TEST REPORT

No. I20N02376-BT

for

Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd

Feature phone

Model Name: CP3321AT

with

Hardware Version: P1

Software Version: 3321AT.201014.2S

FCC ID: R38YLCP3321AT

Issued Date: 2020-10-20

Note:

The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of SAICT.

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1. Summary of Test Report

1.1. Test Items

Description	Feature phone
Model Name	CP3321AT
Applicant's name	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Manufacturer's Name	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd

1.2. Test Standards

FCC Part15-2019; ANSI C63.10-2013

1.3. Test Result

Pass

1.4. Testing Location

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

1.5. Project data

Testing Start Date:	2020-09-16
Testing End Date:	2020-10-16

1.6. Signature

Lin Zechuang

(Prepared this test report)

Tang Weisheng

(Reviewed this test report)

Zhang Bojun

(Approved this test report)

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2. Client Information

2.1. Applicant Information

Company Name:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Address:	Building B, Boton Science Park, Chaguang Road, Xili Town, Nanshan District, Shenzhen
Contact Person	Yentl Chen
E-Mail	chenyanting@yulong.com
Telephone:	+86 15927320221
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2.2. Manufacturer Information

Company Name:	Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd
Address:	Building B, Boton Science Park, Chaguang Road, Xili Town, Nanshan District, Shenzhen
Contact Person	Yentl Chen
E-Mail	chenyanting@yulong.com
Telephone:	+86 15927320221
Fax:	/

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

3.1. About EUT

Description	Feature phone
Model Name	CP3321AT
Frequency Band	2400MHz~2483.5MHz
Type of Modulation	GFSK/ π /4 DQPSK/8DPSK
Number of Channels	79
Antenna Type	Integrated
Antenna Gain	-0.6dBi
Power Supply	3.8V DC by Battery
FCC ID	R38YLCP3321AT
Condition of EUT as received	No abnormality in appearance

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

3.2. Internal Identification of EUT used during the test

EUT ID*	IMEI	HW Version	SW Version	Receive Date
UT09aa	990016030008690	P1	3321AT.201014.2S	2020-09-16
UT03aa	990016030008328	P1	3321AT.201014.2S	2020-09-16

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

3.3. Internal Identification of AE used during the test

AE ID*	Description	AE ID*
AE1	Battery	/
AE2	Travel Charger	/
AE3	Micro B Cable	/

AE1

Model	Li-ion
Manufacturer	Tianjin Lishen
Capacity	1500mAh
Nominal Voltage	3.8V

AE2

Model	618045
Manufacturer	Shenzhen Kosun

AE3

Model	USB A To Micro B
Manufacturer	Shenzhen BRL

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

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3.4. General Description

The Equipment under Test (EUT) is a model of Feature phone with integrated antenna and battery.
It consists of normal options: Lithium Battery, Charger and USB Cable.
Manual and specifications of the EUT were provided to fulfil the test.
Samples undergoing test were selected by the client.

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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 Part 15	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	2019
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013

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5. Test Results

5.1. Testing Environment

Normal Temperature: 15~35°C

Relative Humidity: 20~75%

5.2. Test Results

No	Test cases	Sub-clause of Part 15C	Verdict
0	Antenna Requirement	15.203	**P**
1	Maximum Peak Output Power	15.247 (b)	**P**
2	Band Edges Compliance	15.247 (d)	**P**
3	Conducted Spurious Emission	15.247 (d)	**P**
4	Radiated Spurious Emission	15.247,15.205,15.209	**P**
5	Occupied 20dB bandwidth	15.247(a)	**/**
6	Time of Occupancy(Dwell Time)	15.247(a)	**P**
7	Number of Hopping Channel	15.247(a)	**P**
8	Carrier Frequency Separation	15.247(a)	**P**
9	AC Power line Conducted Emission	15.107,15.207	**P**

See **ANNEX A** for details.

5.3. Statements

SAICT has evaluated the test cases requested by the applicant/manufacturer as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.

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6. Test Equipments Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2021-01-15	1 year
2	Bluetooth Tester	CBT32	100584	Rohde & Schwarz	2021-01-01	1 year
3	Test Receiver	ESCI	100701	Rohde & Schwarz	2021-08-09	1 year
4	LISN	ENV216	102067	Rohde & Schwarz	2021-07-16	1 year

Radiated emission test system

NO.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Loop Antenna	HLA6120	35779	TESEQ	2022-04-25	3 years
2	BiLog Antenna	3142E	00224831	ETS-Lindgren	2021-05-17	3 years
3	Horn Antenna	3117	00066577	ETS-Lindgren	2022-04-02	3 years
4	Test Receiver	ESR7	101676	Rohde & Schwarz	2020-11-27	1 year
5	Spectrum Analyser	FSV40	101192	Rohde & Schwarz	2021-01-14	1 year
6	Chamber	FACT3-2.0	1285	ETS-Lindgren	2021-07-19	2 years
7	Horn Antenna	QSH-SL-18-26-S-20	17013	Q-par	2023-01-06	3 years

Test software

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

The path loss value of conduction test is automatically compensated by the test system.
EUT is engineering software provided by the customer to control the transmitting signal.
The EUT was programmed to be in continuously transmitting mode.

Anechoic chamber

Fully anechoic chamber by ETS-Lindgren

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7. Laboratory Environment

Semi-anechoic chambe

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< ±4 dB, 3 m distance, from 30 to 1000 MHz

Shielded room

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

Fully-anechoic chamber

Temperature	Min. = 15 ˚C, Max. = 35 ˚C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Voltage Standing Wave Ratio （VSWR）	≤ 6 dB, from 1 to 18 GHz, 3 m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz

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8. Measurement Uncertainty

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

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ANNEX A: Detailed Test Results

A.0 Antenna requirement

Measurement Limit:

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

Conclusion: The Directional gains of antenna used for transmitting is -0.6dBi.
The RF transmitter uses an integrate antenna without connector.

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A.1 Maximum Peak Output Power

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

Use the following spectrum analyzer settings:

a) Set Span = 6 MHz.

b) Set RBW = 3 MHz.

c) Set VBW = 3 MHz.

d) Sweep time = auto.

e) Detector = peak.

f) Trace = max hold.

g) Allow trace to stabilize.

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

I)The indicated level is the peak output power.

Measurement Limit:

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

Measurement Results:

Mode	Frequency (MHz)	Peak output power (dBm)		Conclusion
GFSK	2402(CH0)	Fig.1	-0.84	**P**
	2441(CH39)	Fig.2	0.24	**P**
	2480(CH78)	Fig.3	-0.39	**P**
π /4 DQPSK	2402(CH0)	Fig.4	-0.11	**P**
	2441(CH39)	Fig.5	0.41	**P**
	2480(CH78)	Fig.6	0.30	**P**
8DPSK	2402(CH0)	Fig.7	0.05	**P**
	2441(CH39)	Fig.8	0.52	**P**
	2480(CH78)	Fig.9	0.43	**P**

See below for test graphs.

Conclusion: Pass

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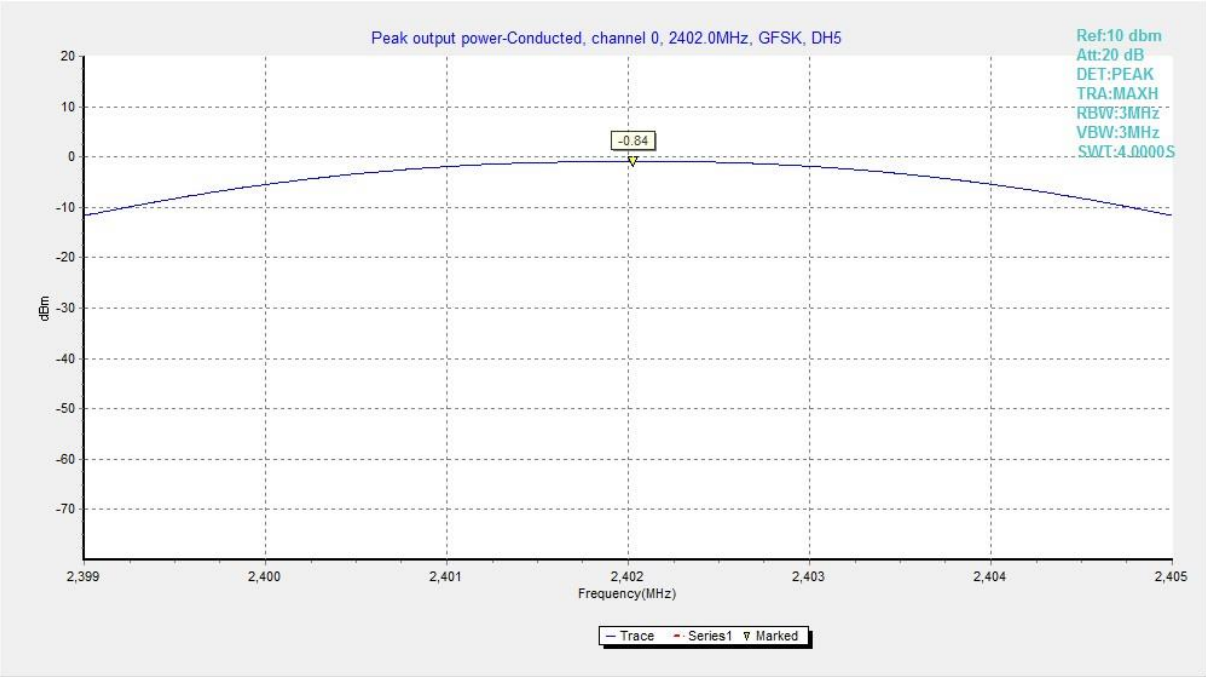

Fig. 1 RF output power (GFSK, Ch 0)

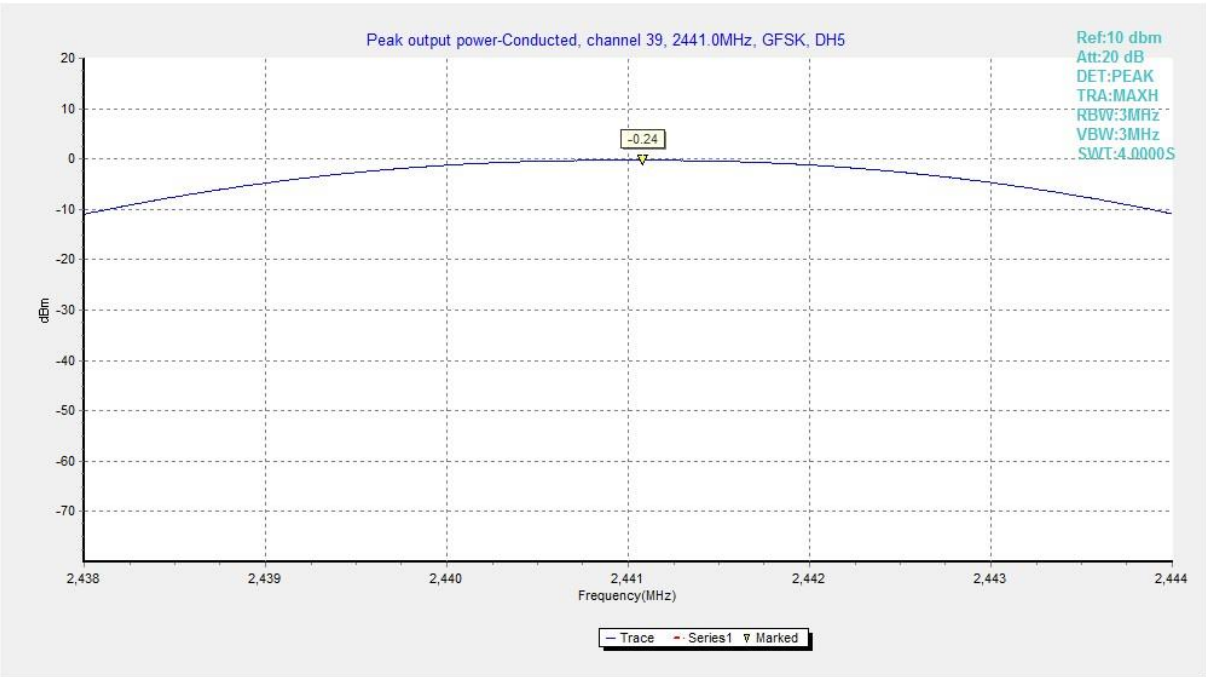

Fig. 2 RF output power (GFSK, Ch 39)

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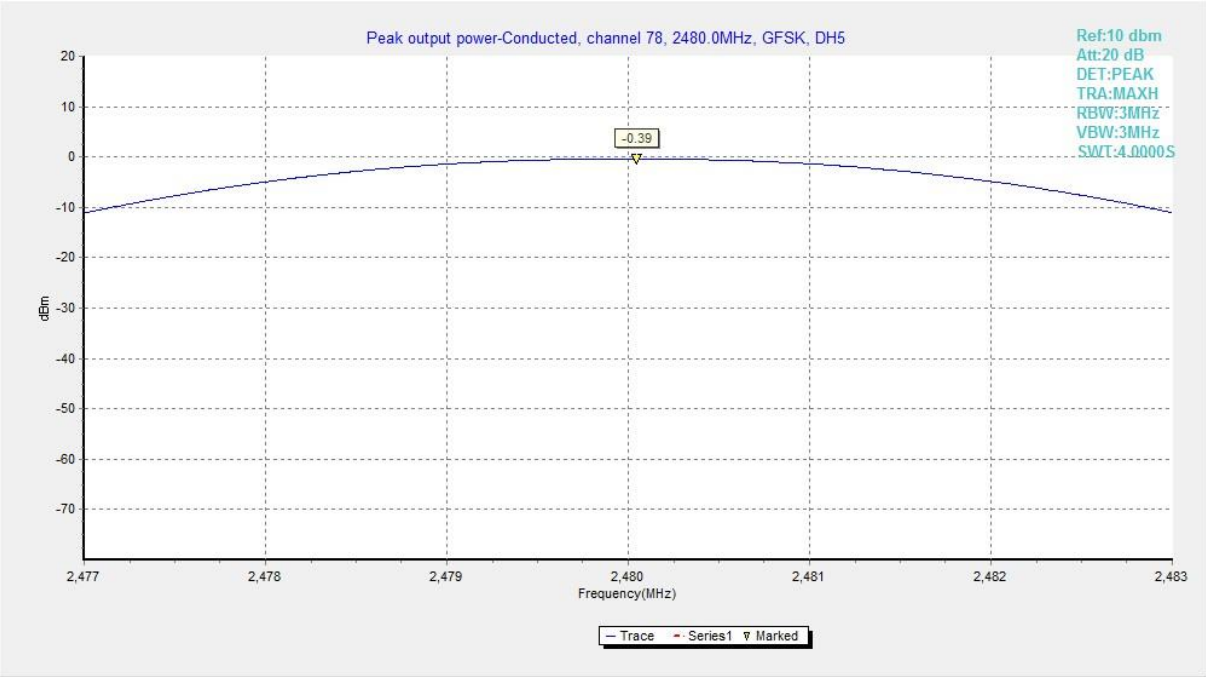

Fig. 3 RF output power (GFSK, Ch 78)

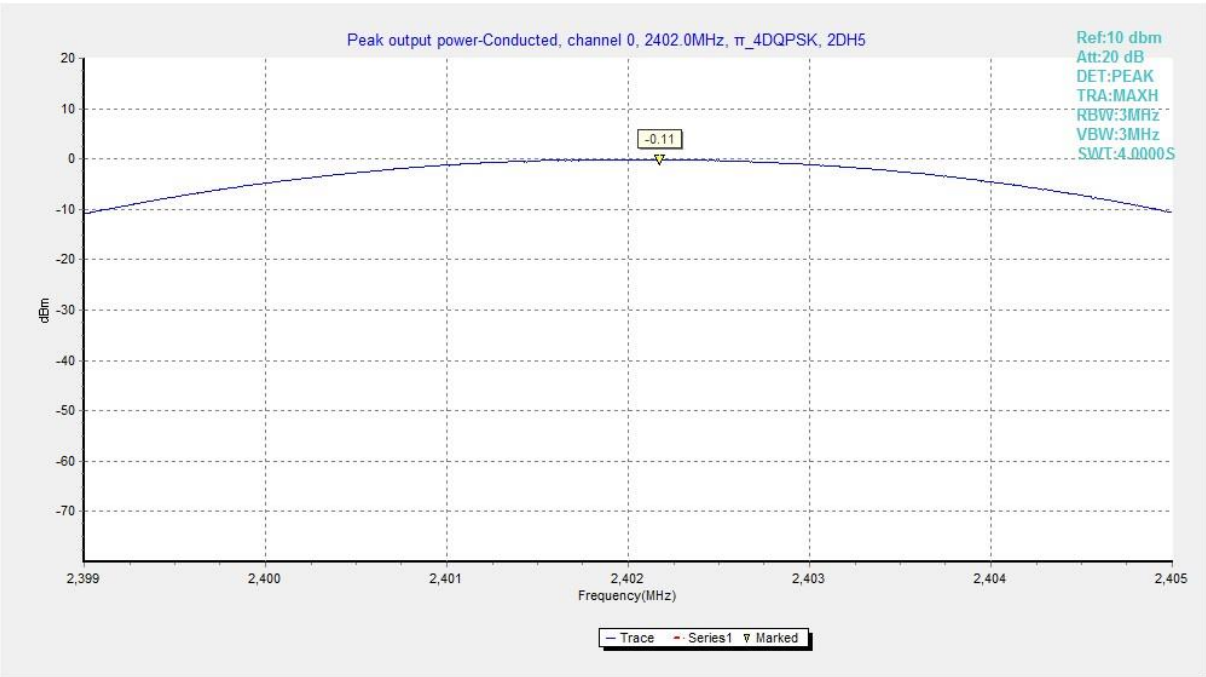

Fig. 4 RF output power (π /4 DQPSK, Ch 0)

