



***Full***

# **TEST REPORT**

**No. I14D00033-RFB**

***For***

**Client : Moxee Technologies**

**Production : WCDMA/GSM (GPRS) Dual-Mode  
Digital Mobile Phone**

**Model Name : X1**

**FCC ID: 2ADHZ-MOXEEX1**

**Hardware Version: MBV1.0**

**Software Version: MOXEE\_X1\_V1.1**

**Issued date: 2014-11-28**

**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                            |
|---------------|----------|------------|---------------------------------|
| I14D00033-RFB | 00       | 2014-11-28 | Initial creation of test report |

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## 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: | -10/+55℃ |
| Relative Humidity:   | 20-75%   |

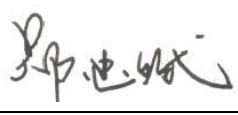
### 1.3. Project data

|                     |            |
|---------------------|------------|
| Project Leader:     | Chen Kan   |
| Testing Start Date: | 2014-10-20 |
| Testing End Date:   | 2014-11-15 |

### 1.4. Signature

  
Wang Daming  
(Prepared this test report)

  
Liu Jianquan  
(Reviewed this test report)

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

## **2. Client Information**

### **2.1. Applicant Information**

Company Name: Moxee Technologies  
Address: 10900 NE 8<sup>th</sup> Street, #1000 washtington America  
Contact Person: Joe Phillips  
Telephone: 425-890-7897  
Postcode: 98004

### **2.2. Manufacturer Information**

Company Name: Moxee Technologies  
Address: 10900 NE 8<sup>th</sup> Street, #1000 washtington America  
Contact Person: Joe Phillips  
Telephone: 425-890-7897  
Postcode: 98004

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

#### 3.1. About EUT

|                      |   |
|----------------------|---|
| EUT Description      | WCDMA/GSM (GPRS) Dual-Mode Digital Mobile Phone |
| Model name           | X1  |
| Bluetooth Frequency  | 2402MHz-2480MHz                                 |
| Bluetooth Channel    | Channel0-Channel78                              |
| Bluetooth Modulation | GMSK; $\pi/4$ DQPSK;8DPSK                       |
| Extreme Temperature  | N/A   |
| Nominal Voltage      | 3.8V  |
| 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* | SN or IMEI      | HW Version | SW Version        | Date of receipt |
|---------|-----------------|------------|-------------------|-----------------|
| N02     | 862240021000672 | MBV1.0     | MOXEE_X1_V1.<br>1 | 2014-10-20      |

\*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, 2400-2483.5MHz, and 5725-5850MHz. | 2014    |
| ANSI 63.10 | Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9KHz to 40GHz  | 2009    |



## 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(a)             | /                | P       |
| Peak Power Spectral Density             | 15.247(d)             | /                | P       |
| Occupied 6dB Bandwidth                  | 15.247(d)             | /                | P       |
| Band Edges Compliance                   | 15.247(b)             | /                | 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 63.10.

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°C    |
| Voltage      | Vnom | 3.7V    |
| Humidity     | Hnom | 46%     |
| Air Pressure | Anom | 1010hPa |

**Note:**

- All the test data for each data were verified, but only the worst case was reported.
- The GFSK,  $\pi/4$  DQPSK and 8DPSK were set in DH1 for GFSK, 2-DH1 for  $\pi/4$  DQPSK, 3-DH1 for 8DPSK.
- The DC and low frequency voltages' measurement uncertainty is  $\pm 2\%$ .

**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.

The following deviation from, additions to, or exclusions from the test specifications have been made. See section 3.

**5.2. Statements**

The product name X1, supporting GSM/GPRS /WCDMA/HSDPA/HSUPA/ /BT/WLAN, manufactured by Shanghai Wind Communication Technologies Co.,Ltd. is a new product for testing.

Note: All tests were carried out while using a fully battery charged.

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

#### Measurement Limit

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

The measurement is according to ANSI 63.10.

#### Test Condition:

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

#### Measurement Results:

##### For GFSK

| Channel                           | Ch0 2402 MHz | Ch39 2441 MHz | CH78 2480 MHz | Conclusion |
|-----------------------------------|--------------|---------------|---------------|------------|
| Peak Conducted Output Power (dBm) | 5.312        | 5.755         | 5.953         | P          |
|                                   | Fig.1        | Fig.2         | Fig.3         |            |

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

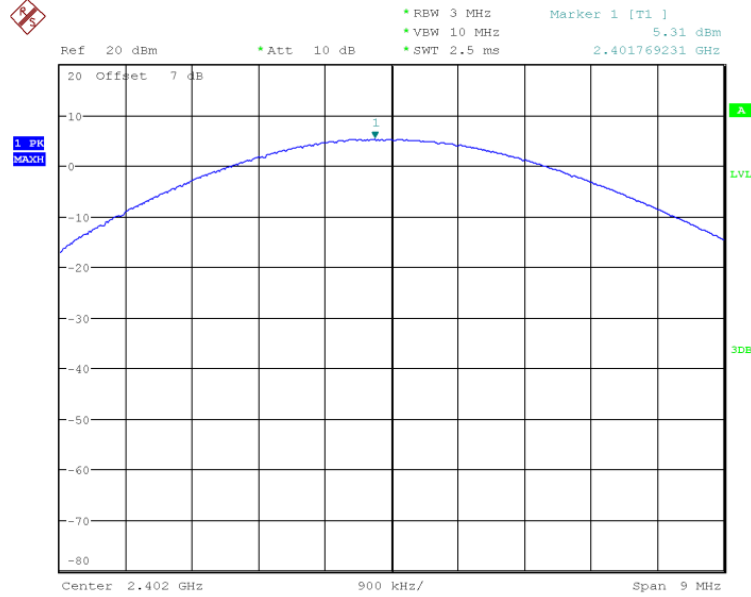
| Channel                           | Ch0 2402 MHz | Ch39 2441 MHz | CH78 2480 MHz | Conclusion |
|-----------------------------------|--------------|---------------|---------------|------------|
| Peak Conducted Output Power (dBm) | 4.618        | 4.976         | 5.037         | P          |
|                                   | Fig.4        | Fig.5         | Fig.6         |            |

##### For 8DPSK

| Channel                           | Ch0 2402 MHz | Ch39 2441 MHz | CH78 2480 MHz | Conclusion |
|-----------------------------------|--------------|---------------|---------------|------------|
| Peak Conducted Output Power (dBm) | 4.625        | 4.984         | 5.053         | P          |
|                                   | Fig.7        | Fig.8         | Fig.9         |            |

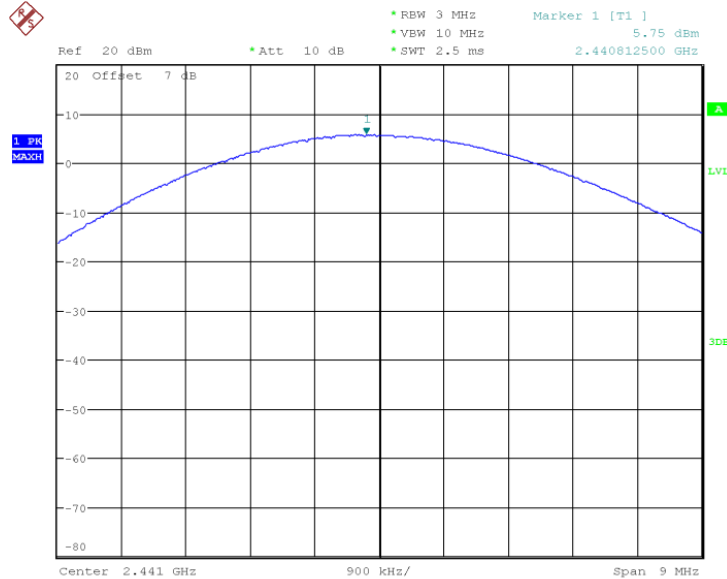
**Conclusion: PASS**

Test graphs an below



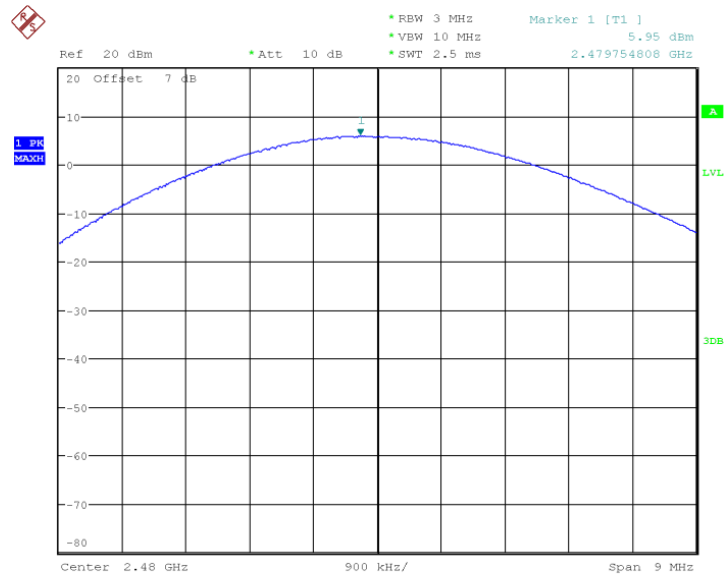
Date: 28.OCT.2014 17:08:40

Fig.1 Peak Conducted Output Power CH0, DH1



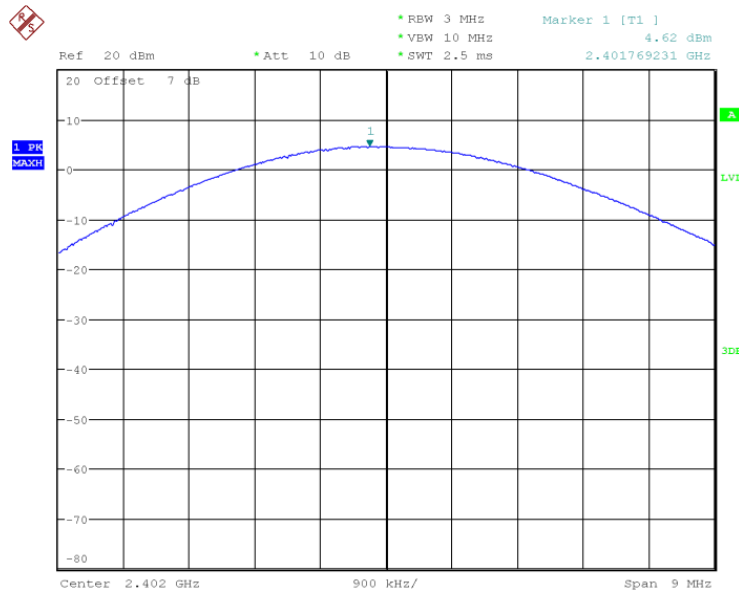
Date: 28.OCT.2014 17:08:53

Fig.2 Peak Conducted Output Power CH39, DH1



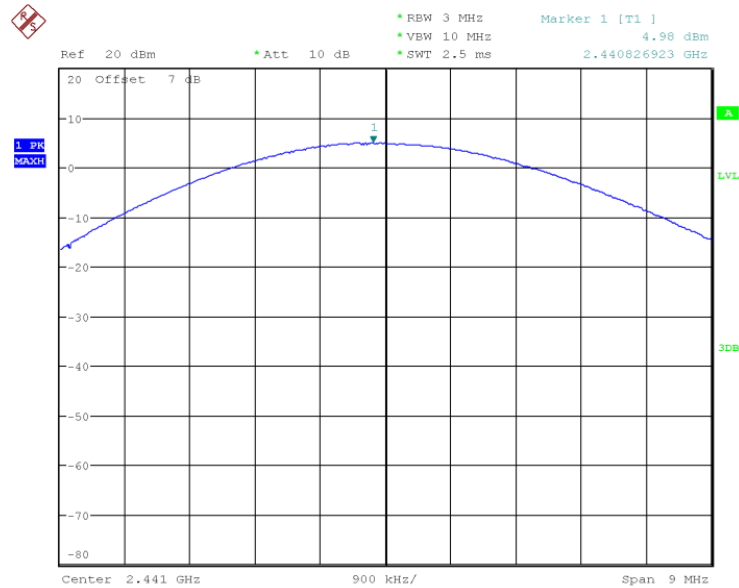
Date: 28.OCT.2014 17:09:05

Fig.3 Peak Conducted Output Power CH78, DH1



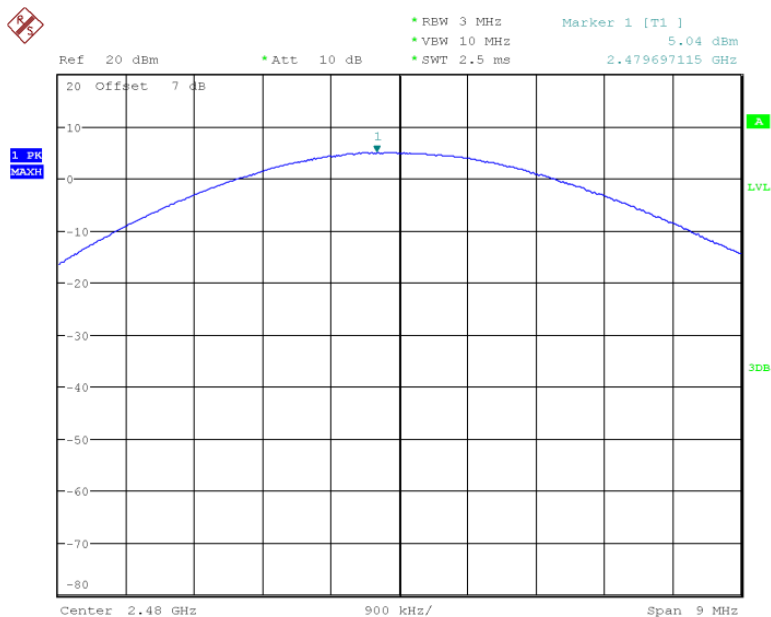
Date: 28.OCT.2014 17:09:17

Fig.4 Peak Conducted Output Power CH0, 2DH1



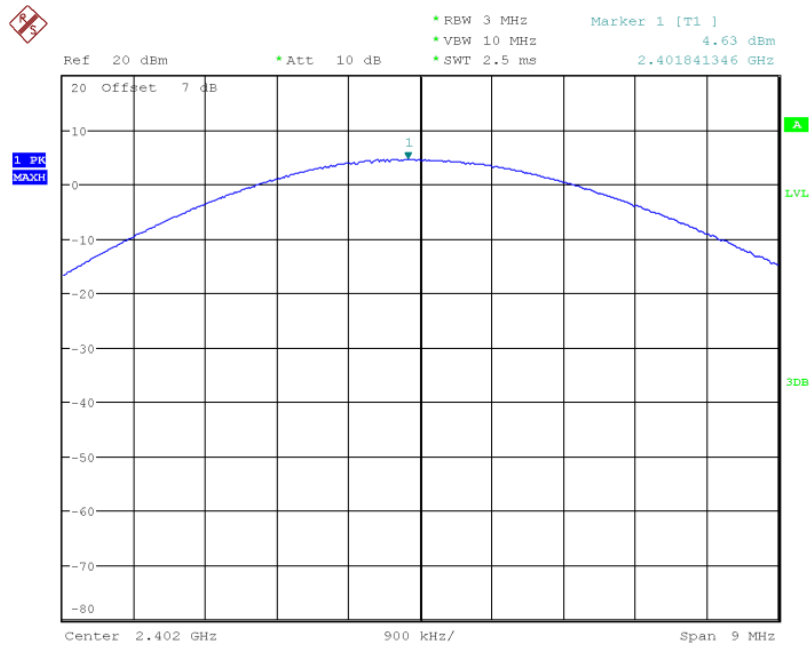
Date: 28.OCT.2014 17:09:29

Fig.5 Peak Conducted Output Power CH39, 2DH1



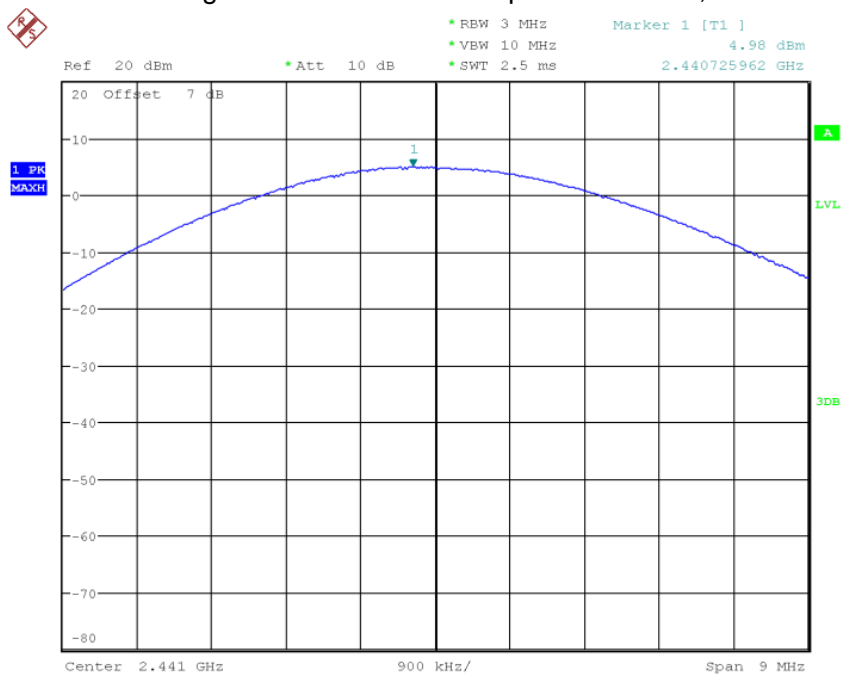
Date: 28.OCT.2014 17:09:41

Fig.6 Peak Conducted Output Power CH78, 2DH1



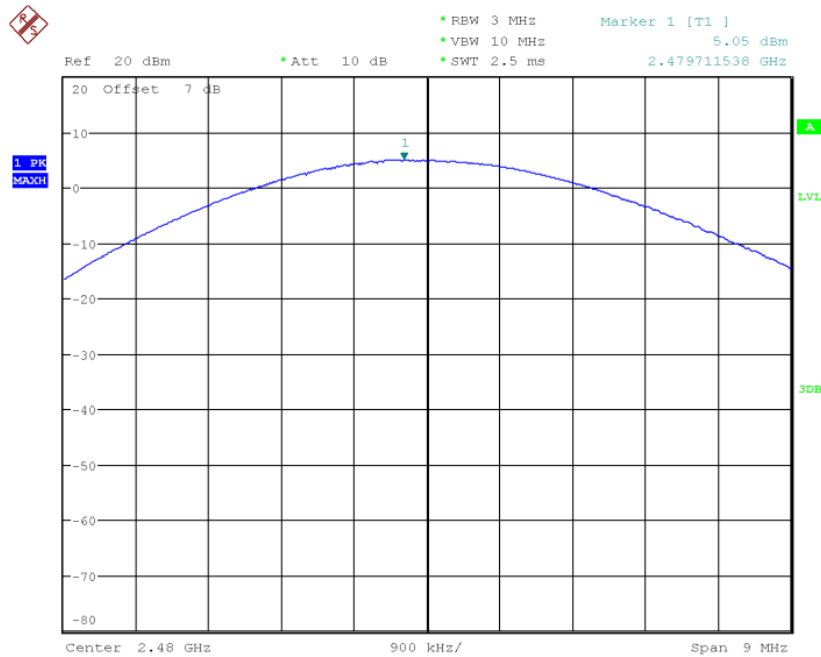
Date: 28.OCT.2014 17:09:53

Fig.7 Peak Conducted Output Power CH0, 3DH1



Date: 28.OCT.2014 17:10:05

Fig.8 Peak Conducted Output Power CH39, 3DH1



Date: 28.OCT.2014 17:10:18

Fig.9 Peak Conducted Output Power CH78, 3DH1

## 6.2. Frequency Band Edges-Conducted

### Measurement Limit:

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

### Test procedures:

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

### 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 $\pi/4$ DQPSK



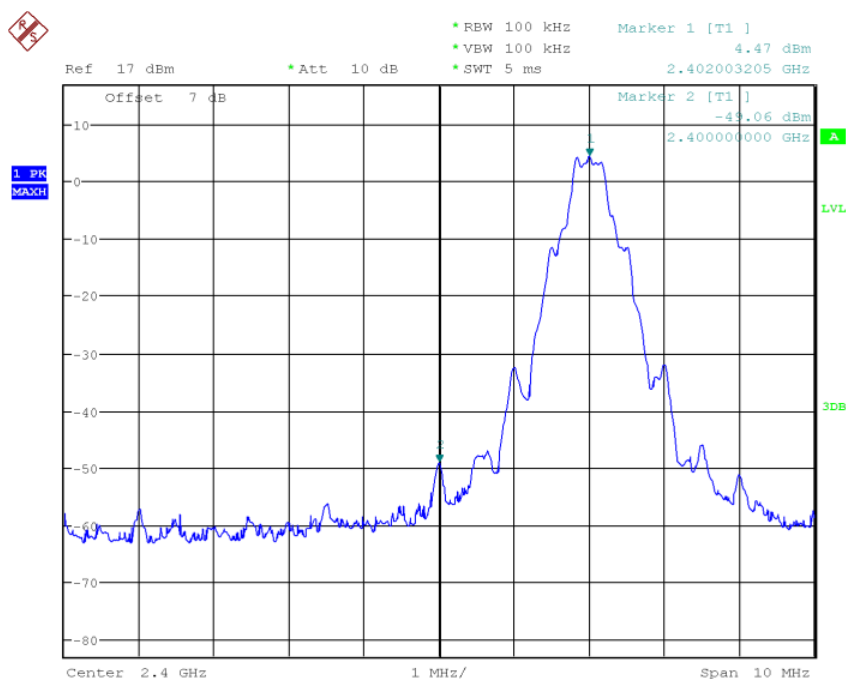
| Channel | Hopping     | Band Edge Power (dBc) | Conclusion |
|---------|-------------|-----------------------|------------|
| 0       | Hopping OFF | Fig.14                | P          |
|         | Hopping ON  | Fig.15                | P          |
| 78      | Hopping OFF | Fig.16                |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

