FCC TEST REPORT
FCC ID: 2BARD-GPLINK2022

Report Number..... :	**ZKT-230426L3046E-1**
Date of Test.....	Feb. 27, 2023 to Apr. 24, 2023
Date of issue..... :	Apr. 24, 2023
Total number of pages	102
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 YIZHI RUILIAN TECHNOLOGY CO.,LTD**
Address ..... :	215, 2nd Floor, Liangji Building, Donghuan 1st Road, Longhua Stree, Longhua District, Shenzhen
Manufacturer's name ..... :	**SHENZHEN YIZHI RUILIAN TECHNOLOGY CO.,LTD**
Address ..... :	215, 2nd Floor, Liangji Building, Donghuan 1st Road, Longhua Stree, Longhua District, Shenzhen
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. ..... :	TRF-EL-112_V0
Test Report Form(s) Originator .... :	ZKT Testing
Master TRF ..... :	Dated: 2023-04-24

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..... :	**A i car Box**
Trademark ..... :	N/A
Model/Type reference..... :	A i car
Ratings..... :	Input: DC 5V/2A Output: 5W

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)..... :	Jackson Fang
Approved (name + signature) ..... :	Lake Xie

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1. VERSION

Report No.	Version	Description	Approved
ZKT-230426L3046E-1	Rev.01	Initial issue of report	Apr. 24, 2023

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 99% OCB	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
Designation Number: CN0110

2.2 MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement y ± 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=1.8dB
10	RF Power Spectral Density	U=1.75dB
11	humidity uncertainty	U=5.3%
12	Temperature uncertainty	U=0.59℃

3. GENERAL INFORMATION

3.1 GENERAL DESCRIPTION OF EUT

Product Name:	A i car Box
Model No.:	A i car
Model Different.:	N/A
Sample ID	CZ20230224-01E
Sample(s) Status:	Engineer sample
Channel numbers:	79
Operation Frequency:	2402MHz~2480MHz
Modulation technology:	GFSK, π/4-DQPSK, 8-DPSK
Antenna Type:	BT chip SPHE900 ANT 1: FPCB antenna BT chip FSC2061 ANT 2: PCB antenna
Antenna gain:	2dBi
Power supply:	Input: DC 5V/2A Output: 5W

Operation Frequency each of channel

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz
6	2408MHz	26	2428MHz	46	2448MHz	66	2468MHz
7	2409MHz	27	2429MHz	47	2449MHz	67	2469MHz
8	2410MHz	28	2430MHz	48	2450MHz	68	2470MHz
9	2411MHz	29	2431MHz	49	2451MHz	69	2471MHz
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
12	2414MHz	32	2434MHz	52	2454MHz	72	2474MHz
13	2415MHz	33	2435MHz	53	2455MHz	73	2475MHz
14	2416MHz	34	2436MHz	54	2456MHz	74	2476MHz
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		

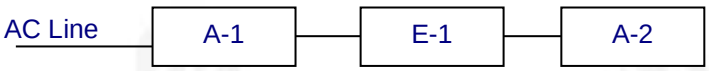
Note:

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:

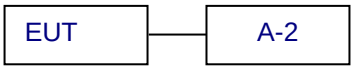
Test channel	Frequency
The lowest channel	2402MHz
The middle channel	2441MHz
The Highest channel	2480MHz

3.2 Test Setup Configuration

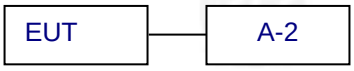
Conducted Emission



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	A i car Box	N/A	A i car	N/A	EUT
A-1	AC Adapter	Lenovo	ADL45WCC	N/A	Auxiliary
A-2	Notebook	Asus Computer Co., Ltd	X1502ZA1260-0D8SXBJX10	N5N0CV10V35921A	Auxiliary

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 found that the worst case was under the nominal rated supply condition. So the report just shows that condition's data.	

Test Software	BT Test Tool
Power level setup	<7dBm

3.5 EQUIPMENTS LIST FOR ALL TEST ITEMS

Radiation Test equipment

Item	Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	Spectrum Analyzer (9kHz-26.5GHz)	KEYSIGHT	9020A	MY55370835	Oct. 28, 2022	Oct. 27, 2023
2	Spectrum Analyzer (10kHz-39.9GHz)	R&S	FSQ	100363	Oct. 28, 2022	Oct. 27, 2023
3	EMI Test Receiver (9kHz-7GHz)	R&S	ESCI7	101169	Oct. 28, 2022	Oct. 27, 2023
4	Bilog Antenna (30-1500MHz)	Schwarzbeck	VULB9168	N/A	Nov. 02, 2022	Nov. 01, 2023
5	Horn Antenna (1GHz-18GHz)	Agilent	AH-118	071145	Nov. 01, 2022	Oct. 31, 2023
6	Horn Antenna (15GHz-40GHz)	A.H.System	SAS-574	588	Oct. 28, 2022	Oct. 27, 2023
7	Loop Antenna	TESEQ	HLA6121	58357	Nov. 01, 2022	Oct. 31, 2023
8	Amplifier (30-1000MHz)	EM Electronics	EM330 Amplifier	060747	Nov. 15, 2022	Nov. 14, 2023
9	Amplifier (1GHz-26.5GHz)	Agilent	8449B	3008A00315	Oct. 28, 2022	Oct. 27, 2023
10	Amplifier (500MHz-40GHz)	Quanjuda	DLE-161	097	Oct. 28, 2022	Oct. 27, 2023
11	Test Cable	N/A	R-01	N/A	Oct. 28, 2022	Oct. 27, 2023
12	Test Cable	N/A	R-02	N/A	Oct. 28, 2022	Oct. 27, 2023
13	Test Cable	N/A	R-03	N/A	Oct. 28, 2022	Oct. 27, 2023
14	Magnetic Field Probe Tester	Narda	ELT-400	0-0344	Nov. 15, 2022	Nov. 14, 2023
15	D.C. Power Supply	LongWei	TPR-6405D	N/A	\	\
16	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	\	\
17	Turntable	MF	MF-7802BS	N/A	\	\
18	Antenna tower	MF	MF-7802BS	N/A	\	\

Conducted emissions Test

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until
1	LISN	R&S	ENV216	101471	Oct. 21, 2022	Oct. 20, 2023
2	LISN	CYBERTEK	EM5040A	E1850400149	Oct. 21, 2022	Oct. 20, 2023
3	Test Cable	N/A	C-01	N/A	Oct. 21, 2022	Oct. 20, 2023
4	Test Cable	N/A	C-02	N/A	Oct. 21, 2022	Oct. 20, 2023
6	EMI Test Receiver	R&S	ESCI3	101393	Oct. 28, 2022	Oct. 27, 2023
7	EMC Software	Frad	EZ-EMC	Ver.EMC-CON 3A1.1	\	\

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.

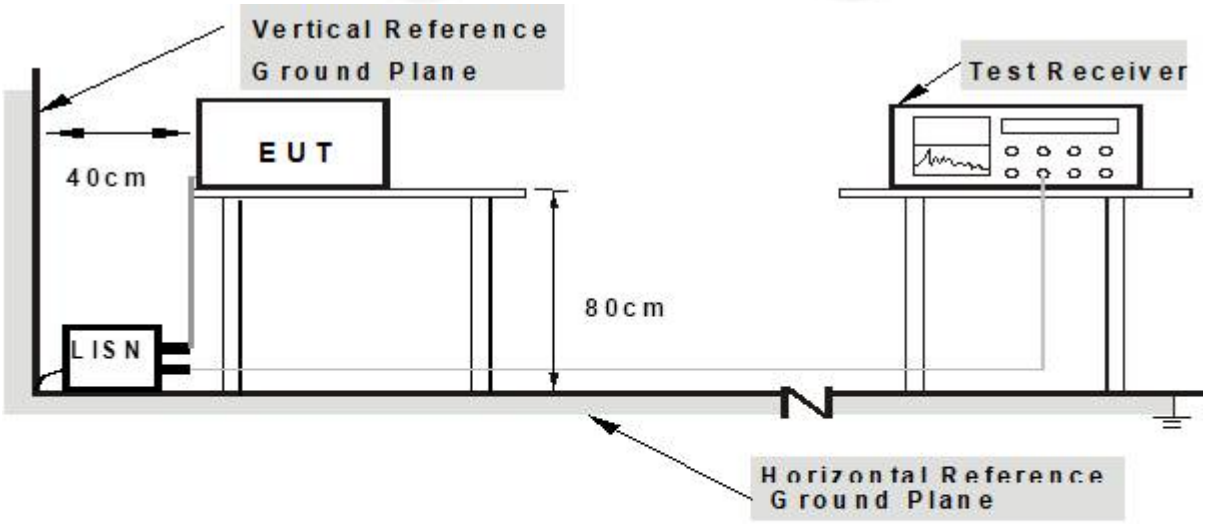
4.1.2 TEST PROCEDURE

a. 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.
b. 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.
c. 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.
d. LISN at least 80 cm from nearest part of EUT chassis.
e. 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



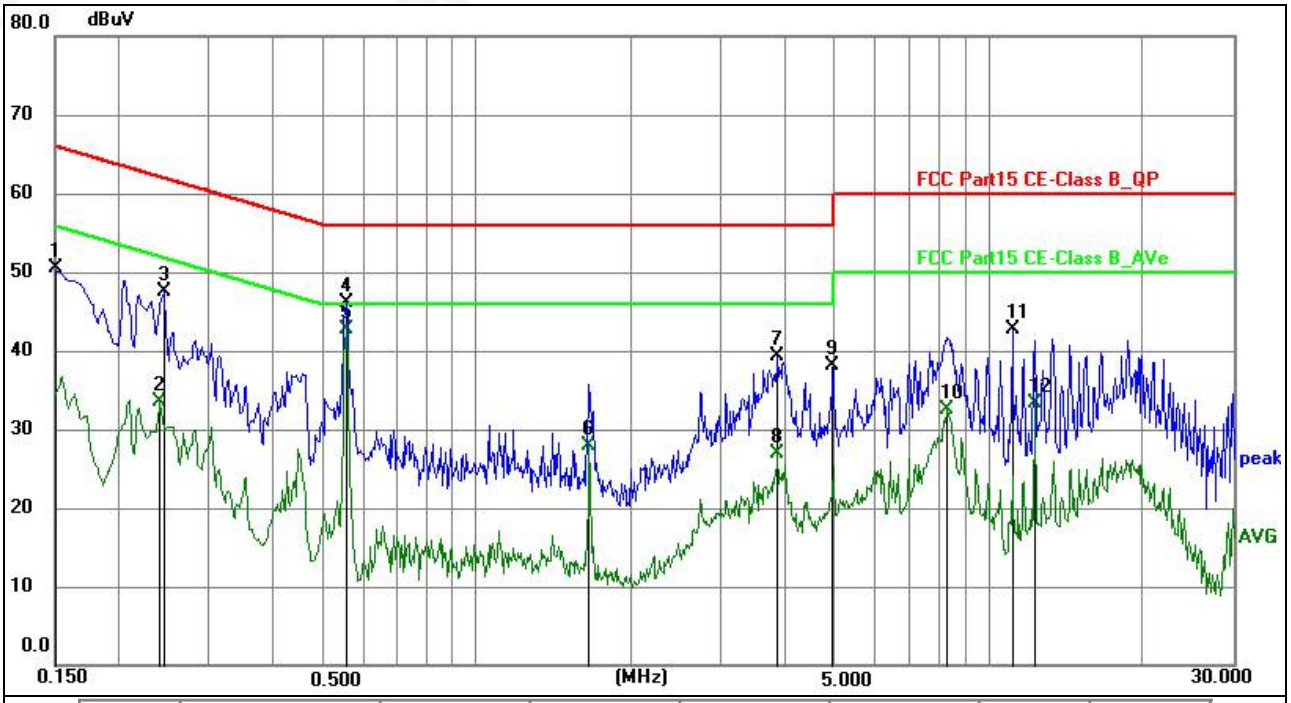
Note: 1.Support units were connected to second LISN.
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

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

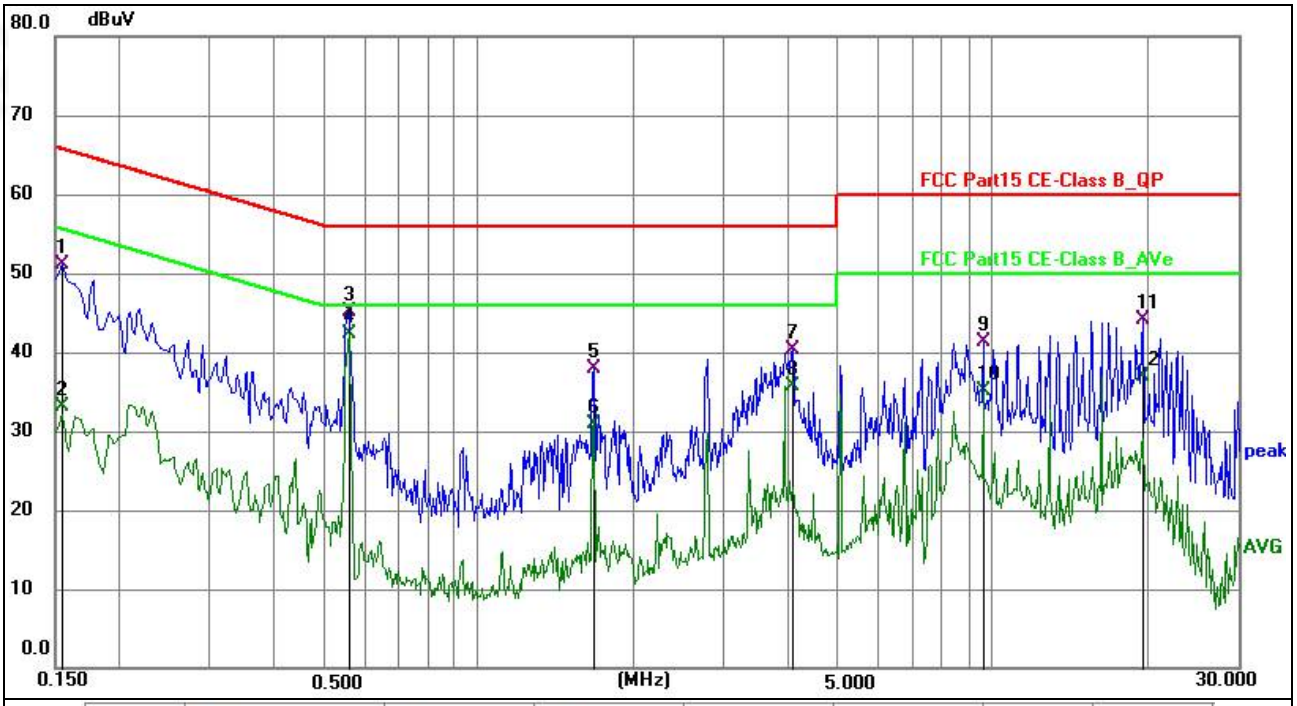
Temperature：	26℃	Relative Humidity：	54%
Pressure：	101kPa	Phase：	L
Test Voltage ：	DC 5V from adapter AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.244400	37.48	10.08	47.56	61.95	-14.39	QP
2	0.244400	23.50	10.08	33.58	51.95	-18.37	AVG
3	0.555000	36.08	10.08	46.16	56.00	-9.84	QP
4 *	0.555000	32.53	10.08	42.61	46.00	-3.39	AVG
5	1.661900	25.69	10.02	35.71	56.00	-20.29	QP
6	1.661900	17.93	10.02	27.95	46.00	-18.05	AVG
7	3.866900	29.35	9.88	39.23	56.00	-16.77	QP
8	3.866900	16.97	9.88	26.85	46.00	-19.15	AVG
9	8.276900	31.93	9.67	41.60	60.00	-18.40	QP
10	8.276900	22.88	9.67	32.55	50.00	-17.45	AVG
11	11.121000	33.17	9.53	42.70	60.00	-17.30	QP
12	11.121000	23.70	9.53	33.23	50.00	-16.77	AVG

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.Mesurement Level = Reading level + Correct Factor

Temperature :	26℃	Relative Humidity:	54%
Pressure :	101kPa	Phase :	N
Test Voltage :	DC 5V from adapter AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.154400	40.87	10.14	51.01	65.76	-14.75	QP
2	0.154400	22.91	10.14	33.05	55.76	-22.71	AVG
3	0.559400	34.95	10.08	45.03	56.00	-10.97	QP
4 *	0.559400	32.31	10.08	42.39	46.00	-3.61	AVG
5	1.675400	27.84	10.02	37.86	56.00	-18.14	QP
6	1.675400	20.86	10.02	30.88	46.00	-15.12	AVG
7	4.083000	30.49	9.87	40.36	56.00	-15.64	QP
8	4.083000	25.74	9.87	35.61	46.00	-10.39	AVG
9	9.559400	31.68	9.58	41.26	60.00	-18.74	QP
10	9.559400	25.51	9.58	35.09	50.00	-14.91	AVG
11	19.540500	34.76	9.41	44.17	60.00	-15.83	QP
12	19.540500	27.55	9.41	36.96	50.00	-13.04	AVG

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.Mesurement Level = Reading level + Correct Factor

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 0.8m meters above the ground at a 3 meter semi-anechoic 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 (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:

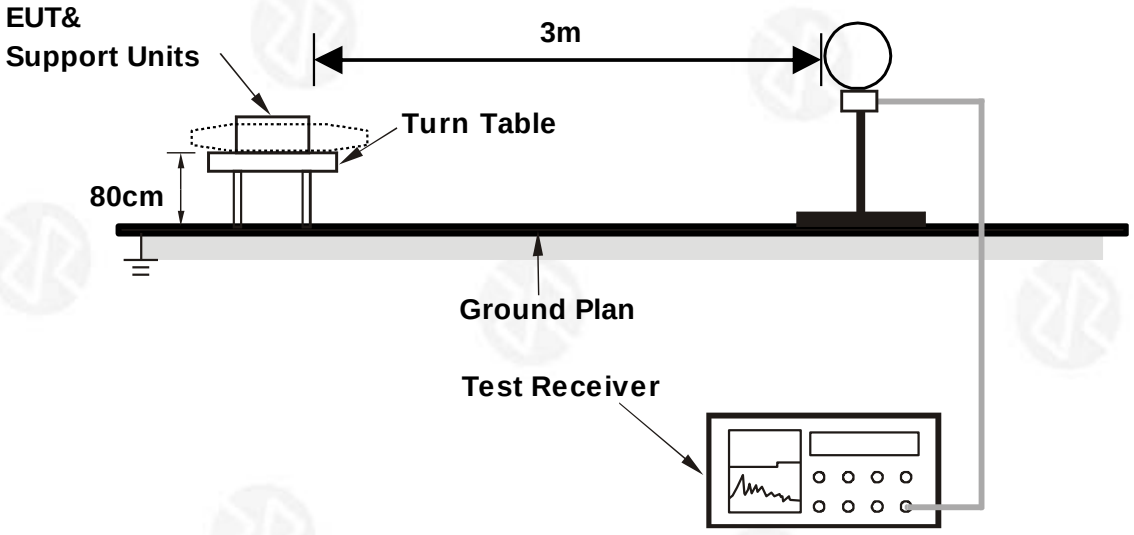
Both horizontal and vertical antenna polarities were tested
and performed pretest to three orthogonal axis. The worst case emissions were reported

4.2.3 DEVIATION FROM TEST STANDARD

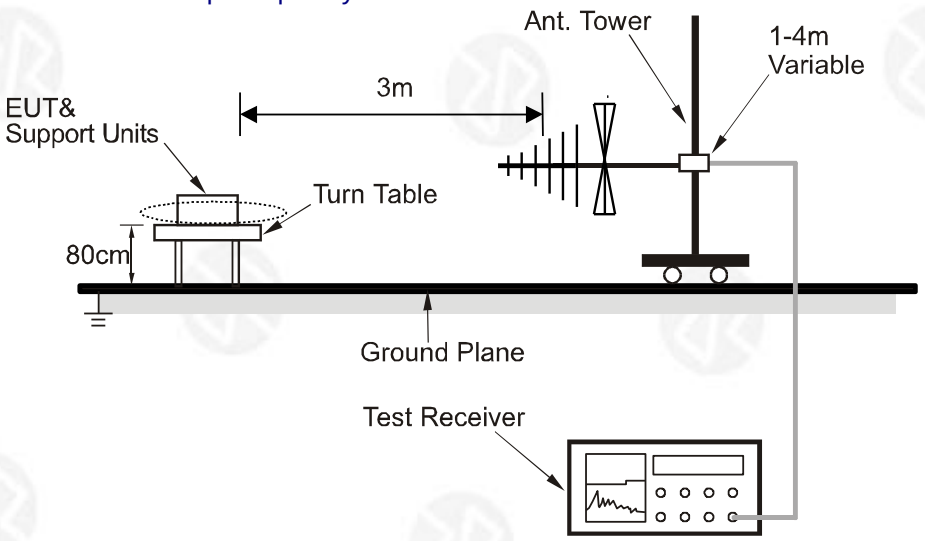
No deviation

4.2.4 TEST SETUP

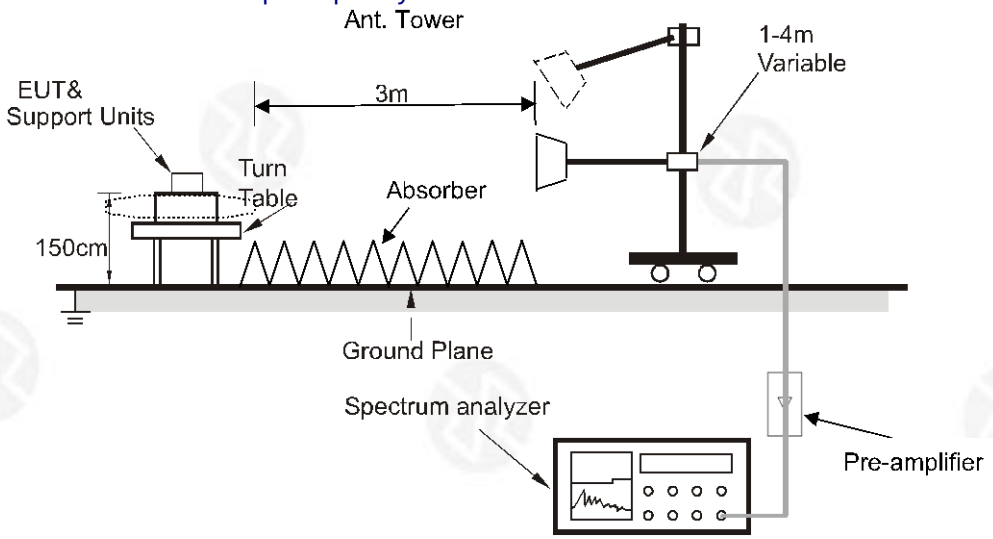
（A）Radiated Emission Test-Up Frequency Below 30MHz



（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

EUT:	A i car Box	Model Name:	A i car
Pressure:	1010 hPa	Test Voltage:	DC 5V from adapter AC 120V/60Hz
Test Mode:	TX	Polarization:	--

Freq.	Reading	Limit	Margin	State
(MHz)	(dBuV/m)	(dBuV/m)	(dB)	P/F
--	--	--	--	Pass
--	--	--	--	Pass

Note:

