TEST REPORT

Application No.:	SUCR2510001026WM
Applicant:	CROSSCALL
Address of Applicant:	245, Rue Paul Langevin 13290，Aix-en-Provence，France
Manufacturer:	CROSSCALL
Address of Manufacturer:	245, Rue Paul Langevin 13290，Aix-en-Provence，France
Equipment Under Test (EUT):	
EUT Name:	Mobile phone
Model No.:	54237-1
Trade Mark:	CROSSCALL
FCC ID:	2BSUT-54237
Standard(s) :	47 CFR Part 15, Subpart C 15.247
Date of Receipt:	2025-10-22
Date of Test:	2025-11-22 to 2025-12-16
Date of Issue:	2025-12-23
Test Result:	**Pass***

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

Revision Record			
Version	**Description**	***Date***	***Remark***
00	Original	2025-12-23	/

Authorized for issue by:				
Tested By		 **Nature Shen/Project Engineer**		
Approved By		 **Cedar Cheng /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)	Customer Declaration
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**
Conducted Emissions at AC Power Line (150kHz-30MHz)	47 CFR Part 15, Subpart C 15.247	ANSI C63.10 (2020) Section 6.2	47 CFR Part 15, Subpart C 15.207	Pass
Radiated Emissions which fall in the restricted bands		ANSI C63.10 (2020) Section 6.10.5	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Radiated Spurious Emissions Below 1GHz		ANSI C63.10 (2020) 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) Section 6.6	47 CFR Part 15, Subpart C 15.205 & 15.209	Pass
Conducted Peak Output Power		ANSI C63.10 (2020) Section 7.8.5	47 CFR Part 15, Subpart C 15.247(b)(1)	Pass
20dB Bandwidth		ANSI C63.10 (2020) Section 6.9.2	47 CFR Part 15, Subpart C 15.247(a)(1)	Pass
Carrier Frequencies Separation		ANSI C63.10 (2020) Section 7.8.2	47 CFR Part 15, Subpart C 15.247a(1)	Pass
Hopping Channel Number		ANSI C63.10 (2020) Section 7.8.3	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Dwell Time		ANSI C63.10 (2020) Section 7.8.4	47 CFR Part 15, Subpart C 15.247a(1)(iii)	Pass
Conducted Band Edges Measurement		ANSI C63.10 (2020) Section 7.8.7.2	47 CFR Part 15, Subpart C 15.247(d)	Pass
Conducted Spurious Emissions		ANSI C63.10 (2020) Section 7.8.7	47 CFR Part 15, Subpart C 15.247(d)	Pass

Remark:The product is available in two memory configurations:

Sample 1 (Samsung KM5P9001DM-B424_P03\TP\JK\ROH)

Sample 2 (Kingston 64UM32-M4GTY7B_GA04)

The two samples differ only in memory, which has no impact on RF performance. Therefore, we only performed testing with Sample 1.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	5V
Hardware Version:	V1.0
Software Version:	N2161V.6.01.01.US01
Operation Frequency:	2402MHz to 2480MHz
Bluetooth Version:	V5.2
Modulation Type:	GFSK, pi/4DQPSK, 8DPSK
Number of Channels:	79
Channel Spacing:	1MHz
Spectrum Spread Technology:	Frequency Hopping Spread Spectrum(FHSS)
Antenna Type:	Integral Antenna
Antenna Gain:	Ant 6: -0.5dBi
Antenna Number:	1
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)

4.2 Environment Parameter

Environment Parameter	Selected Values During Tests	
Relative Humidity	Ambient	
Value	Temperature(°C)	Voltage(V)
NTNV	25	3.87

Note:

NV:Normal Voltage	LV:Low Extreme Test Voltage	HV:High Extreme Test Voltage
NT:Normal Temperature	LT:Low Extreme Test Temperature	HT:High Extreme Test Temperature

4.3 Description of Support Units

Description	Manufacturer	Model No.	Serial No.
Computer	Lenovo	T14	2YK6GR
Mouse	Lenovo	3D optical Mouse	N/A

4.4 Measurement Uncertainty & Decision Rule

No.	Item	Measurement Uncertainty
1	Radio Frequency	± 7.25 x 10^{-8}
2	Duty cycle	± 0.37%
3	Occupied Bandwidth	± 3%
4	Conduction emission	± 3.0dB (150kHz to 30MHz)
5	RF conducted power	± 0.75dB
6	RF power density	± 2.84dB
7	Conducted Spurious emissions	± 0.75dB
8	RF Radiated power	±2.6dB (30MHz-1GHz)
		±2.7dB (1GHz-18GHz)
9	Temperature test	± 1°C
10	Humidity test	± 3%
11	Supply voltages	± 1%
12	Time	± 3%

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.

4.5 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.

South of No. 6 Plant, No. 1, Runsheng Road, Suzhou Industrial Park, Suzhou Area, China (Jiangsu) Pilot Free Trade Zone

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. 6336.01)

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd.is accredited by the American Association for Laboratory Accreditation (A2LA).

• FCC (Designation Number: CN1312)

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd. has been recognized as an accredited testing laboratory.

Test Firm Registration Number: 717327

• ISED (CAB Identifier: CN0120)

SGS-CSTC Standards Technical Services (Suzhou) Co., Ltd. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory.

Company Number: 27594

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	ESR7	SUWI-01-10-01	1/15/2025	1/14/2026
2	LISN	R&S	ENV216	SUWI-01-19-03	5/8/2025	5/7/2026
3	LISN	Schwarzbeck	ENV216	SUWI-01-19-04	5/8/2025	5/7/2026
4	Test Software	Tonscend	JS32-CE_4.0.0.2	SUWI-02-09-05	NCR	NCR
RF Conducted Test						
1	Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	1/20/2025	1/19/2026
2	Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-15	11/21/2025	11/20/2026
3	MXG Vector signal genitor	KEYSIGHT	N5182B	SUWI-01-38-01	1/15/2025	1/14/2026
4	Signal Generator	ROHDE&SCHWARZ	SMW200A	SUWI-01-07-08	3/27/2025	3/26/2026
5	Signal Generator	ROHDE&SCHWARZ	SMW100A	SUWI-01-8-01	1/16/2025	1/15/2026
6	MXG Vector Signal Generator	ROHDE&SCHWARZ	SMR20	SUWI-01-33-01	11/21/2025	11/20/2026
7	Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	SUWI-01-16-13	5/8/2025	5/7/2026
8	Wideband Radio Communication Test Ststion	Anritsu	MT8000A	SUWI-01-34-02	11/21/2025	11/20/2026
9	Wideband Radio Communication Tester	Anritsu	MT8821C	SUWI-01-26-03	11/21/2025	11/20/2026
10	Power meter	Anritsu	ML2495A	SUWI-01-31-01	11/21/2025	11/20/2026
11	Pulse power sensor	Anritsu	MA2411B	SUWI-01-32-01	11/21/2025	11/20/2026
12	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	5/7/2025	5/6/2026
15	Measurement Software	TST	TST 272 V2.02	SUWI-03-55-03	NCR	NCR
16	RF Control unit	TST	TSCB3023R2	SUWI-02-20-01	NCR	NCR
17	RFCables	Tonscend	NA	SUWI-01-03-01	1/16/2025	1/15/2026
RF Radiated Test						
1	Semi-Anechoic Chamber	Brilliant-emc	N/A	SUWI-04-02-01	6/3/2023	6/2/2026
2	Signal Analyzer	ROHDE&SCHWARZ	FSW43	SUWI-01-02-04	1/20/2025	1/19/2026
3	Signal Analyzer	KEYSIGHT	N9020A	SUWI-01-02-09	11/21/2025	11/20/2026
4	Test receiver	ROHDE&SCHWARZ	ESR7	SUWI-01-10-01	1/15/2025	1/14/2026
5	Signal Generator	ROHDE&SCHWARZ	SMW100A	SUWI-01-18-01	1/16/2025	1/15/2026
6	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	VULB 9168	SUWI-01-11-04	9/10/2025	9/9/2027
7	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9120D	SUWI-01-11-02	5/7/2025	5/6/2027
8	Receiving antenna	SCHWRZBECK MESS-ELEKTRONIK	BBHA 9170	SUWI-01-11-03	5/7/2025	5/6/2027
9	Active Loop Antenna	SCHWRZBECK MESS-	FMZB 1519B	SUWI-01-21-01	5/7/2025	5/6/2027

		ELEKTRONIK				
10	Amplifier	Tonscend	TAP9K3G40	SUWI-01-14-01	1/16/2025	1/15/2026
11	Amplifier	Tonscend	TAP01018050	SUWI-01-14-02	1/16/2025	1/15/2026
12	Amplifier	Tonscend	TAP18040048	SUWI-01-14-03	1/20/2025	1/19/2026
13	Wideband Radio Communication Tester	Anritsu	MT8820C	SUWI-01-26-01	11/21/2025	11/20/2026
14	Wideband Radio Communication Tester	Anritsu	MT8821C	SUWI-01-26-03	8/25/2025	8/24/2026
15	Wideband Radio Communication Tester	ROHDE&SCHWARZ	CMW500	SUWI-01-16-09	8/26/2025	8/25/2026
16	Radio Communication Analyzer	StarPoint	SP9500E	SUWI-01-28-02	11/21/2025	11/20/2026
17	Signal Generator	ROHDE&SCHWARZ	SMB100A	SUWI-01-08-01	1/16/2025	1/15/2026
18	DC Power Supply	HYELEC	HY3005B	SUWI-01-18-01	1/15/2025	1/14/2026
19	Temperature and humidity meter	MingGao	TH101B	SUWI-01-01-05	2/13/2025	2/12/2026
20	Measurement Software	Tonscend	JS32-RE 4.0.0.0	SUWI-02-09-06	NCR	NCR
21	RF Control unit	Tonscend	JS0806-1	SUWI-02-20-01	NCR	NCR
22	RFCables	Tonscend	NA	SUWI-01-03-02	1/16/2025	1/15/2026

Remark: NCR=No Calibration Requirement.

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 Integral Antenna and no consideration of replacement. The best case gain of the antenna is -0.5dBi.

Antenna location: Refer to internal photo.

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

Test Requirement 47 CFR Part 15, Subpart C 15.207

Test Method: ANSI C63.10 (2020) Section 6.2

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		

7.1.1 E.U.T. Operation

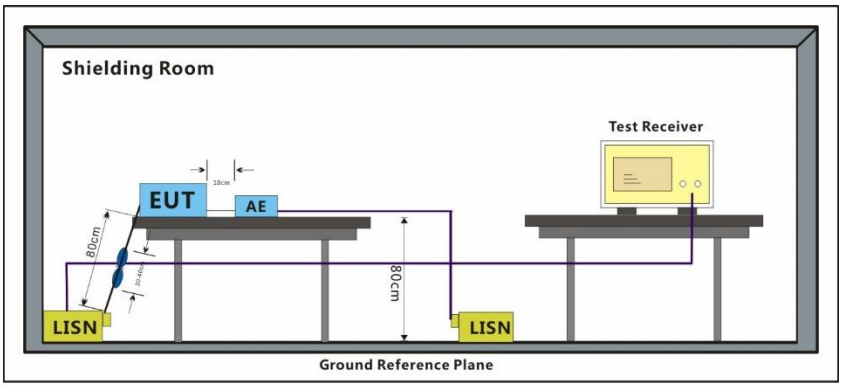
Operating Environment:

Temperature: 23 °C Humidity: 43 % RH Atmospheric Pressure: 1001 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 charging and 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

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.

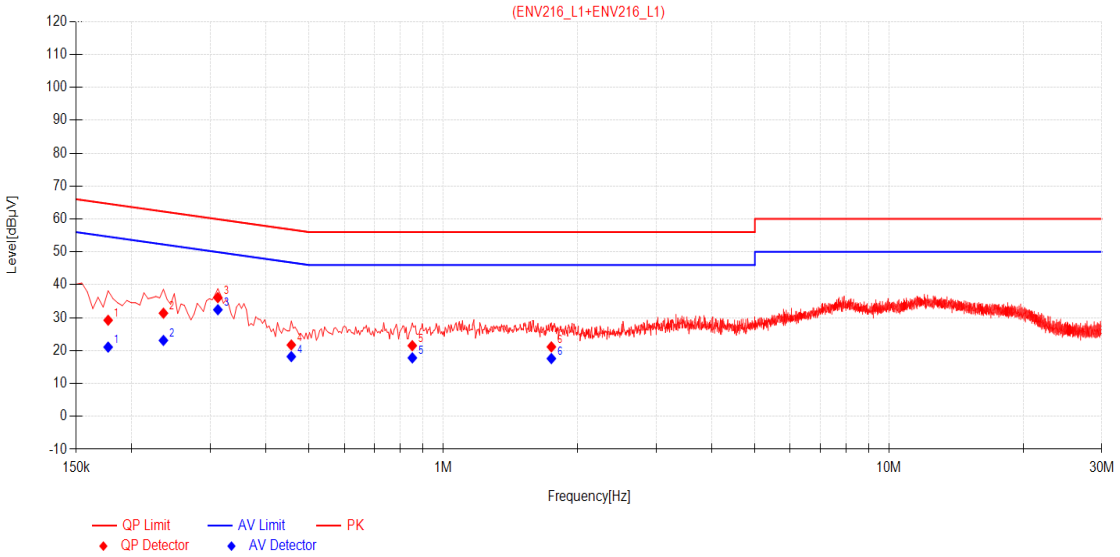
3) The tabletop EUT was placed upon a non-metallic table 0.8m above the ground reference plane. And for floor-standing arrangement, the EUT was placed on the horizontal ground reference plane.

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.

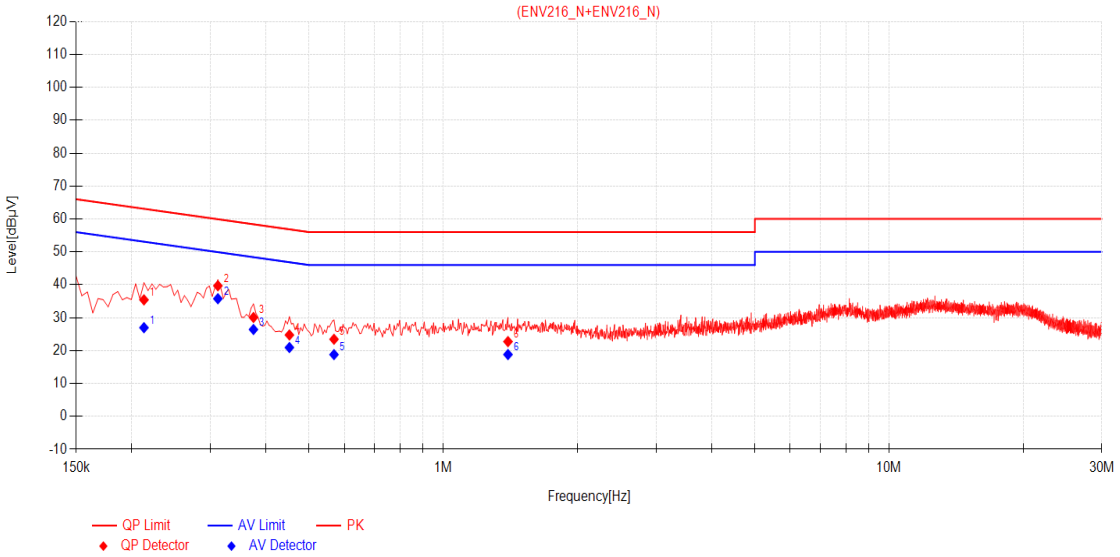
Remark : Level=Read Level+ Cable Loss+ LISN Factor

Test Mode: 00; Line: Live line



Final Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.1770	9.96	19.26	29.22	64.63	35.41	11.09	21.05	54.63	33.58	PASS
2	0.2355	9.97	21.39	31.36	62.25	30.89	13.12	23.09	52.25	29.16	PASS
3	0.3120	9.97	26.12	36.09	59.92	23.83	22.45	32.42	49.92	17.50	PASS
4	0.4560	9.95	11.75	21.70	56.77	35.07	8.22	18.17	46.77	28.60	PASS
5	0.8520	9.93	11.56	21.49	56.00	34.51	7.85	17.78	46.00	28.22	PASS
6	1.7475	9.93	11.19	21.12	56.00	34.88	7.64	17.57	46.00	28.43	PASS

Test Mode: 00; Line: Neutral Line



Final Data List											
NO.	Frequency [MHz]	Factor [dB]	QP Reading [dBµV]	QP Value [dBµV]	QP Limit [dBµV]	QP Margin [dB]	AV Reading [dBµV]	AV Value [dBµV]	AV Limit [dBµV]	AV Margin [dB]	Verdict
1	0.2130	9.97	25.44	35.41	63.09	27.68	16.99	26.96	53.09	26.13	PASS
2	0.3120	9.97	29.73	39.70	59.92	20.22	25.79	35.76	49.92	14.16	PASS
3	0.3750	9.94	20.13	30.07	58.39	28.32	16.46	26.40	48.39	21.99	PASS
4	0.4515	9.92	14.82	24.74	56.85	32.11	11.01	20.93	46.85	25.92	PASS
5	0.5685	9.90	13.54	23.44	56.00	32.56	8.88	18.78	46.00	27.22	PASS
6	1.3965	9.91	12.82	22.73	56.00	33.27	8.88	18.79	46.00	27.21	PASS

7.2 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) Section 6.10.5

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.		

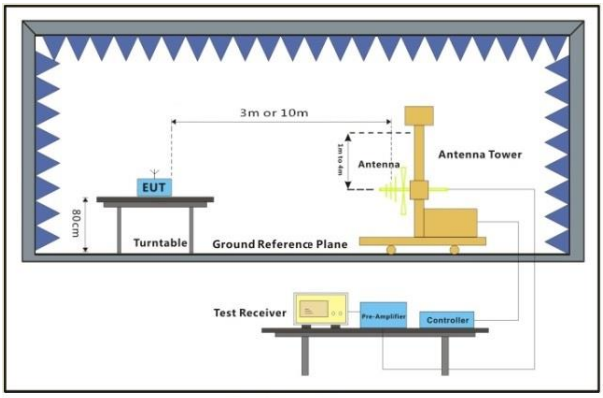
7.2.1 E.U.T. Operation

Operating Environment:
Temperature: 23 °C Humidity: 43 % RH Atmospheric Pressure: 1001 mbar

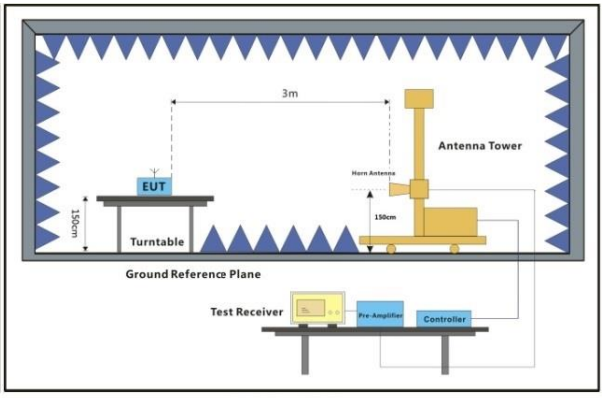
7.2.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in charging and 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



30MHz-1GHz

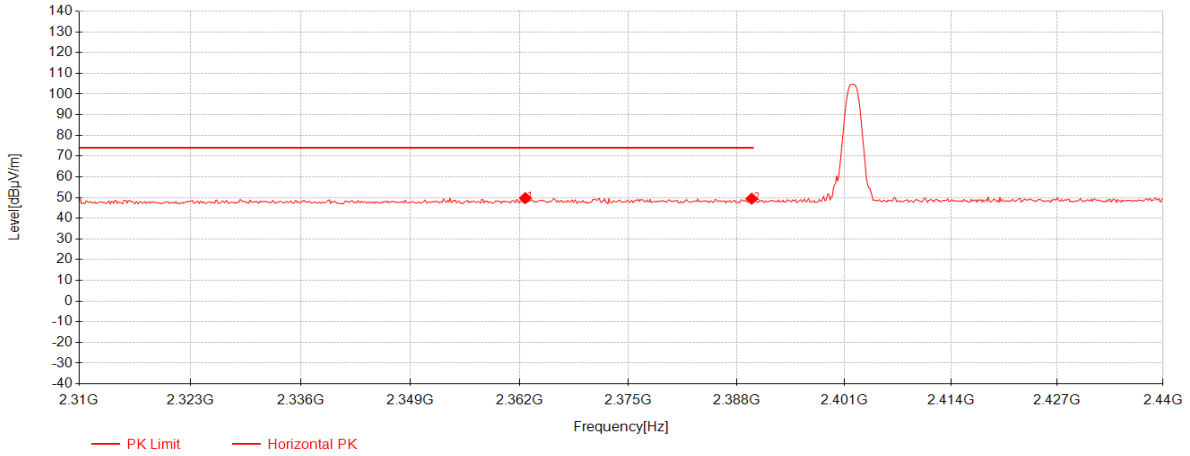


Above 1GHz

7.2.4 Measurement Procedure and Data

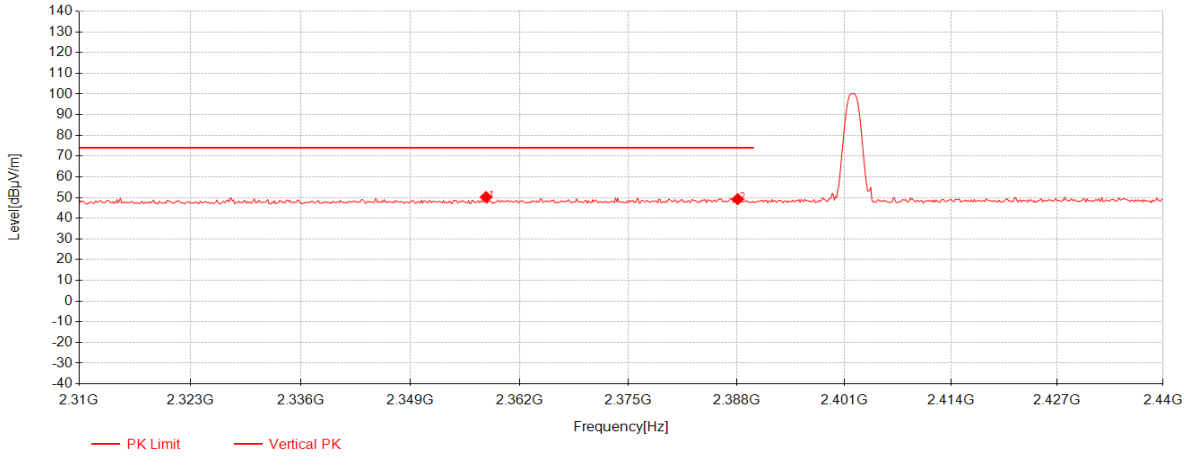
a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters 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.

BT_DH5_TX_CH_00_Horizontal_Peak



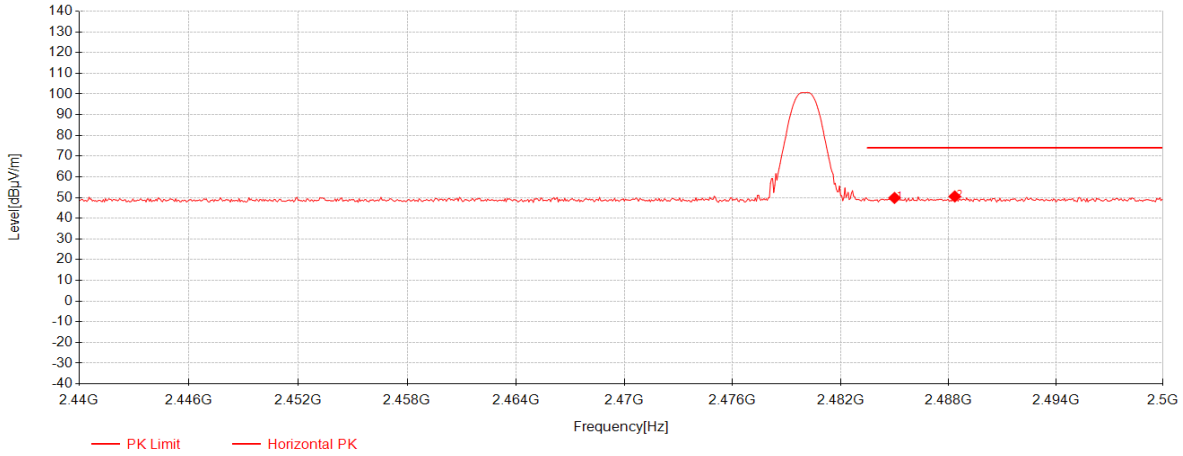
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2362.65	47.37	27.22	-24.84	49.75	74.00	24.25	Horizontal
2	2389.82	46.99	27.29	-24.82	49.46	74.00	24.54	Horizontal

BT_DH5_TX_CH_00_Vertical_Peak



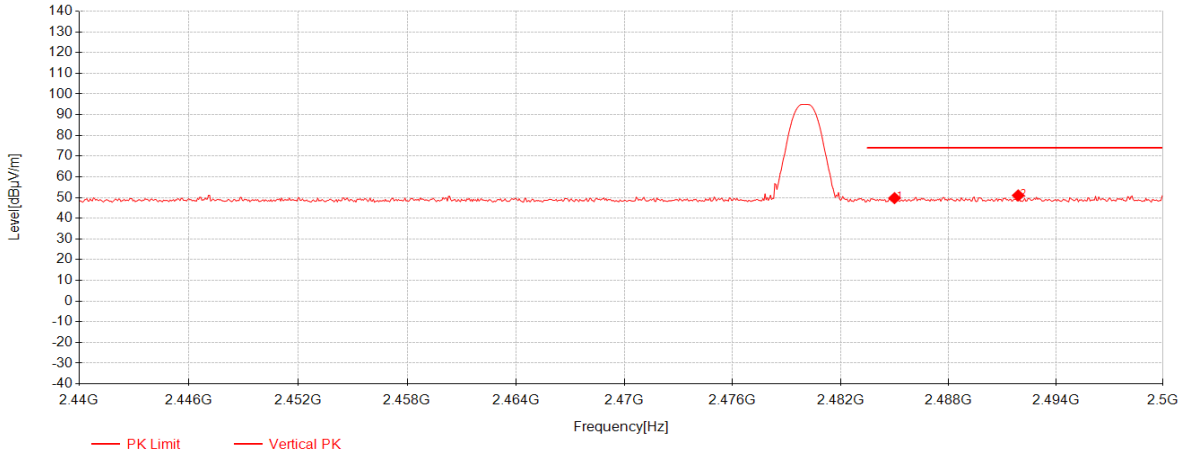
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2357.97	47.86	27.20	-24.84	50.22	74.00	23.78	Vertical
2	2388.13	46.74	27.29	-24.82	49.21	74.00	24.79	Vertical

BT_DH5_TX_CH_78_Horizontal_Peak



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2485	46.88	27.56	-24.63	49.81	74.00	24.19	Horizontal
2	2488.36	47.59	27.57	-24.62	50.53	74.00	23.47	Horizontal

BT_DH5_TX_CH_78_Vertical_Peak



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2485	46.78	27.56	-24.63	49.71	74.00	24.29	Vertical
2	2491.9	48.06	27.58	-24.62	51.02	74.00	22.98	Vertical

7.3 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2020) Section 6.4,6.5
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
960-1000	500	3

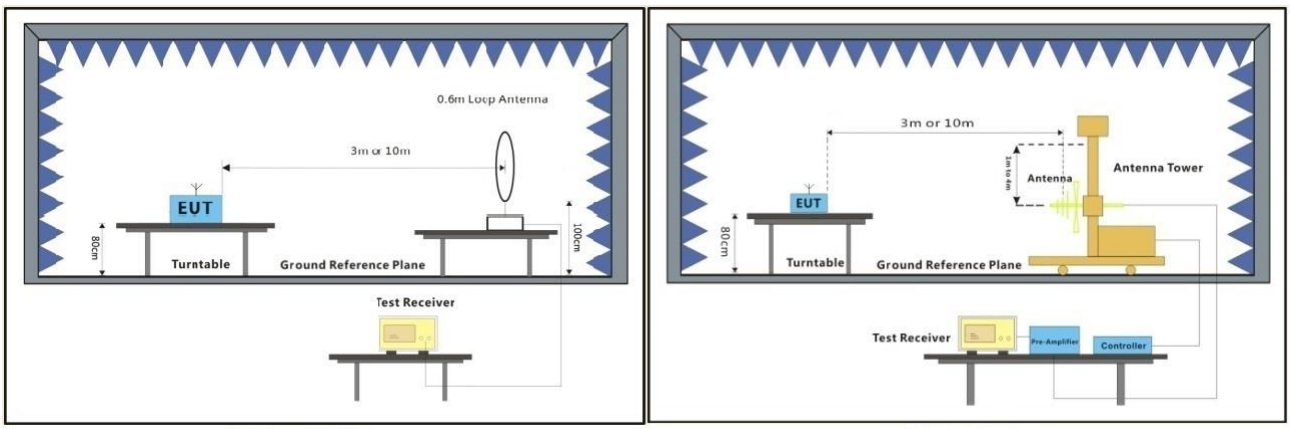
7.3.1 E.U.T. Operation

Operating Environment:
Temperature: 23 °C Humidity: 43 % RH Atmospheric Pressure: 1001 mbar

7.3.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in charging and 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.

