



# FCC PART 15C TEST REPORT

No. I22Z62328-IOT01

for

**HONOR Device Co., Ltd.**

**Smart Phone**

**Model Name: RBN-NX1**

**FCC ID: 2AYGCRBN-NX1**

with

**Hardware Version: HN2VNEM**

**Software Version: 6.1.0.9(C900E9R1P1)**

**Issued Date: 2022-12-29**

**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 CTTL.

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S. Government.

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## **REPORT HISTORY**

| Report Number   | Revision | Description | Issue Date |
|-----------------|----------|-------------|------------|
| I22Z62328-IOT01 | Rev.0    | 1st edition | 2022-12-29 |

## **CONTENTS**

|                                                                         |           |
|-------------------------------------------------------------------------|-----------|
| <b>1. TEST LABORATORY .....</b>                                         | <b>5</b>  |
| 1.1. INTRODUCTION & ACCREDITATION .....                                 | 5         |
| 1.2. TESTING LOCATION .....                                             | 5         |
| 1.3. TESTING ENVIRONMENT .....                                          | 6         |
| 1.4. PROJECT DATA .....                                                 | 6         |
| 1.5. SIGNATURE .....                                                    | 6         |
| <b>2. CLIENT INFORMATION .....</b>                                      | <b>7</b>  |
| 2.1. APPLICANT INFORMATION .....                                        | 7         |
| 2.2. MANUFACTURER INFORMATION .....                                     | 7         |
| <b>3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) .....</b> | <b>8</b>  |
| 3.1. ABOUT EUT .....                                                    | 8         |
| 3.2. INTERNAL IDENTIFICATION OF EUT .....                               | 8         |
| 3.3. INTERNAL IDENTIFICATION OF AE .....                                | 8         |
| 3.4. NORMAL ACCESSORY SETTING .....                                     | 8         |
| 3.5. GENERAL DESCRIPTION .....                                          | 8         |
| <b>4. REFERENCE DOCUMENTS .....</b>                                     | <b>9</b>  |
| 4.1. DOCUMENTS SUPPLIED BY APPLICANT .....                              | 9         |
| 4.2. REFERENCE DOCUMENTS FOR TESTING .....                              | 9         |
| <b>5. TEST RESULTS .....</b>                                            | <b>10</b> |
| 5.1. SUMMARY OF TEST RESULTS .....                                      | 10        |
| 5.2. STATEMENTS .....                                                   | 10        |
| <b>6. TEST FACILITIES UTILIZED .....</b>                                | <b>11</b> |
| <b>7. MEASUREMENT UNCERTAINTY .....</b>                                 | <b>12</b> |
| 7.1. PEAK OUTPUT POWER - CONDUCTED .....                                | 12        |
| 7.2. FREQUENCY BAND EDGES - CONDUCTED .....                             | 12        |
| 7.3. TRANSMITTER SPURIOUS EMISSION - CONDUCTED .....                    | 12        |
| 7.4. TIME OF OCCUPANCY (DWELL TIME) .....                               | 12        |
| 7.5. 20DB BANDWIDTH .....                                               | 12        |
| 7.6. CARRIER FREQUENCY SEPARATION .....                                 | 12        |
| <b>ANNEX A: EUT PARAMETERS .....</b>                                    | <b>13</b> |
| <b>ANNEX B: DETAILED TEST RESULTS .....</b>                             | <b>14</b> |
| B.1. MEASUREMENT METHOD .....                                           | 14        |
| B.2. PEAK OUTPUT POWER .....                                            | 15        |
| B.3. FREQUENCY BAND EDGES – CONDUCTED .....                             | 17        |
| B.4. TRANSMITTER SPURIOUS EMISSION - CONDUCTED .....                    | 24        |
| B.5. TIME OF OCCUPANCY (DWELL TIME) .....                               | 49        |



|                                                 |           |
|-------------------------------------------------|-----------|
| B.6. 20dB BANDWIDTH.....                        | 60        |
| B.7. CARRIER FREQUENCY SEPARATION .....         | 66        |
| B.8. NUMBER OF HOPPING CHANNELS.....            | 69        |
| <b>ANNEX C: ACCREDITATION CERTIFICATE .....</b> | <b>73</b> |

## **1. Test Laboratory**

### **1.1. Introduction & Accreditation**

**Telecommunication Technology Labs, CAICT** is an ISO/IEC 17025:2017 accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP) with lab code 600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (ISED#: 24849). The detail accreditation scope can be found on NVLAP website.

### **1.2. Testing Location**

Conducted testing Location: CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,  
P. R. China 100191

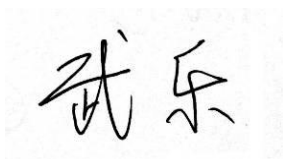
### 1.3. Testing Environment

Normal Temperature: 20-27℃  
Relative Humidity: 20-50%

### 1.4. Project data

Testing Start Date: 2022-11-28  
Testing End Date: 2022-12-29

### 1.5. Signature



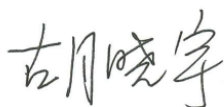
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Wu Le  
(Prepared this test report)



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Sun Zhenyu  
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Hu Xiaoyu  
(Approved this test report)

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: HONOR Device Co., Ltd.  
Suite 3401,Unit A,Building 6,Shum Yip Sky Park,No.8089,Hongli  
Address /Post: West Road,Xiangmihu Street,Futian District,Shenzhen,Guangdong  
518040,People's Republic of China  
City: Shenzhen  
Postal Code: /  
Country: China  
Telephone: /  
Fax: /

### **2.2. Manufacturer Information**

Company Name: HONOR Device Co., Ltd.  
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518040,People's Republic of China  
City: Shenzhen  
Postal Code: /  
Country: China  
Telephone: /  
Fax: /

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

#### 3.1. About EUT

|                    |                           |
|--------------------|---------------------------|
| Description        | Smart Phone               |
| Model Name         | RBN-NX1                   |
| FCC ID             | 2AYGCRBN-NX1              |
| Frequency Band     | ISM 2400MHz~2483.5MHz     |
| Type of Modulation | GFSK/ $\pi/4$ DQPSK/8DPSK |
| Number of Channels | 79                        |
| Power Supply       | 3.87V DC by Battery       |
| Antenna gain       | -2.0dBi                   |

#### 3.2. Internal Identification of EUT

| EUT ID* | SN or IMEI                          | HW Version | SW Version          | Date of receipt |
|---------|-------------------------------------|------------|---------------------|-----------------|
| EUT1    | 868648060014435/<br>868648060048474 | HN2VNEM    | 6.1.0.9(C900E9R1P1) | 2022-11-28      |

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

#### 3.3. Internal Identification of AE

| AE ID* | Description |           |
|--------|-------------|-----------|
| AE1    | Battery     | / Inbuilt |

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

#### 3.4. Normal Accessory setting

Fully charged battery should be used during the test.

#### 3.5. General Description

The Equipment Under Test (EUT) is a model of Smart Phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfill the test. Samples undergoing test were selected by the Client.

## 4. Reference Documents

### 4.1. Documents supplied by applicant

EUT parameters, referring to Annex A for detailed information, is supplied by the client 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 Part15  | FCC CFR 47, Part 15, Subpart C:                                                                   | 2021      |
|             | 15.205 Restricted bands of operation;                                                             |           |
|             | 15.209 Radiated emission limits, general requirements;                                            |           |
| ANSI C63.10 | 15.247 Operation within the bands 902–928MHz,<br>2400–2483.5 MHz, and 5725–5850 MHz.              | June,2013 |
|             | American National Standard of Procedures for<br>Compliance Testing of Unlicensed Wireless Devices |           |

## 5. Test Results

### 5.1. Summary of Test Results

Abbreviations used in this clause:

- P** Pass, The EUT complies with the essential requirements in the standard.  
**F** Fail, The EUT does not comply with the essential requirements in the standard  
**NA** Not Applicable, The test was not applicable  
**NP** Not Performed, The test was not performed by CTTL

| SUMMARY OF MEASUREMENT RESULTS            | Sub-clause          | Verdict   |
|-------------------------------------------|---------------------|-----------|
| Peak Output Power                         | 15.247 (b)(1)       | <b>P</b>  |
| Frequency Band Edges- Conducted           | 15.247 (d)          | <b>P</b>  |
| Transmitter Spurious Emission - Conducted | 15.247 (d)          | <b>P</b>  |
| Time of Occupancy (Dwell Time)            | 15.247 (a) (1)(iii) | <b>P</b>  |
| 20dB Bandwidth                            | 15.247 (a)(1)       | <b>NA</b> |
| Carrier Frequency Separation              | 15.247 (a)(1)       | <b>P</b>  |
| Number of hopping channels                | 15.247 (a)(iii)     | <b>P</b>  |

Please refer to **ANNEX A** for detail.

The measurement is made according to ANSI C63.10.

### 5.2. Statements

CTTL has evaluated the test cases requested by the applicant /manufacturer as listed in section 5.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.2

## 6. Test Facilities Utilized

### Conducted test system

| No. | Equipment              | Model | Serial Number | Manufacturer | Calibration Period | Calibration Due date |
|-----|------------------------|-------|---------------|--------------|--------------------|----------------------|
| 1   | Vector Signal Analyzer | FSQ26 | 100024        | R&S          | 1 year             | 2023-03-23           |
| 2   | Bluetooth Tester       | CBT   | 100315        | R&S          | 1 year             | 2023-01-22           |
| 3   | Shielding Room         | S81   | /             | ETS-Lindgren | /                  | /                    |

## 7. Measurement Uncertainty

### 7.1. Peak Output Power - Conducted

Measurement Uncertainty:

|                               |        |
|-------------------------------|--------|
| Measurement Uncertainty (k=2) | 0.66dB |
|-------------------------------|--------|

### 7.2. Frequency Band Edges - Conducted

Measurement Uncertainty:

|                               |        |
|-------------------------------|--------|
| Measurement Uncertainty (k=2) | 0.66dB |
|-------------------------------|--------|

### 7.3. Transmitter Spurious Emission - Conducted

Measurement Uncertainty:

| Frequency Range   | Uncertainty (k=2) |
|-------------------|-------------------|
| 30 MHz ~ 8 GHz    | 1.22dB            |
| 8 GHz ~ 12.75 GHz | 1.51dB            |
| 12.7GHz ~ 26 GHz  | 1.51dB            |

### 7.4. Time of Occupancy (Dwell Time)

Measurement Uncertainty:

|                               |        |
|-------------------------------|--------|
| Measurement Uncertainty (k=2) | 0.88ms |
|-------------------------------|--------|

### 7.5. 20dB Bandwidth

Measurement Uncertainty:

|                               |          |
|-------------------------------|----------|
| Measurement Uncertainty (k=2) | 61.936Hz |
|-------------------------------|----------|

### 7.6. Carrier Frequency Separation

Measurement Uncertainty:

|                               |          |
|-------------------------------|----------|
| Measurement Uncertainty (k=2) | 61.936Hz |
|-------------------------------|----------|

## **ANNEX A: EUT parameters**

Disclaimer: The antenna gain provided by the client may affect the validity of the measurement results in this report, and the client shall bear the impact and consequences arising therefrom.

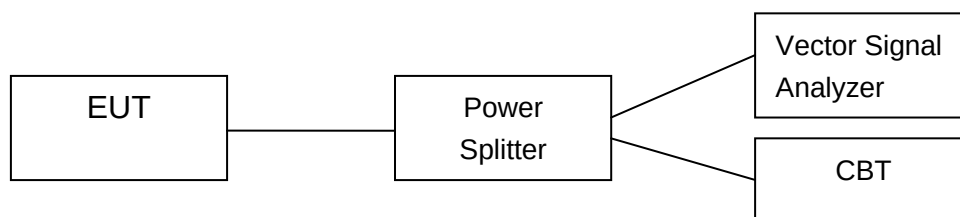
## **ANNEX B: Detailed Test Results**

### **B.1. Measurement Method**

#### **B.1.1. Conducted Measurements**

The measurement is made according to ANSI C63.10.

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode (Transmitter, receiver or transmitter & receiver).
- 3). Set the EUT to the required channel.
- 4). Set the EUT hopping mode (hopping or hopping off).
- 5). Set the spectrum analyzer to start measurement.
- 6). Record the values. Vector Signal Analyzer



## B.2. Peak Output Power

### B.2.1. Peak Output Power – Conducted

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

a) Use the following spectrum analyzer settings:

- Span: 6MHz
- RBW: 3MHz
- VBW: 3MHz
- Sweep time: 2.5ms
- Detector function: peak
- Trace: max hold

b) Allow trace to stabilize.

c) Use the marker-to-peak function to set the marker to the peak of the emission.

d) The indicated level is the peak output power.

#### Measurement Limit:

| Standard               | Limits                |               |
|------------------------|-----------------------|---------------|
| FCC Part 15.247 (b)(1) | Bandwidth $\leq$ 1MHz | 30dBm (1W)    |
|                        | Bandwidth $>$ 1MHz    | 21dBm (125mW) |

#### Measurement Results:

##### For GFSK

| Channel                              | Ch 0<br>2402 MHz | Ch 39<br>2441 MHz | Ch 78<br>2480 MHz | Conclusion |
|--------------------------------------|------------------|-------------------|-------------------|------------|
| Peak Conducted<br>Output Power (dBm) | 12.69            | 12.74             | 13.09             | P          |

##### For $\pi/4$ DQPSK

| Channel                              | Ch 0<br>2402 MHz | Ch 39<br>2441 MHz | Ch 78<br>2480 MHz | Conclusion |
|--------------------------------------|------------------|-------------------|-------------------|------------|
| Peak Conducted<br>Output Power (dBm) | 11.42            | 11.20             | 12.09             | P          |

##### For 8DPSK

| Channel                              | Ch 0<br>2402 MHz | Ch 39<br>2441 MHz | Ch 78<br>2480 MHz | Conclusion |
|--------------------------------------|------------------|-------------------|-------------------|------------|
| Peak Conducted<br>Output Power (dBm) | 11.90            | 11.23             | 12.26             | P          |

**Conclusion: PASS**

**B.2.2. E.I.R.P.**

The radiated E.I.R.P. is listed below:

Antenna gain = -2.0dBi

**For GFSK**

| Channel       | Ch 0<br>2402 MHz | Ch 39<br>2441 MHz | Ch 78<br>2480 MHz | Conclusion |
|---------------|------------------|-------------------|-------------------|------------|
| E.I.R.P (dBm) | 10.69            | 10.74             | 11.09             | P          |

**For  $\pi/4$  DQPSK**

| Channel       | Ch 0<br>2402 MHz | Ch 39<br>2441 MHz | Ch 78<br>2480 MHz | Conclusion |
|---------------|------------------|-------------------|-------------------|------------|
| E.I.R.P (dBm) | 9.42             | 9.20              | 10.09             | P          |

**For 8DPSK**

| Channel       | Ch 0<br>2402 MHz | Ch 39<br>2441 MHz | Ch 78<br>2480 MHz | Conclusion |
|---------------|------------------|-------------------|-------------------|------------|
| E.I.R.P (dBm) | 9.90             | 9.23              | 10.26             | P          |

Note: E.I.R.P. are calculated with the antenna gain.

**Conclusion: PASS**

### B.3. Frequency Band Edges – Conducted

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

Connect the spectrum analyzer to the EUT using an appropriate RF cable connected to the EUT output. Configure the spectrum analyzer settings as described below (be sure to enter all losses between the unlicensed wireless device output and the spectrum analyzer).

- Span: 10 MHz
- Resolution Bandwidth: 100 kHz
- Video Bandwidth: 300 kHz
- Sweep Time: Auto
- Detector: Peak
- Trace: max hold

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

Observe the stored trace and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission. This is not an absolute field strength measurement; it is only a relative measurement to determine the amount by which the emission drops at the band edge relative to the highest fundamental emission level.

#### Measurement Limit:

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

#### Measurement Result:

##### For GFSK

| Channel | Hopping     | Band Edge Power ( dBc) |        | Conclusion |
|---------|-------------|------------------------|--------|------------|
| 0       | Hopping OFF | Fig.1                  | -61.99 | P          |
|         | Hopping ON  | Fig.2                  | -68.83 | P          |
| 78      | Hopping OFF | Fig.3                  | -68.93 | P          |
|         | Hopping ON  | Fig.4                  | -70.65 | P          |

##### For $\pi/4$ DQPSK

| Channel | Hopping     | Band Edge Power ( dBc) |        | Conclusion |
|---------|-------------|------------------------|--------|------------|
| 0       | Hopping OFF | Fig.5                  | -56.38 | P          |
|         | Hopping ON  | Fig.6                  | -66.77 | P          |
| 78      | Hopping OFF | Fig.7                  | -65.06 | P          |
|         | Hopping ON  | Fig.8                  | -66.16 | P          |

##### For 8DPSK

| Channel | Hopping     | Band Edge Power ( dBc) |        | Conclusion |
|---------|-------------|------------------------|--------|------------|
| 0       | Hopping OFF | Fig.9                  | -57.63 | P          |
|         | Hopping ON  | Fig.10                 | -56.88 | P          |

|    |             |        |        |   |
|----|-------------|--------|--------|---|
| 78 | Hopping OFF | Fig.11 | -62.89 | P |
|    | Hopping ON  | Fig.12 | -66.87 | P |

