TEST REPORT

Report No.	CISRR250617180
Project No.	CISR250617180
FCC ID	2BGWM-DUBUDS-S108
Applicant	Shenzhen Jiangyang Supply Chain Management Co., Ltd.
Address	5th Floor, Tongsheng Shareholding Company Office Building Huafan Road, Tongsheng Community, Dalang Subdistrict, Longhua District, Shenzhen
Manufacturer	Shenzhen Jiangyang Supply Chain Management Co., Ltd.
Address	5th Floor, Tongsheng Shareholding Company Office Building Huafan Road, Tongsheng Community, Dalang Subdistrict, Longhua District, Shenzhen
Product Name	Xiaodu Smart Open Ear Headphones S108
Trademark	Xiaodu
Model/Type reference	dubuds S108
Listed Model(s)	N/A
Standard	47 CFR Part 15.247
Test date	June 17, 2025 to June 20, 2025
Issue date	June 23, 2025
Test result	**Complied**

Jimmy Huang

Prepared by: Jimmy Huang

Genry Long

Approved by: Genry Long

The test results relate only to the tested samples.

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1. REPORT VERSION

Version No.	Issue date	Description
00	June 23, 2025	Original

2. 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), 15.209, 15.205	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.

3. SUMMARY

3.1. Product Description *

Main unit information:	
Product Name:	Xiaodu Smart Open Ear Headphones S108
Trade Mark:	Xiaodu
Model No.:	dubuds S108
Listed Model(s):	N/A
Model difference:	N/A
Power supply:	Input: DC 5V
Hardware version:	V1.0
Software version:	V1.0
Accessory unit (AU) information:	
Battery:	DC 3.7V

3.2. Radio Specification Description *

Modulation type:	GFSK, π/4 DQPSK, 8DPSK
Operation frequency:	2402MHz to 2480MHz
Channel number:	79
Channel separation:	1MHz
Antenna type:	Chip
Antenna gain:	2.78dBi

Note:

1) *: Since the above information is provided by the applicant relevant results or conclusions of this report are only made for these information , Bangce is not responsible for the authenticity, integrity and results of the information and/or the validity of the conclusion.
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	-	-

3.3. Modification of EUT

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

3.4. Deviation from standards

None

3.5. 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

4. TEST CONFIGURATION

4.1. Test frequency list

Bandwidth (MHz)	Lowest Channel (LCH) (MHz)	Middle Channel (MCH) (MHz)	Highest Channel (HCH) (MHz)
1	2402	2441	2480

4.2. Descriptions of test mode

No	Test mode	Description
TM1	TX-GFSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with GFSK modulation at lowest, middle and highest channel.
TM2	TX-Pi/4DQPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with Pi/4DQPSK modulation at lowest, middle and highest channel.
TM3	TX-8DPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with 8DPSK modulation at lowest, middle and highest channel.
TM4	TX-GFSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with GFSK modulation,.
TM5	TX-Pi/4DQPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with Pi/4DQPSK modulation.
TM6	TX-8DPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with 8DPSK modulation.
TM7	Link mode	Keep the EUT in Bluetooth linking mode with AE.
TM8	Charging mode	Keep the EUT in charging status
TM9	Simultaneous TX transmission mode	Keep the EUT in Simultaneous TX transmission status

4.3. 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

4.4. Test sample information

Type	Sample No.
Engineer sample	CISR250617180-S01
Normal sample	CISR250617180-S02

4.5. Environmental conditions

Type	Requirement
Temperature:	15~35°C

Relative Humidity:	25~75%
Air Pressure:	860~1060mbar

4.6. Statement of the measurement uncertainty

No.	Test Items	Measurement Uncertainty
1	AC Conducted Emission	1.63dB
2	Peak Output Power	1.34dB
3	Power Spectral Density	1.34dB
4	20dB Bandwidth	0.002%
5	Duty cycle	-
6	Conducted Band Edge and Spurious Emission	1.93dB
7	Radiated Band Edge Emission	3.76dB for 30MHz-1GHz 3.80dB for above 1GHz
8	Radiated Spurious Emission	3.76dB for 30MHz-1GHz 3.80dB for above 1GHz

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

4.7. Equipment Used during the Test

Conducted Emission at AC power line						
Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	EMI Test Receiver	Rohde&schwarz	ESCI7	100853	2025-01-08	2026-01-07
2	Artificial power network	Schwarzbeck	NSLK8127	8127-01096	2025-01-08	2026-01-07
3	8-wire Impedance Stabilization Network	Schwarzbeck	NTFM 8158	8158-00337	2025-01-08	2026-01-07
4	Artificial power network	Schwarzbeck	ENV216	/	2025-01-08	2026-01-07

Channel Separation Number of Hopping Frequencies Dwell Time Emissions in non-restricted frequency bands 20dB Bandwidth Maximum Conducted Output Power						
Item	Equipment name	Manufacturer	Model	Serial No.	Calibration date	Due date
1	MXG RF Signal Generator	Agilent	N5181A	MY50145362	2025-01-08	2026-01-07
2	Spectrum analyzer	R&S	FSV-40N	102130	2025-01-08	2026-01-07
3	Vector Signal Generator	Agilent	N5182A	MY50142364	2025-01-08	2026-01-07
4	Power Meter	WCS	WCS-PM	WCSPM230405A	2025-01-08	2026-01-07

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	EMI Test Receiver	Rohde&schwarz	ESCI7	100853	2025-01-08	2026-01-07
2	Amplifier	Tonscend	TAP9K3G40	AP23A8060270	2025-01-08	2026-01-07
3	Prime amplifier	Tonscend	TAP01018050	AP23A8060280	2025-01-08	2026-01-07
4	9*6*6 anechoic chamber	SKET	9.3*6.3*6	N/A	2024-09-02	2027-09-01
5	Spectrum analyzer	Agilent	N9020A	MY50530263	2025-01-08	2026-01-07
6	Spectrum analyzer	R&S	FSV-40N	102130	2025-01-08	2026-01-07
7	Bilog Antenna	Schwarzbeck	VULB 9163	1463	2023-01-09	2026-01-08
8	Horn Antenna	SCHWARZBECK	BBHA 9120 D	2487	2023-01-09	2026-01-08

9	Active Loop Antenna	SCHWARZBECK	FMZB 1519B	/	2023-01-09	2026-01-08
10	RF Cable	Tonscend	Cable 1	/	2025-01-08	2026-01-07
11	RF Cable	Tonscend	Cable 2	/	2025-01-08	2026-01-07
12	RF Cable	SKET	Cable 3	/	2025-01-08	2026-01-07
13	L.I.S.N.#1	Schwarzbeck	NSLK8127	/	2025-01-08	2026-01-07
14	L.I.S.N.#2	ROHDE&SCHWARZ	ENV216	/	2025-01-08	2026-01-07
15	Horn Antenna	SCHWARZBECK	BBHA9170	1130	2023-01-09	2026-01-08
16	Preamplifier	Tonscend	TAP18040048	AP21C806126	2025-01-08	2026-01-07
17	Variable-frequency power source	Pinhong	PH1110	/	2025-01-08	2026-01-07
18	6dB Attenuator	SKET	DC-6G	/	2025-01-08	2026-01-07
19	Antenna tower	SKT	Bk-4AT-BS	AT2021040101-V1	2025-01-08	2026-01-07

5. TEST RESULTS

5.1. Evaluation Results (Evaluation)

5.1.1. 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.

5.1.1.1. Test Result

Pass

5.1.1.2. Conclusion:

The EUT antenna is Chip(2.78dBi), the directional gain of the antenna less than 6dBi. 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.

5.2. Radio Spectrum Matter Test Results (RF)

5.2.1. 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

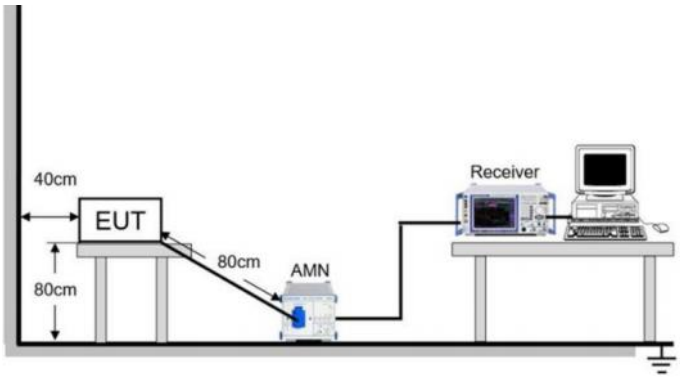
*Decreases with the logarithm of the frequency.

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.

5.2.1.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.8 °C	Humidity:	56 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM8				
Final test mode:	TM8				

5.2.1.2. Test Setup Diagram



5.2.1.3. Test Result

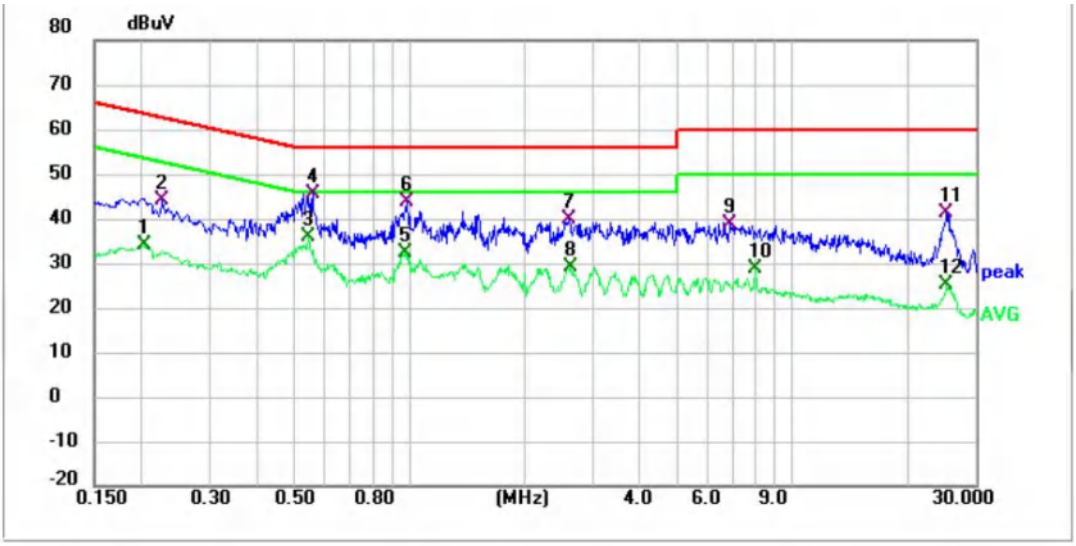
Pass

5.2.1.4. Test Data

Note:

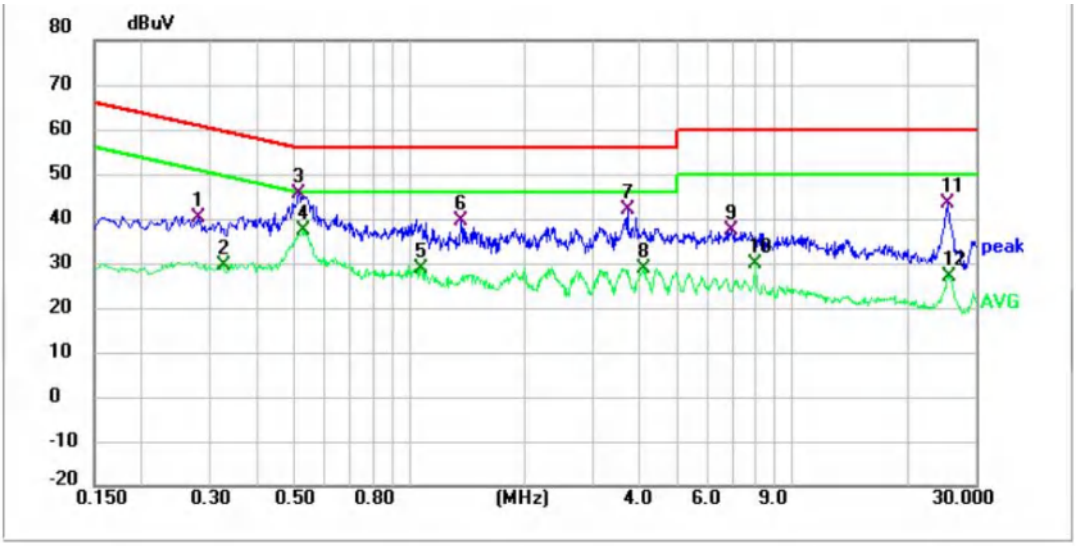
The BT function of this product does not work in charging mode, so only the charging mode(TM8) is tested

Mode8 / Line: Line



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2020	23.61	10.32	33.93	53.53	-19.60	AVG
2	0.2260	33.72	10.33	44.05	62.60	-18.55	QP
3 *	0.5420	25.49	10.38	35.87	46.00	-10.13	AVG
4	0.5580	35.24	10.38	45.62	56.00	-10.38	QP
5	0.9740	21.80	10.43	32.23	46.00	-13.77	AVG
6	0.9860	33.26	10.43	43.69	56.00	-12.31	QP
7	2.6099	29.12	10.87	39.99	56.00	-16.01	QP
8	2.6380	18.28	10.88	29.16	46.00	-16.84	AVG
9	6.8860	26.12	12.69	38.81	60.00	-21.19	QP
10	8.0020	15.83	13.04	28.87	50.00	-21.13	AVG
11	25.2620	26.18	15.11	41.29	60.00	-18.71	QP
12	25.2620	10.08	15.11	25.19	50.00	-24.81	AVG

Mode8/ Line: Neutral



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.2819	29.74	10.34	40.08	60.76	-20.68	QP
2	0.3260	19.08	10.34	29.42	49.55	-20.13	AVG
3	0.5140	35.13	10.38	45.51	56.00	-10.49	QP
4 *	0.5260	26.88	10.38	37.26	46.00	-8.74	AVG
5	1.0740	18.41	10.45	28.86	46.00	-17.14	AVG
6	1.3619	29.07	10.53	39.60	56.00	-16.40	QP
7	3.7100	30.69	11.27	41.96	56.00	-14.04	QP
8	4.0739	17.33	11.42	28.75	46.00	-17.25	AVG
9	6.9420	24.40	12.75	37.15	60.00	-22.85	QP
10	8.0020	16.63	13.06	29.69	50.00	-20.31	AVG
11	25.4660	27.94	15.31	43.25	60.00	-16.75	QP
12	25.7620	11.84	15.28	27.12	50.00	-22.88	AVG

Note:
1). Result = Reading +Correct (Insertion Loss + Cable Loss + Attenuator Factor)
2). Margin = Result - Limit

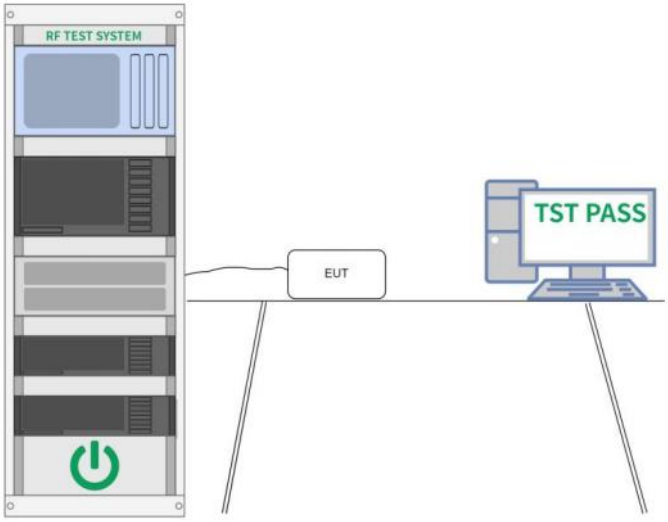
5.2.2. 20dB Bandwidth

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 6.9.3. Frequency hopping shall be disabled for this test.
Procedure:	The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth: a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 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 VBW shall be at least three times the 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) Step a) through step c) might require iteration to adjust within the specified range. e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max-hold mode (until the trace stabilizes) shall be used. f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth. g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies. h) The occupied 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).

5.2.2.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.4 °C	Humidity:	55.9 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

5.2.2.2. Test Setup Diagram



5.2.2.3. Test Result

Pass

5.2.2.4. Test Data

Please Refer to Appendix Report for Details.

5.2.3. 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.

5.2.3.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.4 °C	Humidity:	55.9 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

5.2.3.2. Test Setup Diagram

5.2.3.3. Test Result

Pass

5.2.3.4. Test Data

Please Refer to Appendix Report for Details.

5.2.4. 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.

5.2.4.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.4 °C	Humidity:	55.9 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM4, TM5, TM6				
Final test mode:	TM4, TM5, TM6				

5.2.4.2. Test Setup Diagram

5.2.4.3. Test Result

Pass

5.2.4.4. Test Data

Please Refer to Appendix Report for Details.

5.2.5. 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.

5.2.5.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.4 °C	Humidity:	55.9 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM4, TM5, TM6				
Final test mode:	TM4, TM5, TM6				

5.2.5.2. Test Setup Diagram

5.2.5.3. Test Result

Pass

5.2.5.4. Test Data

Please Refer to Appendix Report for Details.

5.2.6. 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.

5.2.6.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.4 °C	Humidity:	55.9 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM4, TM5, TM6				
Final test mode:	TM4, TM5, TM6				

5.2.6.2. Test Setup Diagram

5.2.6.3. Test Result

Pass

5.2.6.4. Test Data

Please Refer to Appendix Report for Details.

5.2.7. Conducted band edge and spurious emission

Test Requirement:	47 CFR 15.247(d), 15.209, 15.205
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.

5.2.7.1. E.U.T. Operation

Operating Environment:					
Temperature:	22.4 °C	Humidity:	55.9 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2, TM3, TM4, TM5, TM6				
Final test mode:	TM1, TM2, TM3, TM4, TM5, TM6				

5.2.7.2. Test Setup Diagram

5.2.7.3. Test Result

Pass

5.2.7.4. Test Data

Please Refer to Appendix Report for Details.

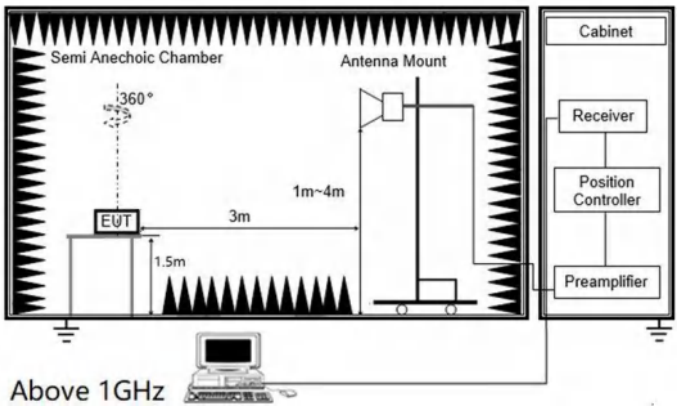
5.2.8. Radiated band edge emission

<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><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></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 waspositioned 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 themaximum 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), Averager level = Peak level + DCCF</td></tr>
</table>

5.2.8.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2, TM3, TM4, TM5, TM6, TM7, TM8, TM9				
Final test mode:	TM1, TM2, TM3, TM4, TM5, TM6, TM7, TM8, TM9				

5.2.8.2. Test Setup Diagram



5.2.8.3. Test Result

Pass

5.2.8.4. Test Data

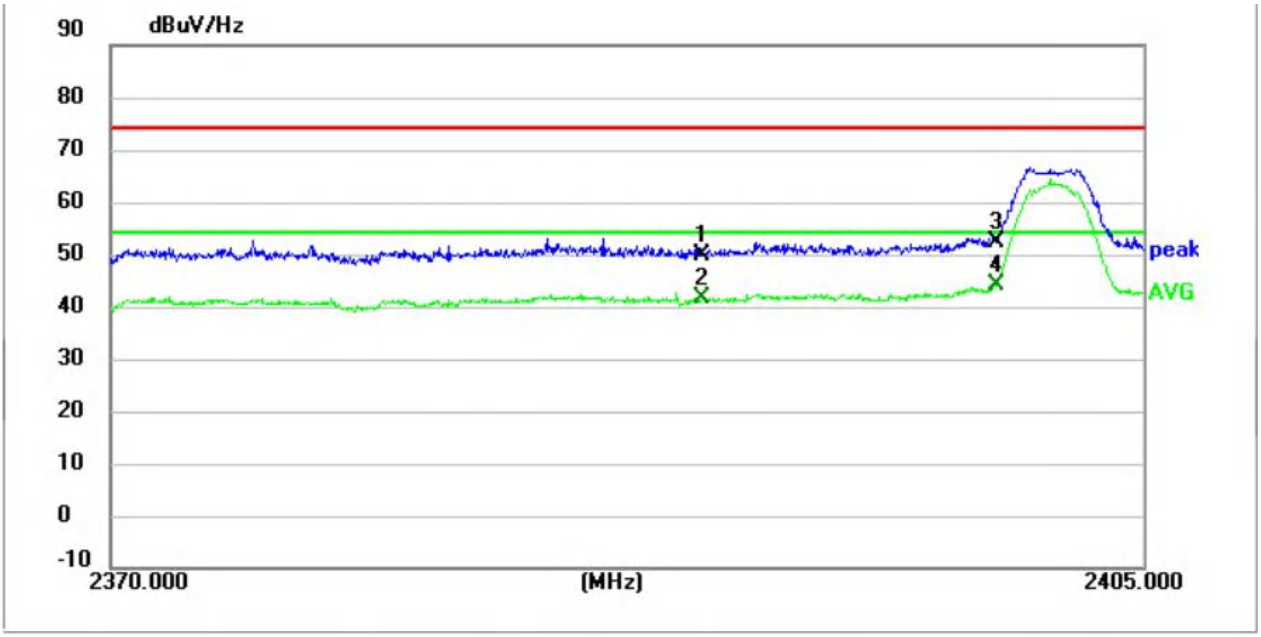
Note:

1) Level= Reading + Factor; 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
4) The other emission levels were very low against the limit.

Have pre-scan all test mode, found TM1 mode which it was worst case, so only show the worst case's data on this report.

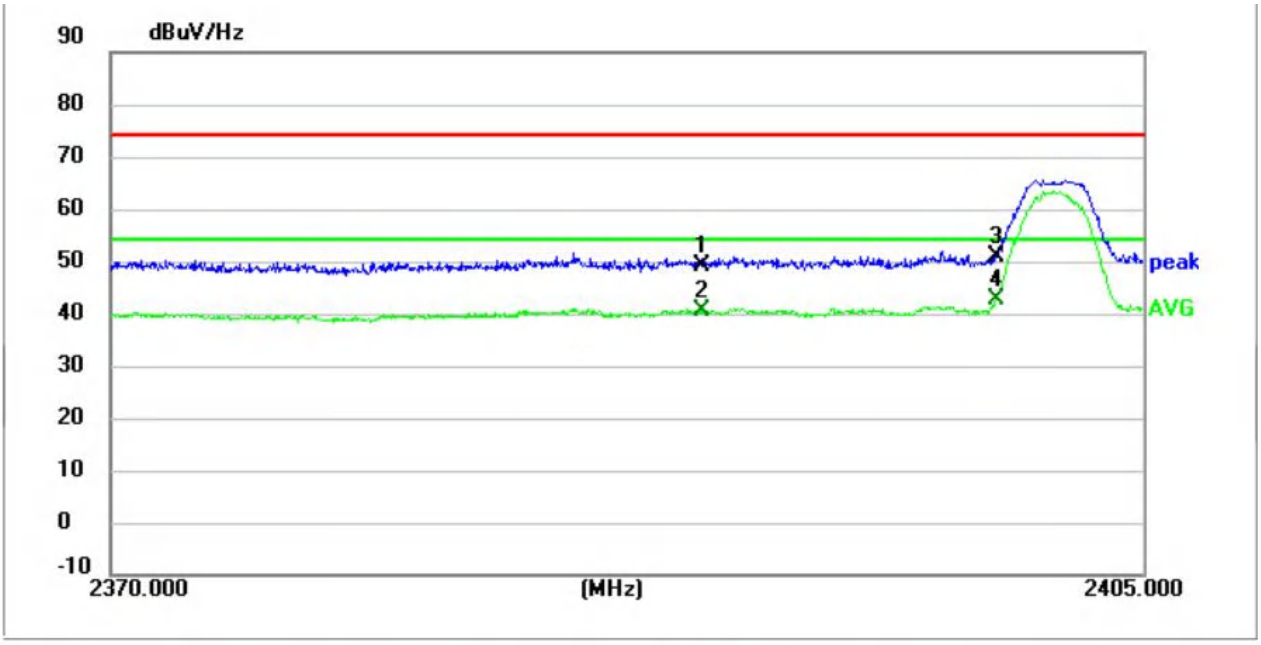
LEFT:

Mode1 / Polarization: Horizontal / CH: L



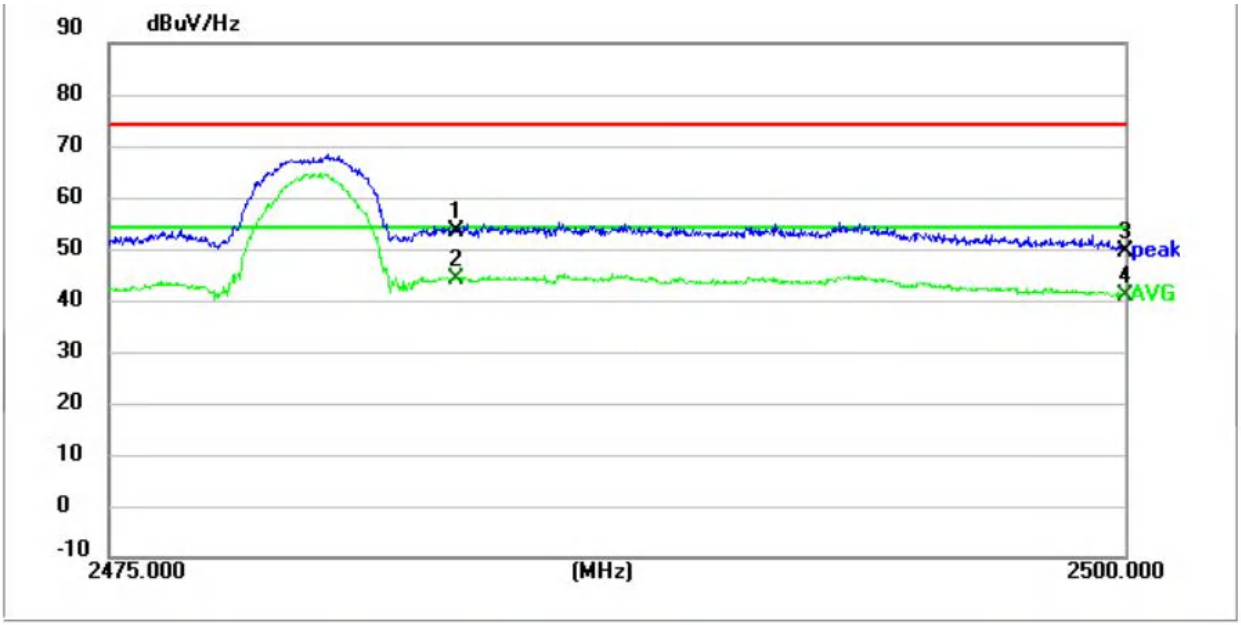
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2390.0000	47.58	2.34	49.92	74.00	-24.08	peak
2	2390.0000	39.14	2.34	41.48	54.00	-12.52	AVG
3	2400.0000	50.10	2.38	52.48	74.00	-21.52	peak
4 *	2400.0000	41.65	2.38	44.03	54.00	-9.97	AVG

Mode1 / Polarization: Vertical / CH: L



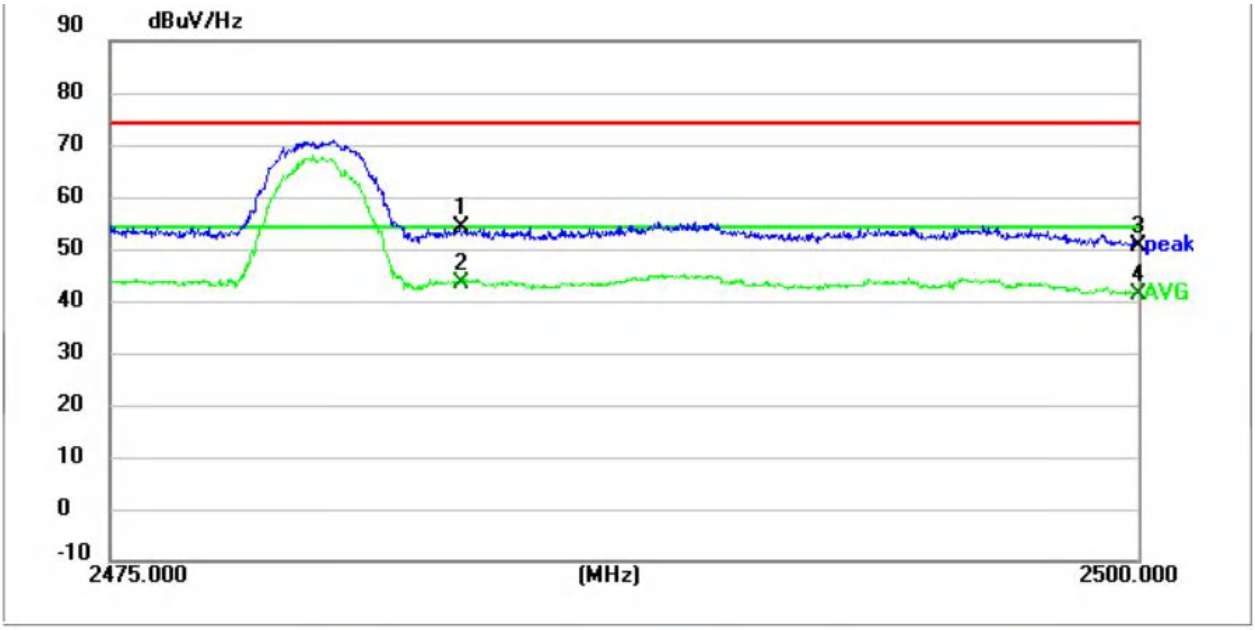
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2390.0000	46.76	2.34	49.10	74.00	-24.90	peak
2	2390.0000	38.04	2.34	40.38	54.00	-13.62	AVG
3	2400.0000	48.52	2.38	50.90	74.00	-23.10	peak
4 *	2400.0000	40.17	2.38	42.55	54.00	-11.45	AVG

Mode1 / Polarization: Horizontal / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2483.5000	50.87	2.66	53.53	74.00	-20.47	peak
2 *	2483.5000	41.54	2.66	44.20	54.00	-9.80	AVG
3	2500.0000	46.60	2.80	49.40	74.00	-24.60	peak
4	2500.0000	38.09	2.80	40.89	54.00	-13.11	AVG