7.3.3 Test Setup Diagram



Below 30MHz 30MHz-1GHz

7.3.4 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 meters semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.

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

c. 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.

d. 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.

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.

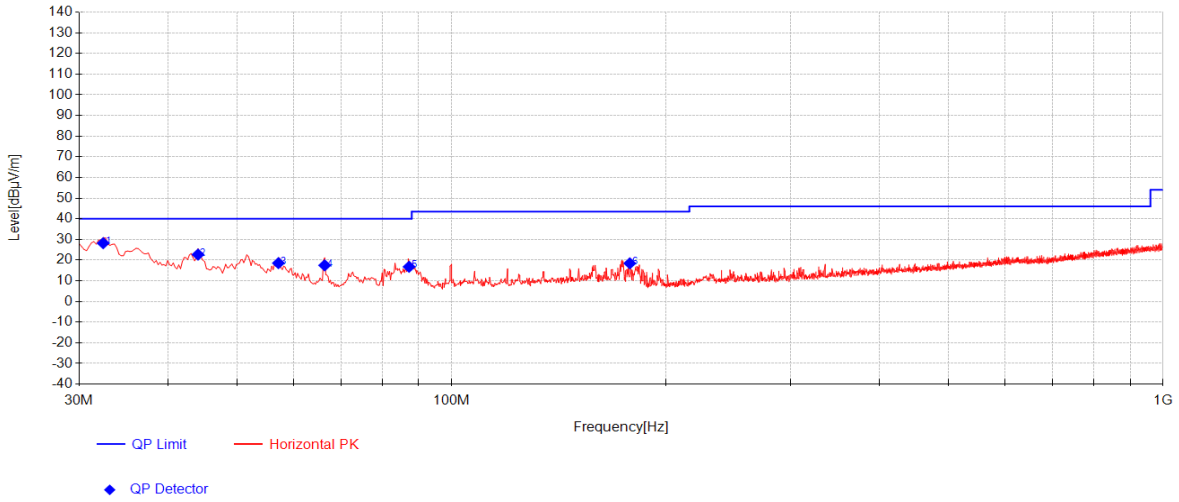
i. Repeat above procedures until all frequencies measured was complete.

Remark:

1. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

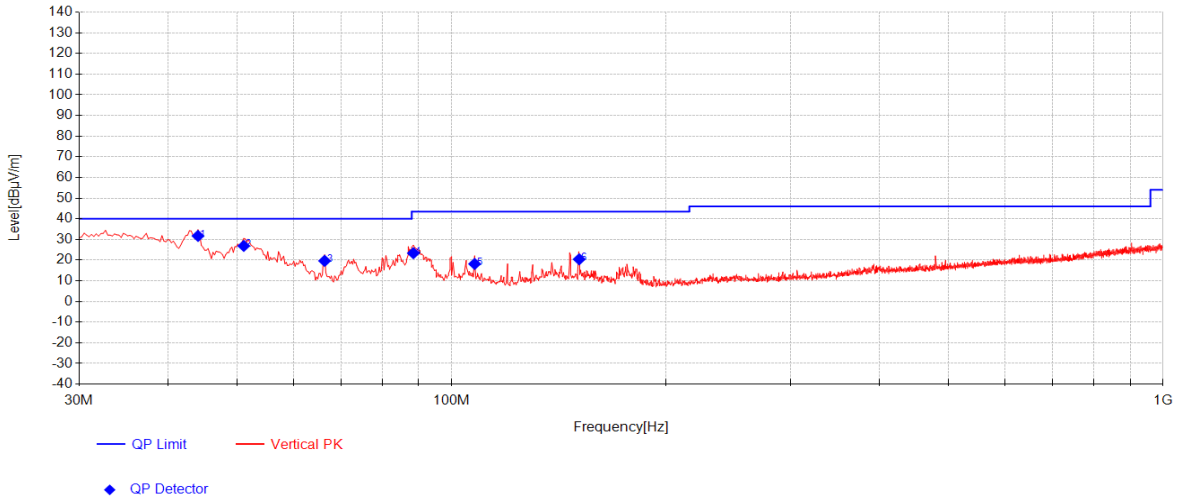
2. Scan from 9kHz to 30MHz, the disturbance below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

Test Mode: 00; Polarity: Horizontal



Final Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	32.425	49.55	12.65	-33.99	28.21	40.00	11.79	157	305	Horizontal
2	44.065	43.16	13.32	-33.79	22.69	40.00	17.31	184	222	Horizontal
3	57.16	39.52	12.64	-33.59	18.57	40.00	21.43	177	75	Horizontal
4	66.375	39.99	10.96	-33.47	17.48	40.00	22.52	169	305	Horizontal
5	87.23	41.06	9.01	-33.28	16.79	40.00	23.21	125	200	Horizontal
6	178.1675	39.94	10.89	-32.38	18.45	43.50	25.05	134	305	Horizontal

Test Mode: 00; Polarity: Vertical



Final Data List										
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	44.065	52.18	13.32	-33.79	31.71	40.00	8.29	152	101	Vertical
2	51.0975	47.19	13.37	-33.68	26.88	40.00	13.12	163	151	Vertical
3	66.375	42.15	10.96	-33.47	19.64	40.00	20.36	147	236	Vertical
4	88.4425	47.69	8.96	-33.27	23.38	43.50	20.12	125	256	Vertical
5	107.8425	41.09	10.10	-33.02	18.17	43.50	25.33	196	330	Vertical
6	151.25	40.34	12.76	-32.67	20.42	43.50	23.08	143	68	Vertical

7.4 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2020) Section 6.6
Measurement Distance: 3m

Limit:

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

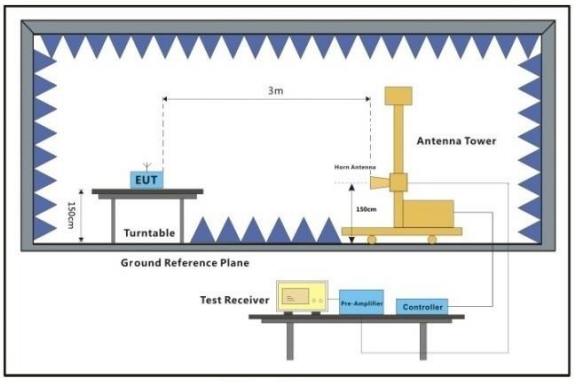
7.4.1 E.U.T. Operation

Operating Environment:
Temperature: 23 °C Humidity: 44 % RH Atmospheric Pressure: 1001 mbar

7.4.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	00	TX_non-Hop mode_Keep the EUT in charging and 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.

7.4.3 Test Setup Diagram



Above 1GHz

7.4.4 Measurement Procedure and Data

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

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

c. 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.

d. 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.

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 peak or average 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. Level= Read Level+ Cable Loss+ Antenna Factor- Preamp Factor

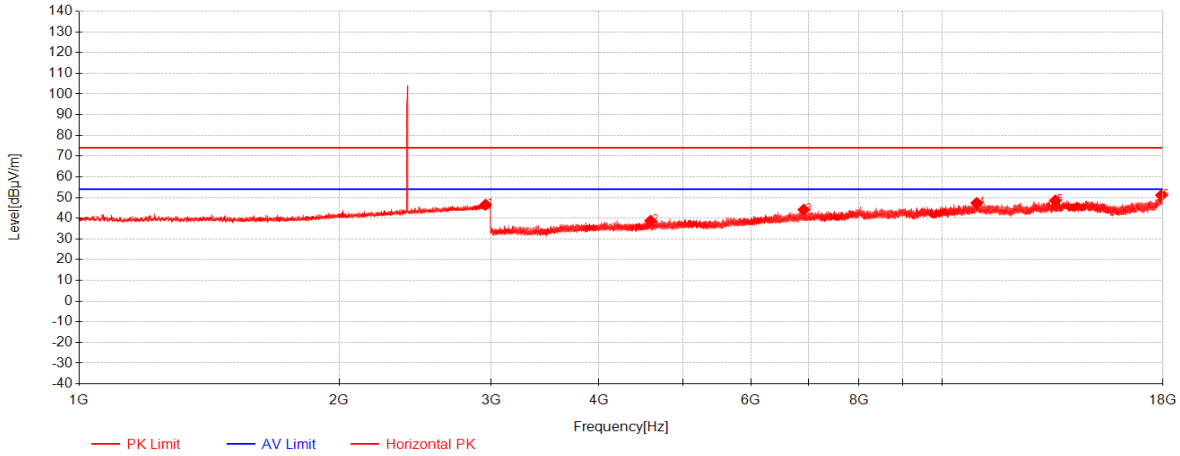
2. Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported.

3. 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.

4: 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.

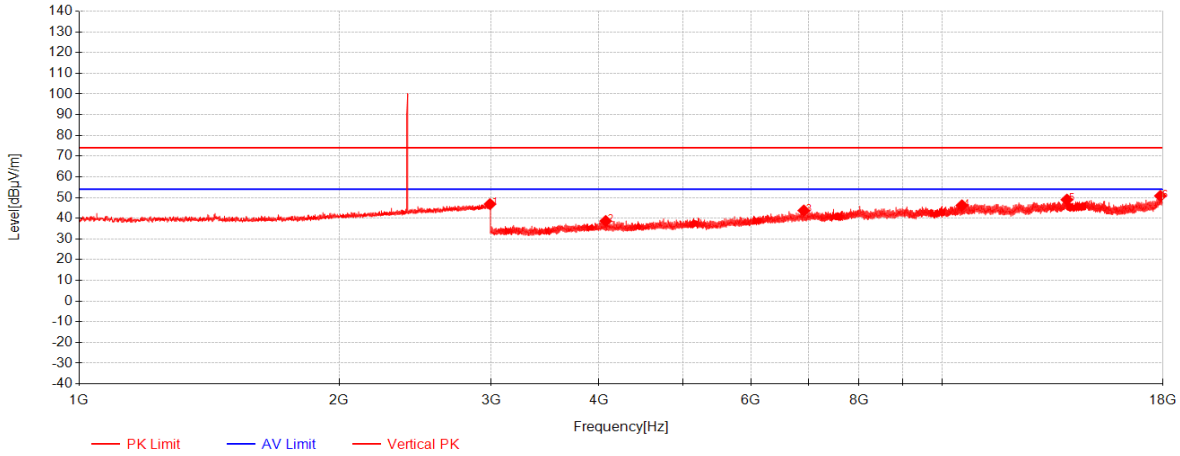
5:For fundamental and harmonic signal measurement, the resolution bandwidth of test receiver/spectrum analyzer is 1MHz and the video bandwidth is $\geqslant$1/T (Duty cycle$<$98%) or 10Hz (Duty cycle$\geqslant$98%) for Average detection (AV) at frequency above 1GHz.

BT_DH5_TX_CH_00_Horizontal



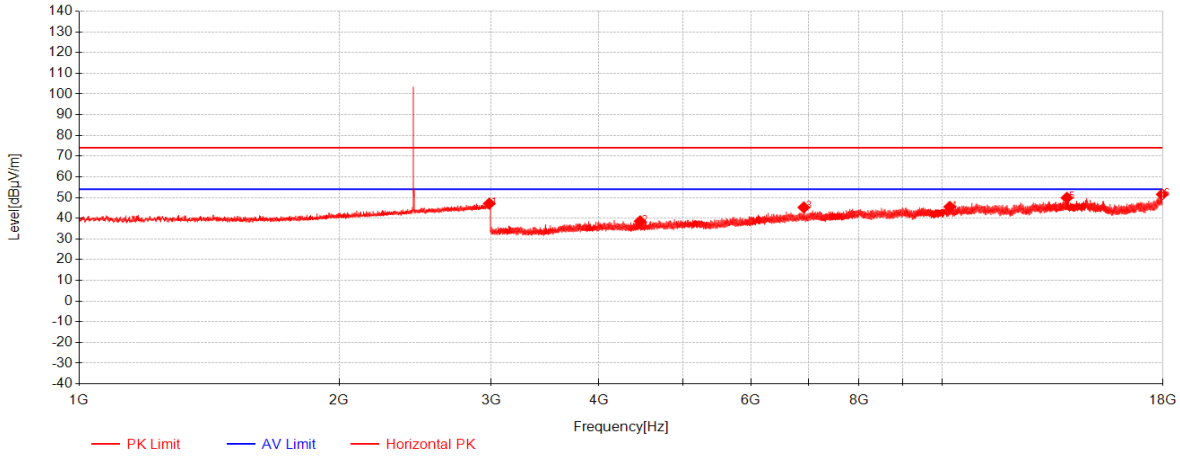
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2955.5	40.60	29.42	-23.49	46.54	74.00	27.46	Horizontal
2	4590	51.75	32.12	-45.09	38.78	74.00	35.22	Horizontal
3	6906.375	50.72	36.15	-42.74	44.13	74.00	29.87	Horizontal
4	10952.25	44.39	39.24	-36.25	47.38	74.00	26.62	Horizontal
5	13506.75	42.92	40.15	-34.53	48.54	74.00	25.46	Horizontal
6	17925	40.75	41.48	-31.09	51.15	74.00	22.85	Horizontal

BT_DH5_TX_CH_00_Vertical



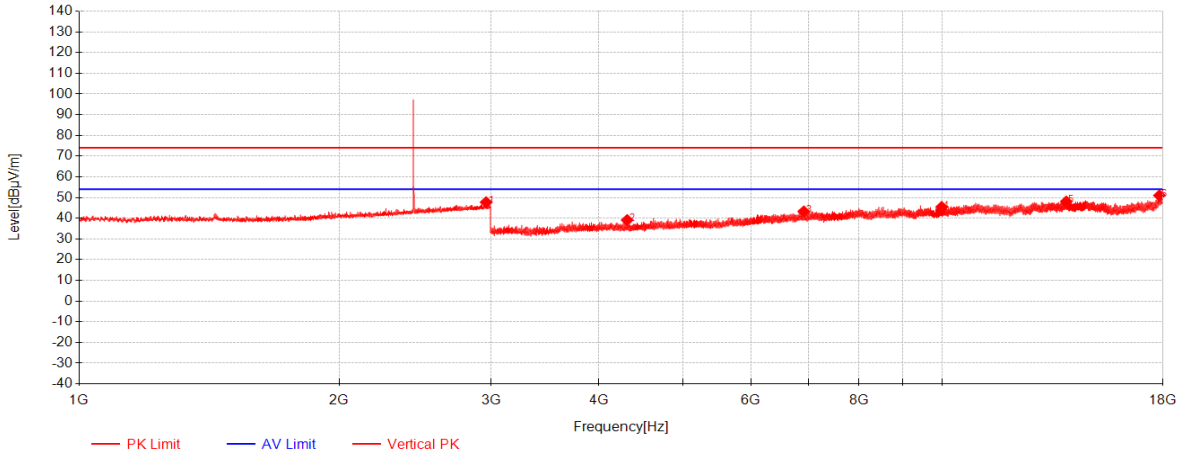
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2991	40.73	29.56	-23.47	46.83	74.00	27.17	Vertical
2	4072.125	52.53	31.22	-45.09	38.65	74.00	35.35	Vertical
3	6906.75	50.29	36.15	-42.75	43.70	74.00	30.30	Vertical
4	10529.25	44.12	38.74	-36.66	46.20	74.00	27.80	Vertical
5	13931.25	43.40	40.37	-34.81	48.96	74.00	25.04	Vertical
6	17875.5	40.41	41.34	-30.96	50.79	74.00	23.21	Vertical

BT_DH5_TX_CH_39_Horizontal



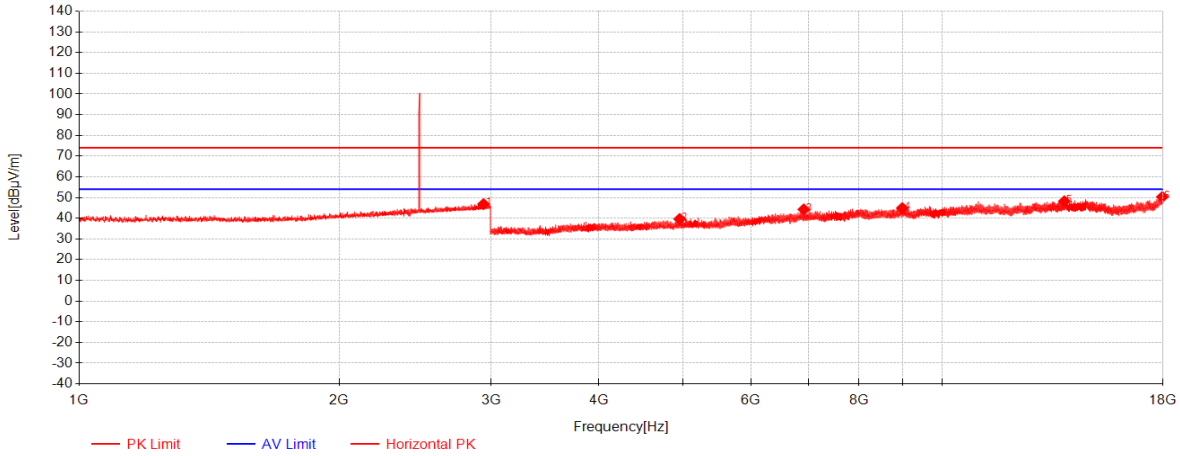
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2985	41.01	29.54	-23.47	47.08	74.00	26.92	Horizontal
2	4463.25	51.97	31.84	-45.30	38.51	74.00	35.49	Horizontal
3	6906.75	51.83	36.15	-42.75	45.24	74.00	28.76	Horizontal
4	10192.125	44.15	38.33	-36.98	45.50	74.00	28.50	Horizontal
5	13929.75	44.31	40.36	-34.79	49.88	74.00	24.12	Horizontal
6	17962.875	41.01	41.59	-31.05	51.55	74.00	22.45	Horizontal

BT_DH5_TX_CH_39_Vertical



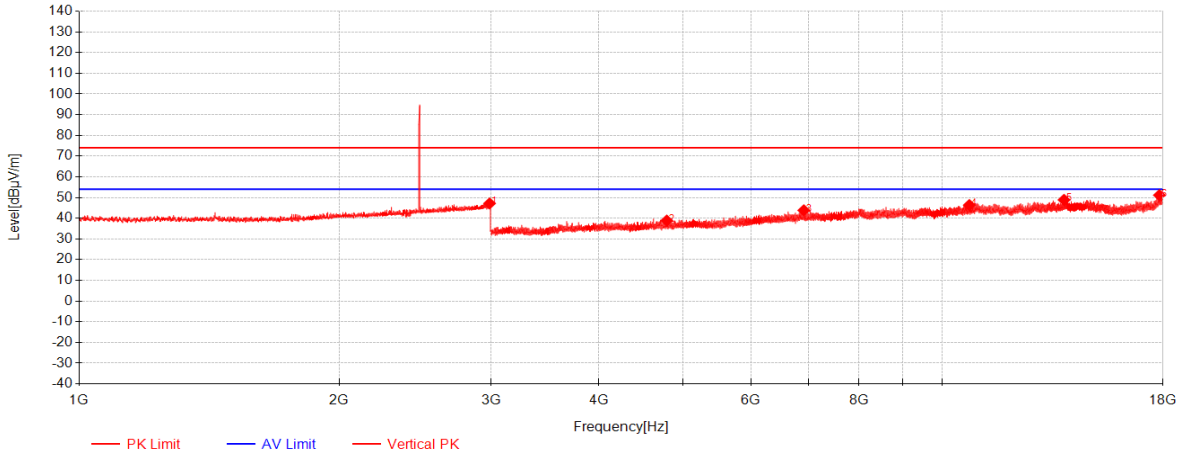
Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2960	41.77	29.44	-23.48	47.73	74.00	26.27	Vertical
2	4311.75	52.91	31.60	-45.38	39.13	74.00	34.87	Vertical
3	6906.75	49.85	36.15	-42.75	43.26	74.00	30.74	Vertical
4	9975.375	45.00	38.10	-37.66	45.44	74.00	28.56	Vertical
5	13907.625	42.24	40.35	-34.54	48.06	74.00	25.94	Vertical
6	17827.5	40.46	41.20	-30.66	51.00	74.00	23.00	Vertical

BT_DH5_TX_CH_78_Horizontal



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2939.5	40.96	29.36	-23.50	46.82	74.00	27.18	Horizontal
2	4960.125	51.46	33.00	-44.85	39.62	74.00	34.38	Horizontal
3	6906.75	50.84	36.15	-42.75	44.25	74.00	29.75	Horizontal
4	8980.5	46.30	37.99	-39.42	44.87	74.00	29.13	Horizontal
5	13833.375	42.96	40.32	-35.08	48.19	74.00	25.81	Horizontal
6	17968.875	39.75	41.61	-31.05	50.31	74.00	23.69	Horizontal

BT_DH5_TX_CH_78_Vertical



Data List								
NO.	Frequency [MHz]	Reading [dBµV]	AF [dB/m]	Factor [dB]	Level [dBµV/m]	Limit [dBµV/m]	Margin [dB]	Polarity
1	2987.5	41.07	29.55	-23.47	47.15	74.00	26.85	Vertical
2	4791.75	51.40	32.60	-45.14	38.86	74.00	35.14	Vertical
3	6906.75	50.42	36.15	-42.75	43.83	74.00	30.17	Vertical
4	10738.875	43.87	38.99	-36.49	46.36	74.00	27.64	Vertical
5	13824	43.72	40.31	-35.17	48.86	74.00	25.14	Vertical
6	17827.125	40.62	41.20	-30.66	51.16	74.00	22.84	Vertical

7.5 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)
Test Method: ANSI C63.10 (2020) 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

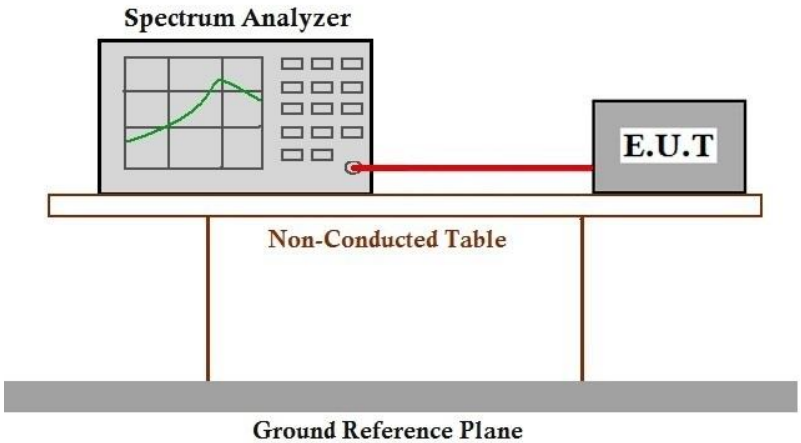
7.5.1 E.U.T. Operation

Operating Environment:
Temperature: 26.3 °C Humidity: 46.4 % RH Atmospheric Pressure: 1001 mbar

7.5.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_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.