**Conclusion: PASS**

**Test graphs as below**

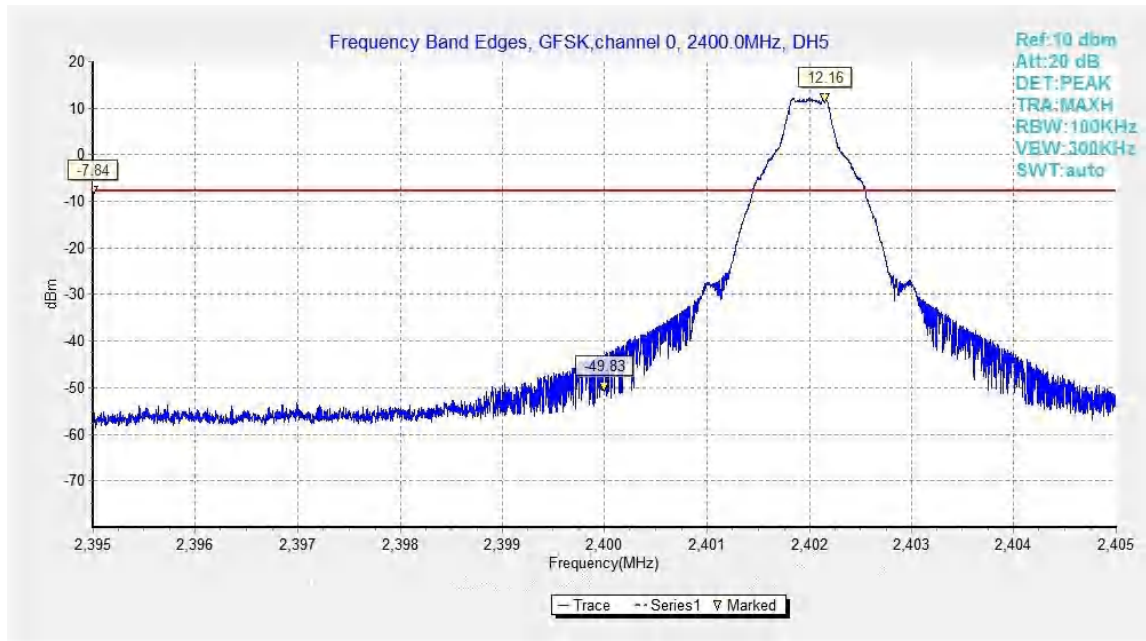


Fig.1. Frequency Band Edges: GFSK, Channel 0, Hopping Off

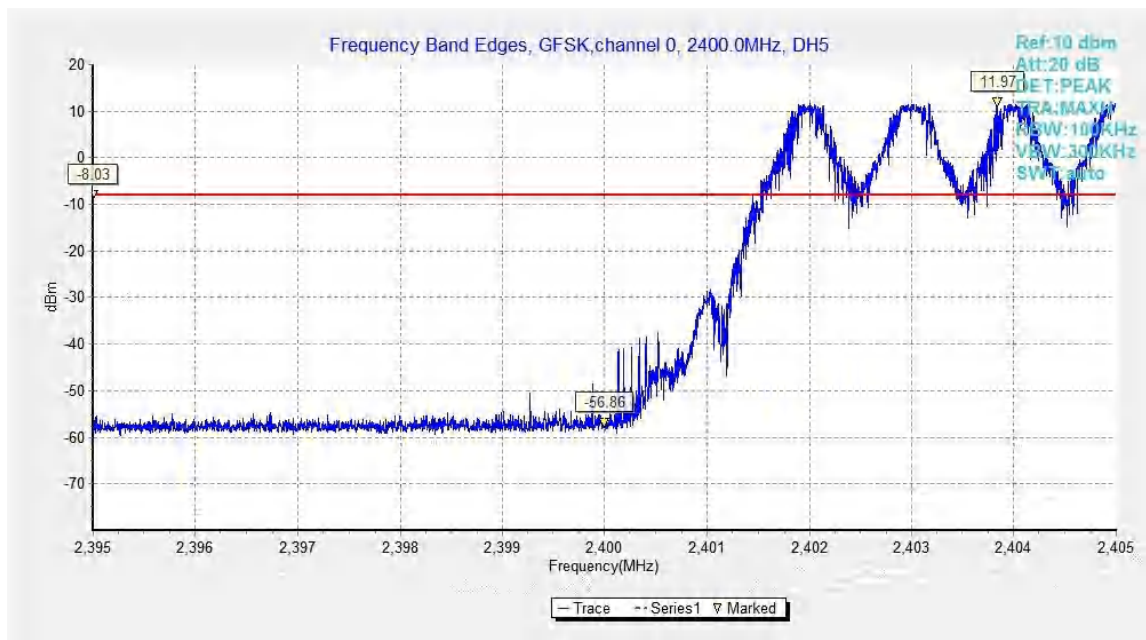


Fig.2. Frequency Band Edges: GFSK, Channel 0, Hopping On

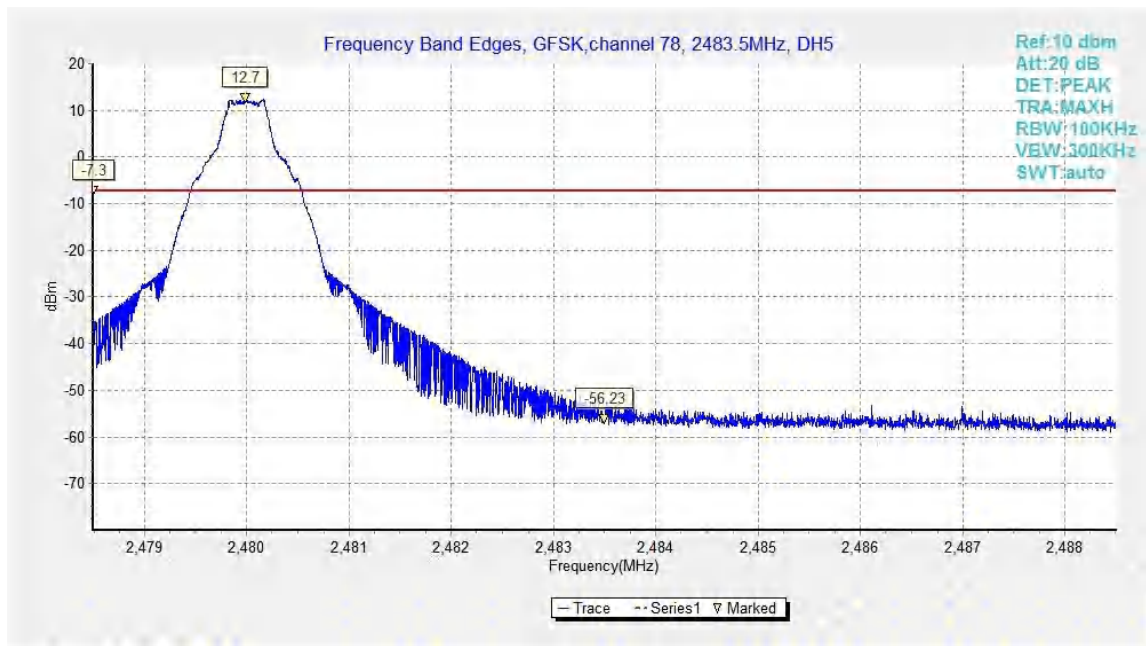


Fig.3. Frequency Band Edges: GFSK, Channel 78, Hopping Off

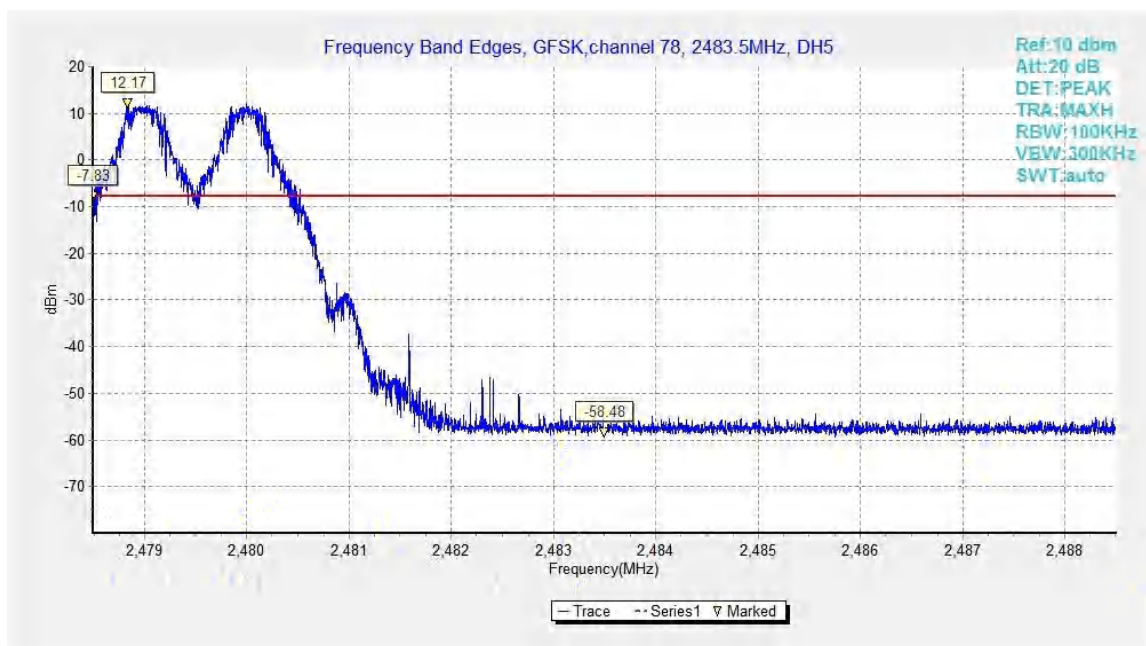


Fig.4. Frequency Band Edges: GFSK, Channel 78, Hopping On

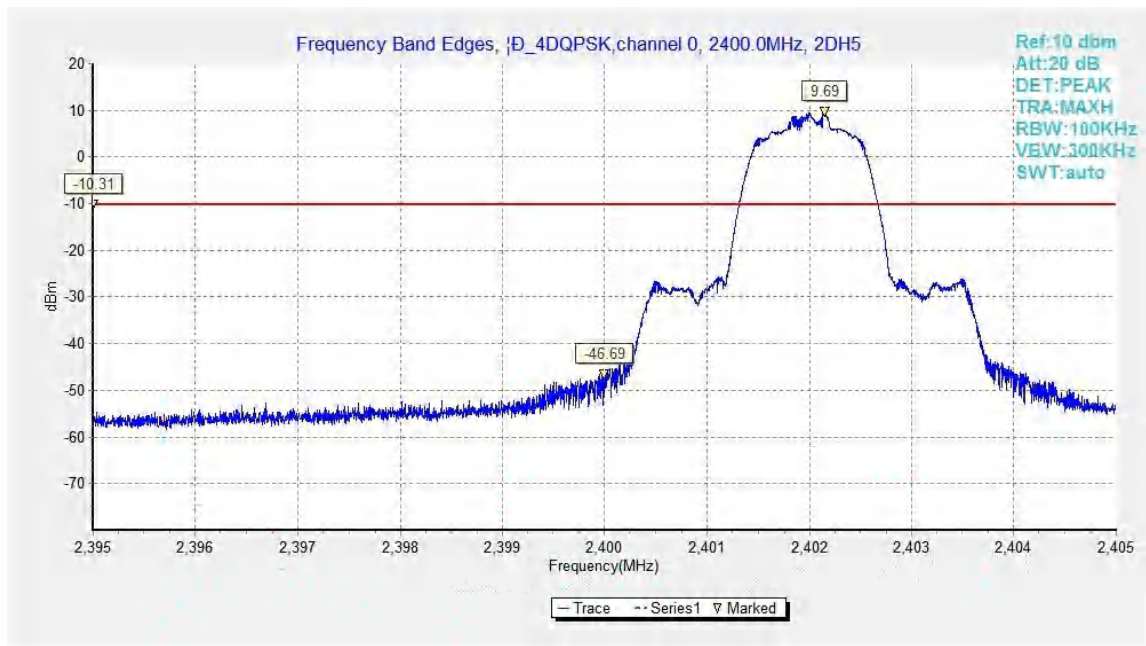


Fig.5. Frequency Band Edges:  $\pi/4$  DQPSK, Channel 0, Hopping Off

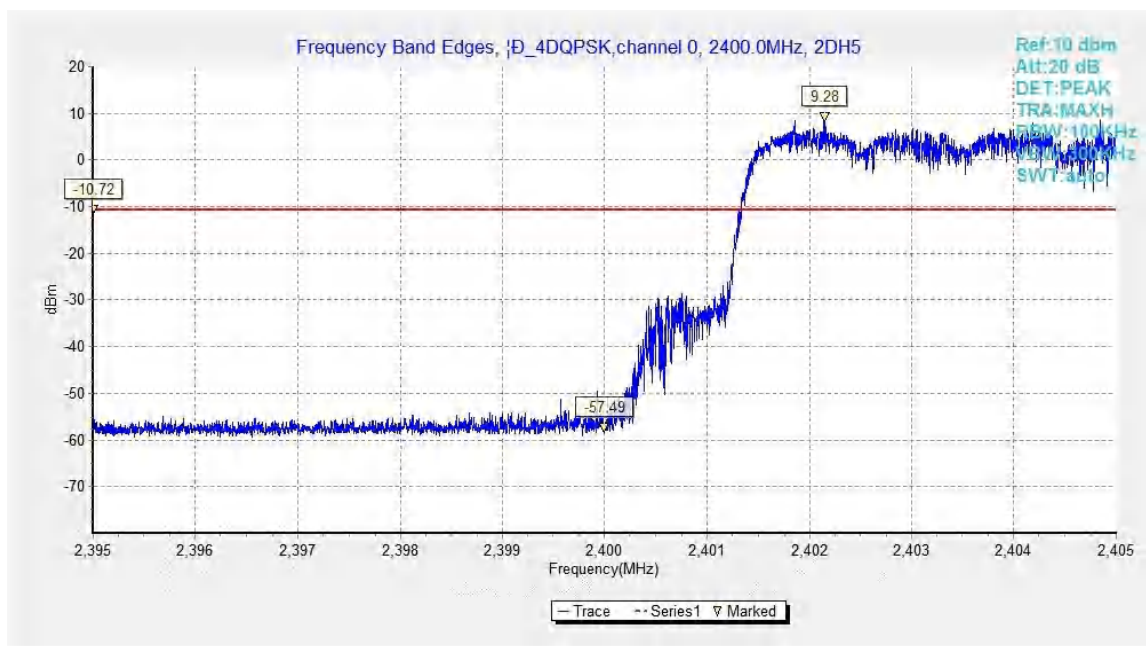


Fig.6. Frequency Band Edges:  $\pi/4$  DQPSK, Channel 0, Hopping On

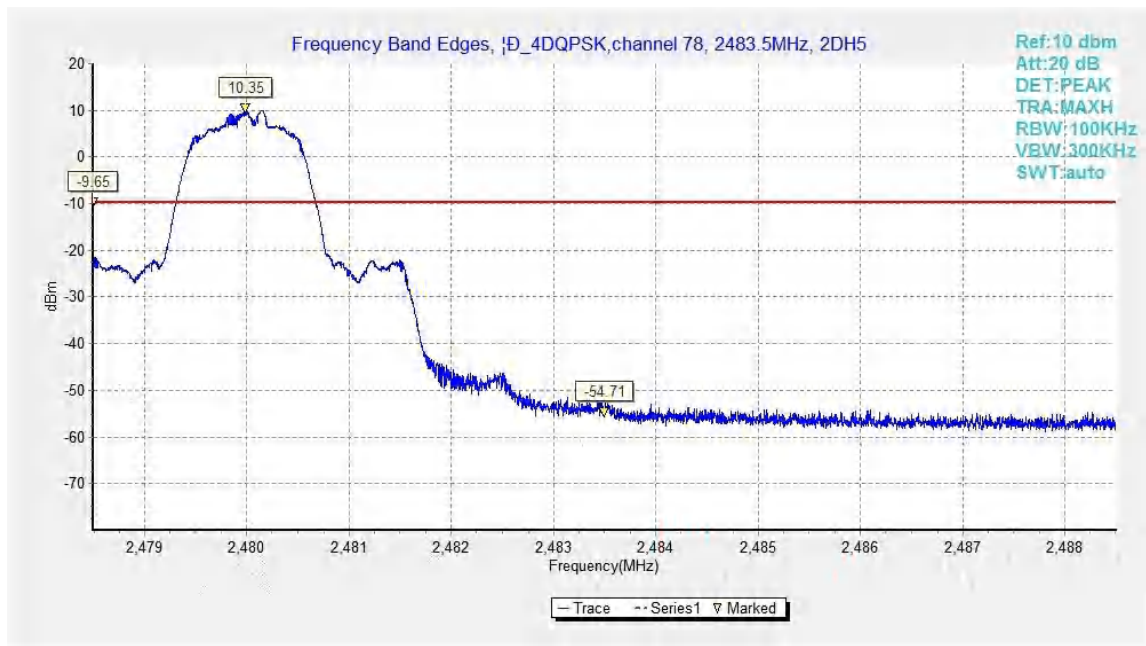


Fig.7. Frequency Band Edges:  $\pi/4$  DQPSK, Channel 78, Hopping Off

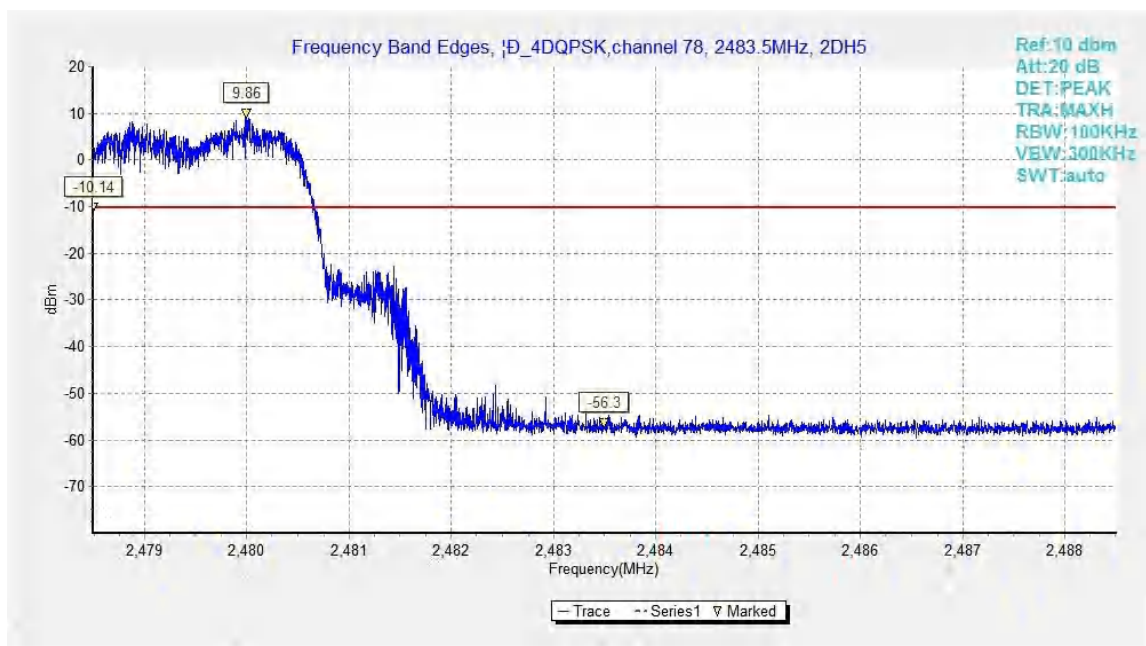


Fig.8. Frequency Band Edges:  $\pi/4$  DQPSK, Channel 78, Hopping On

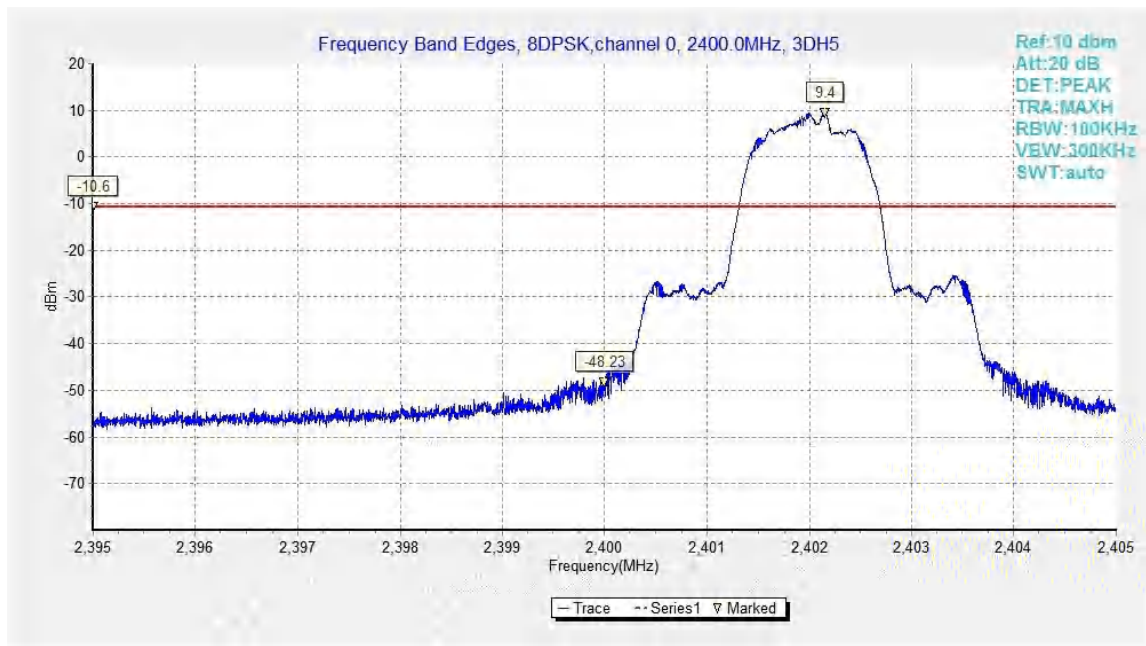


Fig.9. Frequency Band Edges: 8DPSK, Channel 0, Hopping Off

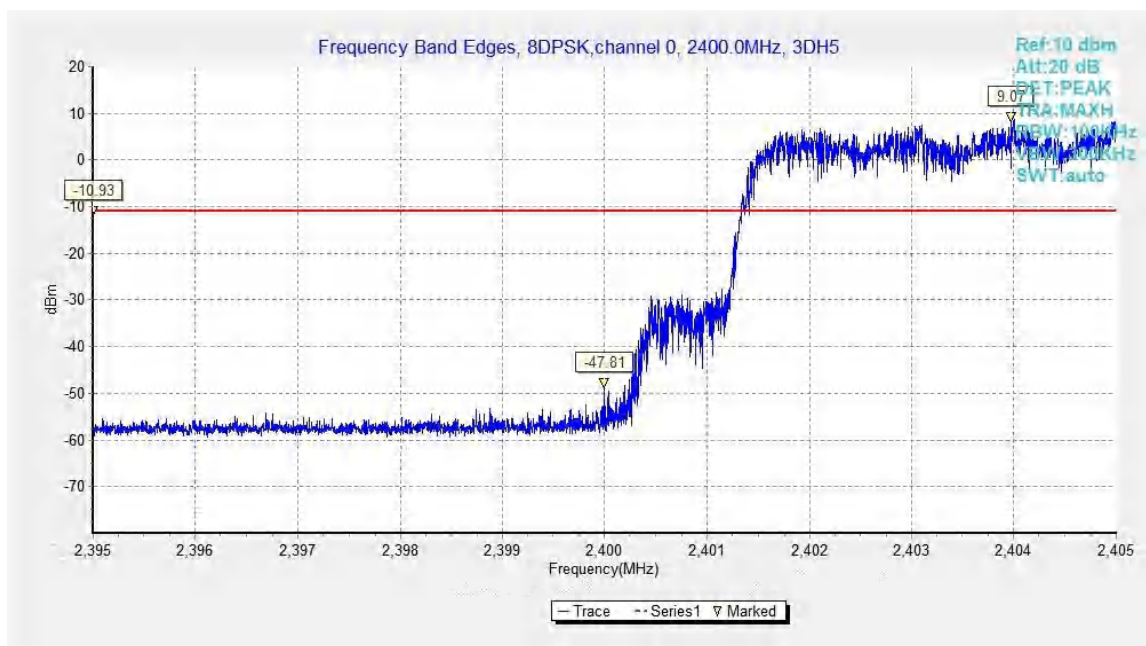


Fig.10. Frequency Band Edges: 8DPSK, Channel 0, Hopping On

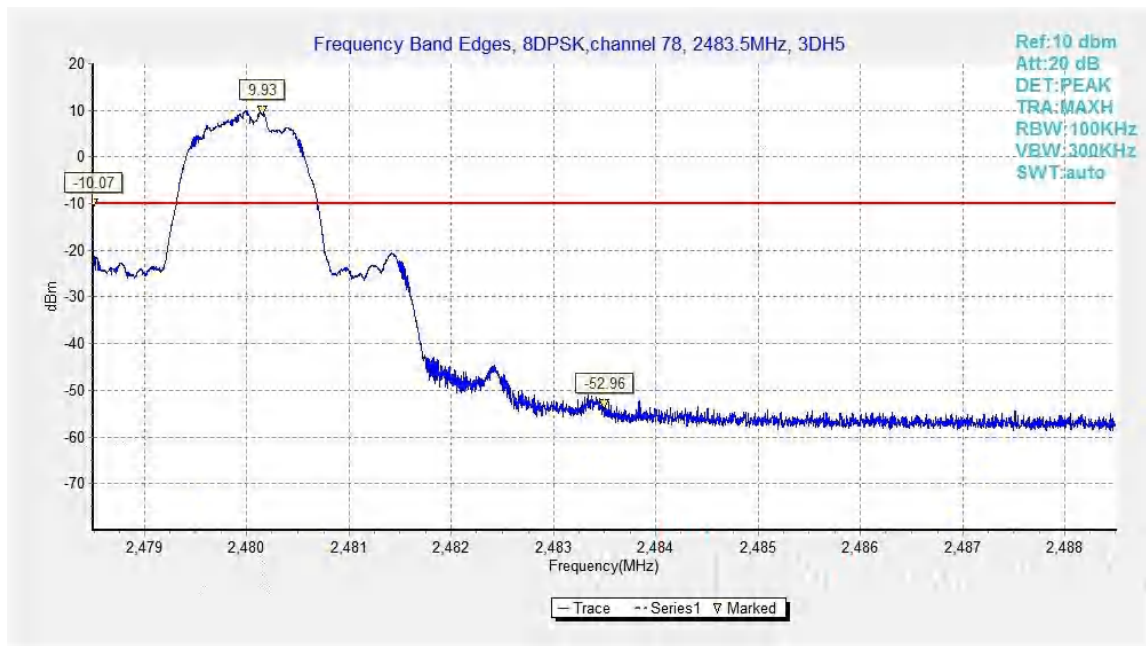


Fig.11. Frequency Band Edges: 8DPSK, Channel 78, Hopping Off

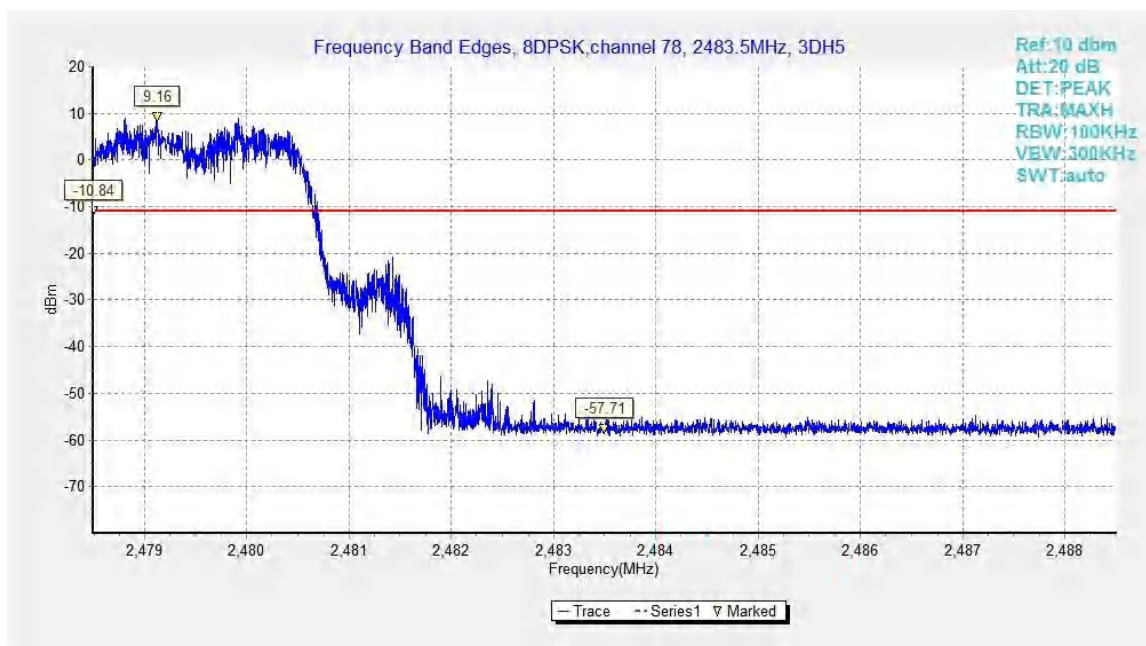


Fig.12. Frequency Band Edges: 8DPSK, Channel 78, Hopping On

## B.4. Transmitter Spurious Emission - Conducted

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

Measurement Procedure – Reference Level

1. Set the RBW = 100 kHz.
2. Set the VBW = 300 kHz.
3. Set the span to 5-30 % greater than the EBW.
4. Detector = peak.
5. Sweep time = auto couple.
6. Trace mode = max hold.
7. Allow trace to fully stabilize.
8. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW. Next, determine the power in 100 kHz band segments outside of the authorized frequency band using the following measurement:

Measurement Procedure - Unwanted Emissions

1. Set RBW = 100 kHz.
2. Set VBW = 300 kHz.
3. Set span to encompass the spectrum to be examined.
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) is attenuated by at least the minimum requirements specified above.

**Measurement Limit:**

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

**Measurement Results:**

**For GFSK**

| Channel | Frequency Range  | Test Results | Conclusion |
|---------|------------------|--------------|------------|
| Ch 0    | Center Frequency | Fig.13       | P          |

|                   |                  |        |   |
|-------------------|------------------|--------|---|
| 2402 MHz          | 30 MHz ~ 1 GHz   | Fig.14 | P |
|                   | 1 GHz ~ 3 GHz    | Fig.15 | P |
|                   | 3 GHz ~ 10 GHz   | Fig.16 | P |
|                   | 10 GHz ~ 26 GHz  | Fig.17 | P |
| Ch 39<br>2441 MHz | Center Frequency | Fig.18 | P |
|                   | 30 MHz ~ 1 GHz   | Fig.19 | P |
|                   | 1 GHz ~ 3 GHz    | Fig.20 | P |
|                   | 3 GHz ~ 10 GHz   | Fig.21 | P |
|                   | 10 GHz ~ 26 GHz  | Fig.22 | P |
| Ch 78<br>2480 MHz | Center Frequency | Fig.23 | P |
|                   | 30 MHz ~ 1 GHz   | Fig.24 | P |
|                   | 1 GHz ~ 3 GHz    | Fig.25 | P |
|                   | 3 GHz ~ 10 GHz   | Fig.26 | P |
|                   | 10 GHz ~ 26 GHz  | Fig.27 | P |

#### For $\pi/4$ DQPSK

| Channel           | Frequency Range  | Test Results | Conclusion |
|-------------------|------------------|--------------|------------|
| Ch 0<br>2402 MHz  | Center Frequency | Fig.28       | P          |
|                   | 30 MHz ~ 1 GHz   | Fig.29       | P          |
|                   | 1 GHz ~ 3 GHz    | Fig.30       | P          |
|                   | 3 GHz ~ 10 GHz   | Fig.31       | P          |
|                   | 10 GHz ~ 26 GHz  | Fig.32       | P          |
| Ch 39<br>2441 MHz | Center Frequency | Fig.33       | P          |
|                   | 30 MHz ~ 1 GHz   | Fig.34       | P          |
|                   | 1 GHz ~ 3 GHz    | Fig.35       | P          |
|                   | 3 GHz ~ 10 GHz   | Fig.36       | P          |
|                   | 10 GHz ~ 26 GHz  | Fig.37       | P          |
| Ch 78<br>2480 MHz | Center Frequency | Fig.38       | P          |
|                   | 30 MHz ~ 1 GHz   | Fig.39       | P          |
|                   | 1 GHz ~ 3 GHz    | Fig.40       | P          |
|                   | 3 GHz ~ 10 GHz   | Fig.41       | P          |
|                   | 10 GHz ~ 26 GHz  | Fig.42       | P          |

#### For 8DPSK

| Channel          | Frequency Range  | Test Results | Conclusion |
|------------------|------------------|--------------|------------|
| Ch 0<br>2402 MHz | Center Frequency | Fig.43       | P          |
|                  | 30 MHz ~ 1 GHz   | Fig.44       | P          |
|                  | 1 GHz ~ 3 GHz    | Fig.45       | P          |
|                  | 3 GHz ~ 10 GHz   | Fig.46       | P          |
|                  | 10 GHz ~ 26 GHz  | Fig.47       | P          |

|                   |                  |        |   |
|-------------------|------------------|--------|---|
| Ch 39<br>2441 MHz | Center Frequency | Fig.48 | P |
|                   | 30 MHz ~ 1 GHz   | Fig.49 | P |
|                   | 1 GHz ~ 3 GHz    | Fig.50 | P |
|                   | 3 GHz ~ 10 GHz   | Fig.51 | P |
|                   | 10 GHz ~ 26 GHz  | Fig.52 | P |
| Ch 78<br>2480 MHz | Center Frequency | Fig.53 | P |
|                   | 30 MHz ~ 1 GHz   | Fig.54 | P |
|                   | 1 GHz ~ 3 GHz    | Fig.55 | P |
|                   | 3 GHz ~ 10 GHz   | Fig.56 | P |
|                   | 10 GHz ~ 26 GHz  | Fig.57 | P |

