequency Separation	±1.9%	(1)
Number of Hopping Channel	±1.9%	(1)
Time of Occupancy	±0.028%	(1)
Max Peak Conducted Output Power	±0.60dB	(1)
Band-edge Spurious Emission	±4.40dB	(1)
Conducted Spurious Emissions	±1.40dB	(1)
Conducted Emissions 9kHz~30MHz	±3.10dB	(1)
Radiated Emissions 9kHz~30MHz	±3.62dB	(1)
Radiated Emissions 30~1000MHz	±4.63dB	(1)
Radiated Emissions 1~18GHz	±4.40dB	(1)
Radiated Emissions 18~40GHz	±4.40dB	(1)

Note (1): This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

1.6. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	21°C ~ 27°C
Relative Humidity:	40% ~ 60%
Air Pressure:	101kPa

2. GENERAL INFORMATION

2.1. Client Information

Applicant:	Dongguan Zhiping Interactive Technology Co., LTD
Address:	Room 301, Building 5, No.30, Lianxing Road, Wulian Village, Fenggang Town, Dongguan City, Guangdong Province, China
Manufacturer:	Dongguan Zhiping Interactive Technology Co., LTD
Address:	Room 301, Building 5, No.30, Lianxing Road, Wulian Village, Fenggang Town, Dongguan City, Guangdong Province, China

2.2. General Description of EUT

Product Name:	Mobile smart screen
Trade Mark:	/
Model/Type reference:	ZPHD-0320
Listed Model(s):	/
Power supply:	12V⎓6A from AC/DC Adapter 14.8Vdc from 12000mAh Lithium Battery
Adapter Model:	J652-1206000UX Input: 100-240V~ 50/60Hz 1.7A Output: 12V⎓6A
Hardware version:	/
Software version:	/
Bluetooth V4.1/ BR+EDR	
Modulation:	GFSK, π/4-DQPSK, 8-DPSK
Operation frequency:	2402MHz~2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	FPC Antenna
Antenna gain:	3.54dBi Max

2.3. Accessory Equipment information

Equipment Information			
Name	Model	S/N	Manufacturer
/	/	/	/
Cable Information			
Name	Shielded Type	Ferrite Core	Length
DC In Cable	Without	Without	1.5M
Test Software Information			
Name	Versions	/	/
Engineering mode	/	/	/

2.4. Operation state

Operation Frequency List: The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing. BT EDR, 79 channels are provided to the EUT. Channels 00/39/78 were selected for testing.

Operation Frequency List:

Channel	Frequency (MHz)
00	**2402**
01	2403
⋮	⋮
38	2440
39	**2441**
40	2442
⋮	⋮
77	2479
78	**2480**

Note: The display in grey were the channel selected for testing.

Test mode

For RF test items:
The engineering test program was provided and enabled to make EUT continuous transmit
For AC power line conducted emissions:
The EUT was set to connect with the Bluetooth instrument under large package sizes transmission.
For Radiated spurious emissions test item:
The engineering test program was provided and enabled to make EUT continuous transmit. The EUT in each of three orthogonal axis emissions had been tested, but only the worst case (X axis) data recorded in the report.

2.5. Measurement Instruments List

RF Test System - SRD					
Item	Test Equipment	Manufacturer	Model No.	Versions/ Serial No.	Calibrated until
1	Spectrum Analyzer	Agilent	N9020A	MY51280803	Apr. 08, 2026
2	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026
3	MXG Vector Signal Generator	Agilent	N5182A	101795	Apr. 08, 2026
4	EXG Analog Signal Generator	Agilent	N5181A	MY47421151	Apr. 08, 2026
5	RF Sensor Unit	Techy	TR1029-2	20220428P009	Apr. 08, 2026
6	High and low temperature test chamber	Asprey	LX-225L	2020091401	Apr. 08, 2026
7	SRD Test Software	TACHOY	RTS	V1.0.0	/
8	2G/3G/4G Test Software	TST	TST-PASS	V2.0	/

Radiated emission					
Item	Test Equipment	Manufacturer	Model No.	Versions/ Serial No.	Calibrated until
1	EMI spectrum receiver	R&S	ESR7	102543	Apr. 08, 2026
2	9*6*6 anechoic chamber	Mao Rui	9*6*6	/	Apr. 08, 2026
3	Spectrum analyzer	R&S	FSV40-N	101795	Apr. 09, 2026
4	Preamplifier	Agilent	8449B	3008A00551	Apr. 09, 2026
5	Preamplifier	HP	8447D	1616A02061	Apr. 08, 2026
6	Horn Antenna	A. H. System, Inc	SAS-571	915	Apr. 18, 2026
7	Trilog-Broadband Antenna	SCHWARZBECK	VULB 9168	01318	Apr. 18, 2026
8	6dB Fixed Attenuator	SKET	AP_DC01G-2W-N-6dB	SK2021012803	Apr. 08, 2026
9	Test Software	SKET	EMC-I	V1.4.0.1	/
10	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Conducted emission					
Item	Test Equipment	Manufacturer	Model No.	Versions/ Serial No.	Calibrated until
1	LISN	R&S	ENV216	101291	Apr. 09, 2026
2	LISN	R&S	ESH3-Z5	894981/024	Apr. 09, 2026
3	EMI Test Receiver	R&S	ESR7	102543	Apr. 08, 2026
5	Test Software	SKET	EMC-I	V1.4.0.1	/
6	Wideband Radio Communication Tester	R&S	CMW500	157763	Apr. 08, 2026

Note: 1. The Cal. Interval was one year.
2. The cable loss has calculated in test result which connection between each test instruments.

3. TEST ITEM AND RESULTS

3.1. Conducted Emission

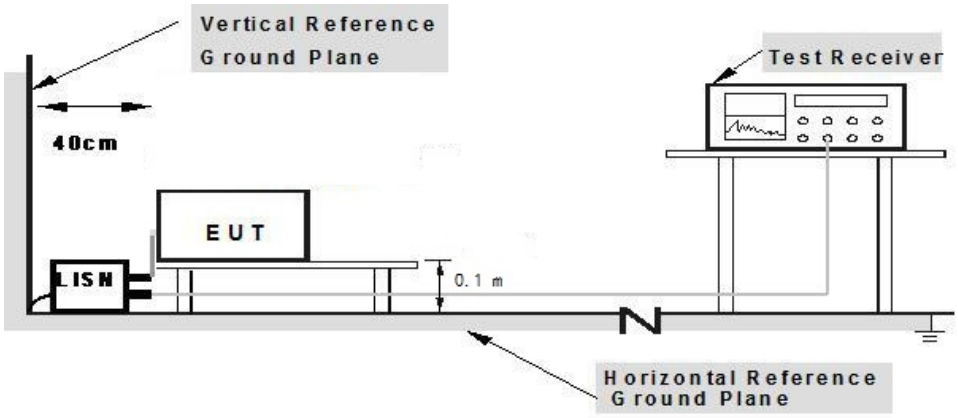
Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.207/ RSS – Gen 8.8

Frequency range (MHz)	Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

Test Configuration



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

Test Procedure

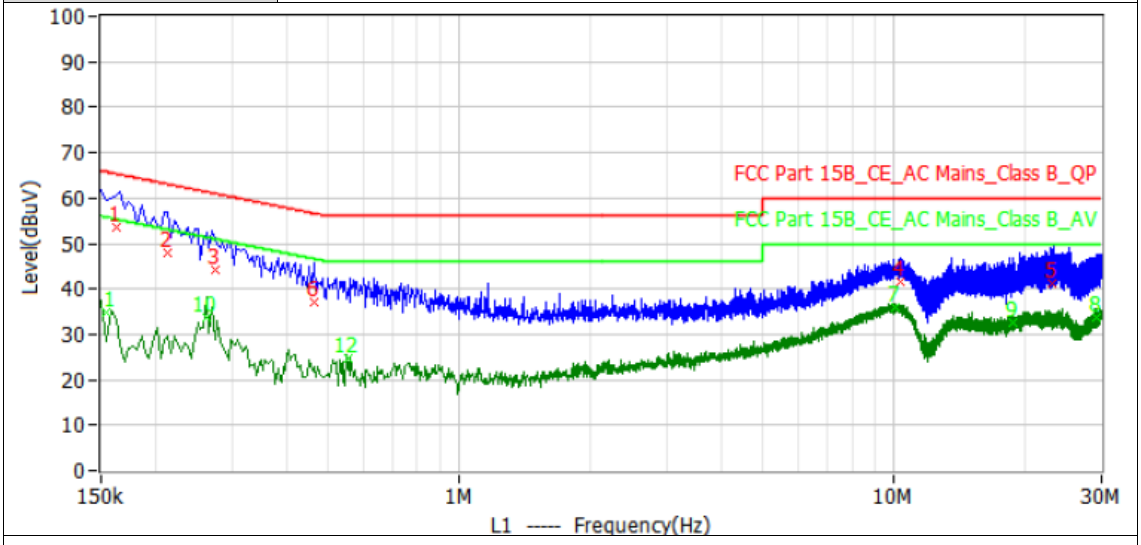
1. The EUT was setup according to ANSI C63.10:2013 requirements.
2. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface.
3. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs)
4. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.
5. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.
6. Conducted Emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.
7. During the above scans, the emissions were maximized by cable manipulation.

Test Mode

Please refer to the clause 2.4.

Test Results

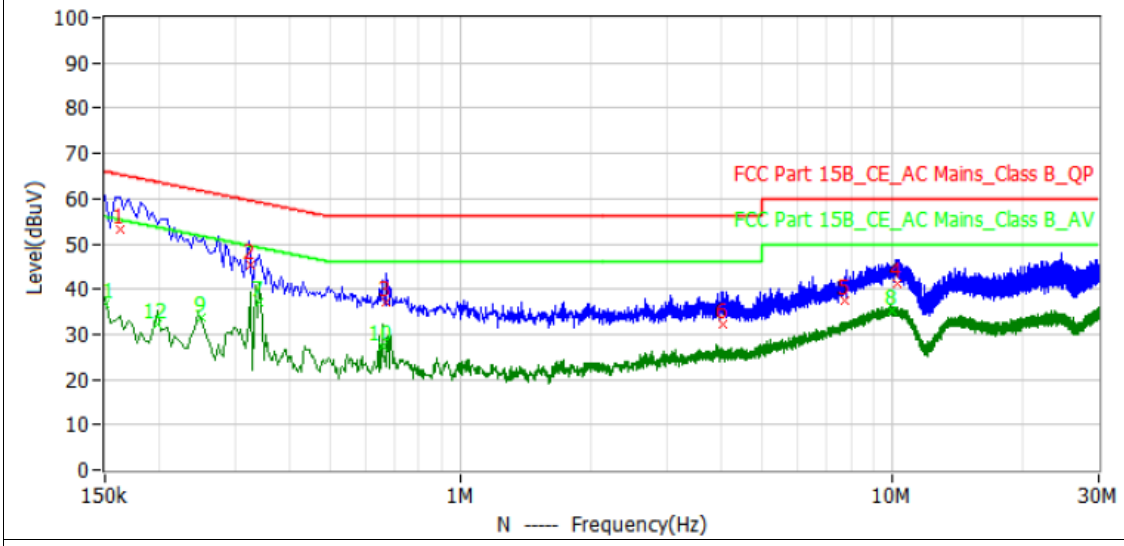
Test Voltage:	AC 120V/60Hz
Test Mode:	GFSK Mode 2402MHz
Terminal:	Line



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector	Polar
1	162.000kHz	43.11	10.40	53.51	65.36	-11.85	QP	L1
2	214.000kHz	37.67	10.40	48.07	63.05	-14.98	QP	L1
3	274.000kHz	33.69	10.60	44.29	61.00	-16.71	QP	L1
4	10.306MHz	28.28	13.30	41.58	60.00	-18.42	QP	L1
5	23.166MHz	27.53	13.60	41.13	60.00	-18.87	QP	L1
6	462.000kHz	26.17	10.80	36.97	56.66	-19.69	QP	L1
7	10.102MHz	22.62	13.30	35.92	50.00	-14.08	AV	L1
8	29.158MHz	19.94	13.70	33.64	50.00	-16.36	AV	L1
9	18.794MHz	19.26	13.50	32.76	50.00	-17.24	AV	L1
10	262.000kHz	23.17	10.50	33.67	51.37	-17.70	AV	L1
11	154.000kHz	24.47	10.40	34.87	55.78	-20.91	AV	L1
12	554.000kHz	13.72	10.90	24.62	46.00	-21.38	AV	L1

Emission Level= Read Level+ Correct Factor

Test Voltage:	AC 120V/60Hz
Test Mode:	GFSK Mode 2402MHz
Terminal:	Neutral



No.	Frequency	Reading dBuV	Factor dB	Level dBuV	Limit dBuV	Delta dB	Detector	Polar
1	162.000kHz	42.67	10.60	53.27	65.36	-12.10	QP	N
2	326.000kHz	34.73	10.60	45.33	59.55	-14.23	QP	N
3	674.000kHz	26.03	11.20	37.23	56.00	-18.77	QP	N
4	10.290MHz	27.55	13.50	41.05	60.00	-18.95	QP	N
5	7.754MHz	24.93	12.60	37.53	60.00	-22.47	QP	N
6	4.034MHz	19.22	13.00	32.22	56.00	-23.78	QP	N
7	342.000kHz	26.34	10.60	36.94	49.15	-12.22	AV	N
8	9.946MHz	21.75	13.50	35.25	50.00	-14.75	AV	N
9	250.000kHz	22.99	10.60	33.59	51.76	-18.17	AV	N
10	658.000kHz	16.28	11.10	27.38	46.00	-18.62	AV	N
11	150.000kHz	26.17	10.60	36.77	56.00	-19.23	AV	N
12	198.000kHz	21.66	10.60	32.26	53.69	-21.43	AV	N

Emission Level= Read Level+ Correct Factor

3.2. Radiated Emission

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.209/ RSS – Gen 8.9

Frequency (MHz)	Field Strength (microvolts/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
960~1000	500	3

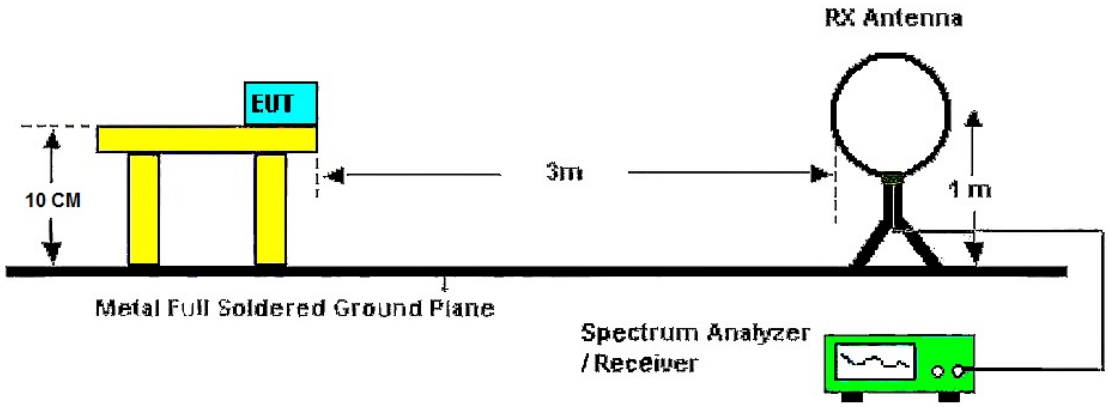
Frequency Range (MHz)	dBμV/m (at 3 meters)	
	Peak	Average
Above 1000	74	54

Note:

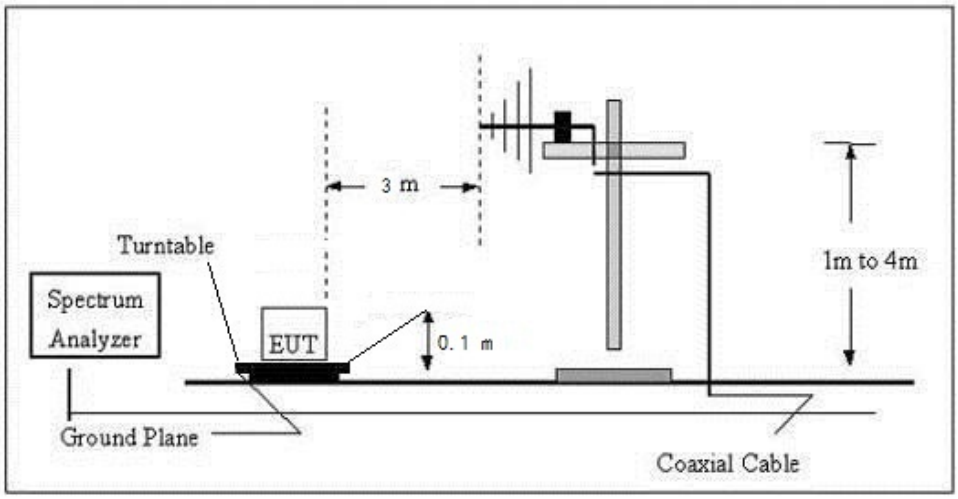
(1) The tighter limit applies at the band edges.