7.5.3 Test Setup Diagram



7.5.4 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

7.6 20dB Bandwidth

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

Limit:

20 dB bandwidth of the hopping channel	Hopping frequencies	Average time of occupancy
less than 250 kHz	least 50 hopping frequencies	shall not be greater than 0.4 seconds within a 20 second period
250 kHz to 500kHz	least 25 hopping frequencies	shall not be greater than 0.4 seconds within a 10 second period.

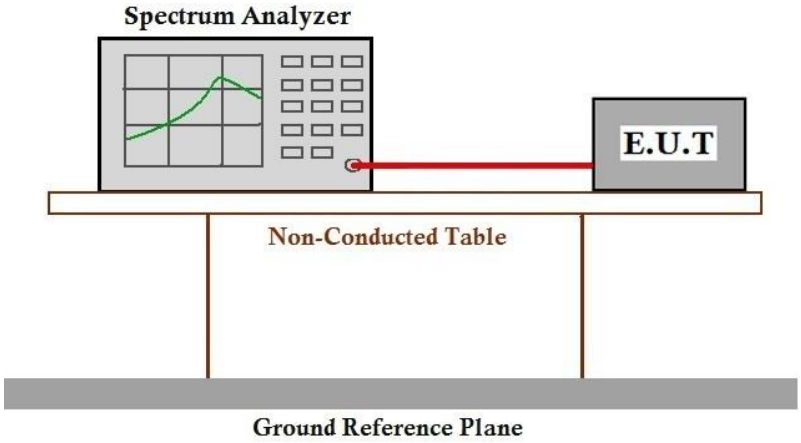
7.6.1 E.U.T. Operation

Operating Environment:
Temperature: 26.3 °C Humidity: 46.4 % RH Atmospheric Pressure: 1001 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 charging and 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.

7.6.3 Test Setup Diagram



7.6.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.7 Carrier Frequencies Separation

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

Test Method: ANSI C63.10 (2020) 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.

7.7.1 E.U.T. Operation

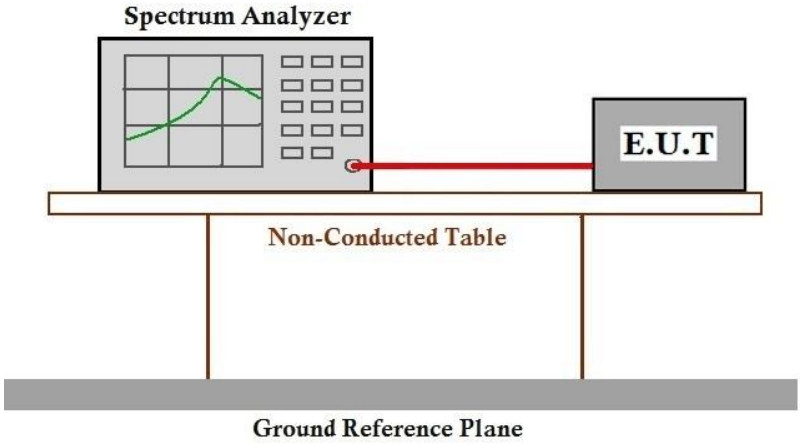
Operating Environment:

Temperature: 26.3 °C Humidity: 46.4 % RH Atmospheric Pressure: 1001 mbar

7.7.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_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 Hopping Channel Number

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10 (2020) 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

7.8.1 E.U.T. Operation

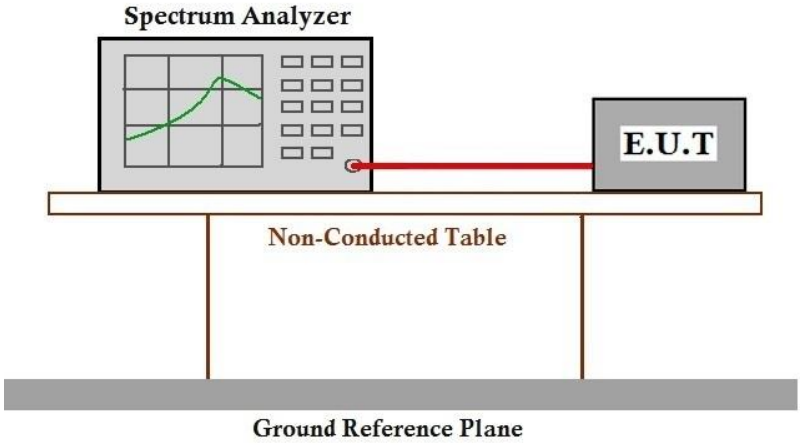
Operating Environment:

Temperature: 26.3 °C Humidity: 46.4 % RH Atmospheric Pressure: 1001 mbar

7.8.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_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



7.8.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.9 Dwell Time

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10 (2020) 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

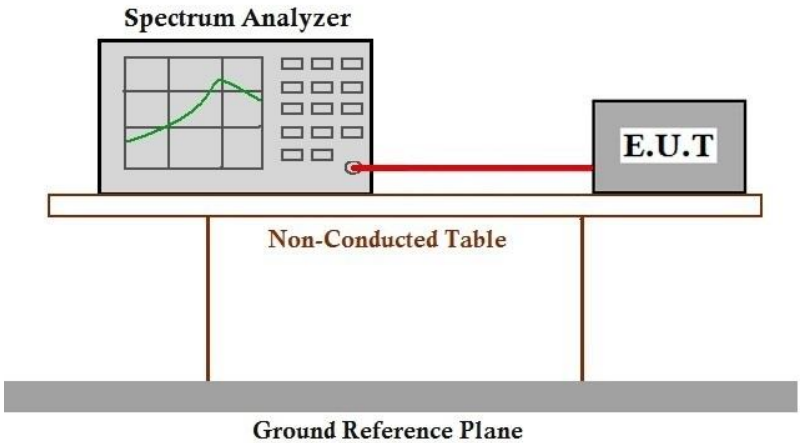
7.9.1 E.U.T. Operation

Operating Environment:
Temperature: 26.3 °C Humidity: 46.4 % RH Atmospheric Pressure: 1001 mbar

7.9.2 Test Mode Description

Pre-scan / Final test	Mode Code	Description
Final test	01	TX_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



7.9.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.10 Conducted Band Edges Measurement

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

Test Method: ANSI C63.10 (2020) 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).

7.10.1 E.U.T. Operation

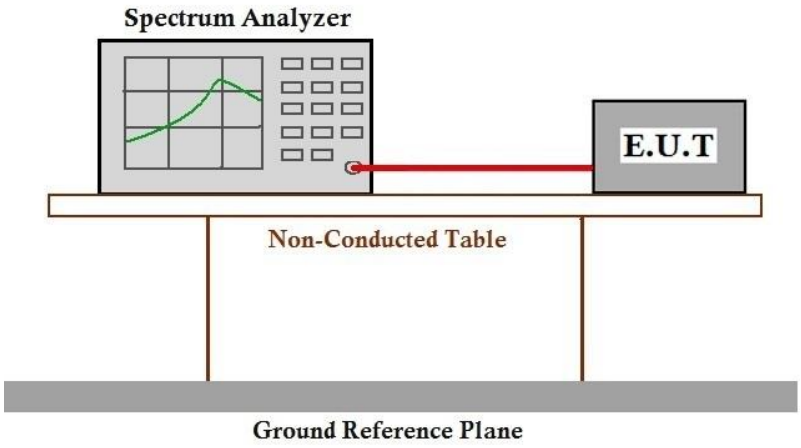
Operating Environment:

Temperature: 26.3 °C Humidity: 46.4 % RH Atmospheric Pressure: 1001 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 charging and 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 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



7.10.4 Measurement Procedure and Data

Please Refer to Appendix for Details

7.11 Conducted Spurious Emissions

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

Test Method: ANSI C63.10 (2020) 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).

7.11.1 E.U.T. Operation

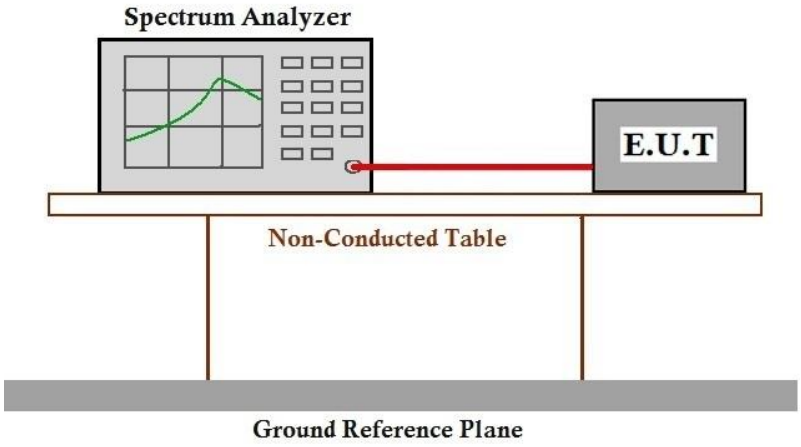
Operating Environment:

Temperature: 26.3 °C Humidity: 46.4 % RH Atmospheric Pressure: 1001 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 charging and 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

Please Refer to Appendix for Details

8 Test Setup Photo

Refer to Appendix - Test Setup Photo for SUCR2510001026WM

9 EUT Constructional Details (EUT Photos)

Refer to Appendix - External Photos for SUCR2510001026WM and Appendix - Internal Photos for SUCR2510001026WM

10 Appendix

1. Duty Cycle

1.1 Test Result

1.1.1 Ant6

Ant6								
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	2.888	3.749	77.03	1.13	0.01
Pi/4DQPSK	SISO	2402	2DH5	2.890	3.750	77.07	1.13	0.01
8DPSK	SISO	2402	3DH5	2.892	3.750	77.12	1.13	0.03

2. Bandwidth

2.1 Test Result

2.1.1 OBW

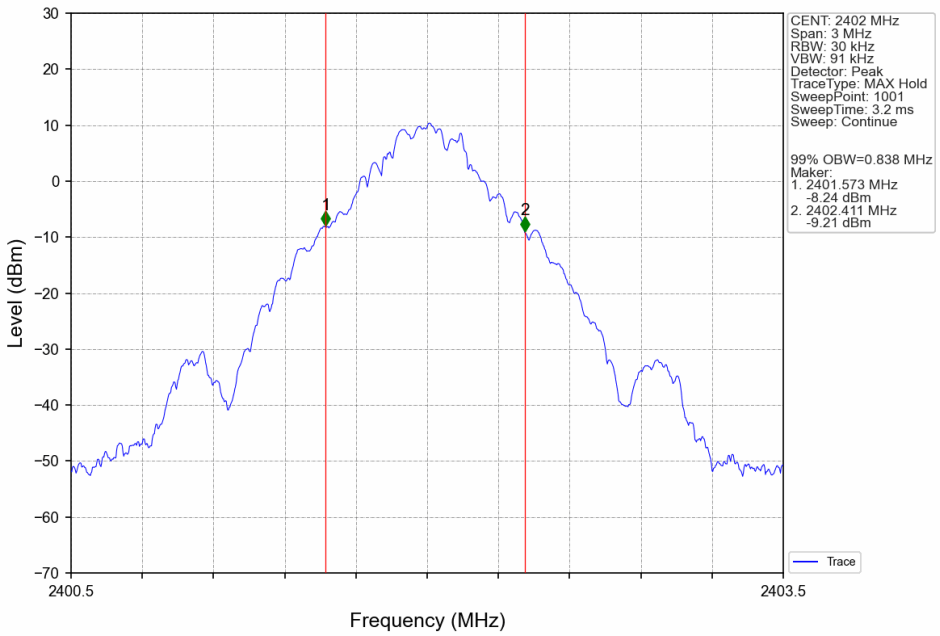
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	6	0.838	/	Pass
		2441	DH5	6	0.834	/	Pass
		2480	DH5	6	0.834	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	6	1.175	/	Pass
		2441	2DH5	6	1.187	/	Pass
		2480	2DH5	6	1.177	/	Pass
8DPSK	SISO	2402	3DH5	6	1.191	/	Pass
		2441	3DH5	6	1.183	/	Pass
		2480	3DH5	6	1.191	/	Pass

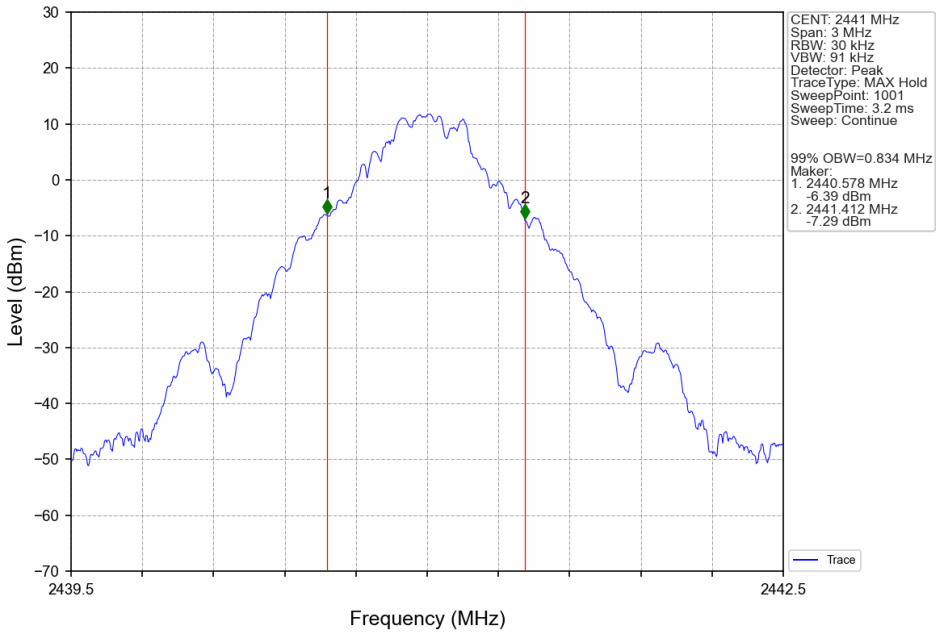
2.1.2 20dB BW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	6	0.942	/	Pass
		2441	DH5	6	0.933	/	Pass
		2480	DH5	6	0.936	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	6	1.320	/	Pass
		2441	2DH5	6	1.333	/	Pass
		2480	2DH5	6	1.312	/	Pass
8DPSK	SISO	2402	3DH5	6	1.312	/	Pass
		2441	3DH5	6	1.312	/	Pass
		2480	3DH5	6	1.317	/	Pass

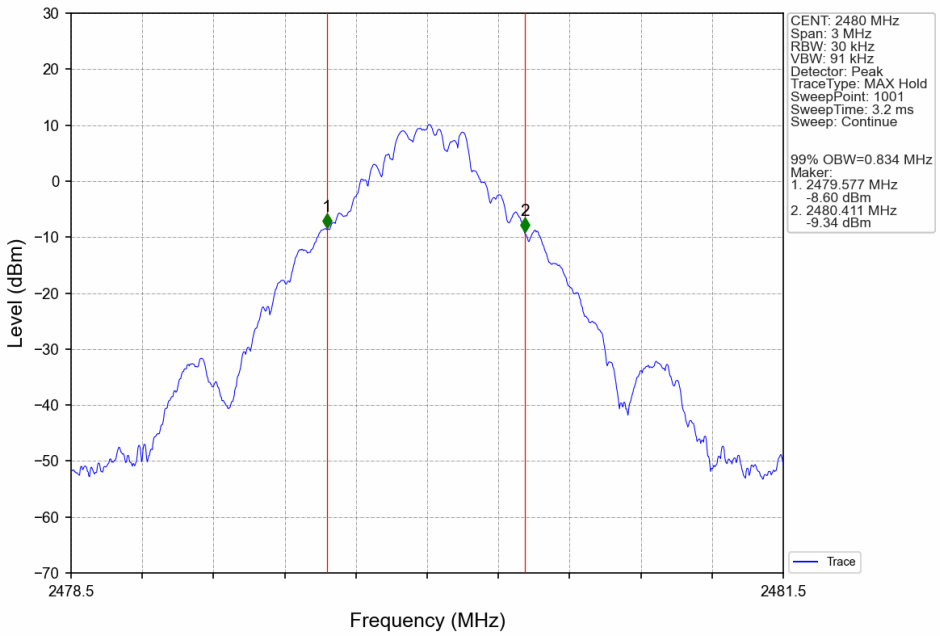
2.2 Test Graph

2.2.1 OBW

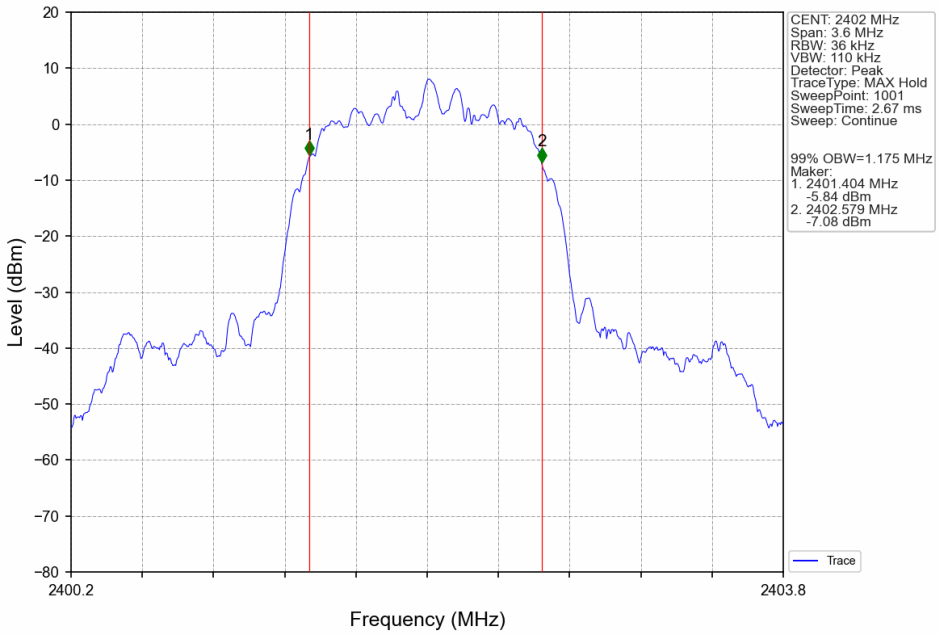
GFSK_DH5_LCH_2402MHz_Ant6_NTNV

GFSK_DH5_MCH_2441MHz_Ant6_NTNV


CENT: 2441 MHz
Span: 3 MHz
RBW: 30 kHz
VBW: 91 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 3.2 ms
Sweep: Continue
99% OBW=0.834 MHz
Maker:
1. 2440.578 MHz
-6.39 dBm
2. 2441.412 MHz
-7.29 dBm
Trace
Level (dBm)
Frequency (MHz)
2439.5
2442.5

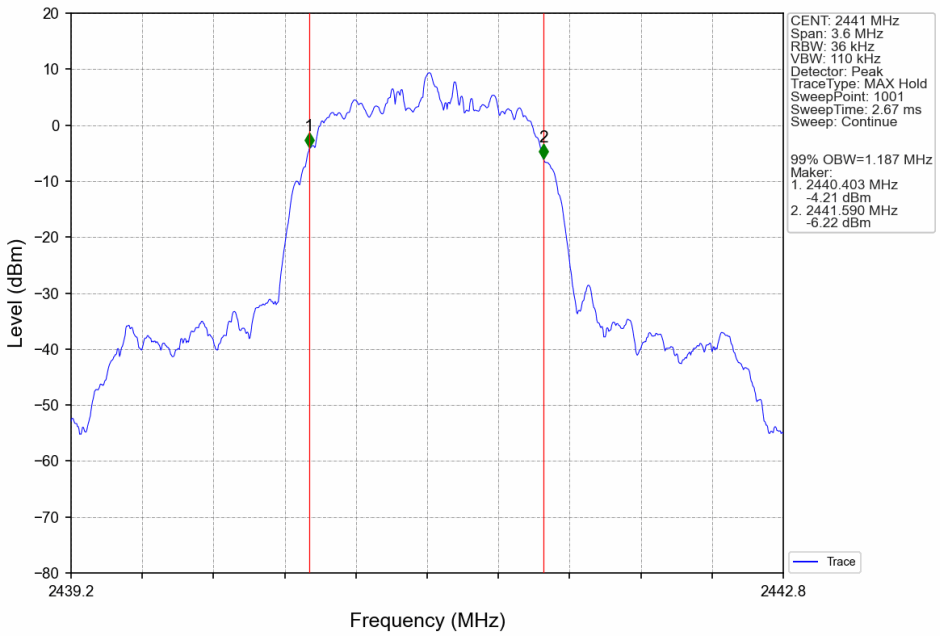
GFSK_DH5_HCH_2480MHz_Ant6_NTNV



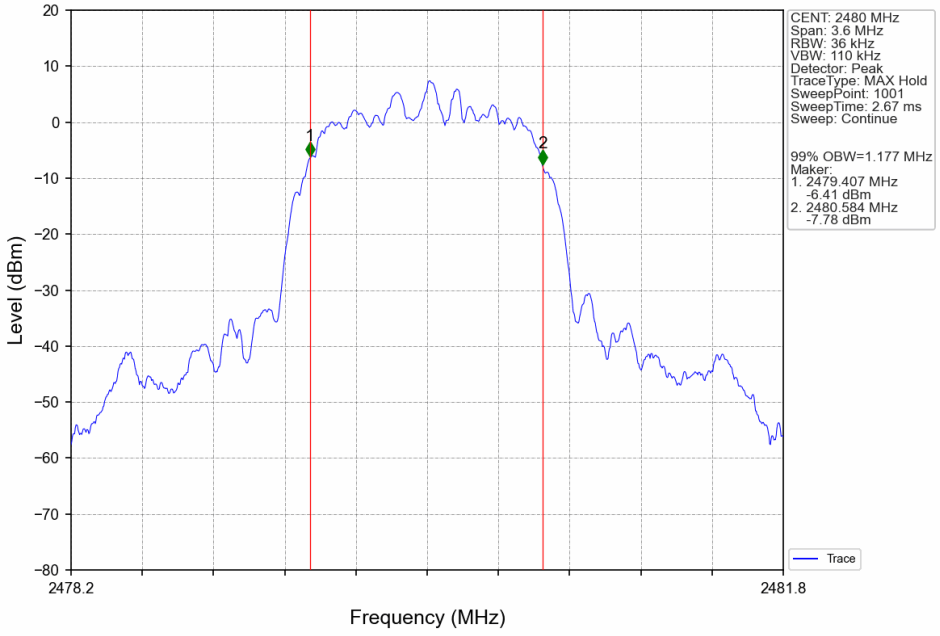
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant6_NTNV



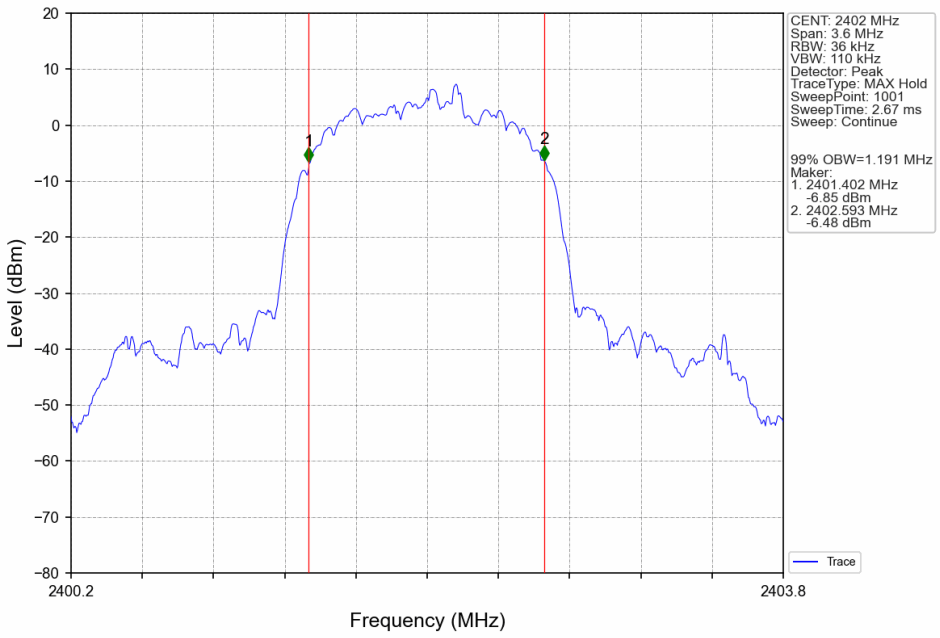
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant6_NTNV



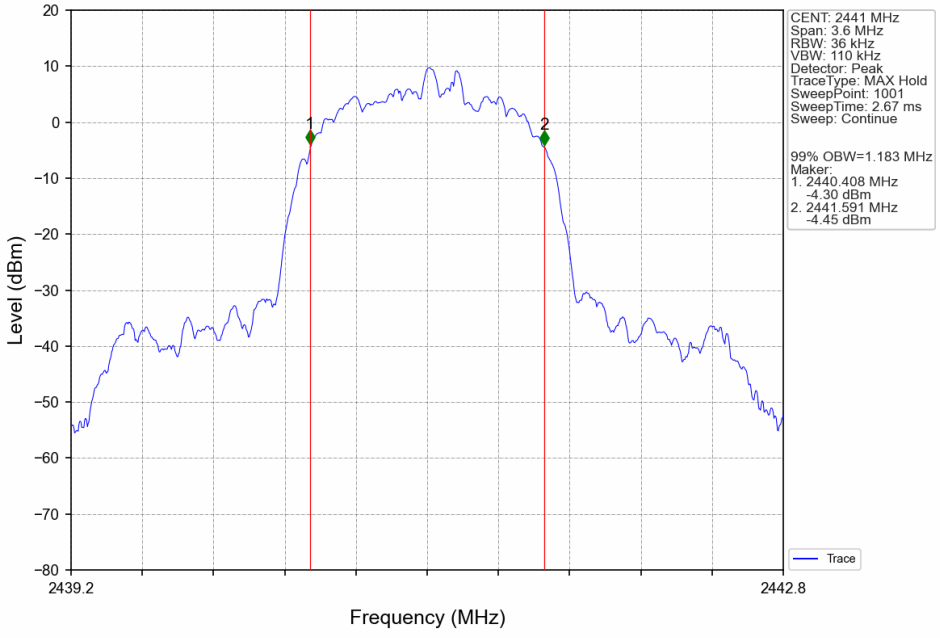
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant6_NTNV



