# TEST REPORT

## No. B20N00042-BT

**i.safe MOBILE GmbH**

**LTE SMARTPHONE**

**Model Name: M33A01**

**with**

**Hardware Version: V1.00**

**Software Version:**

**LA6925(IS330)_IS330_EEA_1.0.0.0.0_1_20200103_MultiDownload_2**

**02001101536_user**

**FCC ID: 2AACZ-M33A01**

**IC: 11122A-M33A01**

**Issued Date: 2020-03-11**

**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.

**Test Laboratory:**

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# 1. Summary of Test Report

## 1.1. Test Items

| | |
|---|---|
| Description | LTE SMARTPHONE |
| Model Name | M33A01 |
| Applicant's name | i.safe MOBILE GmbH |
| Manufacturer's Name | i.safe MOBILE GmbH |

## 1.2. Test Standards

FCC Part15-2018; ANSI C63.10-2013; RSS-247 Issue 2; RSS-Gen Issue 5

## 1.3. Test Result

**Pass**

## 1.4. Testing Location

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

## 1.5. Project data

| | |
|---|---|
| Testing Start Date: | 2020-01-15 |
| Testing End Date: | 2020-02-03 |

## 1.6. Signature

**Lin Kanfeng**

**(Prepared this test report)**

**Tang Weisheng**

**(Reviewed this test report)**

**Zhang Bojun**

**(Approved this test report)**

# 2. Client Information

## 2.1. Applicant Information

| | |
|---|---|
| Company Name: | i.safe MOBILE GmbH |
| Address: | i_Park Tauberfranken 10 97922 Lauda-Koenigshofen Germany |
| Contact Person | Dirk Amann |
| E-Mail | dirk.amann@isafe-mobile.com |
| Telephone: | +491703719004 |
| Fax: | / |

## 2.2. Manufacturer Information

| | |
|---|---|
| Company Name: | i.safe MOBILE GmbH |
| Address: | i_Park Tauberfranken 10 97922 Lauda-Koenigshofen Germany |
| Contact Person | Dirk Amann |
| E-Mail | dirk.amann@isafe-mobile.com |
| Telephone: | +491703719004 |
| Fax: | / |

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

## 3.1. About EUT

| | |
|---|---|
| Description | LTE SMARTPHONE |
| Model Name | M33A01 |
| Brand Name | i.safe MOBILE |
| Frequency Band | 2400MHz~2483.5MHz |
| Type of Modulation | GFSK/π /4 DQPSK/8DPSK |
| Number of Channels | 79 |
| Antenna Type | Integrated |
| Antenna Gain | 1.8dBi |
| Power Supply | 3.8V DC by Battery |
| FCC ID | 2AACZ-M33A01 |
| IC | 11122A-M33A01 |
| 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* | IMEI | HW Version | SW Version | Receive Date |
|---|---|---|---|---|
| EUT1 | 359052100502739 | V1.0.0 | LA6925(IS330)_IS330_EEA_1.0.0.0.0_1_20200103_MultiDownload_202001101536_user | 2020-01-03 |

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

## 3.3. Internal Identification of AE used during the test

| AE ID* | Description | SN |
|---|---|---|
| AE1 | Charger | / |
| AE2 | Battery | / |

AE1

| | |
|---|---|
| Model | ICP12-050-2000B |
| Manufacturer | SHENZHEN SHI YINGYUAN POWER SUPPLY TECHNOLOGY CO., LTD. |

AE2

| | |
|---|---|
| Model | MBP33A01 |
| Manufacturer | Shenzhen 3Sun Electronics Co.,Ltd. |
| Capacitance | 4050mAh |
| Nominal Voltage | 3.7V |

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

## 3.4. General Description

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

It consists of normal options: Lithium Battery, Charger and Headset.

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:<br>15.205 Restricted bands of operation;<br>15.209 Radiated emission limits, general requirements;<br>15.247 Operation within the bands 902–928MHz, 2400–2483.5 MHz, and 5725–5850 MHz | 2018 |
| ANSI C63.10 | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices | 2013 |
| RSS-247 | Spectrum Management and Telecommunications Radio Standards Specification<br>Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices | Issue 2<br>February, 2017 |
| RSS-Gen | Spectrum Management and Telecommunications Radio Standards Specification<br>General Requirements for Compliance of Radio Apparatus | Issue 5<br>April, 2018 |

# 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 | Sub-clause of IC | Verdict |
|---|---|---|---|---|
| 0 | Antenna Requirement | 15.203 | / | **P** |
| 1 | Maximum Peak Output Power | 15.247 (b) | RSS-247 section 5.4 | **P** |
| 2 | Band Edges Compliance | 15.247 (d) | RSS-247 section 5.1 | **P** |
| 3 | Conducted Spurious Emission | 15.247 (d) | RSS-247 section 5.5/ RSS-Gen section 6.13 | **P** |
| 4 | Radiated Spurious Emission | 15.247,15.205,15.209 | RSS-247 section 5.5/ RSS-Gen section 6.13 | **P** |
| 5 | Occupied 20dB bandwidth | 15.247(a) | RSS-247 section 5.1 | **P** |
| 6 | Time of Occupancy (Dwell Time) | 15.247(a) | RSS-247 section 5.1 | **P** |
| 7 | Number of Hopping Channel | 15.247(a) | RSS-247 section 5.1 | **P** |
| 8 | Carrier Frequency Separation | 15.247(a) | RSS-247 section 5.1 | **P** |
| 9 | AC Power line Conducted Emission | 15.107,15.207 | RSS-Gen section 8.8 | **P** |
| 10 | Occupied Bandwidth | / | RSS-Gen section 6.7 | **P** |

See **ANNEX A** for details.

## 5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacturer 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.

## 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 | 2021-01-15 | 1 year |
| 2 | Bluetooth Tester | CBT32 | 100584 | Rohde & Schwarz | 2021-01-01 | 1 year |

### Radiated emission test system

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration Due date | Calibration Period |
|---|---|---|---|---|---|---|
| 1 | LISN | ESH2-Z5 | 100196 | R&S | 2021-01-02 | 1 year |
| 2 | Test Receiver | ESCI | 100701 | R&S | 2020-08-06 | 1 year |
| 3 | Loop Antenna | HLA6120 | 35779 | TESEQ | 2022-05-01 | 3 year |
| 4 | BiLog Antenna | VULB9163 | 9163 329 | Schwarzbeck | 2021-02-16 | 3 year |
| 5 | Horn Antenna | 3117 | 00066585 | ETS-Lindgren | 2022-03-04 | 3 year |
| 6 | Test Receiver | ESR7 | 101675 | R&S | 2020-07-18 | 1 year |
| 7 | Spectrum Analyzer | FSP 40 | 100378 | R&S | 2020-12-12 | 1 year |
| 8 | Chamber | FACT5-2.0 | 4166 | ETS-Lindgren | 2021-05-12 | 3 year |
| 9 | Antenna | QSH-SL-1 8-26-S-20 | 17013 | Q-par | 2021-01-14 | 3 year |
| 10 | Antenna | QSH-SL-2 6-40-K-20 | 17014 | Q-par | 2021-01-10 | 3 year |

### Test software

| No. | Equipment | Manufacturer | Version |
|---|---|---|---|
| 1 | TechMgr Software | CAICT | 2.1.1 |
| 2 | EMC32 | Rohde & Schwarz | 8.53.0 |
| 3 | EMC32 | Rohde & Schwarz | 10.01.00 |

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

### Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

# 7. Laboratory Environment

**Semi-anechoic chambe**

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. = 15 %, Max. = 75 % |
| Shielding effectiveness | 0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB |
| Electrical insulation | > 2MΩ |
| Ground system resistance | < 4 Ω |
| Normalised site attenuation (NSA) | < ±4 dB, 3 m distance, from 30 to 1000 MHz |

**Shielded room**

| | |
|---|---|
| Temperature | Min. = 15 ℃, Max. = 35 ℃ |
| Relative humidity | Min. =20 %, Max. = 75 % |
| Shielding effectiveness | 0.014MHz-1MHz> 60 dB; 1MHz-1000MHz>90 dB |
| Electrical insulation | > 2MΩ |
| Ground system resistance | < 4 Ω |

**Fully-anechoic chamber**

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

## 8. Measurement Uncertainty

| Test Name | Uncertainty *(k=2)* | |
|---|---|---|
| 1. RF Output Power - Conducted | 1.32dB | |
| 2. Time of Occupancy - Conducted | 0.58ms | |
| 3. Occupied channel bandwidth - Conducted | 66Hz | |
| 4. Transmitter Spurious Emission - Conducted | 30MHz≤f≤1GHz | 1.41dB |
| | 1GHz≤f≤7GHz | 1.92dB |
| | 7GHz≤f≤13GHz | 2.31dB |
| | 13GHz≤f≤26GHz | 2.61dB |
| 5. Transmitter Spurious Emission - Radiated | 9kHz≤f≤30MHz | 1.70dB |
| | 30MHz≤f≤1GHz | 4.90dB |
| | 1GHz≤f≤18GHz | 4.60dB |
| | 18GHz≤f≤40GHz | 4.10dB |
| 6. AC Power line Conducted Emission | 150kHz≤f≤30MHz | 3.00dB |

# ANNEX A: Detailed Test Results

## 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 1.8dBi. The RF transmitter uses an integrate antenna without connector.

## A.1 Maximum Peak Output Power

**Measurement Limit:**

| Standard | Limit (dBm) | E.I.R.P Limit (dBm) |
|---|---|---|
| FCC CRF Part 15.247 (b) & RSS-247 Section 5.4 | < 30 | < 36 |

**Measurement Results:**

**Conducted transmitter power**

| Mode | Peak Conducted Output Power (dBm) | | | | | |
|---|---|---|---|---|---|---|
| | 2402MHz (Ch0) | | 2441MHz (Ch39) | | 2480MHz (Ch78) | |
| GFSK | Fig.1 | 6.99 | Fig.2 | 6.21 | Fig.3 | 7.20 |
| π /4 DQPSK | Fig.4 | 6.23 | Fig.5 | 5.46 | Fig.6 | 6.40 |
| 8DPSK | Fig.7 | 6.64 | Fig.8 | 5.90 | Fig.9 | 6.79 |

**E.I.R.P**

| Mode | Peak Conducted Output Power (dBm) | | |
|---|---|---|---|
| | 2402MHz (Ch0) | 2441MHz (Ch39) | 2480MHz (Ch78) |
| GFSK | 8.79 | 8.01 | 9.00 |
| π /4 DQPSK | 8.03 | 7.26 | 8.20 |
| 8DPSK | 8.44 | 7.70 | 8.59 |

Note: E.I.R.P value = Conducted values (with conducted samples) + Antenna Gain.

**See below for test graphs.**

**Conclusion: Pass**

**Fig. 1 Peak Output Power (GFSK, Ch 0)**

**Fig. 2 Peak Output Power (GFSK, Ch 39)**

**Fig. 3 Peak Output Power (GFSK, Ch 78)**

**Fig. 4 Peak Output Power (π /4 DQPSK, Ch 0)**

**Fig. 5 Peak Output Power (π /4 DQPSK, Ch 39)**

**Fig. 6 Peak Output Power (π /4 DQPSK, Ch 78)**

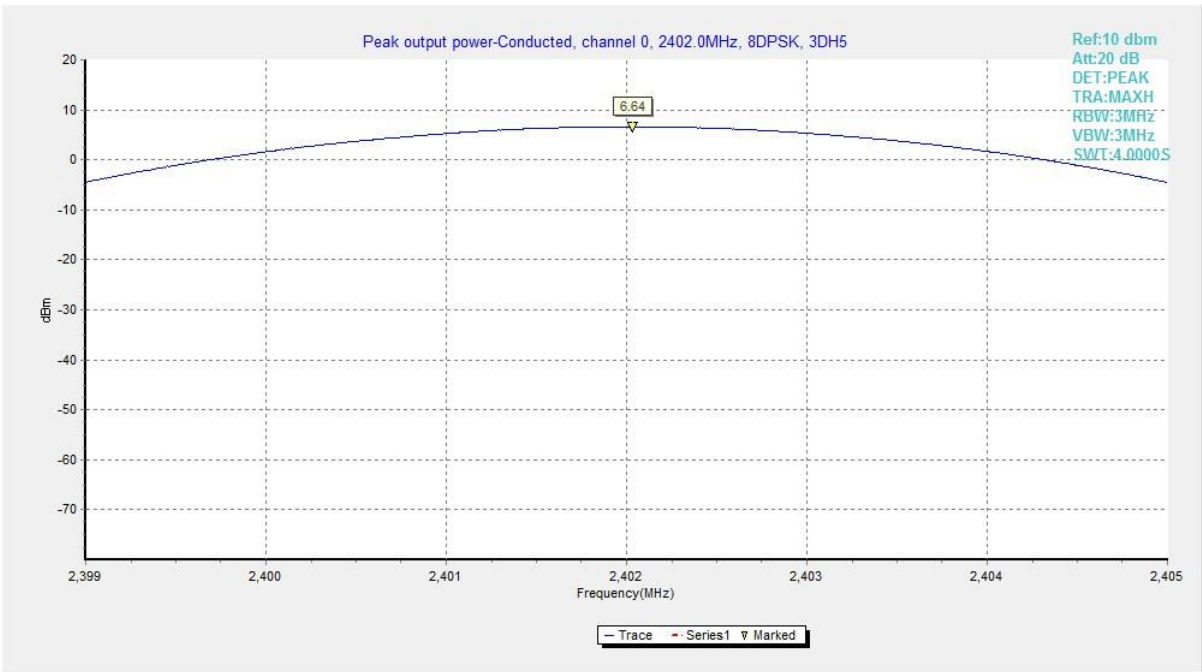


**Fig. 7 Peak Output Power (8DPSK, Ch 0)**

**Fig. 8 Peak Output Power (8DPSK, Ch 39)**

**Fig. 9 Peak Output Power (8DPSK, Ch 78)**

## A.2 Band Edges Compliance

**Measurement Limit:**

| Standard | Limit (dBc) |
|---|---|
| FCC 47 CFR Part 15.247 (d) & RSS-247 Section 5.1 | > 20 |

**Measurement Result:**

| Mode | Channel | Hopping | Test Results | Conclusion |
|---|---|---|---|---|
| GFSK | 0 | ON | Fig.10 | **P** |
| | 78 | ON | Fig.11 | **P** |
| π /4 DQPSK | 0 | ON | Fig.12 | **P** |
| | 78 | ON | Fig.13 | **P** |
| 8DPSK | 0 | ON | Fig.14 | **P** |
| | 78 | ON | Fig.15 | **P** |

| Mode | Channel | Hopping | Test Results | Conclusion |
|---|---|---|---|---|
| GFSK | 0 | OFF | Fig.16 | **P** |
| | 78 | OFF | Fig.17 | **P** |
| π /4 DQPSK | 0 | OFF | Fig.18 | **P** |
| | 78 | OFF | Fig.19 | **P** |
| 8DPSK | 0 | OFF | Fig.20 | **P** |
| | 78 | OFF | Fig.21 | **P** |

