

RADIO TEST REPORT

Applicant..... : Abbingdon Global Limited
Address..... : 79 SCARISBRICK NEW ROAD SOUTHPORT ENGLAND PR&8 6LJ
Manufacturer..... : Dongguan Kaiyun Technology Co., Ltd
Address..... : No. 1, Jinhe Wenming 4th Street, Zhangmutou Town, Dongguan
City,Guangdong Province
Factory..... : Dongguan Kaiyun Technology Co., Ltd
Address..... : No. 1, Jinhe Wenming 4th Street, Zhangmutou Town, Dongguan
City,Guangdong Province
Product Name..... : TWS DAC Amp
Brand Name..... : iFi
Model No. : GO pod, GO pod Air (For model difference refer to section 2)
Measurement Standard..... : Article 2 Paragraph 1 of Certification Ordinance Item 19
Receipt Date of Samples.... : August 30, 2022
Date of Tested..... : August 30, 2022 to September 19, 2022
Date of Report..... : June 20, 2025

This report shows that above equipment is technically compliant with the requirements of the standards above.
All test results in this report apply only to the tested sample(s). Without prior written approval of Dongguan Nore
Testing Center Co., Ltd, this report shall not be reproduced except in full.



Prepared by

Alina Guo / Project Engineer



Approved by

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Revision History

[illegible]

1. Summary of Test Result

Section (ARIB STD-T66)	Description of Test	Result	Remarks
3.2(1) Article 49-20	Spread Spectrum Method	N/A	---
3.2(2) Article 49-20	Antenna Power	PASS	---
3.2(3) Article 14	Antenna Power Tolerance	PASS	---
3.2(4) Article 5, Attached Table No.1	Frequency Tolerance	PASS	---
3.2(5)	Transmission rate	N/A	---
3.2(6) Article 7	Spurious emission intensity	PASS	---
3.3(1) Article 24	Limit on secondary radiated emissions	PASS	---
3.2(7) Article 6, Attached Table No.2	Occupied Bandwidth	PASS	---
3.2(8) Article 49-20	Spreading Bandwidth	---	Reporting only
3.6(2) Article 49-20	Transmitting Antenna Absolute Gain	N/A	Only for EIRP > 12.14dBm/MHz
3.6(2) Article 49-20	Half Power Beam Angle	N/A	Only for EIRP > 12.14dBm/MHz
Article 49-20	Carrier Sensing Function	N/A	---
3.2(11) Article 49-20	Dwell time	PASS	---
Article 49-20	Number of Carrier	N/A	---
Article 6-2, Article 9-4	Interference Prevention Function	PASS	---
Article 49-20	Spreading Factor	N/A	---

Note:

1. Test method is conducted according ARIB STD-T66 Version 3.7-E1 which is based on MIC Notice No.88 Appendix No.43 (Item 19, Paragraph 1, Article 2).
2. N/A means not applicable.
3. The new regulations have removed the lower limit requirement for power and the limit requirement for Spreading bandwidth. As the testing methods have not been updated, the original data were continued to be referenced.

2. General Information

Product Information	
Product Name:	TWS DAC Amp
Main Model Name:	GO pod
Additional Model Name:	GO pod Air
Model Difference:	Both of models have the same circuit schematic, construction, PCB Layout and critical components. Their differences are model name and appearance of enclosure due to the trading purpose.
S/N:	2208-4328
Brand Name:	iFi
Hardware version:	V01
Software version:	V01
Rating:	DC 5V 2A from Charging box or DC 3.8V from li-ion battery for each unit
Test Voltage:	DC 3.8V (Normal Voltage)
I/O Port:	Reference the user's manual
Accessories Information	
Adapter:	N/A
Cable:	N/A
Other:	N/A

Additional information

Note:	According to these model differences, all tests were performed on model GO pod.
Remark:	All the information above are provided by the manufacturer. More detailed feature of the EUT please refers to the user manual.

Revision History

1. This report was an additional report based on original report NTC2208390EV00. 2. Compared with the original report, this report added one model name, changed manufacturer and factory. Details as below:	
Before change	After change
M/N: GO pod Manufacturer/Factory: Dongguan Kaiyun Electronic Industry Co., Ltd. Room 101, No.31, Yanhe Road, Jinhe, Zhangmutou Town, Dongguan City, Guangdong Province, China	M/N: GO pod, GO pod Air Manufacturer/Factory: Dongguan Kaiyun Technology Co., Ltd No. 1, Jinhe Wenming 4th Street, Zhangmutou Town, Dongguan City, Guangdong Province
3. The new model GO pod Air is the same as model GO pod except the model name and appearance of enclosure.	
4. According to these changes, the test result will not be affected, the original data and photos were continued to be referenced. details refer to the report.	

Technical Specification (Bluetooth)

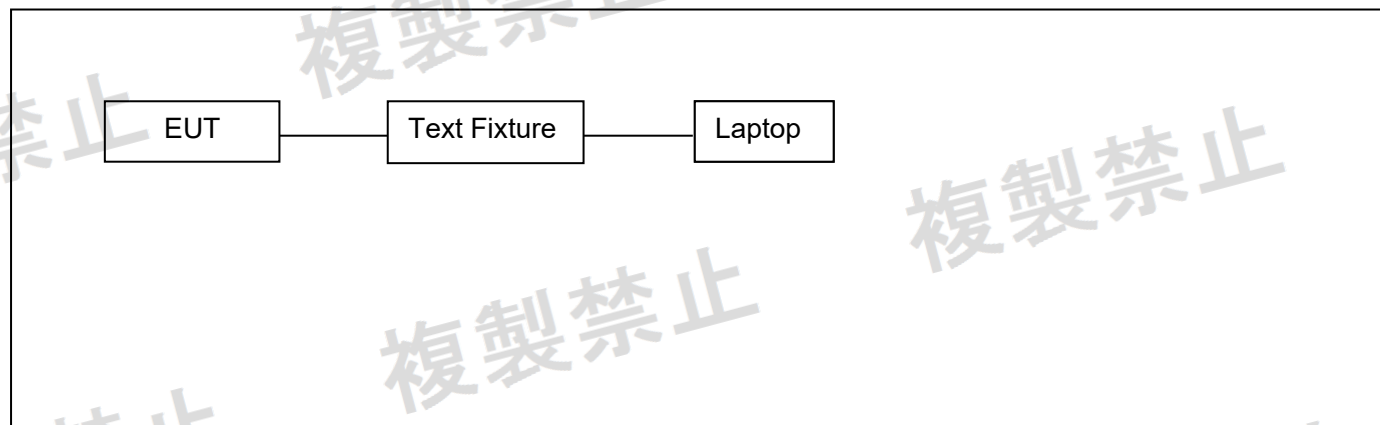
Bluetooth Version:	V5.2
Frequency Range:	2402-2480MHz
Modulation Type:	GFSK, $\pi/4$ -DQPSK, 8DPSK
Number of Channel:	79 (refer to following channel list for details)
Channel Space:	1MHz
Antenna Type:	PIFA Antenna
Antenna Gain:	0 dBi (Declared by manufacturer)
Note: This report only replies to BDR +EDR feature of the EUT.	

Channel List							
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2422	40	2442	60	2462
1	2403	21	2423	41	2443	61	2463
2	2404	22	2424	42	2444	62	2464
3	2405	23	2425	43	2445	63	2465
4	2406	24	2426	44	2446	64	2466
5	2407	25	2427	45	2447	65	2467
6	2408	26	2428	46	2448	66	2468
7	2409	27	2429	47	2449	67	2469
8	2410	28	2430	48	2450	68	2470
9	2411	29	2431	49	2451	69	24721
10	2412	30	2432	50	2452	70	2472
11	2413	31	2433	51	2453	71	2473
12	2414	32	2434	52	2454	72	2474
13	2415	33	2435	53	2455	73	2475
14	2416	34	2436	54	2456	74	2476
15	2417	35	2437	55	2457	75	2477
16	2418	36	2438	56	2458	76	2478
17	2419	37	2439	57	2459	77	2479
18	2420	38	2440	58	2460	78	2480
19	2421	39	2441	59	2461	----	----

3. Test Channels and Modes Detail

Mode		Channel		Frequency (MHz)	Modulation
1.	TX (Hopping)	0-78		2402 – 2480	GFSK/ $\pi/4$ -DQPSK/ 8DPSK
2.	TX (Un-modulation)	Low	0	2402	----
		Middle	39	2441	----
		High	78	2480	----
3.	TX	Low	0	2402	GFSK/ $\pi/4$ -DQPSK/ 8DPSK
		Middle	39	2441	GFSK/ $\pi/4$ -DQPSK/ 8DPSK
		High	78	2480	GFSK/ $\pi/4$ -DQPSK/ 8DPSK
4.	RX	Low	0	2402	GFSK/ $\pi/4$ -DQPSK/ 8DPSK
		Middle	39	2441	GFSK/ $\pi/4$ -DQPSK/ 8DPSK
		High	78	2480	GFSK/ $\pi/4$ -DQPSK/ 8DPSK
5.	Normal Mode	---	---	---	---

4. Block Diagram of Configuration (Conduction connection)



5. Modification of EUT

No modifications are made to the EUT during all test items.

6. Description Support Device

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.

No.	Equipment	Brand	M/N	S/N	Cable Specification	Remarks
1.	Laptop	DELL	VOSTR03400	H3K2XA01	Power cord: 1.15m, unshielded	Provide by the Lab
2.	Power supply of the Laptop	DELL	HA45NM140	N/A	---	Provide by the Lab
3.	Test fixture	---	---	---	----	Provide by the Lab

No.	Test Software	Modulation	Power Setting
1.	BlueTest3 3.3.15	GFSK	3
2.		$\pi/4$ -DQPSK	3
3.		8DPSK	3

7. Test Facility and Location

Test Site	:	Dongguan Nore Testing Center Co., Ltd. (Dongguan NTC Co., Ltd.)
Accreditations and Authorizations	:	The Laboratory has been assessed and proved to be in compliance with CNAS/CL01 Listed by CNAS, August 13, 2018 The Certificate Registration Number is L5795. The Certificate is valid until August 13, 2030 The Laboratory has been assessed and proved to be in compliance with ISO17025 Listed by A2LA, November 01, 2017 The Certificate Registration Number is 4429.01 The Certificate is valid until December 31, 2025 Listed by FCC, November 06, 2017 Test Firm Registration Number: 907417 Listed by Industry Canada, June 08, 2017 The Certificate Registration Number. Is 46405-9743A
Test Site Location	:	Building D, Gaosheng Science and Technology Park, Hongtu Road, Nancheng District, Dongguan City, Guangdong Province, China

8. Applicable Standards and References

According to the specifications of the manufacturer, the EUT must comply with the requirements of the following standards:

Test Standards:

Article 2 Paragraph 1 of Certification Ordinance Item 19

Test method is conducted according ARIB STD-T66 Version 3.7-E1 which is based on MIC Notice No.88

Appendix No.43 (Item 19, Paragraph 1, Article 2).

9. Deviations and Abnormalities from Standard Conditions

No additions, deviations and exclusions from the standard.

10. Test Conditions

No.	Test Item	Test Mode	Test Voltage	Tested by	Remarks
1.	Frequency tolerance	2	☒ NV ☐ LV ☐ HV	Sean	See note 1
2.	Permissible value for occupied bandwidth	1	☒ NV ☐ LV ☐ HV	Sean	See note 1
3.	Spread bandwidth	1	☒ NV ☐ LV ☐ HV	Sean	See note 1
4.	Spurious emission intensity	1, 3	☒ NV ☐ LV ☐ HV	Sean	See note 1
5.	Limit on secondary radiated emissions	4	☒ NV ☐ LV ☐ HV	Sean	See note 1
6.	Antenna power	1	☒ NV ☐ LV ☐ HV	Sean	See note 1
7.	Tolerances for antenna power	1	☒ NV ☐ LV ☐ HV	Sean	See note 1
8.	Transmission Radiation Angle Width	--	☐ NV ☐ LV ☐ HV	--	--
9.	Transmission Antenna Gain	--	☐ NV ☐ LV ☐ HV	--	--
10.	Dwell time	1	☒ NV ☐ LV ☐ HV	Sean	See note 1
11.	Spreading Factor	1	☒ NV ☐ LV ☐ HV	Sean	See note 1
12.	Interference Prevention Function	5	☒ NV ☐ LV ☐ HV	Sean	See note 1

Note:

- The testing climatic conditions for temperature, humidity, and atmospheric pressure are within: 24℃, 55%, 101kPa.
- NV= Normal Voltage; LV= Low Voltage = 90% x Normal Voltage; HV= High Voltage = 110% x Normal Voltage.
- During the input supply voltage to the EUT from the external power source is varied by +/- 10%, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition test, EUT only operated in normal voltage to test all regulations.

Extremity input voltage		RF circuit voltage	RF circuit voltage variation
NV	DC 3.8V	DC 3.3V	0%
LV	DC 4.18V	DC 3.3V	0%
HV	DC 3.42V	DC 3.3V	0%

11. Measurement Uncertainty

Test Item	Measurement Uncertainty
Uncertainty for Conduction Spurious emission Measurement:	$\pm 0.98\text{dB}$
Uncertainty for Output power Measurement:	$\pm 0.78\text{dB}$
Uncertainty for Power density Measurement:	$\pm 1.76\text{dB}$
Uncertainty for Frequency range Measurement:	$\pm 0.94\text{KHz}$
Uncertainty for Bandwidth Measurement:	$\pm 0.94\text{KHz}$
Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.	

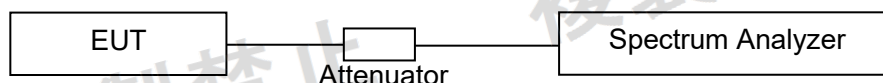
12. Test Item and Test Result

12.1 Frequency tolerance

LIMITS

Standard	Item	Limit
Item 19 of Article 2-1	Tolerance of Frequency	$\leq \pm 50$ ppm

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

1. The antenna port of the EUT was connected to the input of a spectrum analyzer. And analyzer was set as below:
 - a. Set center frequency to test frequency
 - b. Set the span to 500 KHz.
 - c. Set the RBW to 10 KHz
 - d. Set the VBW $\geq$ RBW
 - e. Set the Detector = peak
 - f. Set the Sweep time = auto couple
 - g. Set the Trace mode = max hold
 - h. Allow trace to fully stabilize
2. Use the peak marker function to determine the frequency tolerance.

TEST RESULTS

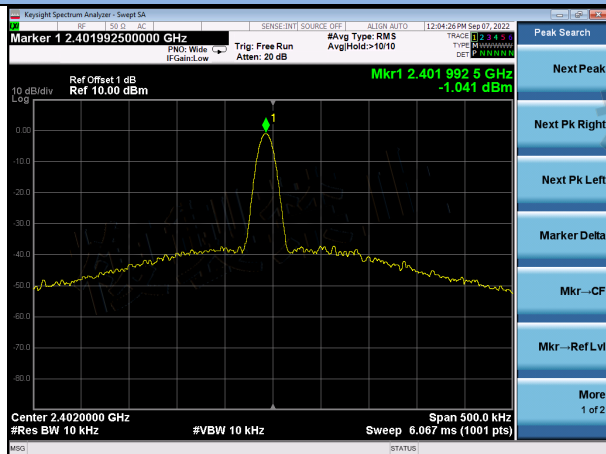
PASS

Please refer to the following tables.

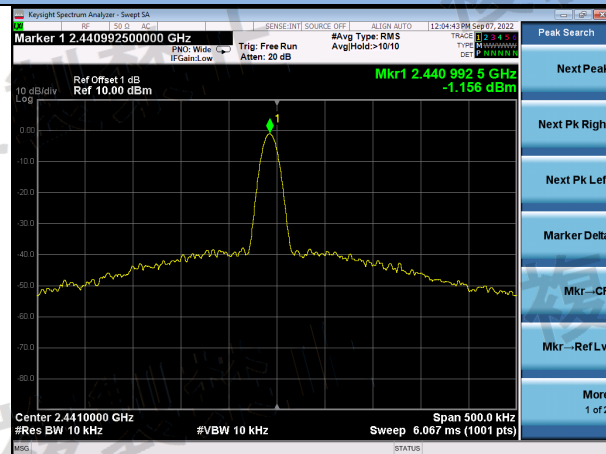
Test Date: September 07, 2022		Test Result: PASS		
Frequency (MHz)	Test Power	Test Result (MHz)	Frequency Error (ppm)	Limit
TX (Un-modulation)				
2402	NV	2401.9925	-3.12	±50ppm
	LV	----	----	----
	HV	----	----	----
2441	NV	2440.9925	-3.07	±50ppm
	LV	----	----	----
	HV	----	----	----
2480	NV	2479.9925	-3.02	±50ppm
	LV	----	----	----
	HV	----	----	----

Test Plots - (Normal Voltage)

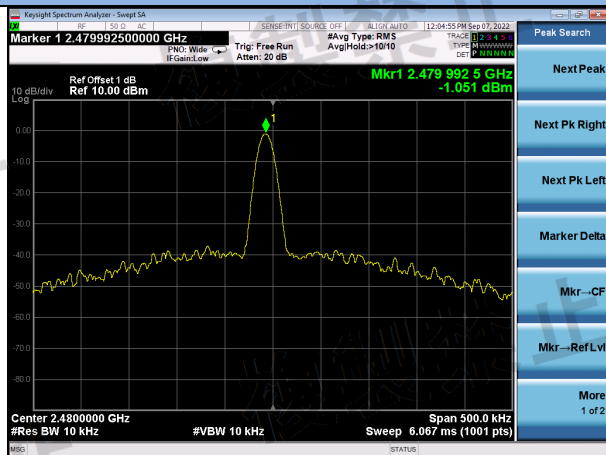
2402MHz



2441MHz



2480MHz



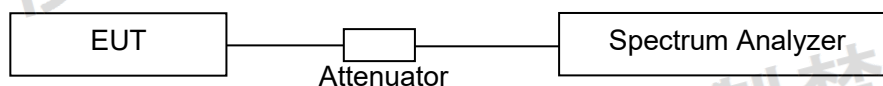
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12.2 Occupied Bandwidth (99%)

LIMITS

Standard	Type	Limit
Item 19 of Article 2-1	DSSS	<26MHz
	FHSS	<83.5MHz
	OFDM	<26MHz or <26~40MHz
	Others	<26MHz

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

- The antenna port of the EUT was connected to the input of a spectrum analyzer. And analyzer was set as below:
 - Set frequency to 2402 ~ 2480 MHz
 - Set the RBW to 1 MHz
 - Set the VBW $\geq$ RBW
 - Set the span to 107.5 MHz.
 - Set the Detector = peak
 - Set the Sweep time = auto couple
 - Set the Trace mode = max hold
 - Allow trace to fully stabilize
- Use the 99% occupied bandwidth function to determine the occupied bandwidth.