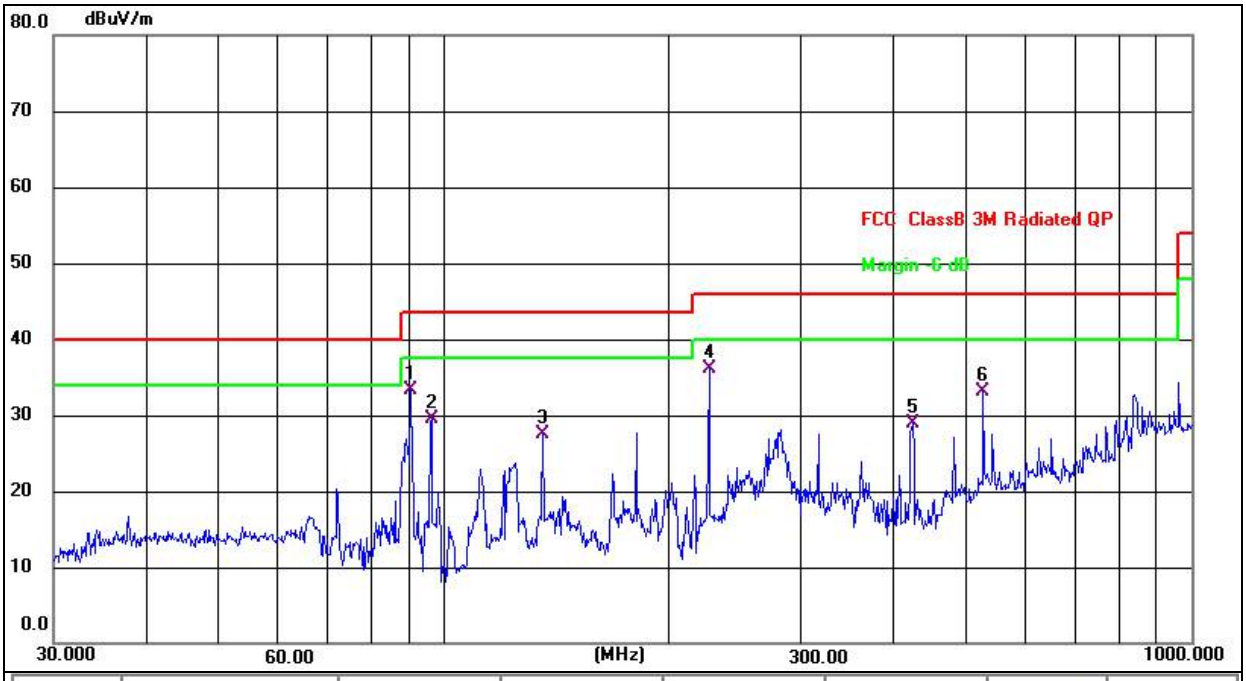
For 9kHz-30MHz, the amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor =40 log (specific distance/test distance)(dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

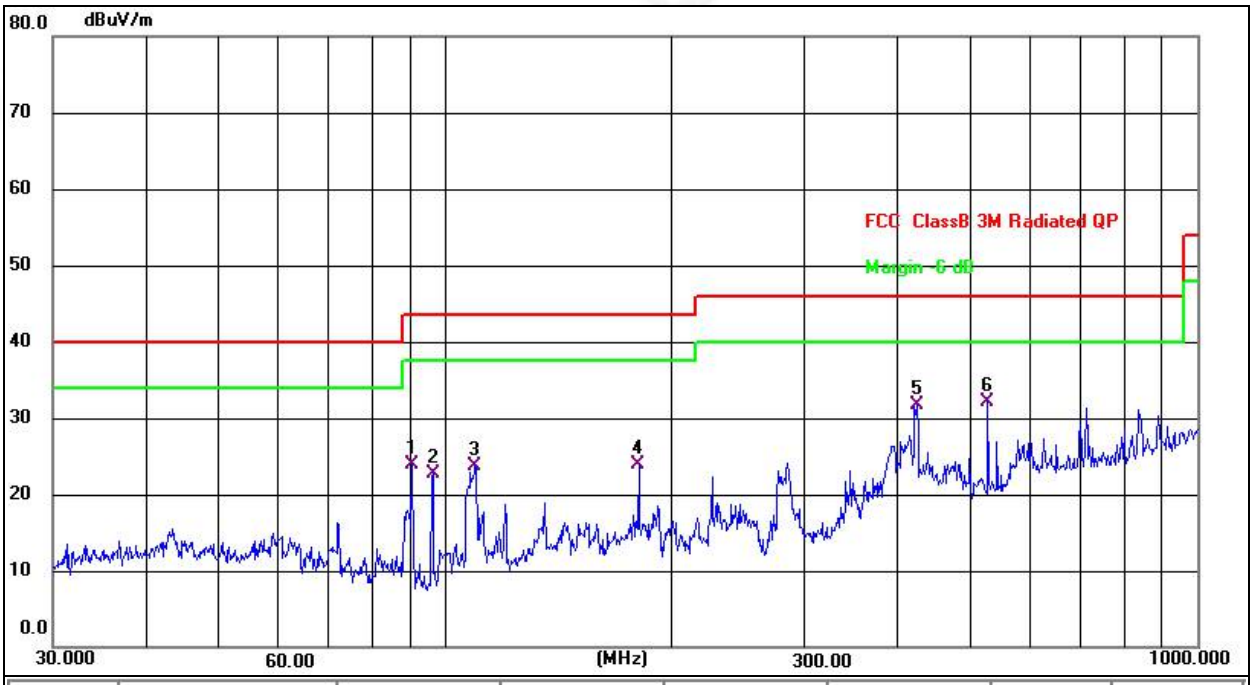
Between 30MHz – 1GHz

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101 kPa	Polarization:	Horizontal
Test Voltage:	DC 5V from adapter AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	90.2202	52.56	-19.21	33.35	43.50	-10.15	QP
2	96.0985	48.09	-18.66	29.43	43.50	-14.07	QP
3	135.5061	42.12	-14.70	27.42	43.50	-16.08	QP
4 *	226.0994	52.24	-16.05	36.19	46.00	-9.81	QP
5	423.5402	38.49	-9.55	28.94	46.00	-17.06	QP
6	526.3967	39.97	-6.87	33.10	46.00	-12.90	QP

Temperature:	26℃	Relative Humidity:	54%
Pressure:	101kPa	Polarization:	Vertical
Test Voltage:	DC 5V from adapter AC 120V/60Hz		



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	90.2202	43.08	-19.21	23.87	43.50	-19.63	QP
2	96.0985	41.29	-18.66	22.63	43.50	-20.87	QP
3	109.4116	41.03	-17.30	23.73	43.50	-19.77	QP
4	180.6484	39.22	-15.23	23.99	43.50	-19.51	QP
5	423.5402	41.31	-9.55	31.76	46.00	-14.24	QP
6 *	526.3967	39.07	-6.87	32.20	46.00	-13.80	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 GFSK mode

1GHz~25GHz

Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector	Polarization
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
GFSK Low Channel:2402MHz							
4804	49.74	1.52	51.26	74.00	-22.74	Peak	V
4804	35.25	1.52	36.77	54.00	-17.23	AVG	V
7206	49.68	5.46	55.14	74.00	-18.86	Peak	V
7206	35.26	5.46	40.72	54.00	-13.28	AVG	V
9608	49.48	6.33	55.81	74.00	-18.19	Peak	V
9608	35.42	6.33	41.75	54.00	-12.25	AVG	V
4804	49.58	1.52	51.10	74.00	-22.90	Peak	H
4804	35.65	1.52	37.17	54.00	-16.83	AVG	H
7206	49.81	5.46	55.27	74.00	-18.73	Peak	H
7206	35.71	5.46	41.17	54.00	-12.83	AVG	H
9608	49.49	6.33	55.82	74.00	-18.18	Peak	H
9608	35.27	6.33	41.60	54.00	-12.40	AVG	H
GFSK Middle Channel:2441MHz							
4882	41.53	1.68	43.21	74.00	-30.79	Peak	V
4882	29.45	1.68	31.13	54.00	-22.87	AVG	V
7323	41.24	5.45	46.69	74.00	-27.31	Peak	V
7323	29.54	5.45	34.99	54.00	-19.01	AVG	V
9764	41.14	6.37	47.51	74.00	-26.49	Peak	V
9764	29.21	6.37	35.58	54.00	-18.42	AVG	V
4882	41.50	1.68	43.18	74.00	-30.82	Peak	H
4882	29.20	1.68	30.88	54.00	-23.12	AVG	H
7323	41.20	5.45	46.65	74.00	-27.35	Peak	H
7323	29.59	5.45	35.04	54.00	-18.96	AVG	H
9764	41.25	6.37	47.62	74.00	-26.38	Peak	H
9764	29.36	6.37	35.73	54.00	-18.27	AVG	H
GFSK High Channel:2480MHz							
4960	41.17	1.83	43.00	74.00	-31.00	Peak	V
4960	29.27	1.83	31.10	54.00	-22.90	AVG	V
7440	41.56	5.43	46.99	74.00	-27.01	Peak	V
7440	29.45	5.43	34.88	54.00	-19.12	AVG	V
9920	41.35	6.41	47.76	74.00	-26.24	Peak	V
9920	29.30	6.41	35.71	54.00	-18.29	AVG	V
4960	41.29	1.83	43.12	74.00	-30.88	Peak	H
4960	29.14	1.83	30.97	54.00	-23.03	AVG	H
7440	41.43	5.43	46.86	74.00	-27.14	Peak	H
7440	29.14	5.43	34.57	54.00	-19.43	AVG	H
9920	41.22	6.41	47.63	74.00	-26.37	Peak	H
9920	29.15	6.41	35.56	54.00	-18.44	AVG	H

Remark:
1. Measurement (dBμV/m) = Reading Level (dBμV) + Correct Factor (dB/m)
   Over (dB) = Measurement (dBμV/m) – Limit (dBμV/m)
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 Edge

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 (2310MHz 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	2300MHz
Stop Frequency	2520
RB / VB (emission in restricted band)	1 MHz / 1 MHz for Peak, 1 MHz / 10Hz 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 1.5 meters 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:

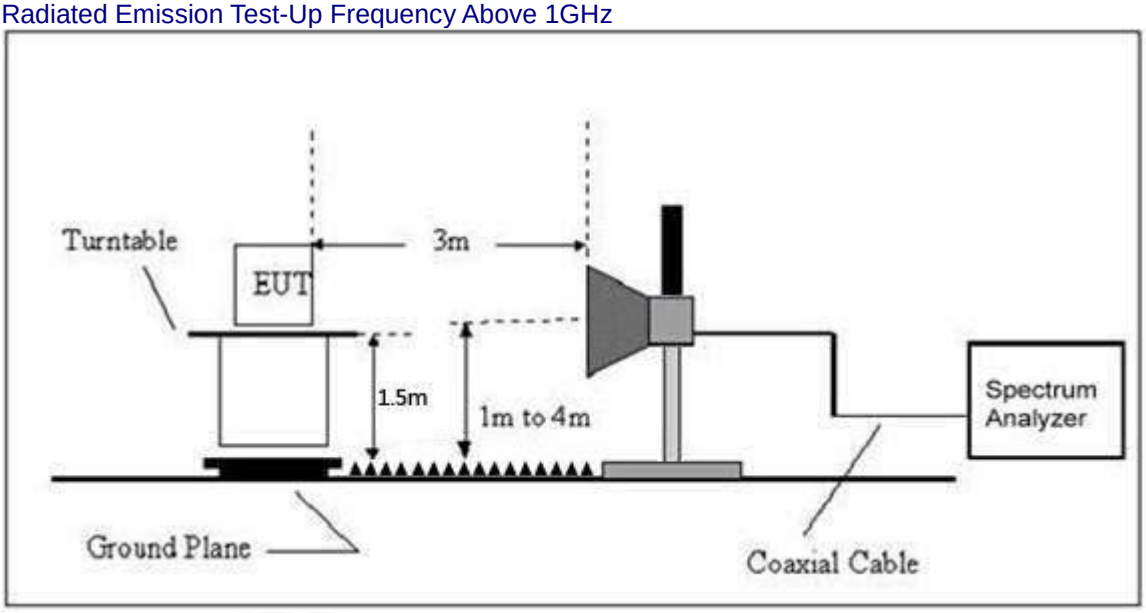
All the modulation modes have been tested, and only the worst results are reflected in the report.

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

Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector	Polarization
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
GFSK – Low band-edge							
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
2310	49.42	-6.6	42.82	74	-31.18	Peak	V
2310	39.12	-6.6	32.52	54	-21.48	AVG	V
2390	49.35	-6.23	43.12	74	-30.88	Peak	V
2390	39.45	-6.23	33.22	54	-20.78	AVG	V
2310	49.23	-6.6	42.63	74	-31.37	Peak	H
2310	39.30	-6.6	32.70	54	-21.30	AVG	H
2390	49.30	-6.23	43.07	74	-30.93	Peak	H
2390	39.47	-6.23	33.24	54	-20.76	AVG	H
GFSK – High band-edge							
2483.5	51.39	-5.79	45.60	74	-28.40	Peak	V
2483.5	42.16	-5.79	36.37	54	-17.63	AVG	V
2500	51.31	-5.72	45.59	74	-28.41	Peak	V

2500	42.47	-5.72	36.75	54	-17.25	AVG	V
2483.5	51.29	-5.79	45.50	74	-28.50	Peak	H
2483.5	42.29	-5.79	36.50	54	-17.50	AVG	H
2500	51.14	-5.72	45.42	74	-28.58	Peak	H
2500	42.23	-5.72	36.51	54	-17.49	AVG	H

Frequency	Reading Level	Correct Factor	Measurement	Limits	Over	Detector	Polarization
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
Hopping GFSK – Low band-edge							
(MHz)	(dBμV)	(dB/m)	(dBμV/m)	(dBμV/m)	(dB)	Peak/AVG	H/V
2310	49.57	-6.6	42.97	74	-31.03	Peak	V
2310	39.48	-6.6	32.88	54	-21.12	AVG	V
2390	49.29	-6.23	43.06	74	-30.94	Peak	V
2390	39.20	-6.23	32.97	54	-21.03	AVG	V
2310	49.45	-6.6	42.85	74	-31.15	Peak	H
2310	39.47	-6.6	32.87	54	-21.13	AVG	H
2390	49.49	-6.23	43.26	74	-30.74	Peak	H
2390	39.55	-6.23	33.32	54	-20.68	AVG	H
Hopping GFSK – High band-edge							
2483.5	51.43	-5.79	45.64	74	-28.36	Peak	V
2483.5	42.11	-5.79	36.32	54	-17.68	AVG	V
2500	51.42	-5.72	45.70	74	-28.30	Peak	V
2500	42.25	-5.72	36.53	54	-17.47	AVG	V
2483.5	51.32	-5.79	45.53	74	-28.47	Peak	H
2483.5	42.42	-5.79	36.63	54	-17.37	AVG	H
2500	51.56	-5.72	45.84	74	-28.16	Peak	H
2500	42.24	-5.72	36.52	54	-17.48	AVG	H

Remark:
1. Measurement (dBμV/m) = Reading Level (dBμV) + Correct Factor (dB/m)
   Over (dB) = Measurement (dBμV/m) – Limit (dBμV/m)

6. CONDUCTED SPURIOUS EMISSION AND BAND EDGE

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.

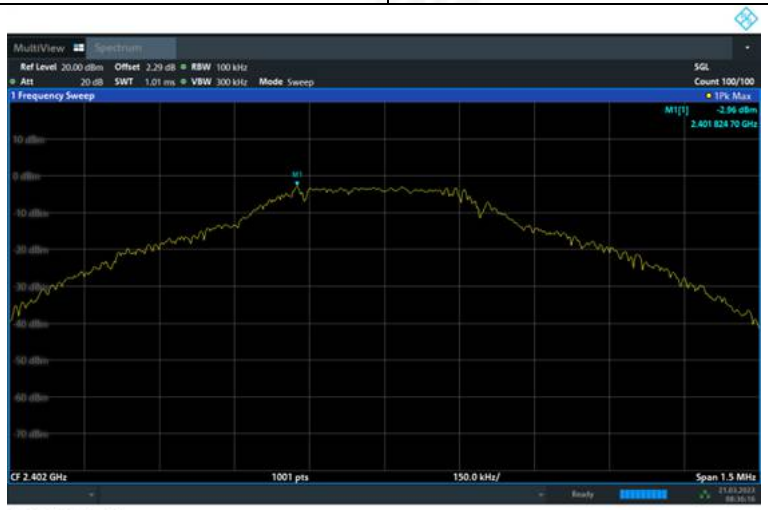
6.4 DEVIATION FROM STANDARD

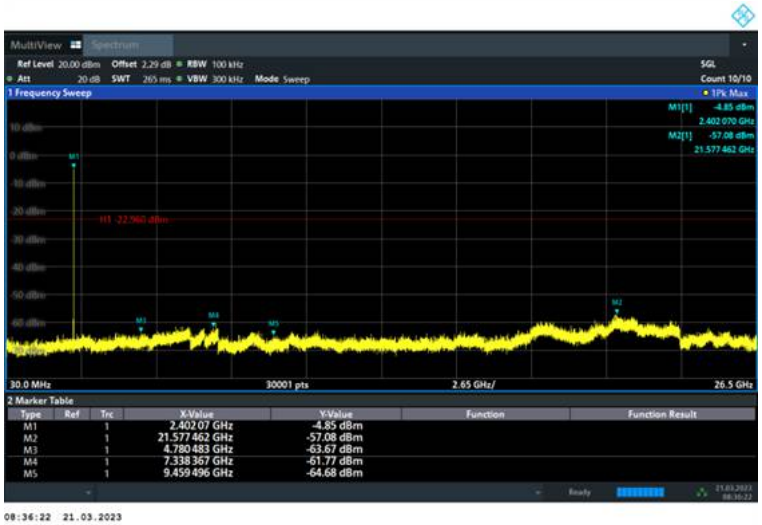
No deviation.

6.5 Test Result

ANT 1 GFSK mode:

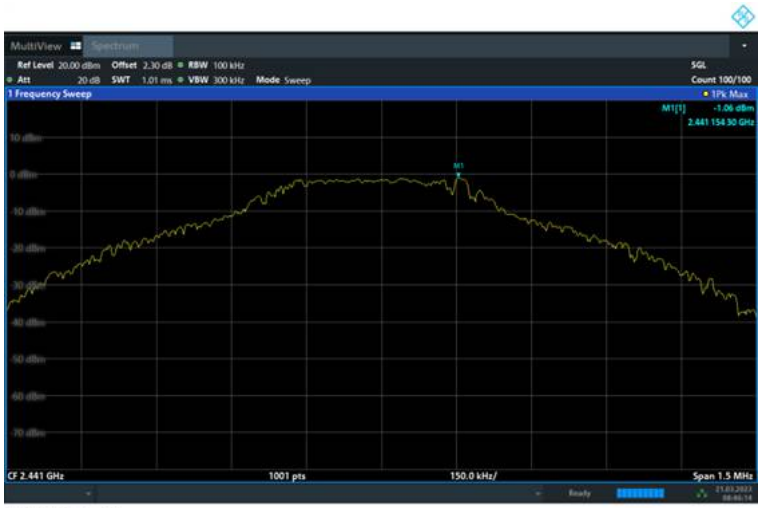
Test channel: 0	Lowest channel

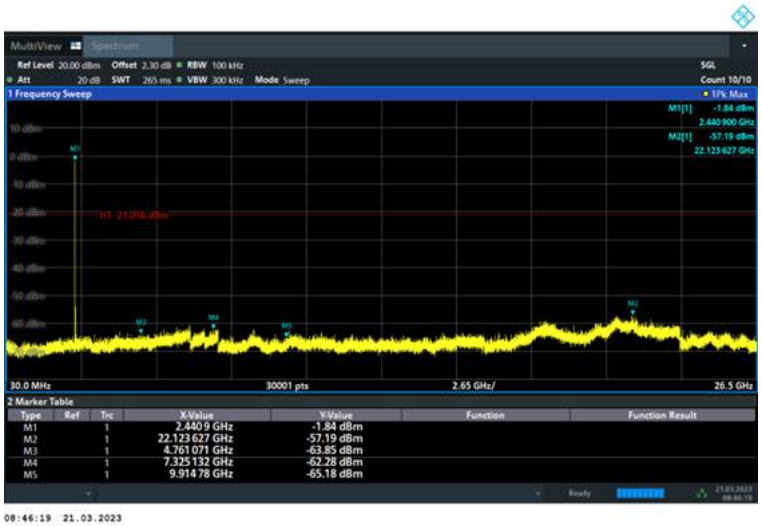




30MHz~26.5GHz

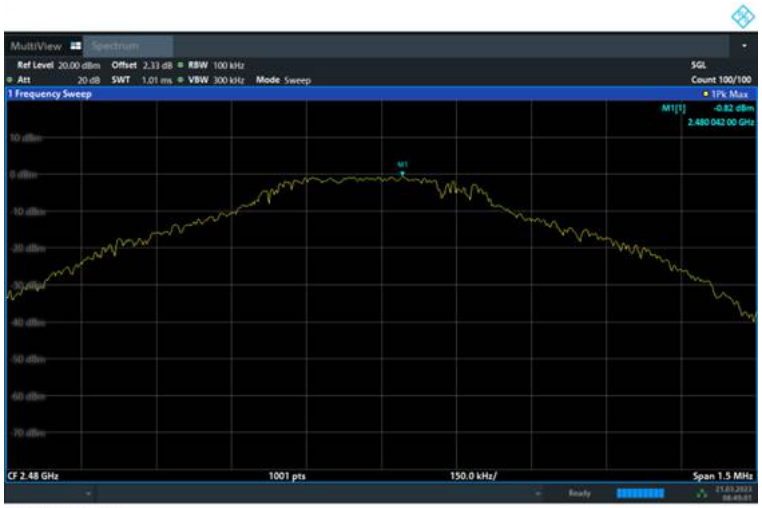
Test channel: 39	Middle channel

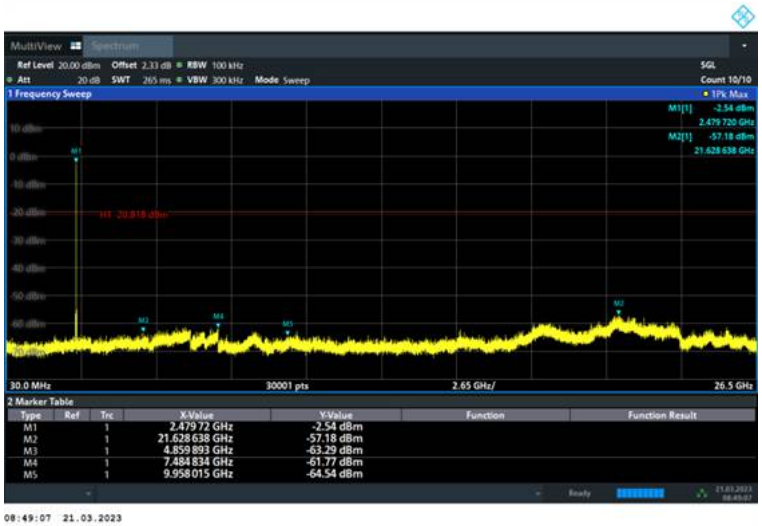




30MHz~26.5GHz

Test channel: 78	Highest channel

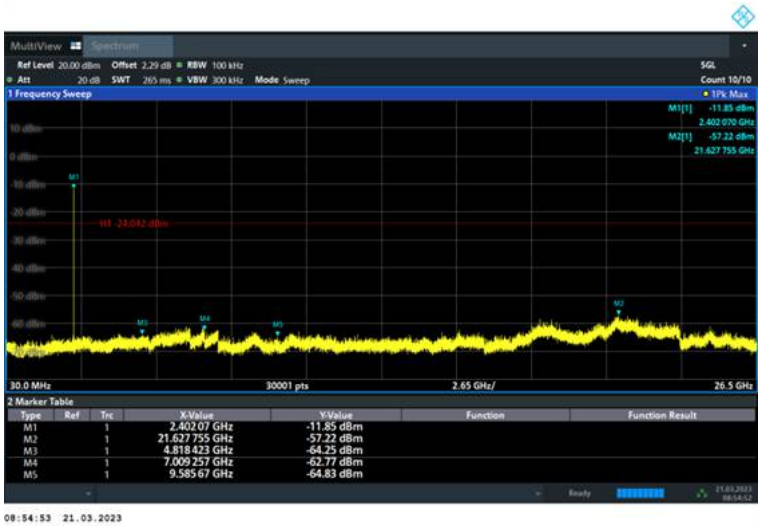




30MHz~26.5GHz

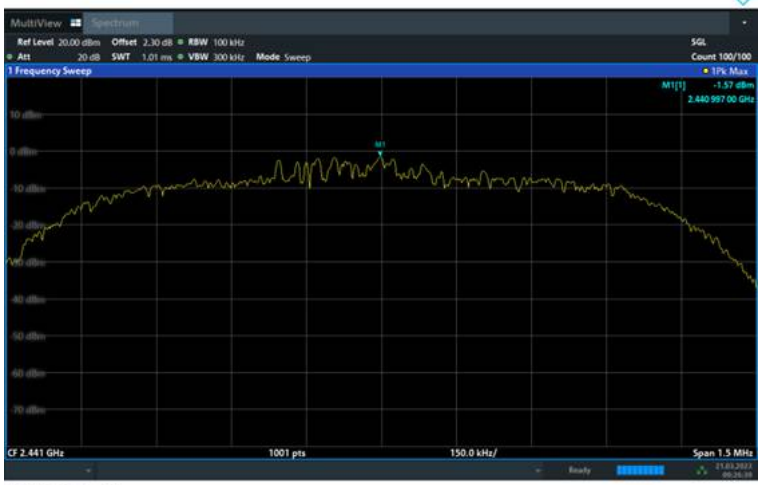
π/4-DQPSK mode:

