*Full*

# TEST REPORT

## No. 18D00141-SRD01

*For*

**Client : Shanghai Sunmi Technology Co.,Ltd.**

**Production : Handheld Wireless Terminal**

**Model Name : T8900/T8901**

**FCC ID : 2AH25L2**

**Hardware Version: 2DD021_V2.01**

**Software Version: L2_V2.6_20180621**

**Issued date: 2018-09-26**

**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 ECIT Shanghai.

**Test Laboratory:**

ECIT Shanghai, East China Institute of Telecommunications

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**Revision Version**

| Report Number | Revision | Date | Memo |
|---|---|---|---|
| I18D00141-SRD01 | 00 | 2018-09-26 | Initial creation of test report |

# CONTENTS

# 1. Test Laboratory

## 1.1. Testing Location

| | |
|---|---|
| Company Name: | ECIT Shanghai, East China Institute of Telecommunications |
| Address: | 7-8F, G Area, No. 668, Beijing East Road, Huangpu District, Shanghai, P. R. China |
| Postal Code: | 200001 |
| Telephone: | (+86)-021-63843300 |
| Fax: | (+86)-021-63843301 |

## 1.2. Testing Environment

| | |
|---|---|
| Normal Temperature: | 15-35℃ |
| Extreme Temperature: | -30/+50℃ |
| Relative Humidity: | 20-75% |

## 1.3. Project data

| | |
|---|---|
| Project Leader: | Yu Anlu |
| Testing Start Date: | 2018-08-07 |
| Testing End Date: | 2018-08-19 |

## 1.4. Signature

**Yang Dejun**
**(Prepared this test report)**

**Shi Hongqi**
**(Reviewed this test report)**

**Zheng Zhongbin**
**Director of the laboratory**
**(Approved this test report)**

# 2. Client Information

## 2.1. Applicant Information

| | |
|---|---|
| Company Name: | Shanghai Sunmi Technology Co.,Ltd. |
| Address: | Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China |
| Postcode: | 200433 |
| Telephone: | 18721763396 |

## 2.2. Manufacturer Information

| | |
|---|---|
| Company Name: | Shanghai Sunmi Technology Co.,Ltd.Shanghai Sunmi Technology Co.,Ltd. |
| Address: | Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China |
| Postcode: | 200433 |
| /////Telephone: | 18721763396 |

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

## 3.1. About EUT

| | |
|---|---|
| EUT Description | Handheld Wireless Terminal |
| Model name | T8900/T8901 |
| BT Frequency | 2402MHz-2480MHz |
| BT Channel | Channel0-Channel78 |
| BT type of modulation | GFSK/ π /4 DQPSK/8DPSK |
| Extreme Temperature | -30/+50℃ |
| Nominal Voltage | 3.85V |
| Extreme High Voltage | 4.35V |
| Extreme Low Voltage | 3.5V |

Note: Photographs of EUT are shown in ANNEX A of this test report.

## 3.2. Internal Identification of EUT used during the test

| EUT ID* | Model Name | SN or IMEI | HW Version | SW Version | Date of receipt |
|---|---|---|---|---|---|
| N02 | T8900/T8901 | N/A | 2DD021_V2.01 | L2_V2.6_20180621 | 2018-07-25 |
| N07 | T8900/T8901 | N/A | 2DD021_V2.01 | L2_V2.6_20180621 | 2018-07-25 |

*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 | RF cable | --- |
| AE2 | --- | --- |

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

# 4. Reference Documents

## 4.1. 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:<br>15.205 Restricted bands of operation;<br>15.209 Radiated emission limits, general requirements;<br>15.247 Operation within the bands 902-928MHz,<br>2400-2483.5MHz, and 5725-5850MHz. | Jun,2016 Edition |
| ANSI C63.10 | American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices | 2013 |

# 5. Summary of Test Results

A brief summary of the tests carried out is shown as following.

| Measurement Items | Sub-clause of Part15C | Sub-clause of IC | Verdict |
|---|---|---|---|
| Maximum Peak Output Power | 15.247(b) | / | P |
| 20dB Occupied Bandwidth | 15.247(a) | / | P |
| Band Edges Compliance | 15.247(b) | / | P |
| Time Of Occupancy (Dwell Time) | 15.247(a) | / | P |
| Carrier Frequency Separation | 15.247(a) | / | P |
| Number Of Hopping Channels | 15.247(a) | / | P |
| Transmitter Spurious Emission-Conducted | 15.247 | / | P |
| Transmitter Spurious Emission-Radiated | 15.247,15.209, | / | P |
| AC Powerline Conducted Emission | 15.107,15.207 | / | P |

Please refer to part 5 for detail.

The measurements are according to ANSI C63.10.

Terms used in Verdict column

| | |
|---|---|
| P | Pass, the EUT complies with the essential requirements in the standard. |
| NP | Not Perform, the test was not performed by ECIT. |
| NA | Not Applicable, the test was not applicable. |
| F | Fail, the EUT does not comply with the essential requirements in the standard. |

Test Conditions

| | |
|---|---|
| Tnom | Normal Temperature |
| Tmin | Low Temperature |
| Tmax | High Temperature |
| Vnom | Normal Voltage |
| Vmin | Low Voltage |

| | |
|---|---|
| Vmax | High Voltage |
| Hnom | Norm Humidity |
| Anom | Norm Air Pressure |

For this report, all the test case listed above are tested under Normal Temperature and Normal Voltage, and also under norm humidity, the specific conditions as following:

| | | |
|---|---|---|
| Temperature | Tnom | 25℃ |
| Voltage | Vnom | 3.85V |
| Humidity | Hnom | 48% |
| Air Pressure | Anom | 1010hPa |

**Note:**

a. All the test data for each data were verified, but only the worst case was reported.

b.The GFSK, π/4 DQPSK and 8DPSK were set in DH1 for GFSK, 2-DH1 for π/4 DQPSK, 3-DH1 for 8DPSK.

c.The DC and low frequency voltages' measurement uncertainty is ±2%.

## 5.1. Notes

All reported tests were carried out on a sample equipment to demonstrate limited compliance with section 3.

The test results of this test report relate exclusively to the item(s) tested as specified in section 5.

## 5.2. Statements

The T8900/T8901, supporting GPRS/EDGE/WCDMA/CDMA/LTE/BT/BLE/WLAN/NFC, manufactured by Shanghai Sunmi Technology Co.,Ltd., which is a new product for testing.

ECIT has verified that the compliance of the tested device specified in section 5 of this test report is successfully evaluated according to the procedure and test methods as defined in type certification requirement listed in section 5 of this test report.

# 6. Test result

## 6.1. Peak Output Power-Conducted

### 6.1.1 Measurement Limit

| Standard | Limit (dBm) |
|---|---|
| FCC Part 15.247(b)(1) | < 30 |

### 6.1.2 Test Condition:

| Hopping Mode | RBW | VBW | Span | Sweeptime |
|---|---|---|---|---|
| Hopping OFF | 3MHz | 10MHz | 9MHz | Auto |

### 6.1.3 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.5.

1. The output power of EUT was connected to the spectrum analyzer and CBT32 by cable and divide. The path loss was compensated to the results for each measurement.
2. Enable EUT transmitter maximum power continuously.
3. Measure the conducted output power and record the results it.

### 6.1.4 Measurement Results:

**For GFSK**

| Channel | Ch0 2402 MHz | Ch39 2441 MHz | CH78 2480 MHz | Conclusion |
|---|---|---|---|---|
| Peak Conducted Output Power (dBm) | 8.715 | 9.356 | 8.639 | P |
| | Fig.1 | Fig.2 | Fig.3 | |

**For π/4 DQPSK**

| Channel | Ch0 2402 MHz | Ch39 2441 MHz | CH78 2480 MHz | Conclusion |
|---|---|---|---|---|
| Peak Conducted Output Power (dBm) | 8.234 | 8.875 | 8.143 | P |
| | Fig.4 | Fig.5 | Fig.6 | |

**For 8DPSK**

| Channel | Ch0 2402 MHz | Ch39 2441 MHz | CH78 2480 MHz | Conclusion |
|---|---|---|---|---|

| | | | | |
|---|---|---|---|---|
| Peak Conducted Output Power (dBm) | 8.41 | 9.02 | 8.303 | P |
| | Fig.7 | Fig.8 | Fig.9 | |

**Conclusion: PASS**

**Test graphs an below**


Fig.1 Peak Conducted Output Power CH0, DH1


Fig.2 Peak Conducted Output Power CH39, DH1

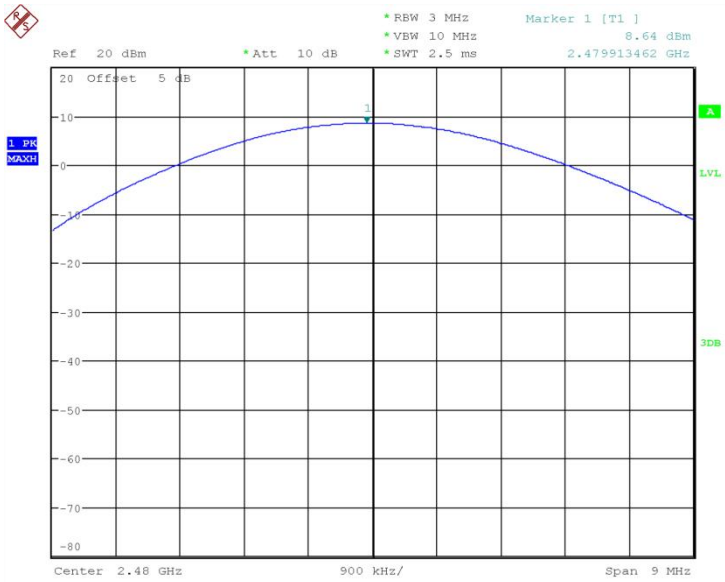



Fig.3 Peak Conducted Output Power CH78, DH1

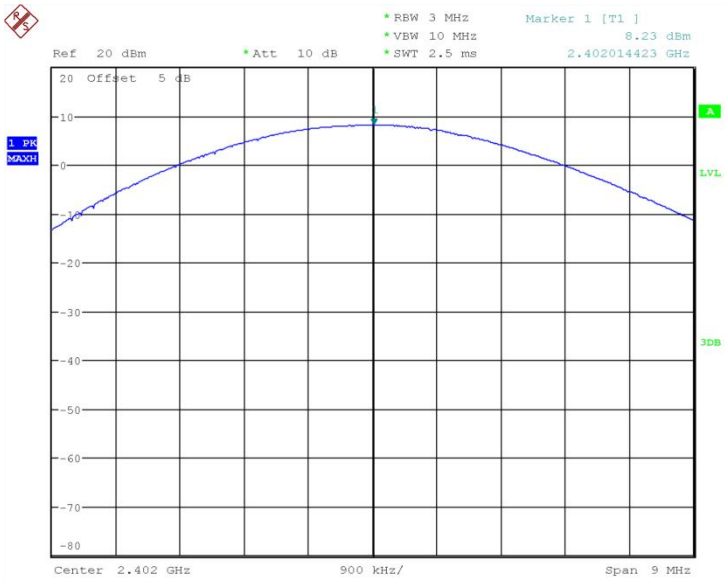



Fig.4 Peak Conducted Output Power CH0, 2DH1

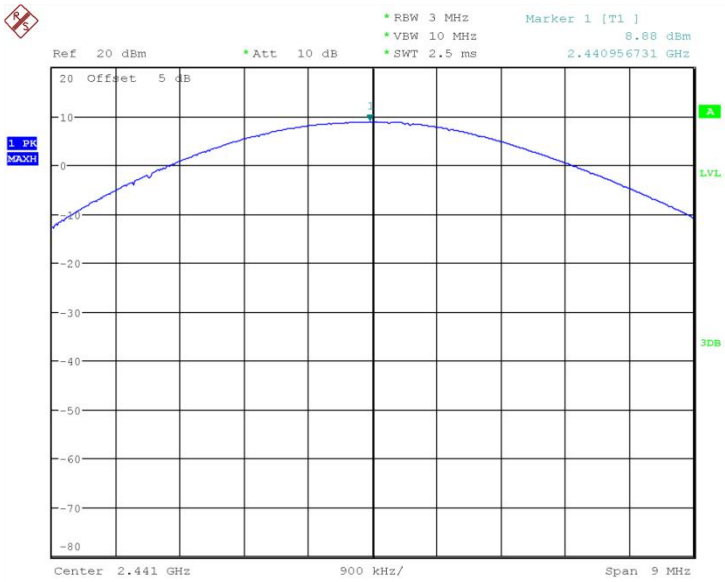



Fig.5 Peak Conducted Output Power CH39, 2DH1

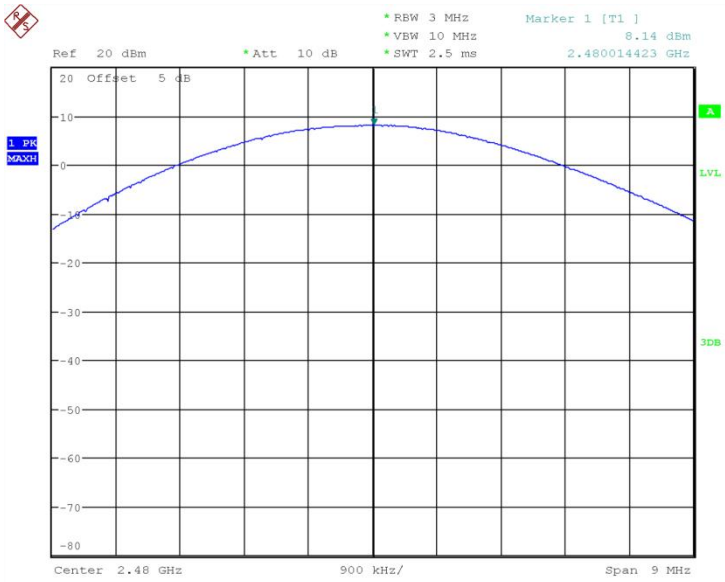



Fig.6 Peak Conducted Output Power CH78, 2DH1

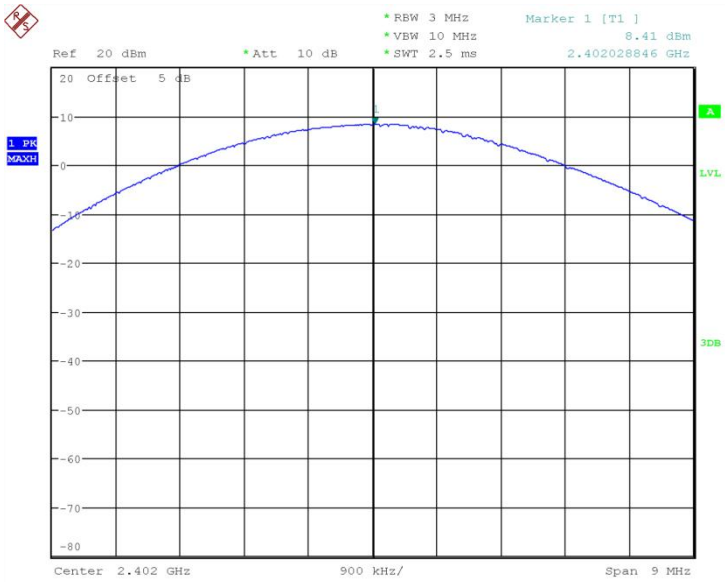



Fig.7 Peak Conducted Output Power CH0, 3DH1

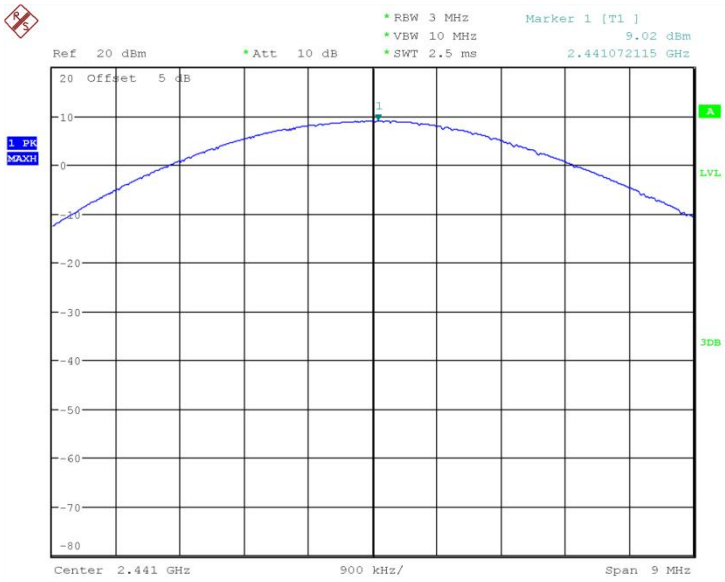



Fig.8 Peak Conducted Output Power CH39, 3DH1

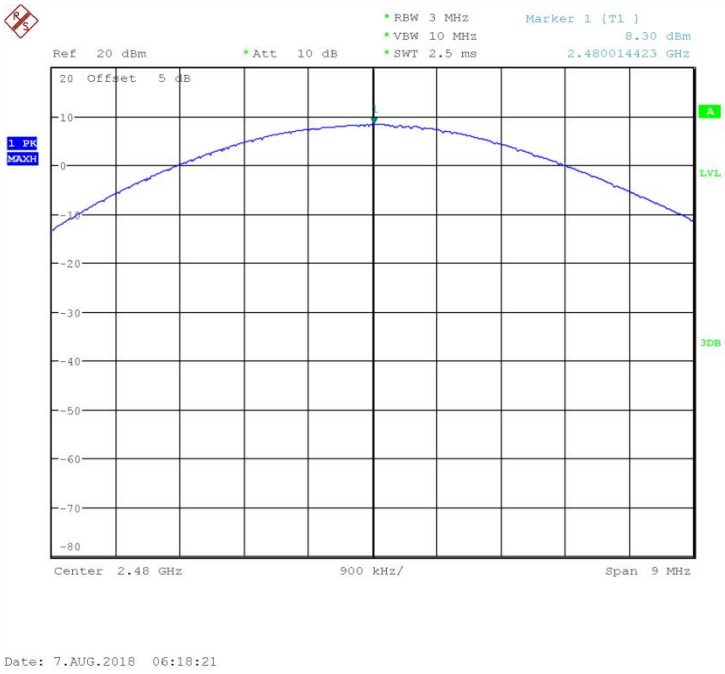



Fig.9 Peak Conducted Output Power CH78, 3DH1

## 6.2. Frequency Band Edges-Conducted

### 6.2.1 Measurement Limit:

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

### 6.2.2 Test procedure

The measurement is according to ANSI C63.10 clause 7.8.6.

