FCC Test Report

Report No.:	2405W56213EB
Applicant:	G-TOUCH LLC.
Address:	1750 NW 107TH Avenue, STE P-411 Miami Florida United States
Product Name:	Mobile feature phone 4G-LTE
Product Model:	Gravity
Multiple Models:	N/A
Trade Mark:	GTOUCH
FCC ID:	2AJDZGL24A
Standards:	FCC CFR Title 47 Part 15C (§15.247)
Test Date:	2024-08-06 to 2024-08-11
Test Result:	Complied
Report Date:	2024-08-23

Reviewed by: Frank Yin — Frank Yin, Project Engineer

Approved by: Jacob Kong — Jacob Kong, Manager

Prepared by:

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

NVLAP TESTING NVLAP LAB CODE 600335-0

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3. This sample tested is in compliance with the limits of the above regulation.

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5. The information marked "#" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

Revision History

Version No.	Issued Date	Description
00	*2024-08-23*	*Original*

Contents

1 General Information

1.1 Client Information

Applicant:	G-TOUCH LLC.
Address:	1750 NW 107TH Avenue, STE P-411 Miami Florida United States
Manufacturer:	G-TOUCH DEVICES LIMITED
Address:	Building 40 11C floor Wanghai RD, Rose Garden 2 Shekou Nanshan District Shenzhen City Guangdong China

1.2 Product Description of EUT

The EUT is Mobile feature phone 4G-LTE that contains BT, GSM/GPRS and LTE radios, this report covers the full testing of the BT radio.

Sample Serial Number	2PCZ-1 for CE&RE test, 2PCZ-2 for RF conducted test(assigned by WATC)
Sample Received Date	2024-08-01
Sample Status	Good Condition
Frequency Range	2402MHz - 2480MHz
Maximum Conducted Peak Output Power	-1.13dBm
Modulation Technology	GFSK, π/4 DQPSK, 8DPSK
Spatial Streams	SISO (1TX, 1RX)
Antenna Gain#	0.11dBi
Power Supply	DC 3.7V from battery or DC 5.0V from adapter
Adapter Information	Input: AC100-240V, 50/60Hz, 0.15A Output: DC 5.0V/500mA
Modification	Sample No Modification by the test lab

1.3 Antenna information

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.

Device Antenna information:	

The Bluetooth antenna is an internal antenna which cannot replace by end-user, please see product internal photos for details.

1.4 Related Submittal(s)/Grant(s)

FCC Part 15, Subpart B, Equipment Class: JBP, FCC ID: 2AJDZGL24A

FCC Part 22H, 24E, Equipment Class: PCE, FCC ID: 2AJDZGL24A

1.5 Measurement Uncertainty

Parameter		Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
AC Power Lines Conducted Emissions		±3.14dB
Emissions, Radiated	Below 30MHz	±2.78dB
	Below 1GHz	±4.84dB
	Above 1GHz	±5.44dB
Emissions, Conducted		1.75dB
Conducted Power		0.74dB
Frequency Error		150Hz
Bandwidth		0.34%
Power Spectral Density		0.74dB

Note: *The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.*

1.6 Laboratory Location

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: qa@watc.com.cn

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 463912, the FCC Designation No. : CN5040.

The lab has been recognized by Innovation, Science and Economic Development Canada to test to Canadian radio equipment requirements, the CAB identifier: CN0160.

1.7 Test Methodology

FCC CFR 47 Part 2

FCC CFR 47 Part 15

KDB 558074 D01 DTS Meas Guidance v05r02

ANSI C63.10-2020

2 Description of Measurement

2.1 Test Configuration

Operating channels:					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	39	2441	76	2478
1	2403	40	2442	77	2479
…	…	…	…	78	2480
38	2440	…	…	/	/
According to ANSI C63.10-2020 chapter 5.6.1 Table 11 requirement, select lowest channel, middle channel, and highest channel in the frequency range in which device operates for testing. The detailed frequency points are as follows:					
Lowest channel		Middle channel		Highest channel	
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
0	2402	39	2441	78	2480

Test Mode:				
Transmitting mode:	Keep the EUT in continuous transmitting with modulation			
Exercise software#:	Signaling Mode			
Mode	**Data rate**	**Power Level Setting#**		
		Low Channel	**Middle Channel**	**High Channel**
GFSK	1Mbps	4 step down from max power	4 step down from max power	4 step down from max power
π/4 DQPSK	2Mbps	4 step down from max power	4 step down from max power	4 step down from max power
8DPSK	3Mbps	4 step down from max power	4 step down from max power	4 step down from max power
The exercise software and the maximum power setting that provided by manufacturer.				

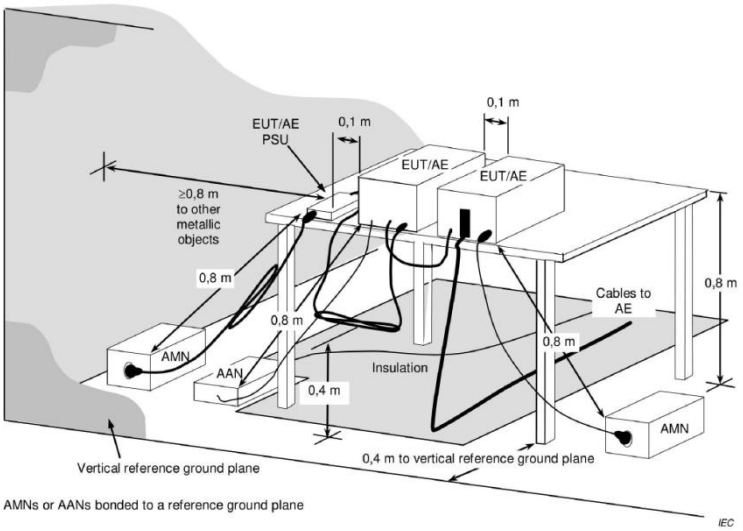
Worst-Case Configuration:
For radiated emissions, EUT was investigated in three orthogonal orientation, the worst-case orientation was recorded in report For AC power line conducted emission and radiated emission 9kHz-1GHz and above 18GHz were performed with the EUT transmits at the channel with highest output power as worst-case scenario.

2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
ROHDE& SCHWARZ	WIDEBAND RADIO COMMUNICATION TESTER	CMW500	116218

2.3 Test Setup

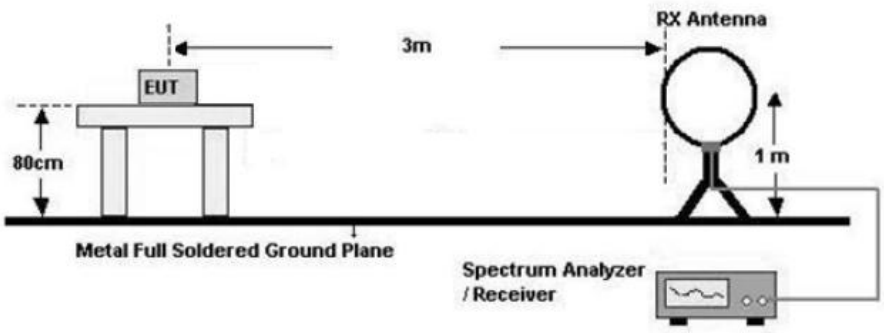
1) Conducted emission measurement:



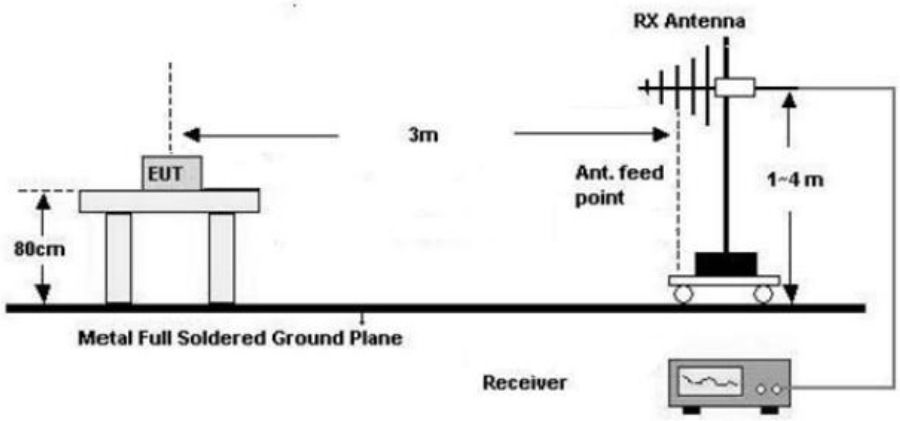
Note: The 0.8 m distance specified between EUT/AE/PSU and AMN/AAN, is applicable only to the EUT being measured. If the device is AE then it shall be >0.8 m.

2) Radiated emission measurement:

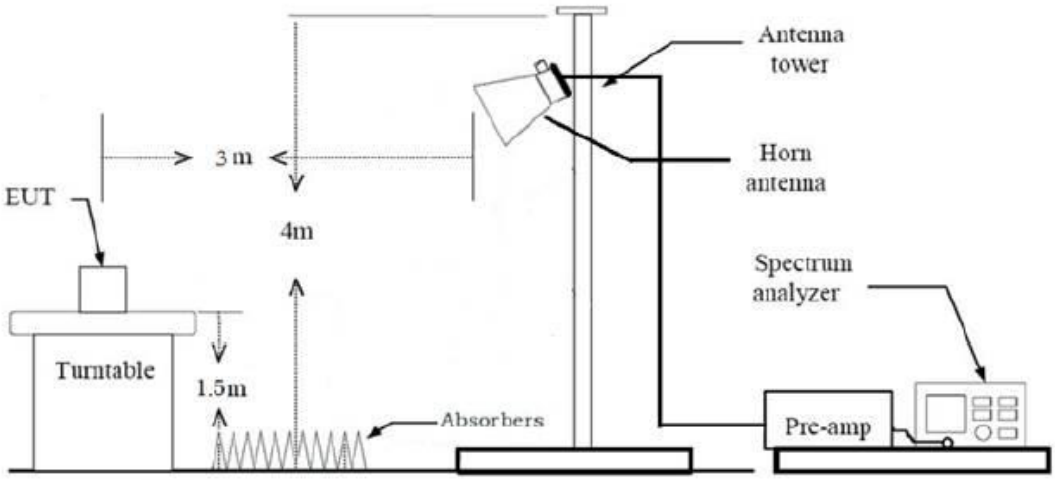
Below 30MHz (3m SAC)



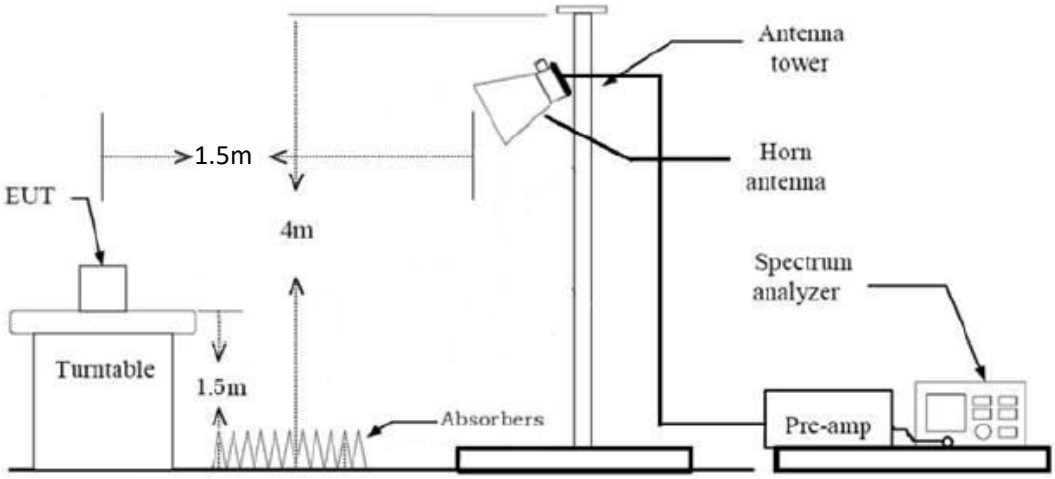
30MHz-1GHz (3m SAC)



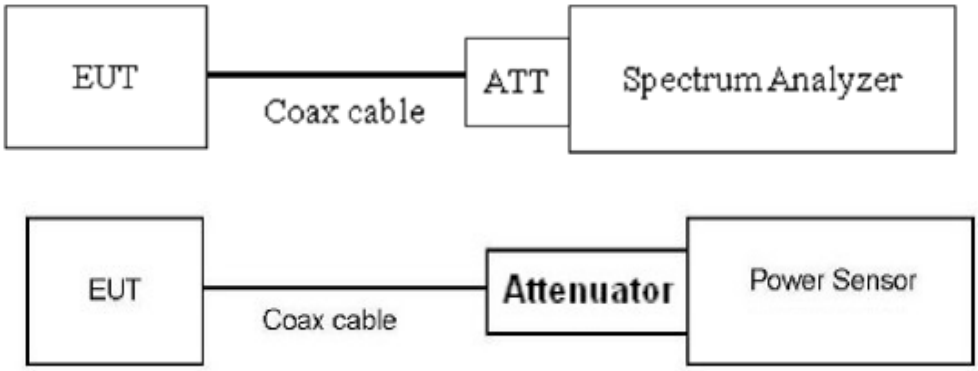
1GHz-18GHz(3m FAC)



Above 18GHz (3m FAC)



3) RF Conducted Test



2.4 Test Procedure

Conducted emission:

1. The E.U.T is placed on a non-conducting table 40cm from the vertical ground plane and 80cm above the horizontal ground plane (Please refer to the block diagram of the test setup and photographs).
2. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.
3. Line conducted data is recorded for both Line and Neutral

Radiated Emission Procedure:

a) For below 30MHz

1. All measurements were made at a test distance of 3 m. The measured data was extrapolated from the test distance (3m) to the specification distance (300 m from 9-490 kHz and 30 m from 490 kHz- 30 MHz) to clearly show the relative levels of fundamental and spurious emissions and demonstrate compliance with the requirement that the level of any spurious emissions be below the level of the intentionally transmitted signal. The extrapolation factor for the limits were 40*Log (test distance / specification distance).
2. Loop antenna use, investigation was done on the three antenna orientations (parallel, perpendicular, gound-parallel)

b) For 30MHz-1GHz:

1. The EUT was placed on the tabletop of a rotating table 0.8 m the ground at a 3 m semi anechoic chamber. The measurement distance from the EUT to the receiving antenna is 3 m.
2. EUT works in each mode of operation that needs to be tested. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

c) For above 1GHz:

1. The EUT was placed on the tabletop of a rotating table 1.5 m the ground at a 3 m fully anechoic room. The measurement distance from the EUT to the receiving antenna is 3 m (1-18GHz) and 1.5 m (above 18GHz).
2. EUT works in each mode of operation that needs to be tested，and having the EUT continuously working. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.
3. Open the test software to control the test antenna and test turntable. Perform the test, save the test results, and export the test data.
4. Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

RF Conducted Test:

1. The antenna port of EUT was connected to the RF port of the test equipment (Power Meter or

Spectrum analyzer) through Attenuator and RF cable.