Test channel: 0	Lowest channel



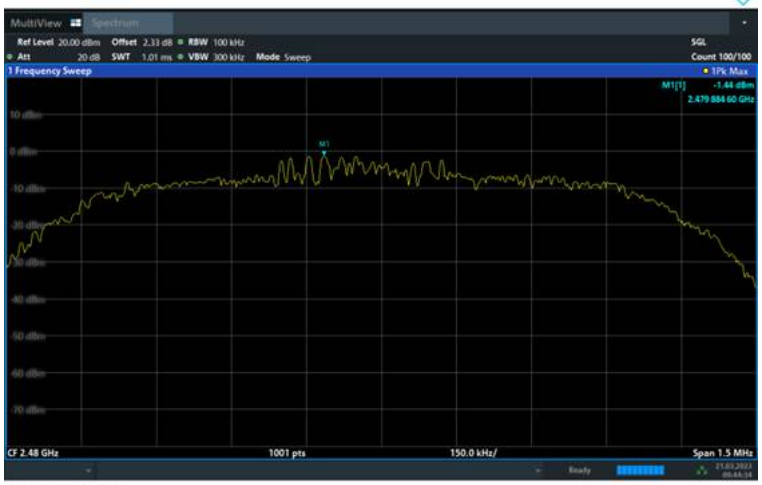
30MHz~26.5GHz

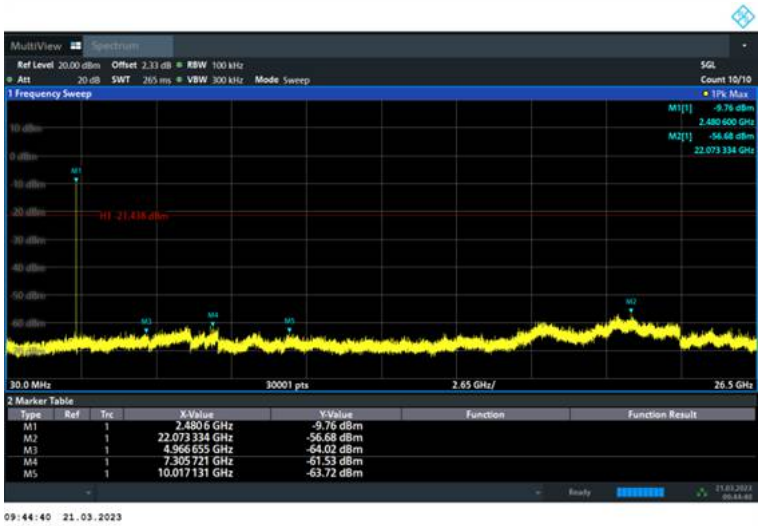
Test channel: 39	Middle channel



30MHz~26.5GHz

Test channel: 78	Highest channel

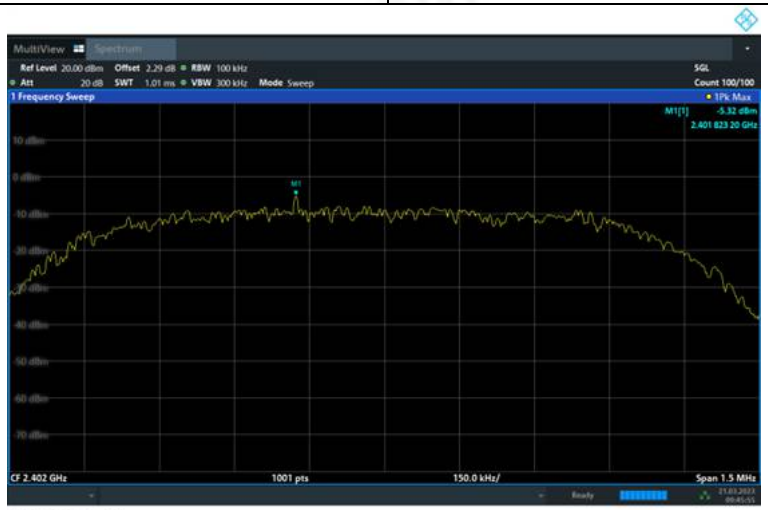


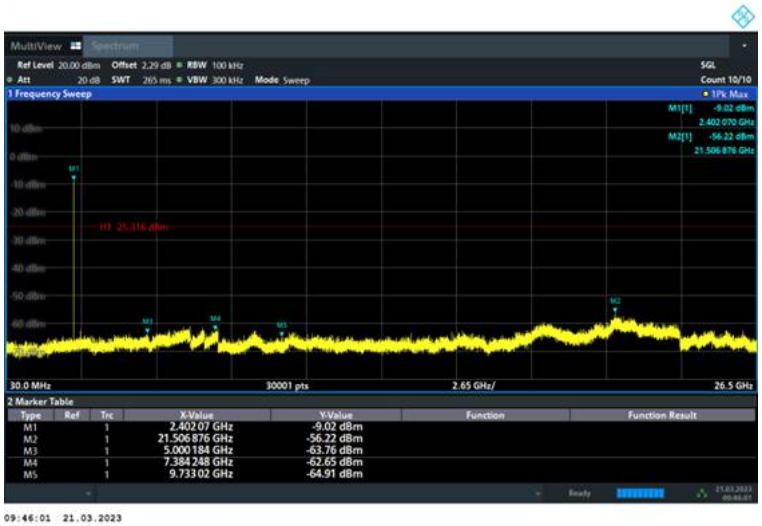


30MHz~26.5GHz

8-DPSK mode:

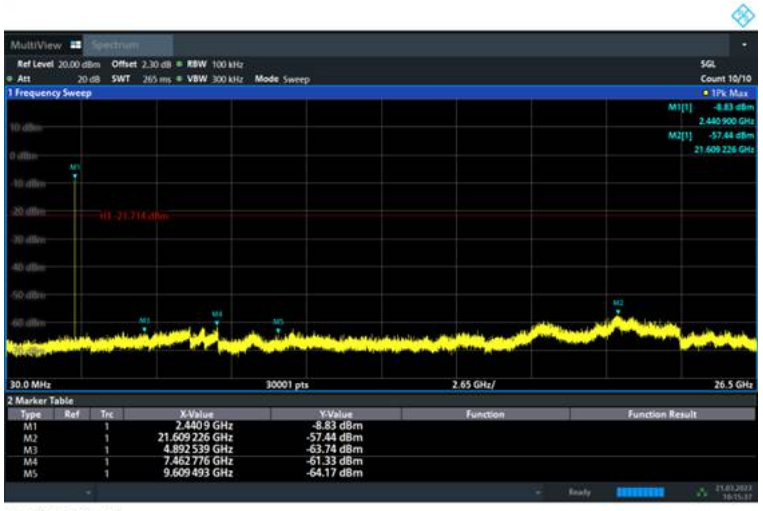
Test channel: 0	Lowest channel





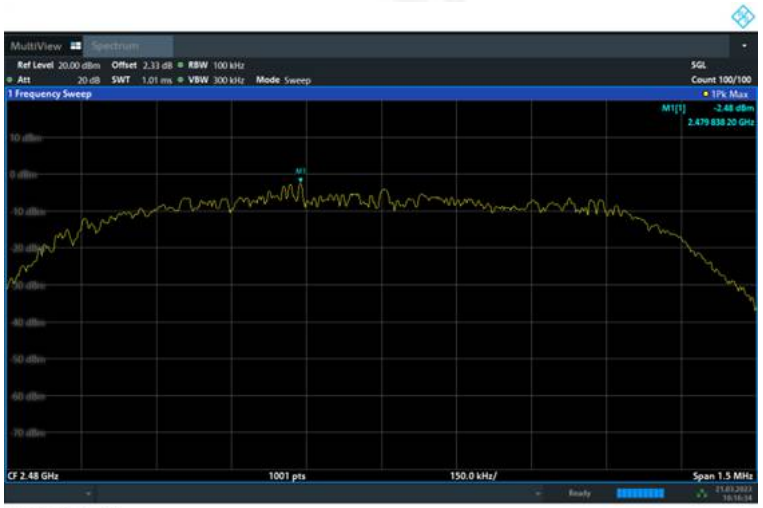
30MHz~26.5GHz

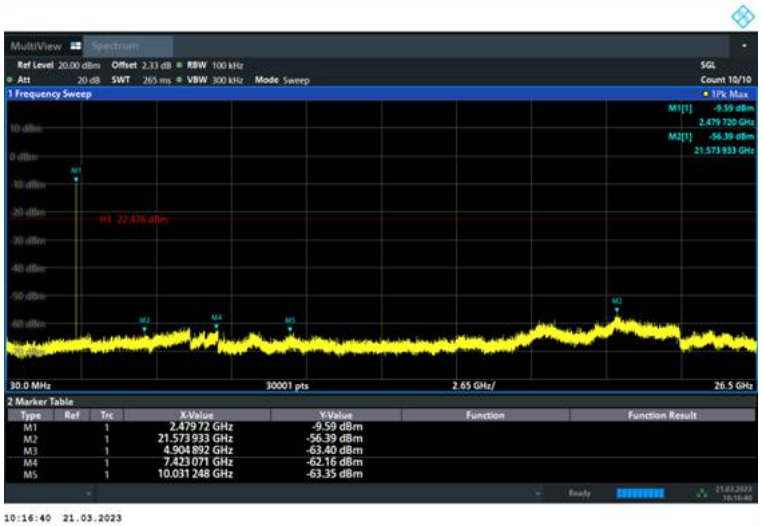
Test channel: 39	Middle channel



30MHz~26.5GHz

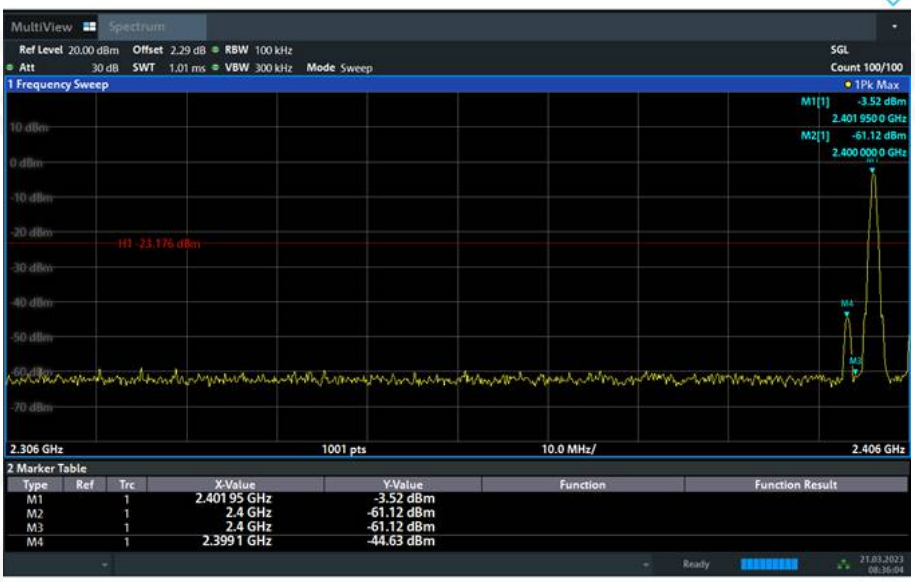
Test channel: 78	Highest channel





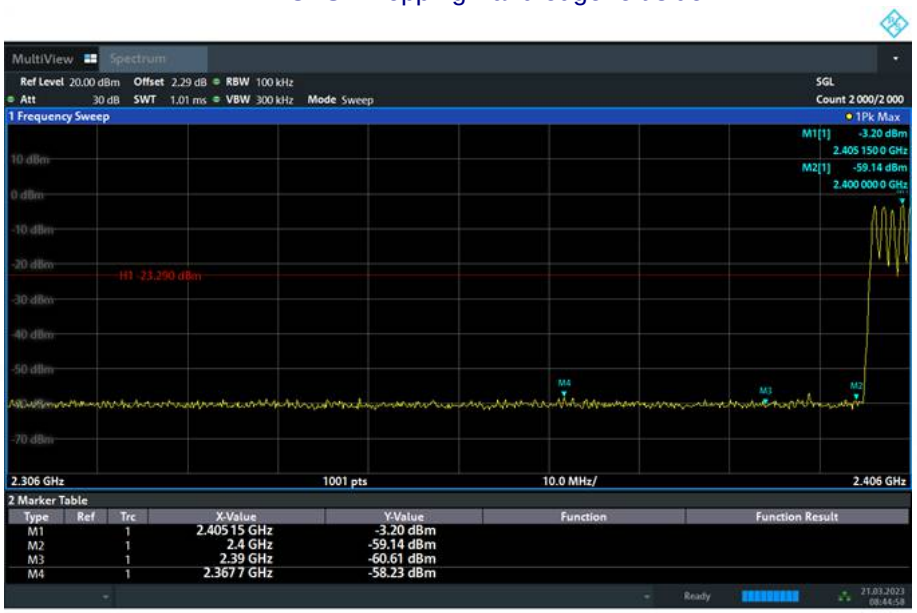
30MHz~26.5GHz

GFSK No-hopping Band edge-left side



08:36:05 21.03.2023

GFSK Hopping Band edge-left side



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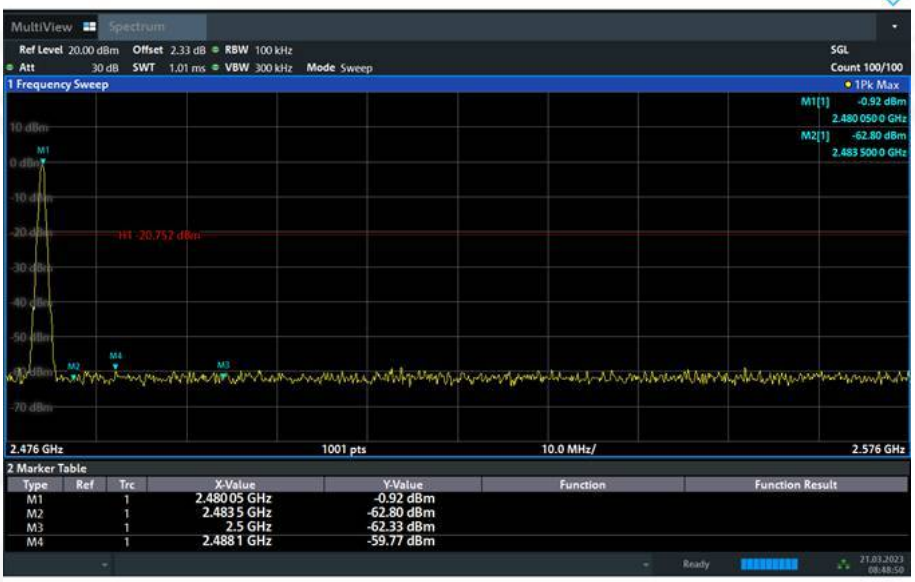
GFSK No-hopping Band edge-right side

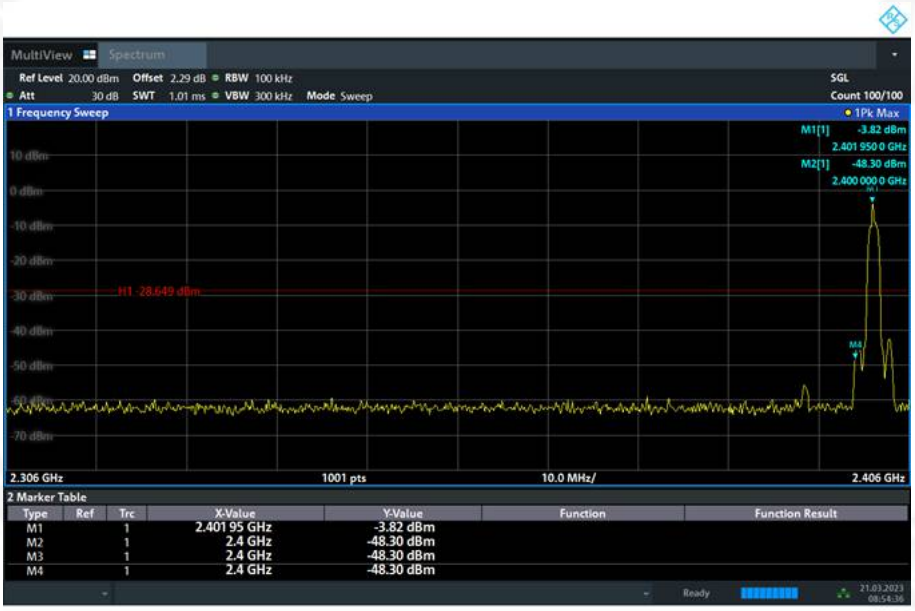


08:48:50 21.03.2023

GFSK Hopping Band edge-right side

08:50:05 21.03.2023

π/4-DQPSK No-hopping Band edge-left side



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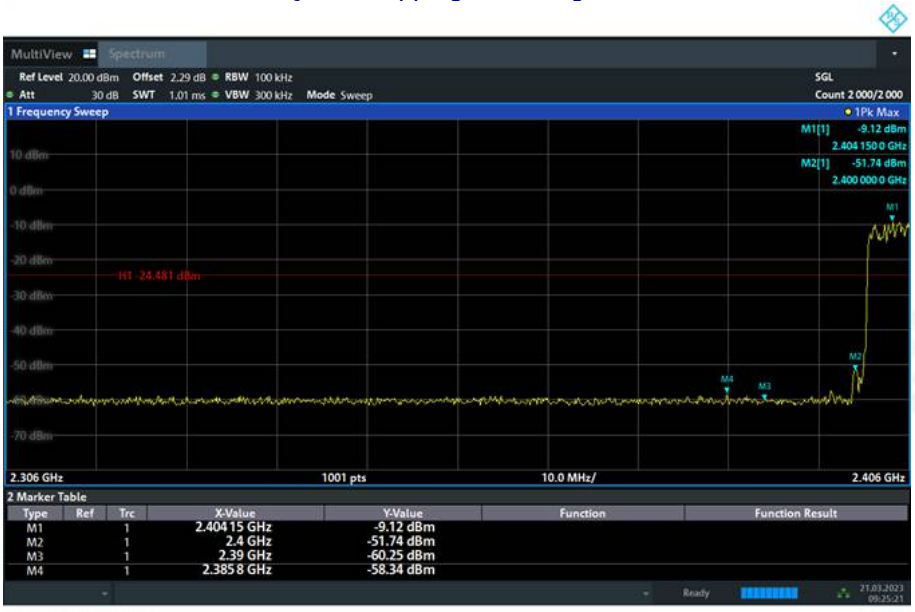
π/4-DQPSK Hopping Band edge-left side



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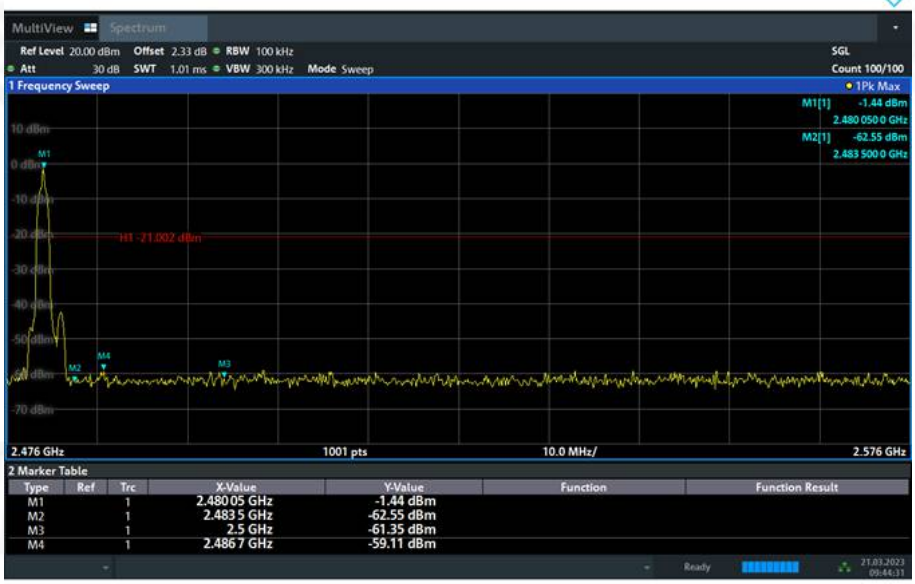
π/4-DQPSK No-hopping Band edge-right side



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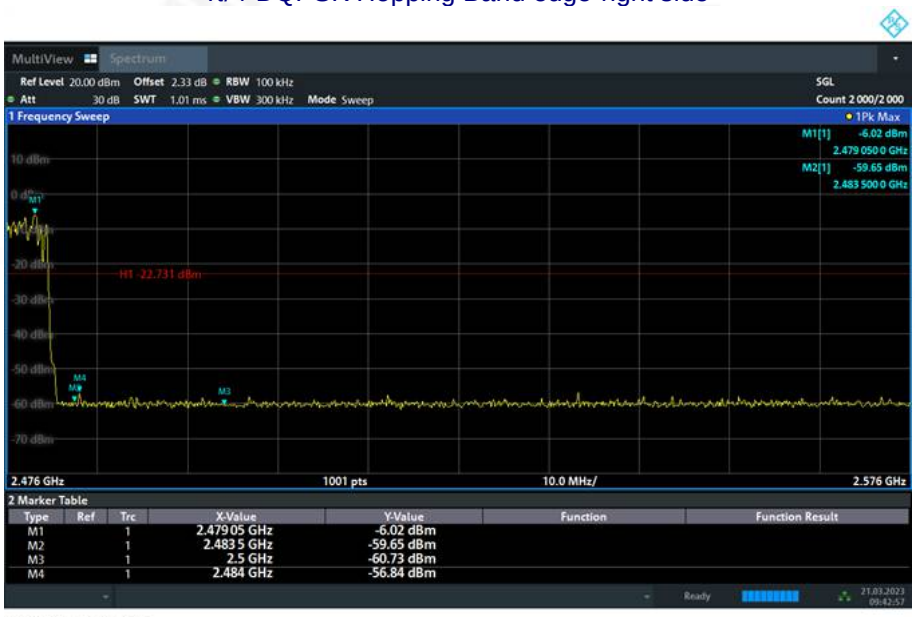
π/4-DQPSK Hopping Band edge-right side



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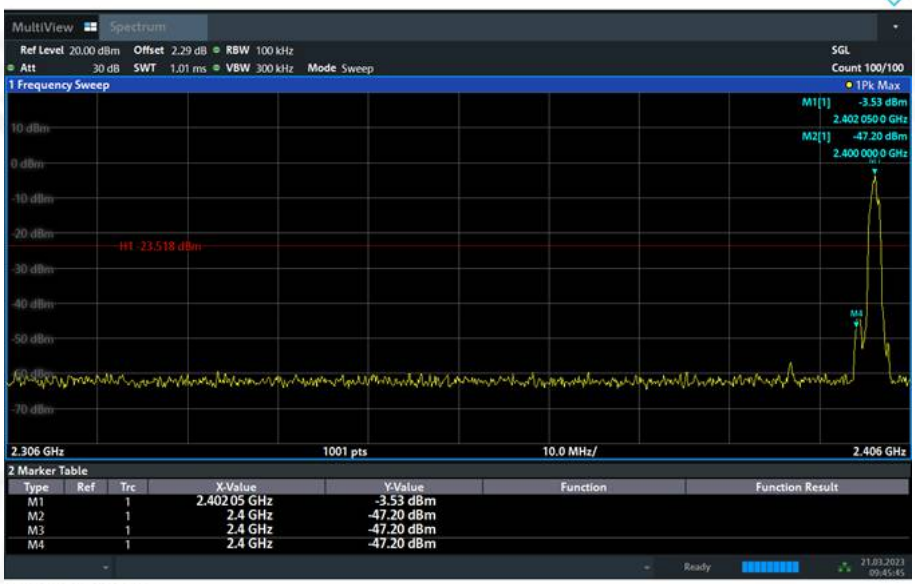
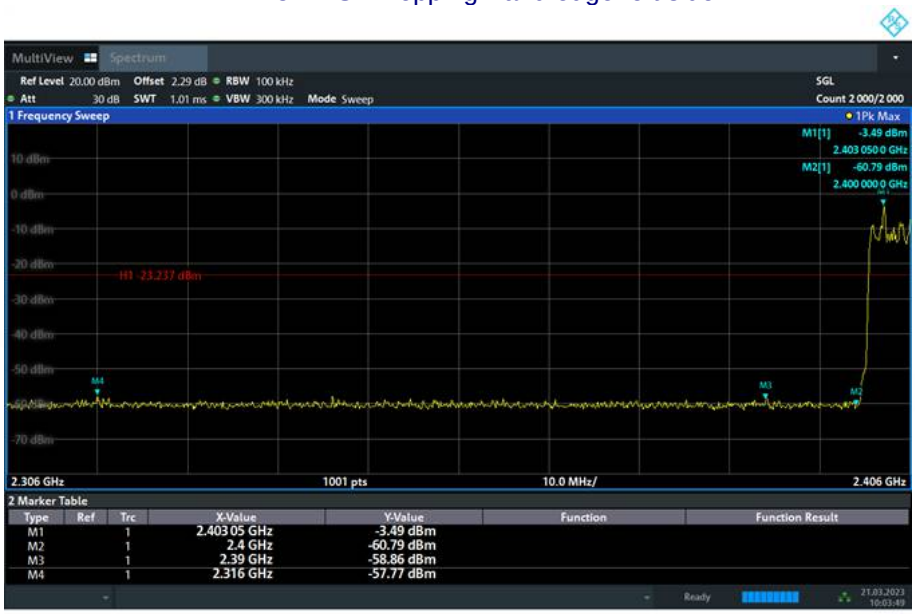
8-DPSK No-hopping Band edge-left side