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz, span more than 1.5 times channel bandwidth (2MHz).
3. Detector =peak, sweep time=auto couple, trace mode=max hold.
4. Allow sweep to continue until the trace stabilizes.

### 6.2.3 Measurement results

**For GFSK**

| Channel | Hopping | Band Edge Power (dBc) | Conclusion |
|---|---|---|---|
| 0 | Hopping OFF | Fig.10 | P |
| | Hopping ON | Fig.11 | P |

| | | | |
|---|---|---|---|
| 78 | Hopping OFF | Fig.12 | P |
| | Hopping ON | Fig.13 | P |

**For π/4 DQPSK**

| Channel | Hopping | Band Edge Power (dBc) | Conclusion |
|---|---|---|---|
| 0 | Hopping OFF | Fig.14 | P |
| | Hopping ON | Fig.15 | P |
| 78 | Hopping OFF | Fig.16 | P |
| | Hopping ON | Fig.17 | P |

**For 8DPSK**

| Channel | Hopping | Band Edge Power (dBc) | Conclusion |
|---|---|---|---|
| 0 | Hopping OFF | Fig.18 | P |
| | Hopping ON | Fig.19 | P |
| 78 | Hopping OFF | Fig.20 | P |
| | Hopping ON | Fig.21 | P |

**Conclusion: PASS**

**Test graphs an below**

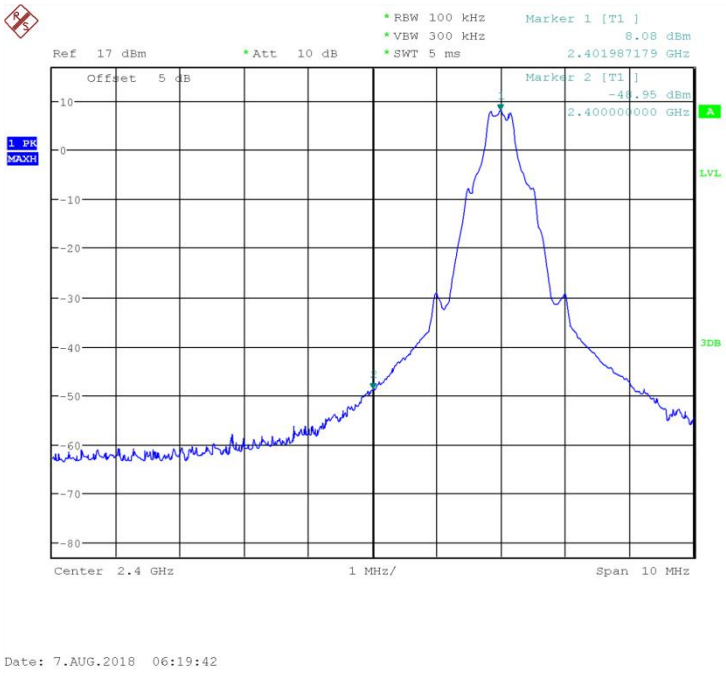



Fig.10 Frequency Band Edge: GFSK, Ch0, Hopping OFF

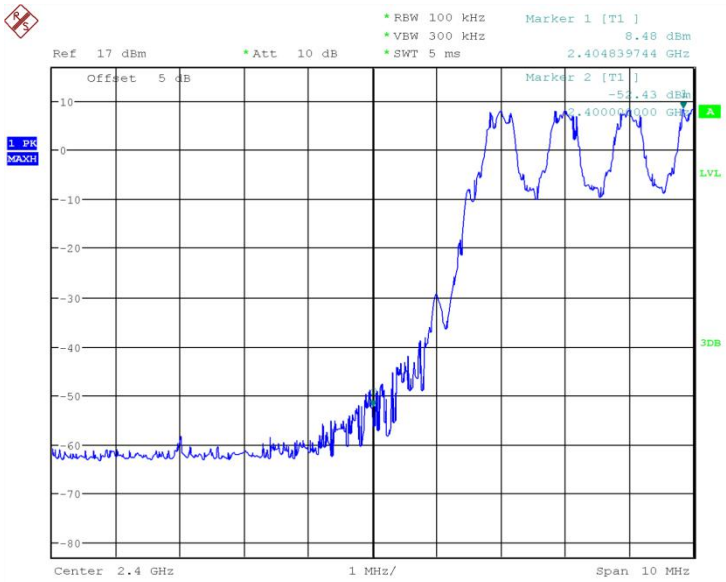



Fig.11 Frequency Band Edge: GFSK, Ch0, Hopping ON

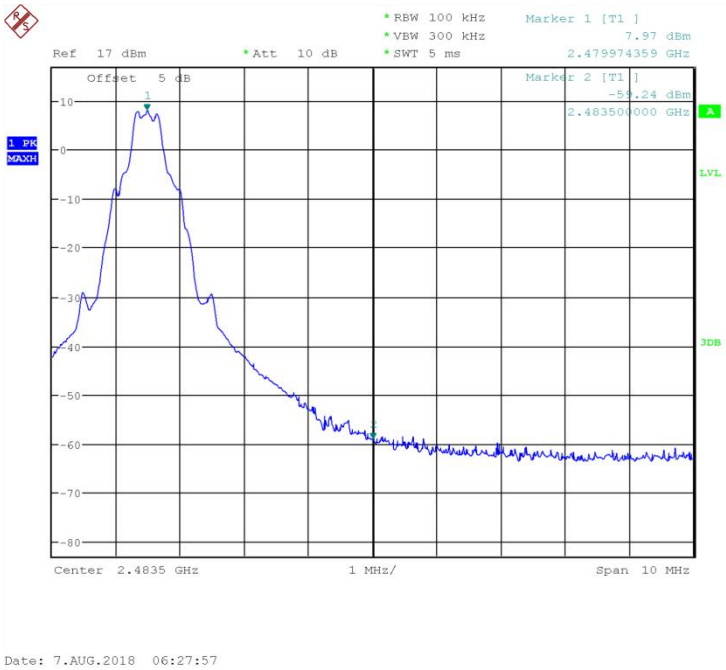



Fig.12 Frequency Band Edge: GFSK, Ch78, Hopping OFF

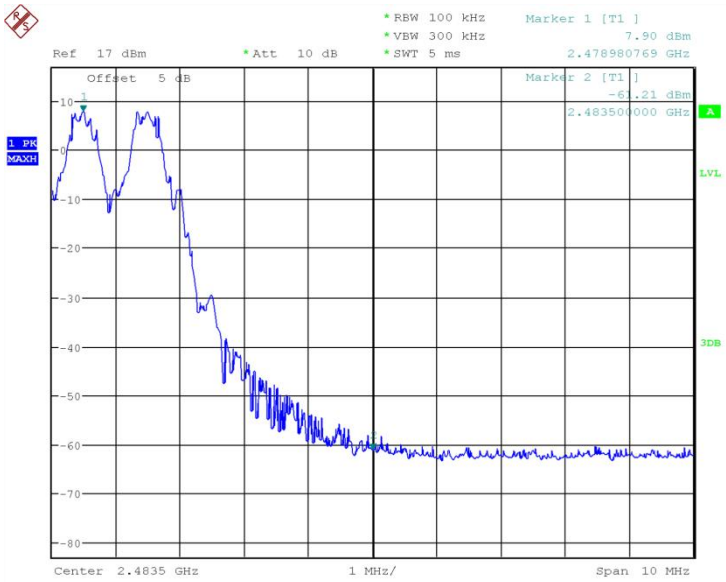



Fig.13 Frequency Band Edge: GFSK, Ch78, Hopping ON

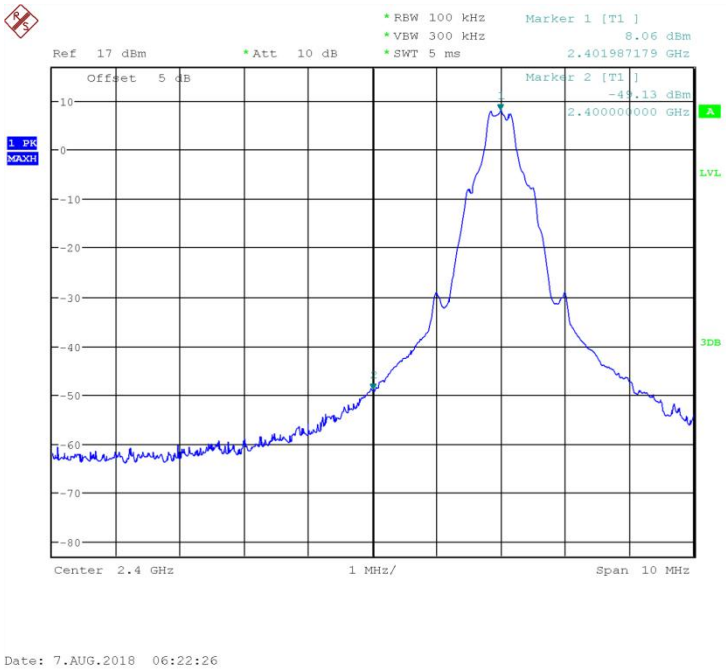



Fig.14 Frequency Band Edge: π/4 DQPSK, Ch0, Hopping OFF

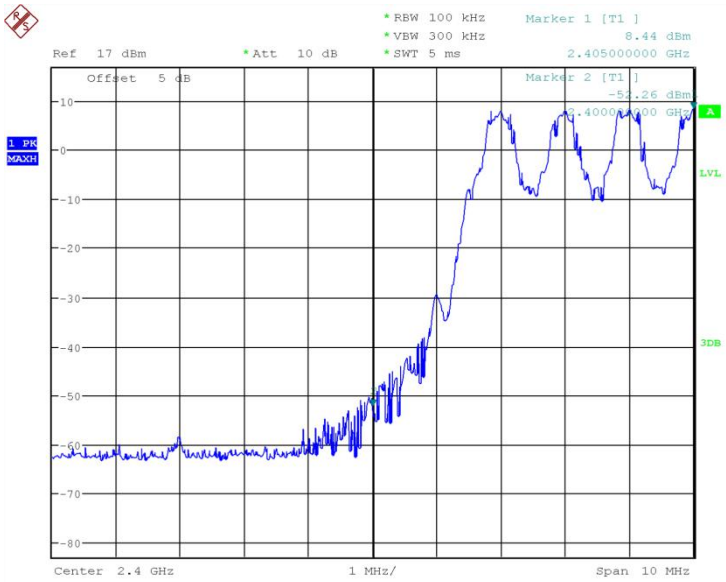



Fig.15 Frequency Band Edge: π/4 DQPSK, Ch0, Hopping ON

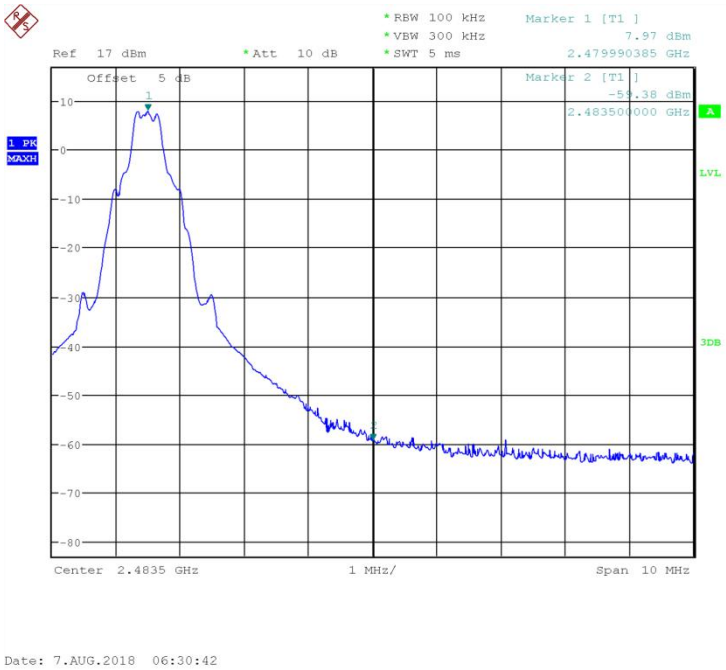



Fig.16 Frequency Band Edge: π/4 DQPSK, Ch78, Hopping OFF

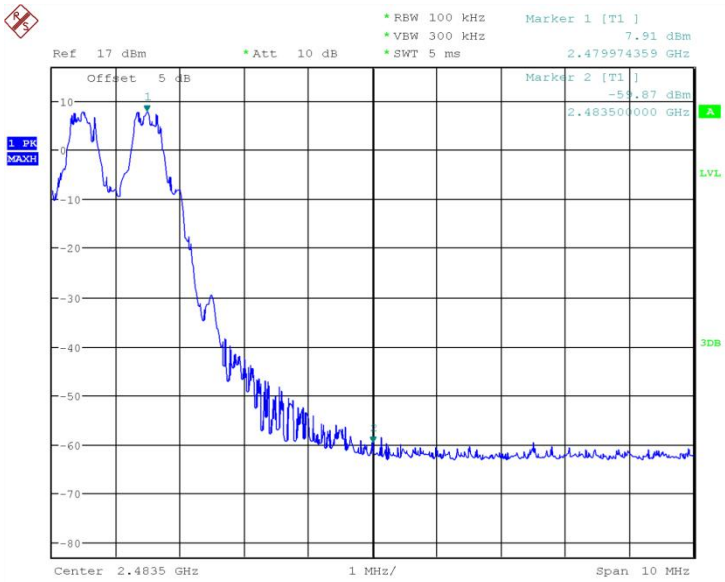



Fig.17 Frequency Band Edge: π/4 DQPSK, Ch78, Hopping ON

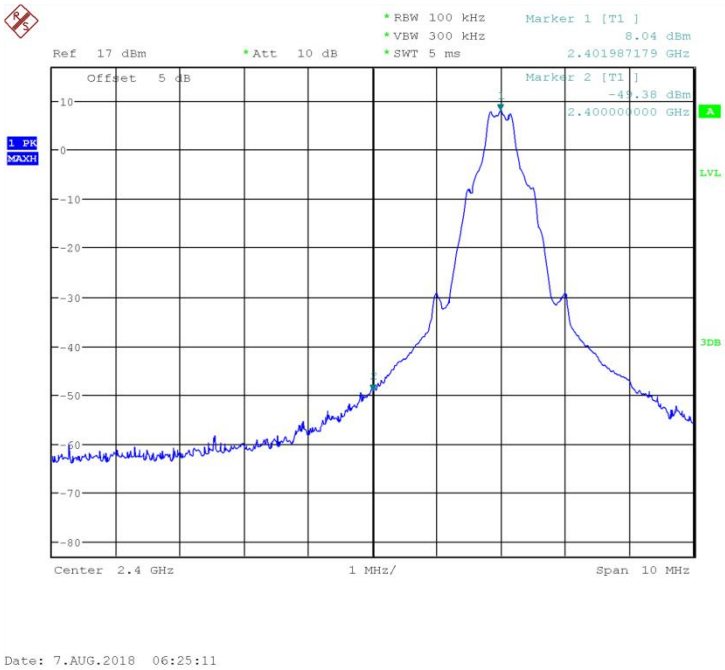



Fig.18 Frequency Band Edge: 8DPSK, Ch0, Hopping OFF

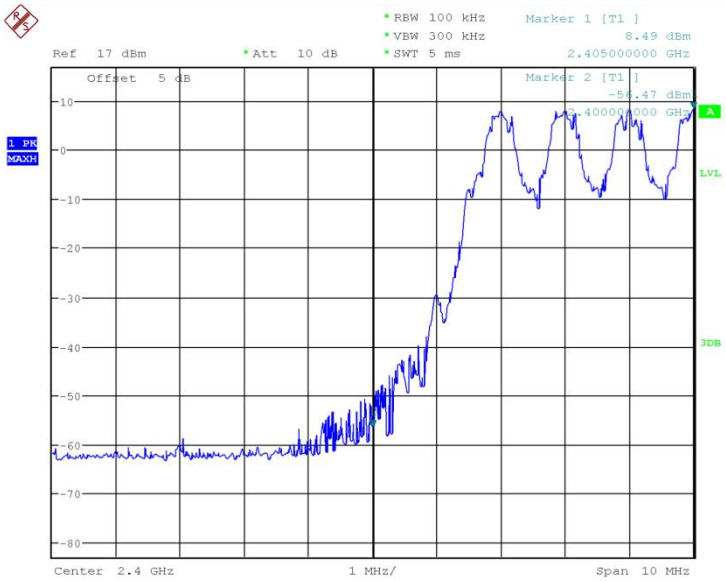



Fig.19 Frequency Band Edge: 8DPSK, Ch0, Hopping ON

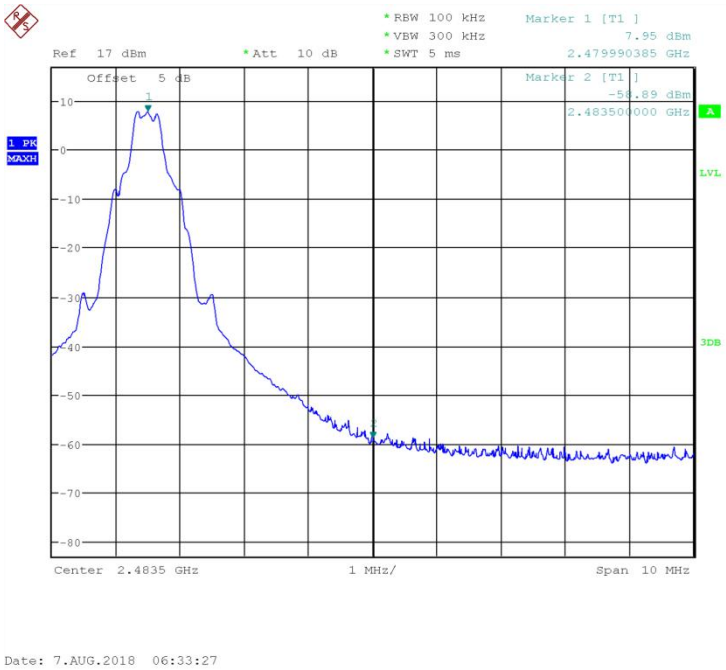



Fig.20 Frequency Band Edge: 8DPSK, Ch78, Hopping OFF

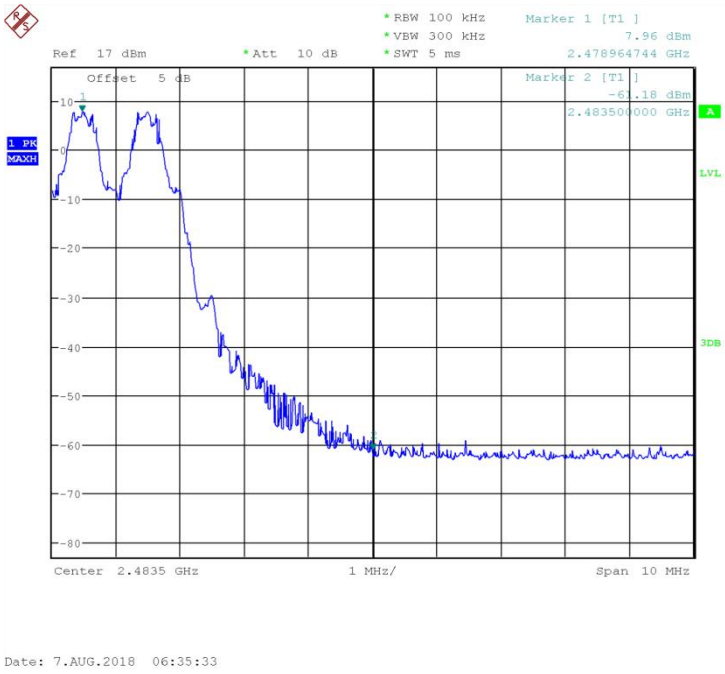



Fig.21 Frequency Band Edge: 8DPSK, Ch78, Hopping ON

## 6.3. Conducted Emission

### 6.3.1 Measurement Limit:

| Standard | Limit |
|---|---|
| FCC 47 CFR Part15.247 (d) | 20dB below peak output power in 100KHz bandwidth |

### 6.3.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.8.

1. Connect the EUT to spectrum analyzer.
2. Set RBW=100KHz, VBW=300KHz.
3. Detector =peak, sweep time=auto couple, trace mode=max hold.

### 6.3.3 Measurement Results:

**For GFSK**

| Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|
| **Ch0 2402MHz** | Center Freq. | Fig.22 | P |
| | 30MHz~26GHz | Fig.23 | P |
| **Ch39 2441MHz** | Center Freq. | Fig.24 | P |
| | 30MHz~26GHz | Fig.25 | P |

| | | | |
|---|---|---|---|
| **Ch78 2480MHz** | Center Freq. | Fig.26 | P |
| | 30MHz~26GHz | Fig.27 | P |

**For π/4 DQPSK**

| Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|
| **Ch0 2402MHz** | Center Freq. | Fig.28 | P |
| | 30MHz~26GHz | Fig.29 | P |
| **Ch39 2441MHz** | Center Freq. | Fig.30 | P |
| | 30MHz~26GHz | Fig.31 | P |
| **Ch78 2480MHz** | Center Freq. | Fig.32 | P |
| | 30MHz~26GHz | Fig.33 | P |

**For 8DPSK**

| Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|
| **Ch0 2402MHz** | Center Freq. | Fig.34 | P |
| | 30MHz~26GHz | Fig.35 | P |
| **Ch39 2441MHz** | Center Freq. | Fig.36 | P |
| | 30MHz~26GHz | Fig.37 | P |
| **Ch78 2480MHz** | Center Freq. | Fig.38 | P |
| | 30MHz~26GHz | Fig.39 | P |