2. The cable assembly insertion loss of 8.5dB (including 6.0dB Attenuator and 2.5dB cable) was entered as an offset in the power meter. Note: Actual cable loss was unavailable at the time of testing, therefore a loss of 2.5dB was assumed as worst case. This was later verified to be true by laboratory. (if the RF cable provided by client, the cable loss declared by client)
3. The EUT is keeping in continuous transmission mode and tested in all modulation modes.

2.5 Measurement Method

Description of Test	Measurement Method
AC Line Conducted Emissions	ANSI C63.10-2020 Section 6.2
Maximum Conducted Output Power	ANSI C63.10-2020 Section 7.8.5
20 dB Emission Bandwidth	ANSI C63.10-2020 Section 6.9.2
99% Occupied Bandwidth	ANSI C63.10-2020 Section 6.9.3
Channel separation	ANSI C63.10-2020 Section 7.8.2
Number of hopping Frequency	ANSI C63.10-2020 Section 7.8.3
Time of occupancy (dwell time)	ANSI C63.10-2020 Section 7.8.4
100kHz Bandwidth of Frequency Band Edge	ANSI C63.10-2020 Section 7.8.7.2&6.10
Radiated emission	ANSI C63.10-2020 Section 7.8&6.3&6.4&6.5&6.6

2.6 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date
AC Line Conducted Emission Test					
ROHDE& SCHWARZ	EMI TEST RECEIVER	ESR	101817	2024/6/4	2025/6/3
R&S	LISN	ENV216	101748	2024/6/4	2025/6/3
N/A	Coaxial Cable	NO.12	N/A	2024/6/6	2025/6/5
Farad	Test Software	EZ-EMC	Ver. EMEC-3A1	/	/
Radiated Emission Test					
R&S	EMI test receiver	ESR3	102758	2024/6/4	2025/6/3
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSV40-N	101608	2024/6/4	2025/6/3
SONOMA INSTRUMENT	Low frequency amplifier	310	186014	2024/6/4	2025/6/3

COM-POWER	preamplifier	PAM-118A	18040152	2024/6/4	2025/6/3
COM-POWER	Amplifier	PAM-840A	461306	2024/8/7	2025/8/6
BACL	Loop Antenna	1313-1A	4010611	2024/2/7	2027/2/6
SCHWARZBECK	Log - periodic wideband antenna	VULB 9163	9163-872	2023/7/7	2026/7/6
Astro Antenna Ltd	Horn antenna	AHA-118S	3015	2023/7/6	2026/7/5
Ducommun technologies	Horn Antenna	ARH-4223-02	1007726-03	2023/7/10	2026/7/9
Oulitong	Band Reject Filter	OBSF-2400-248 3.5-50N	OE02103119	2024/6/4	2025/6/3
N/A	Coaxial Cable	N/A	NO.9	2024/6/4	2025/6/3
N/A	Coaxial Cable	N/A	NO.14	2024/6/4	2025/6/3
N/A	Coaxial Cable	N/A	NO.15	2024/6/4	2025/6/3
N/A	Coaxial Cable	N/A	NO.16	2024/6/4	2025/6/3
N/A	Coaxial Cable	N/A	NO.17	2024/6/4	2025/6/3
Audix	Test Software	E3	191218 V9	/	/
RF Conducted Test					
ROHDE& SCHWARZ	SPECTRUM ANALYZER	FSU-26	200680/026	2023/7/12	2024/7/11
N/A	Coaxial Cable	NO.10	N/A	2024/6/4	2025/6/3
narda	6dB attenuator	603-06-1	N/A	2023/7/26	2024/7/25

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

3 Test Results

3.1 Test Summary

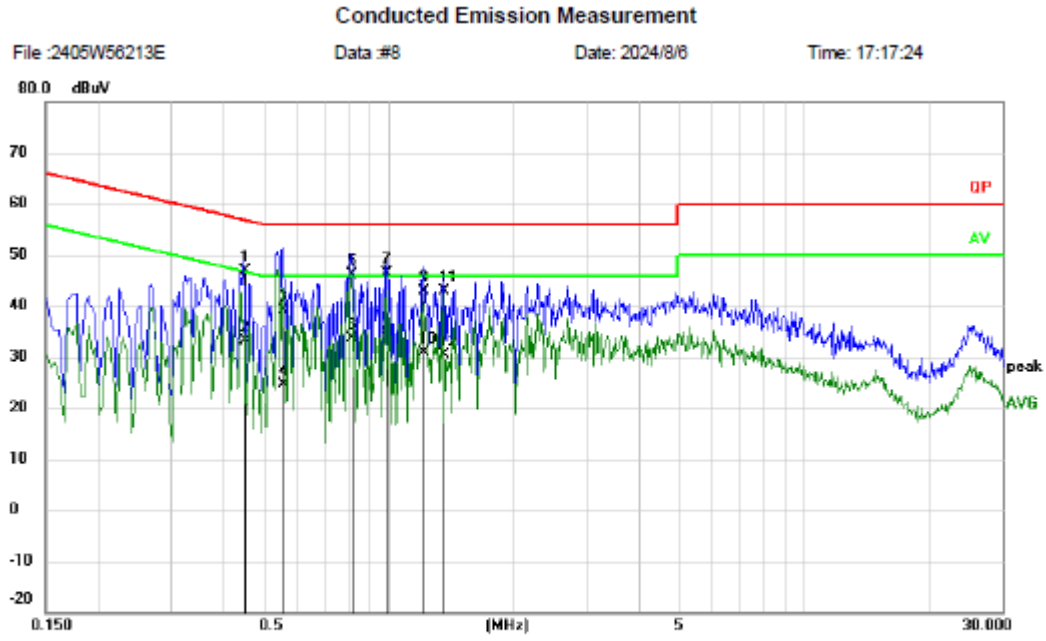
FCC Rules	Description of Test	Result
§15.203	Antenna Requirement	Compliance
§15.207 (a)	AC Line Conducted Emissions	Compliance
§15.247 (a)(1)	20dB Emission Bandwidth	Compliance
-	99% Occupied Bandwidth	Report only
§15.247 (a)(1)	Channel separation	Compliance
§15.247 (a)(1)(iii)	Number of hopping Frequency	Compliance
§15.247 (a)(1)(iii)	Time of occupancy (dwell time)	Compliance
§15.247(b)(1)	Maximum Conducted Output Power	Compliance
§15.247(d)	100kHz Bandwidth of Frequency Band Edge	Compliance
§15.205, §15.209, §15.247(d)	Radiated emission	Compliance

3.2 Limit

Test items	Limit
AC Line Conducted Emissions	See details §15.207 (a)
Conducted Output Power	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.
Channel separation	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
Number of hopping Frequency	Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels.
Time of occupancy (dwell time)	The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.
Spurious Emissions, 100kHz Bandwidth of Frequency Band Edge	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)).

3.3 AC Line Conducted Emissions Test Data

Test Date:	2024-08-06	Test By:	Lirou Li
Environment condition:	Temperature: 22.9°C; Relative Humidity:65%; ATM Pressure: 101.3kPa		



Limit: QP
Mode:transmitting
Note: 8DPSK H Channel

Phase: L1
Power: AC 120V/60Hz

Temperature: 22.9 ℃
Humidity: 65 %
Air Pressure: 1013 hpa

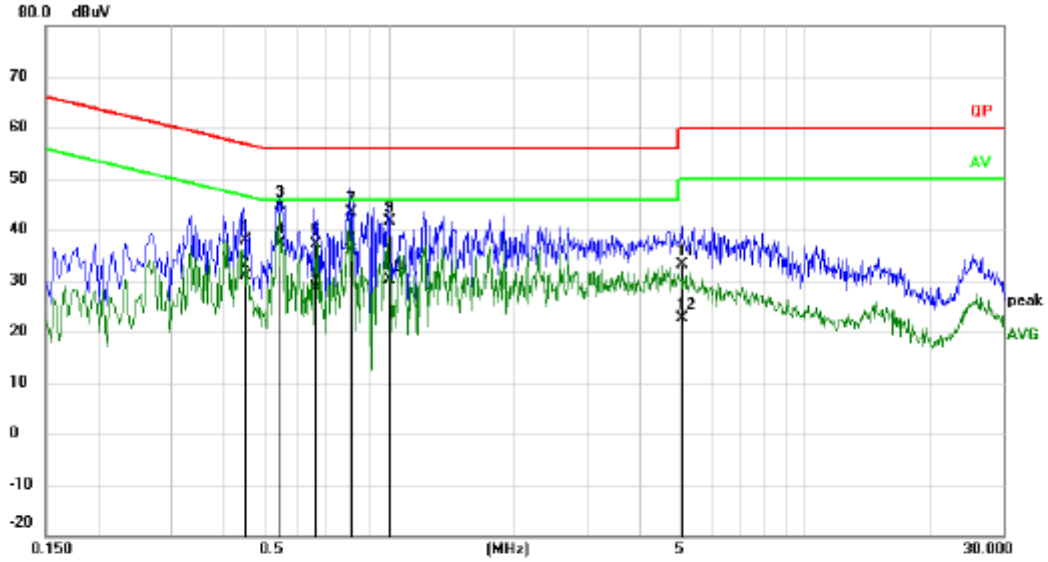
No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4500	36.11	10.80	46.91	56.88	-9.97	QP	
2		0.4500	22.37	10.80	33.17	46.88	-13.71	AVG	
3		0.5580	28.27	10.83	39.10	56.00	-16.90	QP	
4		0.5580	13.83	10.83	24.66	46.00	-21.34	AVG	
5		0.8139	35.21	10.95	46.16	56.00	-9.84	QP	
6		0.8139	22.72	10.95	33.67	46.00	-12.33	AVG	
7	*	0.9940	35.34	11.06	46.40	56.00	-9.60	QP	
8		0.9940	21.30	11.06	32.36	46.00	-13.64	AVG	
9		1.2140	31.88	10.94	42.82	56.00	-13.18	QP	
10		1.2140	19.83	10.94	30.77	46.00	-15.23	AVG	
11		1.3540	31.92	10.86	42.78	56.00	-13.22	QP	
12		1.3540	19.61	10.86	30.47	46.00	-15.53	AVG	

*:Maximum data x:Over limit !:over margin

Engineer Signature: Lirou

Conducted Emission Measurement

File :2405W56213E Data :#7 Date: 2024/8/6 Time: 17:05:51



Limit: QP Phase: N Temperature: 22.9 ℃

Mode:transmitting Power: AC 120V/60Hz Humidity: 65 %

Note: 8DPSK H Channel Air Pressure: 1013 hpa

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over Limit		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.4500	27.26	10.68	37.94	56.88	-18.94	QP	
2		0.4500	20.22	10.68	30.90	46.88	-15.98	AVG	
3		0.5460	34.00	10.67	44.67	56.00	-11.33	QP	
4	*	0.5460	26.80	10.67	37.47	46.00	-8.53	AVG	
5		0.6660	26.66	10.58	37.24	56.00	-18.76	QP	
6		0.6660	18.08	10.58	28.66	46.00	-17.34	AVG	
7		0.8100	32.78	10.61	43.39	56.00	-12.61	QP	
8		0.8100	25.38	10.61	35.99	46.00	-10.01	AVG	
9		1.0020	31.03	10.66	41.69	56.00	-14.31	QP	
10		1.0020	19.52	10.66	30.18	46.00	-15.82	AVG	
11		5.0739	22.61	10.55	33.16	60.00	-26.84	QP	
12		5.0739	12.08	10.55	22.63	50.00	-27.37	AVG	

*:Maximum data x:Over limit !:over margin Engineer Signature: Lirou

Remark:

Measurement (dBuV)= Reading Level (dBuV) + Correct Factor(dB)

Correct Factor(dB)= LISN Voltage Division Factor (dB)+ Cable loss(dB)

Over Limit = Measurement – Limit

3.4 Radiated emission Test Data

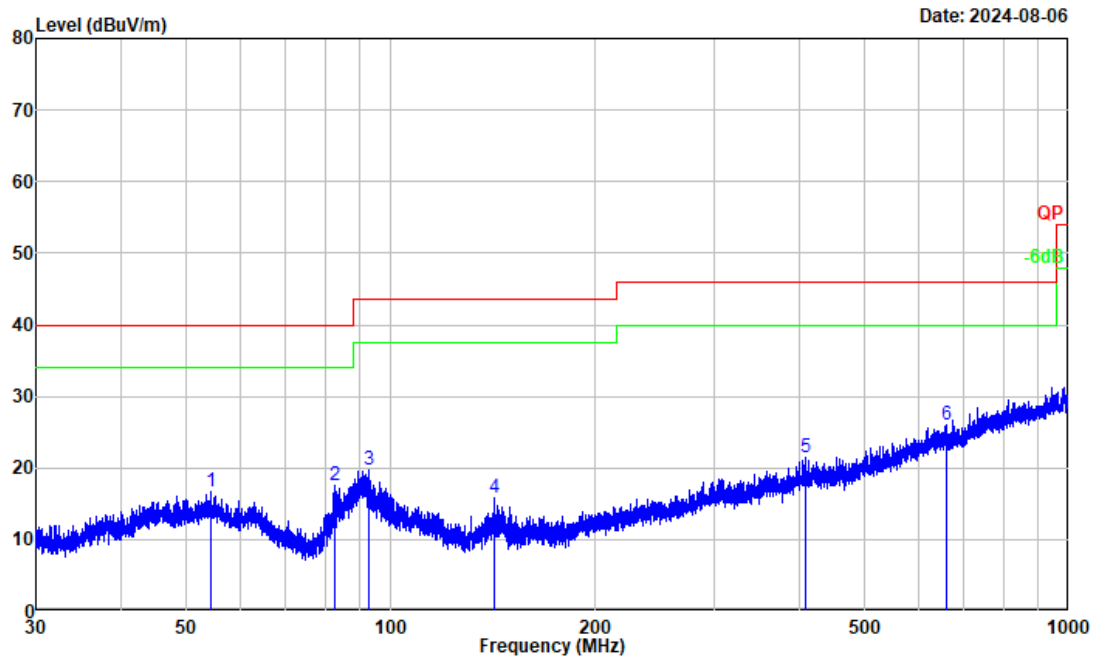
9 kHz-30MHz:

Test Date:	2024-08-06	**Test By:**	Bard Huang
Environment condition:	Temperature: 22.4°C; Relative Humidity:61%; ATM Pressure: 99.9kPa		

For radiated emissions below 30MHz, there were no emissions found within 20dB of limit.