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

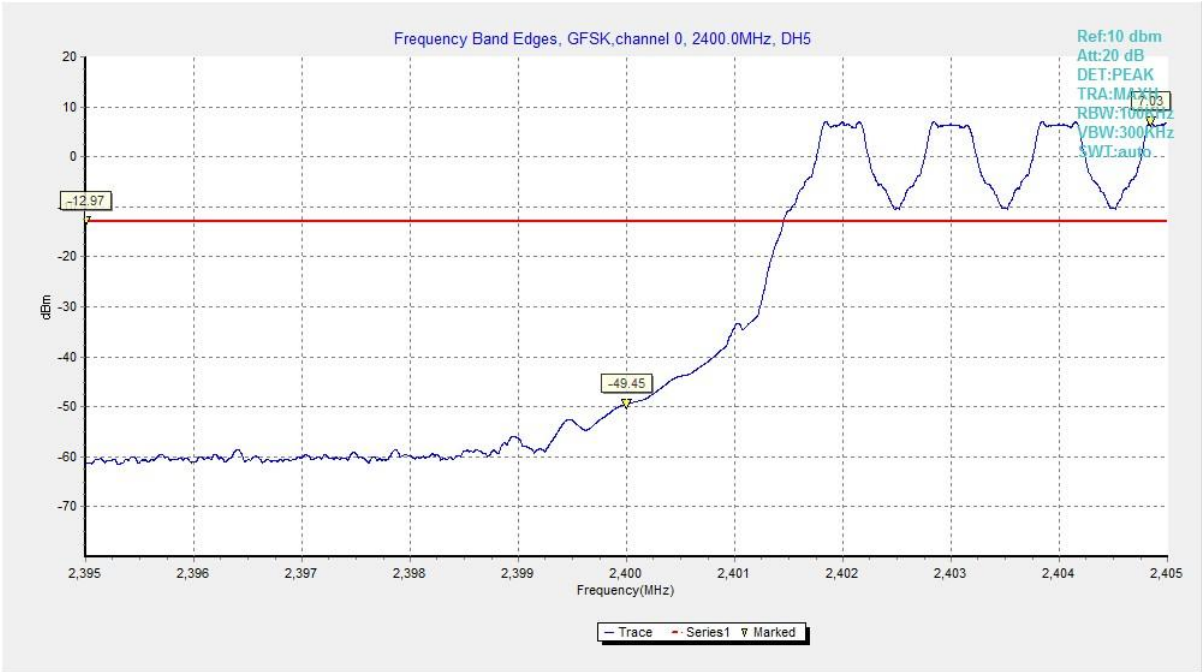


**Fig. 10 Band Edges (GFSK, Ch 0, Hopping ON)**

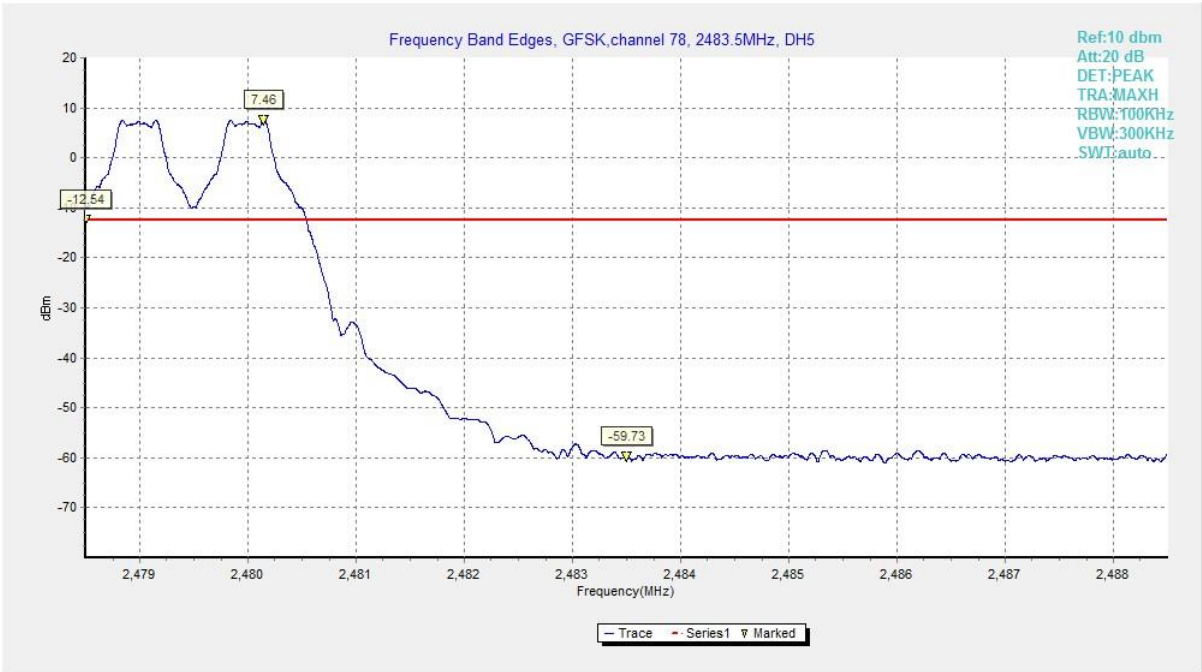


**Fig. 11 Band Edges (GFSK, Ch 78, Hopping ON)**

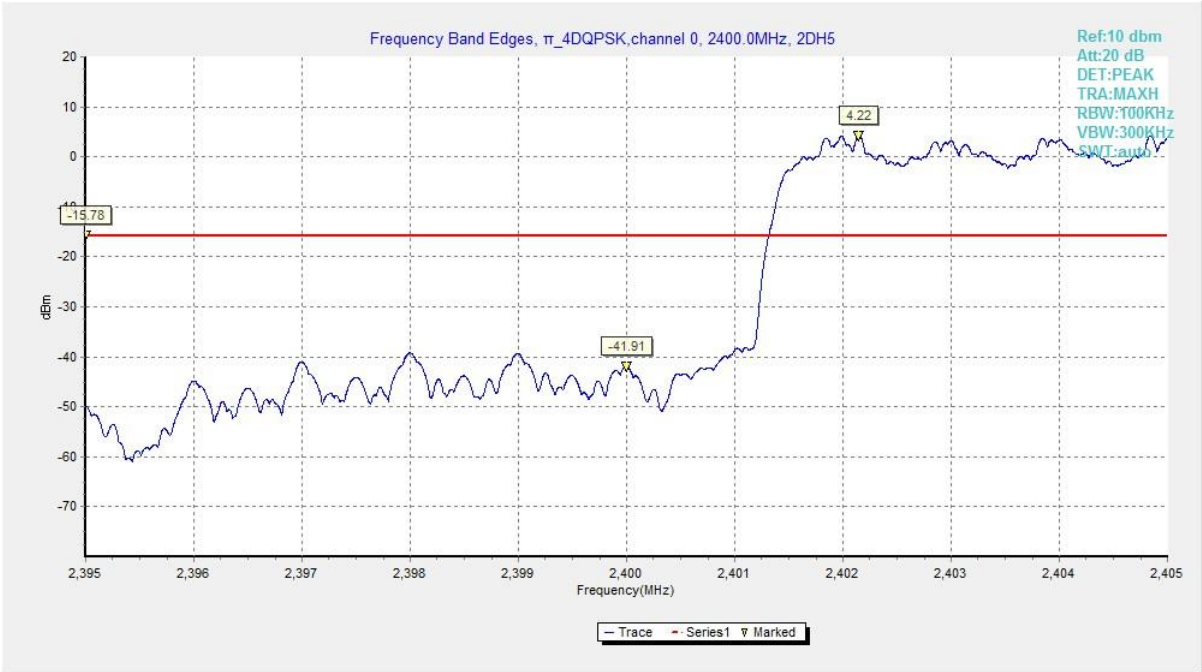


**Fig. 12 Band Edges (π /4 DQPSK, Ch 0, Hopping ON)**

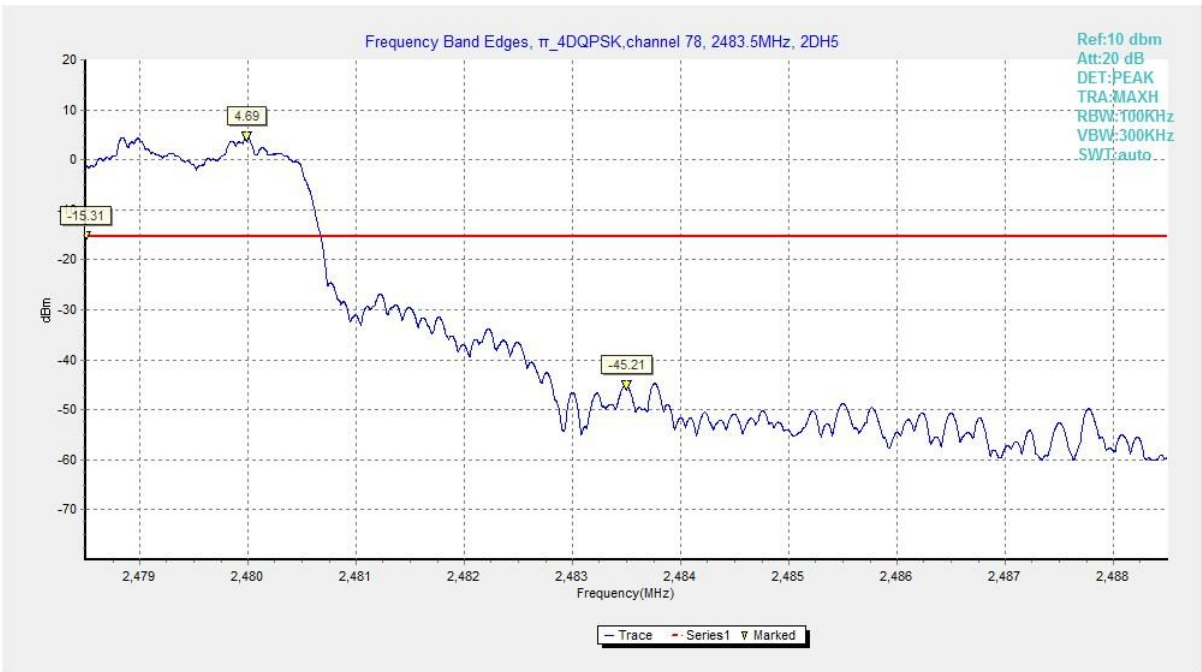


**Fig. 13 Band Edges (π /4 DQPSK, Ch 78, Hopping ON)**

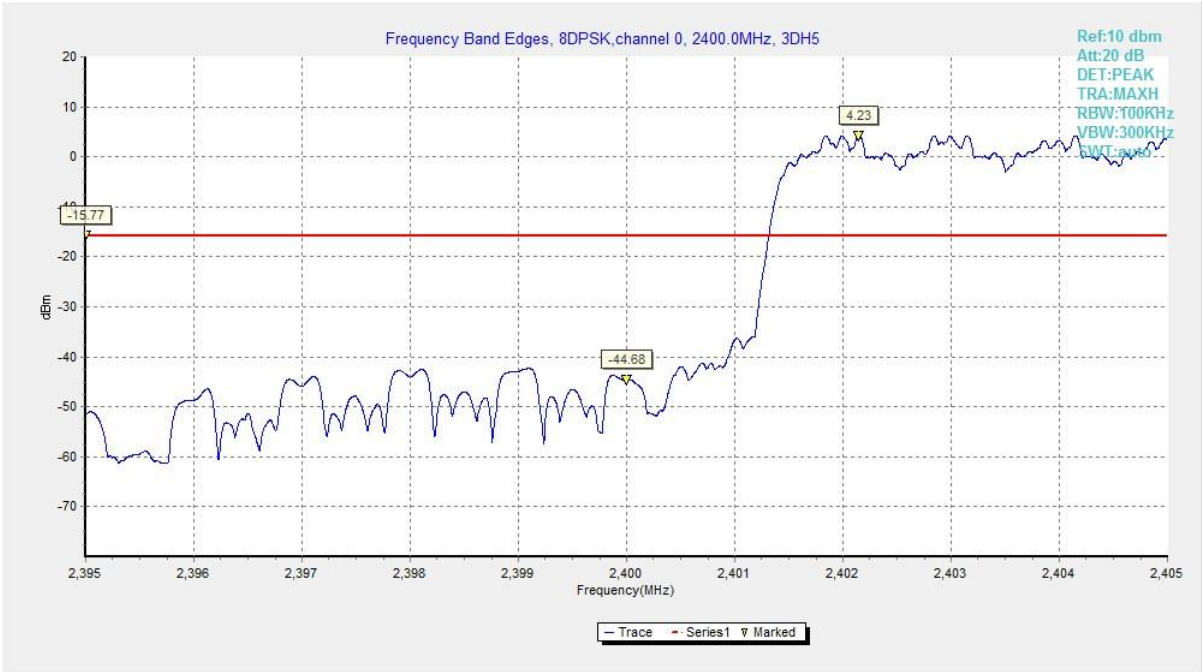


**Fig. 14 Band Edges (8DPSK, Ch 0, Hopping ON)**

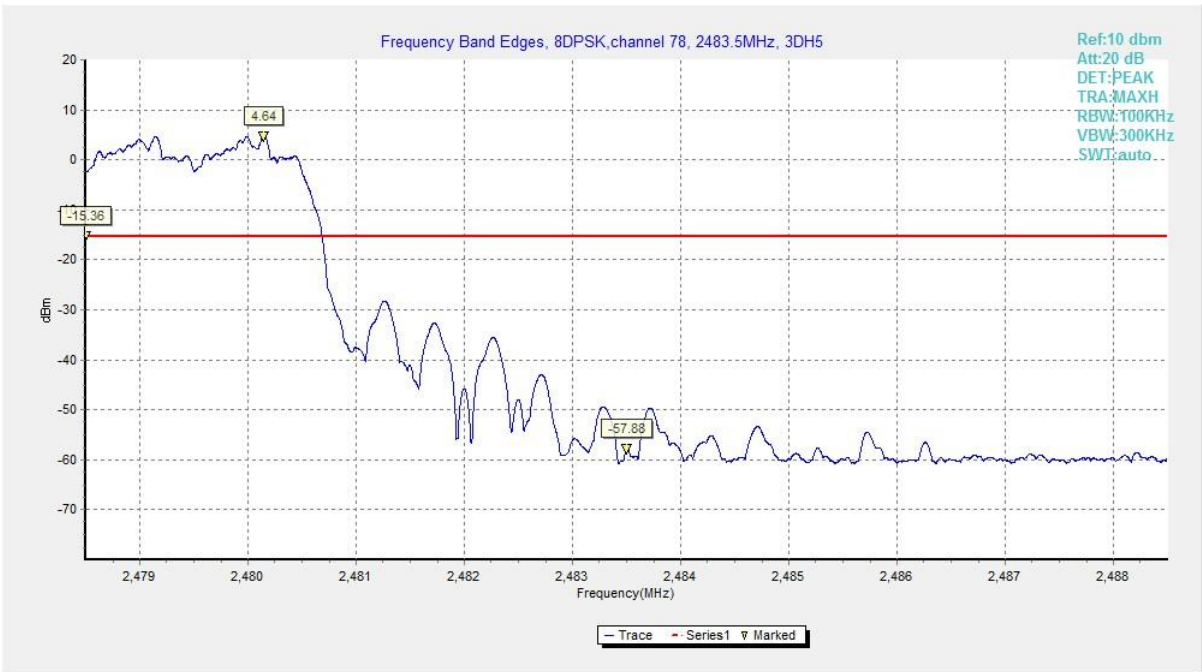


**Fig. 15 Band Edges (8DPSK, Ch 78, Hopping ON)**

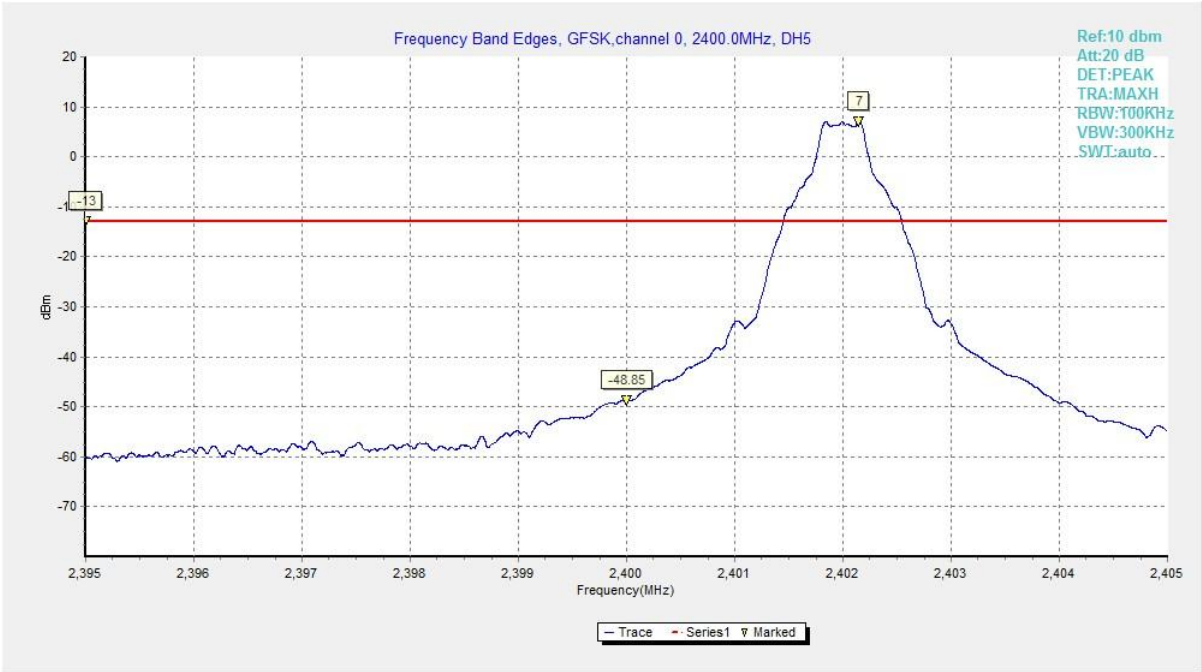


**Fig. 16 Band Edges (GFSK, Ch 0, Hopping OFF)**

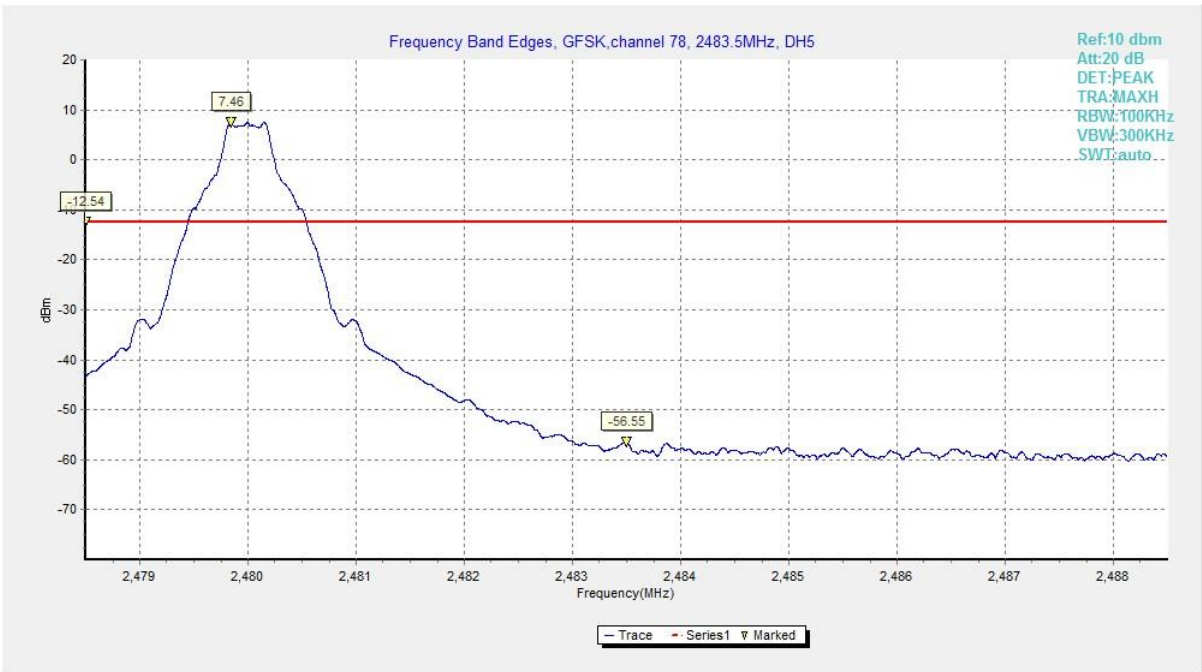


**Fig. 17 Band Edges (GFSK, Ch 78, Hopping OFF)**

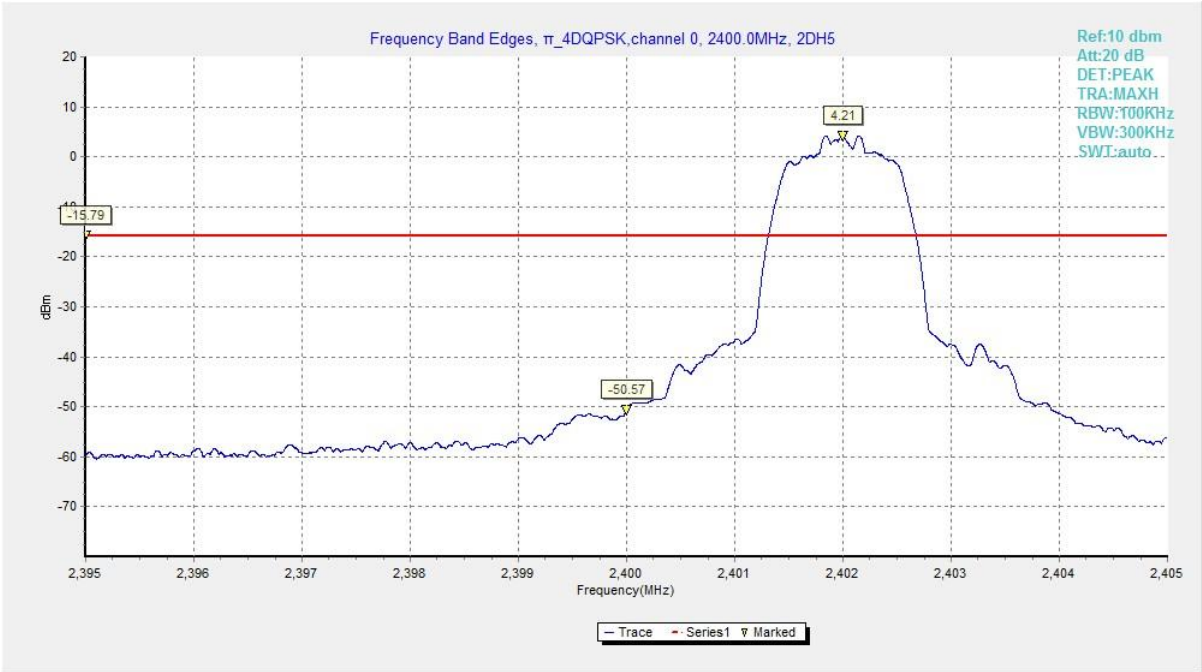


**Fig. 18 Band Edges (π /4 DQPSK, Ch 0, Hopping OFF)**

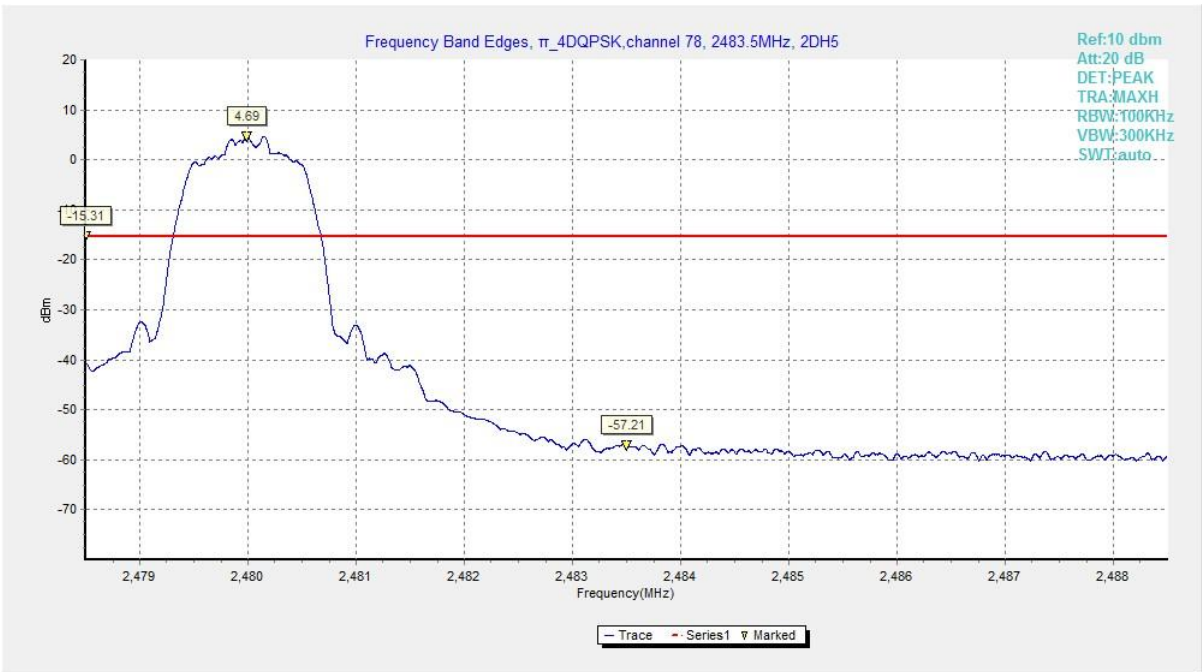


**Fig. 19 Band Edges (π /4 DQPSK, Ch 78, Hopping OFF)**

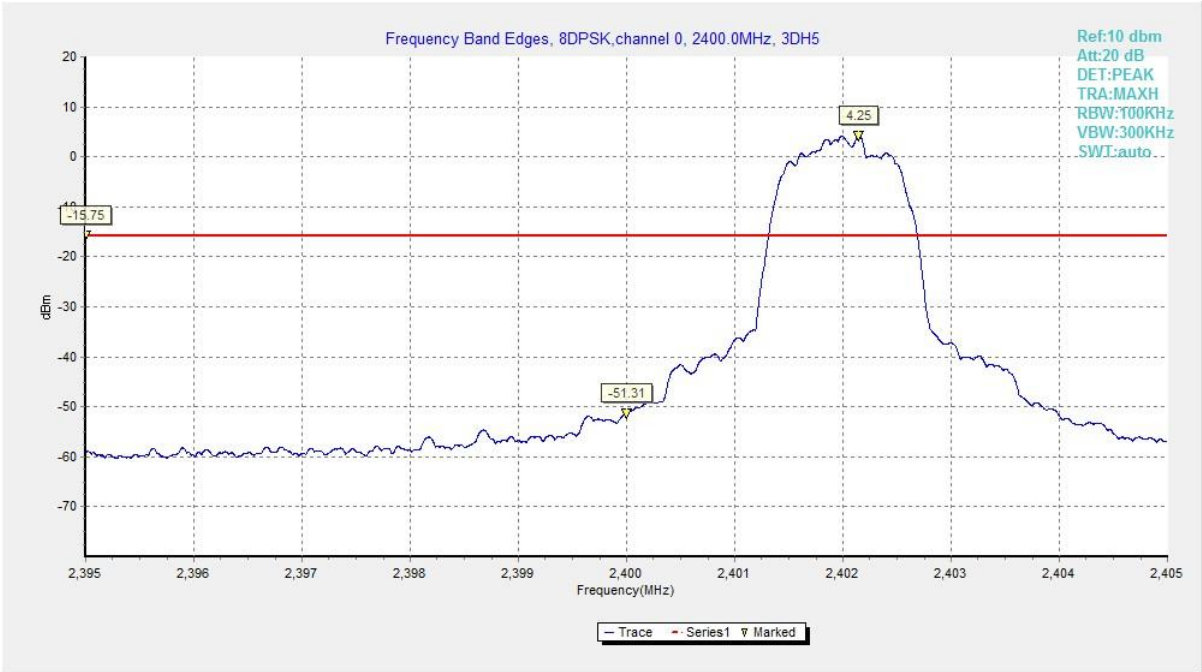


**Fig. 20 Band Edges (8DPSK, Ch 0, Hopping OFF)**

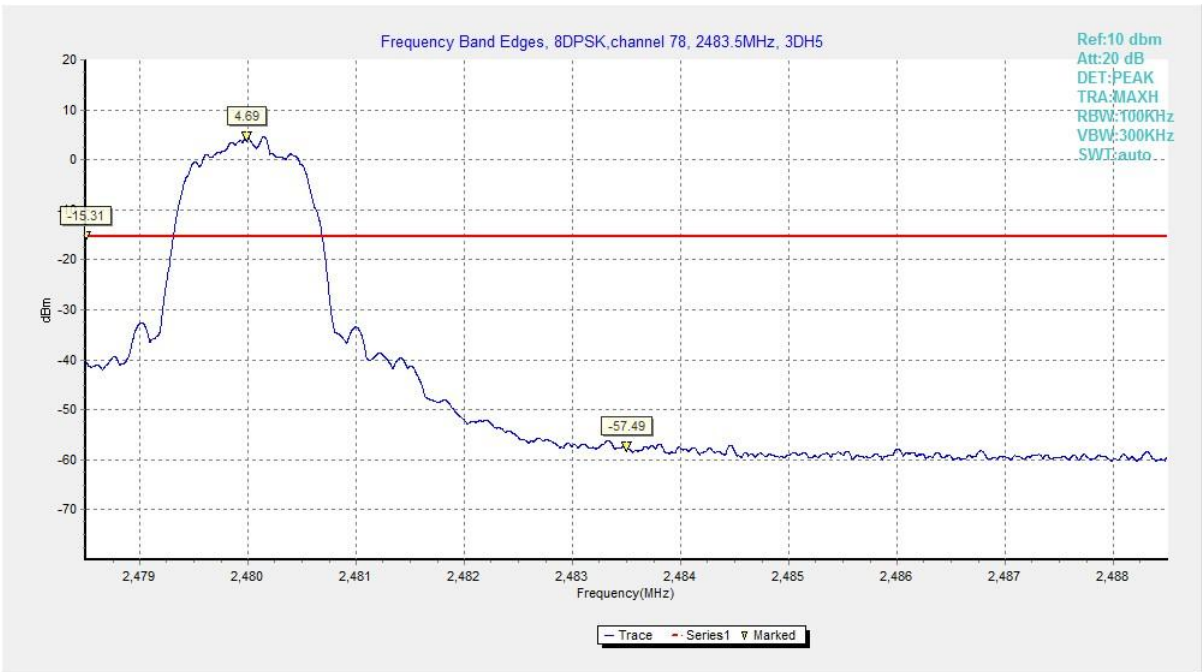


**Fig. 21 Band Edges (8DPSK, Ch 78, Hopping OFF)**

## A.3 Conducted Emission

**Measurement Limit:**

| Standard | Limit |
|---|---|
| FCC 47 CFR Part 15.247 (d) & RSS-247 section 5.5/ RSS-Gen section 6.13 | 20dB below peak output power in 100 kHz bandwidth |

**Measurement Results:**

| MODE | Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|---|
| GFSK | 0 | 2.402 GHz | Fig.22 | **P** |
| | | 1GHz-3GHz | Fig.23 | **P** |
| | | 3GHz-10GHz | Fig.24 | **P** |
| | 39 | 2.441 GHz | Fig.25 | **P** |
| | | 1GHz-3GHz | Fig.26 | **P** |
| | | 3GHz-10GHz | Fig.27 | **P** |
| | 78 | 2.480 GHz | Fig.28 | **P** |
| | | 1GHz-3GHz | Fig.29 | **P** |
| | | 3GHz-10GHz | Fig.30 | **P** |
| π /4 DQPSK | 0 | 2.402 GHz | Fig.31 | **P** |
| | | 1GHz-3GHz | Fig.32 | **P** |
| | | 3GHz-10GHz | Fig.33 | **P** |
| | 39 | 2.441 GHz | Fig.34 | **P** |
| | | 1GHz-3Ghz | Fig.35 | **P** |
| | | 3GHz-10GHz | Fig.36 | **P** |
| | 78 | 2.480 GHz | Fig.37 | **P** |
| | | 1GHz-3Ghz | Fig.38 | **P** |
| | | 3GHz-10GHz | Fig.39 | **P** |
| 8DPSK | 0 | 2.402 GHz | Fig.40 | **P** |
| | | 1GHz-3GHz | Fig.41 | **P** |
| | | 3GHz-10GHz | Fig.42 | **P** |
| | 39 | 2.441 GHz | Fig.43 | **P** |
| | | 1GHz-3GHz | Fig.44 | **P** |
| | | 3GHz-10GHz | Fig.45 | **P** |
| | 78 | 2.480 GHz | Fig.46 | **P** |
| | | 1GHz-3GHz | Fig.47 | **P** |
| | | 3GHz-10GHz | Fig.48 | **P** |
| / | All channels | 30 MHz-1GHz | Fig.49 | **P** |
| | | 10GHz-26GHz | Fig.50 | **P** |