(2) Emission Level (dBuV/m)=20log Emission Level (uV/m).

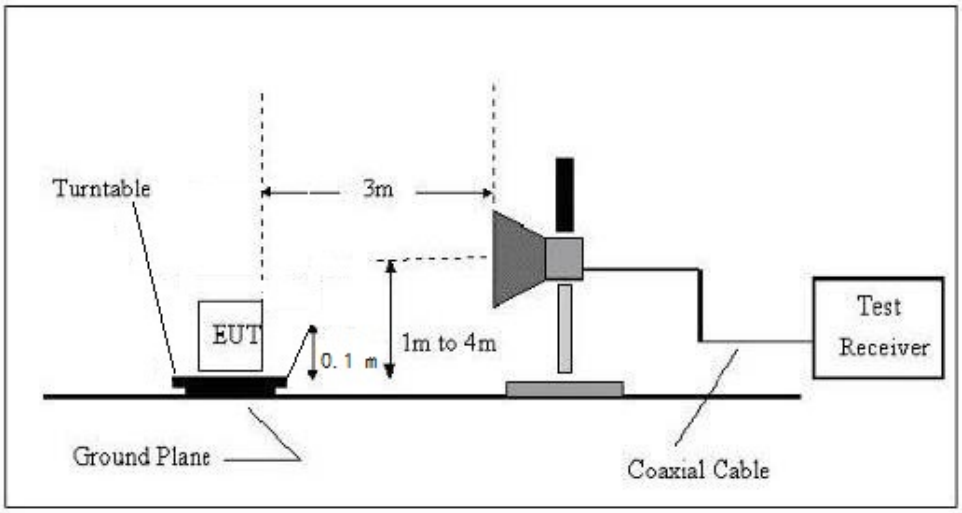
Test Configuration



Below 30MHz Test Setup



Below 1000MHz Test Setup



Above 1GHz Test Setup

Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013
2. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5. Set to the maximum power setting and enable the EUT transmit continuously.
6. Use the following spectrum analyzer settings

(1) Span shall wide enough to fully capture the emission being measured;
(2) Below 30 MHz:
9kHz – 150kHz, RBW=200Hz, VBW≥RBW, Sweep=auto, Detector function=peak, Trace=max hold;
150kHz – 30MHz, RBW=9kHz, VBW≥RBW, Sweep=auto, Detector function=peak, Trace=max hold; If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
(3) 30 MHz - 1 GHz:
RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;
If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.

(4) From 1 GHz to 10th harmonic:

RBW=1MHz, VBW=3MHz Peak detector for Peak value.

RBW=1MHz, VBW≥1/T Peak detector for Average value.

Note 1: For the 1/T& Duty Cycle please refer to clause 3.10 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

Test Result

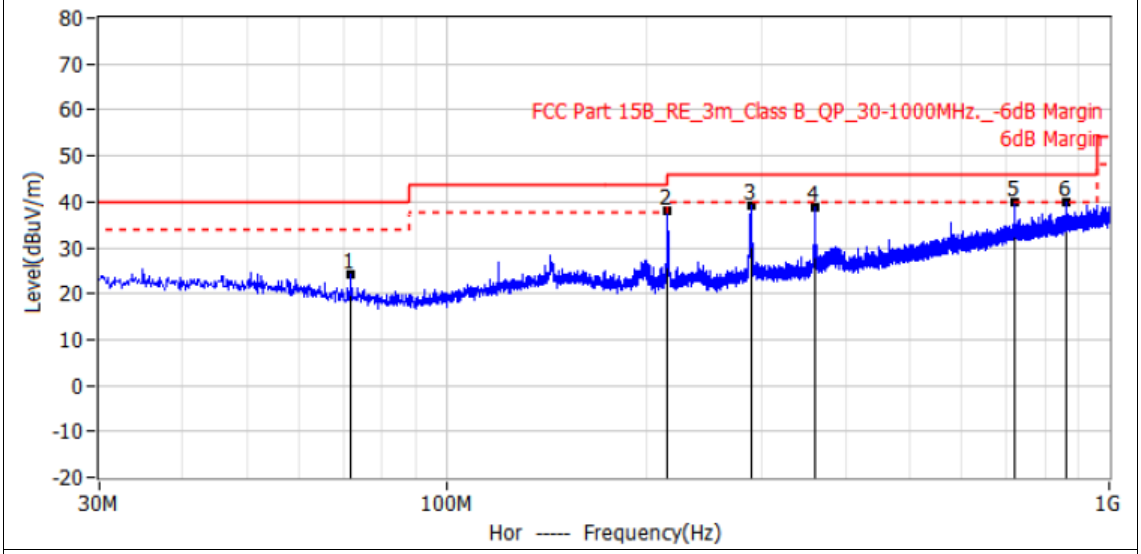
9 KHz~30 MHz

From 9 kHz to 30 MHz Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

30MHz-1GHz

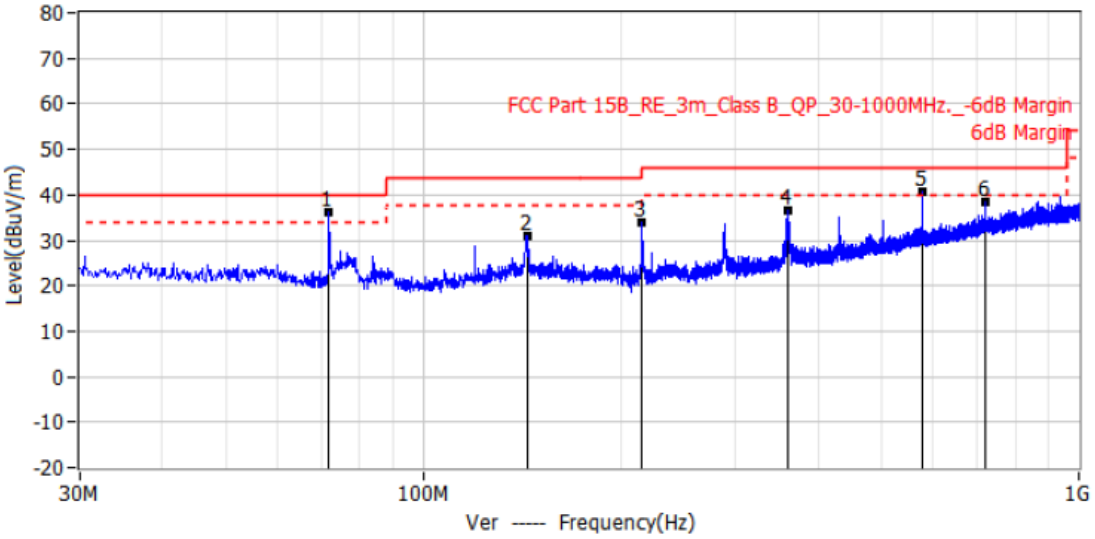
Ant. Pol.	Horizontal
Test Mode:	GFSK Mode 2402MHz
Remark:	Only worse case is reported



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Delta dB	Detector	Polar	Height cm	Angle deg
1*	71.953MHz	11.7	12.5	24.2	40.0	-15.8	QP	Hor	100.0	140.0
2*	215.876MHz	24.7	13.3	38.0	43.5	-5.5	QP	Hor	100.0	296.0
3*	287.899MHz	23.4	15.6	39.0	46.0	-7.0	QP	Hor	100.0	296.0
4*	359.921MHz	21.4	17.4	38.8	46.0	-7.2	QP	Hor	100.0	48.0
5*	719.791MHz	15.3	24.6	39.9	46.0	-6.1	QP	Hor	100.0	27.0
6*	863.836MHz	13.3	26.5	39.8	46.0	-6.2	QP	Hor	100.0	0.0

Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

Ant. Pol.	Vertical
Test Mode:	GFSK Mode 2402MHz
Remark:	Only worse case is reported



No.	Frequency	Reading dBuV	Factor dB/m	Level dBuV/m	Limit dBuV/m	Delta dB	Detector	Polar	Height cm	Angle deg
1*	71.953MHz	23.8	12.5	36.3	40.0	-3.7	QP	Ver	100.0	104.0
2*	143.975MHz	15.1	16.0	31.1	43.5	-12.4	QP	Ver	100.0	168.0
3*	215.876MHz	20.6	13.3	33.9	43.5	-9.6	QP	Ver	100.0	243.0
4*	359.921MHz	19.1	17.4	36.5	46.0	-9.5	QP	Ver	100.0	0.0
5*	575.868MHz	18.4	22.1	40.5	46.0	-5.5	QP	Ver	100.0	0.0
6*	719.791MHz	14.0	24.6	38.6	46.0	-7.4	QP	Ver	100.0	328.0

Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

Above 1GHz

Remark: Pre-scan all modulation mode, and found the GFSK mode which were the worst case, So only show the test data for worst case.

GFSK Mode 2402MHz							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Polarization	Detector
4804	48.63	3.7	52.33	74	-21.67	Horizontal	Peak
4804	43.25	3.7	46.95	74	-27.05	Vertical	Peak
4804	38.15	3.7	41.85	54	-12.15	Horizontal	Average
4804	33.21	3.7	36.91	54	-17.09	Vertical	Average
Remarks: 1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value 3.No report for the emission which more than 10 dB below the prescribed limit							

GFSK Mode 2441MHz							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Polarization	Detector
4880	49.58	4.0	53.58	74	-20.42	Horizontal	Peak
4880	44.13	4.0	48.13	74	-25.87	Vertical	Peak
4880	39.47	4.0	43.47	54	-10.53	Horizontal	Average
4880	34.21	4.0	38.21	54	-15.79	Vertical	Average
Remarks: 1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value 3.No report for the emission which more than 10 dB below the prescribed limit							

GFSK Mode 2480MHz							
Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Polarization	Detector
4960	48.63	4.3	52.93	74	-21.07	Horizontal	Peak
4960	43.21	4.3	47.51	74	-26.49	Vertical	Peak
4960	38.74	4.3	43.04	54	-10.96	Horizontal	Average
4960	33.61	4.3	37.91	54	-16.09	Vertical	Average
Remarks: 1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor 2.Margin value = Level -Limit value 3.No report for the emission which more than 10 dB below the prescribed limit							

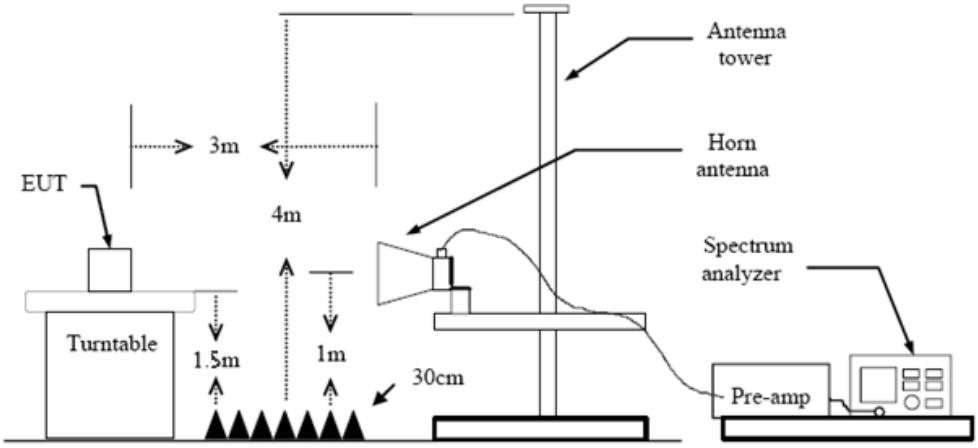
3.3. Radiated Emissions Restricted Band

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):

Restricted Frequency Band (MHz)	(dBuV/m)(at 3m)	
	Peak	Average
2310 ~ 2390	74	54
2483.5 ~ 2500	74	54

Test Configuration



Test Procedure

1. The EUT was setup and tested according to ANSI C63.10:2013 requirements.
2. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.
5. The receiver set as follow:
   RBW=1MHz, VBW=3MHz Peak detector for Peak value.
   RBW=1MHz, VBW see note 1 with Peak Detector for Average Value.

   Note 1: For measurements above 1 GHz the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz for peak measurements and 1 MHz resolution bandwidth with 1/T video bandwidth with peak detector for average measurements. For the Duty Cycle please refer to clause 3.10 Duty Cycle.

Test Mode

Please refer to the clause 2.4.

Test Results

Remark: Pre-scan all modulation mode, and found the GFSK mode which were the worst case, So only show the test data for worst case.

GFSK Mode 2402MHz

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Polarization	Detector
2310	49.55	-3.4	46.15	74	-27.85	Horizontal	Peak
2310	44.36	-3.4	40.96	74	-33.04	Vertical	Peak
2390	49.15	-3.1	46.05	74	-27.95	Horizontal	Peak
2390	44.25	-3.1	41.15	74	-32.85	Vertical	Peak
2310	39.52	-3.4	36.12	54	-17.88	Horizontal	Average
2310	34.14	-3.4	30.74	54	-23.26	Vertical	Average
2390	39.56	-3.1	36.46	54	-17.54	Horizontal	Average
2390	34.15	-3.1	31.05	54	-22.95	Vertical	Average

Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

GFSK Mode 2480MHz

Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Polarization	Detector
2483.5	49.62	-2.8	46.82	74	-27.18	Horizontal	Peak
2483.5	44.25	-2.8	41.45	74	-32.55	Vertical	Peak
2500	49.33	-2.7	46.63	74	-27.37	Horizontal	Peak
2500	45.21	-2.7	42.51	74	-31.49	Vertical	Peak
2483.5	38.56	-2.8	35.76	54	-18.24	Horizontal	Average
2483.5	33.44	-2.8	30.64	54	-23.36	Vertical	Average
2500	38.41	-2.7	35.71	54	-18.29	Horizontal	Average
2500	34.62	-2.7	31.92	54	-22.08	Vertical	Average

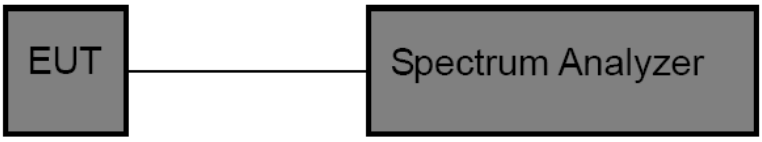
Remarks:
1.Factor (dB/m) = Antenna Factor (dB/m)+Cable Factor (dB)-Pre-amplifier Factor
2.Margin value = Level -Limit value

3.4. Band edge and Spurious Emissions (Conducted)

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (d):In any 100 kHz 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 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.

Test Configuration



Test Procedure

1. The transmitter output was connected to the spectrum analyzer through an attenuator, the path loss was compensated to the results for each measurement.
2. Set to the maximum power setting and enable the EUT transmit continuously
3. Use the following spectrum analyzer settings:
   RBW = 100 kHz, VBW ≥ RBW, scan up through 10th harmonic.
   Sweep = auto, Detector function = peak, Trace = max hold
4. Measure and record the results in the test report.