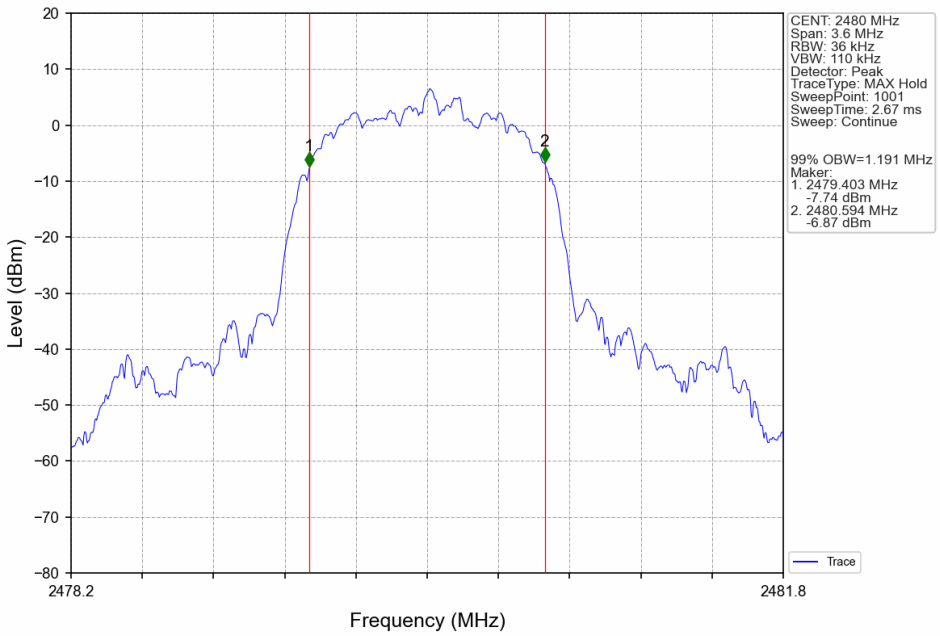
8DPSK_3DH5_LCH_2402MHz_Ant6_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant6_NTNV

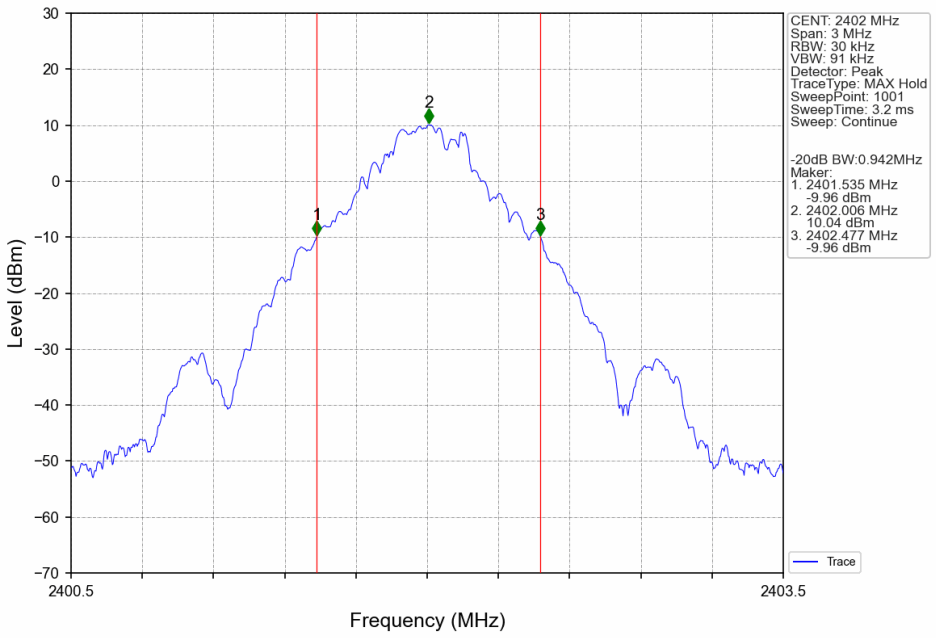


8DPSK_3DH5_HCH_2480MHz_Ant6_NTNV

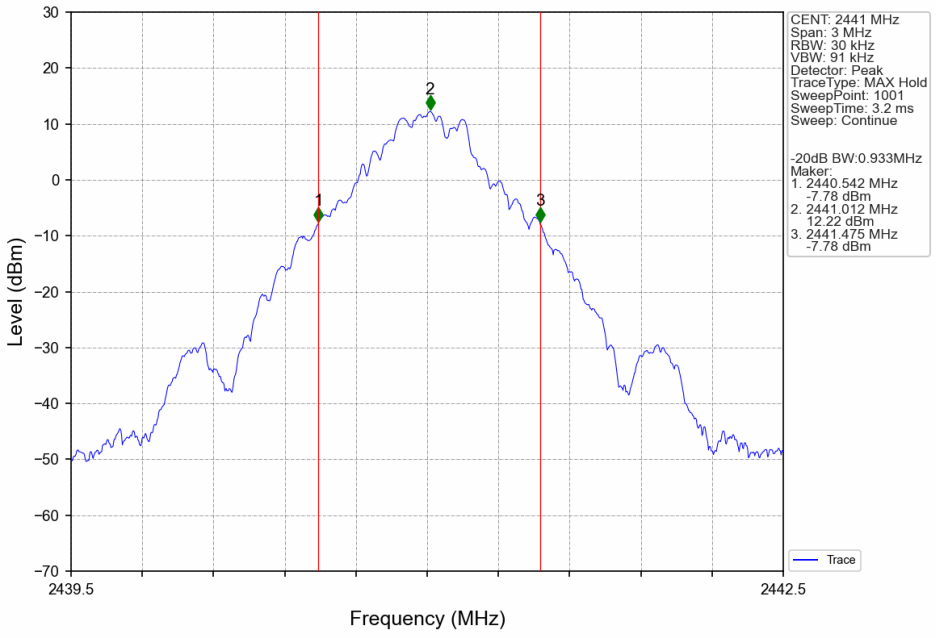


2.2.2 20dB BW

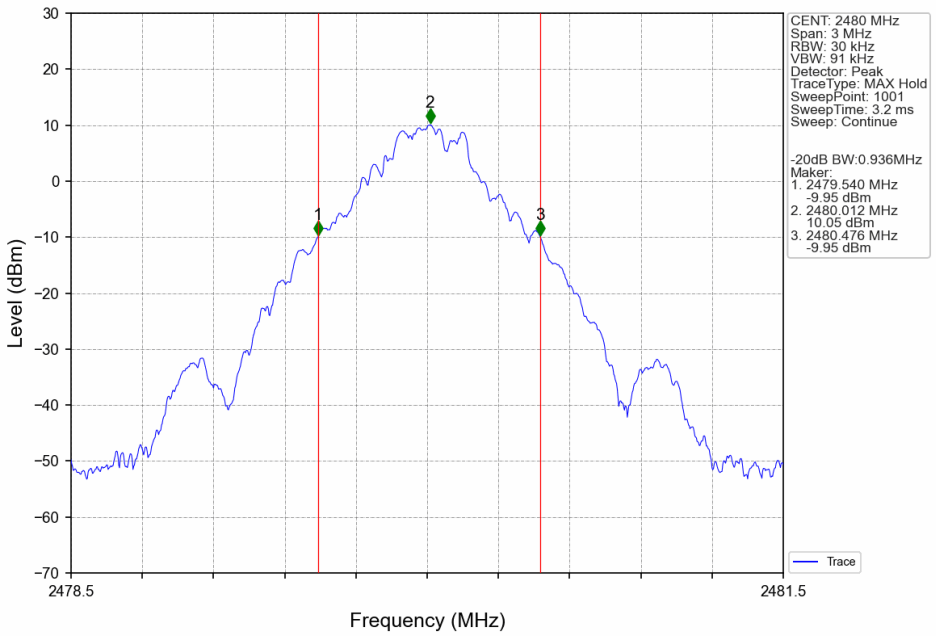
GFSK_DH5_LCH_2402MHz_Ant6_NTNV



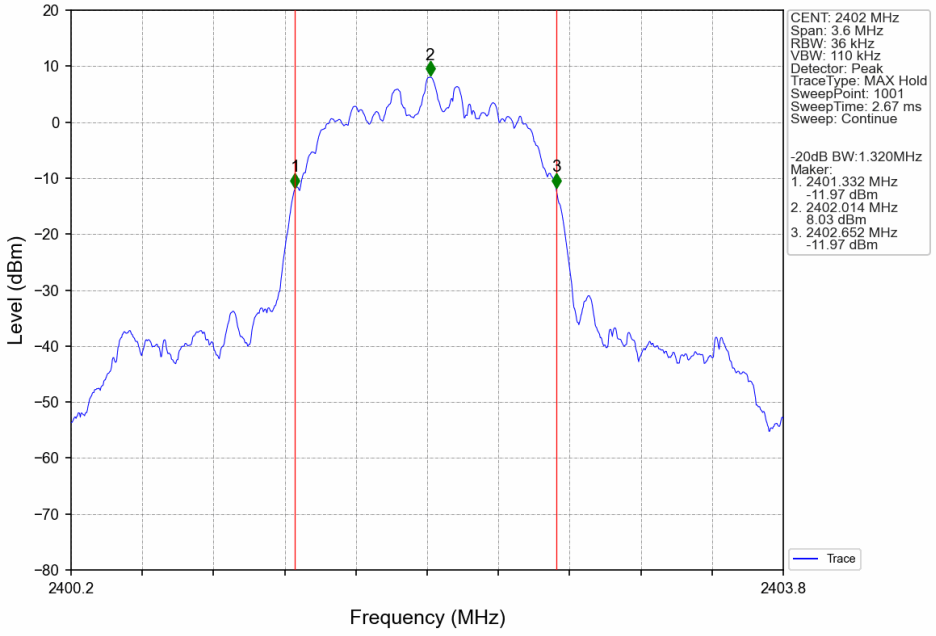
GFSK_DH5_MCH_2441MHz_Ant6_NTNV



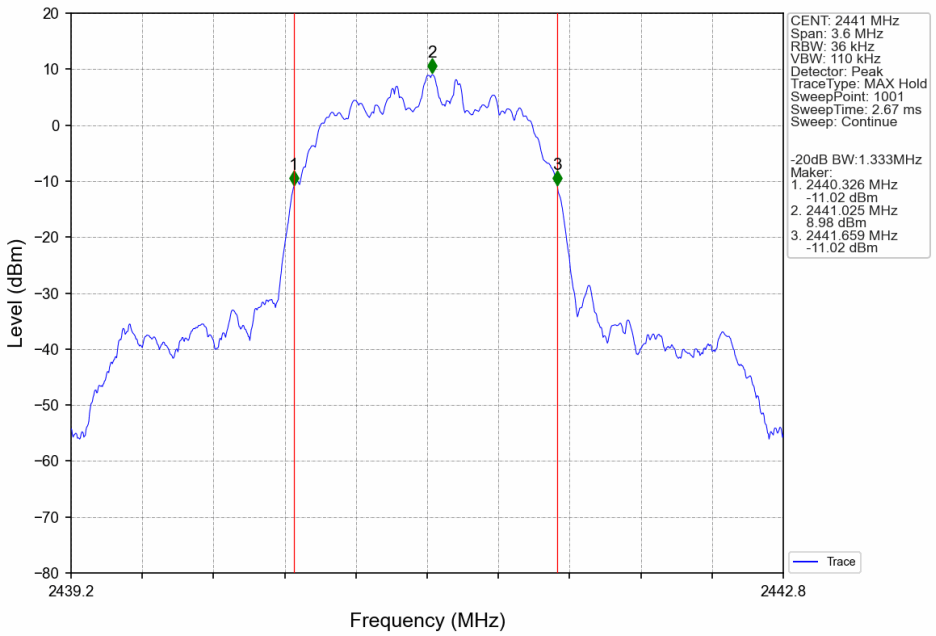
GFSK_DH5_HCH_2480MHz_Ant6_NTNV



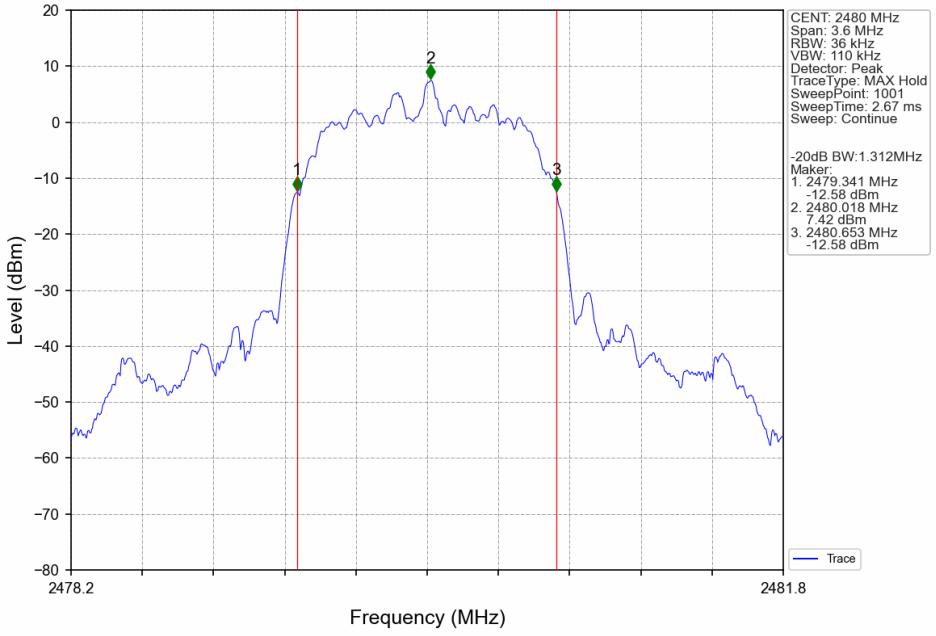
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant6_NTNV



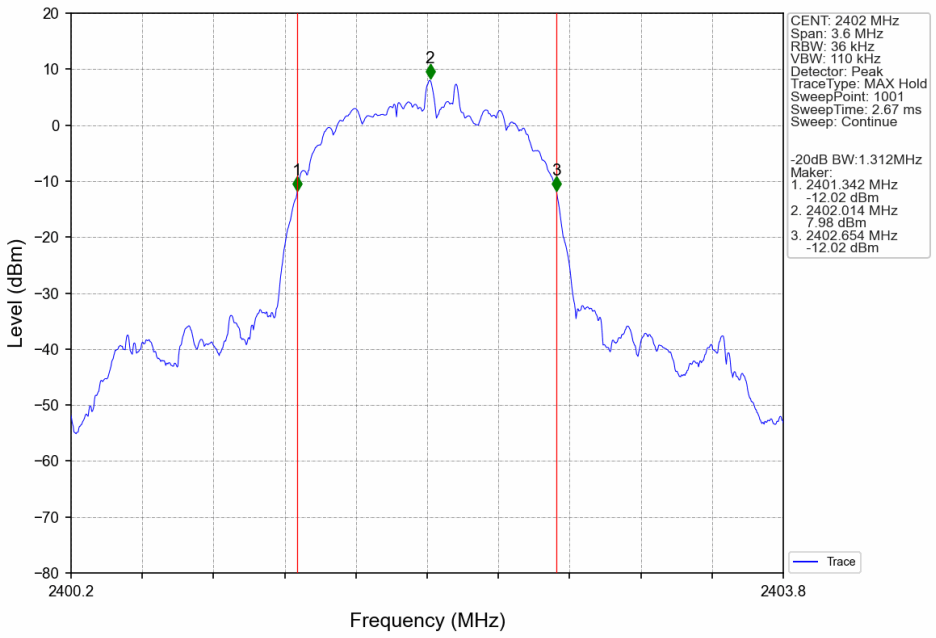
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant6_NTNV



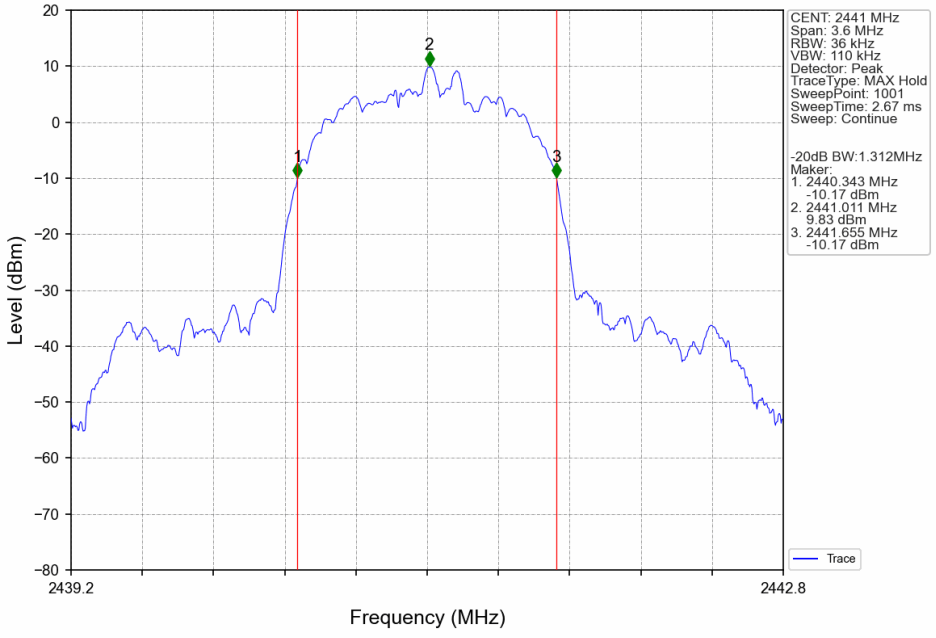
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant6_NTNV



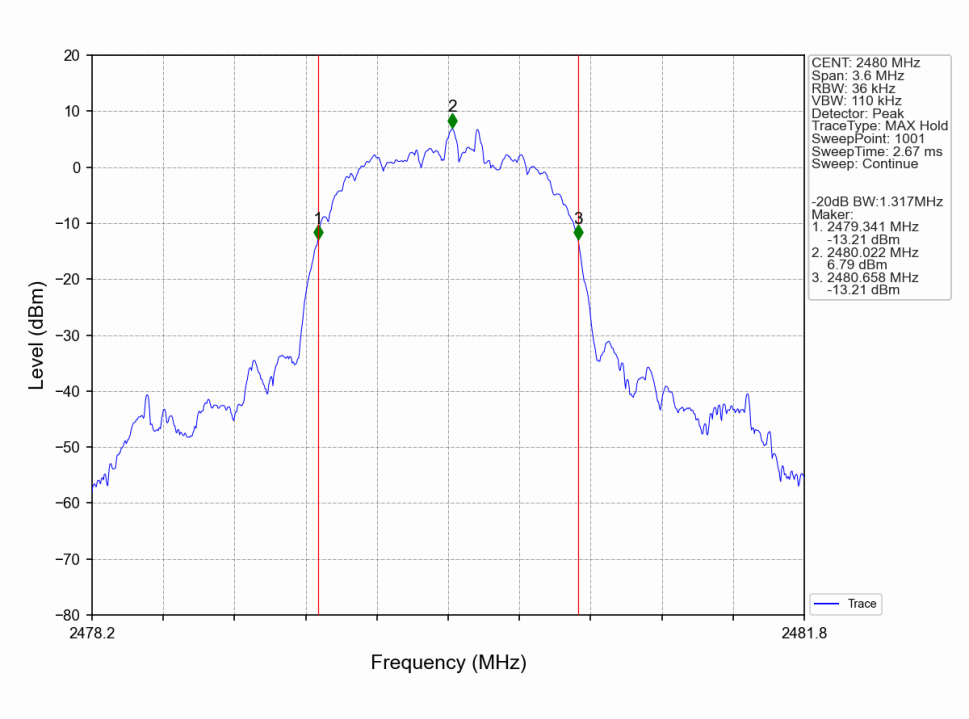
8DPSK_3DH5_LCH_2402MHz_Ant6_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant6_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant6_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
				ANT6	Limit	
GFSK	SISO	2402	DH5	12.22	<=30	Pass
		2441	DH5	14.07	<=30	Pass
		2480	DH5	11.97	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	11.48	<=20.97	Pass
		2441	2DH5	13.33	<=20.97	Pass
		2480	2DH5	11.11	<=20.97	Pass
8DPSK	SISO	2402	3DH5	11.78	<=20.97	Pass
		2441	3DH5	13.63	<=20.97	Pass
		2480	3DH5	11.13	<=20.97	Pass
Note1: Antenna Gain: Ant6: -0.50dBi;						

4. Carrier Frequency Separation

4.1 Test Result

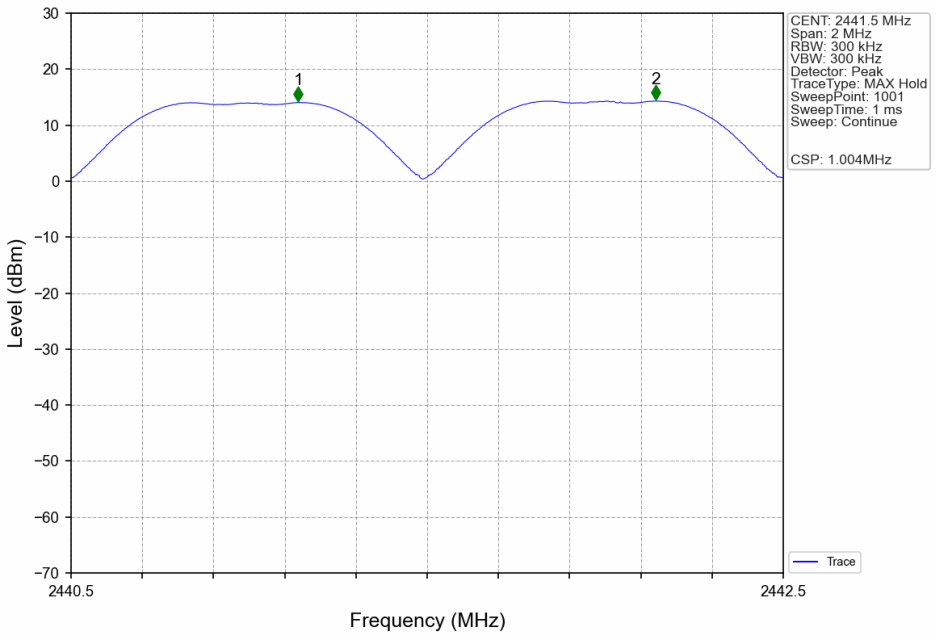
4.1.1 Ant6

Ant6							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.004	0.942	>=0.942	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	0.996	1.333	>=0.889	Pass
8DPSK	SISO	HOPP	3DH5	1.001	1.317	>=0.878	Pass

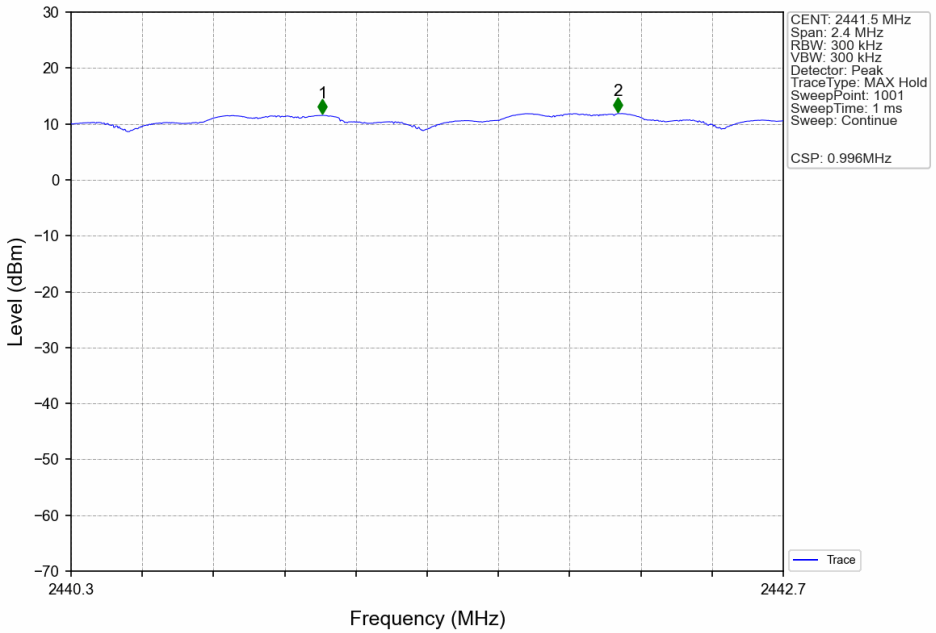
4.2 Test Graph

4.2.1 Ant6

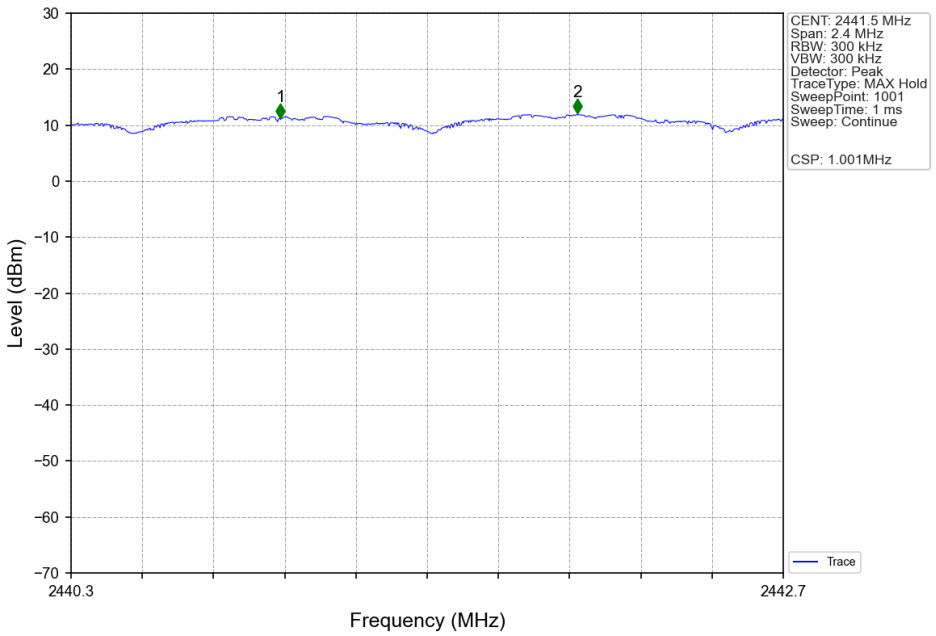
GFSK_DH5_HOPP_Ant6_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant6_NTNV