**Conclusion: PASS**

**Test graphs as below**

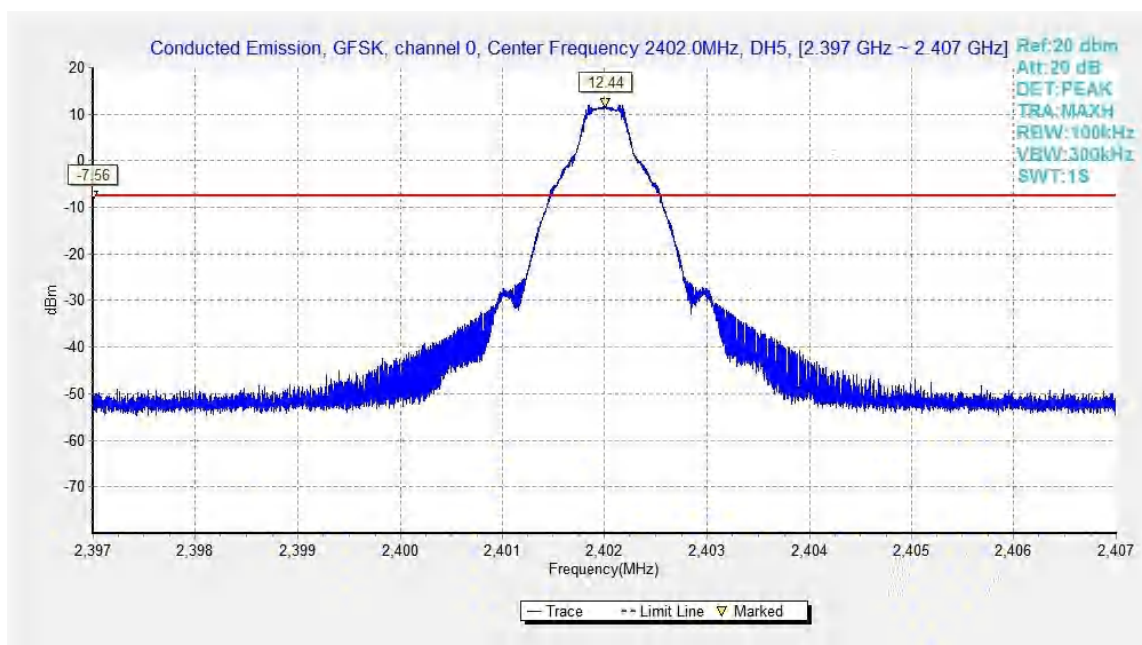


Fig.13. Conducted spurious emission: GFSK, Channel 0, 2402MHz

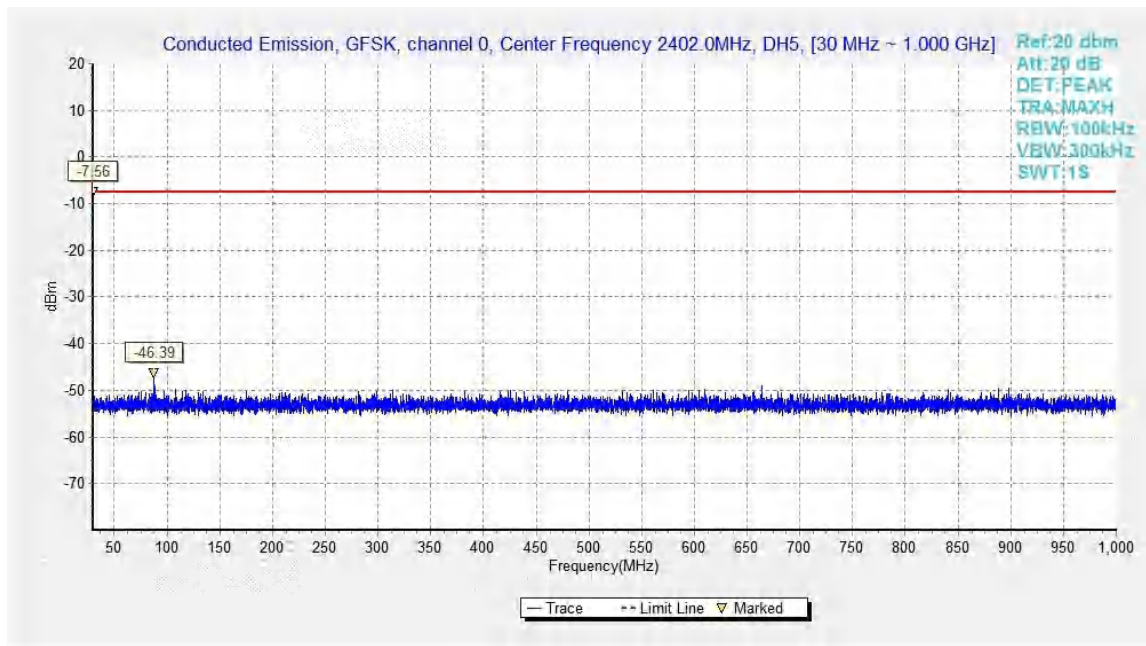


Fig.14. Conducted spurious emission: GFSK, Channel 0, 30MHz - 1GHz

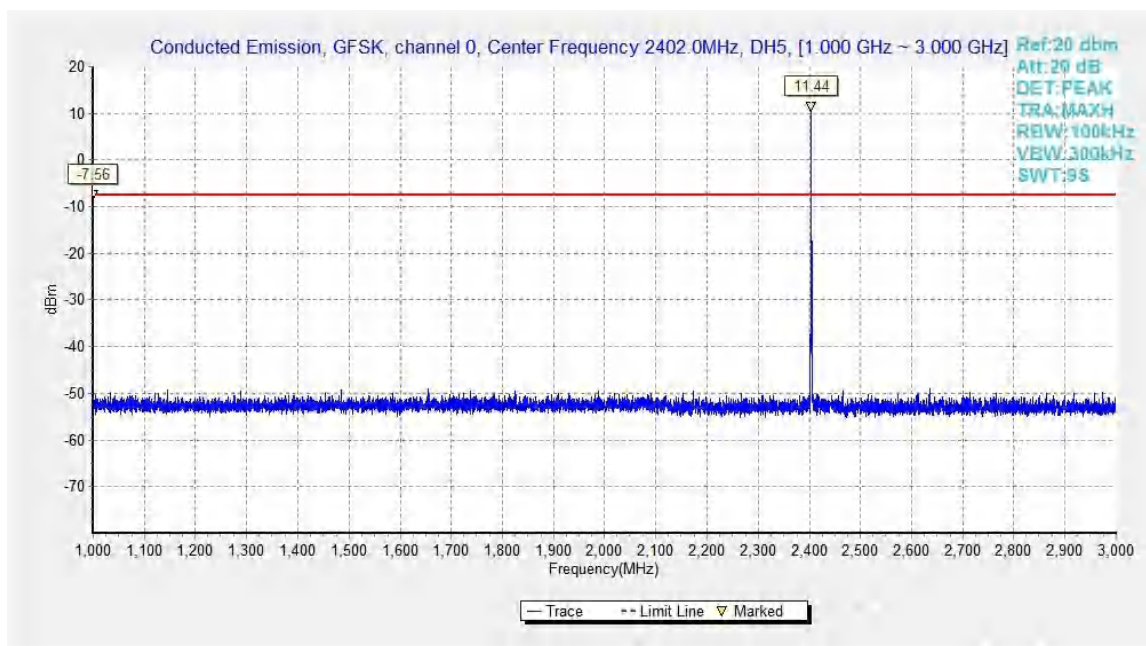


Fig.15. Conducted spurious emission: GFSK, Channel 0, 1GHz - 3GHz

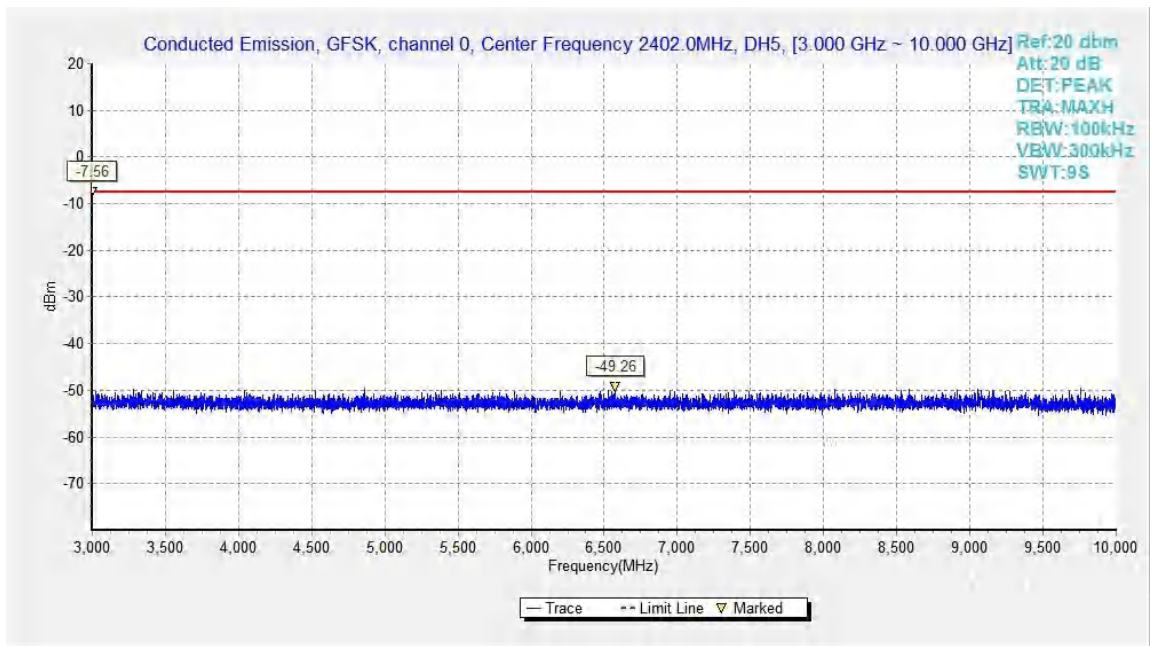


Fig.16. Conducted spurious emission: GFSK, Channel 0, 3GHz - 10GHz

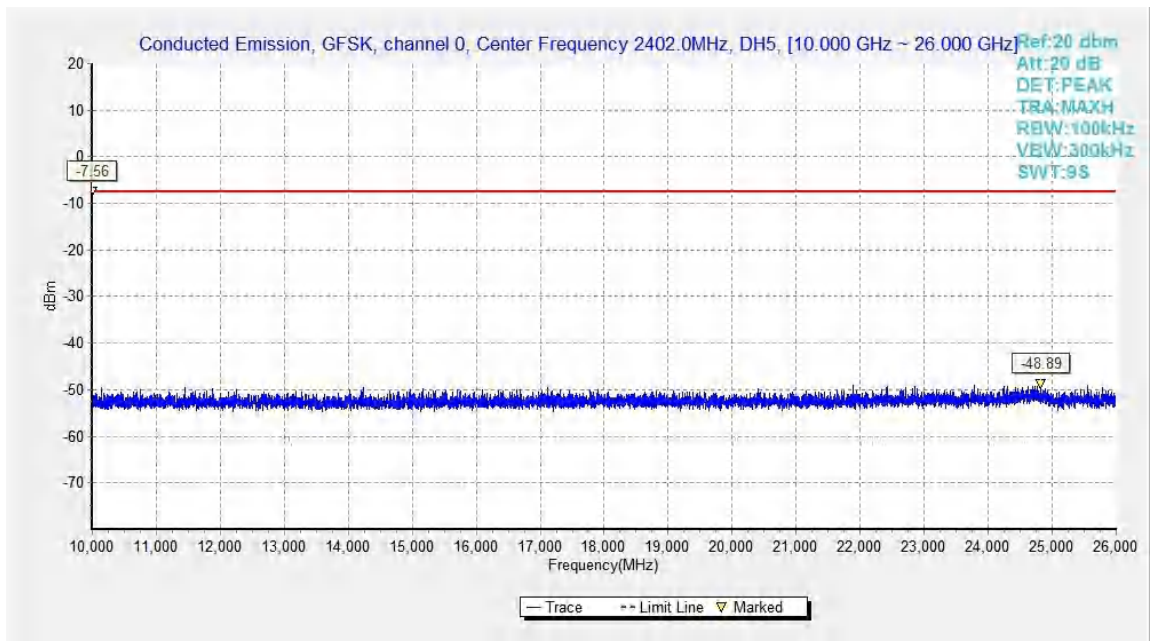


Fig.17. Conducted spurious emission: GFSK, Channel 0, 10GHz - 26GHz

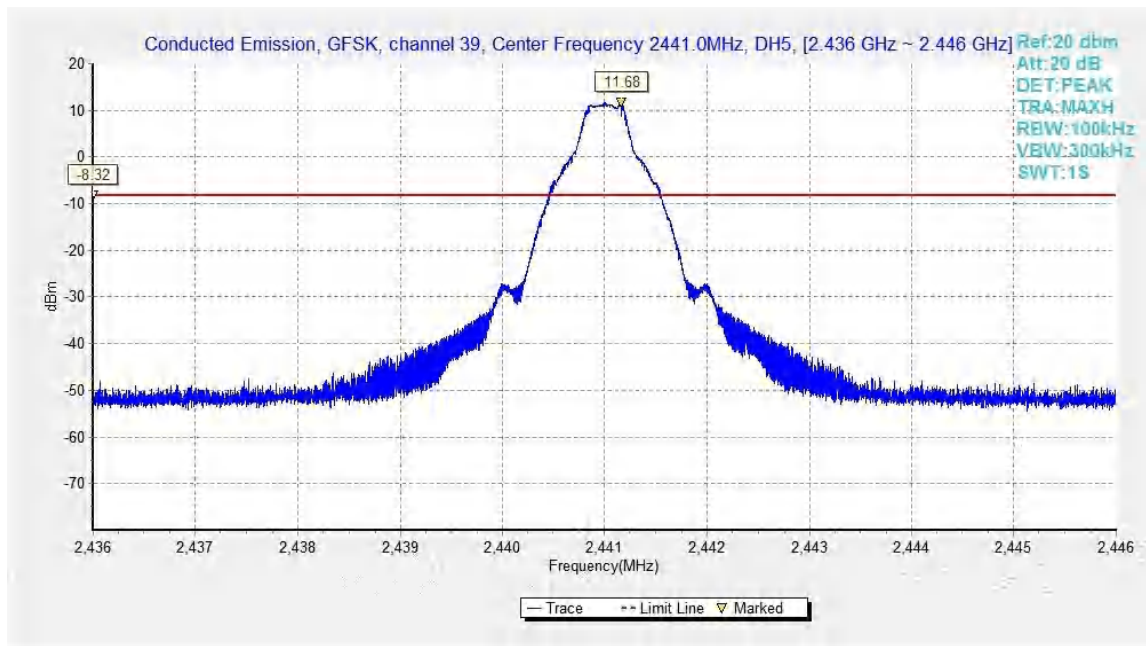


Fig.18. Conducted spurious emission: GFSK, Channel 39, 2441MHz

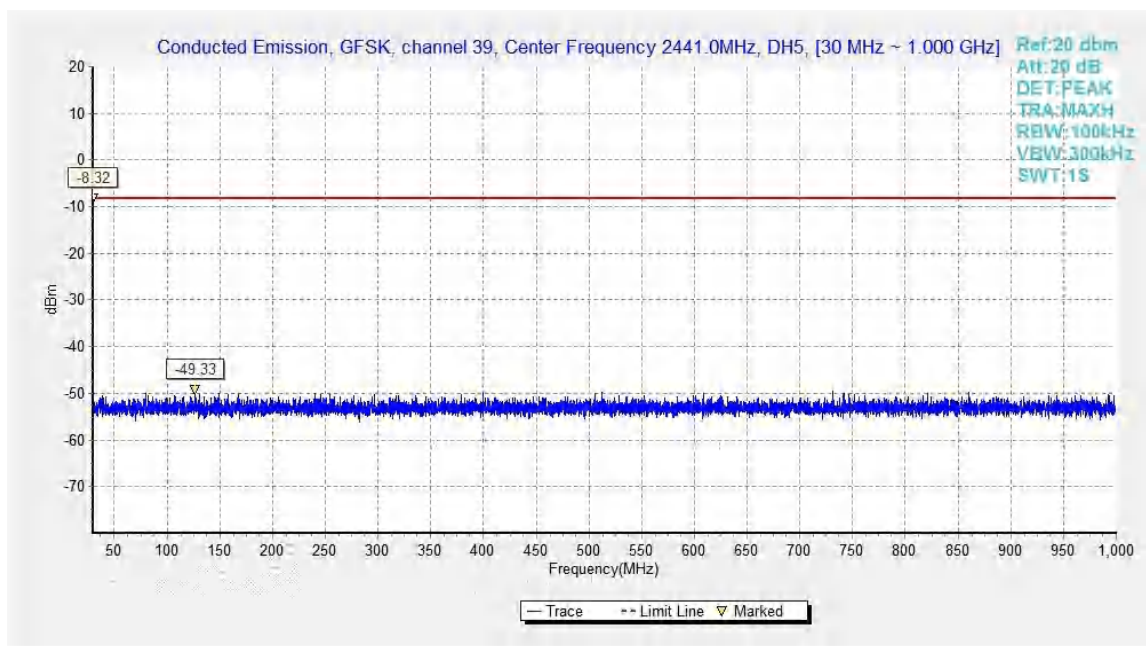


Fig.19. Conducted spurious emission: GFSK, Channel 39, 30MHz - 1GHz

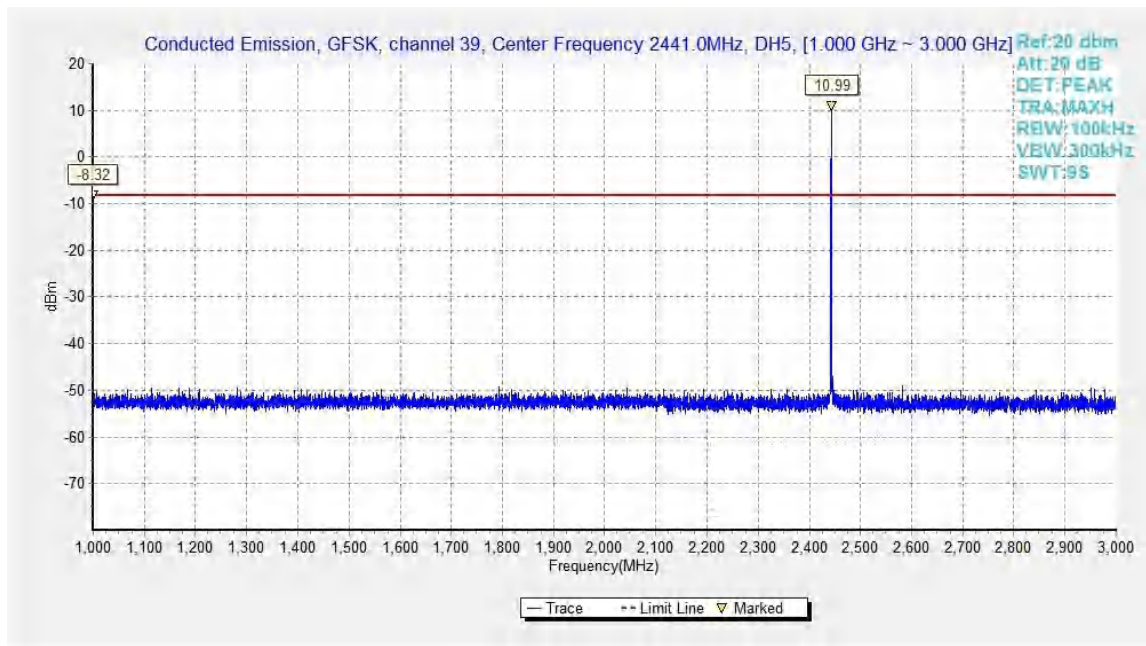


Fig.20. Conducted spurious emission: GFSK, Channel 39, 1GHz – 3GHz

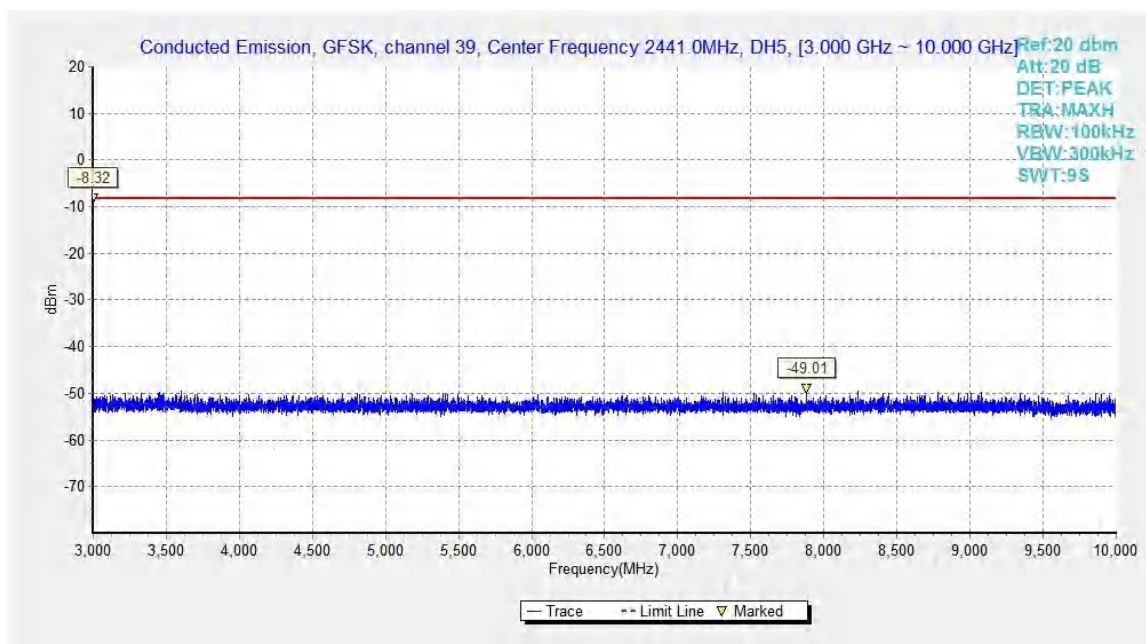


Fig.21. Conducted spurious emission: GFSK, Channel 39, 3GHz – 10GHz

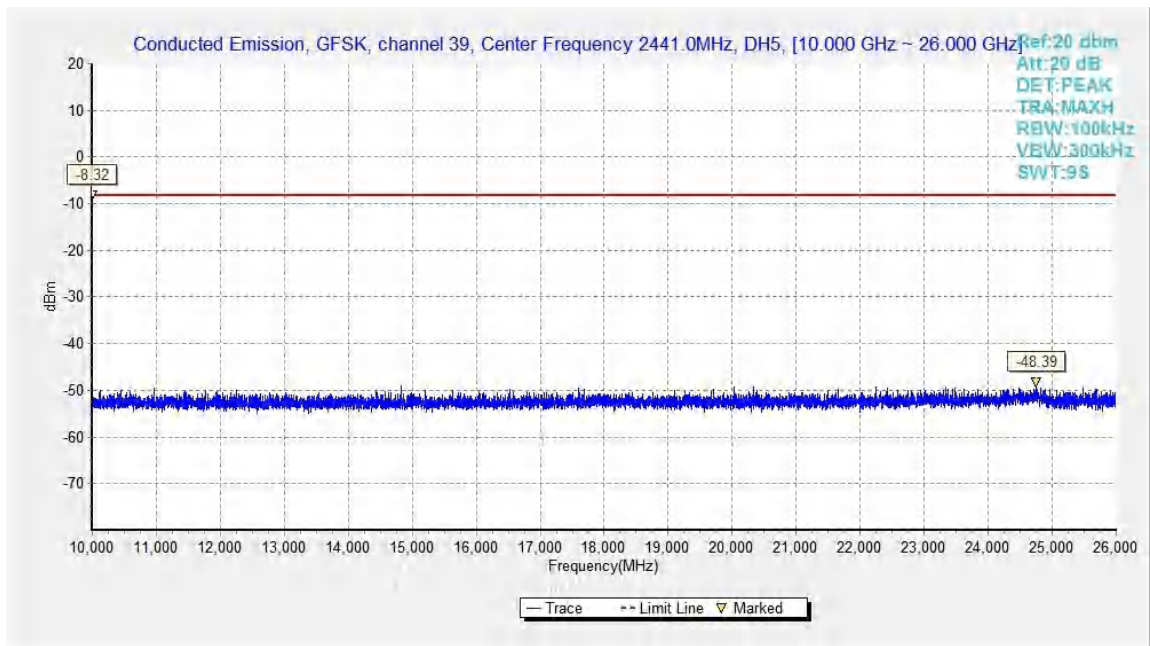


Fig.22. Conducted spurious emission: GFSK, Channel 39, 10GHz – 26GHz

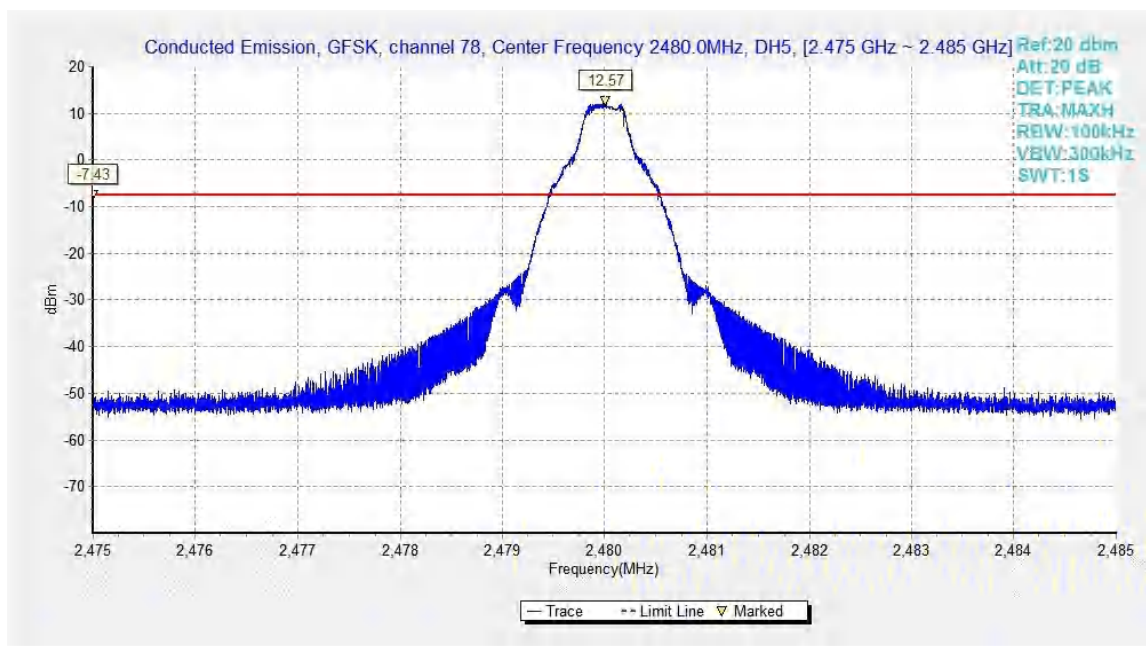


Fig.23. Conducted spurious emission: GFSK, Channel 78, 2480MHz

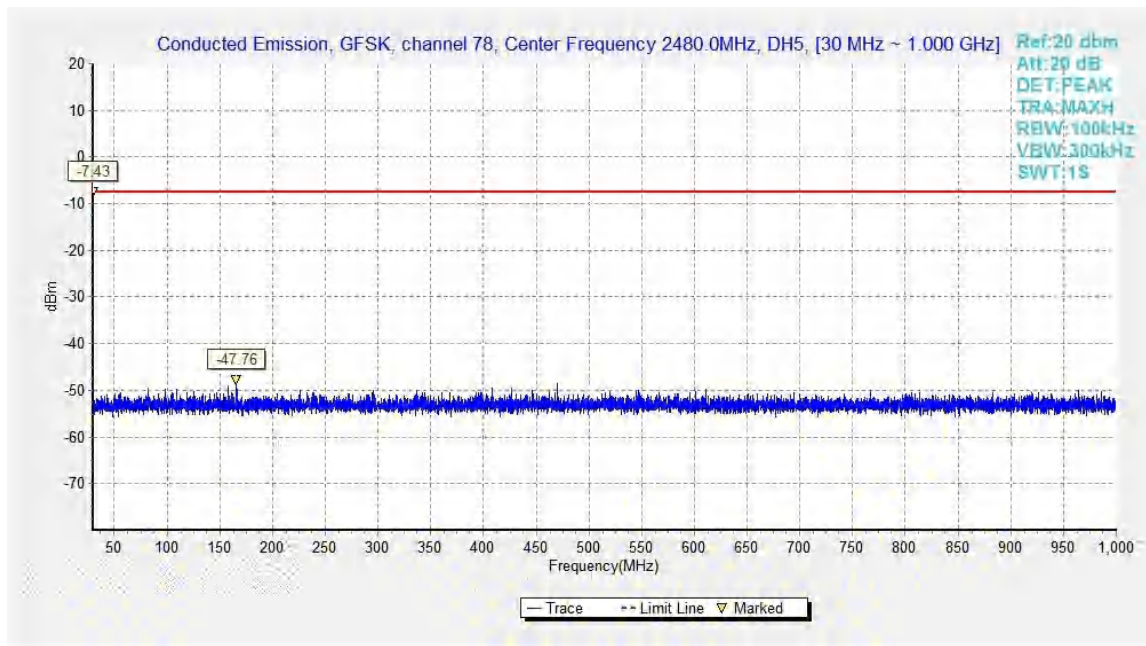


Fig.24. Conducted spurious emission: GFSK, Channel 78, 30MHz - 1GHz

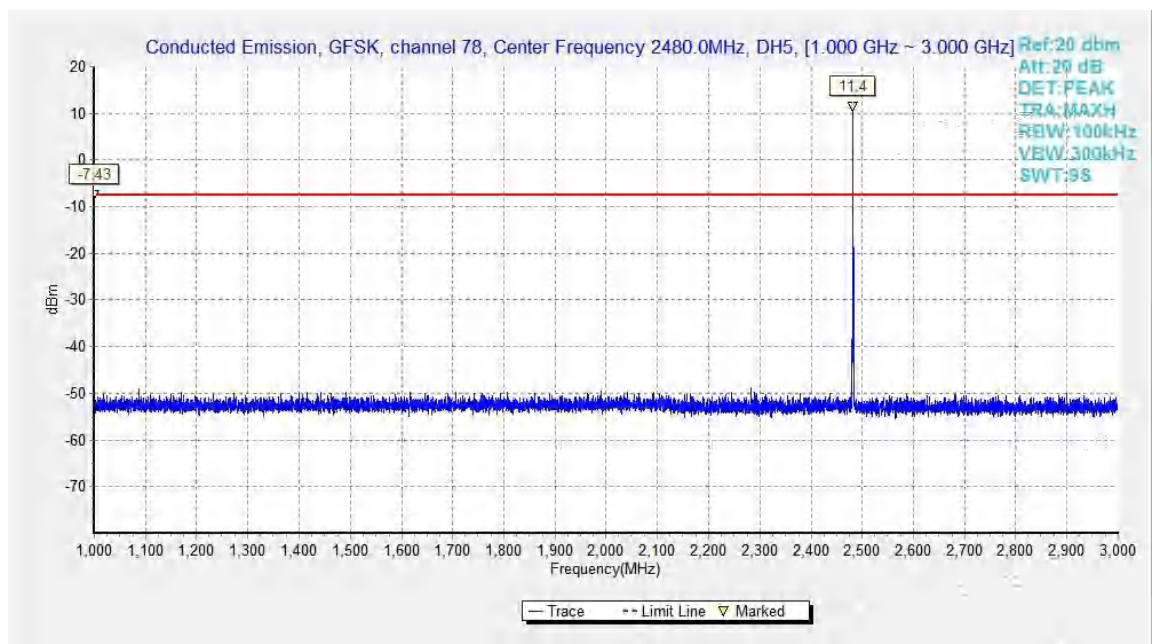


Fig.25. Conducted spurious emission: GFSK, Channel 78, 1GHz - 3GHz

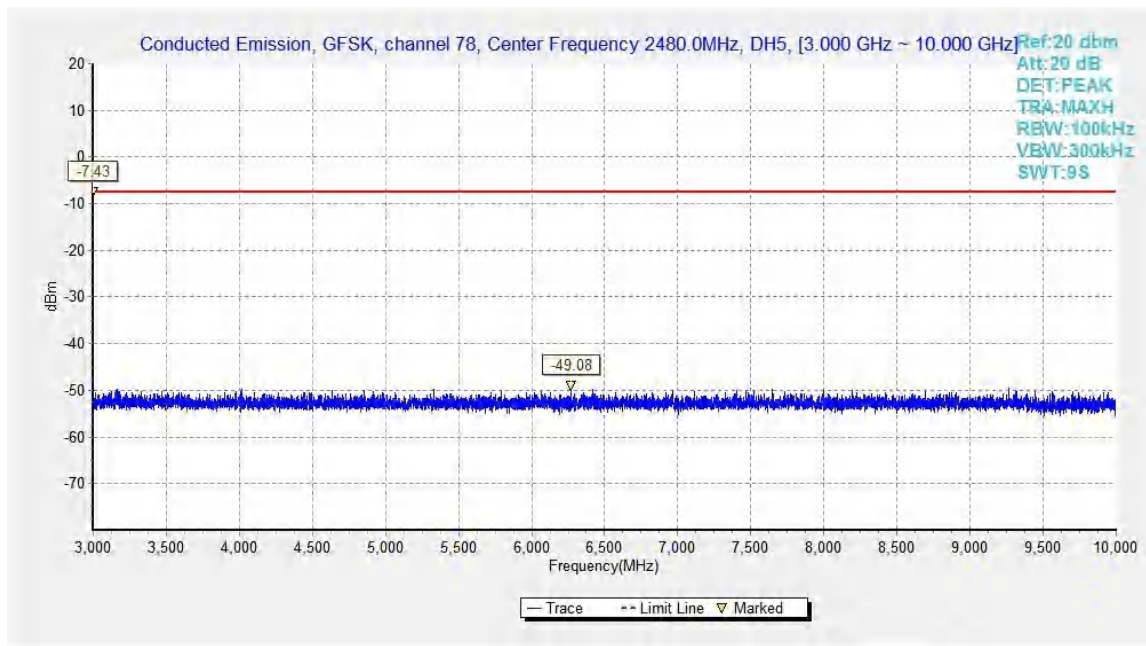


Fig.26. Conducted spurious emission: GFSK, Channel 78, 3GHz - 10GHz

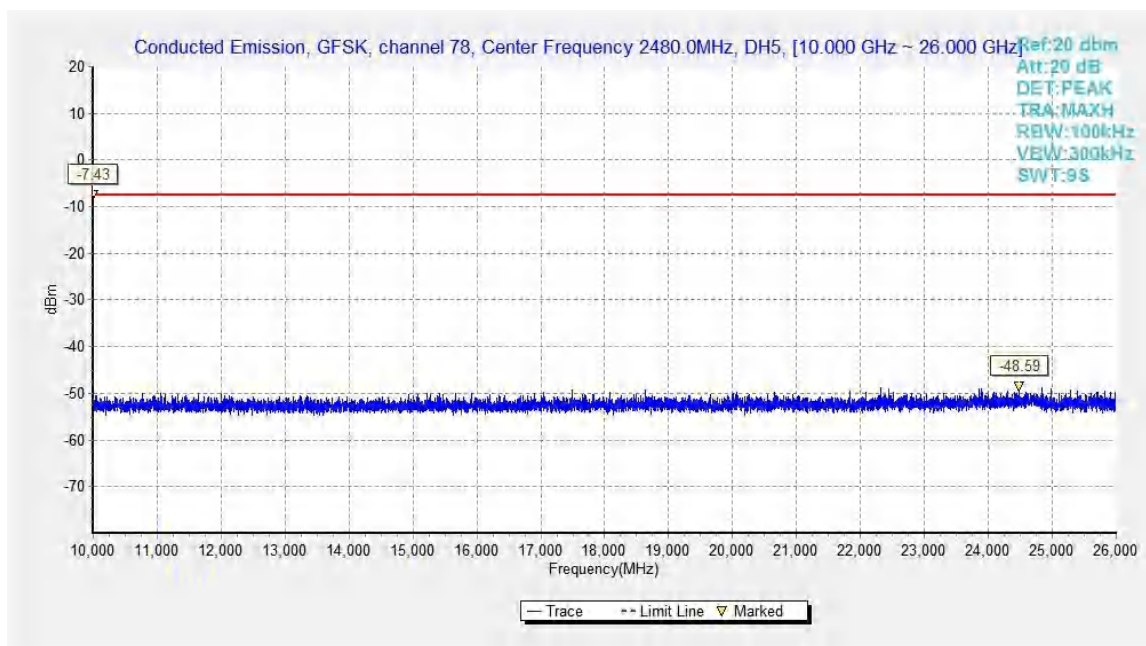


Fig.27. Conducted spurious emission: GFSK, Channel 78, 10GHz - 26GHz

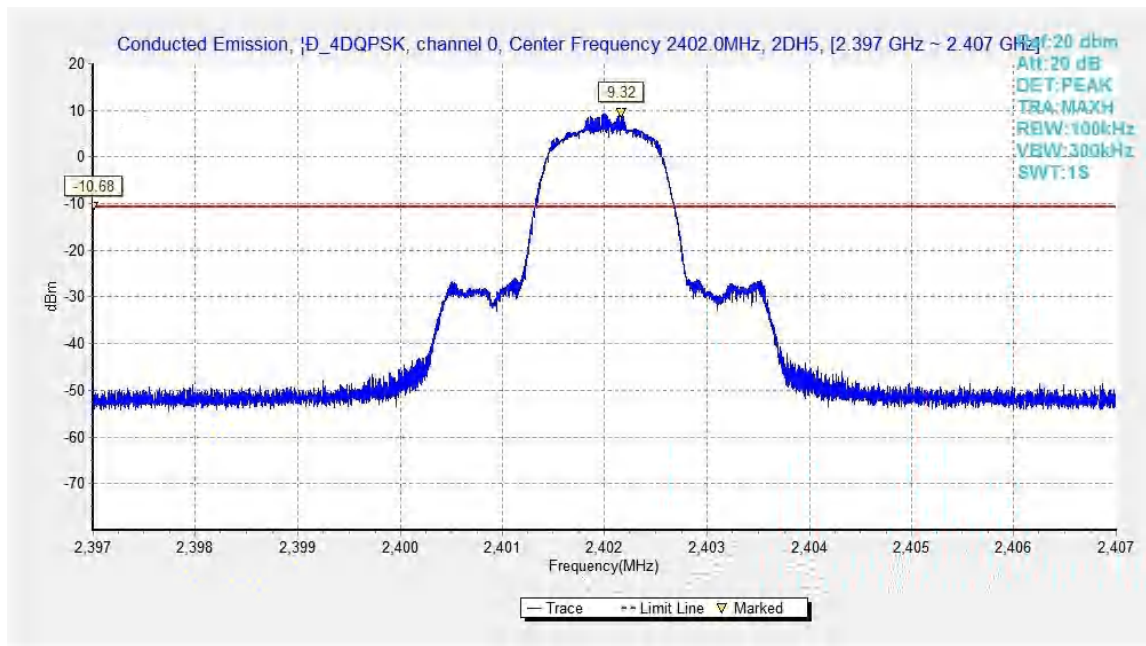


Fig.28. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 0, 2402MHz

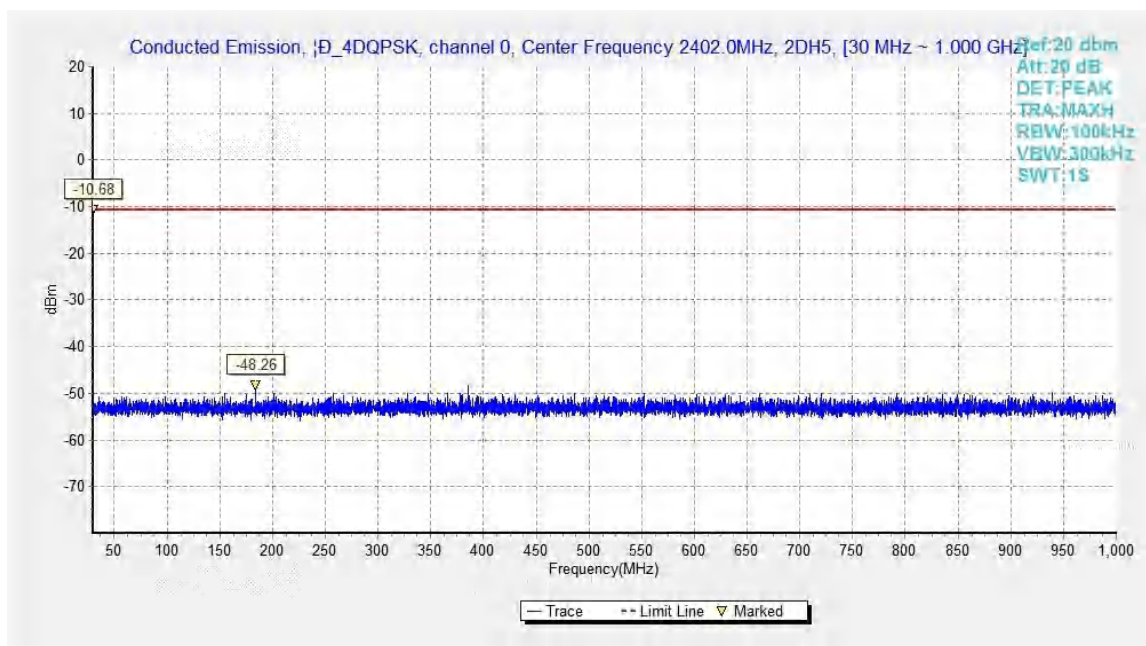


