TEST REPORT

No. I21N02615-BT

for

TCL Communication Ltd.

MOVEAUDIO S108 TRUE WIRELESS IN-EAR HEADPHONES

Model Name: TW08

with

Hardware Version: YBFR1C2

Software Version: 1.0.0.0

FCC ID: 2ACCJB166

Issued Date: 2021-09-18

Designation Number: CN1210

ISED Assigned Code: 23289

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:

SAICT, Shenzhen Academy of Information and Communications Technology

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1. Summary of Test Report

1.1. Test Items

Description	MOVEAUDIO S108 TRUE WIRELESS IN-EAR HEADPHONES
Model Name	TW08
Applicant's name	TCL Communication Ltd.
Manufacturer's Name	TCL Communication Ltd.

1.2. Test Standards

FCC CFR 47, Part 15, Subpart C-2019

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:	2021-08-21
Testing End Date:	2021-09-17

1.6. Signature

Lin Zechuang

(Prepared this test report)

An Ran

(Reviewed this test report)

Zhang Bojun

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person	Gong Zhizhou
E-Mail	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

2.2. Manufacturer Information

Company Name:	TCL Communication Ltd.
Address:	5/F, Building 22E, 22 Science Park East Avenue, Hong Kong Science Park, Shatin, NT, Hong Kong
Contact Person	Gong Zhizhou
E-Mail	zhizhou.gong@tcl.com
Telephone:	0086-755-36611722
Fax:	0086-755-36612000-81722

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

3.1. About EUT

Description	MOVEAUDIO S108 TRUE WIRELESS IN-EAR HEADPHONES
Model Name	TW08
Frequency Band	2400MHz~2483.5MHz
Type of Modulation	GFSK/ π /4 DQPSK/8DPSK
Number of Channels	79
Antenna Type	Integrated
Antenna Gain	-0.93dBi
Power Supply	3.7V DC by Battery
FCC ID	2ACCJB166
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
UT01aa	/	YBFR1C2	1.0.0.0	2021-08-20
UT02aa	/	YBFR1C2	1.0.0.0	2021-08-20

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

3.3. Internal Identification of AE used during the test

AE ID*	Description	AE ID*
AE1	Battery	/

*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 MOVEAUDIO S108 TRUE WIRELESS IN-EAR HEADPHONES (the left headphone) with integrated antenna and battery.
It consists of normal options: Charger.
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

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	**/**
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	**NA**

See **ANNEX A** for details.

NA: Because the device can not use Bluetooth function when charging, the conducted continuous disturbance test is not required.

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	2021-12-30	1 year
2	Bluetooth Tester	CBT32	100584	Rohde & Schwarz	2021-12-30	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	2024-05-27	3 years
3	Horn Antenna	3117	00066577	ETS-Lindgren	2022-04-02	3 years
4	Test Receiver	ESR7	101676	Rohde & Schwarz	2021-11-25	1 year
5	Spectrum Analyser	FSV40	101192	Rohde & Schwarz	2022-01-13	1 year
6	Chamber	FACT3-2.0	1285	ETS-Lindgren	2023-05-29	2 years
7	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

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. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4Ω
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	< 4Ω

Fully-anechoic chamber

Temperature	Min. = 15 ℃, Max. = 35 ℃
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4Ω
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

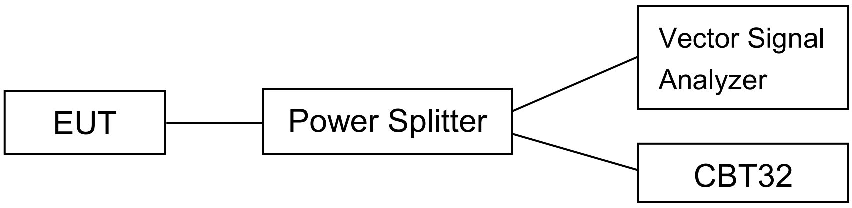
ANNEX A: Detailed Test Results

Test Configuration

The measurement is made according to ANSI C63.10.

