

TEST REPORT

Product Name: Dancing Bot Speaker

Trade Mark: SoftBank Robotics

Model No.: SZ0100001A01

Add. Model No.: N/A

Report Number: 25042117467RFC-1

Specified Categories: Item 19 of Article 2 Paragraph 1

Standard: MIC Notification No. 88 Appendix No.43

Test Result: PASS

Date of Issue: May 6, 2025

Prepared for:

SoftBank Robotics Corp.

7-1, Kaigan 1-chome, Minato-ku, Tokyo 105-7537, Japan

Prepared by:

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UTTR-RF-STDT66-V1.1

Version

Version No.	Date	Description
V1.0	May 6, 2025	Original

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1. GENERAL INFORMATION

1.1 CLIENT INFORMATION

Applicant:	SoftBank Robotics Corp.
Address of Applicant:	7-1, Kaigan 1-chome, Minato-ku, Tokyo 105-7537, Japan
Manufacturer:	SoftBank Robotics Corp.
Address of Manufacturer:	7-1, Kaigan 1-chome, Minato-ku, Tokyo 105-7537, Japan
Factory:	SHENZHEN E.PLUS INDMSERY CO., LTD
Address of Factory:	West 8/F Bldg A2, Tianrui Industrial Zone, Fuyuan 1st Rd, Fuyong Street, Baoan District, Shenzhen

1.2 EUT INFORMATION

1.2.1 General Description of EUT

Product Name:	Dancing Bot Speaker
Model No.:	SZ0100001A01
Add. Model No.:	N/A
Trade Mark:	SoftBank Robotics
DUT Stage:	Identical Prototype
Software Version:	V1.1 (Provided by the customer)
Hardware Version:	ZZ_SP_MAN_V1.5 (Provided by the customer)
Sample Received Date:	April 21, 2025
Sample Tested Date:	April 21, 2025 to April 28, 2025
Remark: The above EUT's information was provided by customer. Please refer to the specifications or user's manual for more detailed description.	

1.2.2 Description of Accessories

Cable	
Description:	USB Type-C to USB Type A Cable
Connector:	USB Type-C / USB Type A
Cable Type:	Unshielded without ferrite
Length:	1 Meter

1.3 PRODUCT SPECIFICATION SUBJECTIVE TO THIS STANDARD

Frequency Band:	2400 MHz to 2483.5 MHz
Frequency Range:	2402 MHz to 2480 MHz
Radio Technique:	Bluetooth BR + EDR
AFH Function:	Not Support
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Type of Modulation:	GFSK, $\pi/4$ DQPSK, 8DPSK
Number of Channels:	79 (Please see NOTE 1)
Channel Separation:	1 MHz
RF Output Power:	Please see NOTE 2
Antenna Type: (Provided by the customer)	PCB Antenna
Antenna Gain: (Provided by the customer)	-0.53 dBi
Test Voltage:	Please see NOTE 3

NOTE:

1. Operation frequency each of channel

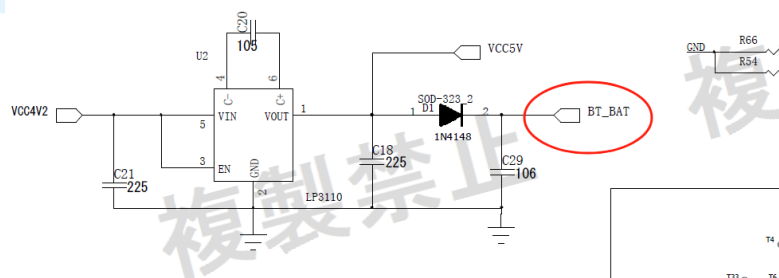
Operation Frequency Each of Channel	
$f = 2402 + k \text{ MHz}, k = 0, \dots, 78$	
Note:	
f	is the operating frequency (MHz);
k	is the operating channel.

2. The RF output power as below table:

	Rated output power density (mW/MHz)	Conducted RF output power density (mW/MHz)	Radiated RF output power density (mW/MHz)
Normal mode			
GFSK	0.015	0.0157	0.0139
$\pi/4$ DQPSK	0.015	0.0163	0.0144
8DPSK	0.015	0.0162	0.0143

3. Test voltage as below table:

	Normal Voltage	Low Extreme Voltage	High Extreme Voltage
Operating Voltage (V)	3.7 V	4.26 V	3.23 V
Measuring Voltage (V)	4.261 V	4.259 V	4.268 V
Tolerance (%)	--	-0.05 %	0.16 %



When EUT be operated at $\pm 10\%$ from the normal supply voltage, the supply voltage of RF part was varied within $\pm 1\%$. All test cases were done under the normal supply voltage.

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1.4 OTHER INFORMATION

Modulation Configure			
Modulation	Packet	Packet Type	Packet Size
GFSK	1-DH1	4	27
	1-DH3	11	183
	1-DH5	15	339
$\pi/4$ DQPSK	2-DH1	20	54
	2-DH3	26	367
	2-DH5	30	679
8DPSK	3-DH1	24	83
	3-DH3	27	552
	3-DH5	31	1021

1.5 GENERAL DESCRIPTION OF APPLIED STANDARDS

The EUT is a RF product, according to the specifications of the manufacturers. It must comply with the requirements of the following standards:

Item 19 of Article 2 Paragraph 1,
MIC Notification No. 88 Appendix No.43

All test items have been performed and recorded as per the above standards

1.6 DESCRIPTION OF SUPPORT UNITS

The EUT has been tested with associated equipment below.

1) Support Equipment

Description	Manufacturer	Model No.	Serial Number	Supplied by
Laptop	DELL	Inspiron 5409	9BN63 A0D	UnionTrust

2) Support Cable

Cable No.	Description	Connector	Length	Supplied by
1	Antenna Cable	SMA	0.15 Meter	UnionTrust

1.7 TEST LOCATION

All tests were performed at:

Shenzhen UnionTrust Quality and Technology Co., Ltd.

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1.8 TEST FACILITY

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

CNAS-Lab Code: L9069

The measuring equipment utilized to perform the tests documented in this report has been calibrated once a year or in accordance with the manufacturer's recommendations, and is traceable under the ISO/IEC 17025 to international or national standards. Equipment has been calibrated by accredited calibration laboratories.

A2LA-Lab Certificate No.: 4312.01

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

ISED Wireless Device Testing Laboratories

CAB identifier: CN0032

FCC Accredited Lab.

Designation Number: CN1194

Test Firm Registration Number: 259480

1.9 DEVIATION FROM STANDARDS

None.

1.10 ABNORMALITIES FROM STANDARD CONDITIONS

None.

1.11 OTHER INFORMATION REQUESTED BY THE CUSTOMER

None.

1.12 MEASUREMENT UNCERTAINTY

No.	Item	Measurement Uncertainty
1	Radio frequency	$\pm 6.5 \times 10^{-8}$
2	Occupied Channel Bandwidth	$\pm 1.86 \%$
3	RF output power, conducted	$\pm 0.68 \text{ dB}$
4	Power Spectral Density	$\pm 0.6 \text{ dB}$
5	Spurious emissions, conducted	$\pm 2.7 \text{ dB}$
6	Supply voltages	$\pm 0.68 \%$
7	Time	$\pm 0.19 \%$
Remark: 95% Confidence Levels, k=2.		

2. TEST SUMMARY

Item	Notice 88 Appendix 43 Reference	ARIB STD-T66 Reference	Report reference	Result
GENERAL PROVISIONS				
Frequency Tolerance	C	3.2 (4)	5.3	PASS
Occupied bandwidth	D	3.2 (7)	5.4	PASS
Spurious emissions	E	3.2 (6)	5.6	PASS
TRANSMITTING EQUIPMENT				
Antenna power	F	3.2 (1)	5.7	PASS
SAR	--	--	--	N/A
TRANSMITTING ANTENNA				
Type, configuration, etc. of transmitting antenna	--	--	1.3, 5.2	PASS
Direction pattern of transmitting antenna	--	--	5.2	PASS
RECEIVING EQUIPMENT				
Spurious emissions of receiver	H	3.3 (1)	5.8	PASS
Refer to all articles for transmitting antenna	--	--	5.2	PASS
OPERATING FREQUENCY 2402 TO 2480MHZ				
High Frequency/modulation section cannot be opened easily	--	3.7 (1)	5.11	PASS
Communication method	--	3.1 (1)	1.3	PASS
Modulation method	--	3.2 (1)a	1.3	PASS
Spread spectrum method	--	3.2 (1)a	5.5	PASS
Antenna power	--	3.2 (2)	5.7	PASS
Absolute gain of transmitting antenna	--	3.6 (2)	5.7	PASS
Angular width of principal radiation (AWPR)	--	3.6 (2)	5.7	PASS
Number of carriers within 1 MHz bandwidth in OFDM	--	3.2 (10)	--	N/A
Diffusion bandwidth	--	3.2 (8)	5.5	PASS
Spreading factor	--	3.2 (9)	5.5	PASS
Frequency retention time (FH employed)	--	3.2 (11)	5.9	PASS
Interference Prevention Function	--	3.4.1 (1)	5.10	PASS
Note:				
1) N/A: In this whole report not applicable.				
Disclaimer and Explanations:				
The declared of product specification and data (e.g., antenna gain, RF specification, etc) for EUT presented in the report are provided by the customer, and the customer takes all the responsibilities for the accuracy of product specification.				

3. EQUIPMENT LIST

Used	Equipment	Manufacturer	Model No.	Serial Number	Cal. date	Cal. Due date
☒	EXA Spectrum Analyzer	KEYSIGHT	N9020A	MY51286807	25-Oct-2024	24-Oct-2025
☐	USB Wideband Power Sensor	KEYSIGHT	U2021XA	MY55430035	25-Oct-2024	24-Oct-2025
☐	MXG X-Series RF Vector Signal Generator	KEYSIGHT	N5182B	MY51350267	25-Oct-2024	24-Oct-2025
☒	DC Source	KIKUSUI	PWR400L	LK003024	19-July-2024	18-July-2025
☒	Digital multimeter	FLUKE	15B+	30701460WS 15	29-Oct-2024	28-Oct-2025
☒	Wideband Radio Communication Tester	R&S	CMW500	120932	28-Mar-2025	27-Mar-2026

Note 1: Calibration Method

- Calibration conducted by the National Institute of Information and Communications Technology [NICT](#) or a designated calibration agency under Article 102-18 paragraph
- Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992)
- Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the [NICT](#) or a designated calibration agency under Article 102-18 paragraph
- 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

The all calibration corresponds to c) described above.

Note 2: Calibration information

Calibration Agency: Guangzhou LiSai Metrology & Test Co., Ltd.

Address: No.8, South Street Shi Ji Institute Guangzhou, Guangdong, China

4. TEST CONFIGURATION

4.1 ENVIRONMENTAL CONDITIONS FOR TESTING

4.1.1 Normal or Extreme Test Conditions

Environment Parameter	Selected Values During Tests		
Test Condition	Ambient		
	Temperature (°C)	Voltage (Vac)	Relative Humidity (%)
TN/VN	+15 to +35	3.7	45%-85%
TN/VL		4.26	
TN/VH		3.23	
Remark: 1) VN: Normal Voltage; TN: Normal Temperature; 2) VL: Low Extreme Test Voltage; VH: High Extreme Test Voltage. 3) The operating voltage range of this device declared by client is 4.26Vac to 3.23 Vac.			

4.1.2 Record of Normal Environment and Test Sample

Test Item	Temp. (°C)	Relative Humidity (%)	Pressure (kPa)	Sample No.	Tested by
Frequency Tolerance	23.3	45.9	99.9	S202504215826-ZJA01/2	Curry Xue
Occupied bandwidth & Spreading bandwidth					
Spurious emissions					
Antenna power					
Spurious emissions of receiver					
Dwell Time					

4.2 TEST CHANNELS

Mode	Tx/Rx Frequency	Test RF Channel Lists		
		Lowest(L)	Middle(M)	Highest(H)
GFSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz
π /4DQPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz
8DPSK (DH1, DH3, DH5)	2402 MHz to 2480 MHz	Channel 0	Channel 39	Channel 78
		2402 MHz	2441 MHz	2480 MHz

4.3 EUT TEST STATUS

Type of Modulation	Tx/Rx Function	Description
GFSK/ π /4DQPSK/ 8DPSK	1Tx/1Rx	1. Keep the EUT in continuously transmitting with modulation or un-modulation test single. 2. Keep the EUT in continuously receiving. 3. Keep the EUT in continuously transmitting with modulation test Hopping Frequency.

Power Setting (Provided by the customer)
Power Setting: 3

Test Software (Provided by the customer)
BT FCC Tool V2.21

4.4 PRE-SCAN

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data packets and antenna ports (if EUT with antenna diversity architecture).

4.4.1 Worst-case data packets

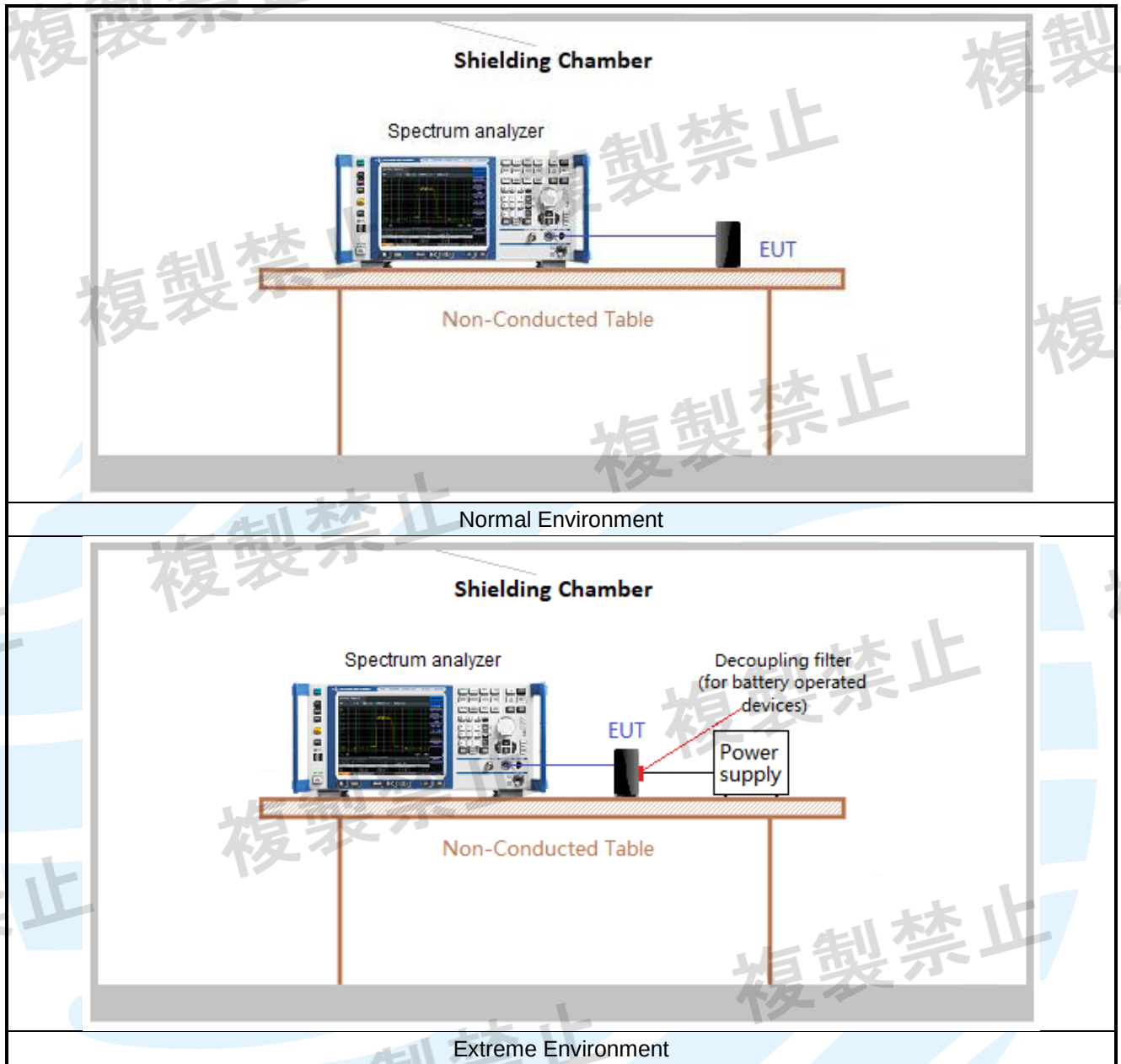
Type of Modulation	Worst-case data rates
GFSK	DH5
$\pi/4$ DQPSK	2DH5
8DPSK	3DH5

4.4.2 Tested channel detail

Following channel(s) was (were) selected for the final test as listed below.