CENT: 2441.5 MHz
Span: 2.4 MHz
RBW: 300 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 1 ms
Sweep: Continue
CSP: 0.996MHz
1
2
Trace
Level (dBm)
Frequency (MHz)
30
20
10
0
−10
−20
−30
−40
−50
−60
−70
2440.3
2442.7

8DPSK_3DH5_HOPP_Ant6_NTNV



5. Number of Hopping Frequencies

5.1 Test Result

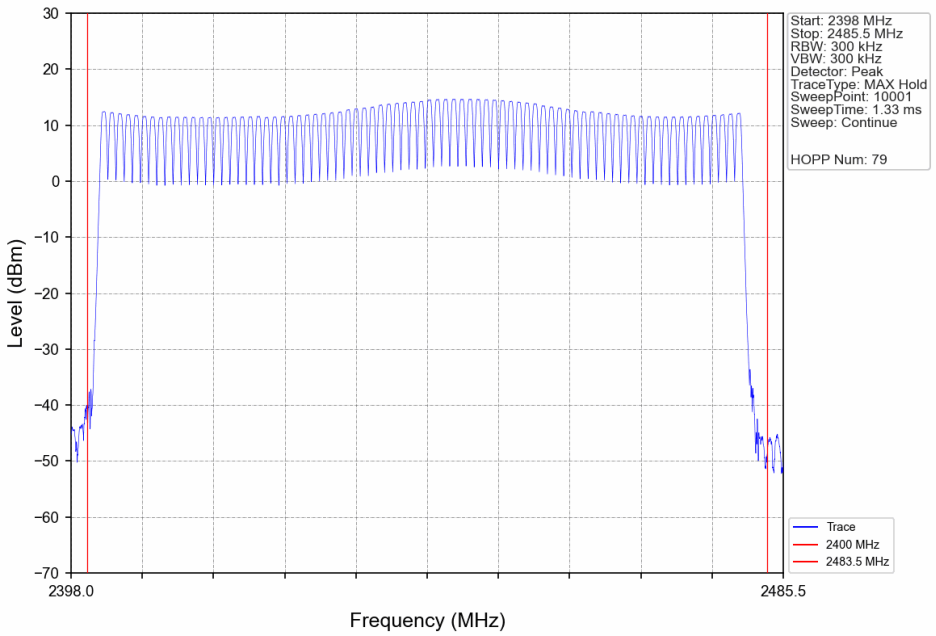
5.1.1 HoppNum

Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT6	Limit	
GFSK	SISO	HOPP	DH5	79	>=15	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	79	>=15	Pass
8DPSK	SISO	HOPP	3DH5	79	>=15	Pass

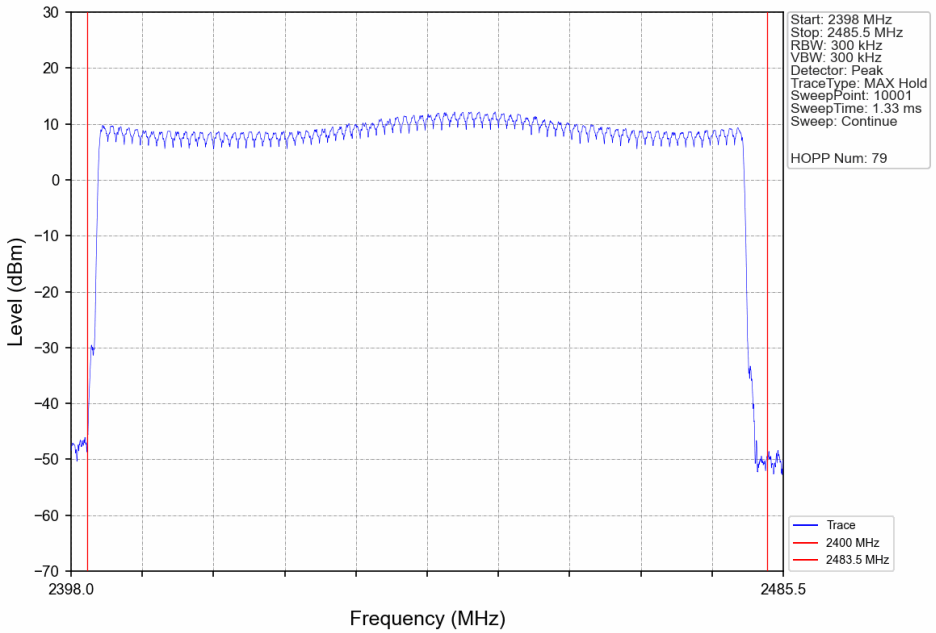
5.2 Test Graph

5.2.1 HoppNum

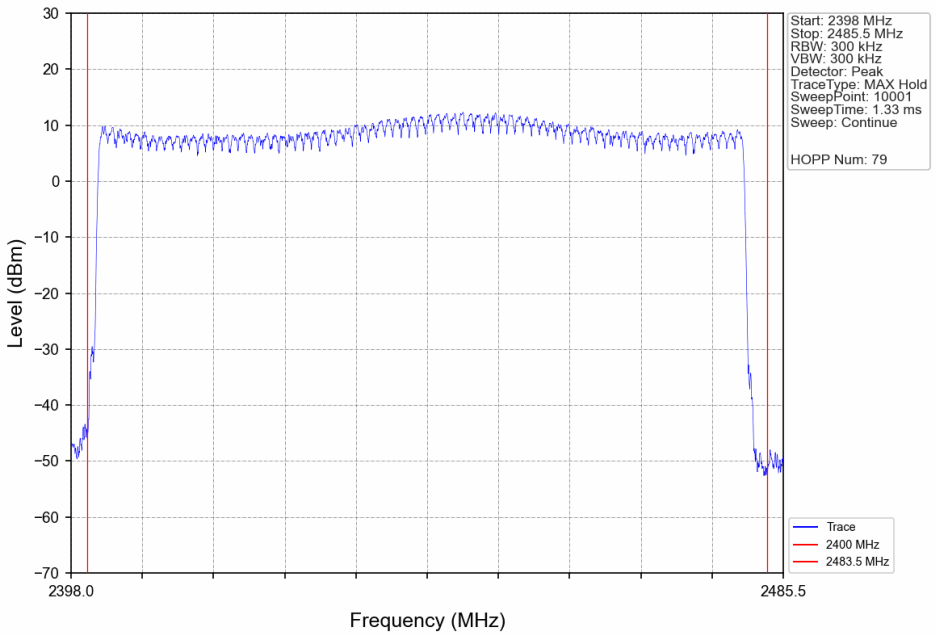
GFSK_DH5_HOPP_Ant6_NTNV



Pi/4DQPSK_2DH5_HOPP_Ant6_NTNV


Start: 2398 MHz
Stop: 2485.5 MHz
RBW: 300 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 10001
SweepTime: 1.33 ms
Sweep: Continue
HOPP Num: 79
Trace
2400 MHz
2483.5 MHz
Level (dBm)
Frequency (MHz)
30
20
10
0
−10
−20
−30
−40
−50
−60
−70
2398.0
2485.5

8DPSK_3DH5_HOPP_Ant6_NTNV



6. Time of Occupancy (Dwell Time)

6.1 Test Result

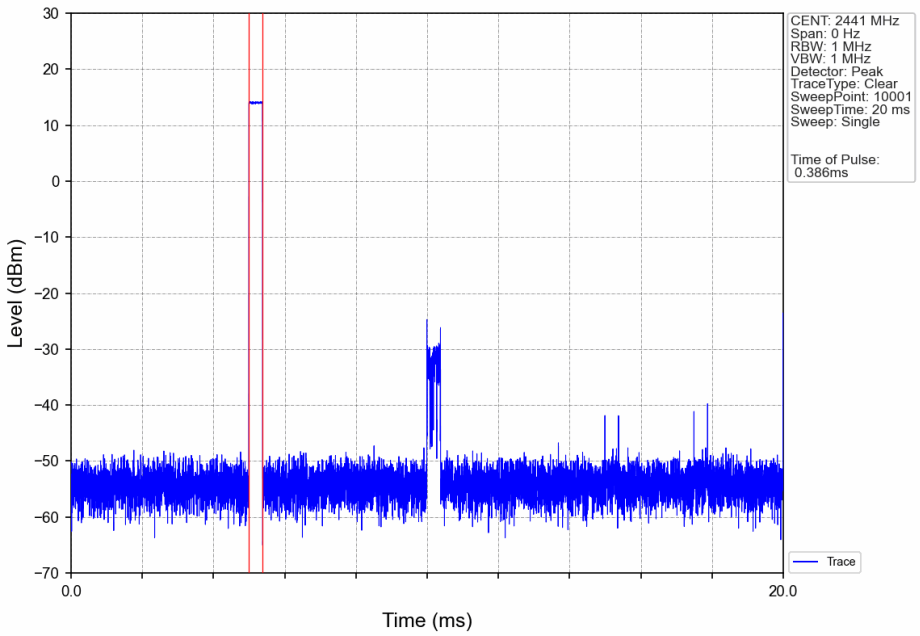
6.1.1 Ant6

Ant6									
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	0.386	31.600	319	123.134	<=400	Pass
			DH3	1.640	31.600	168	275.520	<=400	Pass
			DH5	2.890	31.600	105	303.450	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.394	31.600	320	126.080	<=400	Pass
			2DH3	1.646	31.600	156	256.776	<=400	Pass
			2DH5	2.892	31.600	105	303.660	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.394	31.600	319	125.686	<=400	Pass
			3DH3	1.644	31.600	153	251.532	<=400	Pass
			3DH5	2.896	31.600	117	338.832	<=400	Pass

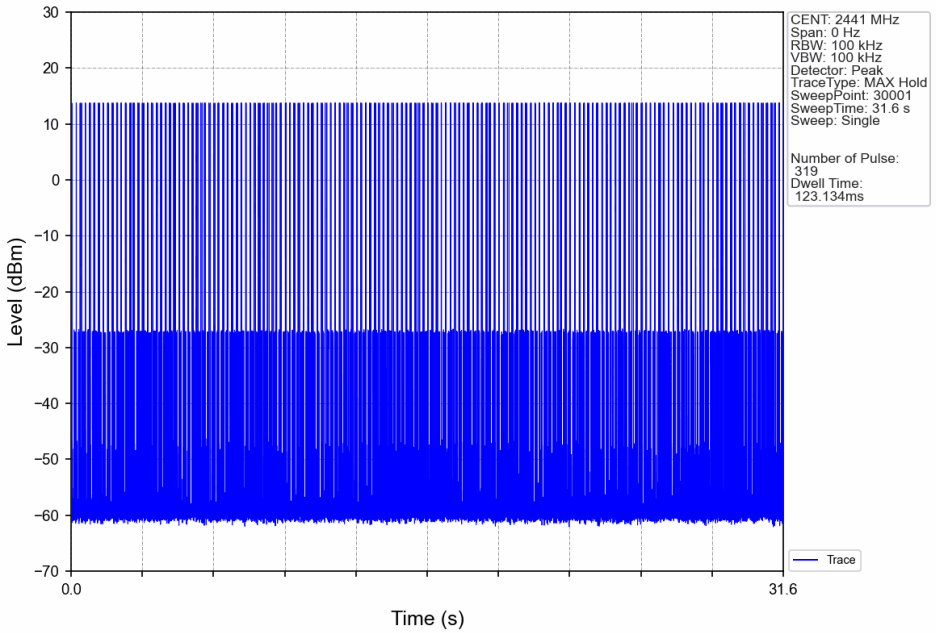
6.2 Test Graph

6.2.1 Ant6

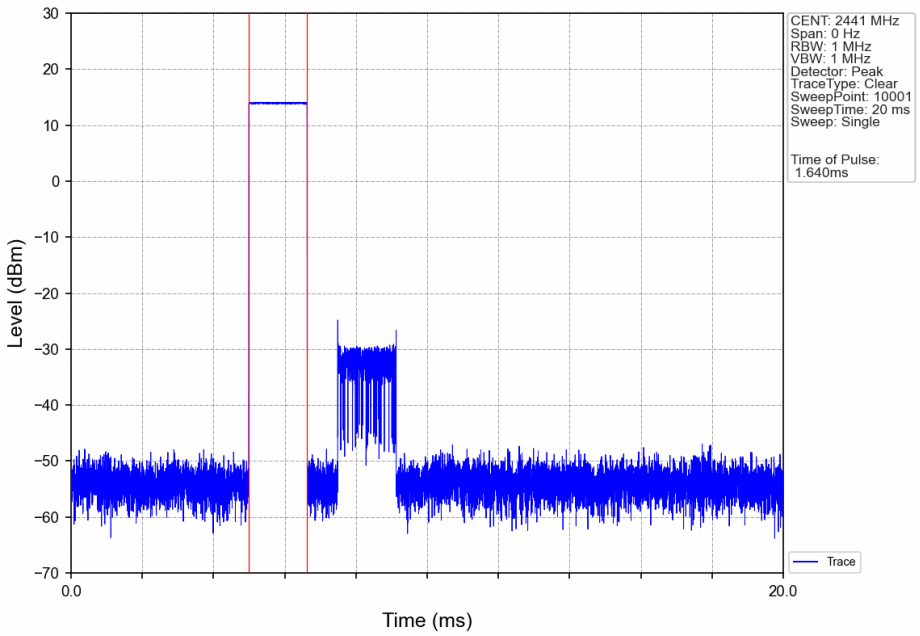
GFSK_DH1_HOPP_Ant6_NTNV



GFSK_DH1_HOPP_Ant6_NTNV


CENT: 2441 MHz
Span: 0 Hz
RBW: 100 kHz
VBW: 100 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 30001
SweepTime: 31.6 s
Sweep: Single
Number of Pulse: 319
Dwell Time: 123.134ms
Level (dBm)
30
20
10
0
−10
−20
−30
−40
−50
−60
−70
0.0
31.6
Time (s)
Trace

GFSK_DH3_HOPP_Ant6_NTNV



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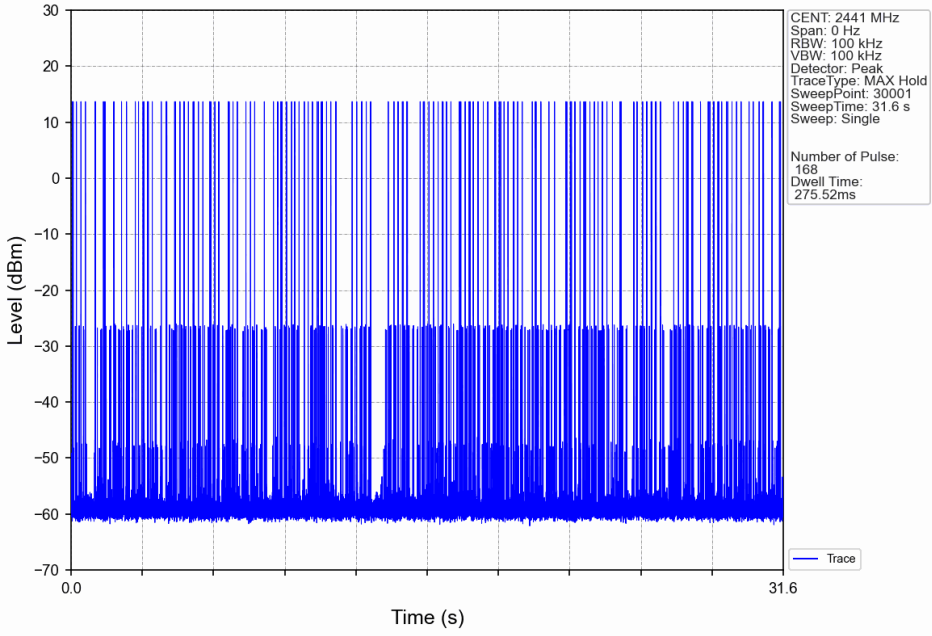
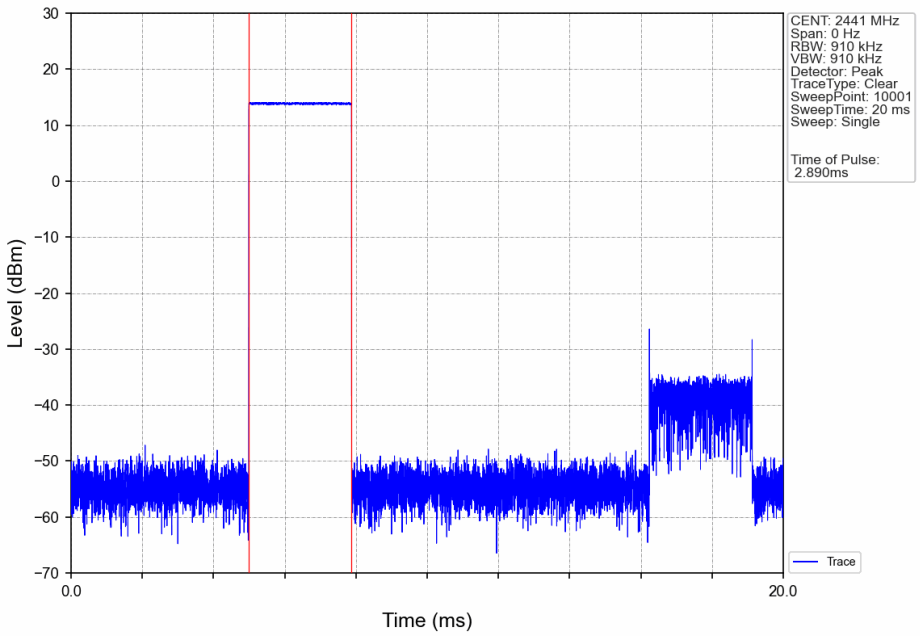


GFSK_DH5_HOPP_Ant6_NTNV



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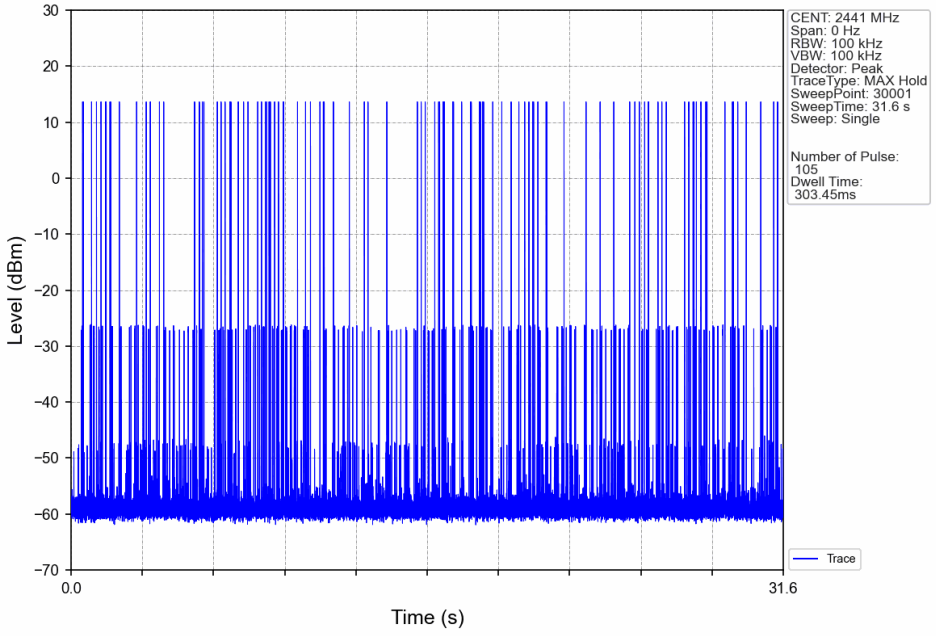
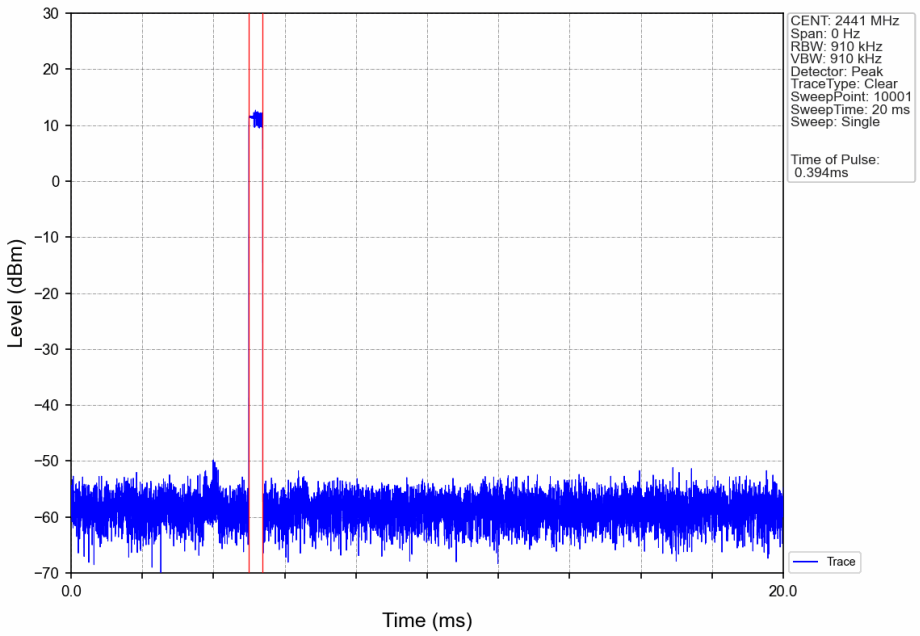


Pi/4DQPSK_2DH1_HOPP_Ant6_NTNV



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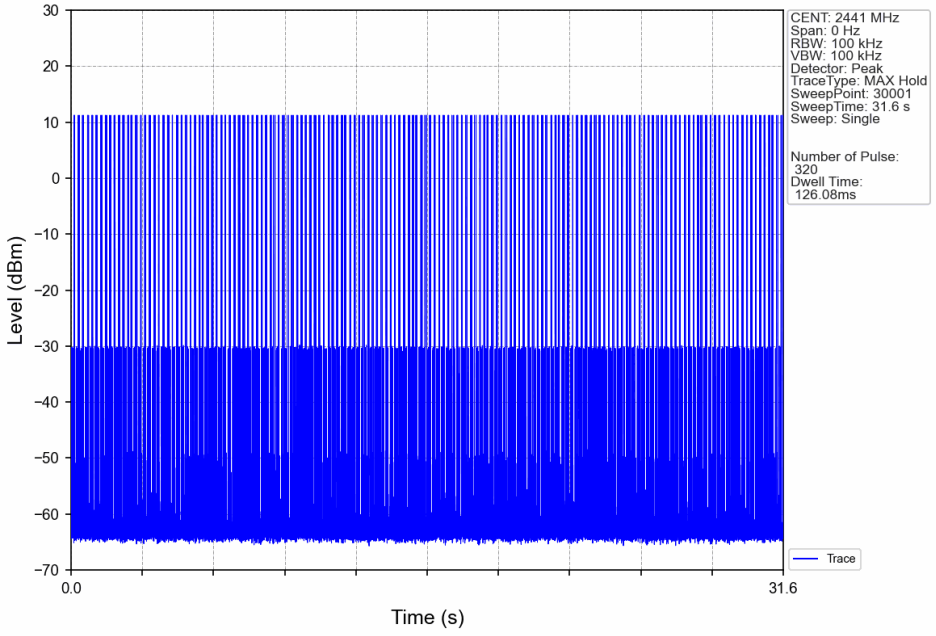

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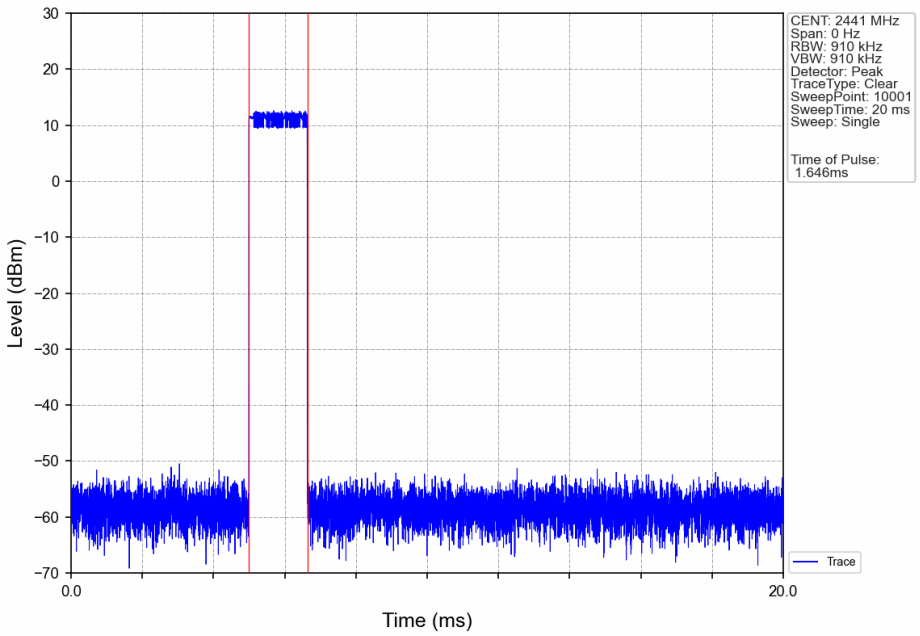