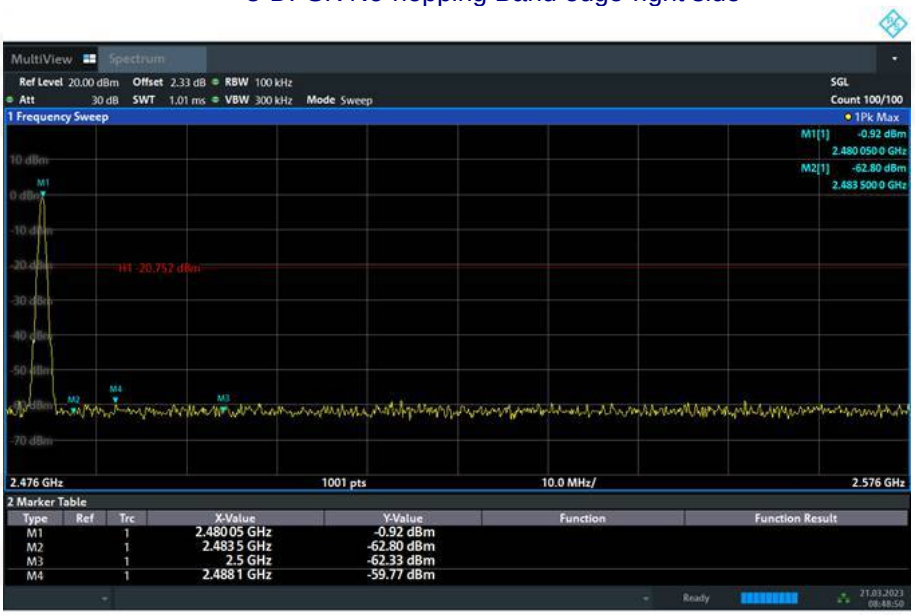
09:45:45 21.03.2023

8-DPSK Hopping Band edge-left side



10:03:49 21.03.2023

8-DPSK No-hopping Band edge-right side



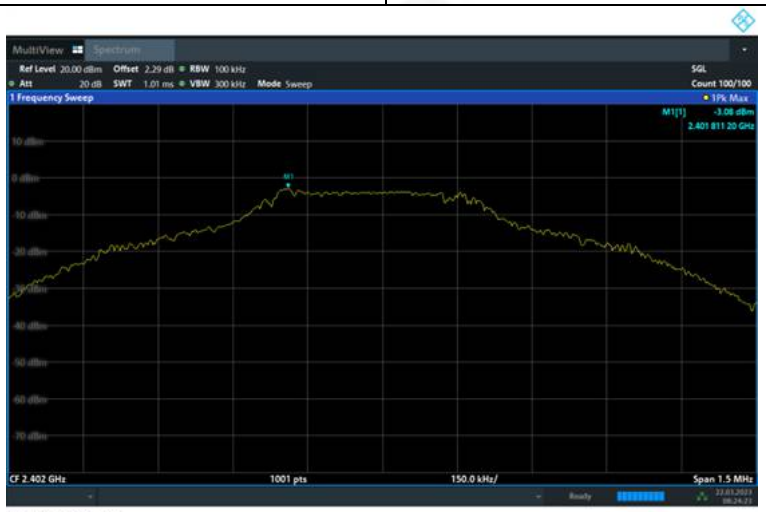
08:48:50 21.03.2023

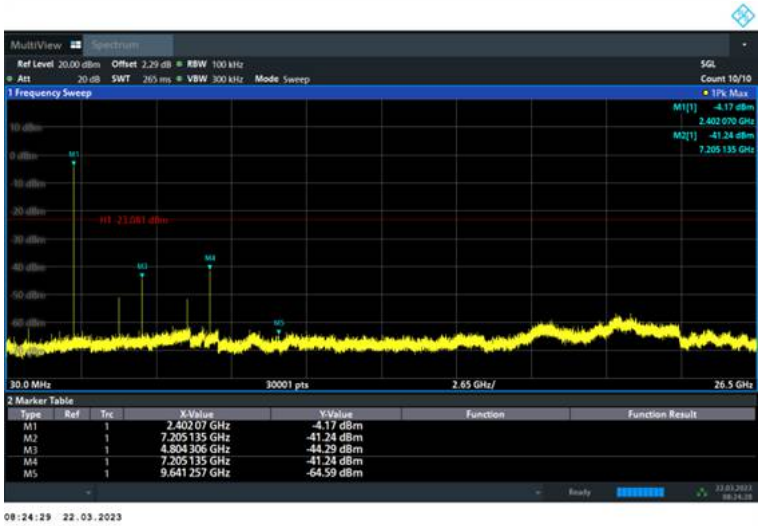
8-DPSK Hopping Band edge-right side

10:19:21 21.03.2023

ANT 2
GFSK mode:

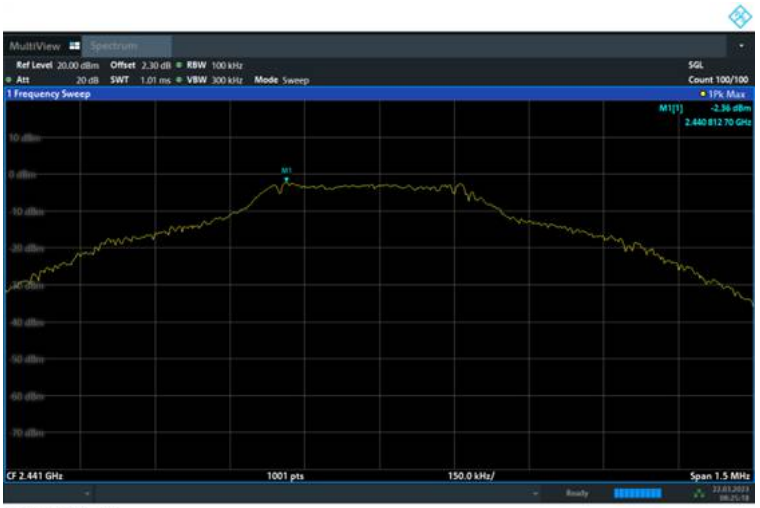
Test channel: 0	Lowest channel

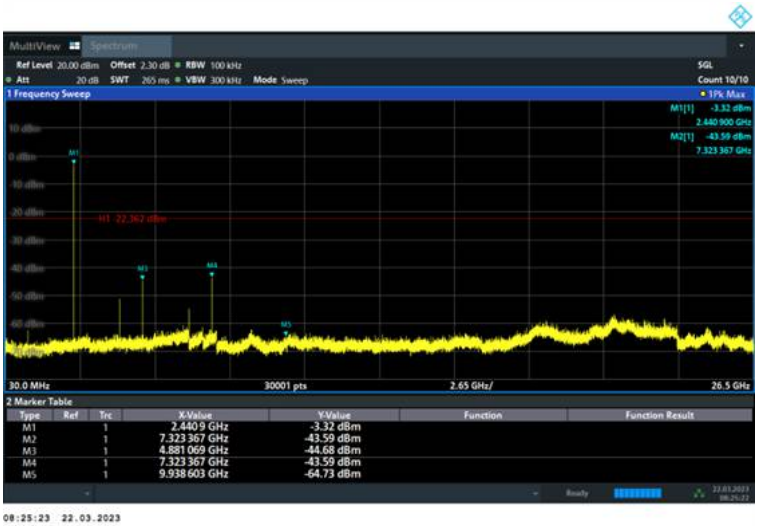




30MHz~26.5GHz

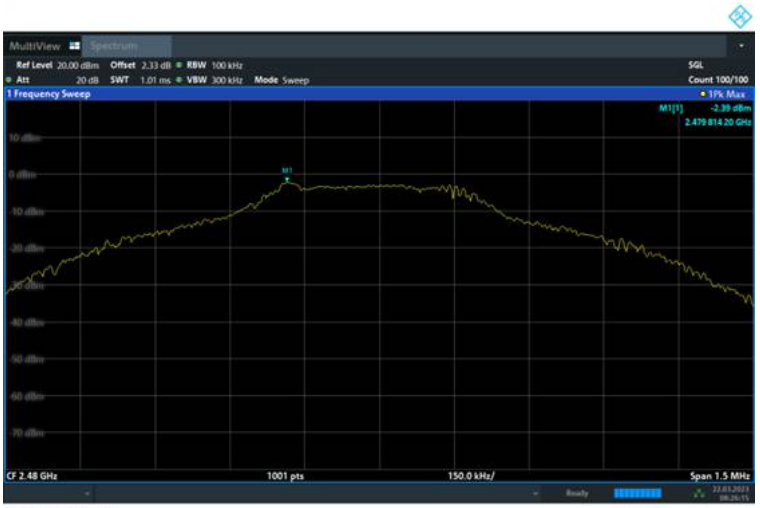
Test channel: 39	Middle channel

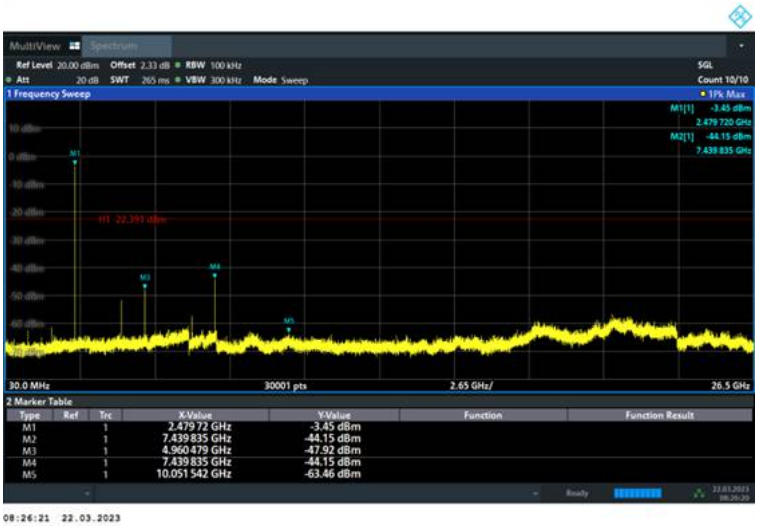




30MHz~26.5GHz

Test channel: 78	Highest channel

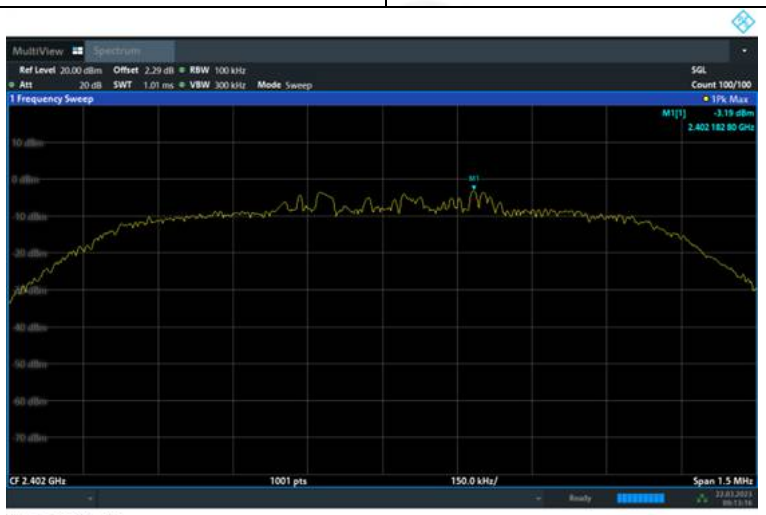


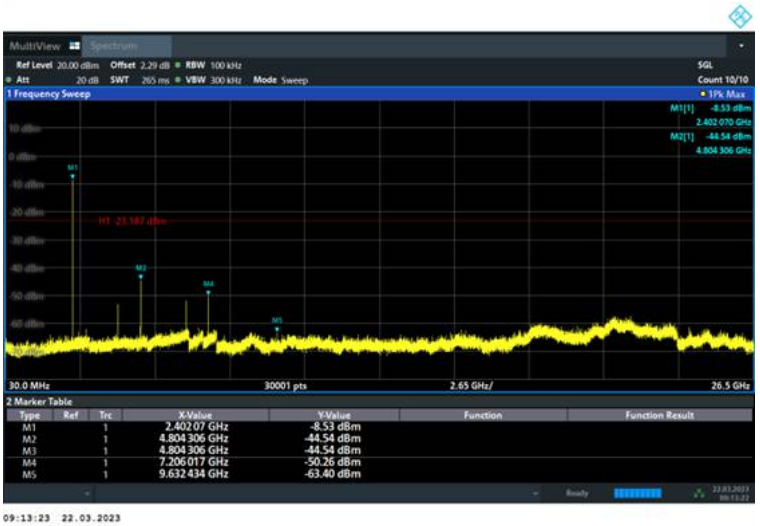


30MHz~26.5GHz

π/4-DQPSK mode:

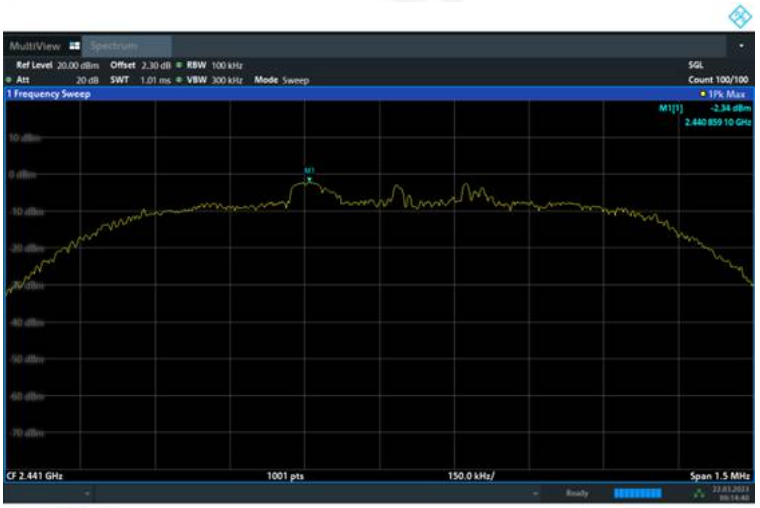
Test channel: 0	Lowest channel

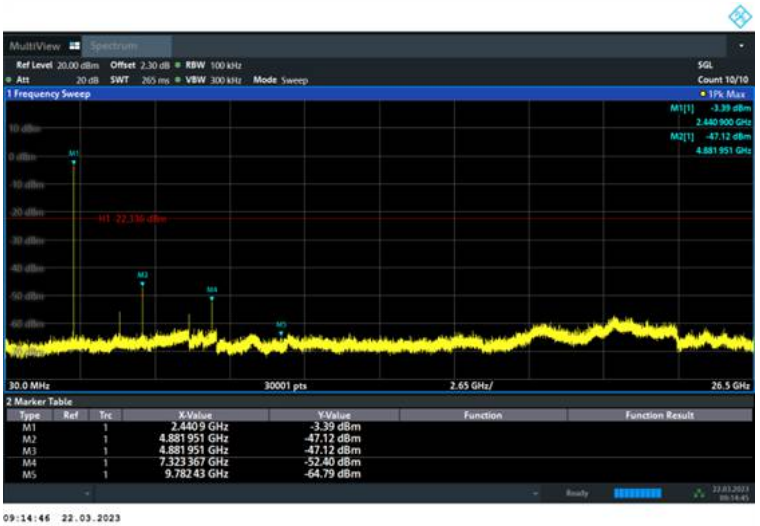




30MHz~26.5GHz

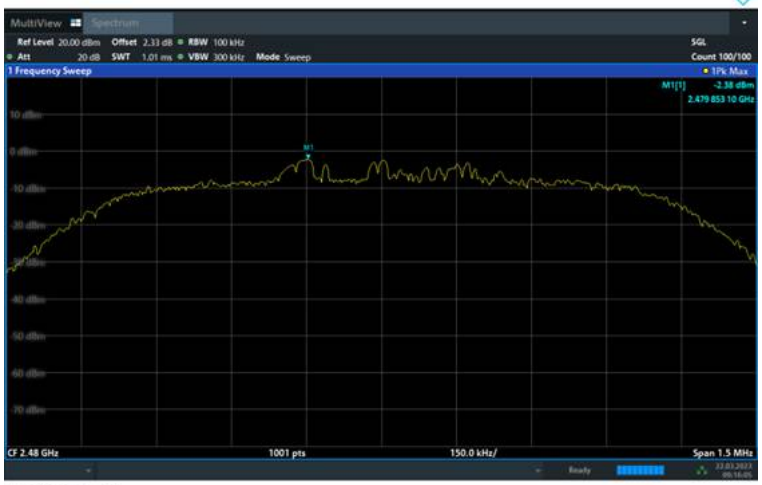
Test channel: 39	Middle channel

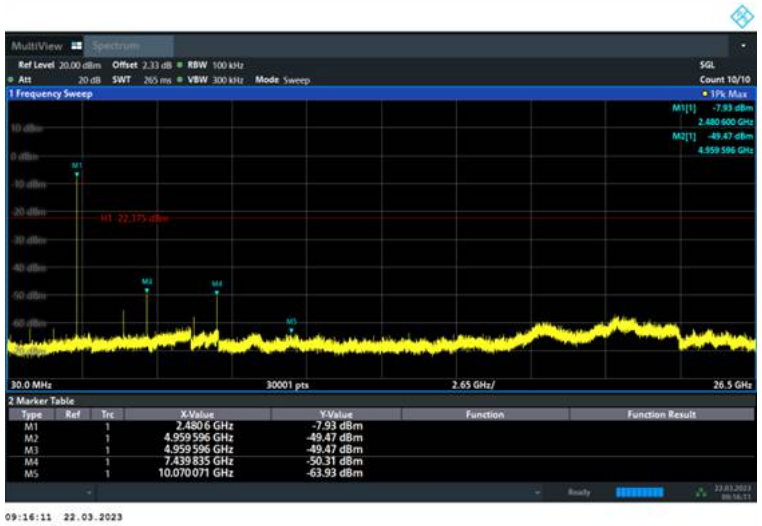




30MHz~26.5GHz

Test channel: 78	Highest channel

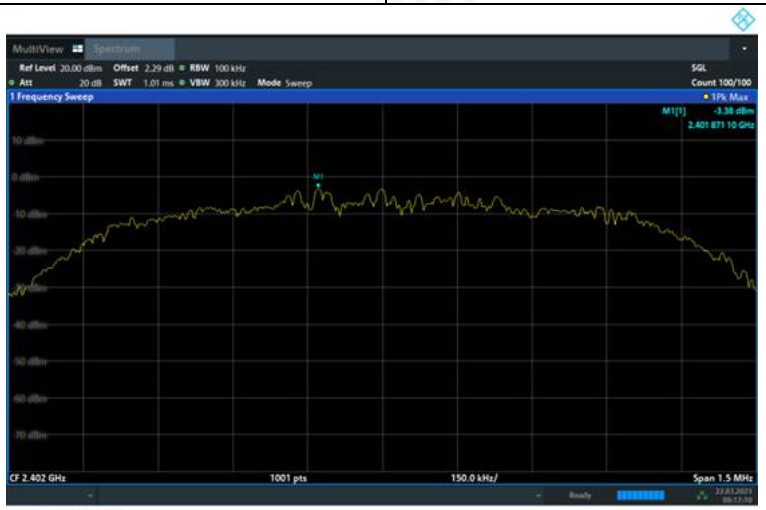


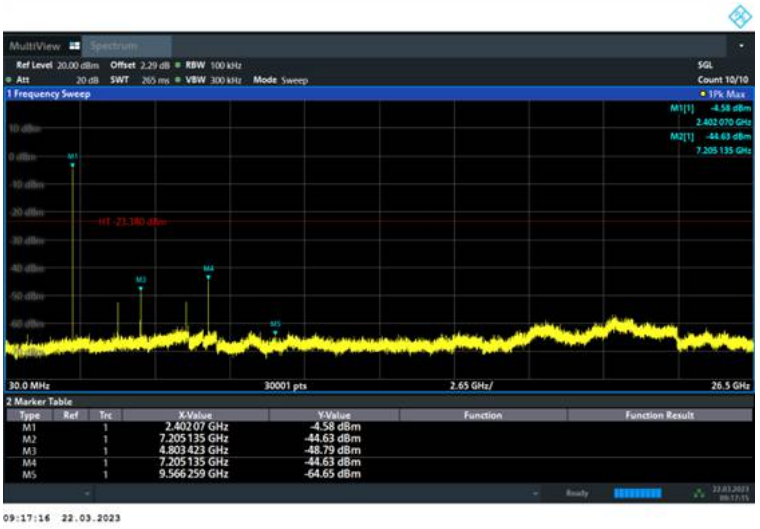


30MHz~26.5GHz

8-DPSK mode:

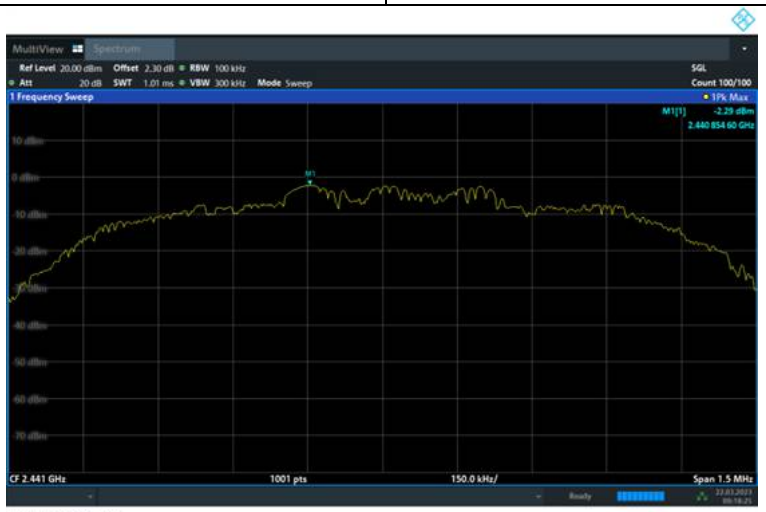
Test channel: 0	Lowest channel

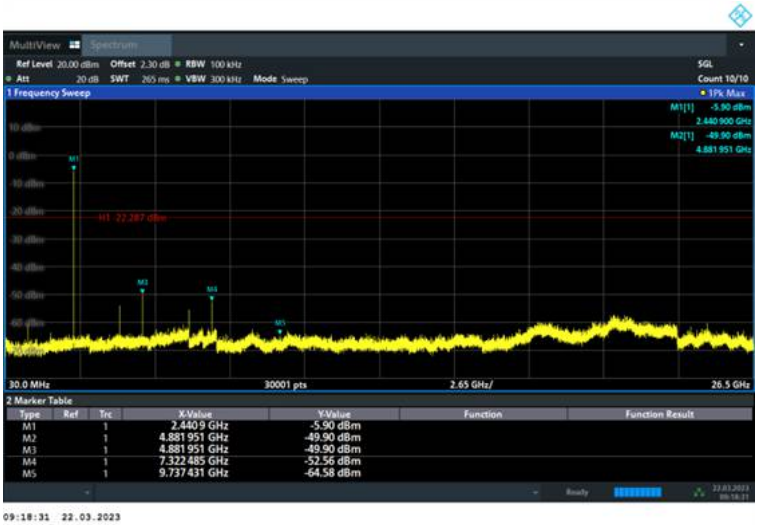




30MHz~26.5GHz

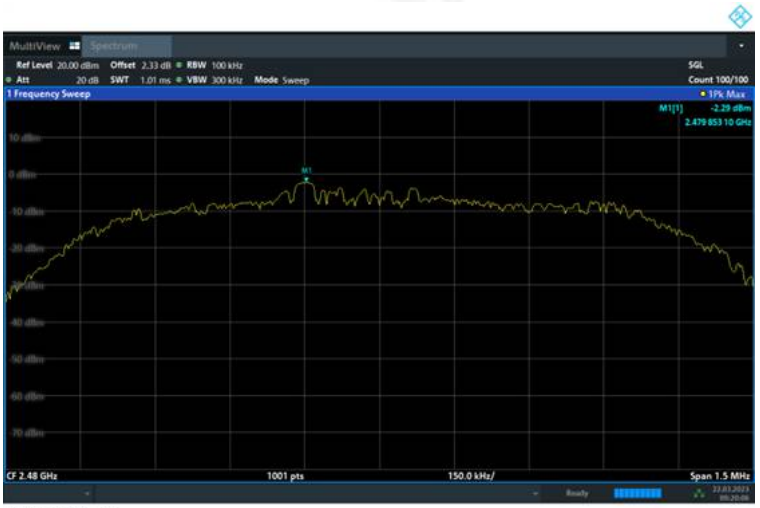
Test channel: 39	Middle channel

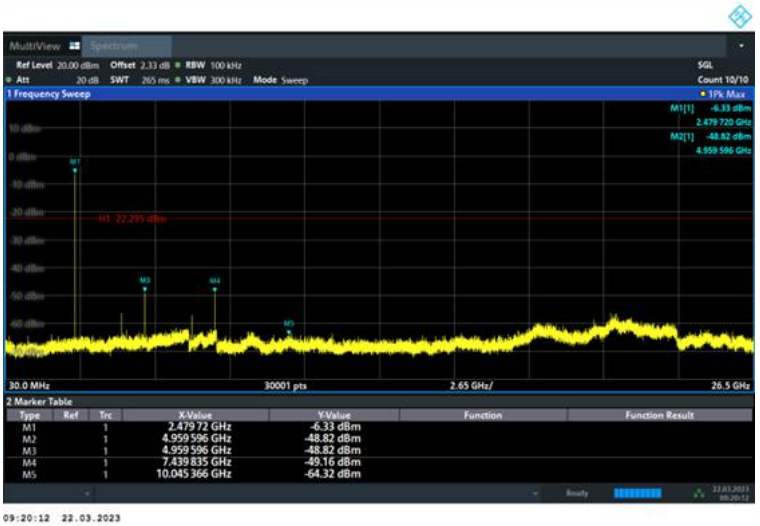




30MHz~26.5GHz

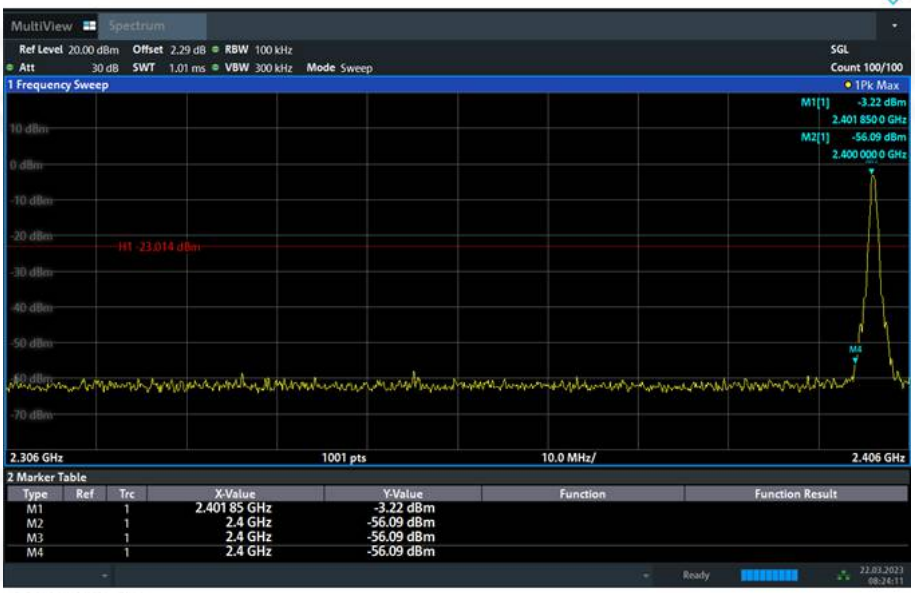
Test channel: 78	Highest channel



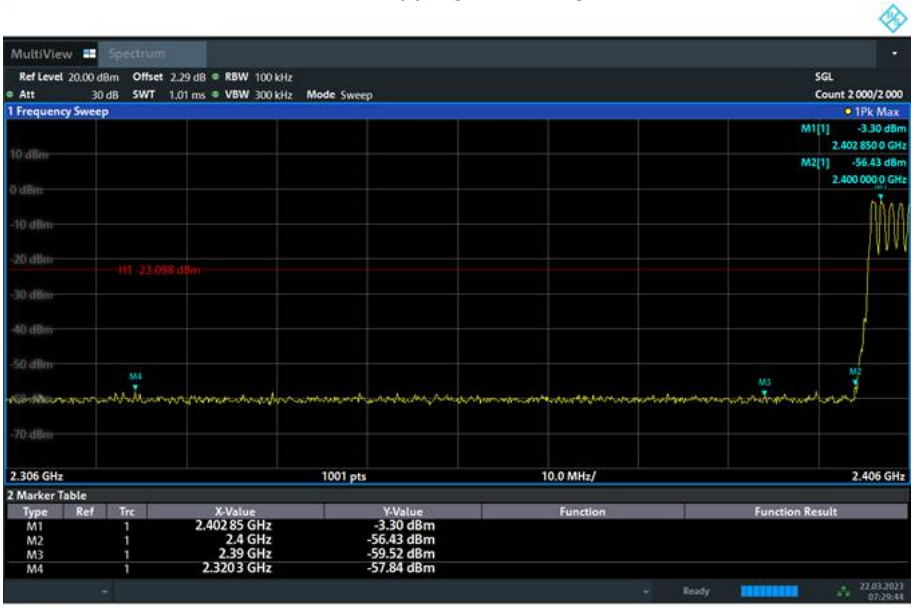


30MHz~26.5GHz

GFSK No-hopping Band edge-left side



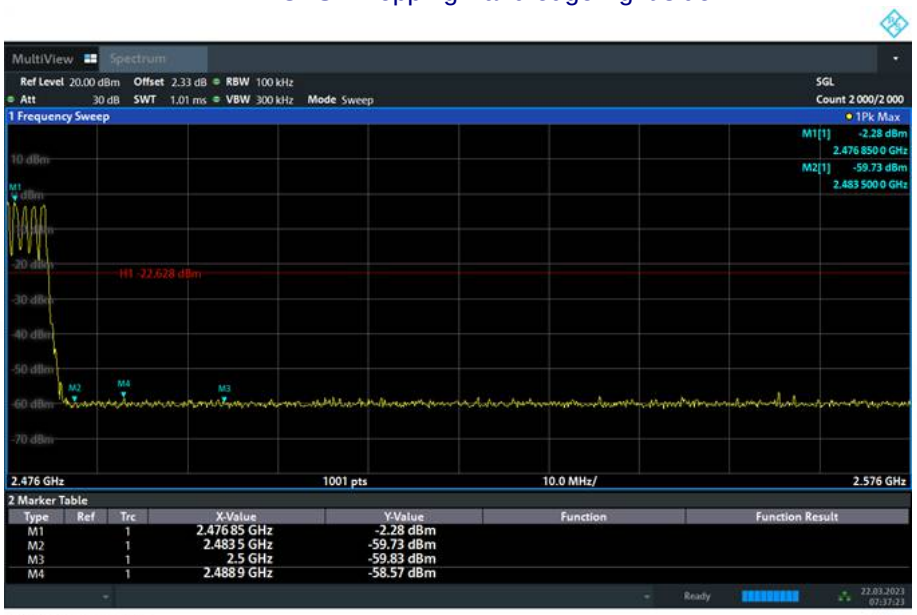
GFSK Hopping Band edge-left side



GFSK No-hopping Band edge-right side

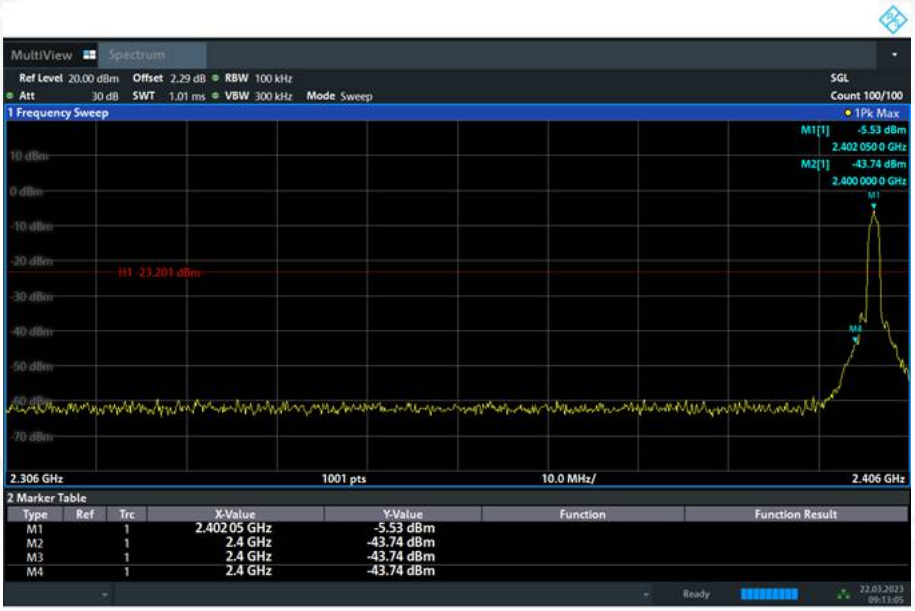
08:26:04 22.03.2023

GFSK Hopping Band edge-right side

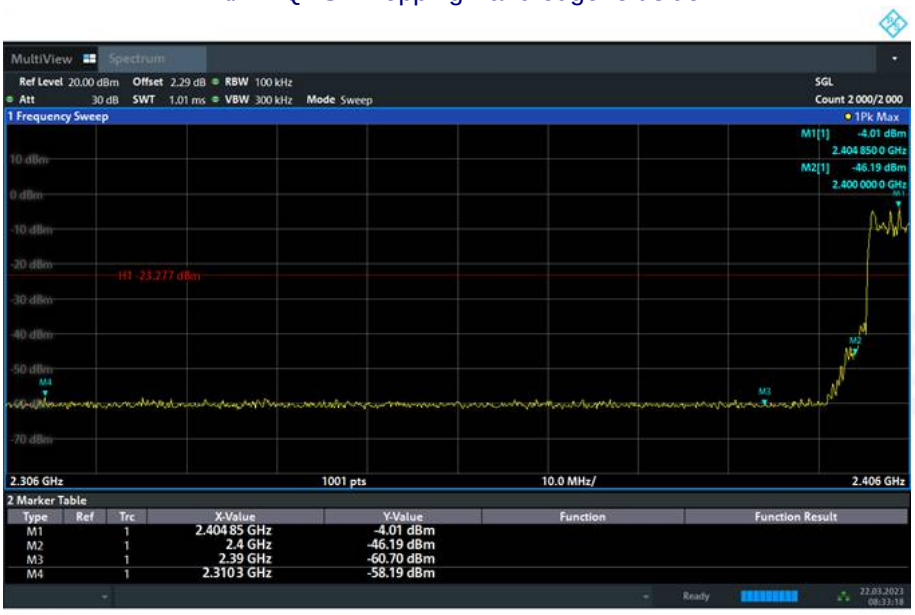


07:37:24 22.03.2023

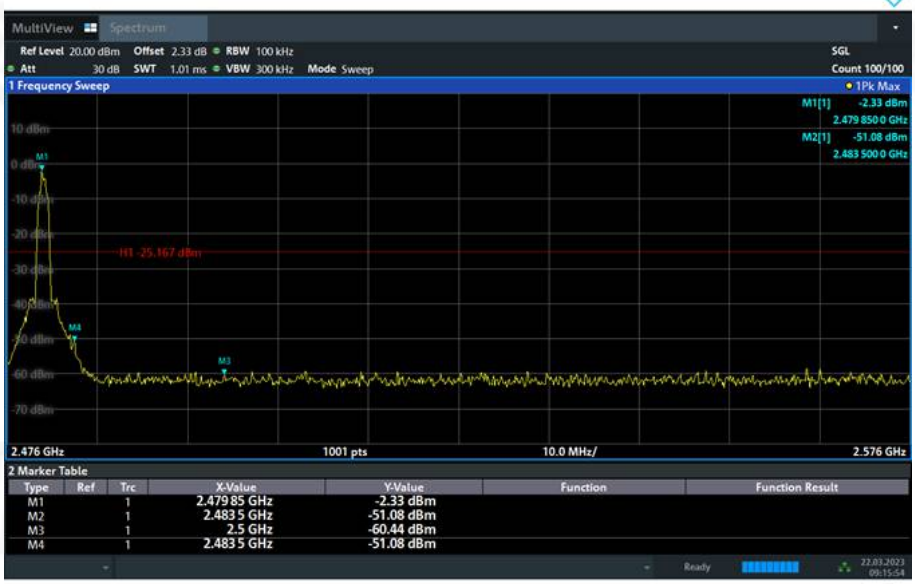
π/4-DQPSK No-hopping Band edge-left side



π/4-DQPSK Hopping Band edge-left side

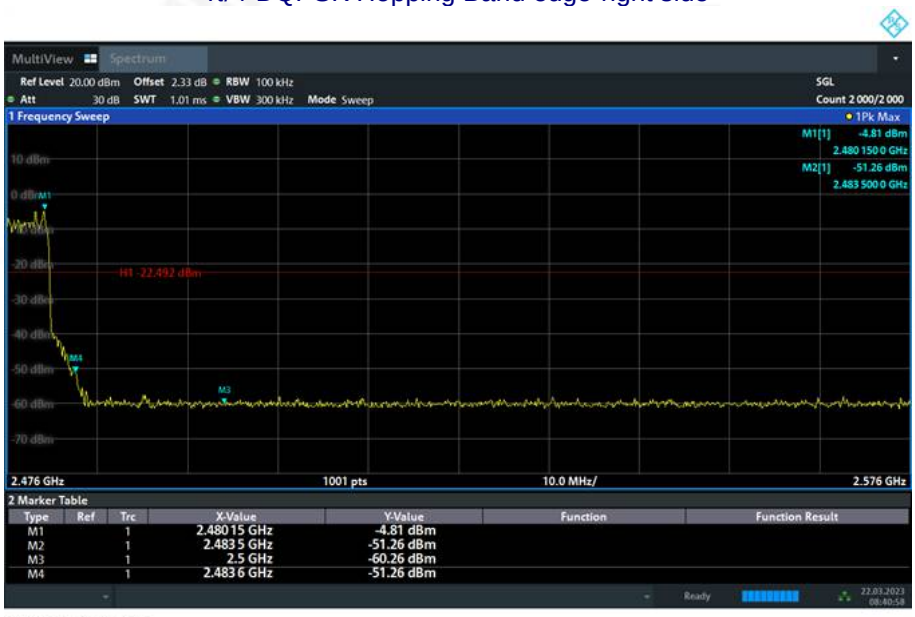


π/4-DQPSK No-hopping Band edge-right side



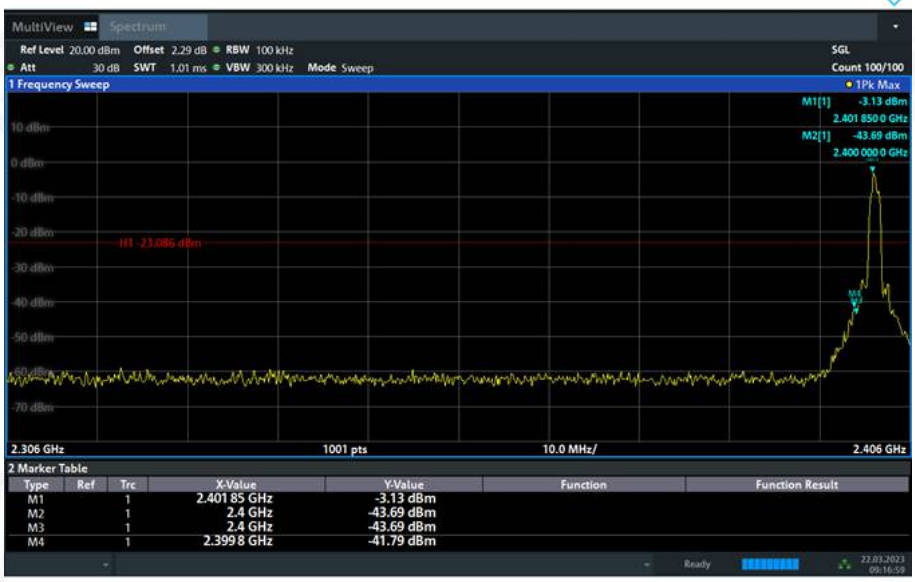
09:15:55 22.03.2023

π/4-DQPSK Hopping Band edge-right side



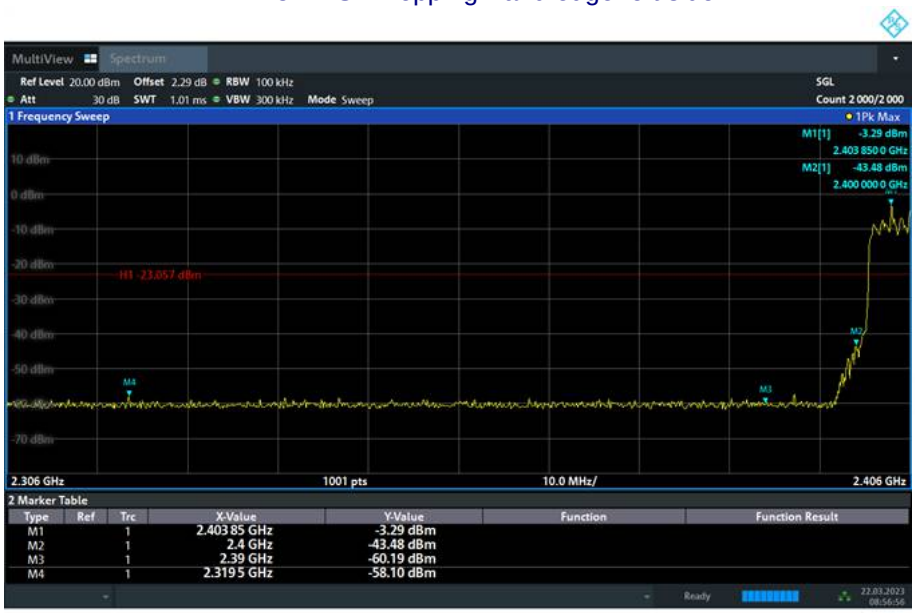
08:40:58 22.03.2023

8-DPSK No-hopping Band edge-left side



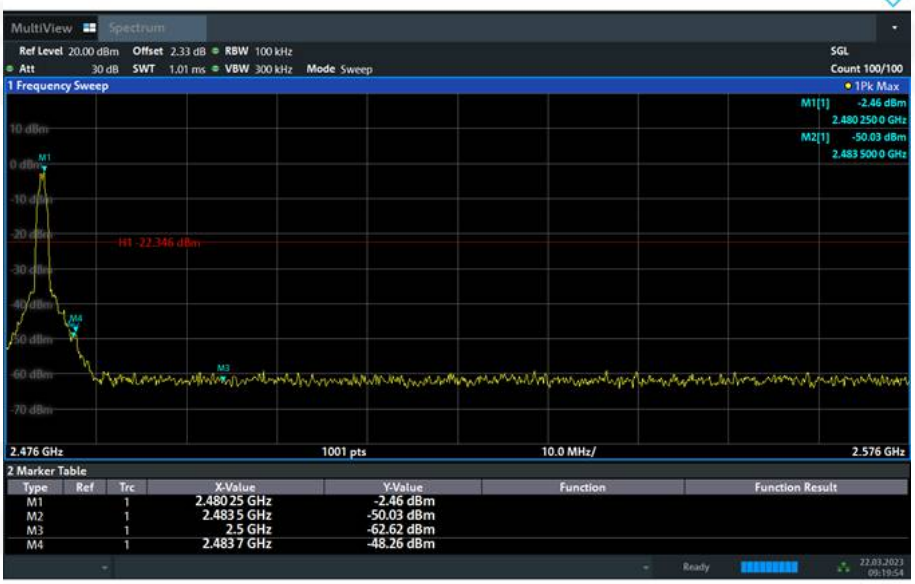
09:16:59 22.03.2023

8-DPSK Hopping Band edge-left side



08:56:56 22.03.2023

8-DPSK No-hopping Band edge-right side



09:19:55 22.03.2023

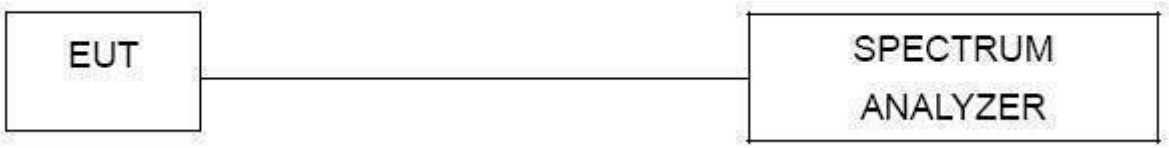
8-DPSK Hopping Band edge-right side

09:04:36 22.03.2023

7. 20DB 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. The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram above.
2. Spectrum Setting:
Bandwidth: RBW=30 kHz, VBW=100 kHz, detector= Peak

7.4 DEVIATION FROM STANDARD

No deviation.

