



TEST REPORT

No.24T04N000881-003-BT

for

Realme Chongqing Mobile Telecommunications Corp., Ltd.

Smart watch

Model Name: RMW2401

with

Hardware Version: V1.1

Software Version: TBD

FCC ID: 2AUYFRMW2401

Issued Date: 2024-05-28

Designation Number: CN1210

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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REPORT HISTORY

| Report Number | Revision | Description | Issue Date |
|----------------------|-----------------|--------------------|-------------------|
| 24T04N000881-003-BT | Rev.0 | 1st edition | 2024-05-28 |

Note: the latest revision of the test report supersedes all previous versions.



CONTENTS

| | |
|---|-----------|
| 1. SUMMARY OF TEST REPORT | 4 |
| 1.1. TEST ITEMS | 4 |
| 1.2. TEST STANDARDS | 4 |
| 1.3. TEST RESULT | 4 |
| 1.4. TESTING LOCATION | 4 |
| 1.5. PROJECT DATA | 4 |
| 1.6. SIGNATURE | 4 |
| 2. CLIENT INFORMATION | 5 |
| 2.1. APPLICANT INFORMATION | 5 |
| 2.2. MANUFACTURER INFORMATION | 5 |
| 3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) | 6 |
| 3.1. ABOUT EUT | 6 |
| 3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST | 6 |
| 3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST | 6 |
| 3.4. GENERAL DESCRIPTION | 6 |
| 4. REFERENCE DOCUMENTS | 7 |
| 4.1. DOCUMENTS SUPPLIED BY APPLICANT | 7 |
| 4.2. REFERENCE DOCUMENTS FOR TESTING | 7 |
| 5. TEST RESULTS | 8 |
| 5.1. TESTING ENVIRONMENT | 8 |
| 5.2. TEST RESULTS | 8 |
| 5.3. STATEMENTS | 8 |
| 6. TEST EQUIPMENTS UTILIZED | 9 |
| 7. LABORATORY ENVIRONMENT | 10 |
| 8. MEASUREMENT UNCERTAINTY | 11 |
| ANNEX A: DETAILED TEST RESULTS | 12 |
| TEST CONFIGURATION | 12 |
| A.0 ANTENNA REQUIREMENT | 15 |
| A.1 MAXIMUM PEAK OUTPUT POWER | 16 |
| A.2 BAND EDGES COMPLIANCE | 17 |
| A.3 CONDUCTED EMISSION | 24 |
| A.4 RADIATED EMISSION | 30 |
| A.5 20DB BANDWIDTH | 42 |
| A.6 TIME OF OCCUPANCY (DWELL TIME) | 48 |
| A.7 NUMBER OF HOPPING CHANNELS | 52 |
| A.8 CARRIER FREQUENCY SEPARATION | 55 |
| A.9 AC POWER LINE CONDUCTED EMISSION | 58 |



1. Summary of Test Report

1.1. Test Items

| | |
|---------------------|--|
| Description | Smart watch |
| Model Name | RMW2401 |
| Applicant's name | Realme Chongqing Mobile Telecommunications Corp., Ltd. |
| Manufacturer's Name | Realme Chongqing Mobile Telecommunications Corp., Ltd. |

1.2. Test Standards

FCC Part15-2023; ANSI C63.10-2013.

1.3. Test Result

Pass

Please refer to "5.2.Test Results"

1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road,
Futian District, Shenzhen, Guangdong, P. R. China 51800

1.5. Project data

| | |
|---------------------|------------|
| Testing Start Date: | 2024-04-30 |
| Testing End Date: | 2024-05-22 |

1.6. Signature

Lin Zechuang

(Prepared this test report)

An Ran

(Reviewed this test report)

Zhang Bojun

(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: Realme Chongqing Mobile Telecommunications Corp., Ltd.
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Contact Person Chunyu Feng
E-Mail fengchunyu@realme.com
Telephone: (86)13823232013
Fax: /

2.2. Manufacturer Information

Company Name: Realme Chongqing Mobile Telecommunications Corp., Ltd.
Address: No.178 Yulong Avenue,Yufengshan,Yubei District,Chongqing,China
Contact Person Chunyu Feng
E-Mail fengchunyu@realme.com
Telephone: (86)13823232013
Fax: /



3. Equipment Under Test (EUT) and Ancillary Equipment (AE)

3.1. About EUT

| | |
|------------------------------|------------------------------|
| Description | Smart watch |
| Model Name | RMW2401 |
| Frequency Band | ISM 2400MHz~2483.5MHz |
| Equipment type | Bluetooth® BR/EDR |
| Type of Modulation | GFSK/π/4 DQPSK/8DPSK |
| Number of Channels | 79 |
| Antenna Type | Integrated antenna |
| Antenna Gain | -0.19dBi. |
| Power Supply | 5V DC by Battery |
| FCC ID | 2AUYFRMW2401 |
| Condition of EUT as received | No abnormality in appearance |

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

3.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version | Date of Receipt |
|----------------|-------------------|-------------------|-------------------|------------------------|
| UT01aa | / | V1.1 | TBD | 2024-04-25 |
| UT04aa | / | V1.1 | TBD | 2024-04-25 |

*EUT ID: is used to identify the test sample in the lab internally.

UT01aa is used for conduction test, UT04aa is used for radiation test and AC Power line Conducted Emission test.

3.3. Internal Identification of AE used during the test

| AE No. | Description | AE ID* |
|-----------------|--|---------------|
| AE1 | Battery | / |
| AE1 | | |
| Model | 632225V | |
| Manufacturer | ZHONGSHAN ZHONGWANGDE NEW ENERGY TECHNOLOGY Co., LTD | |
| Capacity | 380mAh | |
| Nominal Voltage | 3.8 V | |

*AE ID and AE Label: is used to identify the test sample in the lab internally.

3.4. General Description

The Equipment under Test (EUT) is a model of Smart watch with integrated antenna and battery.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.



4. Reference Documents

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

The following documents listed in this section are referred for testing.

| Reference | Title | Version |
|------------------|---|----------------|
| FCC Part 15 | FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902–928MHz, 2400–2483.5 MHz, and 5725–5850 MHz | 2023 |
| ANSI C63.10 | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices | 2013 |



5. Test Results

5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

5.2. Test Results

| No | Test cases | Sub-clause of Part 15C | Verdict |
|----|----------------------------------|------------------------|---------|
| 0 | Antenna Requirement | 15.203 | P |
| 1 | Maximum Peak Output Power | 15.247 (b) | P |
| 2 | Band Edges Compliance | 15.247 (d) | P |
| 3 | Conducted Spurious Emission | 15.247 (d) | P |
| 4 | Radiated Spurious Emission | 15.247,15.205,15.209 | P |
| 5 | Occupied 20dB bandwidth | 15.247(a) | / |
| 6 | Time of Occupancy(Dwell Time) | 15.247(a) | P |
| 7 | Number of Hopping Channel | 15.247(a) | P |
| 8 | Carrier Frequency Separation | 15.247(a) | P |
| 9 | AC Power line Conducted Emission | 15.107,15.207 | P |

See **ANNEX A** for details.

5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacture as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.

Disclaimer:

A. After confirmation with the customer, the sample information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences arising therefrom shall be borne by the customer.

B. The samples in this report are provided by the customer, and the test results are only applicable to the samples received.



6. Test Equipments Utilized

Conducted test system

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration Due date | Calibration Period |
|-----|----------------------------|----------|---------------|-----------------|----------------------|--------------------|
| 1 | Vector Signal Analyzer | FSV40 | 100903 | Rohde & Schwarz | 2024-12-27 | 1 year |
| 2 | Power Sensor | U2021XA | MY55430013 | Keysight | 2024-12-27 | 1 year |
| 3 | Data Acquisition | U2531A | TW55443507 | Keysight | / | / |
| 4 | RF Control Unit | JS0806-2 | 21C8060398 | Tonscend | 2025-05-06 | 1 year |
| 5 | Wireless Connective Tester | CMW270 | 100540 | Rohde & Schwarz | 2025-03-11 | 1 year |
| 6 | Shielding Room | S81 | CT000986-1344 | ETS-Lindgren | 2026-09-12 | 5 years |

Radiated test system

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration Due date | Calibration Period |
|-----|-------------------|-----------------------|---------------|-----------------|----------------------|--------------------|
| 1 | Test Receiver | ESR7 | 101676 | Rohde & Schwarz | 2024-11-22 | 1 year |
| 2 | BiLog Antenna | 3142E | 0224831 | ETS-Lindgren | 2024-05-27 | 3 years |
| 3 | Horn Antenna | 3117 | 00066577 | ETS-Lindgren | 2025-04-17 | 3 years |
| 4 | Anechoic Chamber | FACT3-2.0 | 1285 | ETS-Lindgren | 2025-05-28 | 2 years |
| 5 | Spectrum Analyzer | FSV40 | 101192 | Rohde & Schwarz | 2025-01-10 | 1 year |
| 6 | Loop Antenna | HLA6120 | 35779 | TESEQ | 2025-05-12 | 3 years |
| 7 | Horn Antenna | QSH-SL-1 8-26-S-20 | 17013 | Q-par | 2026-02-01 | 3 years |
| 8 | Test Receiver | ESCI | 100702 | Rohde & Schwarz | 2025-01-10 | 1 year |
| 9 | LISN | ENV216 | 102067 | Rohde & Schwarz | 2024-10-07 | 1 year |

Test software

| No. | Equipment | Manufacturer | Version |
|-----|-----------|-----------------|----------|
| 1 | JS1120-3 | Tonscend | 3.3 |
| 2 | EMC32 | Rohde & Schwarz | 10.50.40 |

EUT is engineering software provided by the customer to control the transmitting signal.
The EUT was programmed to be in continuously transmitting mode.



7. Laboratory Environment

Shielded room

| | |
|--------------------------|---|
| Temperature | Min. = 15 °C, Max. = 35 °C |
| Relative humidity | Min. = 20 %, Max. = 75 % |
| Shielding effectiveness | 0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB |
| Electrical insulation | > 2M Ω |
| Ground system resistance | < 4 Ω |

Anechoic chamber

| | |
|------------------------------------|---|
| Temperature | Min. = 15 °C, Max. = 35 °C |
| Relative humidity | Min. = 20 %, Max. = 75 % |
| Shielding effectiveness | 0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB |
| Electrical insulation | > 2M Ω |
| Ground system resistance | < 4 Ω |
| Normalised site attenuation (NSA) | < ± 4 dB, 3 m distance, from 30 to 1000 MHz |
| Voltage Standing Wave Ratio (VSWR) | ≤ 6 dB, from 1 to 18 GHz, 3m distance |
| Uniformity of field strength | Between 0 and 6 dB, from 80 to 6000 MHz |



8. Measurement Uncertainty

| Test Name | Uncertainty ($k=2$) | |
|--|-----------------------|--------|
| 1. Maximum Peak Output Power | 1.32dB | |
| 2. Band Edges Compliance | 1.92dB | |
| 3. Transmitter Spurious Emission - Conducted | 30MHz≤f<1GHz | 1.41dB |
| | 1GHz≤f<7GHz | 1.92dB |
| | 7GHz≤f<13GHz | 2.31dB |
| | 13GHz≤f≤26GHz | 2.61dB |
| 4.. Transmitter Spurious Emission - Radiated | 9kHz≤f<30MHz | 1.70dB |
| | 30MHz≤f<1GHz | 4.80dB |
| | 1GHz≤f<18GHz | 4.62dB |
| | 18GHz≤f≤40GHz | 2.36dB |
| 5. 20dB Bandwidth | 4.56kHz | |
| 6. Time of Occupancy (Dwell Time) & Number of Hopping Channels | 0.58ms | |
| 7. Carrier Frequency Separation | 4.56kHz | |
| 8. AC Power line Conducted Emission | 150kHz≤f≤30MHz | 2.68dB |

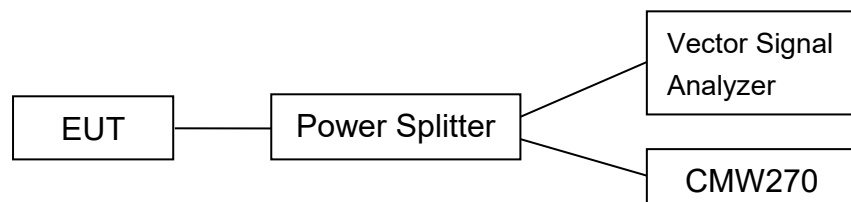
ANNEX A: Detailed Test Results

Test Configuration

The measurement is made according to ANSI C63.10.

1) Conducted Measurements

1. Connect the EUT to the test system correctly.
2. Set the EUT to the required work mode.
3. Set the EUT to the required channel.
4. Set the EUT hopping mode (hopping on or hopping off).
5. Set the spectrum analyzer to start measurement.
6. Record the values.



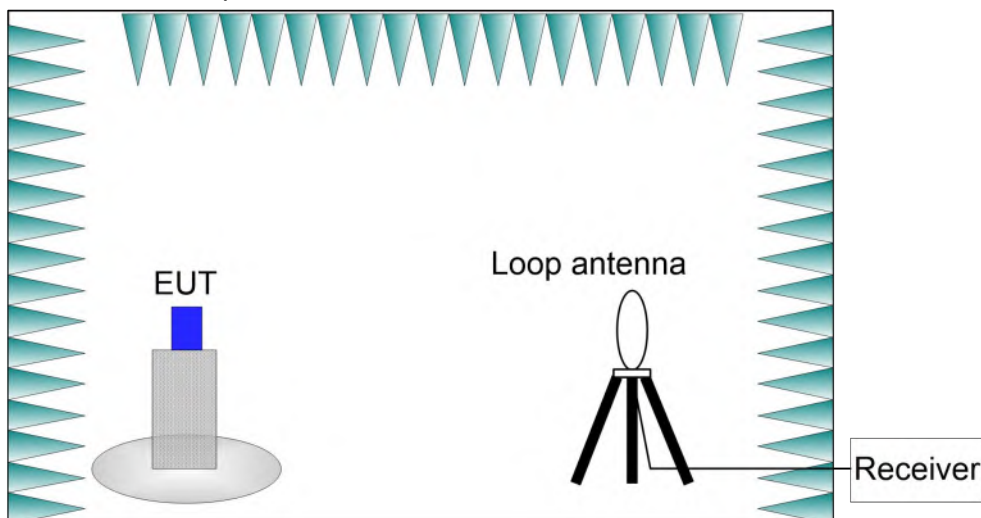
2) Radiated Measurements

Test setup:

9kHz-30MHz:

The EUT are measured in an anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The test setup refers to figure below.

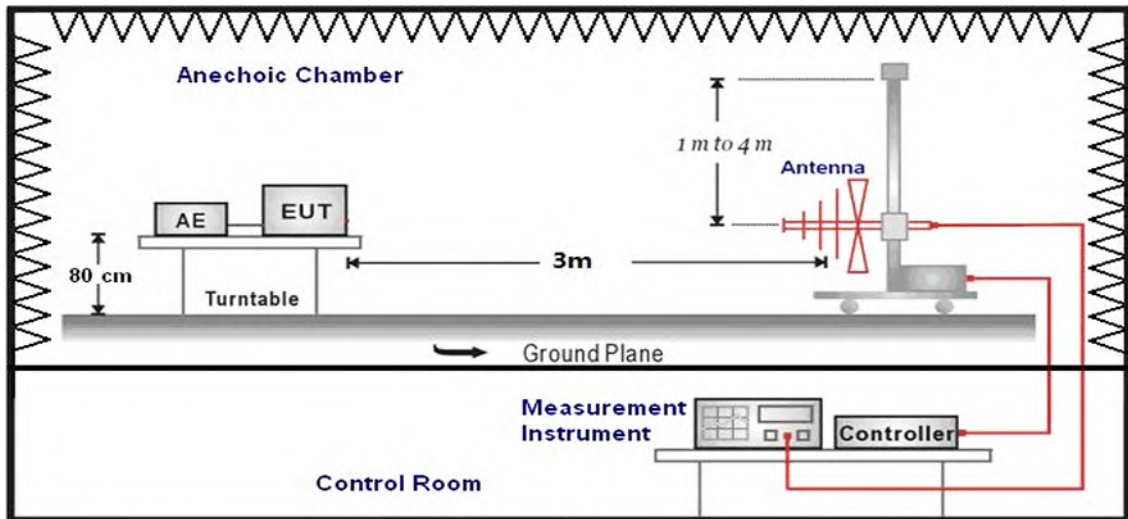
Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.



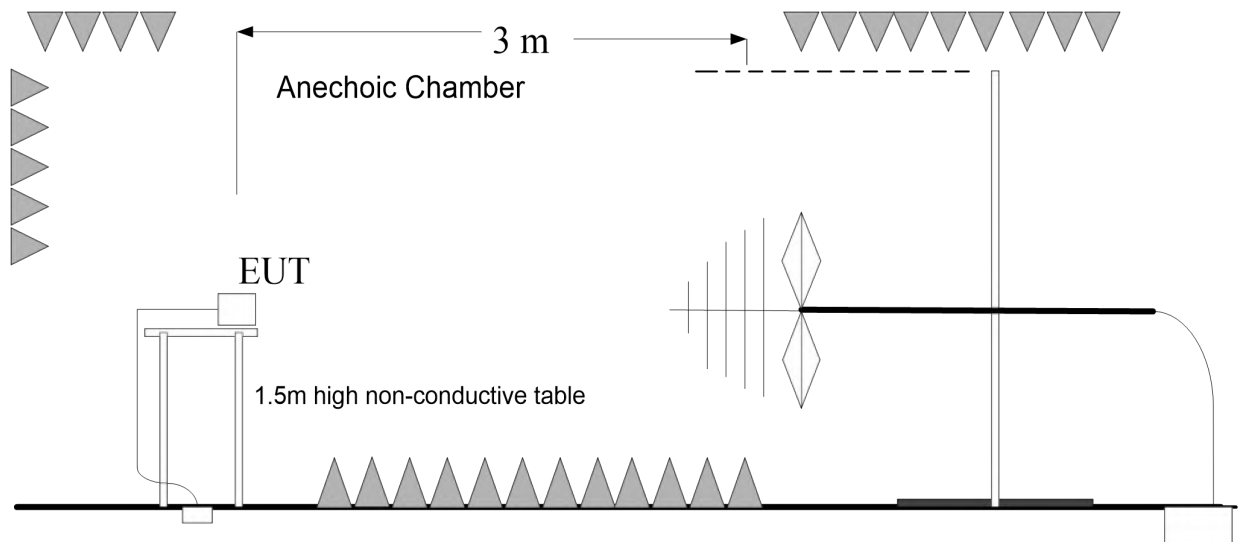
30MHz-26.5GHz:

The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1.0 meter to 4.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.