Fig.29. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 0, 30MHz - 1GHz

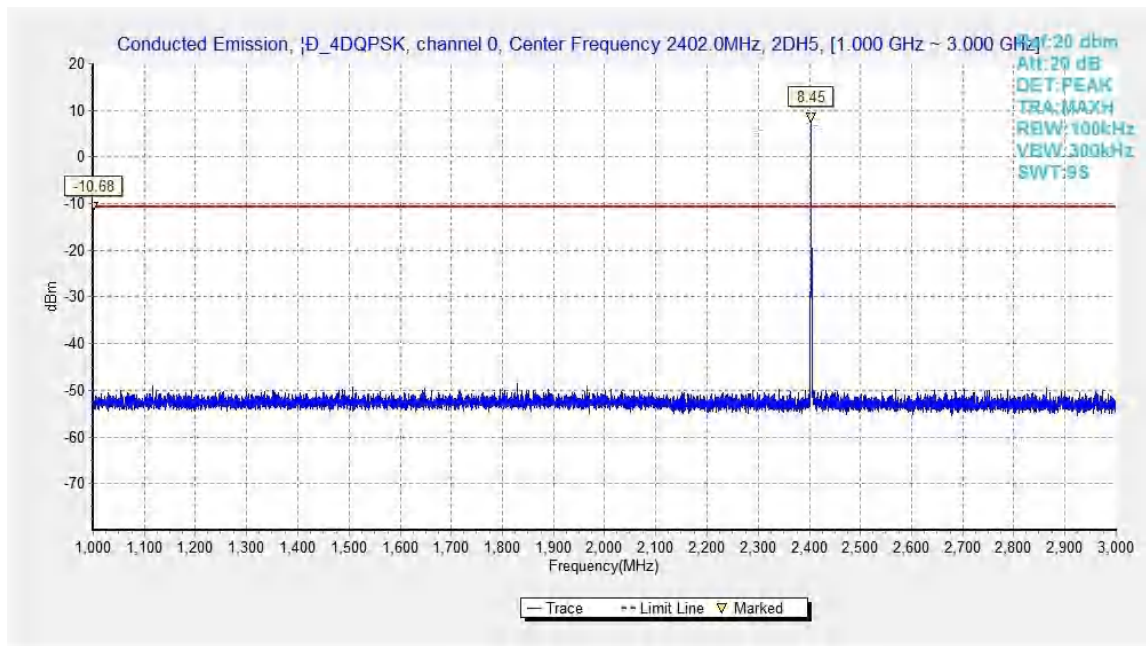


Fig.30. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 0, 1GHz - 3GHz

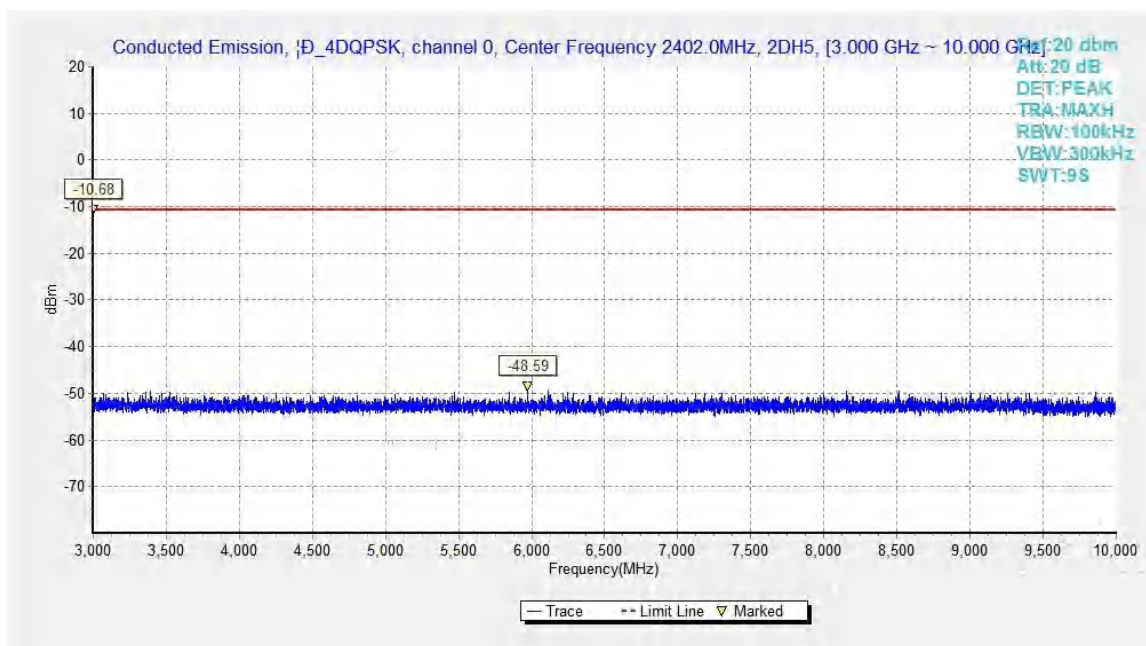


Fig.31. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 0, 3GHz - 10GHz

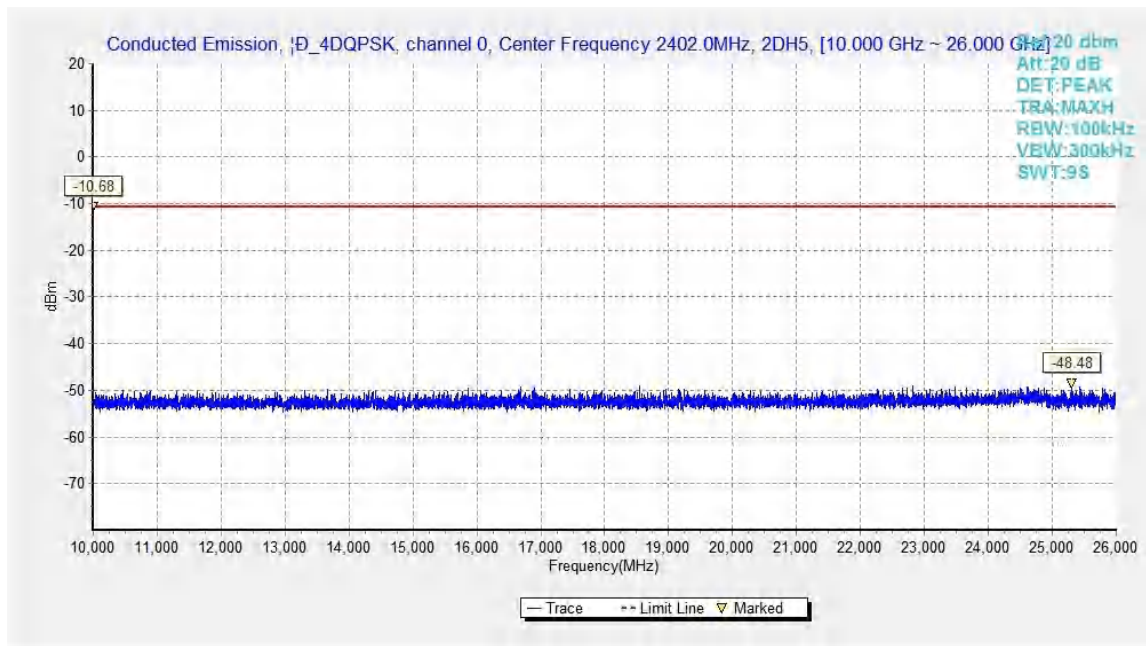


Fig.32. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 0, 10GHz - 26GHz

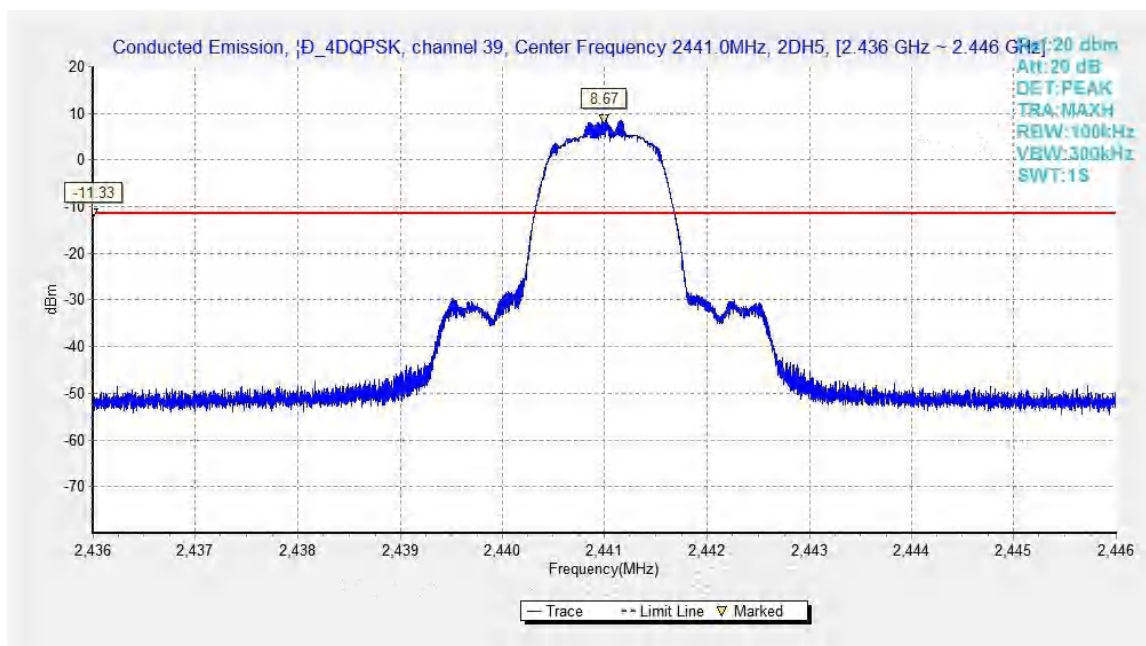


Fig.33. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 39, 2441MHz

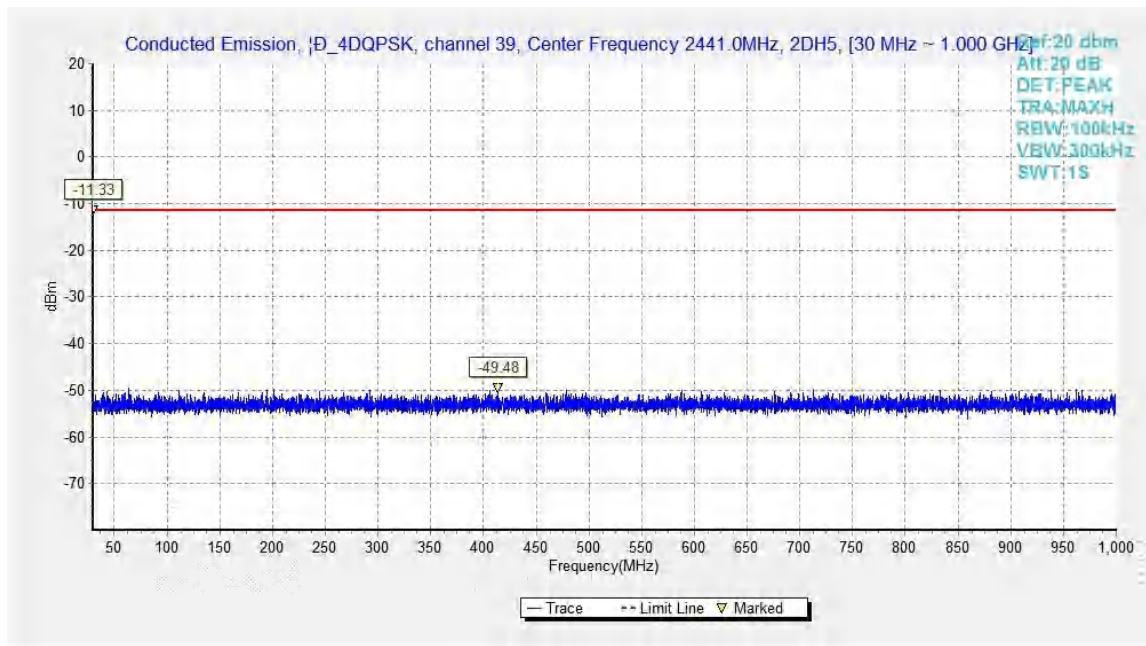


Fig.34. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 39, 30MHz - 1GHz

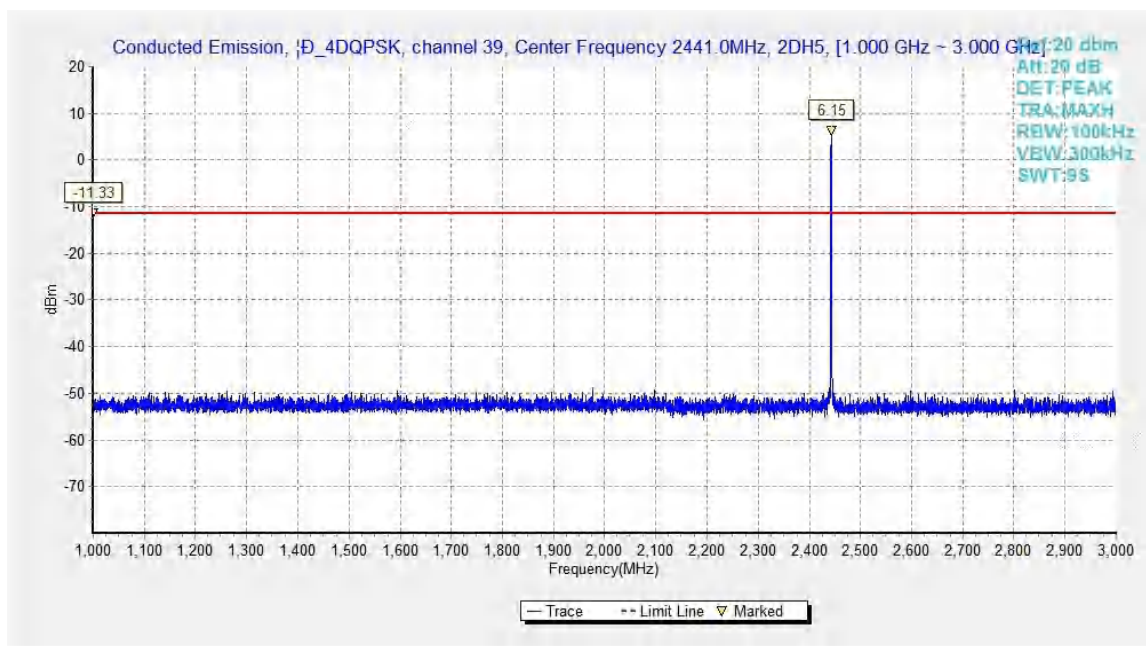


Fig.35. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 39, 1GHz - 3GHz

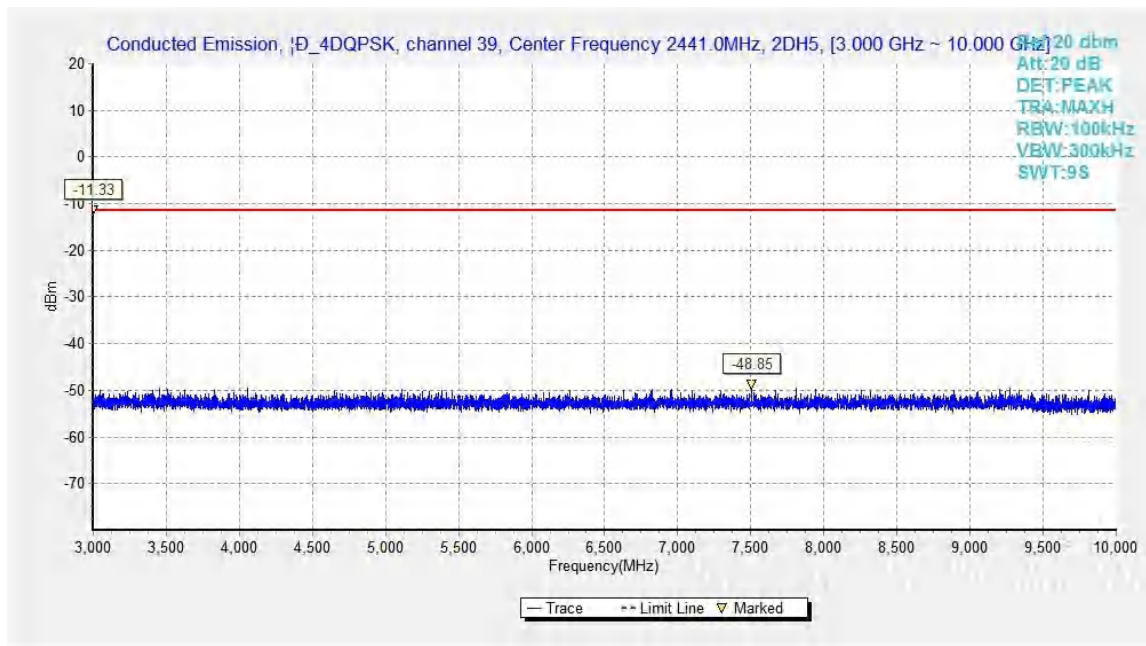


Fig.36. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 39, 3GHz - 10GHz

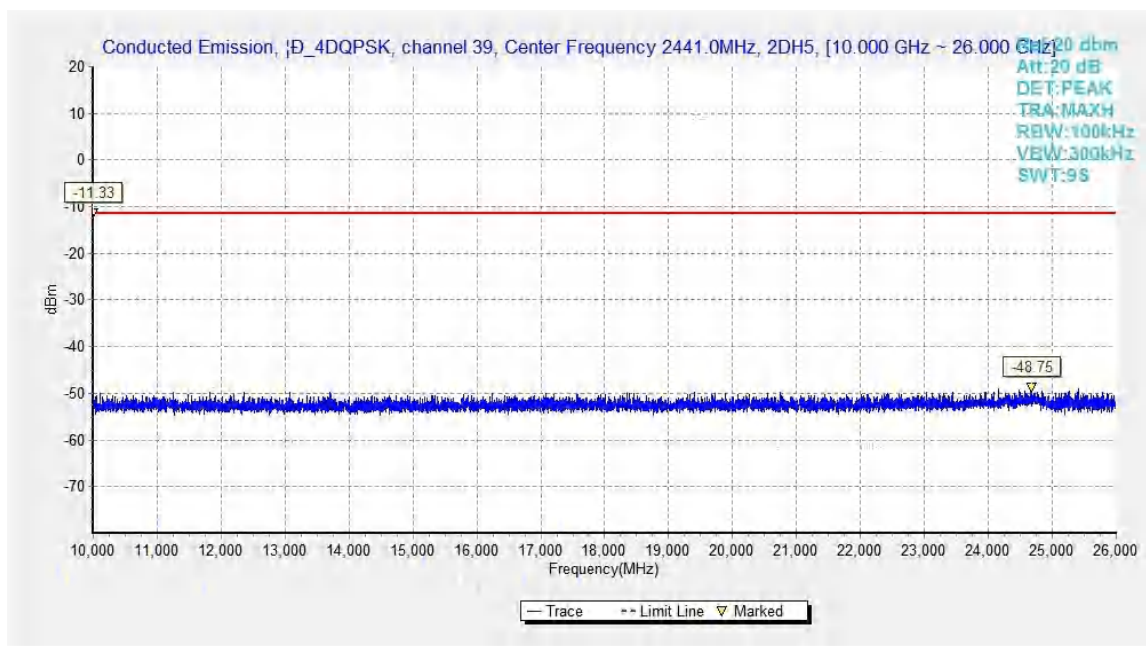


Fig.37. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 39, 10GHz – 26GHz

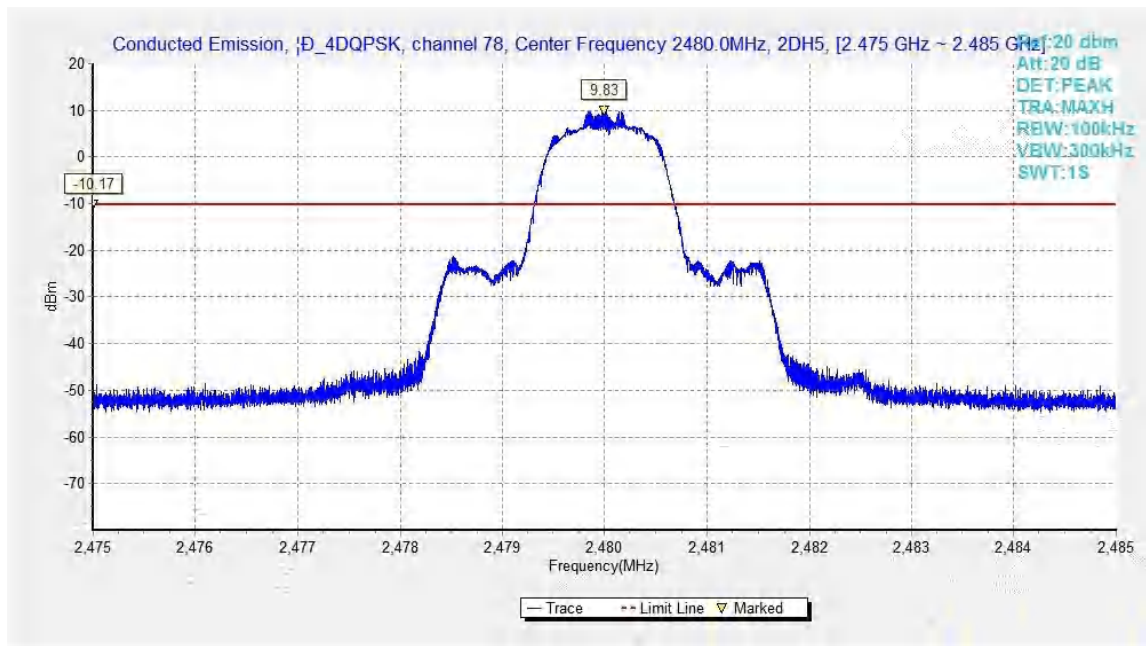


Fig.38. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 78, 2480MHz

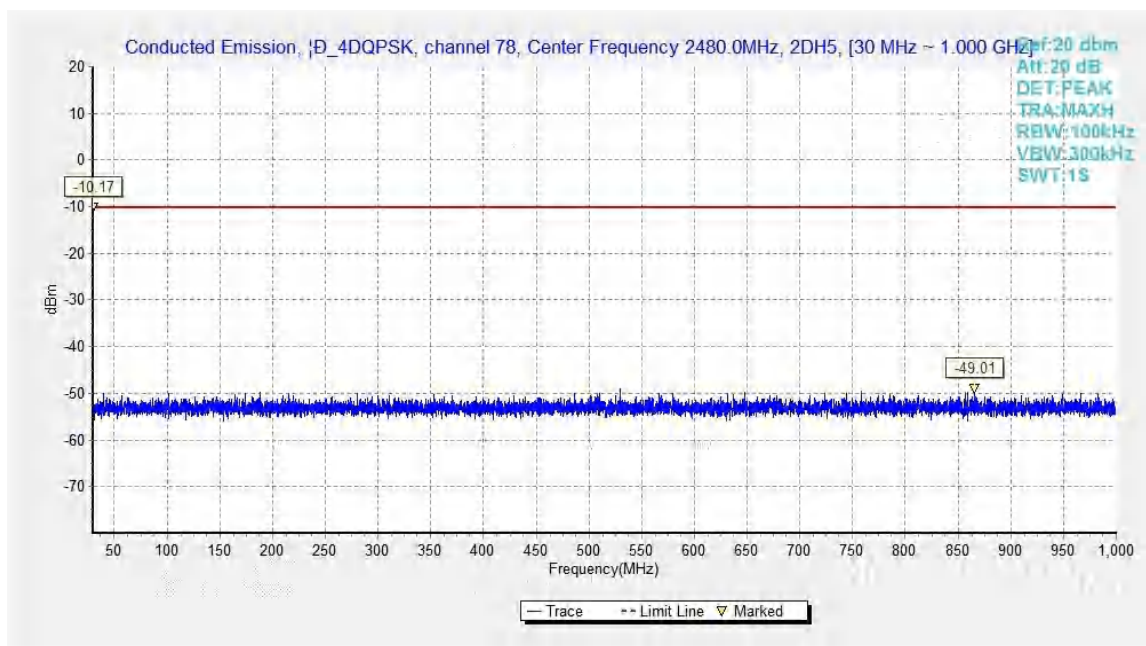


Fig.39. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 78, 30MHz - 1GHz

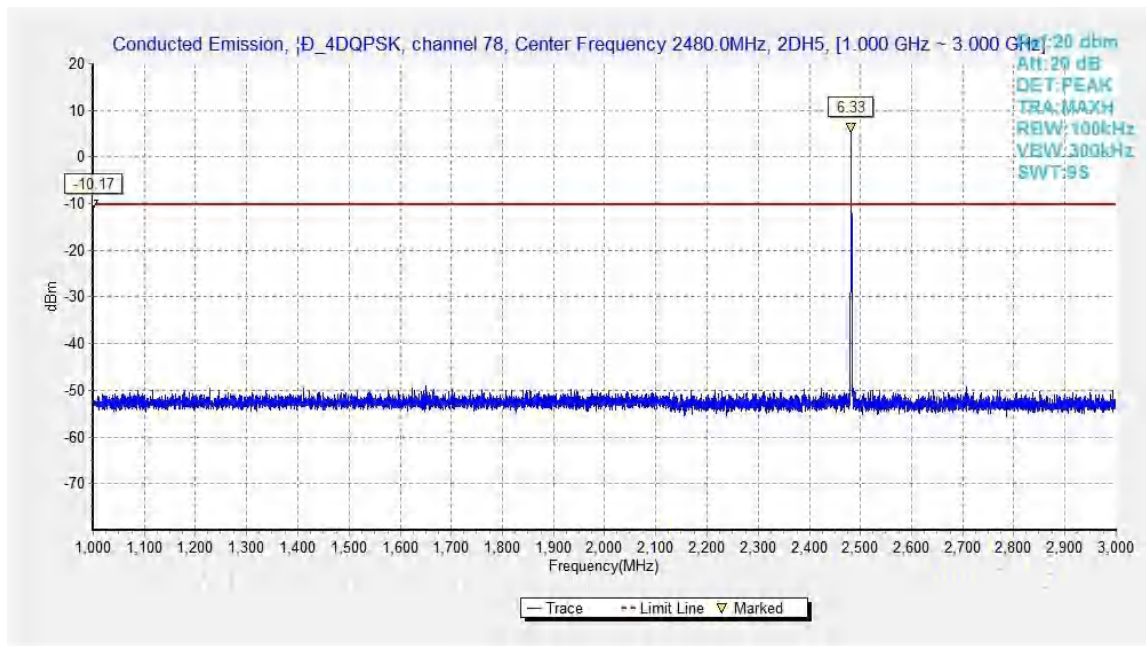


Fig.40. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 78, 1GHz - 3GHz

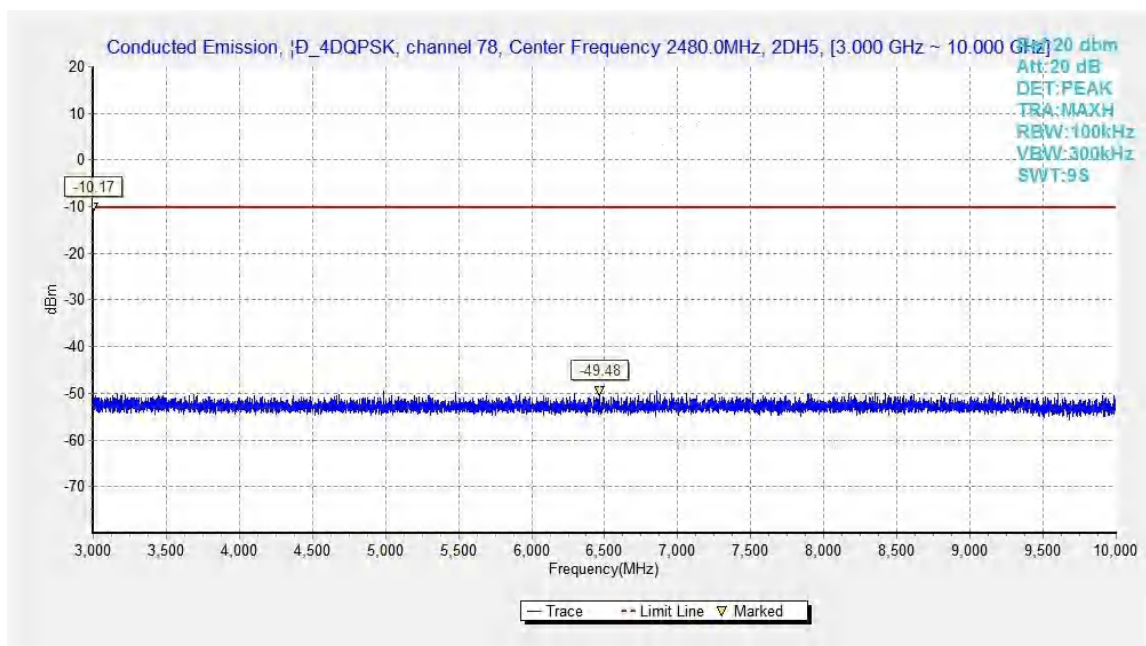


Fig.41. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 78, 3GHz - 10GHz

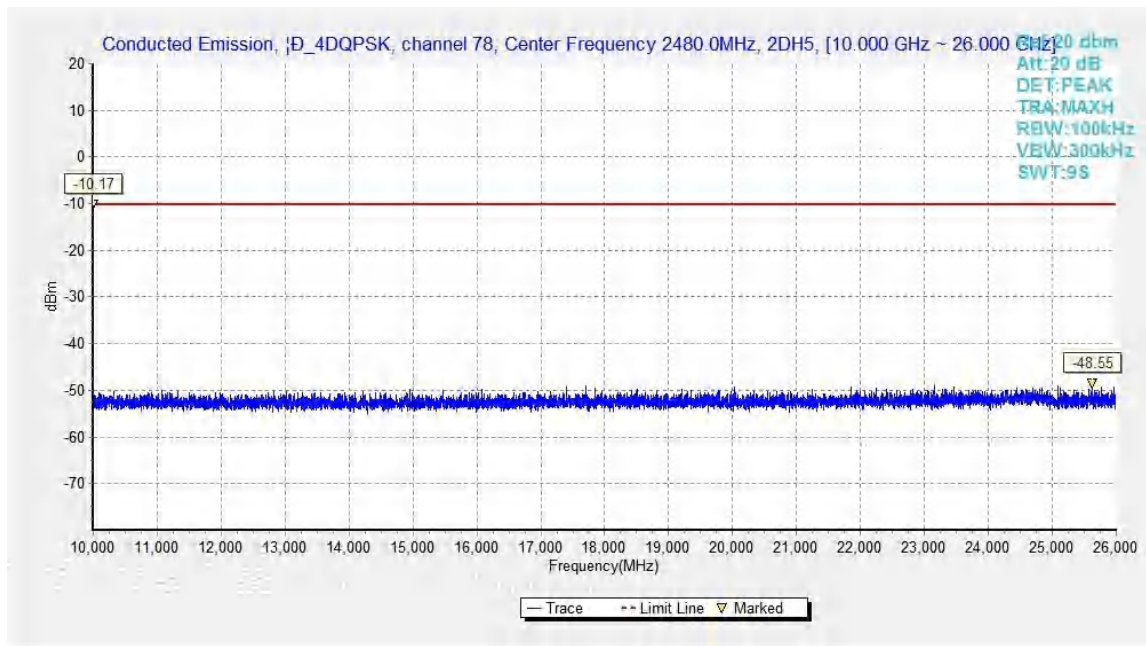


Fig.42. Conducted spurious emission:  $\pi/4$  DQPSK, Channel 78, 10GHz - 26GHz

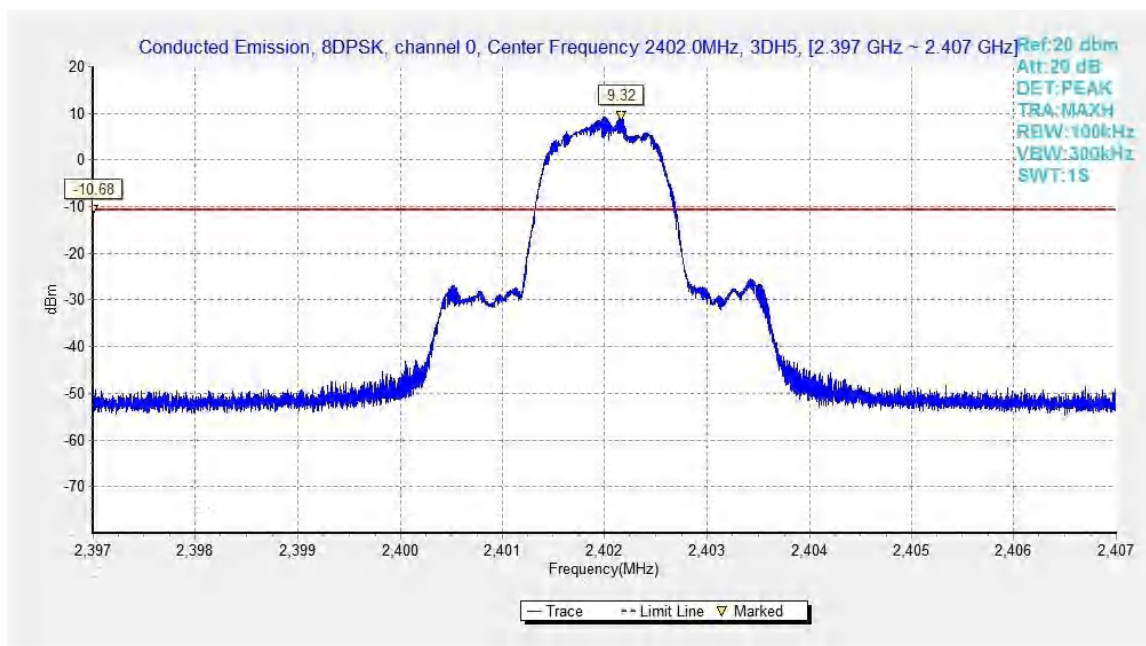


Fig.43. Conducted spurious emission: 8DPSK, Channel 0, 2402MHz

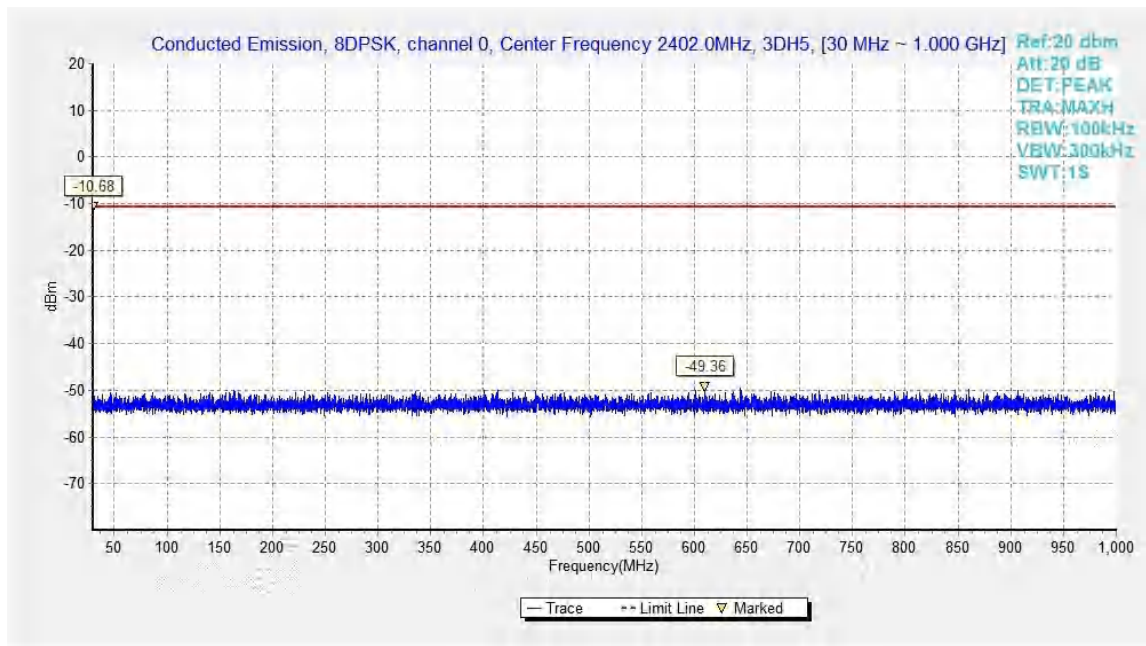


Fig.44. Conducted spurious emission: 8DPSK, Channel 0, 30MHz - 1GHz

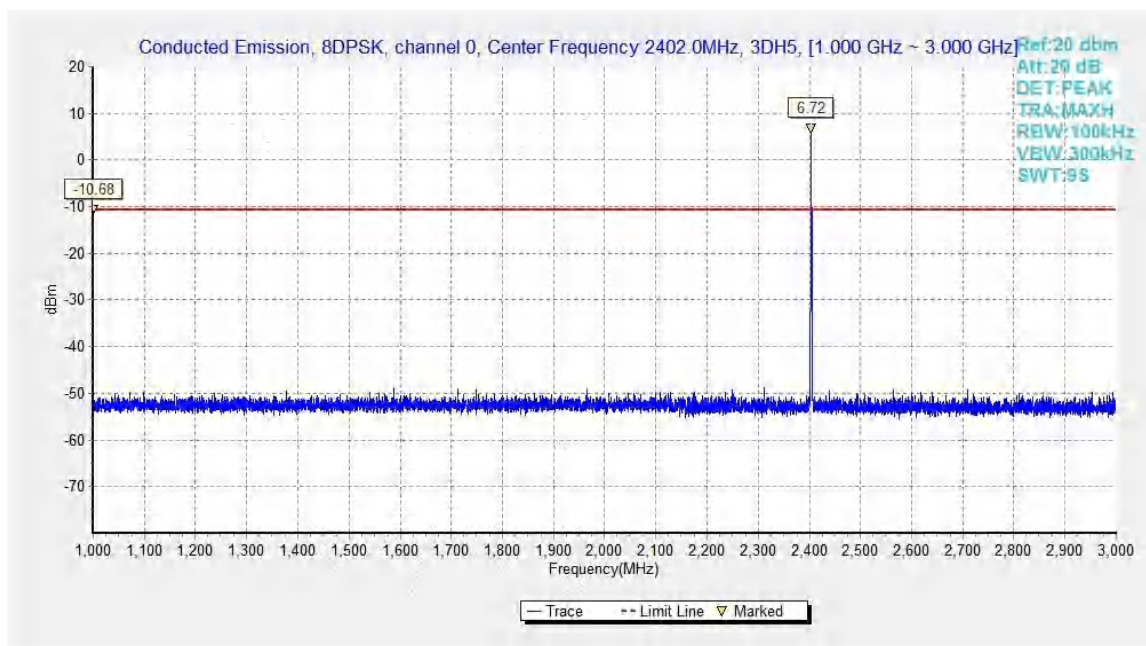