Type of Modulation	GFSK			$\pi/4$ DQPSK			8DPSK		
Data Packets	DH1	DH3	DH5	DH1	2DH3	2DH5	3DH1	3DH3	3DH5
Available Channel	0 to 78								
Test Item	Test channel and choose of data packets								
Frequency Tolerance	Unmodulation or modulation mode Channel 0 & 39 & 78								
	☐	☐	☒	☐	☐	☒	☐	☐	☒
Antenna power	Frequency Hopping Channel 0 to 78								
	☒	☒	☒	☒	☒	☒	☒	☒	☒
Occupied bandwidth & Spreading bandwidth	Channel 0 & 39 & 78								
	☐	☐	☒	☐	☐	☒	☐	☐	☒
Spurious emissions	Channel 0 & 39 & 78								
	☐	☐	☒	☐	☐	☒	☐	☐	☒
Spurious emissions of receiver	Channel 0 & 39 & 78								
	☐	☐	☒	☐	☐	☒	☐	☐	☒
Dwell Time	Channel 39								
	☒	☒	☒	☒	☒	☒	☒	☒	☒
Remark:									
1. The mark "☑" means is chosen for testing;									
2. The mark "☐" means is not chosen for testing									

4.5 TEST SETUP



5. RADIO TECHNICAL REQUIREMENTS SPECIFICATION

5.1 REFERENCE DOCUMENTS FOR TESTING

Item 19 of Article 2 Paragraph 1: Low power data communications system in the 2.4GHz band

ARIB STD-T66 Version 3.7: Second generation low power data communication system/ wireless LAN system

MIC Notification No. 88 Appendix No.43 (2004) of the Ordinance Concerning Technical Regulations
Conformity Certification of Specified Radio Equipment

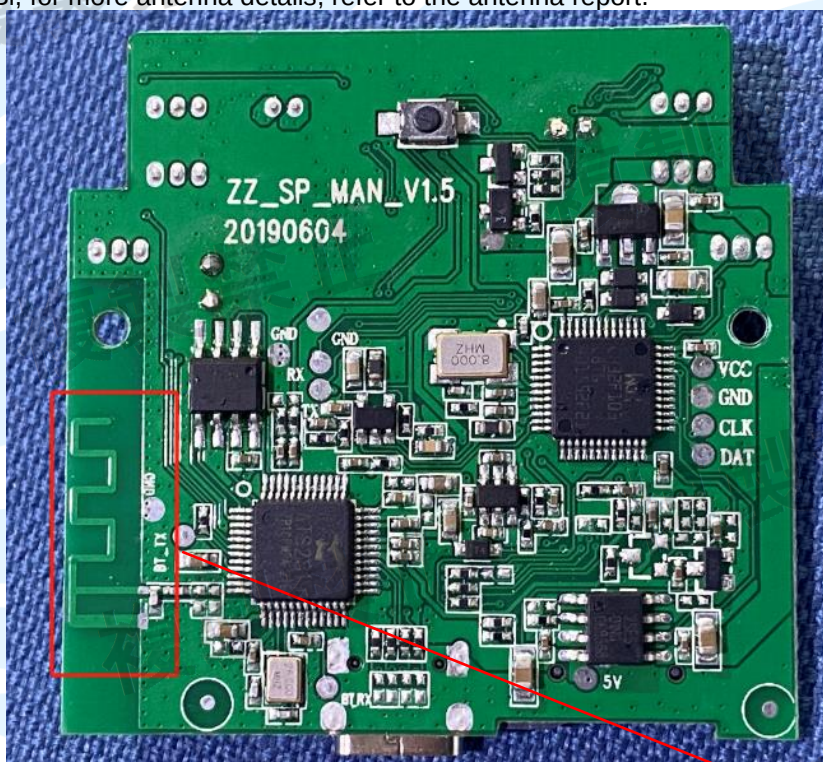
5.2 ANTENNA REQUIREMENT

Standard Requirement

Applicable for equipment with an antenna terminal, including testing terminals) If an antenna connector is available, all relevant tests will be carried out conducted. If not, tests will be carried out in an anechoic room or with a suitable test-fixture.

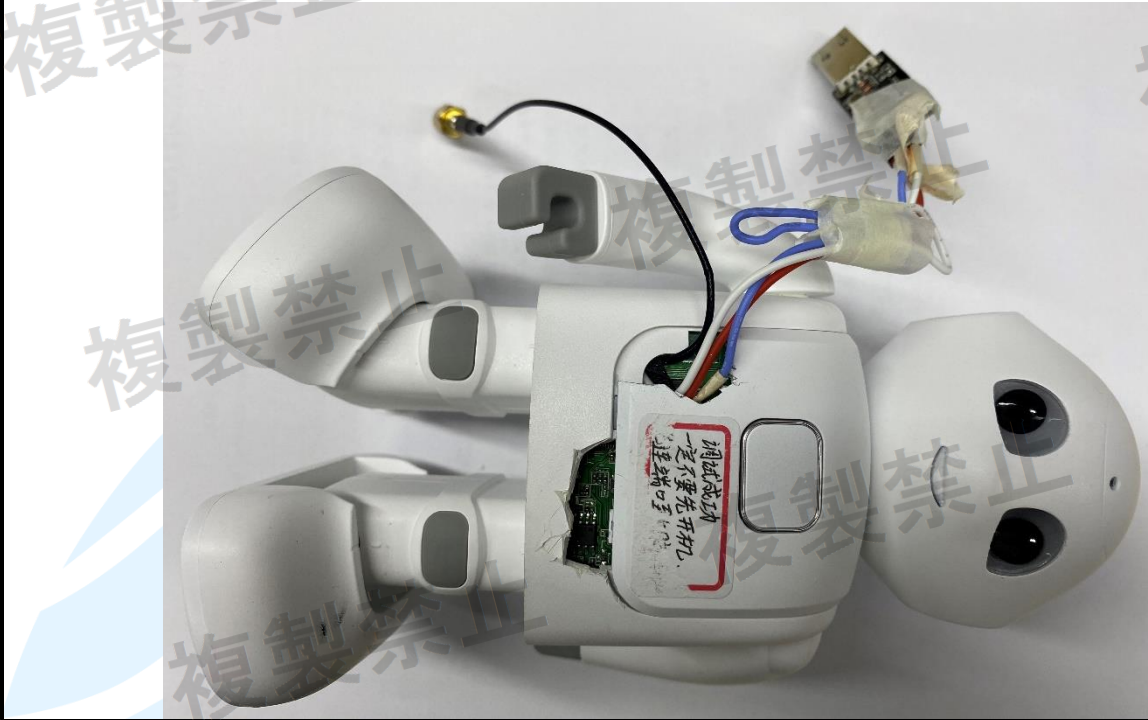
EUT Antenna

The antenna is installed inside the EUT and no consideration of replacement. The best-case gain of the antenna is -0.53 dBi, for more antenna details, refer to the antenna report.



BT ANT

Result: An antenna connector is available, all relevant tests will be carried out conducted.



5.3 FREQUENCY TOLERANCE

5.3.1 Limit

Tolerance of frequency shall be +/- 50ppm.

5.3.2 Test Setup

Refer to section 4.5 for details.

5.3.3 Instruments Used

Refer to section 3 for details

5.3.4 Test Procedures

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

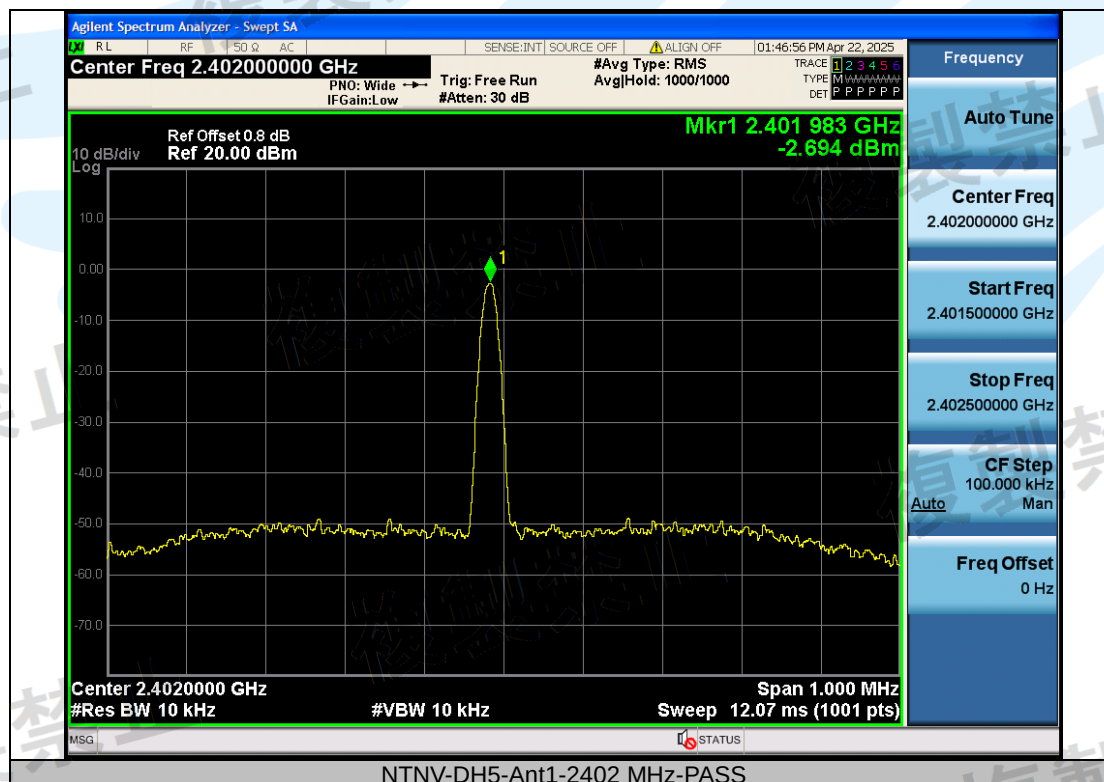
Use the following spectrum analyzer settings:

1. Center Frequency = test frequency
2. RBW = 10kHz, VBW = 10kHz;
3. Sweep = auto;
4. Detector function = peak
5. Trace = max hold
6. The frequency tolerance test case is directly measured using spectrum analyzer. Then the frequency error formula is $(f-f_c)/f_c \times 10^6$ ppm and the limit is less than ± 50 ppm.

5.3.5 Test Result

Test Condition	Test Mode	Antenna	Test Frequency [MHz]	Center Freq. [MHz]	Result [ppm]	Limit [ppm]	Verdict
NTNV	DH5	Ant1	2402	2401.983	-7.07744	±50	PASS
NTNV	DH5	Ant1	2441	2440.978	-9.01270	±50	PASS
NTNV	DH5	Ant1	2480	2479.979	-8.46774	±50	PASS

Note: Result [ppm] = (Center Freq. - Test Frequency) / Test Frequency * 1000000.



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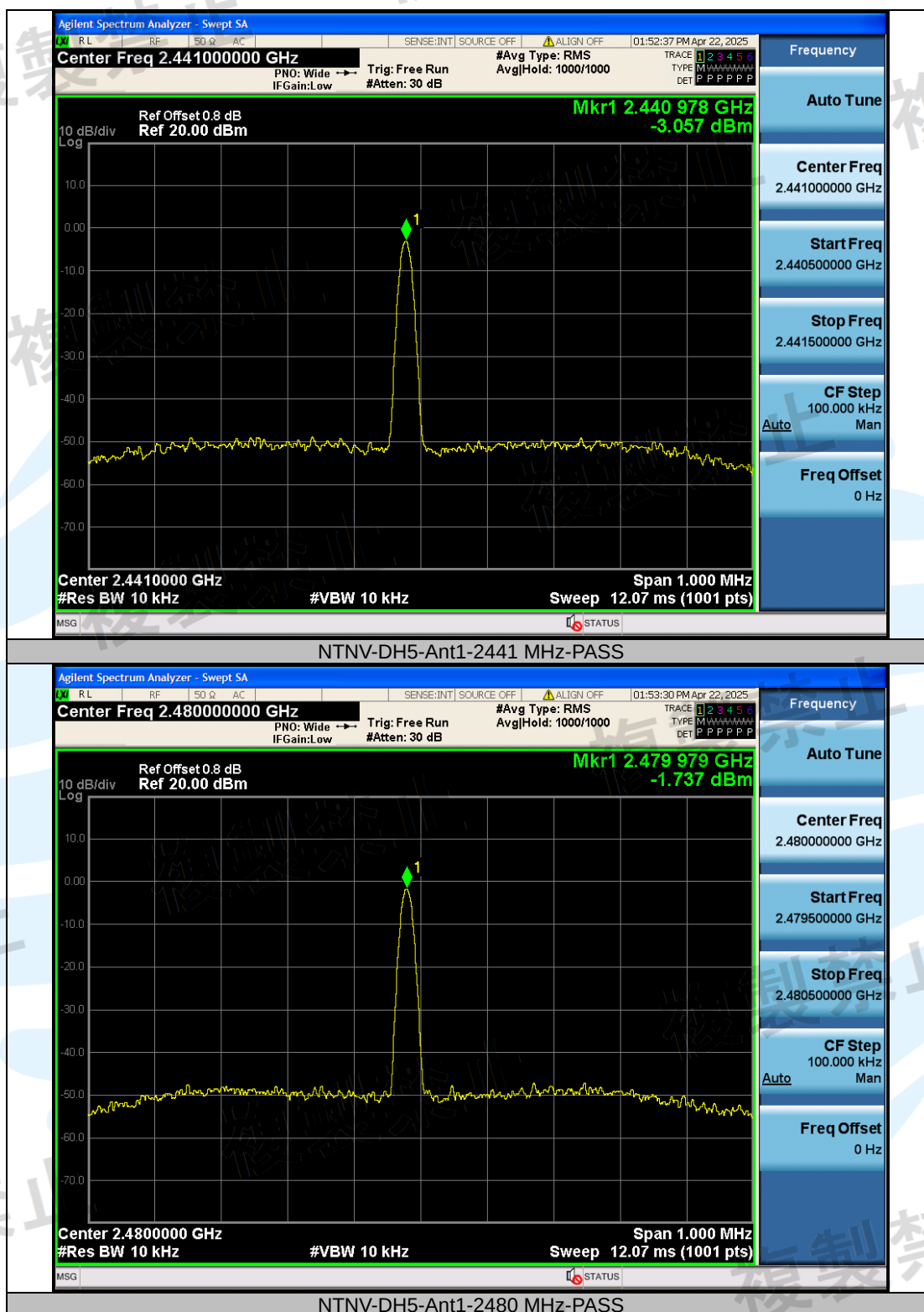
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5.4 OCCUPIED BANDWIDTH (99% BW)

5.4.1 Limit

Occupied bandwidth shall be 83.5MHz or less.

5.4.2 Test Setup

Refer to section 4.5 for details.

5.4.3 Instruments Used

Refer to section 3 for details

5.4.4 Test Procedures

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

1. Center Frequency = 2441 MHz
2. Span = 2 to 3.5 times Limit
3. RBW = 300kHz, VBW = 300kHz;
4. Sweep = auto;
5. Trace = max hold
6. Use the 99 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.

5.4.5 Test Result

Please refer to Appendix A

5.5 SPREADING BANDWIDTH (90% BW)

5.5.1 Limit

Spreading bandwidth ≥ 500 kHz.
Spreading factor ≥ 5 .

5.5.2 Test Setup

Refer to section 4.5 for details.

5.5.3 Instruments Used

Refer to section 3 for details

5.5.4 Test Procedures

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

1. Center Frequency = 2441 MHz
2. Span = 2 to 3.5 times Limit
3. RBW = 300kHz, VBW = 300kHz;
4. Sweep = auto;
5. Trace = max hold
6. Use the 90 % bandwidth function of the spectrum analyser to measure the Occupied Channel Bandwidth of the UUT. This value shall be recorded.

5.5.5 Test Result

Please refer to Appendix A

5.6 SPURIOUS EMISSIONS

5.6.1 Limit

Frequency (MHz)	Limit	
	uW/MHz	dBm/MHz
Operating frequency 2400 to 2483.5MHz		
$2387 \leq f < 2400$	≤ 25	-16
$2483.5 < f \leq 2496.5$	≤ 25	-16
All other frequencies	≤ 2.5	-26 (-36@RBW=100KHz)

5.6.2 Test Setup

Refer to section 4.5 for details.

5.6.3 Instruments Used

Refer to section 3 for details

5.6.4 Test Procedures

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

- a) Below 1GHz
 1. Set RBW = VBW = 100 kHz.
 2. Detector = peak.
 3. Sweep = auto couple.
 4. Trace Mode = max hold.
 5. Allow trace to fully stabilize.
 6. Use the peak marker function to determine the maximum amplitude level.
- b) Above 1GHz
 1. Set RBW = VBW = 1 MHz.
 2. Detector = peak.
 3. Sweep = auto couple.
 4. Trace Mode = max hold.
 5. Allow trace to fully stabilize.
 6. Use the peak marker function to determine the maximum amplitude level.

5.6.5 Test Result

Please refer to Appendix A

5.7 ANTENNA POWER

5.7.1 Limit

Antenna power	EIRP (max)	
	Omni-directional case	Directional case
3mW/MHz or less	6.91 dBm/MHz	16.91 dBm/MHz
	4.91 mW/MHz	49.09 mW/MHz

Tolerance of antenna power shall be +20% (upper value) and -80% (lower value).

5.7.2 Test Setup

Refer to section 4.5 for details.

