TEST REPORT

Report No.	CISRR26072049201
Project No.	CISR260720492
FCC ID	2BTLR-Z06
Applicant	Shenzhen Cantianshu Information Technology Co., Ltd.
Address	Room 2803B, West Tower, Xinghe WORLD Twin Towers, No. 8 Yaxing Road, Nankeng Community, Bantian Subdistrict, Longgang District, Shenzhen
Manufacturer	Shenzhen Cantianshu Information Technology Co., Ltd.
Address	Room 2803B, West Tower, Xinghe WORLD Twin Towers, No. 8 Yaxing Road, Nankeng Community, Bantian Subdistrict, Longgang District, Shenzhen
Product Name	ZNP AI Smart Translator
Trade mark	-
Model/Type reference	ZNP Z06
Listed Model(s)	-
Standard	47 CFR Part 15.247
Date of sample receipt	July 20, 2026
Test date	July 20, 2026 to July 29, 2026
Issue date	July 29, 2026
Test result	**Complied**

Reviewed by: Genry Long

Approved by: Hans Hu

The test results relate only to the tested samples.
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1. STANDARD AND APPLICABLE TEST METHODS

The tests were performed according to following standards:

47 CFR Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

ANSI C63.10-2020: American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

2. REPORT VERSION

Version No.	Issue date	Description
00	July 29, 2026	Original

3. TEST DESCRIPTION

No.	Test Item	Standard Requirement	Result
1	Antenna Requirement	47 CFR 15.203	Pass
2	Conducted Emission at AC power line	47 CFR 15.207(a)	Pass
3	20dB Bandwidth	47 CFR 15.247(a)(1)	Pass
4	Maximum Conducted Output Power	47 CFR 15.247(b)(1)	Pass
5	Channel Separation	47 CFR 15.247(a)(1)	Pass
6	Number of Hopping Frequencies	47 CFR 15.247(a)(1)(iii)	Pass
7	Dwell Time	47 CFR 15.247(a)(1)(iii)	Pass
8	Conducted band edge and spurious emission	47 CFR 15.247(d)	Pass
9	Radiated band edge emission	47 CFR 15.247(d), 15.209, 15.205	Pass
10	Radiated Spurious Emission (below 1GHz)	47 CFR 15.247(d), 15.209, 15.205	Pass
11	Radiated Spurious Emission (Above 1GHz)	47 CFR 15.247(d), 15.209, 15.205	Pass

Note:

– The measurement uncertainty is not included in the test result.

4. SUMMARY

4.1. Product Description *

Main unit information:	
Product Name:	ZNP AI Smart Translator
Trade mark:	-
Model No.:	ZNP Z06
Listed Model(s):	-
Model difference:	-
Power supply:	DC 5V from USB-C Port DC 3.7V from battery
Hardware version:	-
Software version:	-
Accessory unit (AU) information:	
Battery information:	3.7V 400mAh 1.48Wh

4.2. Radio Specification Description *

Modulation type:	GFSK, π/4 DQPSK, 8DPSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	PCB Antenna
Antenna gain:	-2.15dBi

Note:

1) *: As the above information is provided by the applicant, all relevant results and conclusions of this report are based solely on such information. Bangce lab shall not be liable for the authenticity, integrity, and resulting outcomes of the information, and/or the validity of the conclusions herein.
2) Operation frequency list as follow:

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	2471
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	-	-

4.3. Modification of EUT

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

4.4. Deviation from standards

None

4.5. Testing Site

Laboratory Name	Shenzhen Bangce Testing Technology Co., Ltd.
Laboratory Location	101, building 10, Yunli Intelligent Park, Shutianpu community, Matian Street, Guangming District, Shenzhen，Guangdong, China
Contact information	Tel: 86-755-2319 6848, email: service@cis-cn.net Website: http://www.cis-cn.net/
FCC registration number	736346
FCC designation number	CN1372

5. TEST CONFIGURATION

5.1. Test frequency list

Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
2402	2441	2480

5.2. Descriptions of test mode

No	Test mode	Description
Mode1	TX-GFSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with GFSK modulation at lowest, middle and highest channel.
Mode2	TX-Pi/4DQPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with Pi/4DQPSK modulation at lowest, middle and highest channel.
Mode3	TX-8DPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with 8DPSK modulation at lowest, middle and highest channel.
Mode4	TX-GFSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with GFSK modulation,.
Mode5	TX-Pi/4DQPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with Pi/4DQPSK modulation.
Mode6	TX-8DPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with 8DPSK modulation.
Mode7	Charging+Link mode	Keep the EUT in charging+Bluetooth linking mode with AE.

5.3. Support unit used in test configuration

The EUT has been associated with peripherals and configuration operated in a manner tended to maximize its emission characteristics in a typical application.
The following peripheral devices and interface cables were connected during the measurement:

Item	Equipment name	Trade Name	Model No.
1	Adapter	Guangdong Sangu Technology Co. ltd	SG-0501000AU

5.4. Test sample information

Type	Sample No.
Engineer sample	CISR260720492-S01
Normal sample	CISR260720492-S02

5.5. Environmental conditions

Type	Requirement
Temperature:	15~35°C
Relative Humidity:	25~75%
Air Pressure:	860~1060mbar

5.6. Statement of the measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	Conducted Emission at AC power line (150kHz ~ 30MHz)	3.52dB
2	Bandwidth	0.19%
3	Conducted output power	1.38dB
4	Time	2.3ns
5	Conducted spurious emission	1.40dB
6	Radiated Spurious Emission (Above 1GHz)	4.60dB
7	Radiated Spurious Emission (9kHz ~ 30MHz)	3.28dB
8	Radiated Spurious Emission (30MHz ~ 1000MHz)	4.46dB

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=1.96.

5.7. Equipment Used during the Test

Conducted Emission at AC power line

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	8*4*3 Shielding room	SKET	8m*4m*3 m	CIS-EE012	2024-09-02	2027-09-01
2	EMI Test Receiver	ROHDE&SCHWARZ	ESPI7	CIS-EE043	2026-01-06	2027-01-05
3	LISN	SCHWARZBECK	NSLK 8127	CIS-EE044	2026-01-06	2027-01-05
4	LISN-AE	ETS	3810/2NM	CIS-EE075	2026-01-06	2027-01-05
5	RF Cable	SKET	-	CIS-EE071	2026-01-06	2027-01-05
6	Power Strip	BULL	GNIN-413	CIS-EE087	2026-01-06	2027-01-05
7	Test software	FARAD	EZ-CON	CIS-EE095	/	/
8	Thermohygrometer	DeLi	8866	CIS-EE069	2026-01-06	2027-01-05

Number of Hopping Frequencies
Dwell Time
Emissions in non-restricted frequency bands
20dB Bandwidth
Maximum Conducted Output Power
Channel Separation

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	Spectrum analyzer	ROHDE&SCHWARZ	FSV-40N	CIS-EE076	2026-01-06	2027-01-05
2	Notch Filter Assembly	WCS	SMU-1003	CIS-EE093	2026-01-06	2027-01-05
3	Vector Signal Generator	Agilent	N5182A	CIS-RE012	2026-01-06	2027-01-05
4	Analog Signal Generator	Agilent	N5181A	CIS-RE013	2026-01-06	2027-01-05
5	Test software	WCS	WCN-Regulatory	CIS-EE103	/	/

Band edge emissions (Radiated)
Emissions in frequency bands (below 1GHz)
Emissions in frequency bands (above 1GHz)

Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	9*6*6 Chamber	SKET	9m*6m*6 m	CIS-EE011	2024-09-02	2027-09-01
2	EMI Test Receiver	ROHDE&SCHWARZ	ESCI	CIS-EE016	2026-01-06	2027-01-05
3	Broadband Antenna	SCHWARZBECK	VULB 9163	CIS-EE018	2026-01-06	2029-01-05

4	Double Ridged Broadband Horn Antennas	SCHWARZBECK	BBHA 9120D	CIS-EE019	2026-01-06	2029-01-05
5	Preamplifier	Tonscend	TAP9K3G 40	CIS-EE021	2026-01-06	2027-01-05
6	Preamplifier	Tonscend	TAP0101 8050	CIS-EE022	2026-01-06	2027-01-05
7	Preamplifier	WCS	DLNA-1-18G-40	CIS-EE081	2026-01-06	2027-01-05
8	RF Cable	Tonscend	-	CIS-EE024	2026-01-06	2027-01-05
9	RF Cable	Tonscend	-	CIS-EE025	2026-01-06	2027-01-05
10	Test software	FARAD	EZ-EMC RE	CIS-EE097	/	/
11	Thermohygrometer	DeLi	8866	CIS-EE067	2026-01-06	2027-01-05
12	Loop Antenna	SCHWARZBECK	FMZB 1513-60 B	CIS-EE060	2026-01-06	2029-01-05
13	Broadband Horn Antenna	SCHWARZBECK	BBHA 9170	CIS-EE020	2025-01-09	2028-01-08
14	Preamplifier	Tonscend	TAP1804 0048	CIS-EE023	2026-01-06	2027-01-05
15	1GHz Highpass	COM-MW	ZHPF6-M1000-18000-3910	CIS-EEA043	2026-01-06	2027-01-05
16	3GHz Highpass	COM-MW	ZHPF6-M3000-18000-5254	CIS-EEA044	2026-01-06	2027-01-05
17	6GHz Highpass	COM-MW	ZHPF6-M6500-18000-547	CIS-EEA045	2026-01-06	2027-01-05
18	Notch Filter Assembly	Tonscend	TS@JS08 06-F	CIS-EE026	2026-01-06	2027-01-05
19	Spectrum analyzer	Agilent	N9020A	CIS-RE001	2026-01-06	2027-01-05

6. TEST RESULTS

6.1. Evaluation Results (Evaluation)

6.1.1. Antenna Requirement

Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.
Test Method:	---

6.1.1.1. Test Result

Pass

6.1.1.2. Conclusion:

The EUT antenna is PCB antenna, It comply with the standard requirement. In case of replacement of broken antenna the same antenna type must be used.Antenna structure please refer to the EUT internal photographs antenna photo.

6.2. Radio Spectrum Matter Test Results (RF)

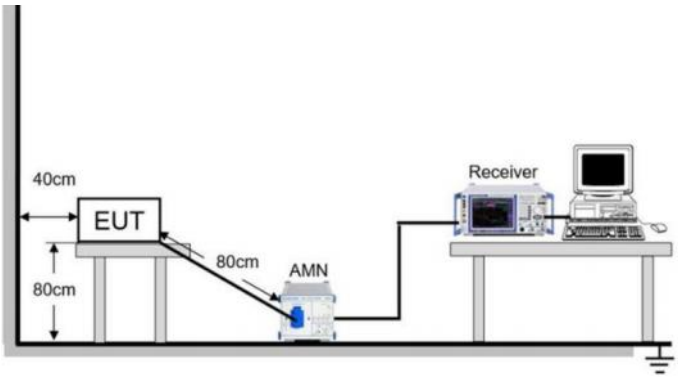
6.2.1. Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).
Test Limit:	Frequency of emission (MHz) / Conducted limit (dBμV): Quasi-peak / Average 0.15-0.5: 66 to 56* / 56 to 46* 0.5-5: 56 / 46 5-30: 60 / 50 *Decreases with the logarithm of the frequency.
Test Method:	ANSI C63.10-2020 section 6.2
Procedure:	1>. The EUT was setup according to ANSI C63.10 requirements. 2>. The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. 3>. The EUT and simulators are connected to the main power through a line impedances stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. 4>. The peripheral devices are also connected to the main power through a LISN. (Refer to the block diagram of the test setup and photographs) 5>. Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source. 6>. The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length. 7>. Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz. 8>. During the above scans, the emissions were maximized by cable manipulation.

6.2.1.1. E.U.T. Operation

Operating Environment:					
Temperature:	25.3 °C	Humidity:	65.5 %	Atmospheric Pressure:	102.4 kPa
Pre test mode:	Mode7				
Final test mode:	Mode7				

6.2.1.2. Test Setup Diagram

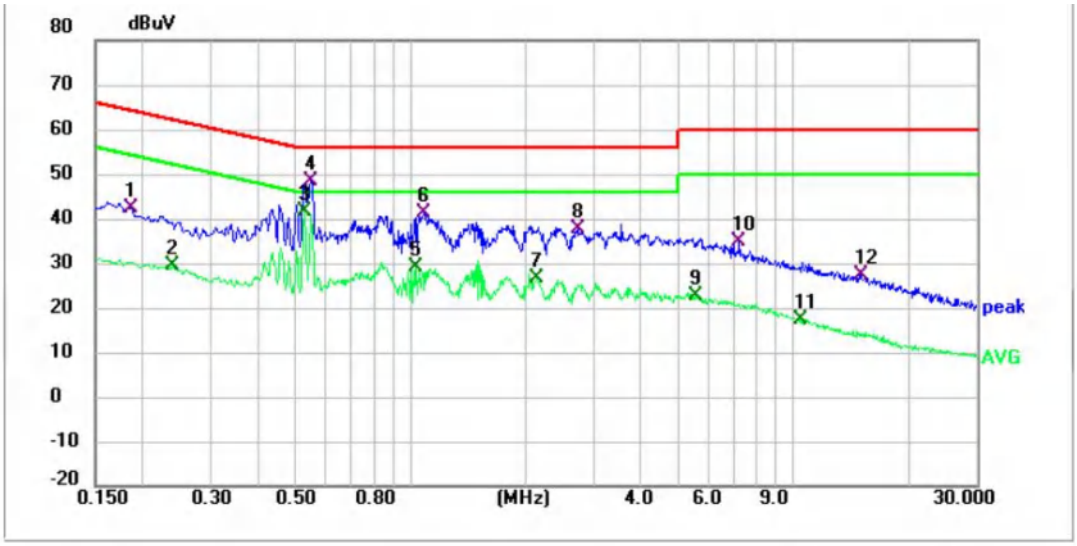


6.2.1.3. Test Result

Pass

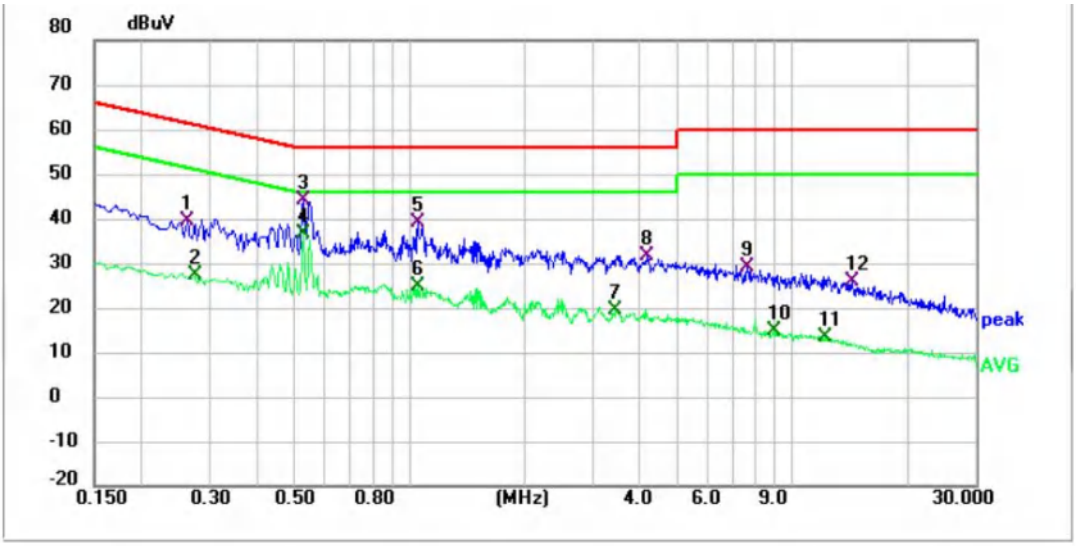
6.2.1.4. Test Data

Mode7 / Line: Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1860	32.25	10.18	42.43	64.21	21.78	QP
2	0.2380	19.13	10.16	29.29	52.17	22.88	AVG
3 *	0.5260	31.43	10.16	41.59	46.00	4.41	AVG
4	0.5460	38.16	10.16	48.32	56.00	7.68	QP
5	1.0300	19.08	10.19	29.27	46.00	16.73	AVG
6	1.0859	31.07	10.19	41.26	56.00	14.74	QP
7	2.1340	16.28	10.26	26.54	46.00	19.46	AVG
8	2.7340	27.48	10.30	37.78	56.00	18.22	QP
9	5.5380	12.45	10.37	22.82	50.00	27.18	AVG
10	7.2180	24.39	10.35	34.74	60.00	25.26	QP
11	10.4700	7.10	10.40	17.50	50.00	32.50	AVG
12	15.0140	16.82	10.50	27.32	60.00	32.68	QP

Mode7 / Line: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2620	29.48	10.15	39.63	61.37	21.74	QP
2	0.2740	17.17	10.15	27.32	51.00	23.68	AVG
3	0.5260	33.82	10.12	43.94	56.00	12.06	QP
4 *	0.5260	26.32	10.12	36.44	46.00	9.56	AVG
5	1.0500	28.87	10.16	39.03	56.00	16.97	QP
6	1.0500	14.84	10.16	25.00	46.00	21.00	AVG
7	3.4580	9.31	10.31	19.62	46.00	26.38	AVG
8	4.1900	21.26	10.34	31.60	56.00	24.40	QP
9	7.6260	18.75	10.36	29.11	60.00	30.89	QP
10	8.9540	4.52	10.37	14.89	50.00	35.11	AVG
11	12.2260	2.80	10.44	13.24	50.00	36.76	AVG
12	14.3860	15.47	10.46	25.93	60.00	34.07	QP

Note:
1>. Level = Reading +Factor (Voltage Division Coefficient + Cable Loss + Attenuator Factor)
2>. Margin = Limit - Level

6.2.2. 20dB Bandwidth

Test Requirement:	47 CFR 15.247(a)(1)
Test Limit:	Refer to 47 CFR 15.215(c), intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
Test Method:	ANSI C63.10-2020, section 7.8.6, For occupied bandwidth measurements, use the procedure in 6.9.2. Frequency hopping shall be disabled for this test.
Procedure:	A dBc bandwidth is measured as the width of the spectral envelope of the modulated signal, at an amplitude level reduced from a reference value by a specified ratio (or in decibels, a specified number of dB down from the reference value). Typical ratios, expressed in dB, are −6 dB, −20 dB, and −26 dB, corresponding to 6 dB BW, 20 dB BW, and 26 dB BW, respectively. In this subclause, the ratio is designated by "−xx dB." The reference value is either the level of the unmodulated carrier or the highest level of the spectral envelope of the modulated signal, as stated by the applicable requirement. Some requirements might specify a specific maximum or minimum value for the "−xx dB" bandwidth; other requirements might specify that the "−xx dB" bandwidth be entirely contained within the authorized or designated frequency band.51 a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW. b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be at least three times RBW, unless otherwise specified by the applicable requirement. c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.6.2. d) Steps a) through c) might require iteration to adjust within the specified tolerances. e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value. f) Set detection mode to peak and trace mode to max-hold. g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value). h) Determine the "−xx dB down amplitude" using [(reference value) - xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument. i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j). j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "−xx dB down amplitude" determined in step h). If a marker is below this "−xx dB down amplitude" value, then it shall be as close as possible to this value. The dBc bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "−xx dB down amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth.

	k) The dBc bandwidth shall be reported by providing spectral plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6.2.2.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.9 °C	Humidity:	55.4 %	Atmospheric Pressure:	102.9 kPa
Pre test mode:	Mode1, Mode2, Mode3				
Final test mode:	Mode1, Mode2, Mode3				

6.2.2.2. Test Setup Diagram

6.2.2.3. Test Result

Pass

6.2.2.4. Test Data

Please Refer to Appendix for Details.

6.2.3. Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(1)
Test Limit:	Refer to 47 CFR 15.247(b)(1), 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.
Test Method:	ANSI C63.10-2020, section 7.8.5
Procedure:	This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. Frequency hopping shall be disabled for this test. Use the following spectrum analyzer settings: a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel. b) RBW > 20 dB bandwidth of the emission being measured. c) VBW ≥ RBW. d) Sweep: No faster than coupled (auto) time. e) Detector function: Peak. f) Trace: Max-hold. g) Allow trace to stabilize. h) Use the marker-to-peak function to set the marker to the peak of the emission. i) The indicated level is the peak output power, after any corrections for external attenuators and cables. j) A spectral plot of the test results and setup description shall be included in the test report. NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

6.2.3.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.3 °C	Humidity:	56.7 %	Atmospheric Pressure:	102.9 kPa
Pre test mode:	Mode1, Mode2, Mode3				
Final test mode:	Mode1, Mode2, Mode3				

6.2.3.2. Test Setup Diagram

6.2.3.3. Test Result

Pass

6.2.3.4. Test Data

Please Refer to Appendix for Details.

6.2.4. Channel Separation

Test Requirement:	47 CFR 15.247(a)(1)
Test Limit:	Refer to 47 CFR 15.247(a)(1), 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.
Test Method:	ANSI C63.10-2020, section 7.8.2
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: Wide enough to capture the peaks of two adjacent channels. b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel. c) Video (or average) bandwidth (VBW) ≥ RBW. d) Sweep: No faster than coupled (auto) time. e) Detector function: Peak. f) Trace: Max-hold. g) Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A spectral plot of the data shall be included in the test report.

6.2.4.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.1 °C	Humidity:	56.1 %	Atmospheric Pressure:	102.9 kPa
Pre test mode:	Mode4, Mode5, Mode6				
Final test mode:	Mode4, Mode5, Mode6				

6.2.4.2. Test Setup Diagram

6.2.4.3. Test Result

Pass

6.2.4.4. Test Data

Please Refer to Appendix for Details.

6.2.5. Number of Hopping Frequencies

Test Requirement:	47 CFR 15.247(a)(1)(iii)
Test Limit:	Refer to 47 CFR 15.247(a)(1)(iii), Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	ANSI C63.10-2020, section 7.8.3
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: The frequency band of operation. Depending on the number of channels the device supports, it could be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen. b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller. c) VBW ≥ RBW. d) Sweep: No faster than coupled (auto) time. e) Detector function: Peak. f) Trace: Max-hold. g) Allow the trace to stabilize. It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A spectral plot of the data shall be included in the test report.

6.2.5.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.6 °C	Humidity:	55.6 %	Atmospheric Pressure:	102.9 kPa
Pre test mode:	Mode4, Mode5, Mode6				
Final test mode:	Mode4, Mode5, Mode6				

6.2.5.2. Test Setup Diagram

6.2.5.3. Test Result

Pass

6.2.5.4. Test Data

Please Refer to Appendix for Details.

6.2.6. Dwell Time

Test Requirement:	47 CFR 15.247(a)(1)(iii)
Test Limit:	Refer to 47 CFR 15.247(a)(1)(iii), Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. 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. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	ANSI C63.10-2020, section 7.8.4
Procedure:	The dwell time per hop on a channel is the time from the start of the first transmission to the end of the last transmission for that hop. If the device has a single transmission per hop then the dwell time is the duration of that transmission. If the device has a multiple transmissions per hop then the dwell time is measured from the start of the first transmission to the end of the last transmission. The time of occupancy is the total time that the device dwells on a channel over an observation period specified in the regulatory requirement. To determine the time of occupancy the spectrum analyzer will be configured to measure both the dwell time per hop and the number of times the device transmits on a specific channel in a given period. The EUT shall have its hopping function enabled. Compliance with the requirements shall be made with the minimum and with the maximum number of channels enabled. If the dwell time per channel does not vary with the number of channels than compliance with the requirements may be based on the minimum number of channels. If the device supports different dwell times per channel (example Bluetooth devices can dwell on a channel for 1, 3 or 5 time slots) then measurements can be limited to the longest dwell time with the minimum number of channels. Use the following spectrum analyzer settings to determine the dwell time per hop: a) Span: Zero span, centered on a hopping channel. b) RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected transmission time per hop. c) Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. Setting the sweep time to be slightly longer than the hopping period per channel (hopping period = 1/hopping rate) should achieve this. d) Use a video trigger, where possible with a trigger delay, so that the start of the transmission is clearly observed. The trigger level might need adjustment to reduce the chance of triggering when the system hops on an adjacent channel. e) Detector function: Peak. f) Trace: Clear-write, single sweep. g) Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between these two markers. To determine the number of hops on a channel in the regulatory observation period repeat the measurement using a longer sweep time. When the device uses a single hopping sequence the period of measurement should be sufficient to capture at least 2 hops. When the device uses a dynamic hopping sequence, or the sequence varies, the period of measurement may need to capture multiple hops to better determine the average time of occupancy. Count the number of hops on the channel across the sweep time. The average number of hops on the same channel within the regulatory observation period is calculated from the number of hops on the channel divided by the spectrum analyzer sweep time multiplied by the regulatory observation period. For example, if three hops are counted with an analyzer sweep time of 500 ms and

	the regulatory observation period is 10 s, then the number of hops in that ten seconds is 3 / 0.5 × 10, or 60 hops. The average time of occupancy is calculated by multiplying the dwell time per hop by the number of hops in the observation period.