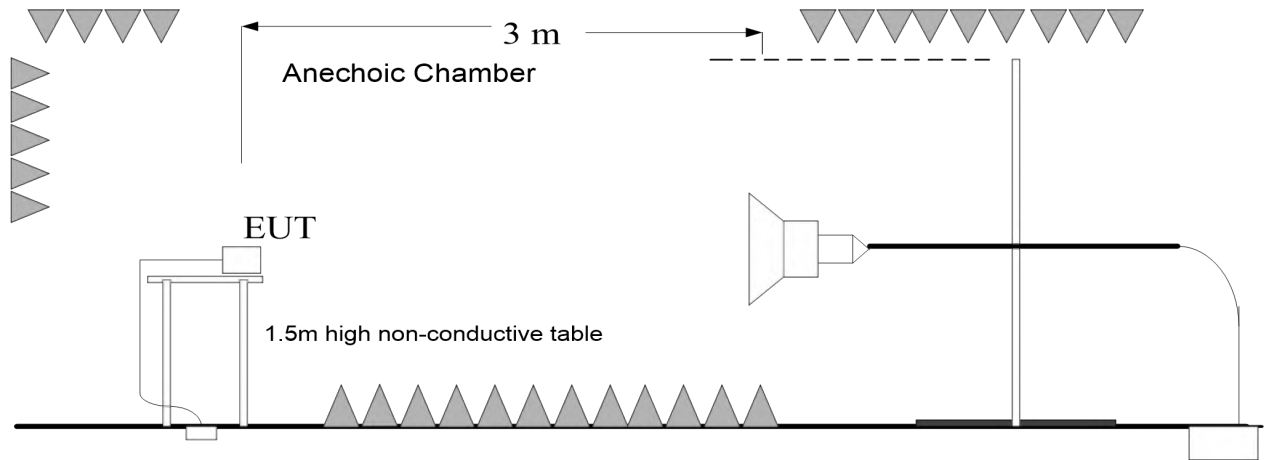
30MHz-1GHz:



1GHz-3GHz:

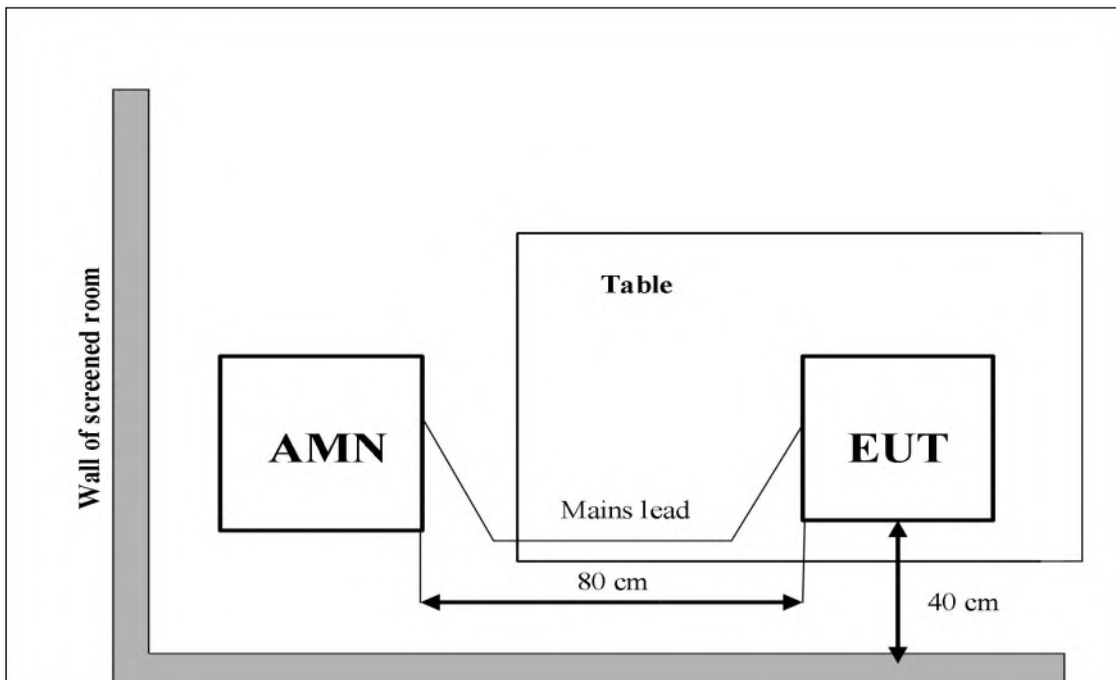


3GHz-26.5GHz:



3) AC Power line Conducted Emission Measurement

The EUT is working as Bluetooth terminal. A communication link of Bluetooth is set up with a System Simulator (SS). The EUT is commanded to operate at maximum transmitting power.





A.0 Antenna requirement

Measurement Limit:

| Standard | Requirement |
|---------------------|--|
| FCC CRF Part 15.203 | An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. 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. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded. |

**Conclusion: The Directional gains of antenna used for transmitting is -0.19dBi.
The RF transmitter uses an integrate antenna without connector.**



A.1 Maximum Peak Output Power

Method of Measurement: See ANSI C63.10-clause 7.8.5.

A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

Measurement Limit:

| Standard | Limit (dBm) |
|------------------------|-------------|
| FCC CRF Part 15.247(b) | < 30 |

Measurement Results:

| Mode | Peak Conducted Output Power (dBm) | | |
|---------------|-----------------------------------|----------------|----------------|
| | 2402MHz (CH0) | 2441MHz (CH39) | 2480MHz (CH78) |
| GFSK | 7.32 | 6.97 | 6.68 |
| $\pi/4$ DQPSK | 7.26 | 6.89 | 6.58 |
| 8DPSK | 7.31 | 6.95 | 6.52 |

Conclusion: Pass



A.2 Band Edges Compliance

Method of Measurement: See ANSI C63.10-clause 7.8.6.

Measurement Limit:

| Standard | Limit (dBc) |
|----------------------------|-------------|
| FCC 47 CFR Part 15.247 (d) | > 20 |

Measurement Result:

| Mode | Frequency (MHz) | Hopping | Test Results (dBc) | | Conclusion |
|---------------|-----------------|---------|--------------------|-------|------------|
| GFSK | 2402(CH0) | OFF | Fig.1 | 51.23 | P |
| | 2480(CH78) | OFF | Fig.2 | 51.17 | P |
| | 2402(CH0) | ON | Fig.3 | 50.86 | P |
| | 2480(CH78) | ON | Fig.4 | 51.46 | P |
| $\pi/4$ DQPSK | 2402(CH0) | OFF | Fig.5 | 51.01 | P |
| | 2480(CH78) | OFF | Fig.6 | 48.28 | P |
| | 2402(CH0) | ON | Fig.7 | 47.79 | P |
| | 2480(CH78) | ON | Fig.8 | 51.06 | P |
| 8DPSK | 2402(CH0) | OFF | Fig.9 | 51.44 | P |
| | 2480(CH78) | OFF | Fig.10 | 49.61 | P |
| | 2402(CH0) | ON | Fig.11 | 51.70 | P |
| | 2480(CH78) | ON | Fig.12 | 51.82 | P |

See below for test graphs.

Conclusion: Pass

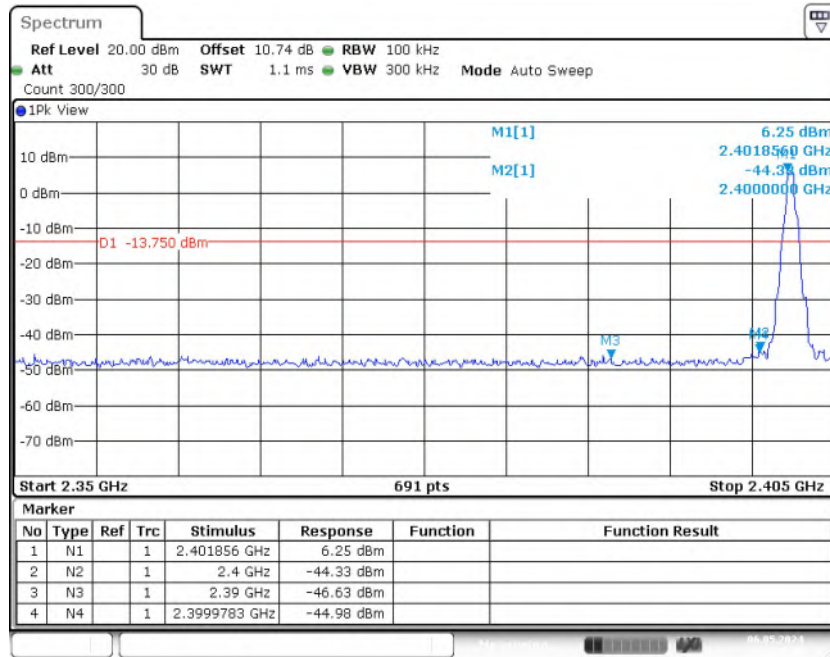


Fig. 1 Band Edges (GFSK, CH0, Hopping OFF)

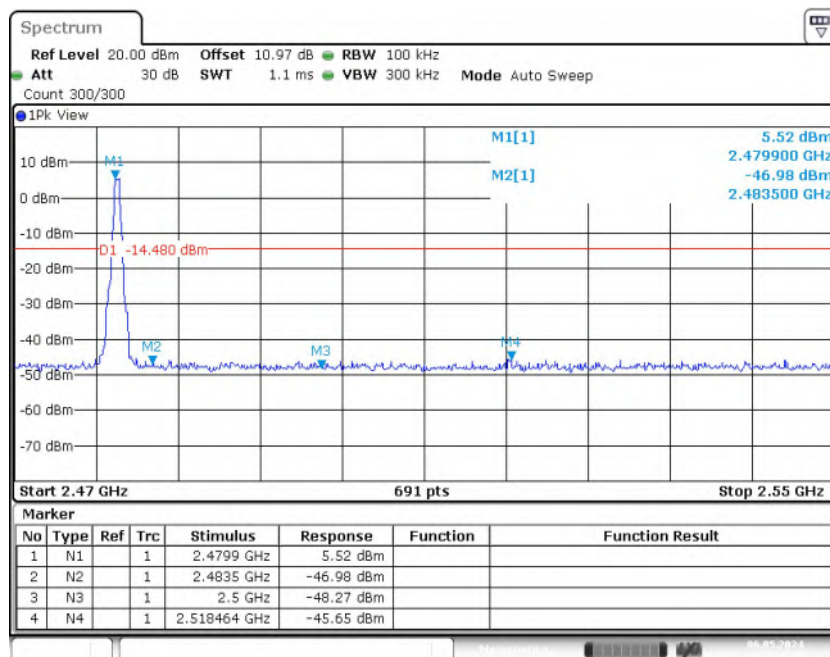


Fig. 2 Band Edges (GFSK, CH78, Hopping OFF)

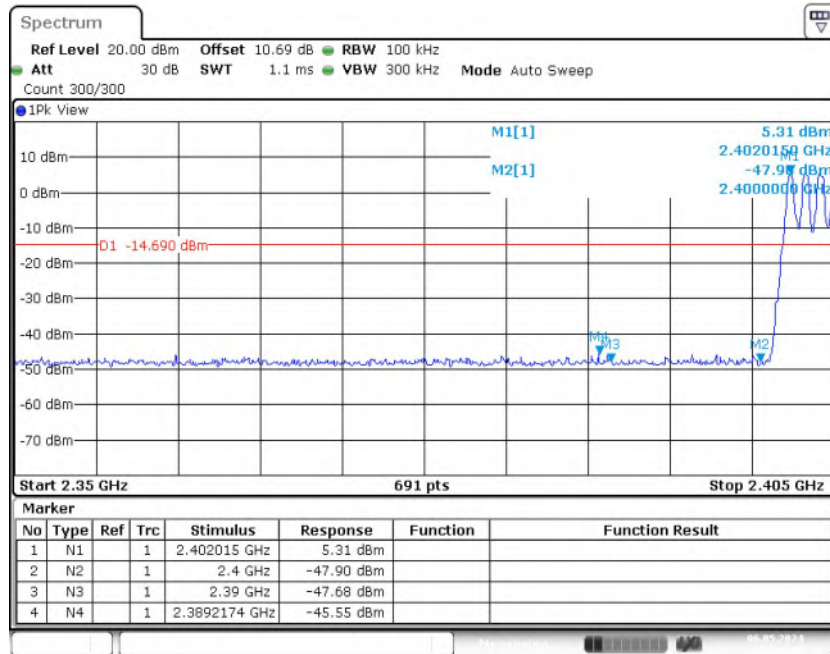


Fig. 3 Band Edges (GFSK, CH0, Hopping ON)

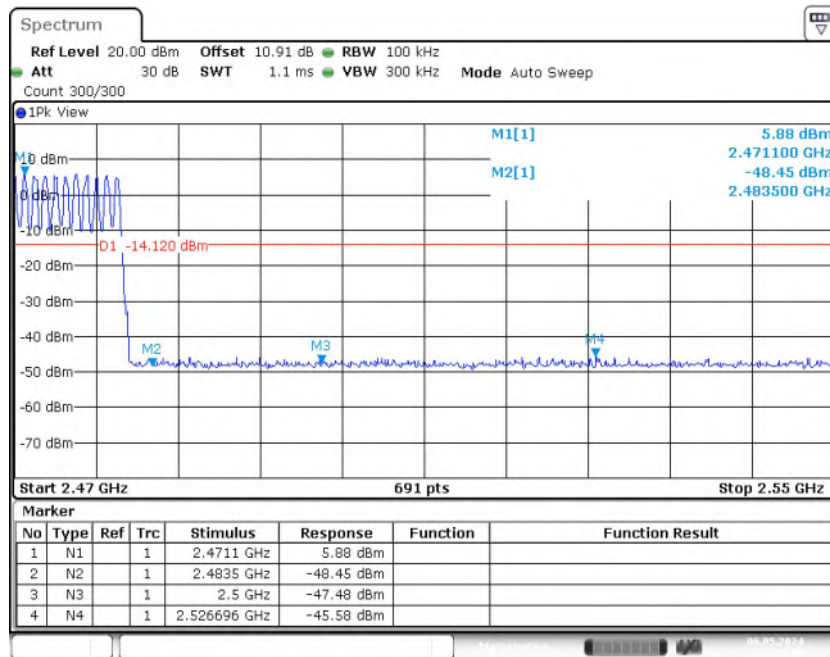


Fig. 4 Band Edges (GFSK, CH78, Hopping ON)

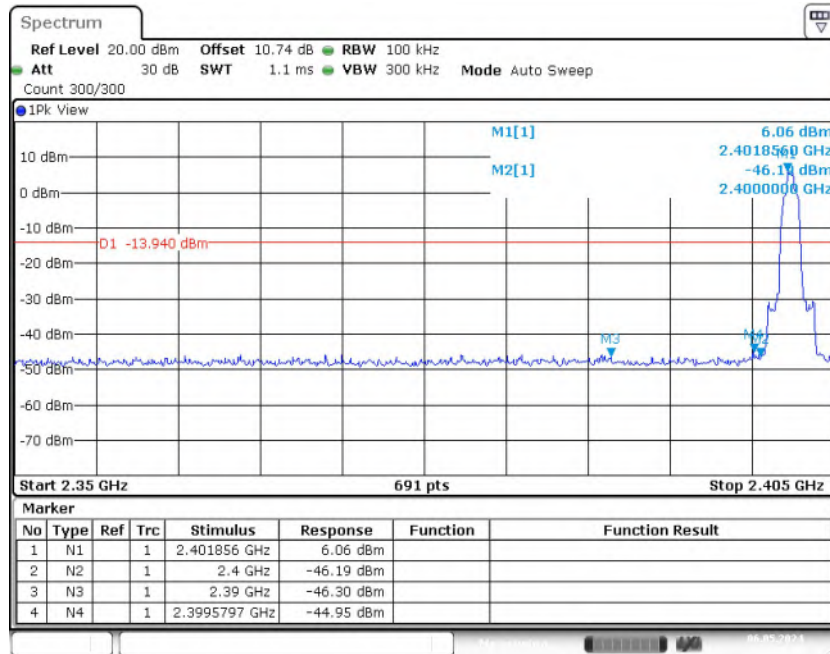


Fig. 5 Band Edges ($\pi/4$ DQPSK, CH0, Hopping OFF)

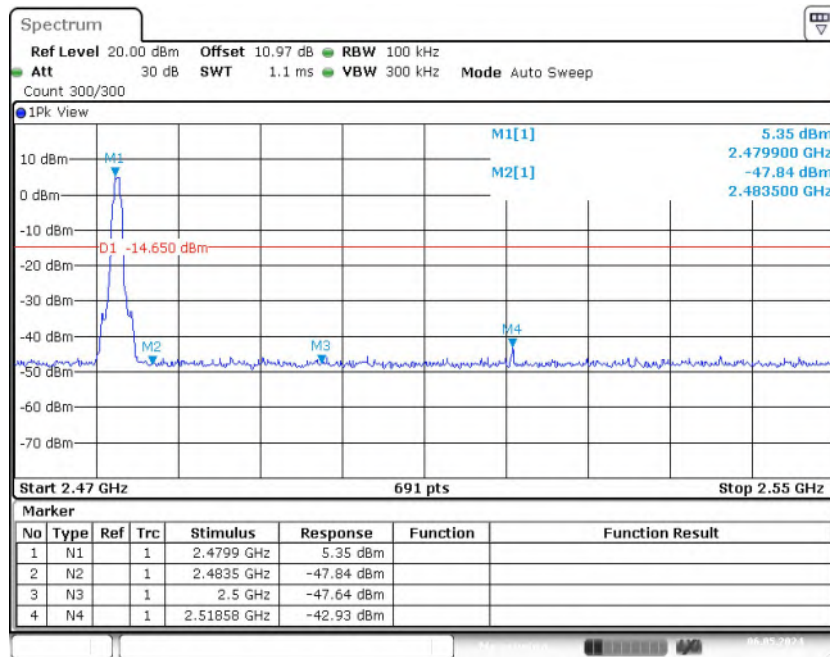


Fig. 6 Band Edges ($\pi/4$ DQPSK, CH78, Hopping OFF)

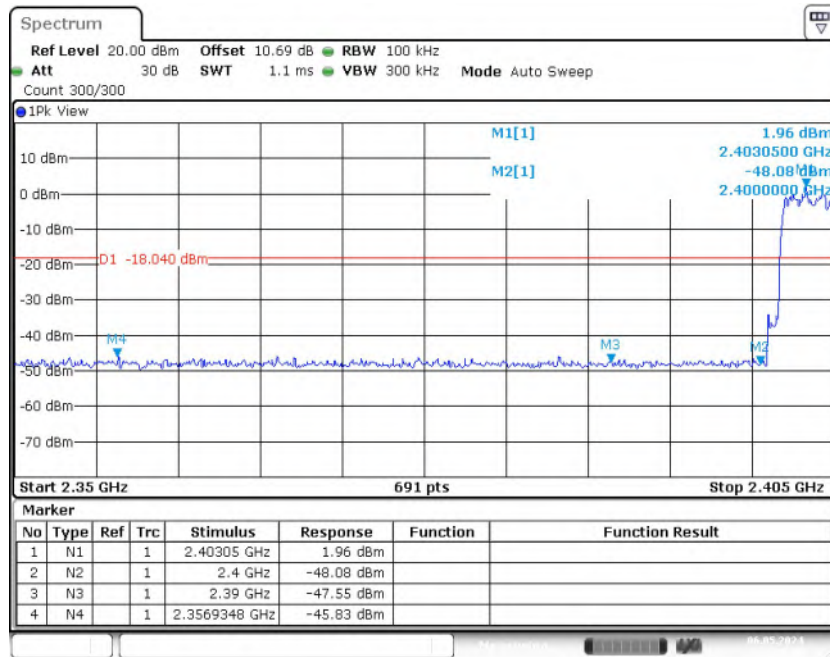


Fig. 7 Band Edges ($\pi/4$ DQPSK, CH0, Hopping ON)

