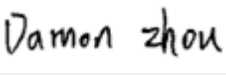
TEST REPORT

Application No.:	KSCR2606001505AT
FCC ID:	2AHDKS08A
Applicant:	RCF SpA
Address of Applicant:	Via Raffaello Sanzio, 13 Reggio Emilia Italy 42124
Manufacturer:	RCF SpA
Address of Manufacturer:	Via Raffaello Sanzio, 13 Reggio Emilia Italy 42124
Factory:	Speaker Electronic(Jiashan) Co.,Ltd
Address of Factory:	No. 8 Development Zone Road, Huimin Sub-district, Jiashan County, Zhejiang, 314112, P.R. China
Equipment Under Test (EUT):	
EUT Name:	ACTIVE 4 CHANNELS AUDIO SYSTEM
Model No.:	S 08-A
Trade Mark:	RCF
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2026-06-22
Date of Test:	2026-06-23 to 2026-07-09
Date of Issue:	2026-07-10
Test Result:	**Pass***

* In the configuration tested, the EUT complied with the standards specified above.

Compliance Certification Services (Kunshan) Inc.
程智电子科技（昆山）有限公司
No.10 Weiye Road, Development Zone, Kunshan, Jiangsu, China
中国・江苏省昆山开发区伟业路 10 号 215301
t (86-512)57355888
f (86-512)57370818
www.sgsgroup.com.cn
sgs.china@sgs.com
Member of the SGS Group （SGS SA）

Revision Record			
Version	**Description**	***Date***	***Remark***
00	Original	2026-07-10	/

Authorized for issue by:				
Prepared By				
		Damon/Project Engineer		
Approved By				
		Terry Hou /Reviewer		

2 Test Summary

Radio Spectrum Technical Requirement				
Item	**Standard**	**Method**	**Requirement**	**Result**
Antenna Requirement	47 CFR Part 15, Subpart C 15.247	N/A	47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)	Pass
Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence		N/A	47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)	Pass

Radio Spectrum Matter Part				
Item	**Standard**	**Method**	**Requirement**	**Result**
Maximum Conducted Output Power	47 CFR Part 15, Subpart C 15.247	ANSI C63.10-2020+Cor.1-2023 Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	Pass
20dB Bandwidth		ANSI C63.10-2020+Cor.1-2023 Section 6.9.2	47 CFR Part 15, Subpart C 15.247(a)(1)	Pass
Carrier Frequencies Separation		ANSI C63.10-2020+Cor.1-2023 Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass
Hopping Channel Number		ANSI C63.10-2020+Cor.1-2023 Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Dwell Time		ANSI C63.10-2020+Cor.1-2023 Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Conducted Band Edges Measurement		ANSI C63.10-2020+Cor.1-2023 Section 7.8.7.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10-2020+Cor.1-2023 Section 7.8.7	47 CFR Part 15, Subpart C 15.247(d)	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10-2020+Cor.1-2023 Section 6.10.5 & 7.8.8	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10-2020+Cor.1-2023 Section 6.4,6.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Above 1GHz		ANSI C63.10-2020+Cor.1-2023 Section 6.6 & 7.8.8	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Conducted Emissions at AC Power Line (150kHz-30MHz)		ANSI C63.10-2020+Cor.1-2023 Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	AC100-240V 50-60Hz
Test voltage:	AC120V 60Hz
Operation Frequency:	2402MHz to 2480MHz
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Antenna Type:	PCB Antenna
Antenna Gain:	1.54dBi (Provided by manufacturer)
Antenna Number:	1

4.2 Power level setting using in test:

Channel	Power setting
2402	0
2440	0
2480	0

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	ThinkPad X100e	/
SecureCRT	VanDyke	V 6.2.0	/
Serial port adapter plate	/	Test Plate 3	/

4.4 Measurement Uncertainty

No.	Item	Measurement Uncertainty
1	Radio Frequency	8.4×10^{-8}
2	Timeout	2s
3	Duty Cycle	0.37%
4	Occupied Bandwidth	3%
5	RF Conducted Power	0.6dB
6	RF Power Density	2.9dB
7	Conducted Spurious Emissions	0.75dB
8	RF Radiated Power	5.2dB (Below 1GHz)
		5.9dB (Above 1GHz)
9	Radiated Spurious Emission Test	4.2dB (Below 30MHz)
		4.5dB (30MHz-1GHz)
		5.1dB (1GHz-18GHz)
		5.4dB (Above 18GHz)
10	Temperature Test	1°C
11	Humidity Test	3%
12	Supply Voltages	1.5%
13	Time	3%
Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.		

4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

No.10 Weiye Rd, Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China.

Tel: +86 512 5735 5888 Fax: +86 512 5737 0818

No tests were sub-contracted.

Note:

1. SGS is not responsible for wrong test results due to incorrect information (e.g., max. internal working frequency, antenna gain, cable loss, etc) is provided by the applicant. (If applicable).

2. SGS is not responsible for the authenticity, integrity and the validity of the conclusion based on results of the data provided by applicant. (If applicable).

3. Sample source: sent by customer.

4.6 Test Facility

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

• A2LA (Certificate No. 2541.01)

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA).

• FCC (Designation Number: CN1172)

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory.

• ISED (CAB Identifier: CN0072)

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 2324E

• VCCI (Member No:1938)

The 3m and 10m Semi-anechoic chamber and Shielded Room of Compliance Certification Services (Kunshan) Inc. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-20134, R-11600, C-11707, T-11499, G-10216 respectively.

4.7 Deviation from Standards

None

4.8 Abnormalities from Standard Conditions

None

5 Equipment List

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
Conducted Emission at Mains Terminals						
1	EMI Test Receive	R&S	ESCI	KS301196	07/09/2025	07/08/2026
2	EMI Test Receive	R&S	ESCI	KS301196	07/06/2026	07/05/2027
3	LISN	R&S	ENV216	KS301197	01/08/2026	01/07/2027
4	LISN	Schwarzbeck	NNLK 8129	KS301091	01/08/2026	01/07/2027
5	Pulse Limiter	R&S	ESH3-Z2	KUS1902E001	12/18/2025	12/17/2026
6	CE test Cable	Thermax	/	CZ301102	12/18/2025	12/17/2026
7	Software	Faratronic	E3	/	N.C.R	N.C.R
RF Radiated Test						
1	Spectrum Analyzer	R&S	FSV40	KUS1806E003	07/09/2025	07/08/2026
2	Spectrum Analyzer	R&S	FSV40	KUS1806E003	07/06/2026	07/05/2027
3	Universal Radio Communication Tester	R&S	CMW500	KSEM009-1	12/17/2025	12/16/2026
4	Signal Generator	Agilent	E8257C	KS301066	07/22/2025	07/21/2026
5	Loop Antenna（9KHz-30MHz）	COM-POWER	AL-130R	KUS1806E001	07/11/2025	07/10/2026
6	Loop Antenna（9KHz-30MHz）	COM-POWER	AL-130R	KUS1806E001	07/07/2026	07/06/2027
7	Bilog Antenna（30MHz-1GHz）	TESEQ	CBL 6112D	KUS1806E005	07/12/2025	07/11/2026
8	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	KS301079	01/11/2026	01/10/2028
9	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	CZ301058	01/11/2026	01/10/2028
10	Amplifier(30MHz~1GHz)	TST	LNA009100G30	KSEM061	12/18/2025	12/17/2026
11	Amplifier(400MHz~8GHz)	TST	LNA004080G30	KSEM062	12/18/2025	12/17/2026
12	Amplifier(1GHz~18GHz)	TST	LNA010180G45	KSEM039	07/09/2025	07/08/2026
13	Amplifier(1GHz~18GHz)	TST	LNA010180G45	KSEM039	07/07/2026	07/06/2027
14	Amplifier(18~40GHz)	TST	LNA180400G40	KSEM038	07/09/2025	07/08/2026
15	Amplifier(18~40GHz)	TST	LNA180400G40	KSEM038	07/07/2026	07/06/2027
16	RF Test Cable	REBES MICROWAVE	A81-SMSM-10M	CZ301097-CZ301100	11/14/2025	11/13/2026
17	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	12/30/2025	12/29/2026
18	Software	ESE	E3_V 6.111221a	/	NCR	NCR
19	Measurement Software	Tonscend	JS32-RE V5.0.0.1	/	NCR	NCR
20	Measurement Software	Tonscend	JS32-RSE V5.0.0.0	/	NCR	NCR

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
RF Conducted Test						
1	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	07/09/2025	07/08/2026
2	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	07/07/2026	07/06/2027
3	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	07/09/2025	07/08/2026
4	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	07/07/2026	07/06/2027
5	Spectrum Analyzer	Keysight	N9030B	KSEM021-1	12/17/2025	12/16/2026
6	Signal Generator	R&S	SMBV100B	KSEM032	12/17/2025	12/16/2026
7	Signal Generator	R&S	SMW200A	KSEM020-1	07/09/2025	07/08/2026
8	Signal Generator	R&S	SMW200A	KSEM020-1	07/07/2026	07/06/2027
9	Signal Generator	Agilent	N5182A	KUS2001M001-1	07/08/2025	07/07/2026
10	Signal Generator	Agilent	N5182A	KUS2001M001-1	07/07/2026	07/06/2027
11	Signal Generator	Agilent	E8257C	KS301066	07/22/2025	07/21/2026
12	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	07/09/2025	07/08/2026
13	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	07/07/2026	07/06/2027
14	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	12/17/2025	12/16/2026
15	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	07/08/2025	07/07/2026
16	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	07/07/2026	07/06/2027
17	Switcher	TST	FY562	KUS2001M001-4	12/17/2025	12/16/2026
18	Conducted Test Cable	Thermax	RF01-RF04	CZ301111-CZ301120	12/17/2025	12/16/2026
19	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KS301190	07/15/2025	07/14/2026
20	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	12/30/2025	12/29/2026
21	Conducted Test Cable	Thermax	RF01-RF04	CZ301111-CZ301120	12/17/2025	12/16/2026
22	Software	BST	TST-PASS	/	NCR	NCR

6 Radio Spectrum Technical Requirement

6.1 Antenna Requirement

6.1.1 Test Requirement:

47 CFR Part 15, Subpart C 15.203 & 15.247(b)(4)

6.1.2 Conclusion

Standard Requirement:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

15.247(b) (4) requirement:

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

EUT Antenna:

The antenna is PCB Antenna and no consideration of replacement. The best case gain of the antenna is 1.54 dBi.

Antenna location: Refer to internal photo.

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
Conducted Emission at Mains Terminals						
1	EMI Test Receive	R&S	ESCI	KS301196	07/09/2025	07/08/2026
2	LISN	R&S	ENV216	KS301197	01/08/2026	01/07/2027
3	LISN	Schwarzbeck	NNLK 8129	KS301091	01/08/2026	01/07/2027
4	Pulse Limiter	R&S	ESH3-Z2	KUS1902E001	12/18/2025	12/17/2026
5	CE test Cable	Thermax	/	CZ301102	12/18/2025	12/17/2026
6	Software	Faratronic	E3	/	N.C.R	N.C.R
7	EMI Test Receive	R&S	ESCI	KS301196	07/06/2026	07/05/2027
RF Radiated Test						
1	Spectrum Analyzer	R&S	FSV40	KUS1806E003	07/09/2025	07/08/2026
2	Universal Radio Communication Tester	R&S	CMW500	KSEM009-1	12/17/2025	12/16/2026
3	Signal Generator	Agilent	E8257C	KS301066	07/22/2025	07/21/2026
4	Loop Antenna（9KHz-30MHz）	COM-POWER	AL-130R	KUS1806E001	07/11/2025	07/10/2026
5	Bilog Antenna（30MHz-1GHz）	TESEQ	CBL 6112D	KUS1806E005	07/12/2025	07/11/2026
6	Horn-antenna(1-18GHz)	Schwarzbeck	BBHA9120D	KS301079	01/11/2026	01/10/2028
7	Horn Antenna(18-40GHz)	Schwarzbeck	BBHA9170	CZ301058	01/11/2026	01/10/2028
8	Amplifier(30MHz~1GHz)	TST	LNA009100G30	KSEM061	12/18/2025	12/17/2026
9	Amplifier(400MHz~8GHz)	TST	LNA004080G30	KSEM062	12/18/2025	12/17/2026
10	Amplifier(1GHz~18GHz)	TST	LNA010180G45	KSEM039	07/09/2025	07/08/2026
11	Amplifier(18~40GHz)	TST	LNA180400G40	KSEM038	07/09/2025	07/08/2026
12	RF Test Cable	REBES MICROWAVE	A81-SMSM-10M	CZ301097-CZ301100	11/14/2025	11/13/2026
13	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-4	12/30/2025	12/29/2026
14	Software	ESE	E3_V 6.111221a	/	NCR	NCR
15	Measurement Software	Tonscend	JS32-RE V5.0.0.1	/	NCR	NCR
16	Measurement Software	Tonscend	JS32-RSE V5.0.0.0	/	NCR	NCR
17	Spectrum Analyzer	R&S	FSV40	KUS1806E003	07/06/2026	07/05/2027
18	Loop Antenna（9KHz-30MHz）	COM-POWER	AL-130R	KUS1806E001	07/07/2026	07/06/2027
19	Amplifier(1GHz~18GHz)	TST	LNA010180G45	KSEM039	07/07/2026	07/06/2027
20	Amplifier(18~40GHz)	TST	LNA180400G40	KSEM038	07/07/2026	07/06/2027

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
RF Conducted Test						
1	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	07/09/2025	07/08/2026
2	Spectrum Analyzer	Keysight	N9020A	KUS1911E004-2	07/07/2026	07/06/2027
3	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	07/09/2025	07/08/2026
4	Spectrum Analyzer	Keysight	N9020A	KUS2001M001-2	07/07/2026	07/06/2027
5	Spectrum Analyzer	Keysight	N9030B	KSEM021-1	12/17/2025	12/16/2026
6	Signal Generator	R&S	SMBV100B	KSEM032	12/17/2025	12/16/2026
7	Signal Generator	R&S	SMW200A	KSEM020-1	07/09/2025	07/08/2026
8	Signal Generator	R&S	SMW200A	KSEM020-1	07/07/2026	07/06/2027
9	Signal Generator	Agilent	N5182A	KUS2001M001-1	07/08/2025	07/07/2026
10	Signal Generator	Agilent	N5182A	KUS2001M001-1	07/07/2026	07/06/2027
11	Signal Generator	Agilent	E8257C	KS301066	07/22/2025	07/21/2026
12	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	07/09/2025	07/08/2026
13	Radio Communication Test Station	Anritsu	MT8000A	KSEM001-1	07/07/2026	07/06/2027
14	Radio Communication Analyzer	Anritsu	MT8821C	KSEM002-1	12/17/2025	12/16/2026
15	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	07/08/2025	07/07/2026
16	Universal Radio Communication Tester	R&S	CMW500	KUS1911E004-1	07/07/2026	07/06/2027
17	Switcher	TST	FY562	KUS2001M001-4	12/17/2025	12/16/2026
18	Conducted Test Cable	Thermax	RF01-RF04	CZ301111-CZ301120	12/17/2025	12/16/2026
19	Temp. / Humidity Chamber	TERCHY	MHK-120AK	KS301190	07/15/2025	07/14/2026
20	Temperature & Humidity Recorder	Renke Control	RS-WS-N01-6J	KSEM024-5	12/30/2025	12/29/2026
21	Conducted Test Cable	Thermax	RF01-RF04	CZ301111-CZ301120	12/17/2025	12/16/2026
22	Software	BST	TST-PASS	/	NCR	NCR

6.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

6.2.1 Test Requirement:

47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

6.2.2 Conclusion

Standard Requirement:

The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudorandom ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

Frequency hopping spread spectrum systems are not required to employ all available hopping channels during each transmission. However, the system, consisting of both the transmitter and the receiver, must be designed to comply with all of the regulations in this section should the transmitter be presented with a continuous data (or information) stream. In addition, a system employing short transmission bursts must comply with the definition of a frequency hopping system and must distribute its transmissions over the minimum number of hopping channels specified in this section.

The incorporation of intelligence within a frequency hopping spread spectrum system that permits the system to recognize other users within the spectrum band so that it individually and independently chooses and adapts its hopsets to avoid hopping on occupied channels is permitted. The coordination of frequency hopping systems in any other manner for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters is not permitted.

Compliance for section 15.247(a)(1):

According to Technical Specification, the pseudorandom sequence may be generated in a nine-stage shift register whose 5th and 9th stage outputs are added in a modulo-two addition stage. And the result is fed back to the input of the first stage. The sequence begins with the first ONE of 9 consecutive ONEs; i.e. the shift register is initialized with nine ones.

> Number of shift register stages: 9

> Length of pseudo-random sequence: 29 -1 = 511 bits

> Longest sequence of zeros: 8 (non-inverted signal)

Linear Feedback Shift Register for Generation of the PRBS sequence

An example of Pseudorandom Frequency Hopping Sequence as follow:

Each frequency used equally on the average by each transmitter.

According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

Compliance for section 15.247(g):

According to Technical Specification, the system transmits the packet with the pseudorandom hopping frequency with a continuous data and the short burst transmission from the Bluetooth system is also transmitted under the frequency hopping system with the pseudorandom hopping frequency system.

Compliance for section 15.247(h):

According to Technical specification, the system incorporates with an adaptive system to detect other user within the spectrum band so that it individually and independently to avoid hopping on the occupied channels.

The system is designed not have the ability to coordinated with other FHSS System in an effort to avoid the simultaneous occupancy of individual hopping frequencies by multiple transmitter.

7 Radio Spectrum Matter Test Results

7.1 Maximum Conducted Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)
Test Method: ANSI C63.10-2020+Cor.1-2023 Section 7.8.5

Limit:

Frequency range(MHz)	Output power of the intentional radiator(watt)
902-928	1 for ≥50 hopping channels
	0.25 for 25≤ hopping channels <50
	1 for digital modulation
2400-2483.5	1 for ≥75 non-overlapping hopping channels
	0.125 for all other frequency hopping systems
	1 for digital modulation
5725-5850	1 for frequency hopping systems and digital modulation

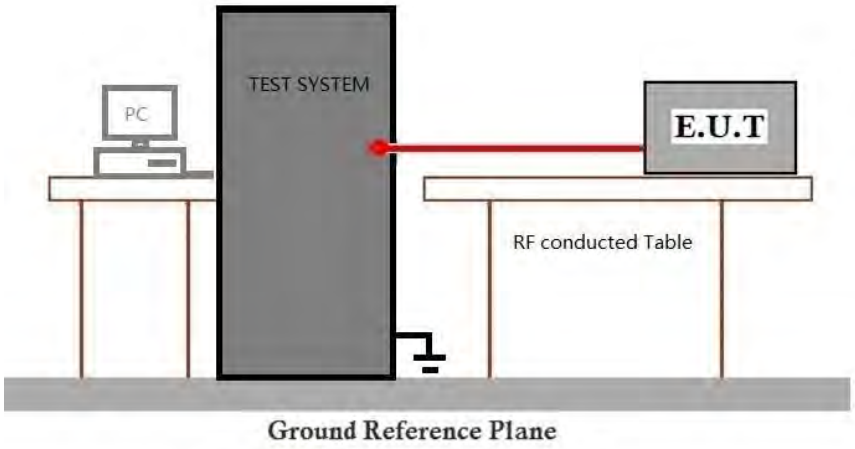
7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 24 °C Humidity: 55 % RH Atmospheric Pressure: 1010 mbar

7.1.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.1.3 Test Setup Diagram



7.1.4 Measurement Procedure and Data

Note: Since the verify power the same operating range bandwidth and smaller power can be covered by the higher power.

Please Refer to Appendix for Details

7.2 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247(a)(1)
Test Method: ANSI C63.10-2020+Cor.1-2023 Section 6.9.2

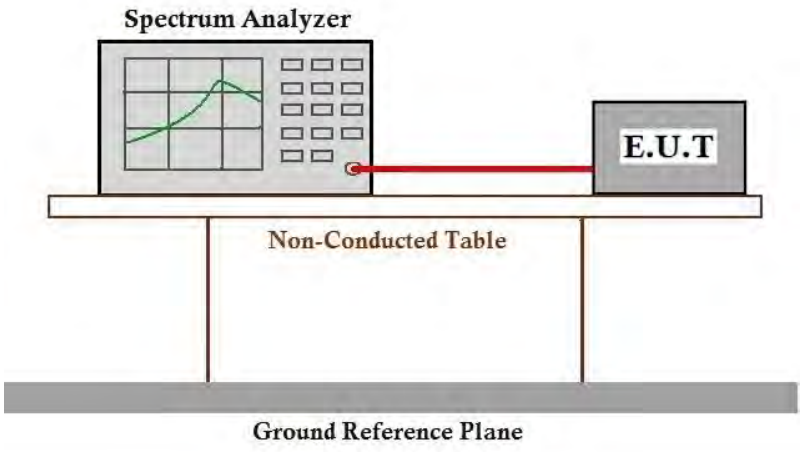
7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 24 °C Humidity: 55 % RH Atmospheric Pressure: 1010 mbar

7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.2.3 Test Setup Diagram



7.2.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.3 Carrier Frequencies Separation

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)

Test Method: ANSI C63.10-2020+Cor.1-2023 Section 7.8.2

Limit:

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.

7.3.1 E.U.T. Operation

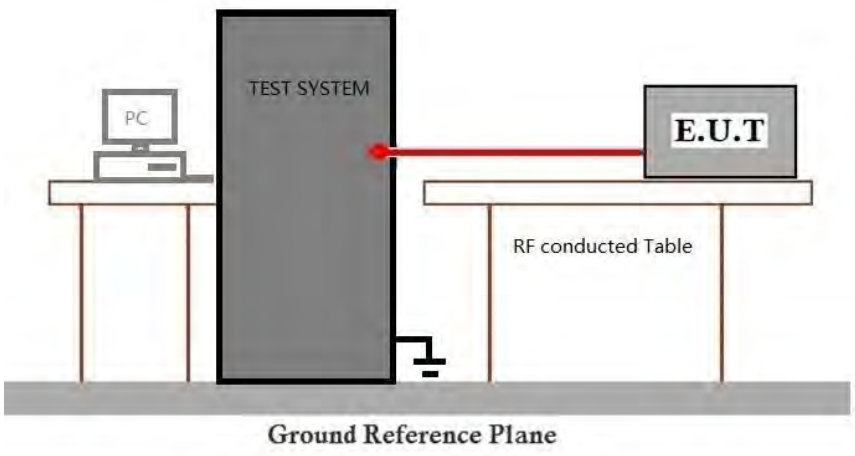
Operating Environment:

Temperature: 24 °C Humidity: 55 % RH Atmospheric Pressure: 1010 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.3.3 Test Setup Diagram



7.3.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.4 Hopping Channel Number

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10-2020+Cor.1-2023 Section 7.8.3

Limit:

Frequency range(MHz)	Number of hopping channels (minimum)
902-928	50 for 20dB bandwidth <250kHz
	25 for 20dB bandwidth ≥250kHz
2400-2483.5	15
5725-5850	75

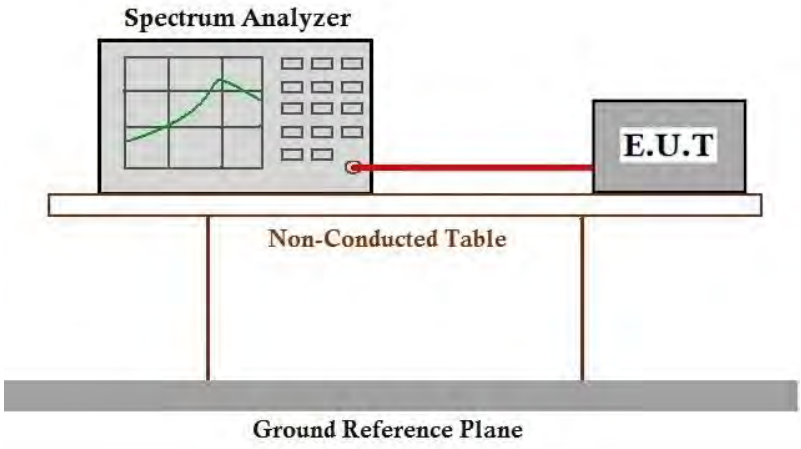
7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 24 °C Humidity: 55 % RH Atmospheric Pressure: 1010 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.4.3 Test Setup Diagram



7.4.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.5 Dwell Time

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10-2020+Cor.1-2023 Section 7.8.4

Limit:

Frequency(MHz)	Limit
902-928	0.4S within a 20S period(20dB bandwidth<250kHz)
	0.4S within a 10S period(20dB bandwidth≥250kHz)
2400-2483.5	0.4S within a period of 0.4S multiplied by the number of hopping channels
5725-5850	0.4S within a 30S period

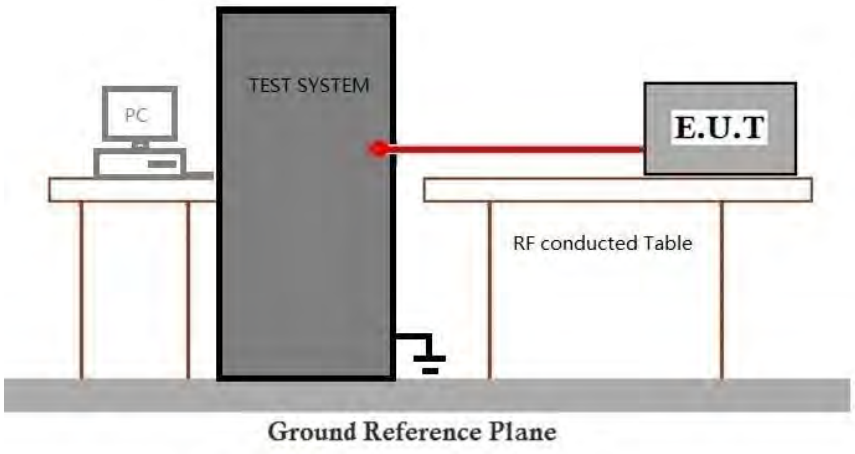
7.5.1 E.U.T. Operation

Operating Environment:
Temperature: 24 °C Humidity: 55 % RH Atmospheric Pressure: 1010 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.5.3 Test Setup Diagram



7.5.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.6 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10-2020+Cor.1-2023 Section 7.8.7.2

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

7.6.1 E.U.T. Operation

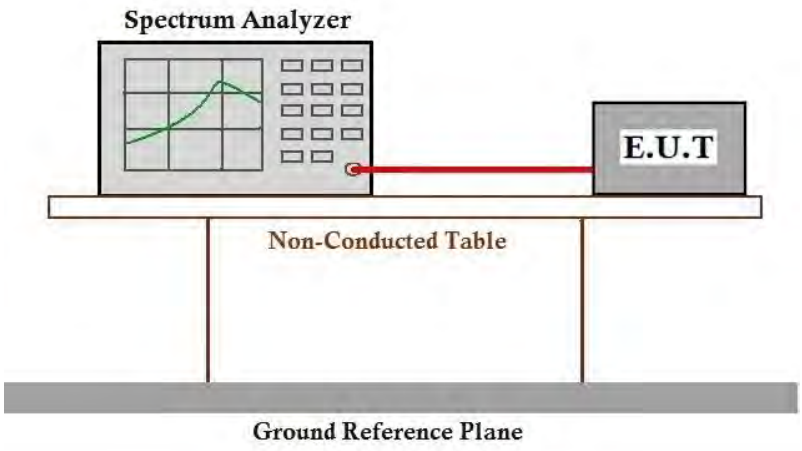
Operating Environment:

Temperature: 24 °C Humidity: 55 % RH Atmospheric Pressure: 1010 mbar

7.6.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.
Final test	01	TX_Hop mode_Keep the EUT in frequency hopping mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)

Test Method: ANSI C63.10-2020+Cor.1-2023 Section 7.8.7

Limit:

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

7.7.1 E.U.T. Operation

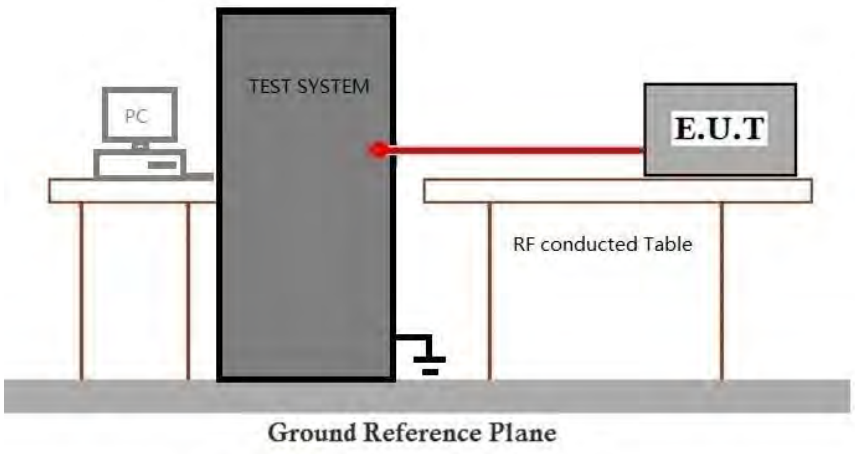
Operating Environment:

Temperature: 24 °C Humidity: 55 % RH Atmospheric Pressure: 1010 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.7.3 Test Setup Diagram



7.7.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.8 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10-2020+Cor.1-2023 Section 6.10.5 & 7.8.8
Measurement Distance: 3m

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
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90kHz, 110-490kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.		

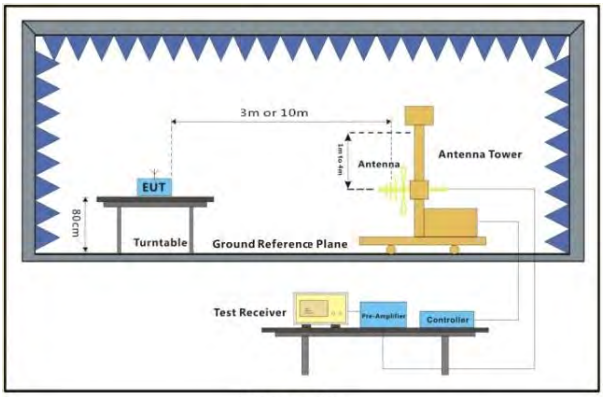
7.8.1 E.U.T. Operation

Operating Environment:
Temperature: 25 °C Humidity: 53 % RH Atmospheric Pressure: 1010 mbar

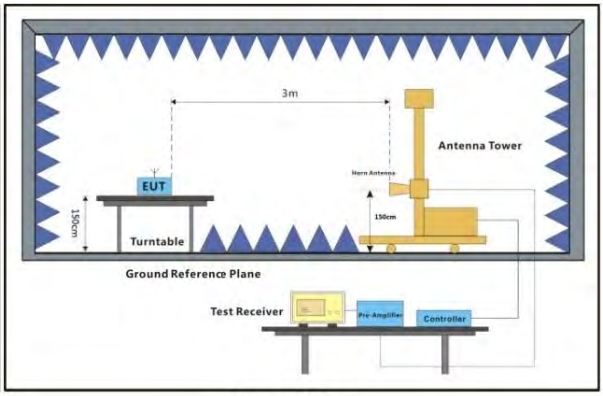
7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.8.3 Test Setup Diagram



30MHz-1GHz



Above 1GHz

7.8.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.

d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.

h. Test the EUT in the lowest channel, the middle channel, the Highest channel.

i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

j. Repeat above procedures until all frequencies measured was complete.

