FCC PART 15C
TEST REPORT
No. I16Z41857-SRD01

for

TCL Communication Ltd.

GSM Quad Band Mobile phone

Model Name: 1054X

Marketing name ： Alcatel 1054X

FCC ID: 2ACCJB074

with

Hardware Version: PIO

Software Version: V1.0

Issued Date: 2016-9-21

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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I16Z41857-SRD01	Rev.0	1st edition	2016-9-21

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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

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2016-9-1

Testing End Date: 2016-9-21

1.4. Signature

Sun Zhenyu

(Prepared this test report)

Li Zhuofang

(Reviewed this test report)

Lv Songdong

(Approved this test report)

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2. Client Information

2.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address /Post:	5F, C-Tower, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area,Shanghai,201203,P.R.China
City:	Shanghai
Postal Code:	201203
Country:	China
Telephone:	0086-21-51798260
Fax:	0086-21-61460600
Contact Person:	Smile.Wu
Contact Email:	Xia.wu@tcl.com

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address /Post:	5F, C-Tower, No. 232, Liang Jing Road, ZhangJiang High-Tech Park, Pudong Area,Shanghai,201203,P.R.China
City:	Shanghai
Postal Code:	201203
Country:	China
Telephone:	0086-21-51798260
Fax:	0086-21-61460600
Contact Person:	Smile.Wu
Contact Email:	Xia.wu@tcl.com

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

3.1. About EUT

Description	GSM Quad Band Mobile phone
Model Name	1054X
Marketing name	Alcatel 1054X
FCC ID	2ACCJB074
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	GFSK/π/4 DQPSK/8DPSK
Number of Channels	79
Power Supply	3.7V DC by Battery

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	358299070001934	PIO	V1.0
EUT2	352273017386340	PIO	V1.0

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

3.3. Internal Identification of AE

AE ID*	Description	SN	Remarks
AE1	Battery	/	16TCT-BA-0590
AE3	Charger	/	/
AE4	Charger	/	/
AE5	USB Cable	/	16TCT-DC-0280

AE1

Model	CAB0800002C1
Manufacturer	BYD
Capacitance	800 mAh
Nominal voltage	3.7 V

AE3

Model	CBA3068AGAC1
Manufacturer	BYD
Length of cable	/

AE4

Model	CBA3068AAAC1
Manufacturer	BYD
Length of cable	/

AE5

Model	CDA0000092C3
Manufacturer	JIAYIKANG

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Length of cable	96cm

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

3.4. EUT set-ups

EUT set-up No.	Combination of EUT and AE	Remarks
Set.1	EUT1+ AE1+ AE3+ AE5	Charger

3.5. Normal Accessory setting

Fully charged battery should be used during the test.

3.6. General Description

The Equipment Under Test (EUT) is a model of GSM Quad Band Mobile phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfill the test.

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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: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902–928MHz, 2400–2483.5 MHz, and 5725–5850 MHz.	2015
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	June,2013

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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

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6. 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	2017-07-05
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	2017-07-05
2	Loop antenna	HFH2-Z2	829324/007	Rohde & Schwarz	3 years	2017-12-16
3	BiLog Antenna	VULB9163	235	Schwarzbeck	3 years	2019-05-10
4	Dual-Ridge Waveguide Horn Antenna	3115	6914	EMCO	3 years	2017-12-15
5	Dual-Ridge Waveguide Horn Antenna	3116	2661	ETS-Lindgren	3 years	2017-06-30
6	Vector Signal Analyzer	FSV	101047	Rohde & Schwarz	1 year	2017-06-28
7	Semi-anechoic chamber	/	CT000332-1074	Frankonia German	/	/
8	Bluetooth Tester	CBT	100153	Rohde & Schwarz	1 year	2017-03-02

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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.

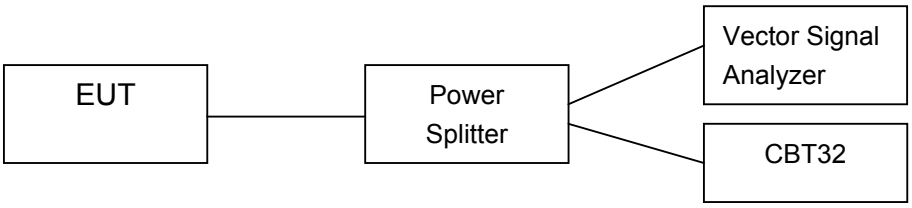
2). Set the EUT to the required work mode (Transmitter, receiver or transmitter & receiver).

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

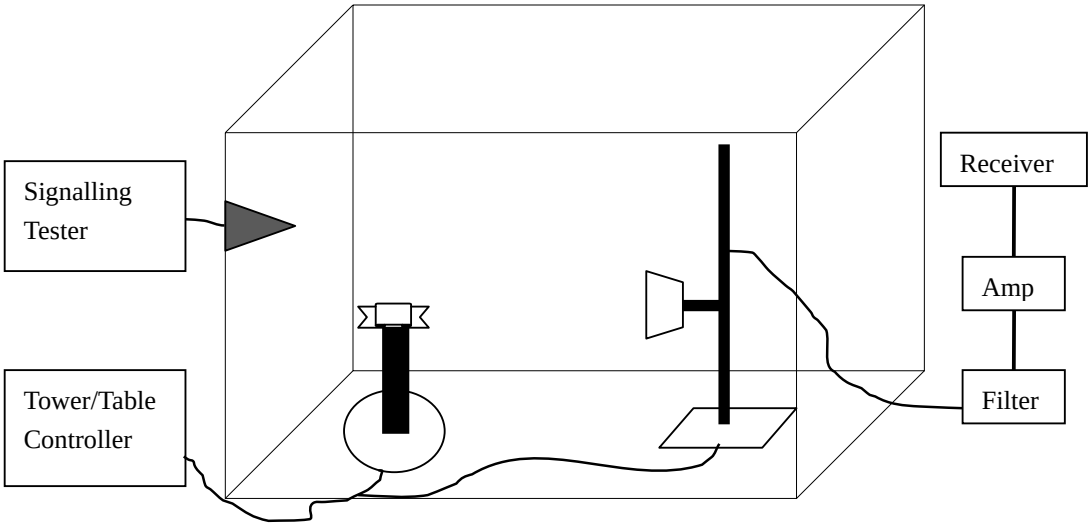
The measurement is made according to ANSI C63.10

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;



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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)	-0.73	-1.26	-0.15	P

Forπ/4 DQPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	1.10	0.60	1.36	P

For 8DPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	1.45	0.90	1.71	P

Conclusion: PASS

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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	-46.37	P
	Hopping ON	Fig.2	-46.55	P
78	Hopping OFF	Fig.3	-55.21	P
	Hopping ON	Fig.4	-47.10	P

Forπ/4 DQPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.5	-43.33	P
	Hopping ON	Fig.6	-55.12	P
78	Hopping OFF	Fig.7	-48.46	P
	Hopping ON	Fig.8	-56.97	P

For 8DPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.9	-52.62	P
	Hopping ON	Fig.10	-53.44	P

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78	Hopping OFF	Fig.11	-49.19	P
	Hopping ON	Fig.12	-59.35	P

Conclusion: PASS

Test graphs as below

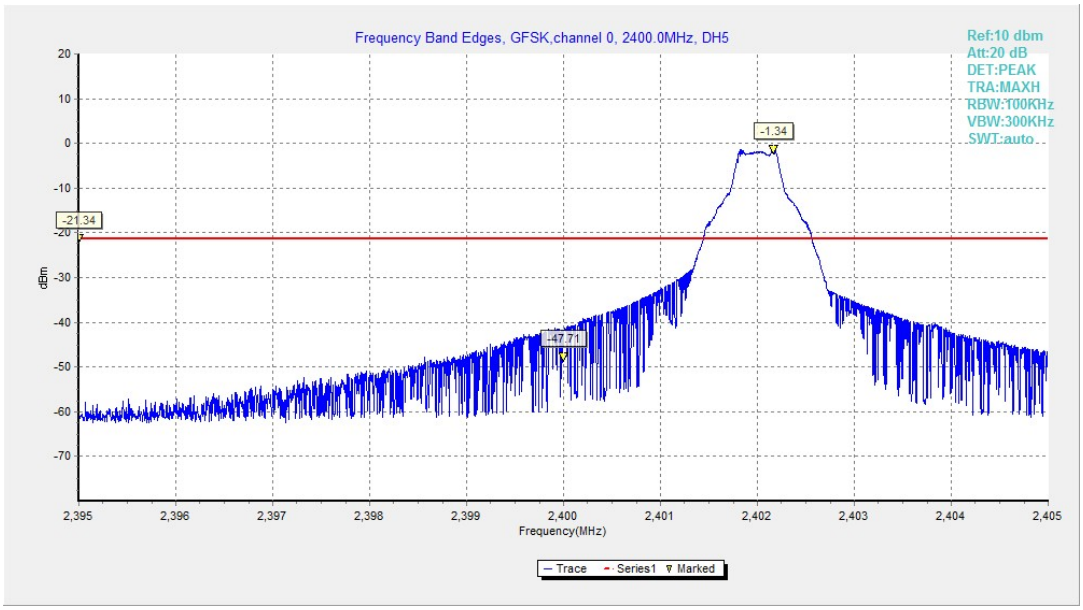

Fig.1. Frequency Band Edges: GFSK, Channel 0, Hopping Off

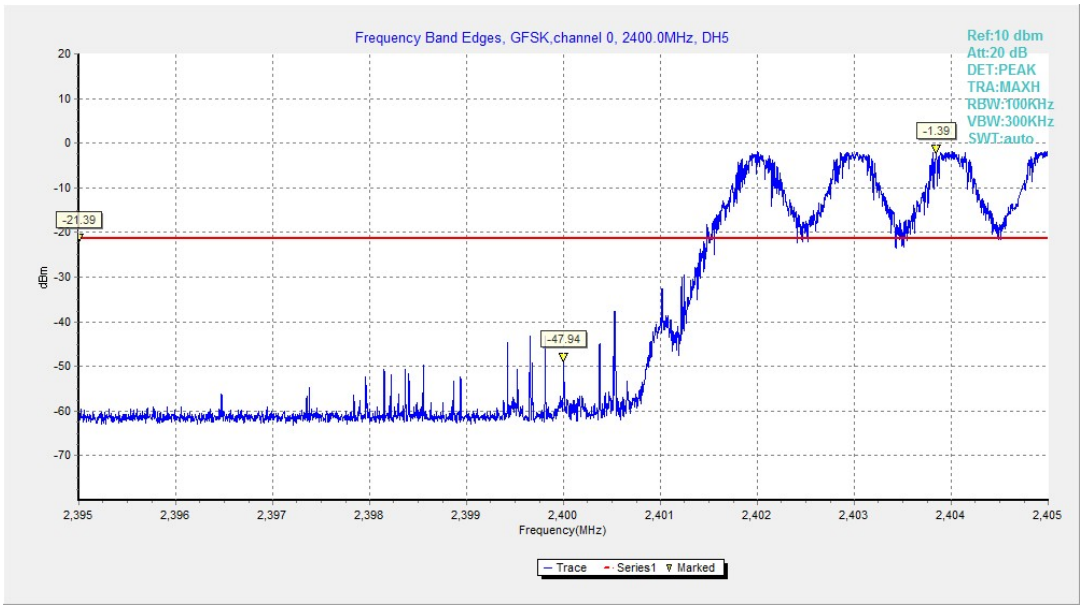

Fig.2. Frequency Band Edges: GFSK, Channel 0, Hopping On

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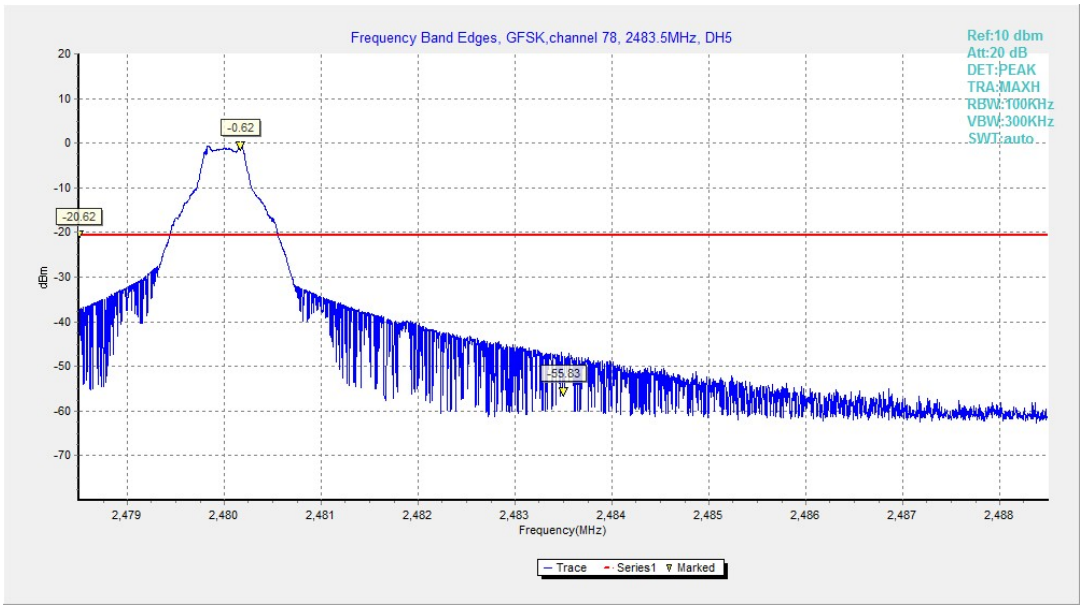