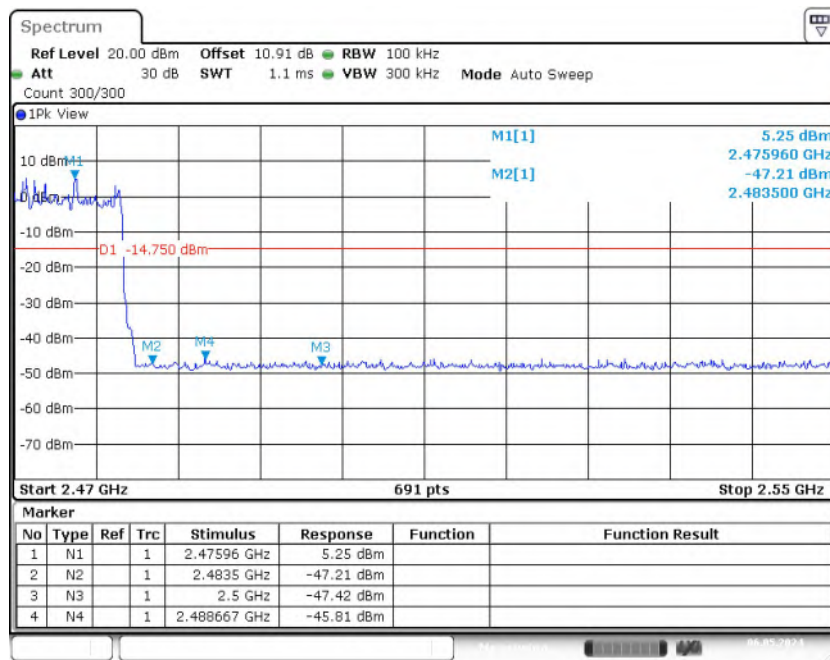


Fig. 8 Band Edges ($\pi/4$ DQPSK, CH78, Hopping ON)

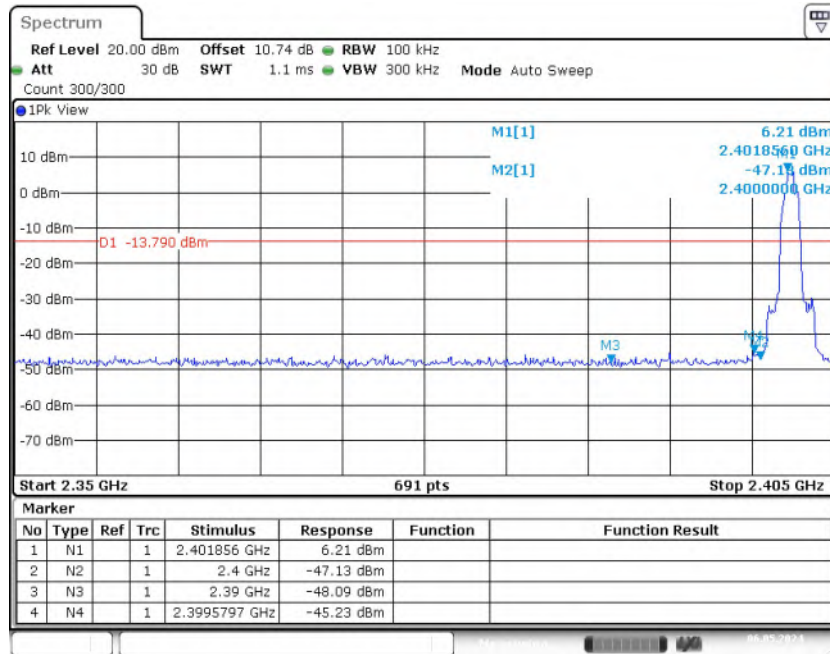


Fig. 9 Band Edges (8DPSK, CH0, Hopping OFF)

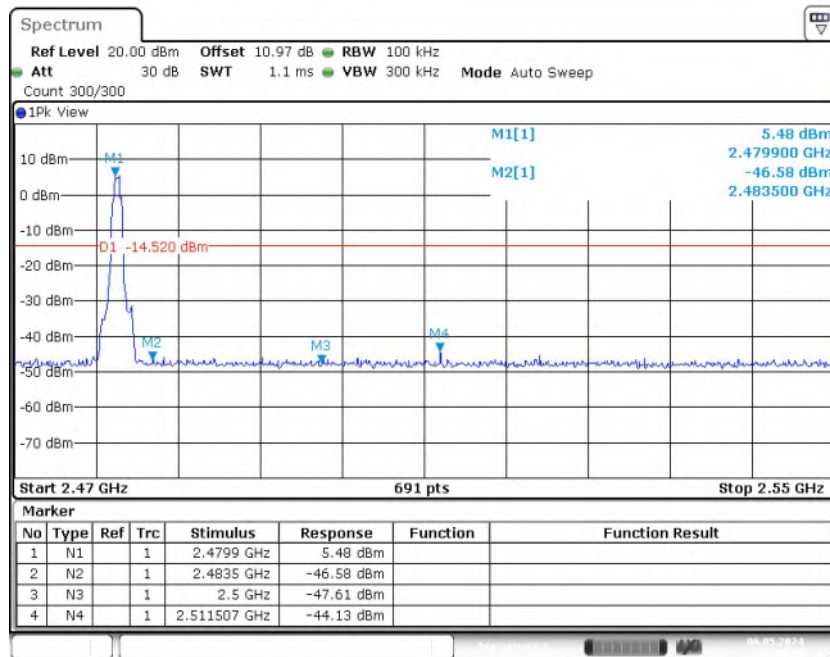


Fig. 10 Band Edges (8DPSK, CH78, Hopping OFF)

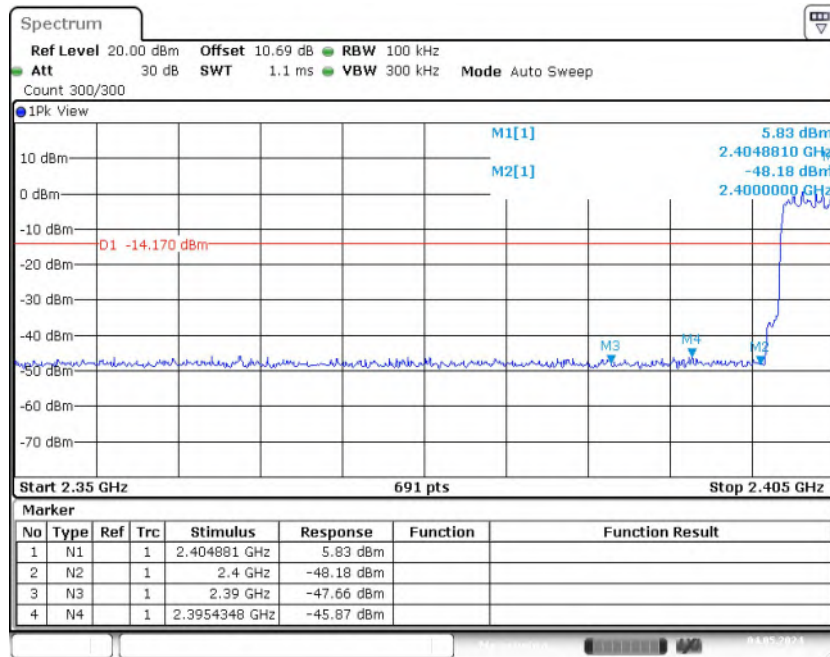


Fig. 11 Band Edges (8DPSK, CH0, Hopping ON)

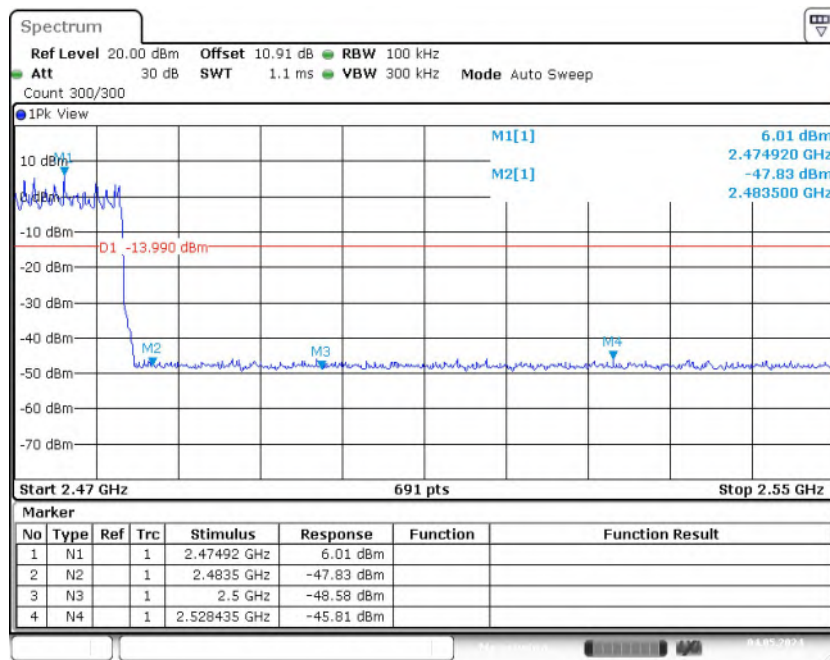


Fig. 12 Band Edges (8DPSK, CH78, Hopping ON)



A.3 Conducted Emission

Method of Measurement: See ANSI C63.10-clause 7.8.8.

Measurement Limit:

| Standard | Limit (dBm) |
|----------------------------|---|
| FCC 47 CFR Part 15.247 (d) | 20dBm below peak output power in 100kHz bandwidth |

Measurement Results:

| Mode | Frequency (MHz) | Frequency Range | Test Results | Conclusion |
|------------------|-----------------|-----------------|--------------|------------|
| GFSK | 2402(CH0) | 1GHz-26.5GHz | Fig.13 | P |
| | 2441(CH39) | 1GHz-26.5GHz | Fig.14 | P |
| | 2480(CH78) | 1GHz-26.5GHz | Fig.15 | P |
| $\pi/4$ DQPSK | 2402(CH0) | 1GHz-26.5GHz | Fig.16 | P |
| | 2441(CH39) | 1GHz-26.5GHz | Fig.17 | P |
| | 2480(CH78) | 1GHz-26.5GHz | Fig.18 | P |
| 8DPSK | 2402(CH0) | 1GHz-26.5GHz | Fig.19 | P |
| | 2441(CH39) | 1GHz-26.5GHz | Fig.20 | P |
| | 2480(CH78) | 1GHz-26.5GHz | Fig.21 | P |
| / | All channels | 30MHz -1GHz | Fig.22 | P |

See below for test graphs.

Conclusion: Pass

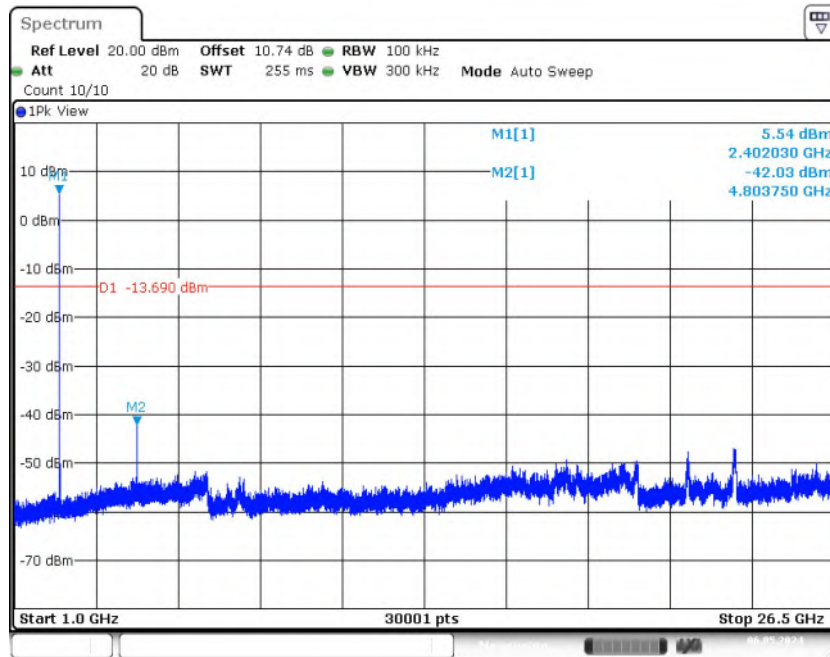


Fig. 13 Conducted Spurious Emission (GFSK, CH0, 1GHz-26.5GHz)

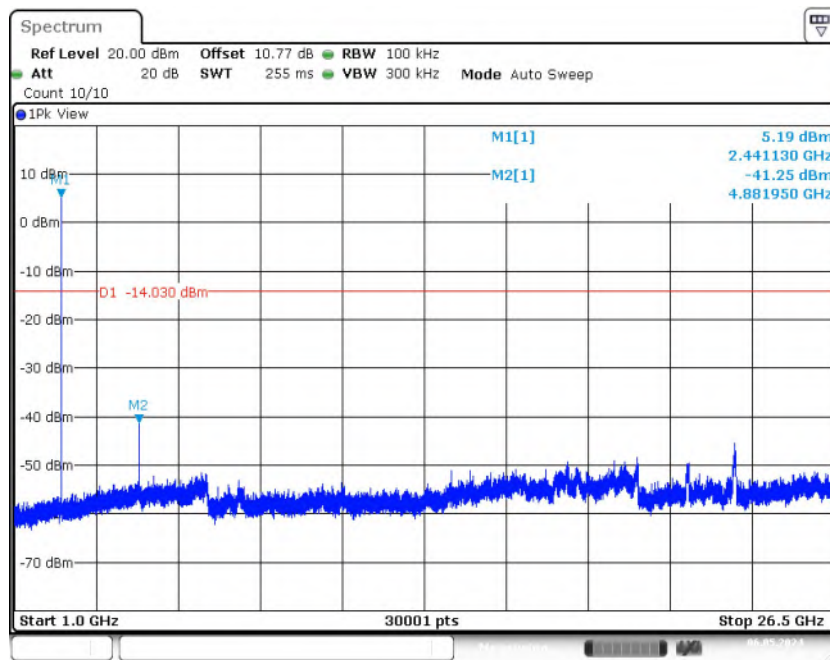


Fig. 14 Conducted Spurious Emission (GFSK, CH39, 1GHz-26.5GHz)

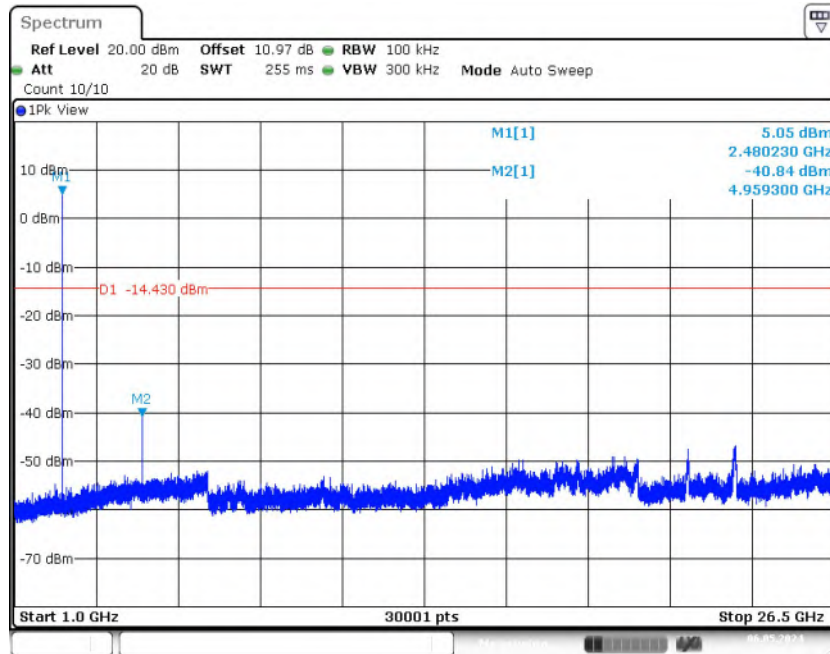


Fig. 15 Conducted Spurious Emission (GFSK, CH78, 1GHz-26.5GHz)

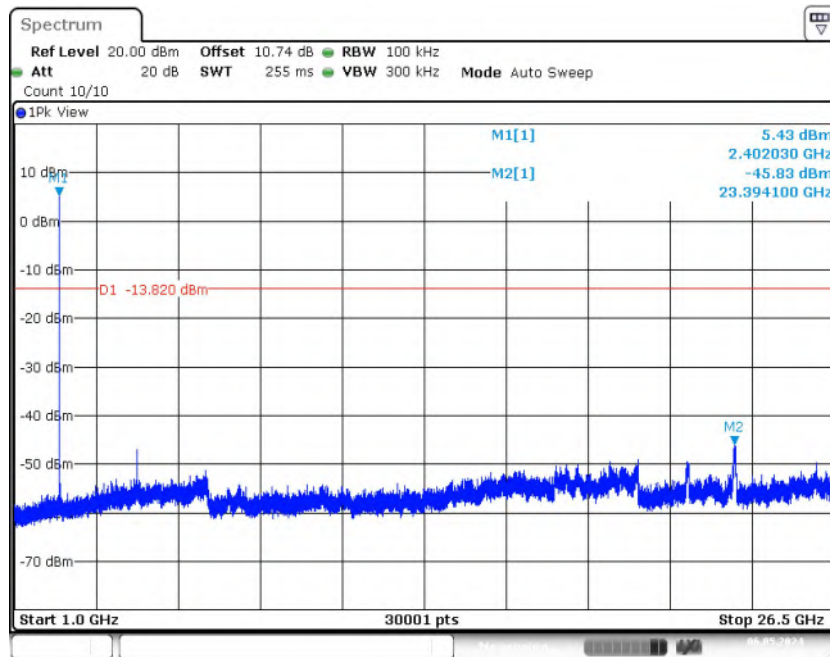


Fig. 16 Conducted Spurious Emission ($\pi/4$ DQPSK, CH0, 1GHz-26.5GHz)

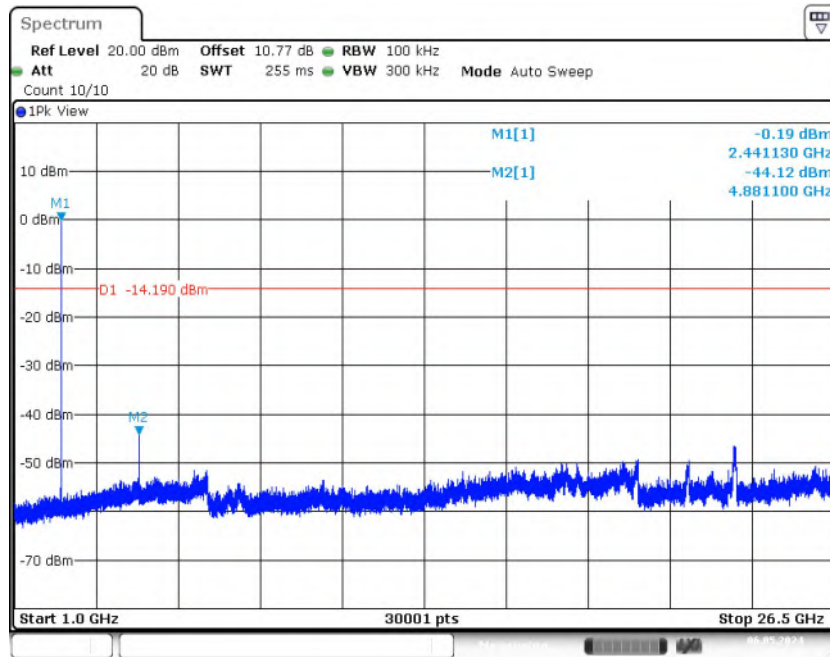


Fig. 17 Conducted Spurious Emission ($\pi/4$ DQPSK, CH39, 1GHz-26.5GHz)

