TEST REPORT

No. B20N00421-BT

i.safe MOBILE GmbH

LTE SMARTPHONE

Model Name: M53A01

with

Hardware Version: V1.00

Software Version: IS530_EEA_1.0.0.0.0_1_20200331

FCC ID: 2AACZ-M53A01

IC: 11122A-M53A01

Issued Date: 2020-06-09

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.

Test Laboratory:

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1. Summary of Test Report

1.1. Test Items

Description	LTE SMARTPHONE
Model Name	M53A01
Applicant's name	i.safe MOBILE GmbH
Manufacturer's Name	i.safe MOBILE GmbH

1.2. Test Standards

FCC Part15-2018; ANSI C63.10-2013; RSS-247 Issue 2; RSS-Gen Issue 5

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:	2020-03-30
Testing End Date:	2020-04-10

1.6. Signature

Lin Kanfeng

(Prepared this test report)

Tang Weisheng

(Reviewed this test report)

Zhang Bojun

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	i.safe MOBILE GmbH
Address:	i_Park Tauberfranken 10 97922 Lauda-Koenigshofen Germany
Contact Person	Dirk Amann
E-Mail	dirk.amann@isafe-mobile.com
Telephone:	+491703719004
Fax:	/

2.2. Manufacturer Information

Company Name:	i.safe MOBILE GmbH
Address:	i_Park Tauberfranken 10 97922 Lauda-Koenigshofen Germany
Contact Person	Dirk Amann
E-Mail	dirk.amann@isafe-mobile.com
Telephone:	+491703719004
Fax:	/

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

3.1. About EUT

Description	LTE SMARTPHONE
Model Name	M53A01
Brand Name	i.safe MOBILE
Frequency Band	2400MHz~2483.5MHz
Type of Modulation	GFSK/π /4 DQPSK/8DPSK
Number of Channels	79
Antenna Type	Integrated
Antenna Gain	-0.5dBi
Power Supply	3.8V DC by Battery
FCC ID	2AACZ-M53A01
IC	11122A-M53A01
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
EUT1	/	V1.0.0	IS530_EEA_1.0.0.0.0_1_20200331	2020-03-09

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

3.3. Internal Identification of AE used during the test

AE ID*	Description	SN
AE1	Charger	/
AE2	Battery	/

AE1

Model	ICP12-050-2000B
Manufacturer	SHENZHEN SHI YINGYUAN POWER SUPPLY TECHNOLOGY CO., LTD.

AE2

Model	MBP53A01
Manufacturer	FPR Connectivity Technology Inc.
Capacitance	3600mAh
Nominal Voltage	3.8V

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

3.4. General Description

The Equipment under Test (EUT) is a model of LTE SMARTPHONE with integrated antenna and battery.

It consists of normal options: Lithium Battery, Charger and Headset.

Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.

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
RSS-247	Spectrum Management and Telecommunications Radio Standards Specification Digital Transmission Systems (DTSs), Frequency Hopping Systems (FHSs) and License-Exempt Local Area Network (LE-LAN) Devices	Issue 2 February, 2017
RSS-Gen	Spectrum Management and Telecommunications Radio Standards Specification General Requirements for Compliance of Radio Apparatus	Issue 5 April, 2018

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	Sub-clause of IC	Verdict
0	Antenna Requirement	15.203	/	**P**
1	Maximum Peak Output Power	15.247 (b)	RSS-247 section 5.4	**P**
2	Band Edges Compliance	15.247 (d)	RSS-247 section 5.1	**P**
3	Conducted Spurious Emission	15.247 (d)	RSS-247 section 5.5/ RSS-Gen section 6.13	**P**
4	Radiated Spurious Emission	15.247,15.205,15.209	RSS-247 section 5.5/ RSS-Gen section 6.13	**P**
5	Occupied 20dB bandwidth	15.247(a)	RSS-247 section 5.1	**P**
6	Time of Occupancy (Dwell Time)	15.247(a)	RSS-247 section 5.1	**P**
7	Number of Hopping Channel	15.247(a)	RSS-247 section 5.1	**P**
8	Carrier Frequency Separation	15.247(a)	RSS-247 section 5.1	**P**
9	AC Power line Conducted Emission	15.107,15.207	RSS-Gen section 8.8	**P**
10	Occupied Bandwidth	/	RSS-Gen section 6.7	**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.

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	Power Sensor	U2021XA	MY55430013	Agilent	2021-01-15	1 year
4	Data Acquisiton	U2531A	TW55443507	Agilent	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	LISN	ESH2-Z5	100196	R&S	2021-01-02	1 year
2	Test Receiver	ESCI	100701	R&S	2020-08-06	1 year
3	Loop Antenna	HLA6120	35779	TESEQ	2022-05-01	3 year
4	BiLog Antenna	VULB9163	9163 329	Schwarzbeck	2021-02-16	3 year
5	Horn Antenna	3117	00066585	ETS-Lindgren	2022-03-04	3 year
6	Test Receiver	ESR7	101675	R&S	2020-07-18	1 year
7	Spectrum Analyzer	FSP 40	100378	R&S	2020-12-12	1 year
8	Chamber	FACT5-2.0	4166	ETS-Lindgren	2021-05-12	3 year
9	Antenna	QSH-SL-1 8-26-S-20	17013	Q-par	2021-01-14	3 year
10	Antenna	QSH-SL-2 6-40-K-20	17014	Q-par	2021-01-10	3 year

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

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

7. Laboratory Environment

Semi-anechoic chambe

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 15 %, 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 ℃, Max. = 35 ℃
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 ℃, Max. = 35 ℃
Relative humidity	Min. = 15 %, 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

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

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 -0.5dBi. The RF transmitter uses an integrate antenna without connector.

A.1 Maximum Peak Output Power

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

A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

Measurement Limit:

Standard	Limit (dBm)	E.I.R.P Limit (dBm)
FCC CRF Part 15.247 (b) & RSS-247 Section 5.4	< 30	< 36

Measurement Results:

Conducted transmitter power

Mode	Peak Conducted Output Power (dBm)		
	2402MHz (Ch0)	2441MHz (Ch39)	2480MHz (Ch78)
GFSK	7.64	6.95	7.64
π /4 DQPSK	6.86	6.17	6.77
8DPSK	7.29	6.53	7.21

E.I.R.P

Mode	Peak Conducted Output Power (dBm)		
	2402MHz (Ch0)	2441MHz (Ch39)	2480MHz (Ch78)
GFSK	7.14	6.45	7.14
π /4 DQPSK	6.36	5.67	6.27
8DPSK	6.79	6.03	6.71

Note: E.I.R.P value = Conducted values (with conducted samples) + Antenna Gain.

Conclusion: Pass

A.2 Band Edges Compliance

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d) & RSS-247 Section 5.1	> 20

Measurement Result:

Mode	Channel	Hopping	Test Results	Conclusion
GFSK	0	ON	Fig.1	**P**
	78	ON	Fig.2	**P**
π /4 DQPSK	0	ON	Fig.3	**P**
	78	ON	Fig.4	**P**
8DPSK	0	ON	Fig.5	**P**
	78	ON	Fig.6	**P**

Mode	Channel	Hopping	Test Results	Conclusion
GFSK	0	OFF	Fig.7	**P**
	78	OFF	Fig.8	**P**
π /4 DQPSK	0	OFF	Fig.9	**P**
	78	OFF	Fig.10	**P**
8DPSK	0	OFF	Fig.11	**P**
	78	OFF	Fig.12	**P**

See below for test graphs.

Conclusion: Pass

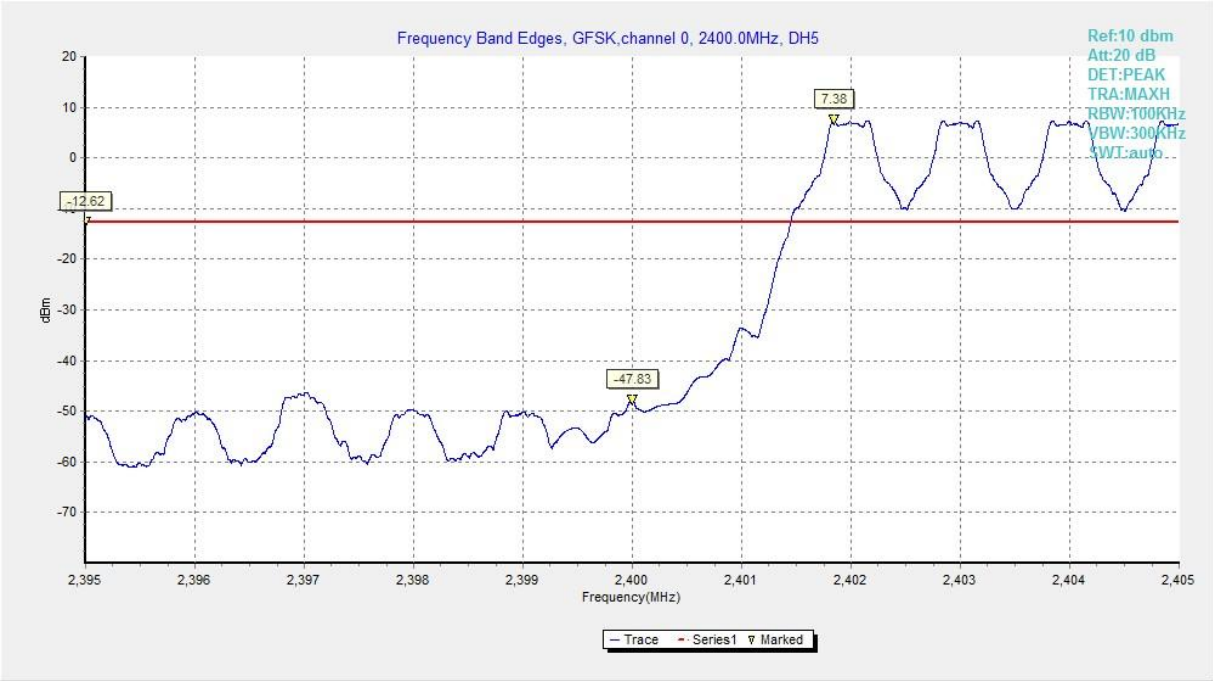

Fig. 1 Band Edges (GFSK, Ch 0, Hopping ON)

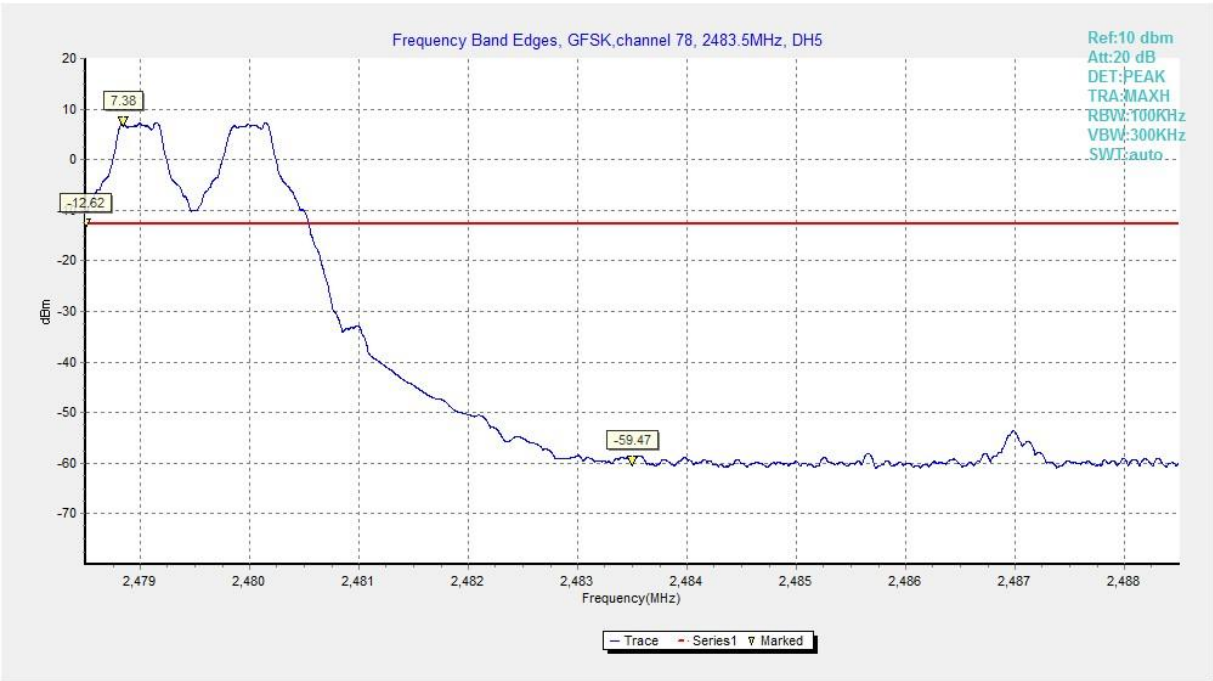

Fig. 2 Band Edges (GFSK, Ch 78, Hopping ON)

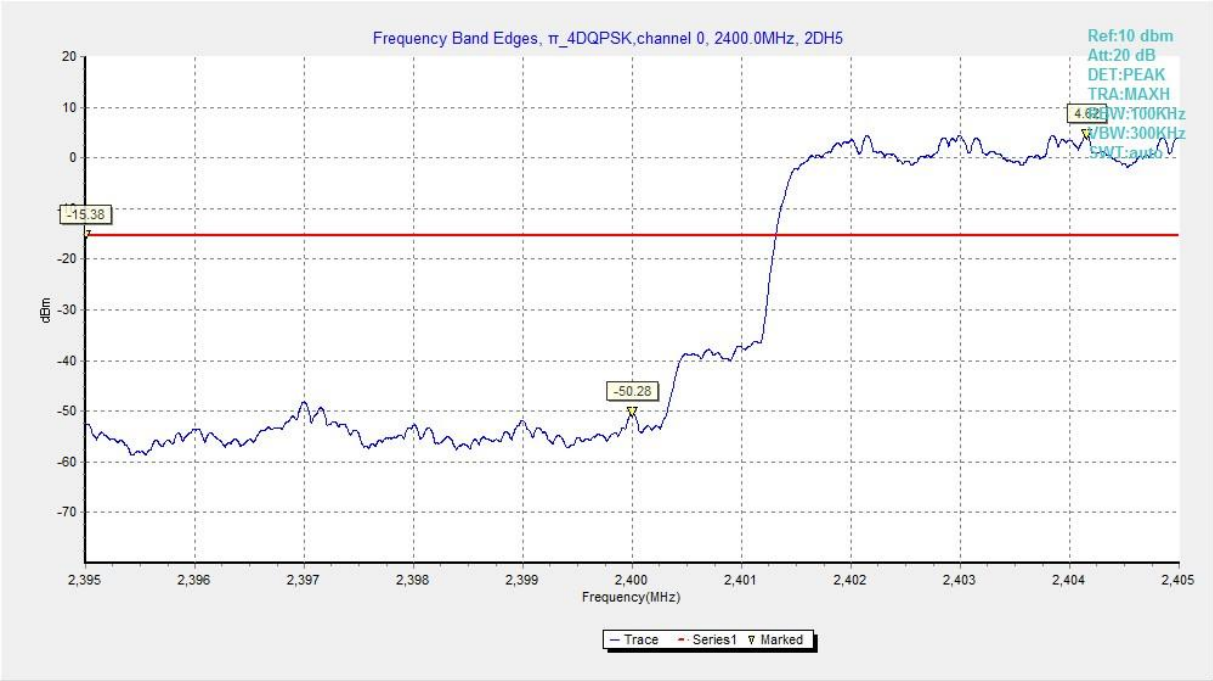

Fig. 3 Band Edges (π /4 DQPSK, Ch 0, Hopping ON)

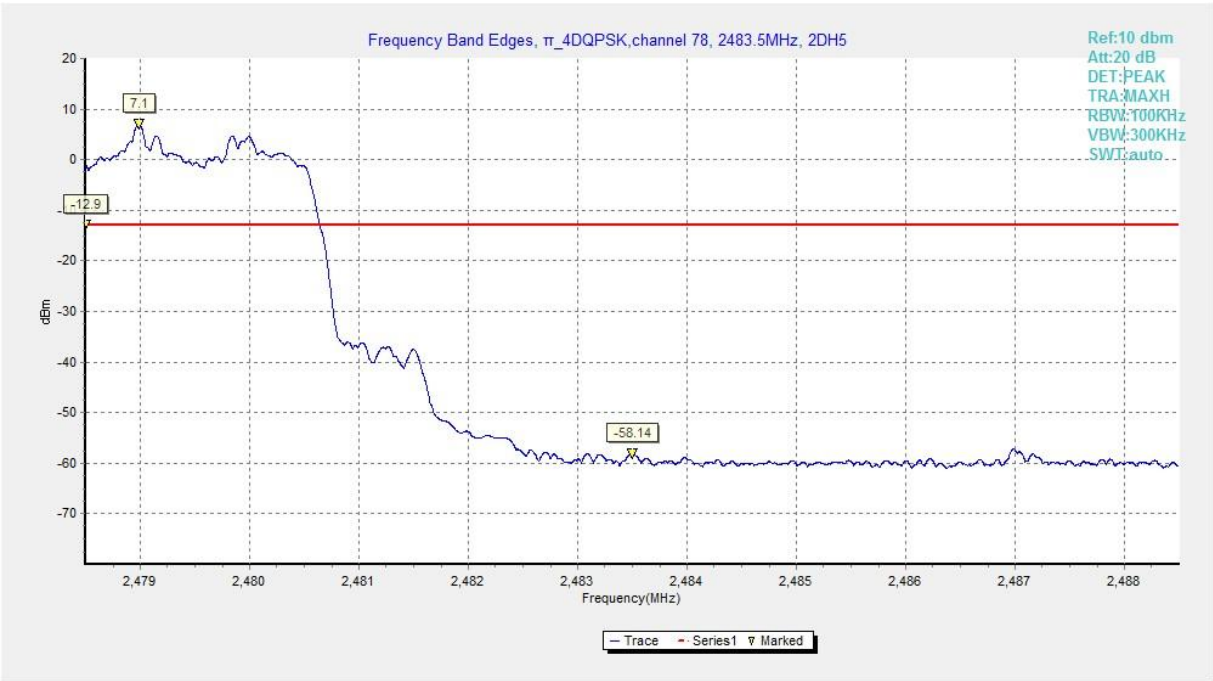

Fig. 4 Band Edges (π /4 DQPSK, Ch 78, Hopping ON)

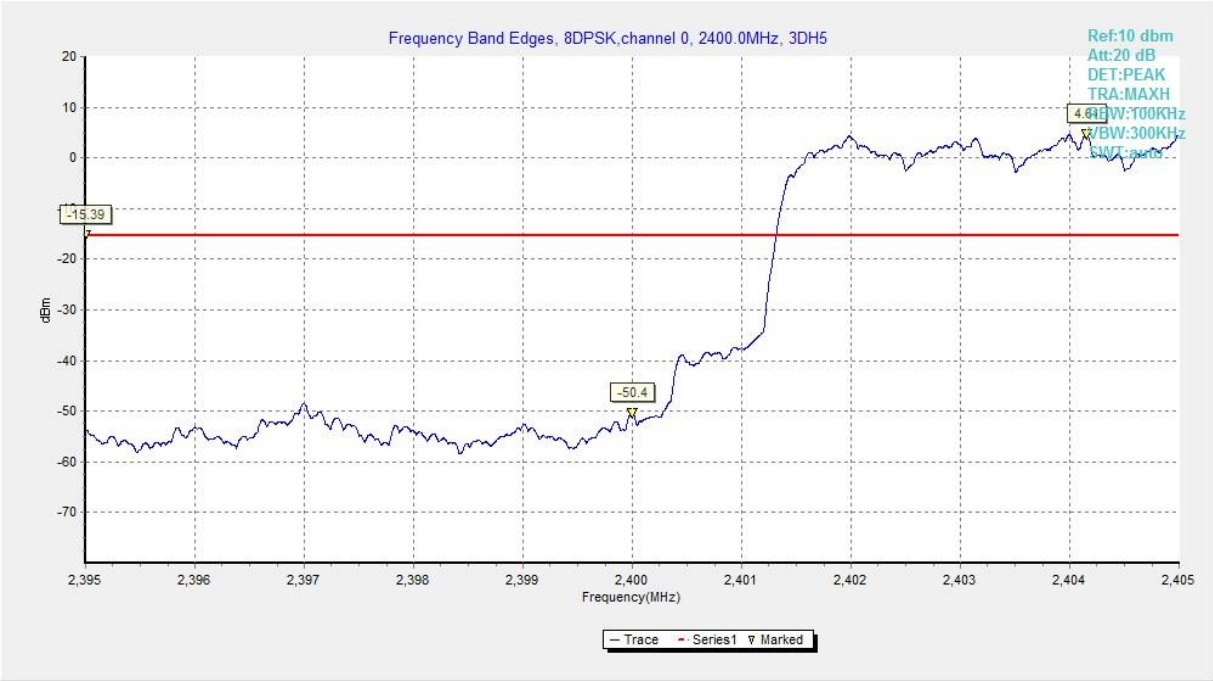

Fig. 5 Band Edges (8DPSK, Ch 0, Hopping ON)

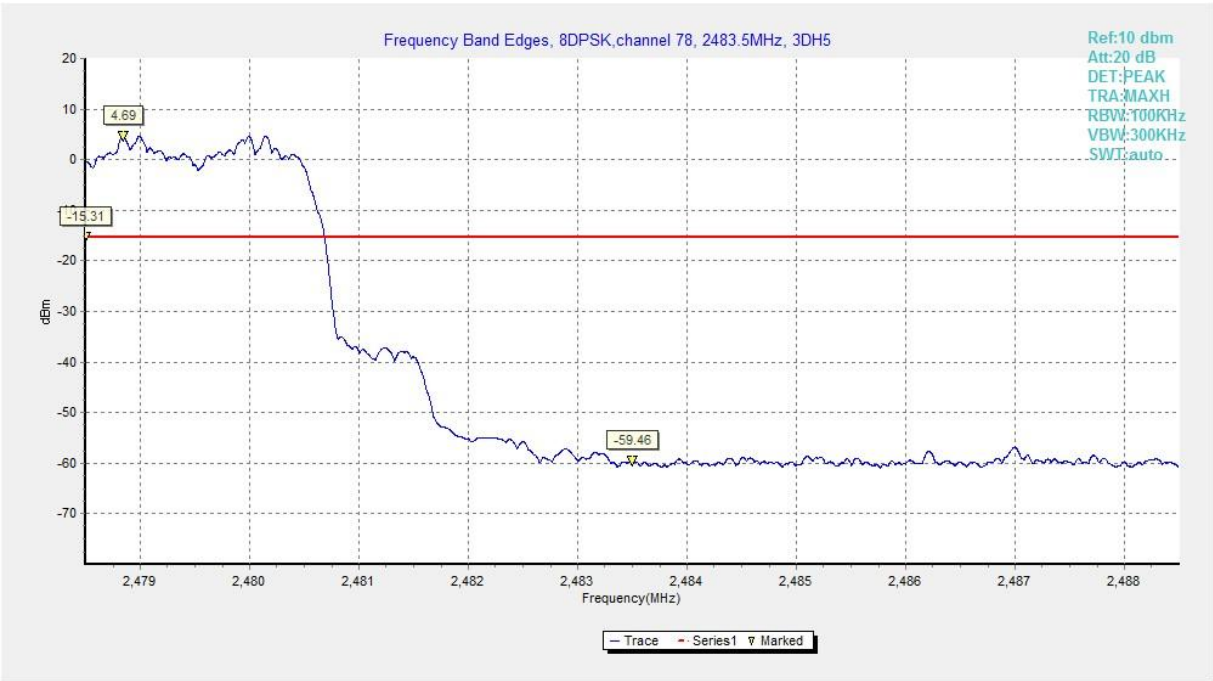

Fig. 6 Band Edges (8DPSK, Ch 78, Hopping ON)

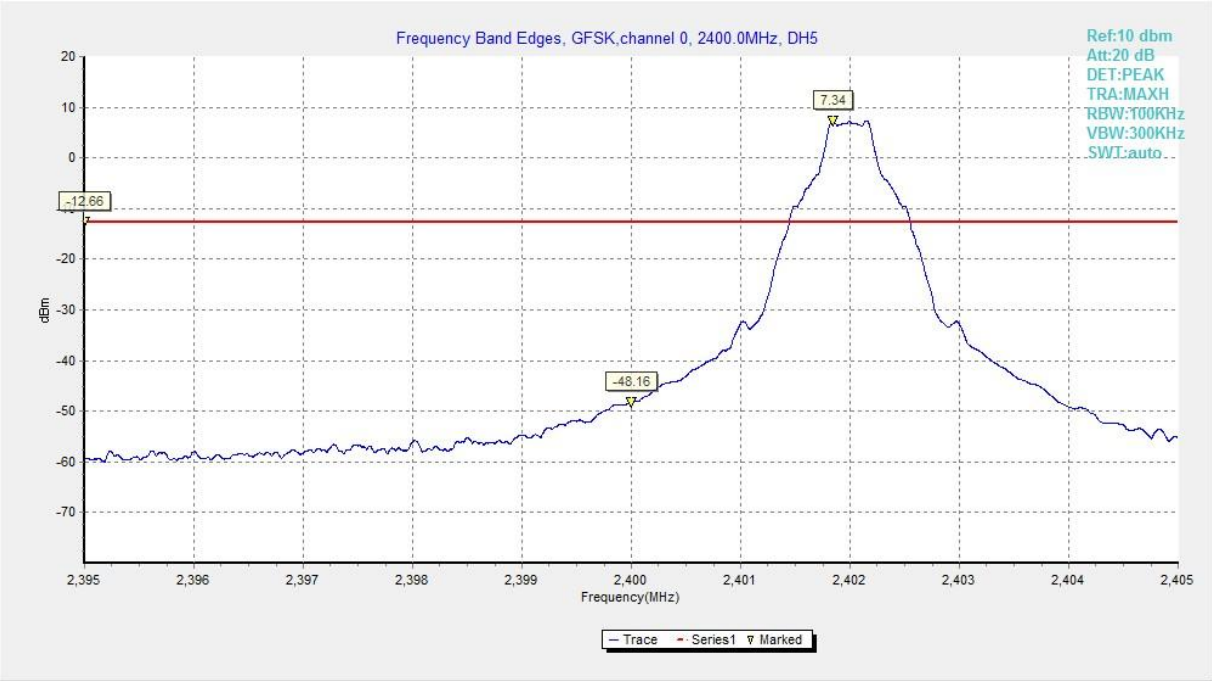

Fig. 7 Band Edges (GFSK, Ch 0, Hopping OFF)

