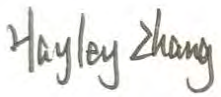
TEST REPORT

Application No.:	SUCR2504000355MO
Applicant:	METICOMM PTE. LTD.
Address of Applicant:	15 UPPER CIRCULAR ROAD, #06-01, SINGAPORE 058413
Manufacturer:	METICOMM PTE. LTD.
Address of Manufacturer:	15 UPPER CIRCULAR ROAD, #06-01, SINGAPORE 058413
EUT Description:	IoT Module
Model No.:	MQM744-0-50-0B,MQM744-0-50-0U,MQM744-0-50-0P, MQM748-0-50-0B,MQM748-0-50-0U,MQM748-0-50-0P ♣
♣	Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical.
Trade Mark:	Meticomm
FCC ID:	2BQY7-M7400
Standards:	FCC 47 CFR Part 2, Subpart J FCC 47 CFR Part 15, Subpart C
Date of Receipt:	June 7, 2025
Date of Test:	June 8, 2025 to June 16, 2025
Date of Issue:	July 3, 2025
Test Result :	**PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Version

Revision Record			
Version	**Description**	***Date***	***Remark***
01	Original	July 3, 2025	/

Authorized for issue by:				
Tested By				
		Hayley Zhang/Project Manager		
Approved By				
		Cloud Peng/Technical Manager		

Contents

1 Test Summary

Test Item	FCC Rule No.	Test Method	Test Result	Result
Antenna Requirement	15.203/15.247(b)	--	Clause 3.1	PASS
AC Power Line Conducted Emission	15.207	ANSI C63.10 2020 Section 6.2	Clause 3.3	PASS
Conducted Peak Output Power	15.247 (b)(1)	ANSI C63.10 2020 Section 11.9	Clause 3.4	PASS
20dB Emission Bandwidth & 99% Occupied Bandwidth	15.247 (a)(1)	ANSI C63.10 2020 Section 6.9	Clause 3.5	For Report Purpose
Carrier Frequencies Separation	15.247 (a)(1)	ANSI C63.10 2020 Section 7.8.2	Clause 3.6	PASS
Hopping Channel Number	15.247 (a)(1)	ANSI C63.10 2020 Section 7.8.3	Clause 3.7	PASS
Dwell Time	15.247 (a)(1)	ANSI C63.10 2020 Section 7.8.4	Clause 3.8	PASS
Band-edge for RF Conducted Emissions	15.247(d)	ANSI C63.10 2020 Section 7.8.7	Clause 3.9	PASS
RF Conducted Spurious Emissions	15.247(d)	ANSI C63.10 2020 Section 7.8.7	Clause 3.10	PASS
Radiated Spurious emissions	15.247(d); 15.205/15.209	ANSI C63.10 2020 Section 6.4 / 6.5 / 6.6	Clause 3.11	PASS
Restricted bands around fundamental frequency (Radiated Emission)	15.247(d); 15.205/15.209	ANSI C63.10 2020 Section 6.10	Clause 3.12	PASS

2 General Information

2.1 Details of Client

Applicant:	METICOMM PTE. LTD.
Address of Applicant:	15 UPPER CIRCULAR ROAD, #06-01, SINGAPORE 058413
Manufacturer:	METICOMM PTE. LTD.
Address of Manufacturer:	15 UPPER CIRCULAR ROAD, #06-01, SINGAPORE 058413

2.2 Test Location

Company:	SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.
Address:	South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone
Post code:	215000
Test engineer:	Tizzy Song

2.3 Test Facility

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

• **A2LA (Certificate No. 6336.01)**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 6336.01.

• **Innovation, Science and Economic Development Canada**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0120.

IC#: 27594.

• **FCC –Designation Number: CN1312**

SGS-CSTC STANDARDS TECHNICAL SERVICES (SUZHOU) CO., LTD. has been recognized as an accredited testing laboratory.

Designation Number: CN1312.

Test Firm Registration Number: 717327

2.4 General Description of EUT

Hardware Version:	N/A
Software Version:	N/A
Power Supply:	3.3V
Operation Frequency:	2400MHz~2483.5MHz fc = 2402 MHz + N * 1 MHz, where: -fc = “Operating Frequency” in MHz, -N = “Channel Number” with the range from 0 to 78.
Bluetooth version:	Bluetooth V5.3
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, π/4DQPSK, 8DPSK
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Antenna Type:	MQM744-0-50-0B, MQM748-0-50-0B: PCB Antenna MQM744-0-50-0U,MQM744-0-50-0P,MQM748-0-50-0U,MQM748-0-50-0P: Dipole Antenna
Antenna Gain:	MQM744-0-50-0B, MQM748-0-50-0B: 2.52dBi MQM744-0-50-0U,MQM744-0-50-0P,MQM748-0-50-0U,MQM748-0-50-0P: 3.37dBi
	Note: The antenna gain are derived from the gain information report provided by the manufacturer.
RF Cable:	1dB
The differences between models are listed below, while the other parts are completely identical. Based on the differences, complete testing was conducted for MQM744-0-50-0U, and RSE was tested for MQM744-0-50-0B. Remark: As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.	

Model	MQM744-0-50-0U	MQM744-0-50-0B	MQM744-0-50-0P
Antenna	1 types: Dipole	1 type: PCB	1 types: Dipole
Impedance	C21=1.2pF C20=1.5pF	C21=1.2pF C20=1.5pF	C21=1.8pF C20=2pF
Inductor	L2=2.7nH	L2=3nH	L2=2.2nH
Support platform system and feature	Support external antenna with antenna connect on module	Support integrated PCB antenna	Support external antenna with antenna connect on host platform. Module support RF output pins in the module package.

Model	MQM748-0-50-0U	MQM748-0-50-0B	MQM748-0-50-0P
Antenna	1 types: Dipole	1 type: PCB	1 types: Dipole
Impedance	C21=1.2pF C20=1.5pF	C21=1.2pF C20=1.5pF	C21=1.8pF C20=2pF
Inductor	L2=2.7nH	L2=3nH	L2=2.2nH
Support platform system and feature	Support external antenna with antenna connect on module	Support integrated PCB antenna	Support external antenna with antenna connect on host platform. Module support RF output pins in the module package.

Antenna Type	Antenna Part No.	Freq.	Peak Antenna Gain (dBi)
PCB Antenna	RFIQM0744010NB001	2.4G Hz	2.52
Dipole Antenna	RFPCA521010EMABY01		3.37

Remark:
1. Pre-scan was done on the above antennas, measurements were demonstrated by using the antenna with the highest gain as the worst case scenarios.
2. Antenna information is provided by the applicant.

Operation Frequency of each channel							
Channel	**Frequency**	**Channel**	**Frequency**	**Channel**	**Frequency**	**Channel**	**Frequency**
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
2	2404MHz	22	2424MHz	42	2444MHz	62	2464MHz
3	2405MHz	23	2425MHz	43	2445MHz	63	2465MHz
4	2406MHz	24	2426MHz	44	2446MHz	64	2466MHz
5	2407MHz	25	2427MHz	45	2447MHz	65	2467MHz
6	2408MHz	26	2428MHz	46	2448MHz	66	2468MHz
7	2409MHz	27	2429MHz	47	2449MHz	67	2469MHz
8	2410MHz	28	2430MHz	48	2450MHz	68	2470MHz
9	2411MHz	29	2431MHz	49	2451MHz	69	2471MHz
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
12	2414MHz	32	2434MHz	52	2454MHz	72	2474MHz
13	2415MHz	33	2435MHz	53	2455MHz	73	2475MHz
14	2416MHz	34	2436MHz	54	2456MHz	74	2476MHz
15	2417MHz	35	2437MHz	55	2457MHz	75	2477MHz
16	2418MHz	36	2438MHz	56	2458MHz	76	2478MHz
17	2419MHz	37	2439MHz	57	2459MHz	77	2479MHz
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz		

Remark:
In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The Lowest channel(CH0)	2402MHz
The Middle channel(CH39)	2441MHz
The Highest channel(CH78)	2480MHz

2.5 Test Environment

Environment Parameter	101 kPa Selected Values During Tests	
Relative Humidity	44-46 % RH Ambient	
Value	**Temperature(℃)**	**Voltage(V)**
NTNV	22~23	3.3
Remark: NV: Normal Voltage NT: Normal Temperature		

2.6 Description of Support Units

The EUT has been tested as an independent unit.

3 Equipment List

Item	Equipment	Manufacturer	Model	Inventory No	Cal Date	Cal. Due Date
Conducted Emission at Mains Terminals						
1	EMI Test Receive	R&S	ESR7	SUWI-01-10-01	1/15/2025	1/14/2026
2	LISN	R&S	ENV216	SUWI-01-19-03	2025/5/8	2026/5/7
3	LISN	Schwarzbeck	ENV216	SUWI-01-19-04	2025/5/8	2026/5/7
6	Test Software	Tonscend	JS32-CE_4.0.0.2	SUWI-02-09-05	N.C.R	N.C.R
RF Conducted Test						
1	Shielding Room	Brilliant-emc	N/A	SUWI-04-08-01	11/9/2022	11/8/2025
2	Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	2025/5/8	2026/5/7
9	Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-15	11/21/2024	11/20/2025
7	MXG Vector signal genitor	KEYSIGHT	N5182B	SUWI-01-38-01	1/15/2025	1/14/2026
8	Signal Generator	ROHDE&SCHWARZ	SMW200A	SUWI-01-07-08	3/27/2025	3/26/2026
10	MXG Vector Signal Generator	ROHDE&SCHWARZ	SMR20	SUWI-01-33-01	3/17/2025	3/16/2026
3	Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	SUWI-01-16-13	2025/5/8	2026/5/7
11	Wideband Radio Communication Test Ststion	Anritsu	MT8000A	SUWI-01-34-02	11/19/2024	11/18/2025
12	Wideband Radio Communication Tester	Anritsu	MT8821C	SUWI-01-26-03	11/19/2024	11/18/2025
5	Power meter	Anritsu	ML2495A	SUWI-01-31-01	11/19/2024	11/18/2025
6	Pulse power sensor	Anritsu	MA2411B	SUWI-01-32-01	11/19/2024	11/18/2025
4	DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	1/15/2025	1/14/2026
13	Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-07	2/13/2025	2/12/2026
14	Temperature Chamber	GIANT FORCE	ICT-017-40-SP-SD	SUWI-01-13-02	2025/5/8	2026/5/7
15	Measurement Software	TST	TST 272 V2.0	SUWI-03-55-03	NCR	NCR
RF Radiated Test						
1	Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	6/3/2023	6/2/2026
4	Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	1/20/2025	1/19/2026
5	Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-09	11/21/2024	11/20/2025
6	Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	1/15/2025	1/14/2026
8	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9168	SUWI-01-11-04	8/22/2024	8/21/2026
9	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	5/7/2025	5/6/2027
10	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9170	SUWI-01-11-03	5/7/2025	5/6/2027
11	Active Loop Antenna	SCHWRZBECK MESS-ELEKTRONIK	FMZB 1519B	SUWI-01-21-01	5/7/2025	5/6/2027
12	Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	1/16/2025	1/15/2026
13	Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	1/16/2025	1/15/2026
14	Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	1/20/2025	1/19/2026
15	Wideband Radio Communication Tester	Anritsu	MT8820C	SUWI-01-26-01	2025/5/8	2026/5/7
16	Wideband Radio Communication Tester	Anritsu	MT8821C	SUWI-01-26-03	11/19/2024	11/18/2025
17	Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	SUWI-01-16-09	2025/5/8	2026/5/7

18	Radio Communication Analyzer	StarPoint	SP9500E	SUWI-01-28-02	11/19/2024	11/18/2025
3	Signal Generator	ROHDE&SCHWARZ	SMB100A	SUWI-01-08-01	2025/5/8	2026/5/7
7	DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	1/15/2025	1/14/2026
2	Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2/13/2025	2/12/2026
19	Measurement Software	Tonscend	JS32-RSE 4.0.0.1	SUWI-02-09-06	NCR	NCR

Remark: NCR=No Calibration Requirement.

4 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Total RF power, conducted	±0.54dB
2	RF power density, conducted	±1.03dB
3	Spurious emissions, conducted	±0.54dB
4	Radio Frequency	±1.0 %
5	Duty Cycle	±0.37%
6	Occupied Bandwidth	±1.0 %
7	Conduction Emission	± 2.90dB (150kHz to 30MHz)
8	Radiated Emission	± 3.13dB (9k -30MHz)
		± 4.80dB (30M -1GHz)
		± 4.80dB (1GHz to 18GHz)
		± 4.80dB (Above 18GHz)

Remark:
The U_{lab} (lab Uncertainty) is less than $U_{cispr/ETSI}$ (CISPR/ETSI Uncertainty), so the test results
– compliance is deemed to occur if no measured disturbance level exceeds the disturbance limit;
– non-compliance is deemed to occur if any measured disturbance level exceeds the disturbance limit.

5 Test results and Measurement Data

5.1 Antenna Requirement

Standard requirement:	47 CFR Part 15C Section 15.203 /247(b)

15.203 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.

The antenna is PCB Antenna and dipole Antenna and no consideration of replacement. The best case gain of the antenna is 2.52dBi for PCB Antenna, 3.37dBi for Dipole Antenna

Note:

The antenna gain are derived from the gain information report provided by the manufacturer.

Remark:

As above information is provided and confirmed by the applicant. SGS is not liable to the accuracy, suitability, reliability or/and integrity of the information.

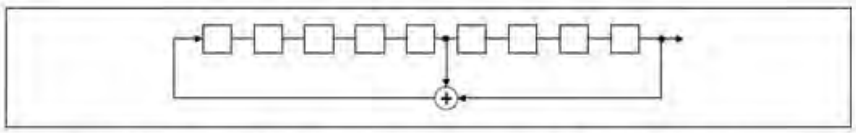
5.2 Other requirements Frequency Hopping Spread Spectrum System Hopping Sequence

5.2.1 Test Requirement:

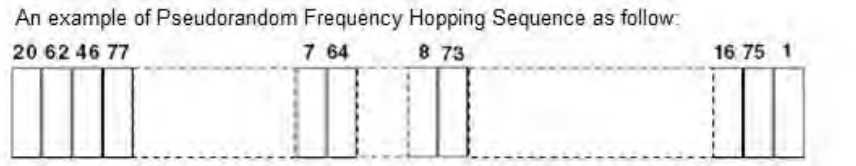
47 CFR Part 15, Subpart C 15.247(a)(1),(g),(h)

5.2.2 Conclusion

Standard Requirement:
The system shall hop to channel frequencies that are selected at the system hopping rate from a Pseudo randomly 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 pseudo random 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:



Linear Feedback Shift Register for Generation of the PRBS sequence

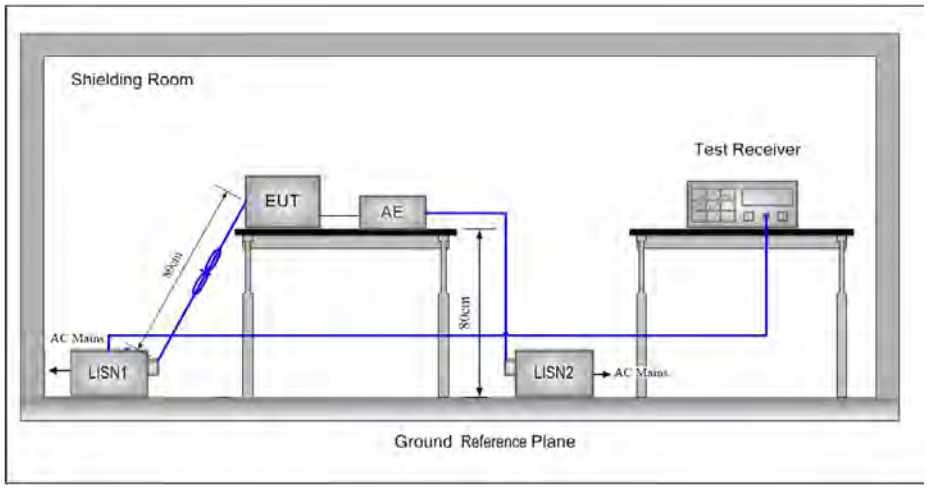


Each frequency used equally on the average by each transmitter.
According to Technical Specification, the receivers are designed to have input and IF bandwidths that match the hopping channel bandwidths of any transmitters and shift frequencies in synchronization with the transmitted signals.

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 RF 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.

5.3 AC Power Line Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.207		
Test Method:	ANSI C63.10: 2020 Section 6.2		
Test Frequency Range:	150kHz to 30MHz		
Receiver Setup:	RBW = 9kHz, VBW = 30kHz		
Limit:	Frequency range (MHz)	Limit (dBuV)	
		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 Procedure:	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 50Ω/50μH + 5Ω 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: 2020 on conducted measurement.		

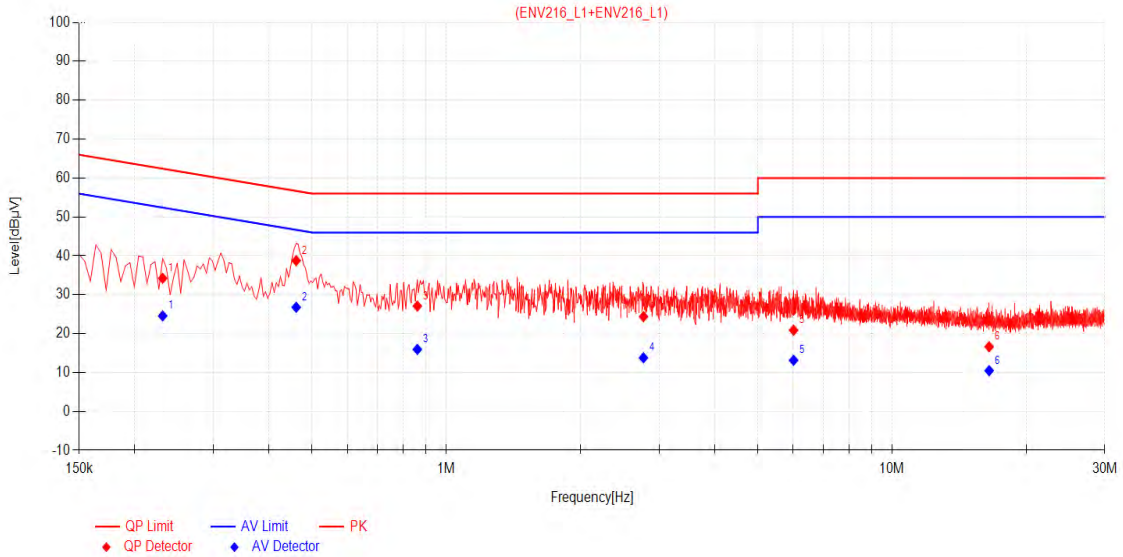
Test Setup:	
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type.
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Instruments Used:	Refer to section 3 for details.
Test Results:	Pass

Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.
Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

MQM744-0-50-0U

Phase:	Line

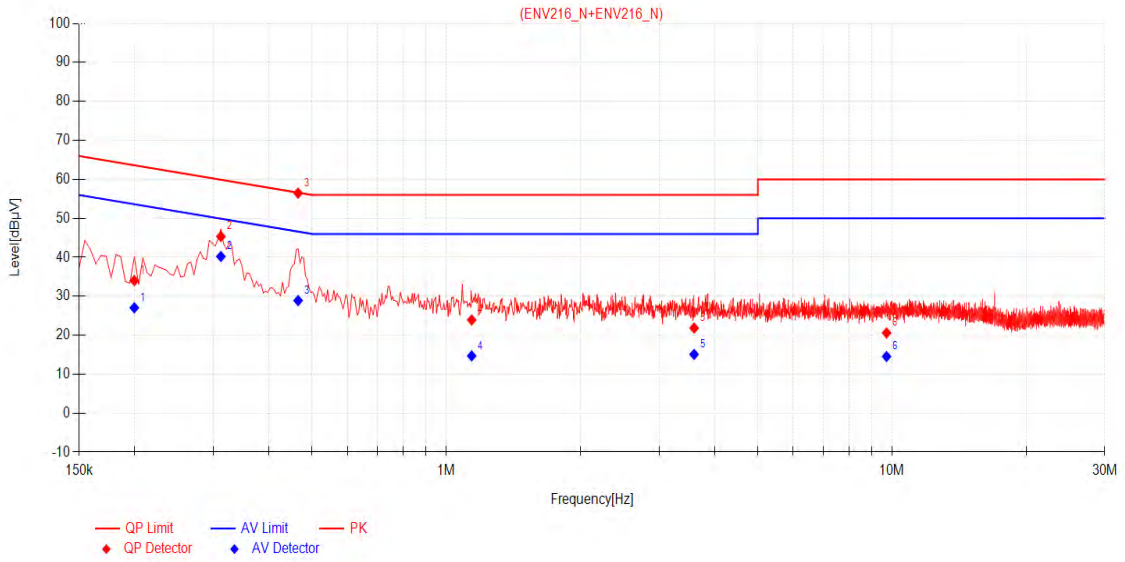


Final Data List

NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV] True QP Reading[dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV] True AV Reading[dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.2310	10.07	24.16	34.23	62.41	28.18	14.49	24.56	52.41	27.85	PASS
2	0.4605	10.06	28.72	38.78	56.68	17.90	16.72	26.78	46.68	19.90	PASS
3	0.8610	10.01	17.07	27.08	56.00	28.92	5.94	15.95	46.00	30.05	PASS
4	2.7690	9.83	14.54	24.37	56.00	31.63	3.96	13.79	46.00	32.21	PASS
5	6.0135	9.82	11.08	20.90	60.00	39.10	3.33	13.15	50.00	36.85	PASS
6	16.5165	9.78	6.85	16.63	60.00	43.37	0.70	10.48	50.00	39.52	PASS

Remark:
1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
3. Margin = Limit[dBµV] – Value[dBµV]

Phase:	Neutral

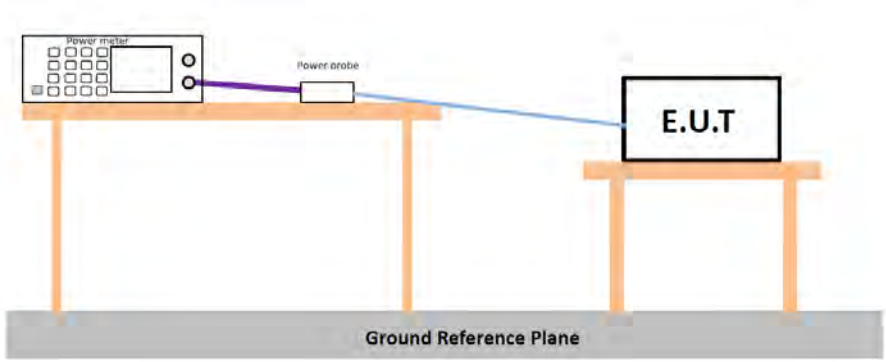


Final Data List

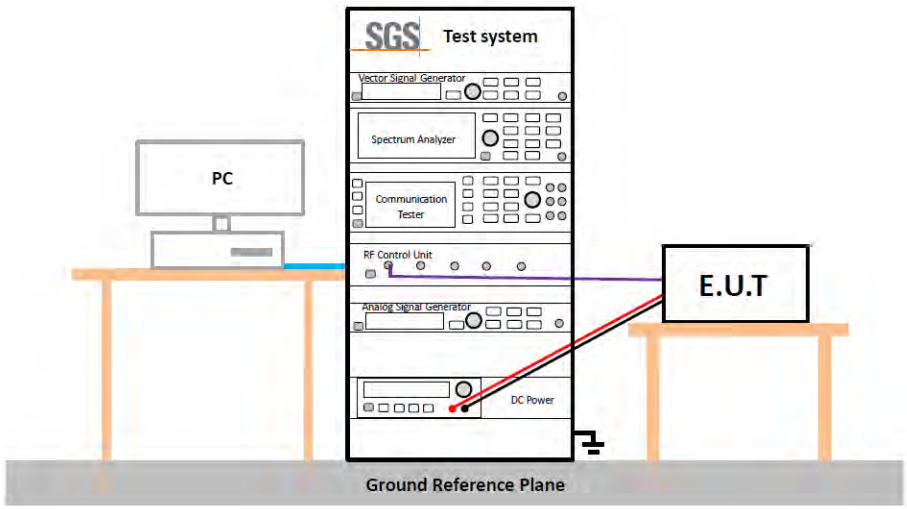
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV] True QP Reading[dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV] True AV Reading[dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1995	10.08	23.95	34.03	63.63	29.60	16.96	27.04	53.63	26.59	PASS
2	0.3120	10.07	35.27	45.34	59.92	14.58	30.14	40.21	49.92	9.71	PASS
3	0.4650	10.06	46.40	56.46	56.60	0.14	18.83	28.89	46.60	17.71	PASS
4	1.1400	9.95	13.96	23.91	56.00	32.09	4.75	14.70	46.00	31.30	PASS
5	3.5970	9.86	11.98	21.84	56.00	34.16	5.22	15.08	46.00	30.92	PASS
6	9.7215	9.78	10.82	20.60	60.00	39.40	4.75	14.53	50.00	35.47	PASS

Remark:
1. The following Quasi-Peak and Average measurements were performed on the EUT:
2. Value =Reading[dBµV] + Factor(Lisn factor[dB] + cable loss[dB]).
3. Margin = Limit[dBµV] – Value[dBµV]

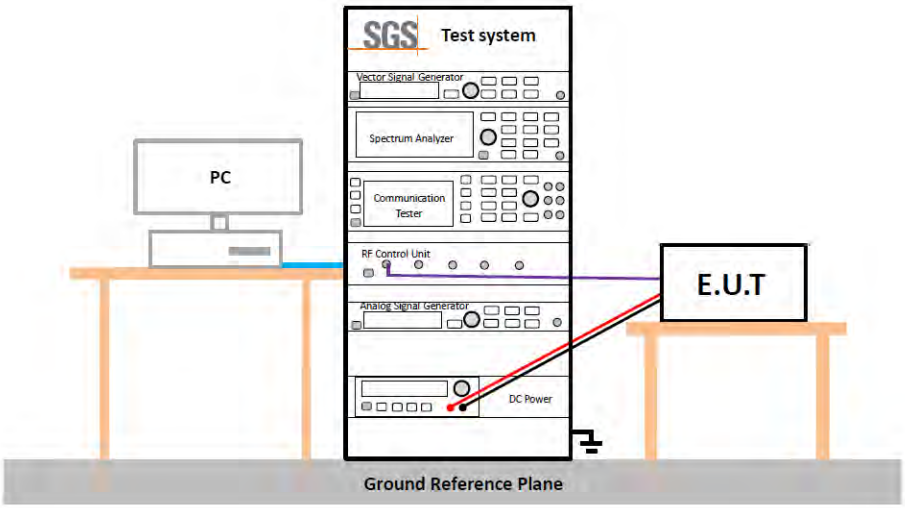
5.4 Conducted Output Power

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)&15.247 (b)(1)
Test Method:	ANSI C63.10:2020 Section 7.8.5
Test Setup:	 * Test with power meter (Detector function: Peak
Test Instruments:	Refer to section 3 for details
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type.
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Limit:	0.125 watts
Test Results:	Pass
The detailed test data see: **Appendix**	

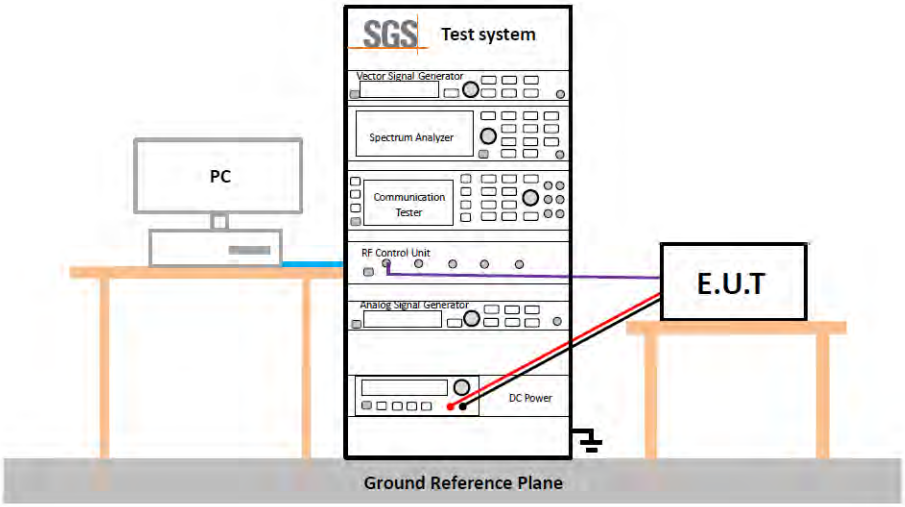
5.5 20dB Emission Bandwidth & 99% Occupied Bandwidth

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2020 Section 6.9
Test Setup:	
Instruments Used:	Refer to section 3 for details
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type.
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Limit:	No restriction limits
Test Results:	For Report Purpose
The detailed test data see: **Appendix**	

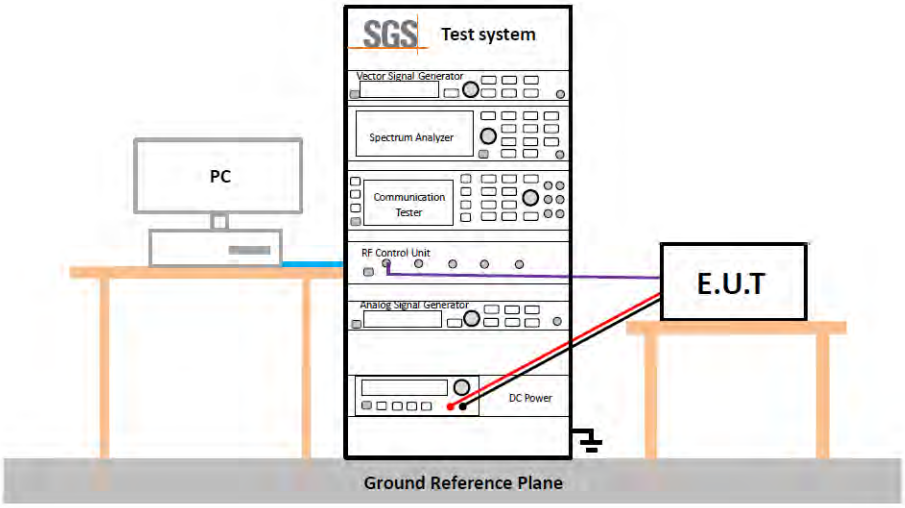
5.6 Carrier Frequencies Separation

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2020 Section 7.8.2
Test Setup:	
Test Instruments:	Refer to section 3 for details
Exploratory Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type.
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Limit:	2/3 of the 20dB bandwidth
	Remark: the transmission power is less than 0.125W.
Test Results:	Pass
The detailed test data see: **Appendix**	

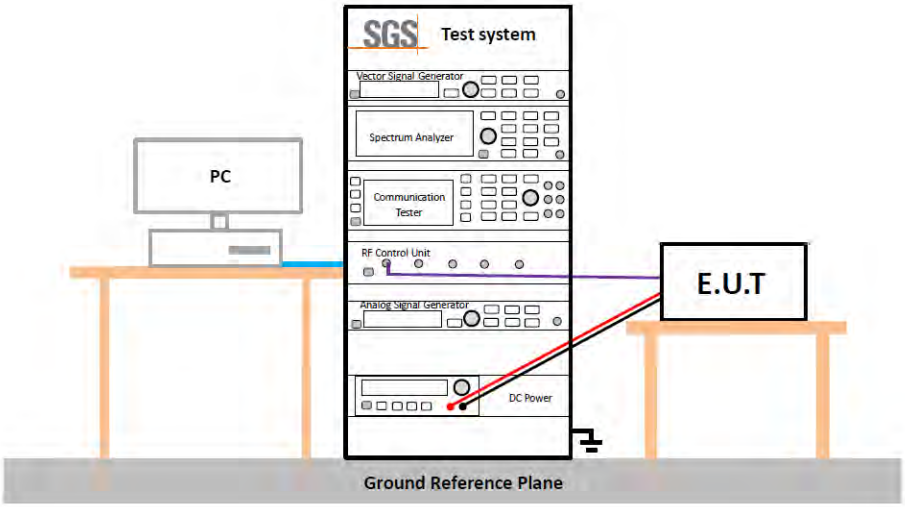
5.7 Hopping Channel Number

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2020 Section 7.8.3
Test Setup:	
Instruments Used:	Refer to section 3 for details
Test Mode:	Hopping transmitting with all kind of modulation
Limit:	At least 15 channels
Test Results:	Pass
The detailed test data see: **Appendix**	

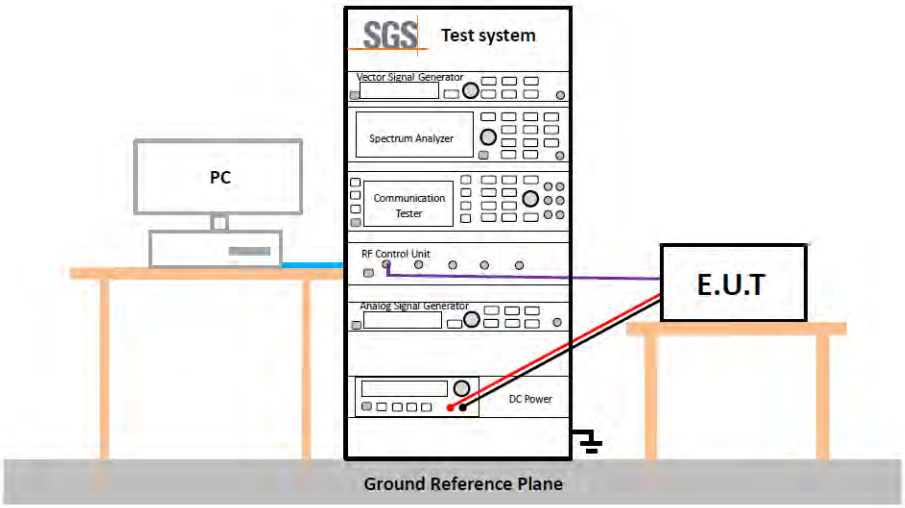
5.8 Dwell Time

Test Requirement:	47 CFR Part 15C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2020 Section 7.8.4
Test Setup:	
Instruments Used:	Refer to section 3 for details
Test Mode:	Hopping transmitting with all kind of modulation and all kind of data type.
Limit:	0.4 Second
Test Results:	Pass
The detailed test data see: **Appendix**	

5.9 Band-edge for RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10:2020 Section 7.8.7
Test Setup:	
Instruments Used:	Refer to section 3 for details
Exploratory Test Mode:	Hopping and Non-hopping transmitting with all kind of modulation and all kind of data type.
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Test Results:	Pass
The detailed test data see: **Appendix**	

5.10 Spurious RF Conducted Emissions

Test Requirement:	47 CFR Part 15C Section 15.247 (d)
Test Method:	ANSI C63.10:2020 Section 7.8.7
Test Setup:	
Instruments Used:	Refer to section 3 for details
Exploratory Test Mode:	Non-hopping transmitting with all kind of modulation and all kind of data type.
Final Test Mode:	Through Pre-scan, find the DH5 of data type is the worst case of GFSK modulation type, 2-DH5 of data type is the worst case of π/4DQPSK modulation type, 3-DH5 of data type is the worst case of 8DPSK modulation type.
Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum 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.
Test Results:	Pass
The detailed test data see: **Appendix**	

5.11 Radiated Spurious Emissions

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205				
Test Method:	ANSI C63.10 :2020 Section 6.4 / 6.5 / 6.6				
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)				
Test Frequency:	9kHz ~ 25GHz				
Limit:	Frequency	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz-0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz-88MHz	100	40.0	Quasi-peak	3
	88MHz-216MHz	150	43.5	Quasi-peak	3
	216MHz-960MHz	200	46.0	Quasi-peak	3
	960MHz-1GHz	500	54.0	Quasi-peak	3
	Above 1GHz	500	54.0	Average	3
	Remark: 15.35(b),Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.				