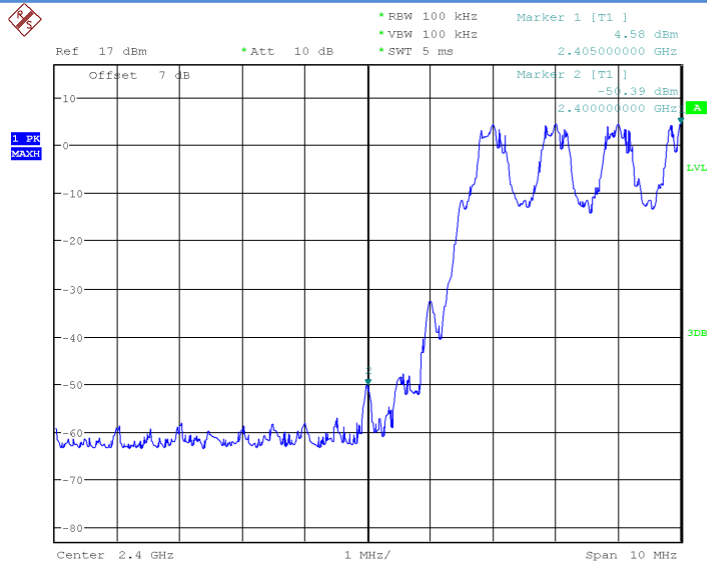
**Conclusion: PASS**

Test graphs an below



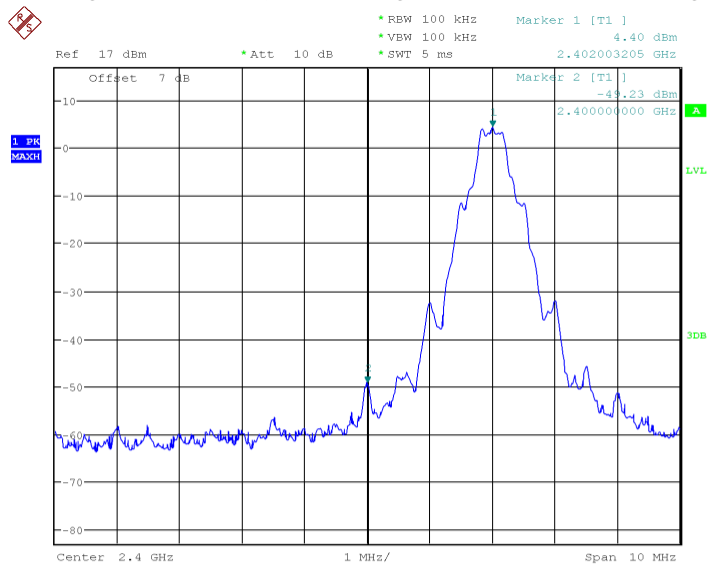
Date: 28.OCT.2014 17:11:24

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



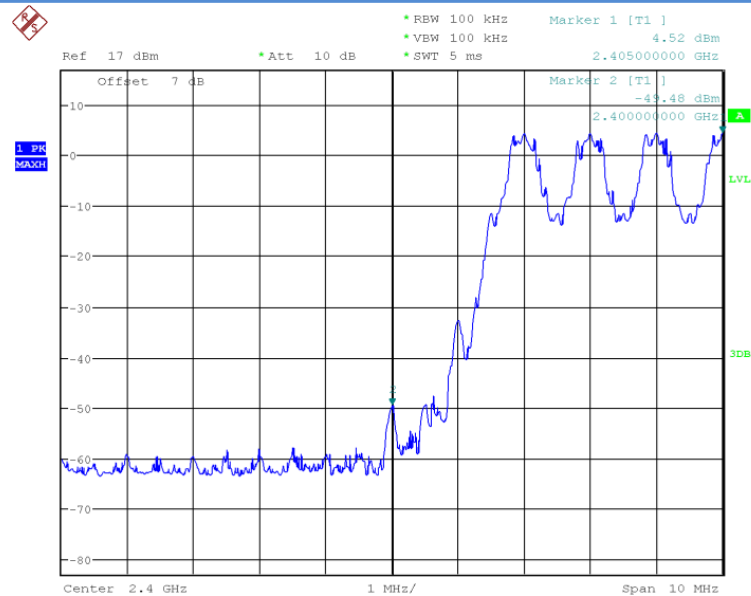
Date: 28.OCT.2014 17:13:29

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



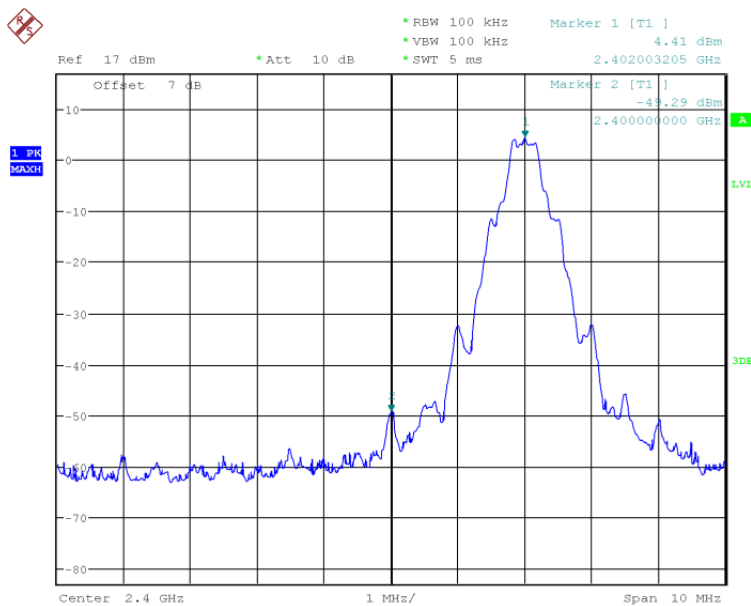
Date: 28.OCT.2014 17:14:03

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



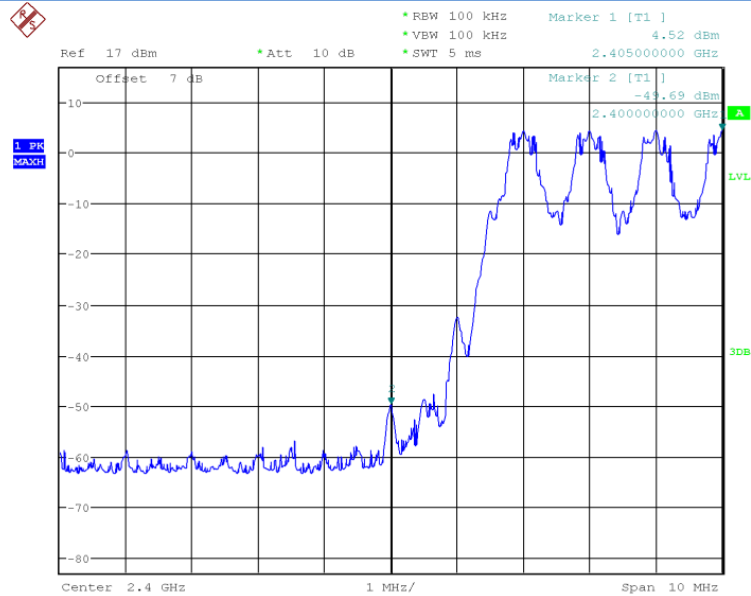
Date: 28.OCT.2014 17:16:08

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



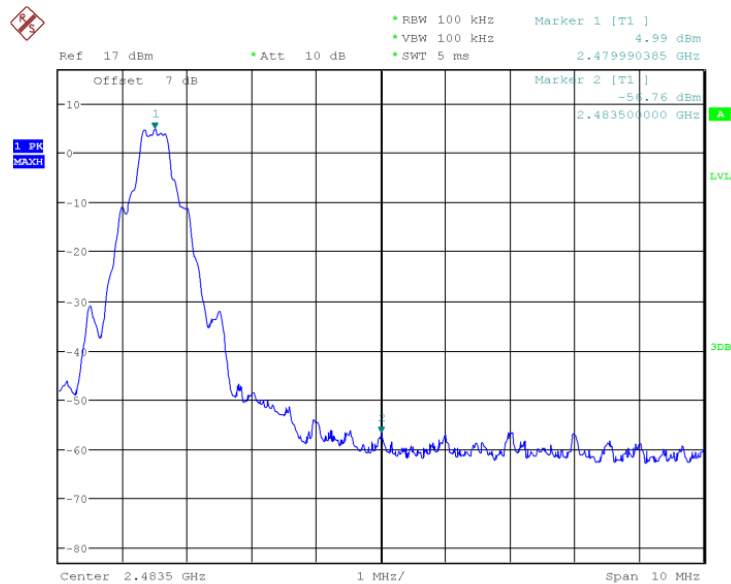
Date: 28.OCT.2014 17:16:42

Fig.14 Frequency Band Edge:  $\pi/4$  DQPSK, Ch0, Hopping OFF



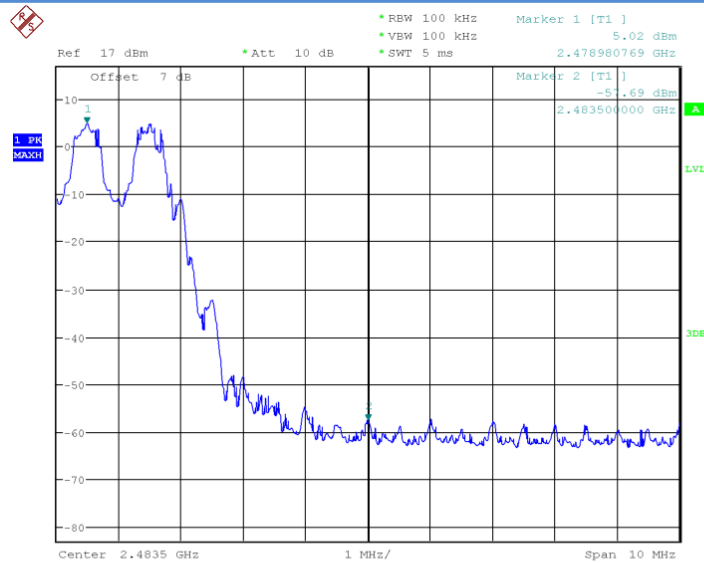
Date: 28.OCT.2014 17:18:47

Fig.15 Frequency Band Edge:  $\pi/4$  DQPSK, Ch0, Hopping ON



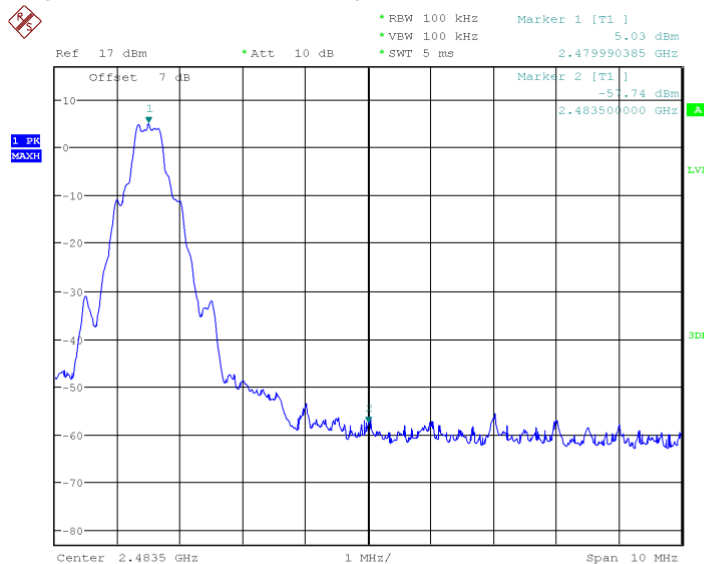
Date: 28.OCT.2014 17:19:22

Fig.16 Frequency Band Edge:  $\pi/4$  DQPSK, Ch78, Hopping OFF



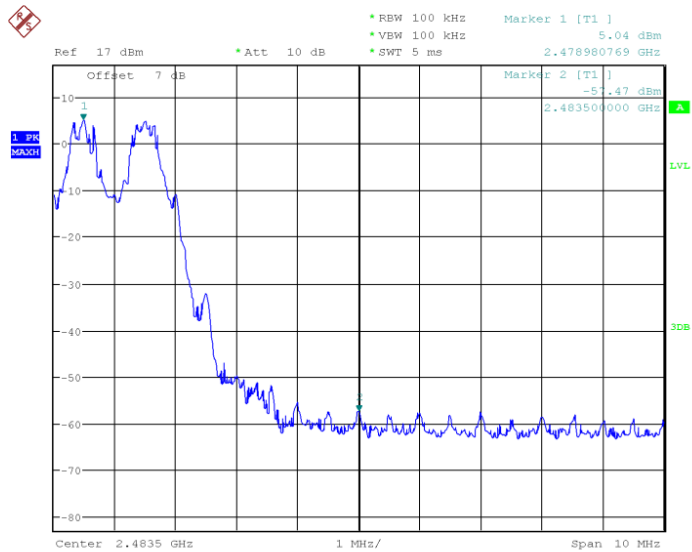
Date: 28.OCT.2014 17:21:27

Fig.17 Frequency Band Edge:  $\pi/4$  DQPSK, Ch78, Hopping ON



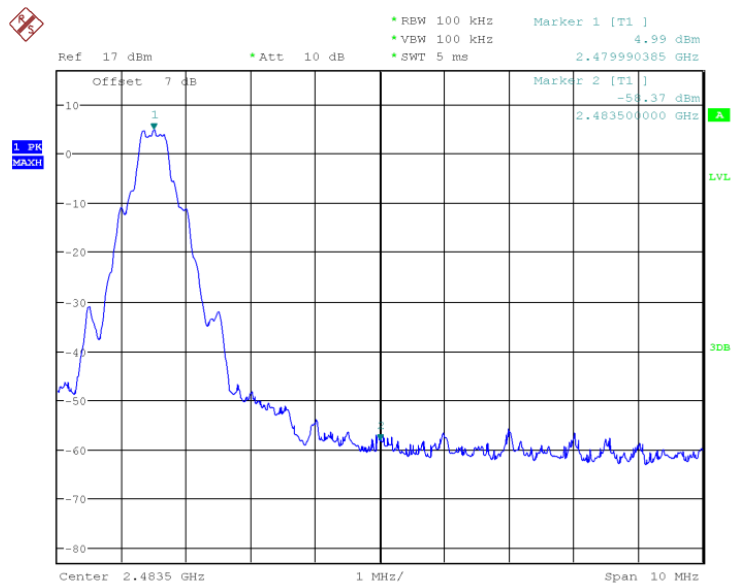
Date: 28.OCT.2014 17:22:02

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



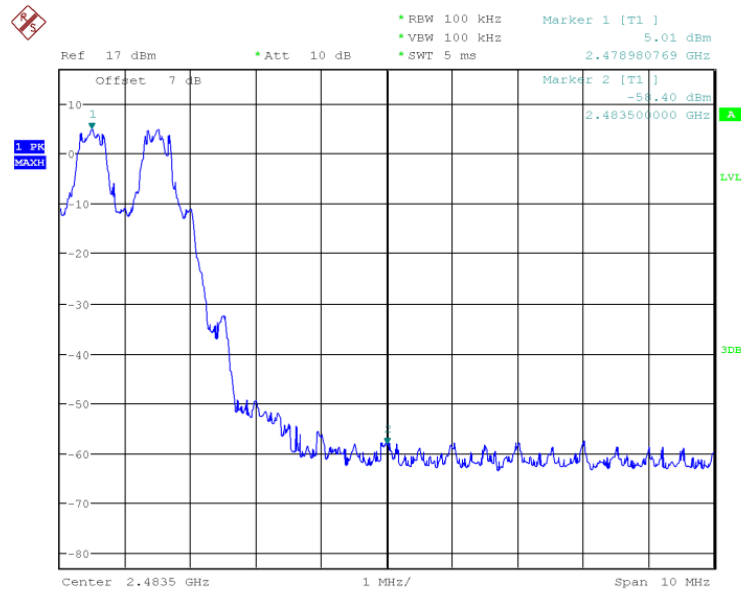
Date: 28.OCT.2014 17:24:06

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



Date: 28.OCT.2014 17:24:41

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



Date: 28.OCT.2014 17:26:46

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

## 6.3. Conducted Emission

### Measurement Limit:

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

The measurement is according to ANSI 63.10

### Test procedures:

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

### Measurement Results:

For GFSK

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  $\pi/4$  DQPSK**

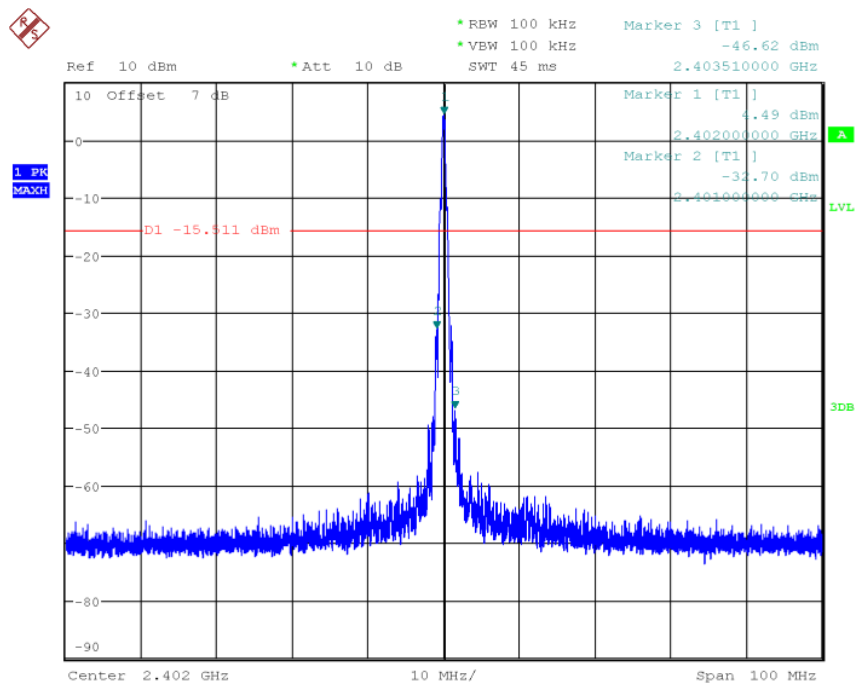
| Channel             | Frequency Range | Test Results | Conclusion |
|---------------------|-----------------|--------------|------------|
| <b>Ch0 2402MHz</b>  | Center Freq.    | Fig.28       | P          |
|                     | 30MHz~26GHz     | Fig.29       | P          |
| <b>Ch39 2441MHz</b>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

**For 8DPSK**

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

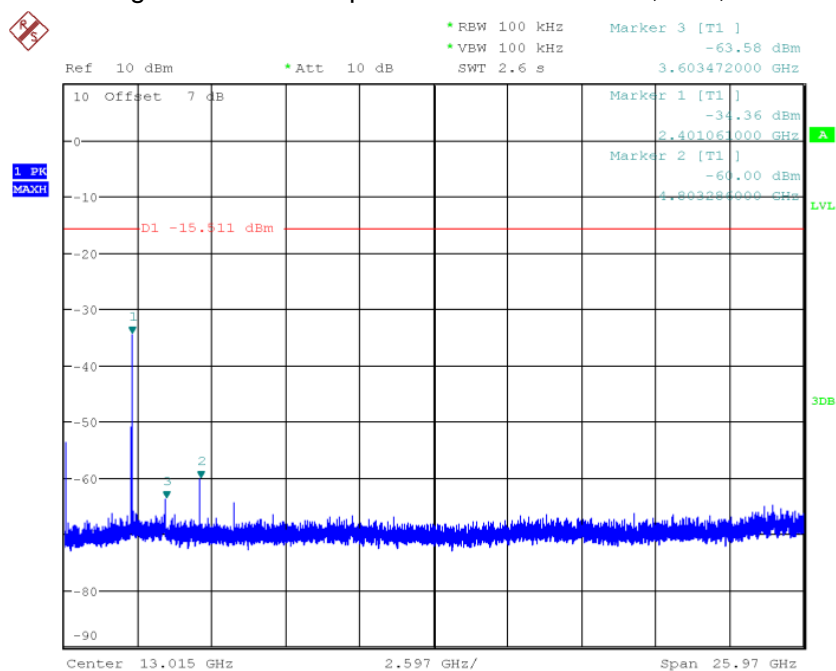
**Conclusion: PASS**
**Test graphs as below**





