



FCC PART 15C TEST REPORT No. I16Z40969-SRD02

for

TCL Communication Ltd

GSM/WCDMA/LTE mobile phone

Model Name: 4060O

FCC ID: 2ACCJB039

with

Hardware Version: 02

Software Version: A3RUCR0

Issued Date: 2016-05-26



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 CTTL.

Test Laboratory:

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

No.52, HuayuanNorth Road, Haidian District, Beijing, P. R. China 100191.

Tel:+86(0)10-62304633-2512,Fax:+86(0)10-62304633-2504

Email:cttl_terminals@catr.cn, website:www.chinattl.com

©Copyright. All rights reserved by CTTL.



REPORT HISTORY

| Report Number | Revision | Description | Issue Date |
|----------------------|-----------------|--------------------|-------------------|
| I16Z40969-SRD02 | Rev.0 | 1st edition | 2016-05-26 |

CONTENTS

| | |
|--|-----------|
| 1. TEST LABORATORY | 4 |
| 1.1. TESTING LOCATION | 4 |
| 1.1. TESTING ENVIRONMENT | 4 |
| 1.2. PROJECT DATA | 4 |
| 1.3. SIGNATURE | 4 |
| 2. CLIENT INFORMATION | 5 |
| 2.1. APPLICANT INFORMATION | 5 |
| 2.2. MANUFACTURER INFORMATION | 5 |
| 3. EQUIPMENT UNDERTEST (EUT) AND ANCILLARY EQUIPMENT (AE) | 6 |
| 3.1. ABOUT EUT | 6 |
| 3.2. INTERNAL IDENTIFICATION OF EUT | 6 |
| 3.3. INTERNAL IDENTIFICATION OF AE | 6 |
| 3.4. NORMAL ACCESSORY SETTING | 7 |
| 3.5. GENERAL DESCRIPTION | 7 |
| 4. REFERENCE DOCUMENTS | 7 |
| 4.1. DOCUMENTS SUPPLIED BY APPLICANT | 7 |
| 4.2. REFERENCE DOCUMENTS FOR TESTING | 7 |
| 5. TEST RESULTS | 8 |
| 5.1. SUMMARY OF TEST RESULTS | 8 |
| 5.2. STATEMENTS | 8 |
| 6. TEST FACILITIES UTILIZED | 9 |
| ANNEX A: DETAILED TEST RESULTS | 10 |
| A.1. MEASUREMENT METHOD | 10 |
| A.2. PEAK OUTPUT POWER – CONDUCTED | 11 |
| A.3. FREQUENCY BAND EDGES – CONDUCTED | 12 |
| A.4. CONDUCTED EMISSION | 19 |
| A.5. RADIATED EMISSION | 44 |
| A.6. TIME OF OCCUPANCY (DWELL TIME) | 63 |
| A.7. 20dB BANDWIDTH | 73 |
| A.8. CARRIER FREQUENCY SEPARATION | 79 |
| A.9. NUMBER OF HOPPING CHANNELS | 82 |
| A.10. AC POWERLINE CONDUCTED EMISSION | 86 |
| ANNEX B: ACCREDITATION CERTIFICATE | 91 |

1. Test Laboratory

1.1. Testing Location

Location 1:CTTL(huayuan North Road)

Address: No. 52, Huayuan North Road, Haidian District, Beijing,
P. R. China100191

Location 2:CTTL(Shouxiang)

Address: No. 51 Shouxiang Science Building, Xueyuan Road,
Haidian District, Beijing, P. R. China100191

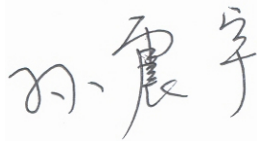
1.2. Testing Environment

Normal Temperature: 15-35°C
Extreme Temperature: -10/+55°C
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2015-12-30
Testing End Date: 2016-05-25

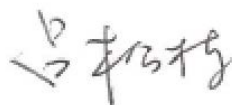
1.4. Signature



Sun Zhenyu
(Prepared this test report)



Li Zhuofang
(Reviewed this test report)



Lv Songdong
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: TCL Communication Ltd
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China. 201203
City: Shanghai
Postal Code: 201203
Country: China
Contact Person: Gong Zhizhou
Contact Email: zhizhou.gong@tcl.com
Telephone: 0086-21-31363544
Fax: 0086-21-61460602

2.2. Manufacturer Information

Company Name: TCL Communication Ltd
Address /Post: 5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park,
Pudong Area Shanghai, P.R. China. 201203
City: Shanghai
Postal Code: 201203
Country: China
Telephone: 0086-21-31363544
Fax: 0086-21-61460602

3. Equipment UnderTest (EUT) and Ancillary Equipment (AE)

3.1. About EUT

| | |
|--------------------|----------------------------|
| Description | GSM/WCDMA/LTE mobile phone |
| Model Name | 4060O |
| FCC ID | 2ACCJB039 |
| Frequency Band | ISM 2400MHz~2483.5MHz |
| Type of Modulation | GFSK/ $\pi/4$ DQPSK/8DPSK |
| Number of Channels | 79 |
| Power Supply | 3.8V DC by Battery |

3.2. Internal Identification of EUT

| EUT ID* | SN or IMEI | HW Version | SW Version |
|---------|------------|------------|------------|
| EUT1 | / | 02 | A3RUCR0 |
| EUT2 | / | 02 | A3RUCR0 |

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

3.3. Internal Identification of AE

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

AE1

| | |
|-----------------|--------------|
| Model | CAB1780002C1 |
| Manufacturer | BYD |
| Capacitance | 1780 mAh |
| Nominal voltage | 3.8V |

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

3.4. Normal Accessory setting

Fully charged battery should be used during the test.

3.5. General Description

The Equipment Under Test (EUT) is a model of GSM/WCDMA/LTE mobile phone mobile phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test.

4. Reference Documents

4.1. Documents supplied by applicant

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

4.2. Reference Documents for testing

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

| Reference | Title | Version |
|-------------|--|-----------|
| FCC Part15 | FCC CFR 47, Part 15, Subpart C: | 2015 |
| | 15.205 Restricted bands of operation; | |
| | 15.209 Radiated emission limits, general requirements; | |
| ANSI C63.10 | 15.247 Operation within the bands 902–928MHz, | June,2013 |
| | 2400–2483.5 MHz, and 5725–5850 MHz. | |
| | American National Standard for Testing Unlicensed Wireless Devices | |

5. Test Results

5.1. Summary of Test Results

Abbreviations used in this clause:

P Pass, The EUT complies with the essential requirements in the standard.

F Fail, The EUT does not comply with the essential requirements in the standard

NA Not Applicable, The test was not applicable

NP Not Performed, The test was not performed by CTTL

| SUMMARY OF MEASUREMENT RESULTS | Sub-clause | Verdict |
|---------------------------------|------------------------|-----------|
| Peak Output Power - Conducted | 15.247 (b)(1) | P |
| Frequency Band Edges | 15.247 (d) | P |
| Conducted Emission | 15.247 (d) | P |
| Radiated Emission | 15.247, 15.205, 15.209 | P |
| Time of Occupancy (Dwell Time) | 15.247 (a) (1)(iii) | P |
| 20dB Bandwidth | 15.247 (a)(1) | NA |
| Carrier Frequency Separation | 15.247 (a)(1) | P |
| Number of hopping channels | 15.247 (a)(b)(iii) | P |
| AC Powerline Conducted Emission | 15.107, 15.207 | P |

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

The measurement is made according to ANSI C63.10.

5.2. Statements

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

This model is a variant product which model name is 4060A; all the test result has been derived from test report of 4060A.

Test Facilities Utilized

Conducted test system

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration Period | Calibration Due date |
|-----|------------------------|--------|---------------|-----------------|--------------------|----------------------|
| 1 | Vector Signal Analyzer | FSQ26 | 200136 | Rohde & Schwarz | 1 year | 2017-01-06 |
| 2 | Bluetooth Tester | CBT32 | 100649 | Rohde & Schwarz | 1 year | 2017-02-09 |
| 3 | Shielding Room | S81 | / | ETS-Lindgren | / | / |
| 4 | LISN | ENV216 | 101200 | Rohde & Schwarz | 1 year | 2016-07-07 |
| 5 | Test Receiver | ESCI | 100344 | Rohde & Schwarz | 1 year | 2017-03-03 |

Radiated emission test system

| No. | Equipment | Model | Serial Number | Manufacturer | Calibration Period | Calibration Due date |
|-----|-----------------------------------|----------|-------------------|------------------|--------------------|----------------------|
| 1 | Test Receiver | ESCI 7 | 100948 | Rohde & Schwarz | 1 year | 2016-07-16 |
| 2 | Loop antenna | HFH2-Z2 | 829324/00 7 | Rohde & Schwarz | 3 year | 2017-12-16 |
| 3 | BiLog Antenna | VULB9163 | 234 | Schwarzbeck | 3 year | 2016-09-15 |
| 4 | Dual-Ridge Waveguide Horn Antenna | 3115 | 6914 | EMCO | 3 year | 2017-12-15 |
| 5 | Dual-Ridge Waveguide Horn Antenna | 3116 | 2661 | ETS-Lindgren | 3 year | 2017-06-30 |
| 6 | Vector Signal Analyzer | FSV | 101047 | Rohde & Schwarz | 1 year | 2016-07-03 |
| 7 | Semi-anechoic chamber | / | CT000332 -1074 | Frankonia German | / | / |
| 8 | Bluetooth Tester | CBT | 100153 | Rohde & Schwarz | 1 year | 2016-09-18 |

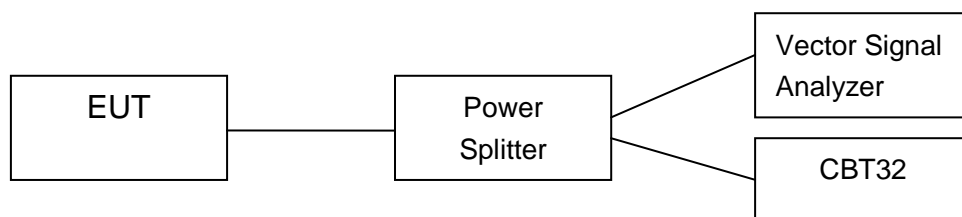
ANNEX A: Detailed Test Results

A.1. Measurement Method

A.1.1. Conducted Measurements

The measurement is made according to ANSI C63.10.

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



A.1.2. Radiated Emission Measurements

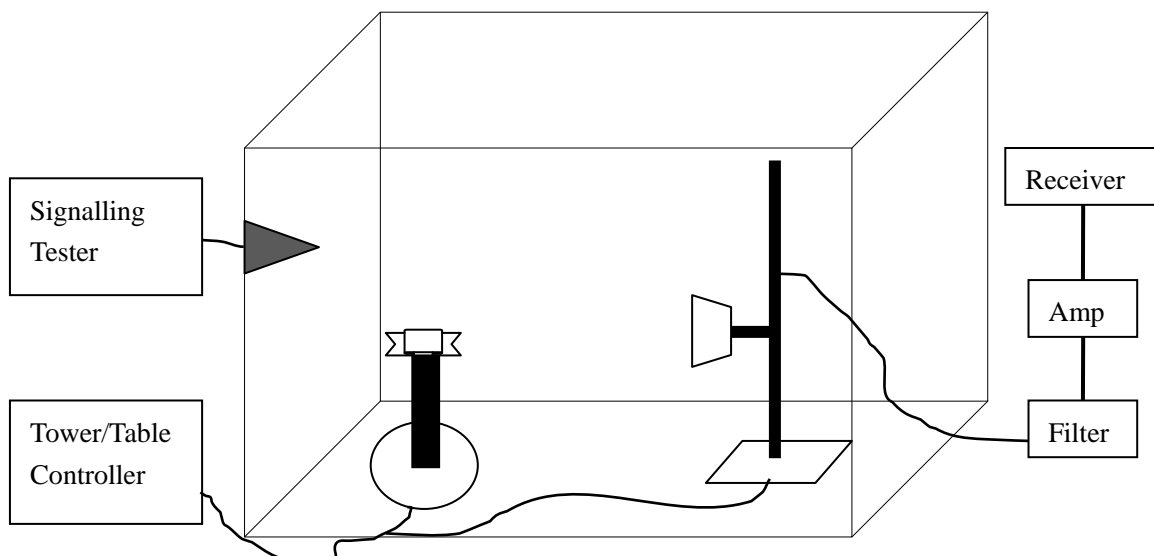
The measurement is made according to ANSI C63.10

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 1MHz;



A.2. Peak Output Power – Conducted

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

a) Use the following spectrum analyzer settings:

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

b) Allow trace to stabilize.

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

d) The indicated level is the peak output power.

Measurement Limit:

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

Measurement Results:

For GFSK

| Channel | Ch 0 2402 MHz | Ch 39 2441 MHz | Ch 78 2480 MHz | Conclusion |
|---|------------------|-------------------|-------------------|------------|
| Peak Conducted Output Power (dBm) | 5.70 | 5.52 | 5.58 | P |

For $\pi/4$ DQPSK

| Channel | Ch 0 2402 MHz | Ch 39 2441 MHz | Ch 78 2480 MHz | Conclusion |
|---|------------------|-------------------|-------------------|------------|
| Peak Conducted Output Power (dBm) | 6.61 | 6.45 | 6.49 | P |

For 8DPSK

| Channel | Ch 0 2402 MHz | Ch 39 2441 MHz | Ch 78 2480 MHz | Conclusion |
|---|------------------|-------------------|-------------------|------------|
| Peak Conducted Output Power (dBm) | 6.95 | 6.77 | 6.82 | P |

Conclusion: PASS

A.3. Frequency Band Edges – Conducted

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

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

- Span: 10 MHz
- Resolution Bandwidth: 100 kHz
- Video Bandwidth: 300 kHz
- Sweep Time: 5ms
- Detector: Peak
- Trace: max hold

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

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

Measurement Limit:

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

Measurement Result:

For GFSK

| Channel | Hopping | Band Edge Power (dBc) | | Conclusion |
|---------|-------------|------------------------|--------|------------|
| 0 | Hopping OFF | Fig.1 | -56.00 | P |
| | Hopping ON | Fig.2 | -56.55 | P |
| 78 | Hopping OFF | Fig.3 | -63.92 | P |
| | Hopping ON | Fig.4 | -65.19 | P |

For $\pi/4$ DQPSK

| Channel | Hopping | Band Edge Power (dBc) | | Conclusion |
|---------|-------------|------------------------|--------|------------|
| 0 | Hopping OFF | Fig.5 | -55.66 | P |
| | Hopping ON | Fig.6 | -55.60 | P |
| 78 | Hopping OFF | Fig.7 | -62.86 | P |
| | Hopping ON | Fig.8 | -60.36 | P |

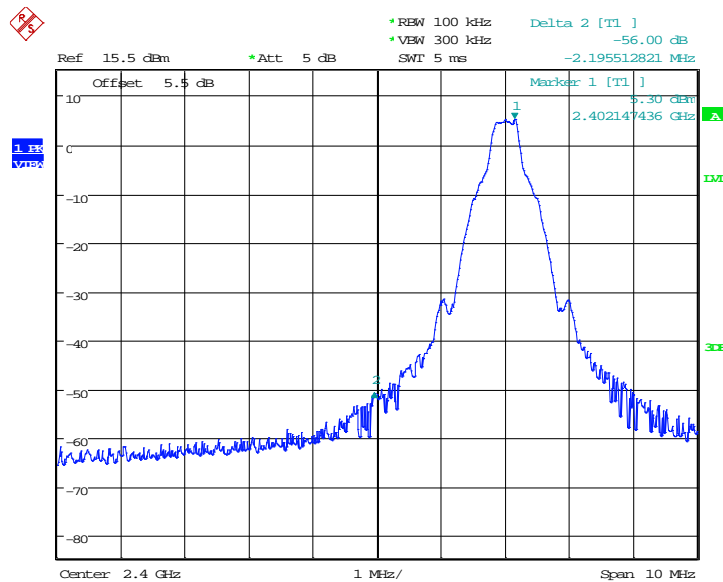
For 8DPSK

| Channel | Hopping | Band Edge Power (dBc) | | Conclusion |
|---------|-------------|------------------------|--------|------------|
| 0 | Hopping OFF | Fig.9 | -56.71 | P |
| | Hopping ON | Fig.10 | -54.29 | P |

| | | | | |
|----|-------------|--------|--------|---|
| 78 | Hopping OFF | Fig.11 | -62.07 | P |
| | Hopping ON | Fig.12 | -63.21 | P |

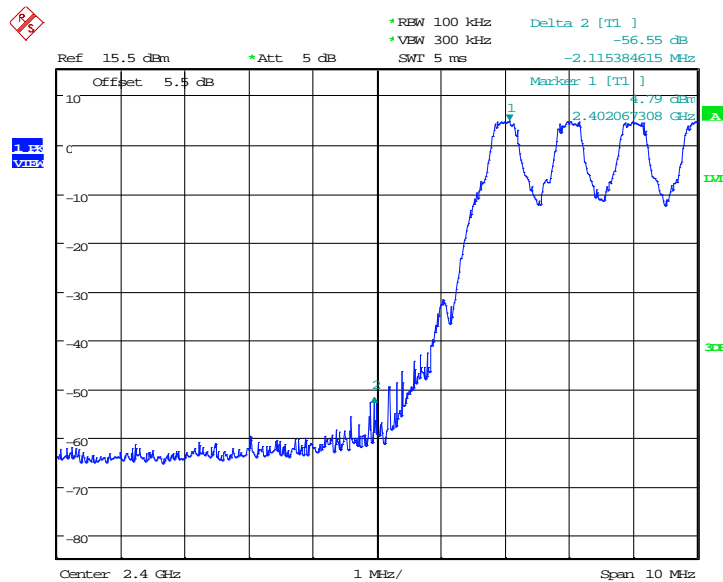
Conclusion: PASS

Test graphs as below



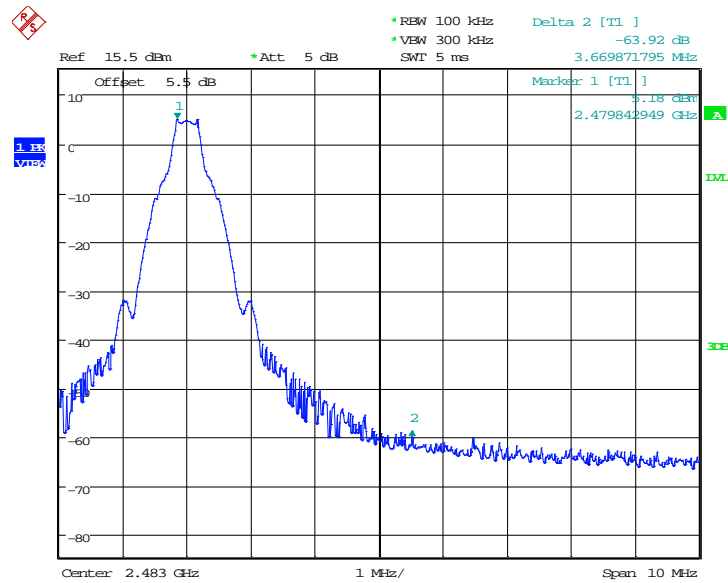
Date: 4.JAN.2016 15:25:27

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



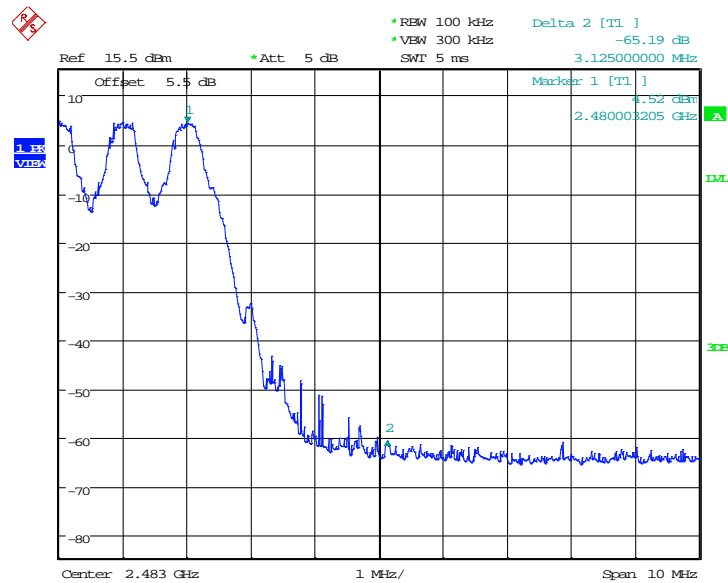
Date: 4.JAN.2016 15:27:47

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



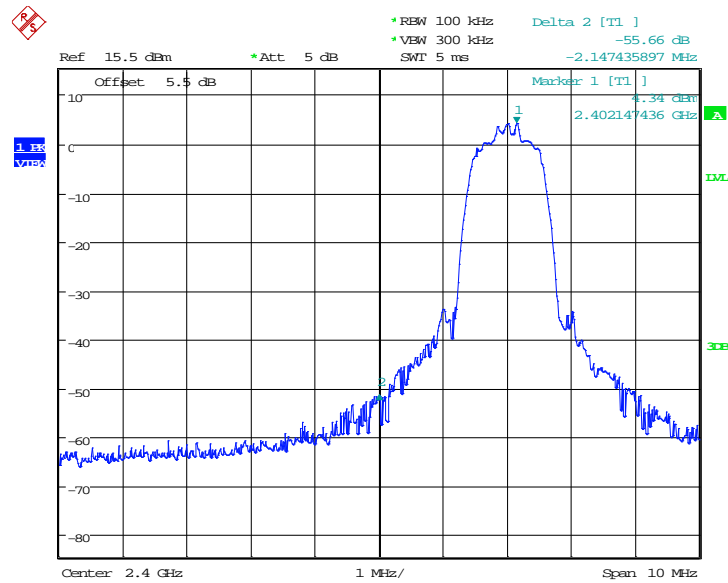
Date: 4.JAN.2016 15:25:45

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



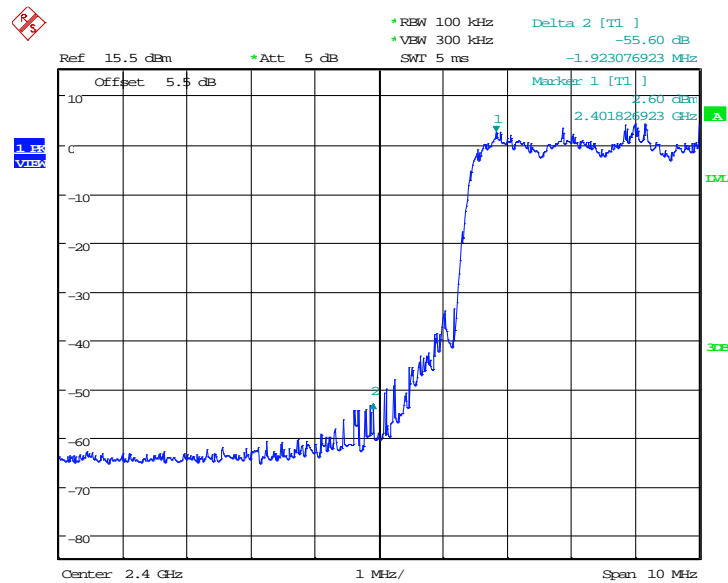
Date: 4.JAN.2016 15:29:50

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



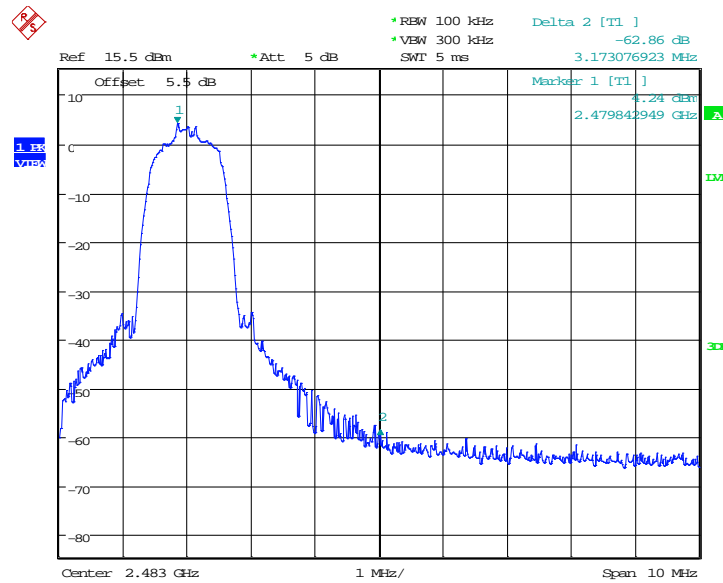
Date: 4.JAN.2016 15:35:43

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



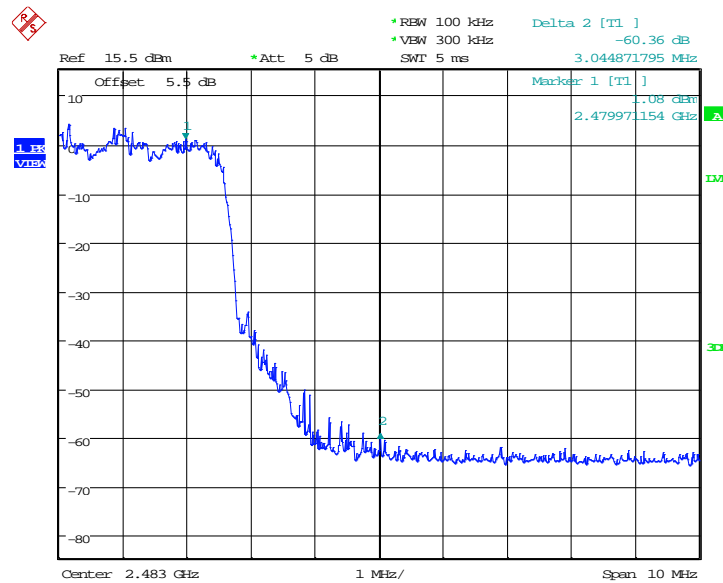
Date: 4.JAN.2016 15:38:02

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



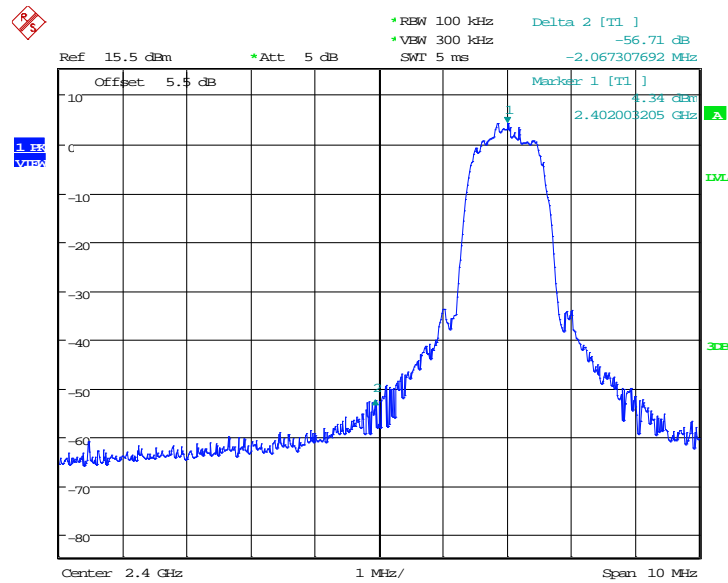
Date: 4.JAN.2016 15:36:00

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



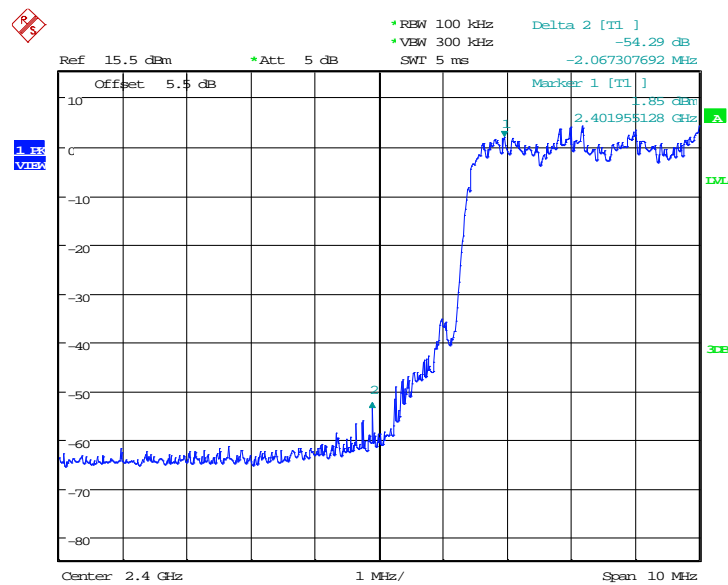
Date: 4.JAN.2016 15:40:05

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



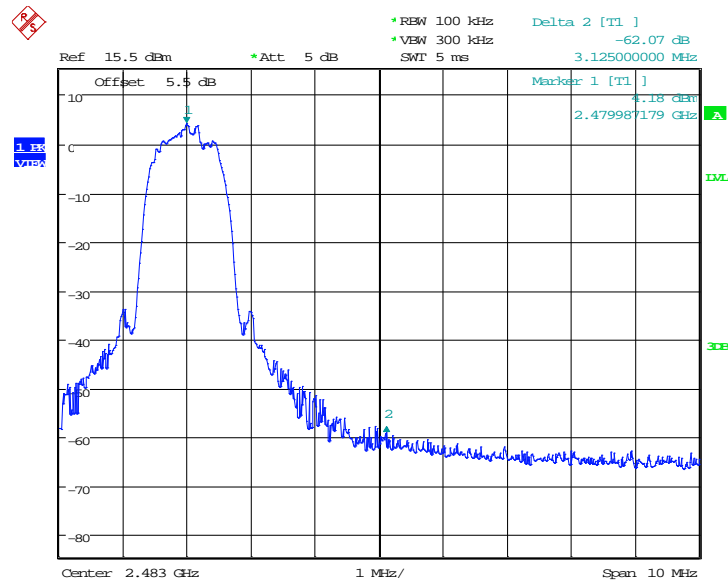
Date: 4.JAN.2016 16:13:59

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



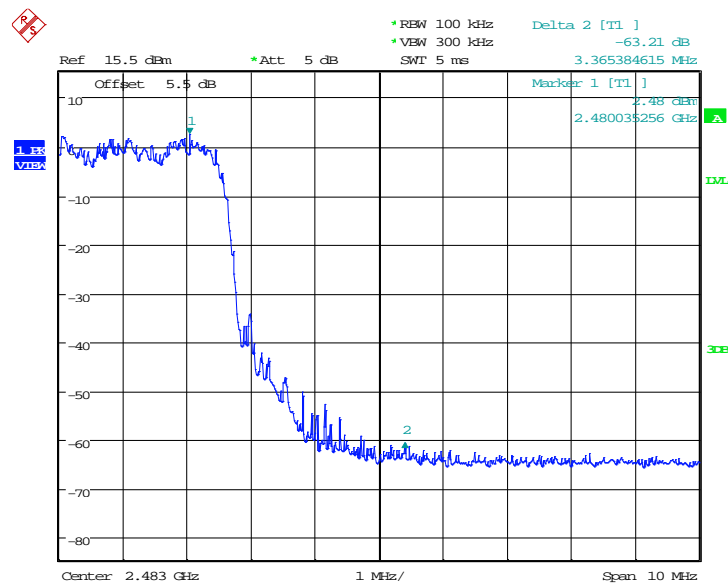
Date: 4.JAN.2016 16:16:19

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



Date: 4.JAN.2016 16:14:16

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



Date: 4.JAN.2016 16:18:21

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

A.4. Conducted Emission

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

Measurement Procedure – Reference Level

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

Measurement Procedure - Unwanted Emissions

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

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

Measurement Limit:

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

Measurement Results:

For GFSK

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

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

For $\pi/4$ DQPSK

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

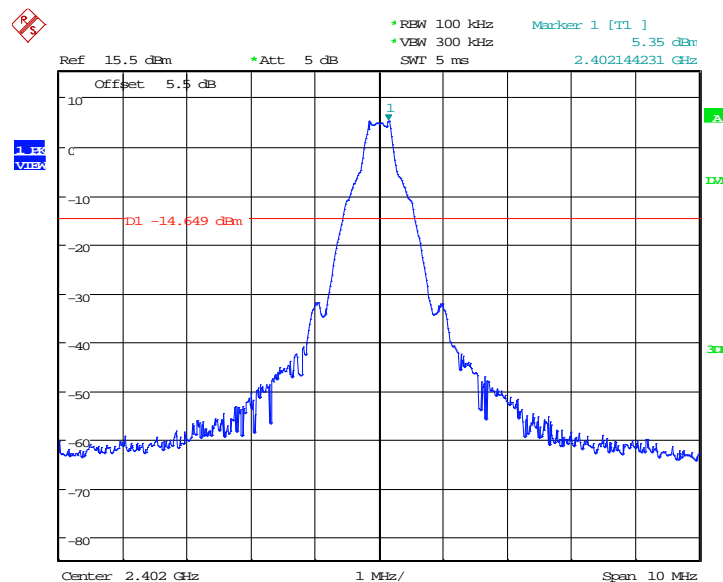
For 8DPSK

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

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

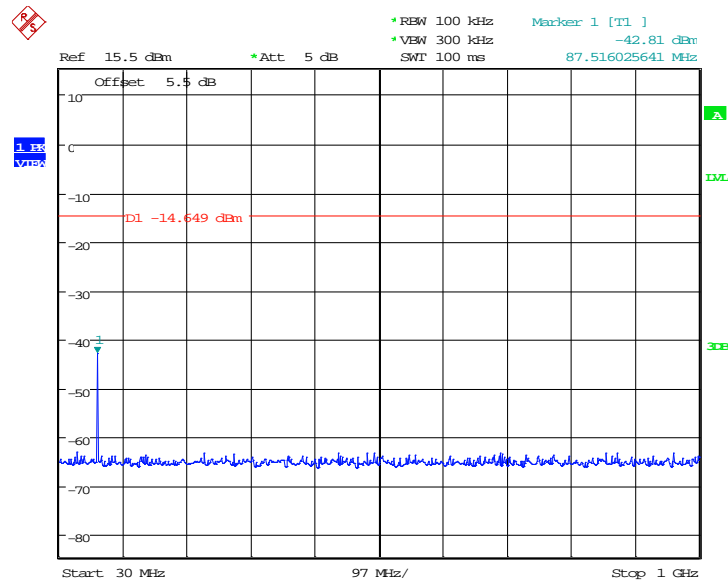
Conclusion: PASS

Test graphs as below



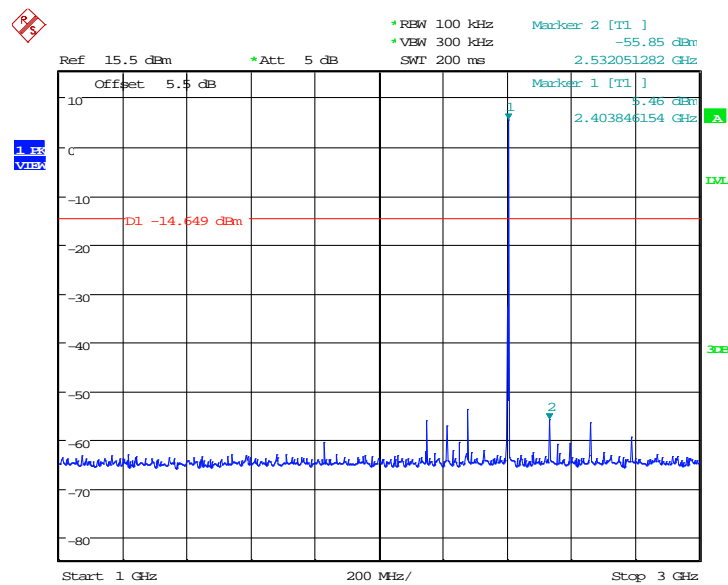
Date: 5.JAN.2016 15:23:53

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



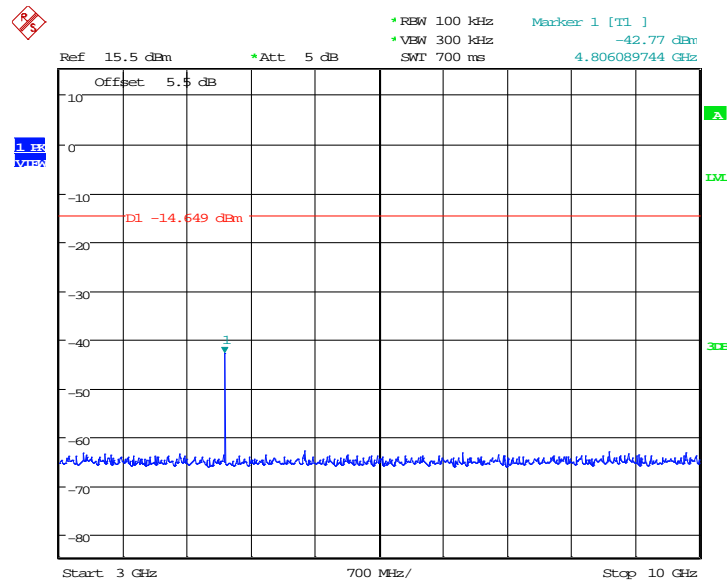
Date: 5.JAN.2016 15:24:10

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



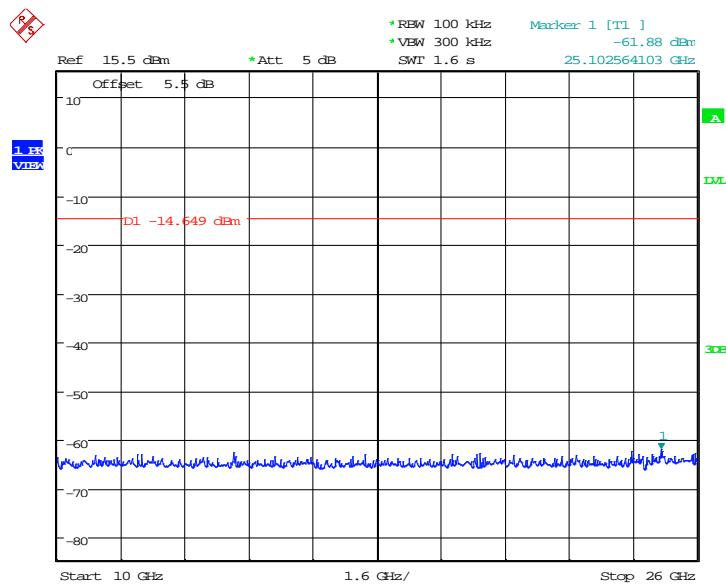
Date: 5.JAN.2016 15:24:41

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



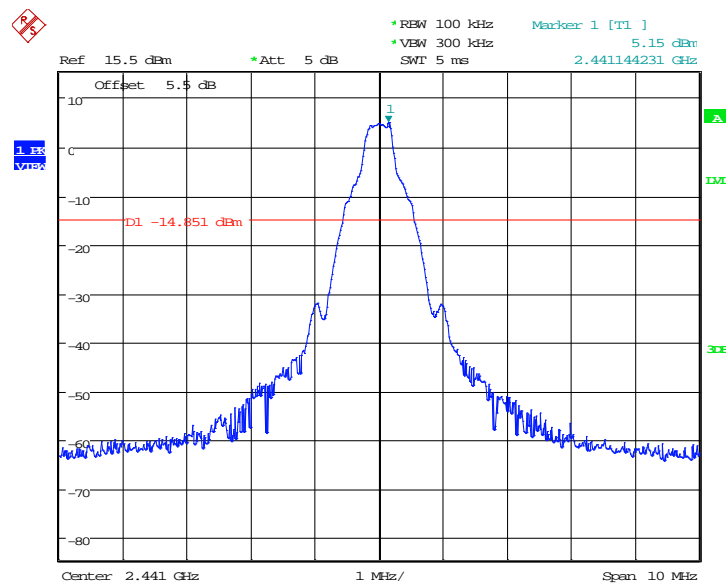
Date: 5.JAN.2016 15:24:58

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



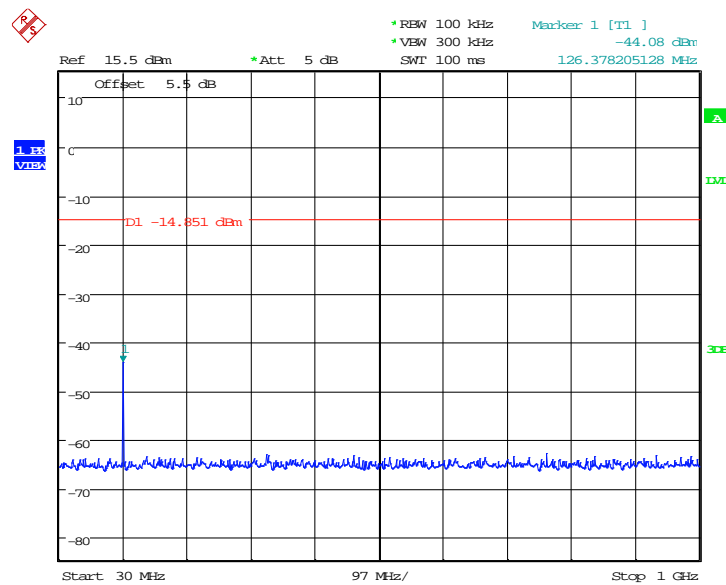
Date: 5.JAN.2016 15:25:14

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



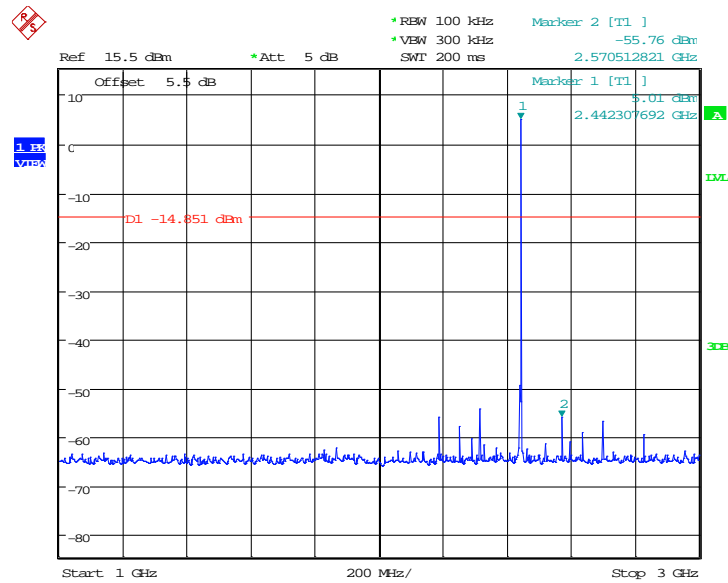
Date: 5.JAN.2016 15:25:31

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



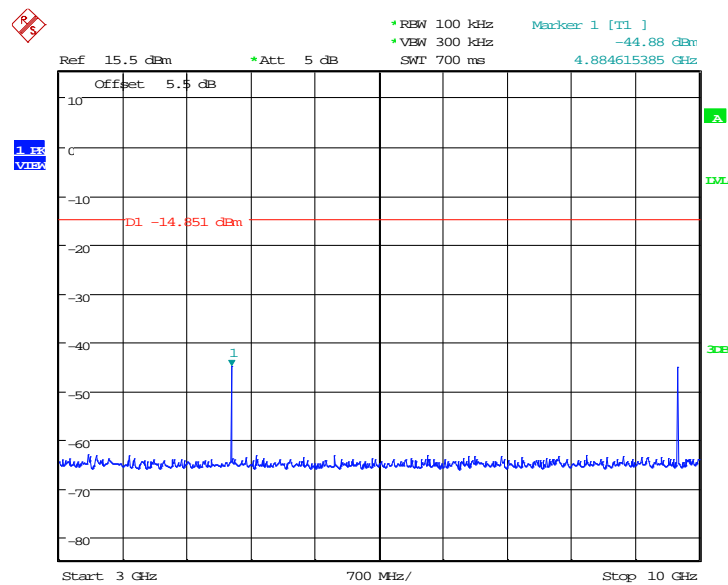
Date: 5.JAN.2016 15:25:48

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



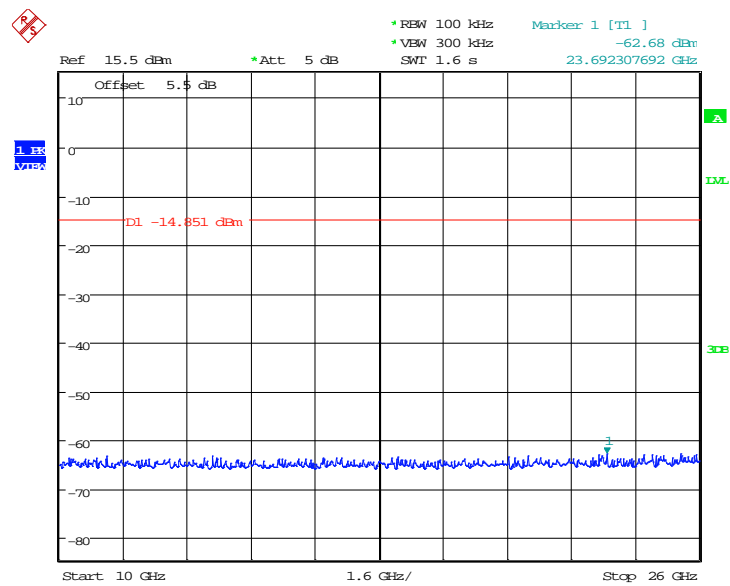
Date: 5.JAN.2016 15:26:19

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



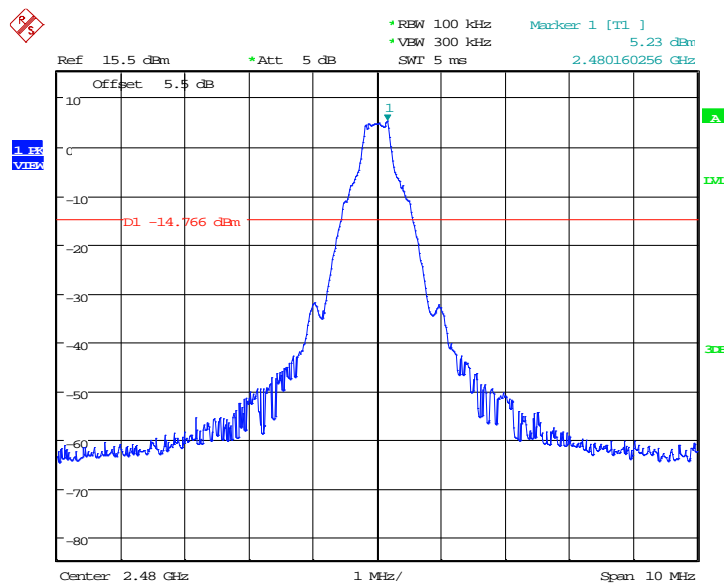
Date: 5.JAN.2016 15:26:36

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



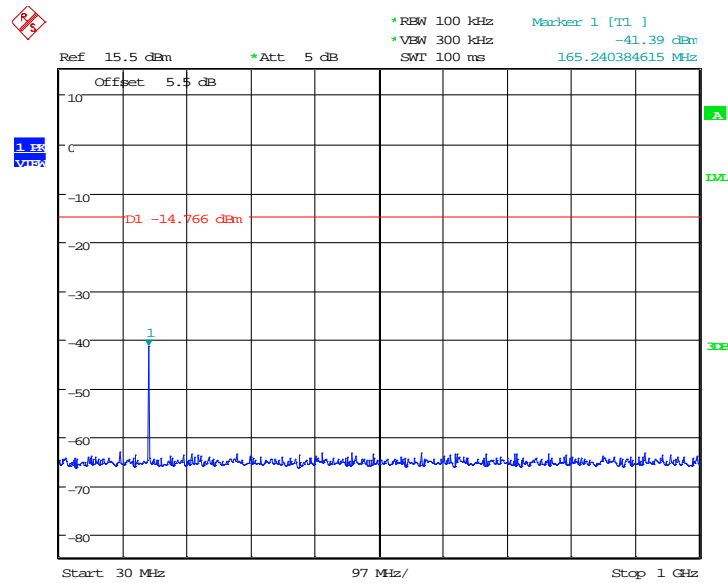
Date: 5.JAN.2016 15:26:52

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



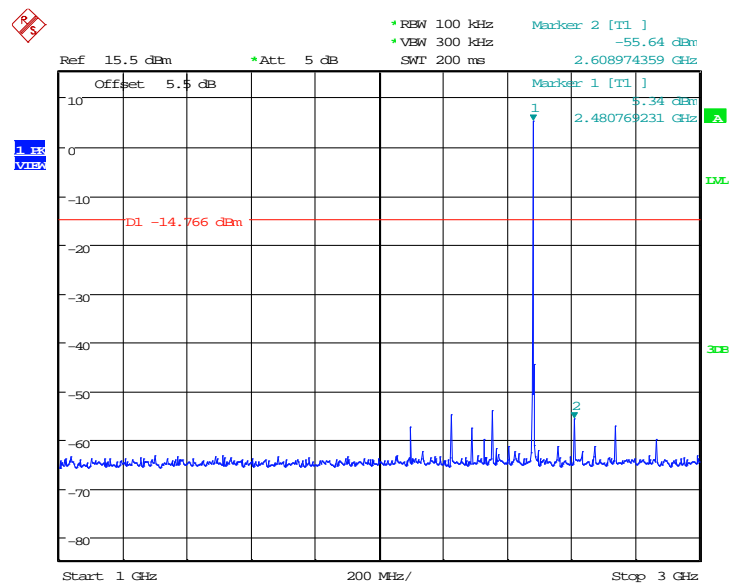
Date: 5.JAN.2016 15:27:09

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



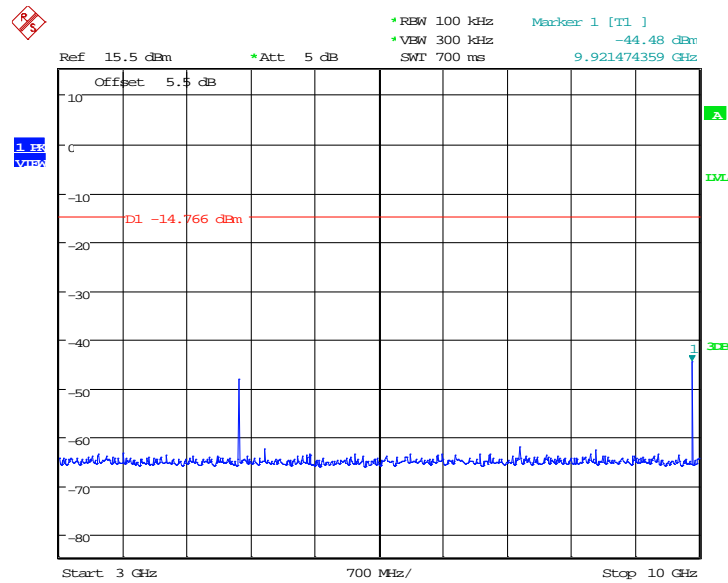
Date: 5.JAN.2016 15:27:25

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



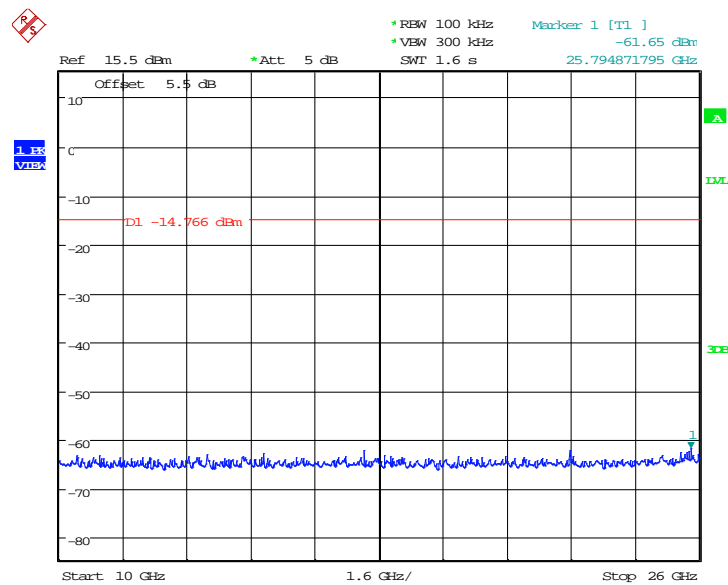
Date: 5.JAN.2016 15:27:57

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



Date: 5.JAN.2016 15:28:14

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



Date: 5.JAN.2016 15:28:30

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



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

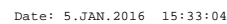
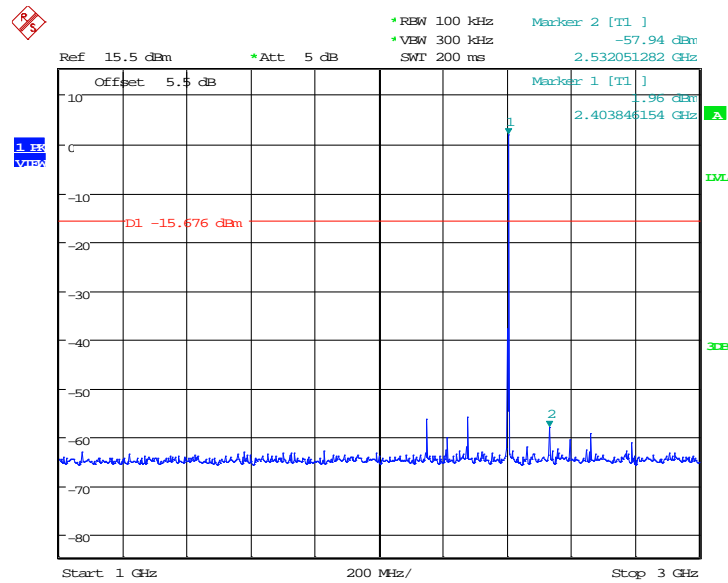
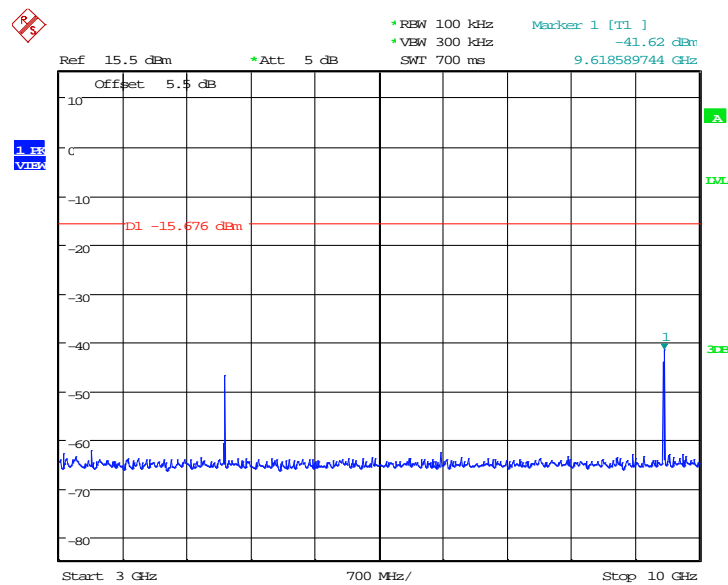