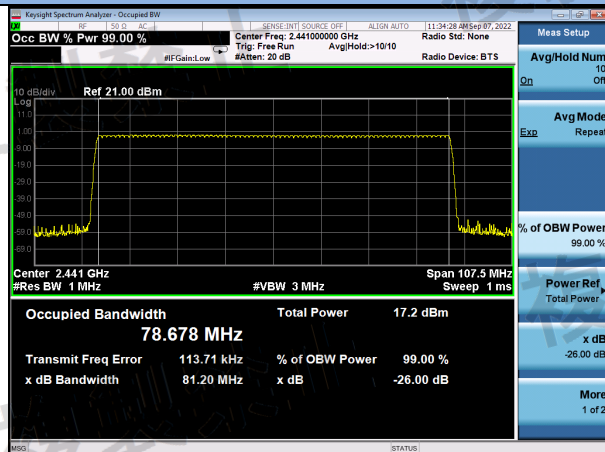
TEST RESULTS

PASS

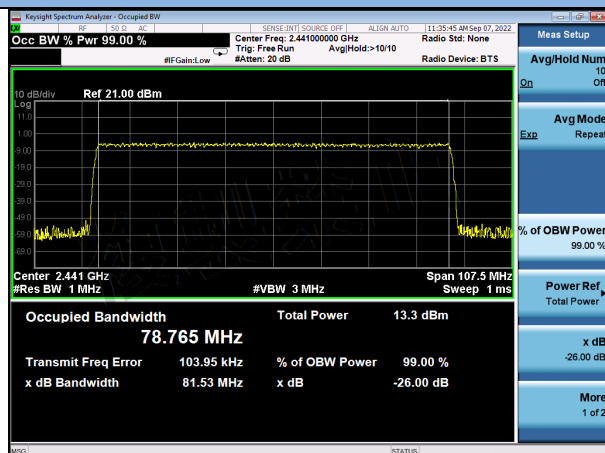
Please refer to the following tables.

Test Date: September 07, 2022		Test Result: PASS		
Frequency (MHz)	Test Power	Packet Type	Test Result (MHz)	Limit
TX Hopping (GFSK)				
2402-2480	NV	DH1	78.684	≤83.5MHz
		DH3	78.678	≤83.5MHz
		DH5	78.681	≤83.5MHz
	LV	DH1	----	----
		DH3	----	----
		DH5	----	----
	HV	DH1	----	----
		DH3	----	----
		DH5	----	----
TX Hopping (π/4-DQPSK)				
2402-2480	NV	2-DH1	78.765	≤83.5MHz
		2-DH3	78.851	≤83.5MHz
		2-DH5	78.842	≤83.5MHz
	LV	2-DH1	----	----
		2-DH3	----	----
		2-DH5	----	----
	HV	2-DH1	----	----
		2-DH3	----	----
		2-DH5	----	----
TX Hopping (8DPSK)				
2402-2480	NV	3-DH1	78.699	≤83.5MHz
		3-DH3	78.762	≤83.5MHz
		3-DH5	78.859	≤83.5MHz
	LV	3-DH1	----	----
		3-DH3	----	----
		3-DH5	----	----
	HV	3-DH1	----	----
		3-DH3	----	----
		3-DH5	----	----

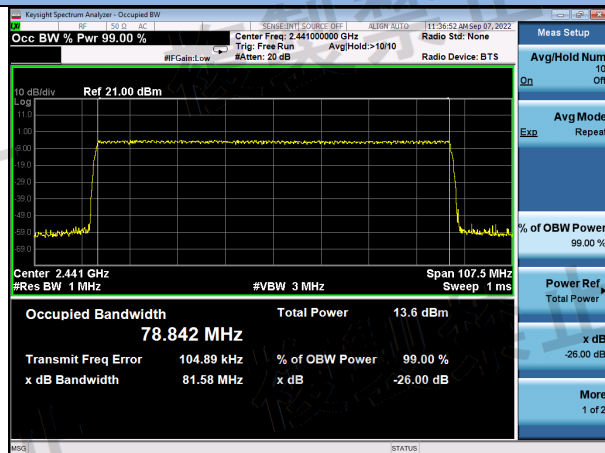
GFSK DH3



π/4-DQPSK 2-DH1

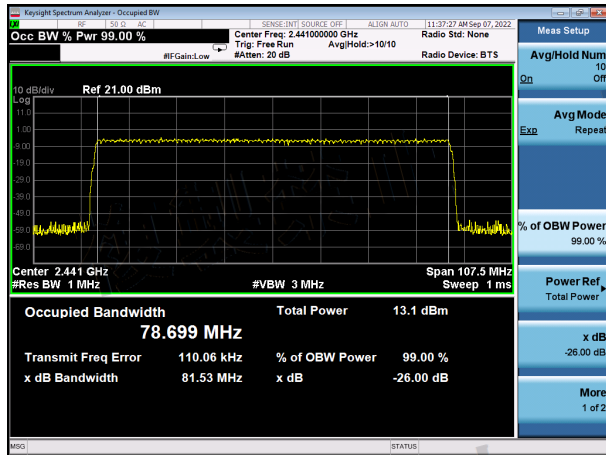


π/4-DQPSK 2-DH5

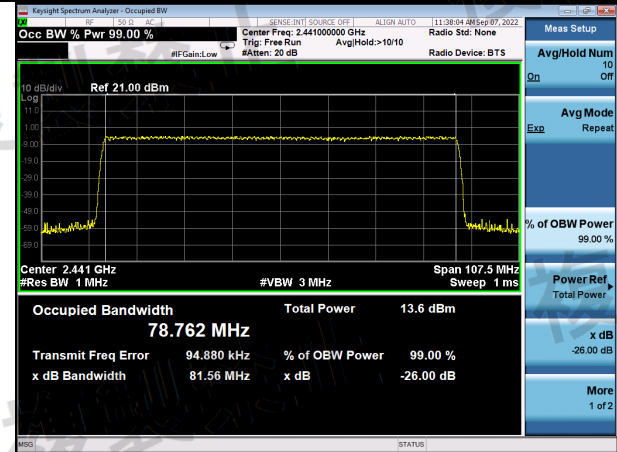


Test Plots - (Normal Voltage)

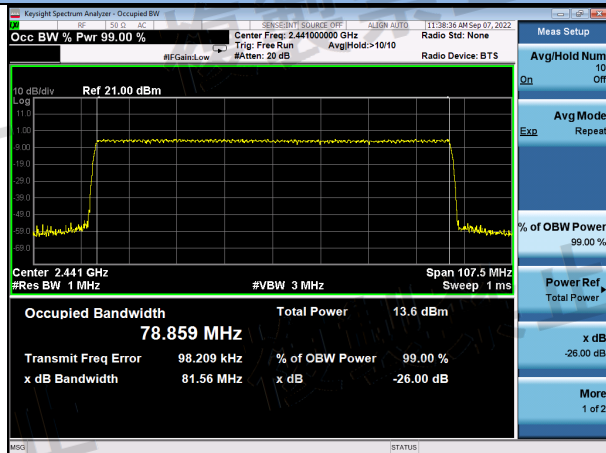
8DPSK 3-DH1



8DPSK 3-DH3



8DPSK 3-DH5



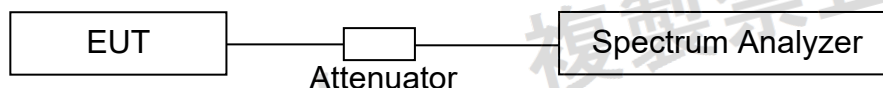
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12.3 Spread-Spectrum Bandwidth (90%)

LIMITS

Standard	Item	Limit
Item 19 of Article 2-1	Spread-Spectrum	Only for reported

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

1. The antenna port of the EUT was connected to the input of a spectrum analyzer. And analyzer was set as below:
 - a. Set frequency to 2402 ~ 2480 MHz
 - b. Set the RBW to 1 MHz
 - c. Set the VBW $\geq$ RBW
 - d. Set the span to 107.5 MHz
 - e. Set the Detector = peak
 - f. Set the Sweep time = auto couple
 - g. Set the Trace mode = max hold
2. Allow trace to fully stabilize
3. Use the 90% occupied bandwidth function to determine the Spread-Spectrum bandwidth.

TEST RESULTS

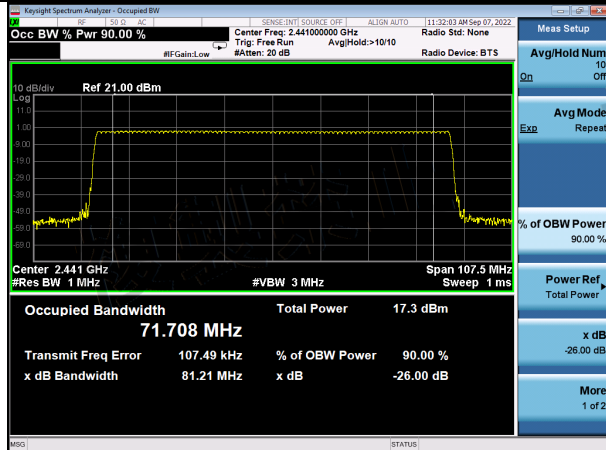
PASS

Please refer to the following tables.

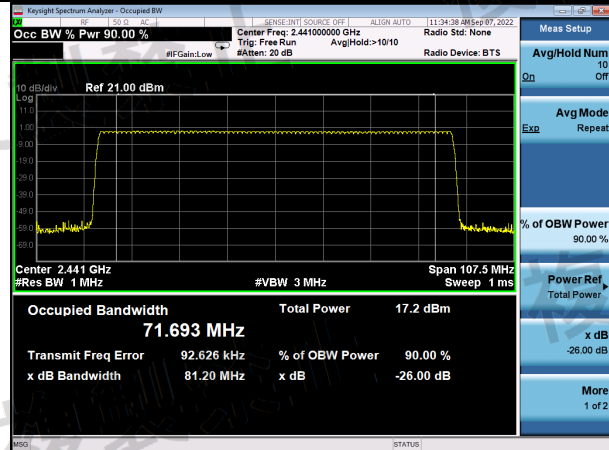
Test Date : September 07, 2022		Test Result: PASS		
Frequency (MHz)	Test Power	Packet Type	Test Result (MHz)	Limit
TX Hopping (GFSK)				
2402-2480	NV	DH1	71.708	Only for reported
		DH3	71.693	Only for reported
		DH5	71.671	Only for reported
	LV	DH1	----	--
		DH3	----	--
		DH5	----	--
	HV	DH1	----	--
		DH3	----	--
		DH5	----	--
TX Hopping ($\pi/4$ -DQPSK)				
2402-2480	NV	2-DH1	71.819	Only for reported
		2-DH3	71.874	Only for reported
		2-DH5	71.831	Only for reported
	LV	2-DH1	----	--
		2-DH3	----	--
		2-DH5	----	--
	HV	2-DH1	----	--
		2-DH3	----	--
		2-DH5	----	--
TX Hopping (8DPSK)				
2402-2480	NV	3-DH1	71.830	Only for reported
		3-DH3	71.789	Only for reported
		3-DH5	71.824	Only for reported
	LV	3-DH1	----	--
		3-DH3	----	--
		3-DH5	----	--
	HV	3-DH1	----	--
		3-DH3	----	--
		3-DH5	----	--

Test Plots - (Normal Voltage)

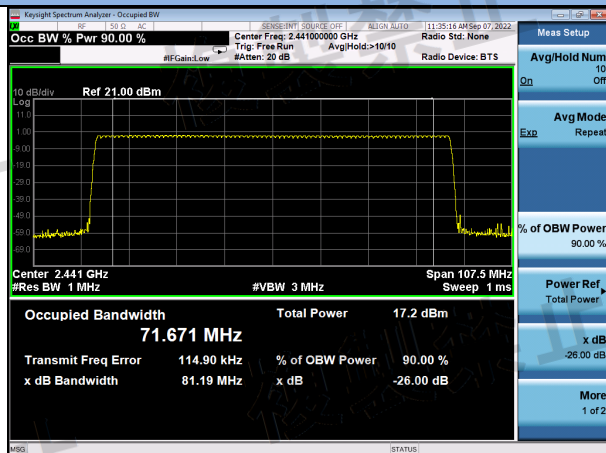
GFSK DH1



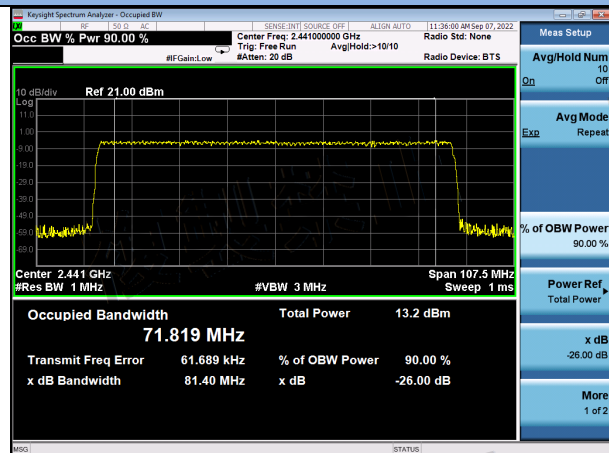
GFSK DH3



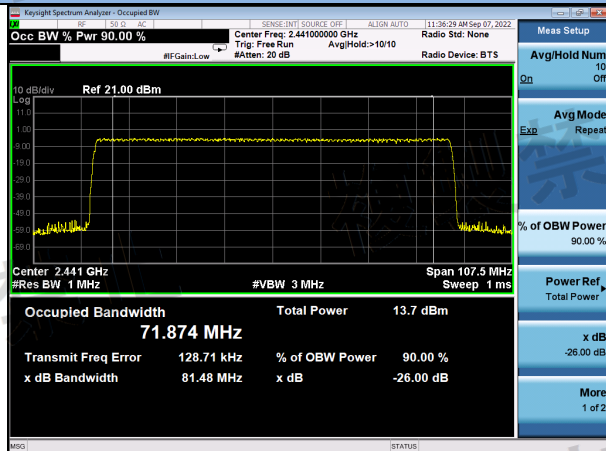
GFSK DH5



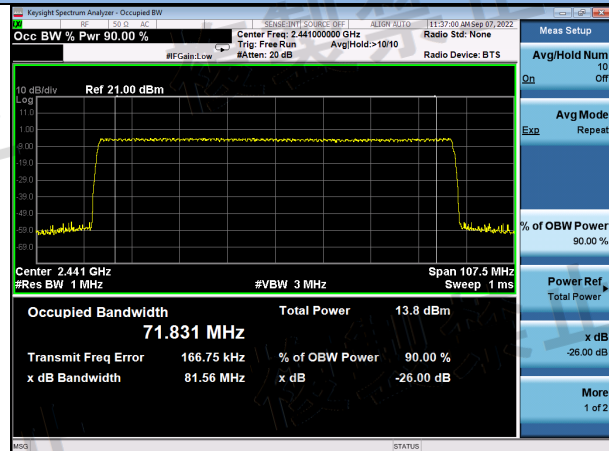
$\pi/4$ -DQPSK 2-DH1



$\pi/4$ -DQPSK 2-DH3

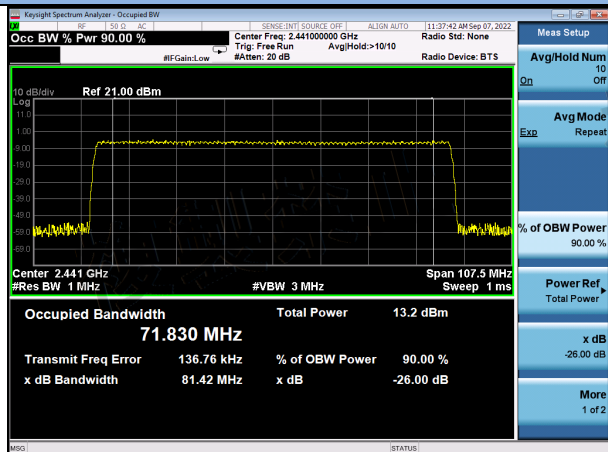


$\pi/4$ -DQPSK 2-DH5

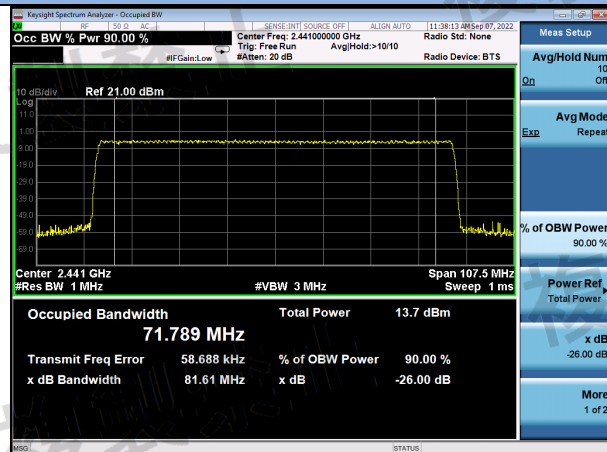


Test Plots - (Normal Voltage)