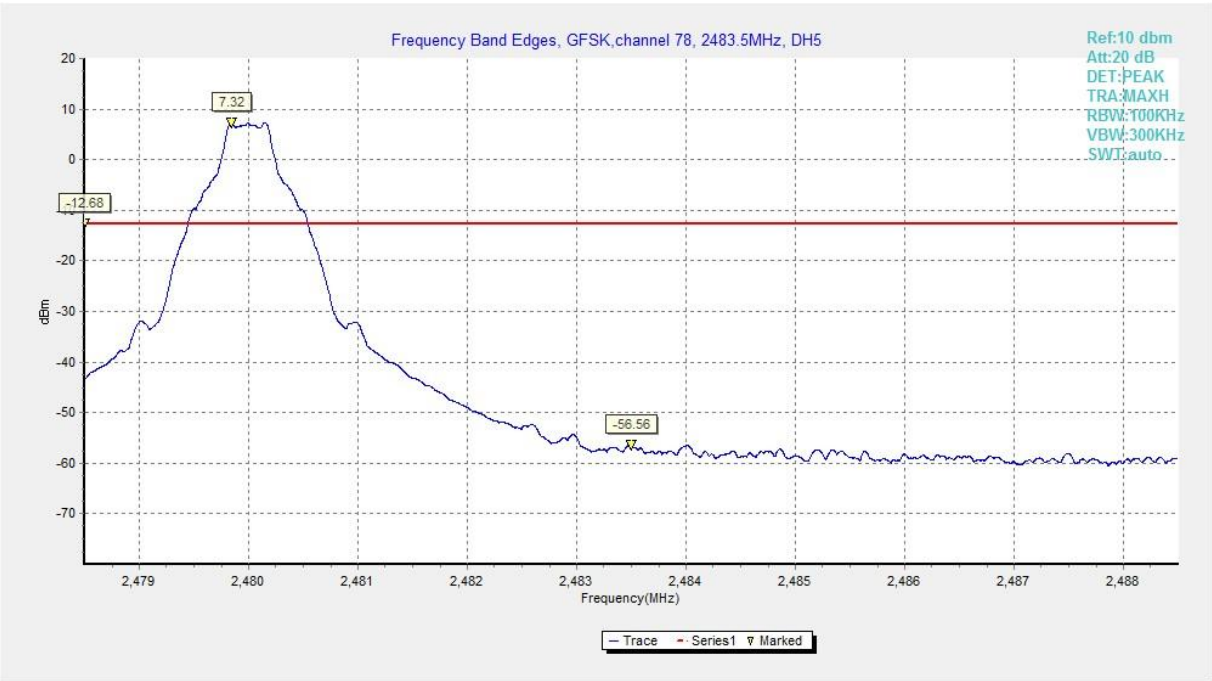

Fig. 8 Band Edges (GFSK, Ch 78, Hopping OFF)

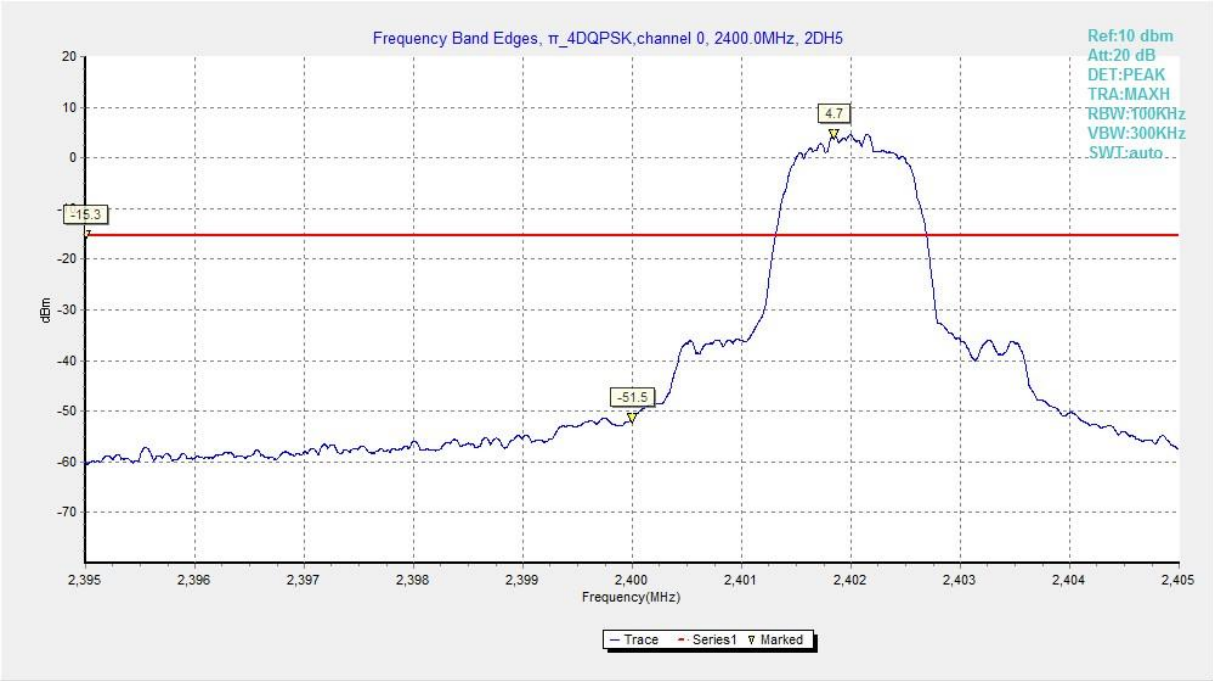

Fig. 9 Band Edges (π /4 DQPSK, Ch 0, Hopping OFF)

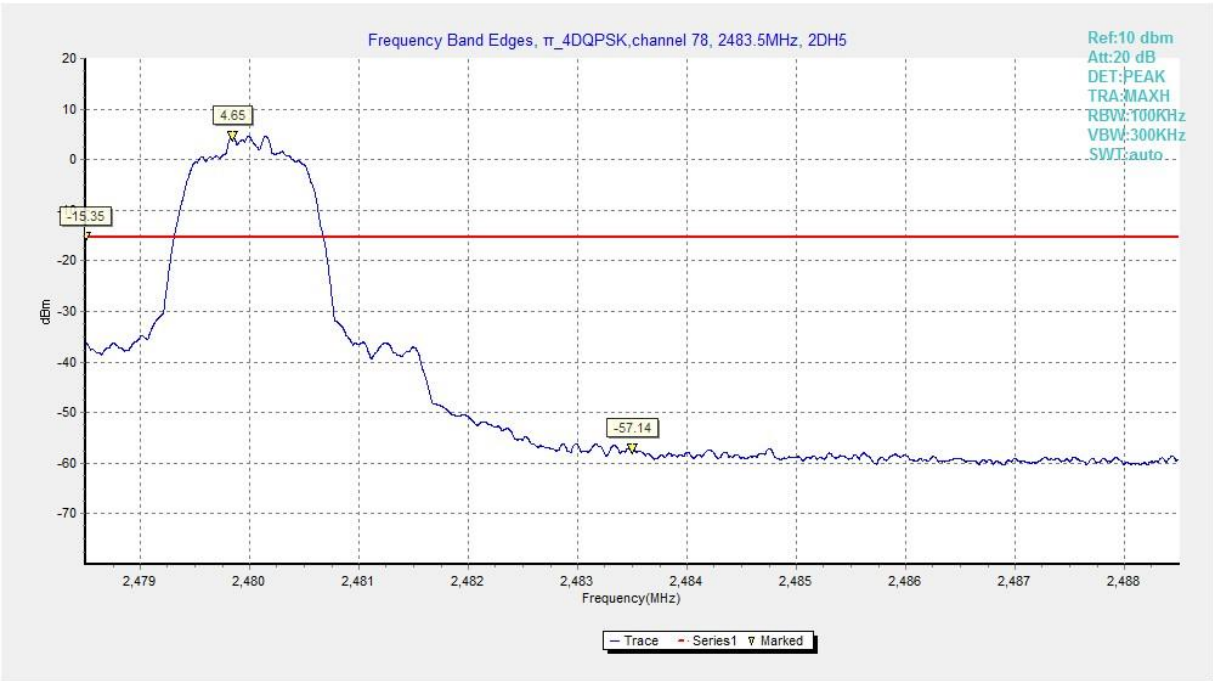

Fig. 10 Band Edges (π /4 DQPSK, Ch 78, Hopping OFF)

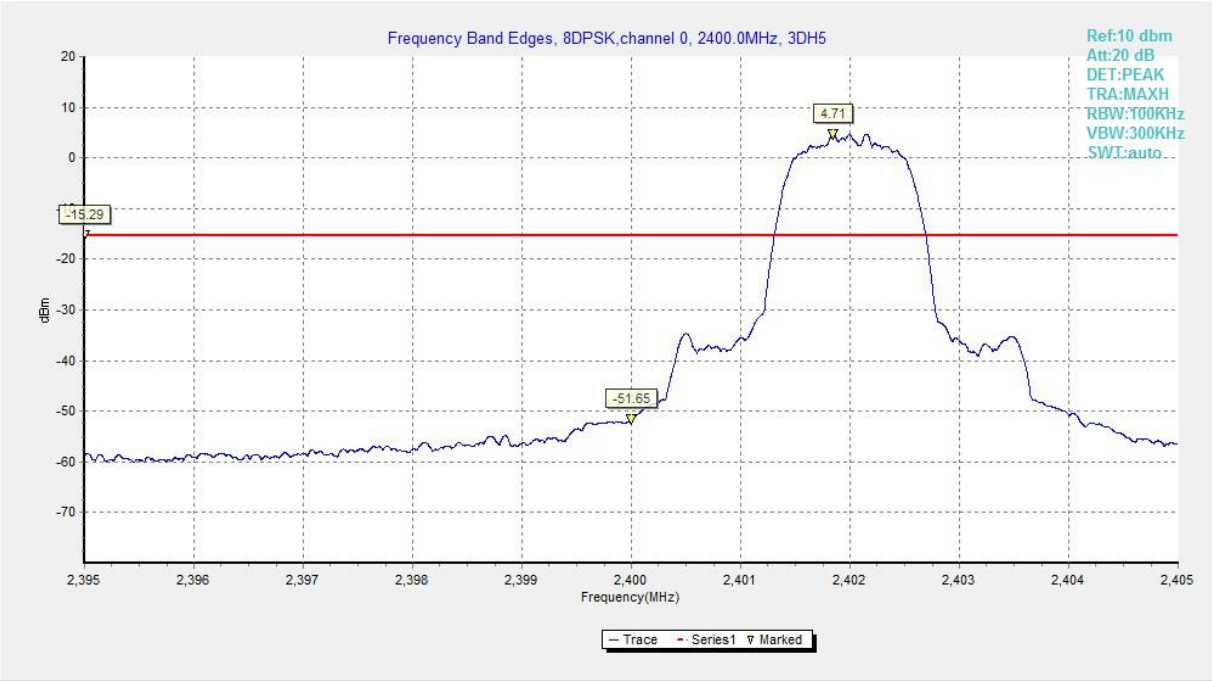

Fig. 11 Band Edges (8DPSK, Ch 0, Hopping OFF)

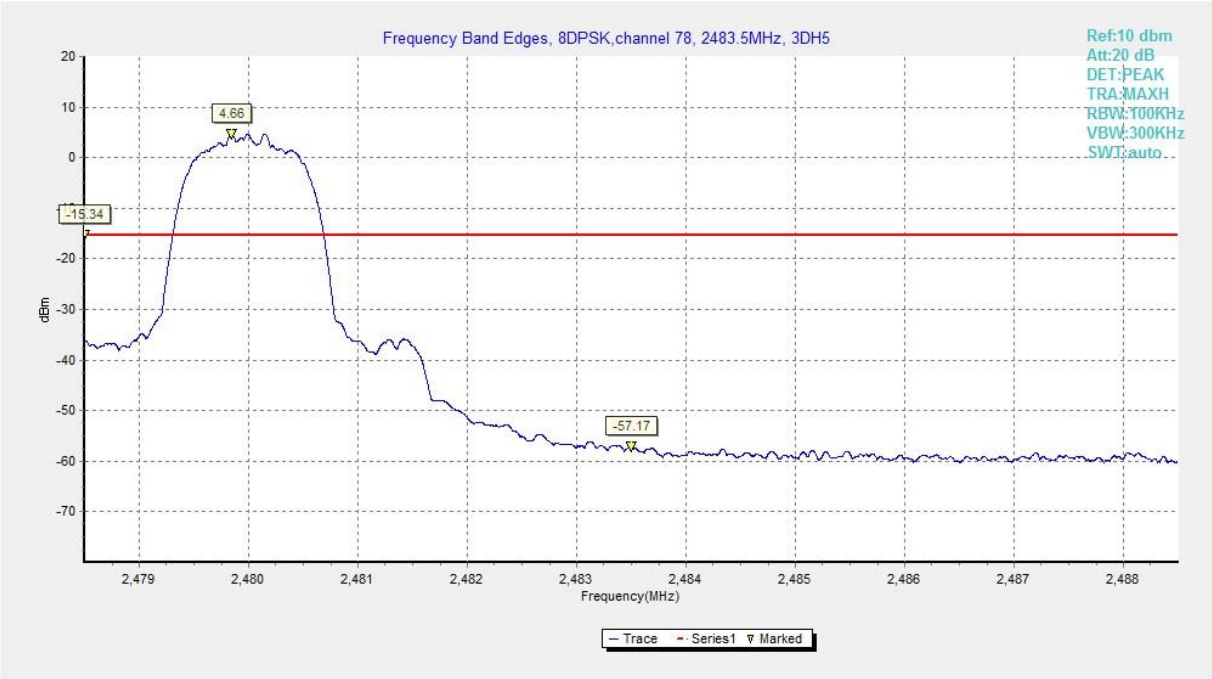

Fig. 12 Band Edges (8DPSK, Ch 78, Hopping OFF)

A.3 Conducted Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d) & RSS-247 section 5.5/ RSS-Gen section 6.13	20dB below peak output power in 100 kHz bandwidth

Measurement Results:

MODE	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	2.402 GHz	Fig.13	**P**
		1GHz-3GHz	Fig.14	**P**
		3GHz-10GHz	Fig.15	**P**
	39	2.441 GHz	Fig.16	**P**
		1GHz-3GHz	Fig.17	**P**
		3GHz-10GHz	Fig.18	**P**
	78	2.480 GHz	Fig.19	**P**
		1GHz-3GHz	Fig.20	**P**
		3GHz-10GHz	Fig.21	**P**
π /4 DQPSK	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**
8DPSK	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**
/	All channels	30 MHz-1GHz	Fig.40	**P**
		10GHz-26GHz	Fig.41	**P**

See below for test graphs.

Conclusion: Pass

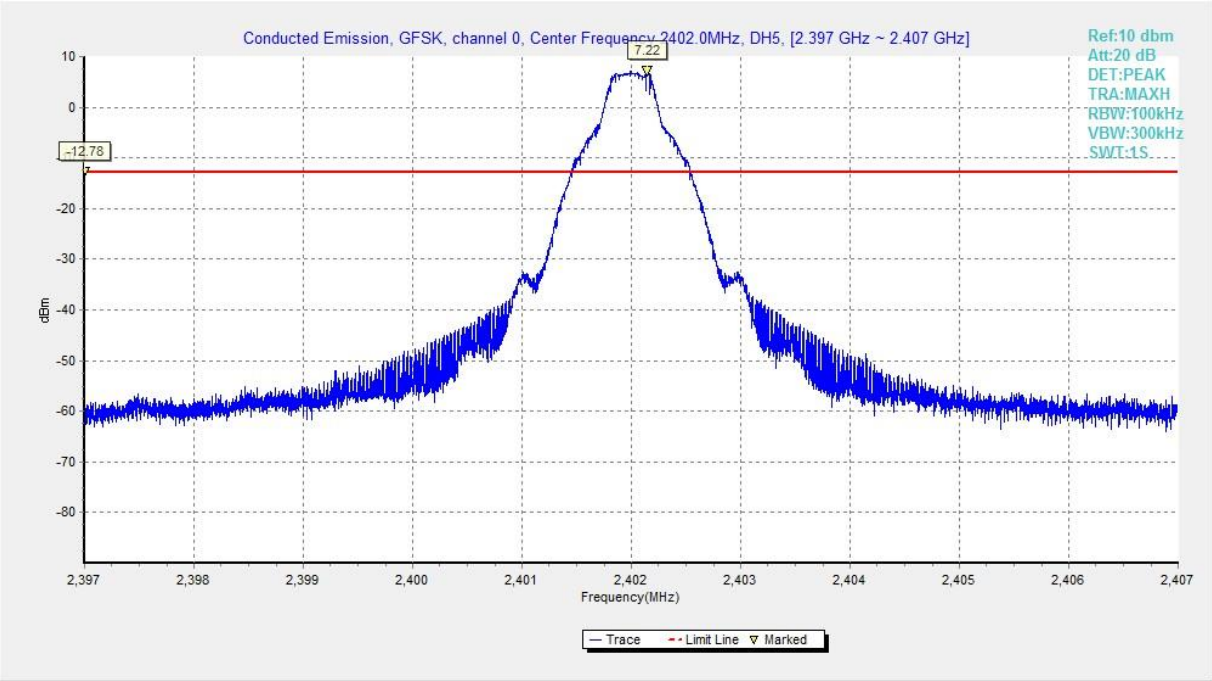

Fig. 13 Conducted Spurious Emission (GFSK, Ch0, 2.402GHz)

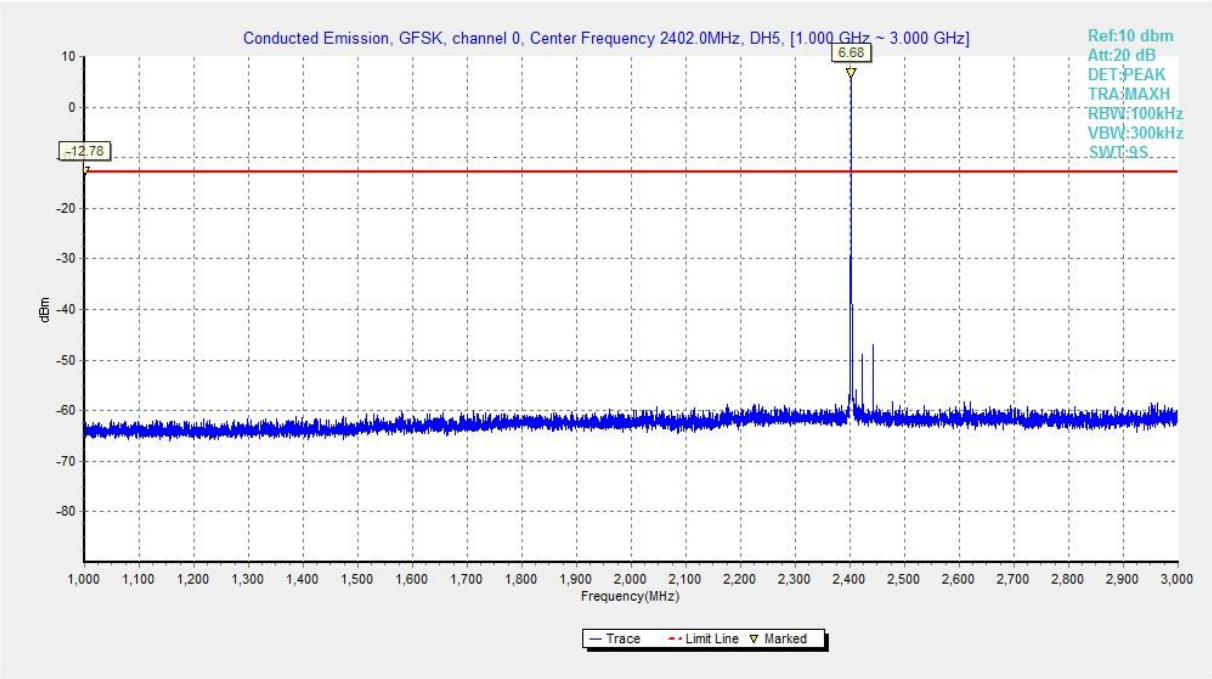

Fig. 14 Conducted Spurious Emission (GFSK, Ch0, 1 GHz-3 GHz)

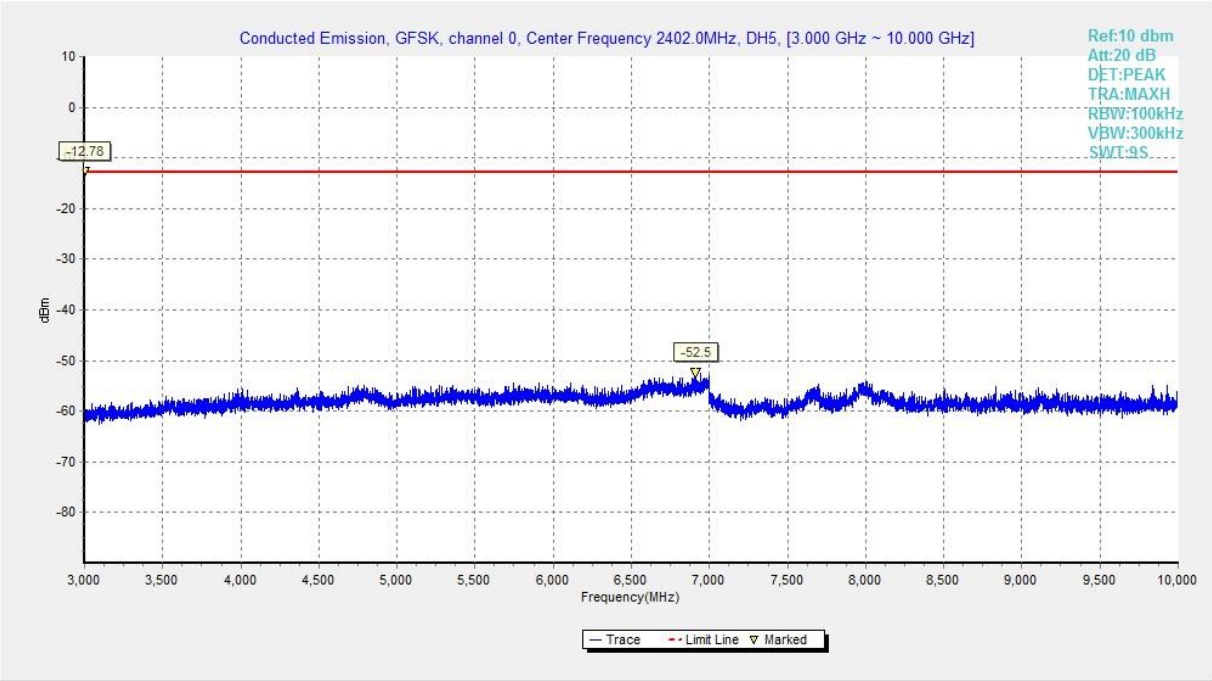

Fig. 15 Conducted Spurious Emission (GFSK, Ch0, 3GHz-10 GHz)

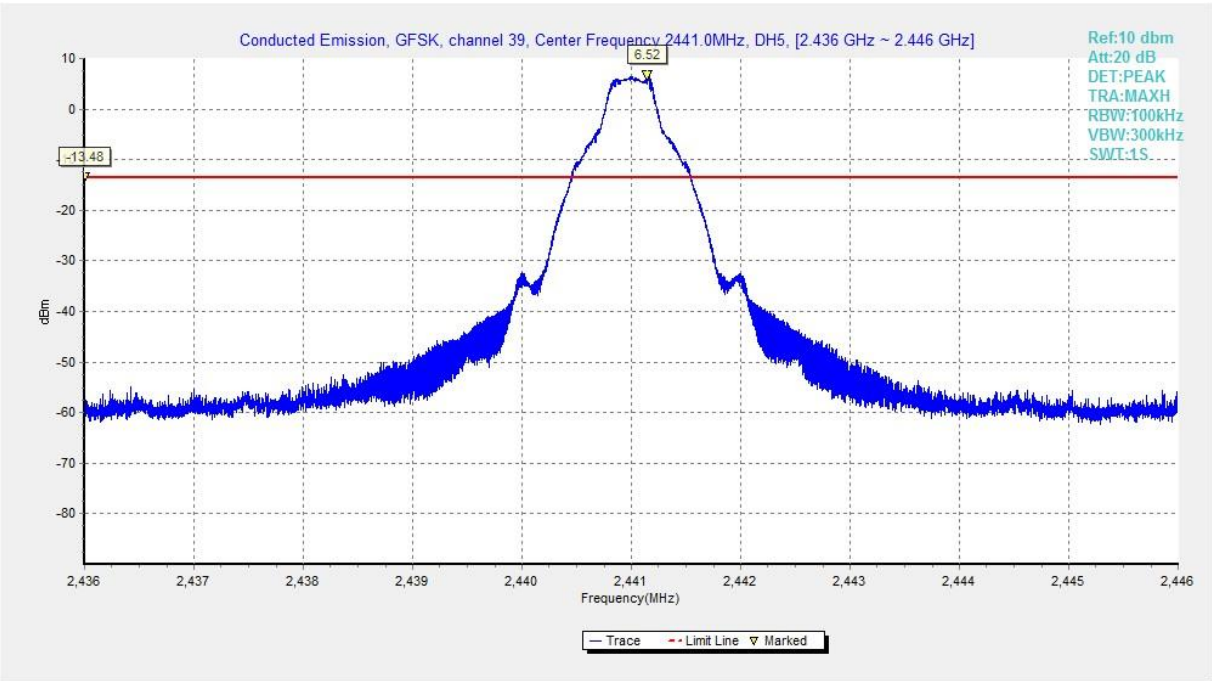

Fig. 16 Conducted Spurious Emission (GFSK, Ch39, 2.441GHz)