Fig.29. Conducted spurious emission: $\pi/4$ DQPSK, Channel 0, 30MHz - 1GHz



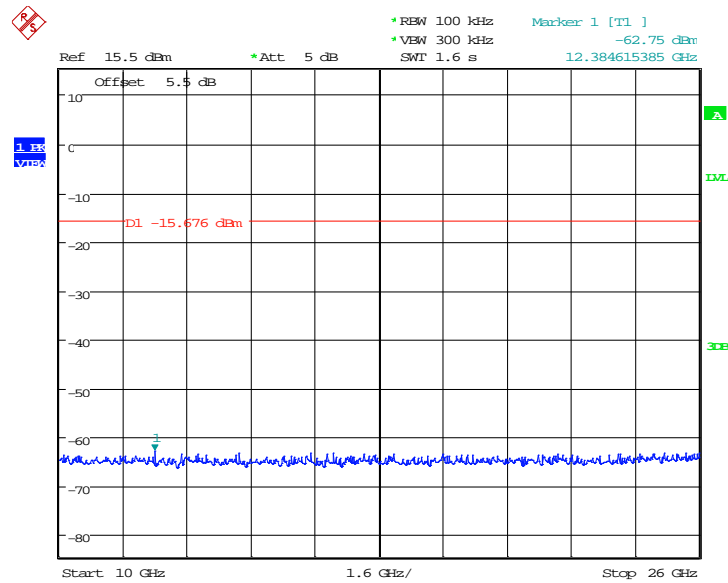
Date: 5.JAN.2016 15:33:36

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



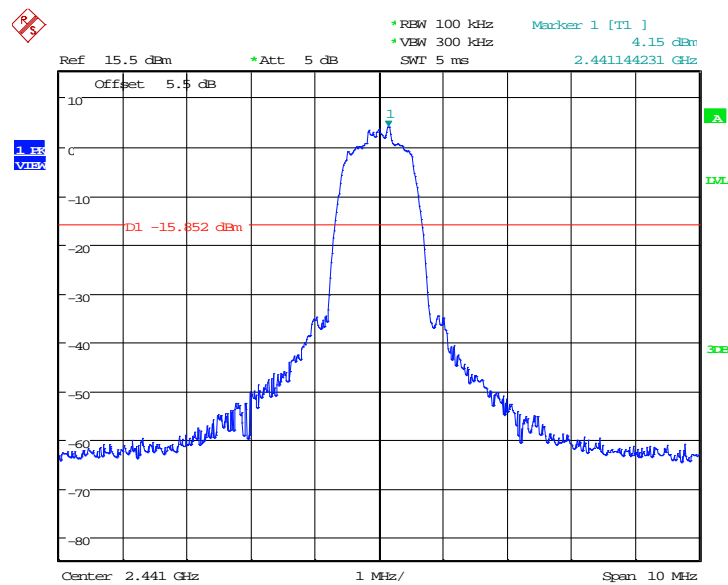
Date: 5.JAN.2016 15:33:52

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



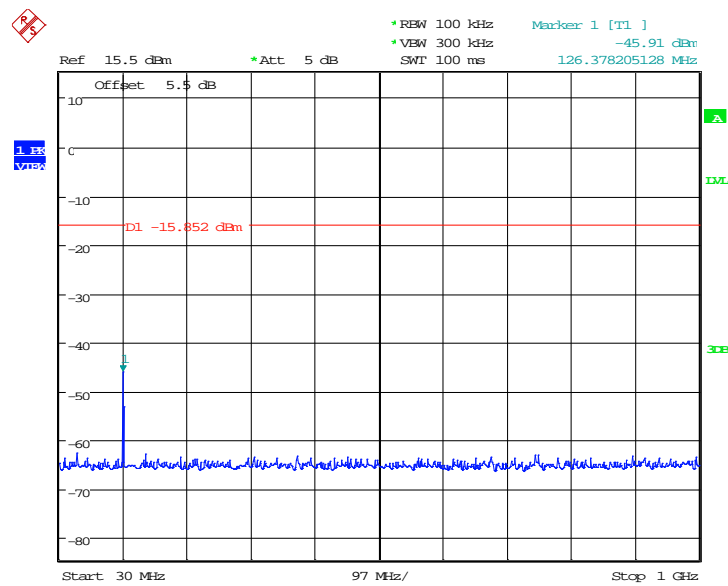
Date: 5.JAN.2016 15:34:09

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



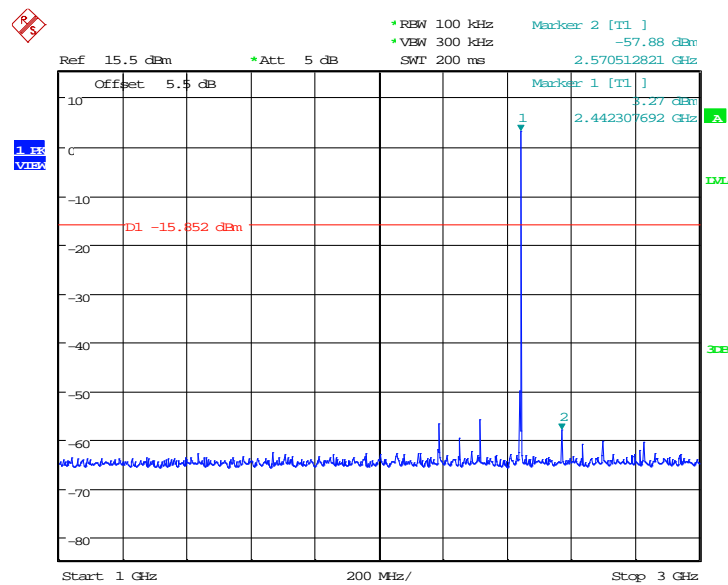
Date: 5.JAN.2016 15:34:26

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



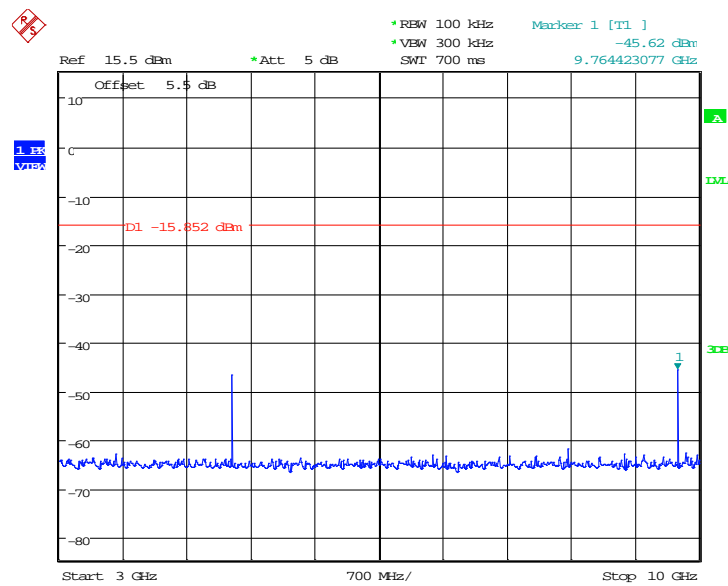
Date: 5.JAN.2016 15:34:42

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



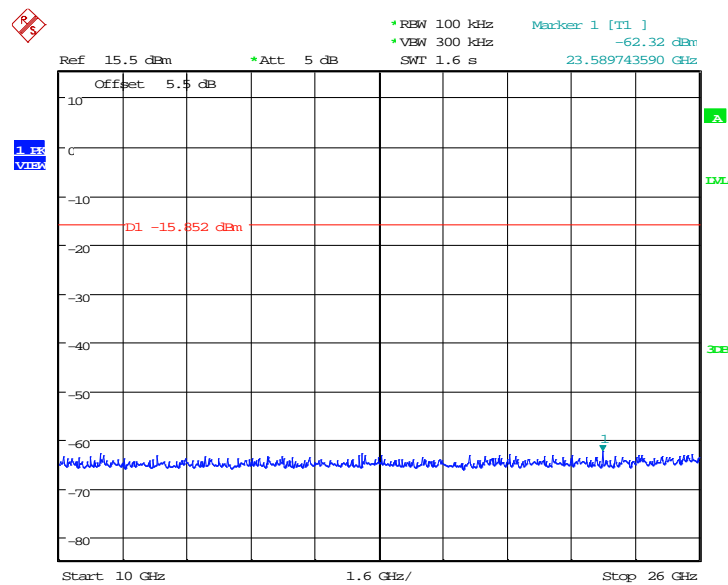
Date: 5.JAN.2016 15:35:14

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



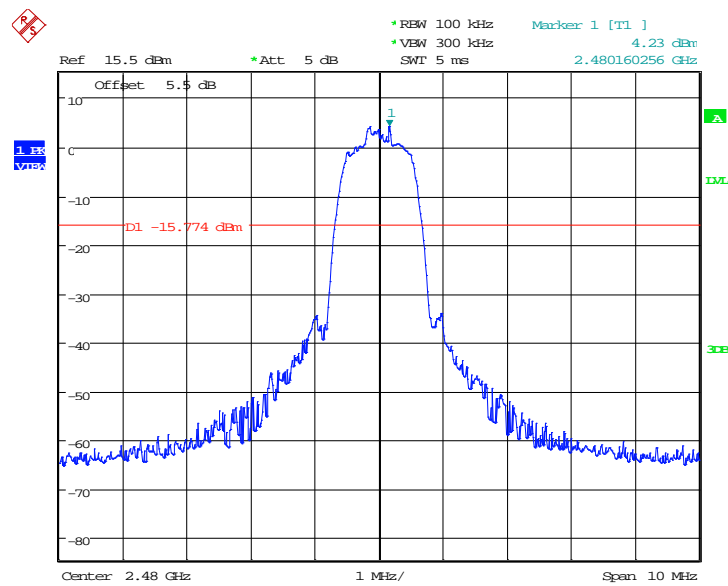
Date: 5.JAN.2016 15:35:30

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



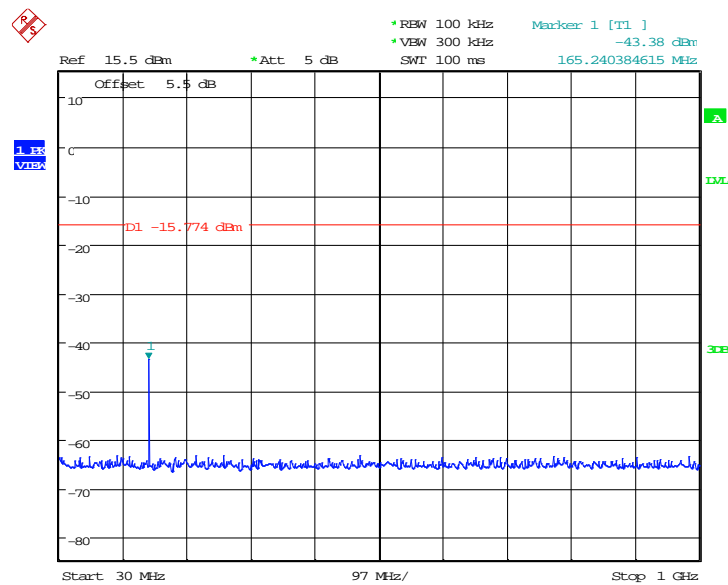
Date: 5.JAN.2016 15:35:47

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



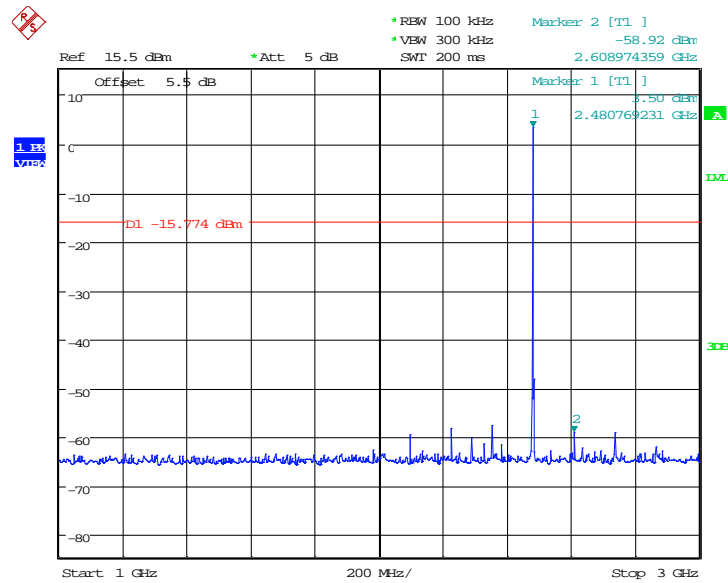
Date: 5.JAN.2016 15:36:04

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



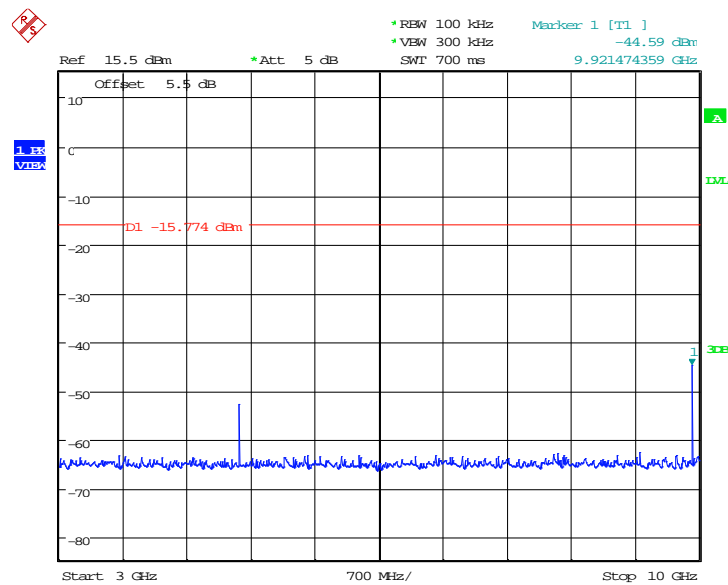
Date: 5.JAN.2016 15:36:20

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



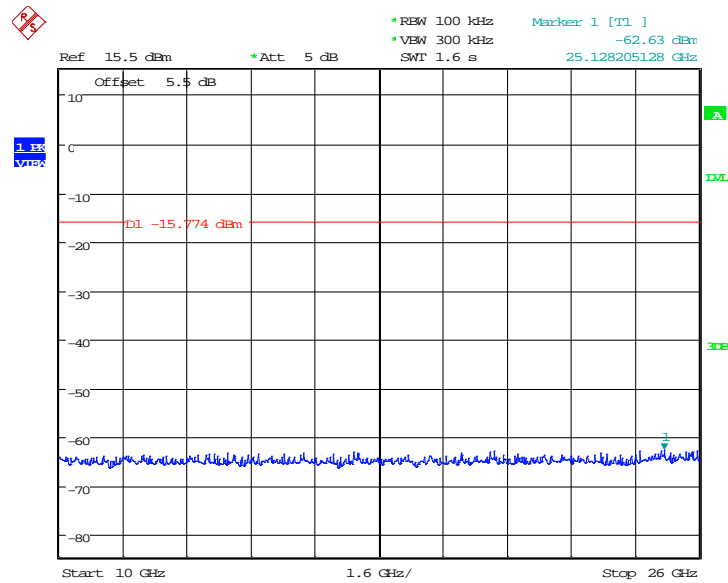
Date: 5.JAN.2016 15:36:52

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



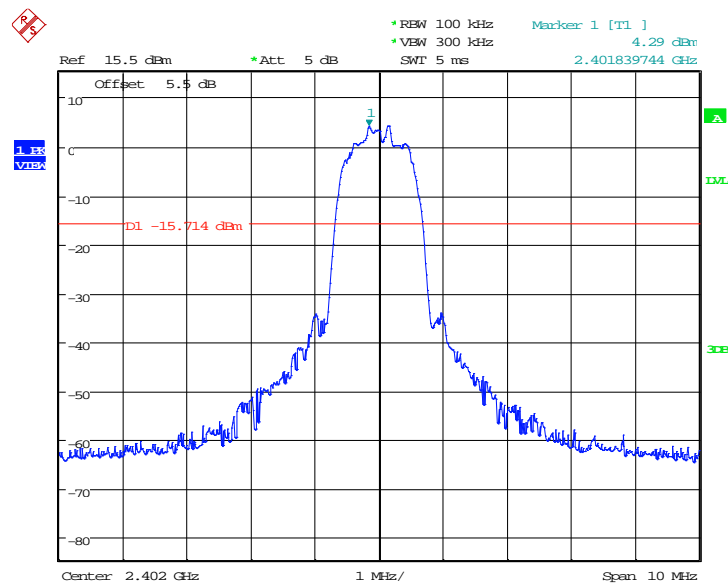
Date: 5.JAN.2016 15:37:08

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



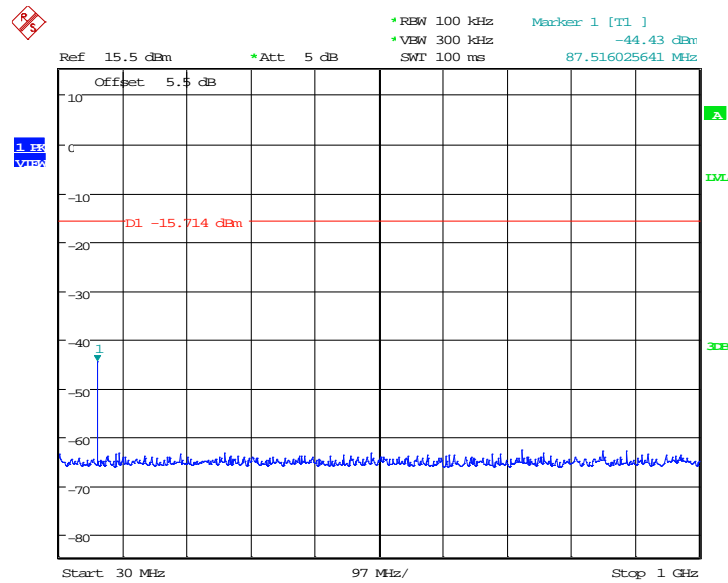
Date: 5.JAN.2016 15:37:25

Fig.42. Fig.30 Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 10GHz - 26GHz