Test Mode

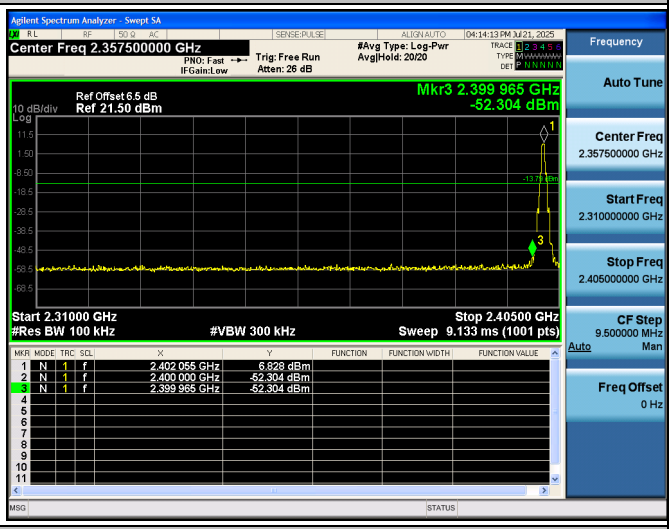
Please refer to the clause 2.4.

Test Results

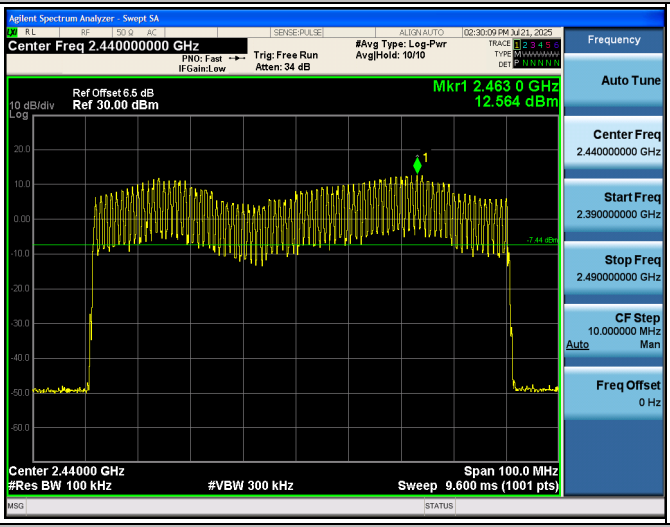
(1) Band edge Conducted Test

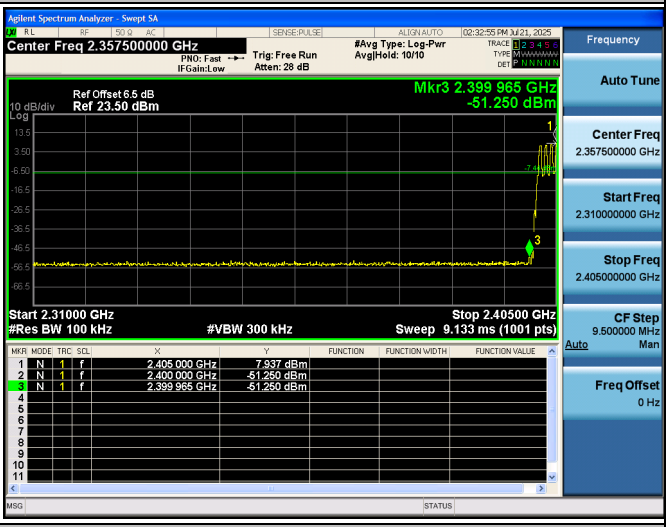
Test Mode	Frequency[MHz]	Ref Level[dBm]	Result[dBm]	Limit[dBm]	Verdict
GFSK	2402	6.213	-52.304	-13.787	PASS
	Hop_2402	12.564	-51.250	-7.436	PASS
	2480	6.060	-55.079	-13.940	PASS
	Hop_2480	12.571	-40.318	-7.429	PASS
π/4-DQPSK	2402	5.996	-46.904	-14.004	PASS
	Hop_2402	12.353	-49.960	-7.647	PASS
	2480	5.649	-59.373	-14.351	PASS
	Hop_2480	12.253	-37.703	-7.747	PASS
8-DPSK	2402	6.015	-47.544	-13.985	PASS
	Hop_2402	12.042	-47.699	-7.958	PASS
	2480	5.706	-60.051	-14.294	PASS
	Hop_2480	9.200	-57.409	-10.800	PASS

