# TEST REPORT

| | |
|---|---|
| **Application No.:** | KSCR2208001552AT |
| **FCC ID:** | 2ADTD-K1T681DBWX |
| **Applicant:** | Hangzhou Hikvision Digital Technology Co., Ltd. |
| **Address of Applicant:** | No.555 Qianmo Road,Binjiang District Hangzhou 310052,China |
| **Manufacturer:** | Hangzhou Hikvision Digital Technology Co., Ltd. |
| **Address of Manufacturer:** | No.555 Qianmo Road,Binjiang District Hangzhou 310052,China |
| **Factory:** | 1.Hangzhou Hikvision Technology Co., Ltd.<br>2.Hangzhou Hikvision Electronics Co., Ltd.<br>3.Chongqing Hikvision Technology Co., Ltd.,<br>4.WuHan Hikvision Technology Co. Ltd |
| **Address of Factory:** | 1.No.700,Dongliu Road, Binjiang District, Hangzhou Ctiy,Zhejiang, 310052, China<br>2.No.299,Qiushi Road,Tonglu Economic Development Zone,Tonglu County, Hangzhou,Zhejiang, 311500,China.<br>3.NO.118.Haikang Road,Area C,Jianqiao Industrial Park,Dadukou District,Chongqing,401325,China.<br>4.No. 12, Wenhua Road, Zhifang Street, Jiangxia District, Wuhan City |
| **Equipment Under Test (EUT):** | |
| **EUT Name:** | Face Recognition Terminal |
| **Model No.:** | DS-K1T681DBWX,DS-K1T681DBWUHK,DS-K1T681DBWCKV,DS-K1T681DBWUVS,DS-K1T681DBWKVO,DS-K1T681DBWHUN¤ |
| ¤ | Please refer to section 2 of this report which indicates which model was actually tested and which were electrically identical. |
| **Trade Mark:** | HIKVISION |
| **Standard(s) :** | 47 CFR Part 15, Subpart C 15.247 |
| **Date of Receipt:** | 2022-08-29 |
| **Date of Test:** | 2022-08-30 to 2022-09-05 |
| **Date of Issue:** | 2022-09-05 |
| **Test Result:** | **Pass*** |

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

Eric Lin
Laboratory Manager

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| Revision Record | | | |
|---|---|---|---|
| ***Version*** | **Description** | ***Date*** | ***Remark*** |
| *00* | Original | *2022-09-05* | / |
| | | | |
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|---|---|---|---|---|
| **Authorized for issue by:** | | | | |
| | | Eric Liu<br>**Eric_Liu/Project Engineer** | | |
| | | Eric Lin<br>**Eric Lin /Reviewer** | | |

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# 2 Test Summary

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

| Radio Spectrum Matter Part | | | | |
|---|---|---|---|---|
| **Item** | **Standard** | **Method** | **Requirement** | **Result** |
| Conducted Peak Output Power | 47 CFR Part 15, Subpart C 15.247 | ANSI C63.10 (2013) Section 7.8.5 | 47 CFR Part 15, Subpart C 15.247(b)(1) | Pass |
| 20dB Bandwidth | | ANSI C63.10 (2013) Section 7.8.7 | 47 CFR Part 15, Subpart C 15.247(a)(1) | Pass |
| Carrier Frequencies Separation | | ANSI C63.10 (2013) Section 7.8.2 | 47 CFR Part 15, Subpart C 15.247a(1) | Pass |
| Hopping Channel Number | | ANSI C63.10 (2013) Section 7.8.3 | 47 CFR Part 15, Subpart C 15.247a(1)(iii) | Pass |
| Dwell Time | | ANSI C63.10 (2013) Section 7.8.4 | 47 CFR Part 15, Subpart C 15.247a(1)(iii) | Pass |
| Conducted Band Edges Measurement | | ANSI C63.10 (2013) Section 7.8.6 | 47 CFR Part 15, Subpart C 15.247(d) | Pass |
| Conducted Spurious Emissions | | ANSI C63.10 (2013) Section 7.8.8 | 47 CFR Part 15, Subpart C 15.247(d) | Pass |
| Radiated Emissions which fall in the restricted bands | | ANSI C63.10 (2013) Section 6.10.5 | 47 CFR Part 15, Subpart C 15.205 & 15.209 | Pass |
| Radiated Spurious Emissions Below 1GHz | | ANSI C63.10 (2013) Section 6.4,6.5 | 47 CFR Part 15, Subpart C 15.205 & 15.209 | Pass |
| Radiated Spurious Emissions Above 1GHz | | ANSI C63.10 (2013) Section 6.6 | 47 CFR Part 15, Subpart C 15.205 & 15.209 | Pass |
| Conducted Emissions at AC Power Line (150kHz-30MHz) | | ANSI C63.10 (2013) Section 6.2 | 47 CFR Part 15, Subpart C 15.207 | Pass |

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**Declaration of EUT Family Grouping:**

Note: There are series models mentioned in this report, and they are the identical in electrical and electronic characters. Only the model DS-K1T681DBWX was tested since their differences were the model number and silk.

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# 4 General Information

## 4.1 Details of E.U.T.

| | |
|---|---|
| Power supply: | DC 12V-24V |
| Operation Frequency: | 2402MHz to 2480MHz |
| Bluetooth Version: | V5.0 Dual mode |
| Modulation Type: | GFSK, π/4DQPSK, 8DPSK |
| Number of Channels: | 79 |
| Channel Spacing: | 1MHz |
| Spectrum Spread Technology: | Frequency Hopping Spread Spectrum(FHSS) |
| Antenna Type: | FPC Antenna |
| Antenna Gain: | 1.2dBi(Provided by the manufacturer) |

## 4.2 Power level setting using in test:

| Channel | DH5 | 2DH5 | 3DH5 |
|---|---|---|---|
| 0 | Default | Default | Default |
| 39 | Default | Default | Default |
| 78 | Default | Default | Default |

## 4.3 Description of Support Units

| Description | Manufacturer | Model No. | Serial No. |
|---|---|---|---|
| Notebook | LENOVO | K27 | EB24537645 |
| Adapter | HONOR | ADS-26FSG-12 | -- |

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## 4.4 Measurement Uncertainty

| No. | Item | Measurement Uncertainty |
|---|---|---|
| 1 | Radio Frequency | $8.4 \times 10^{-8}$ |
| 2 | Timeout | 2s |
| 3 | Duty Cycle | 0.37% |
| 4 | Occupied Bandwidth | 3% |
| 5 | RF Conducted Power | 0.6dB |
| 6 | RF Power Density | 2.9dB |
| 7 | Conducted Spurious Emissions | 0.75dB |
| 8 | RF Radiated Power | 5.2dB (Below 1GHz) |
| | | 5.9dB (Above 1GHz) |
| 9 | Radiated Spurious Emission Test | 4.2dB (Below 30MHz) |
| | | 4.5dB (30MHz-1GHz) |
| | | 5.1dB (1GHz-18GHz) |
| | | 5.4dB (Above 18GHz) |
| 10 | Temperature Test | 1°C |
| 11 | Humidity Test | 3% |
| 12 | Supply Voltages | 1.5% |
| 13 | Time | 3% |

Note: The measurement uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

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## 4.5 Test Location

All tests were performed at:

Compliance Certification Services (Kunshan) Inc.

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

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

No tests were sub-contracted.

Note:

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

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

## 4.6 Test Facility

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

**• CNAS**

Compliance Certification Services (Kunshan) Inc. is accredited by the China National Accreditation Service for Conformity Assessment (CNAS). Registration No. CNAS L4354

**• A2LA**

Compliance Certification Services (Kunshan) Inc. is accredited by the American Association for Laboratory Accreditation (A2LA). Certificate No. 2541.01.

**• FCC**

Compliance Certification Services (Kunshan) Inc. has been recognized as an accredited testing laboratory. Designation Number: CN1172.

**• ISED**

Compliance Certification Services (Kunshan) Inc. has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory. Company Number: 2324E

**• VCCI**

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

## 4.7 Deviation from Standards

None

## 4.8 Abnormalities from Standard Conditions

None

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# 5 Equipment List

| Item | Equipment | Manufacturer | Model | Inventory No | Cal Date | Cal. Due Date |
|---|---|---|---|---|---|---|
| **Conducted Emission at Mains Terminals (150kHz-30MHz)** | | | | | | |
| 1 | EMI Test Receive | R&S | ESCI | KS301101 | 01/22/2022 | 01/21/2023 |
| 2 | LISN | R&S | ENV216 | KS301197 | 01/22/2022 | 01/21/2023 |
| 3 | LISN | Schwarzbeck | NNLK 8129 | KS301091 | 01/22/2022 | 01/21/2023 |
| 4 | Pulse Limiter | R&S | ESH3-Z2 | KUS1902E001 | 01/22/2022 | 01/21/2023 |
| 5 | CE test Cable | Thermax | / | CZ301102 | 11/14/2021 | 11/13/2022 |
| 6 | Test Software | Farad | EZ-EMC | / | N.C.R | N.C.R |
| **RF Conducted Test** | | | | | | |
| 1 | Spectrum Analyzer | Keysight | N9020A | KUS1911E004-2 | 08/22/2022 | 08/21/2023 |
| 2 | Spectrum Analyzer | Keysight | N9020A | KUS2001M001-2 | 08/22/2022 | 08/21/2023 |
| 3 | Spectrum Analyzer | Keysight | N9030B | KSEM021-1 | 01/22/2022 | 01/21/2023 |
| 4 | Signal Generator | R&S | SMW200A | KSEM020-1 | 08/22/2022 | 08/21/2023 |
| 5 | Signal Generator | Agilent | N5182A | KUS2001M001-1 | 08/22/2022 | 08/21/2023 |
| 6 | Radio Communication Test Station | Anritsu | MT8000A | KSEM001-1 | 08/22/2022 | 08/21/2023 |
| 7 | Radio Communication Analyzer | Anritsu | MT8821C | KSEM002-1 | 04/01/2022 | 03/31/2023 |
| 8 | Universal Radio Communication Tester | R&S | CMW500 | KUS1911E004-1 | 08/22/2022 | 08/21/2023 |
| 9 | Switcher | CCSRF | FY562 | KUS2001M001-3 | 08/22/2022 | 08/21/2023 |
| 10 | AC Power Source | EXTECH | 6605 | KS301178 | N.C.R | N.C.R |
| 11 | DC Power Supply | Aglient | E3632A | KS301180 | N.C.R | N.C.R |
| 12 | Conducted Test Cable | Thermax | RF01-RF04 | CZ301111-CZ301120 | 01/16/2022 | 01/15/2023 |
| 13 | Temp. / Humidity Chamber | TERCHY | MHK-120AK | KS301190 | 04/01/2021 | 03/31/2023 |
| 14 | Temperature & Humidity Recorder | Renke Control | RS-WS-N01-6J | KSEM024-5 | 04/14/2022 | 04/13/2023 |
| 15 | Software | BST | TST-PASS | / | N/A | N/A |
| **RF Radiated Test** | | | | | | |
| 1 | Spectrum Analyzer | R&S | FSV40 | KUS1806E003 | 08/22/2022 | 08/21/2023 |
| 2 | Universal Radio Communication Tester | R&S | CMW500 | KSEM009-1 | 04/01/2022 | 03/31/2023 |
| 3 | Signal Generator | Agilent | E8257C | KS301066 | 08/22/2022 | 08/21/2023 |
| 4 | Loop Antenna | COM-POWER | AL-130R | KUS1806E001 | 04/13/2021 | 04/12/2023 |
| 5 | Bilog Antenna | TESEQ | CBL 6112D | KUS1806E005 | 06/29/2021 | 06/28/2023 |
| 6 | Bilog Antenna | SCHWARZBECK | VULB9160 | CZ301016 | 04/13/2021 | 04/12/2024 |
| 7 | Horn-antenna(1-18GHz) | Schwarzbeck | BBHA9120D | KS301079 | 04/02/2022 | 04/01/2024 |
| 8 | Horn-antenna(1-18GHz) | ETS-LINDGREN | 3117 | KS301186 | 02/22/2021 | 02/21/2023 |
| 9 | Horn Antenna(18-40GHz) | Schwarzbeck | BBHA9170 | CZ301058 | 03/17/2022 | 03/16/2023 |
| 10 | Amplifier(30MHz~18GHz) | PANSHAN TECHNOLOGY | LNA:1~18G | KSEM010-1 | 01/22/2022 | 01/21/2023 |
| 11 | Amplifier(18~40GHz) | COM-POWER | PAM-840A | KUS1710E001 | 01/22/2022 | 01/21/2023 |
| 12 | RE Test Cable | REBES MICROWAVE | / | CZ301097 | 11/14/2021 | 11/13/2022 |
| 13 | Temperature & Humidity Recorder | Renke Control | RS-WS-N01-6J | KSEM024-4 | 01/04/2022 | 31/03/2023 |
| 14 | Software | Faratronic | EZ_EMC-v 3A1 | / | N/A | N/A |

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# 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 integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is xx dBi.

Antenna location: Refer to internal photo.

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## 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

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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.

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# 7 Radio Spectrum Matter Test Results

## 7.1 Conducted Peak Output Power

Test Requirement 47 CFR Part 15, Subpart C 15.247(b)(1)
Test Method: ANSI C63.10 (2013) Section 7.8.5

Limit:

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

### 7.1.1 E.U.T. Operation

Operating Environment:
Temperature: 22.9 °C Humidity: 49.5 % RH Atmospheric Pressure: 1010 mbar

### 7.1.2 Test Mode Description

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

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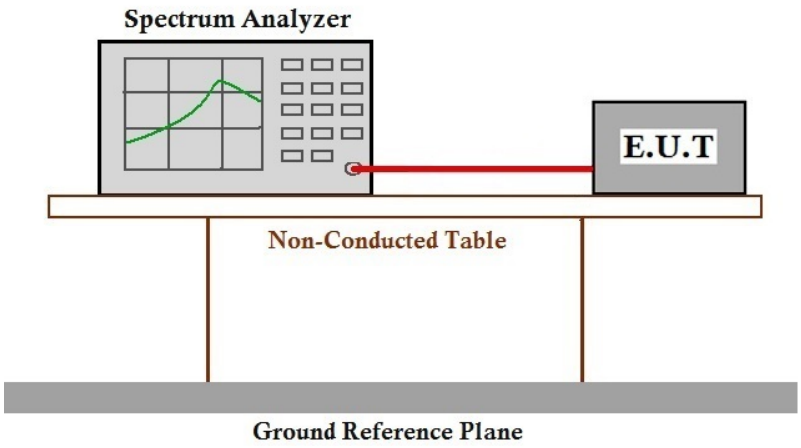
### 7.1.3 Test Setup Diagram




### 7.1.4 Measurement Procedure and Data

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

Please Refer to Appendix C for KSCR220800155203

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## 7.2 20dB Bandwidth

Test Requirement 47 CFR Part 15, Subpart C 15.247(a)(1)
Test Method: ANSI C63.10 (2013) Section 7.8.7

### 7.2.1 E.U.T. Operation

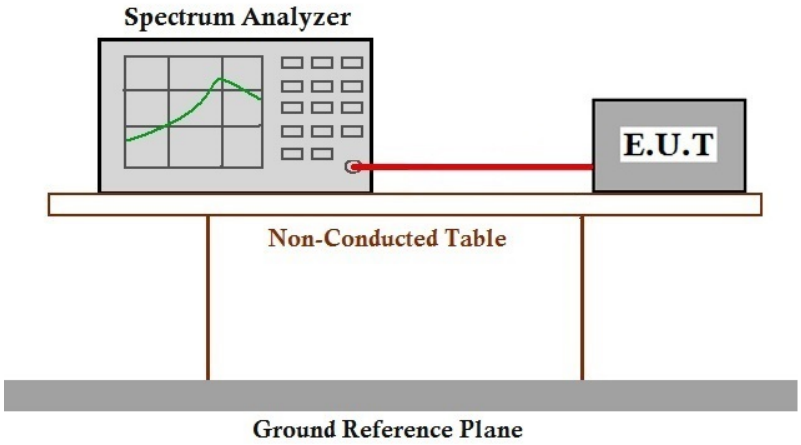
Operating Environment:

Temperature: 22.9 °C Humidity: 49.4 % RH Atmospheric Pressure: 1010 mbar

### 7.2.2 Test Mode Description

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

### 7.2.3 Test Setup Diagram




### 7.2.4 Measurement Procedure and Data

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## 7.3 Carrier Frequencies Separation

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)
Test Method: ANSI C63.10 (2013) Section 7.8.2

Limit:

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

### 7.3.1 E.U.T. Operation

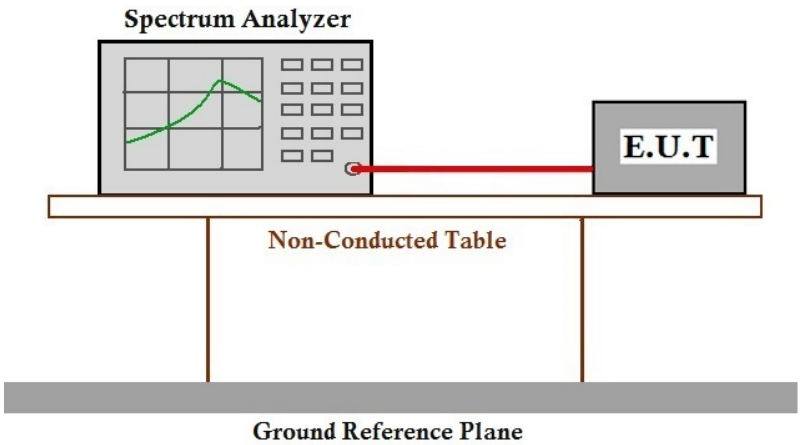
Operating Environment:

Temperature: 22.9 °C Humidity: 49.4 % RH Atmospheric Pressure: 1010 mbar

### 7.3.2 Test Mode Description

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

### 7.3.3 Test Setup Diagram




### 7.3.4 Measurement Procedure and Data

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## 7.4 Hopping Channel Number

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10 (2013) Section 7.8.3

Limit:

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

### 7.4.1 E.U.T. Operation

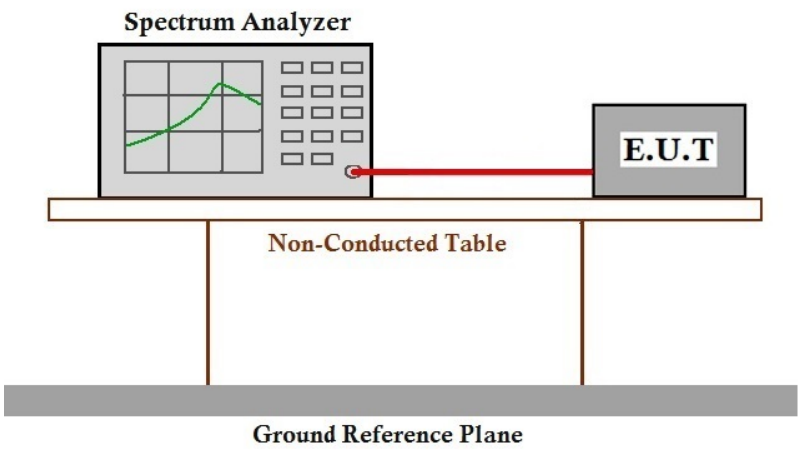
Operating Environment:

Temperature: 22.9 °C Humidity: 49.4 % RH Atmospheric Pressure: 1010 mbar

### 7.4.2 Test Mode Description

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

### 7.4.3 Test Setup Diagram

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### 7.4.4 Measurement Procedure and Data

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## 7.5 Dwell Time

Test Requirement 47 CFR Part 15, Subpart C 15.247a(1)(iii)
Test Method: ANSI C63.10 (2013) Section 7.8.4

Limit:

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

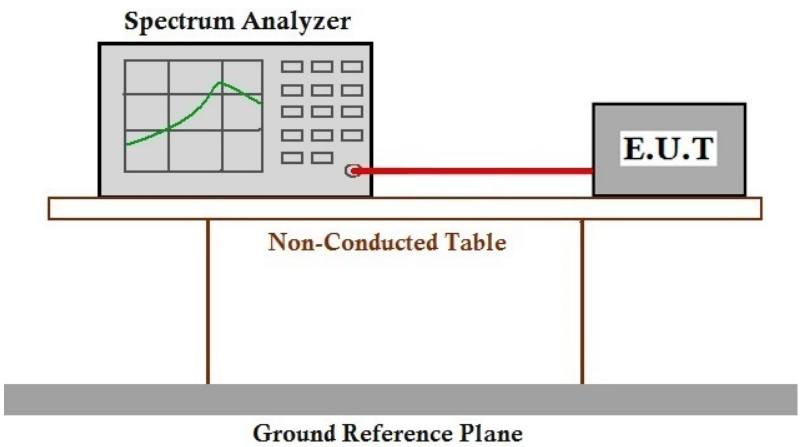
### 7.5.1 E.U.T. Operation

Operating Environment:
Temperature: 22.9 °C Humidity: 49.5 % RH Atmospheric Pressure: 1010 mbar

### 7.5.2 Test Mode Description

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

### 7.5.3 Test Setup Diagram

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### 7.5.4 Measurement Procedure and Data

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## 7.6 Conducted Band Edges Measurement

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
Test Method: ANSI C63.10 (2013) Section 7.8.6

Limit:

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

### 7.6.1 E.U.T. Operation

Operating Environment:

Temperature: 22.9 °C Humidity: 49.5 % RH Atmospheric Pressure: 1010 mbar

### 7.6.2 Test Mode Description

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

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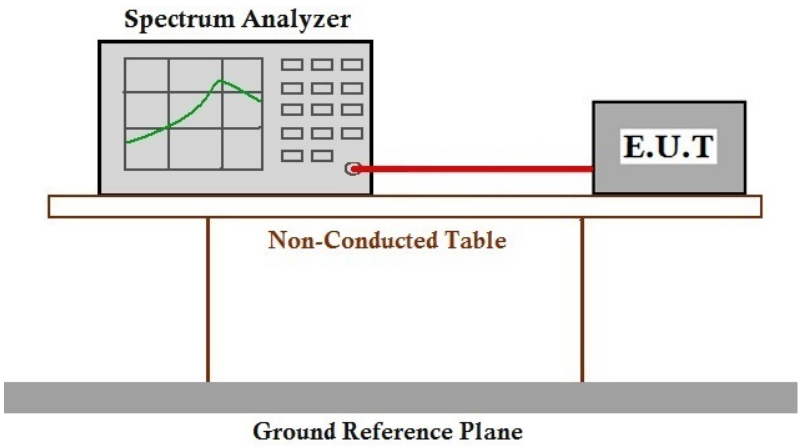
### 7.6.3 Test Setup Diagram




### 7.6.4 Measurement Procedure and Data

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## 7.7 Conducted Spurious Emissions

Test Requirement 47 CFR Part 15, Subpart C 15.247(d)
Test Method: ANSI C63.10 (2013) Section 7.8.8

Limit:

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

### 7.7.1 E.U.T. Operation

Operating Environment:

Temperature: 22.9 °C Humidity: 49.5 % RH Atmospheric Pressure: 1010 mbar

### 7.7.2 Test Mode Description

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

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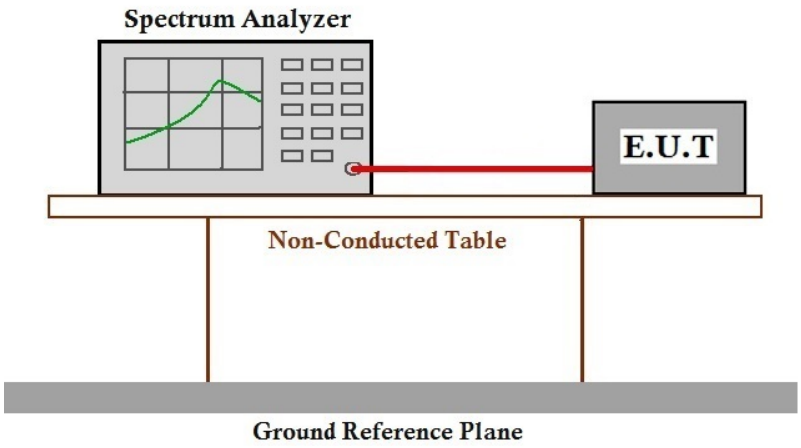
### 7.7.3 Test Setup Diagram




### 7.7.4 Measurement Procedure and Data

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## 7.8 Radiated Emissions which fall in the restricted bands

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) 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. | | |

### 7.8.1 E.U.T. Operation

Operating Environment:

Temperature: 22.0 °C Humidity: 57.9 % RH Atmospheric Pressure: 1010 mbar

### 7.8.2 Test Mode Description

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

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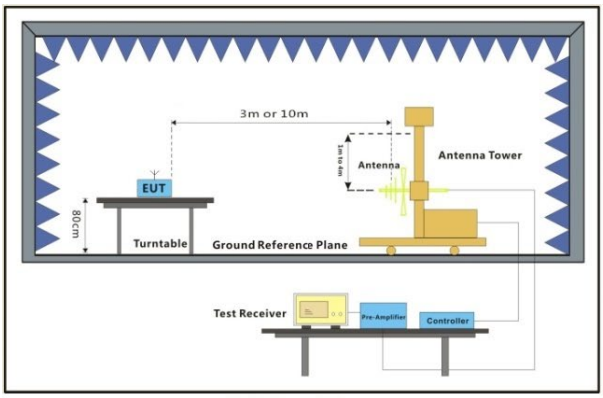
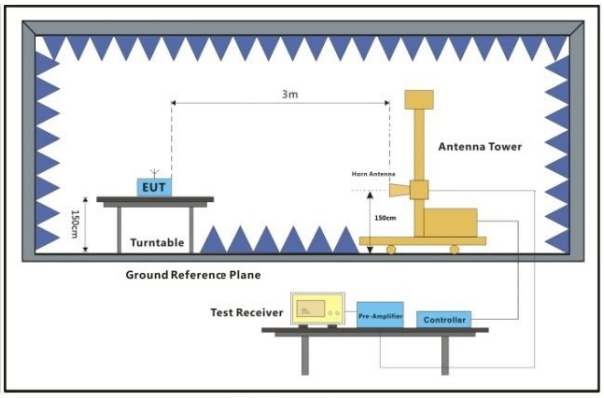
### 7.8.3 Test Setup Diagram




30MHz-1GHz




Above 1GHz

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### 7.8.4 Measurement Procedure and Data

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

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

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

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

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

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

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

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

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

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

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

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

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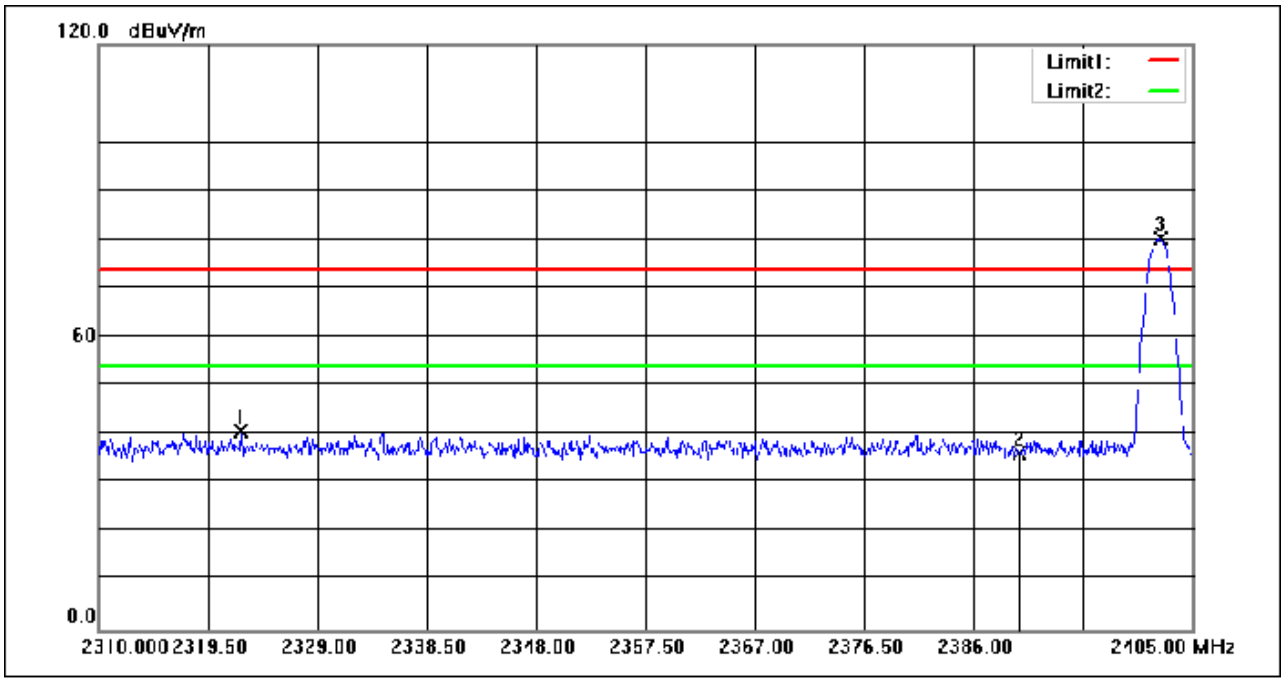
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2322.350 | 59.48 | -18.78 | 40.70 | 74.00 | -33.30 | peak |
| 2 | 2390.000 | 54.80 | -18.75 | 36.05 | 74.00 | -37.95 | peak |
| 3 | 2402.245 | 98.96 | -18.74 | 80.22 | 74.00 | 6.22 | peak |

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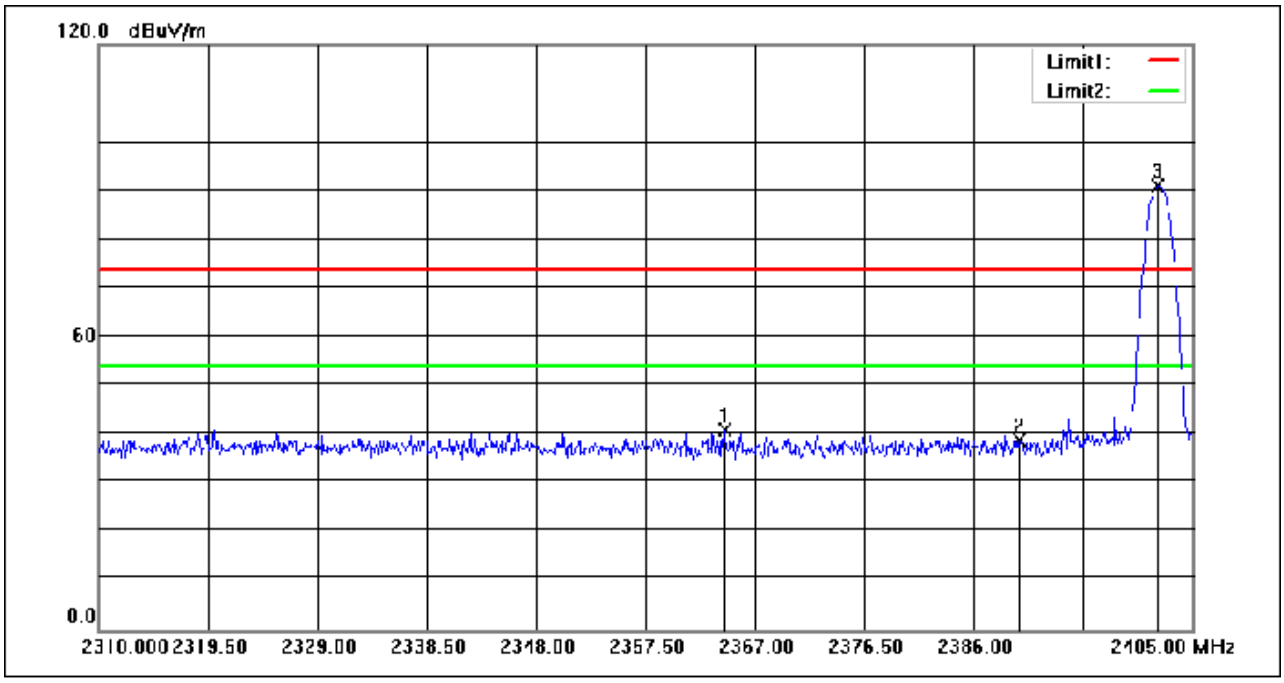
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2364.340 | 59.83 | -18.76 | 41.07 | 74.00 | -32.93 | peak |
| 2 | 2390.000 | 57.73 | -18.75 | 38.98 | 74.00 | -35.02 | peak |
| 3 | 2402.055 | 109.74 | -18.74 | 91.00 | 74.00 | 17.00 | peak |