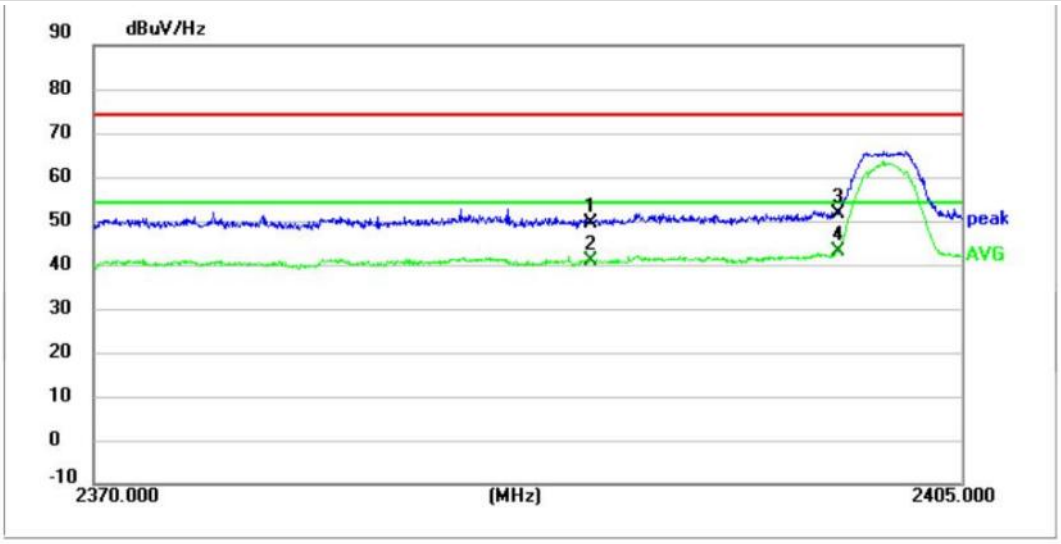
Mode1 / Polarization: Vertical / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2483.5000	51.37	2.66	54.03	74.00	-19.97	peak
2 *	2483.5000	40.71	2.66	43.37	54.00	-10.63	AVG
3	2500.0000	47.84	2.80	50.64	74.00	-23.36	peak
4	2500.0000	38.45	2.80	41.25	54.00	-12.75	AVG

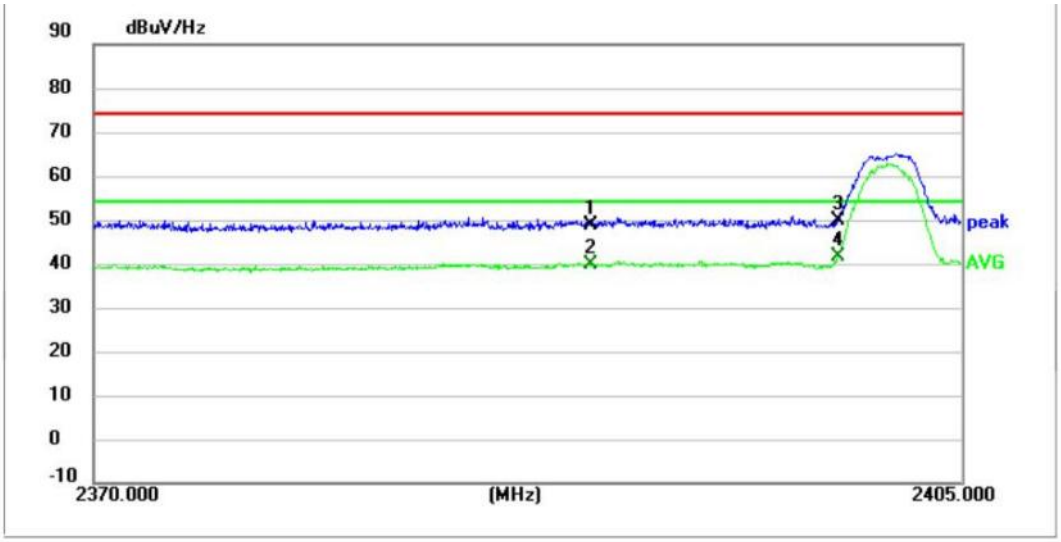
RIGHT:

Mode1 / Polarization: Horizontal / CH: L



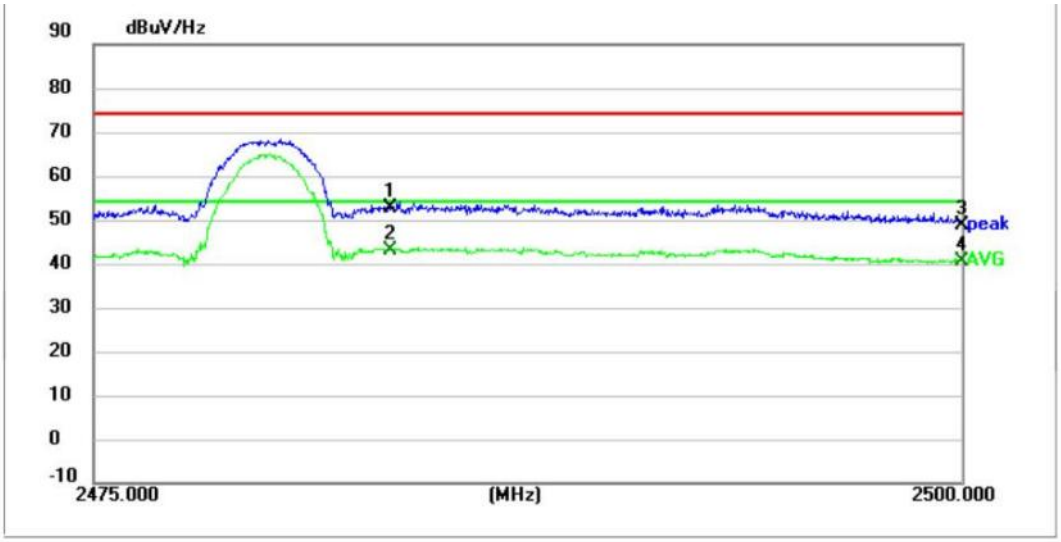
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2390.0000	47.08	2.34	49.42	74.00	-24.58	peak
2	2390.0000	38.64	2.34	40.98	54.00	-13.02	AVG
3	2400.0000	49.10	2.38	51.48	74.00	-22.52	peak
4 *	2400.0000	40.65	2.38	43.03	54.00	-10.97	AVG

Mode1 / Polarization: Vertical / CH: L



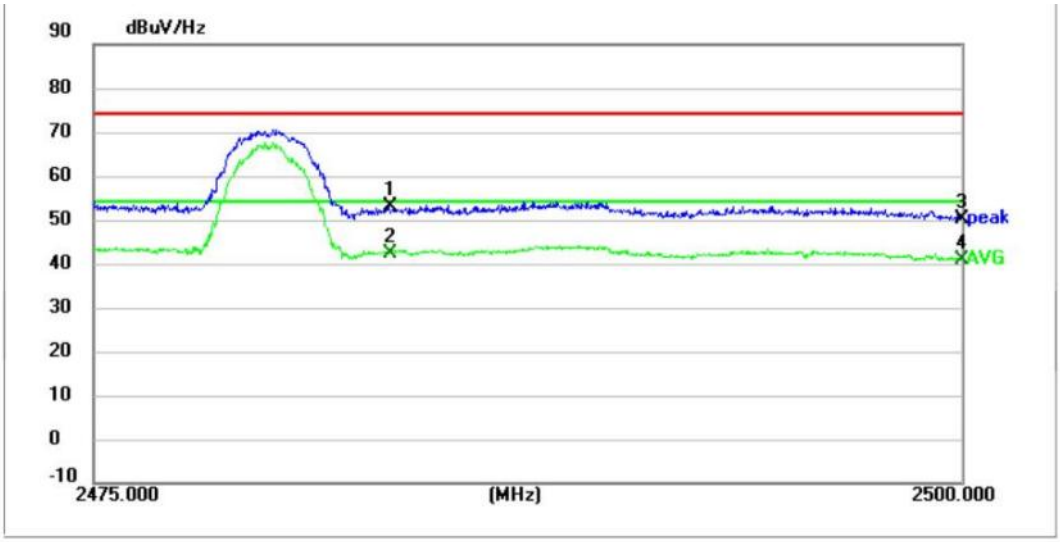
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2390.0000	46.26	2.34	48.60	74.00	-25.40	peak
2	2390.0000	37.54	2.34	39.88	54.00	-14.12	AVG
3	2400.0000	47.52	2.38	49.90	74.00	-24.10	peak
4 *	2400.0000	39.17	2.38	41.55	54.00	-12.45	AVG

Mode1 / Polarization: Horizontal / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2483.5000	49.87	2.66	52.53	74.00	-21.47	peak
2 *	2483.5000	40.54	2.66	43.20	54.00	-10.80	AVG
3	2500.0000	46.10	2.80	48.90	74.00	-25.10	peak
4	2500.0000	37.59	2.80	40.39	54.00	-13.61	AVG

Mode1 / Polarization: Vertical / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2483.5000	50.37	2.66	53.03	74.00	-20.97	peak
2 *	2483.5000	39.71	2.66	42.37	54.00	-11.63	AVG
3	2500.0000	47.34	2.80	50.14	74.00	-23.86	peak
4	2500.0000	37.95	2.80	40.75	54.00	-13.25	AVG

5.2.9. Radiated Spurious Emission (below 1GHz)

Test Requirement:	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)).`
Test Limit:	

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

** 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.

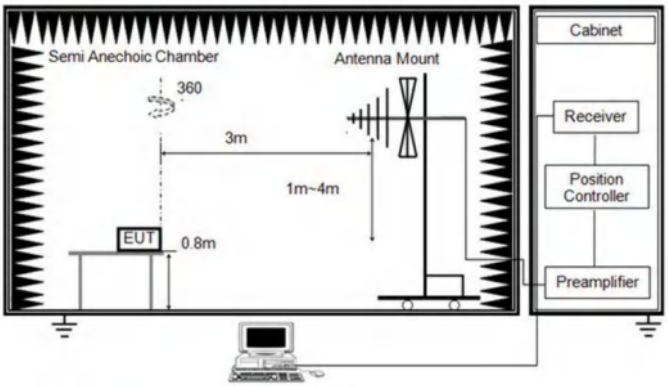
Test Method:	ANSI C63.10-2020 section 6.6.4

Procedure:	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.

5.2.9.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2, TM3, TM4, TM5, TM6, TM7, TM8, TM9				
Final test mode:	TM1, TM2, TM3, TM4, TM5, TM6, TM7, TM8, TM9				

5.2.9.2. Test Setup Diagram



Below 1 GHz and above 30 MHz

5.2.9.3. Test Result

Pass

5.2.9.4. Test Data

Note:

1) Level= Reading + Factor/Transd; Factor/Transd =Antenna Factor+ Cable Loss- Preamp Factor
2) Margin = Limit – Level
3) Average measurement was not performed if peak level is lower than average limit(54 dBuV/m) for above 1GHz.
4) The other emission levels were very low against the limit.
5) This test was performed with EUT in X, Y, Z position and the worse case was found when EUT in X position.

For 9 kHz ~ 30 MHz

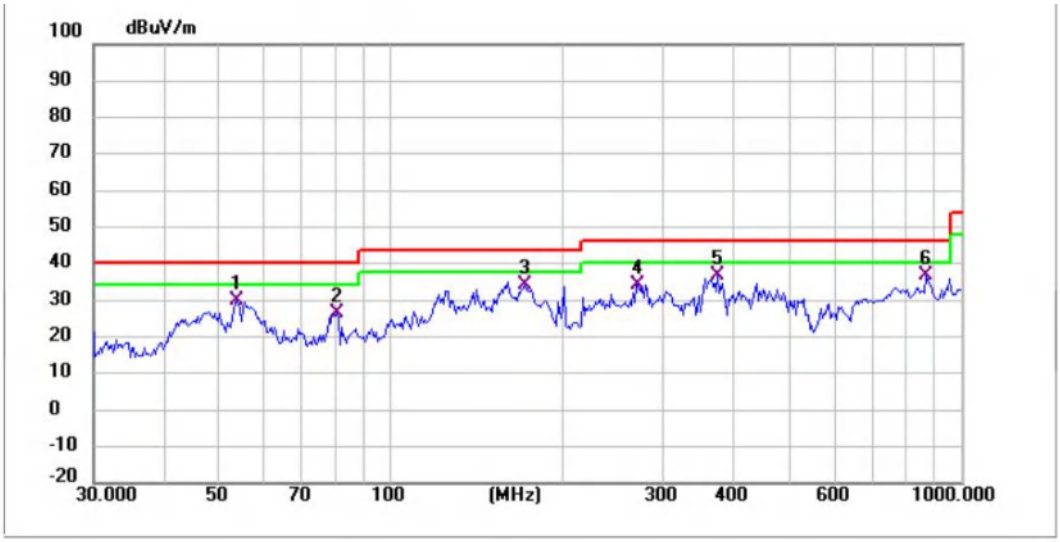
The EUT was pre-scanned this frequency band, found the radiated level 20dB lower than the limit, so don't show data on this report.

For 30 MHz ~ 1000 MHz

Have pre-scan all test mode, found TM1 mode which it was worst case, so only show the worst case's data on this report.

LEFT:

Mode1 / Polarization: Horizontal / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	53.6931	59.92	-29.97	29.95	40.00	-10.05	QP
2	80.0805	61.46	-34.98	26.48	40.00	-13.52	QP
3	171.9944	66.12	-32.05	34.07	43.50	-9.43	QP
4	271.3245	62.30	-28.23	34.07	46.00	-11.93	QP
5	374.6225	62.14	-25.51	36.63	46.00	-9.37	QP
6 *	869.1300	51.97	-15.25	36.72	46.00	-9.28	QP

Mode1 / Polarization: Vertical / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.0782	60.36	-31.19	29.17	40.00	-10.83	QP
2 *	49.7066	61.82	-29.12	32.70	40.00	-7.30	QP
3	106.7587	63.66	-30.69	32.97	43.50	-10.53	QP
4	200.6880	61.90	-29.83	32.07	43.50	-11.43	QP
5	422.0577	60.87	-24.23	36.64	46.00	-9.36	QP
6	881.4067	45.52	-15.13	30.39	46.00	-15.61	QP

RIGHT:

Mode1 / Polarization: Horizontal / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	42.8997	52.92	-29.93	22.99	40.00	-17.01	QP
2	78.9651	56.72	-34.76	21.96	40.00	-18.04	QP
3	160.3454	62.96	-32.97	29.99	43.50	-13.51	QP
4	271.3245	59.80	-28.23	31.57	46.00	-14.43	QP
5	374.6225	60.64	-25.51	35.13	46.00	-10.87	QP
6 *	952.0937	50.10	-13.99	36.11	46.00	-9.89	QP

Mode1 / Polarization: Vertical / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	58.8185	58.61	-30.63	27.98	40.00	-12.02	QP
2	106.7587	63.16	-30.69	32.47	43.50	-11.03	QP
3	200.6880	61.40	-29.83	31.57	43.50	-11.93	QP
4	312.1792	58.09	-26.84	31.25	46.00	-14.75	QP
5 *	449.5557	58.56	-23.38	35.18	46.00	-10.82	QP
6	881.4067	45.02	-15.13	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; Factor =Antenna Factor+ Cable Loss- Preamp Factor
3) Margin = Limit – Level

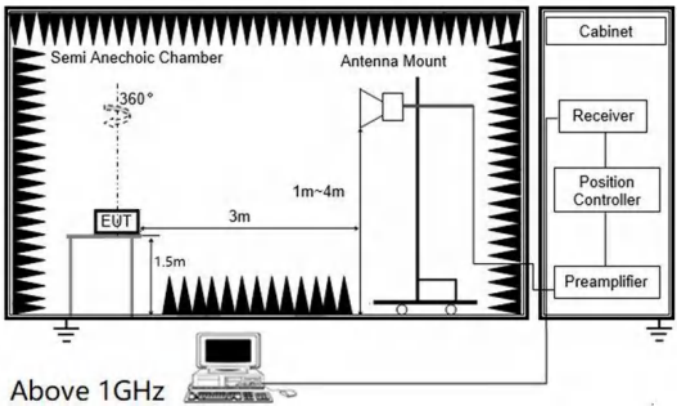
5.2.10. Radiated Spurious Emission (Above 1GHz)

<table>
<tr><td>Test Requirement:</td><td>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 6.6.4</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) 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)Averager level = Peak level + DCCF</td></tr>
</table>

5.2.10.1. E.U.T. Operation

Operating Environment:					
Temperature:	23.4 °C	Humidity:	55 %	Atmospheric Pressure:	103 kPa
Pre test mode:	TM1, TM2, TM3, TM4, TM5, TM6, TM7, TM8, TM9				
Final test mode:	TM1, TM2, TM3, TM4, TM5, TM6, TM7, TM8, TM9				

5.2.10.2. Test Setup Diagram



5.2.10.3. Test Result

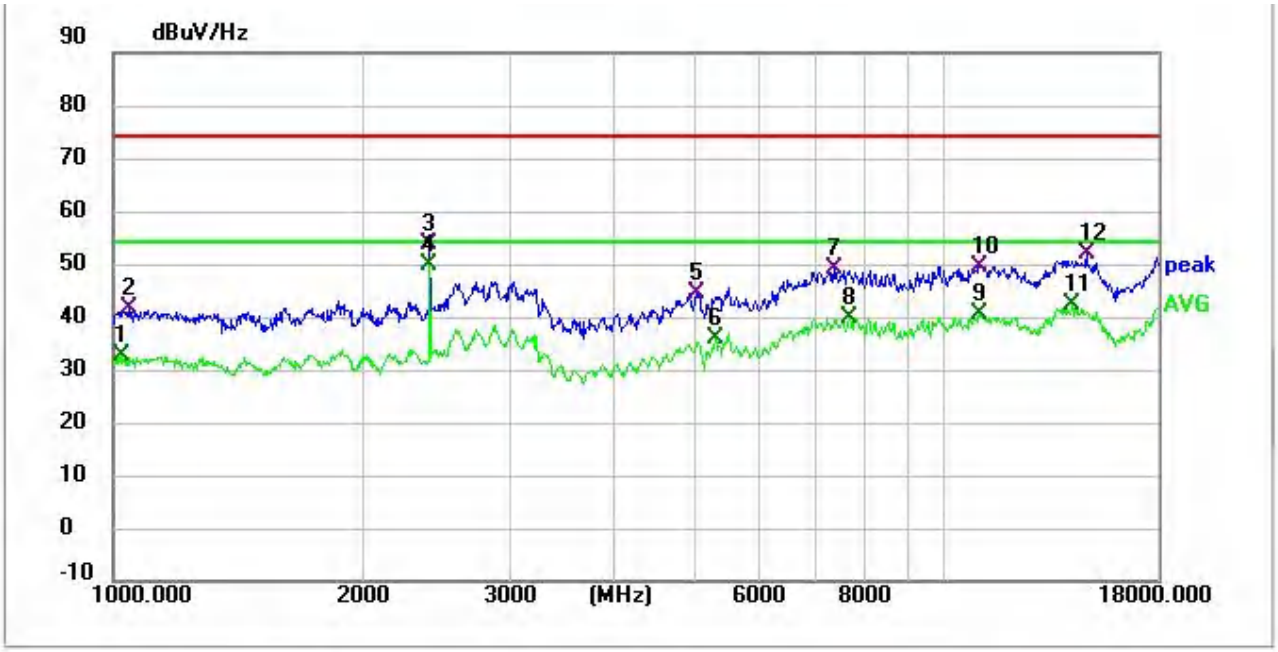
Pass

5.2.10.4. Test Data

Have pre-scan all test mode, found TM1 mode which it was worst case, so only show the worst case's data on this report.

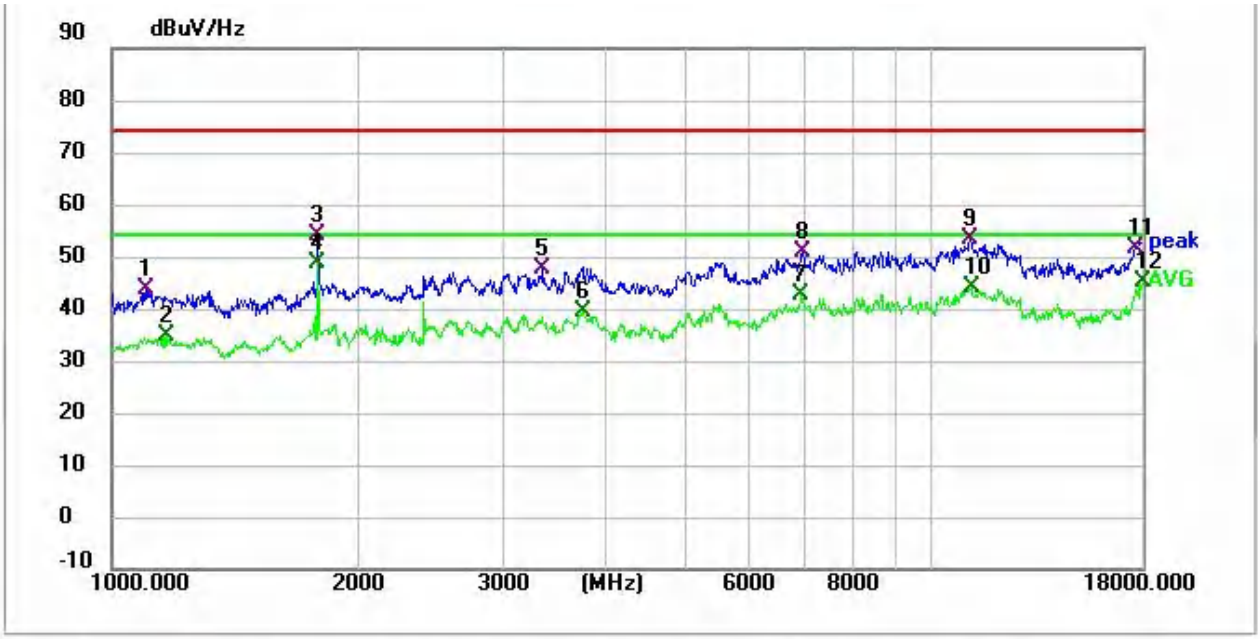
LEFT:

Mode1 / Polarization: Horizontal / CH: L



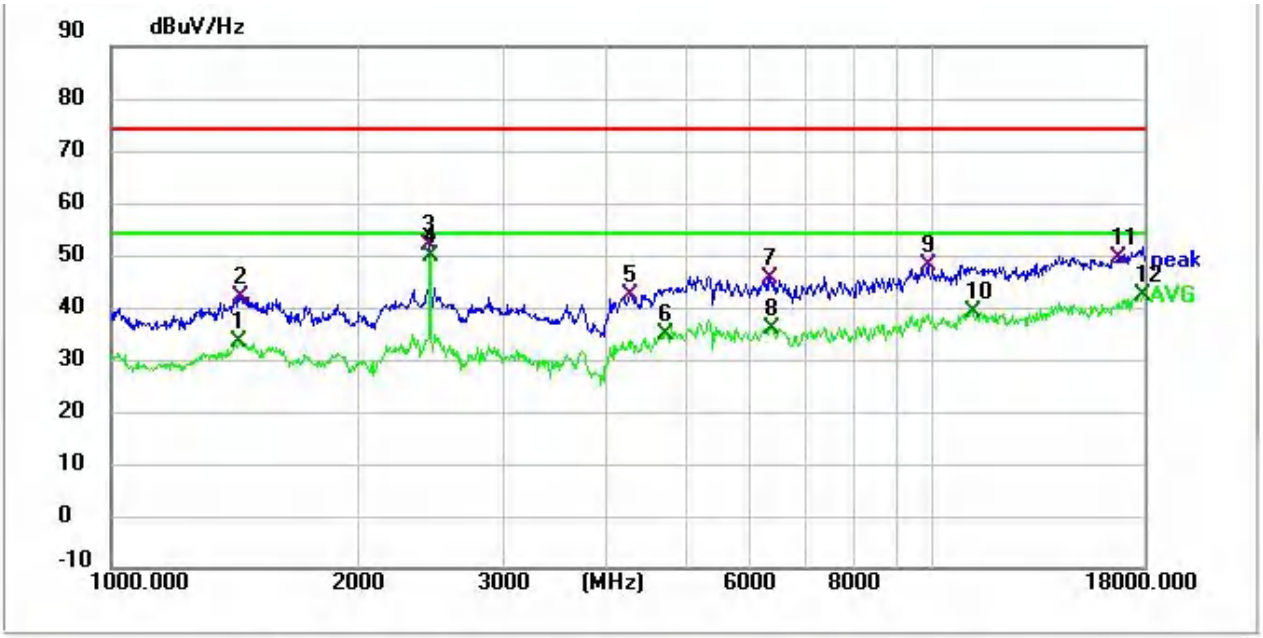
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1028.9000	34.74	-2.02	32.72	54.00	-21.28	AVG
2	1049.3000	43.46	-2.03	41.43	74.00	-32.57	QP
3	2404.2000	51.27	2.38	53.65	74.00	-20.35	QP
4 *	2404.2000	47.60	2.38	49.98	54.00	-4.02	AVG
5	5029.0000	31.85	12.75	44.60	74.00	-29.40	QP
6	5299.3000	22.20	13.75	35.95	54.00	-18.05	AVG
7	7358.0000	26.98	22.13	49.11	74.00	-24.89	QP
8	7672.5000	17.16	22.67	39.83	54.00	-14.17	AVG
9	10984.1000	12.67	27.99	40.66	54.00	-13.34	AVG
10	11028.3000	21.50	28.09	49.59	74.00	-24.41	QP
11	14217.5000	52.73	-10.54	42.19	54.00	-11.81	AVG
12	14804.0000	62.70	-10.68	52.02	74.00	-21.98	QP

Mode1 / Polarization: Vertical / CH: L



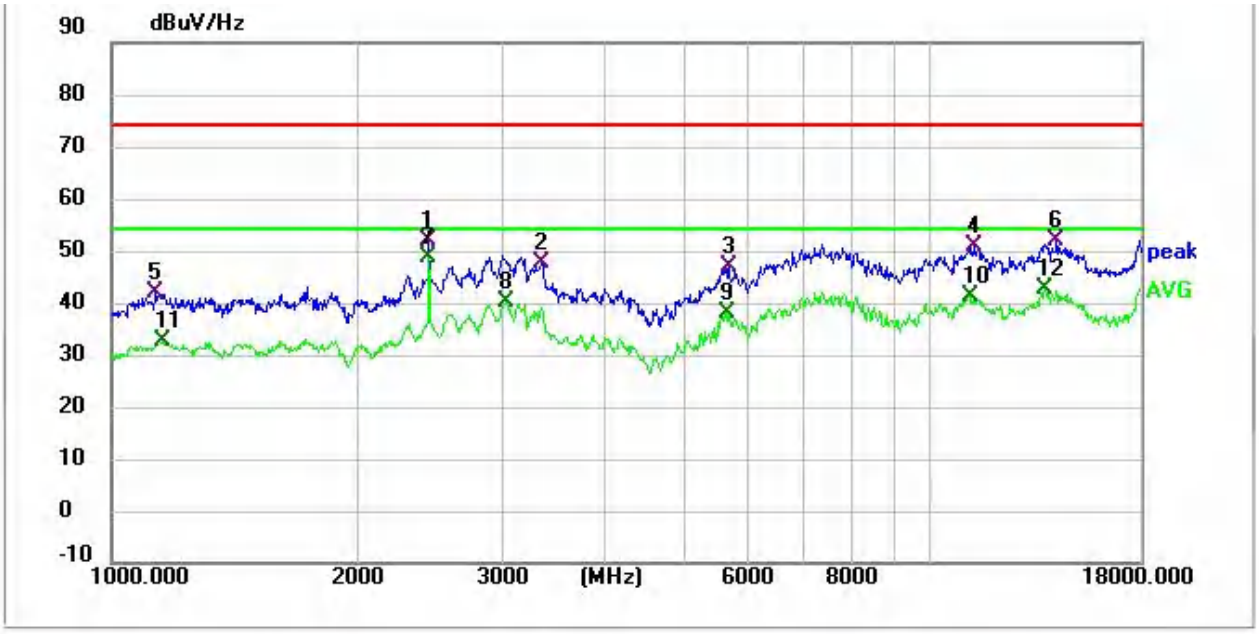
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1102.0000	45.30	-1.67	43.63	74.00	-30.37	QP
2	1168.3000	36.42	-1.64	34.78	54.00	-19.22	AVG
3	1785.4000	54.39	-0.27	54.12	74.00	-19.88	QP
4 *	1785.4000	49.05	-0.27	48.78	54.00	-5.22	AVG
5	3352.8000	41.08	6.44	47.52	74.00	-26.48	QP
6	3748.9000	32.67	6.80	39.47	54.00	-14.53	AVG
7	6934.7000	21.79	20.86	42.65	54.00	-11.35	AVG
8	6961.9000	29.74	21.03	50.77	74.00	-23.23	QP
9	11133.7000	25.26	28.09	53.35	74.00	-20.65	QP
10	11152.4000	16.13	28.12	44.25	54.00	-9.75	AVG
11	17677.0000	62.15	-10.71	51.44	74.00	-22.56	QP
12	18000.0000	54.10	-8.90	45.20	54.00	-8.80	AVG