5.7.3 Instruments Used

Refer to section 3 for details

5.7.4 Test Procedures

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. EUT have transmitted continuous maximum power on hopping mode (For FHSS Device).
3. Frequency hopping system or combined systems of direct spread and frequency hopping:
 - a) Connect the high frequency power meter to the output of the antenna and measure the total power (without bandwidth limitation)
 - b) Divide the total power by the spread bandwidth to find the “average” power per MHz. The average power per MHz is equal to the power meter value dBm + cable loss dB + $10 \log_{10} (1/\text{Duty Cycle})$ dB + $10 \log_{10} (1/\text{Spread Bandwidth})$ dB.
 - c) Confirm that frequency distribution of the hopping frequencies is homogeneous according to the supporting data.
If frequency distribution of the frequencies is not homogeneous, consider other measurement or correction methods based on the supporting data.
 - d) Antenna RF Output Power Tolerance is definition that actual measure antenna power tolerance between + 20% to - 80% power range that manufacturer declare the conducted power density

5.7.5 Test Result

Normal mode _ Conducted antenna power

Test Voltage	Modulation	Channel / Frequency (MHz)	Antenna power	Antenna power density	Tolerance (%)	Rated power (mW/MHz)	Conclusion
			(dBm)	(mW/MHz)			
VN	GFSK _DH5	0/2402	-2.180	0.0085	0.0076	0.015 (-80%~+20%)	PASS
		39/2441	-0.880	0.0115	0.0102		PASS
		79/2480	0.470	0.0157	0.0139		PASS
		Hopping	-3.510	0.0063	0.0056		PASS
	π/4DQPSK _2DH5	0/2402	-2.070	0.0087	0.0077	0.015 (-80%~+20%)	PASS
		39/2441	-0.660	0.0120	0.0106		PASS
		79/2480	0.680	0.0163	0.0144		PASS
		Hopping	-3.560	0.0061	0.0054		PASS
	8DPSK _3DH5	0/2402	-2.150	0.0086	0.0076	0.015 (-80%~+20%)	PASS
		39/2441	-0.820	0.0117	0.0104		PASS
		79/2480	0.590	0.0162	0.0143		PASS
		Hopping	-3.640	0.0061	0.0054		PASS

Note: Antenna power density = Antenna power / Spread-Spectrum

Normal mode _ Radiated antenna power (EIRP)

Test Voltage	Modulation	Channel / Frequency (MHz)	Antenna Gain (dBi)	Radiated RF output power density (mW/MHz)
VN	GFSK_DH5	0/2402	-0.53	0.0076
		39/2441		0.0102
		79/2480		0.0139
		Hopping		0.0056
	π/4DQPSK _2DH5	0/2402		0.0077
		39/2441		0.0106
		79/2480		0.0144
		Hopping		0.0054
	8DPSK_3DH5	0/2402		0.0076
		39/2441		0.0104
		79/2480		0.0143
		Hopping		0.0054

Note: 1. The maximum EIRP is calculated from max output power and antenna gain, the antenna gain provided by the customer, and the customer takes all the responsibilities for the accuracy of antenna gain.

2. The EIRP is less than Limit, HBPA is not necessary.

5.8 SPURIOUS EMISSIONS OF RECEIVER

5.8.1 Limit

Frequency (MHz)	Limit	
	nW	dBm
Below 1GHz	≤ 4	-54
Above 1GHz	≤ 20	-47

5.8.2 Test Setup

Refer to section 4.5 for details.

5.8.3 Instruments Used

Refer to section 3 for details

5.8.4 Test Procedures

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

- c) Below 1GHz
 - 7. Set RBW = VBW = 100 kHz.
 - 8. Detector = peak.
 - 9. Sweep = auto couple.
 - 10. Trace Mode = max hold.
 - 11. Allow trace to fully stabilize.
 - 12. Use the peak marker function to determine the maximum amplitude level.
- d) Above 1GHz
 - 7. Set RBW = VBW = 1 MHz.
 - 8. Detector = peak.
 - 9. Sweep = auto couple.
 - 10. Trace Mode = max hold.
 - 11. Allow trace to fully stabilize.
 - 12. Use the peak marker function to determine the maximum amplitude level.

5.8.5 Test Result

Please refer to Appendix A

5.9 DWELL TIME

5.9.1 Limit

The frequency retention time in the frequency hopping method shall be 0.4 second or less. The total sum of the frequency retention time in any frequency within the time obtained by multiplying the diffusion rate by 0.4 second shall be 0.4 second or shorter.

5.9.2 Test Setup

Refer to section 4.5 for details.

5.9.3 Instruments Used

Refer to section 3 for details

5.9.4 Test Procedures

Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

Use the following spectrum analyzer settings:

- a) Span = zero span, centered on a hopping channel
- b) RBW = RBW = 1 MHz.
- c) Sweep = As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel.
- d) Detector function = peak
- e) Trace = max hold
- f) Use the marker-delta function to determine the dwell time

5.9.5 Test Result

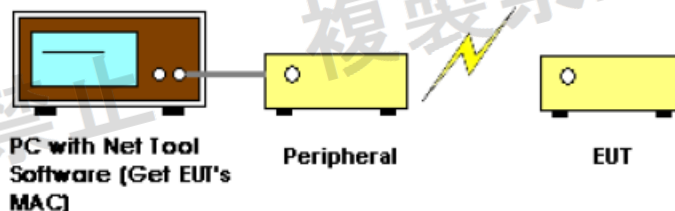
Please refer to Appendix A

5.10 INTERFERENCE PREVENTION FUNCTION

5.10.1 Limit

Identification code $\geq$ 48 bits

5.10.2 Test Setup



5.10.3 Test Procedures

1. In the case that the EUT has the function of automatically transmitting the identification code:
 - a. Transmit the predetermined identification codes from EUT.
 - b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification code:
 - a. Transmit the predetermined identification codes from the counterpart.
 - b. Check if communication is normal.
 - c. Transmit the signals other than predetermined ID codes from the counterpart.
 - d. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

5.10.4 Test Result

TX: The transmitting mode of EUT is on normal operating, the interference prevention function is okay.

RX: The receiving mode of EUT is on normal operating, the interference prevention function is okay.

The ID Code of this Bluetooth device is **F44EFD00FF11** as below list:

Identification code	
CMW BD Address	123456123456 hex
EUT BD Address	
--Default	123456789012 hex
--For Paging	F44EFD00FF11

5.11 CONSTRUCTION PROTECTION

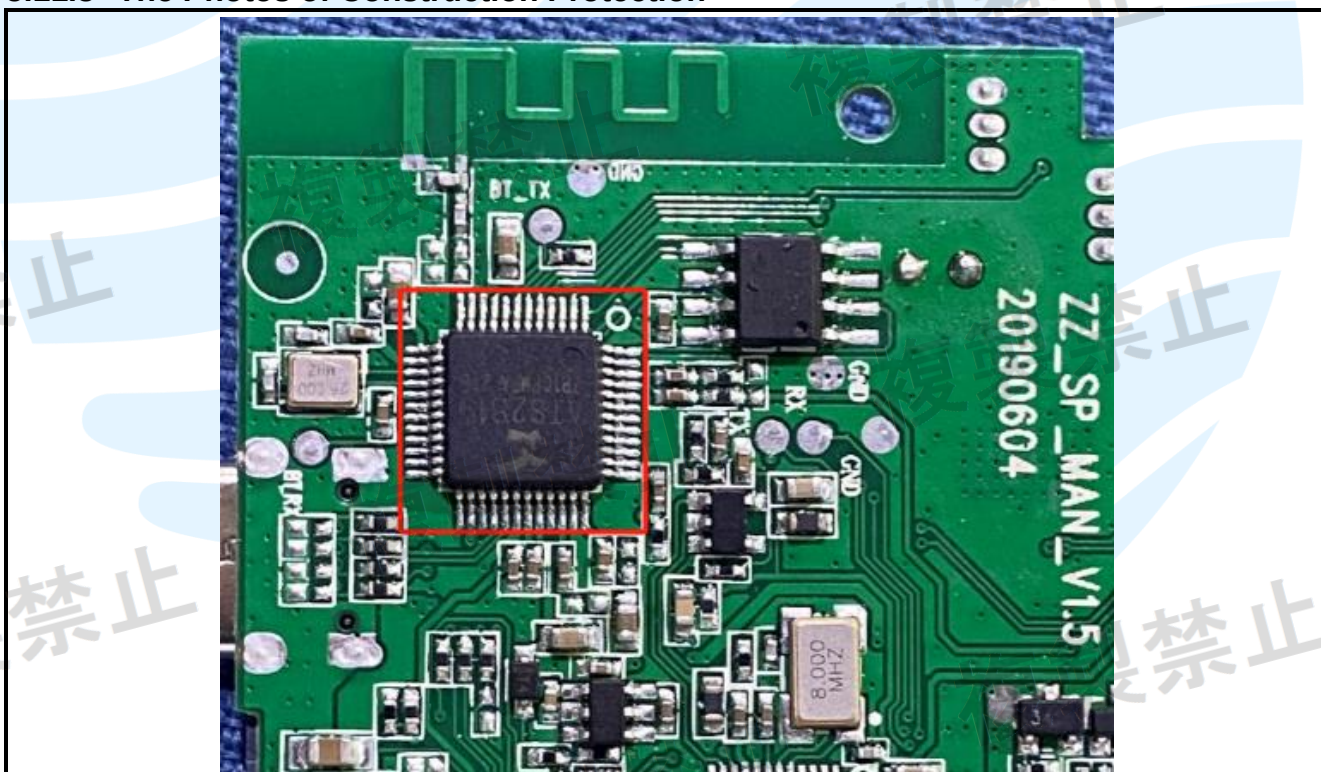
5.11.1 Limit

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

5.11.2 Confirmation Method

☐	Sealed with special screws.
☐	Plastic chassis is being welded using ultrasonic waves.
☐	Chassis is glued using a special adhesive.
☐	Metal covers are spot-fused.
☐	Cover is specially interlocked.
☐	RF and Modulation components are covered with shielding case and this shielding case is soldered.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is welded using the BGA Method.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is glued at its lead with a special adhesive.
☐	Shield case is welded at RF and modulation parts, and ID-ROM is glued with a non-transparent laminating agent.
☒	Other: RF and Modulation parts are mounted on PCB with surface mount technology. RF and modulation components are coated by welding, which cannot be disassembled and modified

5.11.3 The Photos of Construction Protection



APPENDIX A TEST DATA

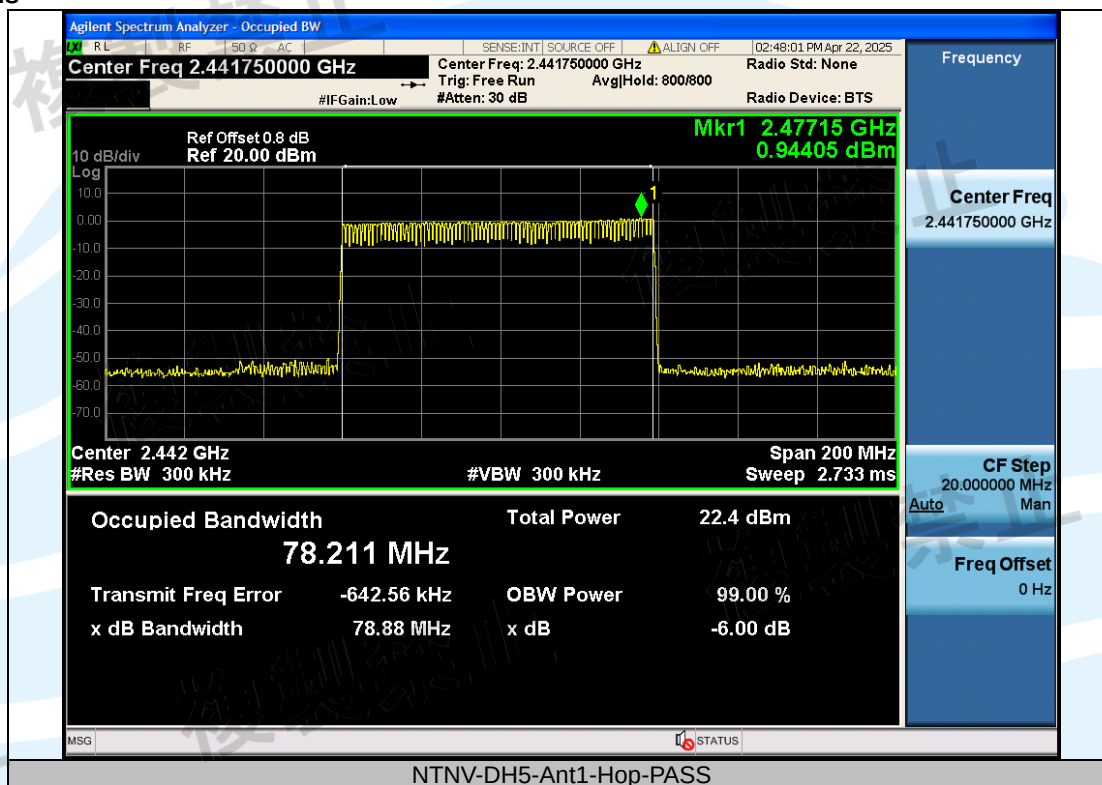
A.1 OCCUPIED BANDWIDTH (99% BW)

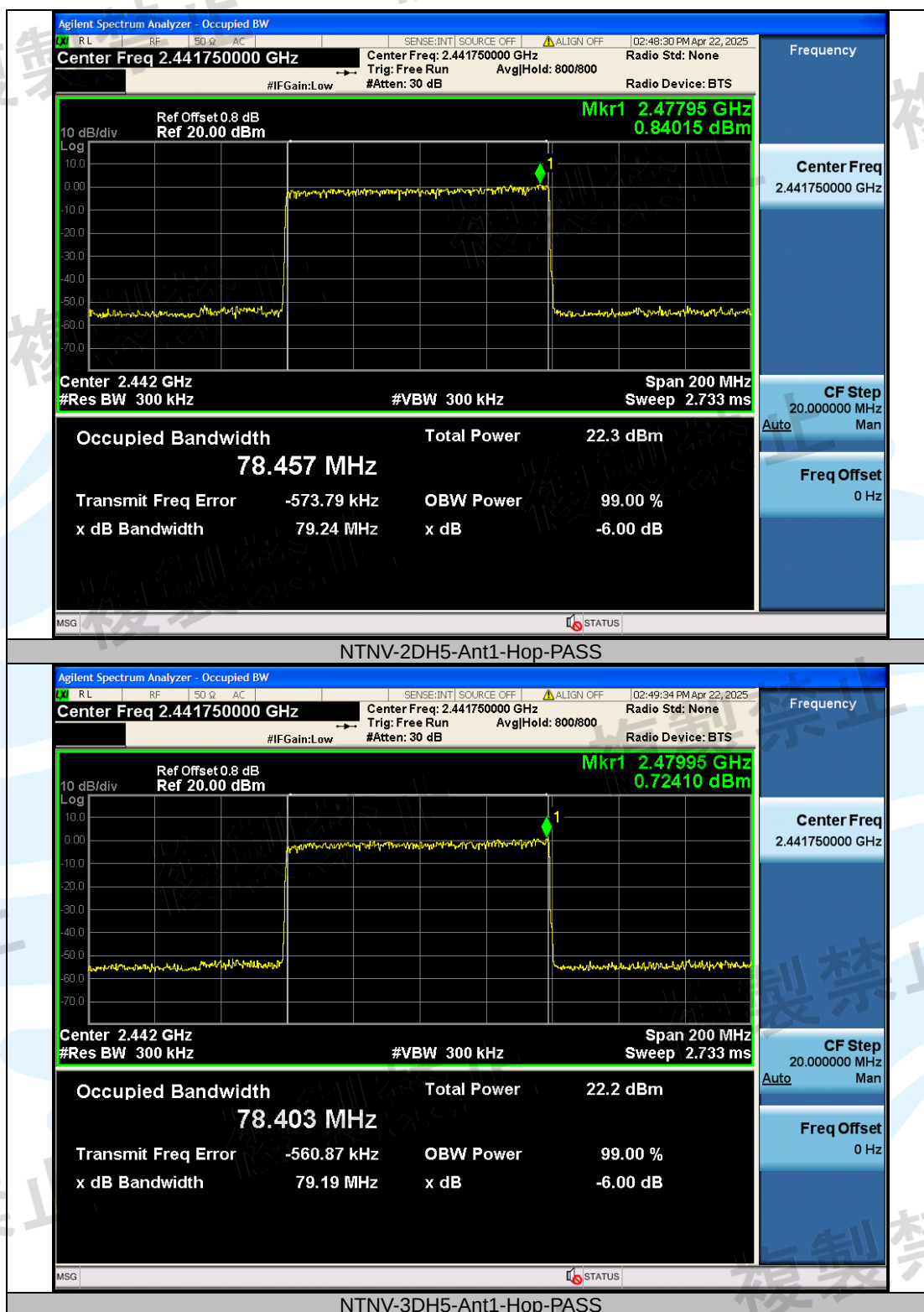
Test Result

Normal Mode

Condition	Modulation	99% BW (MHz)	Limit (MHz)	Result
NT/NV	GFSK_DH5	78.211	83.5	PASS
NT/NV	π /4DQPSK_2-DH5	78.457	83.5	PASS
NT/NV	8DPSK_3-DH5	78.403	83.5	PASS