GFSK_Low_2402

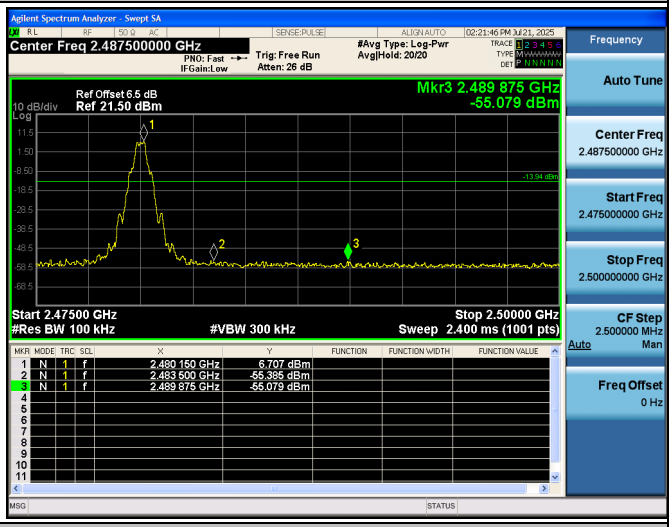


GFSK_Low_Hop_2402

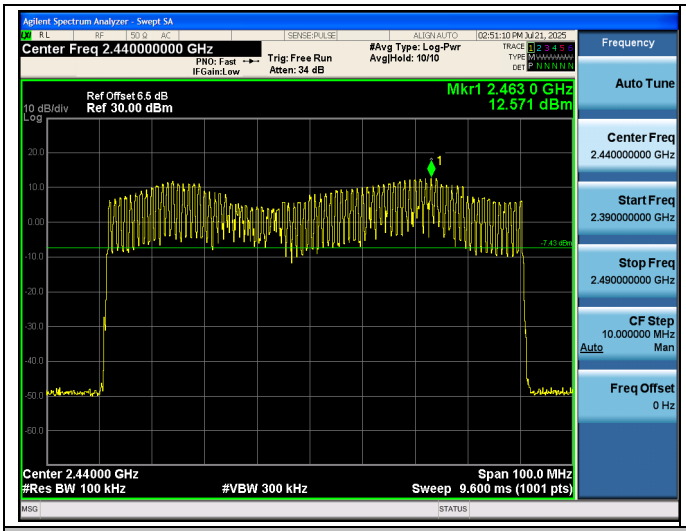


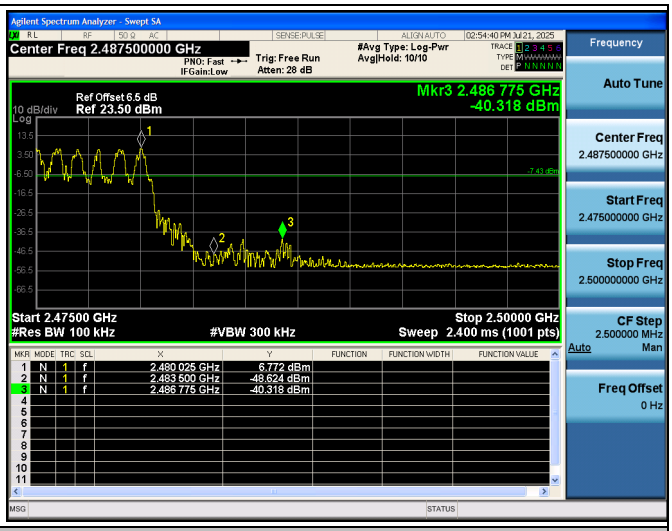


GFSK_High_2480

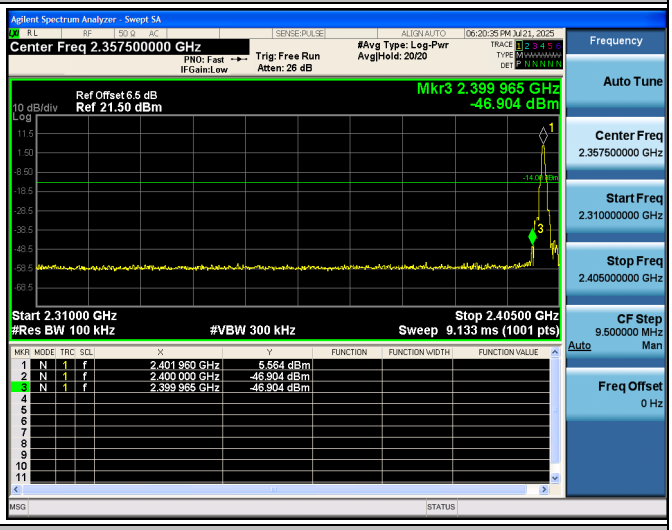


GFSK_High_Hop_2480

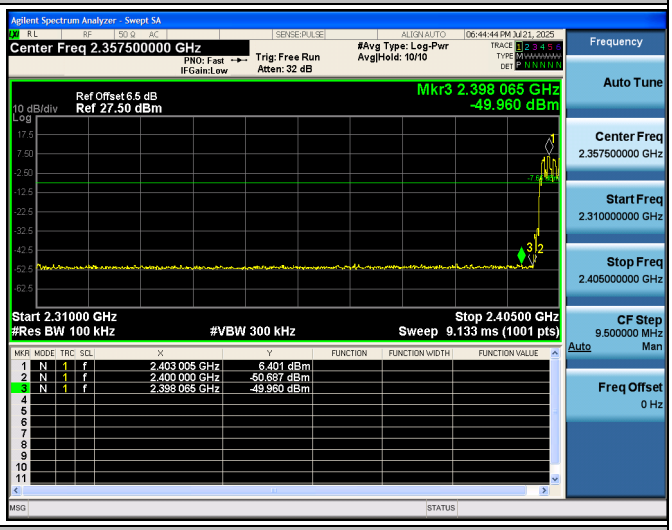




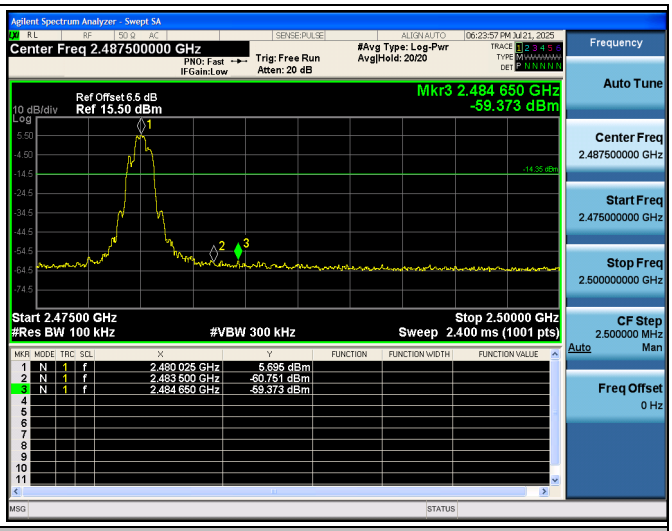
π/4-DQPSK_Low_2402



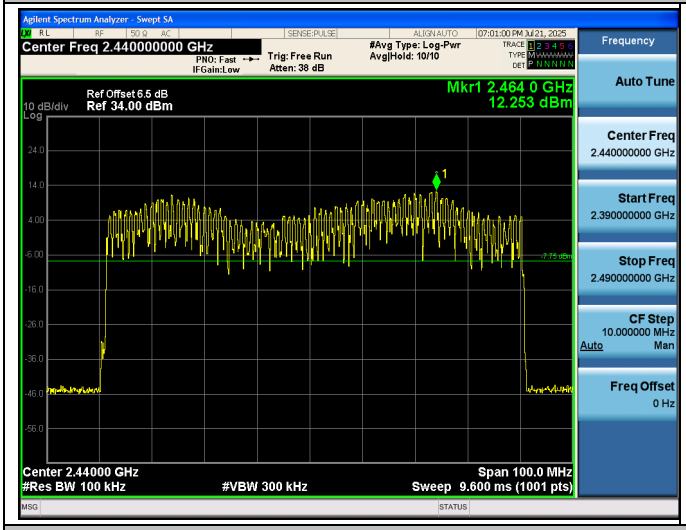
π/4-DQPSK_Low_Hop_2402



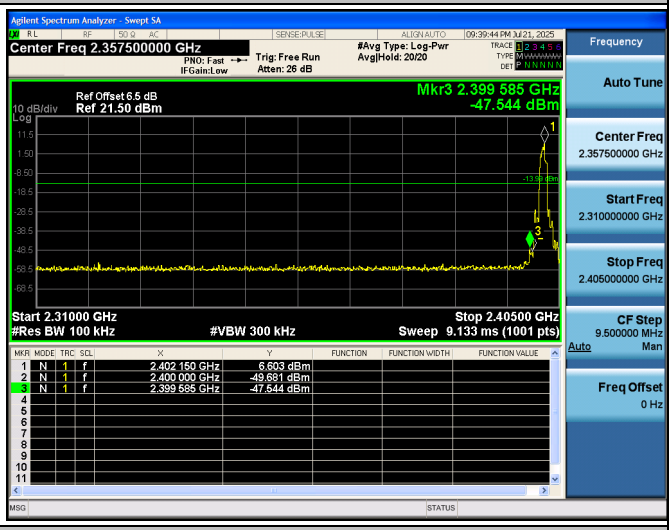
π/4-DQPSK_High_2480



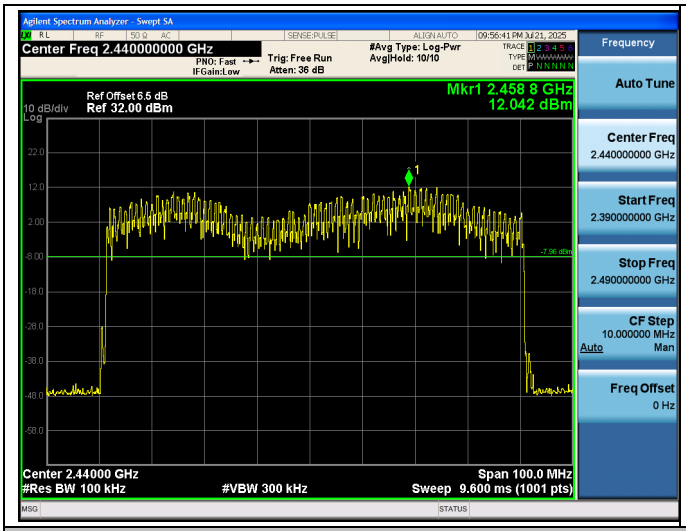
π/4-DQPSK_High_Hop_2480

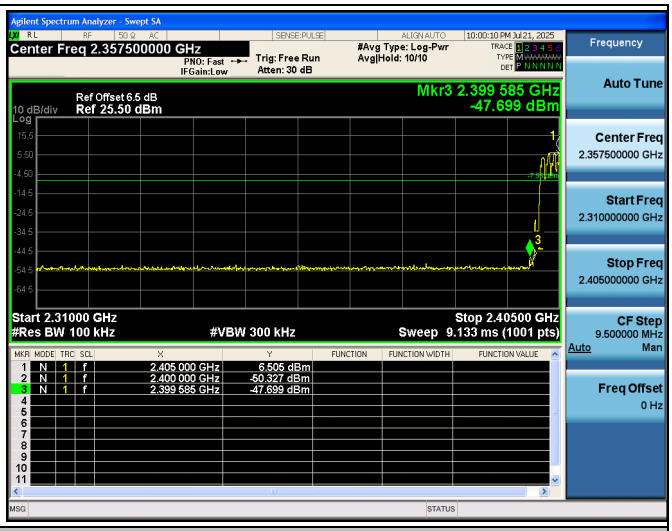


8-DPSK_Low_2402

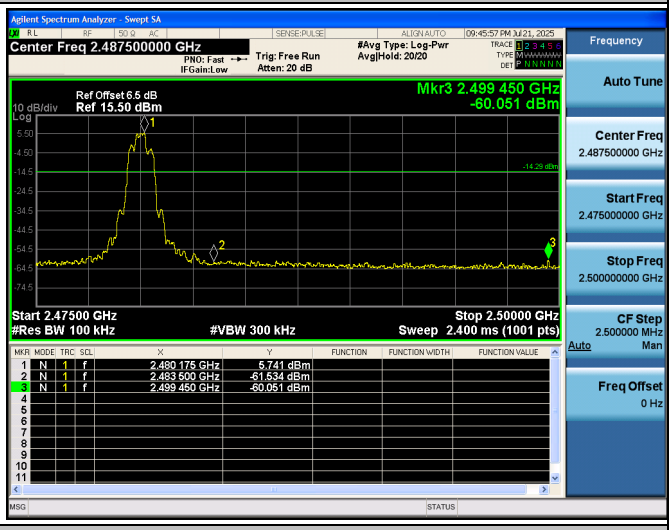


8-DPSK_Low_Hop_2402

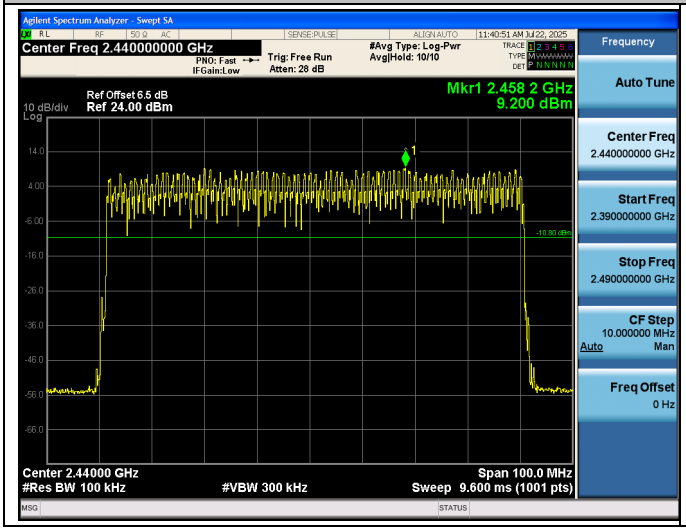




8-DPSK_High_2480



8-DPSK_High_Hop_2480

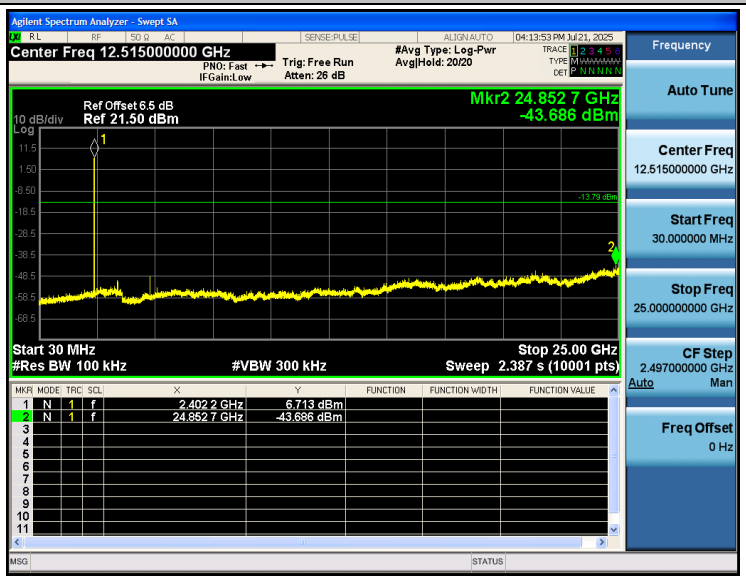


(2) Conducted Spurious Emissions Test

Test Mode	Frequency [MHz]	Ref Level [dBm]	Spurious level[dBm]	Limit[dBm]	Verdict
GFSK	2402	6.213	-43.686	-13.787	PASS
	2440	8.059	-42.419	-11.941	PASS
	2441	6.060	-44.611	-13.940	PASS
π/4-DQPSK	2402	5.996	-43.569	-14.004	PASS
	2480	7.827	-48.123	-12.173	PASS
	2480	5.649	-51.134	-14.351	PASS
8-DPSK	2402	6.015	-43.942	-13.985	PASS
	2480	7.306	-44.659	-12.694	PASS
	2480	5.706	-50.742	-14.294	PASS

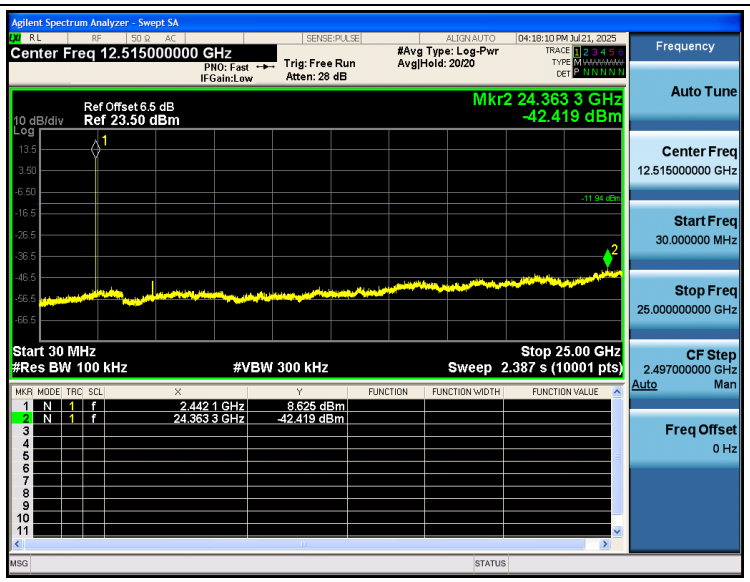
GFSK_2402_Reference

GFSK_2402_30~25000



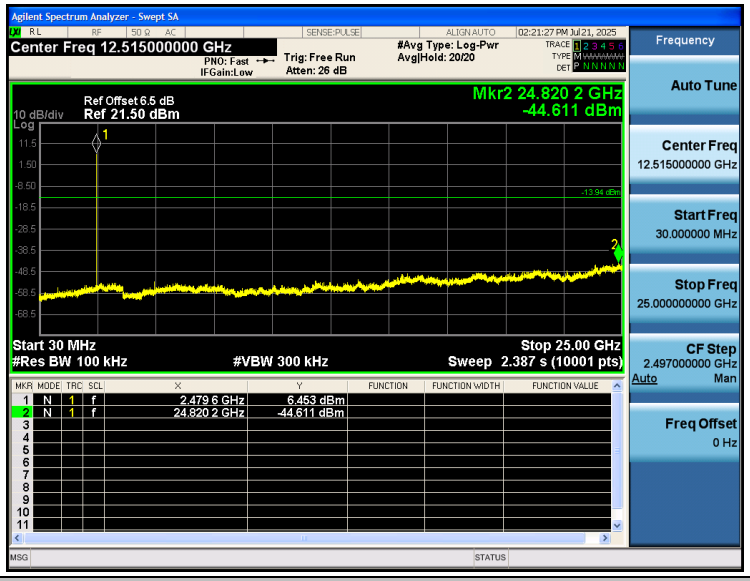
GFSK_2441_Reference

GFSK_2441_30~25000



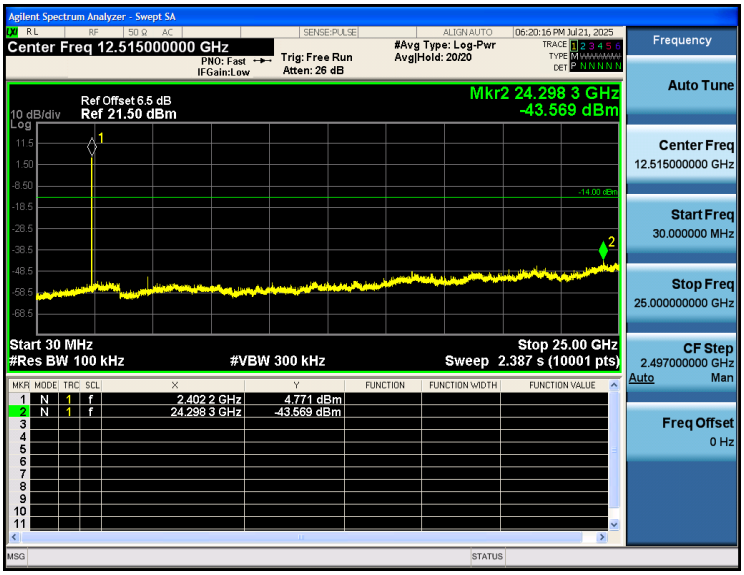
GFSK_2480_Reference

GFSK_2480_30~25000



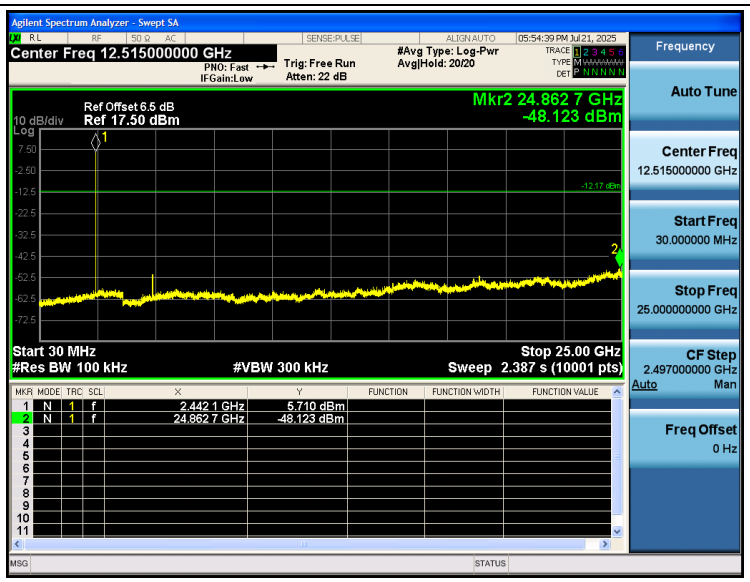
π/4-DQPSK_2402_Reference

π/4-DQPSK_2402_30~25000



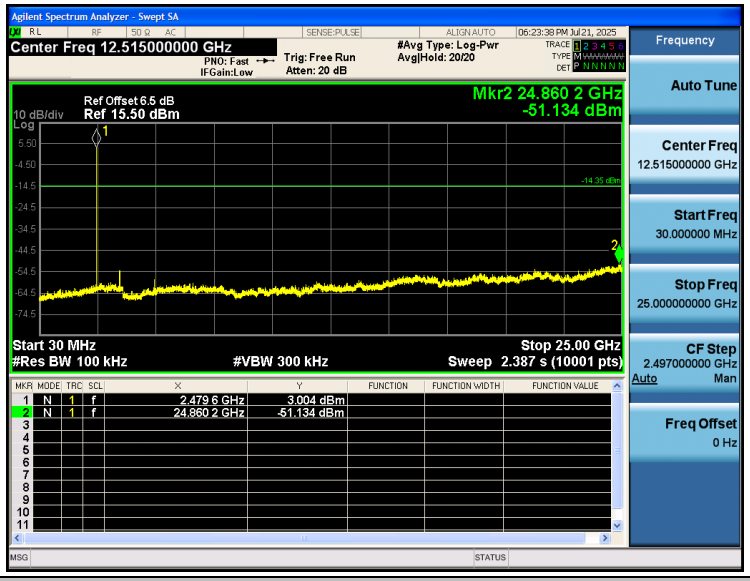
π/4-DQPSK_2441_Reference

π/4-DQPSK_2441_30~25000



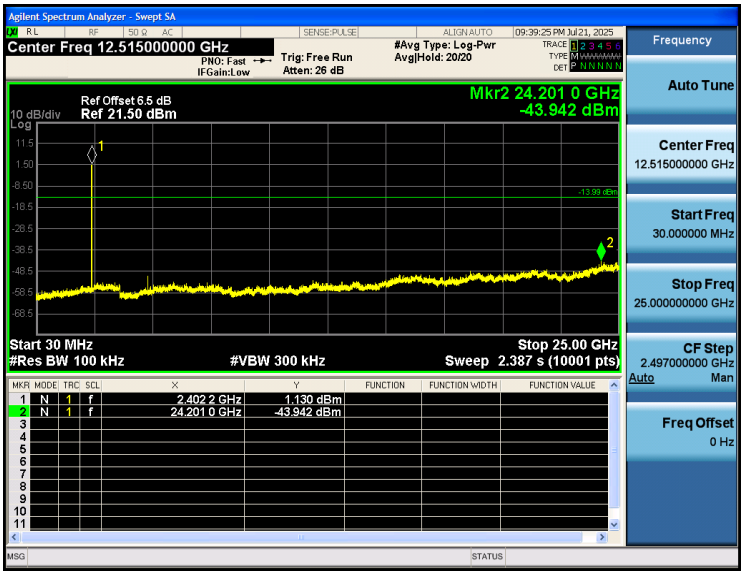
π/4-DQPSK_2480_Reference

π/4-DQPSK_2480_30~25000



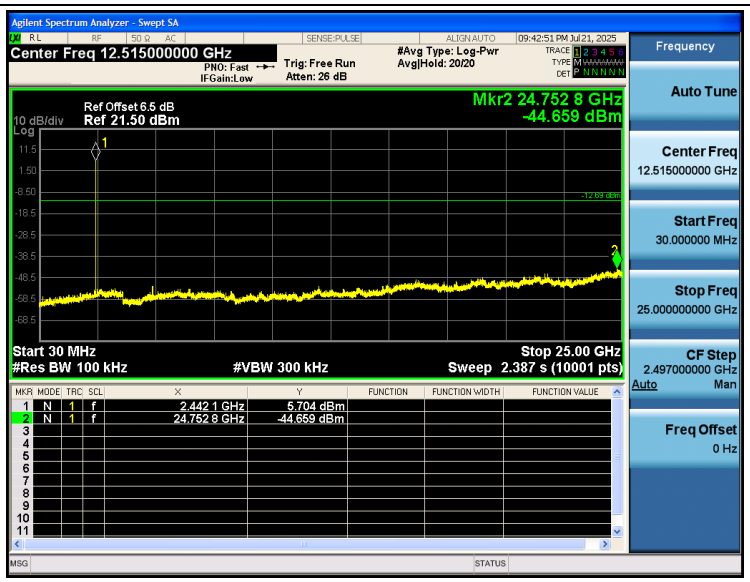
8-DPSK_2402_Reference

8-DPSK_2402_30~25000



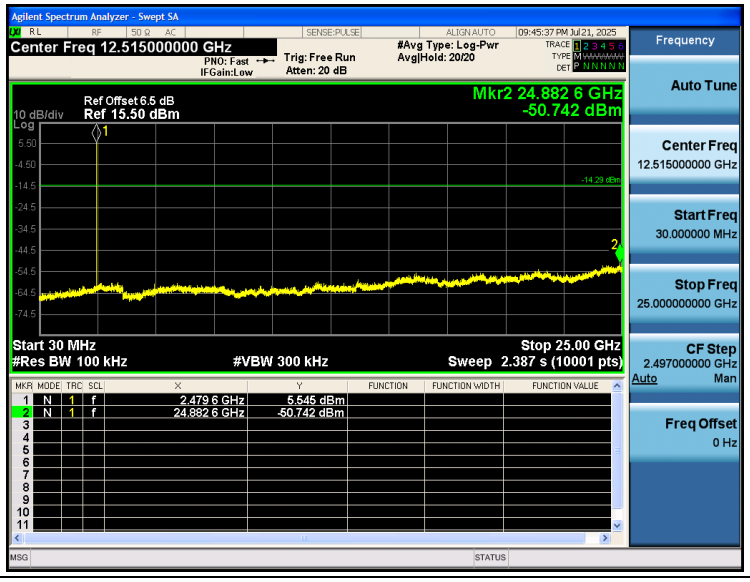
8-DPSK_2441_Reference

8-DPSK_2441_30~25000



8-DPSK_2480_Reference

8-DPSK_2480_30~25000

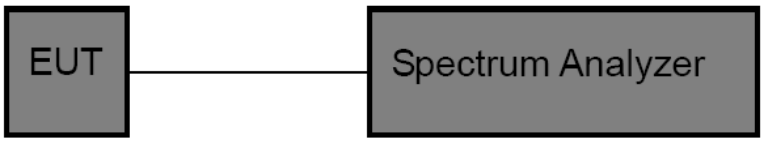


3.5. 20DB Bandwidth

Limit

N/A

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. OCB and 20dB Spectrum Setting:
   (1) Set RBW = 1% ~ 5% occupied bandwidth.
   (2) Set the video bandwidth (VBW) ≥ 3 RBW.
   (3) Detector = Peak.
   (4) Trace mode = Max hold.
   (5) Sweep = Auto couple.