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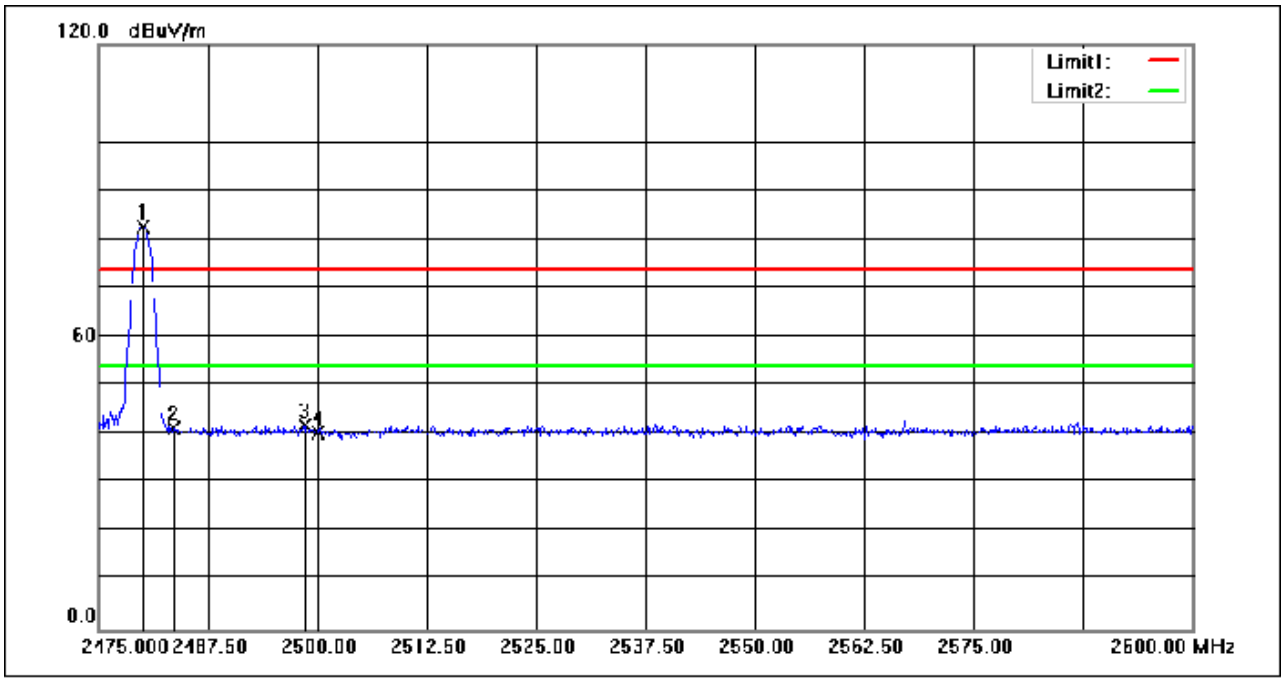
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2480.000 | 101.22 | -18.46 | 82.76 | 74.00 | 8.76 | peak |
| 2 | 2483.500 | 59.78 | -18.45 | 41.33 | 74.00 | -32.67 | peak |
| 3 | 2498.500 | 60.26 | -18.39 | 41.87 | 74.00 | -32.13 | peak |
| 4 | 2500.000 | 58.74 | -18.38 | 40.36 | 74.00 | -33.64 | peak |

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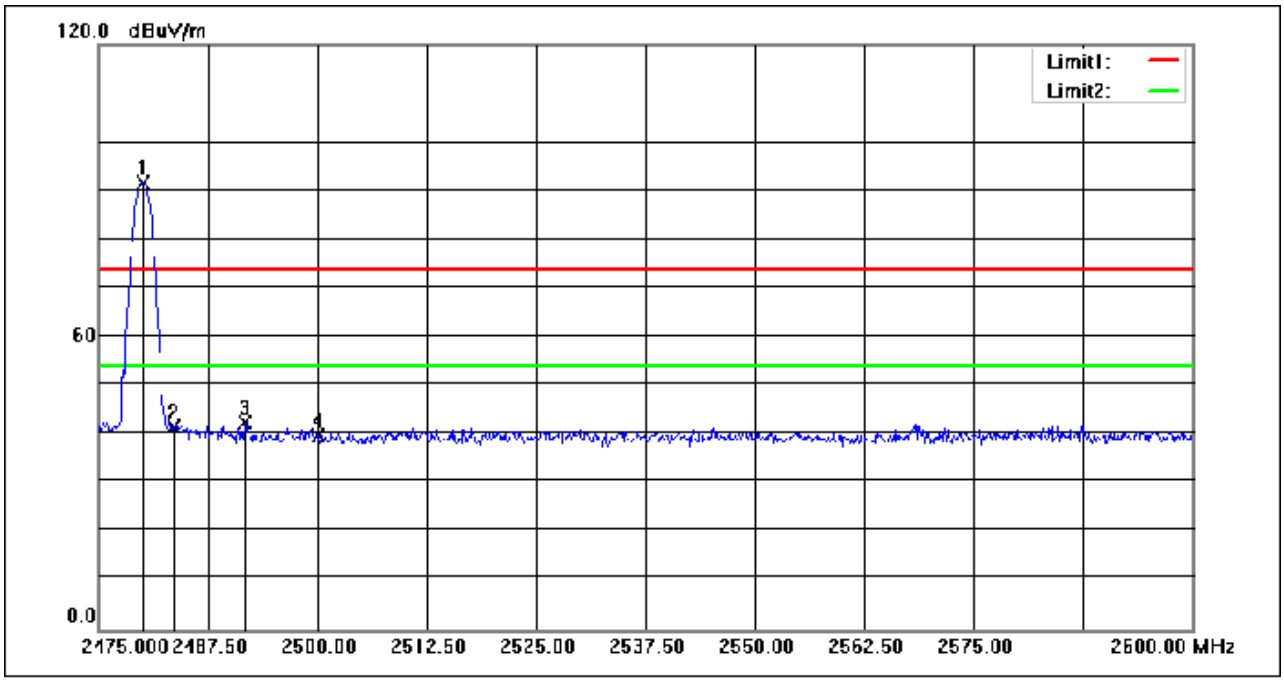
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2480.000 | 110.13 | -18.46 | 91.67 | 74.00 | 17.67 | peak |
| 2 | 2483.500 | 59.97 | -18.45 | 41.52 | 74.00 | -32.48 | peak |
| 3 | 2491.750 | 60.77 | -18.41 | 42.36 | 74.00 | -31.64 | peak |
| 4 | 2500.000 | 58.21 | -18.38 | 39.83 | 74.00 | -34.17 | peak |

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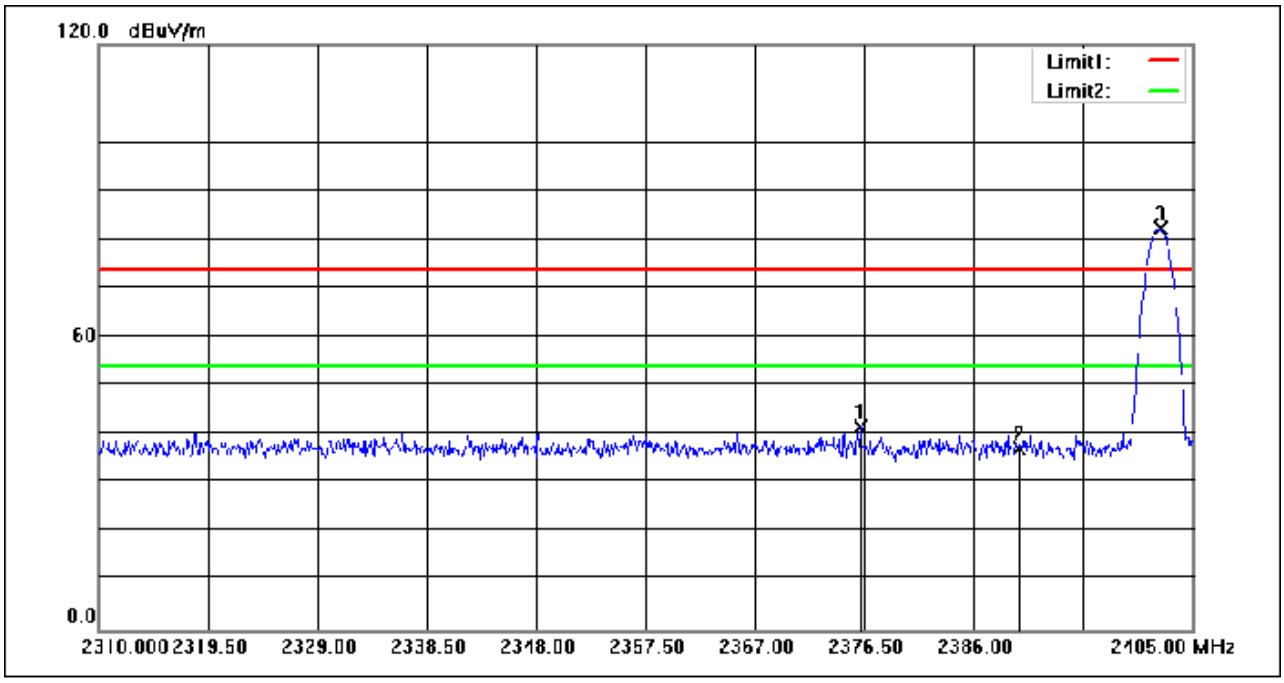
Test Mode: 01; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2376.215 | 60.35 | -18.76 | 41.59 | 74.00 | -32.41 | peak |
| 2 | 2390.000 | 55.94 | -18.75 | 37.19 | 74.00 | -36.81 | peak |
| 3 | 2402.245 | 101.00 | -18.74 | 82.26 | 74.00 | 8.26 | peak |

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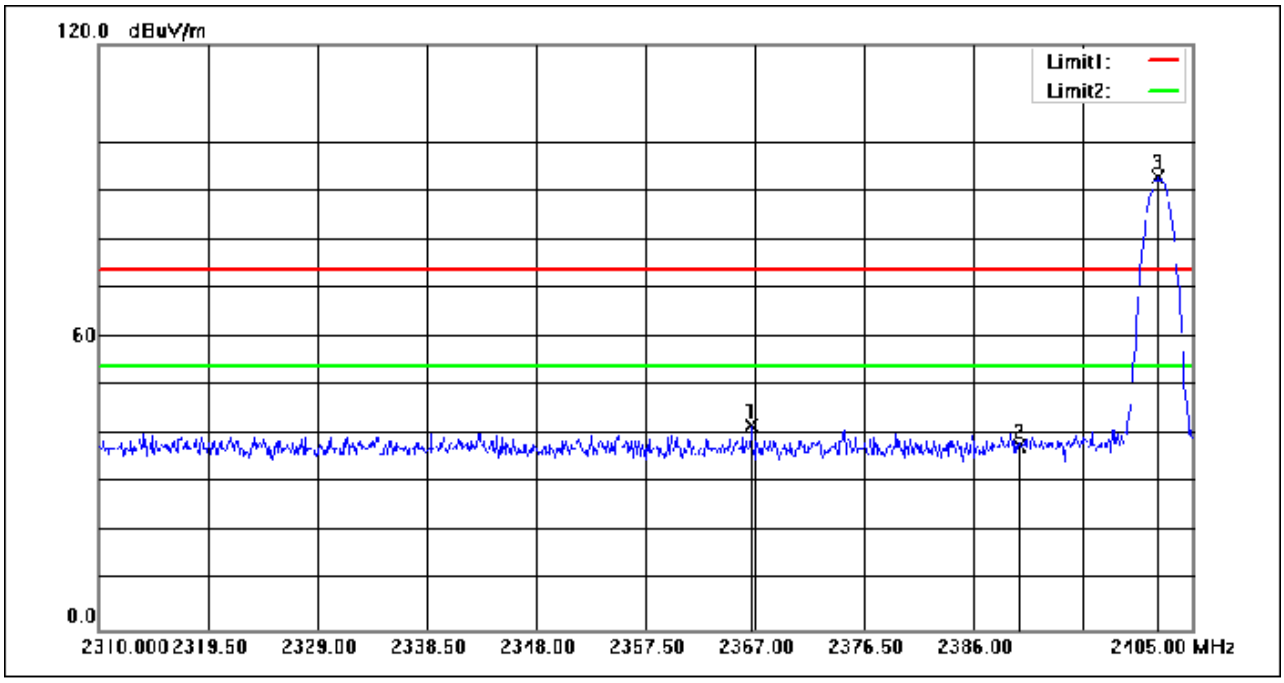
Test Mode: 01; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2366.715 | 60.57 | -18.76 | 41.81 | 74.00 | -32.19 | peak |
| 2 | 2390.000 | 56.51 | -18.75 | 37.76 | 74.00 | -36.24 | peak |
| 3 | 2401.960 | 111.47 | -18.74 | 92.73 | 74.00 | 18.73 | peak |

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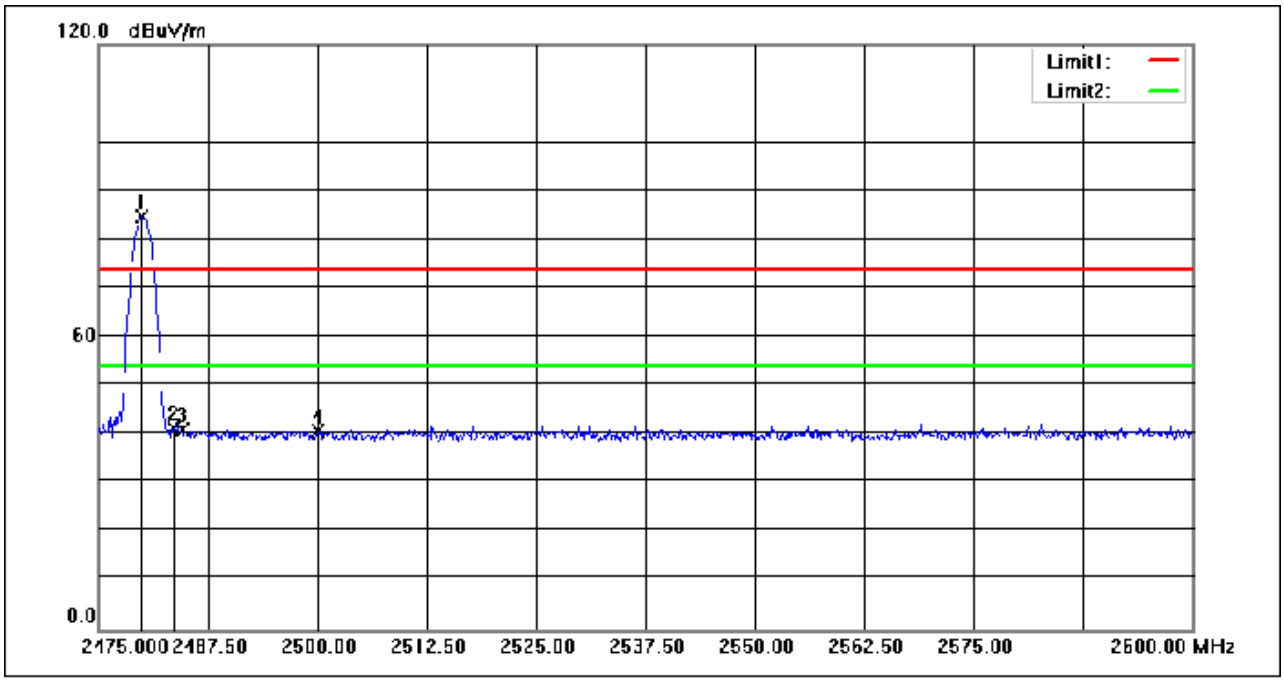
Test Mode: 01; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2479.875 | 103.10 | -18.46 | 84.64 | 74.00 | 10.64 | peak |
| 2 | 2483.500 | 59.77 | -18.45 | 41.32 | 74.00 | -32.68 | peak |
| 3 | 2484.625 | 59.54 | -18.44 | 41.10 | 74.00 | -32.90 | peak |
| 4 | 2500.000 | 59.15 | -18.38 | 40.77 | 74.00 | -33.23 | peak |

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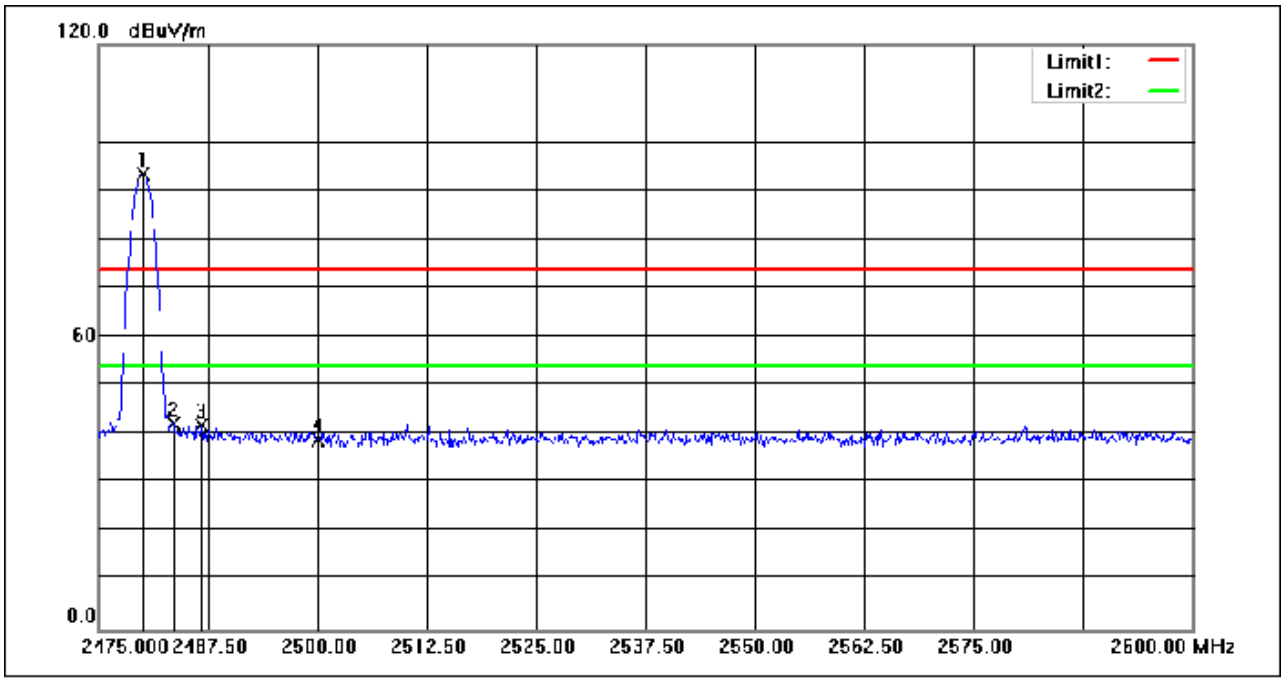
Test Mode: 01; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2480.125 | 111.90 | -18.46 | 93.44 | 74.00 | 19.44 | peak |
| 2 | 2483.500 | 60.60 | -18.45 | 42.15 | 74.00 | -31.85 | peak |
| 3 | 2486.750 | 60.34 | -18.44 | 41.90 | 74.00 | -32.10 | peak |
| 4 | 2500.000 | 57.36 | -18.38 | 38.98 | 74.00 | -35.02 | peak |

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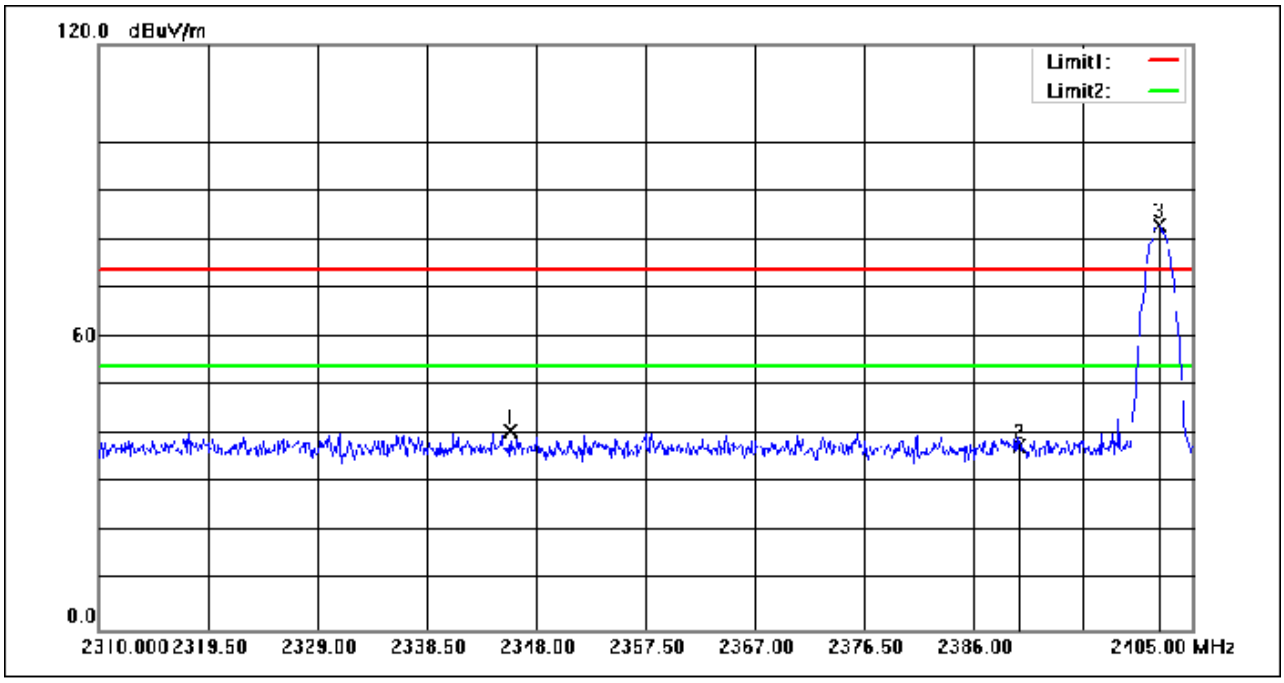
Test Mode: 01; Polarity: Horizontal; Modulation:8DPSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2345.815 | 59.41 | -18.77 | 40.64 | 74.00 | -33.36 | peak |
| 2 | 2390.000 | 56.35 | -18.75 | 37.60 | 74.00 | -36.40 | peak |
| 3 | 2402.150 | 101.64 | -18.74 | 82.90 | 74.00 | 8.90 | peak |

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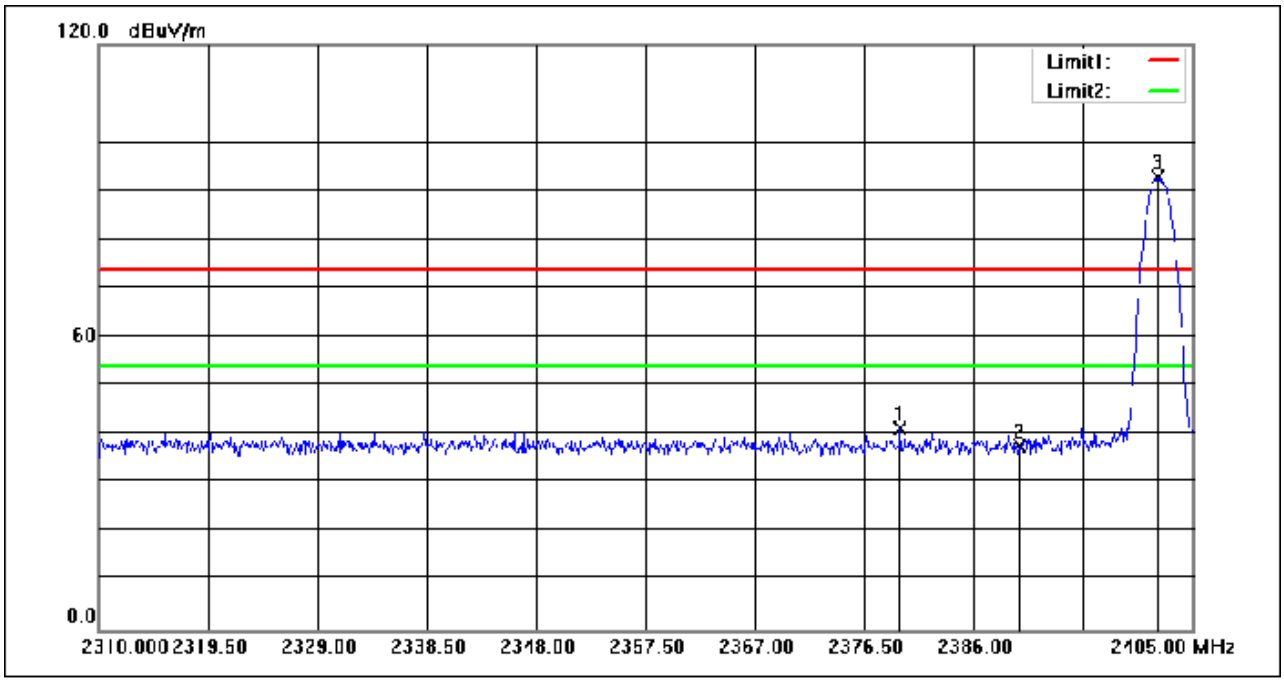


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2379.635 | 59.98 | -18.76 | 41.22 | 74.00 | -32.78 | peak |
| 2 | 2390.000 | 56.34 | -18.75 | 37.59 | 74.00 | -36.41 | peak |
| 3 | 2402.055 | 111.66 | -18.74 | 92.92 | 74.00 | 18.92 | peak |

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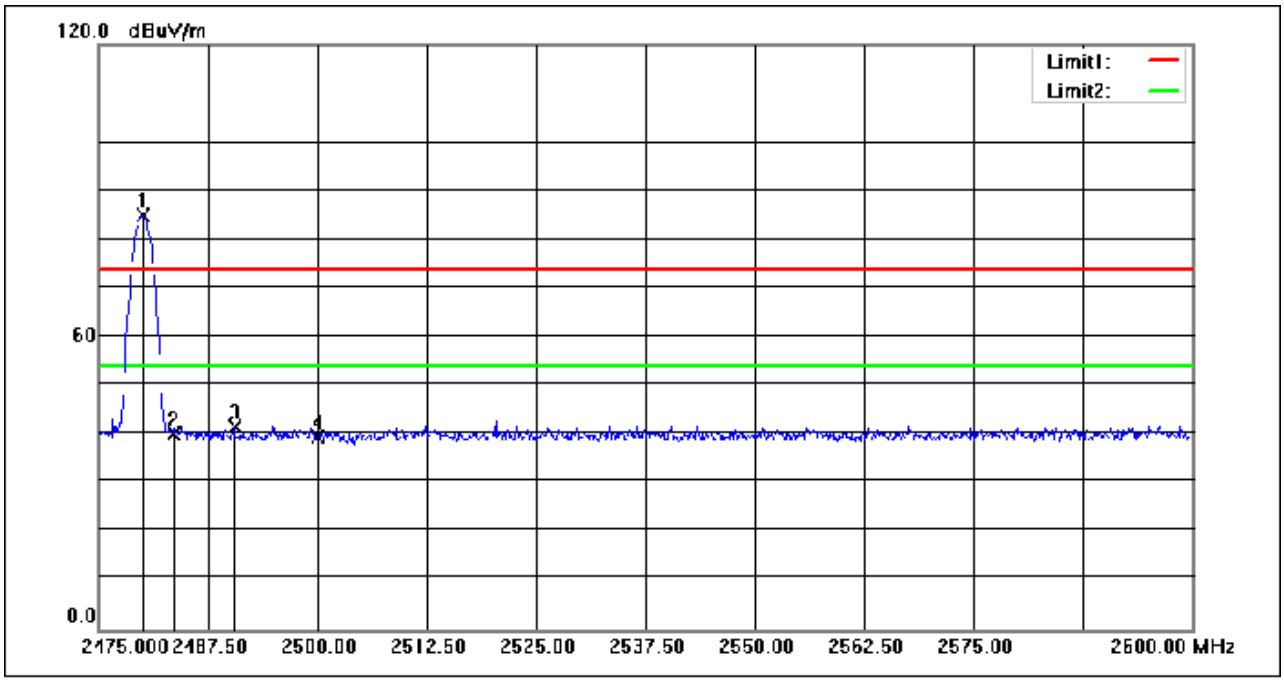


| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2480.000 | 103.44 | -18.46 | 84.98 | 74.00 | 10.98 | peak |
| 2 | 2483.500 | 58.46 | -18.45 | 40.01 | 74.00 | -33.99 | peak |
| 3 | 2490.500 | 60.09 | -18.42 | 41.67 | 74.00 | -32.33 | peak |
| 4 | 2500.000 | 57.93 | -18.38 | 39.55 | 74.00 | -34.45 | peak |

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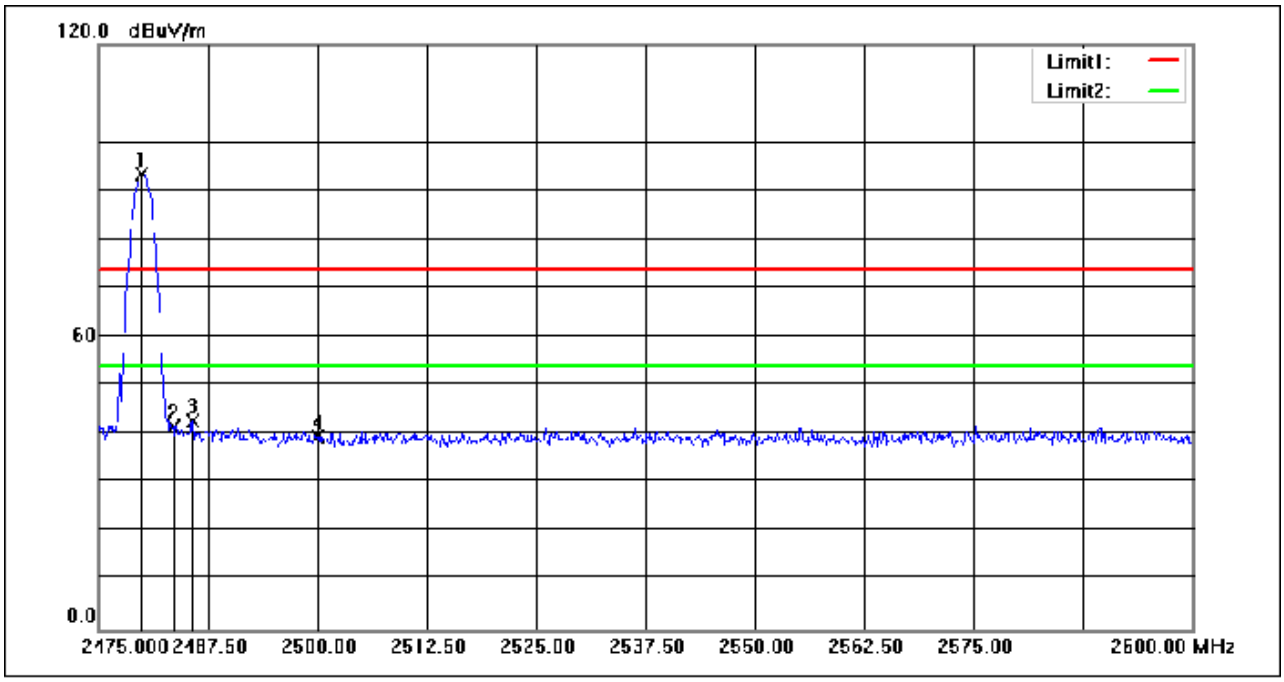
Test Mode: 01; Polarity: Vertical; Modulation:8DPSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 2479.875 | 112.04 | -18.46 | 93.58 | 74.00 | 19.58 | peak |
| 2 | 2483.500 | 59.88 | -18.45 | 41.43 | 74.00 | -32.57 | peak |
| 3 | 2485.750 | 61.10 | -18.44 | 42.66 | 74.00 | -31.34 | peak |
| 4 | 2500.000 | 57.79 | -18.38 | 39.41 | 74.00 | -34.59 | peak |

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## 7.9 Radiated Spurious Emissions Below 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.4,6.5

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 |
| 960-1000 | 500 | 3 |

### 7.9.1 E.U.T. Operation

Operating Environment:

Temperature: 22.0 °C Humidity: 58.0 % RH Atmospheric Pressure: 1010 mbar

### 7.9.2 Test Mode Description

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

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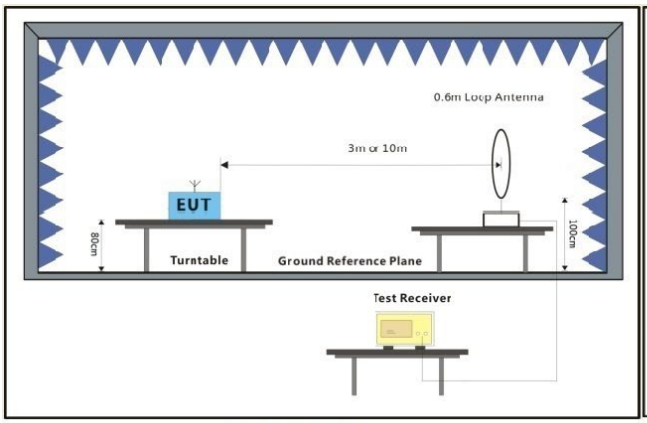
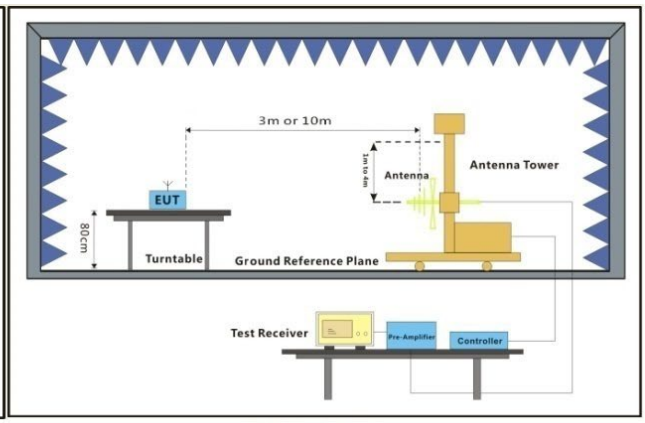
### 7.9.3 Test Setup Diagram




Below 30MHz




30MHz-1GHz

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### 7.9.4 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. 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.

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.

3. The disturbance below 1GHz was very low and the harmonics were the highest point could be found when testing, so only the above harmonics had been displayed.