6.2.6.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.8 °C	Humidity:	56.7 %	Atmospheric Pressure:	102.9 kPa
Pre test mode:	Mode4, Mode5, Mode6				
Final test mode:	Mode4, Mode5, Mode6				

6.2.6.2. Test Setup Diagram

6.2.6.3. Test Result

Pass

6.2.6.4. Test Data

Please Refer to Appendix for Details.

6.2.7. Conducted band edge and spurious emission

Test Requirement:	47 CFR 15.247(d)
Test Limit:	Refer to 47 CFR 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required.
Test Method:	ANSI C63.10-2020 section 7.8.7
Procedure:	7.8.7.1 General considerations To demonstrate compliance with the relative out-of-band emissions requirements conducted spurious emissions shall be measured for the transmit frequencies, per 5.5 and 5.6, and at the maximum transmit powers. Frequency hopping shall be disabled for this test with the exception of measurements at the allocated band-edges which shall be repeated with hopping enabled. Connect the primary antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer. The frequency range of testing shall span 30 MHz to 10 times the operating frequency and this may be done in a single sweep or, to aid resolution, across a number of sweeps. The resolution bandwidth shall be 100 kHz, video bandwidth 300 kHz, and a coupled sweep time with a peak detector. The limit is based on the highest in-band level across all channels measured using the same instrument settings (resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector). To help clearly demonstrate compliance a display line may be set at the required offset (typically 20 dB) below the highest in-band level. Where the highest in-band level is not clearly identified in the out-of-band measurements a separate spectral plot showing the in-band level shall be provided. When conducted measurements cannot be made (for example a device with integrated, non-removable antenna) radiated measurements shall be used. The reference level for determining the limit shall be established by maximizing the field strength from the highest power channel and measuring using the resolution and video bandwidth settings and peak detector as described above. The field strength limit for spurious emissions outside of restricted-bands shall then be set at the required offset (typically 20 dB) below the highest in-band level. Radiated measurements will follow the standards measurement procedures described in Clause 6 with the exception that the resolution bandwidth shall be 100 kHz, video bandwidth 300 kHz, and a coupled sweep time with a peak detector. Note that use of wider measurement bandwidths are acceptable for measuring the spurious emissions provided that the peak detector is used and that the measured value of spurious emissions are compared to the highest in-band level measured with the 100 kHz / 300 kHz bandwidth settings to determine compliance. 7.8.7.2 Band-edges Compliance with a relative limit at the band-edges (e.g., −20 dBc) shall be made on the lowest and on the highest channels with frequency hopping disabled and repeated with frequency hopping enabled. For the latter test the hopping sequence shall include the lowest and highest channels. For measurements with the hopping disabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of the allocated band-edge.

	For measurements with the hopping enabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of both of the allocated band-edges. This could require separate spectral plots for each band-edge.

6.2.7.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.5 °C	Humidity:	56.1 %	Atmospheric Pressure:	102.9 kPa
Pre test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6				
Final test mode:	Mode1, Mode2, Mode3, Mode4, Mode5, Mode6				

6.2.7.2. Test Setup Diagram

6.2.7.3. Test Result

Pass

6.2.7.4. Test Data

Please Refer to Appendix for Details.

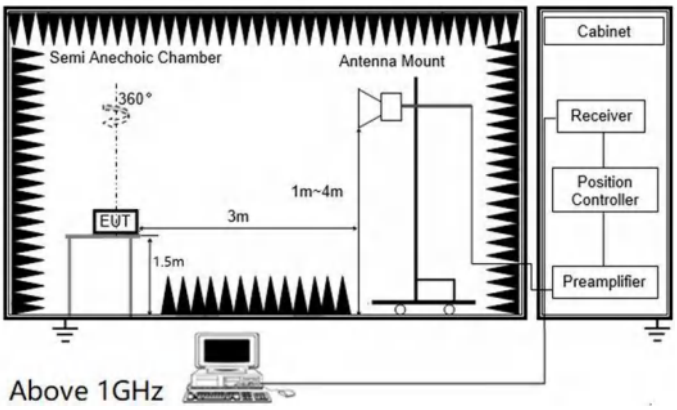
6.2.8. Radiated band edge emission

<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), 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)).</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2020 section 6.10</td></tr>
<tr><td>Procedure:</td><td>1>. EUT was setup and tested according to ANSI C63.10 .
2>. The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3>. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
4>. The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. Thisis repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10 on radiated measurement.
5>. Use the following spectrum analyzer settings:
a) Span shall wide enough to fully capture the emission being measured
b) Set RBW=1MHz, VBW=3MHz for >1GHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement
For average measurement: use duty cycle correction factor method (DCCF), Average level = Peak level + DCCF</td></tr>
</table>

6.2.8.1. E.U.T. Operation

<table>
<tr><td colspan="6">Operating Environment:</td></tr>
<tr><td>Temperature:</td><td>23 °C</td><td>Humidity:</td><td>56.7 %</td><td>Atmospheric Pressure:</td><td>102.9 kPa</td></tr>
<tr><td colspan="2">Pre test mode:</td><td colspan="4">Mode1, Mode2, Mode3</td></tr>
<tr><td colspan="2">Final test mode:</td><td colspan="4">All of the listed pre-test mode were tested, only the data of the worst mode (Mode2) is recorded in the report</td></tr>
</table>

6.2.8.2. Test Setup Diagram

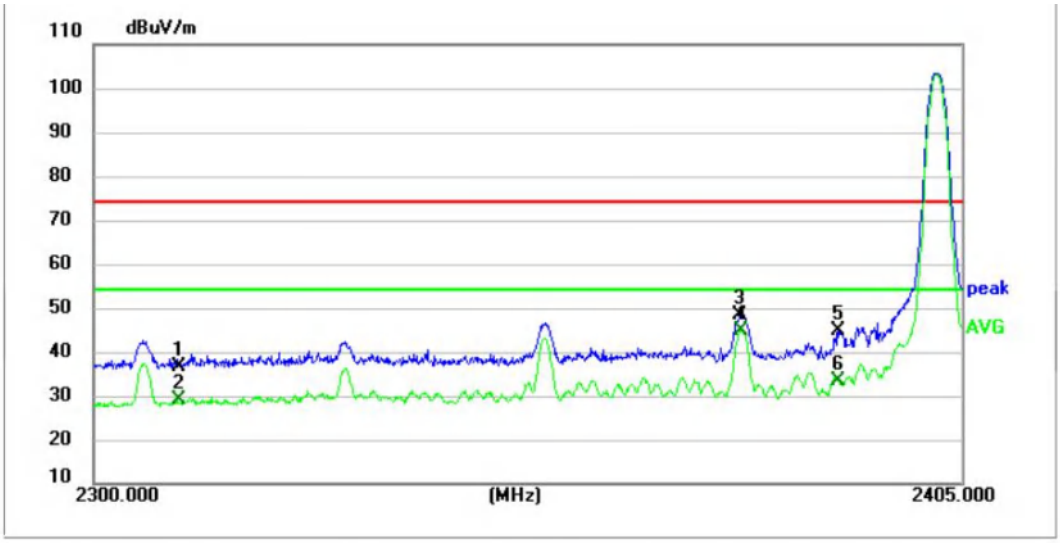


6.2.8.3. Test Result

Pass

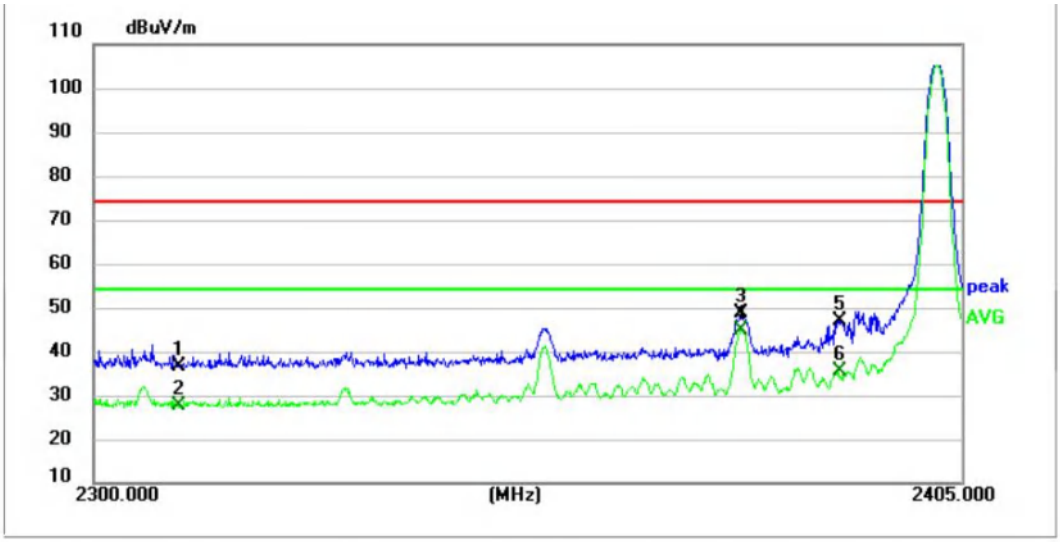
6.2.8.4. Test Data

Mode2 / Polarization: Horizontal / CH: L



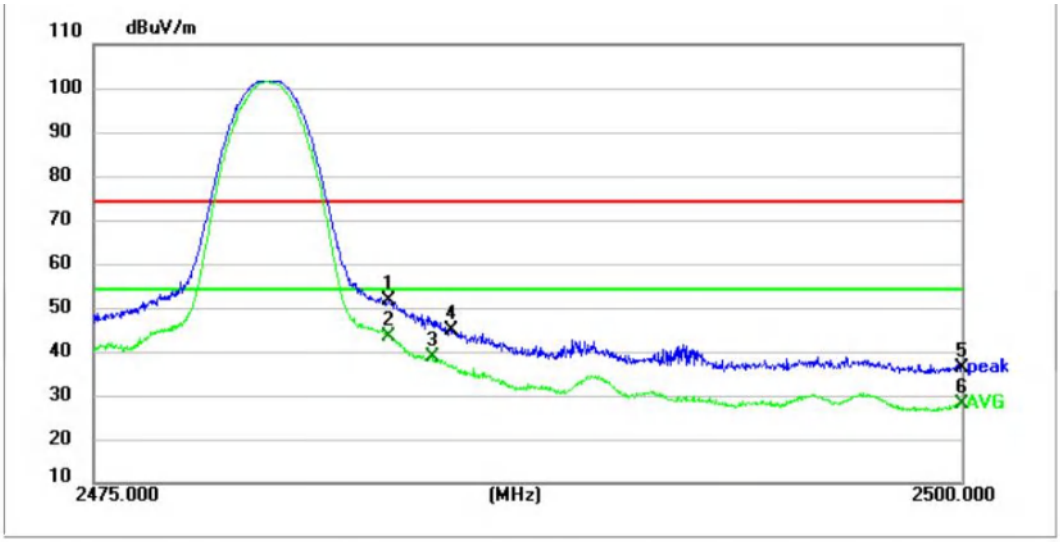
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2310.0000	52.24	-15.55	36.69	74.00	37.31	peak
2	2310.0000	44.51	-15.55	28.96	54.00	25.04	AVG
3	2377.8680	64.11	-15.78	48.33	74.00	25.67	peak
4 *	2377.9625	60.74	-15.78	44.96	54.00	9.04	AVG
5	2390.0000	60.64	-15.78	44.86	74.00	29.14	peak
6	2390.0000	49.01	-15.78	33.23	54.00	20.77	AVG

Mode2 / Polarization: Vertical / CH: L



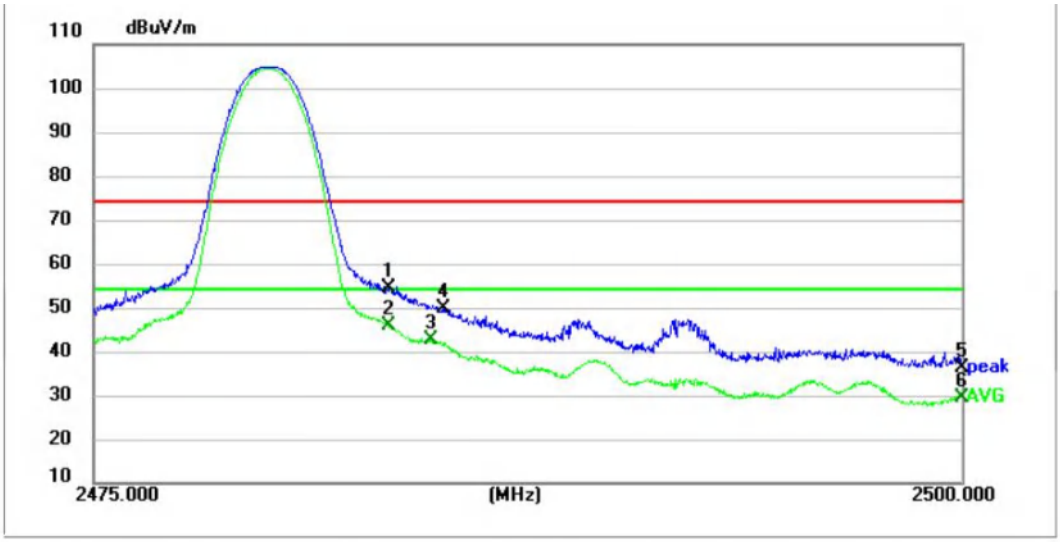
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2310.0000	52.20	-15.55	36.65	74.00	37.35	peak
2	2310.0000	43.18	-15.55	27.63	54.00	26.37	AVG
3	2377.9520	64.58	-15.78	48.80	74.00	25.20	peak
4 *	2377.9520	60.74	-15.78	44.96	54.00	9.04	AVG
5	2390.0000	62.76	-15.78	46.98	74.00	27.02	peak
6	2390.0000	51.42	-15.78	35.64	54.00	18.36	AVG

Mode2 / Polarization: Horizontal / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.5000	67.89	-16.25	51.64	74.00	22.36	peak
2 *	2483.5000	59.59	-16.25	43.34	54.00	10.66	AVG
3	2484.7224	55.09	-16.25	38.84	54.00	15.16	AVG
4	2485.2850	61.23	-16.25	44.98	74.00	29.02	peak
5	2500.0000	52.41	-16.29	36.12	74.00	37.88	peak
6	2500.0000	44.26	-16.29	27.97	54.00	26.03	AVG

Mode2 / Polarization: Vertical / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2483.5000	70.70	-16.25	54.45	74.00	19.55	peak
2 *	2483.5000	62.11	-16.25	45.86	54.00	8.14	AVG
3	2484.7150	59.01	-16.25	42.76	54.00	11.24	AVG
4	2485.0475	65.96	-16.25	49.71	74.00	24.29	peak
5	2500.0000	52.69	-16.29	36.40	74.00	37.60	peak
6	2500.0000	45.86	-16.29	29.57	54.00	24.43	AVG

6.2.9. Radiated Spurious Emission (below 1GHz)

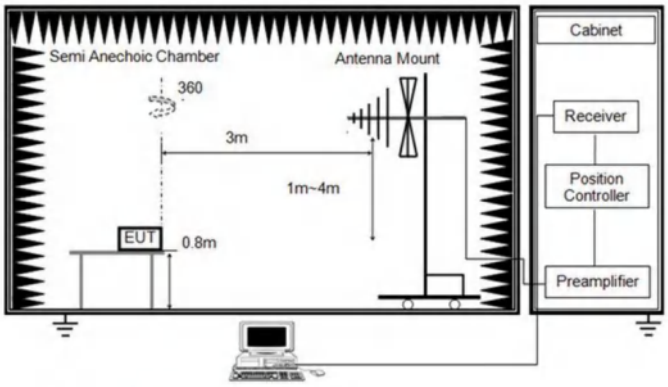
<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2020 section 6.5.4</td></tr>
<tr><td>Procedure:</td><td>1>. The EUT was setup and tested according to ANSI C63.10.
2>. The EUT is placed on a turn table which is 0.8 meter above ground for below 1 GHz, and 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3>. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4>. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5>. Set to the maximum power setting and enable the EUT transmit continuously.
6>. Use the following spectrum analyzer settings
a) Span shall wide enough to fully capture the emission being measured;
b) RBW=120 kHz, VBW=300 kHz, Sweep=auto, Detector function=peak, Trace=max hold;

If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.</td></tr>
</table>

6.2.9.1. E.U.T. Operation

<table>
<tr><td colspan="6">Operating Environment:</td></tr>
<tr><td>Temperature:</td><td>22.4 °C</td><td>Humidity:</td><td>55.1 %</td><td>Atmospheric Pressure:</td><td>102.9 kPa</td></tr>
<tr><td colspan="2">Pre test mode:</td><td colspan="4">Mode1, Mode2, Mode3, Mode7</td></tr>
<tr><td colspan="2">Final test mode:</td><td colspan="4">All of the listed pre-test mode were tested, only the data of the worst mode (Mode7) is recorded in the report</td></tr>
</table>

6.2.9.2. Test Setup Diagram



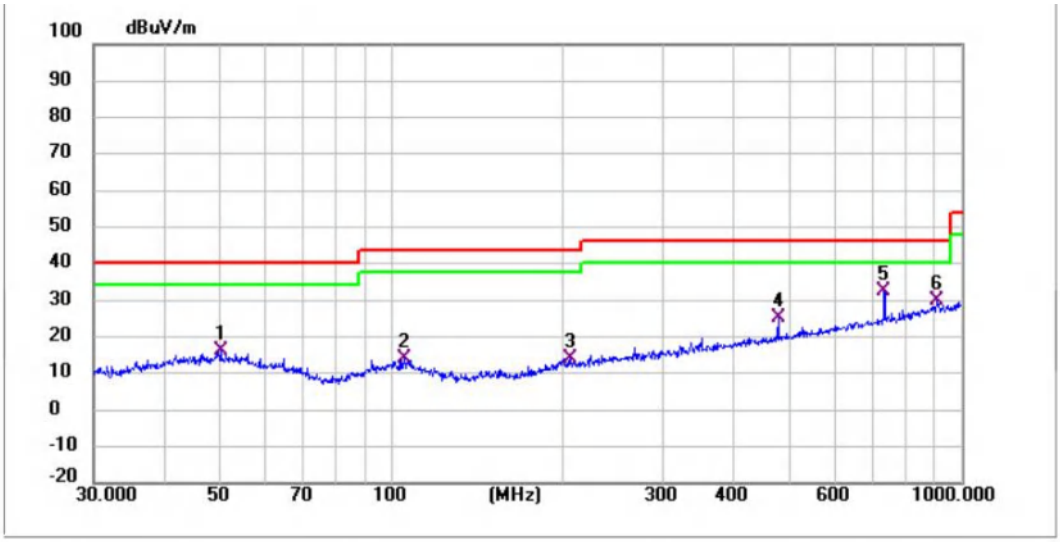
Below 1 GHz and above 30 MHz

6.2.9.3. Test Result

Pass

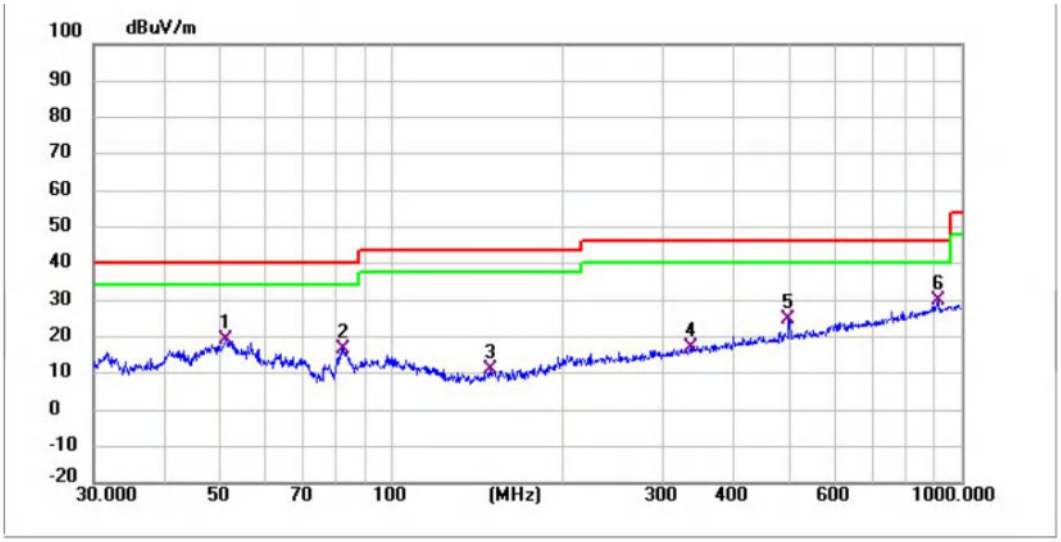
6.2.9.4. Test Data

Mode7 / Polarization: Horizontal



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	50.2324	45.00	-28.76	16.24	40.00	23.76	QP
2	105.6415	44.57	-30.31	14.26	43.50	29.24	QP
3	205.6750	44.56	-30.29	14.27	43.50	29.23	QP
4	477.1693	48.73	-23.44	25.29	46.00	20.71	QP
5 *	731.9202	51.35	-18.77	32.58	46.00	13.42	QP
6	906.4824	46.36	-16.29	30.07	46.00	15.93	QP

Mode7 / Polarization: Vertical



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	51.1210	47.76	-28.74	19.02	40.00	20.98	QP
2	82.3588	51.15	-34.35	16.80	40.00	23.20	QP
3	149.4857	45.14	-33.93	11.21	43.50	32.29	QP
4	334.8588	43.55	-26.37	17.18	46.00	28.82	QP
5	497.6764	47.81	-23.09	24.72	46.00	21.28	QP
6 *	909.6666	46.10	-16.21	29.89	46.00	16.11	QP

Note:
1>. For 9 kHz ~ 30 MHz Measurement
The EUT was pre-scanned this frequency band, found the radiated level 20dB lower than the limit, so don't show data on this report.
2>. Level= Reading + Factor (Antenna Factor+ Cable Loss- Preamp Factor)
3>. Margin = Limit – Level

6.2.10. Radiated Spurious Emission (Above 1GHz)

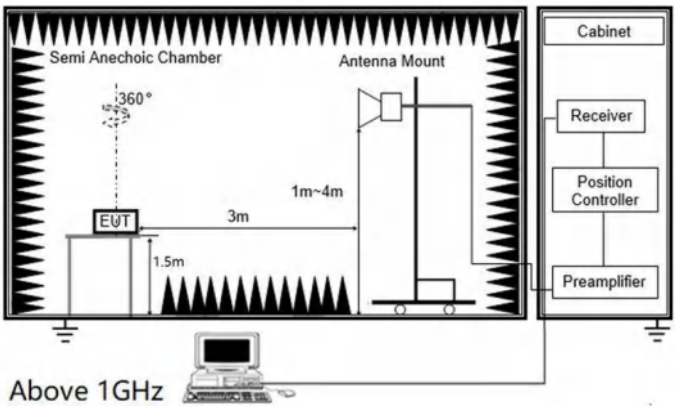
<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), in addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2020 section 6.5.4</td></tr>
<tr><td>Procedure:</td><td>1>. The EUT was setup and tested according to ANSI C63.10.
2>. The EUT is placed on a turn table which is 0.8 meter above ground for 1.5 m for above 1 GHz. The turn table is rotated 360 degrees to determine the position of the maximum emission level.
3>. The EUT was set 3 meters from the receiving antenna, which was mounted on the top of a variable height antenna tower.
4>. For each suspected emission, the EUT was arranged to its worst case and then tune the Antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level to comply with the guidelines.
5>. Set to the maximum power setting and enable the EUT transmit continuously.
6>. Use the following spectrum analyzer settings
a) Span shall wide enough to fully capture the emission being measured;
b) Set RBW=1MHz, VBW=3MHz, Sweep time=auto, Detector=peak, Trace=max hold for Peak measurement

For average measurement: use duty cycle correction factor method (DCCF)
Average level = Peak level + DCCF</td></tr>
</table>

6.2.10.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.7 °C	Humidity:	56.6 %	Atmospheric Pressure:	102.9 kPa
Pre test mode:	Mode1, Mode2, Mode3				
Final test mode:	All of the listed pre-test mode were tested, only the data of the worst mode (Mode2) is recorded in the report				