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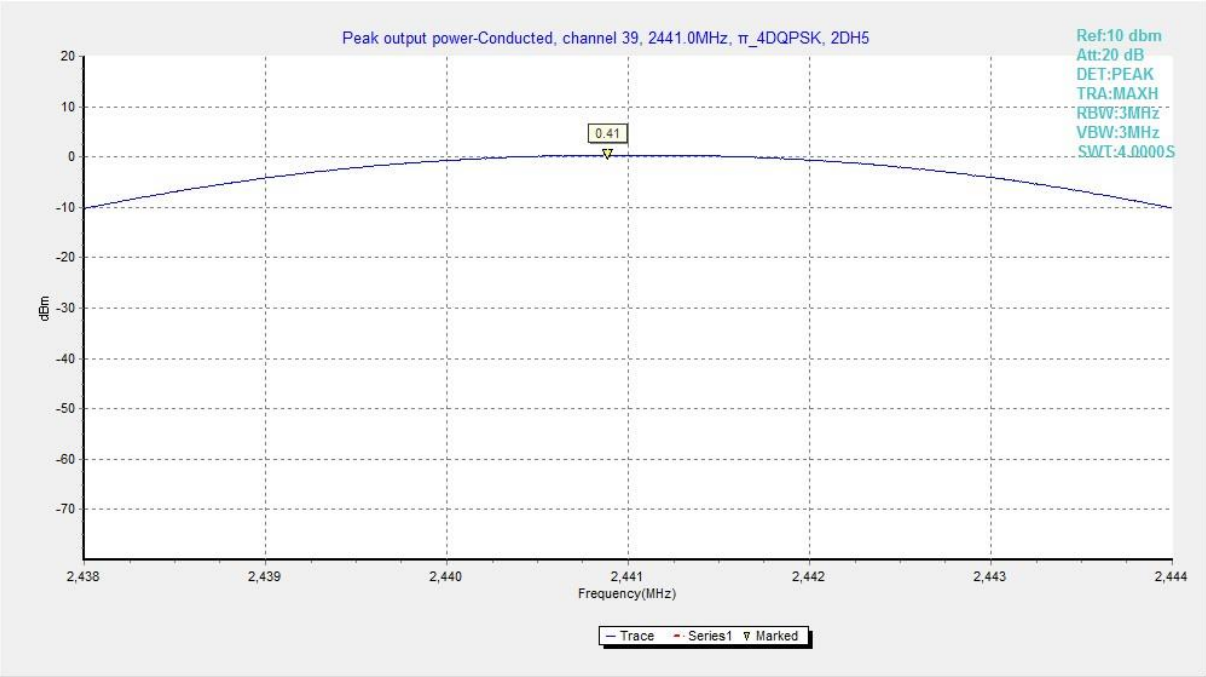

Fig. 5 RF output power (π /4 DQPSK, Ch 39)

Fig. 6 RF output power (π /4 DQPSK, Ch 78)

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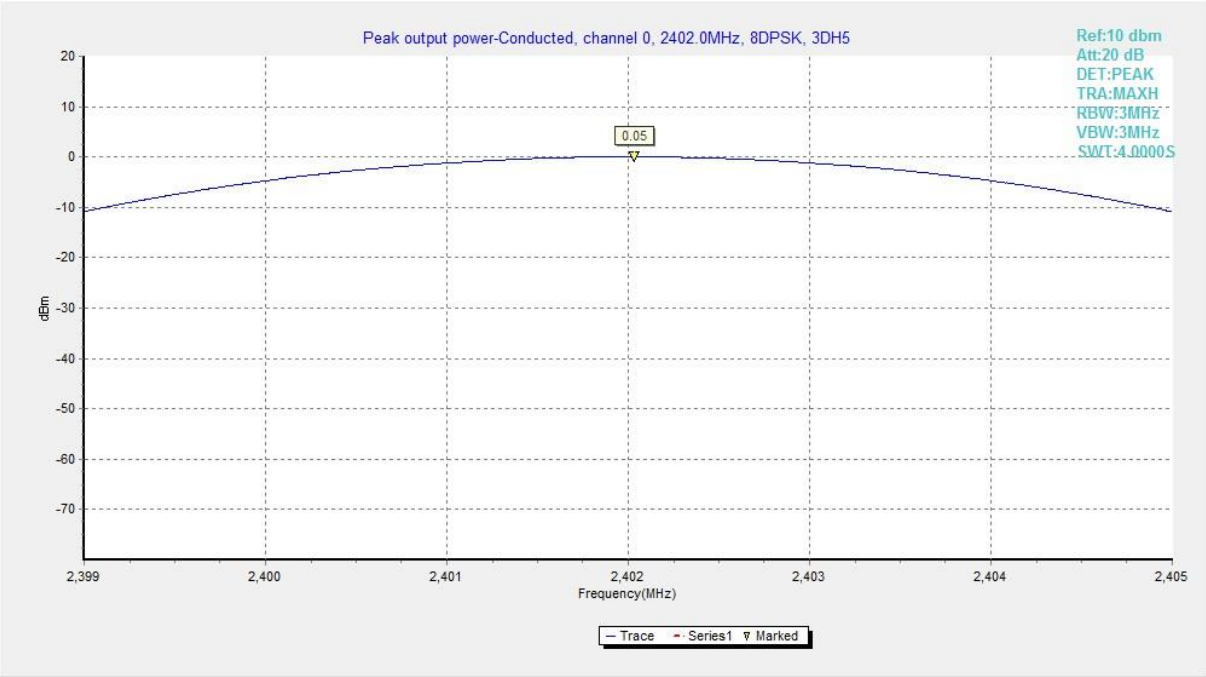

Fig. 7 RF output power (8DPSK, Ch 0)

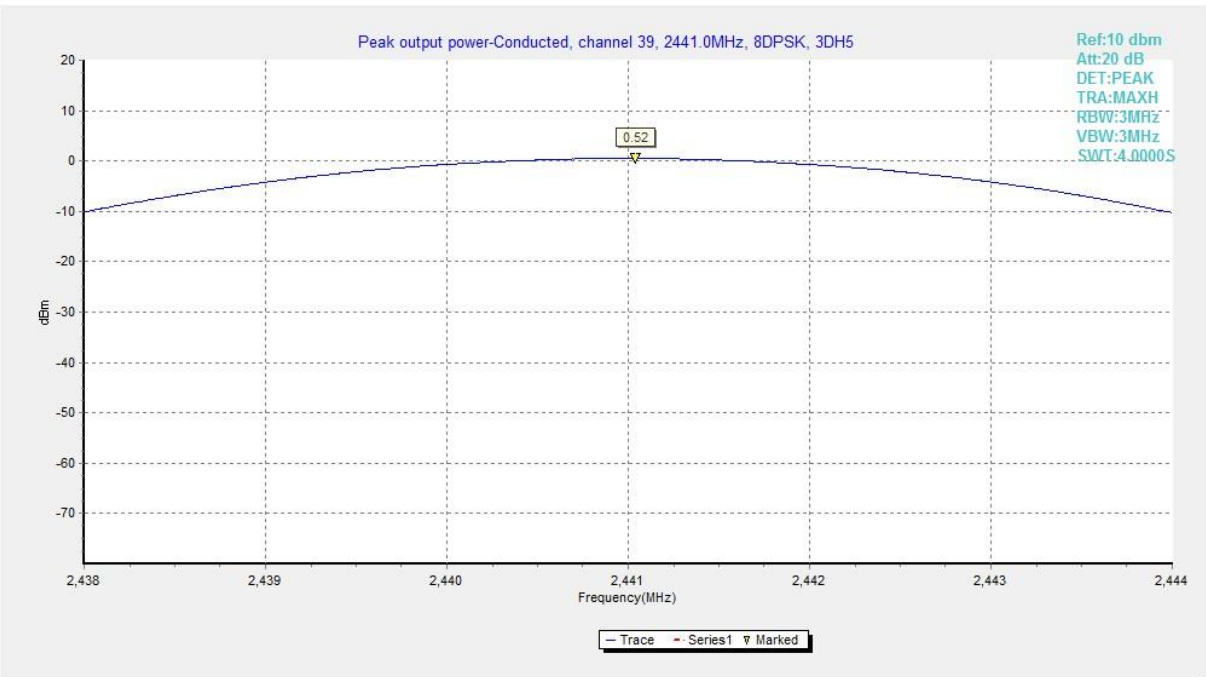

Fig. 8 RF output power (8DPSK, Ch 39)

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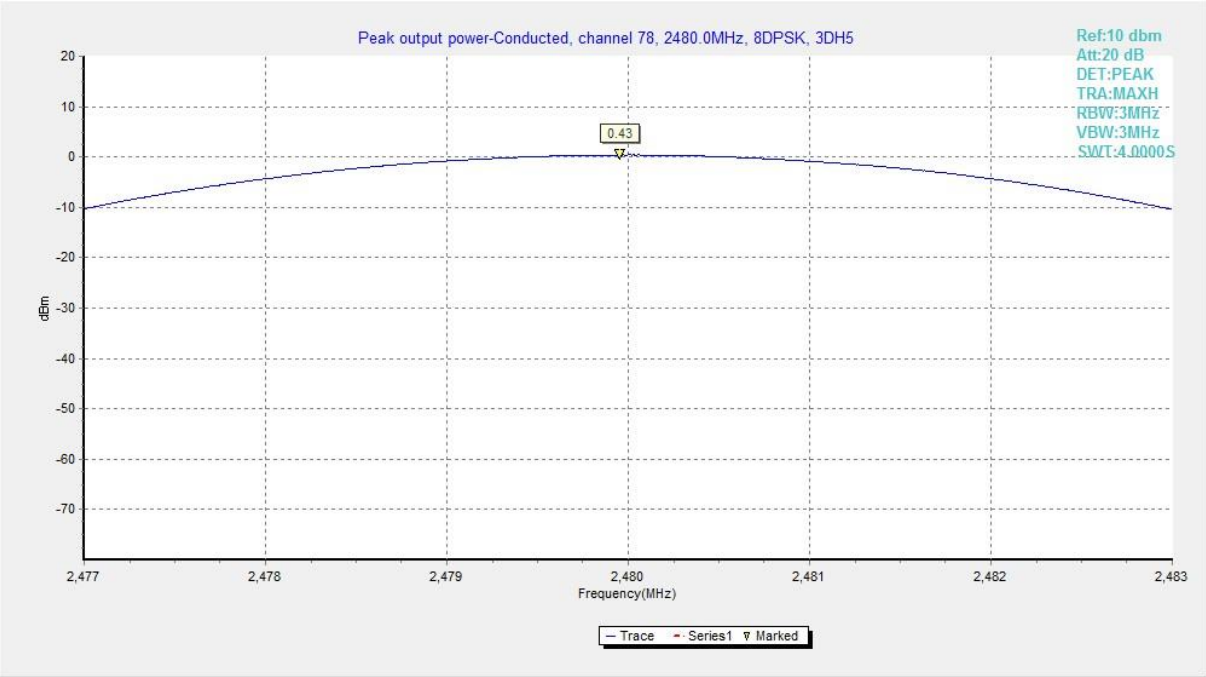

Fig. 9 RF output power (8DPSK, Ch 78)

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A.2 Band Edges Compliance

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	＞20

Measurement Result:

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

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

See below for test graphs.

Conclusion: Pass

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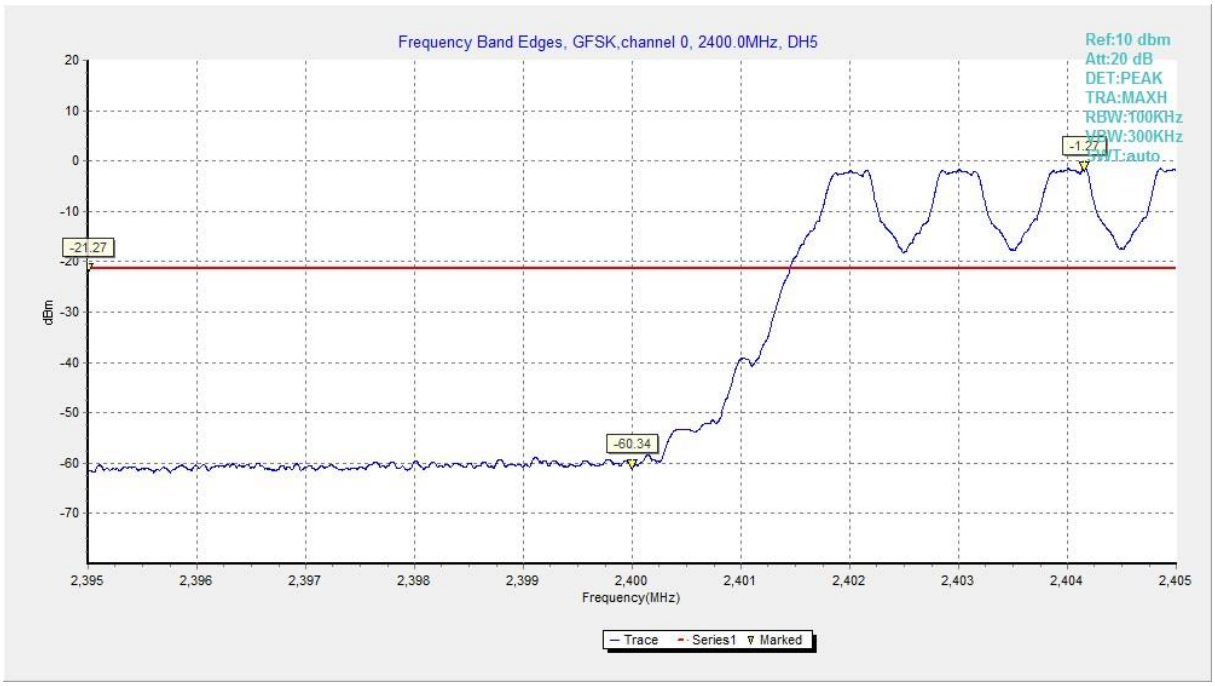

Fig. 10 Band Edges (GFSK, Ch 0, Hopping ON)

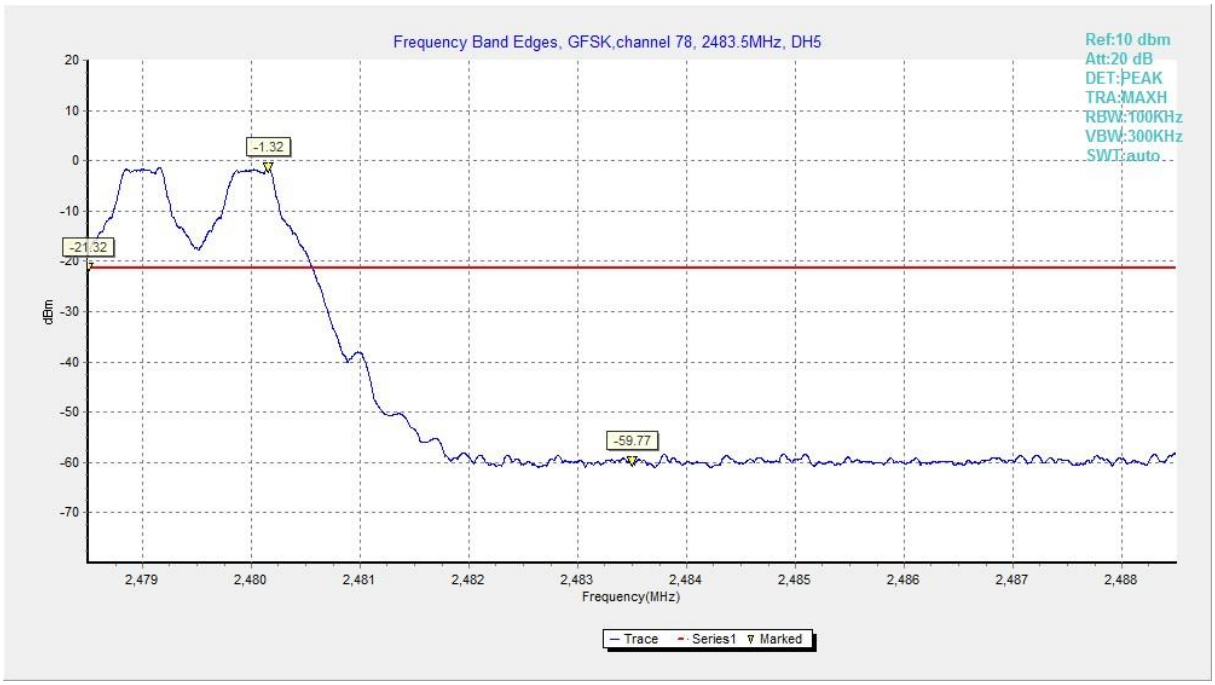

Fig. 11 Band Edges (GFSK, Ch 78, Hopping ON)