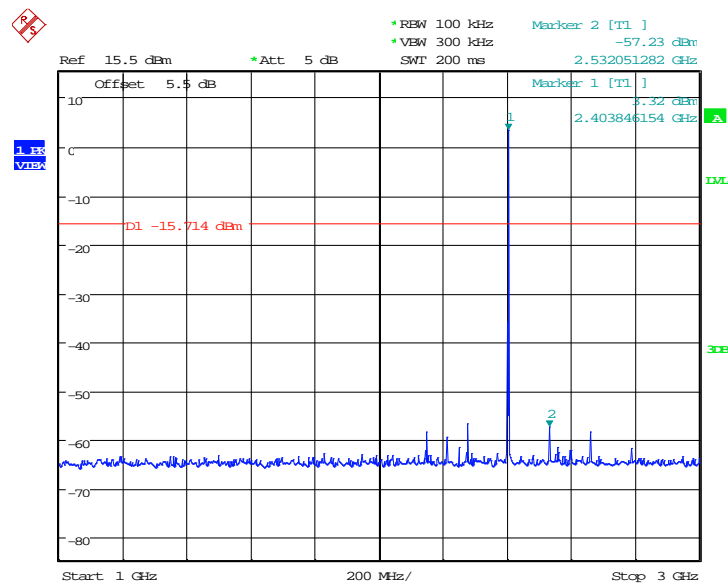
Date: 5.JAN.2016 15:41:38

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



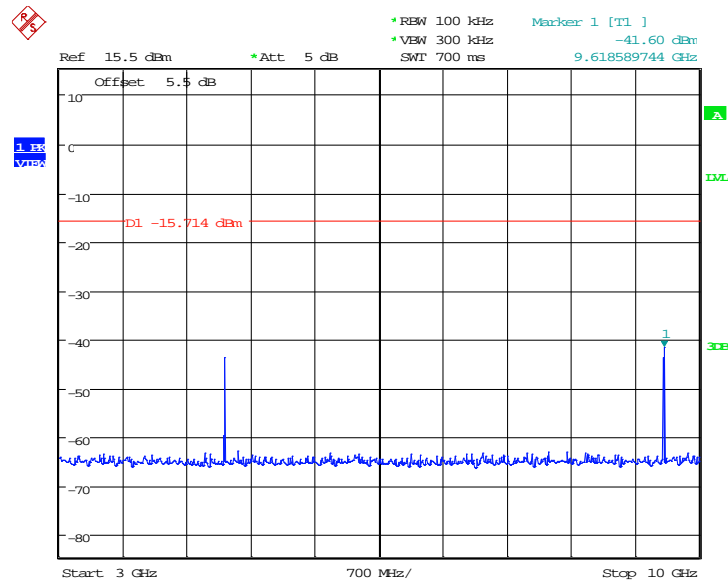
Date: 5.JAN.2016 15:41:55

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



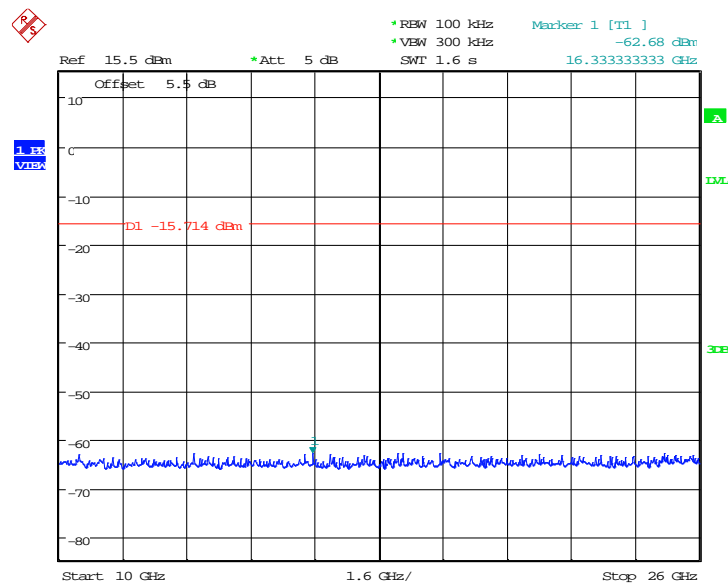
Date: 5.JAN.2016 15:42:26

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



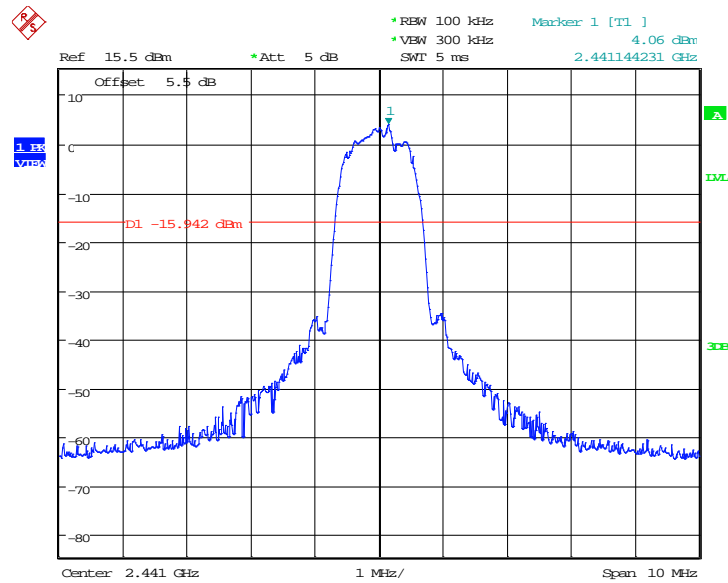
Date: 5.JAN.2016 15:42:43

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



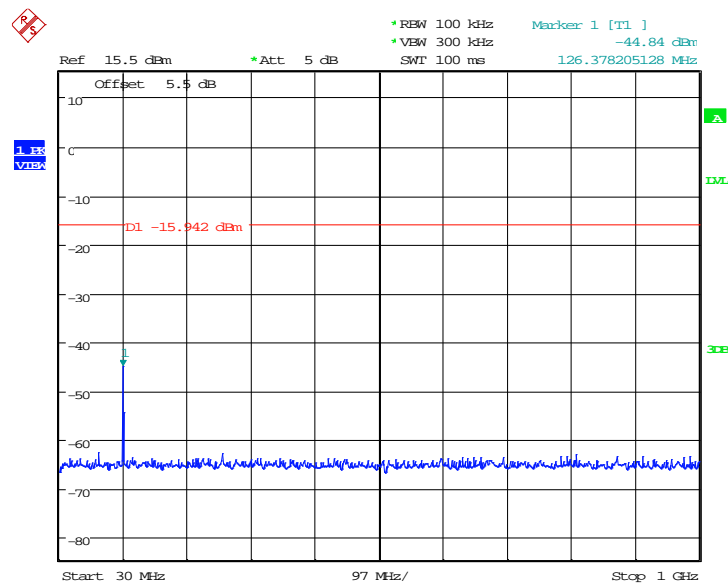
Date: 5.JAN.2016 15:43:00

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



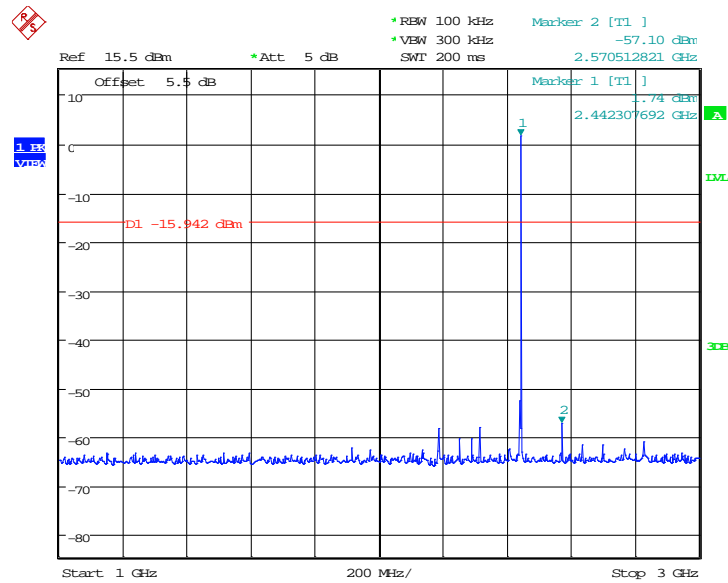
Date: 5.JAN.2016 15:43:16

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



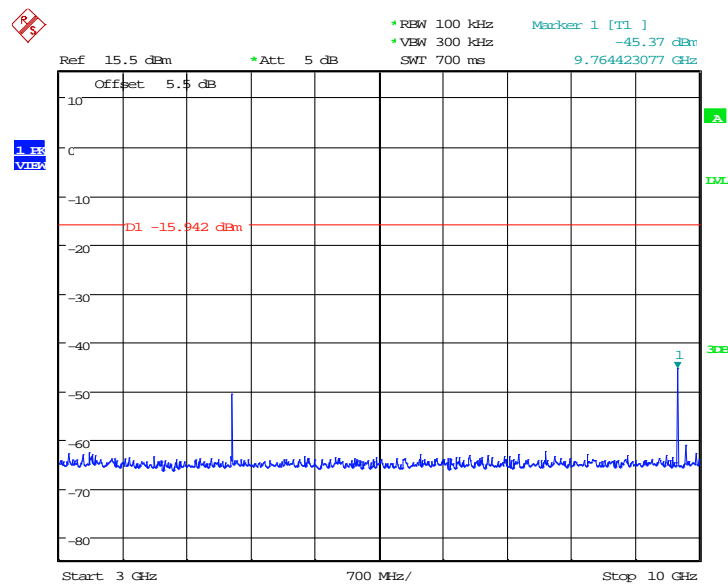
Date: 5.JAN.2016 15:43:33

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



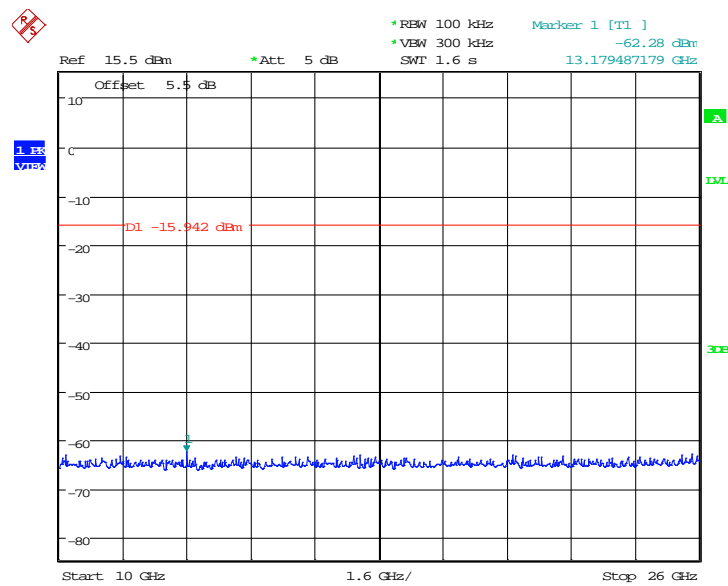
Date: 5.JAN.2016 15:44:04

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



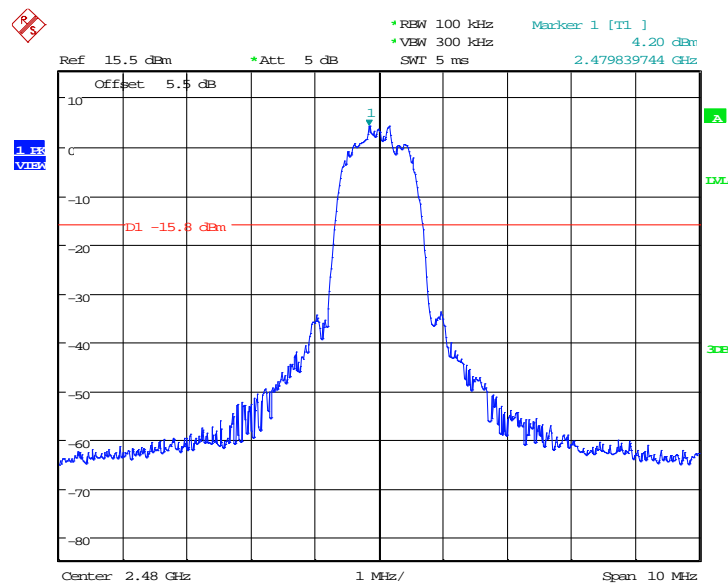
Date: 5.JAN.2016 15:44:21

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



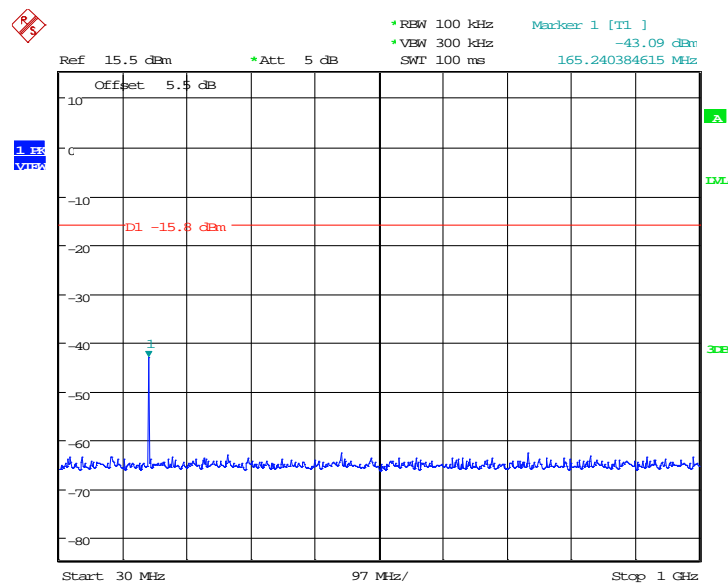
Date: 5.JAN.2016 15:44:37

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



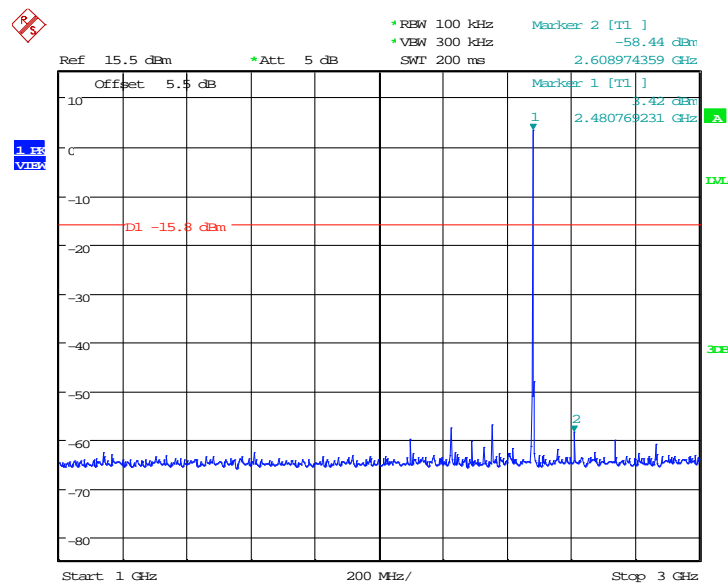
Date: 5.JAN.2016 15:44:54

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



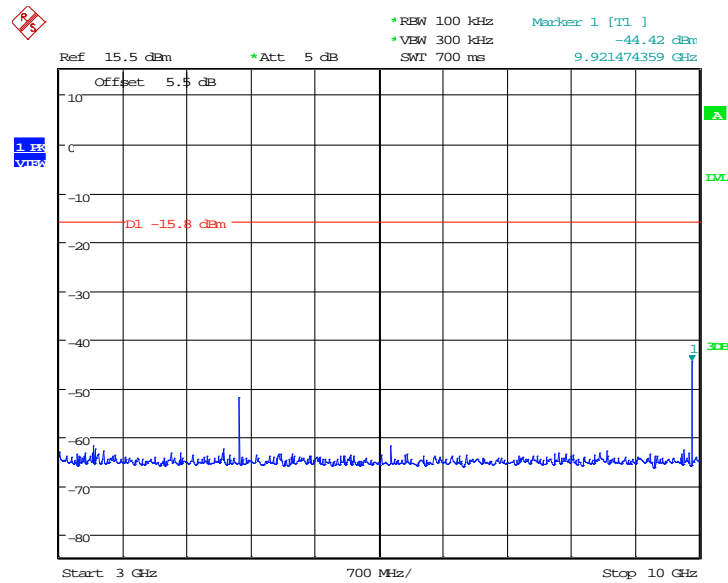
Date: 5.JAN.2016 15:45:11

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



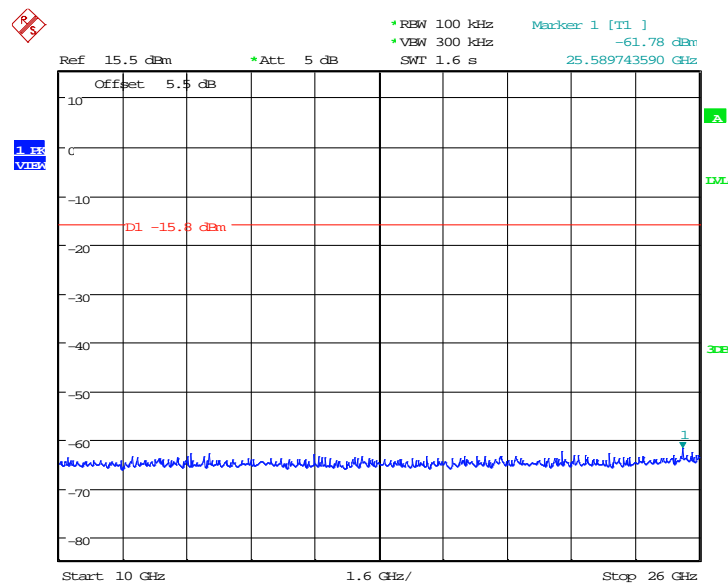
Date: 5.JAN.2016 15:45:42

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



Date: 5.JAN.2016 15:45:59

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



Date: 5.JAN.2016 15:46:15

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

A.5. 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 made according to ANSI C63.10

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

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:

Result= P_{Mea} +ARPL

For GFSK

| Channel | Frequency Range | Test Results | Conclusion |
|-------------------|--------------------|--------------|------------|
| Ch 0 2402 MHz | 1 GHz ~ 3 GHz | Fig.58 | P |
| | 3 GHz ~ 18 GHz | Fig.59 | P |
| Ch 39 2441 MHz | 9 kHz ~ 30 MHz | Fig.60 | P |
| | 30 MHz ~ 1 GHz | Fig.61 | P |
| | 1 GHz ~ 3 GHz | Fig.62 | P |
| | 3 GHz ~ 18 GHz | Fig.63 | P |
| Ch 78 2480 MHz | 1 GHz ~ 3 GHz | Fig.64 | P |
| | 3 GHz ~ 18 GHz | Fig.65 | P |
| Power | 2.38GHz~2.4GHz---L | Fig.66 | P |

| | | | |
|------------------|--------------------|--------|---|
| Power | 2.45GHz~2.5GHz---H | Fig.67 | P |
| For all channels | 18 GHz ~ 26 GHz | Fig.68 | P |

For $\pi/4$ DQPSK

| Channel | Frequency Range | Test Results | Conclusion |
|-------------------|--------------------|--------------|------------|
| Ch 0 2402 MHz | 1 GHz ~ 3 GHz | Fig.69 | P |
| | 3 GHz ~ 18 GHz | Fig.70 | P |
| Ch 39 2441 MHz | 30 MHz ~ 1 GHz | Fig.71 | P |
| | 1 GHz ~ 3 GHz | Fig.72 | P |
| | 3 GHz ~ 18 GHz | Fig.73 | P |
| Ch 78 2480 MHz | 1 GHz ~ 3 GHz | Fig.74 | P |
| | 3 GHz ~ 18 GHz | Fig.75 | P |
| Power | 2.38GHz~2.4GHz---L | Fig.76 | P |
| Power | 2.45GHz~2.5GHz---H | Fig.77 | P |
| For all channels | 18 GHz ~ 26 GHz | Fig.78 | P |

For 8DPSK

| Channel | Frequency Range | Test Results | Conclusion |
|-------------------|--------------------|--------------|------------|
| Ch 0 2402 MHz | 1 GHz ~ 3 GHz | Fig.79 | P |
| | 3 GHz ~ 18 GHz | Fig.80 | P |
| Ch 39 2441 MHz | 30 MHz ~ 1 GHz | Fig.81 | P |
| | 1 GHz ~ 3 GHz | Fig.82 | P |
| | 3 GHz ~ 18 GHz | Fig.83 | P |
| Ch 78 2480 MHz | 1 GHz ~ 3 GHz | Fig.84 | P |
| | 3 GHz ~ 18 GHz | Fig.85 | P |
| Power | 2.38GHz~2.4GHz---L | Fig.86 | P |
| Power | 2.45GHz~2.5GHz---H | Fig.87 | P |
| For all channels | 18 GHz ~ 26 GHz | Fig.88 | P |

GFSK Ch 0 - Average

| Frequency(MHz) | Result(dBuv/m) | ARPL (dB) | PMea(dBuv/m) | Polarization |
|----------------|----------------|-----------|--------------|--------------|
| 2386.715 | 35.5 | -11.1 | 46.600 | H |
| 17959.000 | 50.9 | 27.9 | 23.000 | H |
| 17927.000 | 50.8 | 27.9 | 22.900 | H |
| 17892.000 | 50.8 | 27.1 | 23.700 | H |
| 17960.000 | 50.7 | 27.9 | 22.800 | H |
| 17932.000 | 50.7 | 27.9 | 22.800 | V |

GFSK Ch 39 - Average

| Frequency(MHz) | Result(dBuv/m) | ARPL (dB) | Pmea(dBuv/m) | Polarization |
|----------------|----------------|-----------|--------------|--------------|
| 17988.000 | 50.9 | 27.9 | 23.000 | V |
| 17973.500 | 50.9 | 27.9 | 23.000 | V |
| 17995.500 | 50.7 | 27.9 | 22.800 | H |
| 17970.500 | 50.7 | 27.9 | 22.800 | V |
| 17956.500 | 50.7 | 27.9 | 22.800 | H |

| | | | | |
|-----------|------|------|--------|---|
| 17831.500 | 50.7 | 27.1 | 23.600 | V |
|-----------|------|------|--------|---|

GFSK Ch 78 - Average

| Frequency(MHz) | Result(dBuv/m) | ARPL (dB) | Pmea(dBuv/m) | Polarization |
|----------------|----------------|-----------|--------------|--------------|
| 2484.915 | 36.2 | -11.2 | 47.4 | H |
| 17914.000 | 51.0 | 27.1 | 23.9 | H |
| 17953.000 | 50.7 | 27.9 | 22.8 | H |
| 17917.000 | 50.6 | 27.9 | 22.7 | H |
| 17985.000 | 50.6 | 27.9 | 22.7 | V |
| 17935.000 | 50.6 | 27.9 | 22.7 | V |

 $\pi/4$ DQPSK Ch 0 - Average

| Frequency(MHz) | Result(dBuv/m) | ARPL (dB) | Pmea(dBuv/m) | Polarization |
|----------------|----------------|-----------|--------------|--------------|
| 2384.815 | 35.5 | -11.1 | 46.600 | H |
| 17979.500 | 50.9 | 27.9 | 23.000 | H |
| 17977.500 | 50.8 | 27.9 | 22.900 | V |
| 17987.500 | 50.8 | 27.9 | 22.900 | H |
| 17988.000 | 50.8 | 27.9 | 22.900 | H |
| 17973.500 | 50.8 | 27.9 | 22.900 | H |

 $\pi/4$ DQPSK Ch 39 - Average

| Frequency(MHz) | Result(dBuv/m) | ARPL (dB) | Pmea(dBuv/m) | Polarization |
|----------------|----------------|-----------|--------------|--------------|
| 17973.500 | 50.9 | 27.9 | 23.000 | V |
| 17985.000 | 50.8 | 27.9 | 22.900 | H |
| 17904.500 | 50.8 | 27.1 | 23.700 | H |
| 17981.000 | 50.7 | 27.9 | 22.800 | V |
| 17991.500 | 50.7 | 27.9 | 22.800 | H |
| 17959.000 | 50.7 | 27.9 | 22.800 | H |

 $\pi/4$ DQPSK Ch 78 - Average

| Frequency(MHz) | Result(dBuv/m) | ARPL (dB) | Pmea(dBuv/m) | Polarization |
|----------------|----------------|-----------|--------------|--------------|
| 2491.735 | 35.9 | -11.2 | 47.1 | H |
| 17952.500 | 50.8 | 27.9 | 22.9 | H |
| 17984.500 | 50.7 | 27.9 | 22.8 | H |
| 17974.000 | 50.7 | 27.9 | 22.8 | V |
| 17980.500 | 50.7 | 27.9 | 22.8 | H |
| 17929.500 | 50.7 | 27.9 | 22.8 | V |

8DPSK Ch 0 - Average

| Frequency(MHz) | Result(dBuv/m) | ARPL (dB) | Pmea(dBuv/m) | Polarization |
|----------------|----------------|-----------|--------------|--------------|
| 2387.780 | 35.6 | -11.1 | 46.700 | H |
| 17896.000 | 50.8 | 27.1 | 23.700 | H |
| 17943.500 | 50.8 | 27.9 | 22.900 | H |
| 17988.000 | 50.8 | 27.9 | 22.900 | H |
| 17978.500 | 50.7 | 27.9 | 22.800 | V |

| | | | | |
|-----------|------|------|--------|---|
| 17973.000 | 50.7 | 27.9 | 22.800 | V |
|-----------|------|------|--------|---|

8DPSK Ch 39 - Average

| Frequency(MHz) | Result(dBuv/m) | ARPL (dB) | Pmea(dBuv/m) | Polarization |
|----------------|----------------|-----------|--------------|--------------|
| 17968.000 | 50.7 | 27.9 | 22.800 | H |
| 17976.500 | 50.7 | 27.9 | 22.800 | H |
| 17996.500 | 50.7 | 27.9 | 22.800 | V |
| 17892.000 | 50.7 | 27.1 | 23.600 | H |
| 17917.000 | 50.7 | 27.9 | 22.800 | V |
| 17914.000 | 50.6 | 27.1 | 23.500 | H |

8DPSK Ch 78 - Average

| Frequency(MHz) | Result(dBuv/m) | ARPL (dB) | Pmea(dBuv/m) | Polarization |
|----------------|----------------|-----------|--------------|--------------|
| 2489.750 | 36.0 | -11.2 | 47.2 | H |
| 17959.000 | 51.0 | 27.9 | 23.1 | H |
| 17857.500 | 50.8 | 27.1 | 23.7 | H |
| 17946.000 | 50.7 | 27.9 | 22.8 | V |
| 17971.500 | 50.7 | 27.9 | 22.8 | V |
| 17965.000 | 50.7 | 27.9 | 22.8 | H |

Conclusion: PASS

Test graphs as below:

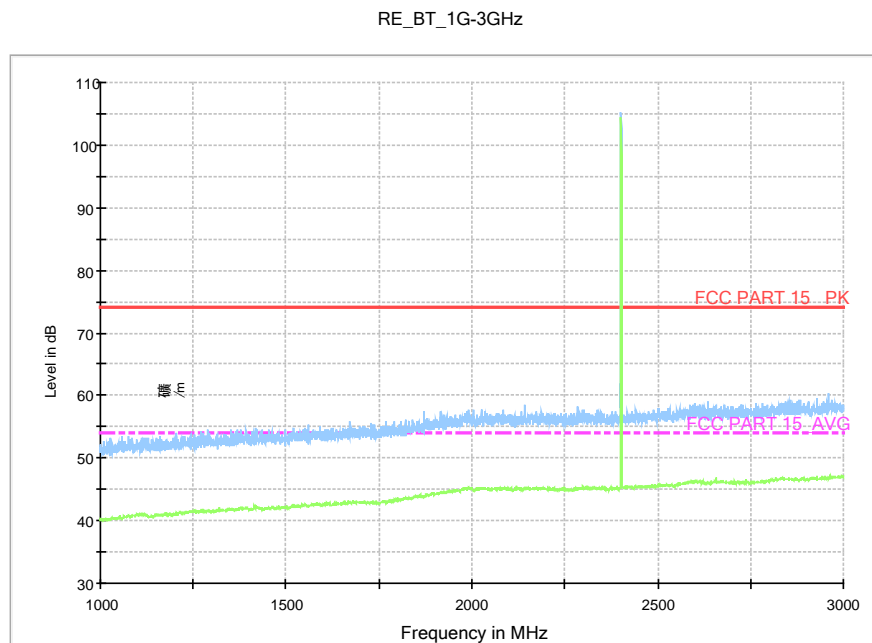


Fig.58. Radiated emission: GFSK, Channel 0, 1 GHz - 3 GHz

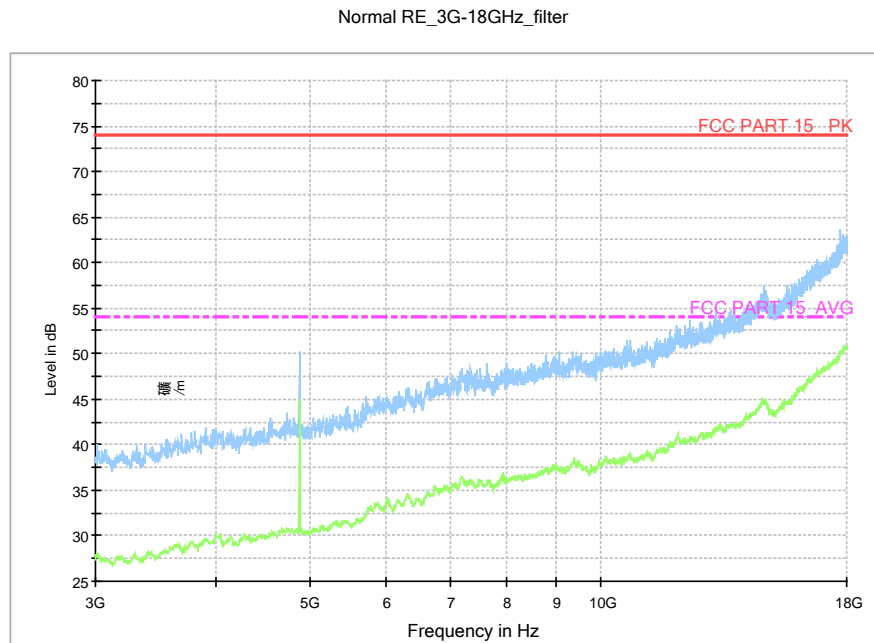


Fig.59. Radiated emission: GFSK, Channel 0, 3 GHz - 18 GHz

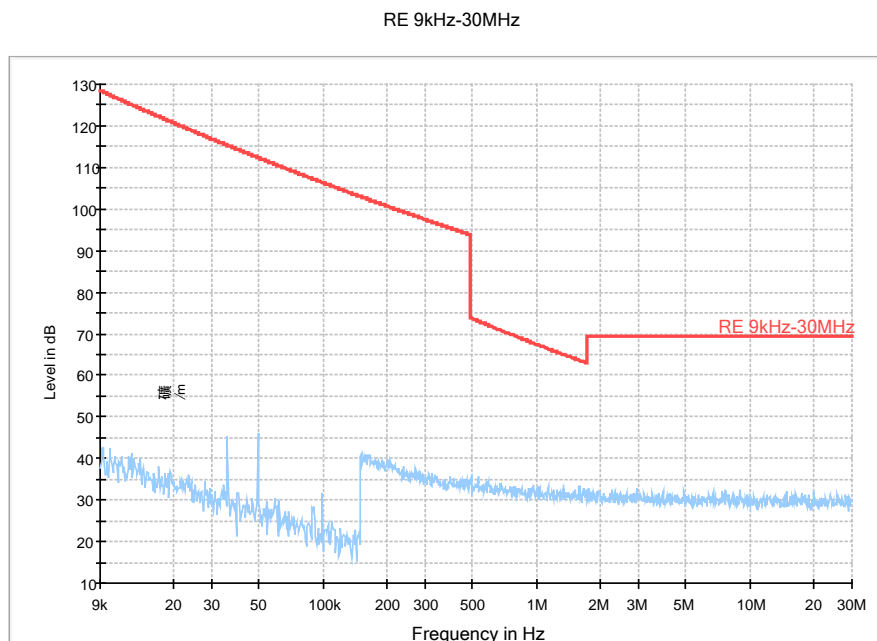


Fig.60. Radiated emission: GFSK, Channel 39, 9 kHz - 30 MHz

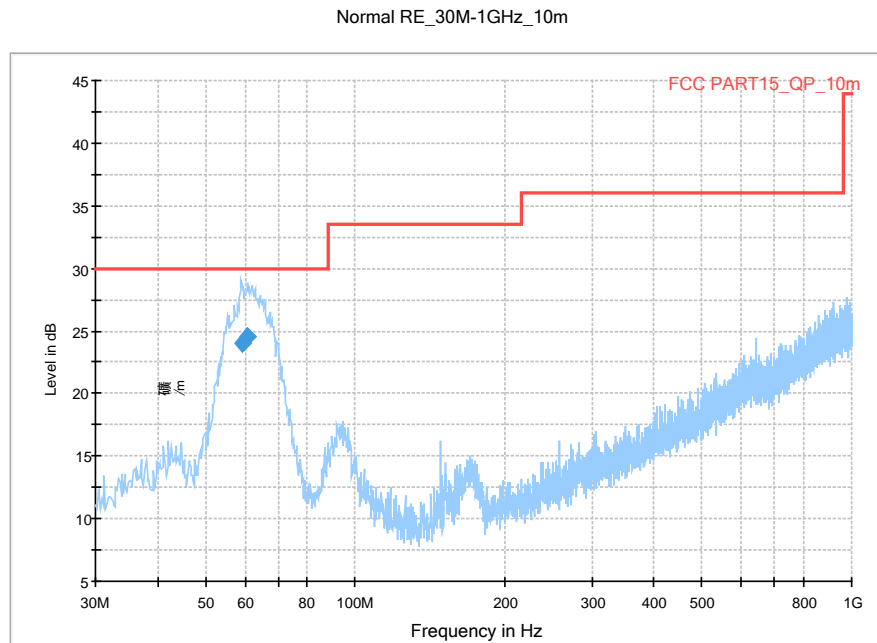


Fig.61. Radiated emission: GFSK, Channel 39, 30 MHz - 1 GHz

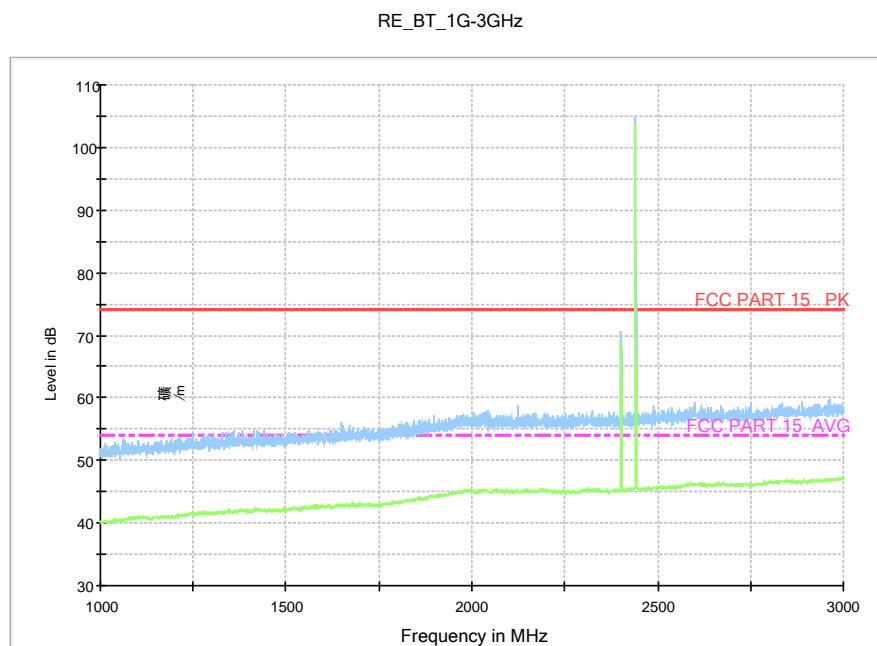


Fig.62. Radiated emission: GFSK, Channel 39, 1 GHz - 3 GHz

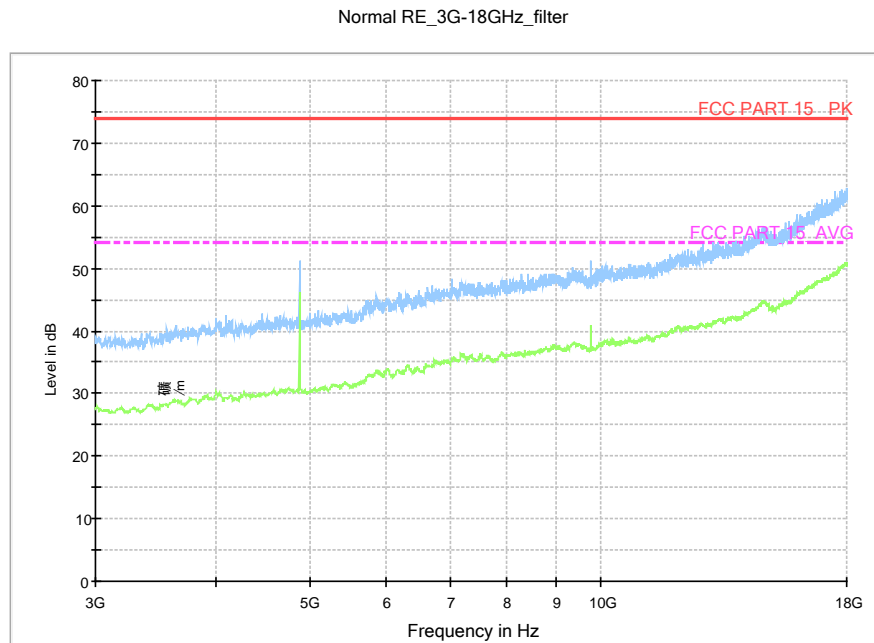


Fig.63. Radiated emission: GFSK, Channel 39, 3 GHz - 18 GHz

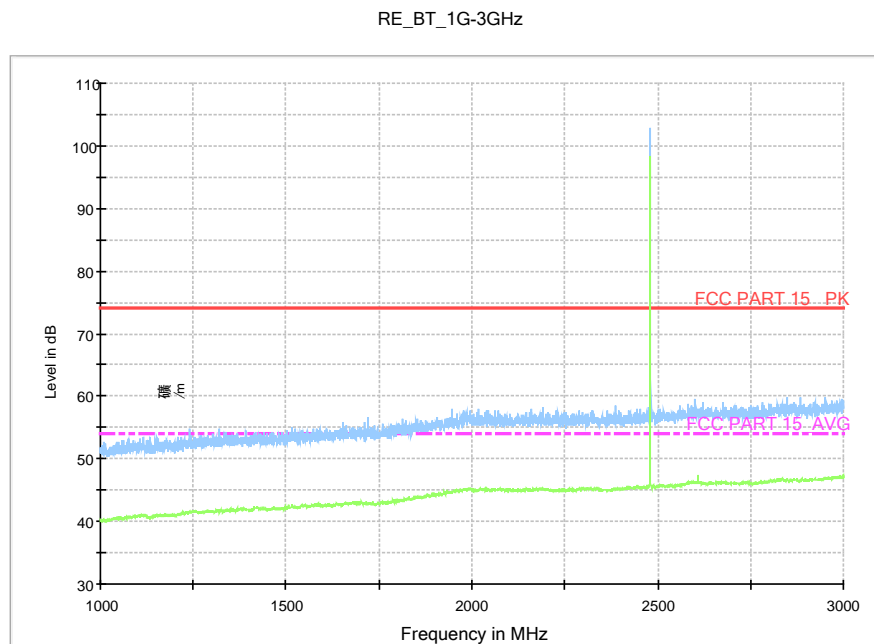


Fig.64. Radiated emission: GFSK, Channel 78, 1 GHz - 3 GHz

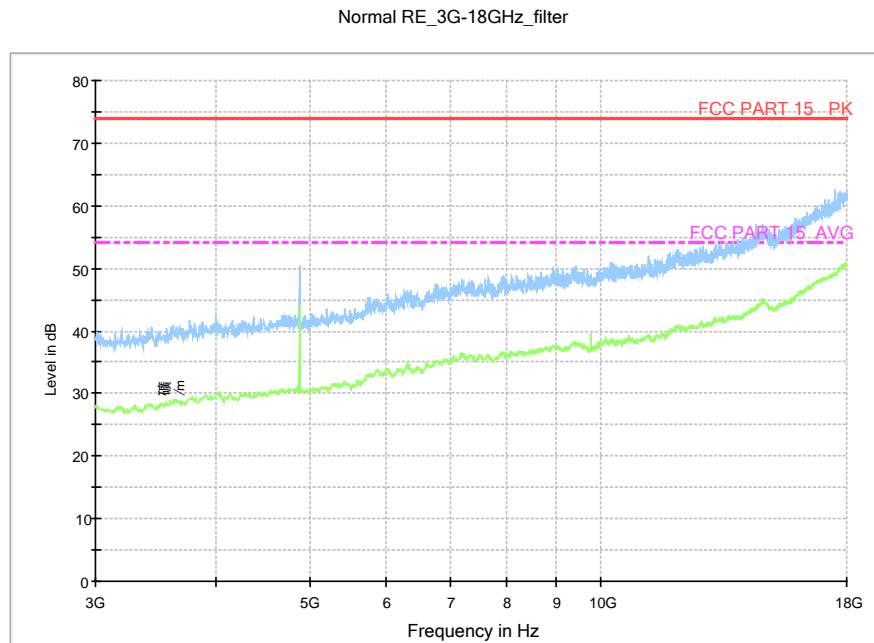


Fig.65. Radiated emission: GFSK, Channel 78, 3 GHz - 18 GHz

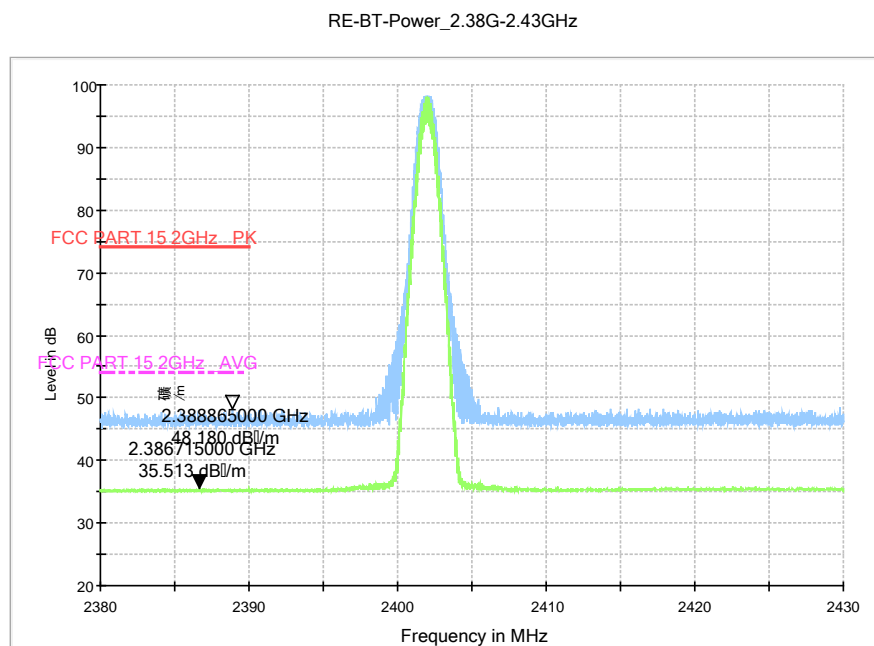


Fig.66. Radiated emission (Power): GFSK, low channel

RE-BT-Power_2.45G-2.5GHz

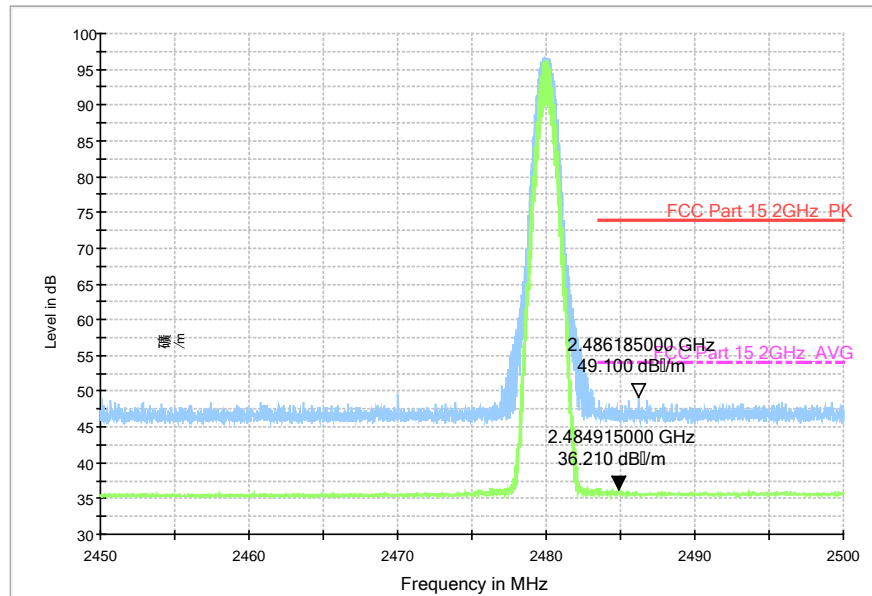


Fig.67. Radiated emission (Power) GFSK, high channel

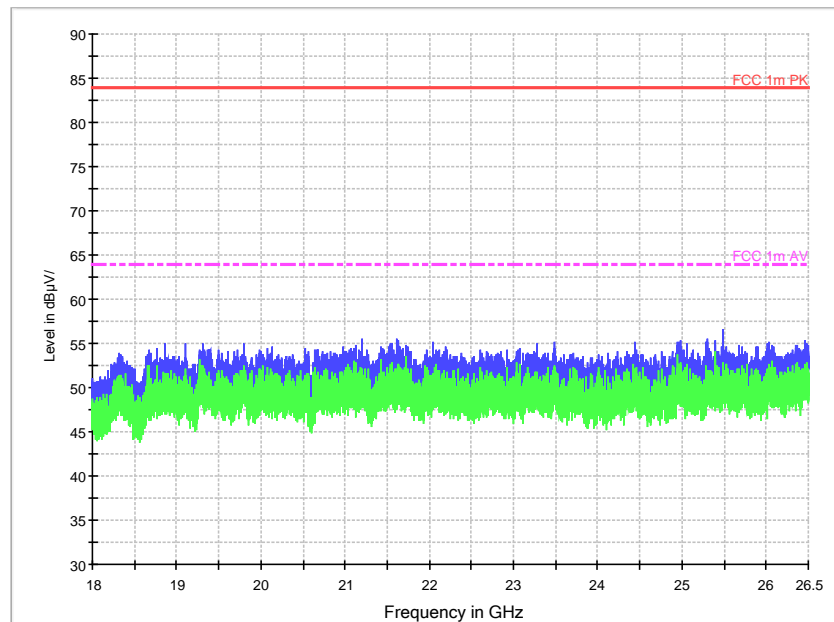


Fig.68. Radiated emission: GFSK, 18 GHz - 26 GHz

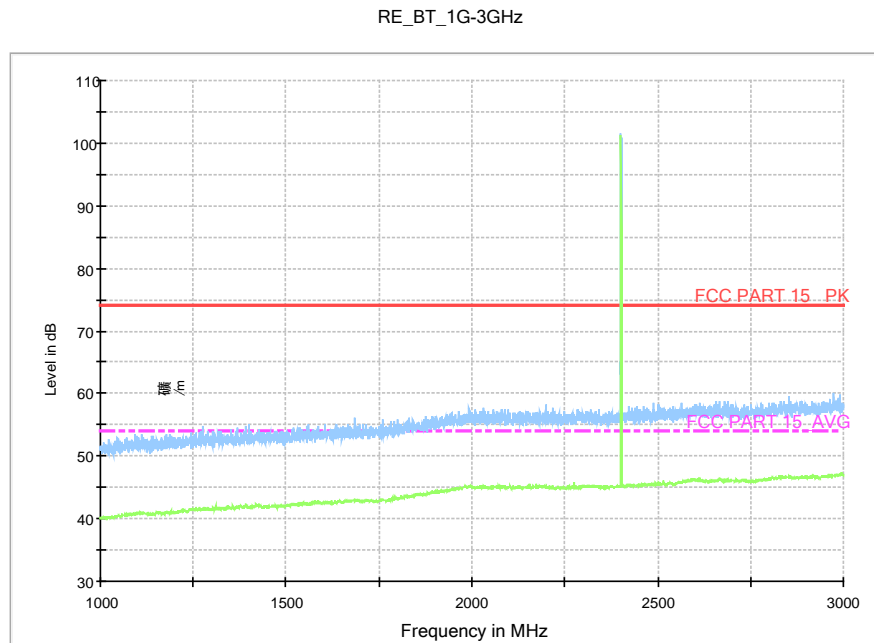


Fig.69. Radiated emission: $\pi/4$ DQPSK, Channel 0, 1 GHz - 3 GHz

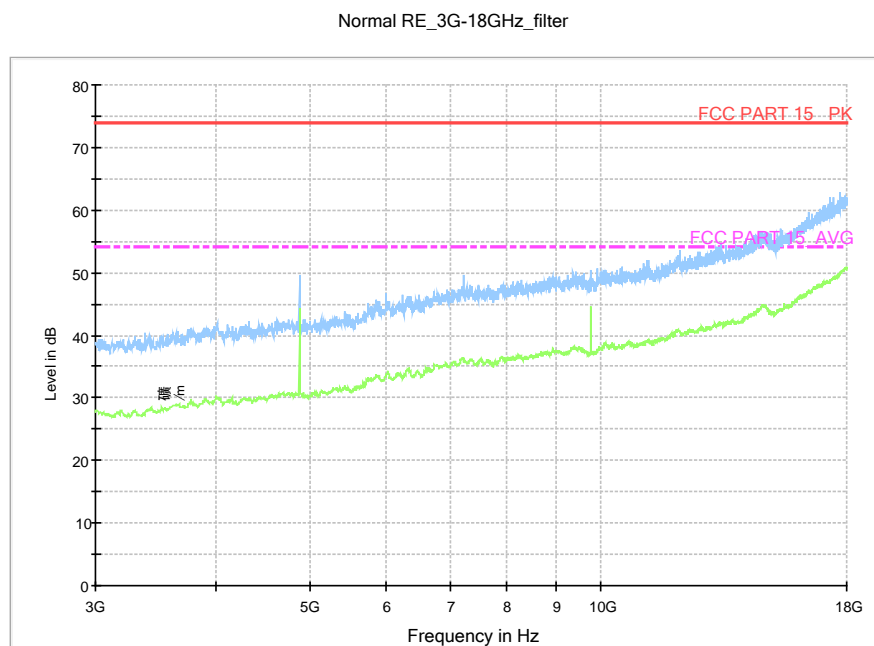


Fig.70. Radiated emission: $\pi/4$ DQPSK, Channel 0, 3 GHz - 18 GHz

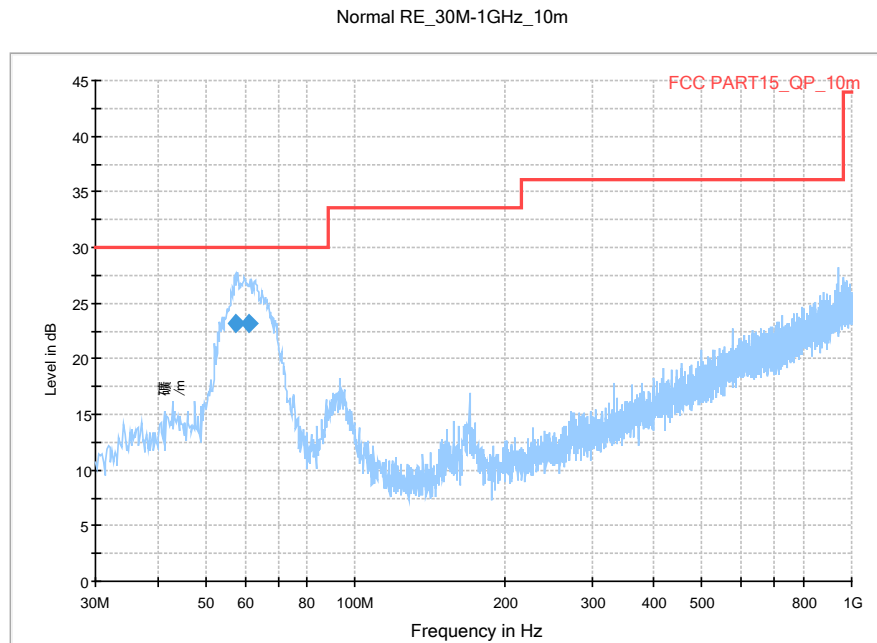


Fig.71. Radiated emission: $\pi/4$ DQPSK, Channel 39, 30 MHz - 1 GHz

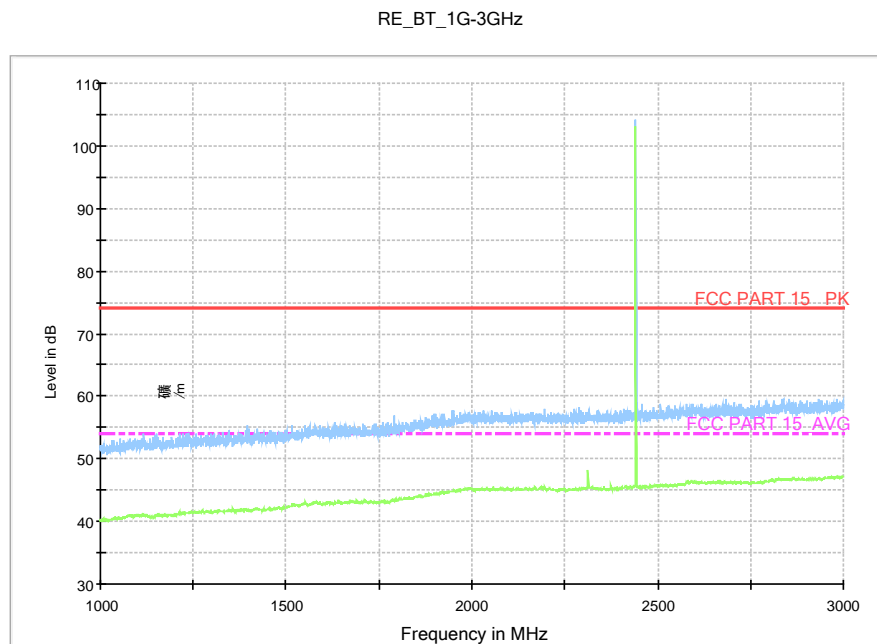


Fig.72. Radiated emission: $\pi/4$ DQPSK, Channel 39, 1 GHz - 3 GHz

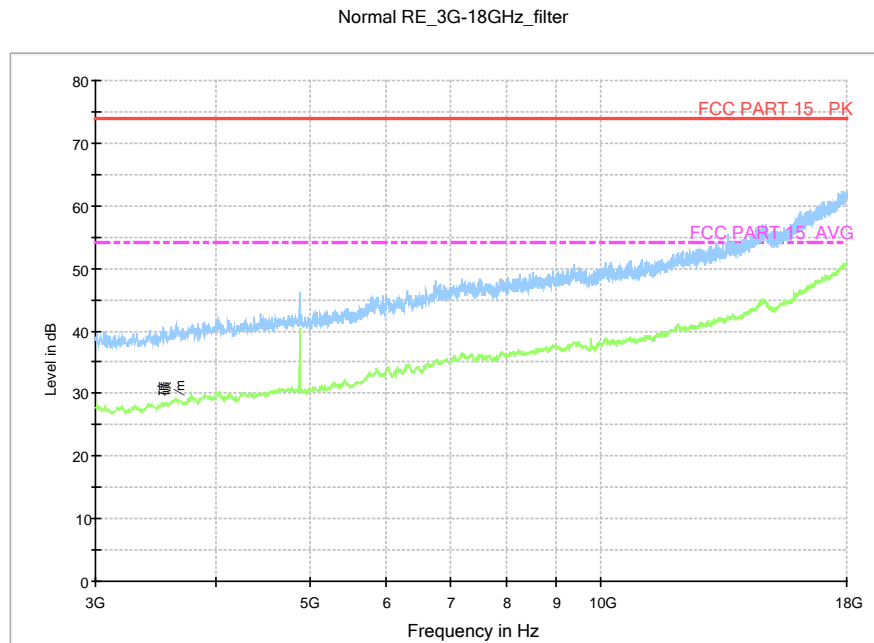


Fig.73. Radiated emission: $\pi/4$ DQPSK, Channel 39, 3 GHz - 18 GHz

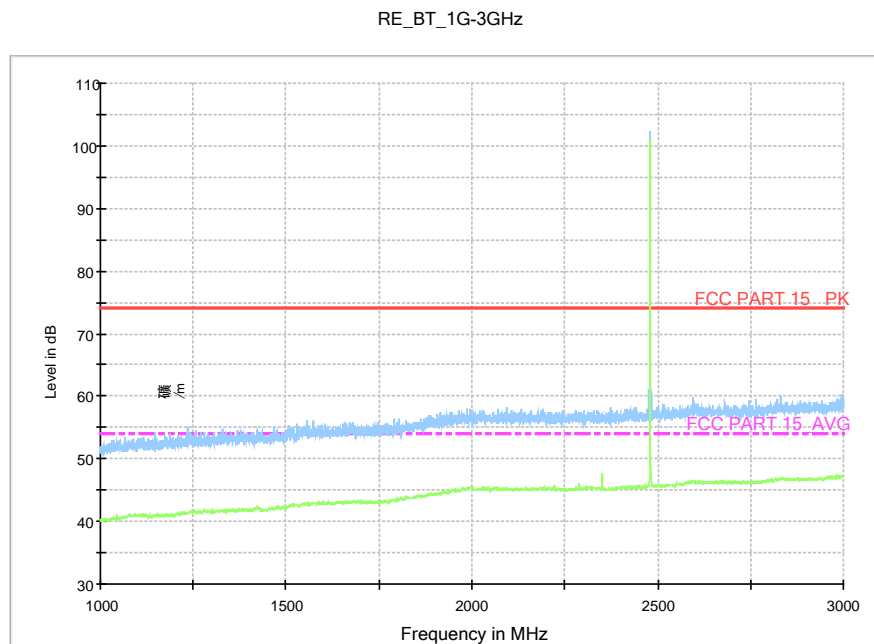


Fig.74. Radiated emission: $\pi/4$ DQPSK, Channel 78, 1 GHz - 3 GHz

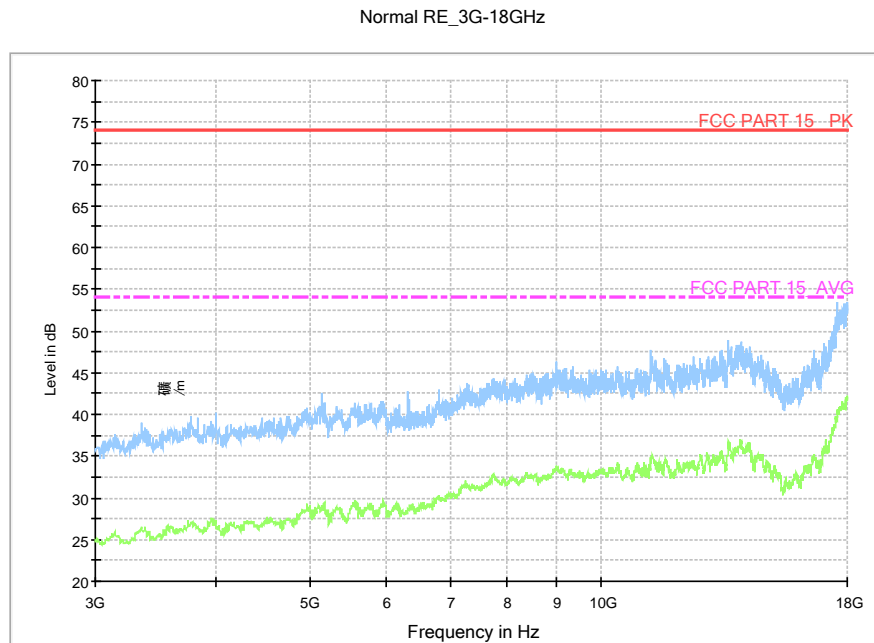


Fig.75. Radiated emission: $\pi/4$ DQPSK, Channel 78, 3 GHz - 18 GHz

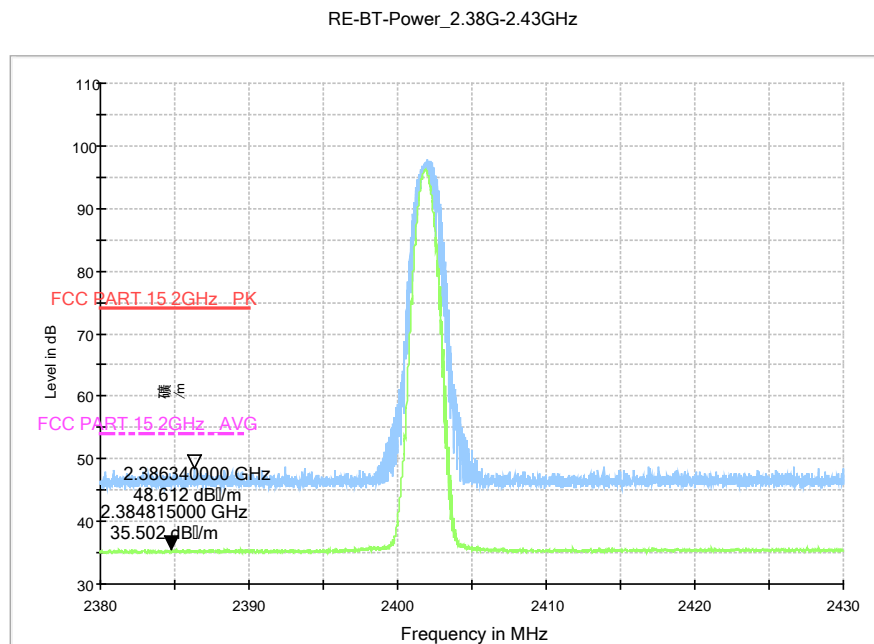


Fig.76. Radiated emission (Power): $\pi/4$ DQPSK, low channel

RE-BT-Power_2.45G-2.5GHz

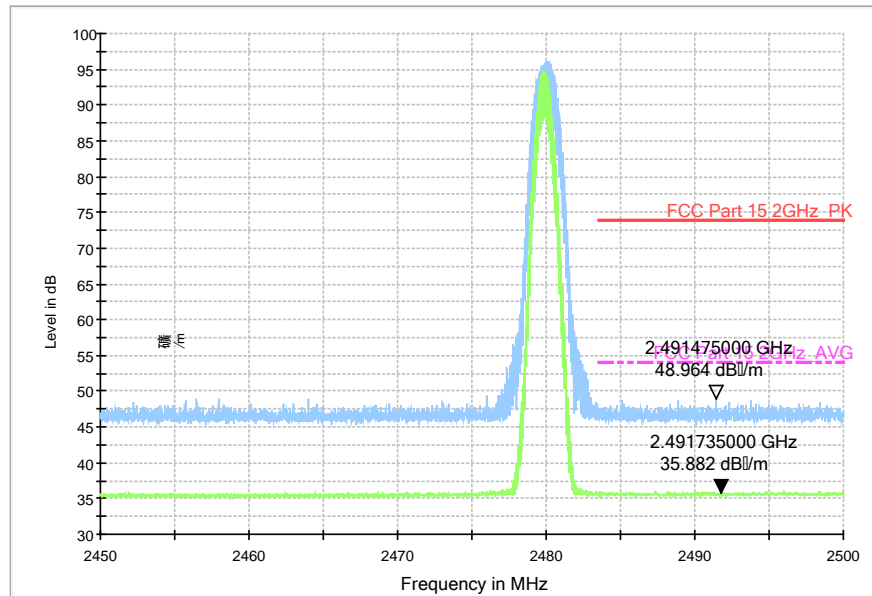


Fig.77. Radiated emission (Power): $\pi/4$ DQPSK, high channel

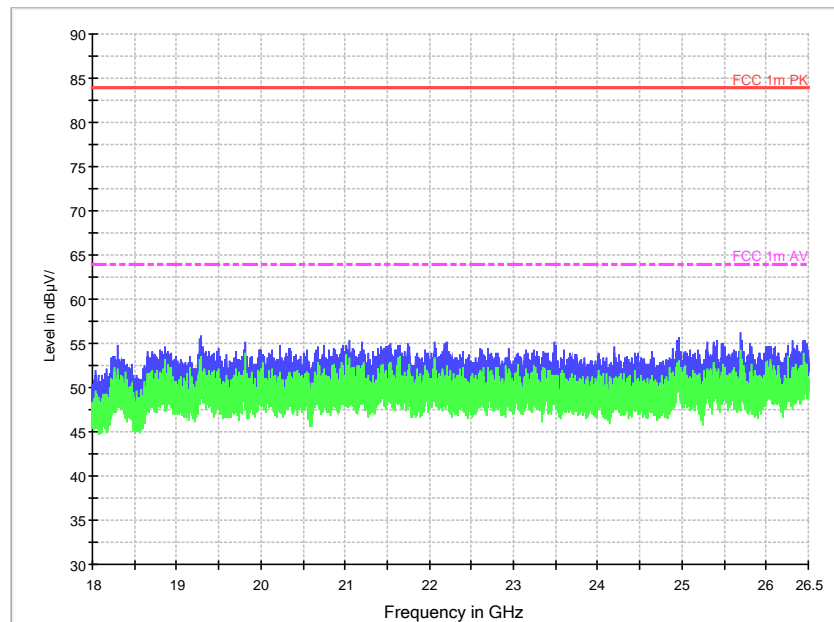


Fig.78. Radiated emission: $\pi/4$ DQPSK, 18 GHz - 26 GHz

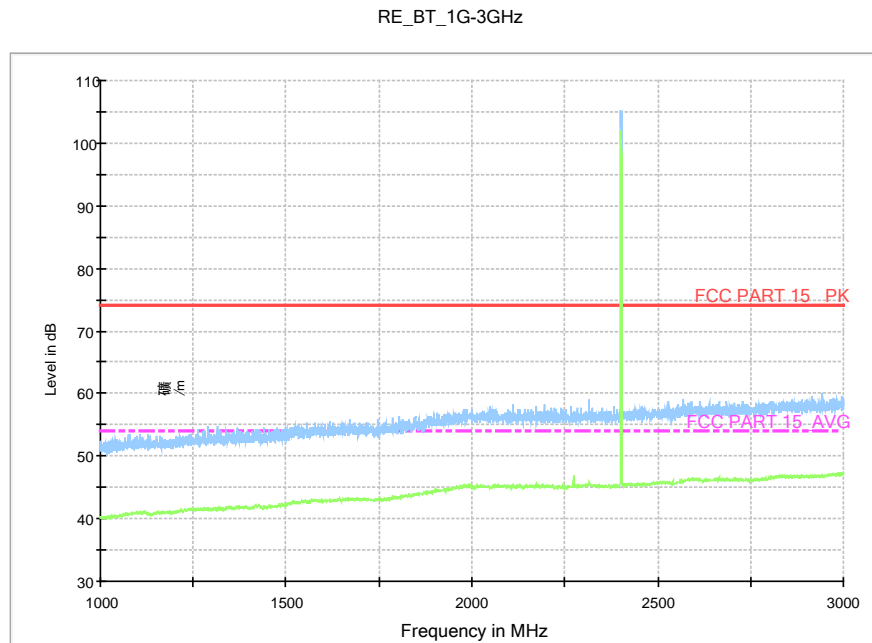


Fig.79. Radiated emission: 8DPSK, Channel 0, 1 GHz - 3 GHz