Fig.45. Conducted spurious emission: 8DPSK, Channel 0, 1GHz - 3GHz

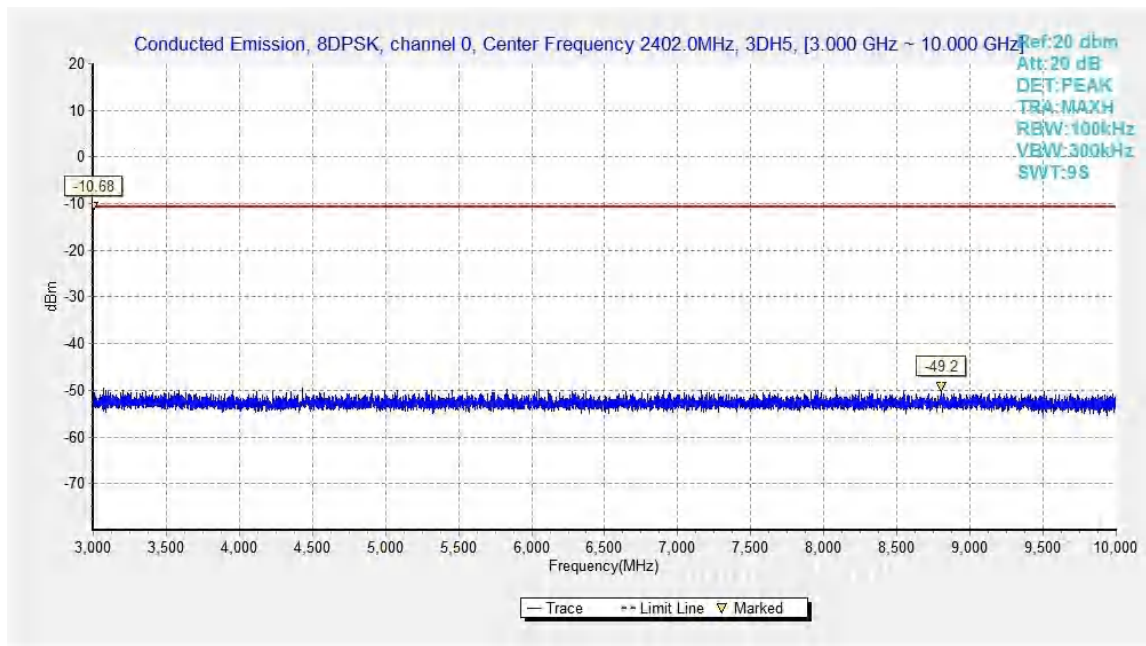


Fig.46. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz

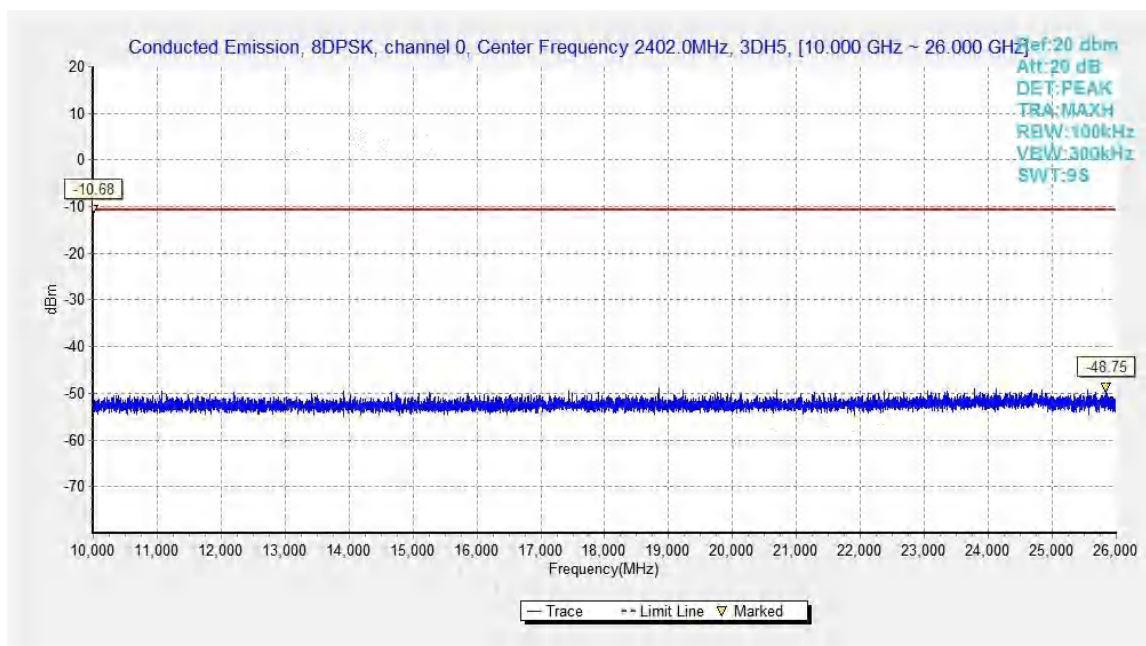


Fig.47. Conducted spurious emission: 8DPSK, Channel 0, 10GHz - 26GHz

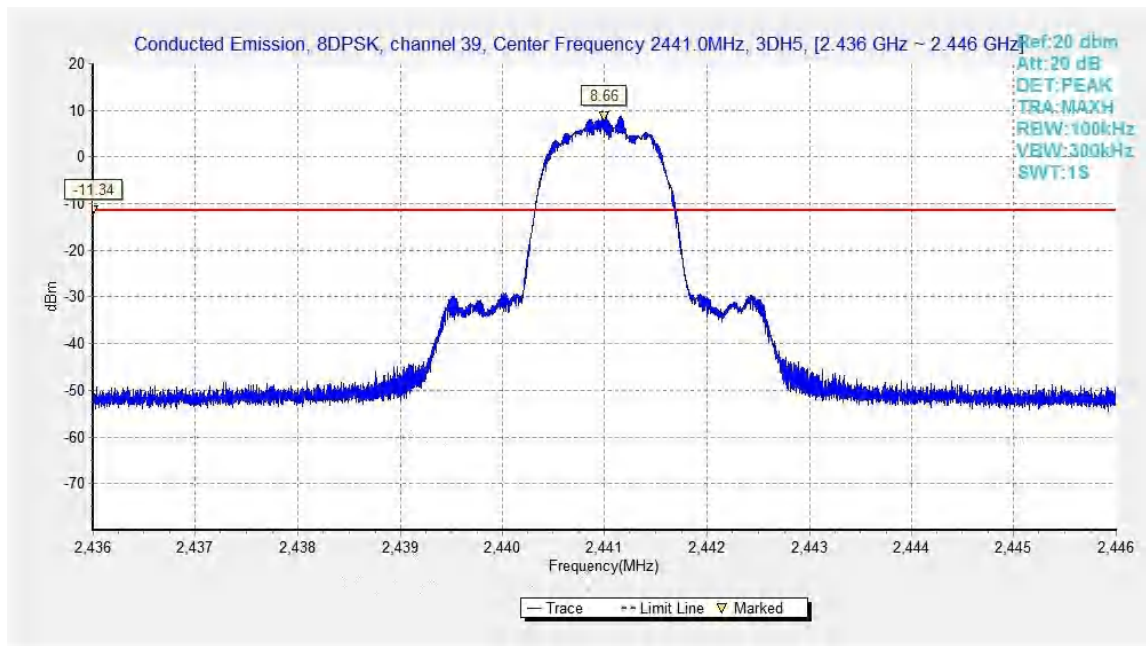


Fig.48. Conducted spurious emission: 8DPSK, Channel 39, 2441MHz

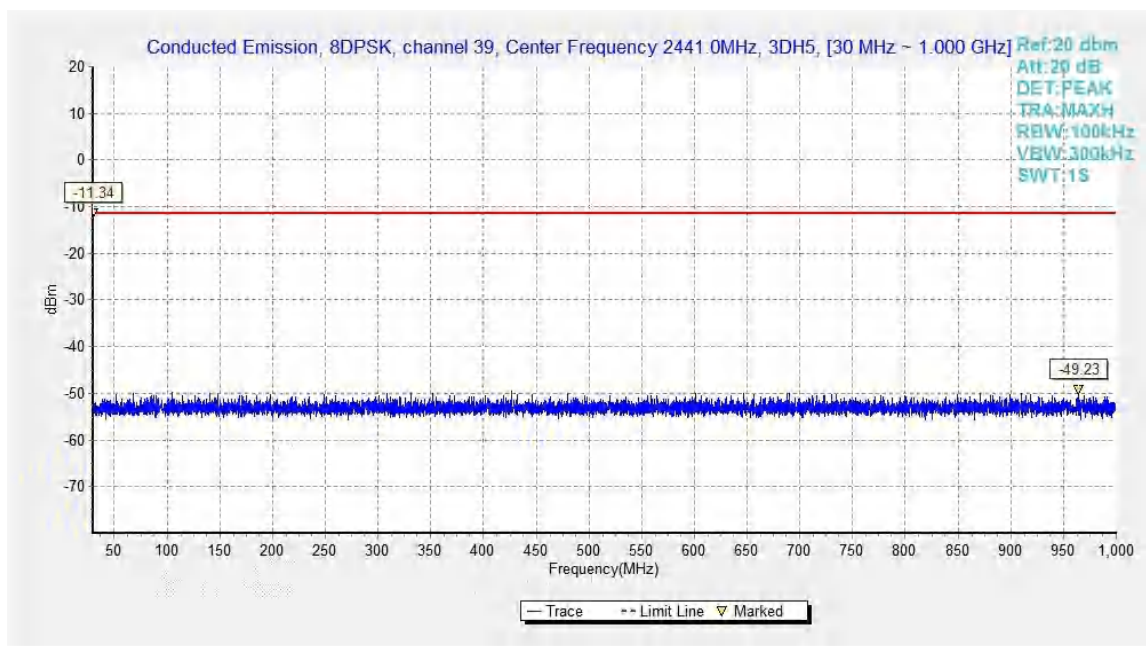


Fig.49. Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz

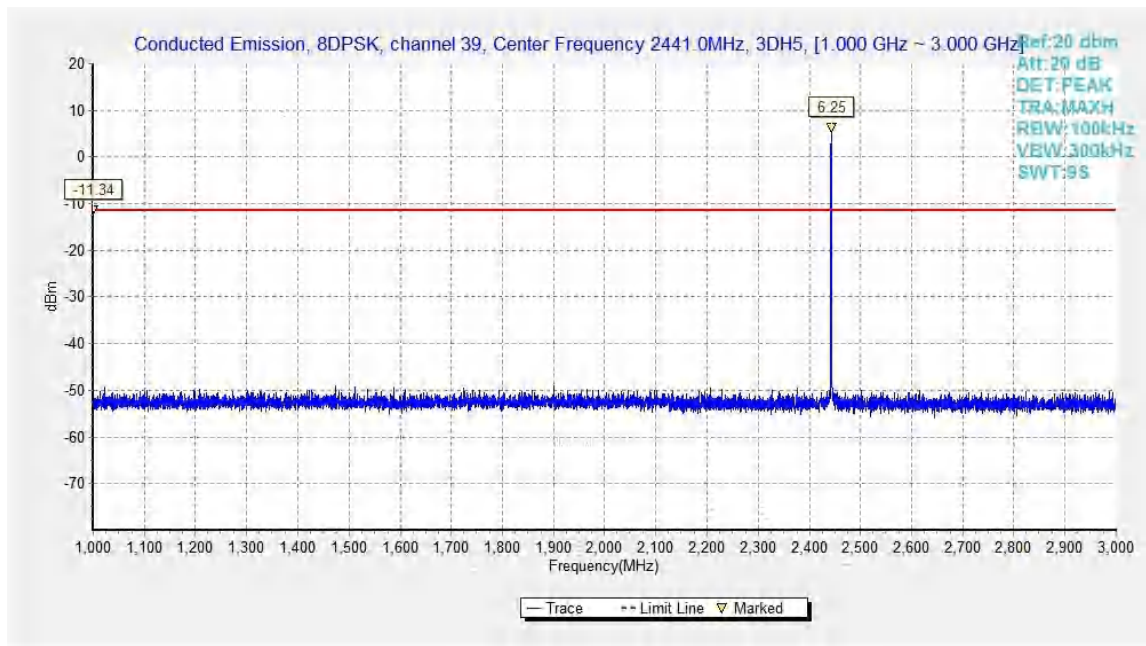


Fig.50. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

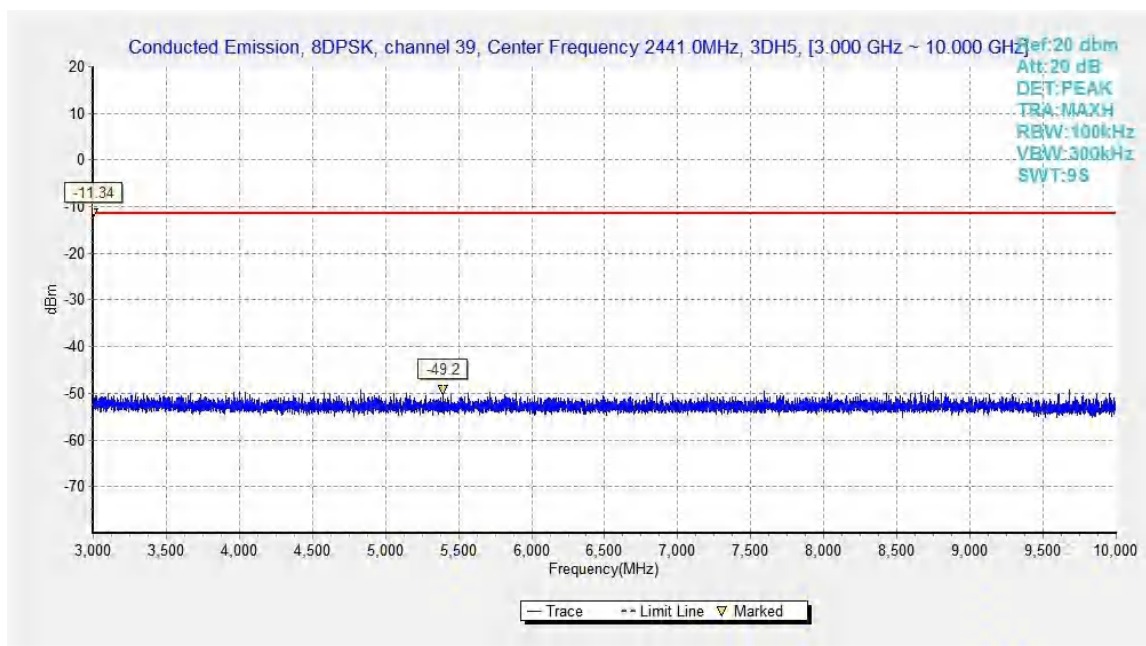


Fig.51. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

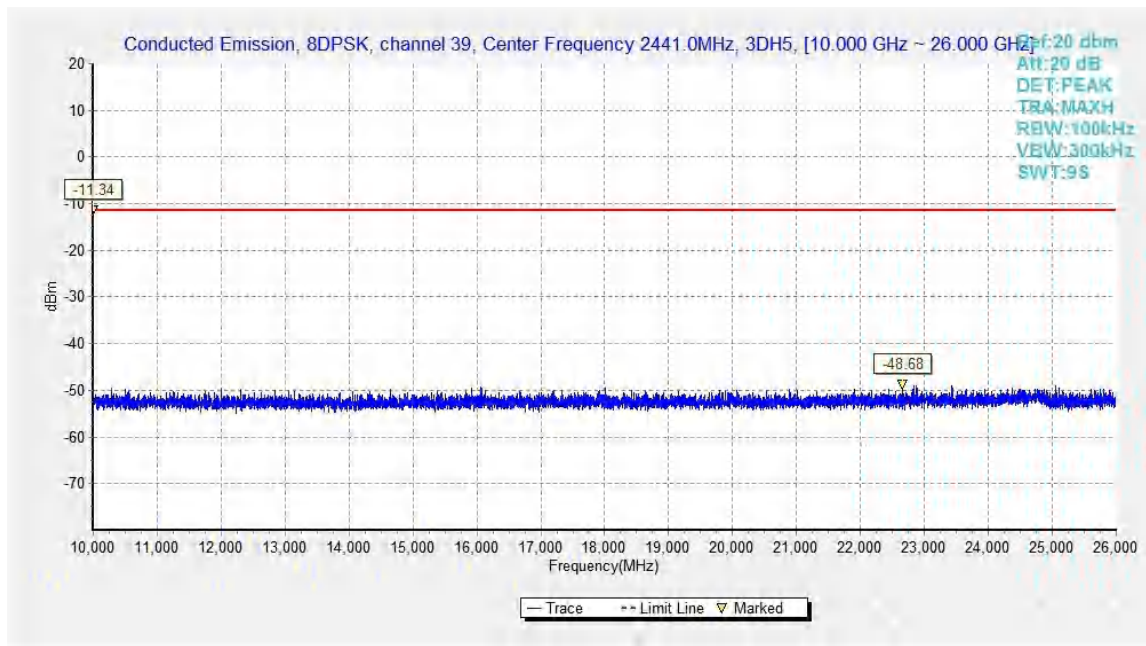


Fig.52. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

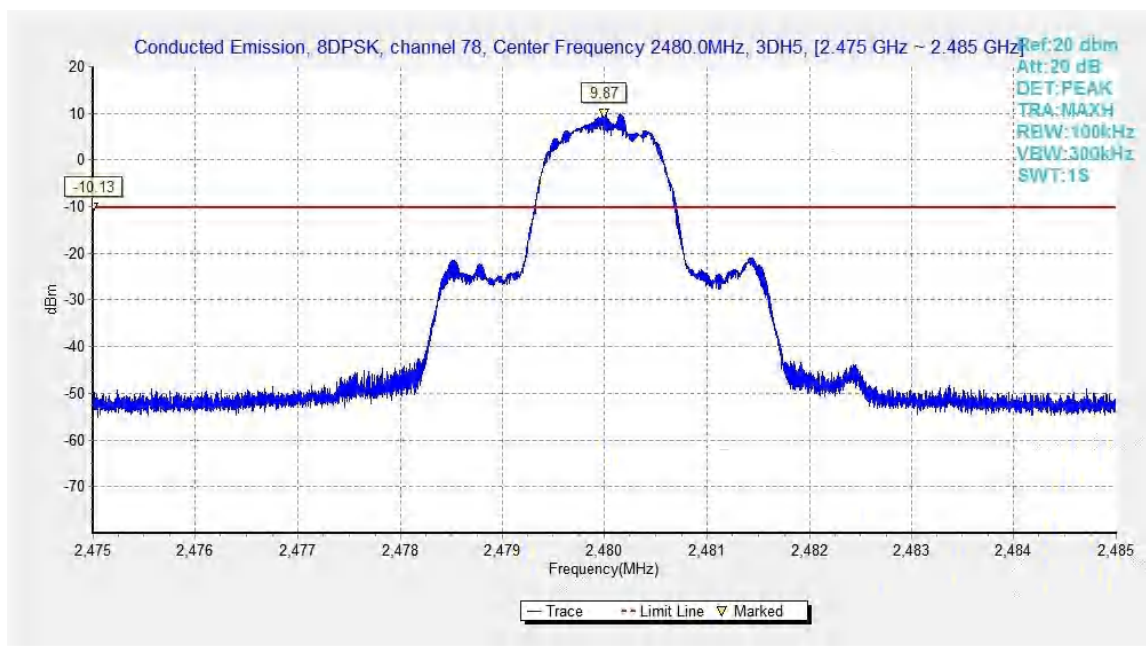


Fig.53. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

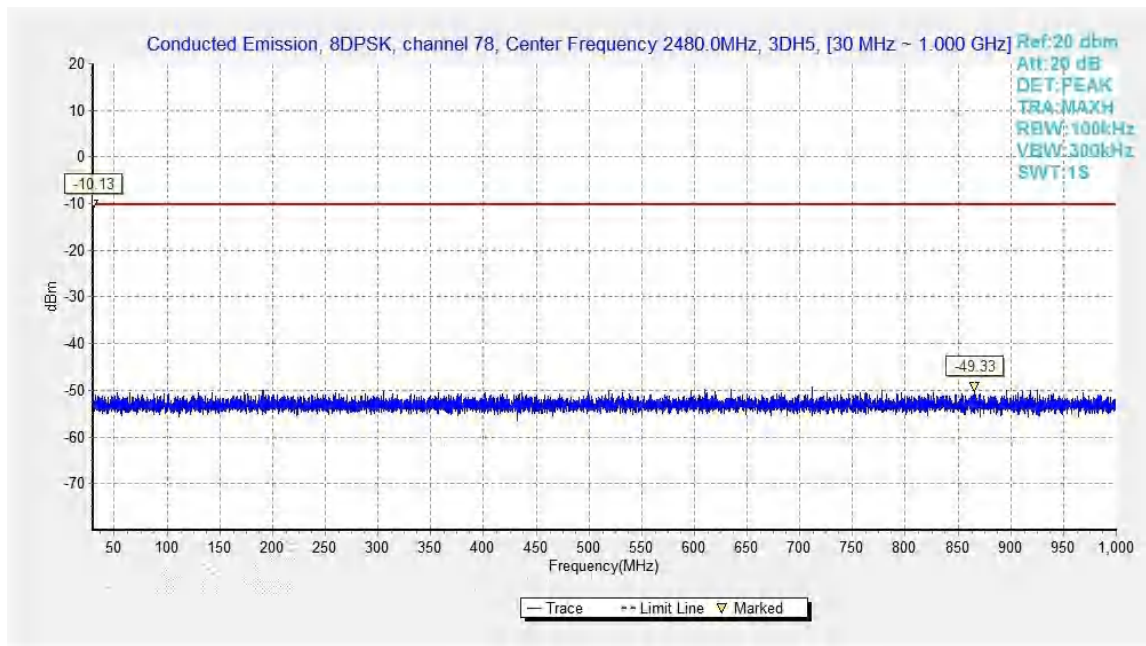


Fig.54. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

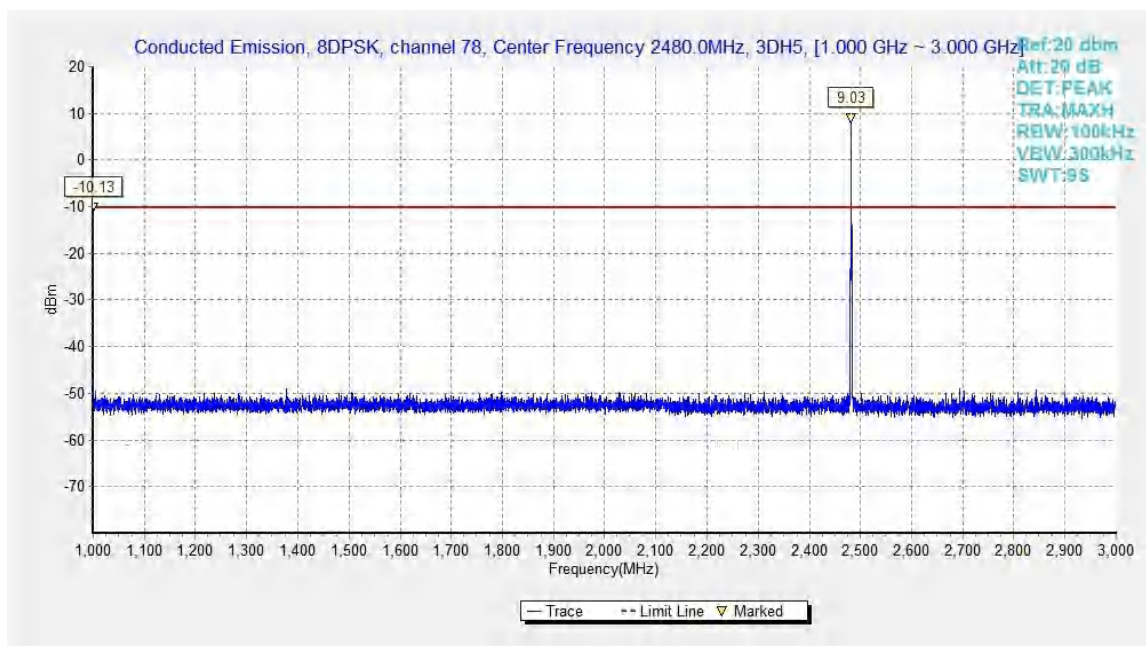


Fig.55. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

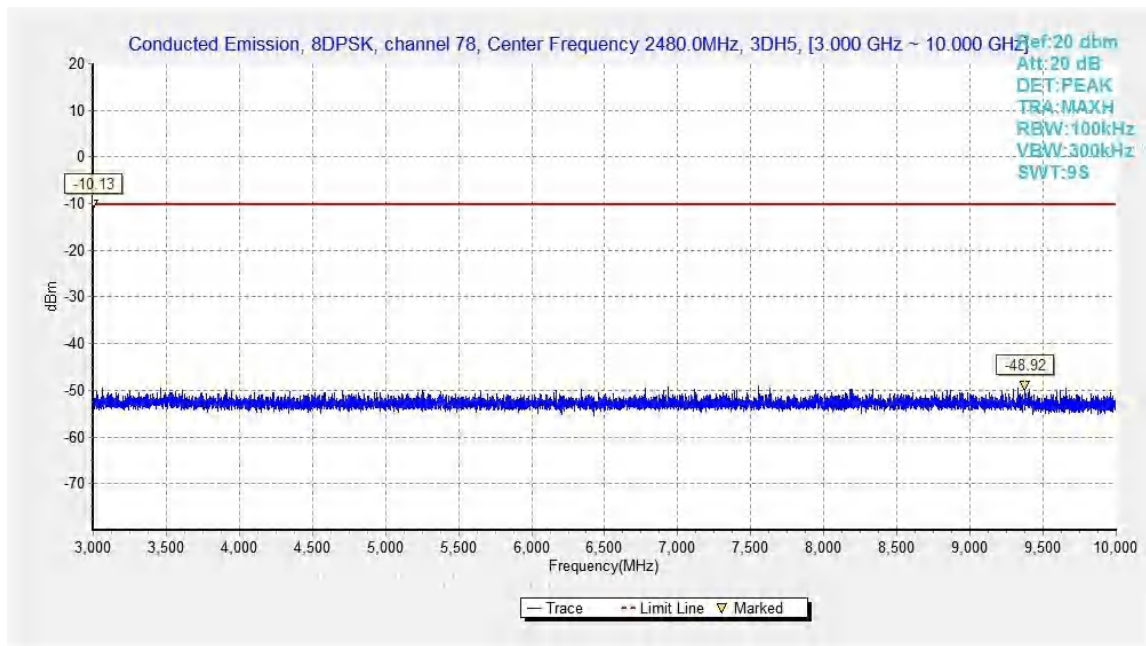


Fig.56. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

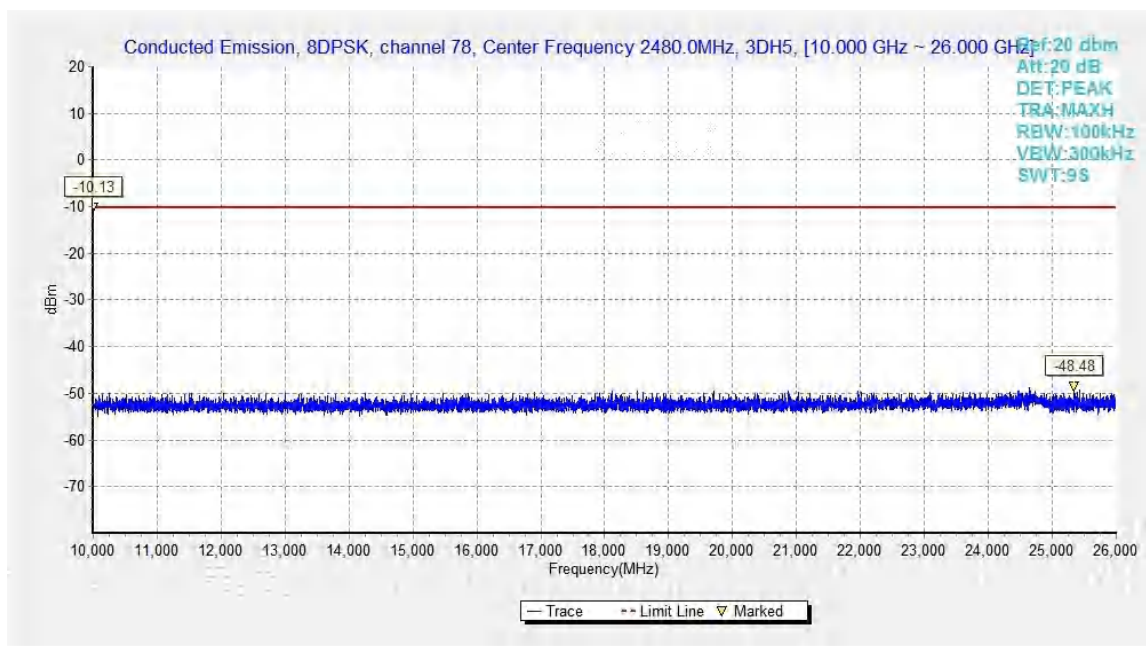


Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

## B.5. Time of Occupancy (Dwell Time)

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

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = zero span, centered on a hopping channel
- RBW = 1 MHz
- VBW  $\geq$  RBW
- Sweep = as necessary to capture the entire dwell time per hopping channel
- Detector function = peak
- Trace = max hold

Measure a pulse time in time domain at middle frequency and then count the hopping number in 31.6s(which equals with 0.4 multiply 79) of middle frequency ,then multiply the pulse time and hopping number and record them.