**See below for test graphs.**

**Conclusion: Pass**

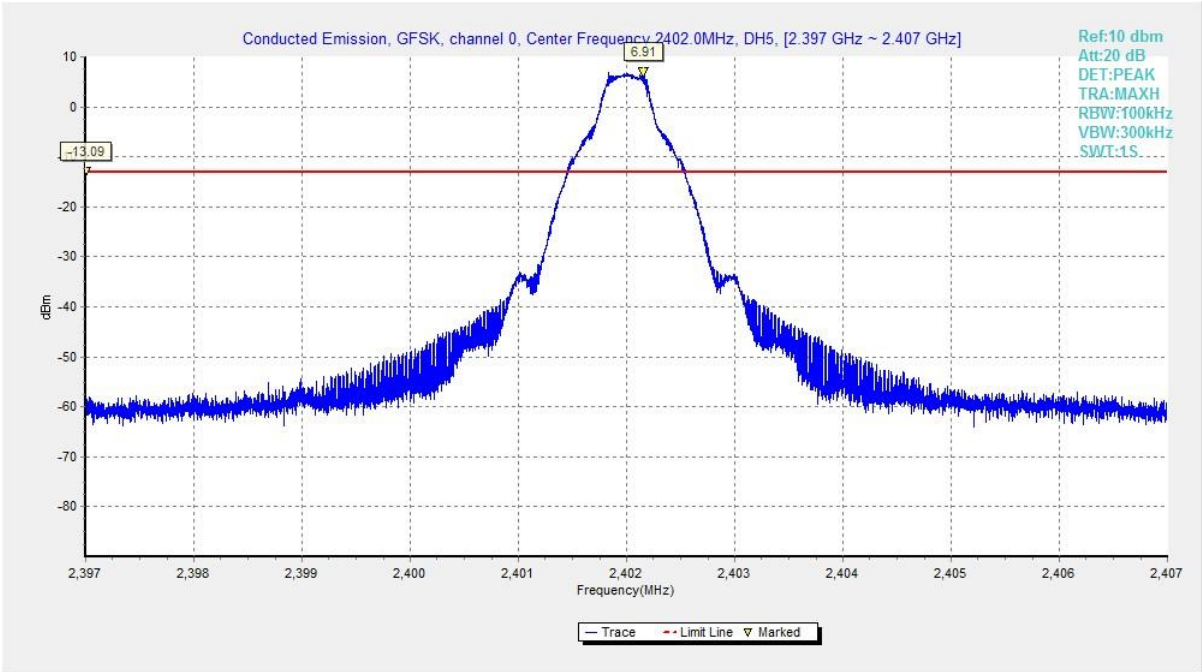


**Fig. 22 Conducted Spurious Emission (GFSK, Ch0, 2.402GHz)**

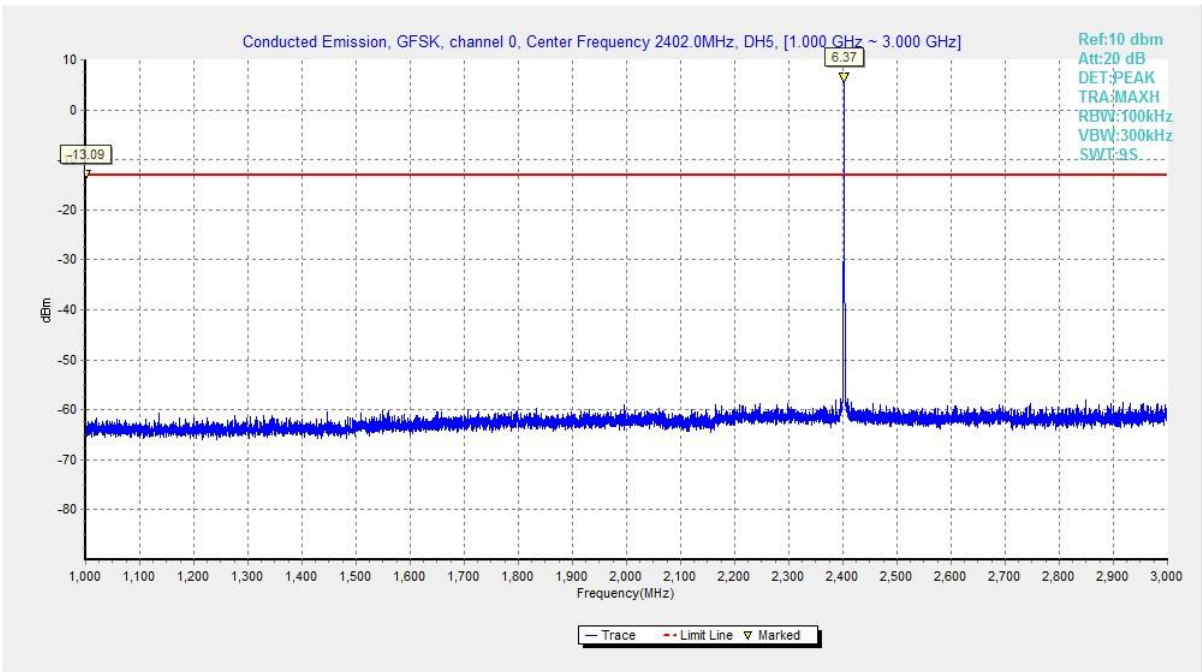


**Fig. 23 Conducted Spurious Emission (GFSK, Ch0, 1 GHz-3 GHz)**

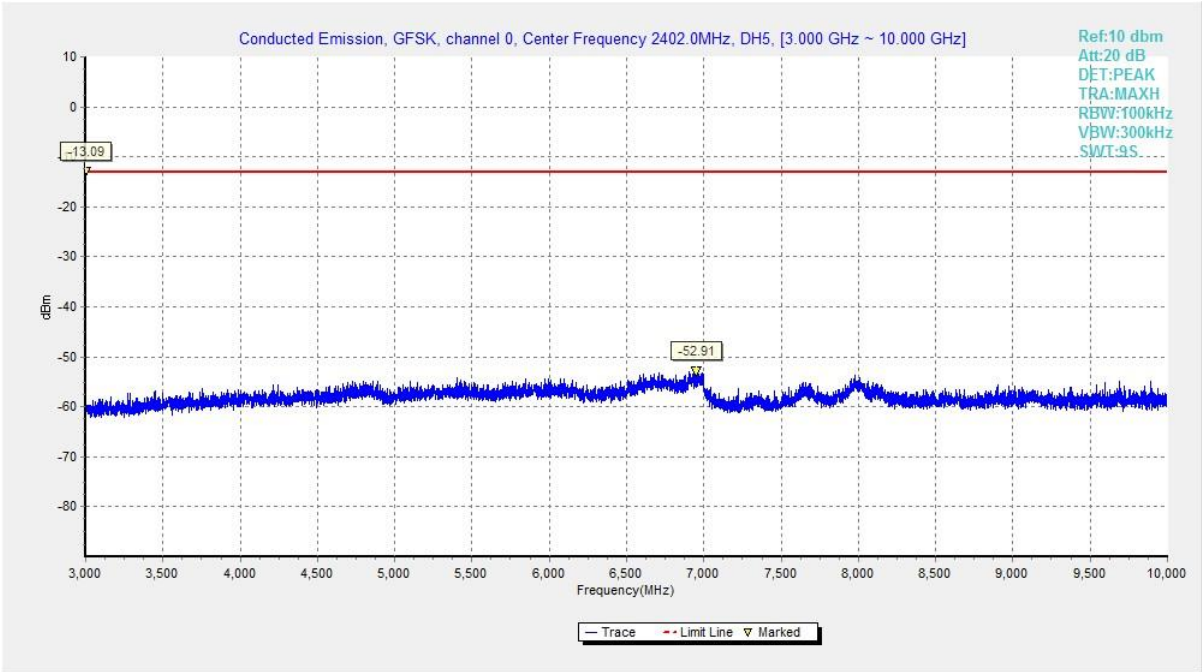


**Fig. 24 Conducted Spurious Emission (GFSK, Ch0, 3GHz-10 GHz)**

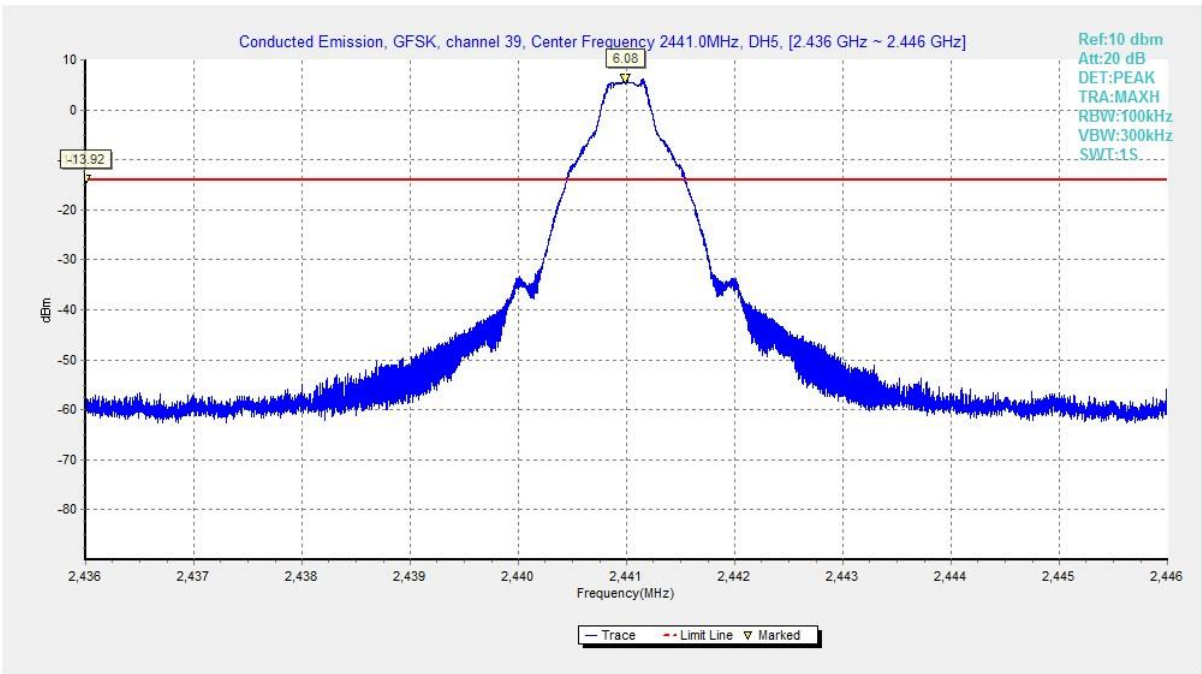


**Fig. 25 Conducted Spurious Emission (GFSK, Ch39, 2.441GHz)**

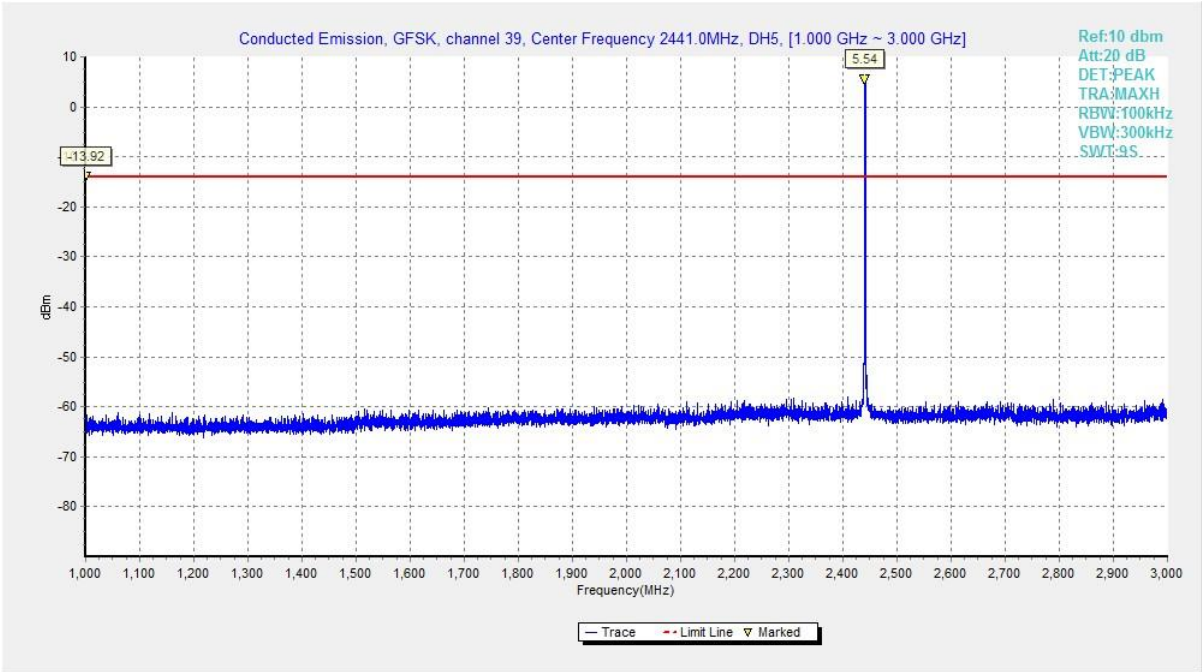


**Fig. 26 Conducted Spurious Emission (GFSK, Ch39, 1GHz-3 GHz)**

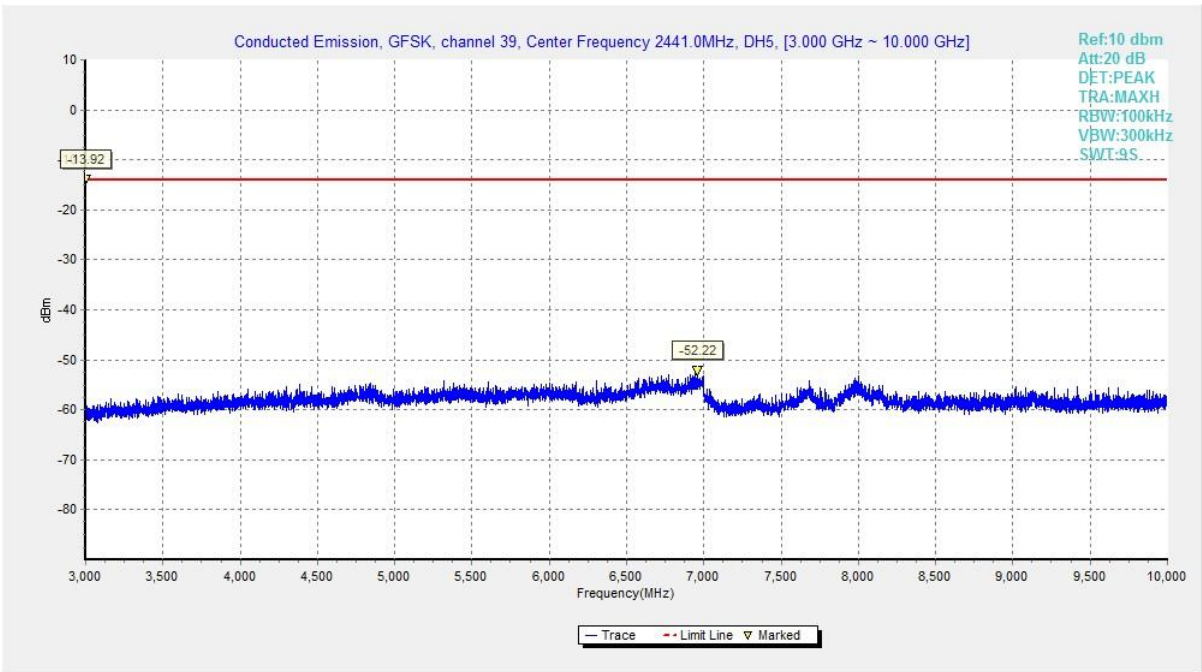


**Fig. 27 Conducted Spurious Emission (GFSK, Ch39, 3GHz-10 GHz)**

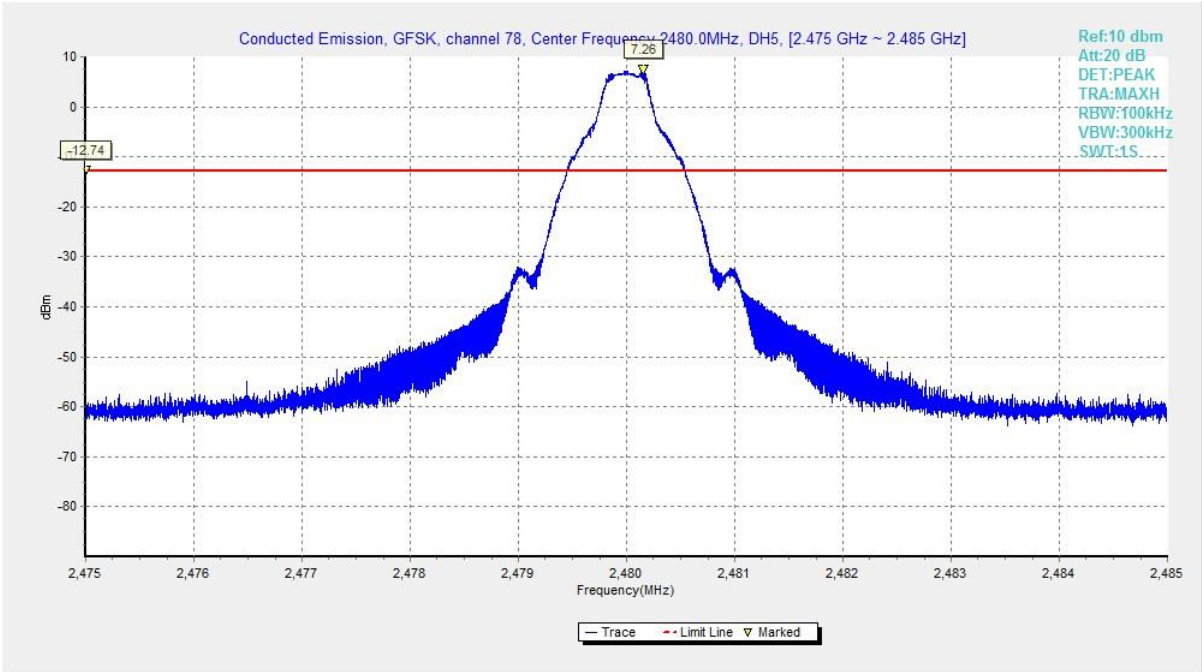


**Fig. 28 Conducted Spurious Emission (GFSK, Ch78, 2.480GHz)**

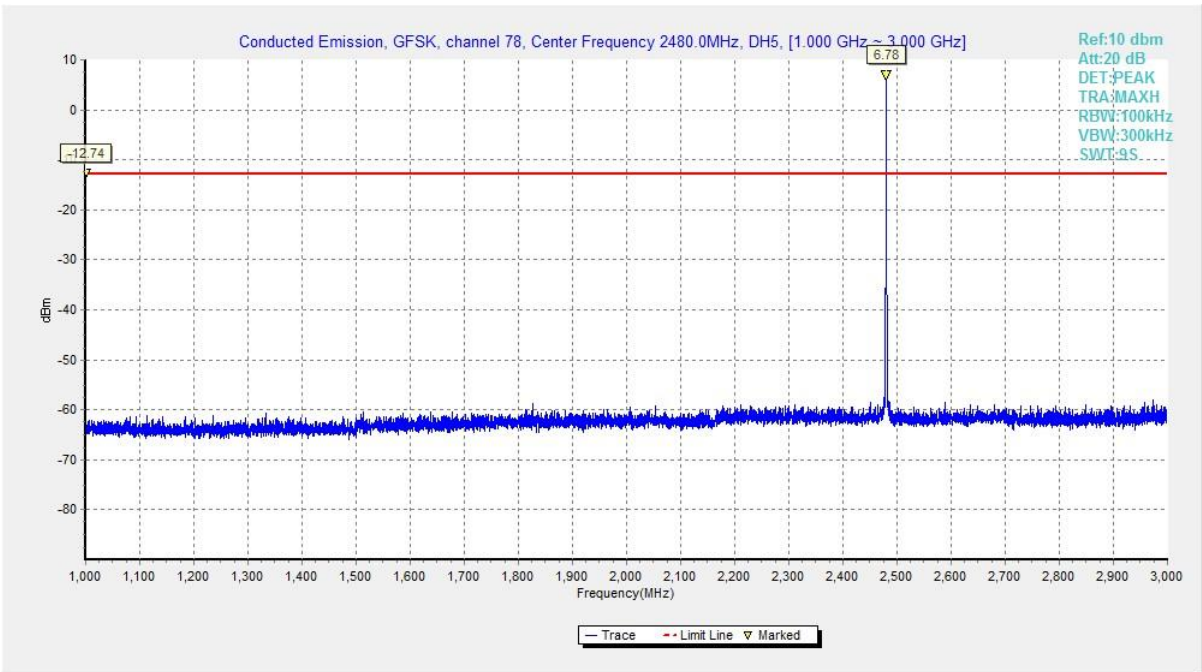