Test Setup:

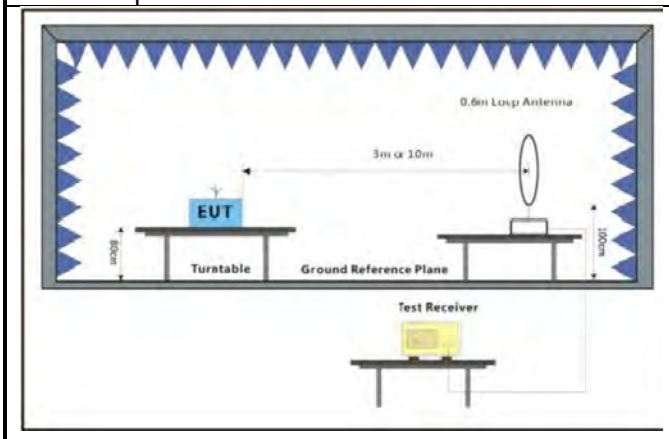


Figure 1. Below 30MHz

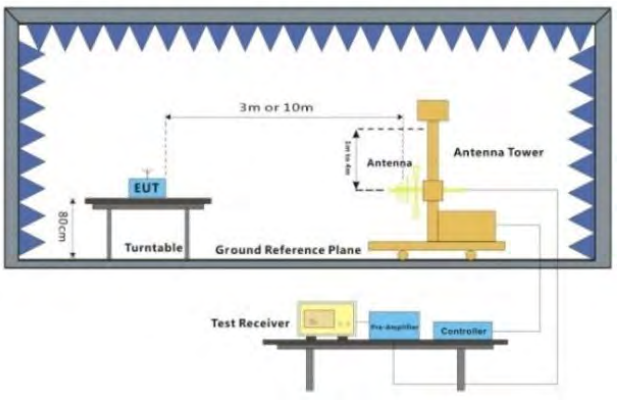


Figure 2. 30MHz to 1GHz

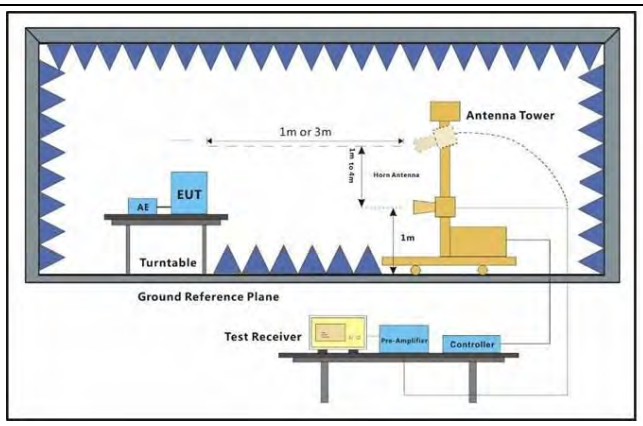


Figure 3. Above 1 GHz

Test Procedure:	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 camber. 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 semi-anechoic camber. The table was rotated 360 degrees to determine the position of the highest radiation (Distance from antenna to EUT is 1m for measurements >18GHz). 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. 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 worse case. i. Repeat above procedures until all frequencies measured was complete. j. The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported. k. The disturbance above 18GHz was very low, and the harmonics were the highest point could be found when testing, so only the harmonics had been displayed. l. At a measurement distance of 1 meter the limit line was increased by 20*LOG(3/1) = 9.54 dB.
Test Configuration:	Measurements below 30MHz • RBW = 10 kHz • VBW = 30 kHz • Detector = Peak & Average & Quasi-peak • Trace mode = max hold Measurements Below 1000MHz • RBW = 120 kHz • VBW = 300 kHz • Detector = Quasi-peak

	• Trace mode = max hold Peak Measurements Above 1000 MHz • RBW = 1 MHz • VBW ≥ 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold Average Measurements Above 1000MHz Use duty cycle correction factor method per 15.35(c). Duty cycle = On time / 100 milliseconds On time = $N_1*L_1 + N_2*L_2 \ldots + N_{N-1}*L_{N-1} + N_N*L_N$ Where N_1 is number of type 1 pulese, L_1 is length of type 1 pulses, etc. Average Value = Peak Value +20*log(Duty cycle).
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case. Pretest the EUT at Charge + Transmitting mode For below 1GHz part, through pre-scan all channels, but only the worst case is recorded in the report.
Instruments Used:	Refer to section 3 for details
Test Results:	Pass
The detailed test data see: **Appendix**	

5.12 Restricted bands around fundamental frequency

Test Requirement:	47 CFR Part 15C Section 15.209 and 15.205		
Test Method:	ANSI C63.10: 2020 Section 6.10		
Test Site:	Measurement Distance: 3m (Semi-Anechoic Chamber)		
Limit:	Frequency	Limit (dBuV/m)	Remark
	30MHz-88MHz	40.0	Quasi-peak
	88MHz-216MHz	43.5	Quasi-peak
	216MHz-960MHz	46.0	Quasi-peak
	960MHz-1GHz	54.0	Quasi-peak
	Above 1GHz	54.0	Average Value
		74.0	Peak Value

Test Setup:

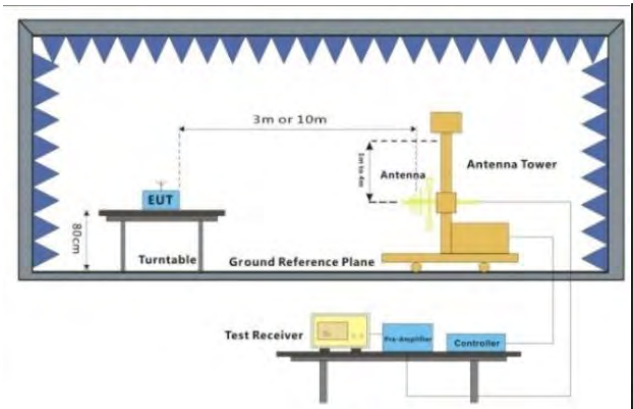


Figure 1. 30MHz to 1GHz

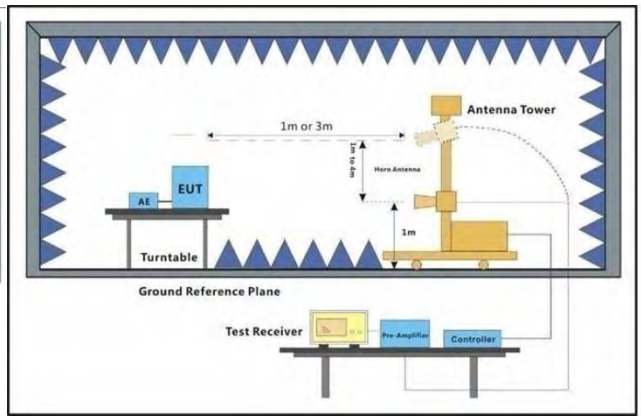


Figure 2. Above 1 GHz

Test Procedure:	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 camber. 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 semi-anechoic camber. 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 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. Place a marker at the end of the restricted band closest to the transmit frequency to show compliance. Also measure any emissions in the restricted bands. Save the spectrum analyzer plot. Repeat for each power and modulation for lowest and highest channel.

	h. Test the EUT in the lowest 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 worse case. j. Repeat above procedures until all frequencies measured was complete.
Test Configuration:	Measurements Below 1000MHz • RBW = 120 kHz • VBW = 300 kHz • Detector = Quasi-peak • Trace mode = max hold Peak Measurements Above 1000 MHz • RBW = 1 MHz • VBW ≥ 3 MHz • Detector = Peak • Sweep time = auto • Trace mode = max hold Average Measurements Above 1000MHz Use duty cycle correction factor method per 15.35(c). Duty cycle = On time / 100 milliseconds On time = $N_1*L_1 + N_2*L_2…+N_{N-1}*L_{N-1} + N_N*L_N$ Where N_1 is number of type 1 pulese, L_1 is length of type 1 pulses, etc. Average Value = Peak Value +20*log(Duty cycle).
Exploratory Test Mode:	Non-hopping transmitting mode with all kind of modulation and all kind of data type Charge + Transmitting mode.
Final Test Mode:	Through Pre-scan, find the DH5 of data type and GFSK modulation is the worst case. Pretest the EUT at Charge + Transmitting mode, Only the worst case is recorded in the report.
Instruments Used:	Refer to section 3 for details
Test Results:	Pass
The detailed test data see: **Appendix**	

6 Photographs - Setup Photos

Refer to Appendix A.2 WLAN Setup Photos.

7 Appendix

1. Duty Cycle

1.1 Test Result

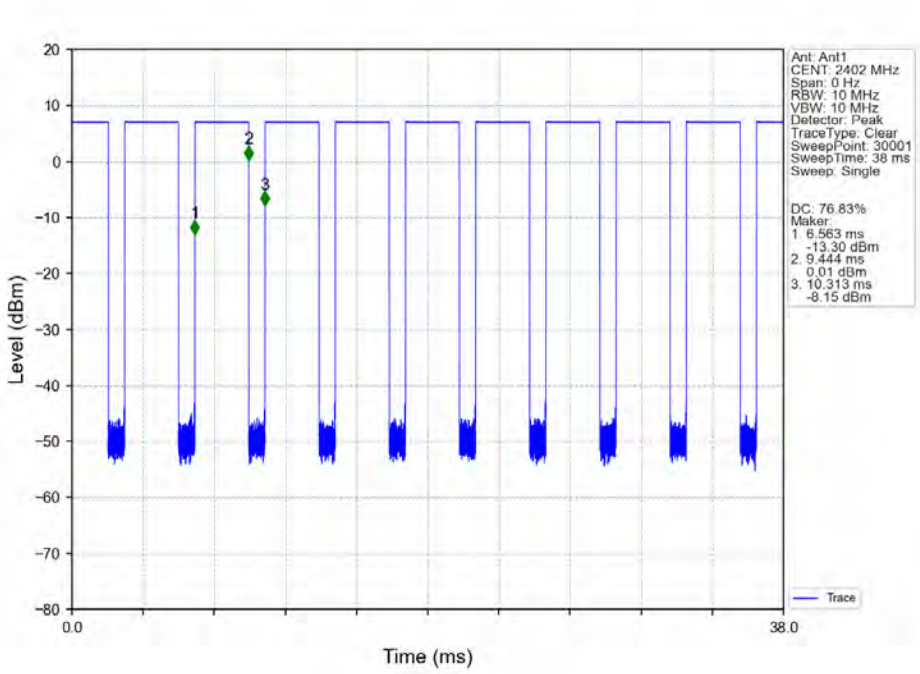
1.1.1 Ant1

Ant1								
Mode	TX Type	Frequency (MHz)	Packet Type	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
GFSK	SISO	2402	DH5	2.881	3.750	76.83	1.14	0.03
		2441	DH5	2.882	3.751	76.83	1.14	0.03
		2480	DH5	2.880	3.749	76.82	1.15	0.03
Pi/4DQPSK	SISO	2402	2DH5	2.887	3.751	76.97	1.14	0.03
		2441	2DH5	2.886	3.750	76.96	1.14	0.03
		2480	2DH5	2.885	3.749	76.95	1.14	0.03
8DPSK	SISO	2402	3DH5	2.886	3.749	76.98	1.14	0.03
		2441	3DH5	2.887	3.750	76.99	1.14	0.01
		2480	3DH5	2.888	3.751	76.99	1.14	0.03

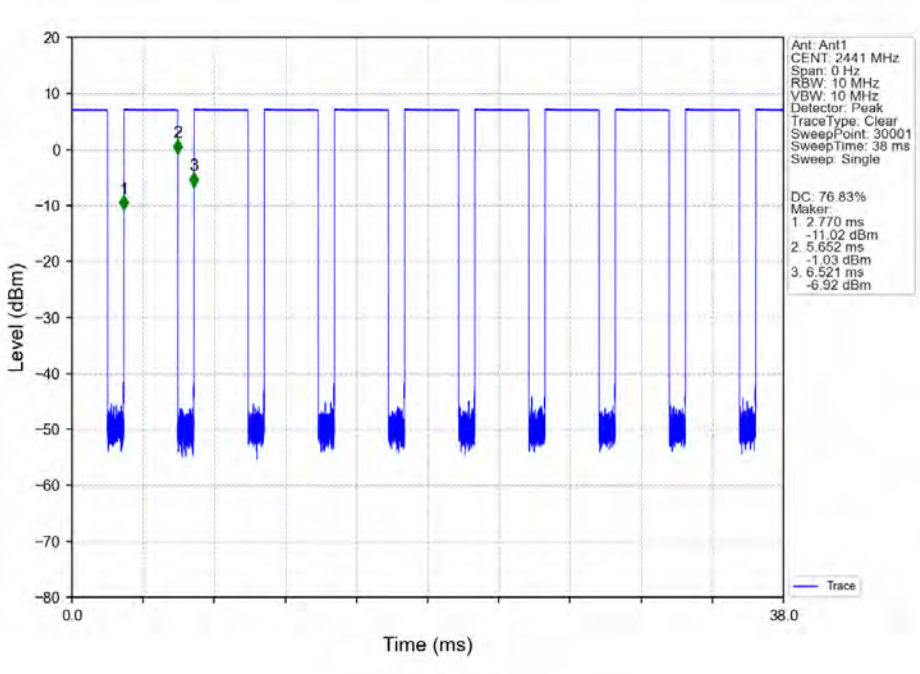
1.2 Test Graph

1.2.1 Ant1

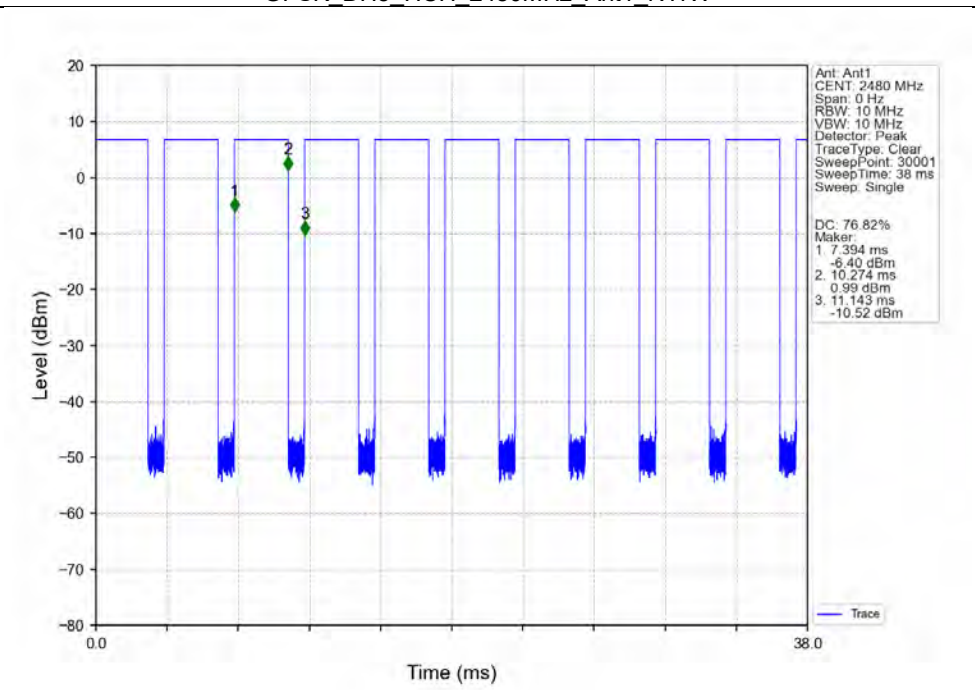
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



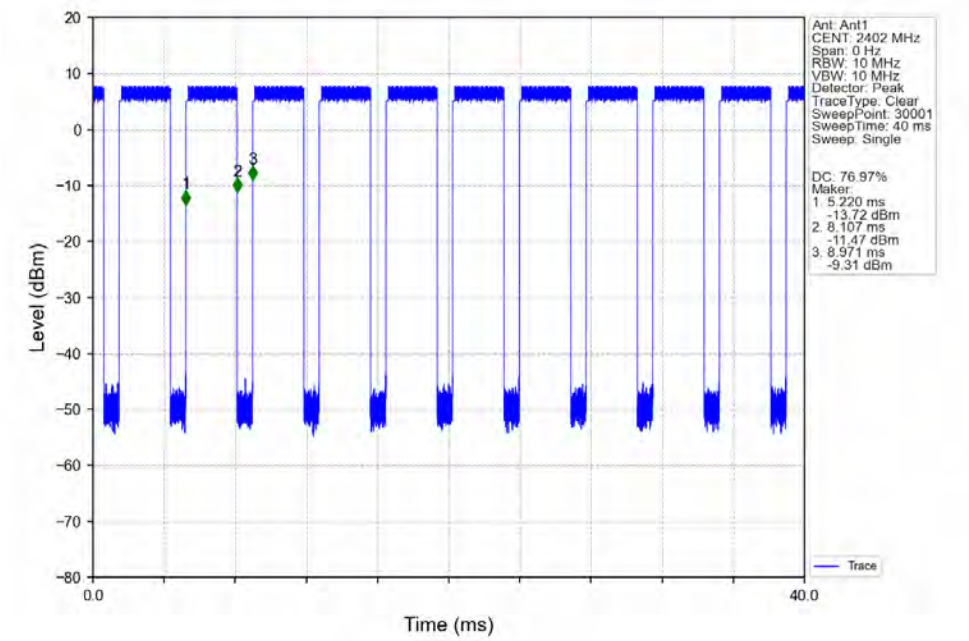
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



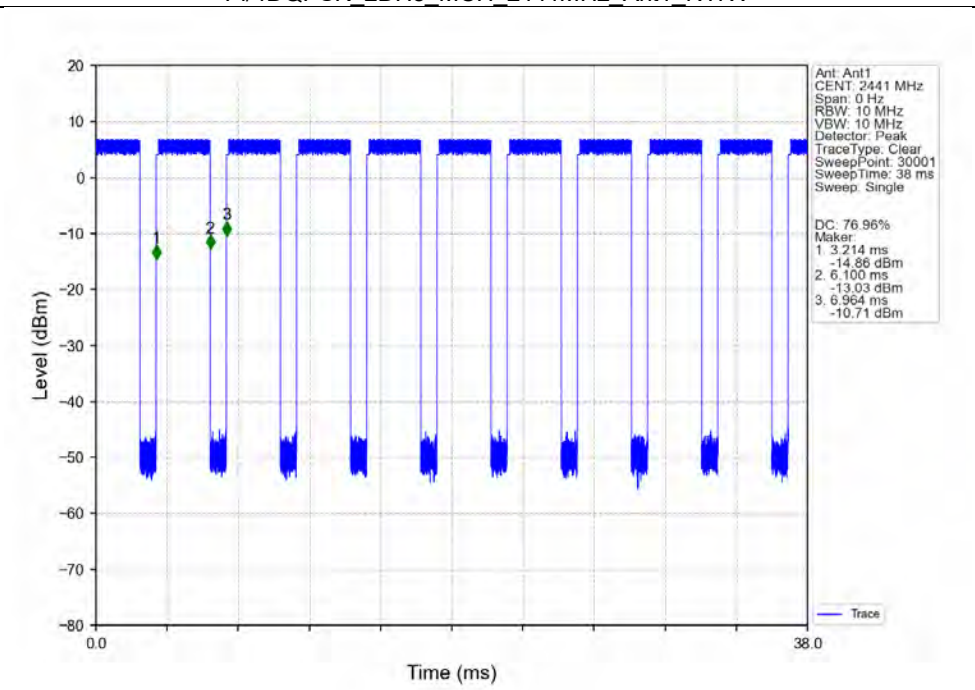
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



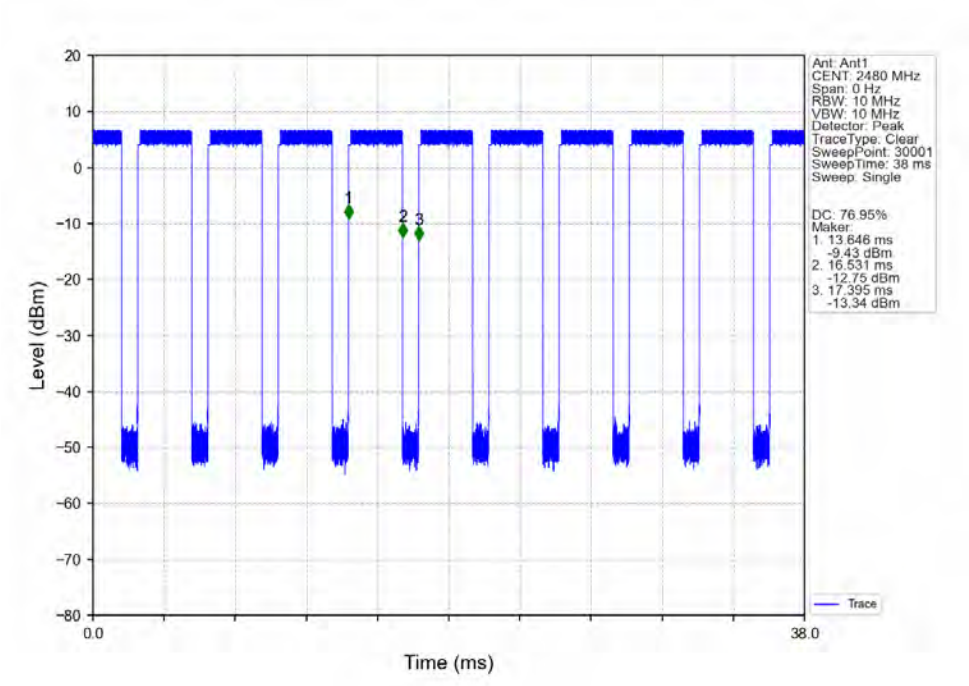
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



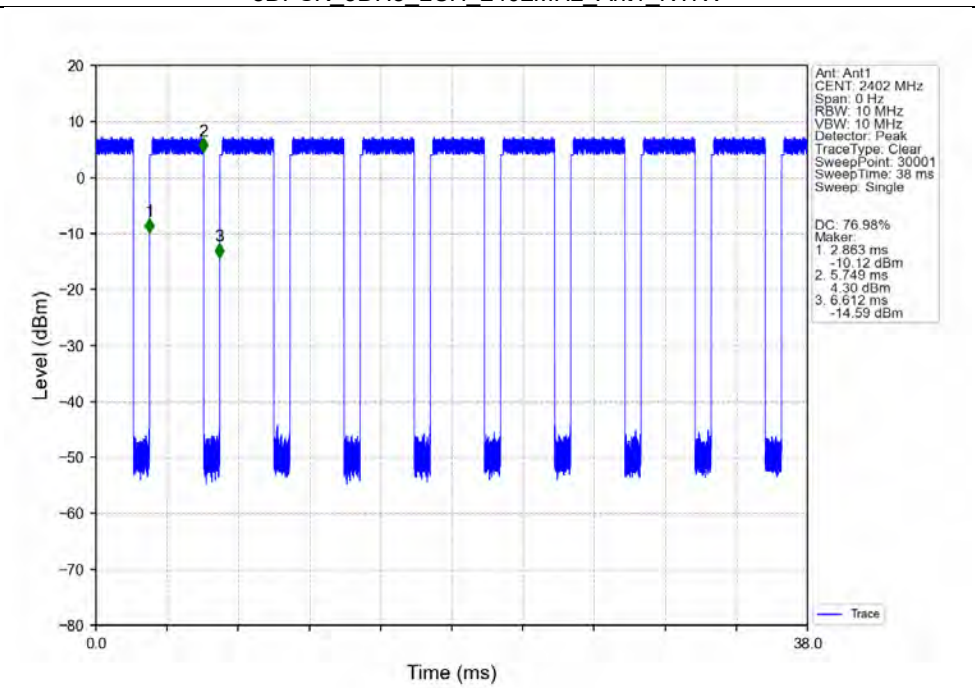
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



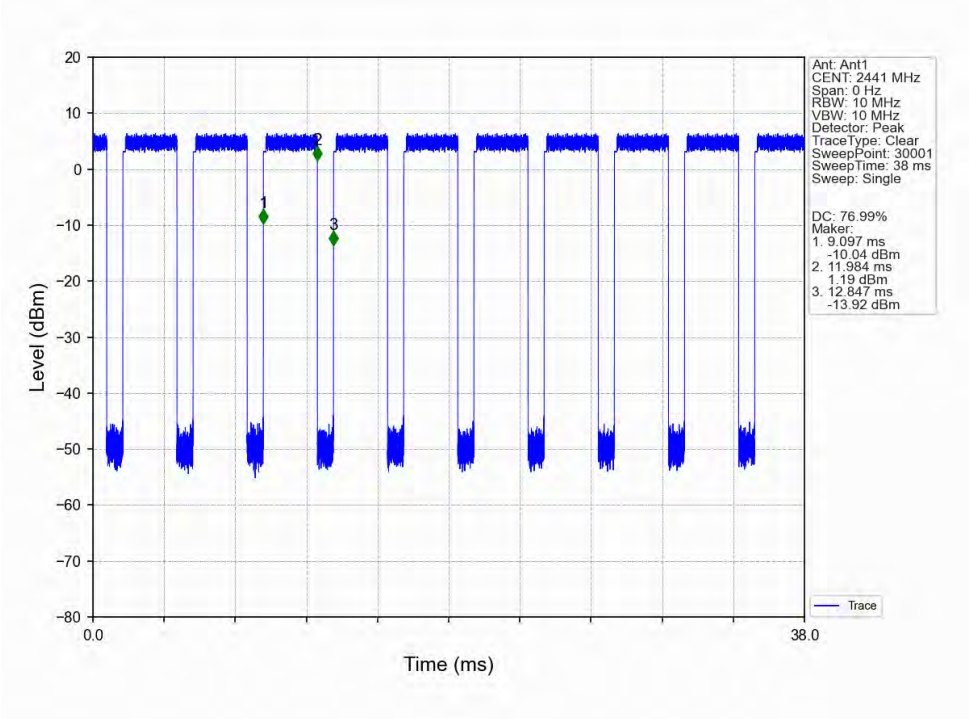
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



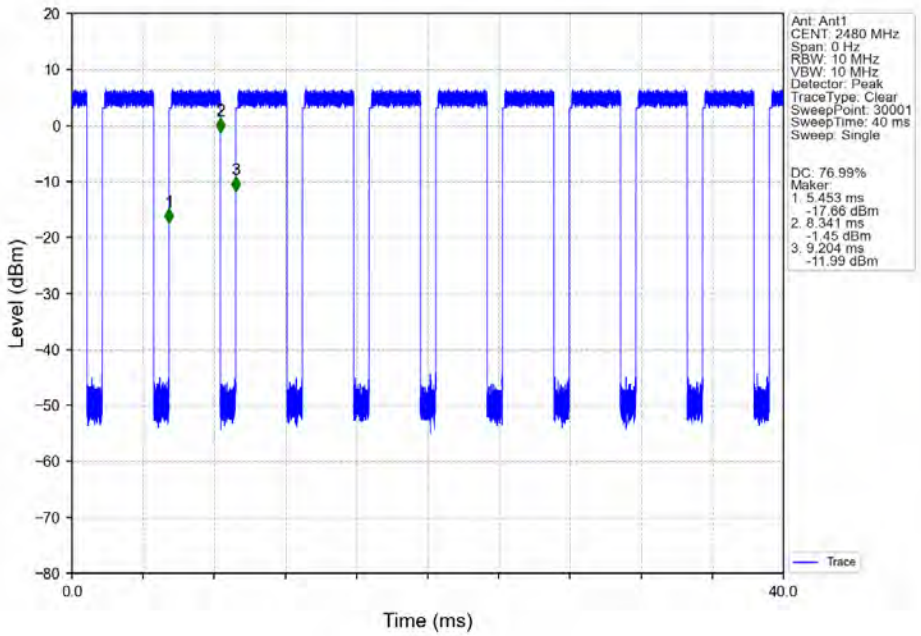
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.811	/	Pass
		2441	DH5	1	0.813	/	Pass
		2480	DH5	1	0.811	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.181	/	Pass
		2441	2DH5	1	1.181	/	Pass
		2480	2DH5	1	1.183	/	Pass
8DPSK	SISO	2402	3DH5	1	1.180	/	Pass
		2441	3DH5	1	1.179	/	Pass
		2480	3DH5	1	1.179	/	Pass

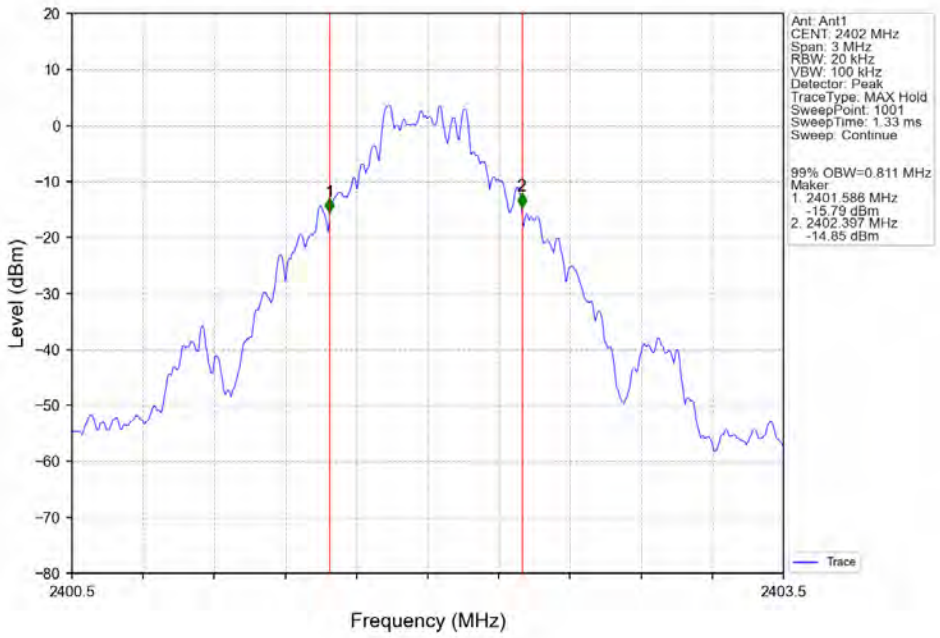
2.1.2 20dB BW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.932	/	Pass
		2441	DH5	1	0.931	/	Pass
		2480	DH5	1	0.889	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.289	/	Pass
		2441	2DH5	1	1.290	/	Pass
		2480	2DH5	1	1.290	/	Pass
8DPSK	SISO	2402	3DH5	1	1.293	/	Pass
		2441	3DH5	1	1.295	/	Pass
		2480	3DH5	1	1.292	/	Pass