### Measurement Limit:

| Standard                           | Limit (ms) |
|------------------------------------|------------|
| FCC 47 CFR Part 15.247(a) (1)(iii) | < 400      |

### Measurement Result:

#### For GFSK

| Channel | Packet | Pulse time (ms) |      | Number of Transmissions |     | Dwell Time (ms) | Conclusion |
|---------|--------|-----------------|------|-------------------------|-----|-----------------|------------|
| 39      | DH1    | Fig.58          | 0.38 | Fig.59                  | 319 | 121.22          | P          |
|         | DH3    | Fig.60          | 1.64 | Fig.61                  | 109 | 178.76          | P          |
|         | DH5    | Fig.62          | 2.88 | Fig.63                  | 66  | 190.08          | P          |

#### For $\pi/4$ DQPSK

| Channel | Packet | Pulse time (ms) |      | Number of Transmissions |     | Dwell Time (ms) | Conclusion |
|---------|--------|-----------------|------|-------------------------|-----|-----------------|------------|
| 39      | 2DH1   | Fig.64          | 0.39 | Fig.65                  | 318 | 124.02          | P          |
|         | 2DH3   | Fig.66          | 1.64 | Fig.67                  | 109 | 178.76          | P          |
|         | 2DH5   | Fig.68          | 2.89 | Fig.69                  | 69  | 199.41          | P          |

**For 8DPSK**

| Channel | Packet | Pulse time (ms) |      | Number of Transmissions |     | Dwell Time (ms) | Conclusion |
|---------|--------|-----------------|------|-------------------------|-----|-----------------|------------|
| 39      | 3DH1   | Fig.70          | 0.39 | Fig.71                  | 321 | 125.19          | P          |
|         | 3DH3   | Fig.72          | 1.64 | Fig.73                  | 98  | 160.72          | P          |
|         | 3DH5   | Fig.74          | 2.89 | Fig.75                  | 67  | 193.63          | P          |