**Fig. 29 Conducted Spurious Emission (GFSK, Ch78, 1GHz-3 GHz)**

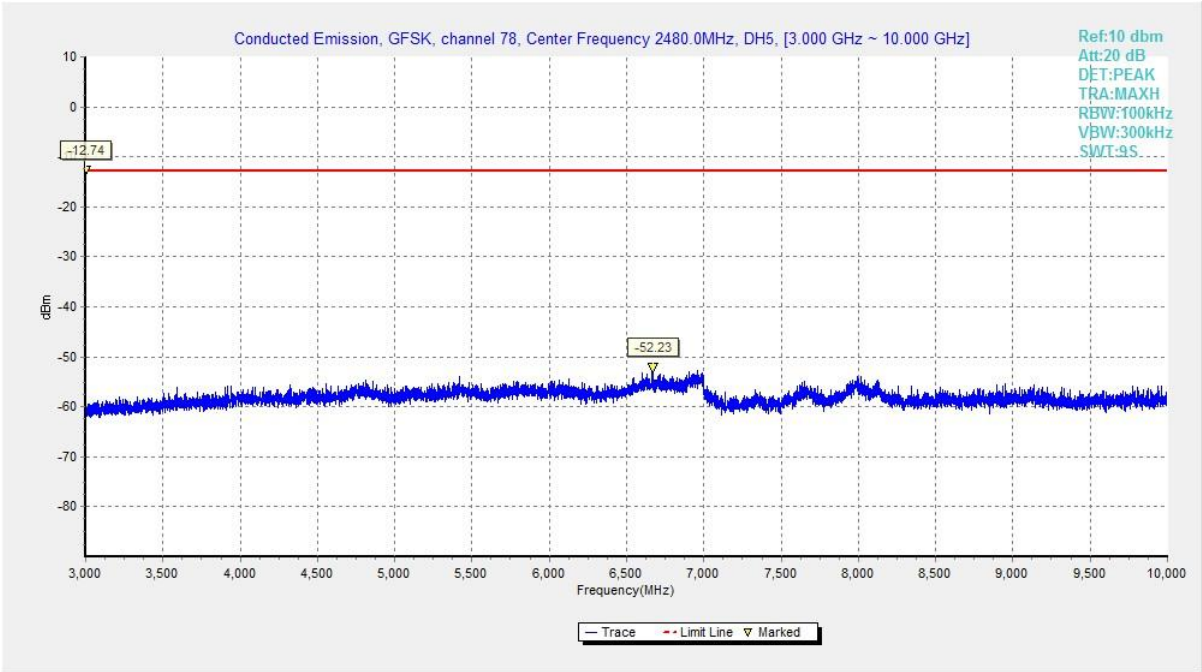


**Fig. 30 Conducted Spurious Emission (GFSK, Ch78, 3GHz-10 GHz)**

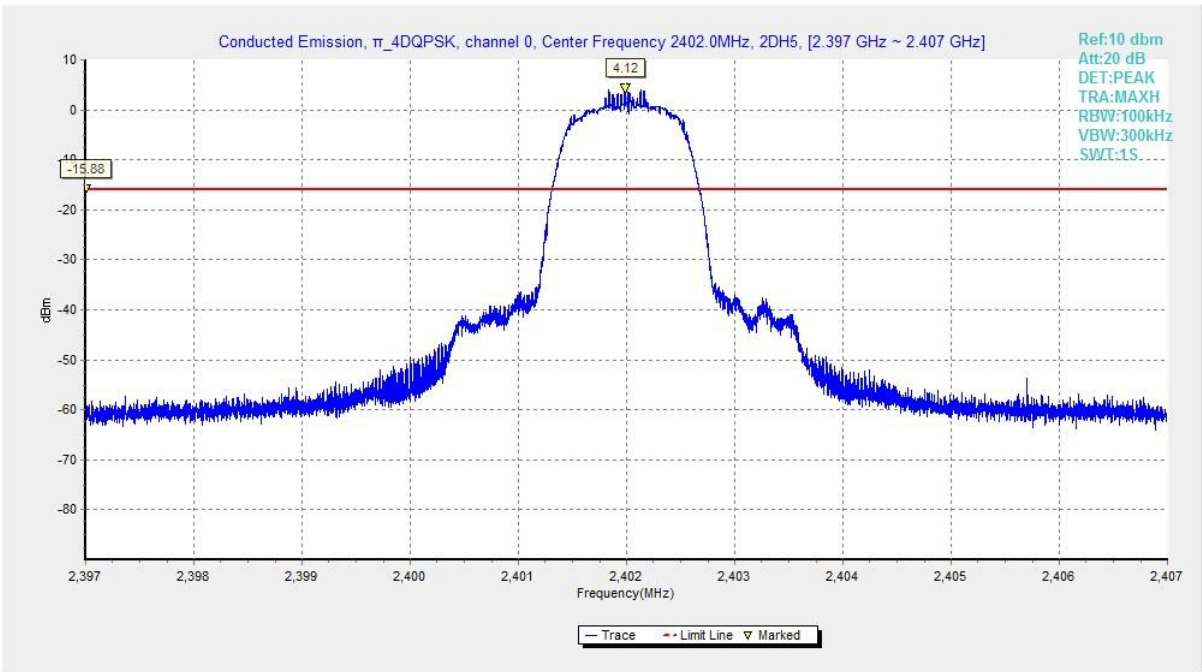


**Fig. 31 Conducted Spurious Emission (π /4 DQPSK, Ch0, 2.402GHz)**

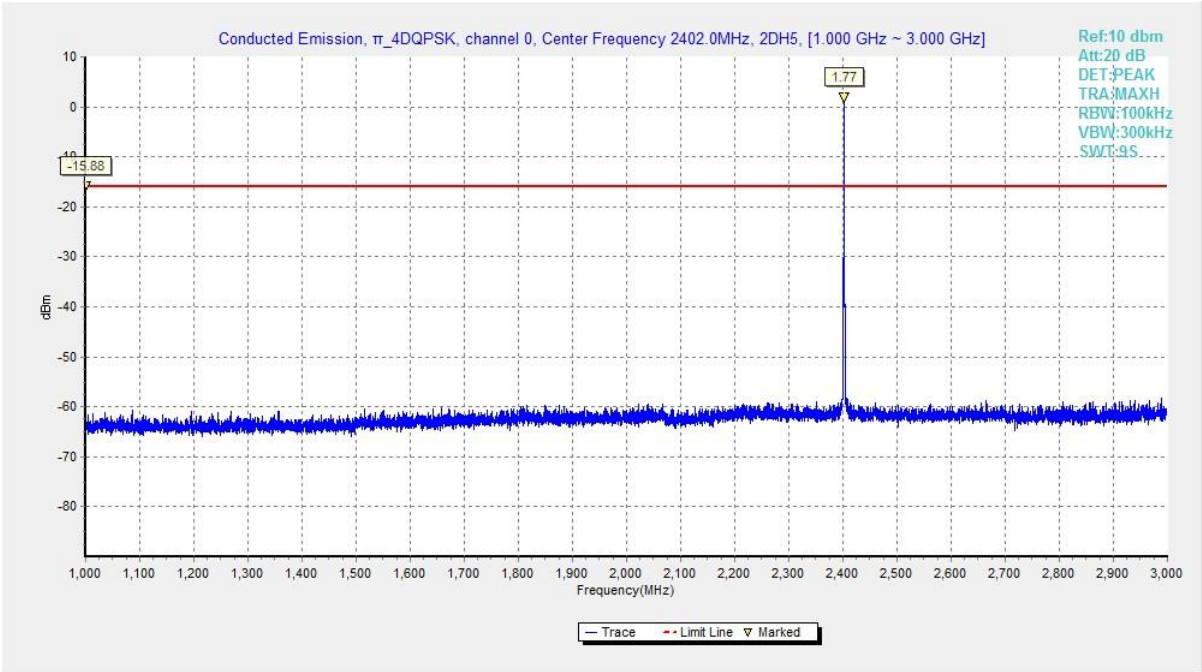


**Fig. 32 Conducted Spurious Emission (π /4 DQPSK, Ch0, 1GHz-3 GHz)**

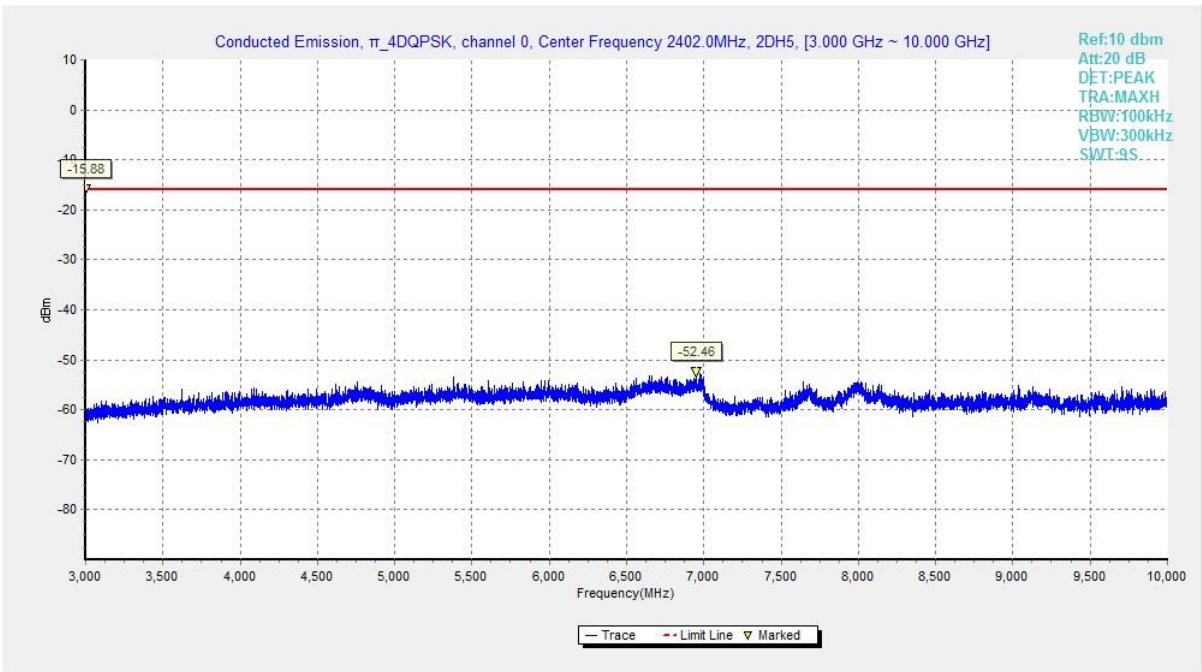


**Fig. 33 Conducted Spurious Emission (π /4 DQPSK, Ch0, 3GHz-10 GHz)**

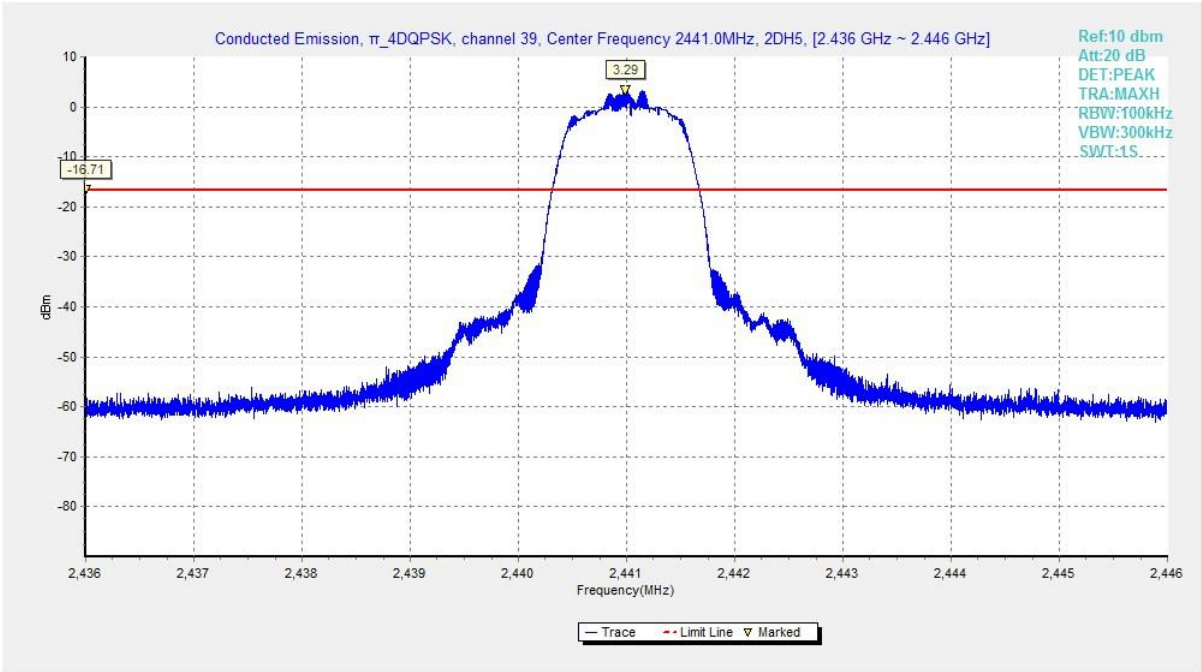


**Fig. 34 Conducted Spurious Emission (π /4 DQPSK, Ch39, 2.441GHz)**

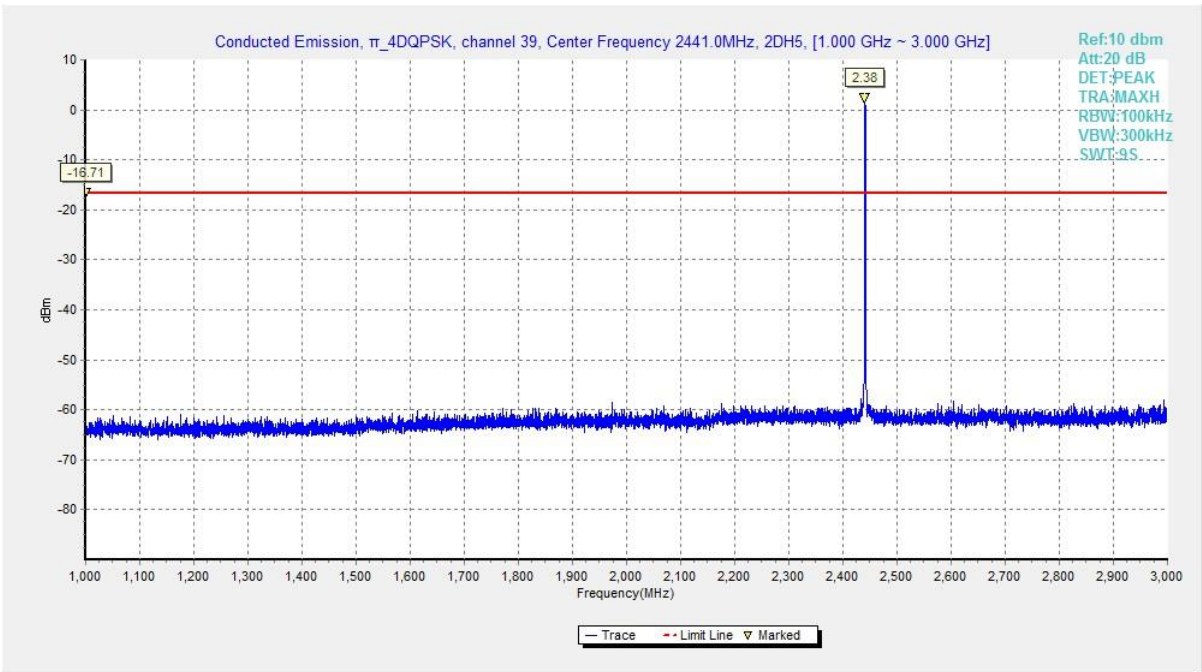


**Fig. 35 Conducted Spurious Emission (π /4 DQPSK, Ch39, 1GHz-3 GHz)**

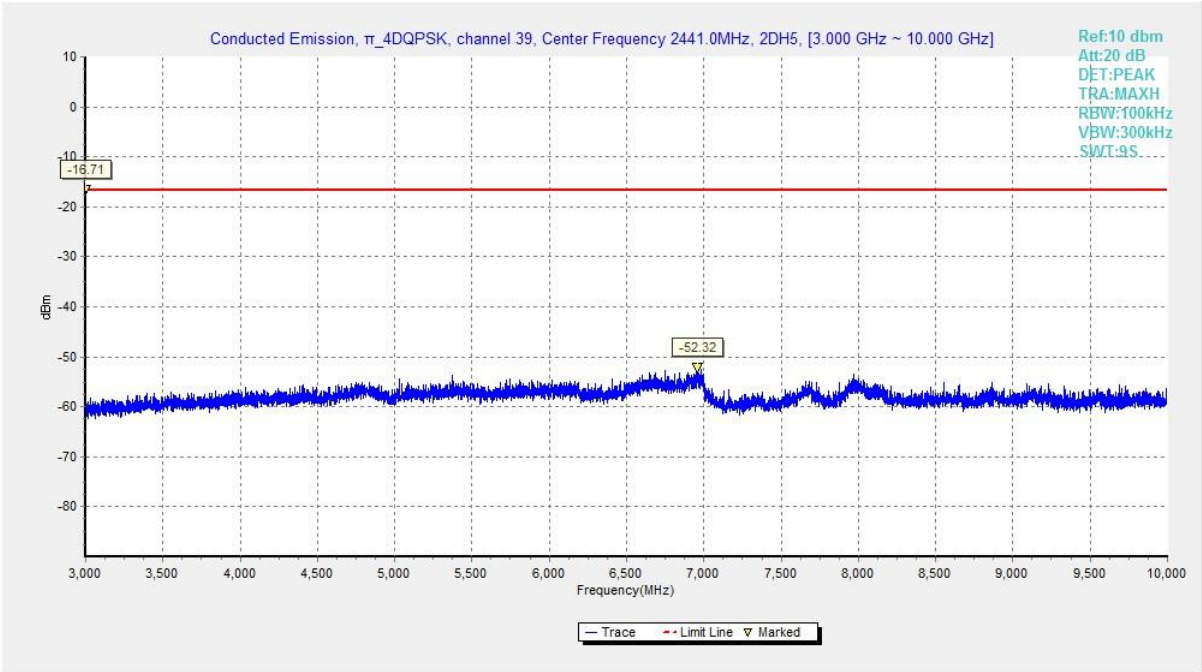


**Fig. 36 Conducted Spurious Emission (π /4 DQPSK, Ch39, 3GHz-10 GHz)**

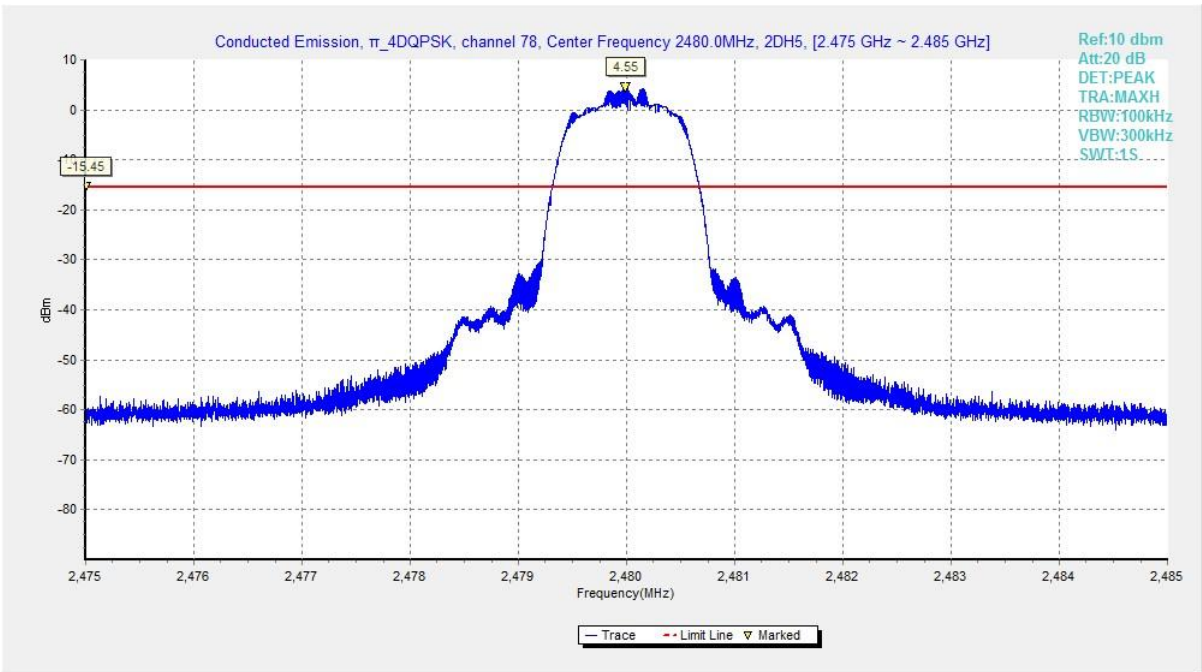