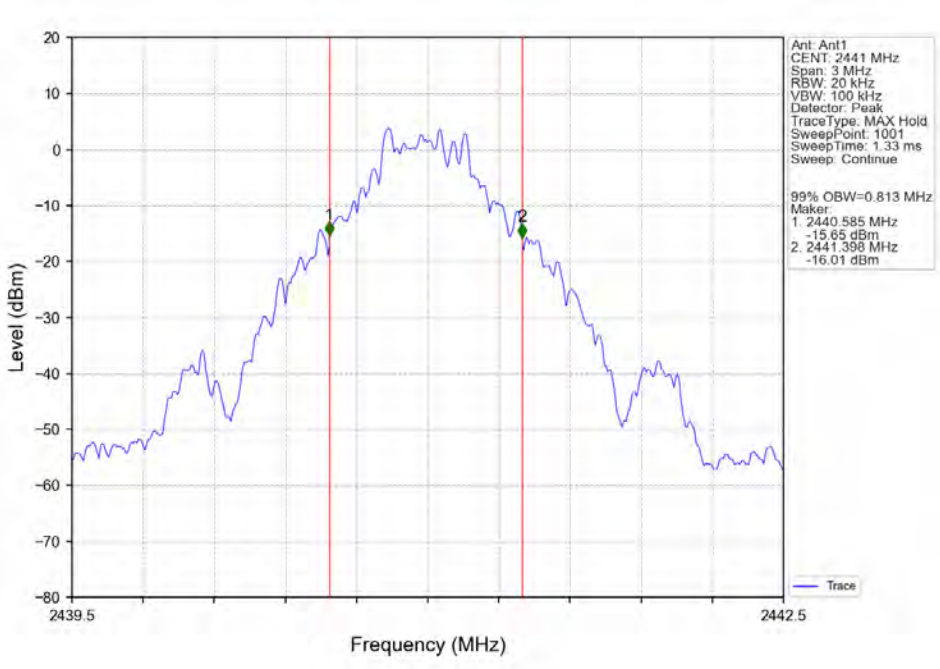
2.2 Test Graph

2.2.1 OBW

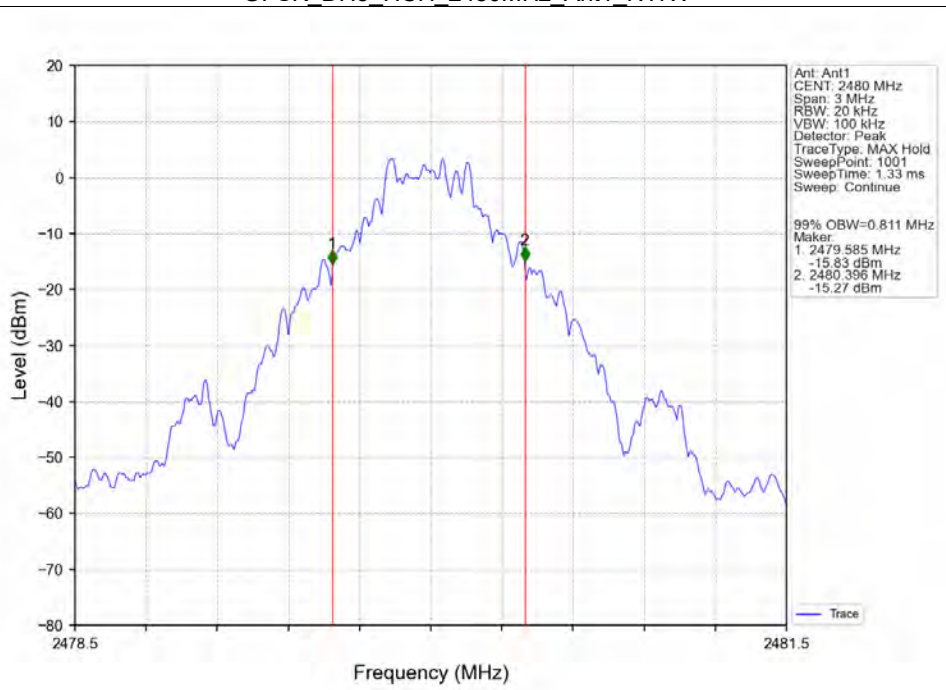
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



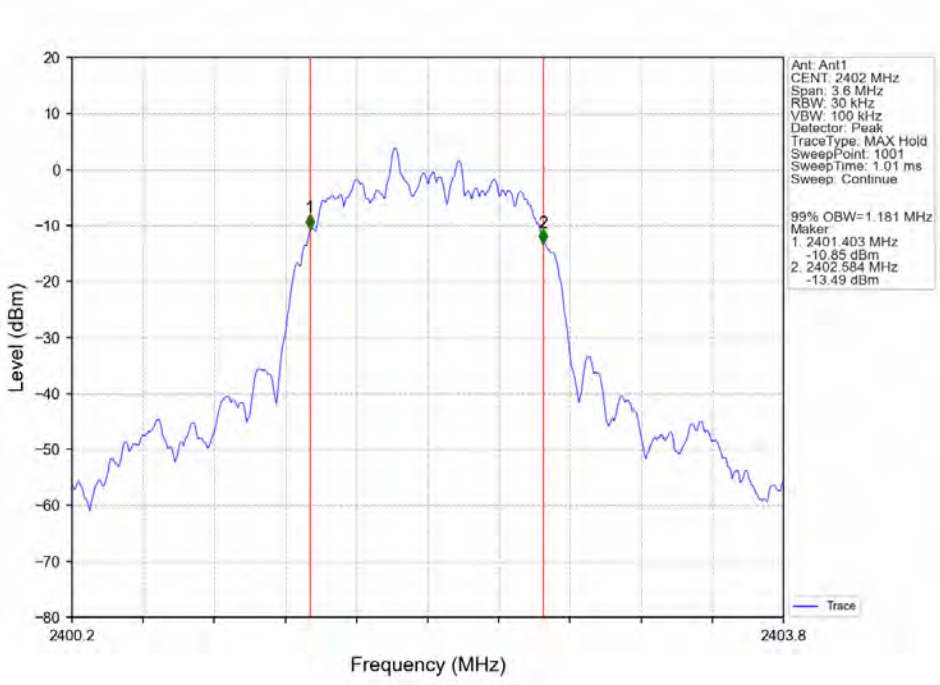
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



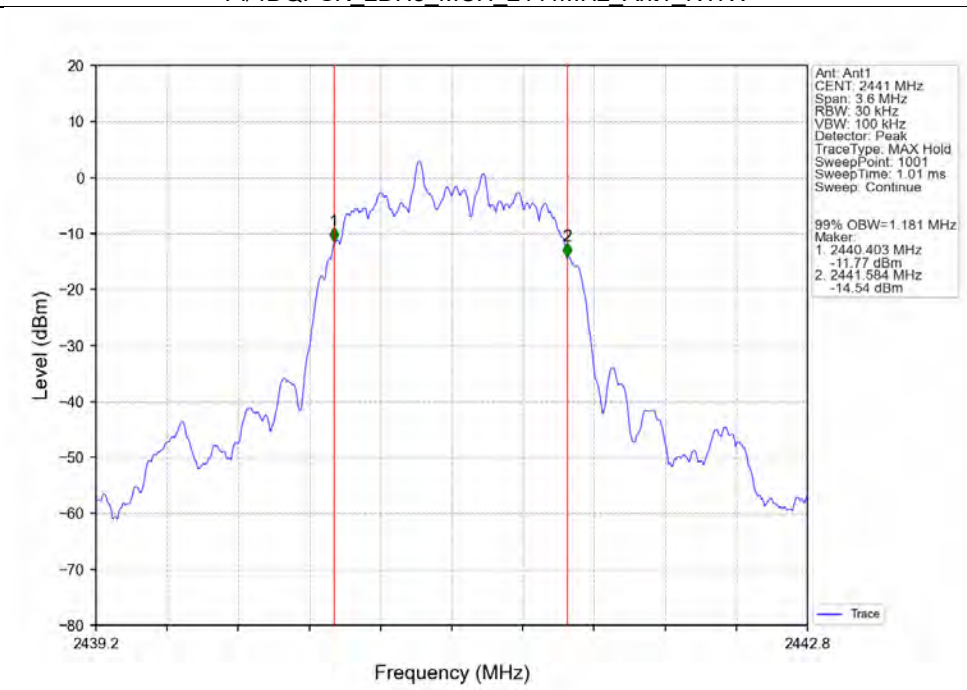
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



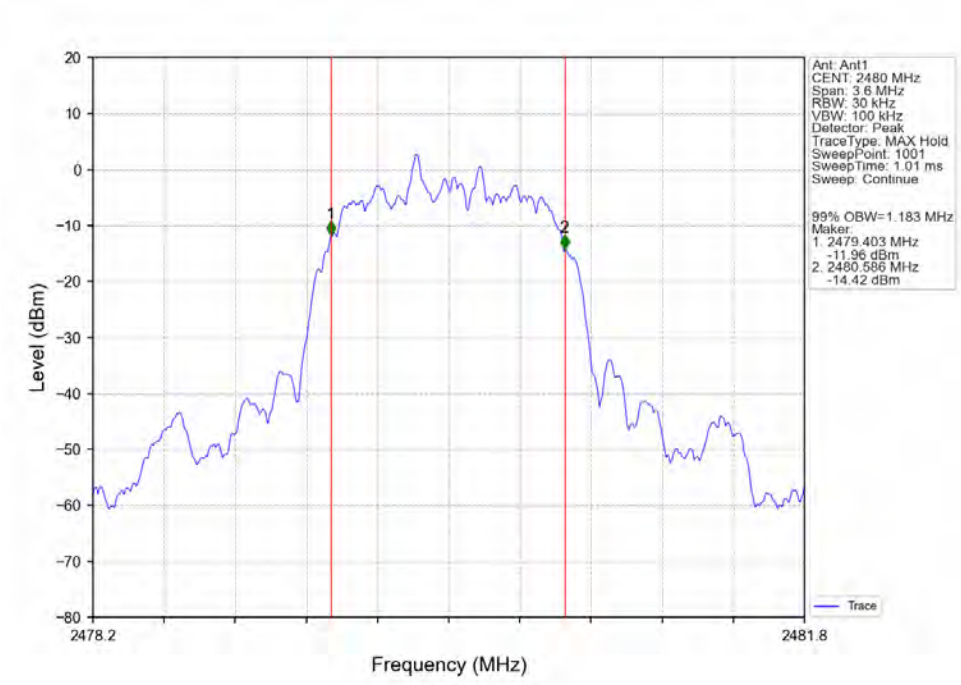
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



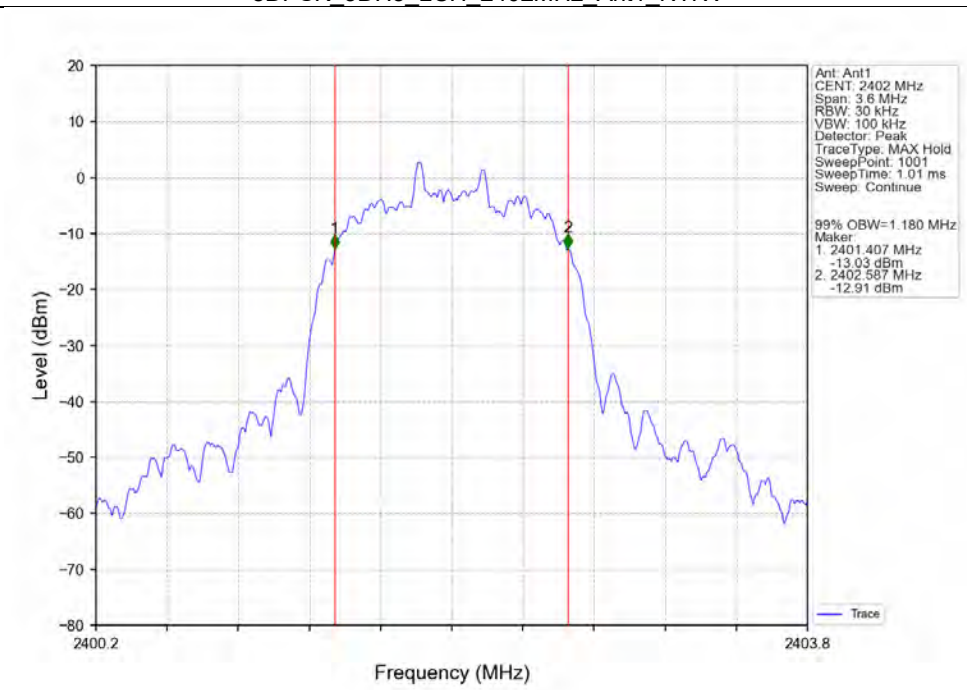
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



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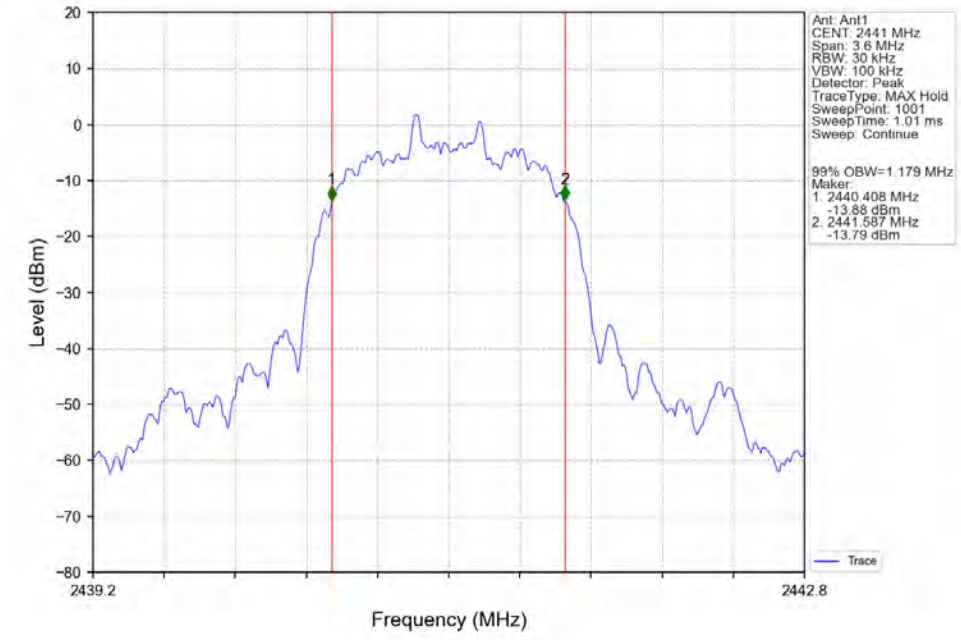
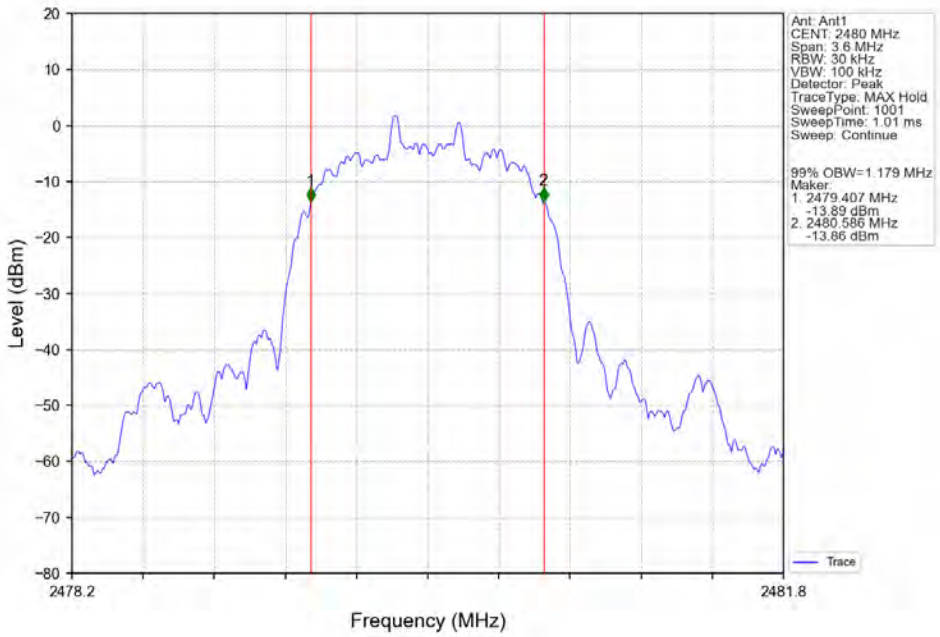
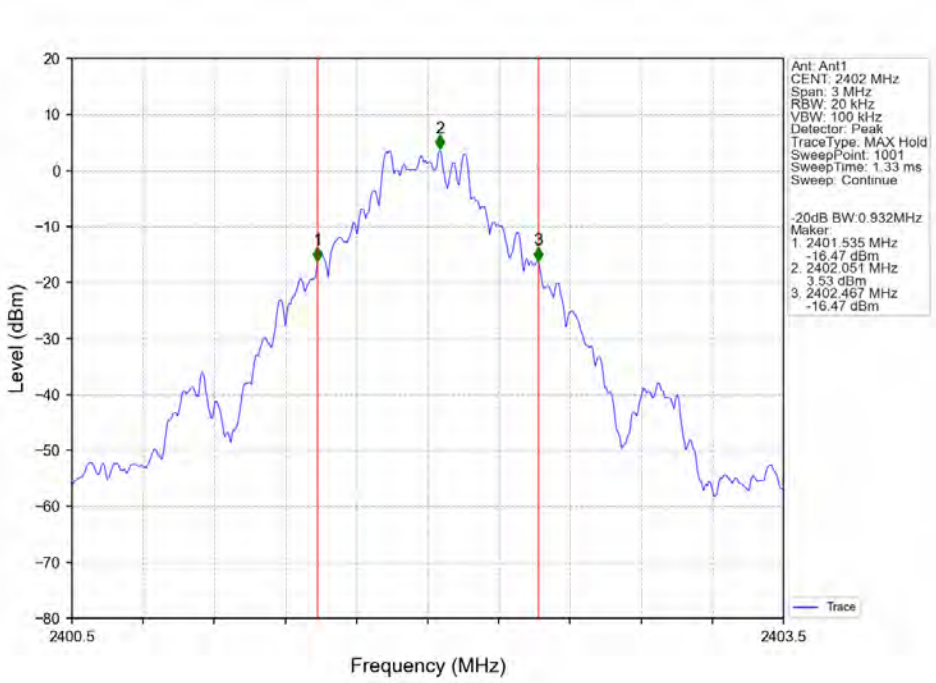


8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

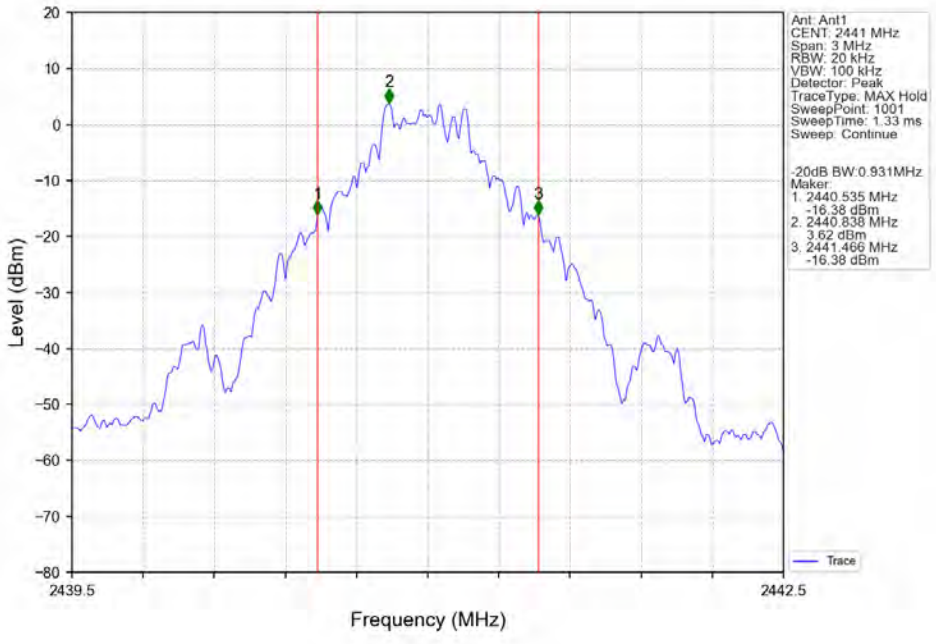


2.2.2 20dB BW

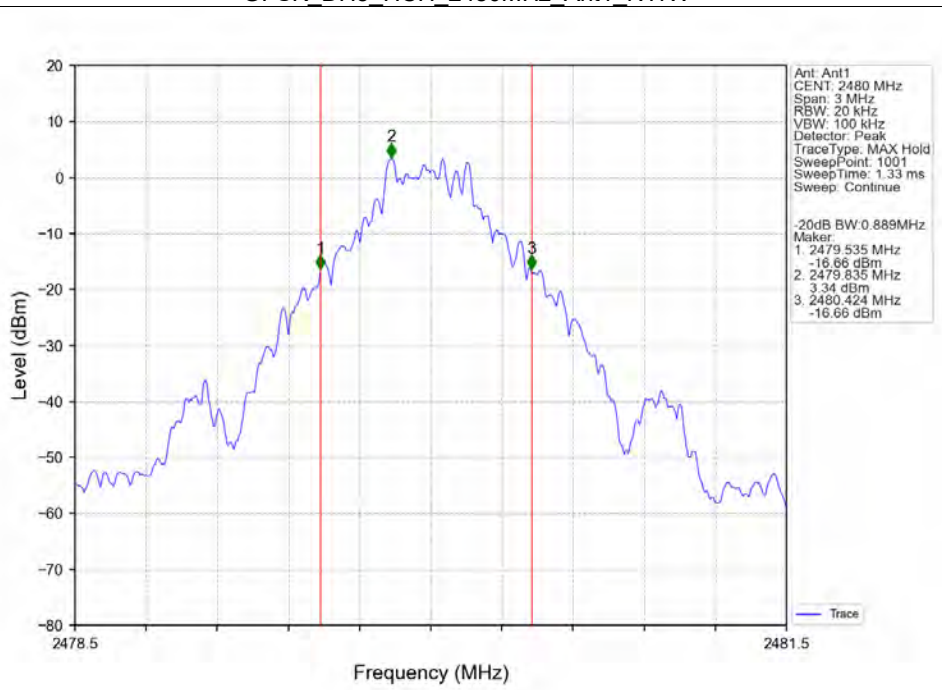
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



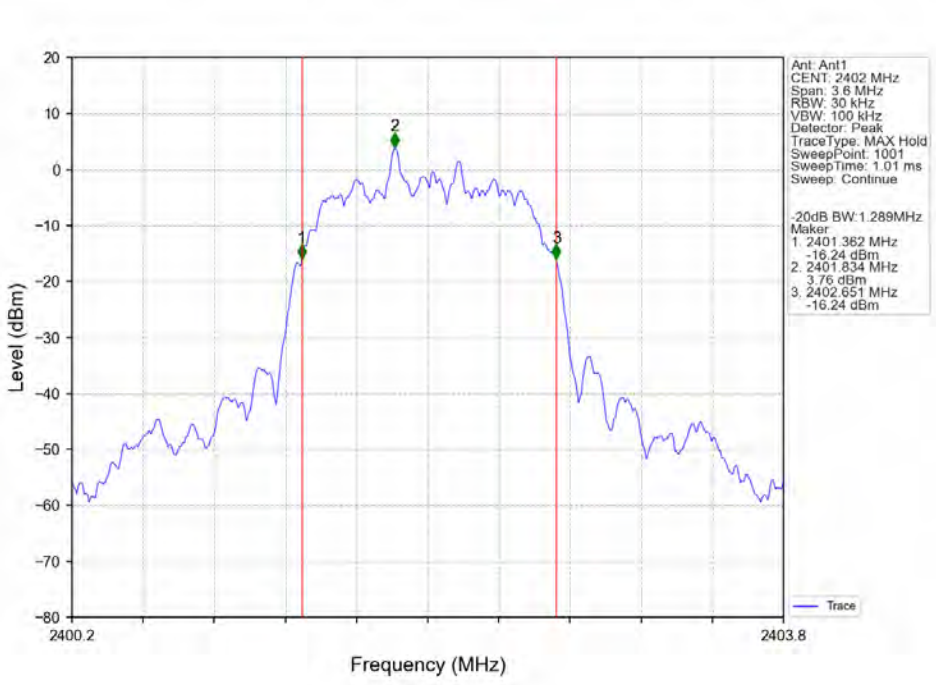
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



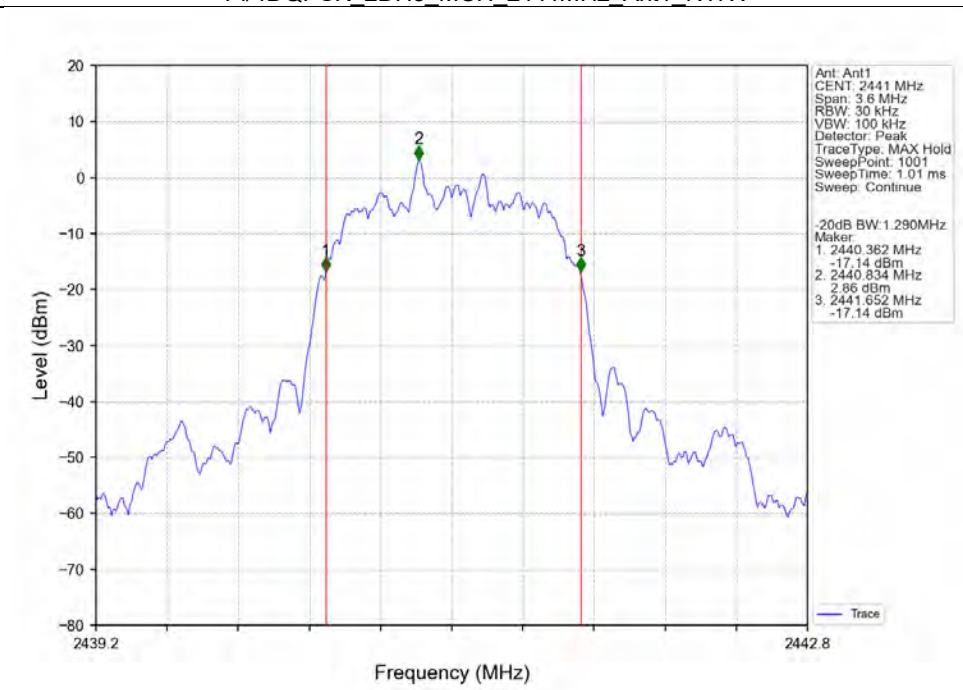
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



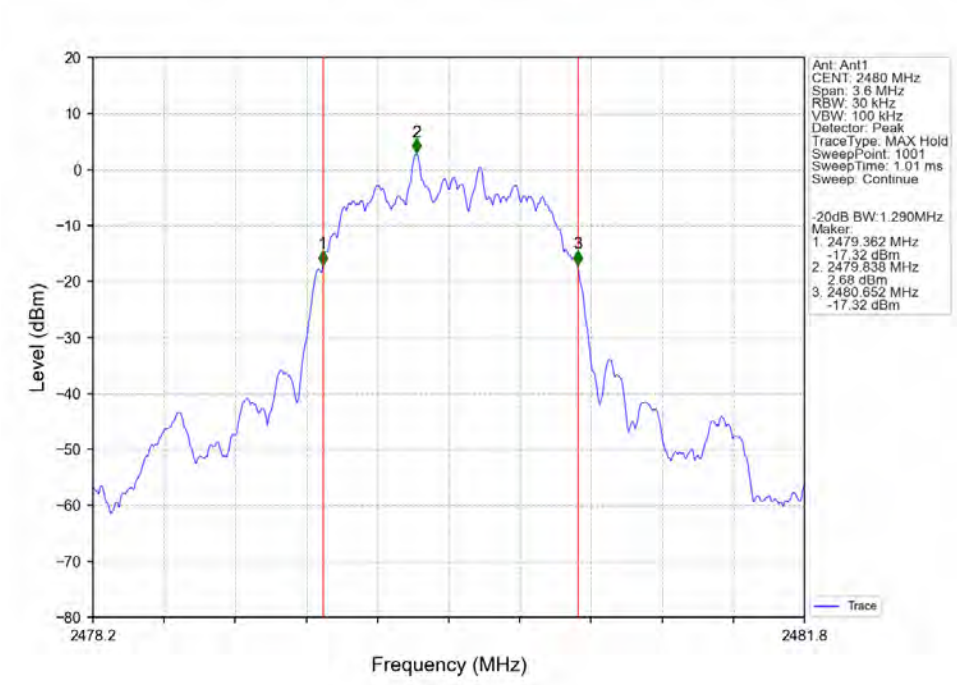
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



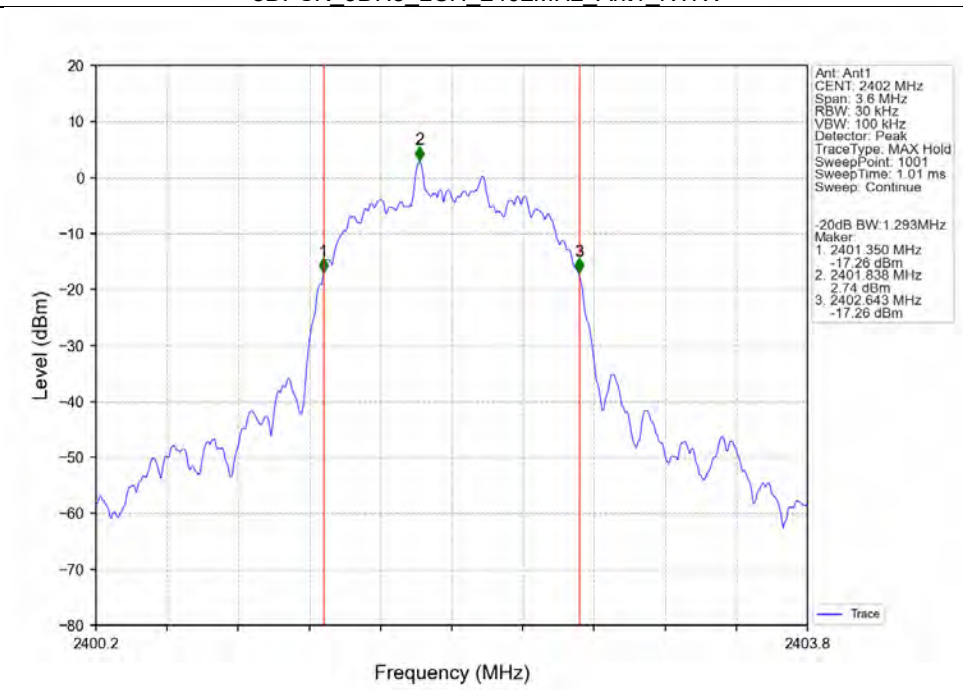
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



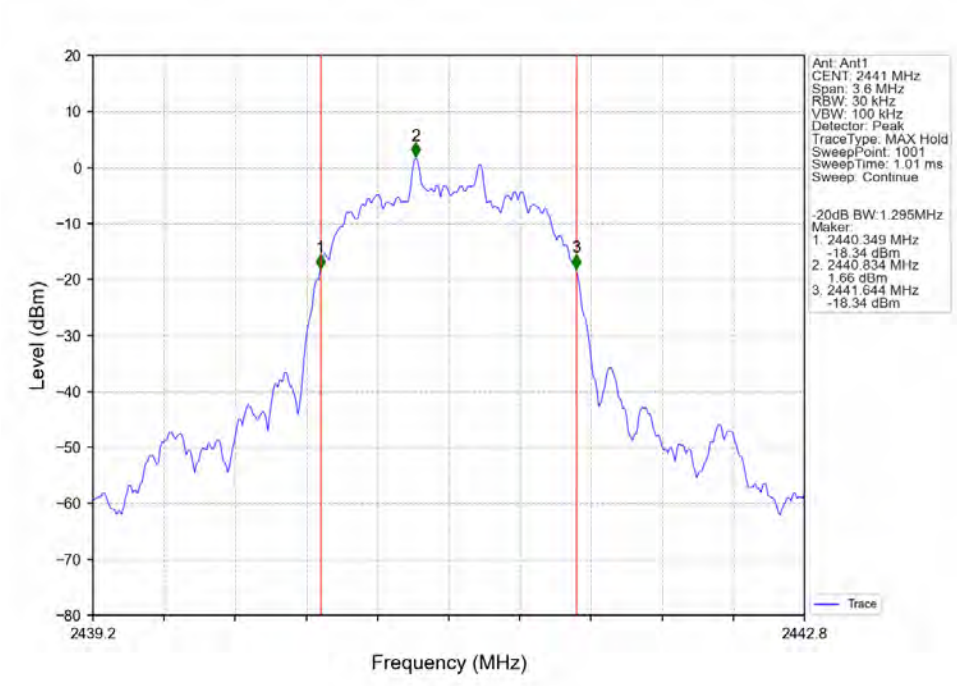
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



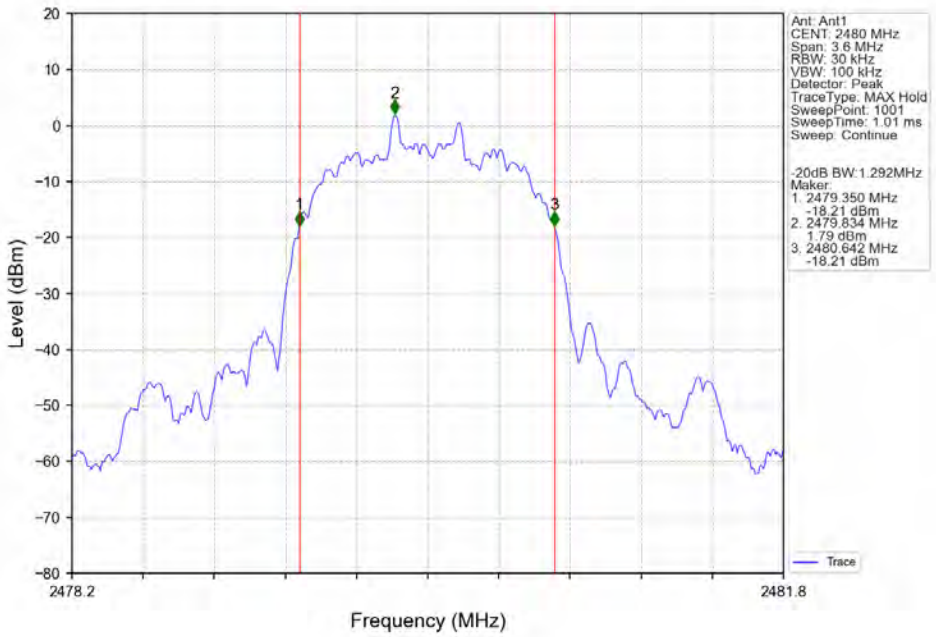
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