**Conclusion: PASS**

**Test graphs as below:**

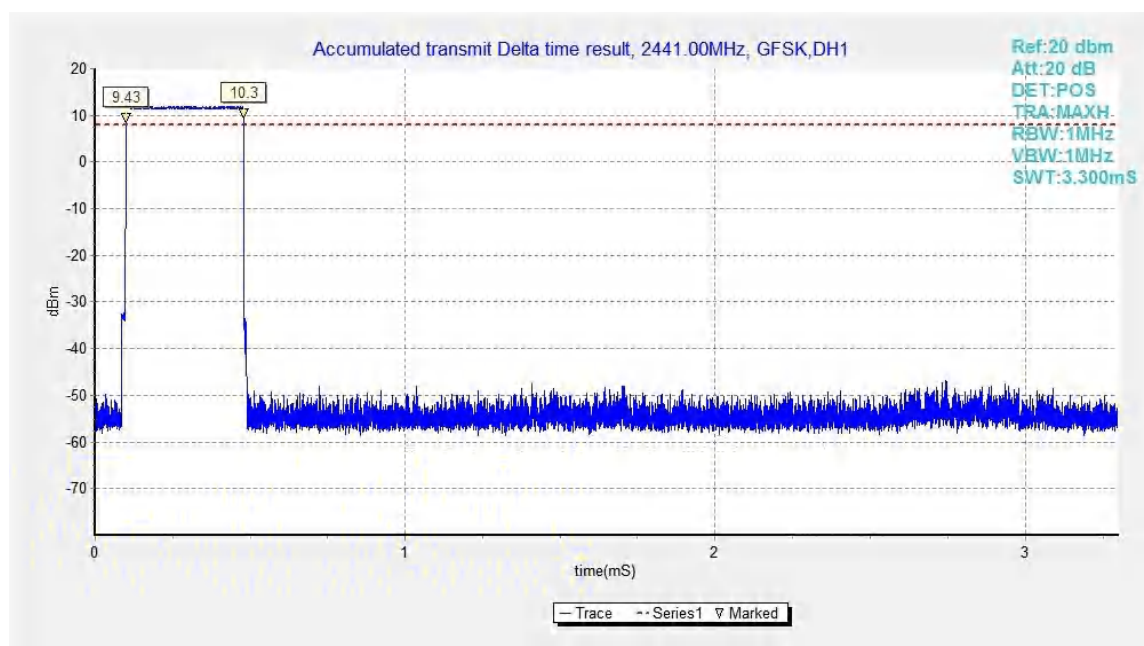


Fig.58. Time of occupancy (Dwell Time): Channel 39, Packet DH1

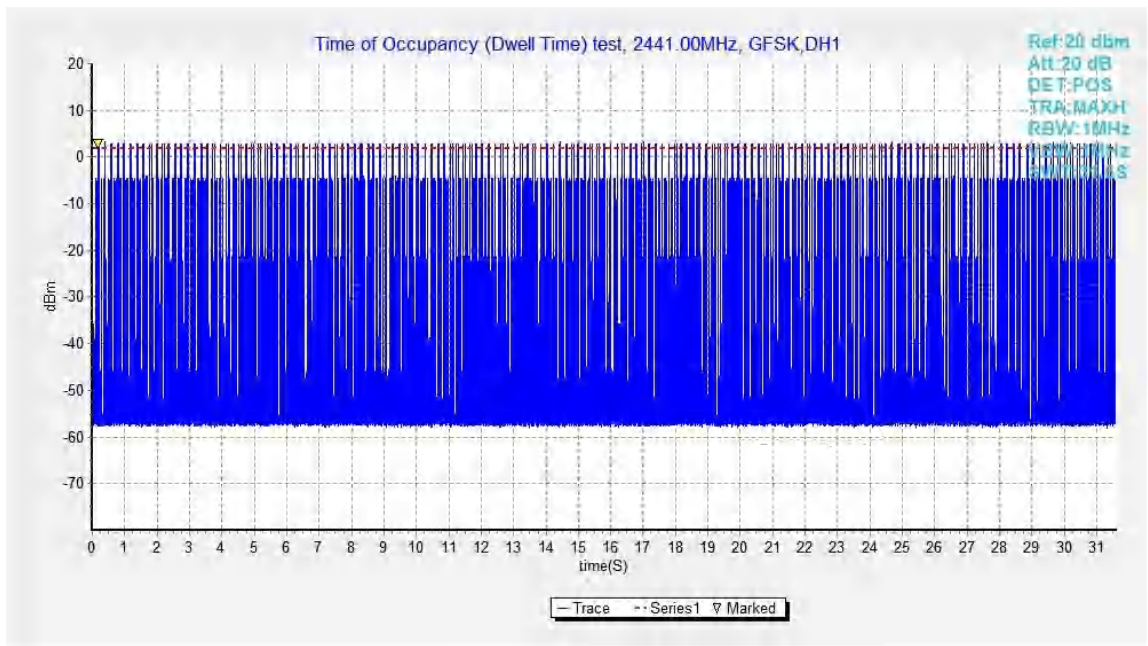


Fig.59. Number of Transmissions Measurement: Channel 39,Packet DH1

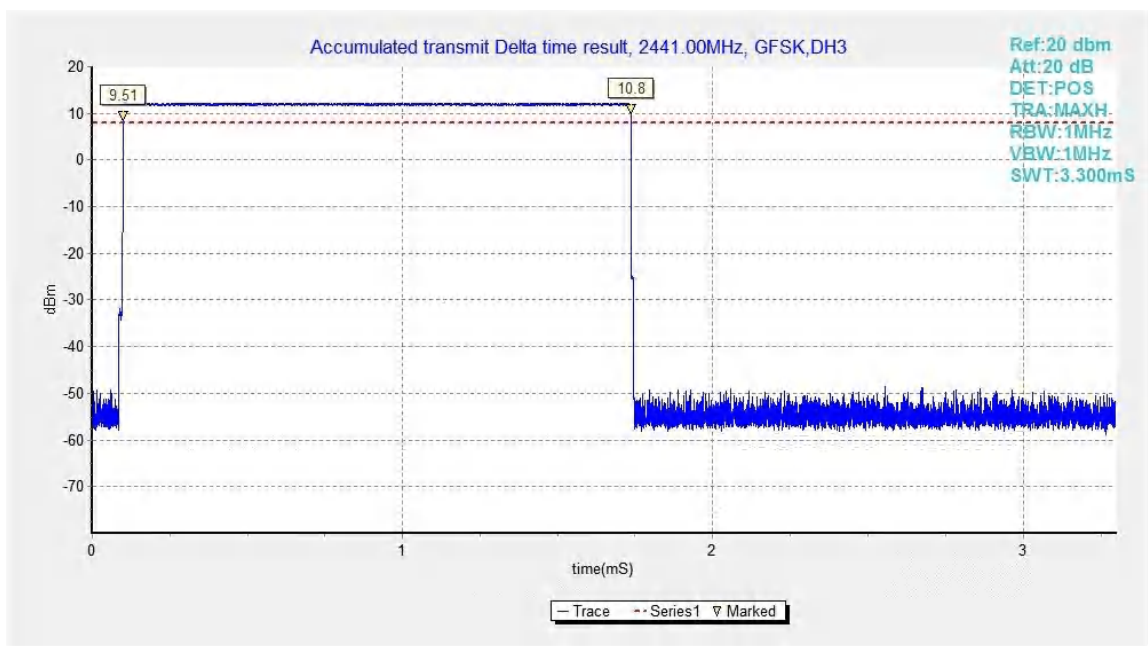


Fig.60. Time of occupancy (Dwell Time): Channel 39, Packet DH3

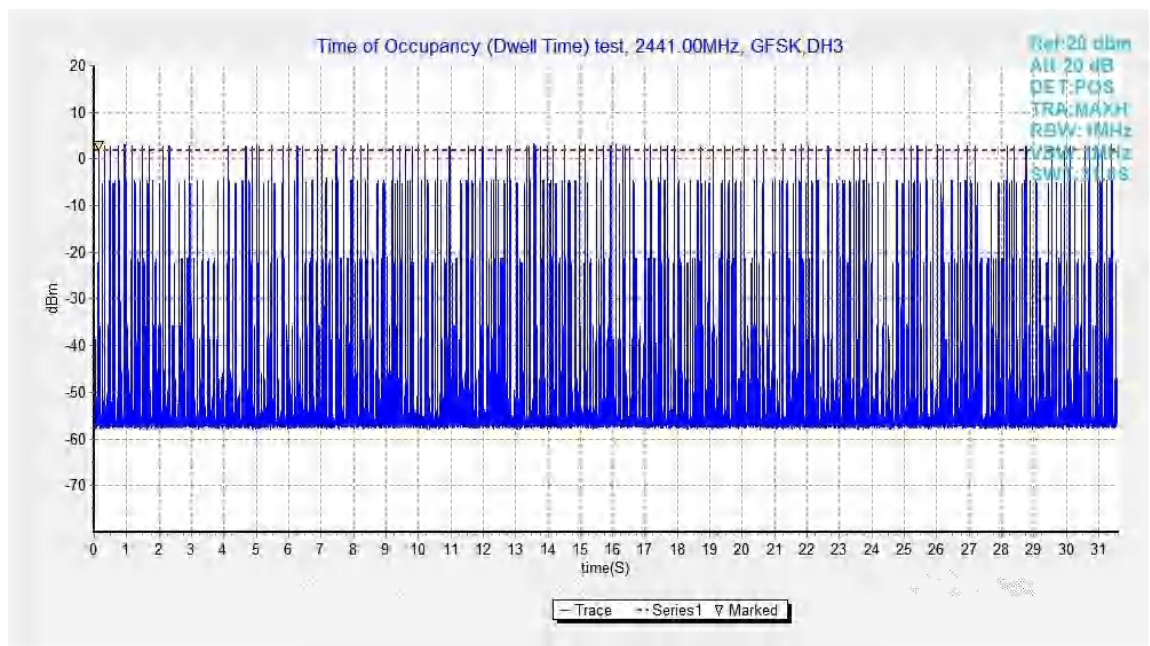


Fig.61. Number of Transmissions Measurement: Channel 39,Packet DH3

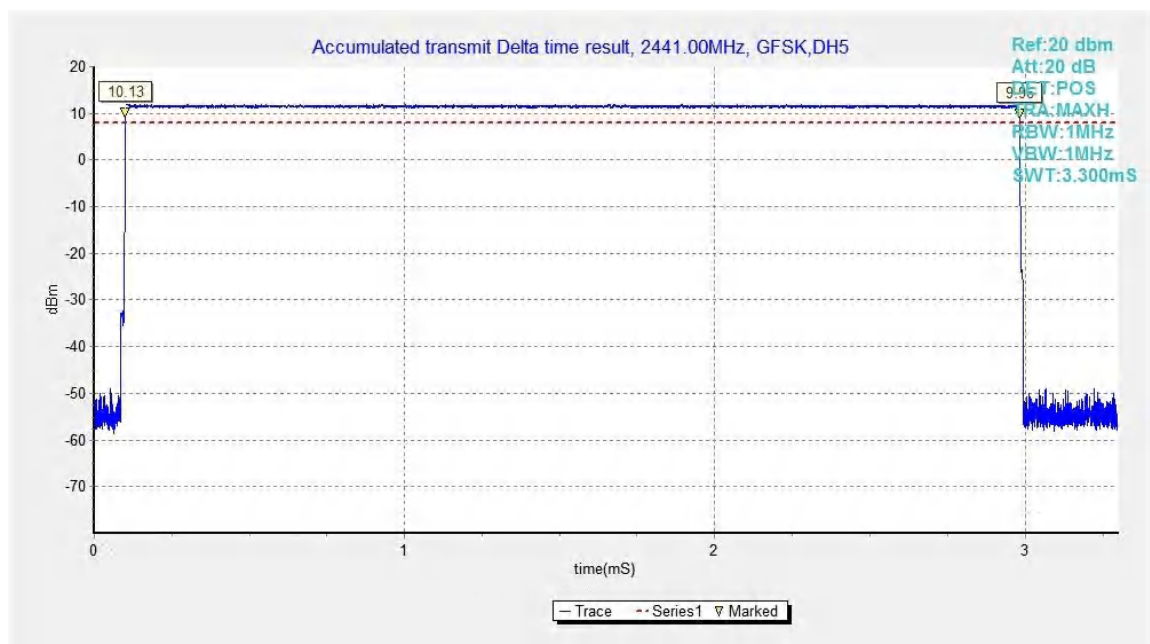


Fig.62. Time of occupancy (Dwell Time): Channel 39, Packet DH5

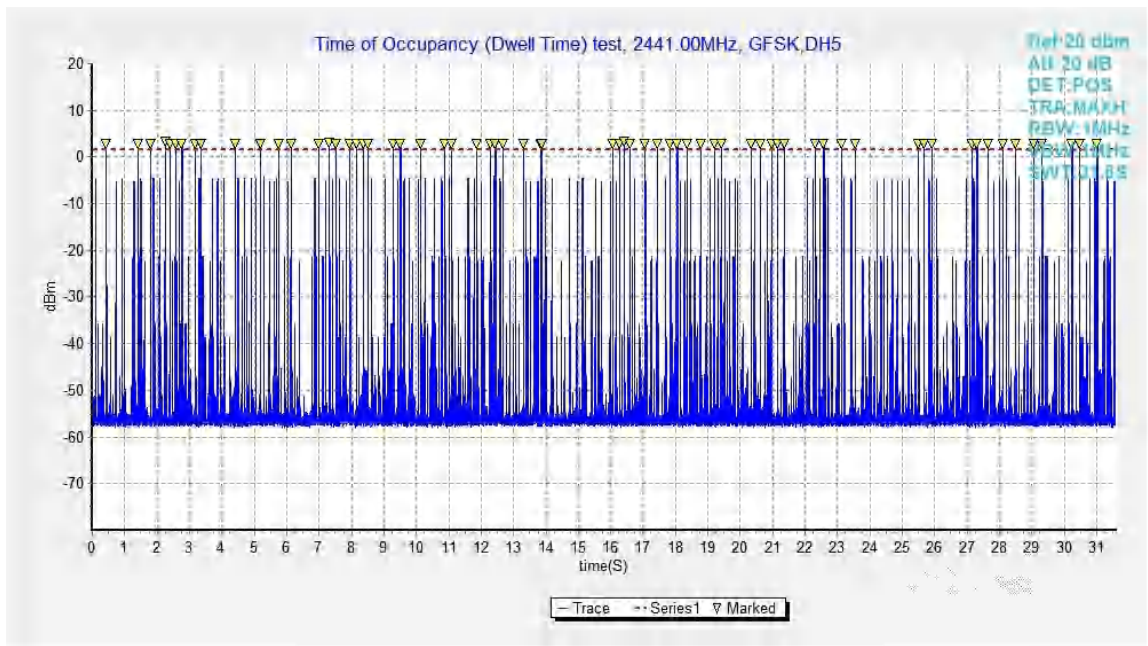


Fig.63. Number of Transmissions Measurement: Channel 39, Packet DH5

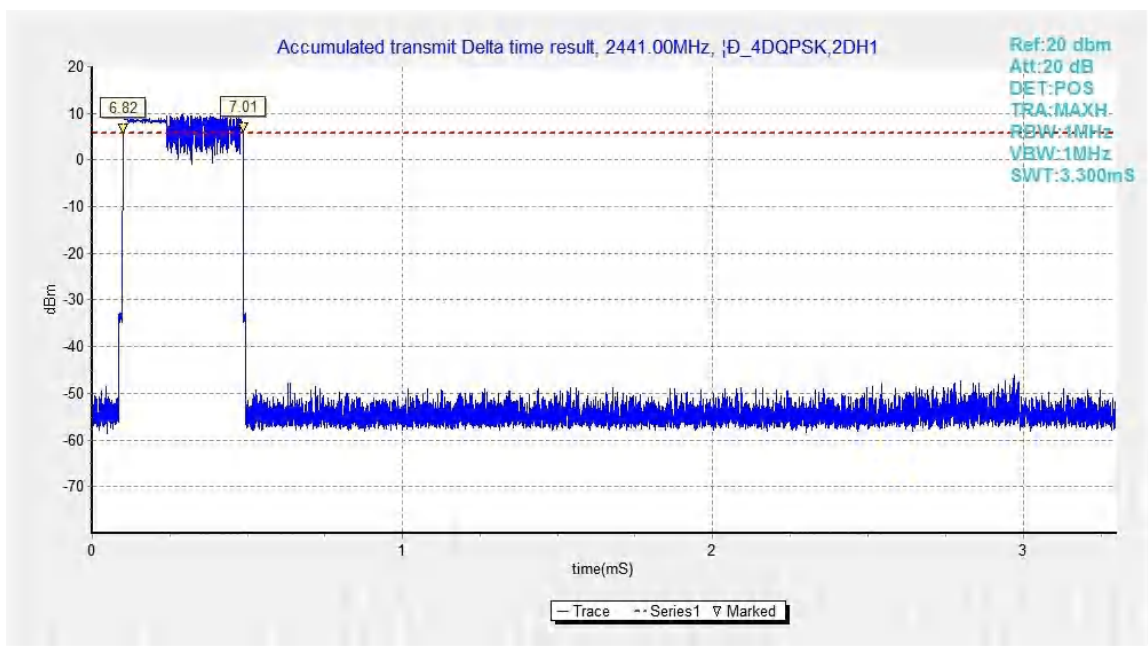


Fig.64. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

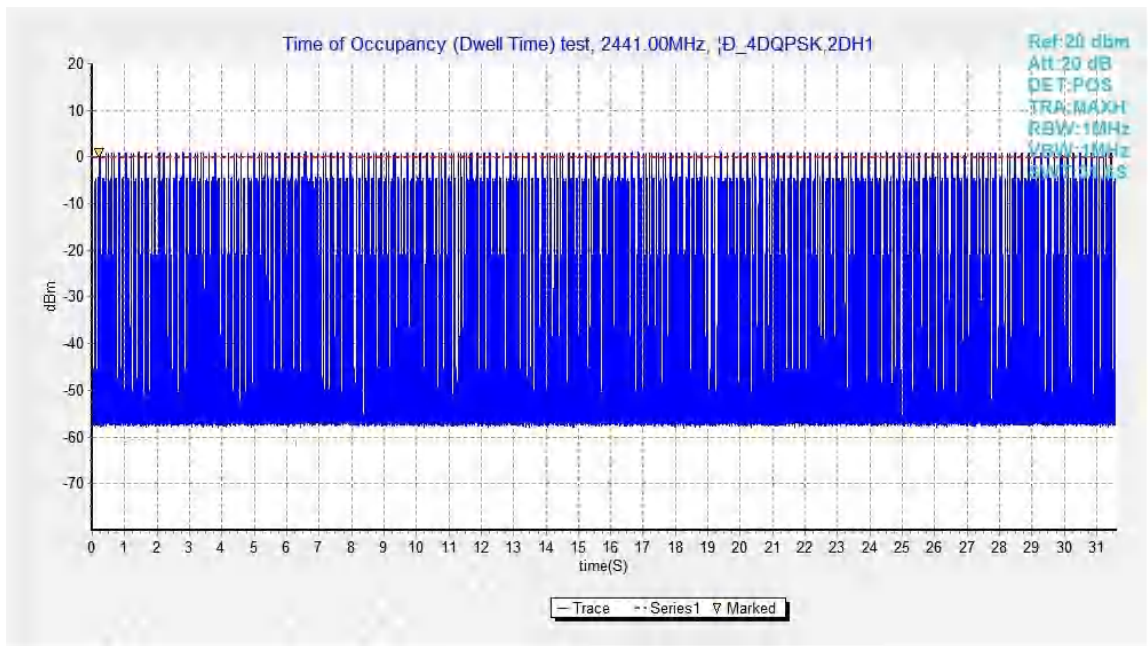


Fig.65. Number of Transmissions Measurement: Channel 39,Packet 2-DH1

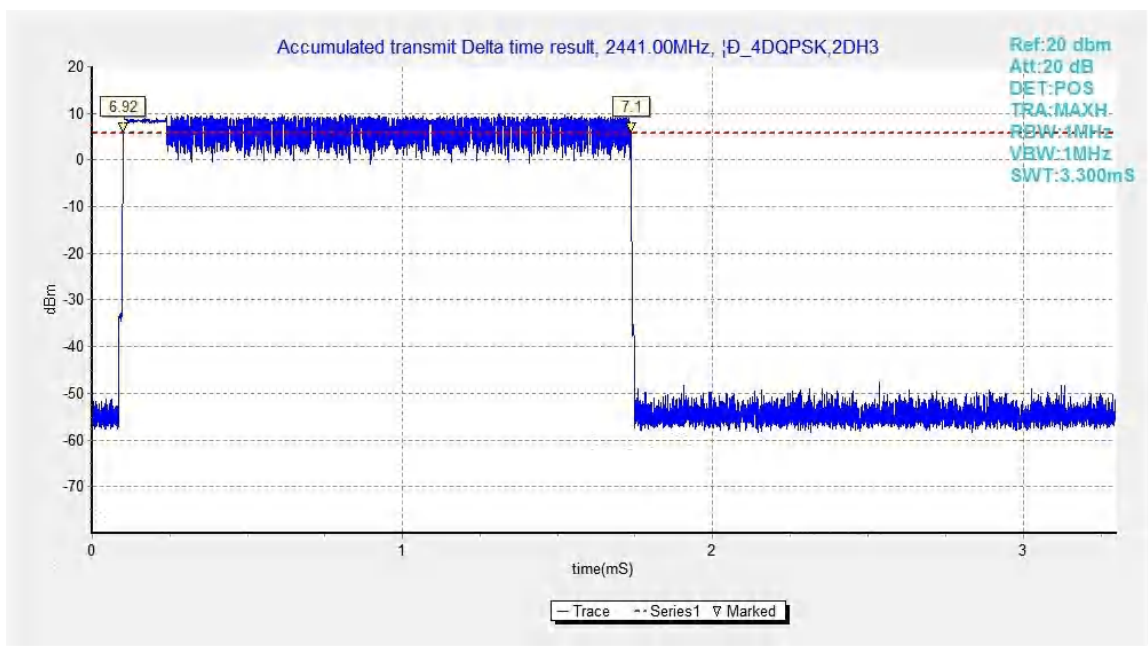


Fig.66. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

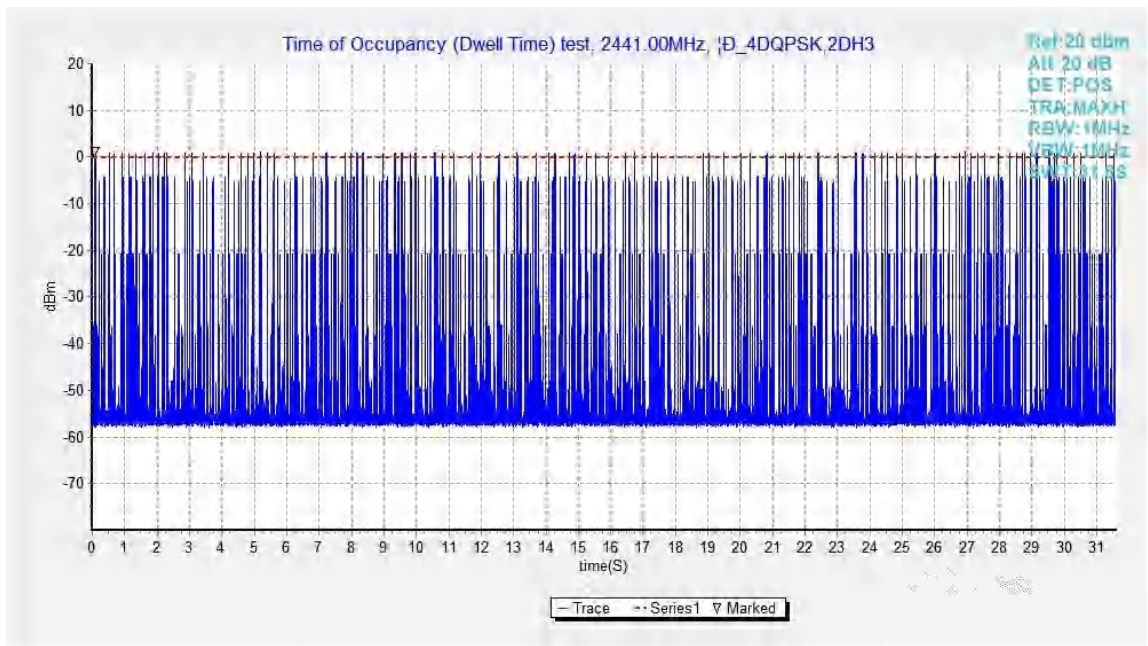


Fig.67. Number of Transmissions Measurement: Channel 39,Packet 2-DH3

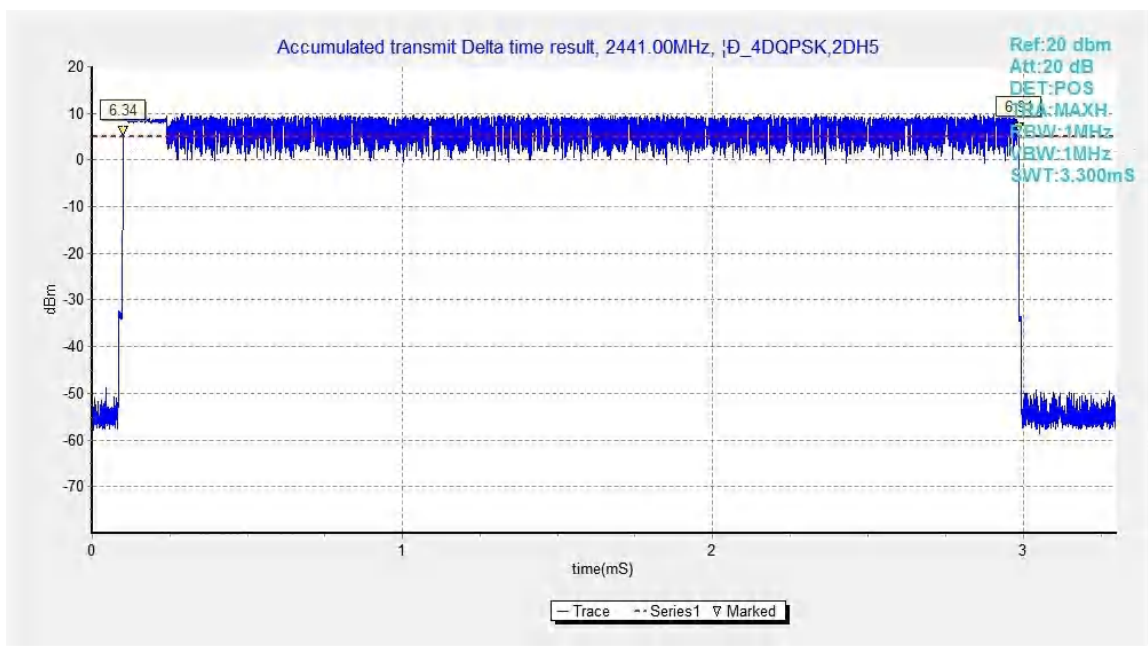


Fig.68. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

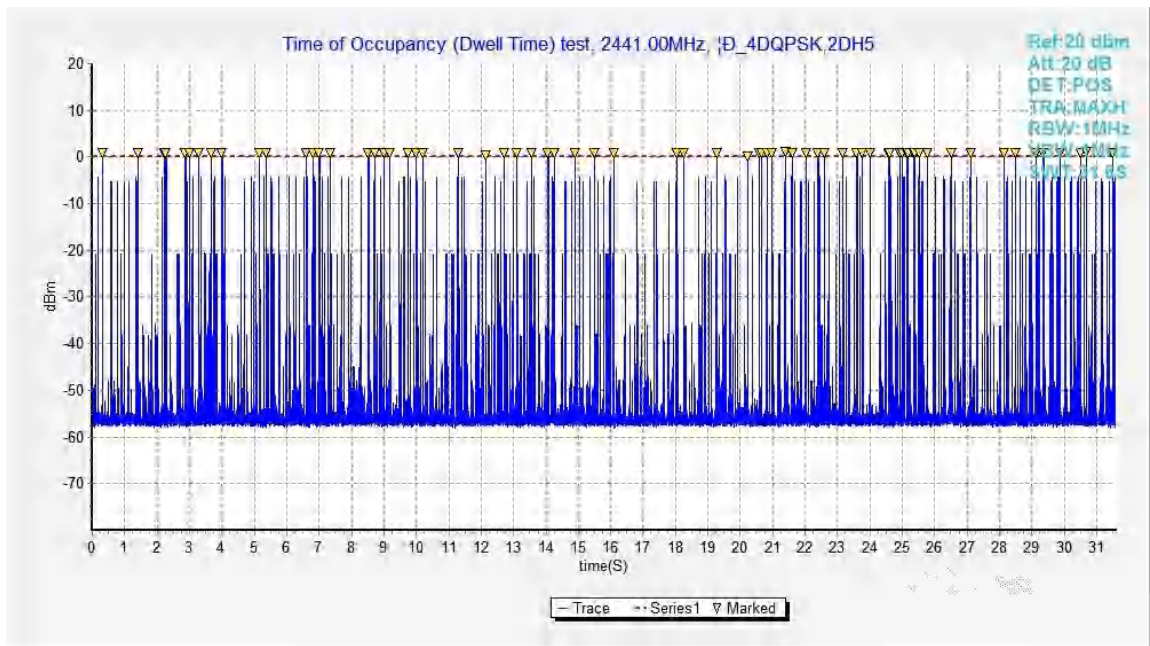


Fig.69. Number of Transmissions Measurement: Channel 39,Packet 2-DH5

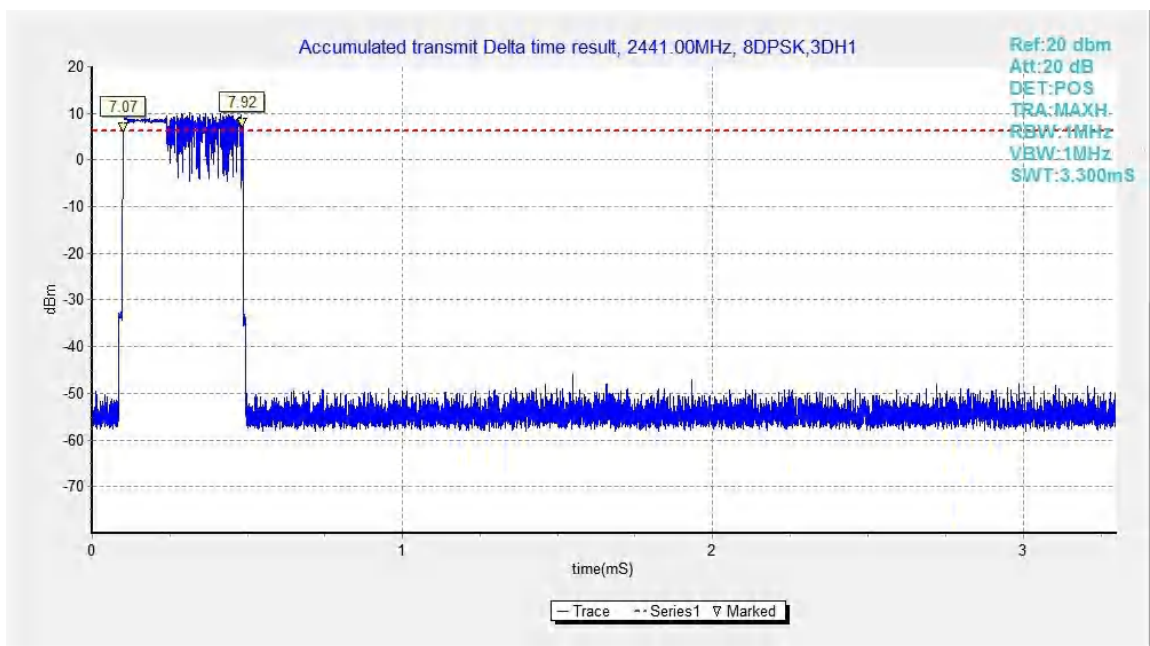


Fig.70. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

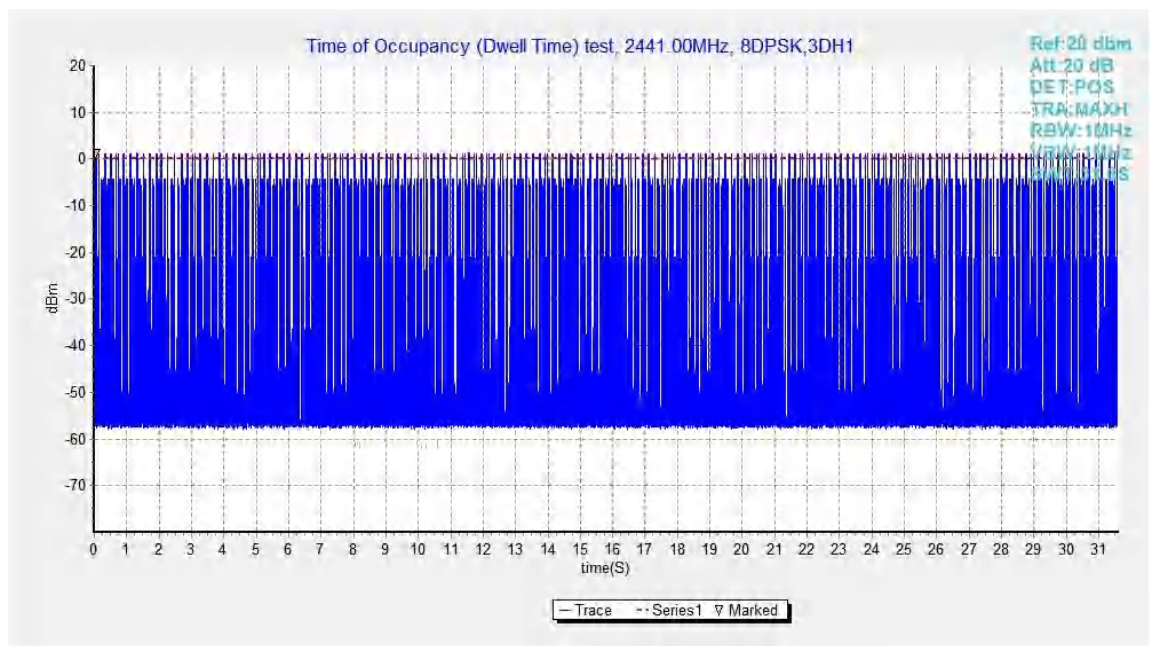


Fig.71. Number of Transmissions Measurement: Channel 39,Packet 3-DH1

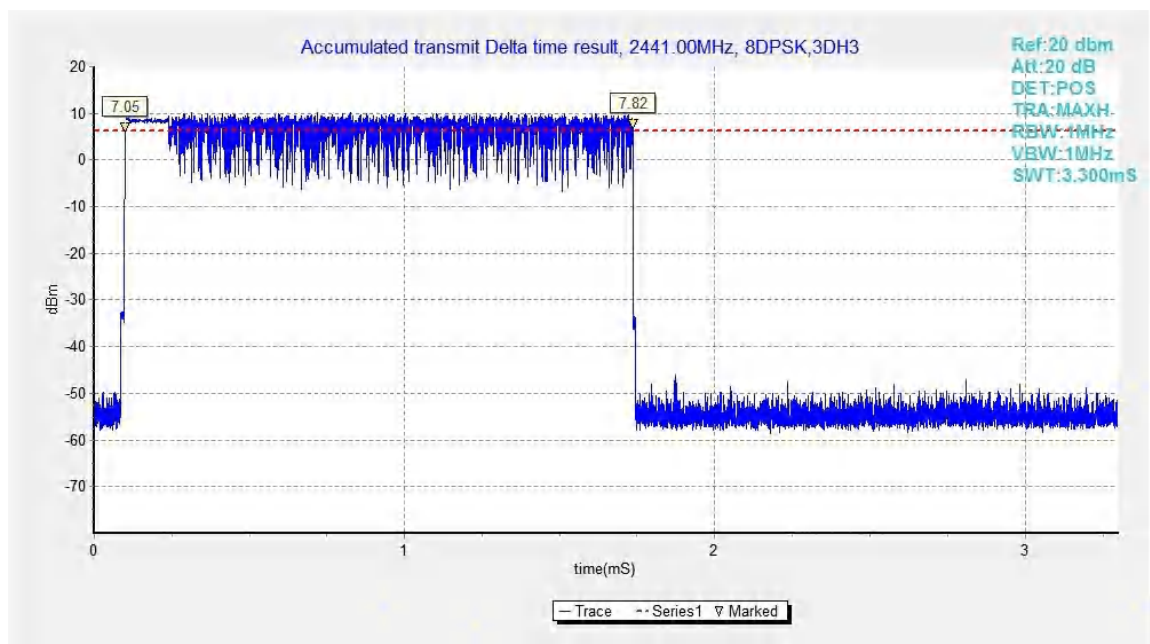


Fig.72. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

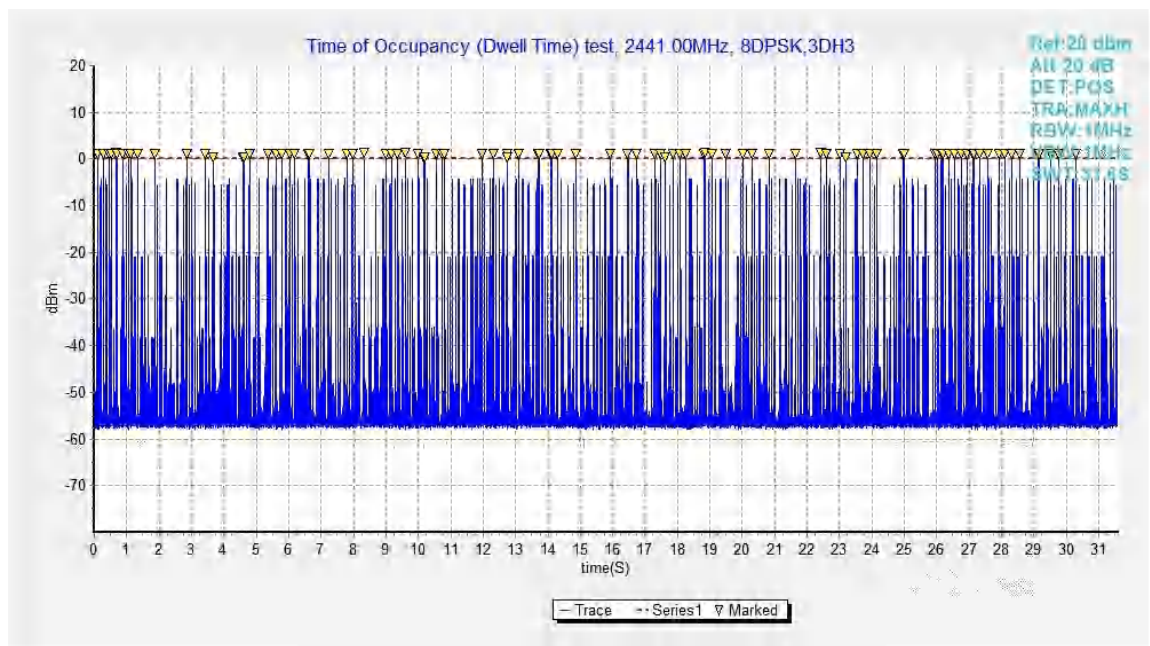


Fig.73. Number of Transmissions Measurement: Channel 39,Packet 3-DH3

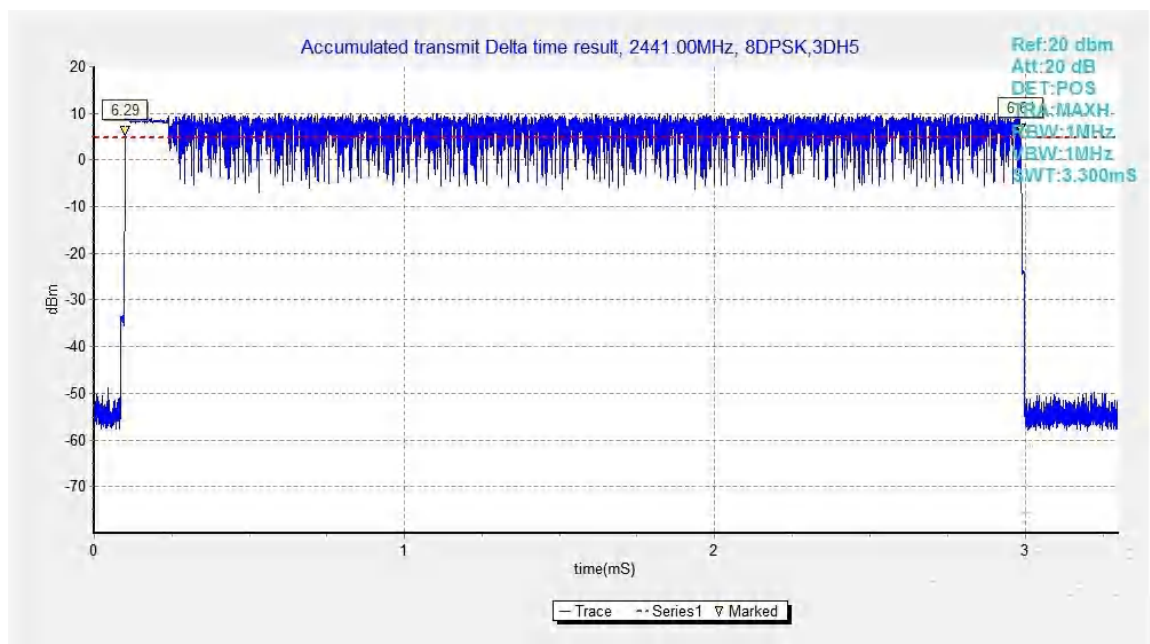


Fig.74. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5

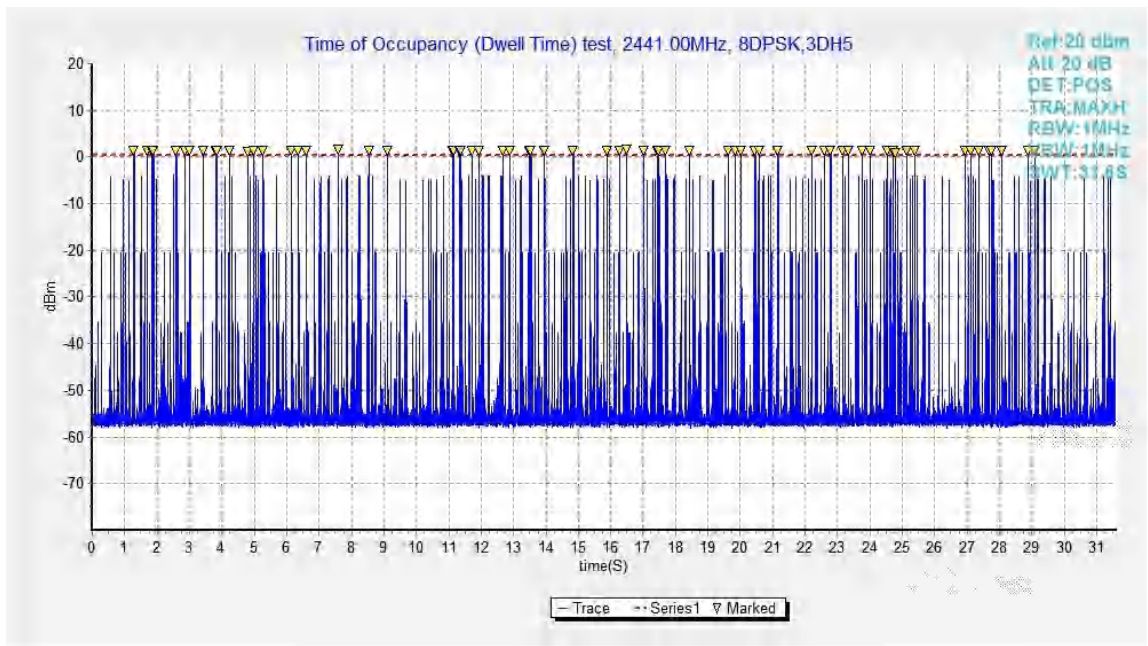


Fig.75. Number of Transmissions Measurement: Channel 39, Packet 3-DH5

## B.6. 20dB Bandwidth

**Method of Measurement: See ANSI C63.10-clause 6.9.2**

Measurement Procedure - Unwanted Emissions

1. Set RBW = 30kHz.
2. Set VBW = 100 kHz.
3. Set span to 3MHz
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

**Measurement Limit:**

| Standard                     | Limit |
|------------------------------|-------|
| FCC 47 CFR Part 15.247(a)(1) | NA *  |

Use NdB Down function of the SA to measure the 20dB Bandwidth

\* Comment: This test case is not required according to the latest FCC 47 CFR Part 15.247. But the test results are necessary for “carrier frequency separation” test case, in Annex A.8.

**Measurement Results:**

**For GFSK**

| Channel | 20dB Bandwidth (kHz) |        | Conclusion |
|---------|----------------------|--------|------------|
| 0       | Fig.76               | 926.25 | NA         |
| 39      | Fig.77               | 929.25 | NA         |
| 78      | Fig.78               | 929.25 | NA         |

**For  $\pi/4$  DQPSK**

| Channel | 20dB Bandwidth (kHz) |         | Conclusion |
|---------|----------------------|---------|------------|
| 0       | Fig.79               | 1281.00 | NA         |
| 39      | Fig.80               | 1280.25 | NA         |
| 78      | Fig.81               | 1276.50 | NA         |

**For 8DPSK**

| Channel | 20dB Bandwidth (kHz) |         | Conclusion |
|---------|----------------------|---------|------------|
| 0       | Fig.82               | 1281.00 | NA         |
| 39      | Fig.83               | 1279.50 | NA         |
| 78      | Fig.84               | 1301.25 | NA         |