**Fig. 37 Conducted Spurious Emission (π /4 DQPSK, Ch78, 2.480GHz)**

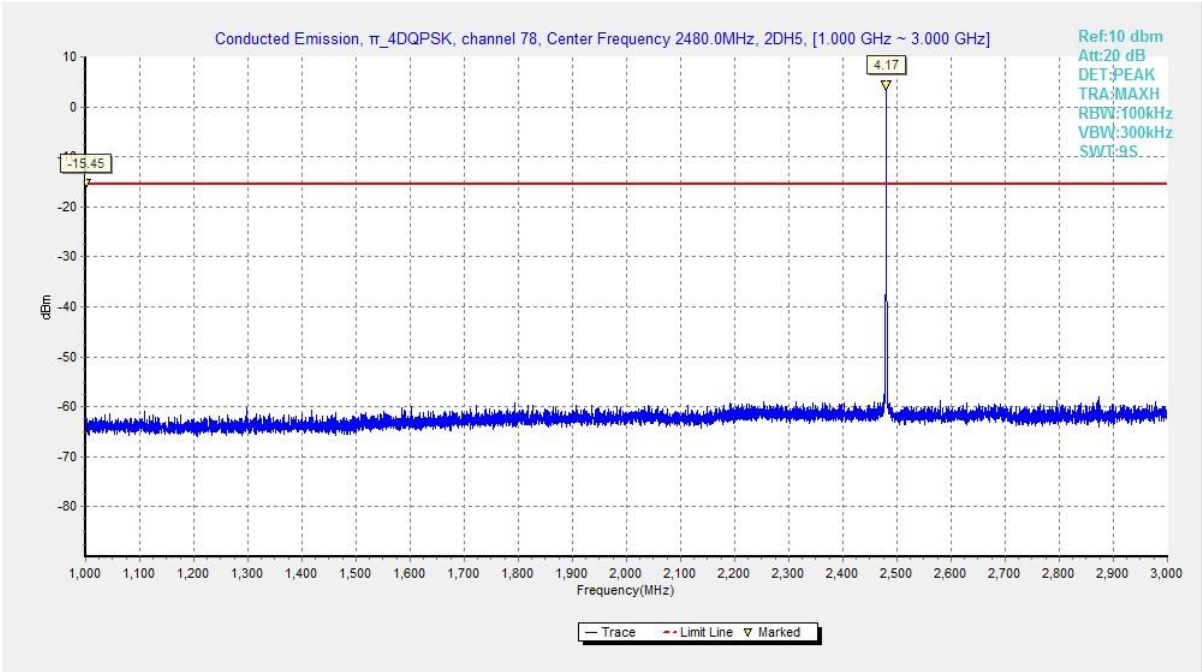


**Fig. 38 Conducted Spurious Emission (π /4 DQPSK, Ch78, 1GHz-3 GHz)**

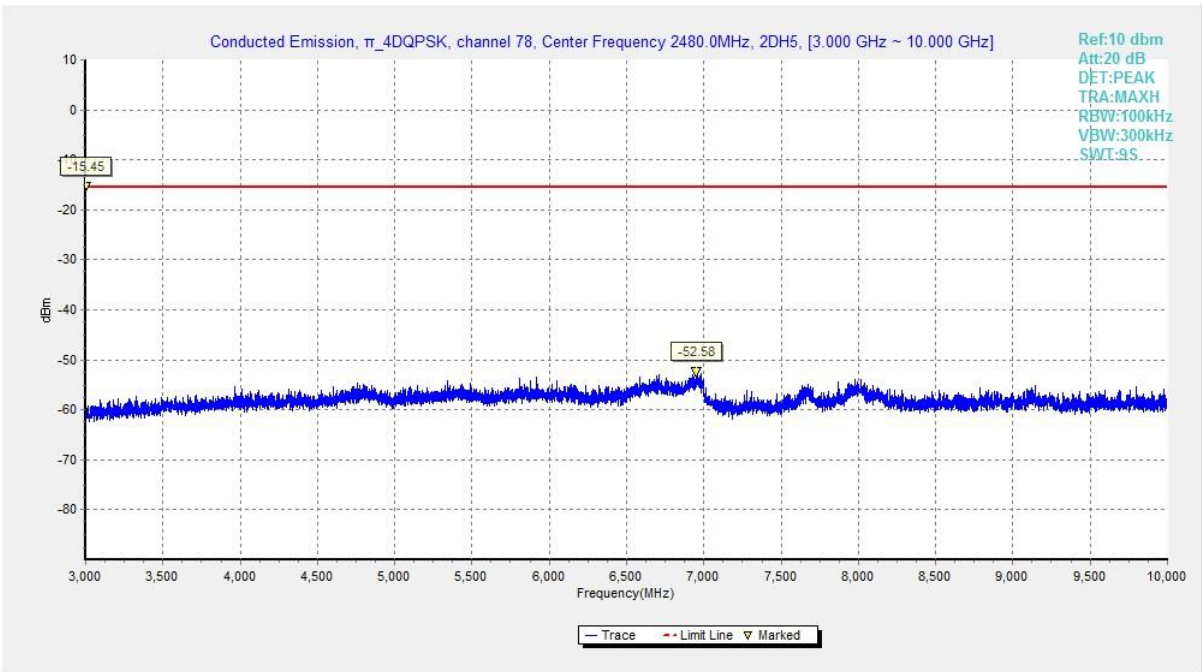


**Fig. 39 Conducted Spurious Emission (π /4 DQPSK, Ch78, 3GHz-10 GHz)**

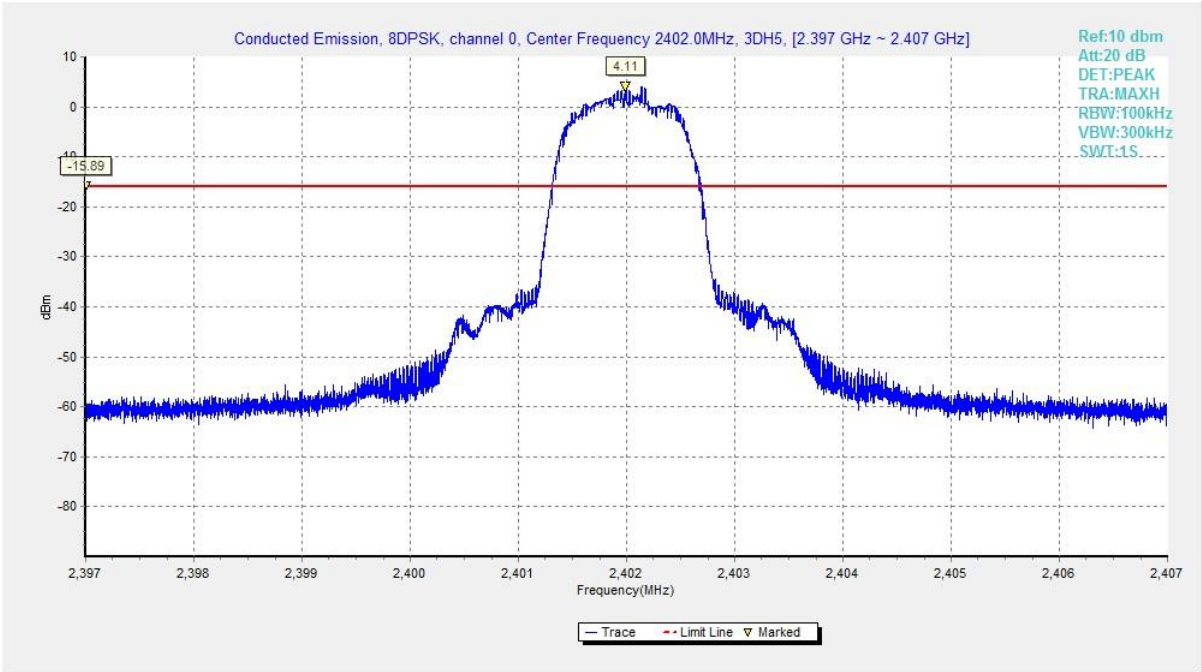


**Fig. 40 Conducted Spurious Emission (8DPSK, Ch0, 2.402GHz)**

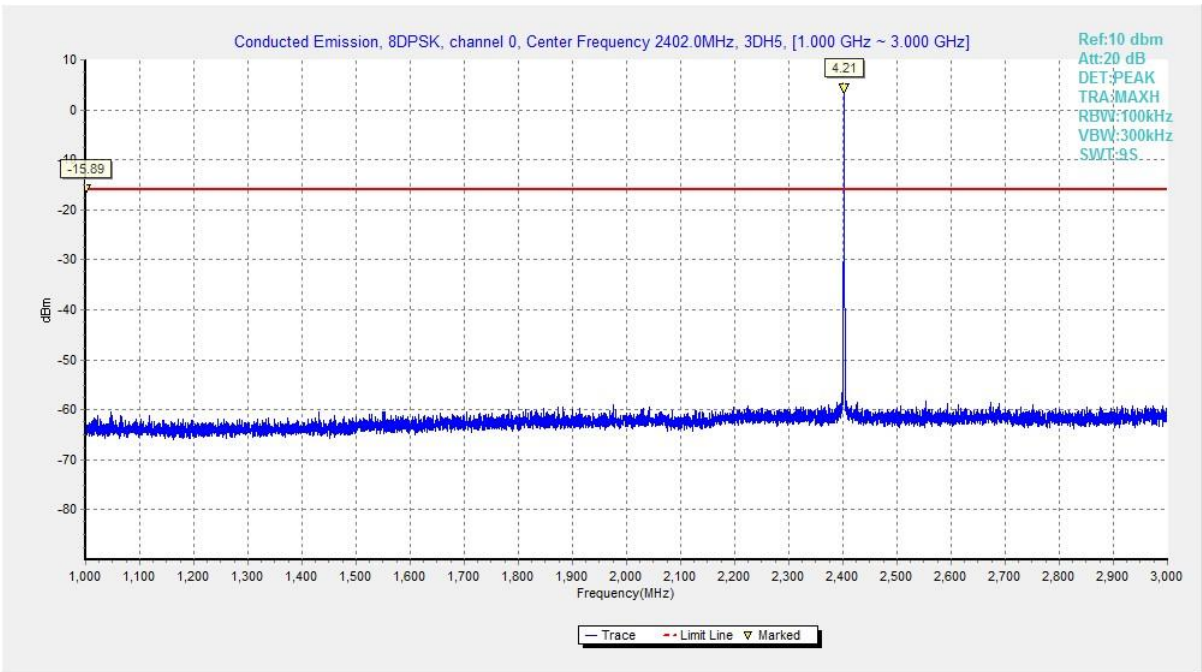


**Fig. 41 Conducted Spurious Emission (8DPSK, Ch0, 1GHz-3 GHz)**

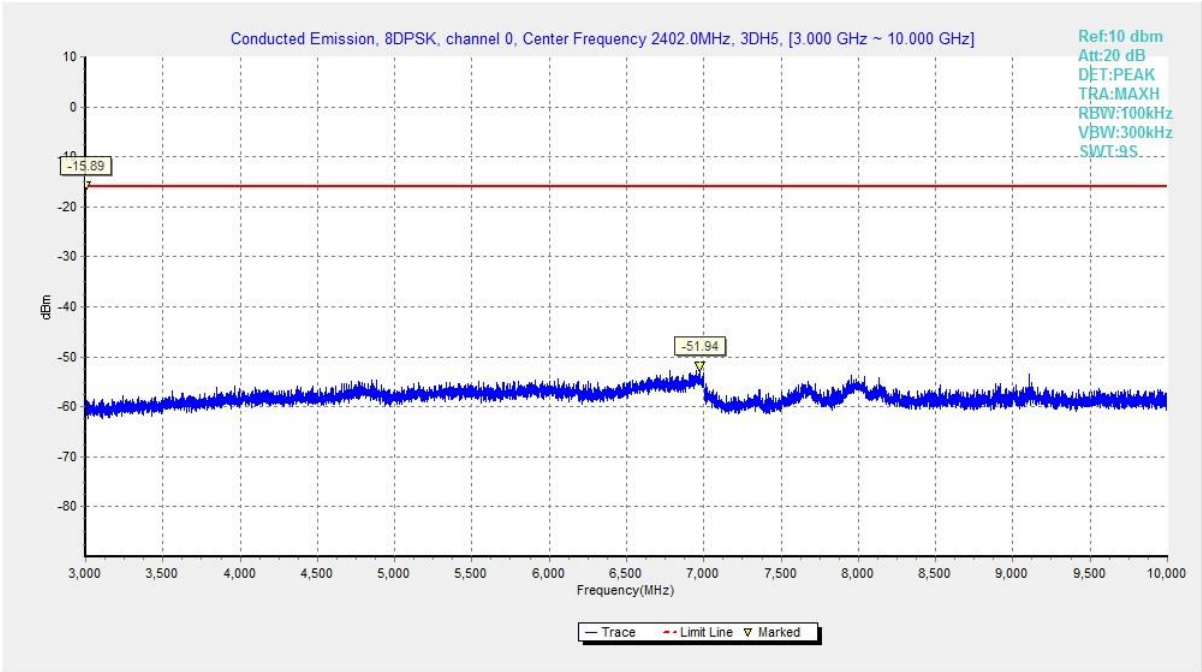


**Fig. 42 Conducted Spurious Emission (8DPSK, Ch0, 3GHz-10 GHz)**

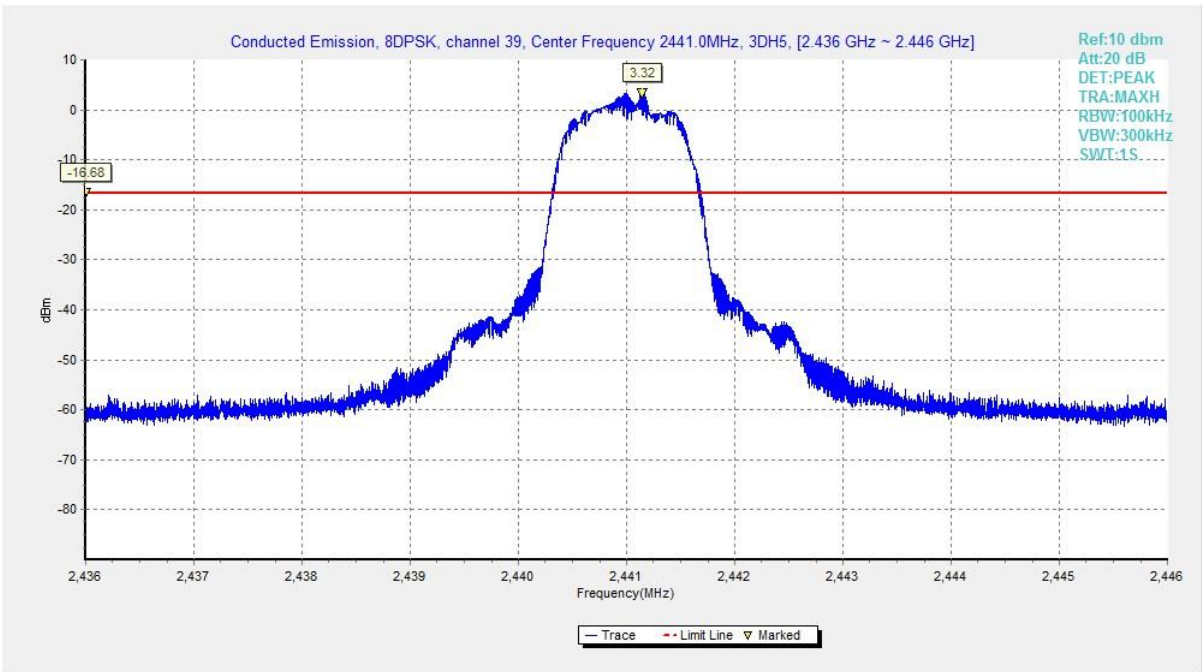


**Fig. 43 Conducted Spurious Emission (8DPSK, Ch39, 2.441GHz)**

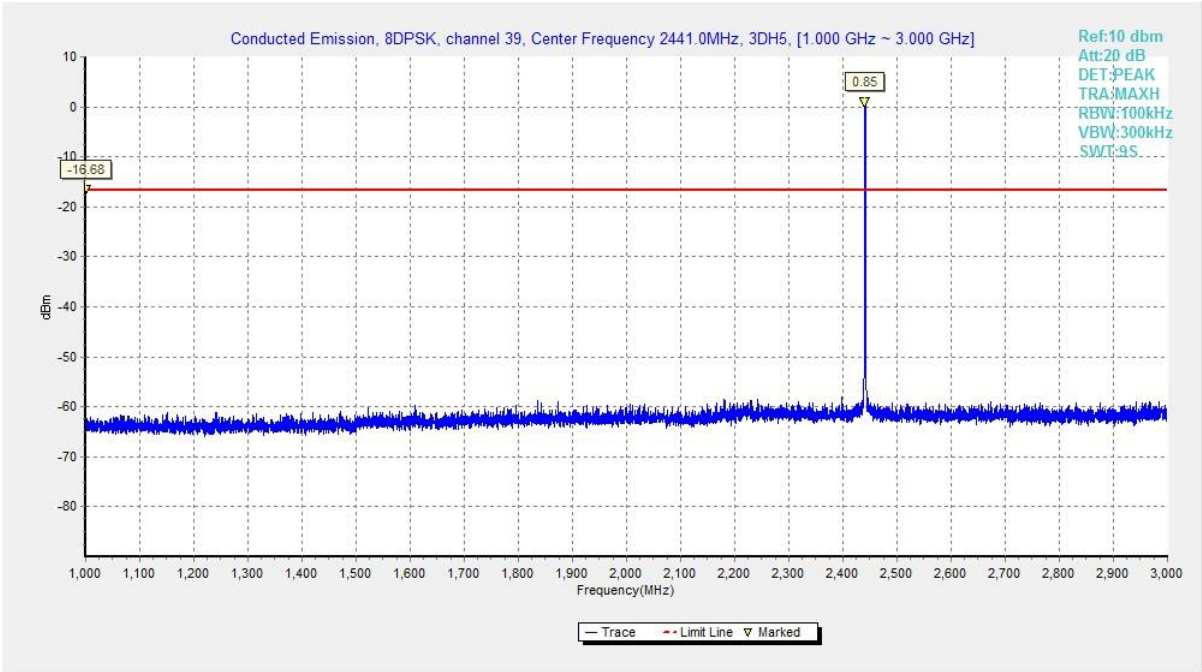


**Fig. 44 Conducted Spurious Emission (8DPSK, Ch39, 1GHz-3 GHz)**

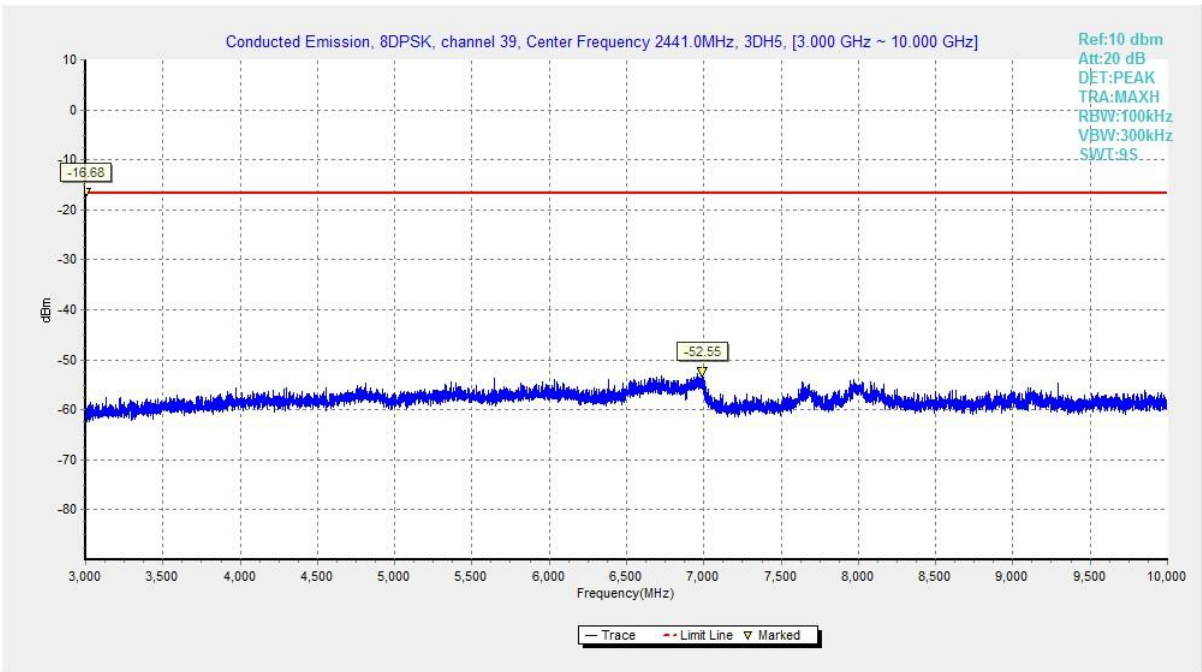