Note: The EUT was set to continuously transmitting in each mode and low, Middle and high channel for the test.

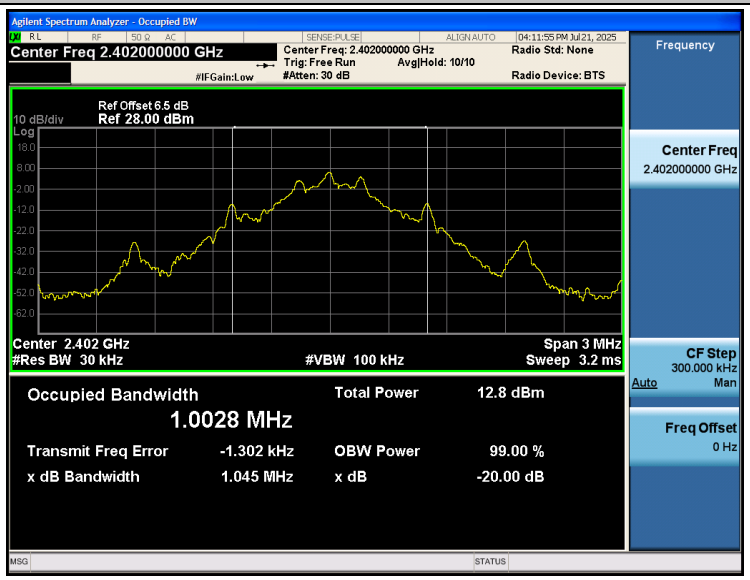
Test Mode

Please refer to the clause 2.4.

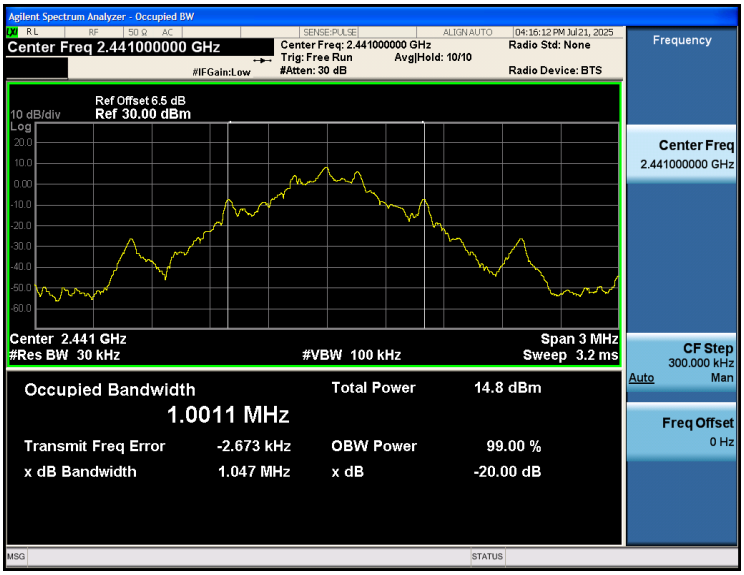
Test Results

Test Mode	Frequency[MHz]	20db EBW[MHz]	20dB Bandwidth *2/3 (kHz)	Verdict
GFSK	2402	1.045	696.7	PASS
	2441	1.047	698.0	PASS
	2480	1.048	698.7	PASS
π/4-DQPSK	2402	1.123	748.7	PASS
	2441	1.118	745.3	PASS
	2480	1.120	746.7	PASS
8-DPSK	2402	1.181	787.3	PASS
	2441	1.184	789.3	PASS
	2480	1.186	790.7	PASS

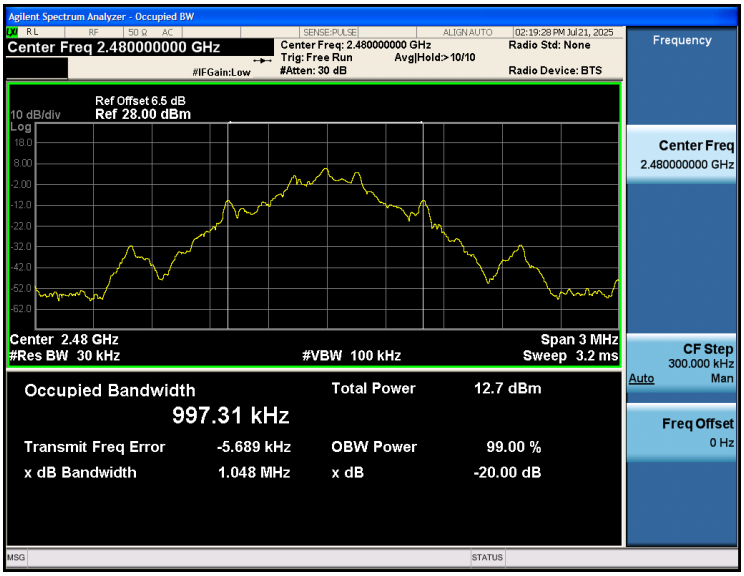
GFSK_2402



GFSK_2441

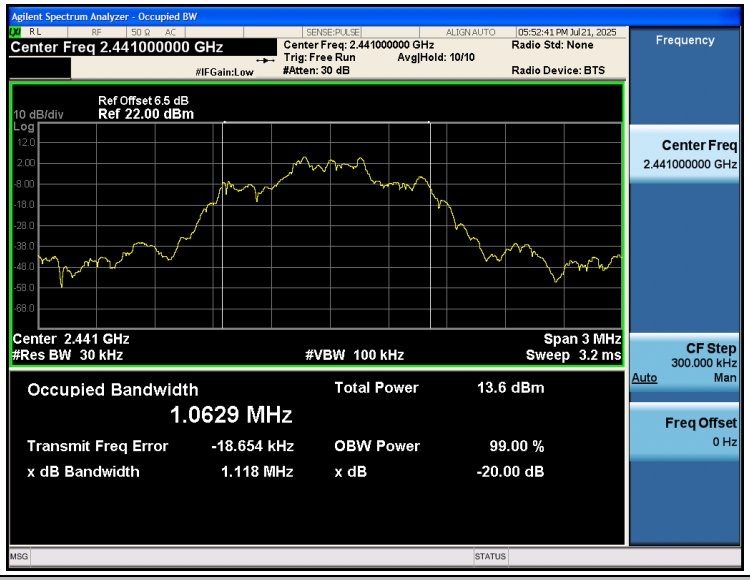


GFSK_2480

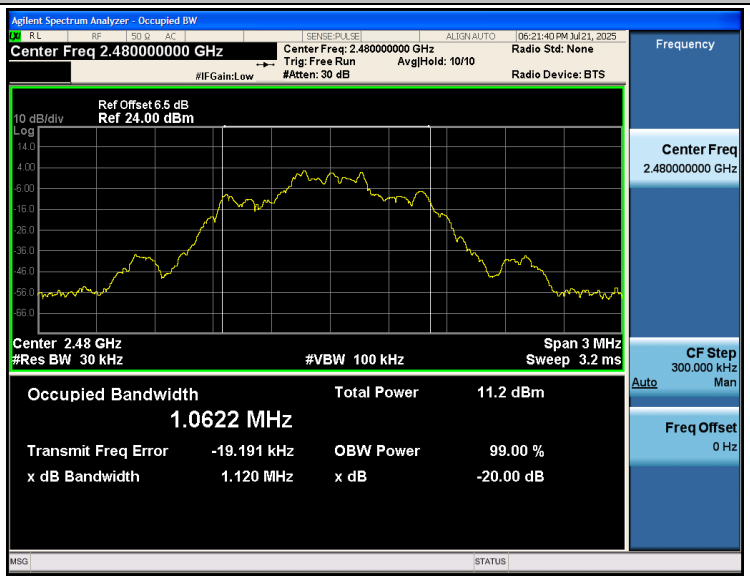


π/4-DQPSK_2402

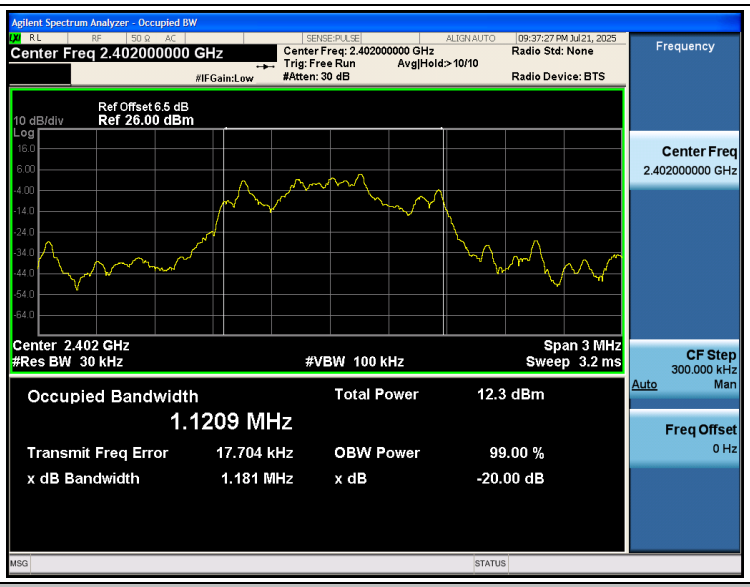
π/4-DQPSK_2441



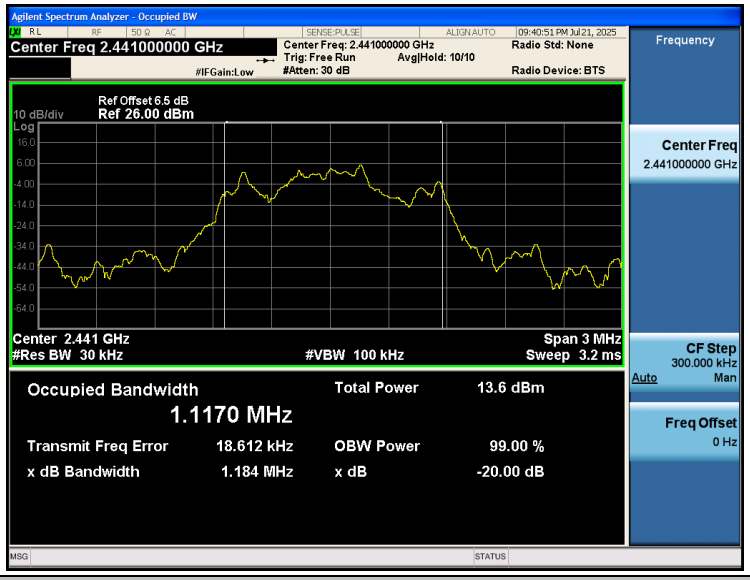
π/4-DQPSK_2480



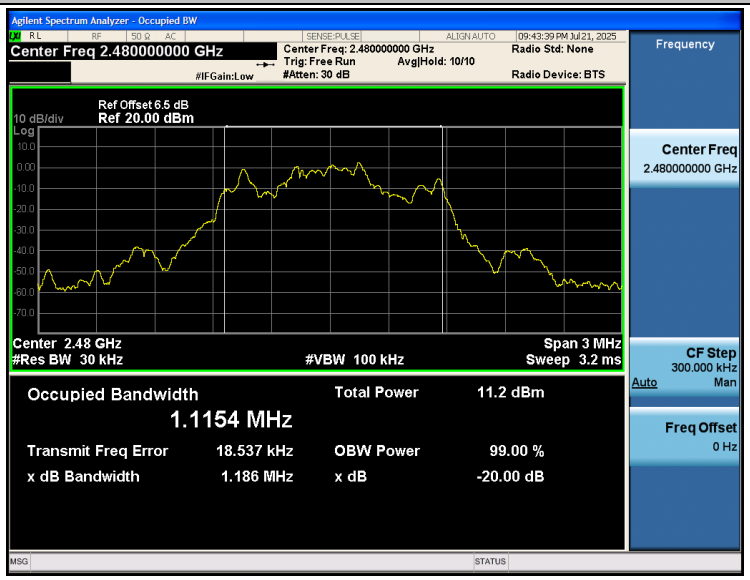
8-DPSK_2402



8-DPSK_2441



8-DPSK_2480



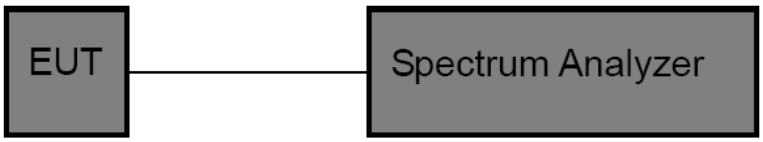
3.6. Channel Separation

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(1)/ RSS-247 5.1 b :

Test Item	Limit	Frequency Range(MHz)
Channel Separation	>25KHz or >two-thirds of the 20 dB bandwidth Which is greater	2400~2483.5

Test Configuration



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:

(1) Set RBW = Set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller.

(2) Set the video bandwidth (VBW) ≥ 3 RBW.

(3) Detector = Peak.

(4) Trace mode = Max hold.

(5) Sweep = Auto couple.

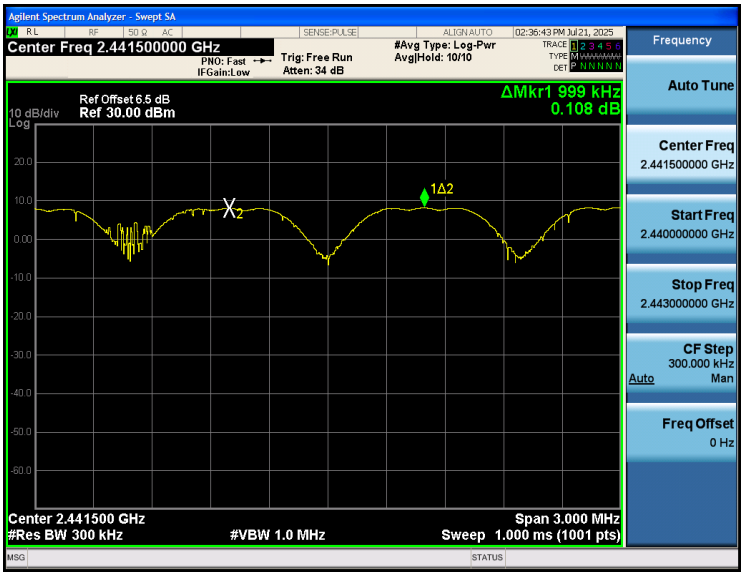
Test Mode

Please refer to the clause 2.4.

Test Results

Test Mode	Frequency[MHz]	Result[MHz]	Limit[kHz]	Verdict
GFSK	Hop_2441	0.999	698.0	PASS
π/4-DQPSK	Hop_2441	0.984	745.3	PASS
8-DPSK	Hop_2441	1.008	789.3	PASS

GFSK_Hop_2441



π/4-DQPSK_Hop_2441

8-DPSK_Hop_2441

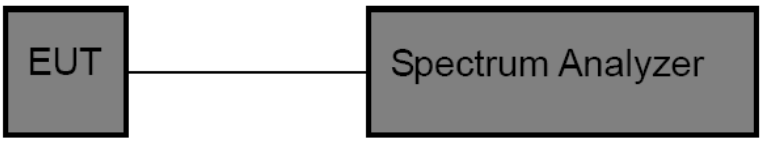
3.7. Number of Hopping Channel

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (a)(iii)/ RSS-247 5.1 d:

Section	Test Item	Limit
15.247 (a)(iii)/ RSS-247 5.1 d:	Number of Hopping Channel	>15

Test Configuration



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:
   (1) Peak Detector: RBW=100 kHz, VBW≥RBW, Sweep time= Auto.