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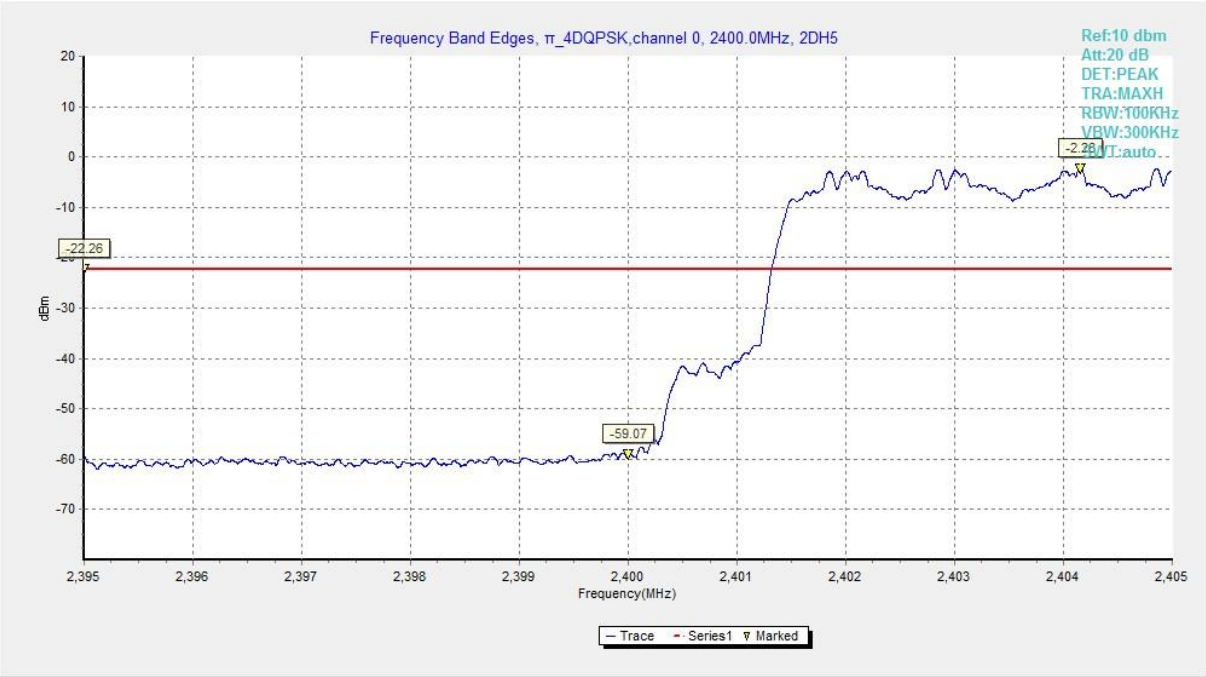

Fig. 12 Band Edges (π /4 DQPSK, Ch 0, Hopping ON)

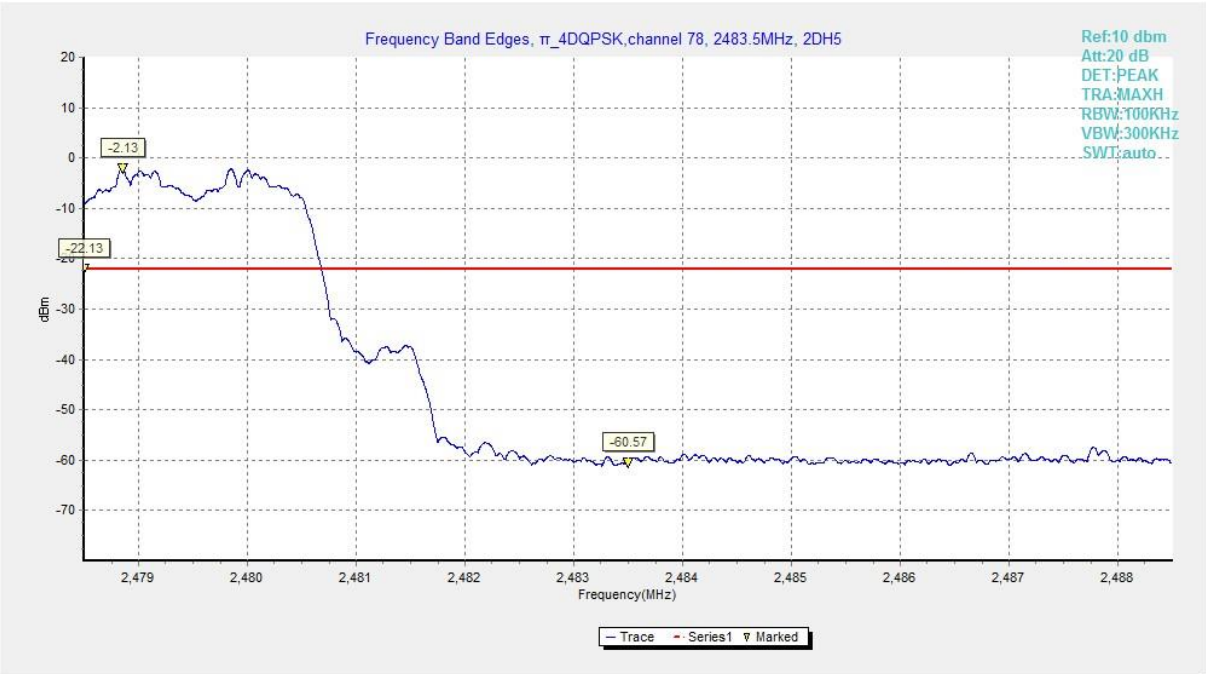

Fig. 13 Band Edges (π /4 DQPSK, Ch 78, Hopping ON)

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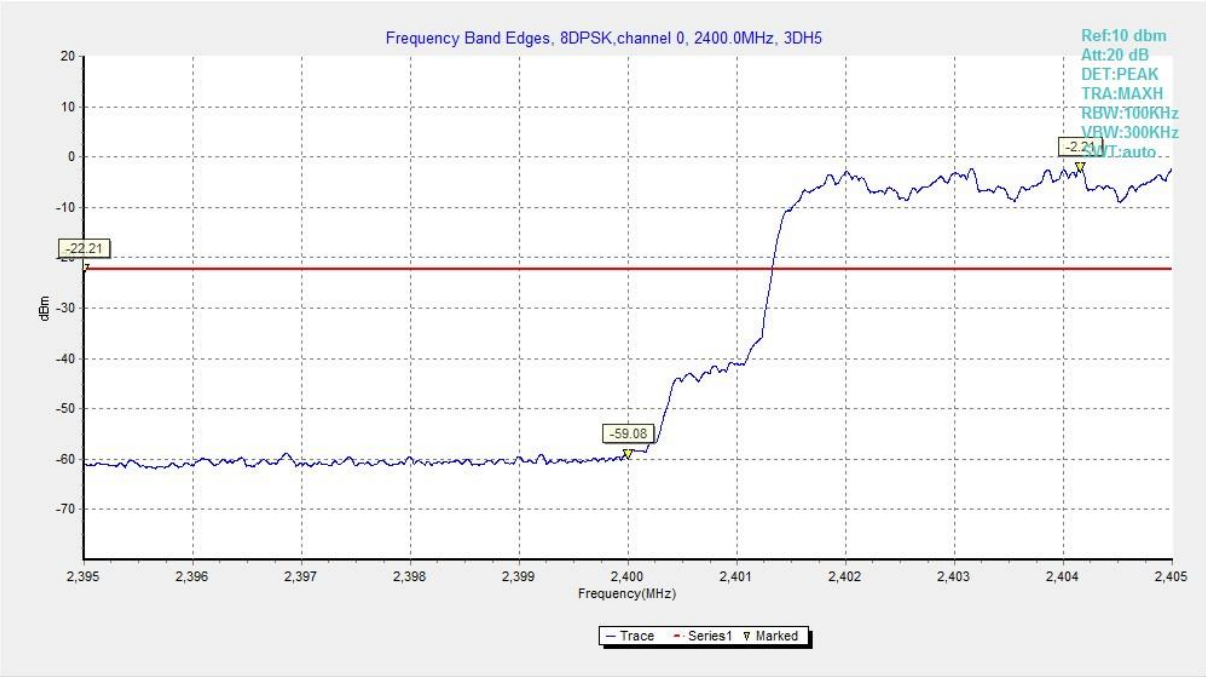

Fig. 14 Band Edges (8DPSK, Ch 0, Hopping ON)

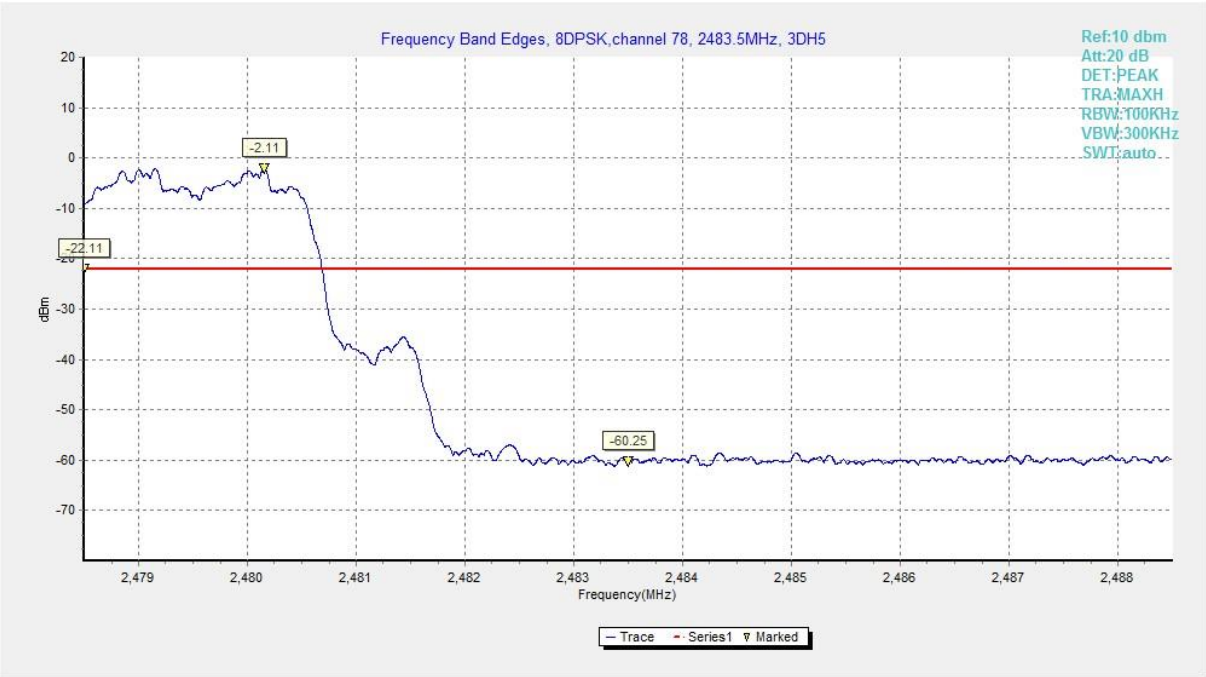

Fig. 15 Band Edges (8DPSK, Ch 78, Hopping ON)

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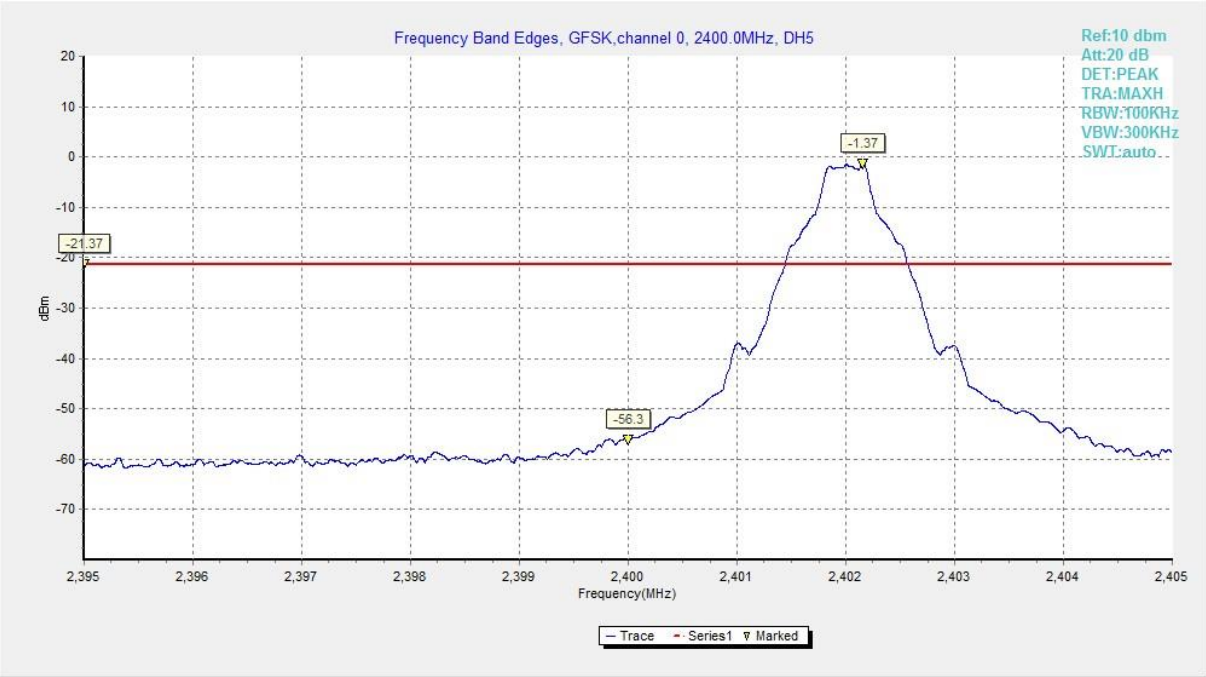

Fig. 16 Band Edges (GFSK, Ch 0, Hopping OFF)

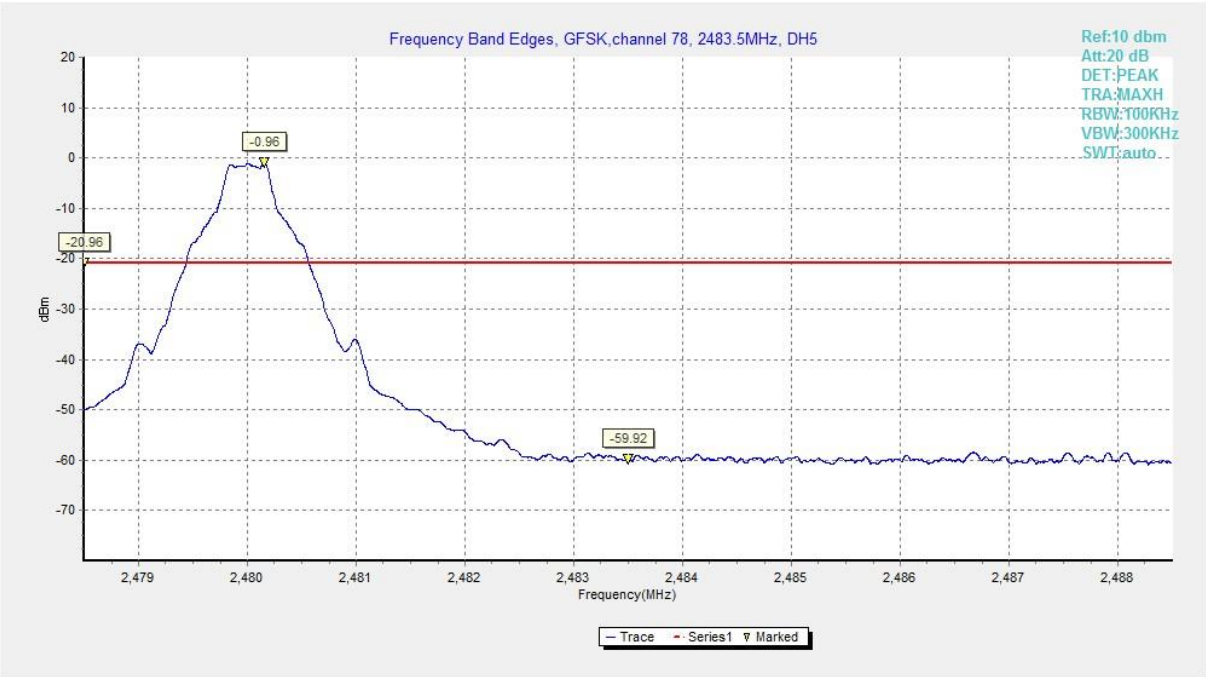

Fig. 17 Band Edges (GFSK, Ch 78, Hopping OFF)

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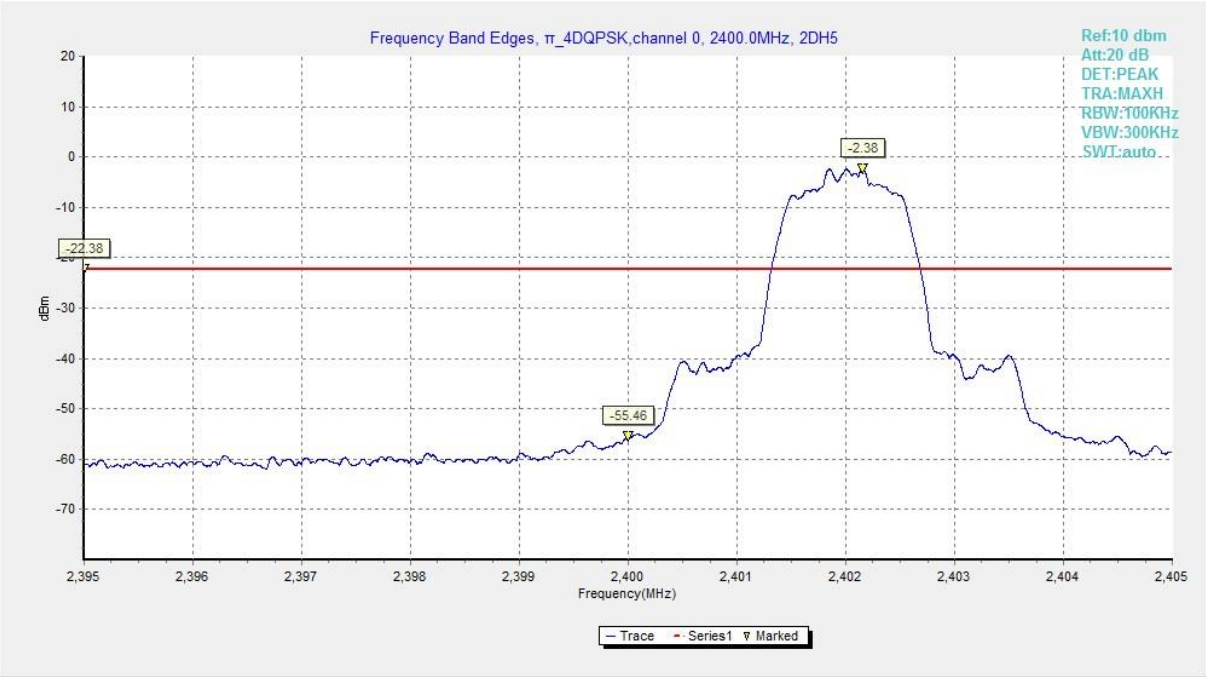