3.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	9.03	<=30	Pass
		2441	DH5	9.34	<=30	Pass
		2480	DH5	9.02	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	11.48	<=20.97	Pass
		2441	2DH5	11.78	<=20.97	Pass
		2480	2DH5	11.45	<=20.97	Pass
8DPSK	SISO	2402	3DH5	12.02	<=20.97	Pass
		2441	3DH5	12.31	<=20.97	Pass
		2480	3DH5	11.99	<=20.97	Pass

4. Carrier Frequency Separation

4.1 Test Result

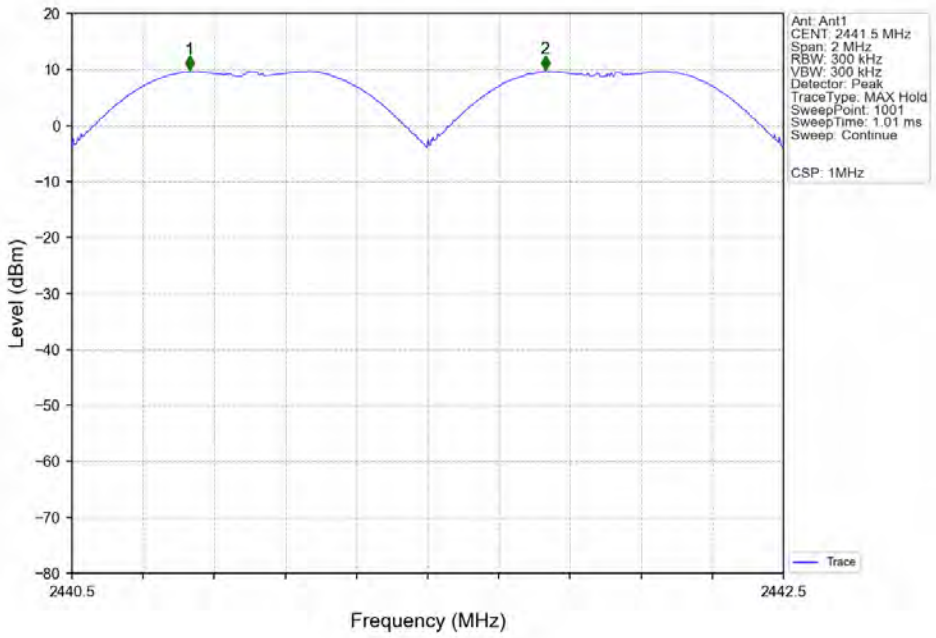
4.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.000	0.932	>=0.932	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.290	>=0.86	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.295	>=0.863	Pass

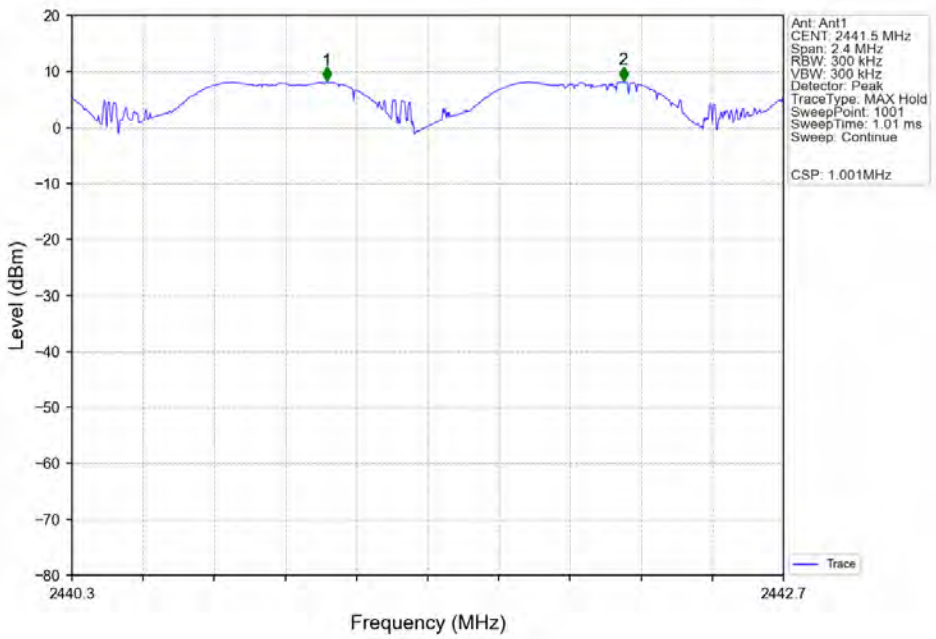
4.2 Test Graph

4.2.1 Ant1

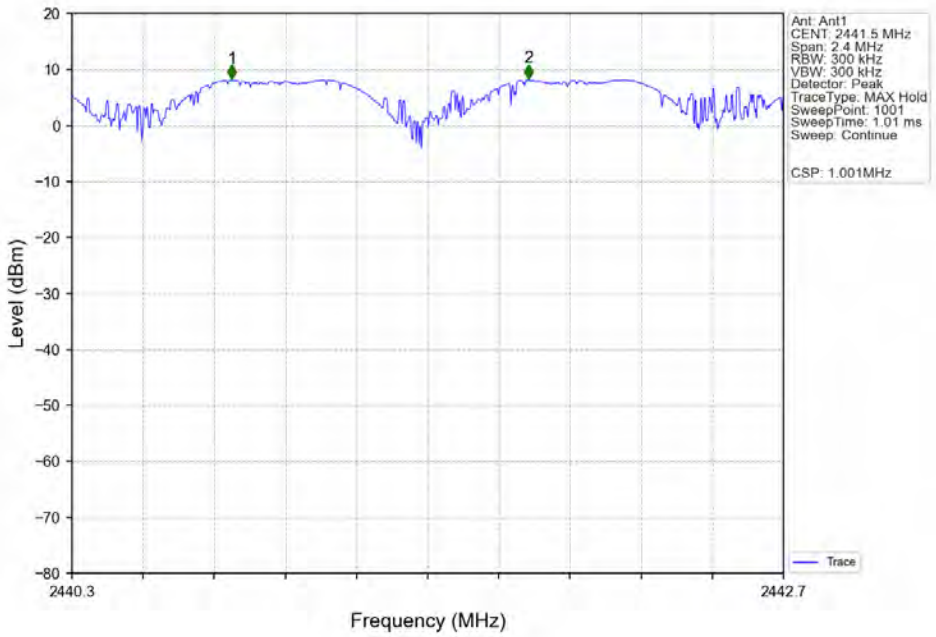
GFSK_DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



5. Number of Hopping Frequencies

5.1 Test Result

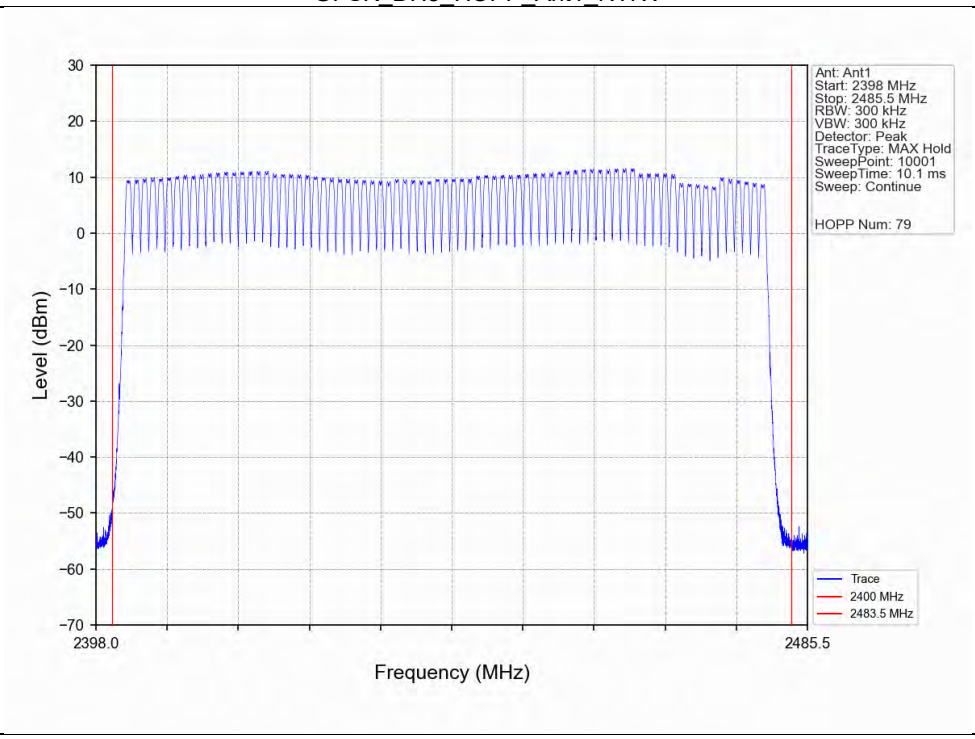
5.1.1 HoppNum

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

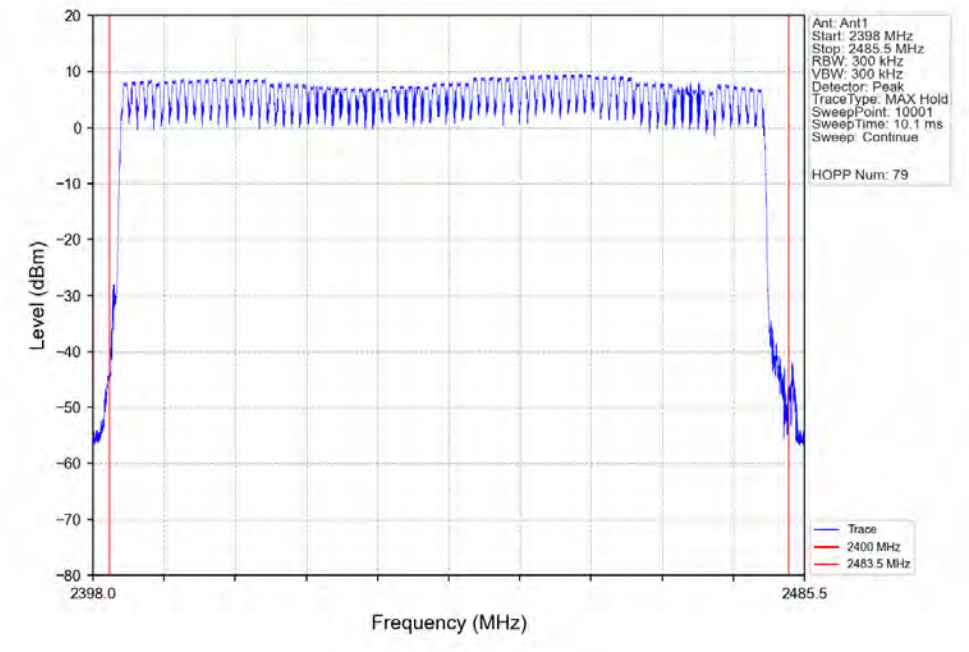
5.2 Test Graph

5.2.1 HoppNum

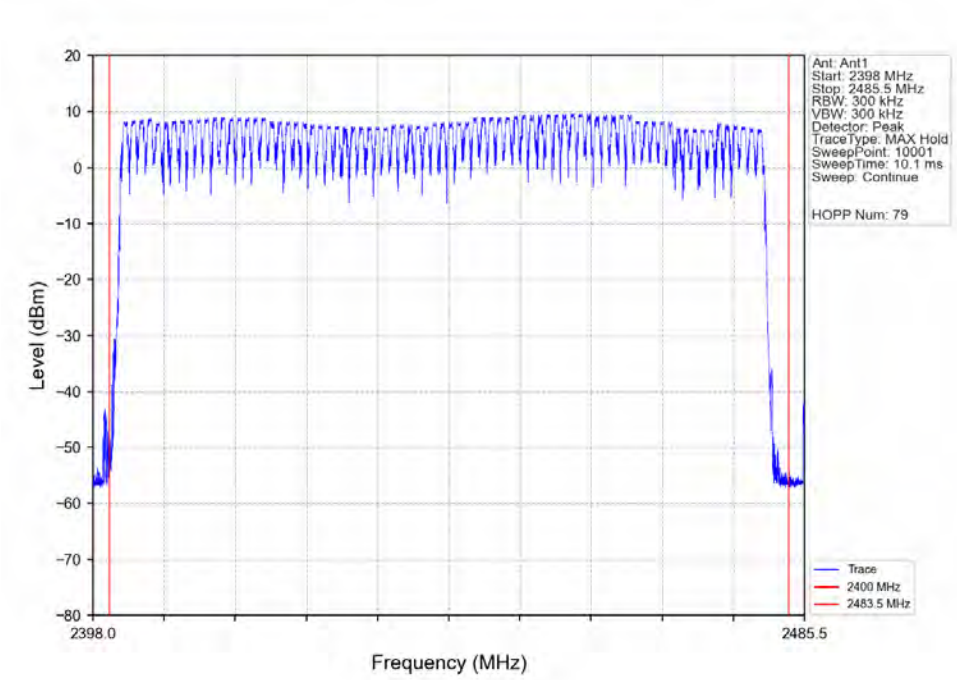
GFSK_DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



6. Time of Occupancy (Dwell Time)

6.1 Test Result

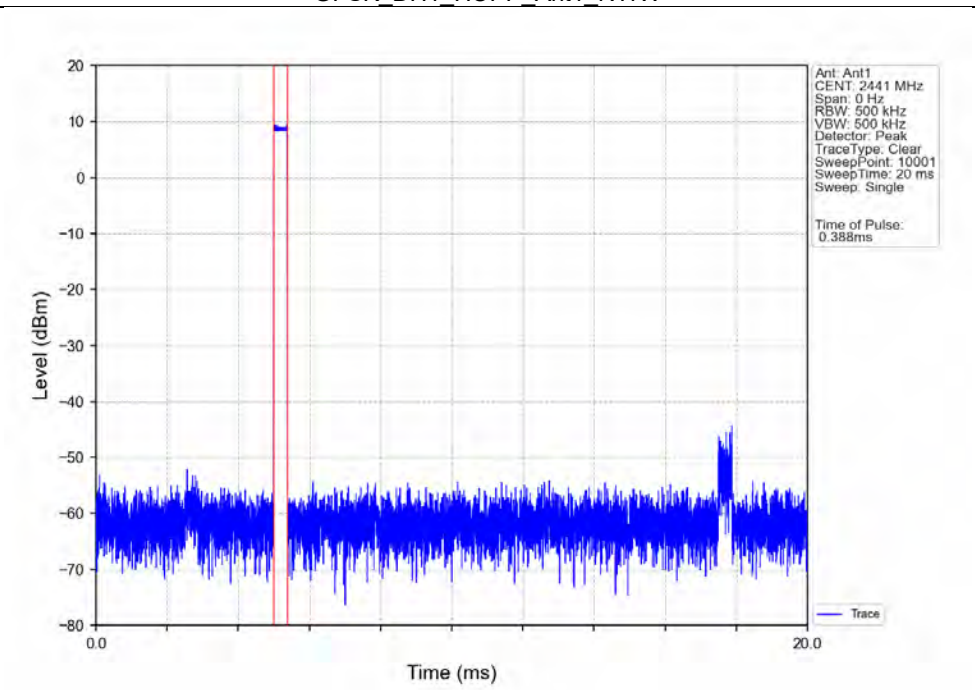
6.1.1 Ant1

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	0.388	31.600	320	124.160	<=400	Pass
			DH3	1.646	31.600	158	260.068	<=400	Pass
			DH5	2.892	31.600	100	289.200	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.398	31.600	315	125.370	<=400	Pass
			2DH3	1.648	31.600	160	263.680	<=400	Pass
			2DH5	2.898	31.600	92	266.616	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.390	31.600	320	124.800	<=400	Pass
			3DH3	1.648	31.600	159	262.032	<=400	Pass
			3DH5	2.898	31.600	98	284.004	<=400	Pass

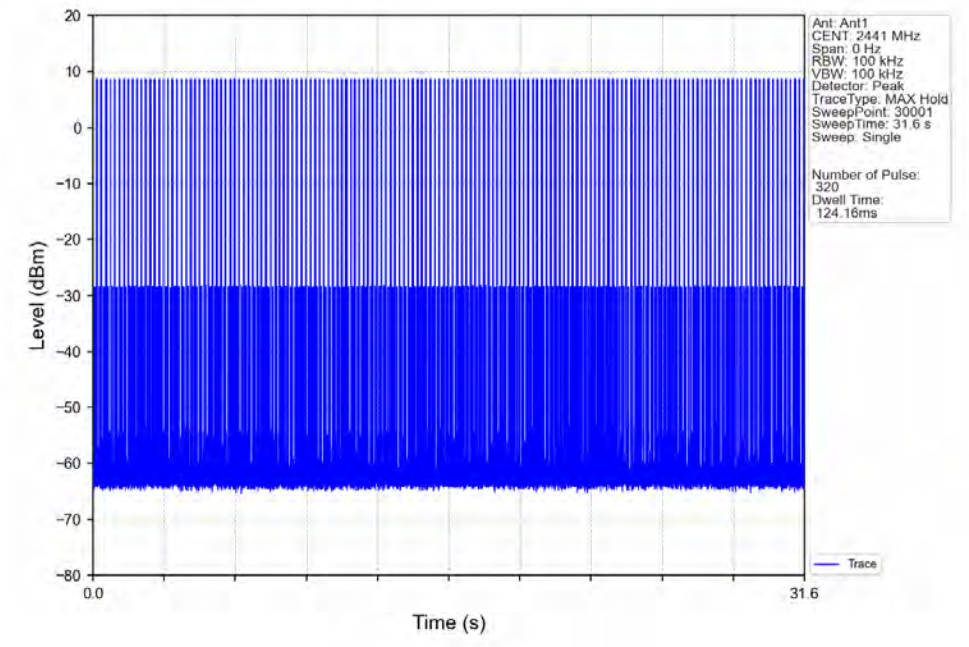
6.2 Test Graph

6.2.1 Ant1

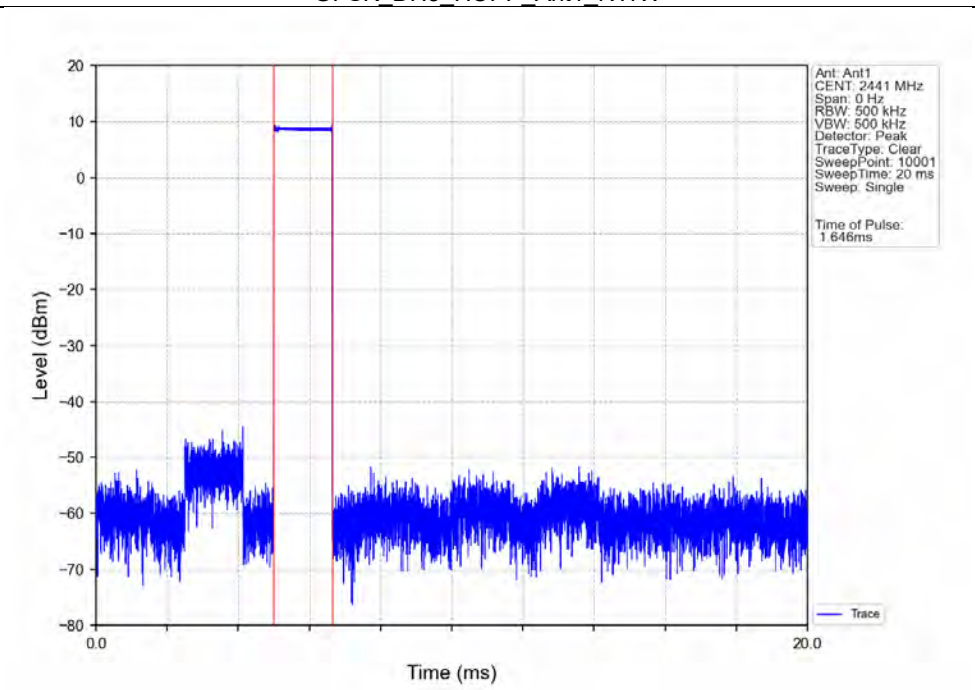
GFSK_DH1_HOPP_Ant1_NTNV



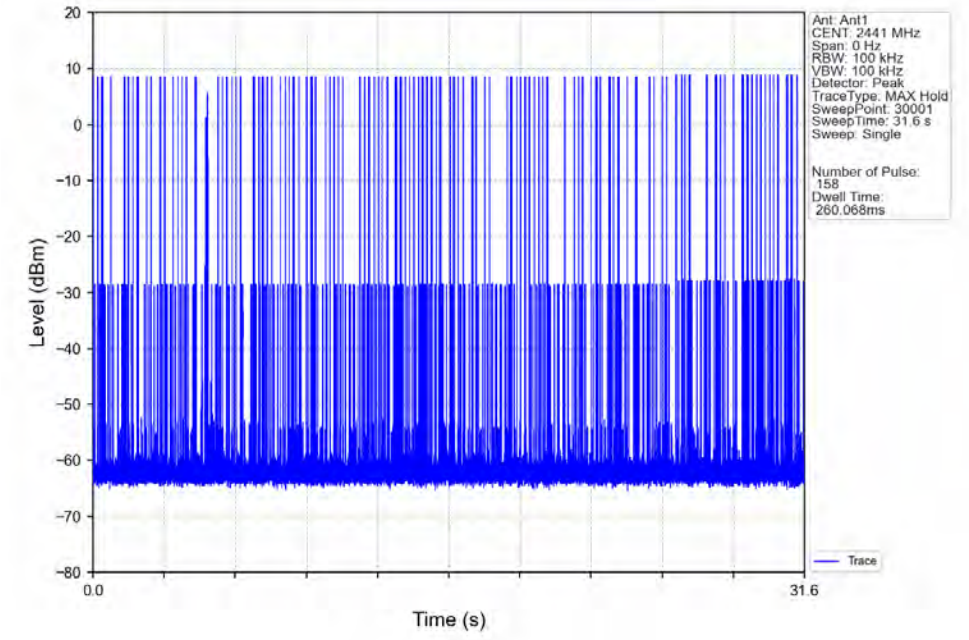
GFSK_DH1_HOPP_Ant1_NTNV



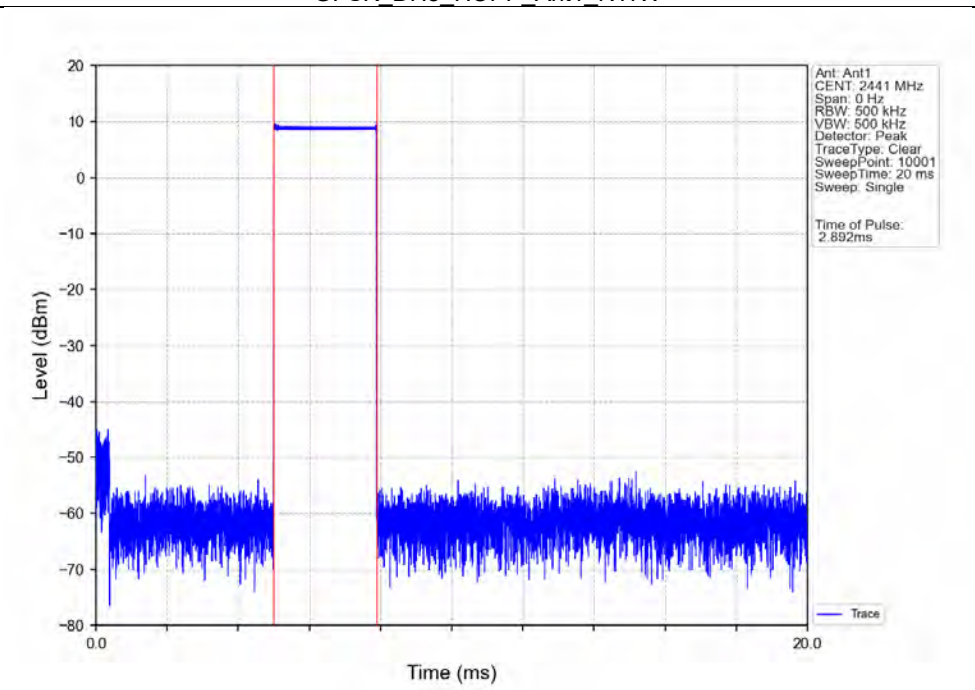
GFSK_DH3_HOPP_Ant1_NTNV



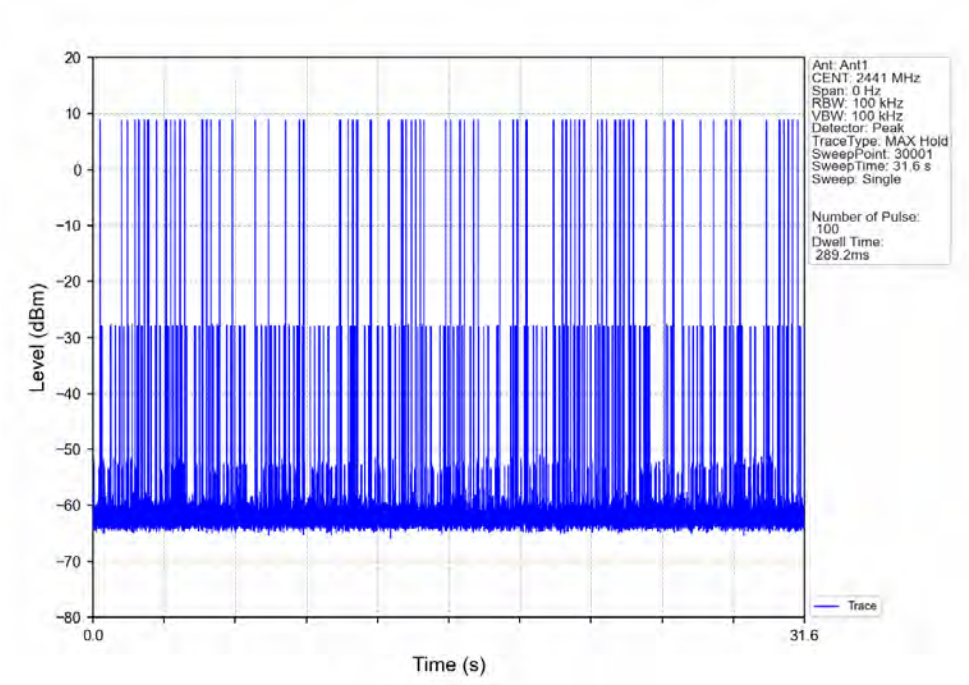
GFSK_DH3_HOPP_Ant1_NTNV



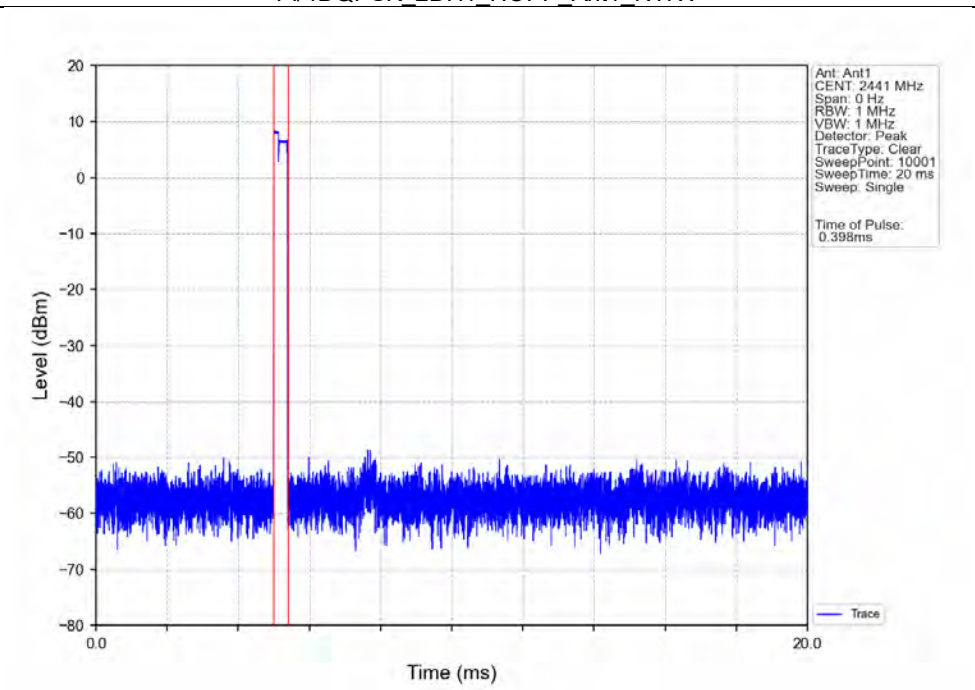
GFSK_DH5_HOPP_Ant1_NTNV



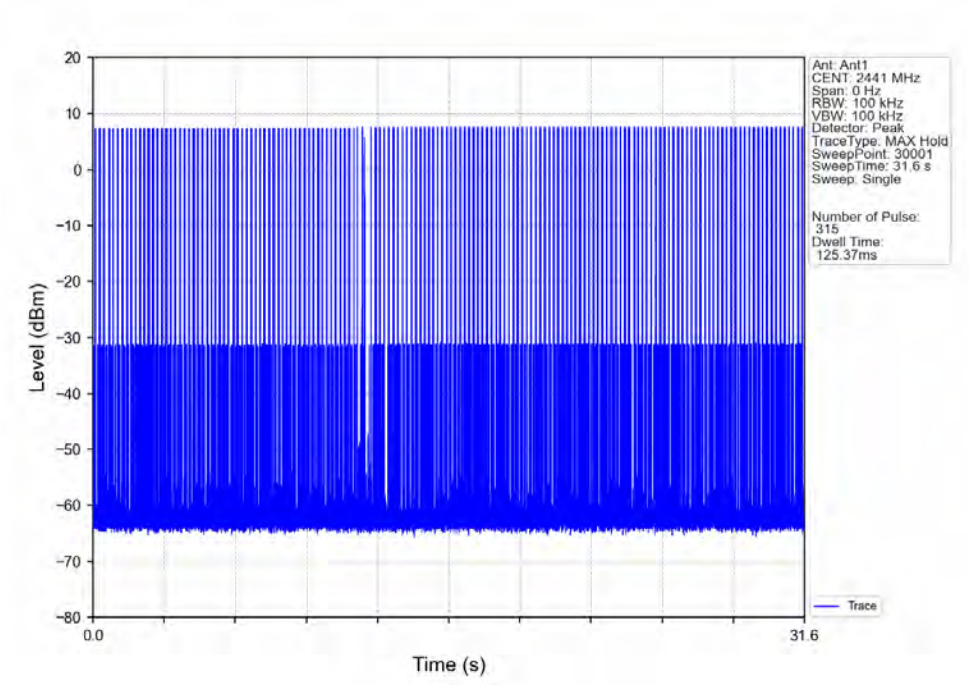
GFSK_DH5_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV



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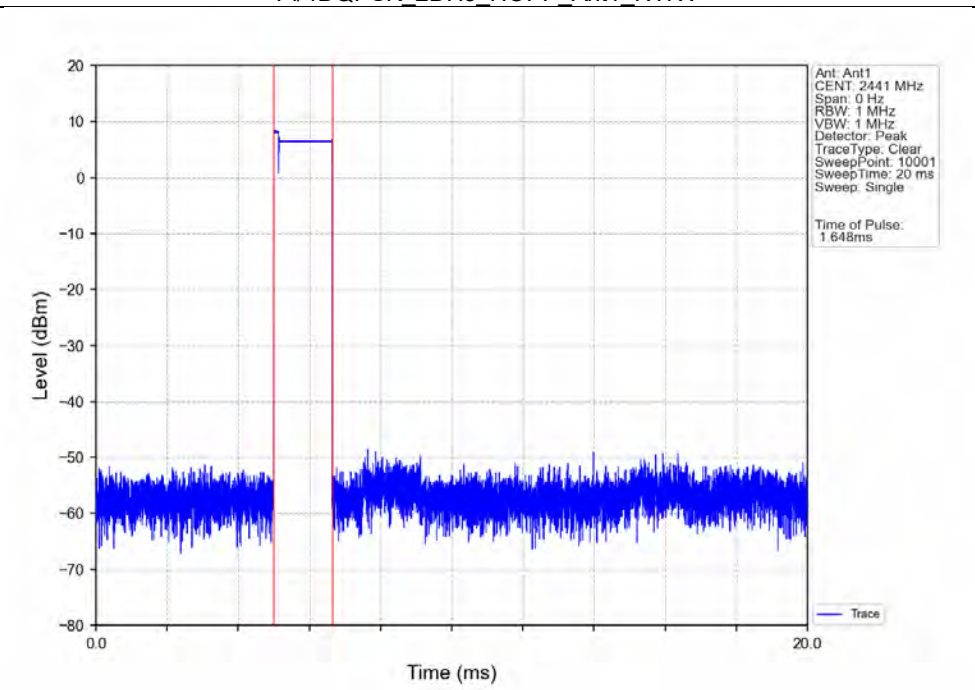

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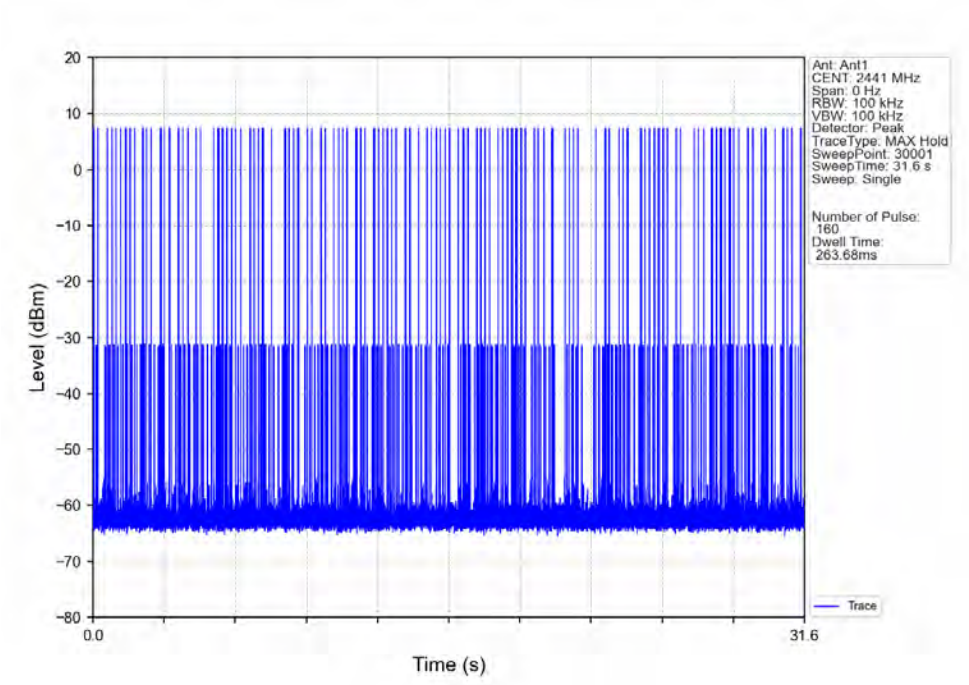