Fig.3. Frequency Band Edges: GFSK, Channel 78, Hopping Off

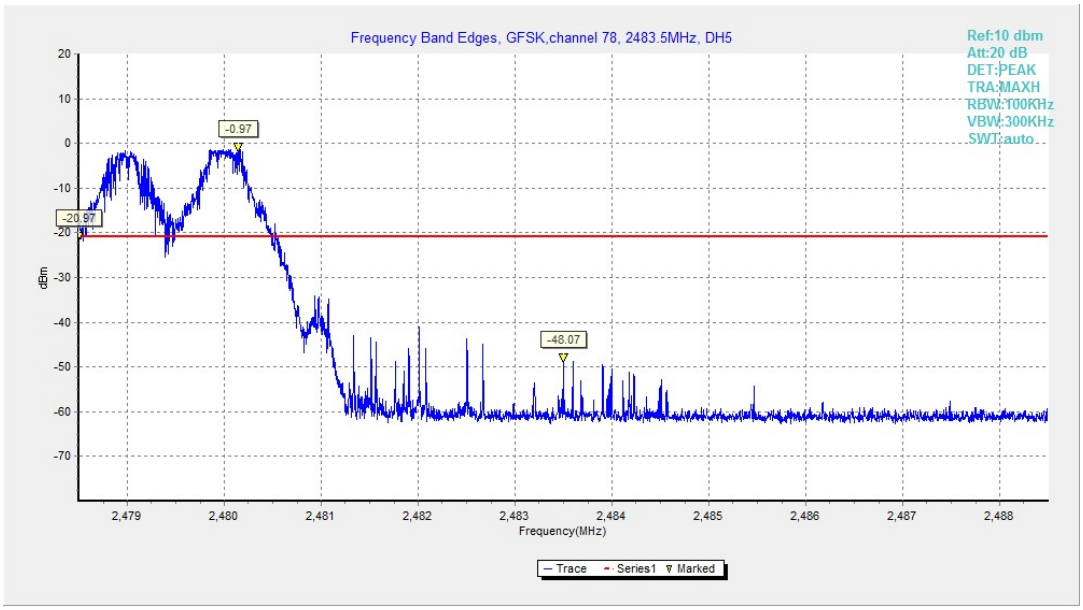

Fig.4. Frequency Band Edges: GFSK, Channel 78, Hopping On

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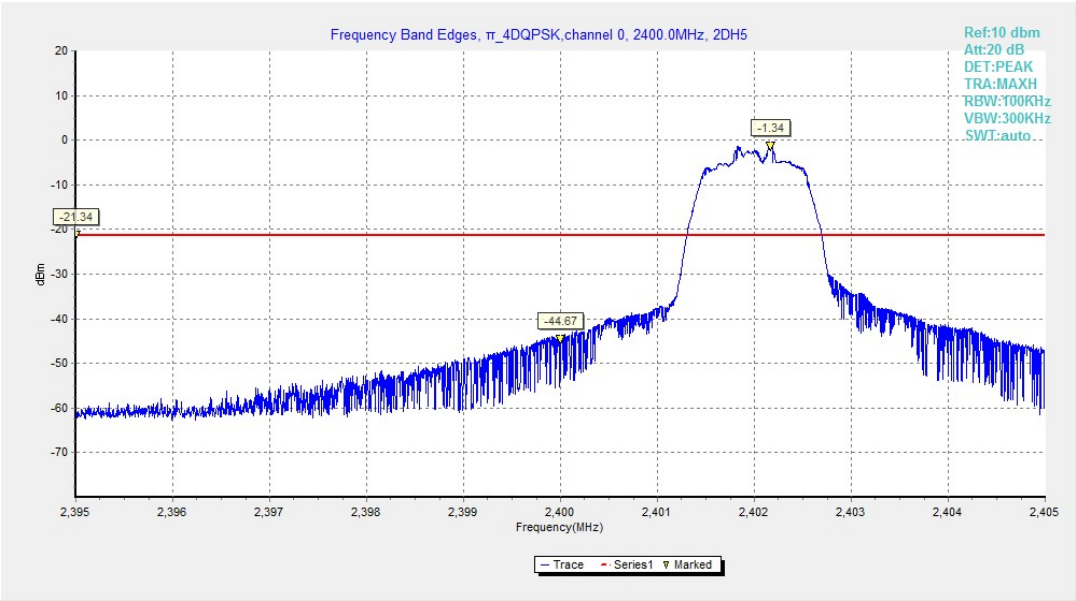

Fig.5. Frequency Band Edges: π/4 DQPSK, Channel 0, Hopping Off

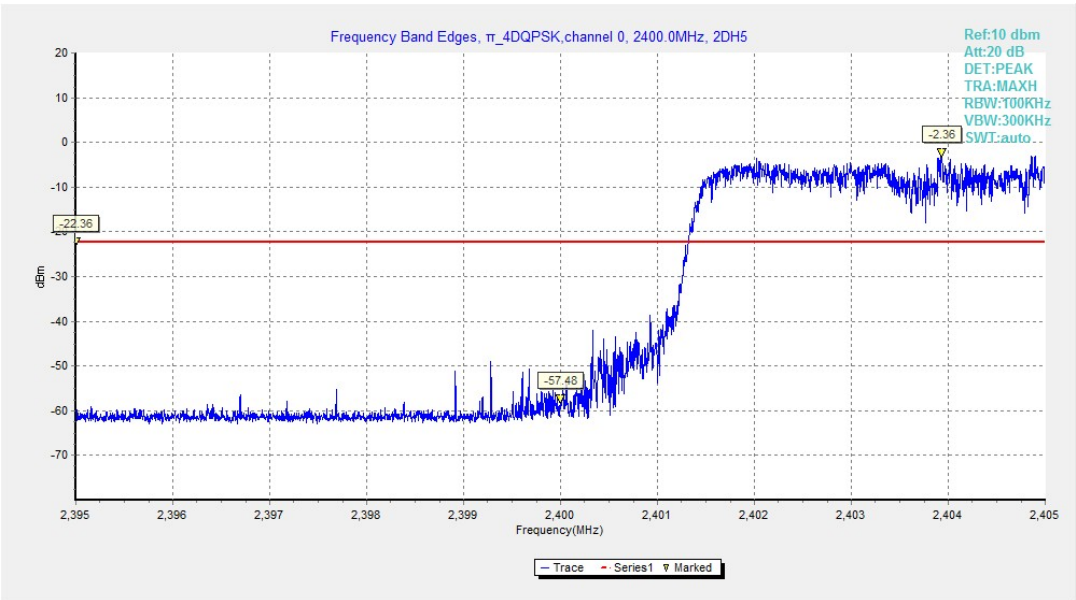

Fig.6. Frequency Band Edges: π/4 DQPSK, Channel 0, Hopping On

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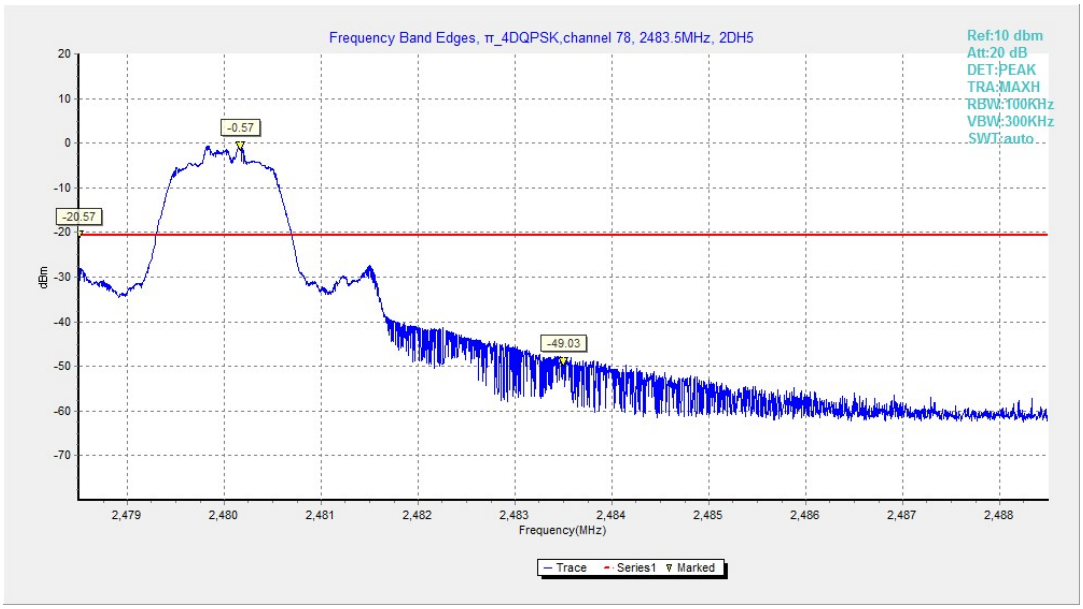

Fig.7. Frequency Band Edges: π/4 DQPSK, Channel 78, Hopping Off

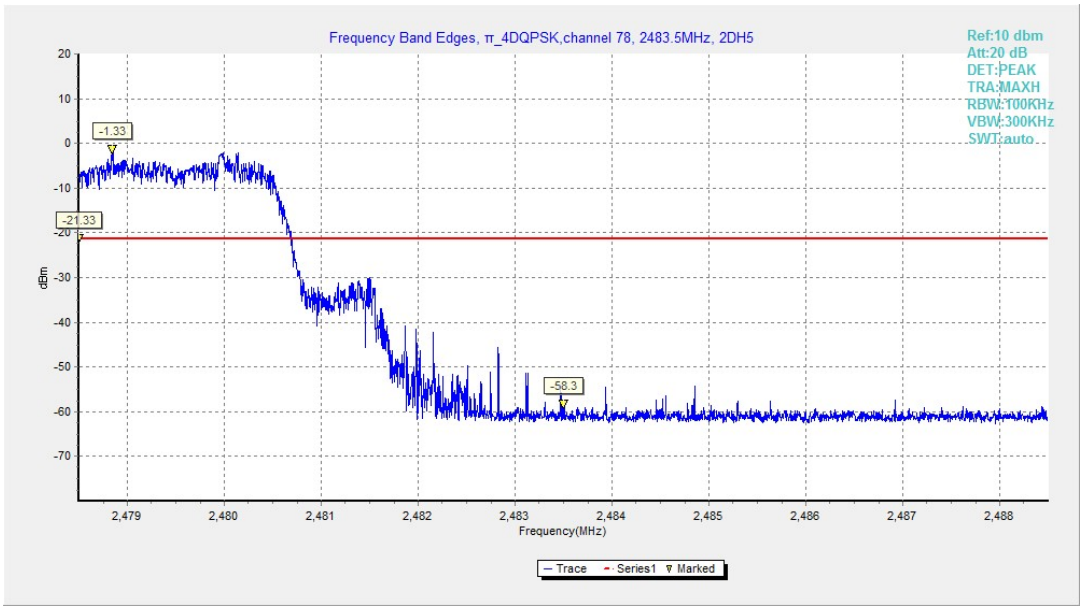

Fig.8. Frequency Band Edges: π/4 DQPSK, Channel 78, Hopping On

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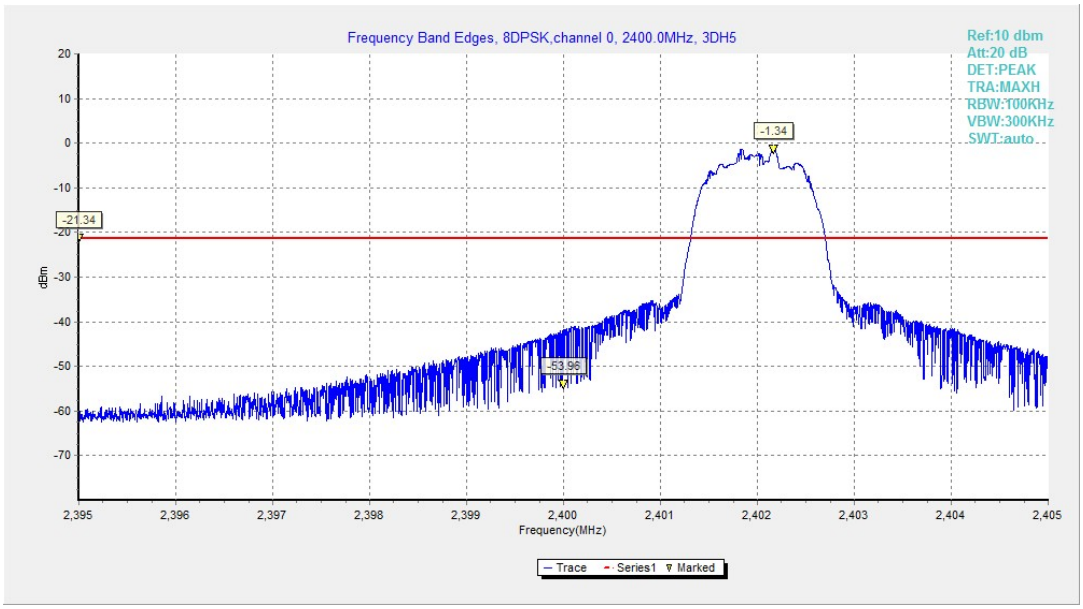