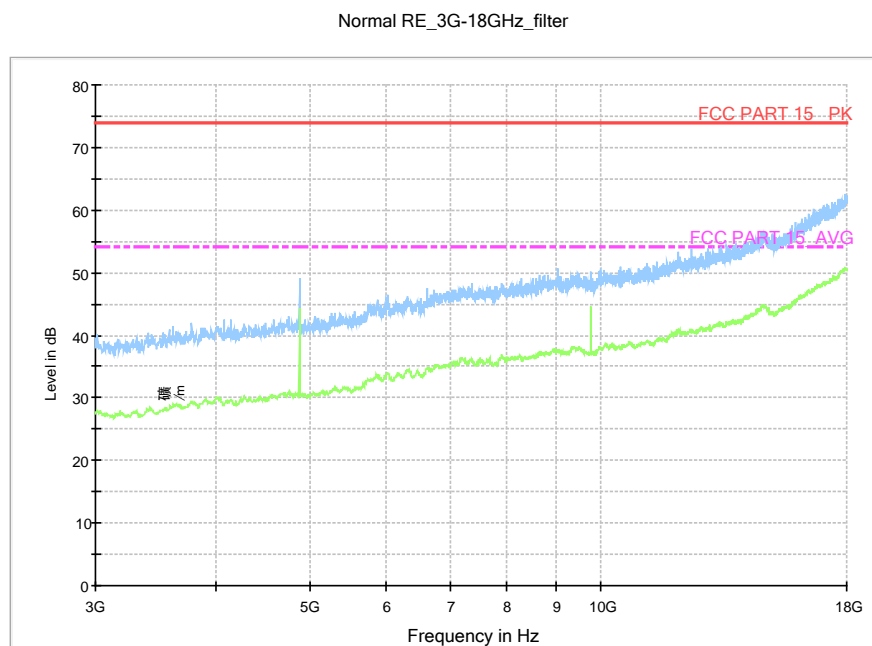


Fig.80. Radiated emission: 8DPSK, Channel 0, 3 GHz - 18 GHz

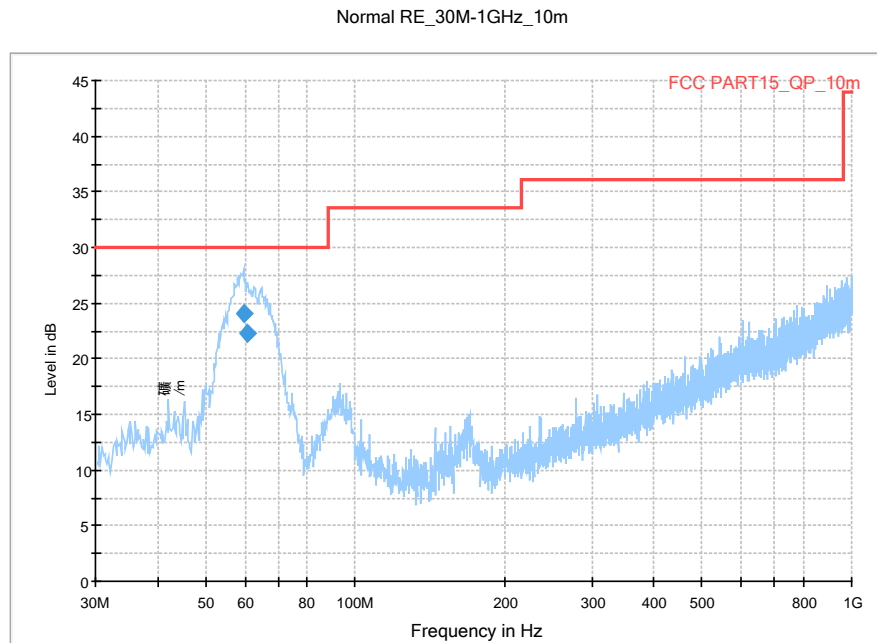


Fig.81. Radiated emission: 8DPSK, Channel 39, 30 MHz - 1 GHz

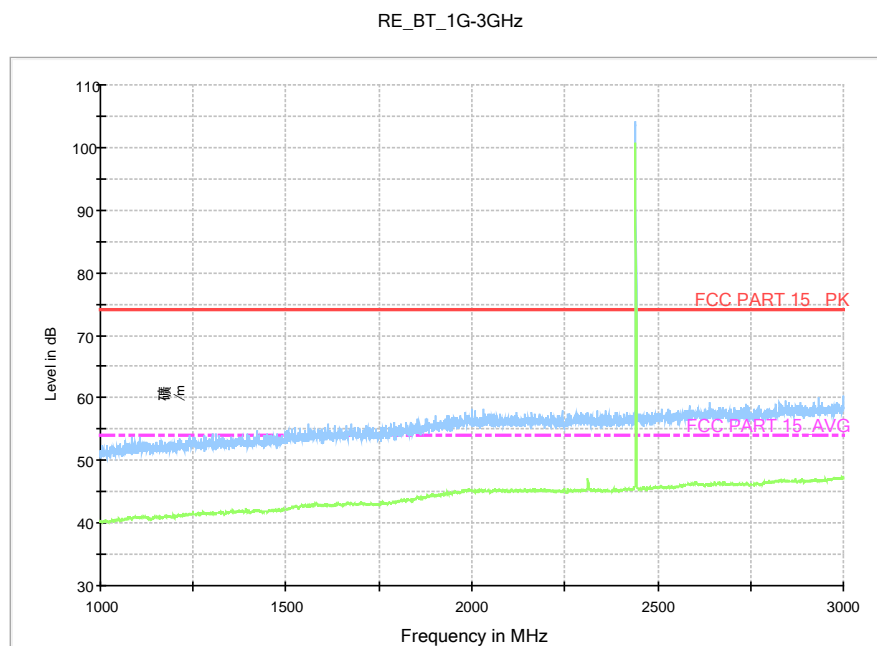


Fig.82. Radiated emission: 8DPSK, Channel 39, 1 GHz - 3 GHz

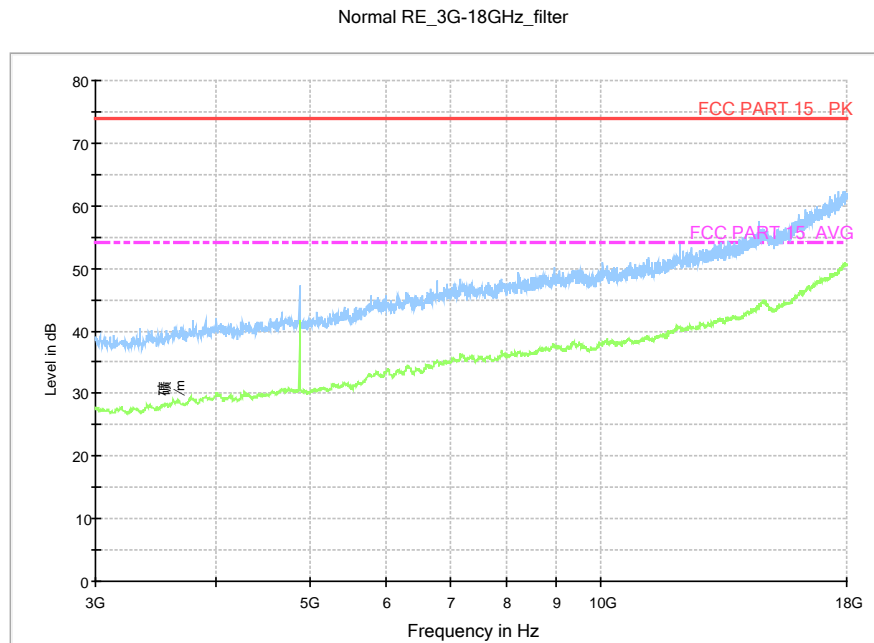


Fig.83. Radiated emission: 8DPSK, Channel 39, 3 GHz - 18 GHz

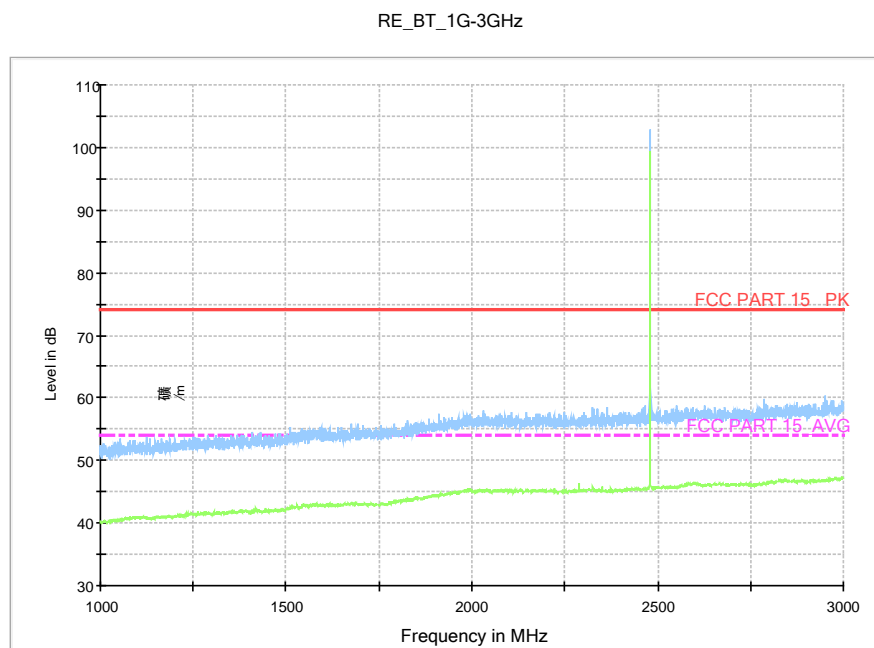


Fig.84. Radiated emission: 8DPSK, Channel 78, 1 GHz - 3 GHz

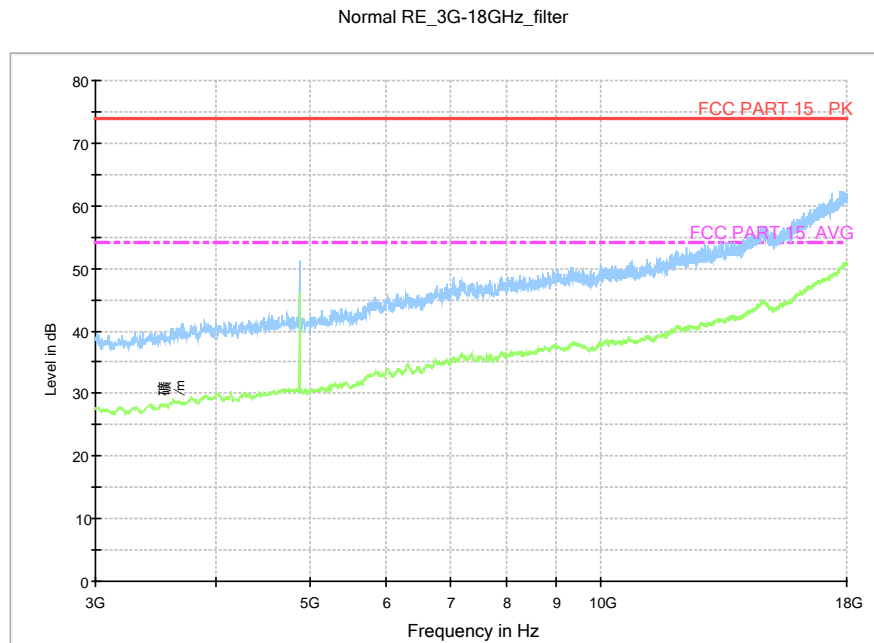


Fig.85. Radiated emission: 8DPSK, Channel 78, 3 GHz - 18 GHz

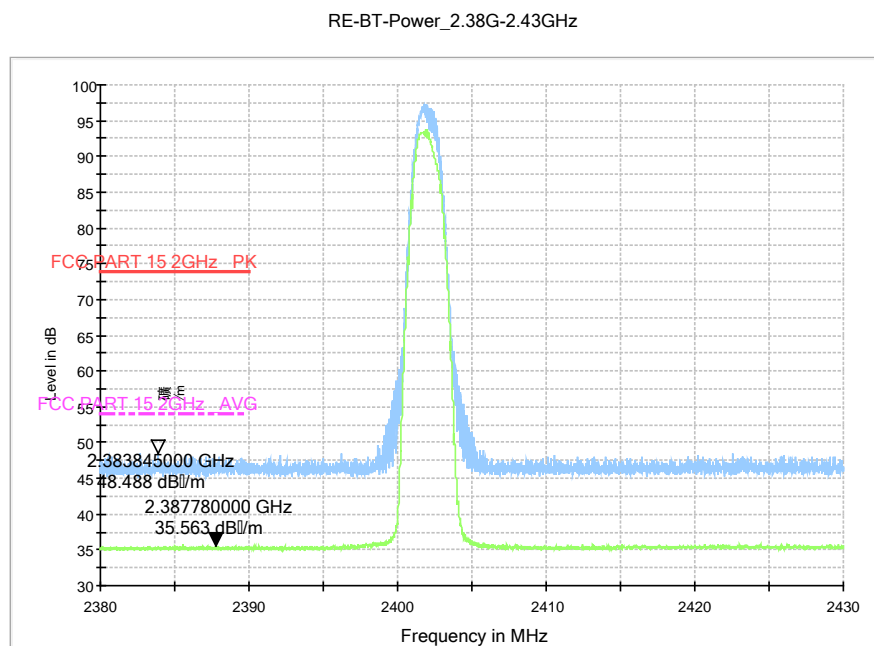


Fig.86. Radiated emission (Power): 8DPSK, low channel

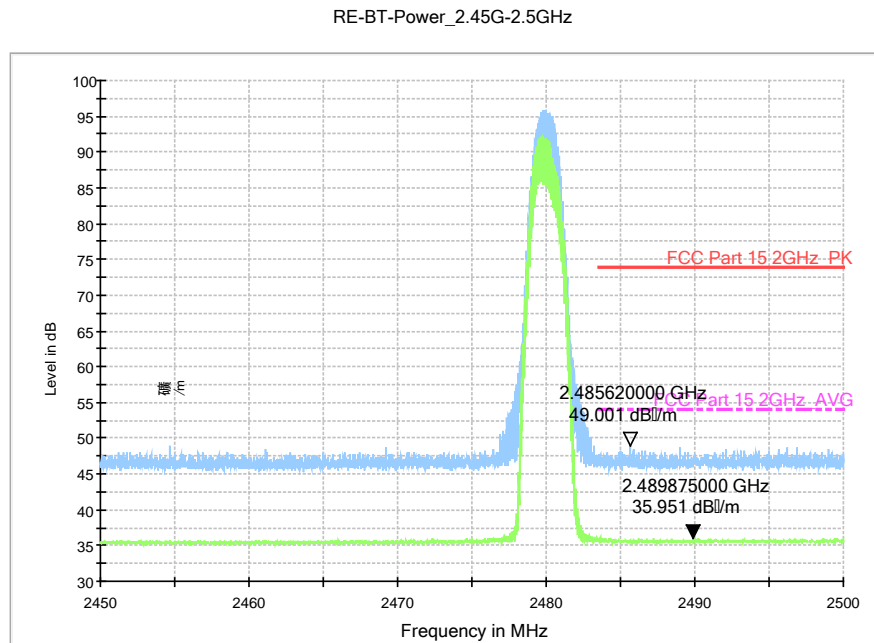


Fig.87. Radiated emission (Power): 8DPSK, high channel

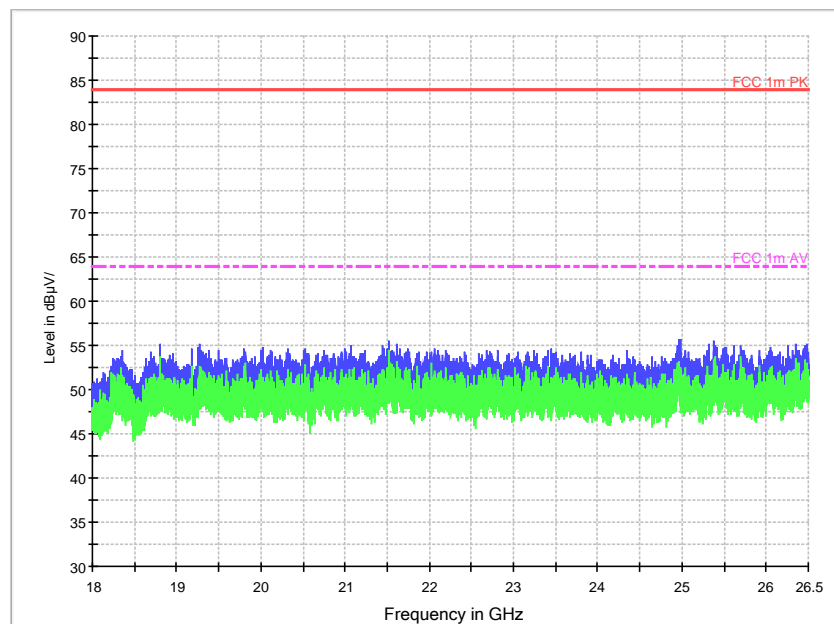


Fig.88. Radiated emission: 8DPSK, 18 GHz - 26 GHz

A.6. Time of Occupancy (Dwell Time)

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

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

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

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

Measurement Limit:

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

Measurement Result:

For GFSK

| Channel | Packet | Dwell Time (ms) | | Conclusion |
|---------|--------|-----------------|--------|------------|
| 39 | DH1 | Fig.89 | 111.57 | P |
| | | Fig.90 | | |
| | DH3 | Fig.91 | 199.65 | P |
| | | Fig.92 | | |
| | DH5 | Fig.93 | 238.51 | P |
| | | Fig.94 | | |

For $\pi/4$ DQPSK

| Channel | Packet | Dwell Time (ms) | | Conclusion |
|---------|--------|-----------------|--------|------------|
| 39 | DH1 | Fig.95 | 111.53 | P |
| | | Fig.96 | | |
| | DH3 | Fig.97 | 186.45 | P |
| | | Fig.98 | | |
| | DH5 | Fig.99 | 186.15 | P |
| | | Fig.100 | | |

For 8DPSK

| Channel | Packet | Dwell Time (ms) | | Conclusion |
|---------|--------|-----------------|--------|------------|
| 39 | DH1 | Fig.101 | 108.40 | P |
| | | Fig.102 | | |
| | DH3 | Fig.103 | 178.20 | P |

Conclusion: PASS
Test graphs as below:

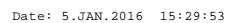


Fig.89. Time of occupancy (Dwell Time): Channel 39, Packet DH1

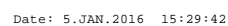
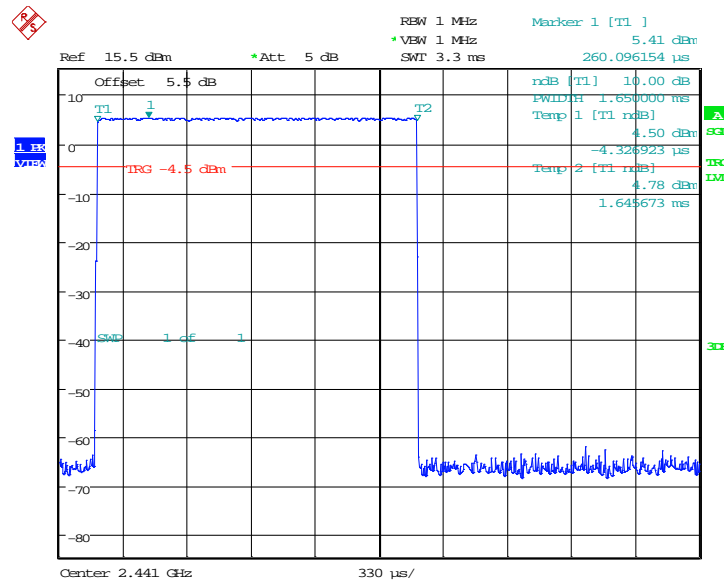
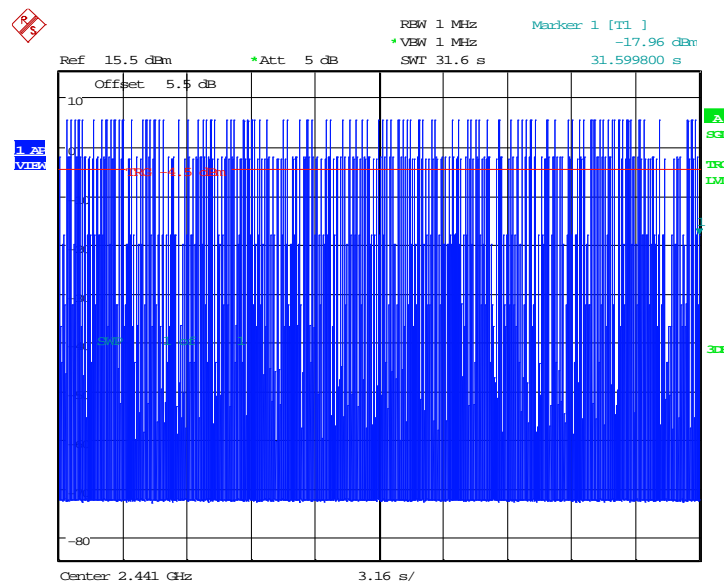