6.2.10.2. Test Setup Diagram

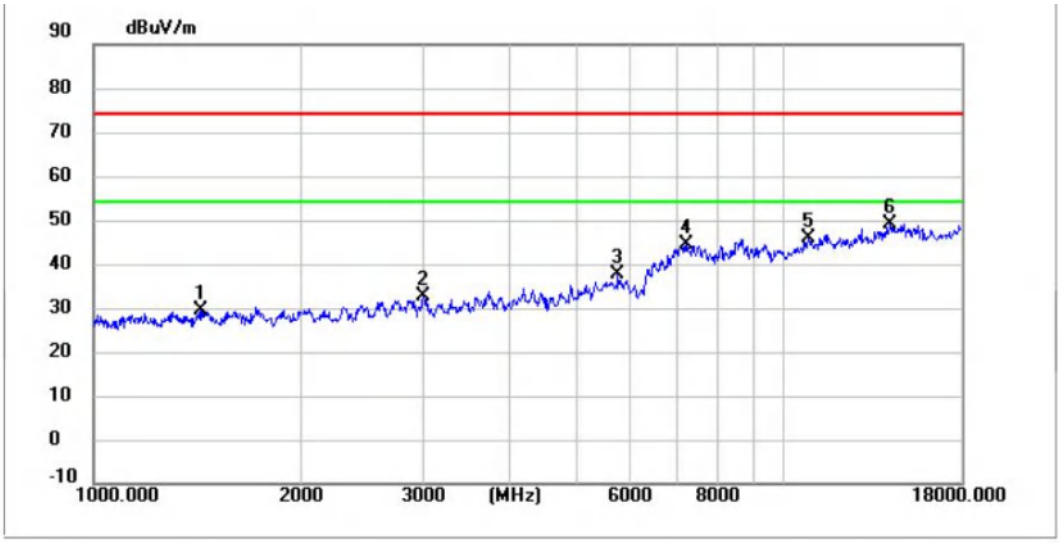


6.2.10.3. Test Result

Pass

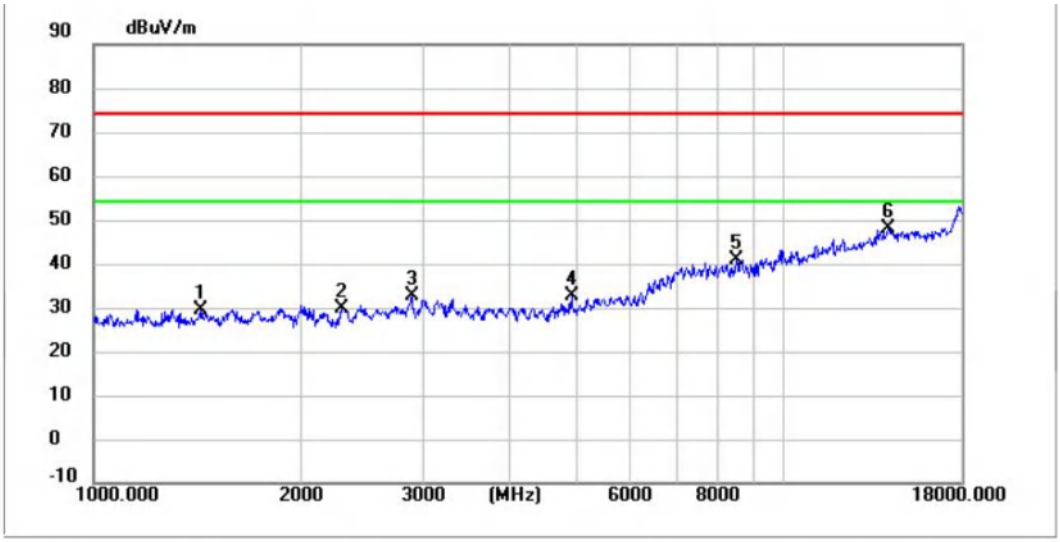
6.2.10.4. Test Data

Mode2 / Polarization: Horizontal / CH: L



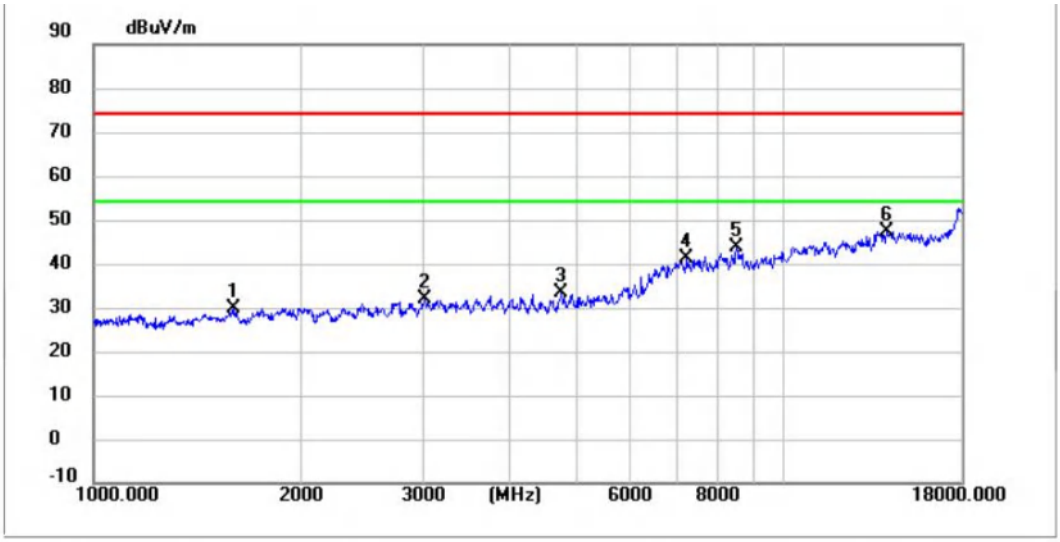
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1431.8000	50.36	-20.92	29.44	74.00	44.56	peak
2	3006.0000	47.13	-14.61	32.52	74.00	41.48	peak
3	5746.4000	43.83	-6.19	37.64	74.00	36.36	peak
4	7228.8000	39.98	4.48	44.46	74.00	29.54	peak
5	10853.2000	33.23	12.79	46.02	74.00	27.98	peak
6 *	14207.3000	30.46	18.62	49.08	74.00	24.92	peak

Mode2 / Polarization: Vertical / CH: L



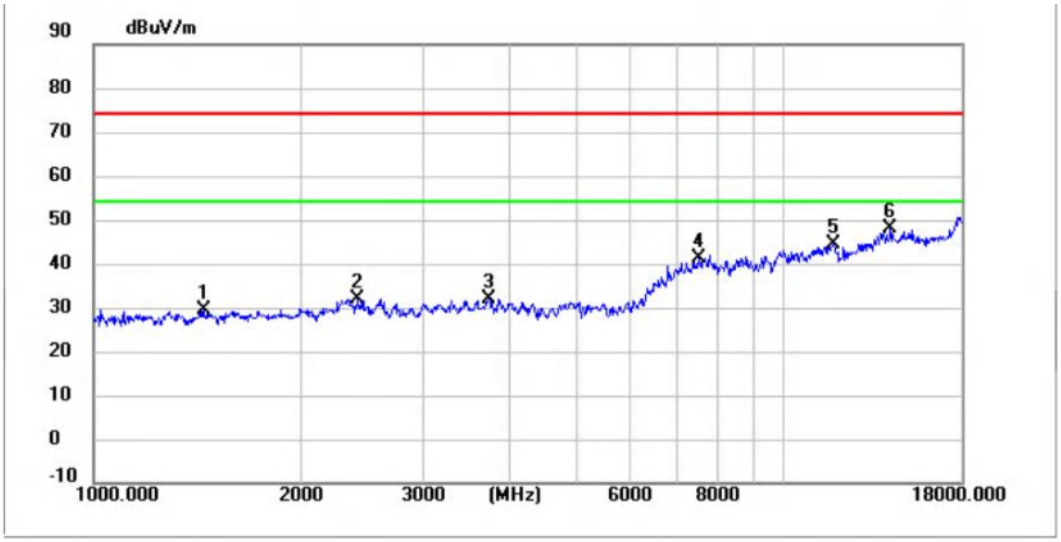
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1428.4000	50.32	-20.95	29.37	74.00	44.63	peak
2	2293.7000	47.48	-17.55	29.93	74.00	44.07	peak
3	2893.8000	47.69	-14.91	32.78	74.00	41.22	peak
4	4916.8000	42.06	-9.26	32.80	74.00	41.20	peak
5	8531.0000	33.47	7.43	40.90	74.00	33.10	peak
6 *	14132.5000	29.43	18.55	47.98	74.00	26.02	peak

Mode2 / Polarization: Horizontal / CH: M



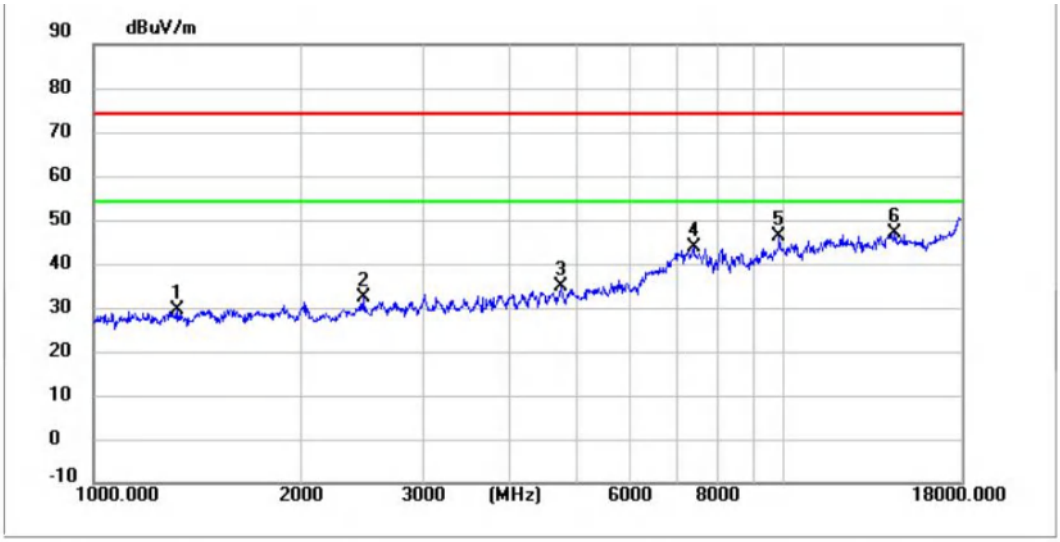
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1596.7000	50.43	-20.48	29.95	74.00	44.05	peak
2	3021.3000	46.52	-14.58	31.94	74.00	42.06	peak
3	4757.0000	43.64	-10.16	33.48	74.00	40.52	peak
4	7237.3000	36.61	4.50	41.11	74.00	32.89	peak
5	8537.8000	36.28	7.44	43.72	74.00	30.28	peak
6 *	14084.9000	28.91	18.53	47.44	74.00	26.56	peak

Mode2 / Polarization: Vertical / CH: M



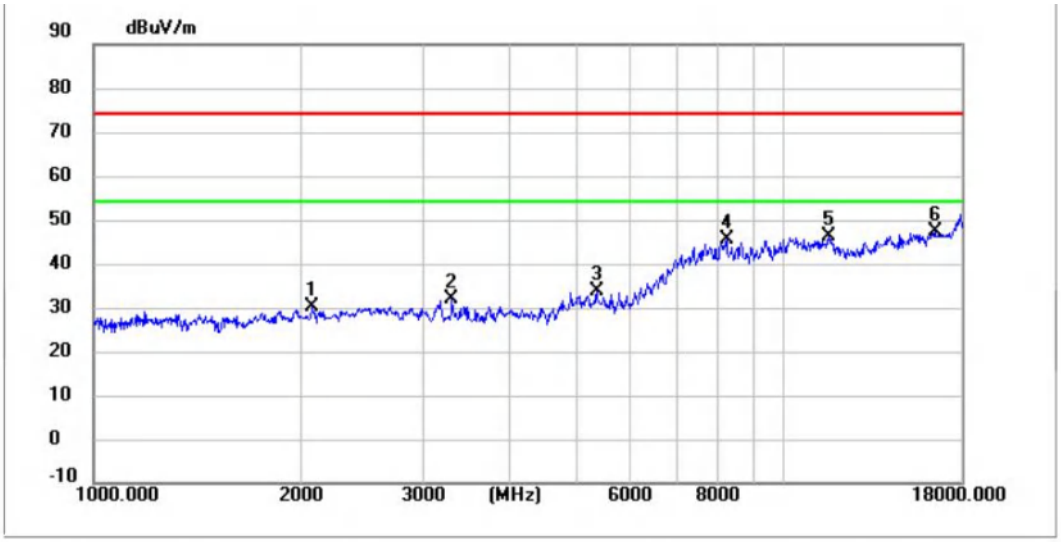
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1447.1000	50.22	-20.83	29.39	74.00	44.61	peak
2	2417.8000	49.28	-17.26	32.02	74.00	41.98	peak
3	3745.5000	45.11	-12.99	32.12	74.00	41.88	peak
4	7526.3000	36.02	5.35	41.37	74.00	32.63	peak
5	11779.7000	30.43	14.18	44.61	74.00	29.39	peak
6 *	14234.5000	29.48	18.58	48.06	74.00	25.94	peak

Mode2 / Polarization: Horizontal / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	1321.3000	50.78	-21.24	29.54	74.00	44.46	peak
2	2462.0000	49.61	-17.15	32.46	74.00	41.54	peak
3	4746.8000	45.09	-10.22	34.87	74.00	39.13	peak
4	7392.0000	38.76	4.89	43.65	74.00	30.35	peak
5	9824.7000	35.50	10.64	46.14	74.00	27.86	peak
6 *	14474.2000	28.53	18.36	46.89	74.00	27.11	peak

Mode2 / Polarization: Vertical / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	2065.9000	48.34	-18.24	30.10	74.00	43.90	peak
2	3300.1000	45.80	-13.95	31.85	74.00	42.15	peak
3	5350.3000	41.29	-7.59	33.70	74.00	40.30	peak
4	8248.8000	38.51	6.90	45.41	74.00	28.59	peak
5	11606.3000	32.08	14.03	46.11	74.00	27.89	peak
6 *	16524.4000	30.19	17.03	47.22	74.00	26.78	peak

Note:
1>. Level= Reading + Factor (Antenna Factor+ Cable Loss- Preamp Factor)
2>. Margin = Limit – Level
3>. Average measurement was not performed if peak level is lower than average limit (54dBuV/m) above 1GHz.

7. APPENDIX REPORT

7.1. Maximum Conducted Output Power

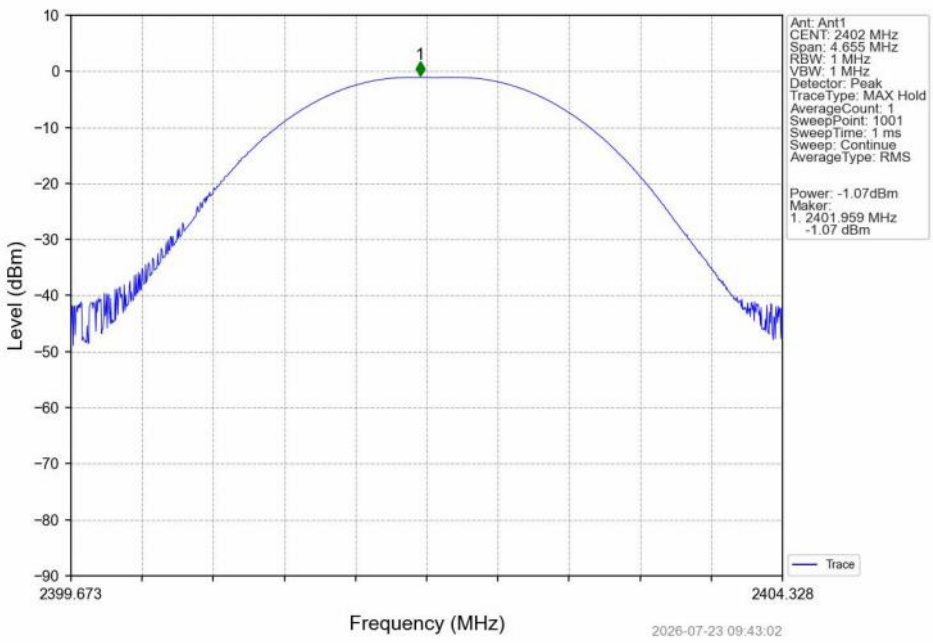
Test Result

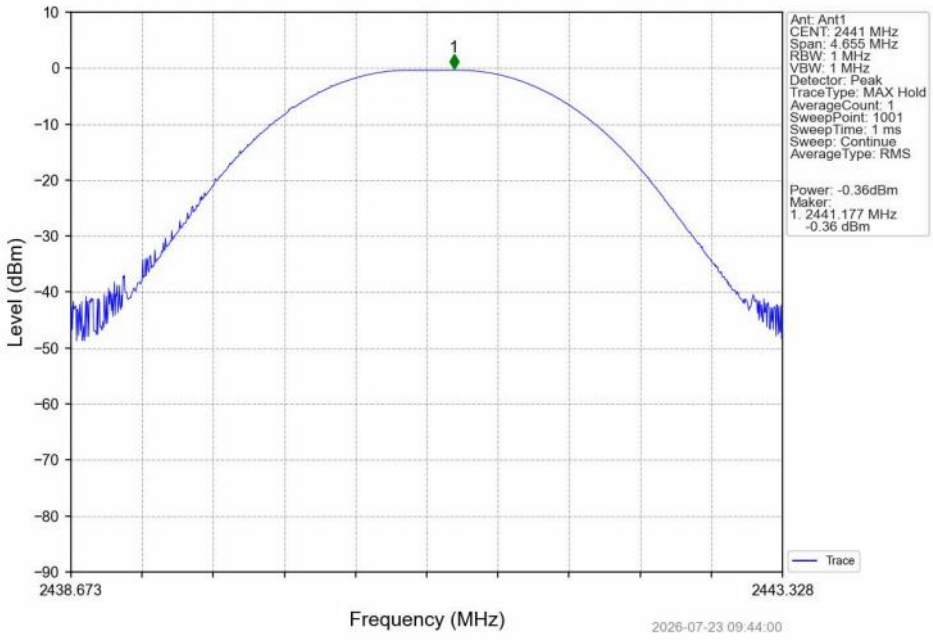
Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-1.07	<=30	Pass
		2441	DH5	-0.36	<=30	Pass
		2480	DH5	0.57	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	-0.68	<=20.97	Pass
		2441	2DH5	-0.12	<=20.97	Pass
		2480	2DH5	0.73	<=20.97	Pass
8DPSK	SISO	2402	3DH5	-0.72	<=20.97	Pass
		2441	3DH5	-0.13	<=20.97	Pass
		2480	3DH5	0.71	<=20.97	Pass

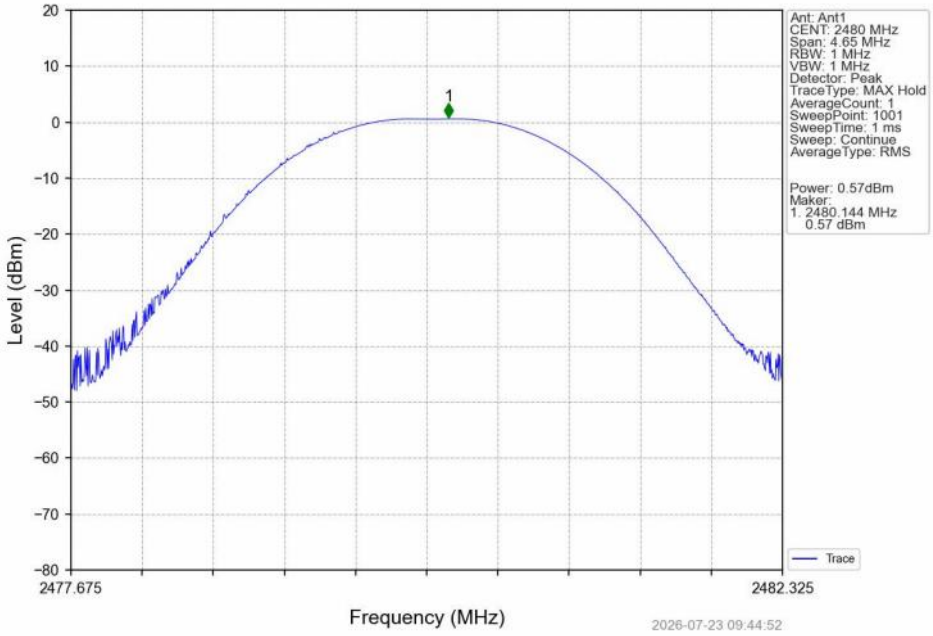
Test Graph

Power

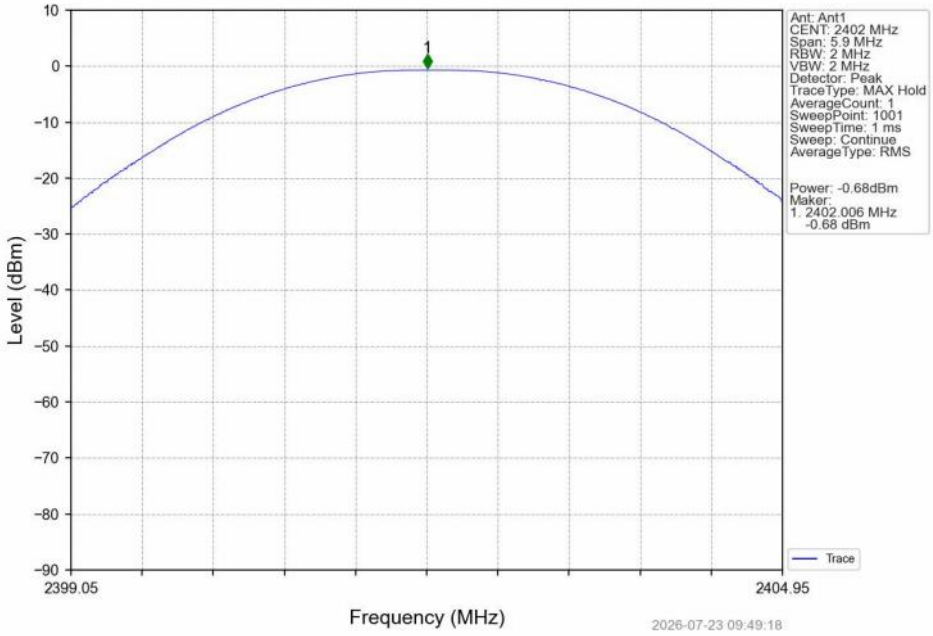
GFSK_DH5_LCH_2402MHz_Ant1_NTNV


GFSK_DH5_MCH_2441MHz_Ant1_NTNV


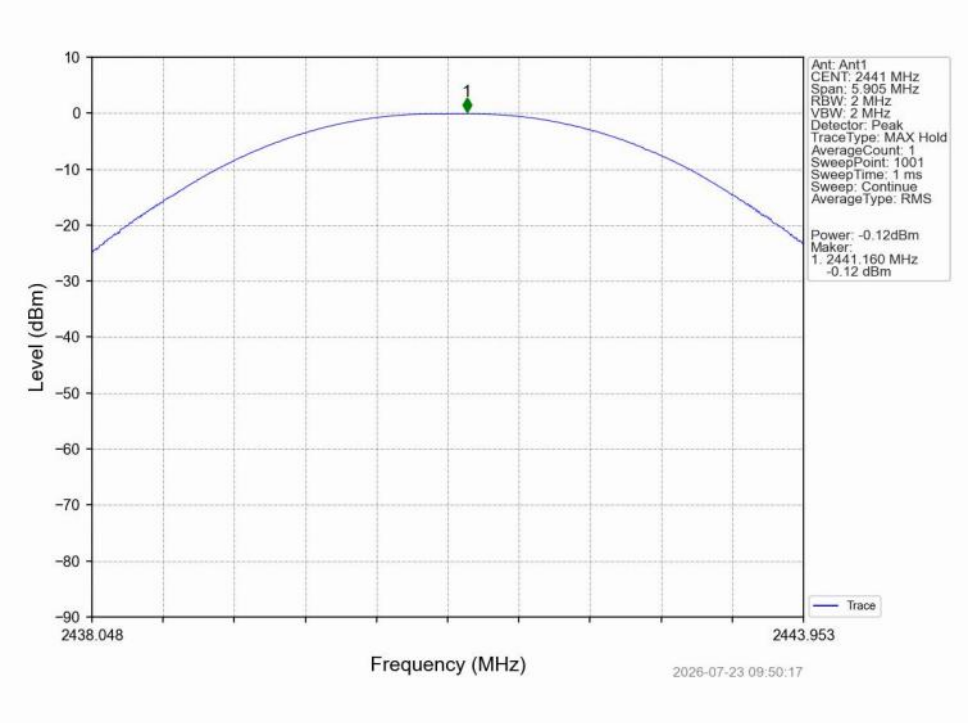
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



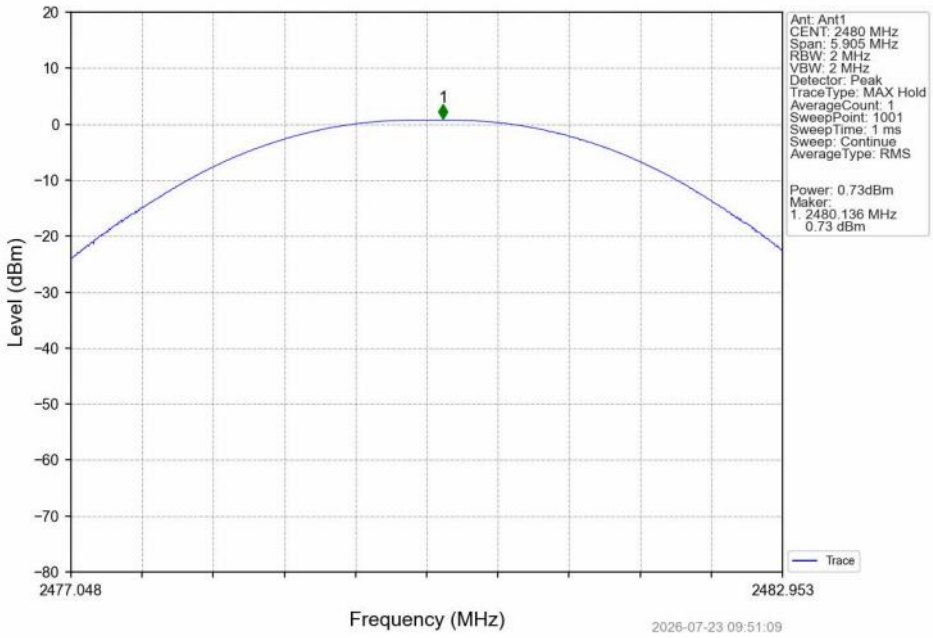
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