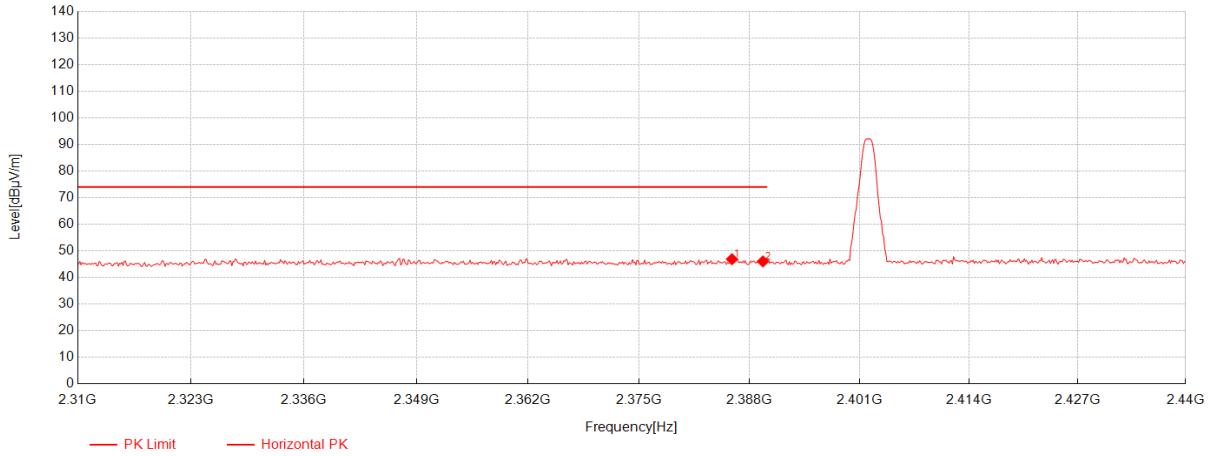
Remark 1: Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

Remark 2: For frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

Remark 3: The resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is 3MHz for Peak detection (PK) and Average detection (AV) at frequency above 1GHz.

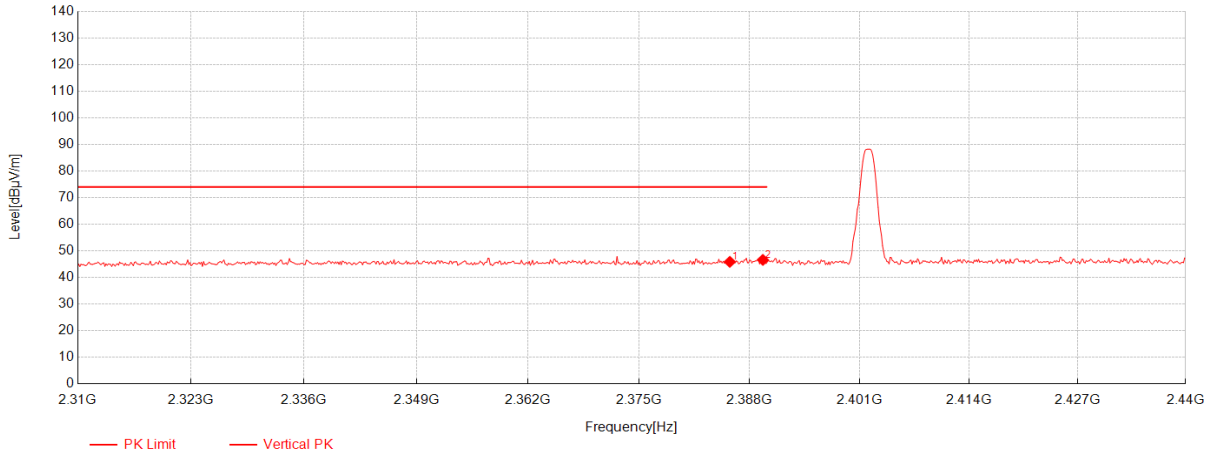
Remark 4:For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geqslant$1/T (Duty cycle$<$98%) or 10Hz (Duty cycle$\geqslant$98%) for Average detection (AV) at frequency above 1GHz.

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



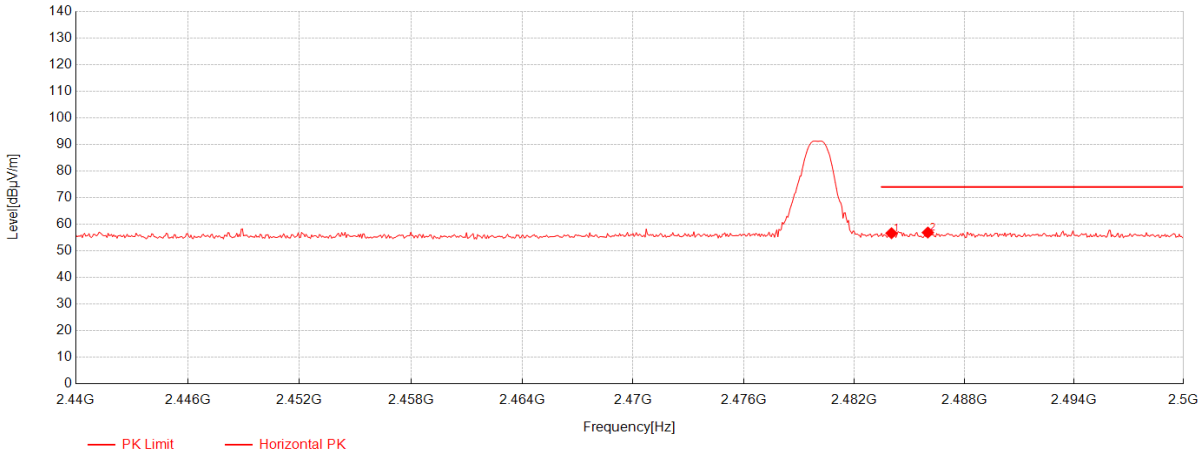
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2385.92	46.34	26.66	-26.15	46.85	74.00	27.15	Horizontal
-	-	-	-	-	22.26	54.00	31.74	-
2	2389.56	45.44	26.70	-26.13	46.01	74.00	27.99	Horizontal
-	-	-	-	-	21.42	54.00	32.58	-

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



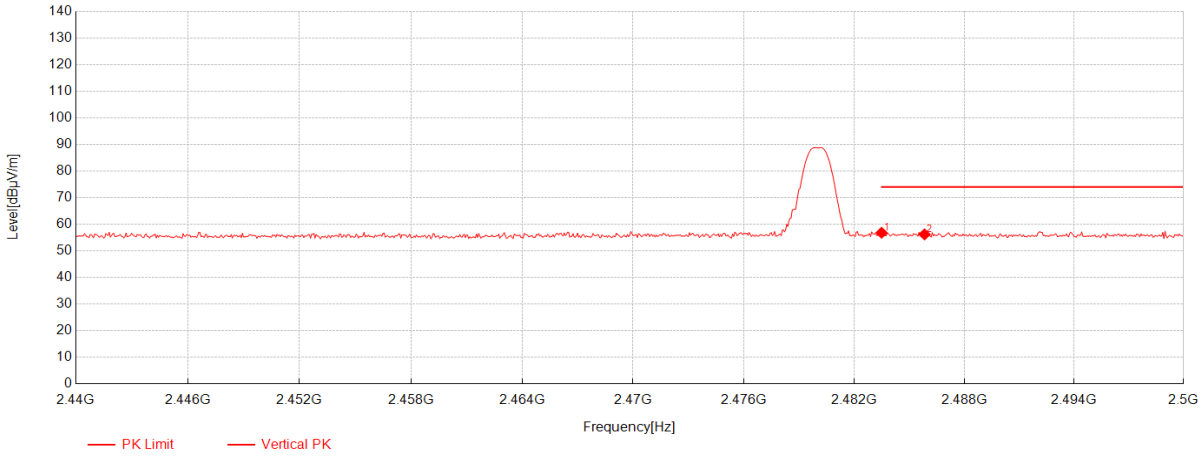
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2385.66	45.33	26.66	-26.15	45.84	74.00	28.16	Vertical
-	-	-	-	-	21.25	54.00	32.75	-
2	2389.56	46.01	26.70	-26.13	46.58	74.00	27.42	Vertical
-	-	-	-	-	21.99	54.00	32.01	-

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2484.04	55.69	27.16	-26.24	56.61	74.00	17.39	Horizontal
-	-	-	-	-	32.02	54.00	21.98	-
2	2486.02	55.96	27.14	-26.24	56.86	74.00	17.14	Horizontal
-	-	-	-	-	32.27	54.00	21.73	-

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2483.5	55.85	27.17	-26.24	56.78	74.00	17.22	Vertical
-	-	-	-	-	32.19	54.00	21.81	-
2	2485.84	55.26	27.14	-26.24	56.16	74.00	17.84	Vertical
-	-	-	-	-	31.57	54.00	22.43	-

7.9 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10-2020+Cor.1-2023 Section 6.4,6.5
Measurement Distance: 3m

Limit:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	Field strength (dBµV/m@3m)
0.009-0.490	2400/F(kHz)	300	128.5 to 93.8
0.490-1.705	24000/F(kHz)	30	73.8 to 62.9
1.705-30.0	30	30	69.60
30-88	100	3	40.0
88-216	150	3	43.5
216-960	200	3	46.0
960-1000	500	3	54.0

Note : The above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz. Radiated emission limits in these two bands are based on measurements employing an average detector.

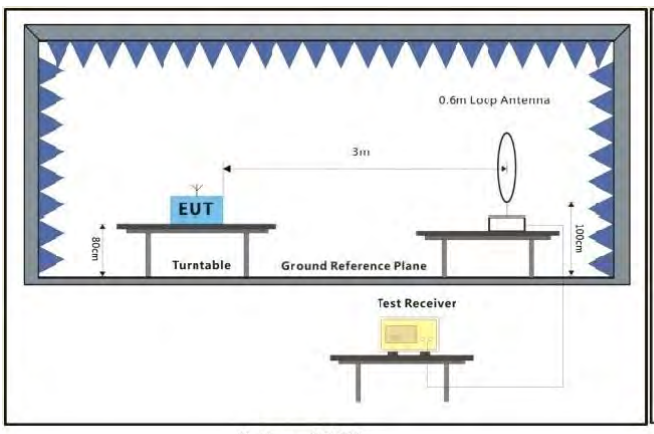
7.9.1 E.U.T. Operation

Operating Environment:
Temperature: 25 °C Humidity: 53 % RH Atmospheric Pressure: 1010 mbar

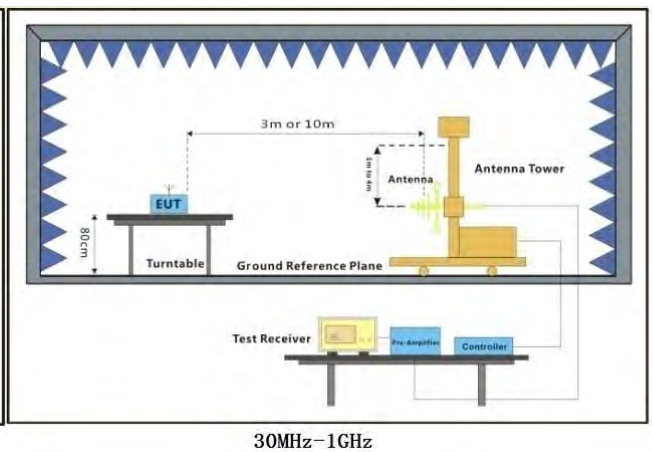
7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.9.3 Test Setup Diagram



Below 30MHz



30MHz-1GHz

7.9.4 Measurement Procedure and Data

a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8m above the ground at a semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

b. The EUT was set 3m or 10m away from the interference-receiving antenna, which was mounted on the variable-height antenna tower.

c. The antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1m to 4m (for the test frequency of below 30MHz, the antenna was tuned to heights 1m) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using quasi-peak method as specified and then reported in a data sheet.

g. Test the EUT in the lowest channel, the middle channel, the Highest channel.

h. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

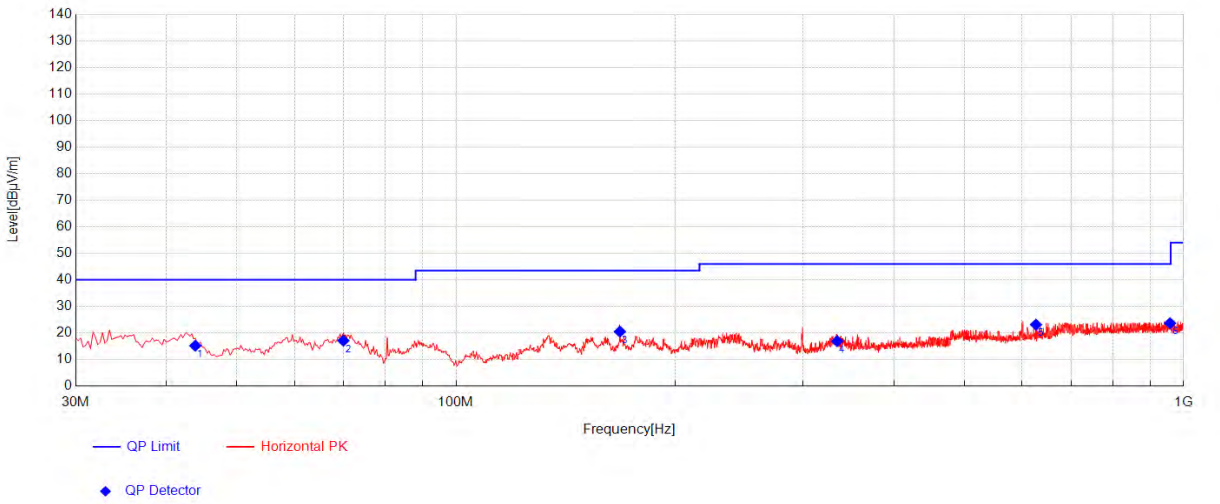
i. Repeat above procedures until all frequencies measured was complete.

Remark:

1 Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

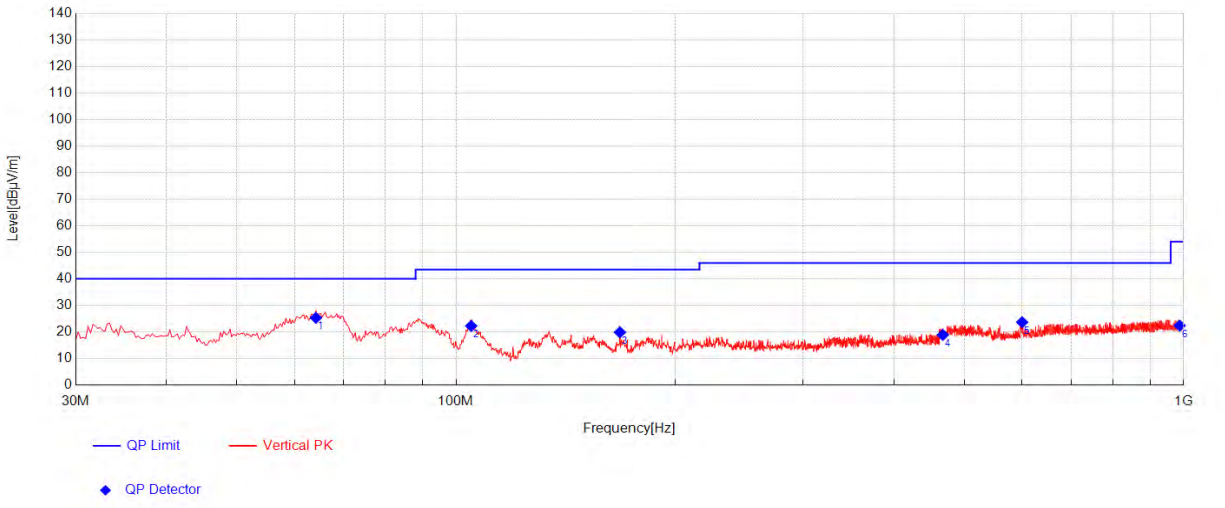
2. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the worst-case test curve is displayed.

Test Mode: 00; Polarity: Horizontal



Final Data List									
NO.	Frequency [MHz]	AF [dB/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	43.8225	9.04	-32.38	15.21	40.00	24.79	255	237	Horizontal
2	70.0125	7.20	-32.08	17.13	40.00	22.87	255	237	Horizontal
3	167.9825	10.40	-31.47	20.52	43.50	22.98	255	302	Horizontal
4	334.095	15.32	-30.73	16.92	46.00	29.08	255	357	Horizontal
5	626.7925	20.70	-29.90	23.13	46.00	22.87	255	360	Horizontal
6	958.0475	22.82	-29.02	23.69	46.00	22.31	255	317	Horizontal

Test Mode: 00; Polarity: Vertical



Final Data List									
NO.	Frequency [MHz]	AF [dB/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	64.1925	5.82	-32.12	25.32	40.00	14.68	255	215	Vertical
2	104.9325	12.51	-31.82	22.25	43.50	21.25	255	187	Vertical
3	167.9825	10.40	-31.47	19.89	43.50	23.61	255	42	Vertical
4	466.7425	18.33	-30.35	18.90	46.00	27.10	255	123	Vertical
5	599.875	20.69	-29.98	23.68	46.00	22.32	255	215	Vertical
6	987.6325	23.16	-28.99	22.40	54.00	31.60	255	243	Vertical

7.10 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10-2020+Cor.1-2023 Section 6.6 & 7.8.8
Measurement Distance: 3m

Limit:

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance(meters)
Above 1000	500	3

Note:

At Above 18GHz, measurements may be performed at a distance shorter than that specified in the regulations

Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor+ Aux Factor (if applicable)

The aux factor needs to be added when measurements are performed at a distance other than the limit distance provided.

EX. Above 18GHz, Aux Factor = 20 dB/decade of distance, the aux factor is 20log(1/3) = -9.54dB (for 1m test distance).

7.10.1 E.U.T. Operation

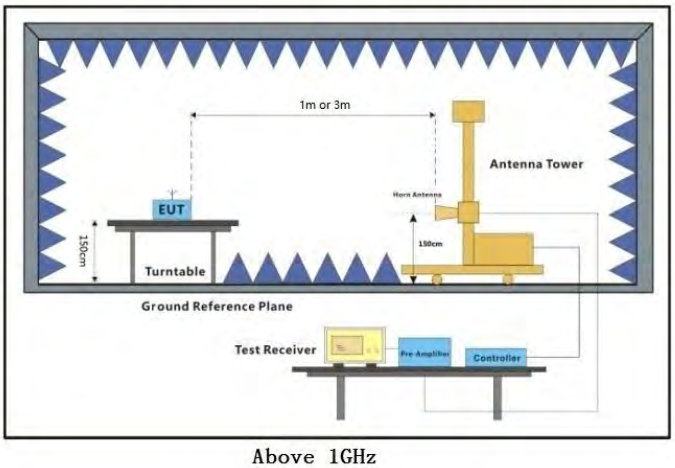
Operating Environment:

Temperature: 25 °C Humidity: 53 % RH Atmospheric Pressure: 1010 mbar

7.10.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.10.3 Test Setup Diagram



Above 1GHz

7.10.4 Measurement Procedure and Data

a. For above 1GHz, the EUT was placed on the top of a rotating table 1.5m above the ground at a 3m fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation. The EUT was set 3m away from the interference-receiving antenna from 1GHz to 18GHz, and 1m away from the interference-receiving antenna above 18GHz.

b. The interference-receiving antenna was mounted on the variable-height antenna tower, with its boresight facing the EUT throughout the test.

c. The antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.

d. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1m to 4m and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.

e. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

f. Test the EUT in the lowest channel, the middle channel, the Highest channel.

g. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.

h. Repeat above procedures until all frequencies measured was complete.

Remark:

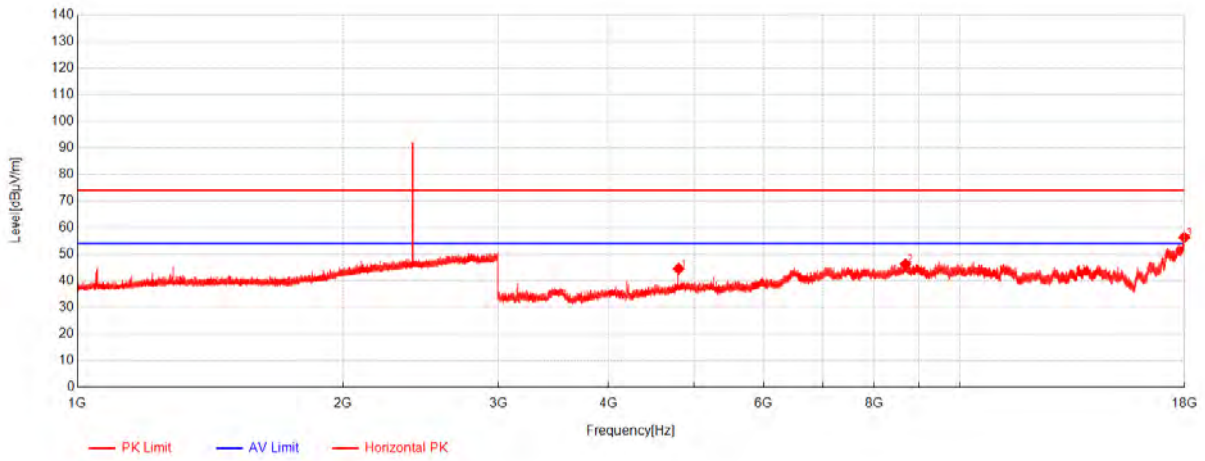
1. Scan from 1GHz to 10th harmonic of the highest frequency or 40 GHz, whichever is lower.

2. As shown in this section, for frequencies above 1GHz, the field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation. For the emissions whose peak level is lower than the average limit, only the peak measurement is shown in the report.

3. For the frequency above 18GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

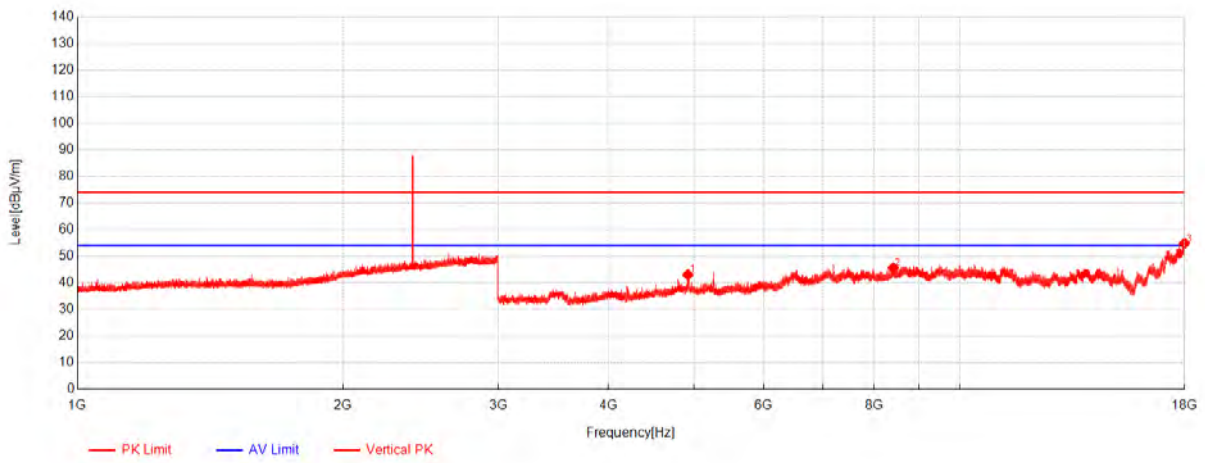
4. For devices with multiple operating modes, measurements on the middle channel is used to determine the worst-case mode(s).

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:Low



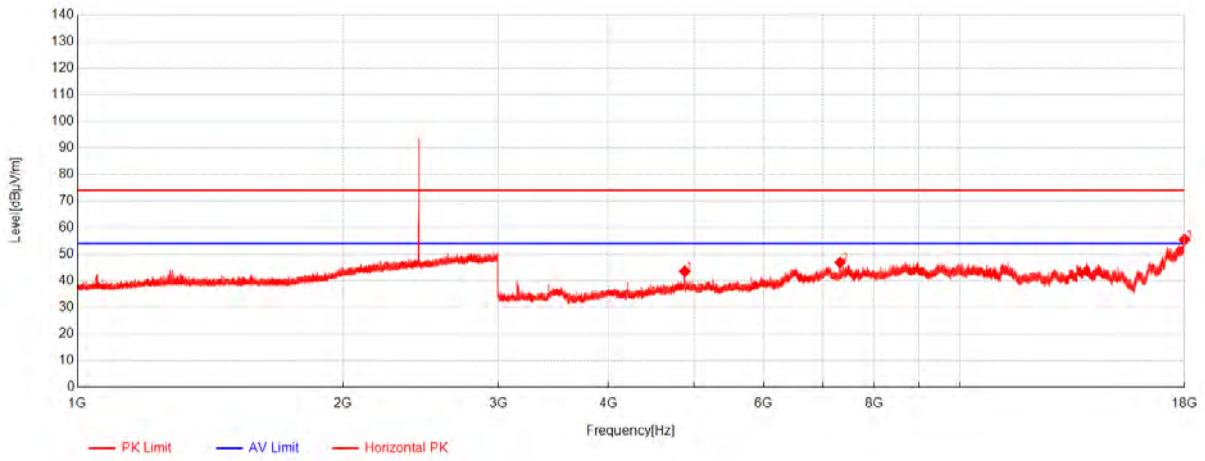
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4804	63.08	31.49	-50.04	44.53	74.00	29.47	Horizontal
-	-	-	-	-	19.94	54.00	34.06	-
2	8685	54.66	37.47	-45.84	46.29	74.00	27.71	Horizontal
-	-	-	-	-	21.70	54.00	32.30	--
3	17983.5	54.52	43.20	-41.44	56.28	74.00	17.72	Horizontal
-	-	-	-	-	31.69	54.00	22.31	

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:Low



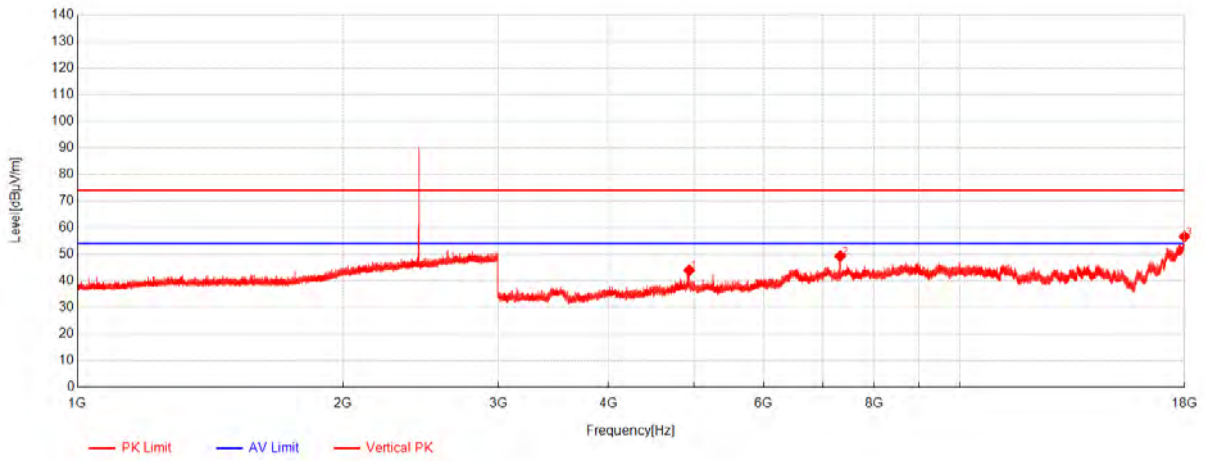
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4921.5	62.26	31.50	-50.73	43.03	74.00	30.97	Vertical
-	-	-	-	-	18.44	54.00	35.56	-
2	8410.5	55.54	37.04	-47.01	45.57	74.00	28.43	Vertical
-	-	-	-	-	20.98	54.00	33.02	-
3	17986	53.03	43.20	-41.40	54.83	74.00	19.17	Vertical
-	-	-	-	-	30.24	54.00	23.76	-

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:middle



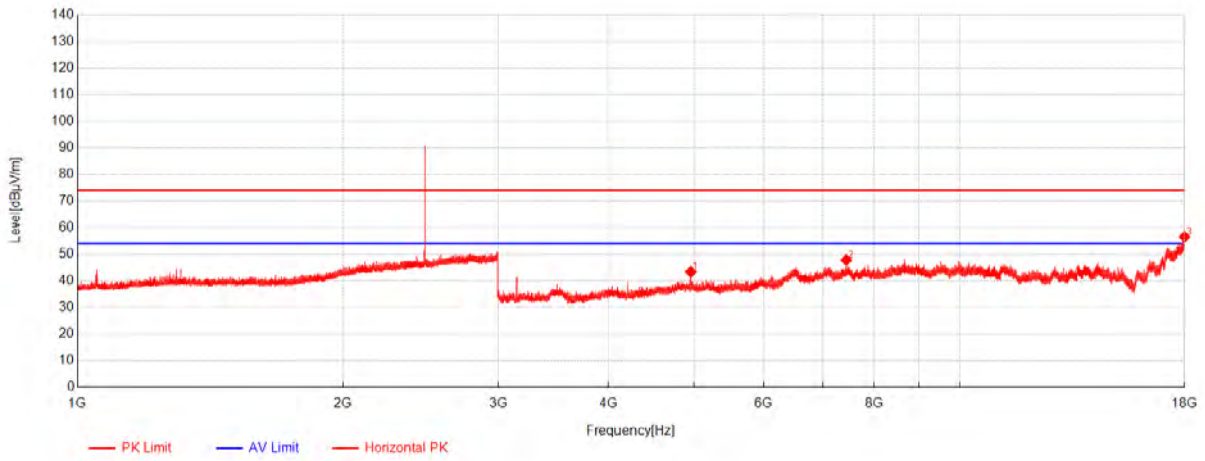
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4881.5	62.71	31.46	-50.61	43.56	74.00	30.44	Horizontal
-	-	-	-	-	18.97	54.00	35.03	-
2	7322.5	59.04	36.35	-48.49	46.90	74.00	27.10	Horizontal
-	-	-	-	-	22.31	54.00	31.69	-
3	17994	53.49	43.20	-41.26	55.43	74.00	18.57	Horizontal
-	-	-	-	-	30.84	54.00	23.16	-

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:middle



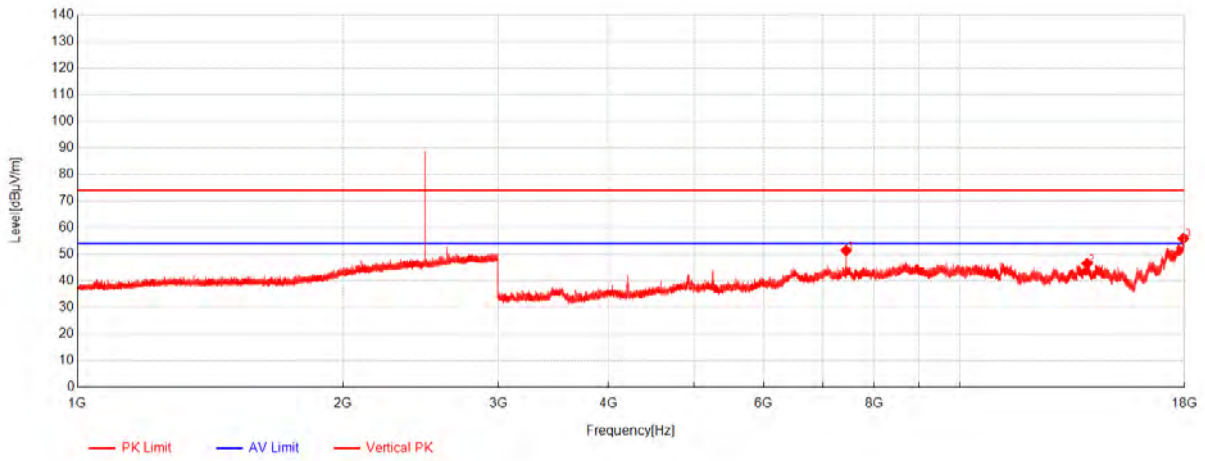
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4938	63.17	31.50	-50.72	43.95	74.00	30.05	Vertical
-	-	-	-	-	19.36	54.00	34.64	-
2	7322.5	61.40	36.35	-48.49	49.26	74.00	24.74	Vertical
-	-	-	-	-	24.67	54.00	29.33	-
3	17987	54.79	43.20	-41.38	56.61	74.00	17.39	Vertical
-	-	-	-	-	32.02	54.00	21.98	-

Test Mode: 00; Polarity: Horizontal; Modulation:GFSK; Channel:High



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4960.5	62.52	31.56	-50.71	43.37	74.00	30.63	Horizontal
-	-	-	-	-	18.78	54.00	35.22	-
2	7440.5	59.01	36.22	-47.46	47.77	74.00	26.23	Horizontal
-	-	-	-	-	23.18	54.00	30.82	-
3	17993.5	54.57	43.20	-41.27	56.50	74.00	17.50	Horizontal
-	-	-	-	-	31.91	54.00	22.09	-

Test Mode: 00; Polarity: Vertical; Modulation:GFSK; Channel:High



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	7439.5	62.64	36.22	-47.47	51.39	74.00	22.61	Vertical
-	-	-	-	-	26.80	54.00	27.20	-
2	13954.5	48.29	40.57	-42.42	46.44	74.00	27.56	Vertical
-	-	-	-	- -	21.85	54.00	32.15	-
3	17936	55.04	43.06	-42.26	55.84	74.00	18.16	Vertical
-	-	-	-		31.25	54.00	22.75	-

7.11 Conducted Emissions at AC Power Line (150kHz-30MHz)

Test Requirement 47 CFR Part 15, Subpart C 15.207
Test Method: ANSI C63.10-2020+Cor.1-2023 Section 6.2
Measurement Distance: 3m

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.		
Detector: Peak for pre-scan (9kHz resolution bandwidth) 0.15M to 30MHz		

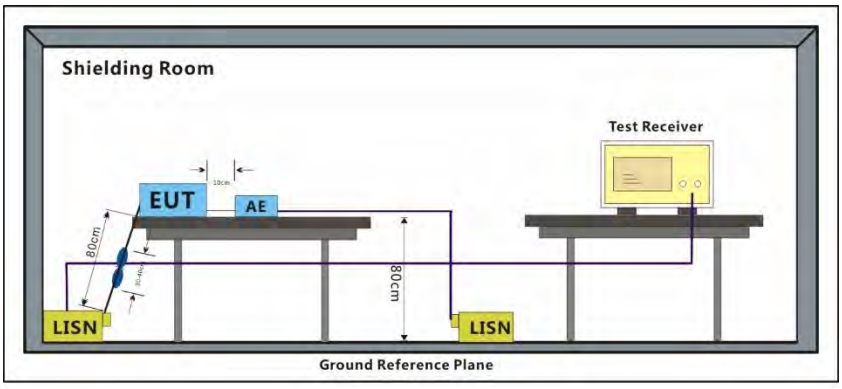
7.11.1 E.U.T. Operation

Operating Environment:
Temperature: 24 °C Humidity: 53 % RH Atmospheric Pressure: 1010 mbar

7.11.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in continuously transmitting mode with GFSK modulation, Pi/4DQPSK modulation, 8DPSK modulation. All modes have been tested and only the data of worst case is recorded in the report.