Fig.9. Frequency Band Edges: 8DPSK, Channel 0, Hopping Off

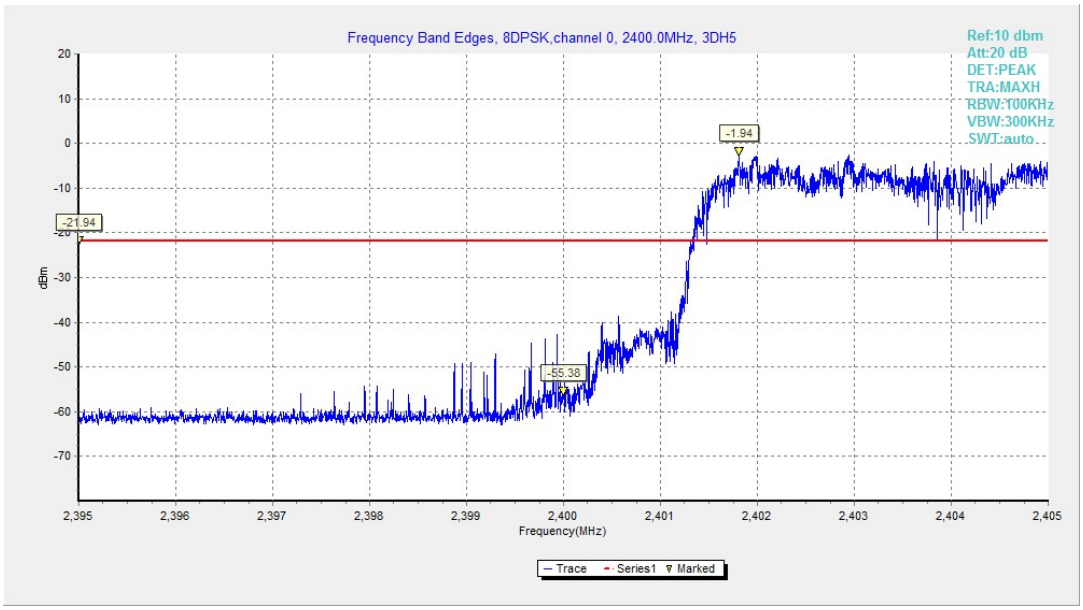

Fig.10. Frequency Band Edges: 8DPSK, Channel 0, Hopping On

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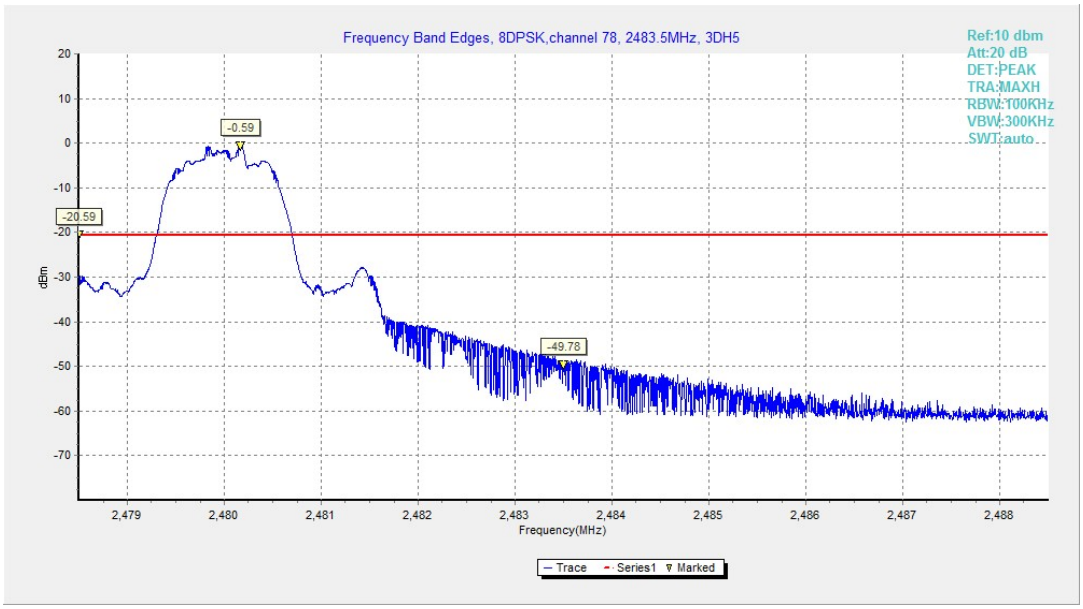

Fig.11. Frequency Band Edges: 8DPSK, Channel 78, Hopping Off

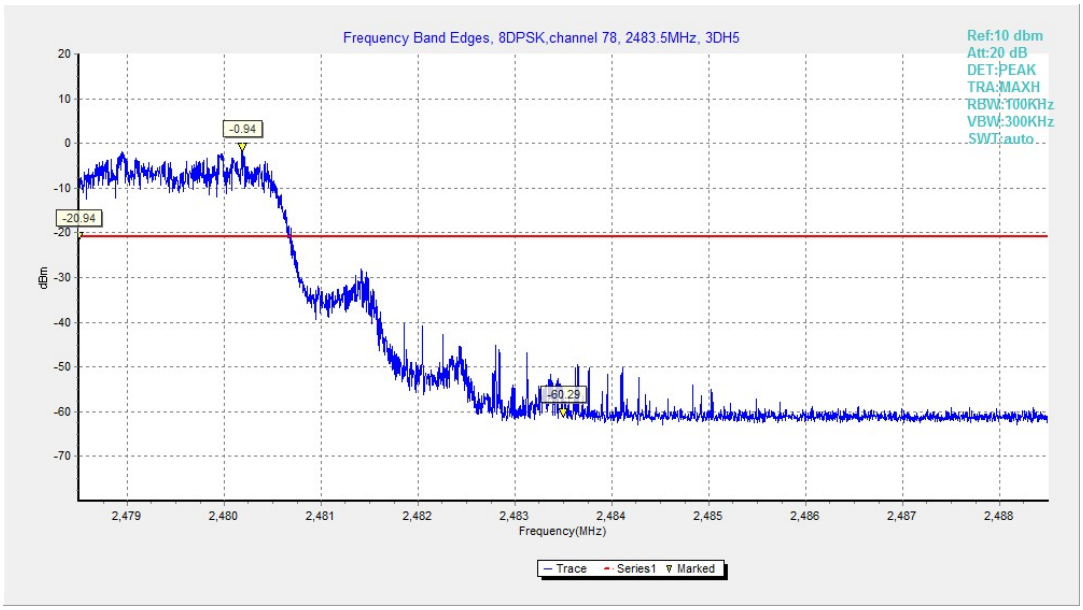

Fig.12. Frequency Band Edges: 8DPSK, Channel 78, Hopping On

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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

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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 π/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

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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

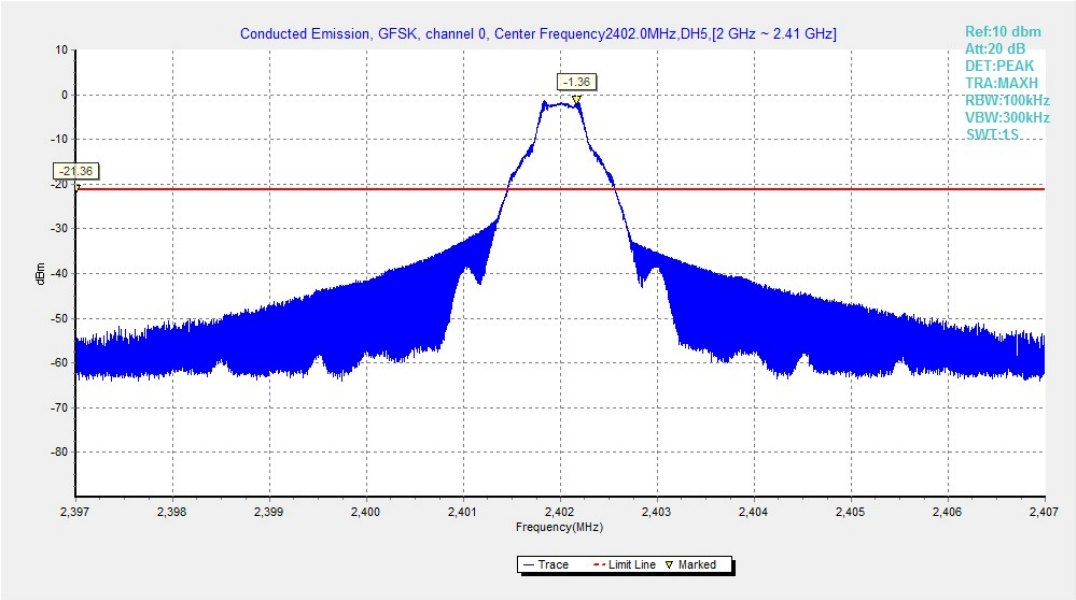

Fig.13. Conducted spurious emission: GFSK, Channel 0,2402MHz

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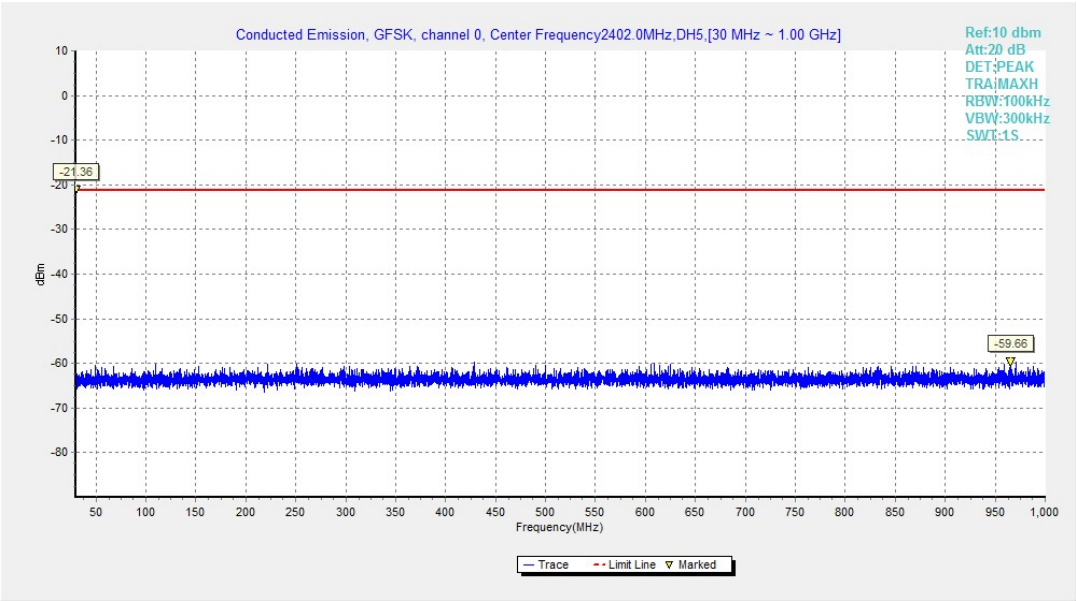