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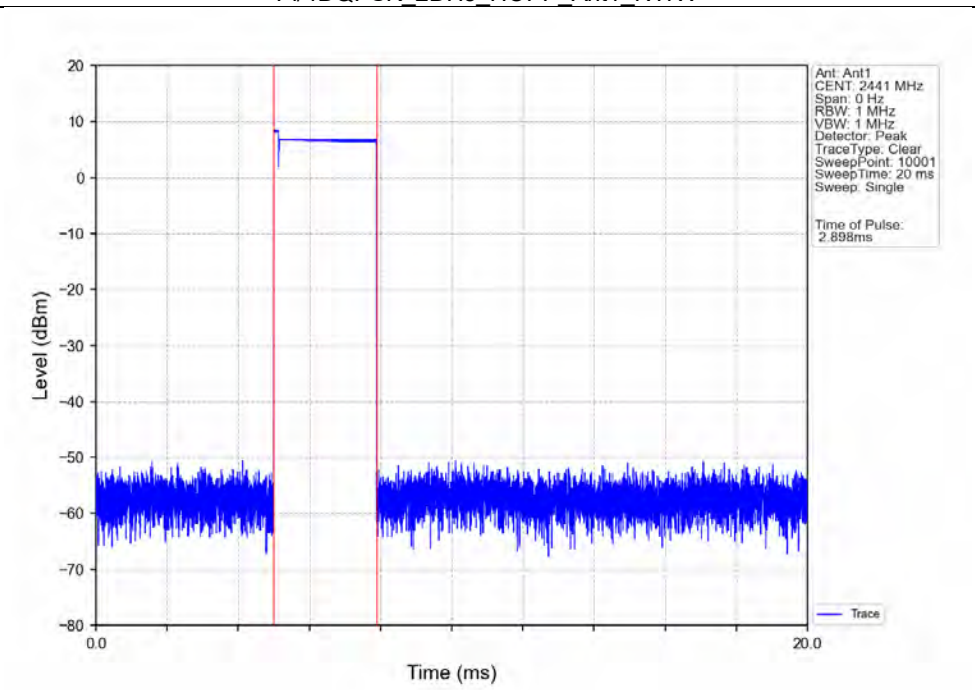
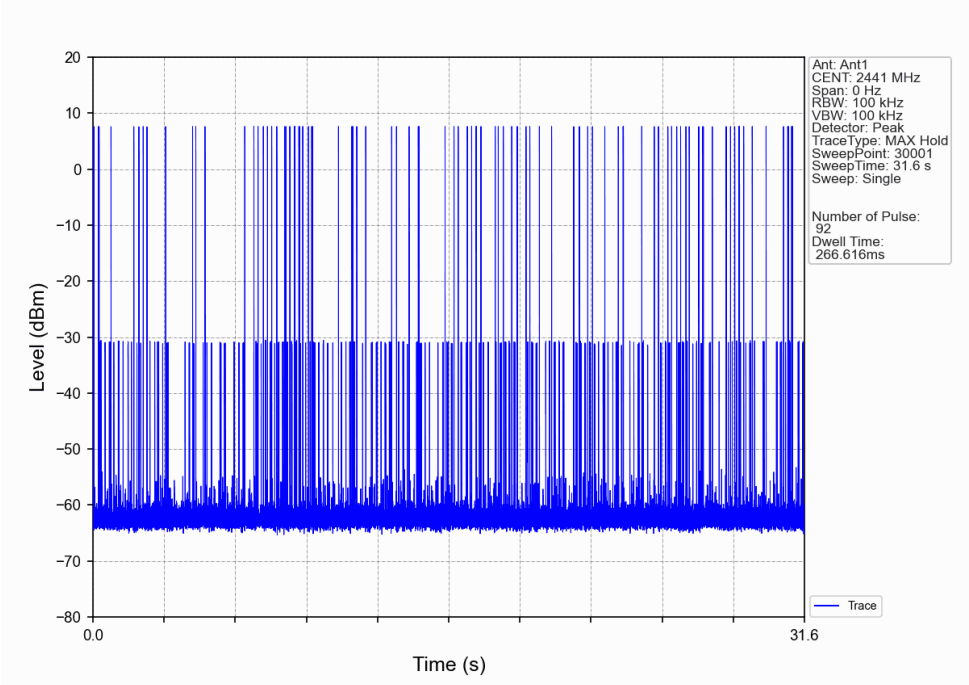
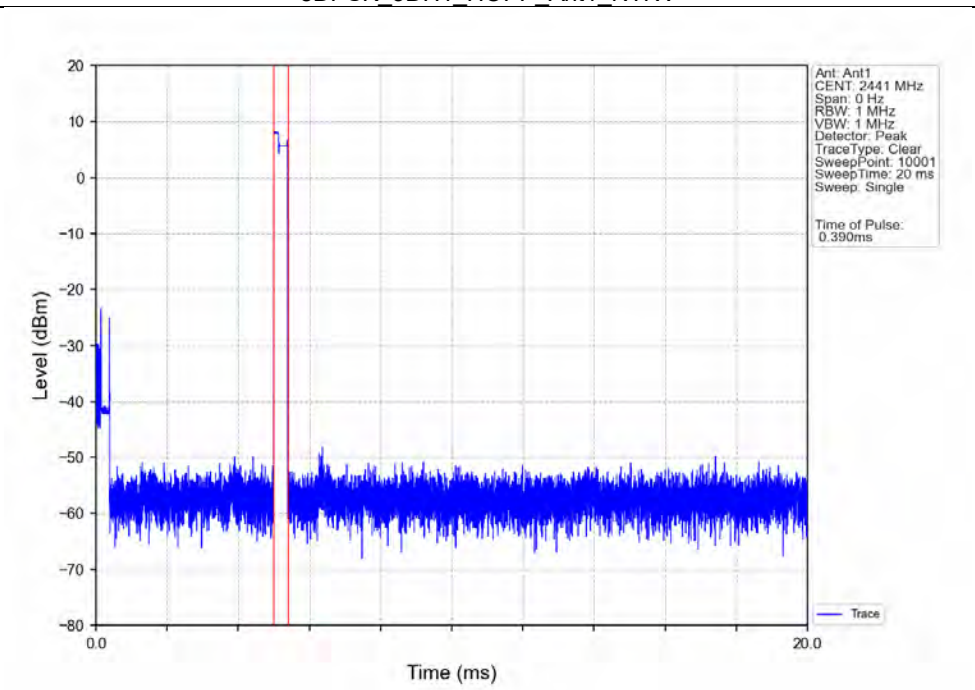


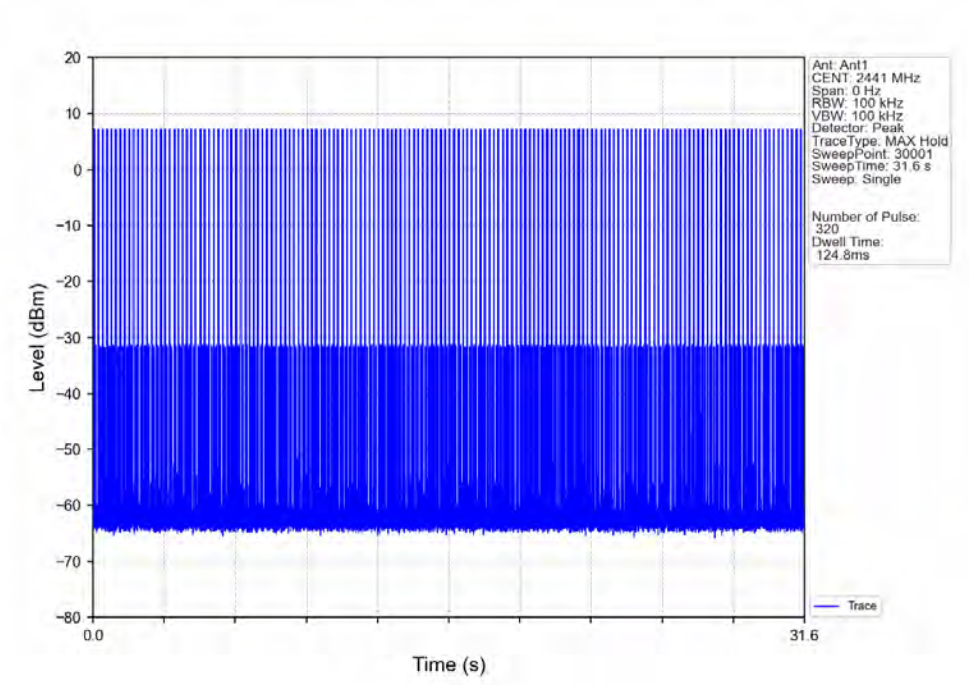
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



8DPSK_3DH1_HOPP_Ant1_NTNV



8DPSK_3DH1_HOPP_Ant1_NTNV



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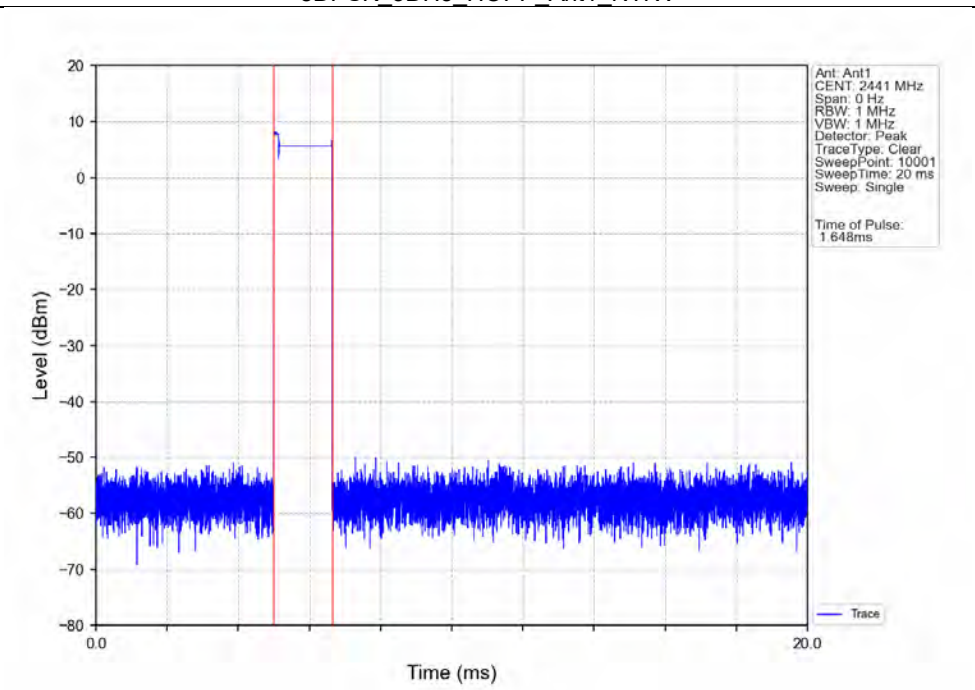

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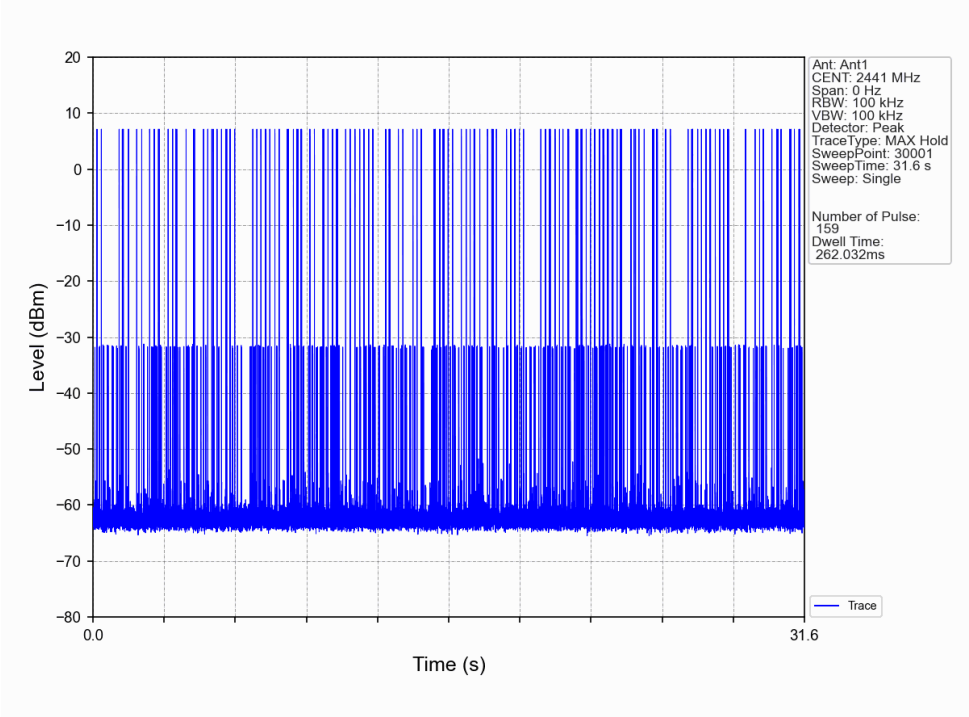
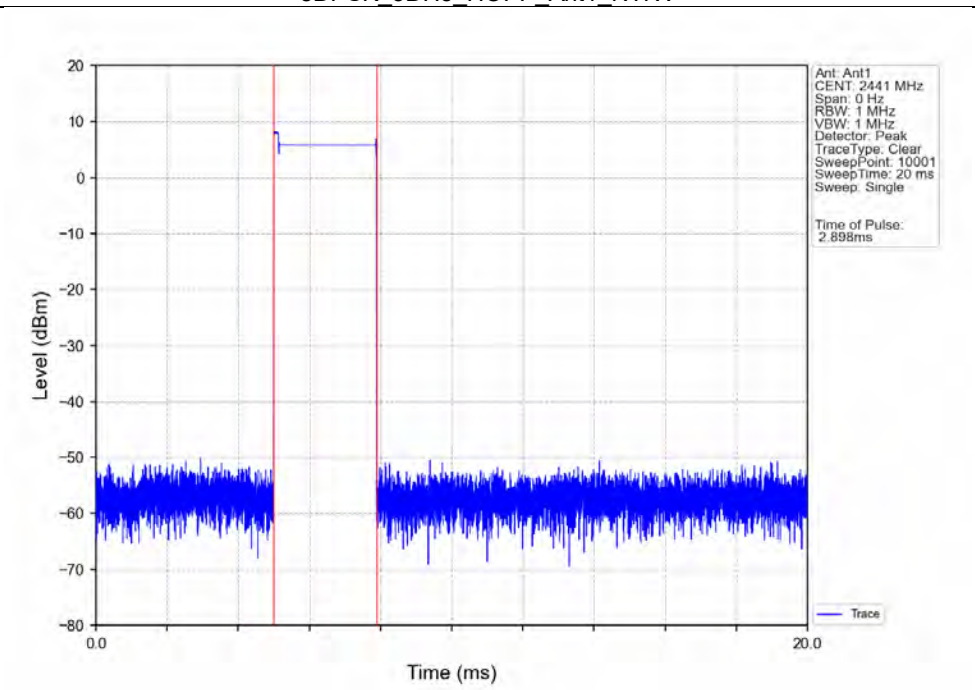
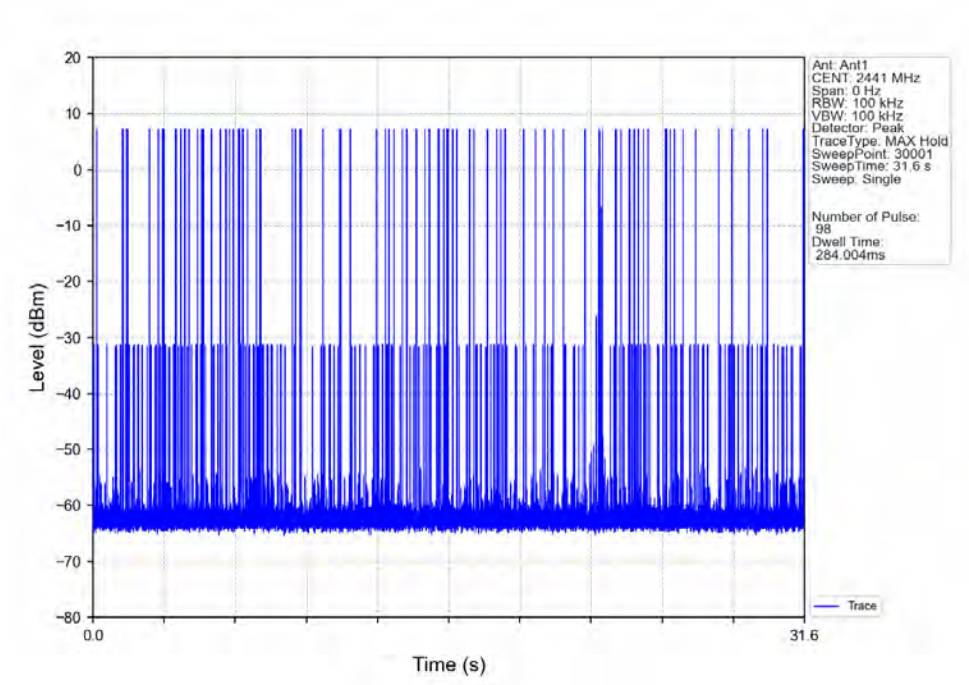


8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



7. Unwanted Emissions In Non-restricted Frequency Bands

7.1 Test Result

7.1.1 Ref

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	7.02
		2441	DH5	1	**7.07**
		2480	DH5	1	6.75
Pi/4DQPSK	SISO	2402	2DH5	1	**5.04**
		2441	2DH5	1	4.12
		2480	2DH5	1	3.97
8DPSK	SISO	2402	3DH5	1	**3.99**
		2441	3DH5	1	3.05
		2480	3DH5	1	3.08
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.					

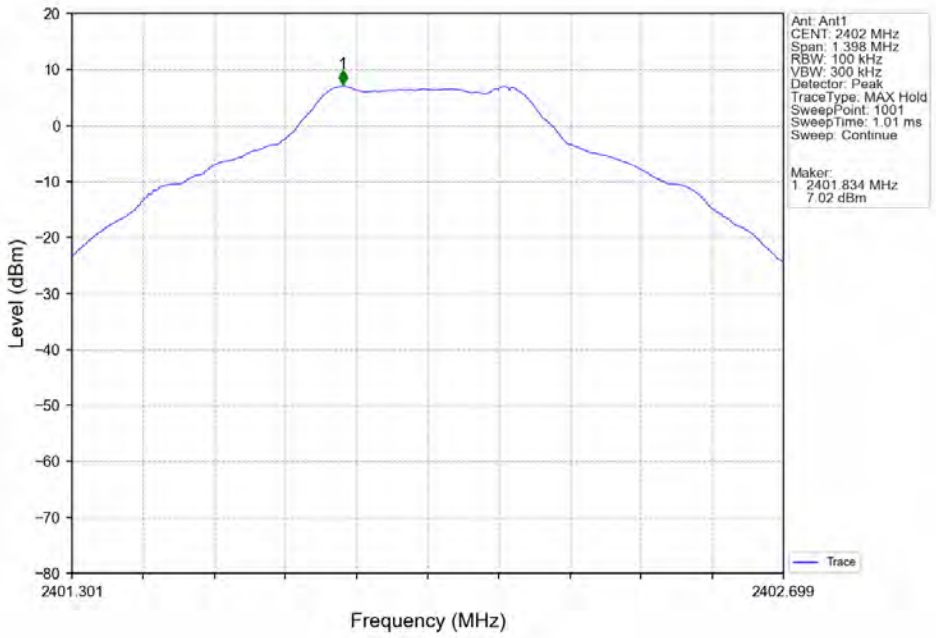
7.1.2 CSE

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	7.07	-12.93	Pass
		2441	DH5	1	7.07	-12.93	Pass
		2480	DH5	1	7.07	-12.93	Pass
		HOPP	DH5	1	7.07	-12.93	Pass
					7.07	-12.93	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	5.04	-14.96	Pass
		2441	2DH5	1	5.04	-14.96	Pass
		2480	2DH5	1	5.04	-14.96	Pass
		HOPP	2DH5	1	5.04	-14.96	Pass
					5.04	-14.96	Pass
8DPSK	SISO	2402	3DH5	1	3.99	-16.01	Pass
		2441	3DH5	1	3.99	-16.01	Pass
		2480	3DH5	1	3.99	-16.01	Pass
		HOPP	3DH5	1	3.99	-16.01	Pass
					3.99	-16.01	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.							

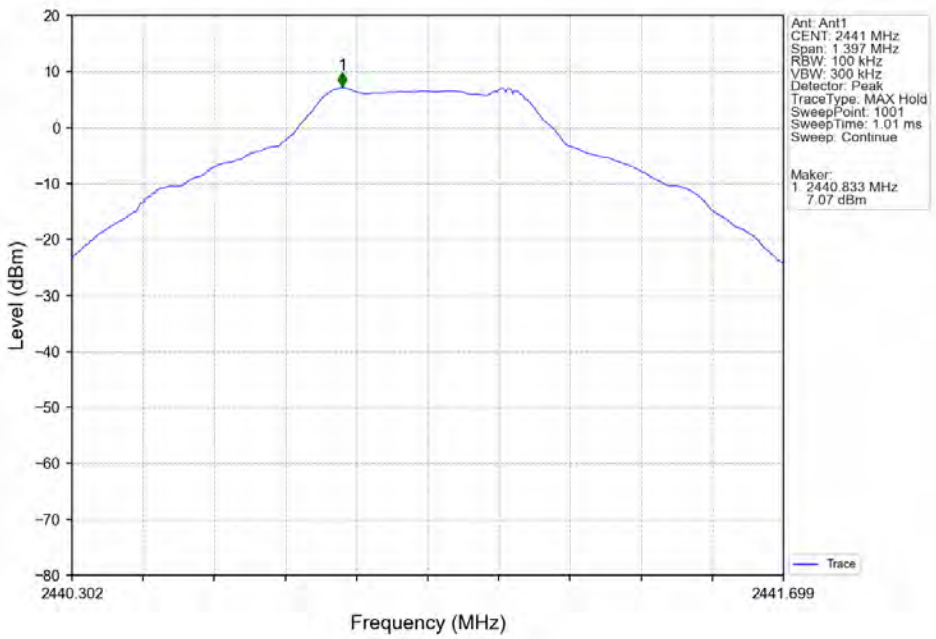
7.2 Test Graph

7.2.1 Ref

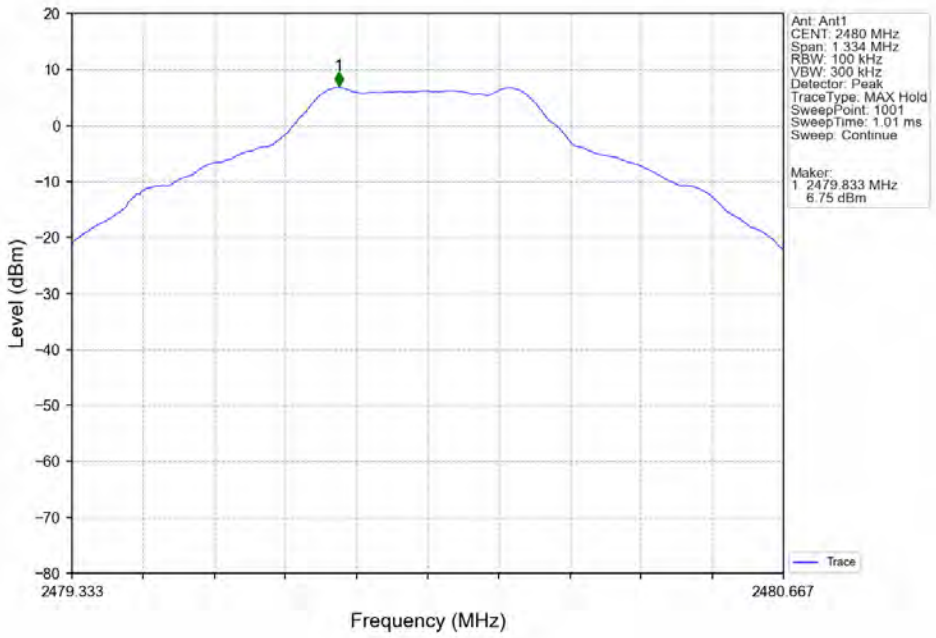
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



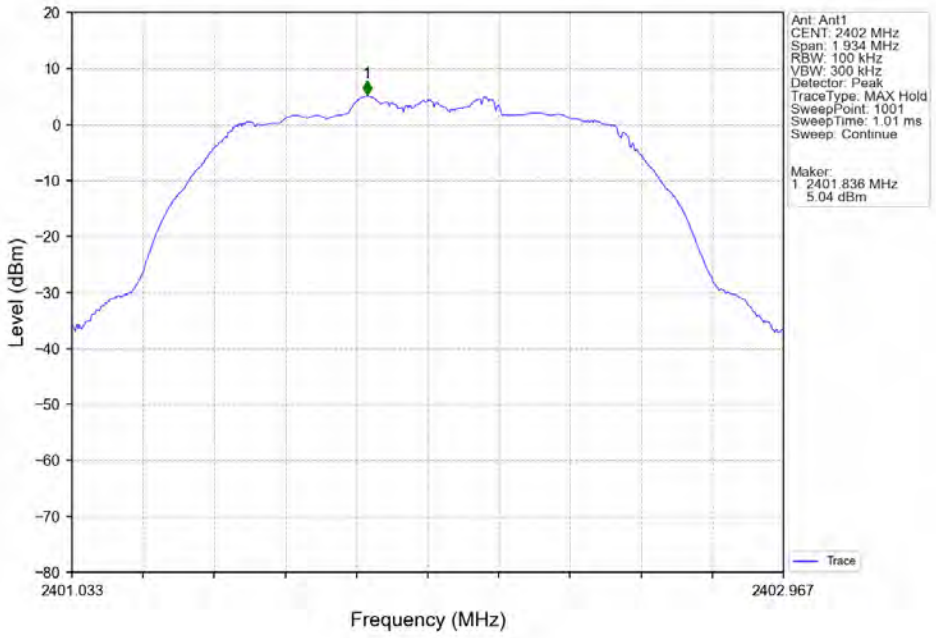
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



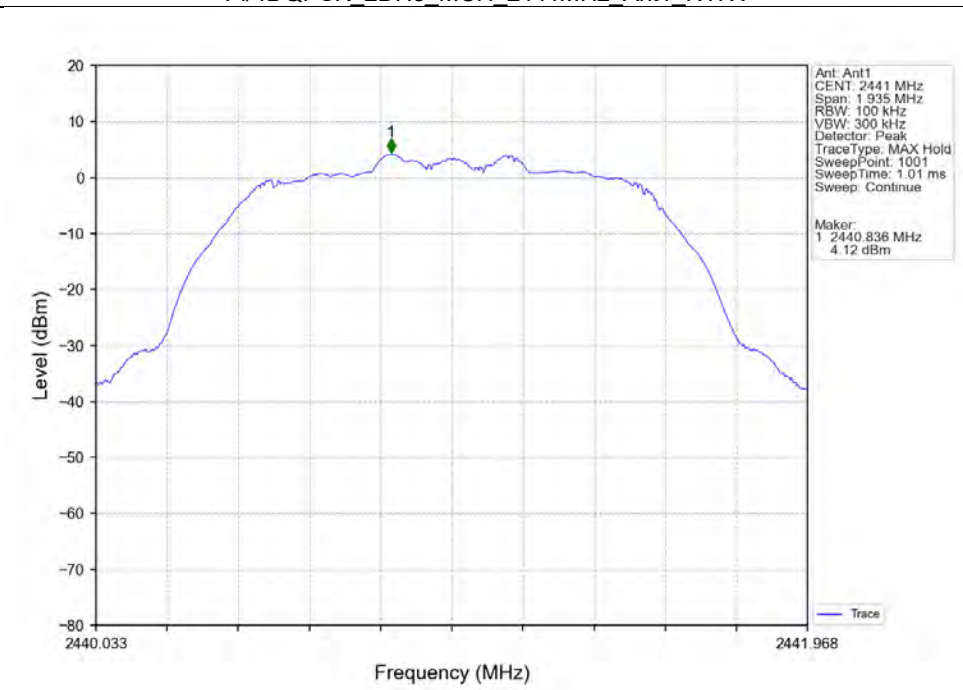
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



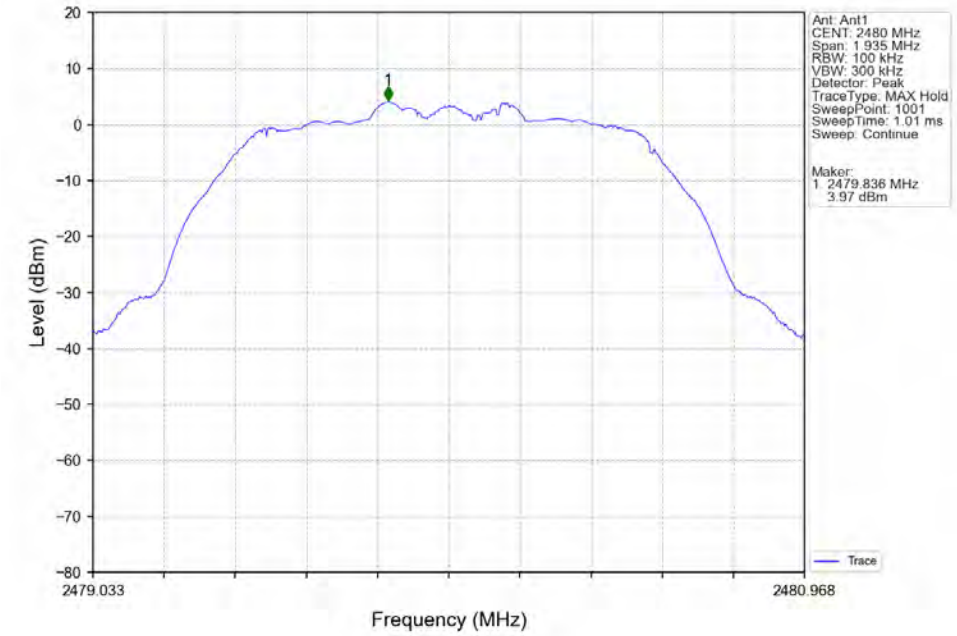
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



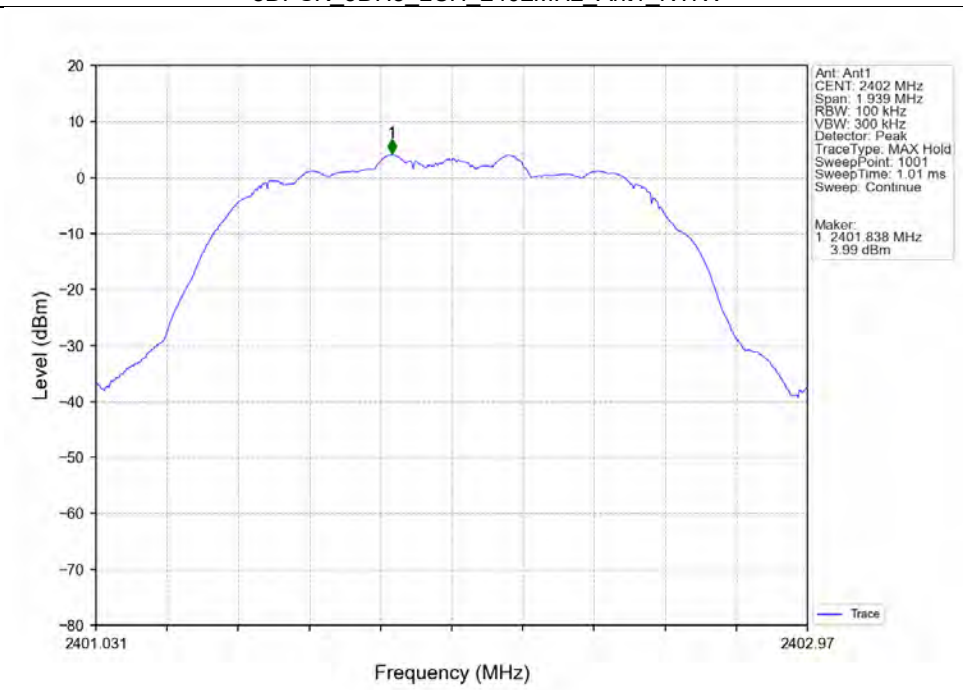
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