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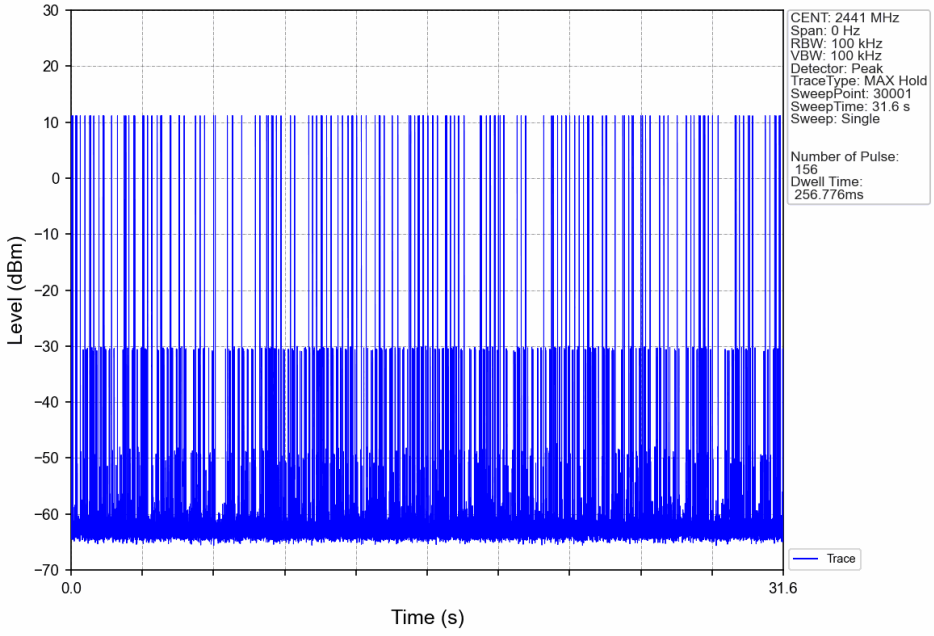

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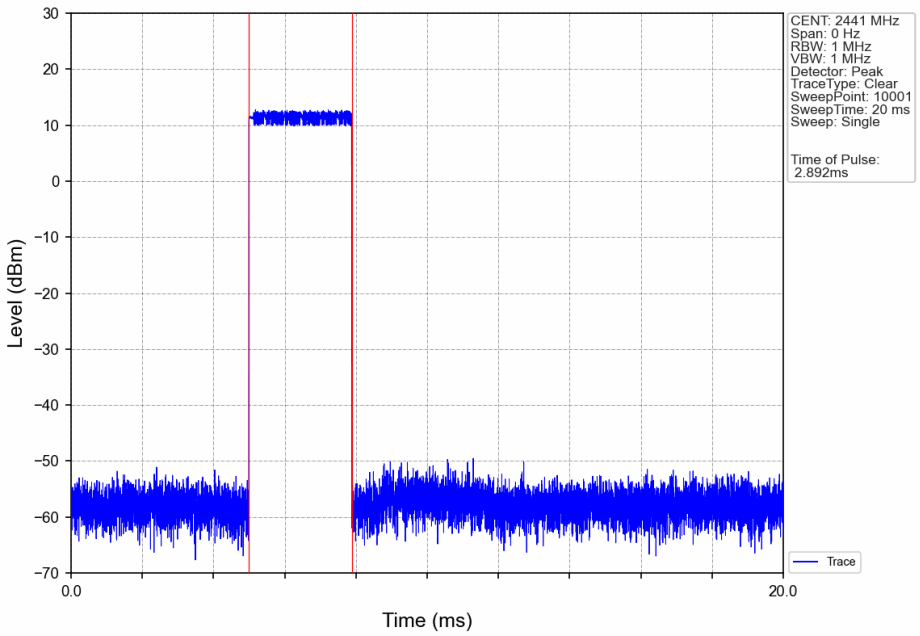

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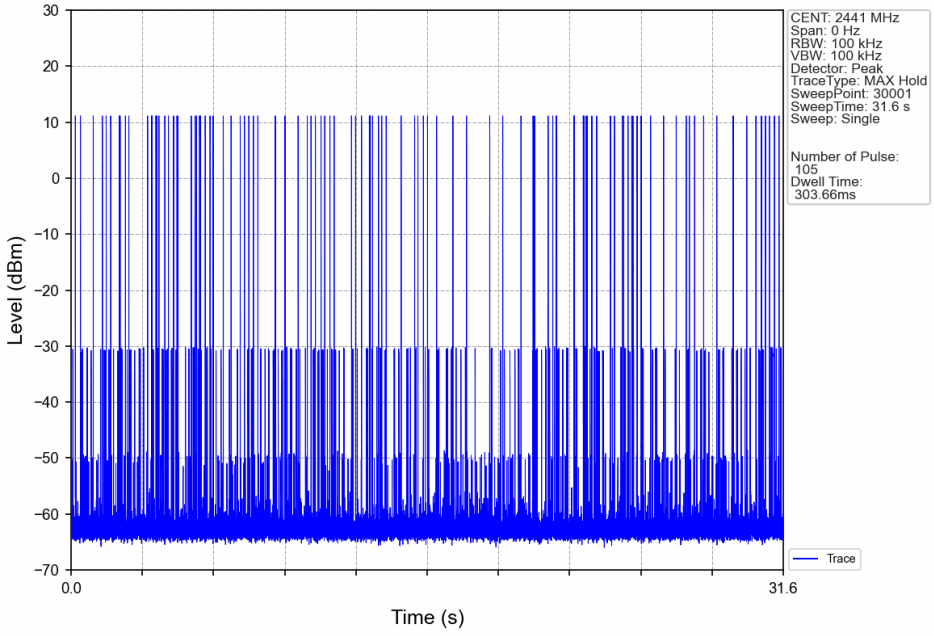
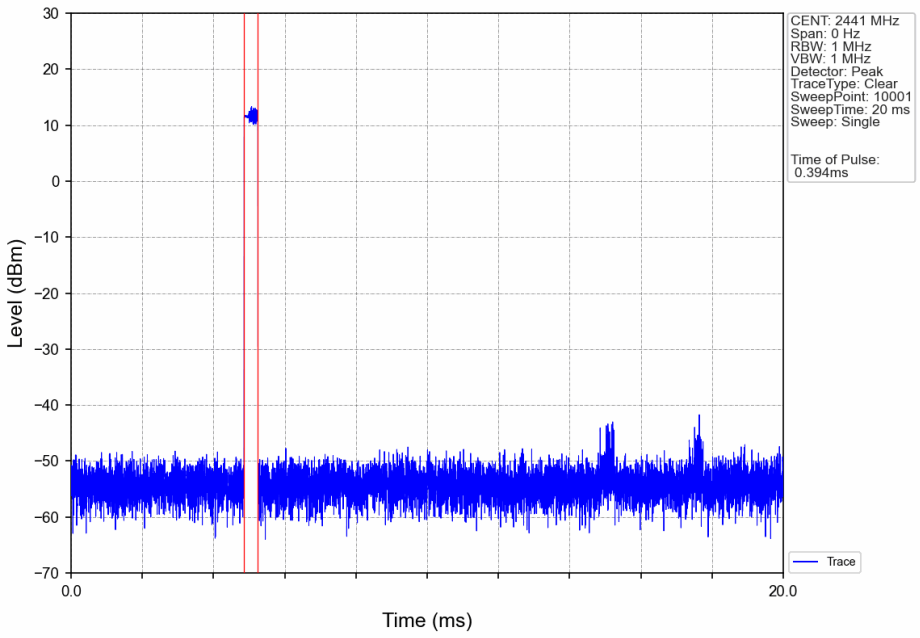
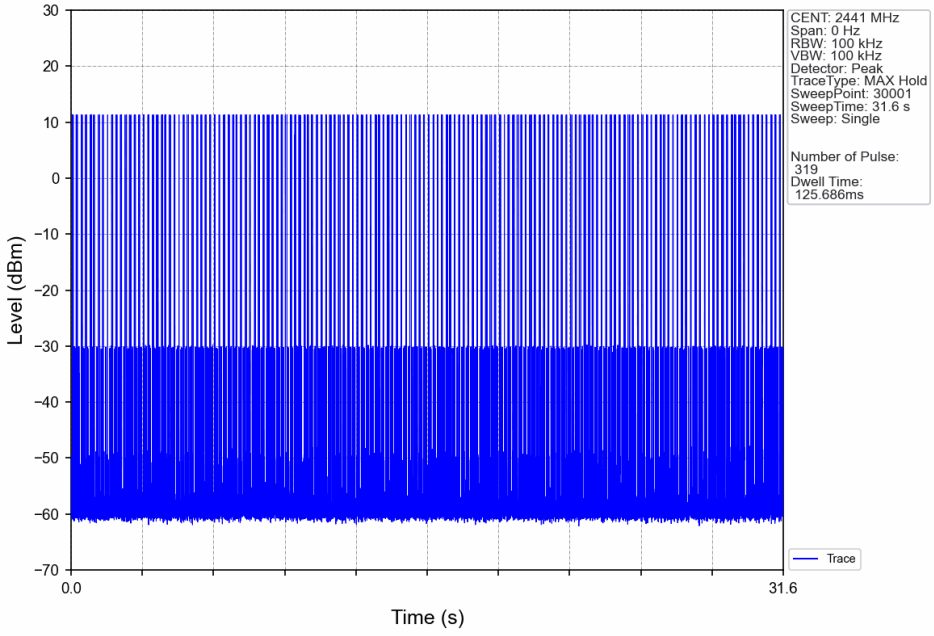


8DPSK_3DH1_HOPP_Ant6_NTNV



8DPSK_3DH1_HOPP_Ant6_NTNV



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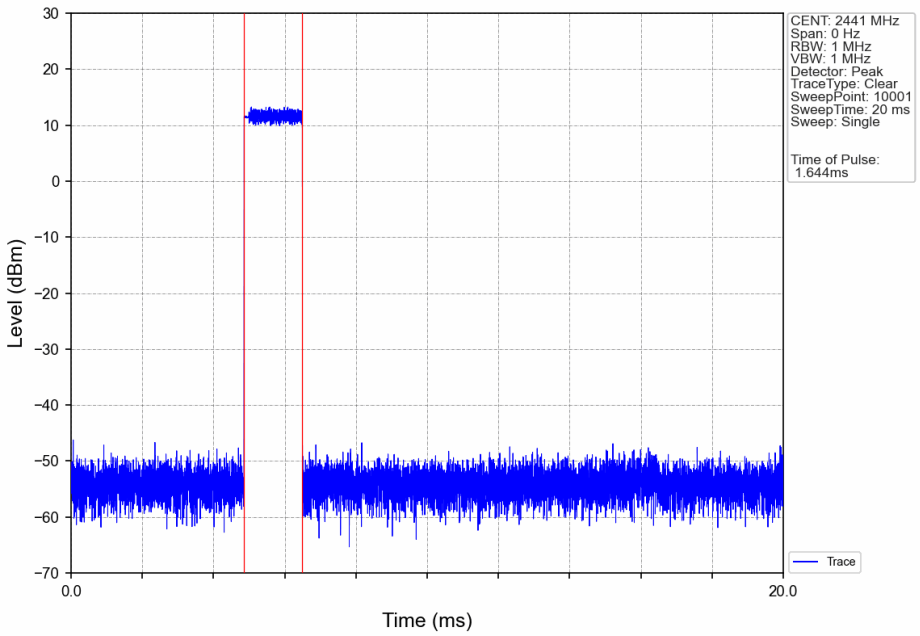

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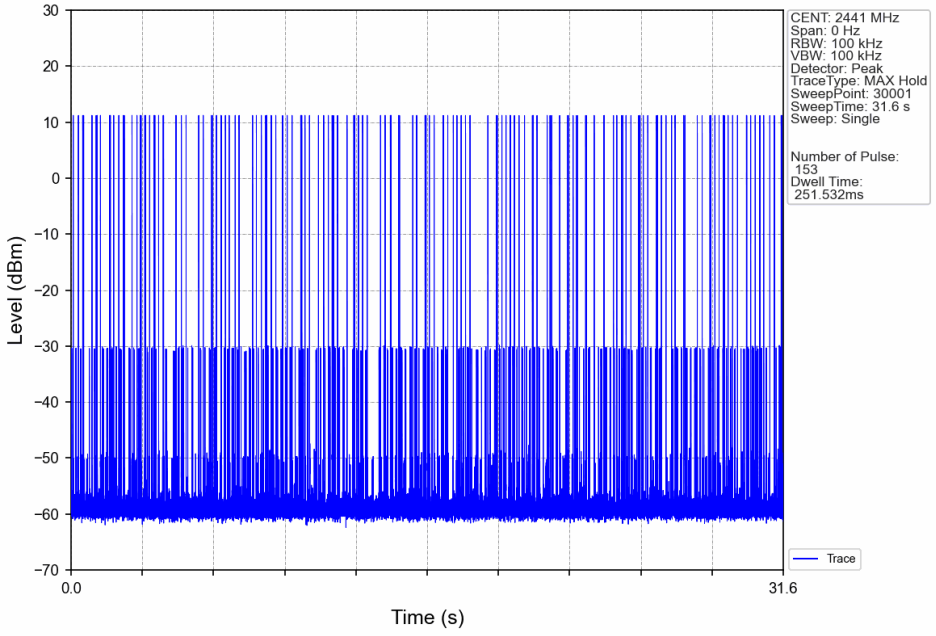
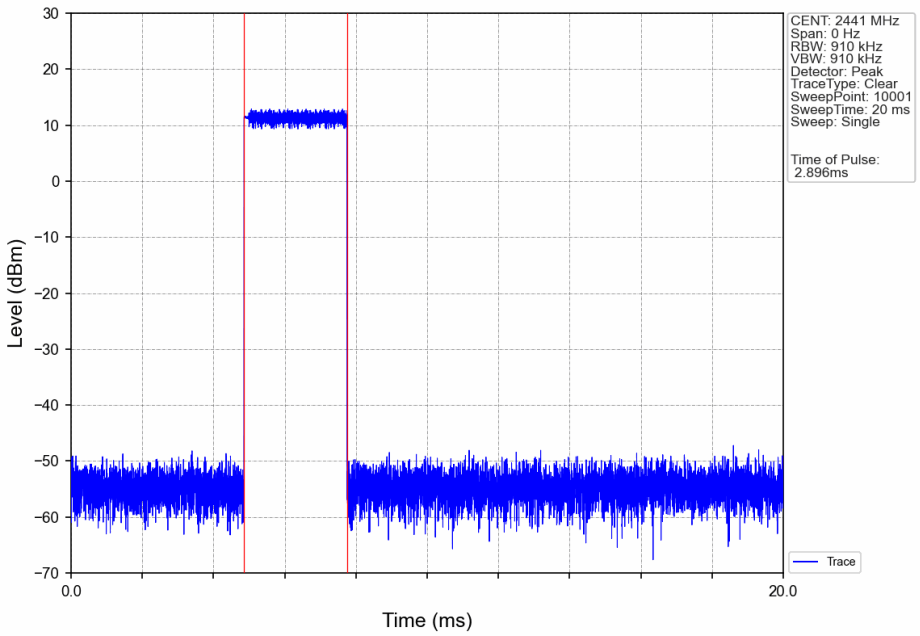
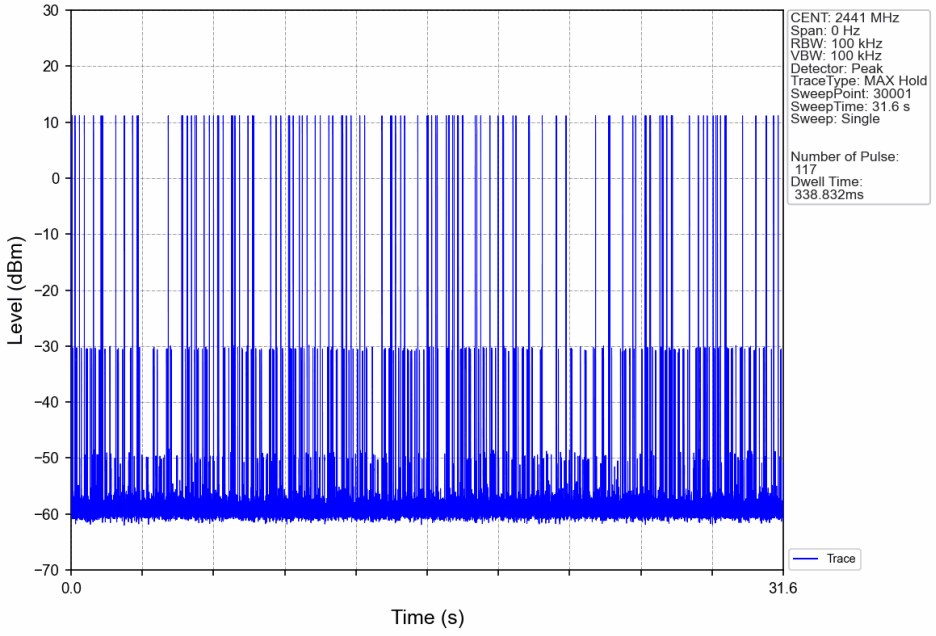


8DPSK_3DH5_HOPP_Ant6_NTNV



8DPSK_3DH5_HOPP_Ant6_NTNV



7. Unwanted Emissions In Non-restricted Frequency Bands

7.1 Test Result

7.1.1 Ref

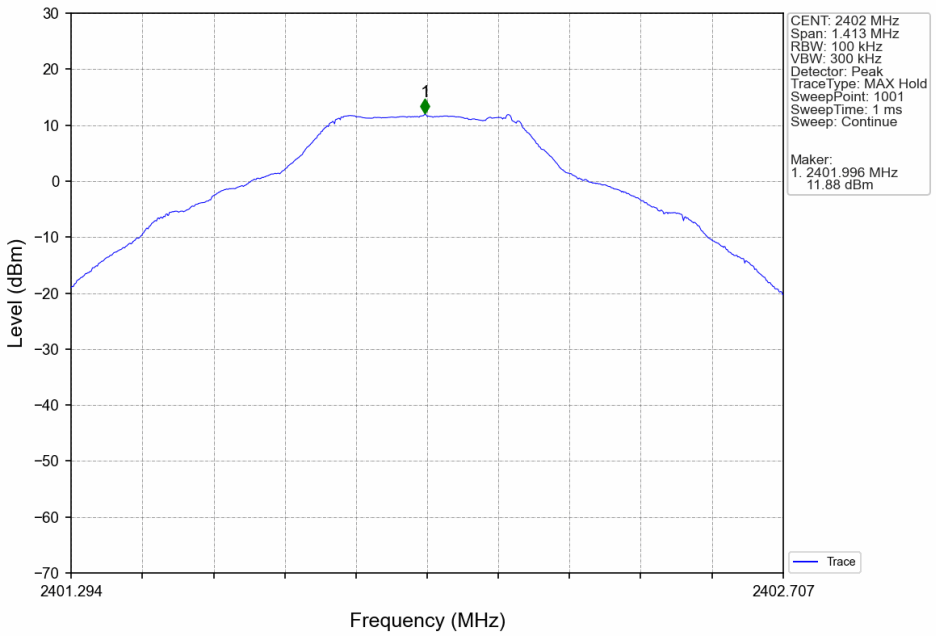
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	6	11.88
		2441	DH5	6	13.98
		2480	DH5	6	11.83
Pi/4DQPSK	SISO	2402	2DH5	6	9.51
		2441	2DH5	6	11.36
		2480	2DH5	6	9.03
8DPSK	SISO	2402	3DH5	6	9.62
		2441	3DH5	6	11.47
		2480	3DH5	6	8.72
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.					

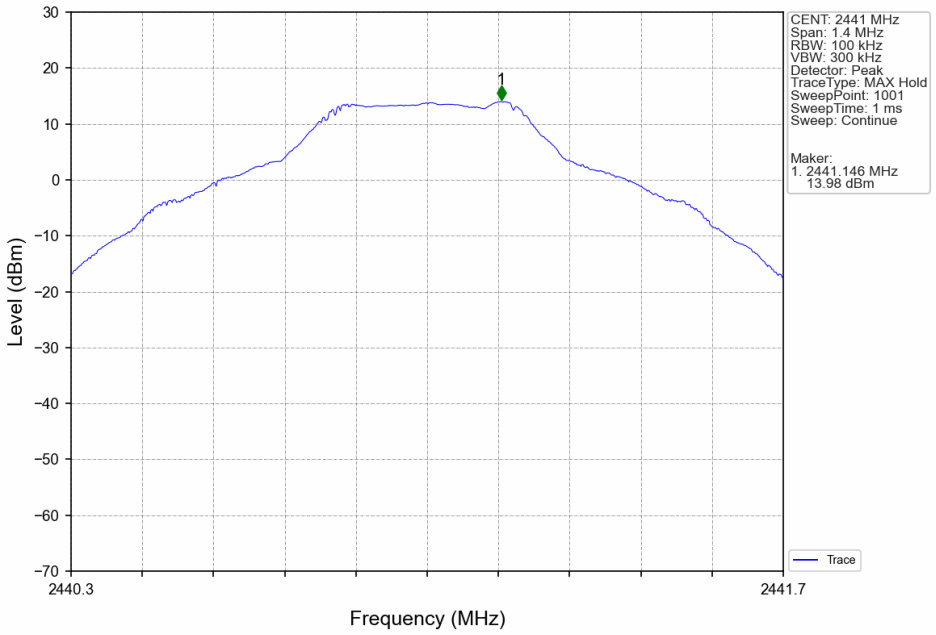
7.1.2 CSE

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	6	13.98	-6.02	Pass
		2441	DH5	6	13.98	-6.02	Pass
		2480	DH5	6	13.98	-6.02	Pass
		HOPP	DH5	6	13.98	-6.02	Pass
					13.98	-6.02	Pass
Pi/4DQPSK	SISO	2402	2DH5	6	11.36	-8.64	Pass
		2441	2DH5	6	11.36	-8.64	Pass
		2480	2DH5	6	11.36	-8.64	Pass
		HOPP	2DH5	6	11.36	-8.64	Pass
					11.36	-8.64	Pass
8DPSK	SISO	2402	3DH5	6	11.47	-8.53	Pass
		2441	3DH5	6	11.47	-8.53	Pass
		2480	3DH5	6	11.47	-8.53	Pass
		HOPP	3DH5	6	11.47	-8.53	Pass
					11.47	-8.53	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.							