**Conclusion: PASS**

**Test graphs as below**

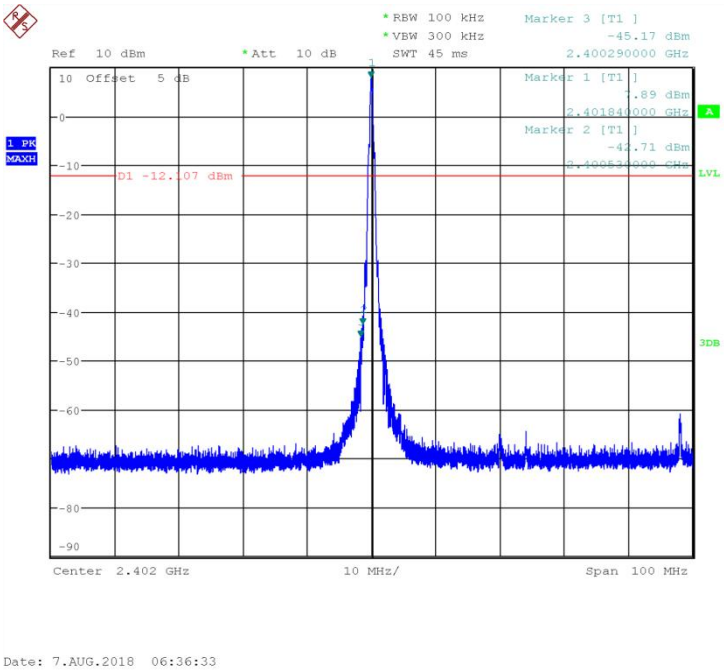



Fig.22 Conducted spurious emission: GFSK, Ch0, 2402MHz

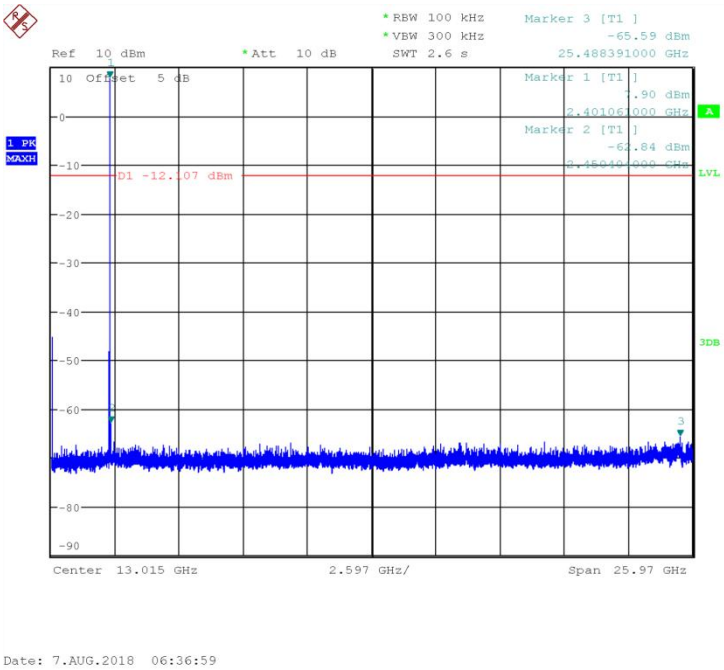



Fig.23 Conducted spurious emission: GFSK, Ch0, 30MHz~26GHz

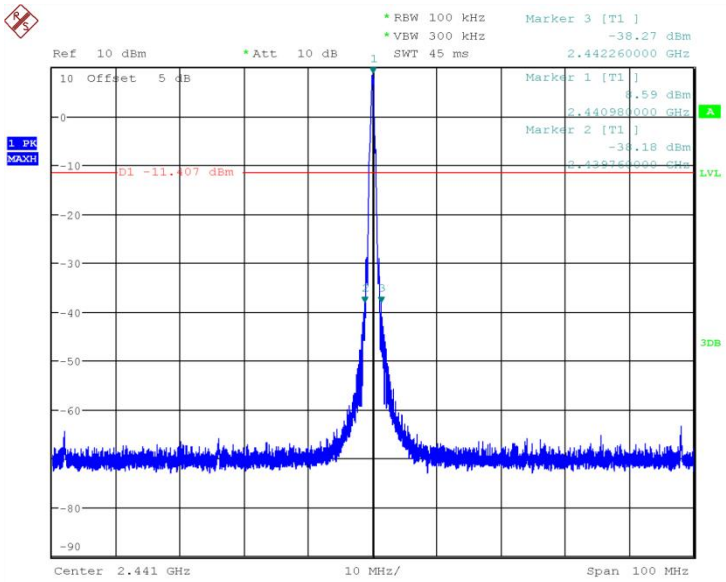



Fig.24 Conducted spurious emission: GFSK, Ch39, 2441MHz

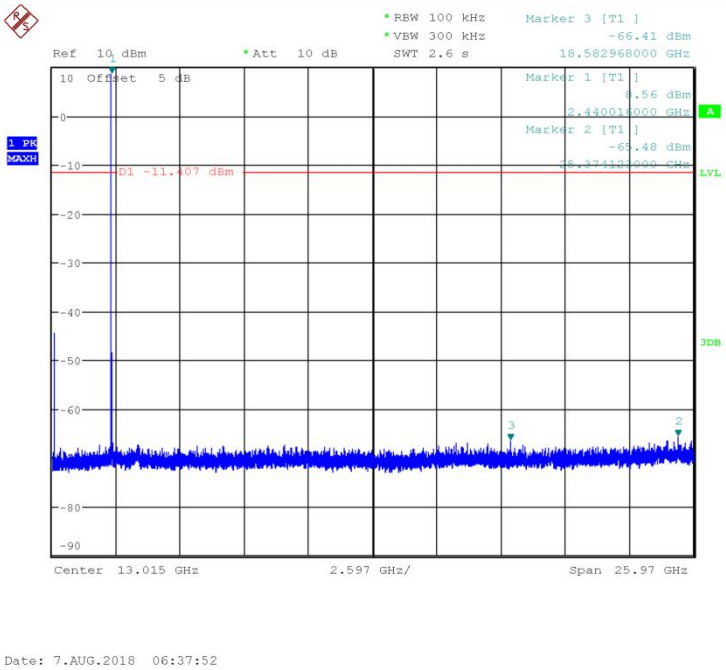



Fig.25 Conducted spurious emission: GFSK, Ch39, 30MHz~26GHz

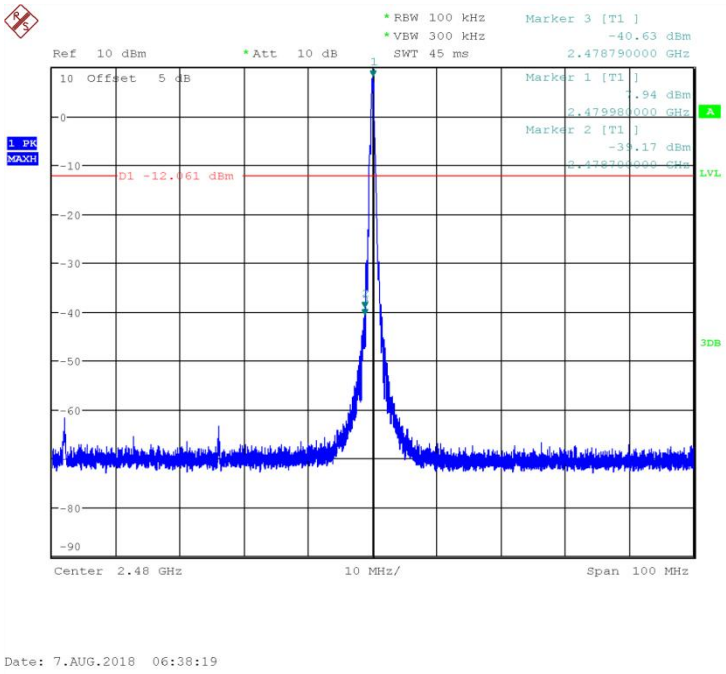



Fig.26 Conducted spurious emission: GFSK, Ch78, 2480MHz

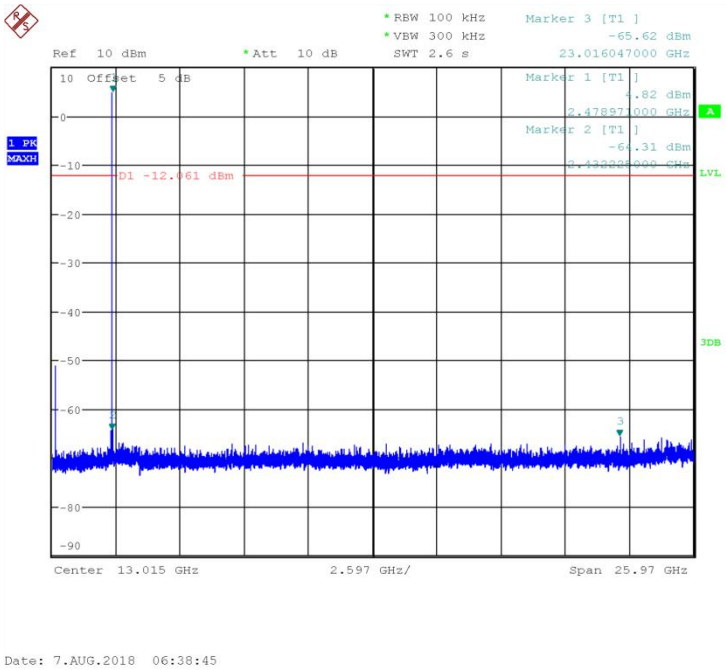



Fig.27 Conducted spurious emission: GFSK, Ch78, 30MHz~26GHz

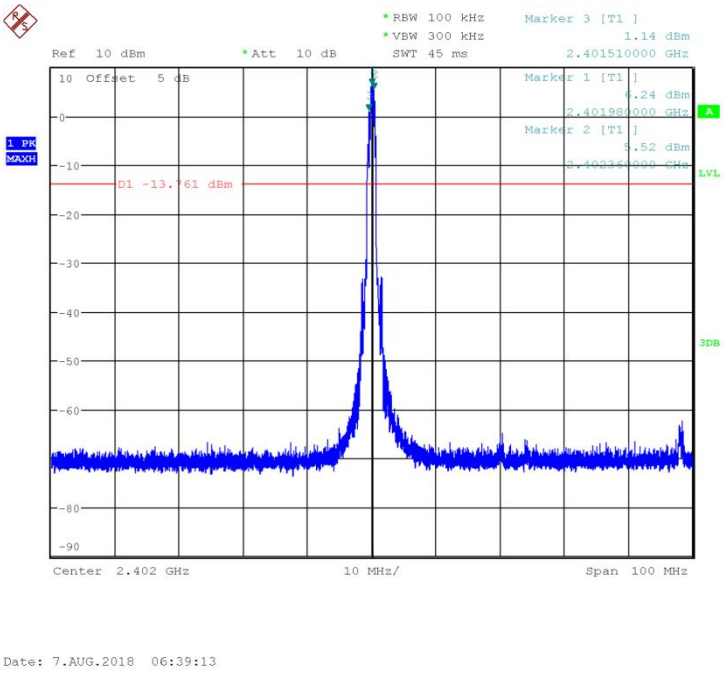



Fig.28 Conducted spurious emission: π/4 DQPSK, Ch0, 2402MHz

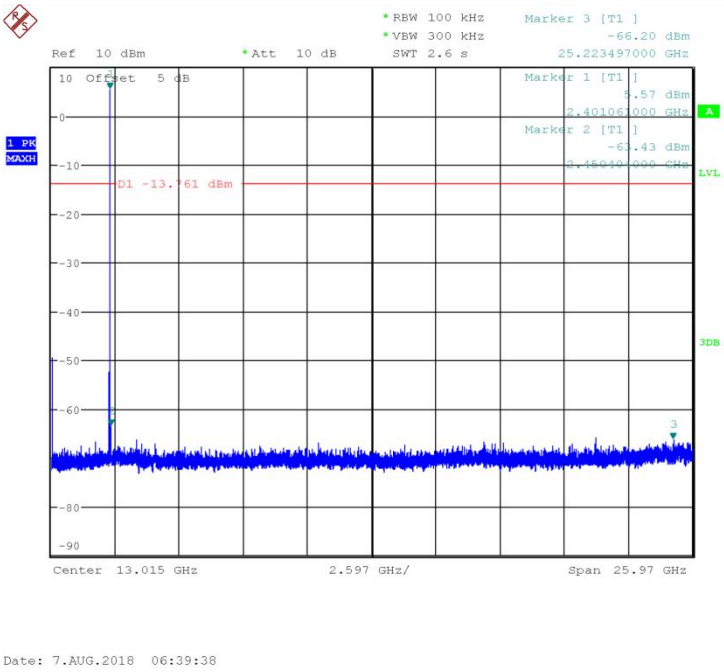



Fig.29 Conducted spurious emission: π/4 DQPSK, Ch0, 30MHz~26GHz

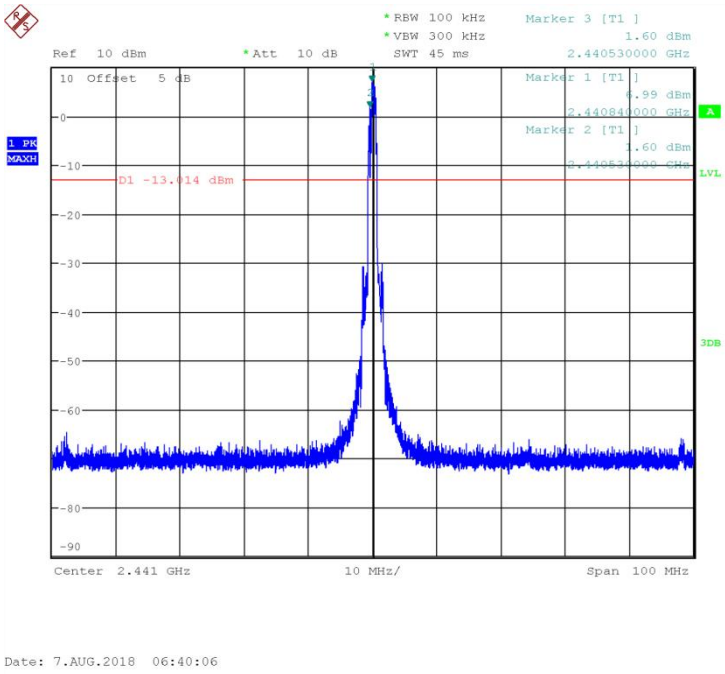



Fig.30 Conducted spurious emission: π/4 DQPSK, Ch39, 2441MHz

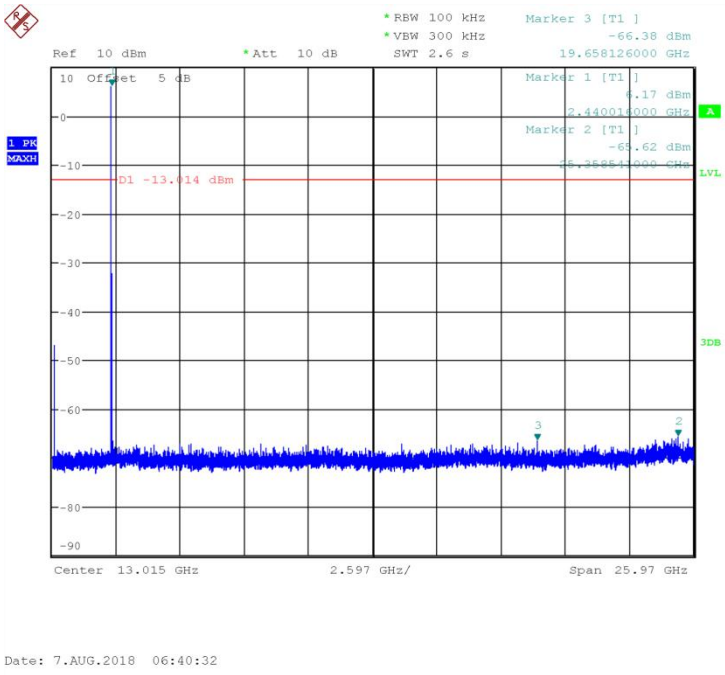



Fig.31 Conducted spurious emission: π/4 DQPSK, Ch39, 30MHz~26GHz

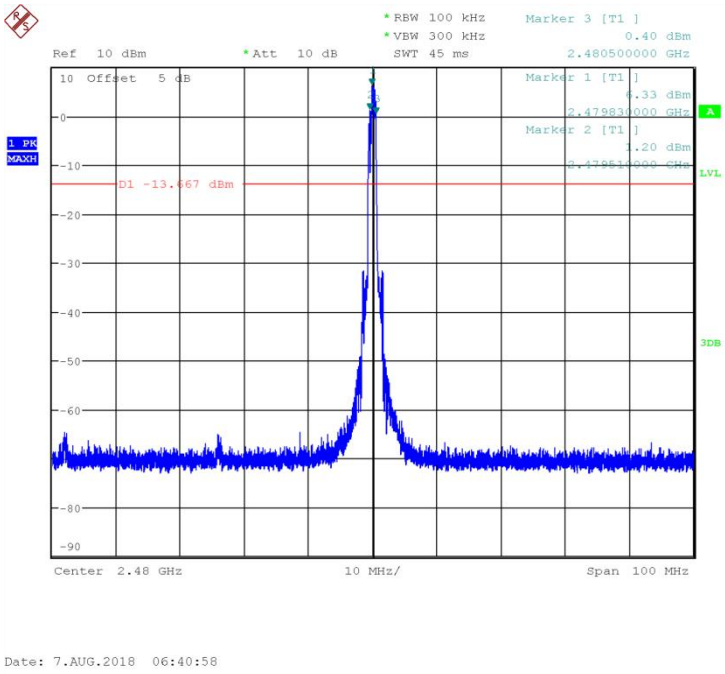



Fig.32 Conducted spurious emission: π/4 DQPSK, Ch78, 2480MHz

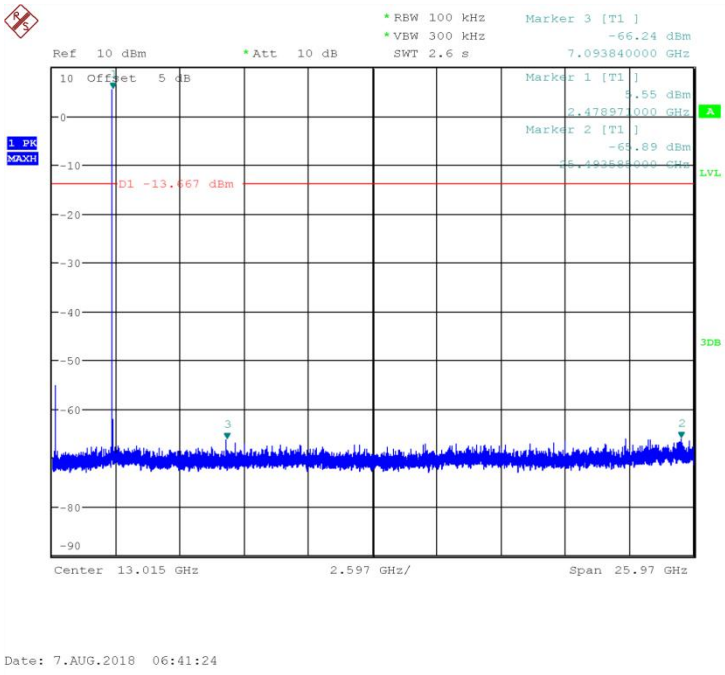



Fig.33 Conducted spurious emission: π/4 DQPSK, Ch78, 30MHz~26GHz

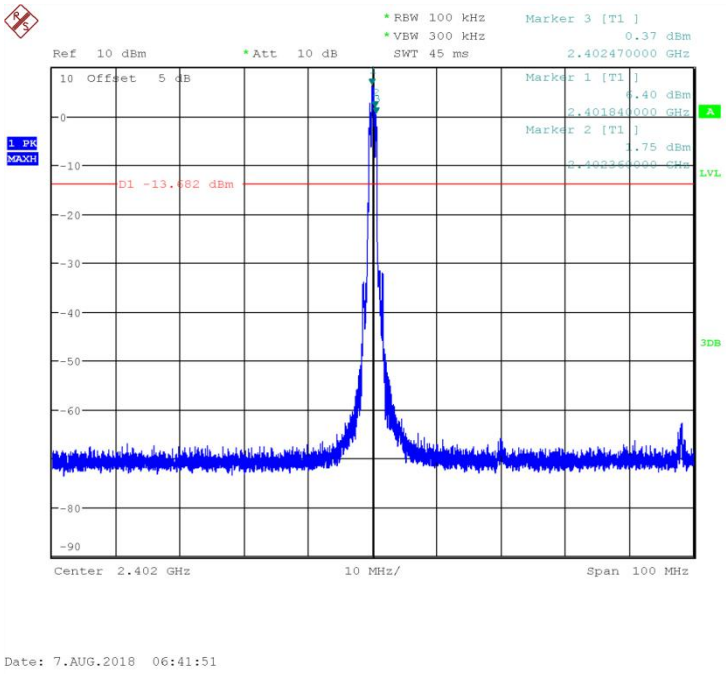



Fig.34 Conducted spurious emission: 8DPSK, Ch0, 2402MHz

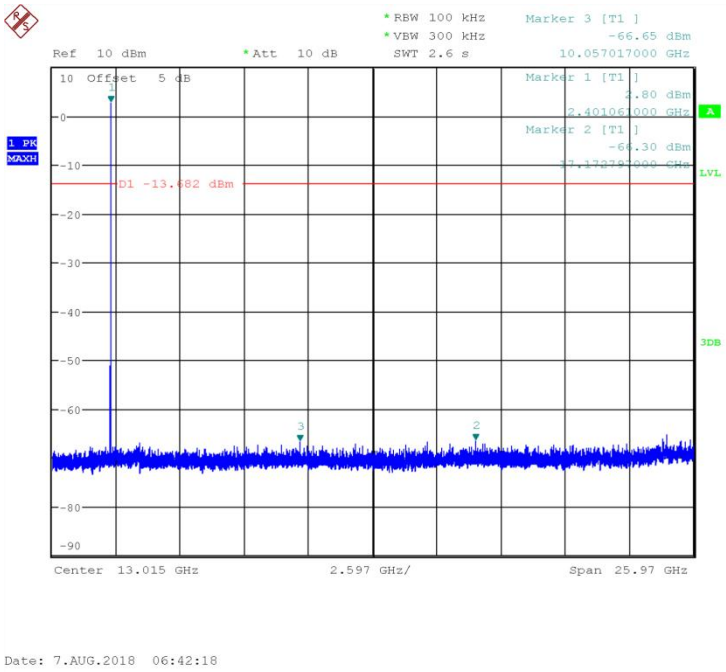



Fig.35 Conducted spurious emission: 8DPSK, Ch0, 30MHz~26GHz

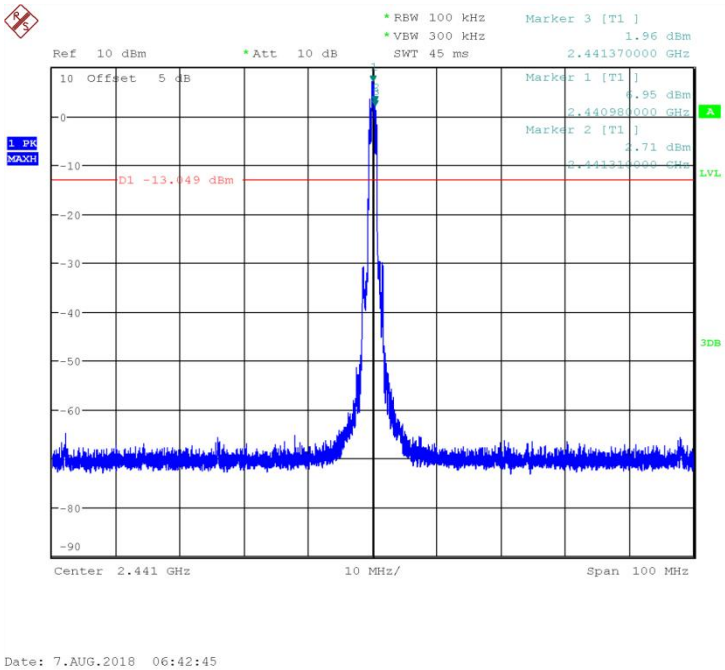



Fig.36 Conducted spurious emission: 8DPSK, Ch39, 2441MHz

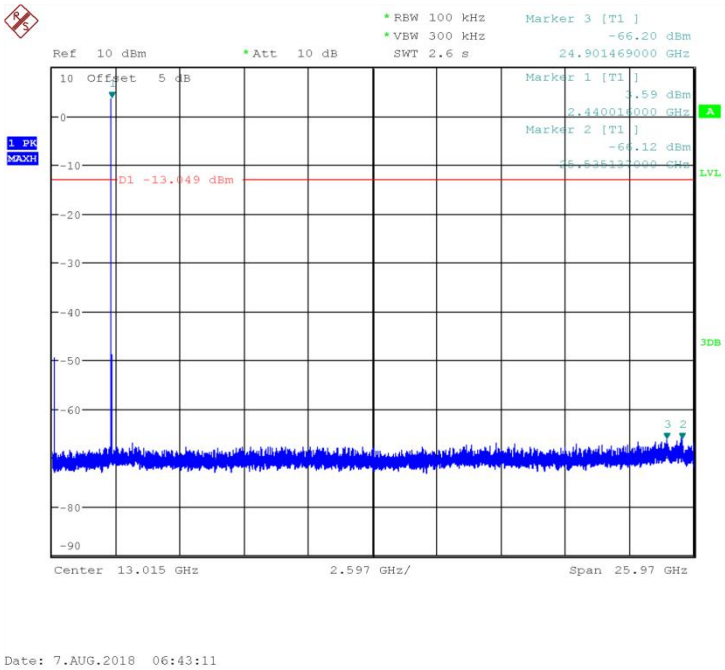



Fig.37 Conducted spurious emission: 8DPSK, Ch39, 30MHz~26GHz

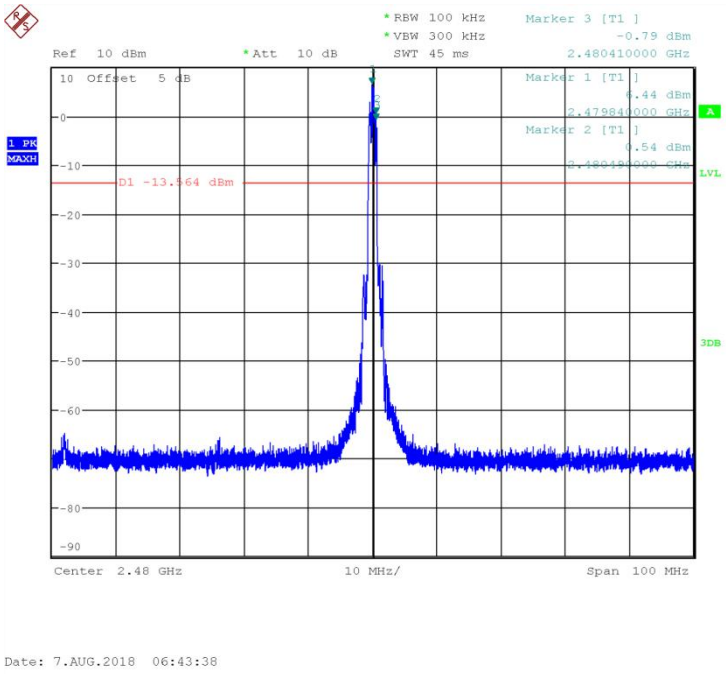



Fig.38 Conducted spurious emission: 8DPSK, Ch78, 2480MHz

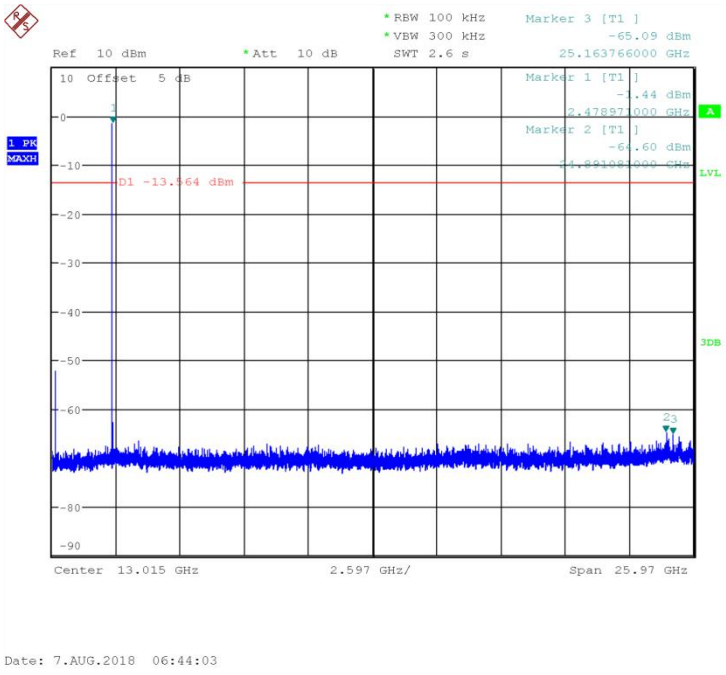



Fig.39 Conducted spurious emission: 8DPSK, Ch78, 30MHz~26GHz

## 6.4. Radiated Emission

### 6.4.1 Measurement Limit:

| Standard | Limit |
|---|---|

| | |
|---|---|
| FCC 47 CFR Part 15.247, 15.205, 15.209 | 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 (uV/m) | Field strength (dBuV/m) |
|---|---|---|
| 30~88 | 100 | 40 |
| 88~216 | 150 | 43.5 |
| 216~960 | 200 | 46 |
| Above 960 | 500 | 54 |

**6.4.2 Test Method**

Portable, small, lightweight, or modular devices that may be handheld, worn on the body, or placed on a table during operation shall be positioned on a non-conducting platform, the top of which is 80 cm above the reference ground plane. The preferred area occupied by the EUT arrangement is 1 m by 1.5 m, but it may be larger or smaller to accommodate various sized EUTs. For testing purposes, ceiling- and wall-mounted devices also shall be positioned on a tabletop (see also ANSI C63.10-2013 section 6.3.4 and 6.3.5). In making any tests involving handheld, body-worn, or ceiling-mounted equipment, it is essential to recognize that the measured levels may be dependent on the orientation (attitude) of the three orthogonal axes of the EUT. Thus, exploratory tests as specified in 8.3.1 shall be carried out for various axes orientations to determine the attitude having maximum or near-maximum emission level.