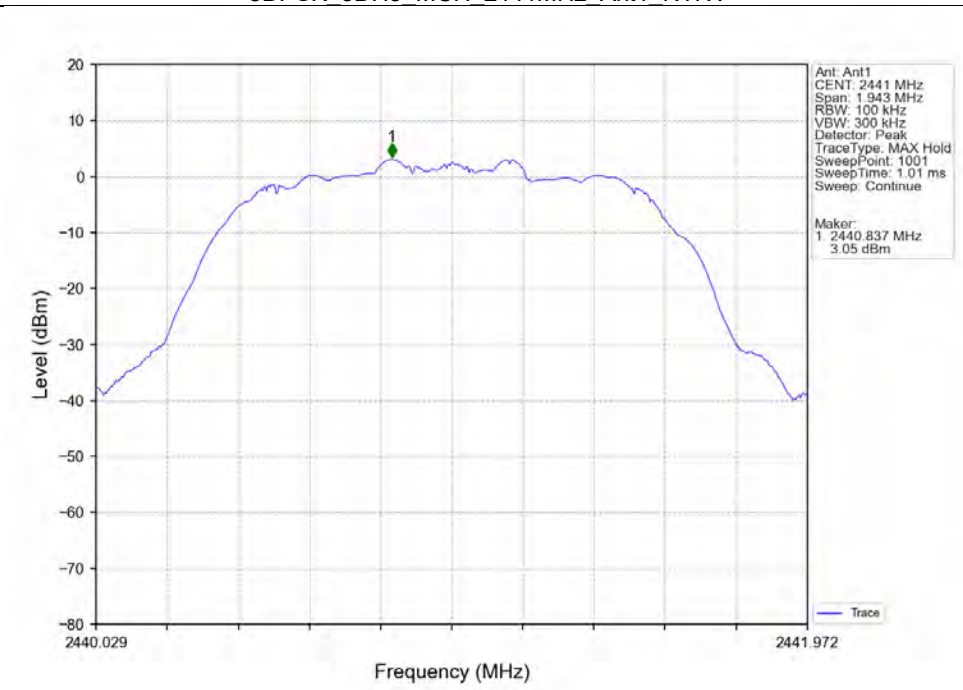
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



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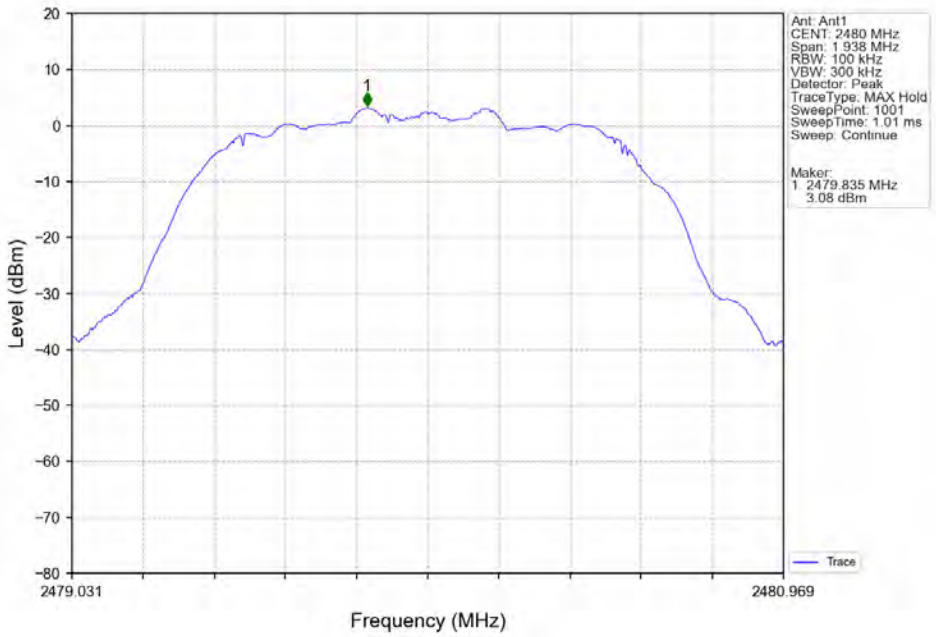
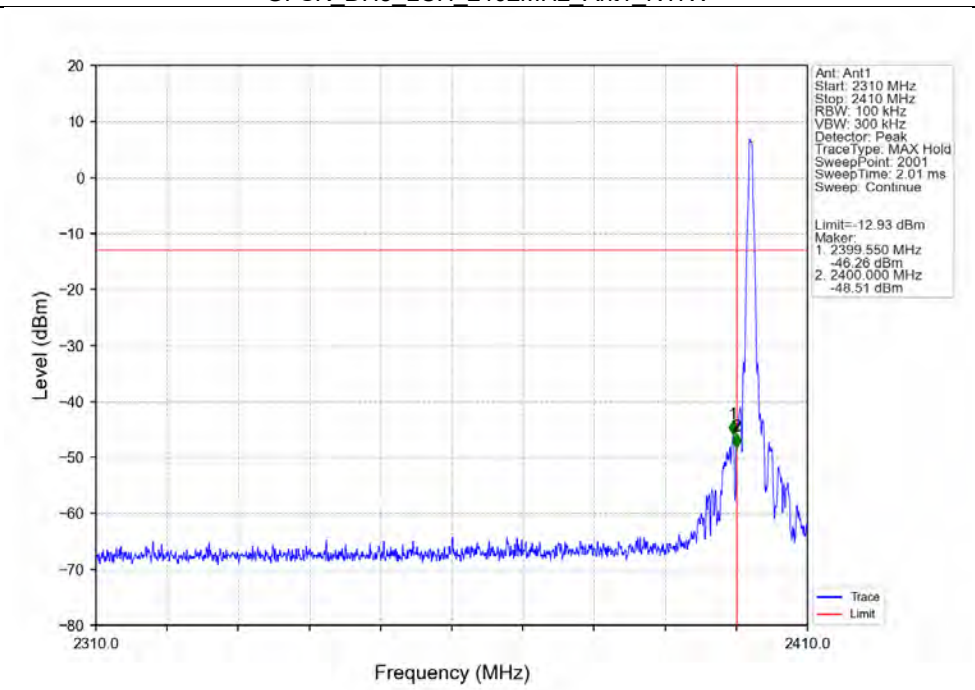
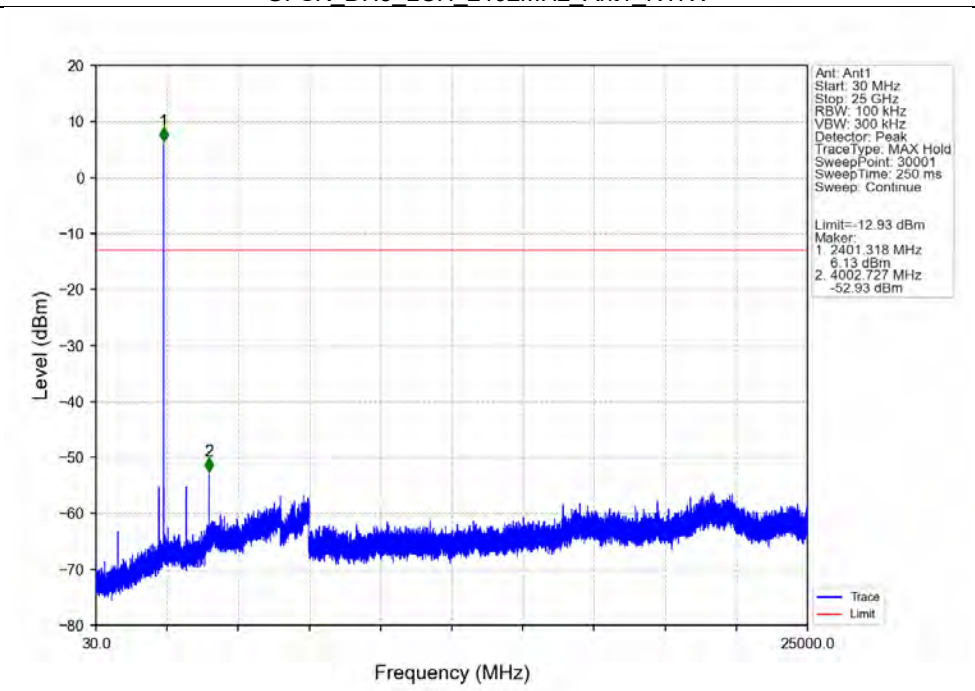


7.2.2 CSE

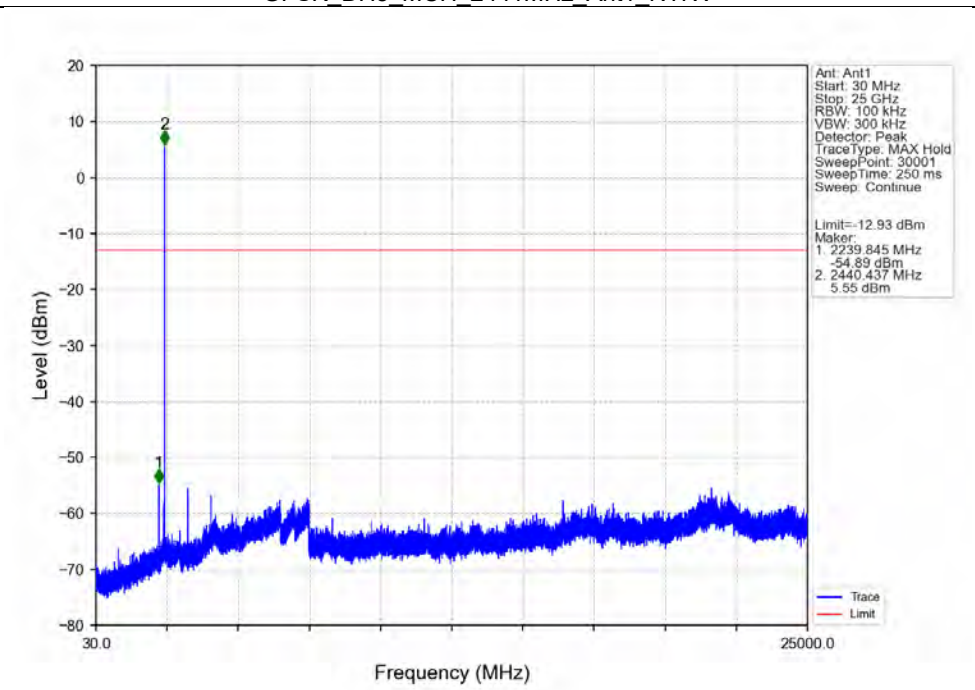
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



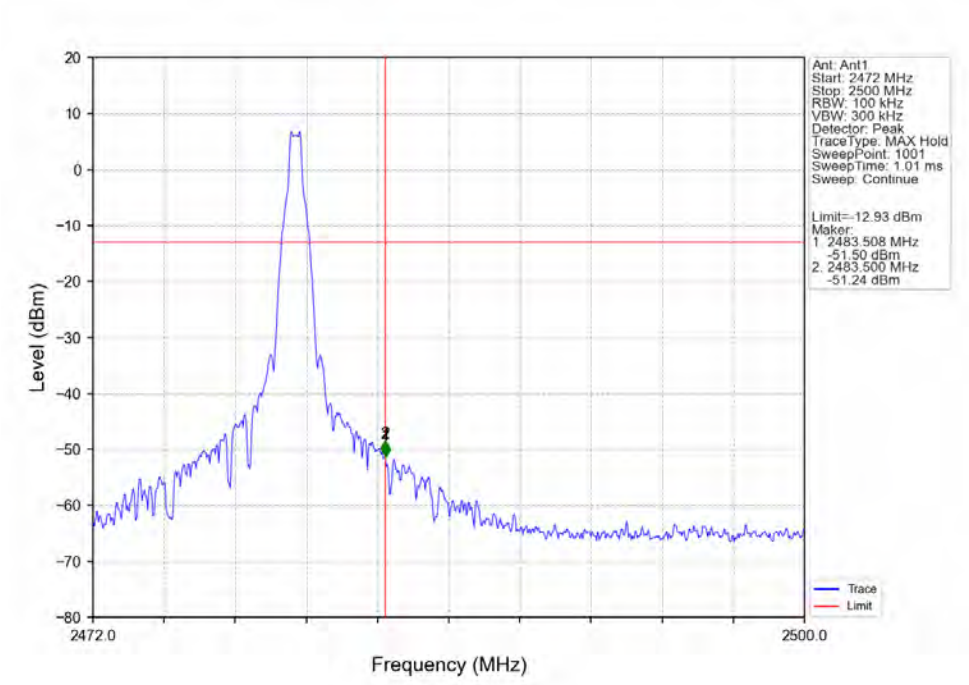
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



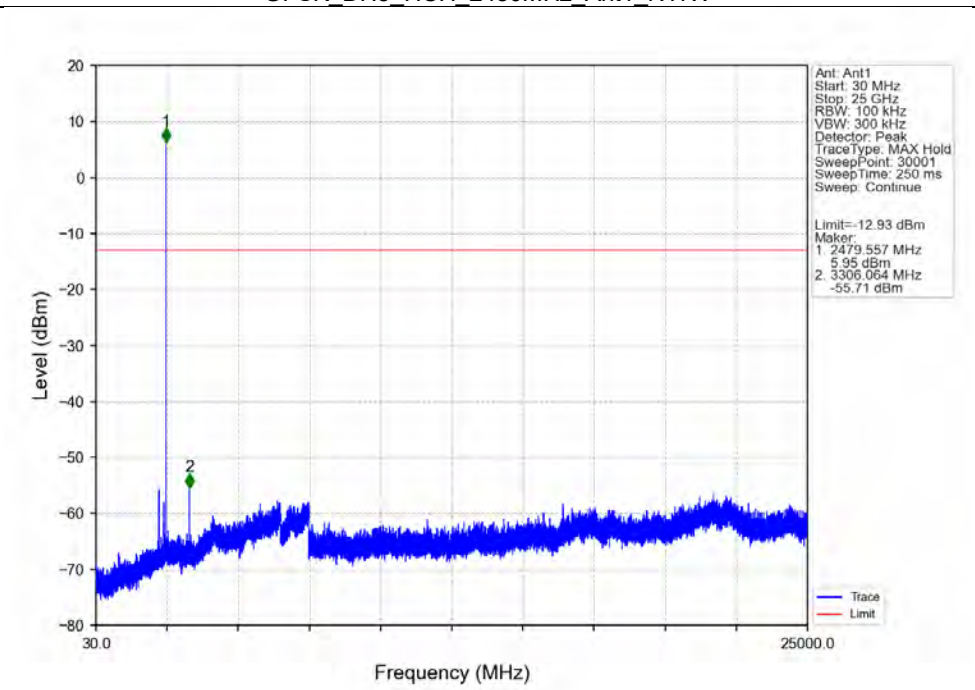
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



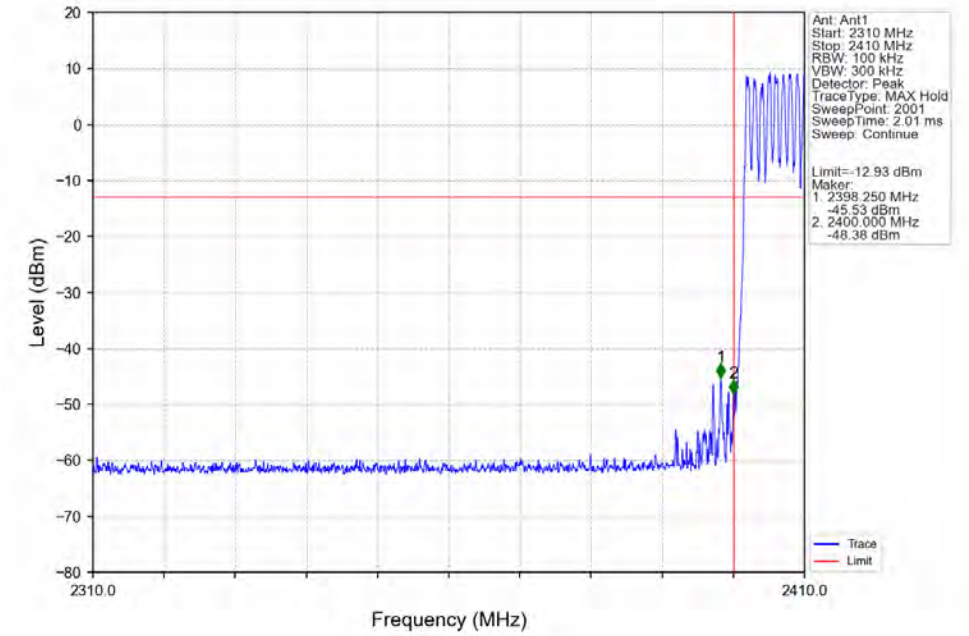
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



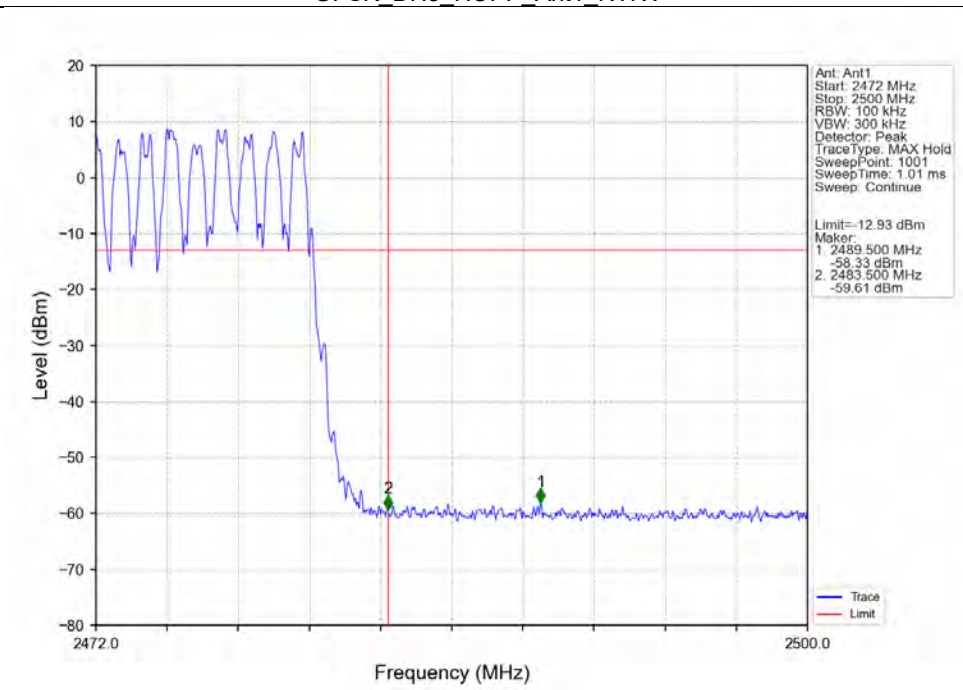
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



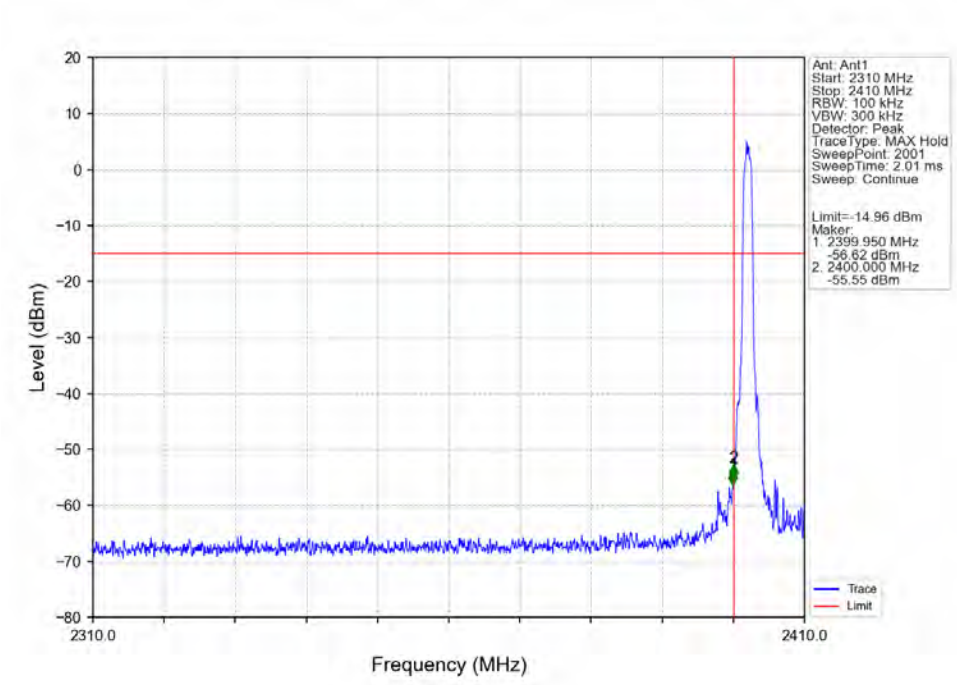
GFSK_DH5_HOPP_Ant1_NTNV



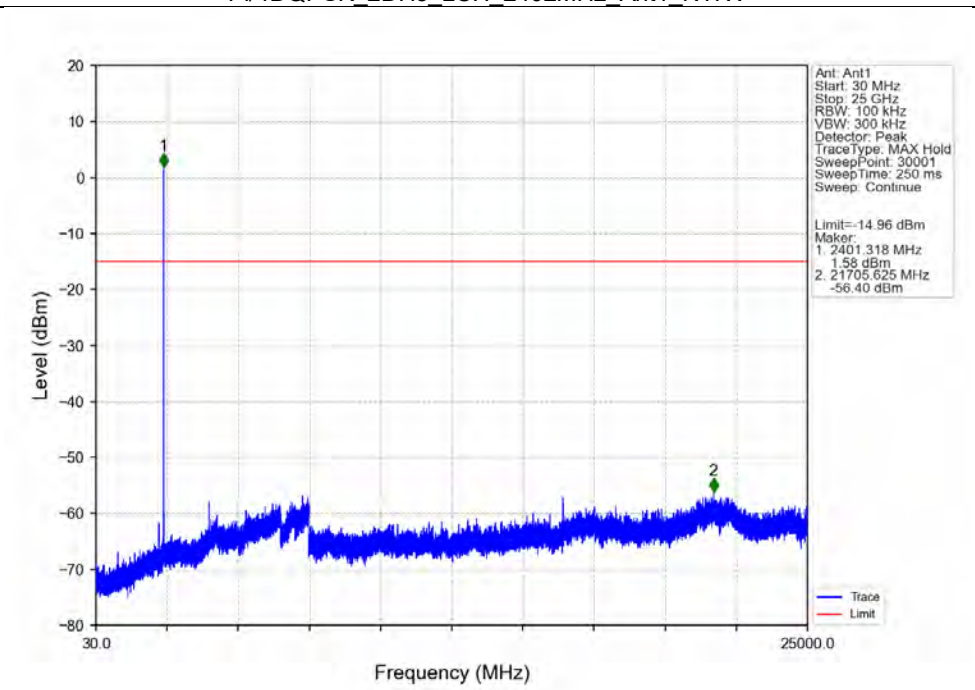
GFSK_DH5_HOPP_Ant1_NTNV



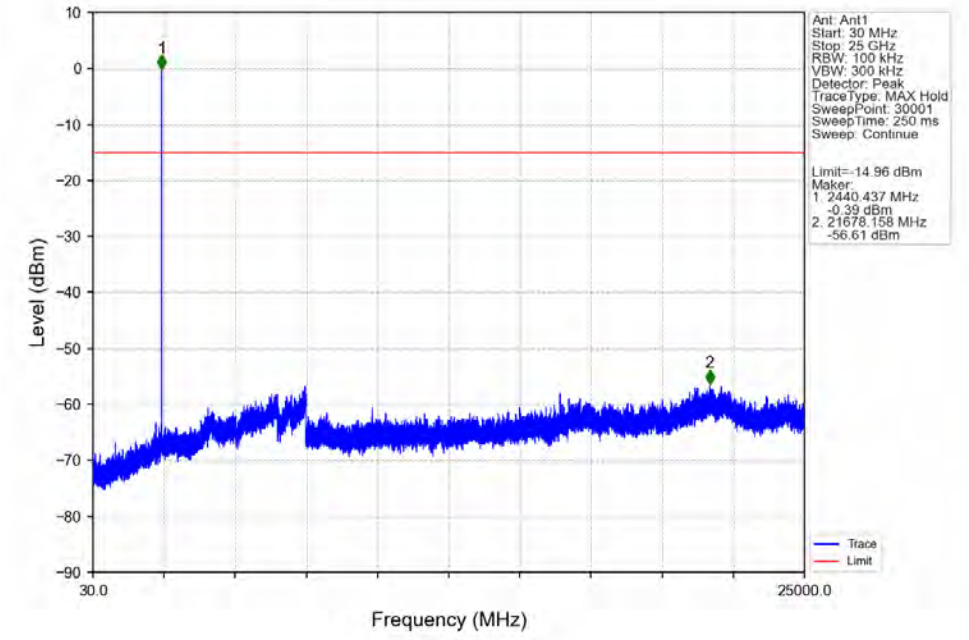
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



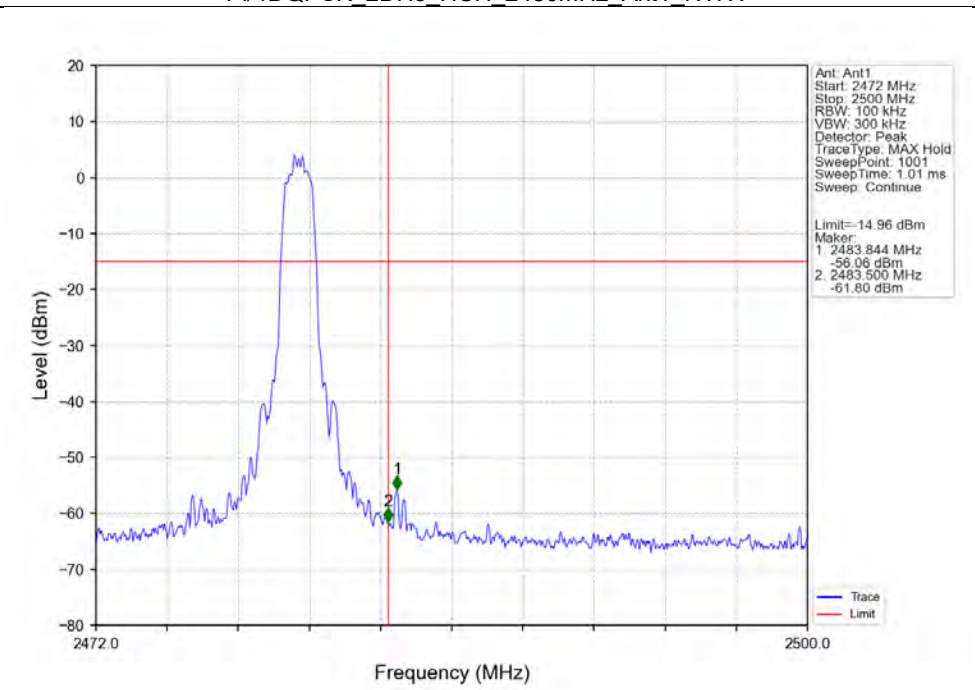
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



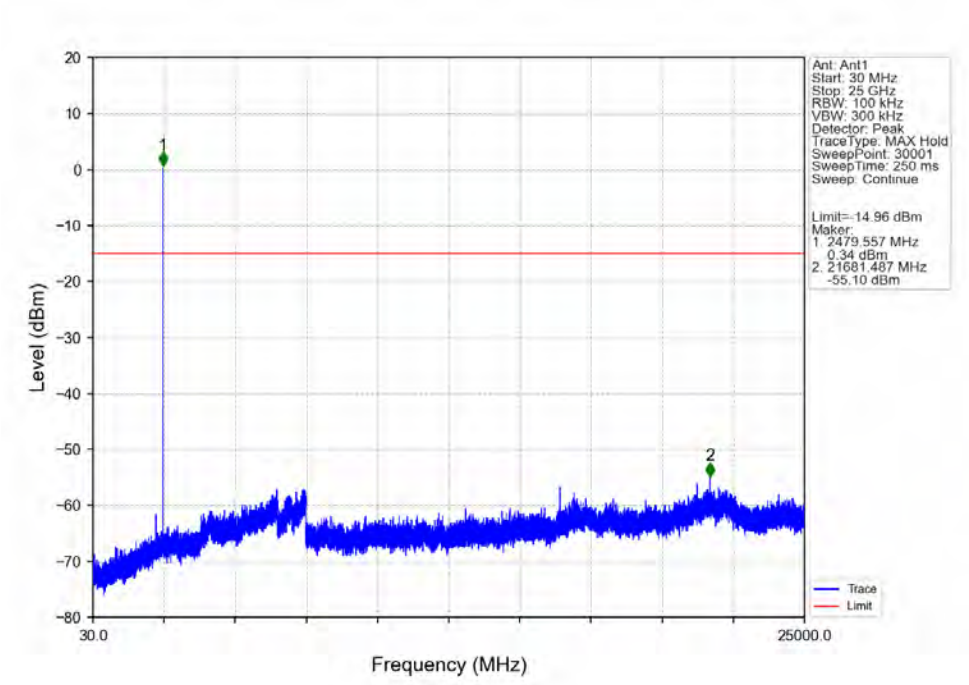
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



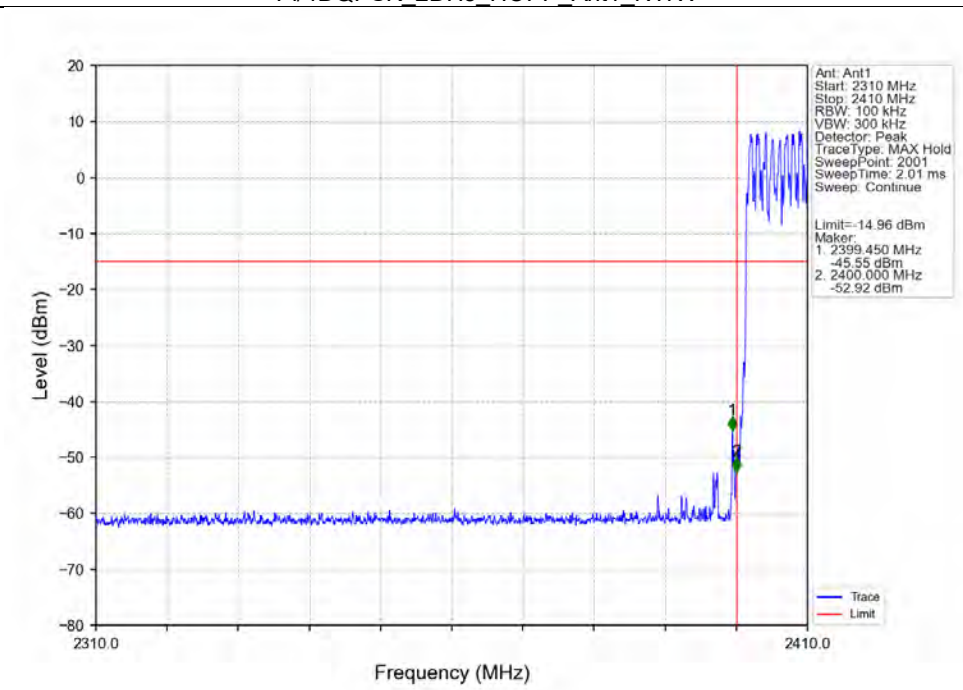
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



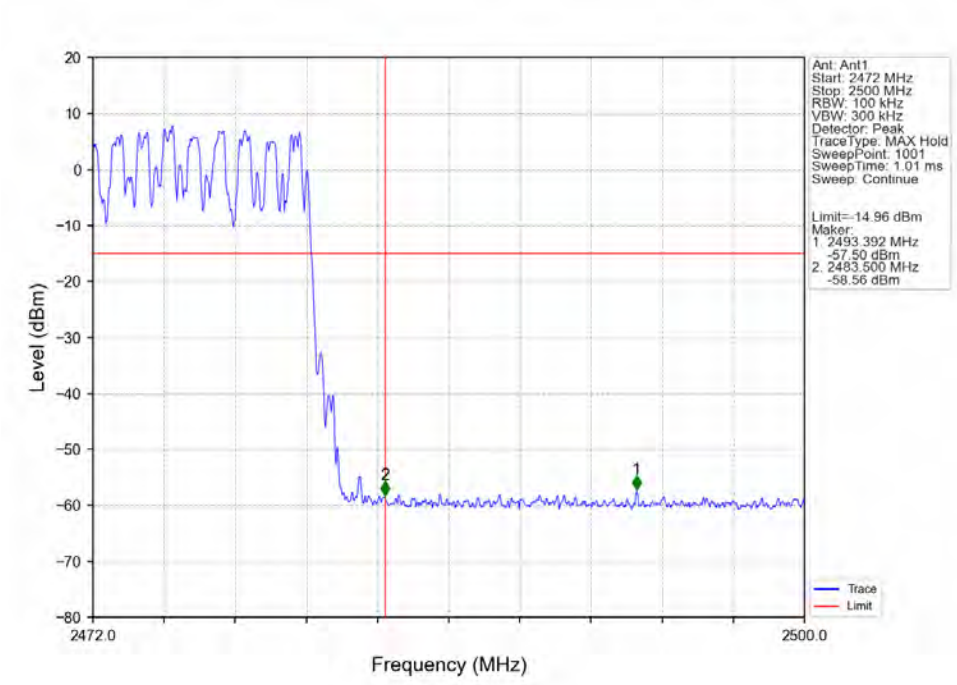
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