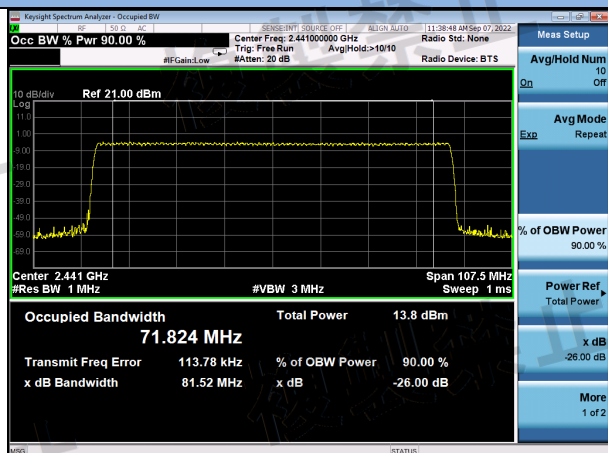
8DPSK 3-DH1



8DPSK 3-DH3



8DPSK 3-DH5



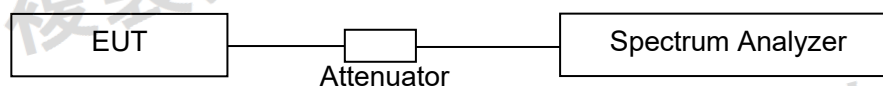
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12.4 Spurious Emission Intensity

LIMITS

Standard	Item	Frequency	Limit
Item 19 of Article 2-1	TX Spurious Emission	30 - 2387MHz	< 2.5uW/MHz / -26dBm/MHz
		2387 - 2400MHz	< 25uW/MHz / -16dBm/MHz
		2483.5 - 2496.5MHz	< 25uW/MHz / -16dBm/MHz
		2496.5MHz - 12.5GHz	< 2.5uW/MHz / -26dBm/MHz

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

1. The antenna port of the EUT was connected to the input of a spectrum analyzer. And analyzer was set as below:
 - a. Set frequency to: 30 ~ 2387 MHz, 2387 ~ 2400 MHz, 2483.5 ~ 2496.5 MHz, 2496.5 ~ 12500 MHz
 - b. Set the RBW to 1 MHz
 - c. Set the VBW $\geq$ RBW
 - d. Set the Detector = peak
 - e. Set the Sweep time = auto couple
 - f. Set the Trace mode = max hold
 - g. Allow trace to fully stabilize
2. Use the peak marker function to determine the emissions.

TEST RESULTS

PASS

Please refer to the following tables.

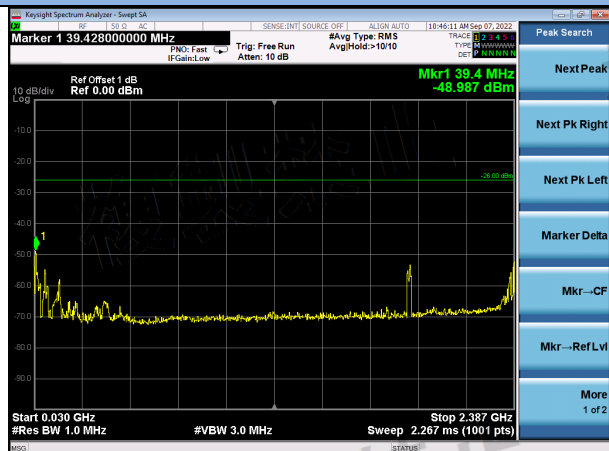
Test Date : September 07, 2022		Test Result: PASS	
Frequency (MHz)	Frequency Range	Test Result	Limit
TX (GFSK)			
2402	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz
2441	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz
2480	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz
TX ($\pi/4$ -DQPSK)			
2402	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz
2440	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz
2480	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz

Test Date : September 07, 2022		Test Result: PASS	
Frequency (MHz)	Frequency Range	Test Result	Limit
TX (8DPSK)			
2402	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz
2441	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz
2480	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz
TX Hopping (GFSK)			
2402-2480	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz
TX Hopping ($\pi/4$ -DQPSK)			
2402-2480	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz
TX Hopping (8DPSK)			
2402-2480	30 - 2387MHz	< -26dBm/MHz	-26dBm/MHz
	2387 - 2400MHz	< -16dBm/MHz	-16dBm/MHz
	2483.5 - 2496.5MHz	< -16dBm/MHz	-16dBm/MHz
	2496.5MHz - 12.5GHz	< -26dBm/MHz	-26dBm/MHz

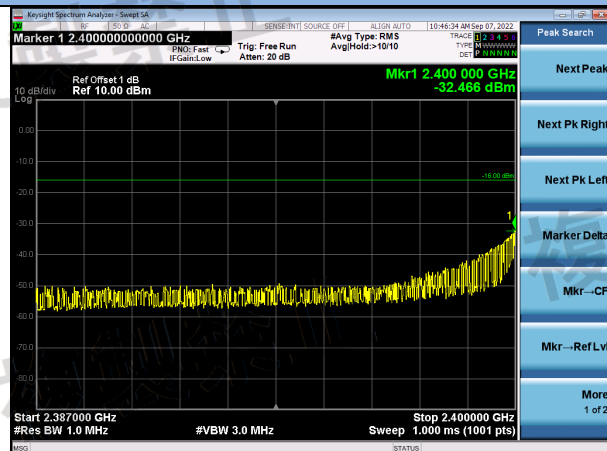
Test Plots

GFSK 2402MHz (Normal Voltage)

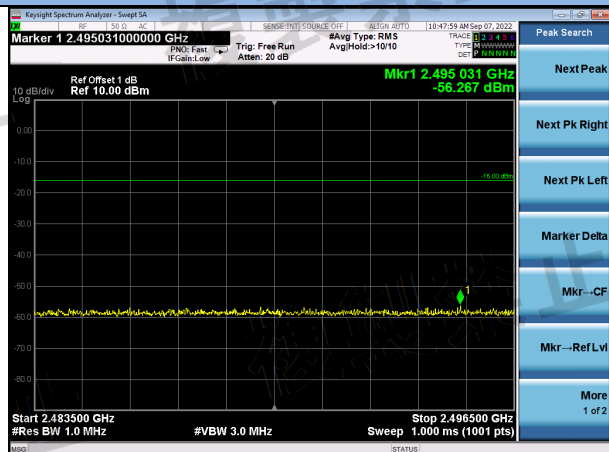
30-2387MHz



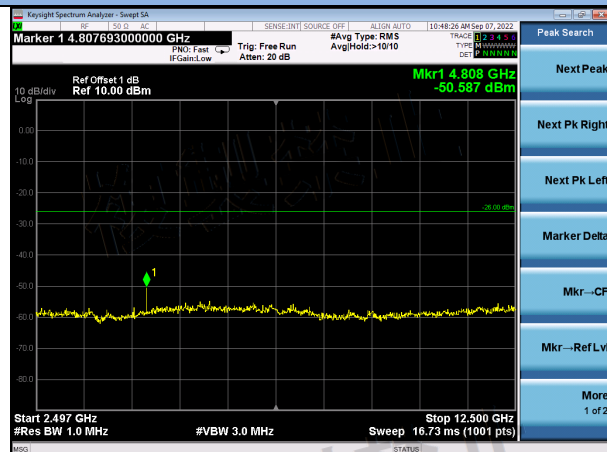
2387-2400MHz



2483.5-2496.5MHz



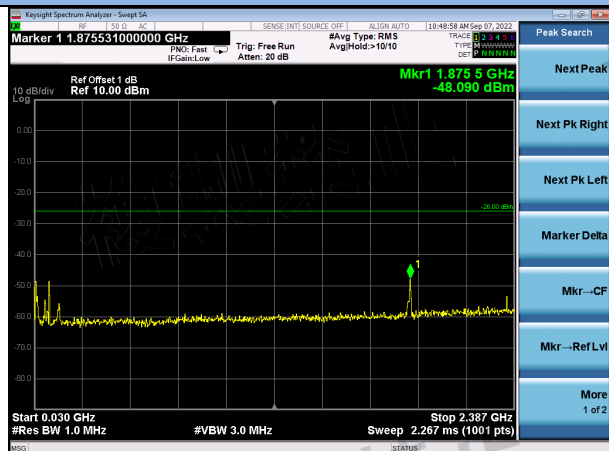
2496.5MHz-12.5GHz



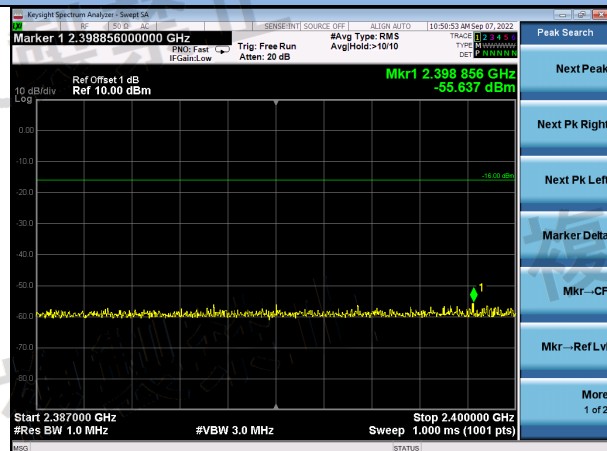
Test Plots

GFSK 2441MHz (Normal Voltage)

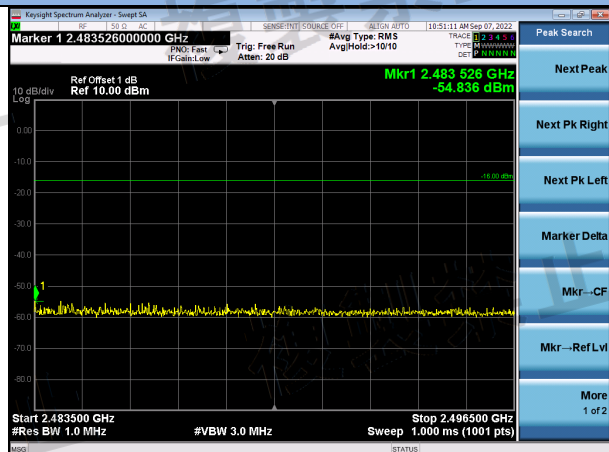
30-2387MHz



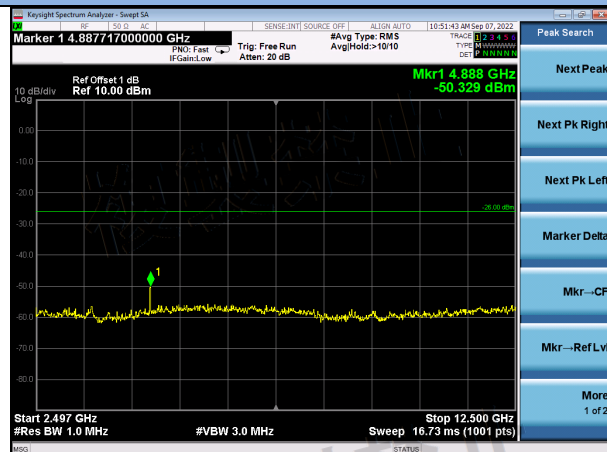
2387-2400MHz



2483.5-2496.5MHz



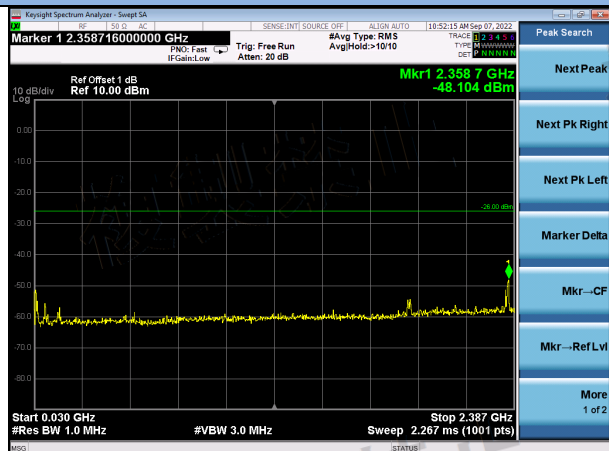
2496.5MHz-12.5GHz



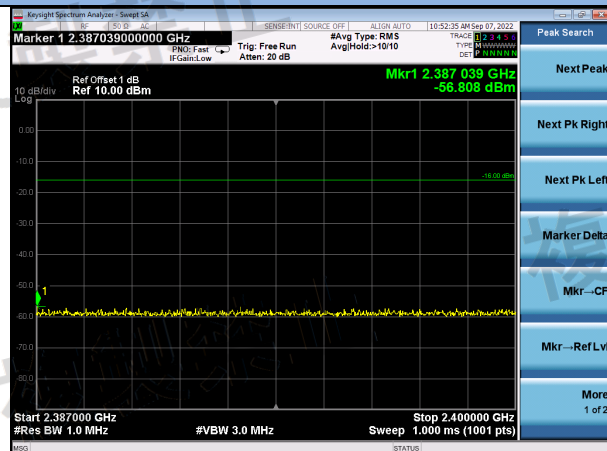
Test Plots

GFSK 2480MHz (Normal Voltage)

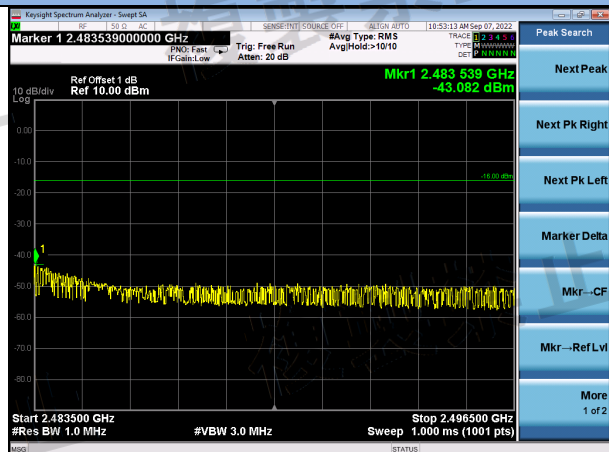
30-2387MHz



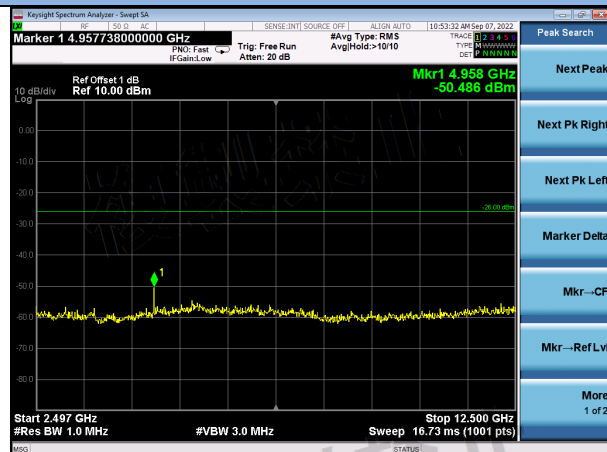
2387-2400MHz



2483.5-2496.5MHz



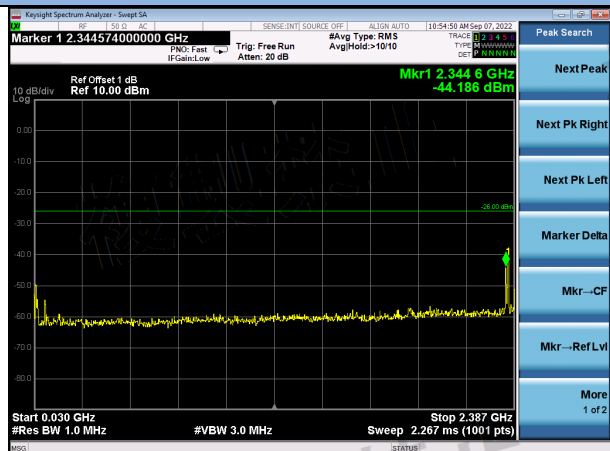
2496.5MHz-12.5GHz



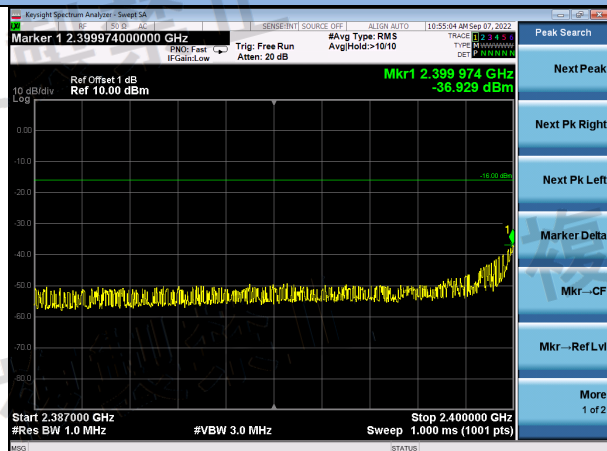
Test Plots

$\pi/4$ -DQPSK 2402MHz (Normal Voltage)