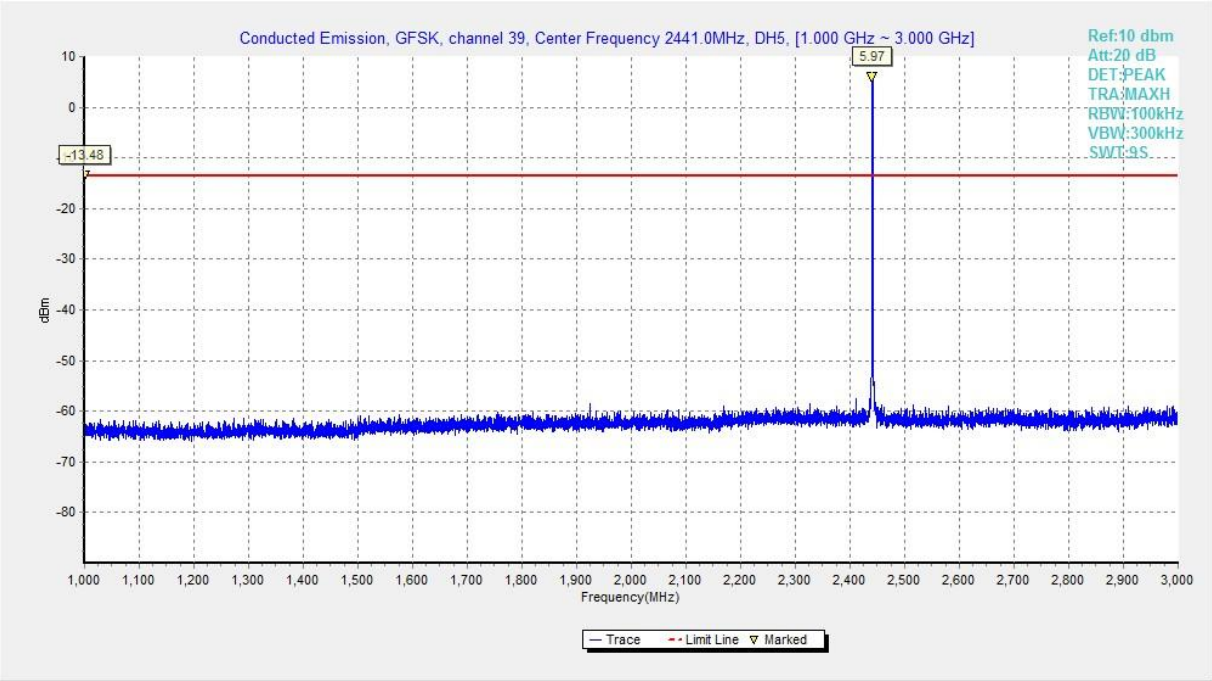

Fig. 17 Conducted Spurious Emission (GFSK, Ch39, 1GHz-3 GHz)

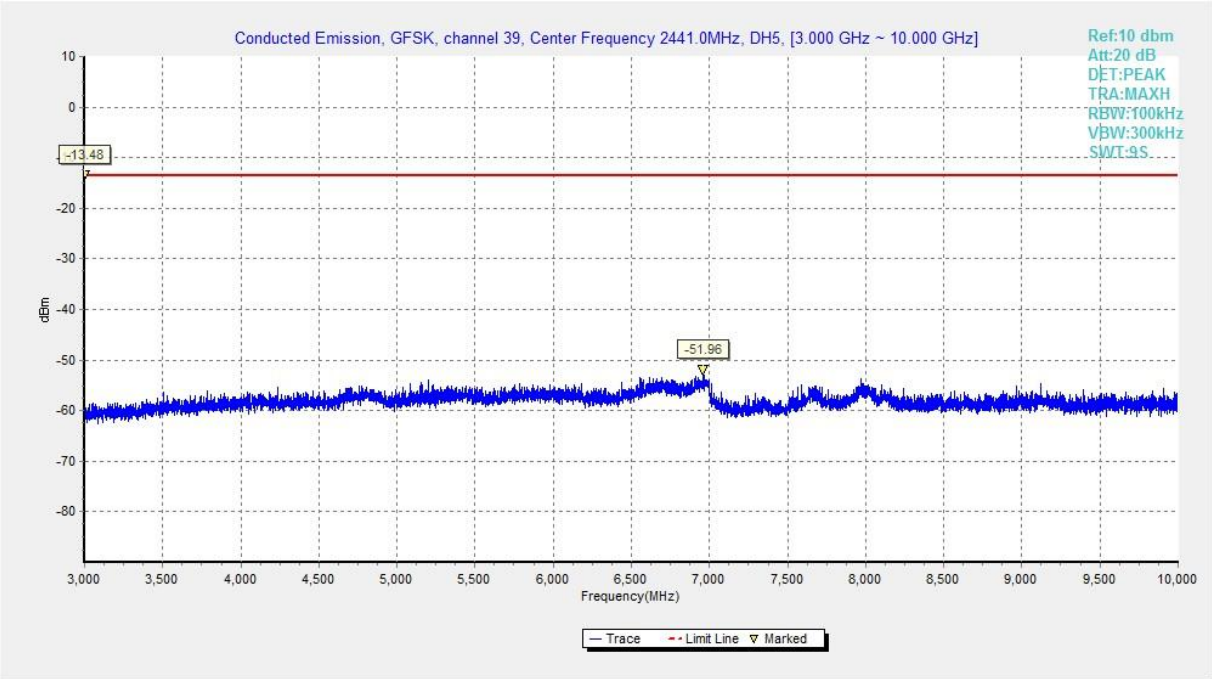

Fig. 18 Conducted Spurious Emission (GFSK, Ch39, 3GHz-10 GHz)

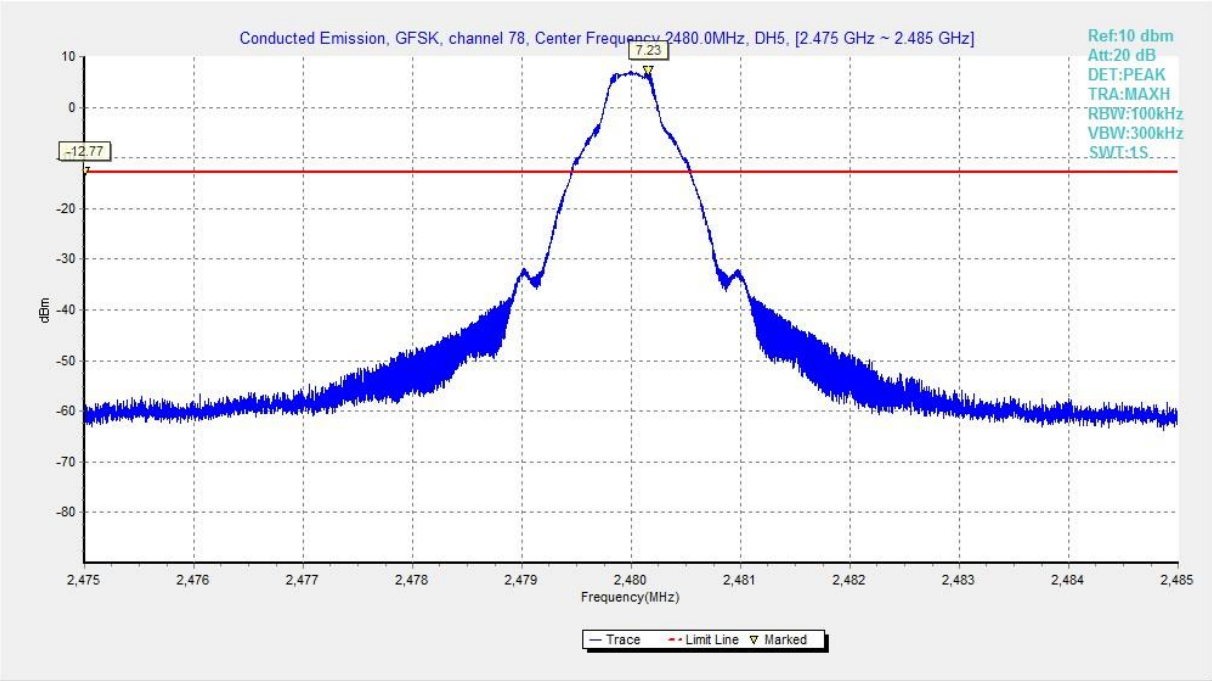

Fig. 19 Conducted Spurious Emission (GFSK, Ch78, 2.480GHz)

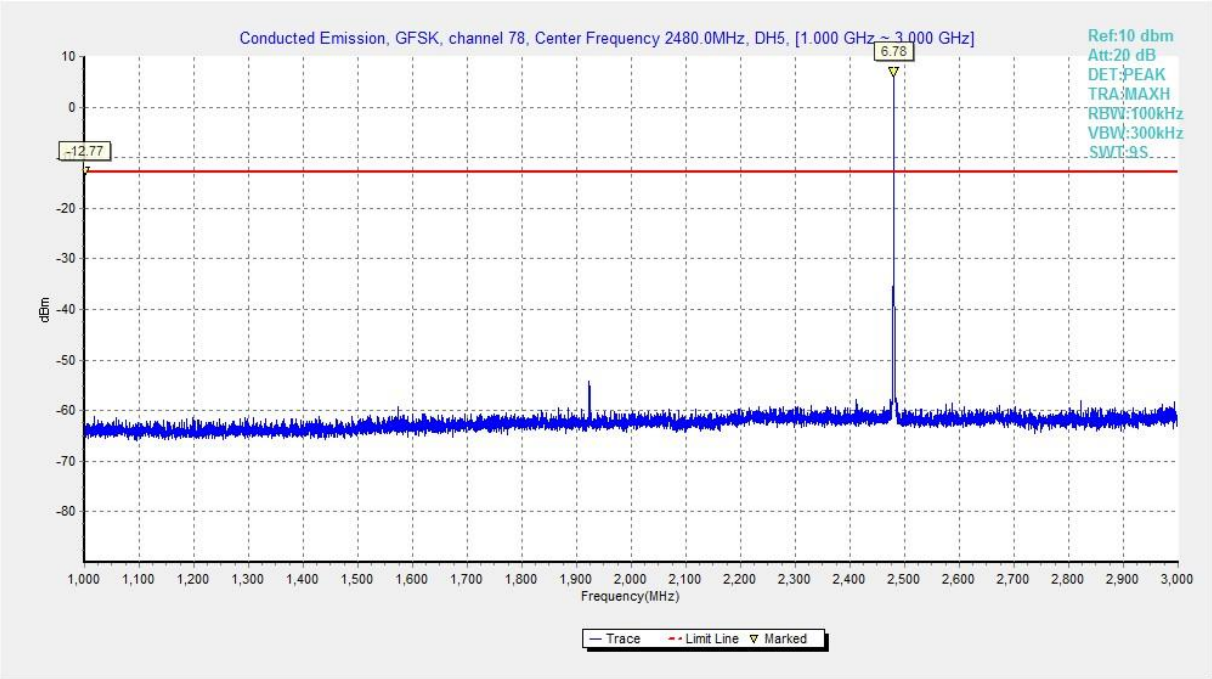

Fig. 20 Conducted Spurious Emission (GFSK, Ch78, 1GHz-3 GHz)

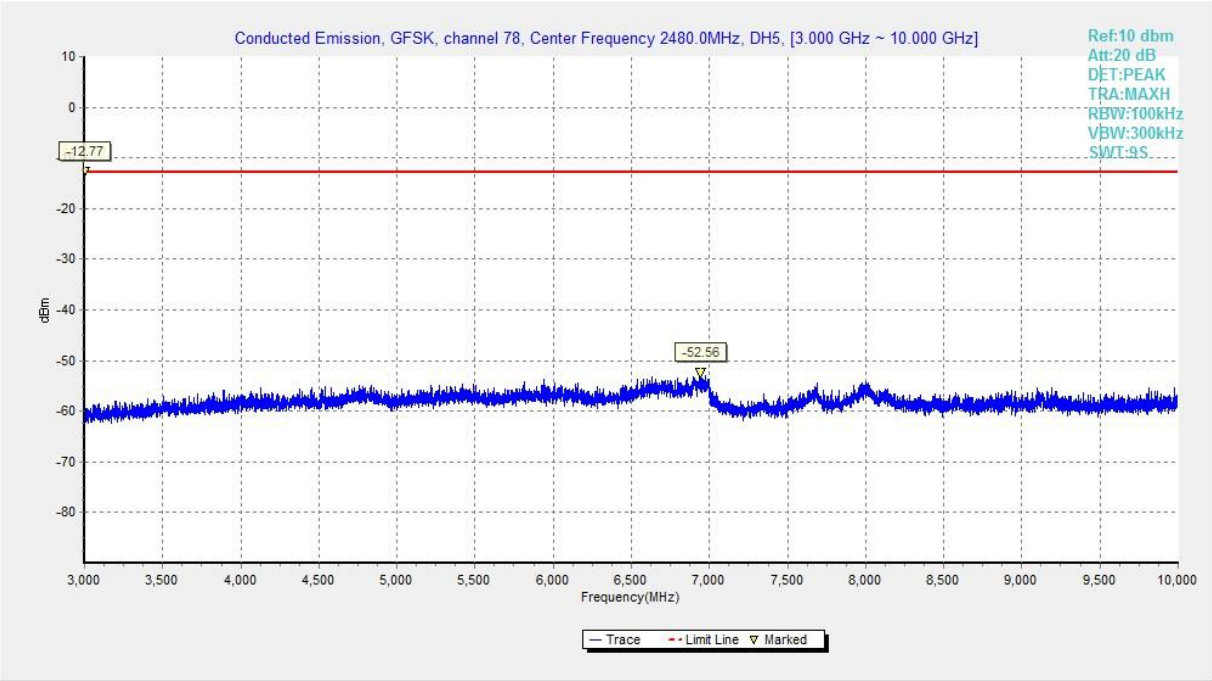

Fig. 21 Conducted Spurious Emission (GFSK, Ch78, 3GHz-10 GHz)

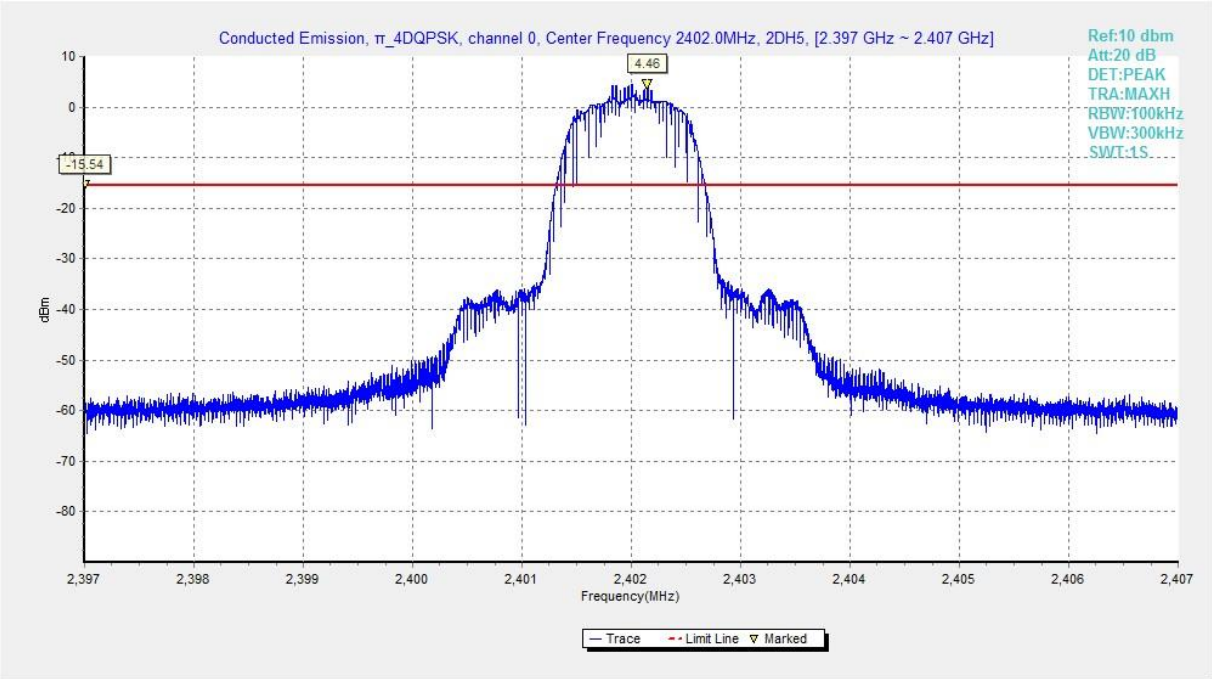

Fig. 22 Conducted Spurious Emission (π /4 DQPSK, Ch0, 2.402GHz)

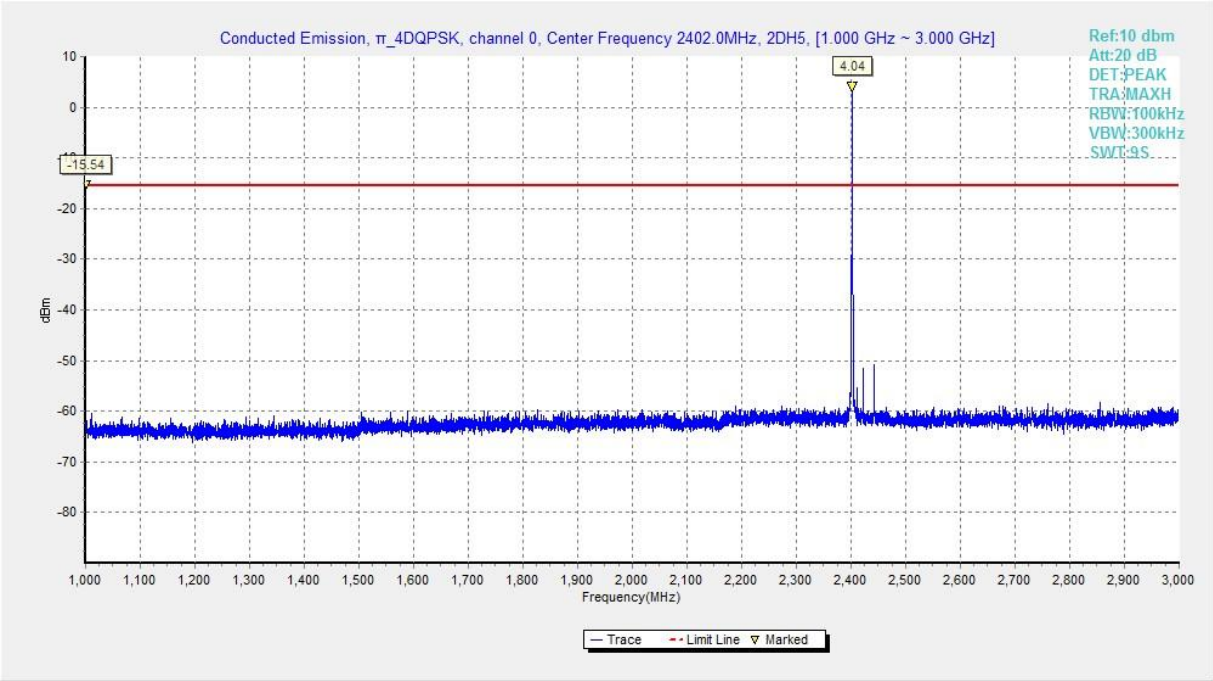

Fig. 23 Conducted Spurious Emission (π /4 DQPSK, Ch0, 1GHz-3 GHz)

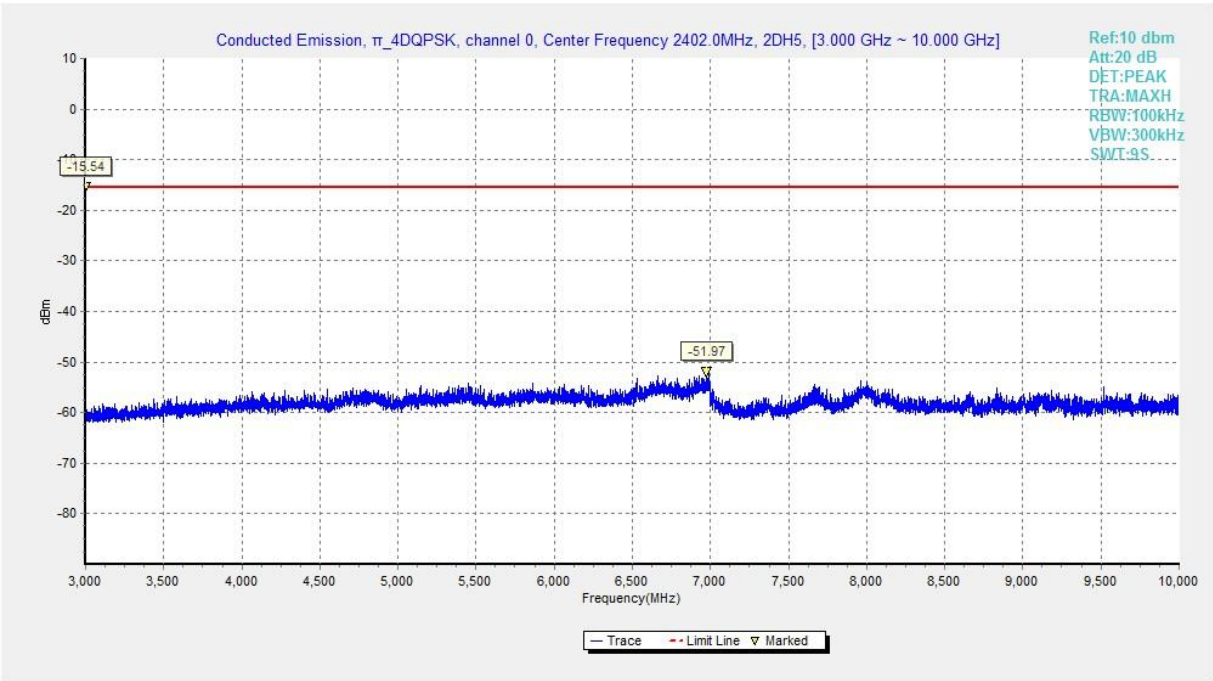

Fig. 24 Conducted Spurious Emission (π /4 DQPSK, Ch0, 3GHz-10 GHz)

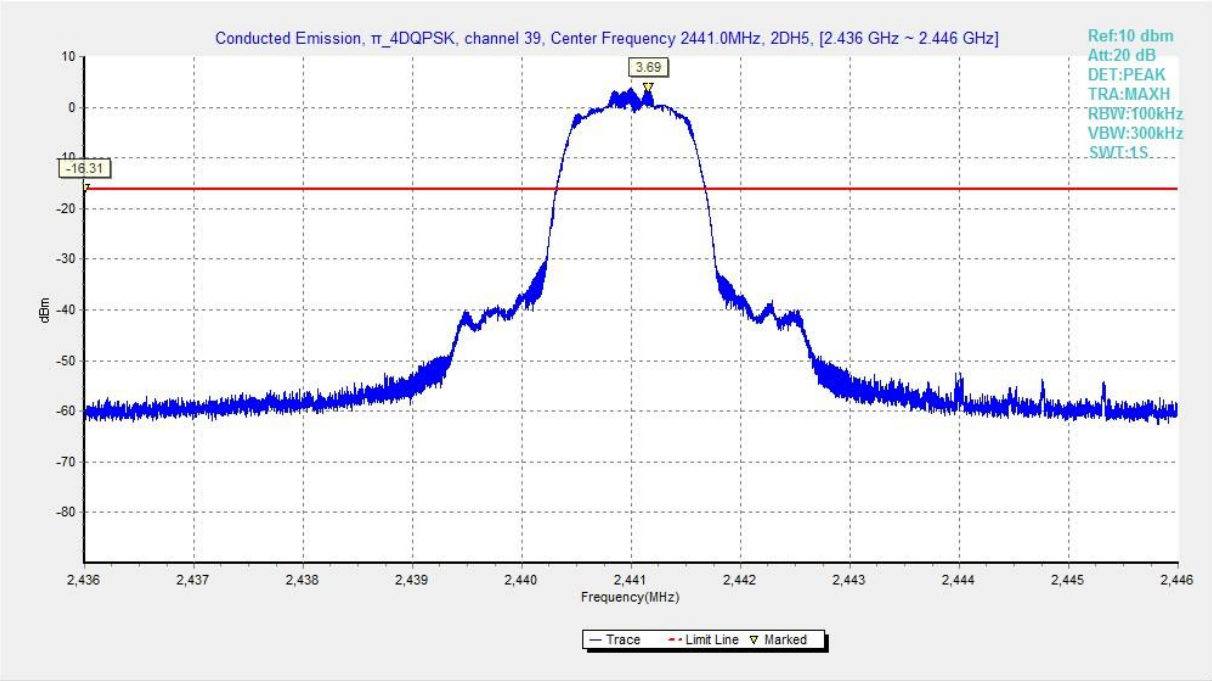

Fig. 25 Conducted Spurious Emission (π /4 DQPSK, Ch39, 2.441GHz)