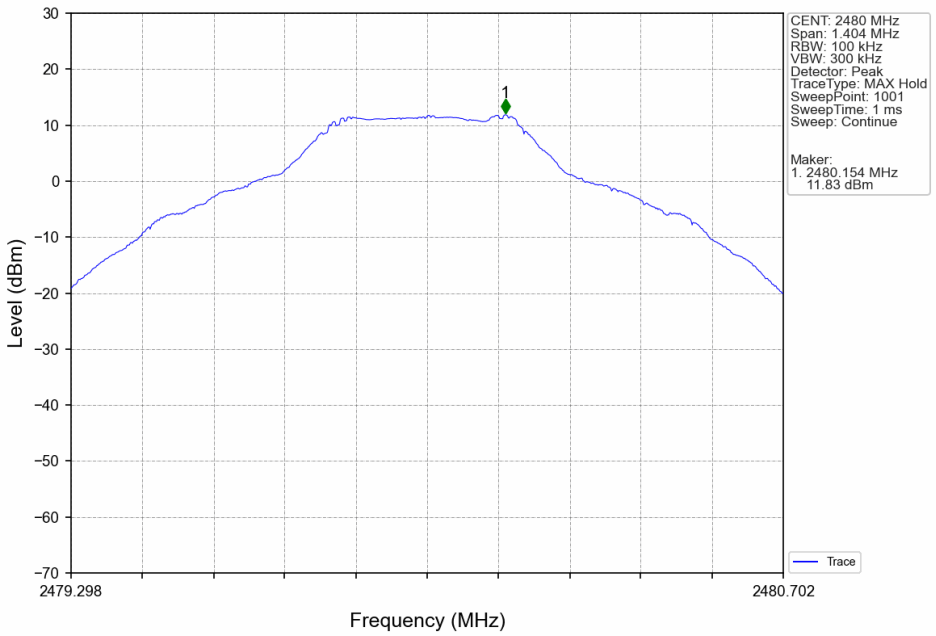
7.2 Test Graph

7.2.1 Ref

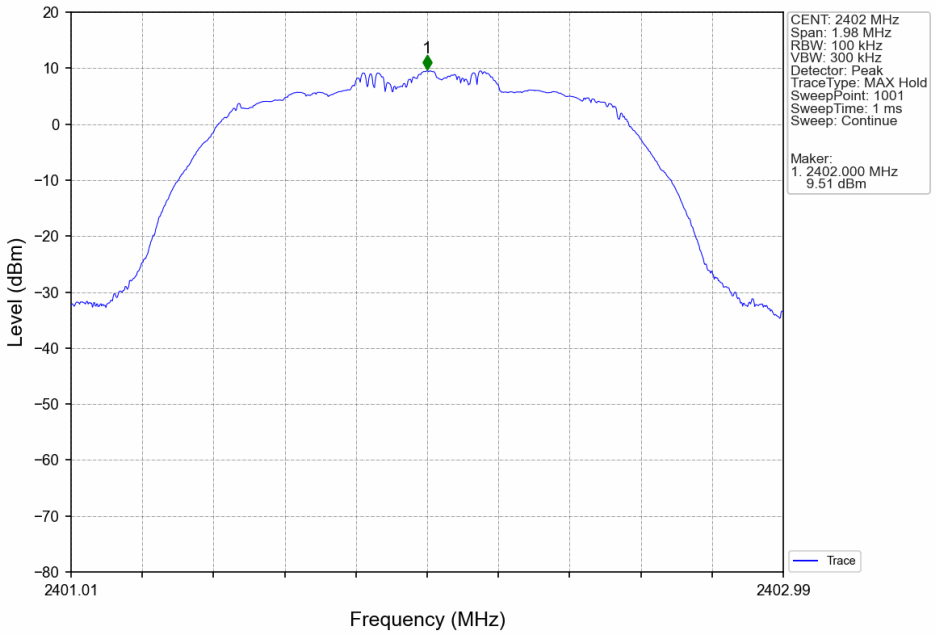
GFSK_DH5_LCH_2402MHz_Ant6_NTNV

GFSK_DH5_MCH_2441MHz_Ant6_NTNV


CENT: 2441 MHz
Span: 1.4 MHz
RBW: 100 kHz
VBW: 300 kHz
Detector: Peak
TraceType: MAX Hold
SweepPoint: 1001
SweepTime: 1 ms
Sweep: Continue
Maker:
1. 2441.146 MHz
13.98 dBm
Trace
Level (dBm)
Frequency (MHz)
30
20
10
0
−10
−20
−30
−40
−50
−60
−70
2440.3
2441.7

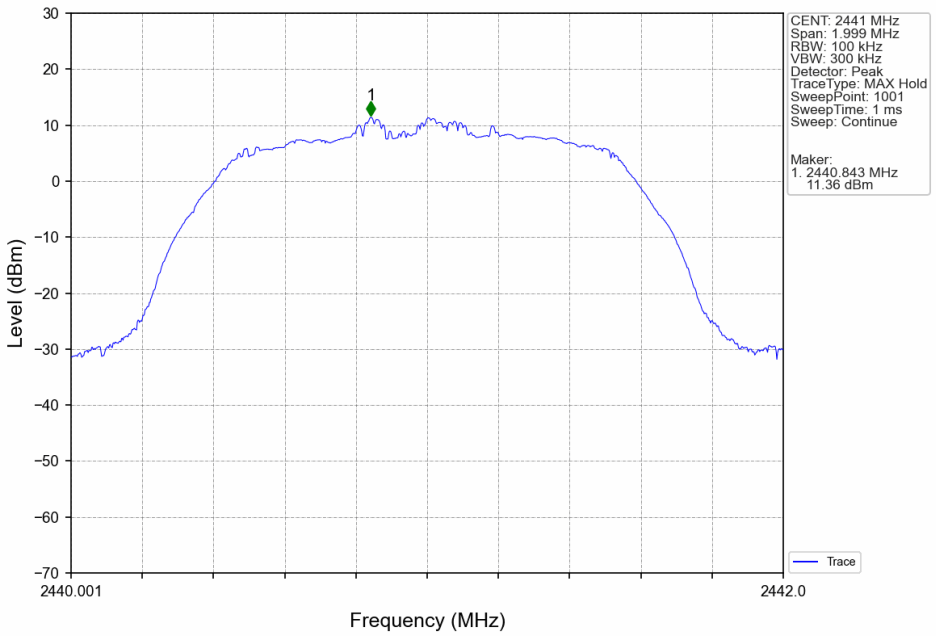
GFSK_DH5_HCH_2480MHz_Ant6_NTNV



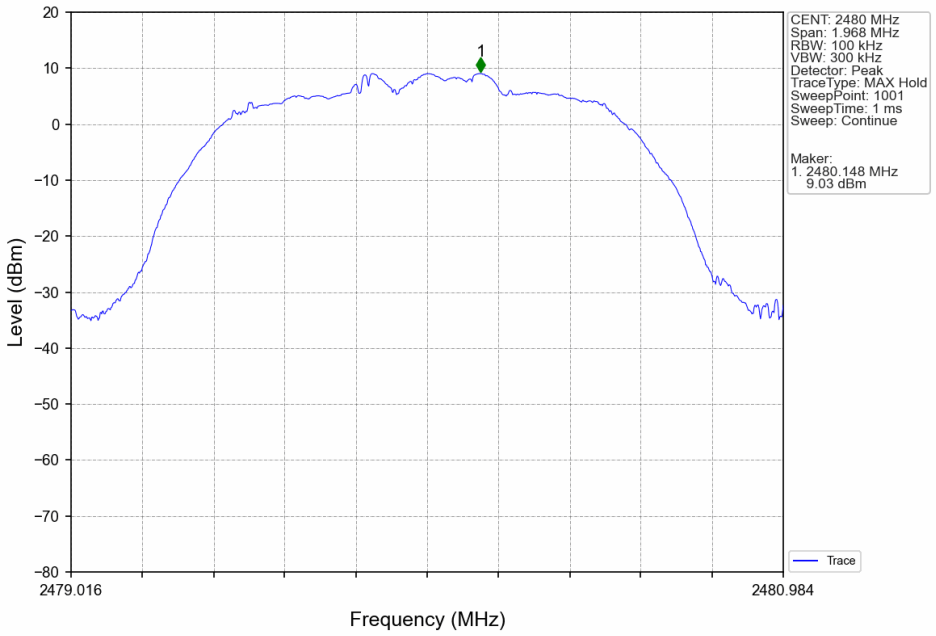
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant6_NTNV



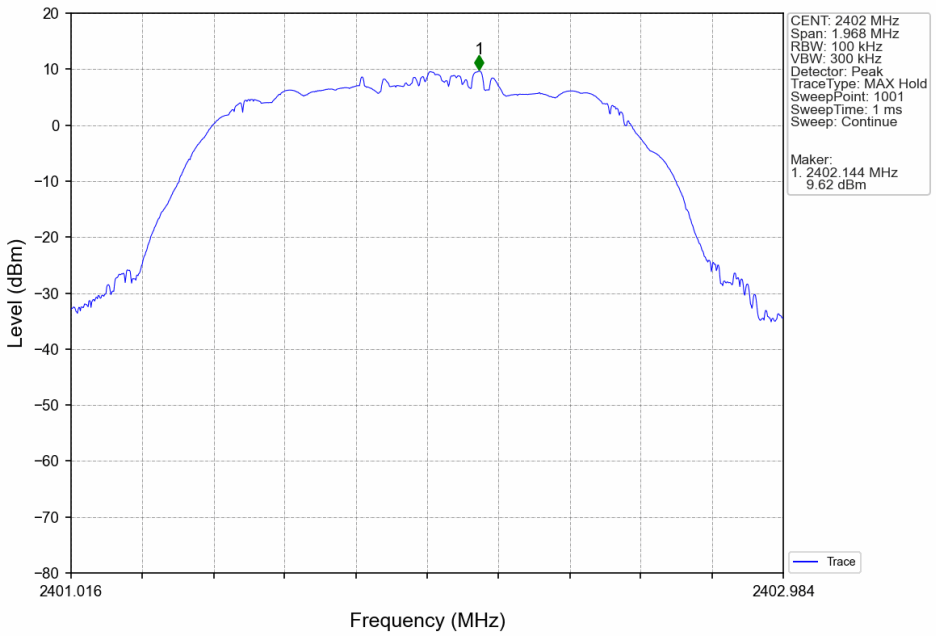
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant6_NTNV



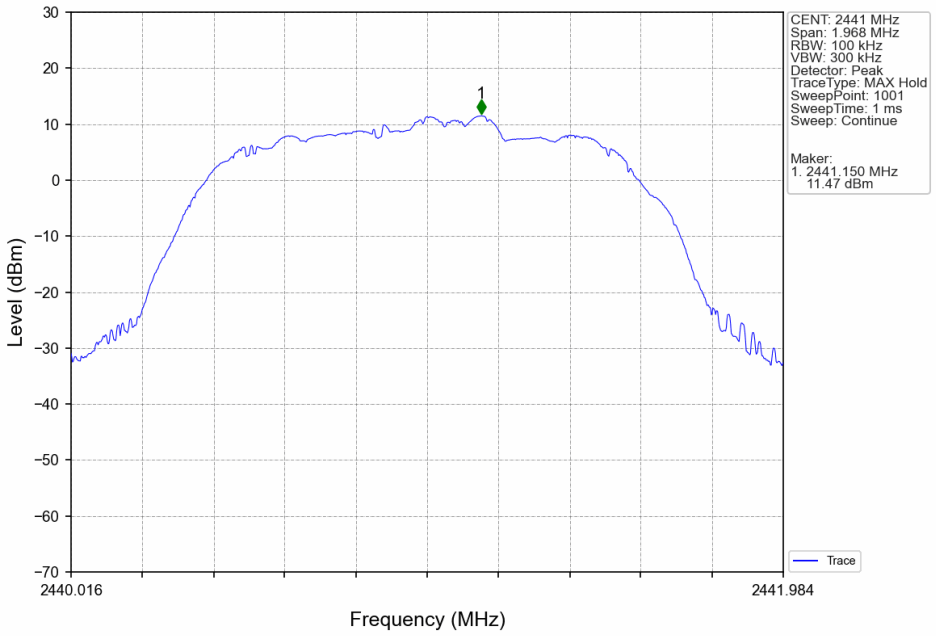
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant6_NTNV



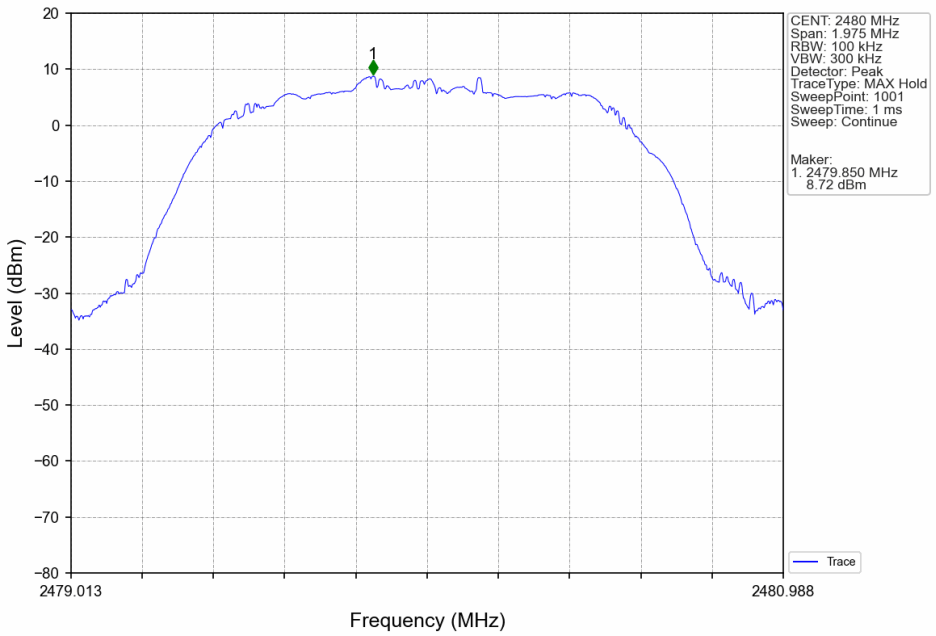
8DPSK_3DH5_LCH_2402MHz_Ant6_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant6_NTNV