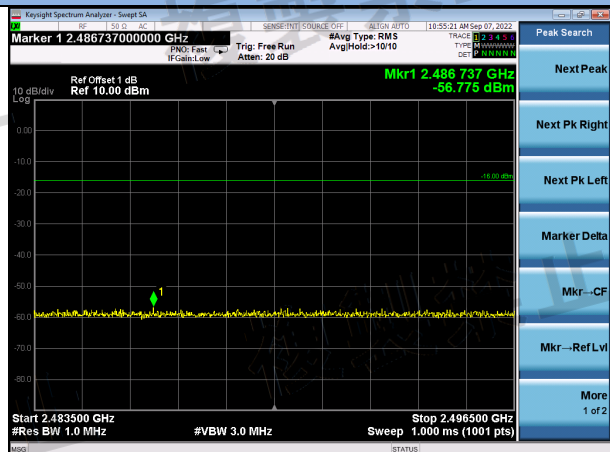
30-2387MHz



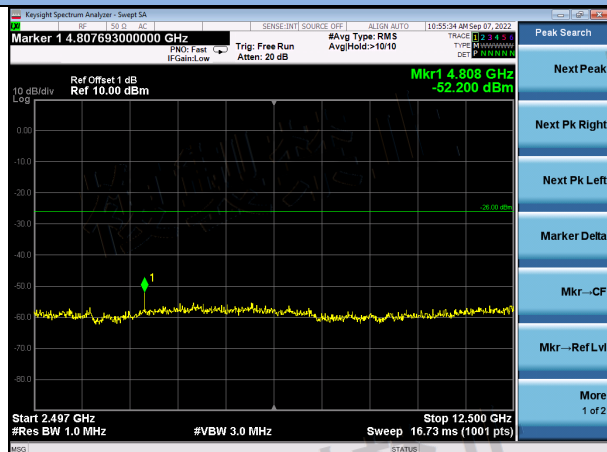
2387-2400MHz



2483.5-2496.5MHz



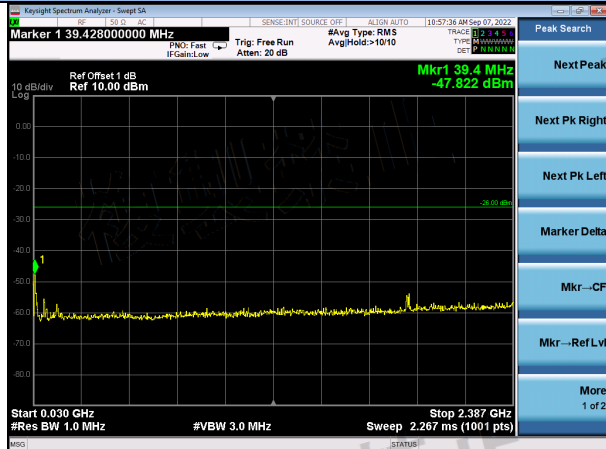
2496.5MHz-12.5GHz



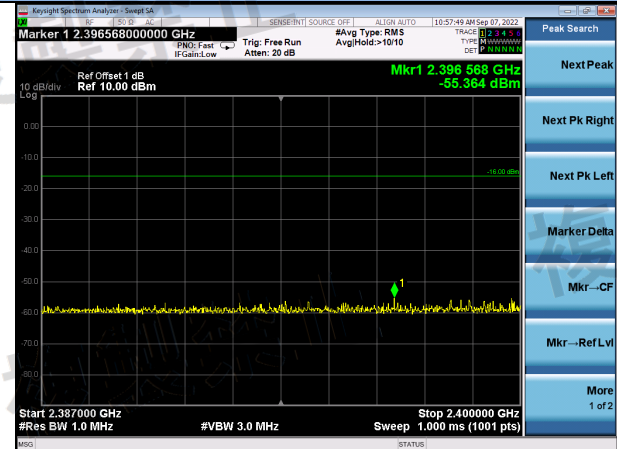
Test Plots

$\pi/4$ -DQPSK 2441MHz (Normal Voltage)

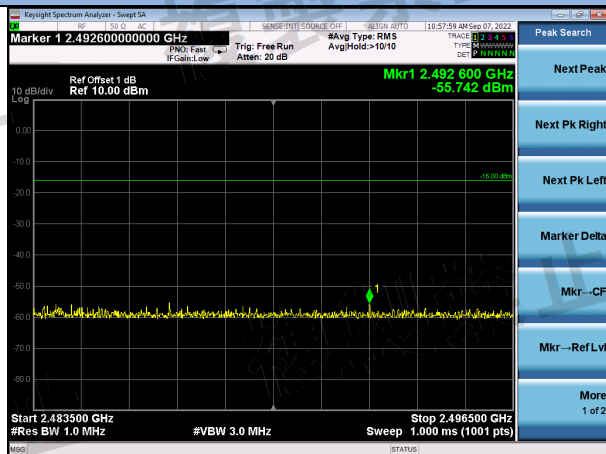
30-2387MHz



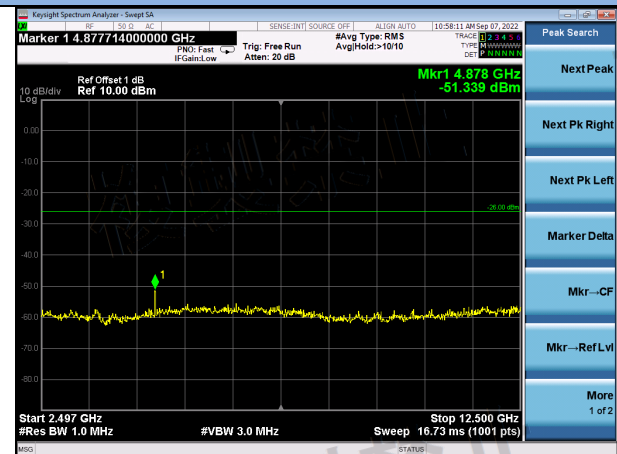
2387-2400MHz



2483.5-2496.5MHz



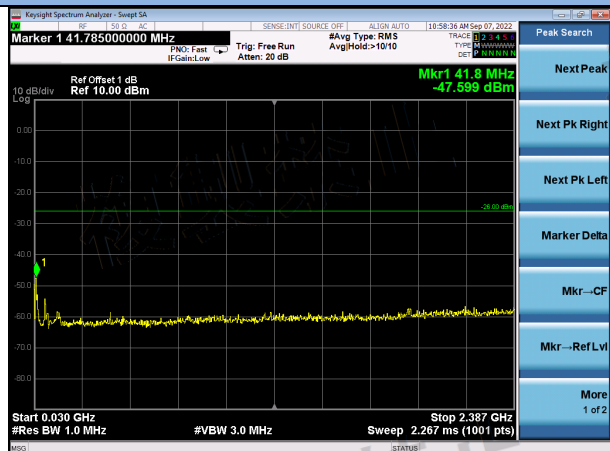
2496.5MHz-12.5GHz



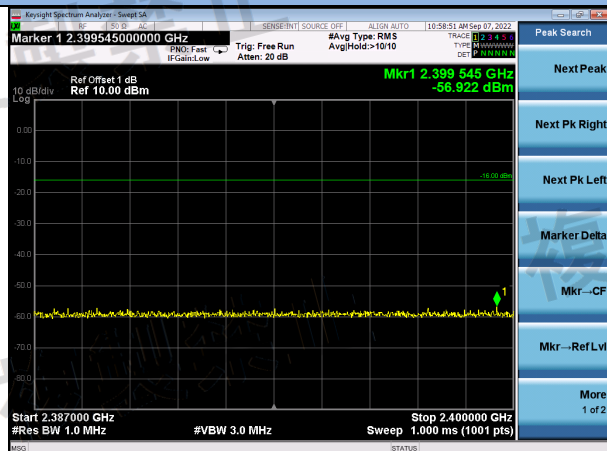
Test Plots

$\pi/4$ -DQPSK 2480MHz (Normal Voltage)

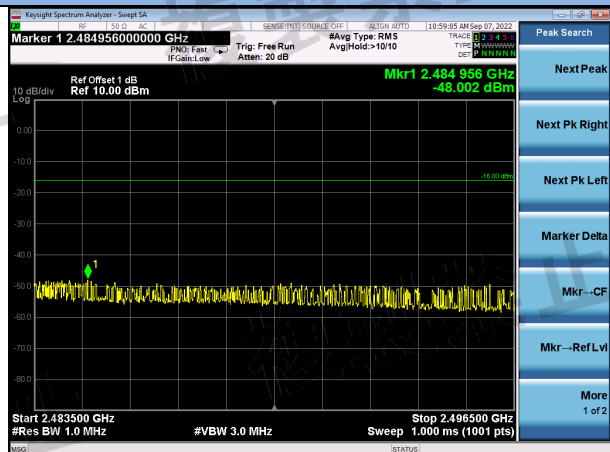
30-2387MHz



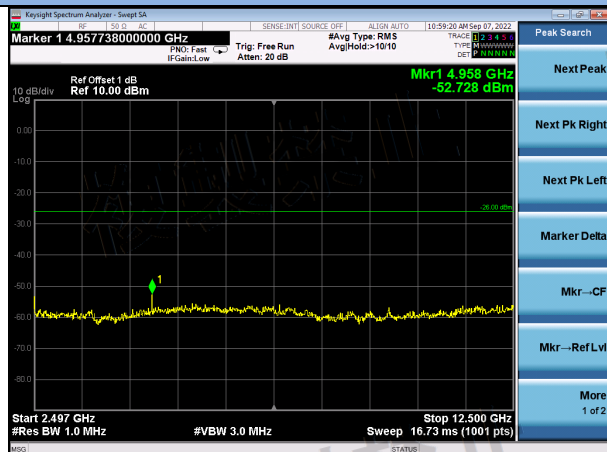
2387-2400MHz



2483.5-2496.5MHz



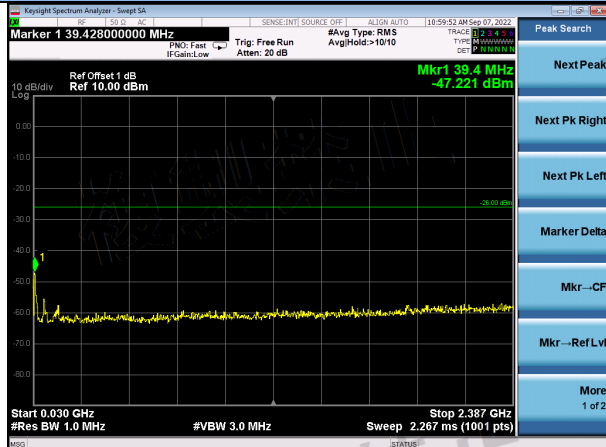
2496.5MHz-12.5GHz



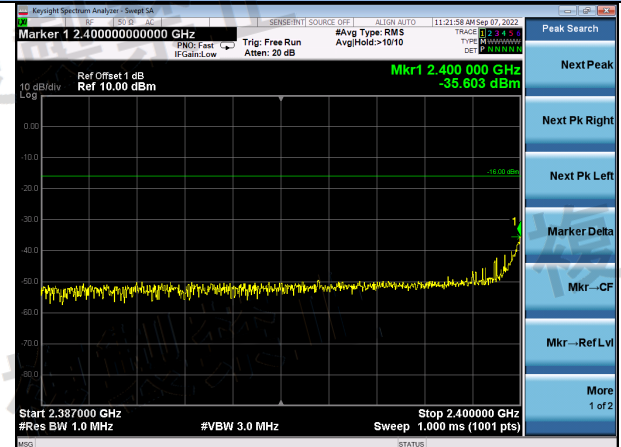
Test Plots

8DPSK 2402MHz (Normal Voltage)

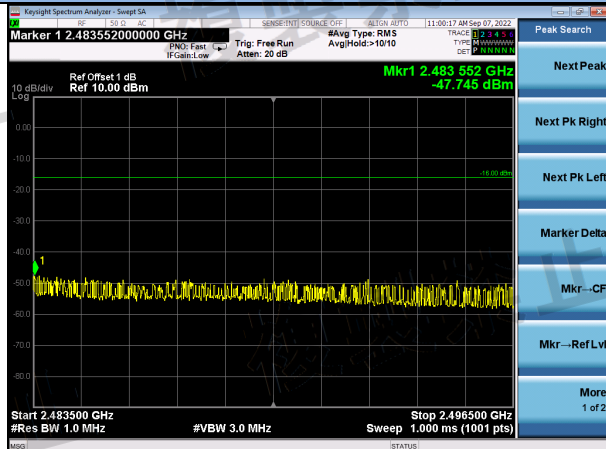
30-2387MHz



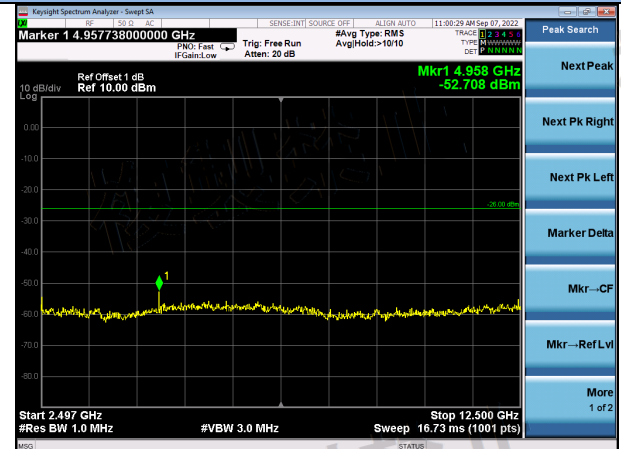
2387-2400MHz



2483.5-2496.5MHz



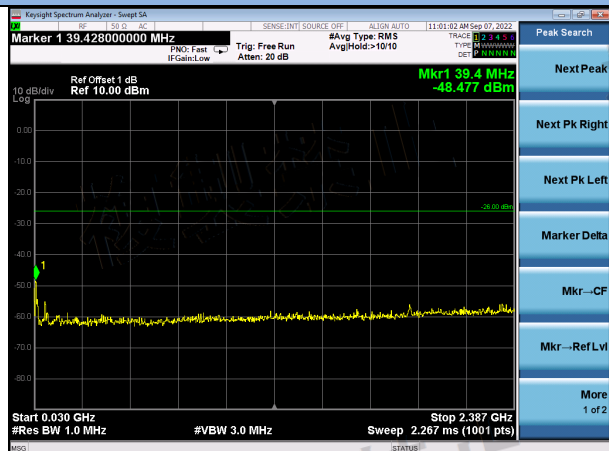
2496.5MHz-12.5GHz



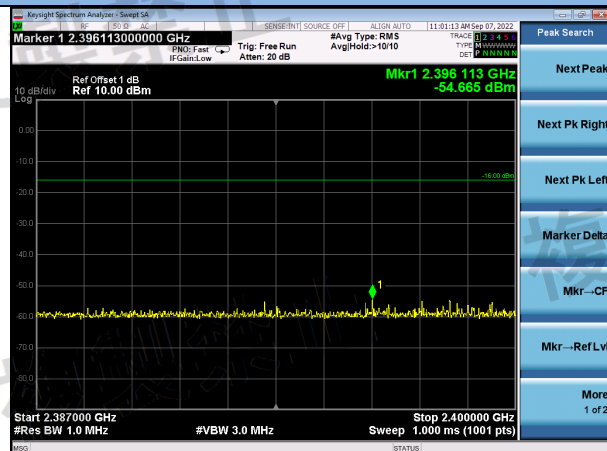
Test Plots

8DPSK 2441MHz (Normal Voltage)