**Fig. 45 Conducted Spurious Emission (8DPSK, Ch39, 3GHz-10 GHz)**

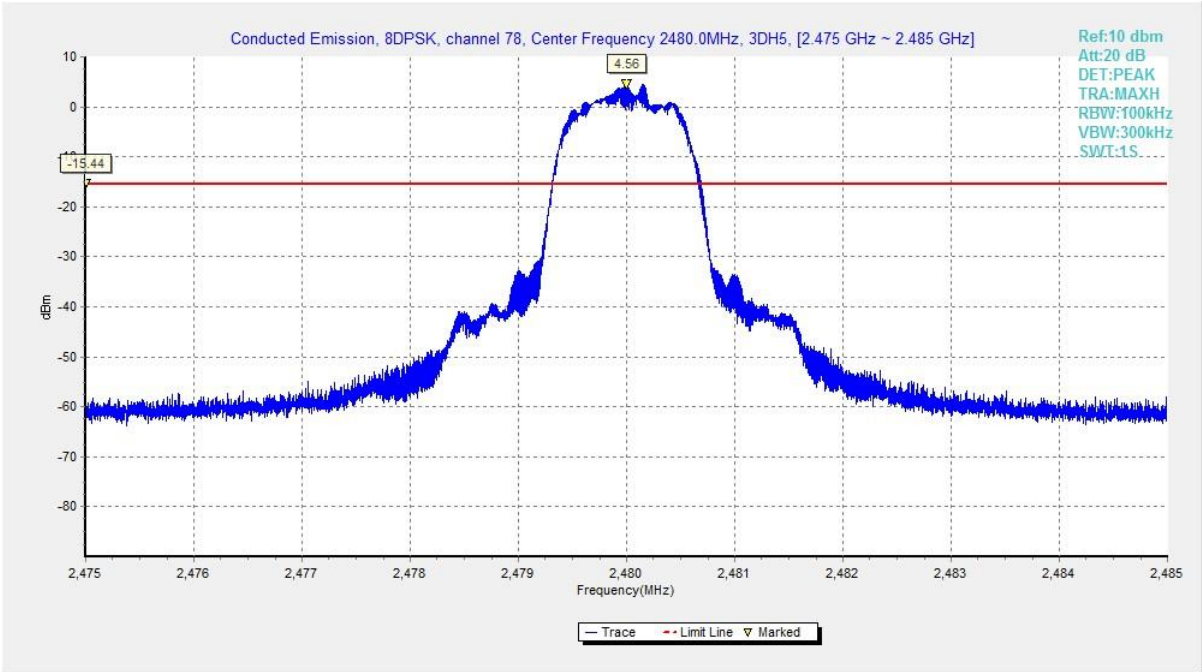


**Fig. 46 Conducted Spurious Emission (8DPSK, Ch78, 2.480GHz)**

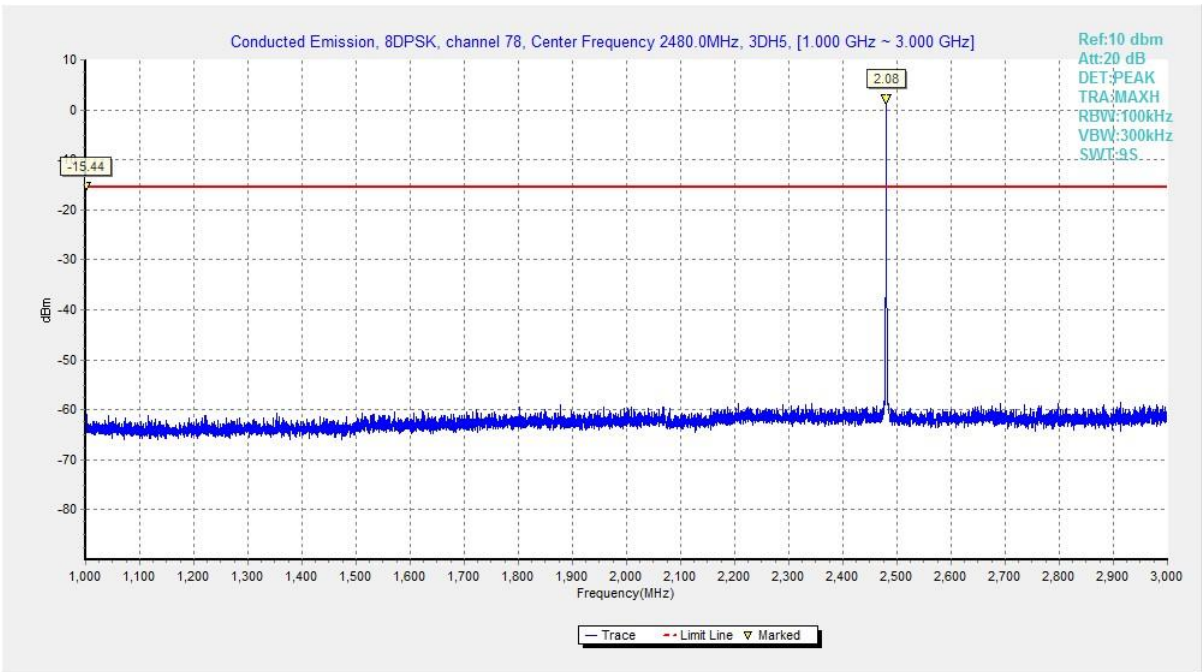


**Fig. 47 Conducted Spurious Emission (8DPSK, Ch78, 1GHz-3 GHz)**

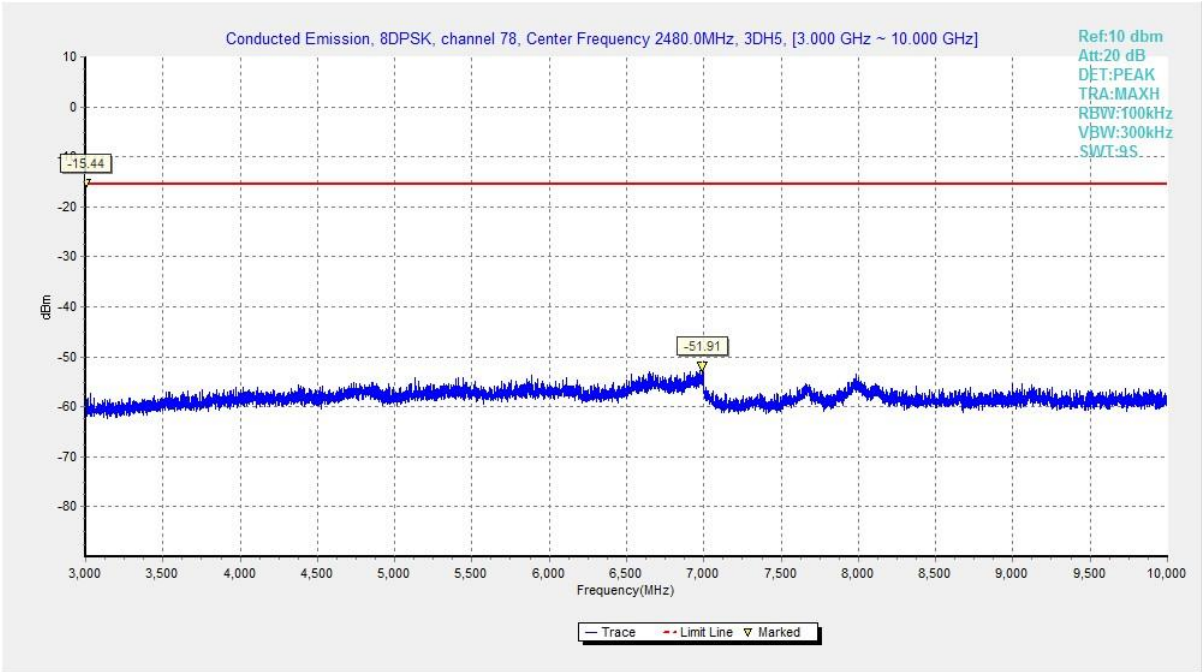


**Fig. 48 Conducted Spurious Emission (8DPSK, Ch78, 3GHz-10 GHz)**

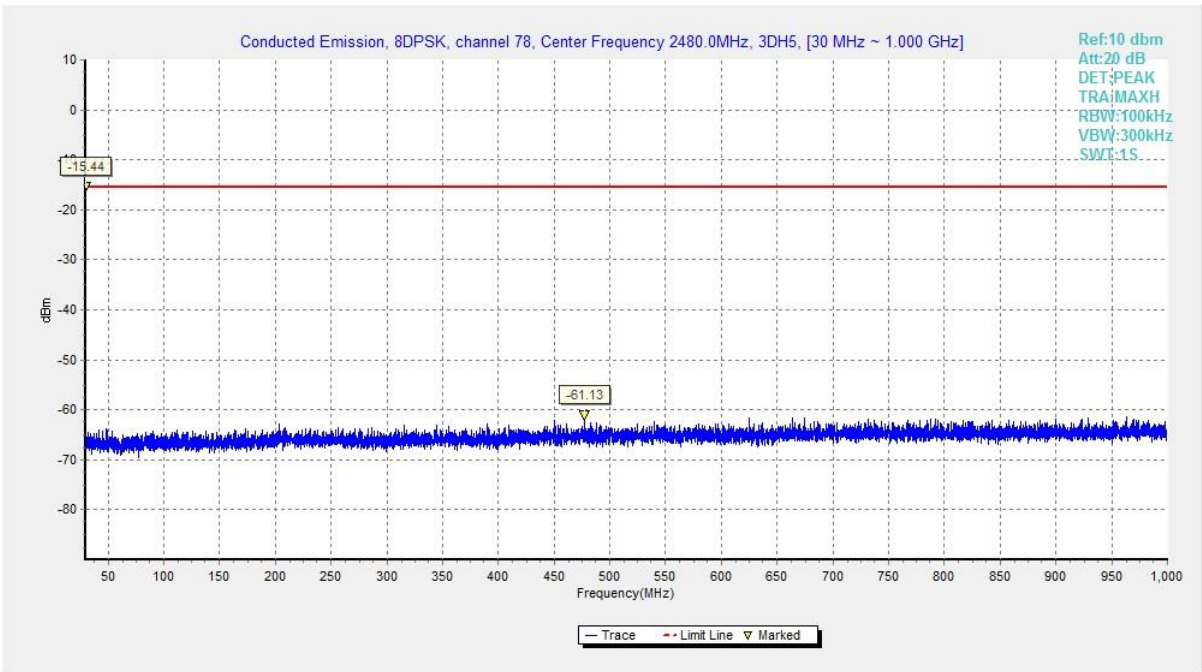


**Fig. 49 Conducted Spurious Emission (All channel, 30 MHz-1 GHz)**

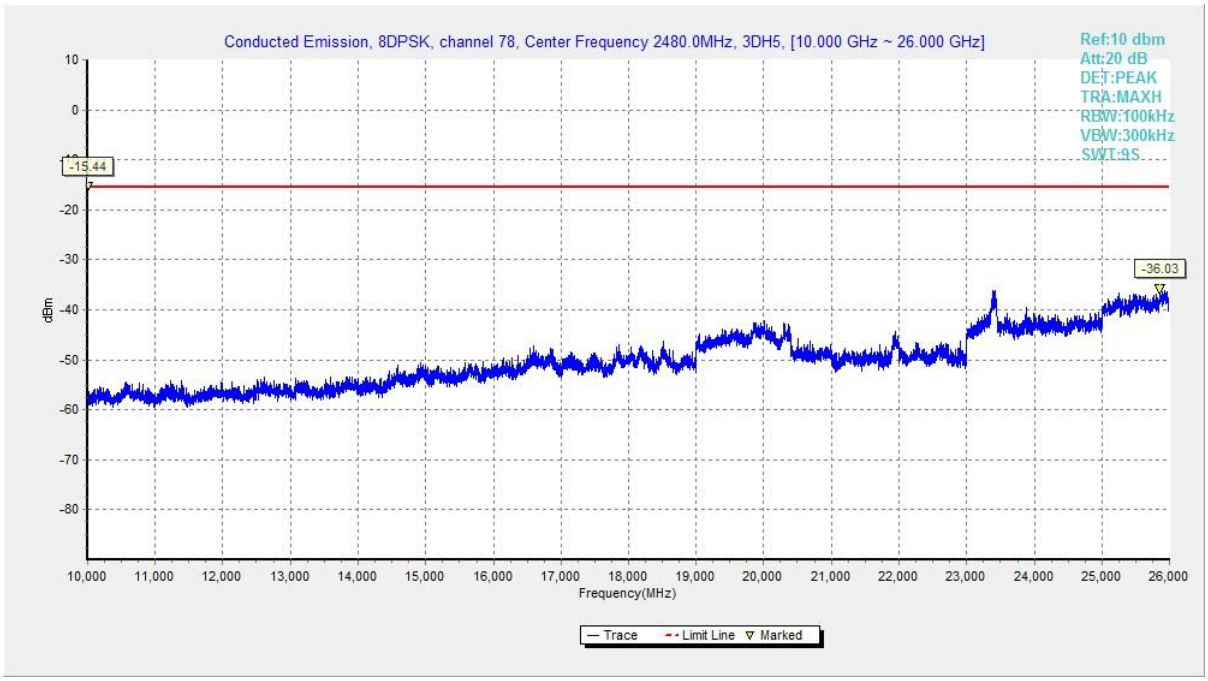


**Fig. 50 Conducted Spurious Emission All channel, 10GHz-26 GHz)**

## A.4 Radiated Emission

**Measurement Limit:**

| Standard | Limit |
|---|---|
| FCC 47 CFR Part 15.247, 15.205, 15.209 & RSS-247 section 5.5/RSS-Gen section 6.13 | 20dB 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 (μV/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.