Fig.14. Conducted spurious emission: GFSK, Channel 0, 30MHz - 1GHz

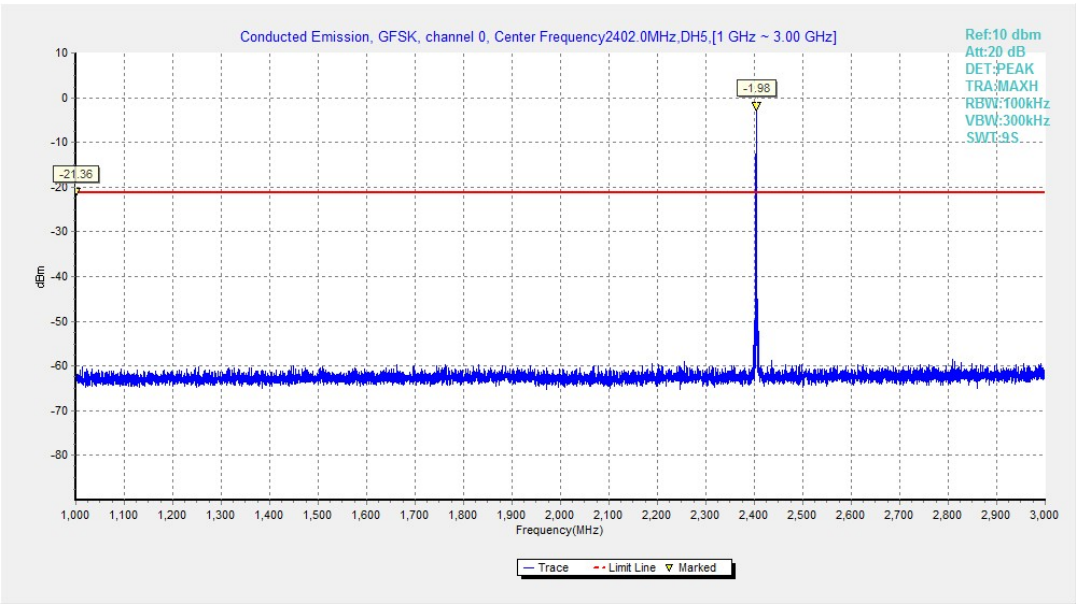

Fig.15. Conducted spurious emission: GFSK, Channel 0, 1GHz - 3GHz

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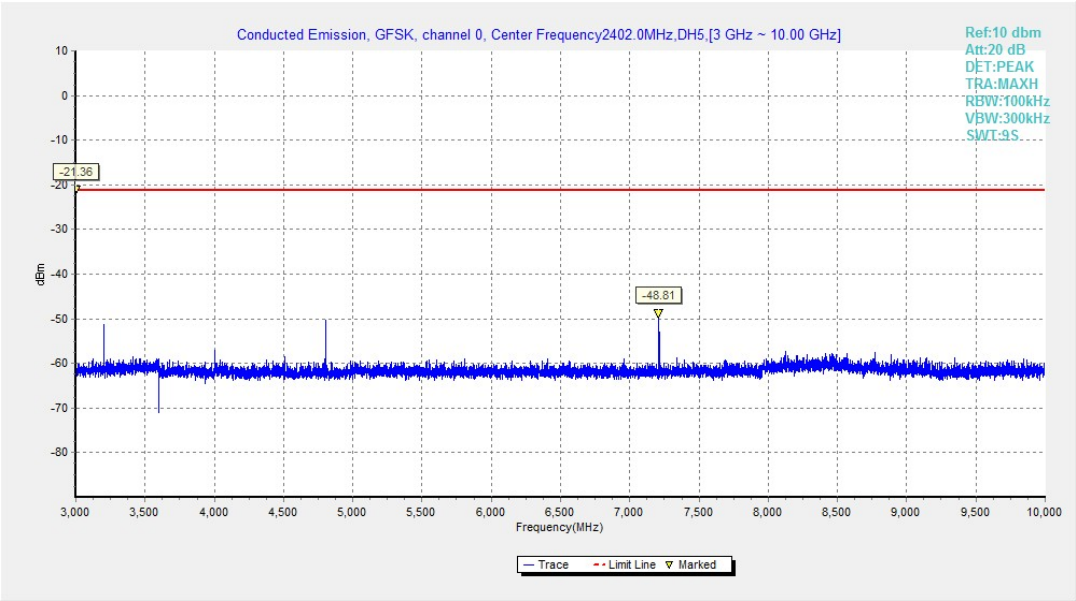

Fig.16. Conducted spurious emission: GFSK, Channel 0, 3GHz - 10GHz

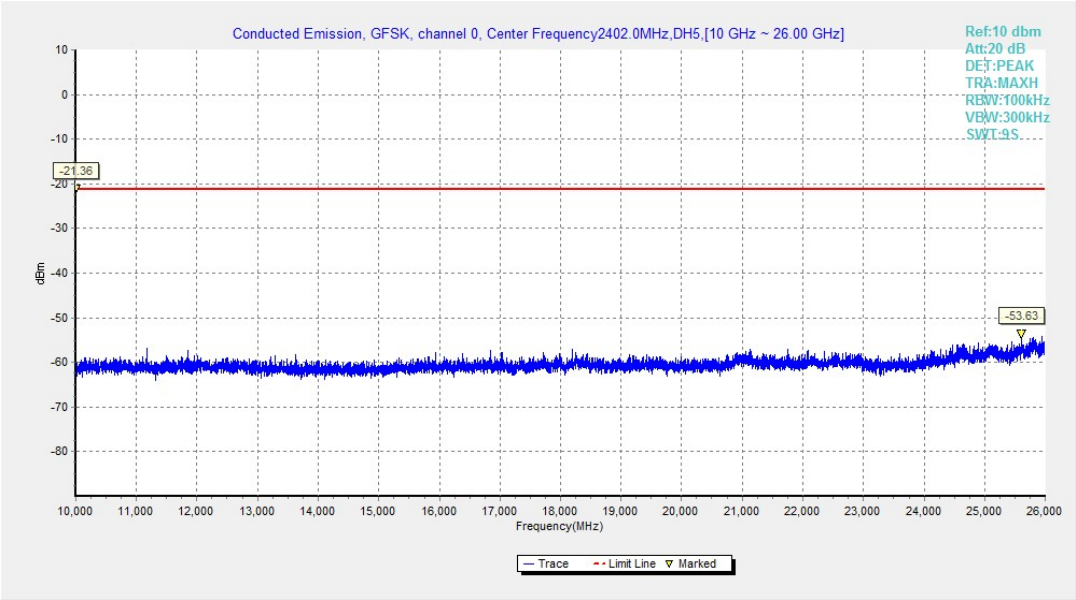

Fig.17. Conducted spurious emission: GFSK, Channel 0,10GHz - 26GHz

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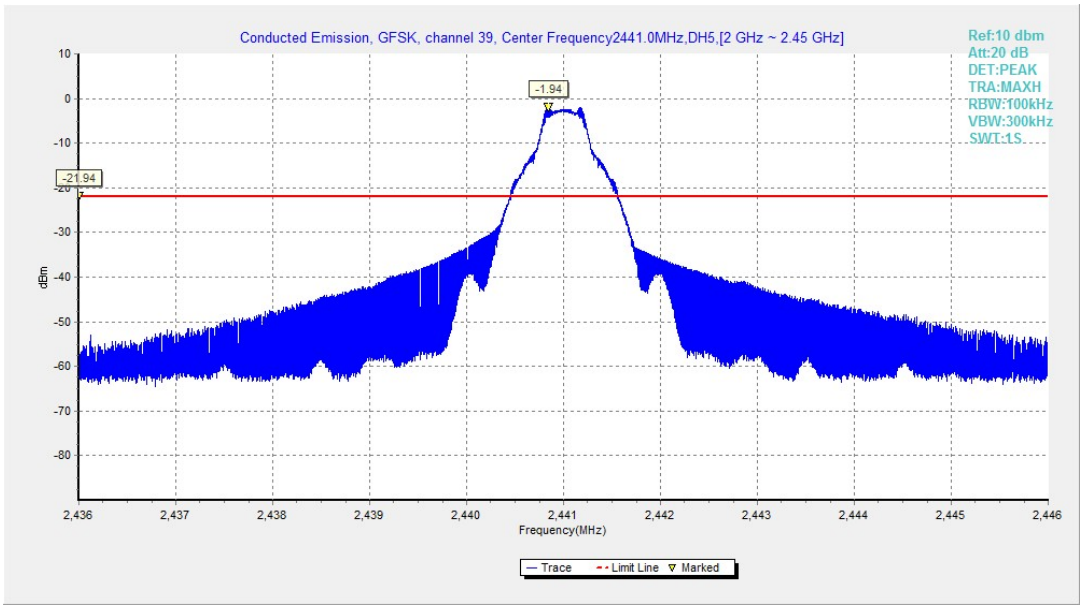

Fig.18. Conducted spurious emission: GFSK, Channel 39, 2441MHz

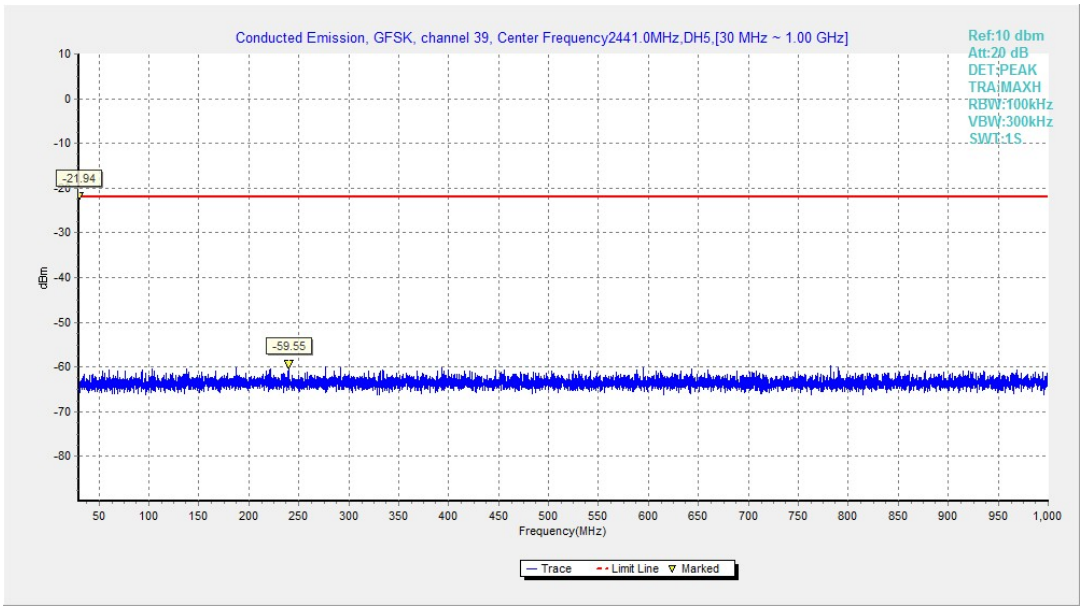

Fig.19. Conducted spurious emission: GFSK, Channel 39, 30MHz - 1GHz

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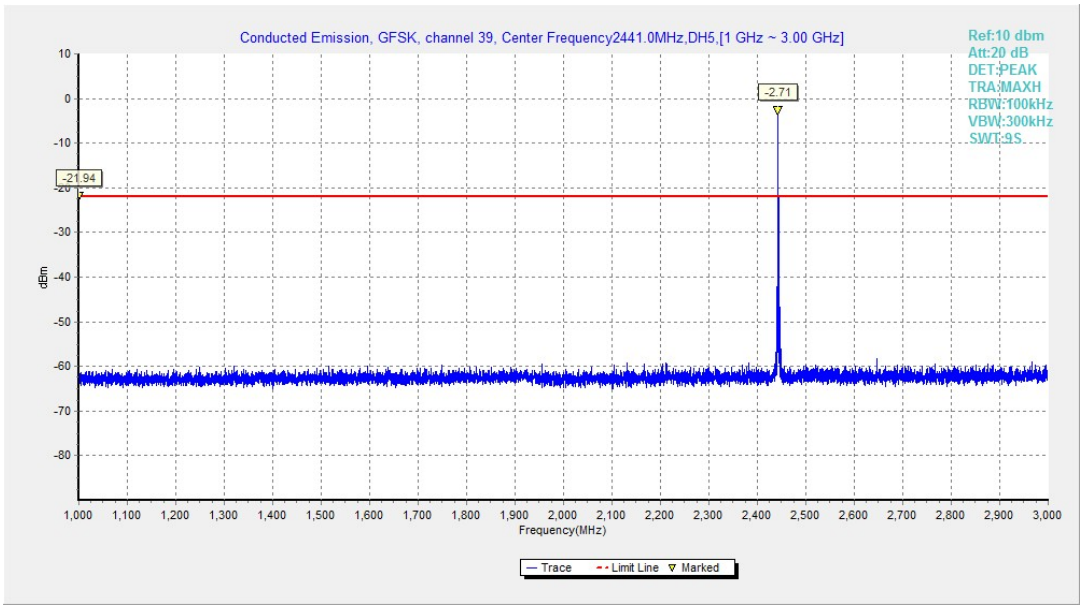