Test Graphs





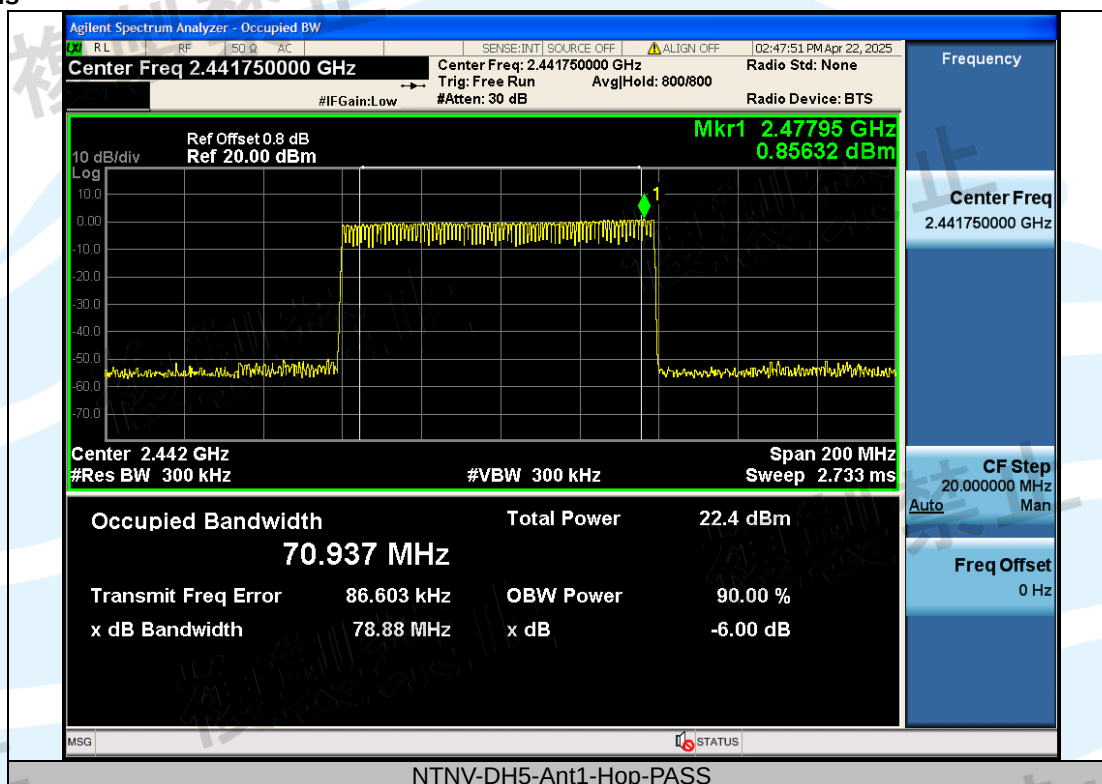
A.2 SPREADING BANDWIDTH (90% BW)

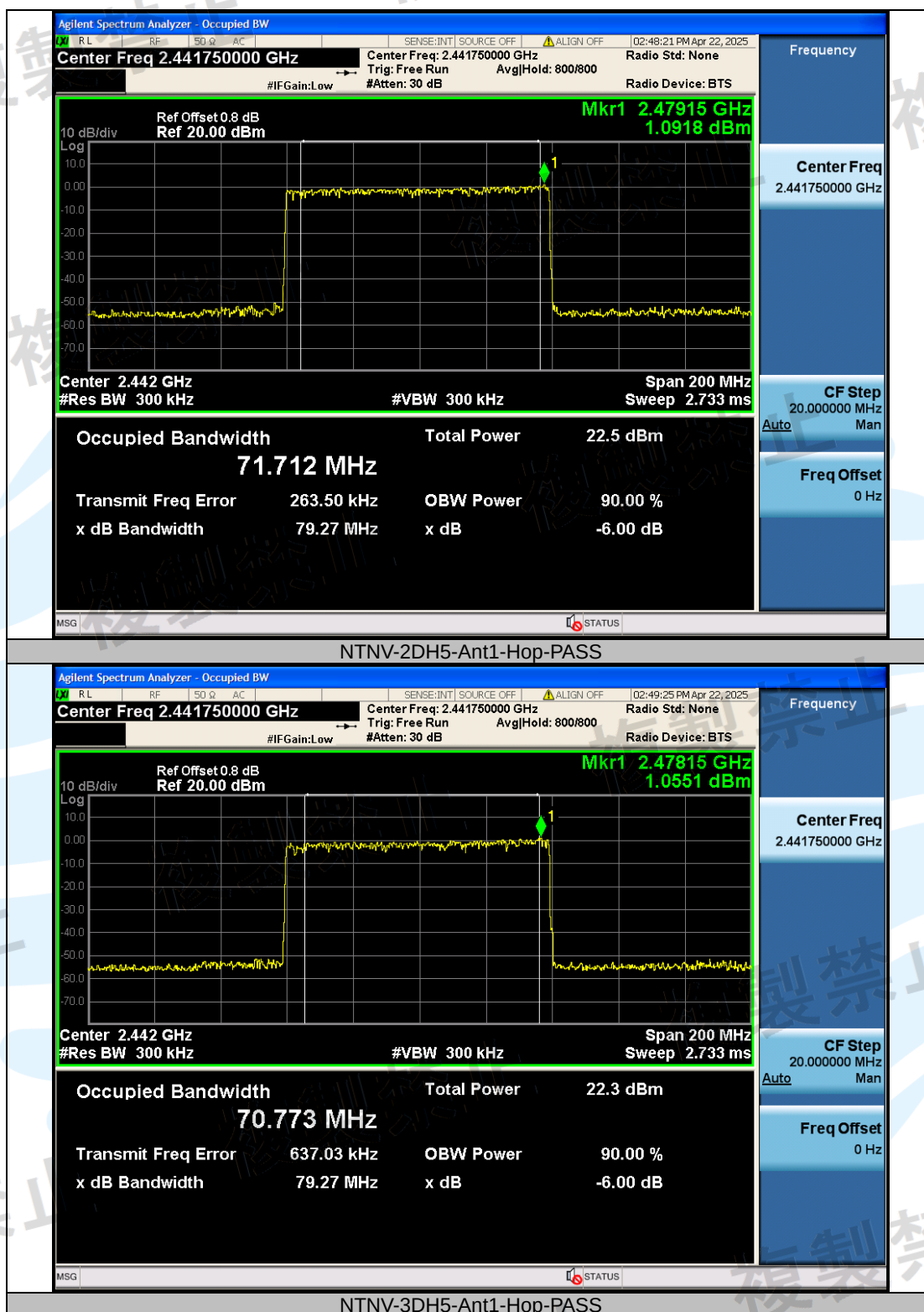
Test Result
Normal Mode

Condition	Modulation	Result [MHz]	Limit [MHz]	Spread Factor	Spreading factor Limit	Result
NT/NV	GFSK_DH5	70.937	≥0.5	70.937	5	PASS
NT/NV	π/4DQPSK_2-DH5	71.712	≥0.5	71.712	5	PASS
NT/NV	8DPSK_3-DH5	70.773	≥0.5	70.773	5	PASS

Note: Spreading Factor: 90% channel power bandwidth / 1.

Test Graphs





A.3 DWELL TIME

Test Result Normal Mode

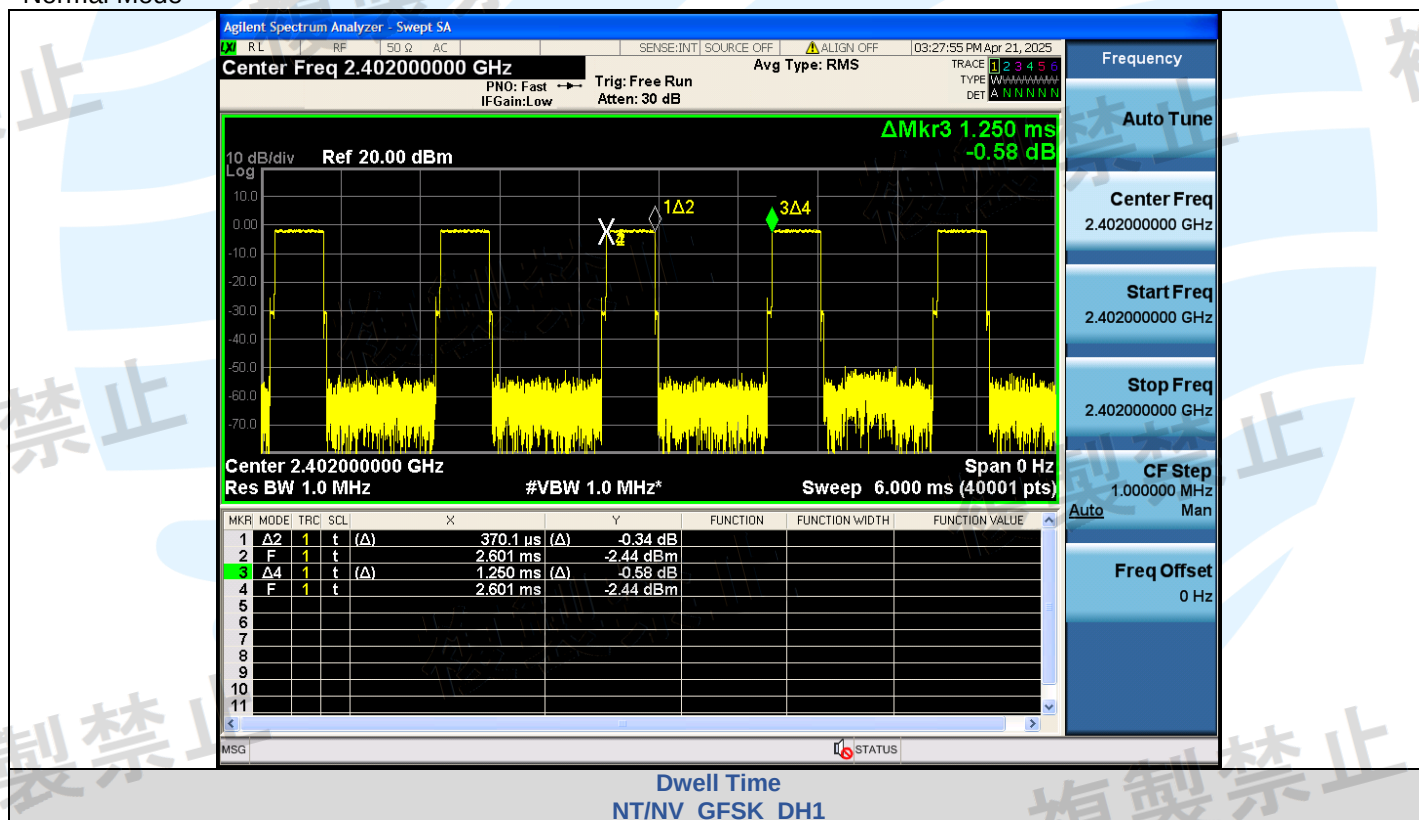
Modulation	Packet	Spreading Rate	(Spreading Rate / 79) * 0.4	On Time (msec)	Period (msec)	Burst Ratio	Dwell Time (msec)	Limit (msec)	Result
GFSK	DH1	70.937	0.3592	0.370	1.250	0.2961	106.3440	400	PASS
GFSK	DH3			1.627	2.502	0.6503	233.5640	400	PASS
GFSK	DH5			2.873	3.750	0.7661	275.1760	400	PASS
$\pi/4$ DQPSK	2-DH1	71.712	0.3631	0.379	1.250	0.3029	109.9750	400	PASS
$\pi/4$ DQPSK	2-DH3			1.628	2.499	0.6515	236.5450	400	PASS
$\pi/4$ DQPSK	2-DH5			2.876	3.750	0.7669	278.4730	400	PASS
8DPSK	3-DH1	70.773	0.3583	0.378	1.250	0.3027	108.4780	400	PASS
8DPSK	3-DH3			1.629	2.501	0.6513	233.4040	400	PASS
8DPSK	3-DH5			2.878	3.749	0.7677	275.0910	400	PASS

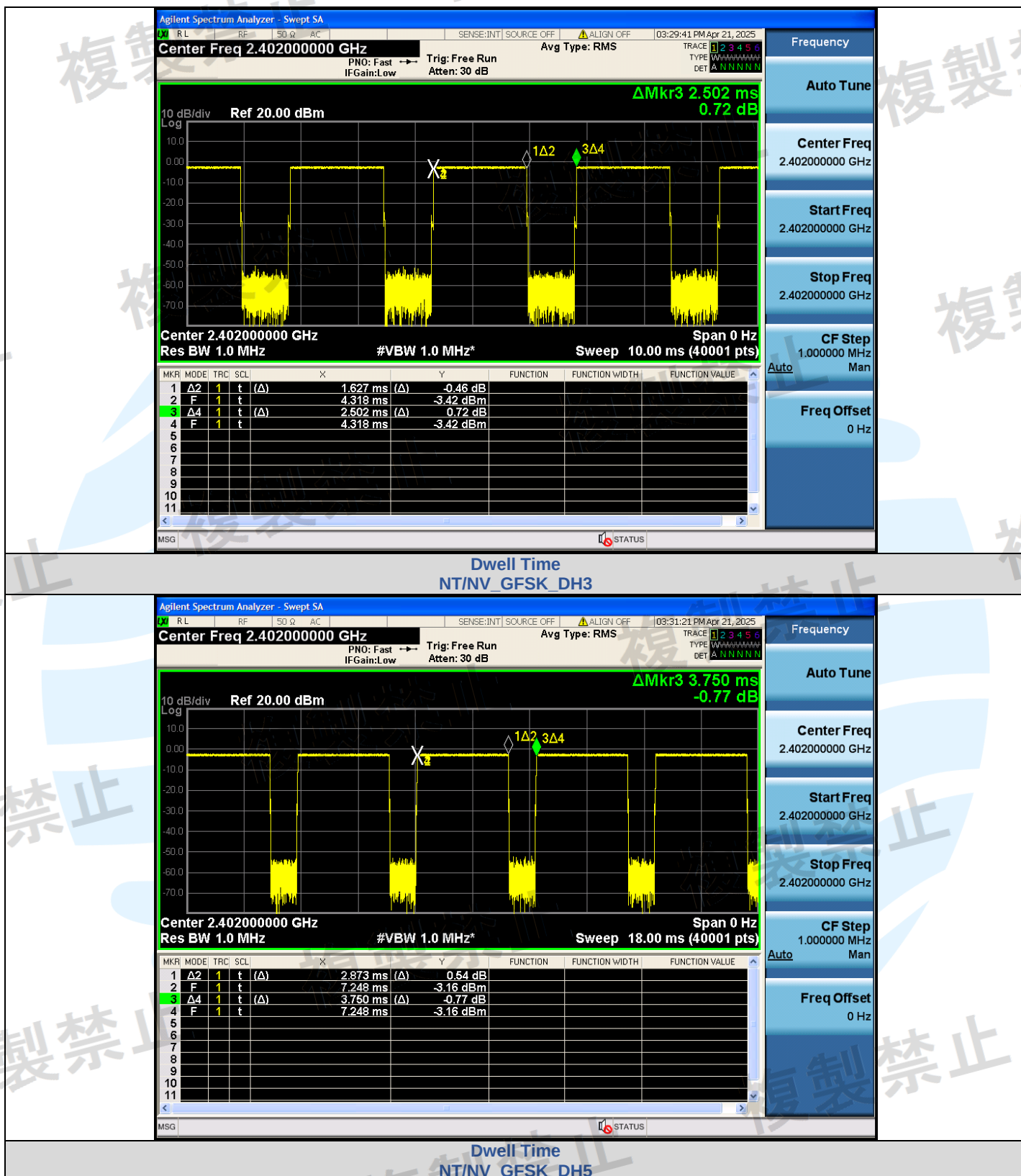
Note:

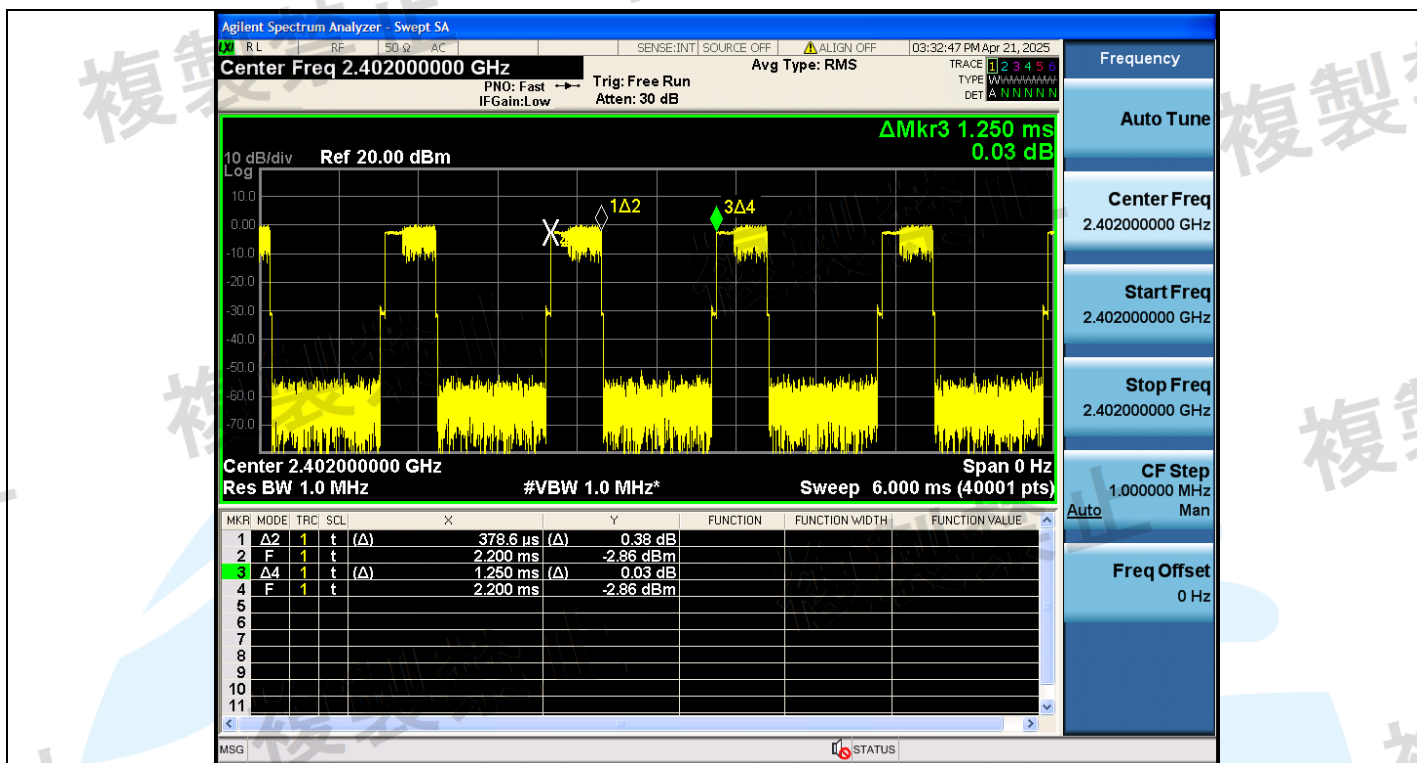
1. Spreading Rate = Spreading factor;
2. Normal mode Dwell time = (Spreading rate/79) x Burst Ratio x 0.4 seconds.
3. Burst Ratio = Duty Cycle = On Time / Period