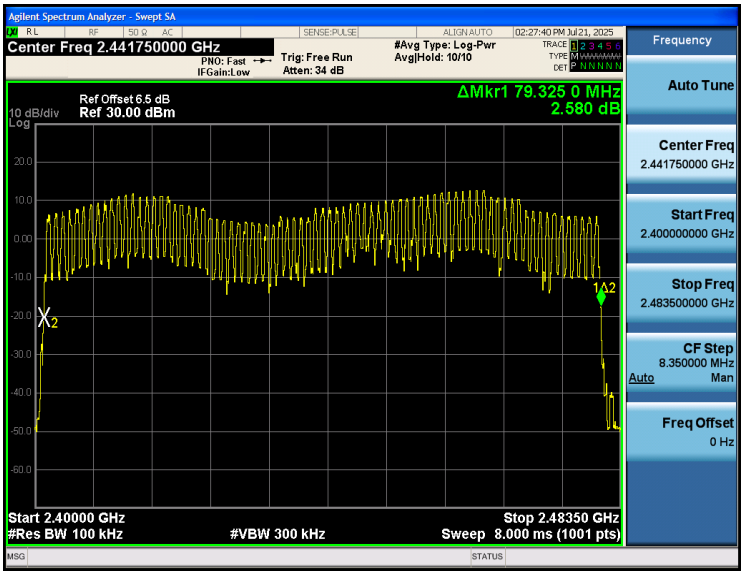
Test Mode

Please refer to the clause 2.4.

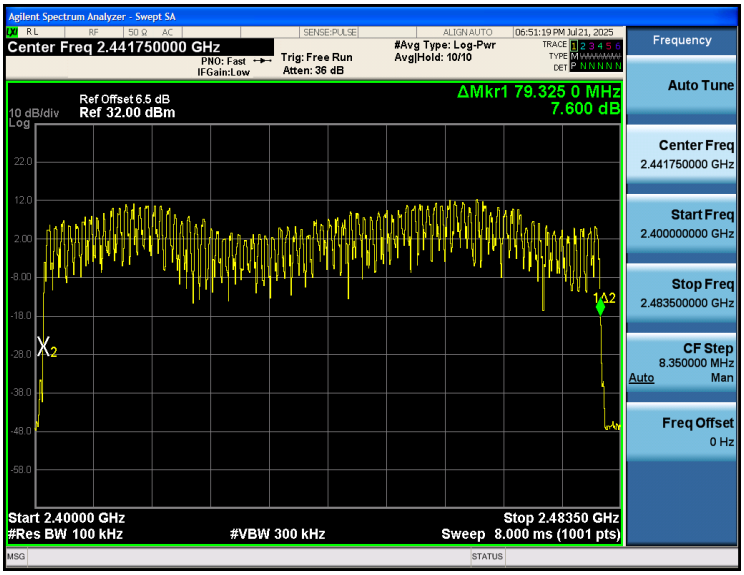
Test Result

Test Mode	Freq(MHz)	Result[Num]	Limit[Num]	Verdict
GFSK	Hop	79	≥15	PASS
π/4-DQPSK	Hop	79	≥15	PASS
8-DPSK	Hop	79	≥15	PASS

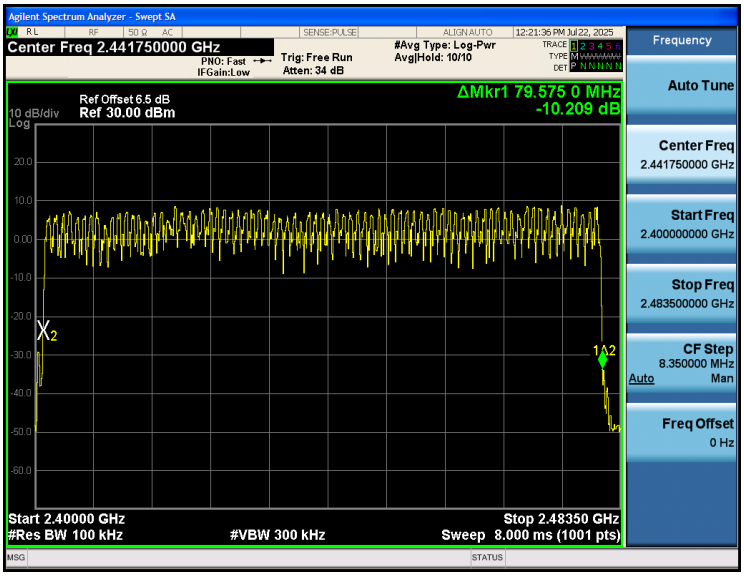
GFSK



π/4-DQPSK



8-DPSK

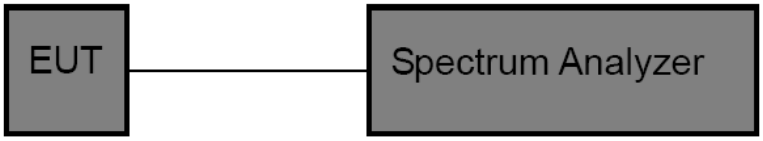


3.8. Dwell Time

Limit

Section	Test Item	Limit
15.247(a)(iii)/ RSS-247 5.1 d	Average Time of Occupancy	0.4 sec

Test Configuration



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:
   (1) Spectrum Setting: RBW=1MHz, VBW≥RBW.
   (2) Use video trigger with the trigger level set to enable triggering only on full pulses.
   (3) Sweep Time is more than once pulse time.
   (4) Set the center frequency on any frequency would be measure and set the frequency span to zero.
   (5) Measure the maximum time duration of one single pulse.
   (6) Set the EUT for packet transmitting.

Test Mode

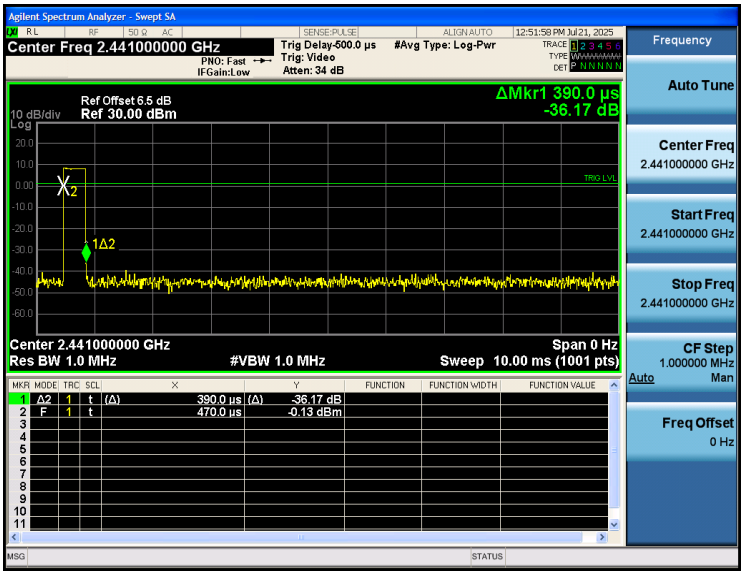
Please refer to the clause 2.4.

Test Result

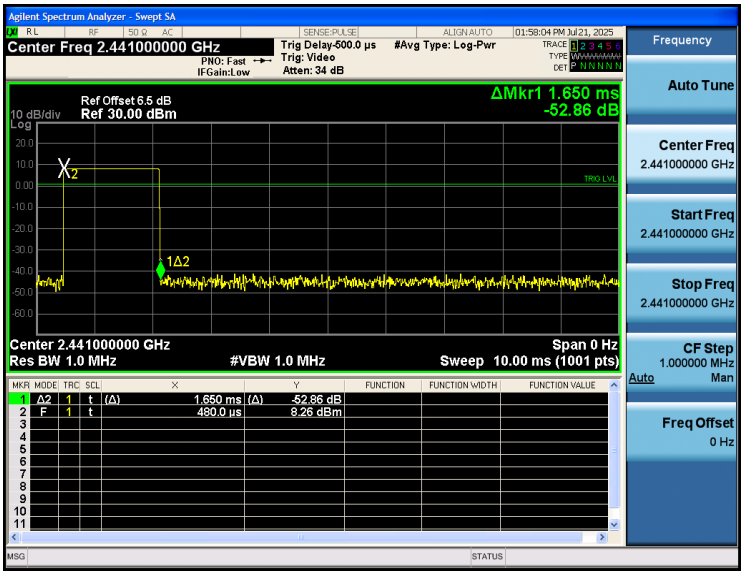
Modulation type	Channel	Frequency [MHz]	Pulse Time (ms)	Total of Dwell (ms)	Period Time (ms)	Limit (Second)	Result
GFSK	DH1	2441	0.39	124.800	31.60	≤ 0.40	Pass
	DH3	2441	1.65	264.000	31.60		
	DH5	2441	2.90	309.333	31.60		
π/4-DQPSK	2DH1	2441	0.39	124.800	31.60	≤ 0.40	Pass
	2DH3	2441	1.64	262.400	31.60		
	2DH5	2441	2.90	309.333	31.60		
8-DPSK	3DH1	2441	0.40	128.000	31.60	≤ 0.40	Pass
	3DH3	2441	1.65	264.000	31.60		
	3DH5	2441	2.89	308.267	31.60		

Note: 1DH1/2DH1/3DH1 Total of Dwell= Pulse Time(1600/2)*31.6/79*
1DH3/2DH3/3DH3 Total of Dwell= Pulse Time(1600/4)*31.6/79*
1DH5/2DH5/3DH5 Total of Dwell= Pulse Time(1600/6)*31.6/79*