Mode1 / Polarization: Horizontal / CH: M



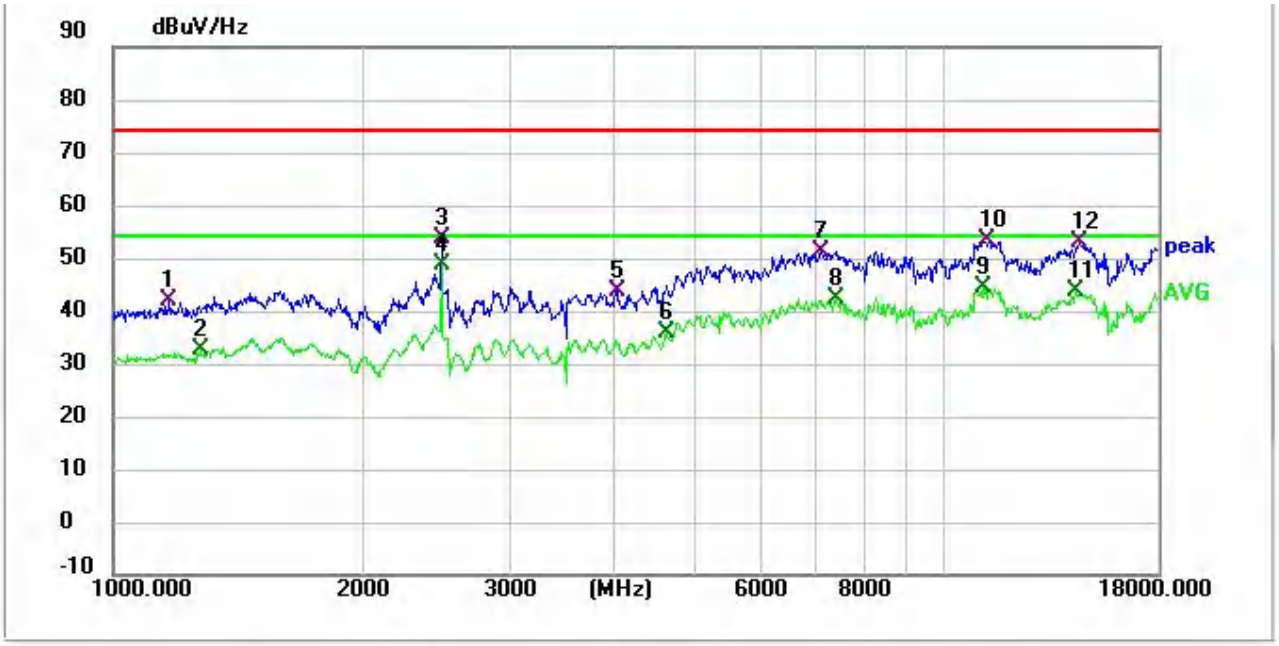
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1431.8000	34.73	-1.44	33.29	54.00	-20.71	AVG
2	1435.2000	43.48	-1.42	42.06	74.00	-31.94	QP
3	2441.6000	49.74	2.39	52.13	74.00	-21.87	QP
4 *	2443.3000	47.58	2.39	49.97	54.00	-4.03	AVG
5	4270.8000	34.39	7.93	42.32	74.00	-31.68	QP
6	4729.8000	24.87	9.97	34.84	54.00	-19.16	AVG
7	6339.7000	27.98	17.52	45.50	74.00	-28.50	QP
8	6349.9000	18.31	17.61	35.92	54.00	-18.08	AVG
9	9843.4000	22.95	25.17	48.12	74.00	-25.88	QP
10	11149.0000	11.02	28.13	39.15	54.00	-14.85	AVG
11	16770.9000	62.42	-12.85	49.57	74.00	-24.43	QP
12	17994.9000	51.42	-8.93	42.49	54.00	-11.51	AVG

Mode1 / Polarization: Vertical / CH: M



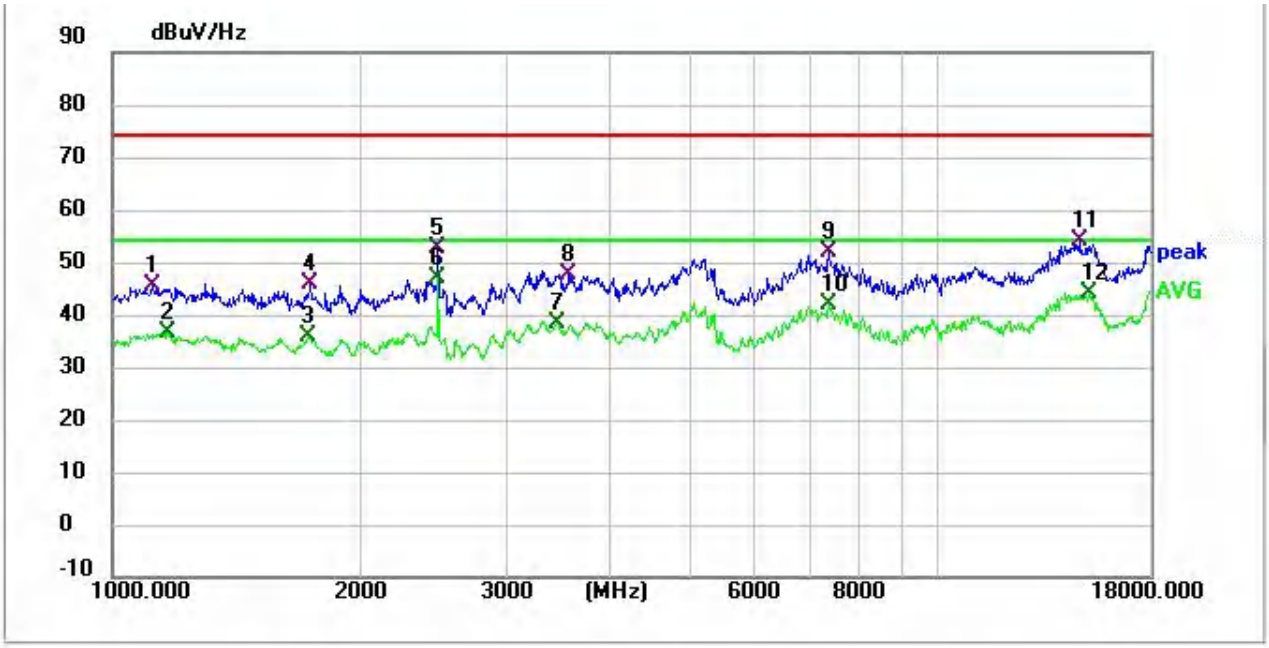
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	2441.6000	49.62	2.39	52.01	74.00	-21.99	QP
2	3344.3000	41.33	6.44	47.77	74.00	-26.23	QP
3	5675.0000	32.05	15.04	47.09	74.00	-26.91	QP
4	11271.4000	22.64	28.16	50.80	74.00	-23.20	QP
5	1134.3000	43.59	-1.69	41.90	74.00	-32.10	QP
6	14217.5000	62.33	-10.54	51.79	74.00	-22.21	QP
7 *	2441.6000	46.19	2.39	48.58	54.00	-5.42	AVG
8	3036.6000	33.91	6.11	40.02	54.00	-13.98	AVG
9	5649.5000	23.16	14.92	38.08	54.00	-15.92	AVG
10	11142.2000	13.13	28.11	41.24	54.00	-12.76	AVG
11	1158.1000	34.33	-1.67	32.66	54.00	-21.34	AVG
12	13775.5000	53.69	-11.18	42.51	54.00	-11.49	AVG

Mode1 / Polarization: Horizontal / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1169.1022	43.45	-1.64	41.81	74.00	-32.19	QP
2	1271.4284	34.10	-1.59	32.51	54.00	-21.49	AVG
3	2480.5621	51.04	2.64	53.68	74.00	-20.32	QP
4 *	2480.5621	46.15	2.64	48.79	54.00	-5.21	AVG
5	4033.1743	36.56	7.30	43.86	74.00	-30.14	QP
6	4620.6583	26.46	9.56	36.02	54.00	-17.98	AVG
7	7090.3905	29.72	21.54	51.26	74.00	-22.74	QP
8	7404.8810	20.26	22.14	42.40	54.00	-11.60	AVG
9	11102.7906	16.49	28.05	44.54	54.00	-9.46	AVG
10	11264.5744	25.13	28.17	53.30	74.00	-20.70	QP
11	14363.5980	54.17	-10.51	43.66	54.00	-10.34	AVG
12	14530.7942	63.67	-10.62	53.05	74.00	-20.95	QP

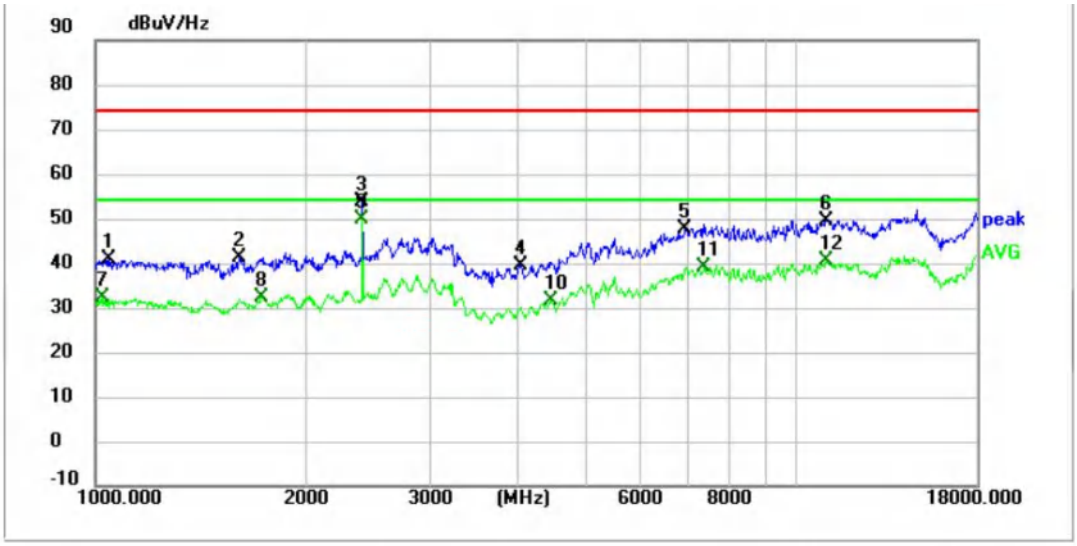
Mode1 / Polarization: Vertical / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1119.0000	47.13	-1.68	45.45	74.00	-28.55	QP
2	1170.0000	38.17	-1.64	36.53	54.00	-17.47	AVG
3	1725.9000	36.76	-0.71	36.05	54.00	-17.95	AVG
4	1741.2000	46.55	-0.60	45.95	74.00	-28.05	QP
5	2482.4000	50.11	2.66	52.77	74.00	-21.23	QP
6 *	2482.4000	44.44	2.66	47.10	54.00	-6.90	AVG
7	3458.2000	32.32	6.24	38.56	54.00	-15.44	AVG
8	3573.8000	41.50	6.33	47.83	74.00	-26.17	QP
9	7363.1000	29.68	22.13	51.81	74.00	-22.19	QP
10	7386.9000	19.78	22.12	41.90	54.00	-12.10	AVG
11	14805.7000	64.83	-10.69	54.14	74.00	-19.86	QP
12	15225.6000	55.22	-11.25	43.97	54.00	-10.03	AVG

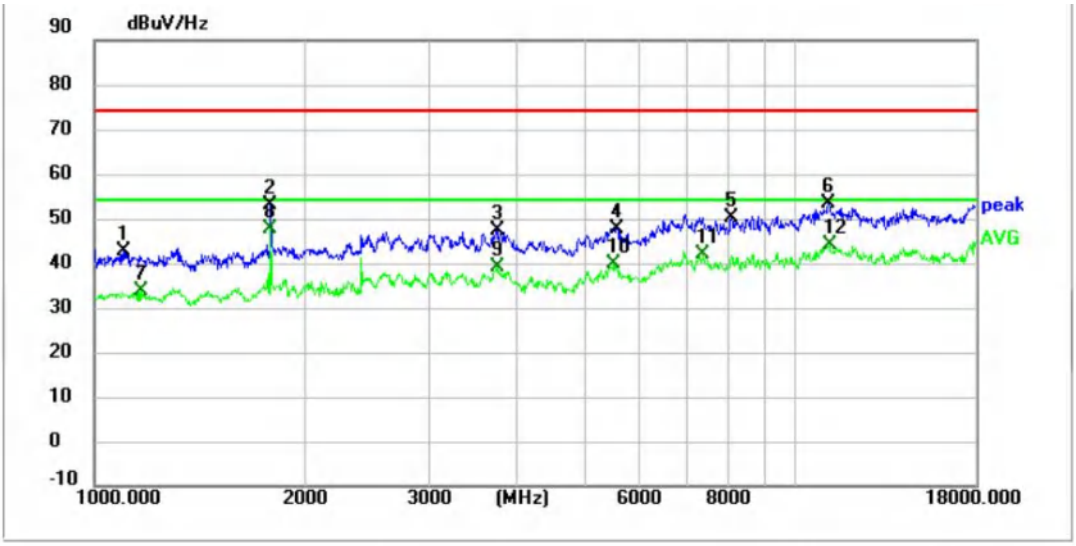
RIGHT:

Mode1 / Polarization: Horizontal / CH: L



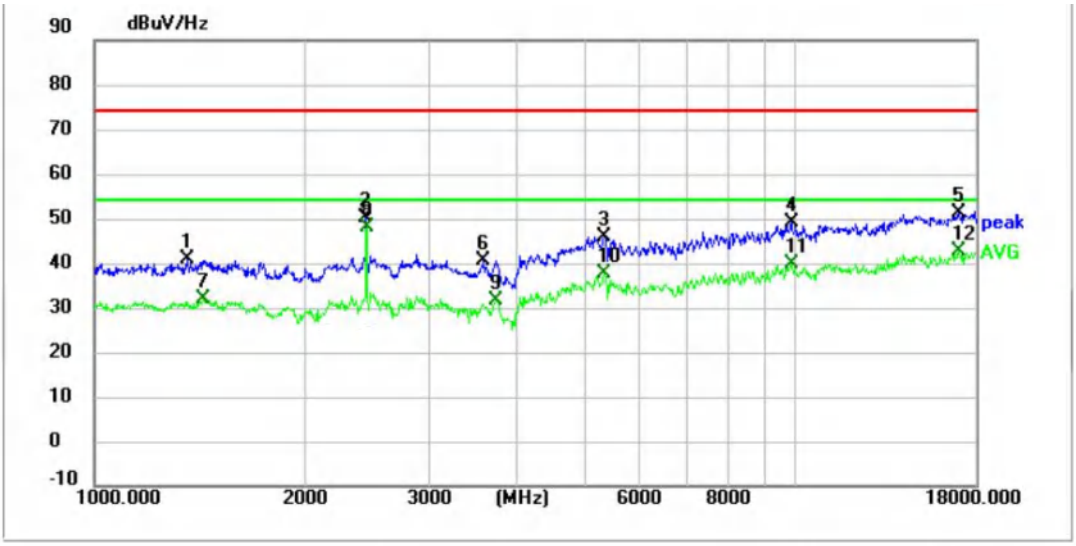
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1049.3000	42.96	-2.03	40.93	74.00	-33.07	peak
2	1605.2000	42.43	-1.21	41.22	74.00	-32.78	peak
3	2404.2000	51.27	2.38	53.65	74.00	-20.35	peak
4	4039.6000	32.21	7.30	39.51	74.00	-34.49	peak
5	6934.7000	26.97	20.86	47.83	74.00	-26.17	peak
6	11028.3000	21.50	28.09	49.59	74.00	-24.41	peak
7	1028.9000	34.24	-2.02	32.22	54.00	-21.78	AVG
8	1725.9000	33.07	-0.71	32.36	54.00	-21.64	AVG
9 *	2404.2000	47.60	2.38	49.98	54.00	-4.02	AVG
10	4464.6000	22.52	8.95	31.47	54.00	-22.53	AVG
11	7385.2000	17.00	22.12	39.12	54.00	-14.88	AVG
12	10984.1000	12.67	27.99	40.66	54.00	-13.34	AVG

Mode1 / Polarization: Vertical / CH: L



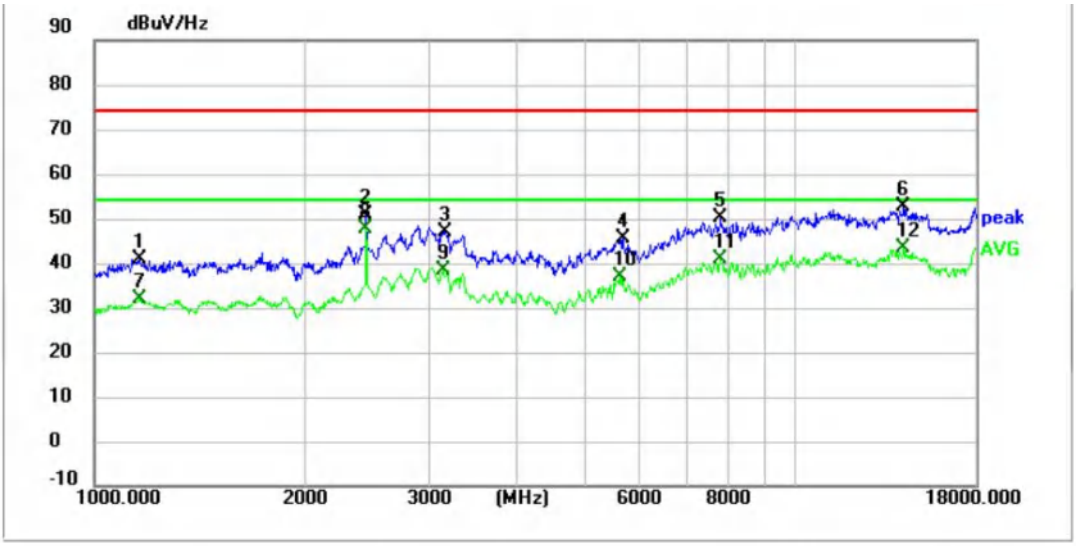
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1102.0000	44.30	-1.67	42.63	74.00	-31.37	peak
2	1785.4000	53.39	-0.27	53.12	74.00	-20.88	peak
3	3748.9000	40.66	6.80	47.46	74.00	-26.54	peak
4	5552.6000	32.99	14.86	47.85	74.00	-26.15	peak
5	8099.2000	27.52	22.81	50.33	74.00	-23.67	peak
6	11133.7000	25.26	28.09	53.35	74.00	-20.65	peak
7	1168.3000	35.42	-1.64	33.78	54.00	-20.22	AVG
8 *	1785.4000	48.05	-0.27	47.78	54.00	-6.22	AVG
9	3748.9000	32.17	6.80	38.97	54.00	-15.03	AVG
10	5516.9000	24.88	14.86	39.74	54.00	-14.26	AVG
11	7375.0000	19.94	22.12	42.06	54.00	-11.94	AVG
12	11152.4000	16.13	28.12	44.25	54.00	-9.75	AVG

Mode1 / Polarization: Horizontal / CH: M



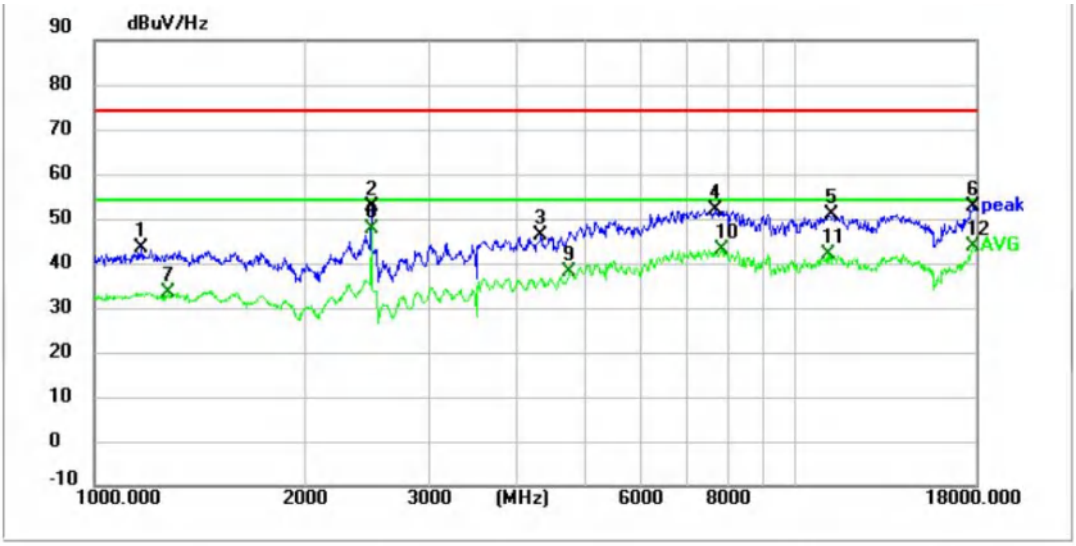
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1358.7000	42.49	-1.65	40.84	74.00	-33.16	peak
2	2441.6000	47.74	2.39	50.13	74.00	-23.87	peak
3	5329.9000	32.36	13.65	46.01	74.00	-27.99	peak
4	9843.4000	23.95	25.17	49.12	74.00	-24.88	peak
5	17085.4000	63.29	-12.21	51.08	74.00	-22.92	peak
6	3590.8000	34.04	6.34	40.38	74.00	-33.62	peak
7	1431.8000	33.23	-1.44	31.79	54.00	-22.21	AVG
8 *	2443.3000	45.58	2.39	47.97	54.00	-6.03	AVG
9	3726.8000	24.88	6.79	31.67	54.00	-22.33	AVG
10	5338.4000	24.03	13.61	37.64	54.00	-16.36	AVG
11	9843.4000	14.53	25.17	39.70	54.00	-14.30	AVG
12	17085.4000	54.94	-12.21	42.73	54.00	-11.27	AVG

Mode1 / Polarization: Vertical / CH: M



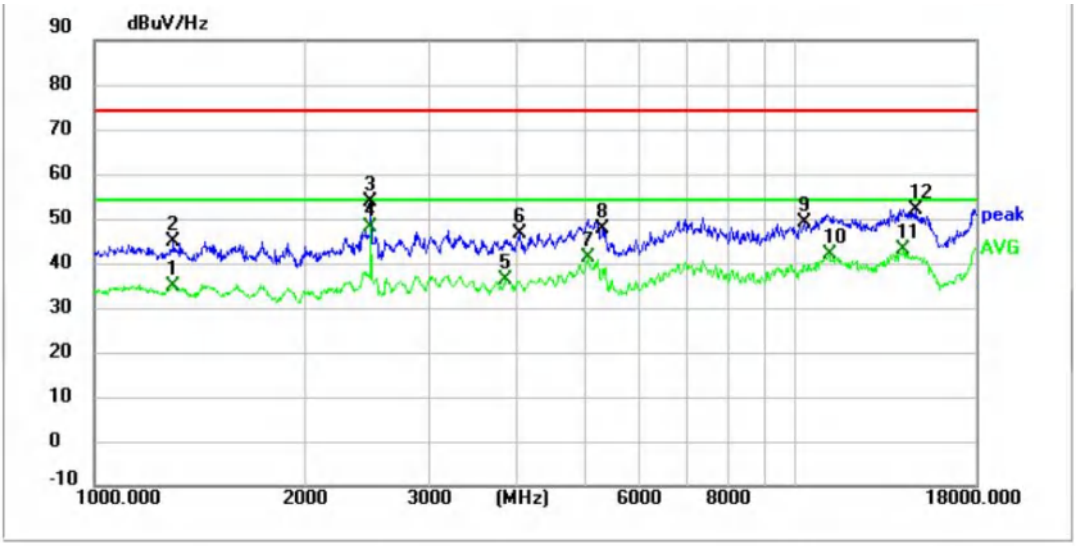
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1163.2000	42.61	-1.65	40.96	74.00	-33.04	peak
2	2441.6000	48.62	2.39	51.01	74.00	-22.99	peak
3	3167.5000	40.66	6.43	47.09	74.00	-26.91	peak
4	5675.0000	30.55	15.04	45.59	74.00	-28.41	peak
5	7811.9000	27.91	22.14	50.05	74.00	-23.95	peak
6	14217.5000	63.33	-10.54	52.79	74.00	-21.21	peak
7	1163.2000	33.48	-1.65	31.83	54.00	-22.17	AVG
8 *	2441.6000	45.19	2.39	47.58	54.00	-6.42	AVG
9	3148.8000	32.12	6.36	38.48	54.00	-15.52	AVG
10	5613.8000	22.27	14.77	37.04	54.00	-16.96	AVG
11	7806.8000	18.62	22.10	40.72	54.00	-13.28	AVG
12	14217.5000	53.91	-10.54	43.37	54.00	-10.63	AVG

Mode1 / Polarization: Horizontal / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1169.1022	44.95	-1.64	43.31	74.00	-30.69	peak
2	2480.5621	50.04	2.64	52.68	74.00	-21.32	peak
3	4323.1836	38.10	8.03	46.13	74.00	-27.87	peak
4	7688.7010	29.17	22.66	51.83	74.00	-22.17	peak
5	11264.5744	22.63	28.17	50.80	74.00	-23.20	peak
6	17896.1431	62.05	-9.42	52.63	74.00	-21.37	peak
7	1271.4284	35.10	-1.59	33.51	54.00	-20.49	AVG
8 *	2480.5621	45.15	2.64	47.79	54.00	-6.21	AVG
9	4756.2990	28.07	10.06	38.13	54.00	-15.87	AVG
10	7823.3388	20.85	22.22	43.07	54.00	-10.93	AVG
11	11102.7906	13.99	28.05	42.04	54.00	-11.96	AVG
12	17896.1431	53.27	-9.42	43.85	54.00	-10.15	AVG

Mode1 / Polarization: Vertical / CH: H

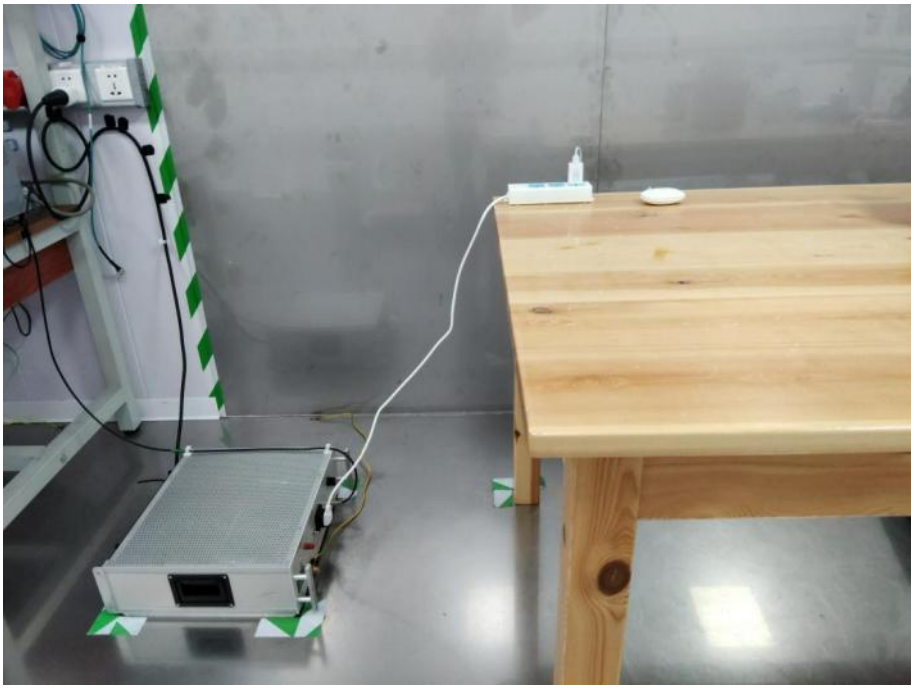


No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/Hz)	Limit (dBuV/Hz)	Margin (dB)	Detector
1	1294.1000	36.55	-1.61	34.94	54.00	-19.06	AVG
2	1299.2000	46.39	-1.61	44.78	74.00	-29.22	peak
3	2482.4000	51.11	2.66	53.77	74.00	-20.23	peak
4 *	2482.4000	45.44	2.66	48.10	54.00	-5.90	AVG
5	3861.1000	29.38	7.04	36.42	54.00	-17.58	AVG
6	4032.8000	39.34	7.30	46.64	74.00	-27.36	peak
7	5056.2000	28.15	13.03	41.18	54.00	-12.82	AVG
8	5306.1000	34.06	13.73	47.79	74.00	-26.21	peak
9	10278.6000	22.98	26.00	48.98	74.00	-25.02	peak
10	11150.7000	13.80	28.12	41.92	54.00	-12.08	AVG
11	14224.3000	53.49	-10.54	42.95	54.00	-11.05	AVG
12	14805.7000	62.83	-10.69	52.14	74.00	-21.86	peak

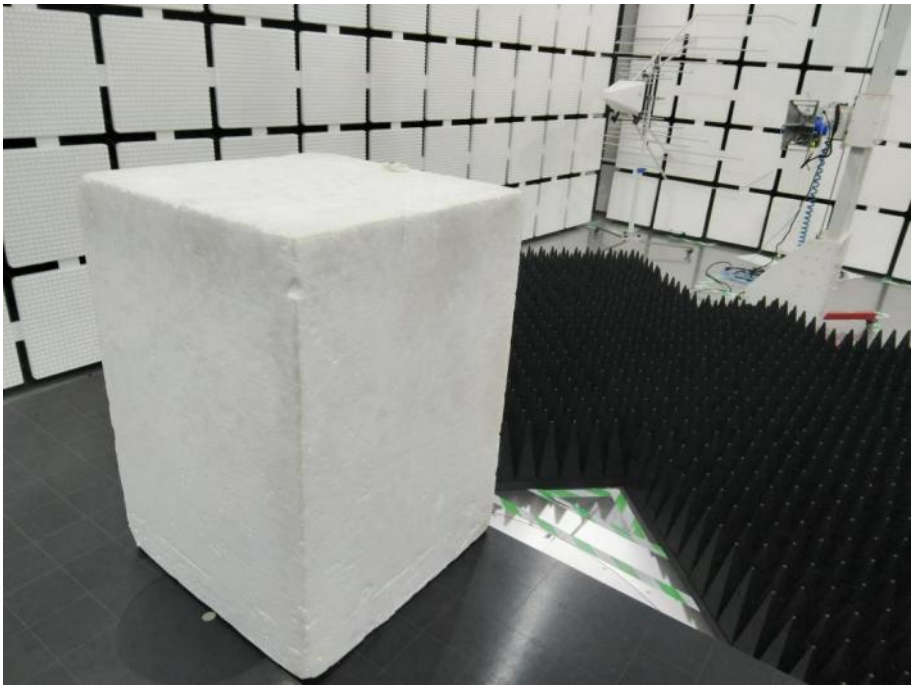
Note:
1) Level= Reading + Factor; Factor =Antenna Factor+ Cable Loss- Preamp Factor
2) Margin = Limit – Level
3) Average measurement was not performed if peak level is lower than average limit (54dBuV/m) for above 1GHz.