Fig.20. Conducted spurious emission: GFSK, Channel 39, 1GHz – 3GHz

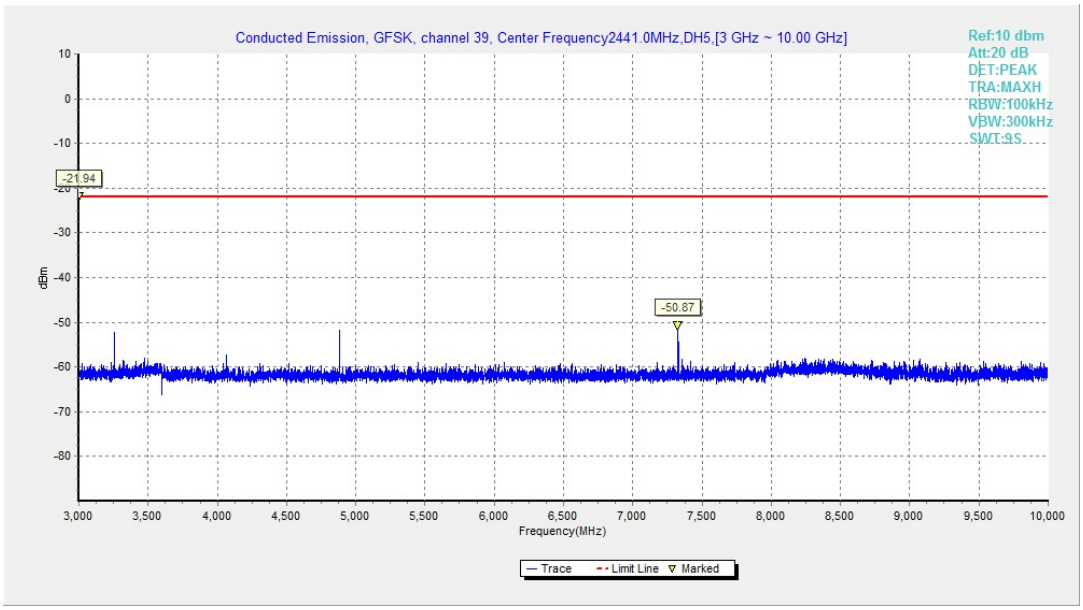

Fig.21. Conducted spurious emission: GFSK, Channel 39, 3GHz – 10GHz

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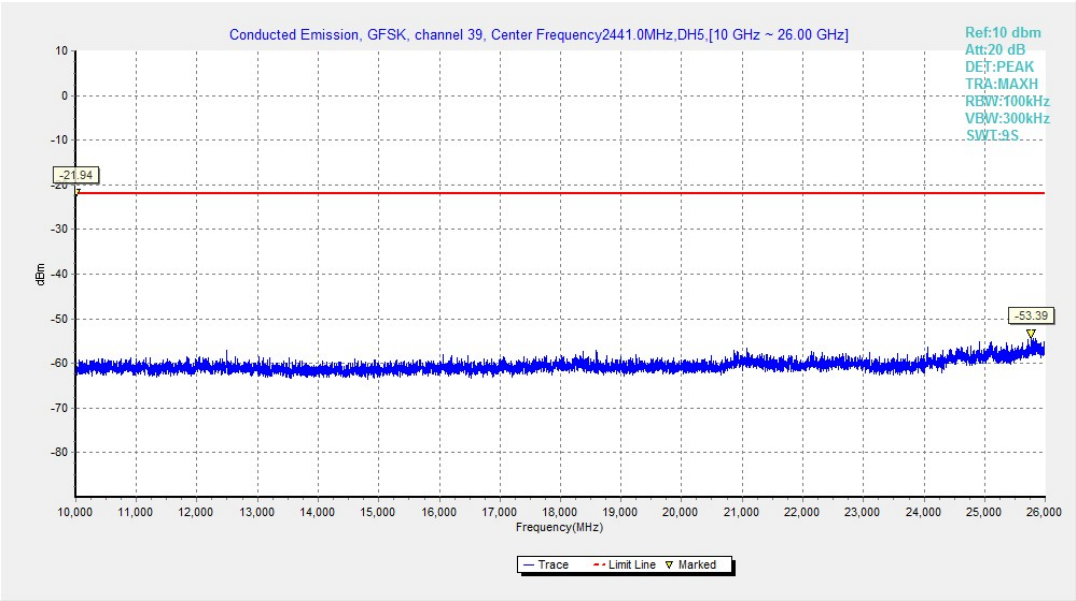

Fig.22. Conducted spurious emission: GFSK, Channel 39, 10GHz – 26GHz

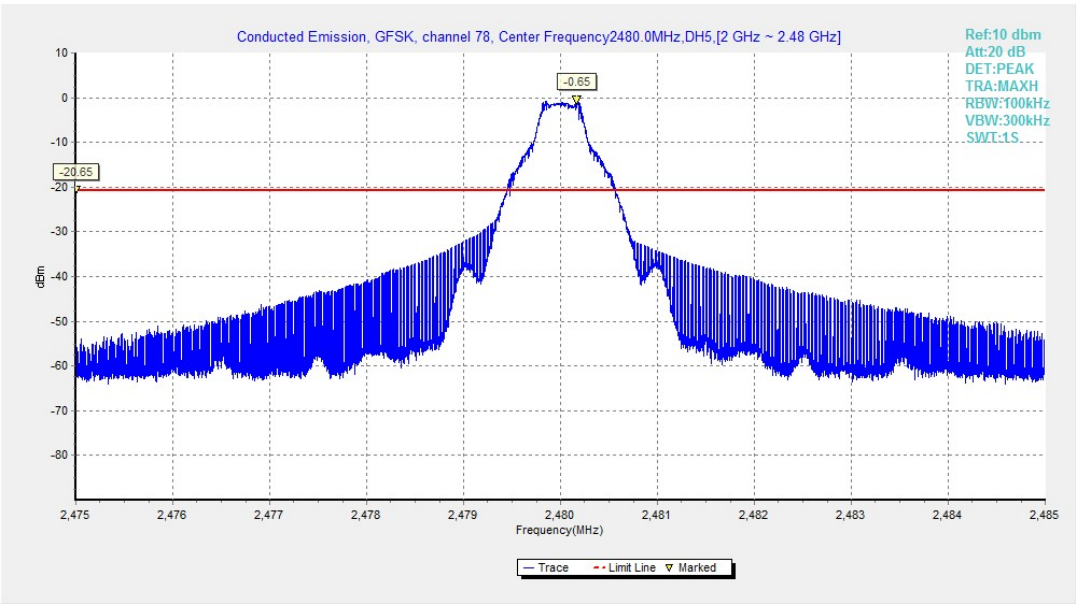

Fig.23. Conducted spurious emission: GFSK, Channel 78, 2480MHz

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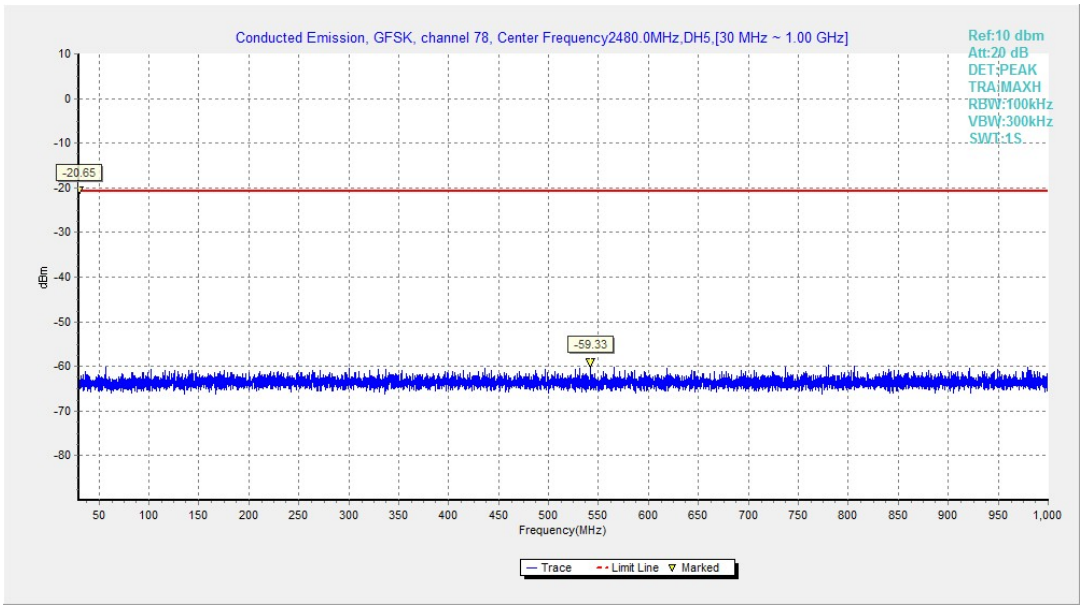

Fig.24. Conducted spurious emission: GFSK, Channel 78, 30MHz - 1GHz

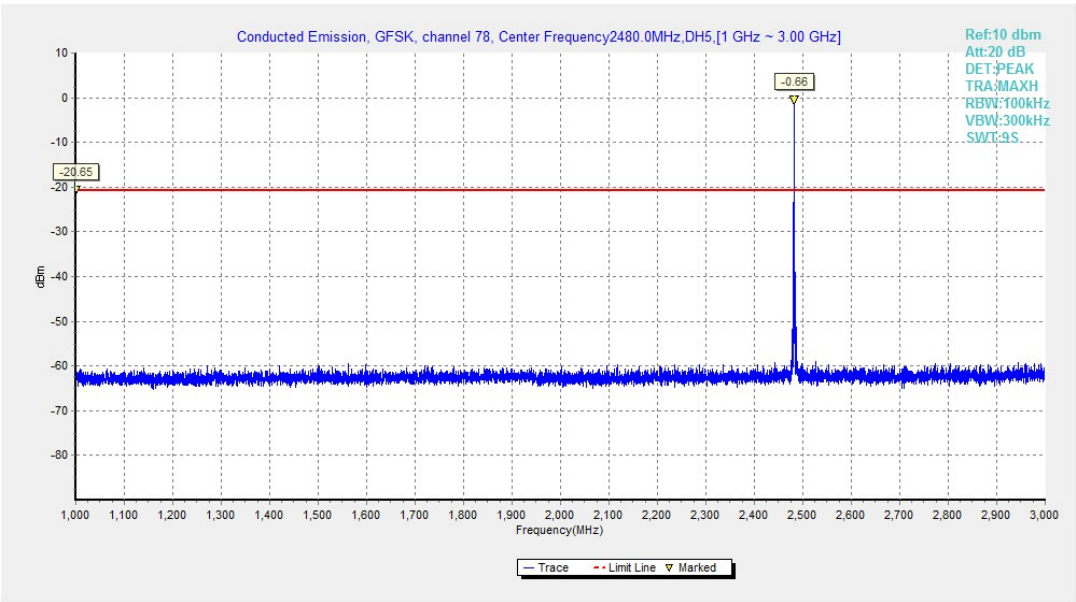

Fig.25. Conducted spurious emission: GFSK, Channel 78, 1GHz - 3GHz

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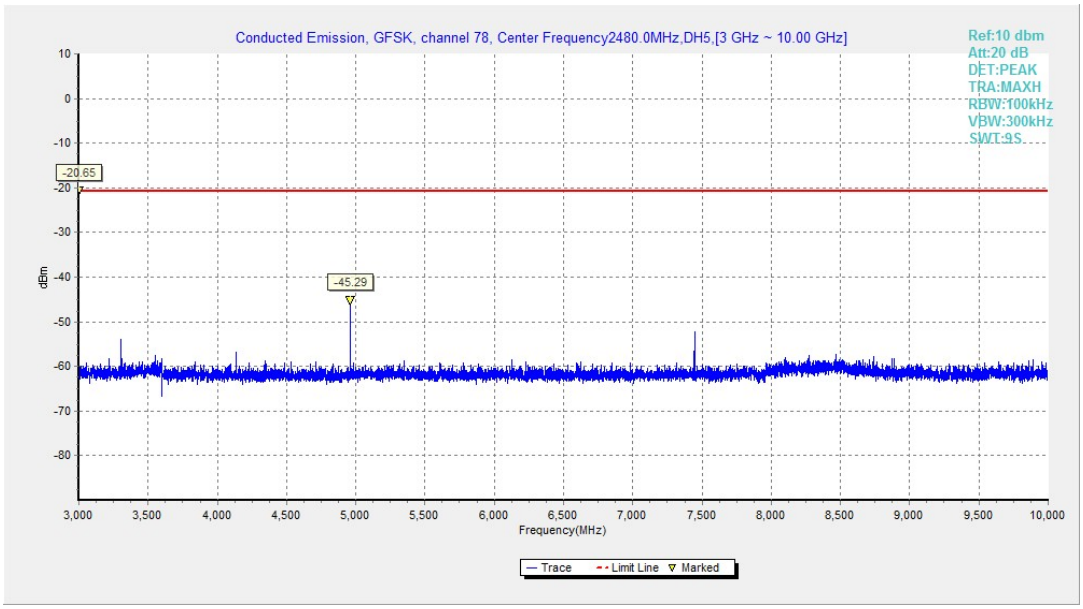