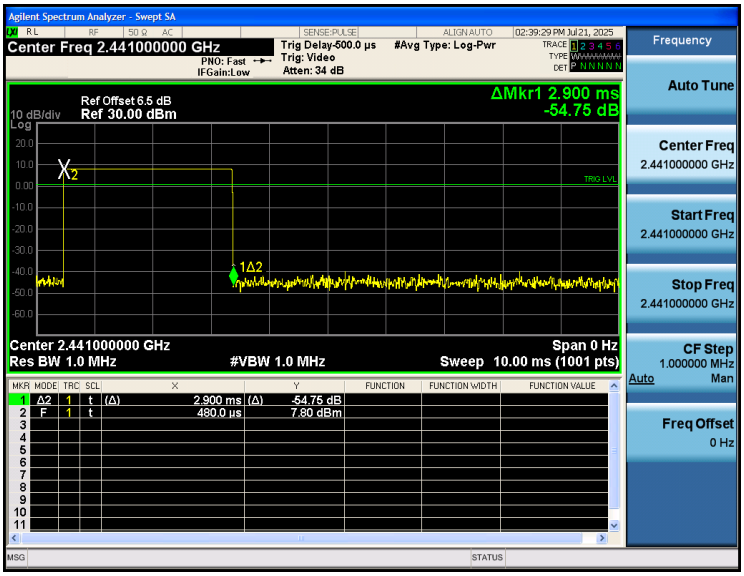
GFSK_DH1_2441



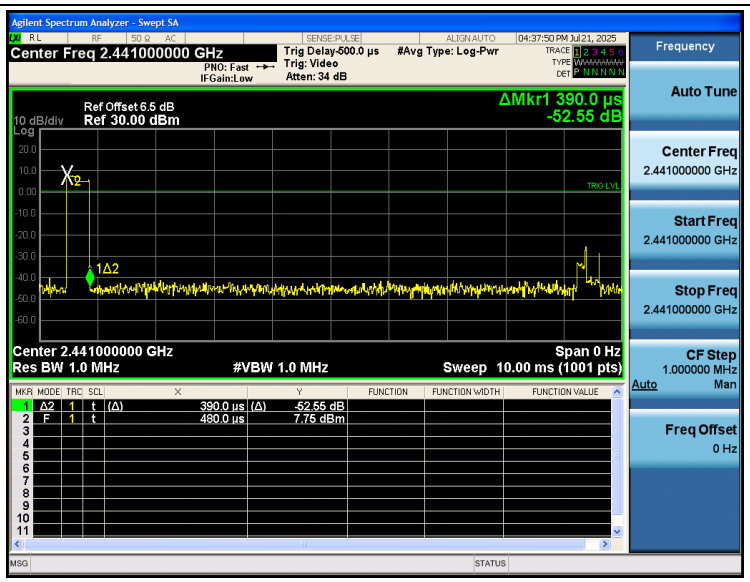
GFSK_DH3_2441



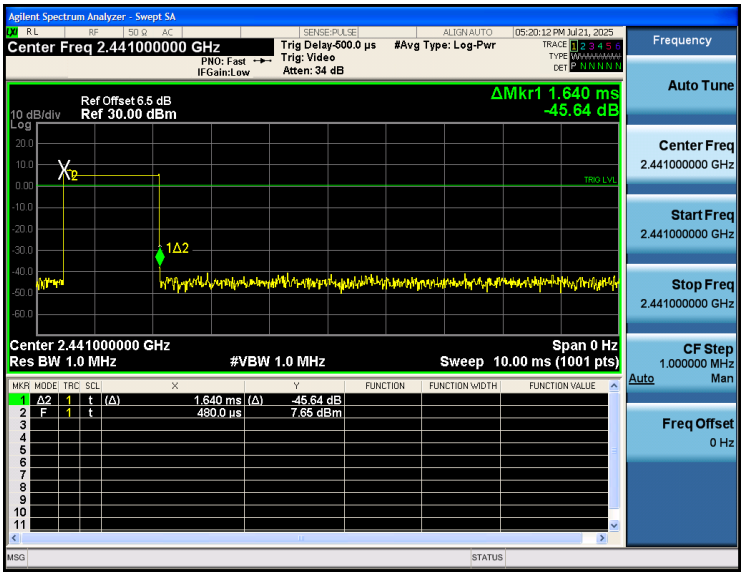
GFSK_DH5_2441



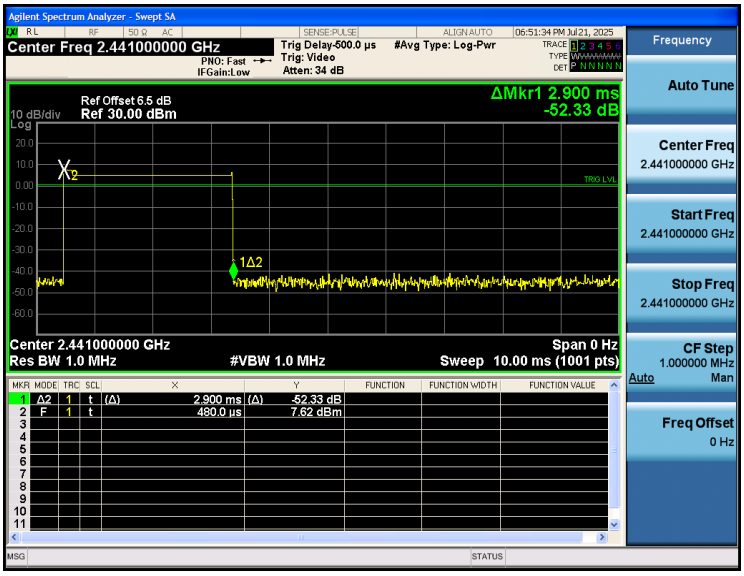
π/4-DQPSK_2DH1_2441



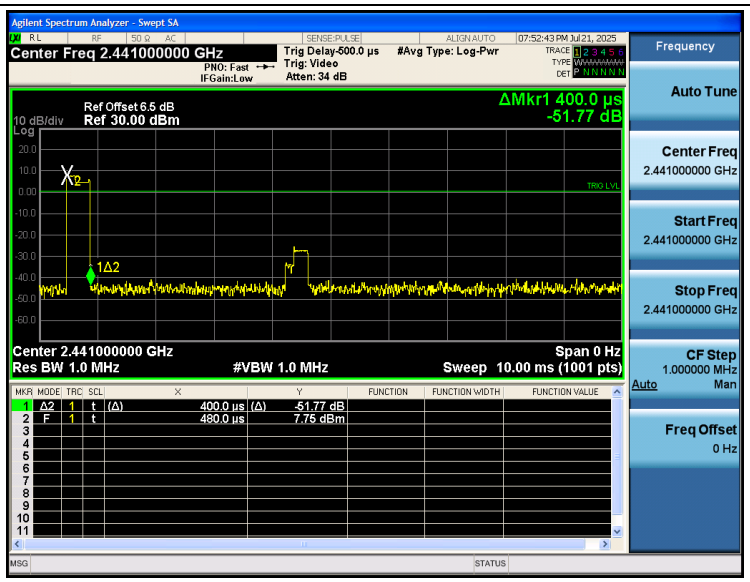
π/4-DQPSK_2DH3_2441



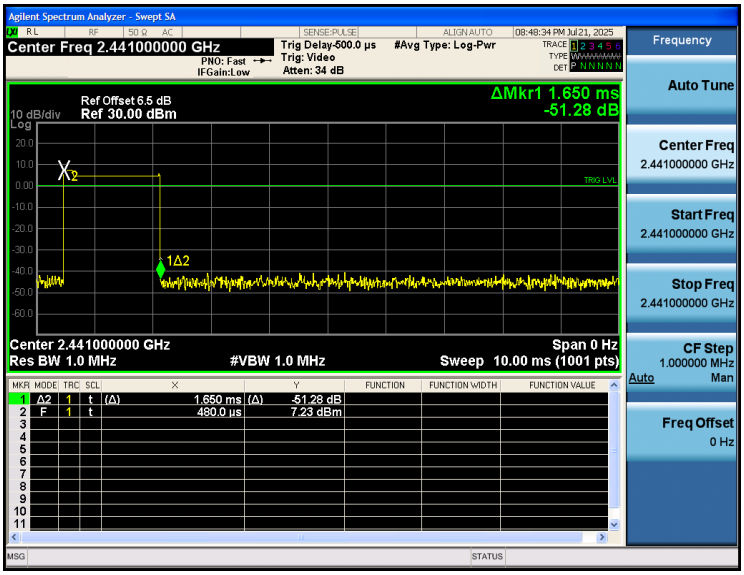
π/4-DQPSK_2DH5_2441



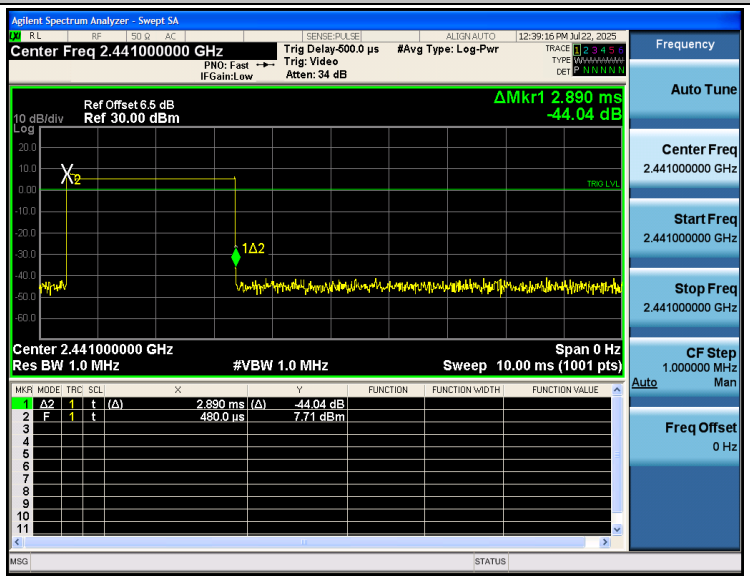
8-DPSK_3DH1_2441



8-DPSK_3DH3_2441



8-DPSK_3DH5_2441



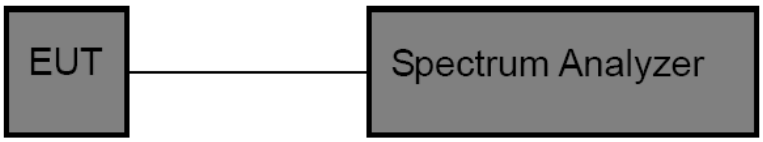
3.9. Peak Output Power

Limit

FCC CFR Title 47 Part 15 Subpart C Section 15.247 (b)(1) / RSS-247 5.4 b:

Test Item	Limit	Frequency Range(MHz)
Maximum Conducted Peak Output Power	Hopping Channels>75 Power<1W(30dBm) Other <125mW(21dBm)	2400~2483.5
E.I.R.P	4 Watt or 36dBm	2400~2483.5

Test Configuration



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:
   (1) Set RBW> 20DB Bandwidth.
   (2) Set the video bandwidth (VBW) ≥ RBW.
   (3) Detector = Peak.
   (4) Trace mode = Max hold.
   (5) Sweep = Auto couple.

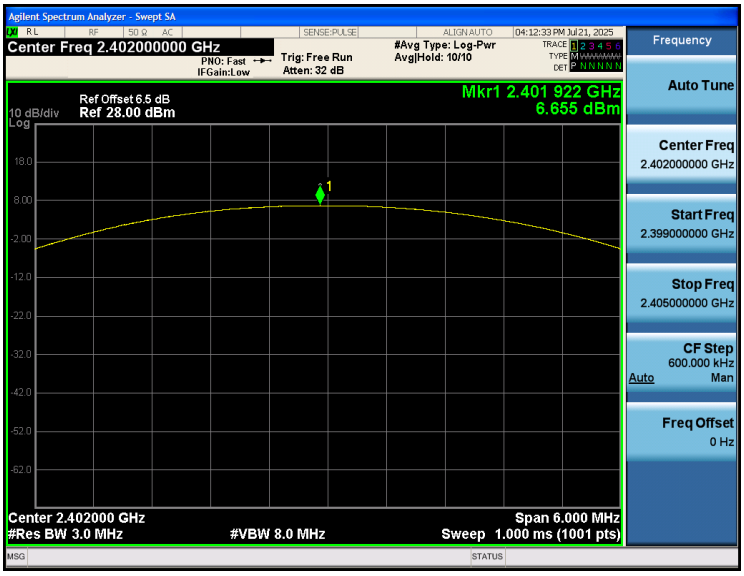
Test Mode

Please refer to the clause 2.4.

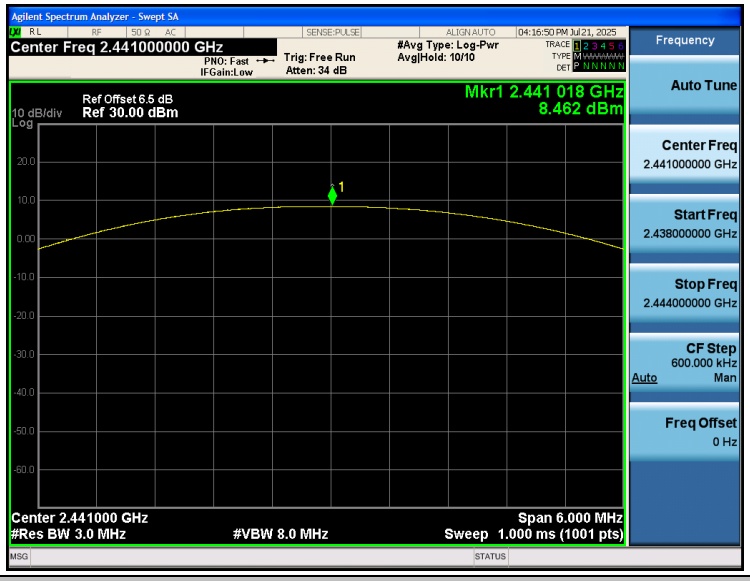
Test Result

Test Mode	Frequency[MHz]	Result[dBm]	Limit[dBm]	Verdict
GFSK	2402	6.655	<=30	PASS
	2441	**8.462**	<=30	PASS
	2480	6.246	<=30	PASS
π/4-DQPSK	2402	7.236	<=30	PASS
	2441	7.778	<=30	PASS
	2480	5.948	<=30	PASS
8-DPSK	2402	6.626	<=30	PASS
	2441	7.745	<=30	PASS
	2480	5.937	<=30	PASS

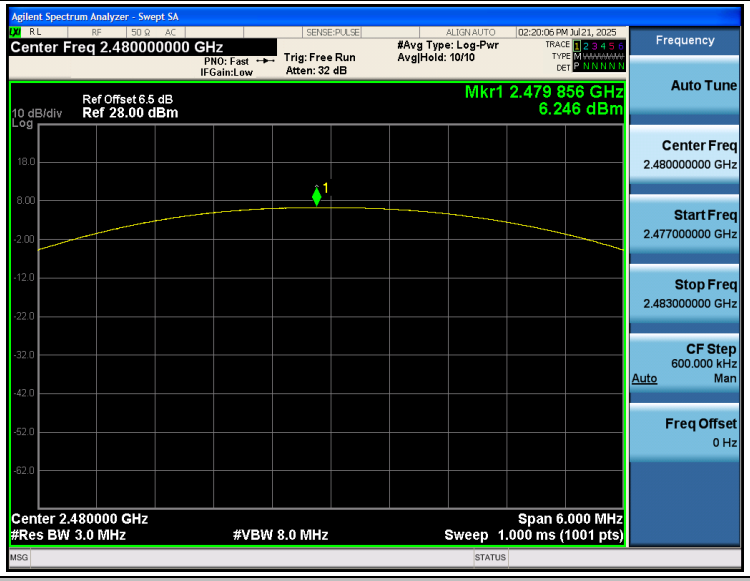
GFSK_2402



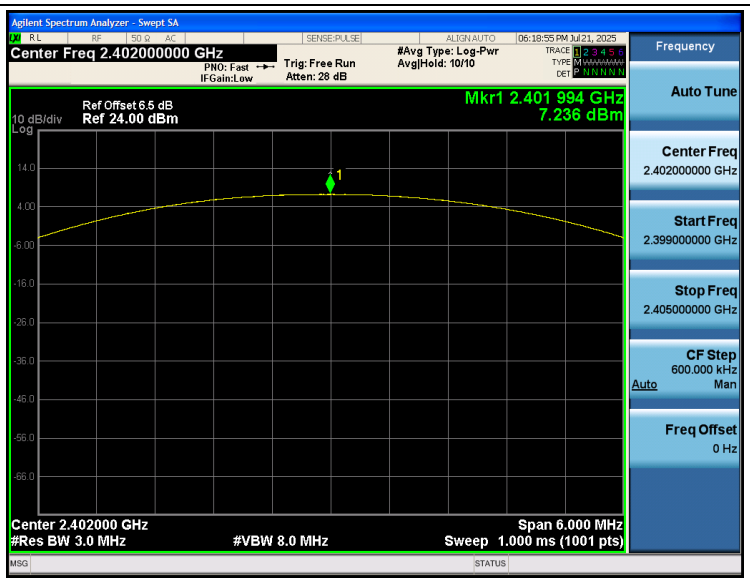
GFSK_2441



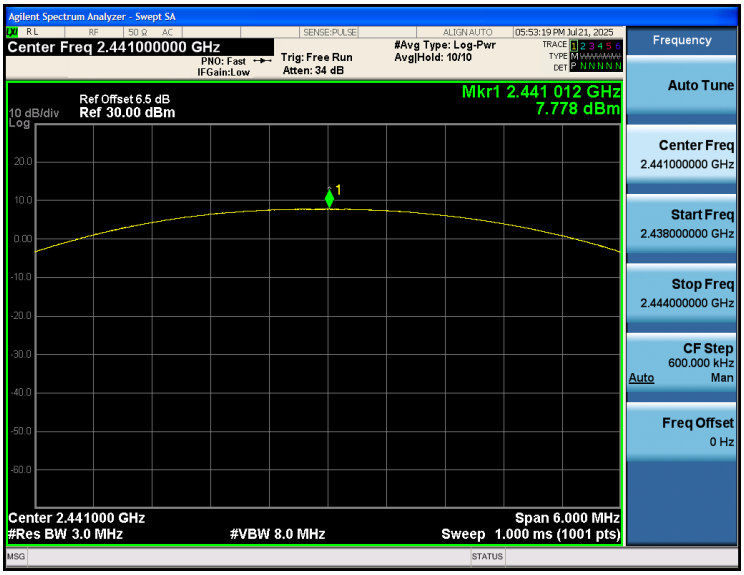
GFSK_2480



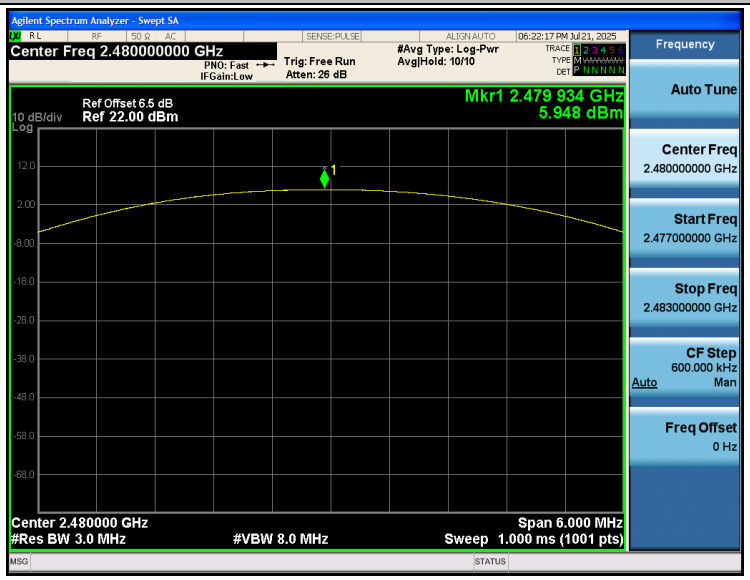
π/4-DQPSK_2402



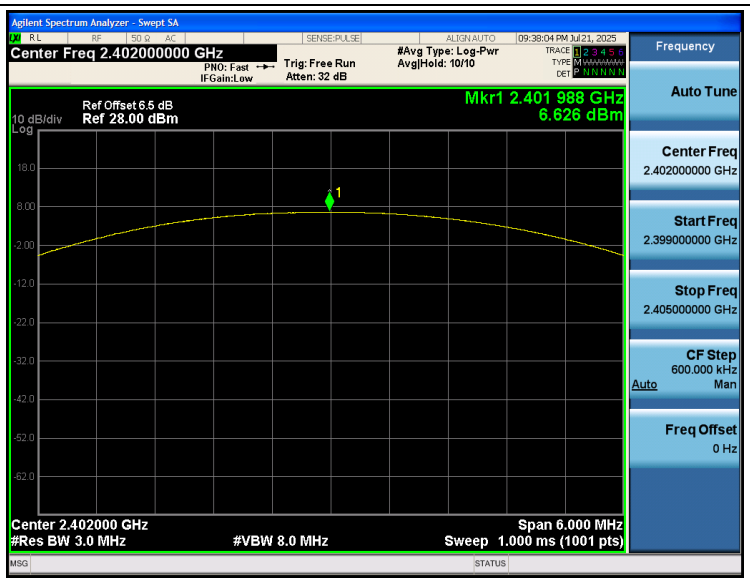
π/4-DQPSK_2441



π/4-DQPSK_2480

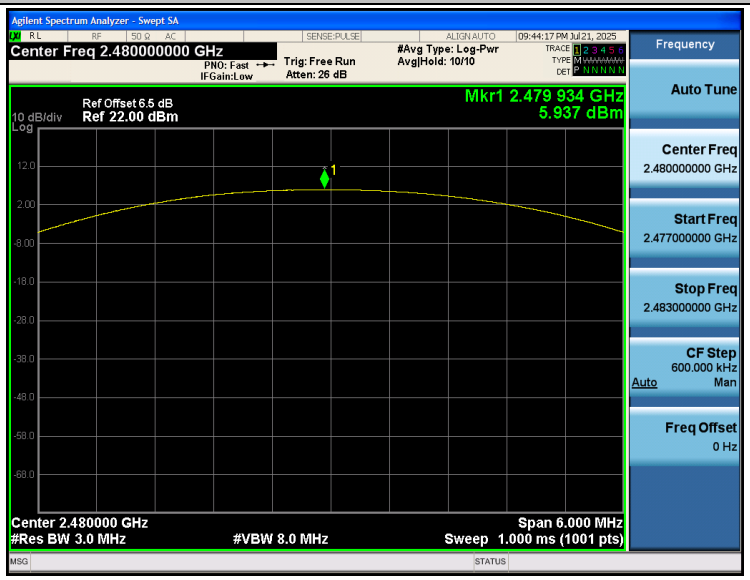


8-DPSK_2402



8-DPSK_2441

8-DPSK_2480

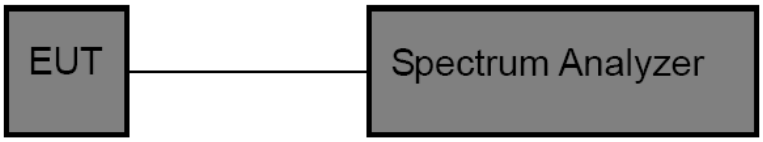


3.10. Duty Cycle

Limit

None, for report purposes only.