6. TEST SETUP PHOTOS

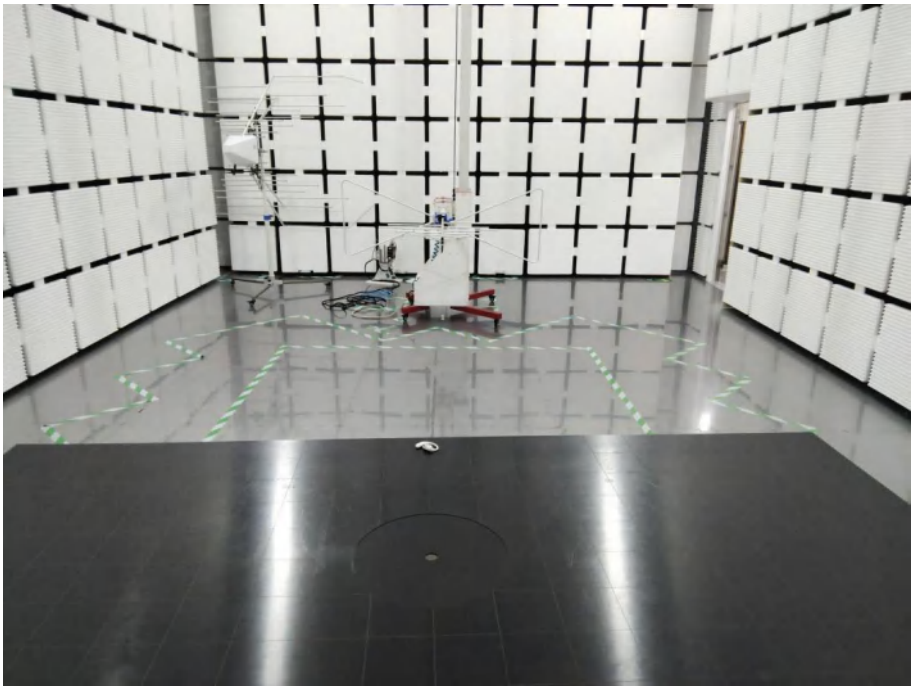
Conducted Emission at AC power line



Radiated band edge emission
Radiated Spurious Emission (Above 1GHz)

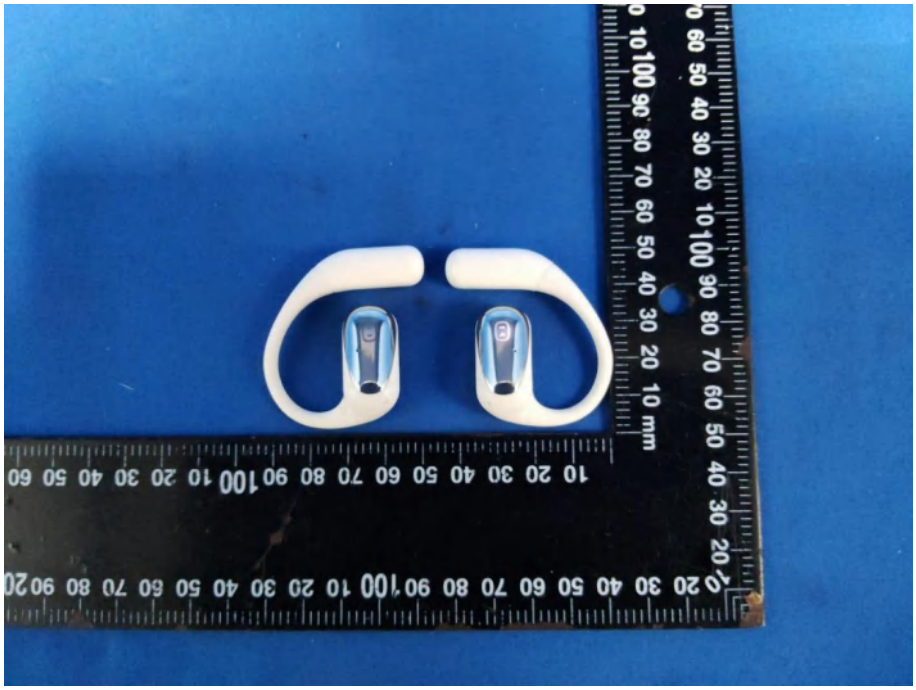


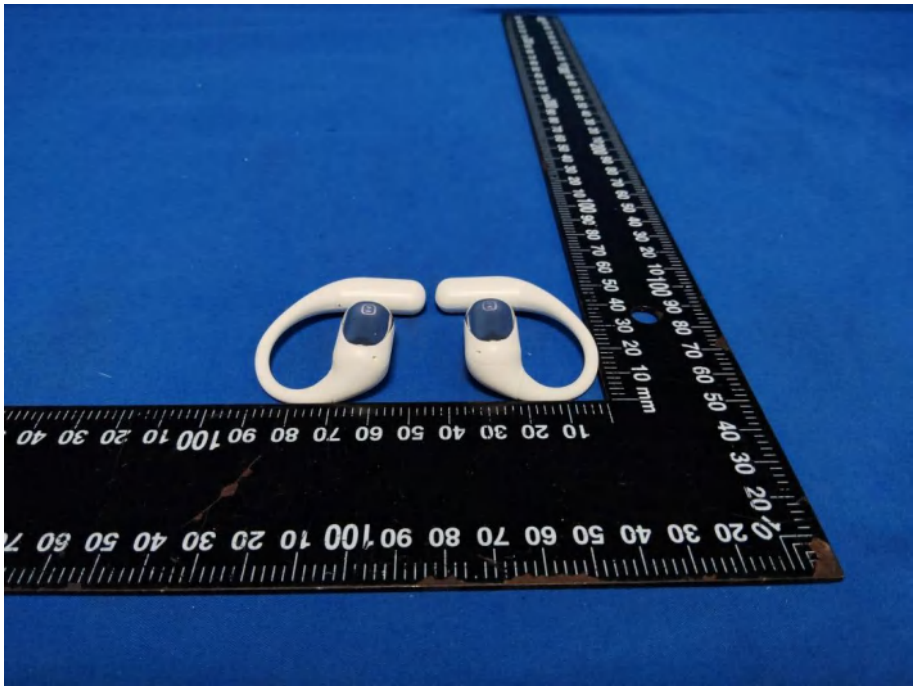
Radiated Spurious Emission (below 1GHz)

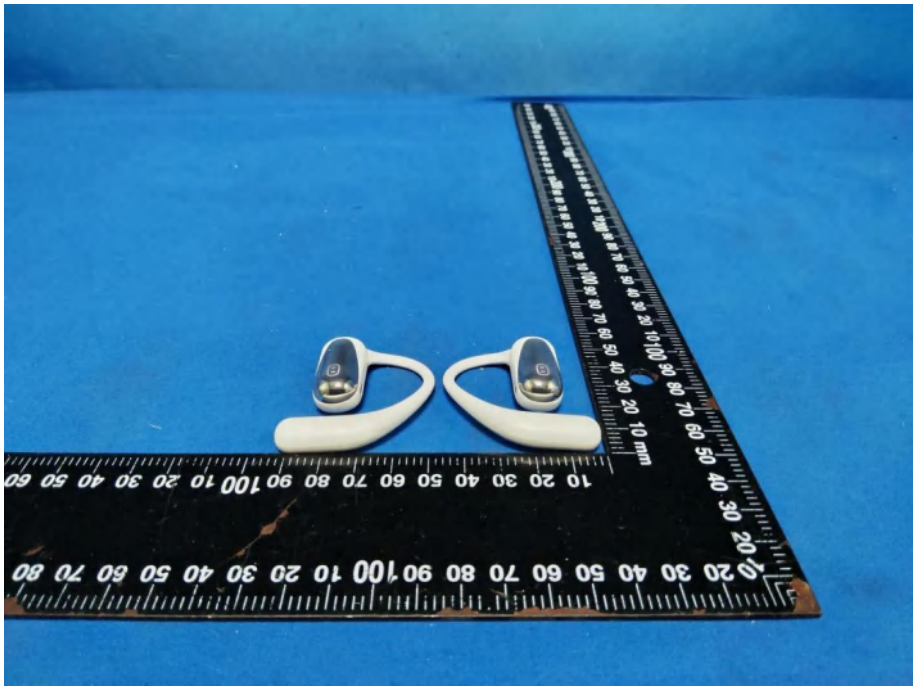


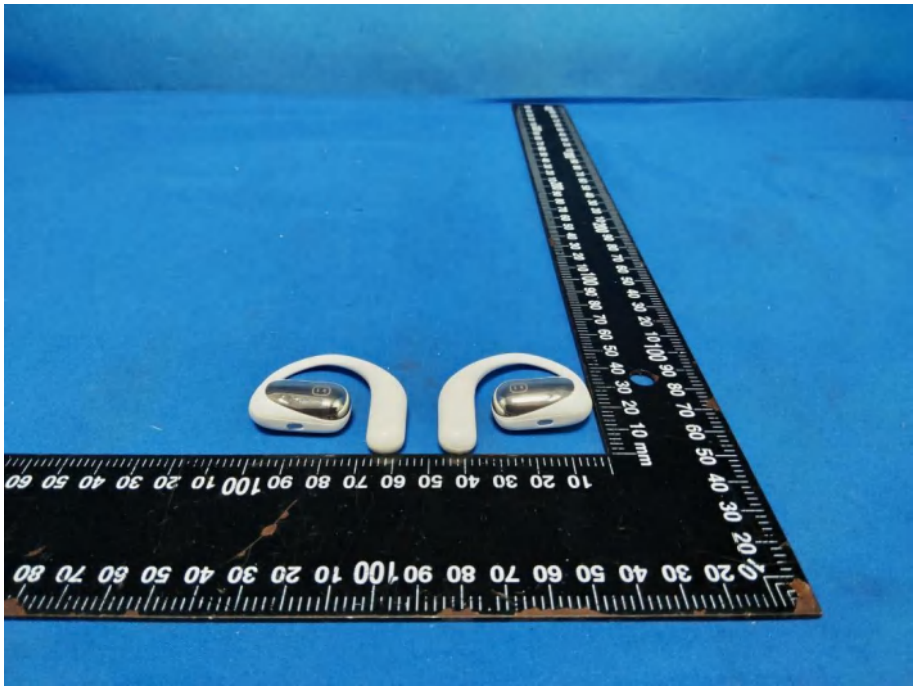
7. EXTERNAL AND INTERNAL PHOTOS

7.1. External Photos

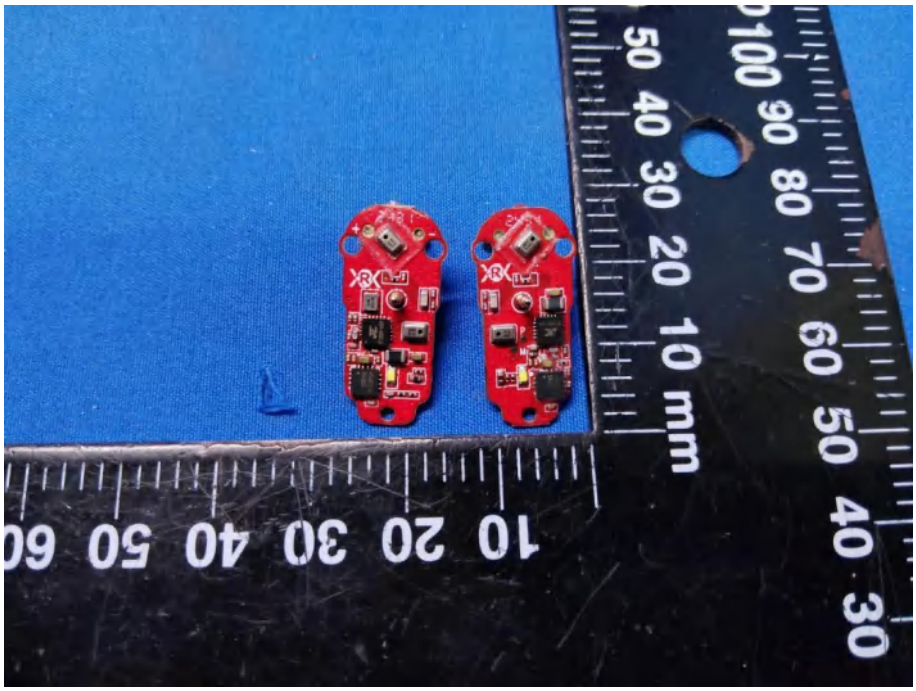


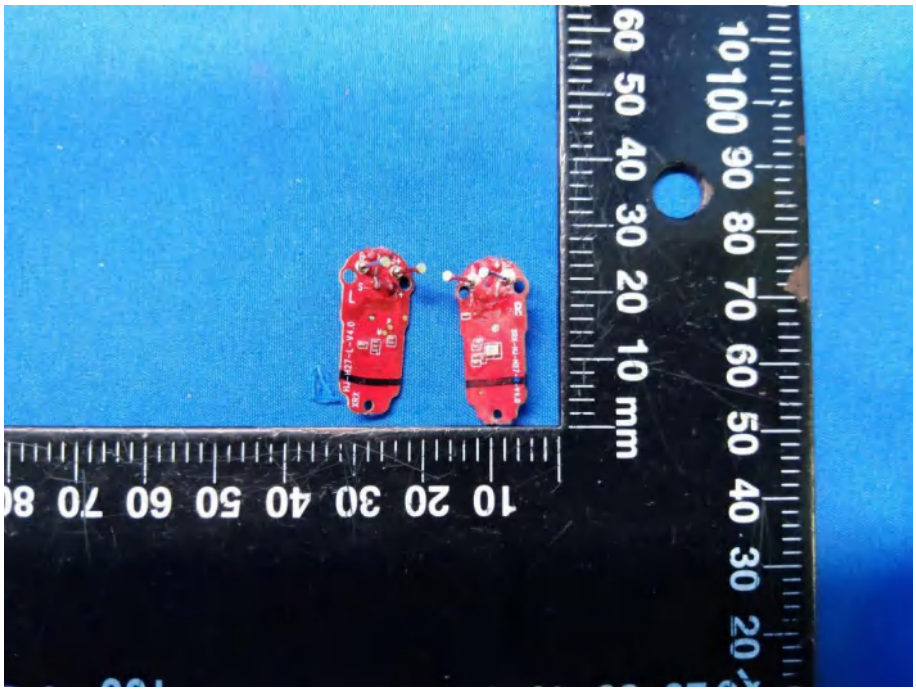


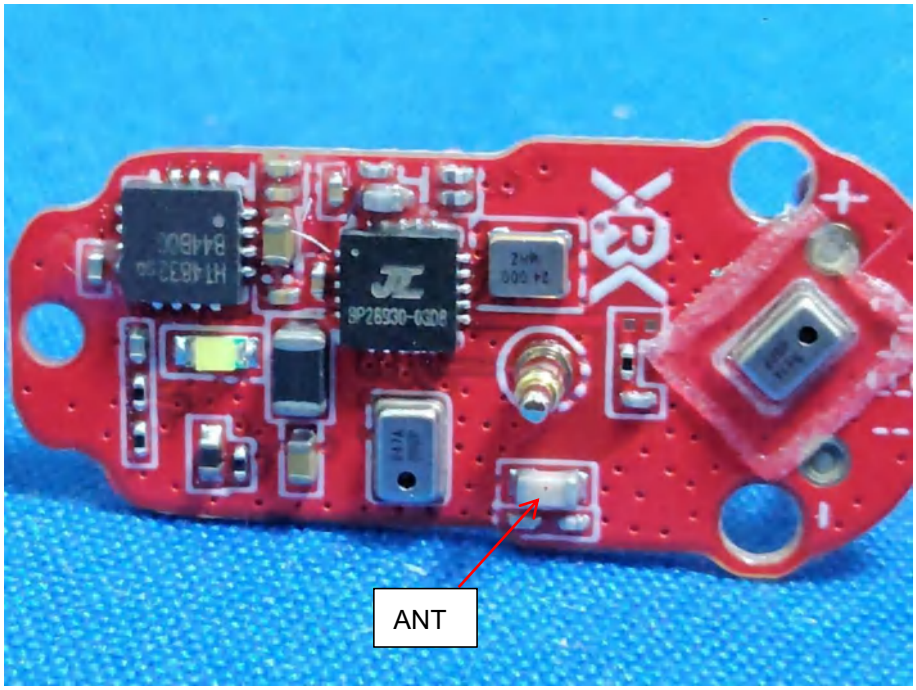


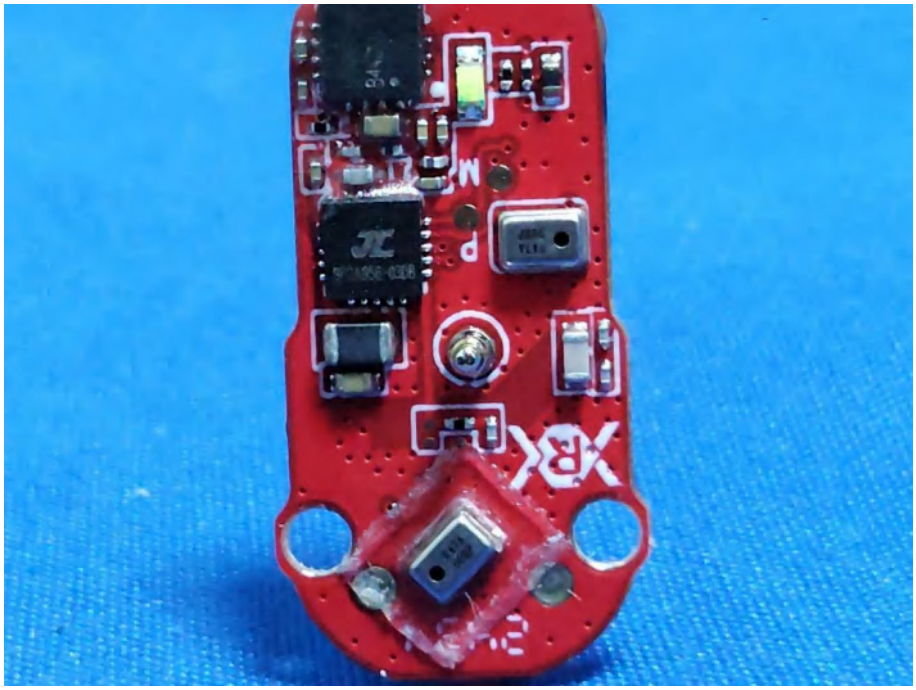


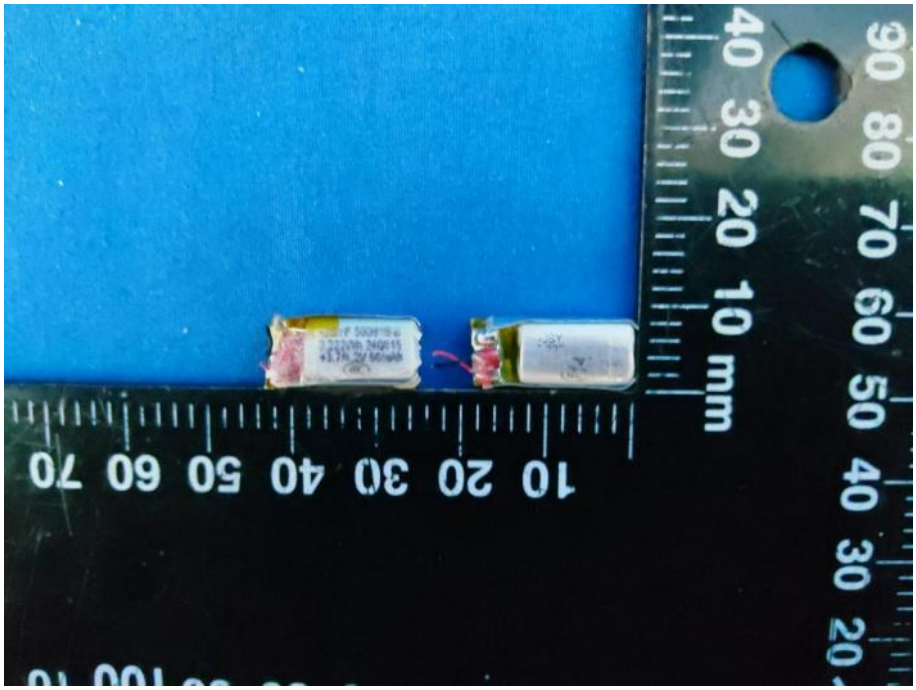
7.2. Internal Photos

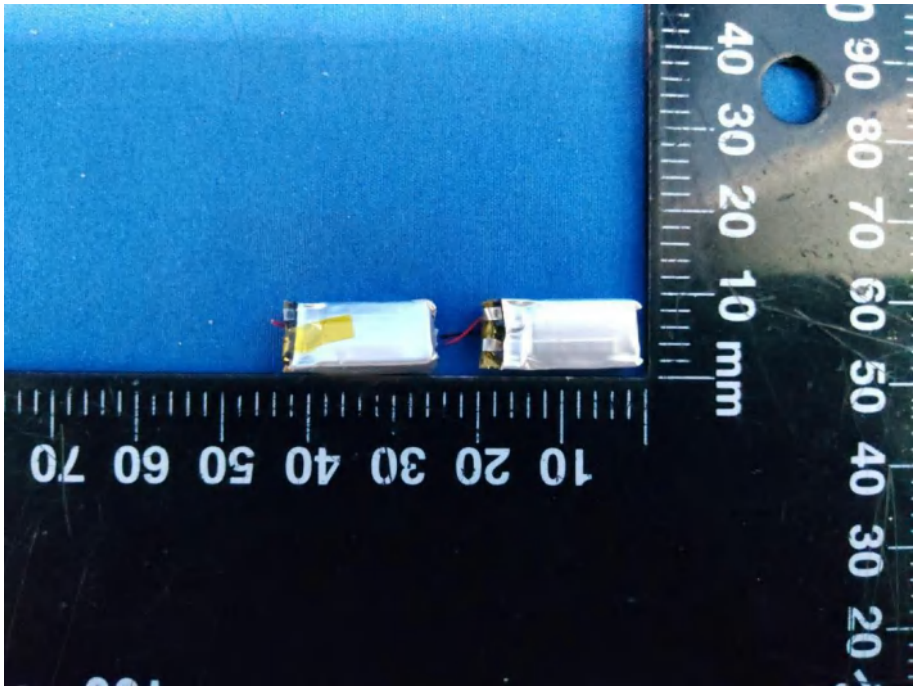





ANT




10 20 30 40 50 60 70
mm
10 20 30 40 50 60 70 80 90



8. Appendix Report

Appendix Report

Project No.:	CISR250617180
Test Engineer:	James Wang
Supervised by:	Rory Huang

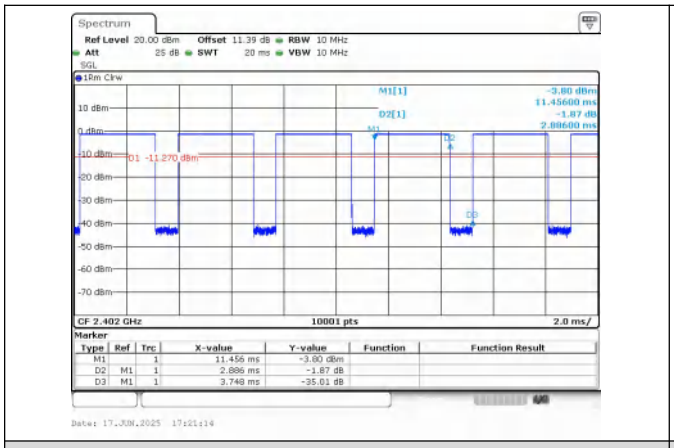
8.1. Duty Cycle

Test Result

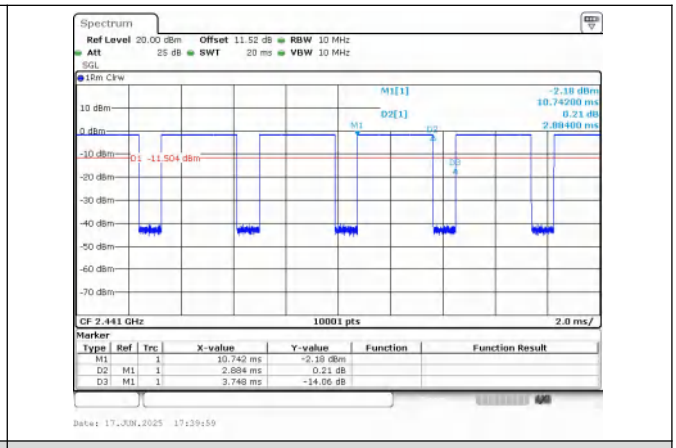
Left:

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.886	3.748	77.00	0.7700	1.1351	0.3465
		39	2.884	3.748	76.95	0.7695	1.1379	0.3467
		78	2.884	3.748	76.95	0.7695	1.1379	0.3467
π/4DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	0.3460
		39	2.890	3.748	77.11	0.7711	1.1289	0.3460
		78	2.890	3.748	77.11	0.7711	1.1289	0.3460
8DPSK	3-DH5	0	2.892	3.748	77.16	0.7716	1.1261	0.3458
		39	2.894	3.748	77.21	0.7721	1.1233	0.3455
		78	2.894	3.748	77.21	0.7721	1.1233	0.3455

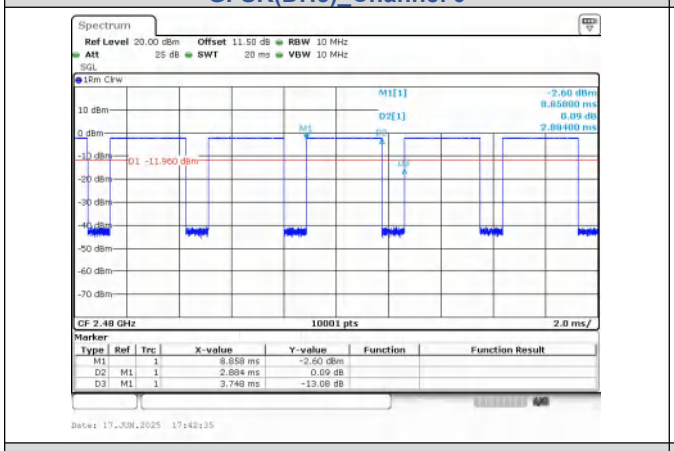
Test Graphs



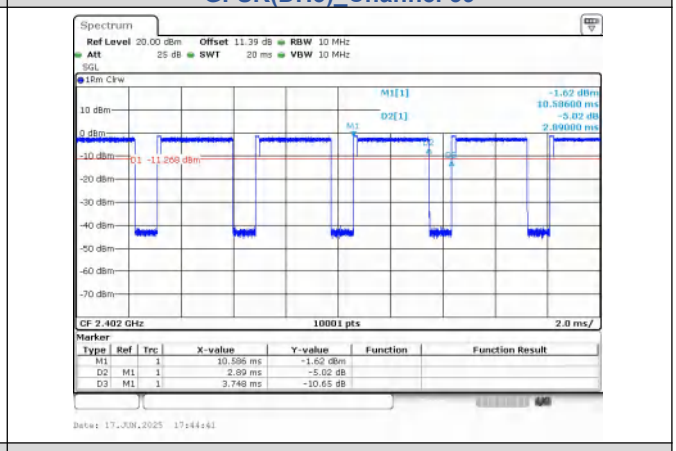
GFSK(DH5)_Channel 0



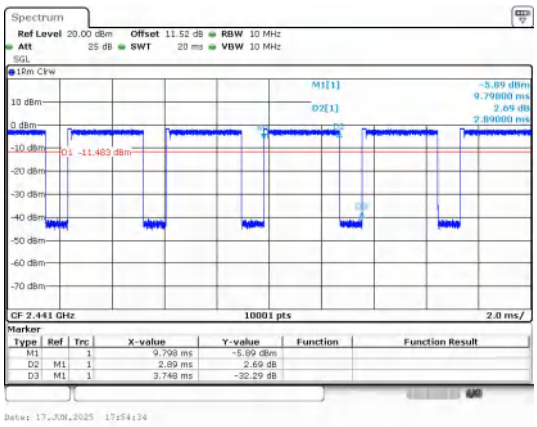
GFSK(DH5)_Channel 39



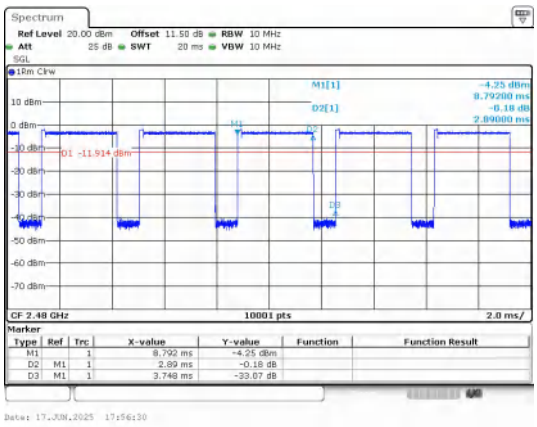
GFSK(DH5)_Channel 78



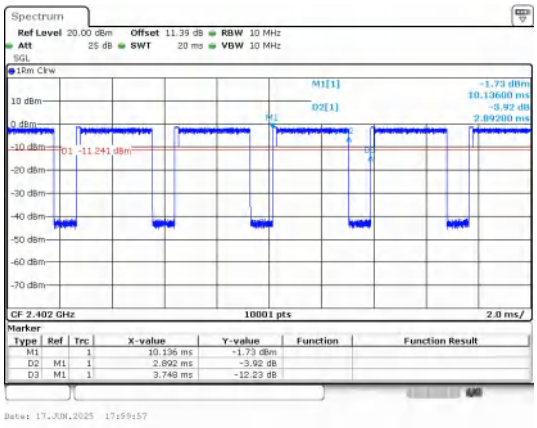
π/4DQPSK(2-DH5)_Channel 0



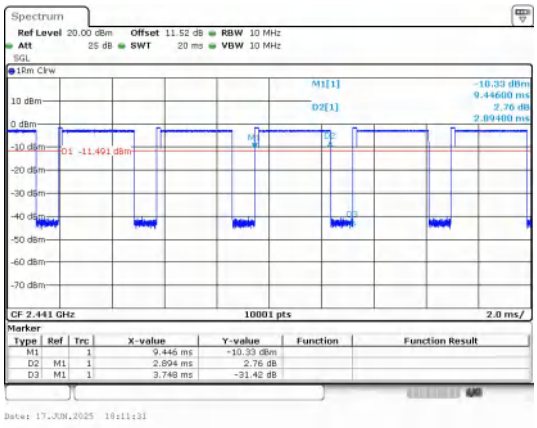
π/4DQPSK(2-DH5)_Channel 39



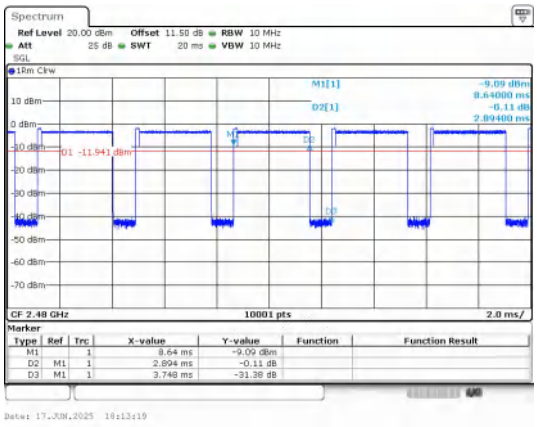
π/4DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0