Test Graphs

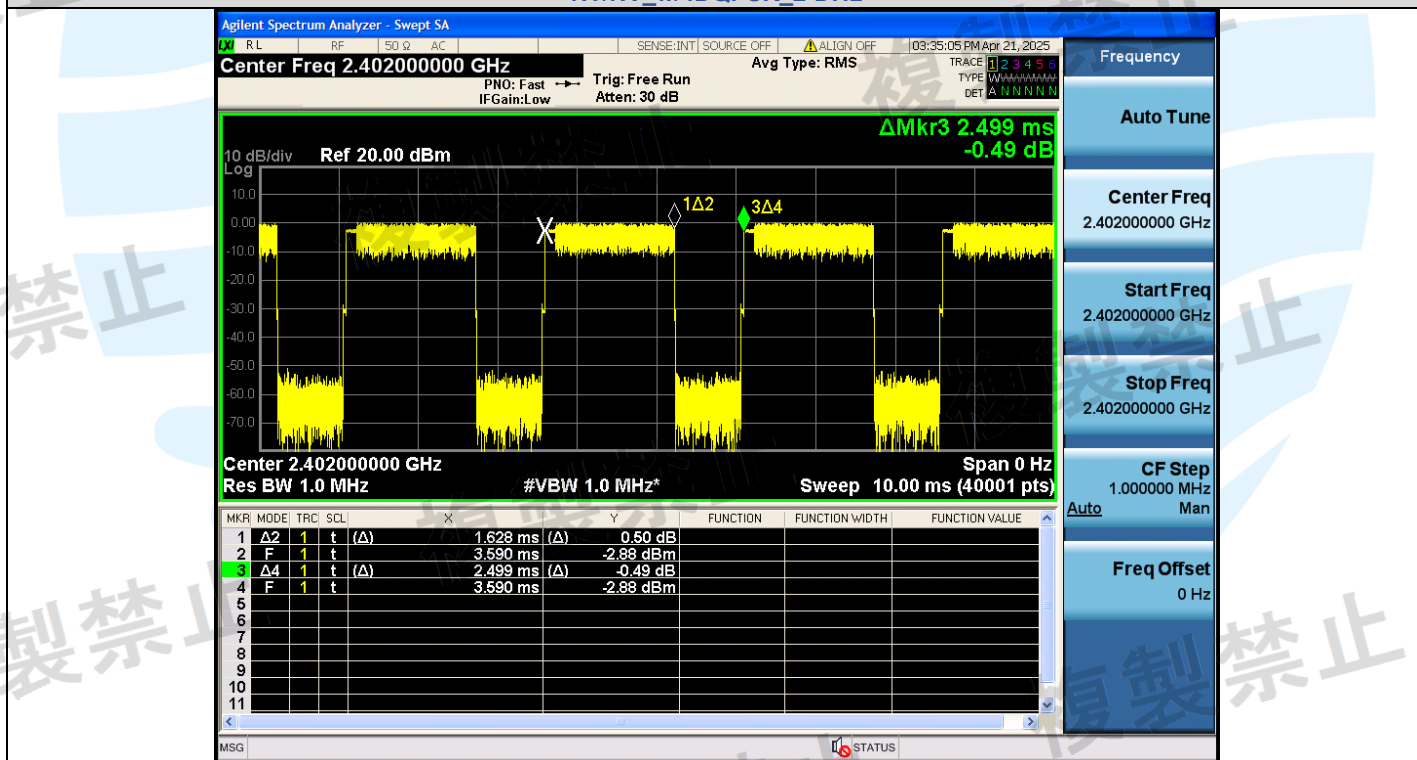
Normal Mode



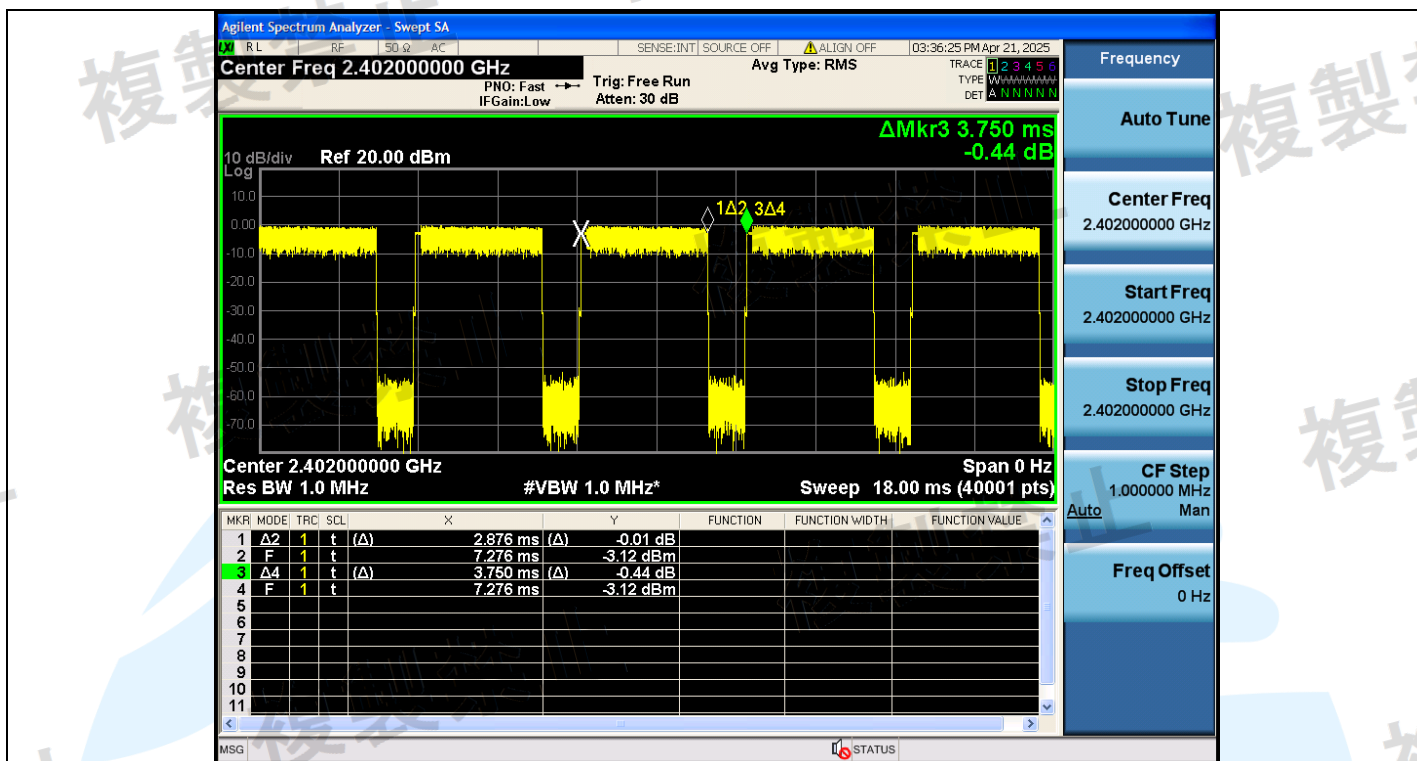




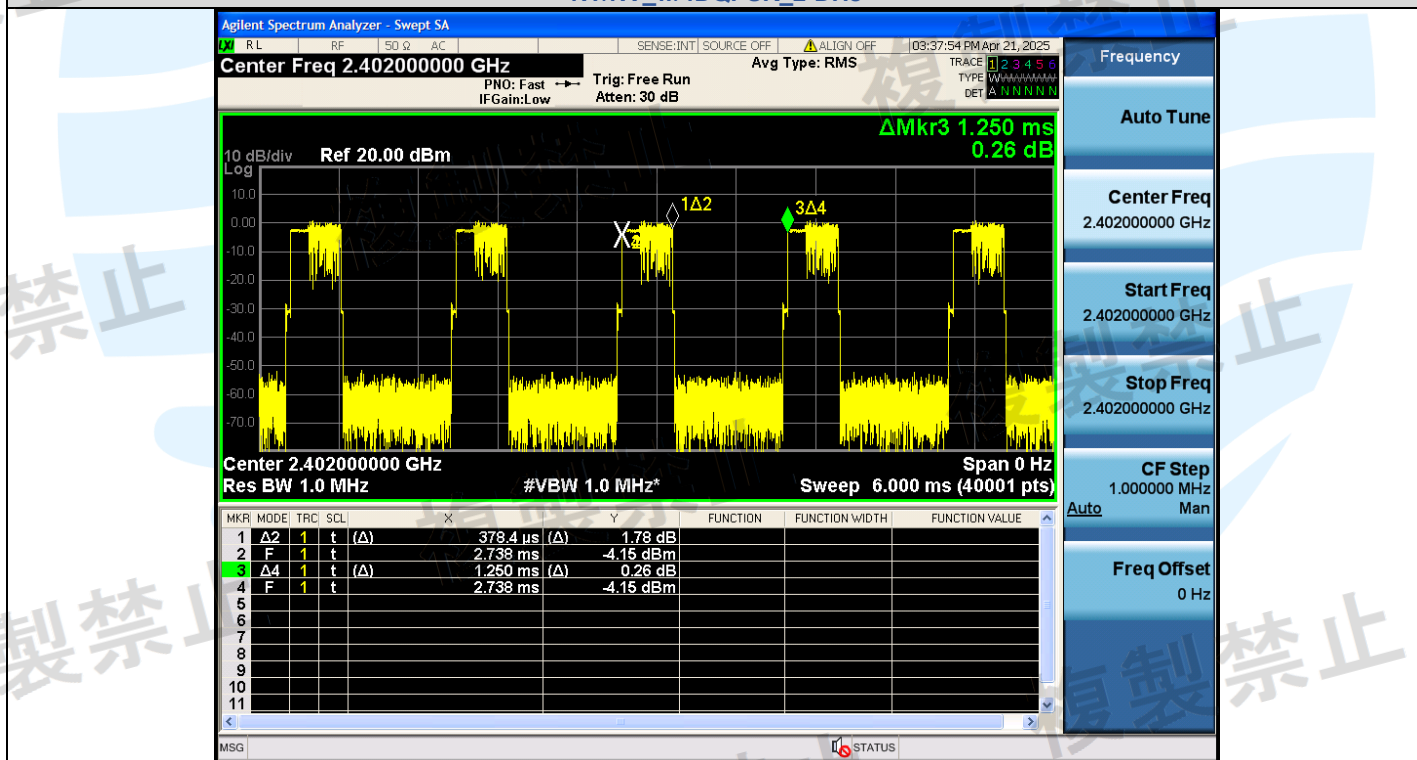
Dwell Time
NT/NV_π/4QPSK_2-DH1



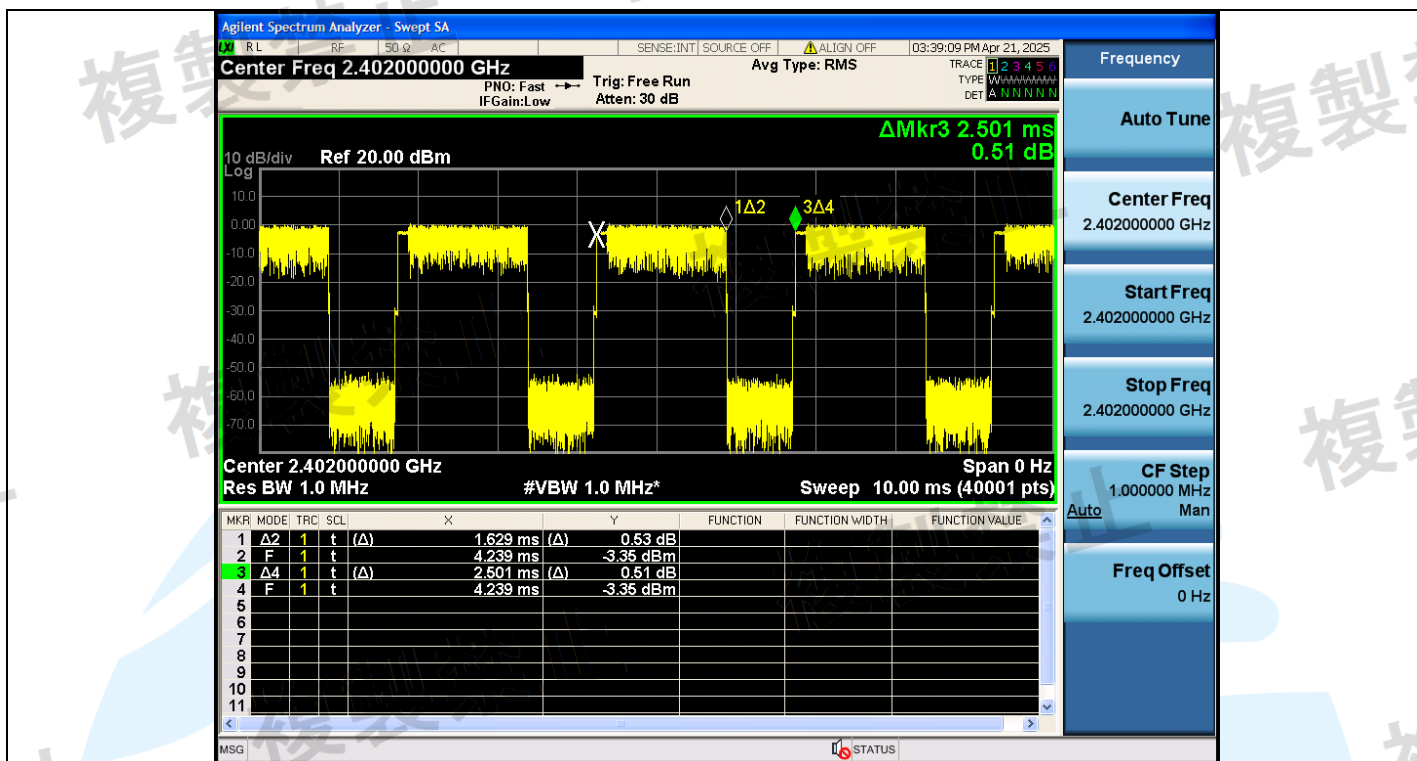
Dwell Time
NT/NV_π/4QPSK_2-DH3



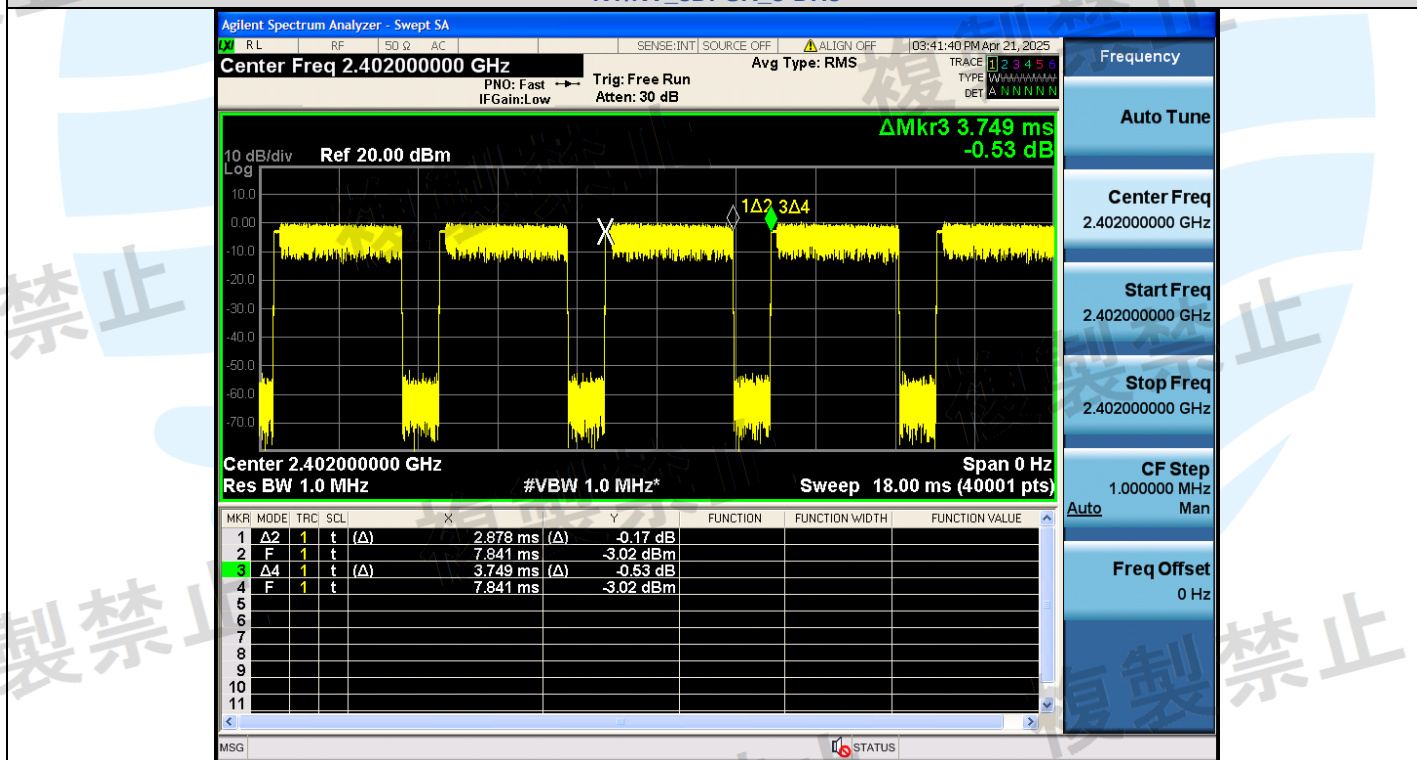
Dwell Time
NT/NV_π/4DQPSK_2-DH5



Dwell Time
NT/NV_8DPSK_3-DH1



Dwell Time
NT/NV_8DPSK_3-DH3



Dwell Time
NT/NV_8DPSK_3-DH5

A.4 SPURIOUS EMISSIONS

Test Result

Test Condition	Test Mode	Antenna	Frequency [MHz]	Freq. Range [MHz]	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [μ W/MHz]	Limit [μ W/MHz]	Verdict
NTNV	DH5	Ant1	2402	30~1000	800.67	-50.91	≤ -26	0.00811	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	1000~2387	2245.87	-50.75	≤ -26	0.00841	≤ 2.5	PASS
NTNV	DH5	Ant1	2402	2387~2400	2399.95	-24.94	≤ -16	3.20627	≤ 25	See table below
NTNV	DH5	Ant1	2402	2483.5~2496.5	2484.15	-46.59	≤ -16	0.02193	≤ 25	PASS
NTNV	DH5	Ant1	2402	2496.5~13000	3418.18	-40.35	≤ -26	0.09226	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	30~1000	813.76	-49.89	≤ -26	0.01026	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	1000~2387	2284.71	-50.00	≤ -26	0.01000	≤ 2.5	PASS
NTNV	DH5	Ant1	2441	2387~2400	2388.70	-46.94	≤ -16	0.02023	≤ 25	PASS
NTNV	DH5	Ant1	2441	2483.5~2496.5	2492.69	-45.29	≤ -16	0.02958	≤ 25	PASS
NTNV	DH5	Ant1	2441	2496.5~13000	9763.87	-48.52	≤ -26	0.01406	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	30~1000	826.61	-48.88	≤ -26	0.01294	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	1000~2387	2272.23	-49.39	≤ -26	0.01151	≤ 2.5	PASS
NTNV	DH5	Ant1	2480	2387~2400	2390.87	-47.22	≤ -16	0.01897	≤ 25	PASS
NTNV	DH5	Ant1	2480	2483.5~2496.5	2483.57	-44.81	≤ -16	0.03304	≤ 25	PASS
NTNV	DH5	Ant1	2480	2496.5~13000	9919.85	-48.18	≤ -26	0.01521	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	30~1000	826.86	-46.73	≤ -26	0.02123	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	1000~2387	2317.65	-50.53	≤ -26	0.00885	≤ 2.5	PASS
NTNV	2DH5	Ant1	2402	2387~2400	2399.99	-24.17	≤ -16	3.82825	≤ 25	See table below
NTNV	2DH5	Ant1	2402	2483.5~2496.5	2485.38	-46.98	≤ -16	0.02004	≤ 25	PASS
NTNV	2DH5	Ant1	2402	2496.5~13000	3405.58	-41.00	≤ -26	0.07943	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	30~1000	813.52	-48.90	≤ -26	0.01288	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	1000~2387	2285.06	-49.76	≤ -26	0.01057	≤ 2.5	PASS
NTNV	2DH5	Ant1	2441	2387~2400	2388.90	-47.06	≤ -16	0.01968	≤ 25	PASS
NTNV	2DH5	Ant1	2441	2483.5~2496.5	2493.66	-46.15	≤ -16	0.02427	≤ 25	PASS
NTNV	2DH5	Ant1	2441	2496.5~13000	9763.87	-47.53	≤ -26	0.01766	≤ 2.5	PASS
NTNV	2DH5	Ant1	2480	30~1000	826.61	-47.57	≤ -26	0.01750	≤ 2.5	PASS
NTNV	2DH5	Ant1	2480	1000~2387	2271.88	-49.15	≤ -26	0.01216	≤ 2.5	PASS