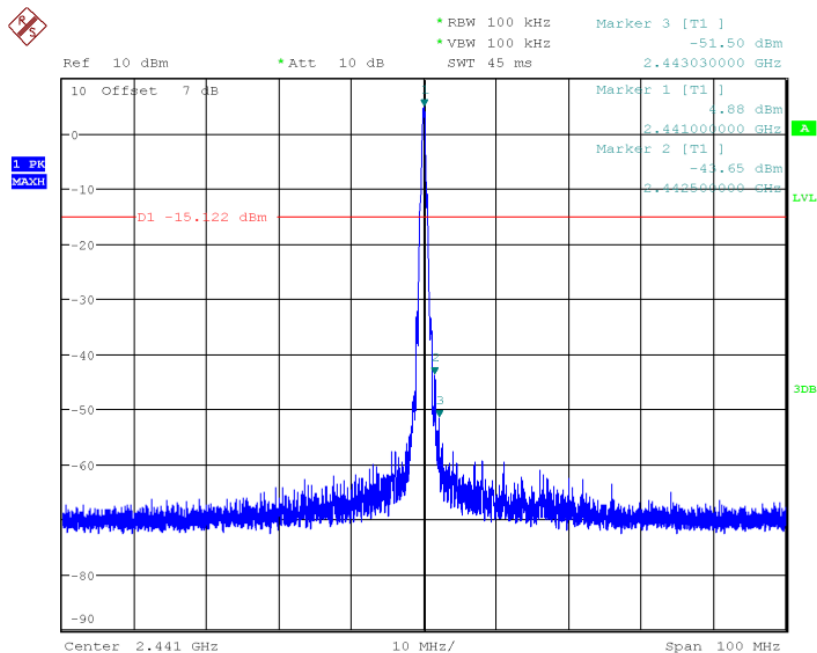
Date: 28.OCT.2014 17:27:38

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



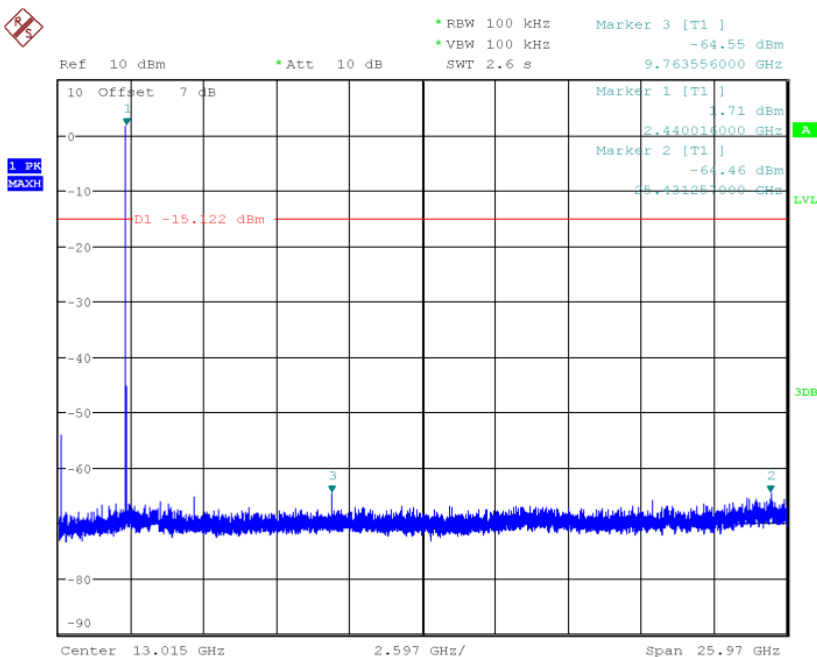
Date: 28.OCT.2014 17:28:01

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



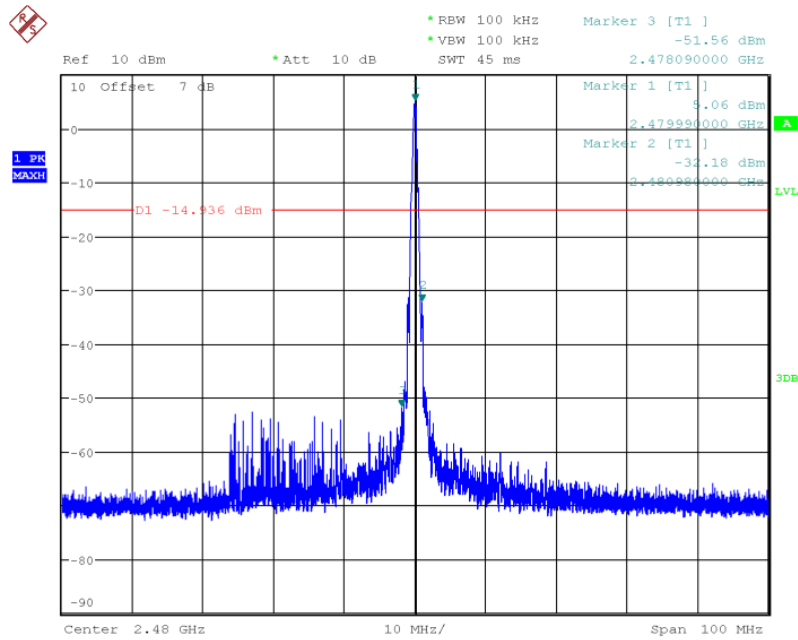
Date: 28.OCT.2014 17:28:25

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



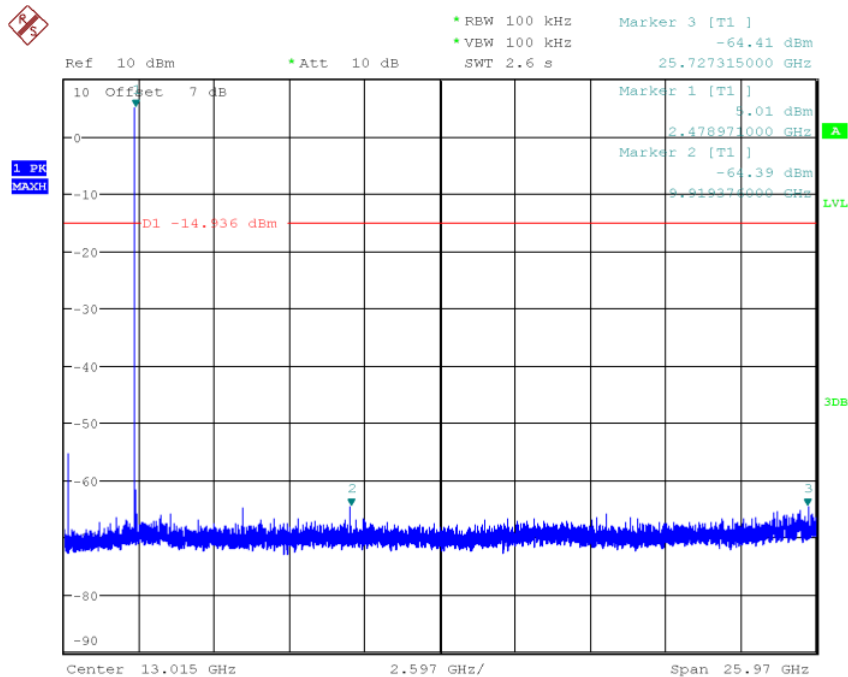
Date: 28.OCT.2014 17:28:48

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



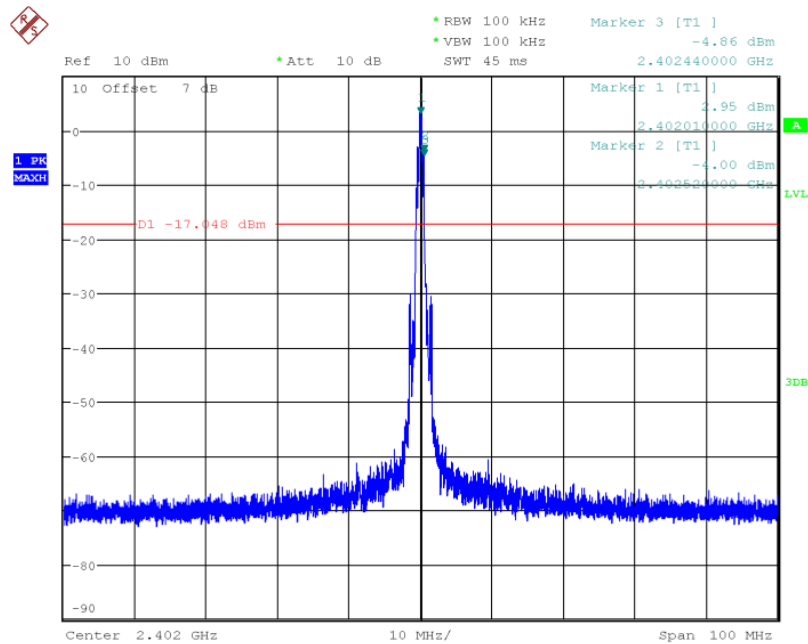
Date: 28.OCT.2014 17:29:12

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



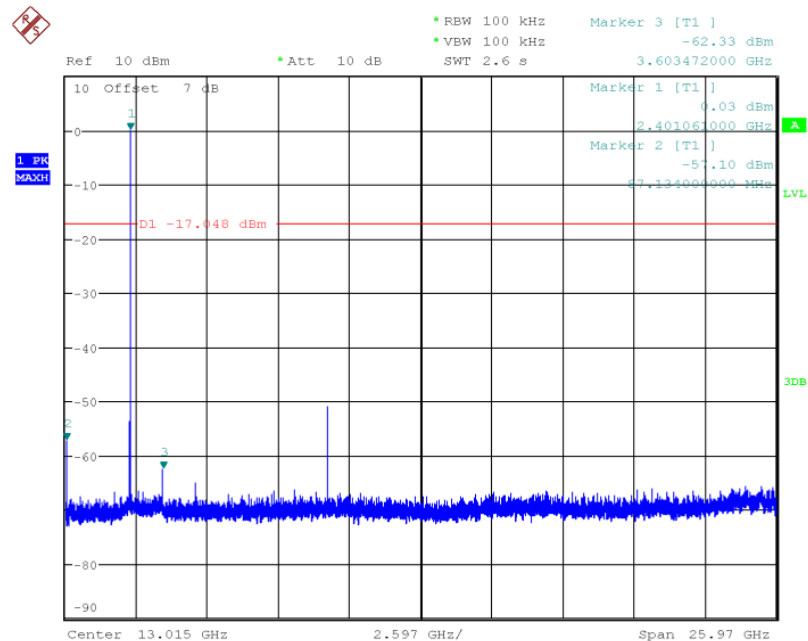
Date: 28.OCT.2014 17:29:35

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



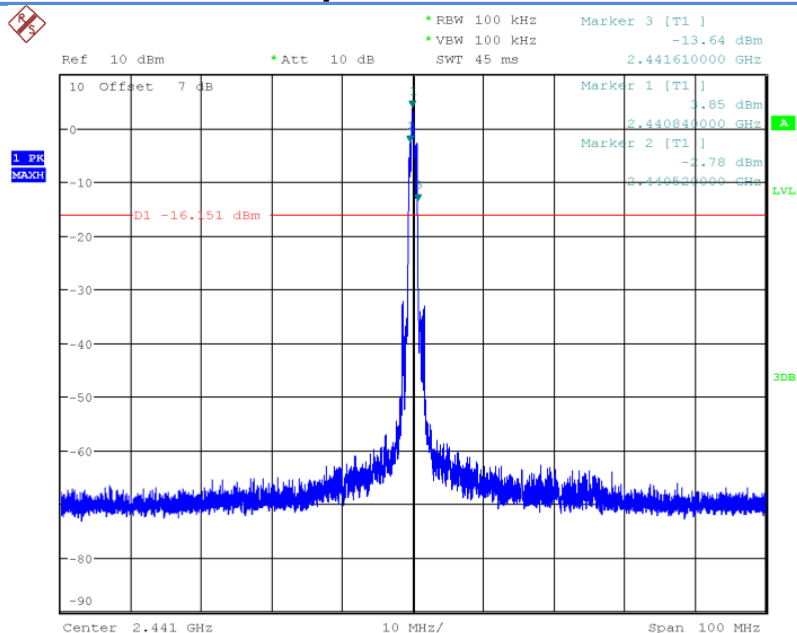
Date: 28.OCT.2014 17:30:00

Fig.28 Conducted spurious emission:  $\pi/4$  DQPSK, Ch0, 2402MHz



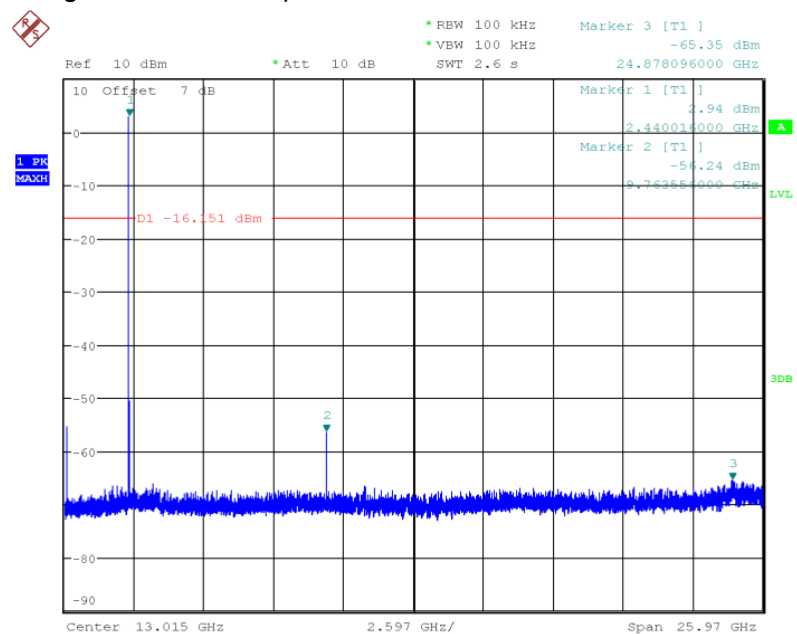
Date: 28.OCT.2014 17:30:23

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



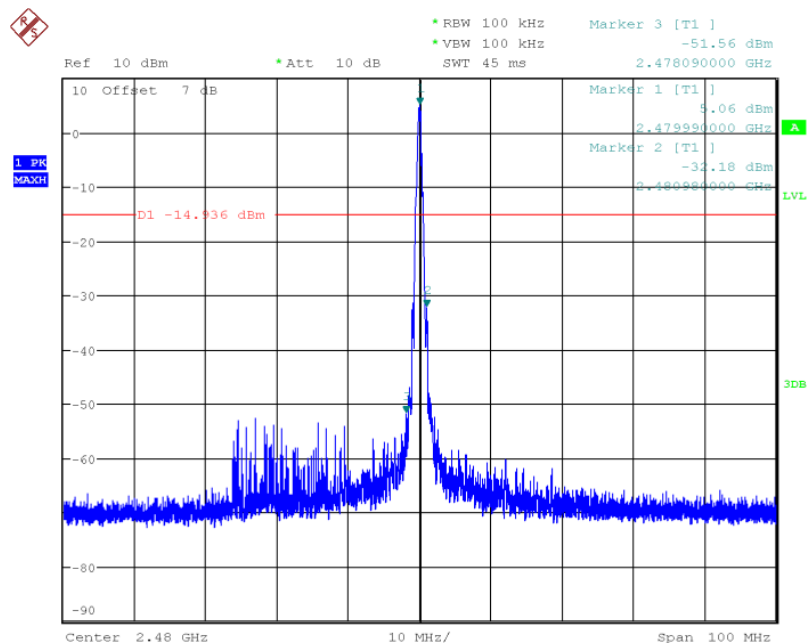
Date: 28.OCT.2014 17:30:48

Fig.30 Conducted spurious emission:  $\pi/4$  DQPSK, Ch39, 2441MHz



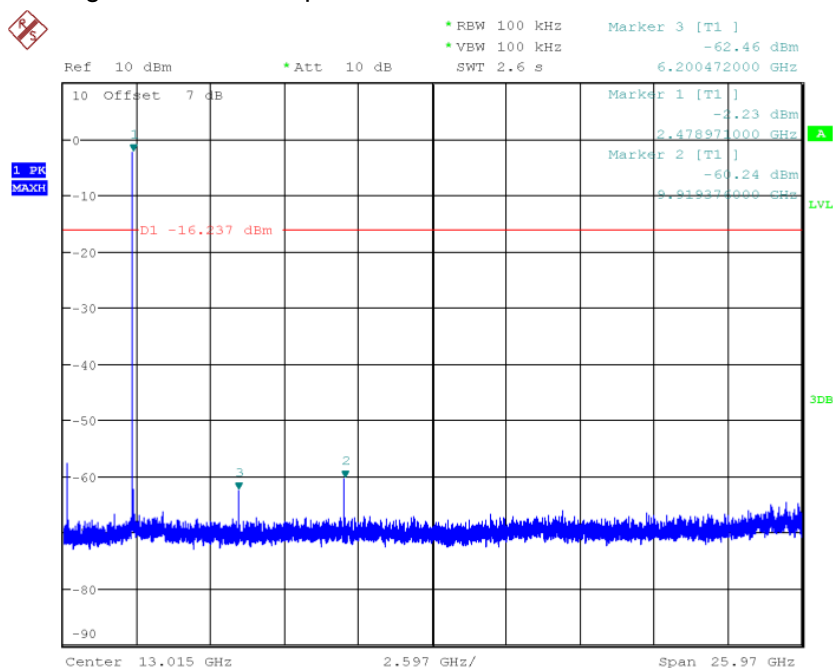
Date: 28.OCT.2014 17:31:11

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



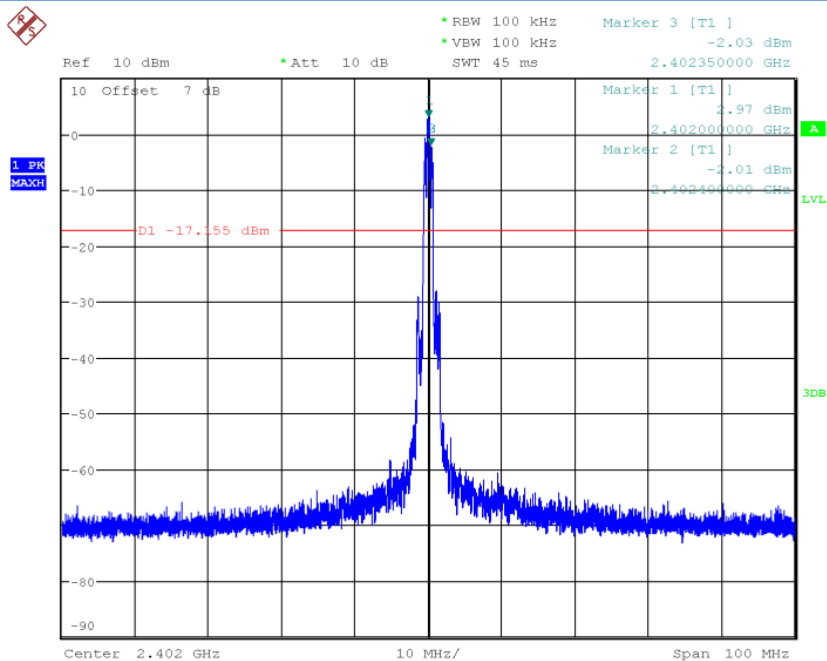
Date: 28.OCT.2014 17:29:12

Fig.32 Conducted spurious emission:  $\pi/4$  DQPSK, Ch78, 2480MHz



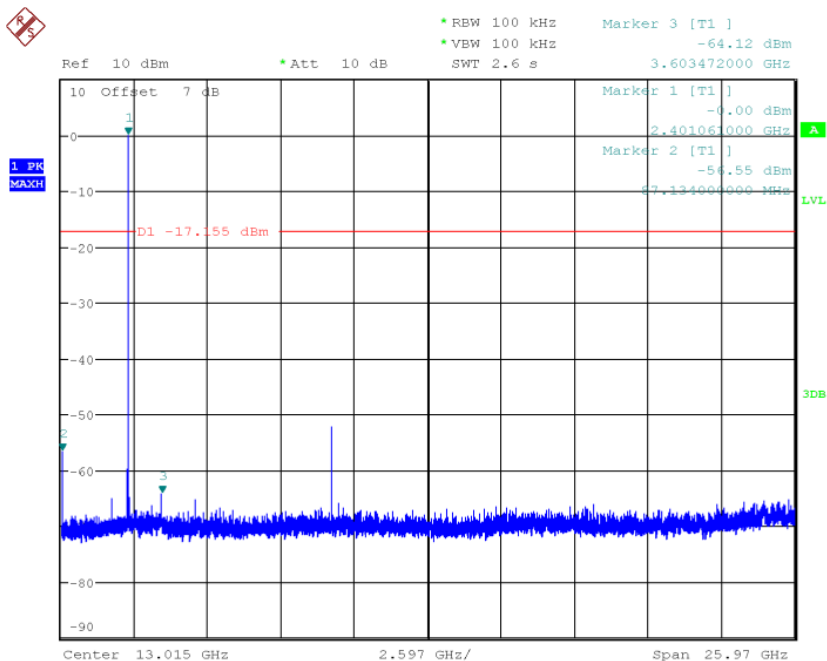
Date: 28.OCT.2014 17:31:59

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



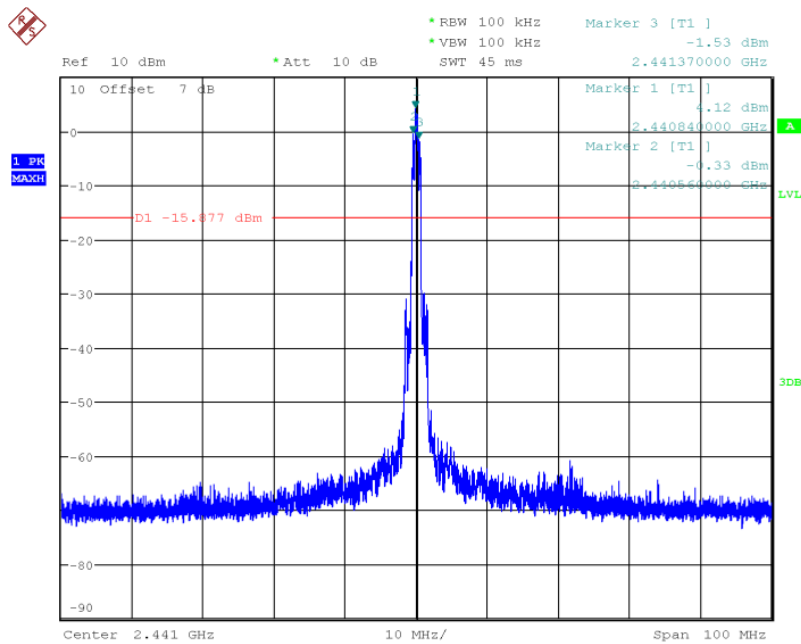
Date: 28.OCT.2014 17:32:24

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



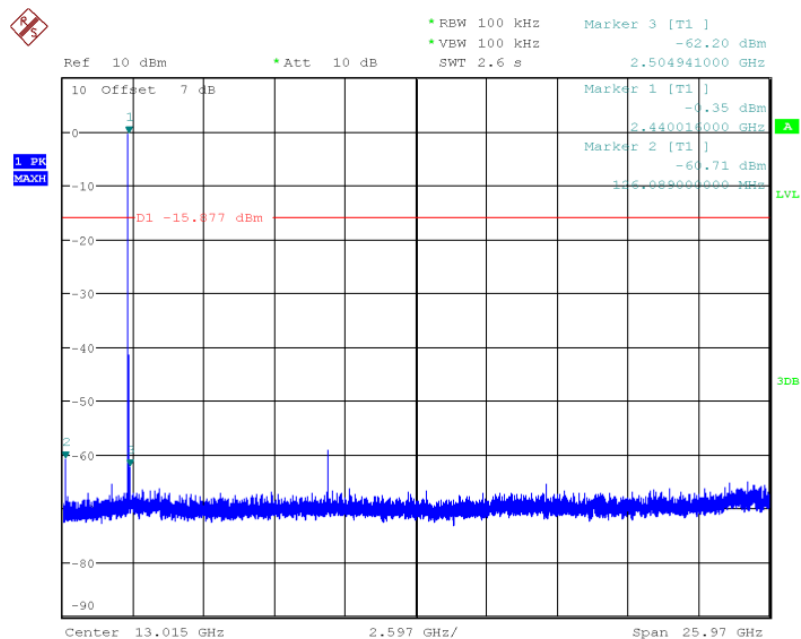
Date: 28.OCT.2014 17:32:47

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



Date: 28.OCT.2014 17:33:12

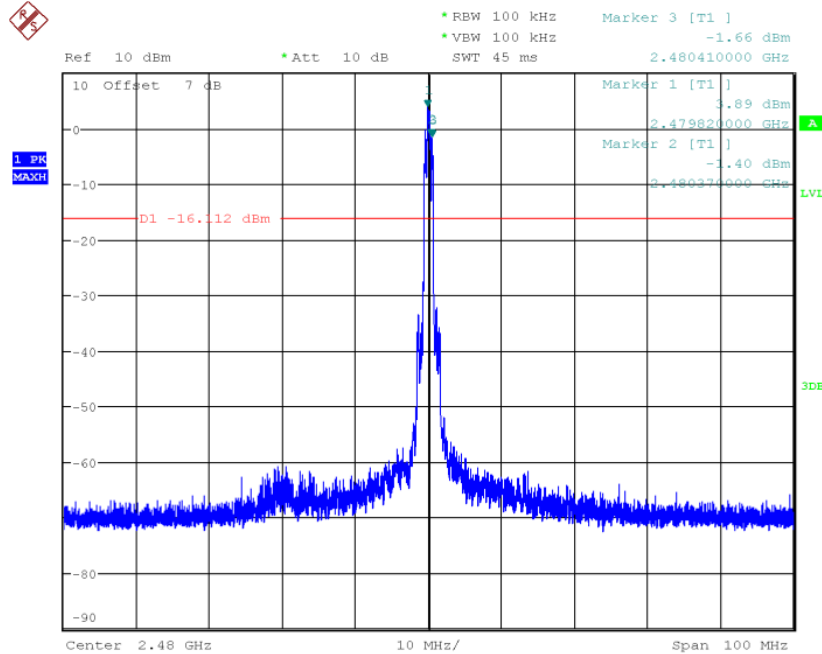
Fig.36 Conducted spurious emission: 8DPSK, Ch39, 2441MHz



Date: 28.OCT.2014 17:33:35

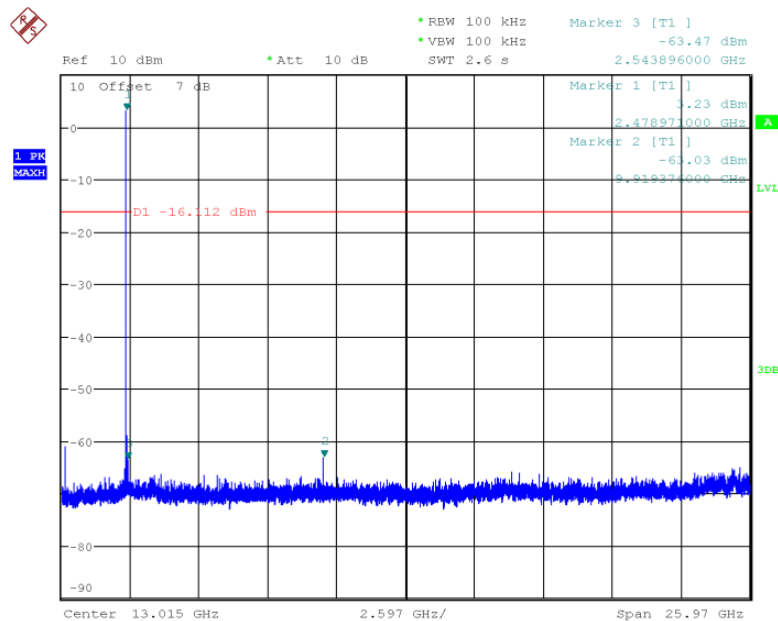
Fig.37 Conducted spurious emission: 8DPSK, Ch39, 30MHz~26GHz





Date: 28.OCT.2014 17:34:00

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



Date: 28.OCT.2014 17:34:23

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

## 6.4. Radiated Emission

### 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)).

The measurement is according to ANSI 63.10

## 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                      |

## Test condition:

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 nonconducting 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 63.10-2009 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             |

## 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:

$$\text{Result} = P_{\text{Mea}} + A_{\text{Rpl}}$$

**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          |
| All channels | 18GHz~26GHz     | Fig.45       | P          |

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

| Channel      | Frequency Range | Test Results | Conclusion |
|--------------|-----------------|--------------|------------|
| Ch0 2402MHz  | 30MH~1GHz       | Fig.46       | P          |
|              | 1GHz~3GHz       | Fig.47       | P          |
|              | 3GHz~18GHz      | Fig.48       | P          |
| Power        | 2.38GHz~2.4GHz  | Fig.49       | P          |
| Power        | 2.45GHz~2.5GHz  | Fig.50       | P          |
| All channels | 18GHz~26GHz     | Fig.51       | P          |

**For 8DPSK**

| Channel      | Frequency Range | Test Results | Conclusion |
|--------------|-----------------|--------------|------------|
| Ch0 2402MHz  | 30MH~1GHz       | Fig.52       | P          |
|              | 1GHz~3GHz       | Fig.53       | P          |
|              | 3GHz~18GHz      | Fig.54       | P          |
| Power        | 2.38GHz~2.4GHz  | Fig.55       | P          |
| Power        | 2.45GHz~2.5GHz  | Fig.56       | P          |
| All channels | 18GHz~26GHz     | Fig.57       | P          |

**GFSK Ch0 30MHz-1GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
|----------------|----------------|-----------|--------------|----------|

|            |       |       |       |   |
|------------|-------|-------|-------|---|
| 51.322932  | 20.42 | -24.7 | 45.12 | V |
| 139.533724 | 18.21 | -28.2 | 46.41 | H |
| 166.990916 | 19.5  | -26.8 | 46.3  | H |

**GFSK Ch0 1GHz-3GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 2946.818654    | 55.43          | 12.6      | 42.83        | V        |
| 2987.524808    | 57.18          | 13.7      | 43.48        | V        |

**GFSK Ch0 3GHz-18GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 15906.47913    | 58.03          | 24.7      | 33.33        | V        |
| 16427.42987    | 58.81          | 26        | 32.81        | H        |

 **$\pi/4$  DQPSK Ch0 30MHz-1GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 38.309928      | 14.24          | -25       | 39.24        | H        |
| 122.5986       | 3.51           | -26.7     | 30.21        | H        |
| 171.624736     | 17.74          | -26.5     | 44.24        | H        |

 **$\pi/4$  DQPSK Ch0 1GHz-3GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 2892.902693    | 54.57          | 11.8      | 42.77        | H        |
| 2957.650385    | 56.3           | 12.9      | 43.4         | V        |

 **$\pi/4$  DQPSK Ch0 3GHz-18GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 15411.0592     | 57.18          | 23.2      | 33.98        | V        |
| 17581.66653    | 63.71          | 28.3      | 35.41        | V        |

**8DPSK 30MHz-1GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 35.748404      | 11.12          | -25.7     | 36.82        | V        |
| 51.452196      | 16.68          | -24.7     | 41.38        | H        |
| 84.6786        | 15.94          | -27.4     | 43.34        | V        |

**8DPSK 1GHz-3GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 2828.492693    | 54.29          | 11.3      | 42.99        | H        |
| 2878.262885    | 54.81          | 11.8      | 43.01        | V        |

**8DPSK 3GHz-18GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 15709.30673    | 57.48          | 23.9      | 33.58        | V        |
| 17545.1522     | 61.92          | 27.2      | 34.72        | H        |

**All Ch 18GHz~26.5GHz**

| Frequency(MHz) | Result(dBuV/m) | ARpl (dB) | PMea(dBuV/m) | Polarity |
|----------------|----------------|-----------|--------------|----------|
| 18238.000000   | 46.23          | 5.85      | 40.38        | V        |
| 19050.600000   | 47.02          | 6.97      | 40.05        | V        |
| 20128.400000   | 46.20          | 6.97      | 39.23        | H        |
| 21179.000000   | 45.48          | 6.97      | 38.51        | V        |
| 22391.950000   | 42.23          | 3.05      | 39.18        | V        |
| 23469.750000   | 43.54          | 3.05      | 40.49        | H        |