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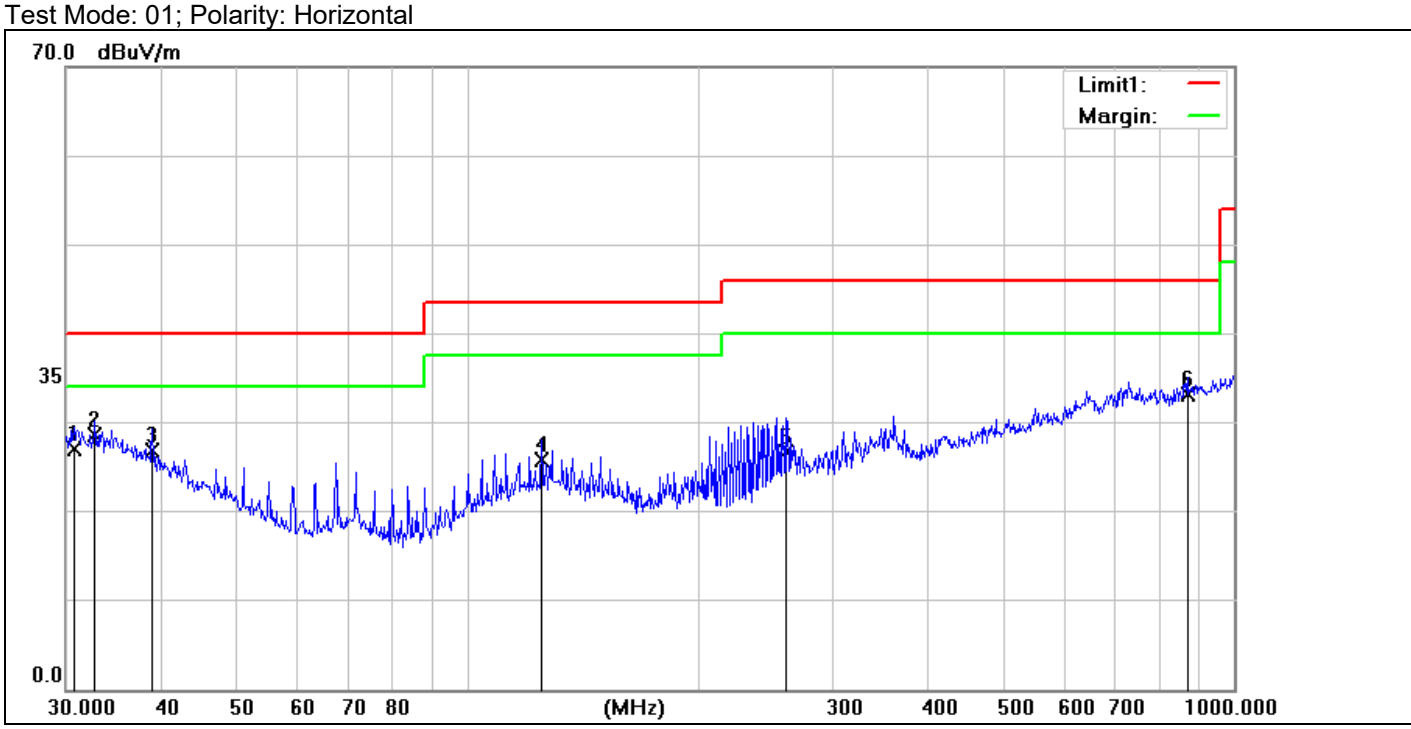
Test Mode: 01; Polarity: Horizontal




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Height | Degree | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | (cm) | (deg.) | |
| 1 | 30.7455 | 1.96 | 25.15 | 27.11 | 40.00 | -12.89 | 100 | 286 | QP |
| 2 | 32.7486 | 3.56 | 25.06 | 28.62 | 40.00 | -11.38 | 100 | 99 | QP |
| 3 | 38.8879 | 4.20 | 22.72 | 26.92 | 40.00 | -13.08 | 100 | 9 | QP |
| 4 | 125.0066 | 6.42 | 19.46 | 25.88 | 43.50 | -17.62 | 100 | 54 | QP |
| 5 | 260.1444 | 5.79 | 20.92 | 26.71 | 46.00 | -19.29 | 200 | 0 | QP |
| 6 | 869.1302 | 4.14 | 29.11 | 33.25 | 46.00 | -12.75 | 100 | 242 | QP |

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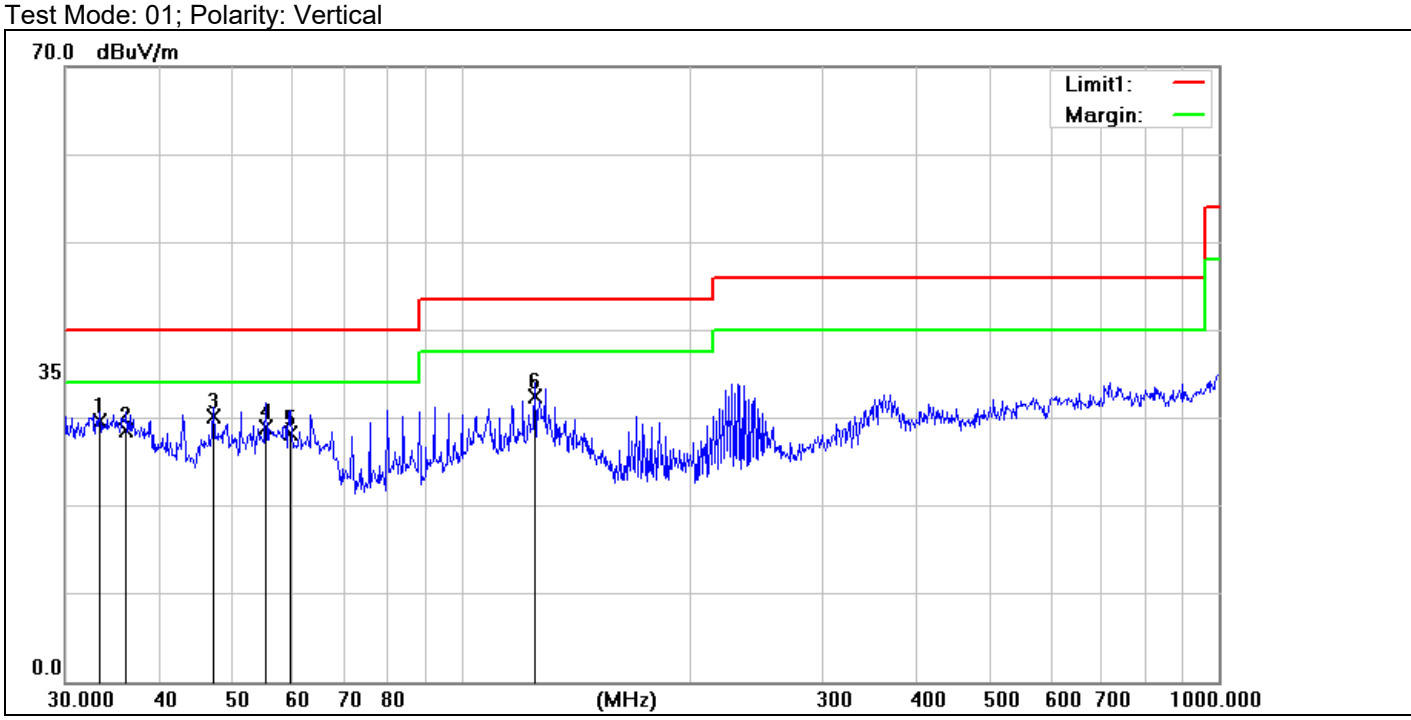
Test Mode: 01; Polarity: Vertical




| No. | Frequency | Reading | Correct | Result | Limit | Margin | Height | Degree | Remark |
|---|---|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | Factor(dB/m) | (dBuV/m) | (dBuV/m) | (dB) | (cm) | (deg.) | |
| 1 | 33.3279 | 4.64 | 24.98 | 29.62 | 40.00 | -10.38 | 100 | 96 | QP |
| 2 | 36.1272 | 4.58 | 24.03 | 28.61 | 40.00 | -11.39 | 100 | 61 | QP |
| 3 | 47.1599 | 11.24 | 18.91 | 30.15 | 40.00 | -9.85 | 100 | 267 | QP |
| 4 | 55.2207 | 12.90 | 16.06 | 28.96 | 40.00 | -11.04 | 200 | 67 | QP |
| 5 | 59.4405 | 13.20 | 15.02 | 28.22 | 40.00 | -11.78 | 100 | 96 | QP |
| 6 | 125.0066 | 12.96 | 19.46 | 32.42 | 43.50 | -11.08 | 100 | 354 | QP |

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## 7.10 Radiated Spurious Emissions Above 1GHz

Test Requirement 47 CFR Part 15, Subpart C 15.205 & 15.209
Test Method: ANSI C63.10 (2013) Section 6.6

Limit:

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

### 7.10.1 E.U.T. Operation

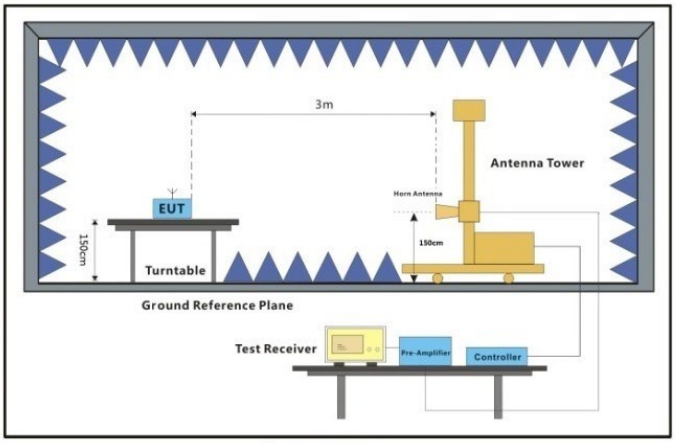
Operating Environment:

Temperature: 25 °C Humidity: 50 % RH Atmospheric Pressure: 1010 mbar

### 7.10.2 Test Mode Description

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

### 7.10.3 Test Setup Diagram




Above 1GHz

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### 7.10.4 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 fully-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.

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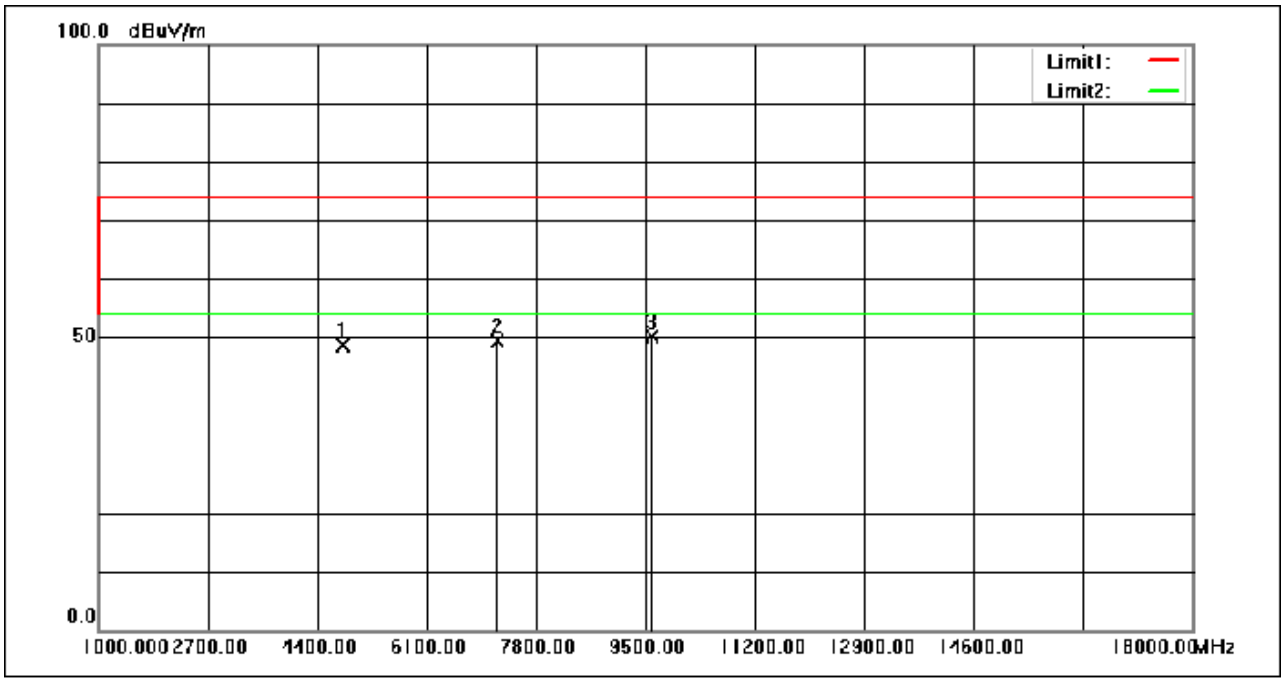
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4804.000 | 57.54 | -8.86 | 48.68 | 74.00 | -25.32 | peak |
| 2 | 7206.000 | 55.16 | -5.89 | 49.27 | 74.00 | -24.73 | peak |
| 3 | 9608.000 | 51.51 | -1.26 | 50.25 | 74.00 | -23.75 | peak |

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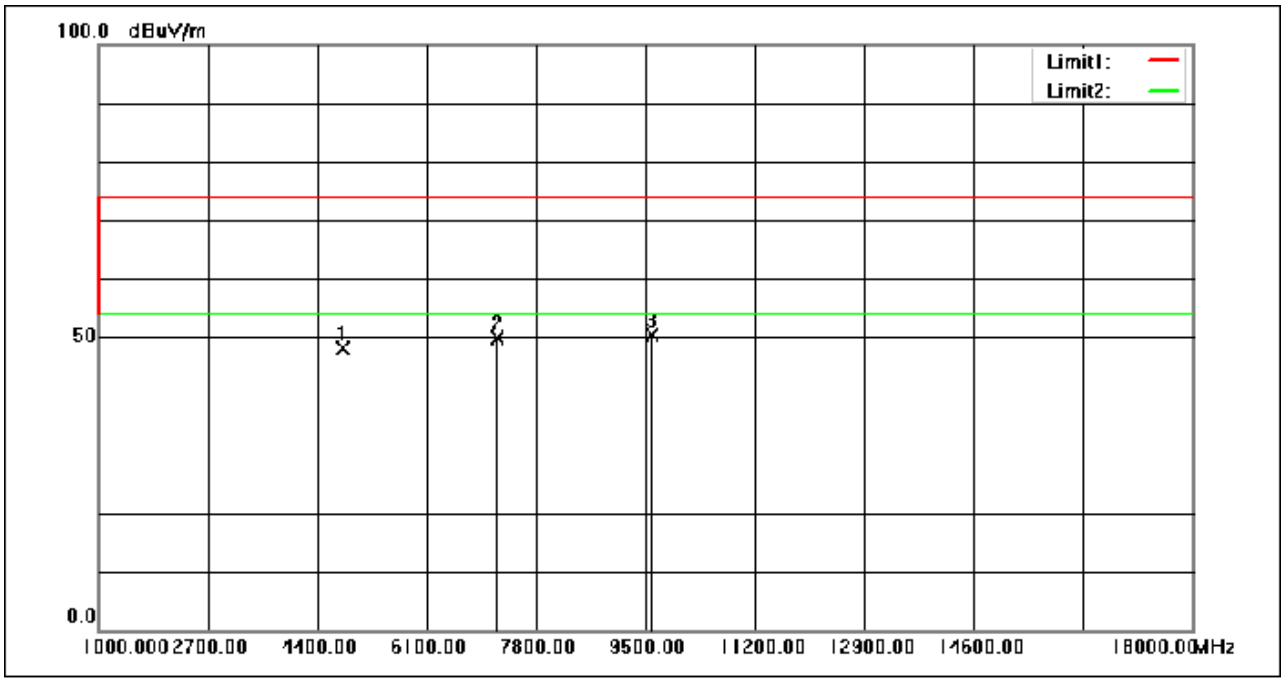
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4804.000 | 57.03 | -8.86 | 48.17 | 74.00 | -25.83 | peak |
| 2 | 7206.000 | 55.85 | -5.89 | 49.96 | 74.00 | -24.04 | peak |
| 3 | 9608.000 | 51.67 | -1.26 | 50.41 | 74.00 | -23.59 | peak |

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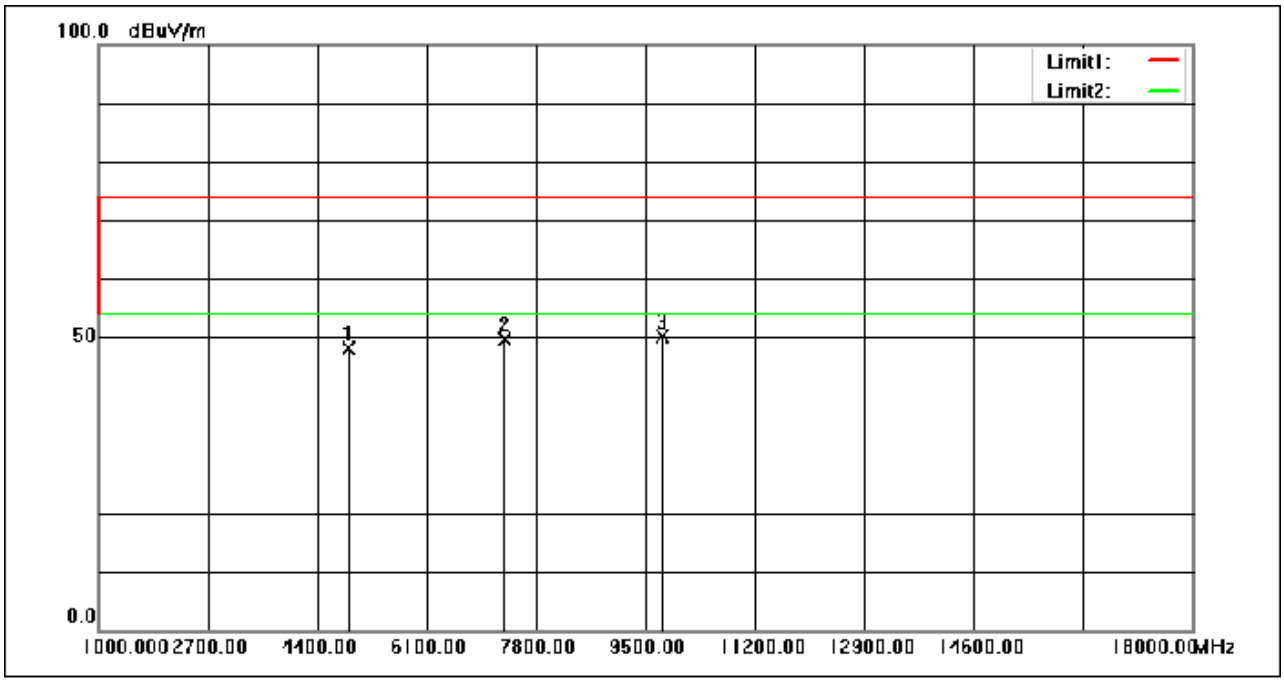
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:middle




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4882.000 | 56.72 | -8.58 | 48.14 | 74.00 | -25.86 | peak |
| 2 | 7323.000 | 55.30 | -5.77 | 49.53 | 74.00 | -24.47 | peak |
| 3 | 9764.000 | 51.66 | -1.46 | 50.20 | 74.00 | -23.80 | peak |

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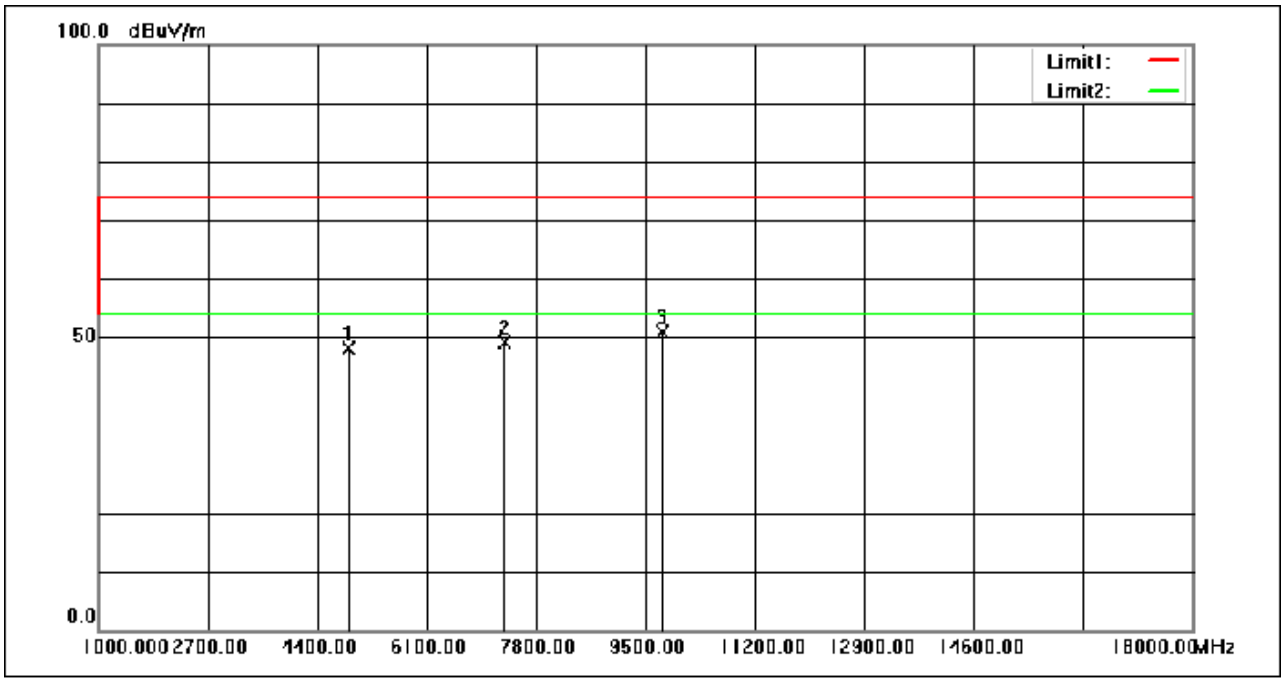
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:middle




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4882.000 | 56.78 | -8.58 | 48.20 | 74.00 | -25.80 | peak |
| 2 | 7323.000 | 55.02 | -5.77 | 49.25 | 74.00 | -24.75 | peak |
| 3 | 9764.000 | 52.23 | -1.46 | 50.77 | 74.00 | -23.23 | peak |

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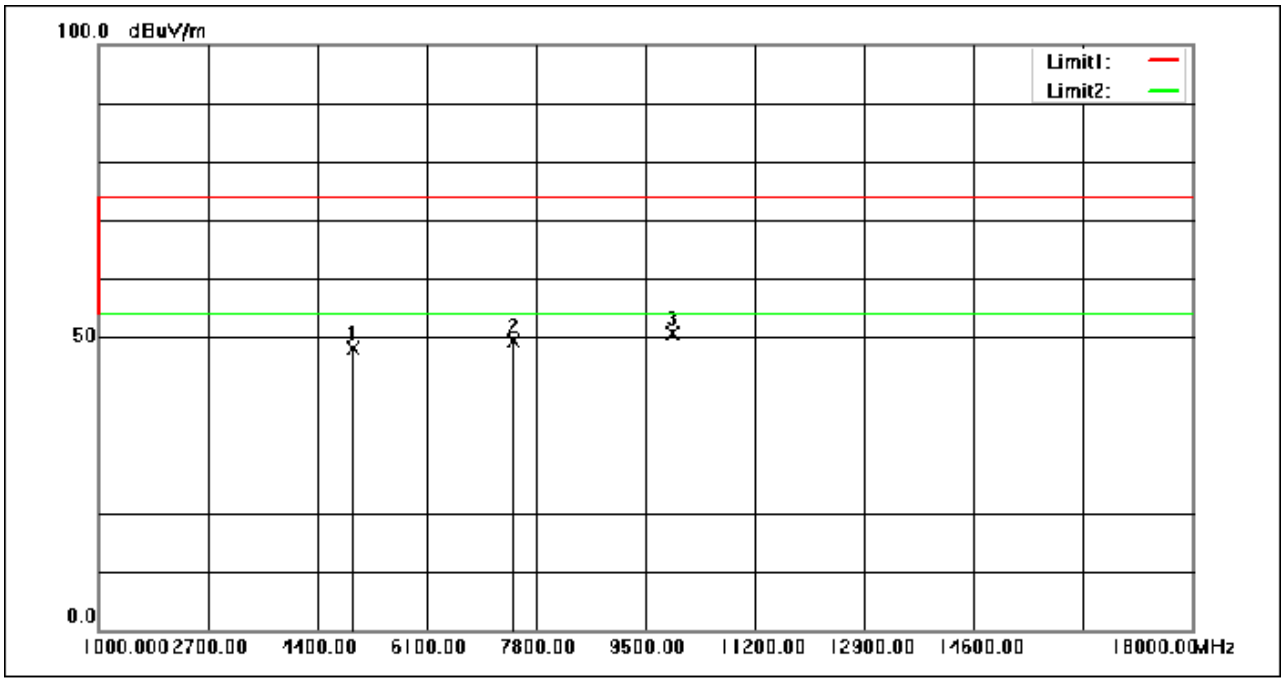
Test Mode: 01; Polarity: Horizontal; Modulation:GFSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4960.000 | 56.35 | -8.32 | 48.03 | 74.00 | -25.97 | peak |
| 2 | 7440.000 | 54.92 | -5.63 | 49.29 | 74.00 | -24.71 | peak |
| 3 | 9920.000 | 51.52 | -0.94 | 50.58 | 74.00 | -23.42 | peak |

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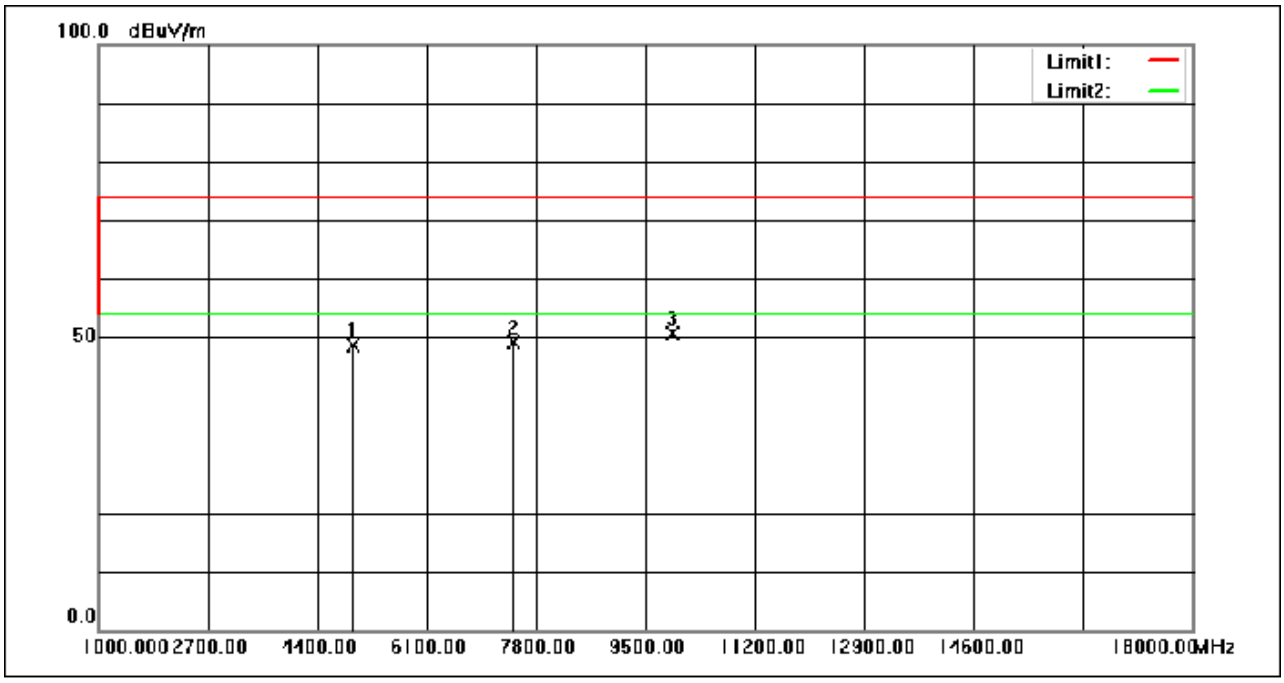
Test Mode: 01; Polarity: Vertical; Modulation:GFSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4960.000 | 57.04 | -8.32 | 48.72 | 74.00 | -25.28 | peak |
| 2 | 7440.000 | 54.70 | -5.63 | 49.07 | 74.00 | -24.93 | peak |
| 3 | 9920.000 | 51.64 | -0.94 | 50.70 | 74.00 | -23.30 | peak |

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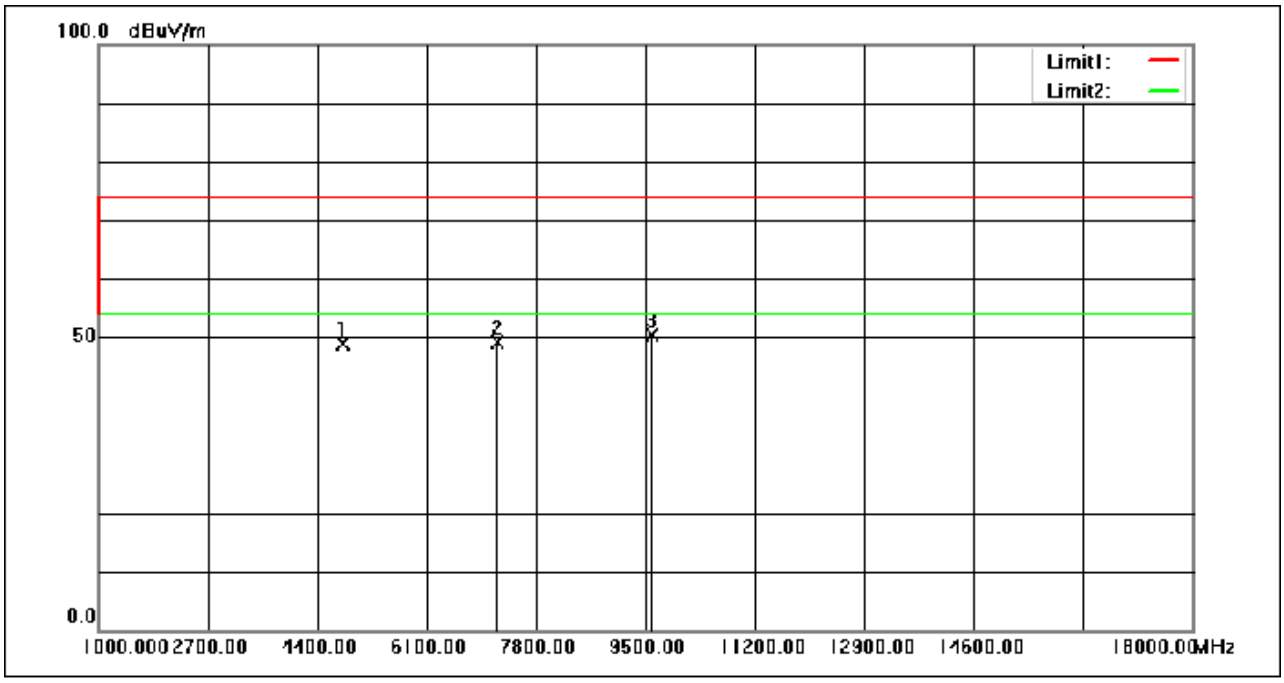
Test Mode: 01; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4804.000 | 57.70 | -8.86 | 48.84 | 74.00 | -25.16 | peak |
| 2 | 7206.000 | 55.03 | -5.89 | 49.14 | 74.00 | -24.86 | peak |
| 3 | 9608.000 | 51.56 | -1.26 | 50.30 | 74.00 | -23.70 | peak |

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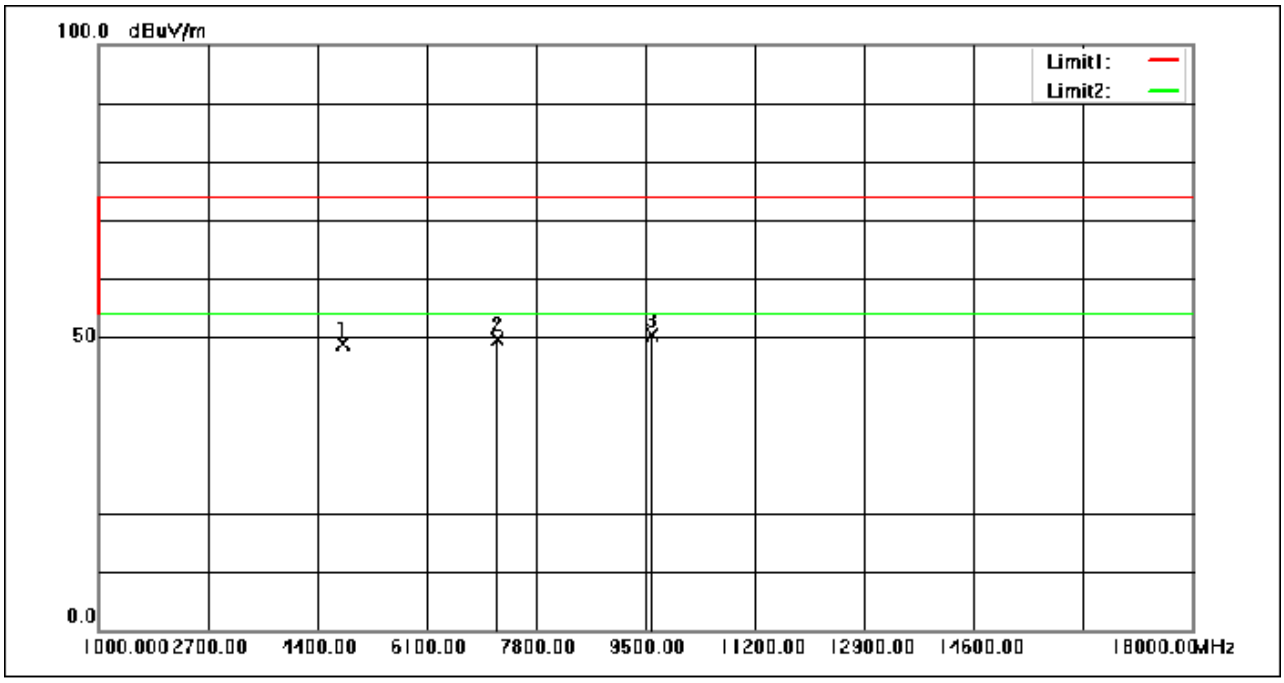
Test Mode: 01; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4804.000 | 57.83 | -8.86 | 48.97 | 74.00 | -25.03 | peak |
| 2 | 7206.000 | 55.41 | -5.89 | 49.52 | 74.00 | -24.48 | peak |
| 3 | 9608.000 | 51.59 | -1.26 | 50.33 | 74.00 | -23.67 | peak |