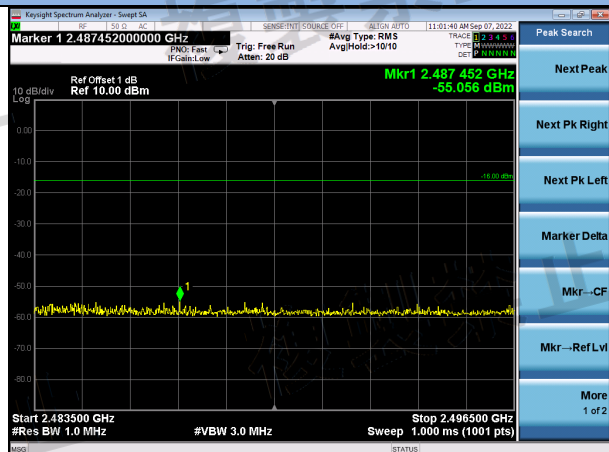
30-2387MHz



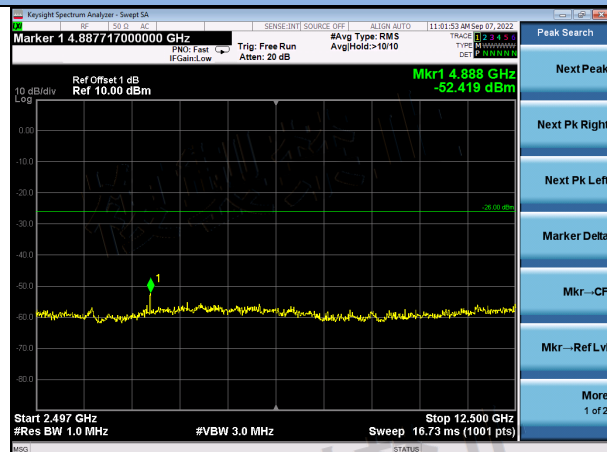
2387-2400MHz



2483.5-2496.5MHz



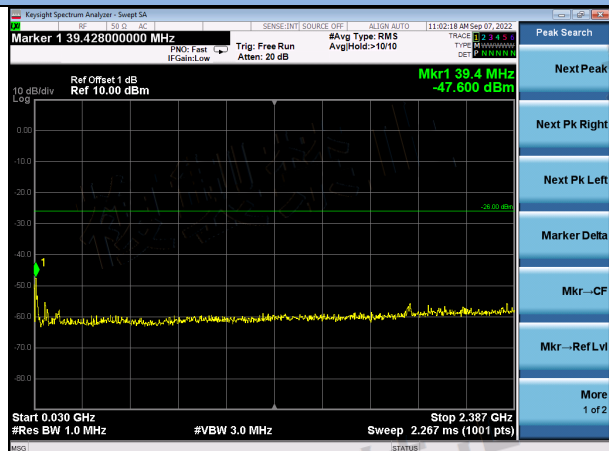
2496.5MHz-12.5GHz



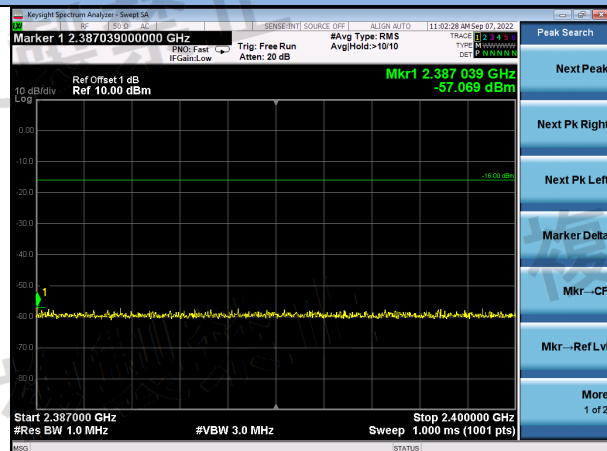
Test Plots

8DPSK 2480MHz (Normal Voltage)

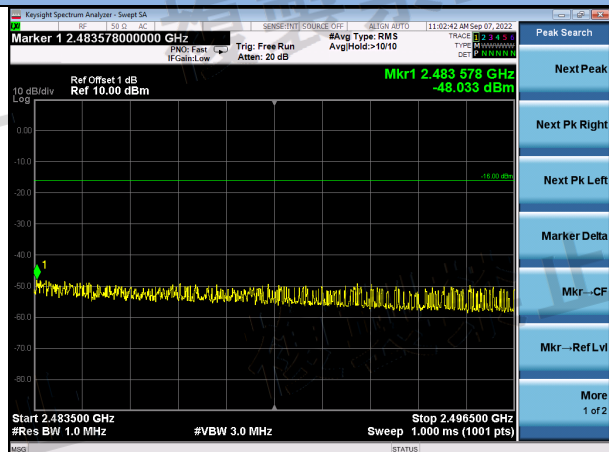
30-2387MHz



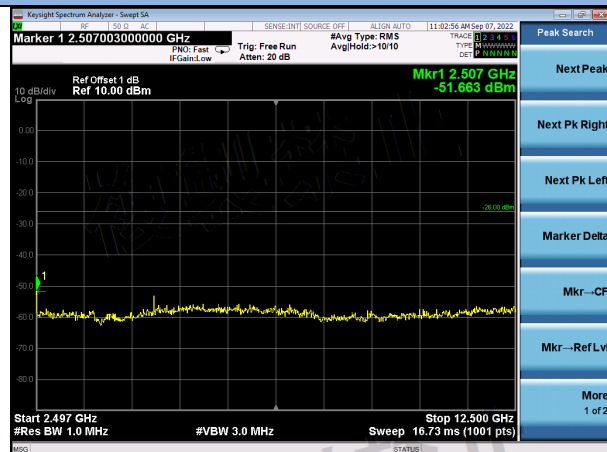
2387-2400MHz



2483.5-2496.5MHz



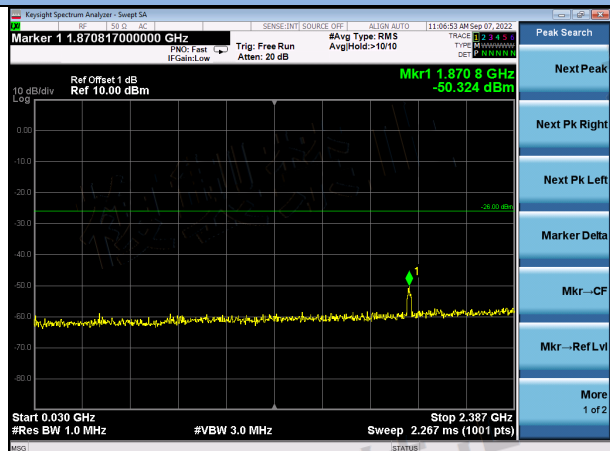
2496.5MHz-12.5GHz



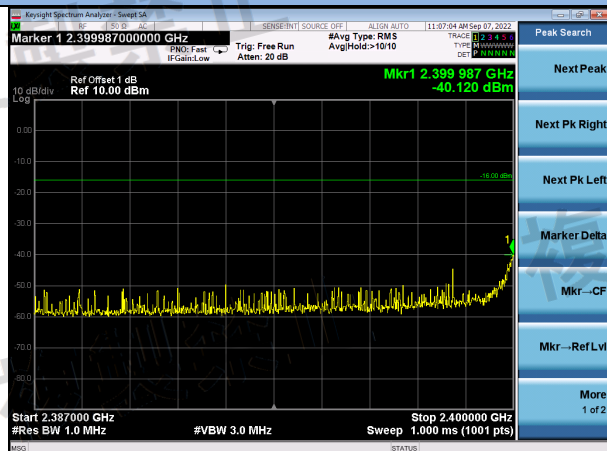
Test Plots

GFSK Hopping (Normal Voltage)

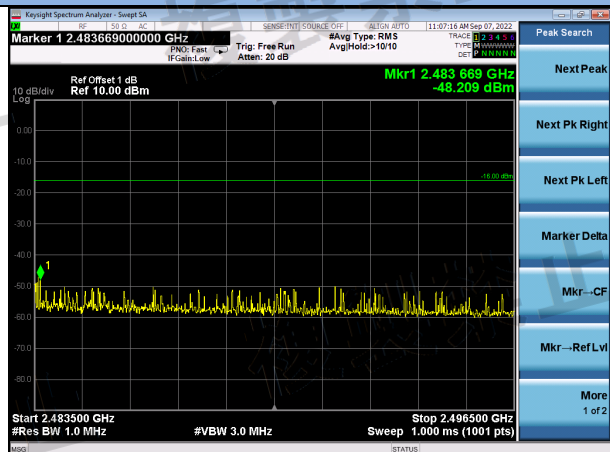
30-2387MHz



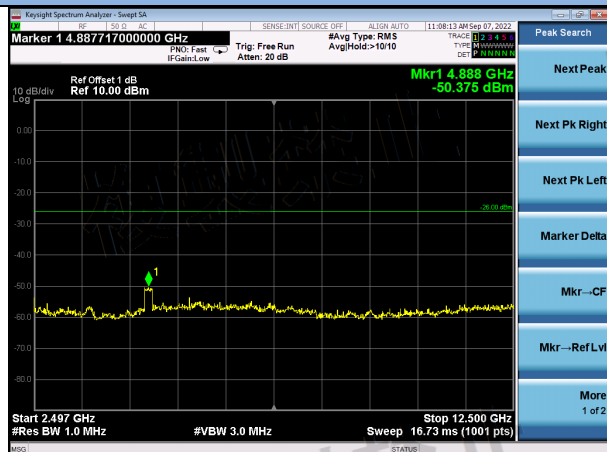
2387-2400MHz



2483.5-2496.5MHz



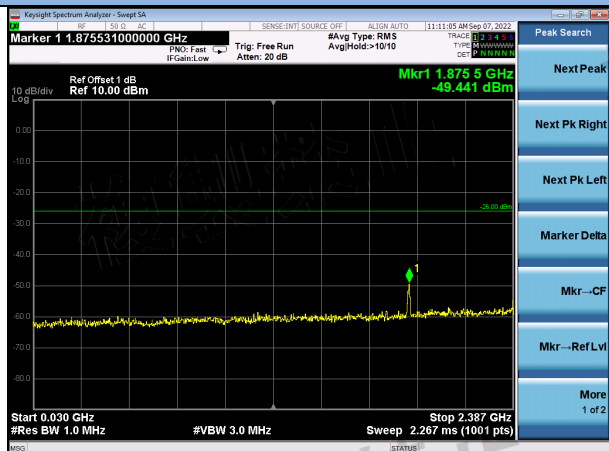
2496.5MHz-12.5GHz



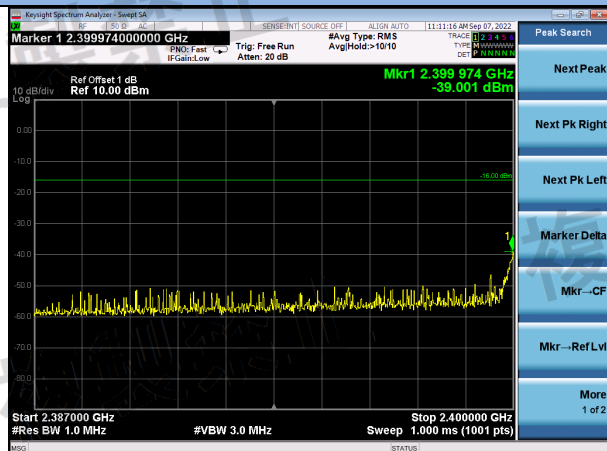
Test Plots

$\pi/4$ -DQPSK Hopping (Normal Voltage)

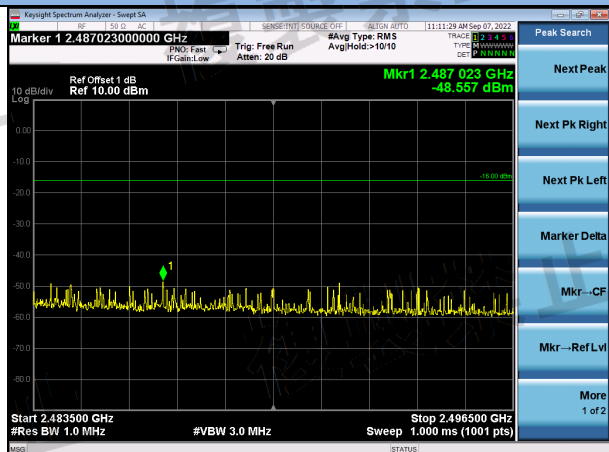
30-2387MHz



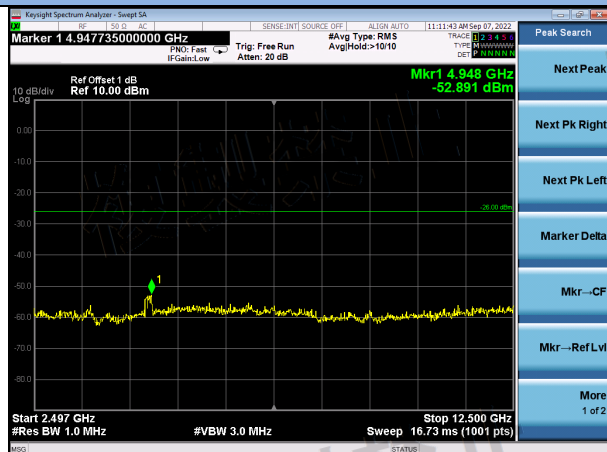
2387-2400MHz



2483.5-2496.5MHz



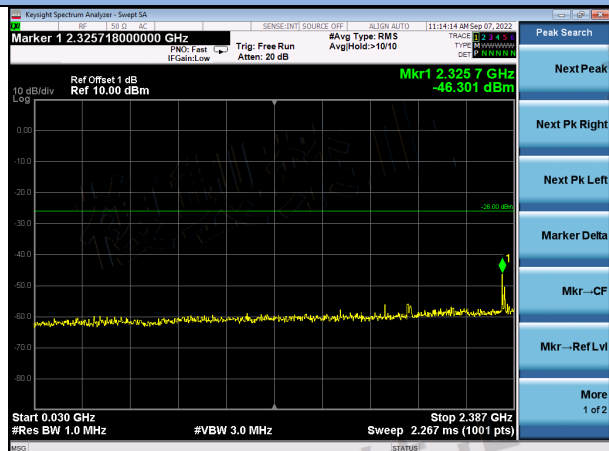
2496.5MHz-12.5GHz



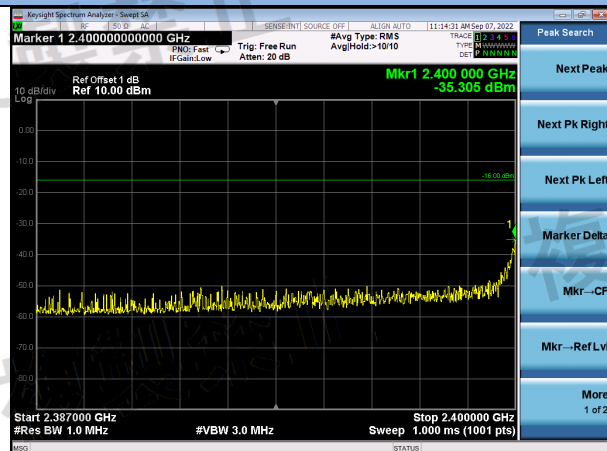
Test Plots

8DPSK Hopping (Normal Voltage)

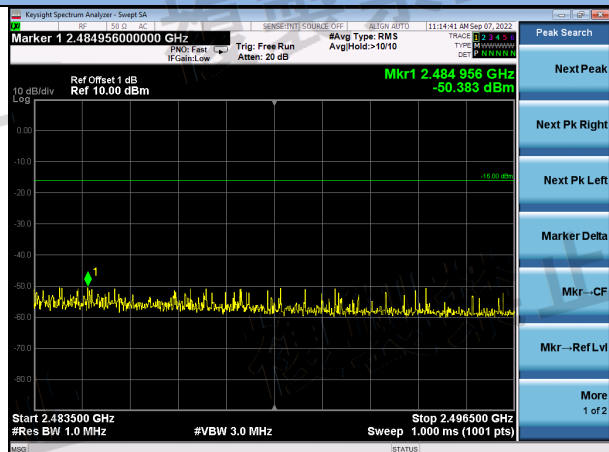
30-2387MHz



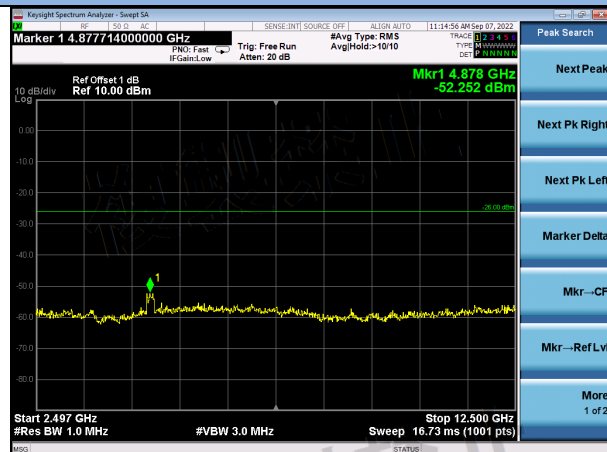
2387-2400MHz



2483.5-2496.5MHz



2496.5MHz-12.5GHz

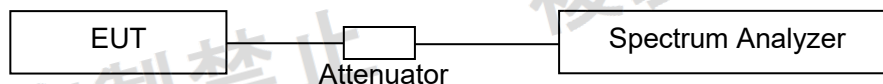


12.5 Limit of Secondary Spurious Emissions

LIMITS

Standard	Item	Frequency	Limit
Item 19 of Article 2-1	RX Spurious Emission	Below 1GHz	< 4nW/-54dBm
		Above 1GHz	< 20nW/-47dBm

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

1. The antenna port of the EUT was connected to the input of a spectrum analyzer. And analyzer was set as below:
 - a. Set frequency to: 30 ~ 1000 MHz, 1000 ~ 12500 MHz
 - b. Set the RBW to 100 KHz for below 1GHz, and 1 MHz for above 1 GHz
 - c. Set the VBW $\geq$ RBW
 - d. Set the Detector = peak
 - e. Set the Sweep time = auto couple
 - f. Set the Trace mode = max hold
 - g. Allow trace to fully stabilize
2. Use the peak marker function to determine the emissions.