Fig.26. Conducted spurious emission: GFSK, Channel 78, 3GHz - 10GHz

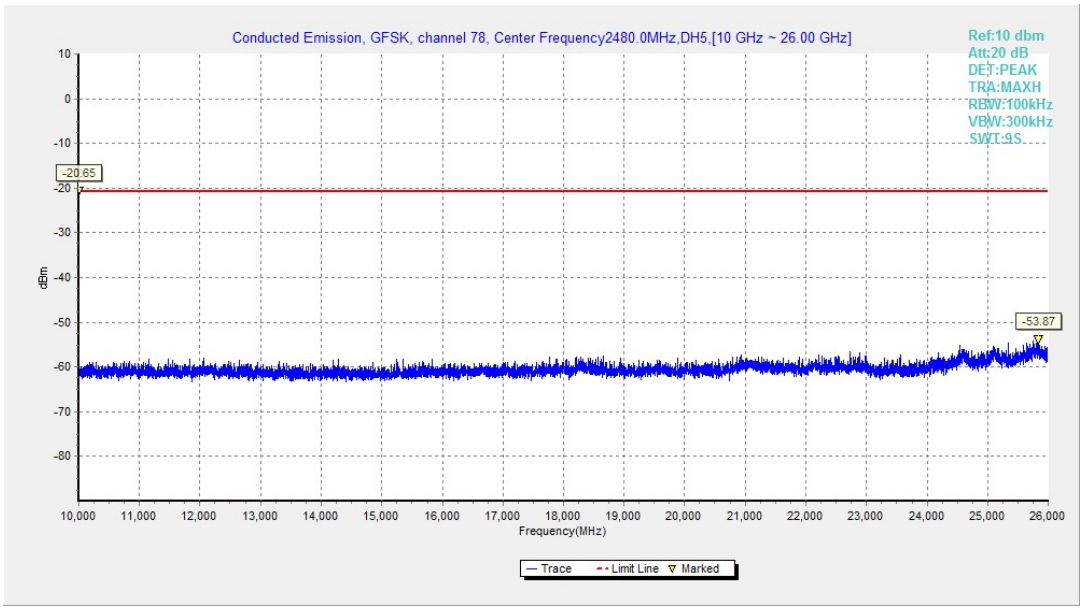

Fig.27. Conducted spurious emission: GFSK, Channel 78, 10GHz - 26GHz

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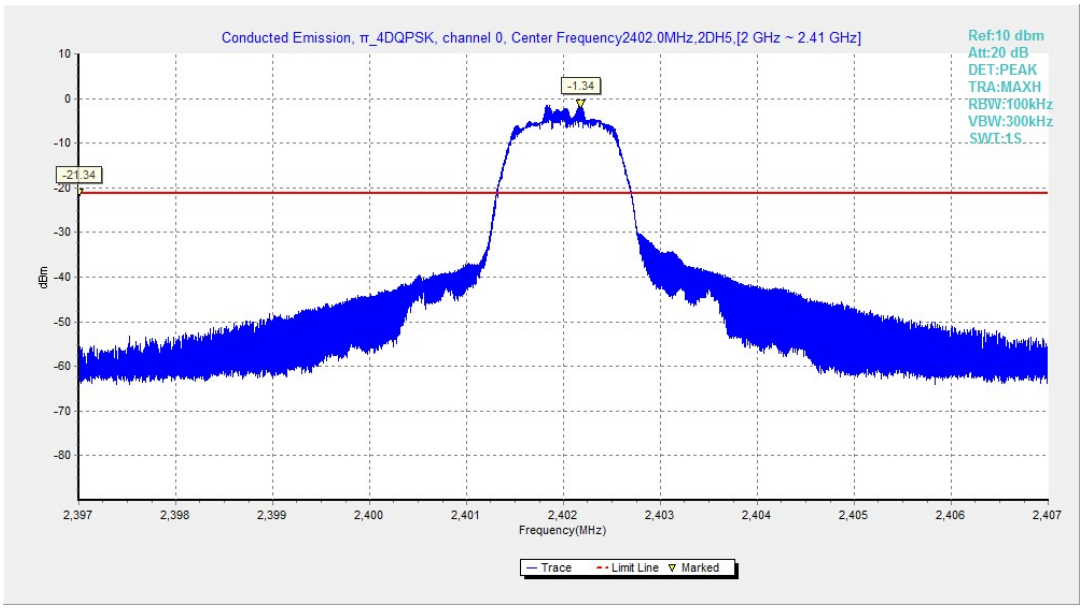

Fig.28. Conducted spurious emission: π/4 DQPSK, Channel 0,2402MHz

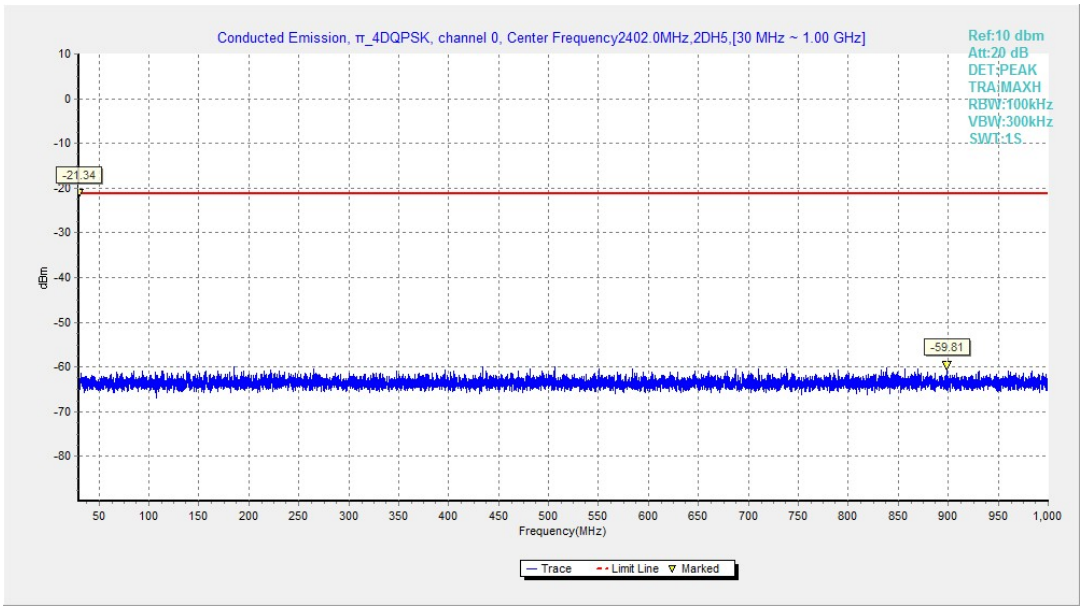

Fig.29. Conducted spurious emission: π/4 DQPSK, Channel 0, 30MHz - 1GHz

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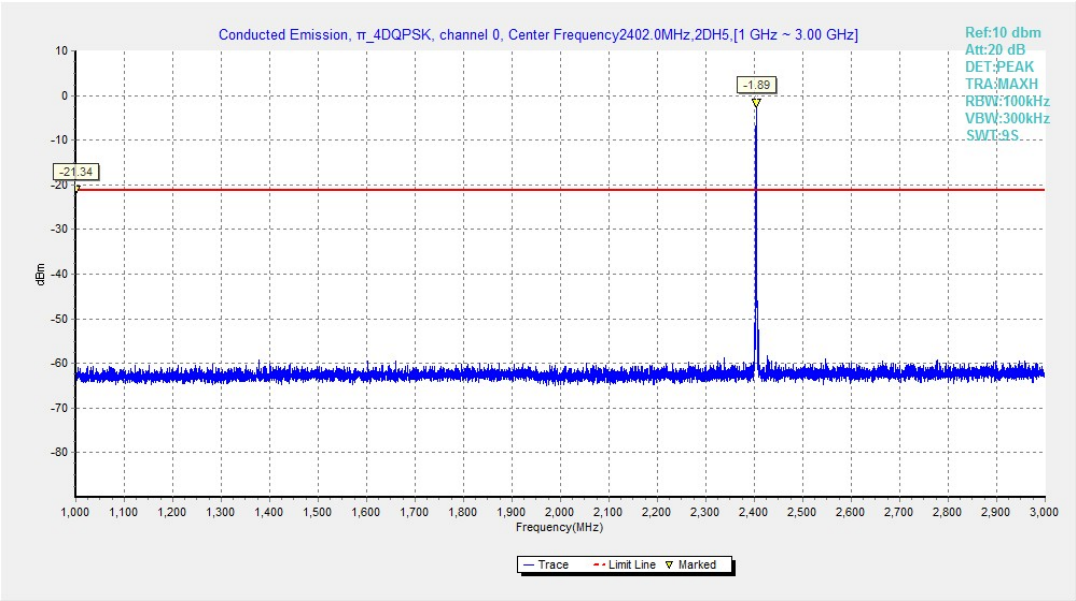

Fig.30. Conducted spurious emission: π/4 DQPSK, Channel 0, 1GHz - 3GHz

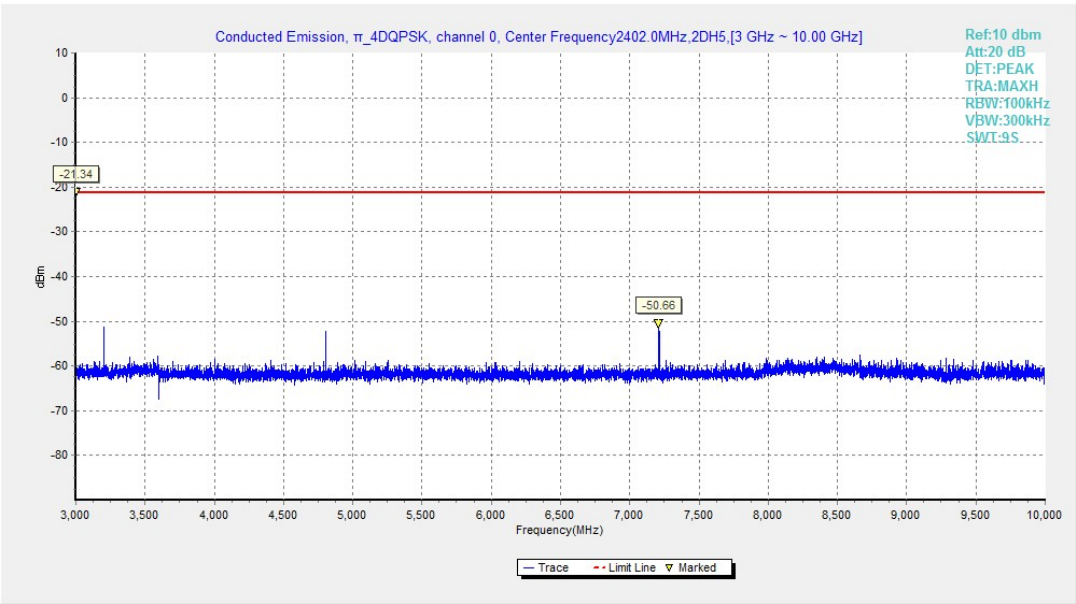

Fig.31. Conducted spurious emission: π/4 DQPSK, Channel 0, 3GHz - 10GHz

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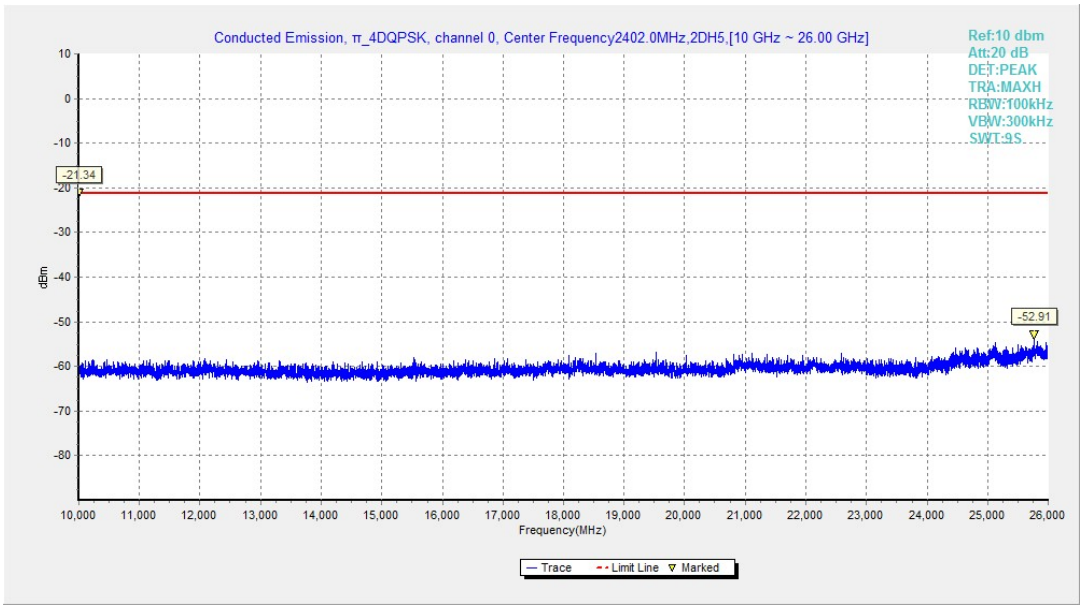