7.11.3 Test Setup Diagram



7.11.4 Measurement Procedure and Data

1) The mains terminal disturbance voltage test was conducted in a shielded room.

2) The EUT was connected to AC power source through a LISN 1 (Line Impedance Stabilization Network) which provides a 50ohm/50μH + 5ohm linear impedance. The power cables of all other units of the EUT were connected to a second LISN 2, which was bonded to the ground reference plane in the same way as the LISN 1 for the unit being measured. A multiple socket outlet strip was used to connect multiple power cables to a single LISN provided the rating of the LISN was not exceeded.

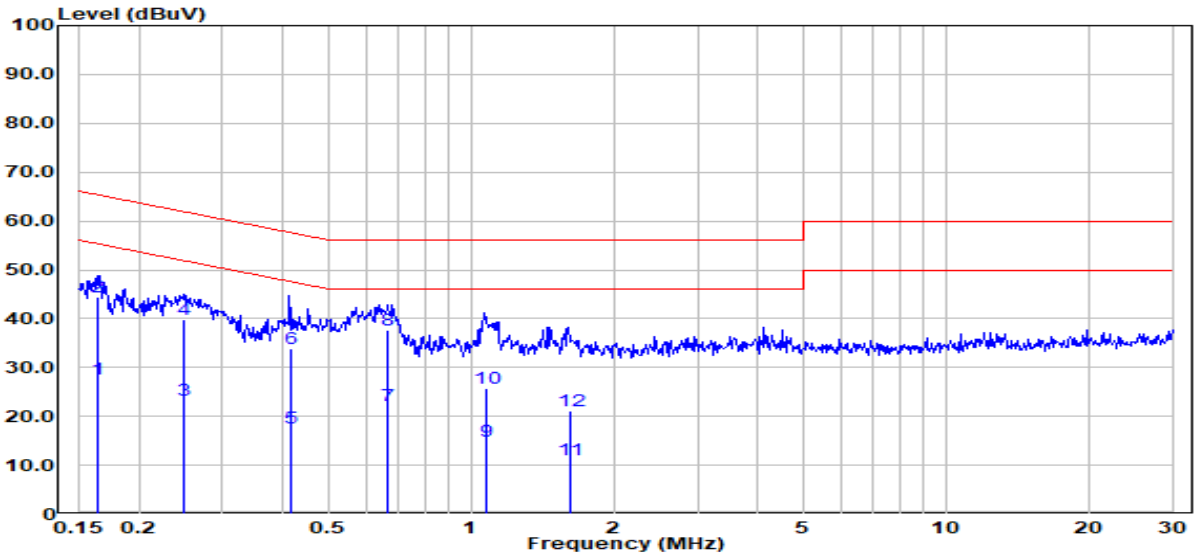
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

4) The test was performed with a vertical ground reference plane. The rear of the EUT shall be 0.4 m from the vertical ground reference plane. The vertical ground reference plane was bonded to the horizontal ground reference plane. The LISN 1 was placed 0.8 m from the boundary of the unit under test and bonded to a ground reference plane for LISNs mounted on top of the ground reference plane. This distance was between the closest points of the LISN 1 and the EUT. All other units of the EUT and associated equipment was at least 0.8 m from the LISN 2.

5) In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.

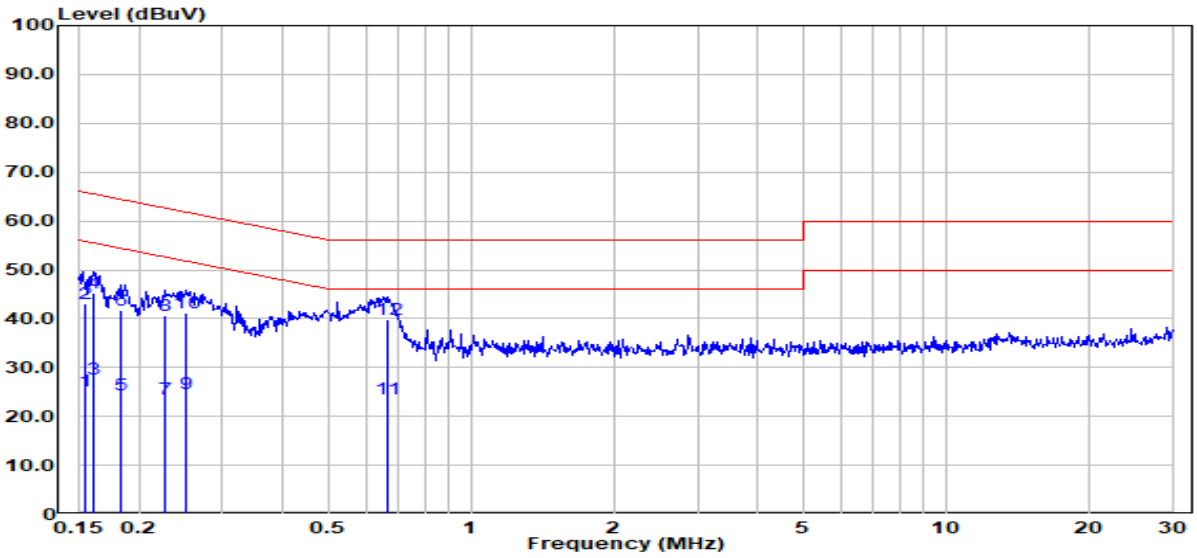
Remark: Level=Read Level+ Cable Loss+ LISN Factor

Test Mode: 00; Line: Live line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1635	7.19	20.32	27.51	55.28	-27.77	Average
2	0.1635	24.19	20.32	44.51	65.28	-20.77	QP
3	0.2482	3.23	20.11	23.34	51.82	-28.48	Average
4	0.2482	19.77	20.11	39.88	61.82	-21.94	QP
5	0.4168	-2.51	20.21	17.70	47.51	-29.81	Average
6	0.4168	13.55	20.21	33.76	57.51	-23.75	QP
7	0.6662	2.02	20.19	22.21	46.00	-23.79	Average
8	0.6662	17.58	20.19	37.77	56.00	-18.23	QP
9	1.0750	-5.17	19.97	14.80	46.00	-31.20	Average
10	1.0750	5.67	19.97	25.64	56.00	-30.36	QP
11	1.6150	-9.03	20.04	11.01	46.00	-34.99	Average
12	1.6150	1.07	20.04	21.11	56.00	-34.89	QP

Test Mode: 00; Line: Neutral Line



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV)	Factor(dB)	(dBuV)	(dBuV)	(dB)	
1	0.1533	4.88	20.43	25.31	55.82	-30.51	Average
2	0.1533	22.67	20.43	43.10	65.82	-22.72	QP
3	0.1601	7.25	20.41	27.66	55.46	-27.80	Average
4	0.1601	24.72	20.41	45.13	65.46	-20.33	QP
5	0.1830	4.18	20.32	24.50	54.35	-29.85	Average
6	0.1830	21.30	20.32	41.62	64.35	-22.73	QP
7	0.2272	3.51	20.18	23.69	52.55	-28.86	Average
8	0.2272	20.38	20.18	40.56	62.55	-21.99	QP
9	0.2520	4.44	20.14	24.58	51.69	-27.11	Average
10	0.2520	21.13	20.14	41.27	61.69	-20.42	QP
11	0.6659	3.26	20.21	23.47	46.00	-22.53	Average
12	0.6659	19.55	20.21	39.76	56.00	-16.24	QP

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2606001505AT

9 EUT Constructional Details (EUT Photos)

Refer to Appendix_Photographs of EUT Constructional Details for KSCR2606001505AT

10 Appendix

1. Bandwidth

1.1 Test Result

1.1.1 OBW

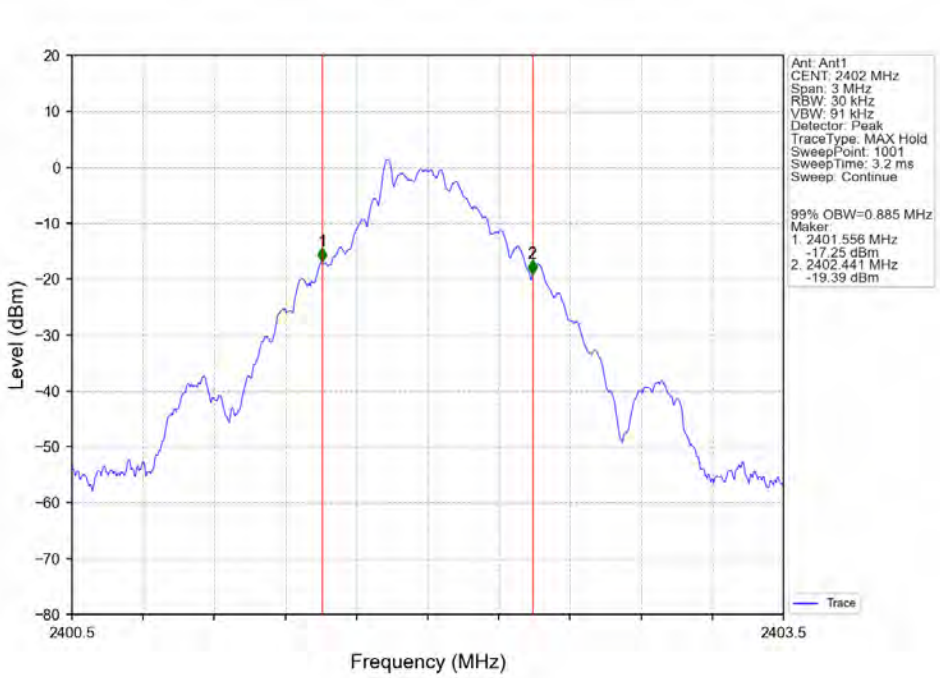
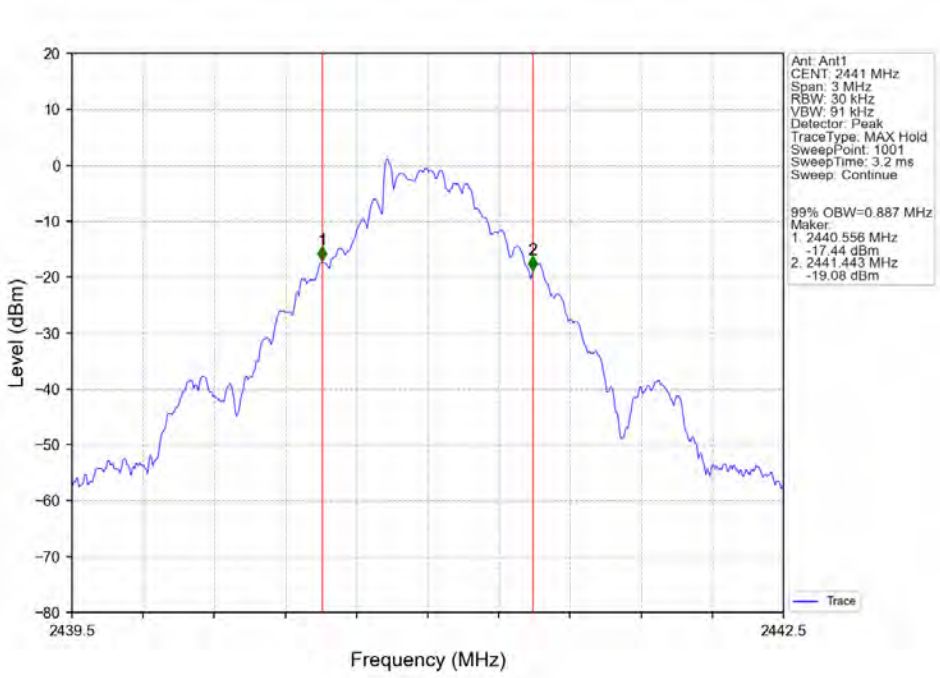
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.885	/	Pass
		2441	DH5	1	0.887	/	Pass
		2480	DH5	1	0.890	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.170	/	Pass
		2441	2DH5	1	1.174	/	Pass
		2480	2DH5	1	1.174	/	Pass
8DPSK	SISO	2402	3DH5	1	1.164	/	Pass
		2441	3DH5	1	1.187	/	Pass
		2480	3DH5	1	1.167	/	Pass

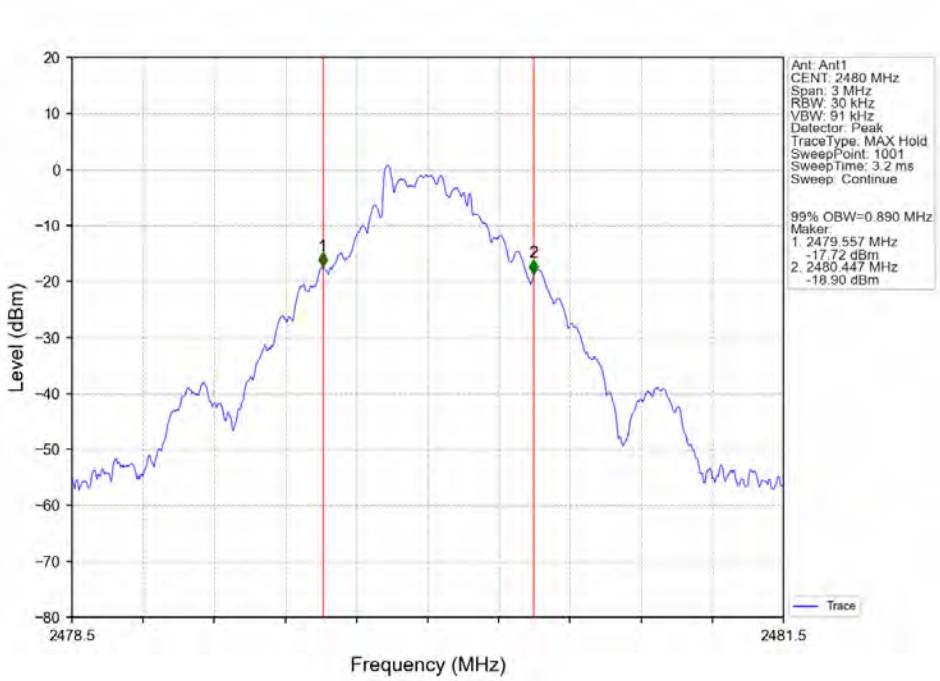
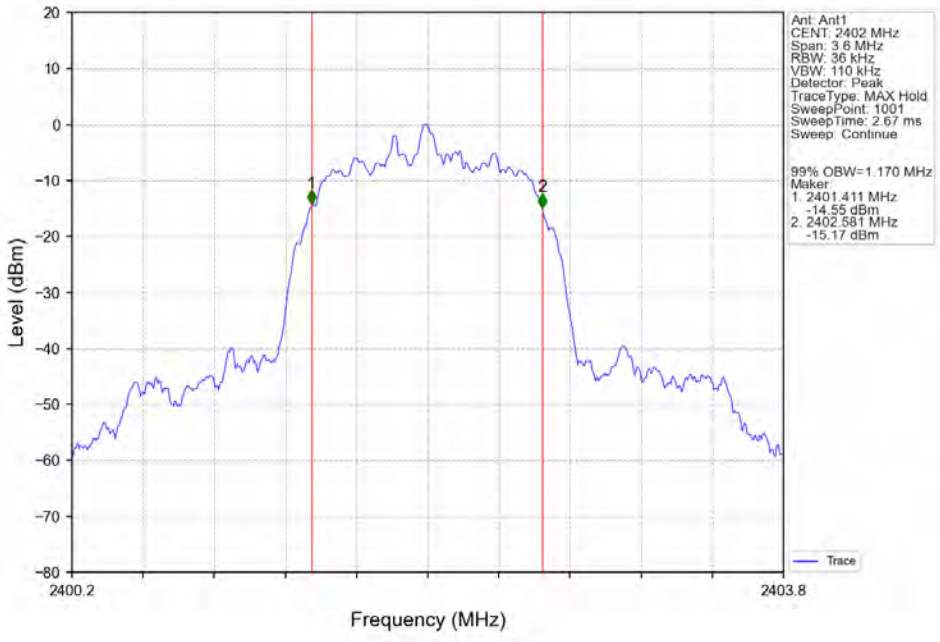
1.1.2 20dB BW

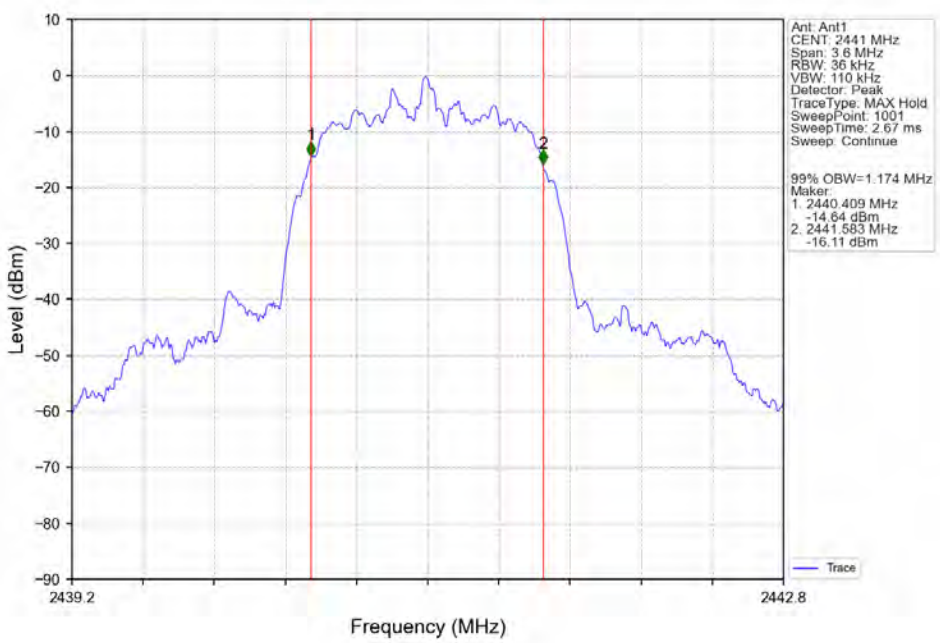
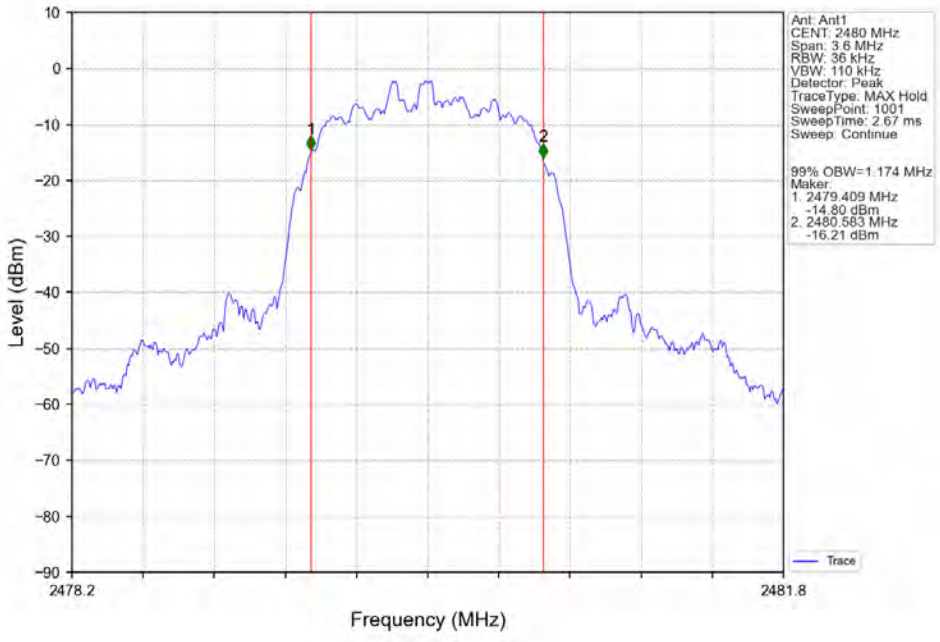
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.948	/	Pass
		2441	DH5	1	0.955	/	Pass
		2480	DH5	1	0.957	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.284	/	Pass
		2441	2DH5	1	1.333	/	Pass
		2480	2DH5	1	1.333	/	Pass
8DPSK	SISO	2402	3DH5	1	1.275	/	Pass
		2441	3DH5	1	1.322	/	Pass
		2480	3DH5	1	1.298	/	Pass

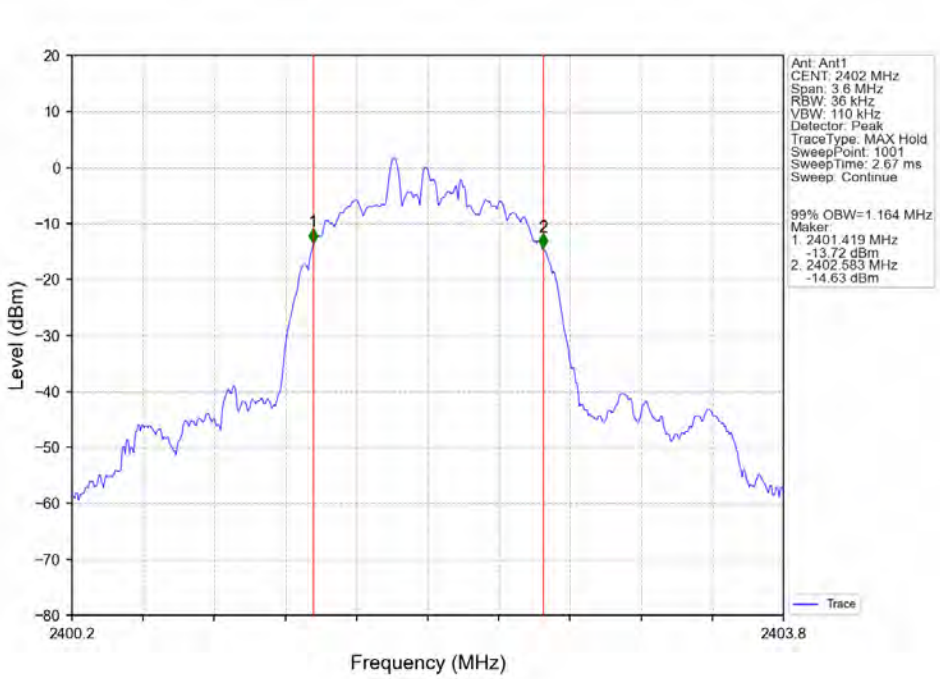
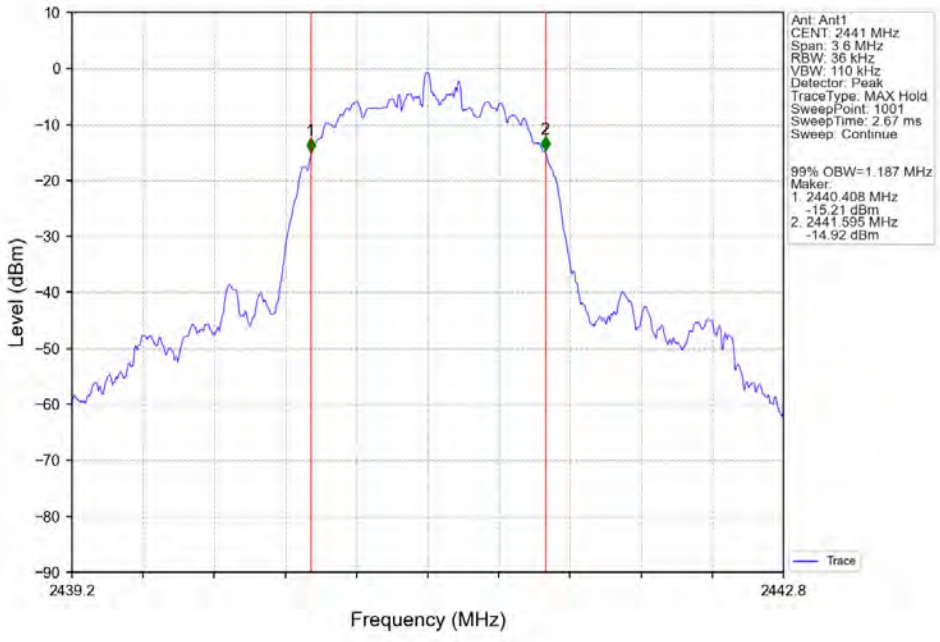
1.2 Test Graph

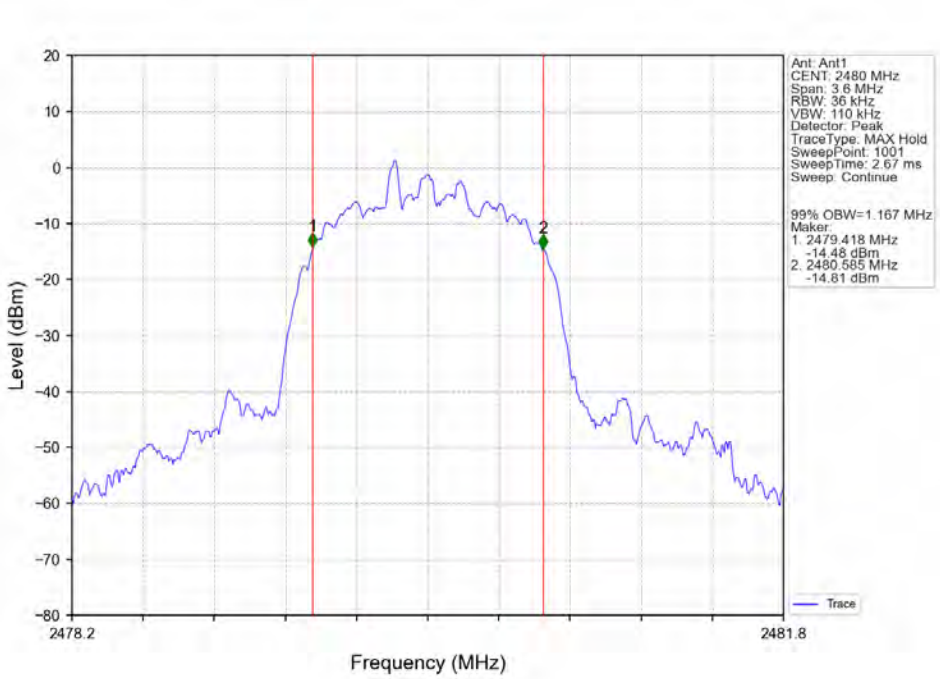
1.2.1 OBW

GFSK_DH5_LCH_2402MHz_Ant1_NTNV

GFSK_DH5_MCH_2441MHz_Ant1_NTNV


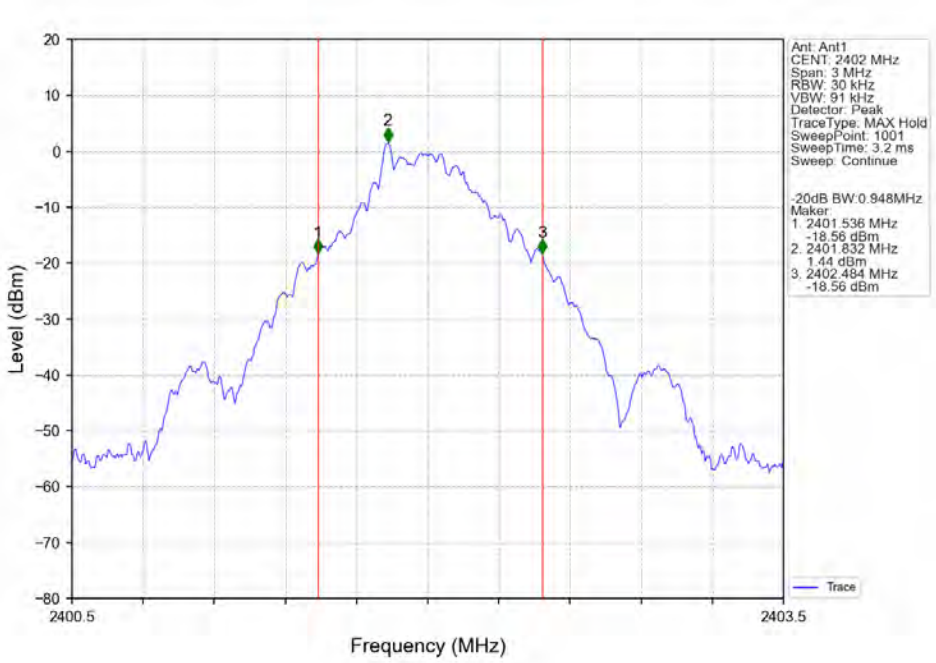
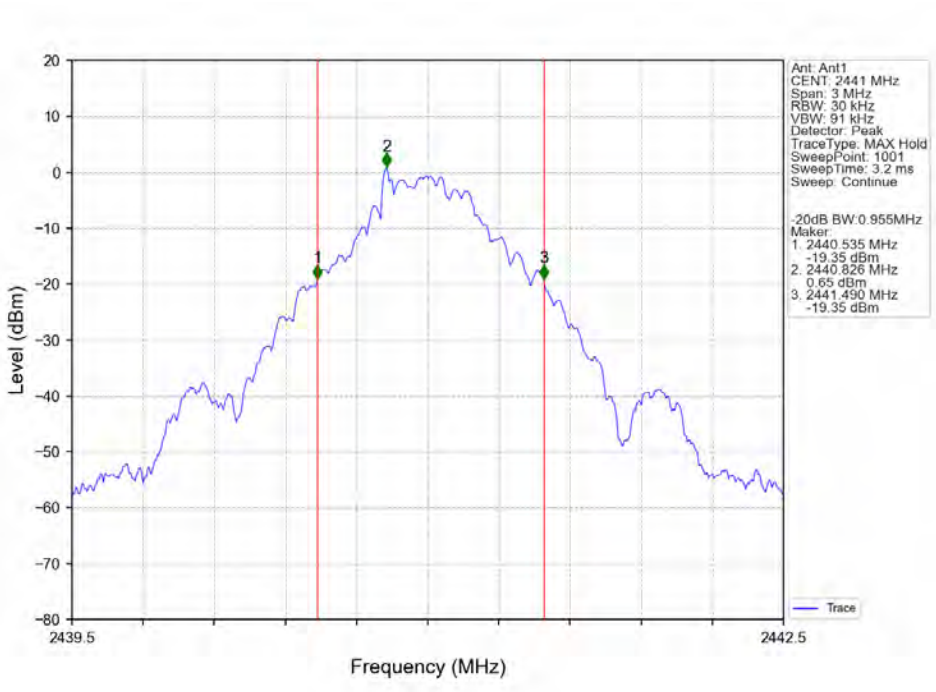
GFSK_DH5_HCH_2480MHz_Ant1_NTNV

Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV


Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV


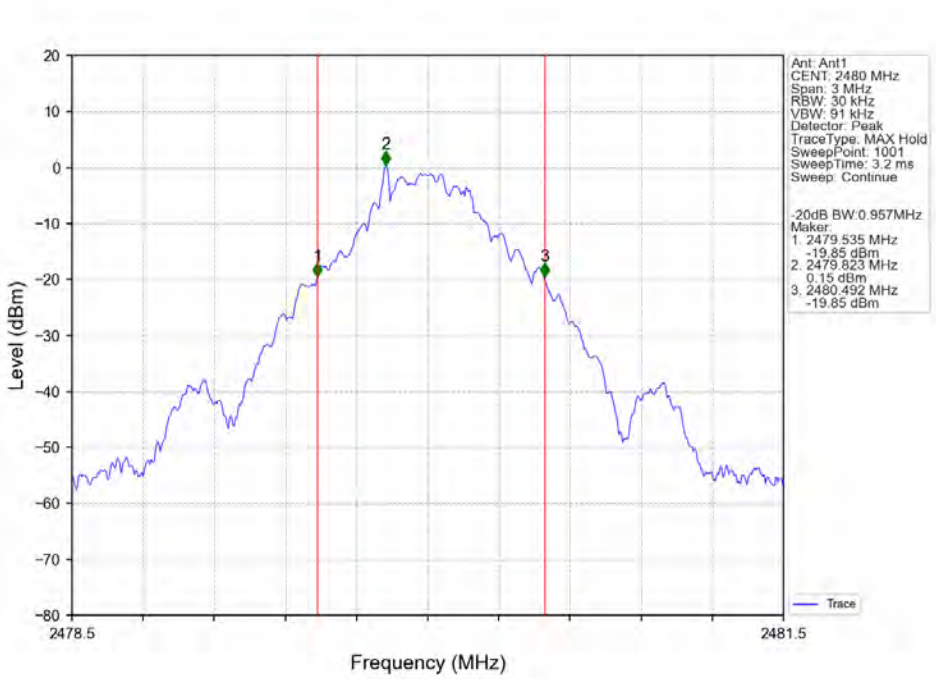
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV


8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV


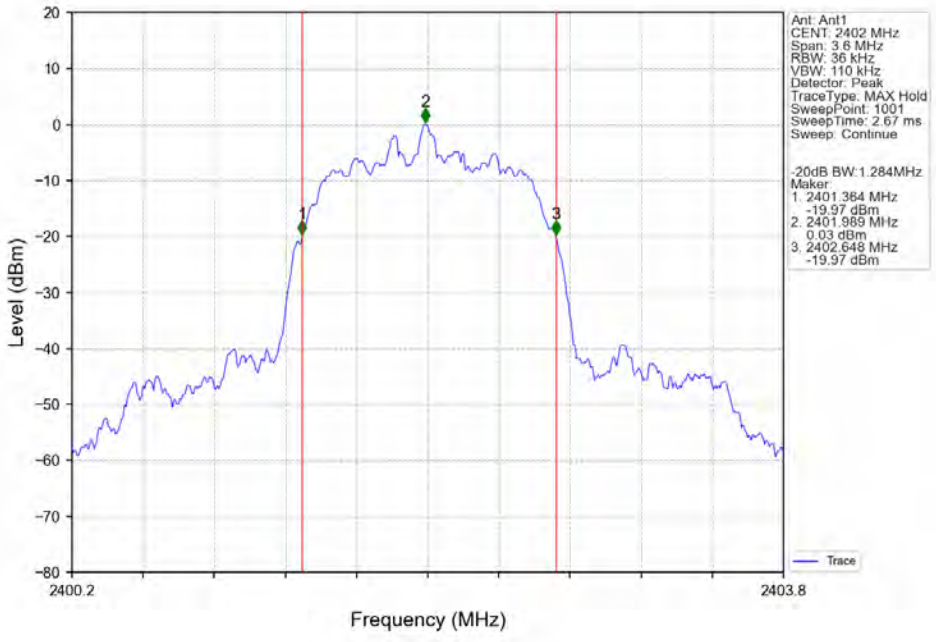
1.2.2 20dB BW

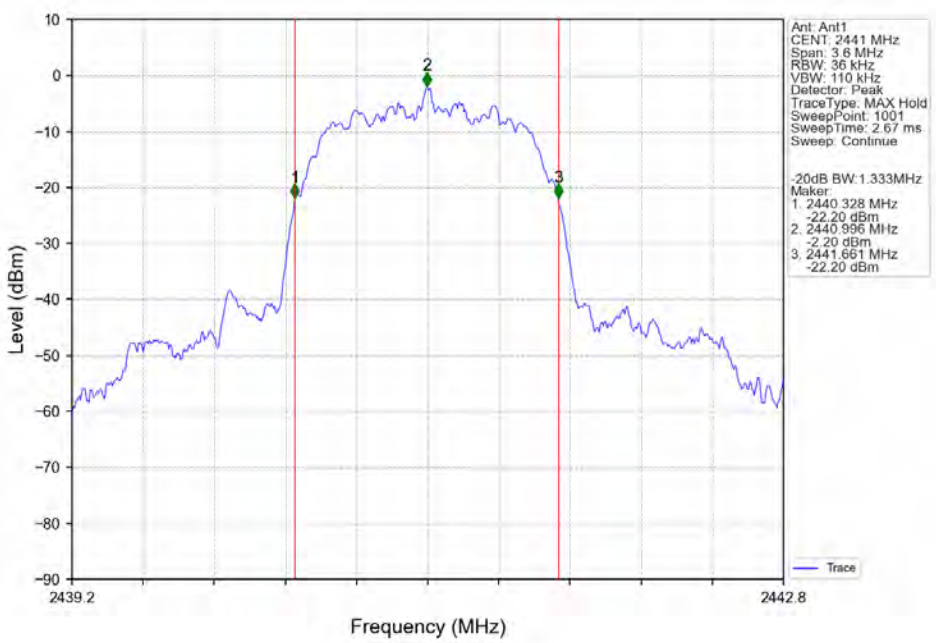
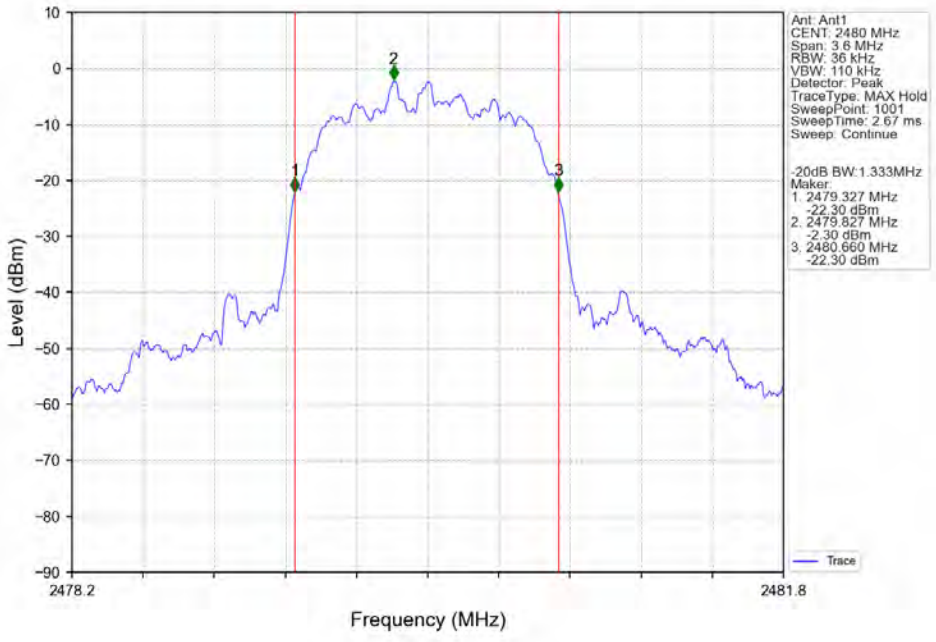
GFSK_DH5_LCH_2402MHz_Ant1_NTNV

GFSK_DH5_MCH_2441MHz_Ant1_NTNV


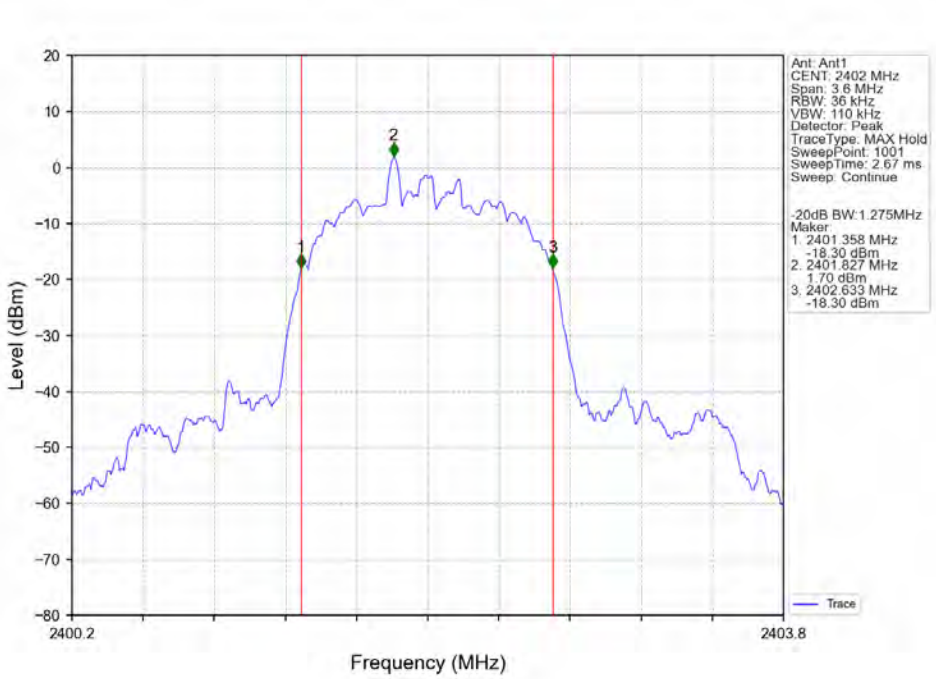
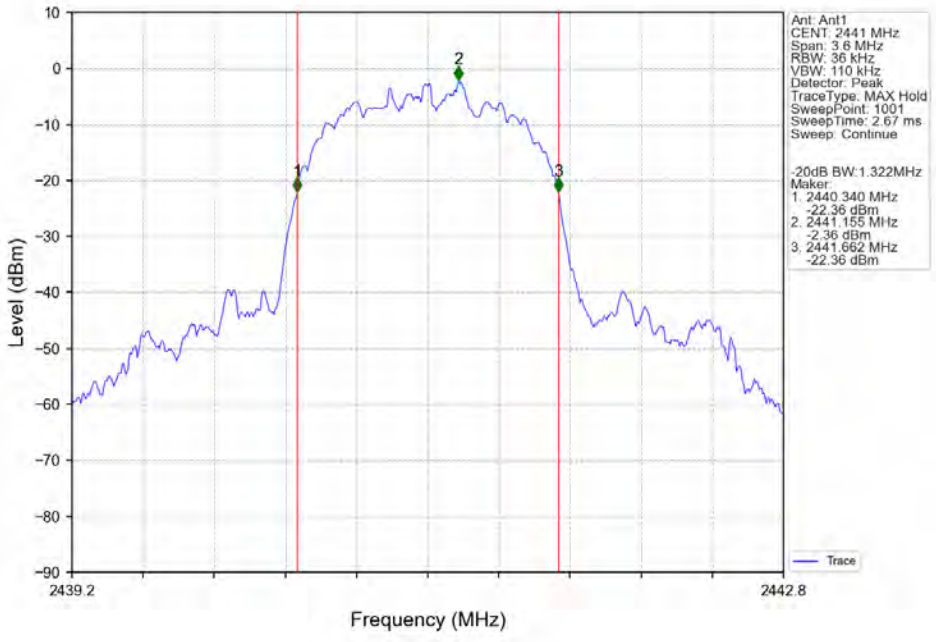
GFSK_DH5_HCH_2480MHz_Ant1_NTNV

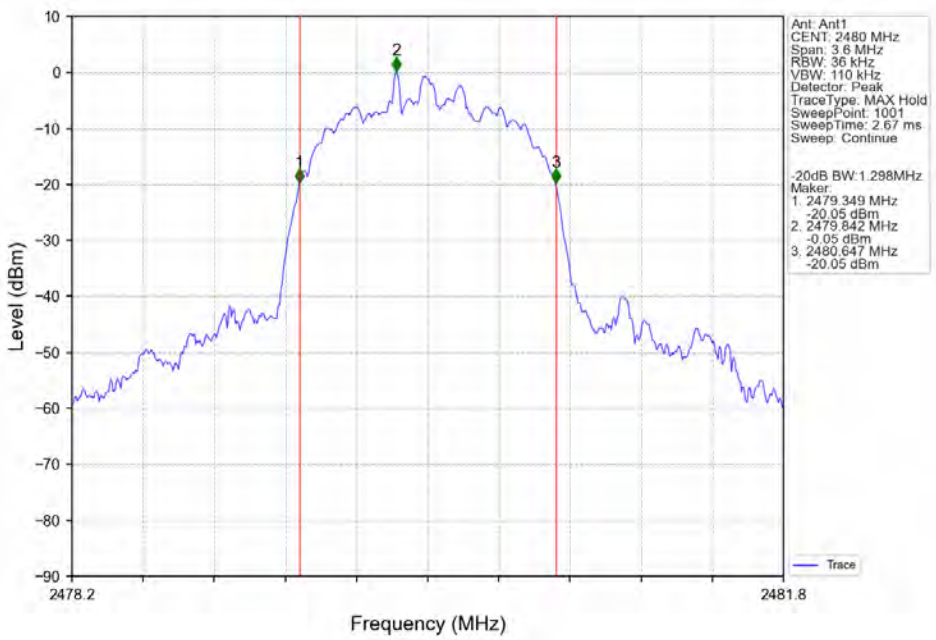


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV


8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV


2. Maximum Conducted Output Power

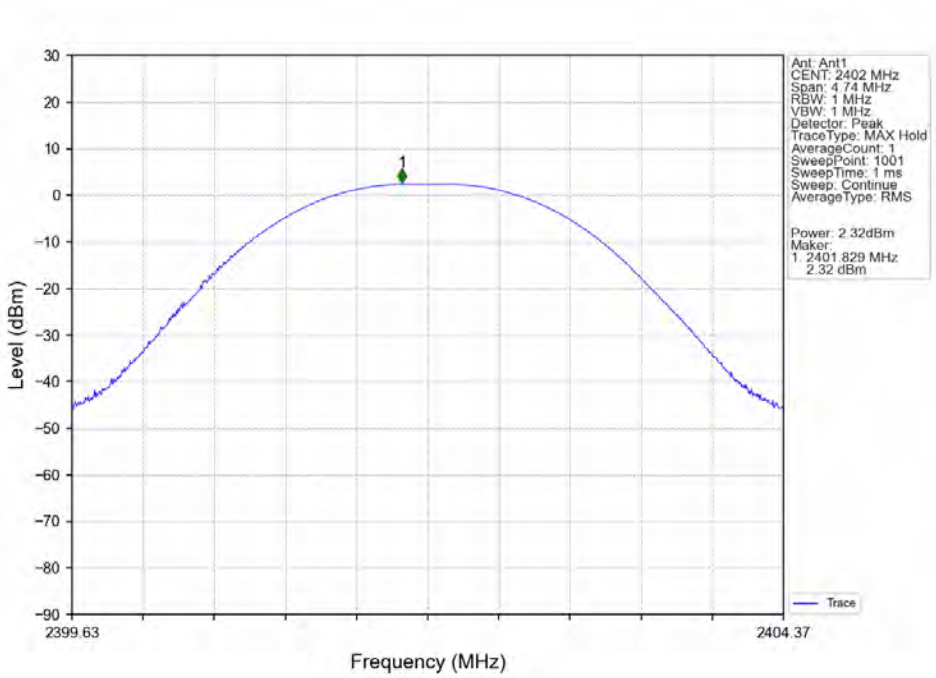
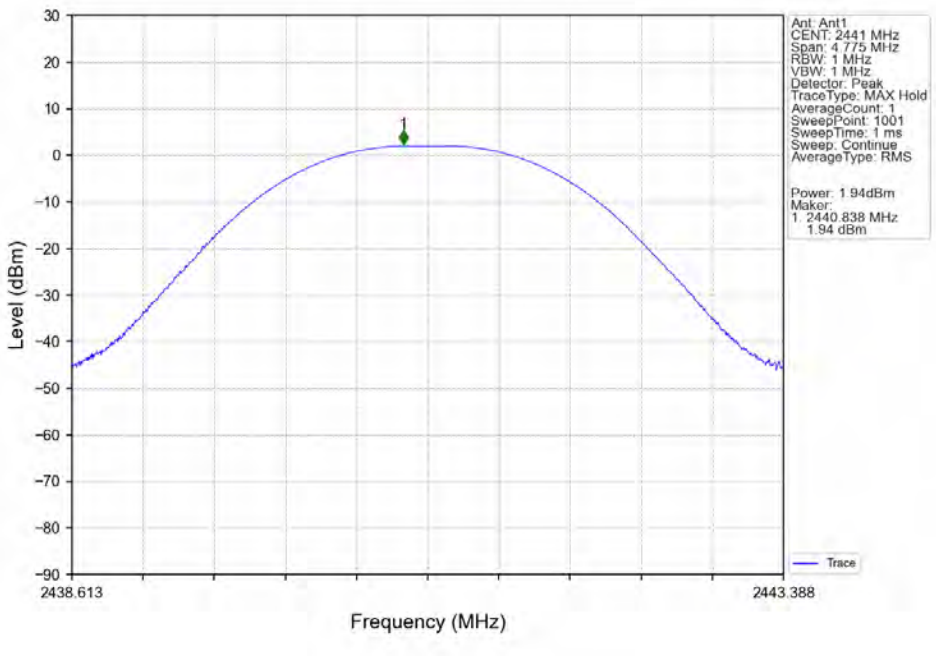
2.1 Test Result

2.1.1 Power

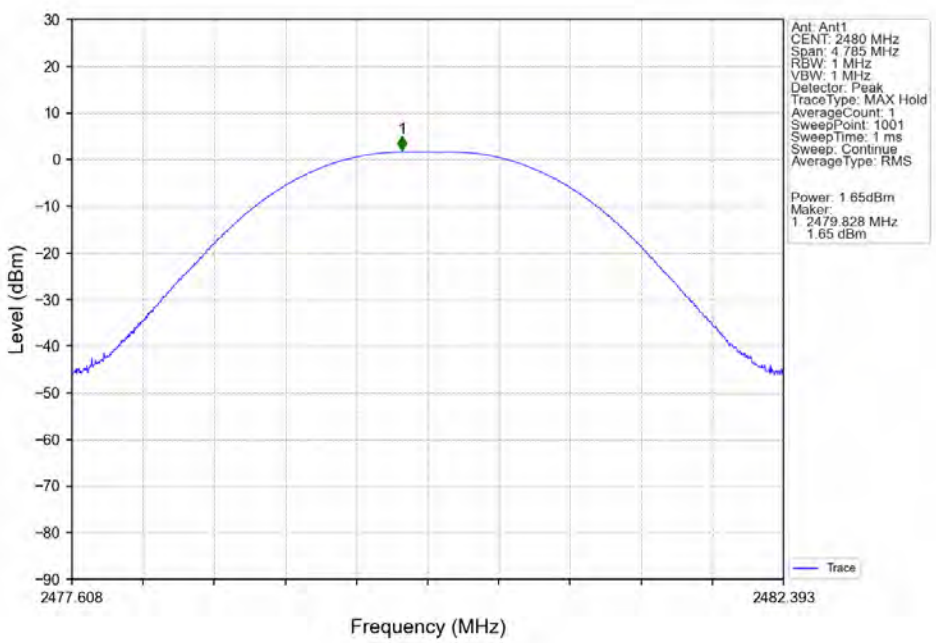
Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	2.32	<=30	Pass
		2441	DH5	1.94	<=30	Pass
		2480	DH5	1.65	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	3.03	<=20.97	Pass
		2441	2DH5	2.64	<=20.97	Pass
		2480	2DH5	2.52	<=20.97	Pass
8DPSK	SISO	2402	3DH5	**3.39**	<=20.97	Pass
		2441	3DH5	3.19	<=20.97	Pass
		2480	3DH5	3.09	<=20.97	Pass
Note1: Antenna Gain: Ant1: 1.54dBi;						

2.2 Test Graph

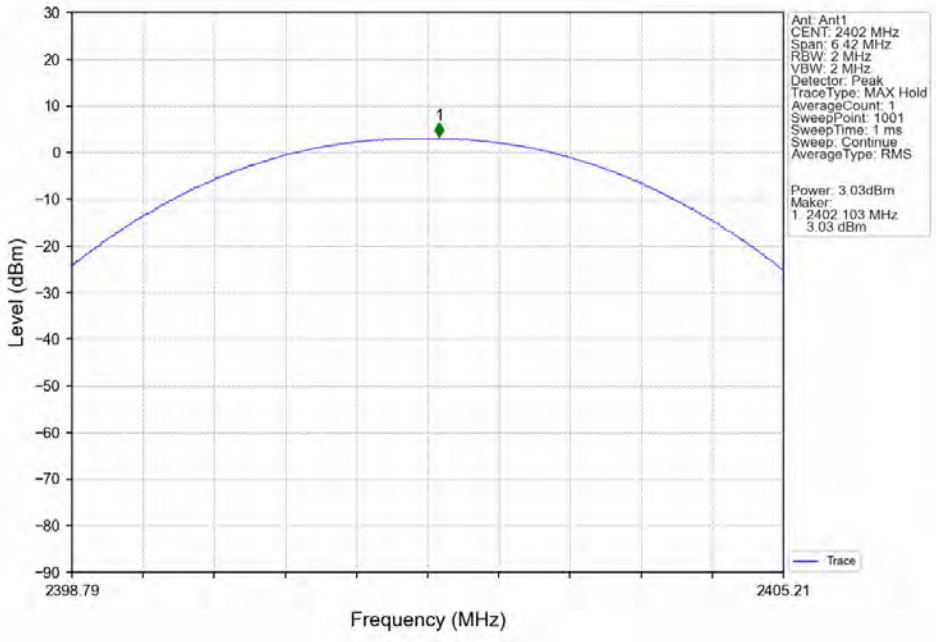
2.2.1 Power

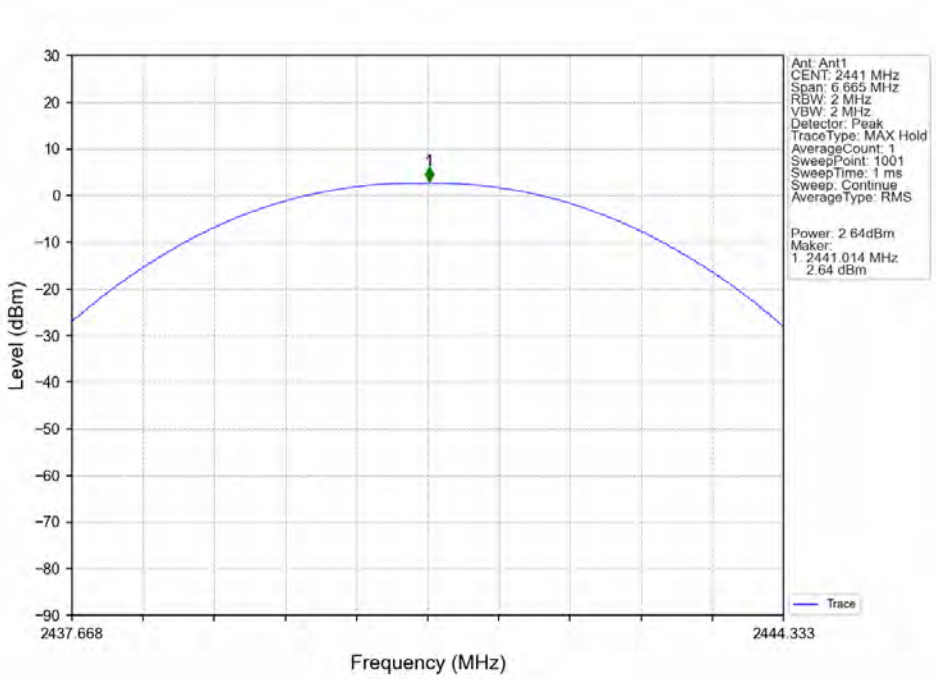
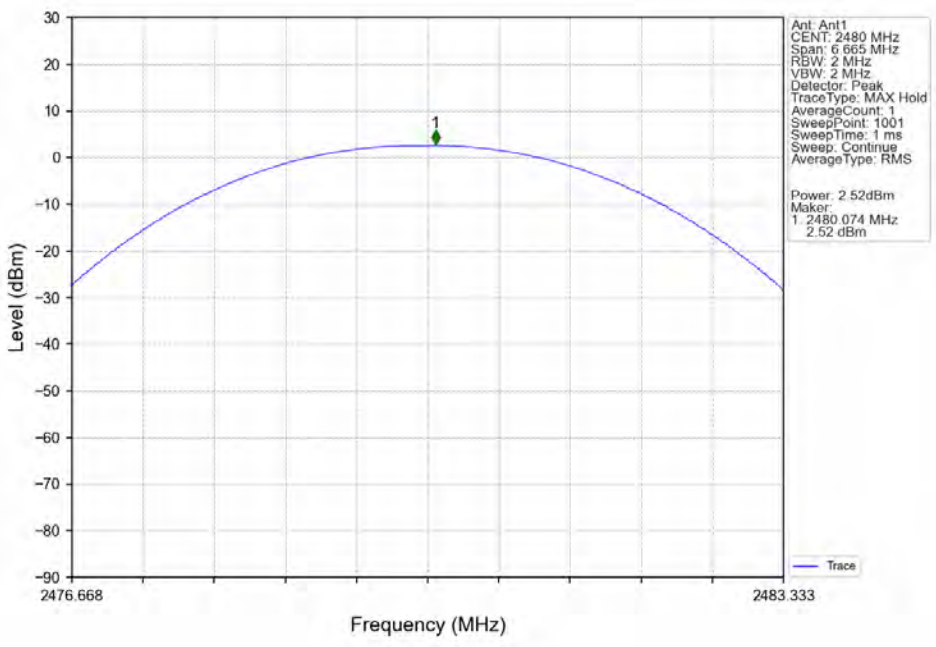
GFSK_DH5_LCH_2402MHz_Ant1_NTNV

GFSK_DH5_MCH_2441MHz_Ant1_NTNV


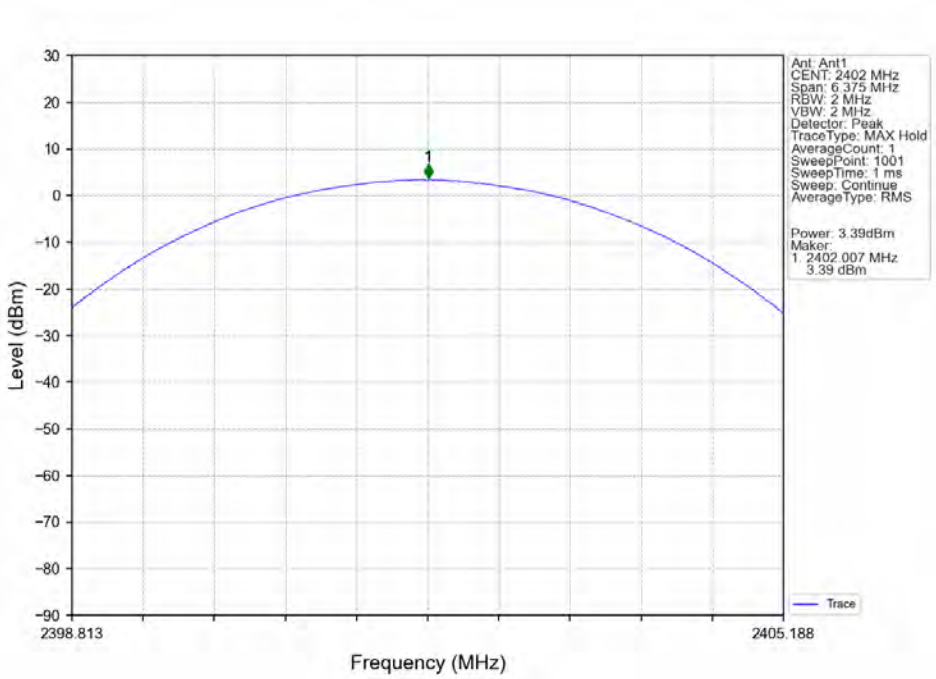
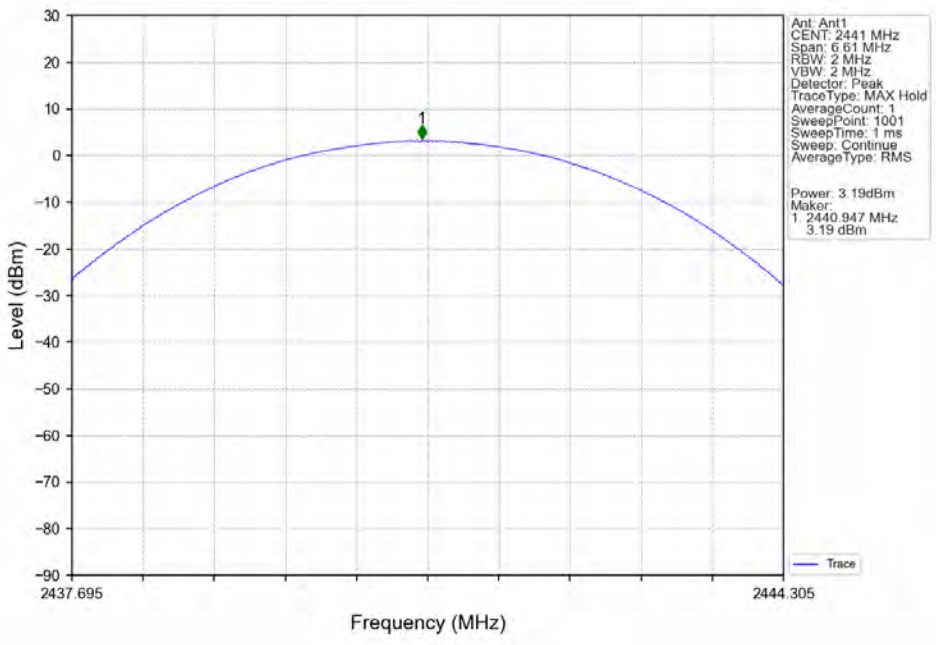
GFSK_DH5_HCH_2480MHz_Ant1_NTNV