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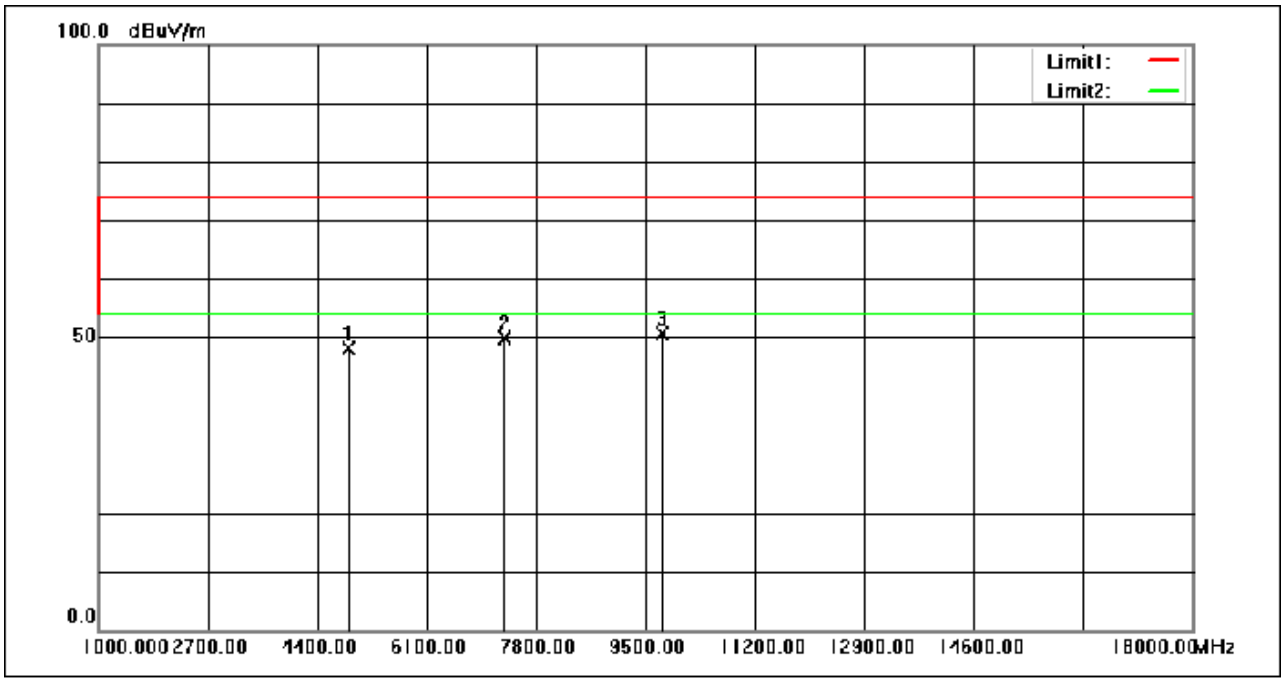
Test Mode: 01; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:middle




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4882.000 | 56.79 | -8.58 | 48.21 | 74.00 | -25.79 | peak |
| 2 | 7323.000 | 55.70 | -5.77 | 49.93 | 74.00 | -24.07 | peak |
| 3 | 9764.000 | 52.11 | -1.46 | 50.65 | 74.00 | -23.35 | peak |

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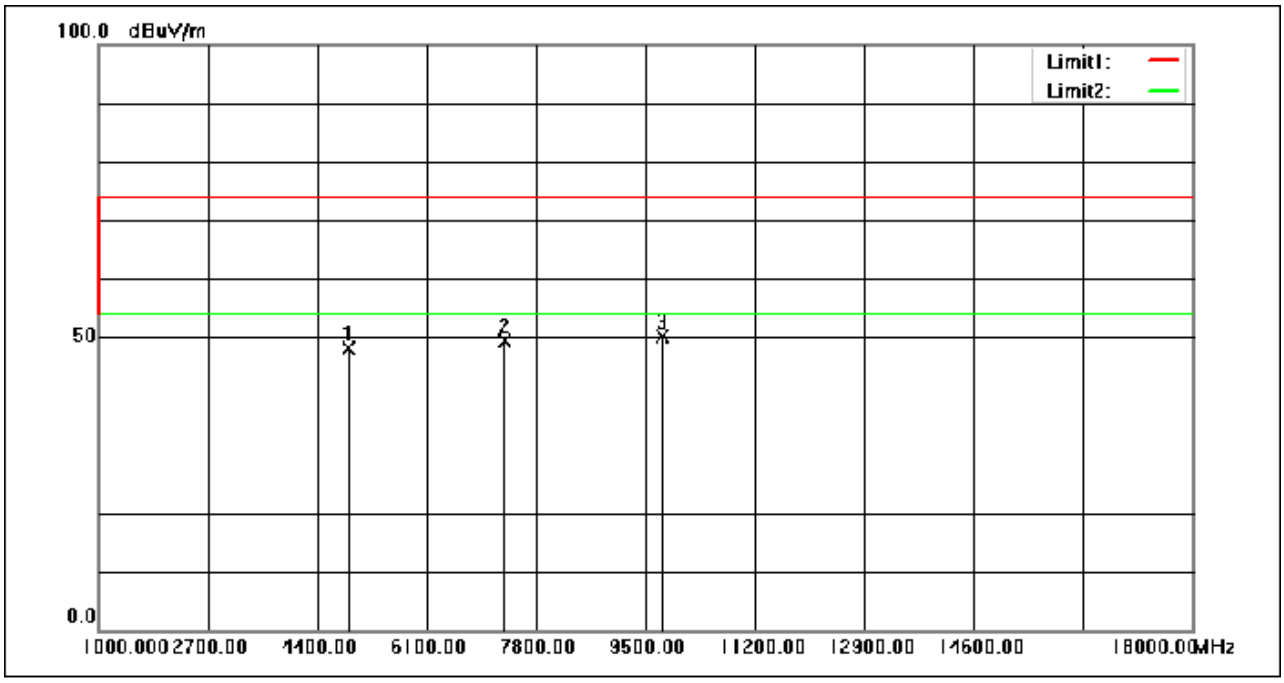
Test Mode: 01; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:middle




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4882.000 | 56.81 | -8.58 | 48.23 | 74.00 | -25.77 | peak |
| 2 | 7323.000 | 55.22 | -5.77 | 49.45 | 74.00 | -24.55 | peak |
| 3 | 9764.000 | 51.52 | -1.46 | 50.06 | 74.00 | -23.94 | peak |

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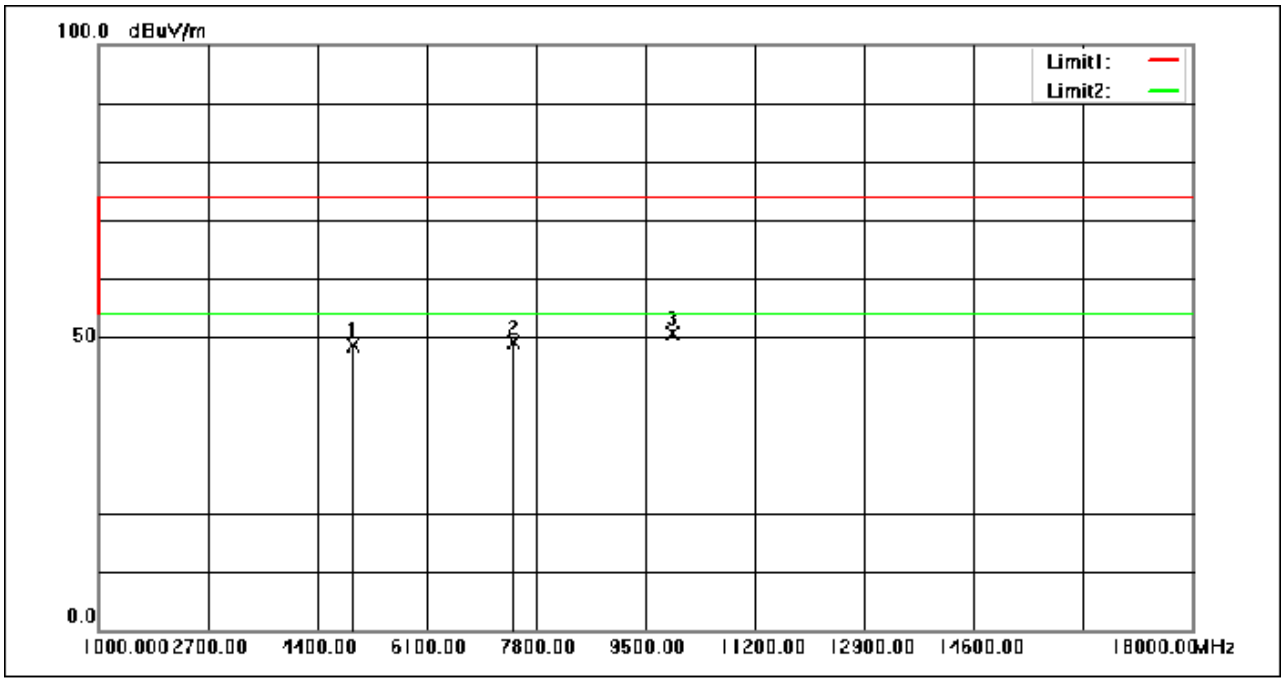
Test Mode: 01; Polarity: Horizontal; Modulation:π/4 DQPSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4960.000 | 57.02 | -8.32 | 48.70 | 74.00 | -25.30 | peak |
| 2 | 7440.000 | 54.67 | -5.63 | 49.04 | 74.00 | -24.96 | peak |
| 3 | 9920.000 | 51.60 | -0.94 | 50.66 | 74.00 | -23.34 | peak |

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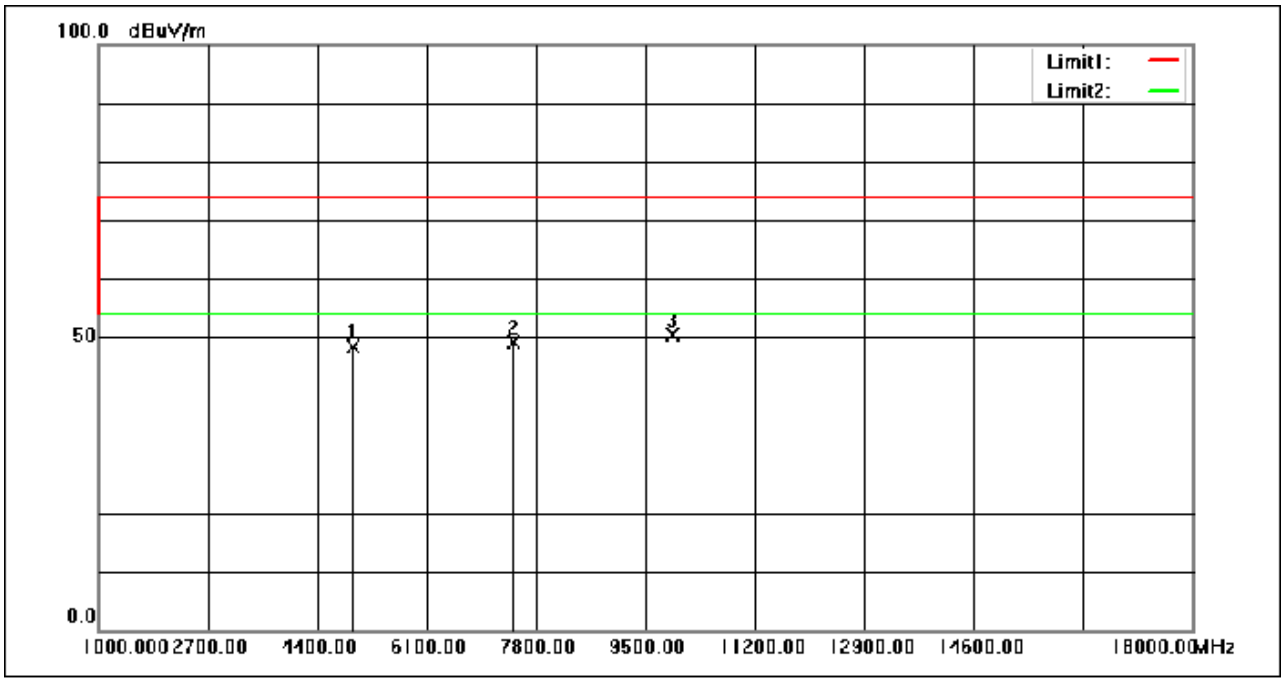
Test Mode: 01; Polarity: Vertical; Modulation:π/4 DQPSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4960.000 | 56.62 | -8.32 | 48.30 | 74.00 | -25.70 | peak |
| 2 | 7440.000 | 54.71 | -5.63 | 49.08 | 74.00 | -24.92 | peak |
| 3 | 9920.000 | 51.31 | -0.94 | 50.37 | 74.00 | -23.63 | peak |

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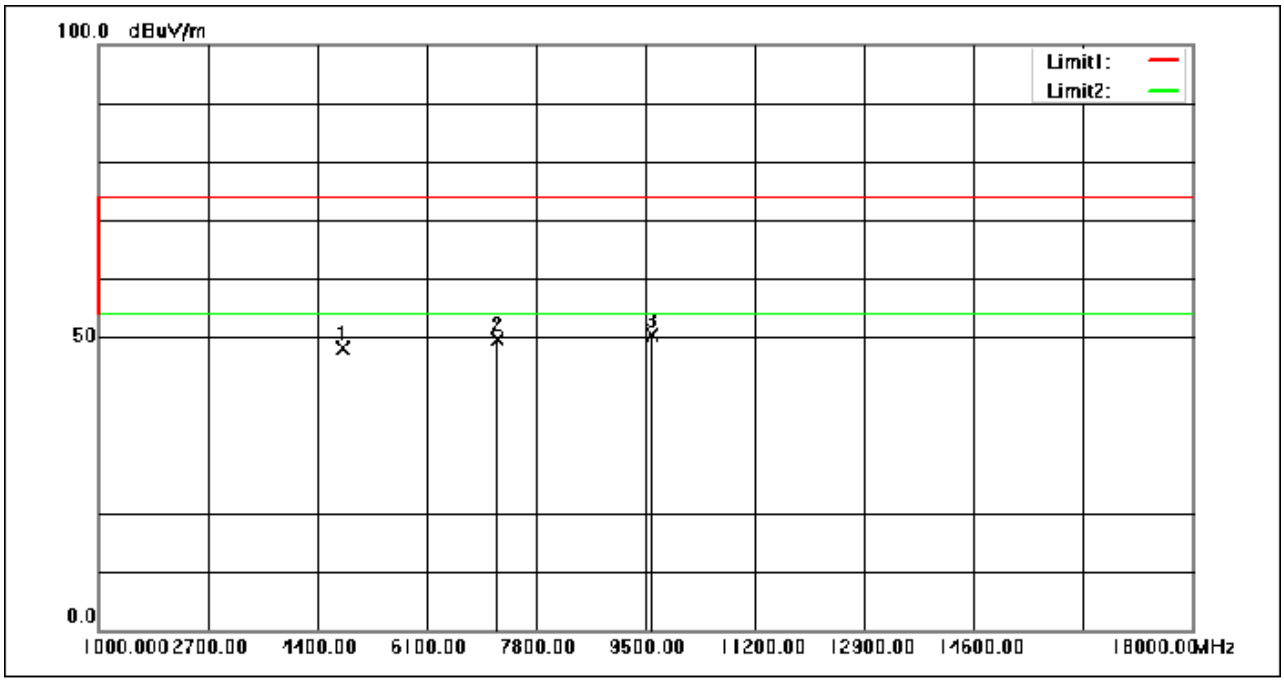
Test Mode: 01; Polarity: Horizontal; Modulation:8DPSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4804.000 | 56.95 | -8.86 | 48.09 | 74.00 | -25.91 | peak |
| 2 | 7206.000 | 55.63 | -5.89 | 49.74 | 74.00 | -24.26 | peak |
| 3 | 9608.000 | 51.52 | -1.26 | 50.26 | 74.00 | -23.74 | peak |

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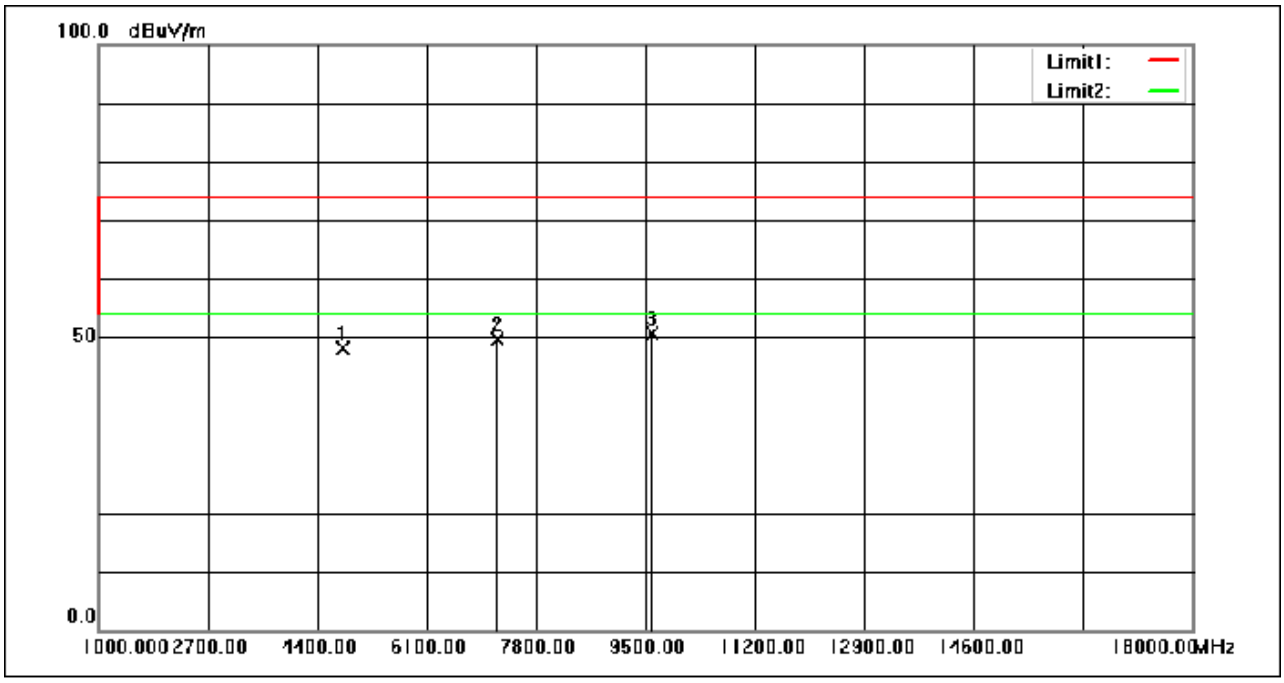
Test Mode: 01; Polarity: Vertical; Modulation:8DPSK; Channel:Low




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4804.000 | 57.04 | -8.86 | 48.18 | 74.00 | -25.82 | peak |
| 2 | 7206.000 | 55.54 | -5.89 | 49.65 | 74.00 | -24.35 | peak |
| 3 | 9608.000 | 51.91 | -1.26 | 50.65 | 74.00 | -23.35 | peak |

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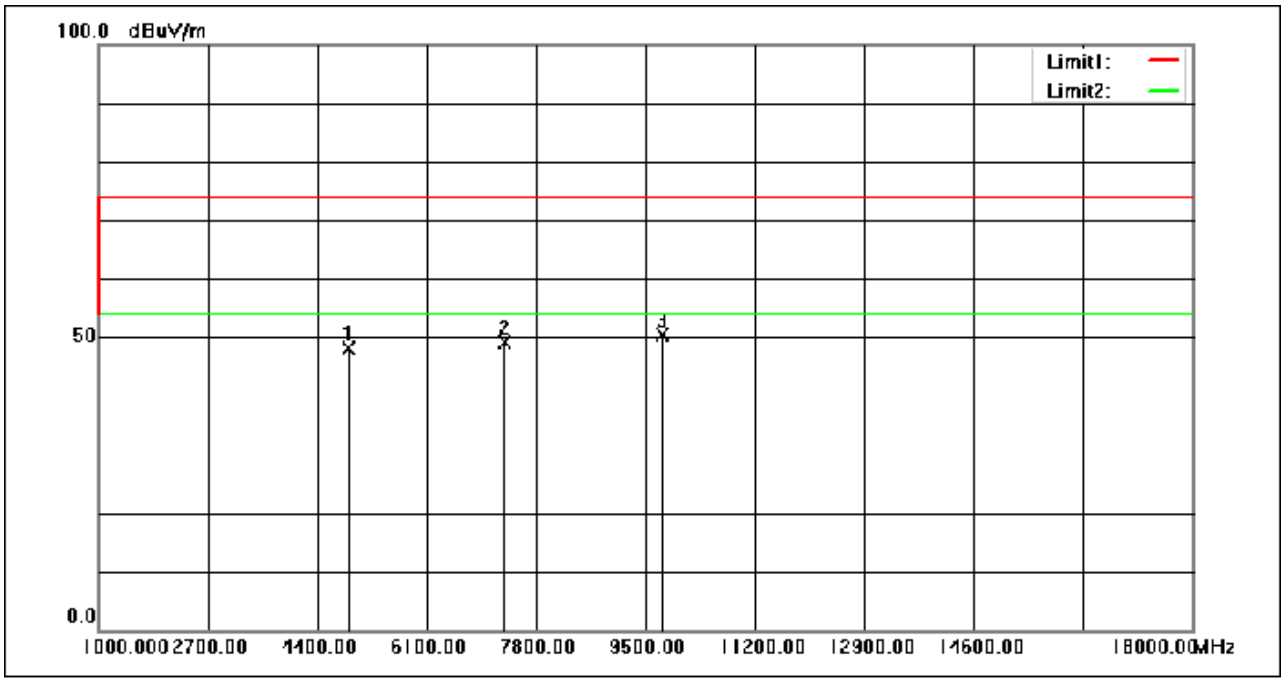
Test Mode: 01; Polarity: Horizontal; Modulation:8DPSK; Channel:middle




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4882.000 | 56.63 | -8.58 | 48.05 | 74.00 | -25.95 | peak |
| 2 | 7323.000 | 54.81 | -5.77 | 49.04 | 74.00 | -24.96 | peak |
| 3 | 9764.000 | 51.74 | -1.46 | 50.28 | 74.00 | -23.72 | peak |

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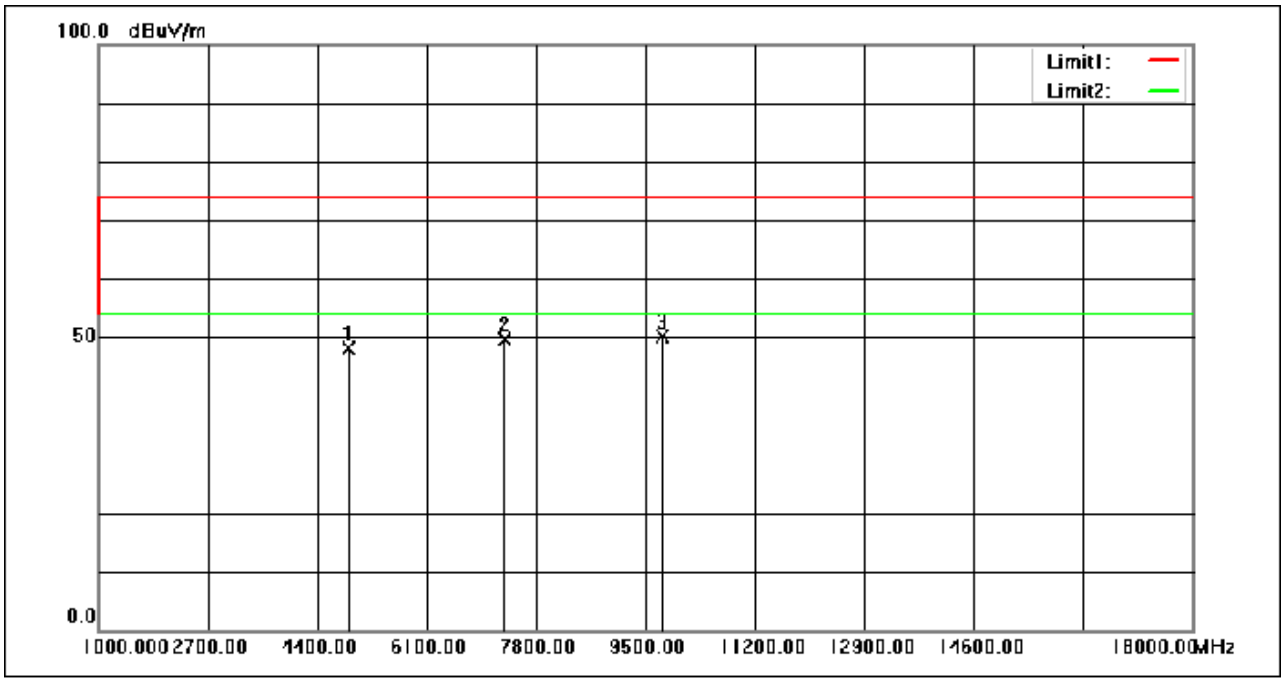
Test Mode: 01; Polarity: Vertical; Modulation:8DPSK; Channel:middle




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4882.000 | 56.81 | -8.58 | 48.23 | 74.00 | -25.77 | peak |
| 2 | 7323.000 | 55.31 | -5.77 | 49.54 | 74.00 | -24.46 | peak |
| 3 | 9764.000 | 51.50 | -1.46 | 50.04 | 74.00 | -23.96 | peak |

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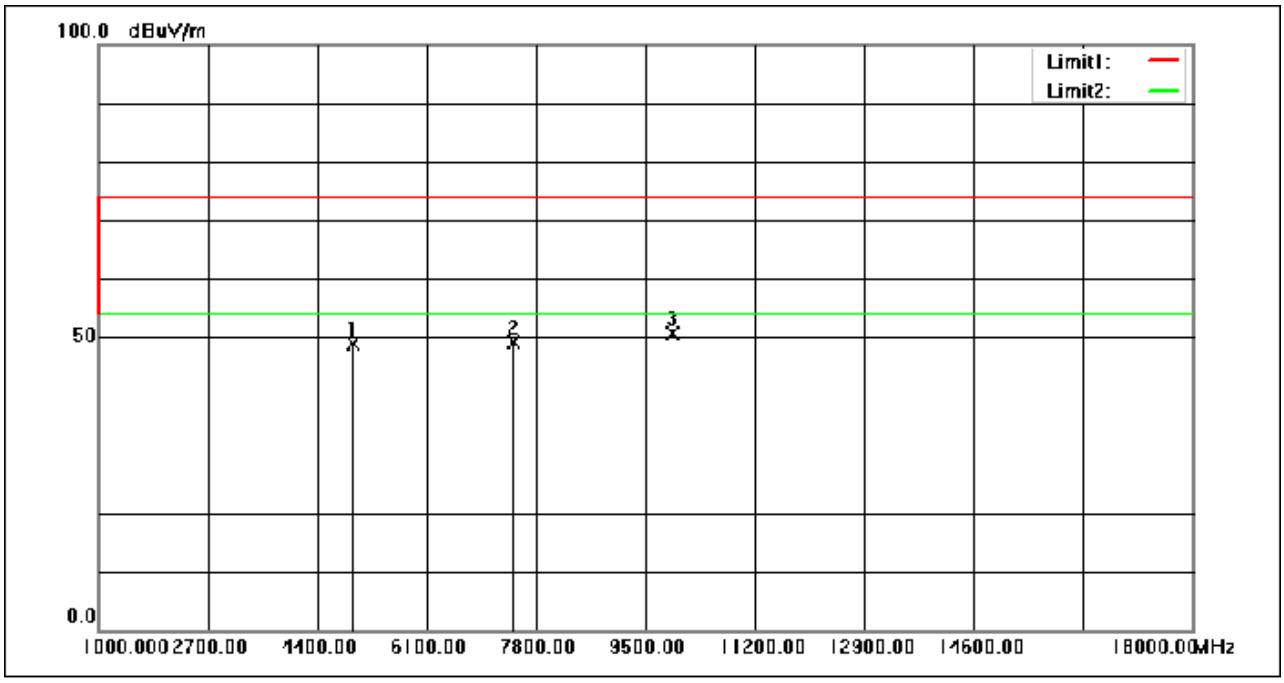
Test Mode: 01; Polarity: Horizontal; Modulation:8DPSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4960.000 | 57.10 | -8.32 | 48.78 | 74.00 | -25.22 | peak |
| 2 | 7440.000 | 54.85 | -5.63 | 49.22 | 74.00 | -24.78 | peak |
| 3 | 9920.000 | 51.51 | -0.94 | 50.57 | 74.00 | -23.43 | peak |

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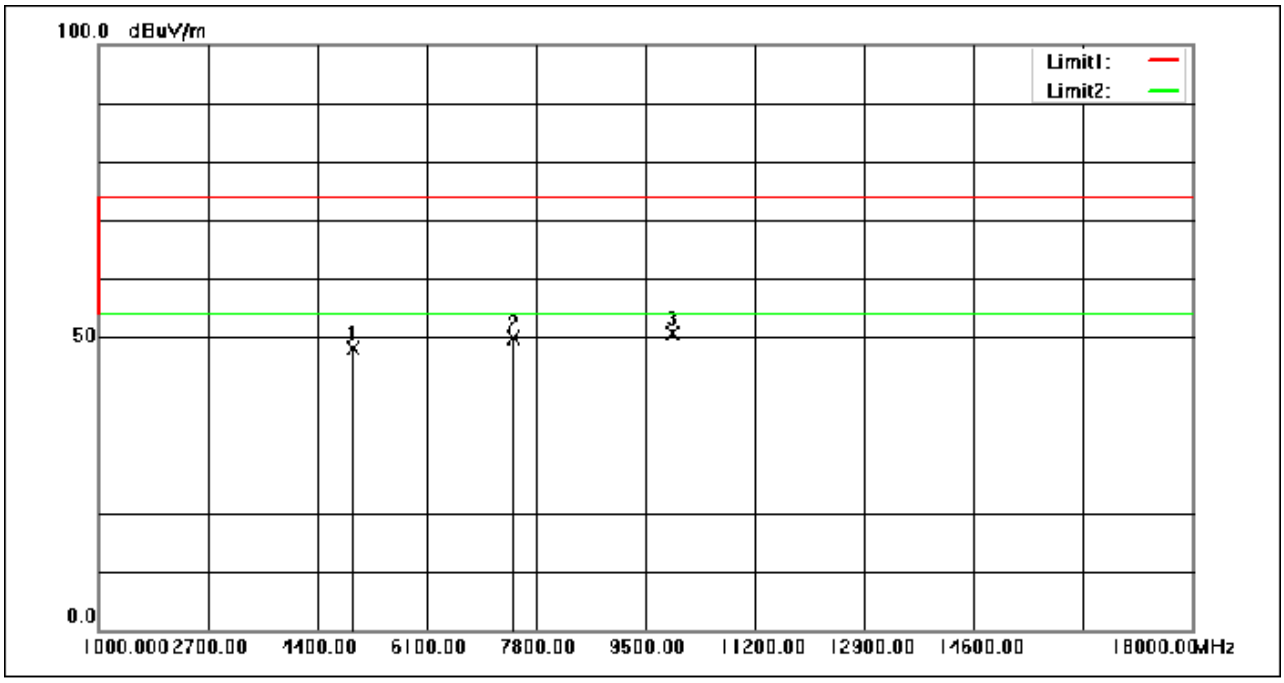
Test Mode: 01; Polarity: Vertical; Modulation:8DPSK; Channel:High




| No. | Frequency (MHz) | Reading (dBuV) | Correction factor(dB/m) | Result (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Remark |
|---|---|---|---|---|---|---|---|
| 1 | 4960.000 | 56.48 | -8.32 | 48.16 | 74.00 | -25.84 | peak |
| 2 | 7440.000 | 55.42 | -5.63 | 49.79 | 74.00 | -24.21 | peak |
| 3 | 9920.000 | 51.56 | -0.94 | 50.62 | 74.00 | -23.38 | peak |

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

Test Requirement 47 CFR Part 15, Subpart C 15.207
Test Method: ANSI C63.10 (2013) 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 | | |

### 7.11.1 E.U.T. Operation

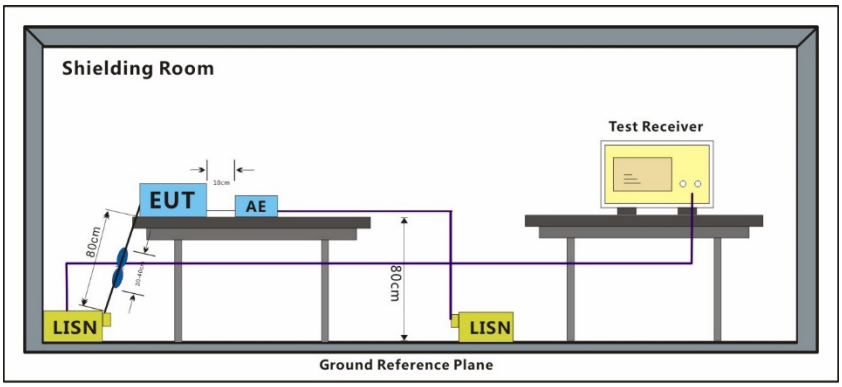
Operating Environment:

Temperature: 20 °C Humidity: 52.6 % RH Atmospheric Pressure: 1010 mbar

### 7.11.2 Test Mode Description

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

### 7.11.3 Test Setup Diagram

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### 7.11.4 Measurement Procedure and Data