Fig.90. Number of Transmissions Measurement:Channel 39,Packet DH1



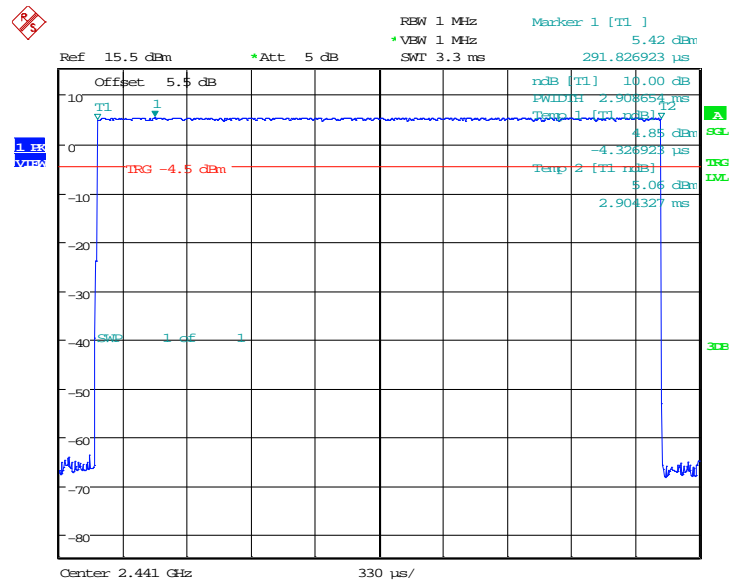
Date: 5.JAN.2016 15:31:12

Fig.91. Time of occupancy (Dwell Time): Channel 39, Packet DH3



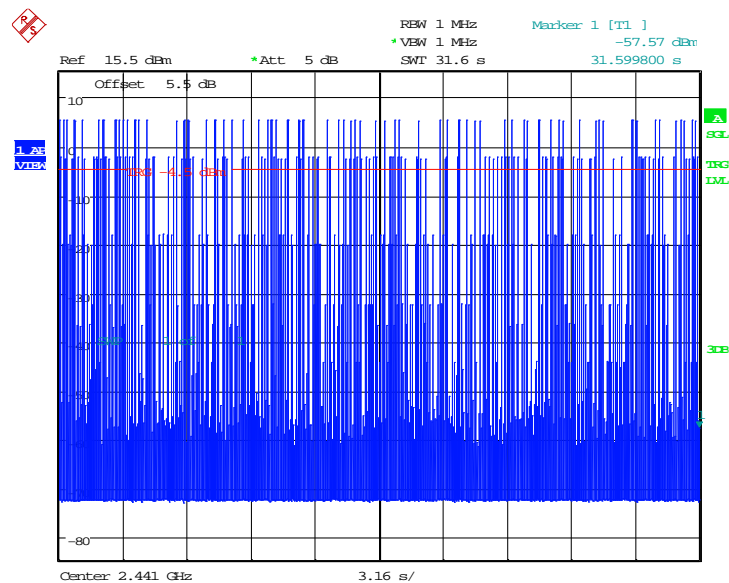
Date: 5.JAN.2016 15:31:01

Fig.92. Number of Transmissions Measurement:Channel 39,Packet DH3



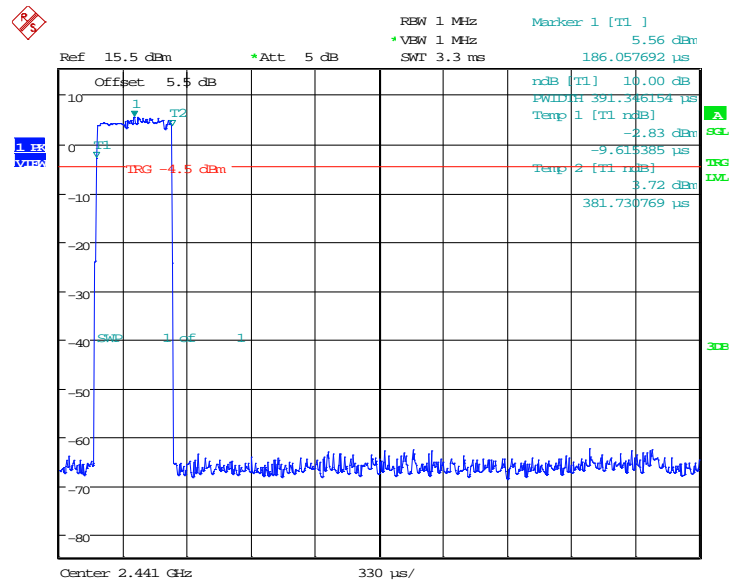
Date: 5.JAN.2016 15:32:29

Fig.93. Time of occupancy (Dwell Time): Channel 39, Packet DH5



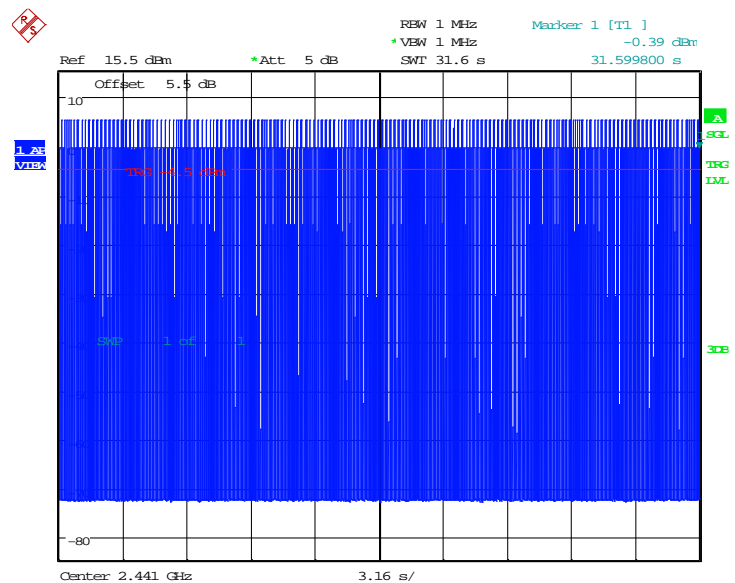
Date: 5.JAN.2016 15:32:17

Fig.94. Number of Transmissions Measurement:Channel 39,Packet DH5



Date: 5.JAN.2016 15:38:48

Fig.95. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1



Date: 5.JAN.2016 15:38:36

Fig.96. Number of Transmissions Measurement:Channel 39,Packet 2-DH1



REW 1 MHz Marker 1 [T1] 5.56 dBm
 *VIEW 1 MHz *Att 5 dB SWT 31.6 s 31.599800 s

Offset 5.5 dB

1.05 VREF

A SQL TRG LVL

300

Center 2.441 GHz 3.16 s/



Fig.98. Number of Transmissions Measurement:Channel 39,Packet 2-DH3



Ref 15.5 dBm *Att 5 dB

REW 1 MHz Marker 1 [T1] -56.85 dBm
 *VEW 1 MHz
 SWT 31.6 s 31.599800 s

Offset 5.5 dB

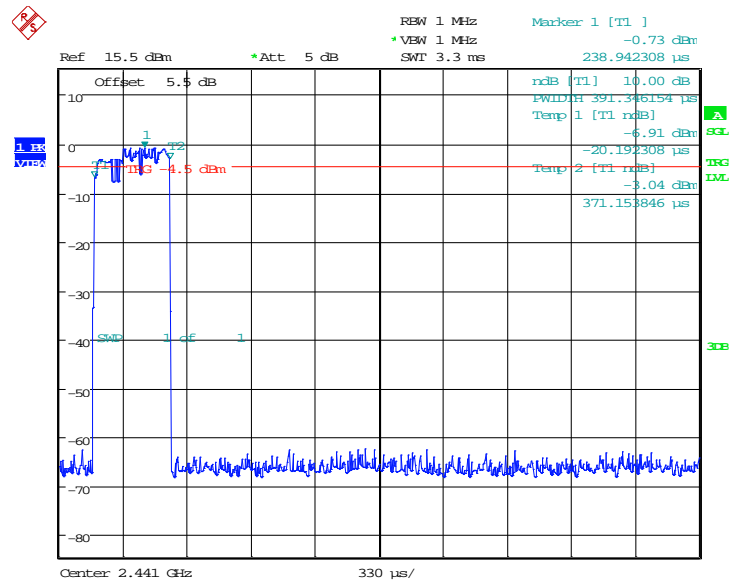
L At Vtx

10
 0
 -10
 -20
 -30
 -40
 -50
 -60
 -70
 -80

Center 2.441 GHz 3.16 s/

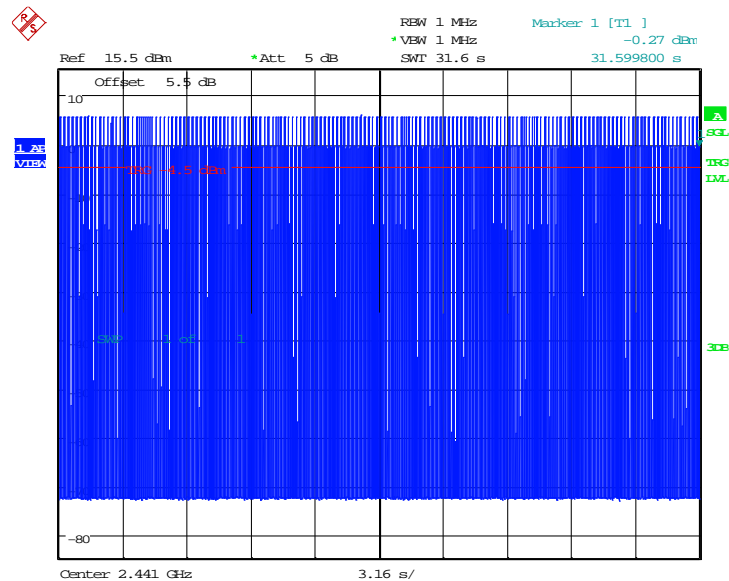
Date: 5.JAN.2016 15:41:08

Fig.100. Number of Transmissions Measurement:Channel 39,Packet 2-DH5



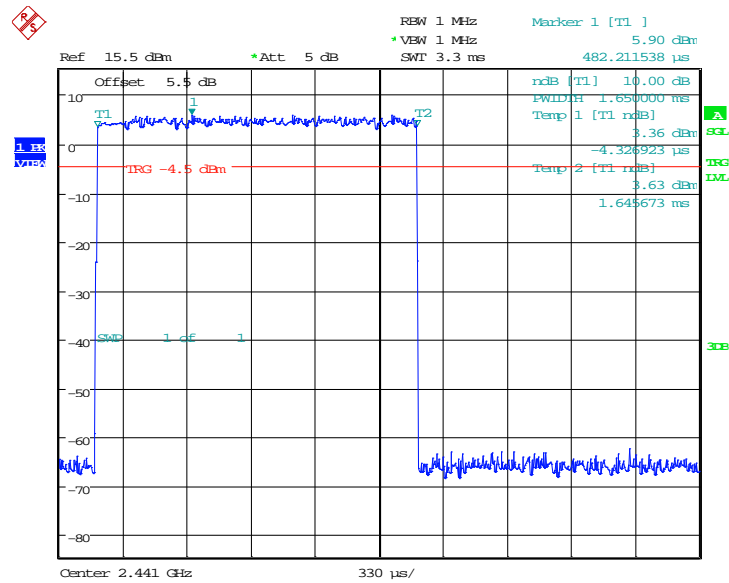
Date: 5.JAN.2016 15:47:39

Fig.101. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1



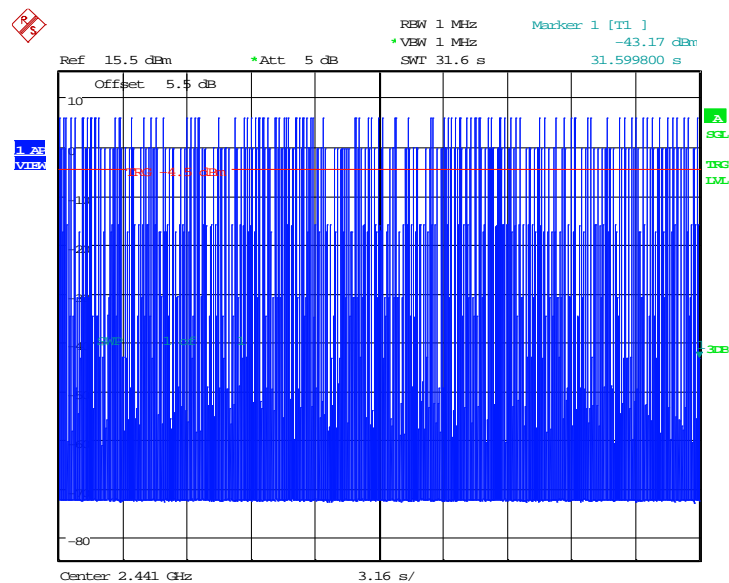
Date: 5.JAN.2016 15:47:27

Fig.102. Number of Transmissions Measurement:Channel 39,Packet 3-DH1



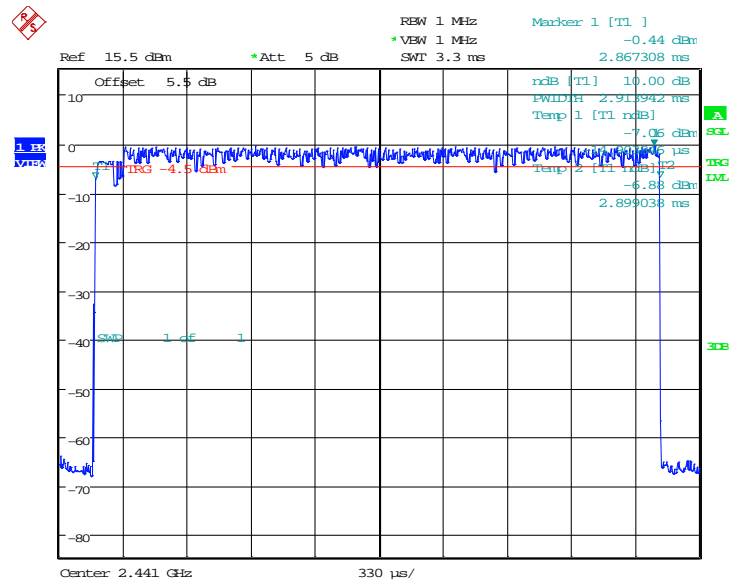
Date: 5.JAN.2016 15:48:55

Fig.103. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3



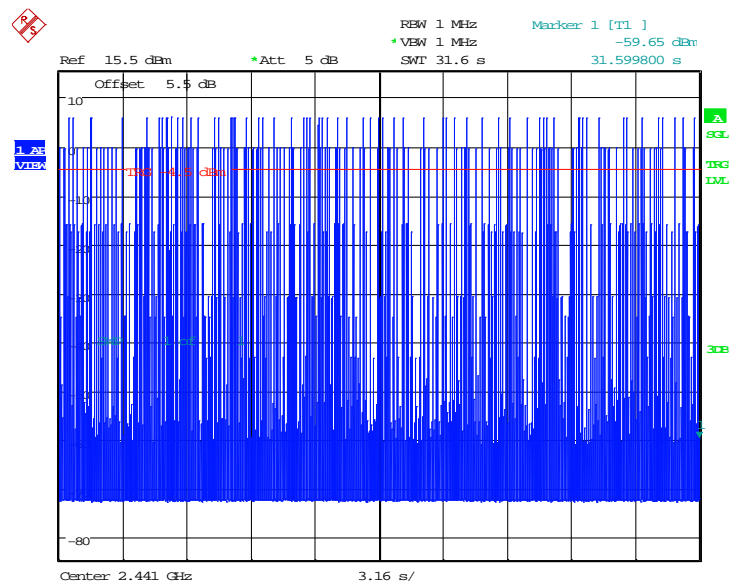
Date: 5.JAN.2016 15:48:43

Fig.104. Number of Transmissions Measurement: Channel 39, Packet 3-DH3



Date: 5.JAN.2016 15:50:09

Fig.105. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5



Date: 5.JAN.2016 15:49:58

Fig.106. Number of Transmissions Measurement:Channel 39,Packet 3-DH5

A.7. 20dB Bandwidth

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

Measurement Procedure - Unwanted Emissions

1. Set RBW = 20kHz.
2. Set VBW = 100 kHz.
3. Set span to 3MHz
4. Detector = peak.
5. Trace Mode = max hold.
6. Sweep = auto couple.
7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

Measurement Limit:

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

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

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

Measurement Results:

For GFSK

| Channel | 20dB Bandwidth (kHz) | | Conclusion |
|---------|----------------------|--------|------------|
| 0 | Fig.107 | 870.19 | NA |
| 39 | Fig.108 | 870.19 | NA |
| 78 | Fig.109 | 870.19 | NA |

For $\pi/4$ DQPSK

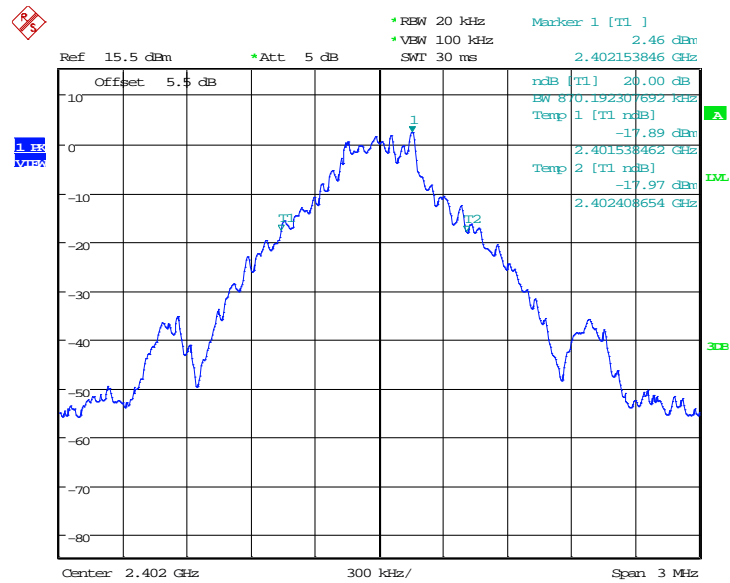
| Channel | 20dB Bandwidth (kHz) | | Conclusion |
|---------|----------------------|---------|------------|
| 0 | Fig.110 | 1269.23 | NA |
| 39 | Fig.111 | 1264.42 | NA |
| 78 | Fig.112 | 1269.23 | NA |

For 8DPSK

| Channel | 20dB Bandwidth (kHz) | | Conclusion |
|---------|----------------------|---------|------------|
| 0 | Fig.113 | 1274.04 | NA |
| 39 | Fig.114 | 1259.62 | NA |
| 78 | Fig.115 | 1288.46 | NA |

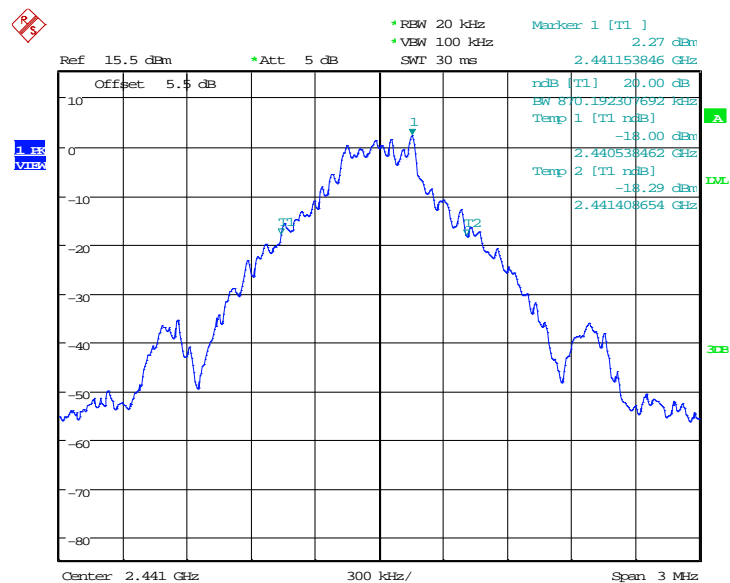
Conclusion: NA

Test graphs as below:



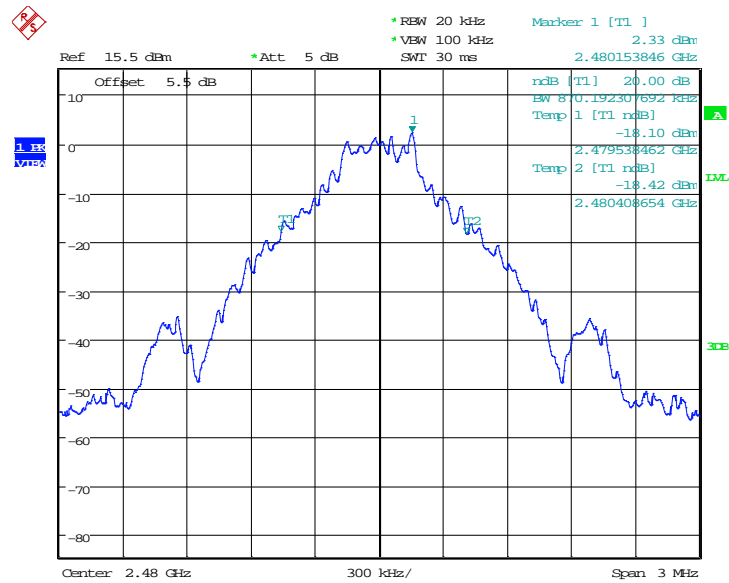
Date: 4.JAN.2016 16:44:21

Fig.107. 20dB Bandwidth: GFSK, Channel 0



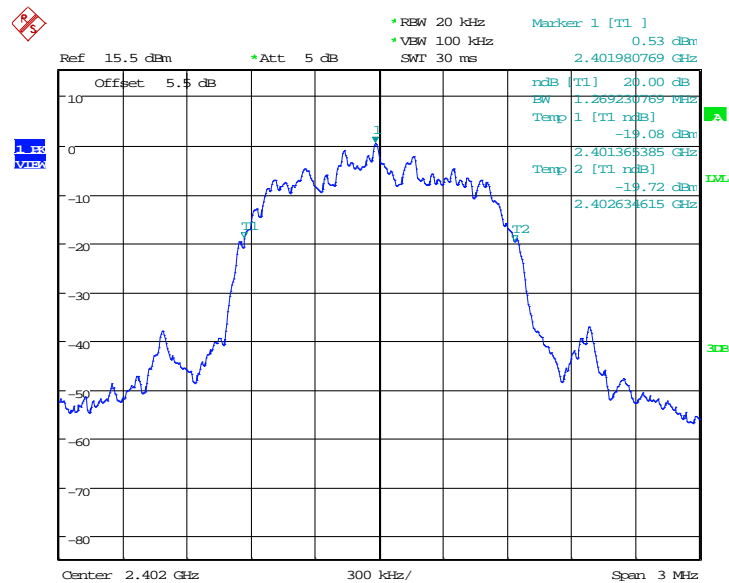
Date: 4.JAN.2016 16:44:53

Fig.108. 20dB Bandwidth: GFSK, Channel 39



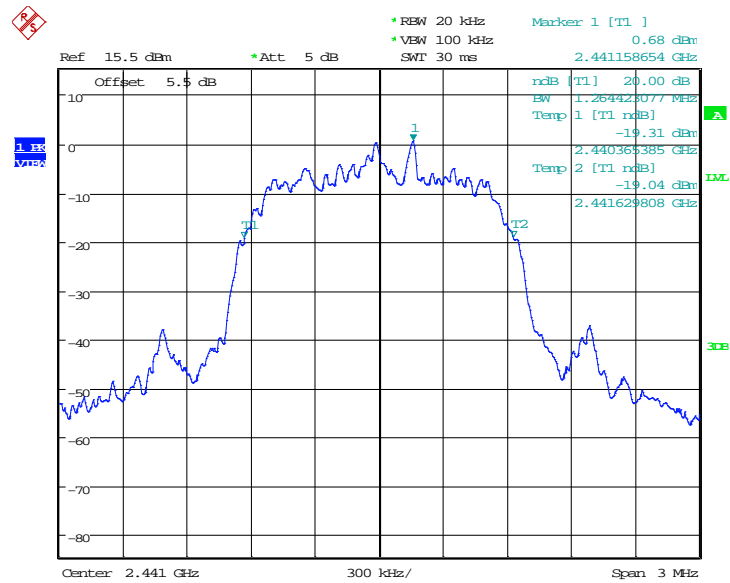
Date: 4.JAN.2016 16:45:25

Fig.109. 20dB Bandwidth: GFSK, Channel 78



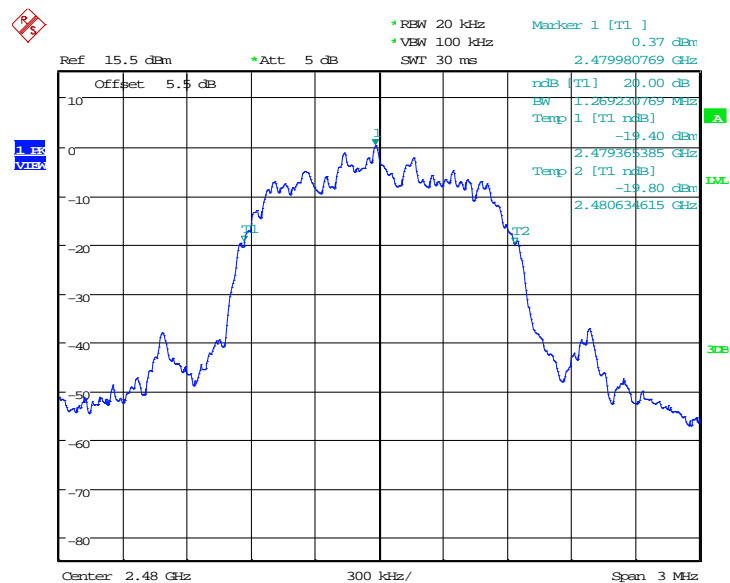
Date: 4.JAN.2016 16:52:10

Fig.110. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 0



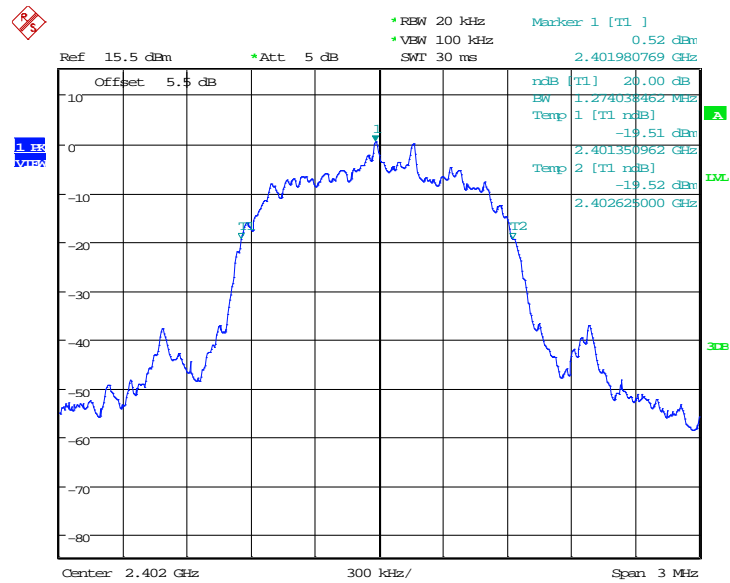
Date: 4.JAN.2016 16:52:41

Fig.111. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 39



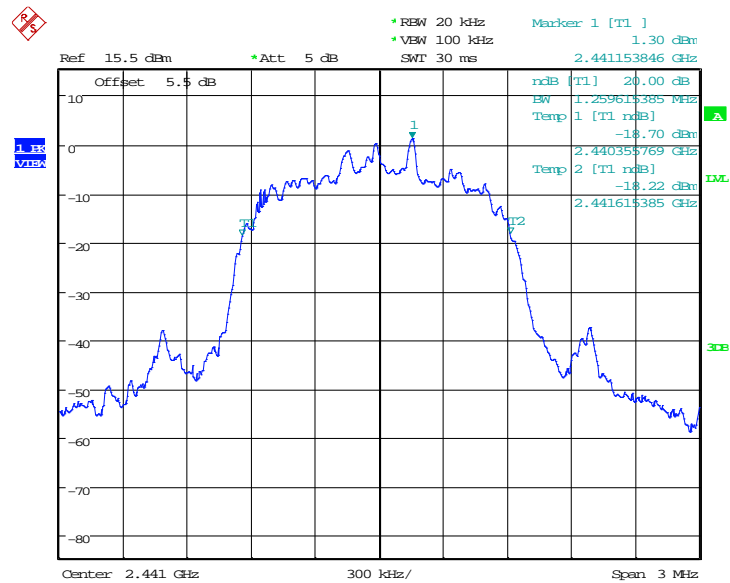
Date: 4.JAN.2016 16:53:13

Fig.112. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 78



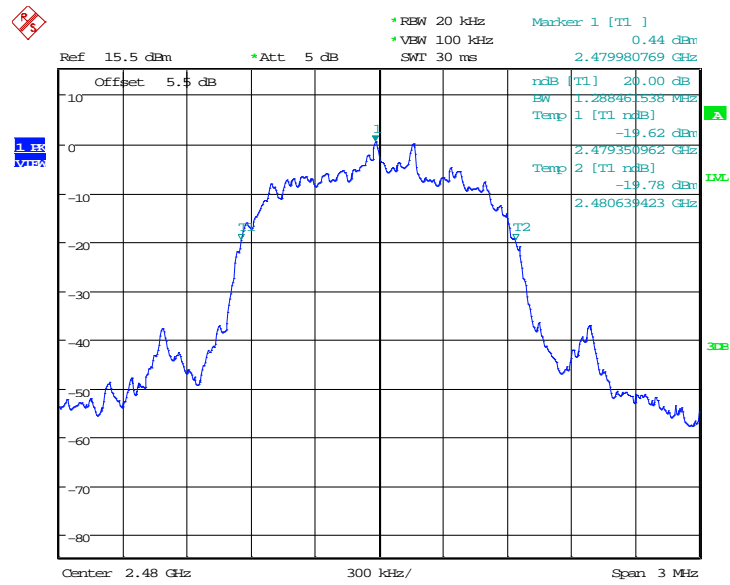
Date: 4.JAN.2016 16:59:59

Fig.113. 20dB Bandwidth: 8DPSK, Channel 0



Date: 4.JAN.2016 17:00:30

Fig.114. 20dB Bandwidth: 8DPSK, Channel 39



Date: 4.JAN.2016 17:01:02

Fig.115. 20dB Bandwidth: 8DPSK, Channel 78

A.8. Carrier Frequency Separation

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

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

- Span = 3MHz
- RBW=300kHz
- VBW=1MHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

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

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

Measurement Limit:

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

Measurement Result:

For GFSK

| Channel | Carrier frequency separation (kHz) | | Conclusion |
|---------|------------------------------------|--------|------------|
| 39 | Fig.116 | 985.58 | P |

For $\pi/4$ DQPSK

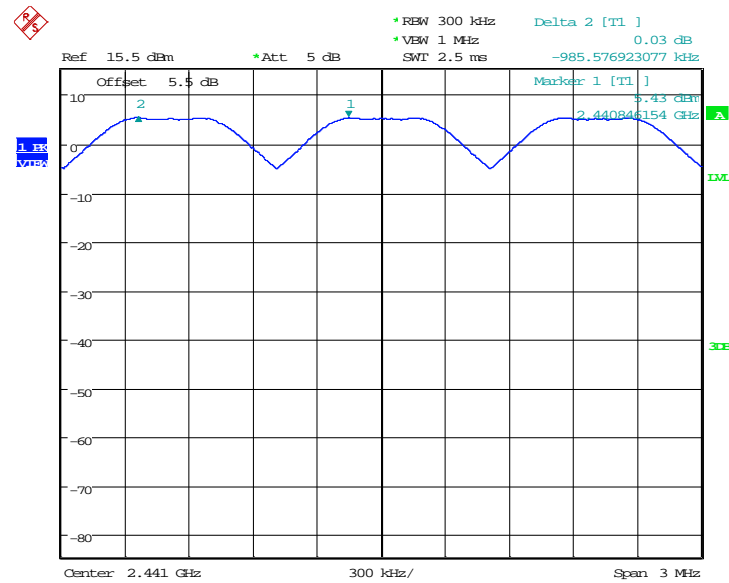
| Channel | Carrier frequency separation (kHz) | | Conclusion |
|---------|------------------------------------|--------|------------|
| 39 | Fig.117 | 971.15 | P |

For 8DPSK

| Channel | Carrier frequency separation (kHz) | | Conclusion |
|---------|------------------------------------|---------|------------|
| 39 | Fig.118 | 1125.00 | P |