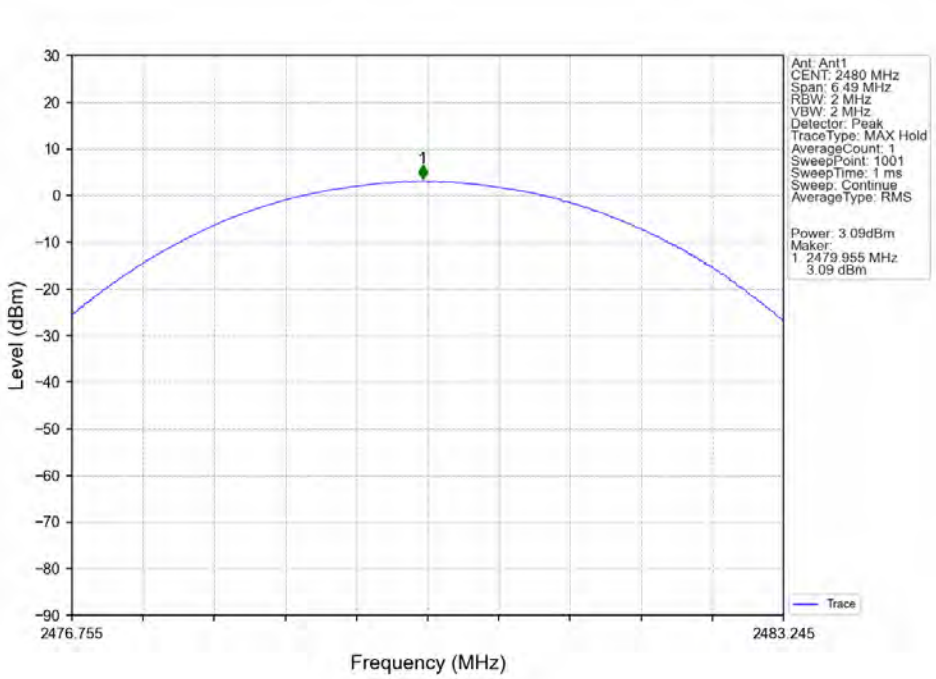


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV


8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV


3. Carrier Frequency Separation

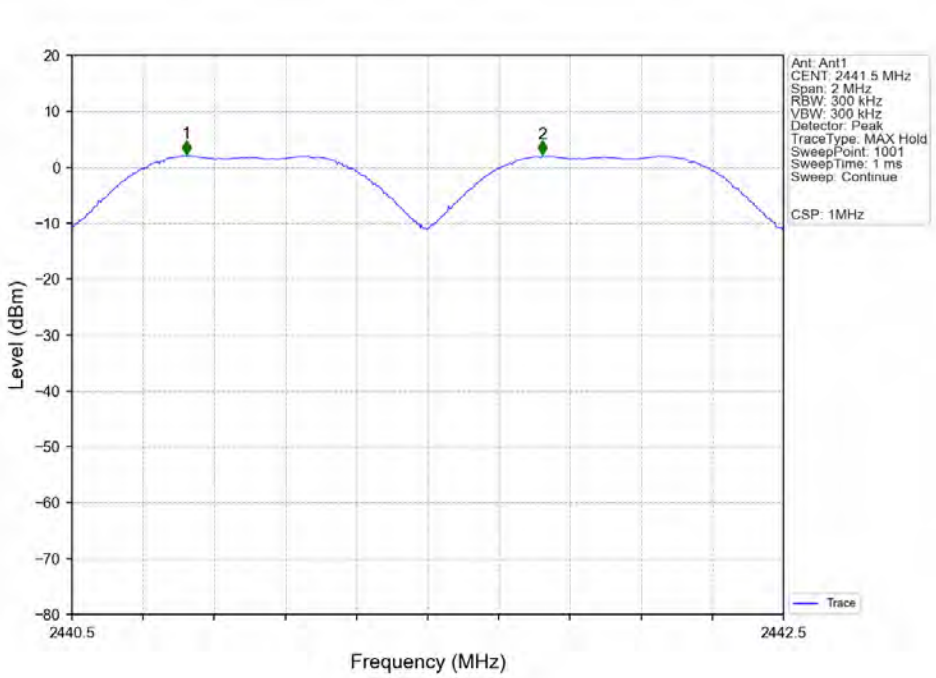
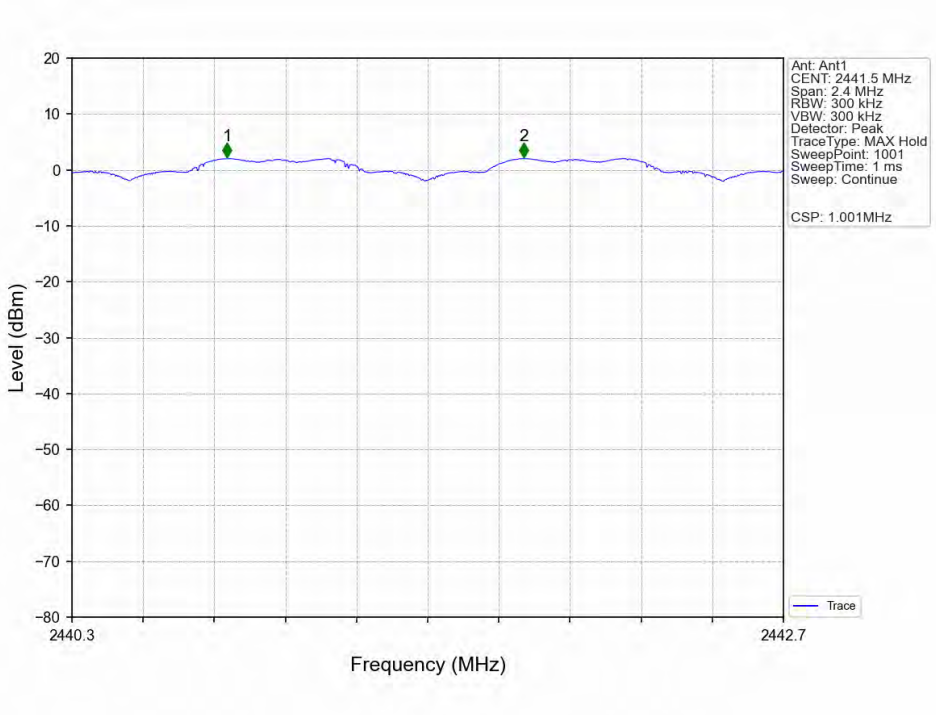
3.1 Test Result

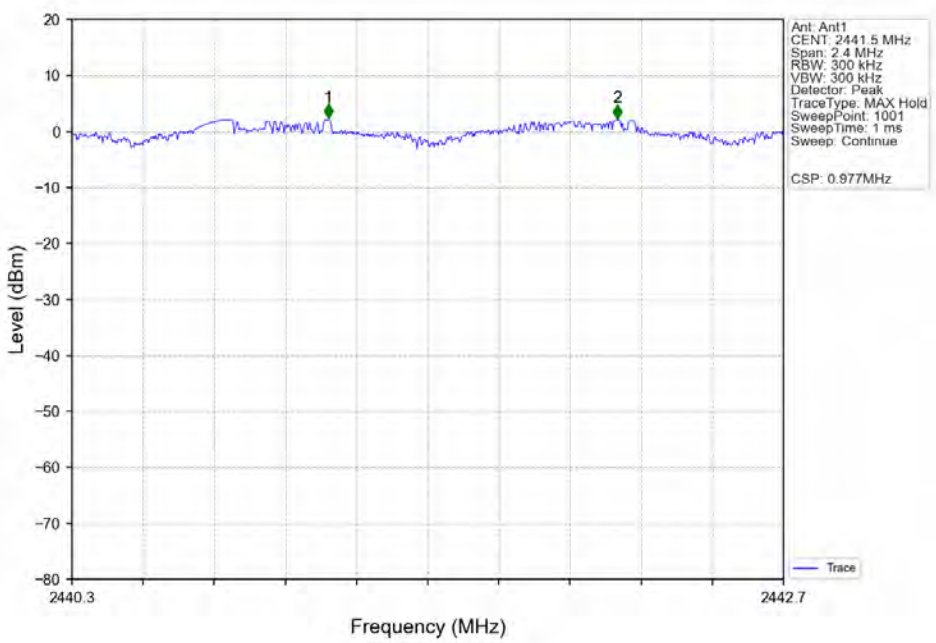
3.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.000	0.957	>=0.957	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.333	>=0.889	Pass
8DPSK	SISO	HOPP	3DH5	0.977	1.322	>=0.881	Pass

3.2 Test Graph

3.2.1 Ant1

GFSK_DH5_HOPP_Ant1_NTNV

Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV


8DPSK_3DH5_HOPP_Ant1_NTNV


4. Number of Hopping Frequencies

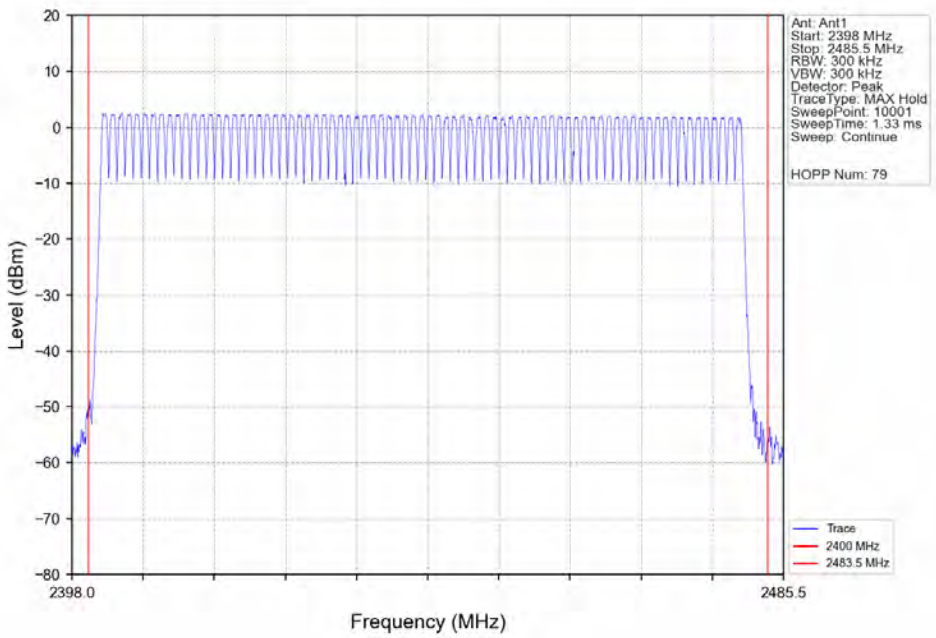
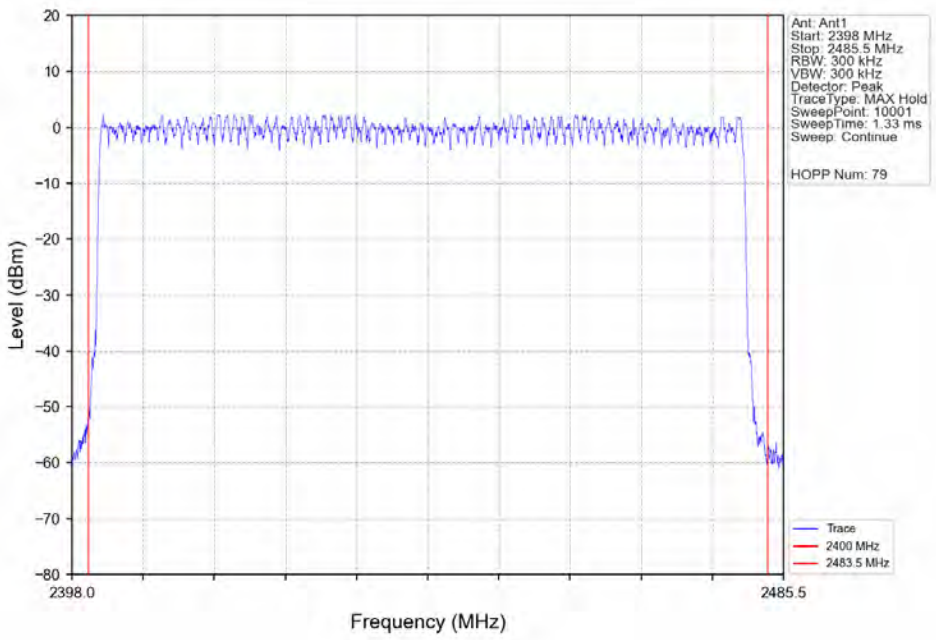
4.1 Test Result

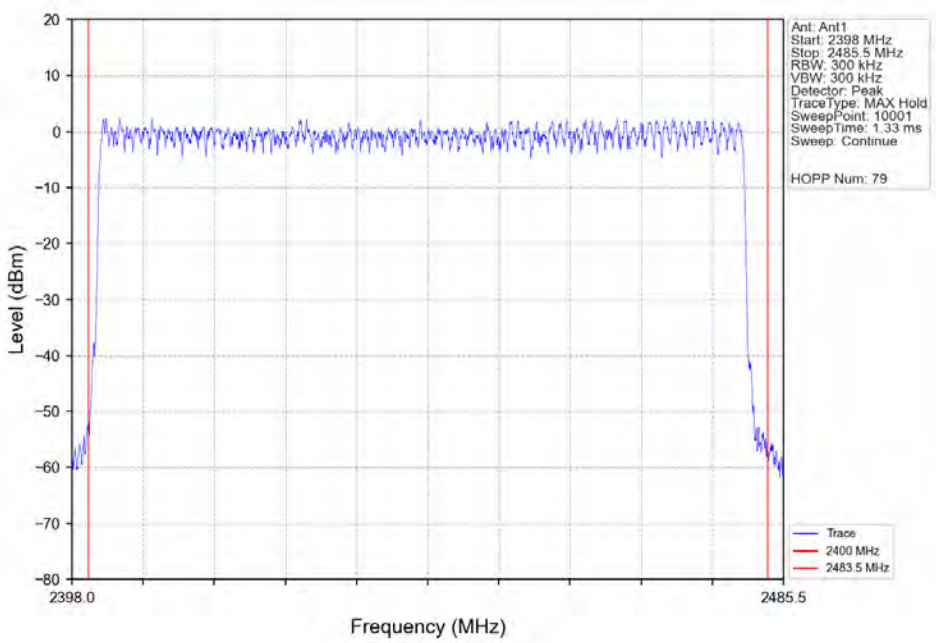
4.1.1 HoppNum

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

4.2 Test Graph

4.2.1 HoppNum

GFSK_DH5_HOPP_Ant1_NTNV

Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV


8DPSK_3DH5_HOPP_Ant1_NTNV


5. Time of Occupancy (Dwell Time)

5.1 Test Result

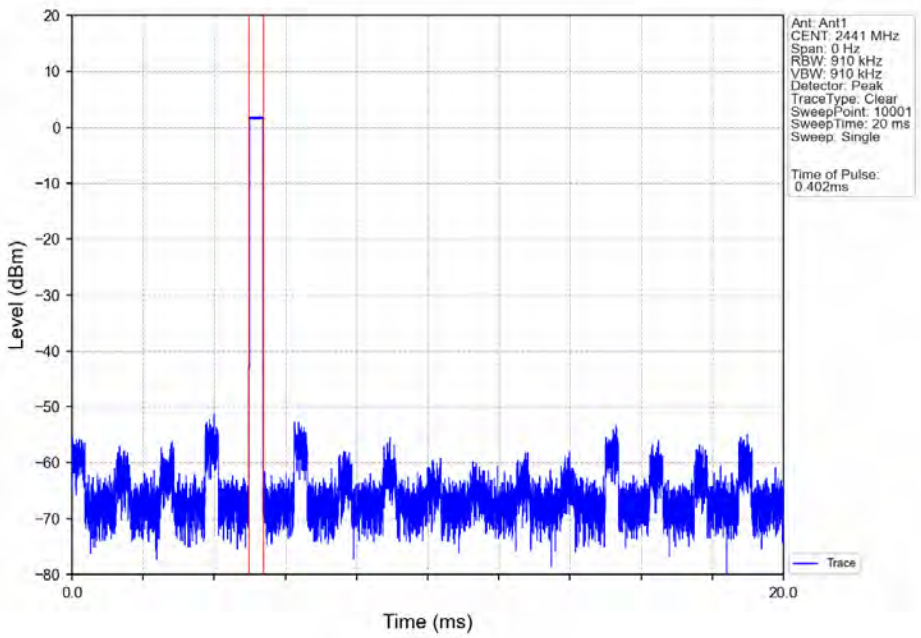
5.1.1 Ant1

Ant1									
Mode	TX Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.402	31.600	319	128.238	<=400	Pass
			DH3	1.652	31.600	160	264.320	<=400	Pass
			DH5	2.900	31.600	105	304.500	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.412	31.600	319	131.428	<=400	Pass
			2DH3	1.662	31.600	159	264.258	<=400	Pass
			2DH5	2.910	31.600	107	311.370	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.412	31.600	319	131.428	<=400	Pass
			3DH3	1.662	31.600	159	264.258	<=400	Pass
			3DH5	2.912	31.600	107	311.584	<=400	Pass

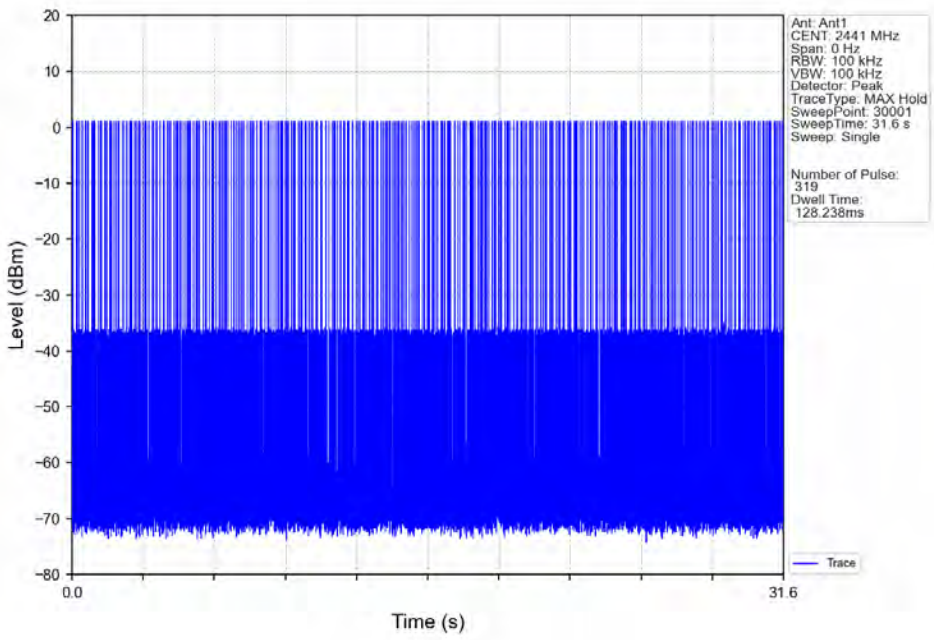
5.2 Test Graph

5.2.1 Ant1

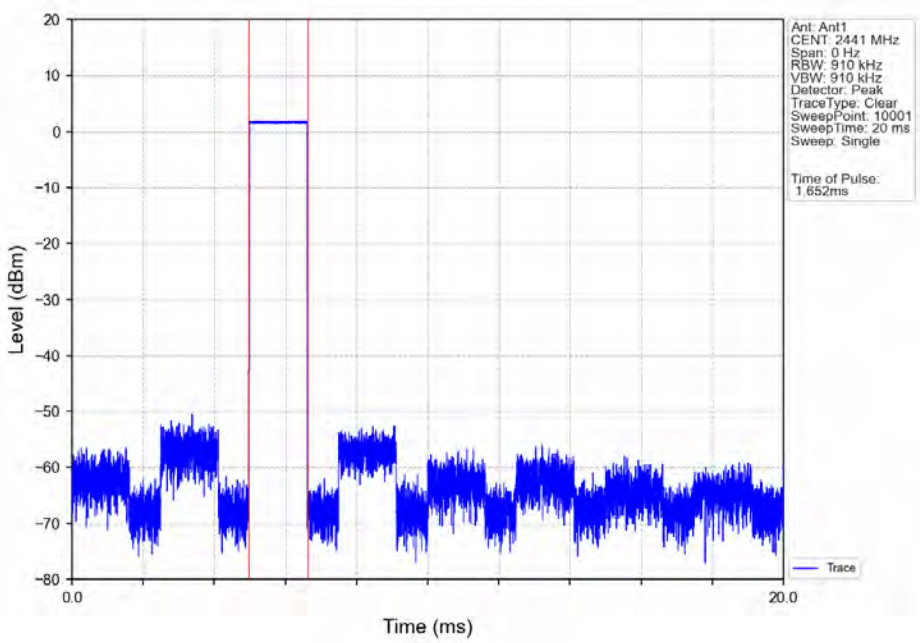
GFSK_DH1_HOPP_Ant1_NTNV



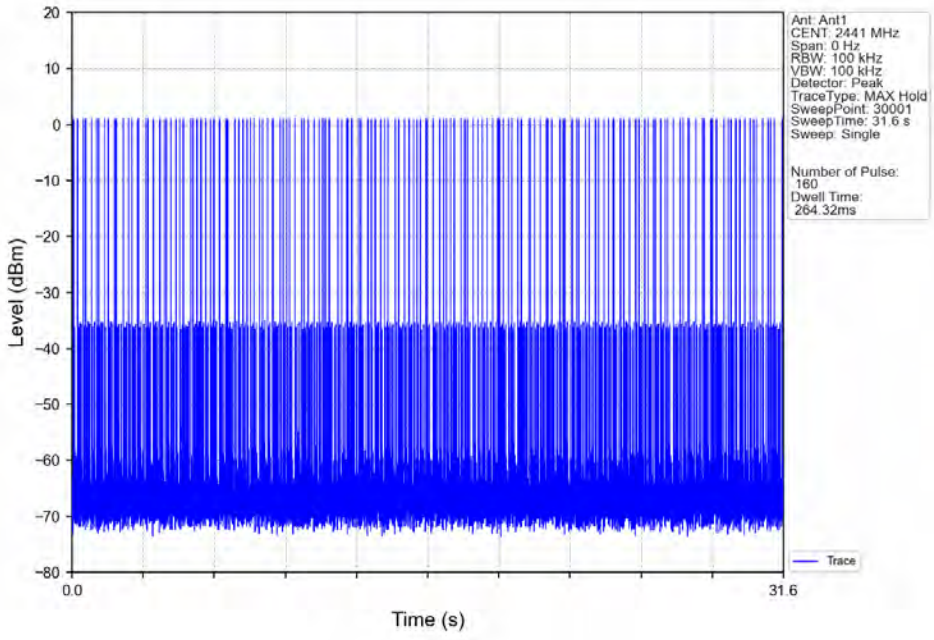
GFSK_DH1_HOPP_Ant1_NTNV



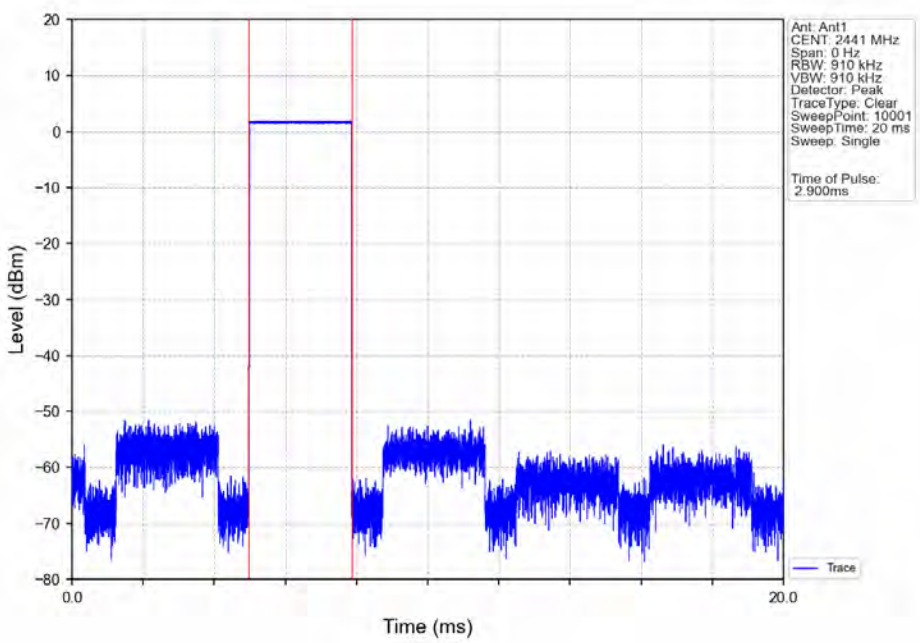
GFSK_DH3_HOPP_Ant1_NTNV



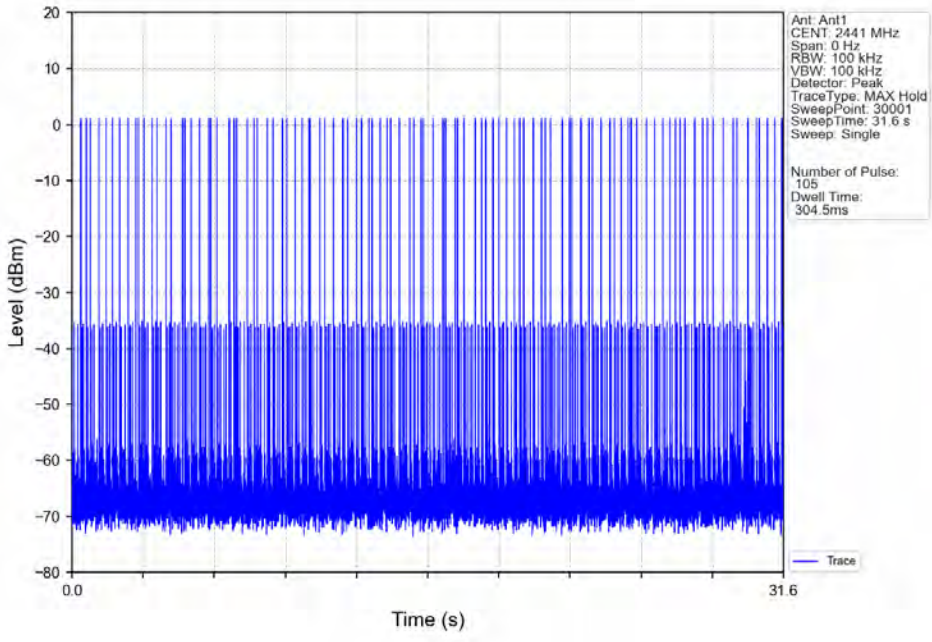
GFSK_DH3_HOPP_Ant1_NTNV

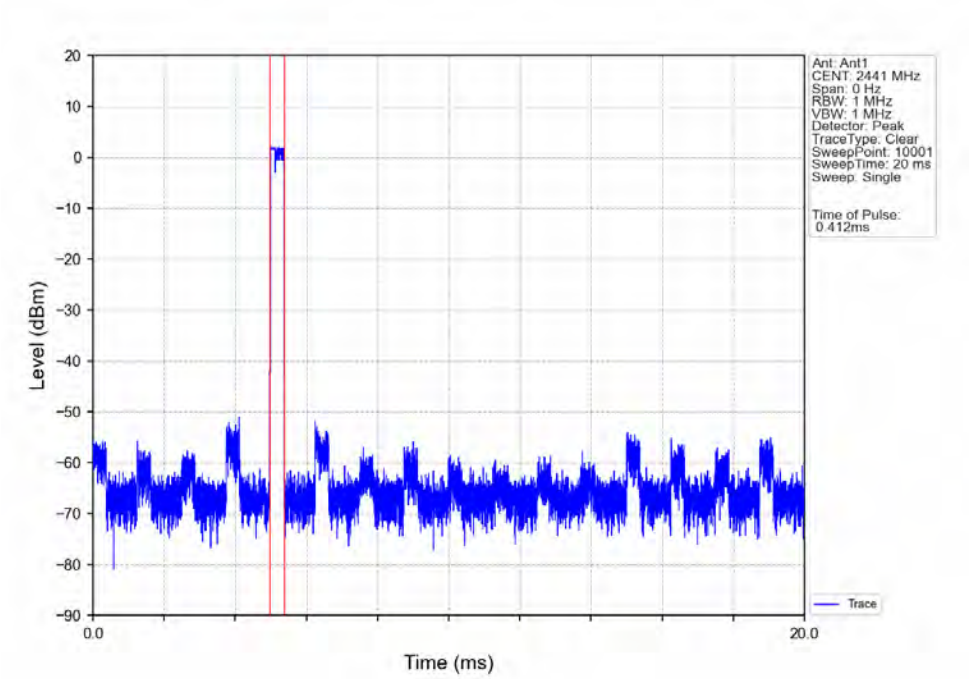


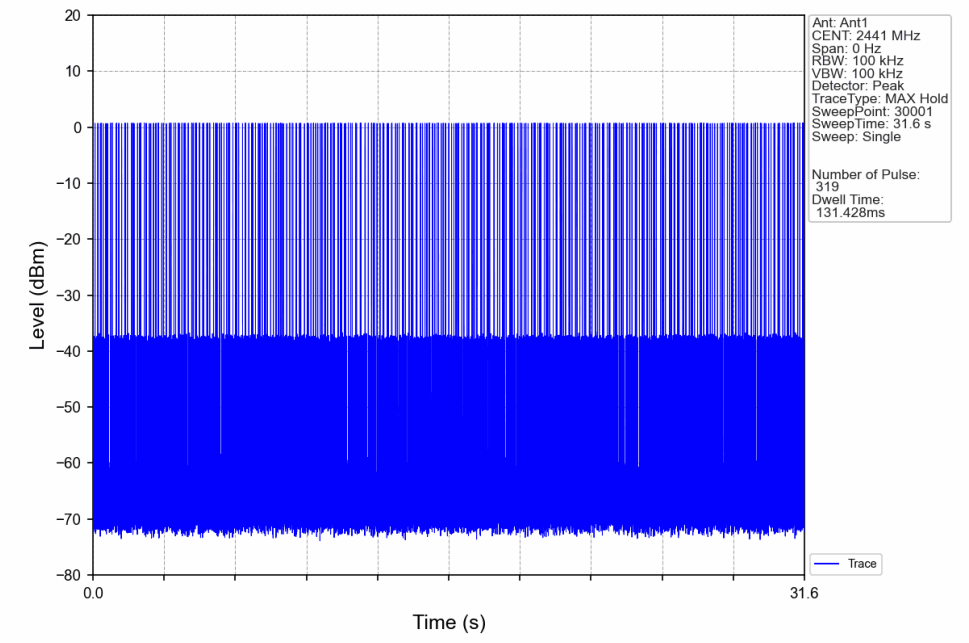
GFSK_DH5_HOPP_Ant1_NTNV

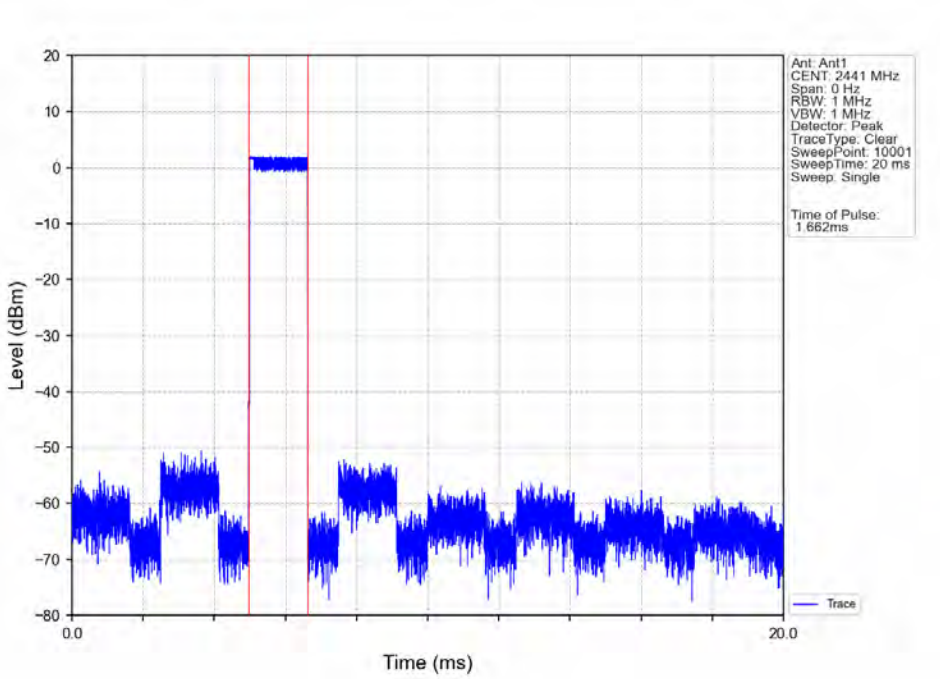
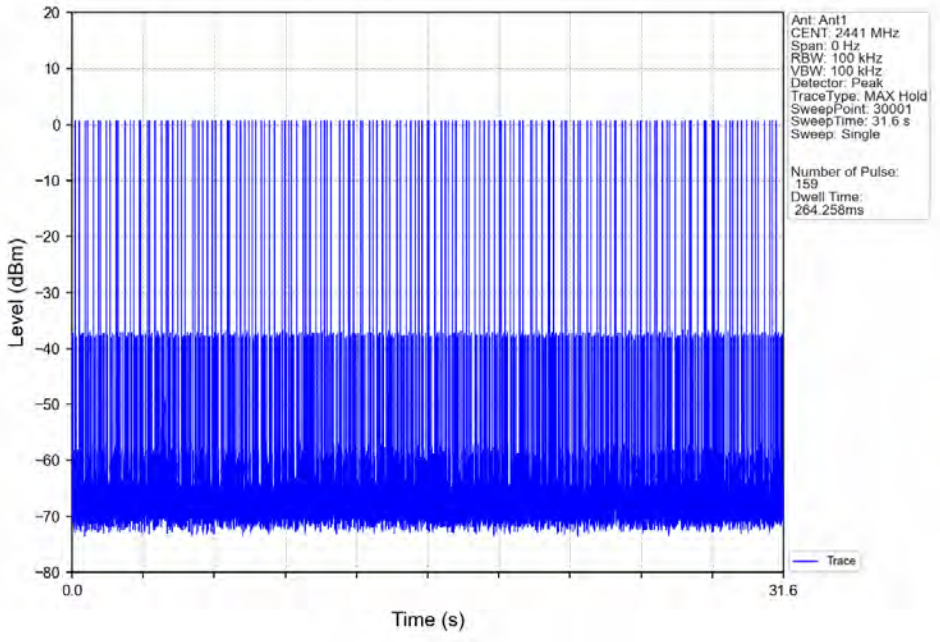