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

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

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

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

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

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

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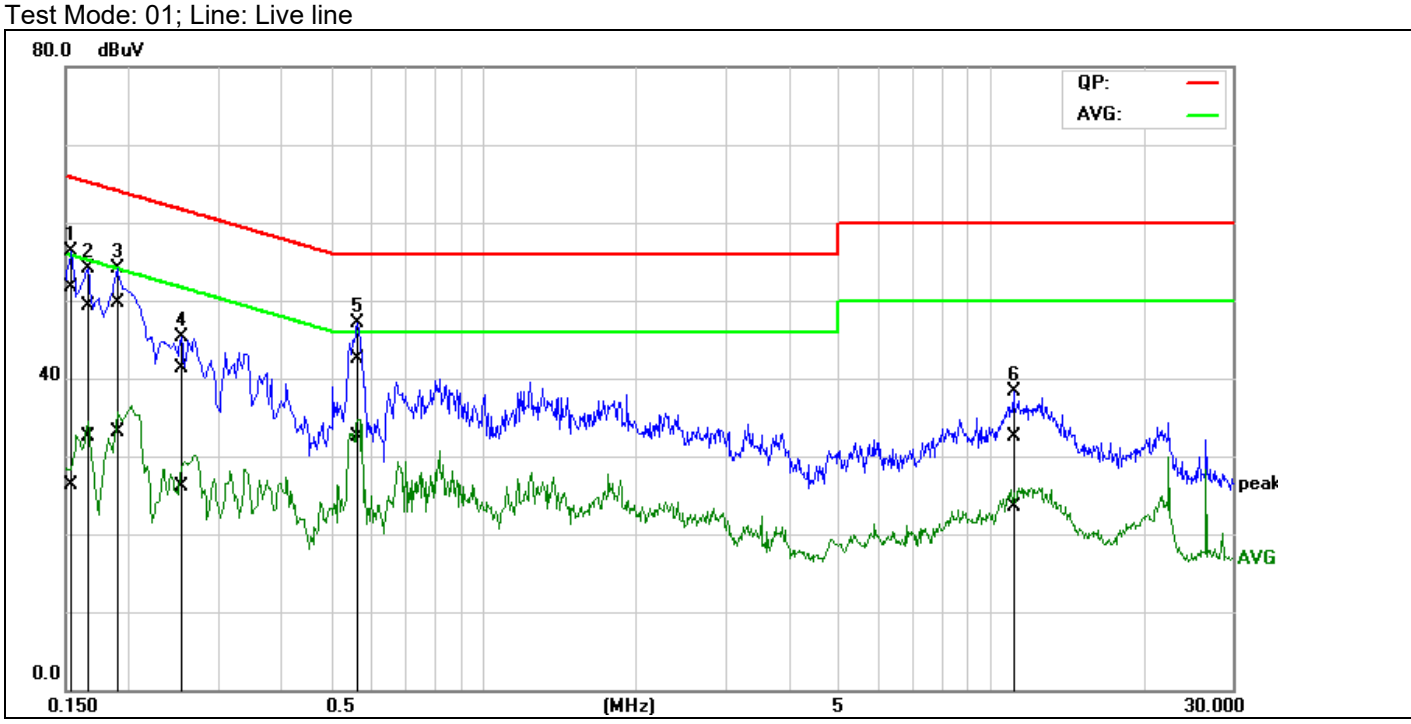
Test Mode: 01; Line: Live line




| No. | Frequency | QuasiPeak reading | Average reading | Correction factor | QuasiPeak result | Average result | QuasiPeak limit | Average limit | QuasiPeak margin | Average margin | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dBuV) | (dBuV) | (dB) | (dB) | |
| 1 | 0.1540 | 32.13 | 6.85 | 19.50 | 51.63 | 26.35 | 65.78 | 55.78 | -14.15 | -29.43 | Pass |
| 2 | 0.1660 | 29.85 | 12.91 | 19.50 | 49.35 | 32.41 | 65.16 | 55.16 | -15.81 | -22.75 | Pass |
| 3 | 0.1900 | 30.15 | 13.52 | 19.50 | 49.65 | 33.02 | 64.04 | 54.04 | -14.39 | -21.02 | Pass |
| 4 | 0.2540 | 21.74 | 6.61 | 19.51 | 41.25 | 26.12 | 61.63 | 51.63 | -20.38 | -25.51 | Pass |
| 5* | 0.5660 | 22.97 | 13.02 | 19.56 | 42.53 | 32.58 | 56.00 | 46.00 | -13.47 | -13.42 | Pass |
| 6 | 11.0940 | 12.50 | 3.47 | 20.08 | 32.58 | 23.55 | 60.00 | 50.00 | -27.42 | -26.45 | Pass |

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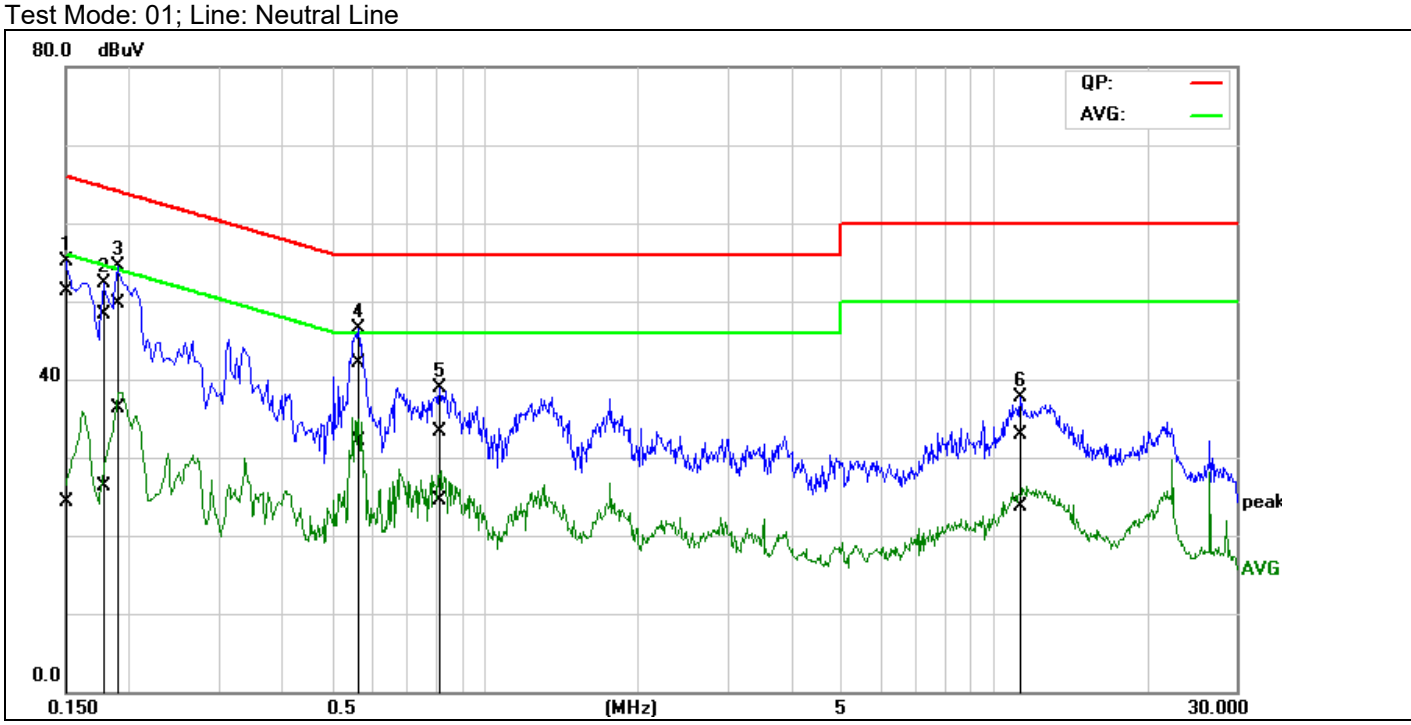
Test Mode: 01; Line: Neutral Line




| No. | Frequency | QuasiPeak reading | Average reading | Correction factor | QuasiPeak result | Average result | QuasiPeak limit | Average limit | QuasiPeak margin | Average margin | Remark |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | (MHz) | (dBuV) | (dBuV) | (dB) | (dBuV) | (dBuV) | (dBuV) | (dBuV) | (dB) | (dB) | |
| 1 | 0.1500 | 31.87 | 4.74 | 19.48 | 51.35 | 24.22 | 66.00 | 56.00 | -14.65 | -31.78 | Pass |
| 2 | 0.1780 | 28.86 | 6.86 | 19.49 | 48.35 | 26.35 | 64.58 | 54.58 | -16.23 | -28.23 | Pass |
| 3 | 0.1900 | 30.19 | 16.75 | 19.49 | 49.68 | 36.24 | 64.04 | 54.04 | -14.36 | -17.80 | Pass |
| 4* | 0.5660 | 22.59 | 12.59 | 19.56 | 42.15 | 32.15 | 56.00 | 46.00 | -13.85 | -13.85 | Pass |
| 5 | 0.8140 | 13.78 | 5.02 | 19.57 | 33.35 | 24.59 | 56.00 | 46.00 | -22.65 | -21.41 | Pass |
| 6 | 11.3140 | 12.89 | 3.57 | 20.09 | 32.98 | 23.66 | 60.00 | 50.00 | -27.02 | -26.34 | Pass |

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# 8 Test Setup Photo

Refer to Appendix - Test Setup Photo for KSCR2208001552AT

# 9 EUT Constructional Details (EUT Photos)

Refer to Appendix - Photographs of EUT Constructional Details for KSCR2208001552AT

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# 10 Appendix

Appendix C for KSCR220800155203

## 1. Bandwidth

### 1.1 OBW

#### 1.1.1 Test Result

| Mode | TX Type | Frequency (MHz) | Packet Type | ANT | 99% Occupied Bandwidth (MHz) Result | Verdict |
|---|---|---|---|---|---|---|
| GFSK | SISO | 2402 | DH5 | 1 | 0.847 | Pass |
| | | 2441 | DH5 | 1 | 0.848 | Pass |
| | | 2480 | DH5 | 1 | 0.847 | Pass |
| Pi/4DQPSK | SISO | 2402 | 2DH5 | 1 | 1.161 | Pass |
| | | 2441 | 2DH5 | 1 | 1.163 | Pass |
| | | 2480 | 2DH5 | 1 | 1.162 | Pass |
| 8DPSK | SISO | 2402 | 3DH5 | 1 | 1.156 | Pass |
| | | 2441 | 3DH5 | 1 | 1.156 | Pass |
| | | 2480 | 3DH5 | 1 | 1.155 | Pass |

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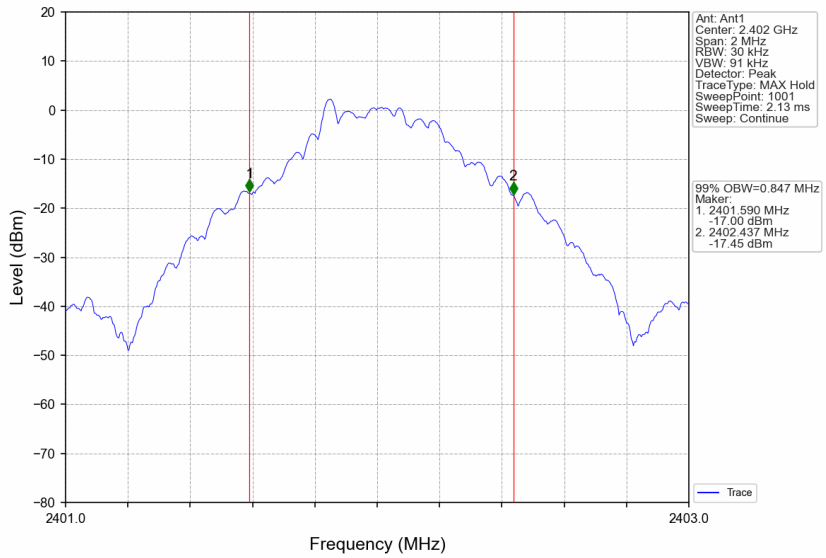
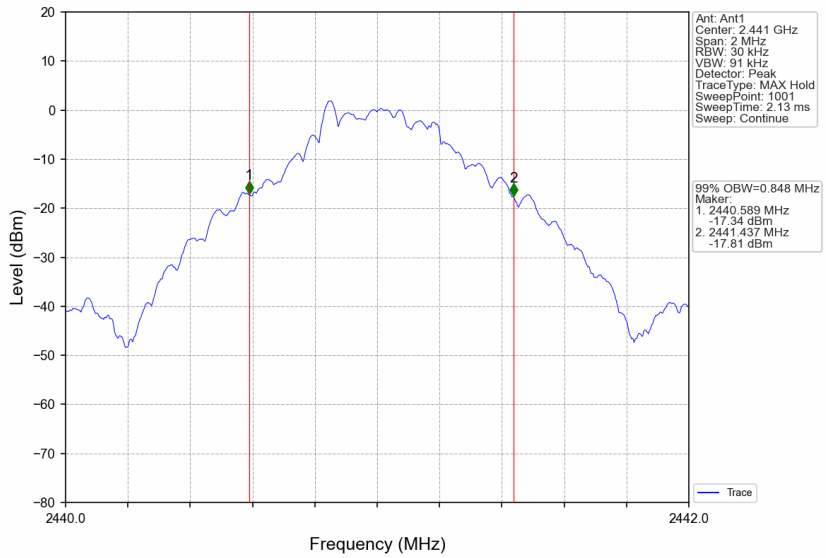
## 1.1.2 Test Graph

GFSK_DH5_LCH_2402MHz_Ant1_NTNV




GFSK_DH5_MCH_2441MHz_Ant1_NTNV

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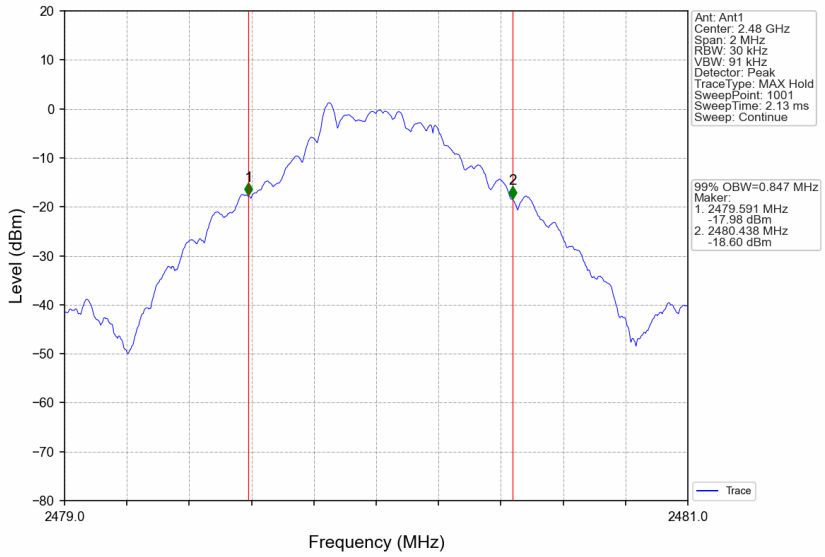
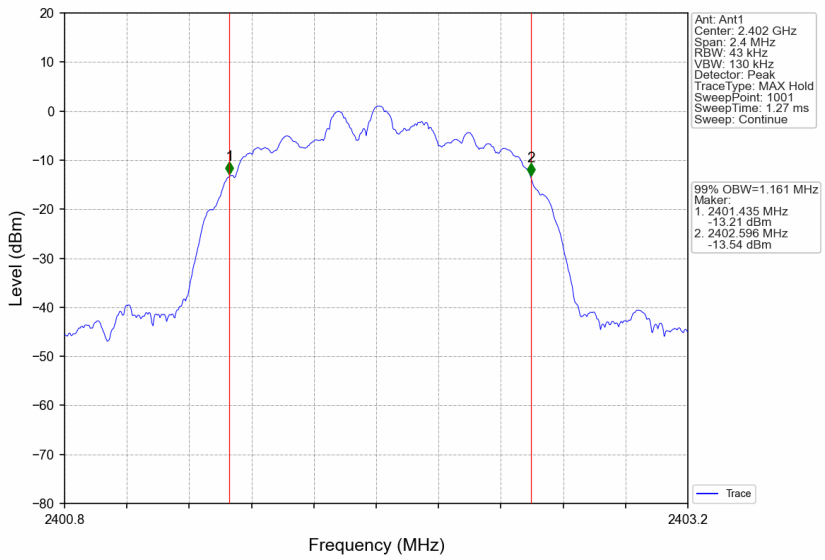
GFSK_DH5_HCH_2480MHz_Ant1_NTNV




Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

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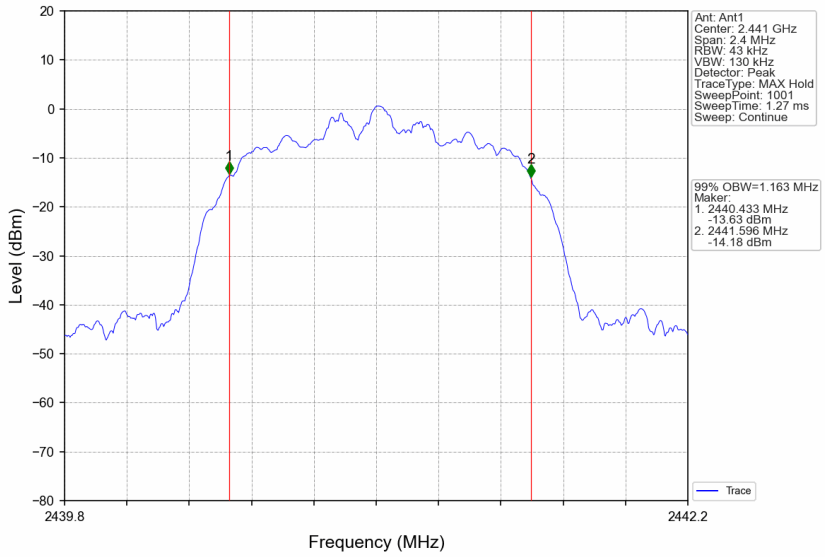
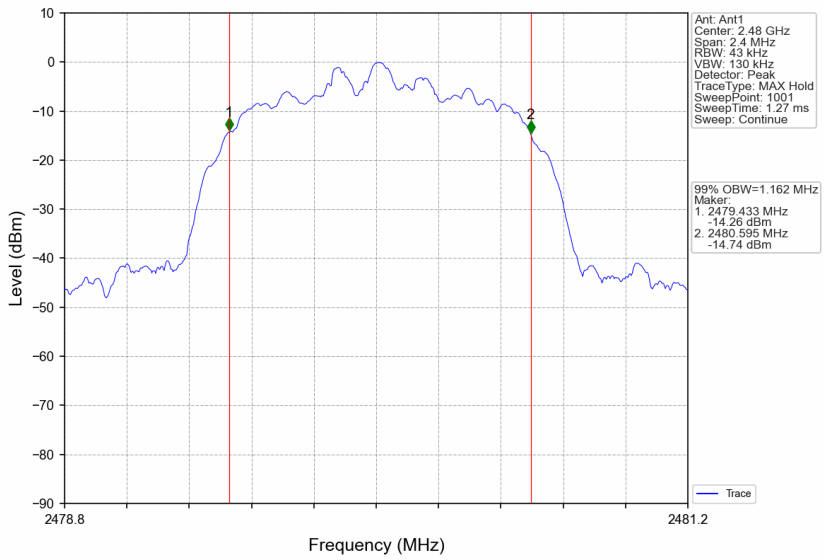
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV




Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

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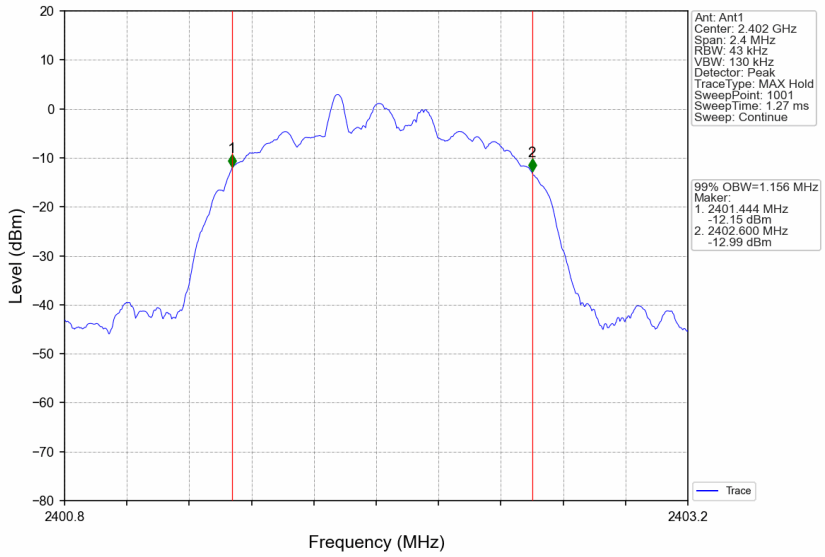
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

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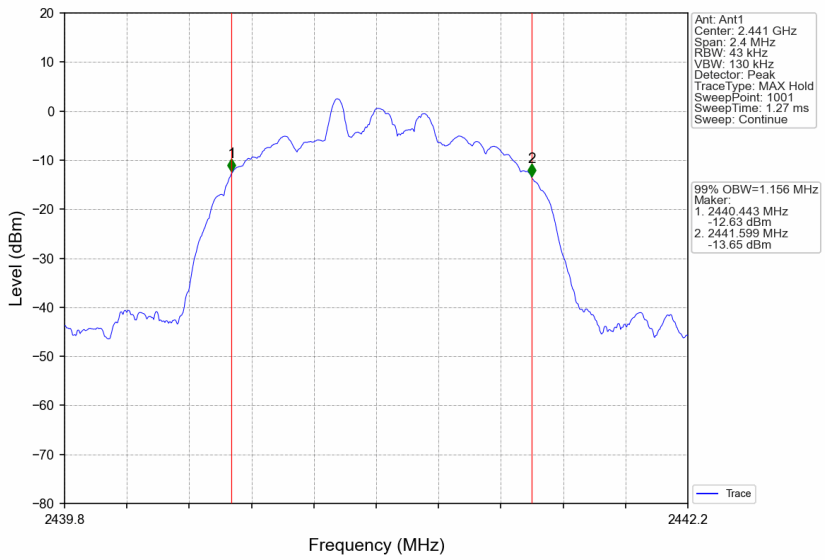


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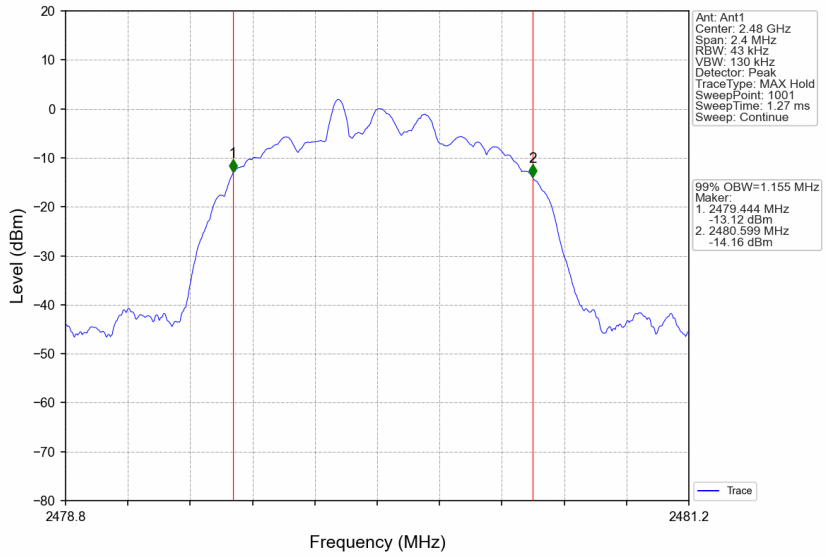
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

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## 1.2 20dB BW

### 1.2.1 Test Result

| Mode | TX Type | Frequency (MHz) | Packet Type | ANT | 20dB Bandwidth (MHz) | Verdict |
|---|---|---|---|---|---|---|
| | | | | | Result | |
| GFSK | SISO | 2402 | DH5 | 1 | 0.940 | Pass |
| | | 2441 | DH5 | 1 | 0.940 | Pass |
| | | 2480 | DH5 | 1 | 0.940 | Pass |
| Pi/4DQPSK | SISO | 2402 | 2DH5 | 1 | 1.284 | Pass |
| | | 2441 | 2DH5 | 1 | 1.285 | Pass |
| | | 2480 | 2DH5 | 1 | 1.284 | Pass |
| 8DPSK | SISO | 2402 | 3DH5 | 1 | 1.274 | Pass |
| | | 2441 | 3DH5 | 1 | 1.275 | Pass |
| | | 2480 | 3DH5 | 1 | 1.274 | Pass |

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## 1.2.2 Test Graph

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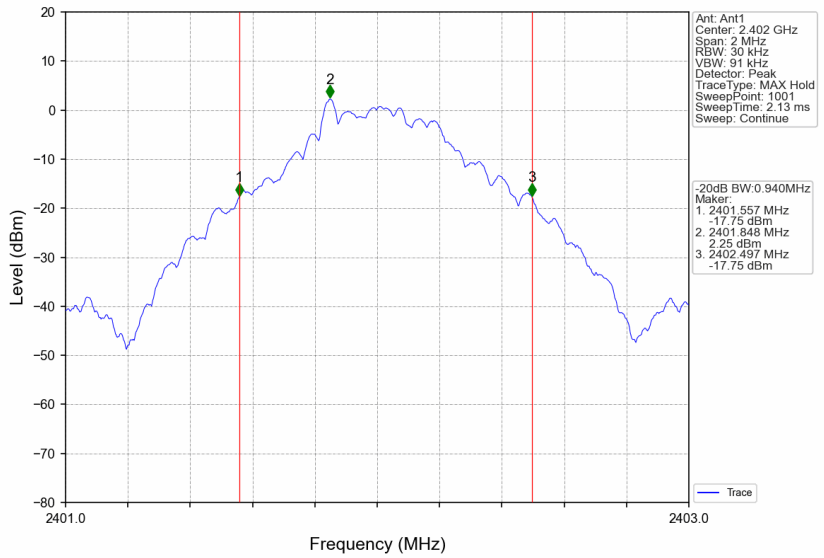


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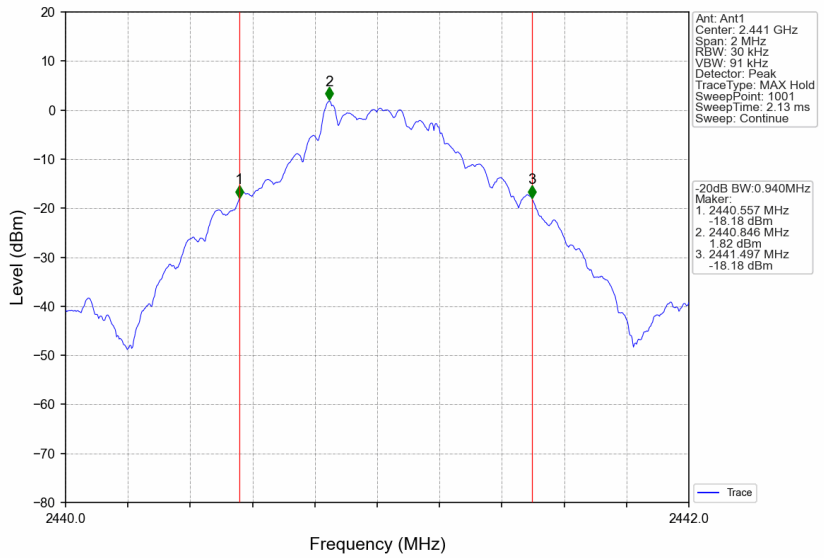


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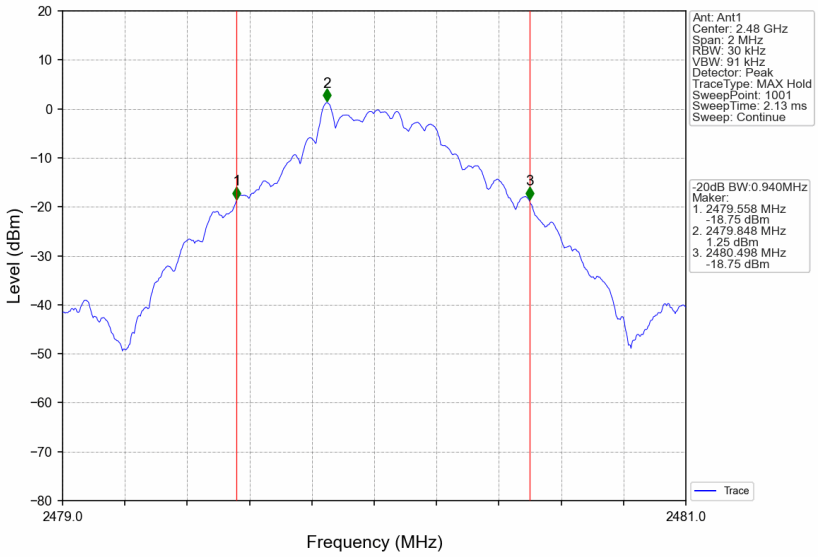
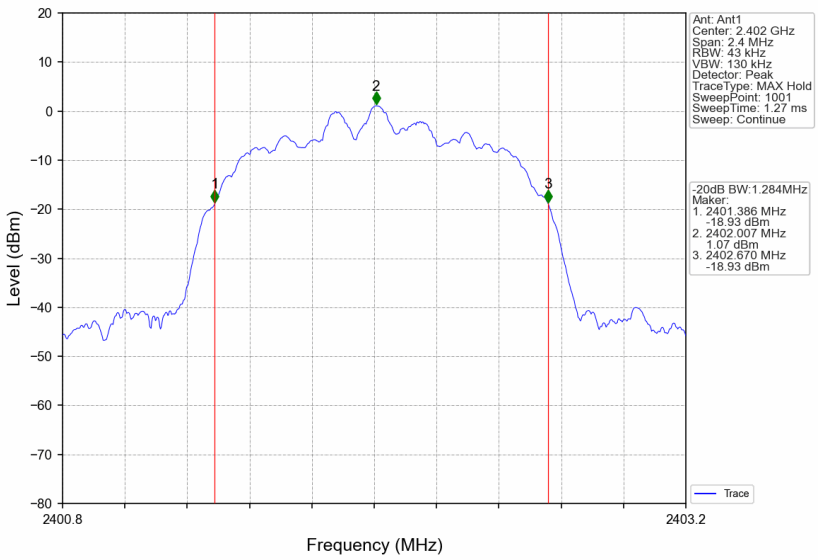



Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

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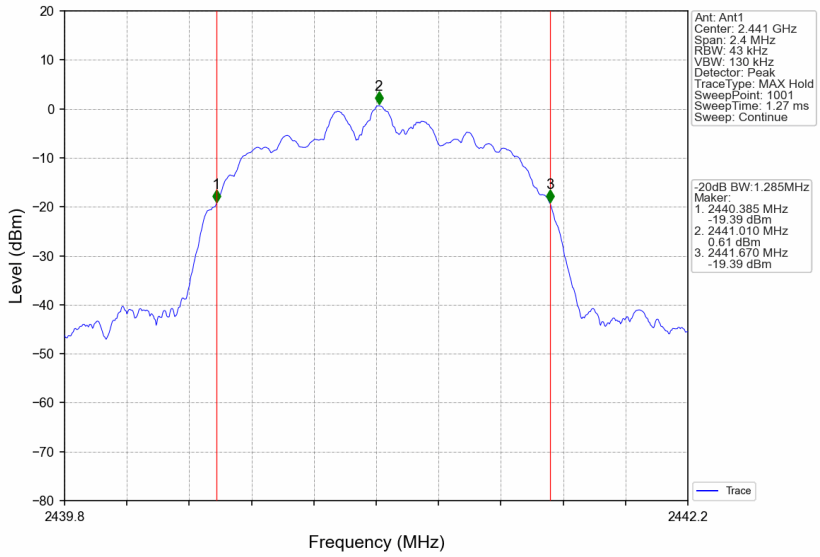
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

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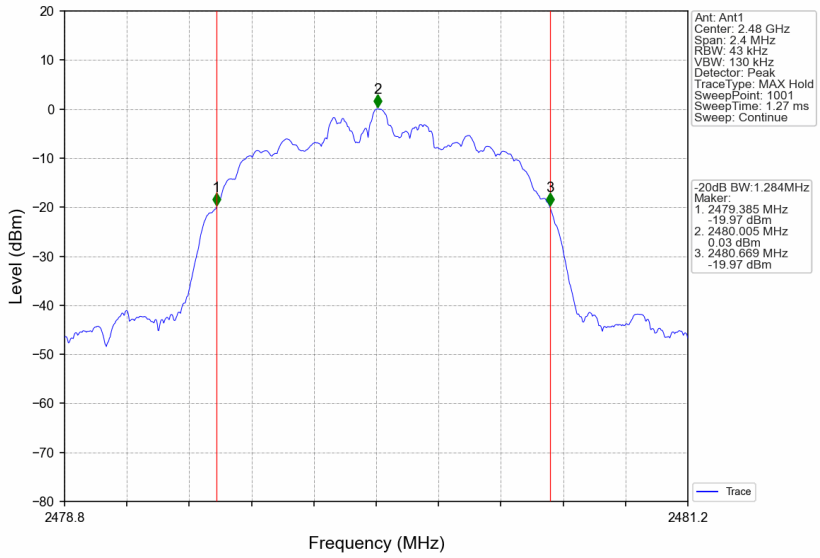


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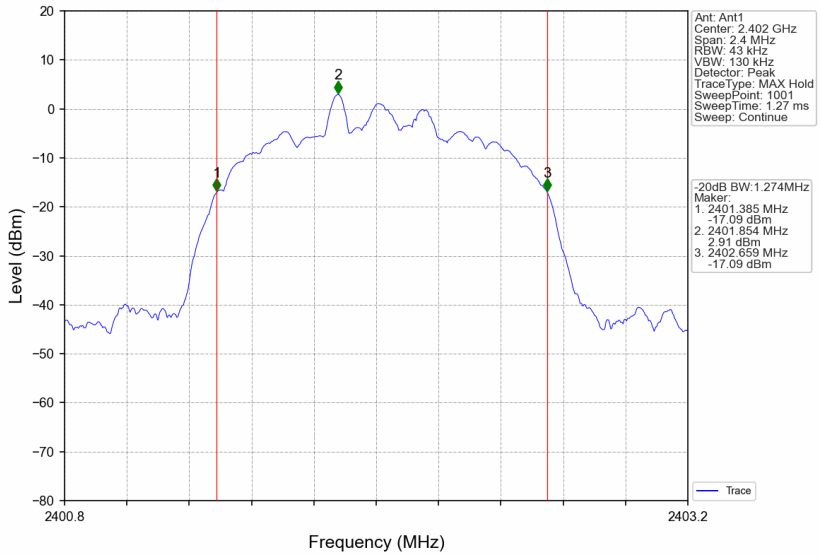