8DPSK(3-DH5)_Channel 39

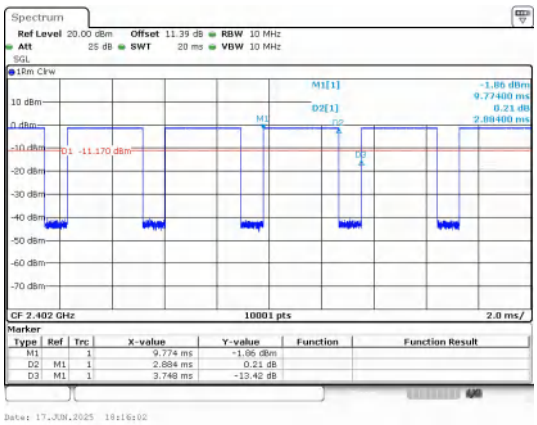


8DPSK(3-DH5)_Channel 78

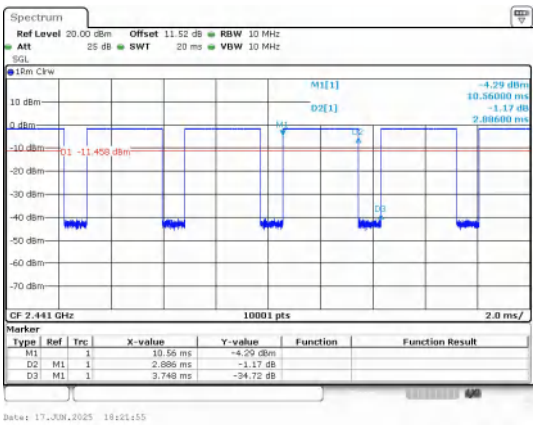
Right:

Modulation	Packets	Channel	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle (linear)	Duty Cycle Factor (dB)	1/T
GFSK	DH5	0	2.884	3.748	76.95	0.7695	1.1379	0.3467
		39	2.886	3.748	77.00	0.7700	1.1351	0.3465
		78	2.884	3.748	76.95	0.7695	1.1379	0.3467
π/4DQPSK	2-DH5	0	2.890	3.748	77.11	0.7711	1.1289	0.3460
		39	2.890	3.748	77.11	0.7711	1.1289	0.3460
		78	2.890	3.748	77.11	0.7711	1.1289	0.3460
8DPSK	3-DH5	0	2.892	3.748	77.16	0.7716	1.1261	0.3458
		39	2.892	3.748	77.16	0.7716	1.1261	0.3458
		78	2.892	3.748	77.16	0.7716	1.1261	0.3458

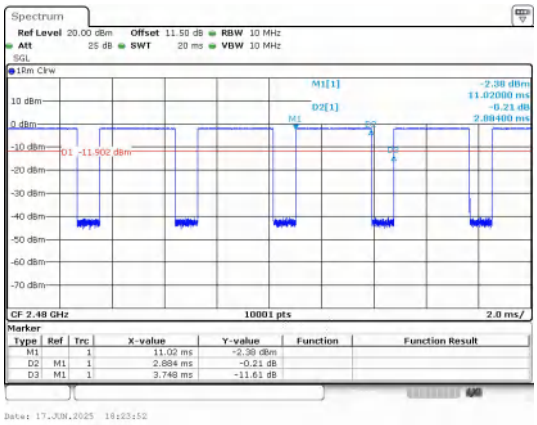
Test Graphs



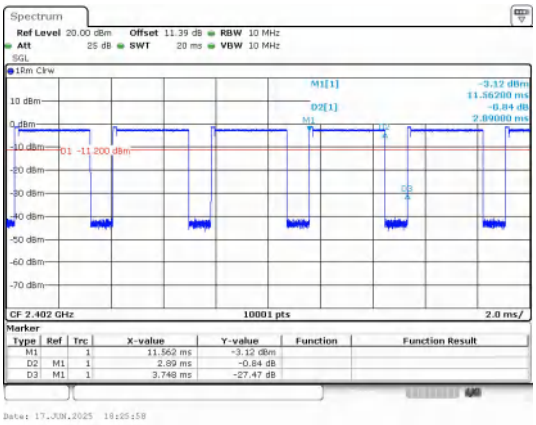
GFSK(DH5)_Channel 0



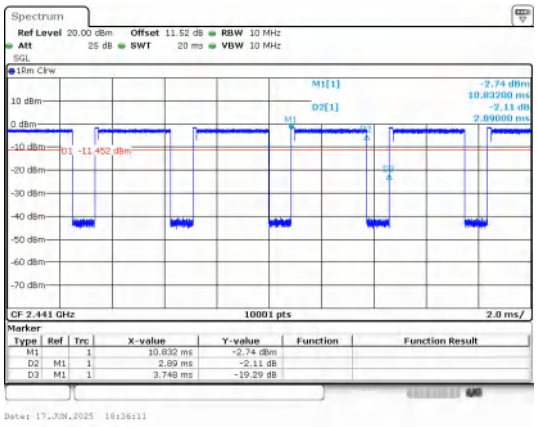
GFSK(DH5)_Channel 39



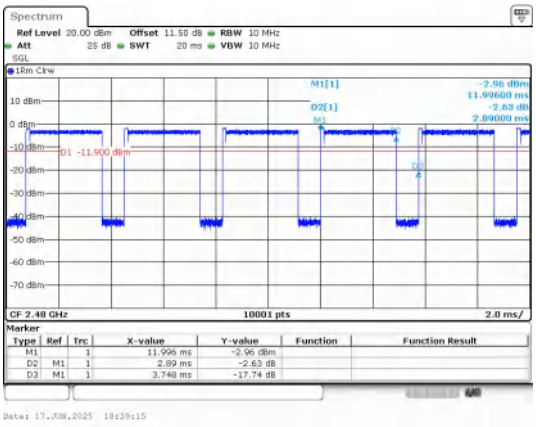
GFSK(DH5)_Channel 78



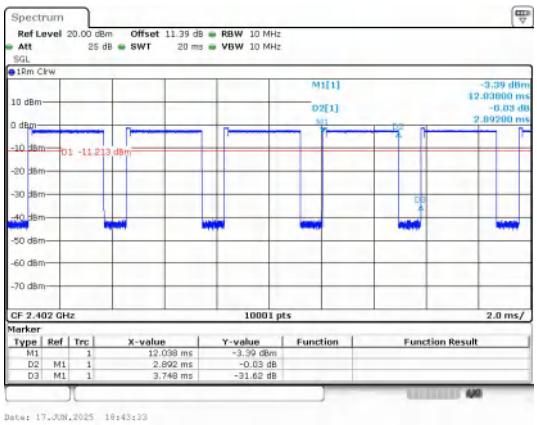
π/4DQPSK(2-DH5)_Channel 0



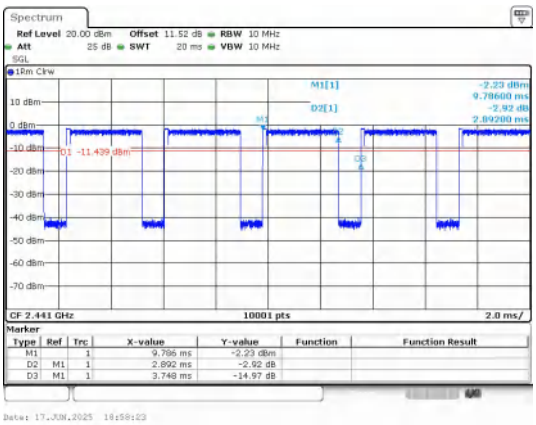
π/4DQPSK(2-DH5)_Channel 39

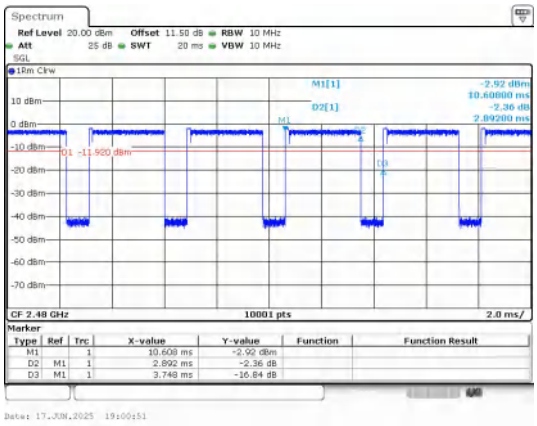


π/4DQPSK(2-DH5)_Channel 78



π/4DQPSK(2-DH5)_Channel 78



8DPSK(3-DH5)_Channel 0	8DPSK(3-DH5)_Channel 39
	
8DPSK(3-DH5)_Channel 78	

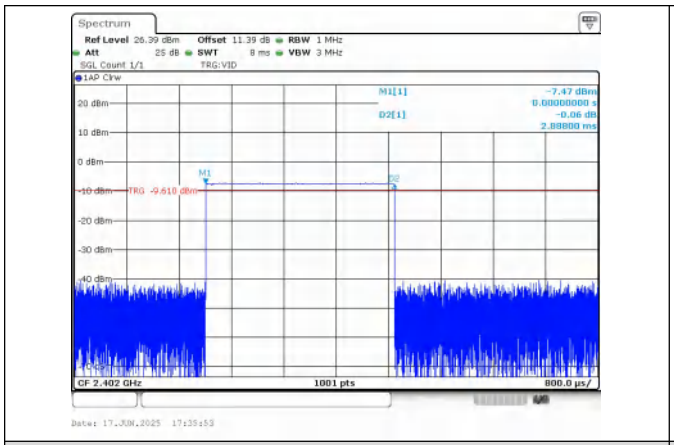
8.2. Dwell Time

Test Result

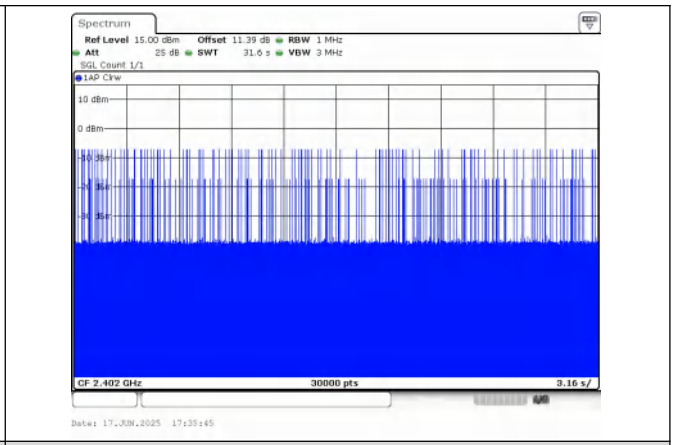
Left:

Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.888	115	332.12	< 400	PASS
π/4DQPSK	2-DH5		2.896	110	318.56		PASS
8DPSK	3-DH5		2.896	106	306.98		PASS

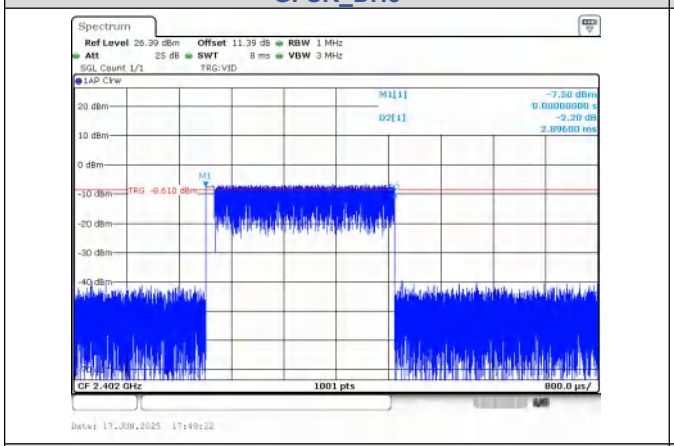
Test Graphs



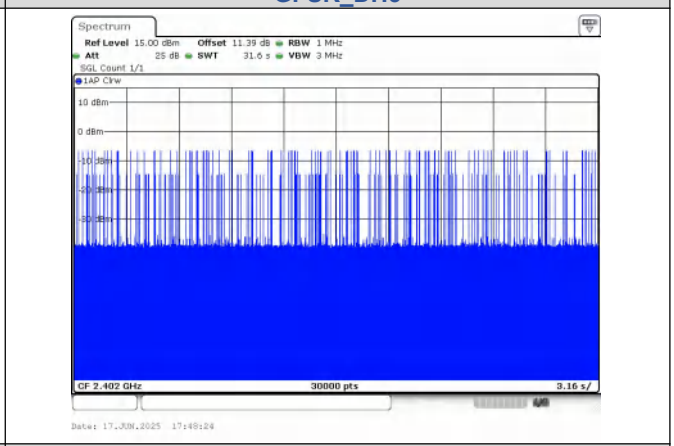
Pulse Width
GFSK_DH5



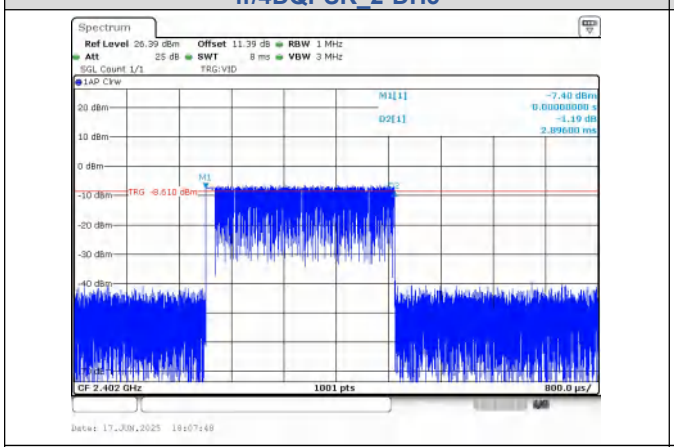
Number of Pulses in 31.6 seconds
GFSK_DH5



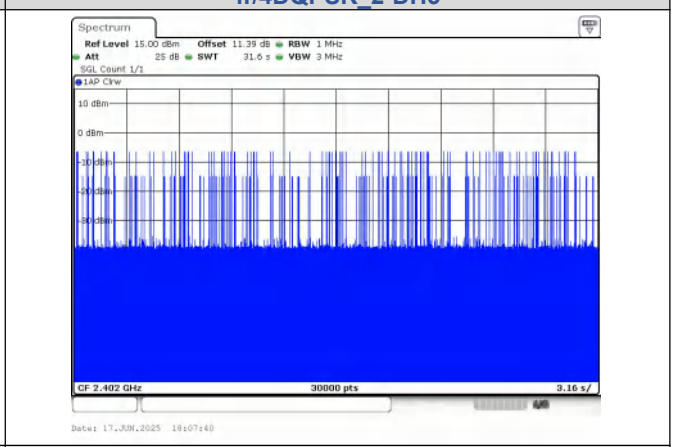
Pulse Width
π/4DQPSK_2-DH5



Number of Pulses in 31.6 seconds
π/4DQPSK_2-DH5



Pulse Width
8DPSK_3-DH5

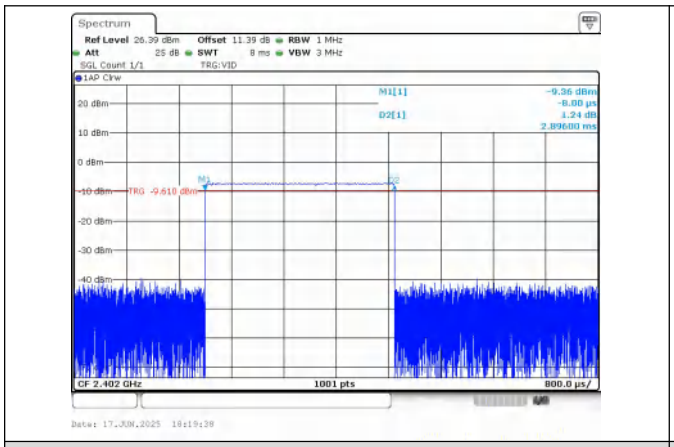


Number of Pulses in 31.6 seconds
8DPSK_3-DH5

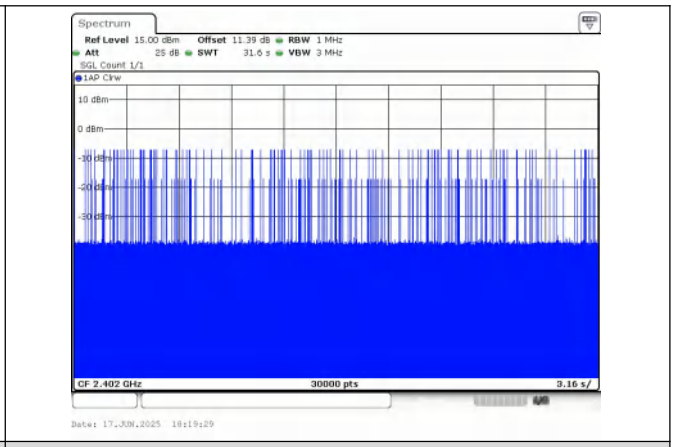
Right:

Modulation	Packet	Channel	Pulse Width (ms)	Number of Pulses in 31.6 seconds	Dwell Time (ms)	Limit (ms)	Result
GFSK	DH5	CH0 (2402MHz)	2.896	112	324.35	< 400	PASS
π/4DQPSK	2-DH5		2.896	96	278.02		PASS
8DPSK	3-DH5		2.896	113	327.25		PASS

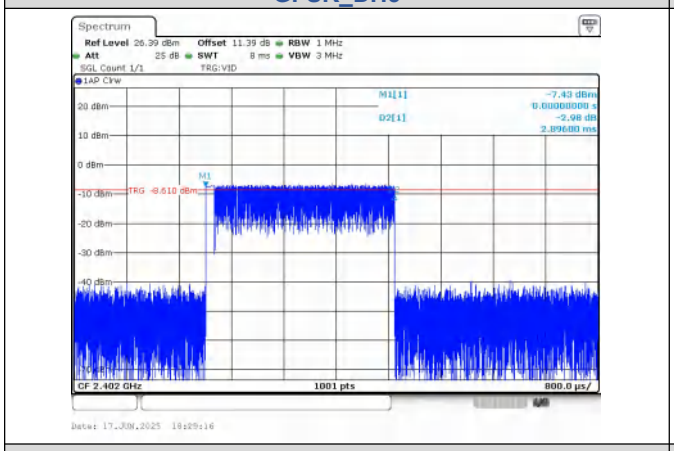
Test Graphs



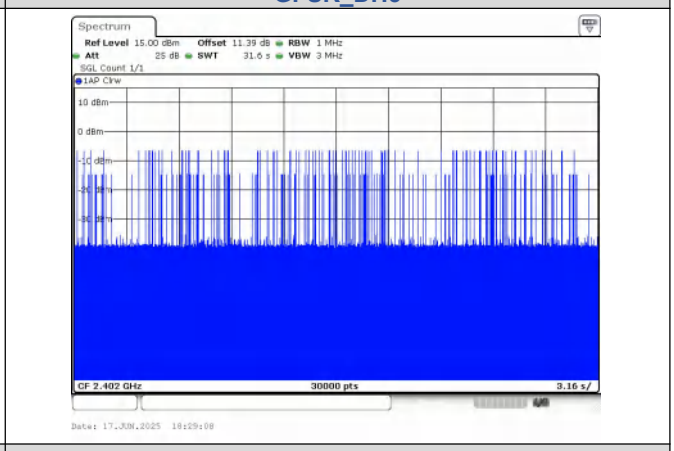
Pulse Width
GFSK_DH5



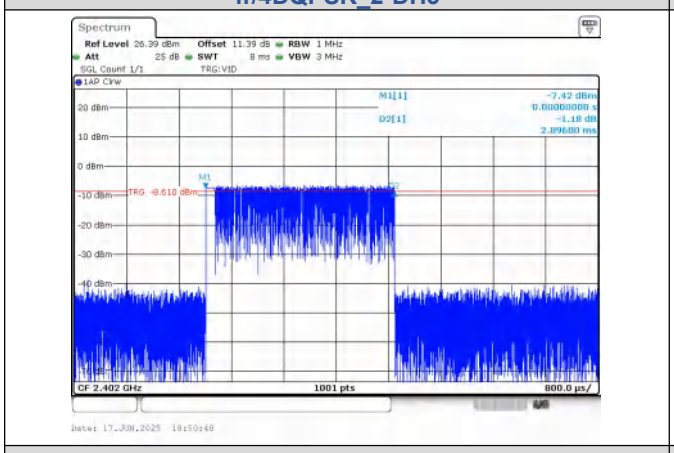
Number of Pulses in 31.6 seconds
GFSK_DH5



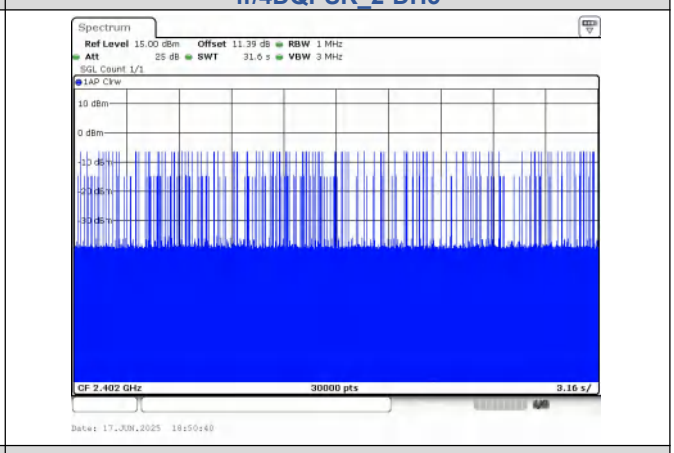
Pulse Width
π/4DQPSK_2-DH5



Number of Pulses in 31.6 seconds
π/4DQPSK_2-DH5



Pulse Width
8DPSK_3-DH5



Number of Pulses in 31.6 seconds
8DPSK_3-DH5

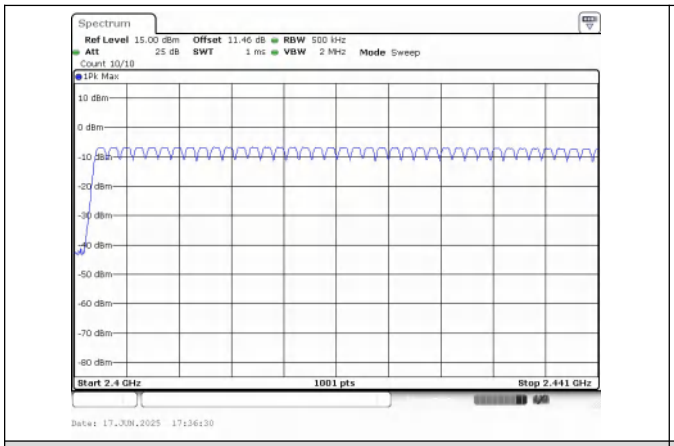
8.3. Number Of Hopping Channel

Test Result

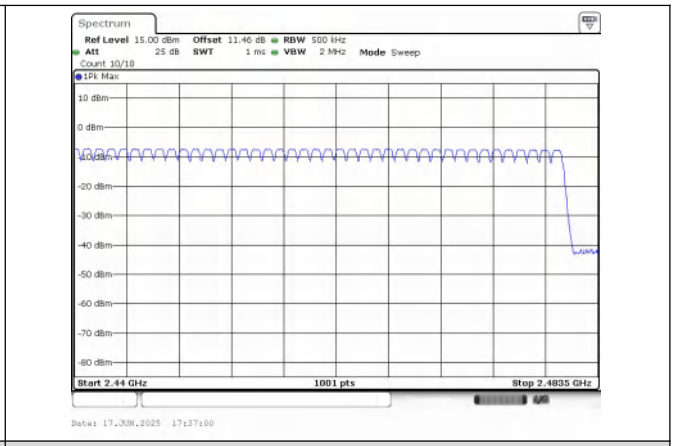
Left:

Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
π/4DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

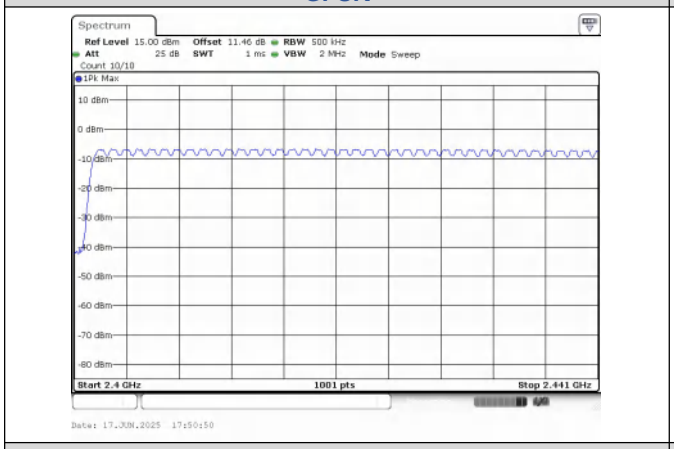
Test Graphs



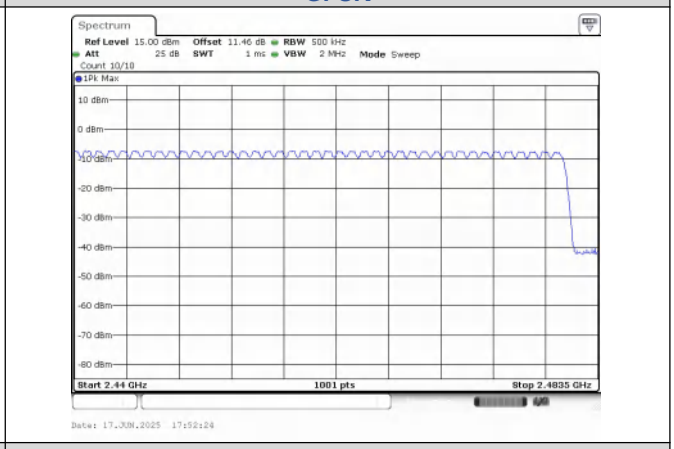
Low End Spectrum Channel Hopping Plot
GFSK



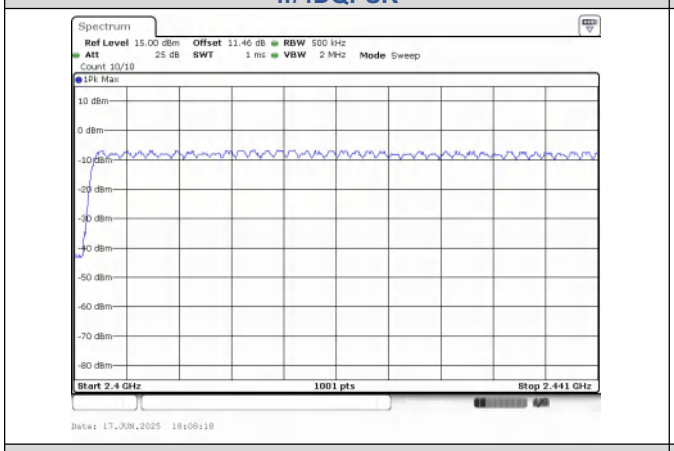
High End Spectrum Channel Hopping Plot
GFSK



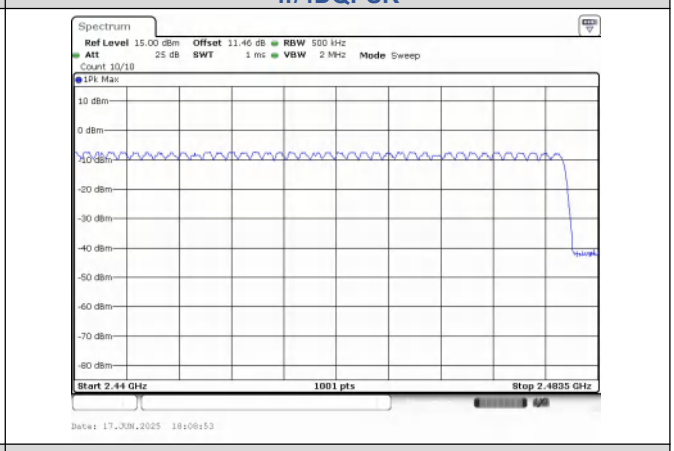
Low End Spectrum Channel Hopping Plot
π/4DQPSK



High End Spectrum Channel Hopping Plot
π/4DQPSK



Low End Spectrum Channel Hopping Plot
8DPSK

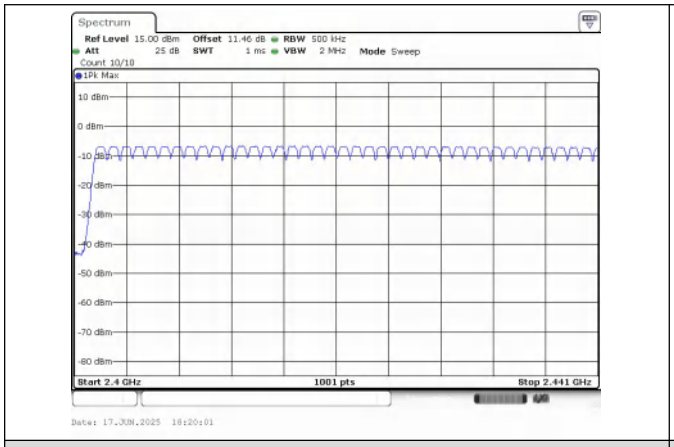


High End Spectrum Channel Hopping Plot
8DPSK

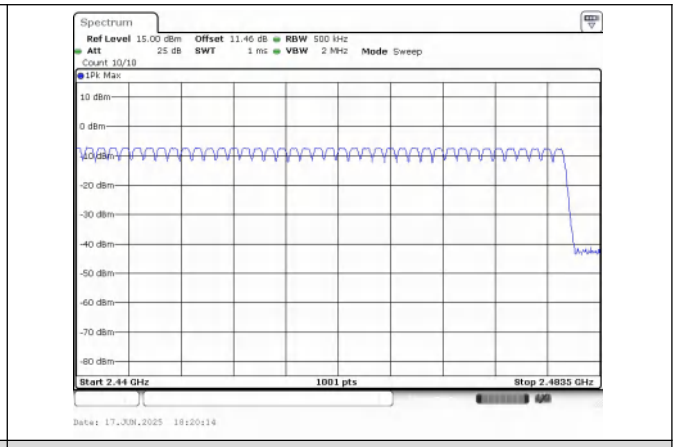
Right:

Modulation	Packet	Number of Hopping Channel	Limit	Result
GFSK	DH5	79	15	PASS
π/4DQPSK	2-DH5	79	15	PASS
8DPSK	3-DH5	79	15	PASS