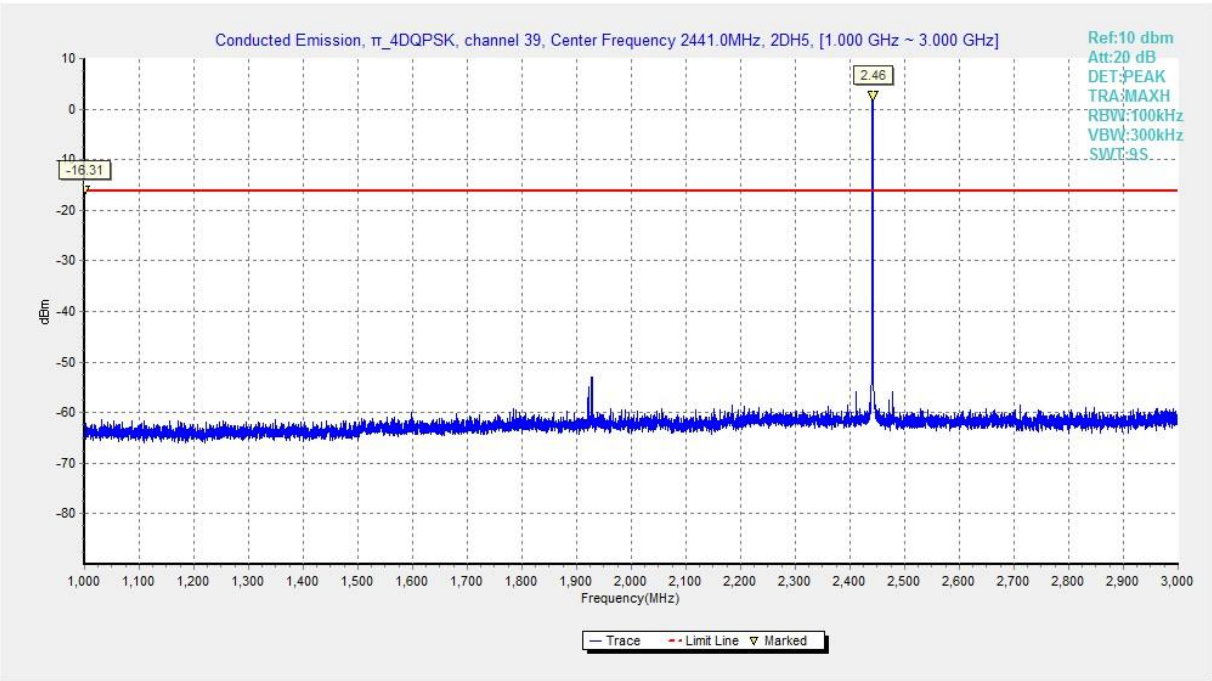

Fig. 26 Conducted Spurious Emission (π /4 DQPSK, Ch39, 1GHz-3 GHz)

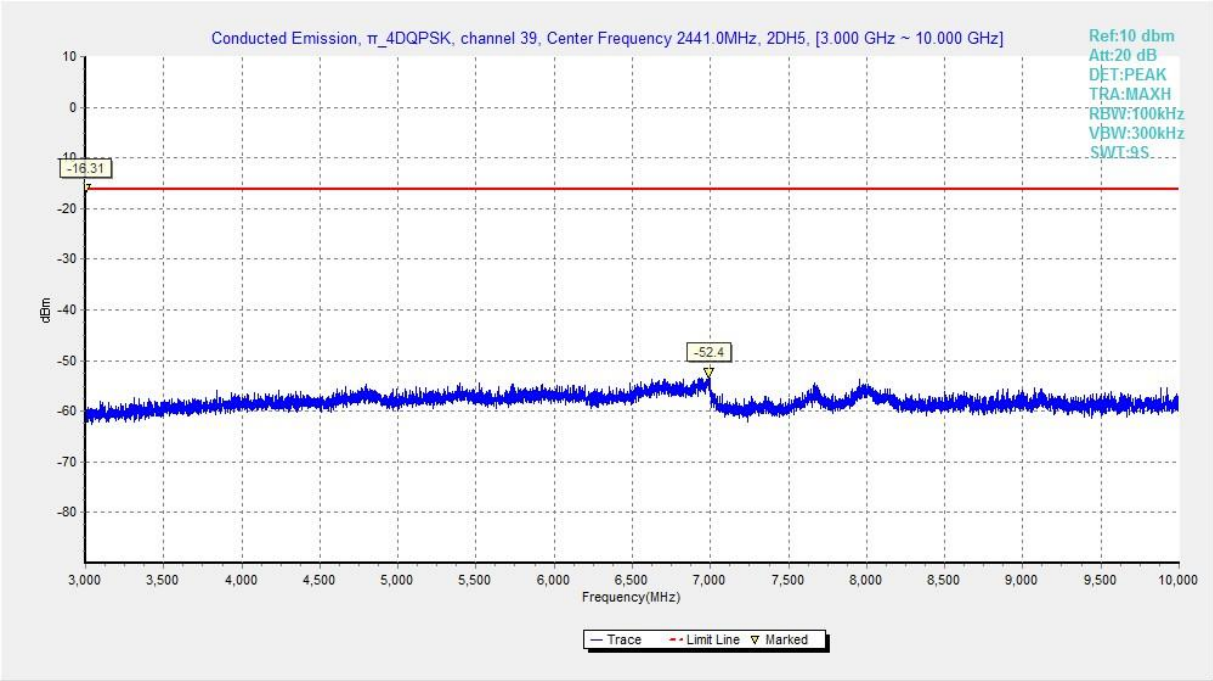

Fig. 27 Conducted Spurious Emission (π /4 DQPSK, Ch39, 3GHz-10 GHz)

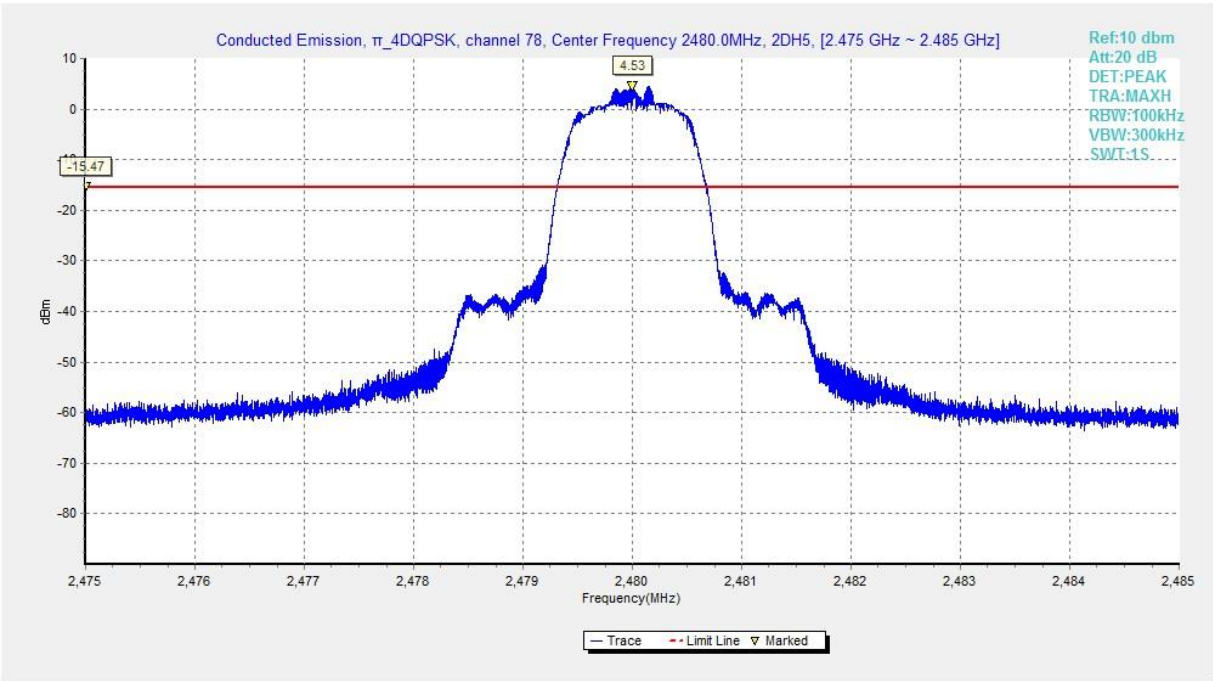

Fig. 28 Conducted Spurious Emission (π /4 DQPSK, Ch78, 2.480GHz)

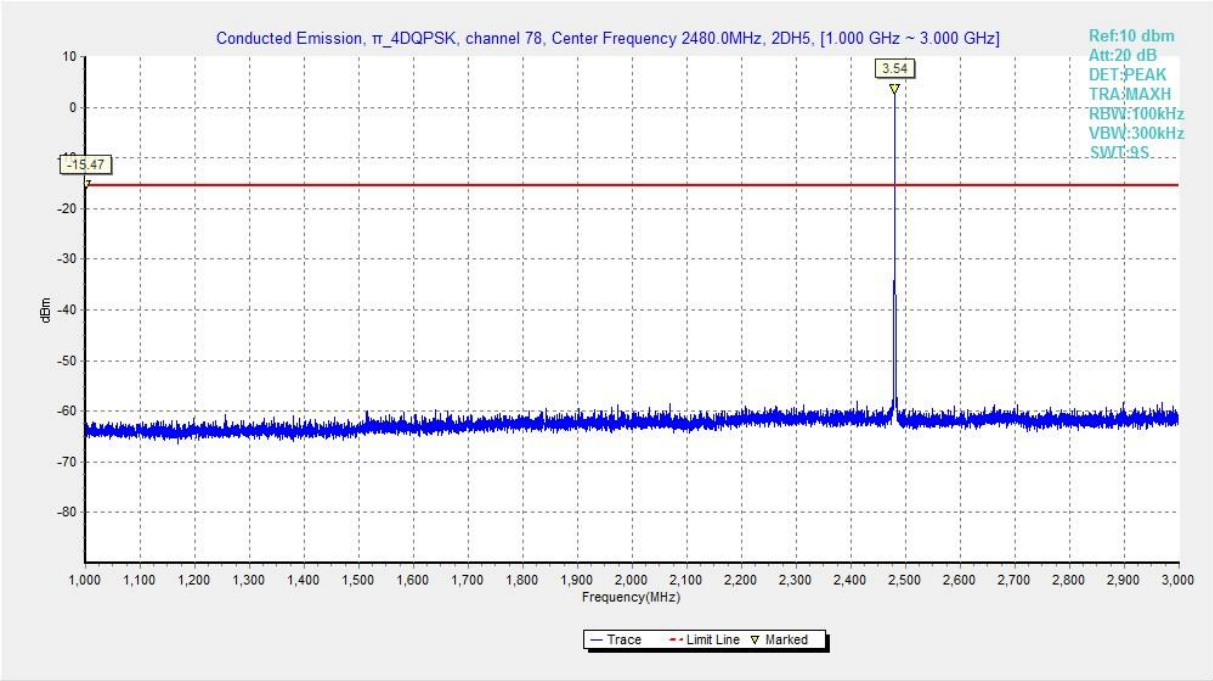

Fig. 29 Conducted Spurious Emission (π /4 DQPSK, Ch78, 1GHz-3 GHz)

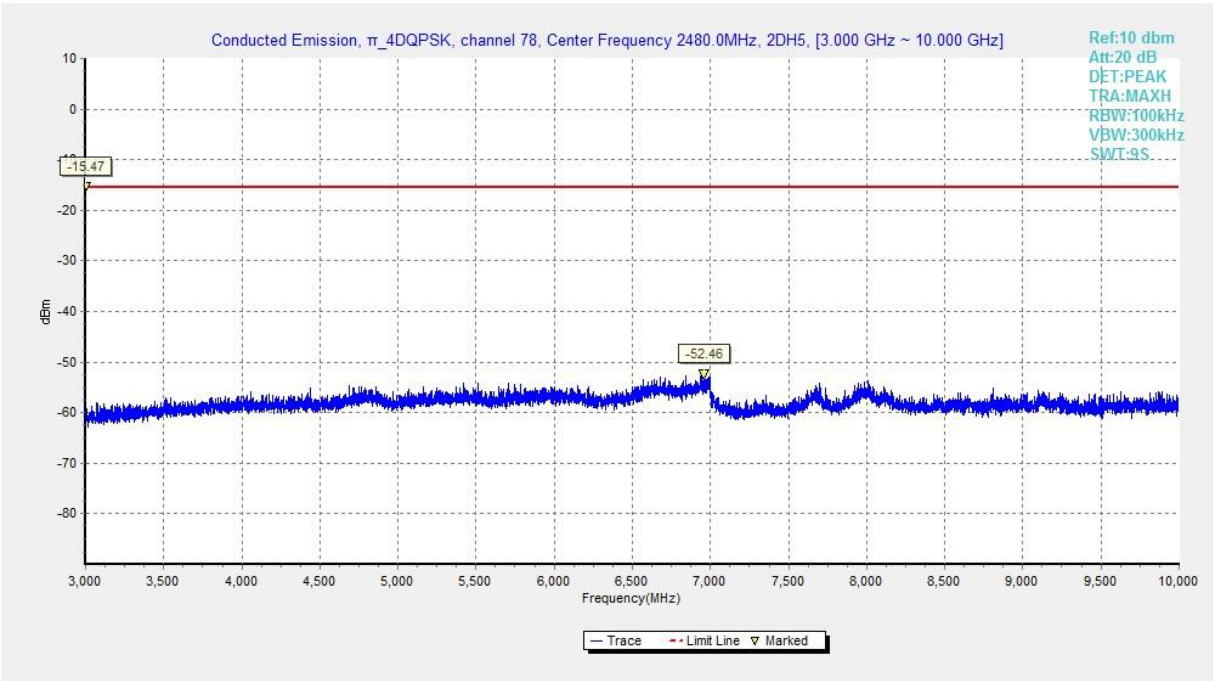

Fig. 30 Conducted Spurious Emission (π /4 DQPSK, Ch78, 3GHz-10 GHz)

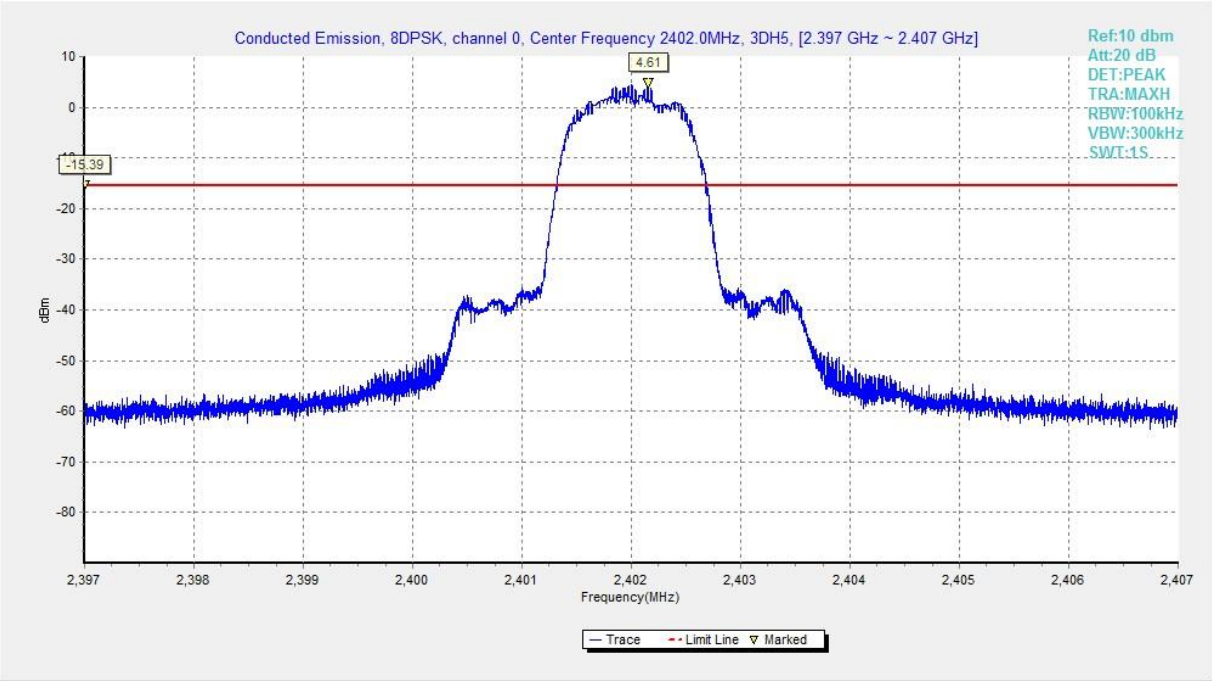

Fig. 31 Conducted Spurious Emission (8DPSK, Ch0, 2.402GHz)

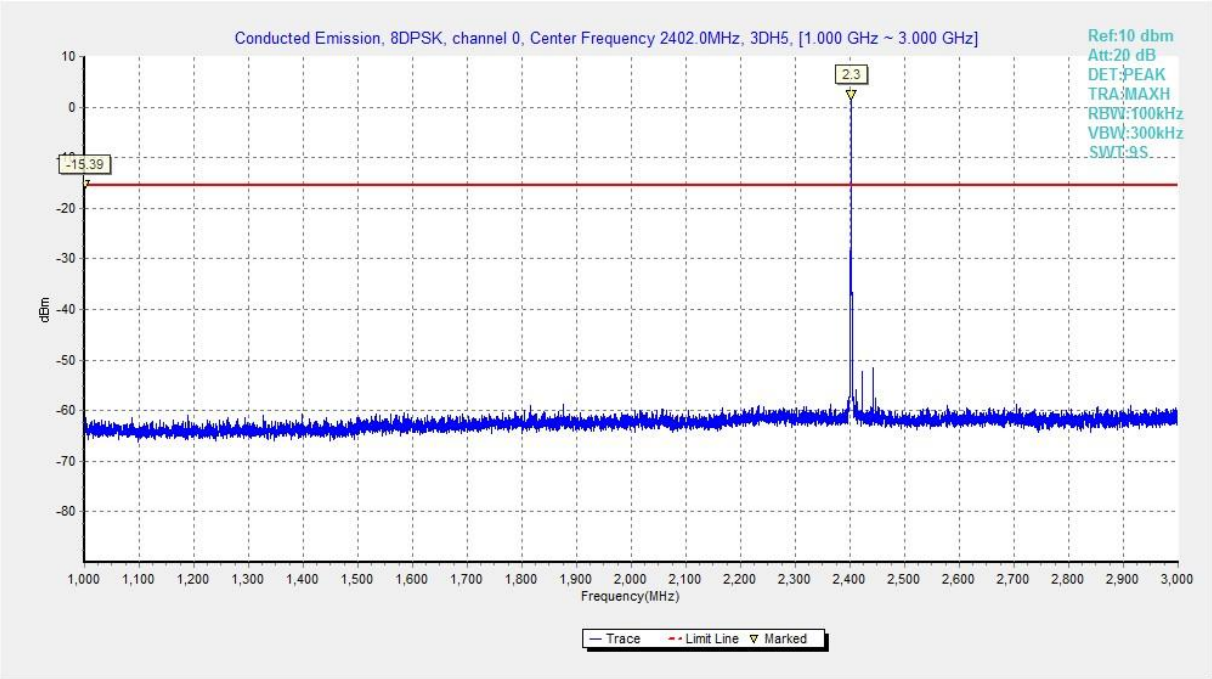

Fig. 32 Conducted Spurious Emission (8DPSK, Ch0, 1GHz-3 GHz)

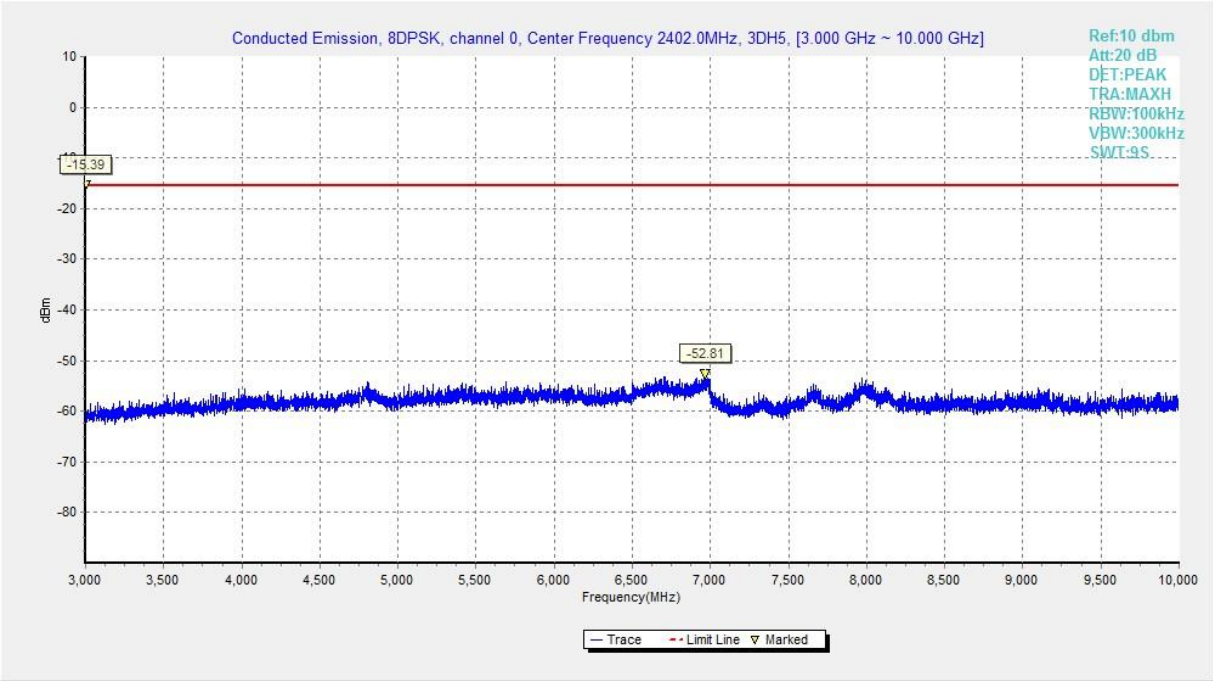

Fig. 33 Conducted Spurious Emission (8DPSK, Ch0, 3GHz-10 GHz)

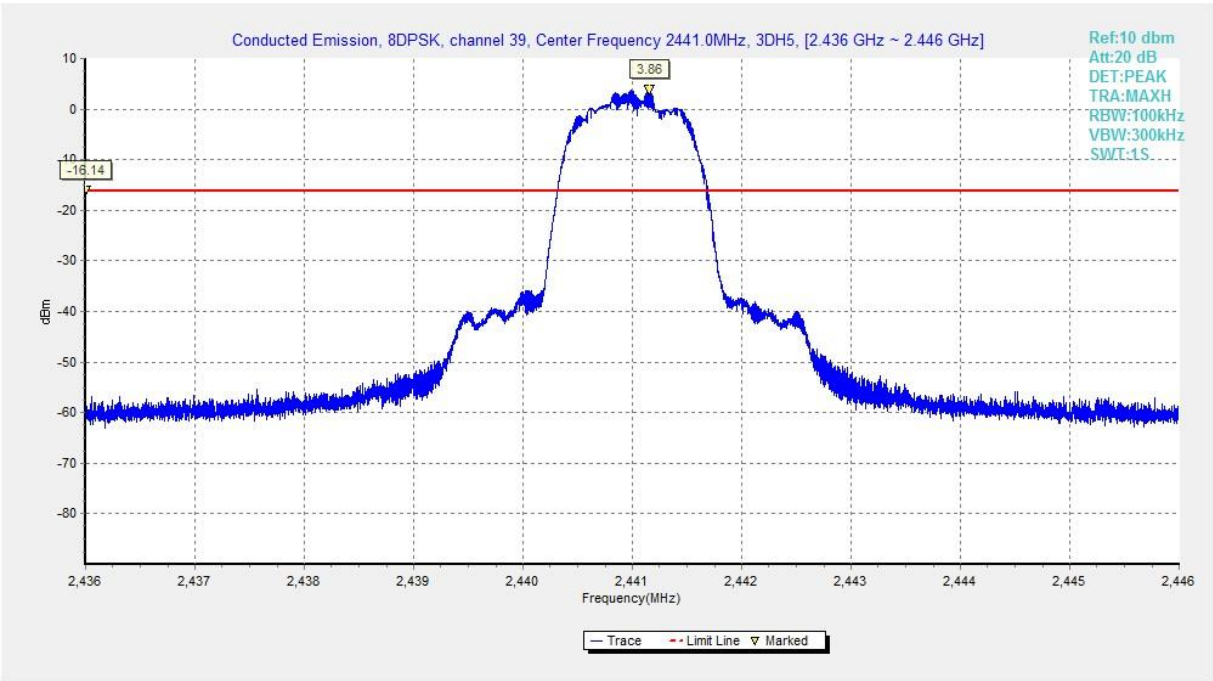

Fig. 34 Conducted Spurious Emission (8DPSK, Ch39, 2.441GHz)