Fig. 18 Band Edges (π /4 DQPSK, Ch 0, Hopping OFF)

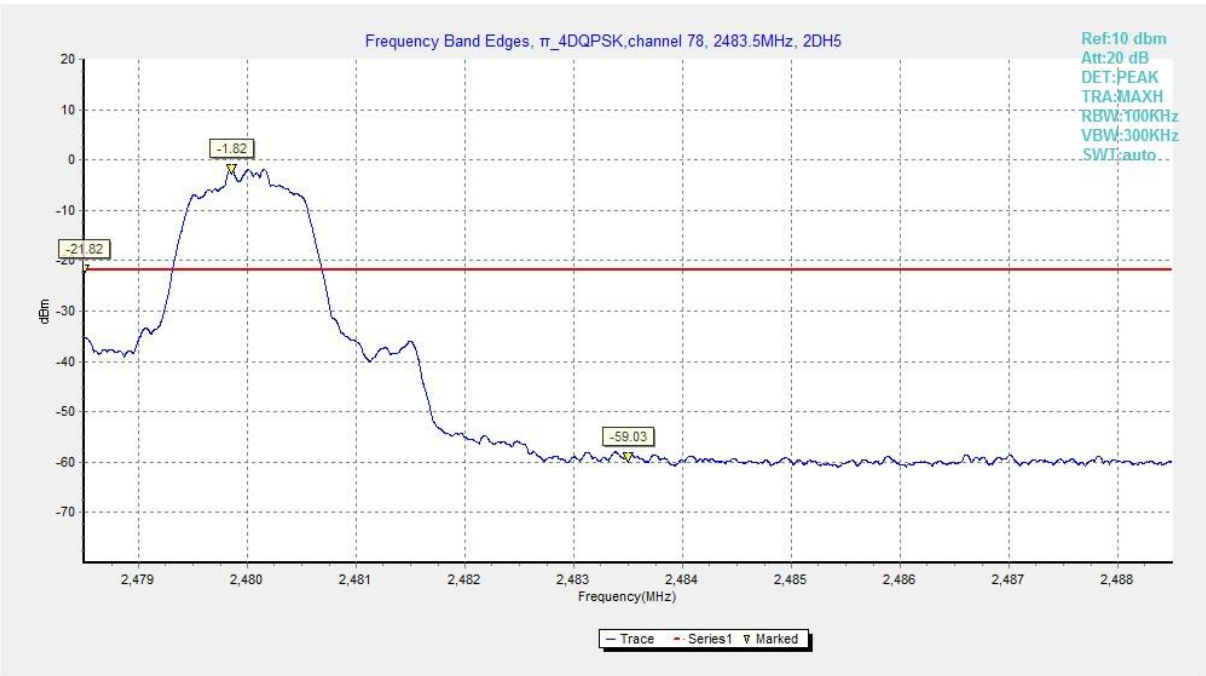

Fig. 19 Band Edges (π /4 DQPSK, Ch 78, Hopping OFF)

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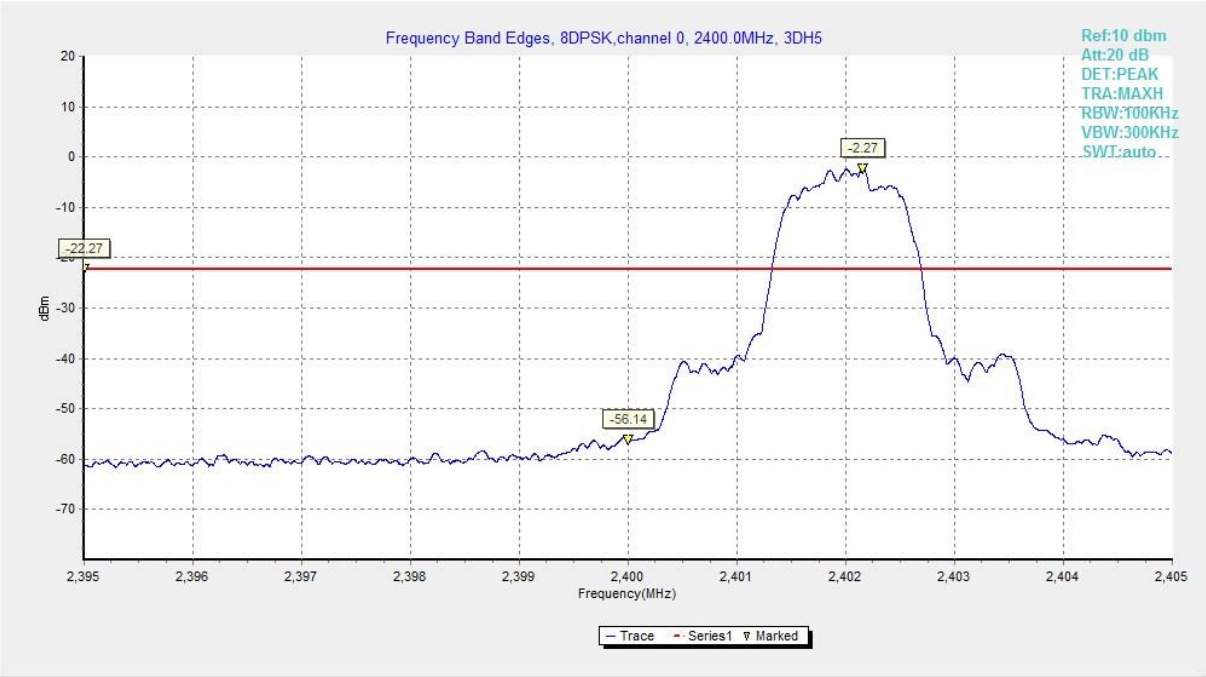

Fig. 20 Band Edges (8DPSK, Ch 0, Hopping OFF)

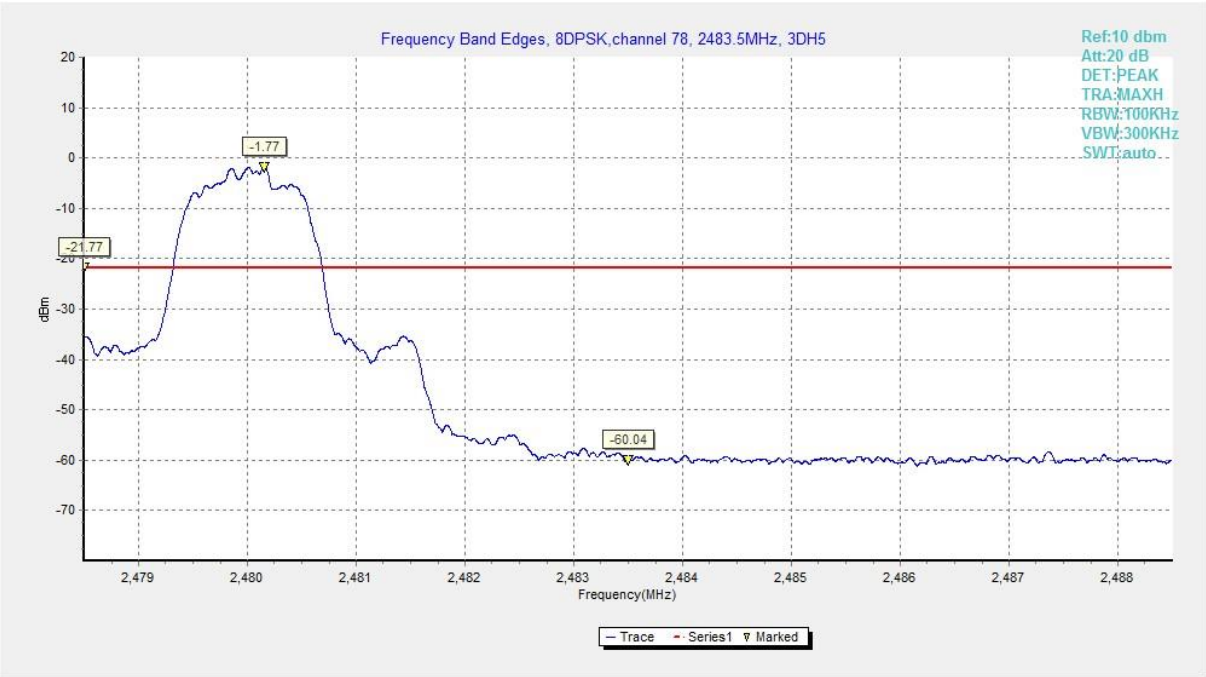

Fig. 21 Band Edges (8DPSK, Ch 78, Hopping OFF)

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A.3 Conducted Emission

Measurement Limit:

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

Measurement Results:

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

See below for test graphs.

Conclusion: Pass

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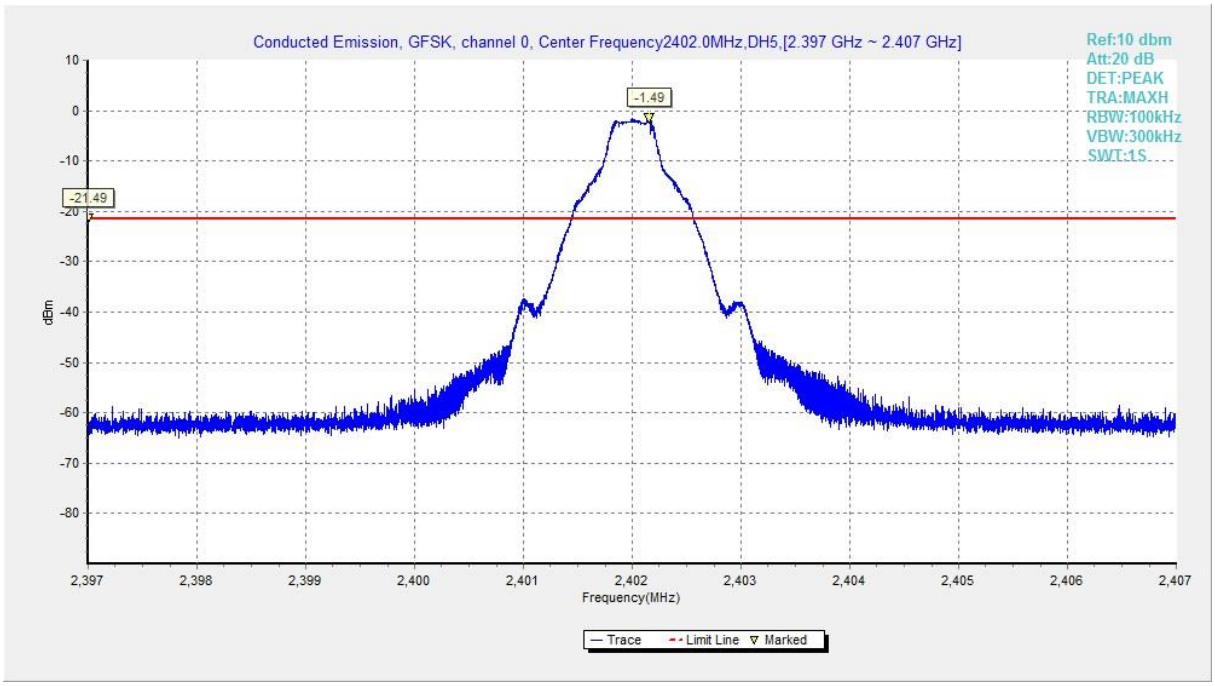

Fig. 22 Conducted Spurious Emission (GFSK, Ch0, 2.402GHz)

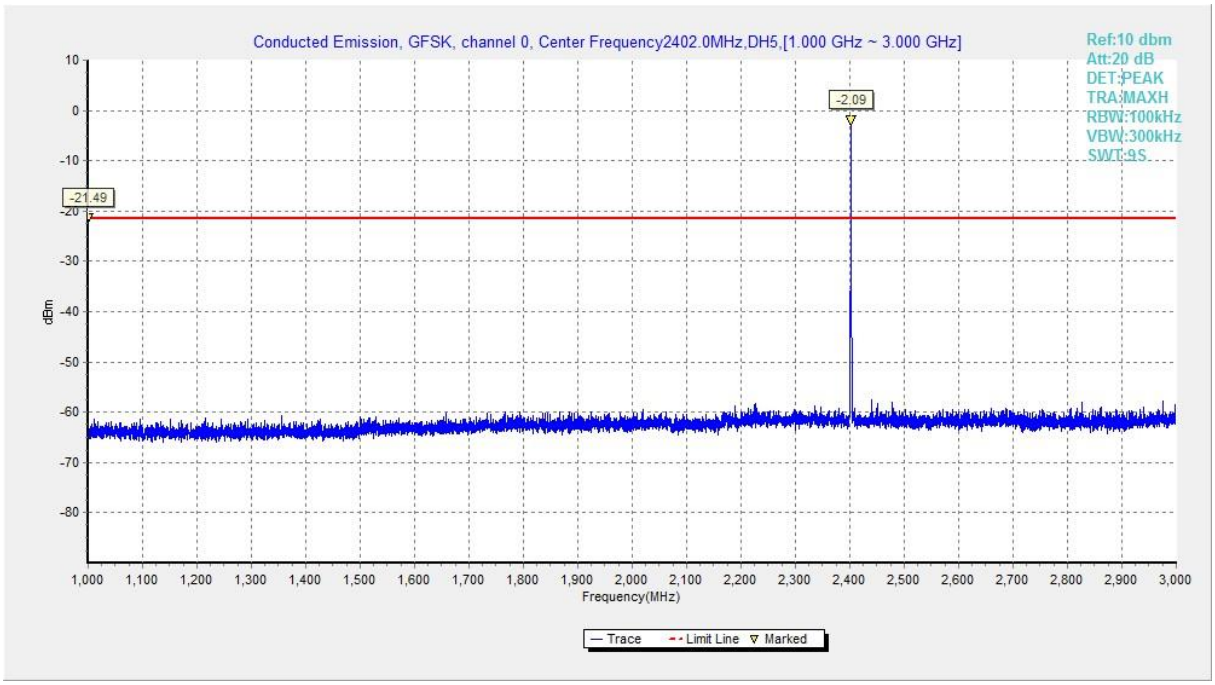

Fig. 23 Conducted Spurious Emission (GFSK, Ch0, 1 GHz-3 GHz)

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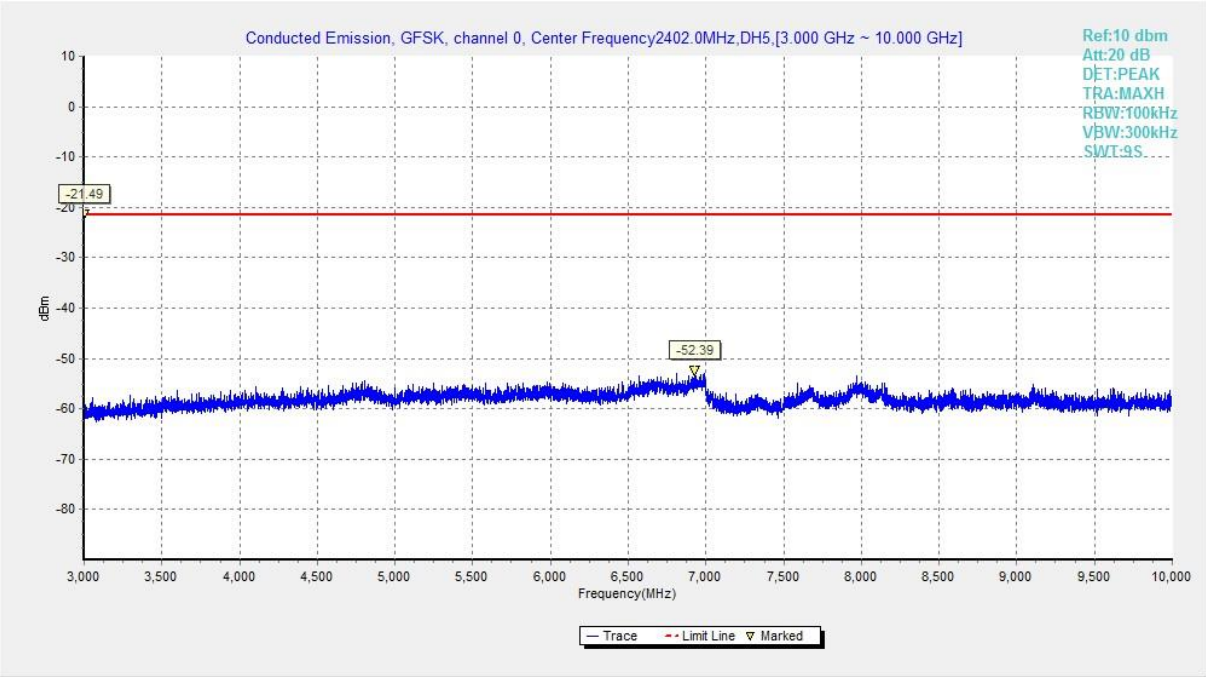