**Conclusion: NA**

**Test graphs as below:**

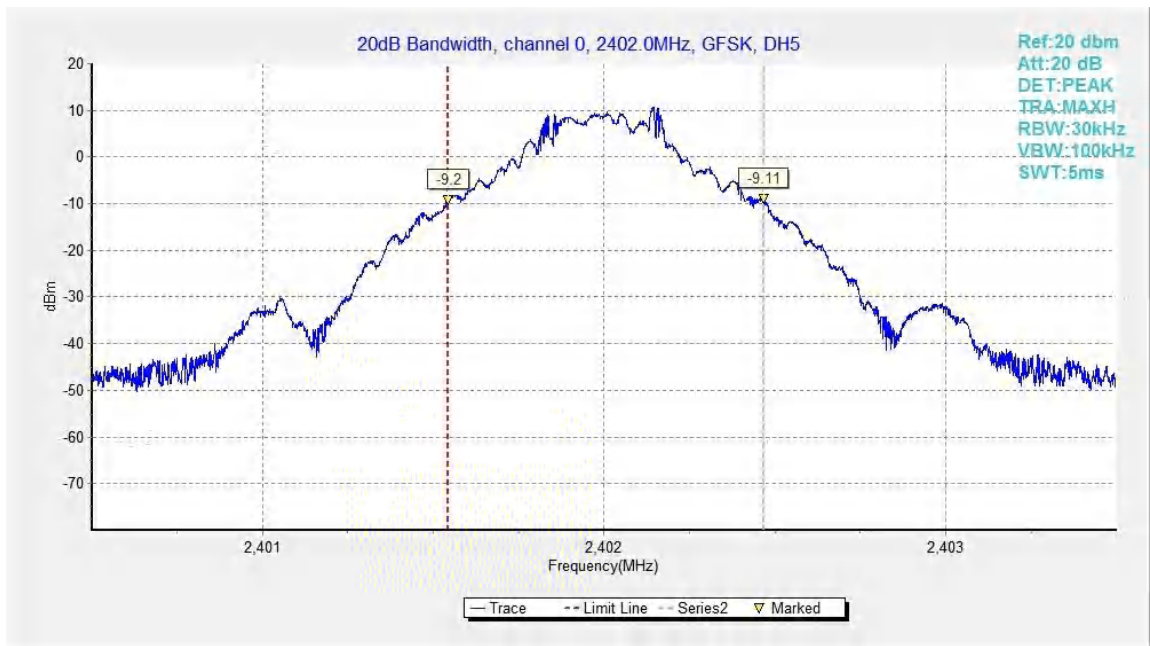


Fig.76. 20dB Bandwidth: GFSK, Channel 0

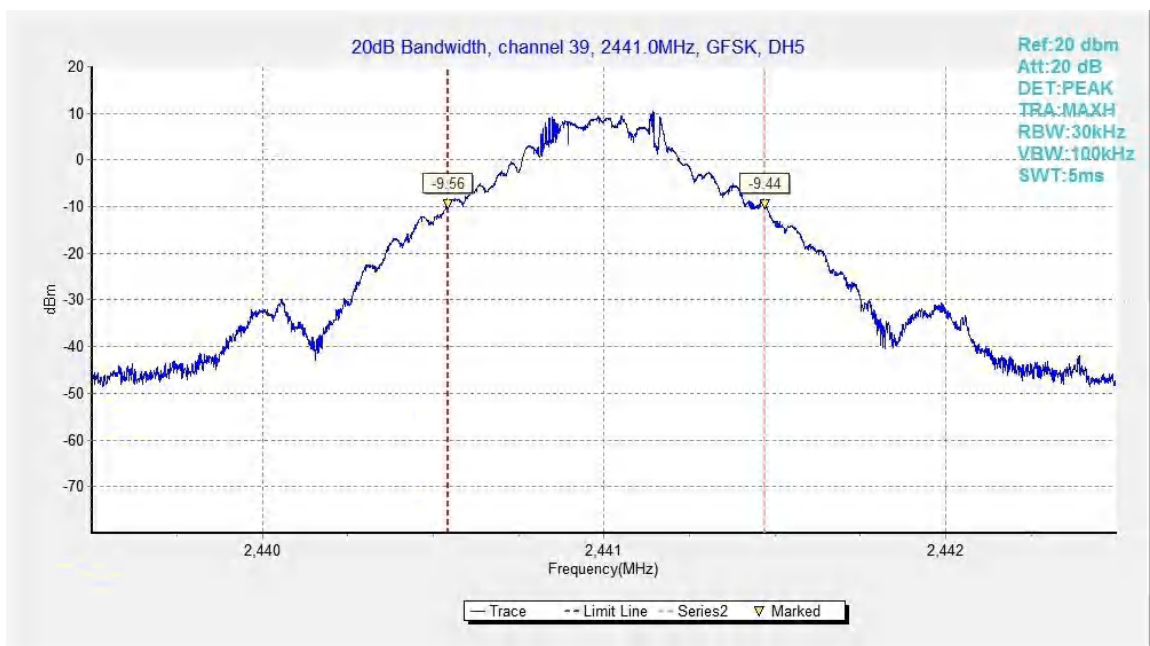


Fig.77. 20dB Bandwidth: GFSK, Channel 39

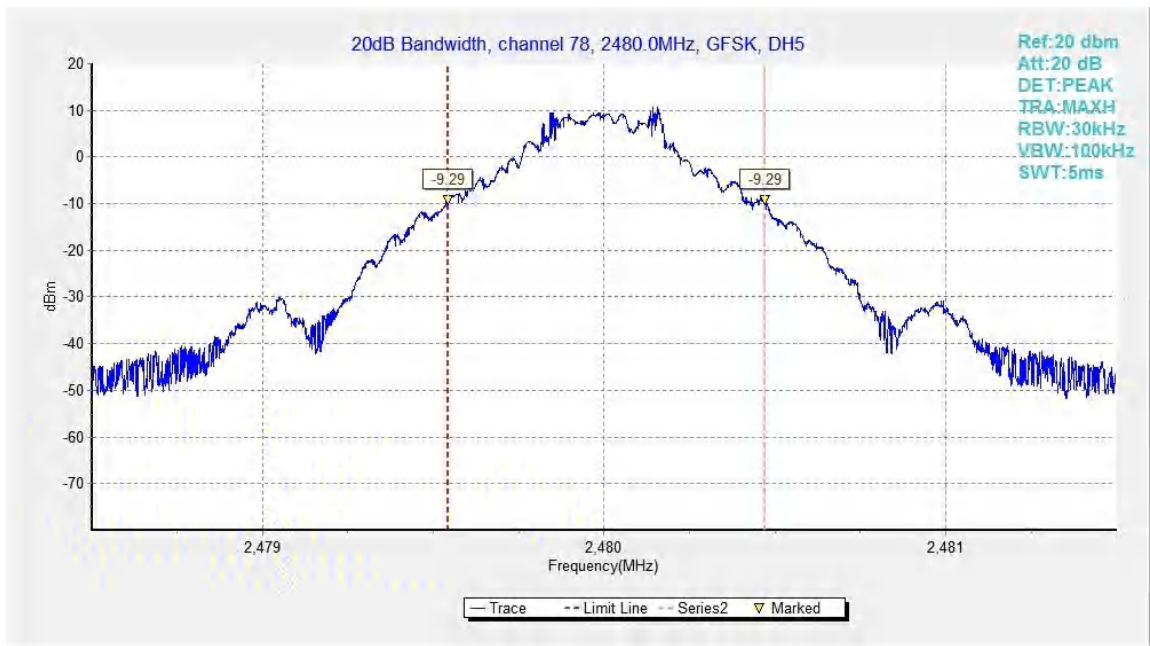


Fig.78. 20dB Bandwidth: GFSK, Channel 78

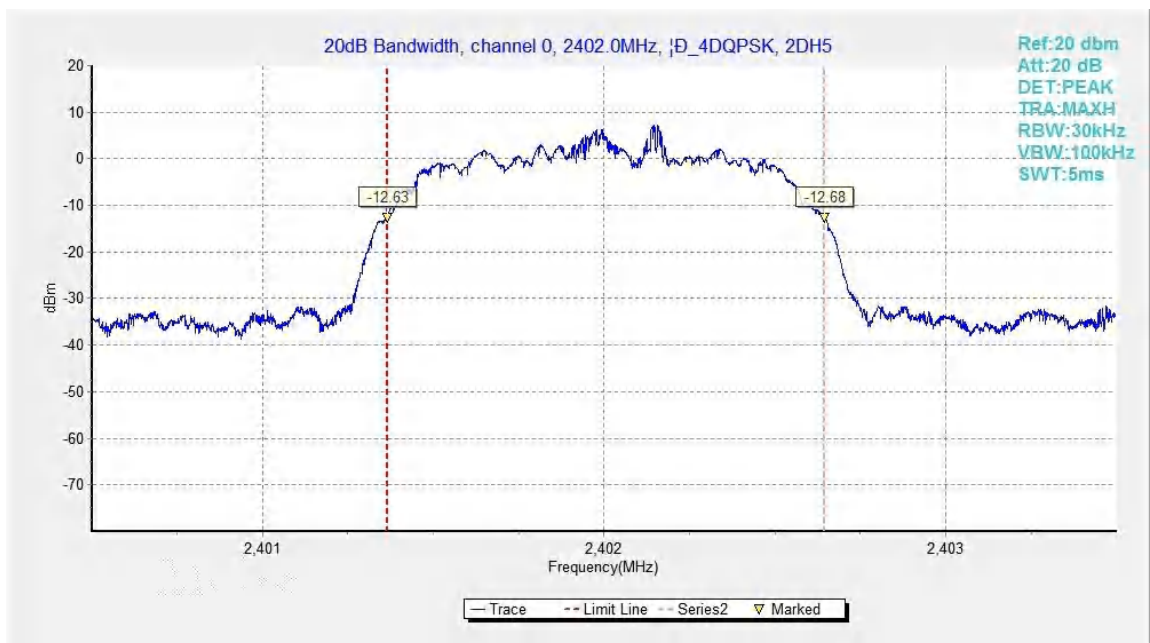


Fig.79. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 0

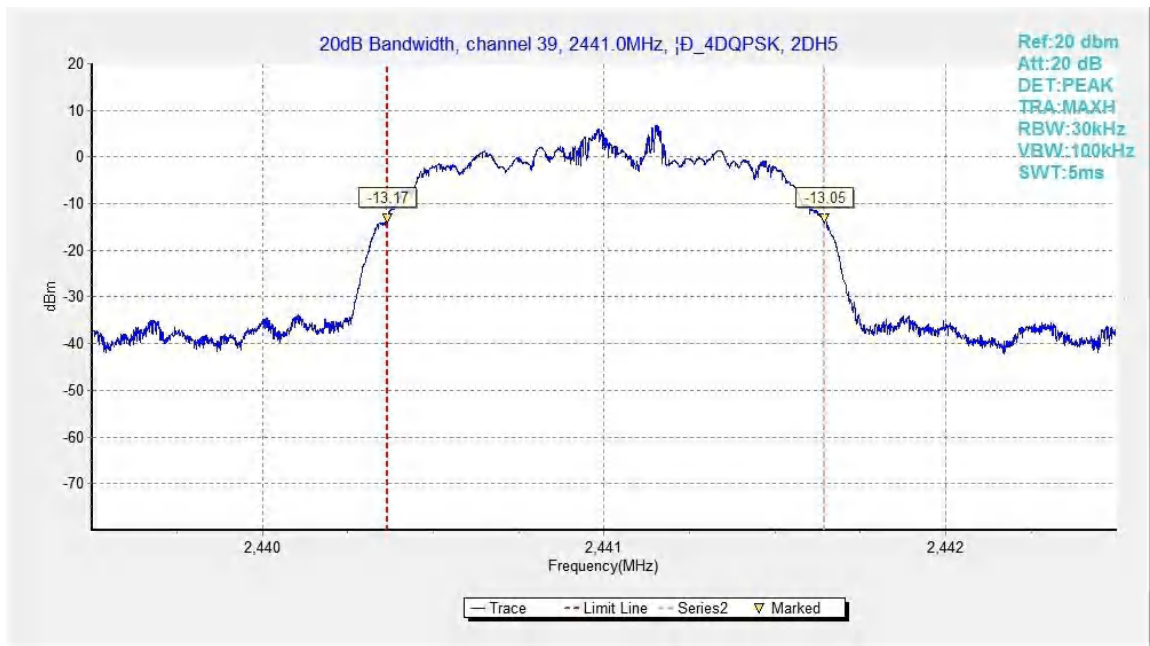


Fig.80. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 39

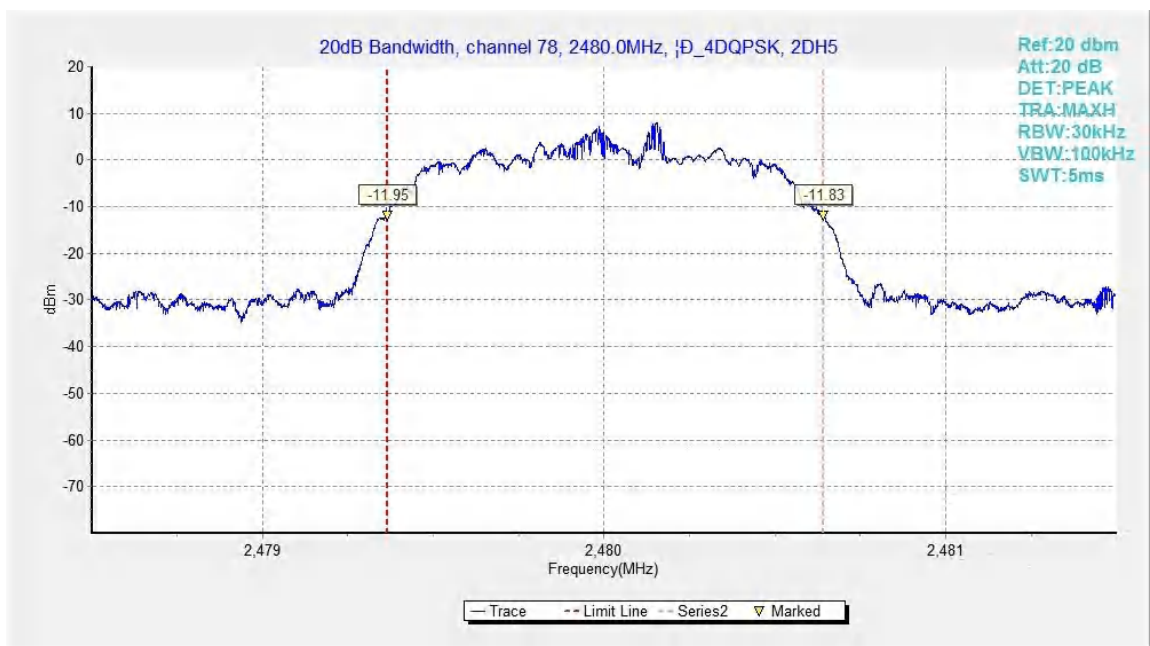


Fig.81. 20dB Bandwidth:  $\pi/4$  DQPSK, Channel 78

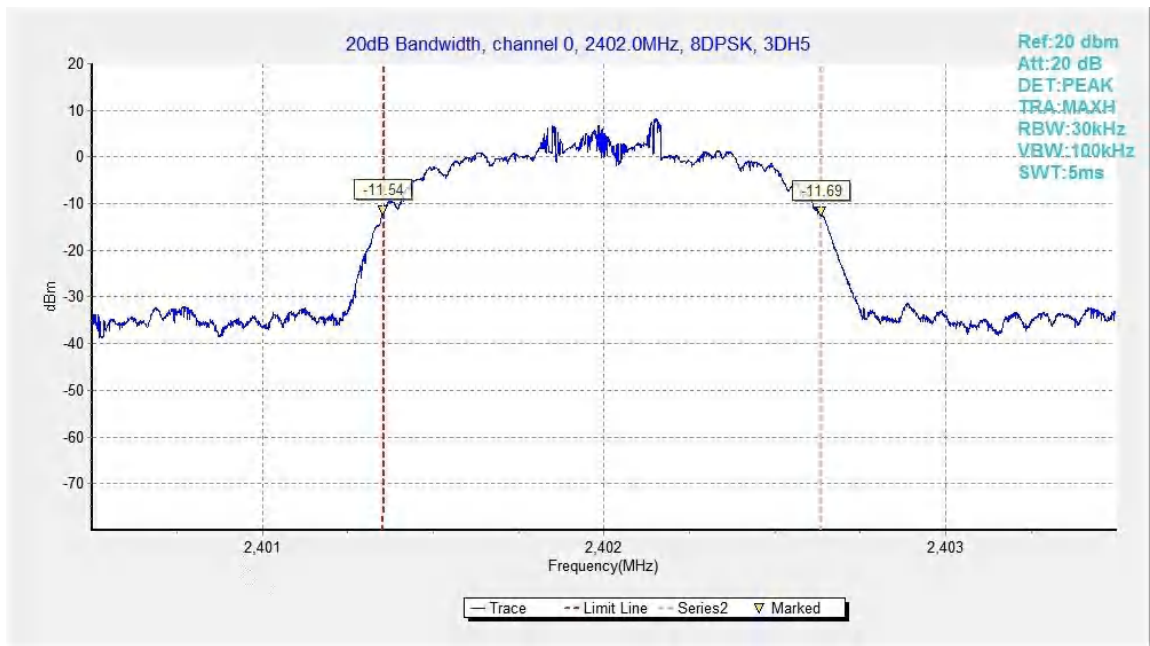


Fig.82. 20dB Bandwidth: 8DPSK, Channel 0

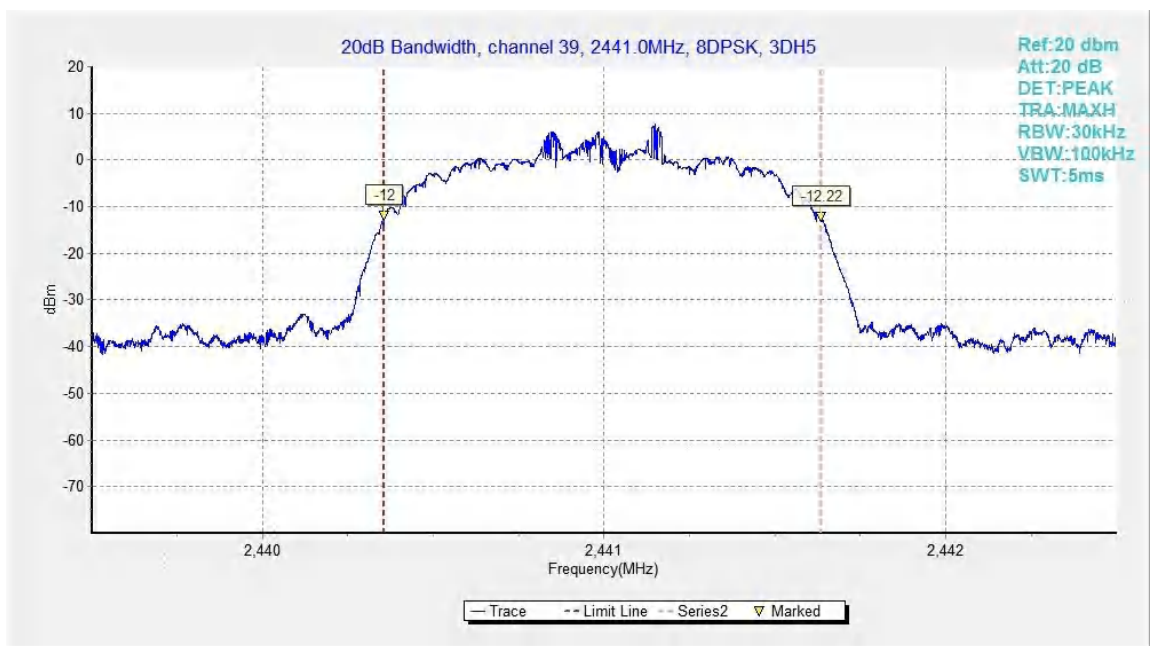


Fig.83. 20dB Bandwidth: 8DPSK, Channel 39

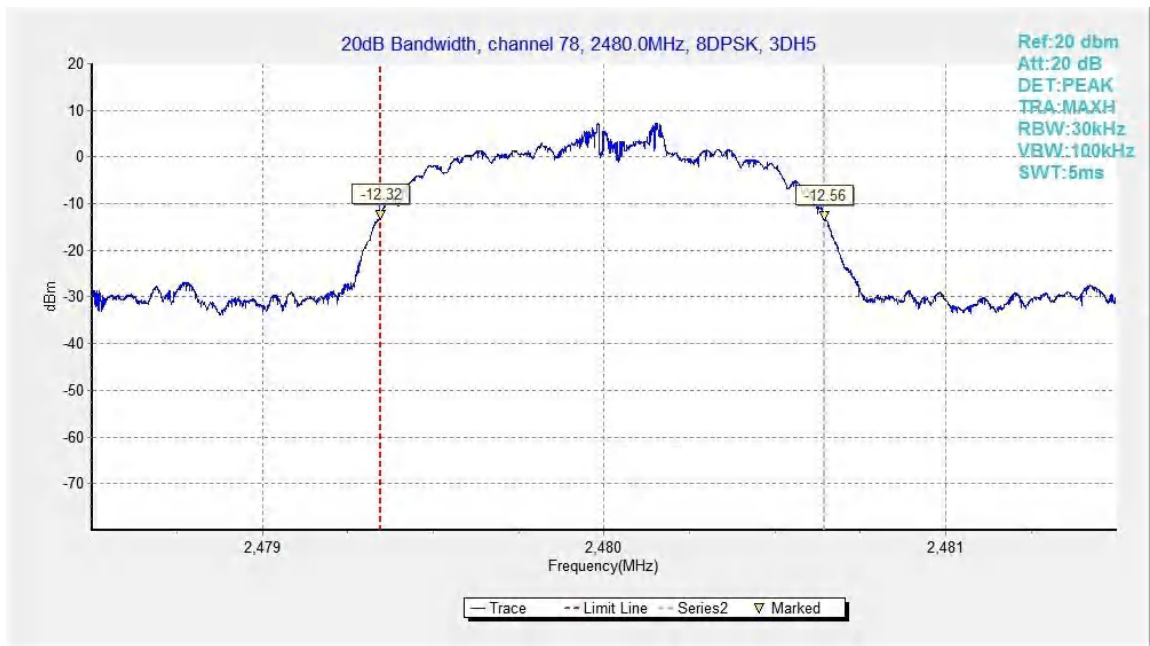


Fig.84. 20dB Bandwidth: 8DPSK, Channel 78

## B.7. Carrier Frequency Separation

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

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = 3MHz
- RBW=300kHz
- VBW=300kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

Search the peak marks of the middle frequency and adjacent channel, then record the separation between them.

\* Comment: This limit should be over 25 kHz or  $(2/3) * 20\text{dB}$  bandwidth, whichever is greater.

### Measurement Limit:

| Standard                     | Limit(kHz)                                     |
|------------------------------|------------------------------------------------|
| FCC 47 CFR Part 15.247(a)(1) | over 25 kHz or $(2/3) * 20\text{dB}$ bandwidth |

### Measurement Result:

#### For GFSK

| Channel | Carrier frequency separation (kHz) |         | Conclusion |
|---------|------------------------------------|---------|------------|
| 39      | Fig.85                             | 1293.75 | P          |

#### For $\pi/4$ DQPSK

| Channel | Carrier frequency separation (kHz) |         | Conclusion |
|---------|------------------------------------|---------|------------|
| 39      | Fig.86                             | 1019.25 | P          |

#### For 8DPSK

| Channel | Carrier frequency separation (kHz) |        | Conclusion |
|---------|------------------------------------|--------|------------|
| 39      | Fig.87                             | 974.25 | P          |

**Conclusion: PASS**

**Test graphs as below:**

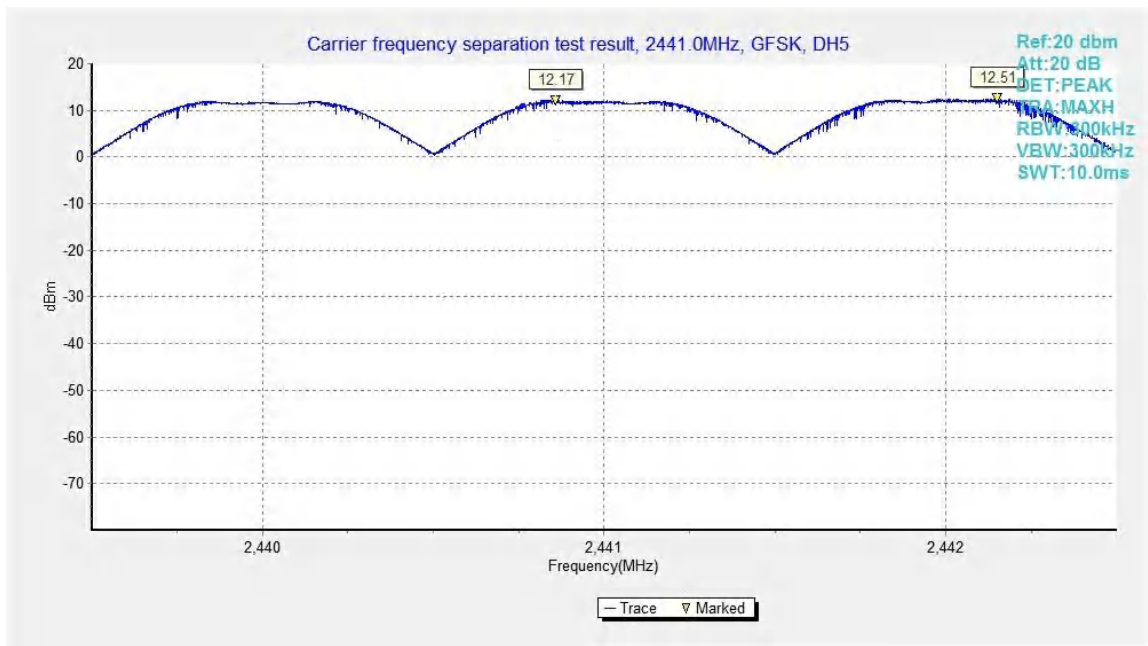


Fig.85. Carrier frequency separation measurement: GFSK, Channel 39

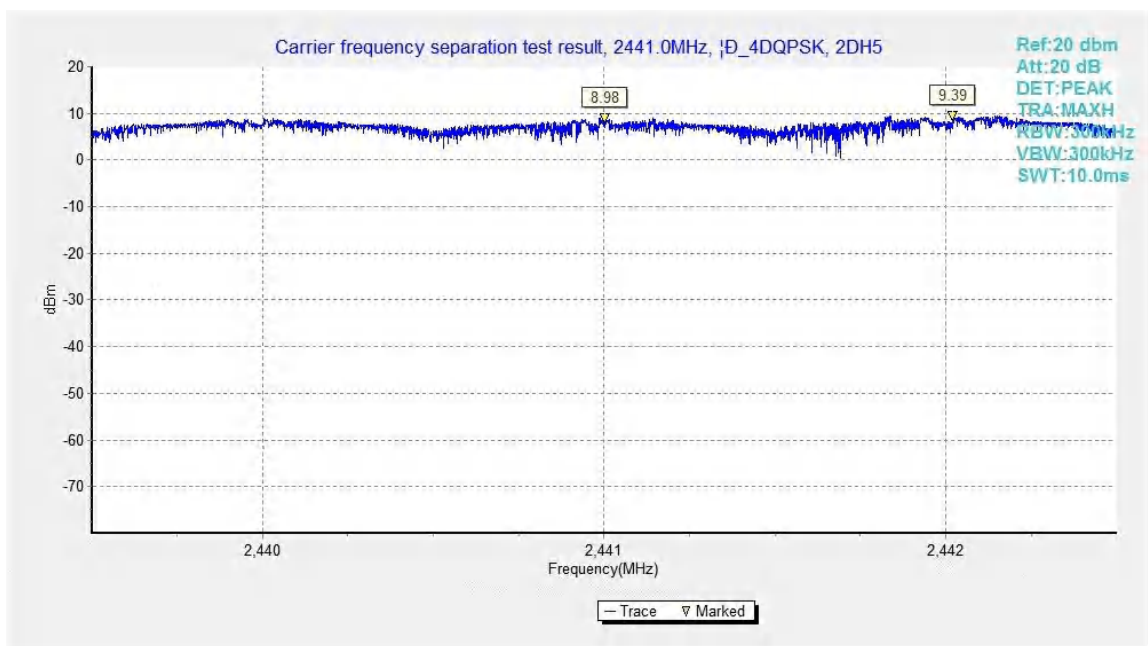


Fig.86. Carrier frequency separation measurement:  $\pi/4$  DQPSK, Channel 39

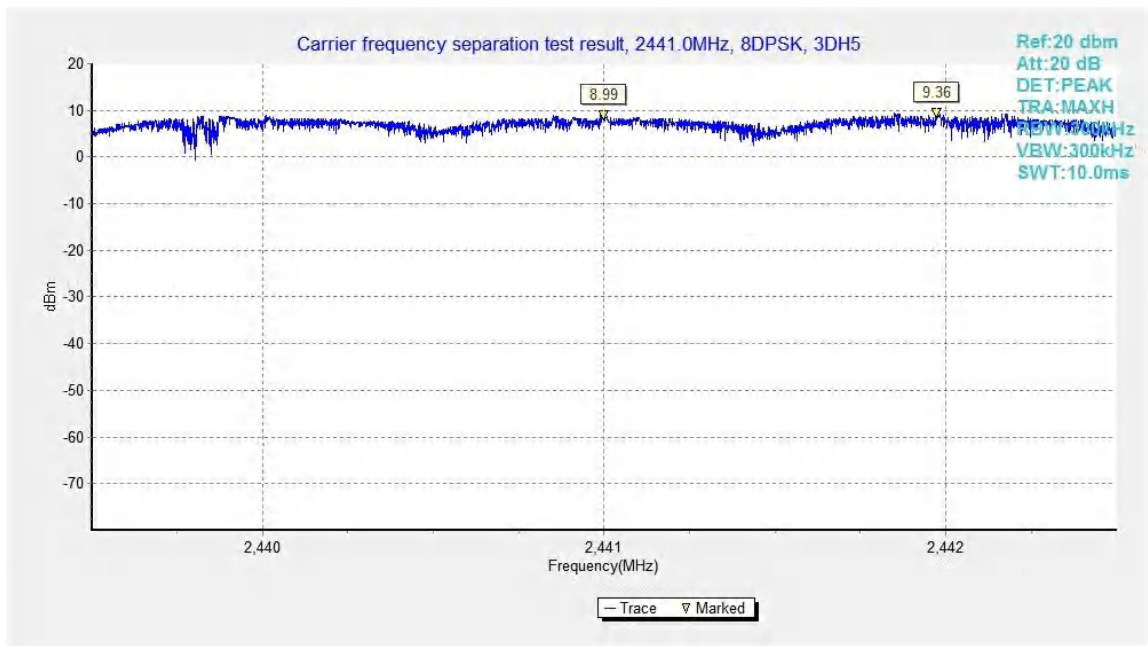


Fig.87. Carrier frequency separation measurement: 8DPSK, Channel 39

## B.8. Number of Hopping Channels

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

The EUT must have its hopping function enabled. Use the following spectrum analyzer settings:

- Span = the frequency band of operation
- RBW = 500kHz
- VBW = 500kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

### Measurement Limit:

| Standard                           | Limit                                |
|------------------------------------|--------------------------------------|
| FCC 47 CFR Part 15.247(a) (1)(iii) | At least 15 non-overlapping channels |

### Measurement Result:

#### For GFSK

| Channel | Number of hopping channels |    | Conclusion |
|---------|----------------------------|----|------------|
| 0~39    | Fig.88                     | 79 | P          |
| 40~78   | Fig.89                     |    |            |

#### For $\pi/4$ DQPSK

| Channel | Number of hopping channels |    | Conclusion |
|---------|----------------------------|----|------------|
| 0~39    | Fig.90                     | 79 | P          |
| 40~78   | Fig.91                     |    |            |

#### For 8DPSK

| Channel | Number of hopping channels |    | Conclusion |
|---------|----------------------------|----|------------|
| 0~39    | Fig.92                     | 79 | P          |
| 40~78   | Fig.93                     |    |            |

**Conclusion: PASS**

**Test graphs as below:**

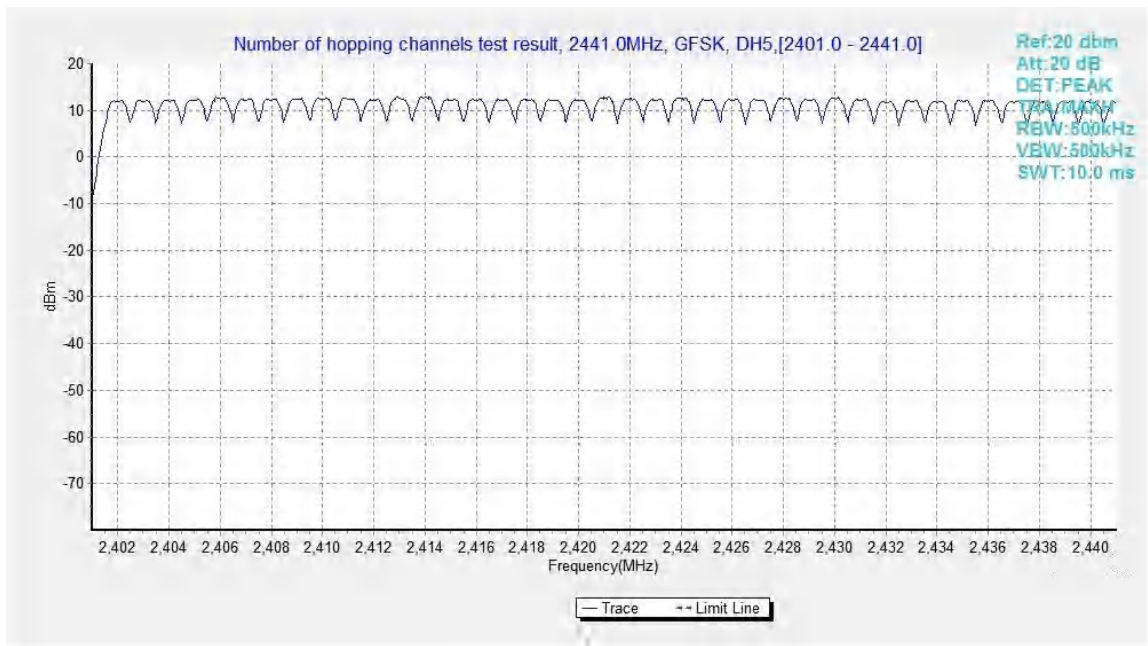


Fig.88. Number of hopping frequencies: GFSK, Channel 0 - 39

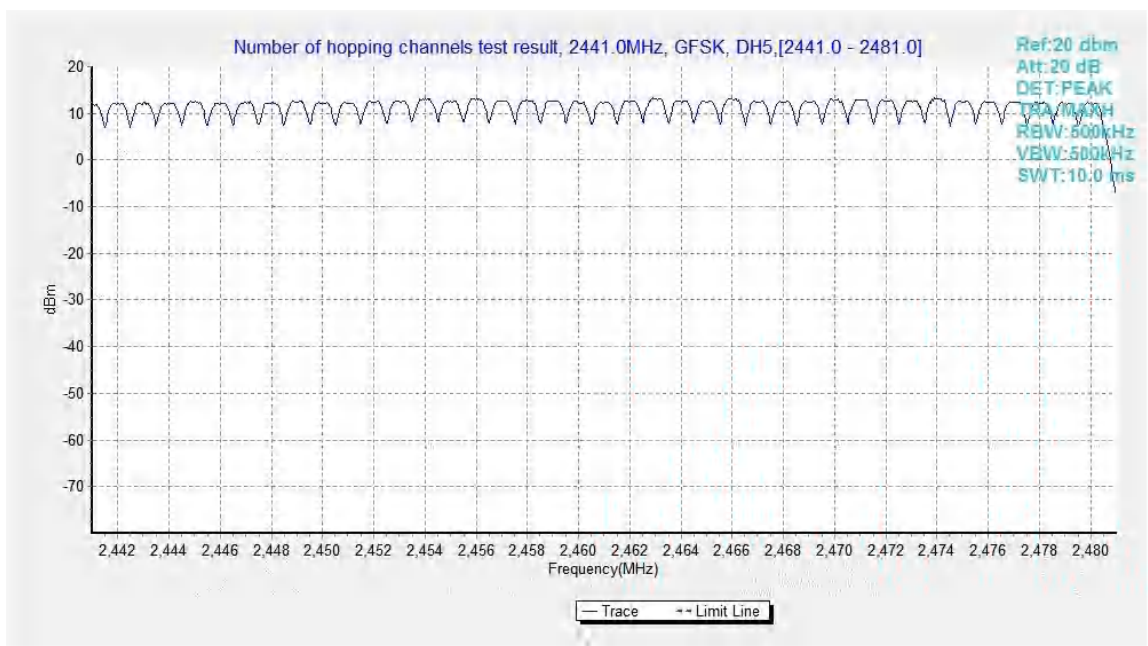


Fig.89. Number of hopping frequencies: GFSK, Channel 40 - 78

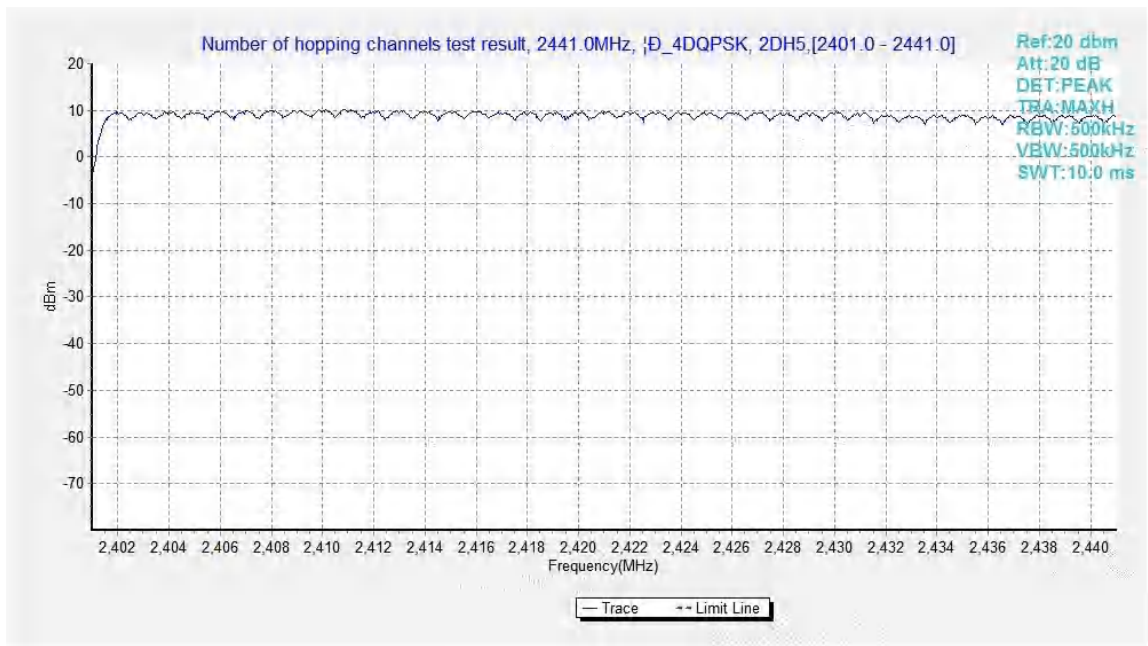


Fig.90. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 0 - 39

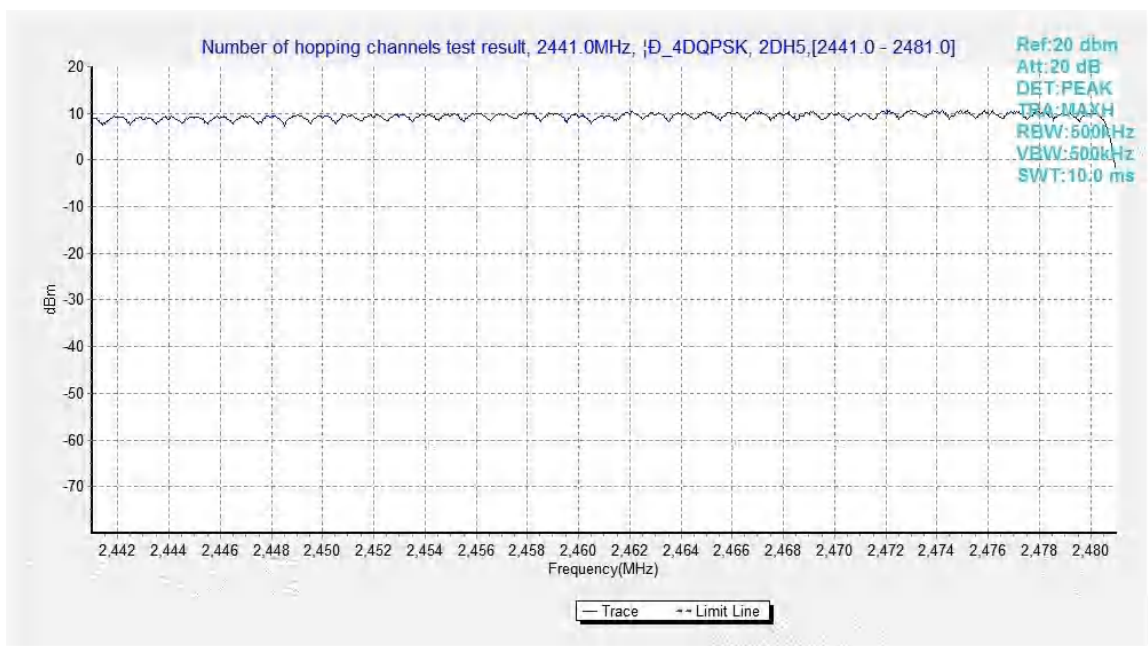


Fig.91. Number of hopping frequencies:  $\pi/4$  DQPSK, Channel 40 - 78

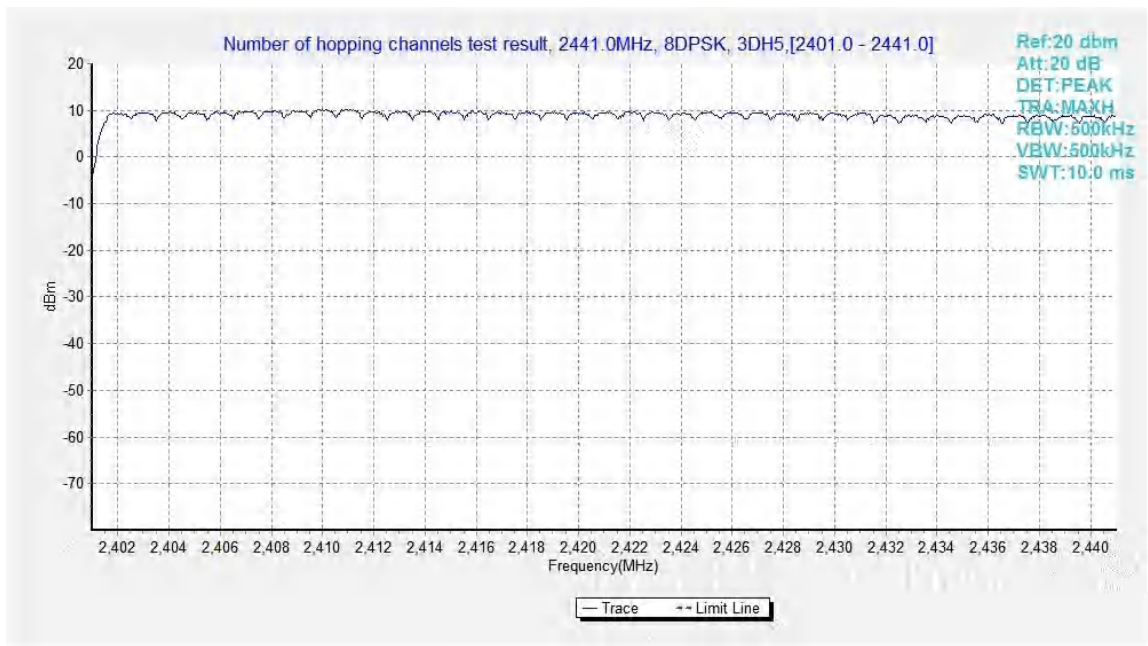


Fig.92. Number of hopping frequencies: 8DPSK, Channel 0 - 39

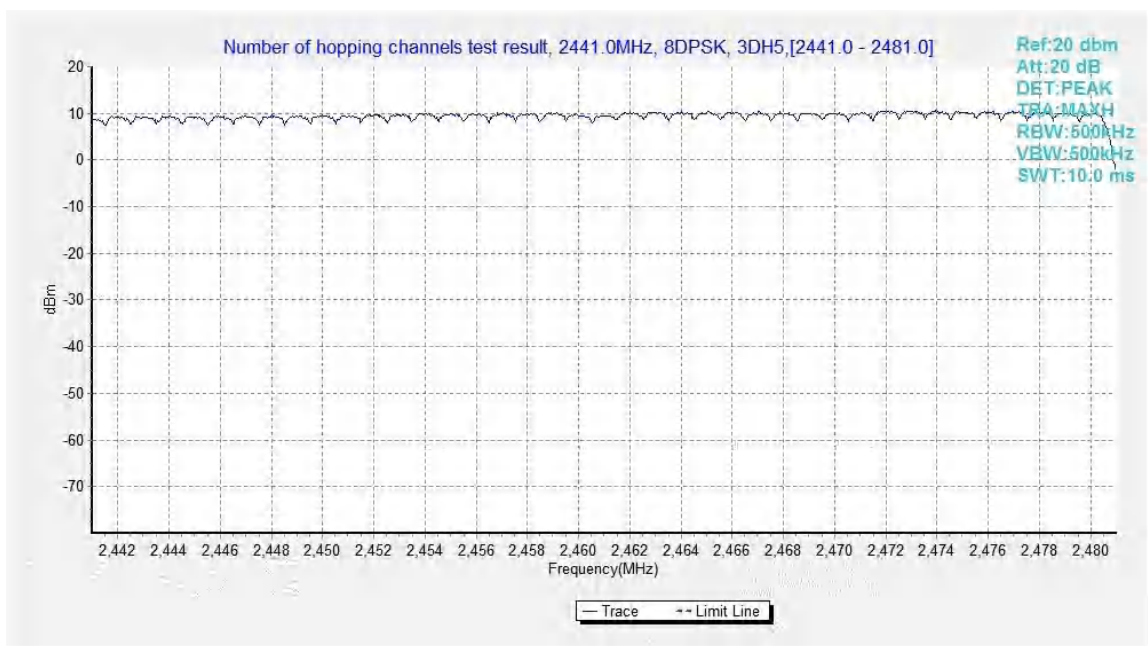
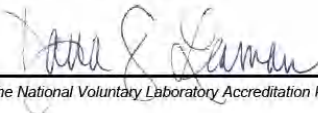


Fig.93. Number of hopping frequencies: 8DPSK, Channel 40 - 78

## **ANNEX C: Accreditation Certificate**

|                                                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                      |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>United States Department of Commerce<br/>National Institute of Standards and Technology</p> <p><b>NVLAP</b> </p>                                                                                                                              |                                                                                                                                                                                                                                                      |
| <hr/> <p><b>Certificate of Accreditation to ISO/IEC 17025:2017</b></p> <hr/>                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                      |
| <p>NVLAP LAB CODE: 600118-0</p>                                                                                                                                                                                                                                                                                                    |                                                                                                                                                                                                                                                      |
| <p><b>Telecommunication Technology Labs, CAICT</b><br/>Beijing<br/>China</p>                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                      |
| <p><i>is accredited by the National Voluntary Laboratory Accreditation Program for specific services,<br/>listed on the Scope of Accreditation, for:</i></p>                                                                                                                                                                       |                                                                                                                                                                                                                                                      |
| <p><b>Electromagnetic Compatibility &amp; Telecommunications</b></p>                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                      |
| <p><i>This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017.<br/>This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality<br/>management system (refer to joint ISO-ILAC-IAF Communiqué dated January 2009).</i></p> |                                                                                                                                                                                                                                                      |
| <p>2022-10-01 through 2023-09-30<br/><i>Effective Dates</i></p>                                                                                                                                                                                                                                                                    | <div><p>For the National Voluntary Laboratory Accreditation Program</p></div> |

**\*\*\*END OF REPORT\*\*\***