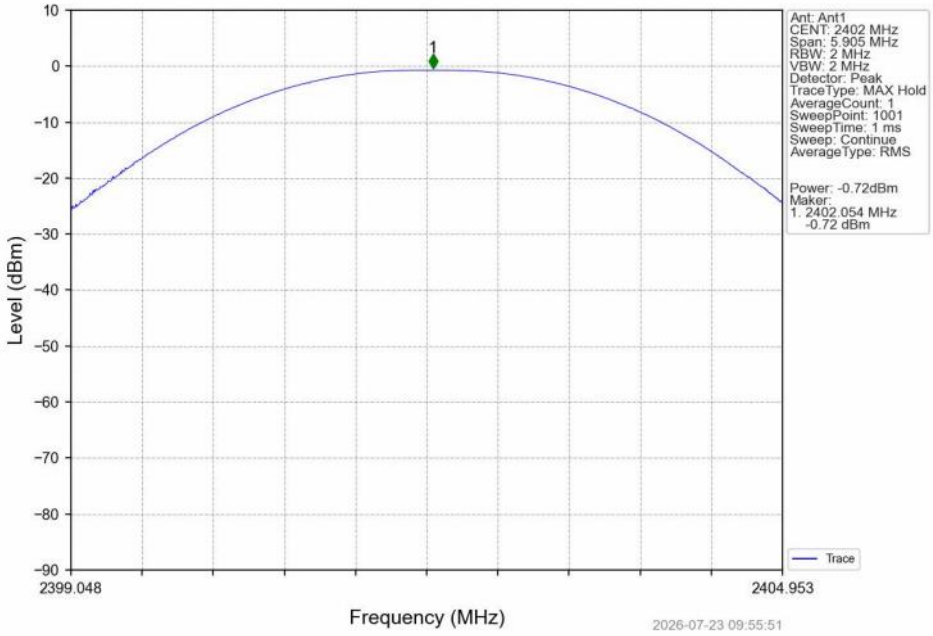
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



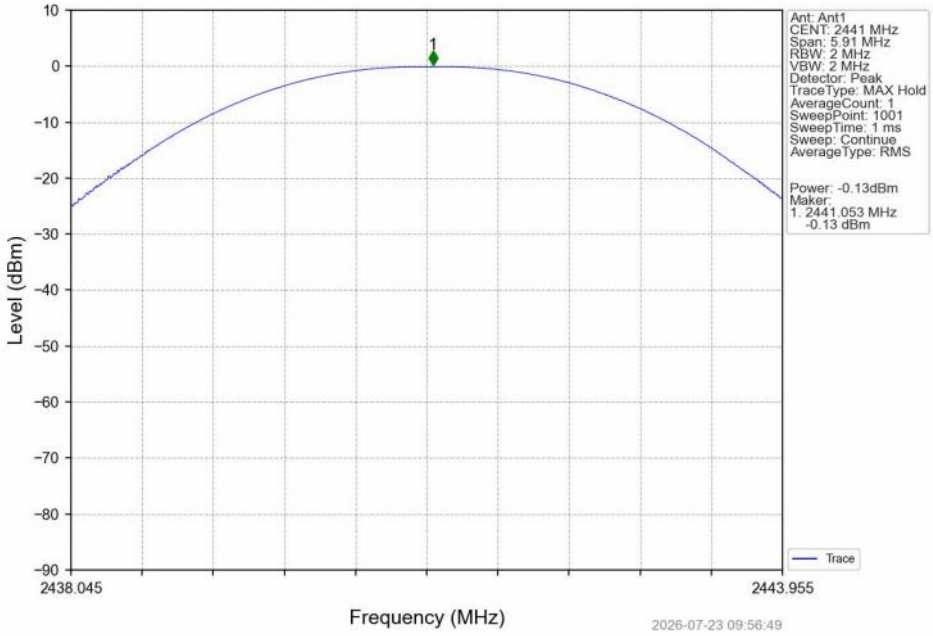
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



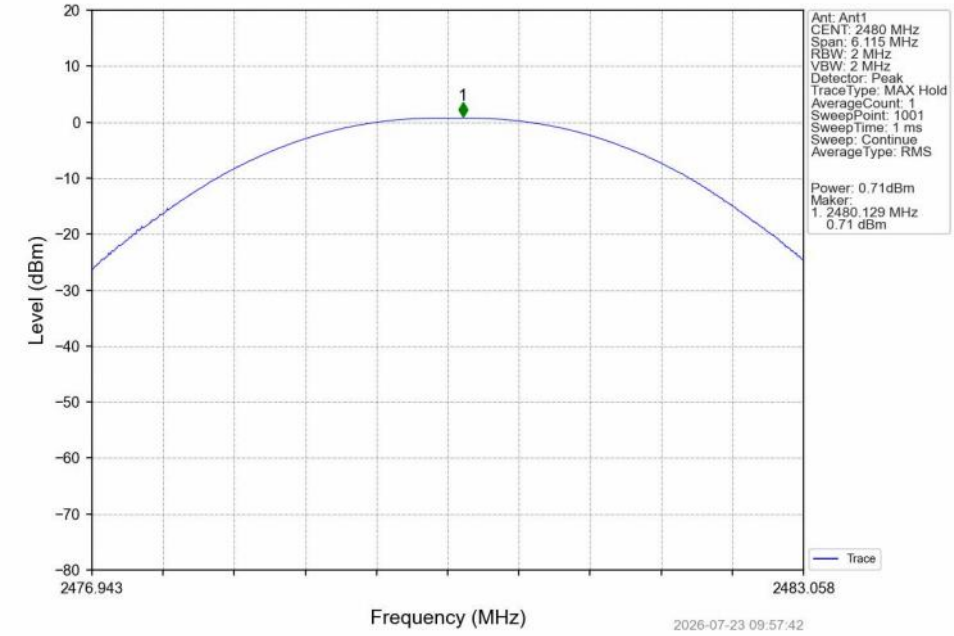
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



7.2. Bandwidth

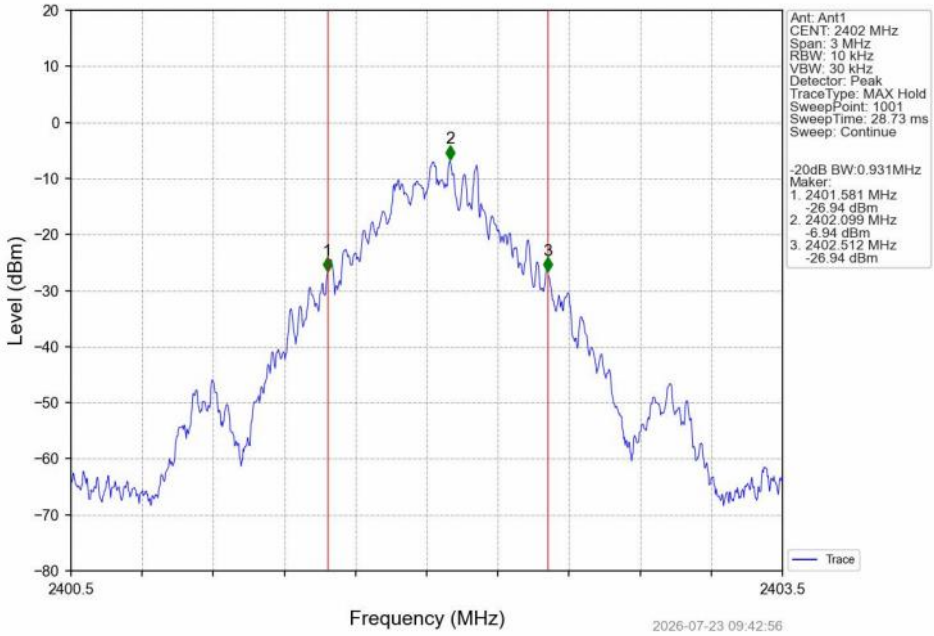
Test Result

20dB BW

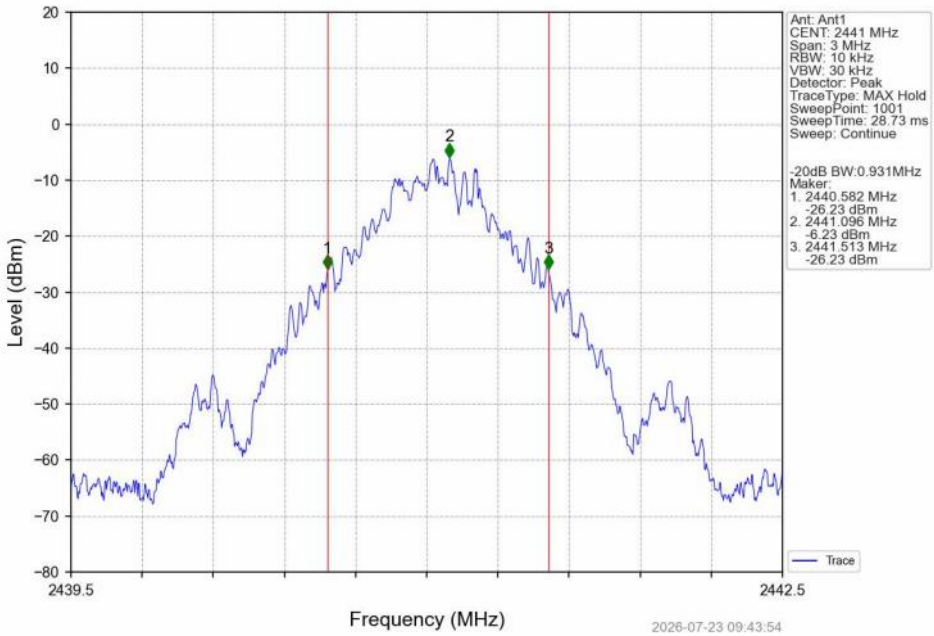
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.931	/	Pass
		2441	DH5	1	0.931	/	Pass
		2480	DH5	1	0.930	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.180	/	Pass
		2441	2DH5	1	1.181	/	Pass
		2480	2DH5	1	1.181	/	Pass
8DPSK	SISO	2402	3DH5	1	1.181	/	Pass
		2441	3DH5	1	1.182	/	Pass
		2480	3DH5	1	1.223	/	Pass

Test Graph
20dB BW

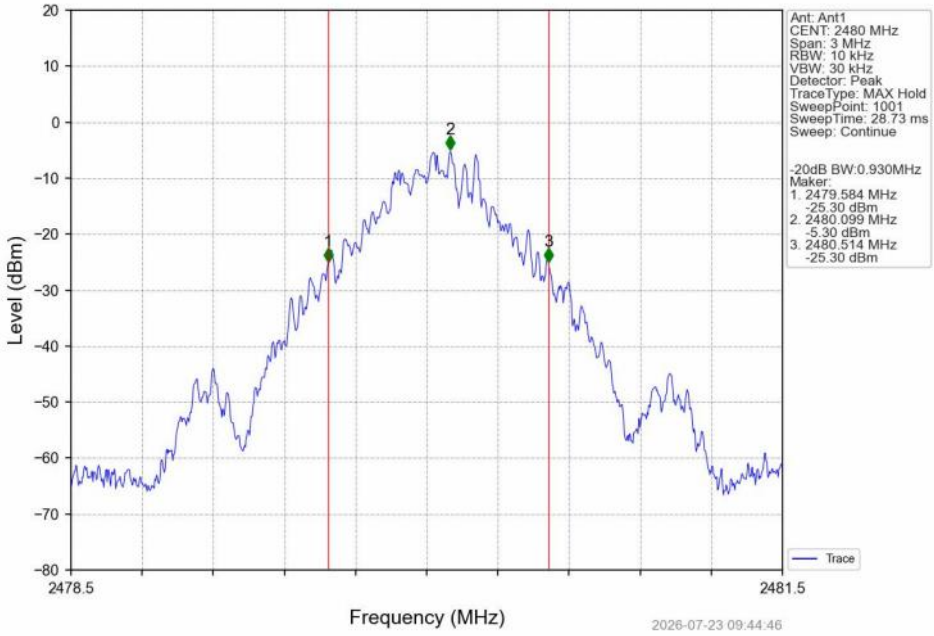
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



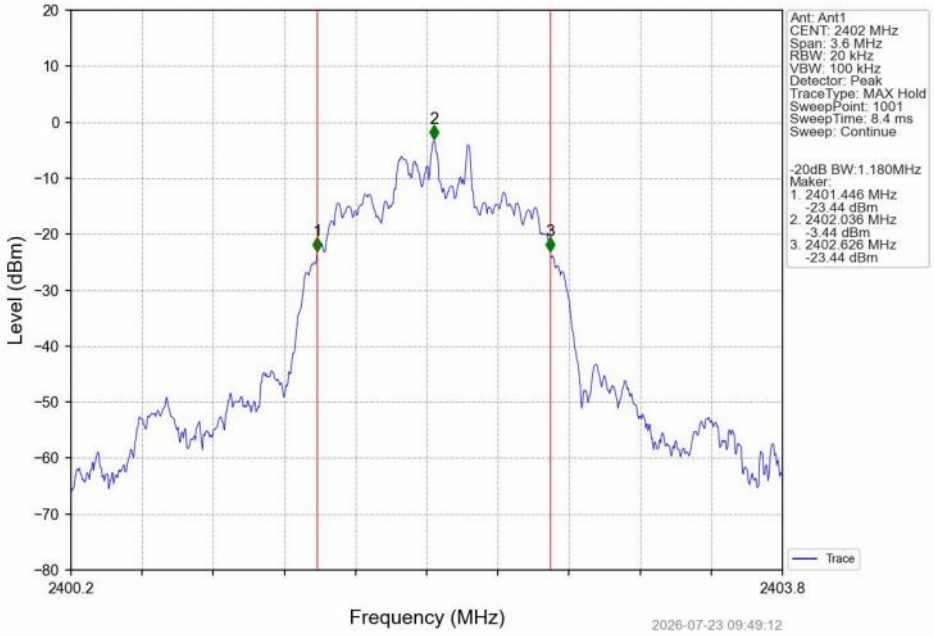
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



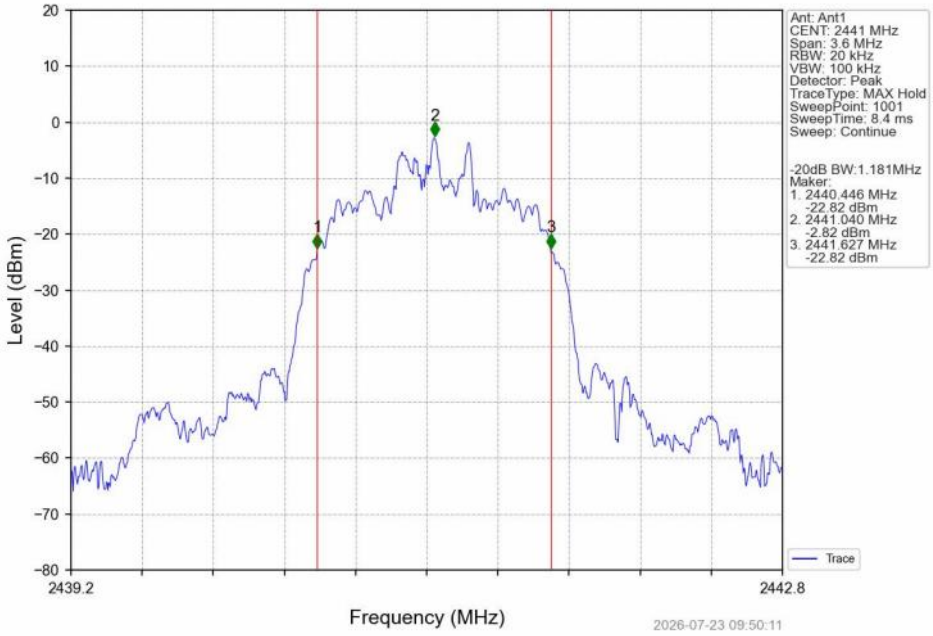
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



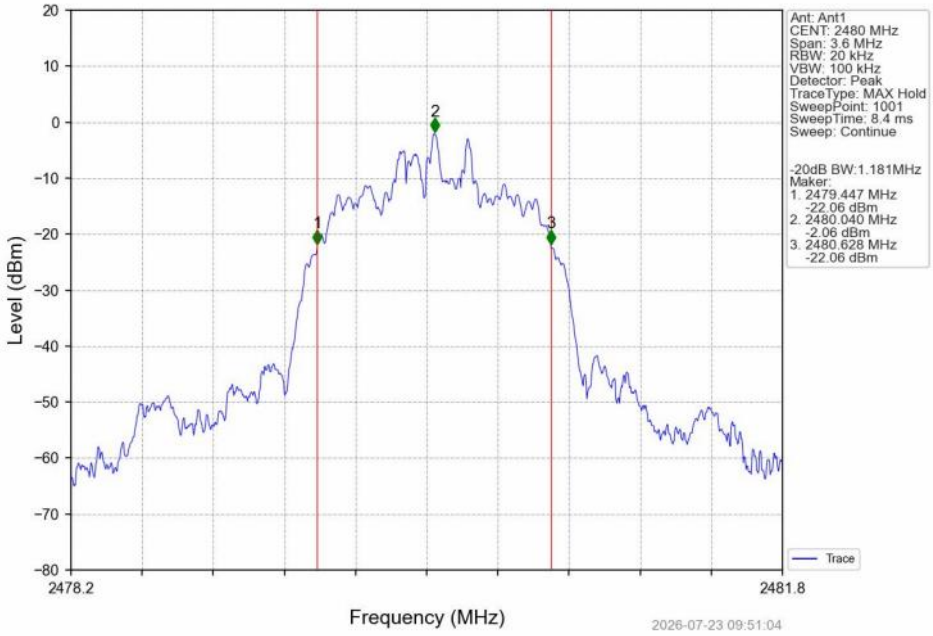
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



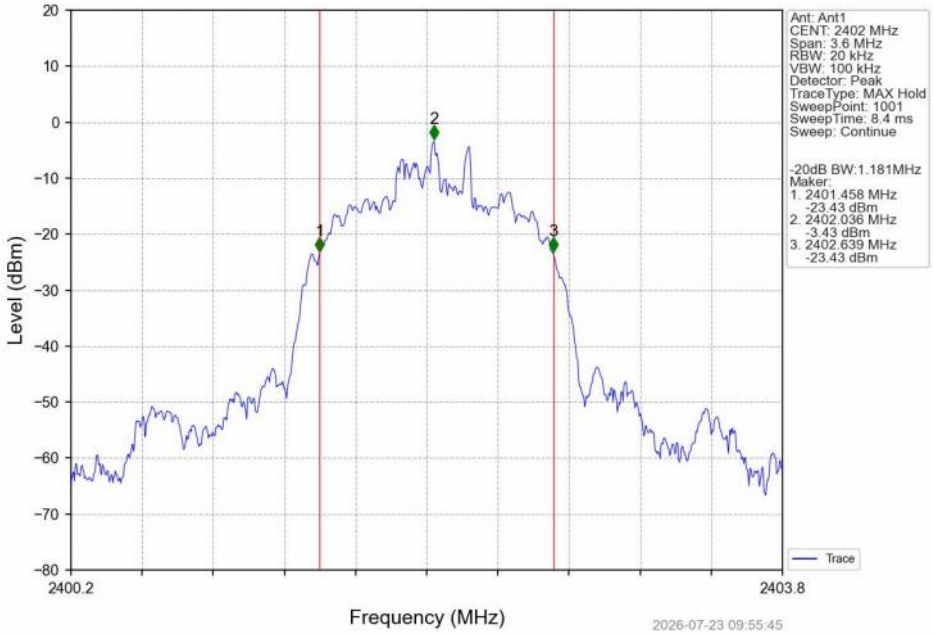
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



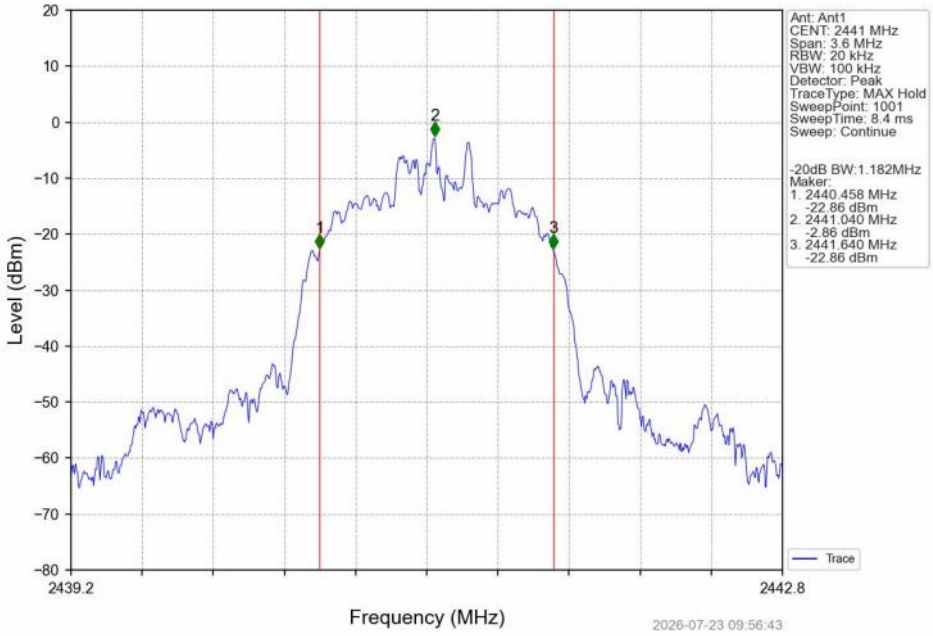
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



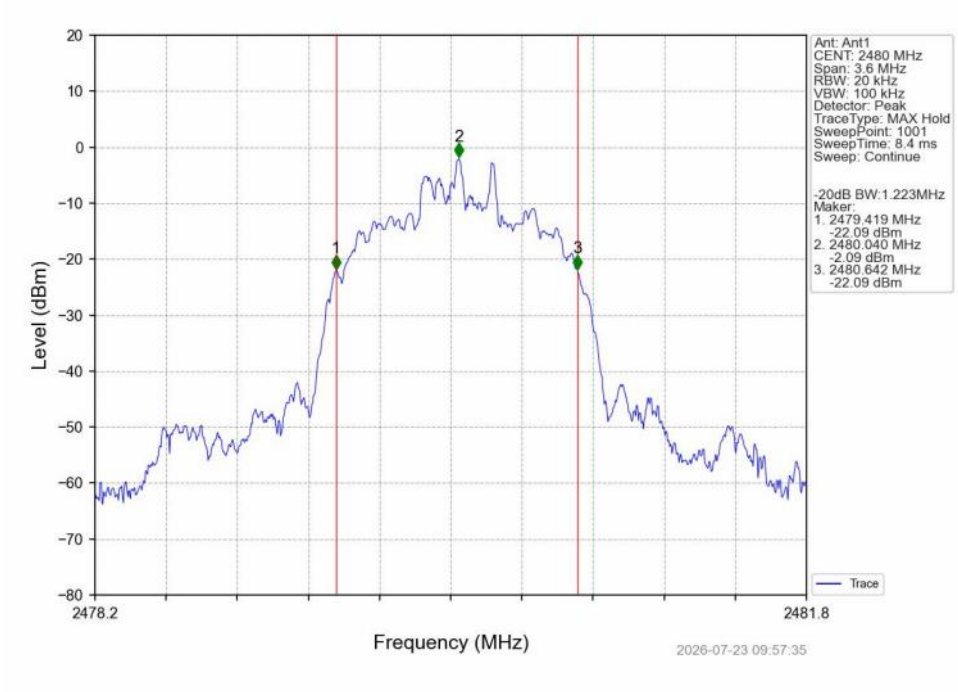
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