**Measurement Results:**

| Mode | Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|---|
| GFSK | 0 | 1 GHz ~ 3 GHz | Fig.51 | **P** |
| | 0 | 3 GHz ~ 18 GHz | Fig.52 | **P** |
| | 39 | 1 GHz ~ 3 GHz | Fig.53 | **P** |
| | 39 | 3 GHz ~ 18 GHz | Fig.54 | **P** |
| | 78 | 1 GHz ~ 3 GHz | Fig.55 | **P** |
| | 78 | 3 GHz ~ 18 GHz | Fig.56 | **P** |
| | Restricted Band(CH0) | 2.38 GHz ~ 2.45 GHz | Fig.57 | **P** |
| | Restricted Band (CH78) | 2.45 GHz ~ 2.5 GHz | Fig.58 | **P** |
| π /4 DQPSK | 0 | 1 GHz ~ 3 GHz | Fig.59 | **P** |
| | 0 | 3 GHz ~ 18 GHz | Fig.60 | **P** |
| | 39 | 1 GHz ~ 3 GHz | Fig.61 | **P** |
| | 39 | 3 GHz ~ 18 GHz | Fig.62 | **P** |
| | 78 | 1 GHz ~ 3 GHz | Fig.63 | **P** |
| | 78 | 3 GHz ~ 18 GHz | Fig.64 | **P** |
| | Restricted Band (CH0) | 2.38 GHz ~ 2.45 GHz | Fig.65 | **P** |
| | Restricted Band (CH78) | 2.45 GHz ~ 2.5 GHz | Fig.66 | **P** |
| 8DPSK | 0 | 1 GHz ~ 3 GHz | Fig.67 | **P** |
| | 0 | 3 GHz ~ 18 GHz | Fig.68 | **P** |
| | 39 | 1 GHz ~ 3 GHz | Fig.69 | **P** |
| | 39 | 3 GHz ~ 18 GHz | Fig.70 | **P** |
| | 78 | 1 GHz ~ 3 GHz | Fig.71 | **P** |
| | 78 | 3 GHz ~ 18 GHz | Fig.72 | **P** |
| | Restricted Band (CH0) | 2.38 GHz ~ 2.45 GHz | Fig.73 | **P** |
| | Restricted Band (CH78) | 2.45 GHz ~ 2.5 GHz | Fig.74 | **P** |
| / | All channels | 9 kHz ~ 30 MHz | Fig.75 | **P** |
| | | 30 MHz ~ 1 GHz | Fig.76 | **P** |
| | | 18 GHz ~ 26.5 GHz | Fig.77 | **P** |

**Worst Case Result**

**GFSK CH78 (1-18GHz)**

| Frequency (MHz) | MaxPeak (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pol | Corr. (dB) |
|---|---|---|---|---|---|
| 10315.50 | 45.06 | 74.00 | 28.94 | H | 5.0 |
| 11920.00 | 45.78 | 74.00 | 28.22 | V | 7.0 |
| 13293.50 | 47.24 | 74.00 | 26.76 | H | 8.9 |
| 14528.50 | 48.43 | 74.00 | 25.57 | V | 11.5 |
| 16738.00 | 50.09 | 74.00 | 23.91 | V | 14.9 |
| 17898.00 | 50.53 | 74.00 | 23.47 | H | 16.3 |

| Frequency (MHz) | Average (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pol | Corr. (dB) |
|---|---|---|---|---|---|
| 10478.50 | 36.19 | 54.00 | 17.81 | H | 5.0 |
| 11618.00 | 36.75 | 54.00 | 17.25 | H | 6.8 |
| 13298.00 | 37.34 | 54.00 | 16.66 | H | 9.0 |
| 14480.50 | 39.12 | 54.00 | 14.88 | H | 11.3 |
| 16576.50 | 40.60 | 54.00 | 13.40 | H | 14.8 |
| 17908.00 | 41.83 | 54.00 | 12.17 | V | 16.3 |

**π /4 DQPSK CH78 (1-18GHz)**

| Frequency (MHz) | MaxPeak (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pol | Corr. (dB) |
|---|---|---|---|---|---|
| 11585.00 | 46.17 | 74.00 | 27.83 | V | 6.6 |
| 13290.50 | 46.95 | 74.00 | 27.05 | H | 8.9 |
| 14538.00 | 47.95 | 74.00 | 26.05 | H | 11.4 |
| 16164.00 | 50.29 | 74.00 | 23.71 | V | 14.3 |
| 16903.00 | 50.35 | 74.00 | 23.65 | V | 15.1 |
| 17834.00 | 51.00 | 74.00 | 23.00 | V | 16.3 |

| Frequency (MHz) | Average (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pol | Corr. (dB) |
|---|---|---|---|---|---|
| 11648.50 | 37.07 | 54.00 | 16.93 | H | 6.9 |
| 13290.50 | 37.54 | 54.00 | 16.46 | H | 8.9 |
| 14454.00 | 38.79 | 54.00 | 15.21 | H | 11.1 |
| 16161.50 | 40.47 | 54.00 | 13.53 | V | 14.2 |
| 17050.00 | 41.18 | 54.00 | 12.82 | H | 15.0 |
| 17901.50 | 41.69 | 54.00 | 12.31 | V | 16.3 |

**8DPSK CH78 (1-18GHz)**

| Frequency (MHz) | MaxPeak (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pol | Corr. (dB) |
|---|---|---|---|---|---|
| 10158.00 | 45.80 | 74.00 | 28.20 | V | 5.0 |
| 11684.00 | 46.99 | 74.00 | 27.01 | V | 7.1 |
| 13162.50 | 47.19 | 74.00 | 26.81 | H | 8.5 |
| 14629.00 | 48.41 | 74.00 | 25.59 | H | 11.3 |
| 16674.00 | 50.48 | 74.00 | 23.52 | H | 14.9 |
| 17755.00 | 52.12 | 74.00 | 21.88 | H | 16.3 |

| Frequency (MHz) | Average (dBuV/m) | Limit (dBuV/m) | Margin (dB) | Pol | Corr. (dB) |
|---|---|---|---|---|---|
| 10206.50 | 36.47 | 54.00 | 17.53 | V | 5.1 |
| 11573.00 | 37.17 | 54.00 | 16.83 | H | 6.5 |
| 12521.00 | 37.68 | 54.00 | 16.32 | H | 8.0 |
| 14502.00 | 39.66 | 54.00 | 14.34 | V | 11.5 |
| 16758.50 | 41.50 | 54.00 | 12.50 | H | 14.8 |
| 17910.00 | 42.59 | 54.00 | 11.41 | V | 16.3 |