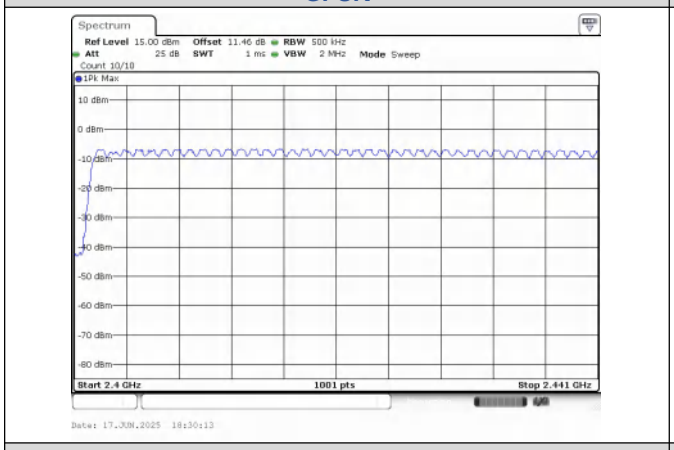
Test Graphs



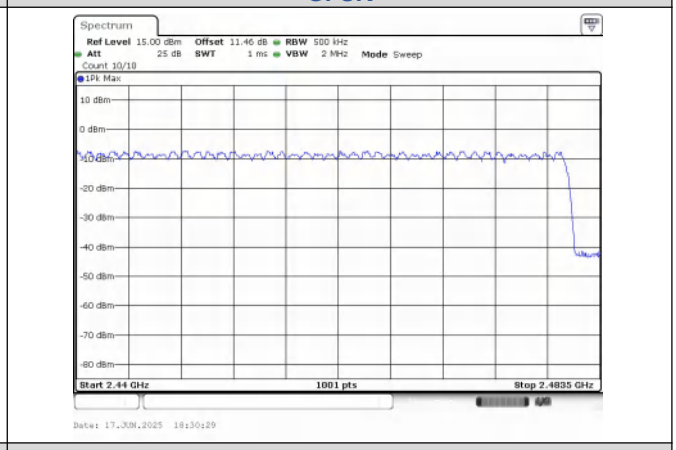
Low End Spectrum Channel Hopping Plot
GFSK



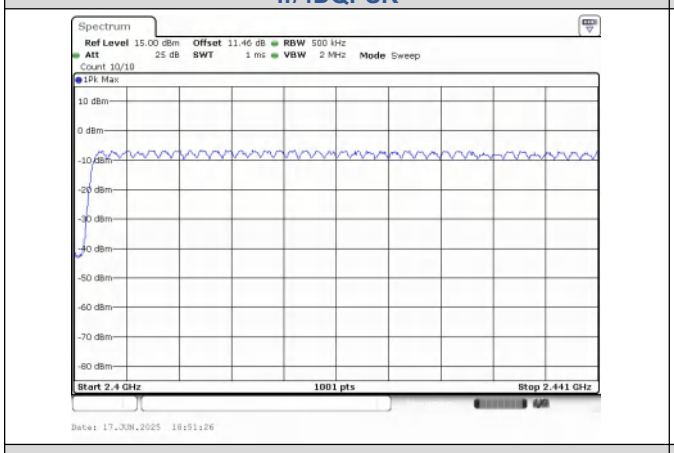
High End Spectrum Channel Hopping Plot
GFSK



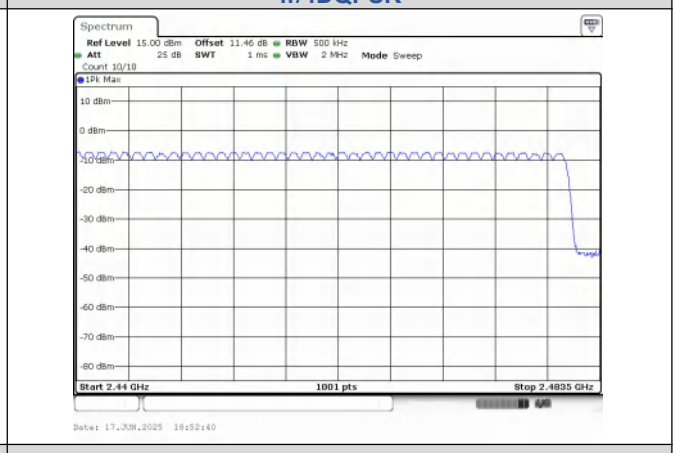
Low End Spectrum Channel Hopping Plot
π/4DQPSK



High End Spectrum Channel Hopping Plot
π/4DQPSK



Low End Spectrum Channel Hopping Plot
8DPSK



High End Spectrum Channel Hopping Plot
8DPSK

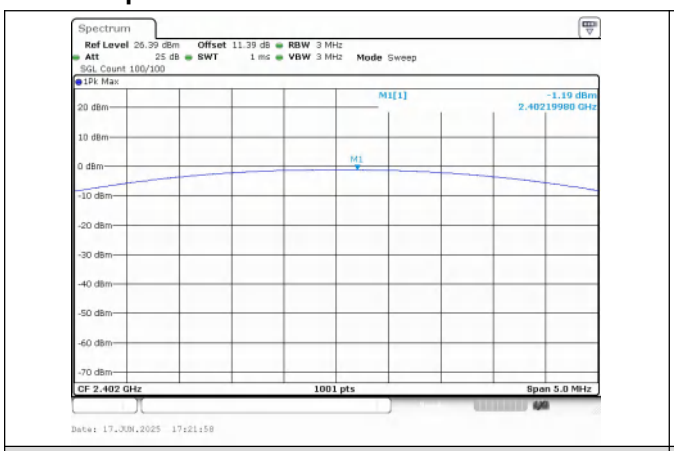
8.4. Conducted Peak Output Power

Test Result

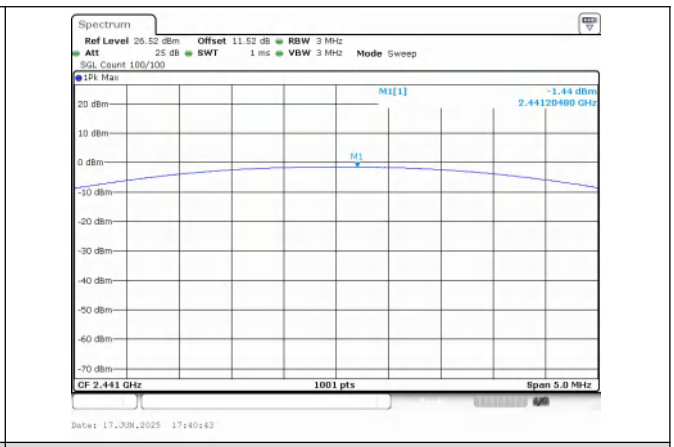
Left:

Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	-1.19	0.76	≤30	PASS
		39	-1.44	0.72		PASS
		78	-1.87	0.65		PASS
π/4DQPSK	2-DH5	0	-0.29	0.94	≤20.97	PASS
		39	-0.51	0.89		PASS
		78	-0.91	0.81		PASS
8DPSK	3-DH5	0	0.07	1.02		PASS
		39	-0.22	0.95		PASS
		78	-0.63	0.86		PASS

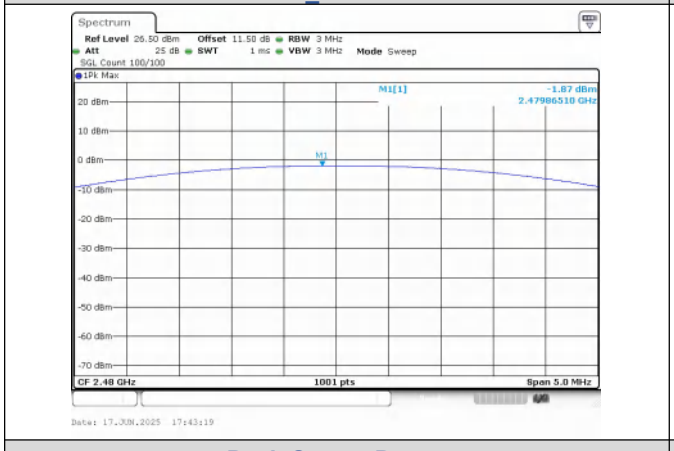
Test Graphs



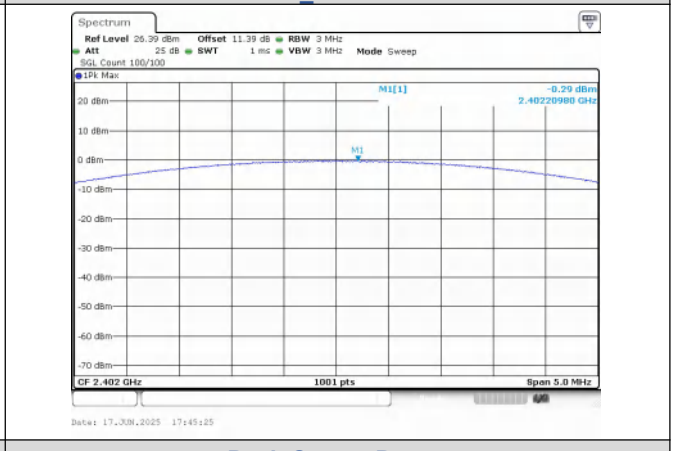
Peak Output Power
GFSK_Channel 0



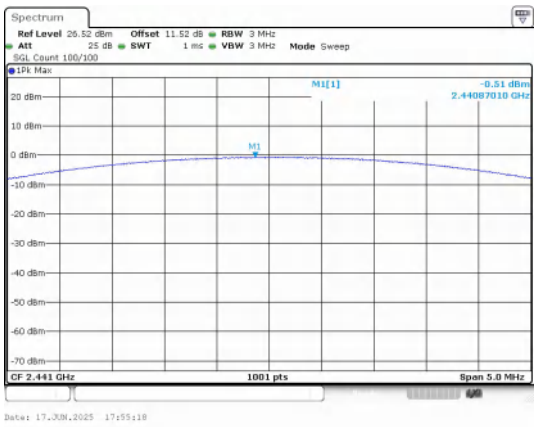
Peak Output Power
GFSK_Channel 39



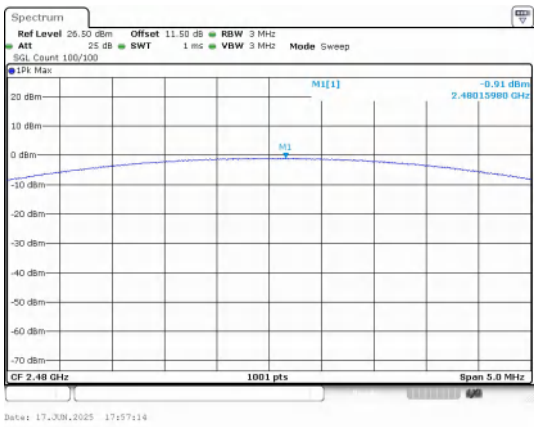
Peak Output Power
GFSK_Channel 78



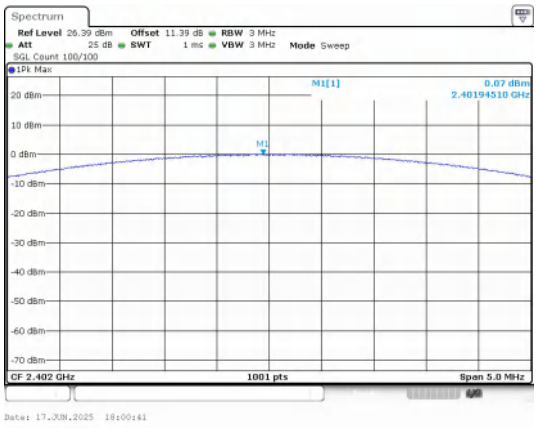
Peak Output Power
π/4DQPSK_Channel 0



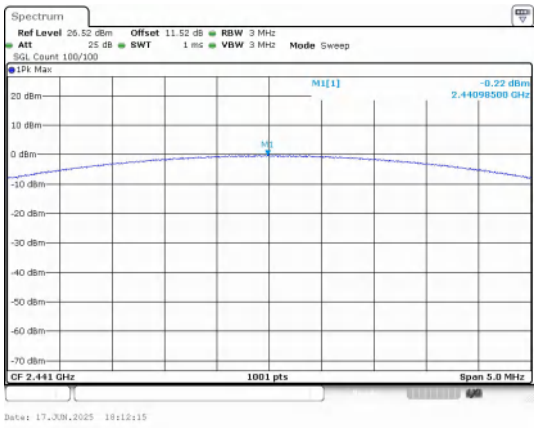
Peak Output Power
π/4DQPSK_Channel 39



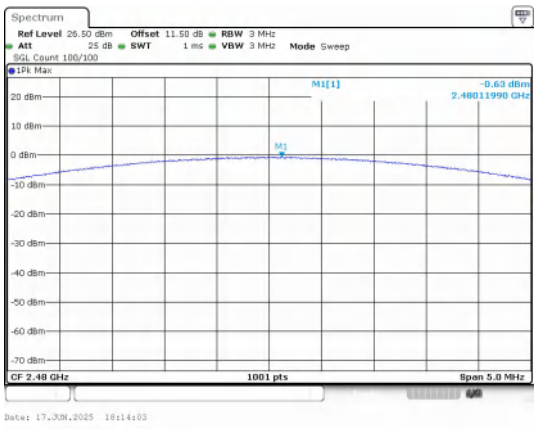
Peak Output Power
π/4DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



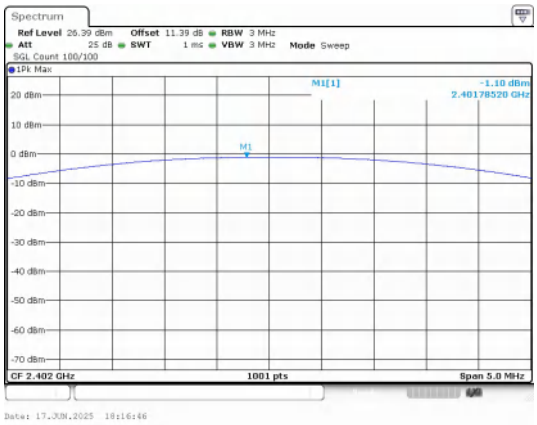
Peak Output Power
8DPSK_Channel 78

Right:

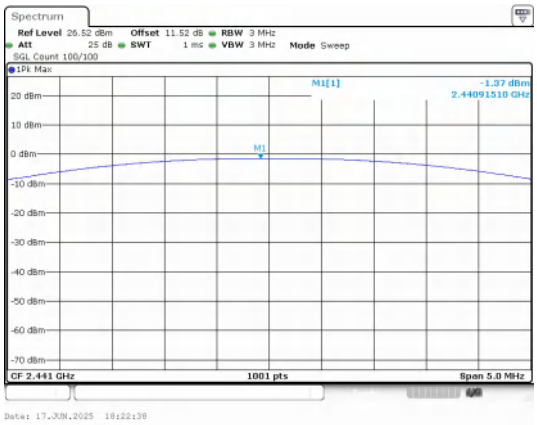
Modulation	Packet Type	Channel	Peak Output Power (dBm)	Peak Output Power (mW)	Limit (dBm)	Result
GFSK	DH5	0	-1.10	0.78	≤30	PASS
		39	-1.37	0.73		PASS
		78	-1.81	0.66		PASS
π/4DQPSK	2-DH5	0	-0.23	0.95	≤20.97	PASS
		39	-0.50	0.89		PASS
		78	-0.90	0.81		PASS
8DPSK	3-DH5	0	0.11	1.03		PASS
		39	-0.18	0.96		PASS

		78	-0.63	0.86		PASS

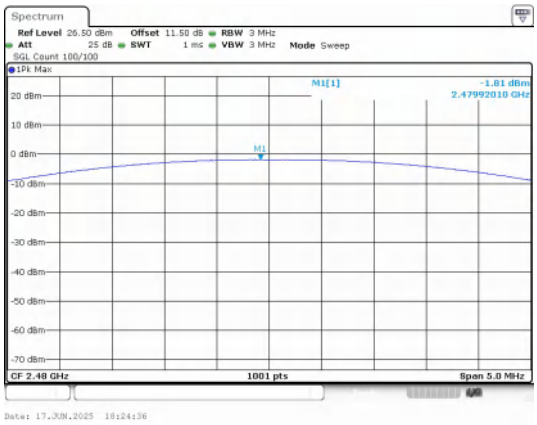
Test Graphs



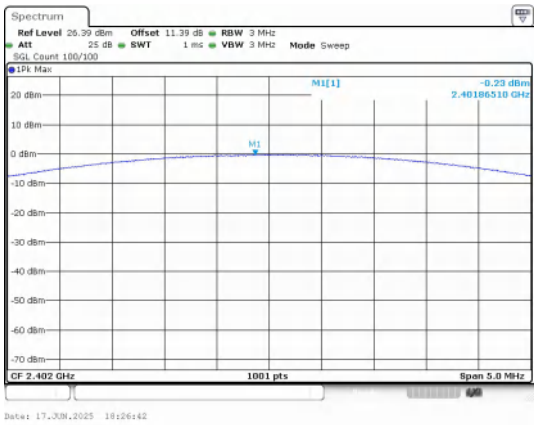
Peak Output Power GFSK_Channel 0



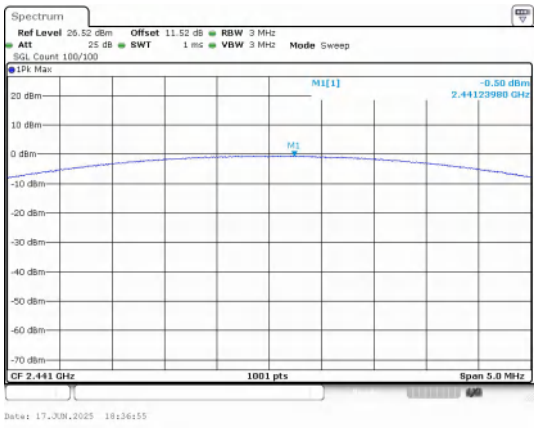
Peak Output Power GFSK_Channel 39



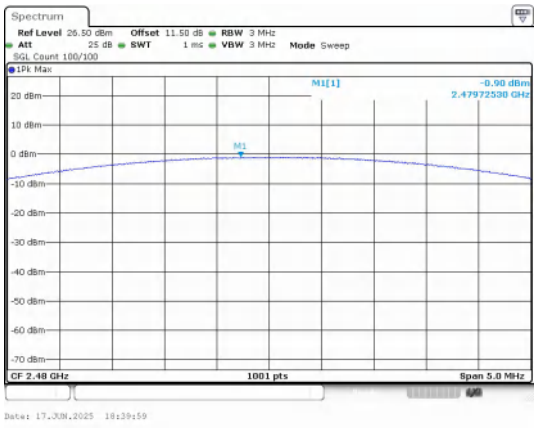
Peak Output Power GFSK_Channel 78



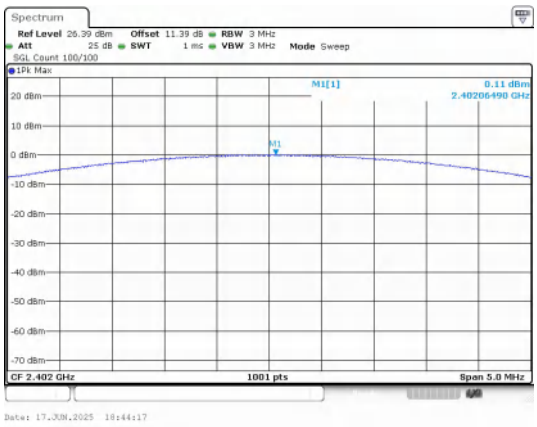
Peak Output Power π/4DQPSK_Channel 0



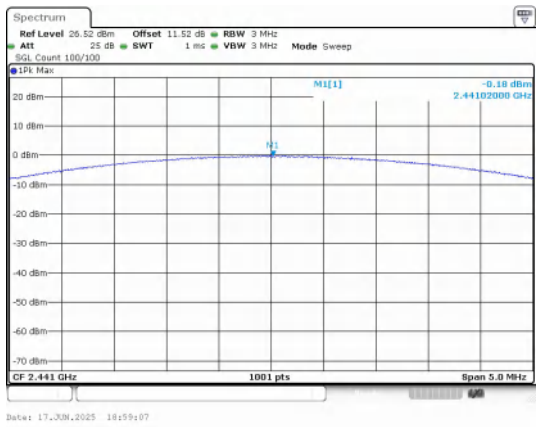
Peak Output Power π/4DQPSK_Channel 39



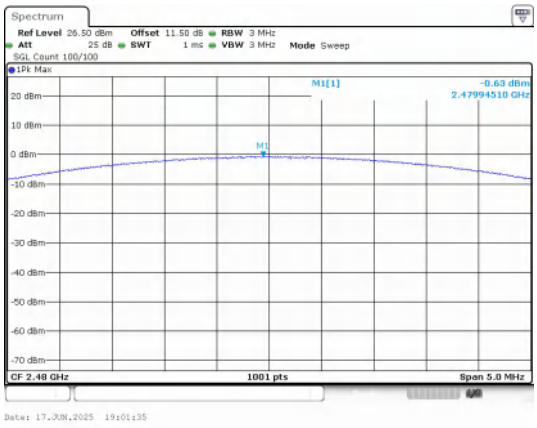
Peak Output Power π/4DQPSK_Channel 78



Peak Output Power
8DPSK_Channel 0



Peak Output Power
8DPSK_Channel 39



Peak Output Power
8DPSK_Channel 78

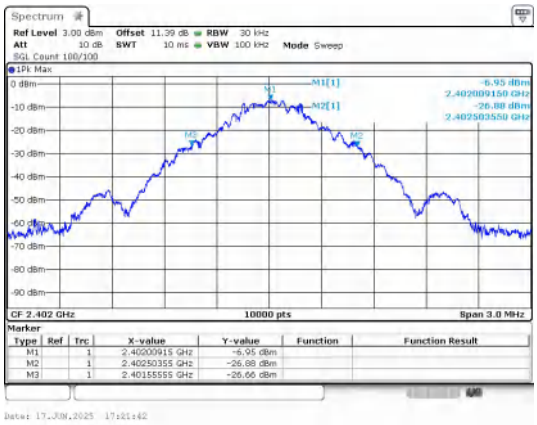
8.5. 20dB Bandwidth

Test Result

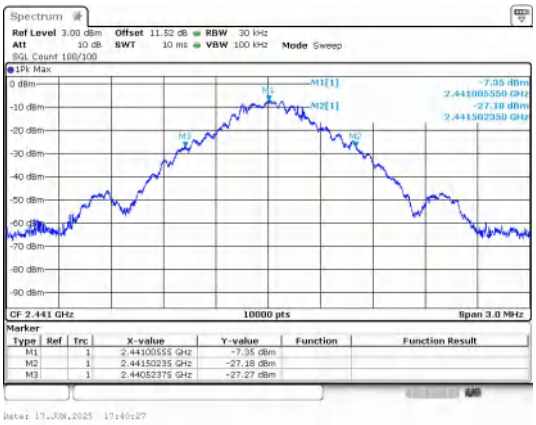
Left:

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	0.94
	39	2441 MHz	0.94
	78	2480 MHz	0.94
π/4DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.280
	78	2480 MHz	1.280
8DPSK	0	2402 MHz	1.300
	39	2441 MHz	1.290
	78	2480 MHz	1.290

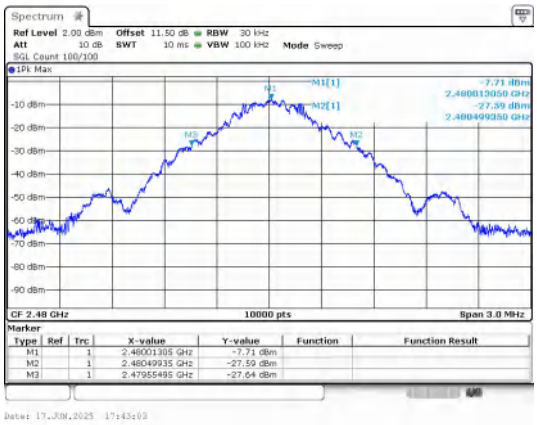
Test Graphs



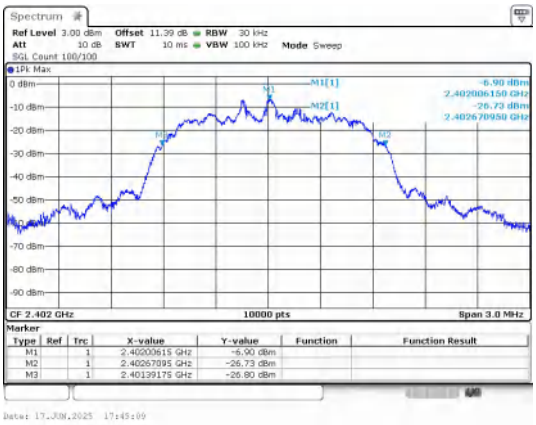
GFSK_DH5_Channel 0



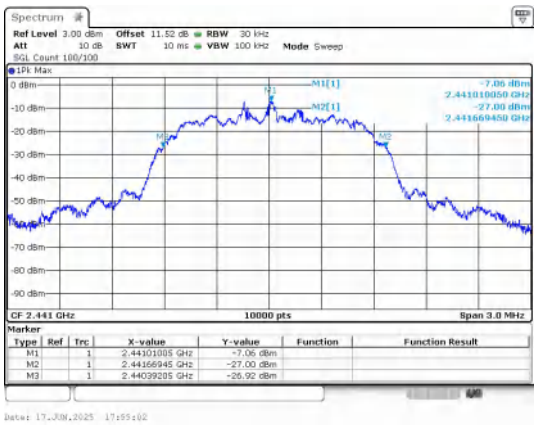
GFSK_DH5_Channel 39



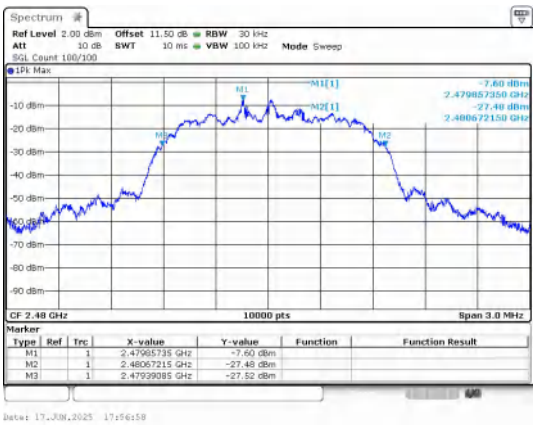
GFSK_DH5_Channel 78



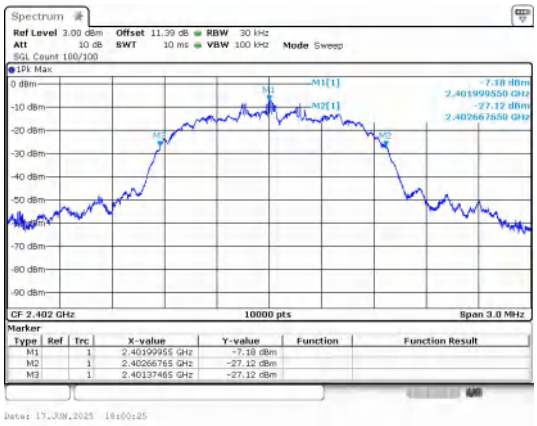
π/4DQPSK_2-DH5_Channel 0



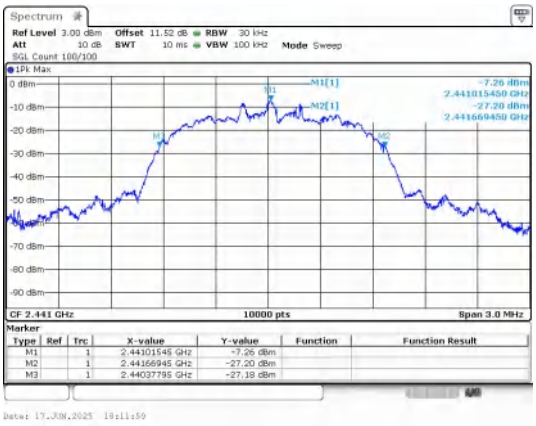
π/4DQPSK_2-DH5_Channel 0



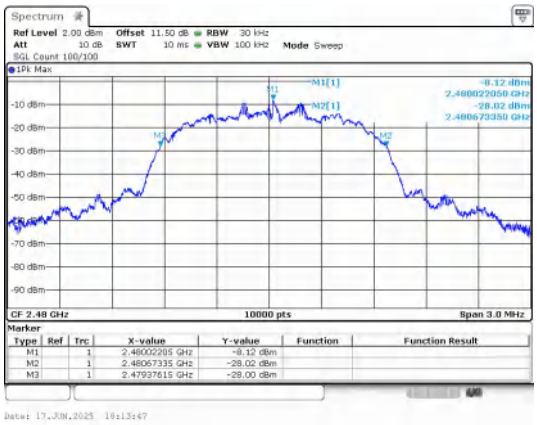
π/4DQPSK_2-DH5_Channel 39



π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



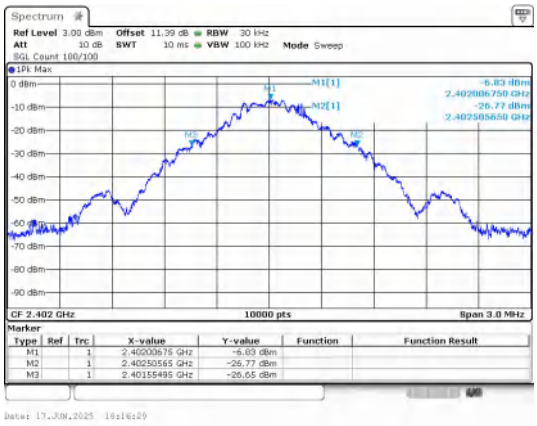
8DPSK_3-DH5_Channel 78

8DPSK_3-DH5_Channel 39

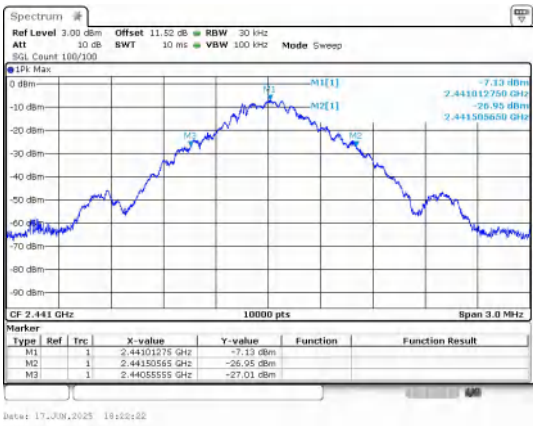
Right:

Modulation	Channel	Center Frequency (MHz)	20 dB Bandwidth (MHz)
GFSK	0	2402 MHz	0.98
	39	2441 MHz	0.98
	78	2480 MHz	0.98
π/4DQPSK	0	2402 MHz	1.280
	39	2441 MHz	1.280
	78	2480 MHz	1.280
8DPSK	0	2402 MHz	1.280
	39	2441 MHz	1.280
	78	2480 MHz	1.280