7.3. Carrier Frequency Separation

Test Result

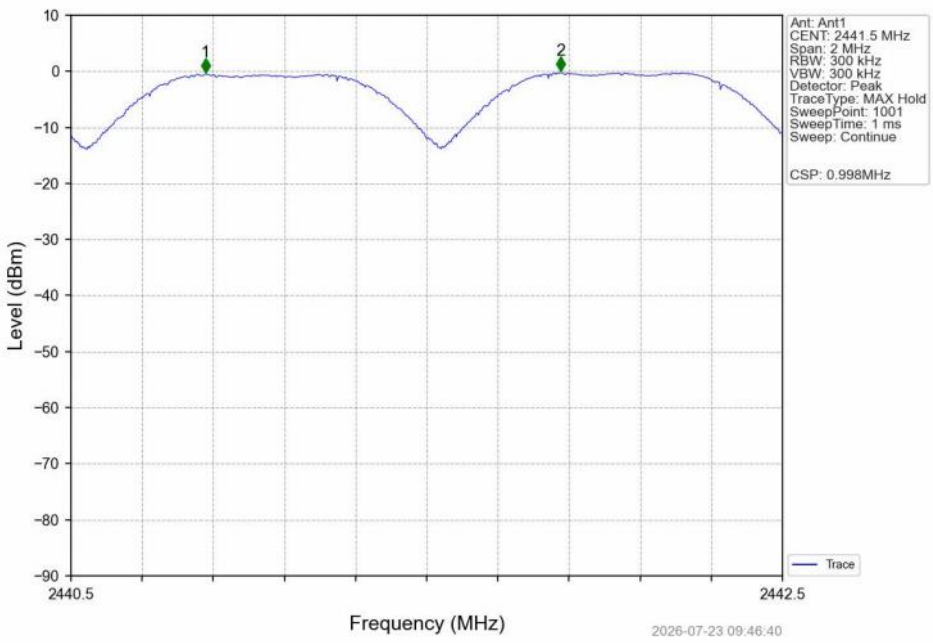
Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	0.998	0.931	>=0.931	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	0.934	1.181	>=0.787	Pass
8DPSK	SISO	HOPP	3DH5	1.015	1.223	>=0.815	Pass

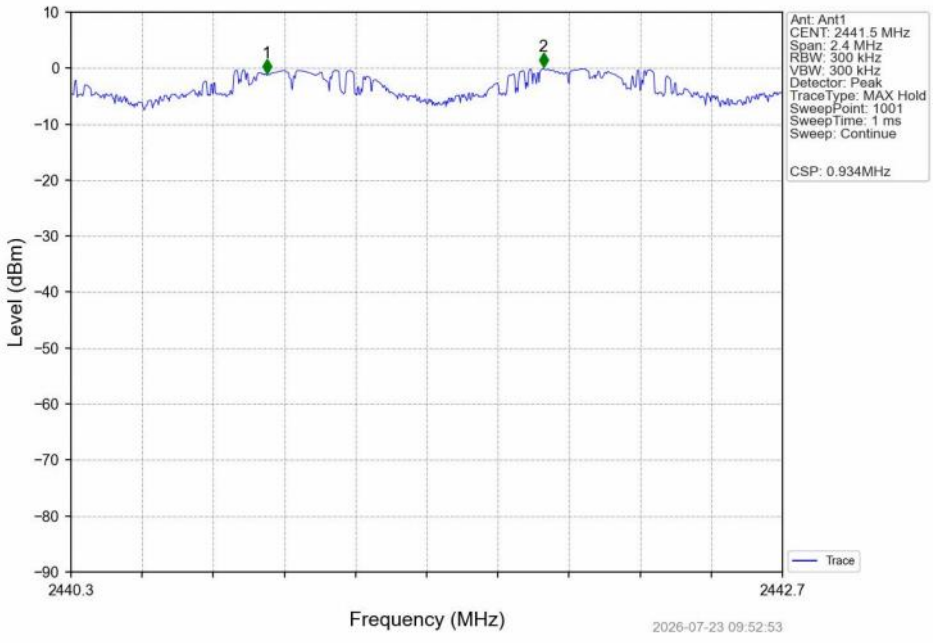
Test Graph

Ant1

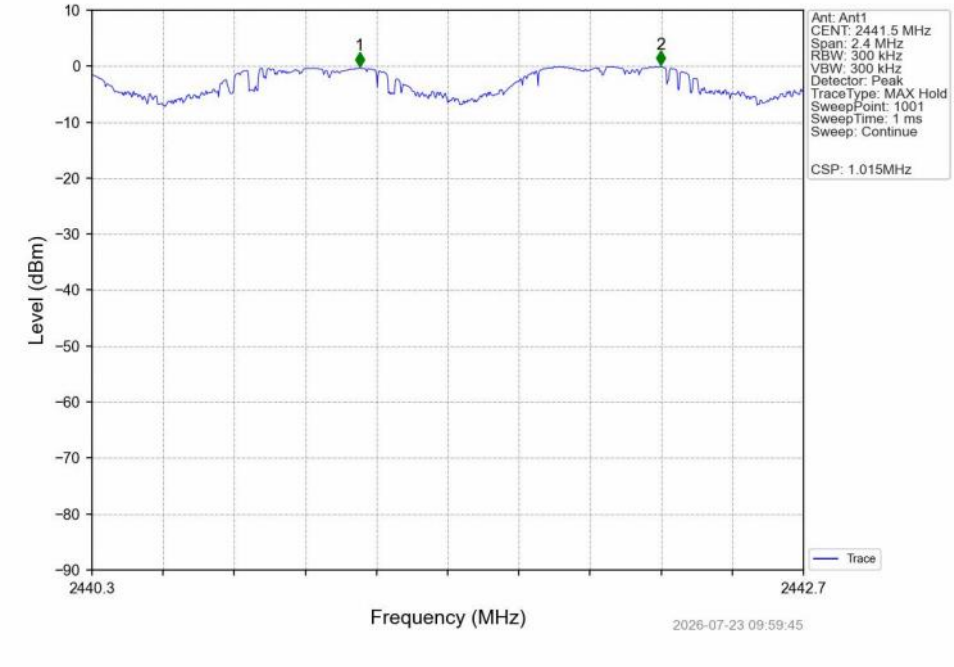
GFSK_DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



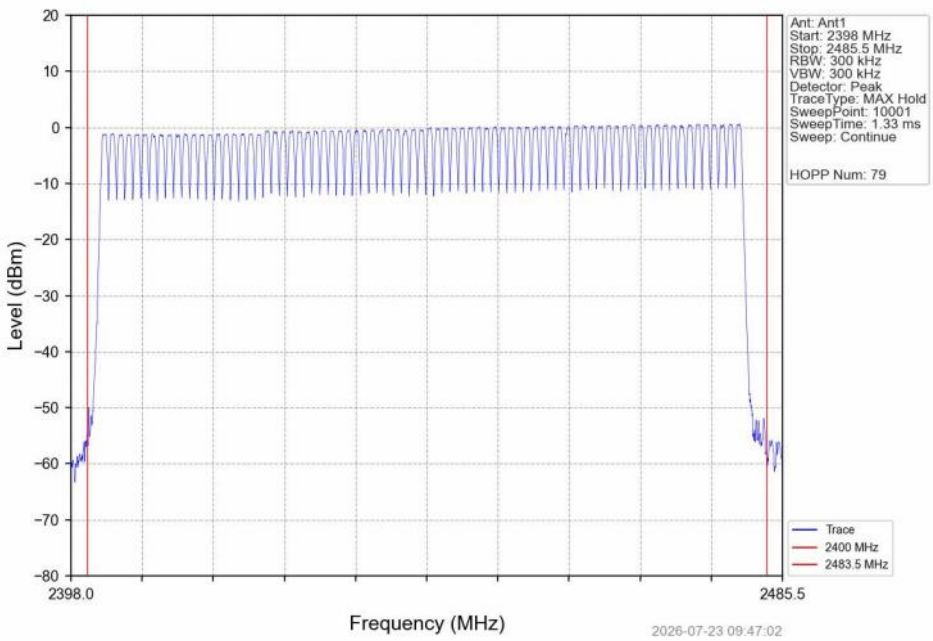
7.4. Number of Hopping Frequencies

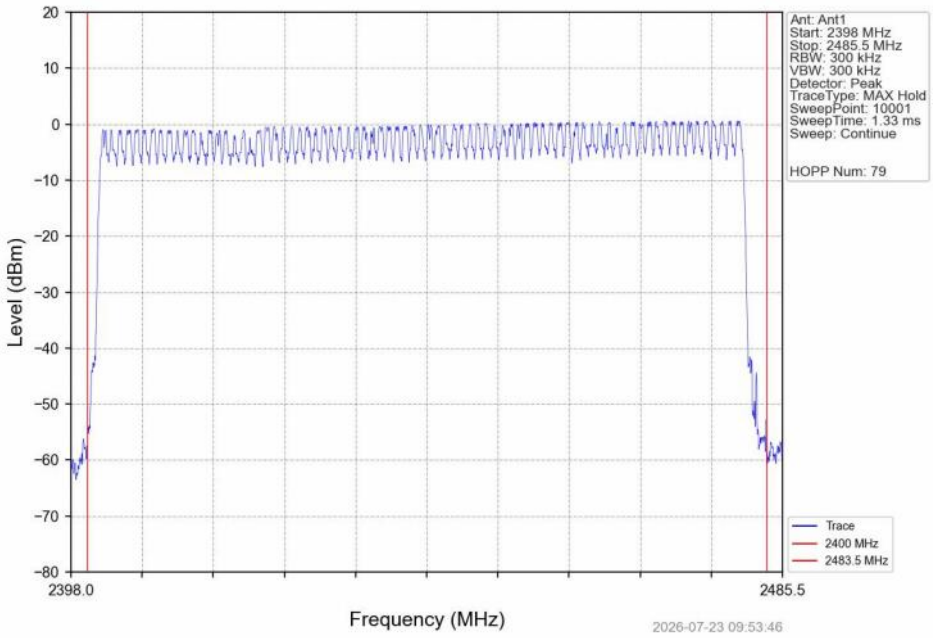
Test Result

HoppNum

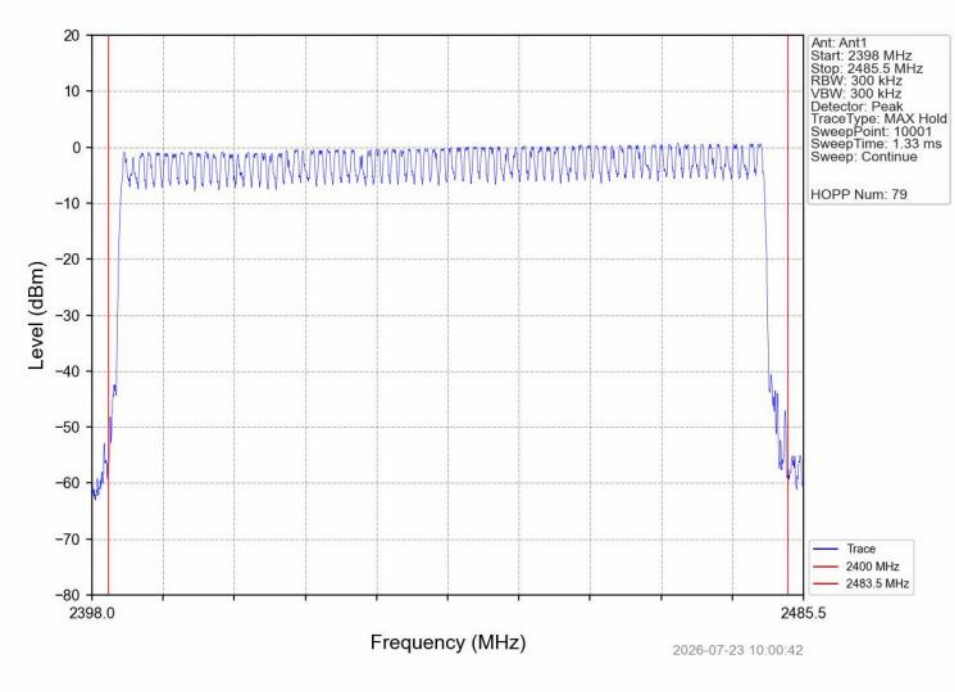
Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	>=15	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	79	>=15	Pass
8DPSK	SISO	HOPP	3DH5	79	>=15	Pass

Test Graph
HoppNum

GFSK_DH5_HOPP_Ant1_NTNV


Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV


8DPSK_3DH5_HOPP_Ant1_NTNV



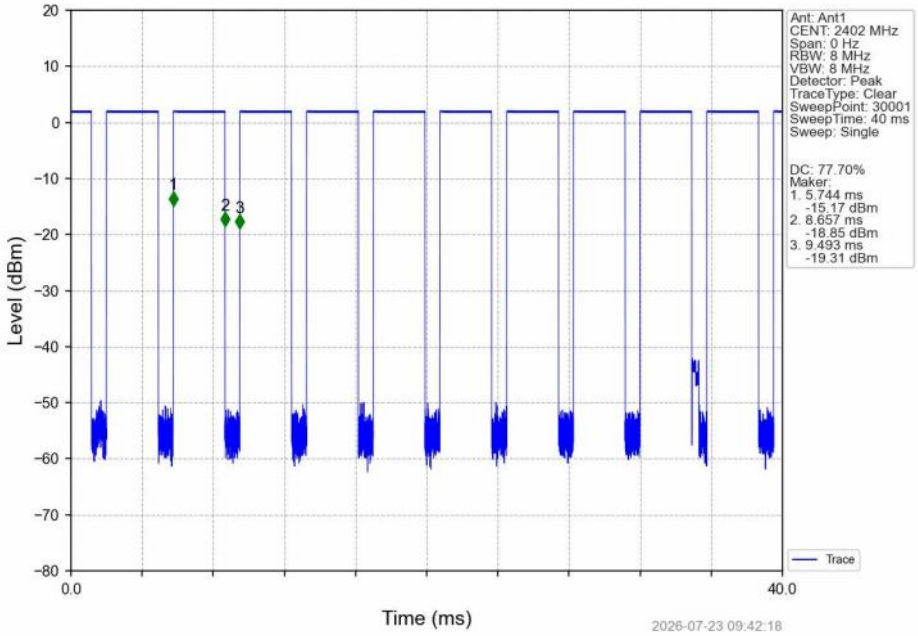
7.5. Duty Cycle

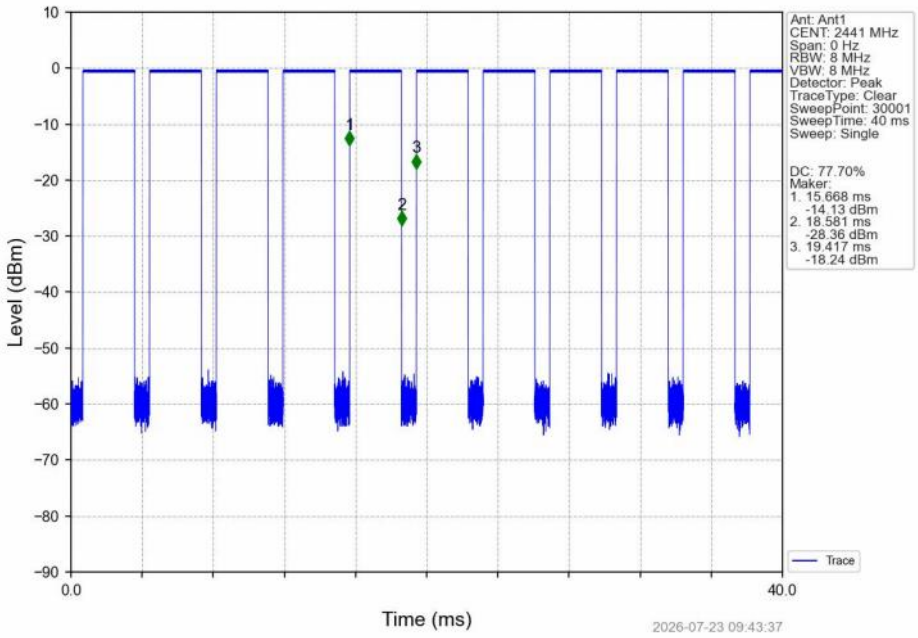
Test Result

Ant1

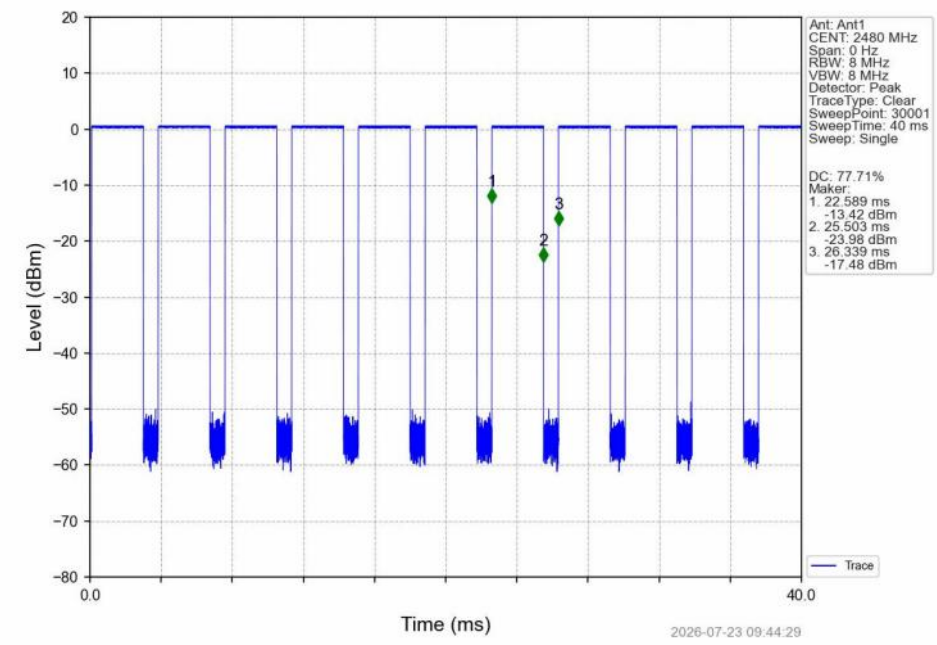
Ant1								
Mode	TX Type	Frequency (MHz)	Packet Type	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
GFSK	SISO	2402	DH5	2.913	3.749	77.70	1.10	0.04
		2441	DH5	2.913	3.749	77.70	1.10	0.04
		2480	DH5	2.914	3.750	77.71	1.10	0.04
Pi/4DQPSK	SISO	2402	2DH5	2.919	3.749	77.86	1.09	0.03
		2441	2DH5	2.920	3.749	77.89	1.09	0.01
		2480	2DH5	2.920	3.749	77.89	1.09	0.03
8DPSK	SISO	2402	3DH5	2.921	3.750	77.89	1.08	0.01
		2441	3DH5	2.921	3.749	77.91	1.08	0.01
		2480	3DH5	2.921	3.749	77.91	1.08	0.01

Test Graph
Ant1

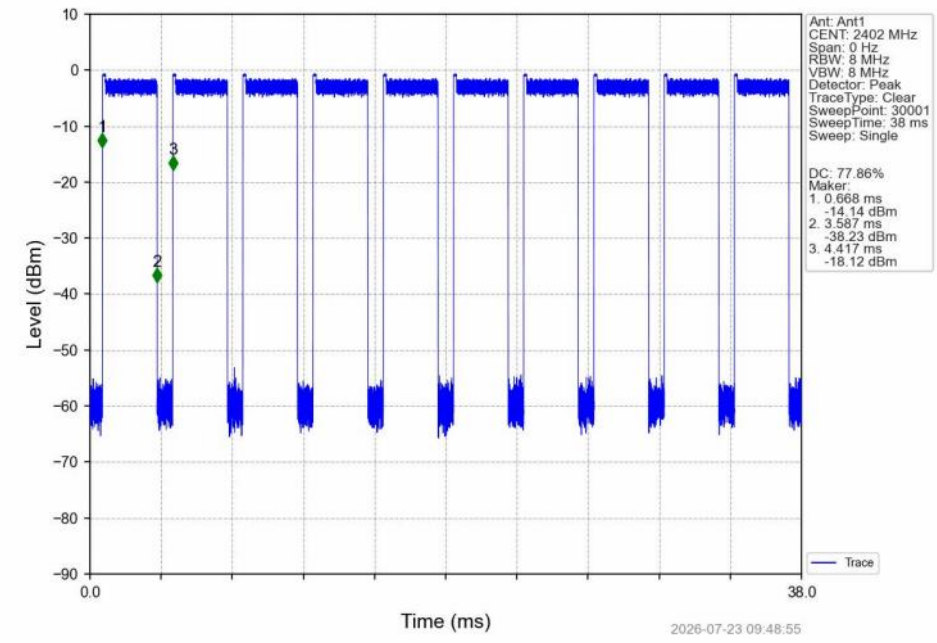
GFSK_DH5_LCH_2402MHz_Ant1_NTNV


GFSK_DH5_MCH_2441MHz_Ant1_NTNV


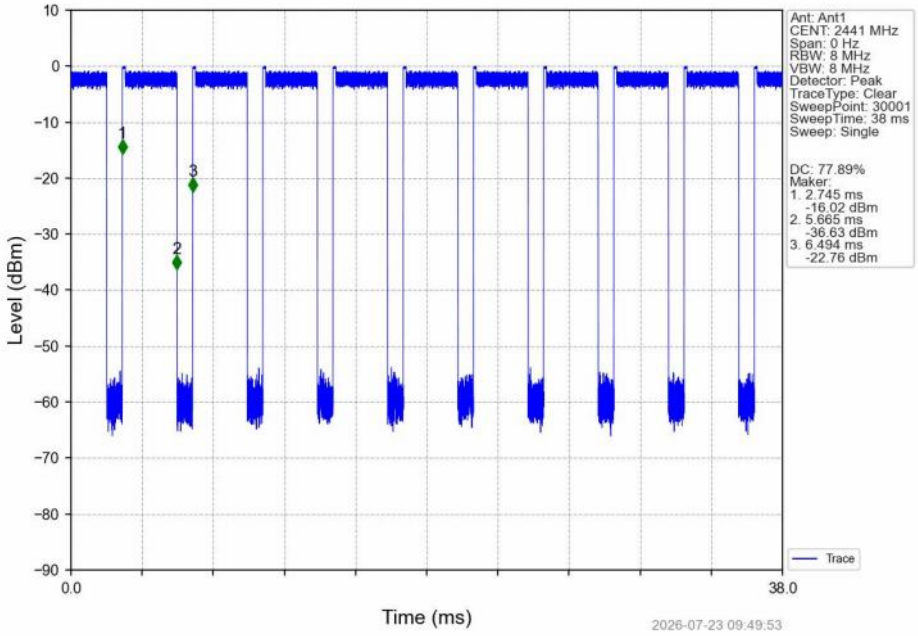
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



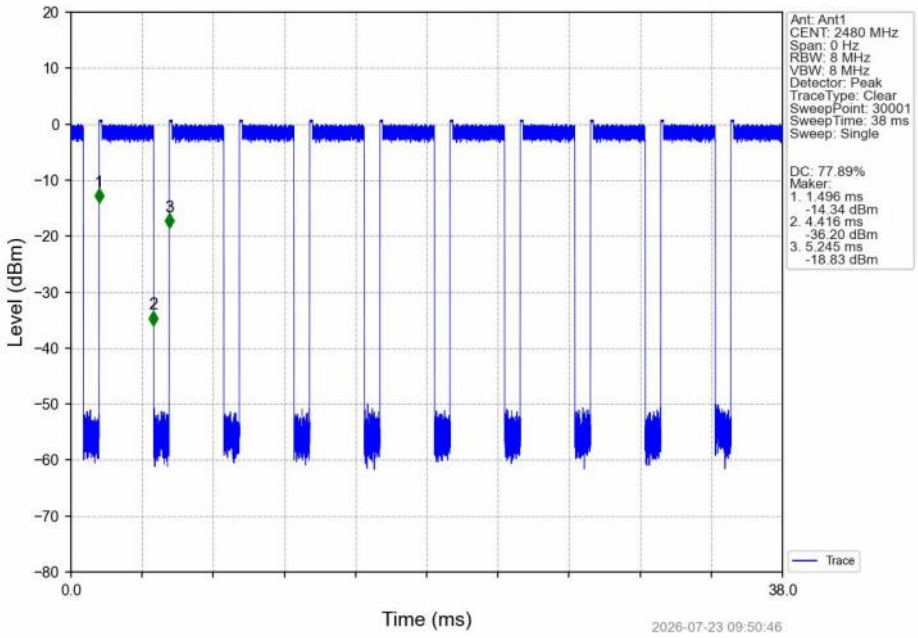
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



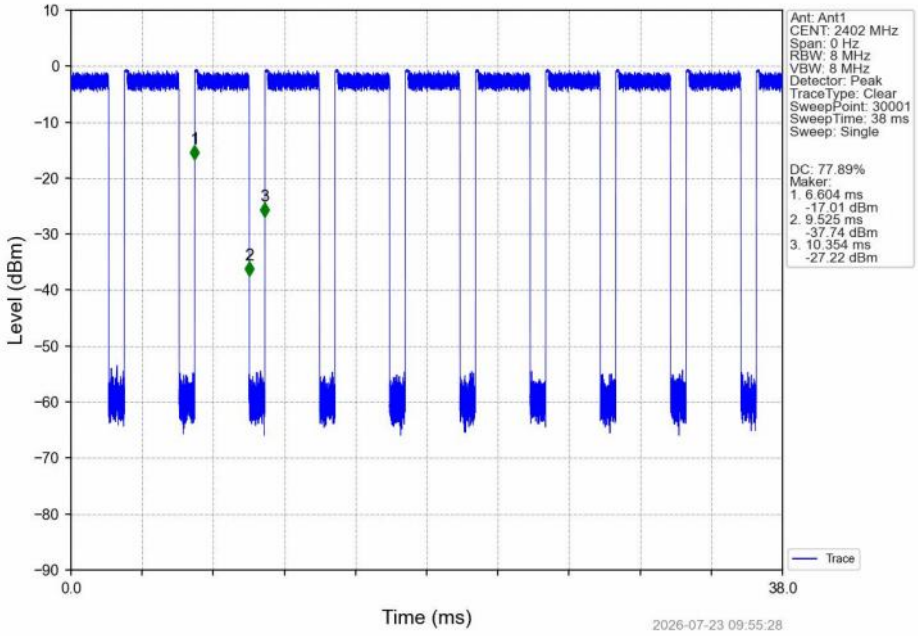
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