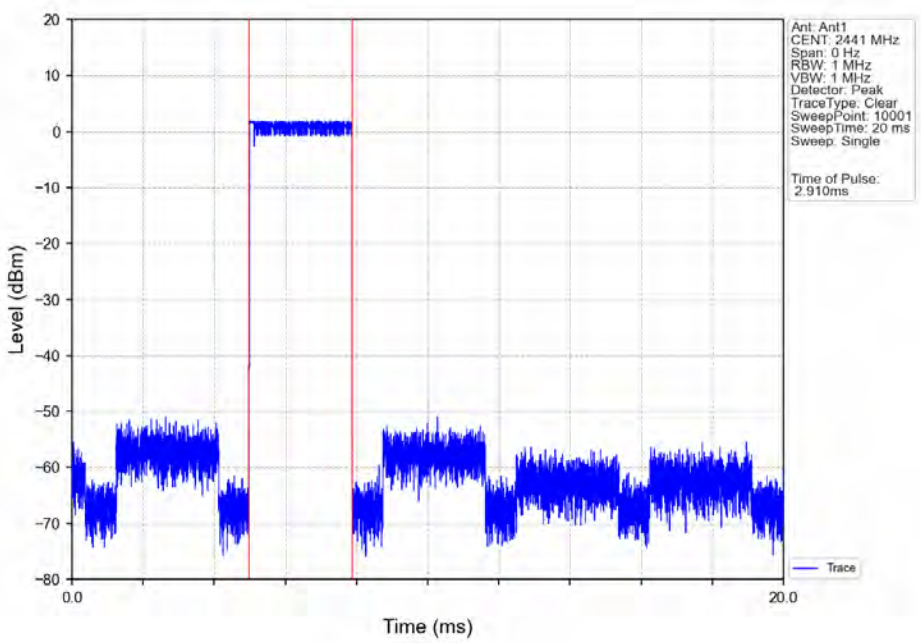
GFSK_DH5_HOPP_Ant1_NTNV

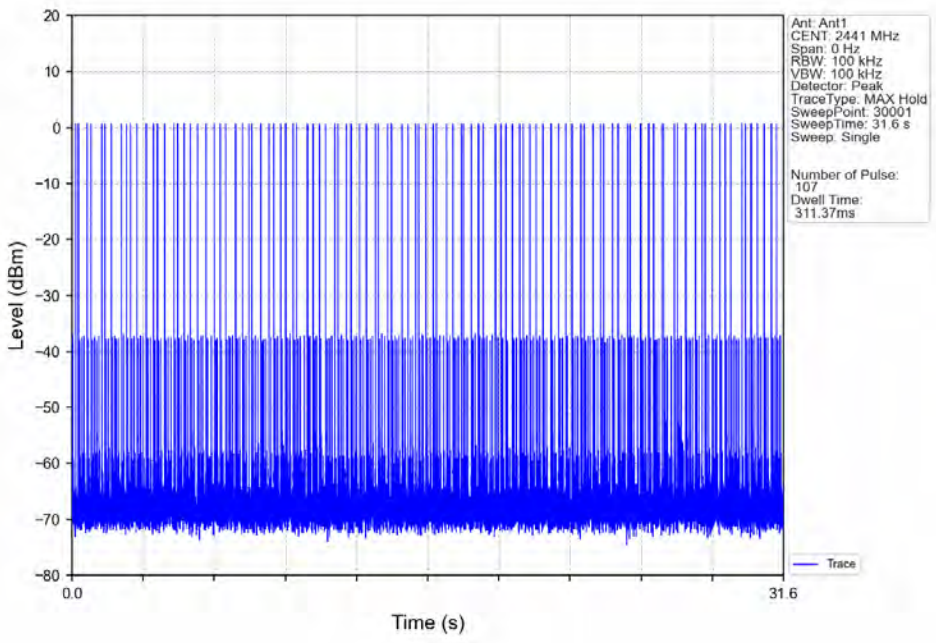


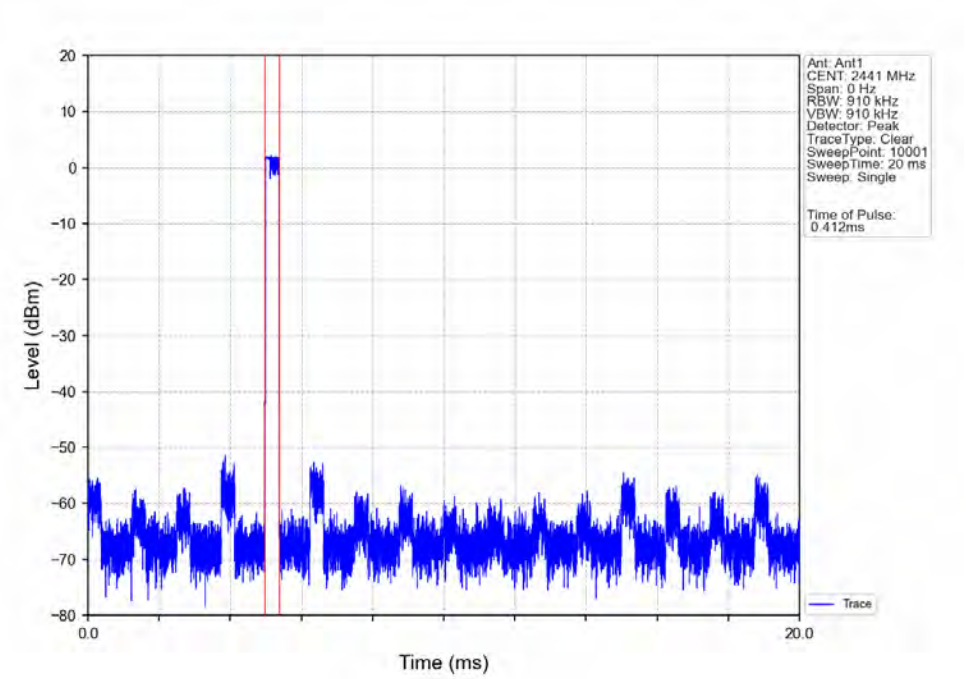
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV


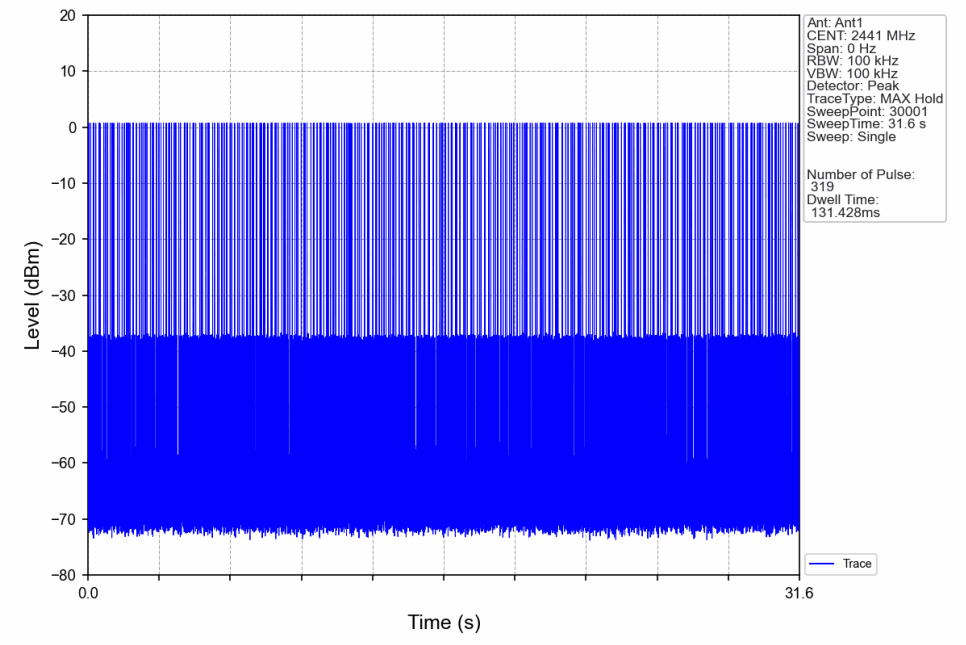
Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV


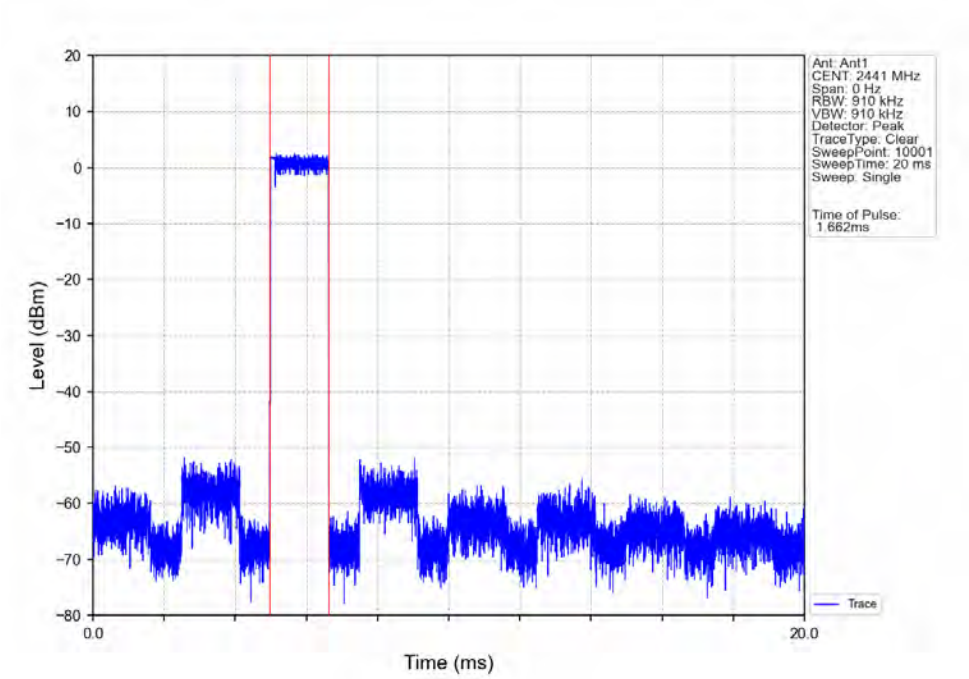
Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV

Pi/4DQPSK_2DH3_HOPP_Ant1_NTNV


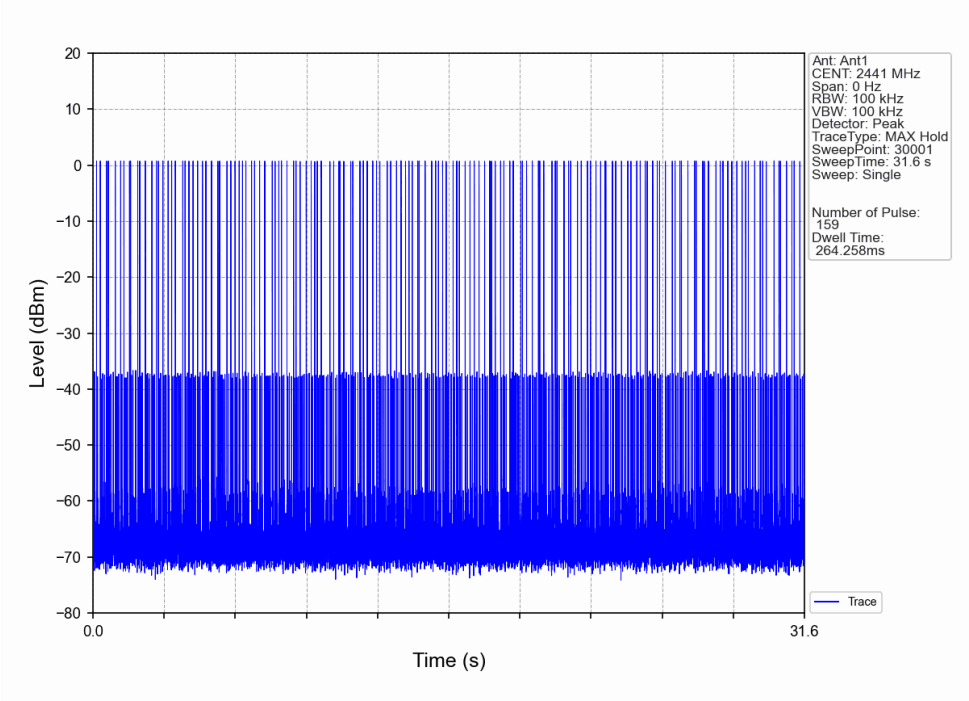
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV


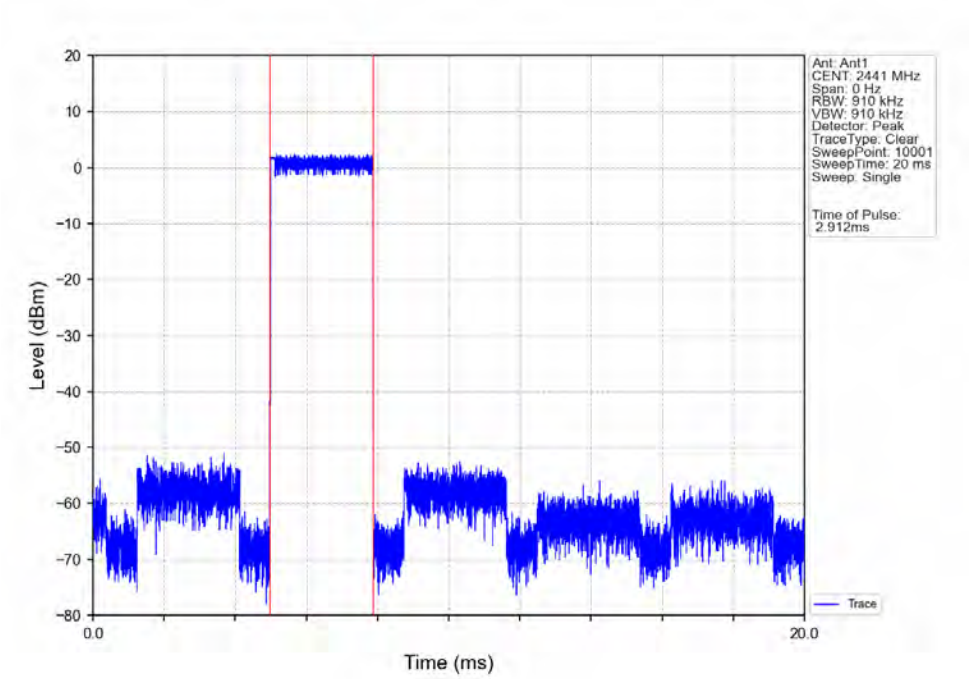
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV


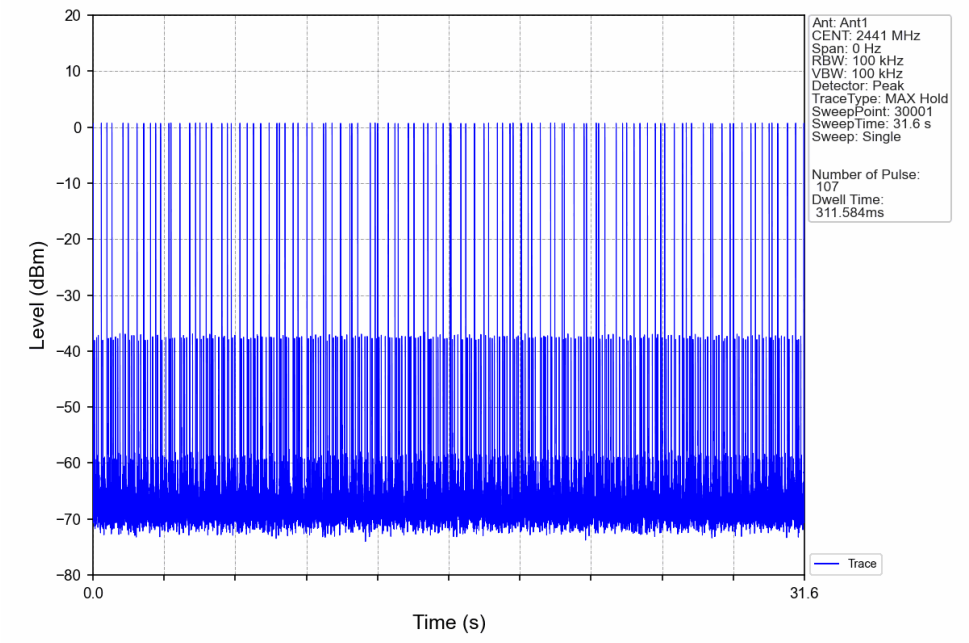
8DPSK_3DH1_HOPP_Ant1_NTNV


8DPSK_3DH1_HOPP_Ant1_NTNV


8DPSK_3DH3_HOPP_Ant1_NTNV


8DPSK_3DH3_HOPP_Ant1_NTNV


8DPSK_3DH5_HOPP_Ant1_NTNV


8DPSK_3DH5_HOPP_Ant1_NTNV


6. Unwanted Emissions In Non-restricted Frequency Bands

6.1 Test Result

6.1.1 Ref

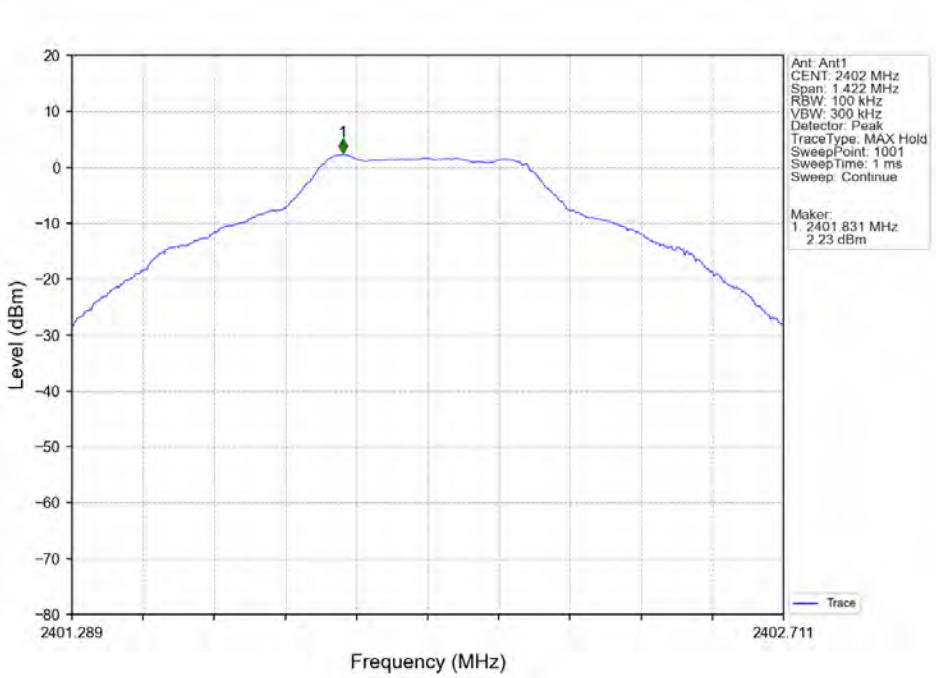
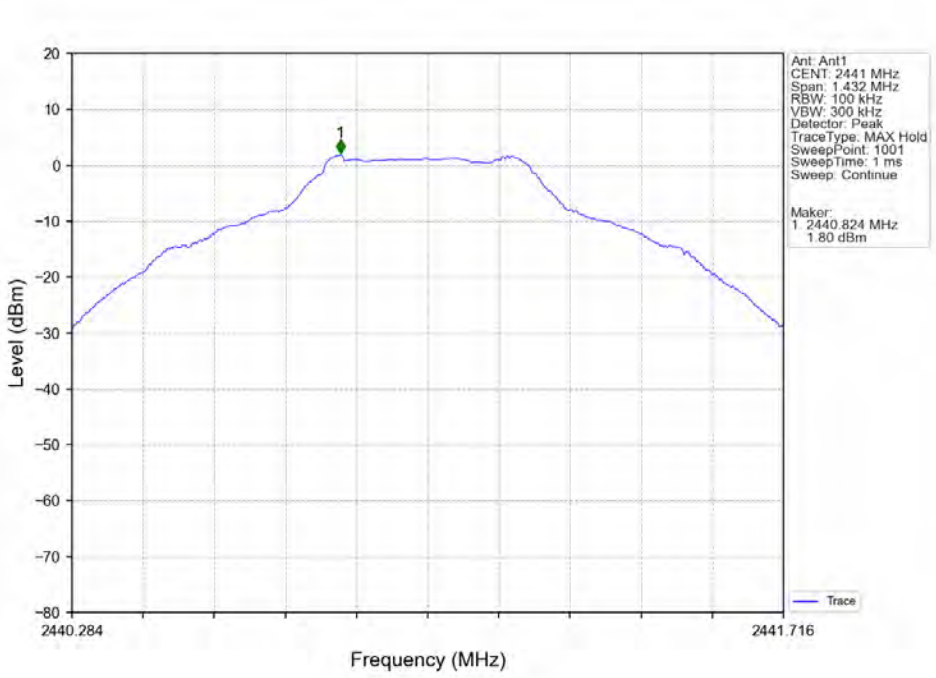
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	2.23
		2441	DH5	1	1.80
		2480	DH5	1	1.57
Pi/4DQPSK	SISO	2402	2DH5	1	1.91
		2441	2DH5	1	1.71
		2480	2DH5	1	1.58
8DPSK	SISO	2402	3DH5	1	2.11
		2441	3DH5	1	1.90
		2480	3DH5	1	1.76

6.1.2 CSE

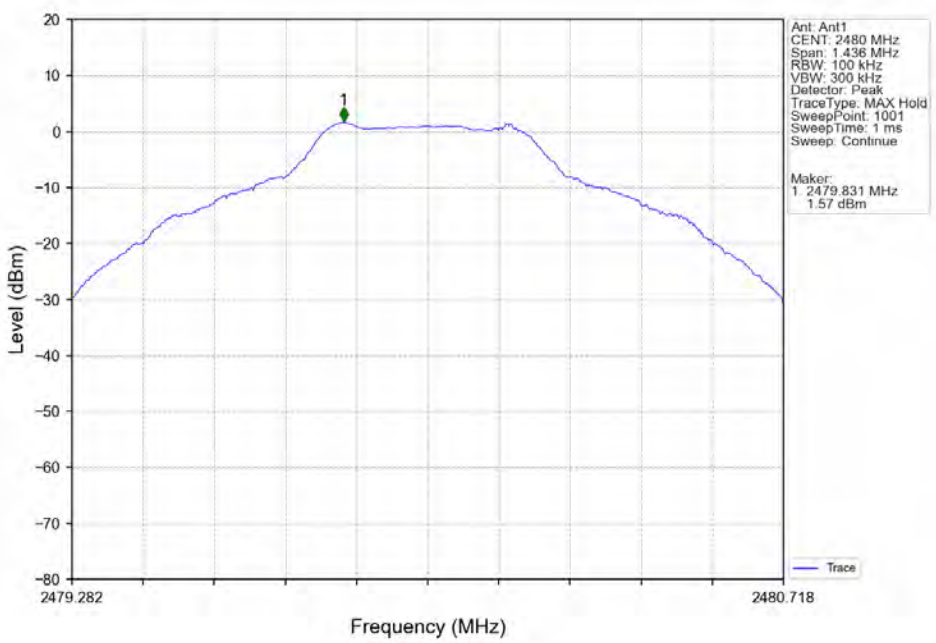
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	2.23	-17.77	Pass
		2441	DH5	1	2.23	-17.77	Pass
		2480	DH5	1	2.23	-17.77	Pass
		HOPP	DH5	1	2.23	-17.77	Pass
					2.23	-17.77	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.91	-18.09	Pass
		2441	2DH5	1	1.91	-18.09	Pass
		2480	2DH5	1	1.91	-18.09	Pass
		HOPP	2DH5	1	1.91	-18.09	Pass
					1.91	-18.09	Pass
8DPSK	SISO	2402	3DH5	1	2.11	-17.89	Pass
		2441	3DH5	1	2.11	-17.89	Pass
		2480	3DH5	1	2.11	-17.89	Pass
		HOPP	3DH5	1	2.11	-17.89	Pass
					2.11	-17.89	Pass

6.2 Test Graph

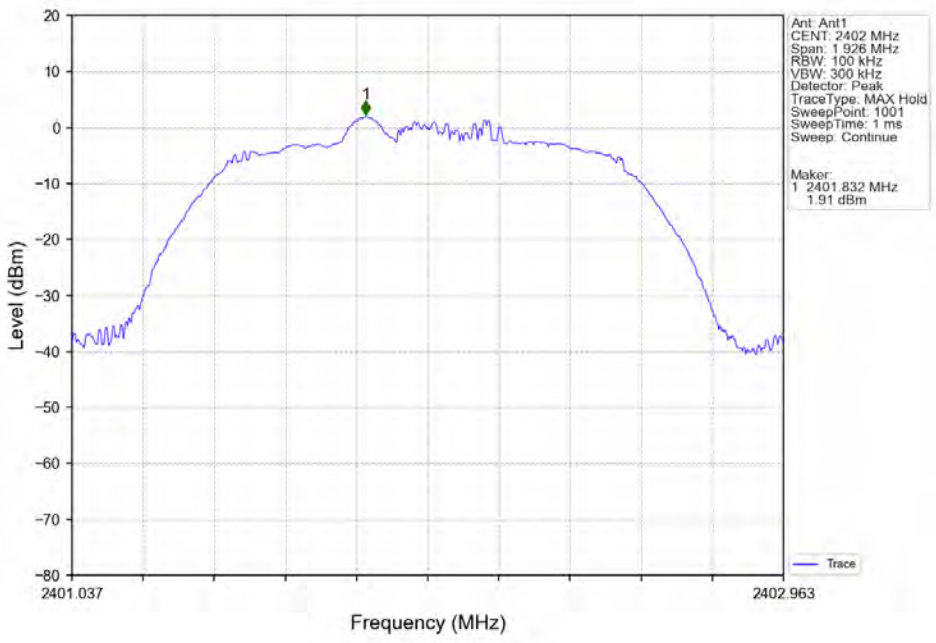
6.2.1 Ref

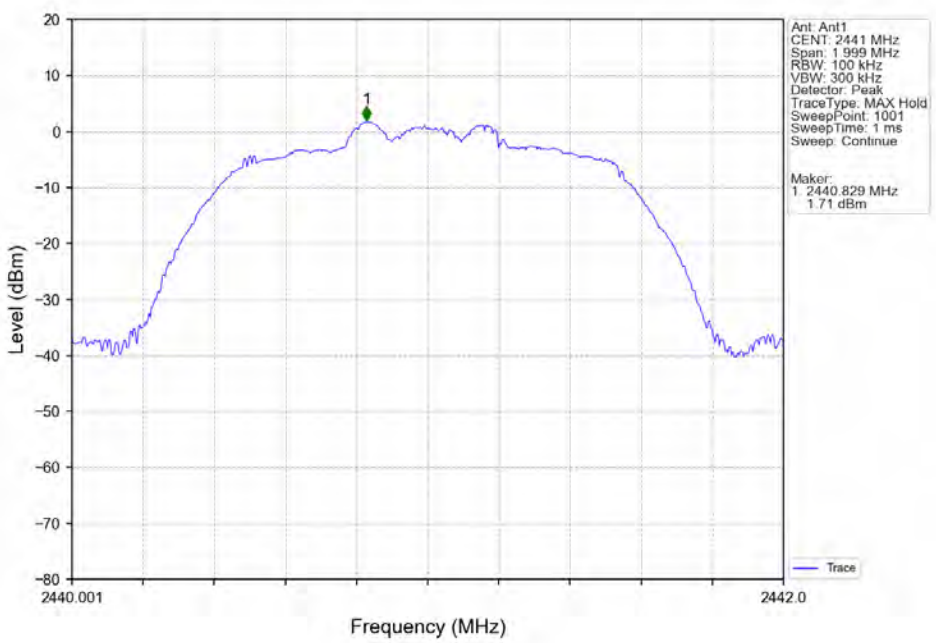
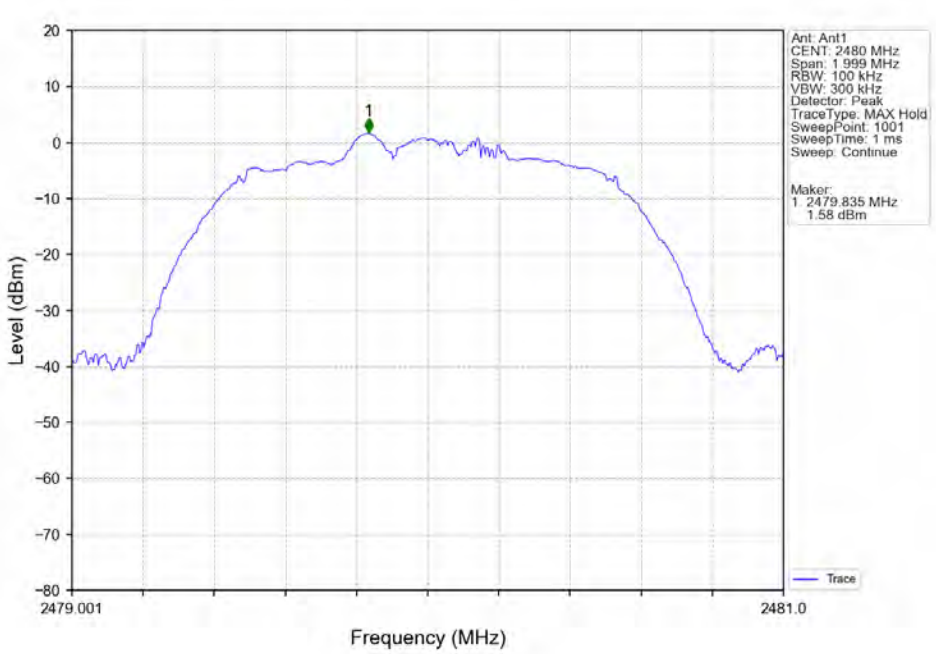
GFSK_DH5_LCH_2402MHz_Ant1_NTNV