**Note:** all the test data shown was peak detected.

**Conclusion:** PASS

**Test graphs as below:**

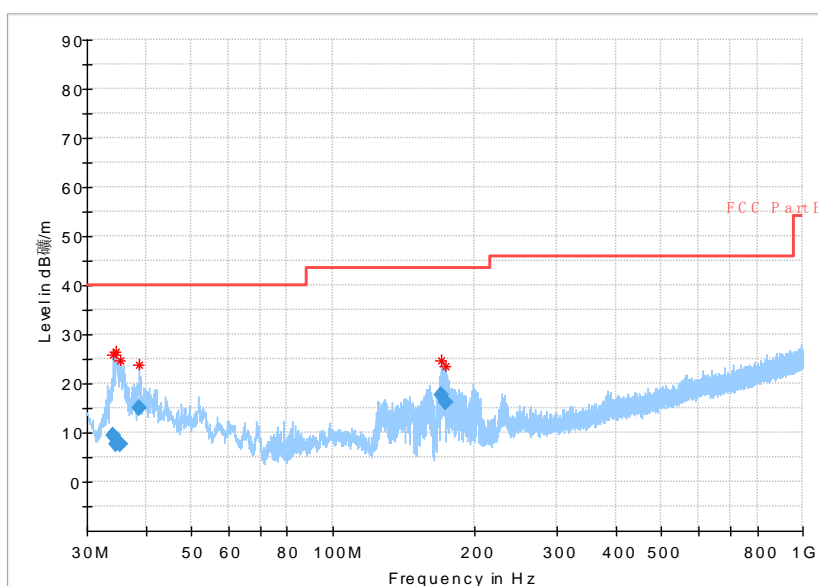


Fig.40 Radiated emission: GFSK, Ch0, 30MHz~1GHz

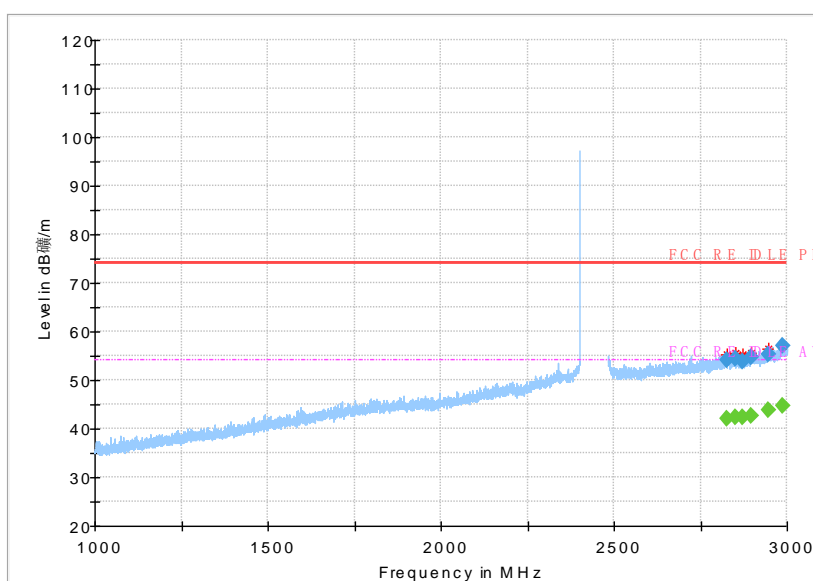


Fig.41 Radiated emission: GFSK, Ch0, 1GHz~3GHz

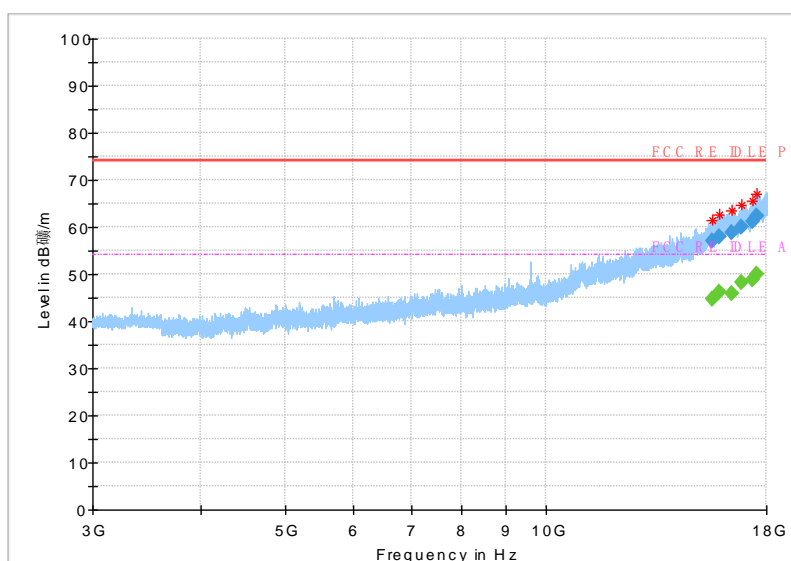


Fig.42 Radiated emission: GFSK, Ch0, 3GHz~18GHz

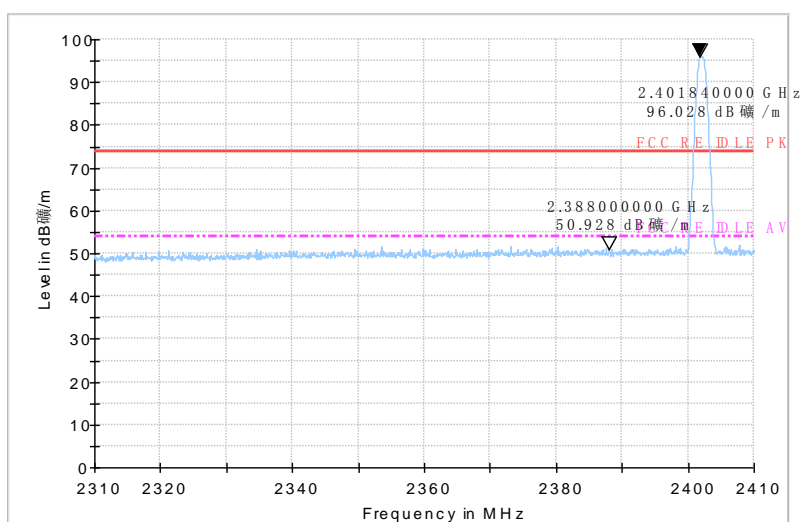


Fig.43 Radiated emission (Power): GFSK, low channel

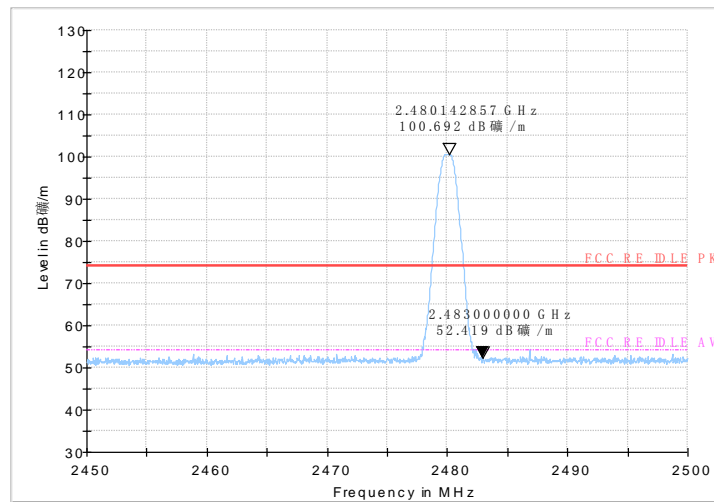


Fig.44 Radiated emission (Power): GFSK, high channel

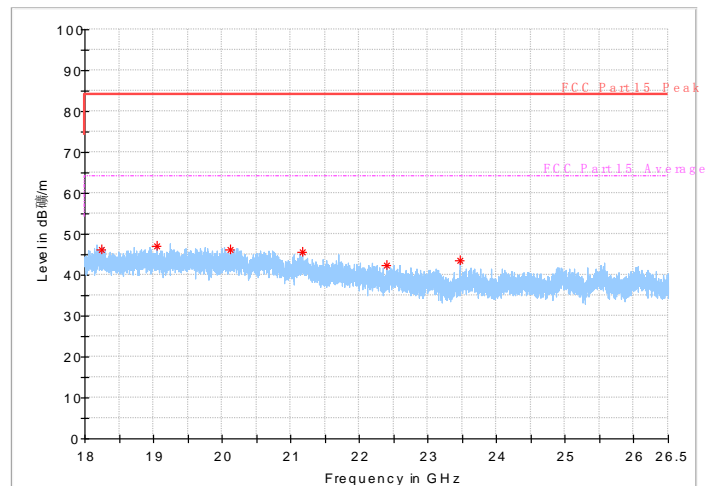


Fig.45 Radiated emission: GFSK, 18 GHz - 26 GHz

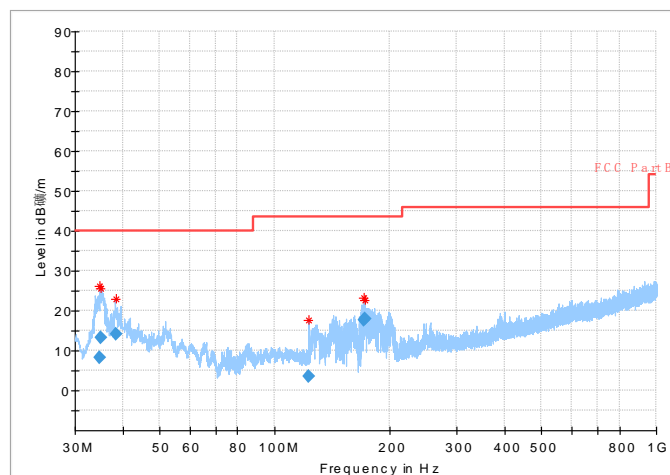


Fig.46 Radiated emission:  $\pi/4$  DQPSK, Ch0, 30MHz~1GHz



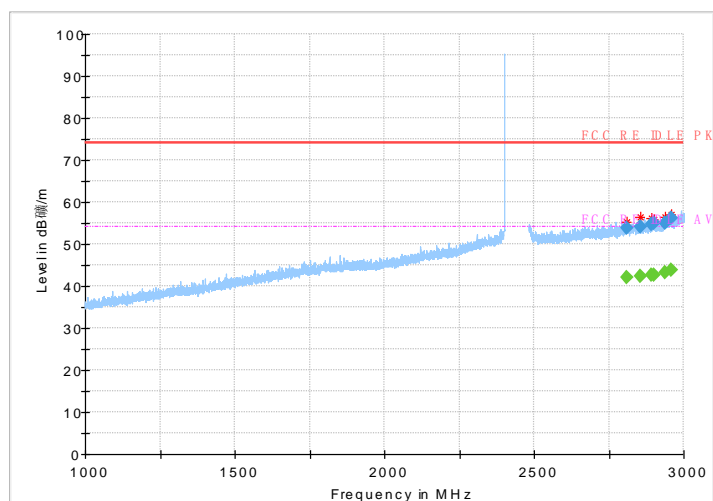


Fig.47 Radiated emission:  $\pi/4$  DQPSK, Ch0, 1GHz~3GHz

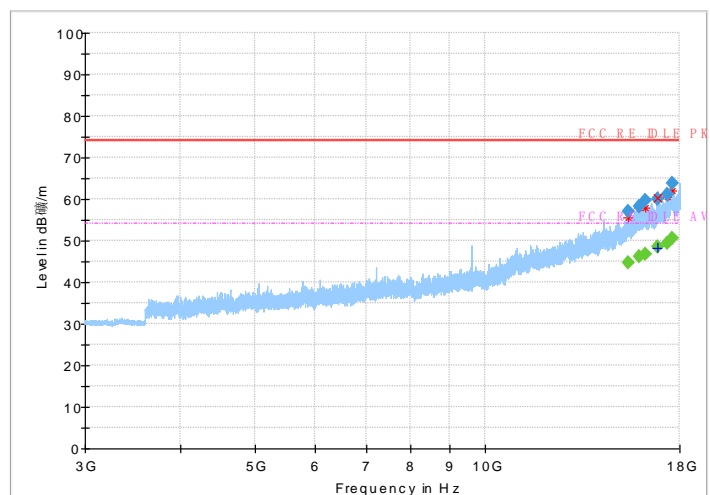


Fig.48 Radiated emission:  $\pi/4$  DQPSK, Ch0, 3GHz~18GHz

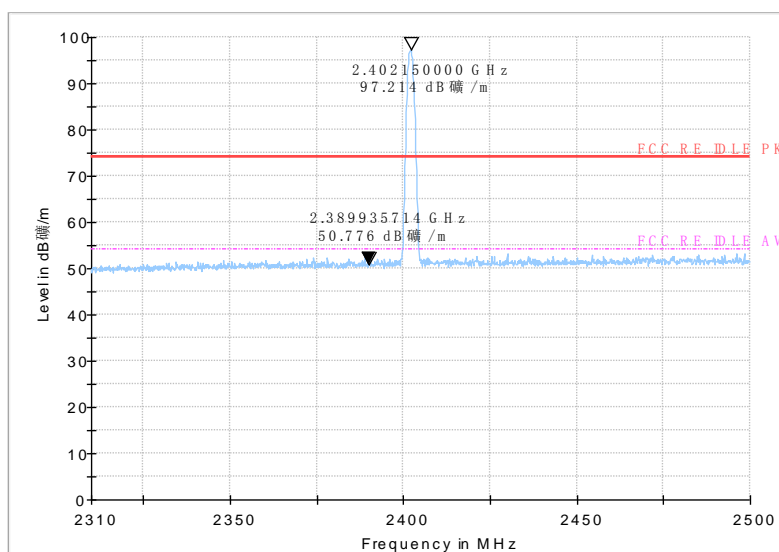


Fig.49 Radiated emission (Power):  $\pi/4$  DQPSK, low channel

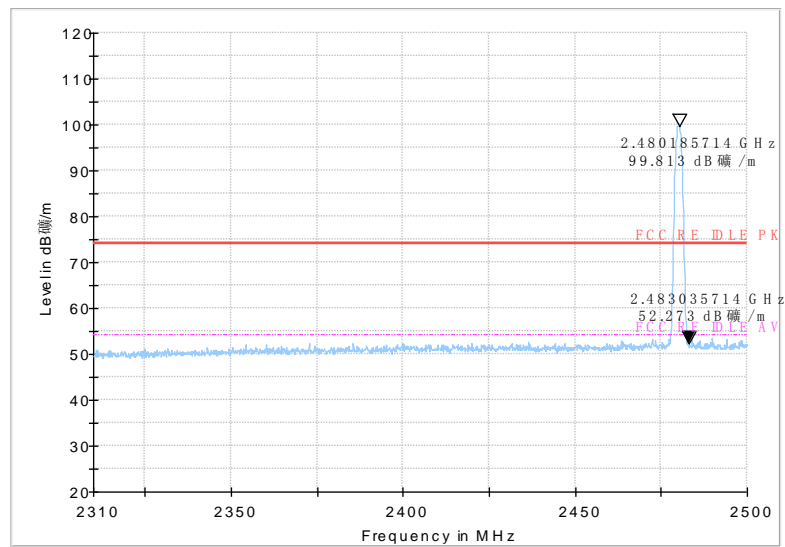


Fig.50 Radiated emission (Power):  $\pi/4$  DQPSK, high channel

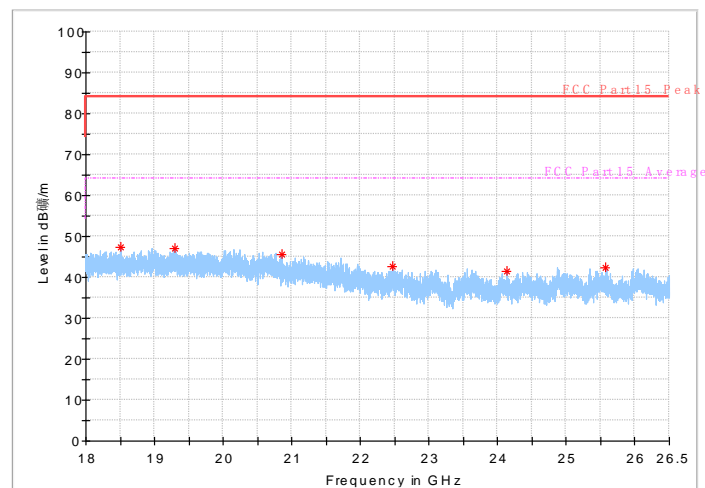


Fig.51 Radiated emission:  $\pi/4$  DQPSK, 18 GHz - 26 GHz

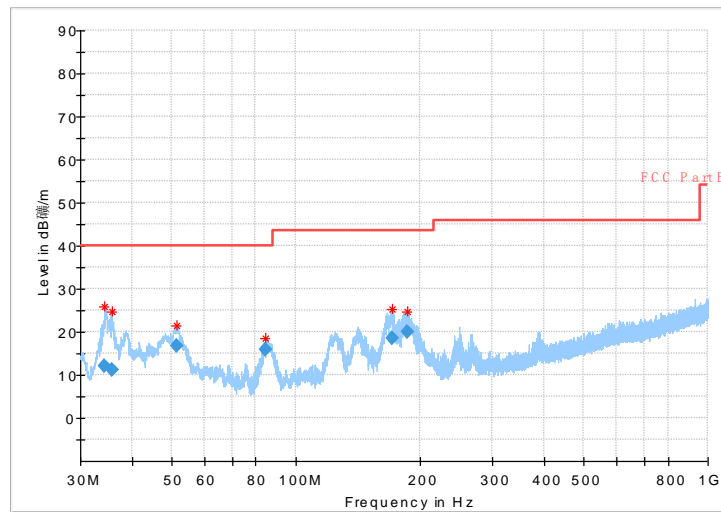


Fig.52 Radiated emission: 8DPSK, Ch0, 30MHz~1GHz

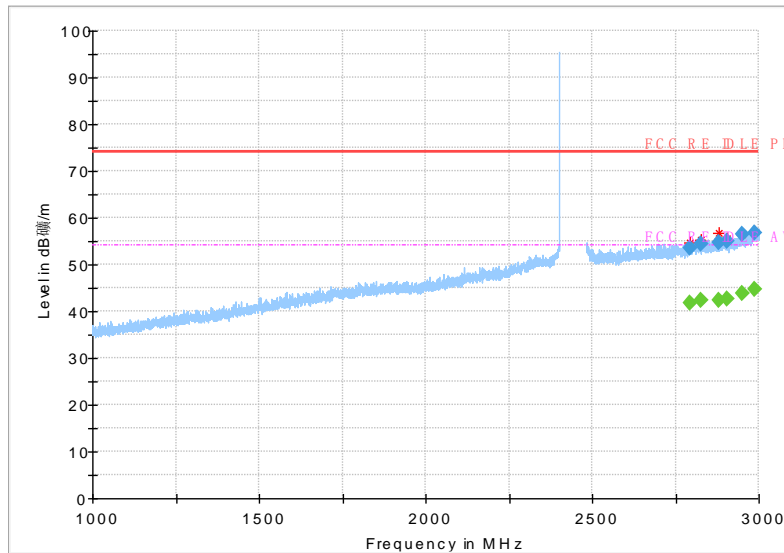


Fig.53 Radiated emission: 8DPSK, Ch0, 1GHz~3GHz

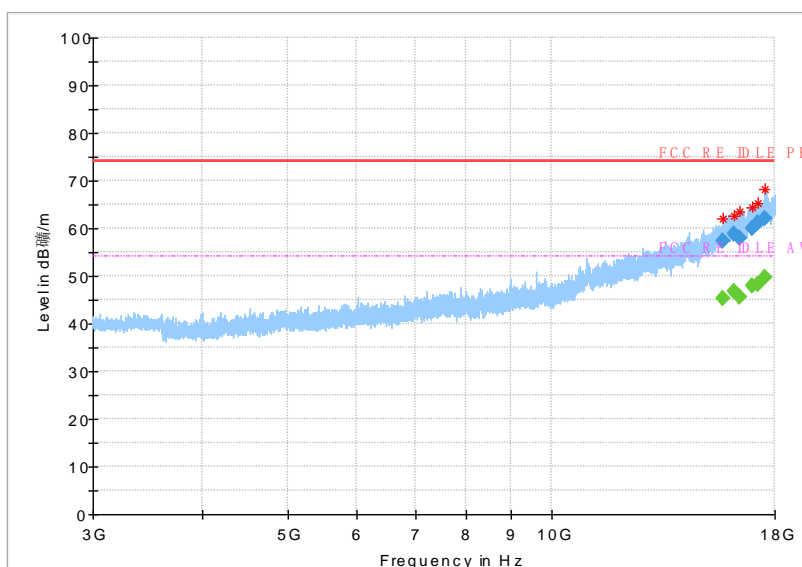


Fig.54 Radiated emission: 8DPSK, Ch0, 3GHz~18GHz

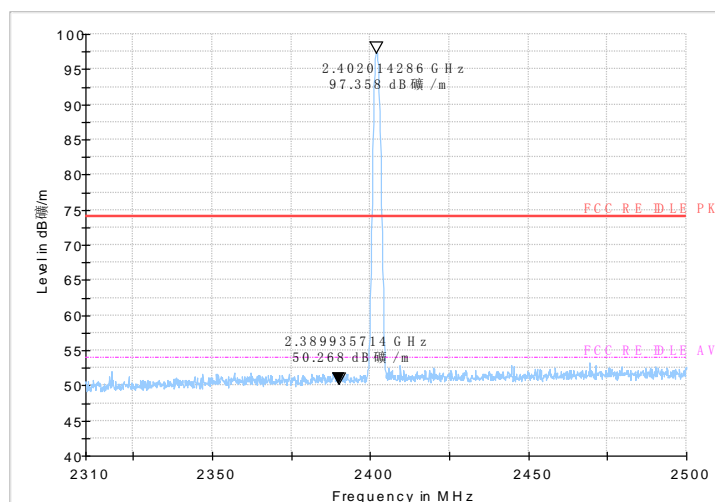


Fig.55 Radiated emission (Power): 8DPSK, low channel

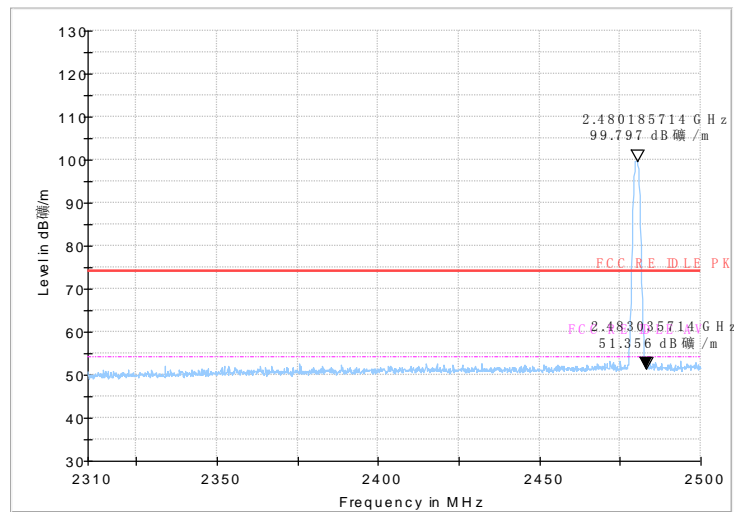


Fig.56 Radiated emission (Power): 8DPSK, high channel

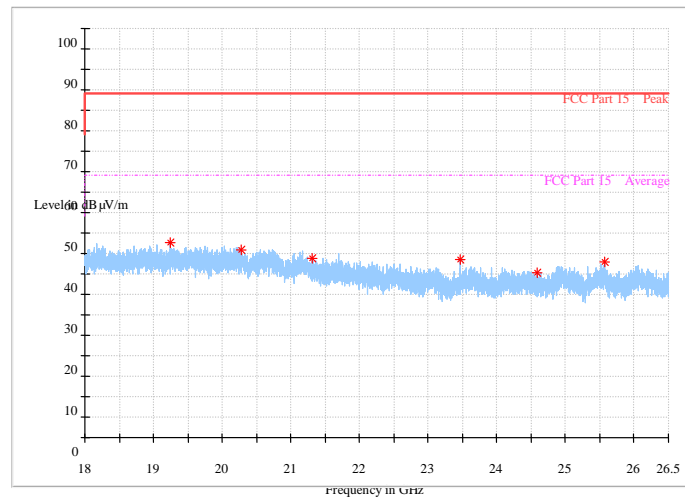


Fig.57 Radiated emission: 8DPSK, 18 GHz - 26 GHz

## 6.5. Time Of Occupancy (Dwell Time)

### Measurement Limit:

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

The measurement is according to ANSI 63.10

### Measurement Result:

#### For GFSK

| Channel | Packet | Dwell Time (ms) |        | Conclusion |
|---------|--------|-----------------|--------|------------|
| 39      | DH1    | Fig.58          | 161.28 | P          |

|  |     |        |        |   |
|--|-----|--------|--------|---|
|  | DH3 | Fig.59 | 281.92 | P |
|  |     | Fig.60 |        |   |
|  | DH5 | Fig.61 | 321.06 | P |
|  |     | Fig.62 |        |   |
|  |     | Fig.63 |        |   |

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

| Channel | Packet | Dwell Time (ms) |        | Conclusion |
|---------|--------|-----------------|--------|------------|
| 39      | 2DH1   | Fig.64          | 163.2  | P          |
|         |        | Fig.65          |        |            |
|         | 2DH3   | Fig.66          | 281.92 | P          |
|         |        | Fig.67          |        |            |
|         | 2DH5   | Fig.68          | 321.06 | P          |
|         |        | Fig.69          |        |            |

**For 8DPSK**

| Channel | Packet | Dwell Time (ms) |        | Conclusion |
|---------|--------|-----------------|--------|------------|
| 39      | 3DH1   | Fig.70          | 166.4  | P          |
|         |        | Fig.71          |        |            |
|         | 3DH3   | Fig.72          | 281.92 | P          |
|         |        | Fig.73          |        |            |
|         | 3DH5   | Fig.74          | 321.06 | P          |
|         |        | Fig.75          |        |            |

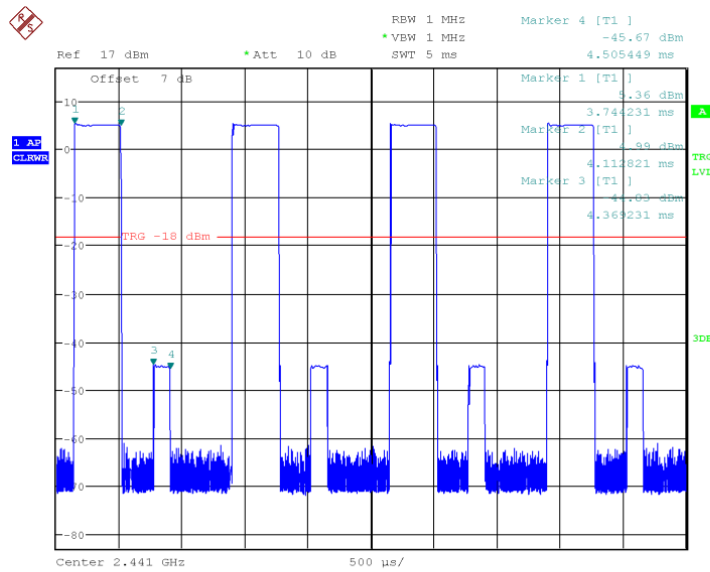
**Note:** the dwell time is Calculated of the sum of test time about 31.5 seconds.

**Equation:** dwell time = pusletime  $\times$  (1600/N)/79  $\times$  T . N is the number of timeslot; T is the time about 31.6s.

**The time of DH5=**3.01 $\times$ (1600/6)/79 $\times$ 31.6=321.06ms.

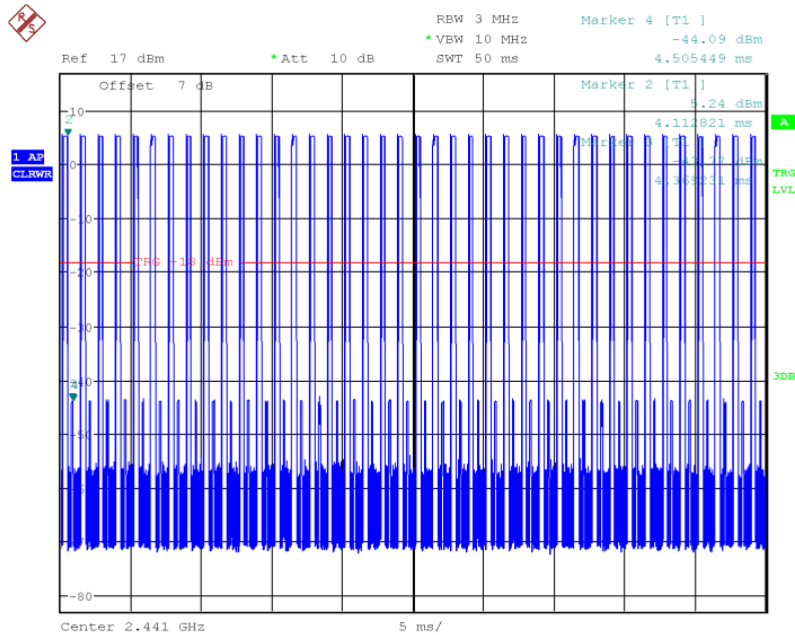
**Conclusion:** PASS

**Test graphs as below:**



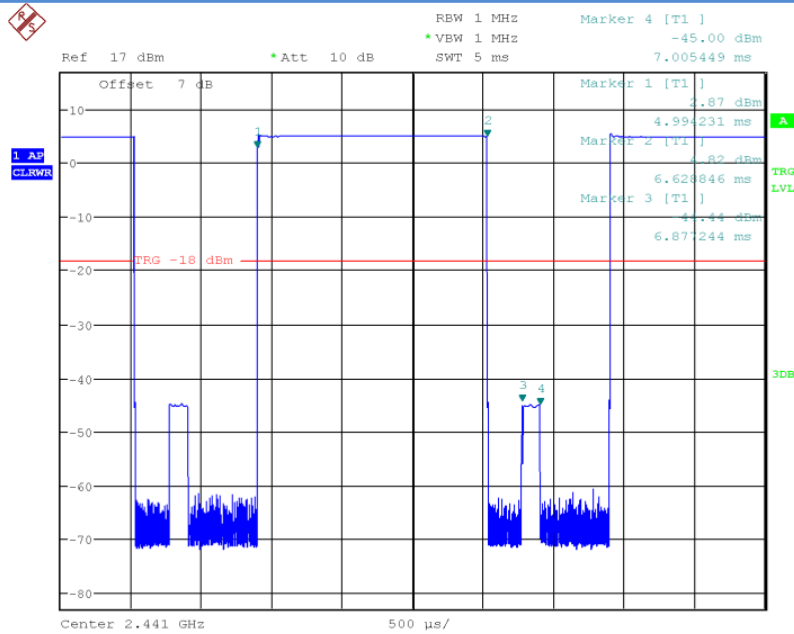
Date: 28.OCT.2014 17:35:04

Fig.58 Time of occupancy (Dwell Time): Ch39, Packet DH1



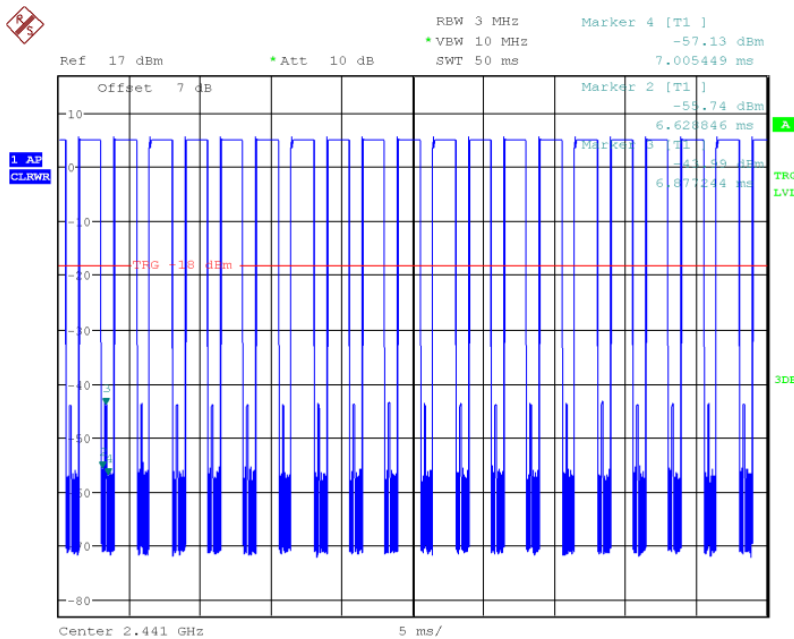
Date: 28.OCT.2014 17:35:11

Fig.59 Number of Transmissions Measurement: Ch39, Packet DH1



Date: 28.OCT.2014 17:35:21

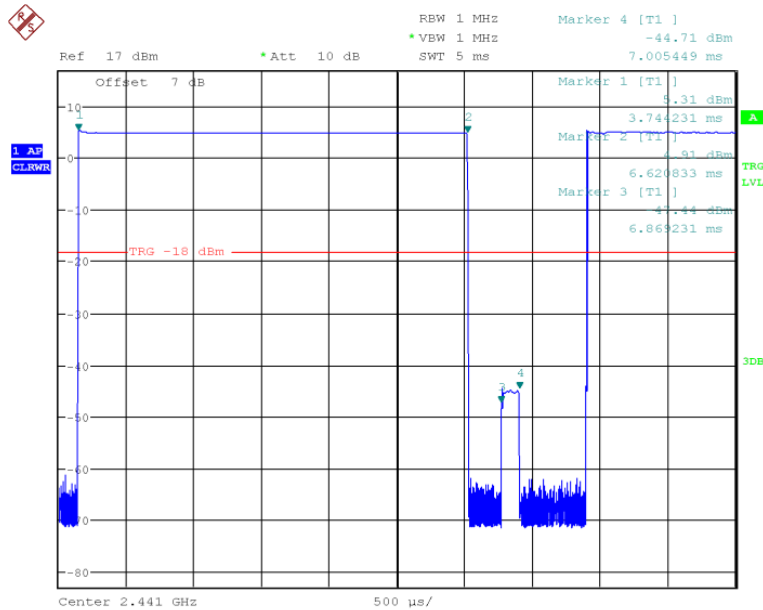
Fig.60 Time of occupancy (Dwell Time): Ch39, Packet DH3