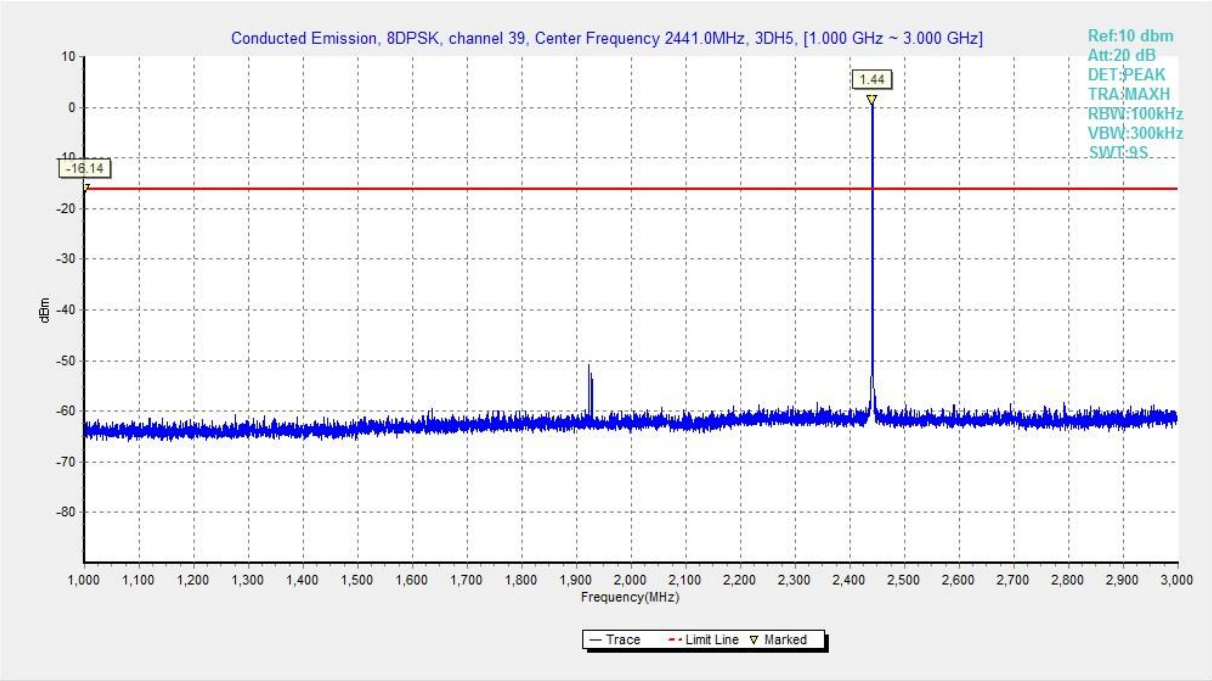

Fig. 35 Conducted Spurious Emission (8DPSK, Ch39, 1GHz-3 GHz)

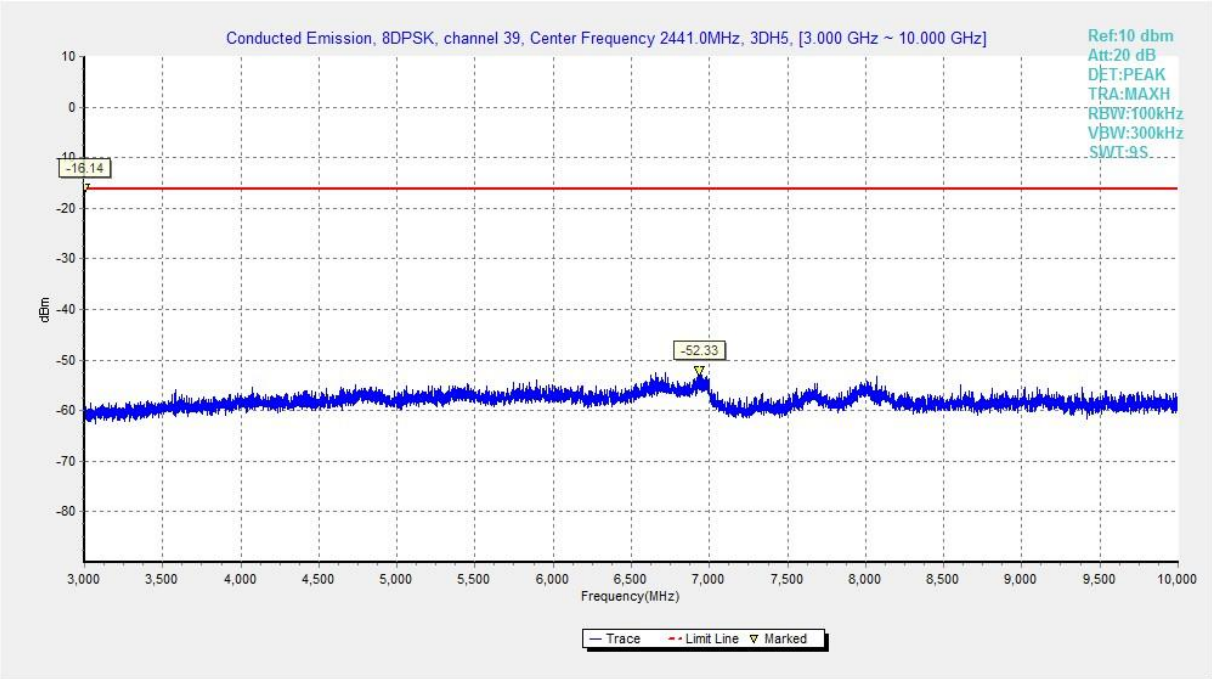

Fig. 36 Conducted Spurious Emission (8DPSK, Ch39, 3GHz-10 GHz)

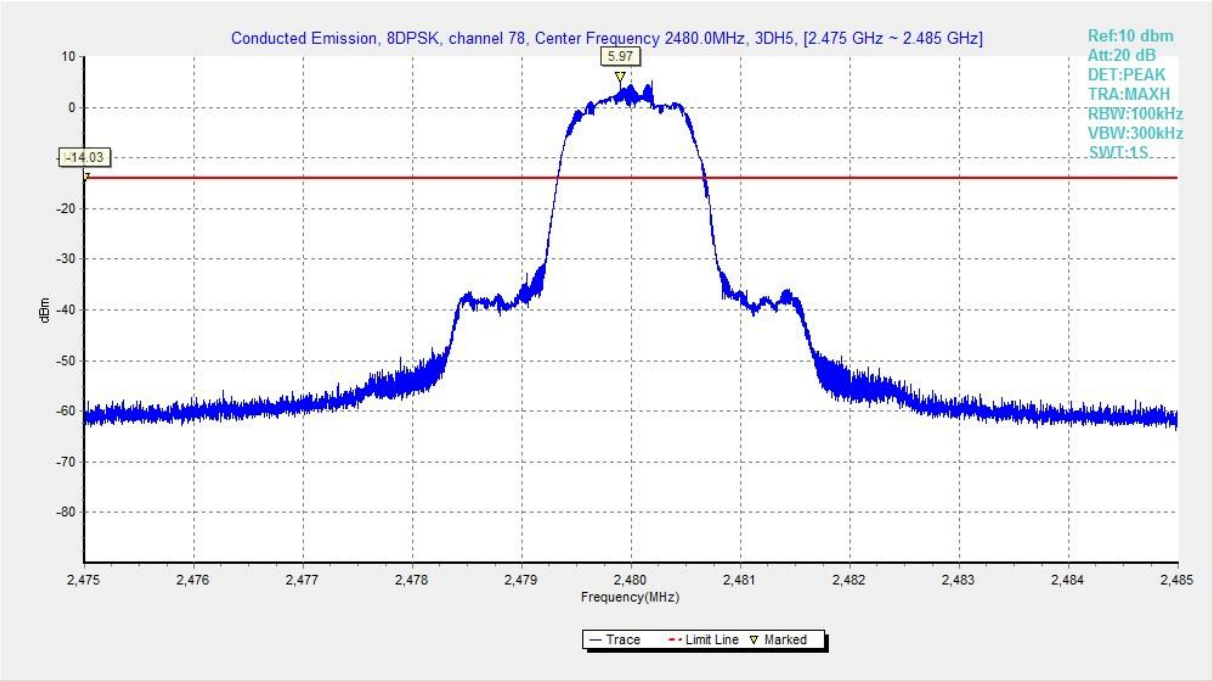

Fig. 37 Conducted Spurious Emission (8DPSK, Ch78, 2.480GHz)

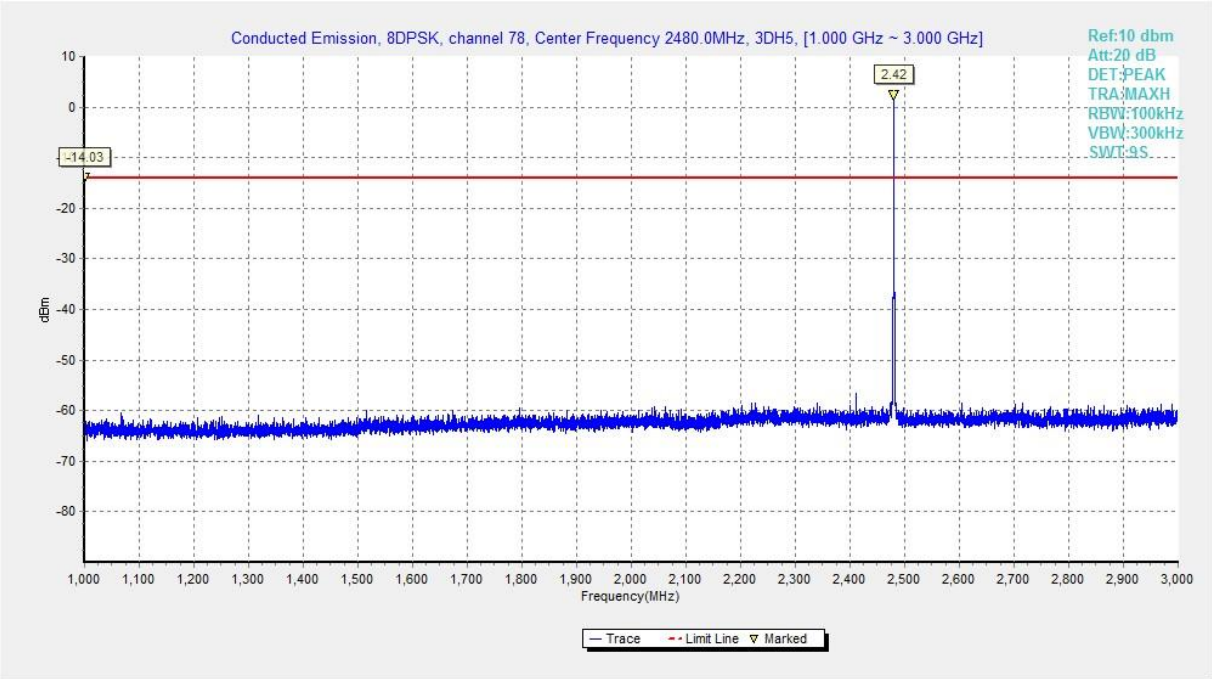

Fig. 38 Conducted Spurious Emission (8DPSK, Ch78, 1GHz-3 GHz)

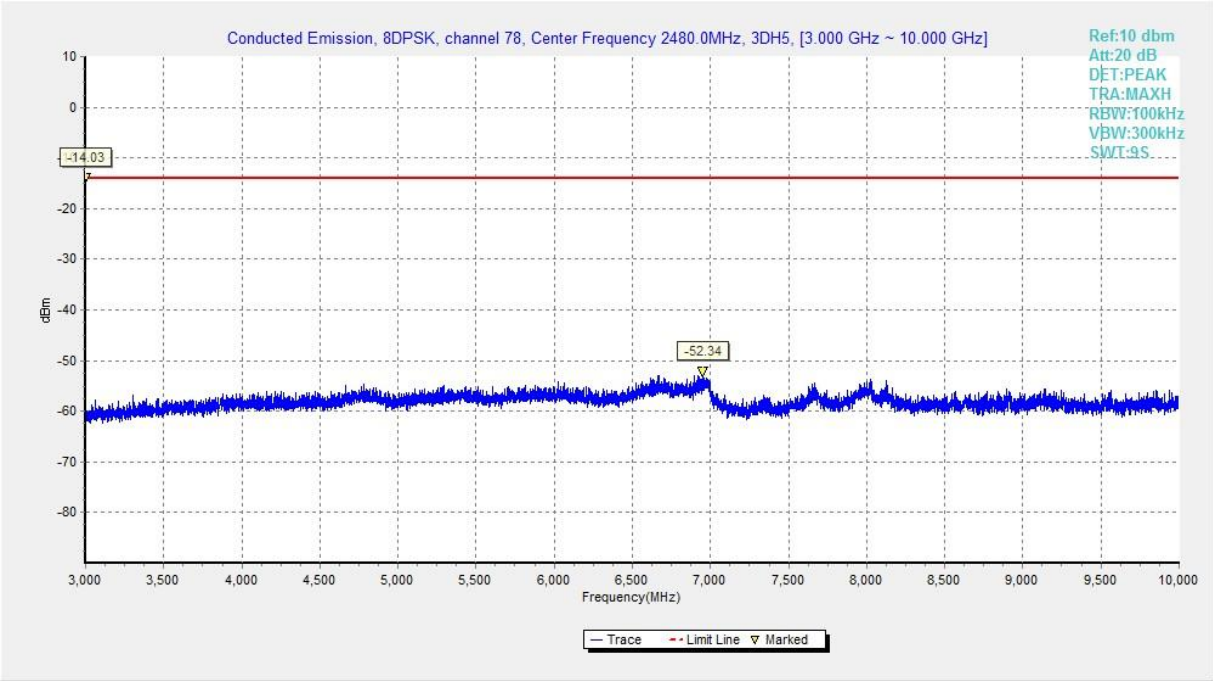

Fig. 39 Conducted Spurious Emission (8DPSK, Ch78, 3GHz-10 GHz)

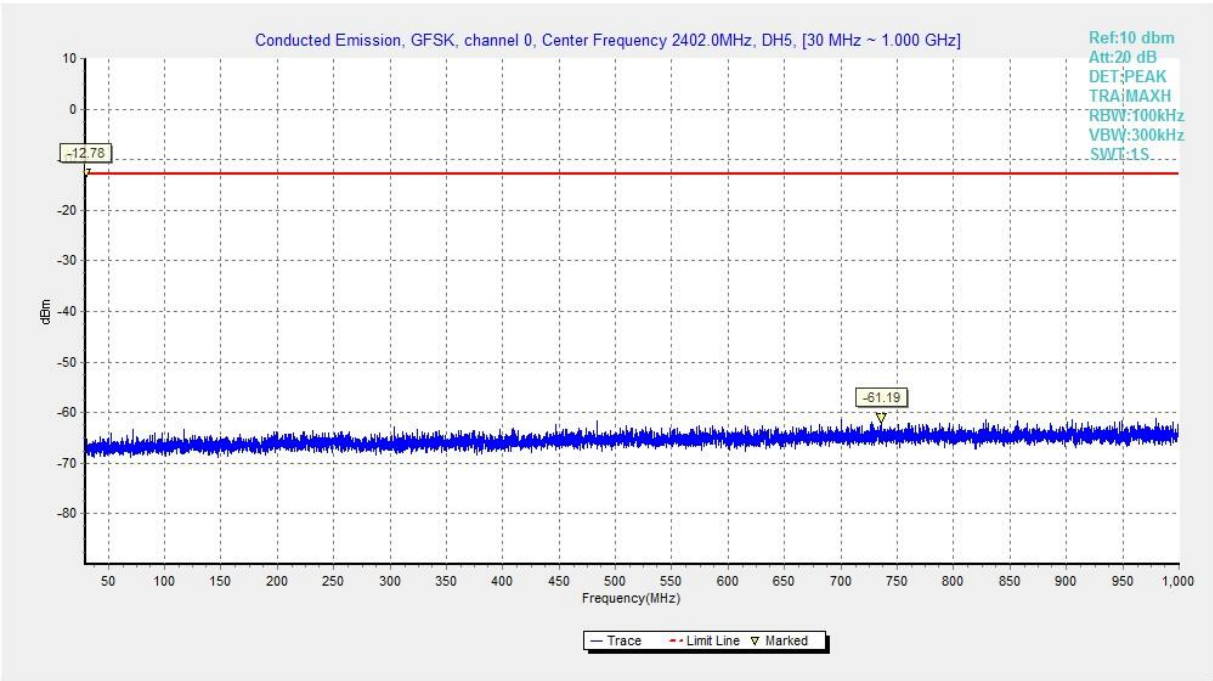

Fig. 40 Conducted Spurious Emission (All channel, 30 MHz-1 GHz)

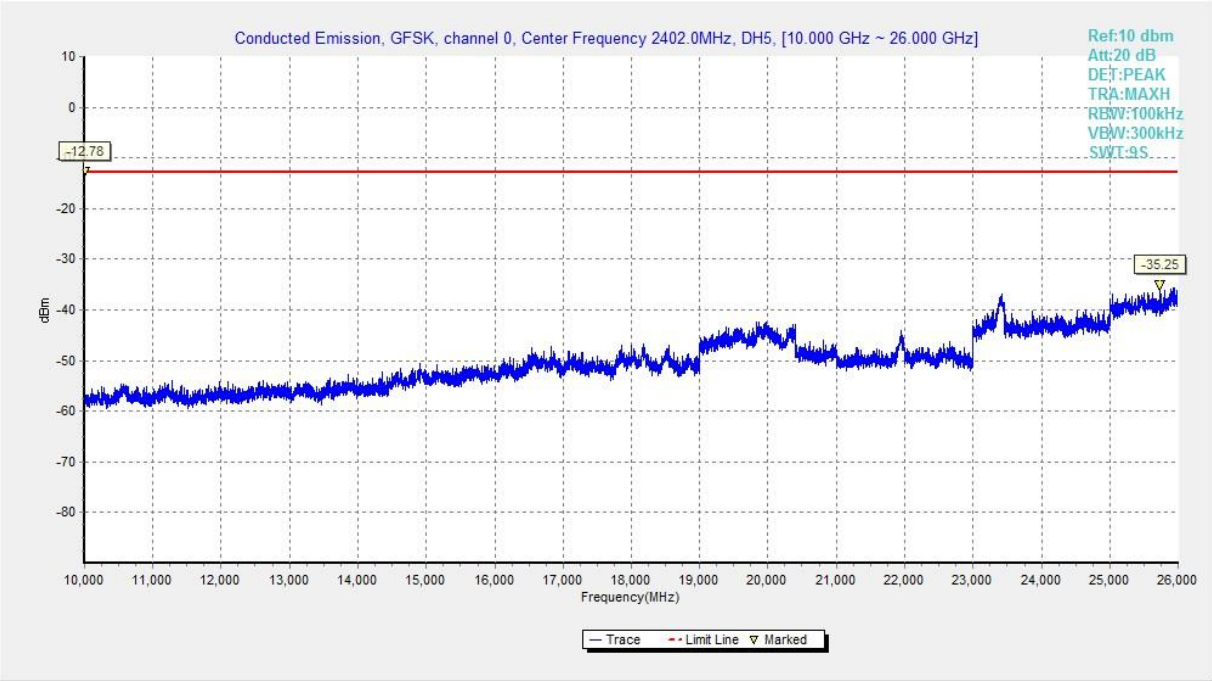

Fig. 41 Conducted Spurious Emission All channel, 10GHz-26 GHz)

A.4 Radiated Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209 & RSS-247 section 5.5/RSS-Gen section 6.13	20dB below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength (μV/m)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

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	120kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

Note: According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic.

The measurement results include the horizontal polarization and vertical polarization measurements.

Measurement Results:

Mode	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	1 GHz ~ 3 GHz	Fig.42	**P**
	0	3 GHz ~ 18 GHz	Fig.43	**P**
	39	1 GHz ~ 3 GHz	Fig.44	**P**
	39	3 GHz ~ 18 GHz	Fig.45	**P**
	78	1 GHz ~ 3 GHz	Fig.46	**P**
	78	3 GHz ~ 18 GHz	Fig.47	**P**
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.48	**P**
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.49	**P**
π /4 DQPSK	0	1 GHz ~ 3 GHz	Fig.50	**P**
	0	3 GHz ~ 18 GHz	Fig.51	**P**
	39	1 GHz ~ 3 GHz	Fig.52	**P**
	39	3 GHz ~ 18 GHz	Fig.53	**P**
	78	1 GHz ~ 3 GHz	Fig.54	**P**
	78	3 GHz ~ 18 GHz	Fig.55	**P**
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.56	**P**
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.57	**P**
8DPSK	0	1 GHz ~ 3 GHz	Fig.58	**P**
	0	3 GHz ~ 18 GHz	Fig.59	**P**
	39	1 GHz ~ 3 GHz	Fig.60	**P**
	39	3 GHz ~ 18 GHz	Fig.61	**P**
	78	1 GHz ~ 3 GHz	Fig.62	**P**
	78	3 GHz ~ 18 GHz	Fig.63	**P**
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.64	**P**
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.65	**P**
/	All channels	9 kHz ~ 30 MHz	Fig.66	**P**
		30 MHz ~ 1 GHz	Fig.67	**P**
		18 GHz ~ 26.5 GHz	Fig.68	**P**

Worst Case Result

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
6420.00	45.47	74.00	28.53	V	2.0
10234.00	45.94	74.00	28.06	V	5.1
12576.50	46.52	74.00	27.48	V	7.8
14372.50	48.06	74.00	25.94	V	10.9
16084.50	50.04	74.00	23.96	V	13.9
17636.00	50.46	74.00	23.54	V	15.6

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
4804.00	32.85	54.00	21.15	H	-1.1
9444.50	32.49	54.00	21.51	H	3.5
11265.00	33.67	54.00	20.33	V	5.5
13309.00	35.18	54.00	18.82	V	9.0
15270.50	36.49	54.00	17.51	H	11.2
17740.00	38.89	54.00	15.11	H	16.1

π /4 DQPSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
10254.00	45.73	74.00	28.27	V	5.2
11661.00	46.44	74.00	27.56	V	6.9
12948.00	46.96	74.00	27.04	H	8.6
14508.00	49.40	74.00	24.60	H	11.5
16027.00	50.32	74.00	23.68	V	13.5
17584.50	50.41	74.00	23.59	V	15.5

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
7013.00	32.34	54.00	21.66	V	1.5
8772.50	31.75	54.00	22.25	V	3.1
11913.50	33.87	54.00	20.13	H	6.9
14196.50	36.19	54.00	17.81	V	10.9
15898.50	37.45	54.00	16.55	V	13.2
17763.50	39.29	54.00	14.71	V	16.2

8DPSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
10204.00	45.70	74.00	28.30	V	5.1
12086.50	46.44	74.00	27.56	V	7.4
12947.00	46.89	74.00	27.11	H	8.6
14497.00	49.02	74.00	24.98	H	11.4
17045.00	51.43	74.00	22.57	H	15.0
17971.50	50.17	74.00	23.83	V	16.0

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
10087.50	33.00	54.00	21.00	V	5.0
11527.00	34.14	54.00	19.86	V	6.3
12943.50	35.13	54.00	18.87	H	8.6
14514.00	36.99	54.00	17.01	H	11.5
16184.00	37.95	54.00	16.05	V	14.4
17888.00	39.61	54.00	14.39	H	16.2

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of “reference path loss”, and Antenna Factor, the gain of the preamplifier, the cable loss. P_{Mea} is the field strength recorded from the instrument.

The measurement results are obtained as described below:

Result = P_{Mea} + Cable Loss + Antenna Factor - Gain of the preamplifier

See below for test graphs.