30MHz-1GHz:

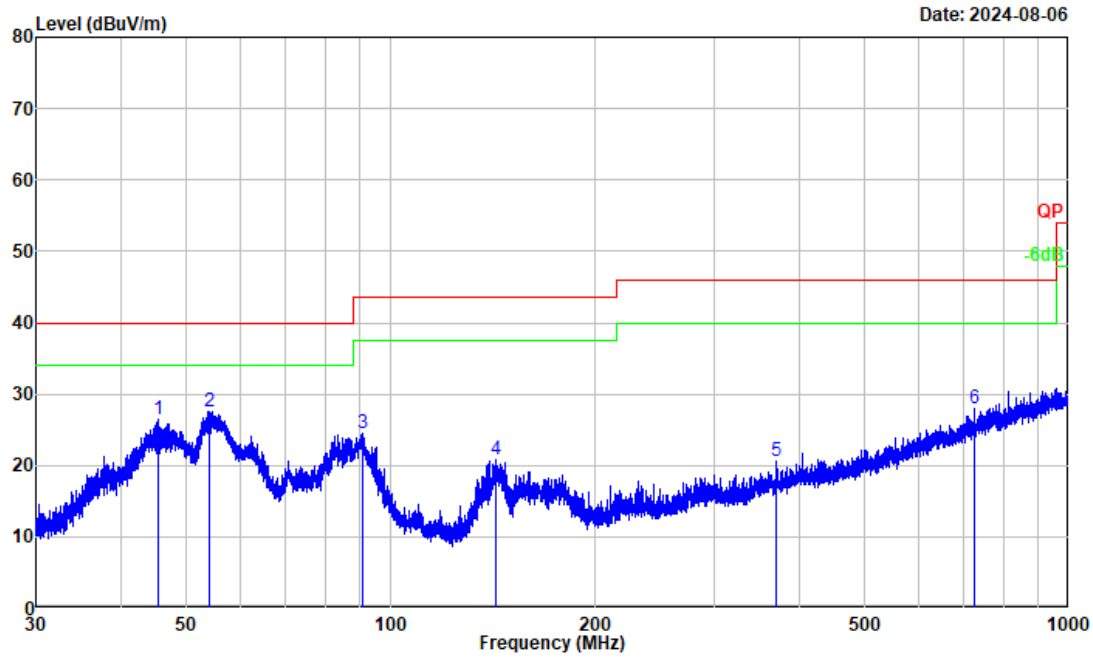
Test Date:	2024-08-06	Test By:	Bard Huang
Environment condition:	Temperature: 22.4°C; Relative Humidity:61%; ATM Pressure: 99.9kPa		



Project No. : 2405W56213E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 22.4℃/61%R.H./99.9kPa
Tested by : Bard Huang
Polarization : horizontal
Remark : 8DPSK High channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	54.313	29.17	-12.46	16.71	40.00	-23.29	Peak
2	82.695	34.79	-17.31	17.48	40.00	-22.52	Peak
3	92.922	34.44	-14.77	19.67	43.50	-23.83	Peak
4	142.041	33.03	-17.15	15.88	43.50	-27.62	Peak
5	409.618	28.77	-7.24	21.53	46.00	-24.47	Peak
6	661.116	28.42	-2.38	26.04	46.00	-19.96	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit



Project No. : 2405W56213E
Test Mode : Transmitting
Test Voltage : AC 120V/60Hz
Environment : 22.4℃/61%R.H./99.9kPa
Tested by : Bard Huang
Polarization : vertical
Remark : 8DPSK High channel

--No.	Frequency (MHz)	Reading (dBµV)	Factor (dB/m)	Result (dBµV/m)	Limit (dBµV/m)	Over Limit (dB)	Detector
1	45.338	38.82	-12.30	26.52	40.00	-13.48	Peak
2	53.980	39.94	-12.39	27.55	40.00	-12.45	Peak
3	90.749	39.79	-15.20	24.59	43.50	-18.91	Peak
4	142.978	37.87	-17.14	20.73	43.50	-22.77	Peak
5	371.144	28.74	-8.24	20.50	46.00	-25.50	Peak
6	724.867	29.23	-1.33	27.90	46.00	-18.10	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit

Above 1GHz:

Test Date:	2024-08-07	Test By:	Luke Li
Environment condition:	Temperature: 22.8°C; Relative Humidity:62%; ATM Pressure: 99.9kPa		

Frequency (MHz)	Reading level (dBμV)	Polar	Corrected Factor (dB/m)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Remark
GFSK							
Low Channel							
2390.000	36.46	horizontal	7.18	43.64	54.00	-10.36	Average
2390.000	47.08	horizontal	7.18	54.26	74.00	-19.74	Peak
2390.000	36.18	vertical	7.18	43.36	54.00	-10.64	Average
2390.000	46.89	vertical	7.18	54.07	74.00	-19.93	Peak
7206.000	52.08	horizontal	1.71	53.79	74.00	-20.21	Peak
7206.000	52.11	vertical	1.71	53.82	74.00	-20.18	Peak
Middle Channel							
7323.000	47.14	horizontal	1.45	48.59	74.00	-25.41	Peak
7323.000	51.88	vertical	1.45	53.33	74.00	-20.67	Peak
High Channel							
2483.500	37.12	horizontal	7.25	44.37	54.00	-9.63	Average
2483.500	47.81	horizontal	7.25	55.06	74.00	-18.94	Peak
2483.500	37.26	vertical	7.25	44.51	54.00	-9.49	Average
2483.500	46.67	vertical	7.25	53.92	74.00	-20.08	Peak
7440.000	47.43	horizontal	1.41	48.84	74.00	-25.16	Peak
7440.000	52.31	vertical	1.41	53.72	74.00	-20.28	Peak
π/4 DQPSK							
Low Channel							
2390.000	36.04	horizontal	7.18	43.22	54.00	-10.78	Average
2390.000	47.12	horizontal	7.18	54.30	74.00	-19.70	Peak
2390.000	36.41	vertical	7.18	43.59	54.00	-10.41	Average
2390.000	46.52	vertical	7.18	53.70	74.00	-20.30	Peak
7206.000	47.52	horizontal	1.71	49.23	74.00	-24.77	Peak
7206.000	51.26	vertical	1.71	52.97	74.00	-21.03	Peak
Middle Channel							
7323.000	49.08	horizontal	1.45	50.53	74.00	-23.47	Peak
7323.000	51.71	vertical	1.45	53.16	74.00	-20.84	Peak
High Channel							
2483.500	37.09	horizontal	7.25	44.34	54.00	-9.66	Average

2483.500	47.77	horizontal	7.25	55.02	74.00	-18.98	Peak
2483.500	37.59	vertical	7.25	44.84	54.00	-9.16	Average
2483.500	47.26	vertical	7.25	54.51	74.00	-19.49	Peak
7440.000	48.16	horizontal	1.41	49.57	74.00	-24.43	Peak
7440.000	52.49	vertical	1.41	53.90	74.00	-20.10	Peak
8DPSK							
Low Channel							
2390.000	36.72	horizontal	7.18	43.90	54.00	-10.10	Average
2390.000	46.82	horizontal	7.18	54.00	74.00	-20.00	Peak
2390.000	36.57	vertical	7.18	43.75	54.00	-10.25	Average
2390.000	46.65	vertical	7.18	53.83	74.00	-20.17	Peak
7206.000	48.94	horizontal	1.71	50.65	74.00	-23.35	Peak
7206.000	49.25	vertical	1.71	50.96	74.00	-23.04	Peak
Middle Channel							
7323.000	46.75	horizontal	1.45	48.20	74.00	-25.80	Peak
7323.000	45.93	vertical	1.45	47.38	54.00	-6.62	Average
7323.000	52.77	vertical	1.45	54.22	74.00	-19.78	Peak
High Channel							
2483.504	37.83	horizontal	7.25	45.08	54.00	-8.92	Average
2483.504	47.67	horizontal	7.25	54.92	74.00	-19.08	Peak
2483.500	37.32	vertical	7.25	44.57	54.00	-9.43	Average
2483.500	47.57	vertical	7.25	54.82	74.00	-19.18	Peak
7440.000	47.01	horizontal	1.41	48.42	74.00	-25.58	Peak
7440.000	52.16	vertical	1.41	53.57	74.00	-20.43	Peak

Remark:

Corrected Amplitude= Reading level + corrected Factor

Corrected Factor = Antenna factor + Cable loss – Amplifier gain

Margin = Corrected Amplitude – Limit

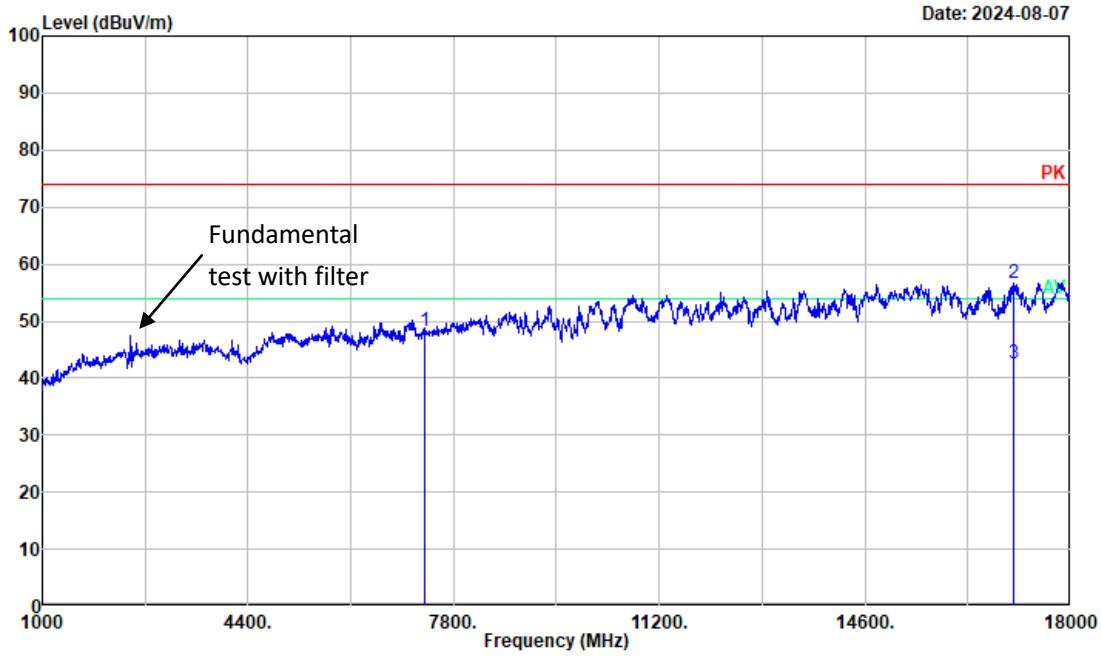
For the test result of Peak below the Peak limit more than 20dB, which can compliance with the average limit, just the Peak level was recorded.

The emission levels of other frequencies that were lower than the limit 20dB, not show in test report.

For emissions in 18GHz-25GHz range, all emissions were investigated and in the noise floor level.