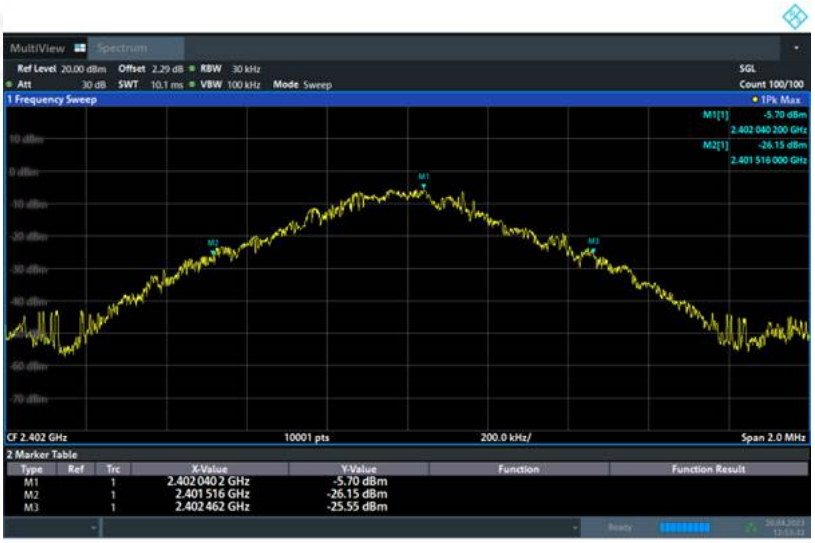
7.5 Test Result

ANT 1

Mode	Test channel	20dB Emission Bandwidth (MHz)	Result
GFSK	Lowest	0.946	Pass
	Middle	0.942	
	Highest	0.946	
π/4-DQPSK	Lowest	1.235	Pass
	Middle	1.22	
	Highest	1.251	
8-DPSK	Lowest	1.243	Pass
	Middle	1.243	
	Highest	1.239	

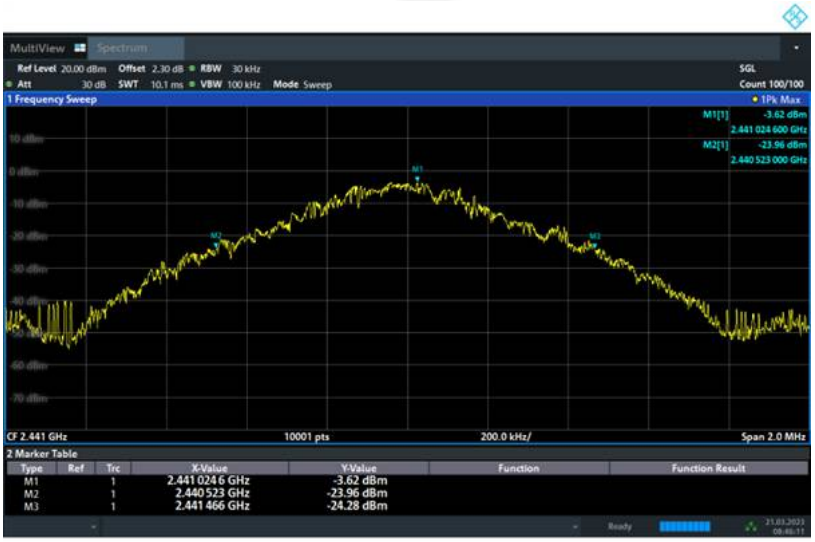
Test plots

GFSK Low Channel



12:53:32 20.04.2023

GFSK Middle Channel



08:46:11 21.03.2023

GFSK High Channel

08:48:46 21.03.2023

π/4-DQPSK Low Channel

π/4-DQPSK Middle Channel

π/4-DQPSK High Channel

8-DPSK Low Channel

09:45:41 21.03.2023

8-DPSK Middle Channel

10:15:29 21.03.2023

8-DPSK High Channel

10:16:20 21.03.2023

ANT 2

Mode	Test channel	20dB Emission Bandwidth (MHz)	Result
GFSK	Lowest	1.037	Pass
	Middle	1.035	
	Highest	1.035	
π/4-DQPSK	Lowest	1.229	Pass
	Middle	1.23	
	Highest	1.225	
8-DPSK	Lowest	1.252	Pass
	Middle	1.25	
	Highest	1.249	

Test plots

GFSK Low Channel

13:04:02 20.04.2023

GFSK Middle Channel

08:25:15 22.03.2023

GFSK High Channel

08:26:00 22.03.2023

π/4-DQPSK Low Channel

09:13:02 22.03.2023

π/4-DQPSK Middle Channel

09:14:37 22.03.2023

π/4-DQPSK High Channel

09:15:51 22.03.2023

8-DPSK Low Channel

09:16:55 22.03.2023

8-DPSK Middle Channel

09:18:23 22.03.2023

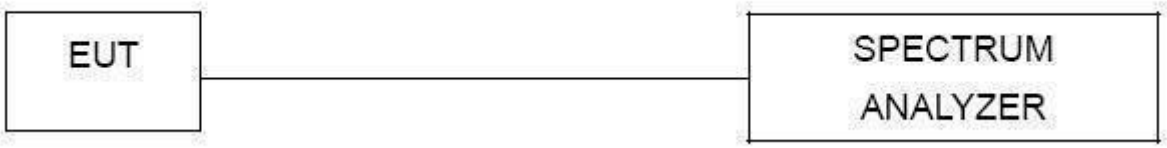
8-DPSK High Channel

09:19:51 22.03.2023

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 π/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 =10MHz. Sweep = auto; Detector Function = Peak.

3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max value.

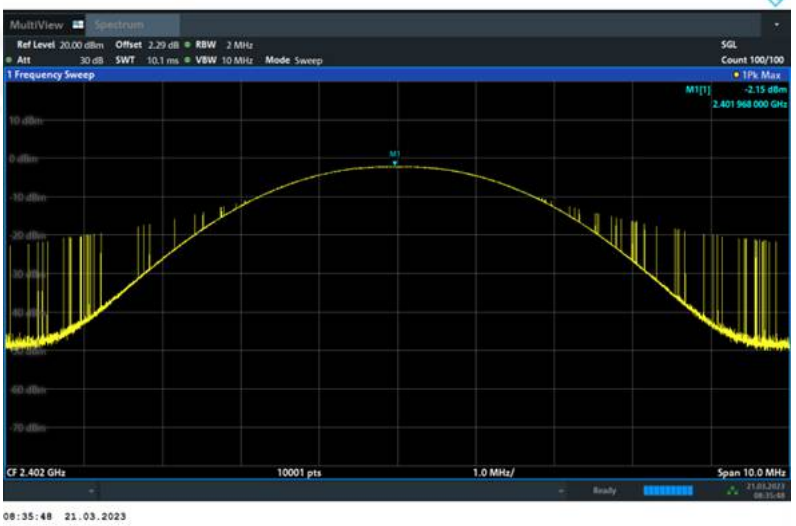
8.4 DEVIATION FROM STANDARD
No deviation.

8.5 Test Result
ANT 1

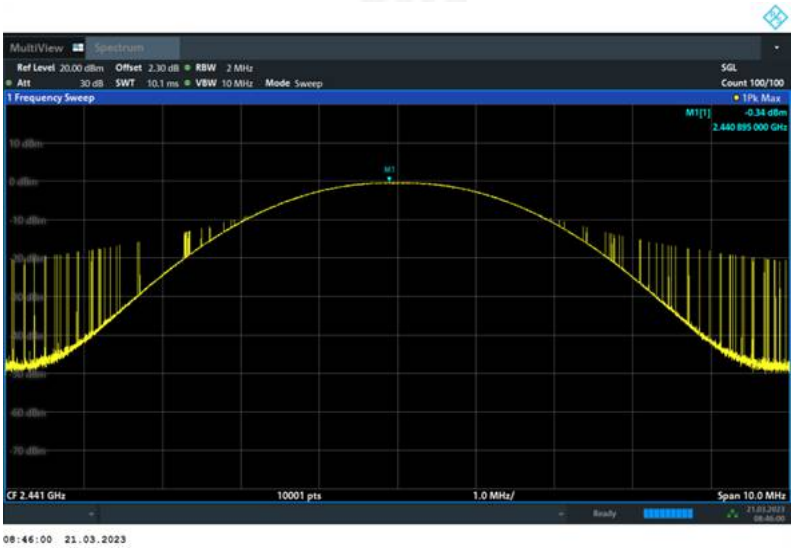
Mode	Test channel	Peak Output Power (dBm)	FCC Limit (dBm)	Result
GFSK	Lowest	-2.15	30.00	Pass
	Middle	-0.34		
	Highest	0.22		
π/4-DQPSK	Lowest	-2.47	30.00	Pass
	Middle	-0.43		
	Highest	0.15		
8-DPSK	Lowest	-2.48	30.00	Pass
	Middle	-0.41		
	Highest	0.18		

Test plots

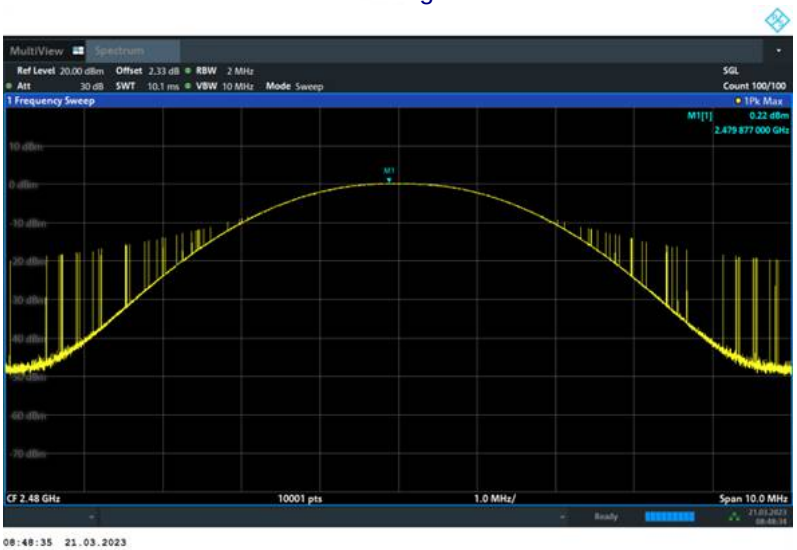
GFSK Low Channel



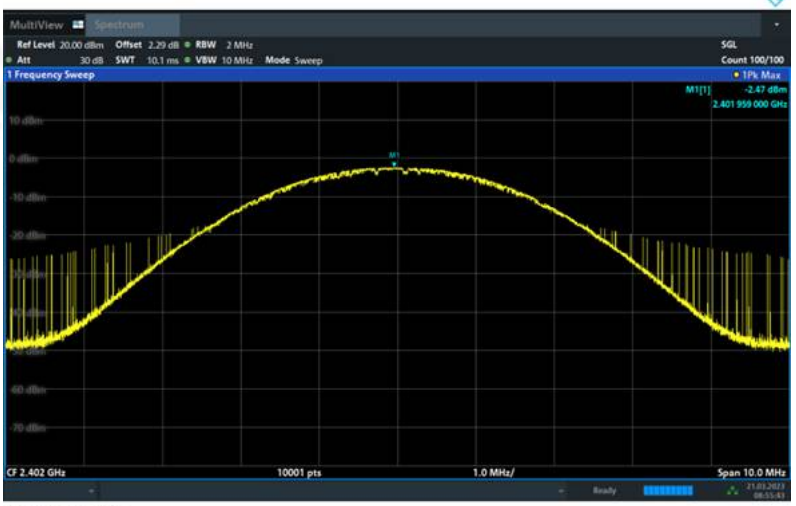
GFSK Middle Channel



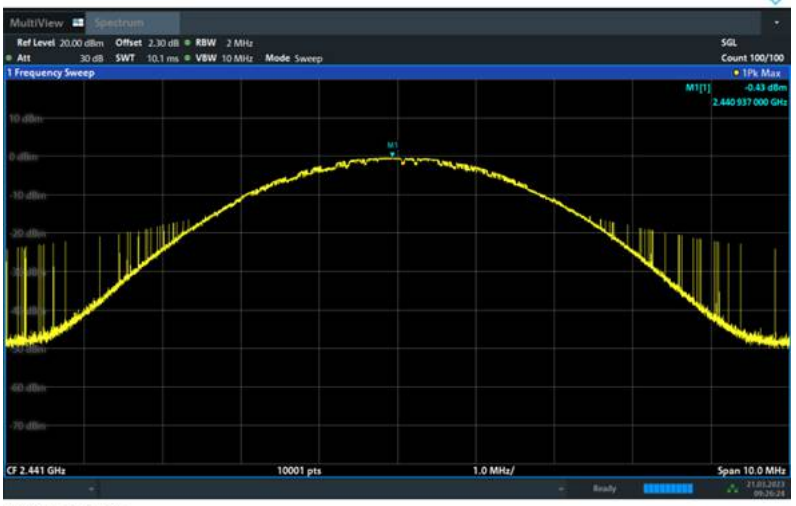
GFSK High Channel



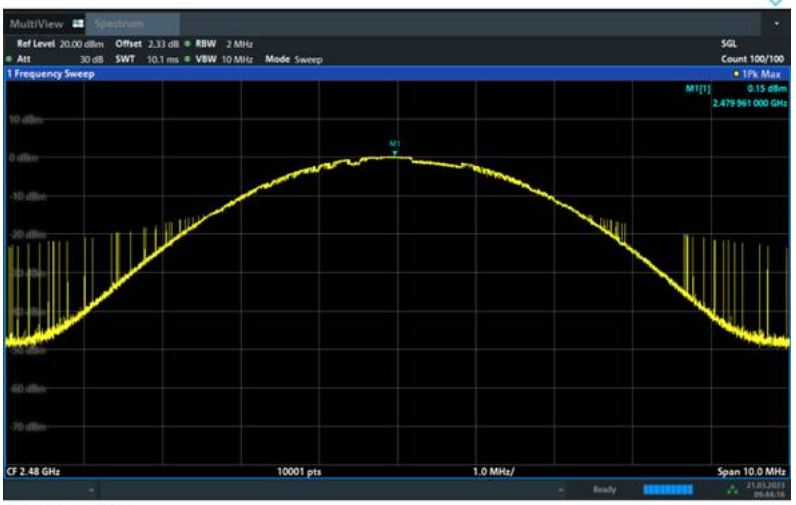
π/4-DQPSK Low Channel



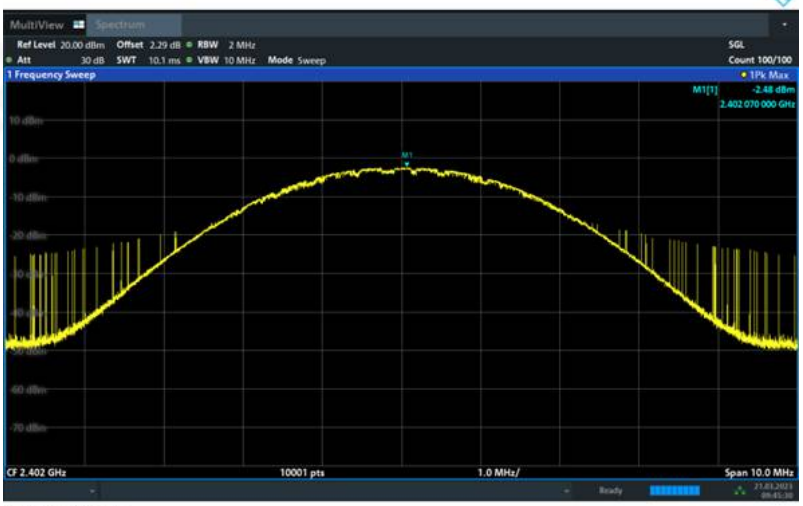
π/4-DQPSK Middle Channel



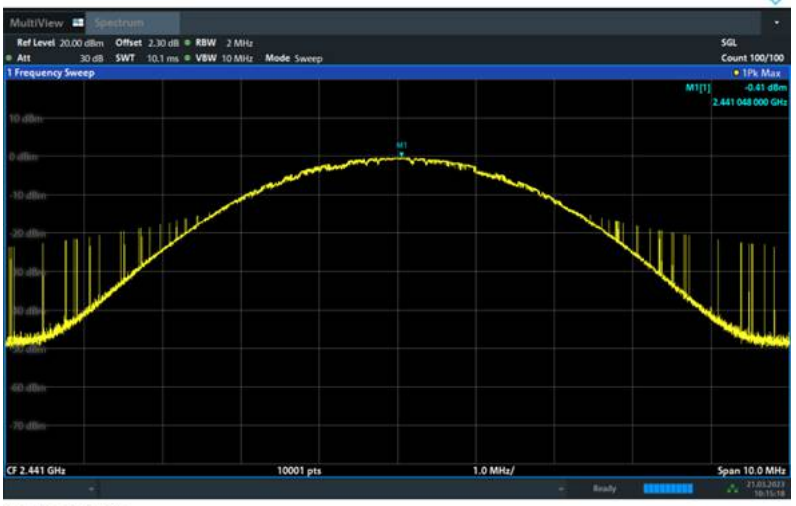
π/4-DQPSK High Channel



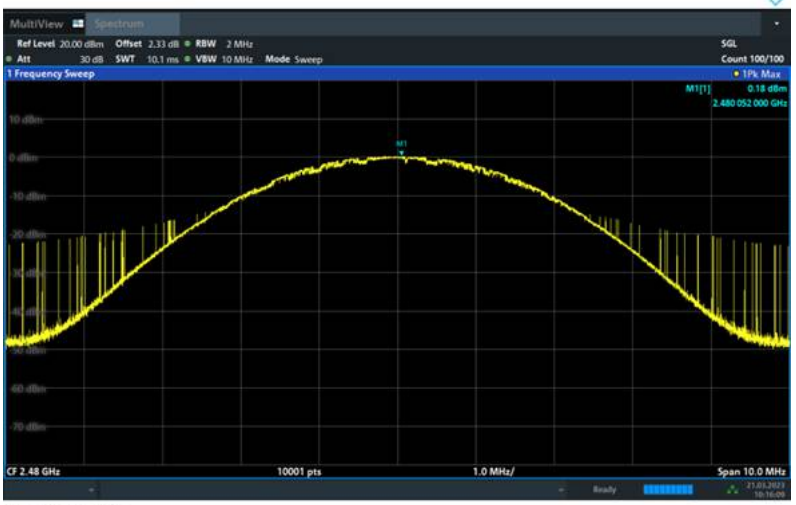
8-DPSK Low Channel



8-DPSK Middle Channel



8-DPSK High Channel

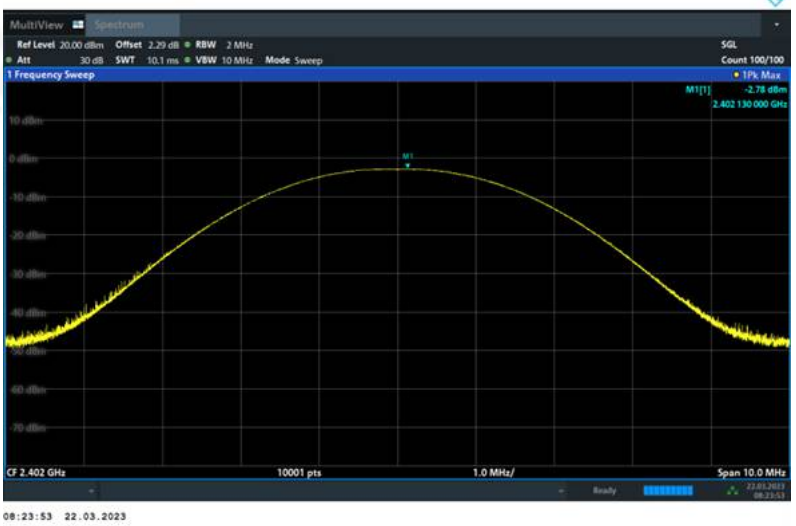


ANT 2

Mode	Test channel	Peak Output Power (dBm)	FCC Limit (dBm)	Result
GFSK	Lowest	-2.78	21.00	Pass
	Middle	-2.05		
	Highest	-2.11		
π/4-DQPSK	Lowest	-2.78	21.00	Pass
	Middle	-2.07		
	Highest	-2.13		
8-DPSK	Lowest	-2.75	21.00	Pass
	Middle	-2.05		
	Highest	-2.08		

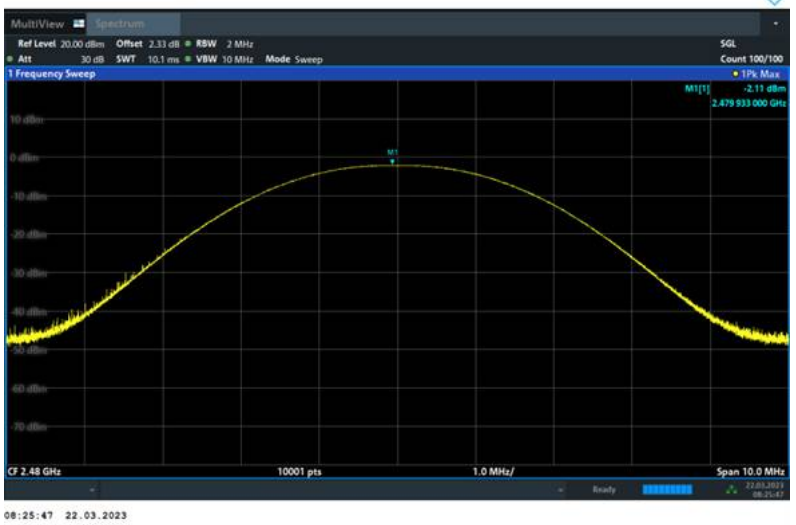
Test plots

GFSK Low Channel

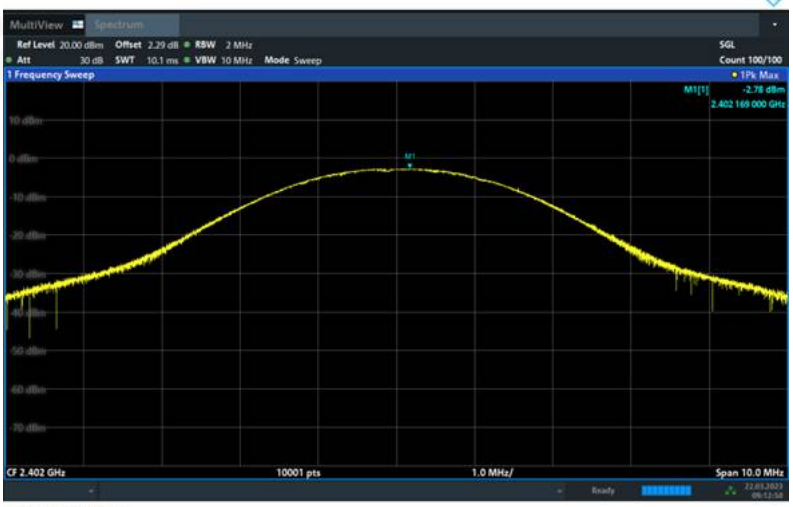


GFSK Middle Channel

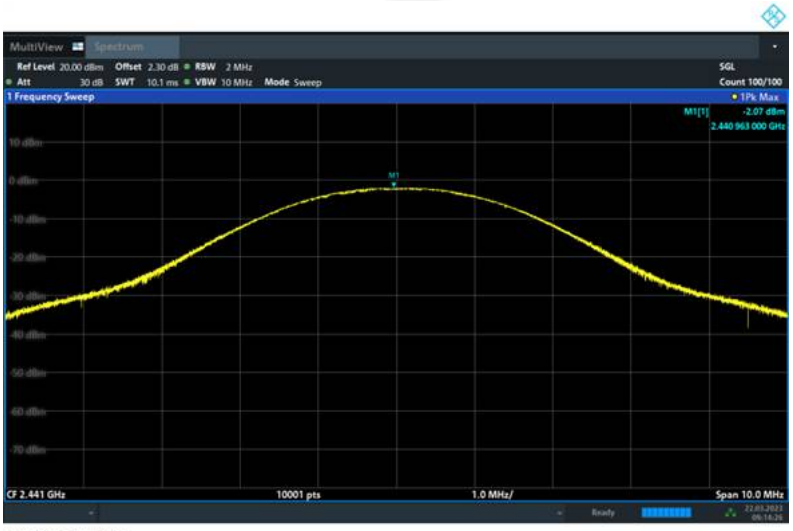
GFSK High Channel



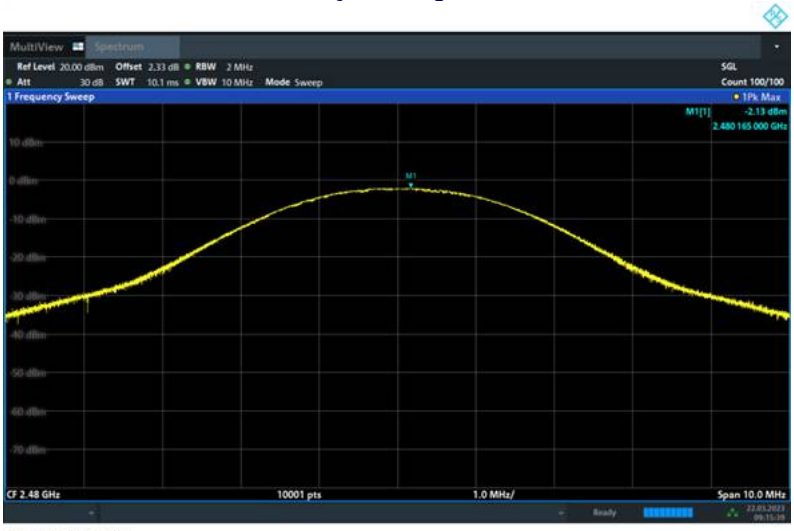
π/4-DQPSK Low Channel



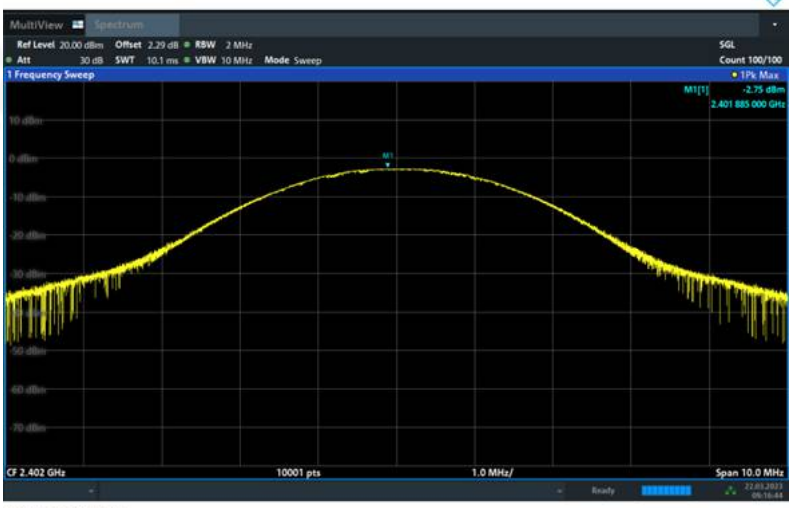
π/4-DQPSK Middle Channel



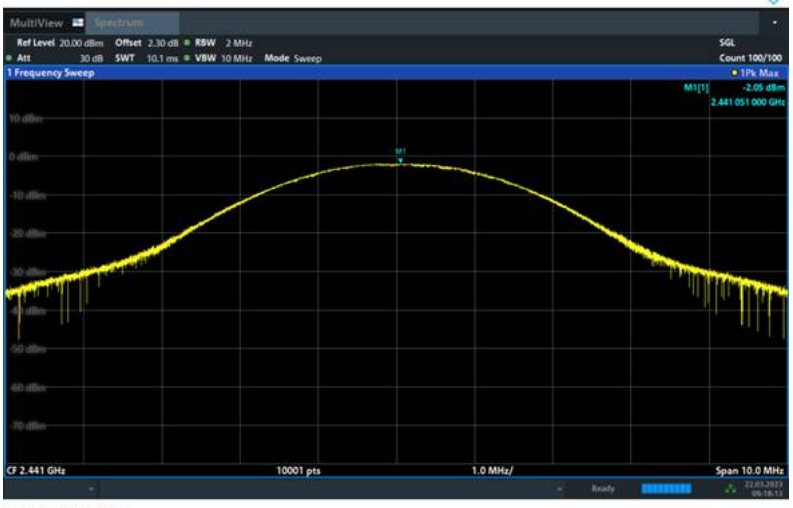
π/4-DQPSK High Channel



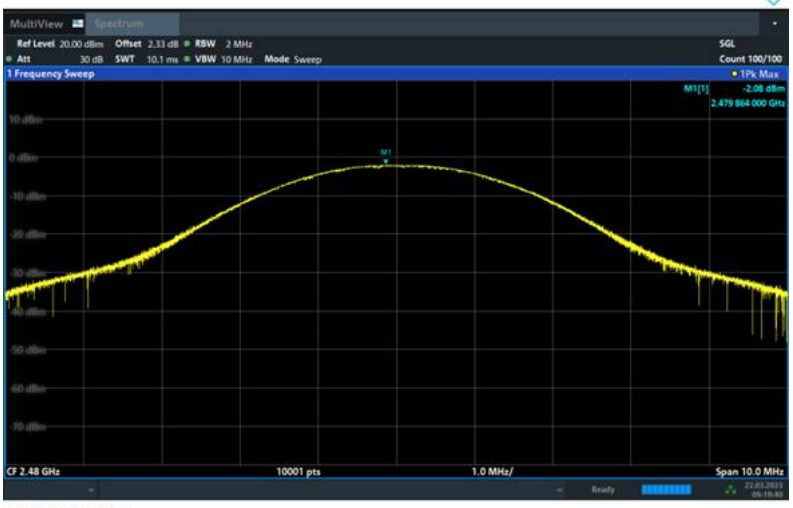
8-DPSK Low Channel



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 π/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