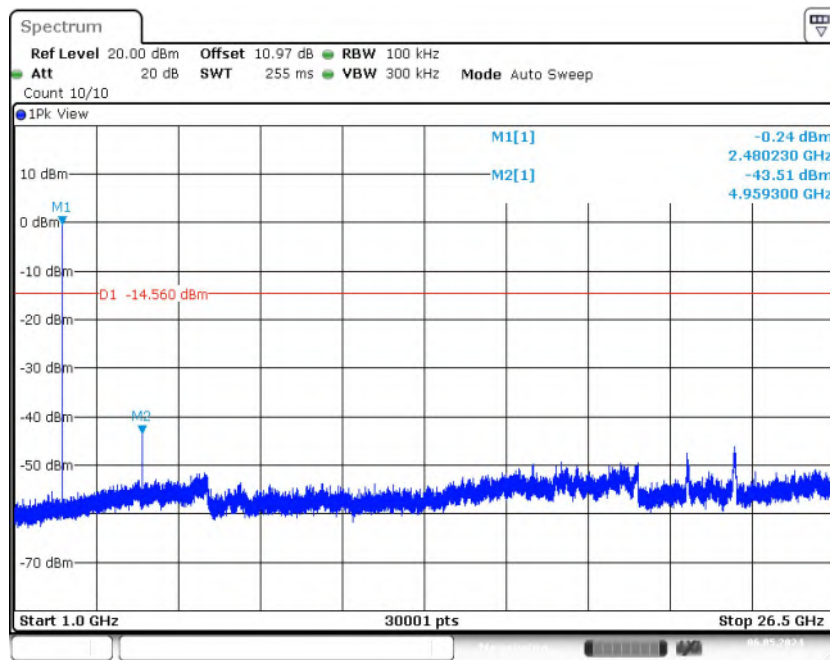


Fig. 18 Conducted Spurious Emission ($\pi/4$ DQPSK, CH78, 1GHz-26.5GHz)

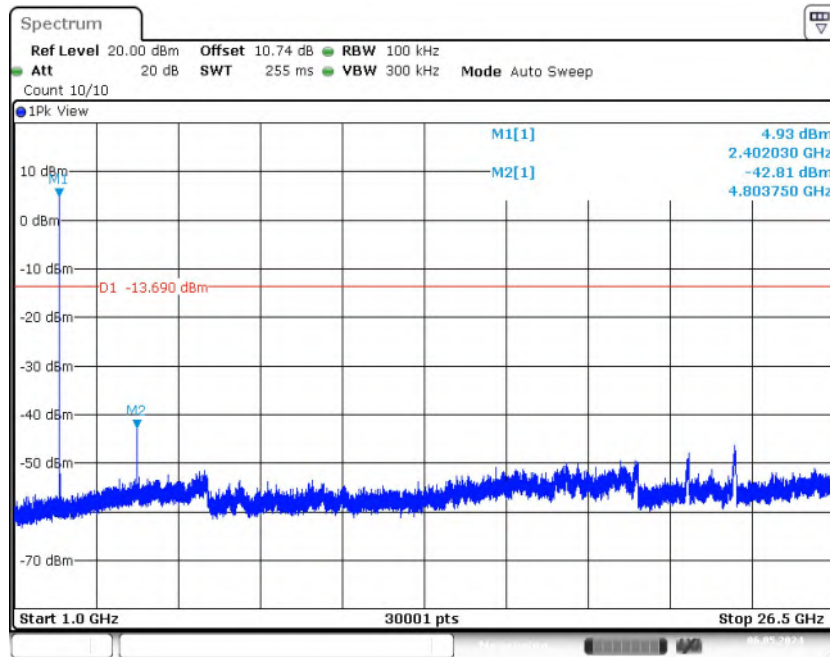


Fig. 19 Conducted Spurious Emission (8DPSK, CH0, 1GHz-26.5GHz)

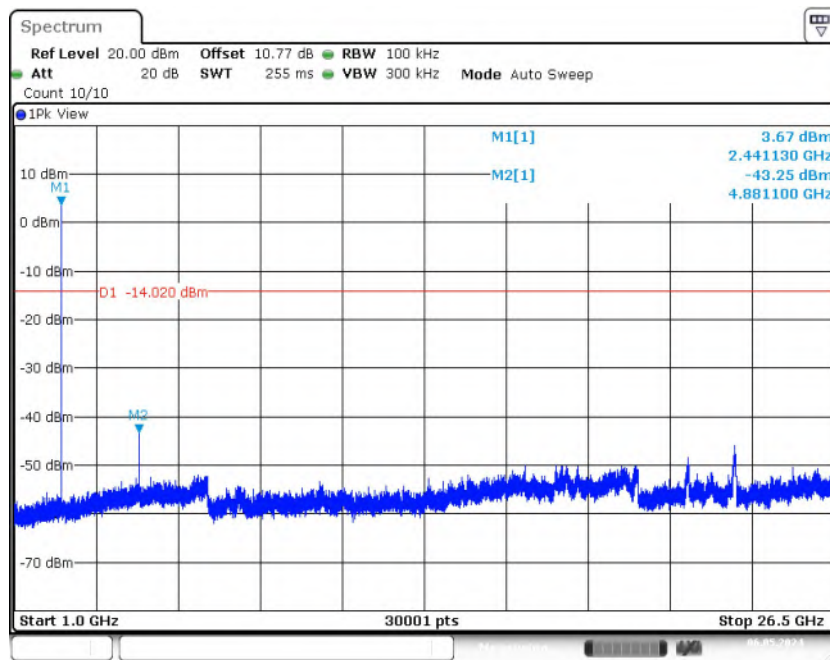


Fig. 20 Conducted Spurious Emission (8DPSK, CH39, 1GHz-26.5GHz)

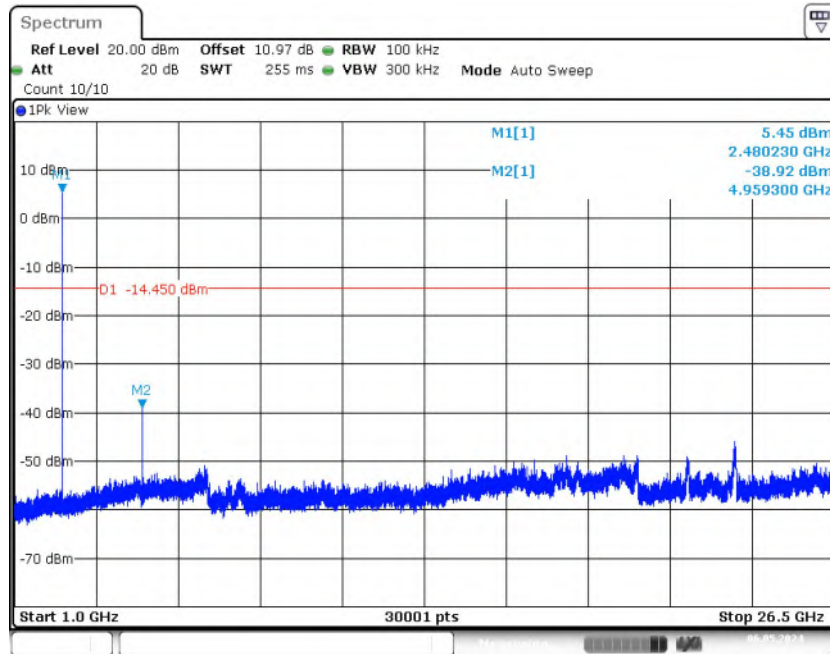


Fig. 21 Conducted Spurious Emission (8DPSK, CH78, 1GHz-26.5GHz)

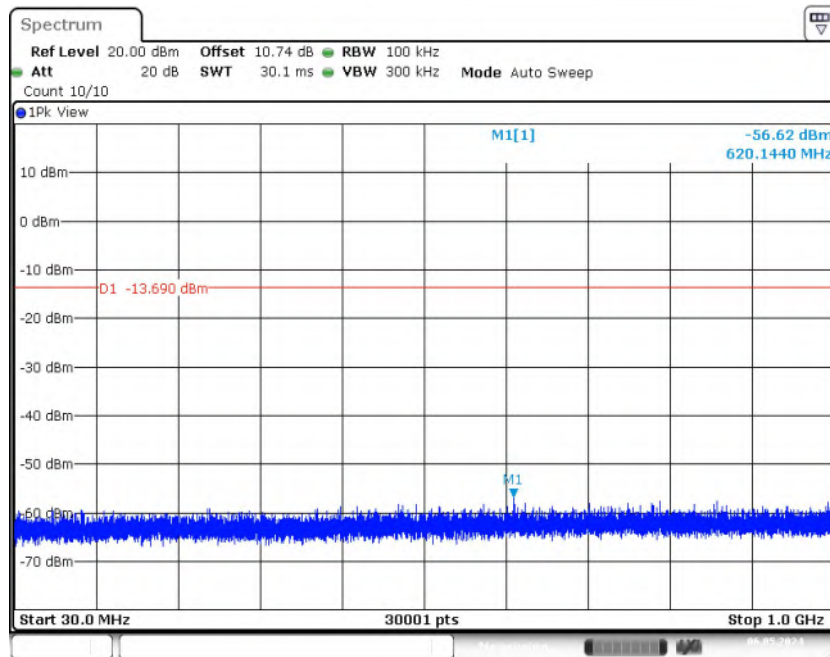


Fig. 22 Conducted Spurious Emission (All Channels, 30MHz -1GHz)



A.4 Radiated Emission

Method of Measurement: See ANSI C63.10-clause 6.3&6.4&6.5&6.6.

Measurement Limit:

| Standard | Limit (dBm) |
|--|-------------------------------|
| FCC 47 CFR Part 15.247, 15.205, 15.209 | 20dBm below peak output power |

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)).

Limit in restricted band:

| Frequency of emission (MHz) | Field strength(μ V/m) | 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 |

Test Condition:

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

| Frequency of emission (MHz) | RBW/VBW | Sweep Time(s) |
|-----------------------------|---------------|---------------|
| 30-1000 | 120kHz/300kHz | 5 |
| 1000-4000 | 1MHz/3MHz | 15 |
| 4000-18000 | 1MHz/3MHz | 40 |
| 18000-26500 | 1MHz/3MHz | 20 |

Note: According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic. The measurement results include the horizontal polarization and vertical polarization measurements. For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.



Measurement Results:

| Mode | Frequency (MHz) | Frequency Range | Test Results | Conclusion |
|--------------|------------------------|---------------------|--------------|------------|
| GFSK | 2402(CH0) | 1 GHz ~18 GHz | Fig.23 | P |
| | 2441(CH39) | 1 GHz ~18 GHz | Fig.24 | P |
| | 2480(CH78) | 1 GHz ~18 GHz | Fig.25 | P |
| | Restricted Band(CH0) | 2.38 GHz ~ 2.45 GHz | Fig.26 | P |
| | Restricted Band (CH78) | 2.45 GHz ~ 2.5 GHz | Fig.27 | P |
| π/4 DQPSK | 2402(CH0) | 1 GHz ~18 GHz | Fig.28 | P |
| | 2441(CH39) | 1 GHz ~18 GHz | Fig.29 | P |
| | 2480(CH78) | 1 GHz ~18 GHz | Fig.30 | P |
| | Restricted Band (CH0) | 2.38 GHz ~ 2.45 GHz | Fig.31 | P |
| | Restricted Band (CH78) | 2.45 GHz ~ 2.5 GHz | Fig.32 | P |
| 8DPSK | 2402(CH0) | 1 GHz ~18 GHz | Fig.33 | P |
| | 2441(CH39) | 1 GHz ~18 GHz | Fig.34 | P |
| | 2480(CH78) | 1 GHz ~18 GHz | Fig.35 | P |
| | Restricted Band (CH0) | 2.38 GHz ~ 2.45 GHz | Fig.36 | P |
| | Restricted Band (CH78) | 2.45 GHz ~ 2.5 GHz | Fig.37 | P |
| / | All channels | 9 kHz ~30 MHz | Fig.38 | P |
| | | 30 MHz ~1 GHz | Fig.39 | P |
| | | 18 GHz ~26.5 GHz | Fig.40 | P |

Worst Case Result

GFSK CH0 (1-18GHz)

| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-----|--------------|
| 4804.200000 | 51.27 | 74.00 | 22.73 | V | 5.2 |
| 9608.142857 | 49.85 | 74.00 | 24.15 | V | 8.7 |
| 13950.857143 | 49.65 | 74.00 | 24.35 | H | 13.0 |
| 14997.857143 | 51.76 | 74.00 | 22.24 | V | 14.4 |
| 16669.714286 | 54.54 | 74.00 | 19.46 | H | 19.0 |
| 17685.857143 | 55.54 | 74.00 | 18.46 | V | 20.6 |

| Frequency (MHz) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-----|--------------|
| 4804.200000 | 40.82 | 54.00 | 13.18 | V | 5.2 |
| 9608.142857 | 43.47 | 54.00 | 10.53 | V | 8.7 |
| 13950.857143 | 39.61 | 54.00 | 14.39 | H | 13.0 |
| 14997.857143 | 39.19 | 54.00 | 14.81 | V | 14.4 |
| 16669.714286 | 42.31 | 54.00 | 11.69 | H | 19.0 |
| 17685.857143 | 42.91 | 54.00 | 11.09 | V | 20.6 |



π/4 DQPSK CH0 (1-18GHz)

| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-----|--------------|
| 4803.900000 | 51.30 | 74.00 | 22.70 | V | 5.2 |
| 9608.142857 | 49.65 | 74.00 | 24.35 | V | 8.7 |
| 13370.142857 | 49.41 | 74.00 | 24.59 | H | 12.9 |
| 14938.714286 | 50.88 | 74.00 | 23.12 | H | 15.0 |
| 16627.285714 | 53.93 | 74.00 | 20.07 | V | 18.9 |
| 17668.285714 | 55.13 | 74.00 | 18.87 | V | 20.6 |

| Frequency (MHz) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-----|--------------|
| 4803.900000 | 41.33 | 54.00 | 12.67 | V | 5.2 |
| 9608.142857 | 41.88 | 54.00 | 12.12 | V | 8.7 |
| 13370.142857 | 37.52 | 54.00 | 16.48 | H | 12.9 |
| 14938.714286 | 38.71 | 54.00 | 15.29 | H | 15.0 |
| 16627.285714 | 41.73 | 54.00 | 12.27 | V | 18.9 |
| 17668.285714 | 42.89 | 54.00 | 11.11 | V | 20.6 |

8DPSK CH0 (1-18GHz)

| Frequency (MHz) | MaxPeak (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-----|--------------|
| 4803.900000 | 50.92 | 74.00 | 23.08 | V | 5.2 |
| 9608.571429 | 47.15 | 74.00 | 24.85 | V | 8.7 |
| 11998.285714 | 48.53 | 74.00 | 26.47 | H | 11.7 |
| 14190.428572 | 50.18 | 74.00 | 23.82 | H | 13.3 |
| 16693.714286 | 55.06 | 74.00 | 18.94 | V | 19.0 |
| 17696.142857 | 55.52 | 74.00 | 18.48 | V | 20.6 |

| Frequency (MHz) | Average (dBμV/m) | Limit (dBμV/m) | Margin (dB) | Pol | Corr. (dB/m) |
|-----------------|------------------|----------------|-------------|-----|--------------|
| 4803.900000 | 41.78 | 54.00 | 12.22 | V | 5.2 |
| 9608.571429 | 40.58 | 54.00 | 13.42 | V | 8.7 |
| 11998.285714 | 37.96 | 54.00 | 16.04 | H | 11.7 |
| 14190.428572 | 39.90 | 54.00 | 14.10 | H | 13.3 |
| 16693.714286 | 44.38 | 54.00 | 9.62 | V | 19.0 |
| 17696.142857 | 44.05 | 54.00 | 9.95 | V | 20.6 |

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and Antenna Factor, the gain of the preamplifier, the cable loss. P_{Mea} is the field strength recorded from the instrument. The measurement results are obtained as described below:

Result= P_{Mea} +Cable Loss +Antenna Factor-Gain of the preamplifier.

See below for test graphs.

Conclusion: Pass

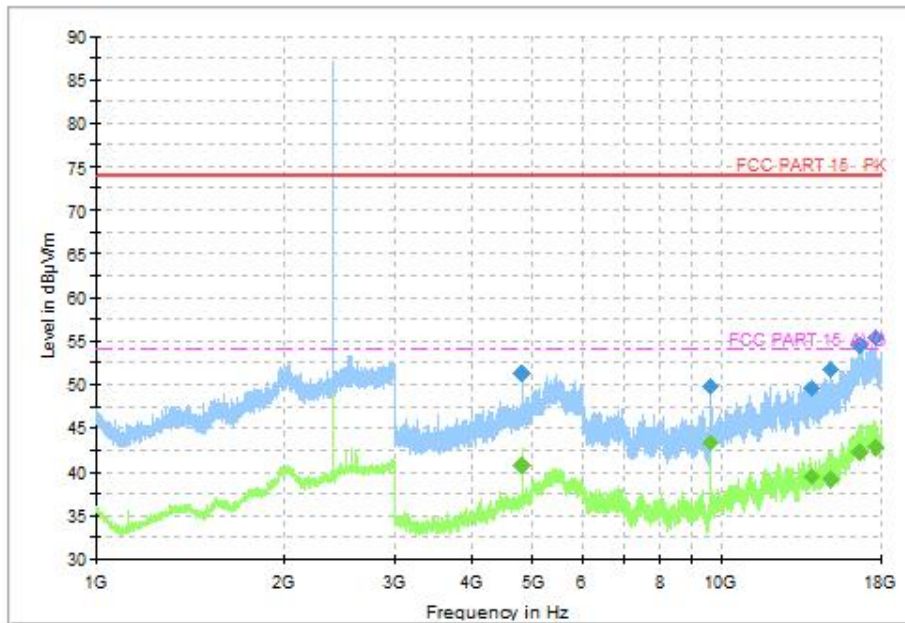


Fig. 23 Radiated Spurious Emission (GFSK, CH0, 1GHz ~18GHz)

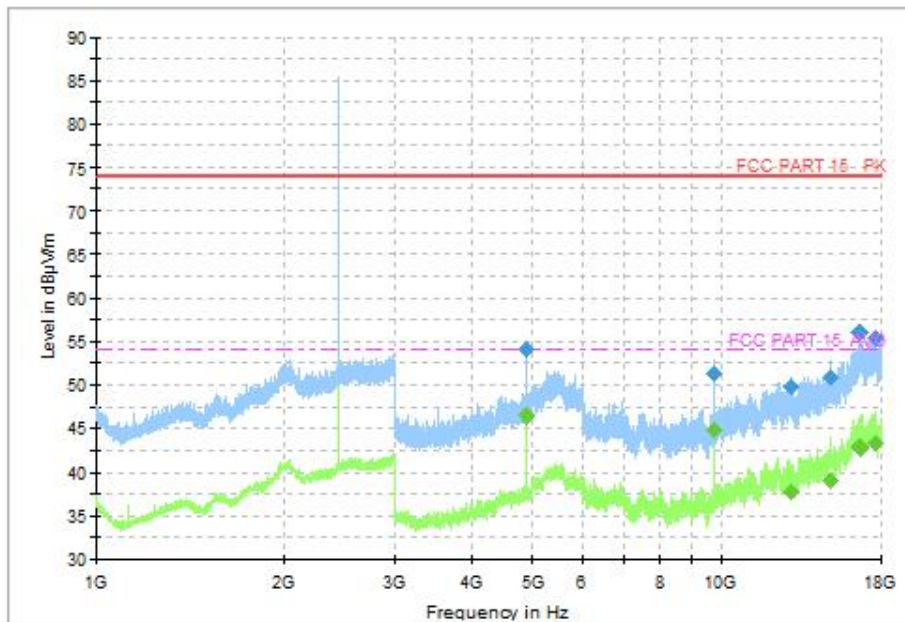


Fig. 24 Radiated Spurious Emission (GFSK, CH39, 1GHz ~18GHz)