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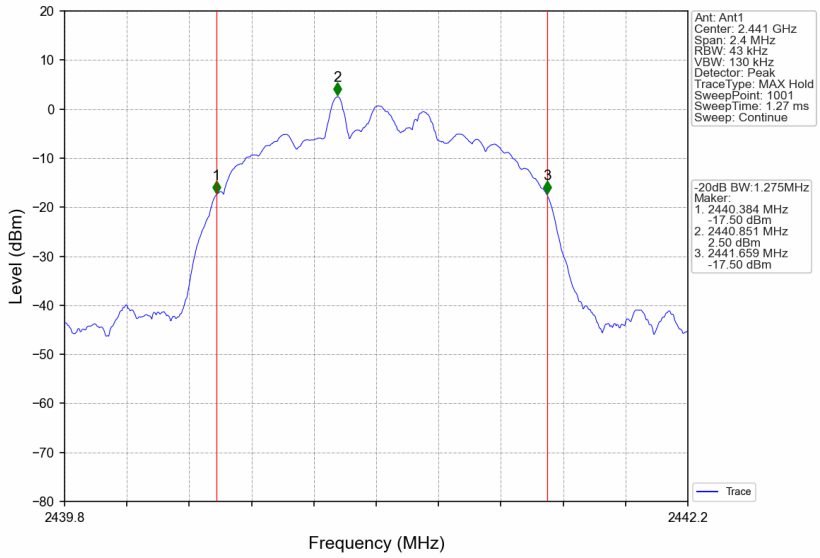


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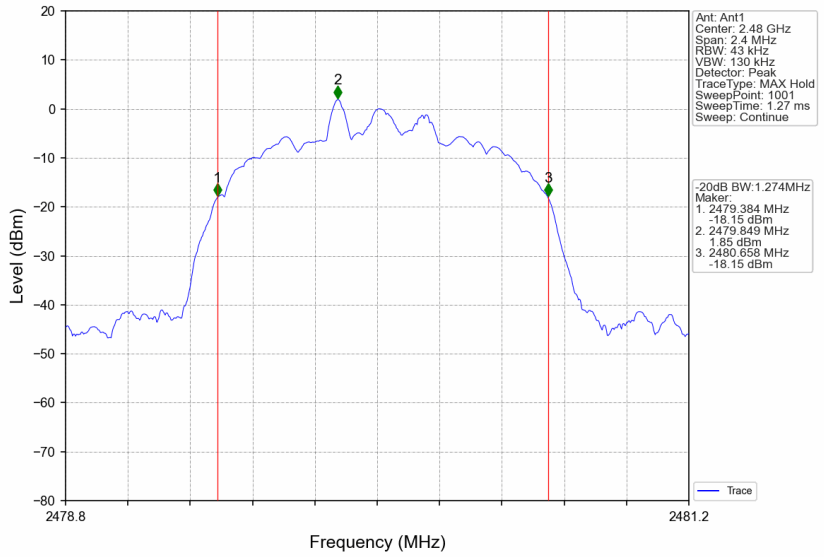
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

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# 2. Maximum Conducted Output Power

## 2.1 Power

### 2.1.1 Test Result

| Mode | TX Type | Frequency (MHz) | Packet Type | Maximum Peak Conducted Output Power (dBm) | | Verdict |
|---|---|---|---|---|---|---|
| | | | | ANT1 | Limit | |
| GFSK | SISO | 2402 | DH5 | 3.05 | <=30 | Pass |
| | | 2441 | DH5 | 2.66 | <=30 | Pass |
| | | 2480 | DH5 | 2.05 | <=30 | Pass |
| Pi/4DQPSK | SISO | 2402 | 2DH5 | 3.09 | <=20.97 | Pass |
| | | 2441 | 2DH5 | 2.67 | <=20.97 | Pass |
| | | 2480 | 2DH5 | 2.06 | <=20.97 | Pass |
| 8DPSK | SISO | 2402 | 3DH5 | 3.36 | <=20.97 | Pass |
| | | 2441 | 3DH5 | 2.93 | <=20.97 | Pass |
| | | 2480 | 3DH5 | 2.34 | <=20.97 | Pass |
| Note1: Antenna Gain: Ant1: 1.20dBi; | | | | | | |

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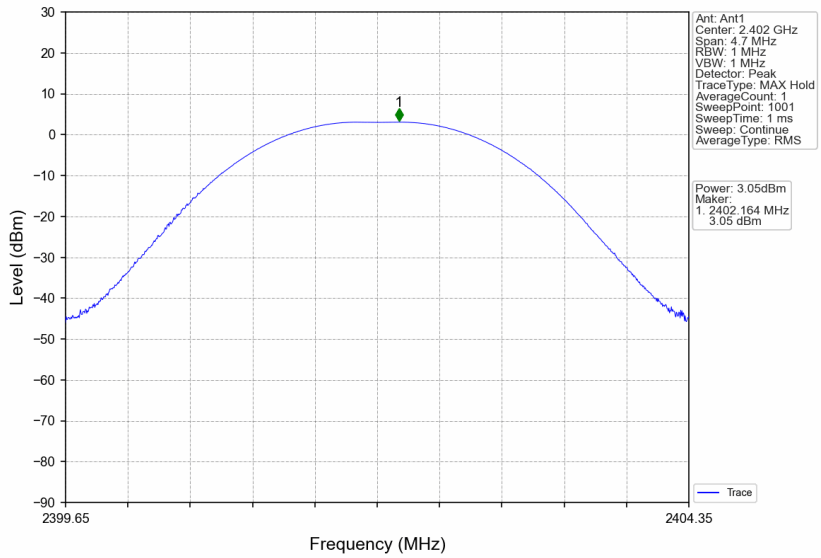
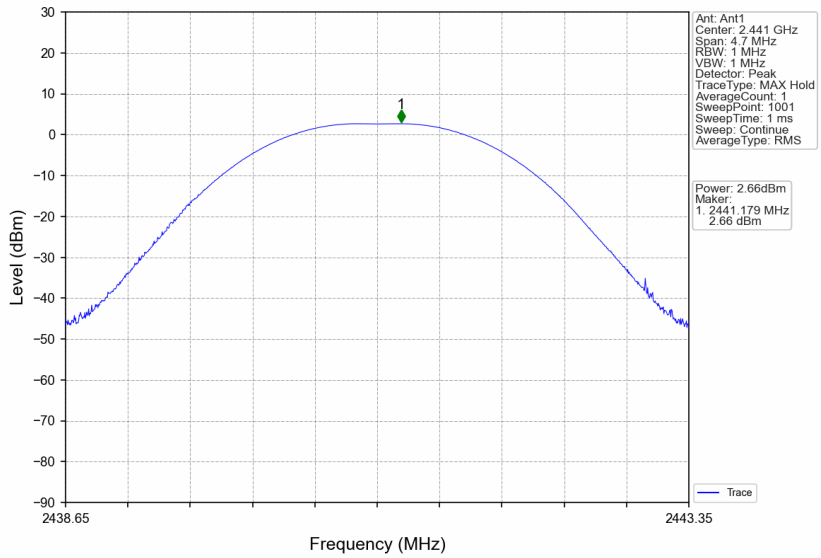
## 2.1.2 Test Graph

GFSK_DH5_LCH_2402MHz_Ant1_NTNV




GFSK_DH5_MCH_2441MHz_Ant1_NTNV

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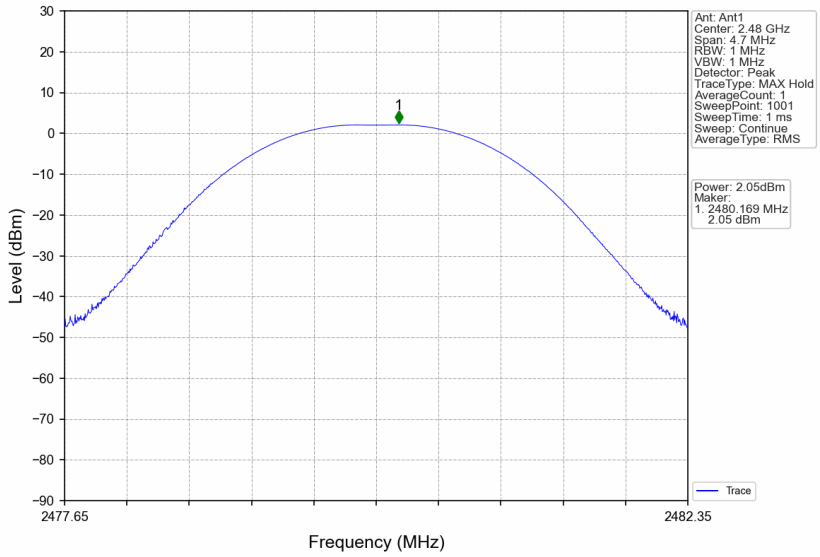
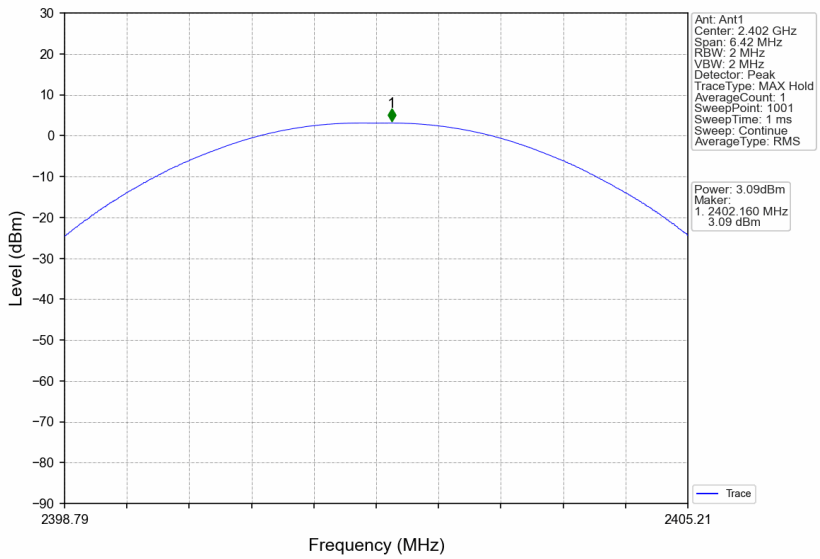



Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

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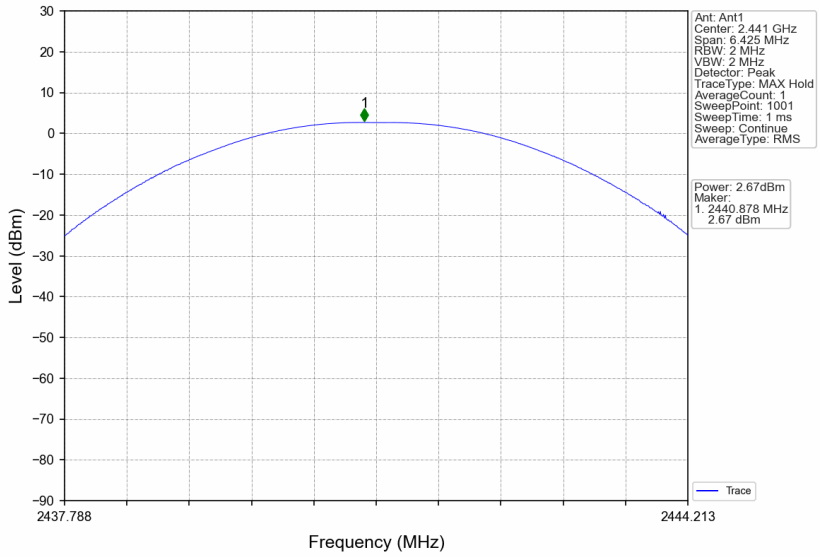
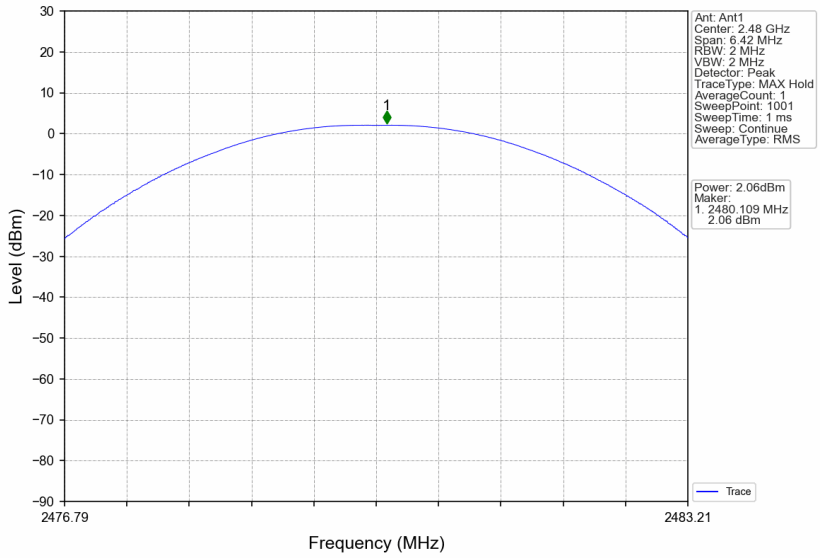



Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

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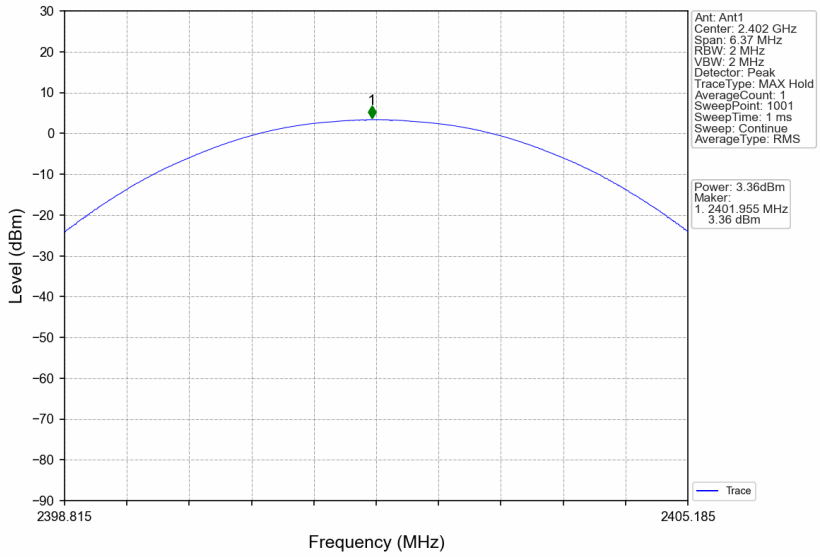
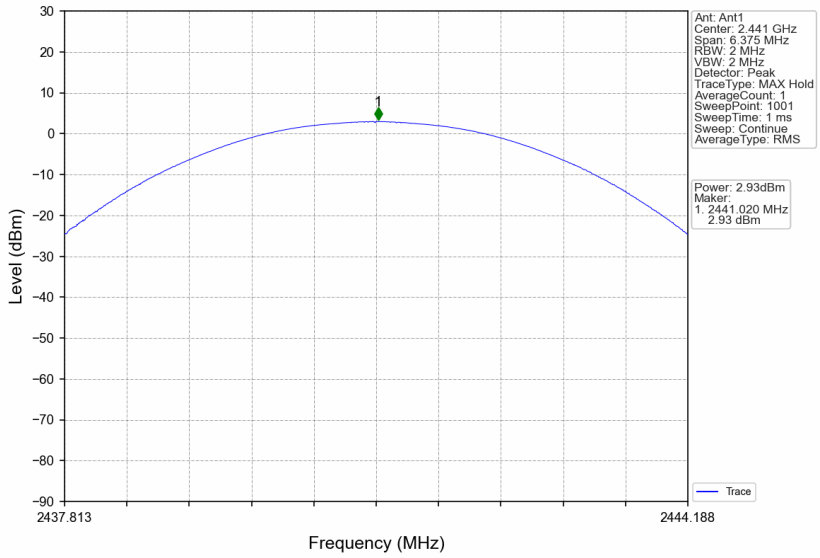



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

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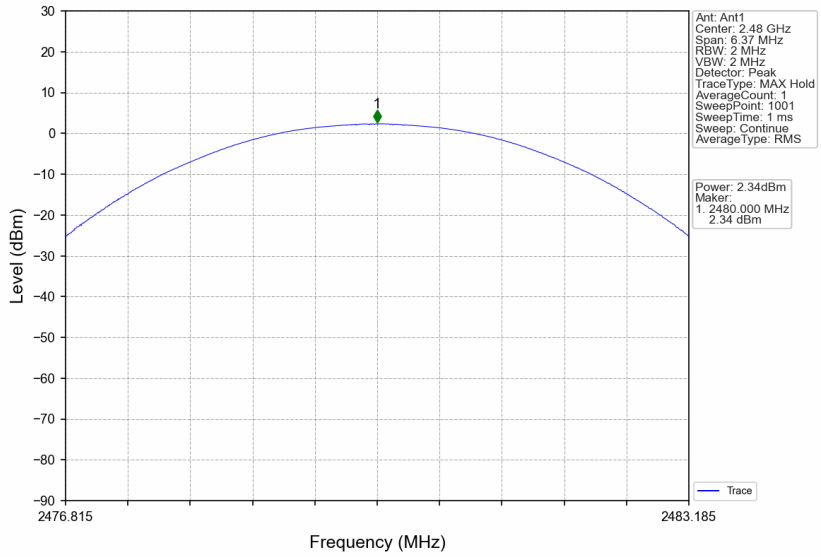


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# 3. Carrier Frequency Separation

## 3.1 Ant1

### 3.1.1 Test Result

| Ant1 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Mode | TX Type | Frequency (MHz) | Packet Type | Channel Separation (MHz) | 20dB Bandwidth (MHz) | Limit (MHz) | Verdict |
| GFSK | SISO | HOPP | DH5 | 1.000 | 0.940 | >=0.94 | Pass |
| Pi/4DQPSK | SISO | HOPP | 2DH5 | 0.989 | 1.285 | >=0.857 | Pass |
| 8DPSK | SISO | HOPP | 3DH5 | 1.008 | 1.275 | >=0.85 | Pass |

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### 3.1.2 Test Graph

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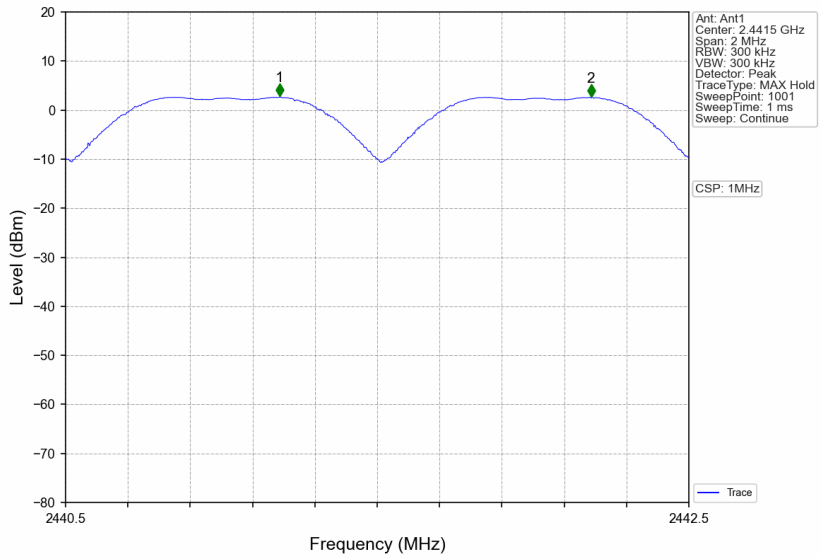
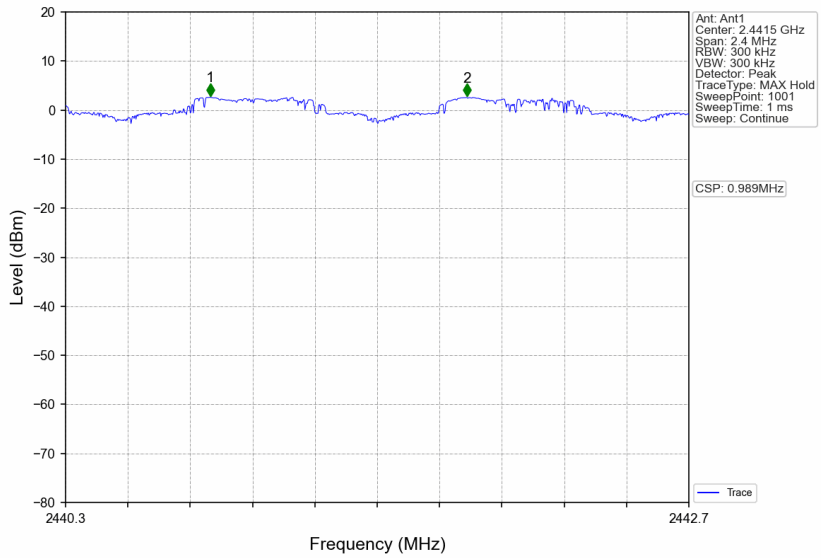



Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV

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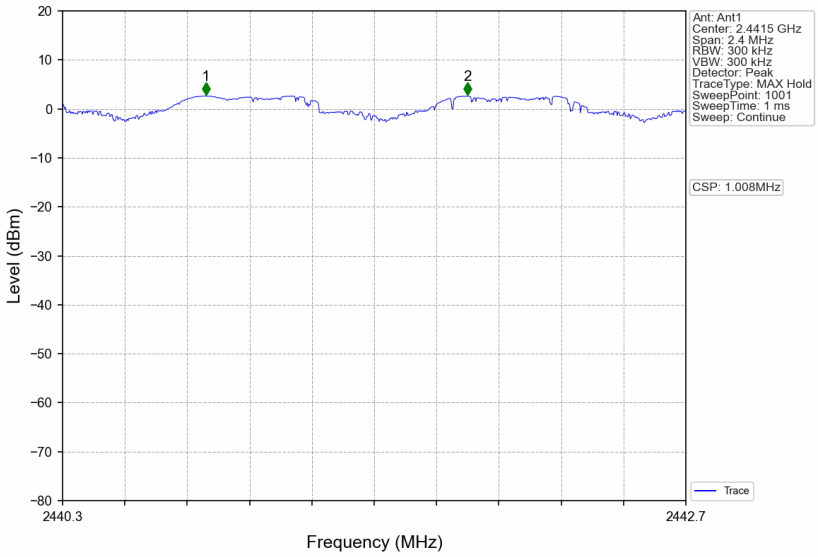
8DPSK_3DH5_HOPP_Ant1_NTNV

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# 4. Number of Hopping Frequencies

## 4.1 HoppNum

### 4.1.1 Test Result

| 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 |

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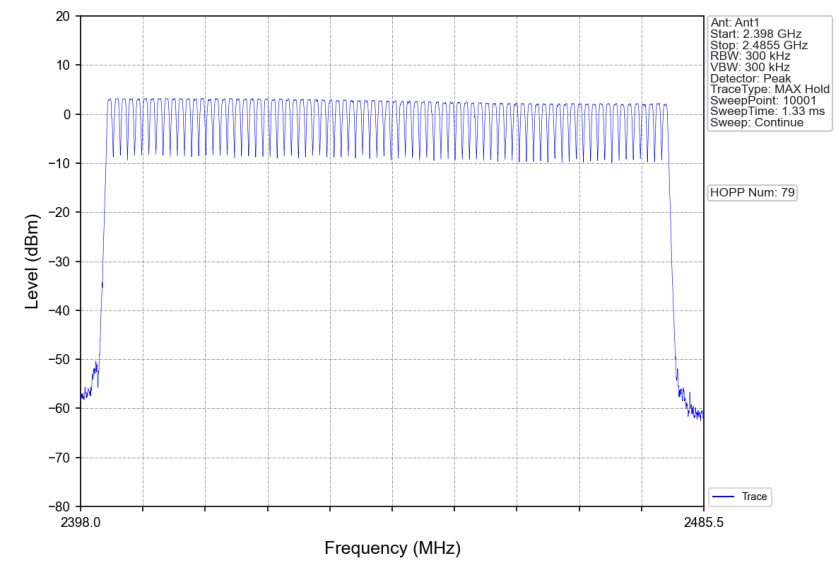
## 4.1.2 Test Graph

GFSK_DH5_HOPP_Ant1_NTNV

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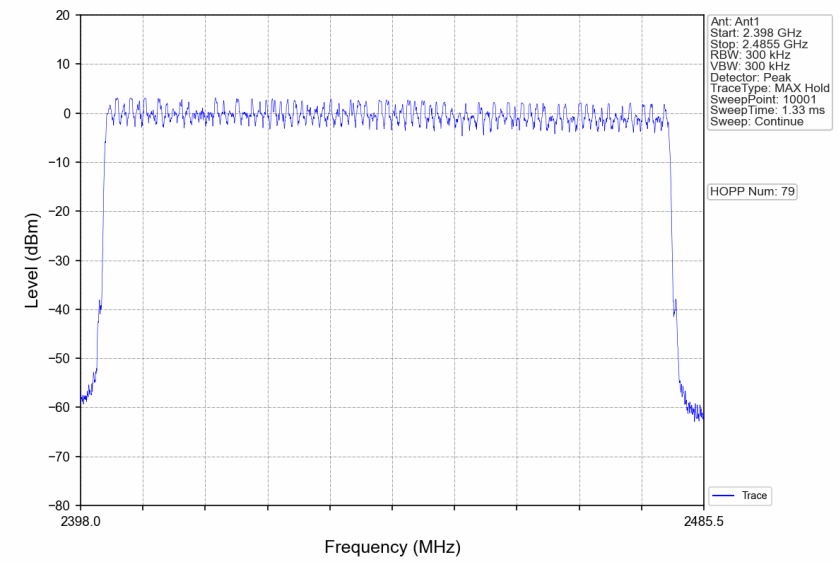


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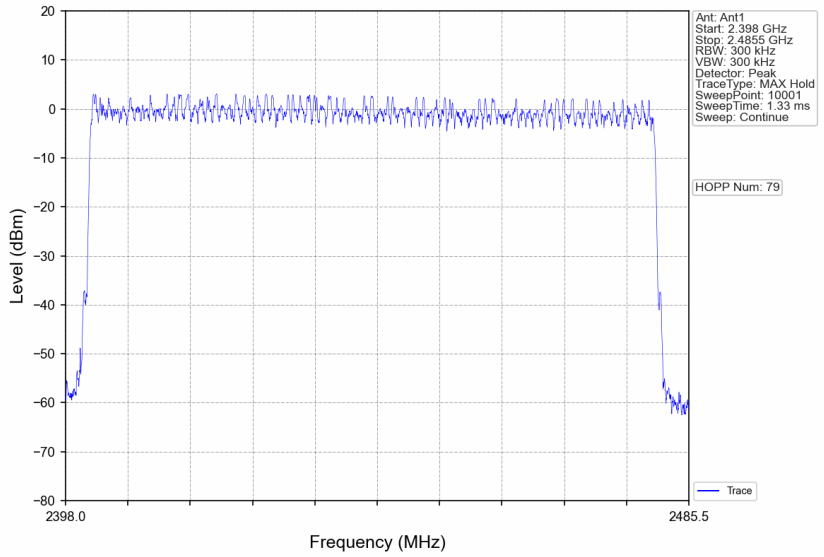
8DPSK_3DH5_HOPP_Ant1_NTNV

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# 5. Time of Occupancy (Dwell Time)

## 5.1 Ant1

### 5.1.1 Test Result

| Ant1 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Mode | TX Type | Frequency (MHz) | Packet Type | Duration of Single Pulse (ms) | Observation Period (s) | Num of Pulse in Observation Period | Dwell Time (ms) | Limit (ms) | Verdict |
| GFSK | SISO | HOPP | DH1 | 0.402 | 31.600 | 156 | 62.712 | <=400 | Pass |
| | | | DH3 | 1.624 | 31.600 | 78 | 126.672 | <=400 | Pass |
| | | | DH5 | 2.898 | 31.600 | 52 | 150.696 | <=400 | Pass |
| Pi/4DQPSK | SISO | HOPP | 2DH1 | 0.412 | 31.600 | 156 | 64.272 | <=400 | Pass |
| | | | 2DH3 | 1.662 | 31.600 | 78 | 129.636 | <=400 | Pass |
| | | | 2DH5 | 2.910 | 31.600 | 52 | 151.320 | <=400 | Pass |
| 8DPSK | SISO | HOPP | 3DH1 | 0.410 | 31.600 | 156 | 63.960 | <=400 | Pass |
| | | | 3DH3 | 1.660 | 31.600 | 78 | 129.480 | <=400 | Pass |
| | | | 3DH5 | 2.912 | 31.600 | 52 | 151.424 | <=400 | Pass |

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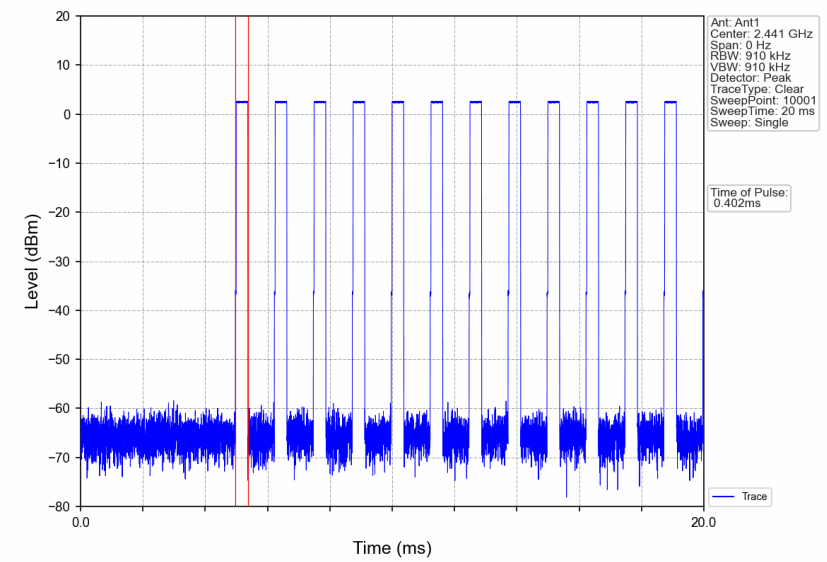
## 5.1.2 Test Graph

GFSK_DH1_HOPP_Ant1_NTNV

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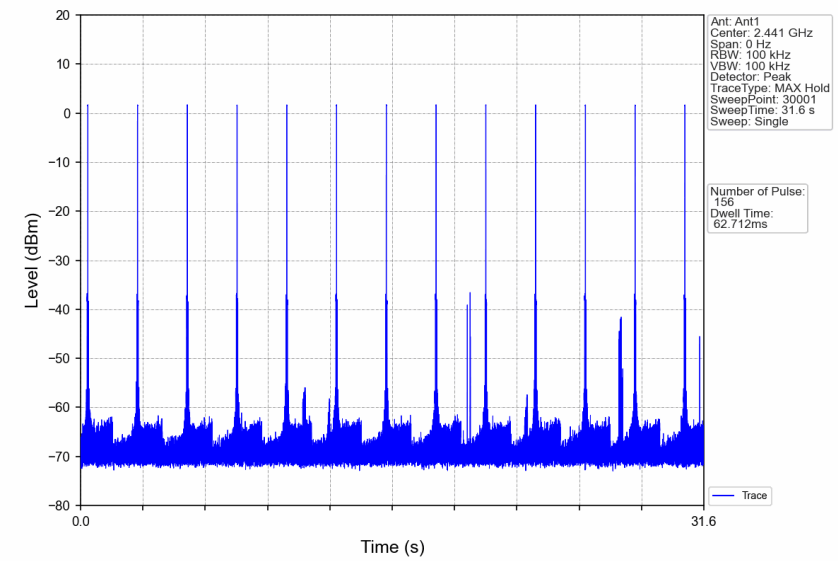


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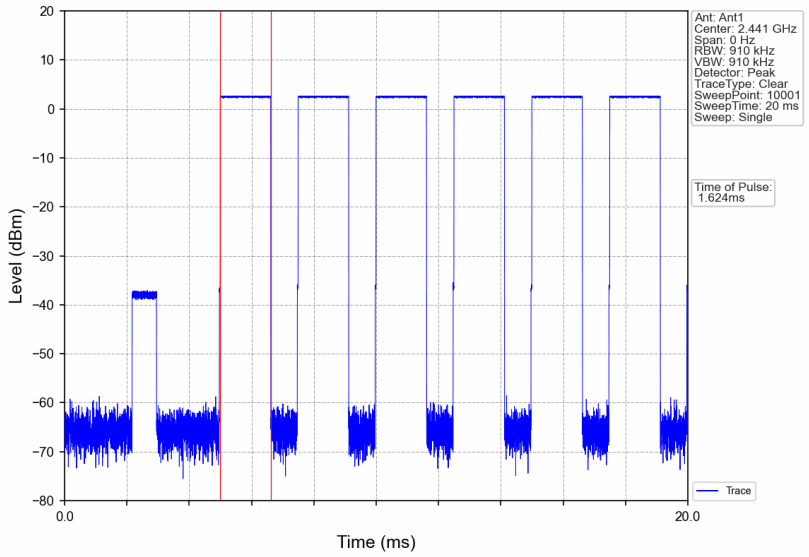