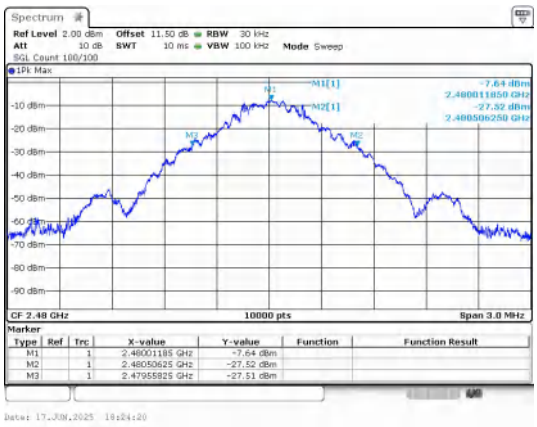
Test Graphs



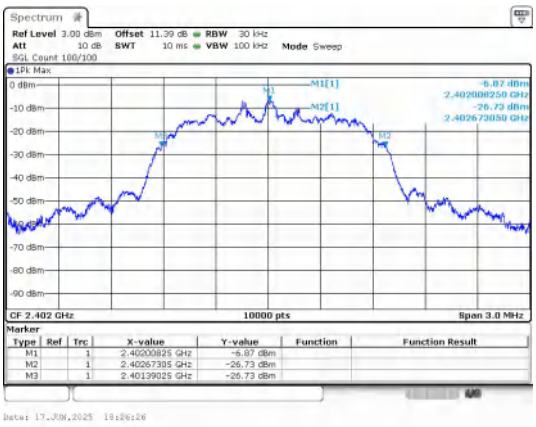
GFSK_DH5_Channel 0



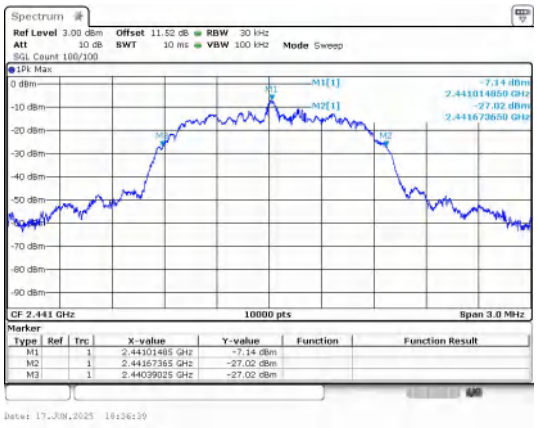
GFSK_DH5_Channel 39



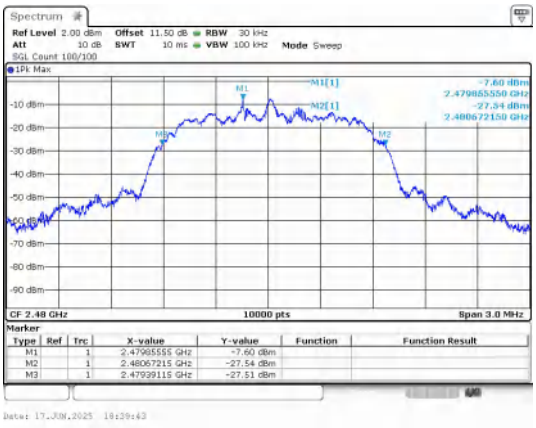
GFSK_DH5_Channel 78



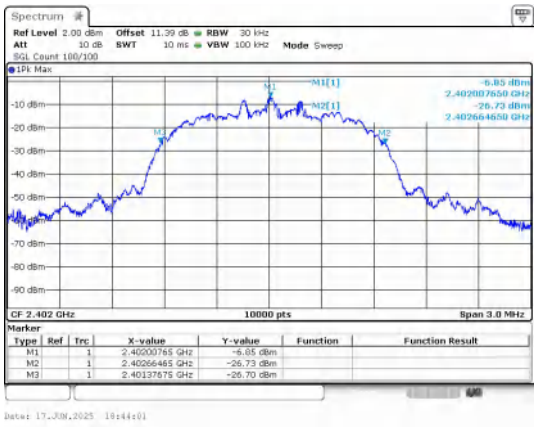
π/4DQPSK_2-DH5_Channel 0



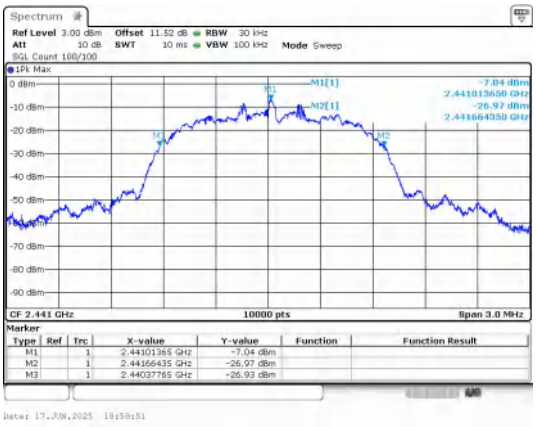
π/4DQPSK_2-DH5_Channel 39



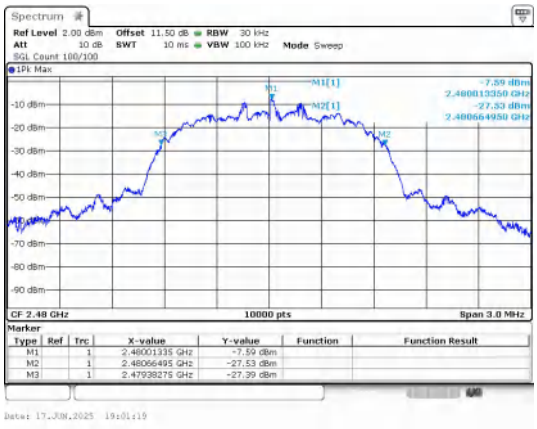
π/4DQPSK_2-DH5_Channel 78



8DPSK_3-DH5_Channel 0



8DPSK_3-DH5_Channel 39



8DPSK_3-DH5_Channel 78

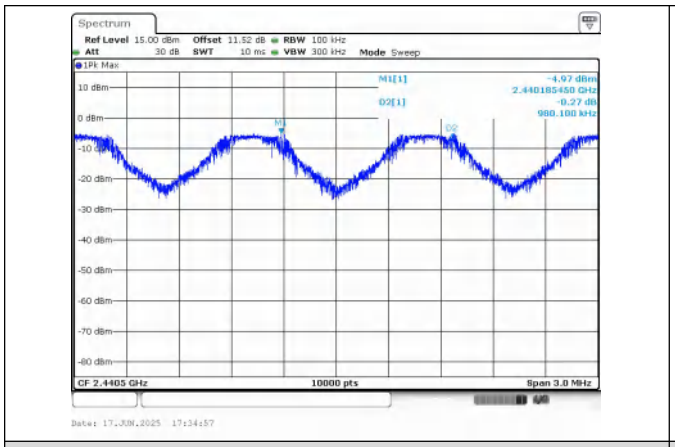
8.6. Carrier Frequencies Separation

Test Result

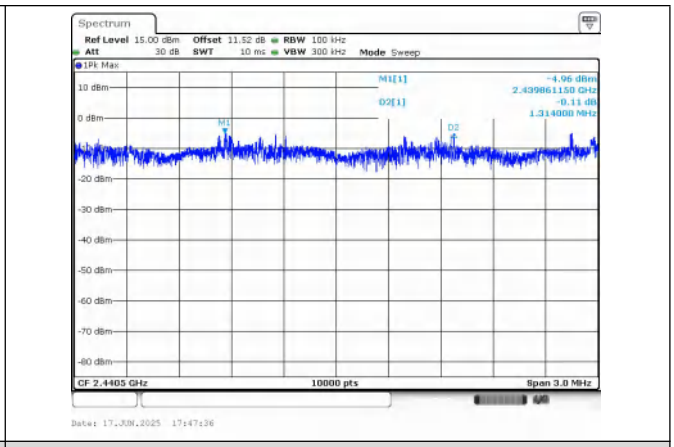
Left:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.1854	2441.1656	0.9801	0.94	PASS
π/4DQPSK	2-DH5	2439.8612	2441.1752	1.3140	0.853	PASS
8DPSK	3-DH5	2440.0114	2441.1901	1.1787	0.867	PASS

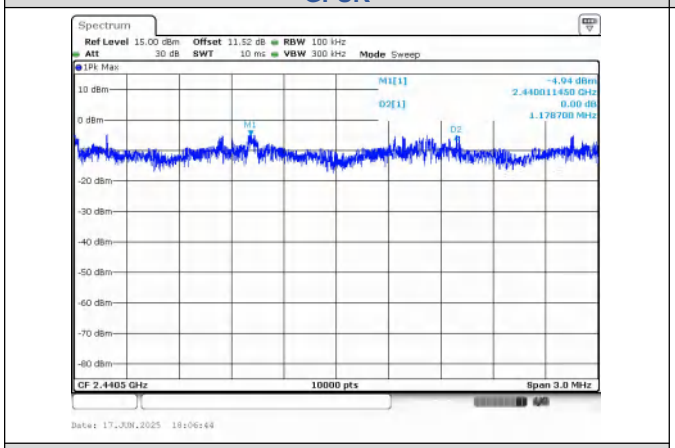
Test Graphs



GFSK



π/4DQPSK

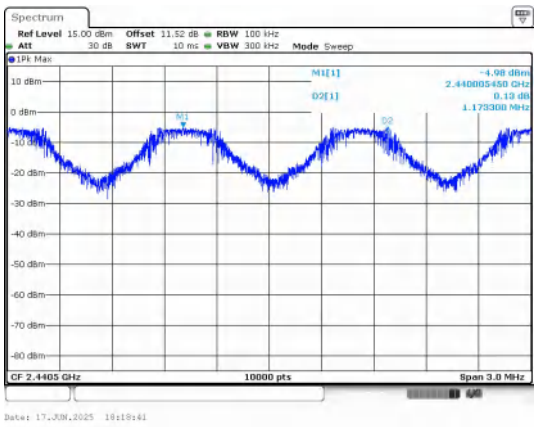


8DPSK

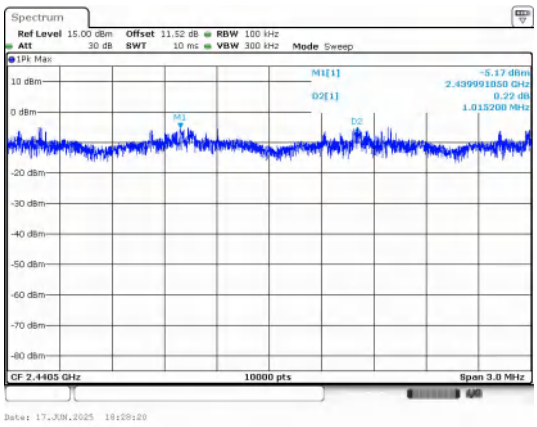
Right:

Modulation	Packet	Left Center frequency (MHz)	Right Center frequency (MHz)	Hopping Frequency Separation (MHz)	Limit (MHz)	Result
GFSK	DH5	2440.0055	2441.1788	1.1733	0.98	PASS
π/4DQPSK	2-DH5	2439.9911	2441.0062	1.0152	0.853	PASS
8DPSK	3-DH5	2439.8465	2440.9943	1.1478	0.86	PASS

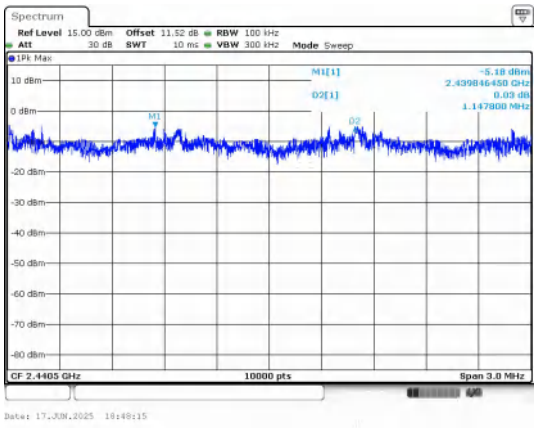
Test Graphs



GFSK



π/4DQPSK



8DPSK

8.7. Conducted Out Of Band Emission

Test Result

Left:

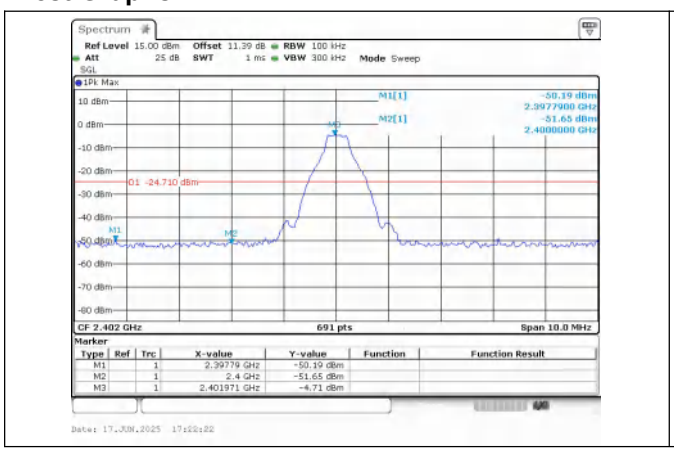
Non-Hopping

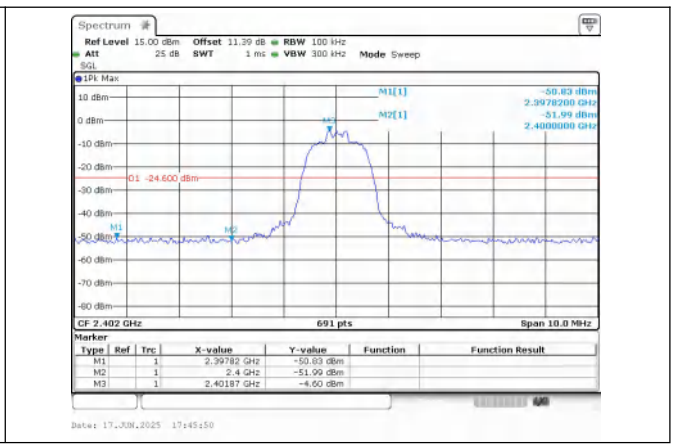
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2397.79	-50.186	-24.71	-25.476	PASS
			2400.00	-51.650	-24.71	-26.940	PASS
			9608.10	-46.395	-24.71	-21.685	PASS
		39	9763.72	-46.825	-24.91	-21.915	PASS
		78	2483.50	-52.310	-25.32	-26.990	PASS
			9920.20	-45.933	-25.32	-20.613	PASS
π/4DQPSK	2-DH5	0	2397.82	-50.828	-24.6	-26.228	PASS
			2400.00	-51.990	-24.6	-27.390	PASS
			9608.10	-46.961	-24.6	-22.361	PASS
		39	9763.72	-47.619	-24.83	-22.789	PASS
		78	2483.50	-52.060	-25.27	-26.790	PASS
			9920.20	-45.957	-25.27	-20.687	PASS
8DPSK	3-DH5	0	2397.41	-50.399	-24.74	-25.659	PASS
			2400.00	-51.940	-24.74	-27.200	PASS
			9608.10	-46.464	-24.74	-21.724	PASS
		39	9763.72	-46.574	-25.24	-21.334	PASS
		78	2483.50	-51.940	-25.56	-26.380	PASS
			9920.20	-45.330	-25.56	-19.770	PASS

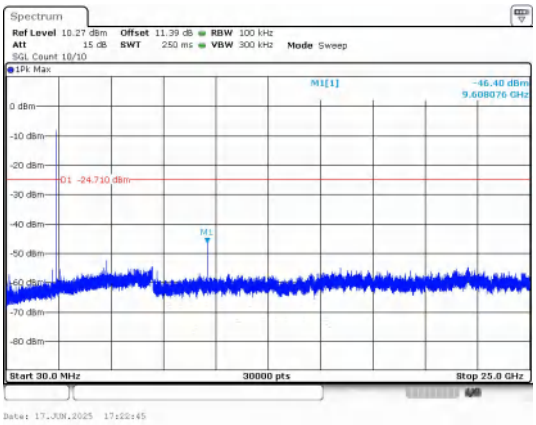
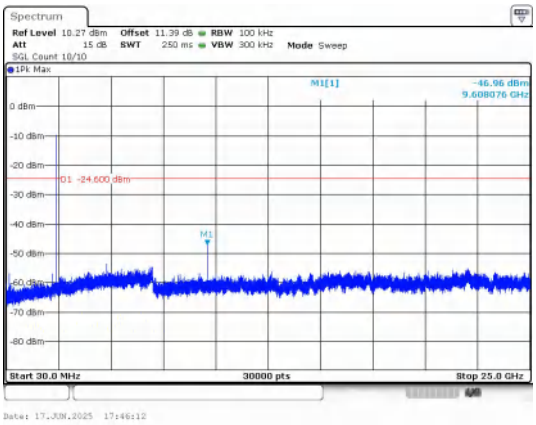
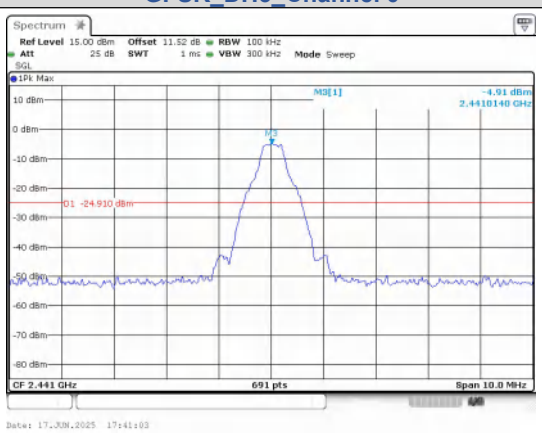
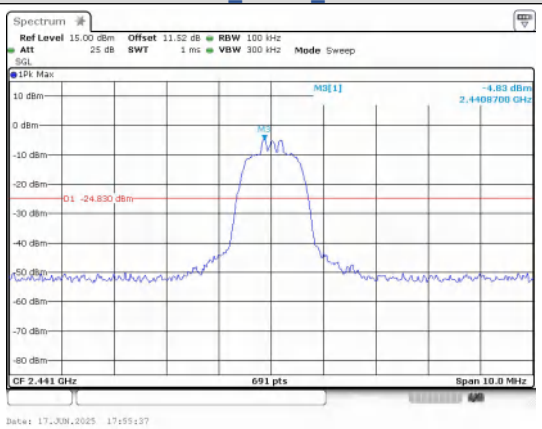
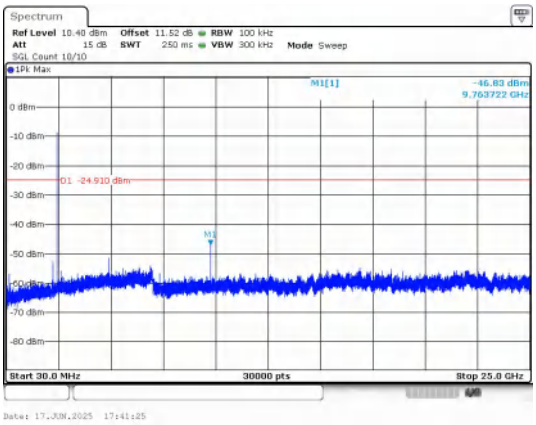
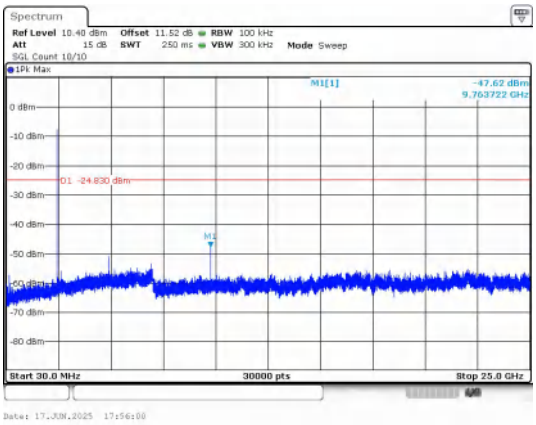
Hopping

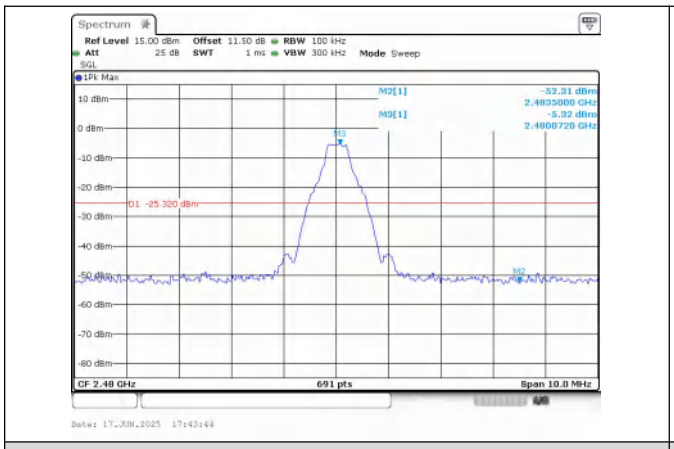
Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2395.90	-49.731	-24.7	-25.031	PASS
			2400.00	-51.510	-24.7	-26.810	PASS
			2483.50	-50.390	-25.45	-24.940	PASS
π/4DQPSK	2-DH5		2397.95	-49.837	-24.96	-24.877	PASS
			2400.00	-51.770	-24.96	-26.810	PASS
			2483.50	-50.400	-25.91	-24.490	PASS
8DPSK	3-DH5		2398.05	-48.673	-24.87	-23.803	PASS
			2400.00	-51.200	-24.87	-26.330	PASS
			2483.50	-50.880	-26.59	-24.290	PASS

Test Graphs

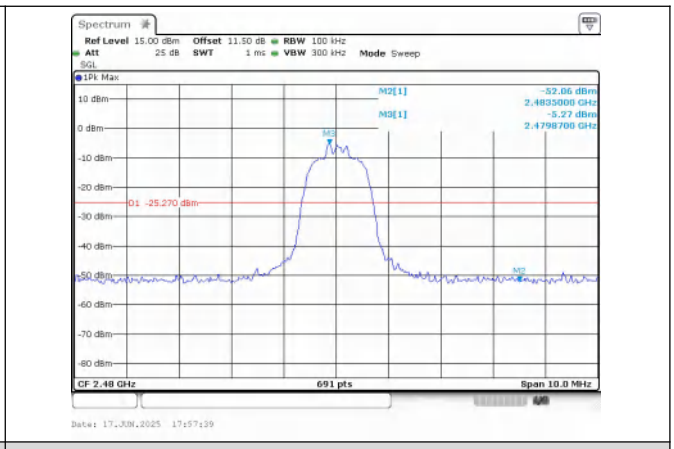




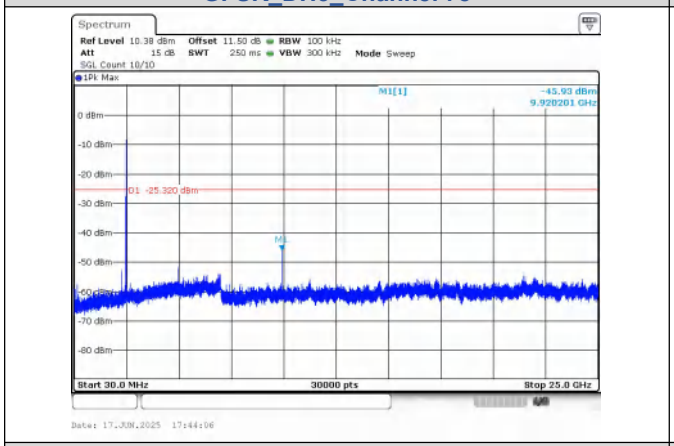
Out Of Band Emission GFSK_DH5_Channel 0	Out Of Band Emission π/4DQPSK_2-DH5_Channel 0
	
30.0 MHz - 25000.0 MHz GFSK_DH5_Channel 0	**30.0 MHz - 25000.0 MHz π/4DQPSK_2-DH5_Channel 0**
	
Out Of Band Emission GFSK_DH5_Channel 39	**Out Of Band Emission π/4DQPSK_2-DH5_Channel 39**
	
30.0 MHz - 25000.0 MHz GFSK_DH5_Channel 39	**30.0 MHz - 25000.0 MHz π/4DQPSK_2-DH5_Channel 39**



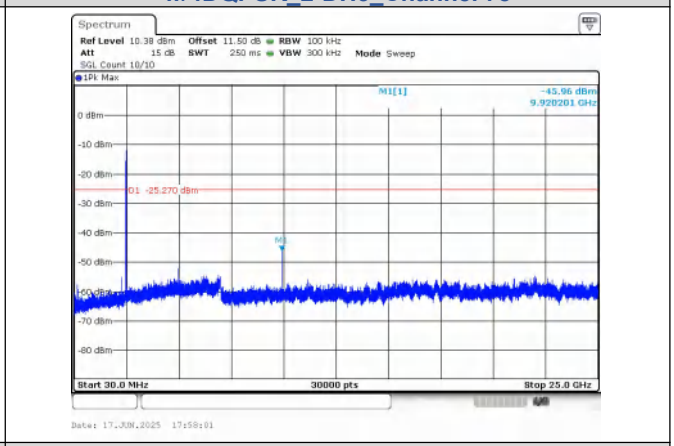
Out Of Band Emission
GFSK_DH5_Channel 78



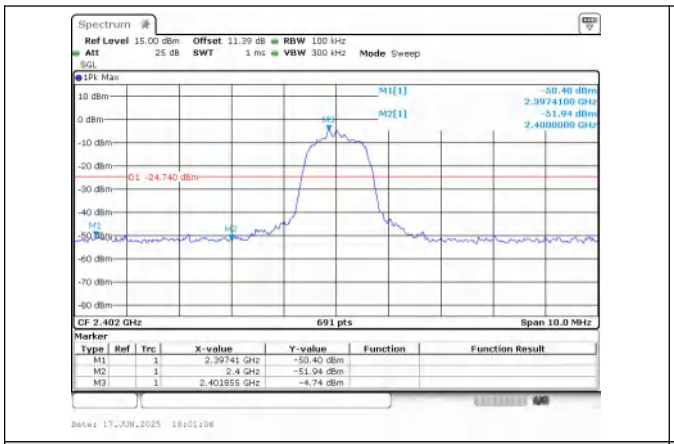
Out Of Band Emission
π/4DQPSK_2-DH5_Channel 78



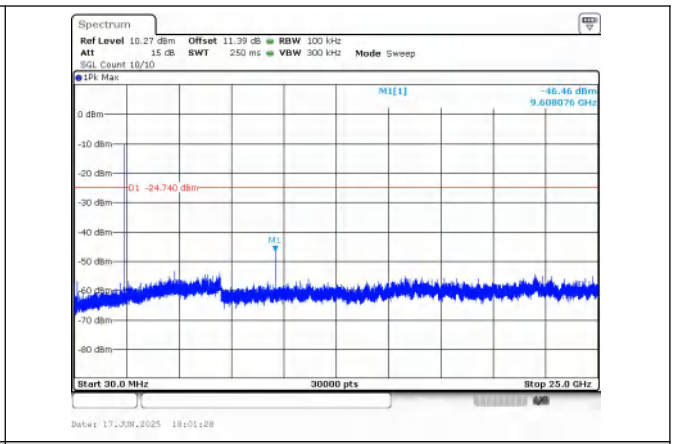
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



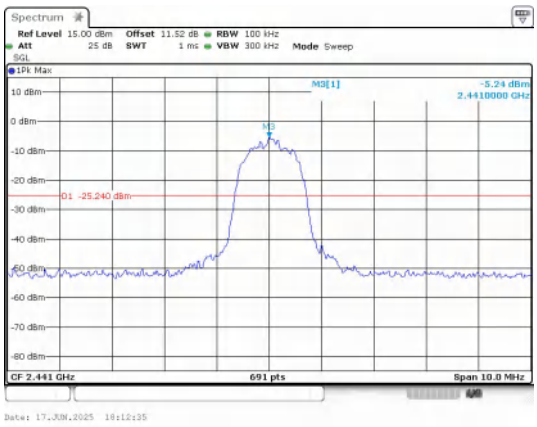
30.0 MHz - 25000.0 MHz
π/4DQPSK_2-DH5_Channel 78



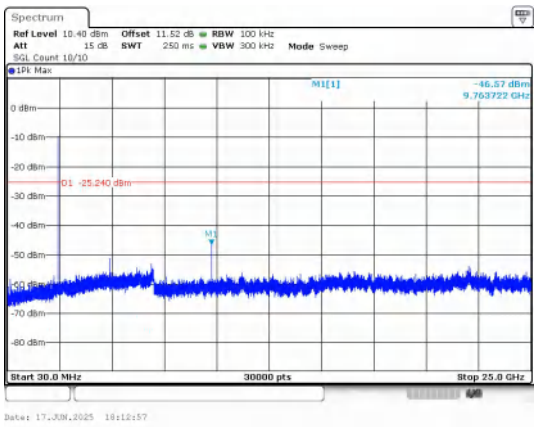
Out Of Band Emission
8DPSK_3-DH5_Channel 0



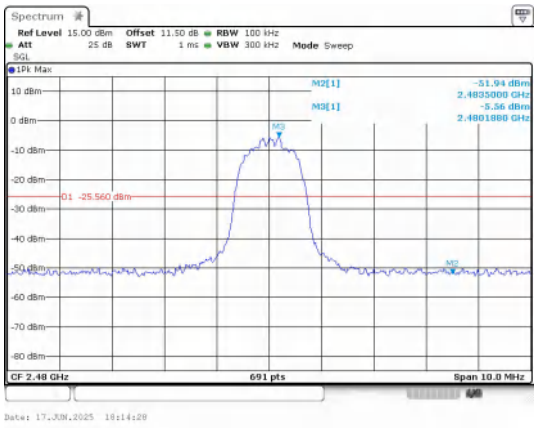
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



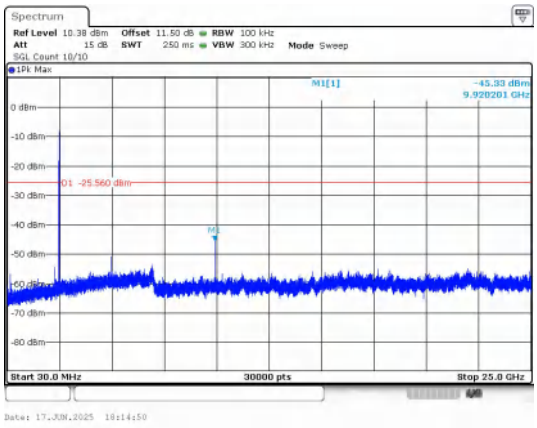
Out Of Band Emission
8DPSK_3-DH5_Channel 39



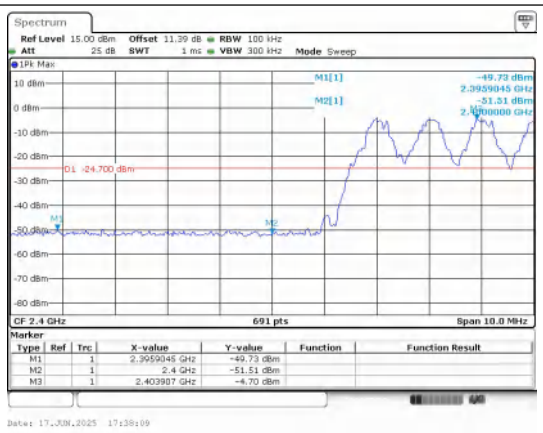
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