Fig. 24 Conducted Spurious Emission (GFSK, Ch0, 3GHz-10 GHz)

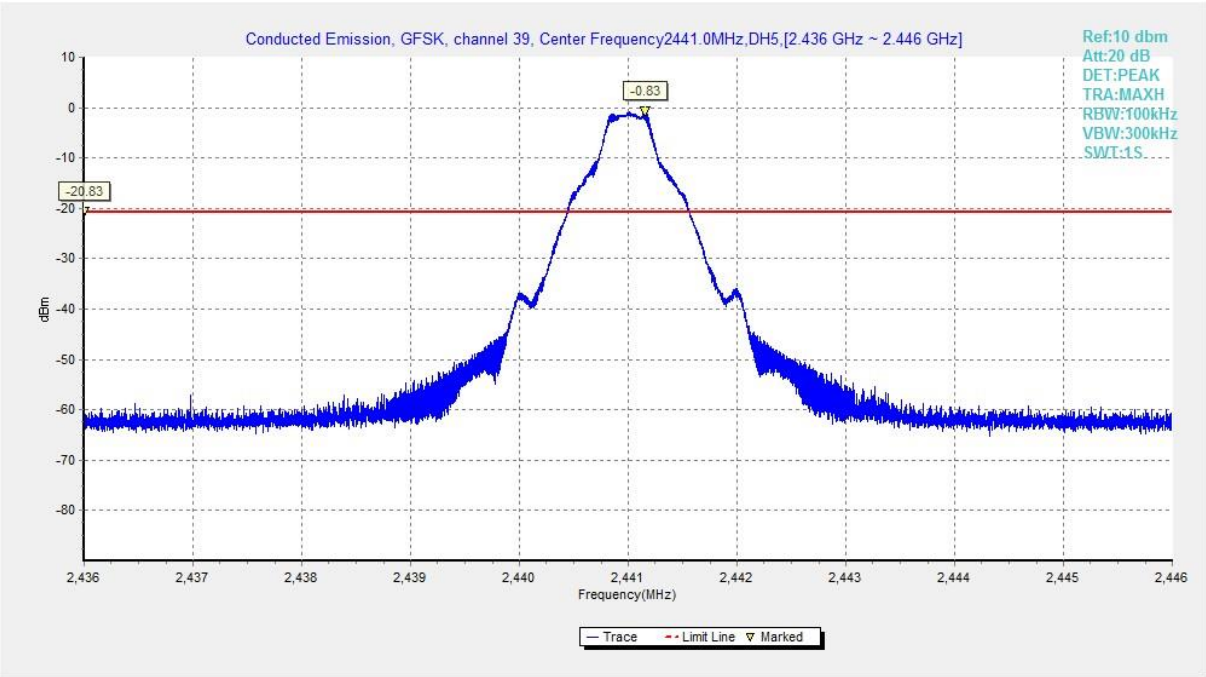

Fig. 25 Conducted Spurious Emission (GFSK, Ch39, 2.441GHz)

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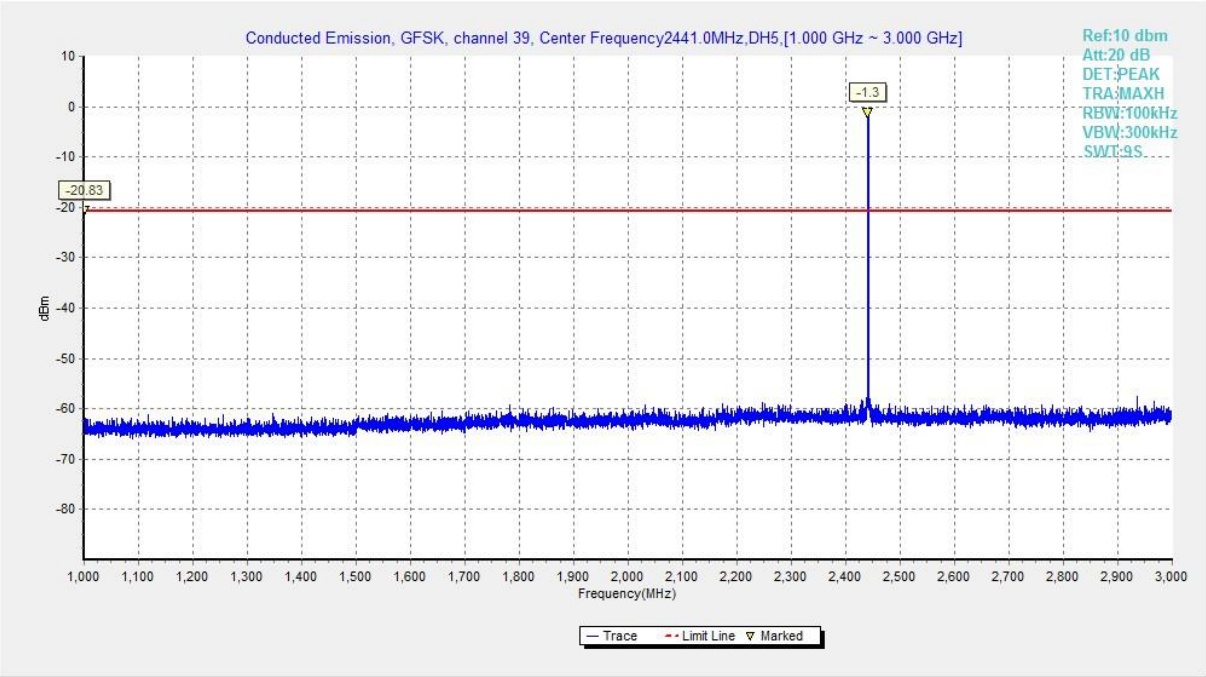

Fig. 26 Conducted Spurious Emission (GFSK, Ch39, 1GHz-3 GHz)

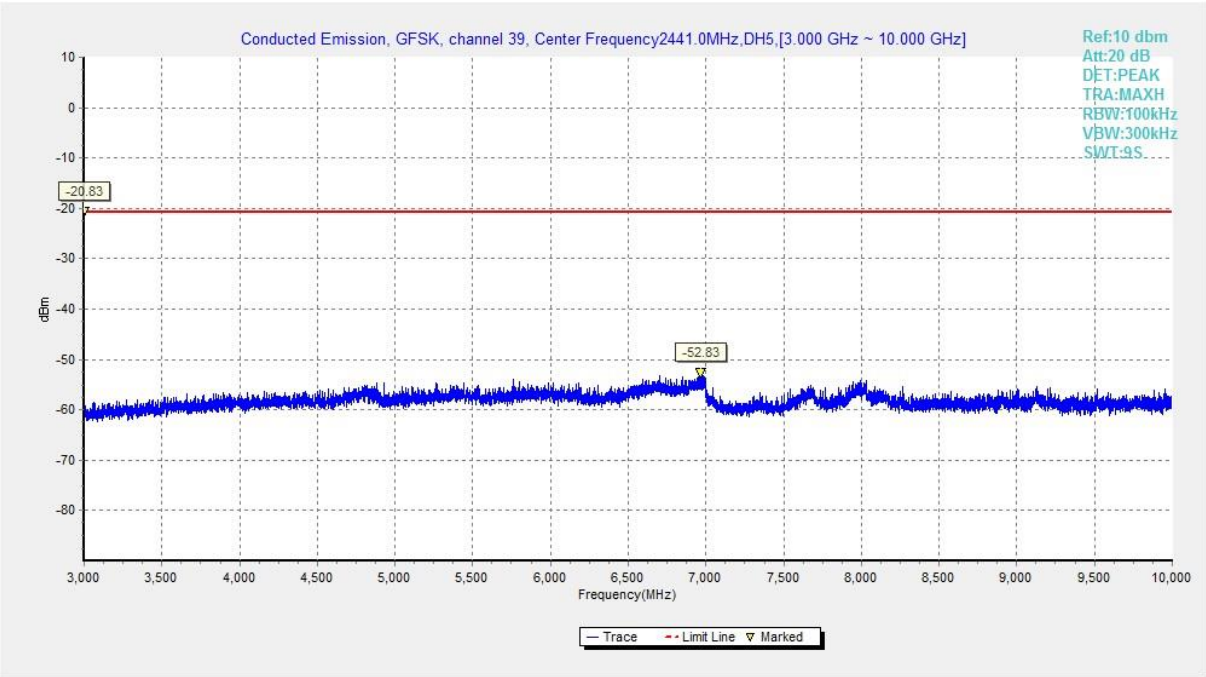

Fig. 27 Conducted Spurious Emission (GFSK, Ch39, 3GHz-10 GHz)

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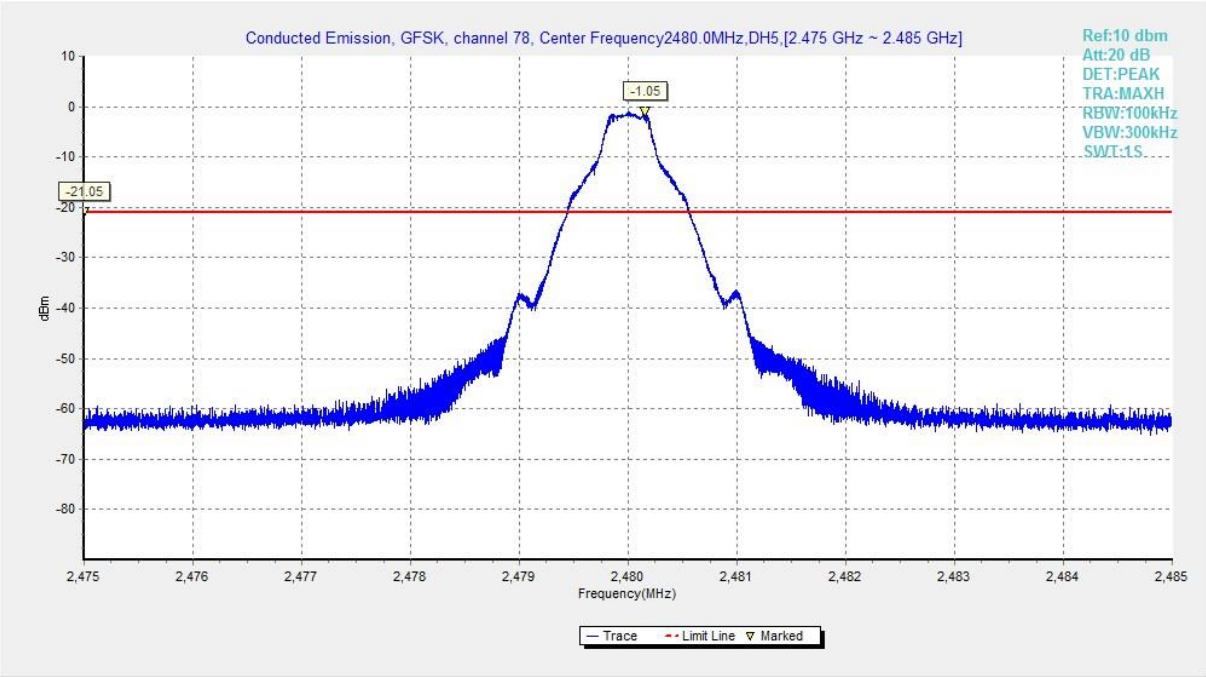

Fig. 28 Conducted Spurious Emission (GFSK, Ch78, 2.480GHz)

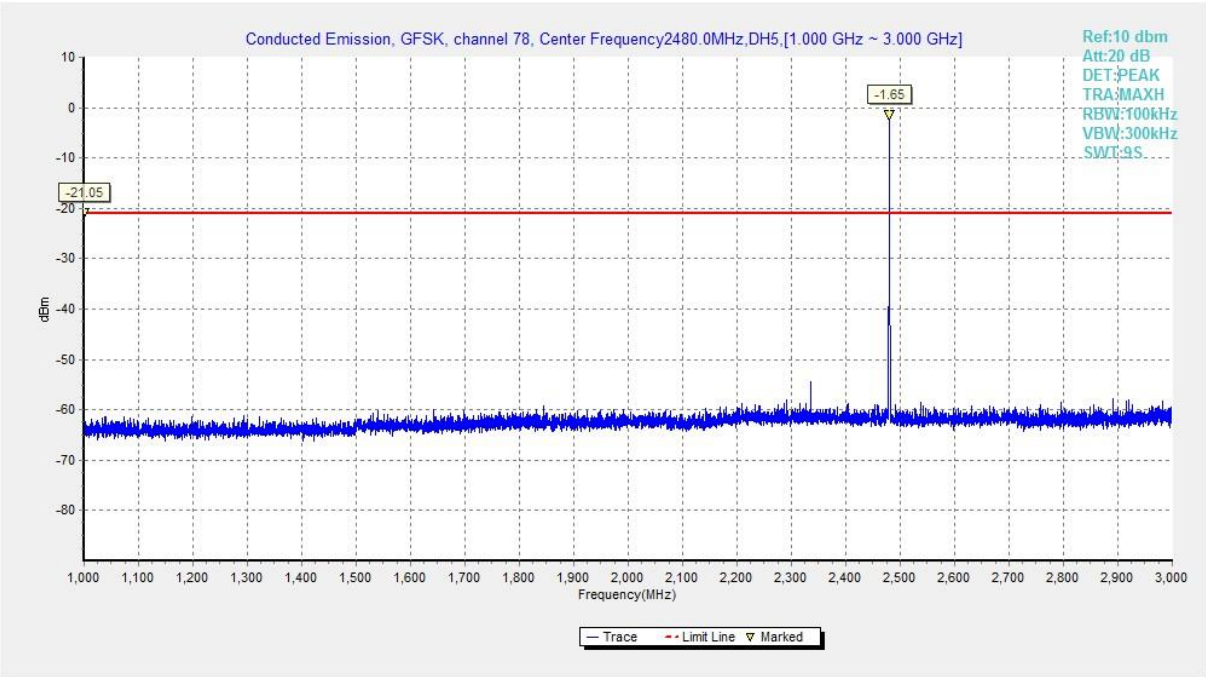

Fig. 29 Conducted Spurious Emission (GFSK, Ch78, 1GHz-3 GHz)

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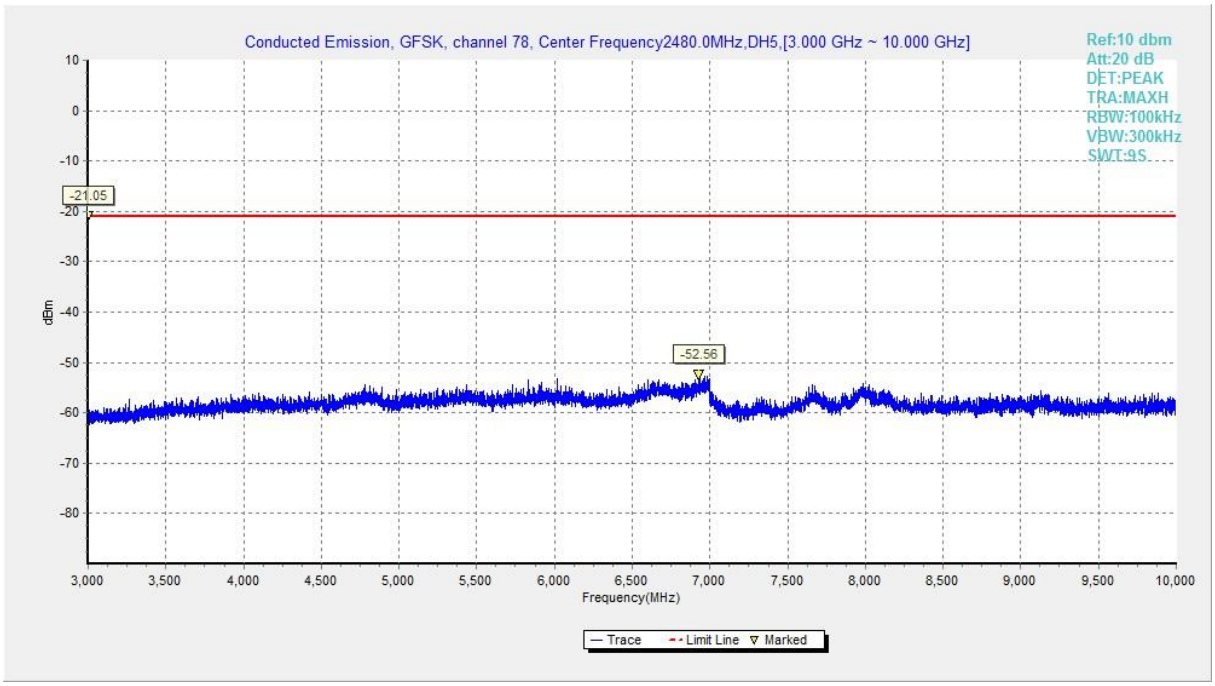

Fig. 30 Conducted Spurious Emission (GFSK, Ch78, 3GHz-10 GHz)