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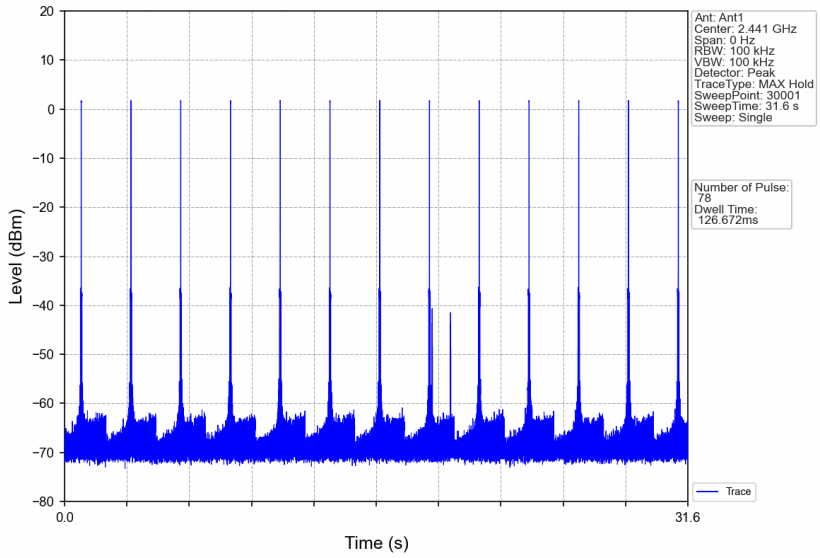


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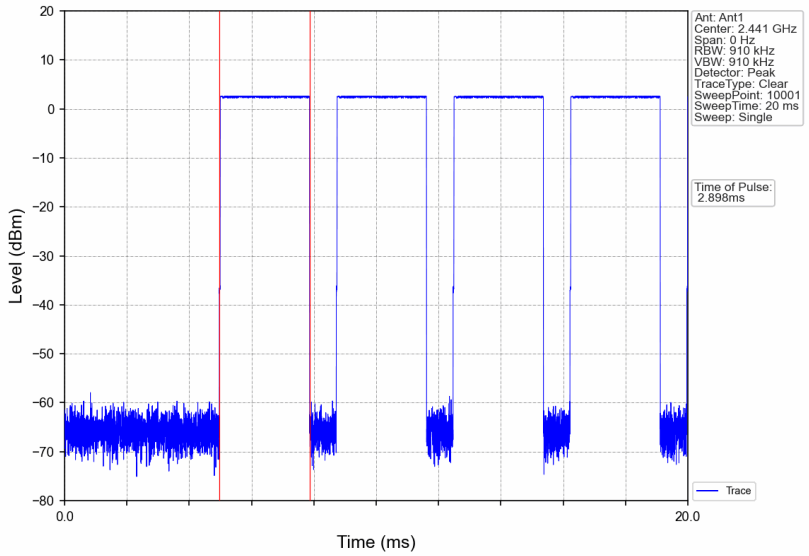


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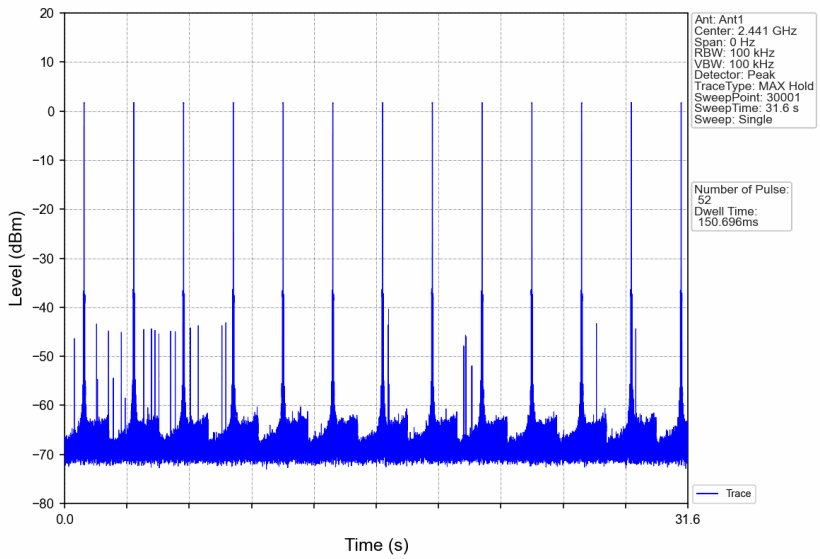


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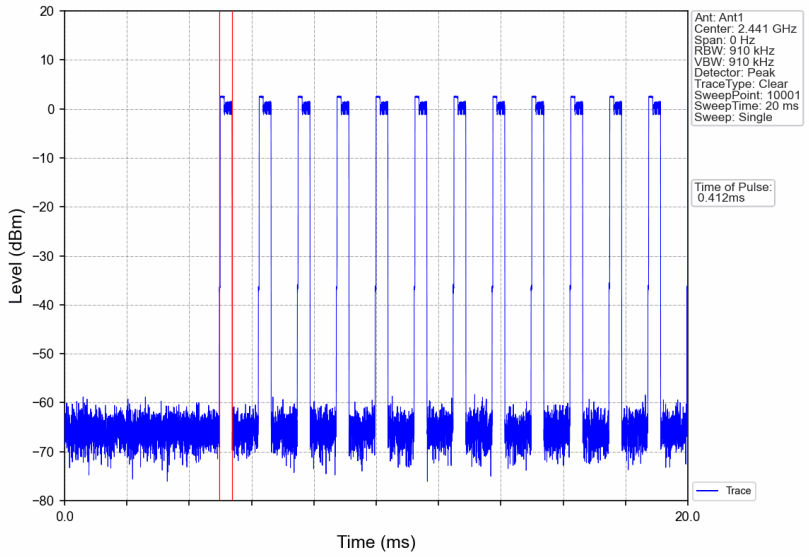


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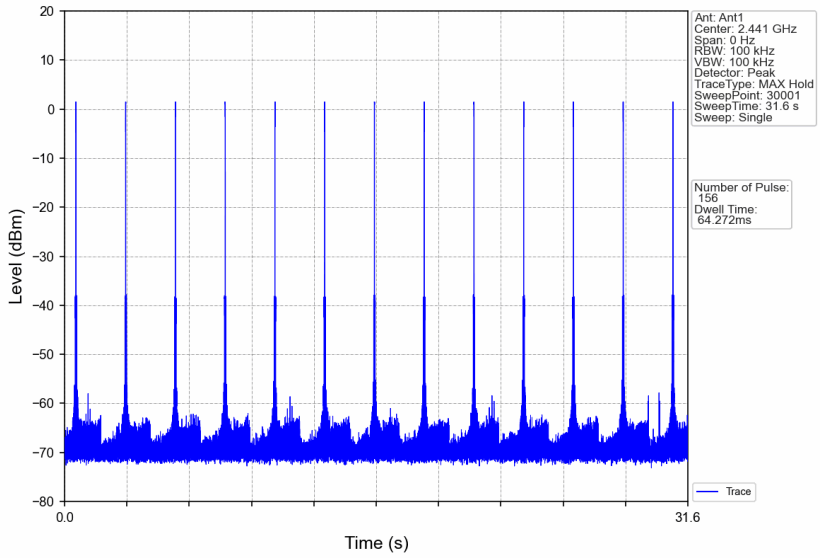


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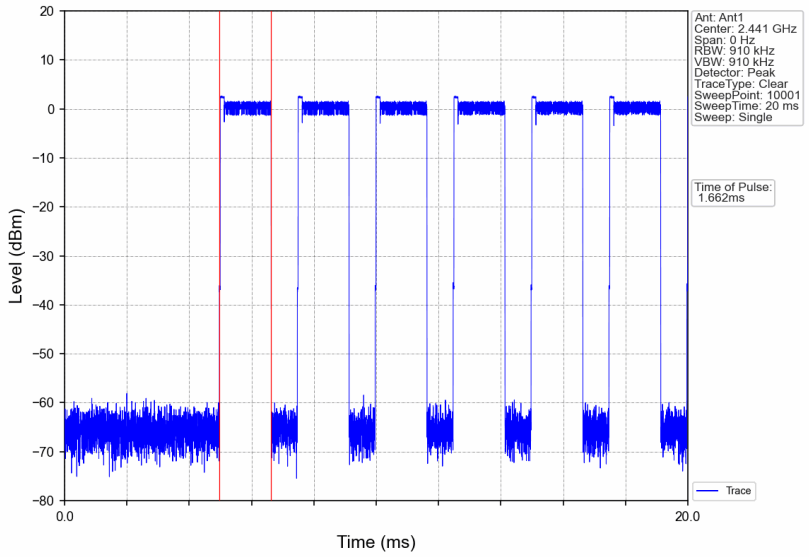


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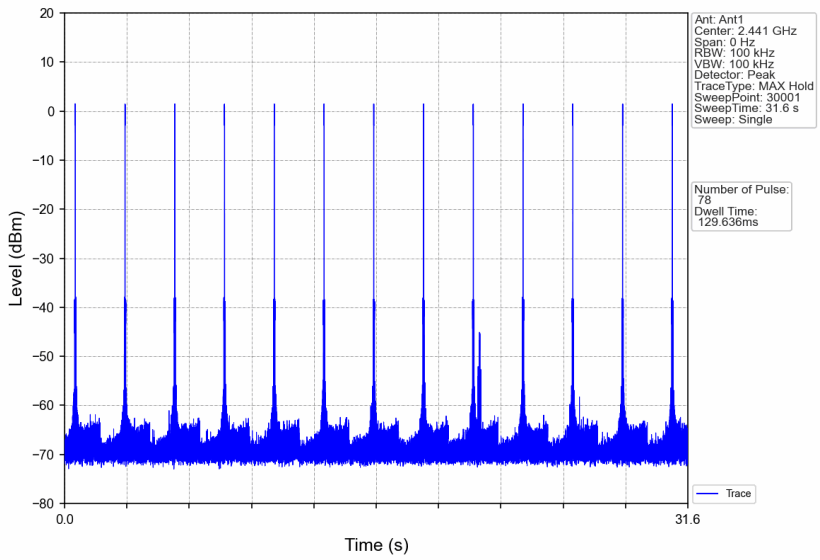


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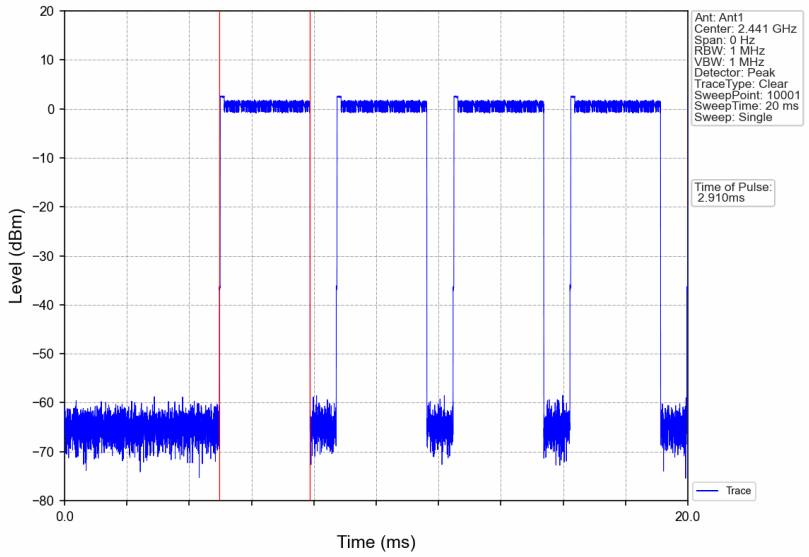


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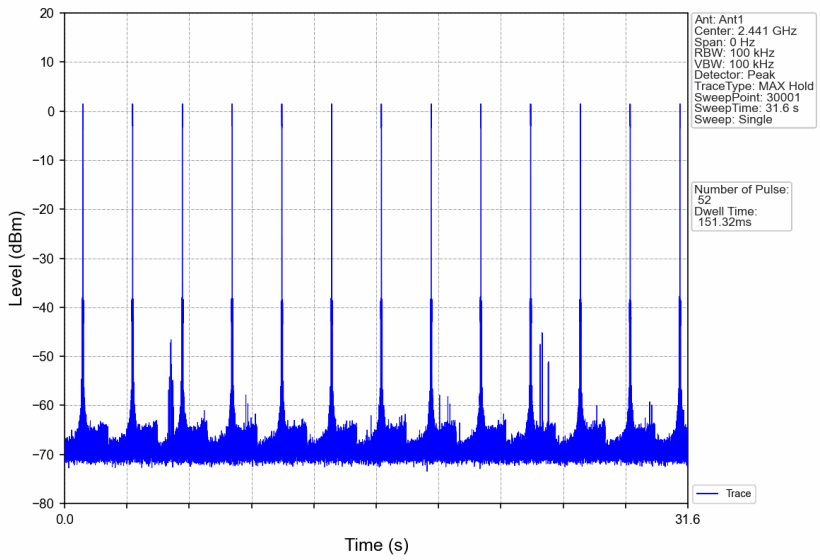


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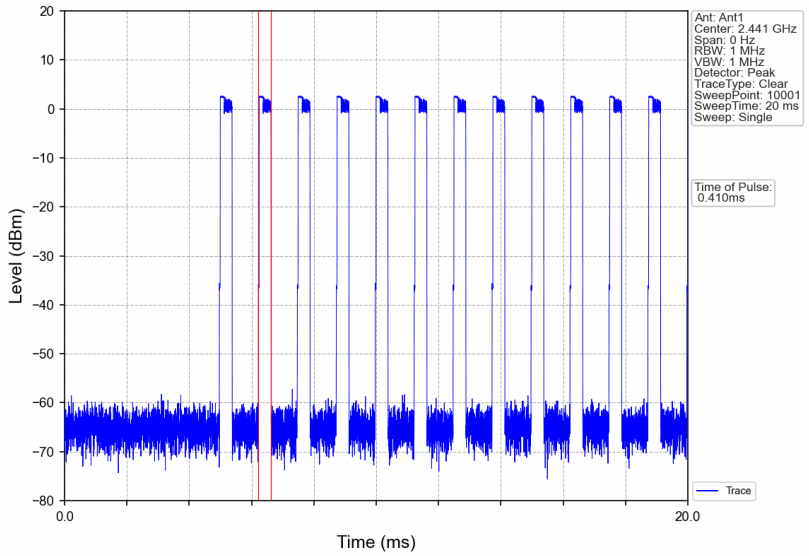


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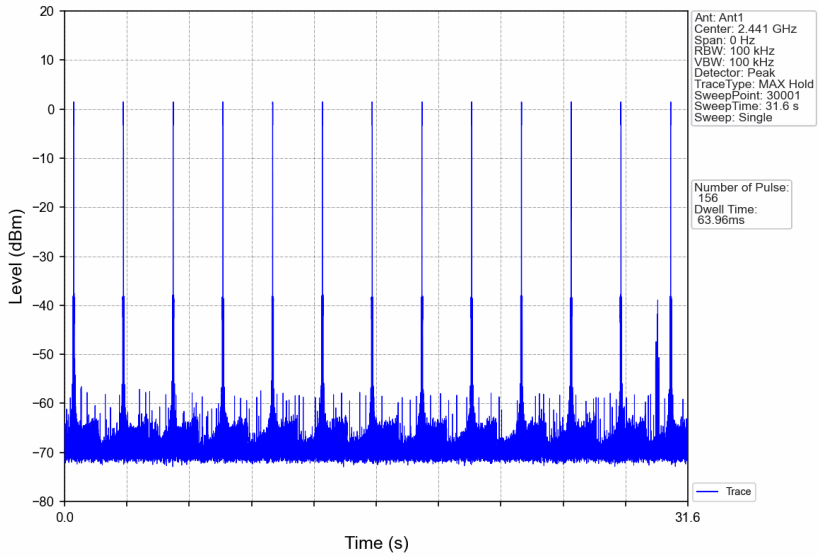


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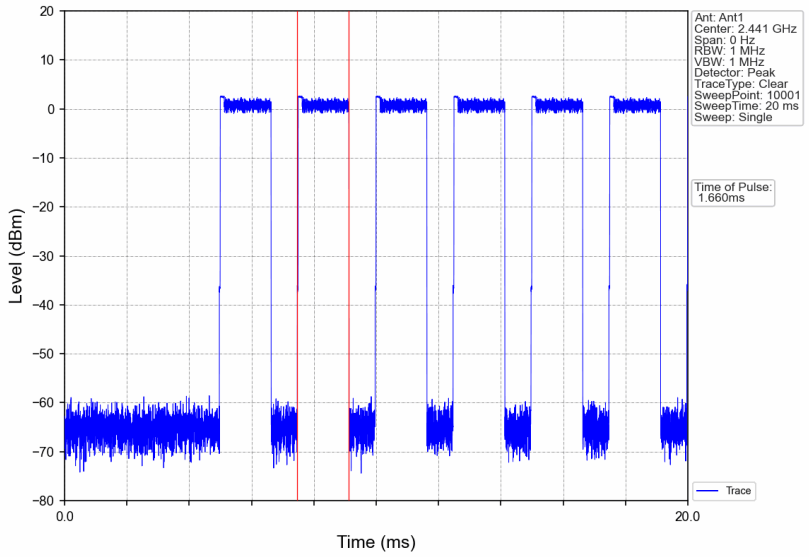


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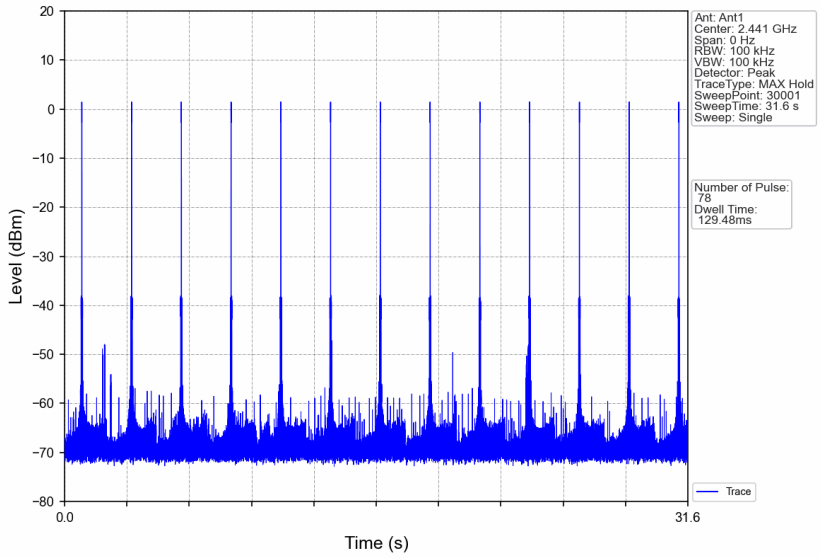


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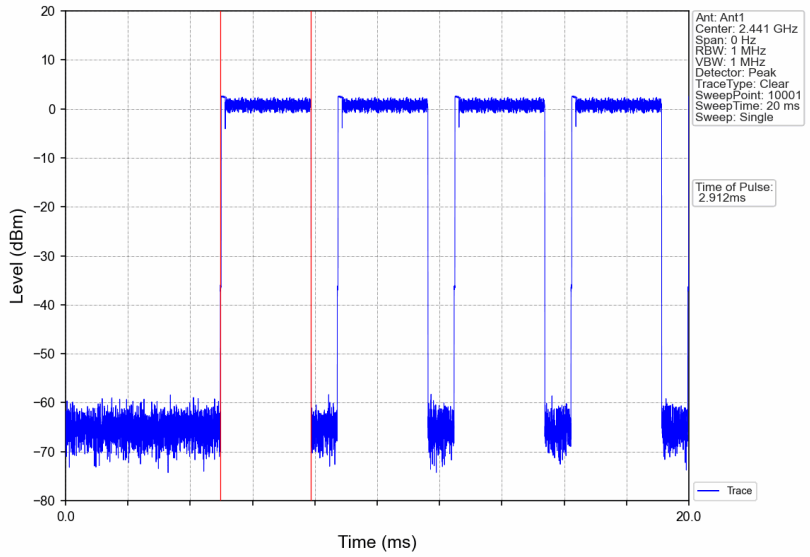
8DPSK_3DH5_HOPP_Ant1_NTNV

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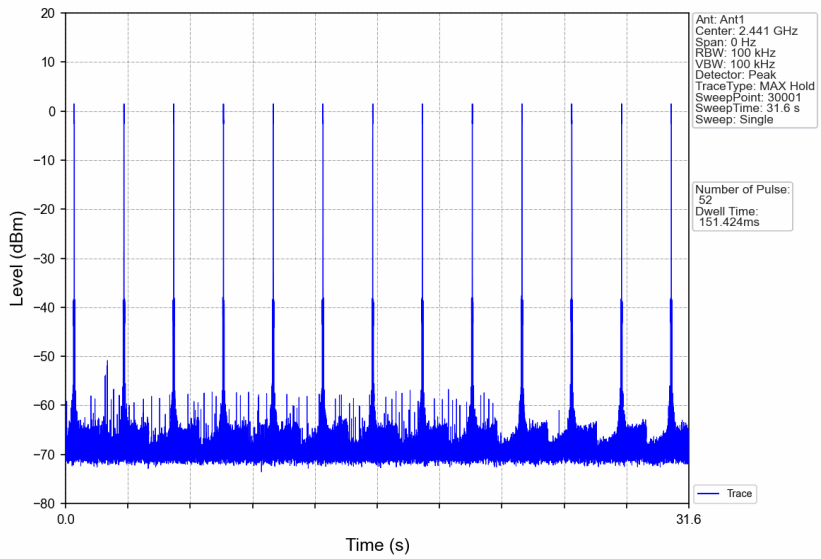


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# 6. Unwanted Emissions InStandard Non-restricted Frequency Bands

## 6.1 Ref

### 6.1.1 Test Result

| Mode | TX Type | Frequency (MHz) | Packet Type | ANT | Level of Reference (dBm) |
|---|---|---|---|---|---|
| GFSK | SISO | 2402 | DH5 | 1 | 3.04 |
| | | 2441 | DH5 | 1 | 2.66 |
| | | 2480 | DH5 | 1 | 2.03 |
| Pi/4DQPSK | SISO | 2402 | 2DH5 | 1 | 2.89 |
| | | 2441 | 2DH5 | 1 | 2.41 |
| | | 2480 | 2DH5 | 1 | 1.82 |
| 8DPSK | SISO | 2402 | 3DH5 | 1 | 3.04 |
| | | 2441 | 3DH5 | 1 | 2.61 |
| | | 2480 | 3DH5 | 1 | 2.02 |
| Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.<br>Note2: RBW = 1MHz was used during the pre-test. The final test will be performed at RBW=100kHz while the margin is less than 3dB. | | | | | |

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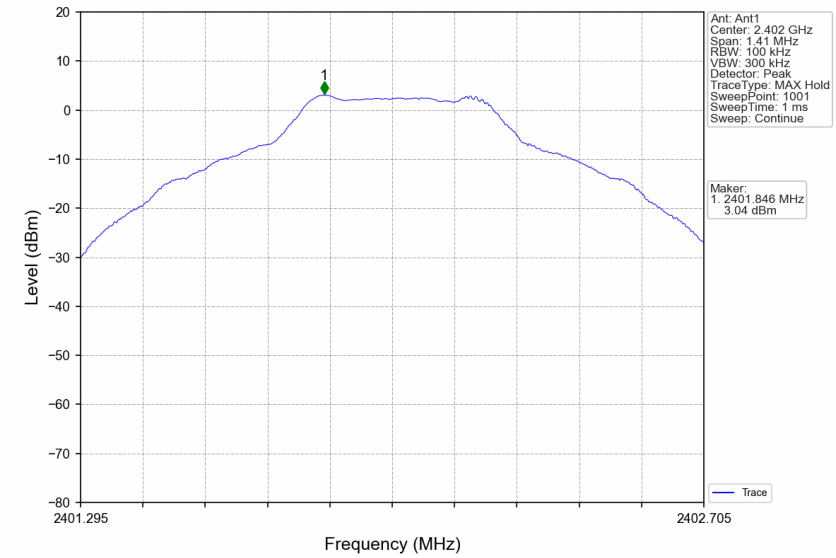
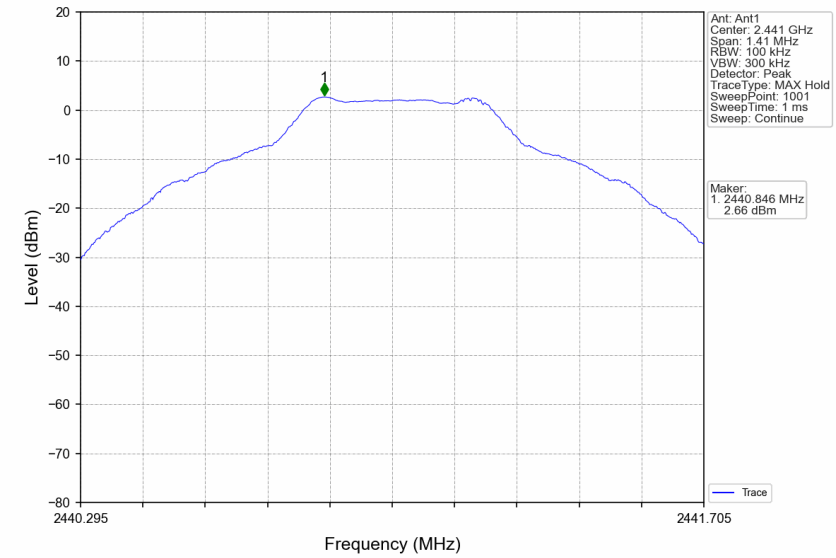
## 6.1.2 Test Graph

GFSK_DH5_LCH_2402MHz_Ant1_NTNV




GFSK_DH5_MCH_2441MHz_Ant1_NTNV

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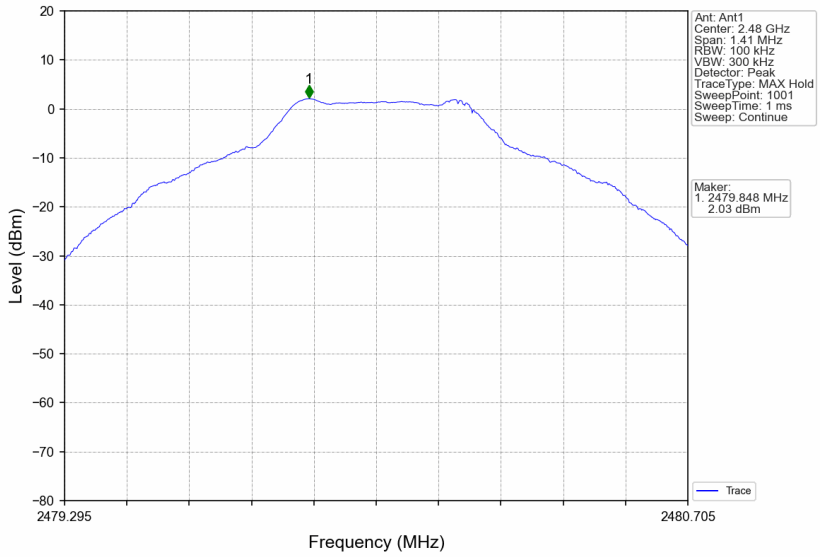
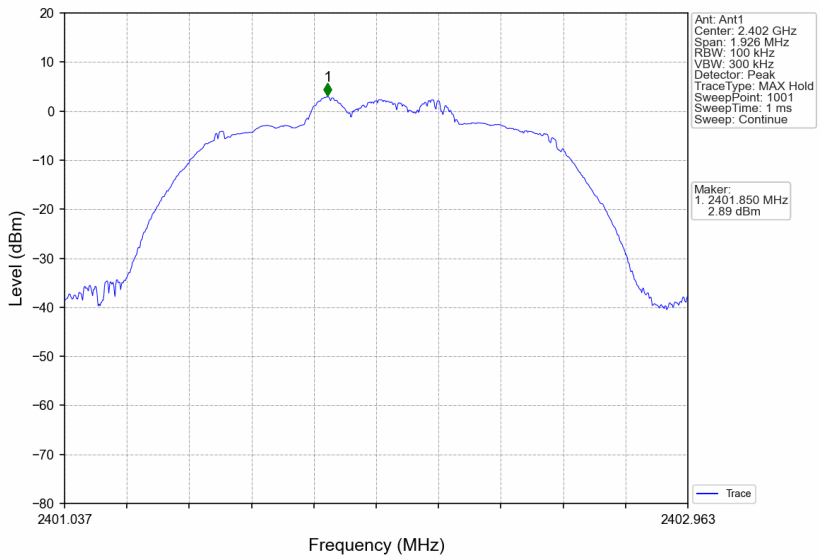
GFSK_DH5_HCH_2480MHz_Ant1_NTNV




Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

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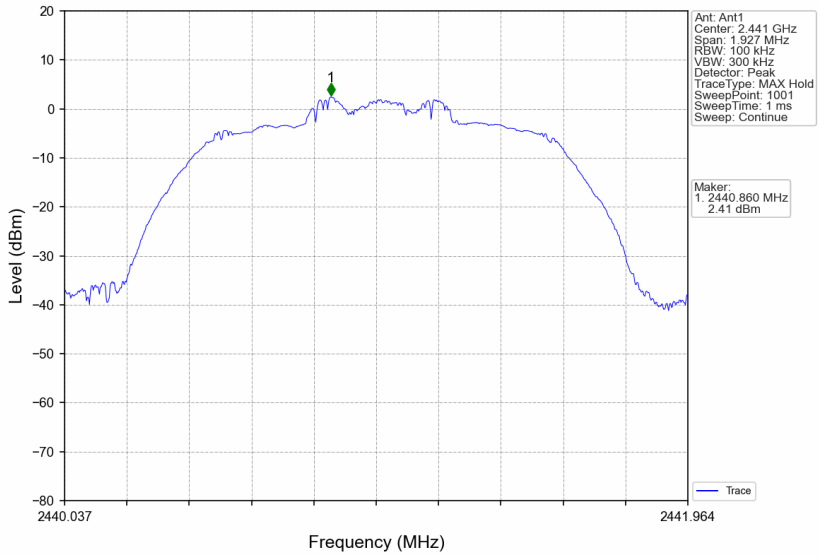
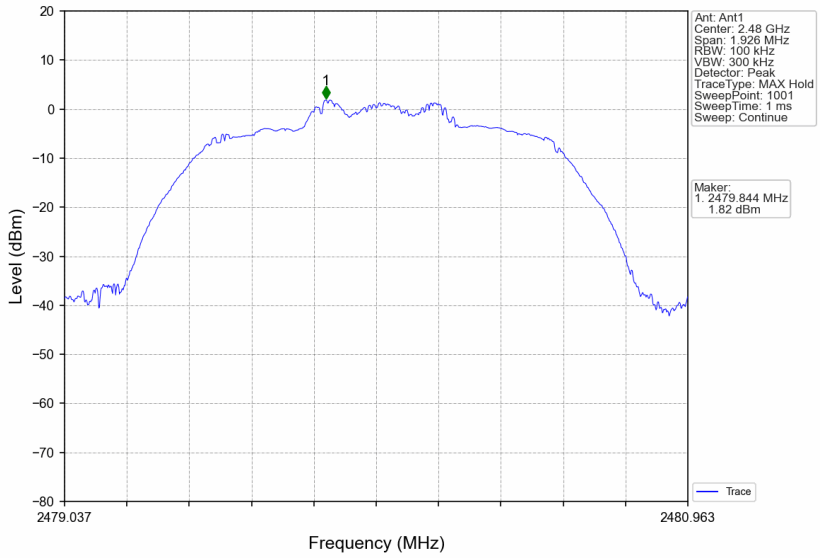
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV




Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

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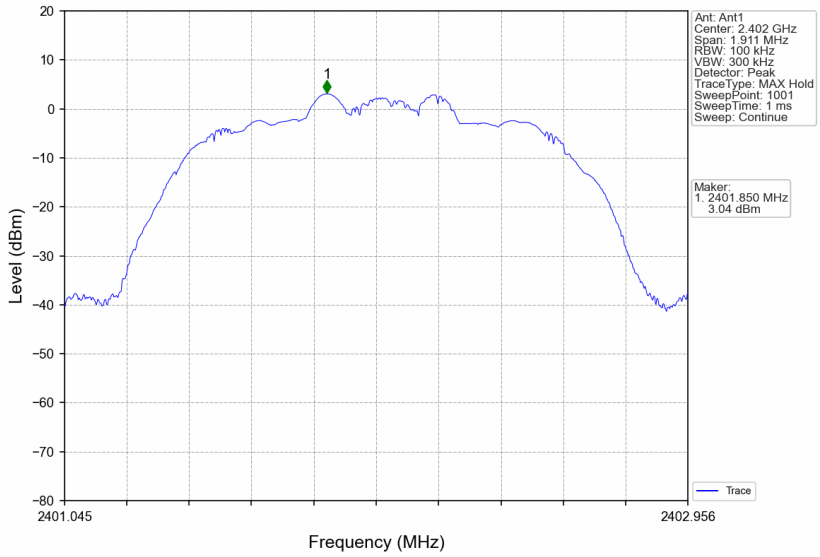
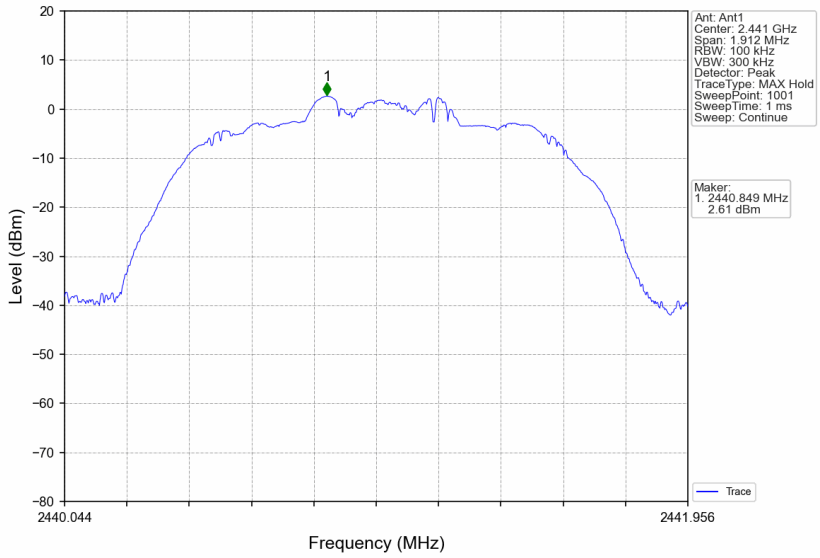
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV




8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

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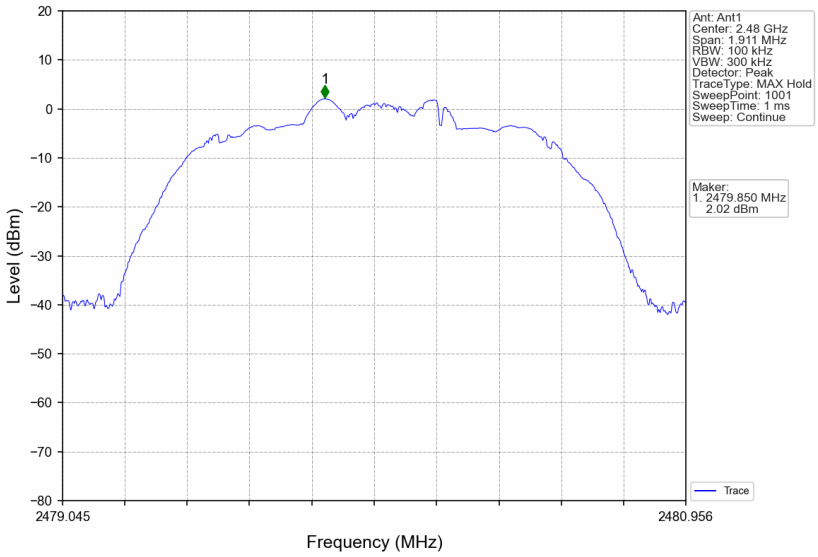
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

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## 6.2 CSE

### 6.2.1 Test Result

| Mode | TX Type | Frequency (MHz) | Packet Type | ANT | Level of Reference (dBm) | Limit (dBm) | Verdict |
|---|---|---|---|---|---|---|---|
| GFSK | SISO | 2402 | DH5 | 1 | 3.04 | -16.96 | Pass |
| | | 2441 | DH5 | 1 | 3.04 | -16.96 | Pass |
| | | 2480 | DH5 | 1 | 3.04 | -16.96 | Pass |
| | | HOPP | DH5 | 1 | 3.04 | -16.96 | Pass |
| Pi/4DQPSK | SISO | 2402 | 2DH5 | 1 | 2.89 | -17.11 | Pass |
| | | 2441 | 2DH5 | 1 | 2.89 | -17.11 | Pass |
| | | 2480 | 2DH5 | 1 | 2.89 | -17.11 | Pass |
| | | HOPP | 2DH5 | 1 | 2.89 | -17.11 | Pass |
| 8DPSK | SISO | 2402 | 3DH5 | 1 | 3.04 | -16.96 | Pass |
| | | 2441 | 3DH5 | 1 | 3.04 | -16.96 | Pass |
| | | 2480 | 3DH5 | 1 | 3.04 | -16.96 | Pass |
| | | HOPP | 3DH5 | 1 | 3.04 | -16.96 | Pass |

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.
Note2: RBW = 1MHz was used during the pre-test. The final test will be performed at RBW=100kHz while the margin is less than 3dB.