Test Configuration



Test Procedure

1. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. The EUT was directly connected to the Spectrum Analyzer and antenna output port as show in the block diagram above. The measurement according to section 10.2 of KDB 558074 D01 DTS Meas Guidance v05r02.
3. Spectrum Setting:

Set analyzer center frequency to test channel center frequency.
Set the span to 0Hz
Set the RBW to 8MHz
Set the VBW to 8MHz
Detector: Peak
Sweep time: Auto
Allow trace to fully stabilize. Then use the peak marker function to determine the maximum amplitude level.

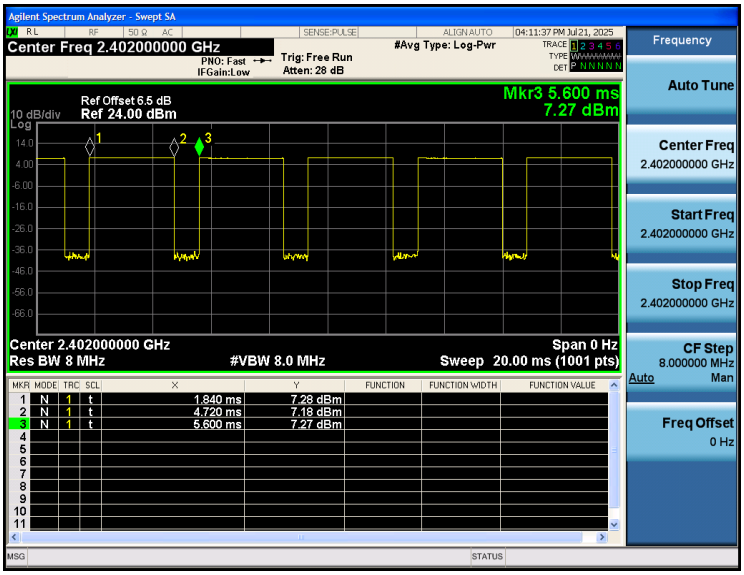
Test Mode

Please refer to the clause 2.4.

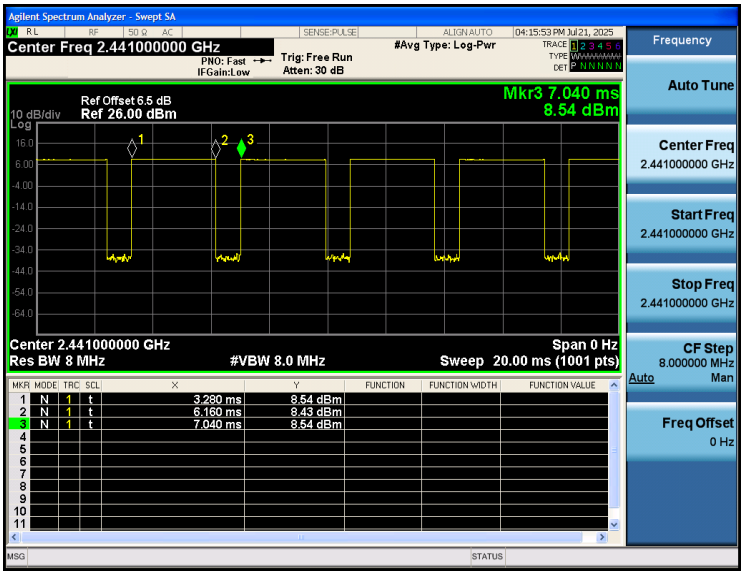
Test Result

Test Mode	Frequency [MHz]	Transmission Duration [ms]	Transmission Period [ms]	Duty Cycle [%]	1/T Minimum VBW (kHz)	Final setting For VBW (kHz)
GFSK	2402	2.88	3.76	76.60	0.35	1
	2441	2.88	3.76	76.60	0.35	1
	2480	2.88	3.76	76.60	0.35	1
π/4-DQPSK	2402	2.88	3.76	76.60	0.35	1
	2441	2.88	3.74	77.01	0.35	1
	2480	2.90	3.76	77.13	0.34	1
8-DPSK	2402	2.88	3.74	77.01	0.35	1
	2441	2.88	3.74	77.01	0.35	1
	2480	2.88	3.74	77.01	0.35	1

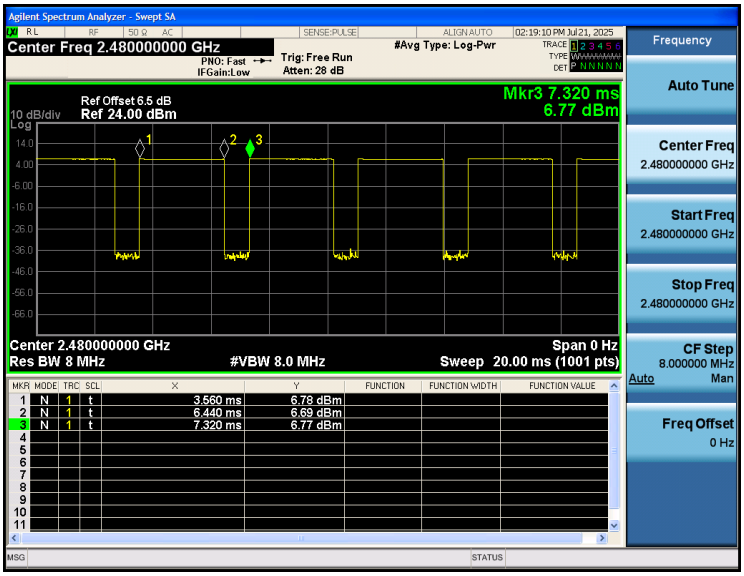
GFSK_2402



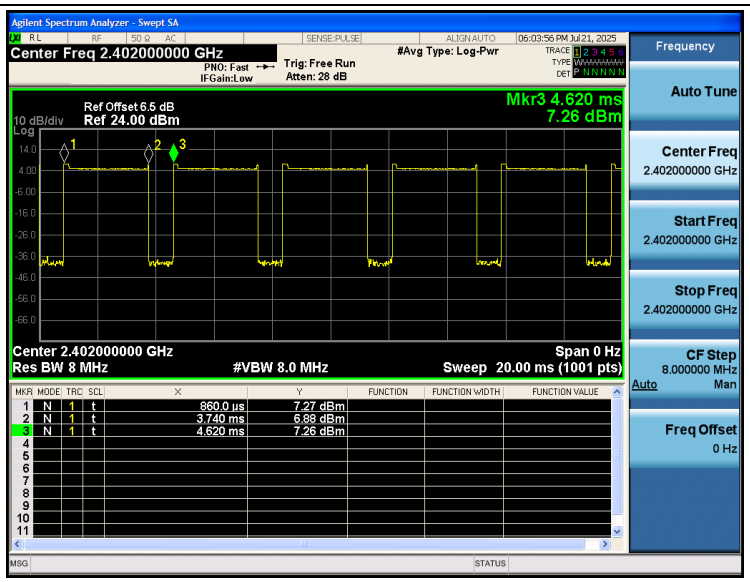
GFSK_2441



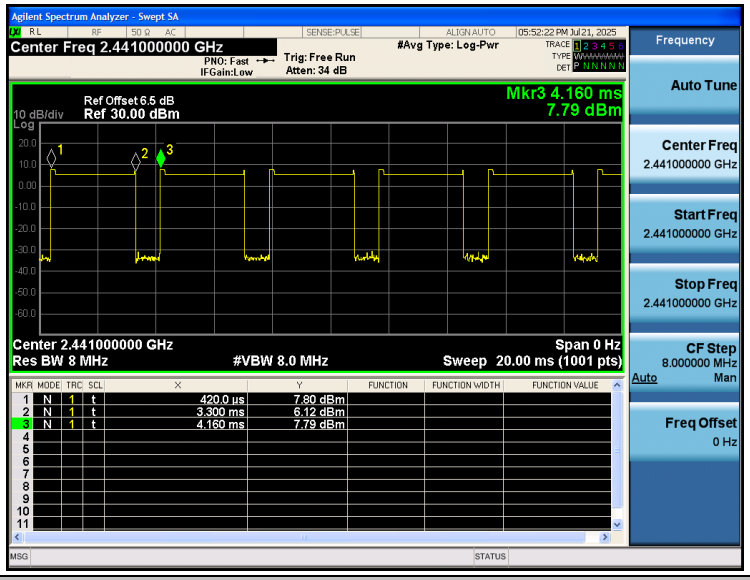
GFSK_2480



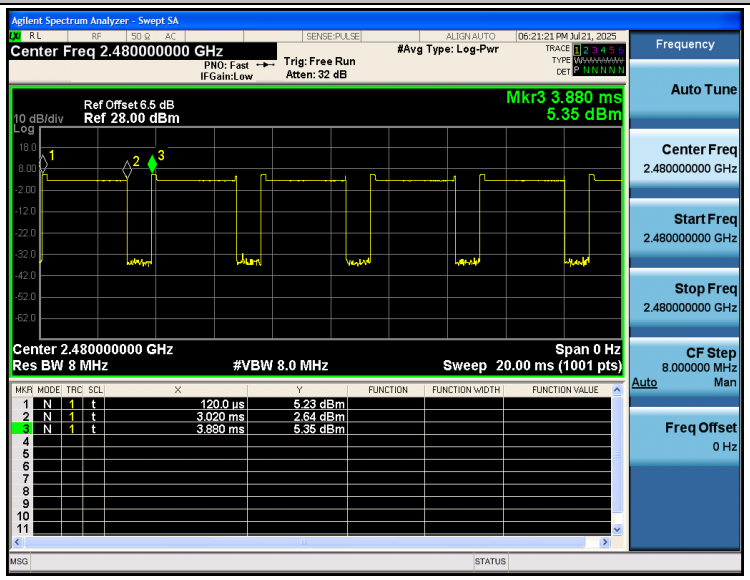
π/4-DQPSK_2402



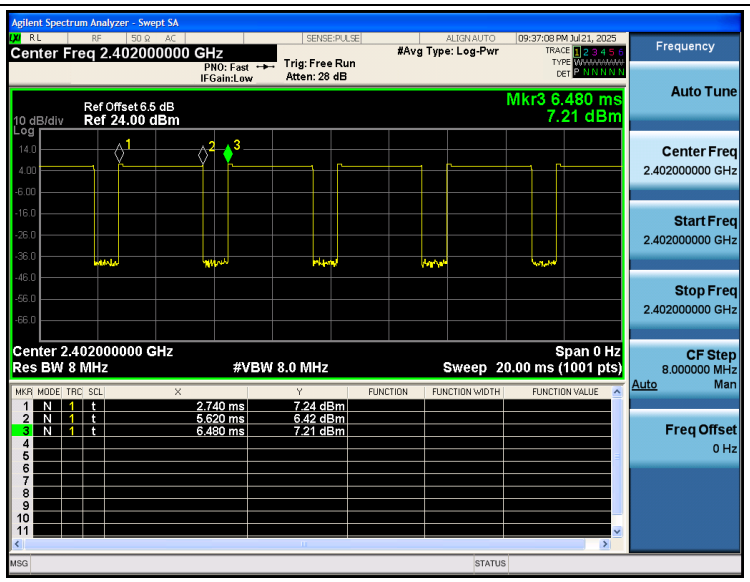
π/4-DQPSK_2441



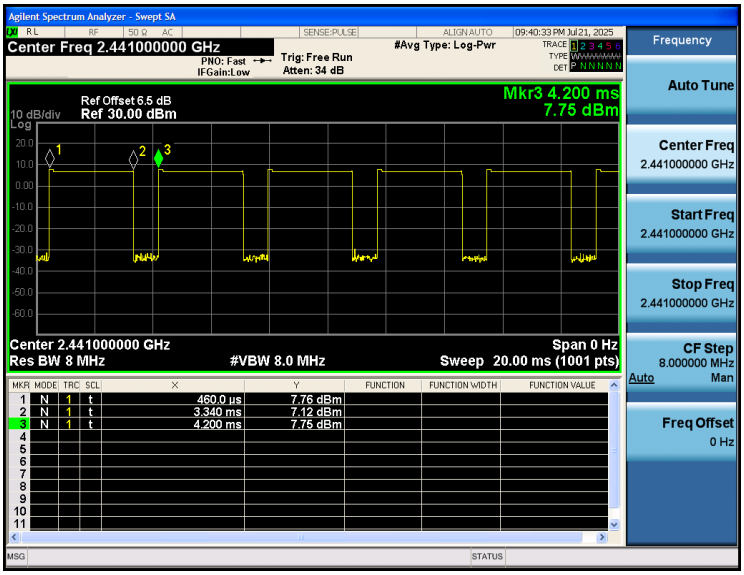
π/4-DQPSK_2480



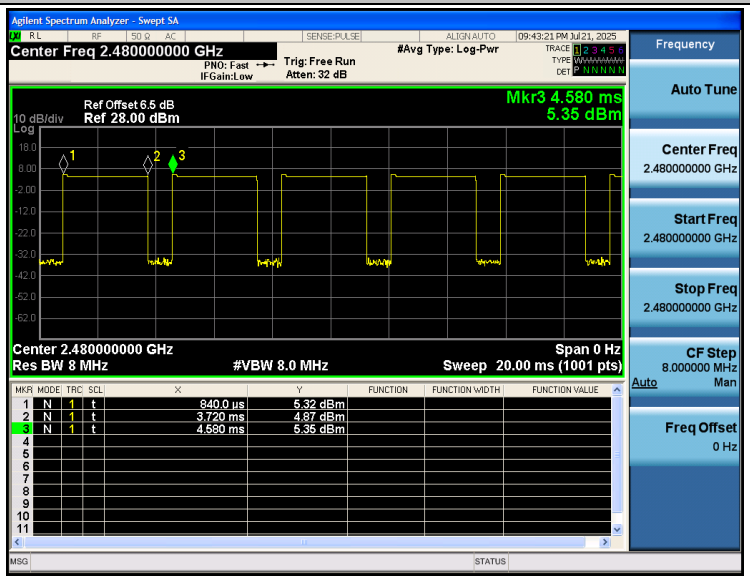
8-DPSK_2402



8-DPSK_2441



8-DPSK_2480



3.11. Antenna requirement

Requirement

FCC CFR Title 47 Part 15 Subpart C Section 15.203:

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 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.

FCC CFR Title 47 Part 15 Subpart C Section 15.247(c) (1)(i):

(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.

Test Result

The directional gain of the antenna less than 6dBi, please refer to the EUT internal photographs antenna photo.

************************THE END*************************