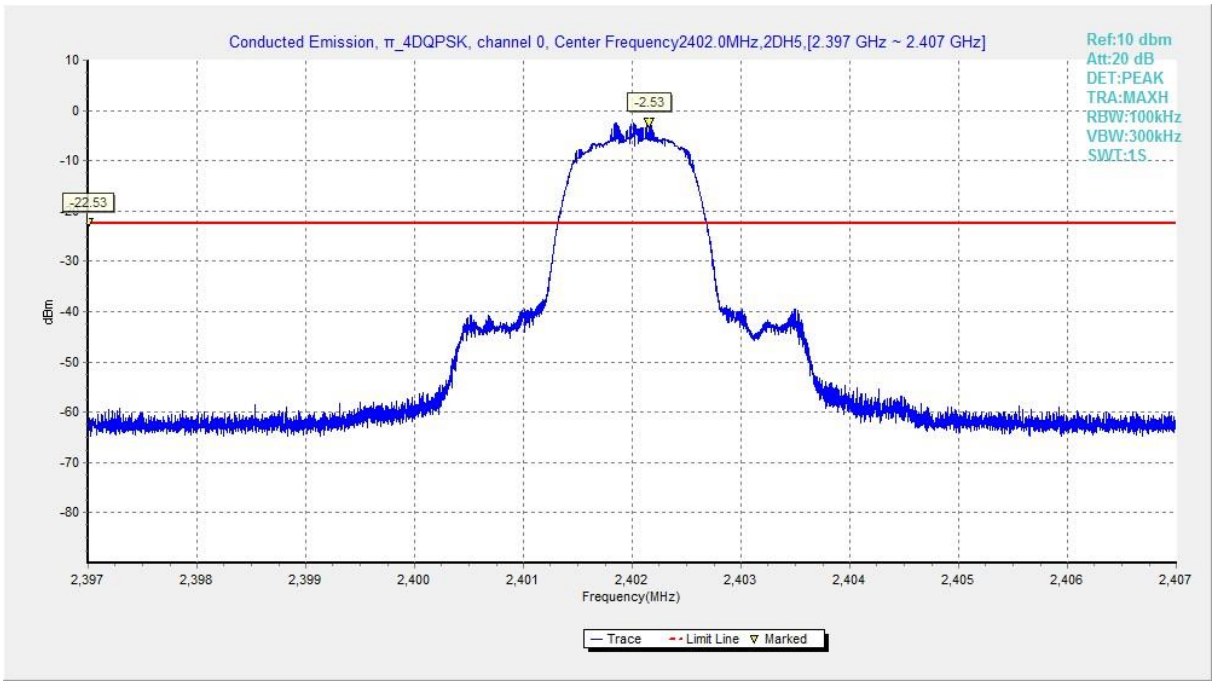

Fig. 31 Conducted Spurious Emission (π /4 DQPSK, Ch0, 2.402GHz)

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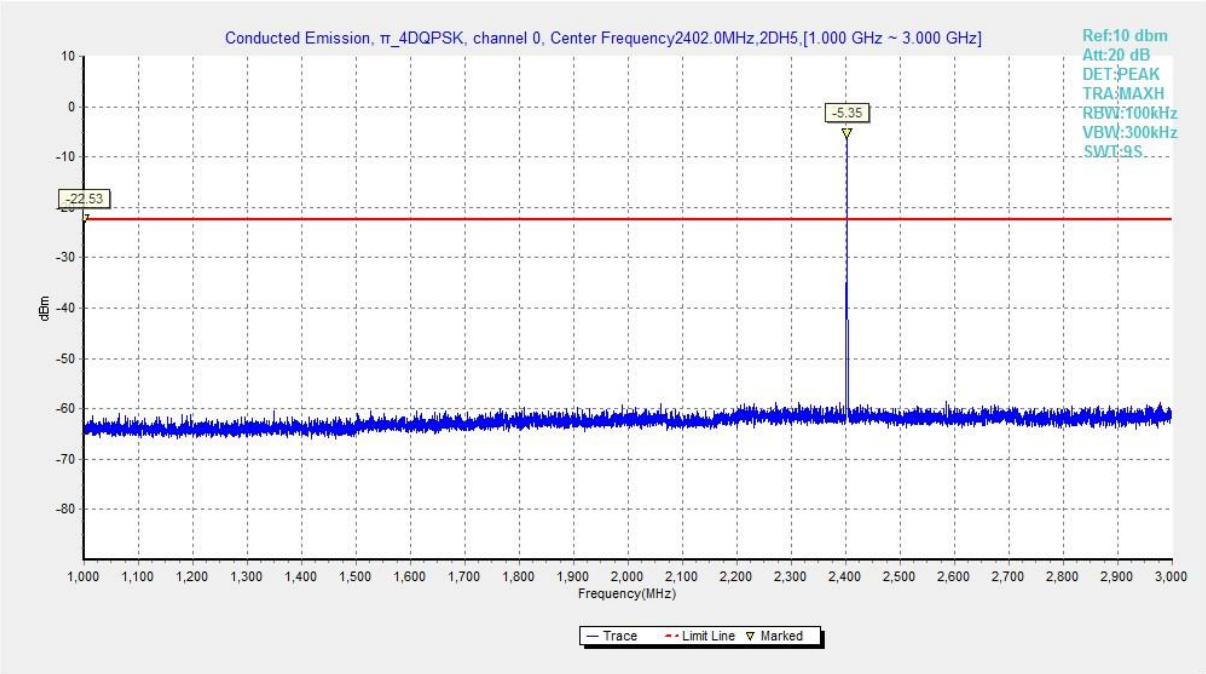

Fig. 32 Conducted Spurious Emission (π /4 DQPSK, Ch0, 1GHz-3 GHz)

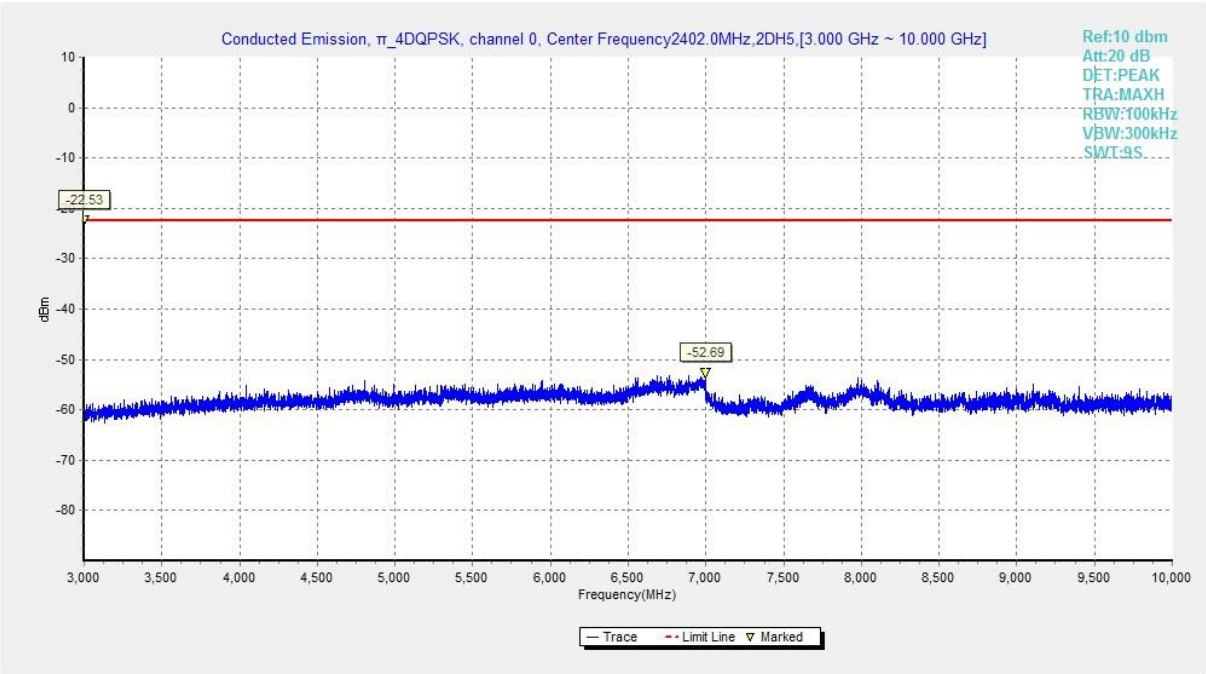

Fig. 33 Conducted Spurious Emission (π /4 DQPSK, Ch0, 3GHz-10 GHz)

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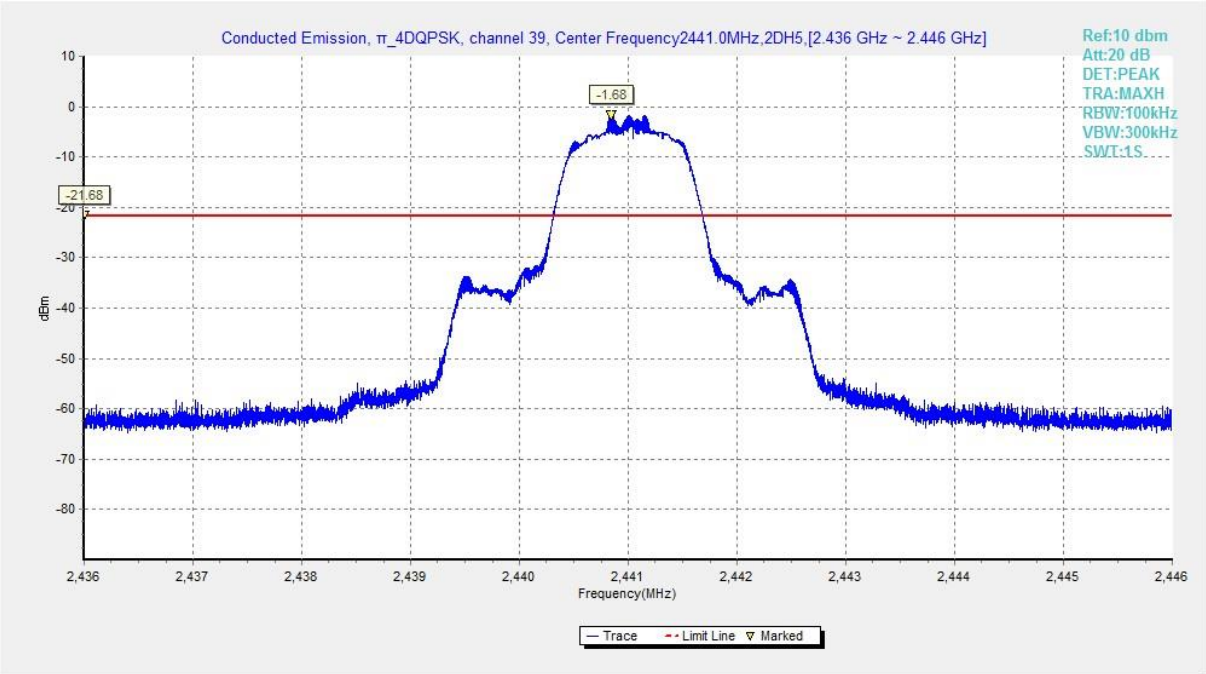

Fig. 34 Conducted Spurious Emission (π /4 DQPSK, Ch39, 2.441GHz)

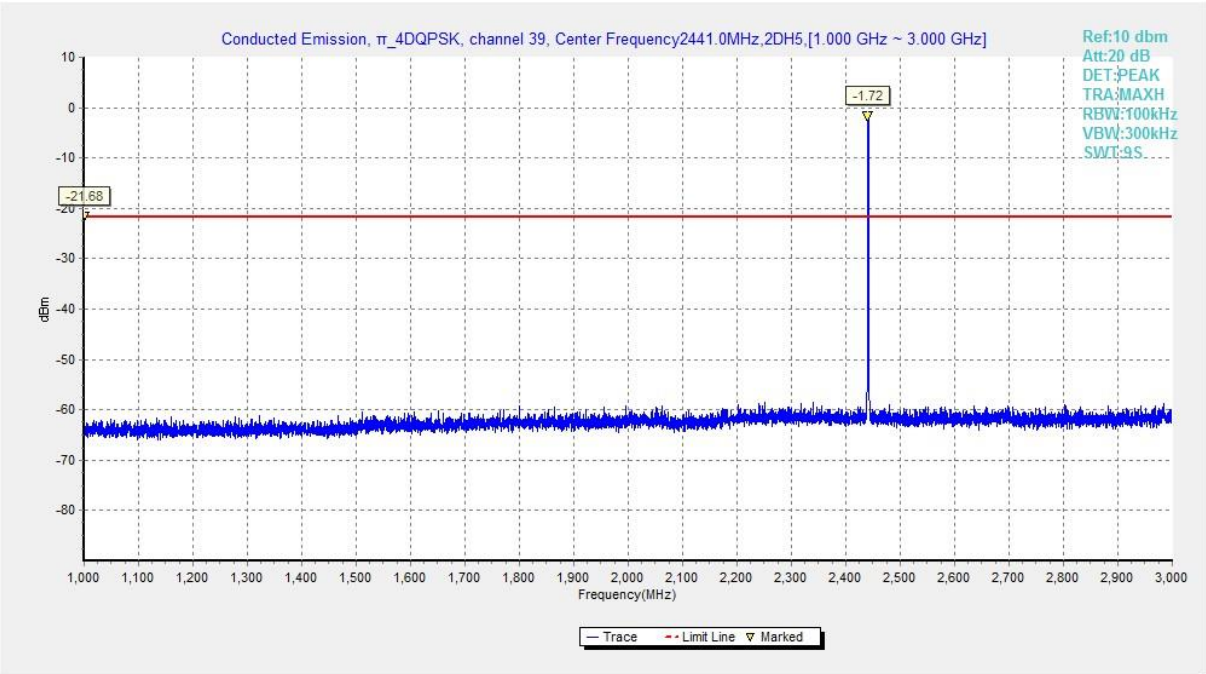

Fig. 35 Conducted Spurious Emission (π /4 DQPSK, Ch39, 1GHz-3 GHz)

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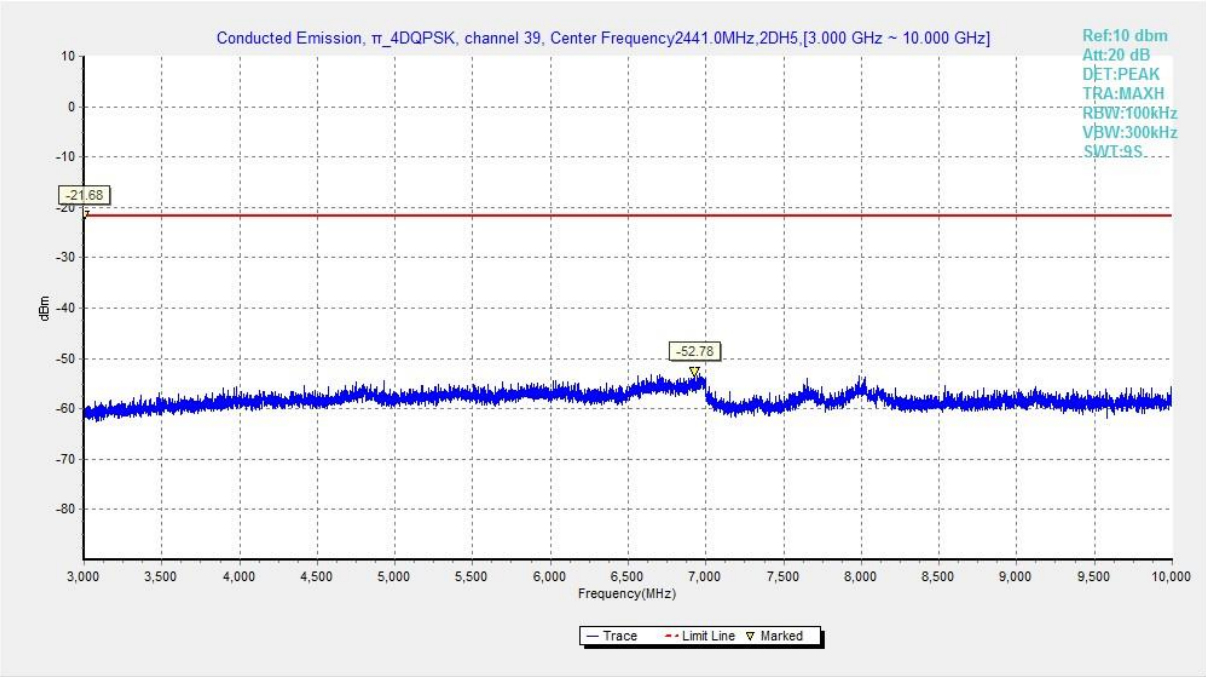

Fig. 36 Conducted Spurious Emission (π /4 DQPSK, Ch39, 3GHz-10 GHz)