NTNV	2DH5	Ant1	2480	2387~2400	2399.37	-47.08	≤ -16	0.01959	≤ 25	PASS
NTNV	2DH5	Ant1	2480	2483.5~2496.5	2483.74	-44.95	≤ -16	0.03199	≤ 25	PASS
NTNV	2DH5	Ant1	2480	2496.5~13000	3407.15	-42.05	≤ -26	0.06237	≤ 2.5	PASS
NTNV	3DH5	Ant1	2402	30~1000	800.67	-49.32	≤ -26	0.01169	≤ 2.5	PASS
NTNV	3DH5	Ant1	2402	1000~2387	1746.55	-42.30	≤ -26	0.05888	≤ 2.5	PASS
NTNV	3DH5	Ant1	2402	2387~2400	2399.99	-24.07	≤ -16	3.91742	≤ 25	See table below
NTNV	3DH5	Ant1	2402	2483.5~2496.5	2495.16	-46.75	≤ -16	0.02113	≤ 25	PASS
NTNV	3DH5	Ant1	2402	2496.5~13000	3407.15	-48.98	≤ -26	0.01265	≤ 2.5	PASS
NTNV	3DH5	Ant1	2441	30~1000	813.52	-48.35	≤ -26	0.01462	≤ 2.5	PASS
NTNV	3DH5	Ant1	2441	1000~2387	2285.06	-49.15	≤ -26	0.01216	≤ 2.5	PASS
NTNV	3DH5	Ant1	2441	2387~2400	2388.42	-47.10	≤ -16	0.01950	≤ 25	PASS
NTNV	3DH5	Ant1	2441	2483.5~2496.5	2493.14	-46.41	≤ -16	0.02286	≤ 25	PASS
NTNV	3DH5	Ant1	2441	2496.5~13000	9763.87	-48.03	≤ -26	0.01574	≤ 2.5	PASS
NTNV	3DH5	Ant1	2480	30~1000	826.86	-47.73	≤ -26	0.01687	≤ 2.5	PASS
NTNV	3DH5	Ant1	2480	1000~2387	2272.23	-49.61	≤ -26	0.01094	≤ 2.5	PASS
NTNV	3DH5	Ant1	2480	2387~2400	2387.40	-47.43	≤ -16	0.01807	≤ 25	PASS
NTNV	3DH5	Ant1	2480	2483.5~2496.5	2484.61	-45.20	≤ -16	0.03020	≤ 25	PASS
NTNV	3DH5	Ant1	2480	2496.5~13000	9919.85	-46.77	≤ -26	0.02104	≤ 2.5	PASS
NTNV	DH5	Ant1	Hopping	30~1000	276.87	-52.70	≤ -26	0.00537	≤ 2.5	PASS
NTNV	DH5	Ant1	Hopping	1000~2387	2383.53	-57.00	≤ -26	0.00200	≤ 2.5	PASS
NTNV	DH5	Ant1	Hopping	2387~2400	2399.96	-24.87	≤ -16	3.25837	≤ 25	See table below
NTNV	DH5	Ant1	Hopping	2483.5~2496.5	2484.74	-43.31	≤ -16	0.04667	≤ 25	PASS
NTNV	DH5	Ant1	Hopping	2496.5~13000	5798.80	-43.78	≤ -26	0.04188	≤ 2.5	PASS
NTNV	2DH5	Ant1	Hopping	30~1000	826.86	-48.37	≤ -26	0.01455	≤ 2.5	PASS

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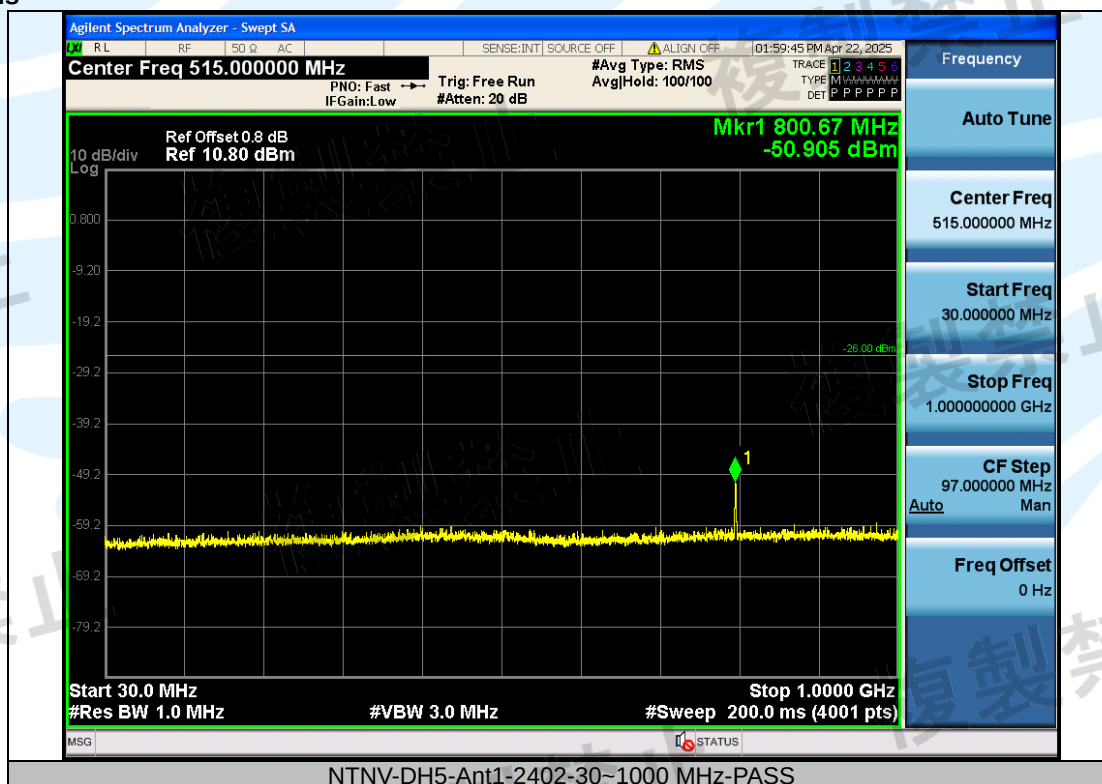
UTTR-RF-STDT66-V1.1

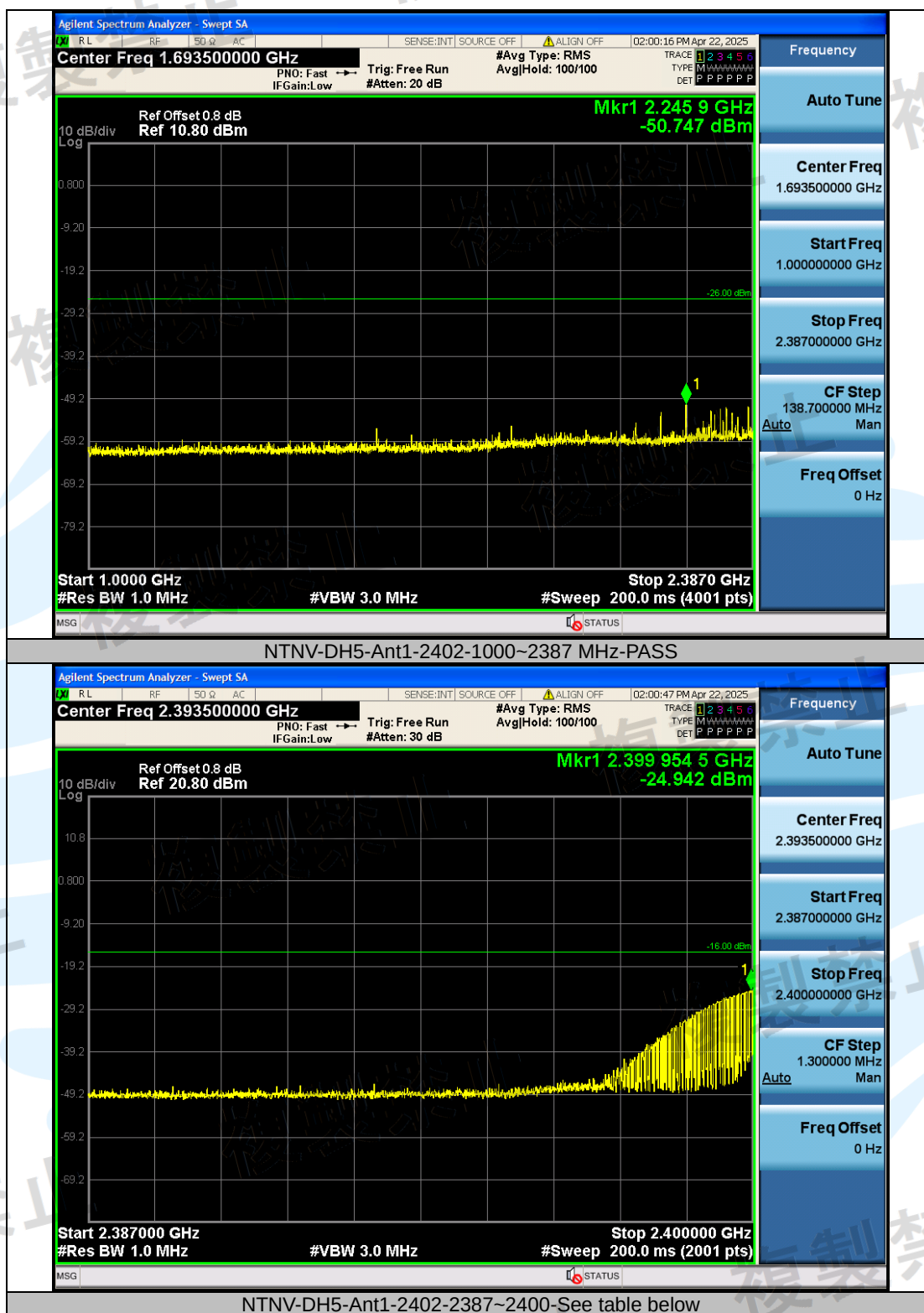
Test Condition	Test Mode	Antenna	Frequency [MHz]	Freq. Range [MHz]	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [μW/MHz]	Limit [μW/MHz]	Verdict
NTNV	2DH5	Ant1	Hopping	1000~2387	2314.88	-50.69	≤-26	0.00853	≤2.5	PASS
NTNV	2DH5	Ant1	Hopping	2387~2400	2399.98	-24.71	≤-16	3.38065	≤25	See table below
NTNV	2DH5	Ant1	Hopping	2483.5~2496.5	2489.94	-46.52	≤-16	0.02228	≤25	PASS
NTNV	2DH5	Ant1	Hopping	2496.5~13000	9792.23	-48.41	≤-26	0.01442	≤2.5	PASS
NTNV	3DH5	Ant1	Hopping	30~1000	824.67	-48.43	≤-26	0.01435	≤2.5	PASS
NTNV	3DH5	Ant1	Hopping	1000~2387	2300.66	-50.43	≤-26	0.00906	≤2.5	PASS
NTNV	3DH5	Ant1	Hopping	2387~2400	2399.97	-25.15	≤-16	3.05492	≤25	See table below
NTNV	3DH5	Ant1	Hopping	2483.5~2496.5	2484.44	-44.56	≤-16	0.03499	≤25	PASS
NTNV	3DH5	Ant1	Hopping	2496.5~13000	5175.42	-47.06	≤-26	0.01968	≤2.5	PASS