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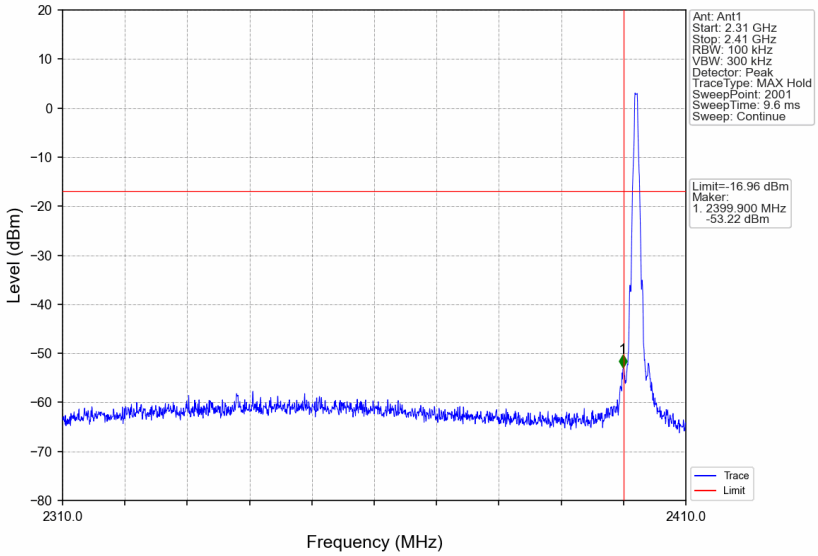
## 6.2.2 Test Graph

GFSK_DH5_LCH_2402MHz_Ant1_NTNV

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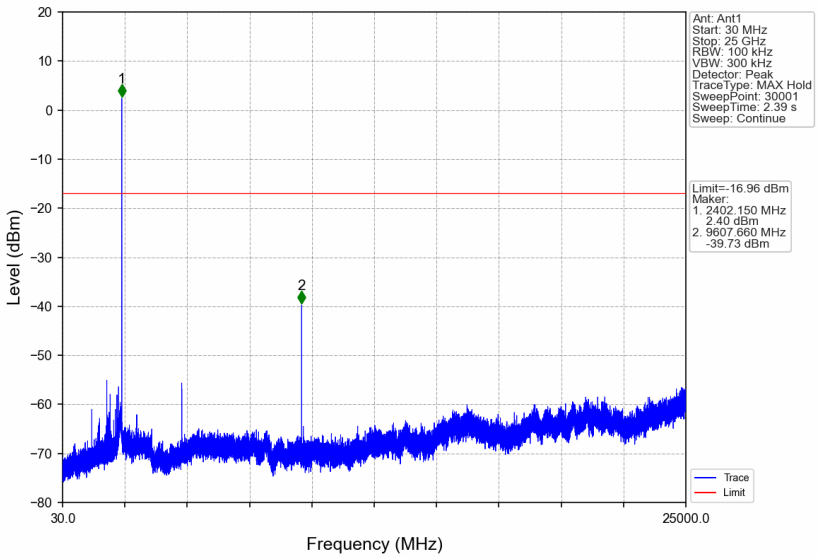


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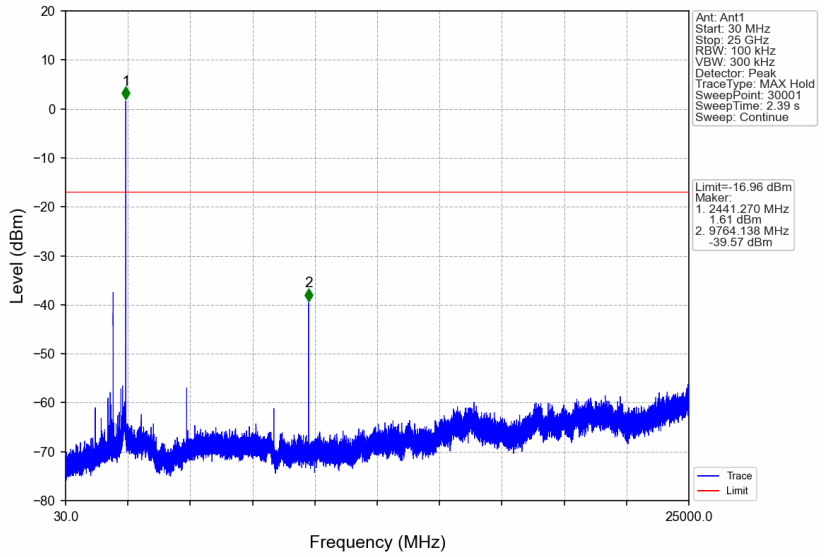
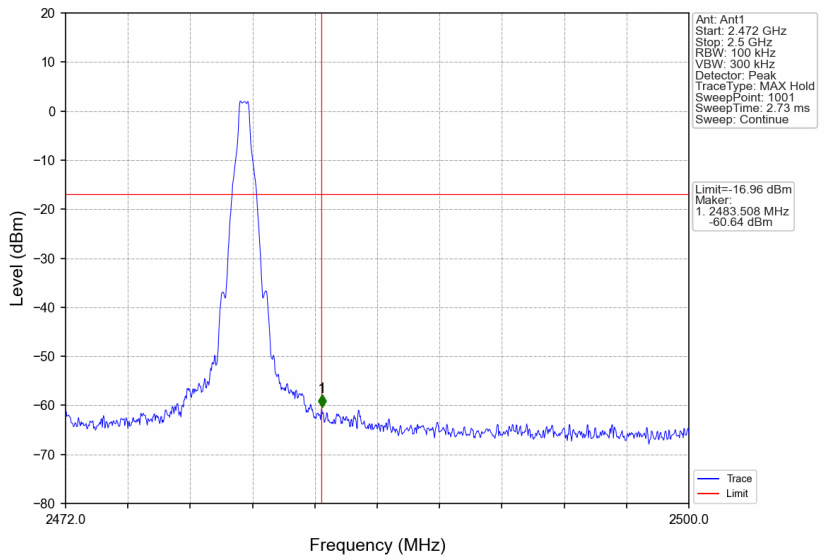



GFSK_DH5_HCH_2480MHz_Ant1_NTNV

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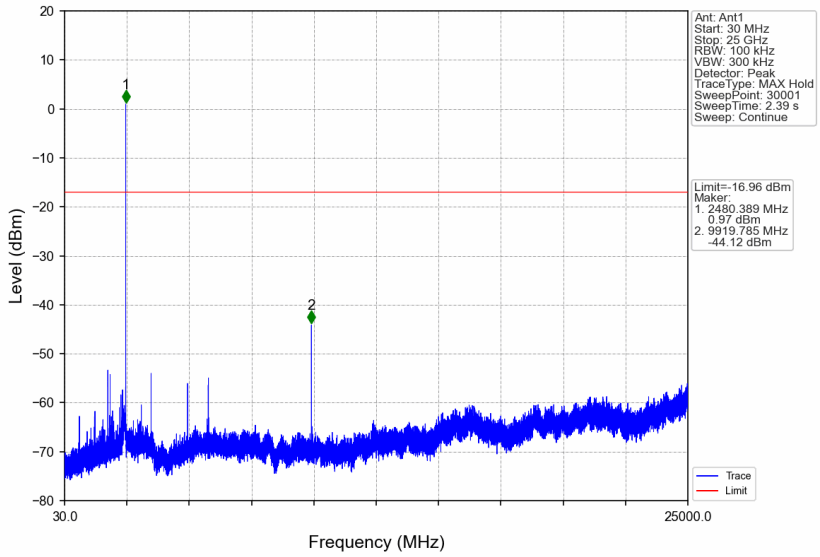


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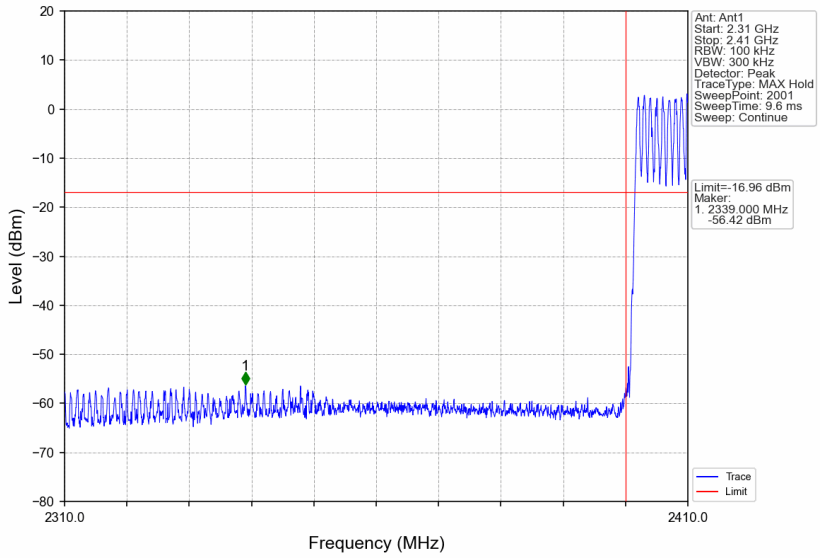


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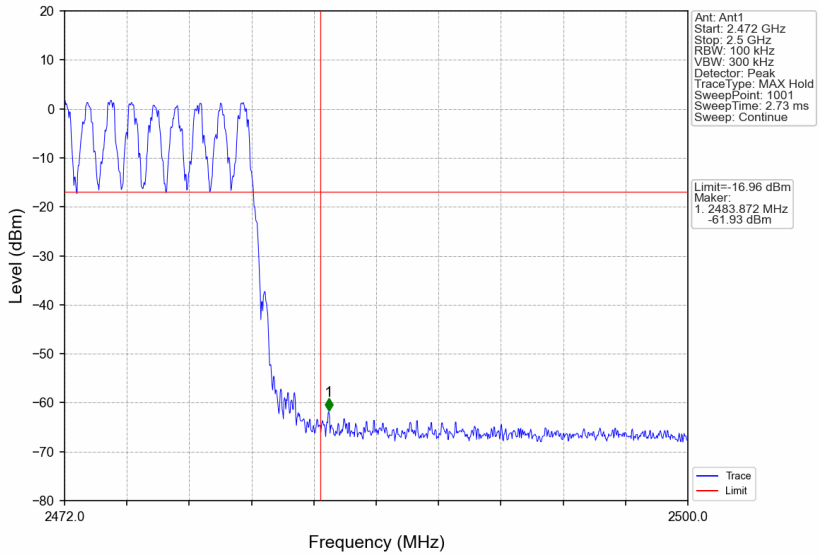
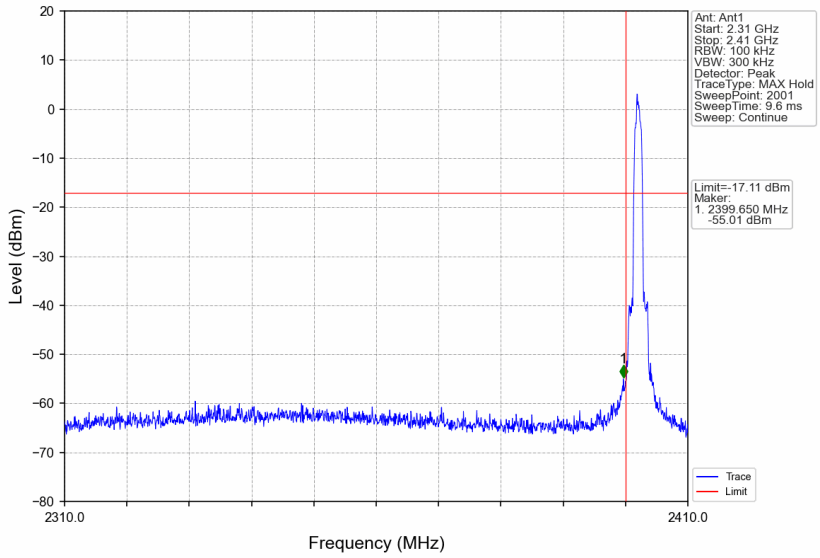



Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV

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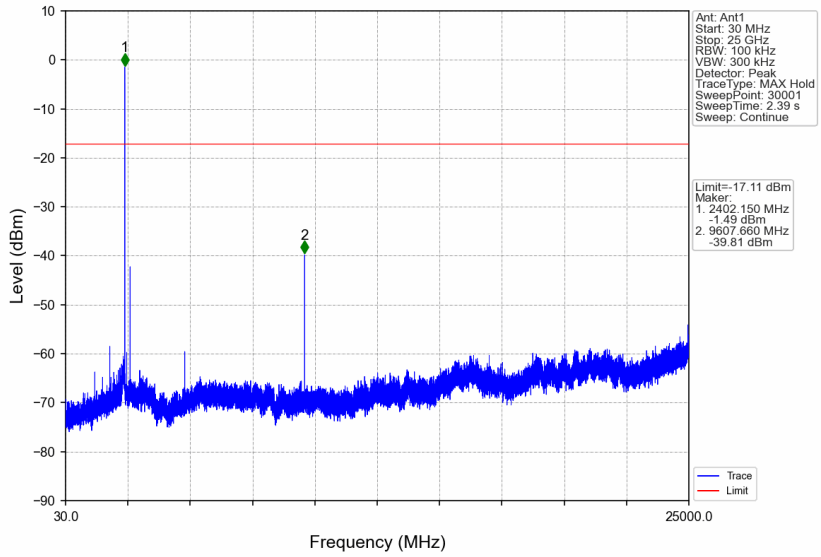


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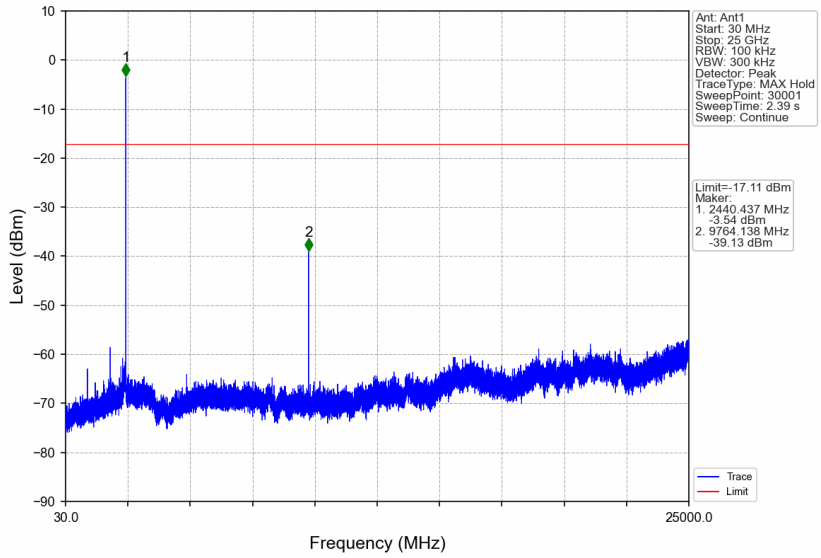


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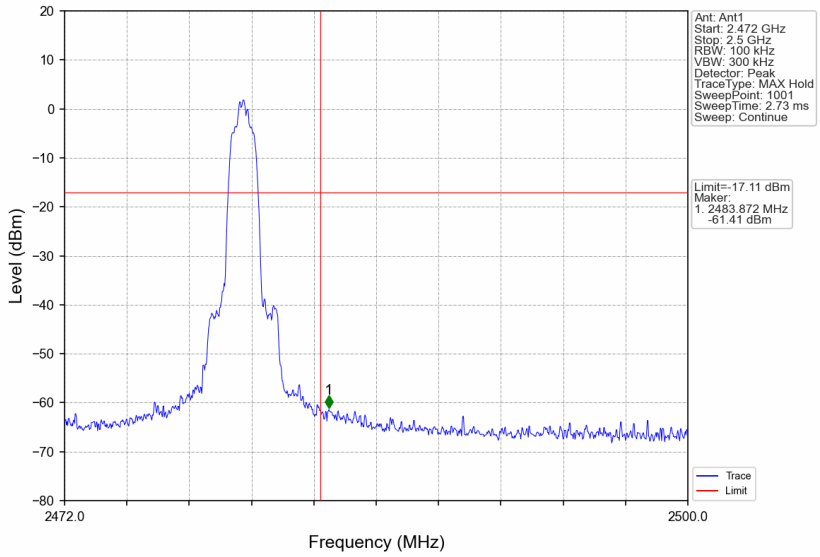
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

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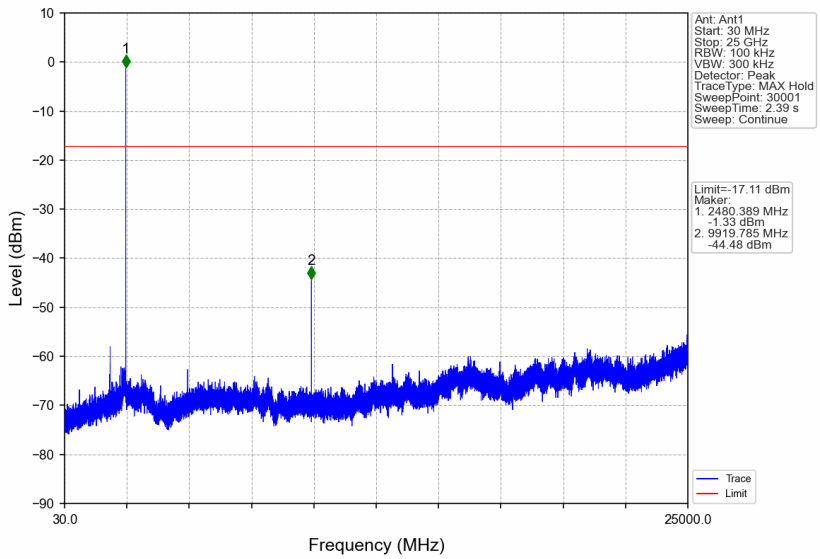


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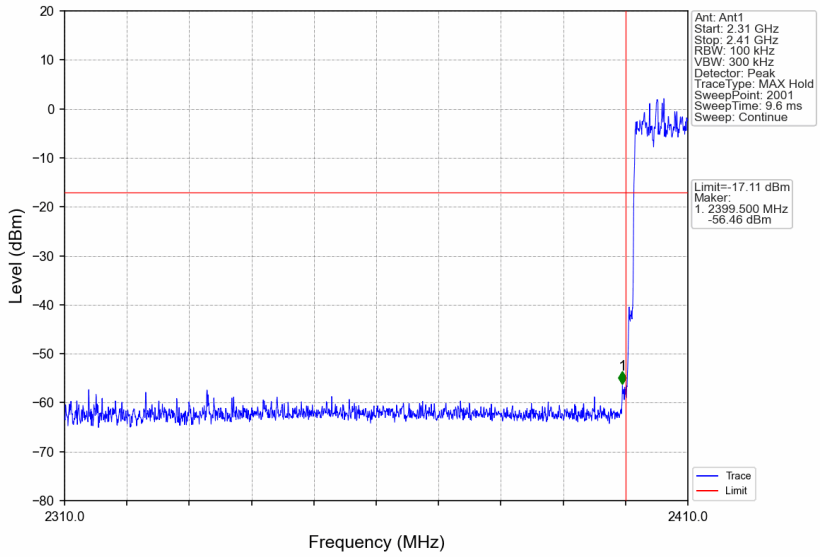


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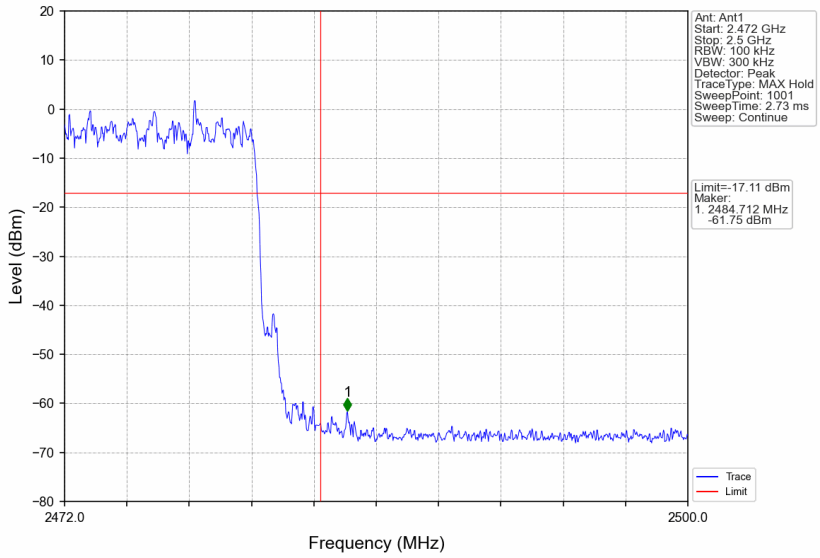


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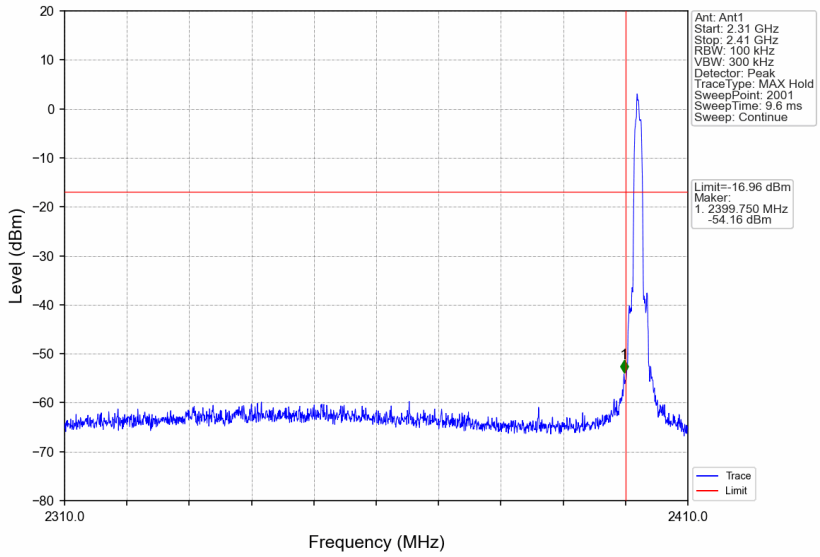
8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

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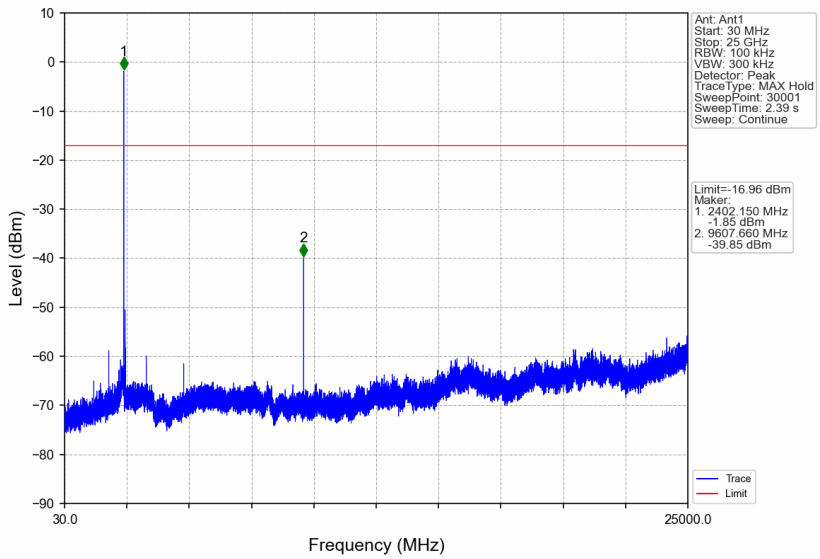


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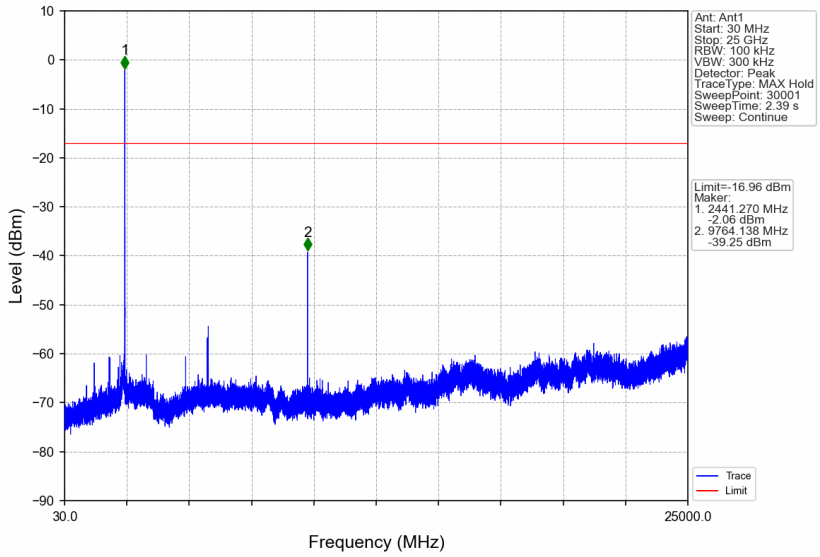
8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

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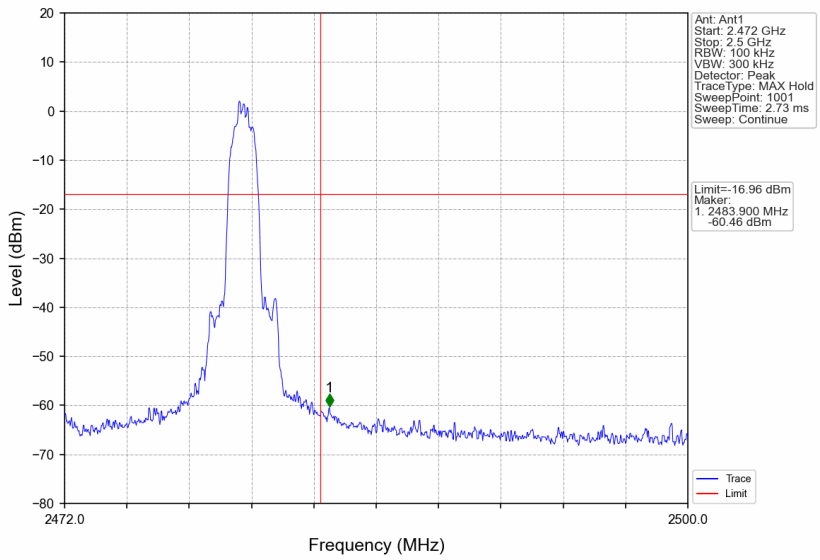


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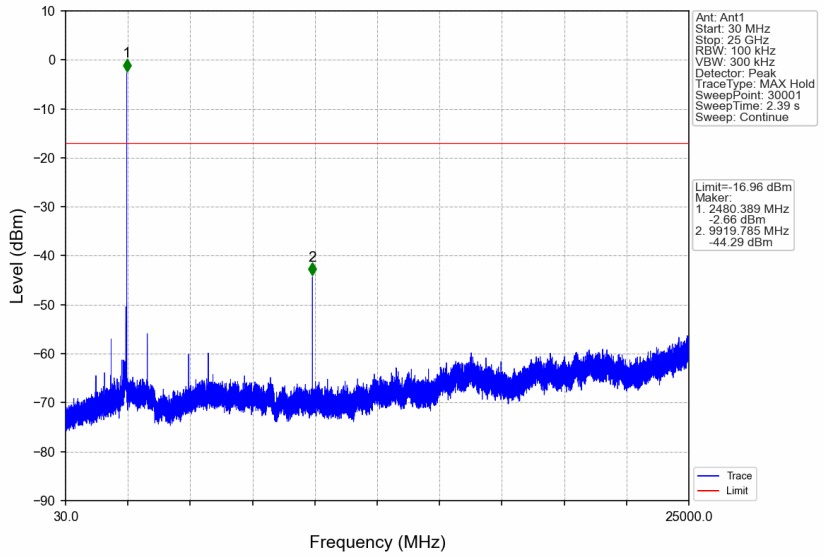
8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

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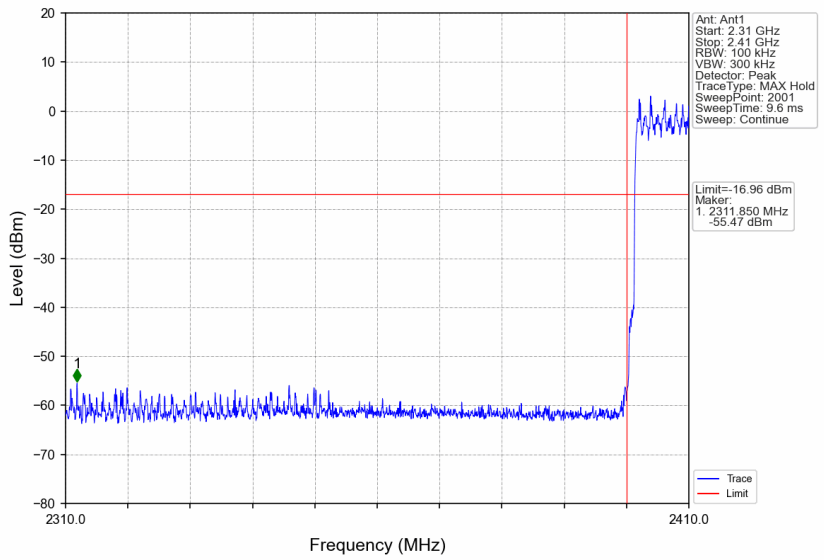


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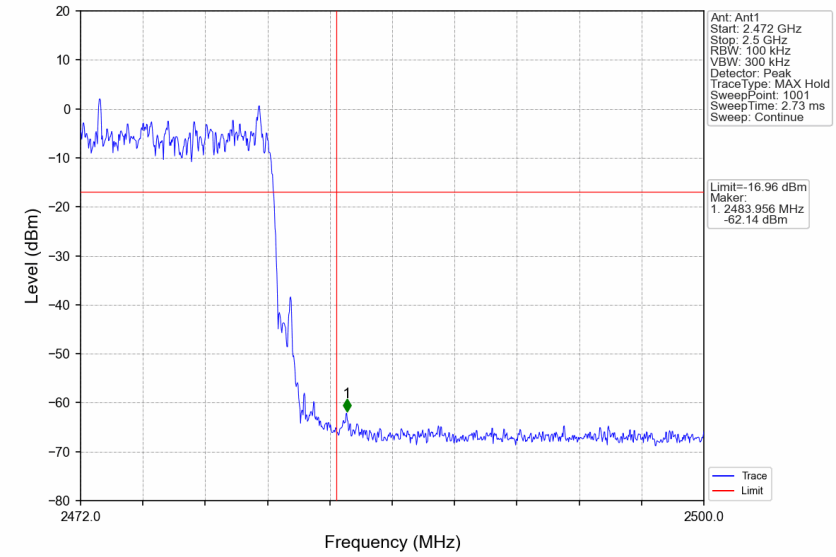
|  |



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