Test plot for example as below:

Mode:	8DPSK	Channel:	2441MHz

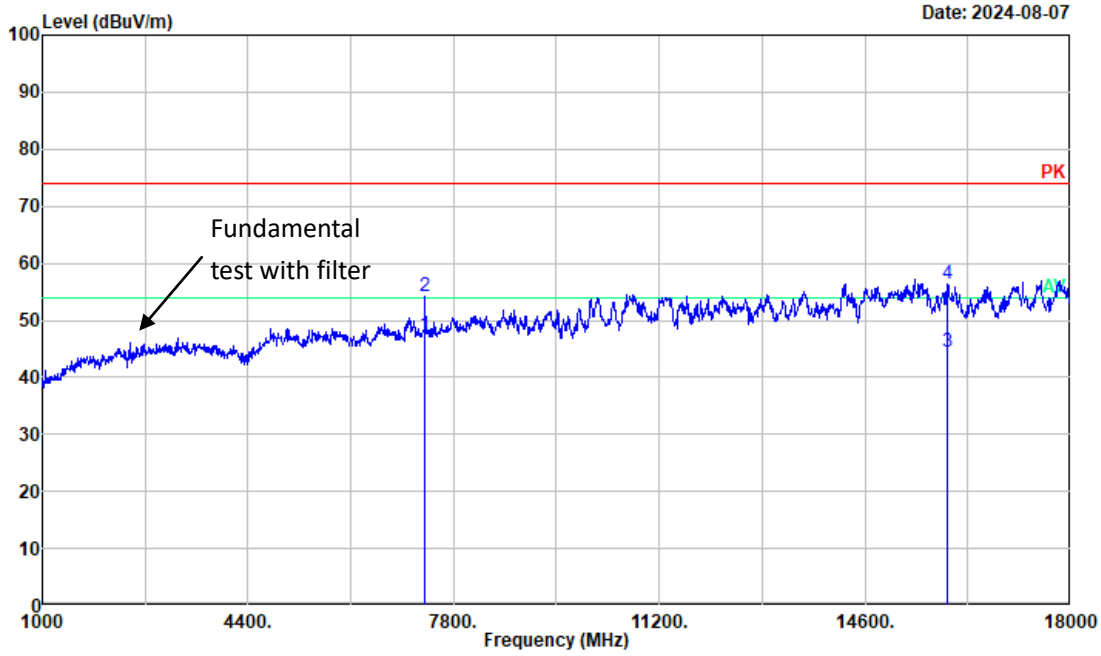


Project No. : 2405W56213E
Test Mode : Transmitting
Test Voltage : Power by battery
Environment : 22.8℃/62%R.H./99.9kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 8DPSK middle channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	7323.000	46.75	1.45	48.20	74.00	-25.80	Peak
2	17056.030	49.55	7.20	56.75	74.00	-17.25	Peak
3	17056.030	35.48	7.20	42.68	54.00	-11.32	Average

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit

Mode:	8DPSK	Channel:	2441MHz

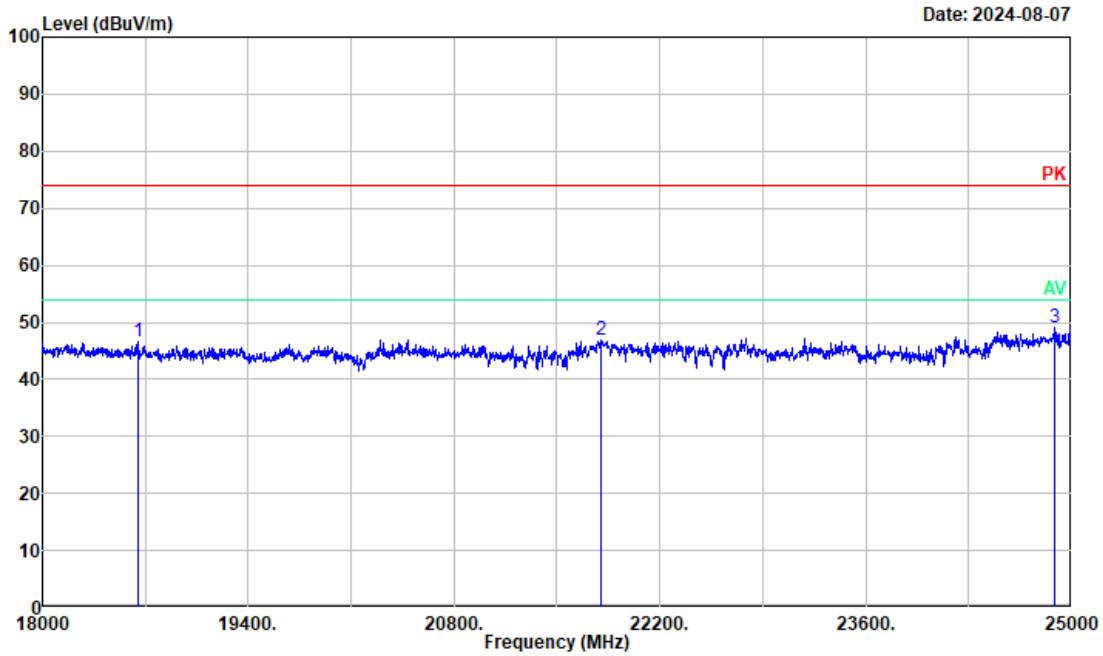


Project No. : 2405W56213E
Test Mode : Transmitting
Test Voltage : Power by battery
Environment : 22.8℃/62%R.H./99.9kPa
Tested by : Luke Li
Polarization : vertical
Remark : 8DPSK middle channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	7323.000	45.93	1.45	47.38	54.00	-6.62	Average
2	7323.000	52.77	1.45	54.22	74.00	-19.78	Peak
3	15967.480	35.89	8.56	44.45	54.00	-9.55	Average
4	15967.480	47.71	8.56	56.27	74.00	-17.73	Peak

Remarks: Factor = Antenna factor + Cable loss - Preamp gain
Result = Reading + Factor
Over Limit = Result - Limit

Mode:	8DPSK	Channel:	2441MHz

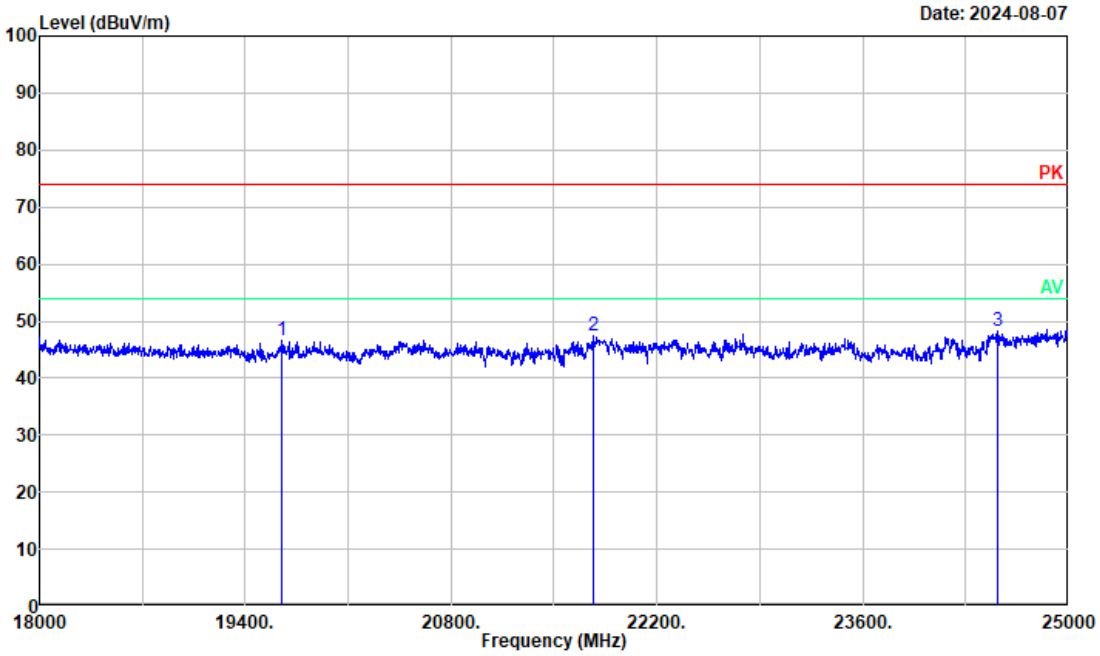


Project No. : 2405W56213E
Test Mode : Transmitting
Test Voltage : Power by battery
Environment : 22.8℃/62%R.H./99.9kPa
Tested by : Luke Li
Polarization : horizontal
Remark : 8DPSK middle channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	18647.820	53.00	-6.33	46.67	74.00	-27.33	Peak
2	21802.900	53.77	-6.98	46.79	74.00	-27.21	Peak
3	24884.440	52.63	-3.58	49.05	74.00	-24.95	Peak

Remarks: Factor = Antenna Factor + Cable loss - Preamp gain – Distance extrapolate factor
Distance extrapolate factor = 20*log(specified distance/measured distance)
Specified distance = 3meters, measured distance = 1.5meters
Result = Reading + Factor
Over Limit = Result - Limit

Mode:	8DPSK	Channel:	2441MHz



Project No. : 2405W56213E
Test Mode : Transmitting
Test Voltage : Power by battery
Environment : 22.8℃/62%R.H./99.9kPa
Tested by : Luke Li
Polarization : vertical
Remark : 8DPSK middle channel

--No.	Frequency (MHz)	Reading (dBμV)	Factor (dB/m)	Result (dBμV/m)	Limit (dBμV/m)	Over Limit (dB)	Detector
1	19652.830	54.04	-7.32	46.72	74.00	-27.28	Peak
2	21771.380	54.32	-7.02	47.30	74.00	-26.70	Peak
3	24516.760	53.95	-5.67	48.28	74.00	-25.72	Peak

Remarks: Factor = Antenna Factor + Cable loss - Preamp gain – Distance extrapolate factor

Distance extrapolate factor = 20*log(specified distance/measured distance)

Specified distance = 3meters, measured distance = 1.5meters

Result = Reading + Factor

Over Limit = Result - Limit

3.5 RF Conducted Test Data

Test Date:	2024-08-11	Test By:	Ryan Zhang
Environment condition:	Temperature: 25.6°C; Relative Humidity:46%; ATM Pressure: 100.9kPa		

3.5.1 20 dB Emission Bandwidth

BDR

Mode	Value (MHz)	Result
GFSK_Low	0.895	Pass
GFSK_Middle	0.895	Pass
GFSK_High	0.895	Pass

EDR

Mode	Value (MHz)	Result
π/4-DQPSK_Low	1.297	Pass
π/4-DQPSK_Middle	1.291	Pass
π/4-DQPSK_High	1.297	Pass
8DPSK_Low	1.282	Pass
8DPSK_Middle	1.273	Pass
8DPSK_High	1.276	Pass

3.5.2 99% Occupied Bandwidth

BDR

Mode	99% OBW (MHz)
GFSK_Low	0.873
GFSK_Middle	0.876
GFSK_High	0.882

EDR

Mode	99% OBW (MHz)
π/4-DQPSK_Low	1.170
π/4-DQPSK_Middle	1.167
π/4-DQPSK_High	1.170
8DPSK_Low	1.161
8DPSK_Middle	1.164
8DPSK_High	1.161

3.5.3 Maximum Conducted Peak Output Power

BDR

Mode	Value (dBm)	Limit (dBm)	Result
GFSK_Low	-5.07	21.00	Pass
GFSK_Middle	-4.09	21.00	Pass
GFSK_High	-2.97	21.00	Pass

EDR

Mode	Value (dBm)	Limit (dBm)	Result
π/4-DQPSK_Low	-3.57	21.00	Pass
π/4-DQPSK_Middle	-2.61	21.00	Pass
π/4-DQPSK_High	-1.44	21.00	Pass
8DPSK_Low	-3.21	21.00	Pass
8DPSK_Middle	-2.18	21.00	Pass
8DPSK_High	-1.13	21.00	Pass

3.5.4 Channel separation

BDR

Mode	Value (MHz)	Limit (MHz)	Result
GFSK_Low	1.000	0.597	Pass
GFSK_Middle	1.000	0.597	Pass
GFSK_High	1.003	0.597	Pass

EDR

Mode	Value (MHz)	Limit (MHz)	Result
π/4-DQPSK_Low	1.006	0.865	Pass
π/4-DQPSK_Middle	1.000	0.861	Pass
π/4-DQPSK_High	1.003	0.865	Pass
8DPSK_Low	1.003	0.855	Pass
8DPSK_Middle	1.003	0.849	Pass
8DPSK_High	0.997	0.851	Pass

3.5.5 Number of hopping Frequency

BDR

Mode	Value	Limit	Result
GFSK_Hopping	79	15	Pass

EDR

Mode	Value	Limit	Result
π/4-DQPSK_Hopping	79	15	Pass
8DPSK_Hopping	79	15	Pass

3.5.6 Time of occupancy (dwell time)

BDR

Mode	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
GFSK_Hopping_DH1	0.412	0.132	0.400	Pass
GFSK_Hopping_DH3	1.694	0.271	0.400	Pass
GFSK_Hopping_DH5	2.943	0.314	0.400	Pass

EDR

Mode	Pulse width (ms)	Dwell time (s)	Limit (s)	Result
π/4-DQPSK_Hopping_2DH1	0.409	0.131	0.400	Pass
π/4-DQPSK_Hopping_2DH3	1.682	0.269	0.400	Pass
π/4-DQPSK_Hopping_2DH5	2.928	0.312	0.400	Pass
8DPSK_Hopping_3DH1	0.409	0.131	0.400	Pass
8DPSK_Hopping_3DH3	1.679	0.269	0.400	Pass
8DPSK_Hopping_3DH5	2.933	0.313	0.400	Pass

Note:

DH1:Dwell time=Pulse width (ms) ×(1600/2/79) ×31.6 s

DH3:Dwell time=Pulse width (ms) ×(1600/4/79) ×31.6 s

DH5:Dwell time=Pulse width (ms) ×(1600/6/79) ×31.6 s

2DH1: Dwell time=Pulse width (ms) ×(1600/2/79) ×31.6 s

2DH3: Dwell time=Pulse width (ms) ×(1600/4/79) ×31.6 s

2DH5: Dwell time=Pulse width (ms) ×(1600/6/79) ×31.6 s

3DH1: Dwell time=Pulse width (ms) ×(1600/2/79) ×31.6 s

3DH3: Dwell time=Pulse width (ms) ×(1600/4/79) ×31.6 s

3DH5: Dwell time=Pulse width (ms) ×(1600/6/79) ×31.6 s

3.5.7 100 kHz Bandwidth of Frequency Band Edge

BDR

Mode	Value (dB)	Limit (dB)	Result
GFSK_Low	45.38	20.00	Pass
GFSK_High	46.76	20.00	Pass
GFSK_Hopping_Lower	44.95	20.00	Pass
GFSK_Hopping_Upper	45.90	20.00	Pass