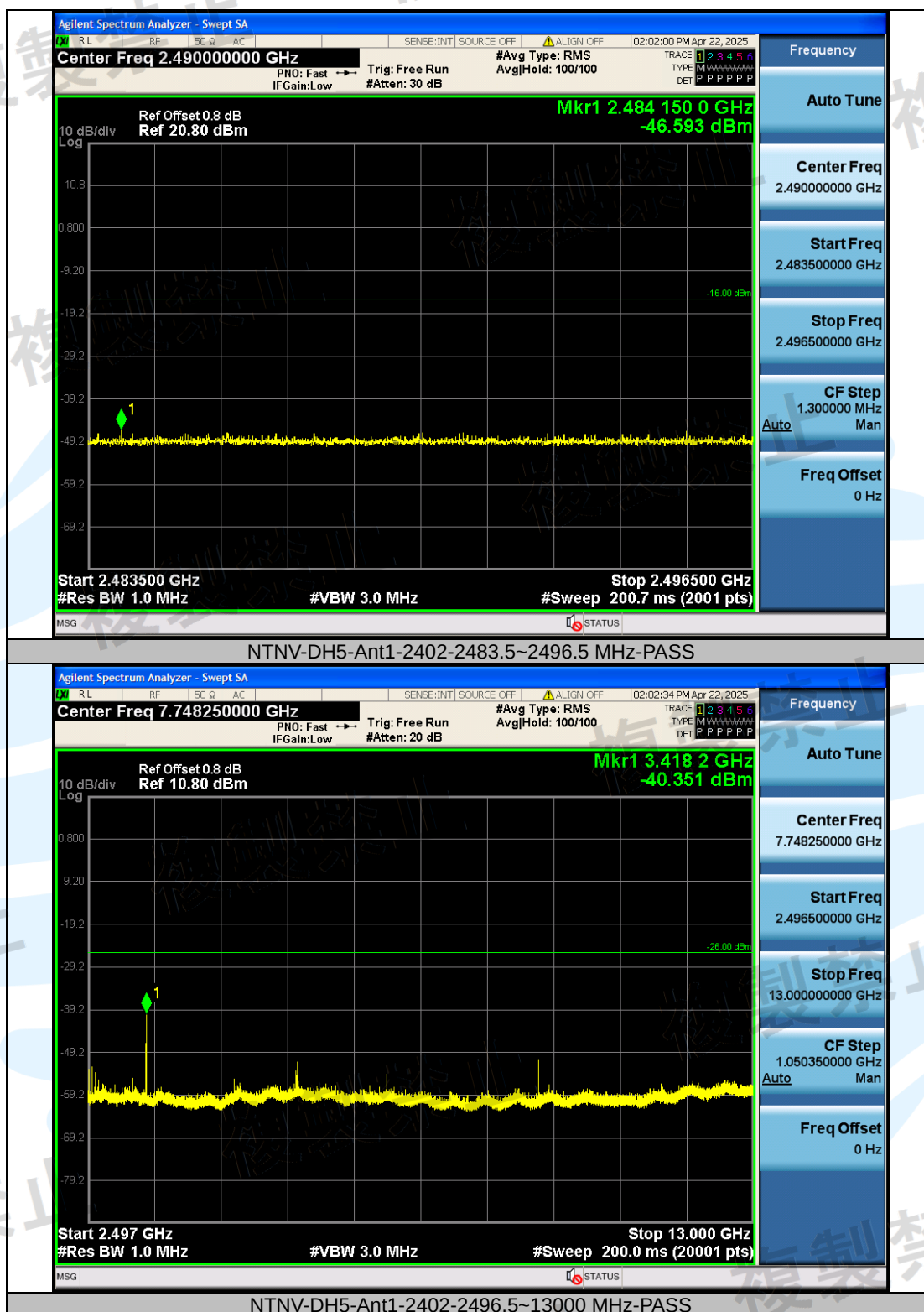
Step2

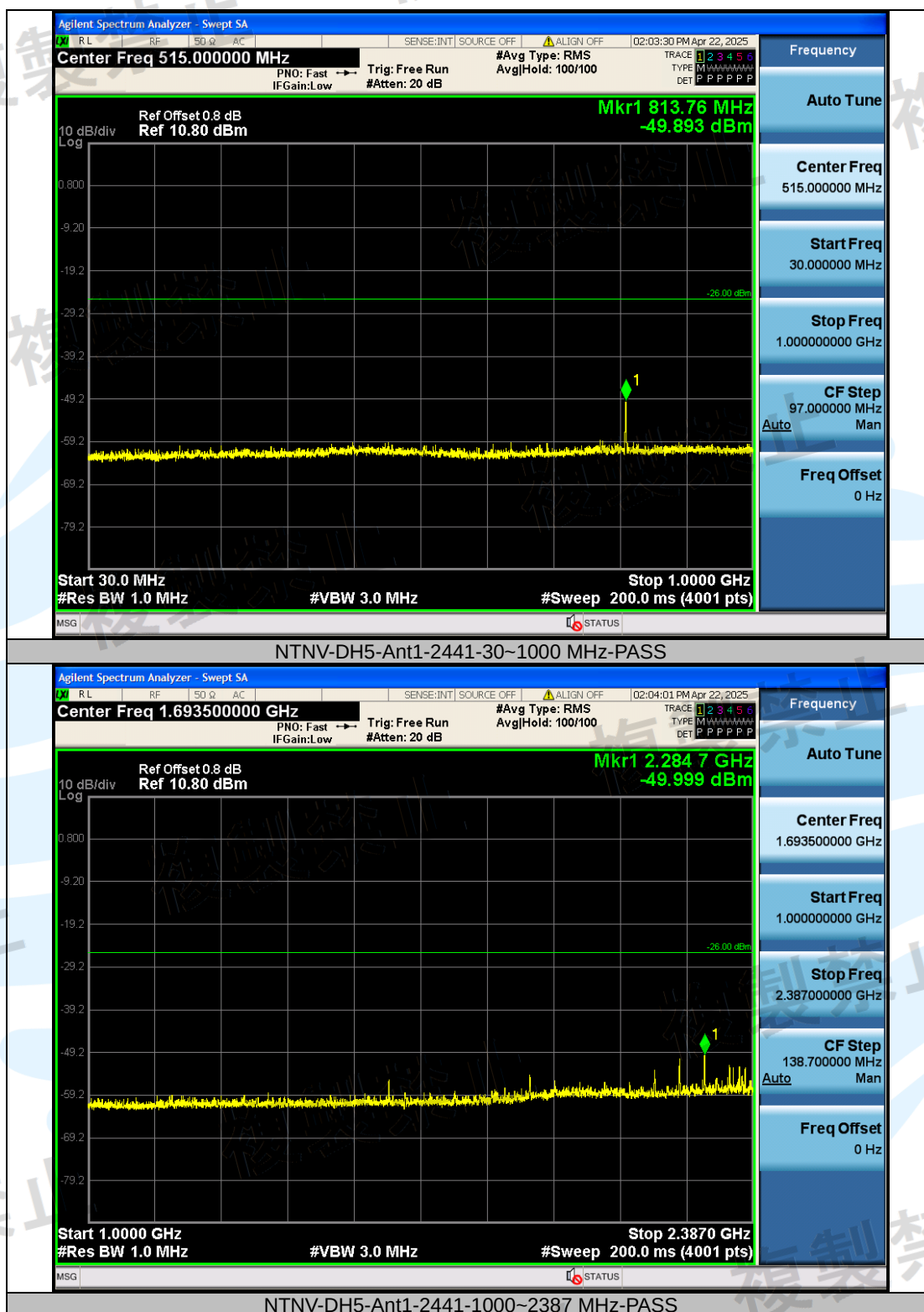
Test Condition	Test Mode	Antenna	Frequency [MHz]	Freq. [MHz]	Result [dBm]	Limit [dBm]	Result [μW/MHz]	Limit [μW/MHz]	Verdict
NTNV	DH5	Ant1	2402	2399.99	-49.54	≤-16	0.01112	≤25	PASS
NTNV	2DH5	Ant1	2402	2399.99	-39.86	≤-16	0.10328	≤25	PASS
NTNV	3DH5	Ant1	2402	2399.95	-42.84	≤-16	0.05200	≤25	PASS
NTNV	DH5	Ant1	Hopping	2397.51	-72.99	≤-16	0.00005	≤25	PASS
NTNV	2DH5	Ant1	Hopping	2399.97	-69.31	≤-16	0.00012	≤25	PASS
NTNV	3DH5	Ant1	Hopping	2399.94	-60.97	≤-16	0.00080	≤25	PASS

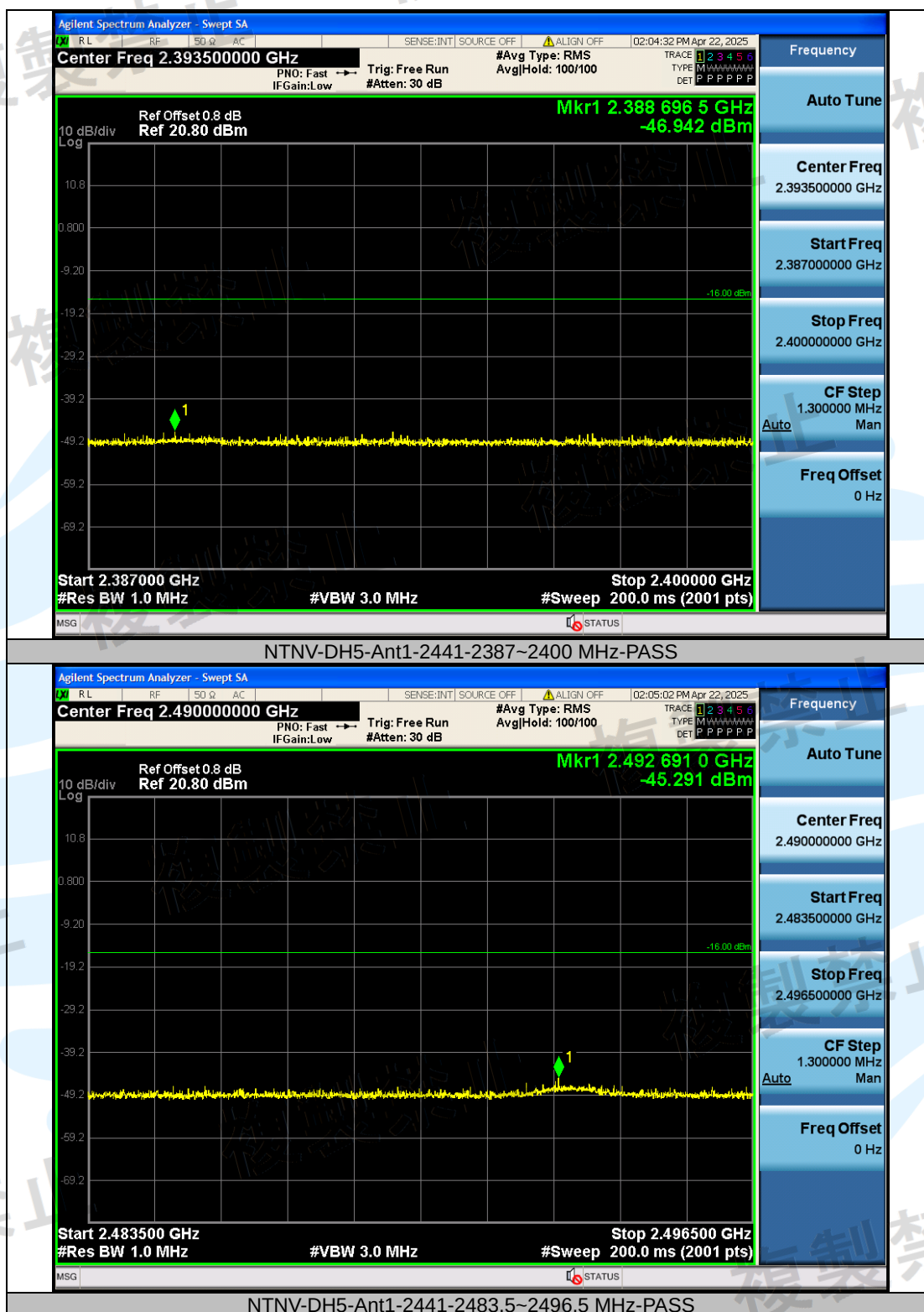
Test Graphs









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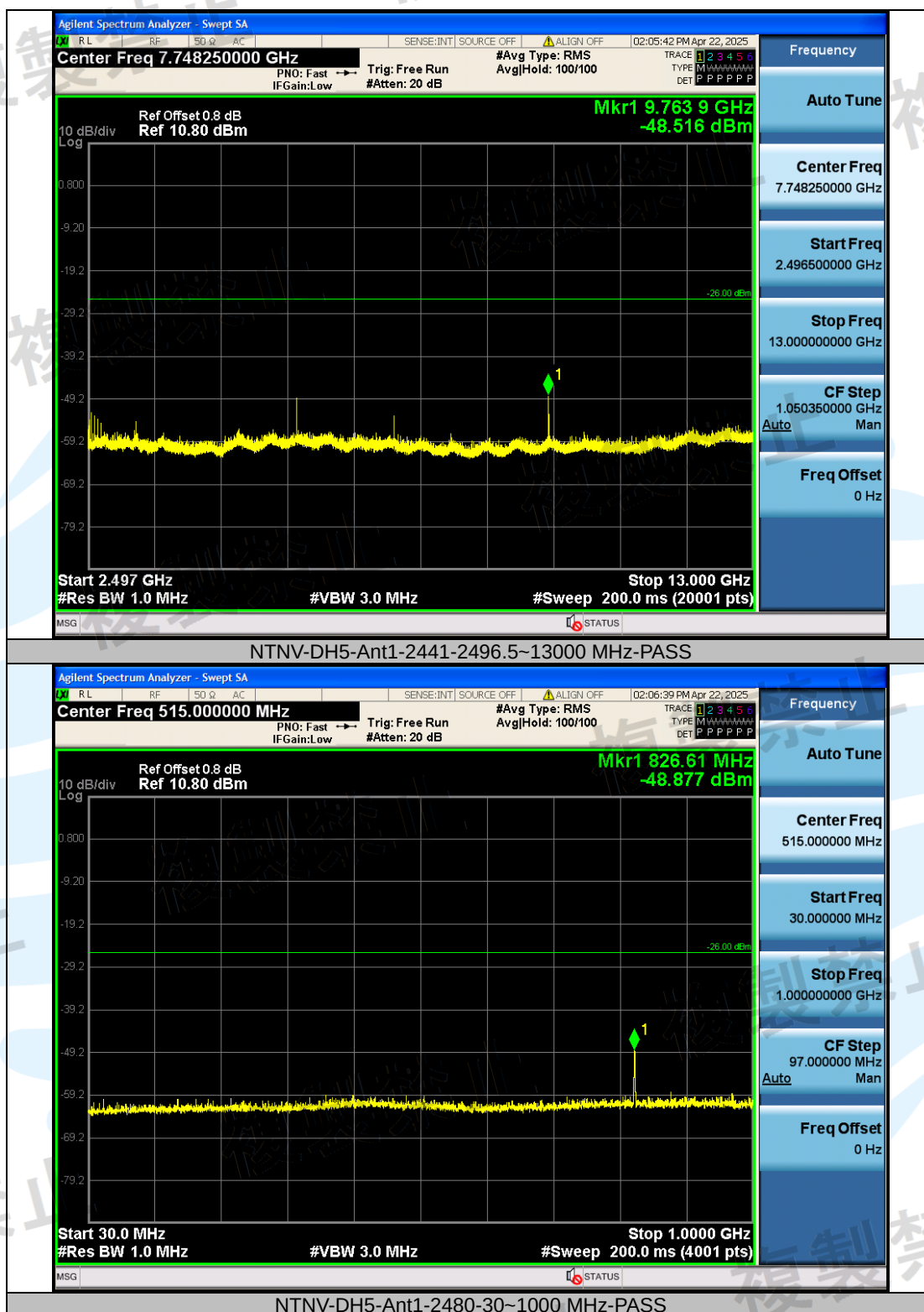
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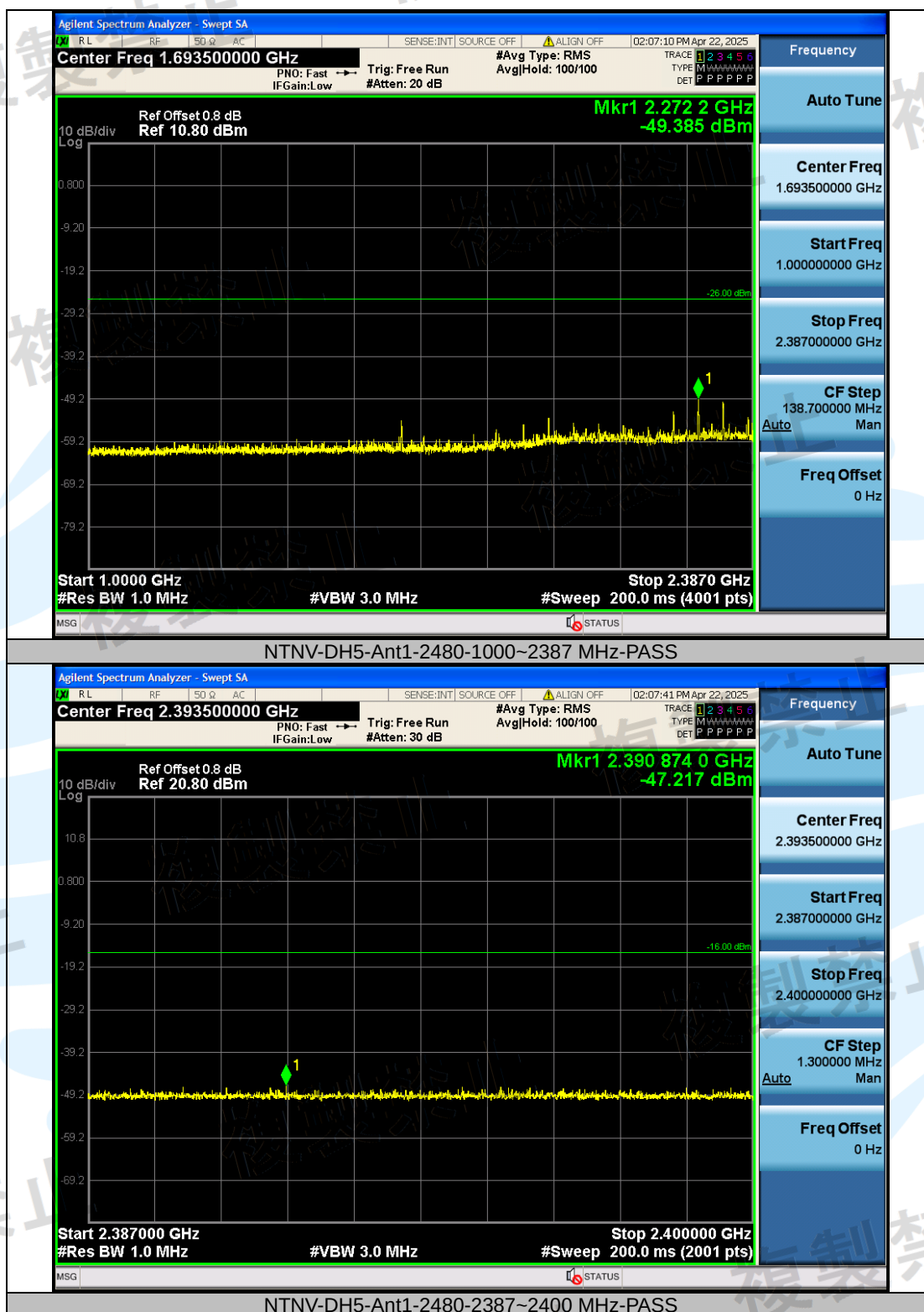
Tel: +86-755-28230886