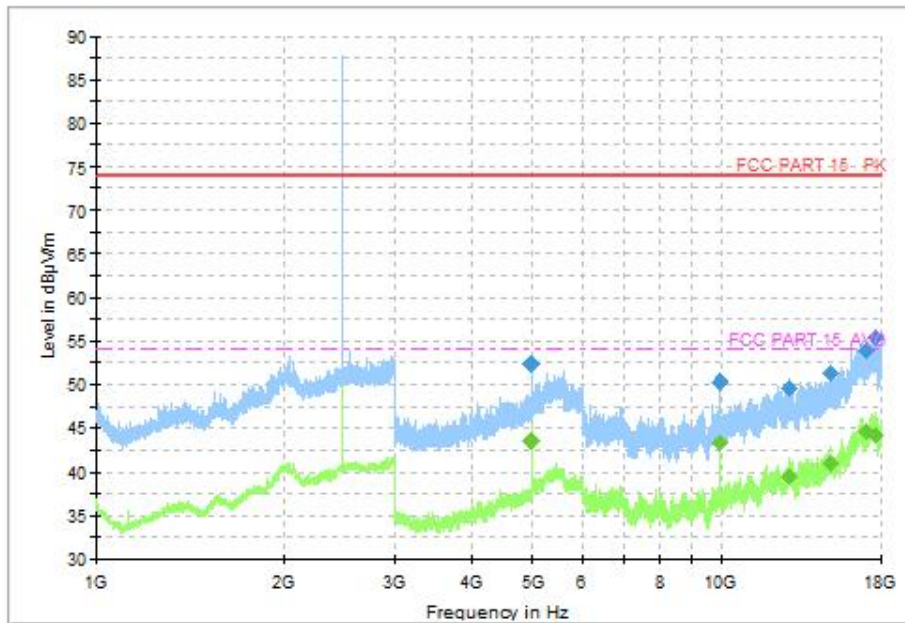


Fig. 25 Radiated Spurious Emission (GFSK, CH78, 1GHz ~18GHz)

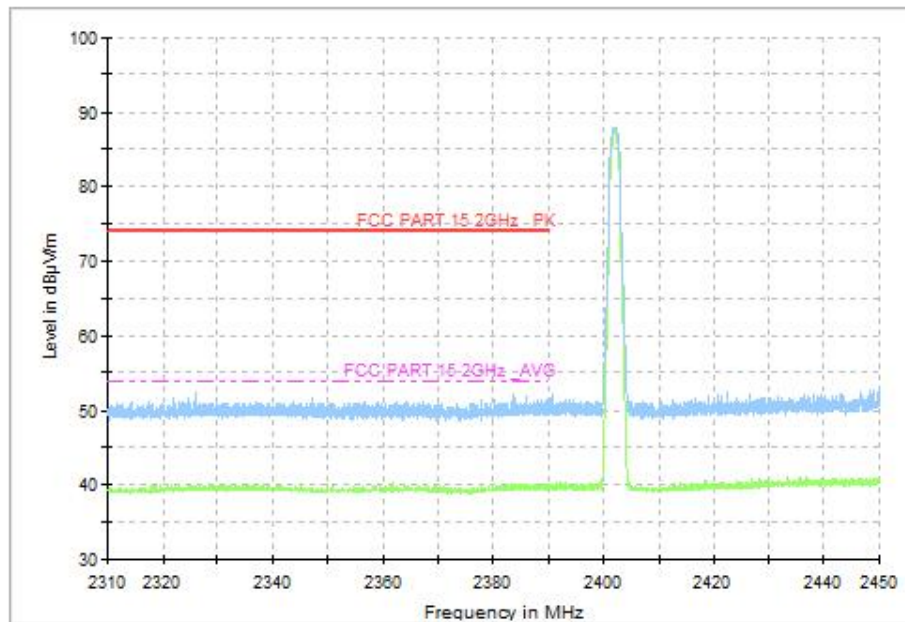


Fig. 26 Radiated Band Edges (GFSK, CH0, 2.38GHz~2.45GHz)

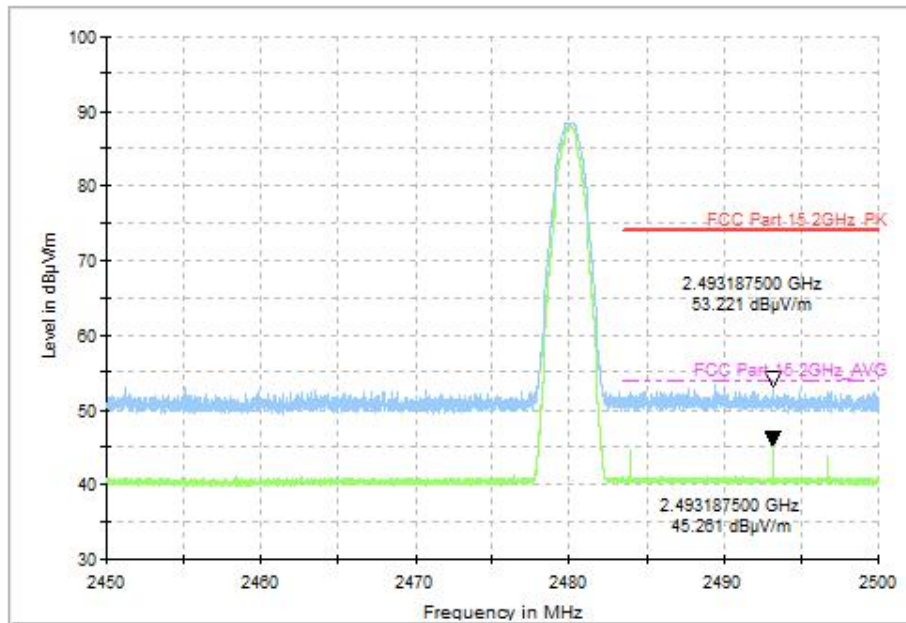


Fig. 27 Radiated Band Edges (GFSK, CH78, 2.45GHz~2.50GHz)

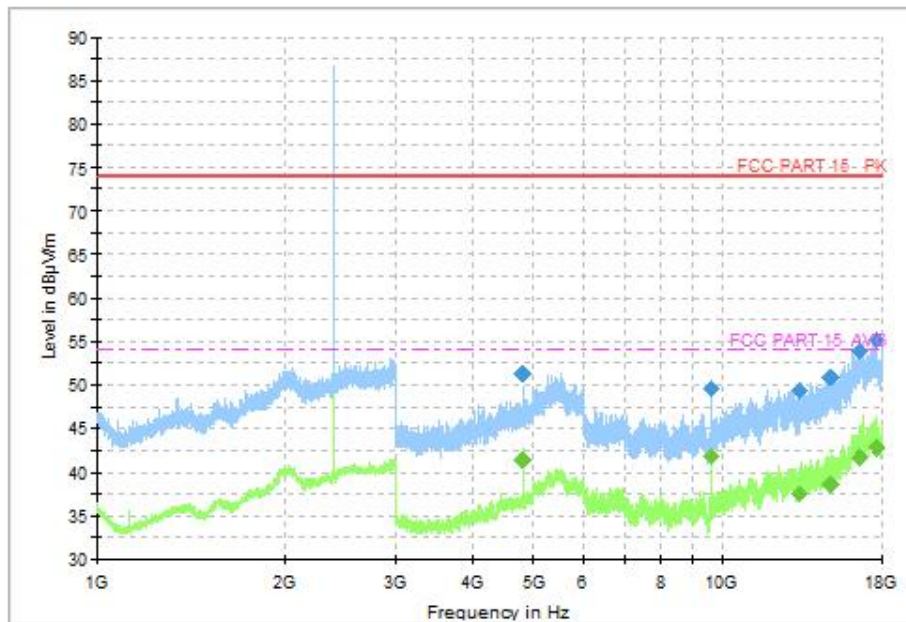


Fig. 28 Radiated Spurious Emission ($\pi/4$ DQPSK, CH0, 1GHz ~18GHz)

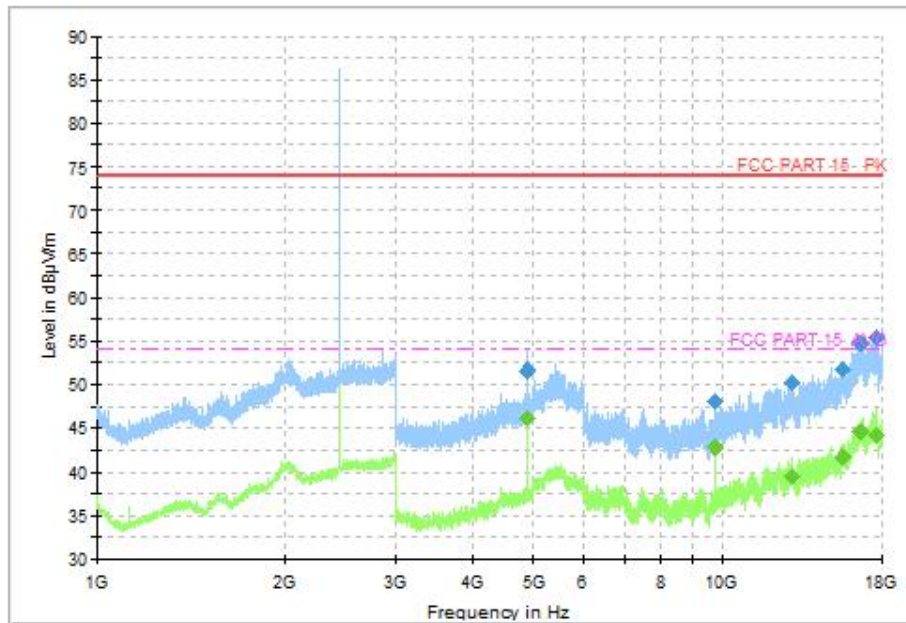


Fig. 29 Radiated Spurious Emission ($\pi/4$ DQPSK, CH39, 1GHz ~18GHz)

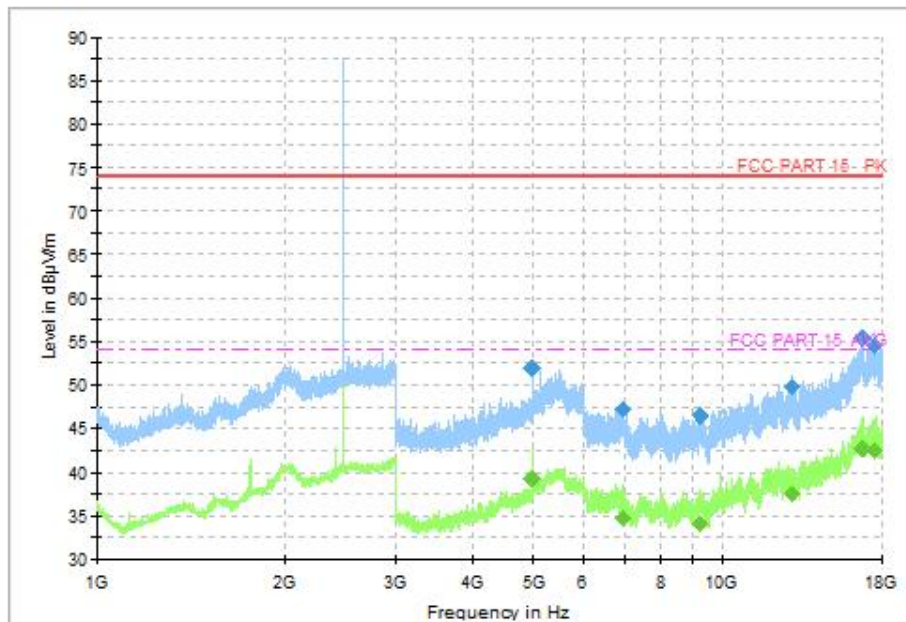


Fig. 30 Radiated Spurious Emission ($\pi/4$ DQPSK, CH78, 1GHz ~18GHz)

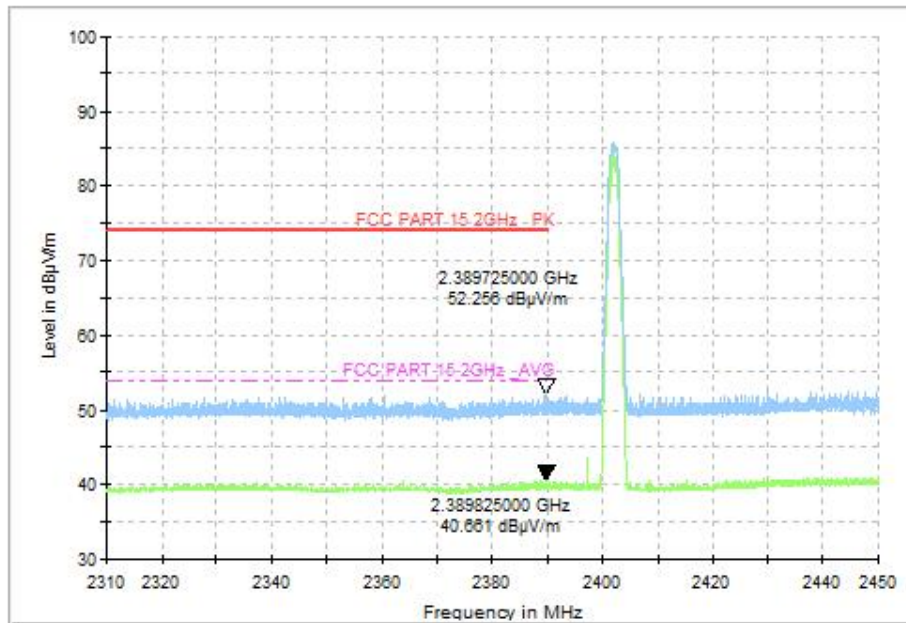


Fig. 31 Radiated Band Edges ($\pi/4$ DQPSK, CH0, 2.38GHz~2.45GHz)

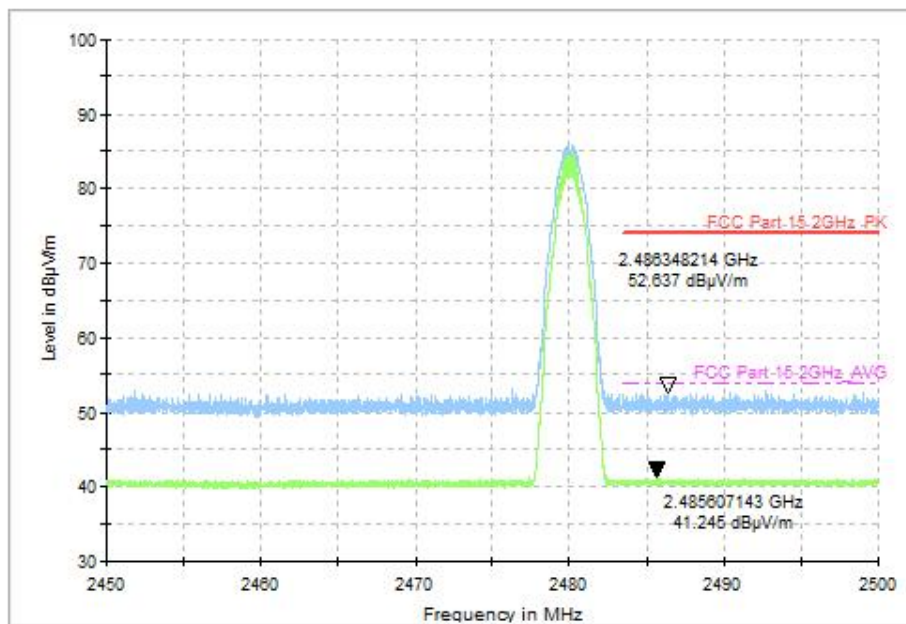


Fig. 32 Radiated Band Edges ($\pi/4$ DQPSK, CH78, 2.45GHz~2.50GHz)

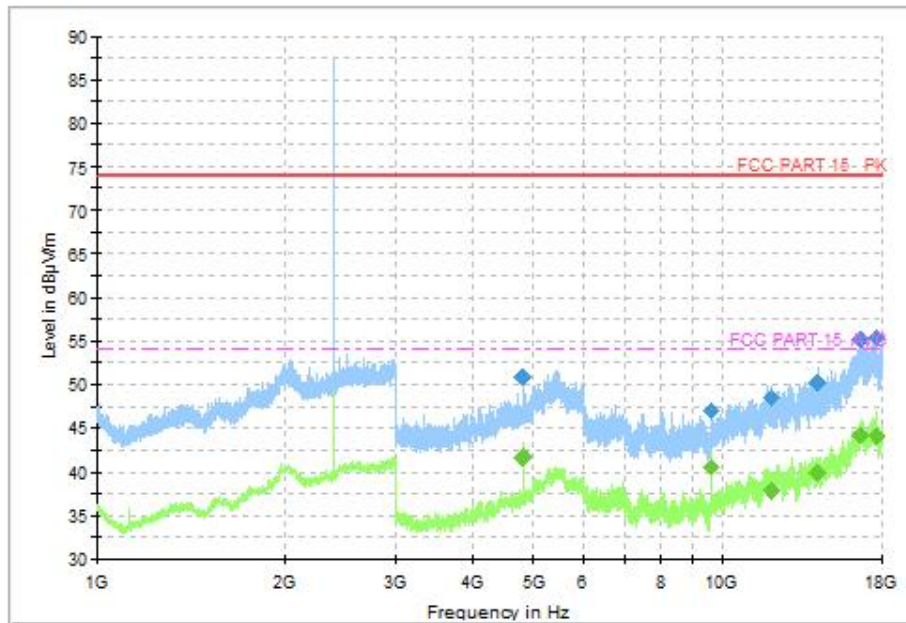


Fig. 33 Radiated Spurious Emission (8DPSK, CH0, 1GHz ~18GHz)

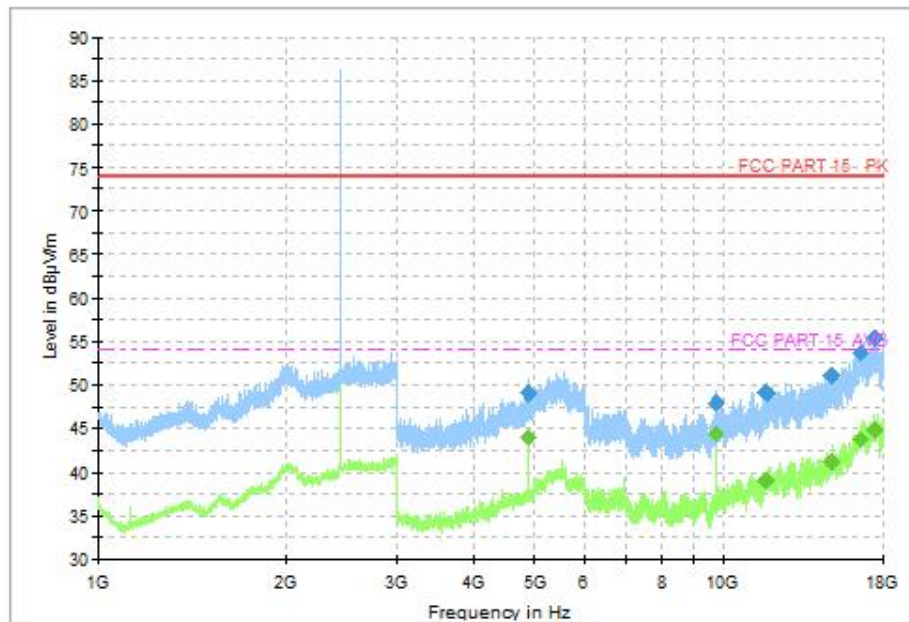


Fig. 34 Radiated Spurious Emission (8DPSK, CH39, 1GHz ~18GHz)