Fig.32. Conducted spurious emission: π/4 DQPSK, Channel 0,10GHz - 26GHz

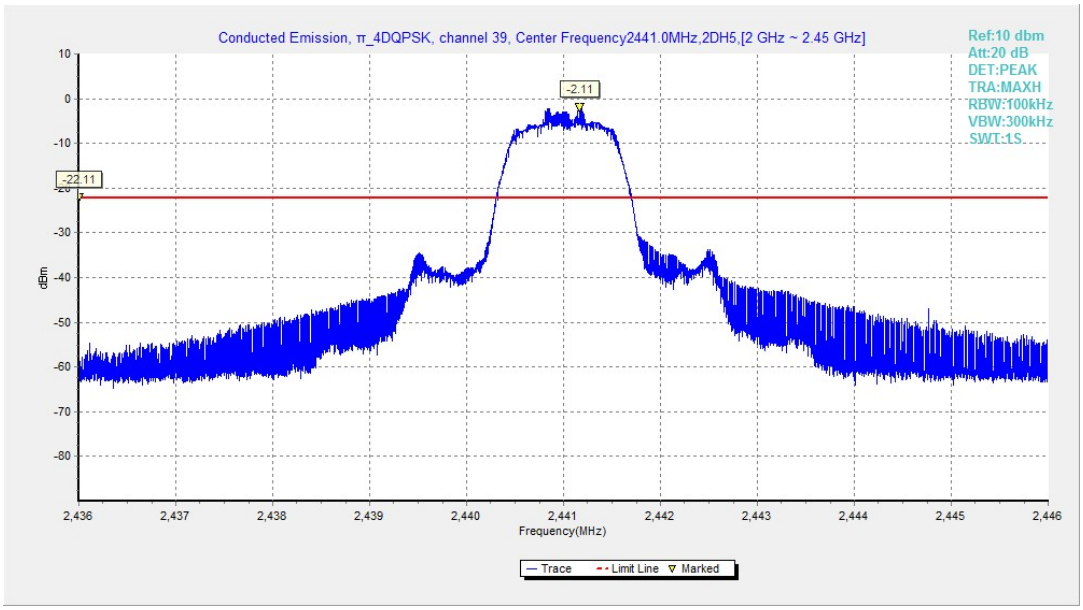

Fig.33. Conducted spurious emission: π/4 DQPSK, Channel 39, 2441MHz

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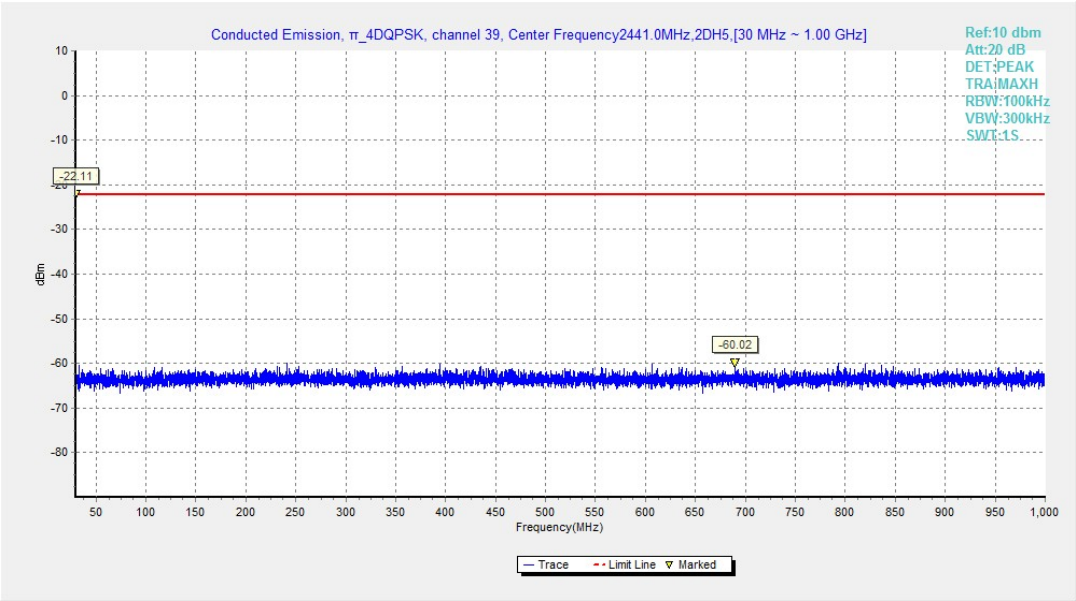

Fig.34. Conducted spurious emission: π/4 DQPSK, Channel 39, 30MHz - 1GHz

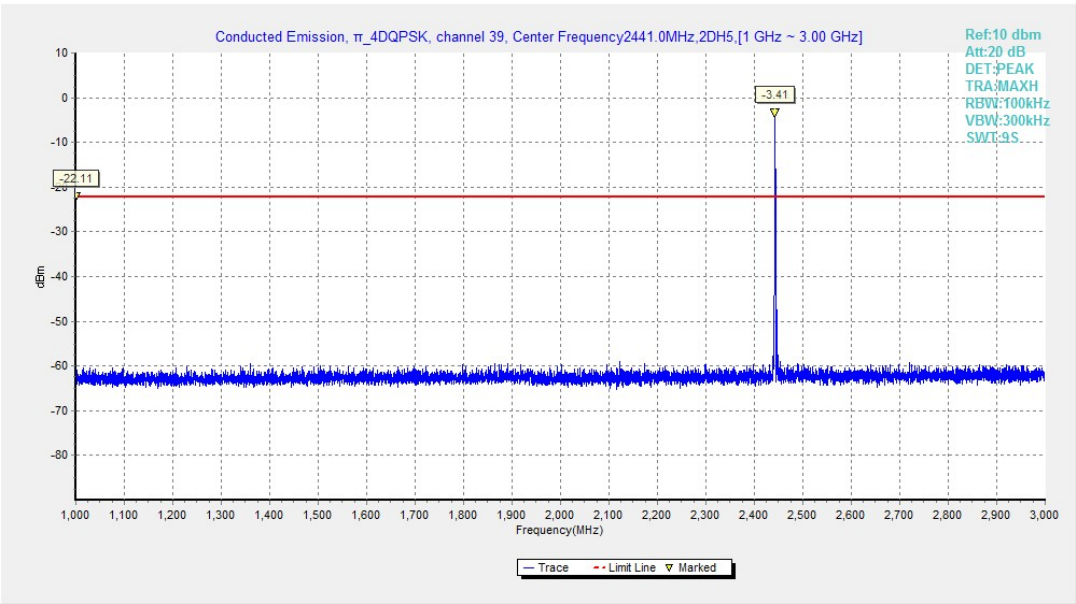

Fig.35. Conducted spurious emission: π/4 DQPSK, Channel 39, 1GHz - 3GHz

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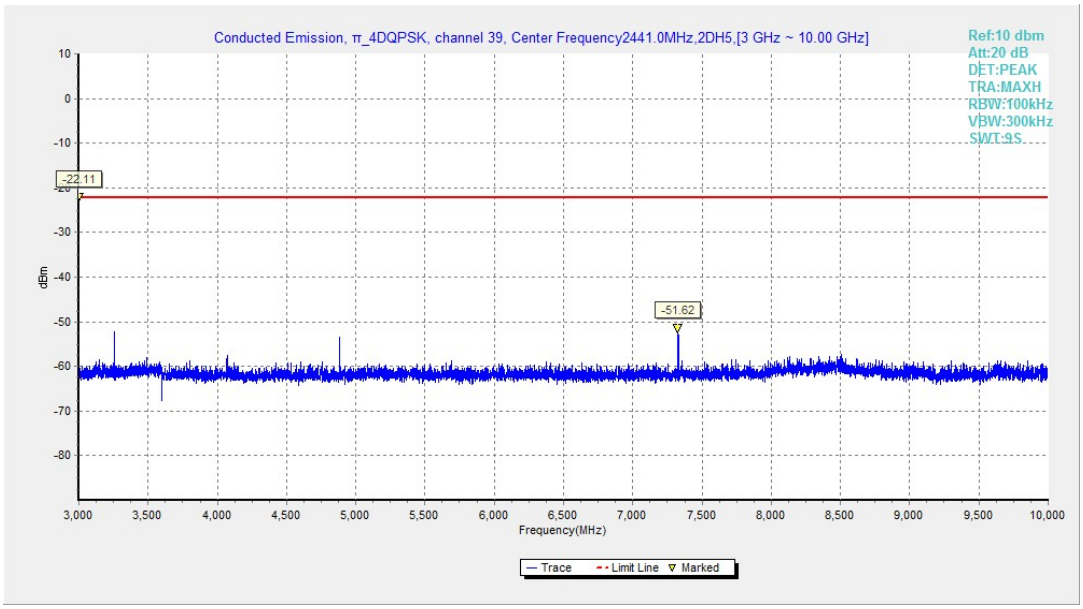

Fig.36. Conducted spurious emission: π/4 DQPSK, Channel 39, 3GHz - 10GHz

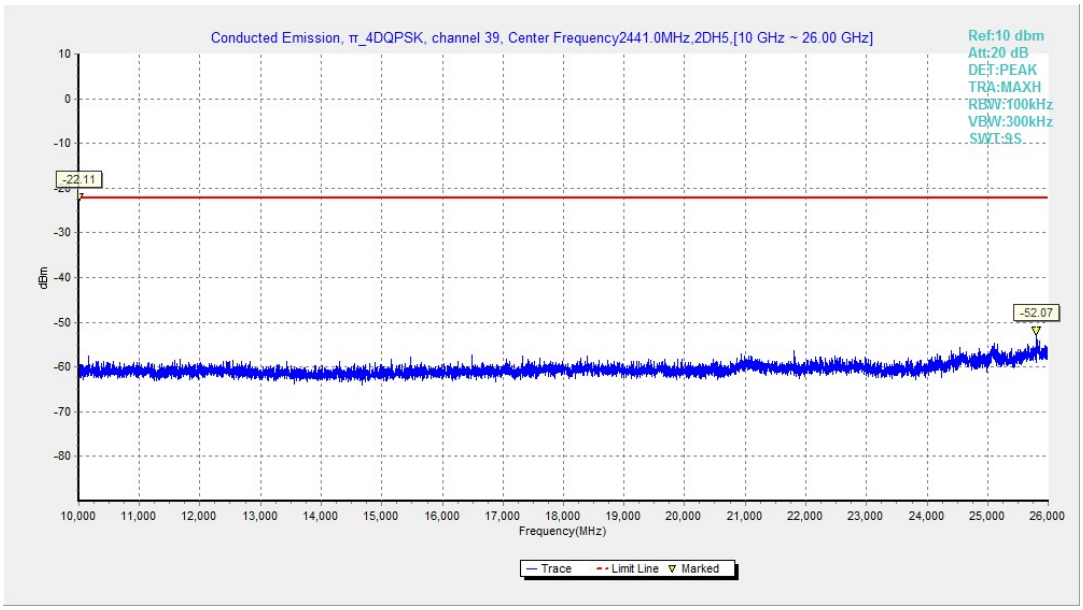

Fig.37. Conducted spurious emission: π/4 DQPSK, Channel 39, 10GHz – 26GHz

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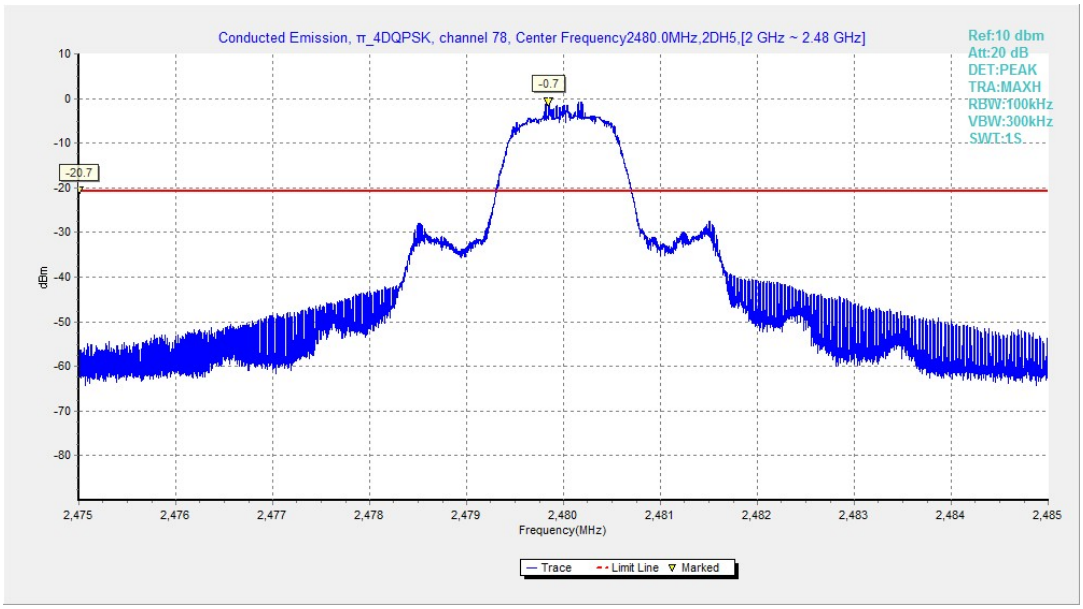