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**

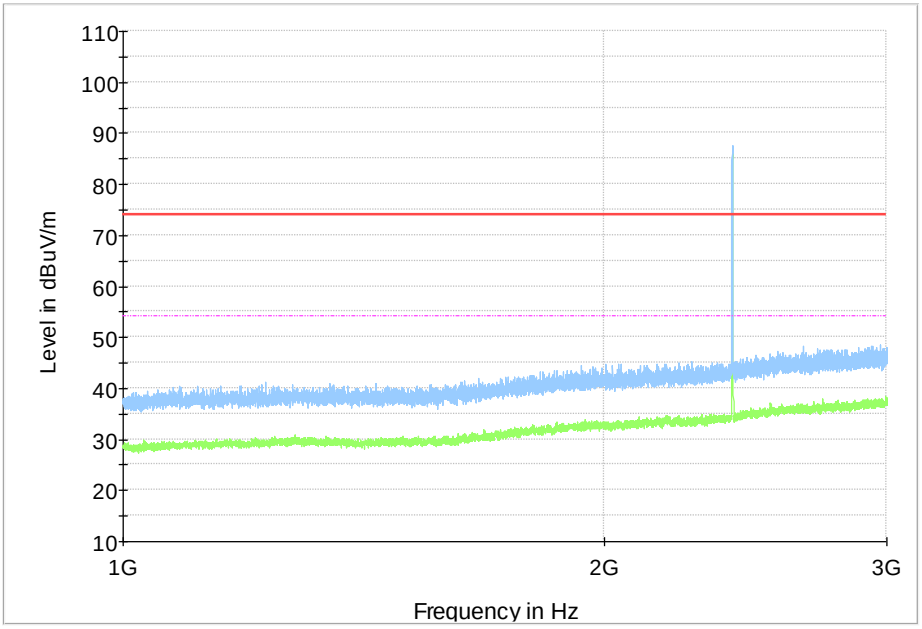


**Fig. 51 Radiated Spurious Emission (GFSK, Ch0, 1GHz ~ 3GHz)**

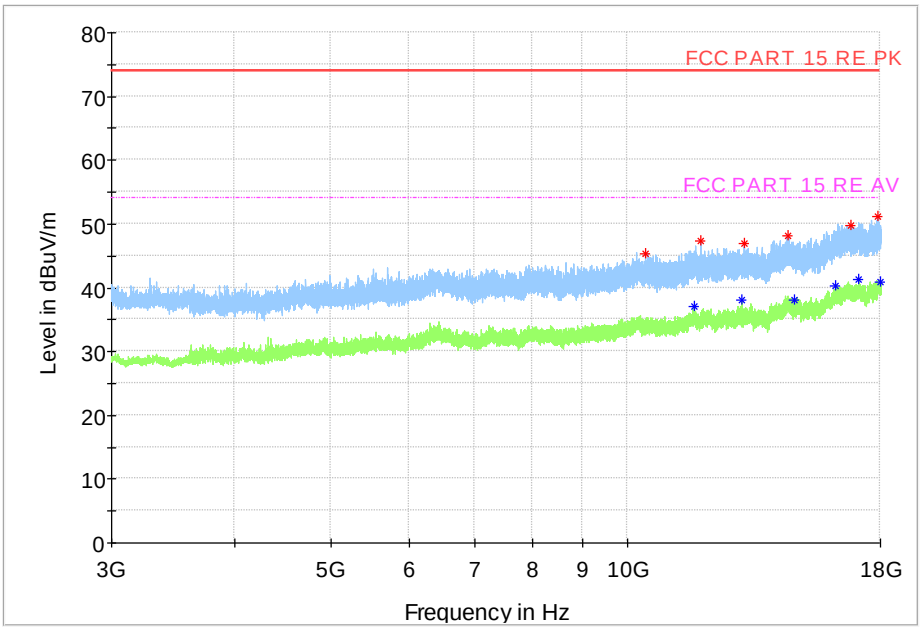


**Fig. 52 Radiated Spurious Emission (GFSK, Ch0, 3GHz ~ 18GHz)**

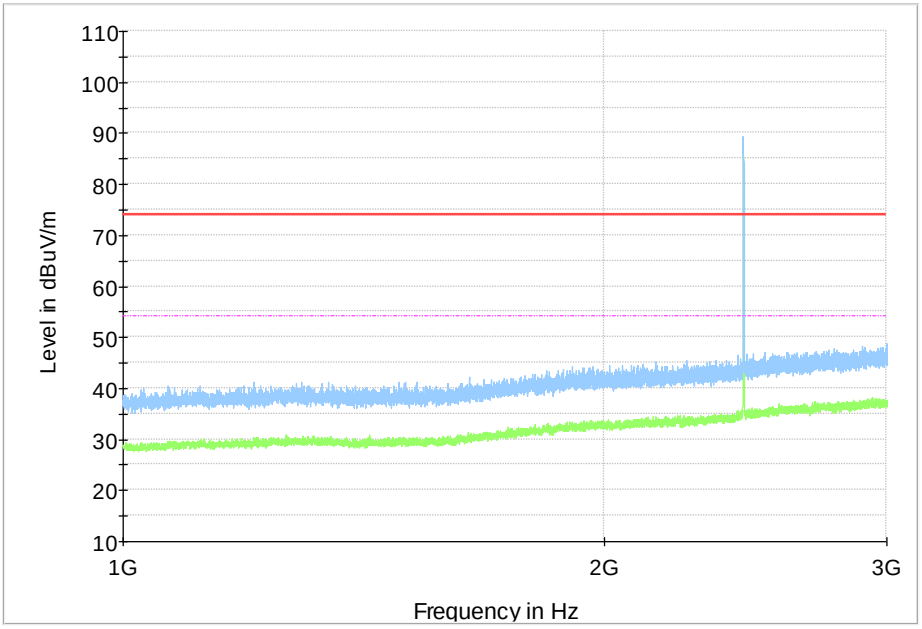


**Fig. 53 Radiated Spurious Emission (GFSK, Ch39, 1GHz ~ 3GHz)**

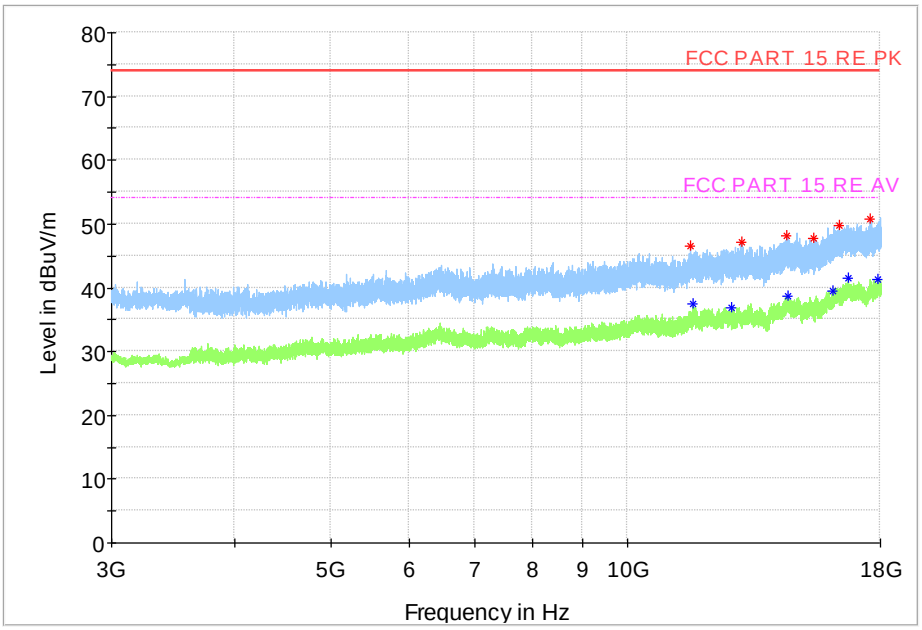


**Fig. 54 Radiated Spurious Emission (GFSK, Ch39, 3GHz ~ 18GHz)**

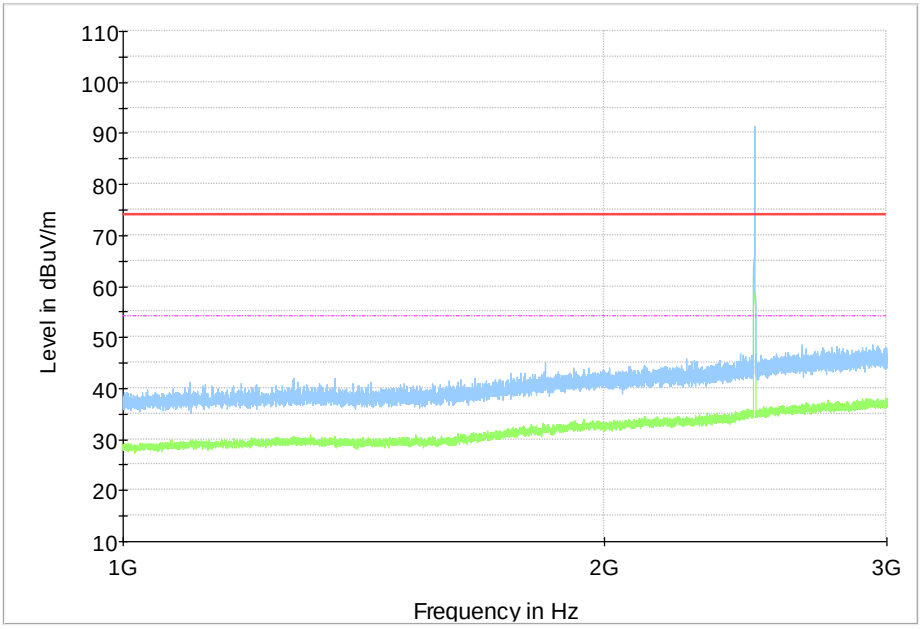


**Fig. 55 Radiated Spurious Emission (GFSK, Ch78, 1GHz ~ 3GHz)**

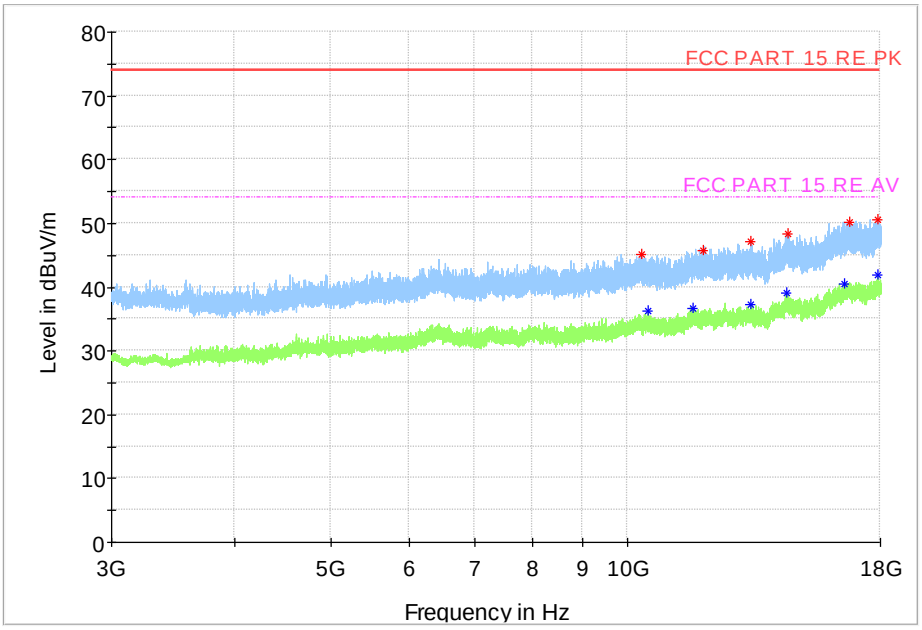


**Fig. 56 Radiated Spurious Emission (GFSK, Ch78, 3GHz ~ 18GHz)**

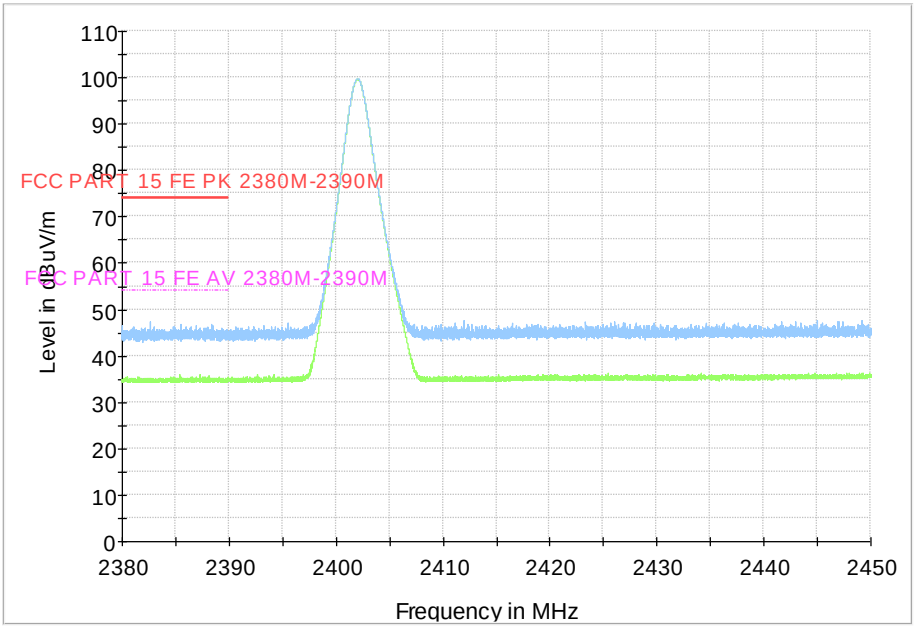


**Fig. 57 Radiated Band Edges (GFSK, Ch0, 2380GHz ~ 2450GHz)**

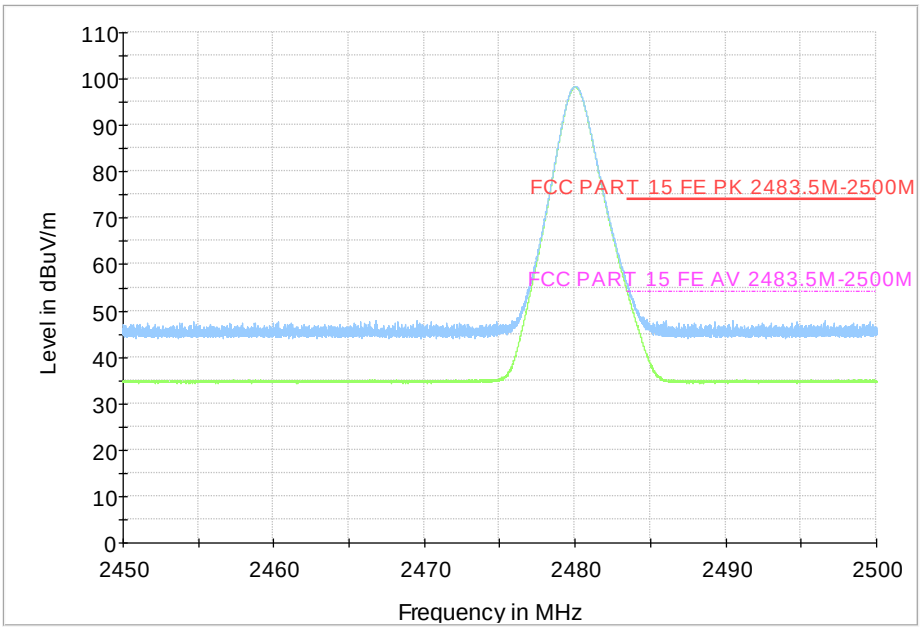


**Fig. 58 Radiated Band Edges (GFSK, Ch78, 2450GHz ~ 2500GHz)**

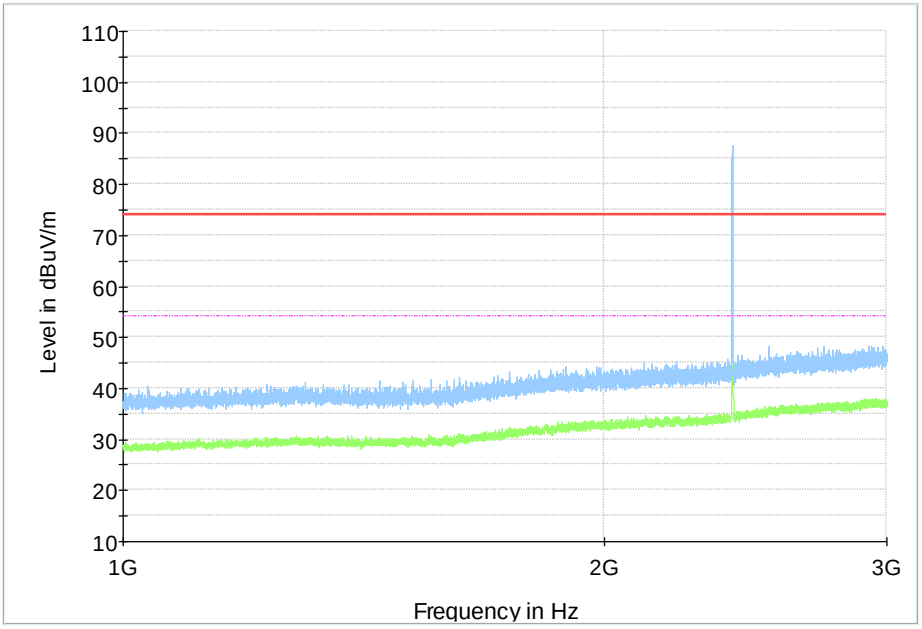


**Fig. 59 Radiated Spurious Emission (π /4 DQPSK, Ch0, 1GHz ~ 3GHz)**

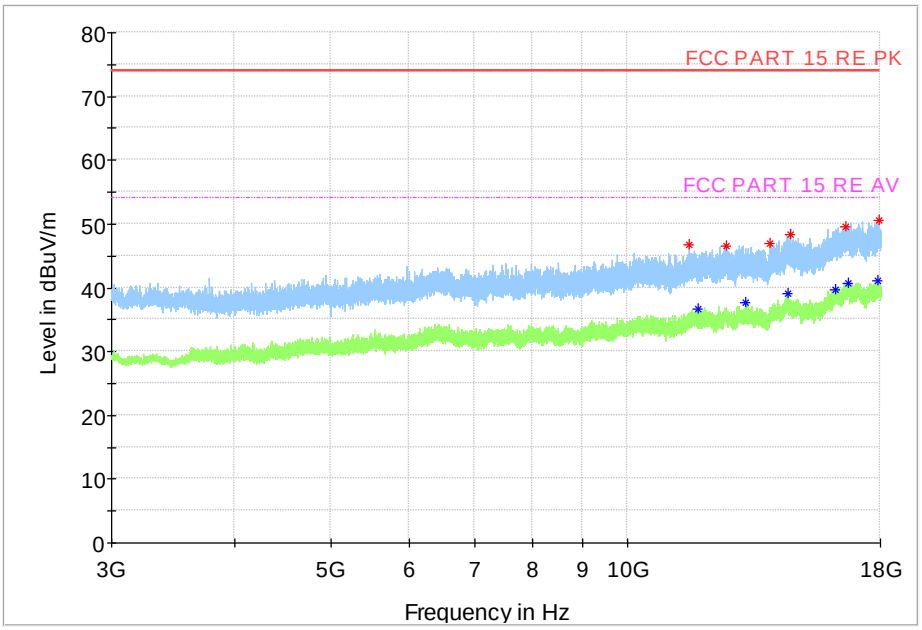


**Fig. 60 Radiated Spurious Emission (π /4 DQPSK, Ch0, 3GHz ~ 18GHz)**

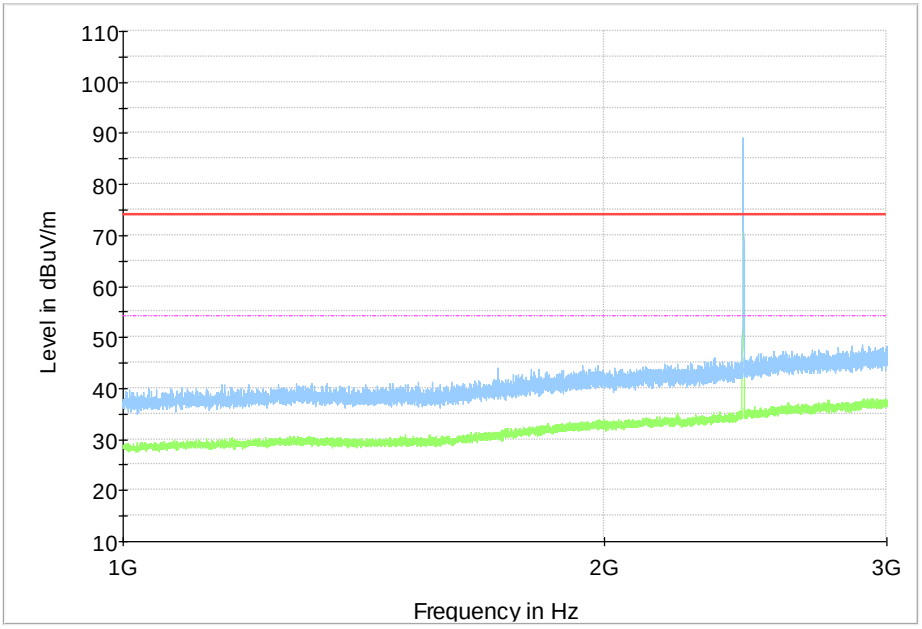


**Fig. 61 Radiated Spurious Emission (π /4 DQPSK, Ch39, 1GHz ~ 3GHz)**

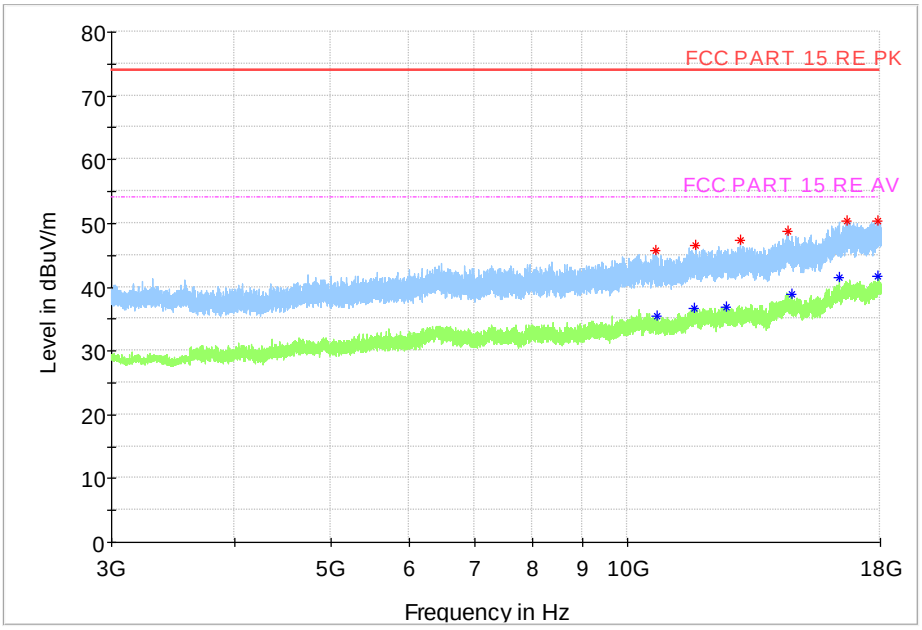


**Fig. 62 Radiated Spurious Emission (π /4 DQPSK, Ch39, 3GHz ~ 18GHz)**

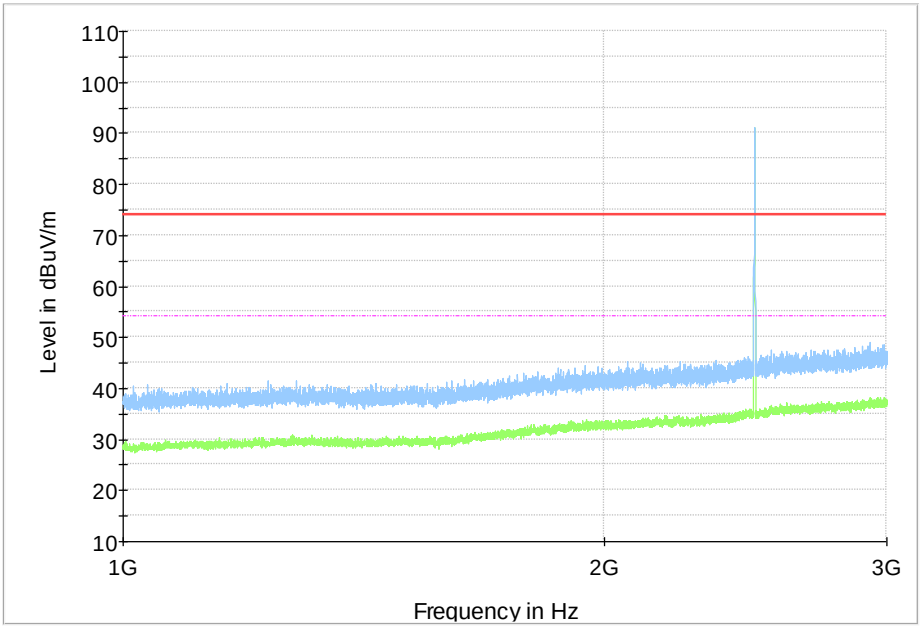


**Fig. 63 Radiated Spurious Emission (π /4 DQPSK, Ch78, 1GHz ~ 3GHz)**

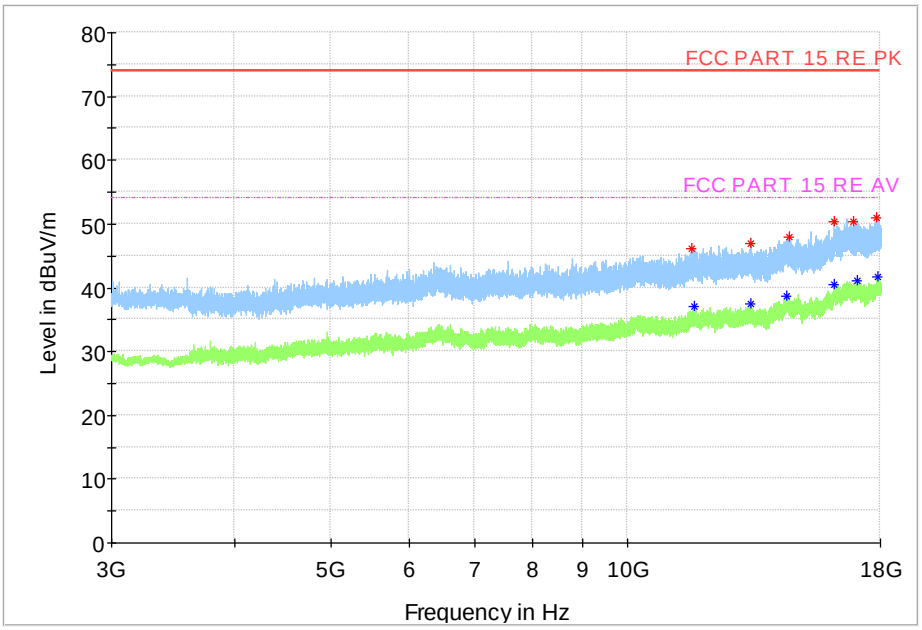


**Fig. 64 Radiated Spurious Emission (π /4 DQPSK, Ch78, 3GHz ~ 18GHz)**

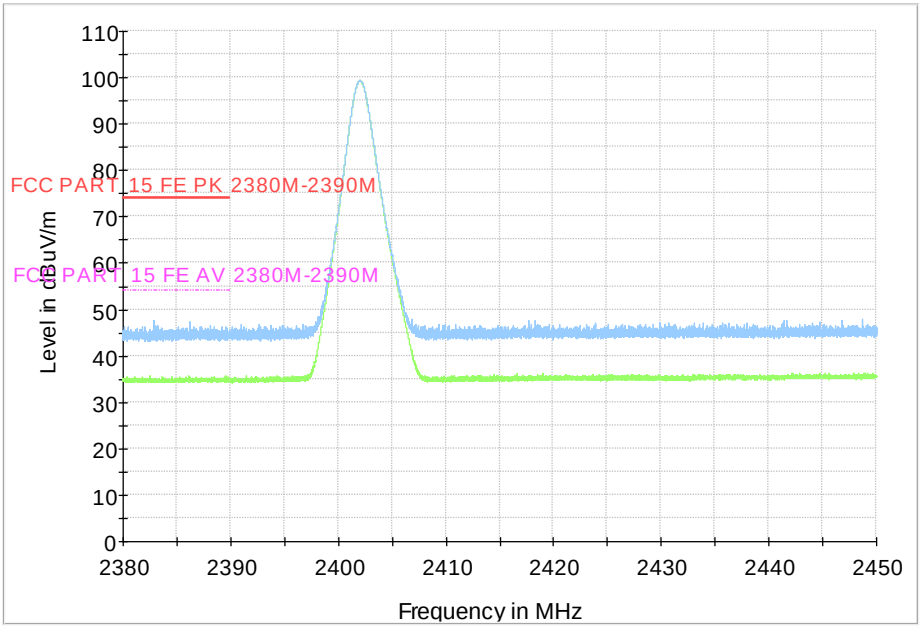


**Fig. 65 Radiated Band Edges (π /4 DQPSK, Ch0, 2380GHz ~ 2450GHz)**

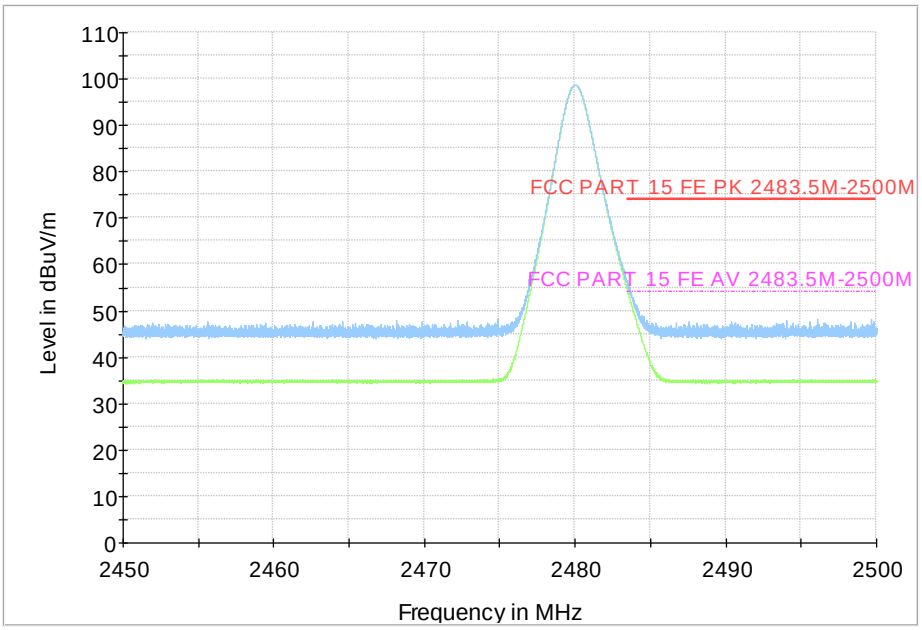


**Fig. 66 Radiated Band Edges (π /4 DQPSK, Ch78, 2450GHz ~ 2500GHz)**