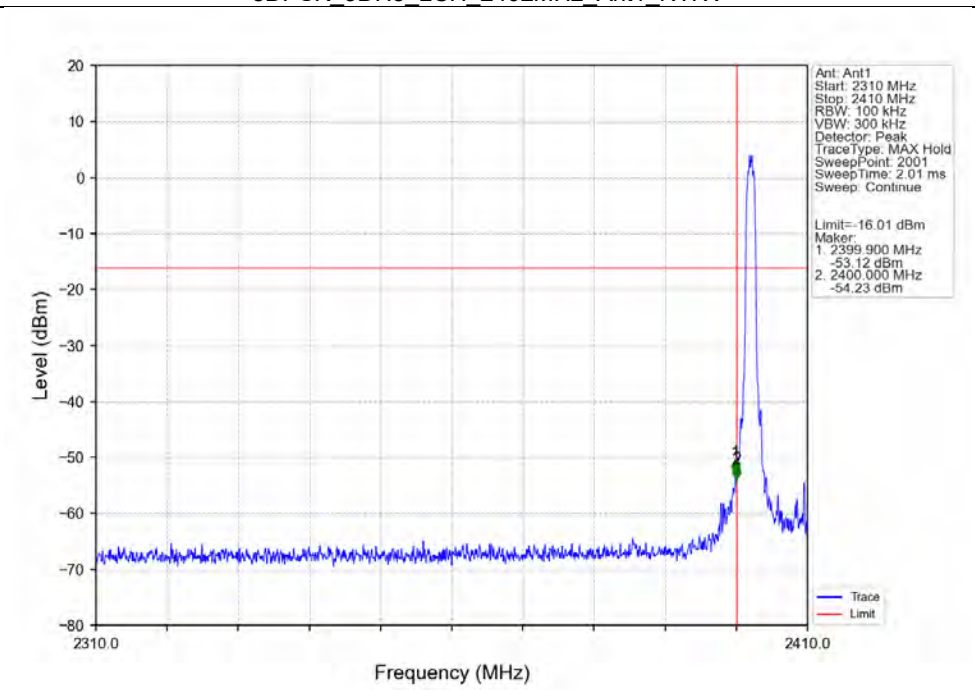
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



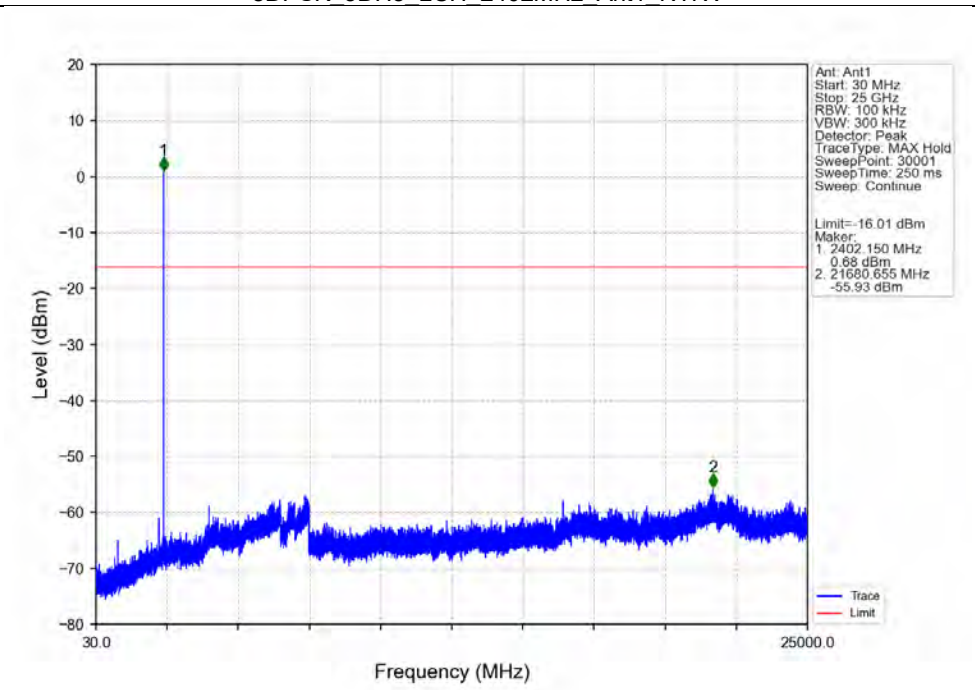
Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV



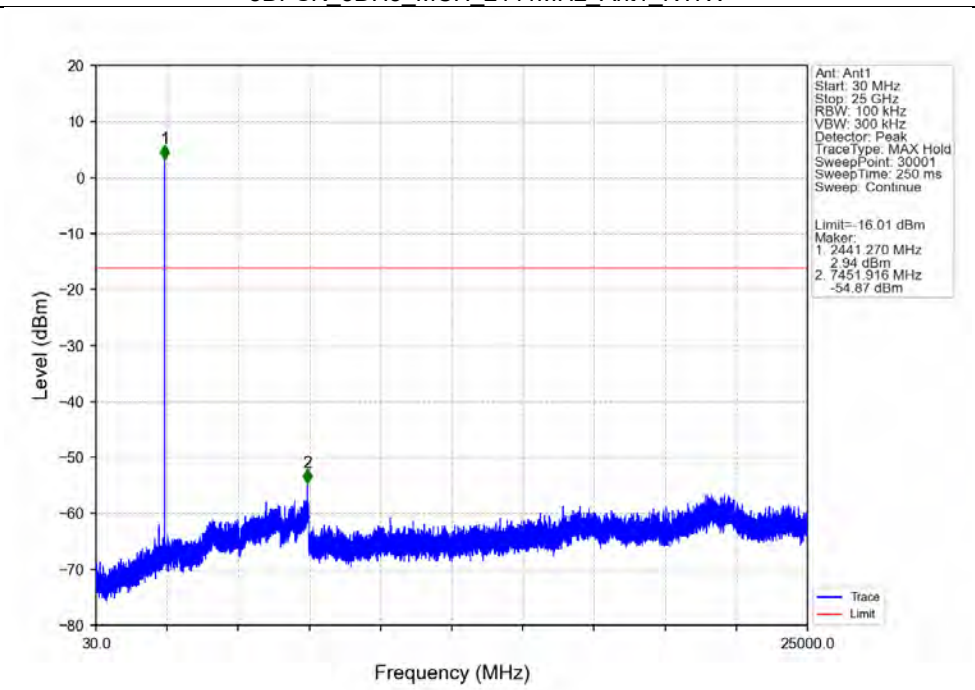
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



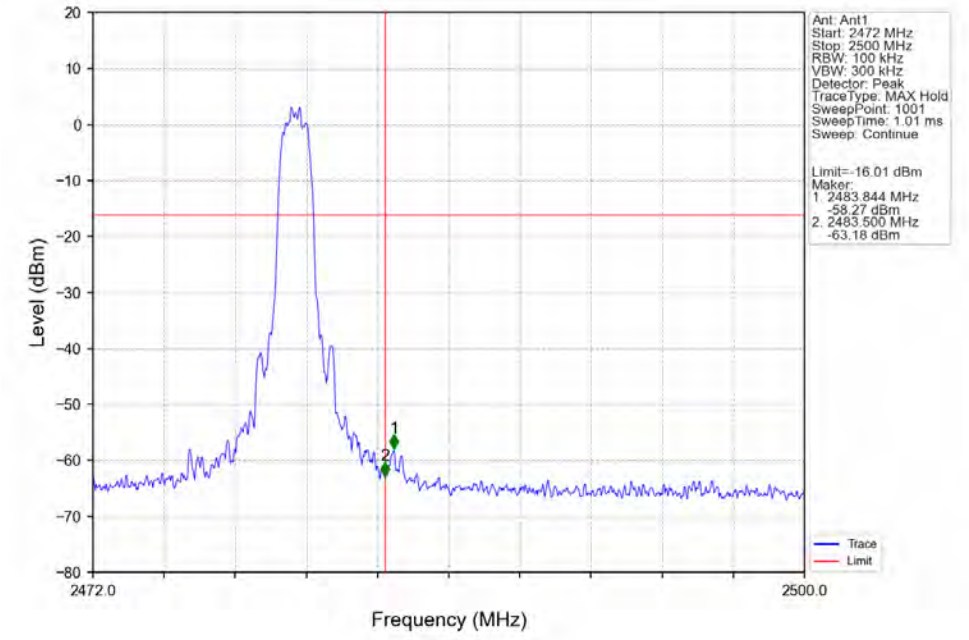
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



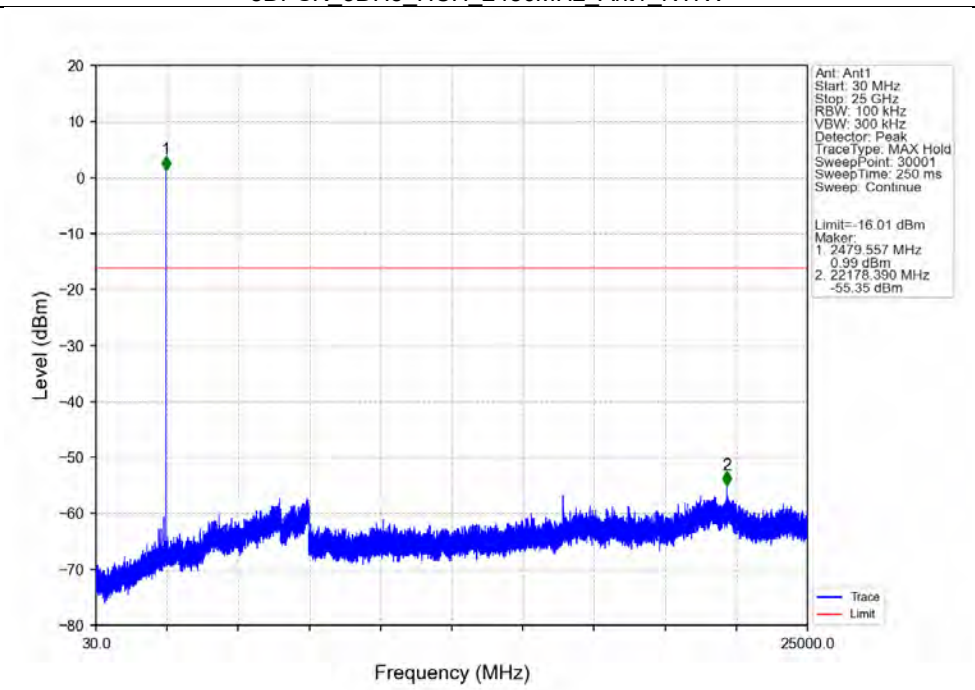
8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV



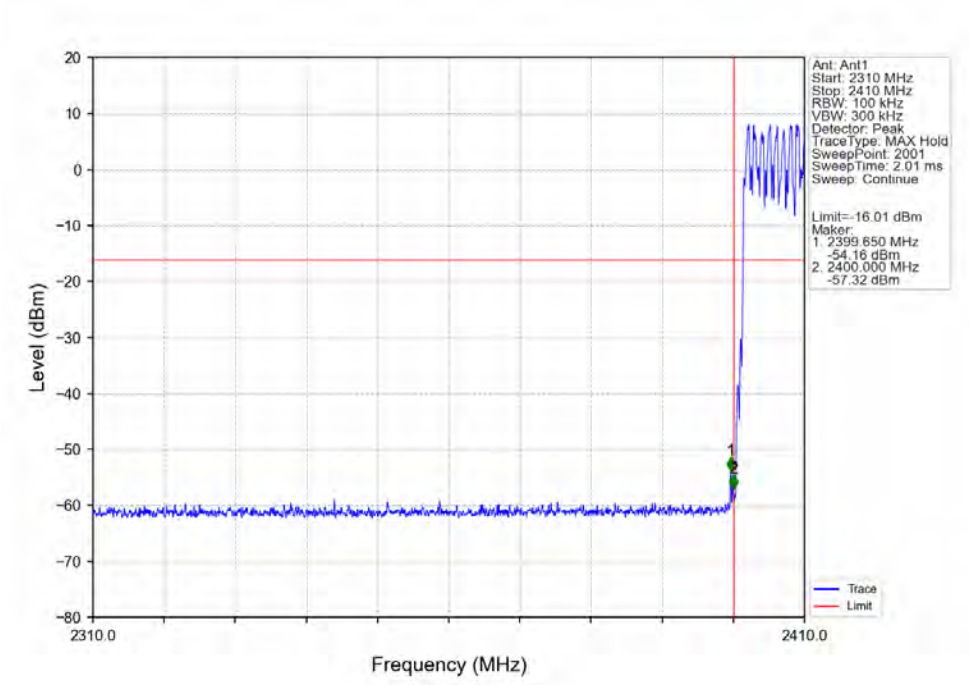
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



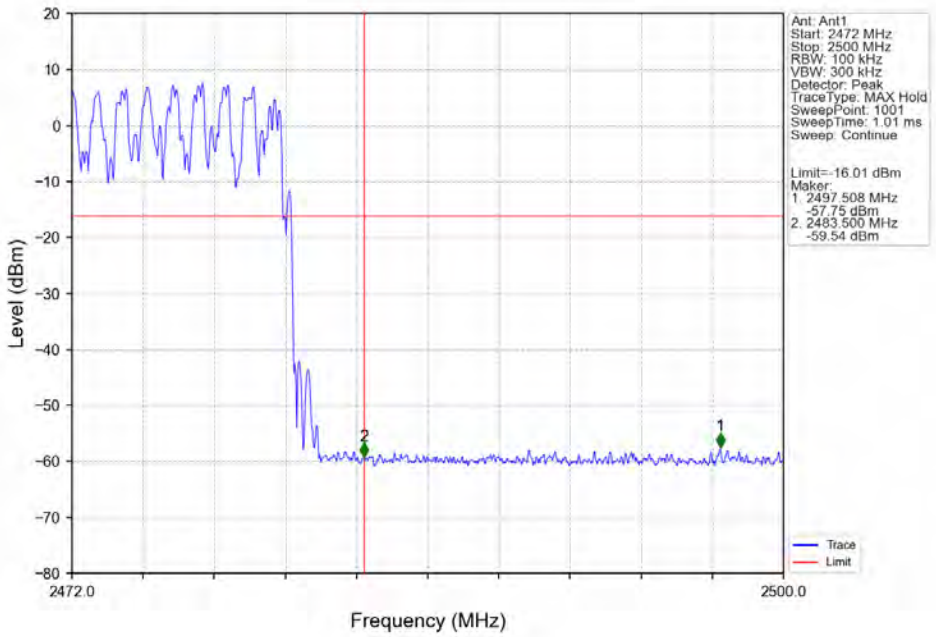
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



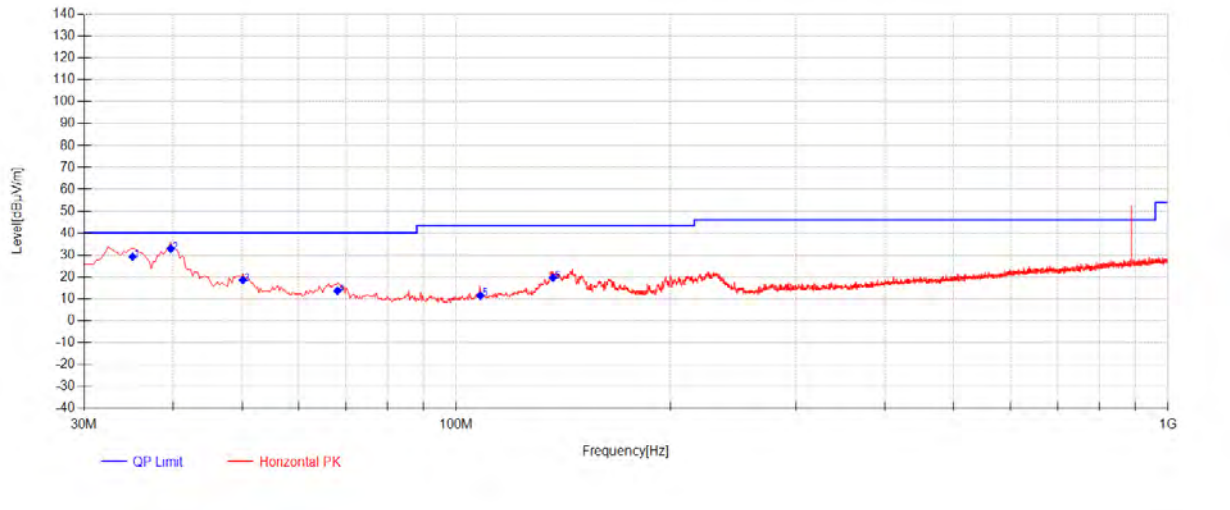
8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV

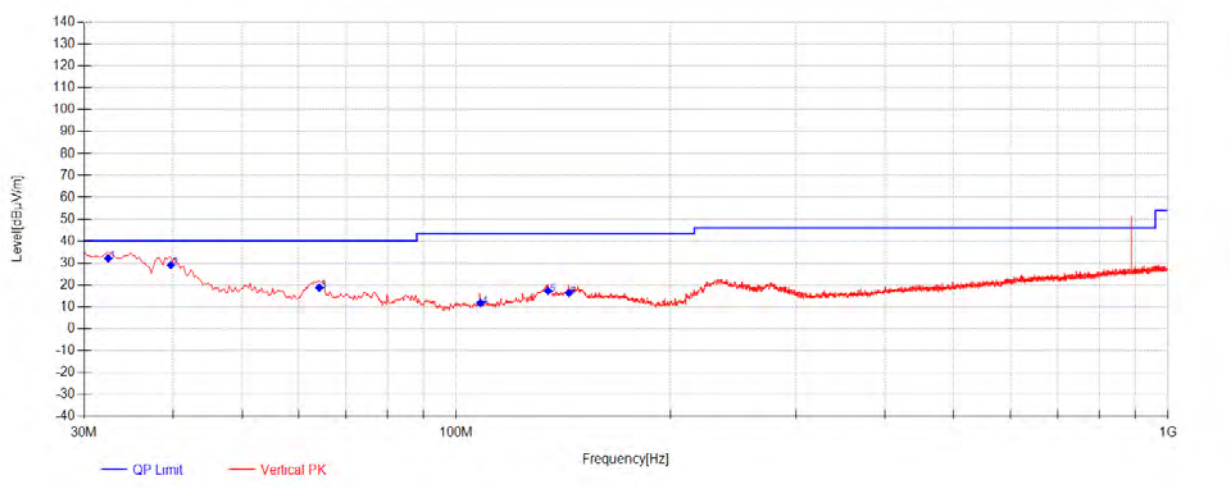


Radiated Spurious Emissions
Radiated emission below 1GHz
Worst case Mode:
MQM744-0-50-0B
GFSK_Channel 78 WORSE



Final Data List								
NO.	Frequency [MHz]]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity
1	35.0925	53.21	-42.27	18.21	29.15	40.00	10.85	Horizontal
2	39.7	56.29	-42.23	18.74	32.80	40.00	7.20	Horizontal
3	50.1275	42.12	-42.15	18.59	18.56	40.00	21.44	Horizontal
4	68.0725	38.56	-41.86	16.79	13.48	40.00	26.52	Horizontal
5	108.085	37.30	-41.44	15.50	11.36	43.50	32.14	Horizontal
6	136.7	42.14	-41.11	18.53	19.56	43.50	23.94	Horizontal

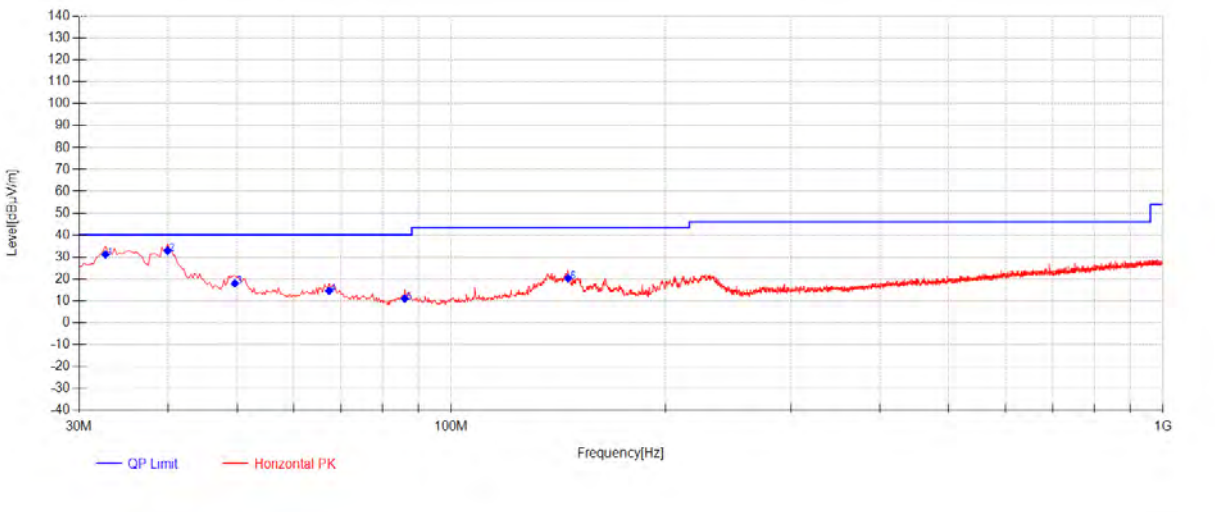
GFSK_Channel 78 WORSE



Final Data List								
NO.	Frequency [MHz]]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity
1	32.425	56.33	-42.29	18.10	32.14	40.00	7.86	Vertical
2	39.7	52.48	-42.23	18.74	28.99	40.00	11.01	Vertical
3	64.1925	43.22	-41.92	17.44	18.74	40.00	21.26	Vertical
4	108.085	37.54	-41.44	15.50	11.60	43.50	31.90	Vertical
5	134.5175	40.01	-41.17	18.36	17.20	43.50	26.30	Vertical
6	143.975	38.49	-40.89	18.60	16.20	43.50	27.30	Vertical

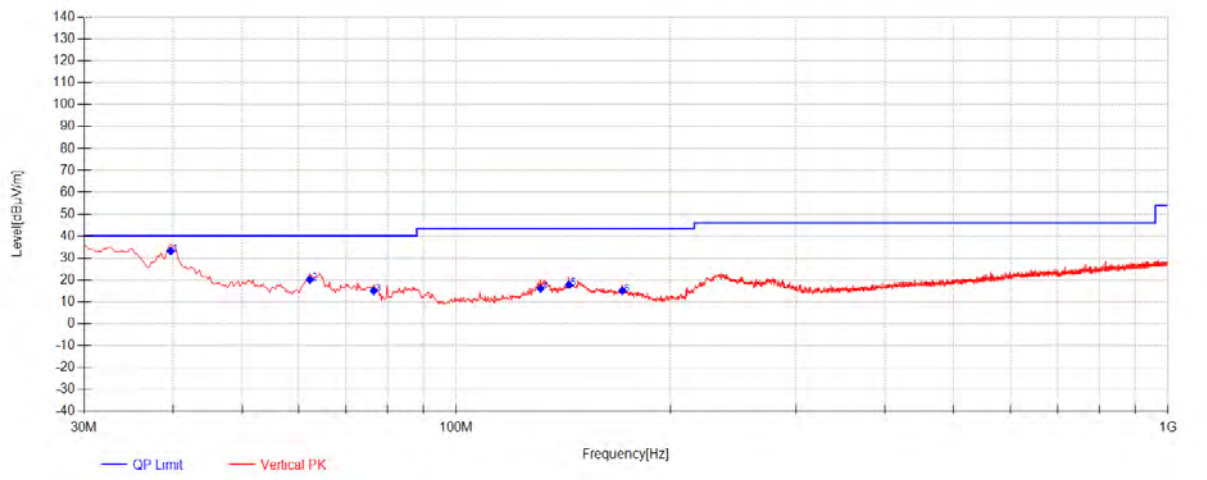
MQM744-0-50-0U

GFSK_Channel 78 WORSE



Final Data List								
NO.	Frequency [MHz]]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity
1	32.6675	55.36	-42.29	18.10	31.17	40.00	8.83	Horizontal
2	39.9425	56.25	-42.23	18.79	32.81	40.00	7.19	Horizontal
3	49.6425	41.36	-42.15	18.67	17.88	40.00	22.12	Horizontal
4	67.345	39.26	-41.87	17.00	14.38	40.00	25.62	Horizontal
5	86.0175	38.16	-41.51	14.21	10.86	40.00	29.14	Horizontal
6	145.915	42.02	-40.84	19.05	20.23	43.50	23.27	Horizontal

GFSK_Channel 78 WORSE

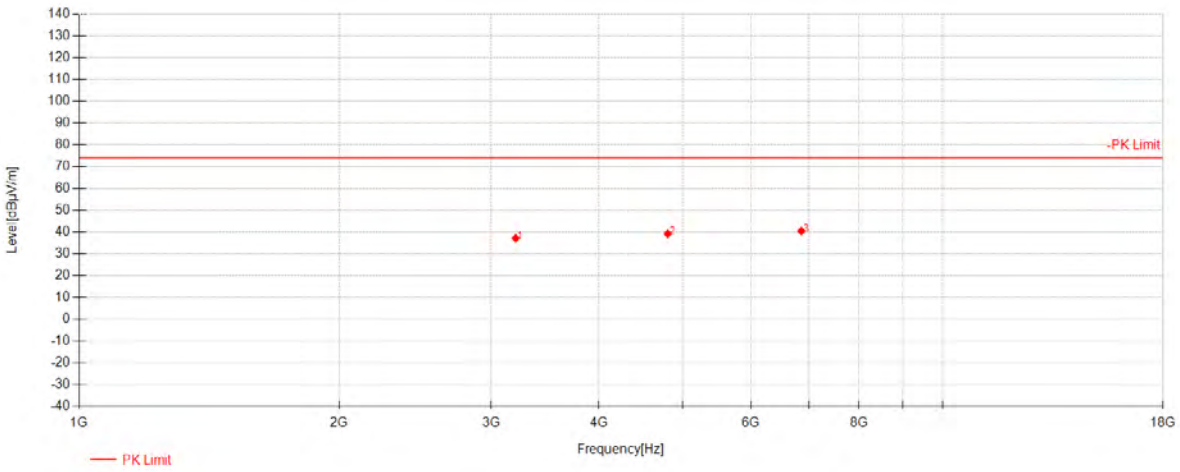


Final Data List								
NO.	Frequency [MHz]]	Reading [dBµV]	Factor [dB]	AF [dB/m]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Polarity
1	39.7	56.66	-42.23	18.74	33.17	40.00	6.83	Vertical
2	62.2525	44.58	-41.95	17.45	20.08	40.00	19.92	Vertical
3	76.56	41.26	-41.70	15.31	14.87	40.00	25.13	Vertical
4	131.365	39.33	-41.26	17.91	15.98	43.50	27.52	Vertical
5	143.975	40.02	-40.89	18.60	17.73	43.50	25.77	Vertical
6	171.135	37.45	-40.66	18.19	14.97	43.50	28.53	Vertical

Remark:

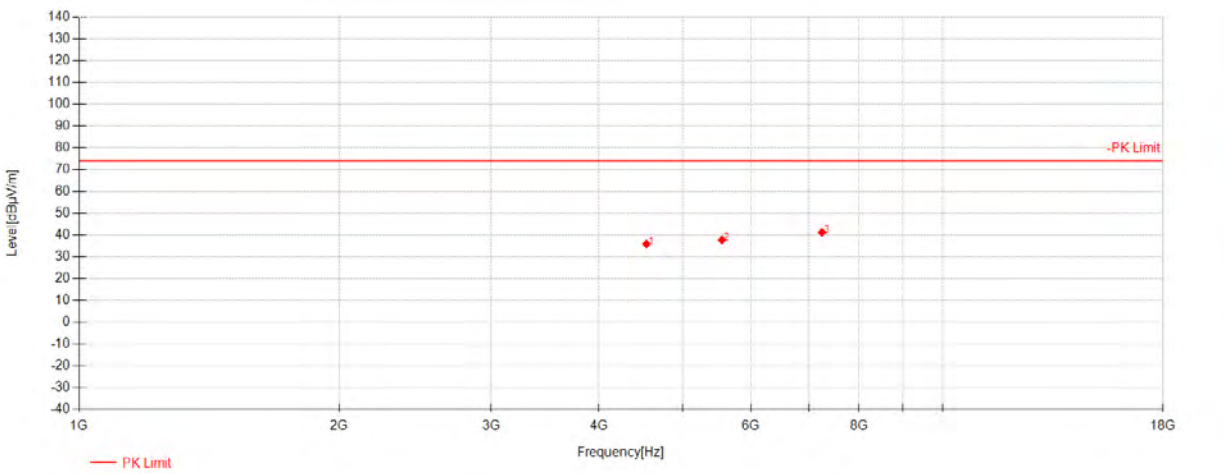
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:
   Value = Reading(dBµV) + AF(dB/m) + Factor(dB):
   AF = Antenna Factor(dB/m)
   Factor = Cable Factor(dB) - Preamplifier gain(dB)
   Margin = Limit(dBµV/m) – Value(dBµV/m)
2) All channels have been tested, but only the worst case data displayed in this report.

Transmitter emission Above 1GHz
MQM744-0-50-0B
GFSK_Channel 00



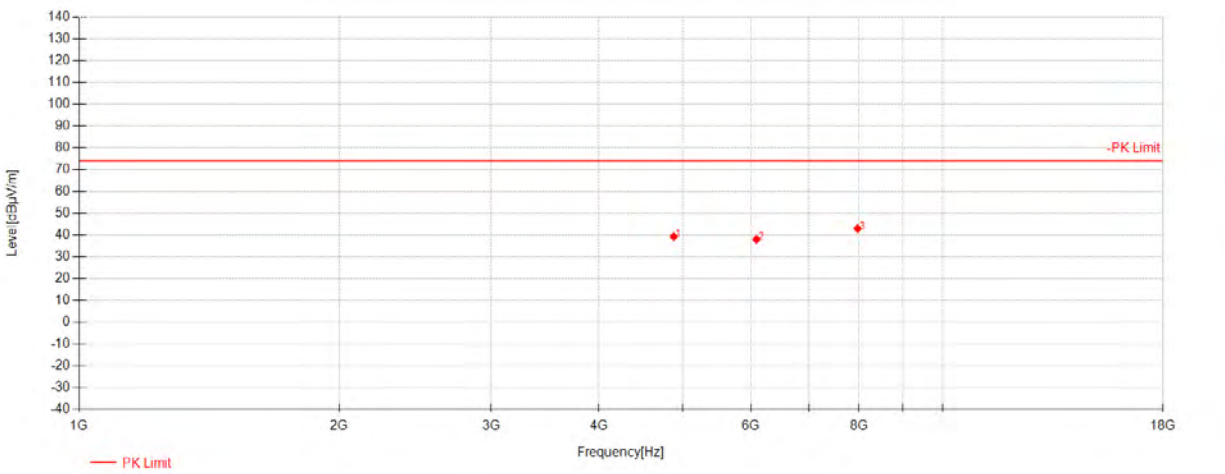
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	3203	54.68	28.30	-45.75	37.23	74.00	36.77	Horizontal
2	4804.5	53.68	31.09	-45.54	39.23	74.00	34.77	Horizontal
3	6862	49.85	34.75	-44.13	40.47	74.00	33.53	Horizontal

GFSK_Channel 00



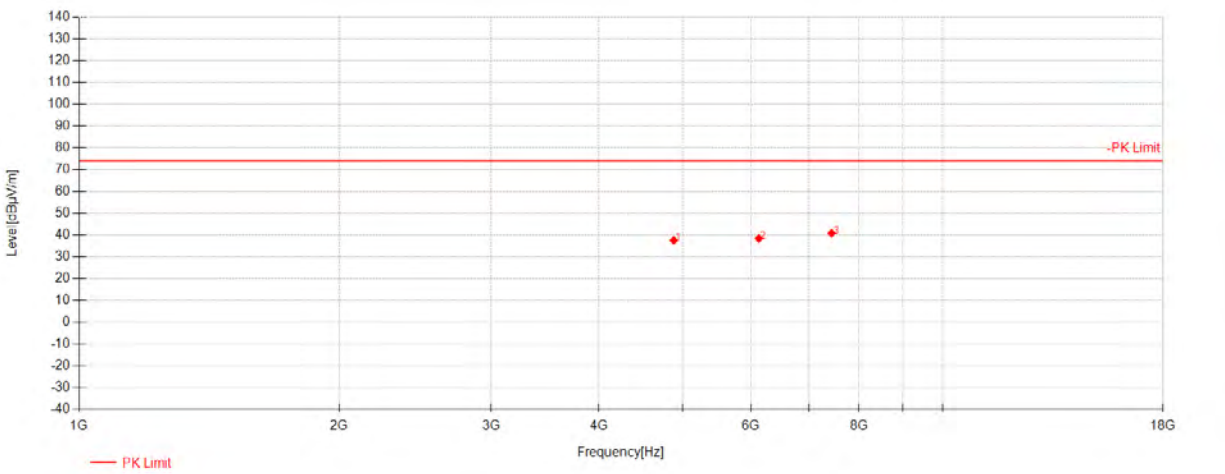
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4539	50.98	30.66	-45.69	35.95	74.00	38.05	Vertical
2	5552	50.67	32.31	-45.15	37.83	74.00	36.17	Vertical
3	7250	49.14	35.70	-43.59	41.25	74.00	32.75	Vertical

GFSK_Channel 39



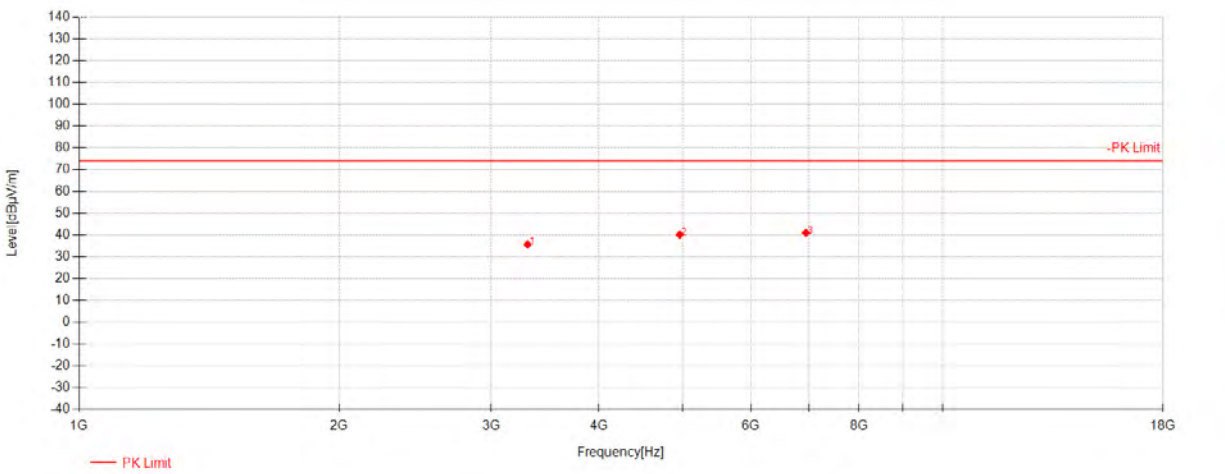
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4882.5	53.64	31.21	-45.53	39.32	74.00	34.68	Horizontal
2	6086.5	49.87	32.69	-44.50	38.06	74.00	35.94	Horizontal
3	7972	48.35	37.06	-42.48	42.93	74.00	31.07	Horizontal