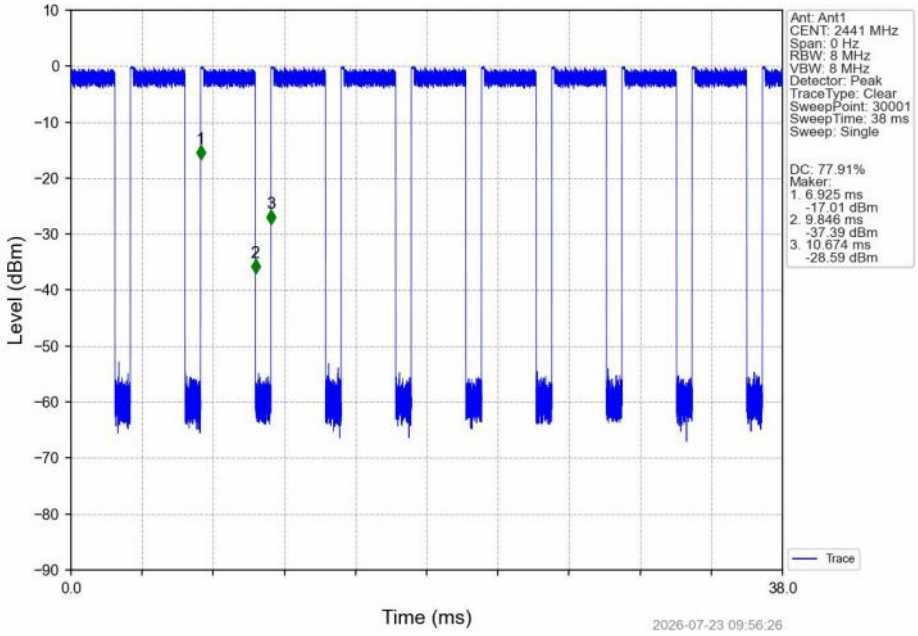
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



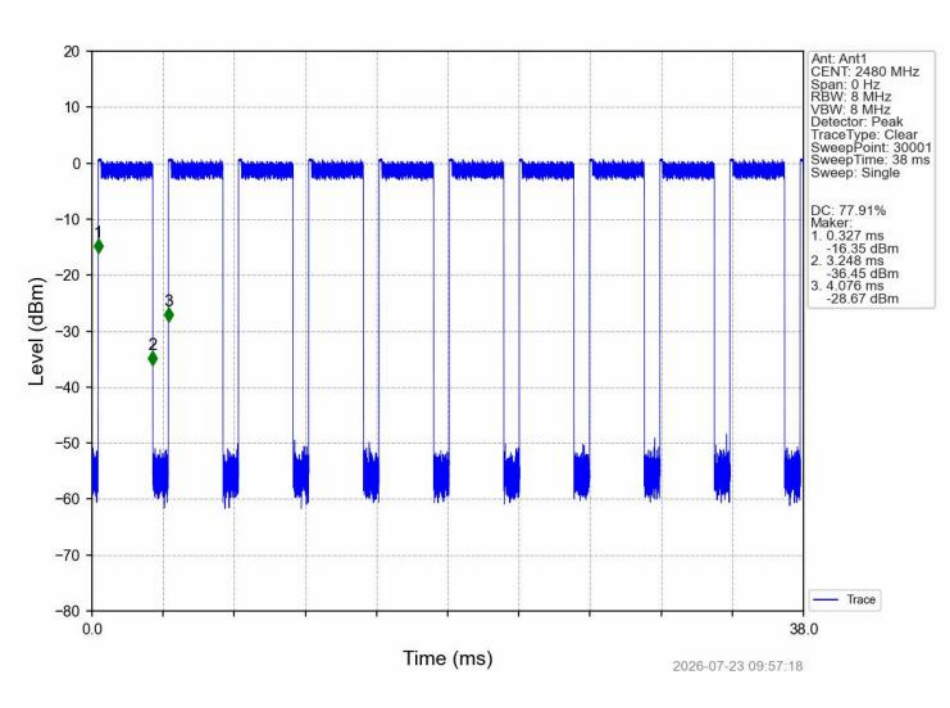
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



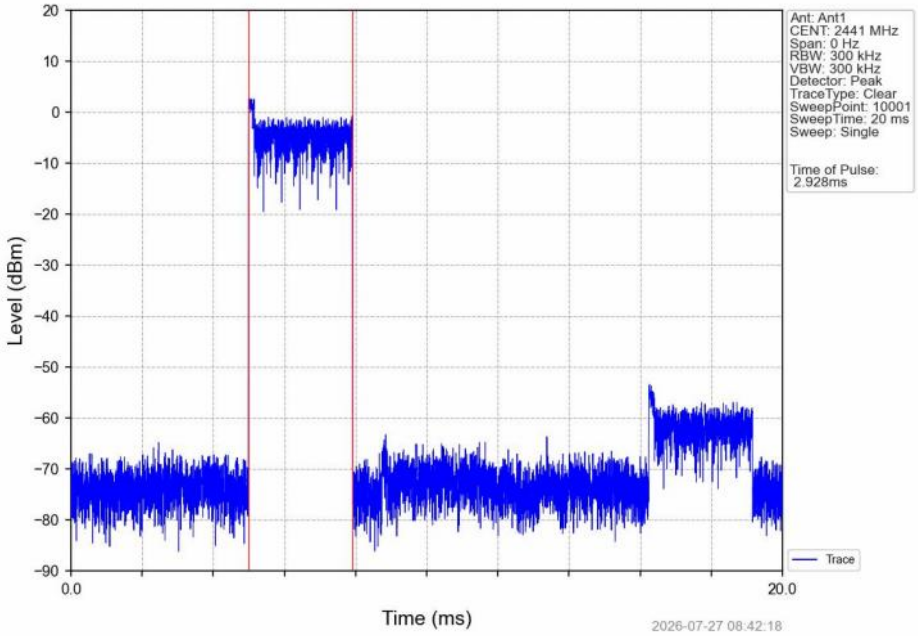
7.6. Time of Occupancy (Dwell Time)

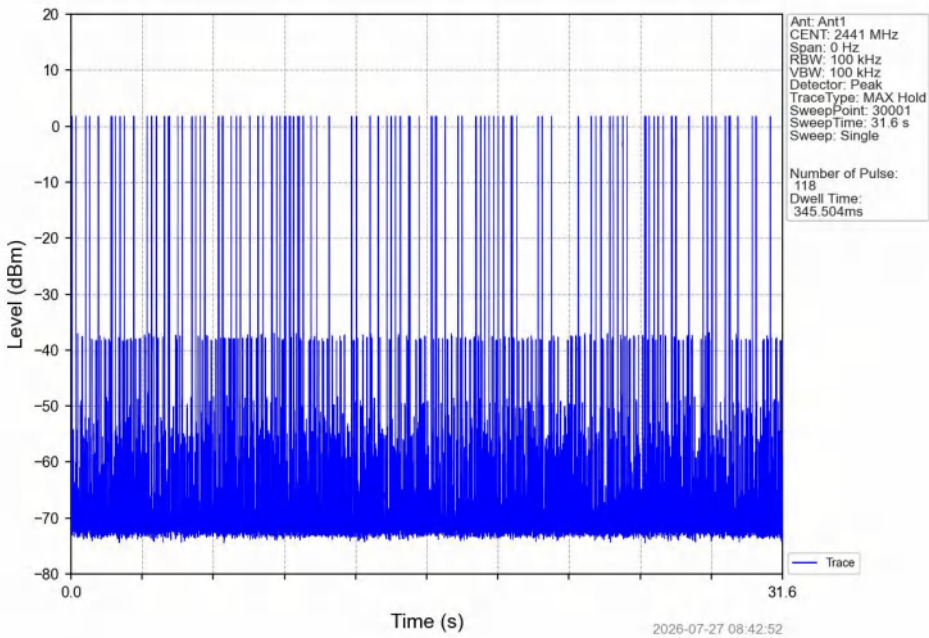
Test Result

Ant1

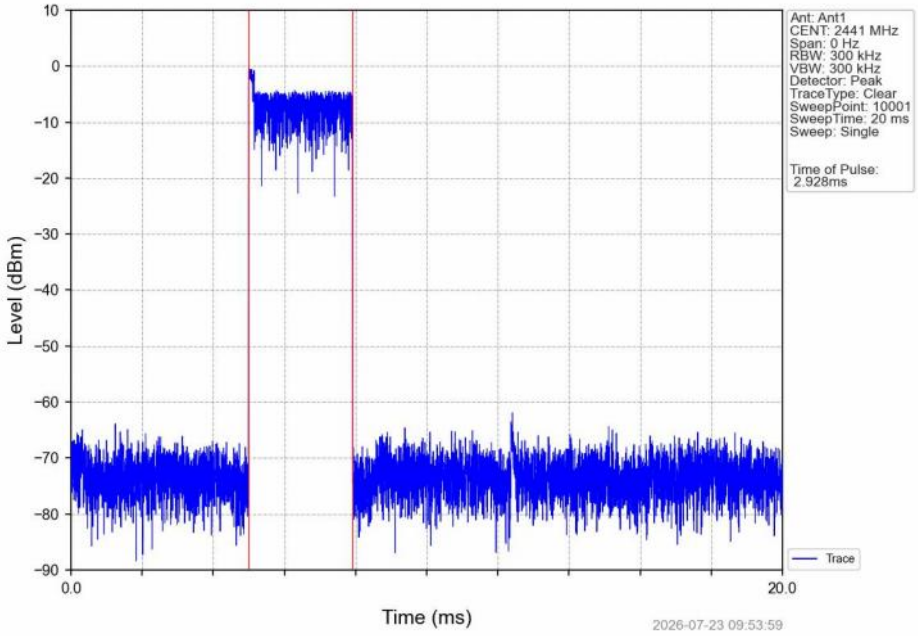
Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH5	2.928	31.600	118	345.504	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	2.928	31.600	117	342.576	<=400	Pass
8DPSK	SISO	HOPP	3DH5	2.924	31.600	107	312.868	<=400	Pass

Test Graph
Ant1

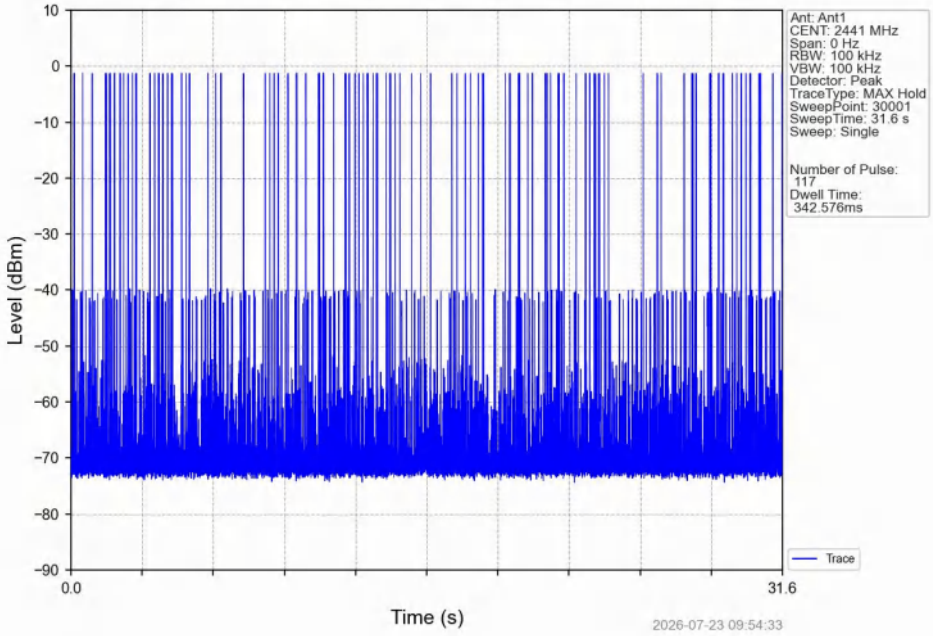
GFSK_DH5_HOPP_Ant1_NTNV


GFSK_DH5_HOPP_Ant1_NTNV


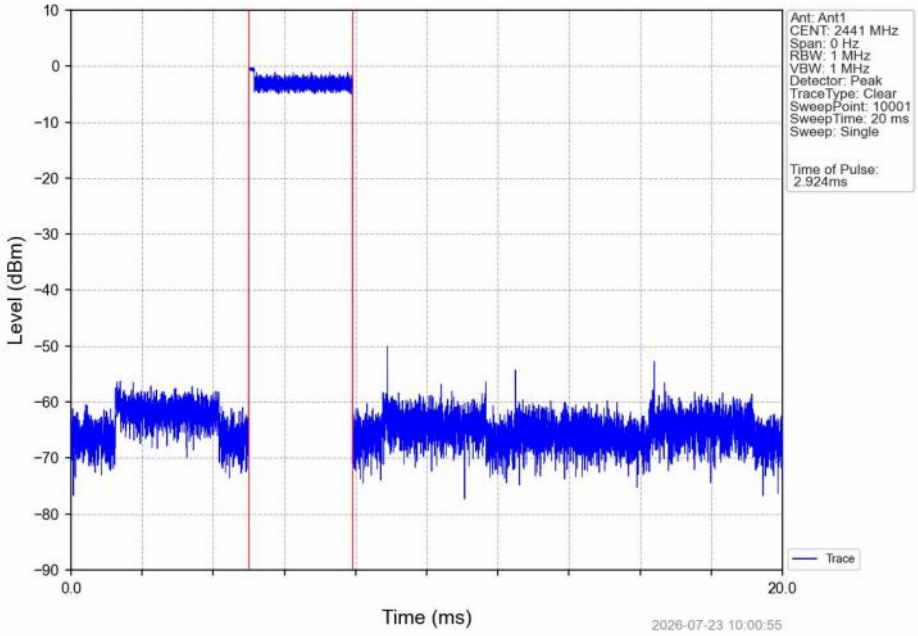
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



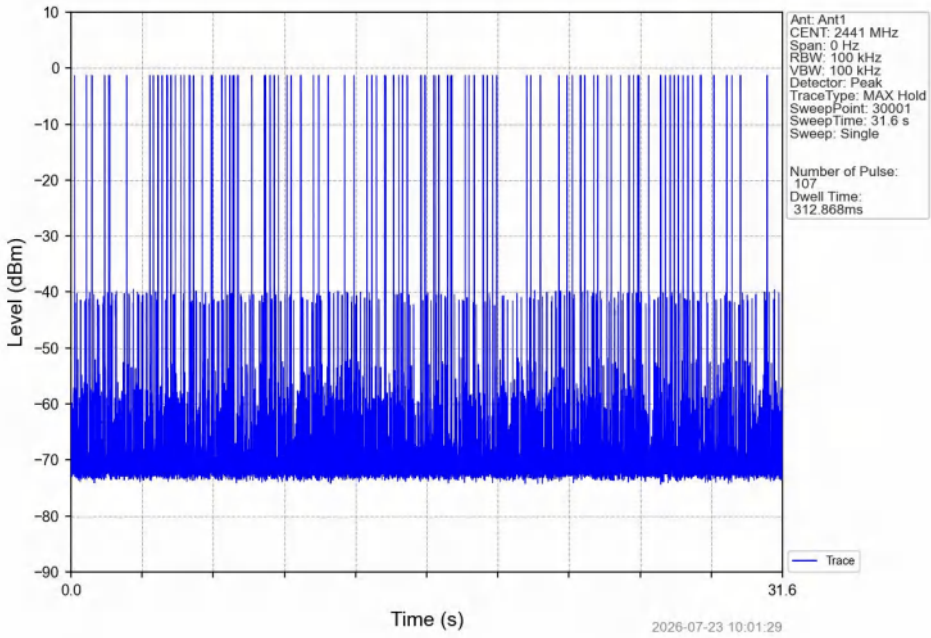
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



7.7. Conducted Spurious & Band Edge Emission

Test Result

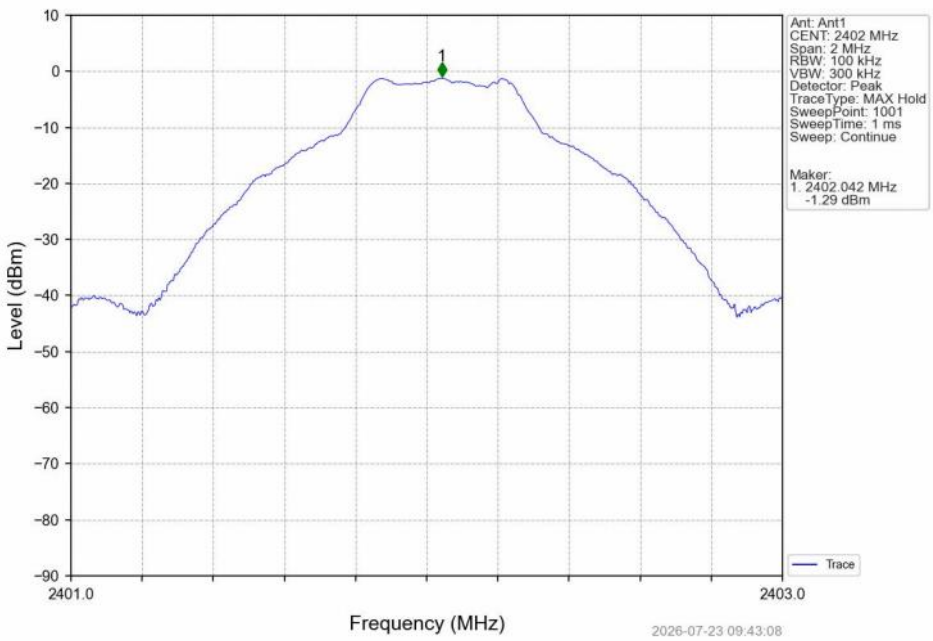
Reference

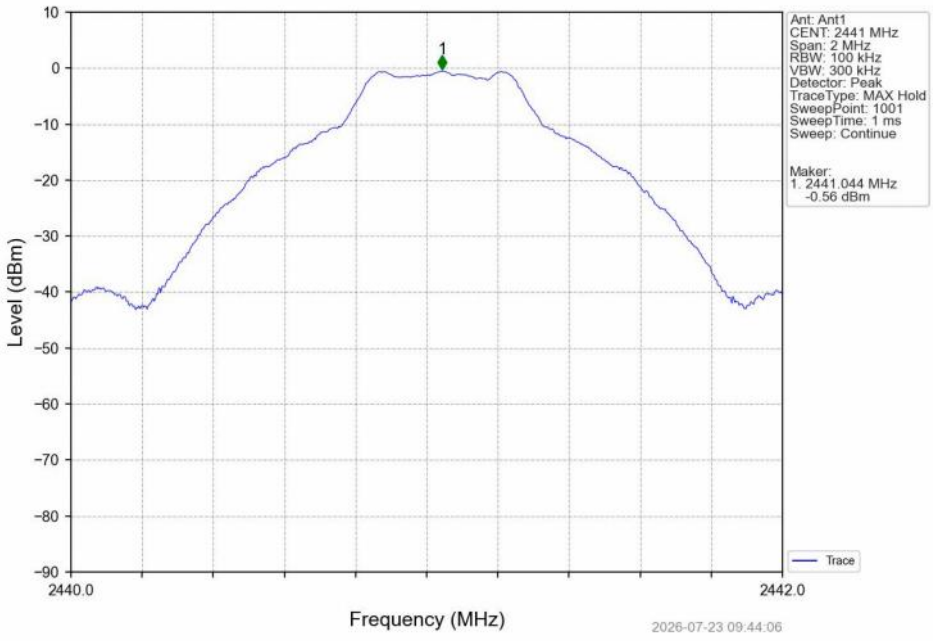
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-1.29
		2441	DH5	1	-0.56
		2480	DH5	1	0.38
Pi/4DQPSK	SISO	2402	2DH5	1	-0.94
		2441	2DH5	1	-0.32
		2480	2DH5	1	0.53
8DPSK	SISO	2402	3DH5	1	-0.94
		2441	3DH5	1	-0.34
		2480	3DH5	1	0.50

Conduct suppose emission

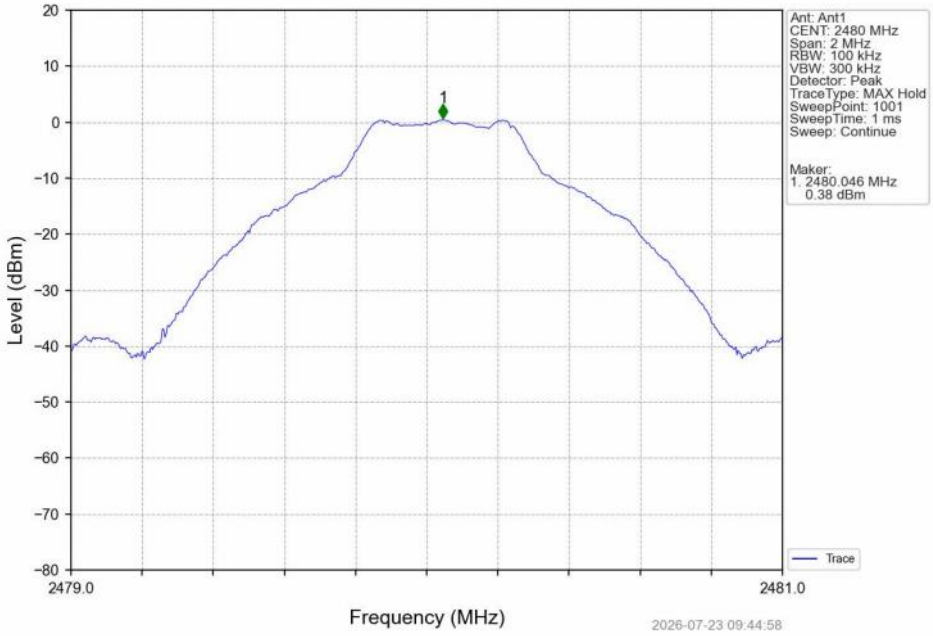
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	0.38	-19.62	Pass
		2441	DH5	1	0.38	-19.62	Pass
		2480	DH5	1	0.38	-19.62	Pass
		HOPP	DH5	1	0.38	-19.62	Pass
					0.38	-19.62	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	0.53	-19.47	Pass
		2441	2DH5	1	0.53	-19.47	Pass
		2480	2DH5	1	0.53	-19.47	Pass
		HOPP	2DH5	1	0.53	-19.47	Pass
					0.53	-19.47	Pass
8DPSK	SISO	2402	3DH5	1	0.50	-19.50	Pass
		2441	3DH5	1	0.50	-19.50	Pass
		2480	3DH5	1	0.50	-19.50	Pass
		HOPP	3DH5	1	0.50	-19.50	Pass
					0.50	-19.50	Pass