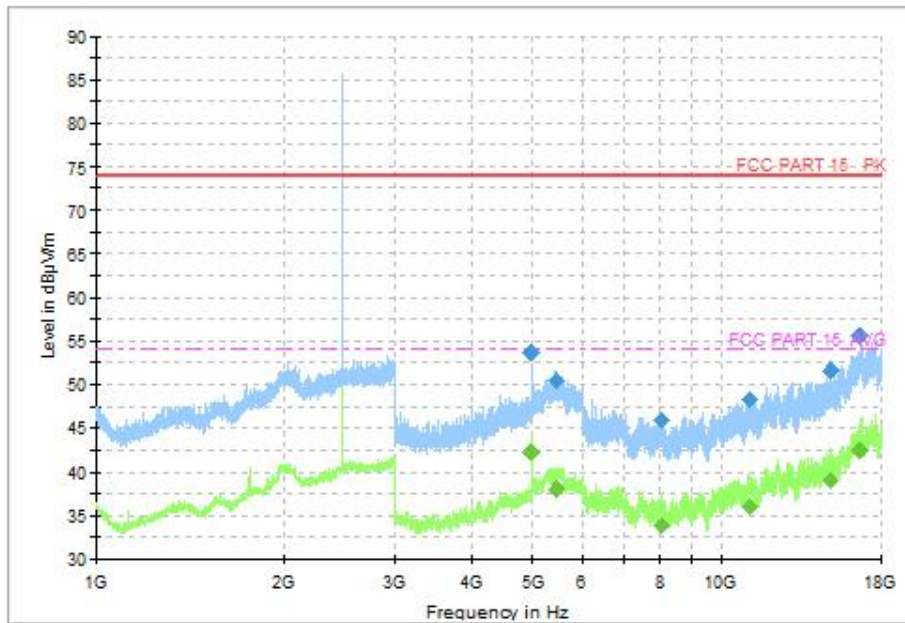


Fig. 35 Radiated Spurious Emission (8DPSK, CH78, 1GHz ~18GHz)

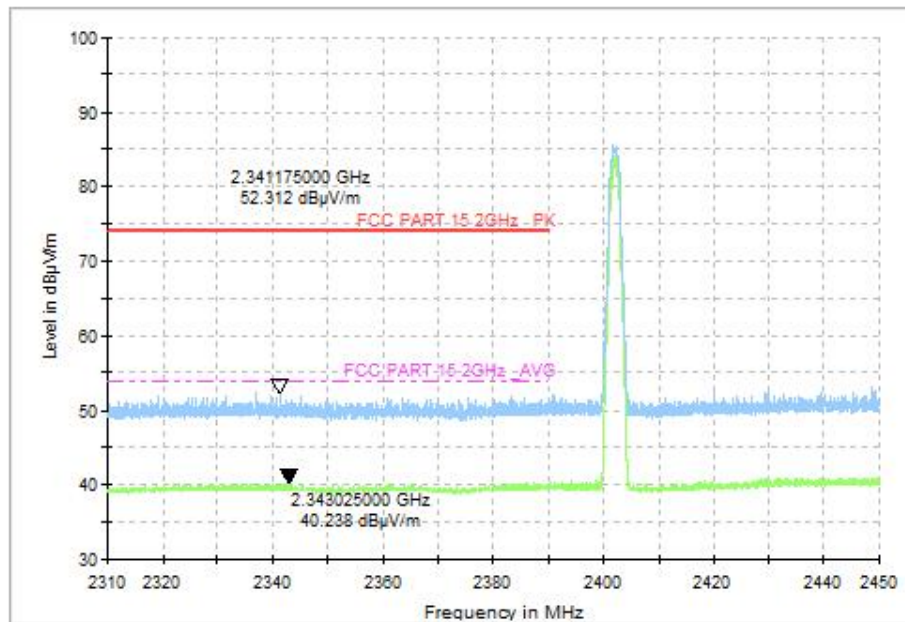


Fig. 36 Radiated Band Edges (8DPSK, CH0, 2.38GHz~2.45GHz)

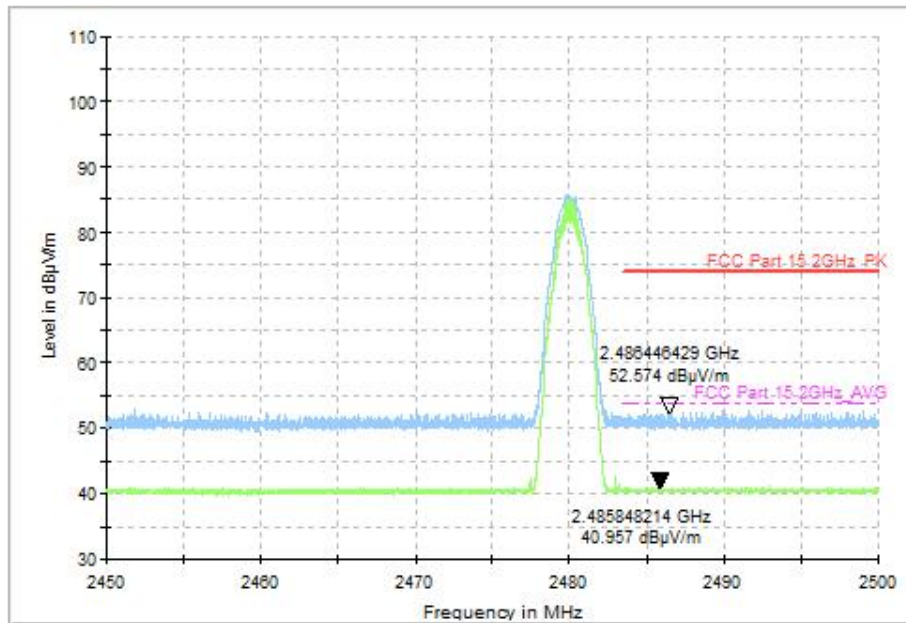


Fig. 37 Radiated Band Edges (8DPSK, CH78, 2.45GHz~2.50GHz)

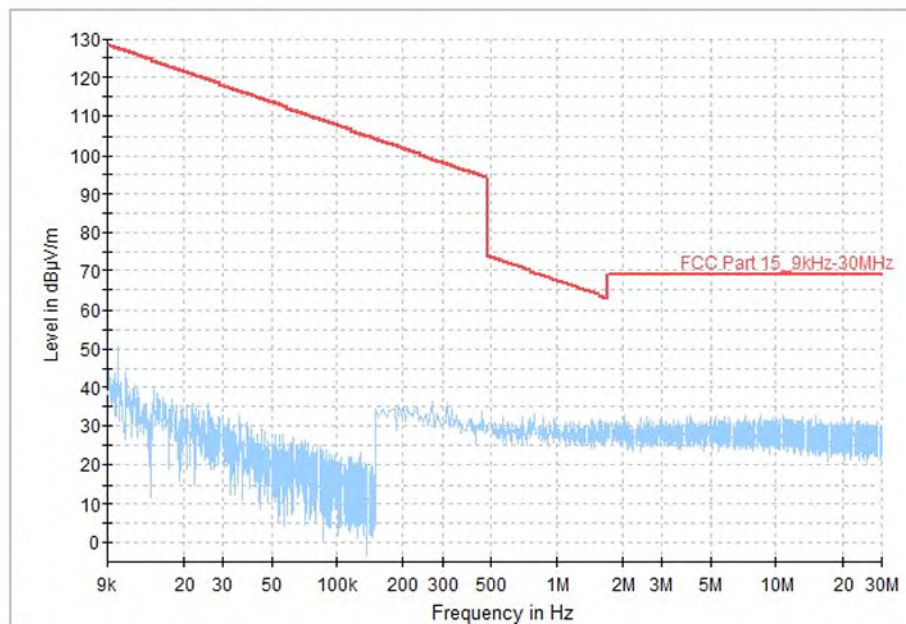


Fig. 38 Radiated Spurious Emission (All Channels, 9kHz ~30MHz)

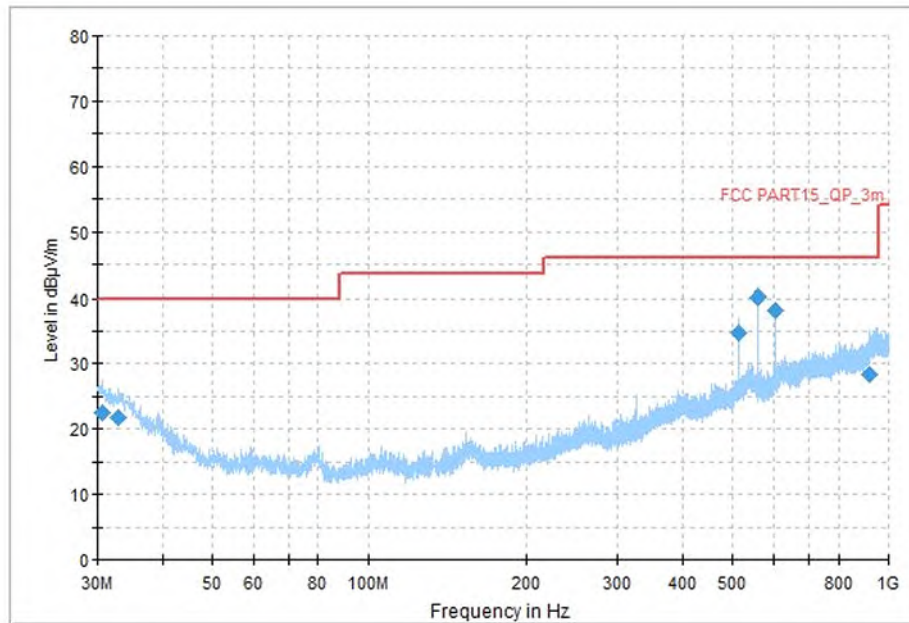


Fig. 39 Radiated Spurious Emission (All Channels, 30MHz ~1GHz)

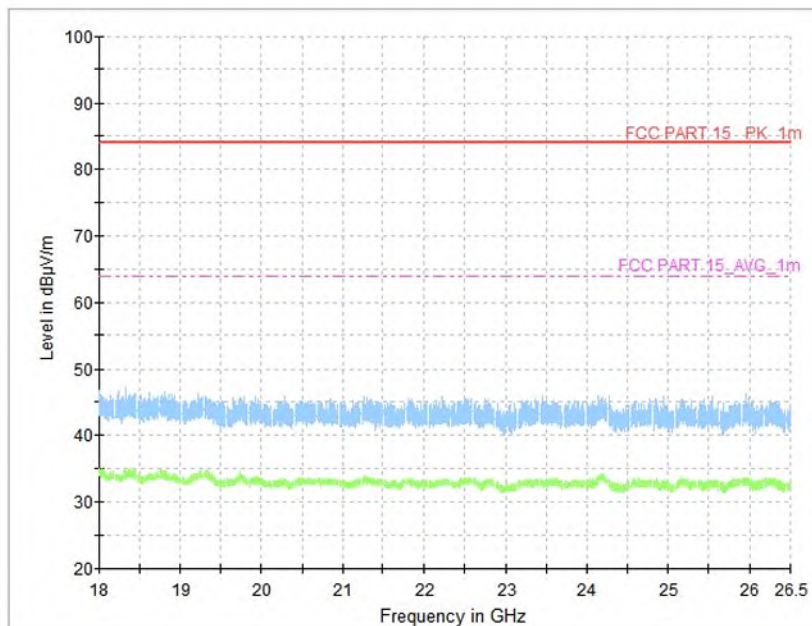


Fig. 40 Radiated Spurious Emission (All Channels, 18GHz ~26.5GHz)

**A.5 20dB Bandwidth****Method of Measurement: See ANSI C63.10-clause 7.8.7.****Measurement Limit:**

| Standard | Limit (MHz) |
|----------------------------|-------------|
| FCC 47 CFR Part 15.247 (a) | / |

Measurement Result:

| Mode | Frequency (MHz) | 20dB Bandwidth (MHz) | | Conclusion |
|---------------|-----------------|----------------------|------|------------|
| | | | | |
| GFSK | 2402(CH0) | Fig.41 | 0.94 | / |
| | 2441(CH39) | Fig.42 | 0.94 | |
| | 2480(CH78) | Fig.43 | 0.94 | |
| $\pi/4$ DQPSK | 2402(CH0) | Fig.44 | 1.21 | / |
| | 2441(CH39) | Fig.45 | 1.21 | |
| | 2480(CH78) | Fig.46 | 1.20 | |
| 8DPSK | 2402(CH0) | Fig.47 | 1.18 | / |
| | 2441(CH39) | Fig.48 | 1.18 | |
| | 2480(CH78) | Fig.49 | 1.16 | |

See below for test graphs.**Conclusion: PASS**

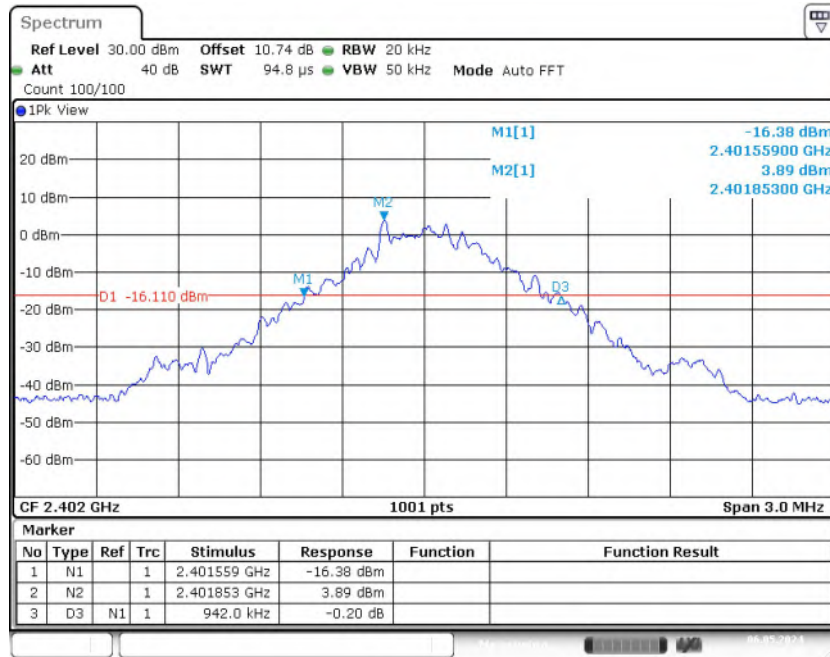


Fig. 41 20dB Bandwidth (GFSK, CH0)

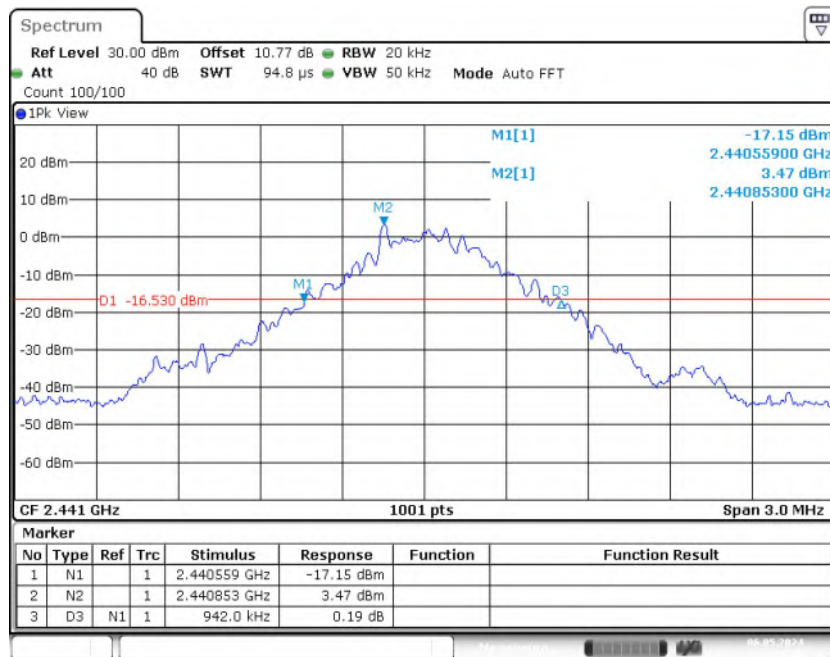


Fig. 42 20dB Bandwidth (GFSK, CH39)



Fig. 43 20dB Bandwidth (GFSK, CH78)

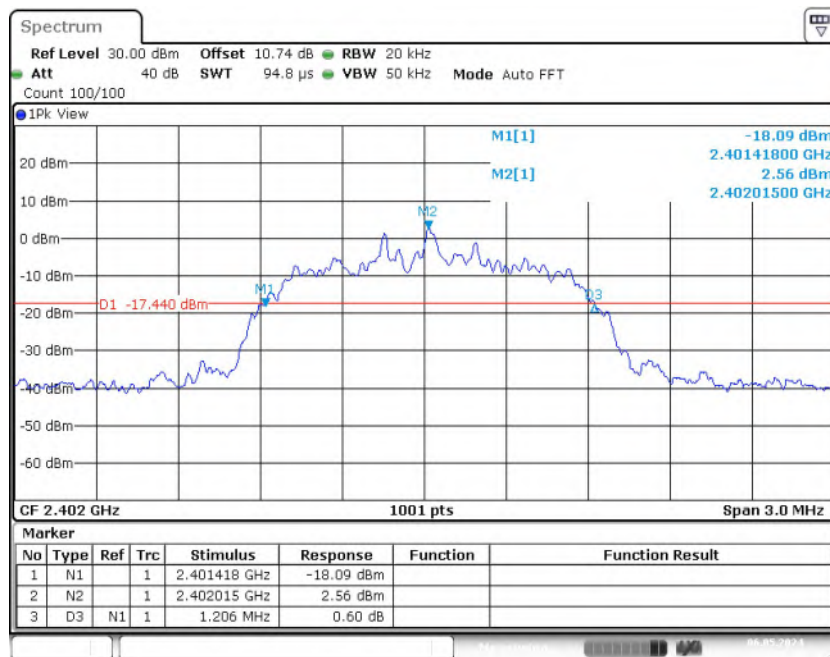


Fig. 44 20dB Bandwidth ($\pi/4$ DQPSK, CH0)

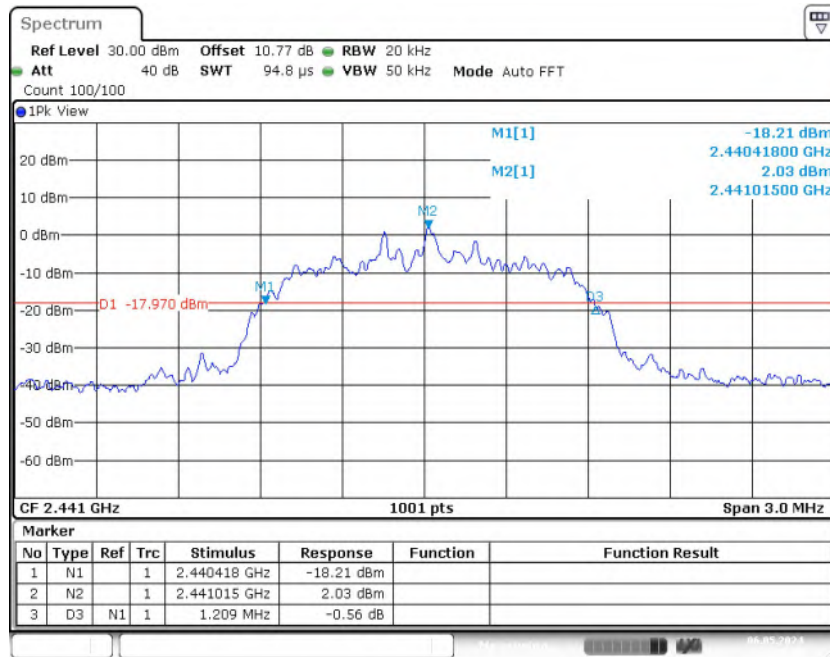


Fig. 45 20dB Bandwidth ($\pi/4$ DQPSK, CH39)