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 | 100KHz/300KHz | 5 |
| 1000~4000 | 1MHz/1MHz | 15 |
| 4000~18000 | 1MHz/1MHz | 40 |
| 18000~26500 | 1MHz/1MHz | 20 |

**6.4.3 Measurement Results:**

A “reference path loss” is established and $A_{Rpi}$ is the attenuation of “reference path loss”,

and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

$A_{Rpi}$ = Cable loss + Antenna Gain-Preamplifier gain

Result=$P_{Mea}$ + $A_{Rpi}$

**For GFSK**

| Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|
| Ch0 2402MHz | 30MH~1GHz | Fig.40 | P |
| | 1GHz~3GHz | Fig.41 | P |
| | 3GHz~18GHz | Fig.42 | P |
| Power | 2.38GHz~2.4GHz | Fig.43 | P |
| Power | 2.45GHz~2.5GHz | Fig.44 | P |

**For π/4 DQPSK**

| Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|
| Ch0 2402MHz | 30MH~1GHz | Fig.45 | P |
| | 1GHz~3GHz | Fig.46 | P |
| | 3GHz~18GHz | Fig.47 | P |
| Power | 2.38GHz~2.4GHz | Fig.48 | P |
| Power | 2.45GHz~2.5GHz | Fig.49 | P |

**For 8DPSK**

| Channel | Frequency Range | Test Results | Conclusion |
|---|---|---|---|
| Ch0 2402MHz | 30MH~1GHz | Fig.50 | P |
| | 1GHz~3GHz | Fig.51 | P |
| | 3GHz~18GHz | Fig.52 | P |
| Power | 2.38GHz~2.4GHz | Fig.53 | P |
| Power | 2.45GHz~2.5GHz | Fig.54 | P |

**GFSK Ch0 30MHz-1GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 34.2 | 12.85 | -22 | 34.85 | V |
| 75.2 | 13.57 | -26.2 | 39.77 | V |
| 172.8 | 20.51 | -25.8 | 46.31 | H |
| 240.0 | 25.1 | -23 | 48.1 | H |
| 458.5 | 19.7 | -17.9 | 37.6 | H |
| 799.1 | 22.74 | -11 | 33.74 | H |

**GFSK Ch0 1GHz-3GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 1995.9 | 53.05 | 1.8 | 51.25 | H |
| 2506.2 | 54.2 | 7.2 | 47 | V |
| 2668.4 | 54.32 | 7.8 | 46.52 | V |
| 2740.4 | 55.61 | 7.7 | 47.91 | V |
| 2876.0 | 55.27 | 8.6 | 46.67 | H |
| 2936.2 | 55.47 | 8.7 | 46.77 | H |

**GFSK Ch0 1GHz-3GHz (Average)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 2506.2 | 41.57 | 7.2 | 34.37 | V |
| 2668.4 | 42.43 | 7.8 | 34.63 | V |
| 2740.4 | 42.28 | 7.7 | 34.58 | V |
| 2876.0 | 43.01 | 8.6 | 34.41 | H |
| 2936.2 | 43.4 | 8.7 | 34.7 | H |

**GFSK Ch0 3GHz-18GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 12872.4 | 52.1 | 16.9 | 35.2 | V |

| | | | | |
|---|---|---|---|---|
| 13987.4 | 52.94 | 18.9 | 34.04 | V |
| 14310.7 | 55.07 | 20.6 | 34.47 | H |
| 15681.8 | 57.25 | 23.2 | 34.05 | H |
| 16793.7 | 60.16 | 27.1 | 33.06 | V |
| 17793.9 | 61.97 | 28.4 | 33.57 | H |

**GFSK Ch0 3GHz-18GHz (Average)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 14310.7 | 42.72 | 20.6 | 22.12 | H |
| 15681.8 | 44.55 | 23.2 | 21.35 | H |
| 16793.7 | 47.8 | 27.1 | 20.7 | V |
| 17793.9 | 48.38 | 28.4 | 19.98 | H |