Conclusion: Pass

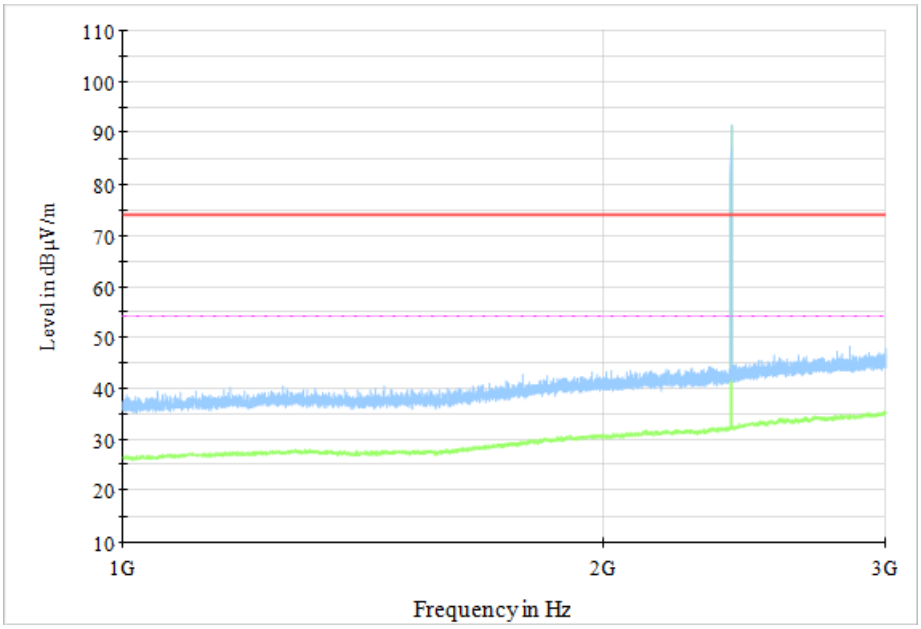

Fig. 42 Radiated Spurious Emission (GFSK, Ch0, 1GHz ~ 3GHz)

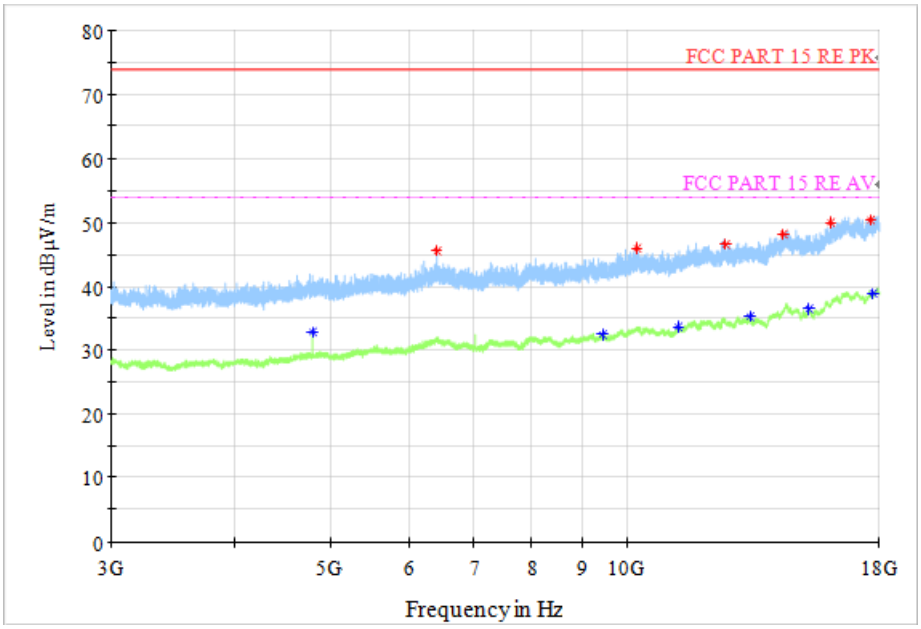

Fig. 43 Radiated Spurious Emission (GFSK, Ch0, 3GHz ~ 18GHz)

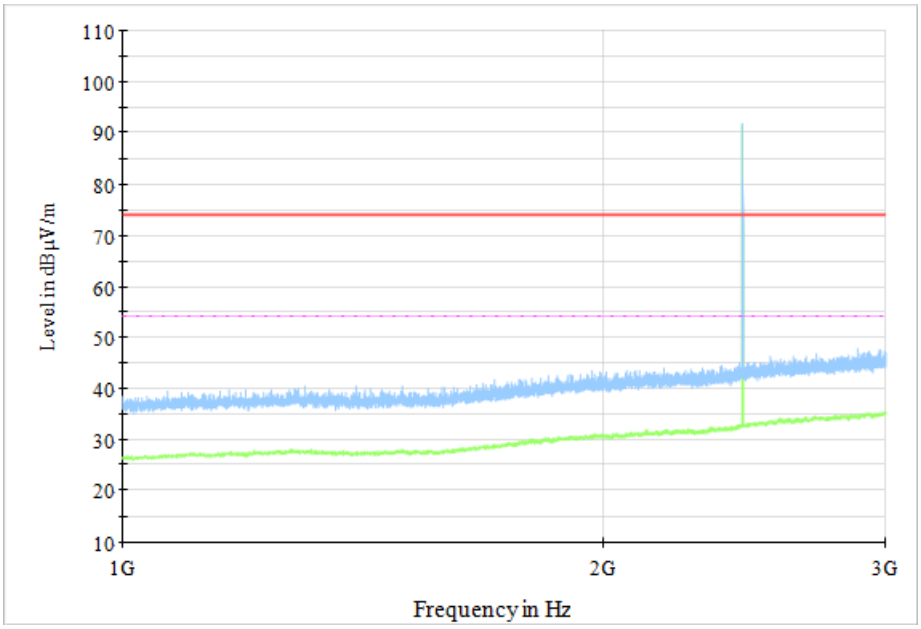

Fig. 44 Radiated Spurious Emission (GFSK, Ch39, 1GHz ~ 3GHz)

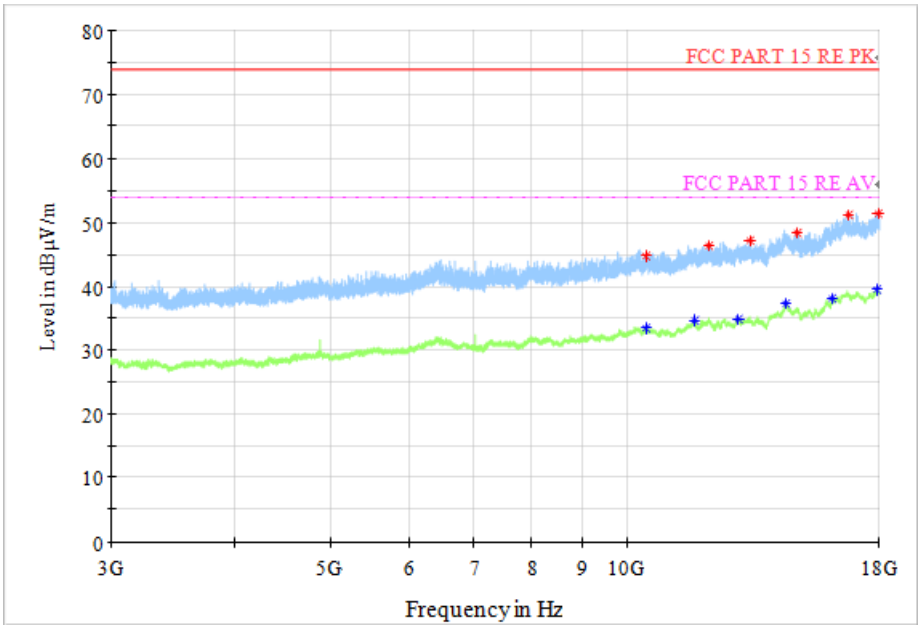

Fig. 45 Radiated Spurious Emission (GFSK, Ch39, 3GHz ~ 18GHz)

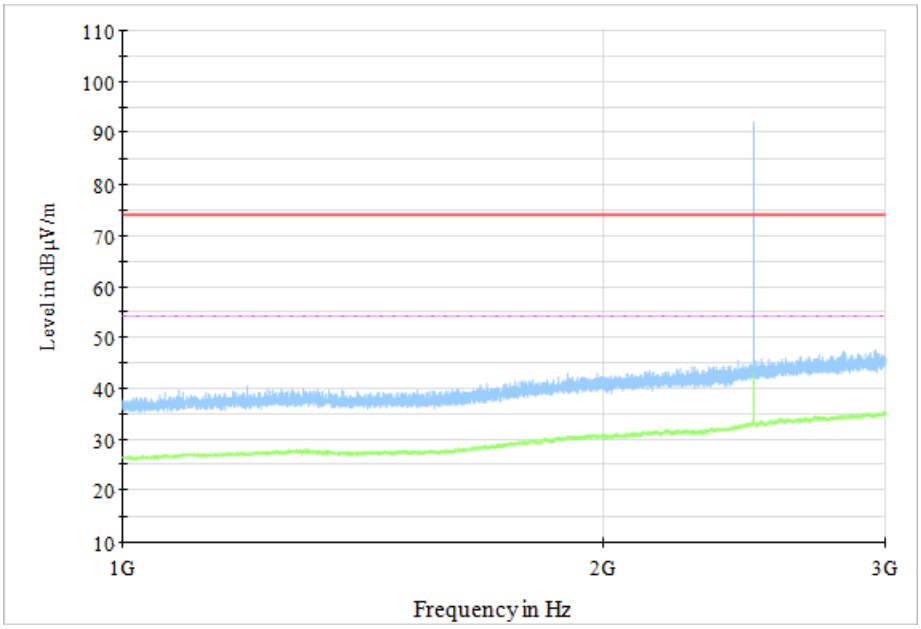

Fig. 46 Radiated Spurious Emission (GFSK, Ch78, 1GHz ~ 3GHz)

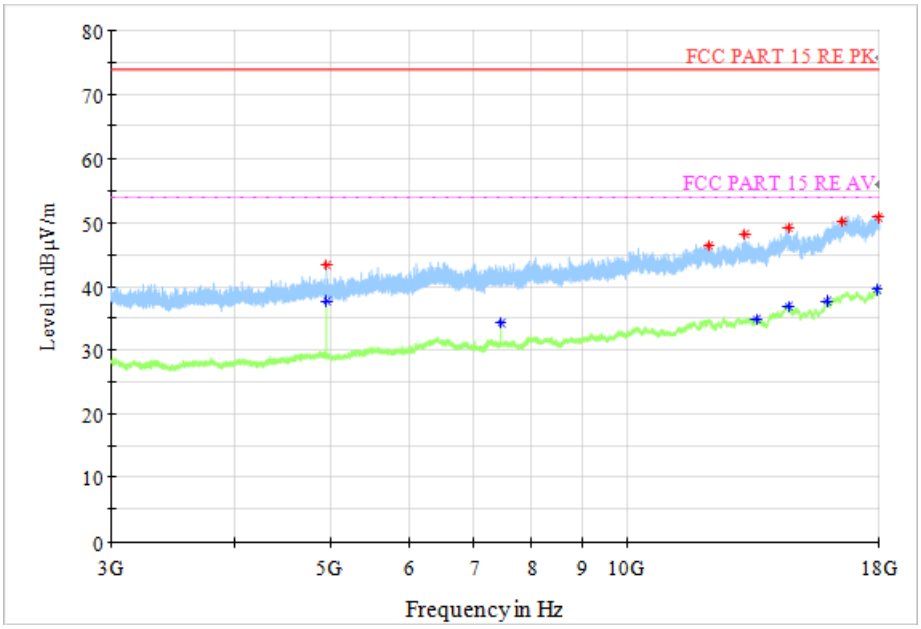

Fig. 47 Radiated Spurious Emission (GFSK, Ch78, 3GHz ~ 18GHz)

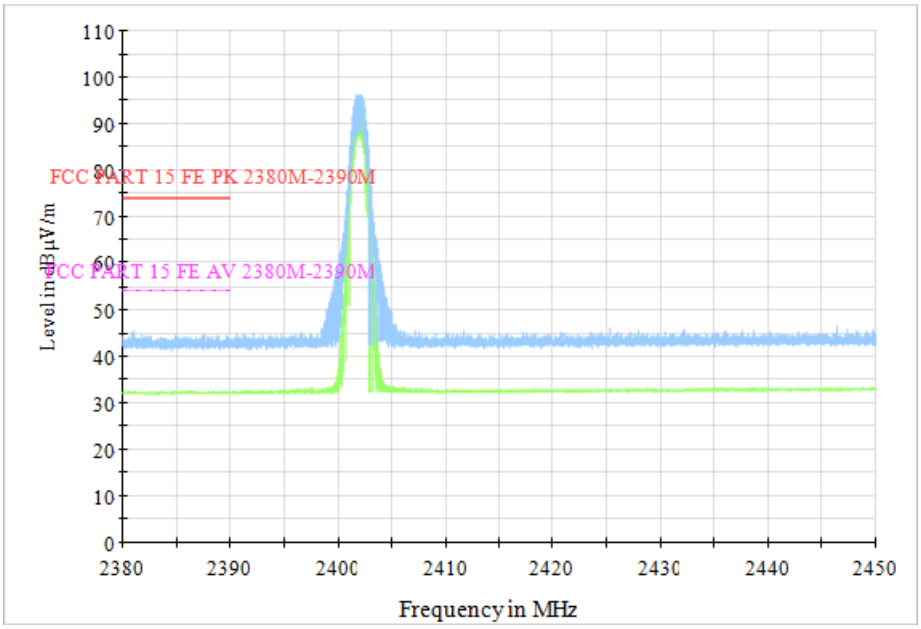

Fig. 48 Radiated Band Edges (GFSK, Ch0, 2380GHz ~ 2450GHz)

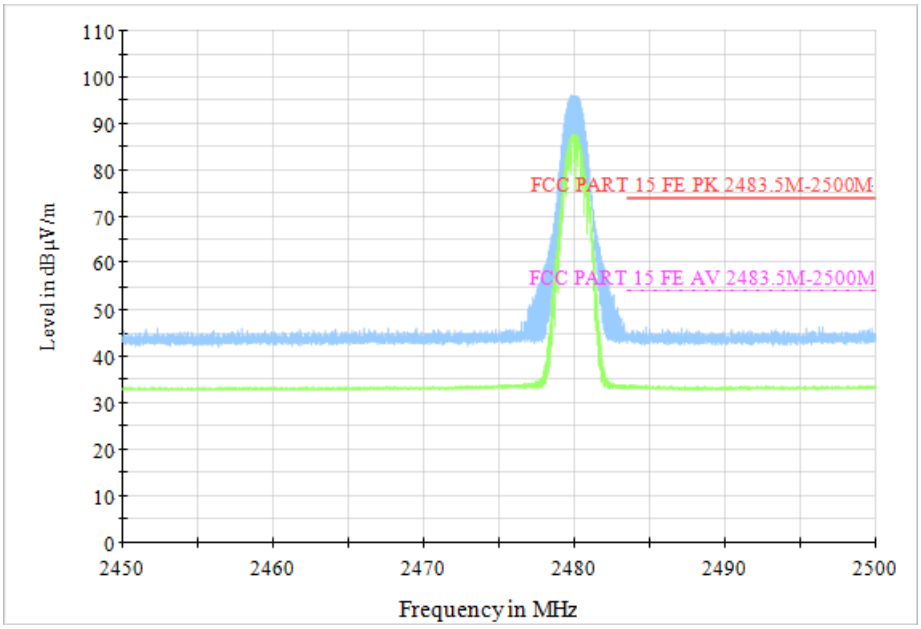

Fig. 49 Radiated Band Edges (GFSK, Ch78, 2450GHz ~ 2500GHz)

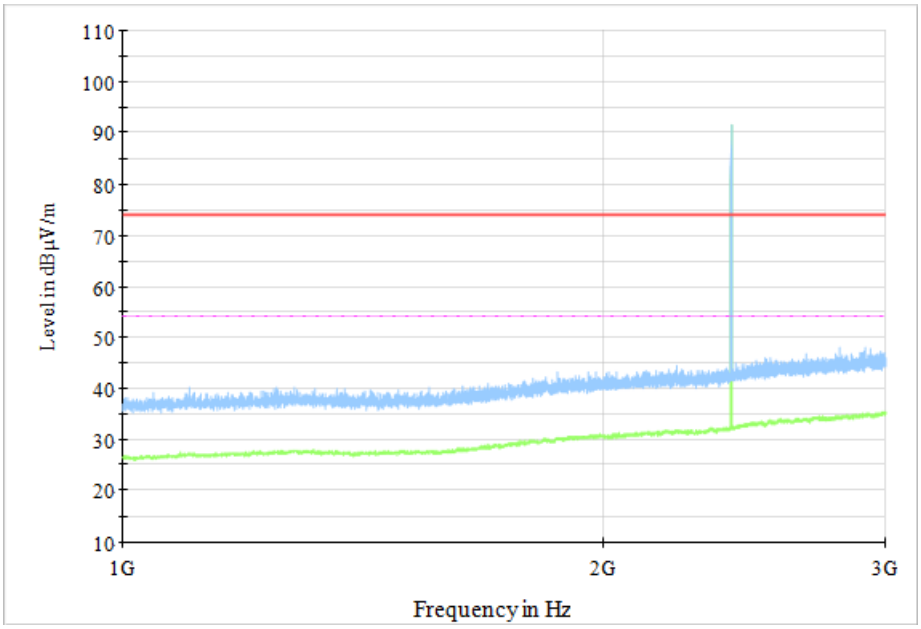

Fig. 50 Radiated Spurious Emission (π /4 DQPSK, Ch0, 1GHz ~ 3GHz)

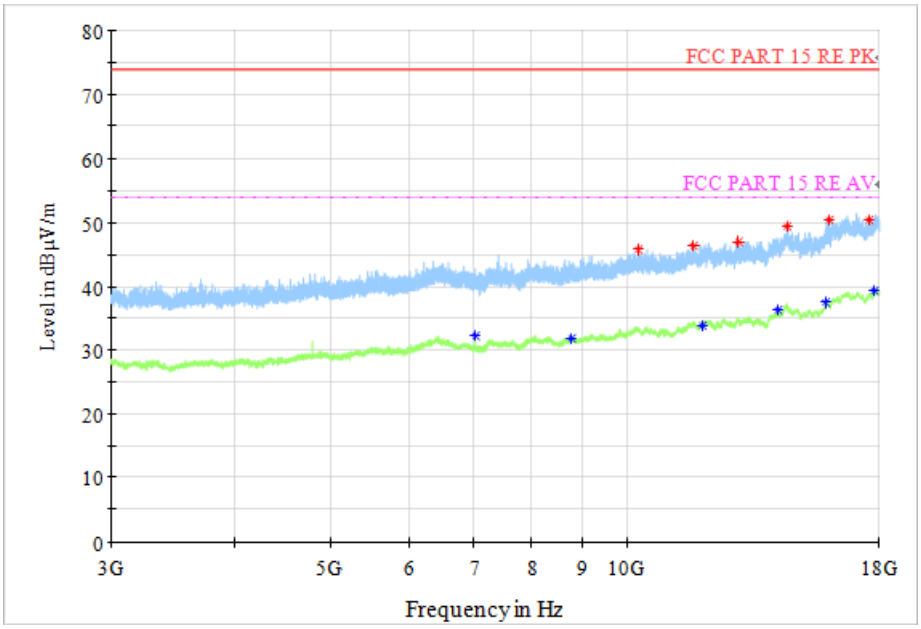

Fig. 51 Radiated Spurious Emission (π /4 DQPSK, Ch0, 3GHz ~ 18GHz)

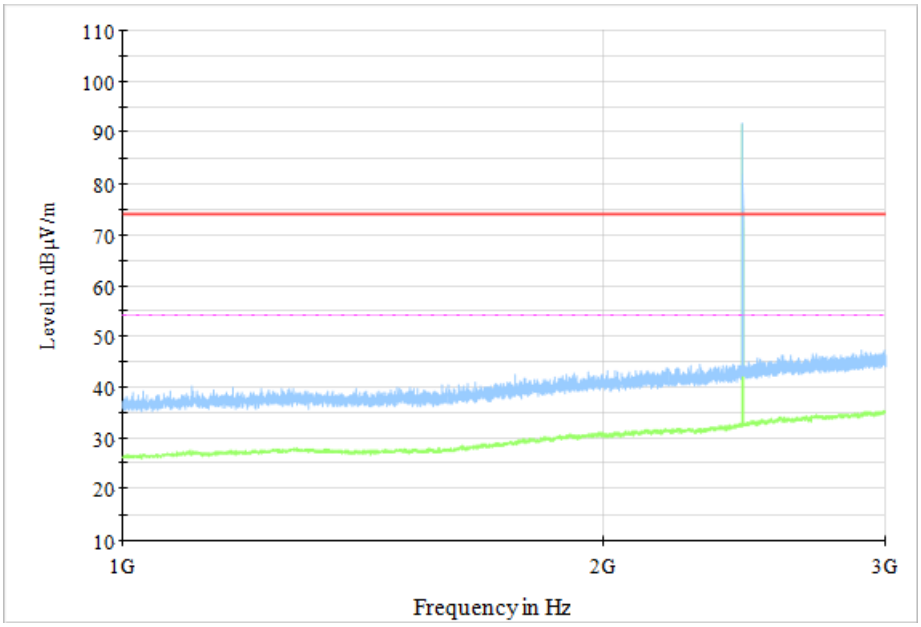

Fig. 52 Radiated Spurious Emission (π /4 DQPSK, Ch39, 1GHz ~ 3GHz)

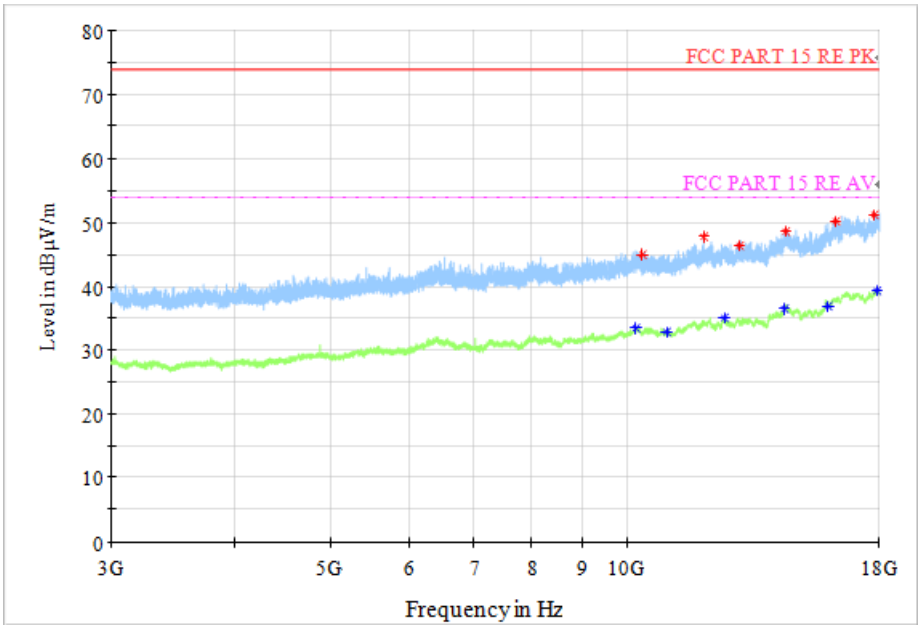

Fig. 53 Radiated Spurious Emission (π /4 DQPSK, Ch39, 3GHz ~ 18GHz)

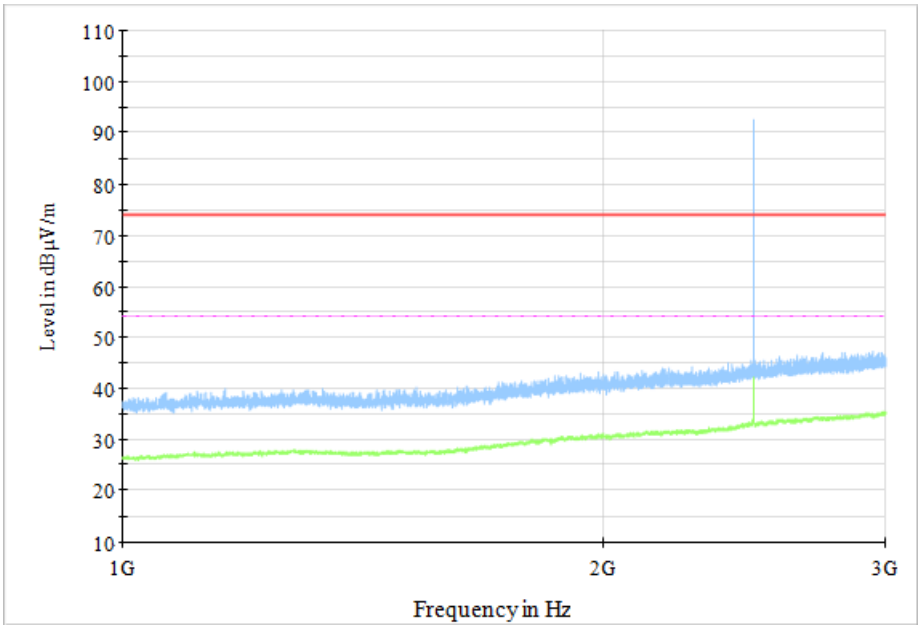

Fig. 54 Radiated Spurious Emission (π /4 DQPSK, Ch78, 1GHz ~ 3GHz)

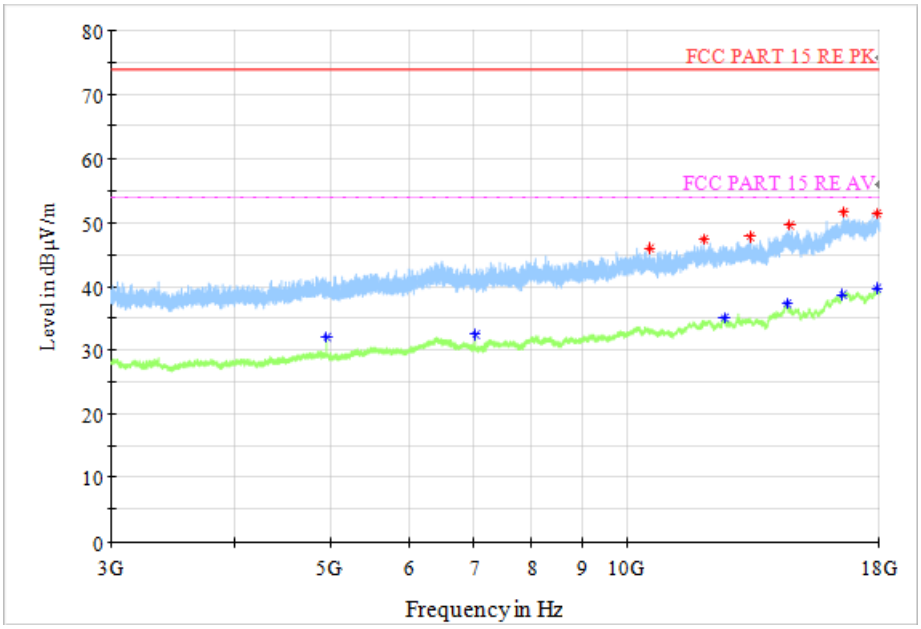

Fig. 55 Radiated Spurious Emission (π /4 DQPSK, Ch78, 3GHz ~ 18GHz)