TEST RESULTS

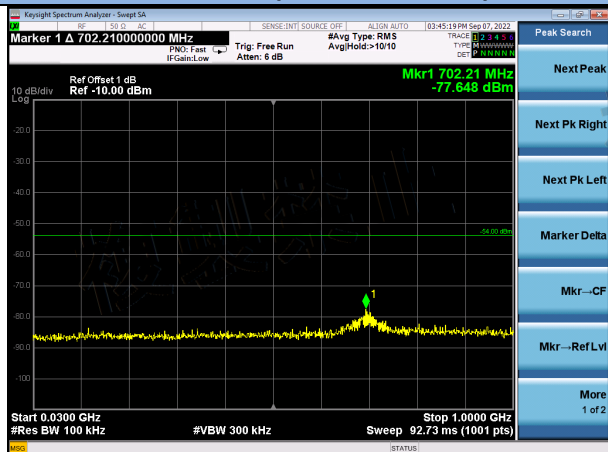
PASS

Please refer to the following tables.

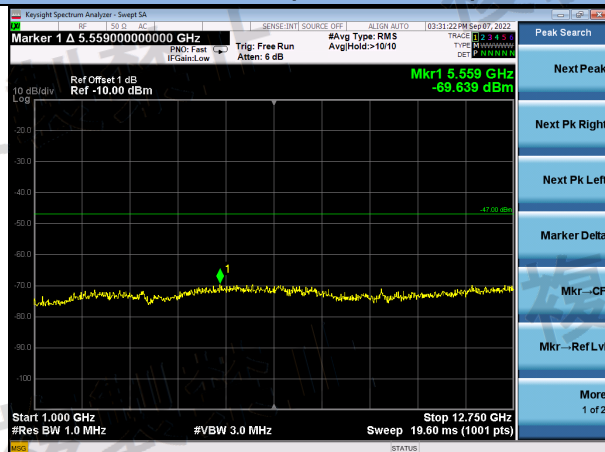
Test Date : September 07, 2022		Test Result: PASS	
Frequency (MHz)	Frequency Range	Test Result	Limit
RX (GFSK)– Normal Voltage			
2402	30 - 1000MHz	<-54dBm	-54dBm
	1 - 12.5GHz	<-47dBm	-47dBm
2441	30 - 1000MHz	<-54dBm	-54dBm
	1 - 12.5GHz	<-47dBm	-47dBm
2480	30 - 1000MHz	<-54dBm	-54dBm
	1 - 12.5GHz	<-47dBm	-47dBm
RX ($\pi/4$ -DQPSK) – Normal Voltage			
2402	30 - 1000MHz	<-54dBm	-54dBm
	1 - 12.5GHz	<-47dBm	-47dBm
2441	30 - 1000MHz	<-54dBm	-54dBm
	1 - 12.5GHz	<-47dBm	-47dBm
2480	30 - 1000MHz	<-54dBm	-54dBm
	1 - 12.5GHz	<-47dBm	-47dBm
RX (8DPSK) – Normal Voltage			
2402	30 - 1000MHz	<-54dBm	-54dBm
	1 - 12.5GHz	<-47dBm	-47dBm
2441	30 - 1000MHz	<-54dBm	-54dBm
	1 - 12.5GHz	<-47dBm	-47dBm
2480	30 - 1000MHz	<-54dBm	-54dBm
	1 - 12.5GHz	<-47dBm	-47dBm

Test Plots – GFSK (Normal Voltage)

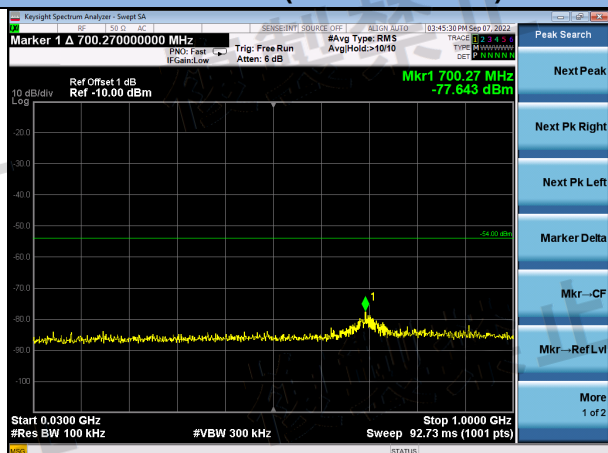
2402MHz (30 - 1000MHz)



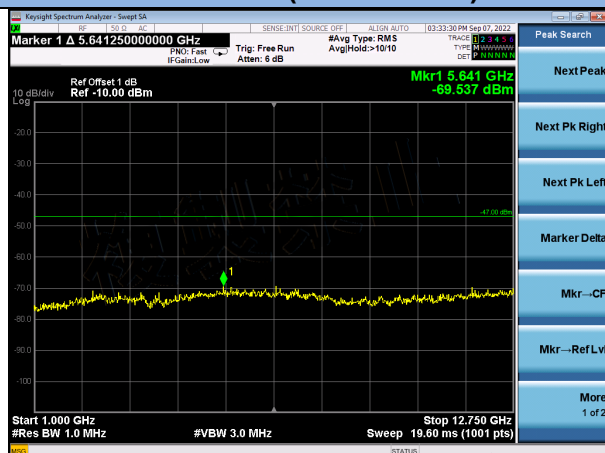
2402MHz (1 - 12.5GHz)



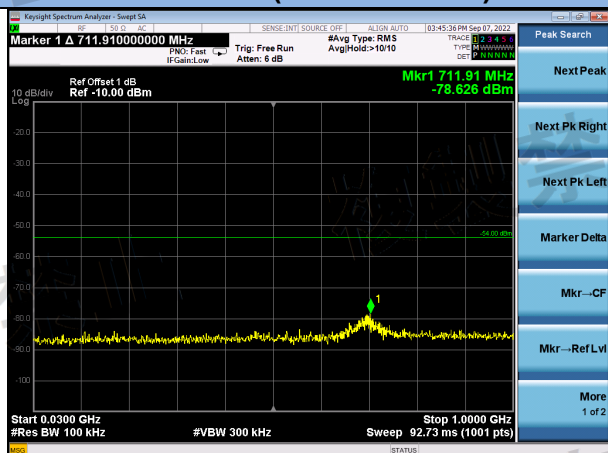
2441MHz (30 - 1000MHz)



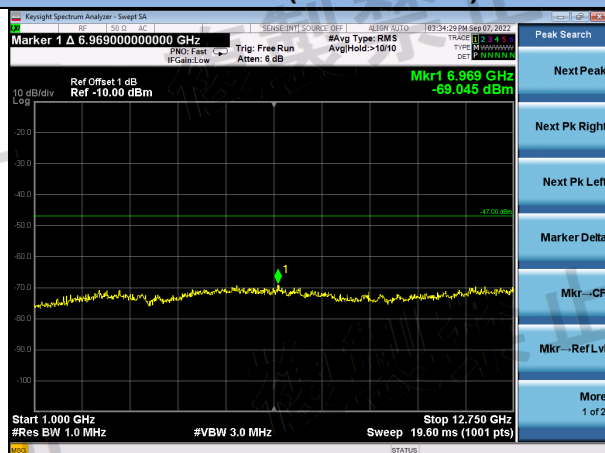
2441MHz (1 - 12.5GHz)



2480MHz (30 - 1000MHz)

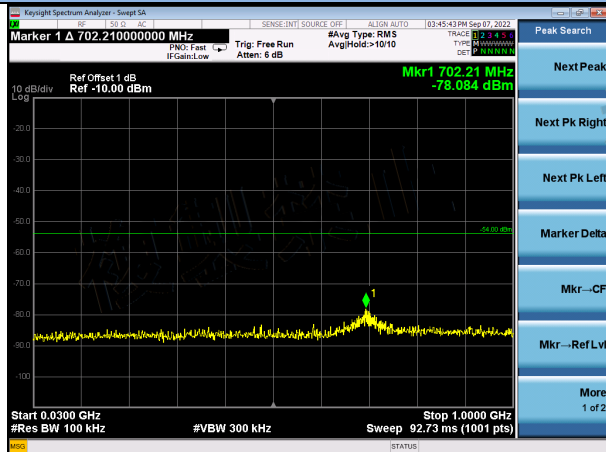


2480MHz (1 - 12.5GHz)

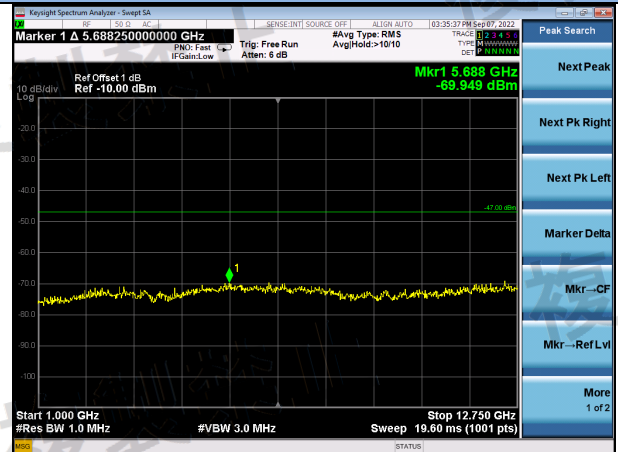


Test Plots $-\pi/4$ -DQPSK (Normal Voltage)

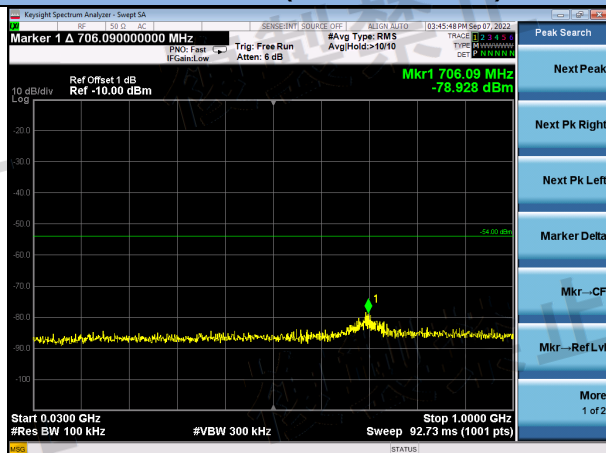
2402MHz (30 - 1000MHz)



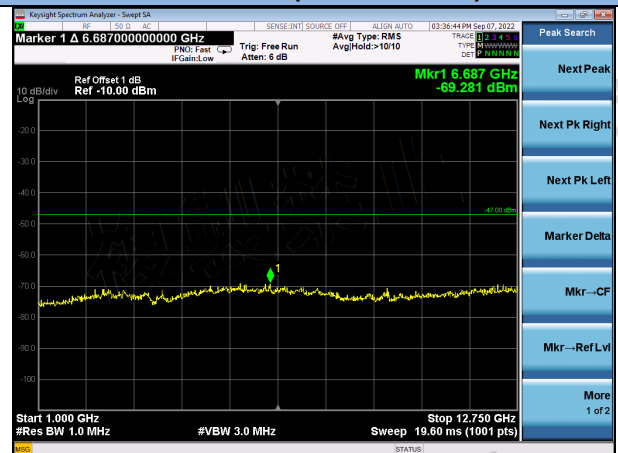
2402MHz (1 - 12.5GHz)



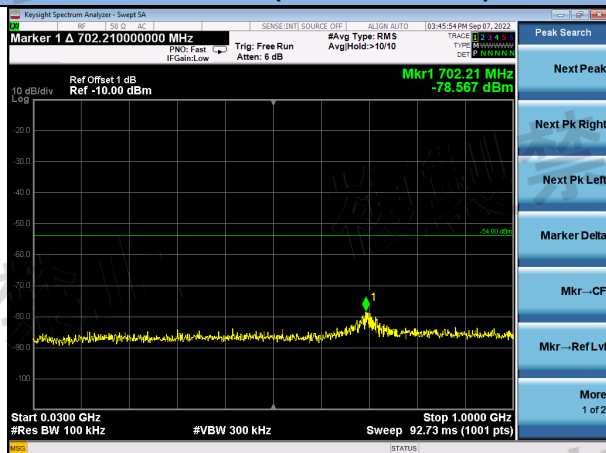
2441MHz (30 - 1000MHz)



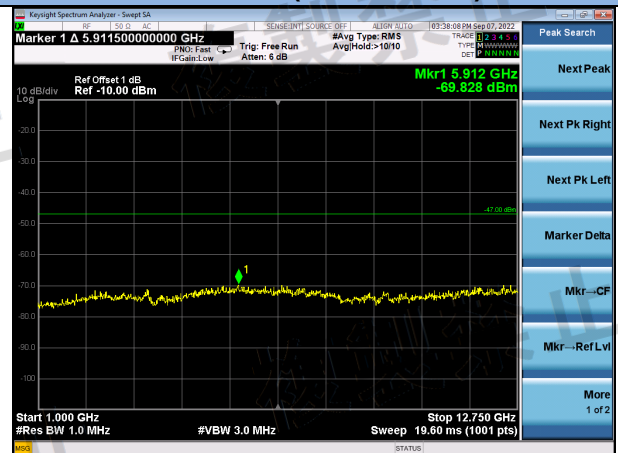
2441MHz (1 - 12.5GHz)



2480MHz (30 - 1000MHz)

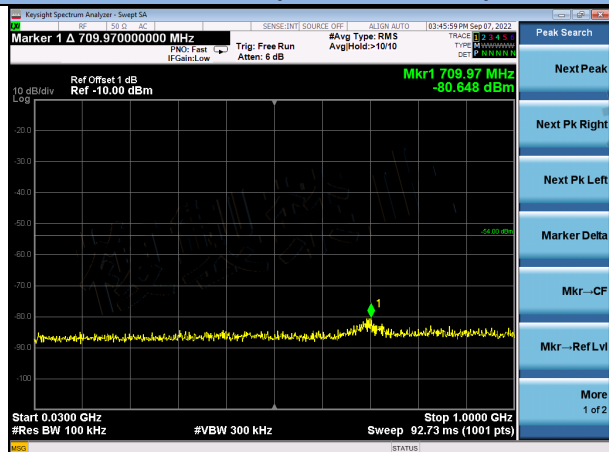


2480MHz (1 - 12.5GHz)

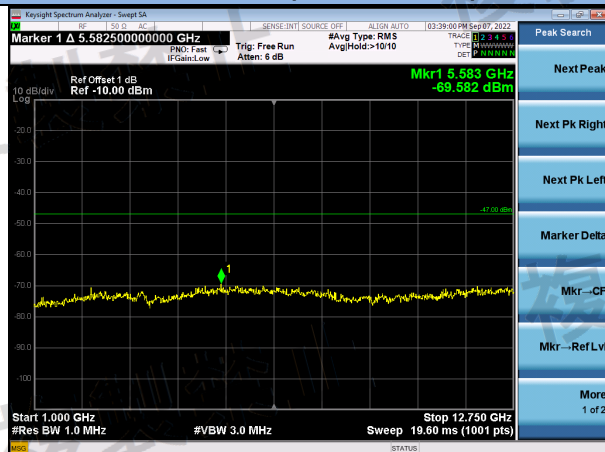


Test Plots –8DPSK (Normal Voltage)

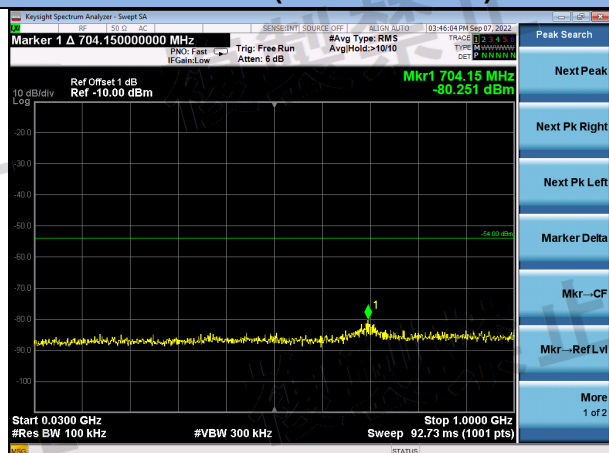
2402MHz (30 - 1000MHz)