GFSK_DH5_MCH_2441MHz_Ant1_NTNV


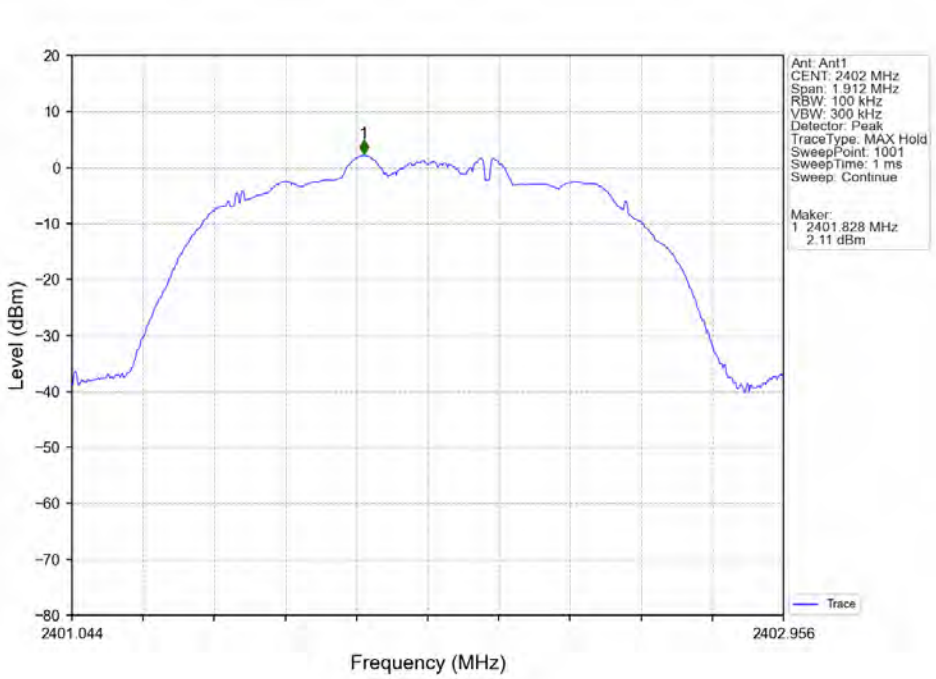
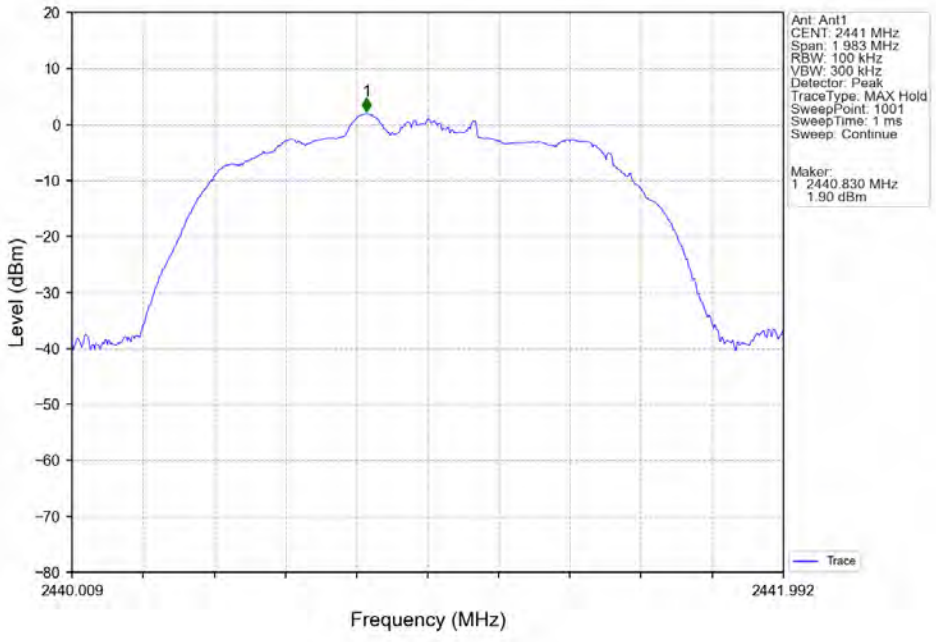
GFSK_DH5_HCH_2480MHz_Ant1_NTNV

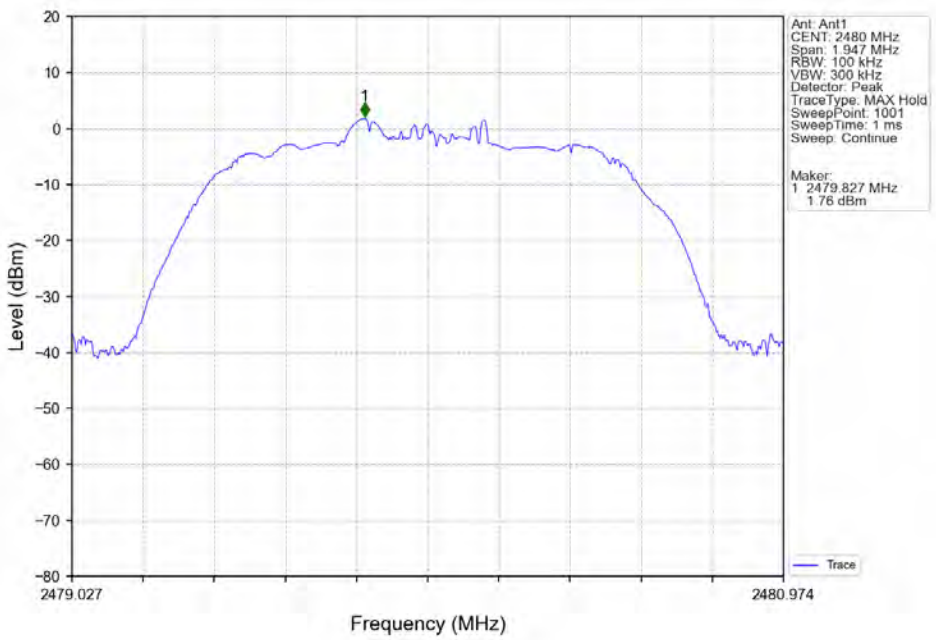


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

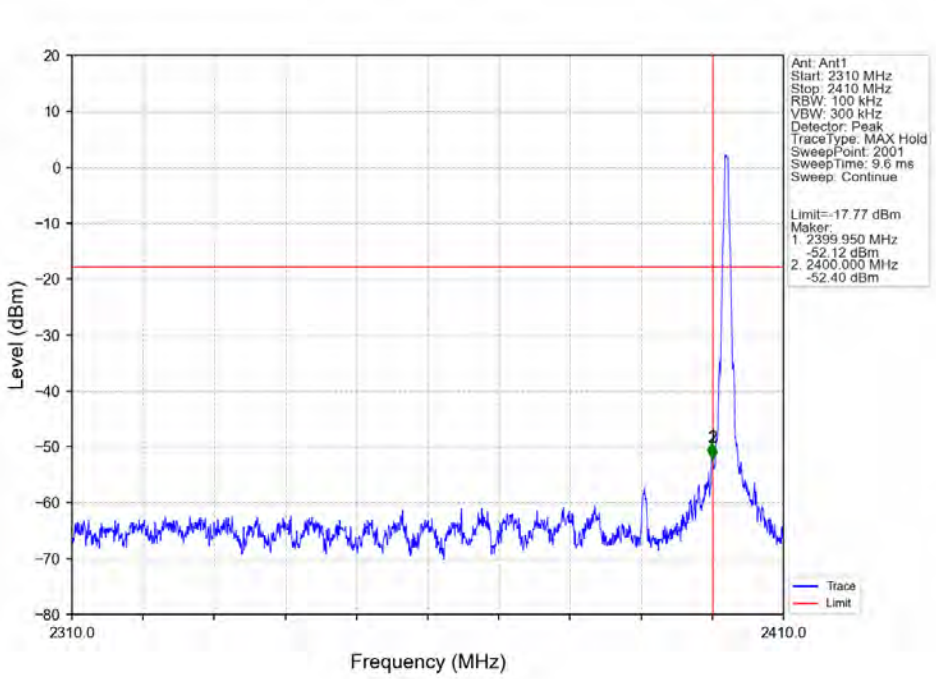
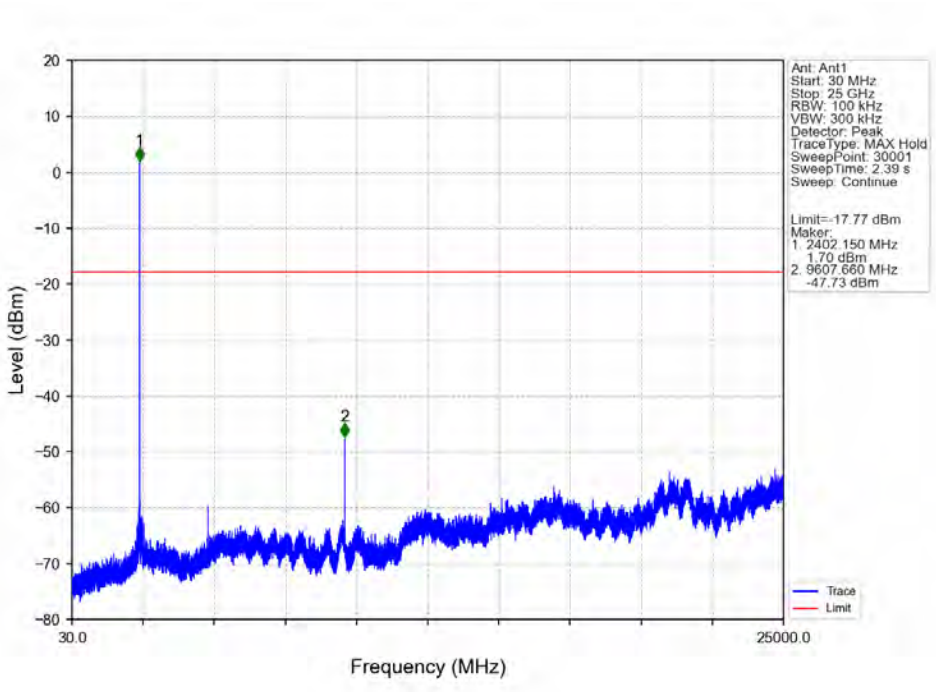


Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV


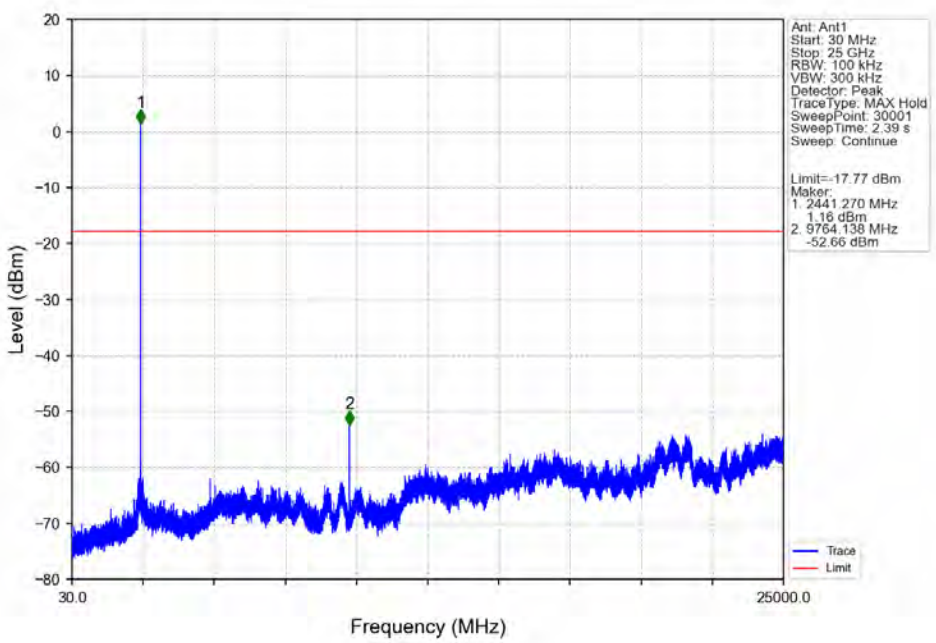
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV


8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV


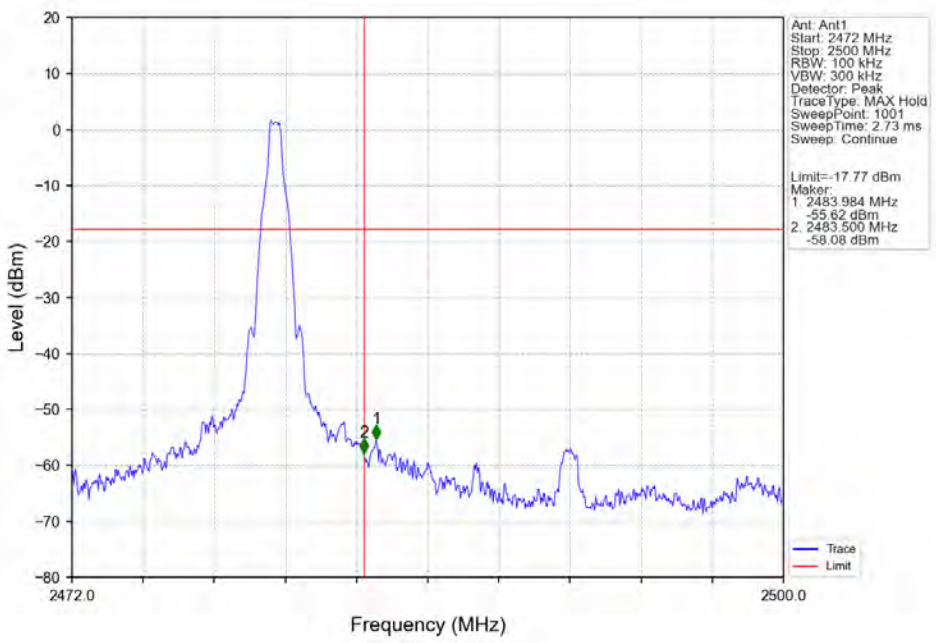
6.2.2 CSE

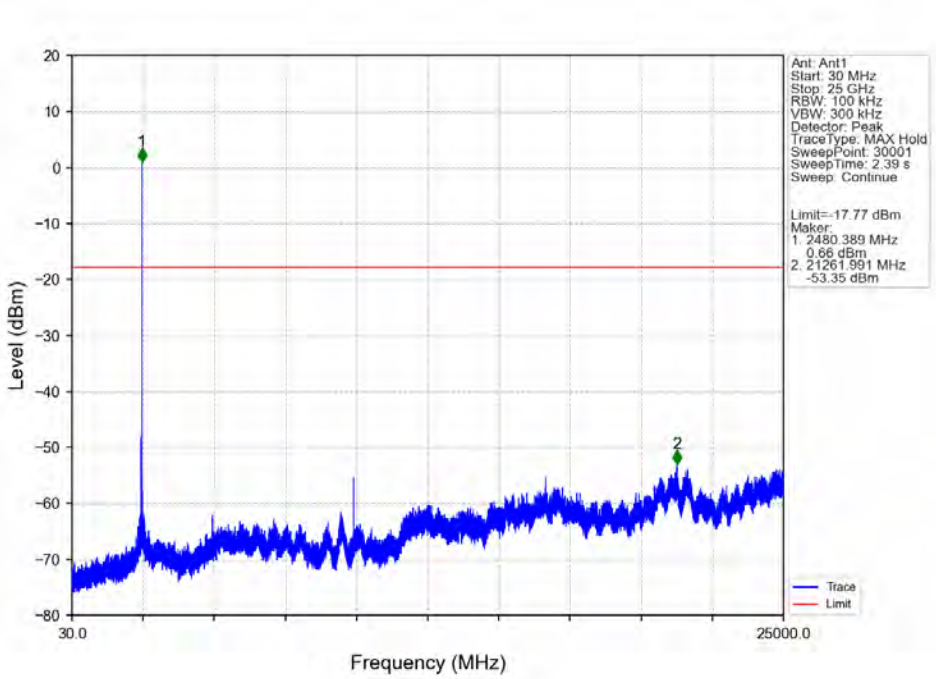
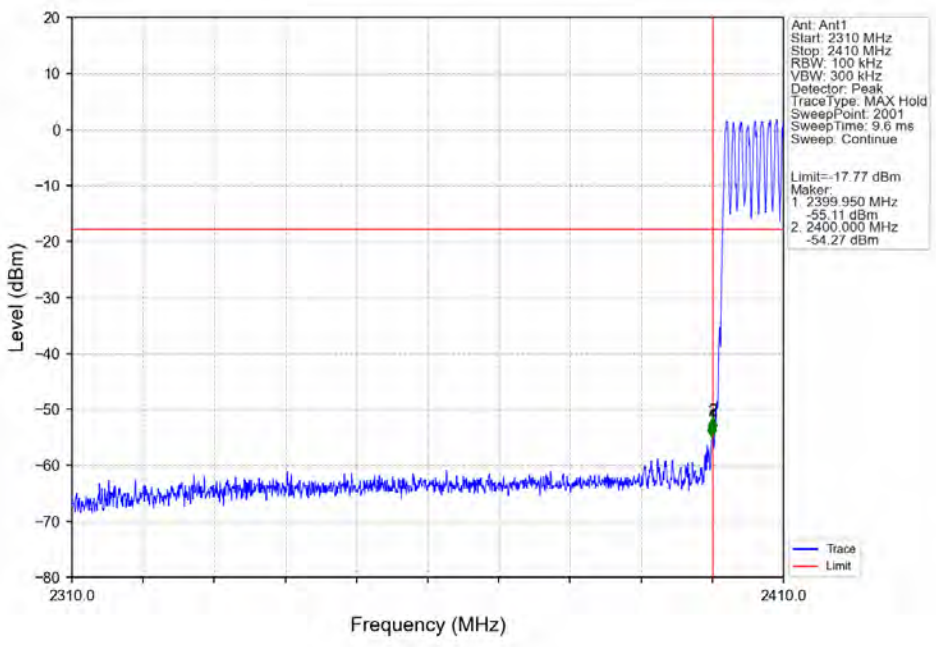
GFSK_DH5_LCH_2402MHz_Ant1_NTNV

GFSK_DH5_LCH_2402MHz_Ant1_NTNV


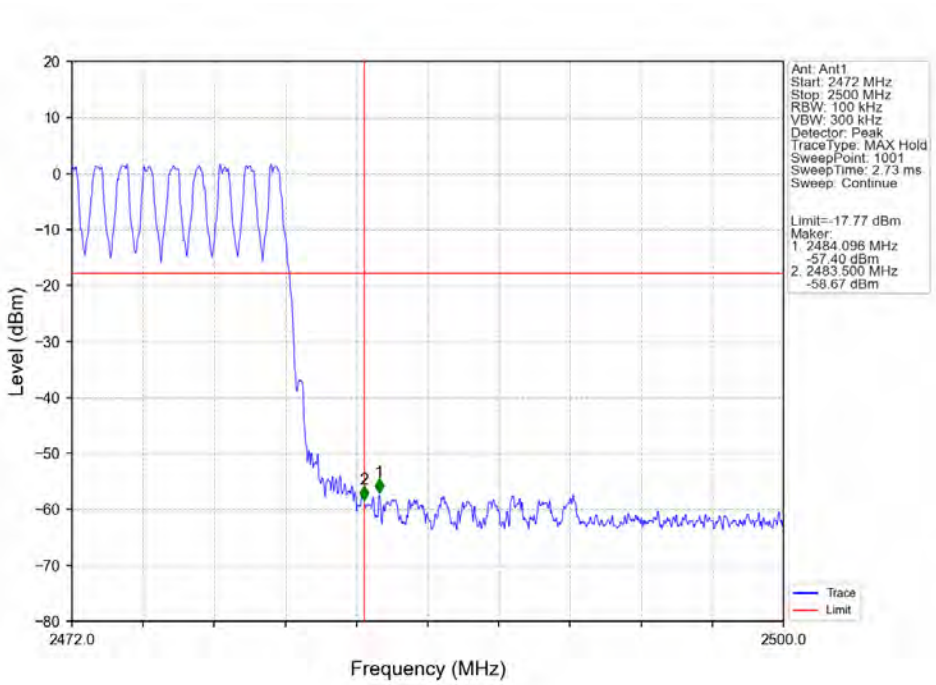
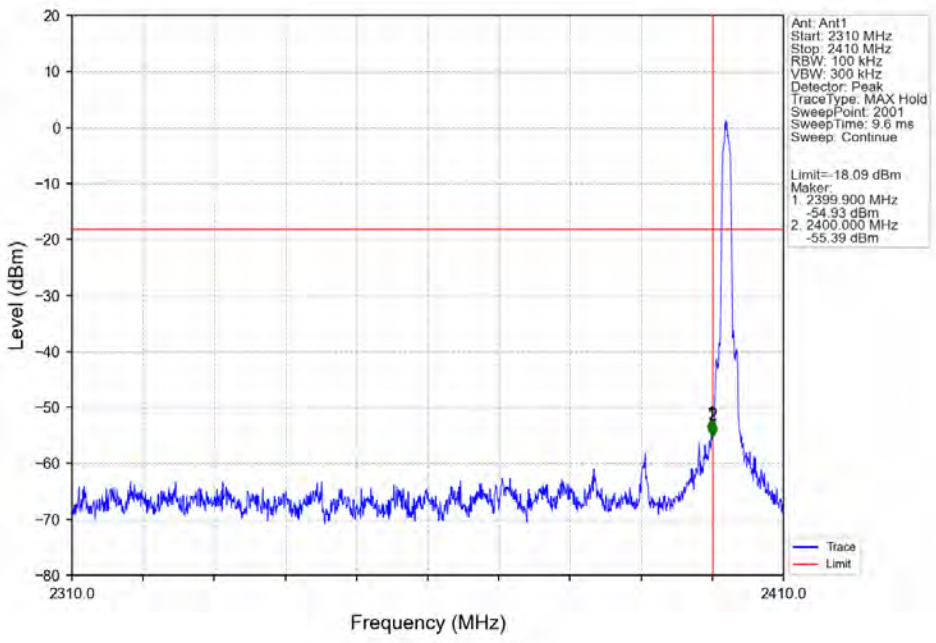
GFSK_DH5_MCH_2441MHz_Ant1_NTNV

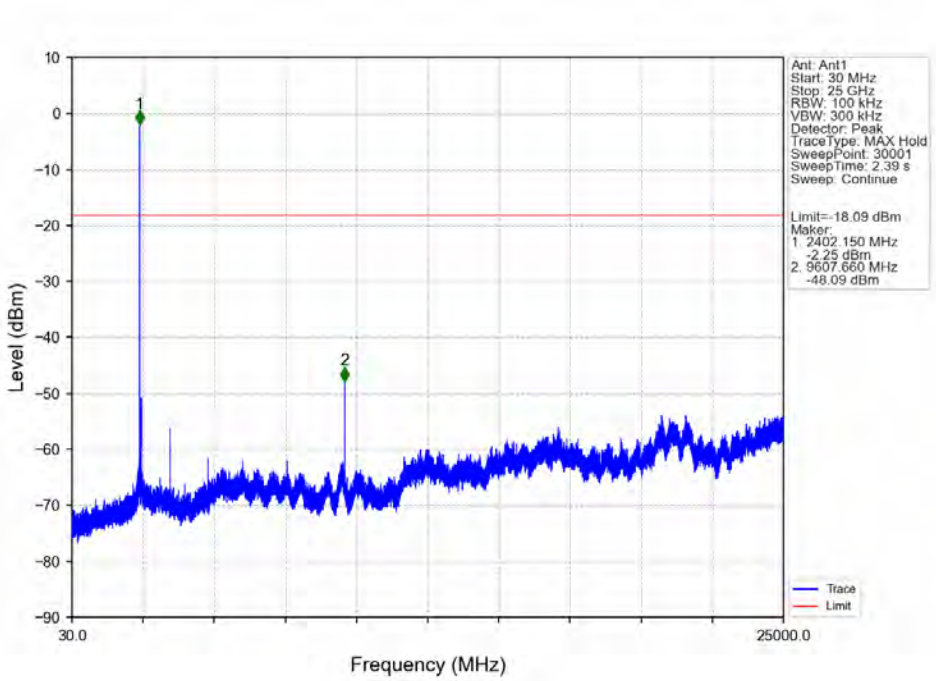
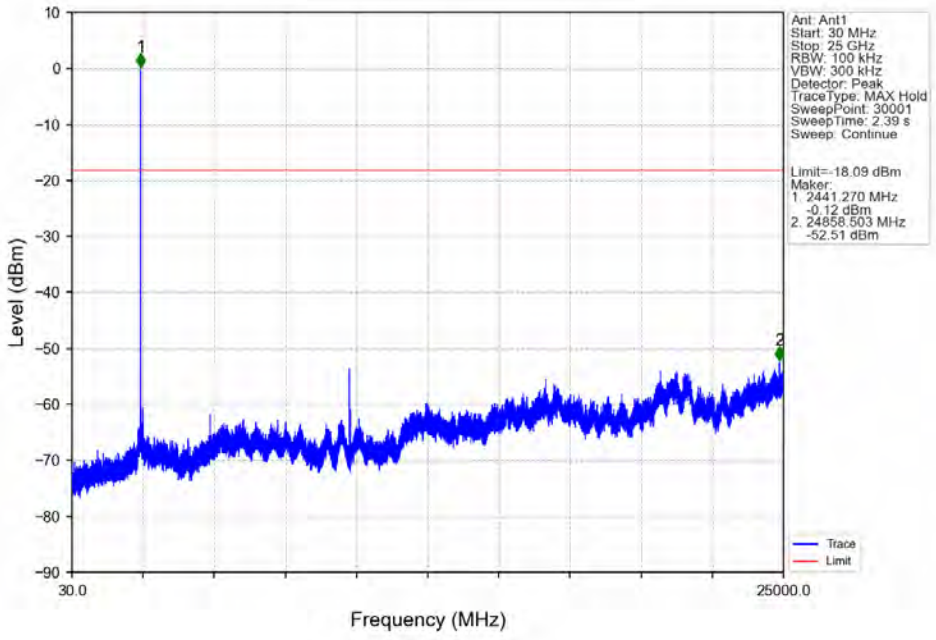


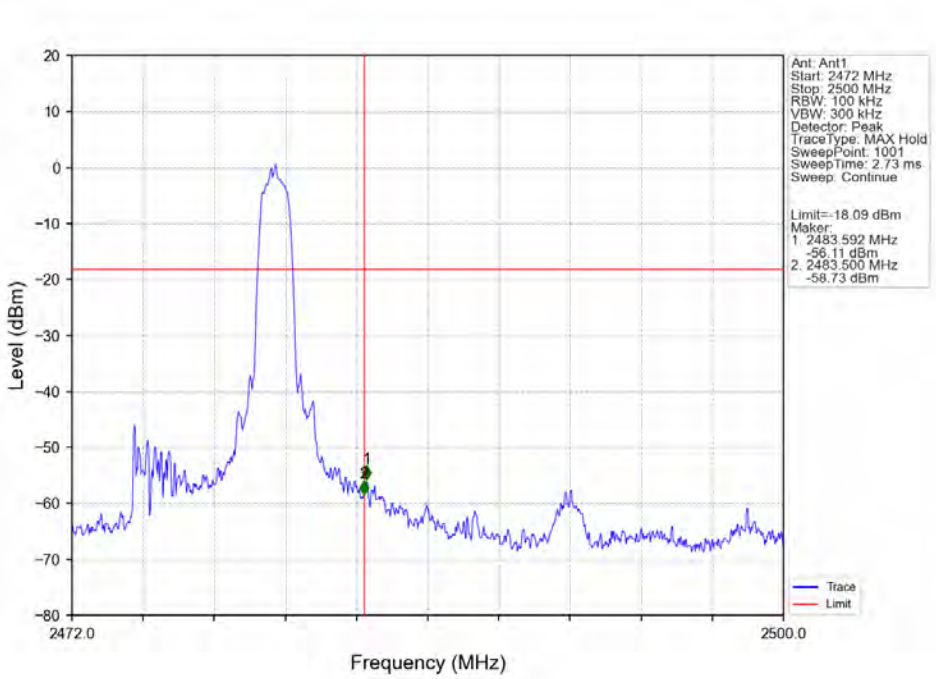
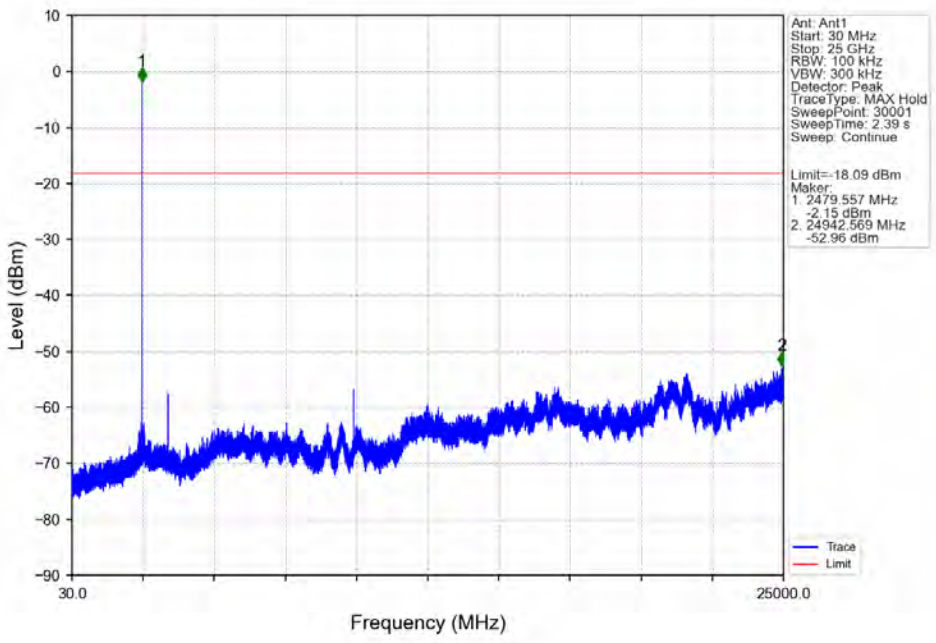
GFSK_DH5_HCH_2480MHz_Ant1_NTNV