**π/4 DQPSK Ch0 30MHz-1GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 33.7 | 14.18 | -22 | 36.18 | V |
| 35.0 | 13.34 | -21.9 | 35.24 | V |
| 74.9 | 13.95 | -26.2 | 40.15 | H |
| 173.9 | 21.42 | -25.7 | 47.12 | H |
| 240.0 | 25.9 | -23 | 48.9 | V |
| 415.1 | 19.23 | -18.6 | 37.83 | H |

**π/4 DQPSK Ch0 1GHz-3GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 1997.9 | 52.07 | 1.9 | 50.17 | H |
| 2544.9 | 53.87 | 7.1 | 46.77 | H |
| 2646.0 | 55.08 | 7.7 | 47.38 | H |
| 2796.6 | 54.54 | 7.9 | 46.64 | H |
| 2843.5 | 55.39 | 8.3 | 47.09 | V |

| | | | | |
|---|---|---|---|---|
| 2914.6 | 55.34 | 8.8 | 46.54 | H |

**π/4 DQPSK Ch0 1GHz-3GHz (Average)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 2646.0 | 42.2 | 7.7 | 34.5 | H |
| 2796.6 | 42.44 | 7.9 | 34.54 | H |
| 2843.5 | 42.61 | 8.3 | 34.31 | V |
| 2914.6 | 43.03 | 8.8 | 34.23 | H |

**π/4 DQPSK Ch0 3GHz-18GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 13714.4 | 53.33 | 17.7 | 35.63 | H |
| 14695.1 | 55.6 | 21.1 | 34.5 | H |
| 15396.8 | 56.77 | 22.7 | 34.07 | V |
| 16409.5 | 58.72 | 25.7 | 33.02 | V |
| 17213.3 | 60.31 | 27.3 | 33.01 | H |
| 17765.5 | 60.09 | 28 | 32.09 | V |

**π/4 DQPSK Ch0 3GHz-18GHz (Average)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 14695.1 | 43.24 | 21.1 | 22.14 | H |
| 15396.8 | 43.88 | 22.7 | 21.18 | V |
| 16409.5 | 45.99 | 25.7 | 20.29 | V |
| 17213.3 | 48.32 | 27.3 | 21.02 | H |
| 17765.5 | 47.89 | 28 | 19.89 | V |

**8DPSK Ch0 30MHz-1GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 34.5 | 17.46 | -22 | 39.46 | V |
| 36.1 | 16.81 | -21.7 | 38.51 | V |

| | | | | |
|---|---|---|---|---|
| 52.3 | 15.31 | -20.4 | 35.71 | V |
| 173.1 | 21.31 | -25.8 | 47.11 | H |
| 240.0 | 25.98 | -23 | 48.98 | V |
| 430.7 | 21.16 | -18.1 | 39.26 | H |

**8DPSK Ch0 1GHz-3GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 2530.0 | 53.95 | 6.9 | 47.05 | V |
| 2616.4 | 53.78 | 7.4 | 46.38 | V |
| 2665.1 | 54.6 | 7.8 | 46.8 | H |
| 2782.1 | 54.18 | 7.8 | 46.38 | V |
| 2848.8 | 55.28 | 8.3 | 46.98 | V |
| 2986.1 | 55.9 | 8.9 | 47 | H |

**8DPSK Ch0 1GHz-3GHz (Average)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 2665.1 | 42.43 | 7.8 | 34.63 | H |
| 2782.1 | 42.34 | 7.8 | 34.54 | V |
| 2848.8 | 42.53 | 8.3 | 34.23 | V |
| 2986.1 | 43.35 | 8.9 | 34.45 | H |

**8DPSK Ch0 3GHz-18GHz (Peak)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 12867.4 | 52.61 | 16.9 | 35.71 | V |
| 14346.5 | 54.47 | 19.9 | 34.57 | V |
| 15236.7 | 54.89 | 21.3 | 33.59 | H |
| 16290.1 | 58.65 | 25.7 | 32.95 | V |
| 16877.5 | 60.11 | 27.4 | 32.71 | V |
| 17832.3 | 60.88 | 28.1 | 32.78 | V |

**8DPSK Ch0 3GHz-18GHz (Average)**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|---|---|---|---|---|
| 14346.5 | 41.87 | 19.9 | 21.97 | V |
| 15236.7 | 43.01 | 21.3 | 21.71 | H |
| 16290.1 | 46.39 | 25.7 | 20.69 | V |
| 16877.5 | 48.35 | 27.4 | 20.95 | V |
| 17832.3 | 48.2 | 28.1 | 20.1 | V |