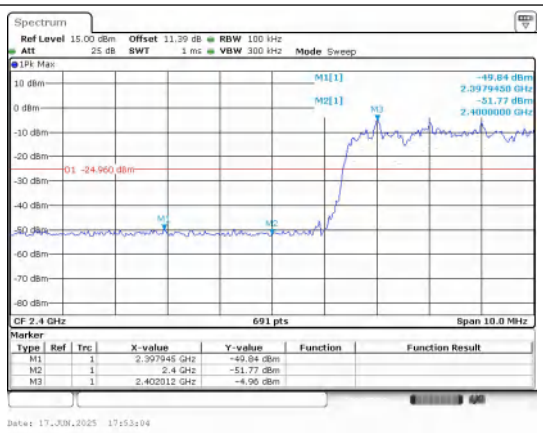
Out Of Band Emission
8DPSK_3-DH5_Channel 78



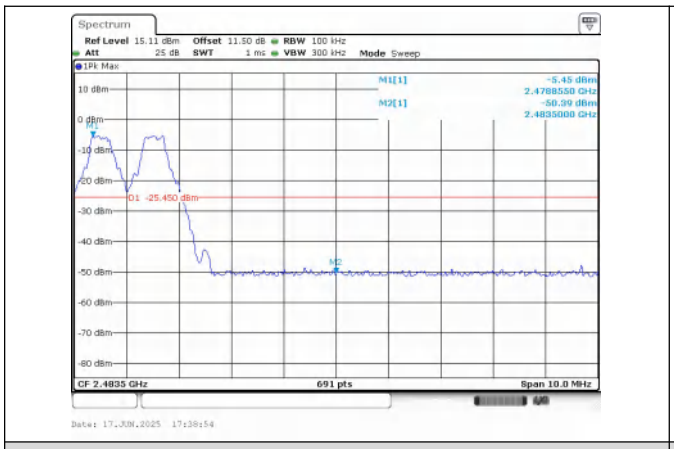
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



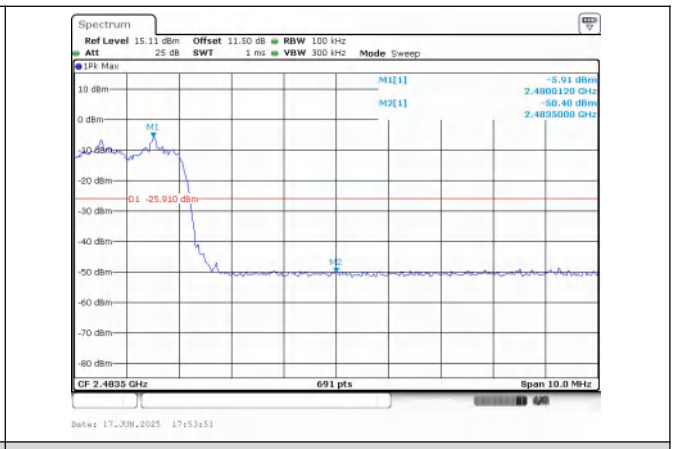
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



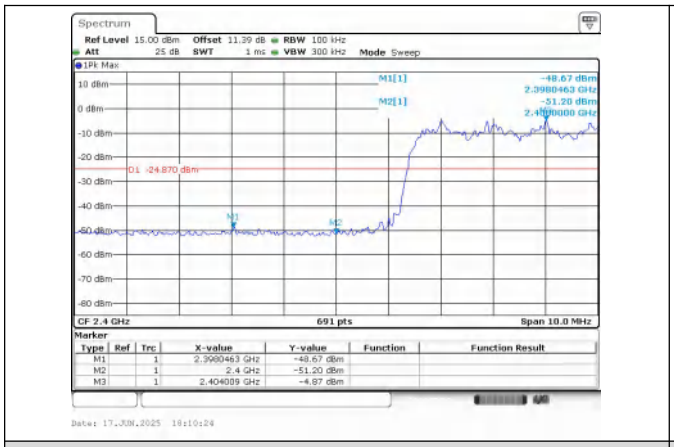
Out Of Band Emission(Left)
π/4DQPSK_2-DH5_Channel Hopping



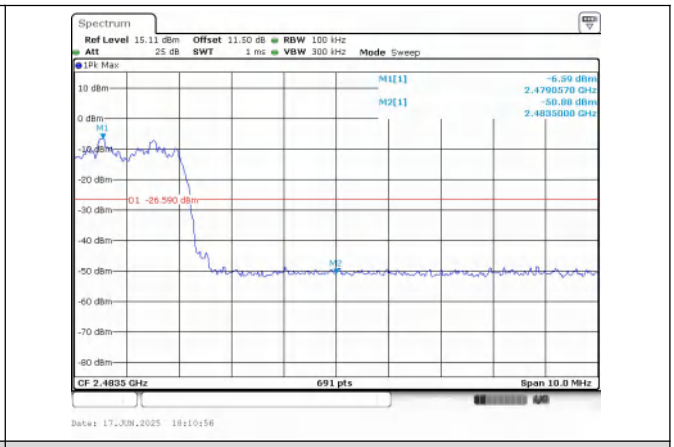
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



Out Of Band Emission(Right)
π/4DQPSK_2-DH5_Channel Hopping



Out Of Band Emission(Left)
8DPSK_3-DH5_Channel Hopping



Out Of Band Emission(Right)
8DPSK_3-DH5_Channel Hopping

Right:

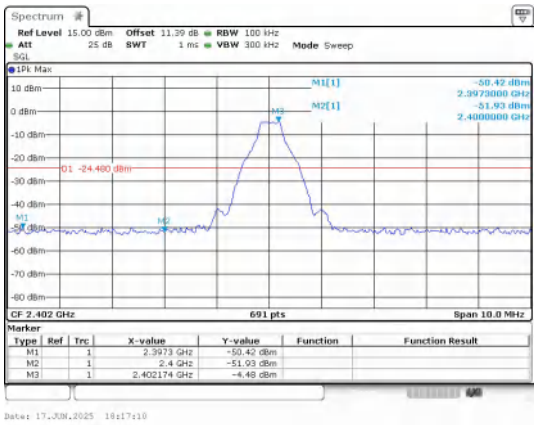
Non-Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	0	2397.30	-50.422	-24.48	-25.942	PASS
			2400.00	-51.930	-24.48	-27.450	PASS
			9608.10	-47.030	-24.48	-22.550	PASS
		39	9763.72	-46.704	-24.9	-21.804	PASS
		78	2483.50	-50.700	-25.31	-25.390	PASS
			9920.20	-45.937	-25.31	-20.627	PASS
π/4DQPSK	2-DH5	0	2397.64	-50.356	-24.6	-25.756	PASS
			2400.00	-52.160	-24.6	-27.560	PASS
			9608.10	-46.728	-24.6	-22.128	PASS
		39	9763.72	-46.632	-25.27	-21.362	PASS
		78	2483.50	-50.670	-25.29	-25.380	PASS
			9920.20	-45.710	-25.29	-20.420	PASS
8DPSK	3-DH5	0	2397.38	-50.114	-24.69	-25.424	PASS
			2400.00	-51.410	-24.69	-26.720	PASS
			9608.10	-46.787	-24.69	-22.097	PASS
		39	9763.72	-47.250	-24.75	-22.500	PASS
		78	2483.50	-51.040	-25.28	-25.760	PASS
			9920.20	-45.489	-25.28	-20.209	PASS

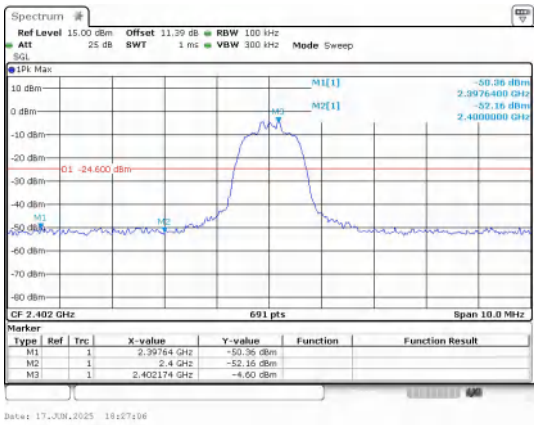
Hopping

Modulation	Packet	Channel	OOB Emission Frequency (MHz)	OOB Emission Level (dBm)	Limit (dBm)	Over Limit (dB)	Result
GFSK	DH5	Hopping	2398.65	-49.375	-24.73	-24.645	PASS
			2400.00	-52.540	-24.73	-27.810	PASS
			2483.50	-51.430	-25.47	-25.960	PASS
π/4DQPSK	2-DH5		2396.43	-49.326	-24.63	-24.696	PASS
			2400.00	-51.140	-24.63	-26.510	PASS
			2483.50	-49.520	-25.23	-24.290	PASS
8DPSK	3-DH5		2398.34	-48.708	-24.4	-24.308	PASS
			2400.00	-50.550	-24.4	-26.150	PASS
			2483.50	-50.780	-28.01	-22.770	PASS

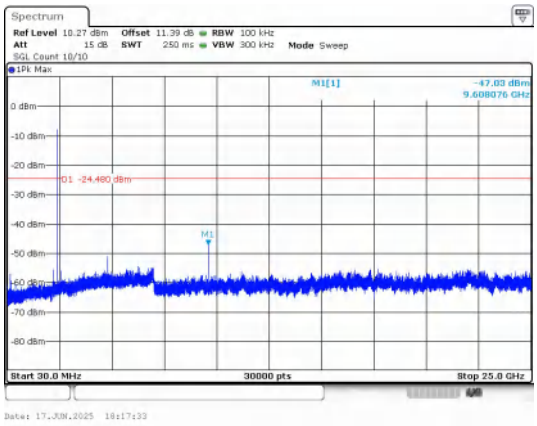
Test Graphs



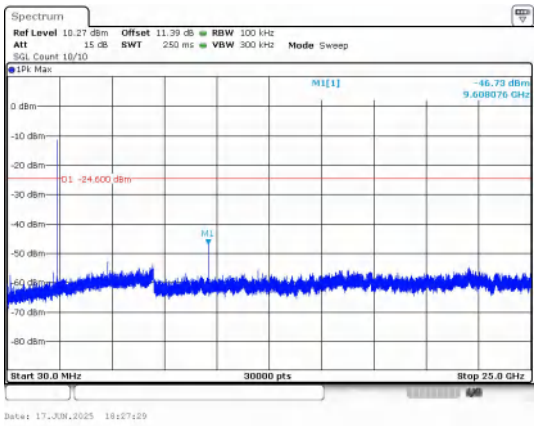
Out Of Band Emission GFSK_DH5_Channel 0



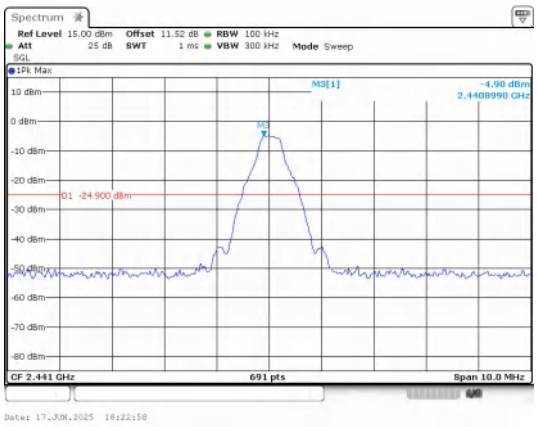
Out Of Band Emission π/4DQPSK_2-DH5_Channel 0



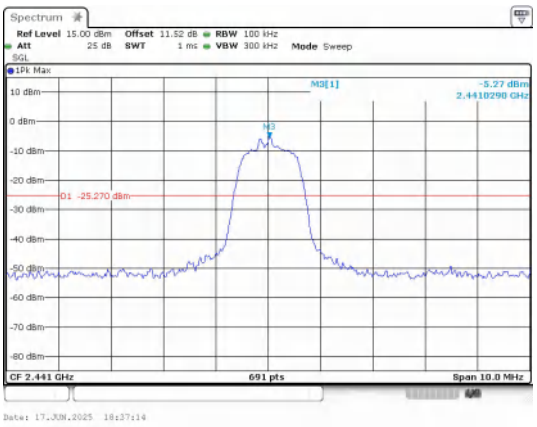
30.0 MHz - 25000.0 MHz GFSK_DH5_Channel 0



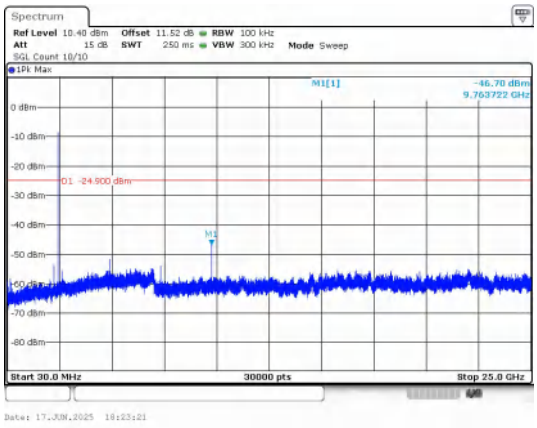
30.0 MHz - 25000.0 MHz π/4DQPSK_2-DH5_Channel 0



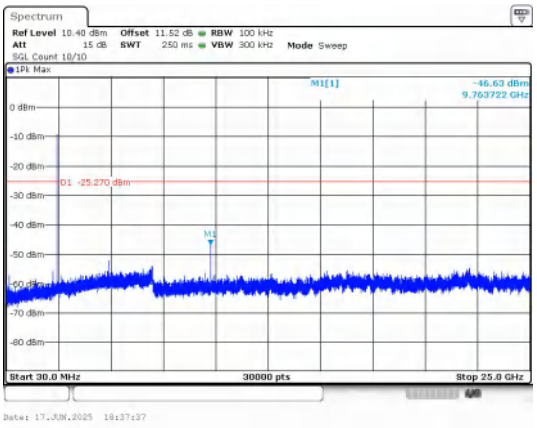
Out Of Band Emission
GFSK_DH5_Channel 39



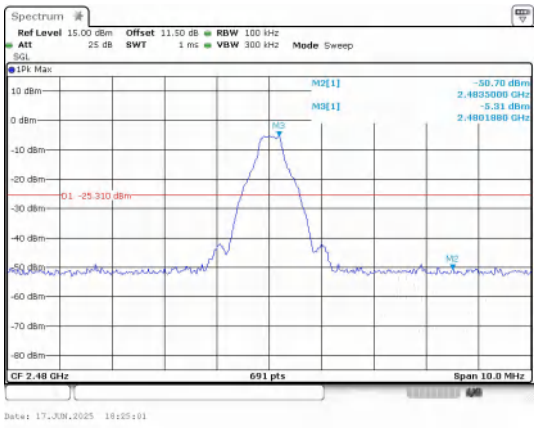
Out Of Band Emission
π/4DQPSK_2-DH5_Channel 39



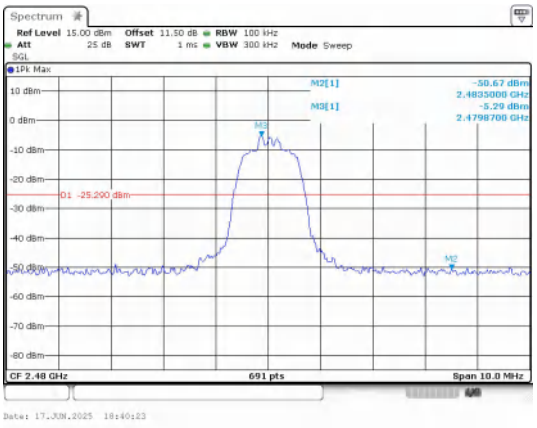
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 39



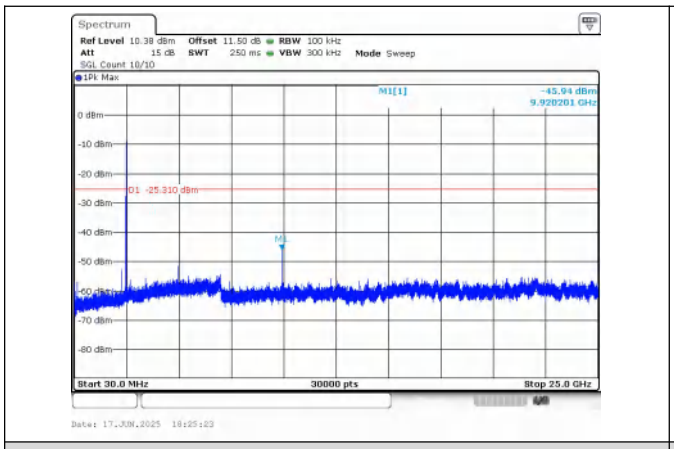
30.0 MHz - 25000.0 MHz
π/4DQPSK_2-DH5_Channel 39



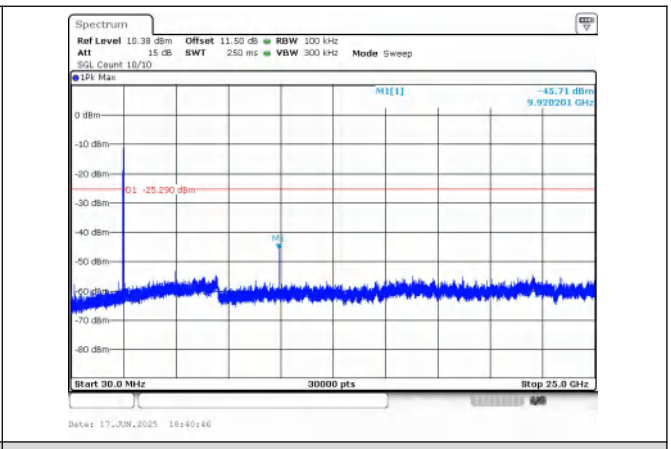
Out Of Band Emission
GFSK_DH5_Channel 78



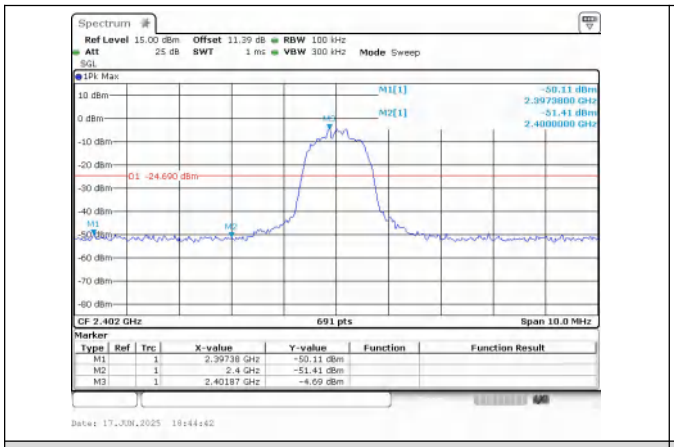
Out Of Band Emission
π/4DQPSK_2-DH5_Channel 78



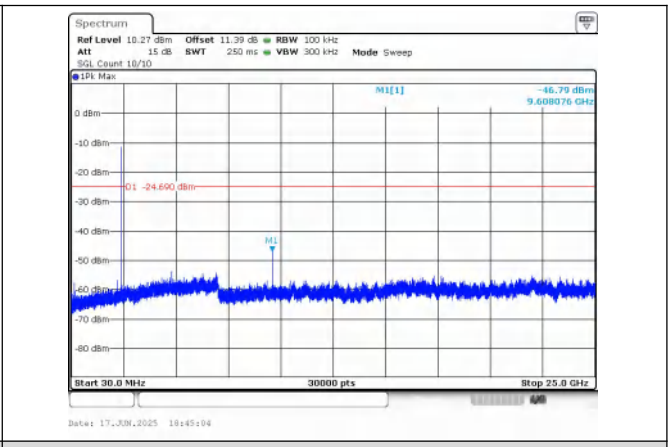
30.0 MHz - 25000.0 MHz
GFSK_DH5_Channel 78



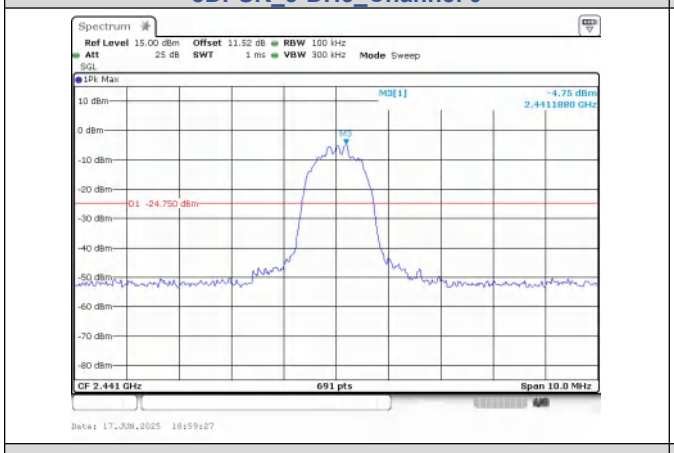
30.0 MHz - 25000.0 MHz
π/4DQPSK_2-DH5_Channel 78



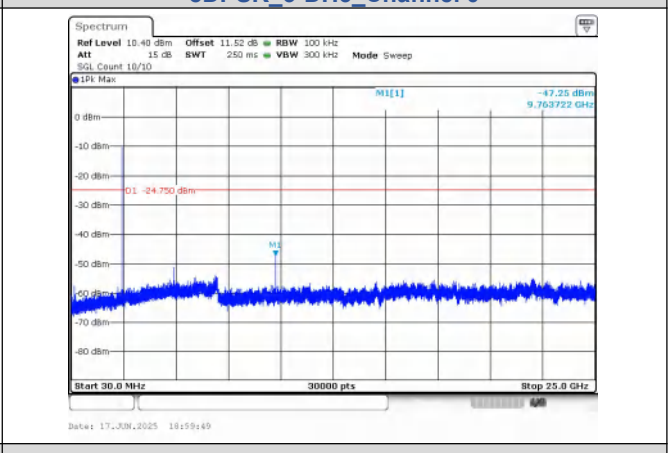
Out Of Band Emission
8DPSK_3-DH5_Channel 0



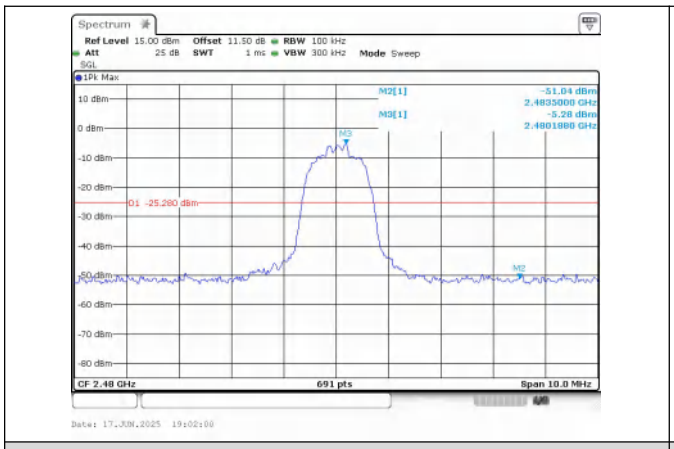
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 0



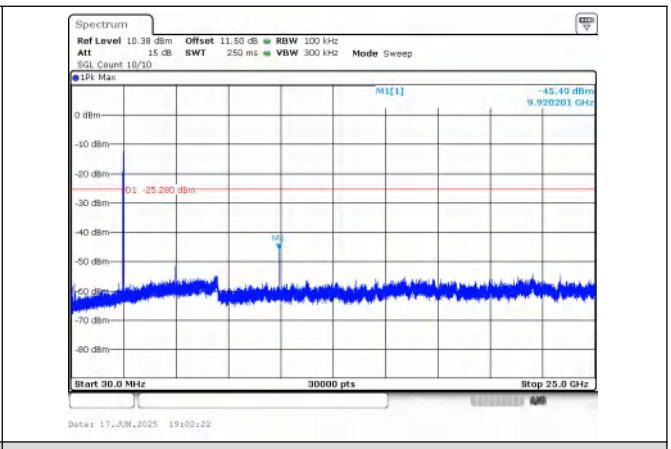
Out Of Band Emission
8DPSK_3-DH5_Channel 39



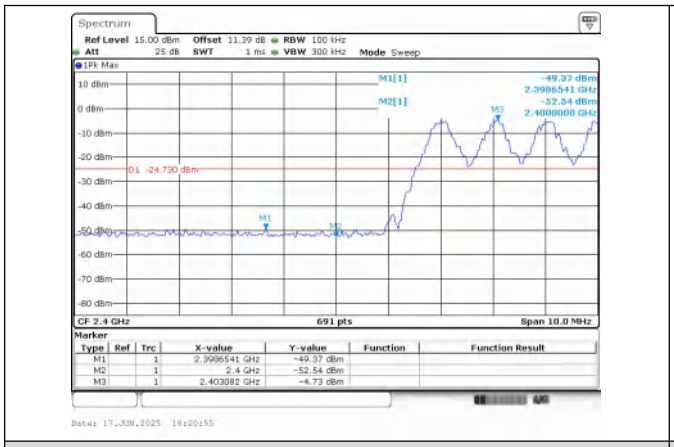
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 39



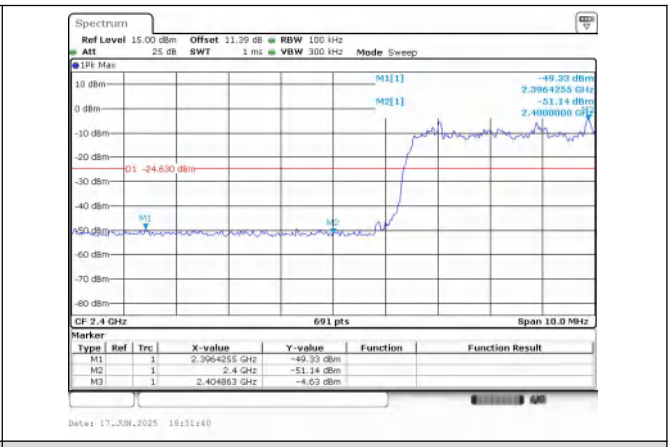
Out Of Band Emission
8DPSK_3-DH5_Channel 78



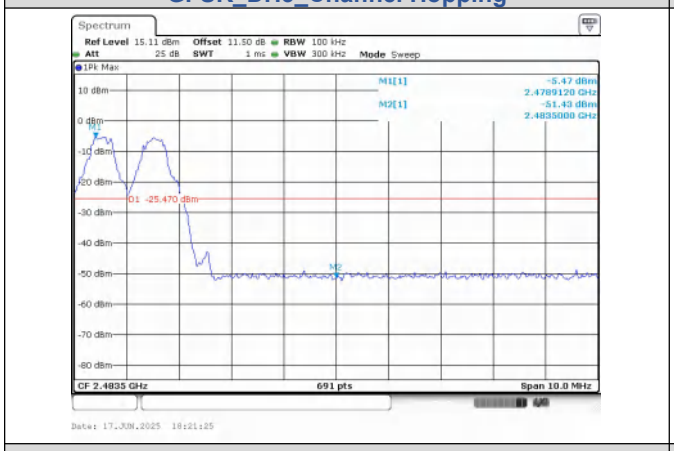
30.0 MHz - 25000.0 MHz
8DPSK_3-DH5_Channel 78



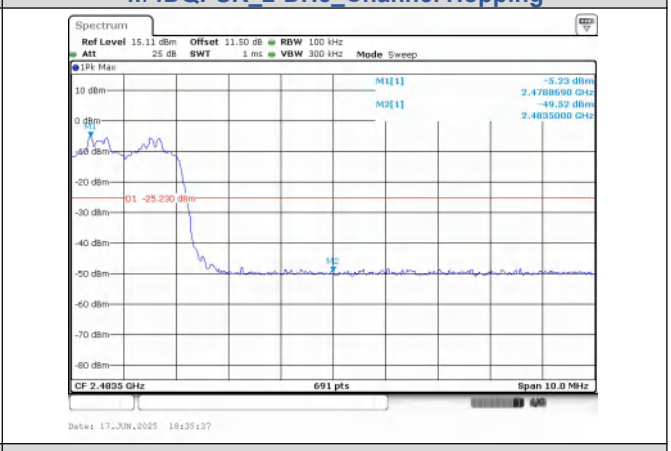
Out Of Band Emission(Left)
GFSK_DH5_Channel Hopping



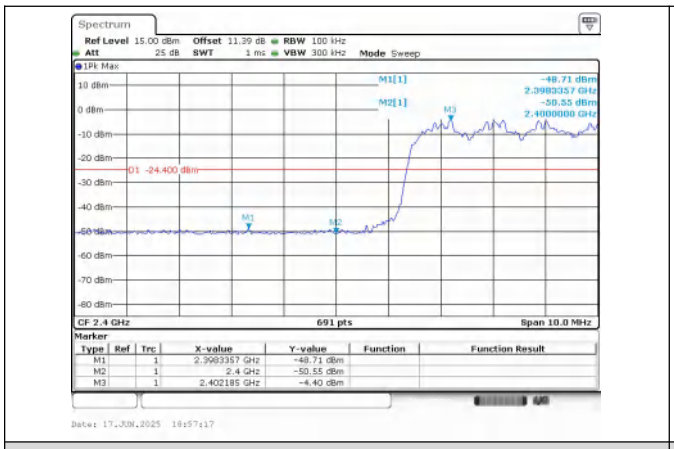
Out Of Band Emission(Left)
π/4DQPSK_2-DH5_Channel Hopping



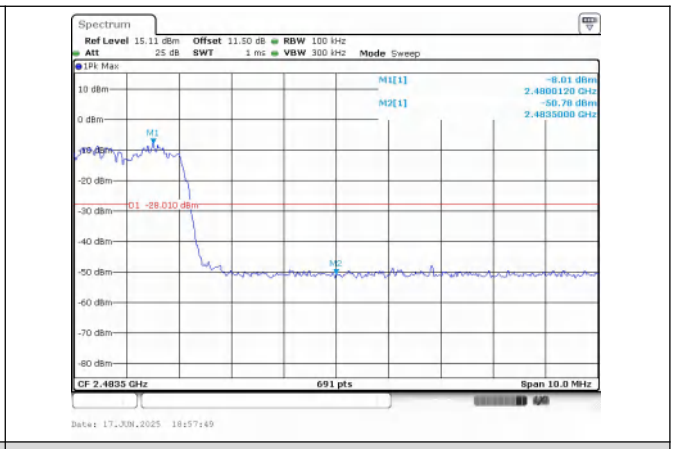
Out Of Band Emission(Right)
GFSK_DH5_Channel Hopping



Out Of Band Emission(Right)
π/4DQPSK_2-DH5_Channel Hopping



Out Of Band Emission(Left)
8DPSK_3-DH5_Channel Hopping



Out Of Band Emission(Right)
8DPSK_3-DH5_Channel Hopping

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