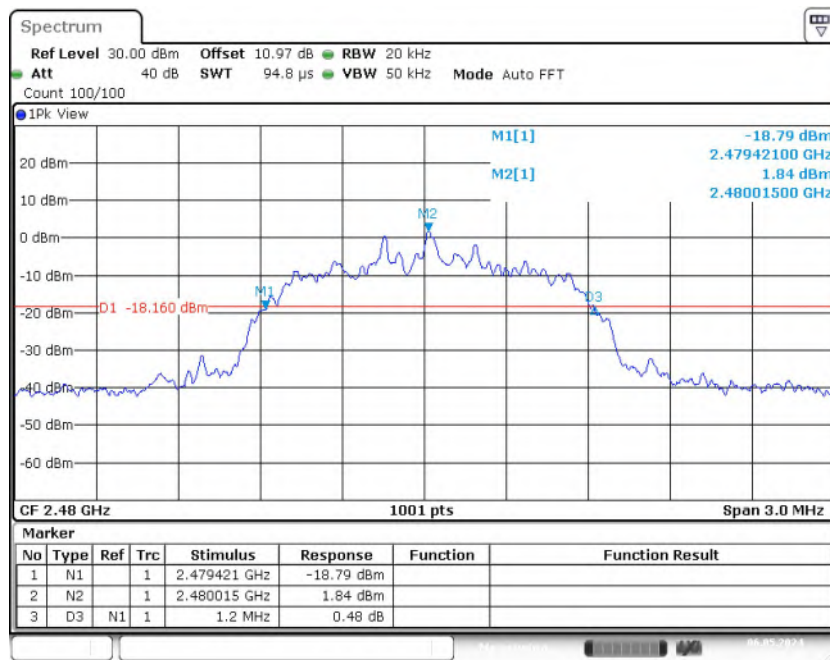


Fig. 46 20dB Bandwidth ($\pi/4$ DQPSK, CH78)

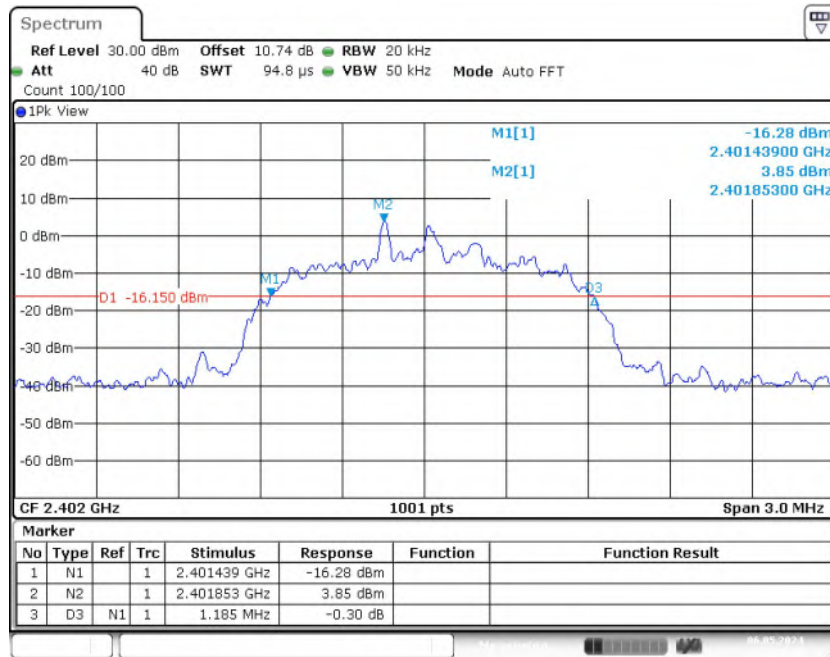


Fig. 47 20dB Bandwidth (8DPSK, CH0)

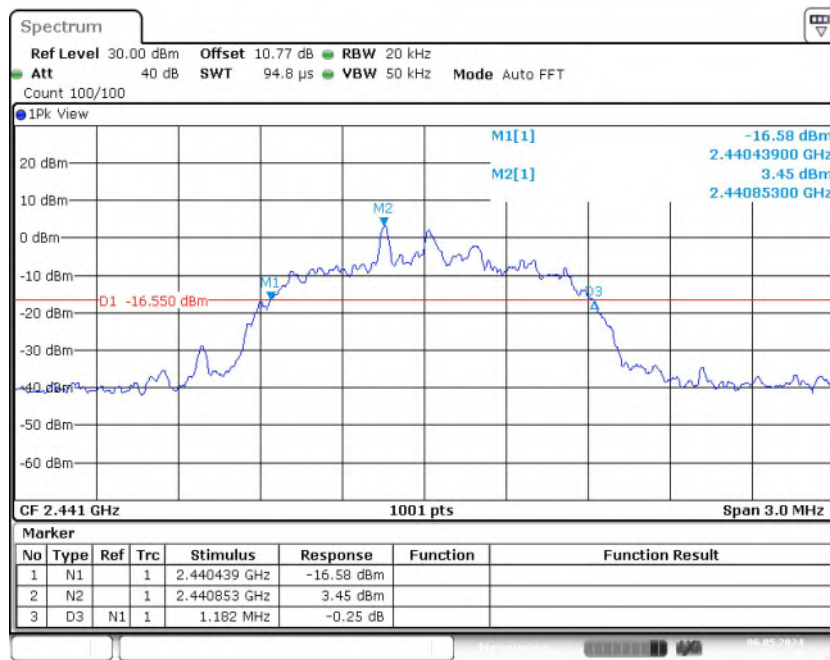


Fig. 48 20dB Bandwidth (8DPSK, CH39)

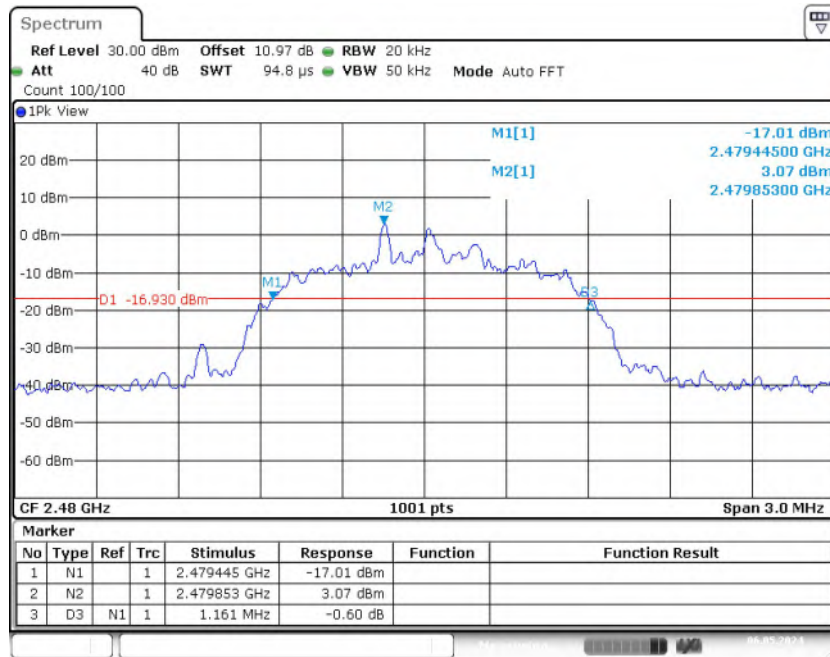


Fig. 49 20dB Bandwidth (8DPSK, CH78)



A.6 Time of Occupancy (Dwell Time)

Method of Measurement: See ANSI C63.10-clause 7.8.4.

Measurement Limit:

| Standard | Limit (s) |
|---------------------------|-----------|
| FCC 47 CFR Part 15.247(a) | < 0.4 |

Measurement Results:

| Mode | Frequency (MHz) | Packet | BurstWidth (ms) | | TotalHops (Num) | | Result (s) | Conclusion |
|---------------|-----------------|--------|-----------------|------|-----------------|-----|------------|------------|
| GFSK | 2441(CH39) | DH5 | Fig.50 | 2.85 | Fig.51 | 110 | 0.314 | P |
| $\pi/4$ DQPSK | 2441(CH39) | 2-DH5 | Fig.52 | 2.86 | Fig.53 | 110 | 0.315 | P |
| 8DPSK | 2441(CH39) | 3-DH5 | Fig.54 | 2.86 | Fig.55 | 110 | 0.315 | P |

See below for test graphs.

Conclusion: Pass

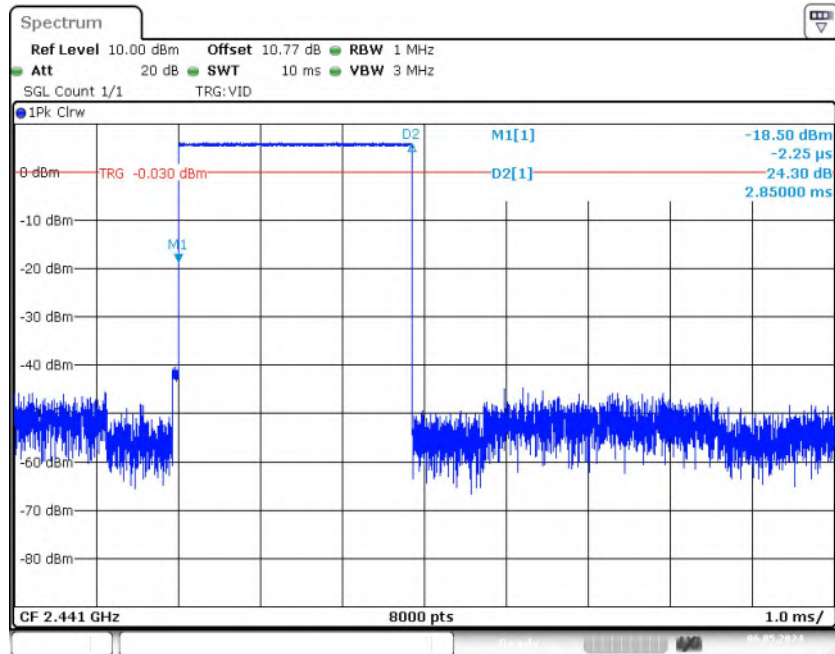


Fig. 50 BurstWidth (Dwell Time) (GFSK, CH39)

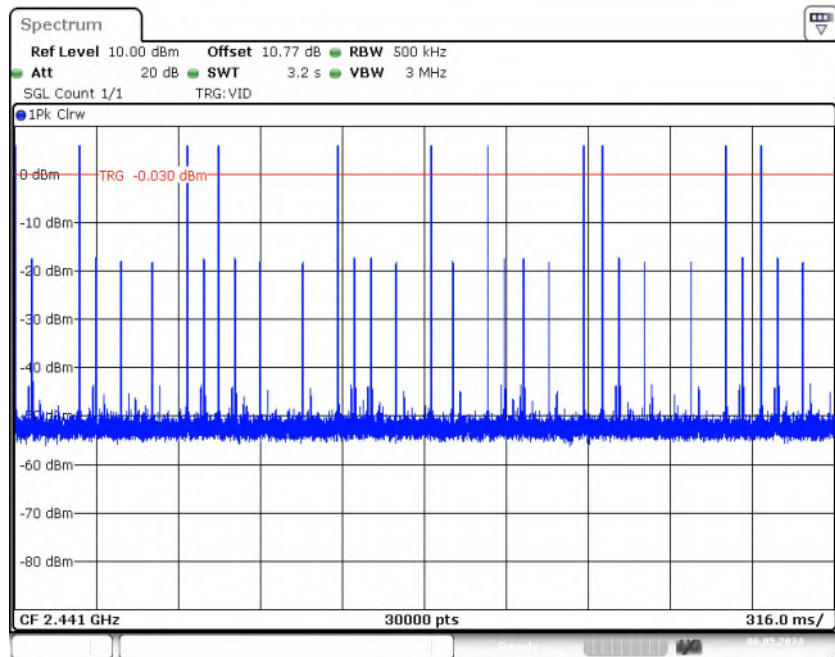


Fig. 51 Number of Burst in Observation Period (Dwell Time) (GFSK, CH39)

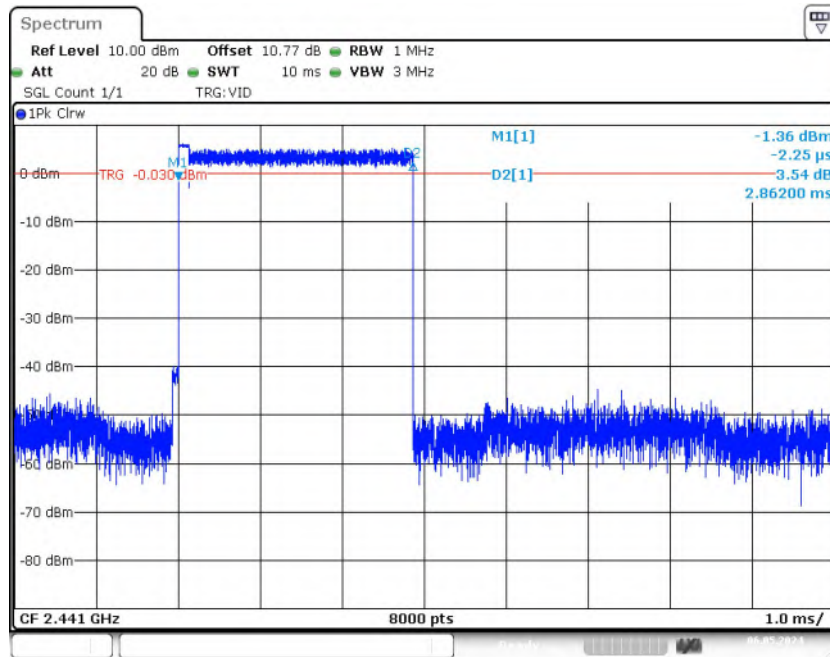


Fig. 52 BurstWidth (Dwell Time) ($\pi/4$ DQPSK, CH39)

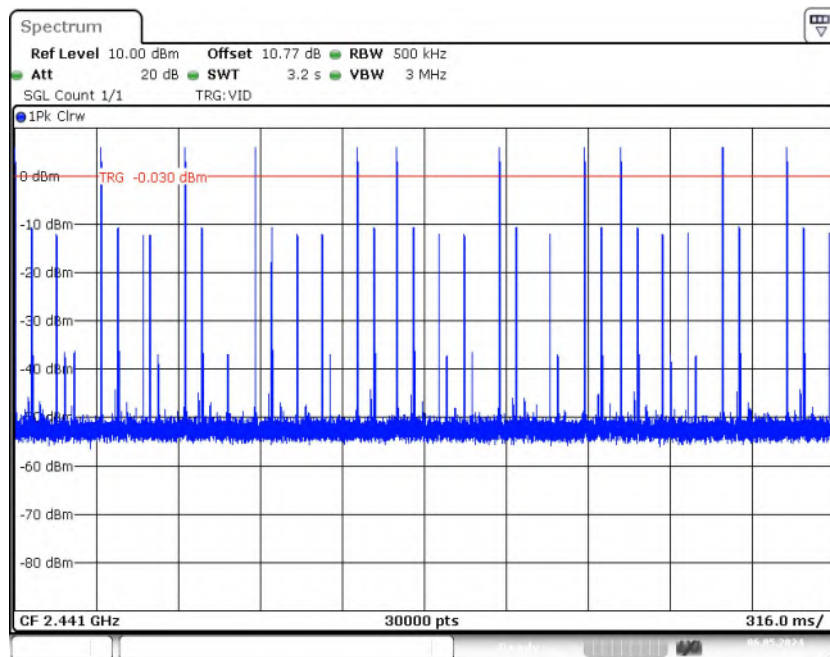


Fig. 53 Number of Burst in Observation Period (Dwell Time) ($\pi/4$ DQPSK, CH39)

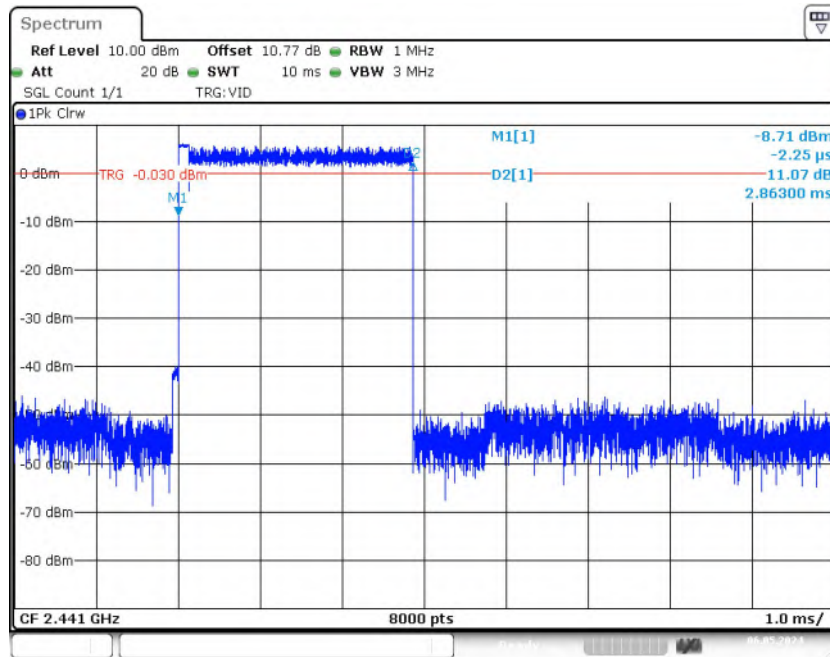


Fig. 54 BurstWidth (Dwell Time) (8DPSK, CH39)

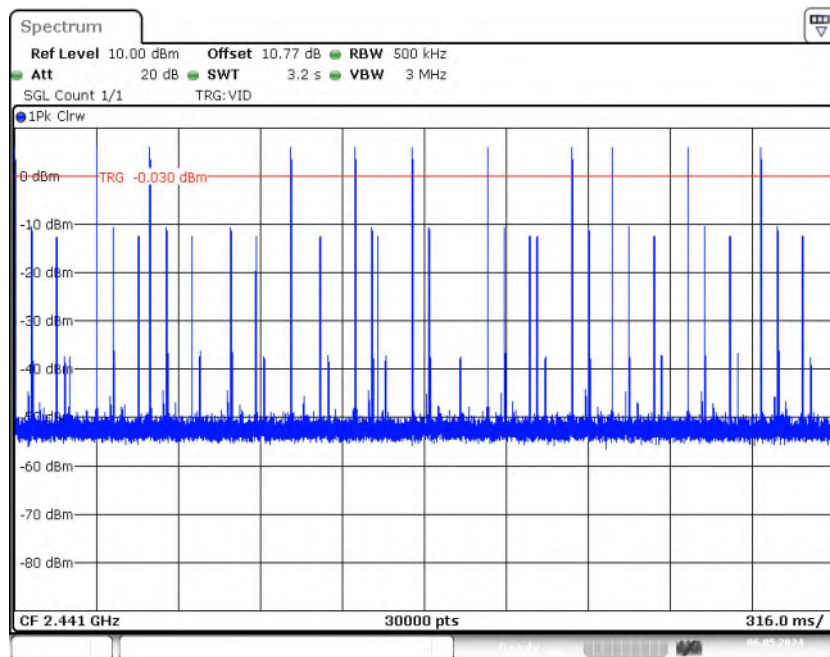


Fig. 55 Number of Burst in Observation Period (Dwell Time) (8DPSK, CH39)



A.7 Number of Hopping Channels

Method of Measurement: See ANSI C63.10-clause 7.8.3.

Measurement Limit:

| Standard | Limit (Num) |
|---------------------------|--------------------------------------|
| FCC 47 CFR Part 15.247(a) | At least 15 non-overlapping channels |

Measurement Results:

| Mode | Packet | Number of Hopping Channels | Test results (Num) | Conclusion |
|---------------|--------|----------------------------|--------------------|------------|
| GFSK | DH5 | Fig.56 | 79 | P |
| $\pi/4$ DQPSK | 2-DH5 | Fig.57 | 79 | P |
| 8DPSK | 3-DH5 | Fig.58 | 79 | P |

See below for test graphs.