ANT 1

Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	0.998	0.631	PASS
GFSK	Middle	0.984	0.628	PASS
GFSK	High	1	0.631	PASS
π/4-DQPSK	Low	0.99	0.823	PASS
π/4-DQPSK	Middle	0.984	0.813	PASS
π/4-DQPSK	High	1.006	0.834	PASS
8-DPSK	Low	0.996	0.829	PASS
8-DPSK	Middle	1	0.829	PASS
8-DPSK	High	1.002	0.826	PASS

Test plots

GFSK Low Channel

GFSK Middle Channel

10:08:56 20.04.2023

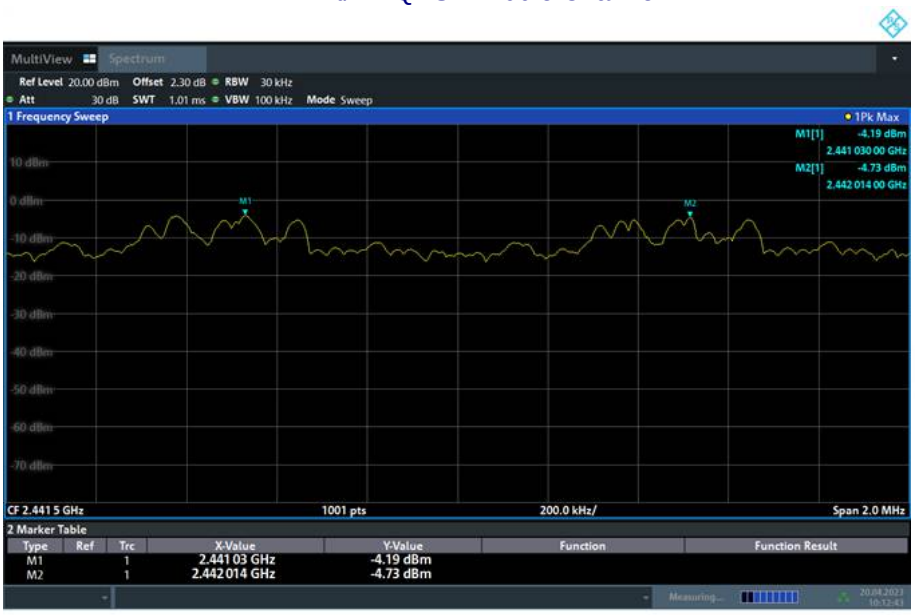
GFSK High Channel

10:05:26 20.04.2023

π/4-DQPSK Low Channel

09:00:03 21.03.2023

π/4-DQPSK Middle Channel



10:12:43 20.04.2023

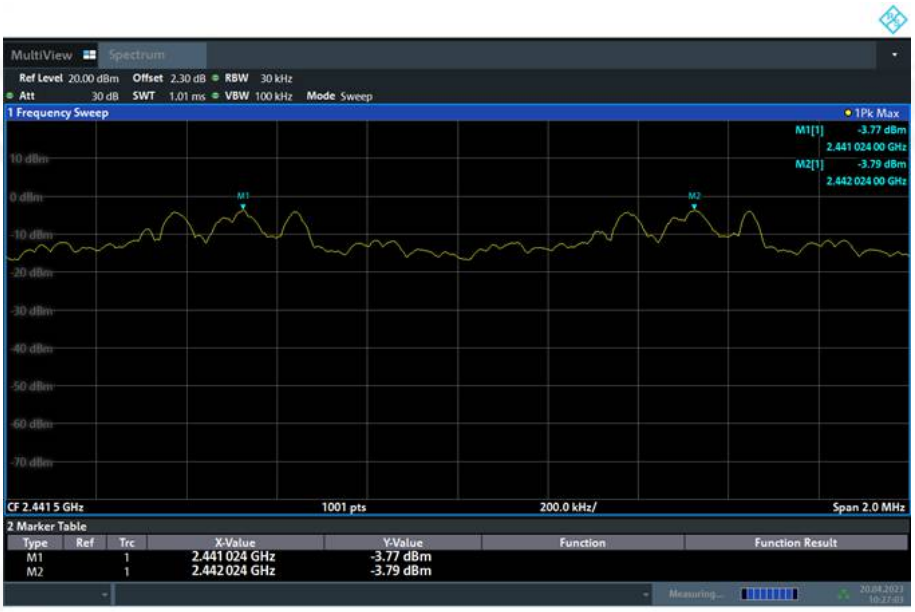
π/4-DQPSK High Channel

10:34:07 20.04.2023

8-DPSK Low Channel

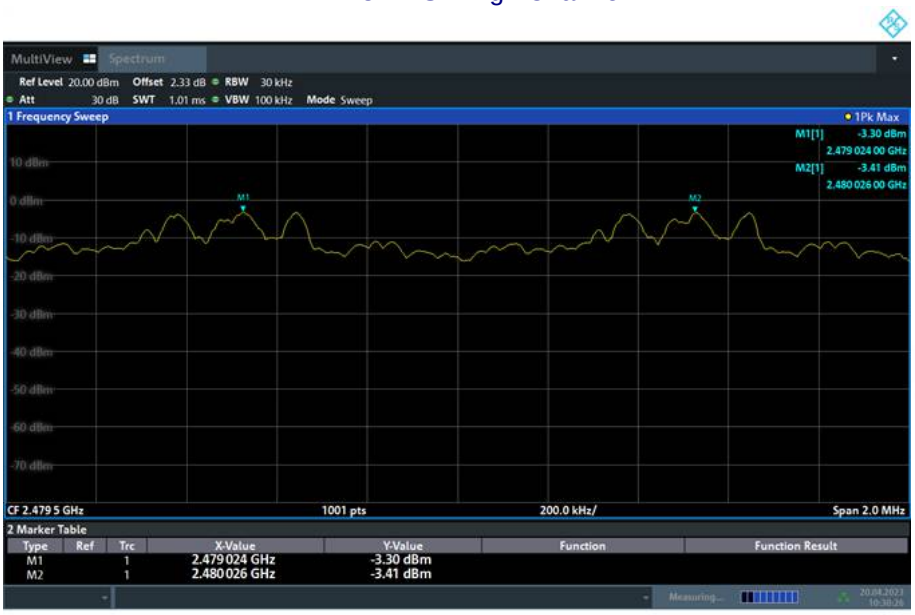
10:14:04 21.03.2023

8-DPSK Middle Channel



10:27:03 20.04.2023

8-DPSK High Channel



10:30:26 20.04.2023

ANT 2

Modulation	Test Channel	Separation (MHz)	Limit(MHz)	Result
GFSK	Low	1.004	0.691	PASS
GFSK	Middle	1.004	0.690	PASS
GFSK	High	1	0.690	PASS
π/4-DQPSK	Low	1.006	0.819	PASS
π/4-DQPSK	Middle	0.998	0.820	PASS
π/4-DQPSK	High	1	0.817	PASS
8-DPSK	Low	0.994	0.835	PASS
8-DPSK	Middle	1	0.833	PASS
8-DPSK	High	1.008	0.833	PASS

Test plots

GFSK Low Channel

07:25:28 22.03.2023

GFSK Middle Channel

07:33:44 22.03.2023

GFSK High Channel

07:41:24 22.03.2023

π/4-DQPSK Low Channel

08:30:44 22.03.2023

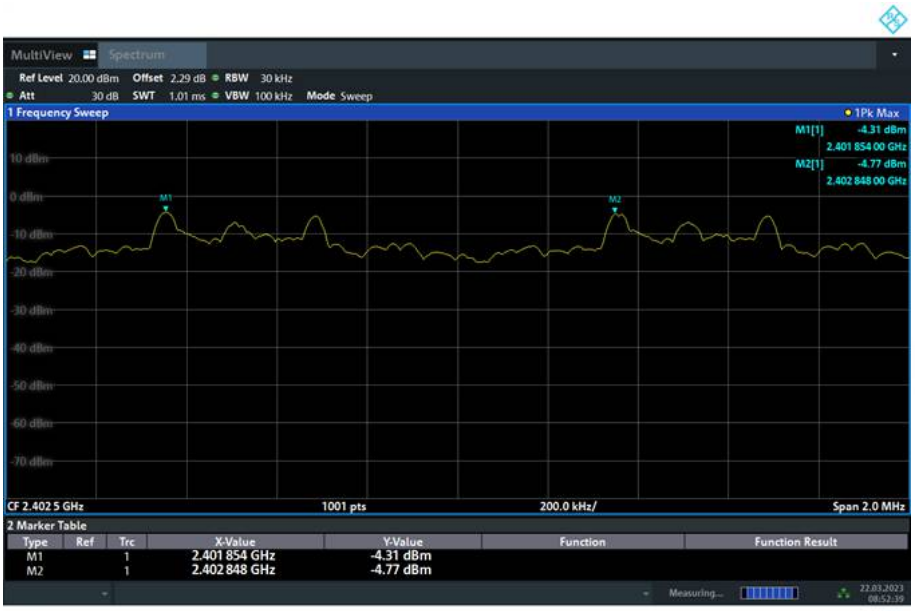
π/4-DQPSK Middle Channel

08:37:19 22.03.2023

π/4-DQPSK High Channel

08:44:58 22.03.2023

8-DPSK Low Channel



08:52:40 22.03.2023

8-DPSK Middle Channel

09:00:57 22.03.2023

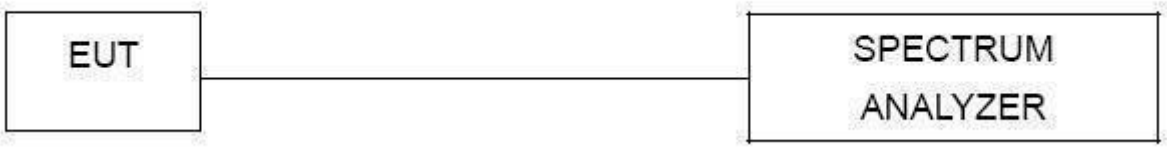
8-DPSK High Channel

09:08:35 22.03.2023

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;

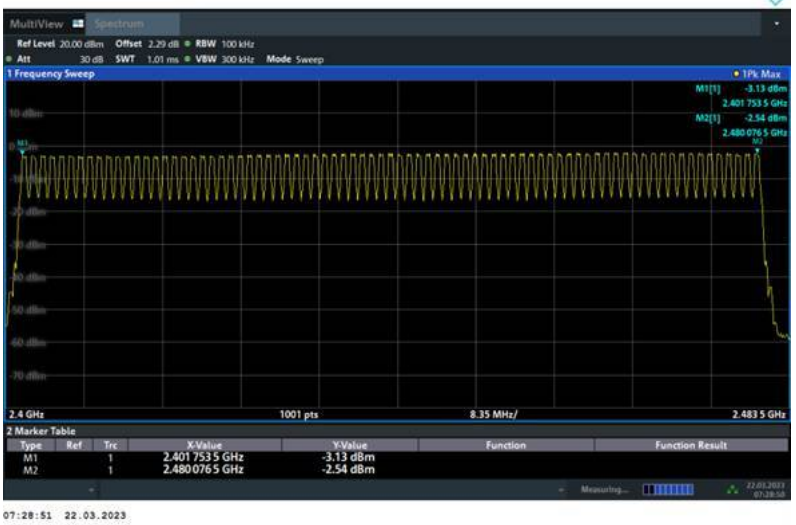
10.3 DEVIATION FROM STANDARD

No deviation.

10.4 Test Result

ANT 1
Test Plots:

79 Channels in total
GFSK



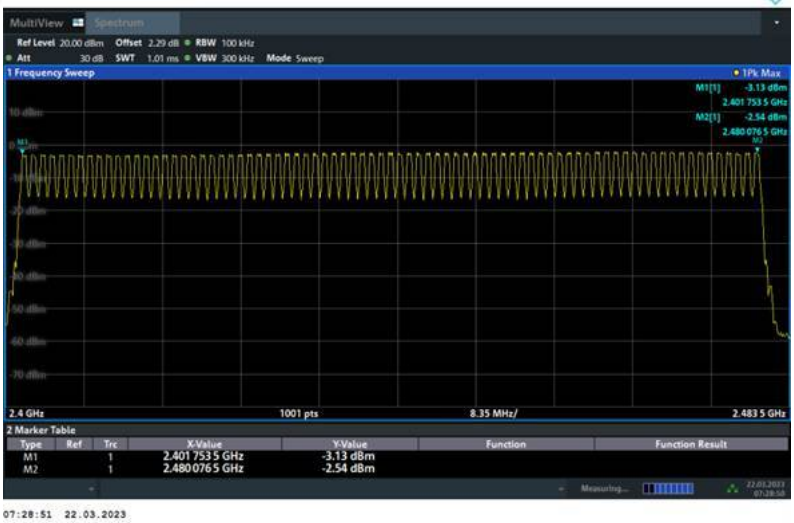
π/4-DQPSK

8-DPSK

ANT 2

Test Plots:

79 Channels in total
GFSK



07:28:51 22.03.2023

π/4-DQPSK

08:32:27 22.03.2023

8-DPSK

08:56:04 22.03.2023

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

ANT 1

GFSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	DH1	42.291	400	Pass
2441MHz	DH3	109.679	400	Pass
2441MHz	DH5	124.055	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: as blow

CH:2441MHz time slot=0.381(ms)*(1600/ (2*79))*31.6=42.291ms

CH:2441MHz time slot=1.637(ms)*(1600/ (4*79))*31.6=109.679ms

CH:2441MHz time slot=2.885(ms)*(1600/ (6*79))*31.6=124.055ms

π/4-DQPSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	2DH1	35.972	400	Pass
2441MHz	2DH3	121.656	400	Pass
2441MHz	2DH5	150.384	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: as blow

CH:2441MHz time slot=0.391(ms)*(1600/ (2*79))*31.6=35.972ms

CH:2441MHz time slot=1.644(ms)*(1600/ (4*79))*31.6=121.656ms

CH:2441MHz time slot=2.892(ms)*(1600/ (6*79))*31.6=150.384ms

8-DPSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	3DH1	39.984	400	Pass
2441MHz	3DH3	91.896	400	Pass
2441MHz	3DH5	124.356	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: as blow

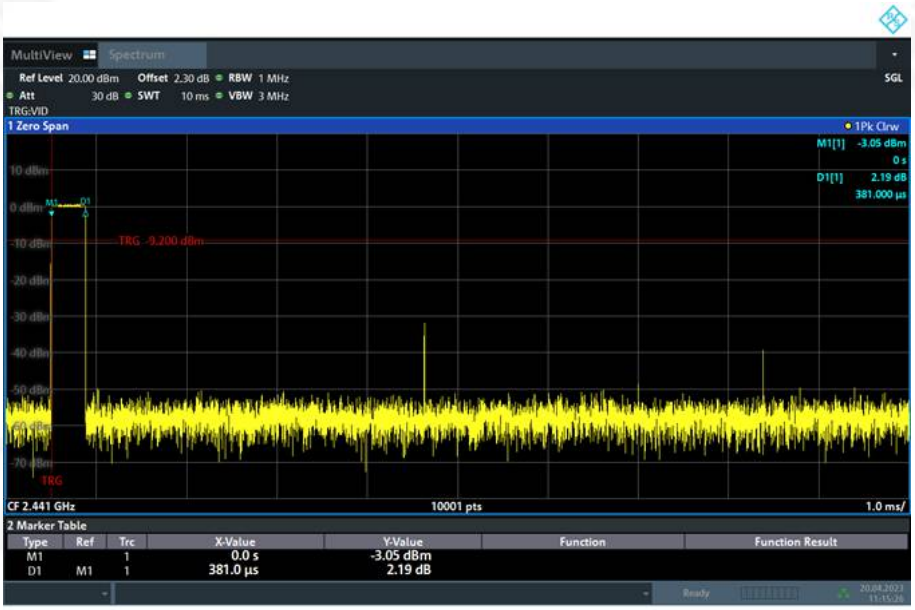
CH:2441MHz time slot=0.392(ms)*(1600/ (2*79))*31.6=39.984ms