GFSK_Channel 39



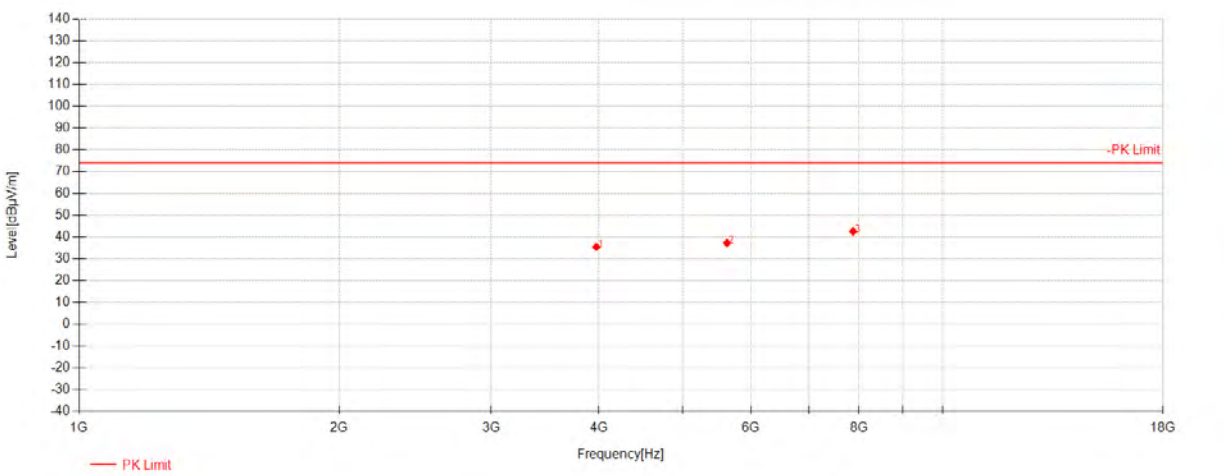
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4882	51.95	31.21	-45.53	37.63	74.00	36.37	Vertical
2	6126	50.15	32.83	-44.53	38.45	74.00	35.55	Vertical
3	7437.5	47.89	36.23	-43.31	40.81	74.00	33.19	Vertical

GFSK_Channel 78



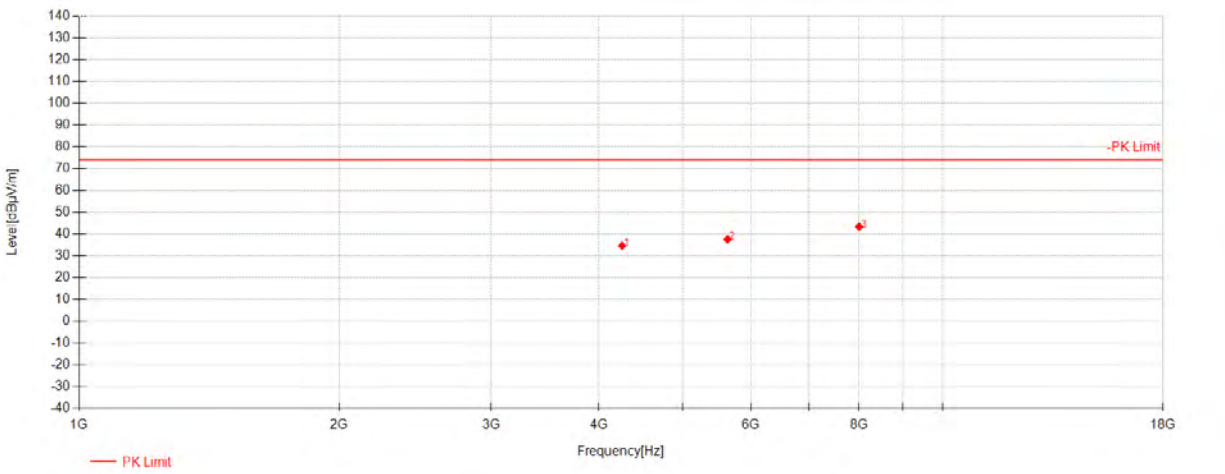
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	3307	53.79	28.41	-46.45	35.75	74.00	38.25	Horizontal
2	4960.5	54.44	31.34	-45.60	40.18	74.00	33.82	Horizontal
3	6946.5	49.97	34.90	-43.84	41.03	74.00	32.97	Horizontal

GFSK_Channel 78



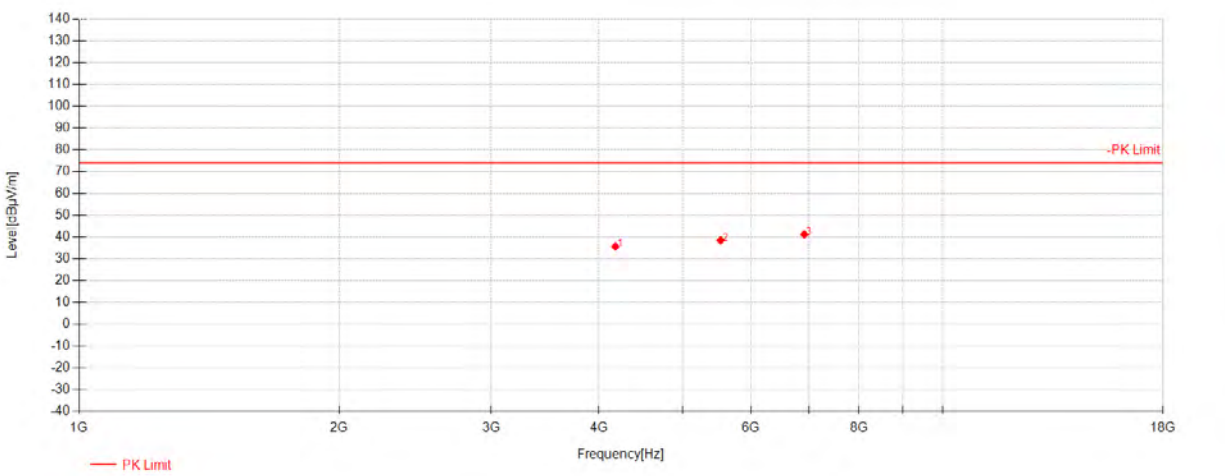
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	3972	52.25	29.36	-46.11	35.50	74.00	38.50	Vertical
2	5627.5	49.98	32.33	-45.01	37.30	74.00	36.70	Vertical
3	7876	48.36	36.93	-42.70	42.59	74.00	31.41	Vertical

MQM744-0-50-0U
GFSK_Channel 00



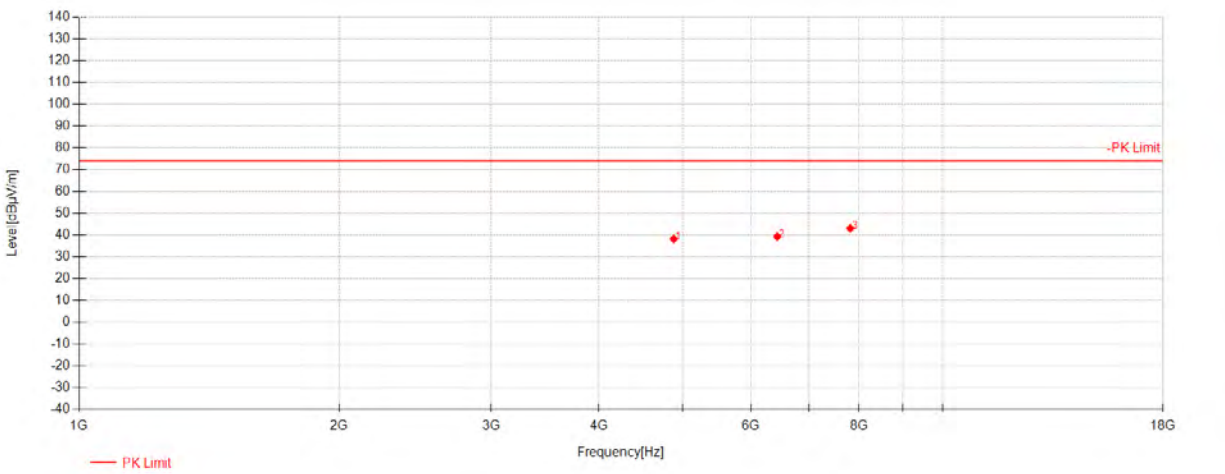
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4254.5	50.30	30.01	-45.64	34.67	74.00	39.33	Horizontal
2	5635	50.32	32.33	-44.99	37.65	74.00	36.35	Horizontal
3	8005.5	48.52	37.10	-42.30	43.32	74.00	30.68	Horizontal

GFSK_Channel 00



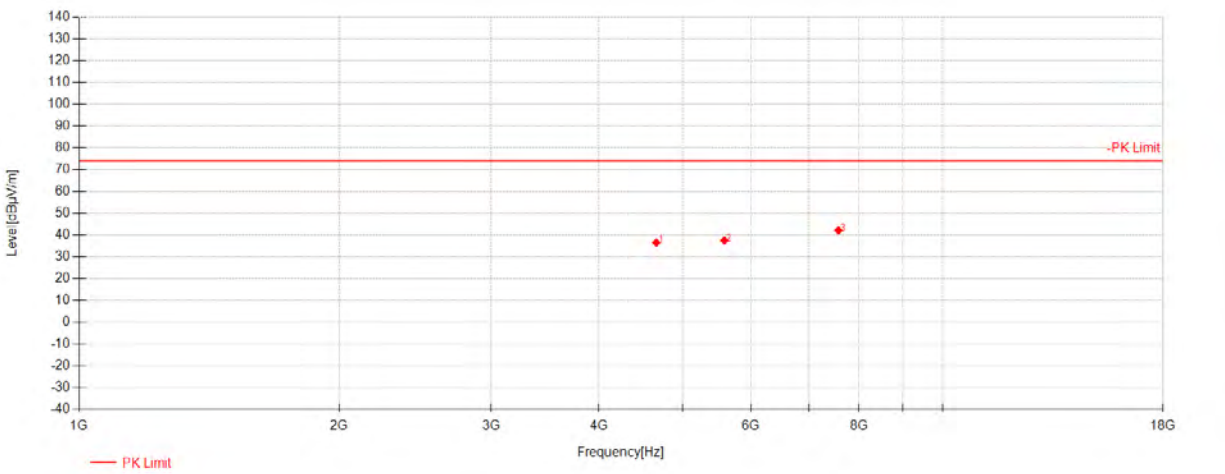
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4178.5	51.68	29.83	-45.77	35.74	74.00	38.26	Vertical
2	5532	51.40	32.31	-45.19	38.52	74.00	35.48	Vertical
3	6916.5	50.39	34.85	-44.01	41.23	74.00	32.77	Vertical

GFSK_Channel 39



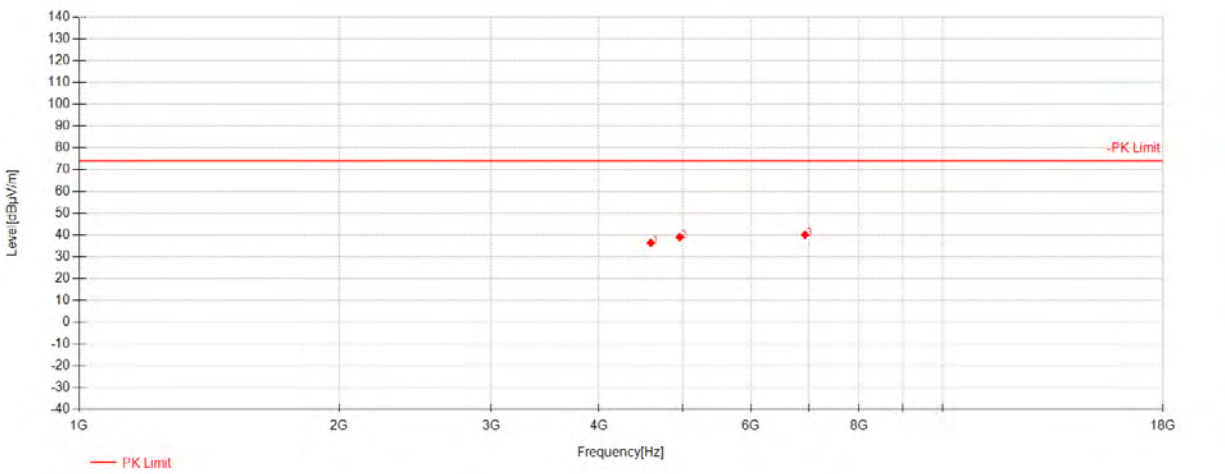
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4882	52.57	31.21	-45.53	38.25	74.00	35.75	Horizontal
2	6434	49.94	33.88	-44.48	39.34	74.00	34.66	Horizontal
3	7820	48.58	36.85	-42.41	43.02	74.00	30.98	Horizontal

GFSK_Channel 39



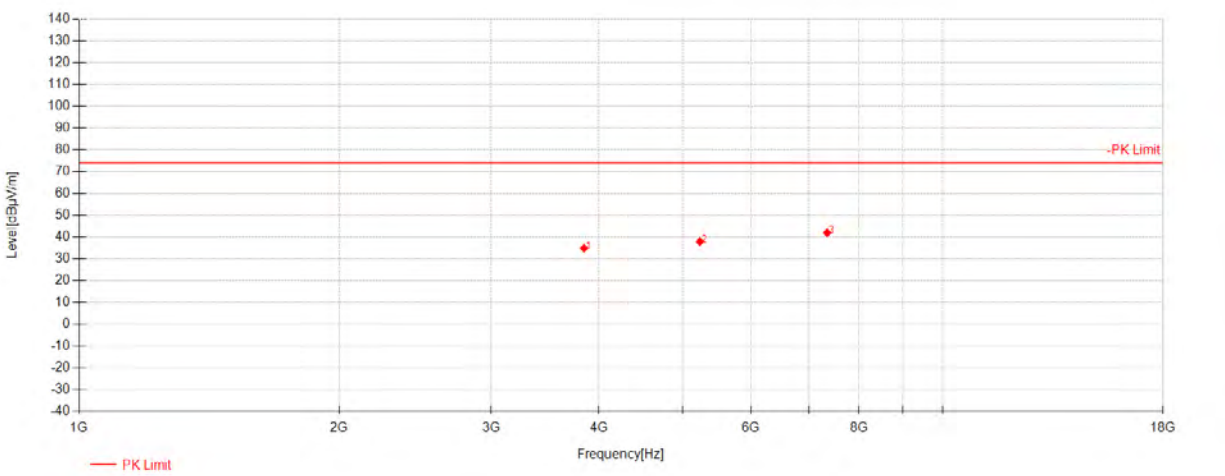
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4660	51.37	30.86	-45.63	36.60	74.00	37.40	Vertical
2	5587.5	50.35	32.32	-45.09	37.58	74.00	36.42	Vertical
3	7574.5	48.61	36.50	-42.98	42.13	74.00	31.87	Vertical

GFSK_Channel 78



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	4593	51.43	30.75	-45.67	36.51	74.00	37.49	Horizontal
2	4960	53.36	31.34	-45.60	39.10	74.00	34.90	Horizontal
3	6929.5	49.18	34.87	-43.94	40.12	74.00	33.88	Horizontal

GFSK_Channel 78

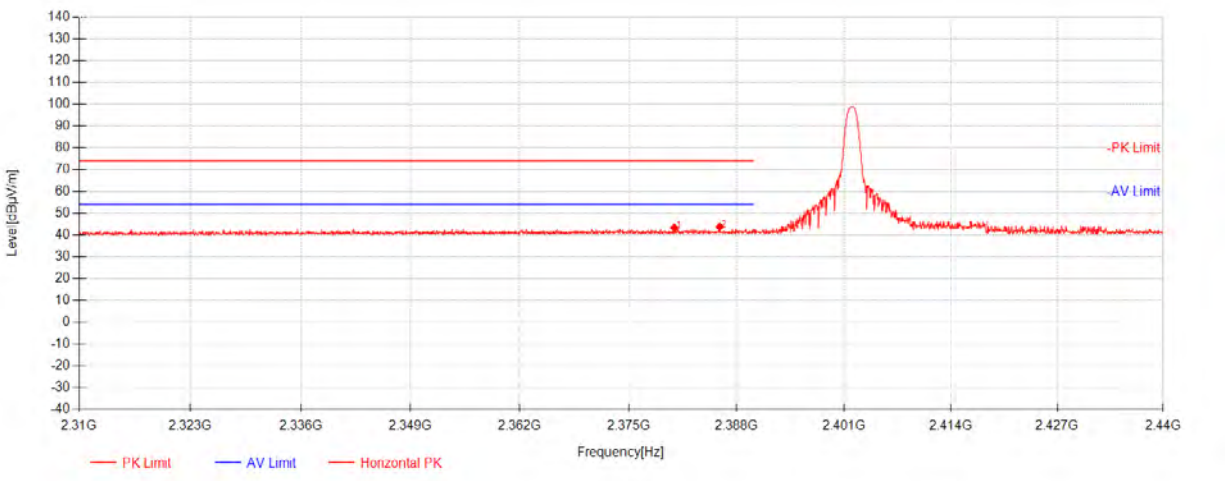


Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	3843.5	51.83	29.15	-46.08	34.90	74.00	39.10	Vertical
2	5235	51.33	31.82	-45.21	37.94	74.00	36.06	Vertical
3	7350	49.53	35.98	-43.58	41.93	74.00	32.07	Vertical

Remark:

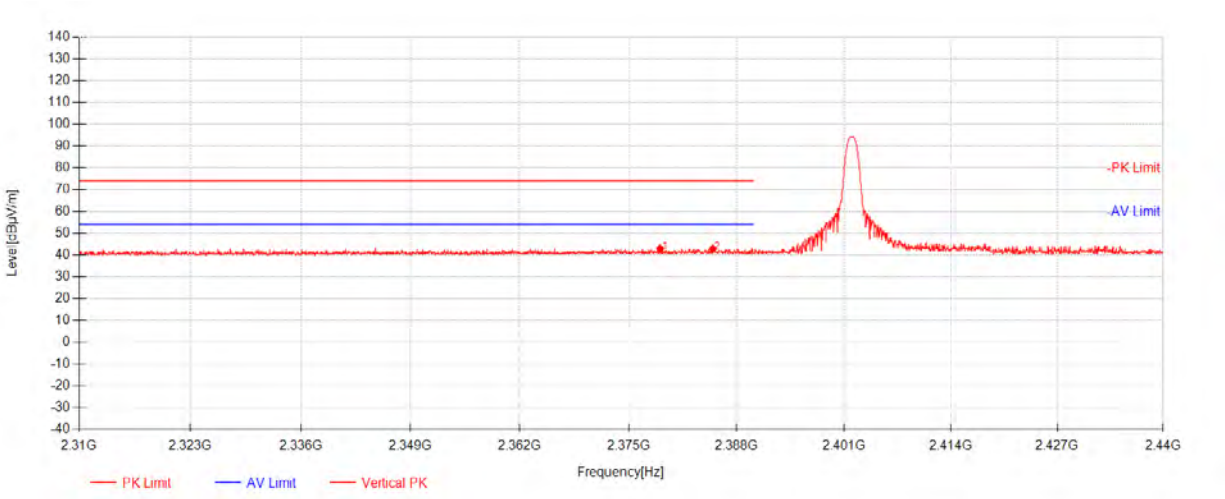
1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:
   Level = Reading(dBµV) + AF(dB/m) + Factor(dB):
   AF = Antenna Factor(dB/m)
   Factor = Cable Factor(dB) - Preamplifier gain(dB)
   Margin = Limit(dBµV/m) – Level(dBµV/m)
2) All channels have been tested, but only the worst case data displayed in this report.

Restricted bands around fundamental frequency
MQM744-0-50-0B
GFSK_Channel 00



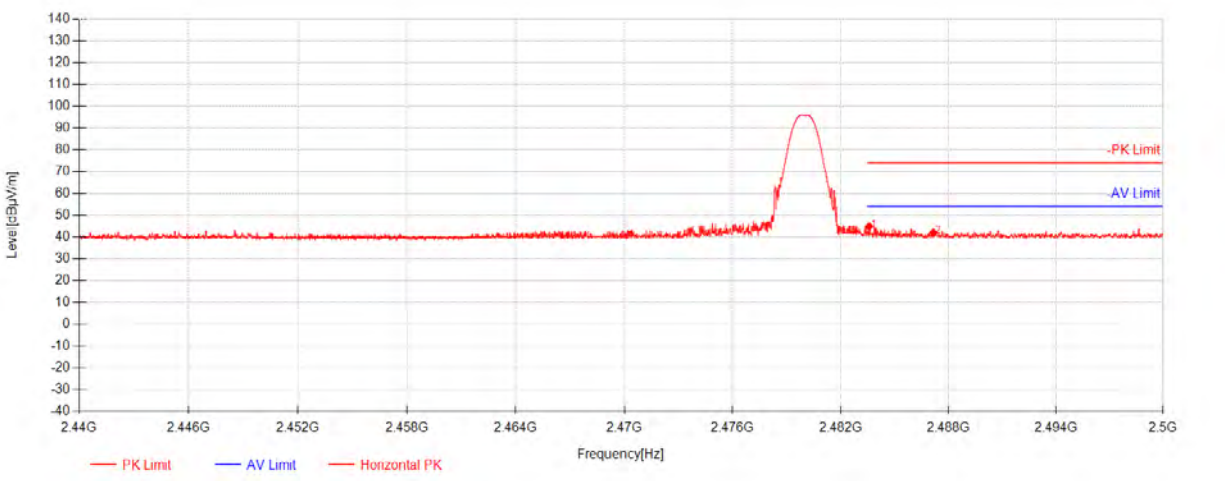
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2380.5033	39.88	26.96	-23.57	43.27	74.00	30.73	Horizontal
2	2385.9633	40.34	26.97	-23.57	43.74	74.00	30.26	Horizontal

GFSK_Channel 00



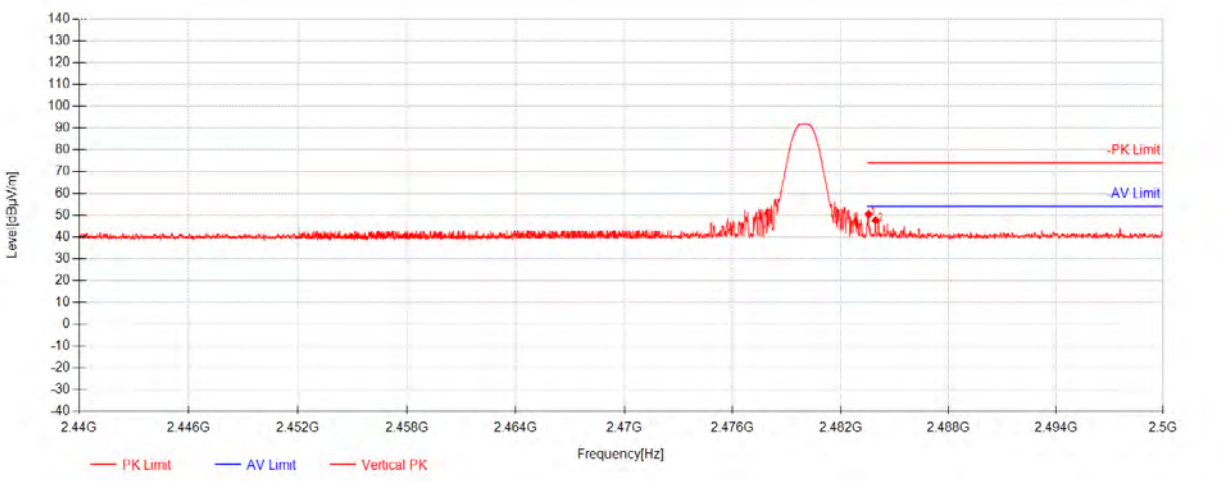
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2378.8133	39.49	26.96	-23.57	42.88	74.00	31.12	Vertical
2	2385.14	39.39	26.97	-23.57	42.79	74.00	31.21	Vertical

GFSK_Channel 78



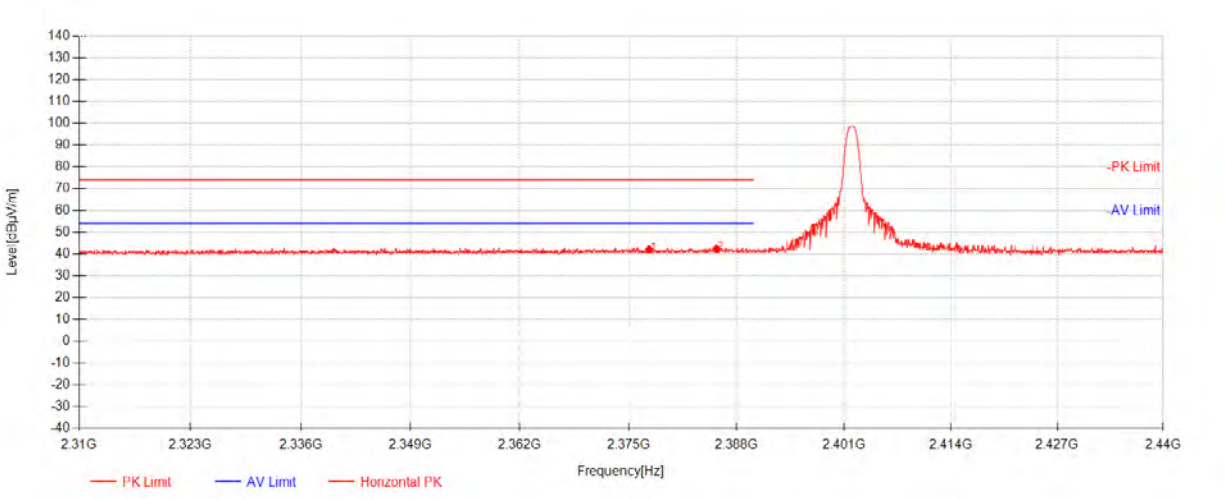
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2483.59	41.24	27.17	-23.54	44.86	74.00	29.14	Horizontal
2	2487.1675	38.41	27.17	-23.54	42.04	74.00	31.96	Horizontal

GFSK_Channel 78



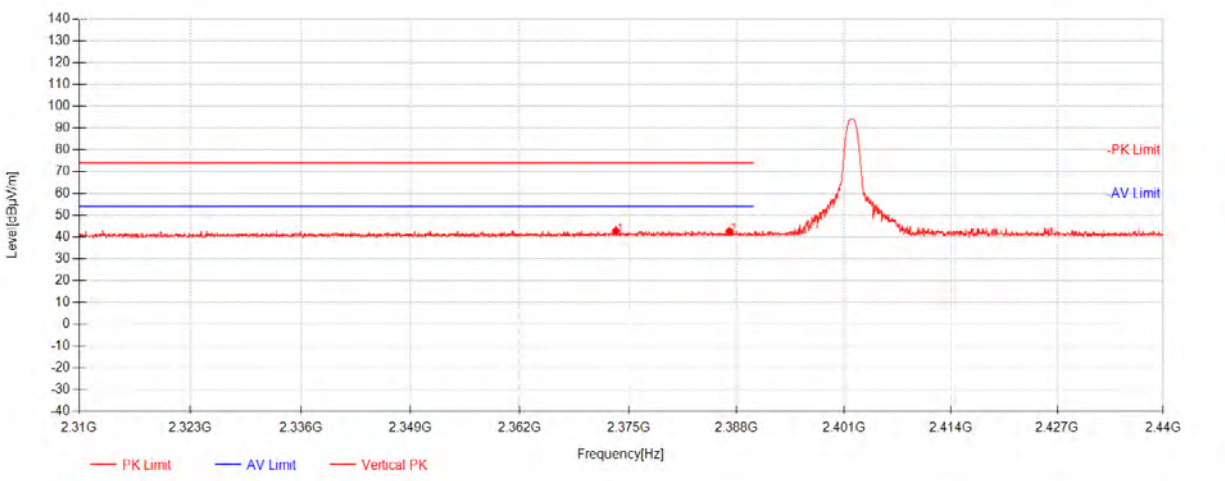
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2483.56	46.88	27.17	-23.54	50.50	74.00	23.50	Vertical
2	2483.95	44.08	27.17	-23.54	47.70	74.00	26.30	Vertical

MQM744-0-50-0U
GFSK_Channel 00



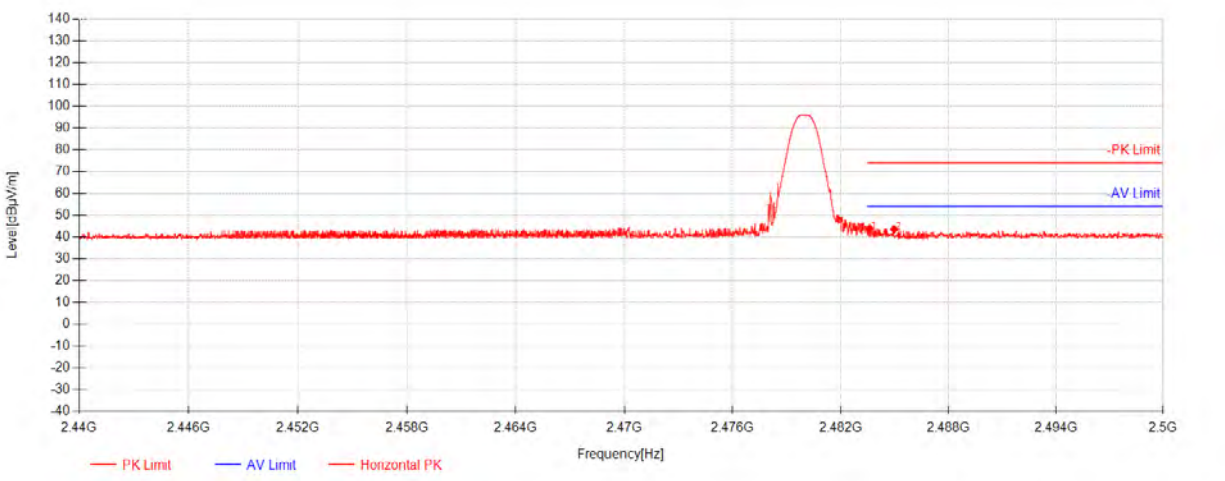
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2377.47	38.80	26.95	-23.57	42.18	74.00	31.82	Horizontal
2	2385.5733	39.08	26.97	-23.57	42.48	74.00	31.52	Horizontal

GFSK_Channel 00



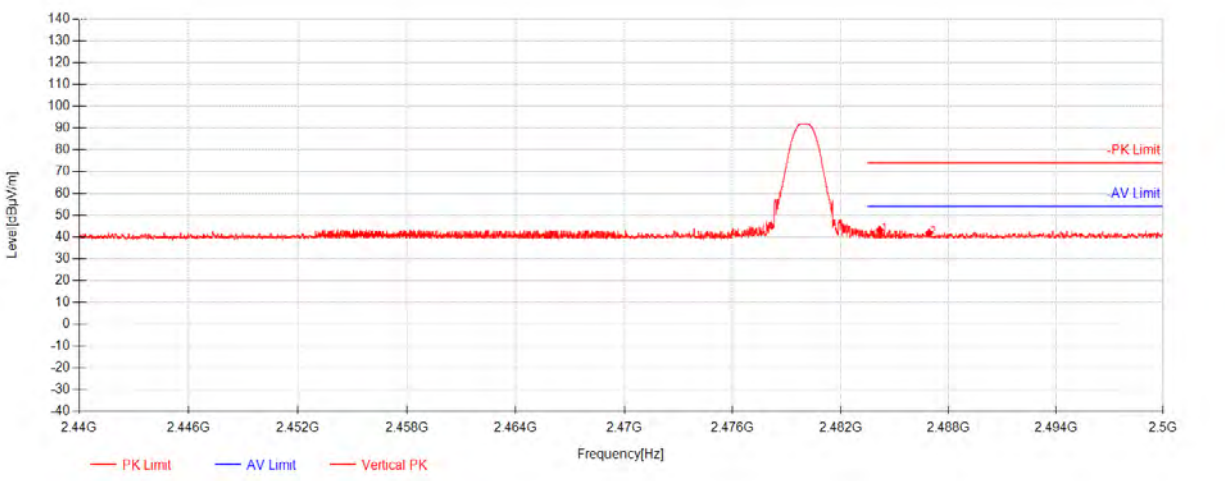
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2373.4833	39.53	26.95	-23.57	42.90	74.00	31.10	Vertical
2	2387.1333	39.29	26.97	-23.57	42.69	74.00	31.31	Vertical

GFSK_Channel 78



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2483.6125	40.28	27.17	-23.54	43.90	74.00	30.10	Horizontal
2	2484.9775	39.92	27.17	-23.54	43.55	74.00	30.45	Horizontal

GFSK_Channel 78



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2484.175	39.47	27.17	-23.54	43.09	74.00	30.91	Vertical
2	2486.9275	38.15	27.17	-23.54	41.78	74.00	32.22	Vertical

Remark:

1) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier gain. The basic equation with a sample calculation is as follows:

Level = Reading(dBµV) + AF(dB/m) + Factor(dB):

AF = Antenna Factor(dB/m)

Factor = Cable Factor(dB) - Preamplifier gain(dB)

Margin = Limit(dBµV/m) – Level(dBµV/m)

---End of Report---