Test Graph
Reference

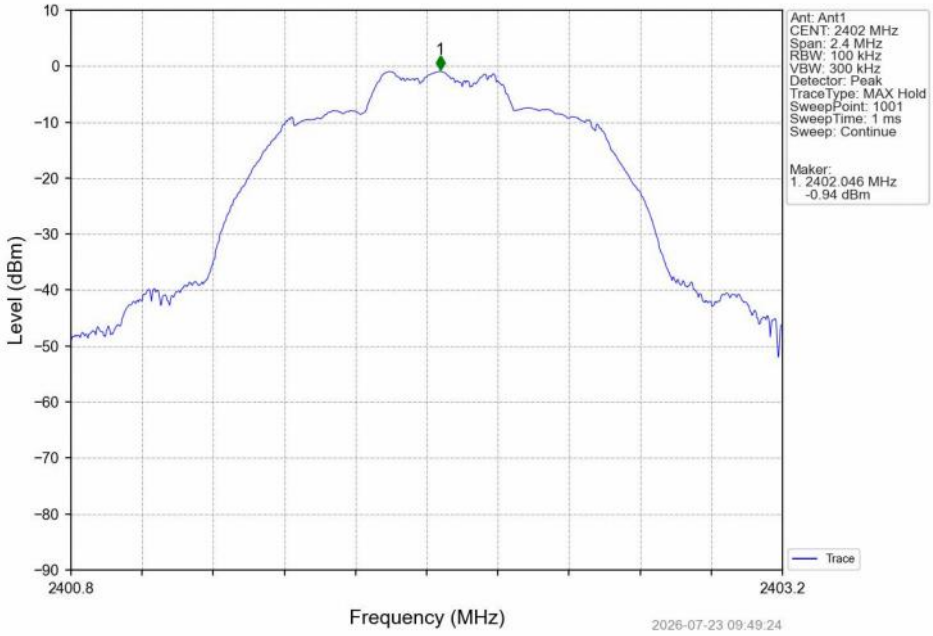
GFSK_DH5_LCH_2402MHz_Ant1_NTNV


GFSK_DH5_MCH_2441MHz_Ant1_NTNV


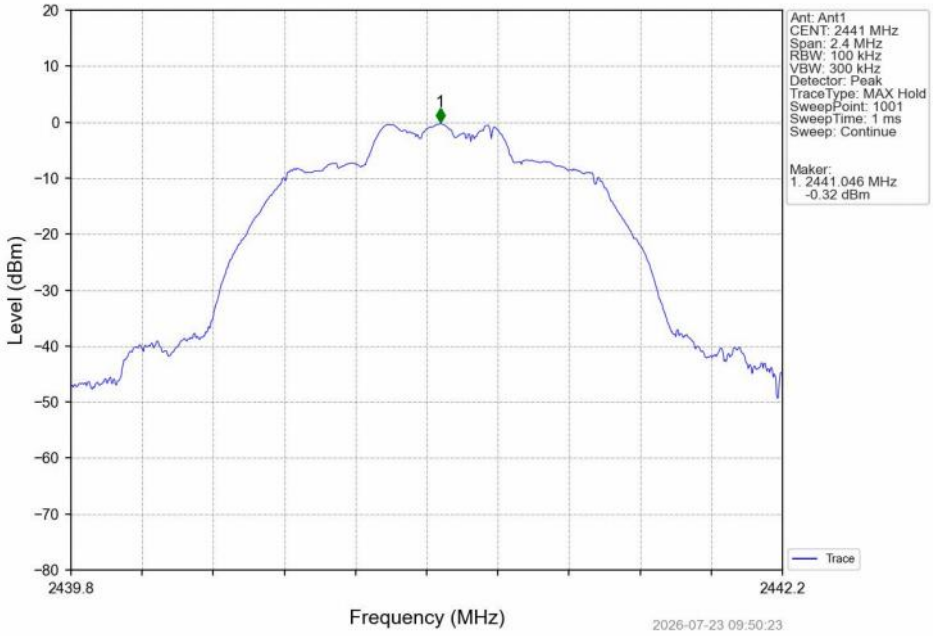
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



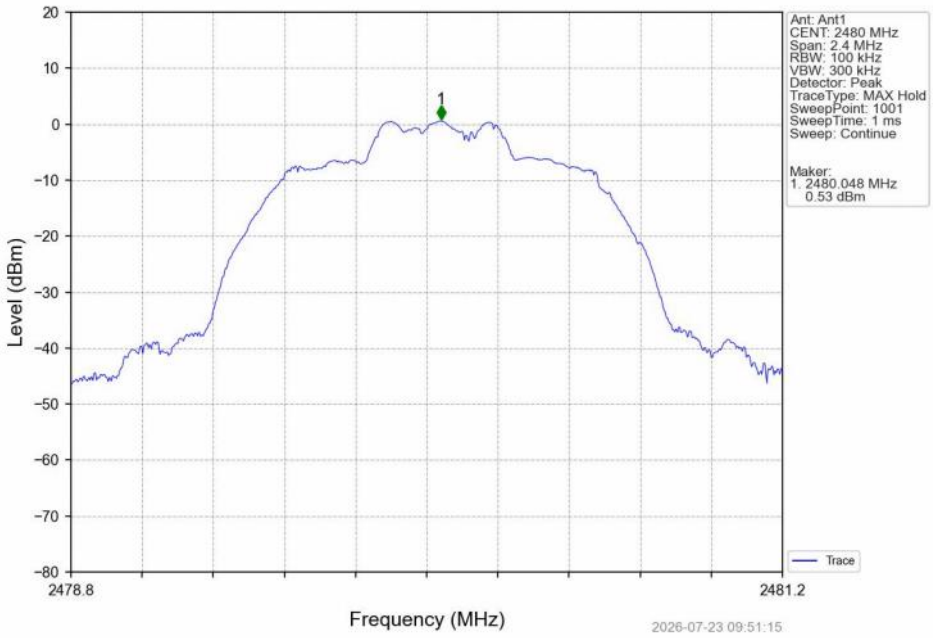
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



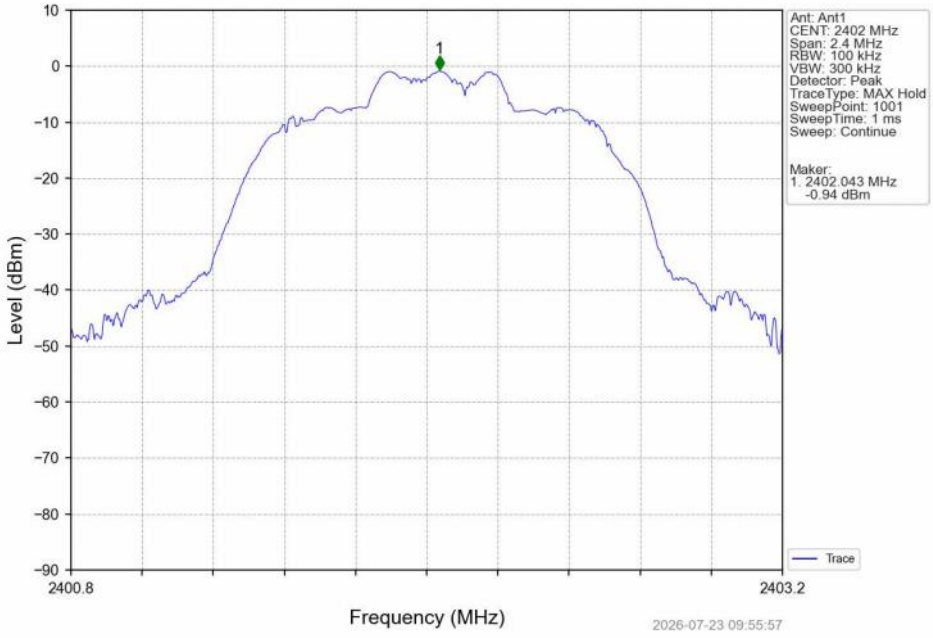
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



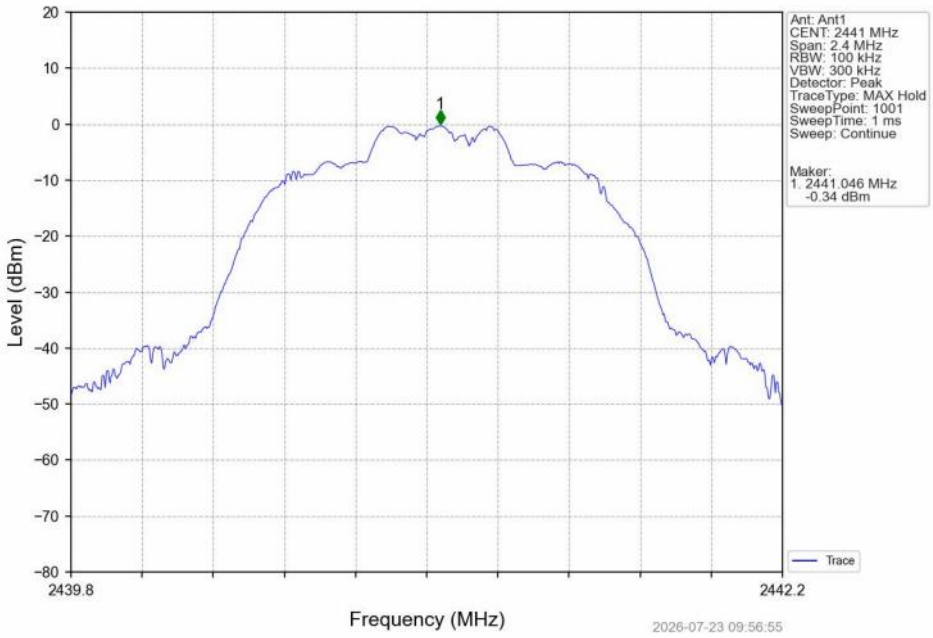
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



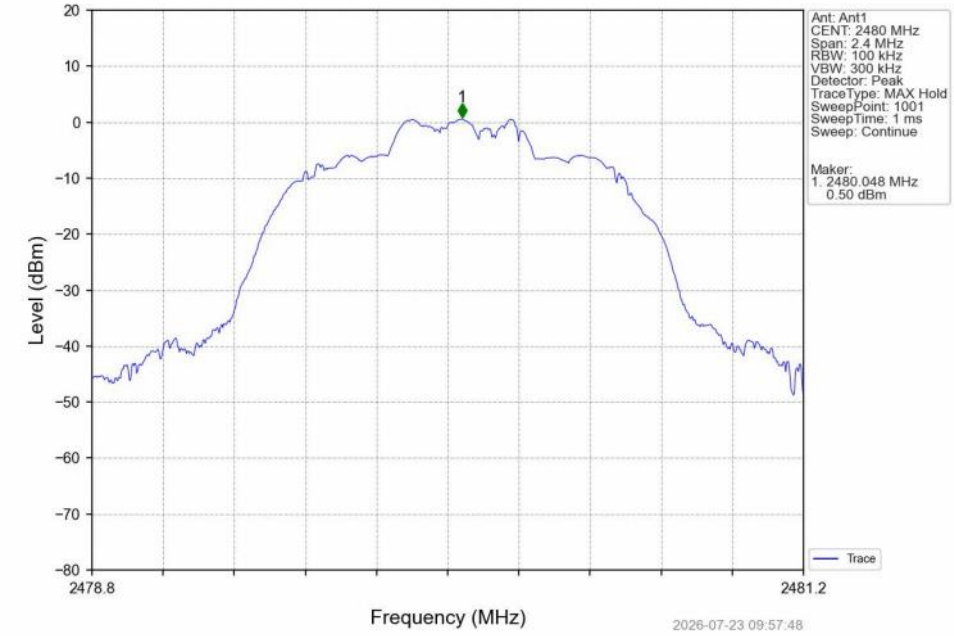
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



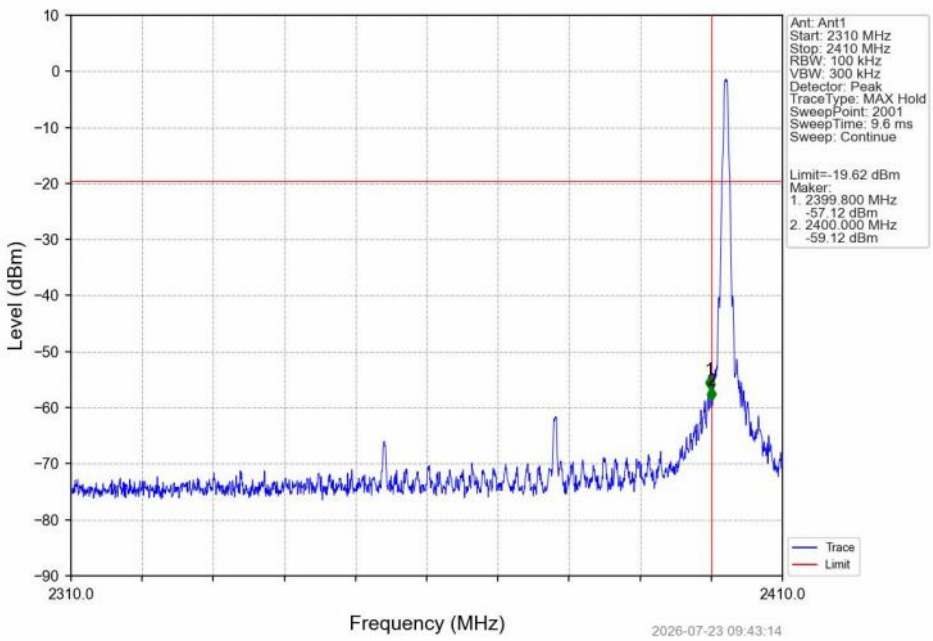
8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



Conduct suppose emission

GFSK_DH5_LCH_2402MHz_Ant1_NTNV


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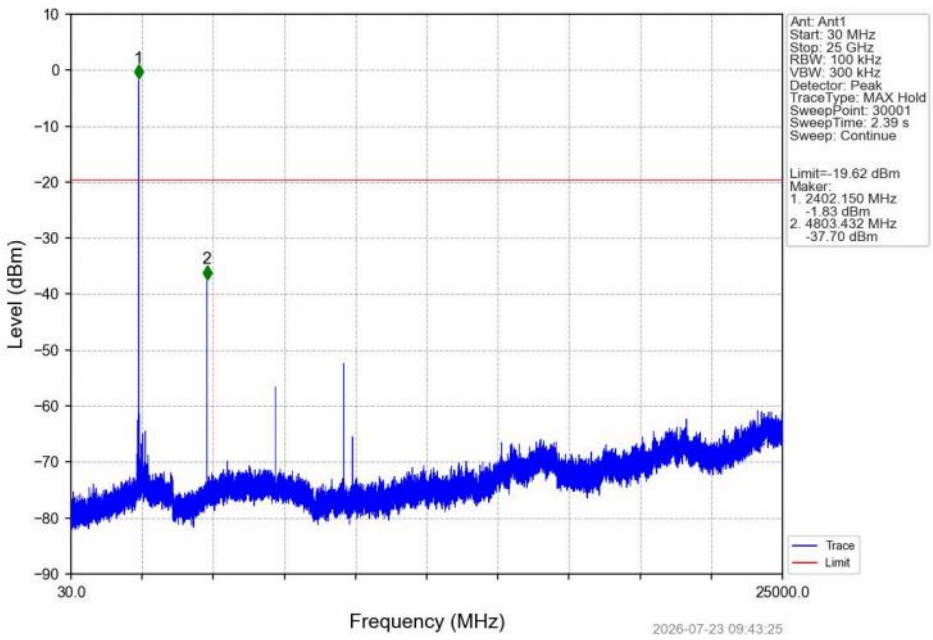
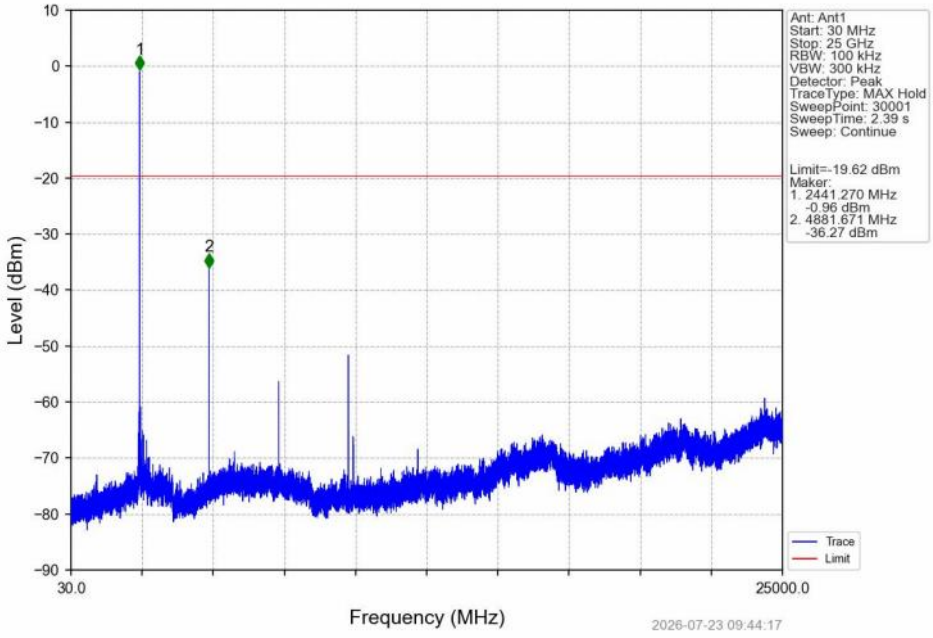


GFSK_DH5_MCH_2441MHz_Ant1_NTNV



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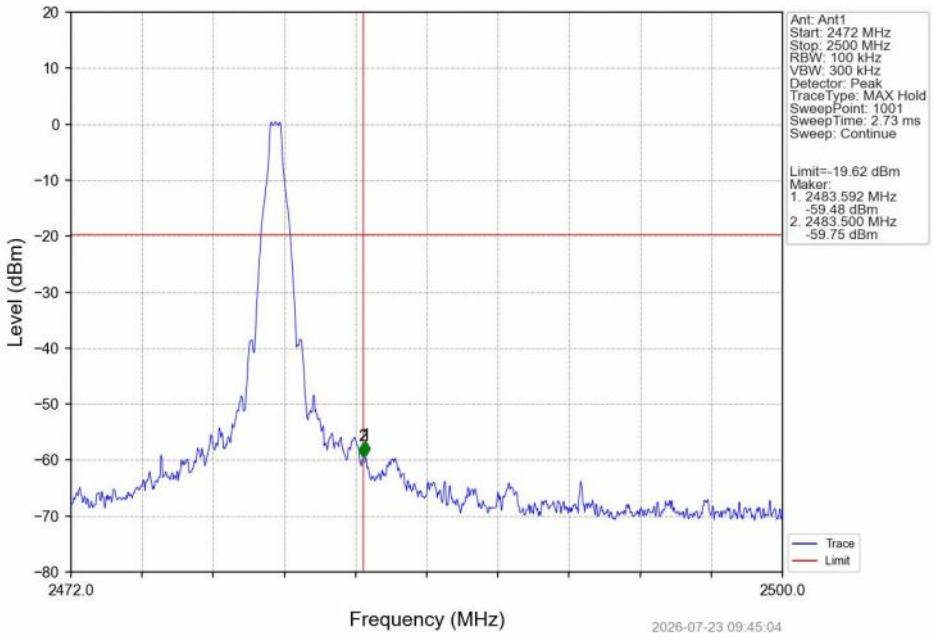
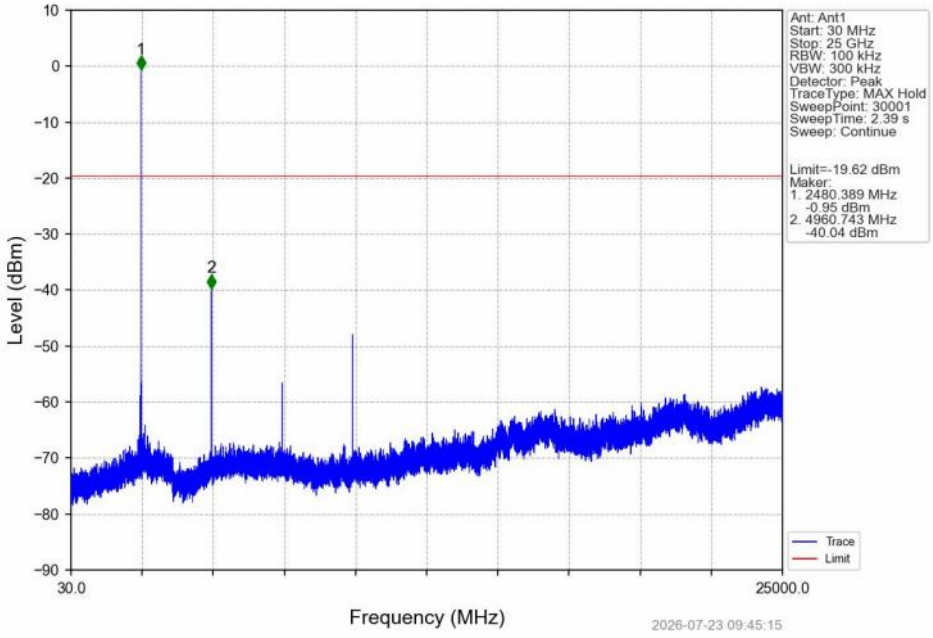
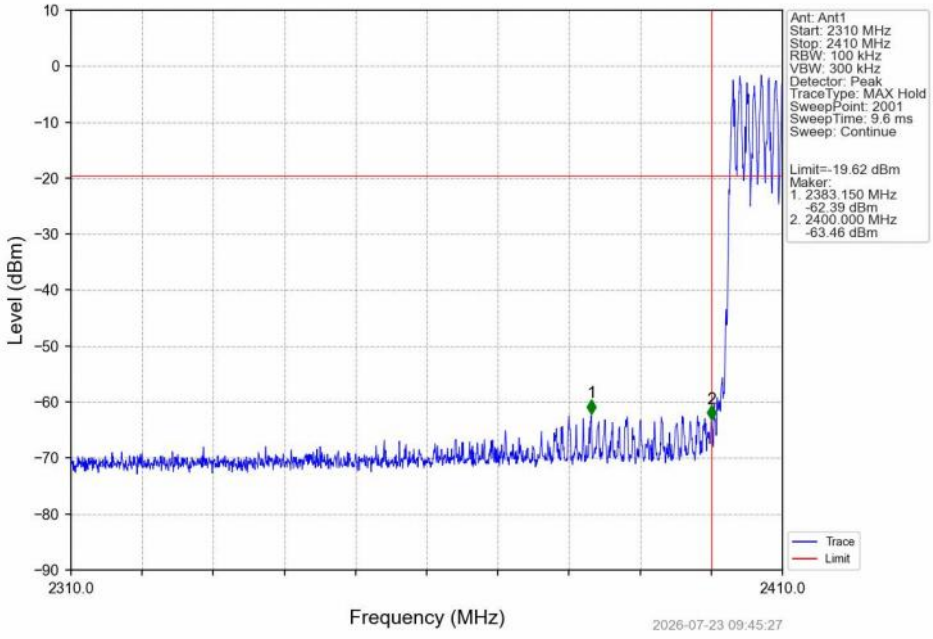


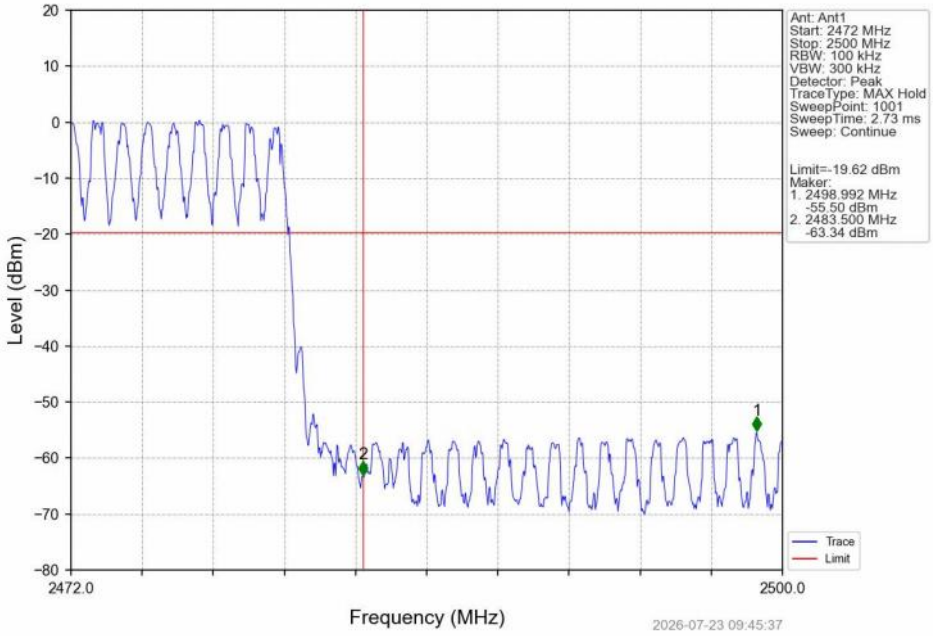
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