Date: 28.OCT.2014 17:35:28

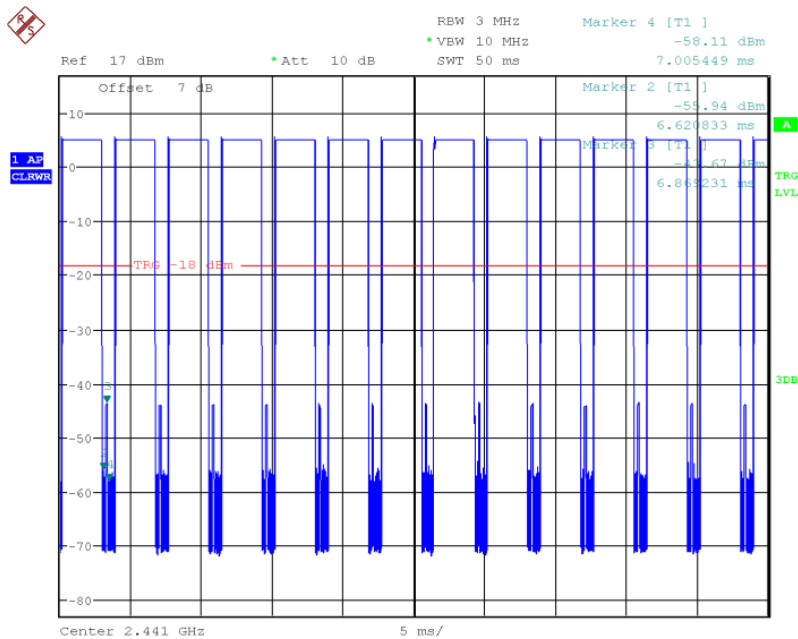
Fig.61 Number of Transmissions Measurement: Ch39, Packet DH3