EDR

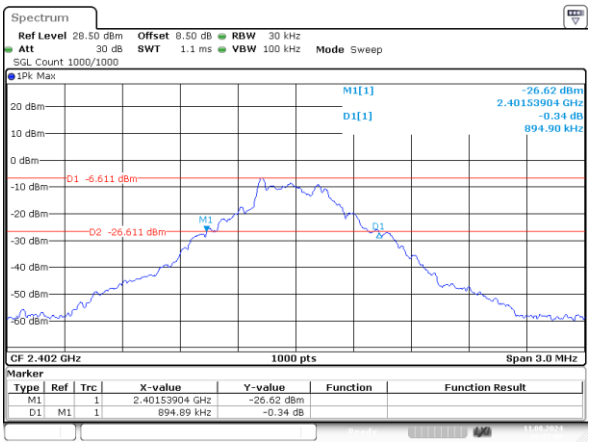
Mode	Value (dB)	Limit (dB)	Result
π/4-DQPSK_Low	43.95	20.00	Pass
π/4-DQPSK_High	44.92	20.00	Pass
π/4-DQPSK_Hopping_Lower	45.16	20.00	Pass
π/4-DQPSK_Hopping_Upper	46.40	20.00	Pass
8DPSK_Low	44.57	20.00	Pass
8DPSK_High	46.72	20.00	Pass
8DPSK_Hopping_Lower	44.78	20.00	Pass
8DPSK_Hopping_Upper	46.72	20.00	Pass

Test Plots:

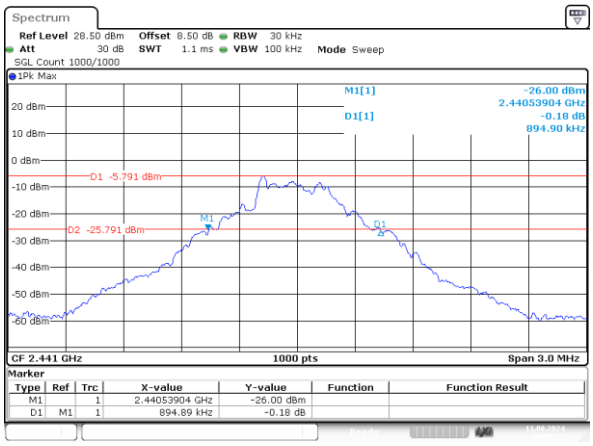
20 dB Emission Bandwidth:

BDR

GFSK_Low 0.895MHz

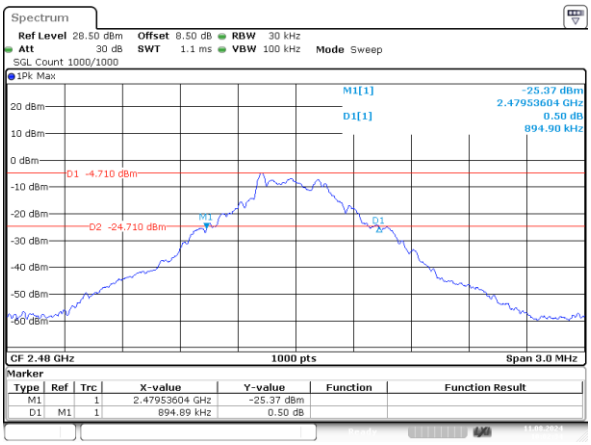


GFSK_Middle 0.895MHz

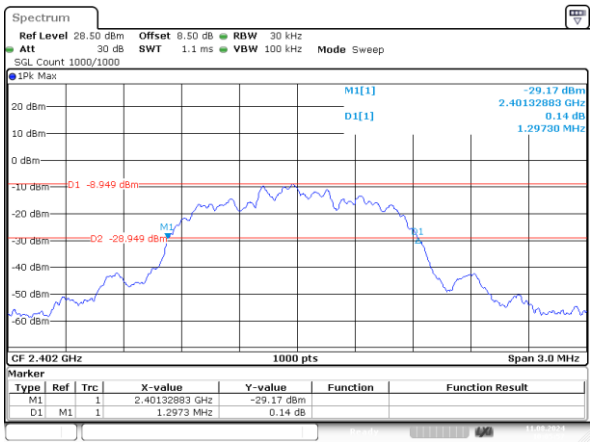


EDR

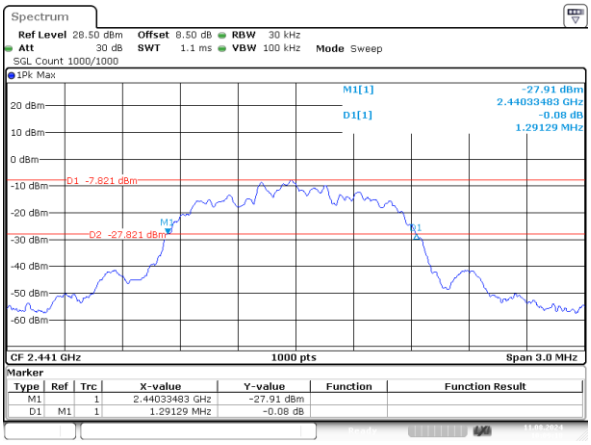
GFSK_High 0.895MHz



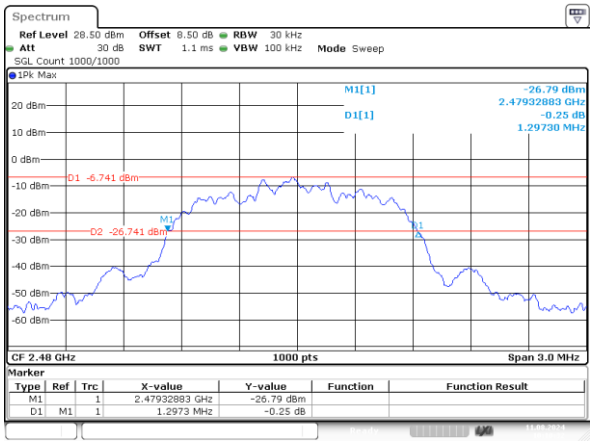
π/4-DQPSK_Low 1.297MHz



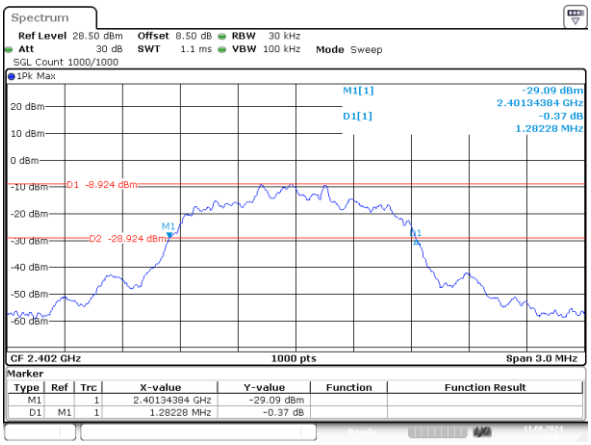
π/4-DQPSK_Middle 1.291MHz



π/4-DQPSK_High 1.297MHz

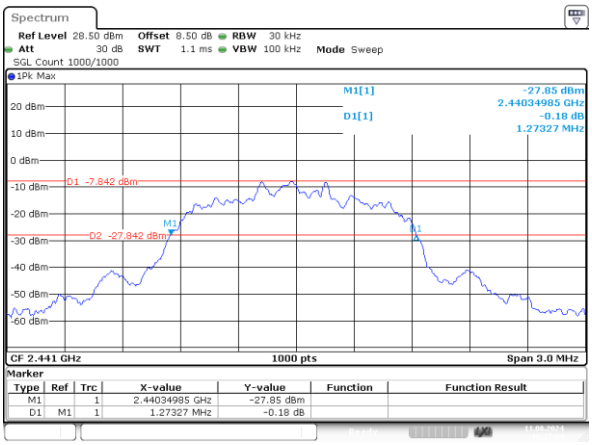


8DPSK_Low 1.282MHz



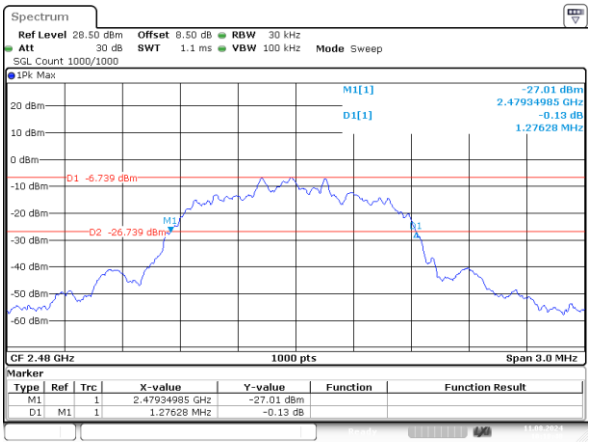
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:14:03

8DPSK_Middle 1.273MHz



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:17:34

8DPSK_High 1.276MHz

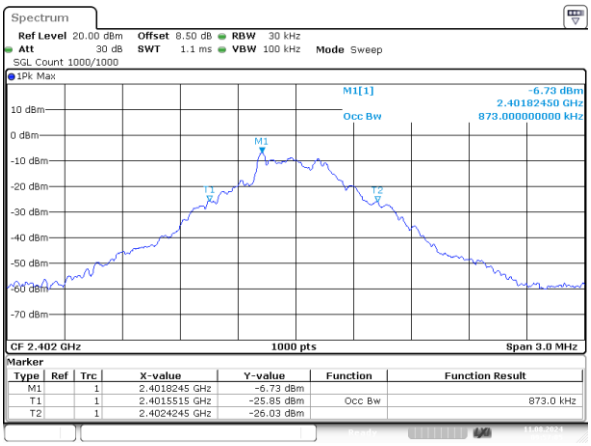


ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:18:49

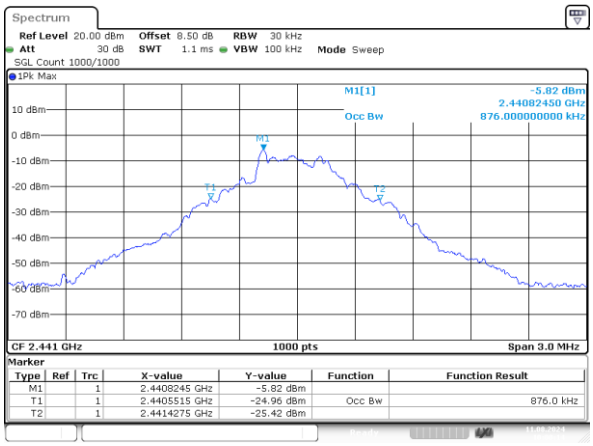
99% Occupied Bandwidth:

BDR

GFSK_Low 0.873MHz

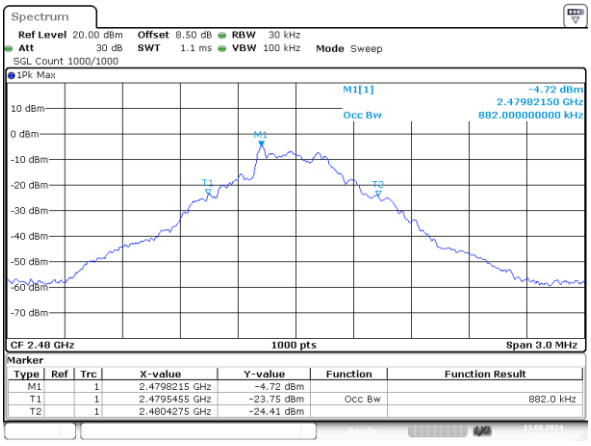


GFSK_Middle 0.876MHz

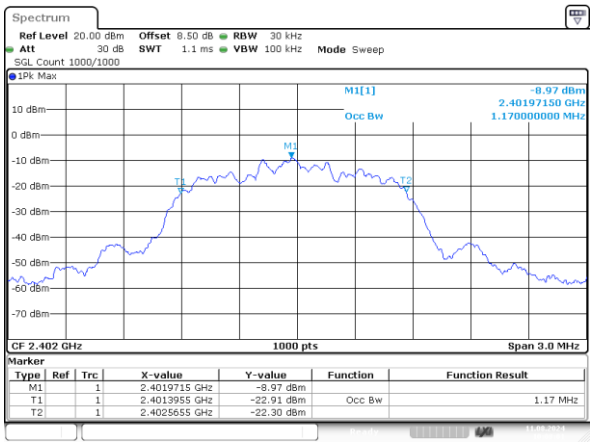


EDR

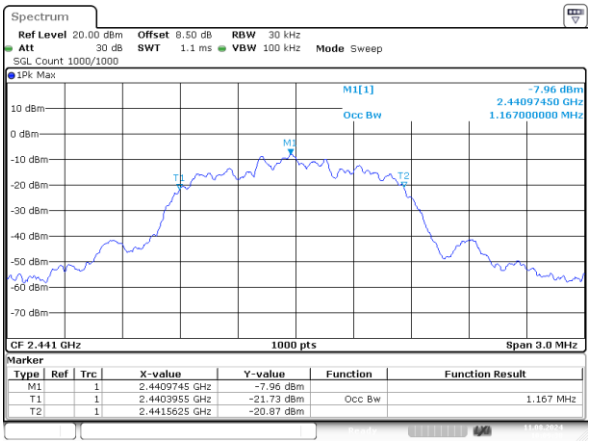
GFSK_High 0.882MHz



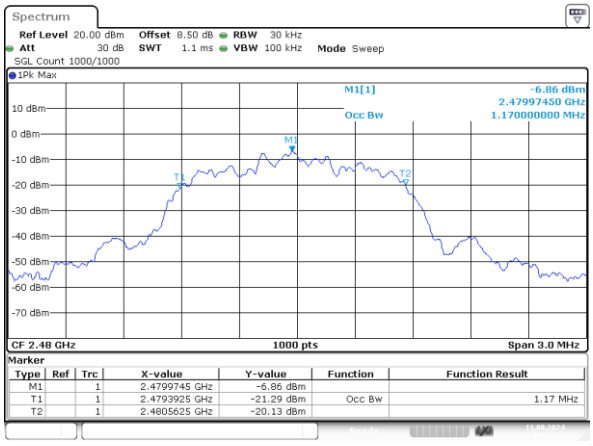
π/4-DQPSK_Low 1.170MHz



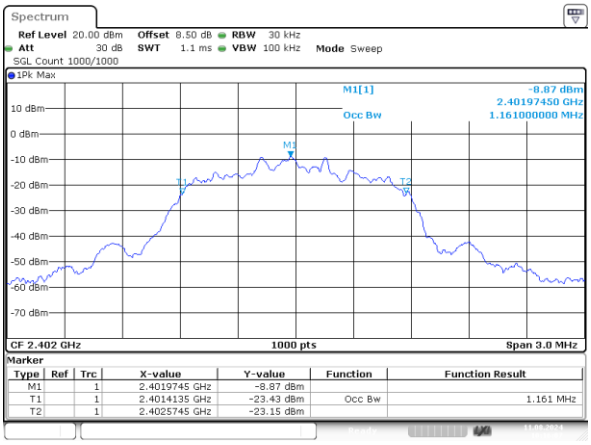
π/4-DQPSK_Middle 1.167MHz



π/4-DQPSK_High 1.170MHz

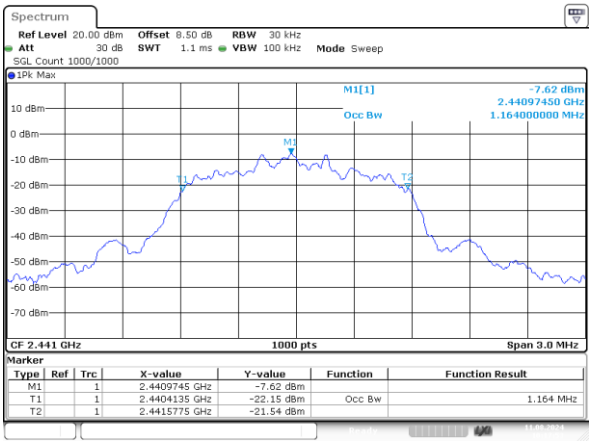


8DPSK_Low 1.161MHz



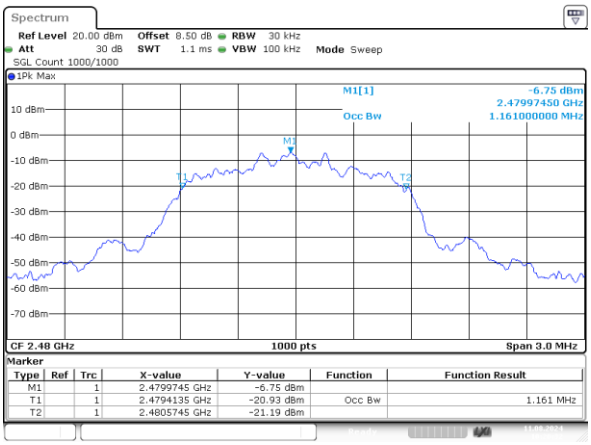
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:16:08

8DPSK_Middle 1.164MHz



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:17:53

8DPSK_High 1.161MHz

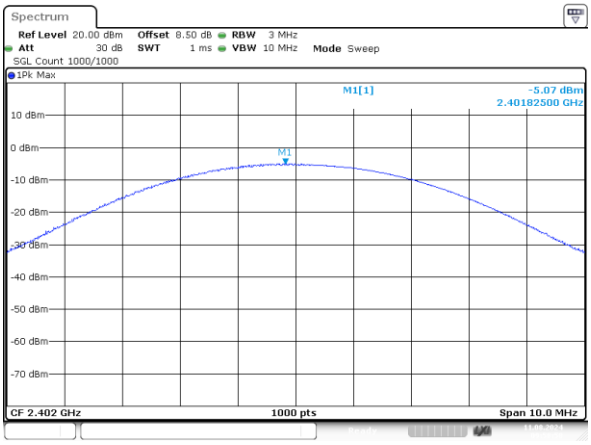


ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:20:32

Maximum Conducted Peak Output Power:

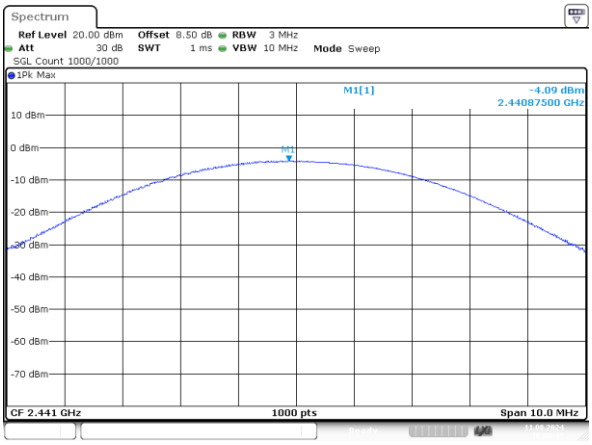
BDR

GFSK_Low -5.07dBm



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 09:58:58

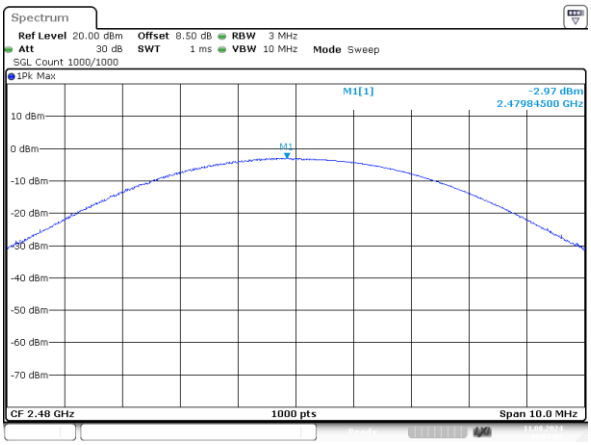
GFSK_Middle -4.09dBm



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:00:49

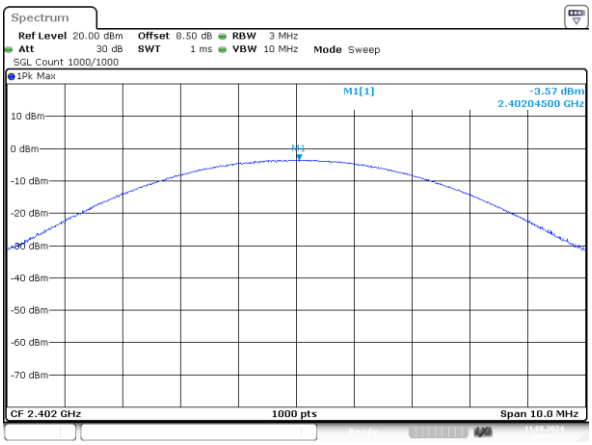
EDR

GFSK_High -2.97dBm



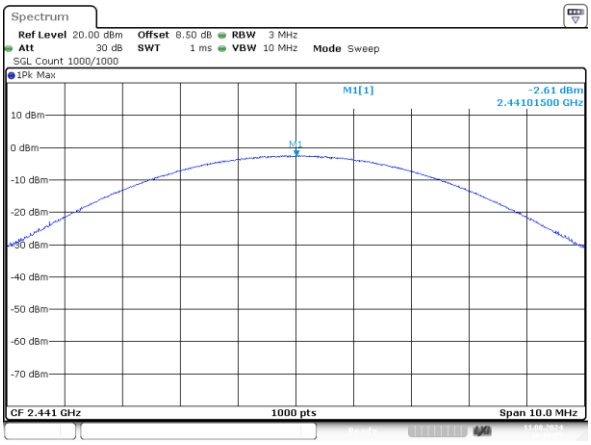
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:05:08

π/4-DQPSK_Low -3.57dBm



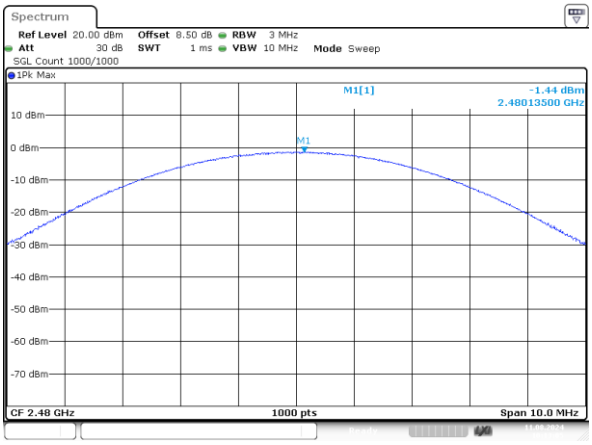
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:08:42

π/4-DQPSK_Middle -2.61dBm



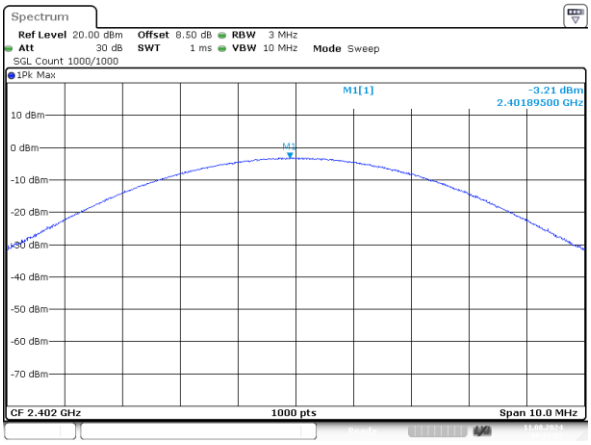
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:10:05

π/4-DQPSK_High -1.44dBm

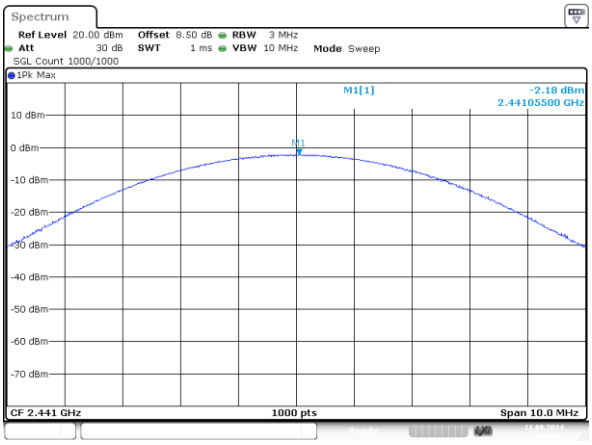


ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:13:05

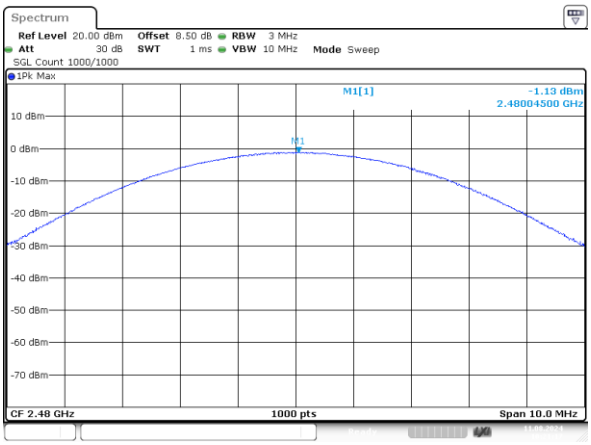
8DPSK_Low -3.21dBm



8DPSK_Middle -2.18dBm



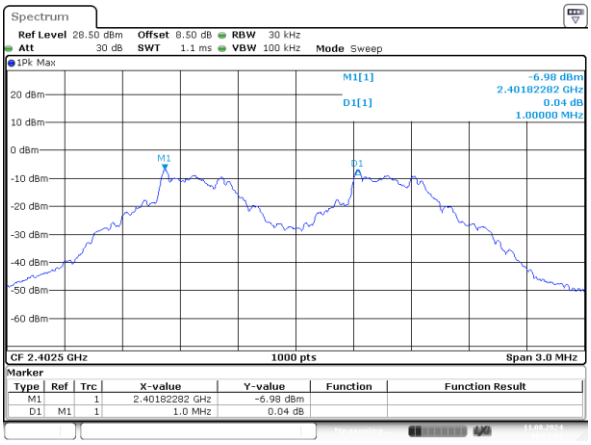
8DPSK_High -1.13dBm



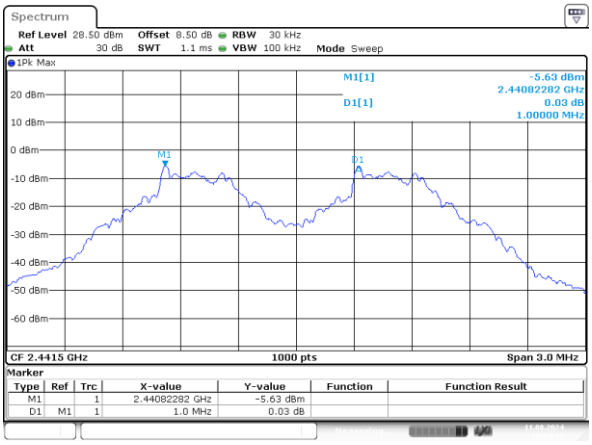
Channel separation:

BDR

GFSK_Low 1MHz

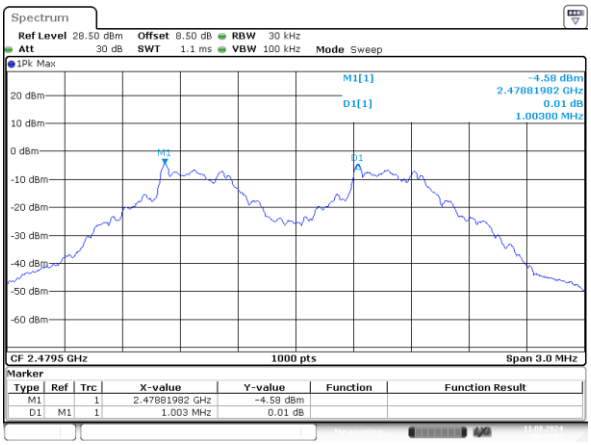


GFSK_Middle 1MHz

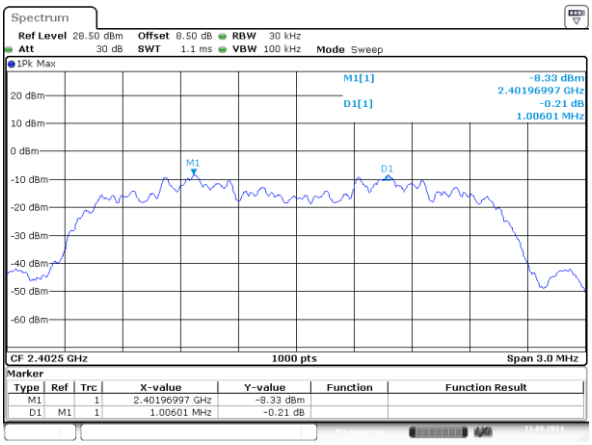


EDR

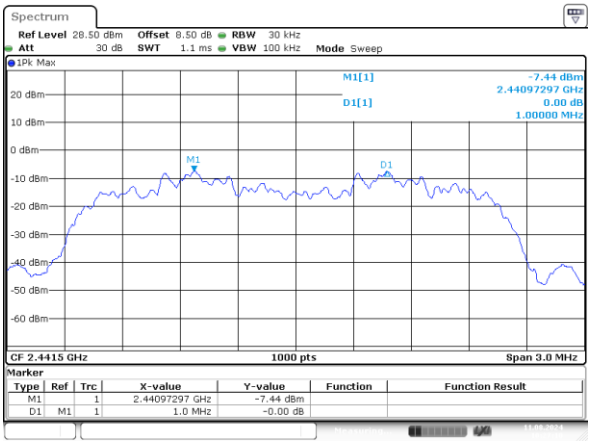
GFSK_High 1.003MHz



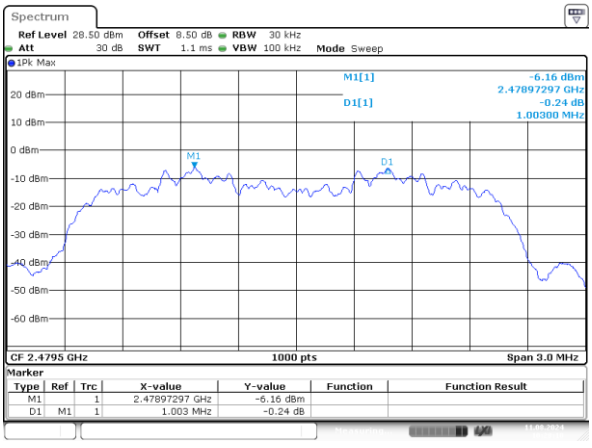
π/4-DQPSK_Low 1.006MHz



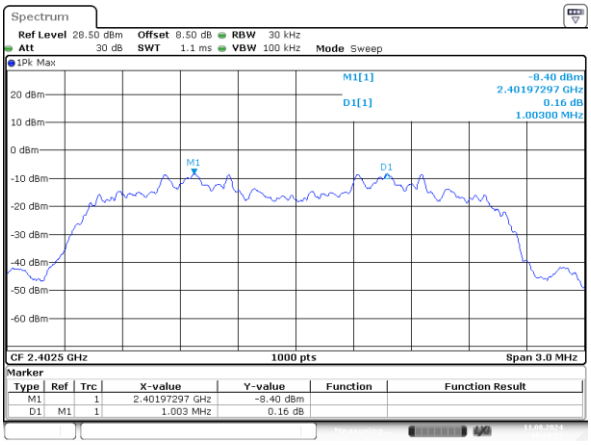
π/4-DQPSK_Middle 1MHz



π/4-DQPSK_High 1.003MHz

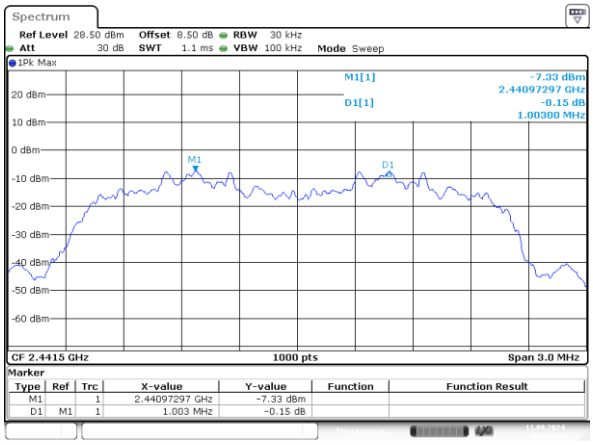


8DPSK_Low 1.003MHz



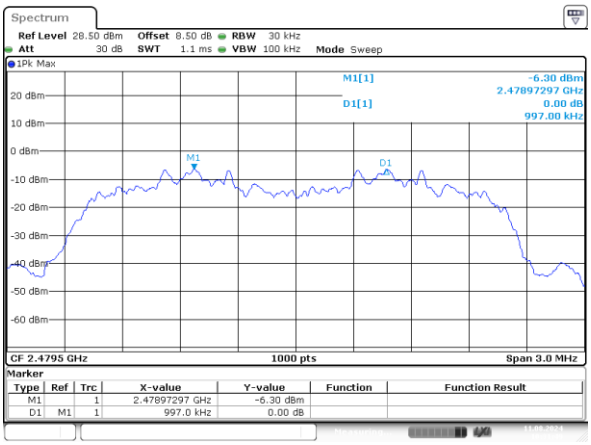
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:29:24

8DPSK_Middle 1.003MHz



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:30:36

8DPSK_High 0.997MHz

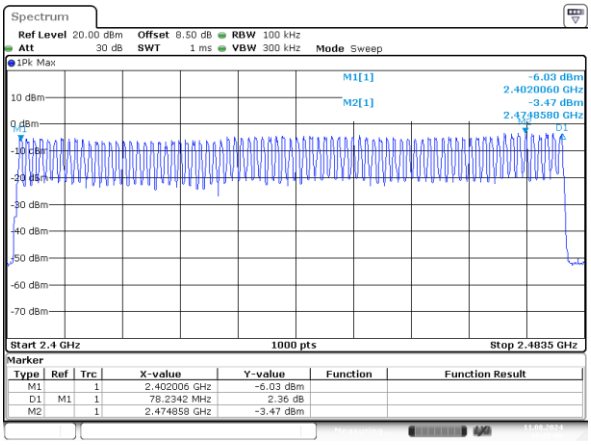


ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:31:49

Number of hopping Frequency

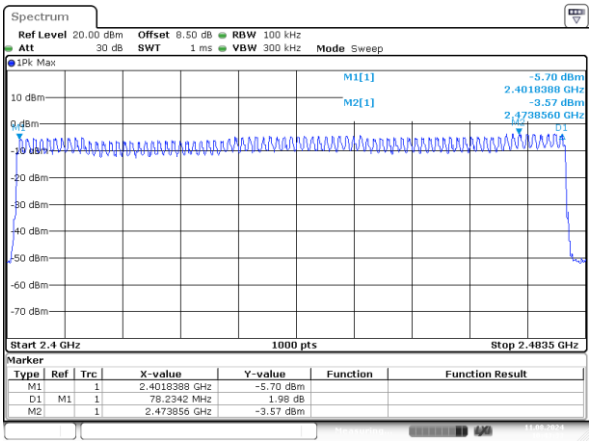
BDR

GFSK_Hopping 79

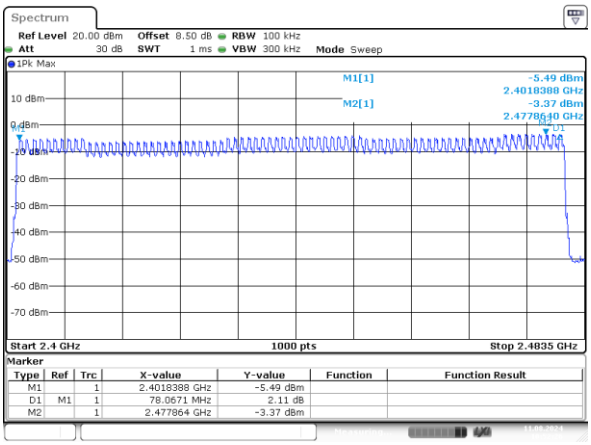


EDR

π/4-DQPSK_Hopping 79



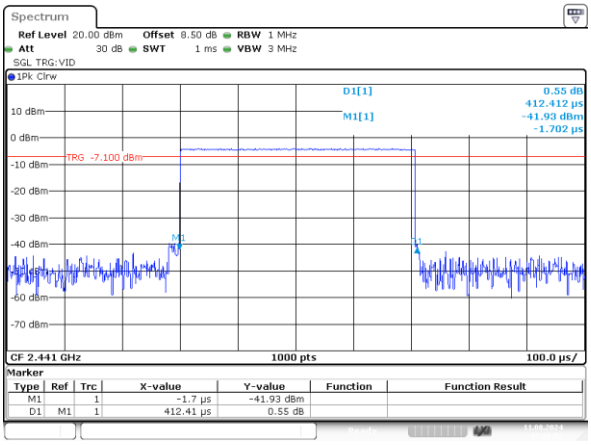
8DPSK_Hopping 79



Time of occupancy (dwell time)

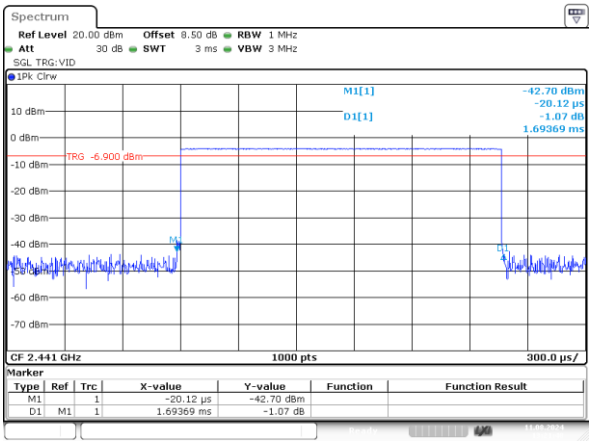
BDR

GFSK_Hopping_DH1 0.412ms



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 13:26:52

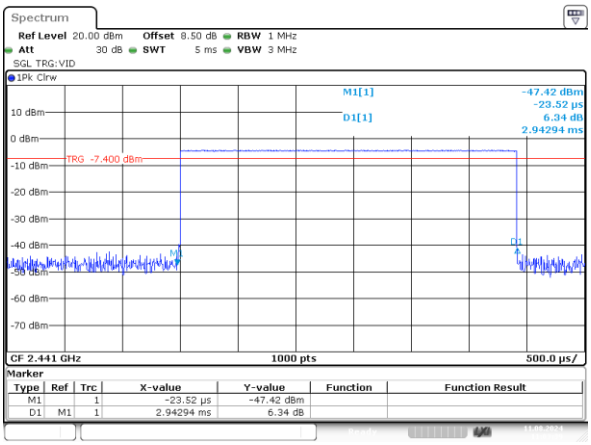
GFSK_Hopping_DH3 1.694ms



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 13:21:48

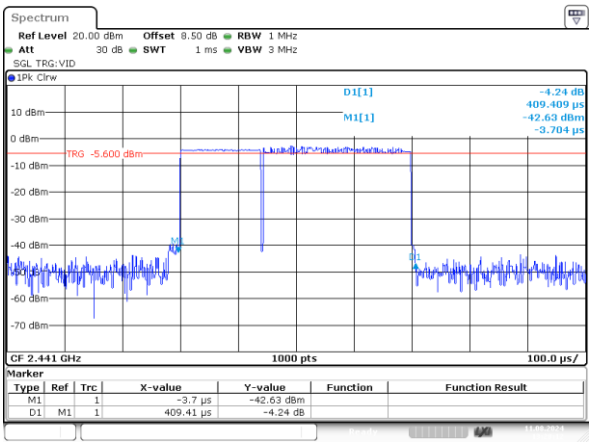
EDR

GFSK_Hopping_DH5 2.943ms



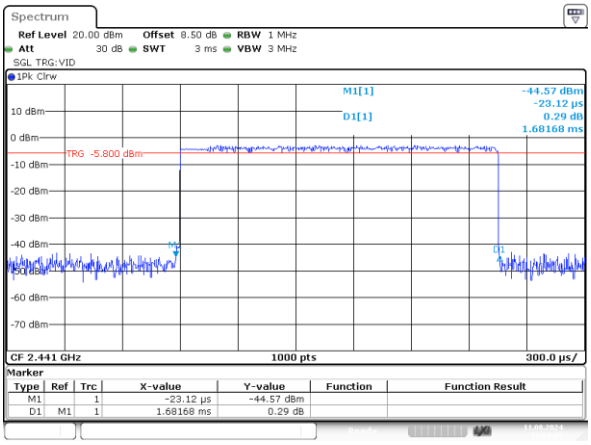
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 11:03:40

π/4-DQPSK_Hopping_2DH1 0.409ms



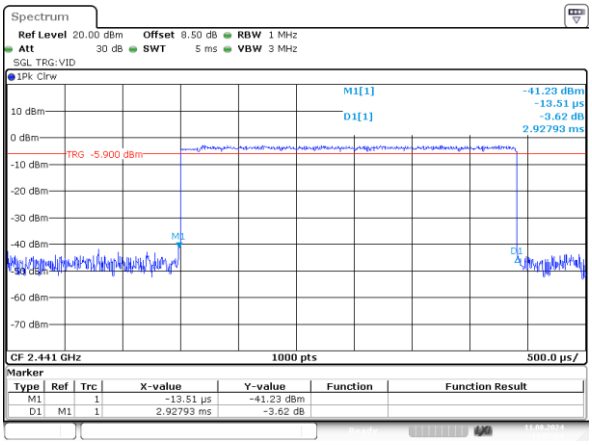
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 13:28:12