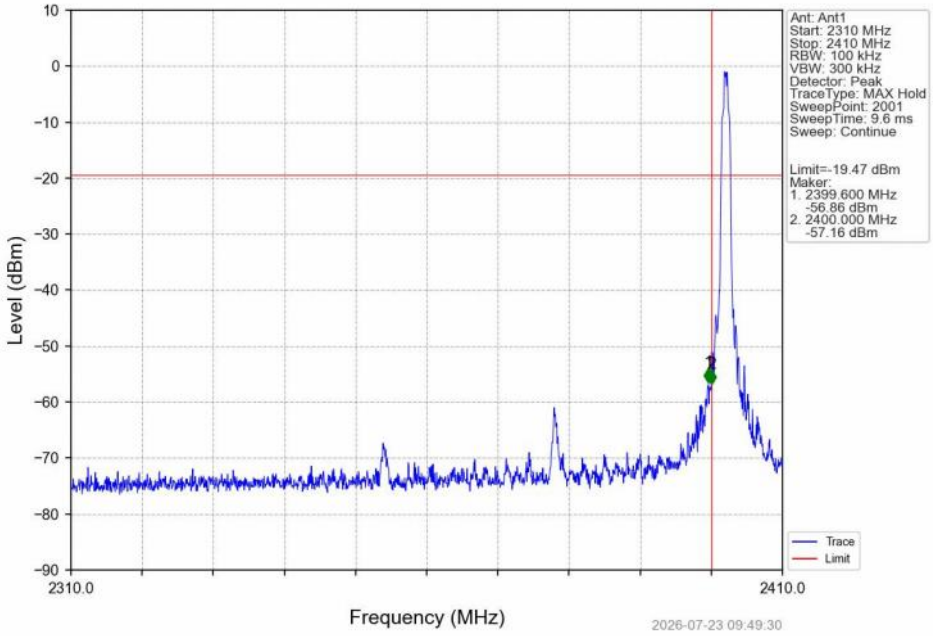
GFSK_DH5_HOPP_Ant1_NTNV



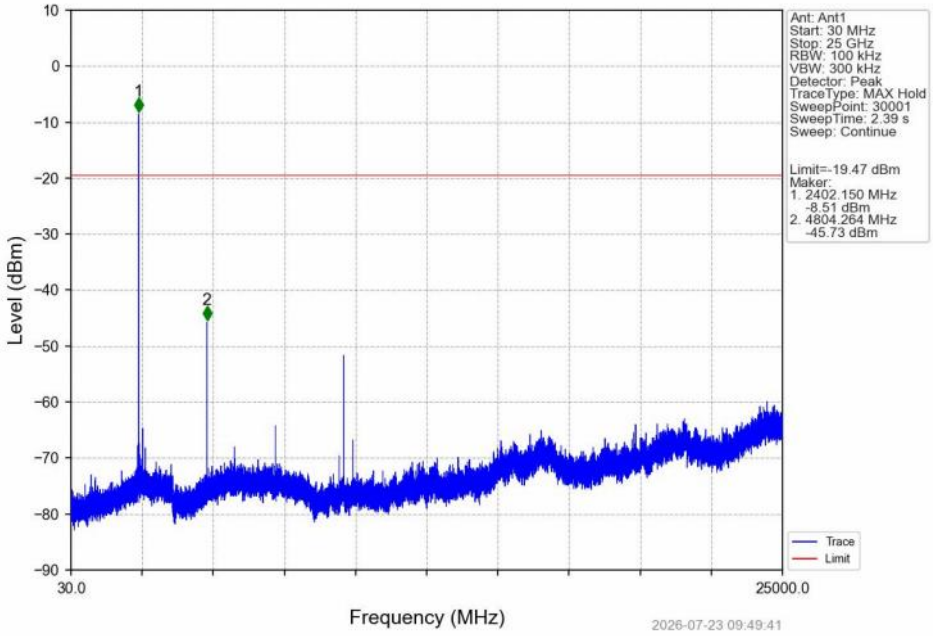
GFSK_DH5_HOPP_Ant1_NTNV



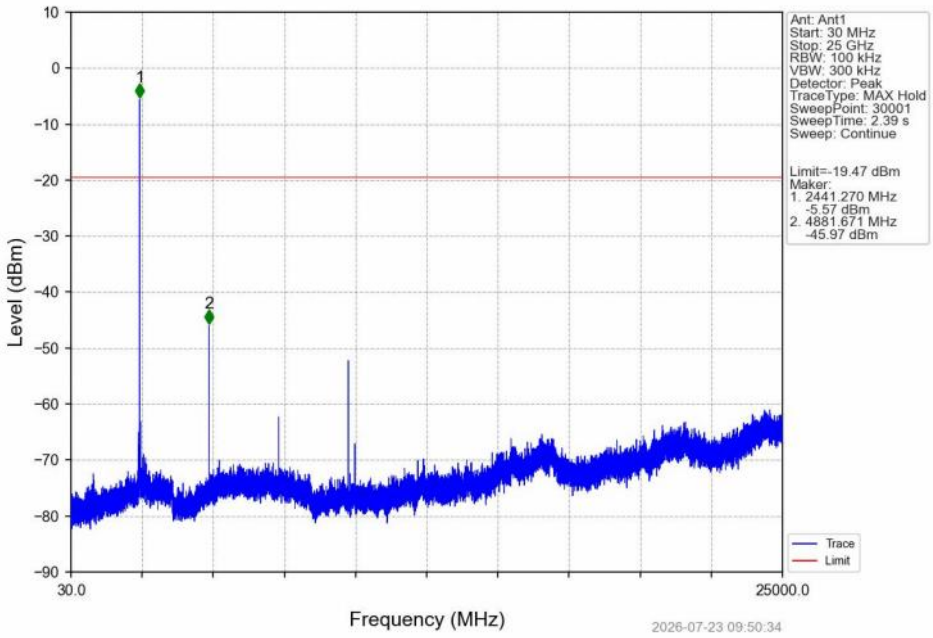
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



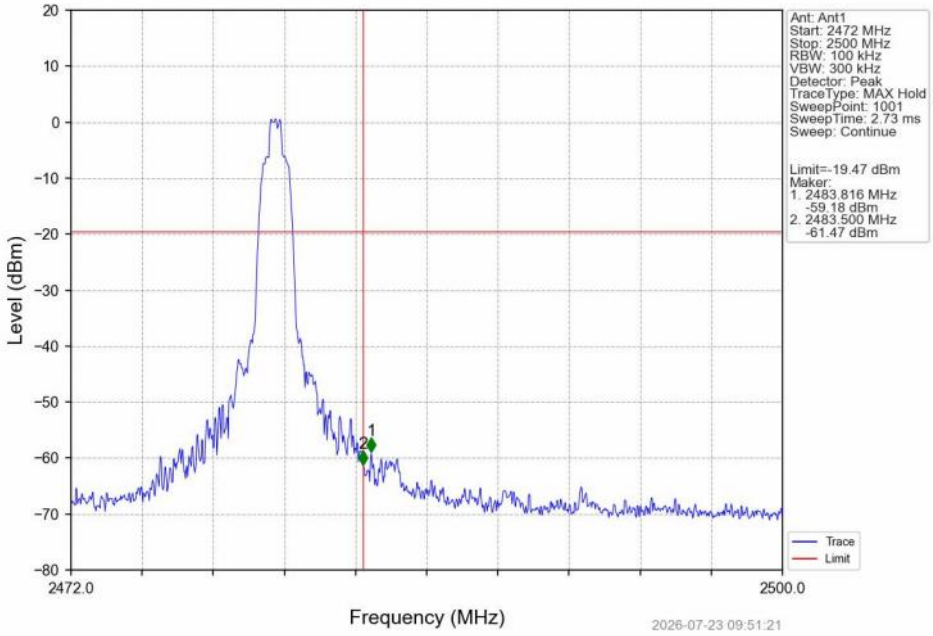
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



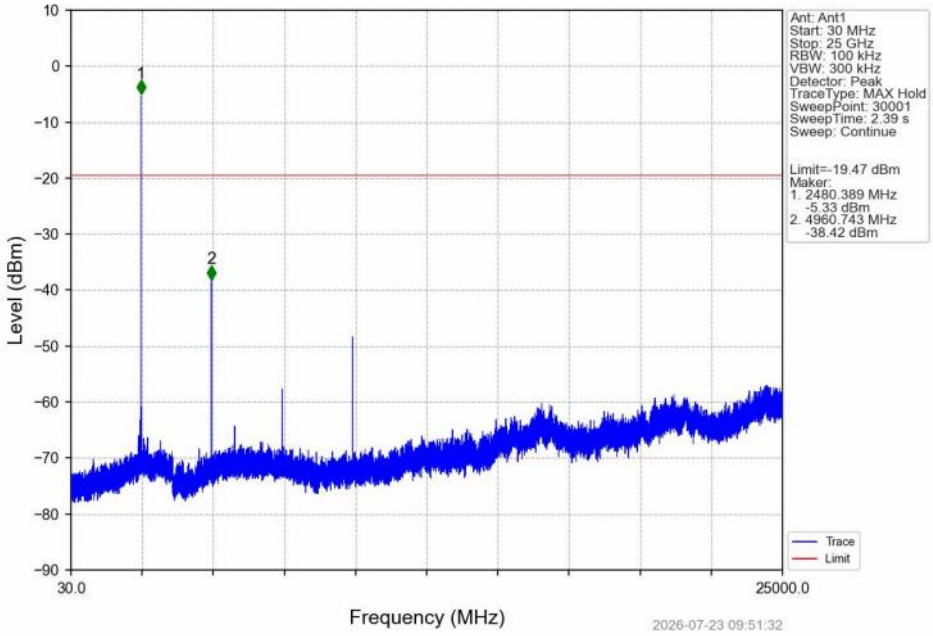
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



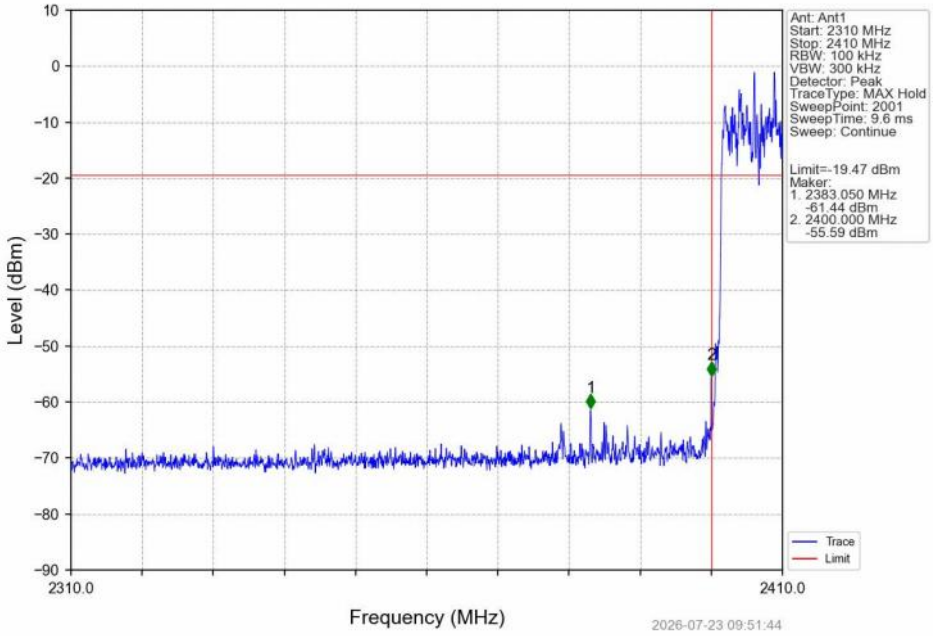
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



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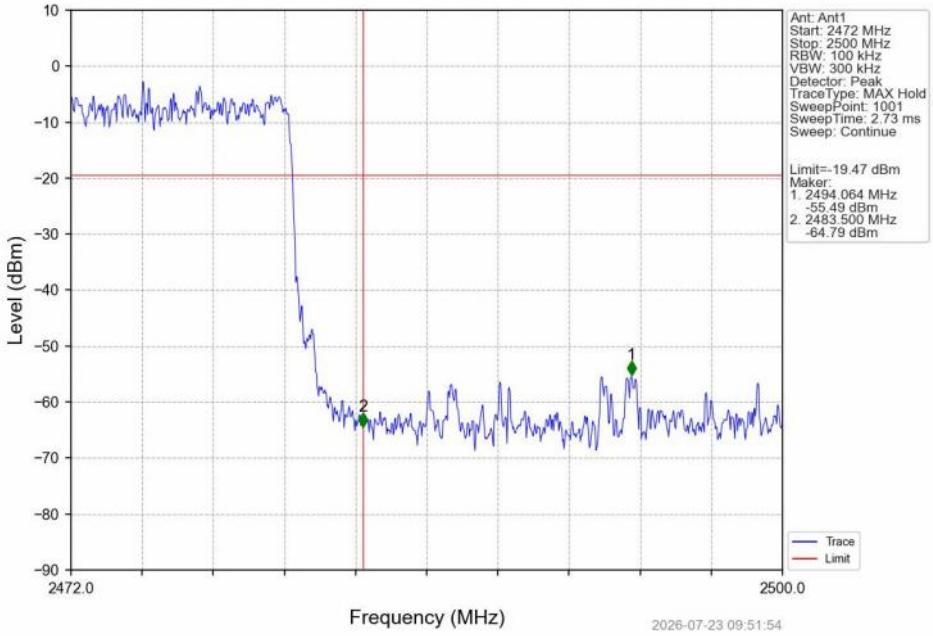
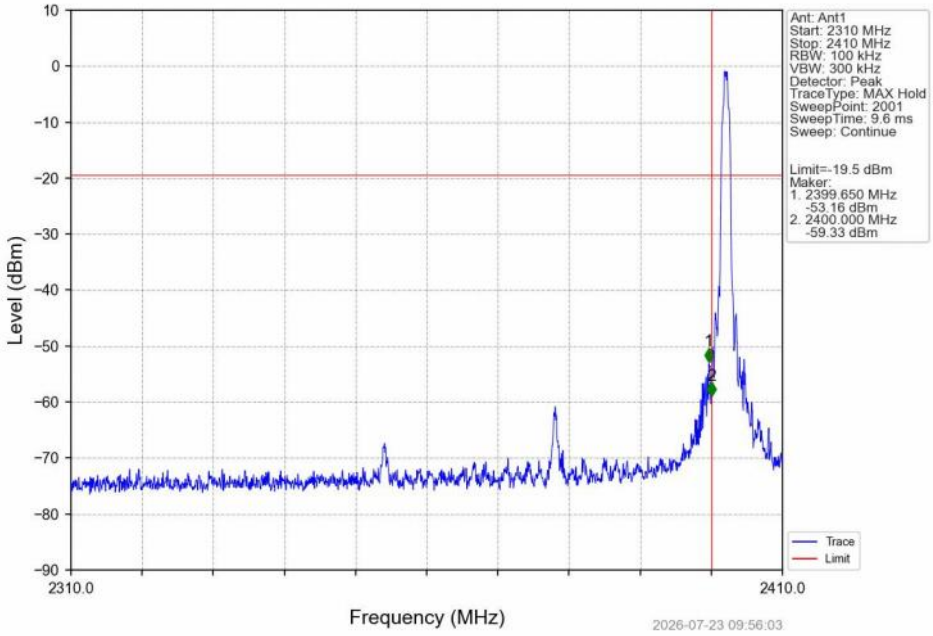
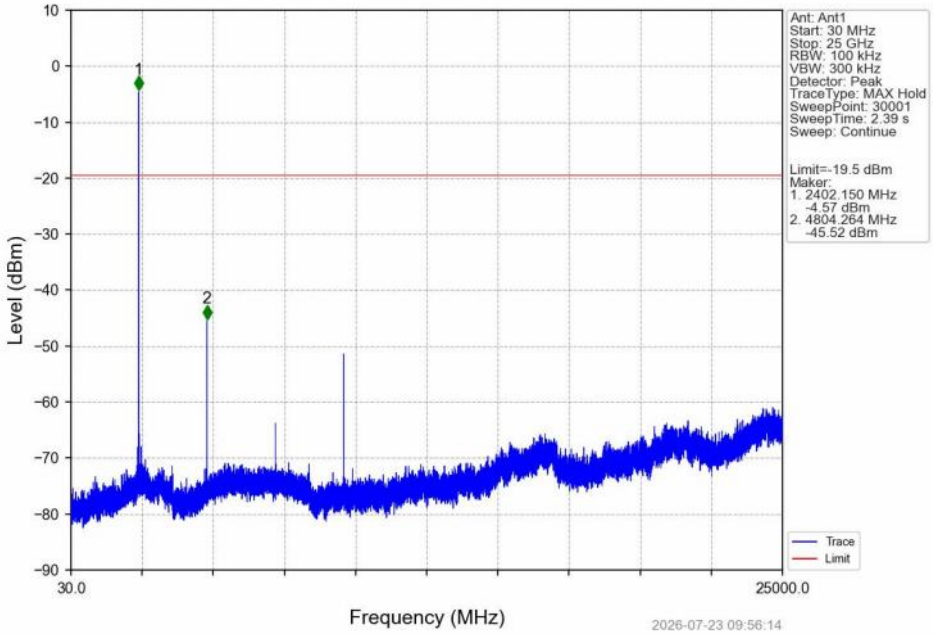


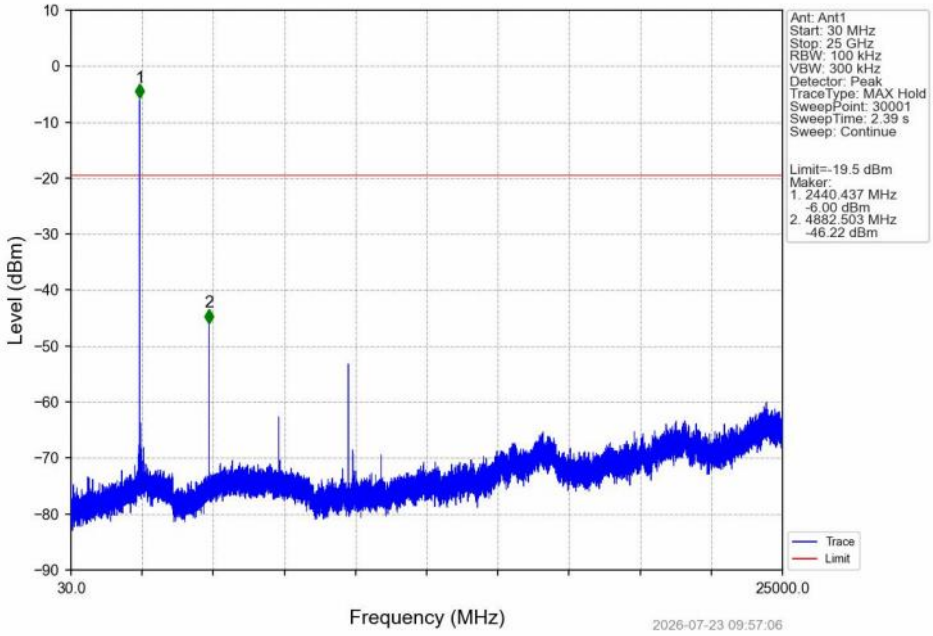
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



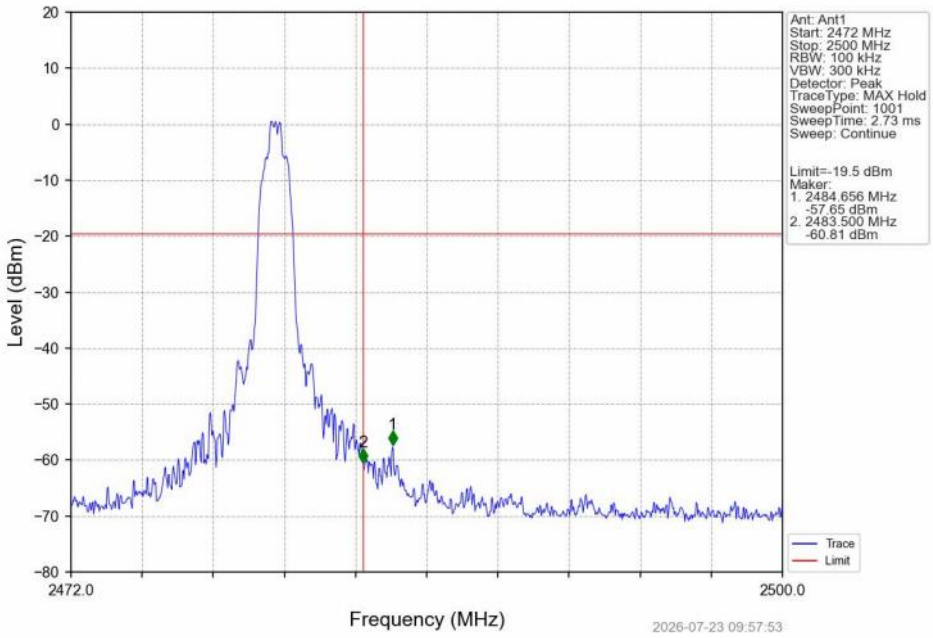
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



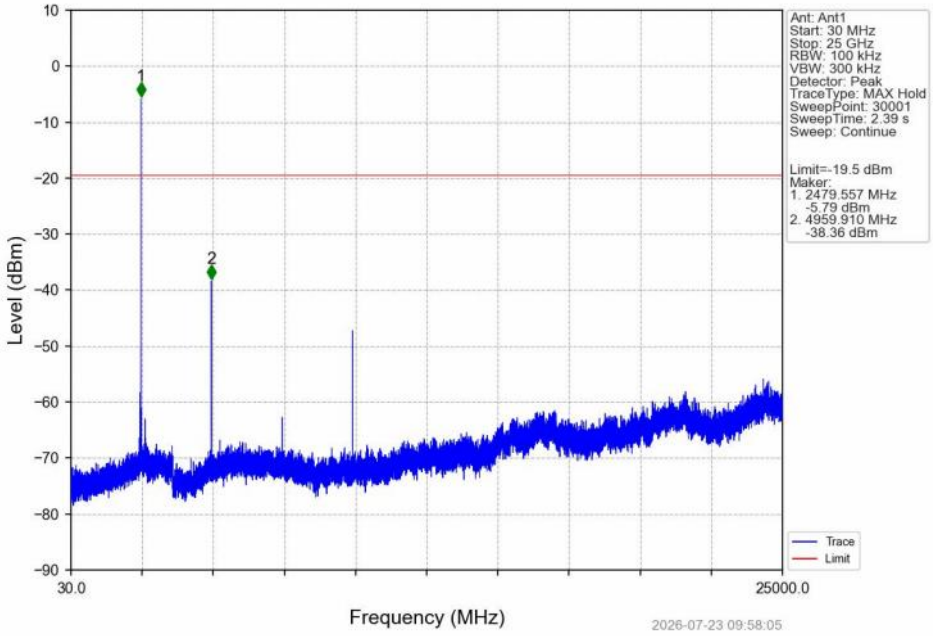
8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



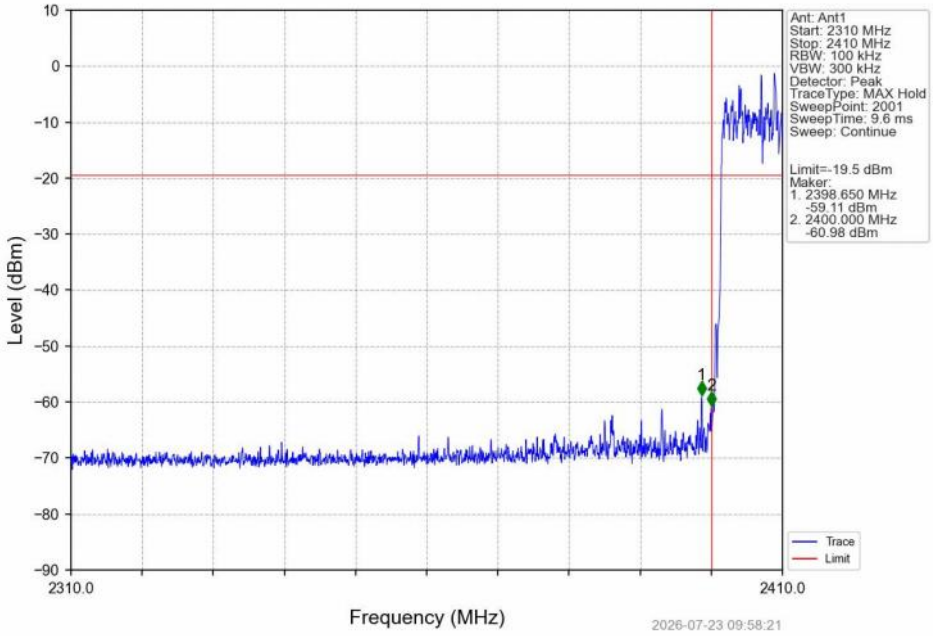
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



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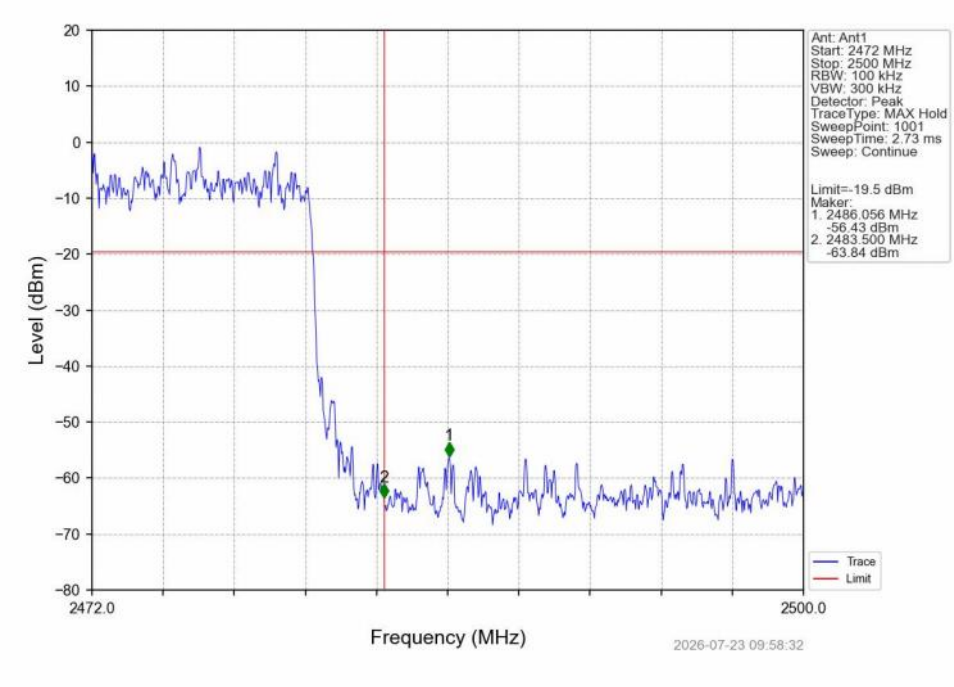

------End of the report-----