Conclusion: Pass

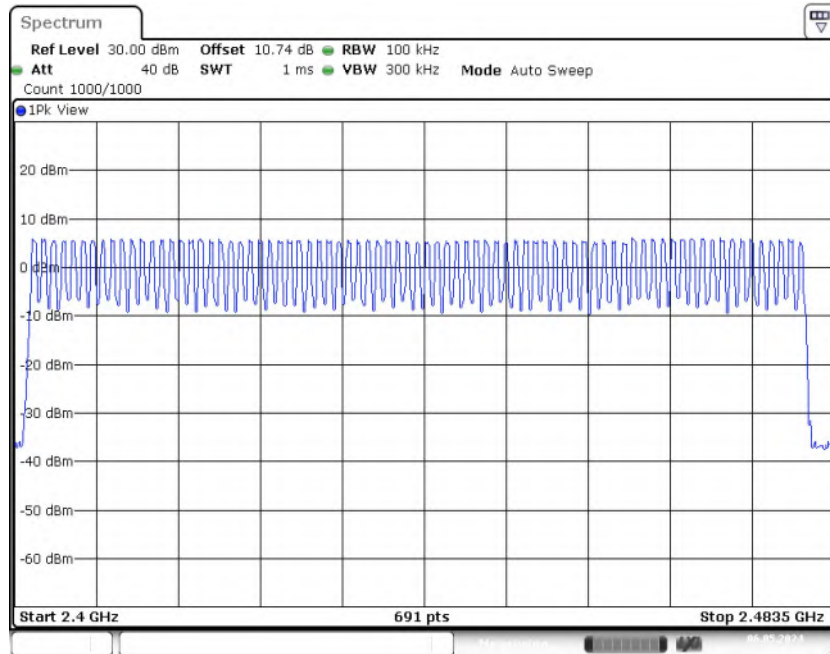


Fig. 56 Number of Hopping Channels (GFSK, Hopping)

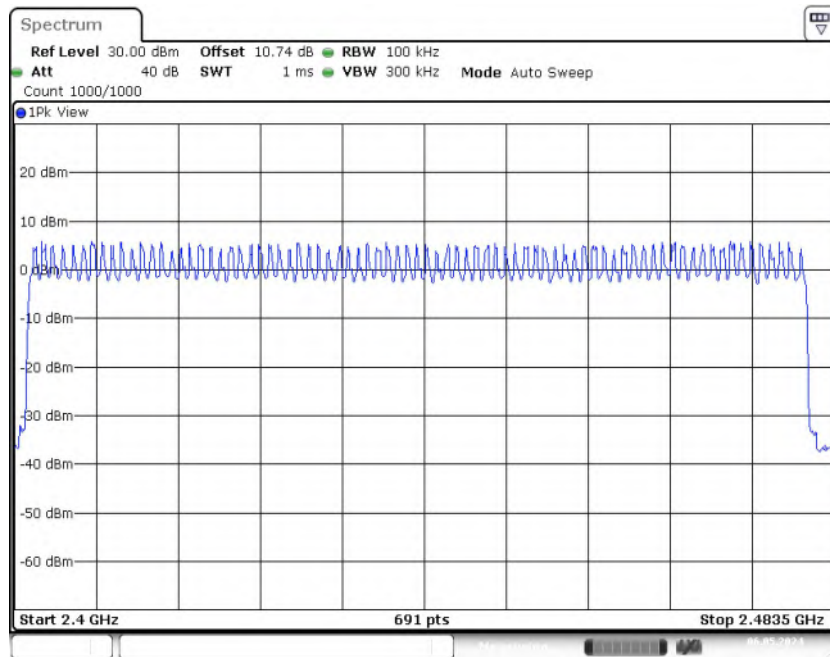


Fig. 57 Number of Hopping Channels ($\pi/4$ DQPSK, Hopping)

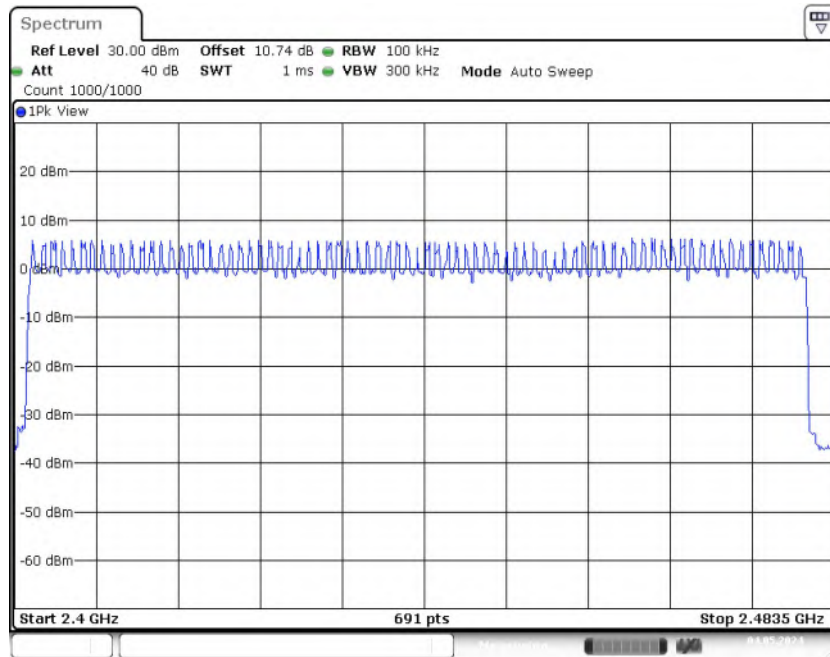


Fig. 58 Number of Hopping Channels (8DPSK, Hopping)



A.8 Carrier Frequency Separation

Method of Measurement: See ANSI C63.10-clause 7.8.2.

Measurement Limit:

| Standard | Limit (kHz) |
|---------------------------|--|
| FCC 47 CFR Part 15.247(a) | By a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater |

Measurement Results:

| Mode | Frequency (MHz) | Packet | Separation of hopping channels | Test result (kHz) | Conclusion |
|---------------|-----------------|--------|--------------------------------|-------------------|------------|
| GFSK | 2441(CH39) | DH5 | Fig.59 | 1003.00 | P |
| $\pi/4$ DQPSK | 2441(CH39) | 2-DH5 | Fig.60 | 1003.00 | P |
| 8DPSK | 2441(CH39) | 3-DH5 | Fig.61 | 1000.00 | P |

See below for test graphs.

Conclusion: Pass

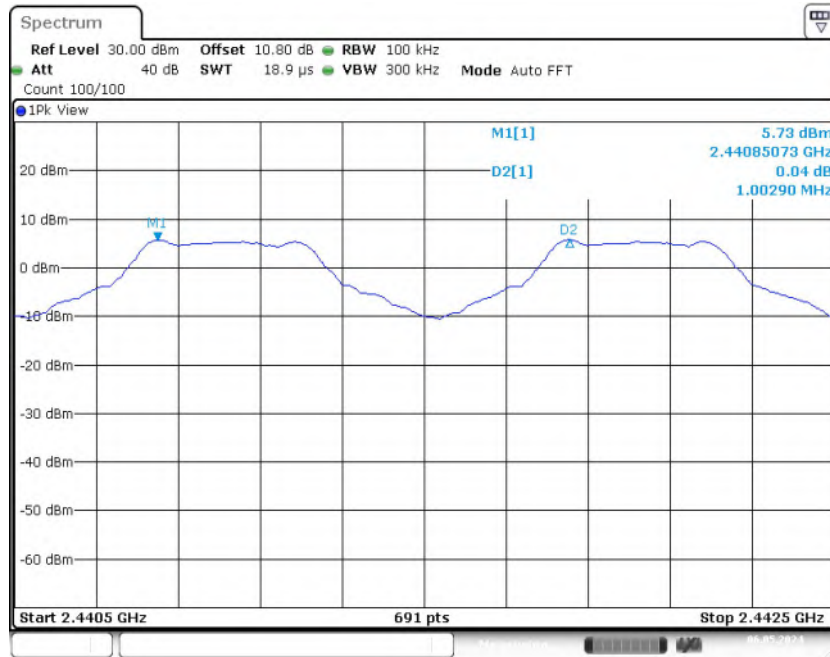


Fig. 59 Carrier Frequency Separation (GFSK, CH39)

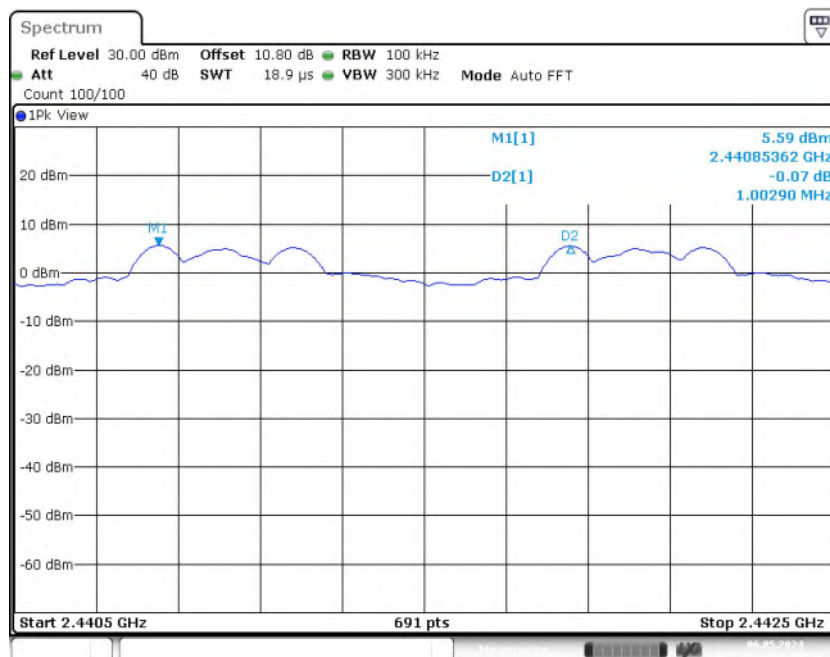


Fig. 60 Carrier Frequency Separation ($\pi/4$ DQPSK, CH39)

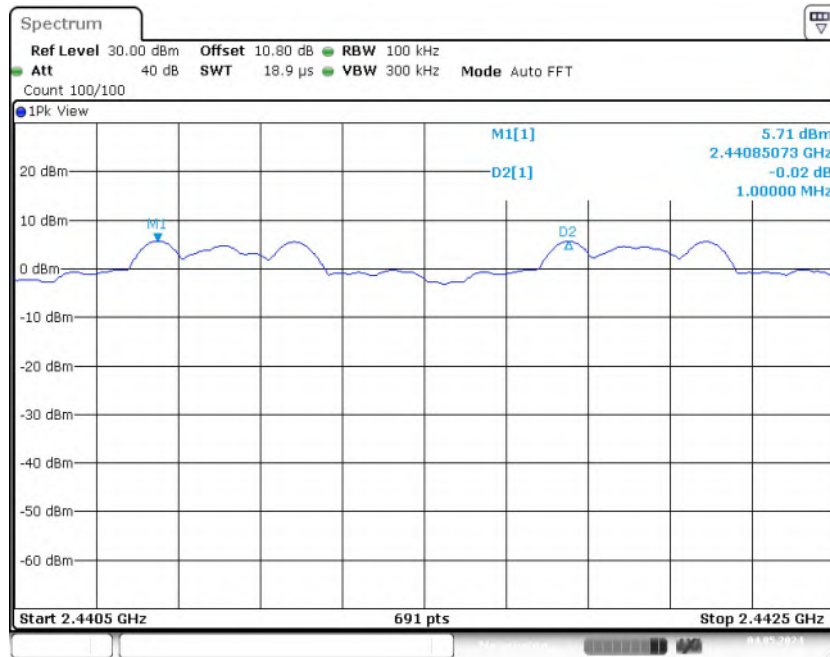


Fig. 61 Carrier Frequency Separation (8DPSK, CH39)



A.9 AC Power line Conducted Emission

Method of Measurement: See ANSI C63.10-clause 6.2.

Test Condition:

| Voltage (V) | Frequency (Hz) |
|-------------|----------------|
| 120 | 60 |

Measurement Result and limit:

| Frequency range (MHz) | Quasi-peak Limit (dB μ V) | Average-peak Limit (dB μ V) | Result (dB μ V) | | Conclusion |
|-----------------------|-------------------------------|---------------------------------|---------------------|--------|------------|
| | | | Traffic | Idle | |
| 0.15 to 0.5 | 66 to 56 | 56 to 46 | Fig.62 | Fig.63 | P |
| 0.5 to 5 | 56 | 46 | | | |
| 5 to 30 | 60 | 50 | | | |

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Note: The measurement results include the L1 and N measurements.

See below for test graphs.

Conclusion: Pass

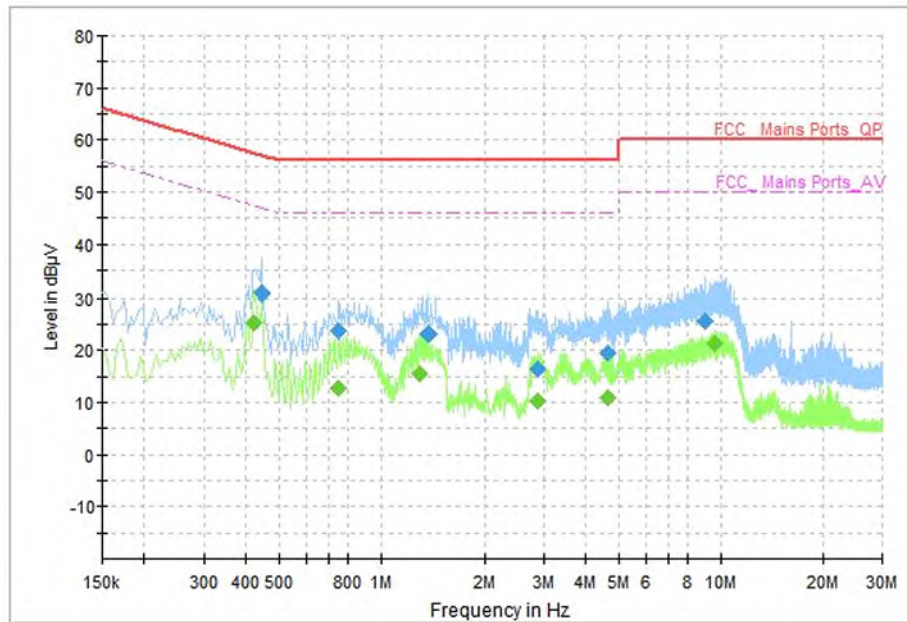


Fig. 62 AC Power line Conducted Emission (Traffic)

Measurement Results: Quasi Peak

| Frequency (MHz) | Quasi Peak (dBµV) | Limit (dBµV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|-------------------|--------------|-------------|------|--------|------------|
| 0.442000 | 30.65 | 57.02 | 26.37 | L1 | ON | 10 |
| 0.750000 | 23.69 | 56.00 | 32.31 | L1 | ON | 10 |
| 1.370000 | 23.05 | 56.00 | 32.95 | L1 | ON | 10 |
| 2.862000 | 16.43 | 56.00 | 39.57 | L1 | ON | 10 |
| 4.646000 | 19.39 | 56.00 | 36.61 | L1 | ON | 10 |
| 9.026000 | 25.59 | 60.00 | 34.41 | L1 | ON | 10 |

Measurement Results: Average

| Frequency (MHz) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|----------------|--------------|-------------|------|--------|------------|
| 0.422000 | 25.32 | 47.41 | 22.09 | L1 | ON | 10 |
| 0.750000 | 12.67 | 46.00 | 33.33 | L1 | ON | 10 |
| 1.302000 | 15.56 | 46.00 | 30.44 | L1 | ON | 10 |
| 2.870000 | 10.40 | 46.00 | 35.60 | L1 | ON | 10 |
| 4.646000 | 10.87 | 46.00 | 35.13 | L1 | ON | 10 |
| 9.582000 | 21.34 | 50.00 | 28.66 | L1 | ON | 10 |

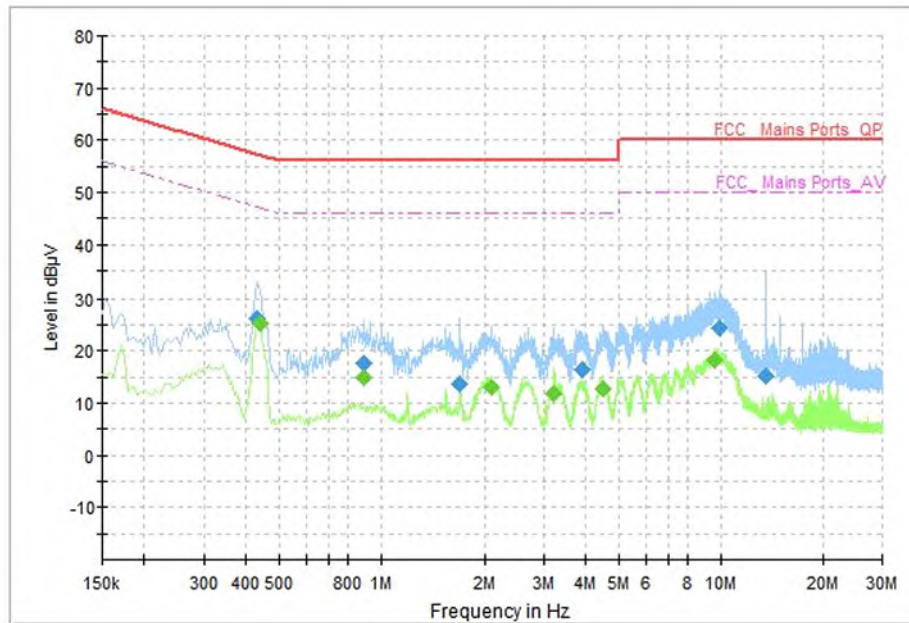


Fig. 63 AC Power line Conducted Emission (Idle)

Measurement Results: Quasi Peak

| Frequency (MHz) | Quasi Peak (dBµV) | Limit (dBµV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|-------------------|--------------|-------------|------|--------|------------|
| 0.430000 | 26.20 | 57.25 | 31.05 | L1 | ON | 10 |
| 0.886000 | 17.61 | 56.00 | 38.39 | L1 | ON | 10 |
| 1.686000 | 13.62 | 56.00 | 42.38 | L1 | ON | 10 |
| 3.886000 | 16.44 | 56.00 | 39.56 | L1 | ON | 10 |
| 9.886000 | 24.39 | 60.00 | 35.61 | L1 | ON | 10 |
| 13.550000 | 15.08 | 60.00 | 44.92 | L1 | ON | 10 |

Measurement Results: Average

| Frequency (MHz) | Average (dBµV) | Limit (dBµV) | Margin (dB) | Line | Filter | Corr. (dB) |
|-----------------|----------------|--------------|-------------|------|--------|------------|
| 0.438000 | 25.28 | 47.10 | 21.82 | L1 | ON | 10 |
| 0.890000 | 14.90 | 46.00 | 31.10 | L1 | ON | 10 |
| 2.094000 | 12.89 | 46.00 | 33.11 | L1 | ON | 10 |
| 3.222000 | 11.93 | 46.00 | 34.07 | L1 | ON | 10 |
| 4.482000 | 12.72 | 46.00 | 33.28 | L1 | ON | 10 |
| 9.618000 | 18.30 | 50.00 | 31.70 | L1 | ON | 10 |

END OF REPORT