Fig.38. Conducted spurious emission: π/4 DQPSK, Channel 78, 2480MHz

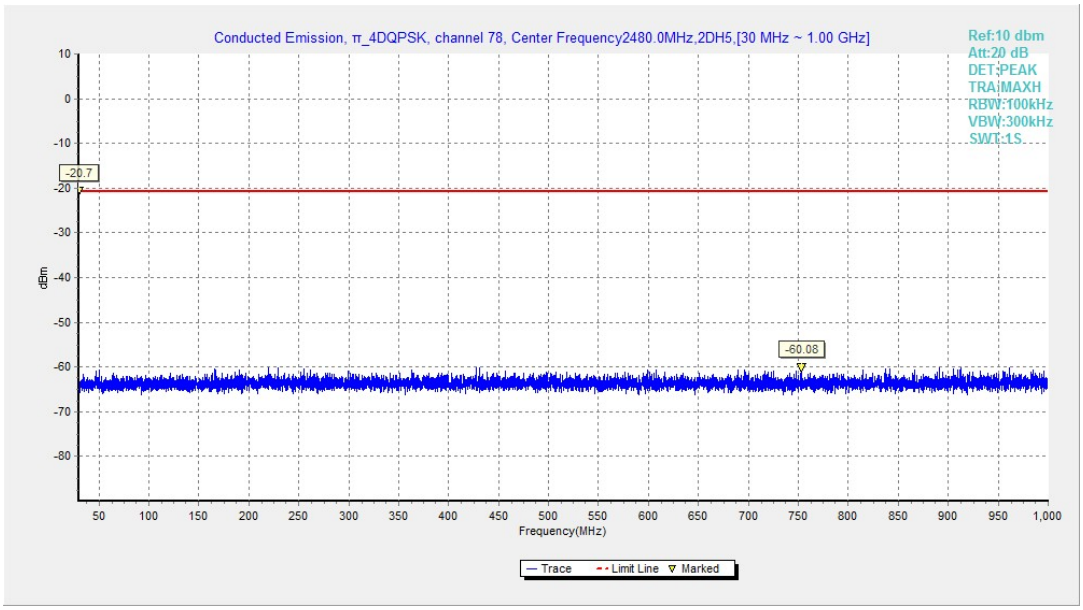

Fig.39. Conducted spurious emission: π/4 DQPSK, Channel 78, 30MHz - 1GHz

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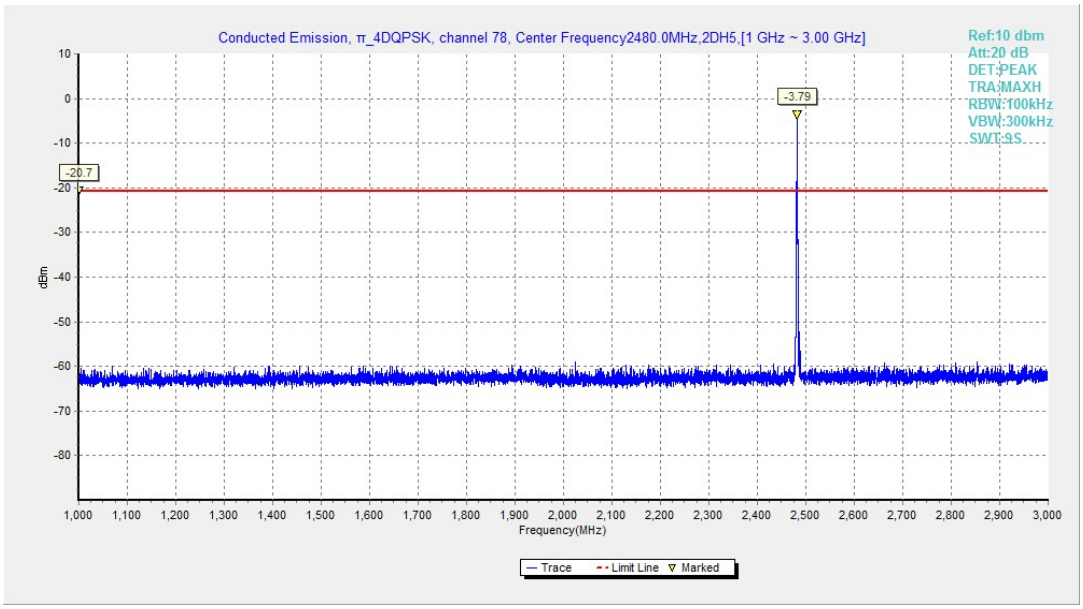

Fig.40. Conducted spurious emission: π/4 DQPSK, Channel 78, 1GHz - 3GHz

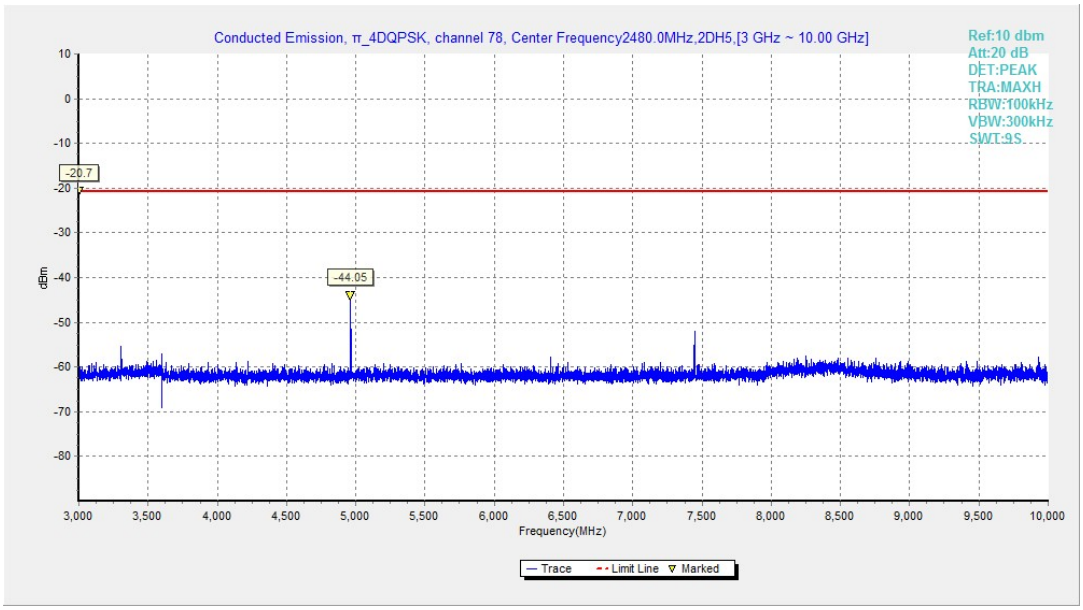

Fig.41. Conducted spurious emission: π/4 DQPSK, Channel 78, 3GHz - 10GHz

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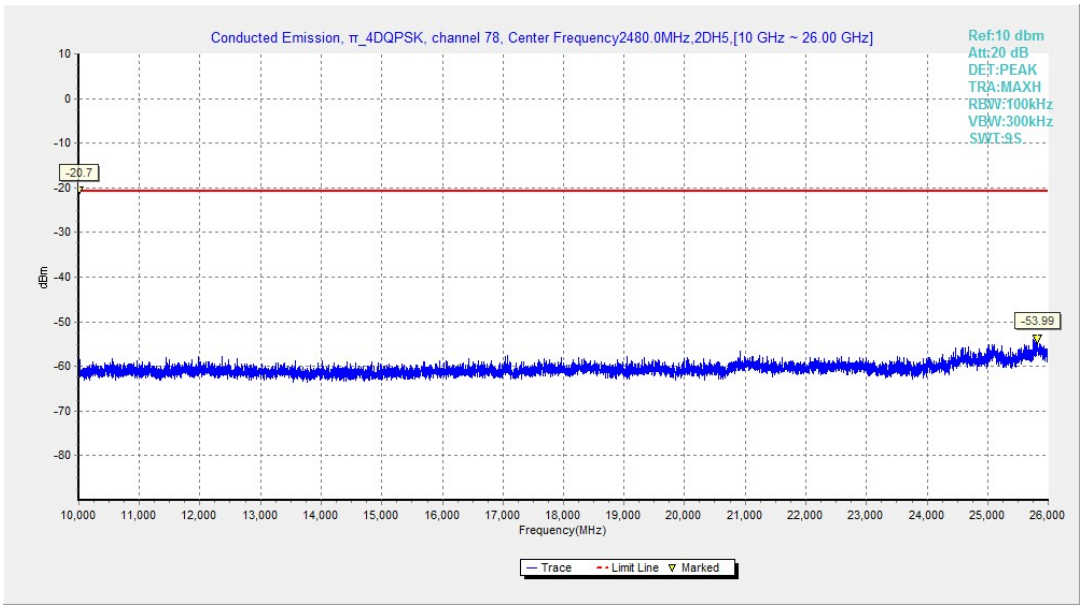

Fig.42. Fig.30 Conducted spurious emission: π/4 DQPSK, Channel 78, 10GHz - 26GHz

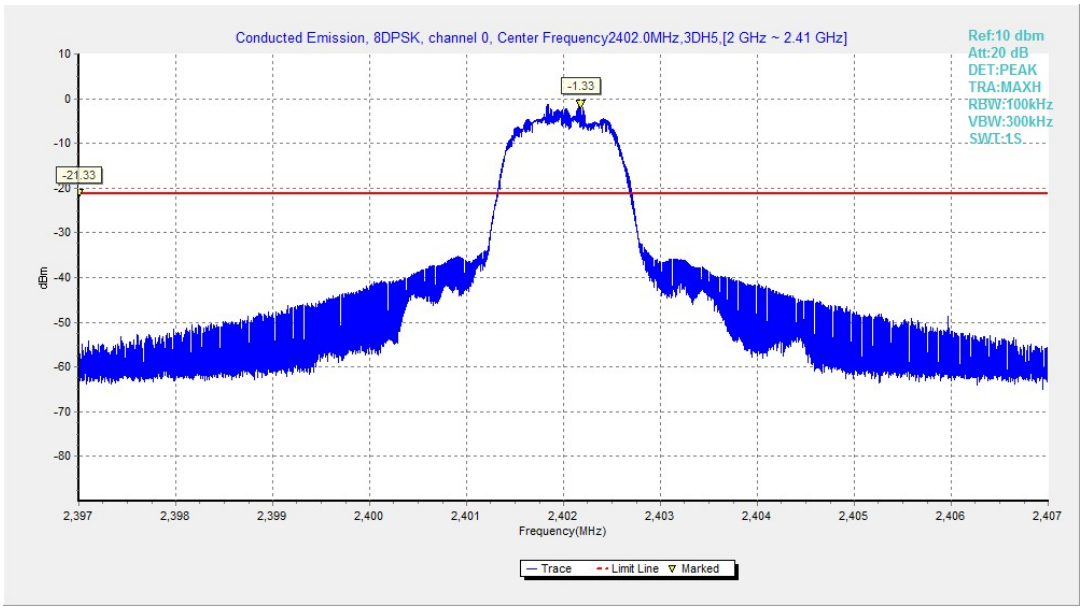

Fig.43. Conducted spurious emission: 8DPSK, Channel 0,2402MHz

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