**Note: Only the worst case is written in the report.**

**Conclusion: PASS**

**Test graphs as below:**

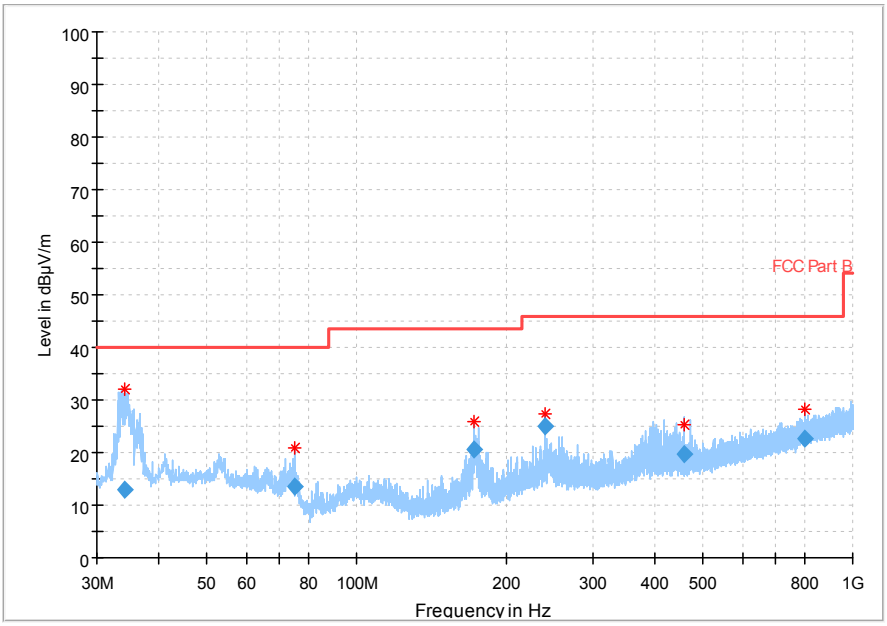



Fig.40 Radiated emission: GFSK, Ch0, 30MHz~1GHz

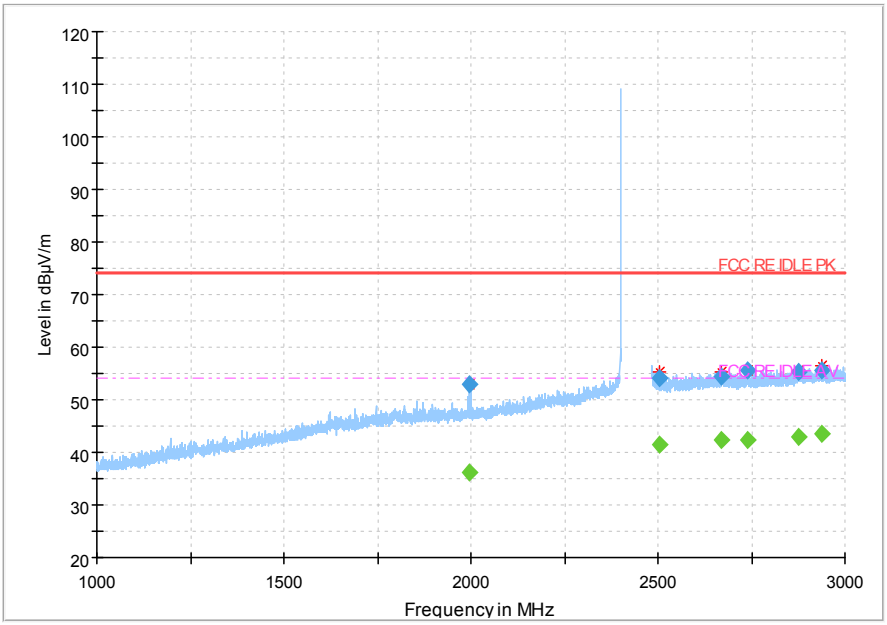



Fig.41 Radiated emission: GFSK, Ch0, 1GHz~3GHz

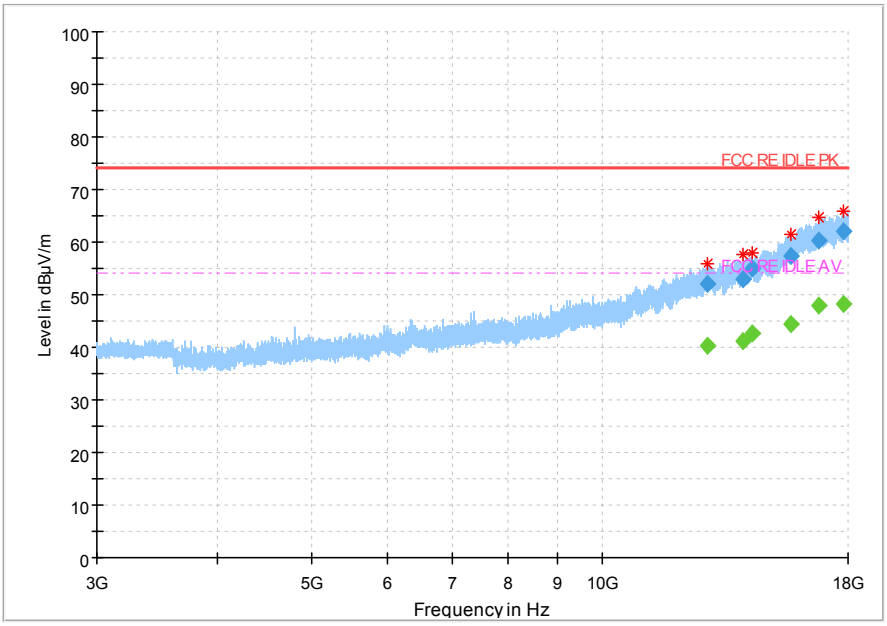
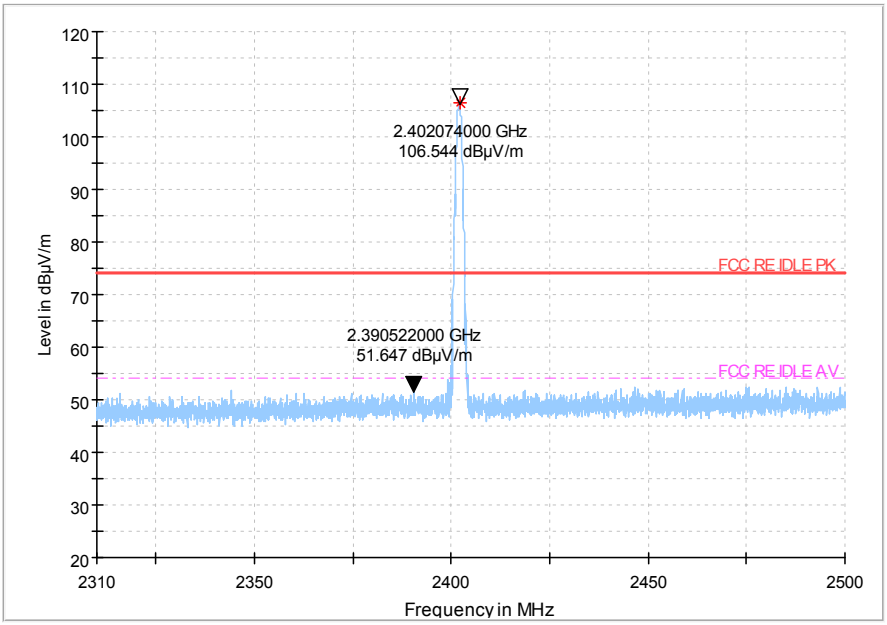



Fig.42 Radiated emission: GFSK, Ch0, 3GHz~18GHz



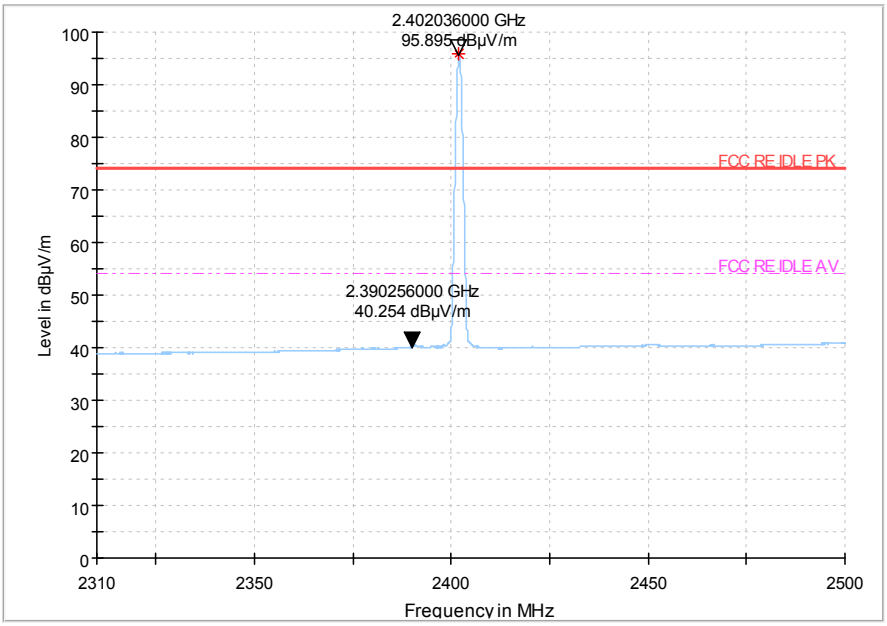
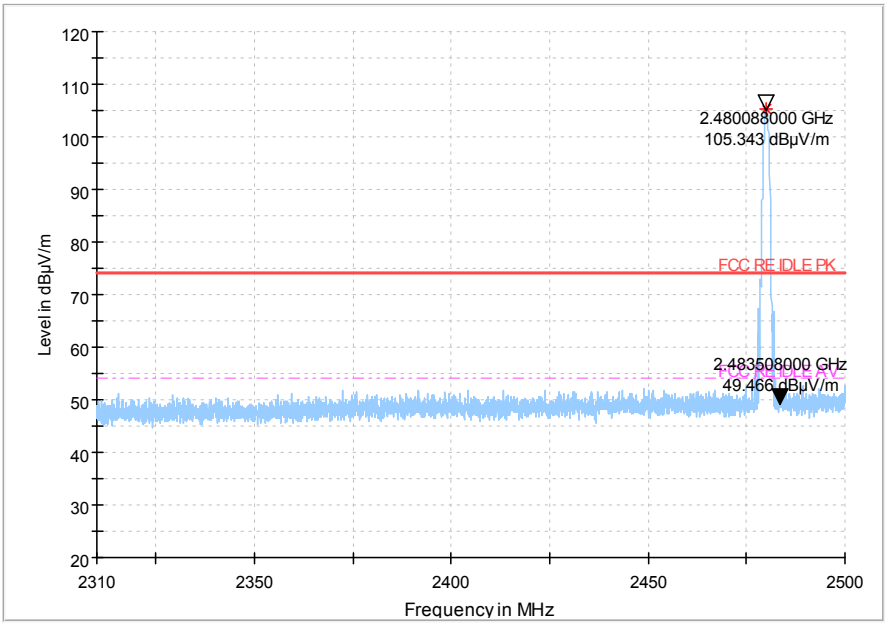




Fig.43 Radiated emission (Power): GFSK, low channel



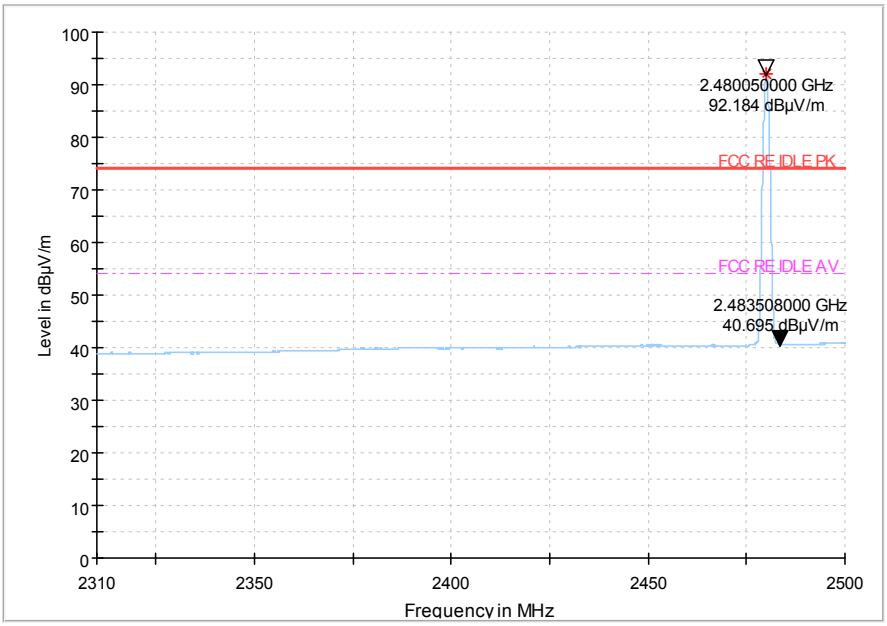




Fig.44 Radiated emission (Power): GFSK, high channel

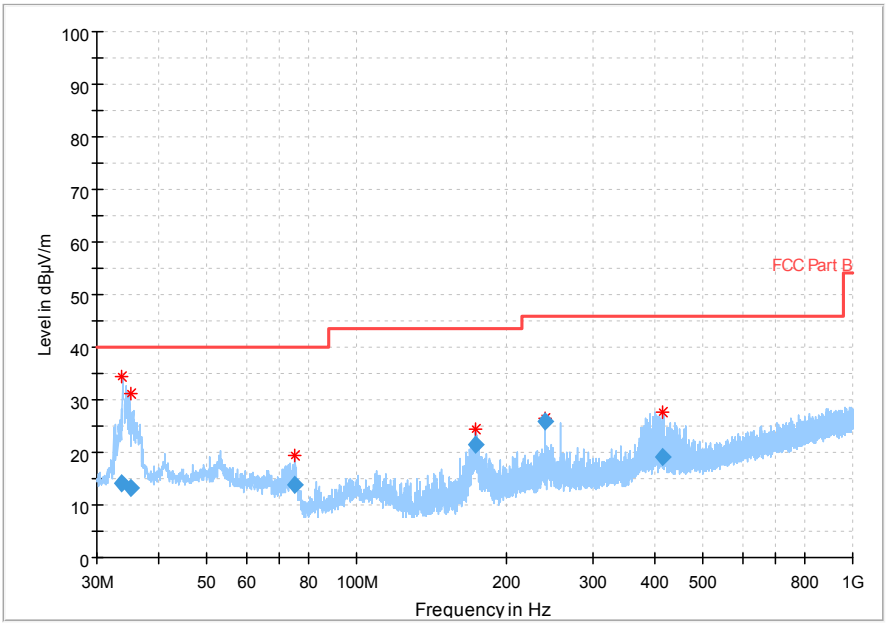



Fig.45 Radiated emission: π/4 DQPSK, Ch0, 30MHz~1GHz

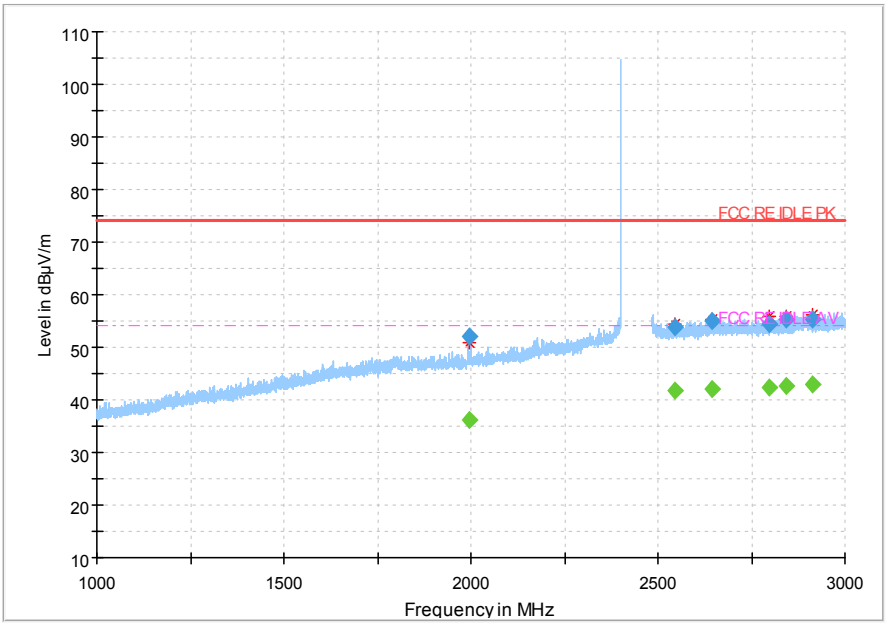



Fig.46 Radiated emission: π/4 DQPSK, Ch0, 1GHz~3GHz

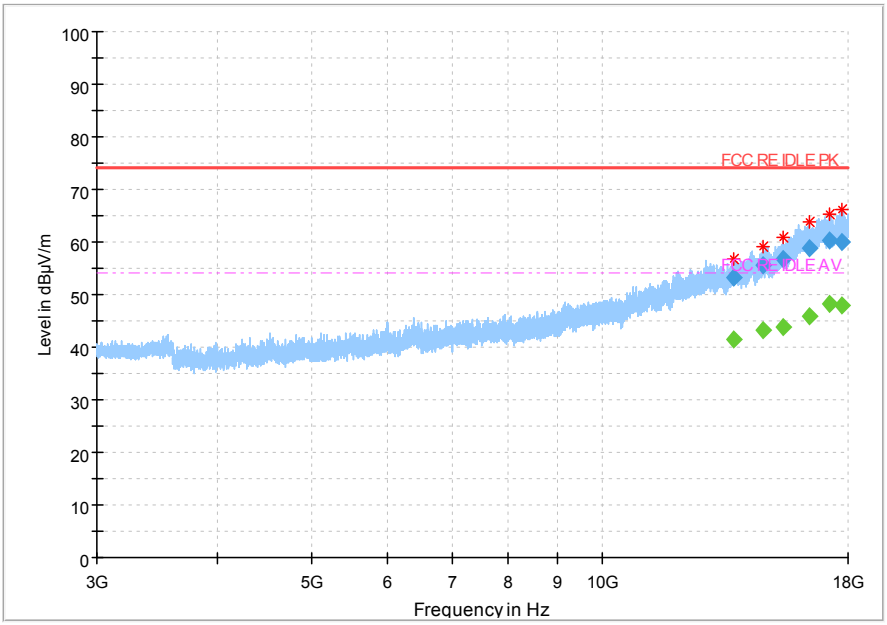
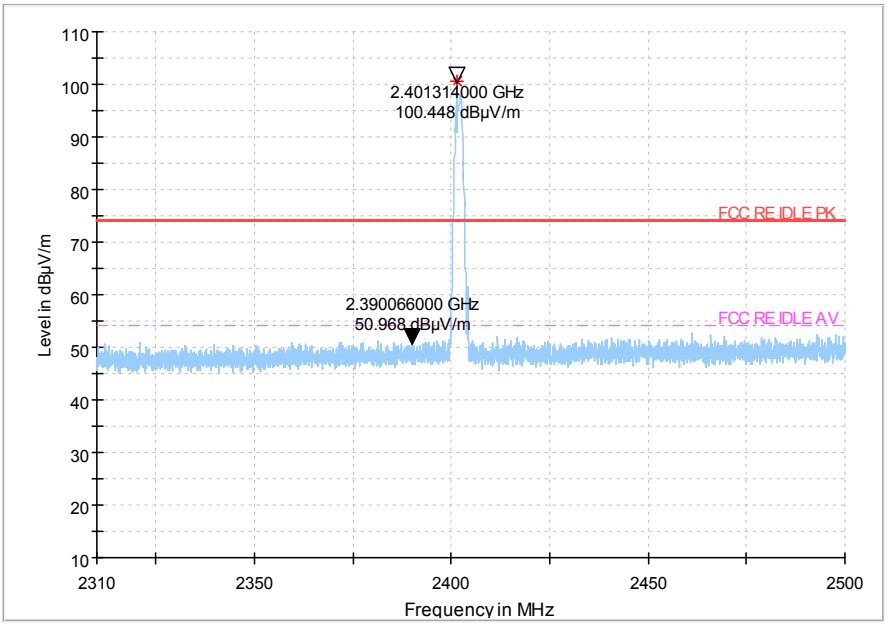