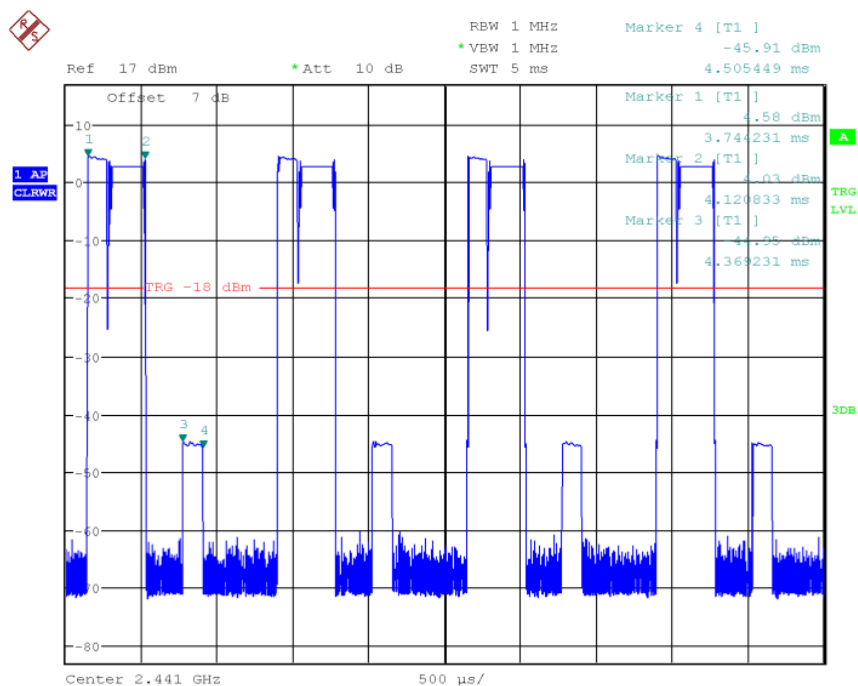
Date: 28.OCT.2014 17:35:37

Fig.62 Time of occupancy (Dwell Time): Ch39,Packet DH5



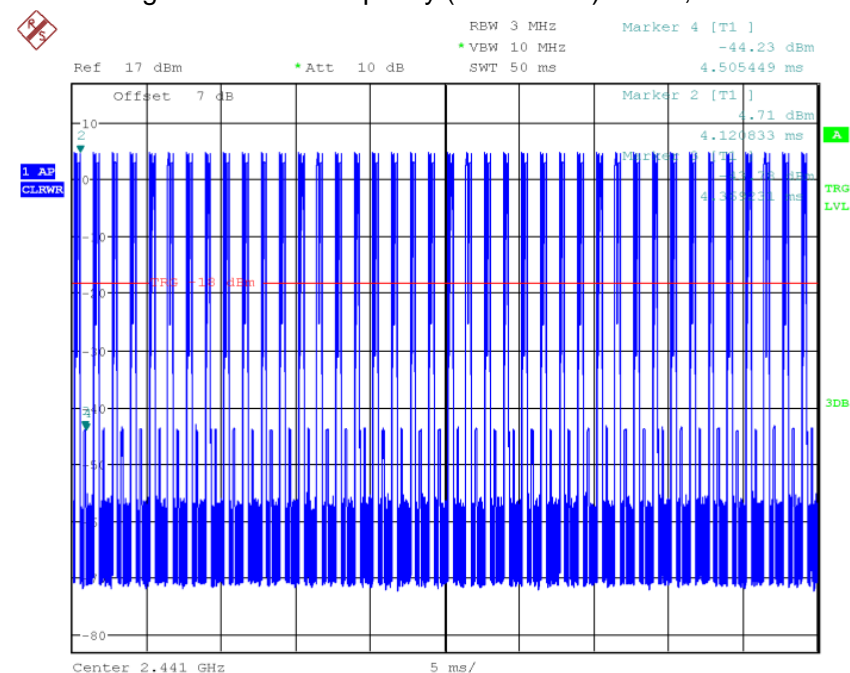
Date: 28.OCT.2014 17:35:44

Fig.63 Number of Transmissions Measurement: Ch39, Packet DH5



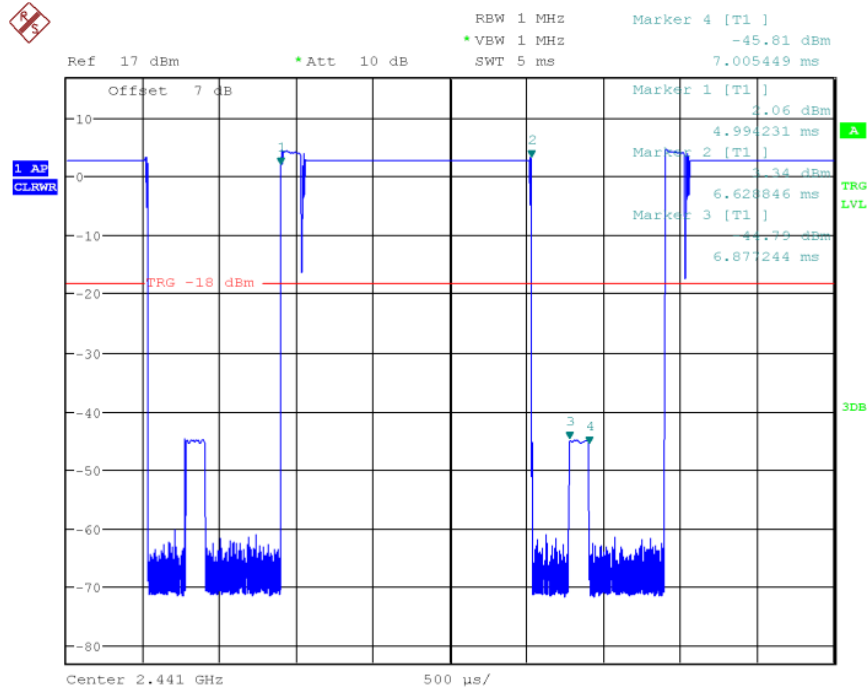
Date: 28.OCT.2014 17:35:53

Fig.64 Time of occupancy (Dwell Time): Ch39,Packet 2-DH1



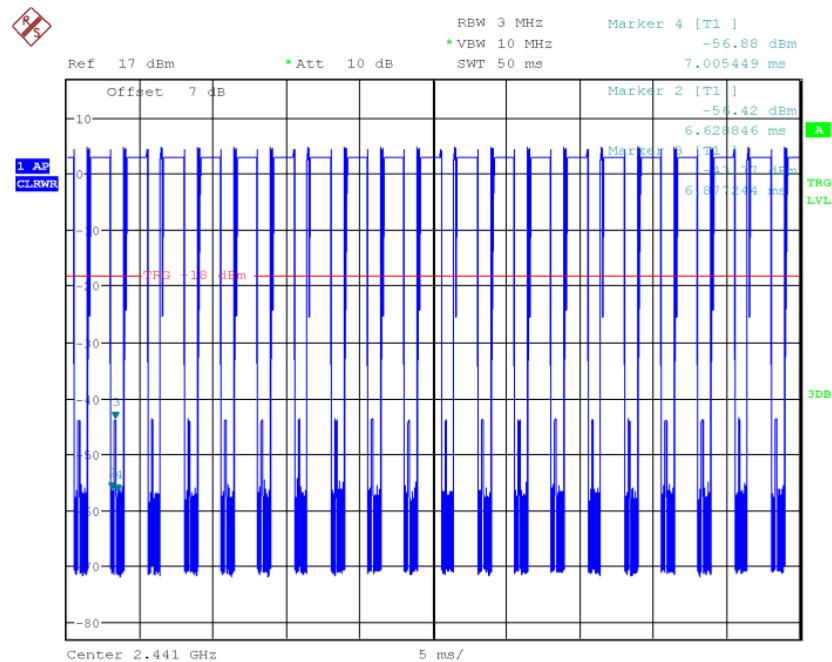
Date: 28.OCT.2014 17:36:00

Fig.65 Number of Transmissions Measurement: Ch39, Packet 2-DH1



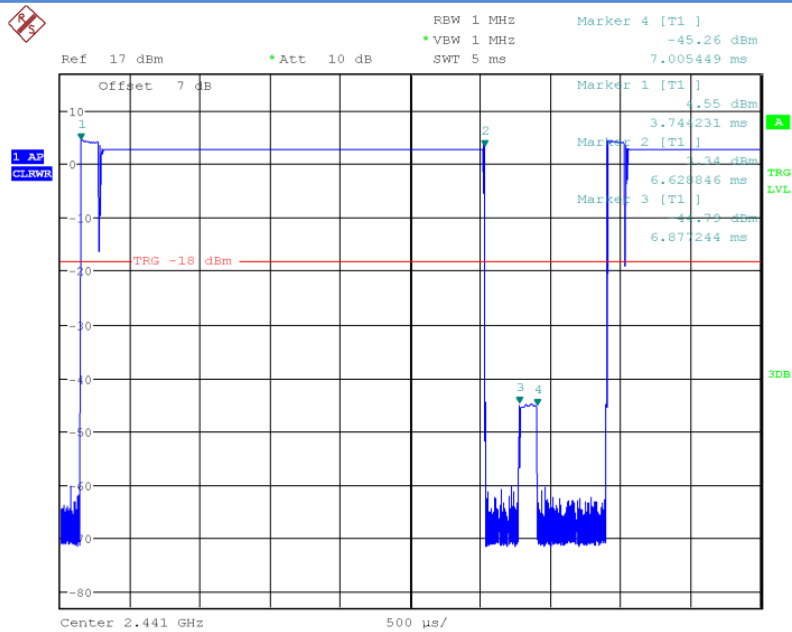
Date: 28.OCT.2014 17:36:09

Fig.66 Time of occupancy (Dwell Time): Ch39,Packet 2-DH3



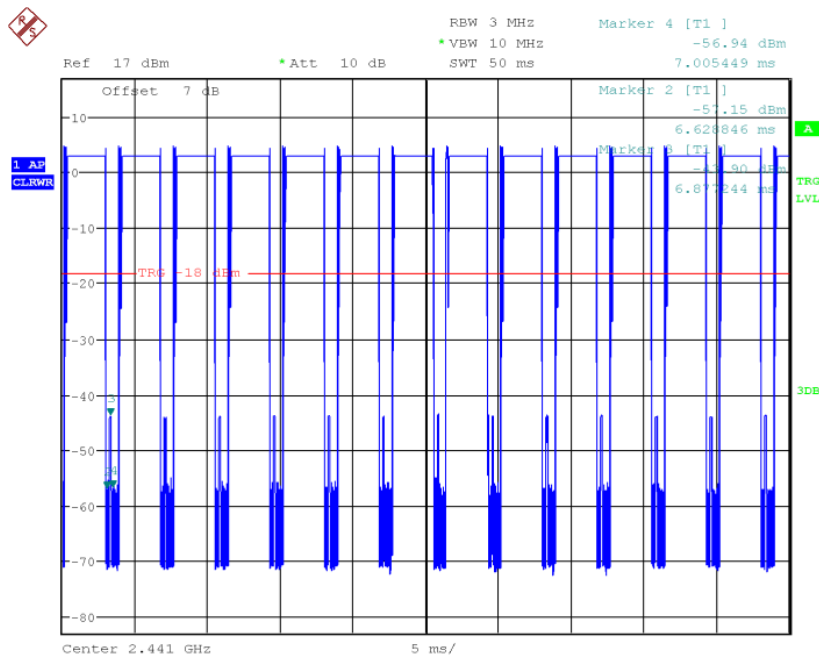
Date: 28.OCT.2014 17:36:16

Fig.67 Number of Transmissions Measurement: Ch39, Packet 2-DH3



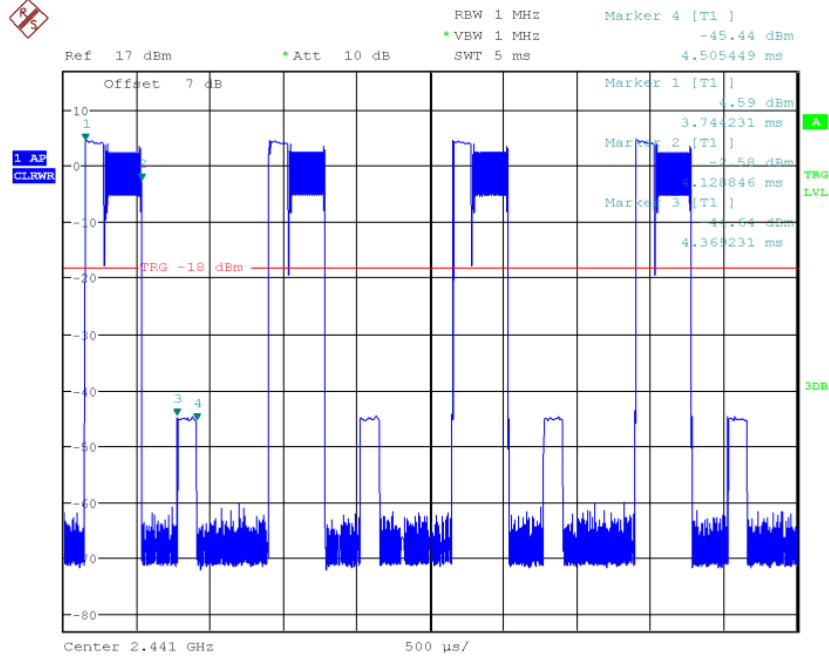
Date: 28.OCT.2014 17:36:26

Fig.68 Time of occupancy (Dwell Time): Ch39,Packet 2-DH5



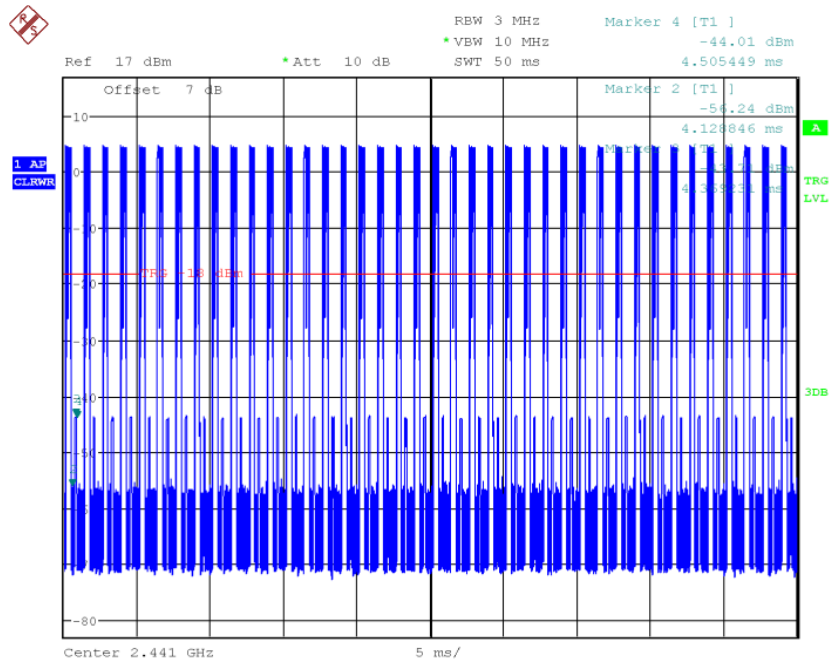
Date: 28.OCT.2014 17:36:33

Fig.69 Number of Transmissions Measurement: Ch39, Packet 2-DH5



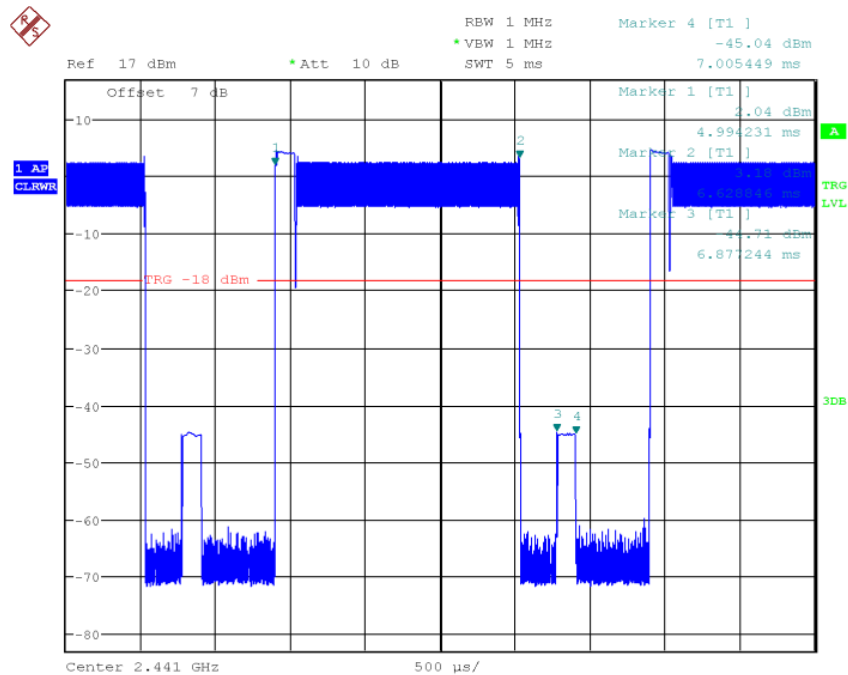
Date: 28.OCT.2014 17:36:41

Fig.70 Time of occupancy (Dwell Time): Ch39,Packet 3-DH1



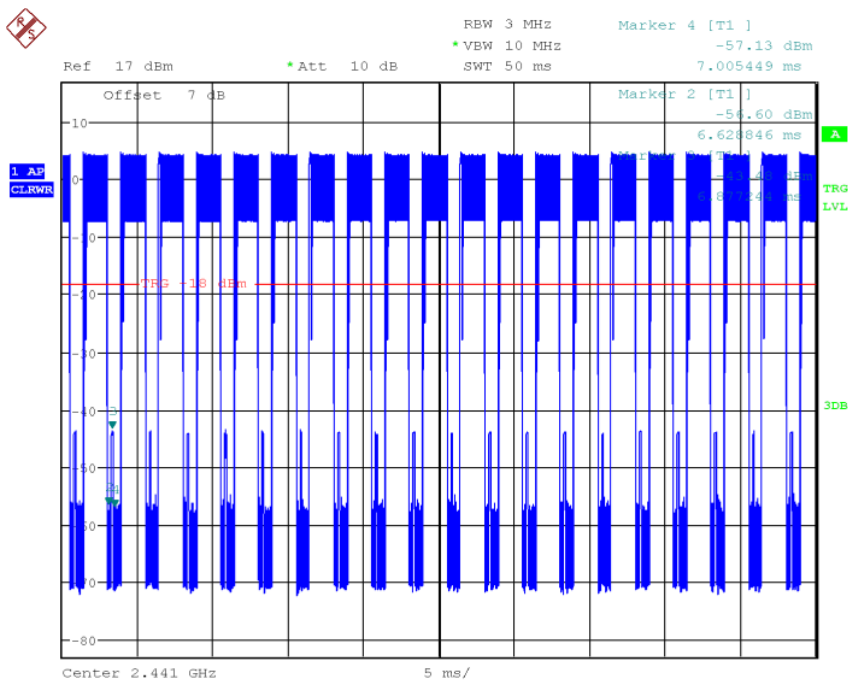
Date: 28.OCT.2014 17:36:49

Fig.71 Number of Transmissions Measurement: Ch39, Packet 3-DH1



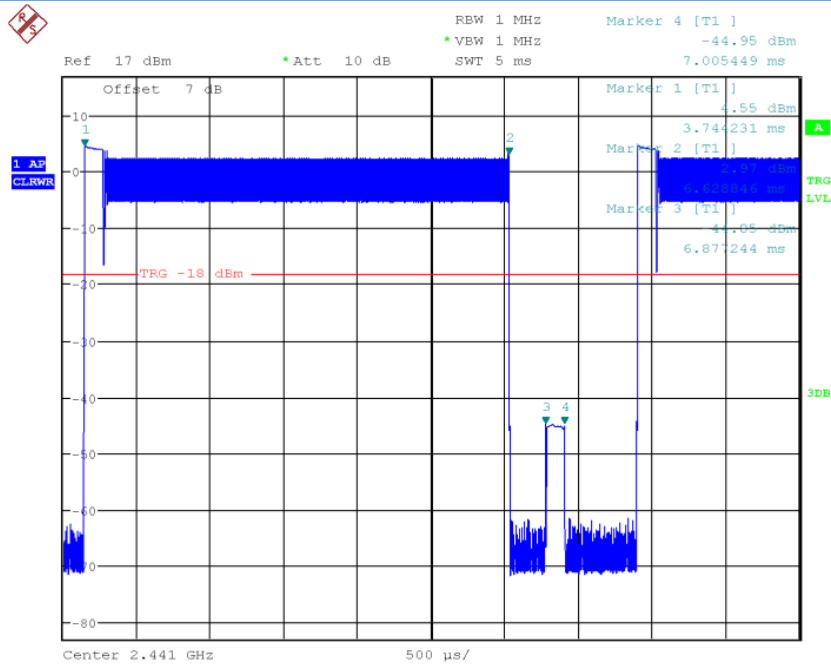
Date: 28.OCT.2014 17:36:57

Fig.72 Time of occupancy (Dwell Time): Ch39,Packet 3-DH3



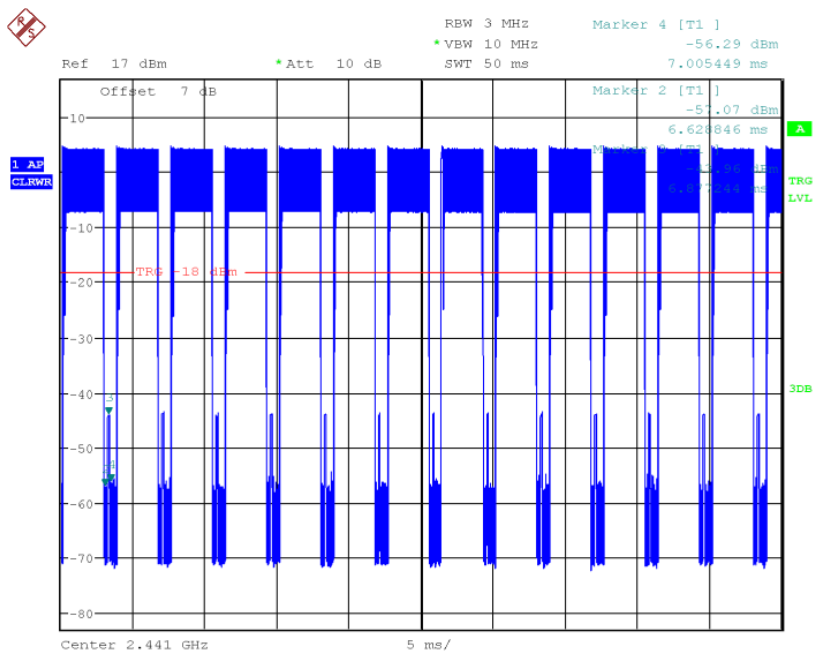
Date: 28.OCT.2014 17:37:05

Fig.73 Number of Transmissions Measurement: Ch39, Packet 3-DH3



Date: 28.OCT.2014 17:37:14

Fig.74 Time of occupancy (Dwell Time): Ch39,Packet 3-DH5



Date: 28.OCT.2014 17:37:21

Fig.75 Number of Transmissions Measurement: Ch39, Packet 3-DH5

## 6.6. 20dB Bandwidth

### Measurement Limit:

| Standard                       | Limit |
|--------------------------------|-------|
| FCC 47 CFR Part 15.247 (a) (1) | N/A   |

The measurement is according to ANSI 63.10.

## Measurement Result:

### For GFSK

| Channel | 20dB Bandwidth (KHz) |      | Conclusion |
|---------|----------------------|------|------------|