CH:2441MHz time slot=1.641(ms)*(1600/ (4*79))*31.6=91.896ms

CH:2441MHz time slot=2.892(ms)*(1600/ (6*79))*31.6=124.326ms

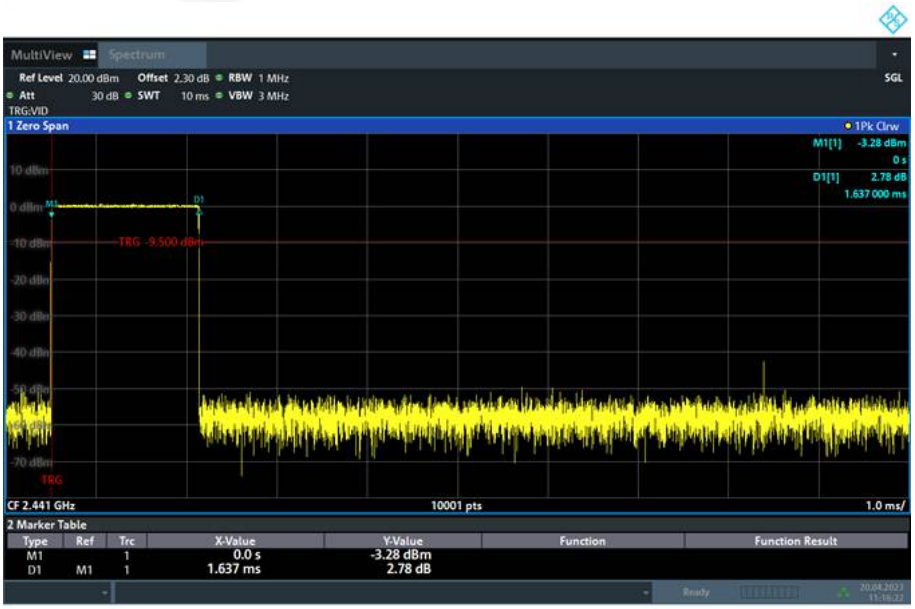
Test Plots

GFSK DH1 2441MHz



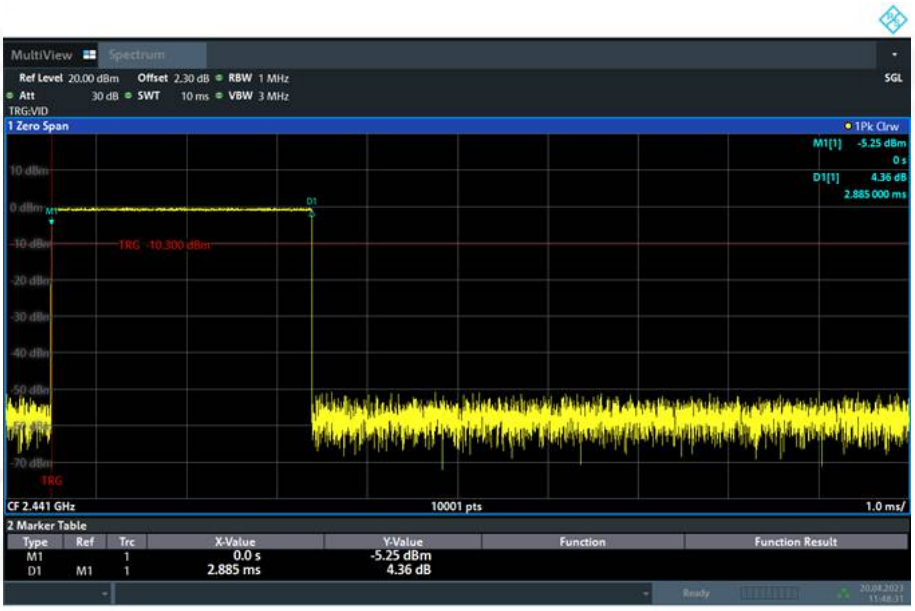
11:15:27 20.04.2023

GFSK DH3 2441MHz



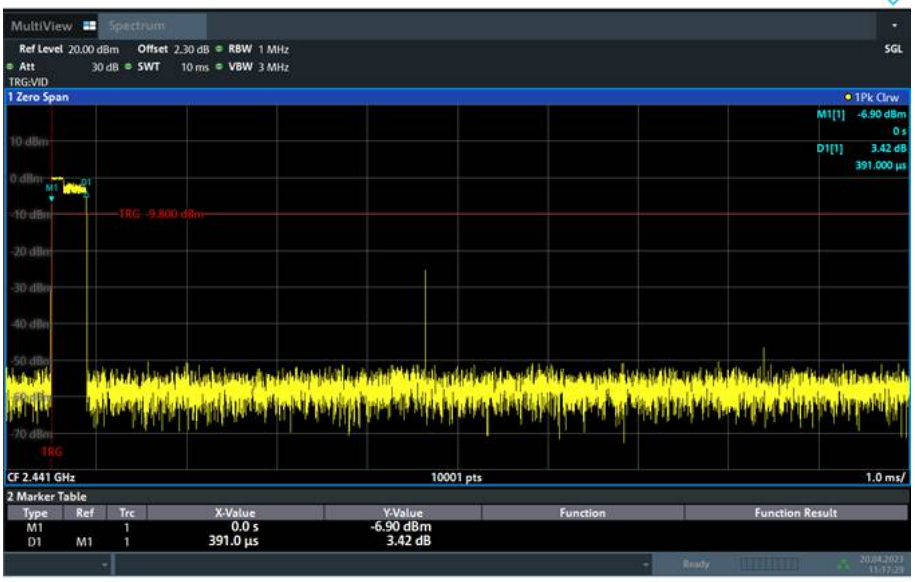
11:16:23 20.04.2023

GFSK DH5 2441MHz



11:48:32 20.04.2023

π/4-DQPSK 2DH1 2441MHz

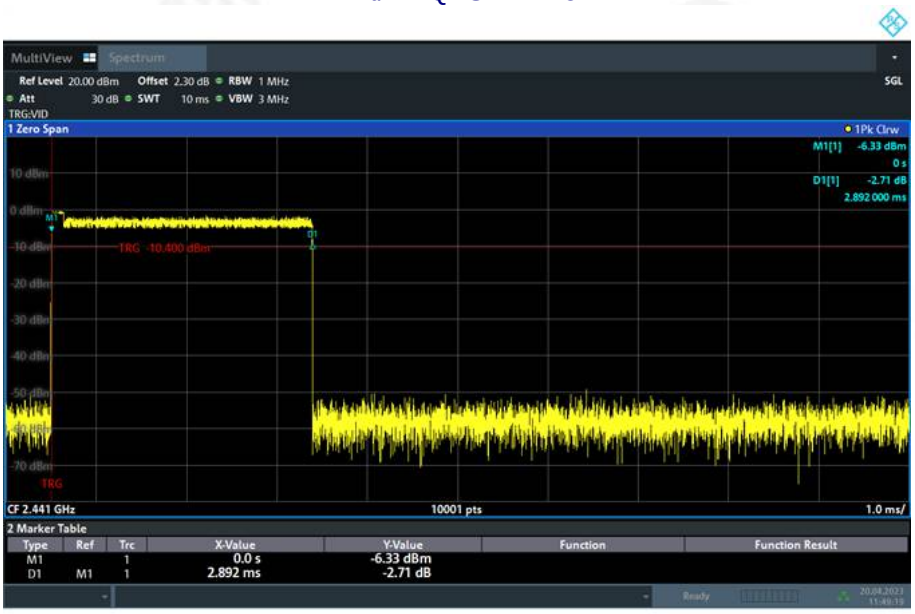


11:17:30 20.04.2023

π/4-DQPSK 2DH3 2441MHz

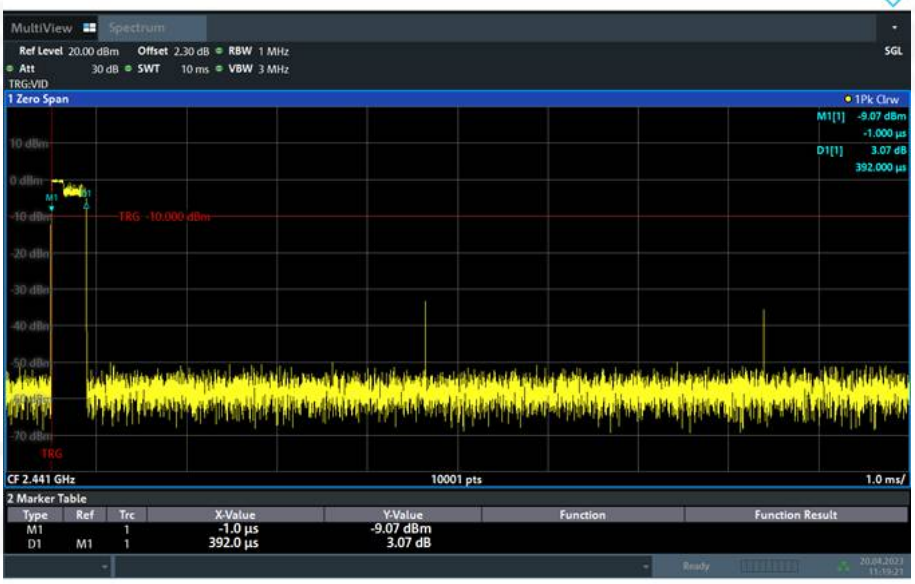
11:18:23 20.04.2023

π/4-DQPSK 2DH5 2441MHz



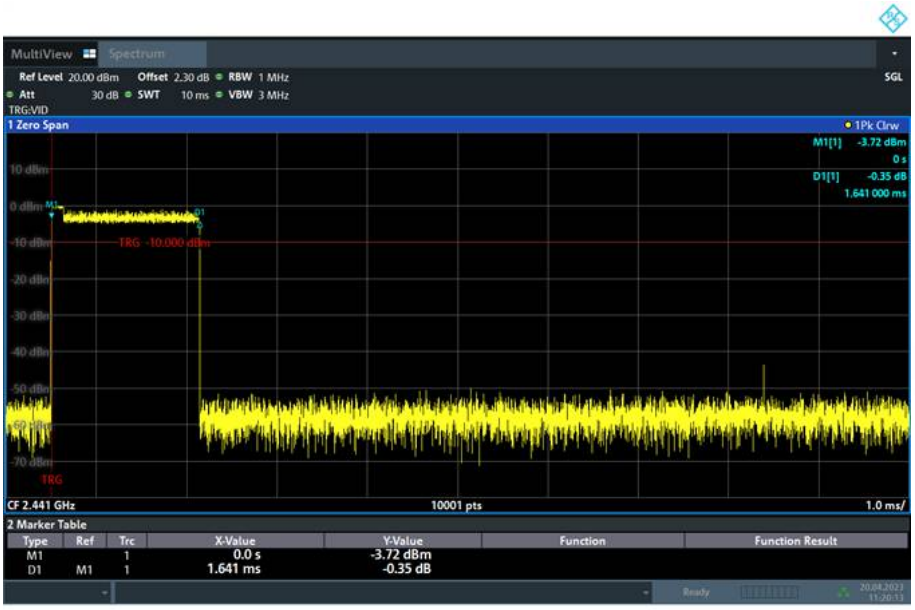
11:49:19 20.04.2023

8-DPSK 3DH1 2441MHz



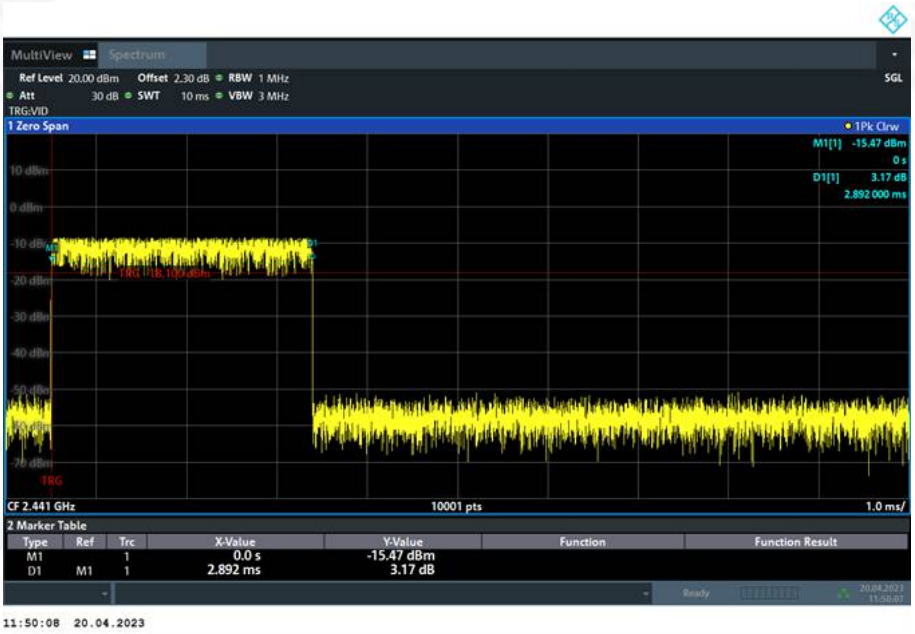
11:19:21 20.04.2023

8-DPSK 3DH3 2441MHz



11:20:14 20.04.2023

8-DPSK 3DH5 2441MHz



ANT 2

GFSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	DH1	70.798	400	Pass
2441MHz	DH3	176.015	400	Pass
2441MHz	DH5	216.975	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: as blow

CH:2441MHz time slot=0.389(ms)*(1600/ (2*79))*31.6=70.798ms

CH:2441MHz time slot=1.645(ms)*(1600/ (4*79))*31.6=176.015ms

CH:2441MHz time slot=2.893 (ms)*(1600/ (6*79))*31.6=216.975ms

π/4-DQPSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	2DH1	69.273	400	Pass
2441MHz	2DH3	178.433	400	Pass
2441MHz	2DH5	219.336	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: as blow

CH:2441MHz time slot=0.387(ms)*(1600/ (2*79))*31.6=69.273ms

CH:2441MHz time slot=1.637(ms)*(1600/ (4*79))*31.6=178.433ms

CH:2441MHz time slot=2.886(ms)*(1600/ (6*79))*31.6=219.336ms

8-DPSK mode:

Frequency	Packet	Dwell time(ms)	Limit(ms)	Result
2441MHz	3DH1	72.568	400	Pass
2441MHz	3DH3	178.433	400	Pass
2441MHz	3DH5	219.488	400	Pass

Remarks:

The test period: T= 0.4 Second/Channel x 79 Channel = 31.6 s

Test channel: as blow

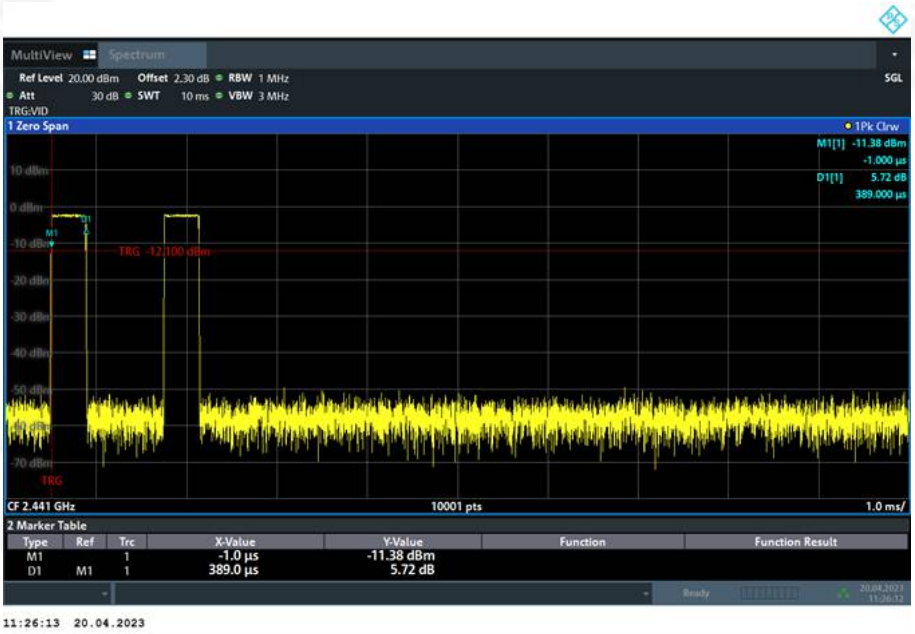
CH:2441MHz time slot=0.386(ms)*(1600/ (2*79))*31.6=72.568ms

CH:2441MHz time slot=1.637(ms)*(1600/ (4*79))*31.6=178.433ms

CH:2441MHz time slot=2.888(ms)*(1600/ (6*79))*31.6=219.488ms

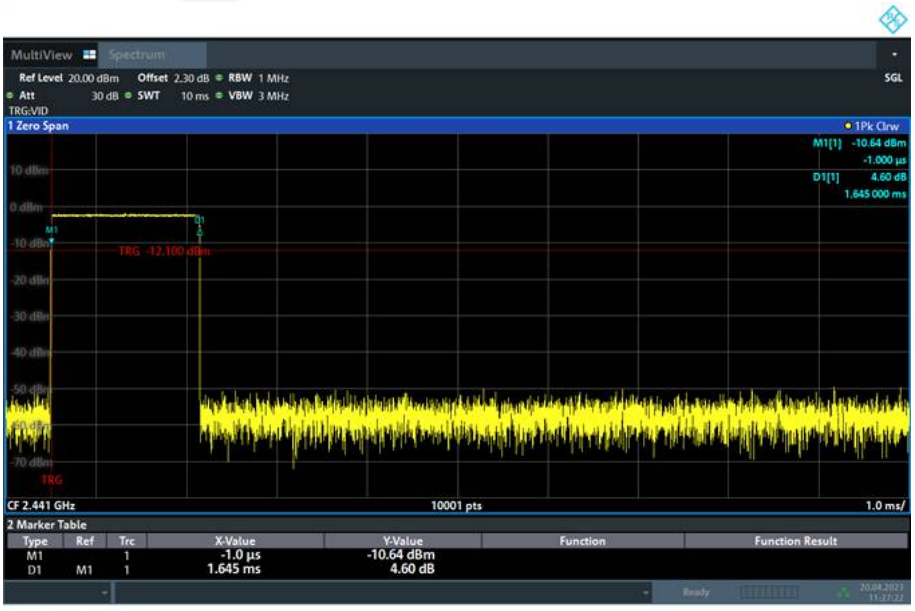
Test Plots

GFSK DH1 2441MHz



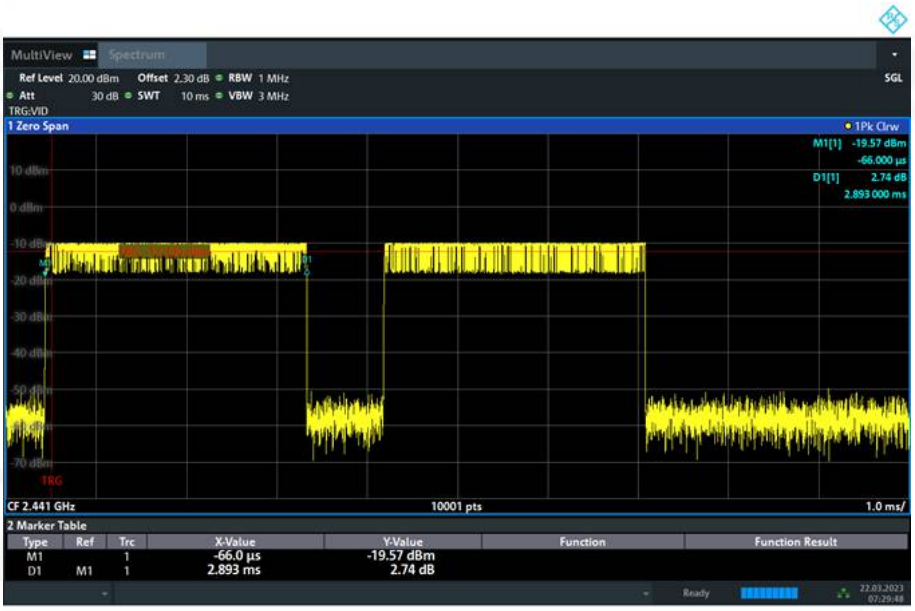
11:26:13 20.04.2023

GFSK DH3 2441MHz



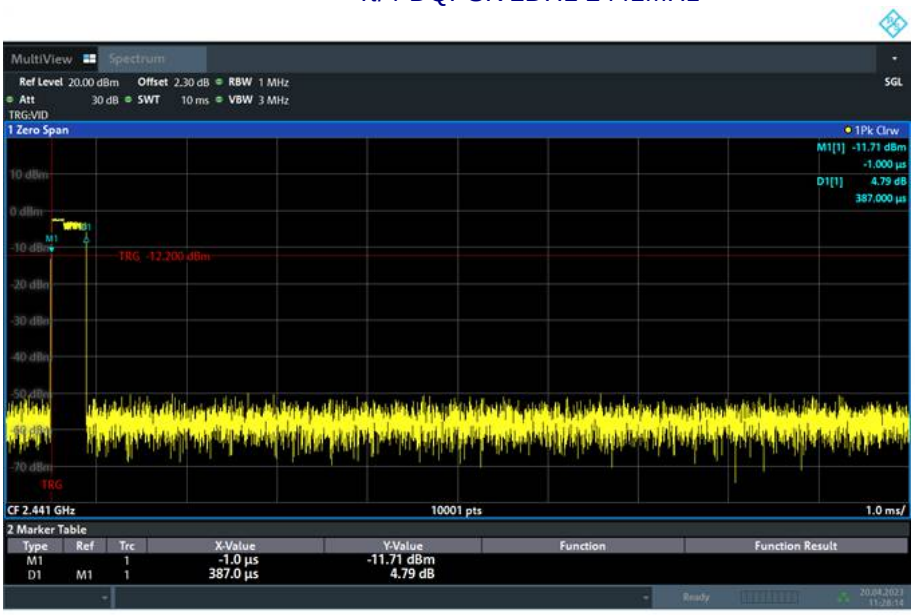
11:27:23 20.04.2023

GFSK DH5 2441MHz



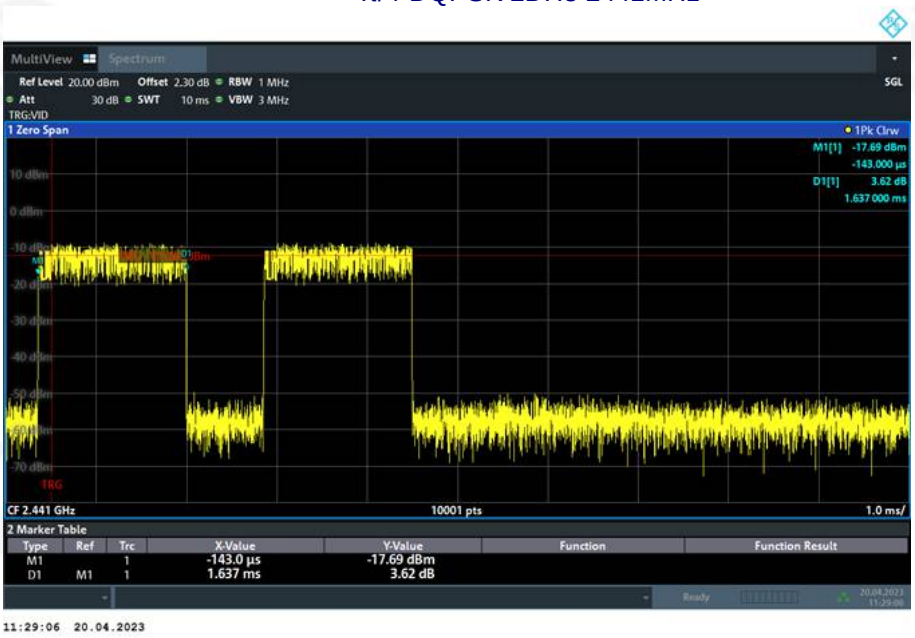
07:29:48 22.03.2023

π/4-DQPSK 2DH1 2441MHz



11:28:15 20.04.2023

π/4-DQPSK 2DH3 2441MHz

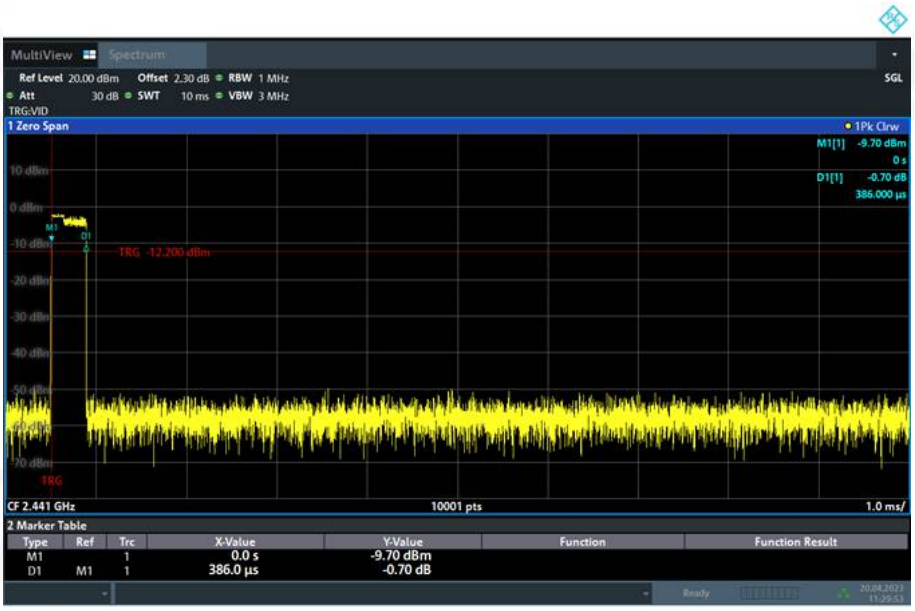


11:29:06 20.04.2023

π/4-DQPSK 2DH5 2441MHz

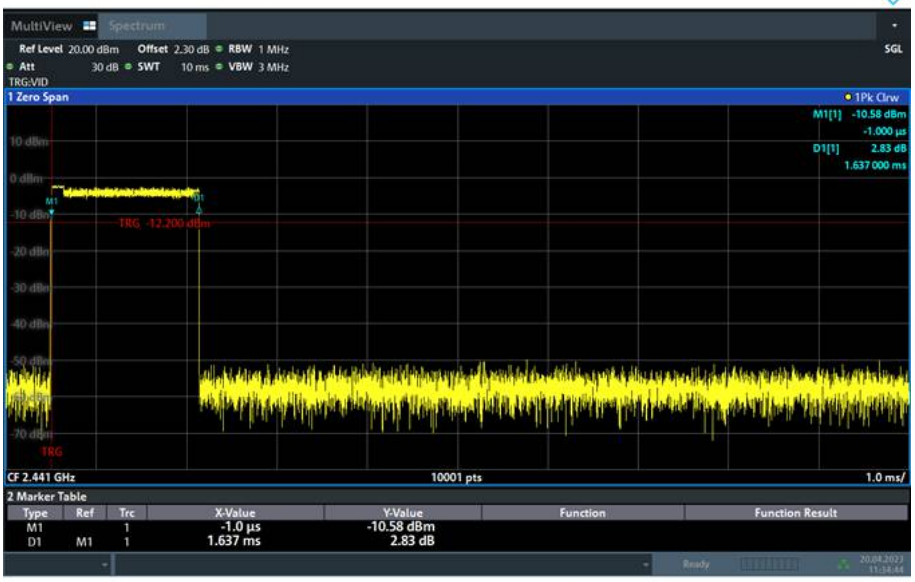
08:33:23 22.03.2023

8-DPSK 3DH1 2441MHz



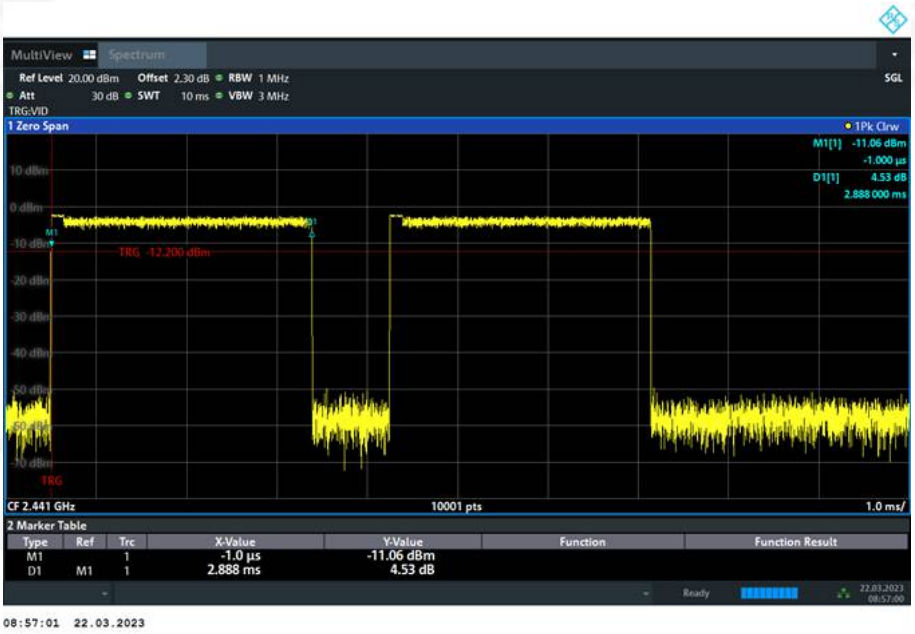
11:29:54 20.04.2023

8-DPSK 3DH3 2441MHz



11:34:45 20.04.2023

8-DPSK 3DH5 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 1 is FPCB antenna, the best case gain of the antennas is 2 dBi, reference to the appendix II for details The antenna 2 is PCB antenna, the best case gain of the antennas is 2 dBi, 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 ※※※※※