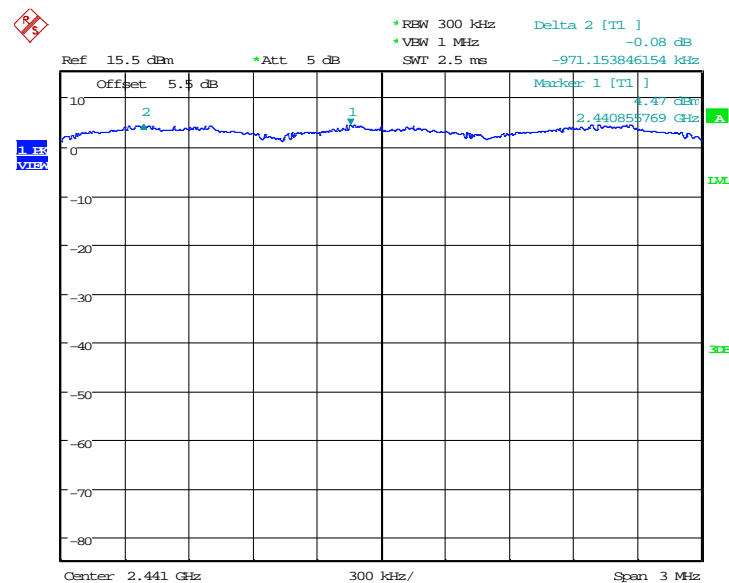
Conclusion: PASS

Test graphs as below:



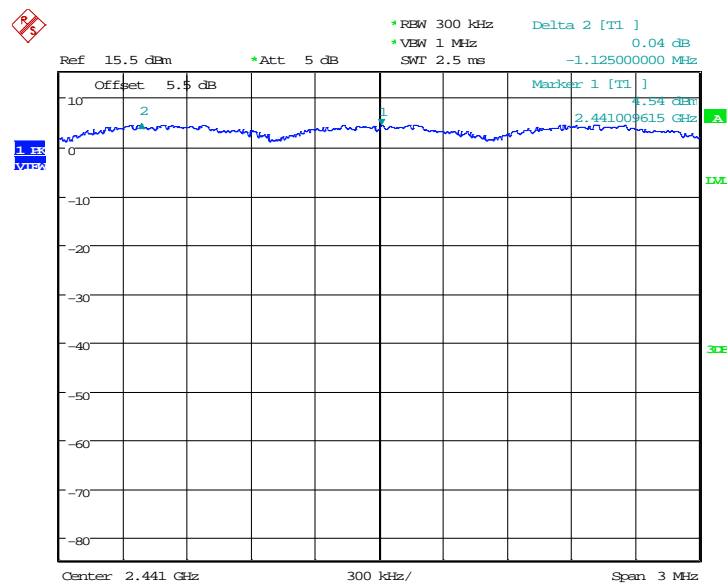
Date: 4.JAN.2016 16:47:29

Fig.116. Carrier frequency separation measurement: GFSK, Channel 39



Date: 4.JAN.2016 16:55:18

Fig.117. Carrier frequency separation measurement: $\pi/4$ DQPSK, Channel 39



Date: 4.JAN.2016 17:03:07

Fig.118. Carrier frequency separation measurement: 8DPSK, Channel 39

A.9. Number of Hopping Channels

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

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

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

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

Measurement Limit:

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

Measurement Result:

For GFSK

| Channel | Number of hopping channels | | Conclusion |
|---------|----------------------------|----|------------|
| 0~39 | Fig.119 | 79 | P |
| 40~78 | Fig.120 | | |

For $\pi/4$ DQPSK

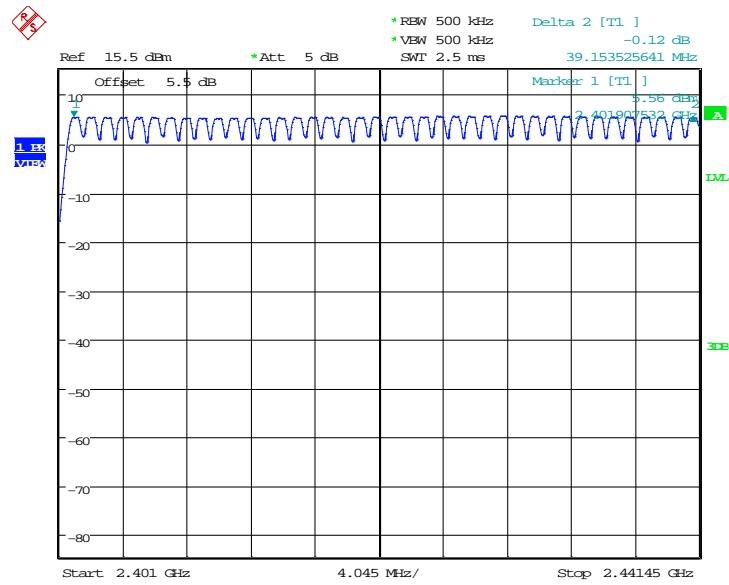
| Channel | Number of hopping channels | | Conclusion |
|---------|----------------------------|----|------------|
| 0~39 | Fig.121 | 79 | P |
| 40~78 | Fig.122 | | |

For 8DPSK

| Channel | Number of hopping channels | | Conclusion |
|---------|----------------------------|----|------------|
| 0~39 | Fig.123 | 79 | P |
| 40~78 | Fig.124 | | |

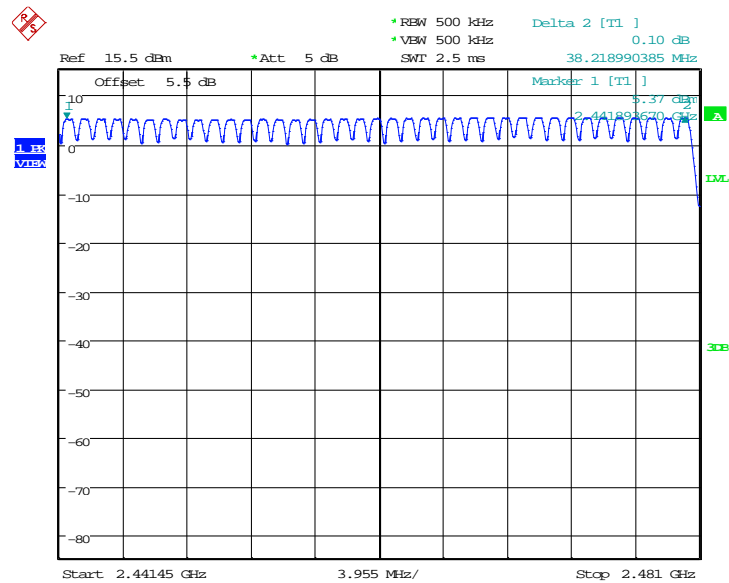
Conclusion: PASS

Test graphs as below:



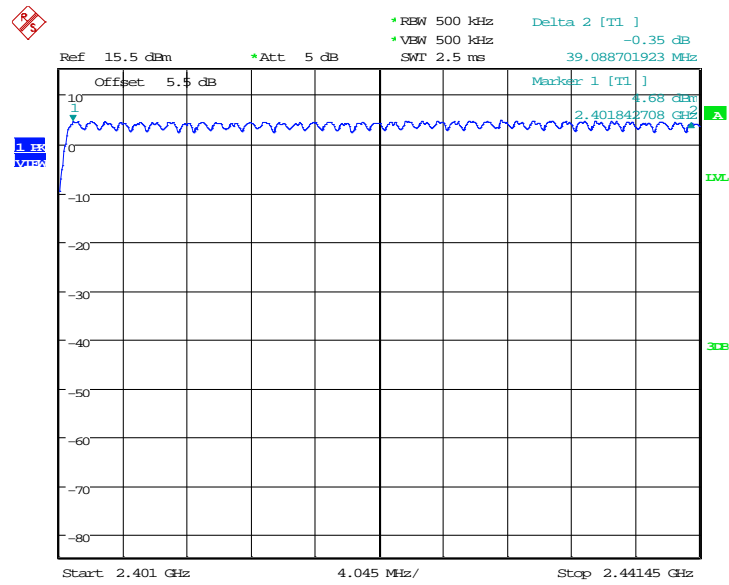
Date: 4.JAN.2016 16:49:33

Fig.119. Number of hopping frequencies: GFSK, Channel 0 - 39



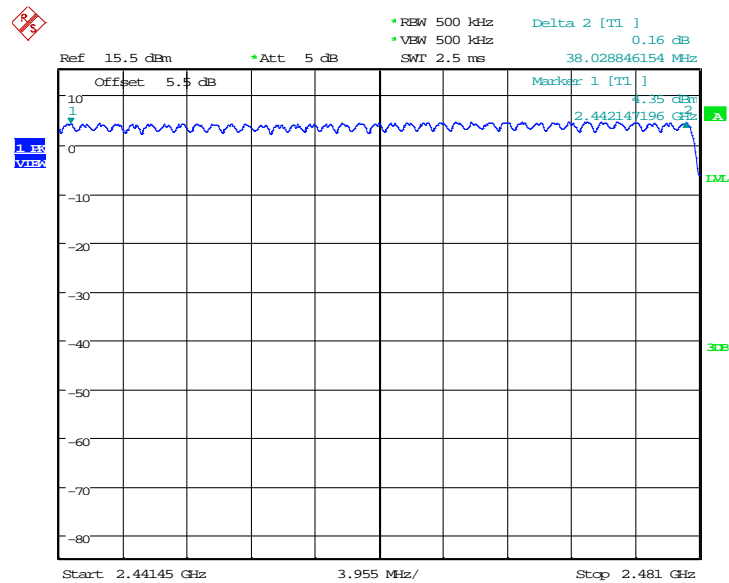
Date: 4.JAN.2016 16:51:36

Fig.120. Number of hopping frequencies: GFSK, Channel 40 - 78



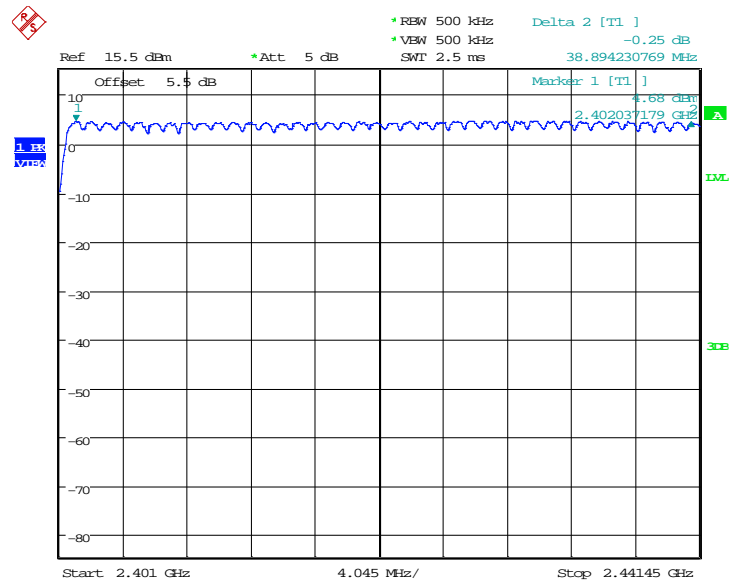
Date: 4.JAN.2016 16:57:22

Fig.121. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 0 - 39



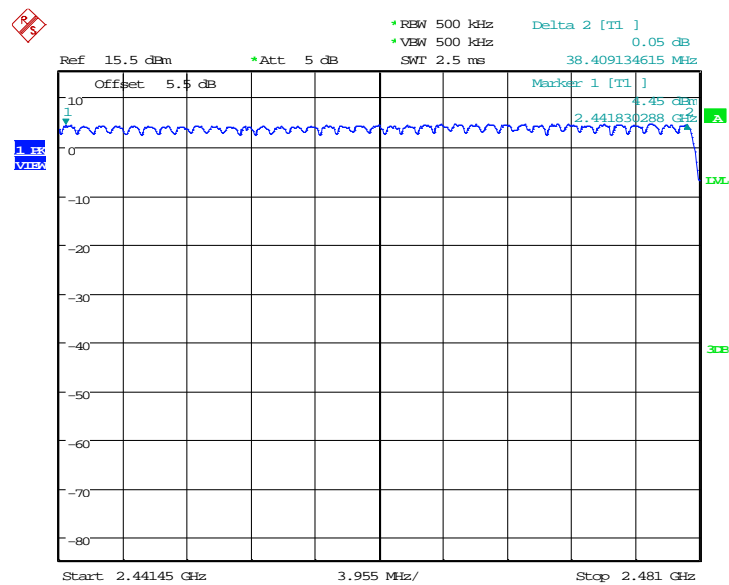
Date: 4.JAN.2016 16:59:25

Fig.122. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 40 - 78



Date: 4.JAN.2016 17:05:11

Fig.123. Number of hopping frequencies: 8DPSK, Channel 0 - 39



Date: 4.JAN.2016 17:07:13

Fig.124. Number of hopping frequencies: 8DPSK, Channel 40 - 78

A.10. AC Powerline Conducted Emission**Test Condition**

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

Measurement Result and limit:**Bluetooth (Quasi-peak Limit)**

| Frequency range (MHz) | Quasi-peak Limit (dB μ V) | Conclusion |
|-----------------------|-------------------------------|------------|
| 0.15 to 0.5 | 66 to 56 | P |
| 0.5 to 5 | 56 | |
| 5 to 30 | 60 | |

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

Bluetooth (Average Limit)

| Frequency range (MHz) | Average Limit (dB μ V) | Conclusion |
|-----------------------|----------------------------|------------|
| 0.15 to 0.5 | 56 to 46 | P |
| 0.5 to 5 | 46 | |
| 5 to 30 | 50 | |

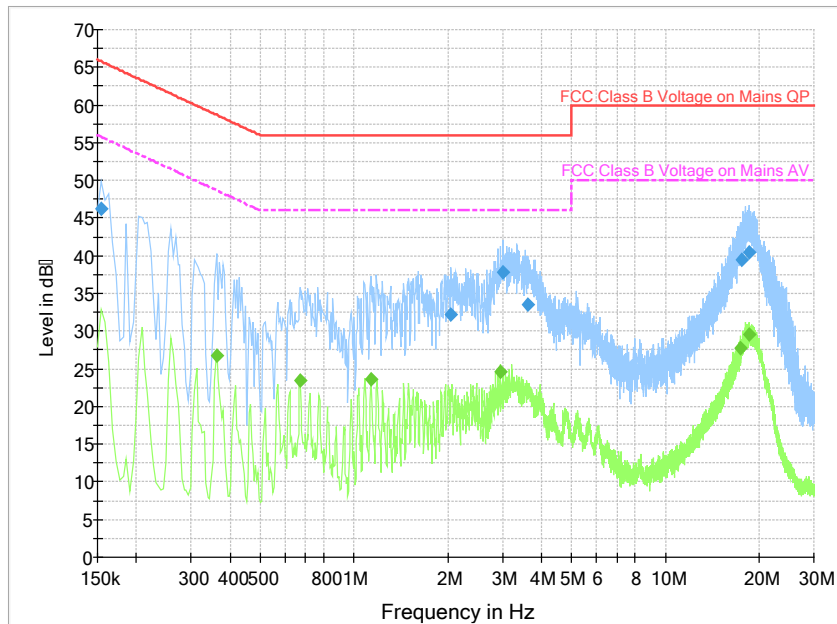
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

The measurement is made according to ANSI C63.10

Conclusion: PASS

Test graphs as below:

Traffic:



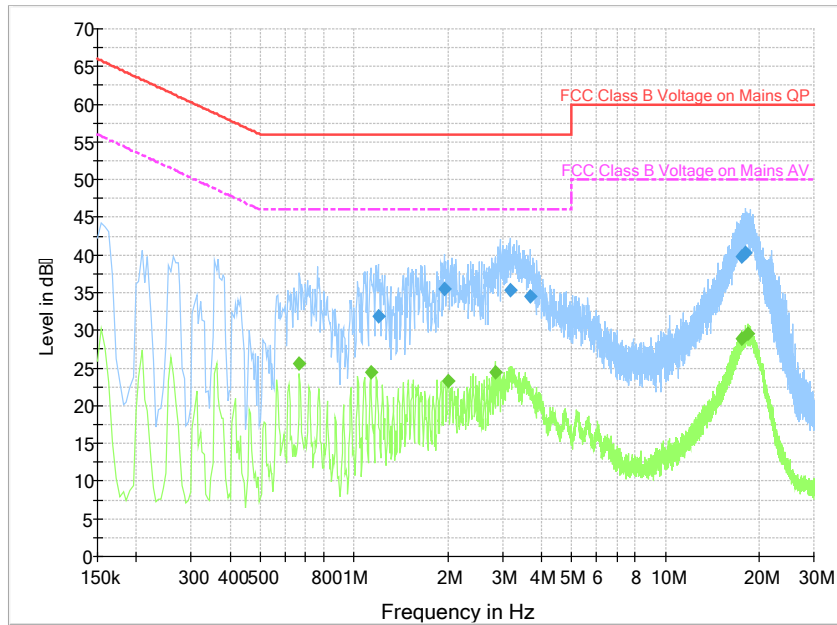
Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.154500 | 46.2 | 2000.0 | 9.000 | On | L1 | 20.0 | 19.6 | 65.8 |
| 2.053500 | 32.2 | 2000.0 | 9.000 | On | N | 19.7 | 23.8 | 56.0 |
| 3.007500 | 37.8 | 2000.0 | 9.000 | On | L1 | 19.1 | 18.2 | 56.0 |
| 3.606000 | 33.6 | 2000.0 | 9.000 | On | N | 19.5 | 22.4 | 56.0 |
| 17.610000 | 39.4 | 2000.0 | 9.000 | On | L1 | 20.0 | 20.6 | 60.0 |
| 18.672000 | 40.5 | 2000.0 | 9.000 | On | L1 | 19.9 | 19.5 | 60.0 |

Final Result 2

| Frequency (MHz) | CAverage (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.361500 | 26.7 | 2000.0 | 9.000 | On | L1 | 19.8 | 22.0 | 48.7 |
| 0.672000 | 23.5 | 2000.0 | 9.000 | On | L1 | 19.8 | 22.5 | 46.0 |
| 1.131000 | 23.6 | 2000.0 | 9.000 | On | L1 | 19.7 | 22.4 | 46.0 |
| 2.949000 | 24.6 | 2000.0 | 9.000 | On | L1 | 19.0 | 21.4 | 46.0 |
| 17.443500 | 27.8 | 2000.0 | 9.000 | On | L1 | 20.0 | 22.2 | 50.0 |
| 18.672000 | 29.6 | 2000.0 | 9.000 | On | L1 | 19.9 | 20.4 | 50.0 |

Idle:



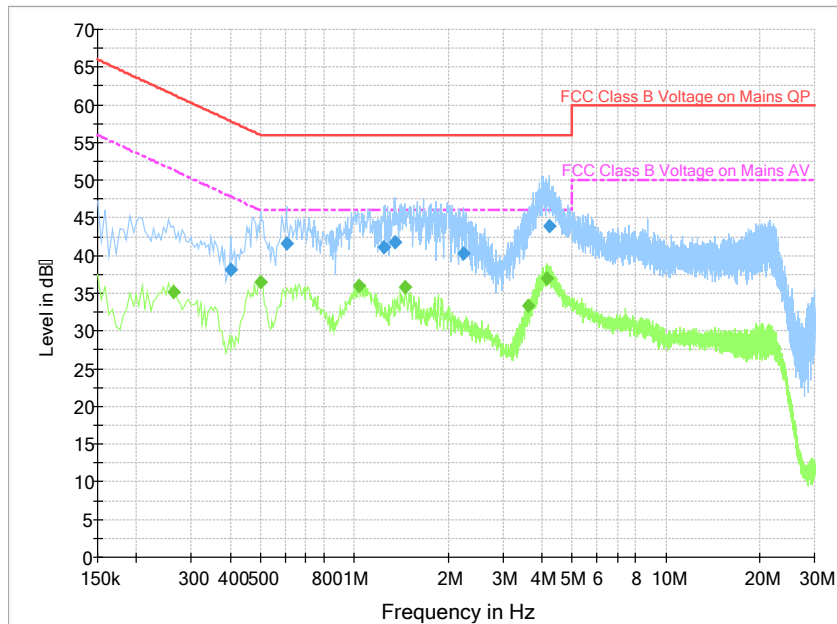
Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 1.194000 | 31.9 | 2000.0 | 9.000 | On | N | 19.7 | 24.1 | 56.0 |
| 1.954500 | 35.4 | 2000.0 | 9.000 | On | L1 | 19.7 | 20.6 | 56.0 |
| 3.169500 | 35.3 | 2000.0 | 9.000 | On | L1 | 19.3 | 20.7 | 56.0 |
| 3.682500 | 34.5 | 2000.0 | 9.000 | On | N | 19.5 | 21.5 | 56.0 |
| 17.547000 | 39.8 | 2000.0 | 9.000 | On | L1 | 20.0 | 20.2 | 60.0 |
| 18.096000 | 40.3 | 2000.0 | 9.000 | On | L1 | 19.9 | 19.7 | 60.0 |

Final Result 2

| Frequency (MHz) | CAverage (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.667500 | 25.6 | 2000.0 | 9.000 | On | L1 | 19.8 | 20.4 | 46.0 |
| 1.131000 | 24.5 | 2000.0 | 9.000 | On | L1 | 19.7 | 21.5 | 46.0 |
| 1.999500 | 23.3 | 2000.0 | 9.000 | On | L1 | 19.7 | 22.7 | 46.0 |
| 2.836500 | 24.4 | 2000.0 | 9.000 | On | L1 | 18.9 | 21.6 | 46.0 |
| 17.578500 | 28.9 | 2000.0 | 9.000 | On | L1 | 20.0 | 21.1 | 50.0 |
| 18.370500 | 29.5 | 2000.0 | 9.000 | On | L1 | 19.9 | 20.5 | 50.0 |

Traffic with CBA0058AG1C2:



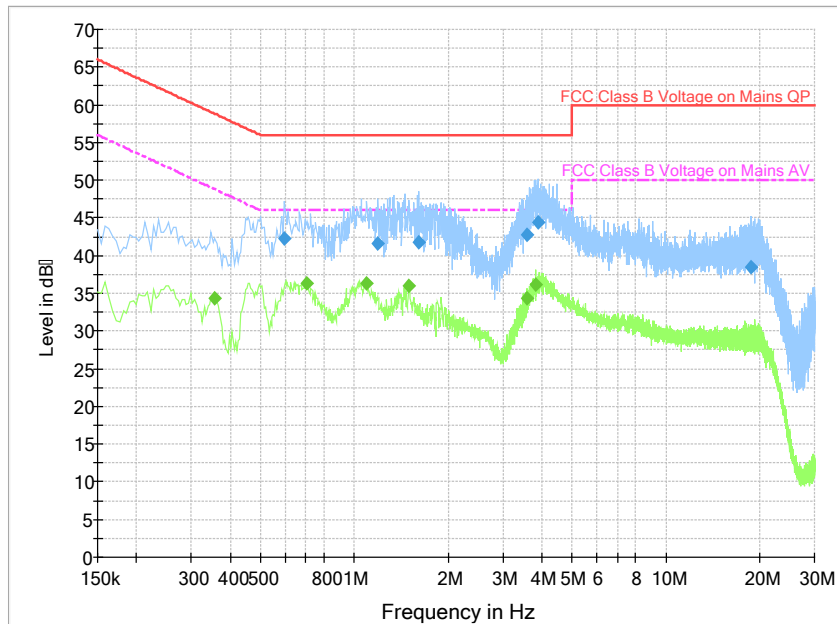
Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.402000 | 38.2 | 2000.0 | 9.000 | On | L1 | 19.9 | 19.6 | 57.8 |
| 0.604500 | 41.6 | 2000.0 | 9.000 | On | N | 19.8 | 14.5 | 56.0 |
| 1.243500 | 41.1 | 2000.0 | 9.000 | On | L1 | 19.7 | 14.9 | 56.0 |
| 1.356000 | 41.7 | 2000.0 | 9.000 | On | L1 | 19.7 | 14.3 | 56.0 |
| 2.242500 | 40.2 | 2000.0 | 9.000 | On | L1 | 19.3 | 15.8 | 56.0 |
| 4.236000 | 44.0 | 2000.0 | 9.000 | On | L1 | 19.6 | 12.0 | 56.0 |

Final Result 2

| Frequency (MHz) | CAverage (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.262500 | 35.2 | 2000.0 | 9.000 | On | N | 19.8 | 16.2 | 51.4 |
| 0.501000 | 36.5 | 2000.0 | 9.000 | On | N | 19.9 | 9.5 | 46.0 |
| 1.032000 | 36.0 | 2000.0 | 9.000 | On | N | 19.7 | 10.0 | 46.0 |
| 1.455000 | 35.8 | 2000.0 | 9.000 | On | N | 19.7 | 10.2 | 46.0 |
| 3.601500 | 33.3 | 2000.0 | 9.000 | On | L1 | 19.5 | 12.7 | 46.0 |
| 4.159500 | 37.0 | 2000.0 | 9.000 | On | L1 | 19.6 | 9.0 | 46.0 |

Idle with CBA0058AG1C2:



Final Result 1

| Frequency (MHz) | QuasiPeak (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|------------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.595500 | 42.2 | 2000.0 | 9.000 | On | N | 19.8 | 13.8 | 56.0 |
| 1.189500 | 41.7 | 2000.0 | 9.000 | On | L1 | 19.7 | 14.3 | 56.0 |
| 1.612500 | 41.7 | 2000.0 | 9.000 | On | L1 | 19.7 | 14.3 | 56.0 |
| 3.574500 | 42.8 | 2000.0 | 9.000 | On | L1 | 19.5 | 13.2 | 56.0 |
| 3.903000 | 44.4 | 2000.0 | 9.000 | On | L1 | 19.5 | 11.6 | 56.0 |
| 18.780000 | 38.5 | 2000.0 | 9.000 | On | L1 | 19.9 | 21.5 | 60.0 |

Final Result 2

| Frequency (MHz) | CAverage (dBμV) | Meas. Time (ms) | Bandwidth (kHz) | Filter | Line | Corr. (dB) | Margin (dB) | Limit (dBμV) |
|-----------------|-----------------|-----------------|-----------------|--------|------|------------|-------------|--------------|
| 0.357000 | 34.4 | 2000.0 | 9.000 | On | N | 19.8 | 14.4 | 48.8 |
| 0.703500 | 36.3 | 2000.0 | 9.000 | On | N | 19.8 | 9.7 | 46.0 |
| 1.090500 | 36.3 | 2000.0 | 9.000 | On | N | 19.7 | 9.7 | 46.0 |
| 1.500000 | 36.0 | 2000.0 | 9.000 | On | N | 19.7 | 10.0 | 46.0 |
| 3.597000 | 34.3 | 2000.0 | 9.000 | On | L1 | 19.5 | 11.7 | 46.0 |
| 3.822000 | 36.1 | 2000.0 | 9.000 | On | L1 | 19.5 | 9.9 | 46.0 |

ANNEX B: Accreditation Certificate

| |
|--|
| <div></div> <div><p>China National Accreditation Service for Conformity Assessment</p><p>LABORATORY ACCREDITATION CERTIFICATE</p><p>(No. CNAS L0570)</p><p>Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT <u>No.52, Huayuan North Road, Haidian District, Beijing, China</u> <u>No.51, Xueyuan Road, Haidian District, Beijing, China</u></p><p><i>to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing and calibration.</i></p><p><i>The scope of accreditation is detailed in the attached schedule bearing the same accreditation number as above. The schedule forms an integral part of this certificate.</i></p><p>Date of Issue: 2014-10-29 Date of Expiry: 2017-06-19 Date of Initial Accreditation: 1998-07-03</p><div></div><p>Signed on behalf of China National Accreditation Service for Conformity Assessment</p><p><small>China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is the signatory to International Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (ILAC MRA) and Asia Pacific Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (APLAC MRA).</small></p><div><div>No.CNAS AL 2</div><div>0011149</div></div></div> |
|--|

END OF REPORT