| 0       | Fig.76               | 1034 | P          |
| 39      | Fig.77               | 1034 | P          |
| 78      | Fig.78               | 1029 | P          |

### For $\pi/4$ DQPSK

| Channel | 20dB Bandwidth (KHz) |      | Conclusion |
|---------|----------------------|------|------------|
| 0       | Fig.79               | 1091 | P          |
| 39      | Fig.80               | 1091 | P          |
| 78      | Fig.81               | 1087 | P          |

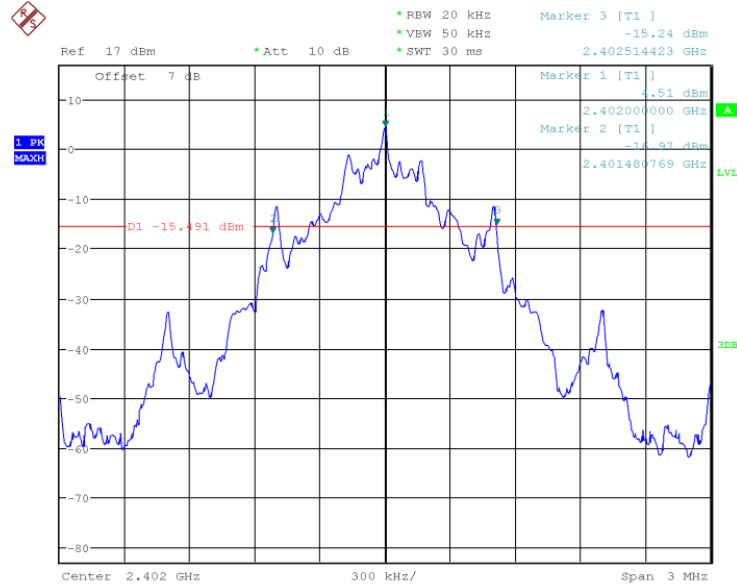
### For 8DPSK

| Channel | 20dB Bandwidth (KHz) |      | Conclusion |
|---------|----------------------|------|------------|
| 0       | Fig.82               | 1192 | P          |
| 39      | Fig.83               | 1192 | P          |
| 78      | Fig.84               | 1192 | P          |

**Conclusion: PASS**

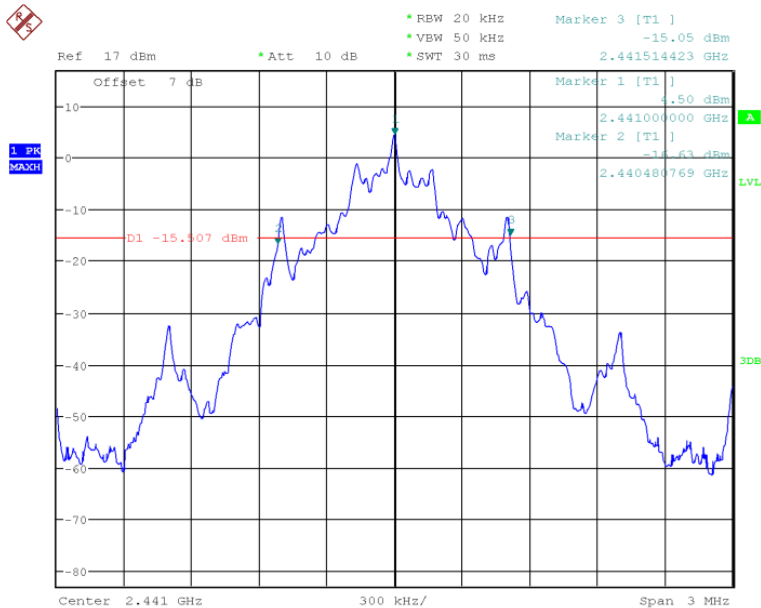
**Test graphs as below:**





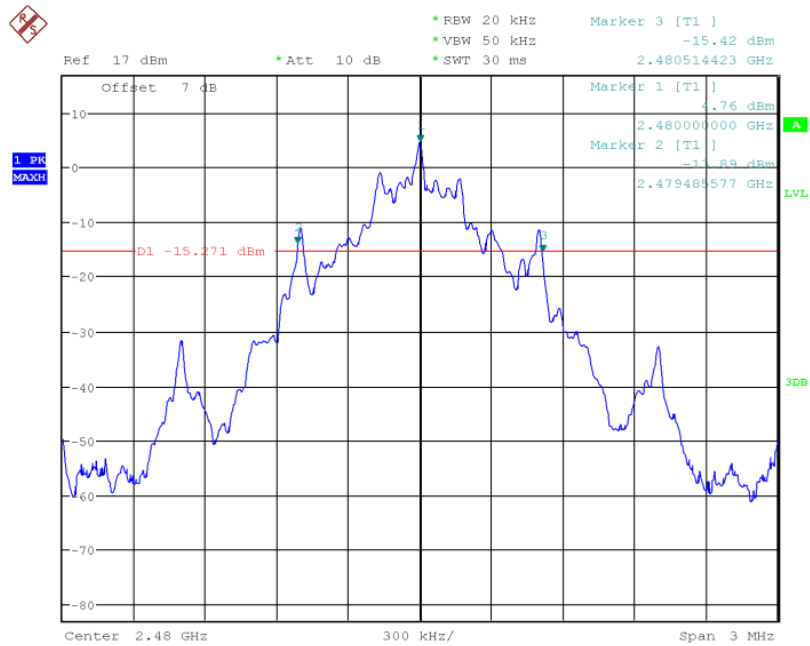
Date: 28.OCT.2014 17:38:03

Fig.76 20dB Bandwidth: GFSK, Ch0



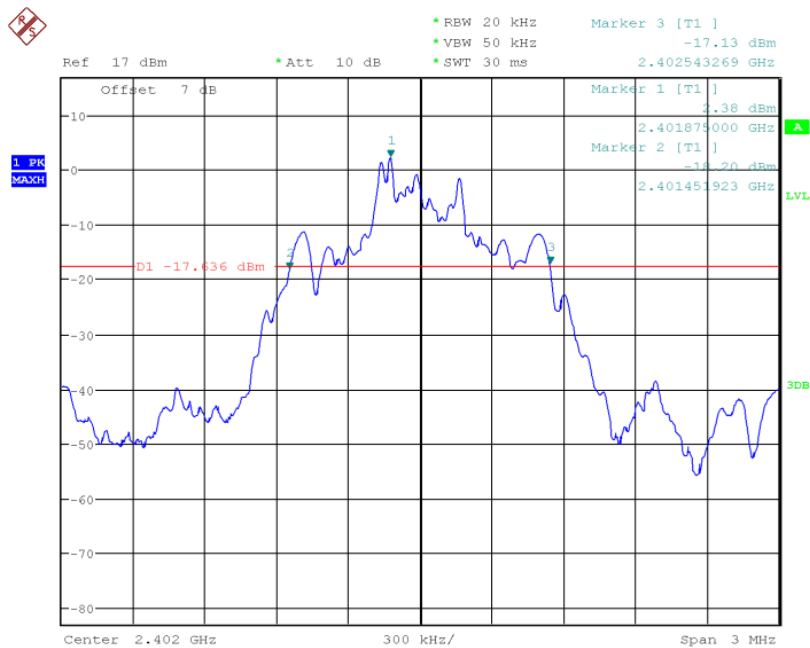
Date: 28.OCT.2014 17:38:18

Fig.77 20dB Bandwidth: GFSK, Ch39



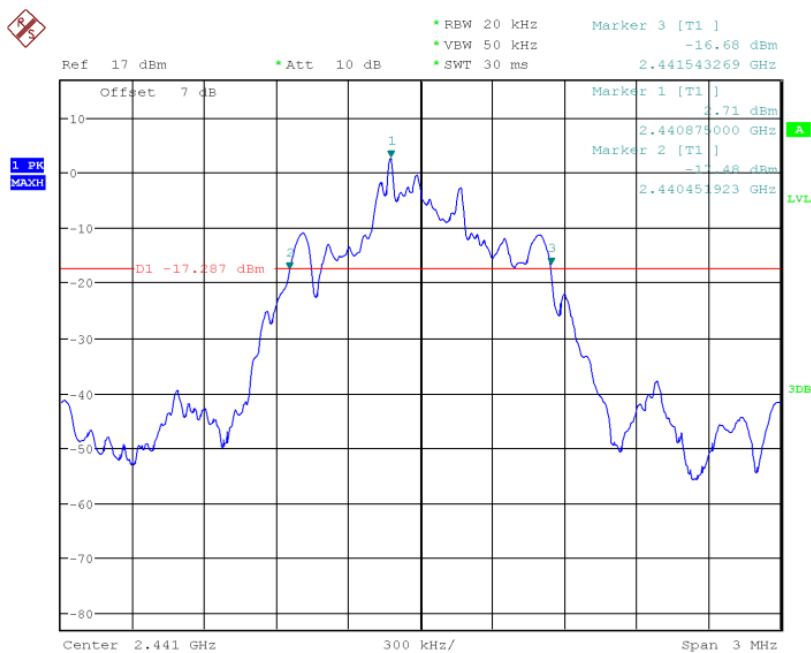
Date: 28.OCT.2014 17:38:32

Fig.78 20dB Bandwidth: GFSK, Ch78



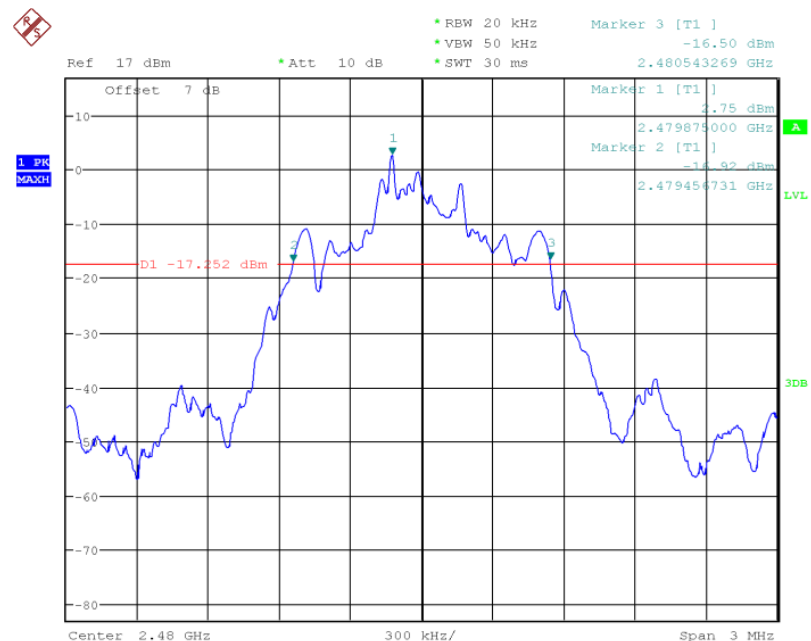
Date: 28.OCT.2014 17:38:46

Fig.79 20dB Bandwidth:  $\pi/4$  DQPSK, Ch0



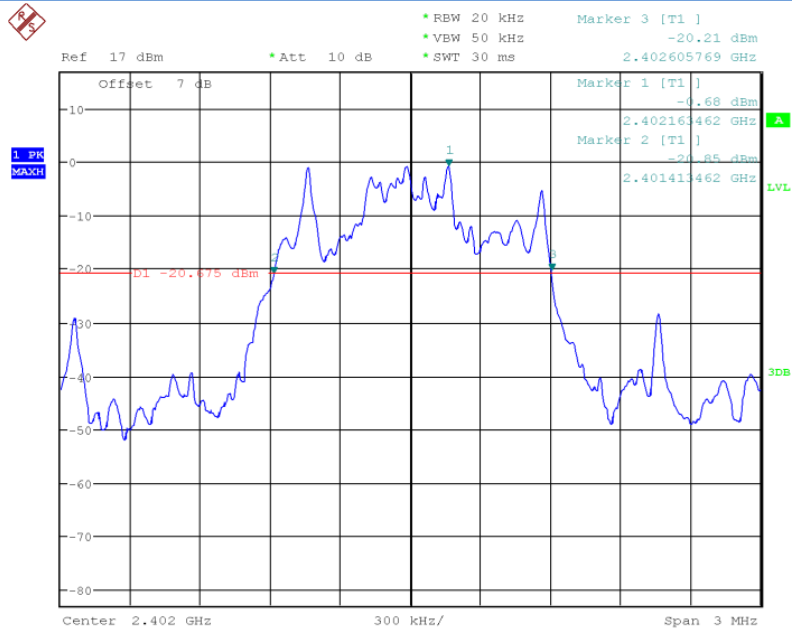
Date: 28.OCT.2014 17:39:00

Fig.80 20dB Bandwidth:  $\pi/4$  DQPSK, Ch39



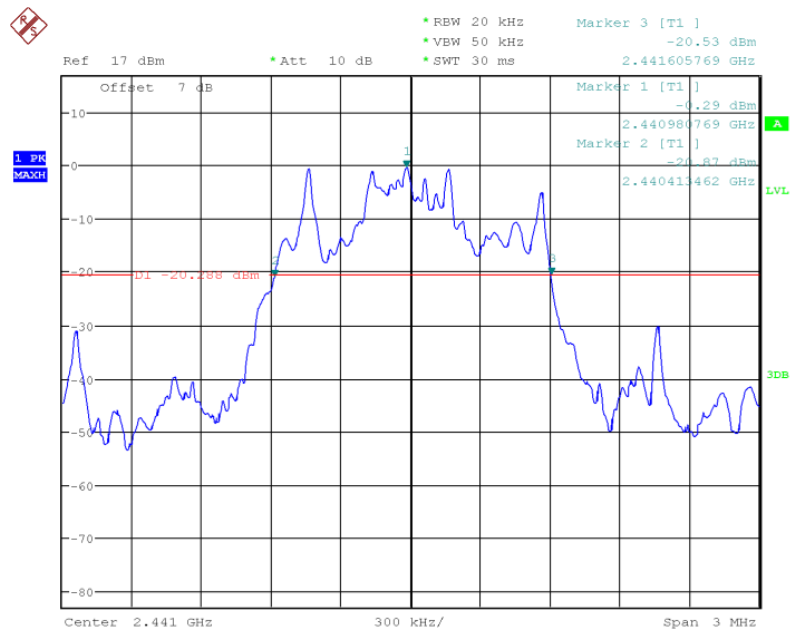
Date: 28.OCT.2014 17:39:14

Fig.81 20dB Bandwidth:  $\pi/4$  DQPSK, Ch78



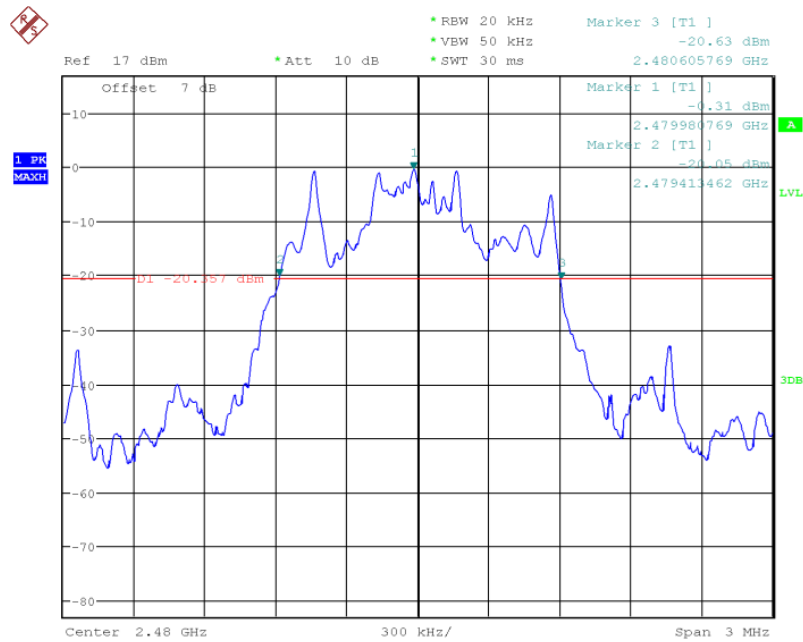
Date: 28.OCT.2014 17:39:28

Fig.82 20dB Bandwidth: 8DPSK, Ch0



Date: 28.OCT.2014 17:39:43

Fig.83 20dB Bandwidth: 8DPSK, Ch39



Date: 28.OCT.2014 17:39:57

Fig.84 20dB Bandwidth: 8DPSK, Ch78

## 6.7. Carrier Frequency Separation

### Measurement Limit:

| Standard                       | Limit (KHz)                        |
|--------------------------------|------------------------------------|
| FCC 47 CFR Part 15.247 (a) (1) | Over 25KHz or (2/3)*20dB bandwidth |

The measurement is according to ANSI 63.10.