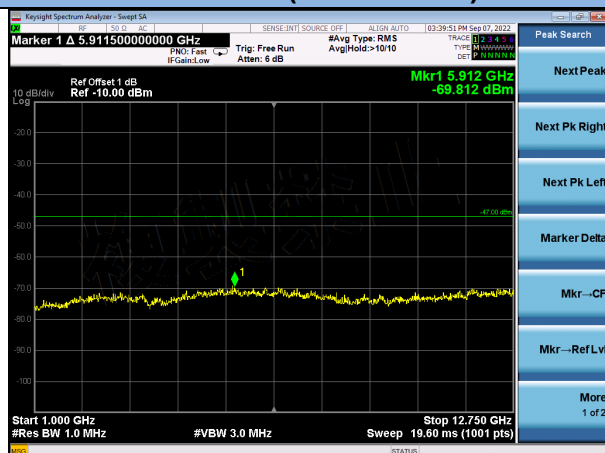
2402MHz (1 - 12.5GHz)



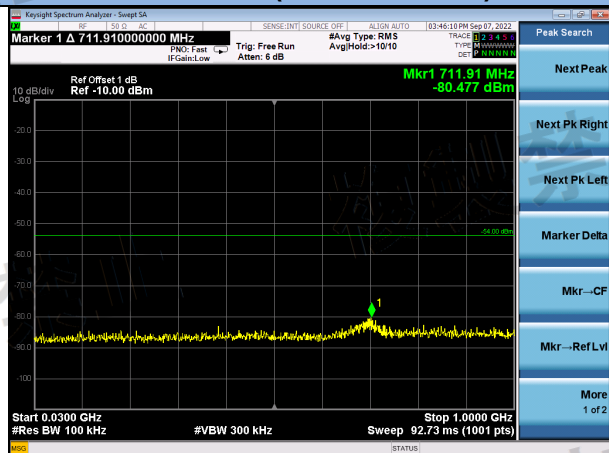
2441MHz (30 - 1000MHz)



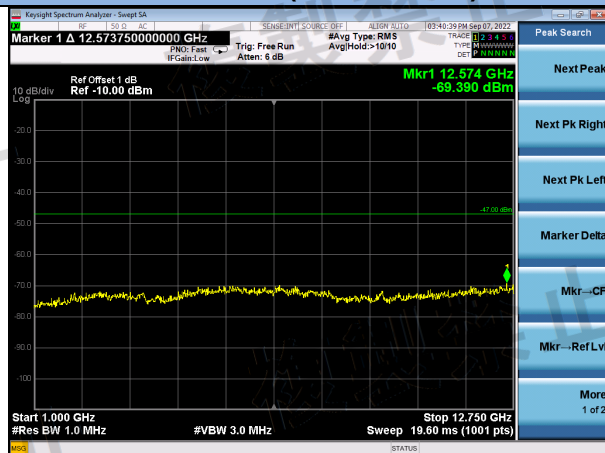
2441MHz (1 - 12.5GHz)



2480MHz (30 - 1000MHz)



2480MHz (1 - 12.5GHz)

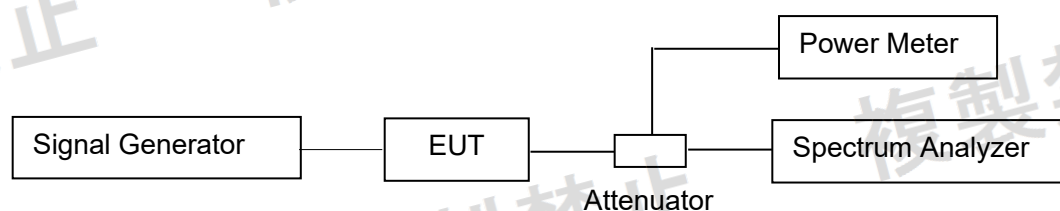


12.6 Antenna Power Measurement

LIMITS

Standard	Item	Spread Spectrum Method	Limit
Article 2-1 Item 19	Antenna Power	FHSS	3mW/MHz or less (2427 - 2470.75MHz)
			3mW/MHz or less (2400 - 2483.5MHz)
		DSSS	10mW/MHz or less
		OFDM	10mW/MHz or less (Occupied bandwidth within 26MHz)
			5mW/MHz or less (Occupied bandwidth 26 - 40MHz)
		Other	10mW or less
	Antenna Power Tolerance	---	+20% or less

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

1. Connect the EUT antenna terminal to the Power Meter and measure the total power.
2. Divide the total power by the spread bandwidth to find the average power per MHz.

TEST RESULTS

PASS

Please refer to the following table.

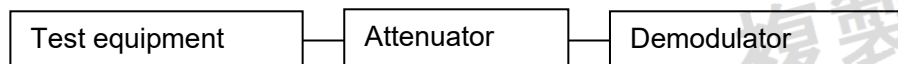
Test Date : September 07, 2022				Test Result: PASS					
Frequency (MHz)	Test Voltage	Power Output (dBm)	Power Output (mW)	Spread Bandwidth (MHz)	Antenna Power Output (mW/MHz)	Limit (mW/MHz)	Rating antenna power (mW/MHz)	Antenna Power Error (mW/MHz)	Antenna Power Error (+20%)
GFSK Hopping – DH5									
2402-2480	NV	16.78	47.64	71.671	0.6647	3.0	1	-0.3353	-33.53%
	LV	----	----	----	----	----	----	----	----
	HV	----	----	----	----	----	----	----	----
π/4-DQPSK Hopping – 2-DH5									
2402-2480	NV	13.37	21.73	71.831	0.3025	3.0	1	-0.6975	-69.75%
	LV	----	----	----	----	----	----	----	----
	HV	----	----	----	----	----	----	----	----
8DPSK Hopping – 3-DH5									
2402-2480	NV	13.37	21.73	71.824	0.3025	3.0	1	-0.6975	-69.75%
	LV	----	----	----	----	----	----	----	----
	HV	----	----	----	----	----	----	----	----
EIRP GFSK (The Worst Case)									
Antenna Power Output (dBm/ MHz)			Antenna Gain (dBi)				EIRP (dBm/MHz)		
-1.7737			0				-1.7737		
Note:									
1. Rating antenna power (mW/MHz) declared by the manufacturer.									
2. Antenna Power Error (mW/MHz) = Test Result (mW/MHz) - Rating antenna power (mW/MHz)									
3. Antenna Power Error (+20%) = Antenna Power Error (mW/MHz) / Rating antenna power (mW/MHz) * 100%.									

12.7 Radio Interface Prevention Function

LIMITS

Standard	Item	Limit
Item 19 of Article 2-1	Identification code	≥48 bits

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

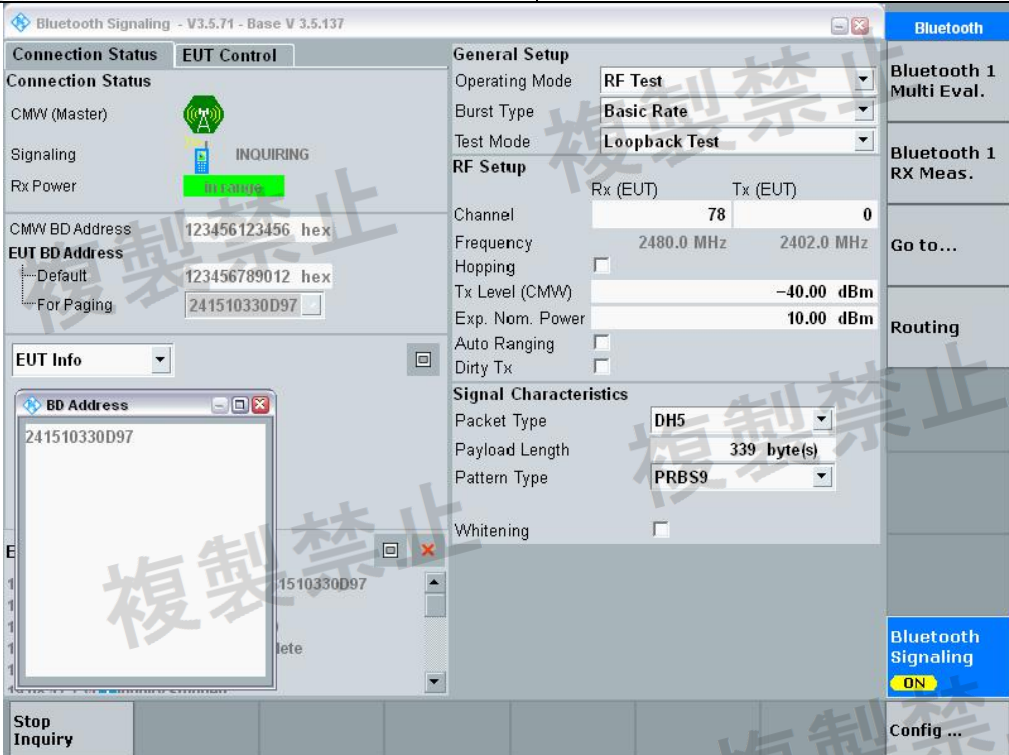
When test equipment has the function to transmit identification code automatically:

- A) Transmit the predetermined identification code from test equipment.
- B) Confirm the transmitted identification code by demodulator.

TEST RESULTS

PASS

Please refer to the following table.

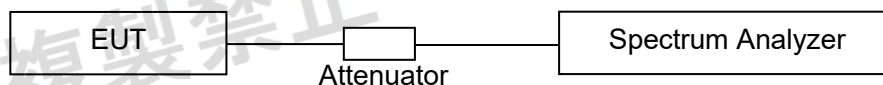
Test Date : September 07, 2022	
MAC Address	Result
241510330D97	Pass
 The screenshot displays the Bluetooth Signaling software interface. The 'Connection Status' tab is active, showing 'EUT Control' and 'Connection Status'. The 'CMW (Master)' is in 'INQUIRING' state. The 'EUT BD Address' is 241510330D97. The 'EUT Info' window shows the same address. The 'General Setup' tab is also visible, showing 'RF Test' mode, 'Basic Rate' burst type, and 'Loopback Test' test mode. The 'RF Setup' section shows 'Channel' 78, 'Frequency' 2480.0 MHz, and 'Tx Level (CMW)' -40.00 dBm. The 'Signal Characteristics' section shows 'Packet Type' DH5, 'Payload Length' 339 byte(s), and 'Pattern Type' PRBS9. The 'Bluetooth Signaling' status is 'ON'.	

12.8 Dwell Time and Spreading Factor

LIMITS

Standard	Item	Limit
Item 19 of Article 2-1	Hopping Frequency Dwell Time	<0.4s
	Spreading factor	Reporting only

BLOCK DIAGRAM OF TEST SETUP



TEST PROCEDURES

1. The antenna port of the EUT was connected to the input of a spectrum analyzer. And analyzer was set as below:
 - a. Set frequency to test frequency
 - b. Set the RBW to 1 MHz
 - c. Set the VBW $\geq$ RBW
 - d. Set the span to zero
 - e. Set the Detector = peak
 - f. Set the Sweep time = auto couple
 - g. Set the Trace mode = max hold
2. Set the EUT transmitting different packet to determine the maximum time duration of one single pulse.

TEST RESULTS

PASS

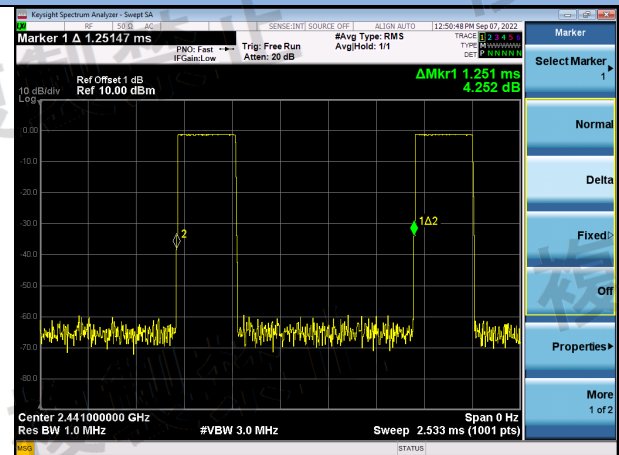
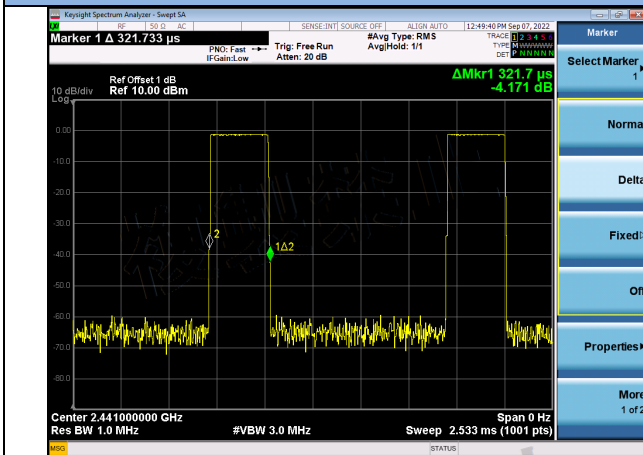
Please refer to the following table.

Test Date : September 07, 2022		Test Result: PASS			
Test Voltage: Normal Voltage		Test Mode: TX (GFSK/ $\pi/4$ -DQPSK/ 8DPSK) Hopping			
Packet Type	90% Spread BW (MHz)	Sending time of 1 burst (ms)	Burst cycle (ms)	Dwell Time (s)	Limit (s)
GFSK Hopping					
DH1	71.708	0.322	1.251	0.0935	<0.4
DH3	71.693	1.655	2.500	0.2403	<0.4
DH5	71.671	2.899	3.743	0.2811	<0.4
$\pi/4$ -DQPSK Hopping					
2-DH1	71.819	0.257	1.253	0.0746	<0.4
2-DH3	71.874	1.653	2.498	0.2408	<0.4
2-DH5	71.831	2.904	3.748	0.2818	<0.4
8DPSK Hopping					
3-DH1	71.830	0.226	1.252	0.0657	<0.4
3-DH3	71.789	1.657	2.502	0.2407	<0.4
3-DH5	71.824	2.901	3.752	0.2812	<0.4
Note:					
1. No. of Hopping Channel = 79					
2. Dwell time = 0.4s * spreading rate * sending time of 1 burst / (burst cycle * No. of hopping channel)					

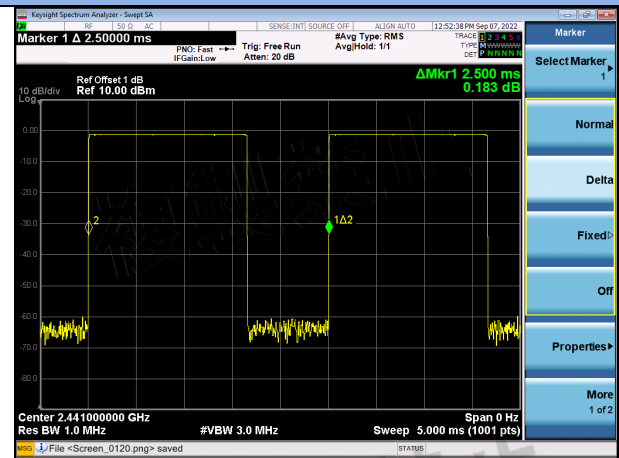
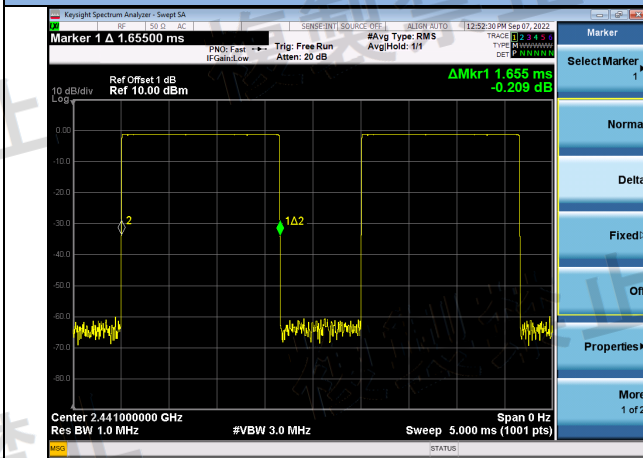
Test Date : September 07, 2022		Test Result: PASS		
Test Voltage: Normal Voltage		Test Mode: TX (GFSK/ $\pi/4$ -DQPSK/ 8DPSK) Hopping		
Packet Type	90% Spread BW (MHz)	Modulation rate (Mbps)	Spreading factor	Limit
Hopping (GFSK)				
DH1	71.708	1	71.708	Reporting only
DH3	71.693	1	71.693	Reporting only
DH5	71.671	1	71.671	Reporting only
Hopping ($\pi/4$ -DQPSK)				
2-DH1	71.819	1	71.819	Reporting only
2-DH3	71.874	1	71.874	Reporting only
2-DH5	71.831	1	71.831	Reporting only
Hopping (8DPSK)				
3-DH1	71.830	1	71.830	Reporting only
3-DH3	71.789	1	71.789	Reporting only
3-DH5	71.824	1	71.824	Reporting only
Note: Spreading factory = Spreading bandwidth/ Modulation rate (GFSK= $\pi/4$ -DQPSK=1Mbps, 8DPSK=1Mbps)				