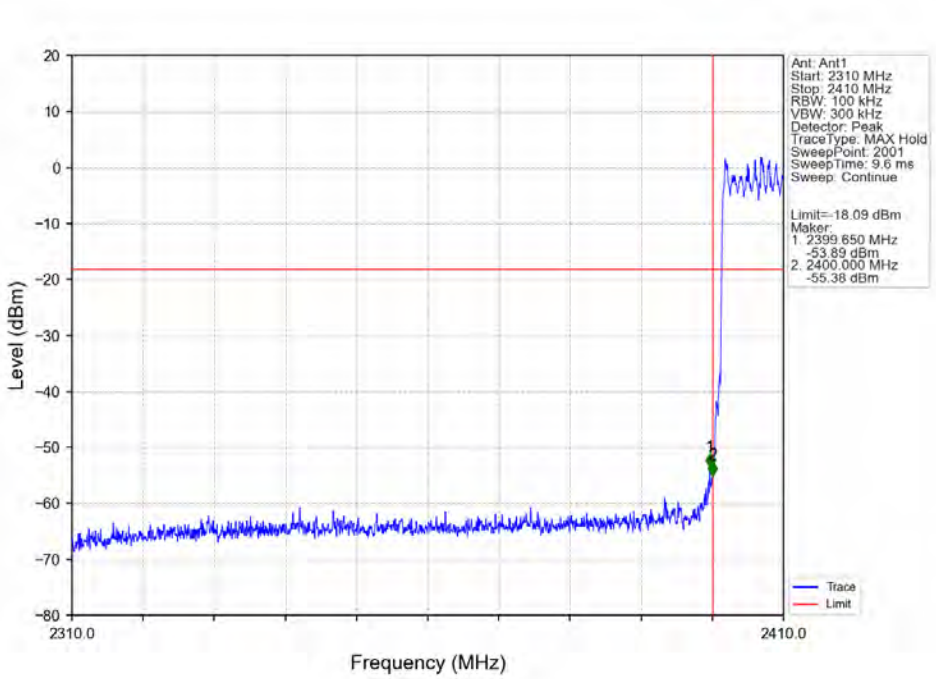


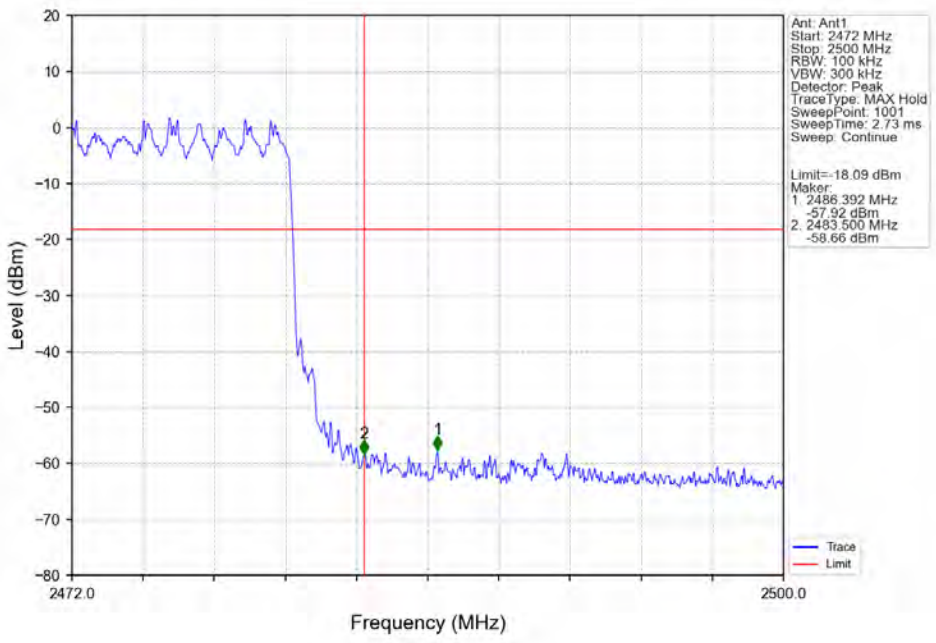
GFSK_DH5_HCH_2480MHz_Ant1_NTNV

GFSK_DH5_HOPP_Ant1_NTNV


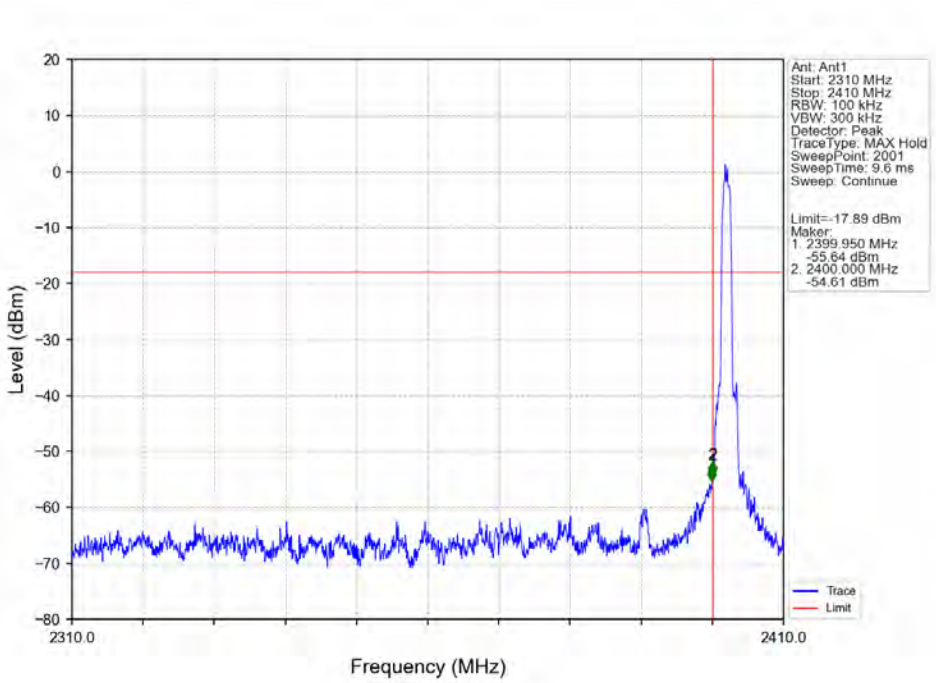
GFSK_DH5_HOPP_Ant1_NTNV

Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV


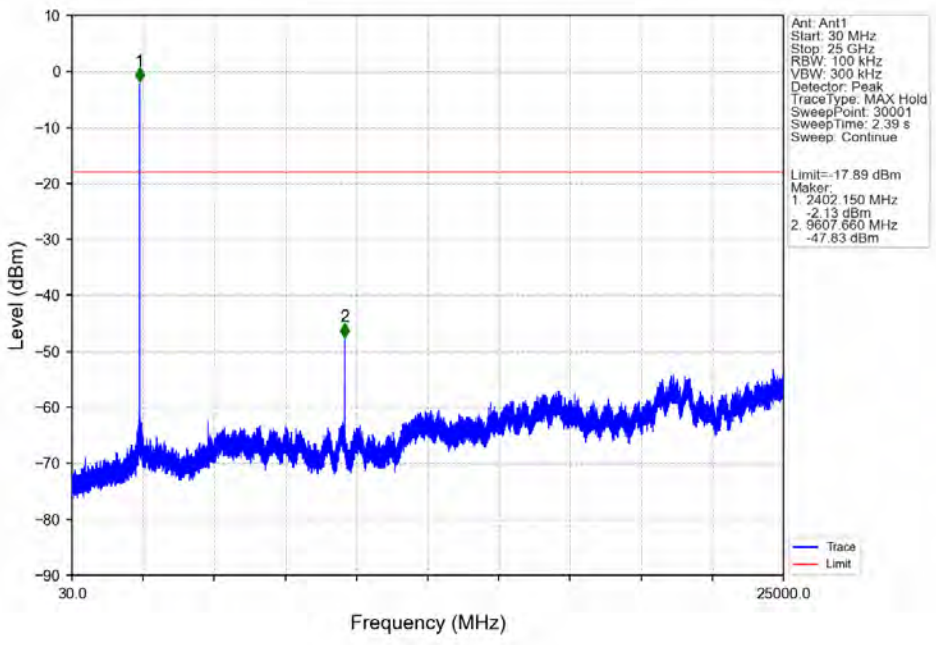
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV


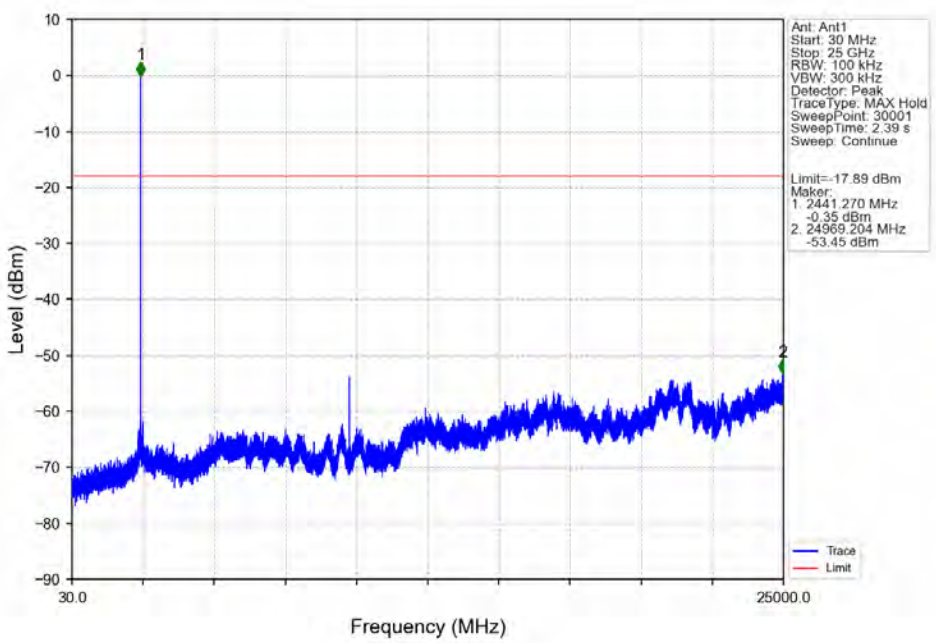
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV


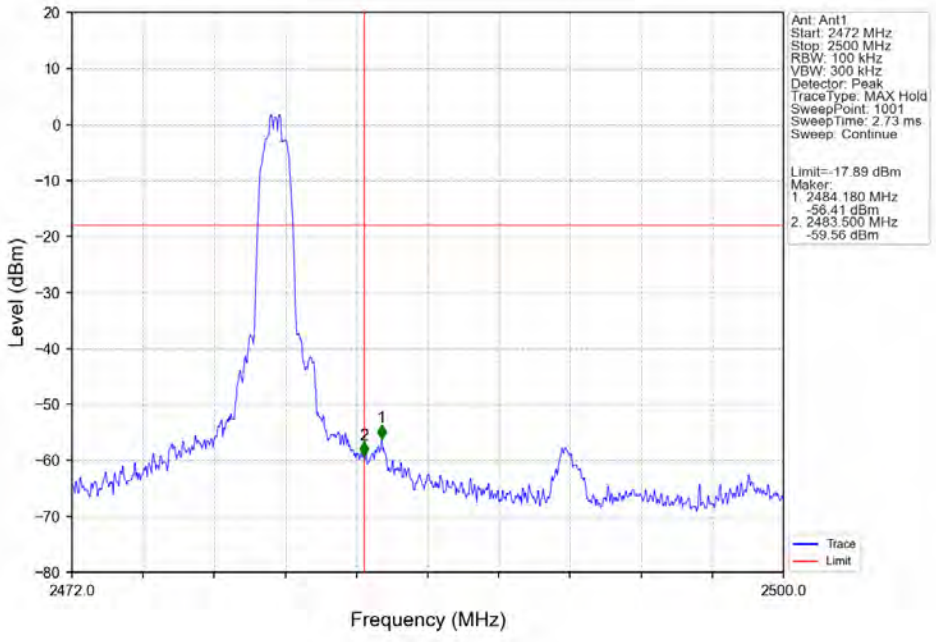
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV


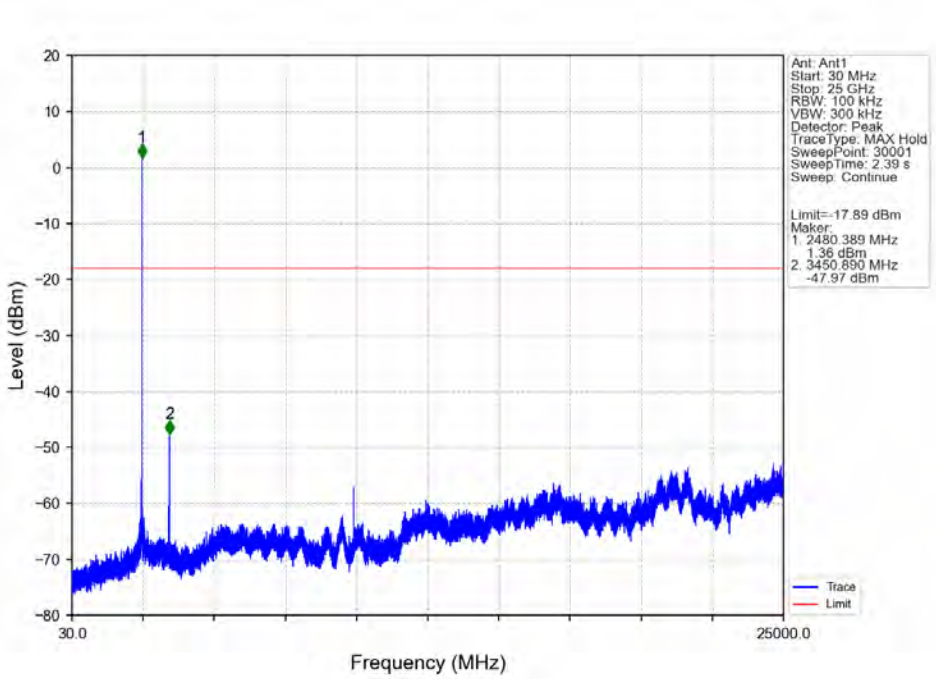
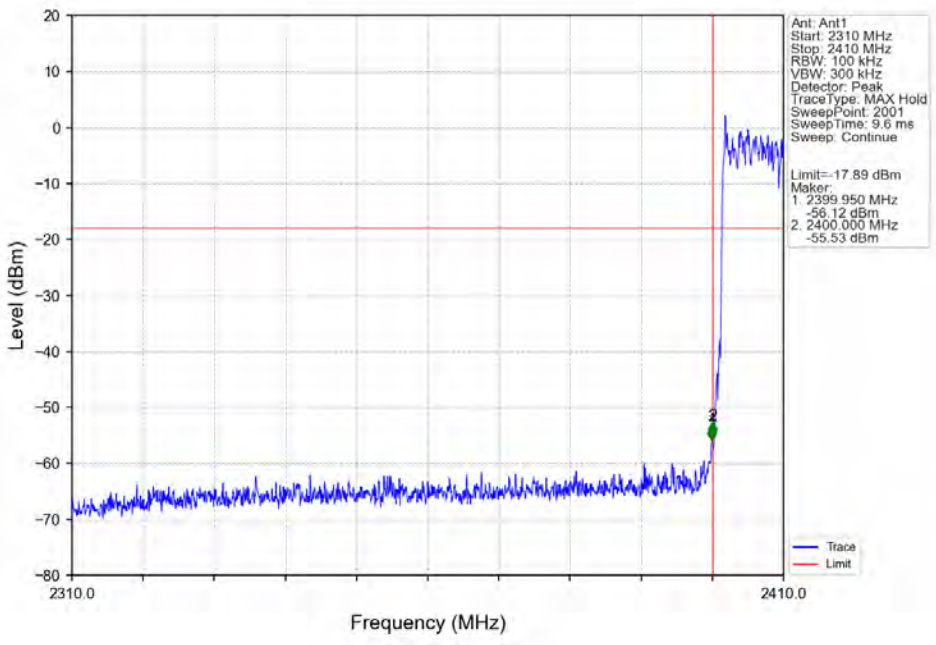
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV


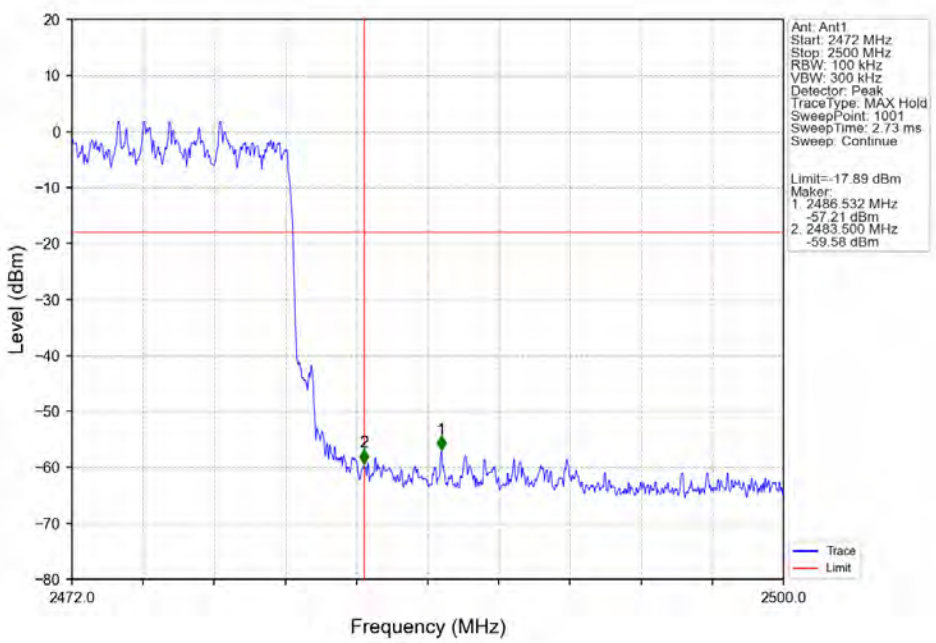
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV


8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV


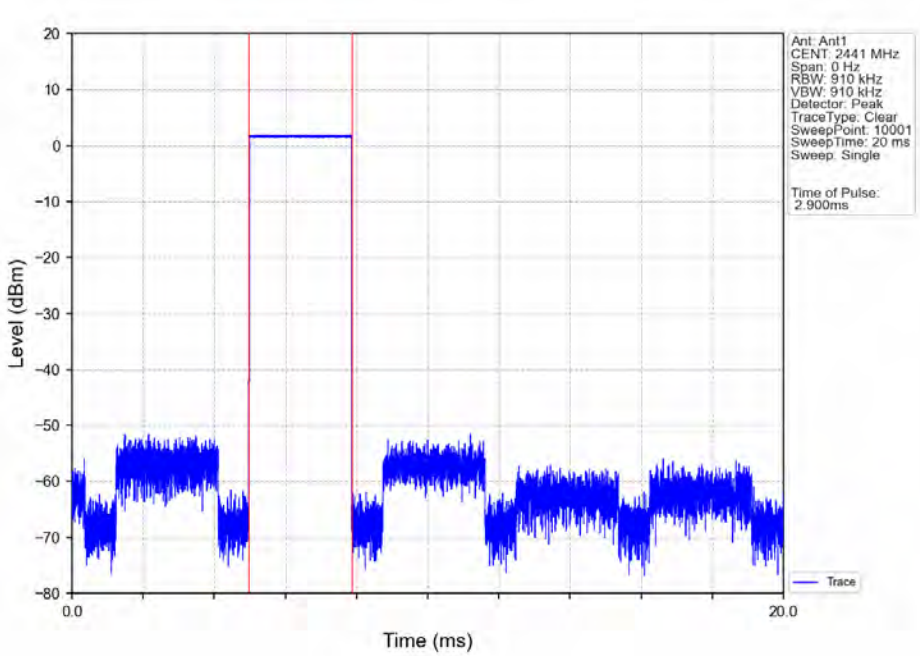
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV


8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

8DPSK_3DH5_HOPP_Ant1_NTNV


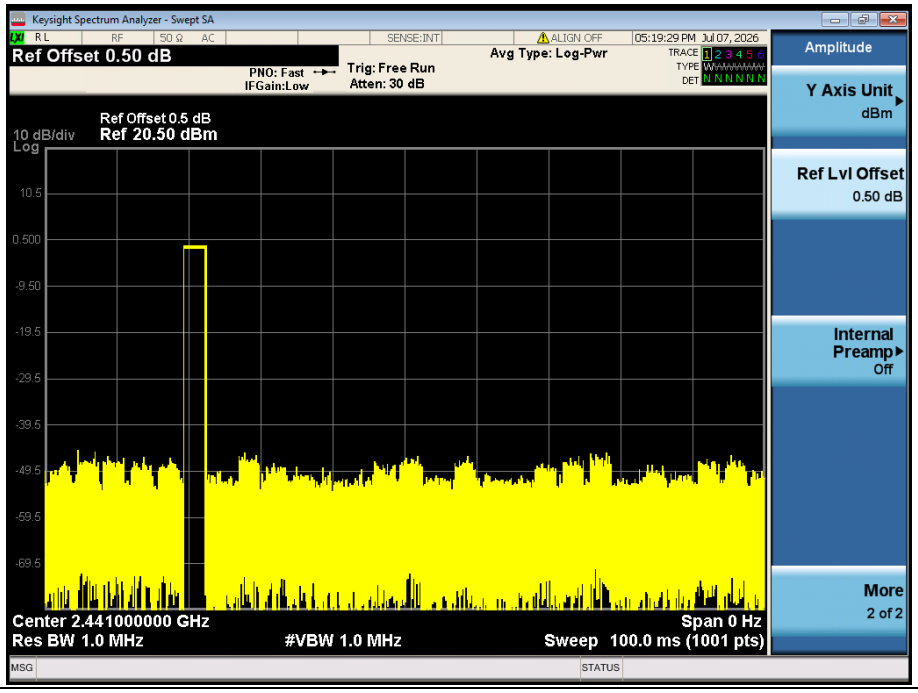
8DPSK_3DH5_HOPP_Ant1_NTNV


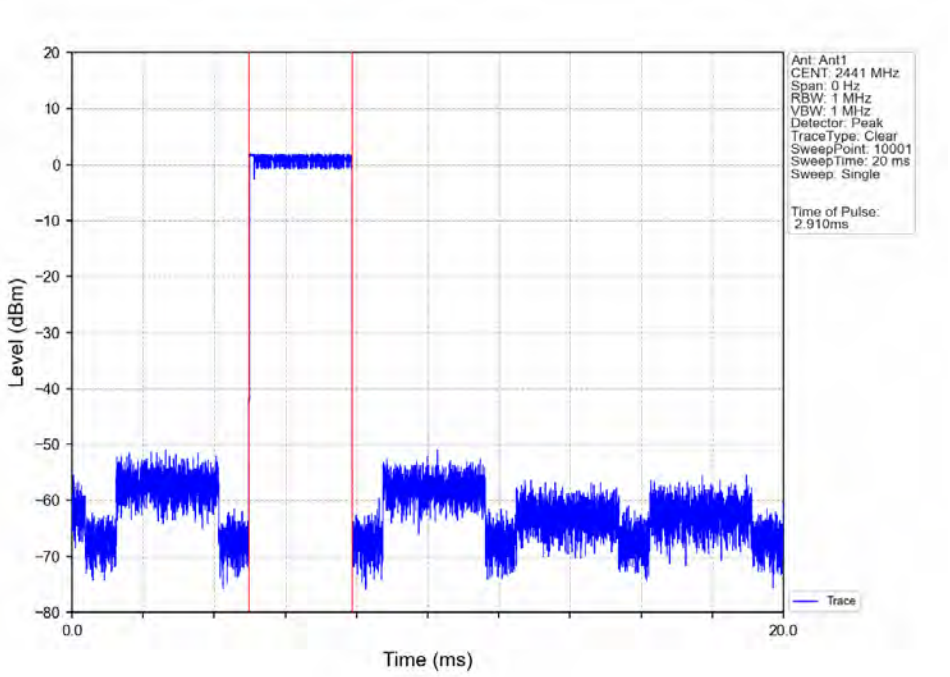
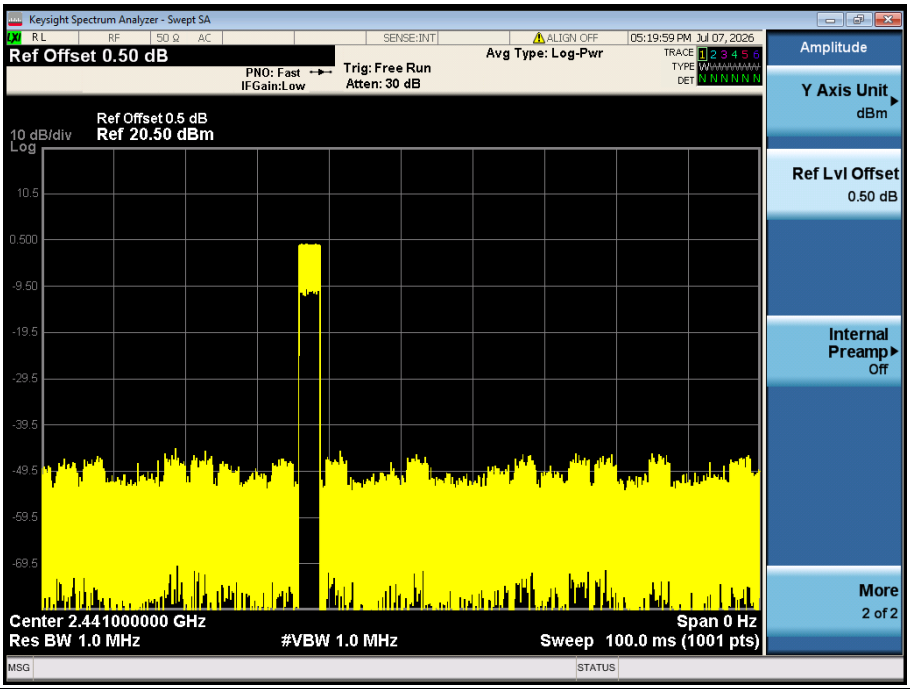
8.Duty Cycle Plots

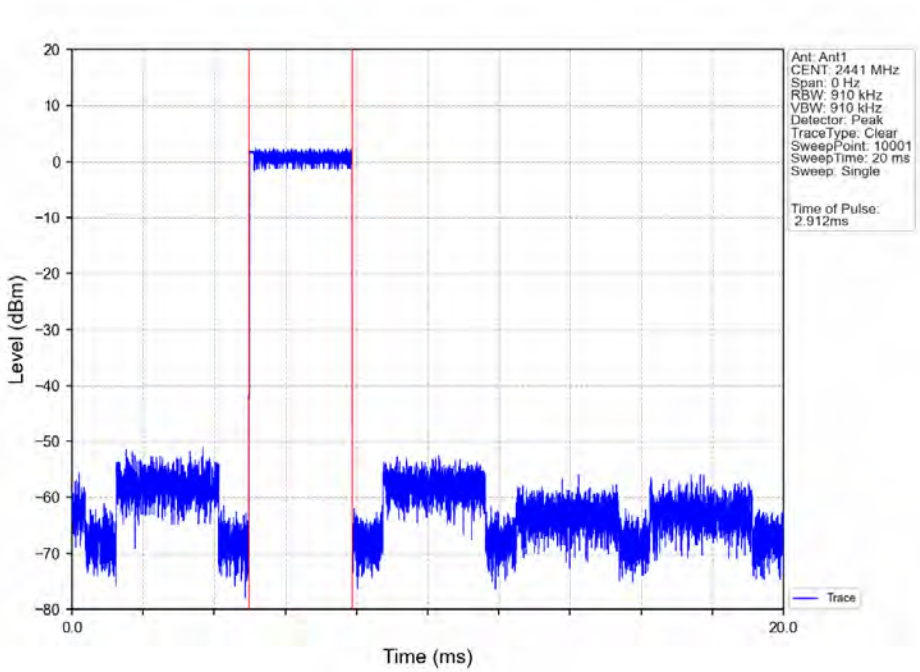
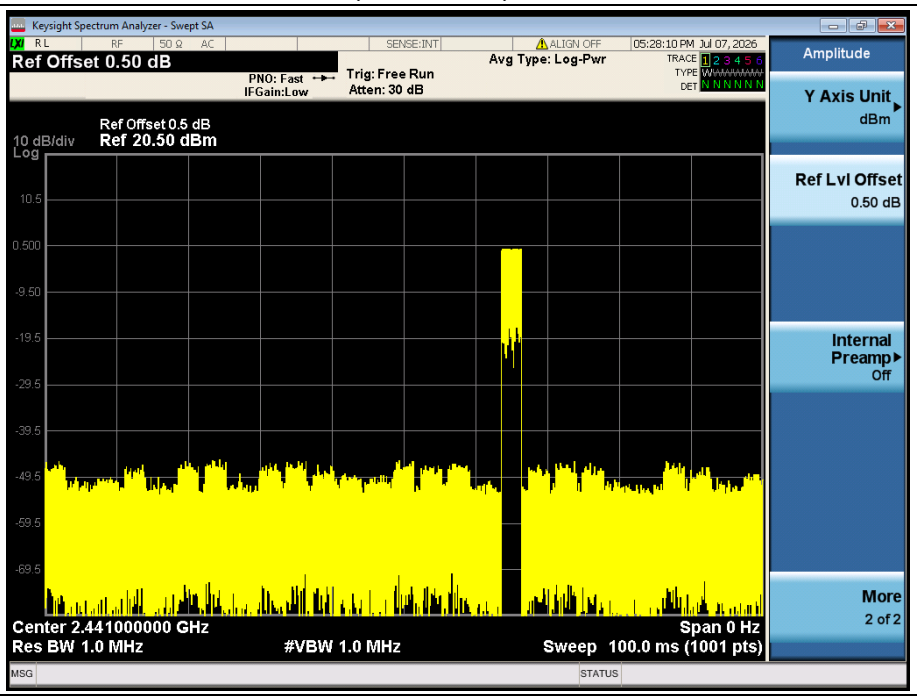
DH5 on time(One Pules)Plot on channel 39



DH5 on time(Count Pulses)Plot on channel 39



2DH5 on time(One Pules)Plot on channel 39

2DH5 on time(Count Pulses)Plot on channel 39


3DH5 on time(One Pules)Plot on channel 39

3DH5 on time(Count Pulses)Plot on channel 39


9. The process and drawings of RSE-AVG

Ant1							
Test Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.000	0.957	>=0.957	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.333	>=0.889	Pass
8DPSK	SISO	HOPP	3DH5	0.977	1.322	>=0.881	Pass

Note:

Channel separation correction

DH5: Channel Separation ≥ 1MHz, Channel separation correction=1

2DH5: Channel Separation ≥ 1MHz, Channel separation correction=1

3DH5: Channel Separation < 1MHz, Channel separation correction=1/0.977=1.024

Overlapping channel correction

DH5: Overlapping channel correction = 0

2DH5: Overlapping channel correction = 1

3DH5: Overlapping channel correction = 1

Test mode	Dwell time per 100 ms	Channel separation correction	Overlapping channel correction	Maximum dwell time
DH5	1*2.900=2.900	1	0	2.900
2DH5	1*2.910=2.910	1	1	5.820
3DH5	1*2.912=2.912	1.024	1	5.894

Note: Maximum dwell time per 1MHz= Dwell time per 100 ms per Channel*(Channel separation correction+ Overlapping channel correction)

Test Mode	Factor
DH5	-30.75
2DH5	-24.70
3DH5	-24.59

Factor=20*log(Maximum dwell time in 100 ms/100)

- End of the Report -