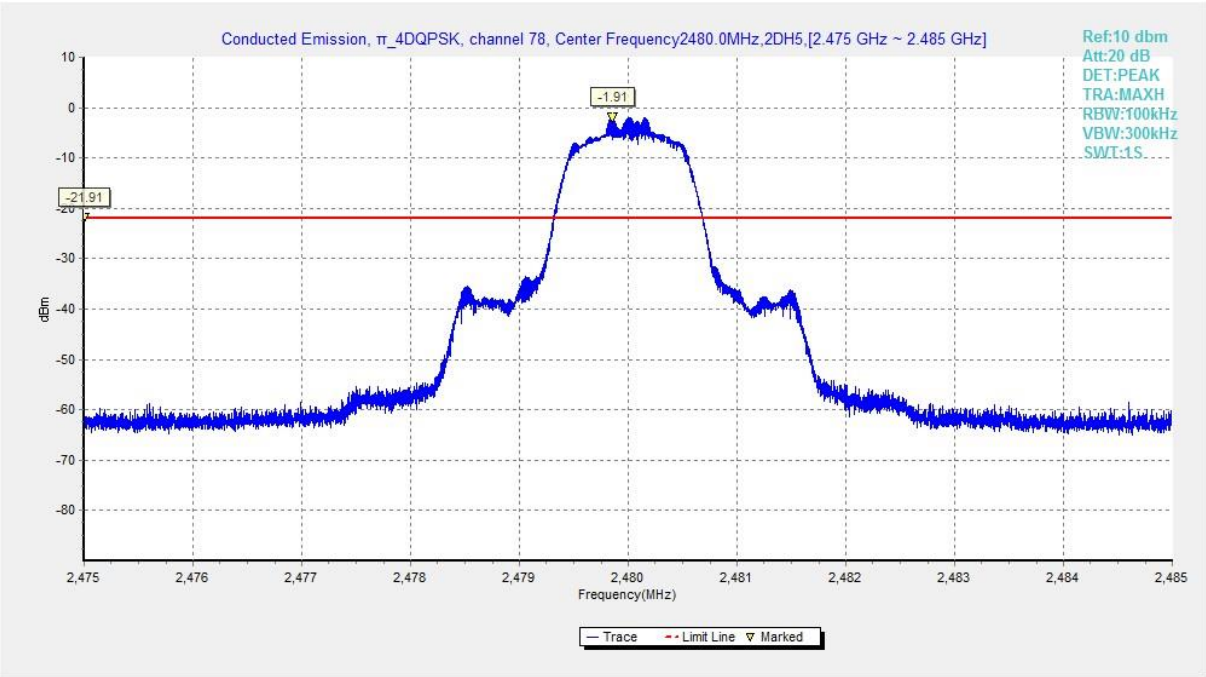

Fig. 37 Conducted Spurious Emission (π /4 DQPSK, Ch78, 2.480GHz)

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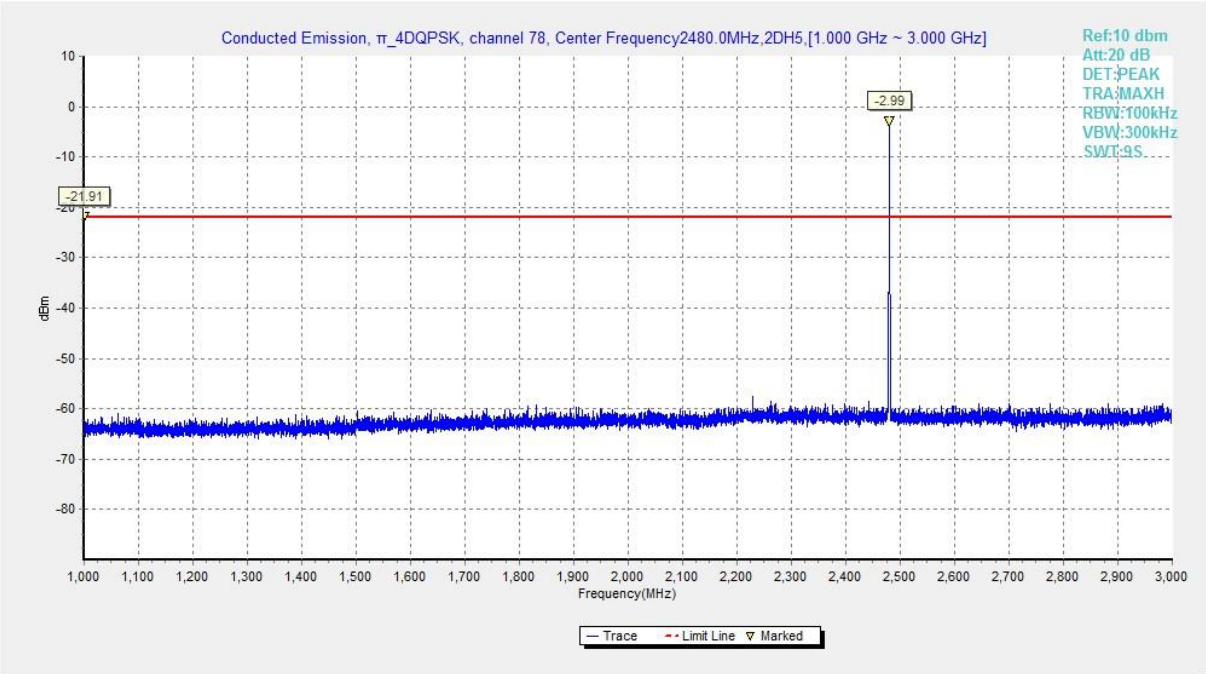

Fig. 38 Conducted Spurious Emission (π /4 DQPSK, Ch78, 1GHz-3 GHz)

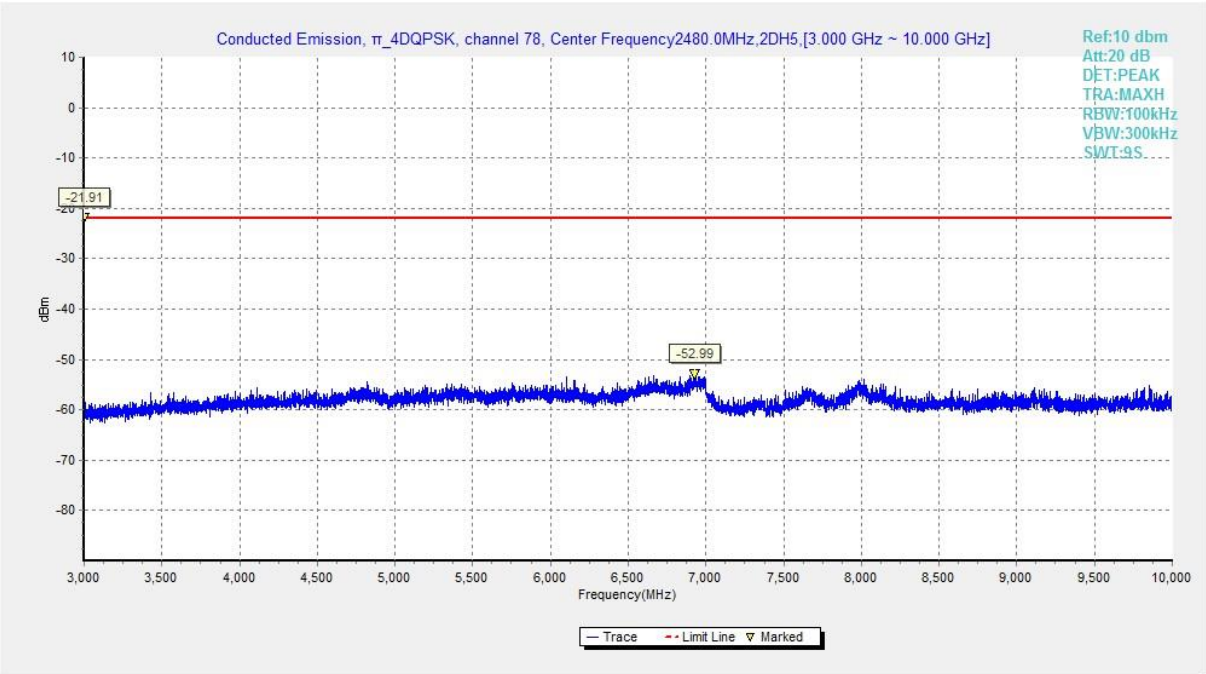

Fig. 39 Conducted Spurious Emission (π /4 DQPSK, Ch78, 3GHz-10 GHz)

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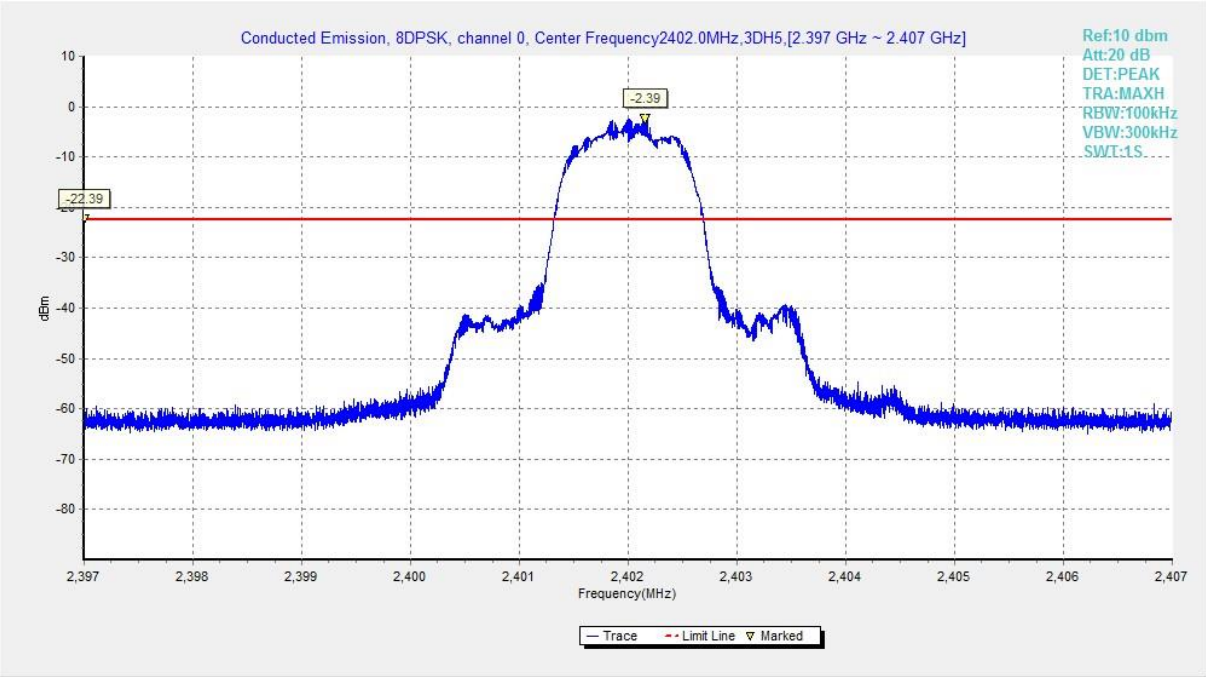

Fig. 40 Conducted Spurious Emission (8DPSK, Ch0, 2.402GHz)

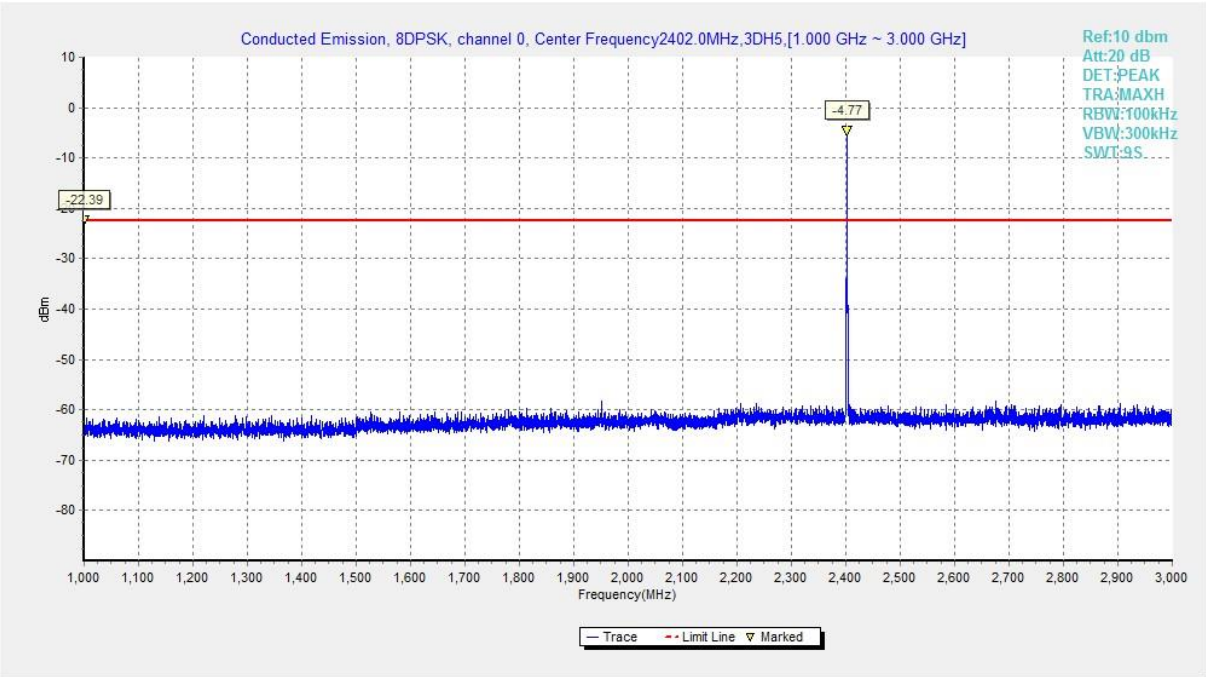

Fig. 41 Conducted Spurious Emission (8DPSK, Ch0, 1GHz-3 GHz)

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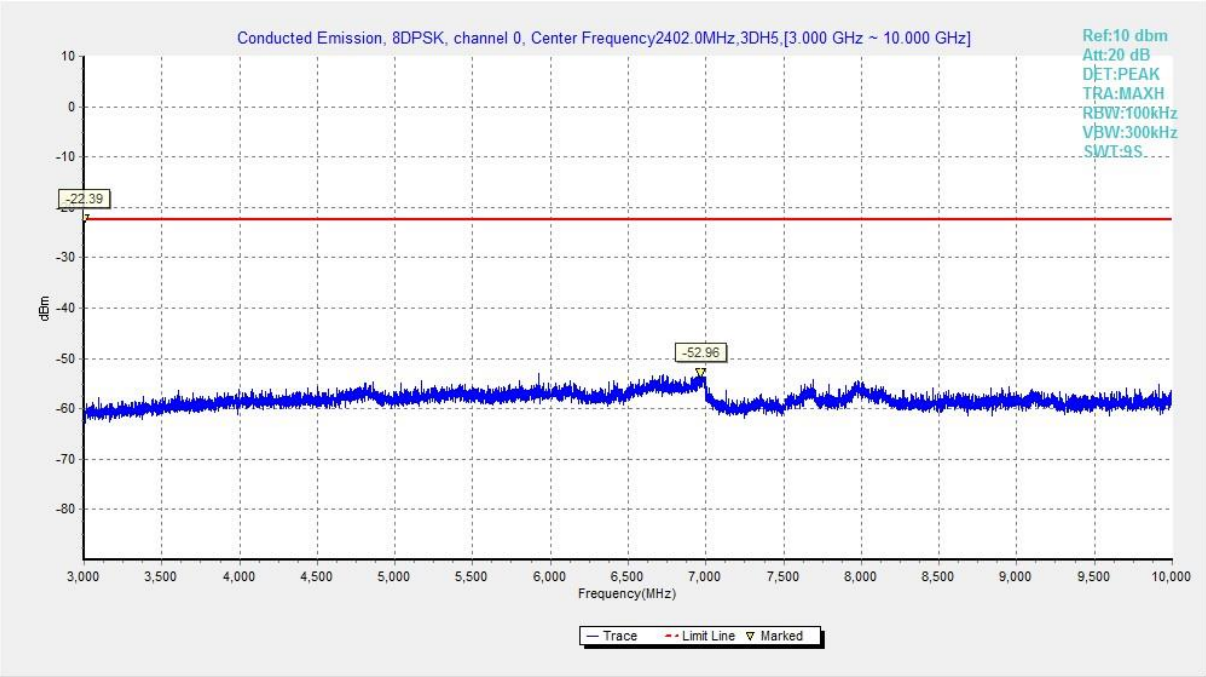

Fig. 42 Conducted Spurious Emission (8DPSK, Ch0, 3GHz-10 GHz)

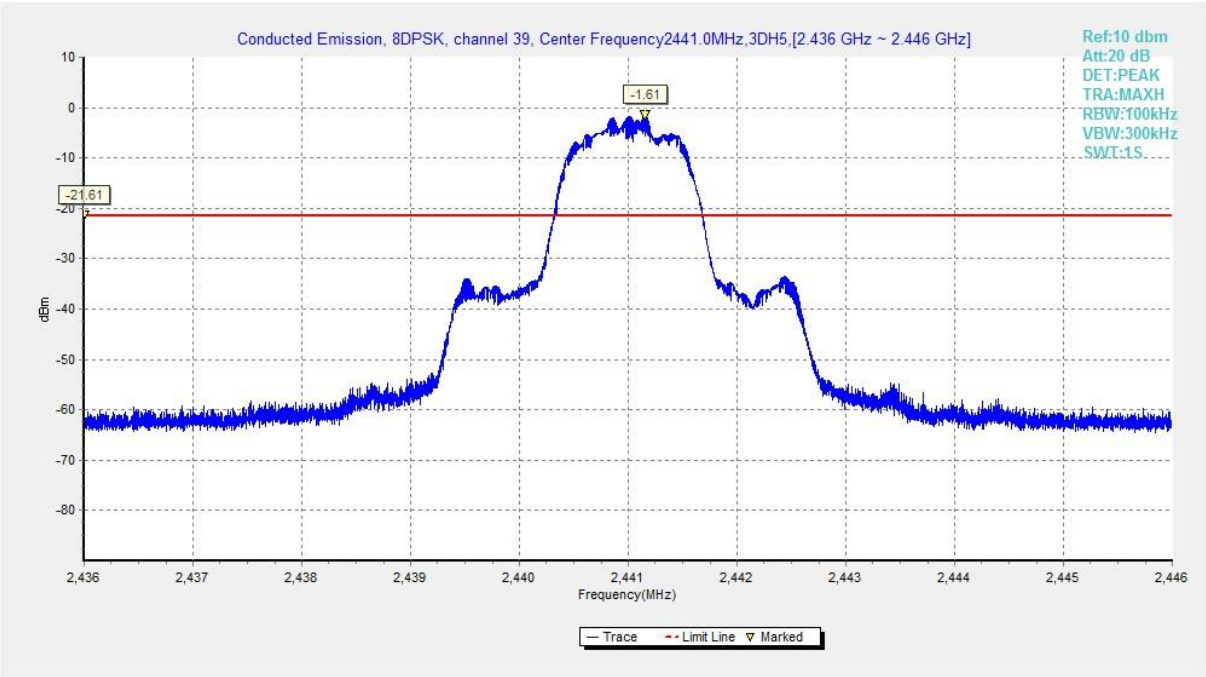

Fig. 43 Conducted Spurious Emission (8DPSK, Ch39, 2.441GHz)