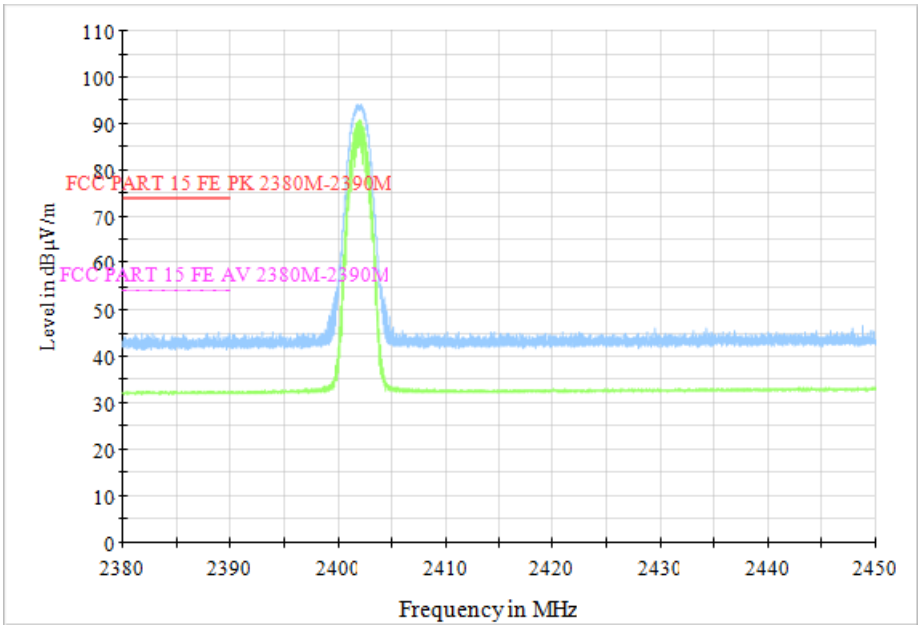

Fig. 56 Radiated Band Edges (π /4 DQPSK, Ch0, 2380GHz ~ 2450GHz)

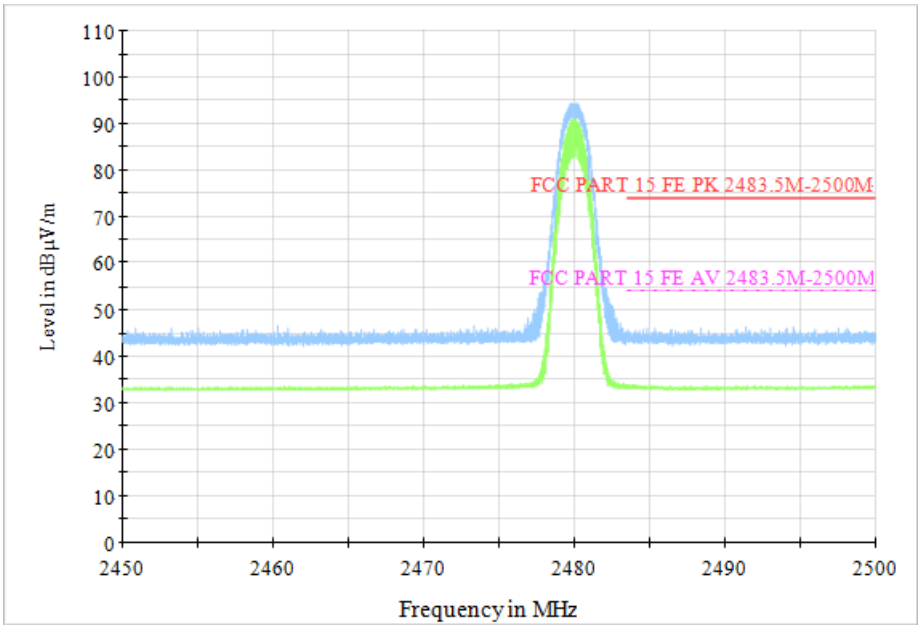

Fig. 57 Radiated Band Edges (π /4 DQPSK, Ch78, 2450GHz ~ 2500GHz)

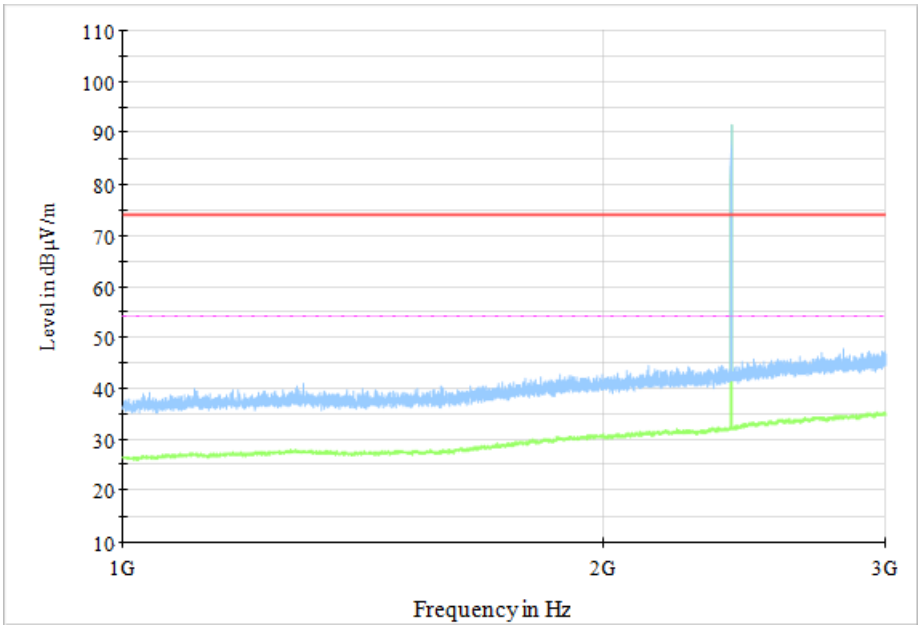

Fig. 58 Radiated Spurious Emission (8DPSK, Ch0, 1GHz ~ 3GHz)

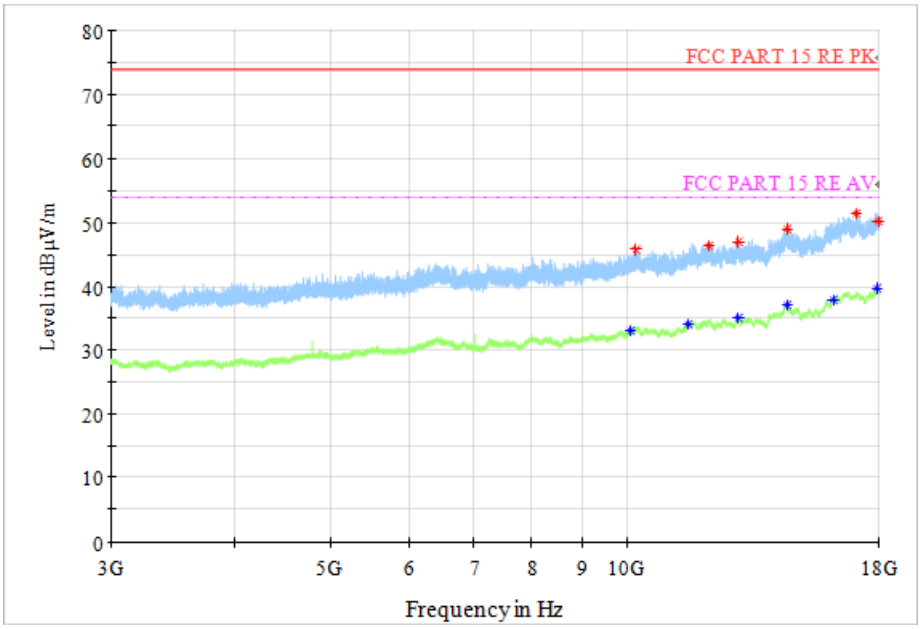

Fig. 59 Radiated Spurious Emission (8DPSK, Ch0, 3GHz ~ 18GHz)

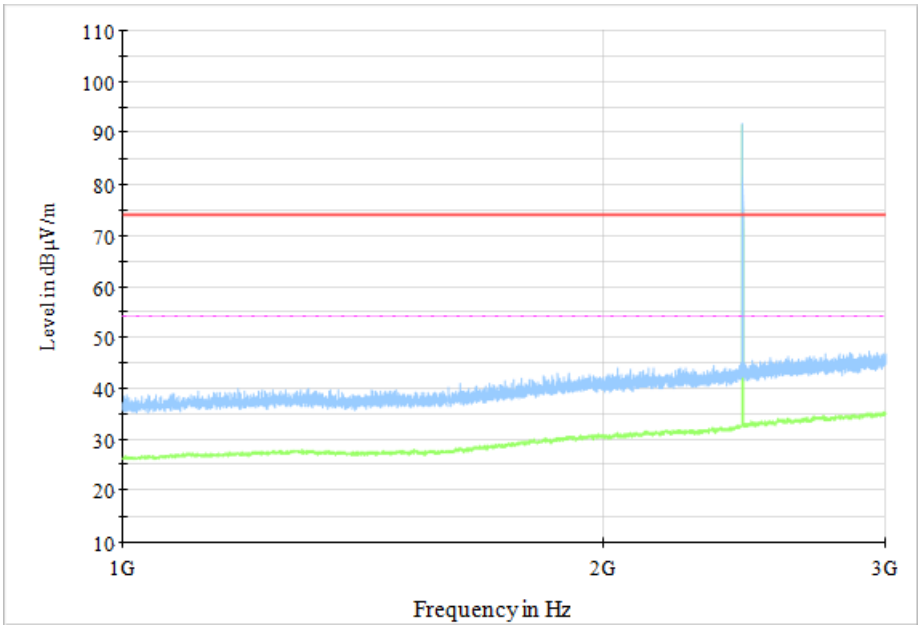

Fig. 60 Radiated Spurious Emission (8DPSK, Ch39, 1GHz ~ 3GHz)

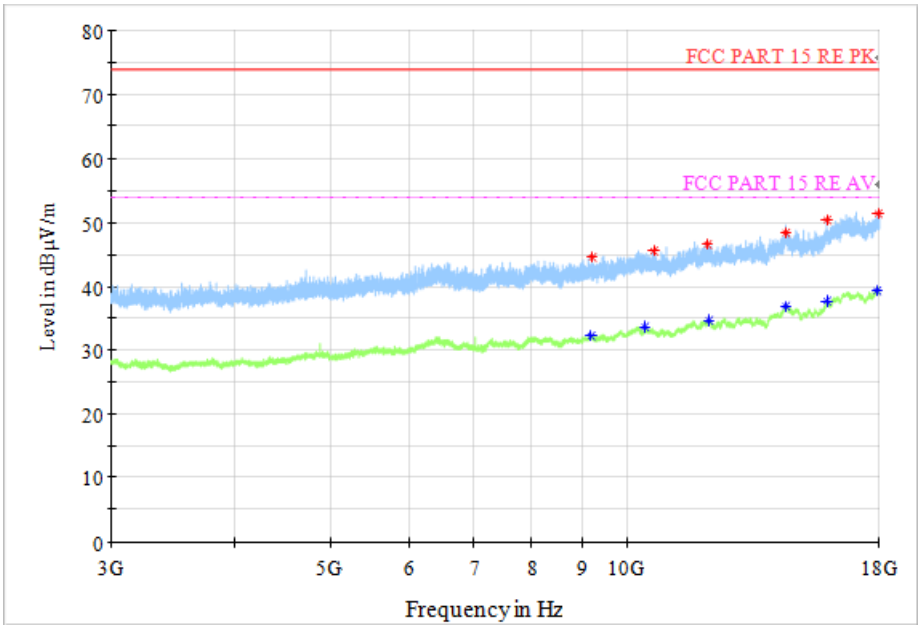

Fig. 61 Radiated Spurious Emission (8DPSK, Ch39, 3GHz ~ 18GHz)

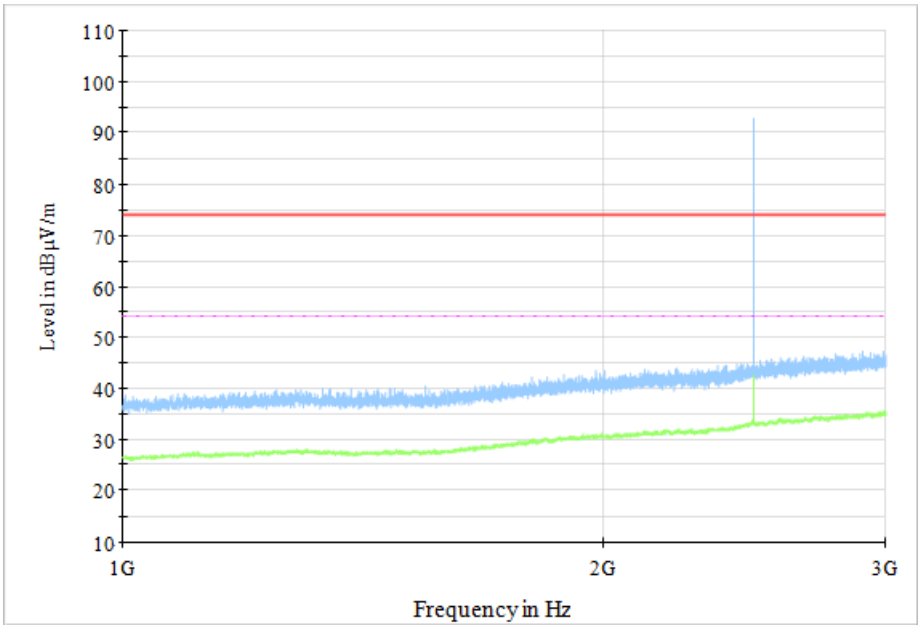

Fig. 62 Radiated Spurious Emission (8DPSK, Ch78, 1GHz ~ 3GHz)

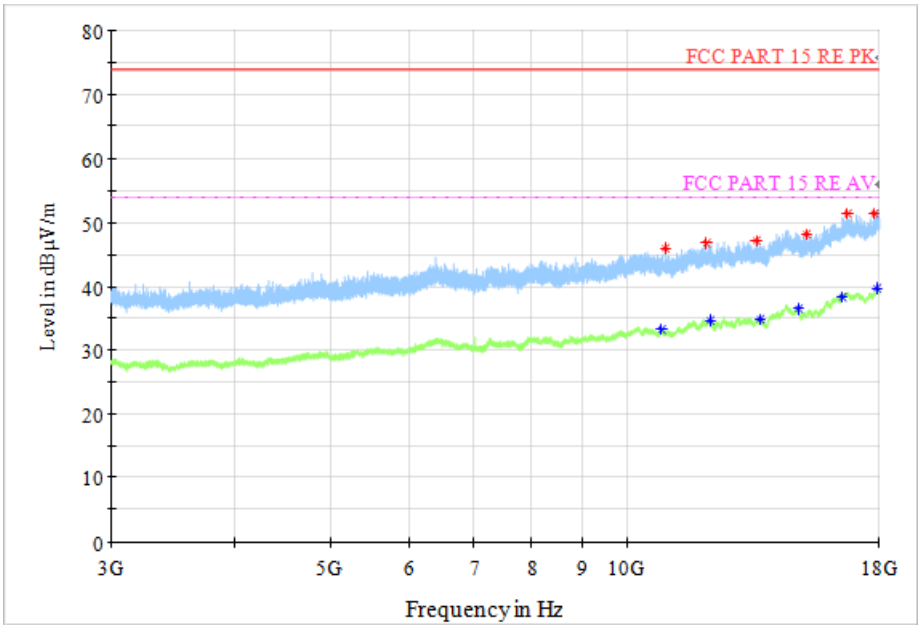

Fig. 63 Radiated Spurious Emission (8DPSK, Ch78, 3GHz ~ 18GHz)

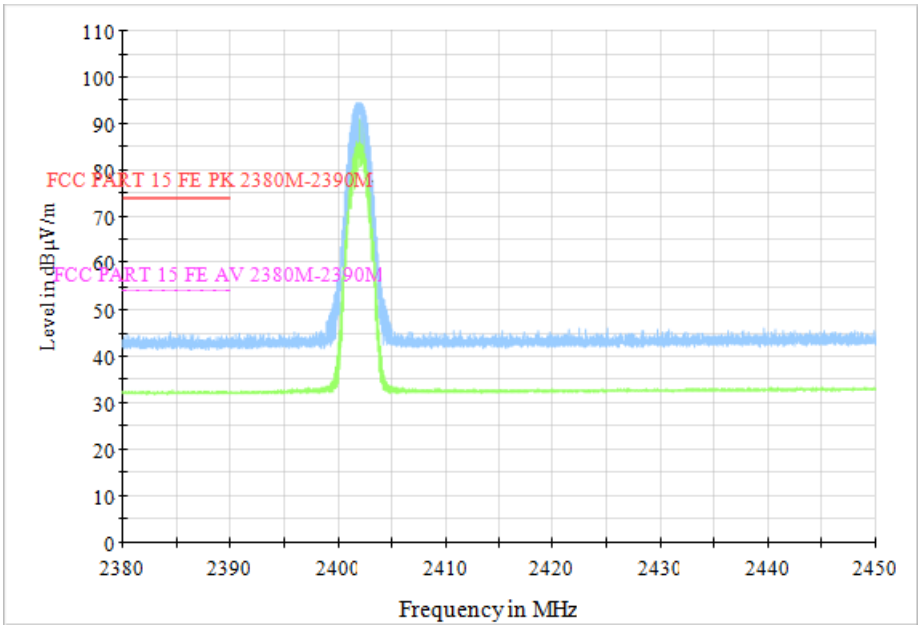

Fig. 64 Radiated Band Edges (8DPSK, Ch0, 2380GHz ~ 2450GHz)

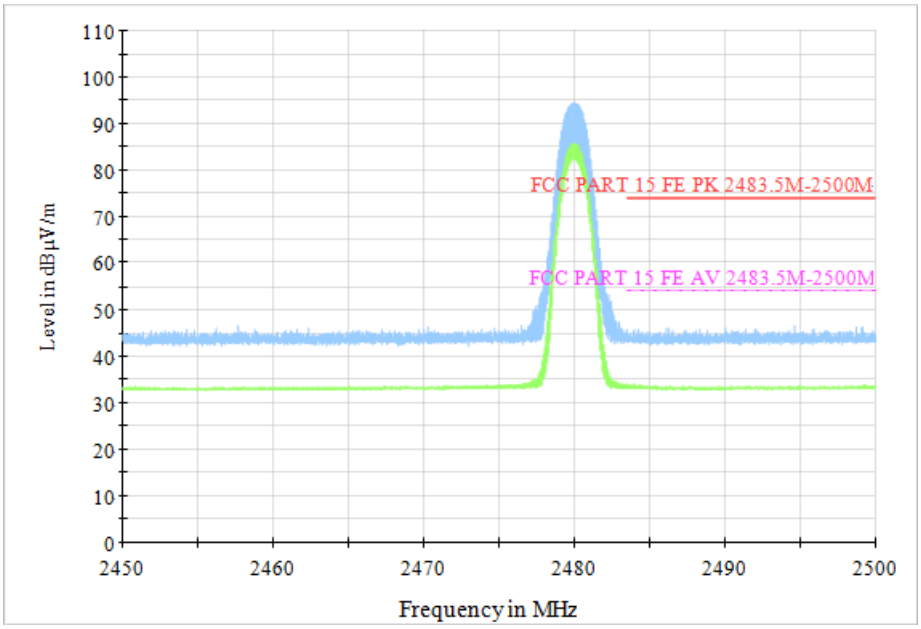

Fig. 65 Radiated Band Edges (8DPSK, Ch78, 2450GHz ~ 2500GHz)

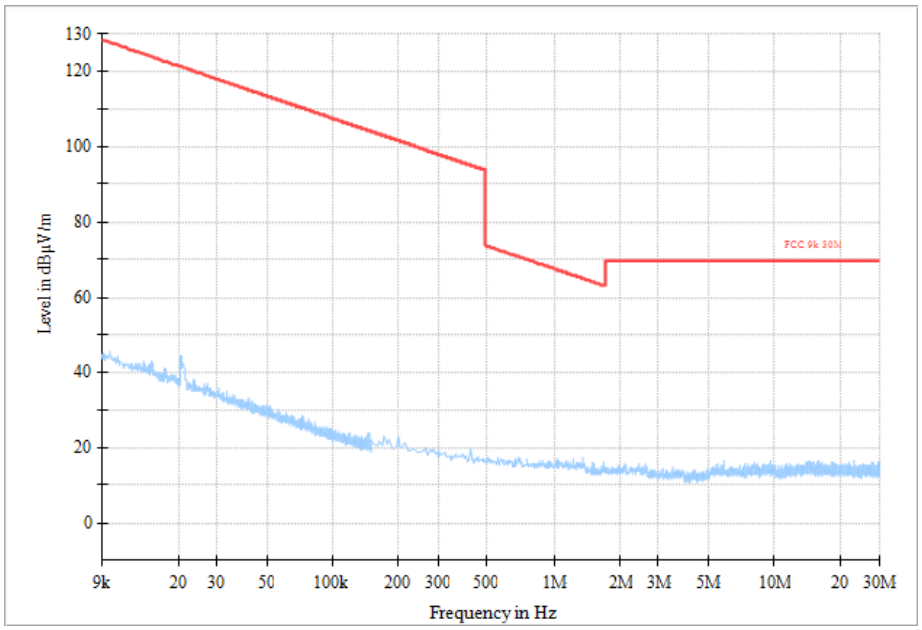

Fig. 66 Radiated Spurious Emission (All Channels, 9kHz ~ 30MHz)

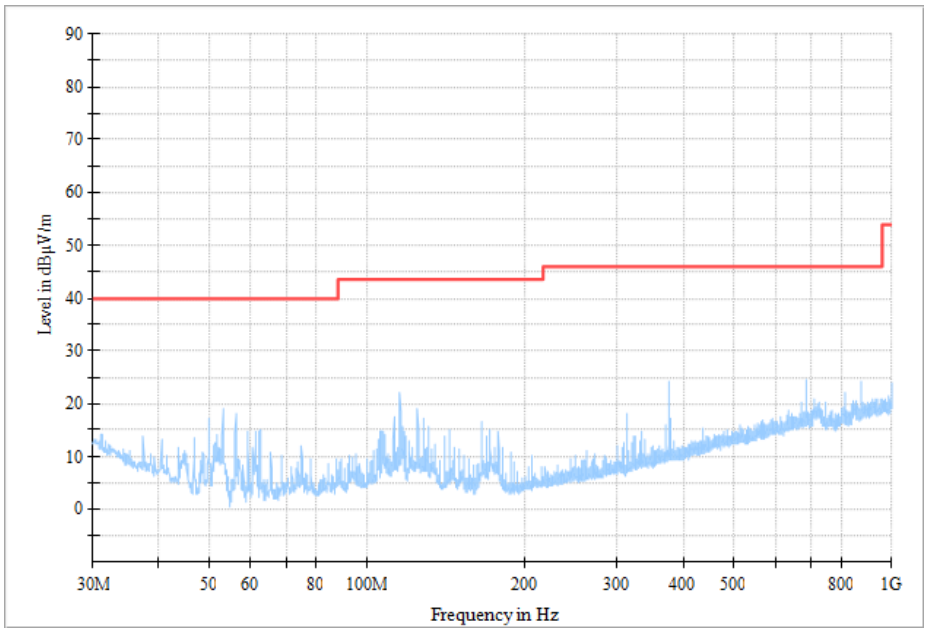

Fig. 67 Radiated Spurious Emission (All Channels, 30MHz ~ 1GHz)

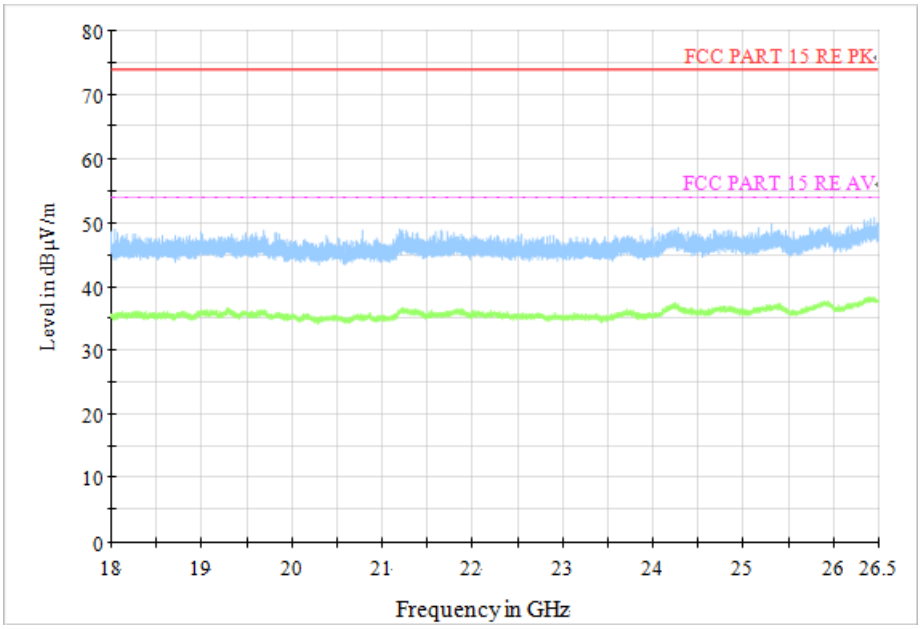

Fig. 68 Radiated Spurious Emission (All Channels, 18GHz ~ 26.5GHz)

A.5 20dB Bandwidth

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a) & RSS-247 section 5.1	/

Measurement Result:

Mode	Channel	20dB Bandwidth (kHz)		conclusion
GFSK	0	Fig.69	969.75	/
	39	Fig.70	925.50	
	78	Fig.71	922.50	
π /4 DQPSK	0	Fig.72	1280.25	/
	39	Fig.73	1279.50	
	78	Fig.74	1285.50	
8DPSK	0	Fig.75	1271.25	/
	39	Fig.76	1272.75	
	78	Fig.77	1299.00	

See below for test graphs.