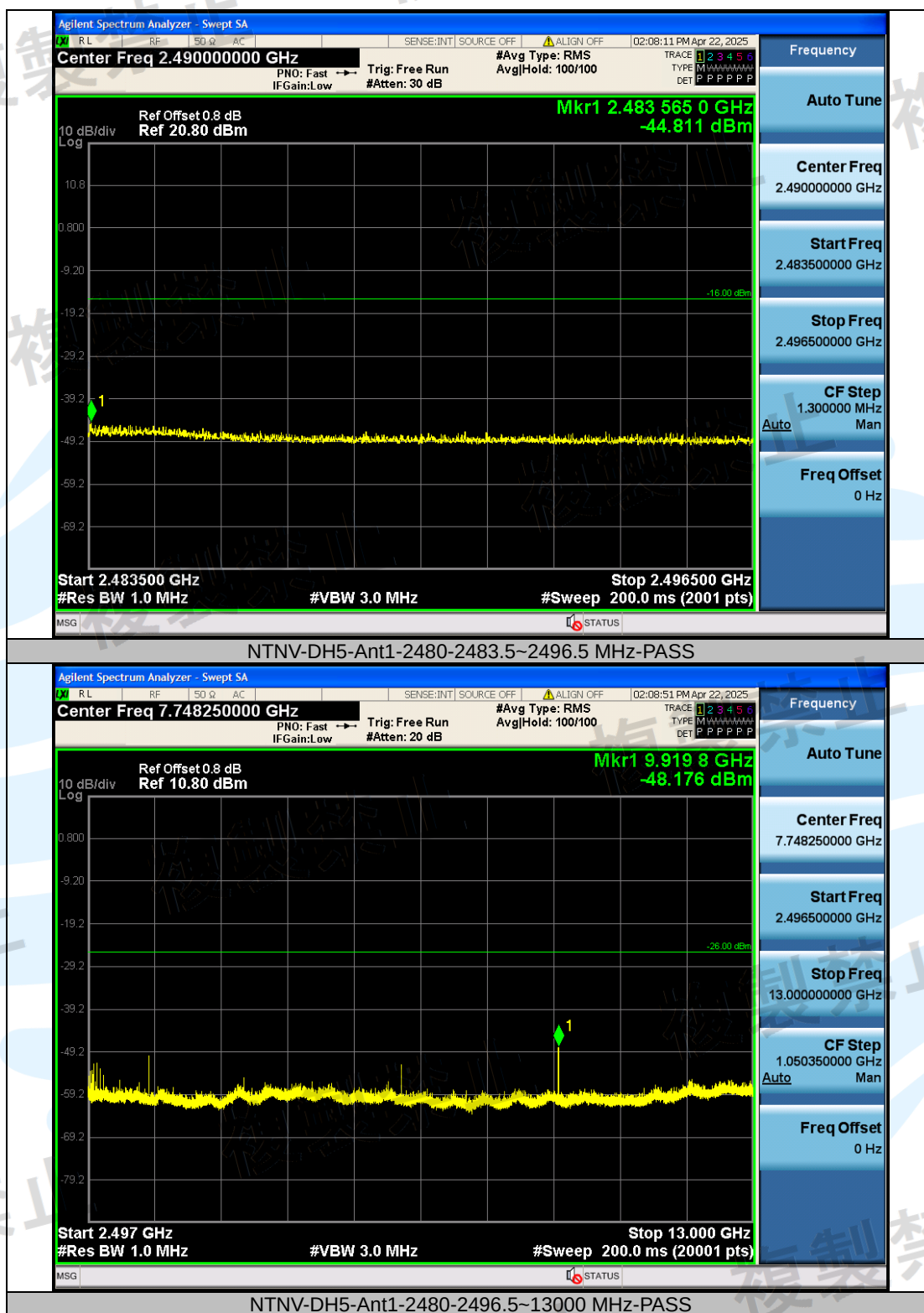
Fax: +86-755-28230886

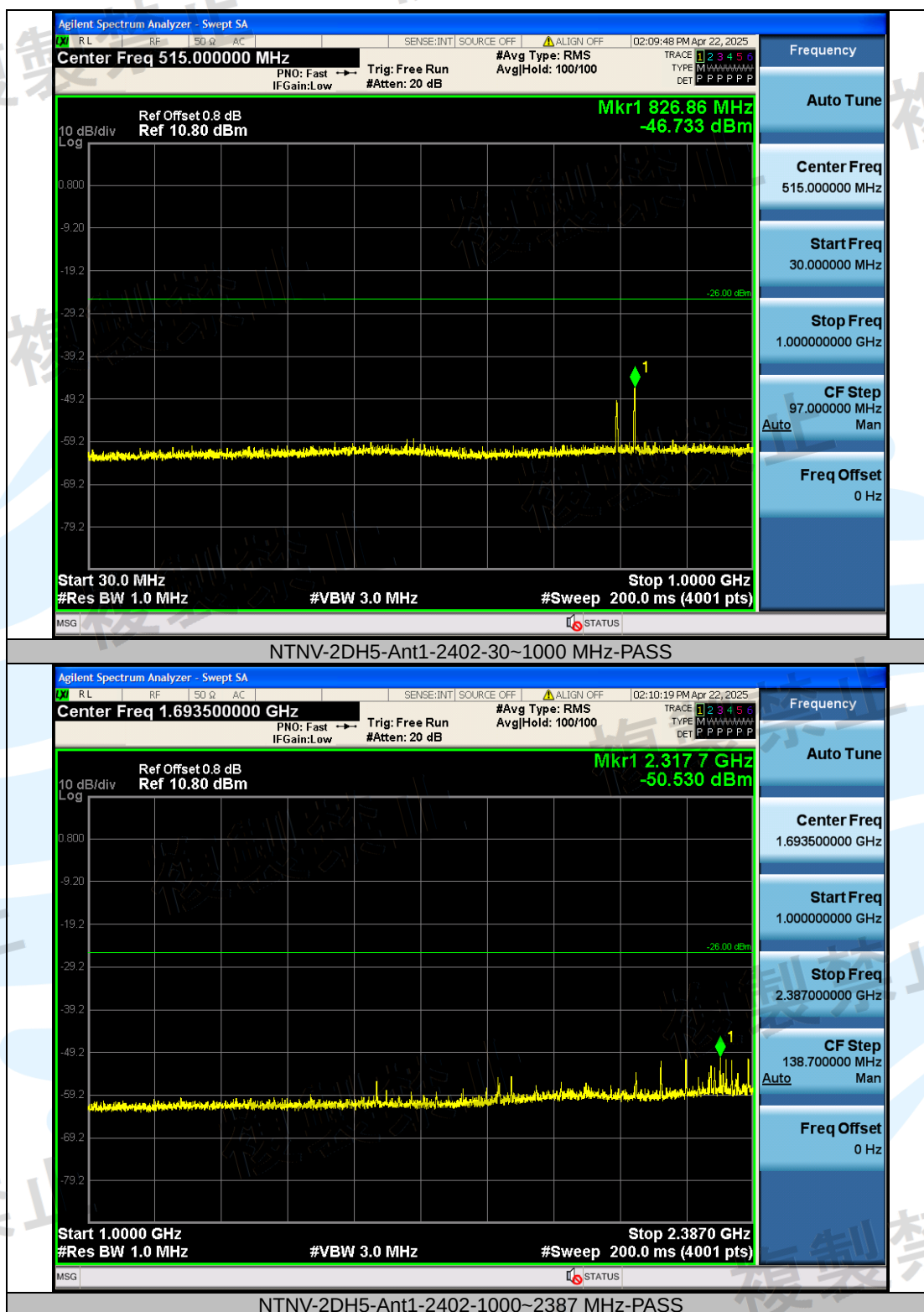
E-mail: info@uttlab.com

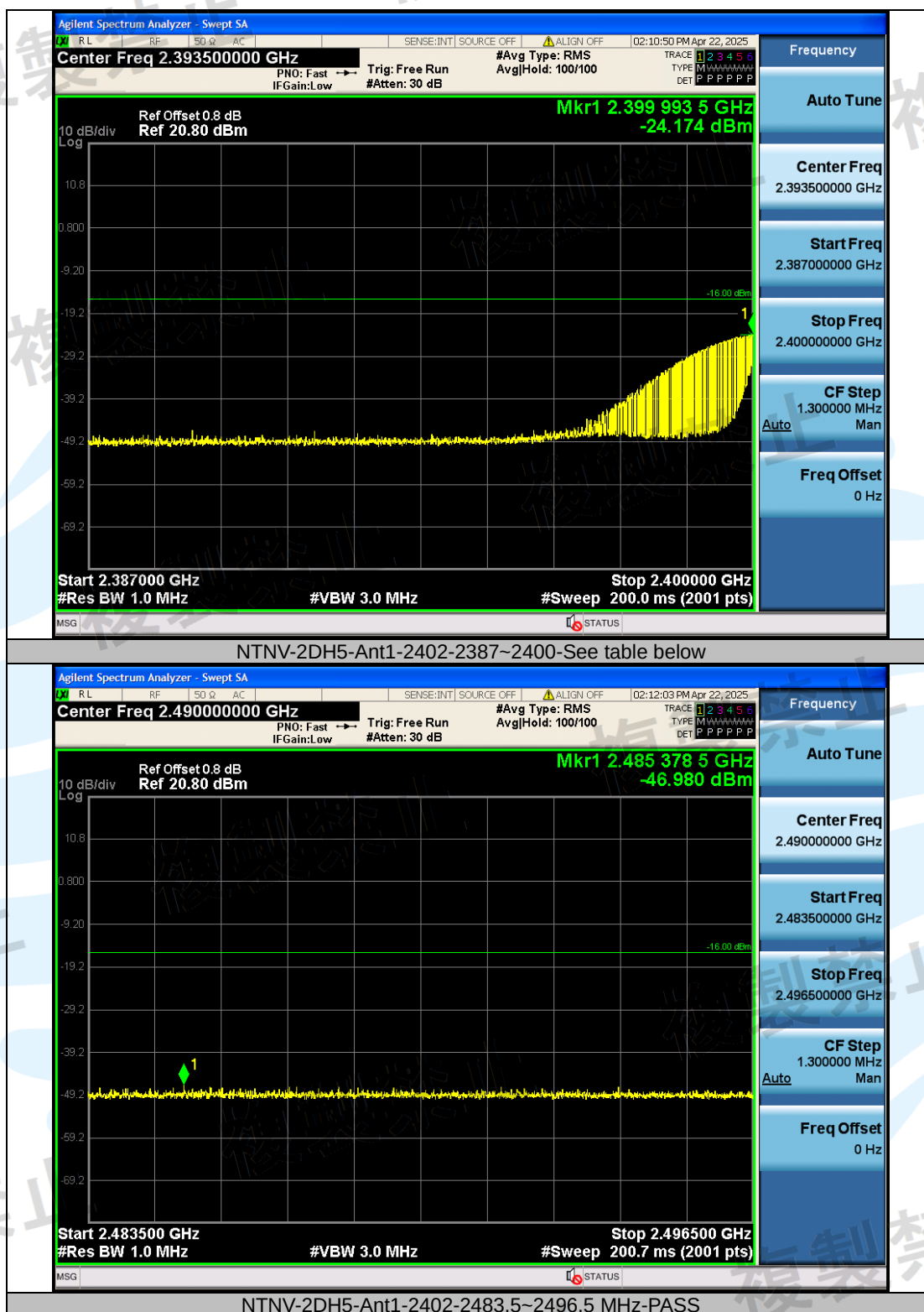
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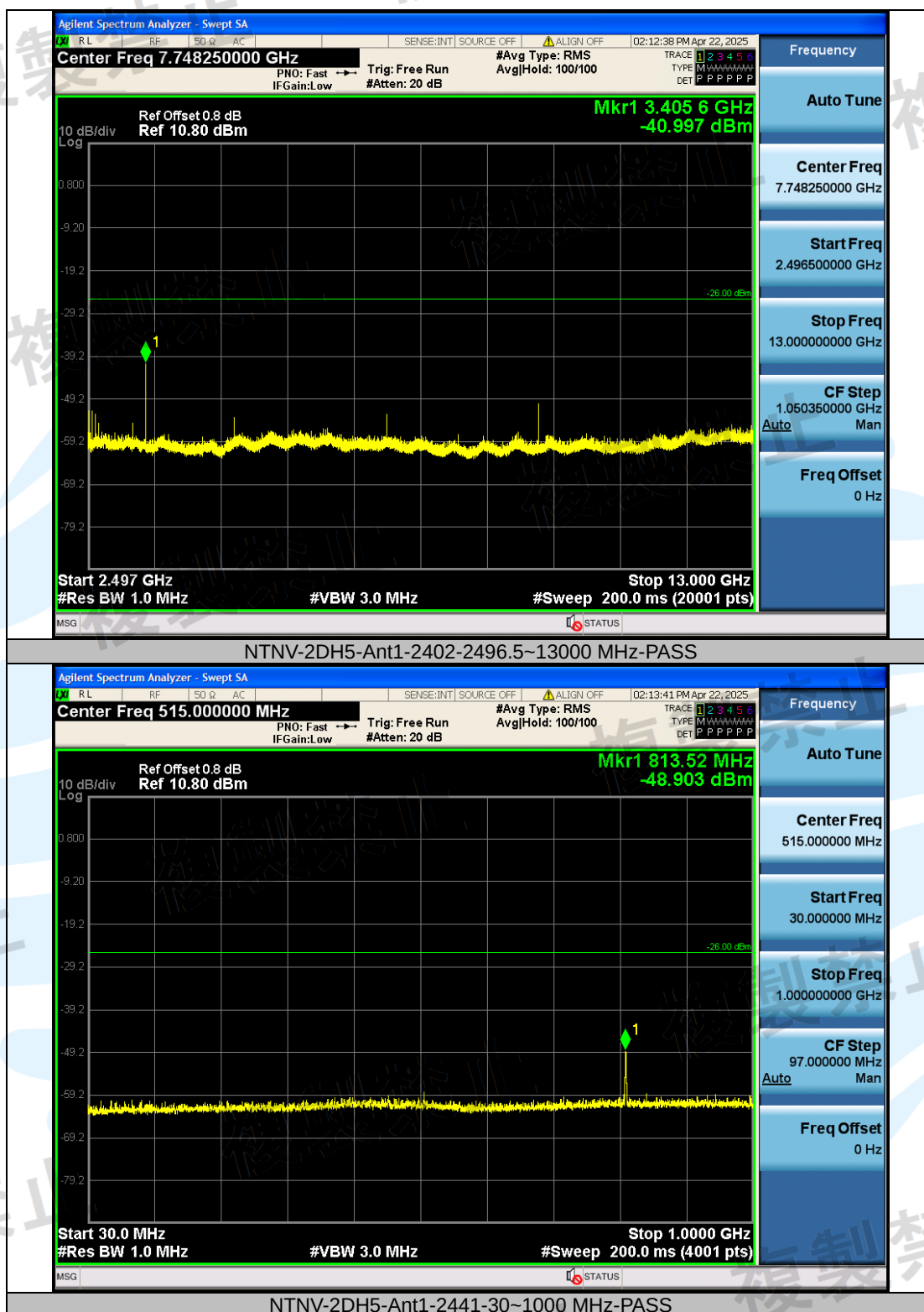
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