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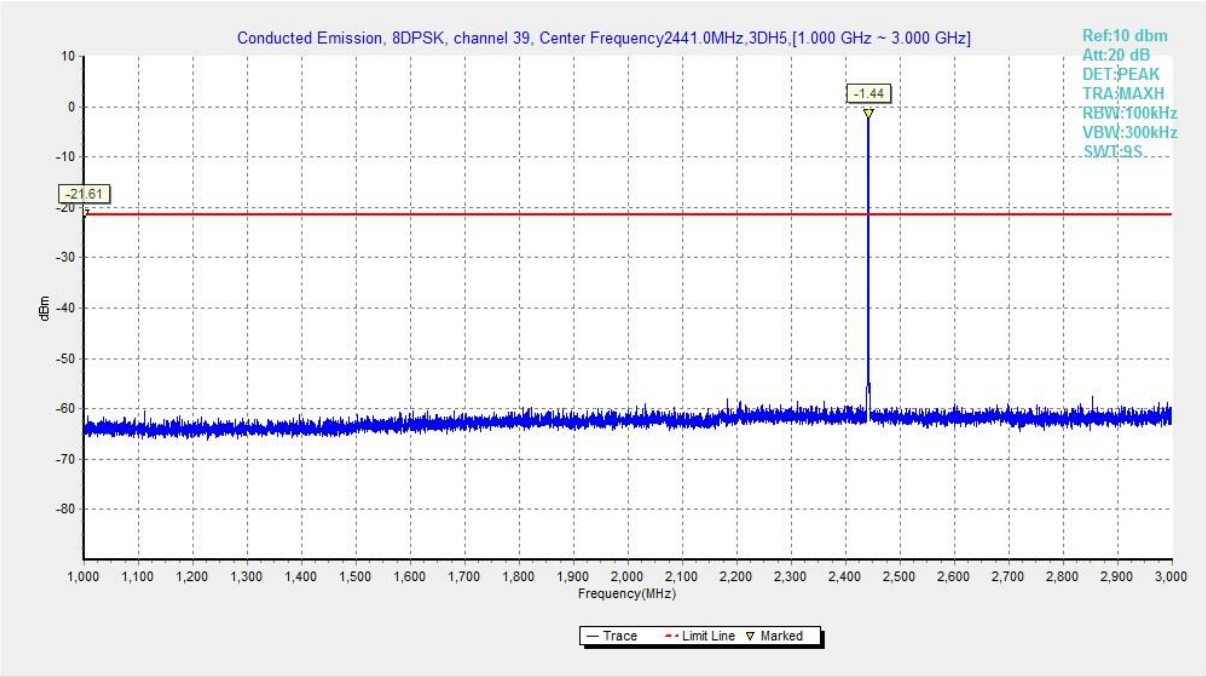

Fig. 44 Conducted Spurious Emission (8DPSK, Ch39, 1GHz-3 GHz)

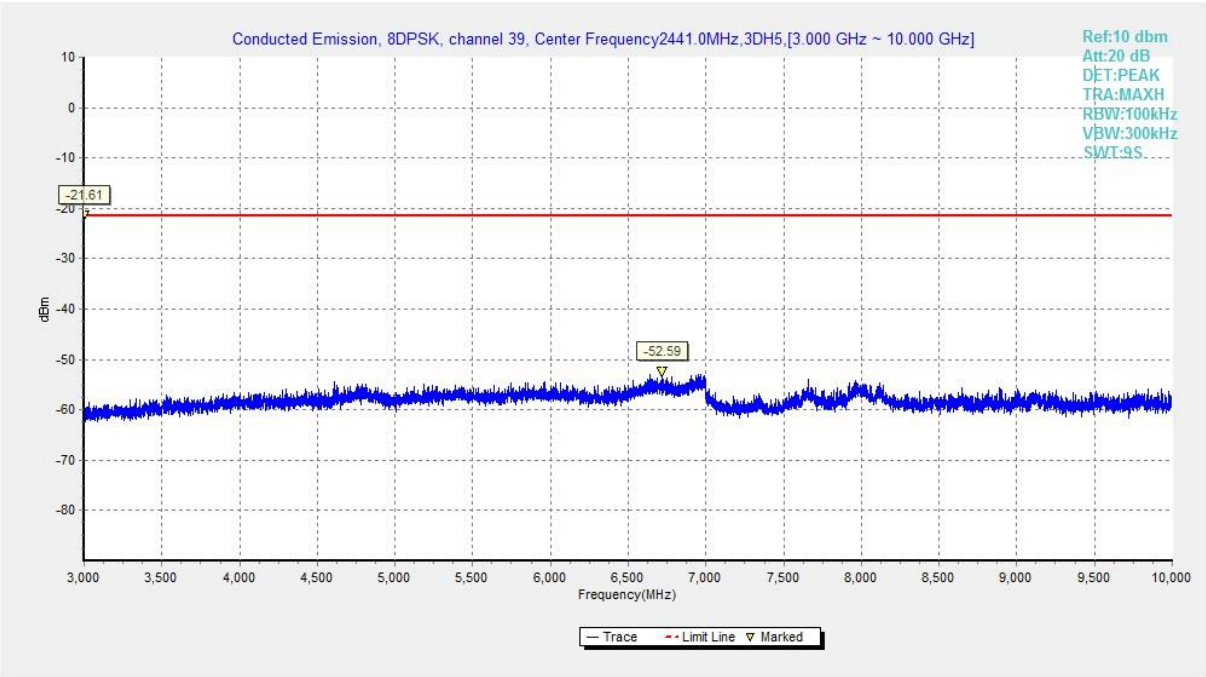

Fig. 45 Conducted Spurious Emission (8DPSK, Ch39, 3GHz-10 GHz)

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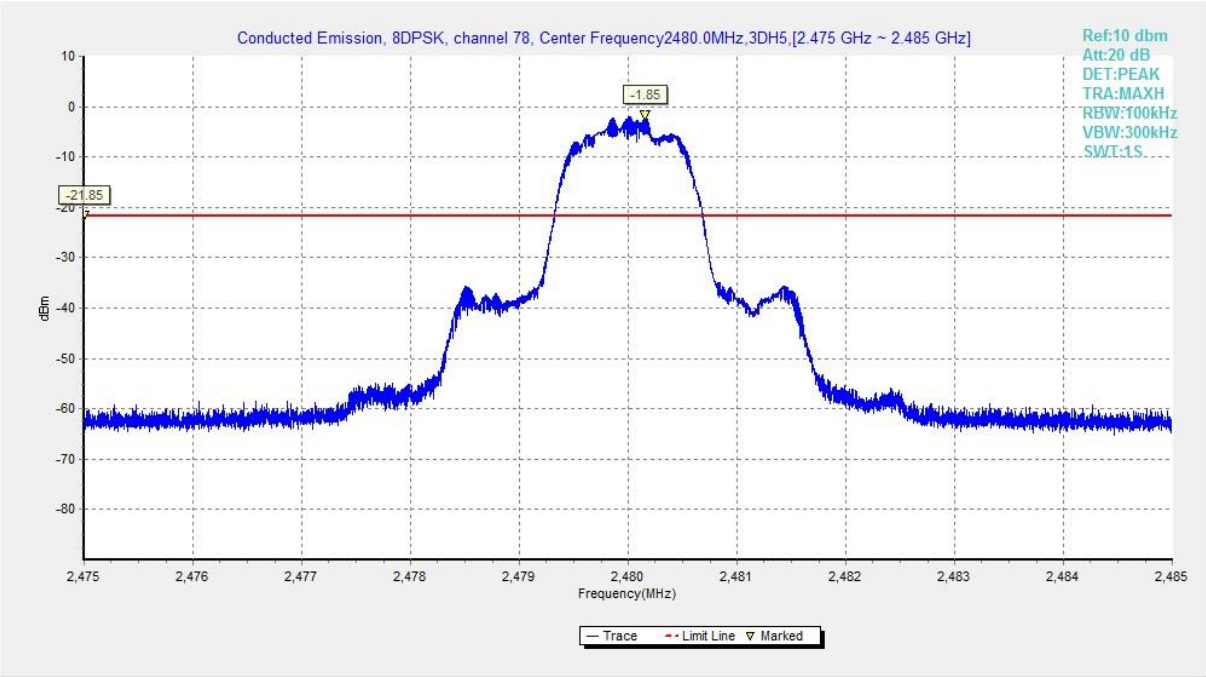

Fig. 46 Conducted Spurious Emission (8DPSK, Ch78, 2.480GHz)

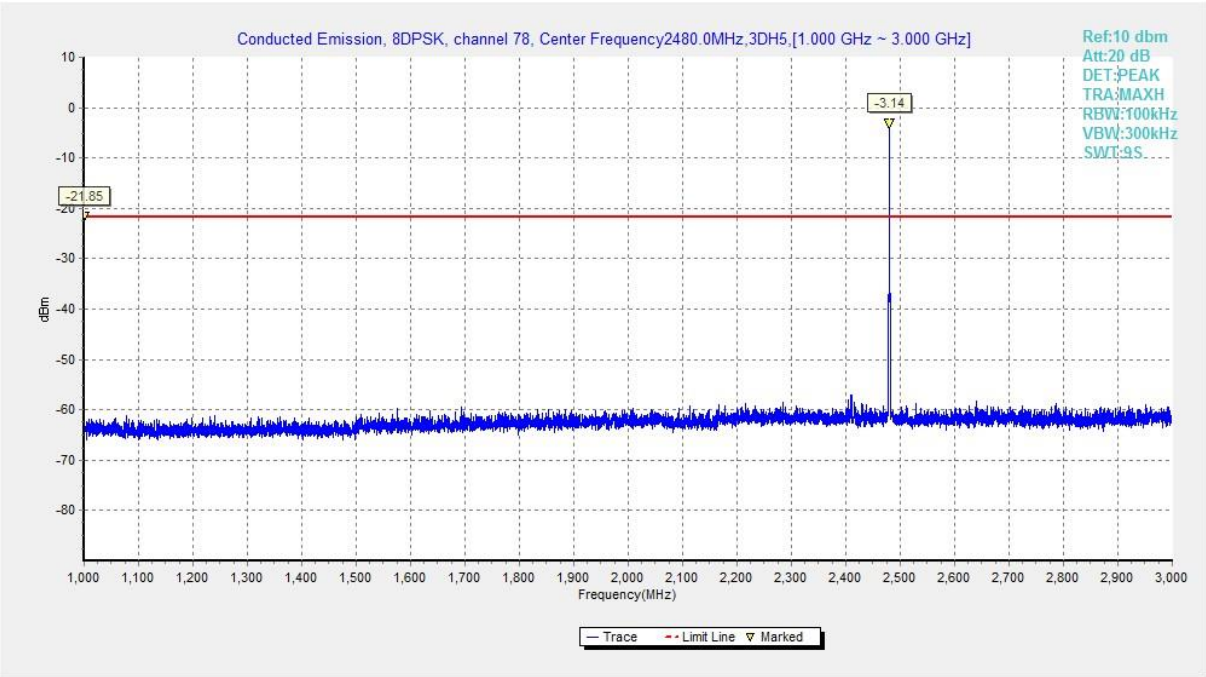

Fig. 47 Conducted Spurious Emission (8DPSK, Ch78, 1GHz-3 GHz)

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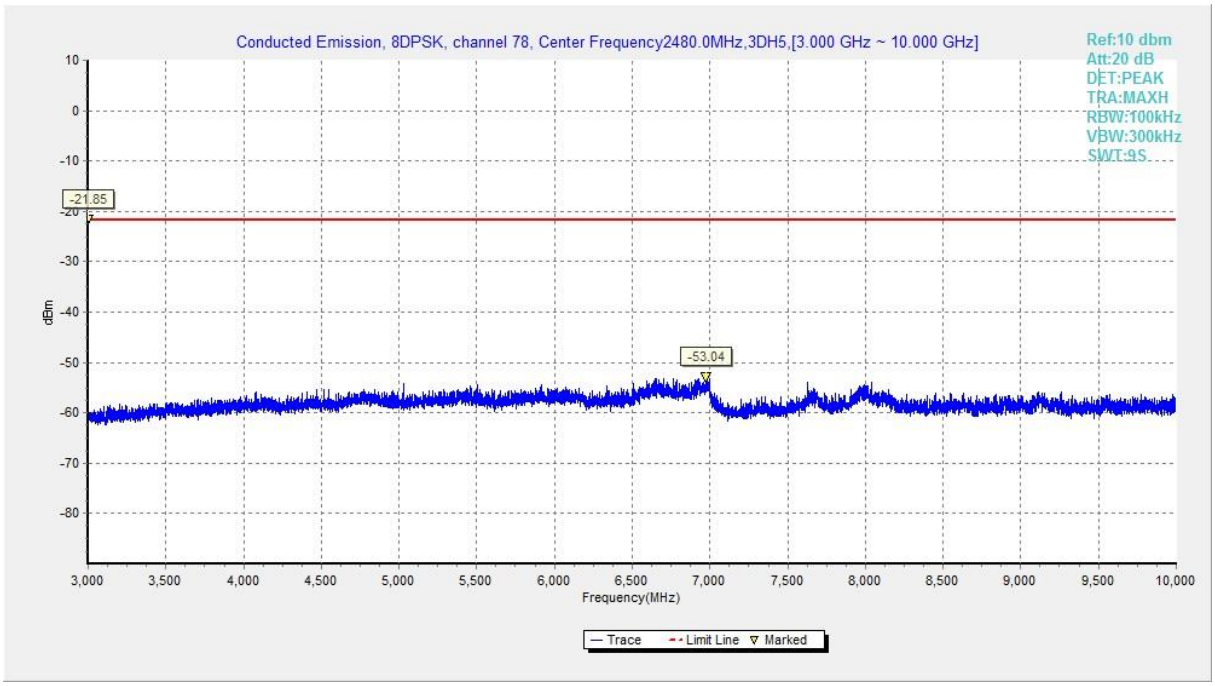

Fig. 48 Conducted Spurious Emission (8DPSK, Ch78, 3GHz-10 GHz)

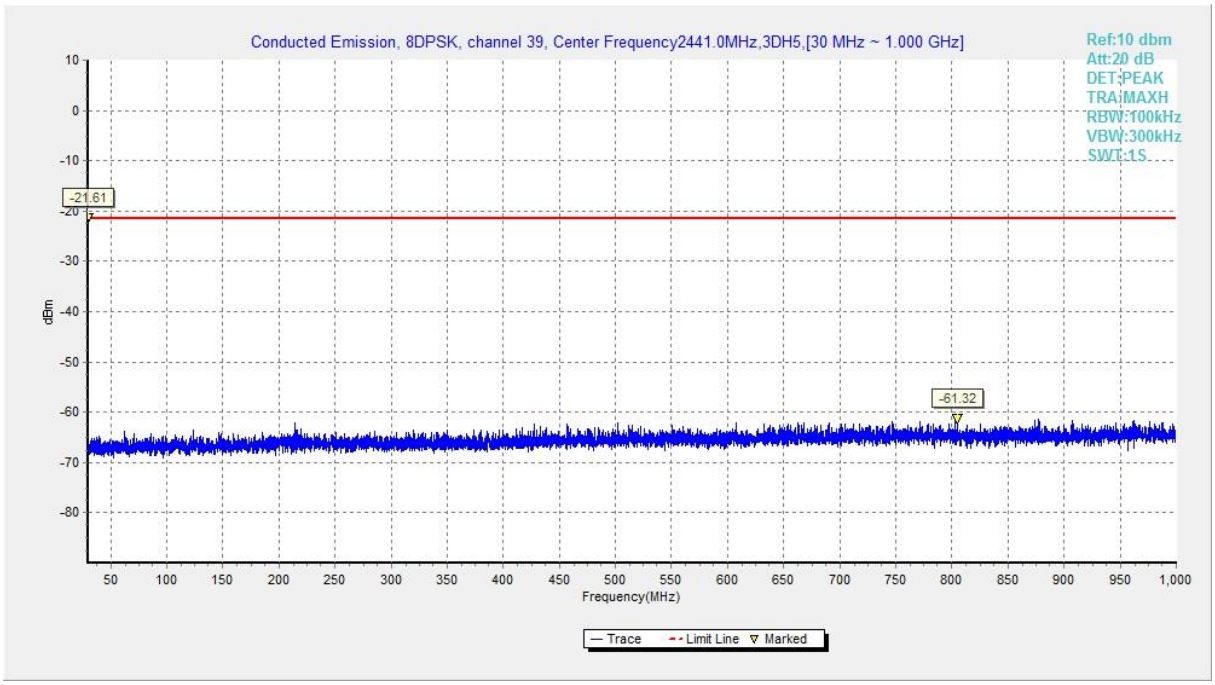

Fig. 49 Conducted Spurious Emission (All channel, 30 MHz-1 GHz)

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