Conclusion: PASS

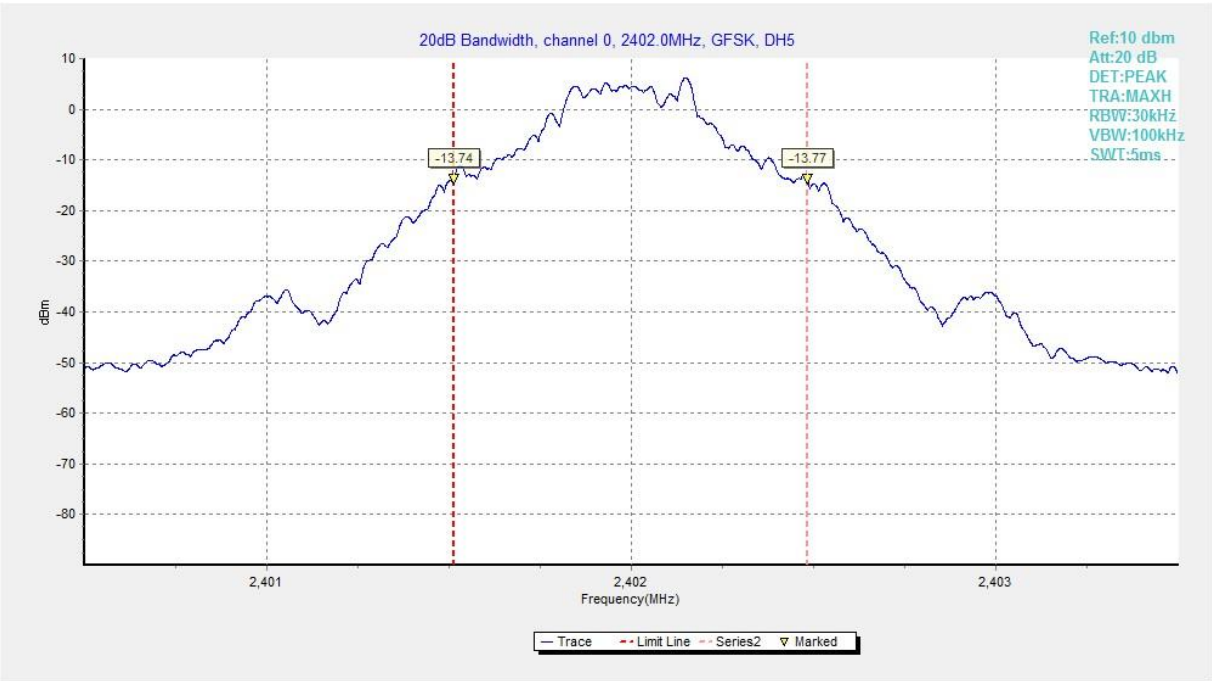

Fig. 69 20dB Bandwidth (GFSK, Ch 0)

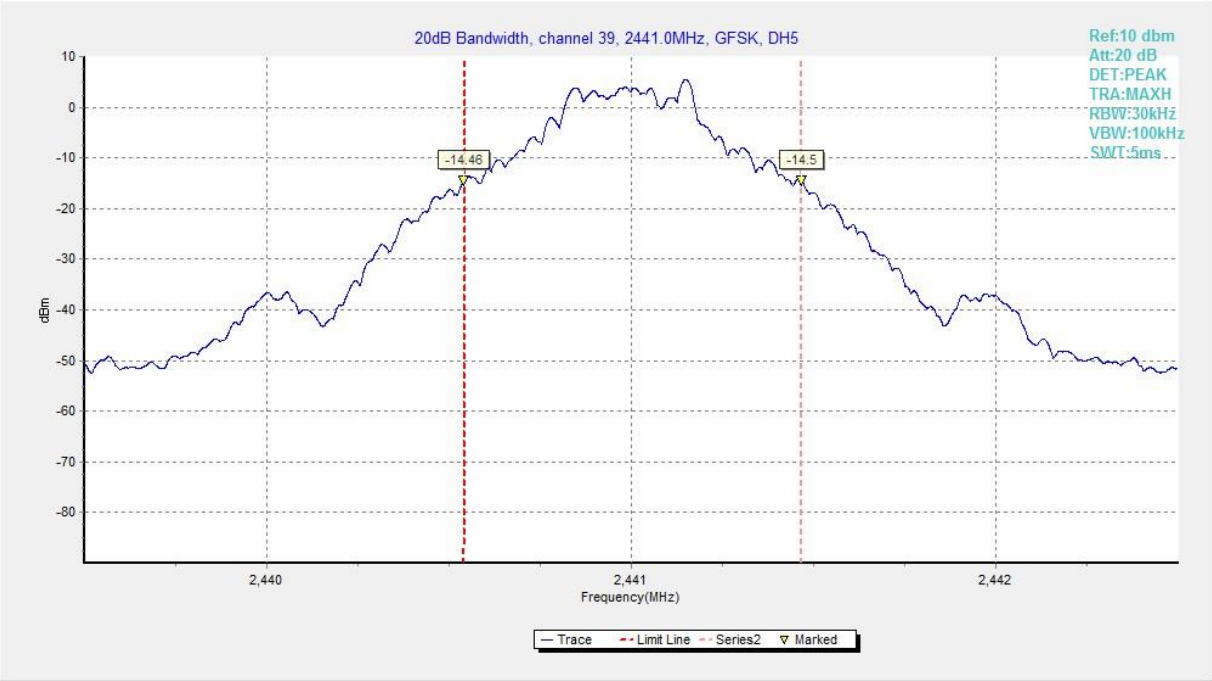

Fig. 70 20dB Bandwidth (GFSK, Ch 39)

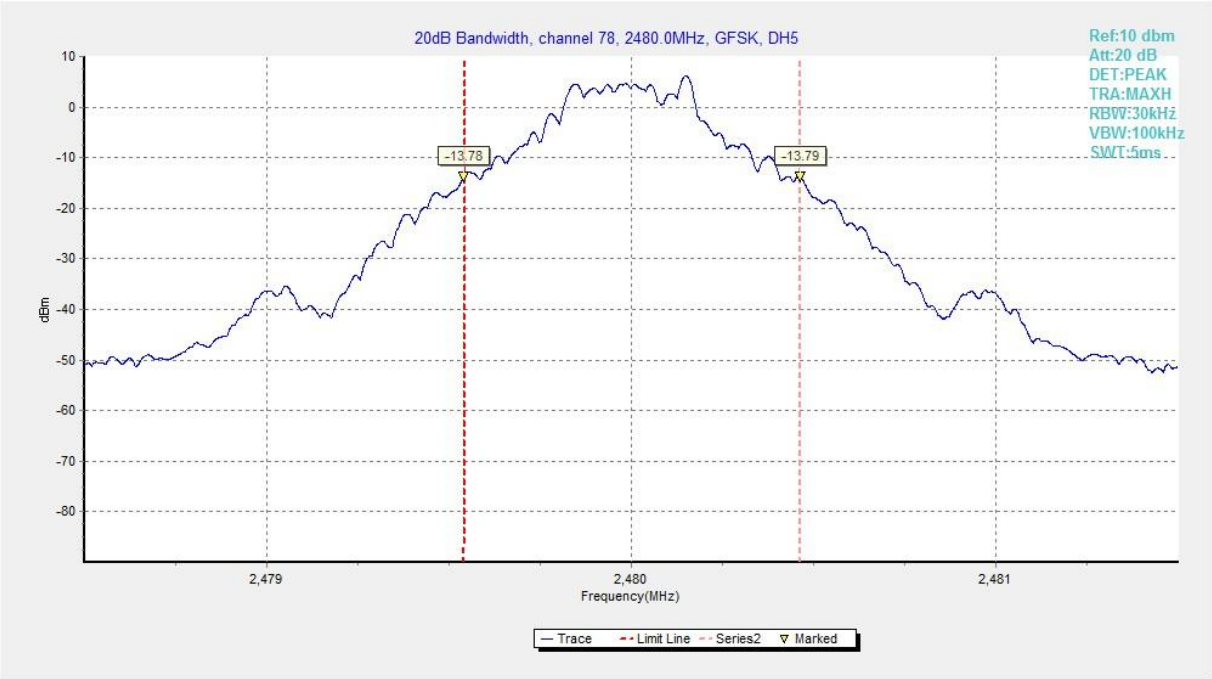

Fig. 71 20dB Bandwidth (GFSK, Ch 78)

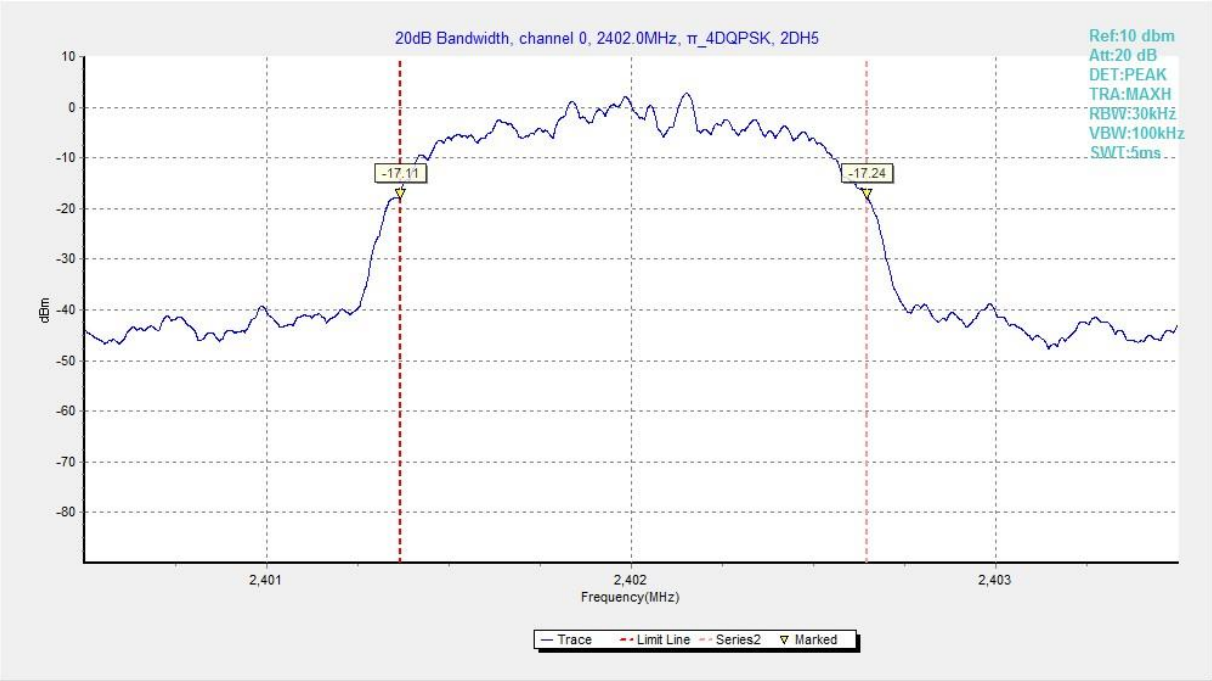

Fig. 72 20dB Bandwidth (π /4 DQPSK, Ch 0)

Fig. 73 20dB Bandwidth (π /4 DQPSK, Ch 39)

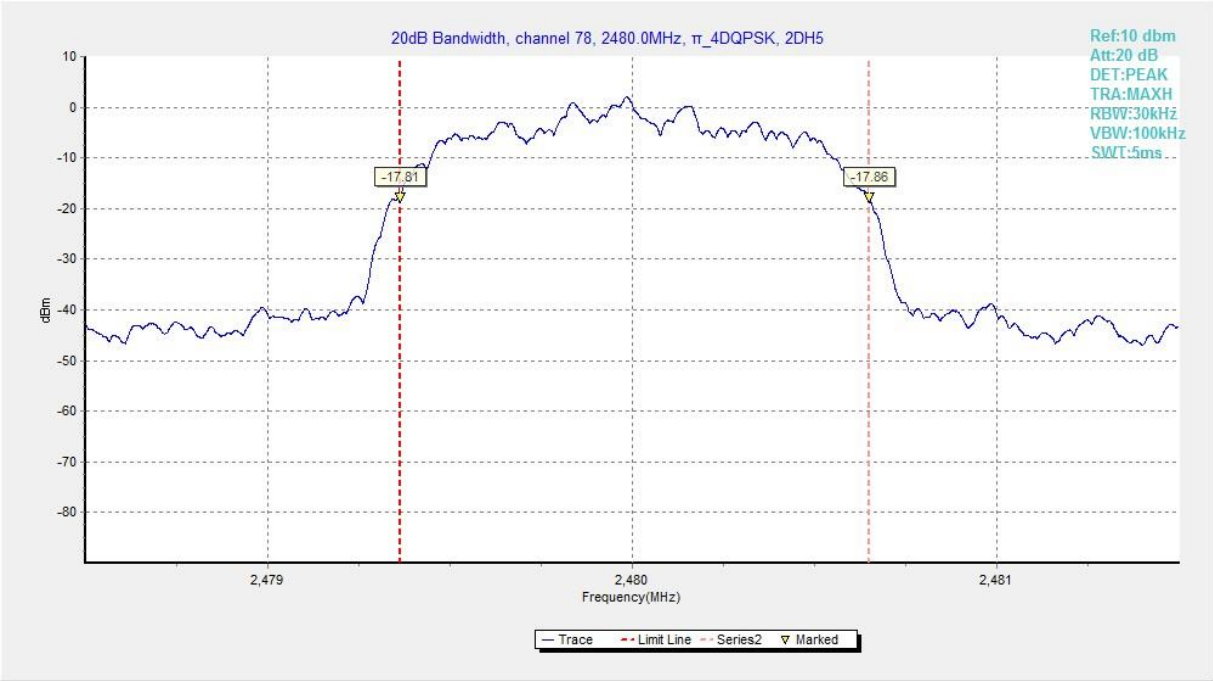

Fig. 74 20dB Bandwidth (π /4 DQPSK, Ch 78)

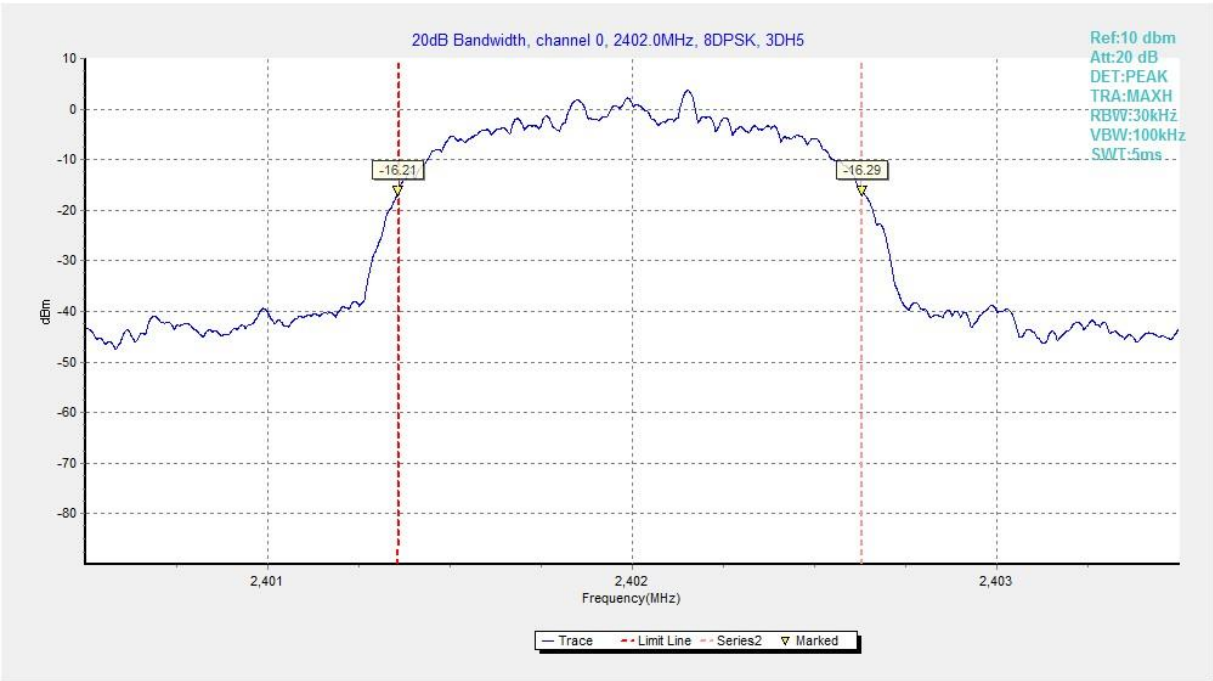

Fig. 75 20dB Bandwidth (8DPSK, Ch 0)

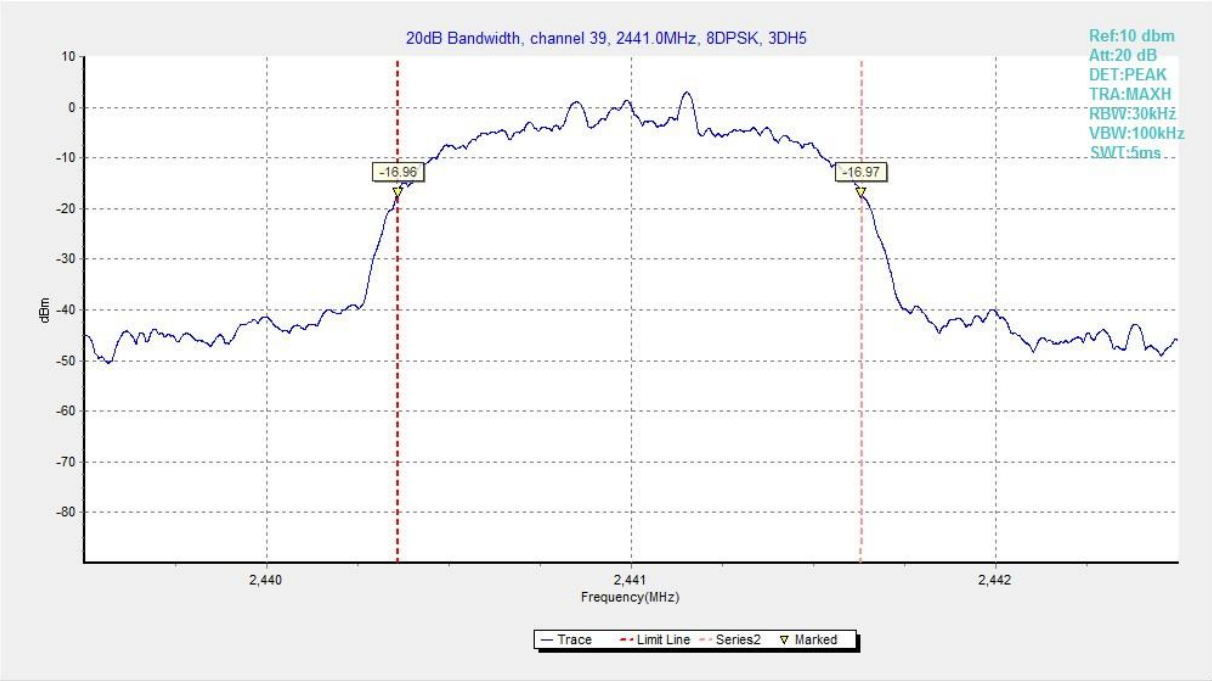

Fig. 76 20dB Bandwidth (8DPSK, Ch 39)

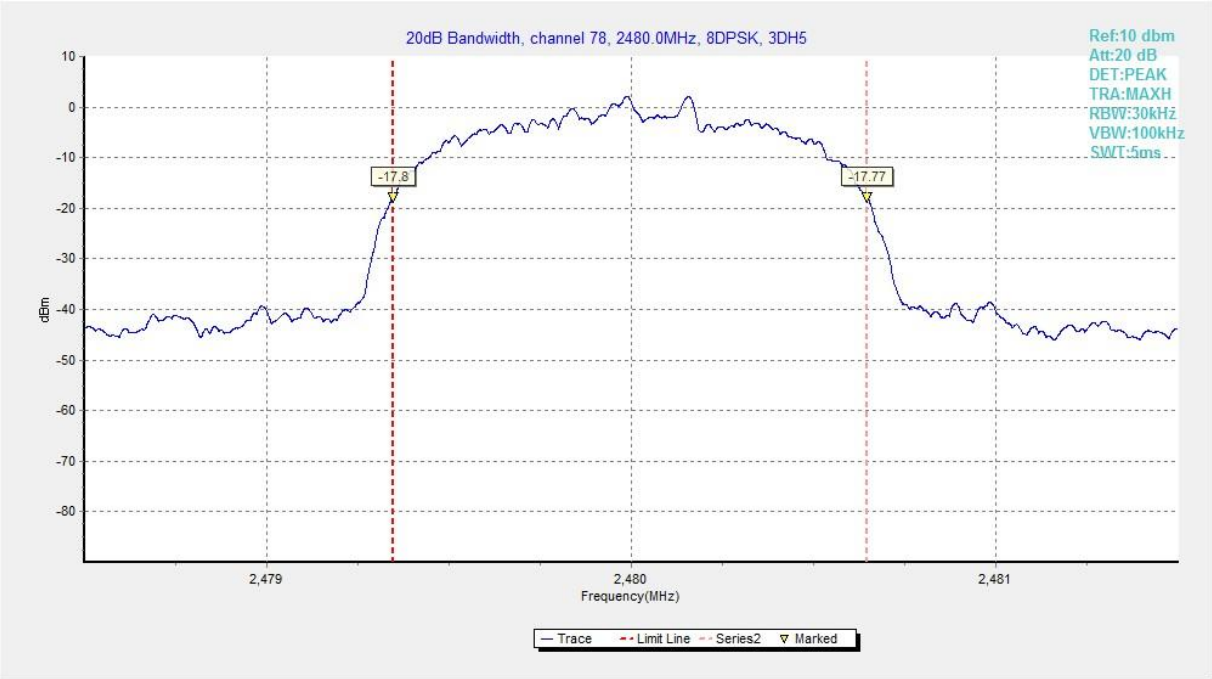

Fig. 77 20dB Bandwidth (8DPSK, Ch 78)

A.6 Time of Occupancy (Dwell Time)

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (a) & RSS-247 section 5.1	< 400 ms

Measurement Results:

Mode	Channel	Packet	Dwell Time(ms)		Conclusion
GFSK	39	DH5	Fig.78	172.38	**P**
			Fig.79		
π /4 DQPSK	39	2-DH5	Fig.80	205.02	**P**
			Fig.81		
8DPSK	39	3-DH5	Fig.82	160.93	**P**
			Fig.83		

See below for test graphs.

Conclusion: Pass

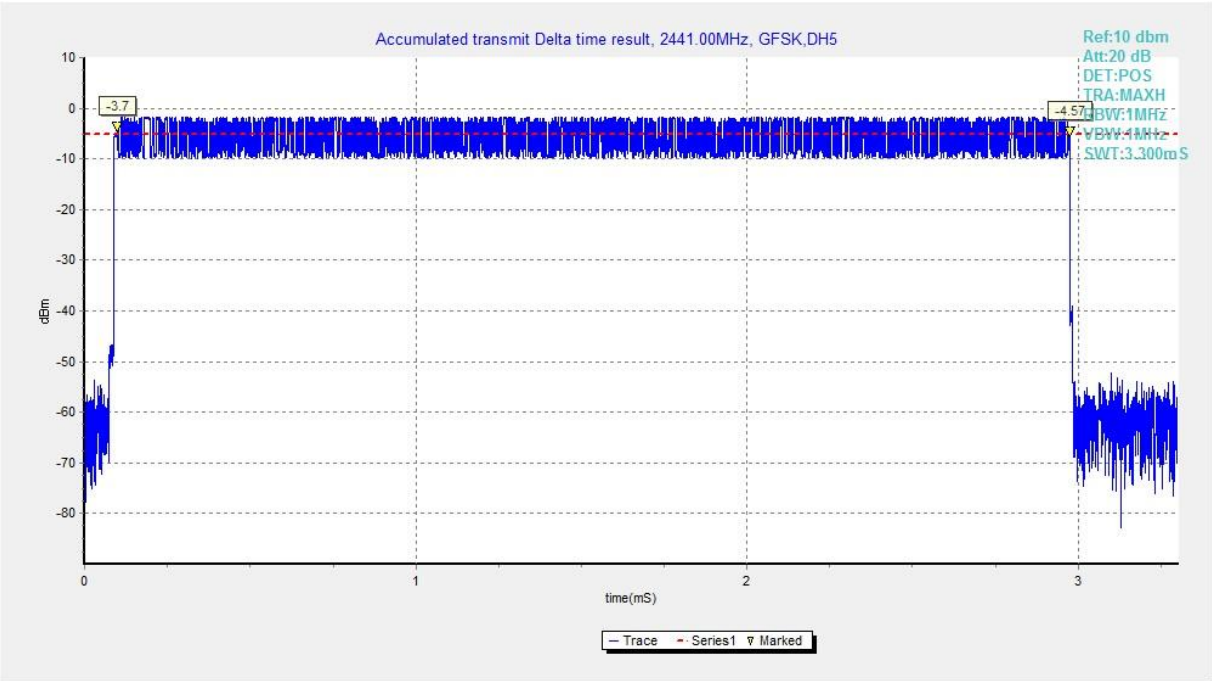

Fig. 78 Time of Occupancy (Dwell Time) (GFSK, Ch39)