### Measurement Result:

#### For GFSK

| Channel | Carrier separation (KHz) |           | Conclusion |
|---------|--------------------------|-----------|------------|
| 39      | Fig.85                   | 1014.4231 | P          |

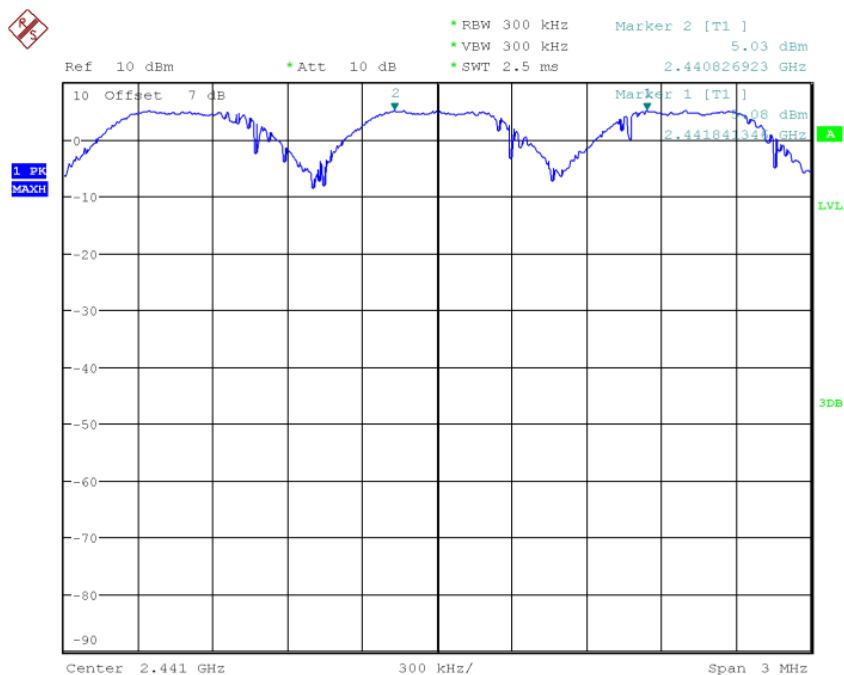
#### For $\pi/4$ DQPSK

| Channel | Carrier separation (KHz) |          | Conclusion |
|---------|--------------------------|----------|------------|
| 39      | Fig.86                   | 961.5385 | P          |

#### For 8DPSK

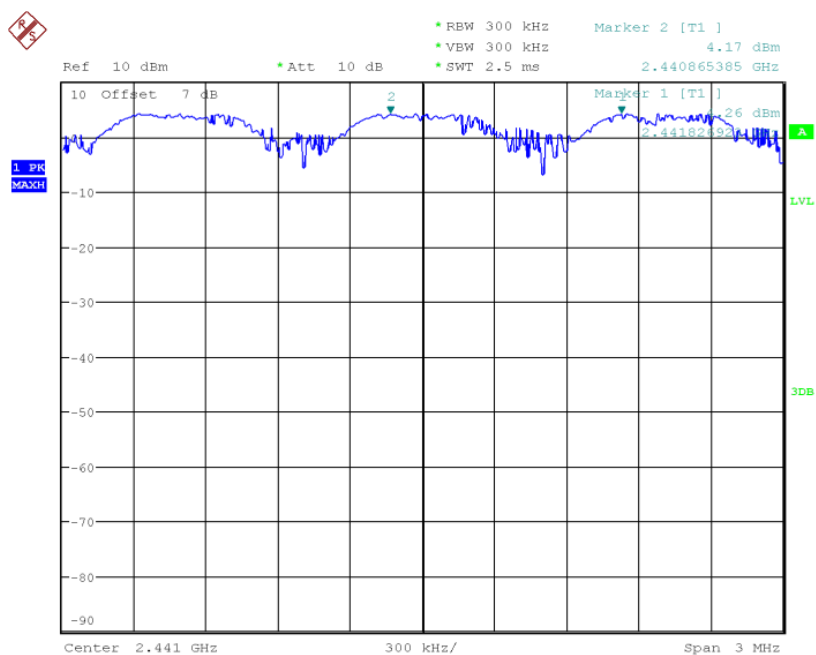
| Channel | Carrier separation (KHz) |           | Conclusion |
|---------|--------------------------|-----------|------------|
| 39      | Fig.87                   | 1009.6154 | P          |

**Conclusion: PASS**
**Test graphs as below:**



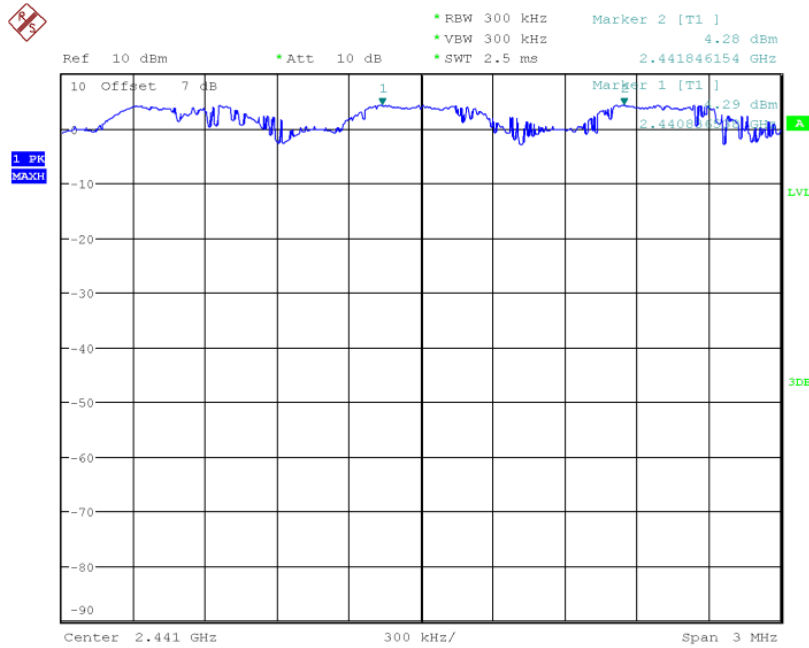
Date: 28.OCT.2014 17:41:37

Fig.85 Carrier separation measurement: GFSK, Ch39



Date: 28.OCT.2014 17:42:48

Fig.86 Carrier separation measurement:  $\pi/4$  DQPSK, Ch39



Date: 28.OCT.2014 17:43:59

Fig.87 Carrier separation measurement: 8DPSK, Ch39

## 6.8. Number Of Hopping Channels

### Measurement Limit:

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

The measurement is according to ANSI 63.10.

### Measurement Result:

#### For GFSK

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

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

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

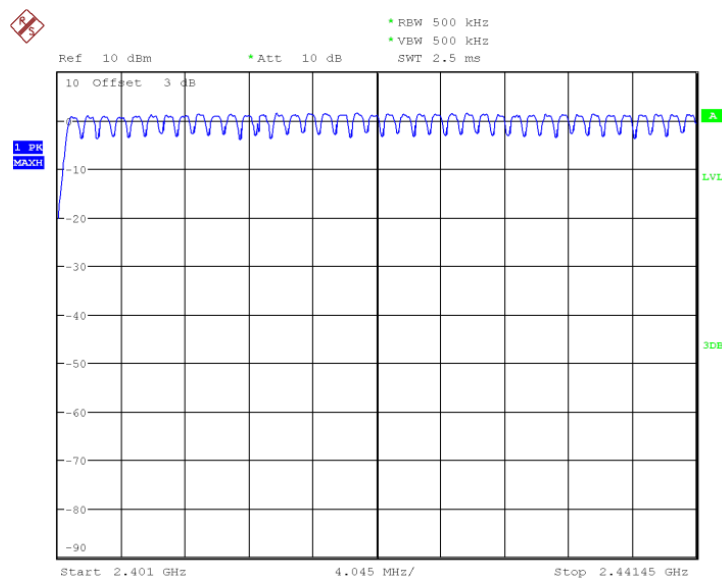
#### For 8DPSK

| Channel | Number of hopping channels |  | Conclusion |
|---------|----------------------------|--|------------|
|---------|----------------------------|--|------------|

|       |        |    |   |
|-------|--------|----|---|
| 0~39  | Fig.92 | 79 | P |
| 40~78 | Fig.93 |    | P |

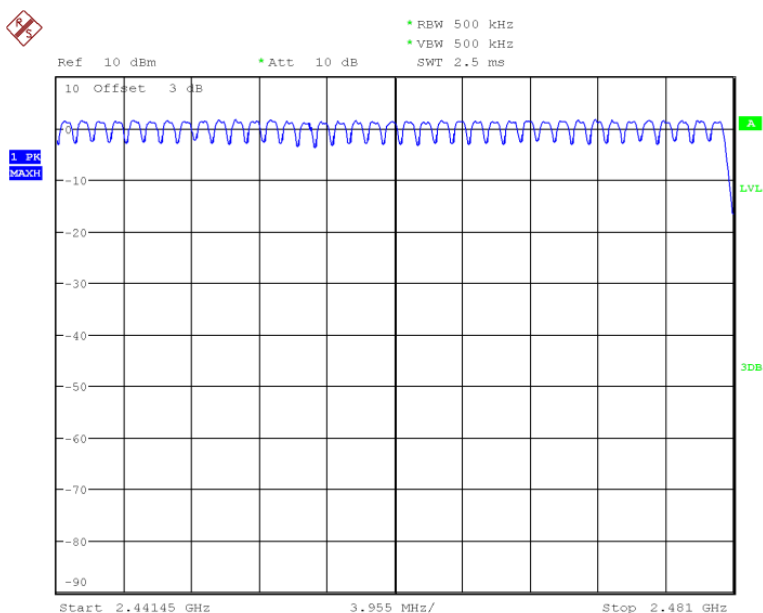
**Conclusion: PASS**

**Test graphs as below:**



Date: 28.OCT.2014 17:46:35

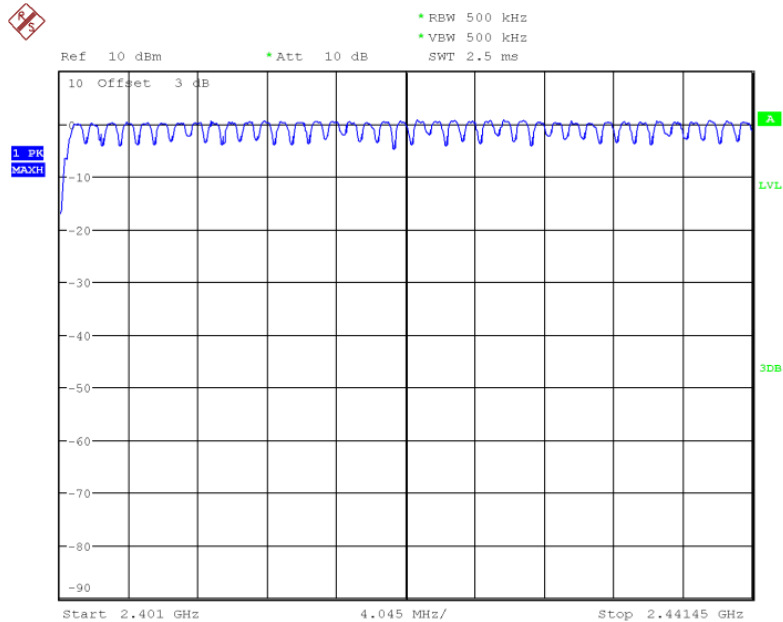
**Fig.88 Number of hopping frequency: GFSK, Ch0~39**



Date: 28.OCT.2014 17:48:39

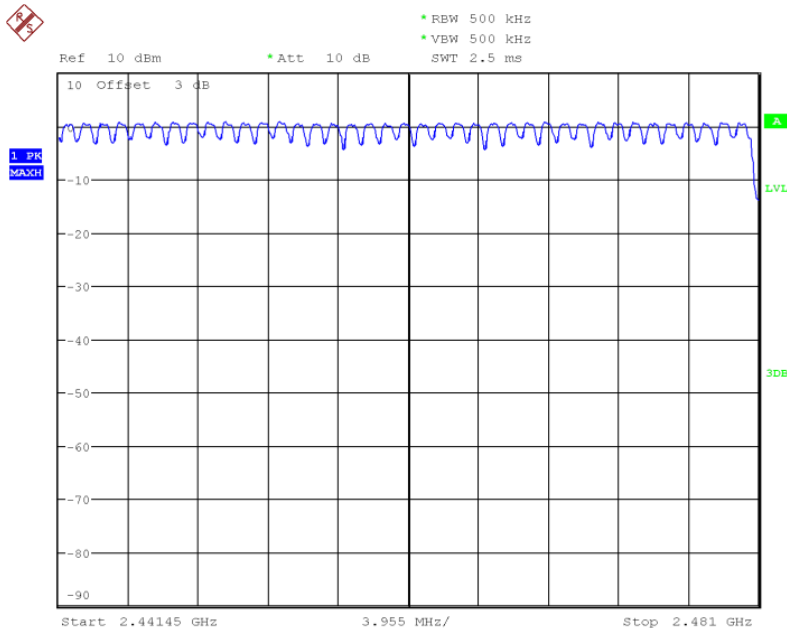
**Fig.89 Number of hopping frequency: GFSK, Ch40~78**





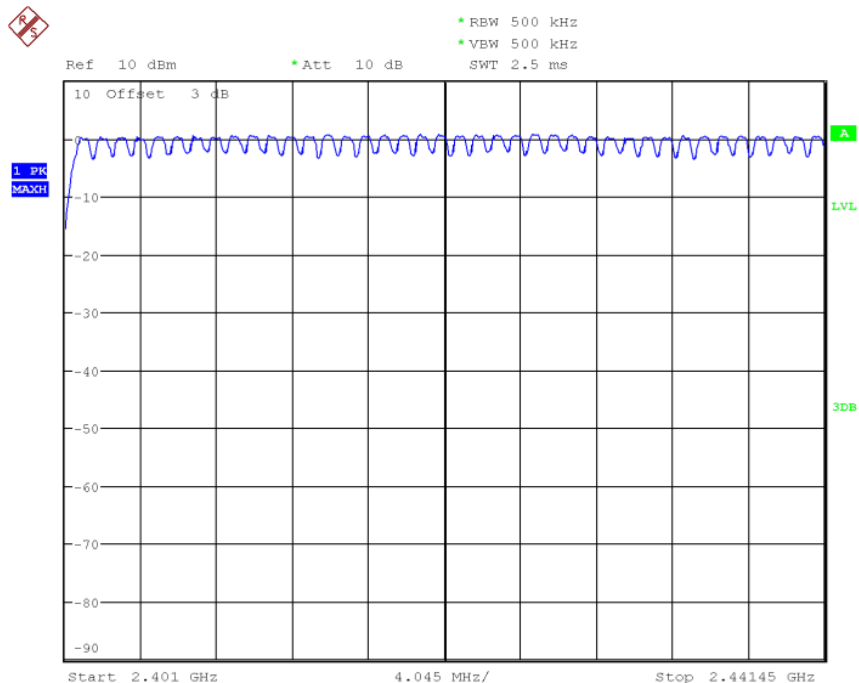
Date: 28.OCT.2014 17:50:44

Fig.90 Number of hopping frequency:  $\pi/4$  DQPSK, Ch0~39



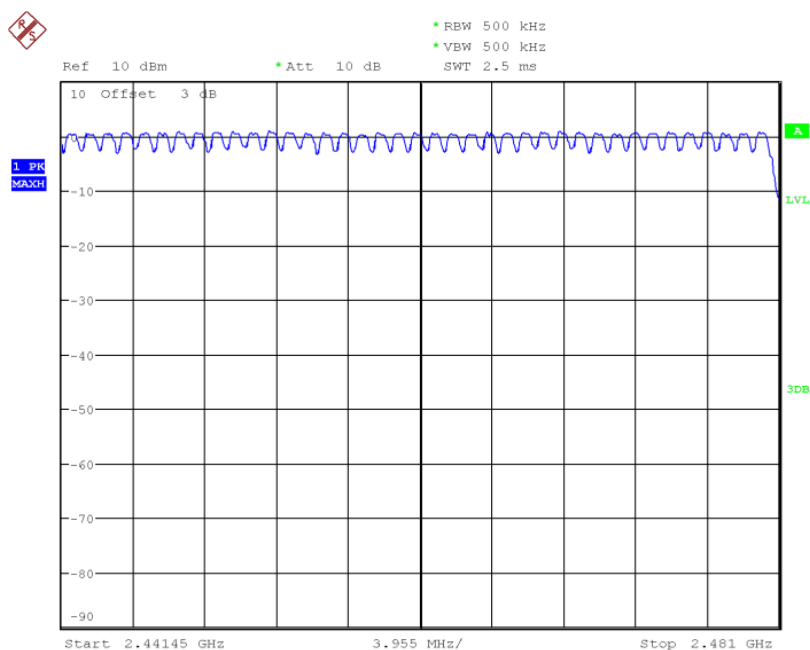
Date: 28.OCT.2014 17:52:50

Fig.91 Number of hopping frequency:  $\pi/4$  DQPSK, Ch40~78



Date: 28.OCT.2014 17:54:55

Fig.92 Number of hopping frequency: 8DPSK, Ch0~39



Date: 28.OCT.2014 17:57:00

Fig.93 Number of hopping frequency: 8DPSK, Ch40~78

## 7. Test Equipments and Ancillaries Used For Tests

The test equipments and ancillaries used are as follows.

### Conducted test system

| No. | Equipment              | Model    | Serial Number | Manufacturer  | Calibration Due date |
|-----|------------------------|----------|---------------|---------------|----------------------|
| 1   | Vector Signal Analyzer | FSQ26    | 101096        | Rohde&Schwarz | 2015-07-06           |
| 2   | DC Power Supply        | ZUP60-14 | LOC-220Z006   | TDL-Lambda    | 2015-07-06           |
| 3   | Bluetooth Tester       | CBT32    | 100785        | Rohde&Schwarz | 2015-01-07           |

### Radiated emission test system

| No. | Equipment                            | Model    | Serial Number | Manufacturer | Calibration Due date |
|-----|--------------------------------------|----------|---------------|--------------|----------------------|
| 1   | Universal Radio Communication Tester | CMU200   | 123101        | R&S          | 2015-07-05           |
| 3   | Test Receiver                        | ESU40    | 100307        | R&S          | 2015-07-24           |
| 4   | Trilog Antenna                       | VULB9163 | 19-162515     | Schwarzbeck  | 2017-11-04           |
| 5   | Double Ridged Guide Antenna          | ETS-3117 | 135885        | ETS          | 2017-05-05           |
| 8   | 2-Line V-Network                     | ENV216   | 101380        | R&S          | 2015-07-24           |

### Anechoic chamber

Fully anechoic chamber by Frankonia German.

## 8. Test Environment

**Shielding Room1** (6.0 meters×3.0 meters×2.7 meters) did not exceed following limits along the conducted RF performance testing:

|                              |  |
|------------------------------|--|
| Temperature                  | Min. = 15 °C, Max. = 30 °C                 |
| Relative humidity            | Min. = 30 %, Max. = 60 %                   |
| Shielding effectiveness      | > 110 dB                                   |
| Ground system resistance     | < 0.5 Ω                                    |
| Uniformity of field strength | Between 0 and 6 dB, from 80MHz to 3000 MHz |

**Control room** did not exceed following limits along the EMC testing:

|                          |                            |
|--------------------------|----------------------------|
| Temperature              | Min. = 15 °C, Max. = 35 °C |
| Relative humidity        | Min. = 30 %, Max. = 60 %   |
| Shielding effectiveness  | > 110 dB                   |
| Electrical insulation    | > 10 kΩ                    |
| Ground system resistance | < 0.5 Ω                    |

**Fully-anechoic chamber1** (6.8 meters×3.08 meters×3.53 meters) did not exceed following limits along the EMC testing:

|                              |  |
|------------------------------|--|
| Temperature                  | Min. = 15 °C, Max. = 30 °C                 |
| Relative humidity            | Min. = 30 %, Max. = 60 %                   |
| Shielding effectiveness      | > 110 dB                                   |
| Electrical insulation        | > 10 kΩ                                    |
| Ground system resistance     | < 0.5 Ω                                    |
| Uniformity of field strength | Between 0 and 6 dB, from 80MHz to 3000 MHz |

**Fully-anechoic chamber2** (Tapered Section: 8.75 meters×3.66 meters×3.66 meters, Rectangular Section: 7.32 meters×3.97 meters×3.66 meters) did not exceed following limits along the EMC testing:

|                              |  |
|------------------------------|--|
| Temperature                  | Min. = 15 °C, Max. = 30 °C                 |
| Relative humidity            | Min. = 35 %, Max. = 60 %                   |
| Shielding effectiveness      | > 110 dB                                   |
| Electrical insulation        | > 10 kΩ                                    |
| Ground system resistance     | < 0.5 Ω                                    |
| Uniformity of field strength | Between 0 and 6 dB, from 30MHz to 40000MHz |

**ANNEX A. Deviations from Prescribed Test Methods**

No deviation from Prescribed Test Methods.

\*\*\*\*\*End The Report\*\*\*\*\*