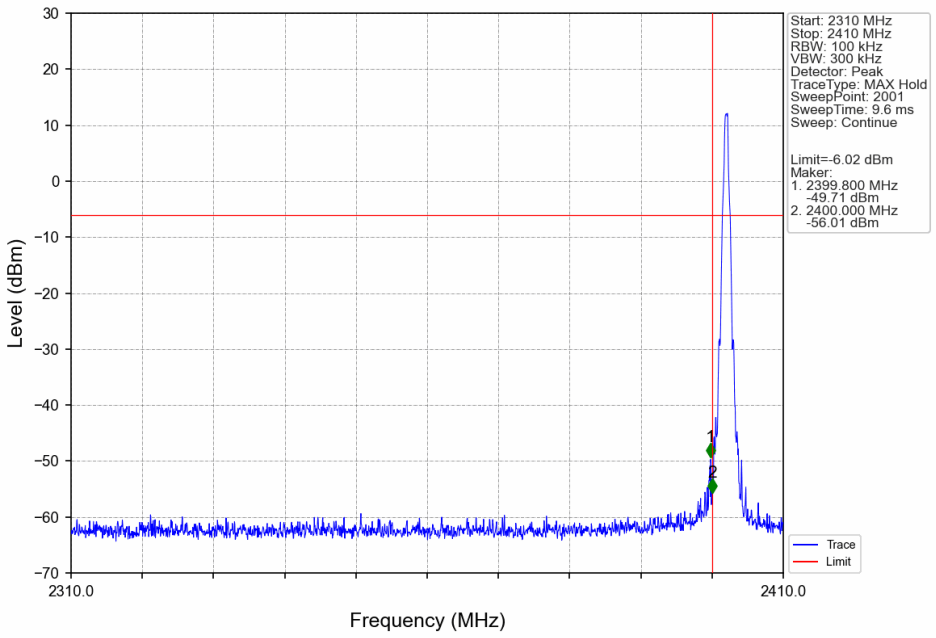


8DPSK_3DH5_HCH_2480MHz_Ant6_NTNV

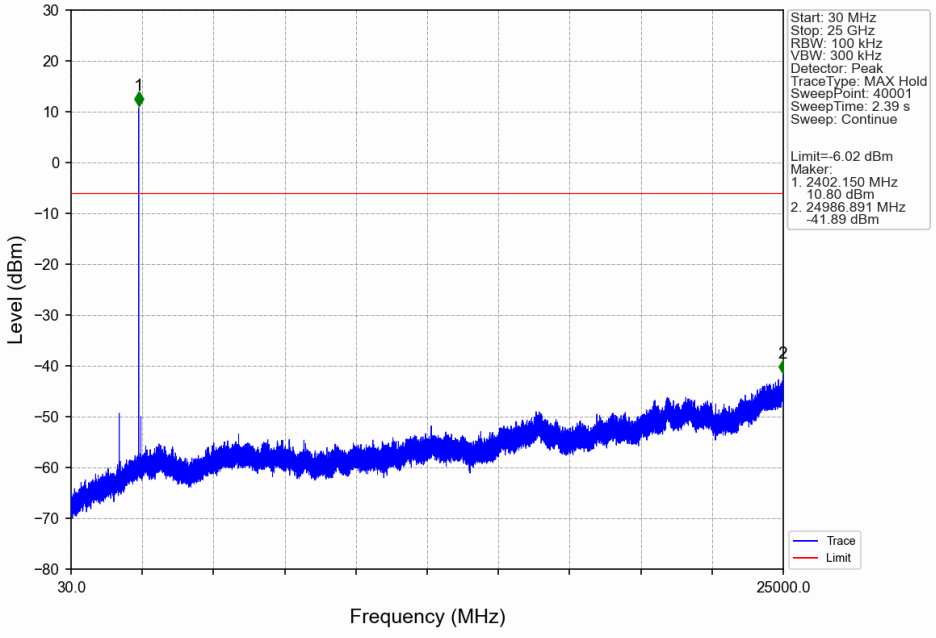


7.2.2 CSE

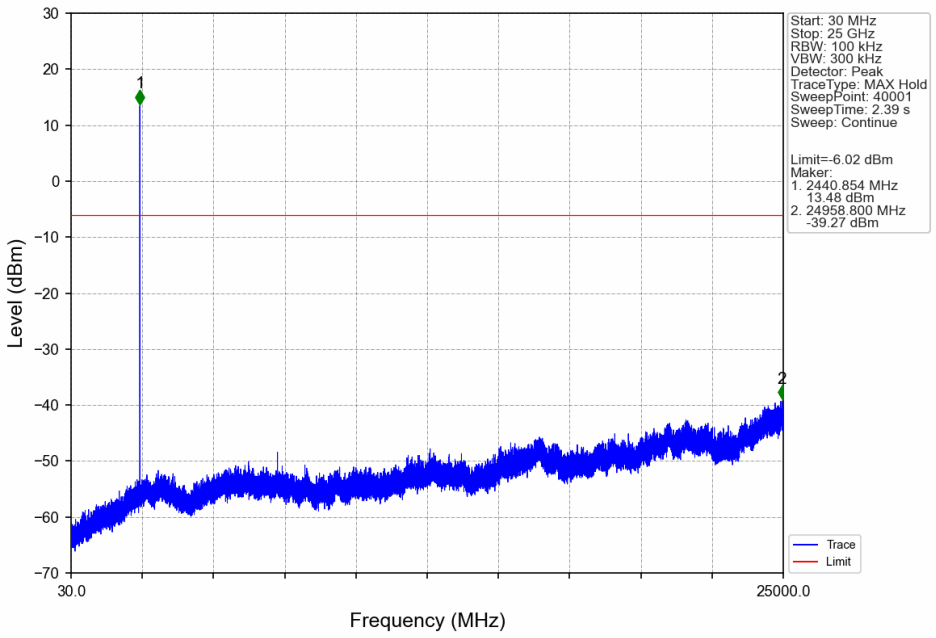
GFSK_DH5_LCH_2402MHz_Ant6_NTNV



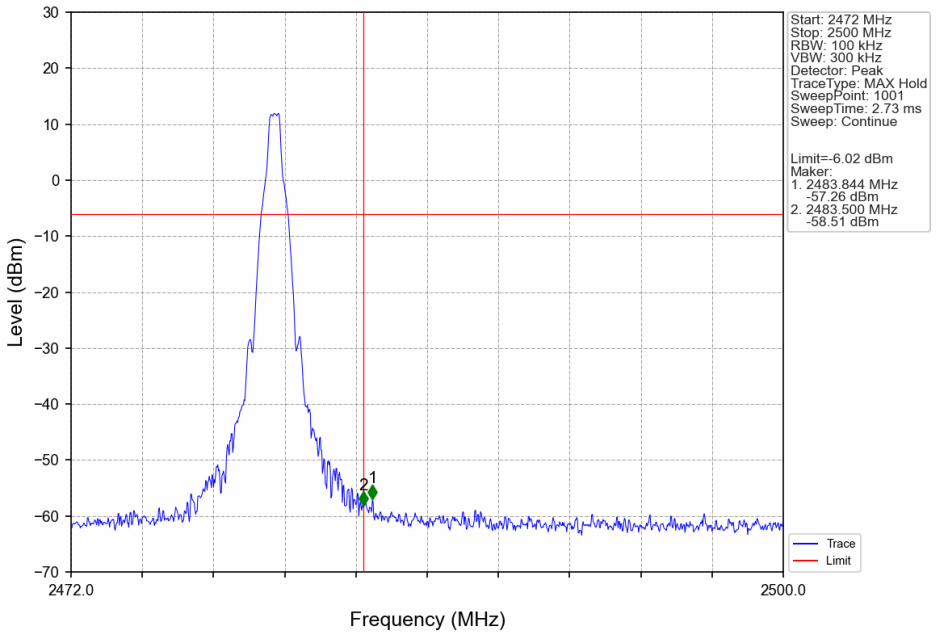
GFSK_DH5_LCH_2402MHz_Ant6_NTNV



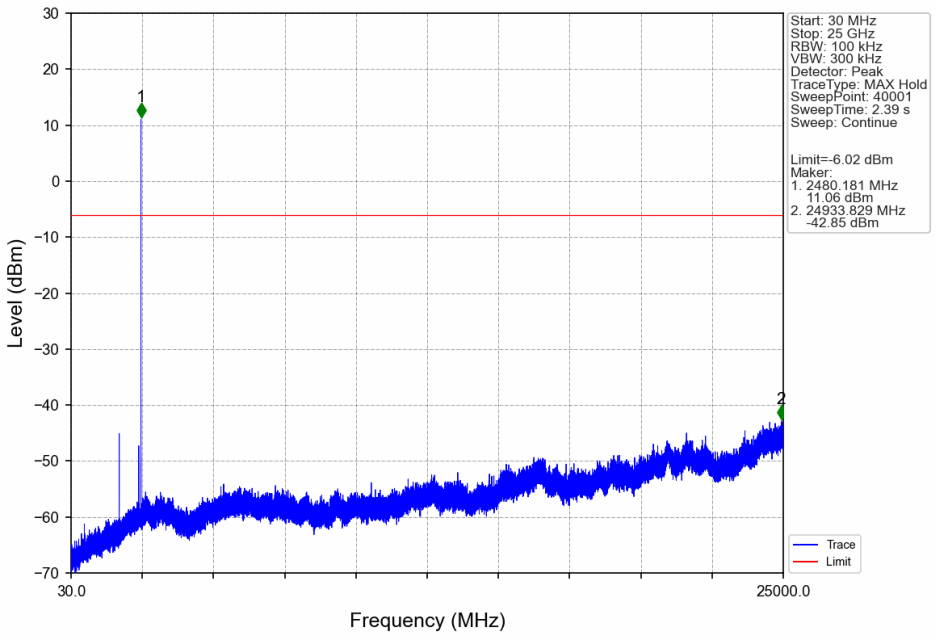
GFSK_DH5_MCH_2441MHz_Ant6_NTNV



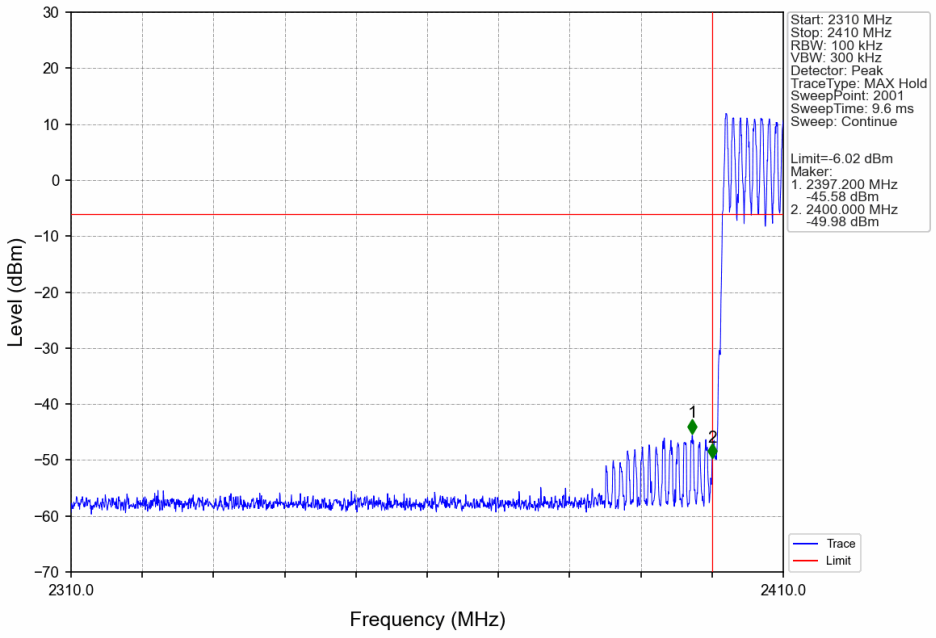
GFSK_DH5_HCH_2480MHz_Ant6_NTNV



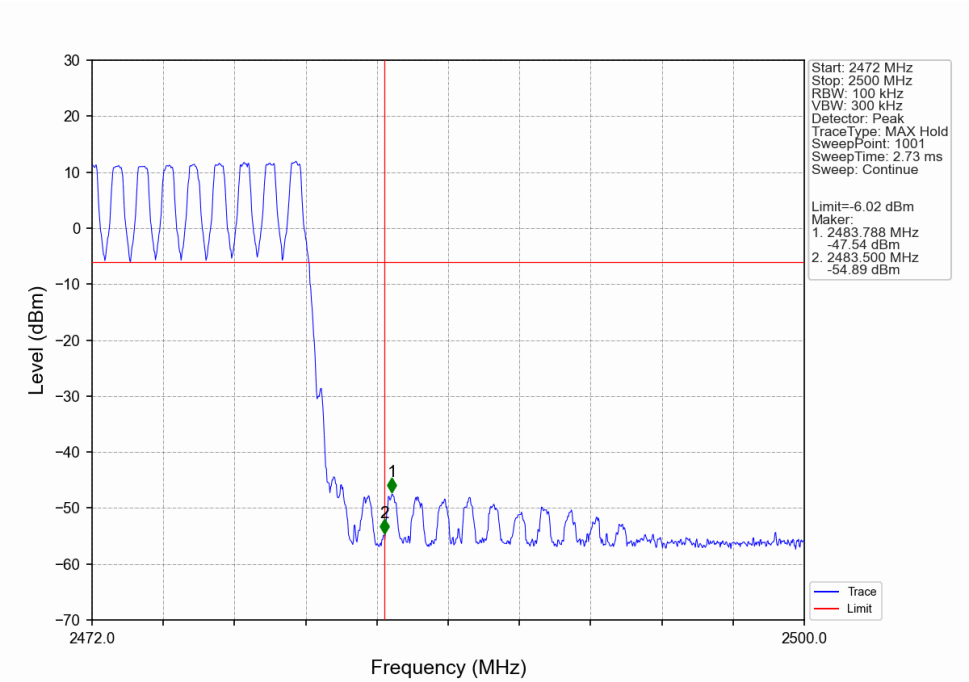
GFSK_DH5_HCH_2480MHz_Ant6_NTNV



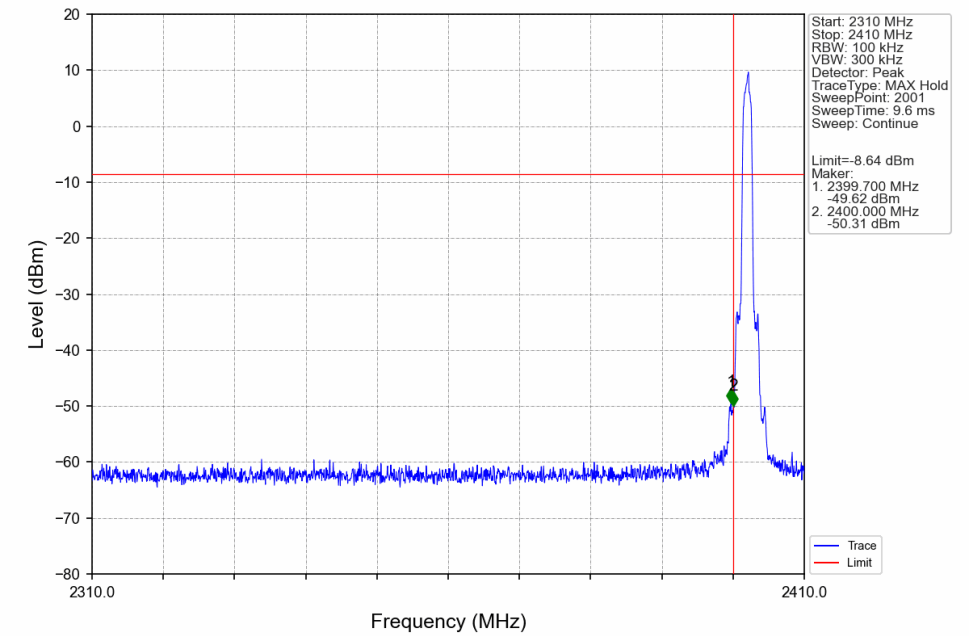
GFSK_DH5_HOPP_Ant6_NTNV



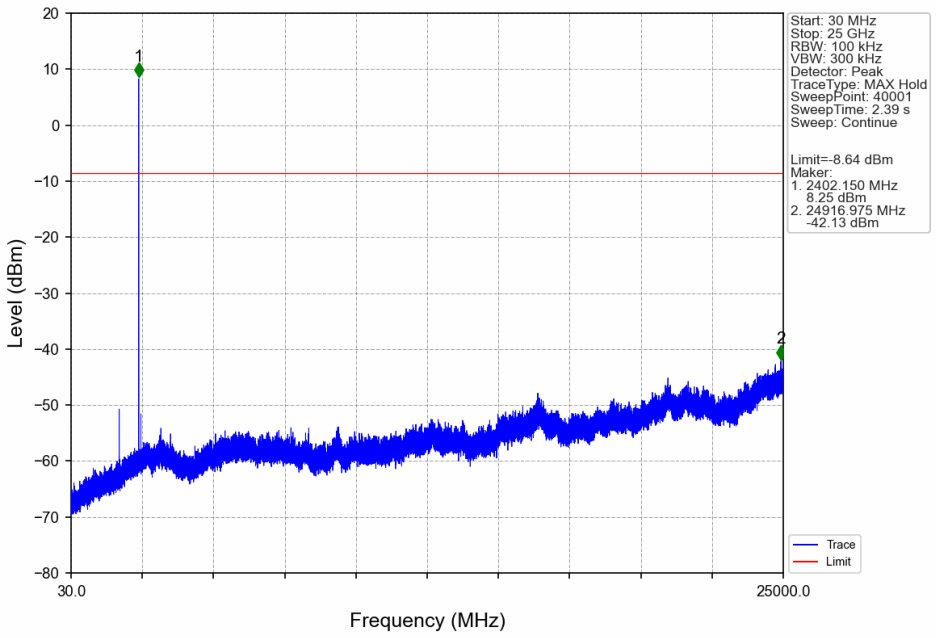
GFSK_DH5_HOPP_Ant6_NTNV



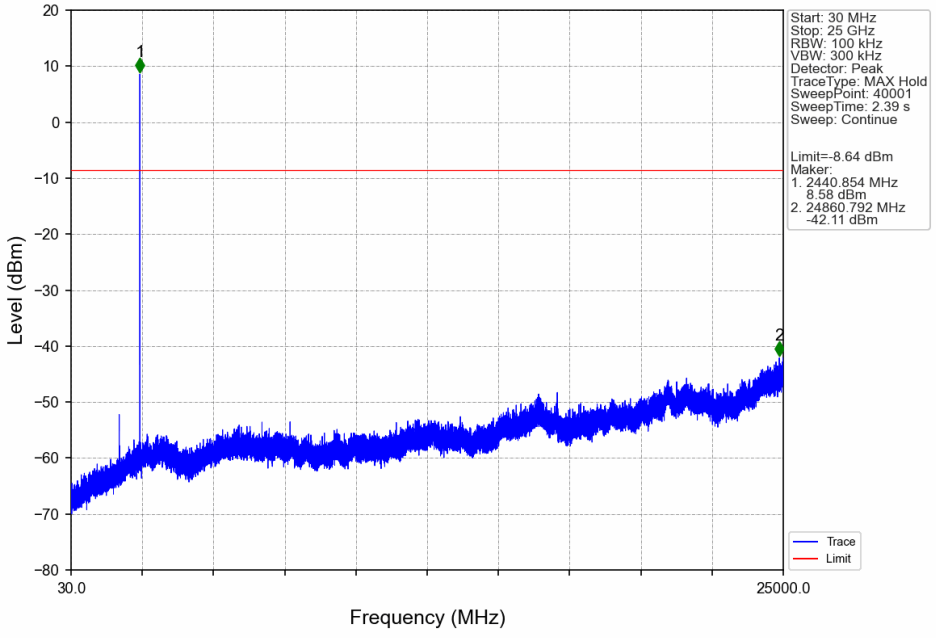
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant6_NTNV



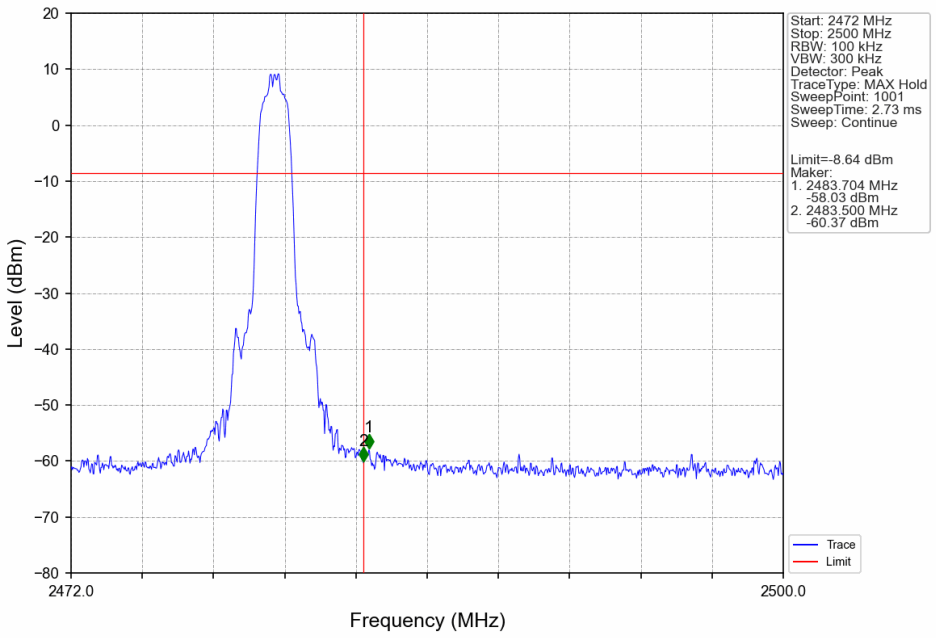
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant6_NTNV



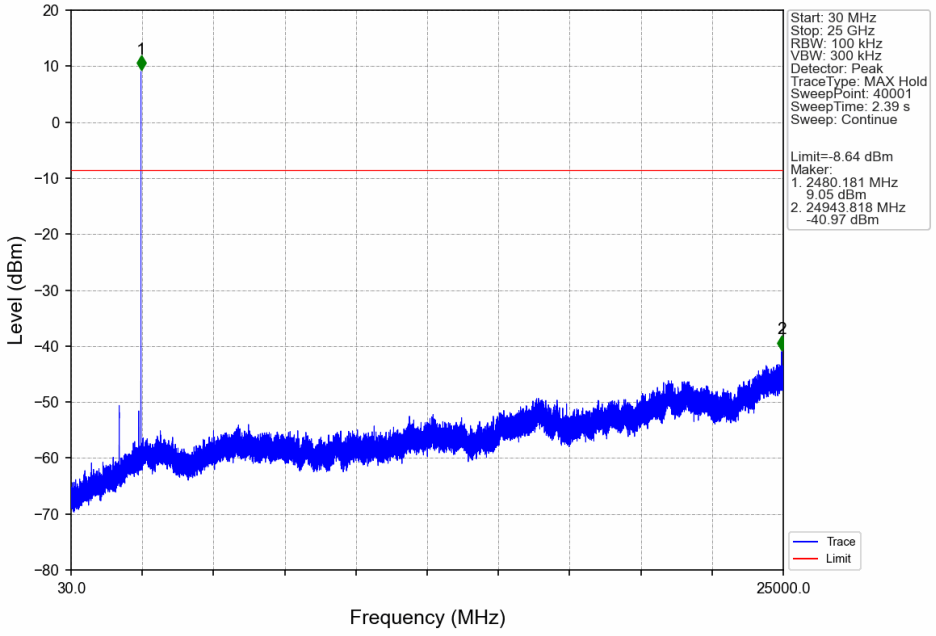
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant6_NTNV



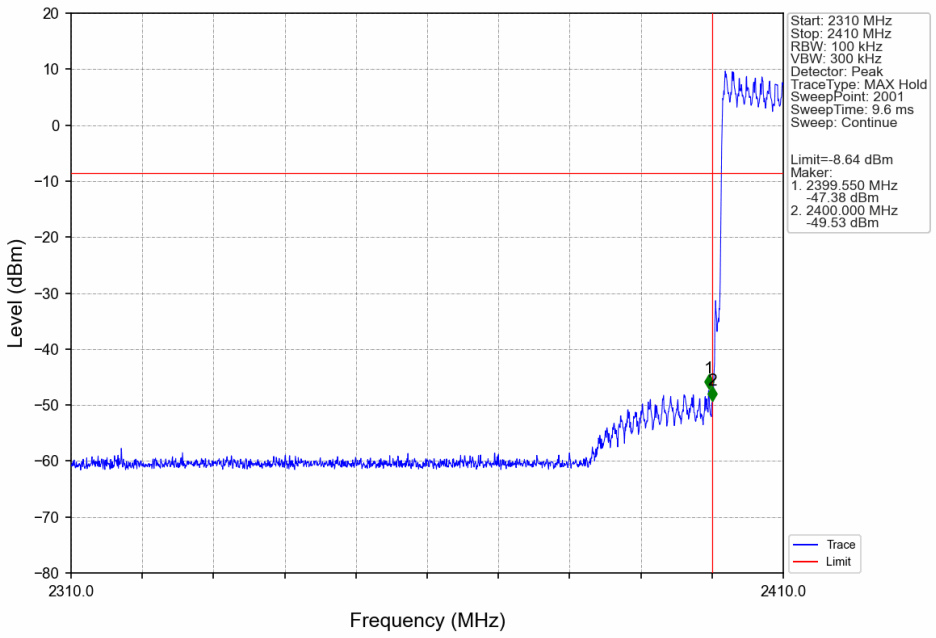
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant6_NTNV



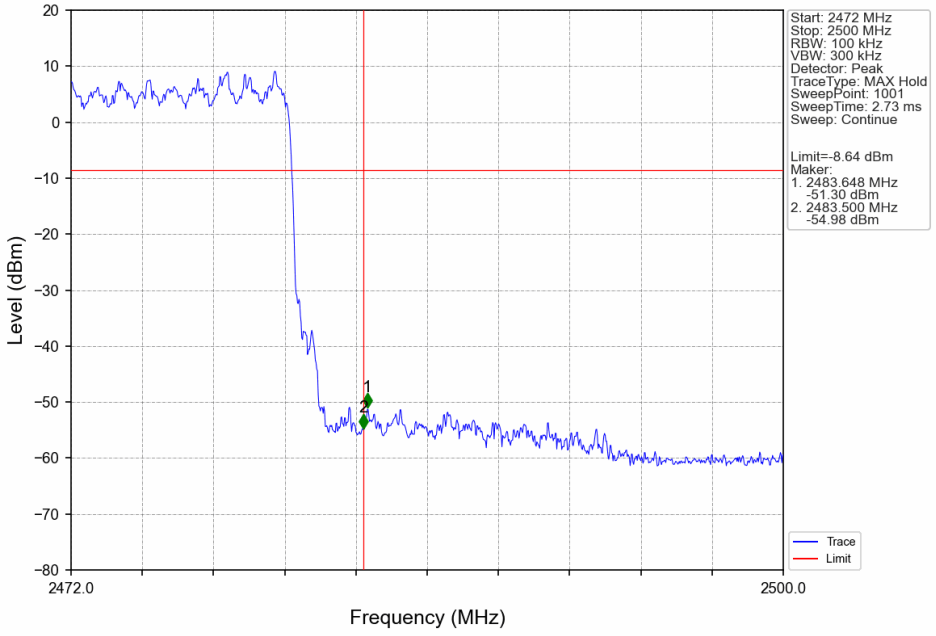
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant6_NTNV



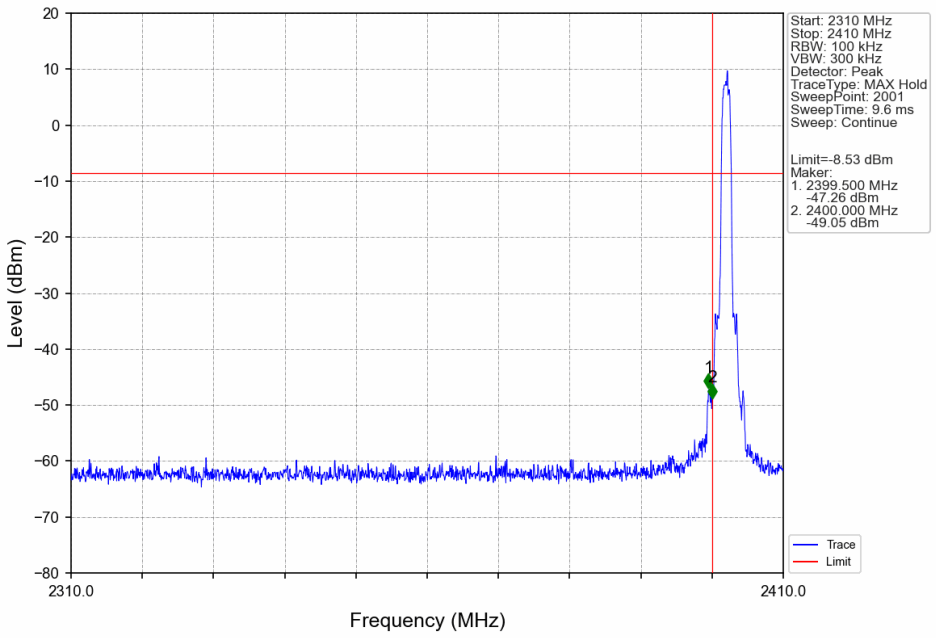
Pi/4DQPSK_2DH5_HOPP_Ant6_NTNV



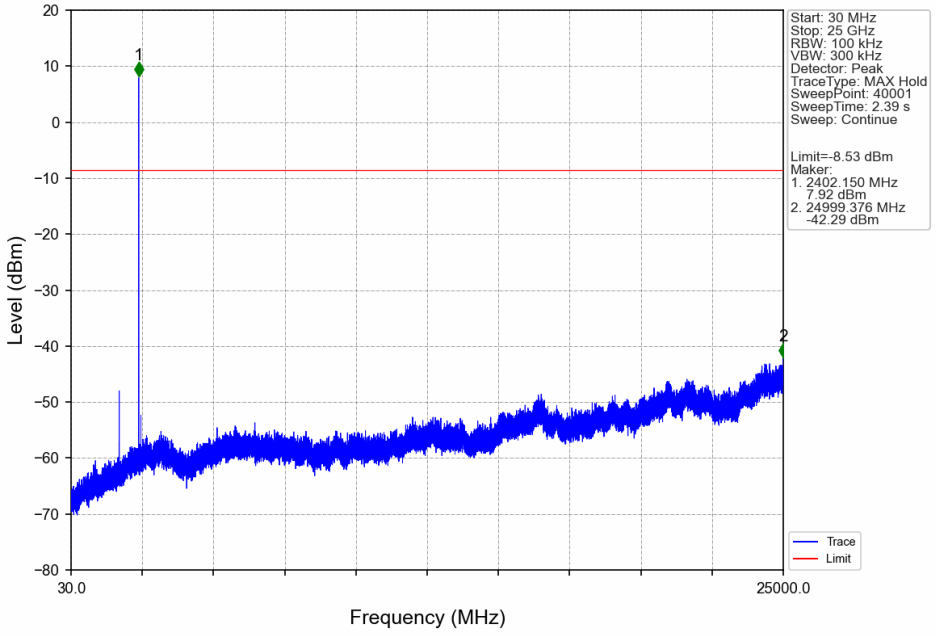
Pi/4DQPSK_2DH5_HOPP_Ant6_NTNV



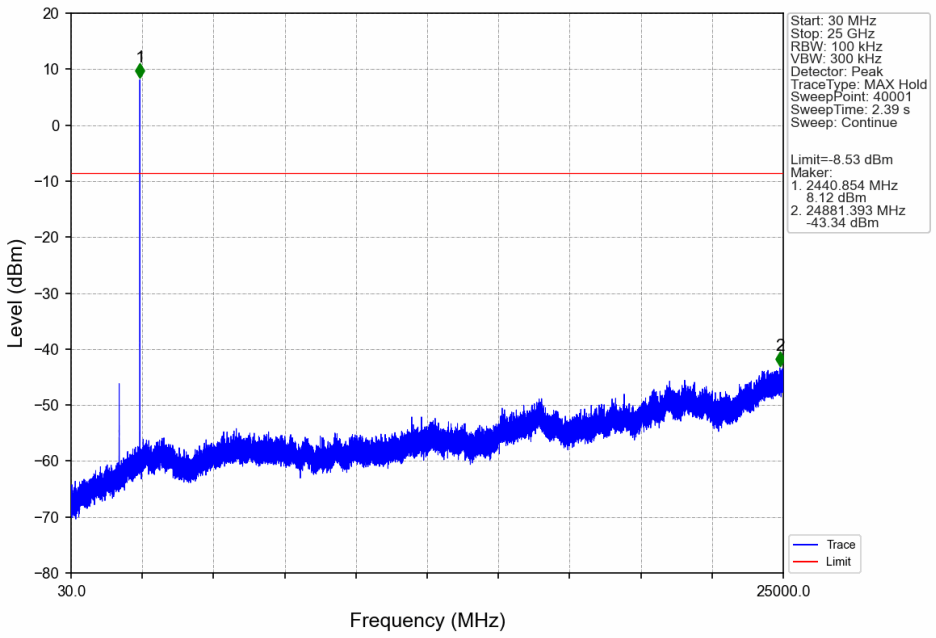
8DPSK_3DH5_LCH_2402MHz_Ant6_NTNV



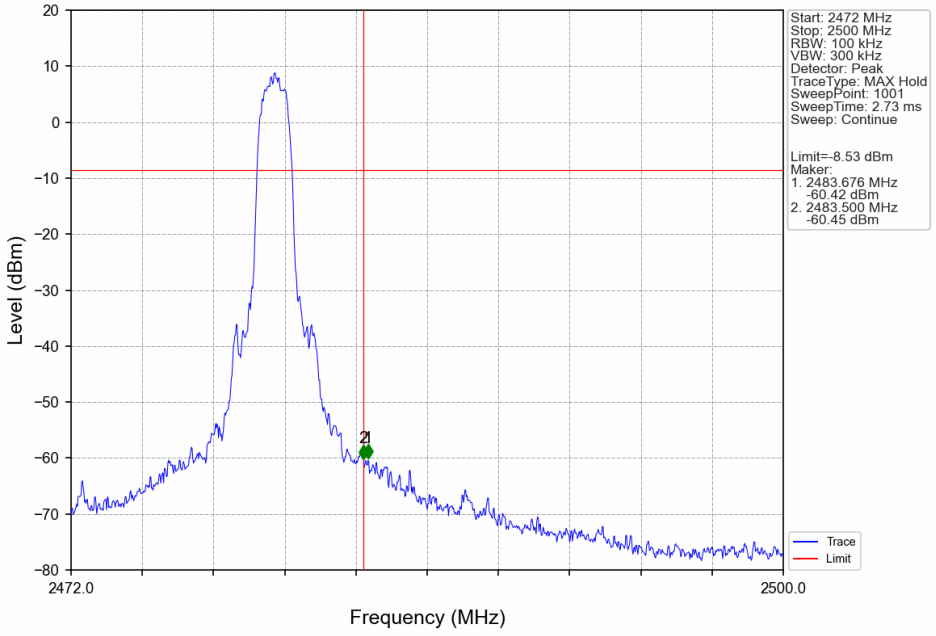
8DPSK_3DH5_LCH_2402MHz_Ant6_NTNV



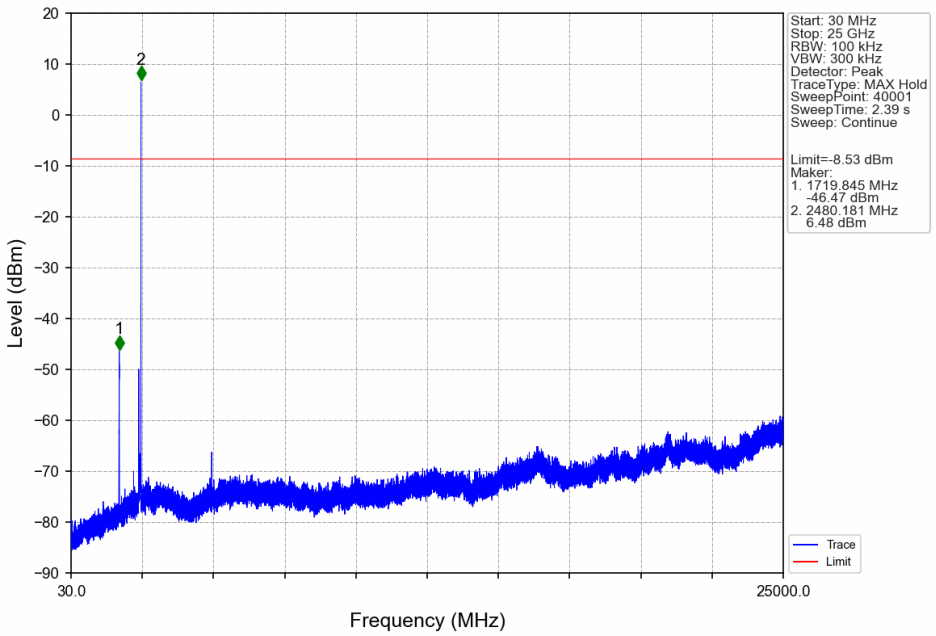
8DPSK_3DH5_MCH_2441MHz_Ant6_NTNV



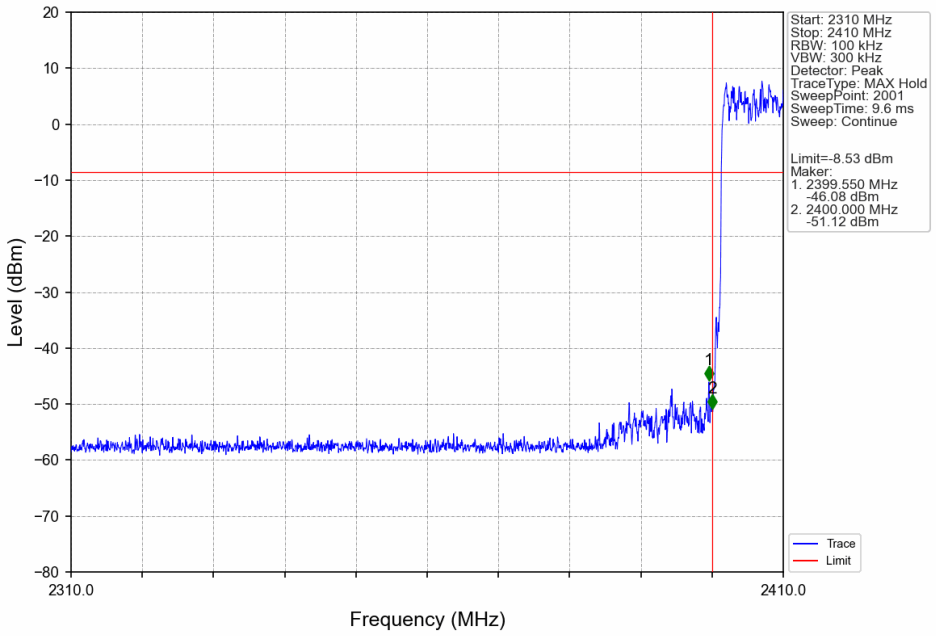
8DPSK_3DH5_HCH_2480MHz_Ant6_NTNV



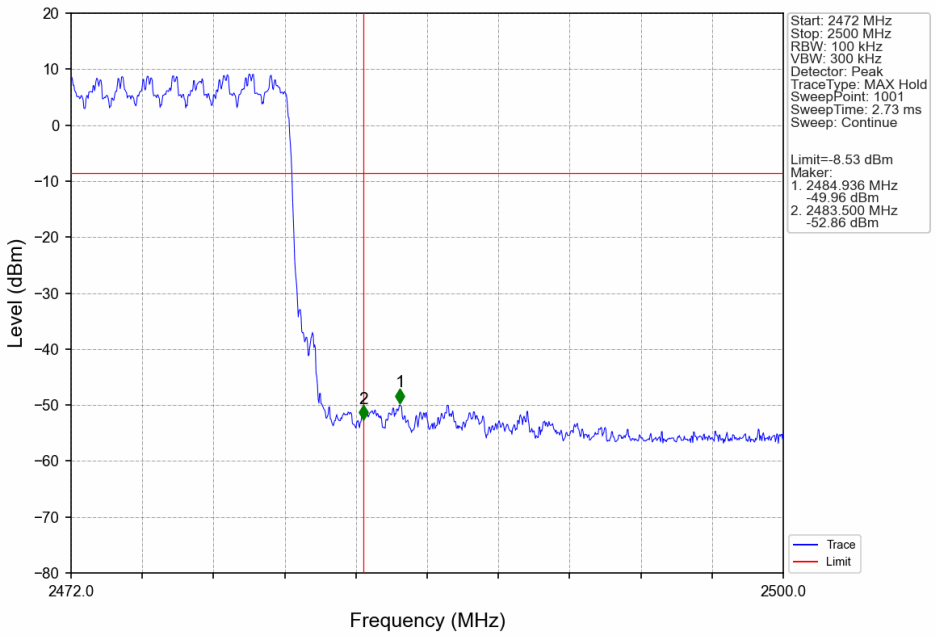
8DPSK_3DH5_HCH_2480MHz_Ant6_NTNV



8DPSK_3DH5_HOPP_Ant6_NTNV



8DPSK_3DH5_HOPP_Ant6_NTNV



- End of the Report -