Test Plots – Normal Voltage

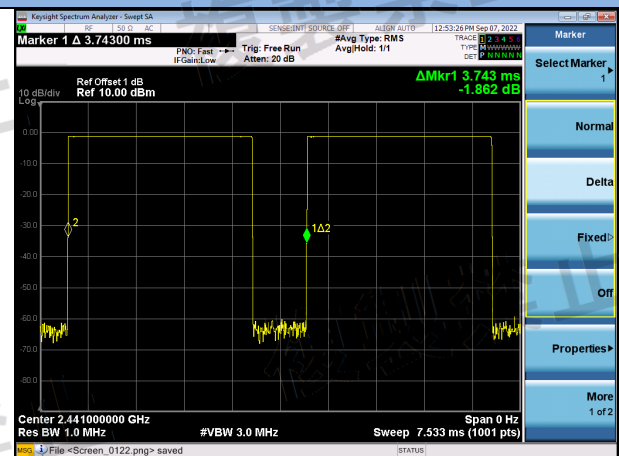
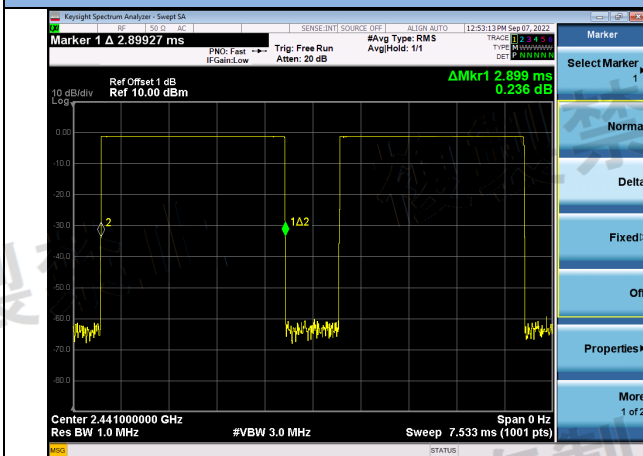
GFSK DH1



GFSK DH3

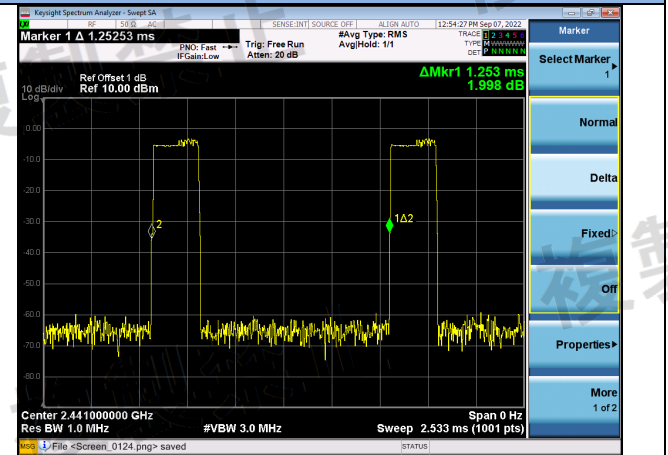
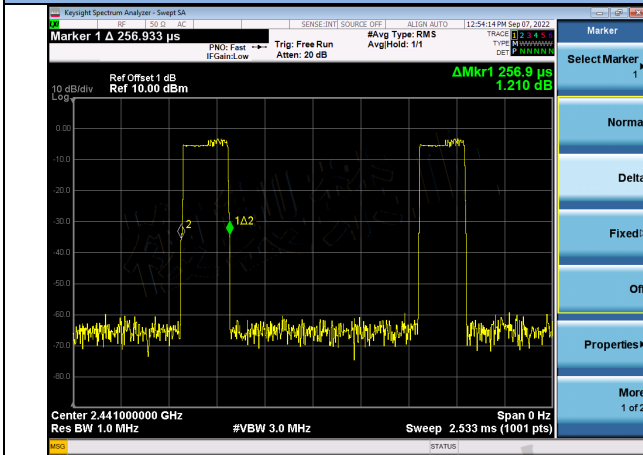


GFSK DH5

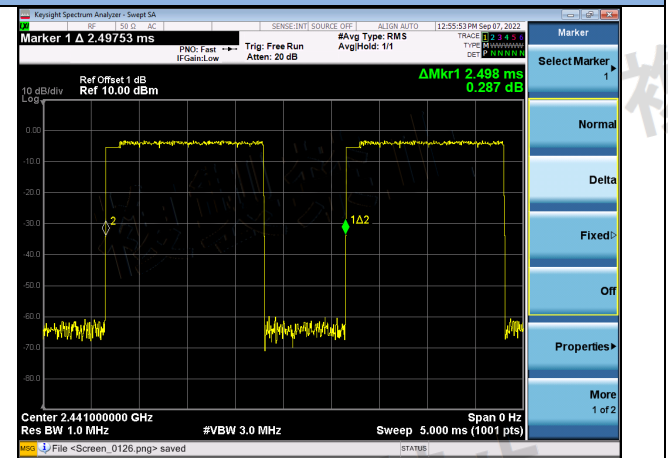
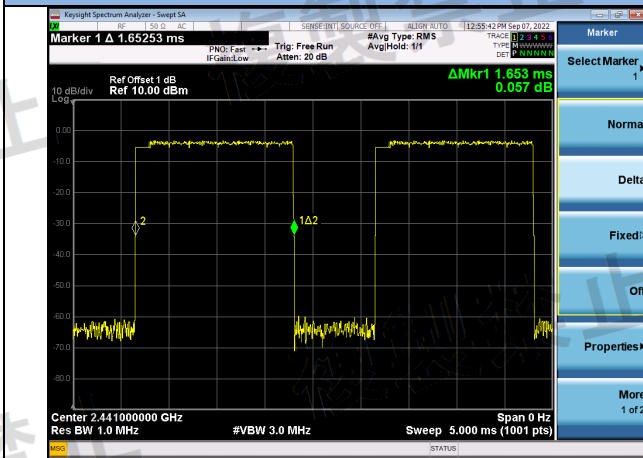


Test Plots – Normal Voltage

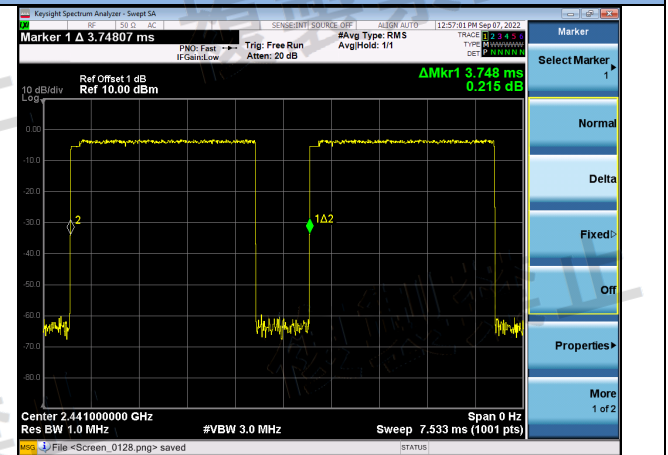
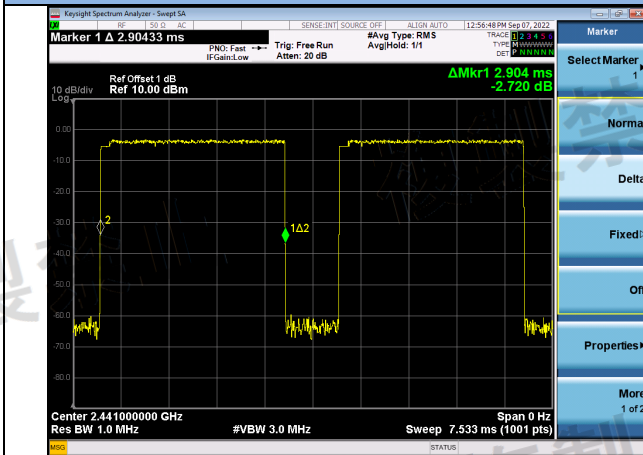
$\pi/4$ -DQPSK 2-DH1



$\pi/4$ -DQPSK 2-DH3

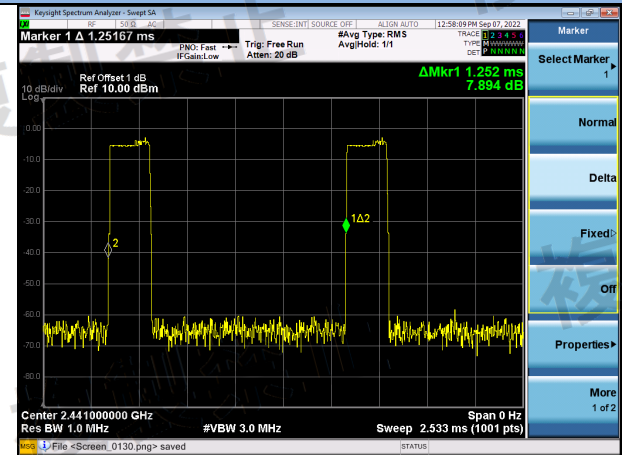
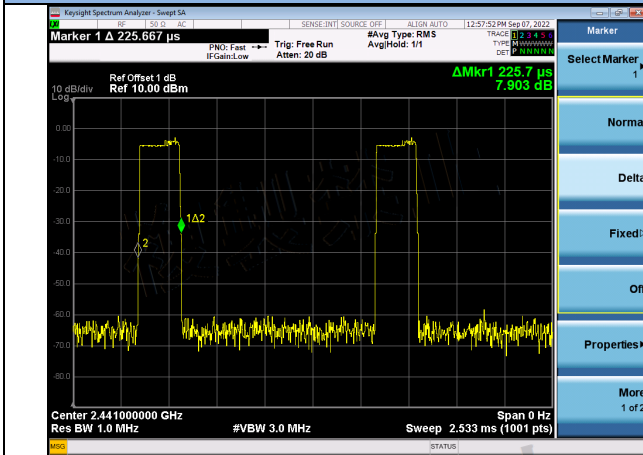


$\pi/4$ -DQPSK 2-DH5

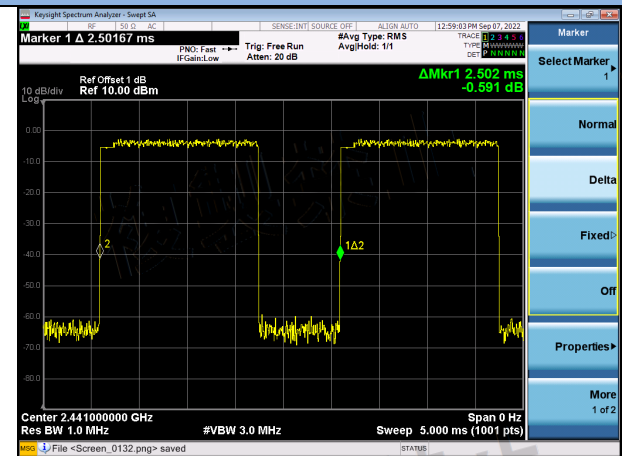
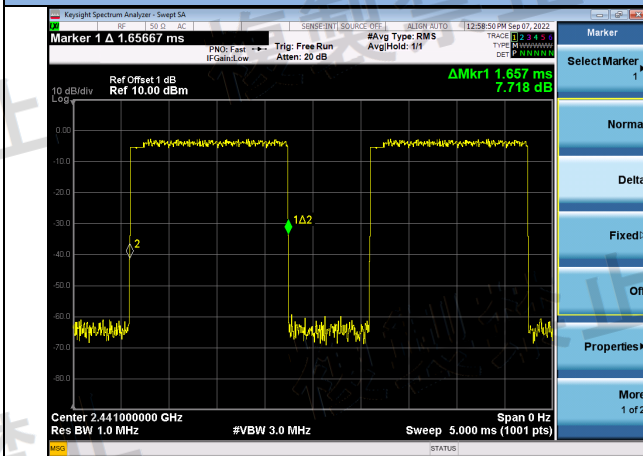


Test Plots – Normal Voltage

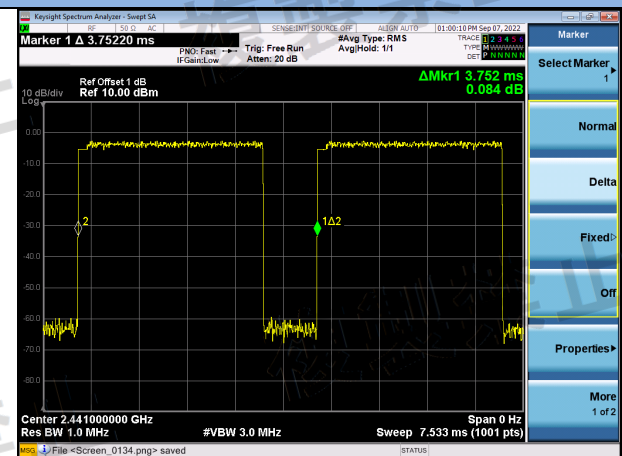
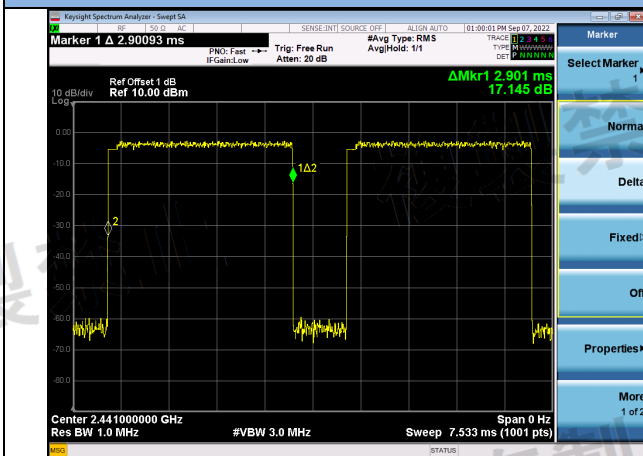
8DPSK 3-DH1



8DPSK 3-DH3



8DPSK 3-DH5



13. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum Analyzer	Rohde & Schwarz	FSU26	200409/026	Mar. 13, 2022	1 Year
2.	Signal Generator	Agilent	E4421B	MY41000708	Mar. 13, 2022	1 Year
3.	Signal Generator	Agilent	N5182A	MY48180739	Mar. 13, 2022	1 Year
4.	Spectrum Analyzer	Keysight	N9020A	MY54200831	Mar. 13, 2022	1 Year
5.	Power Sensor	DARE	RPR3006W	15I00041SNO 64	Mar. 13, 2022	1 Year
6.	Communication Tester	Rohde & Schwarz	CMW500	149004	Mar. 13, 2022	1 Year
7.	DC Source	Maynuo	MY8811	N/A	Mar. 13, 2022	1 Year

Remark:

(a) Calibration conducted by the National Institute of Information and Communications Technology(NICT) in Japan (hereinafter referred to as "NICT") or a designated calibration agency under Article102-18paragraph (1) in JRL.

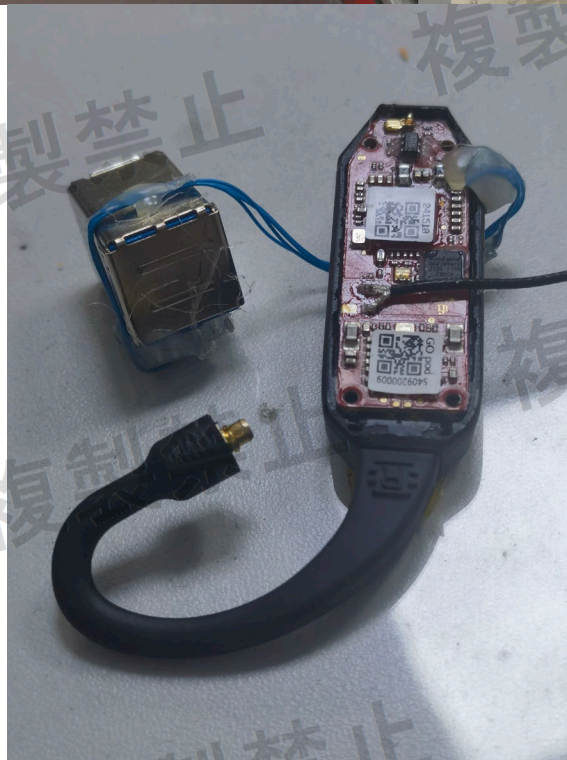
(b) Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act(Act No. 51 of 1992) .

(c) Calibration conducted in countries except Japan, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).

(d) Calibration, etc. conducted by using measuring instruments and other equipment listed in the right column of appended table No. 3, which shall have been given any type of calibration, etc. listed above from (a) to (C) From JRL Article 24-2, paragraph 4, Item 2.

(E) Our lab selects method (c) for the calibration.

14. photograph of Test Setup



--End--