Fig.47 Radiated emission: π/4 DQPSK, Ch0, 3GHz~18GHz



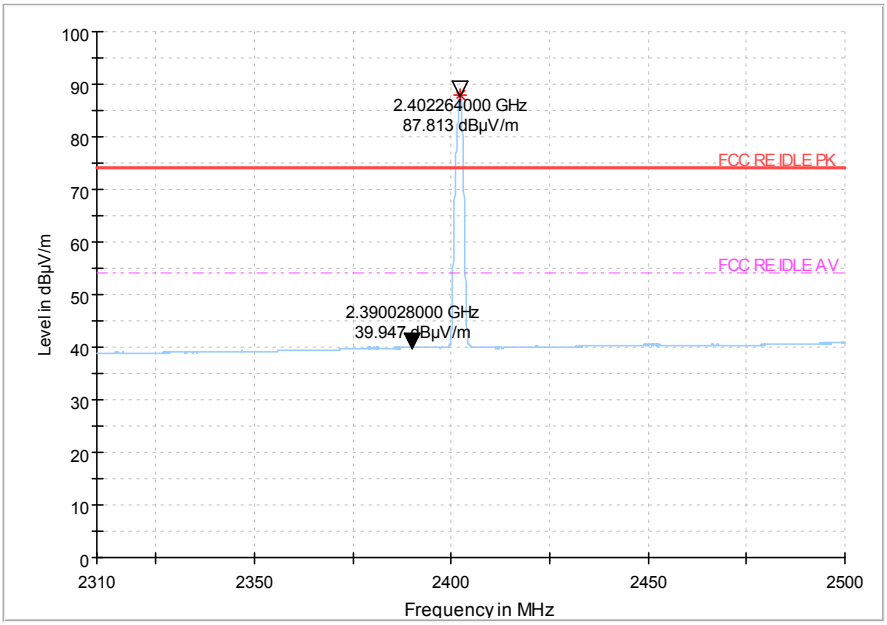
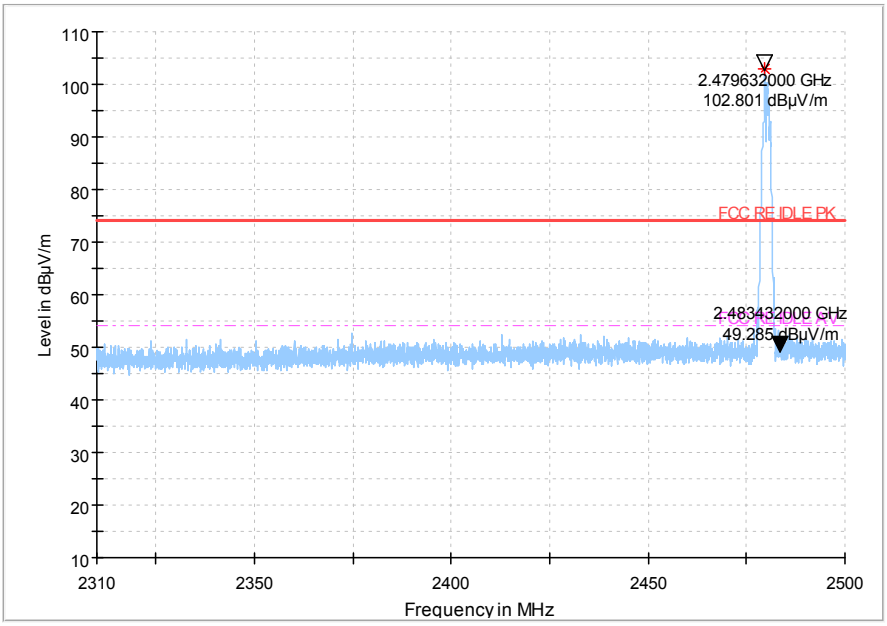



Fig.48 Radiated emission (Power): π/4 DQPSK, low channel



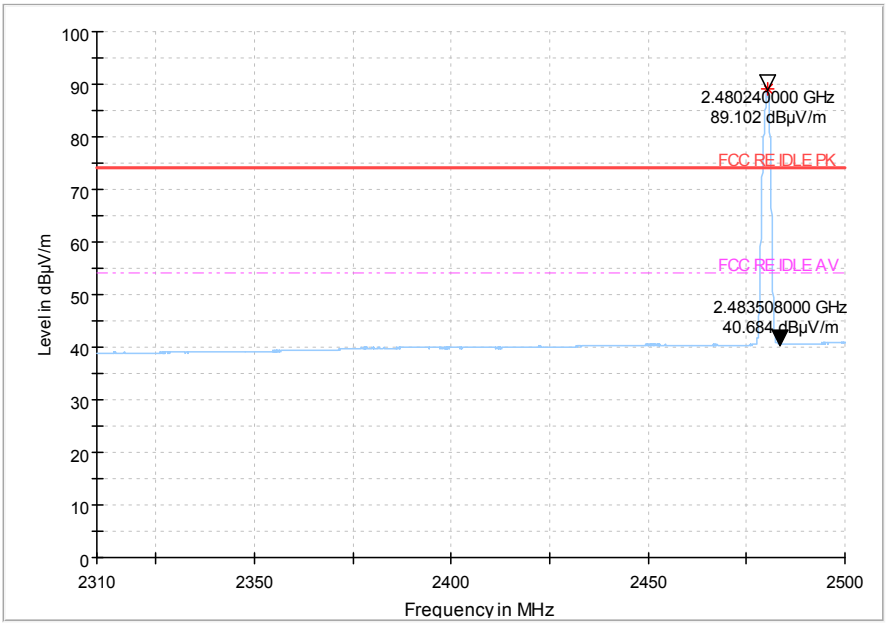



Fig.49 Radiated emission (Power): π/4 DQPSK, high channel

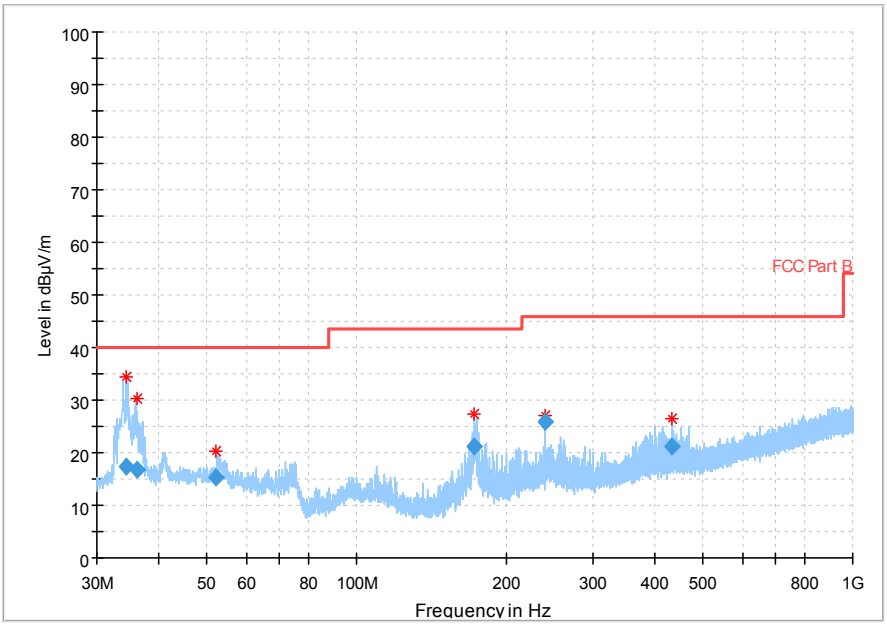



Fig.50 Radiated emission: 8DPSK, Ch0, 30MHz~1GHz

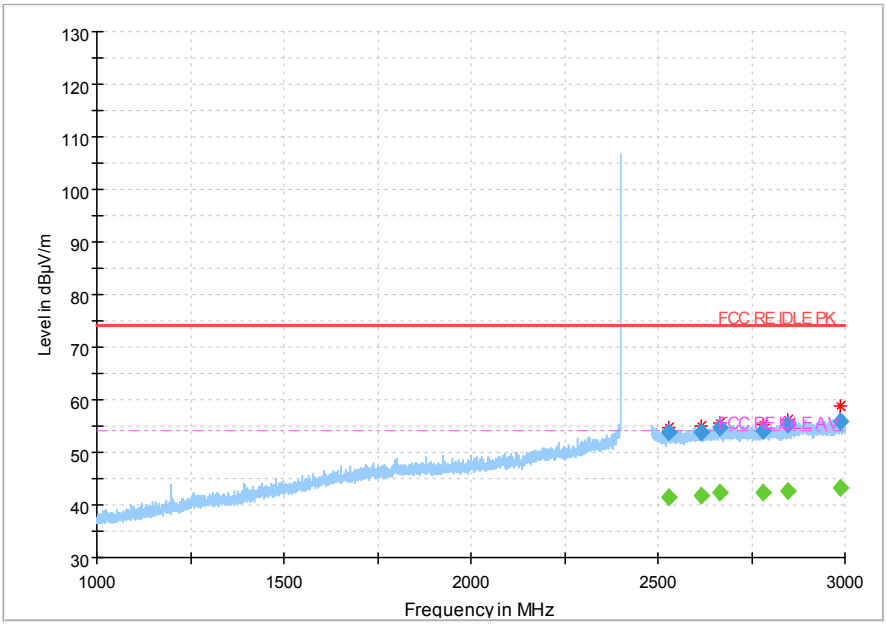



Fig.51 Radiated emission: 8DPSK, Ch0, 1GHz~3GHz

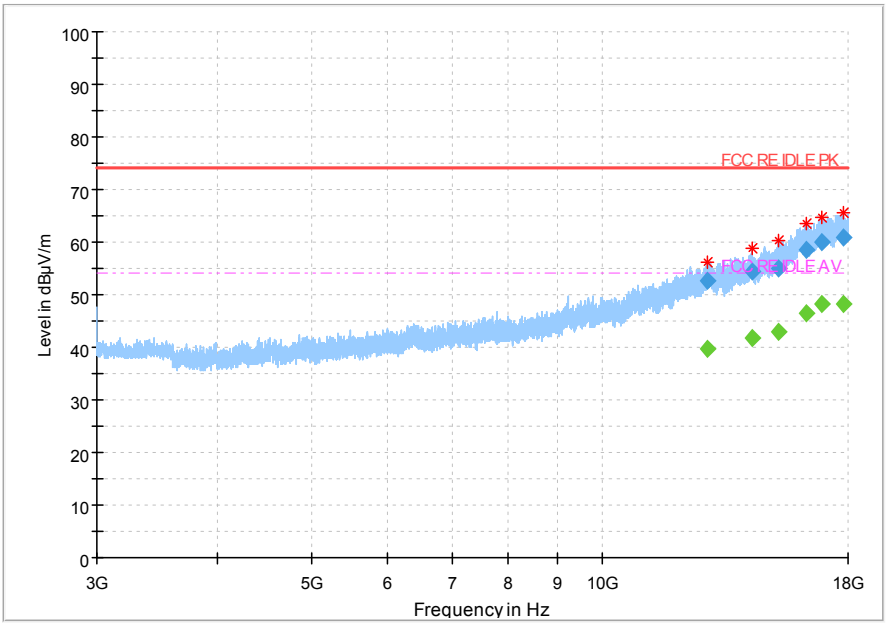
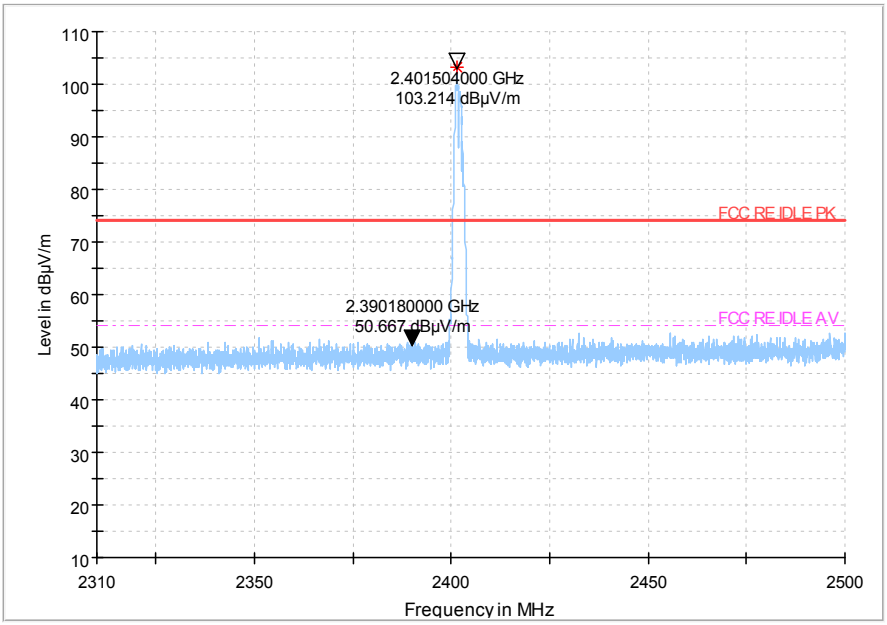



Fig.52 Radiated emission: 8DPSK, Ch0, 3GHz~18GHz



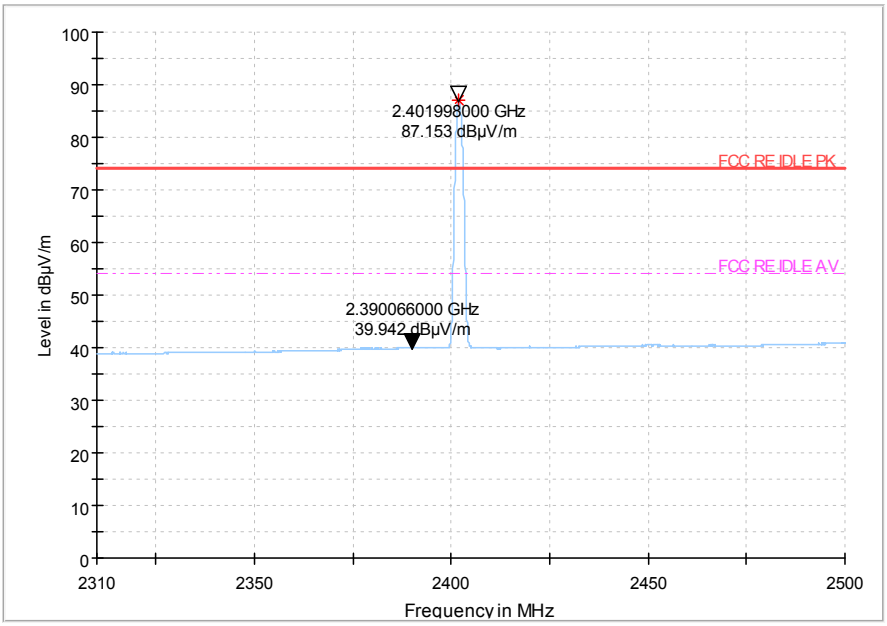
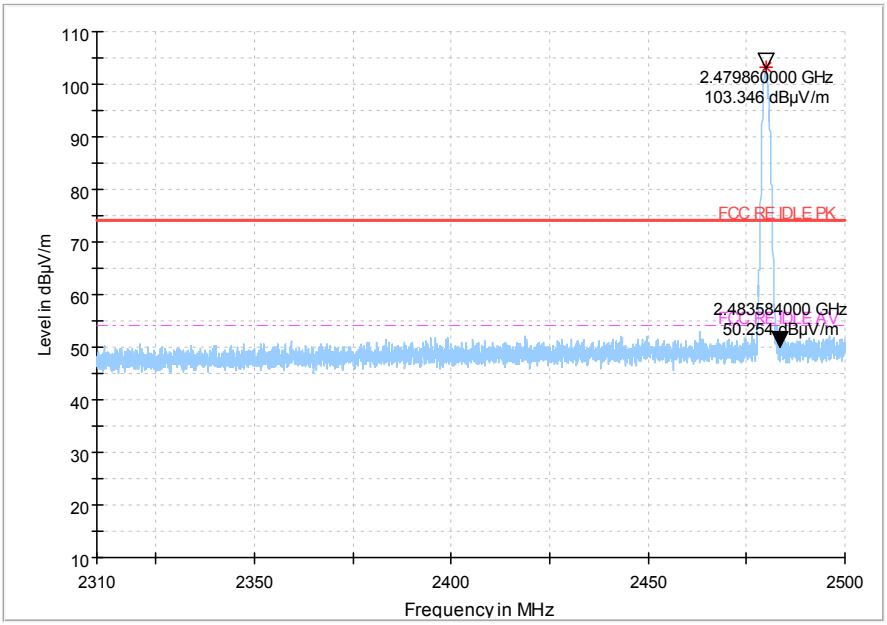