π/4-DQPSK_Hopping_2DH3 1.682ms



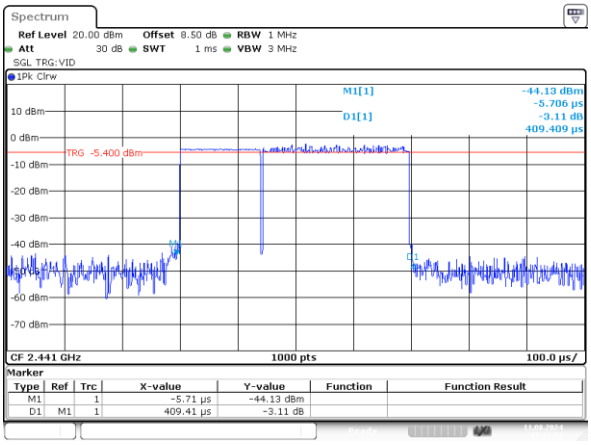
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 11:09:05

π/4-DQPSK_Hopping_2DH5 2.928ms

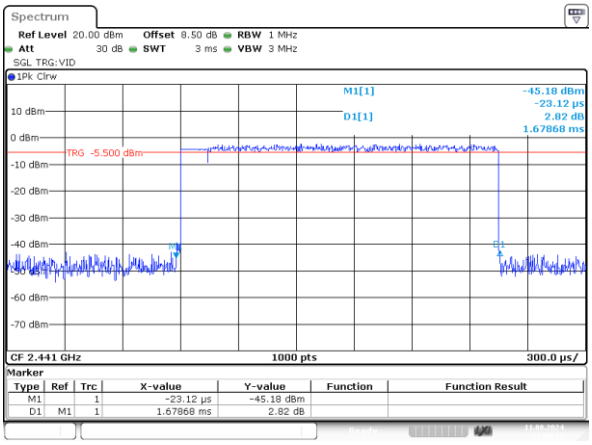


ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 11:05:34

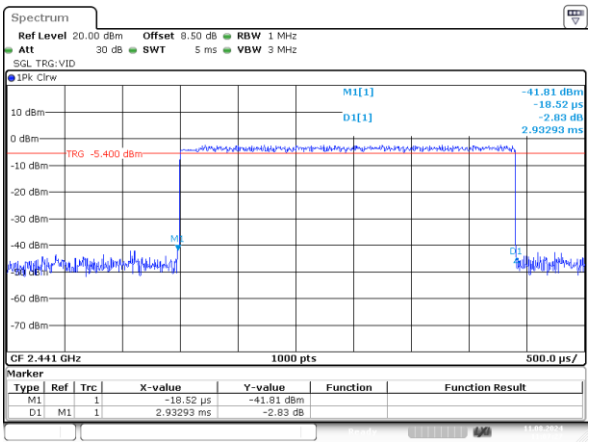
8DPSK_Hopping_3DH1 0.409ms



8DPSK_Hopping_3DH3 1.679ms



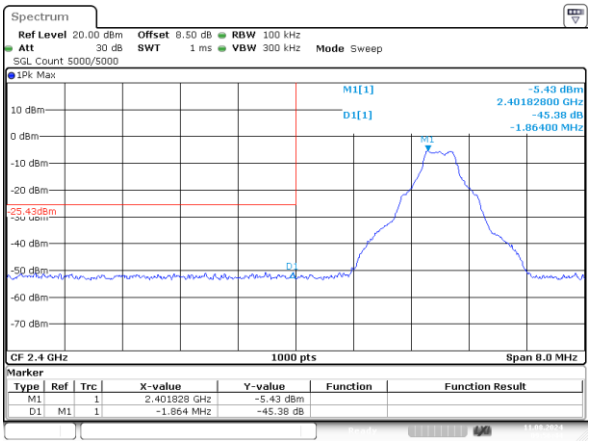
8DPSK_Hopping_3DH5 2.933ms



100kHz Bandwidth of Frequency Band Edge:

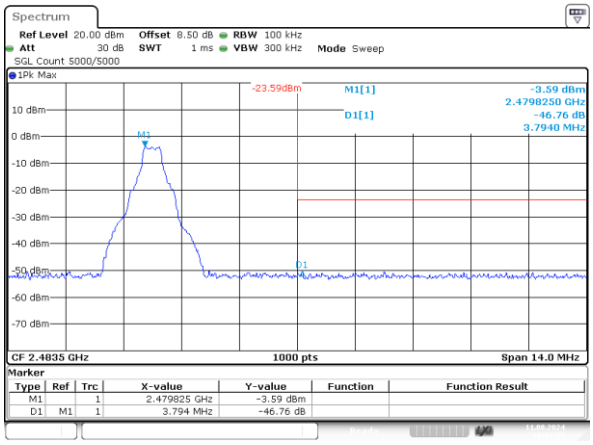
BDR

GFSK_Low 45.38dB



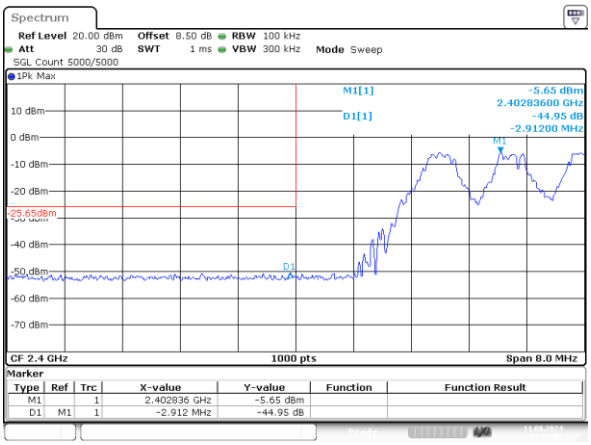
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 09:56:45

GFSK_High 46.76dB



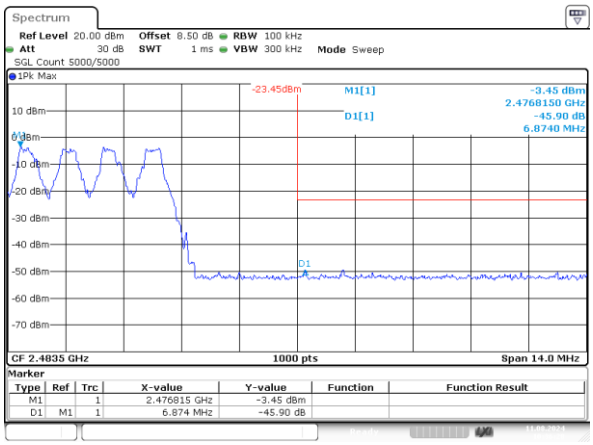
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:03:55

GFSK_Hopping_Lower 44.95dB



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:35:03

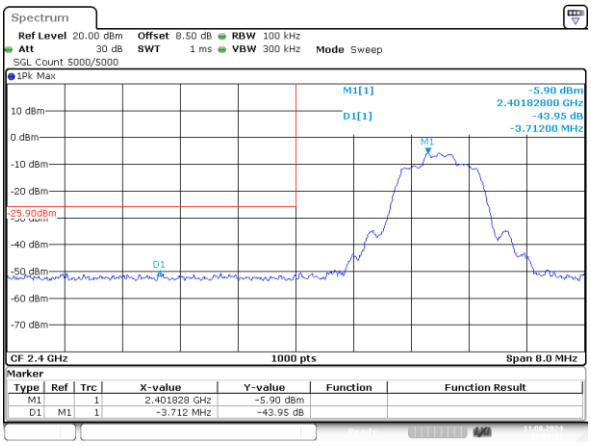
GFSK_Hopping_Upper 45.90dB



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:36:28

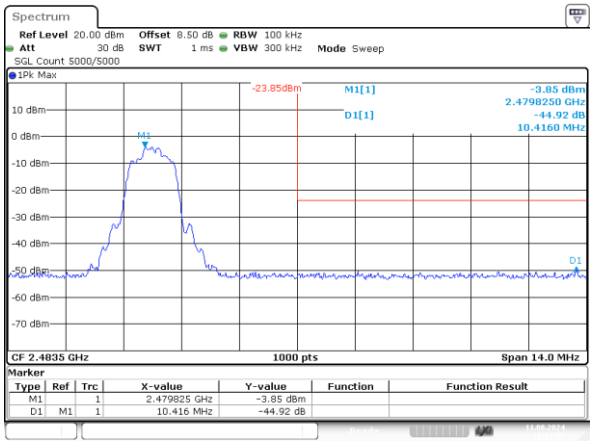
EDR

π/4-DQPSK_Low 43.95dB



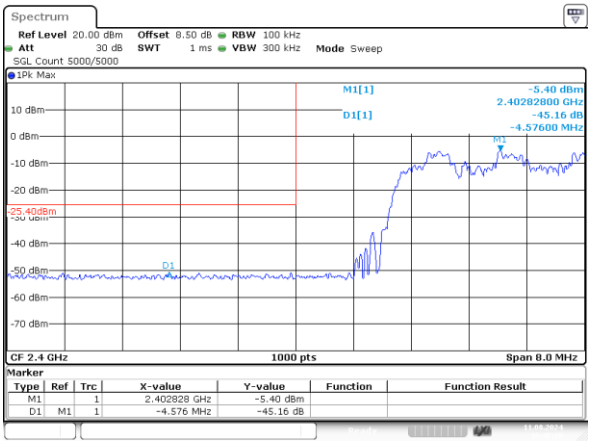
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:07:41

π/4-DQPSK_High 44.92dB



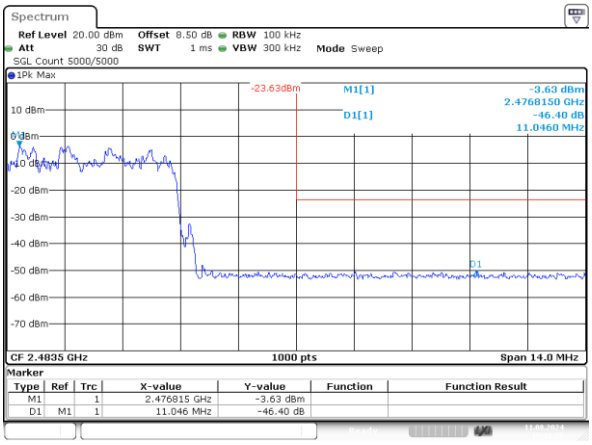
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:11:55

π/4-DQPSK_Hopping_Lower 45.16dB



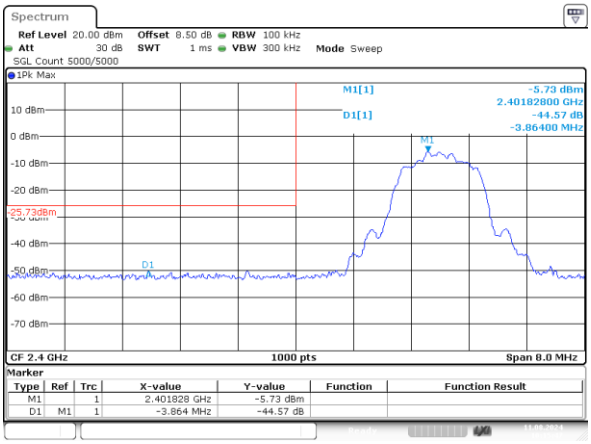
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:40:10

π/4-DQPSK_Hopping_Upper 46.40dB



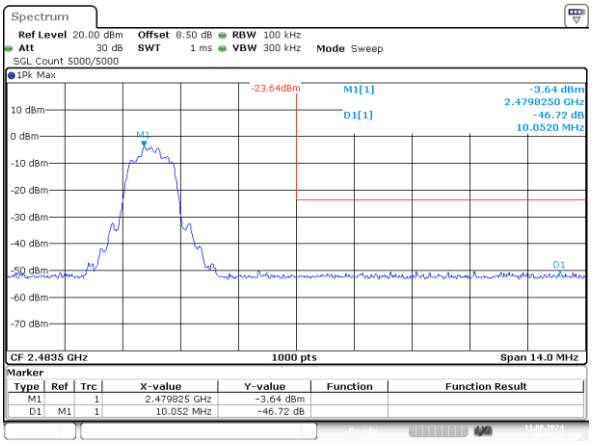
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:41:35

8DPSK_Low 44.57dB



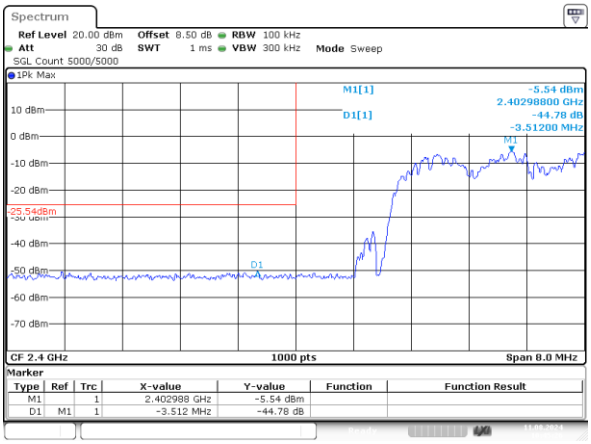
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:15:47

8DPSK_High 46.72dB



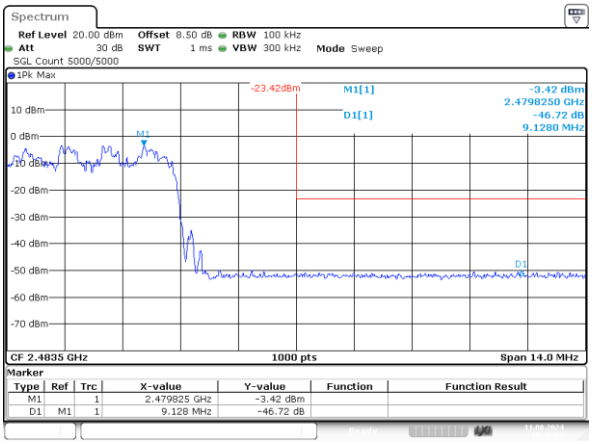
ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:20:12

8DPSK_Hopping_Lower 44.78dB



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:45:27

8DPSK_Hopping_Upper 46.72dB



ProjectNo.:2405W56213E-RF Tester:Ryan Zhang
Date: 11.AUG.2024 10:46:51

4 Test Setup Photo

Please refer to the attachment 2405W56213EB Test Setup photo.

5 E.U.T Photo

Please refer to the attachment 2405W56213E External photo and 2405W56213E Internal photo.

---End of Report---