Fig.53 Radiated emission (Power): 8DPSK, low channel



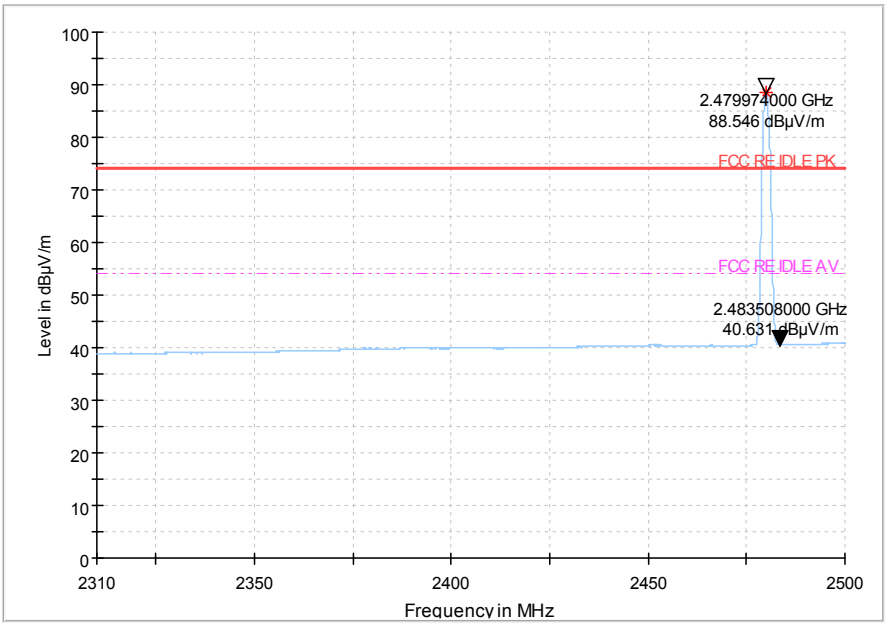
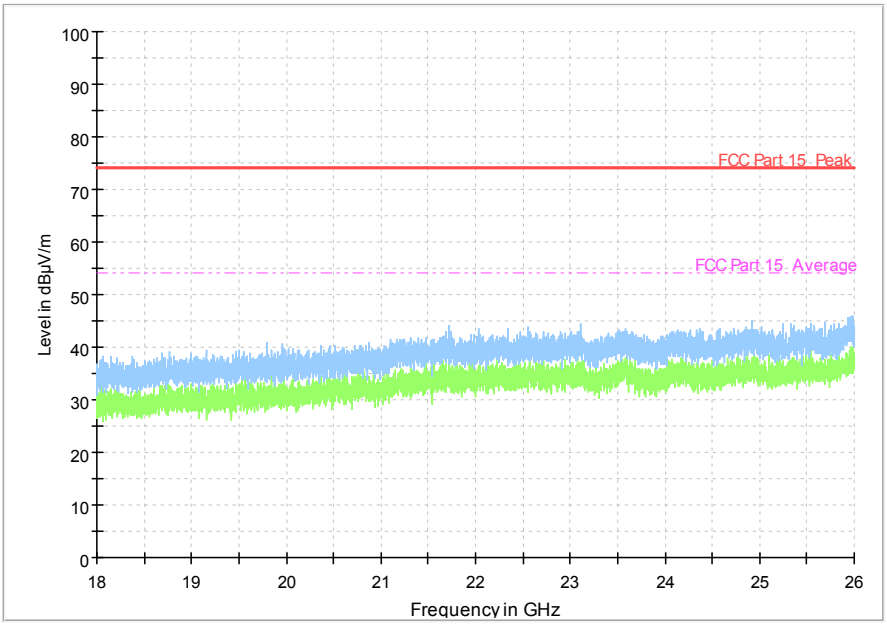




Fig.54 Radiated emission (Power): 8DPSK, high channel




ALL Channel 18GHz~26GHz

## 6.5. Time Of Occupancy (Dwell Time)

### 6.5.1 Measurement Limit:

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

### 6.5.2 Test procedures

The measurement is according to ANSI C63.10 clause 7.8.4

1. Connect the EUT through cable and divide with CBT32 and spectrum analyzer.
2. Enable the EUT transmit maximum power.
3. Set the spectrum analyzer as step 4 to step 8.
4. Span: Zero span, centered on a hopping channel.
5. RBW shall be ≤ channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel.
6. Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to showtwo successive hops on a channel.
7. Detector function: Peak.
8. Trace: Max hold.

9. Use the marker-delta function, and record it.

### 6.5.3 Measurement Result

**For GFSK**

| Channel | Packet | Dwell Time (ms) | | Conclusion |
|---|---|---|---|---|
| 39 | DH1 | Fig.55 | 119.11 | P |
| | | Fig.56 | | |
| | DH3 | Fig.57 | 4.56 | P |
| | | Fig.58 | | |
| | DH5 | Fig.59 | 5.82 | P |
| | | Fig.60 | | |

**For π/4 DQPSK**

| Channel | Packet | Dwell Time (ms) | | Conclusion |
|---|---|---|---|---|
| 39 | 2DH1 | Fig.61 | 17.47 | P |
| | | Fig.62 | | |
| | 2DH3 | Fig.63 | 22.03 | P |
| | | Fig.64 | | |
| | 2DH5 | Fig.65 | 7.34 | P |
| | | Fig.66 | | |

**For 8DPSK**

| Channel | Packet | Dwell Time (ms) | | Conclusion |
|---|---|---|---|---|
| 39 | 3DH1 | Fig.67 | 7.34 | P |
| | | Fig.68 | | |
| | 3DH3 | Fig.69 | 7.6 | P |
| | | Fig.70 | | |
| | 3DH5 | Fig.71 | 10.63 | P |
| | | Fig.72 | | |

**Conclusion: PASS**

**Test graphs as below:**

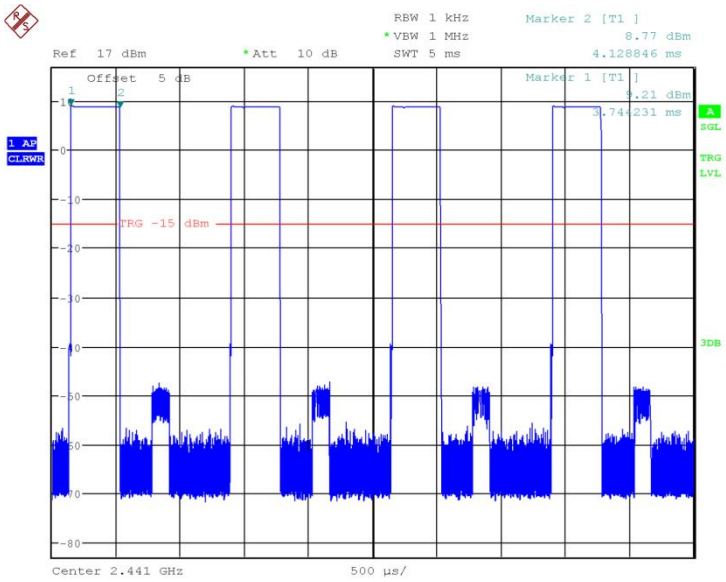



Fig.55 Time of occupancy (Dwell Time): Ch39, Packet DH1

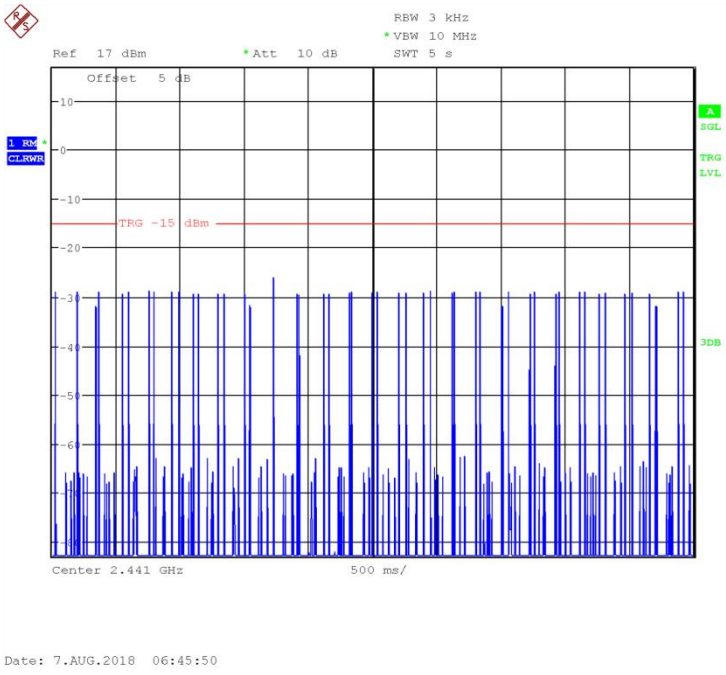



Fig.56 Number of Transmissions Measurement: Ch39, Packet DH1

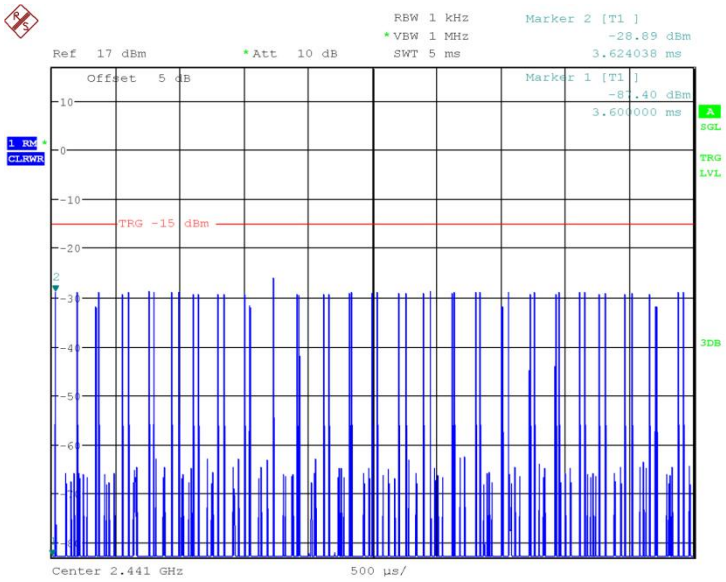



Fig.57 Time of occupancy (Dwell Time): Ch39, Packet DH3

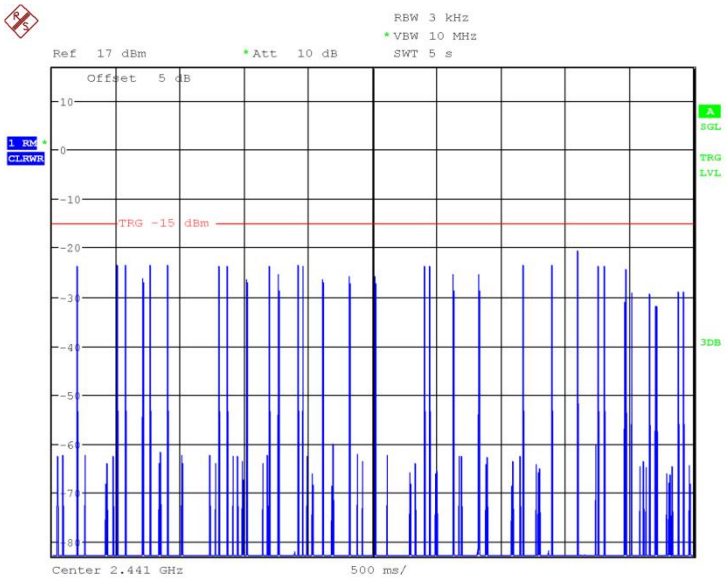



Fig.58 Number of Transmissions Measurement: Ch39, Packet DH3

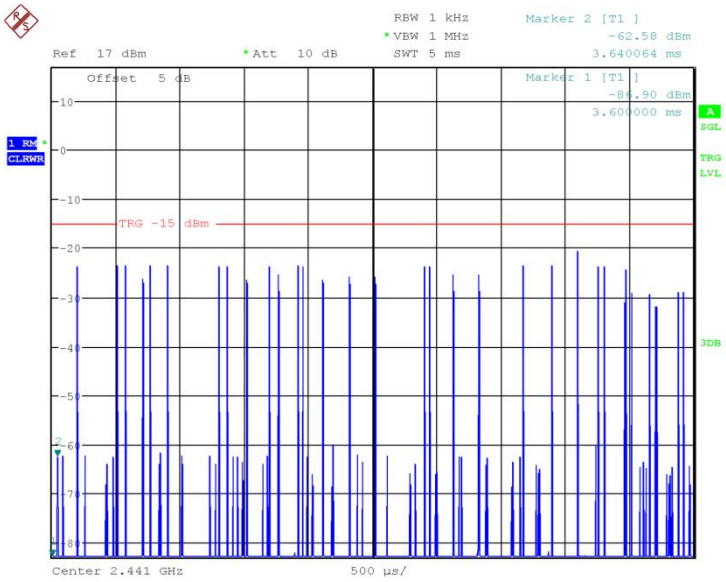



Fig.59 Time of occupancy (Dwell Time): Ch39,Packet DH5

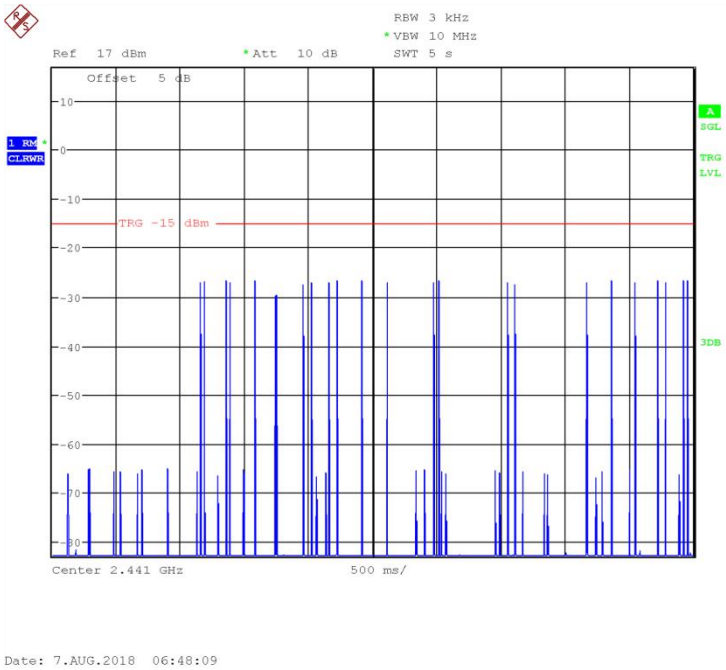



Fig.60 Number of Transmissions Measurement: Ch39, Packet DH5