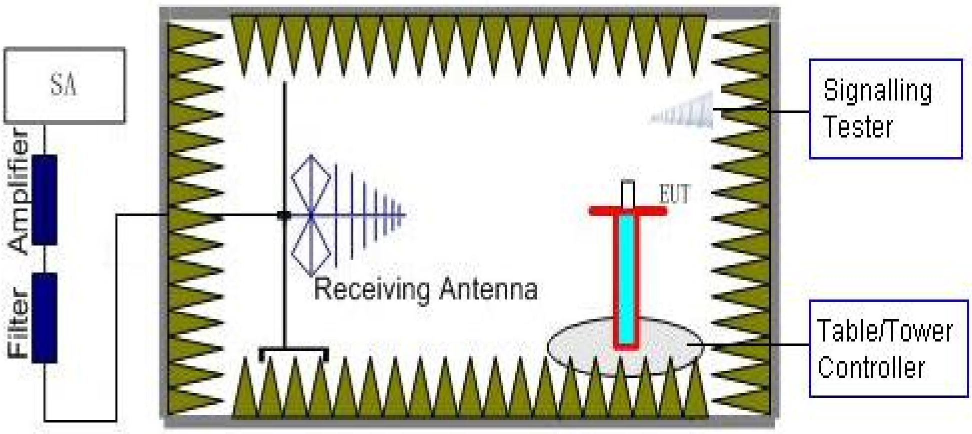
1) Conducted Measurements

1. Connect the EUT to the test system correctly.
2. Set the EUT to the required work mode.
3. Set the EUT to the required channel.
4. Set the EUT hopping mode (hopping on or hopping off).
5. Set the spectrum analyzer to start measurement.
6. Record the values.



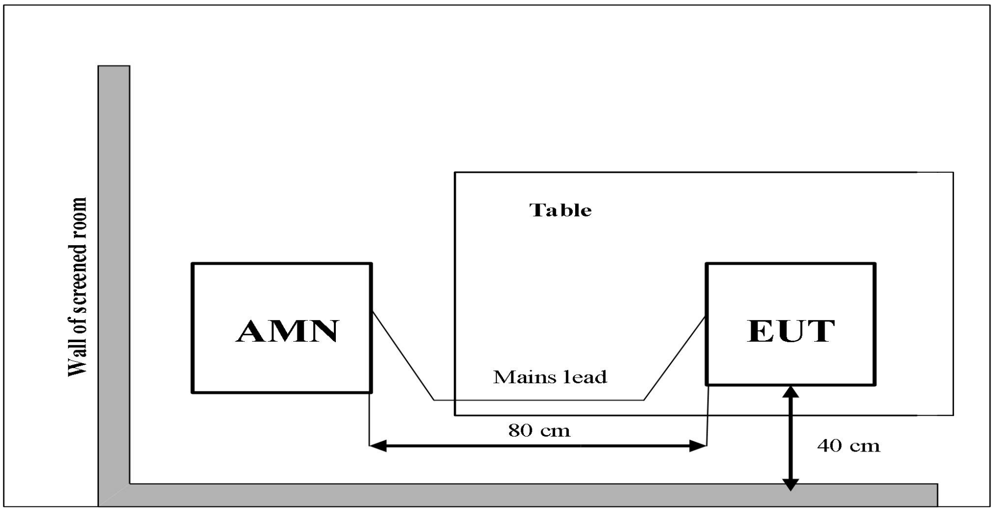
2) Radiated Measurements

Test setup: EUT was placed on a 1.5 meter high non-conductive table at a 3 meter test distance from the receive antenna. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiving antenna polarization.



3) AC Power line Conducted Emission Measurement

The EUT is working as Bluetooth terminal. A communication link of Bluetooth is set up with a System Simulator (SS). The EUT is commanded to operate at maximum transmitting power.



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 -0.93dBi.
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.
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)	E.I.R.P Limit (dBm)
FCC CRF Part 15.247(b)(1) & RSS-247 Section 5.4	< 30	< 36

Measurement Results:

Mode	Peak Conducted Output Power (dBm)		
	2402MHz (Ch0)	2441MHz (Ch39)	2480MHz (Ch78)
GFSK	5.57	3.97	2.19
π /4 DQPSK	5.86	4.27	2.52
8DPSK	5.91	4.38	2.58

The E.I.R.P Results are listed below:

Mode	E.I.R.P (dBm)		
	2402MHz (Ch0)	2441MHz (Ch39)	2480MHz (Ch78)
GFSK	4.64	3.04	1.26
π /4 DQPSK	4.93	3.34	1.59
8DPSK	4.98	3.45	1.65

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

Conclusion: Pass

A.2 Band Edges Compliance

Measurement Limit:

Standard	Limit (dB)
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

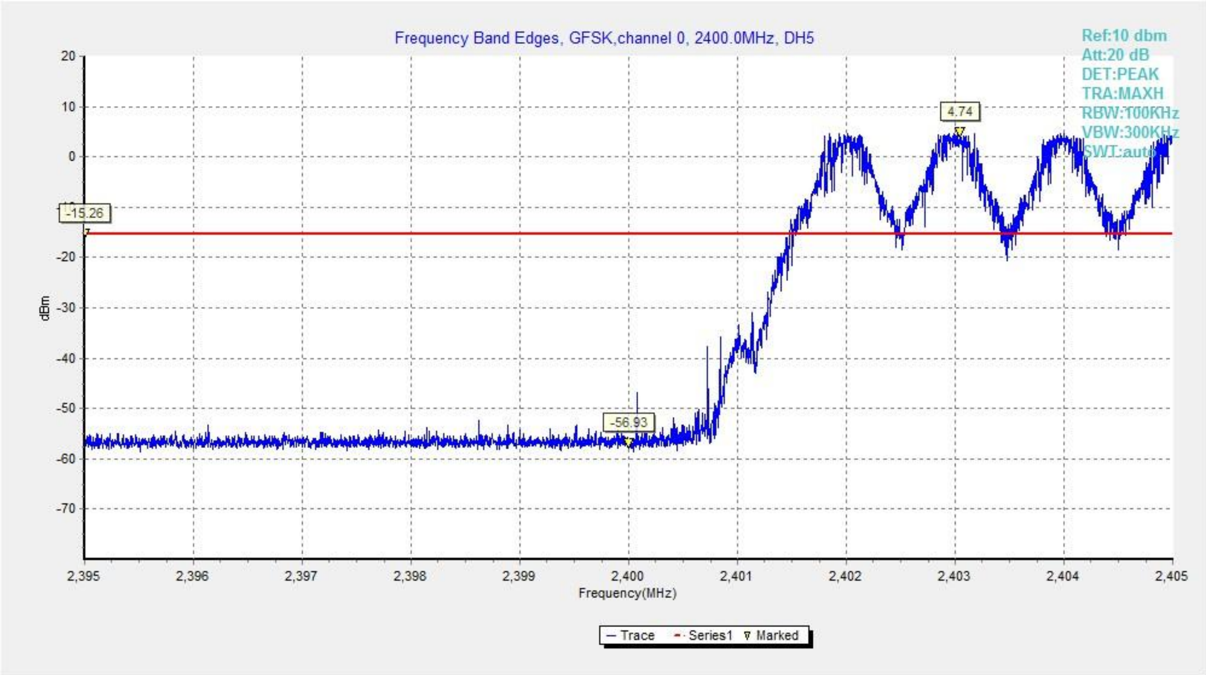


Fig. 1 Band Edges (GFSK, Ch 0, Hopping ON)

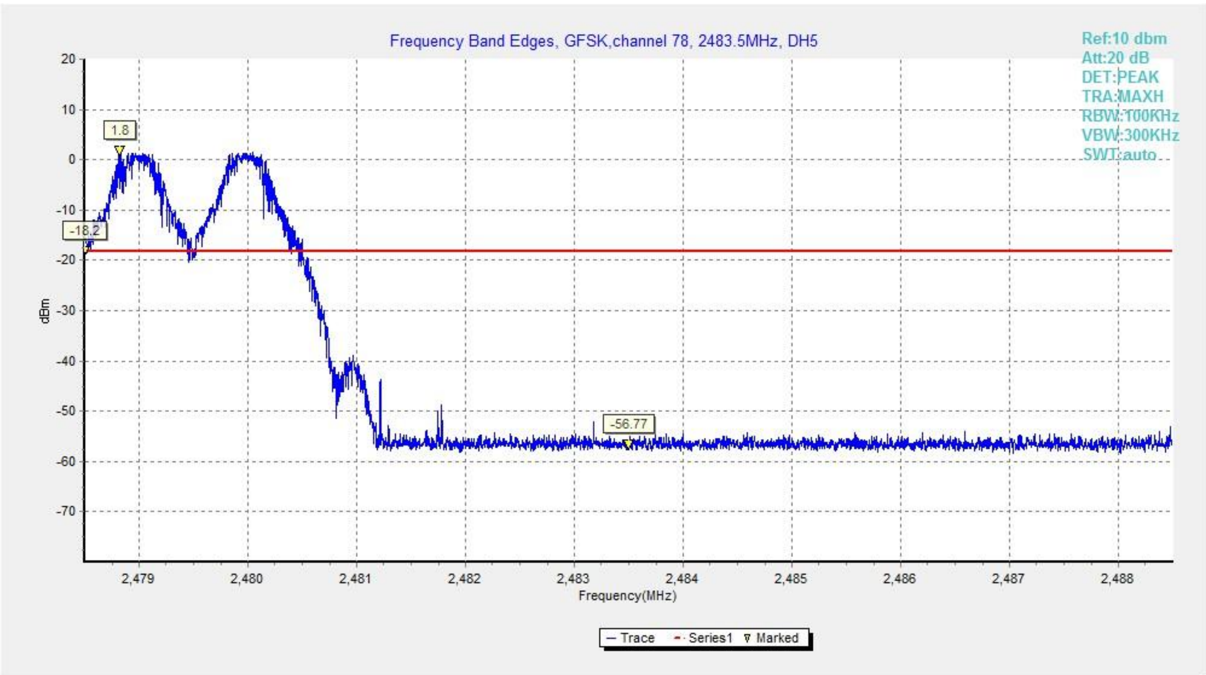


Fig. 2 Band Edges (GFSK, Ch 78, Hopping ON)

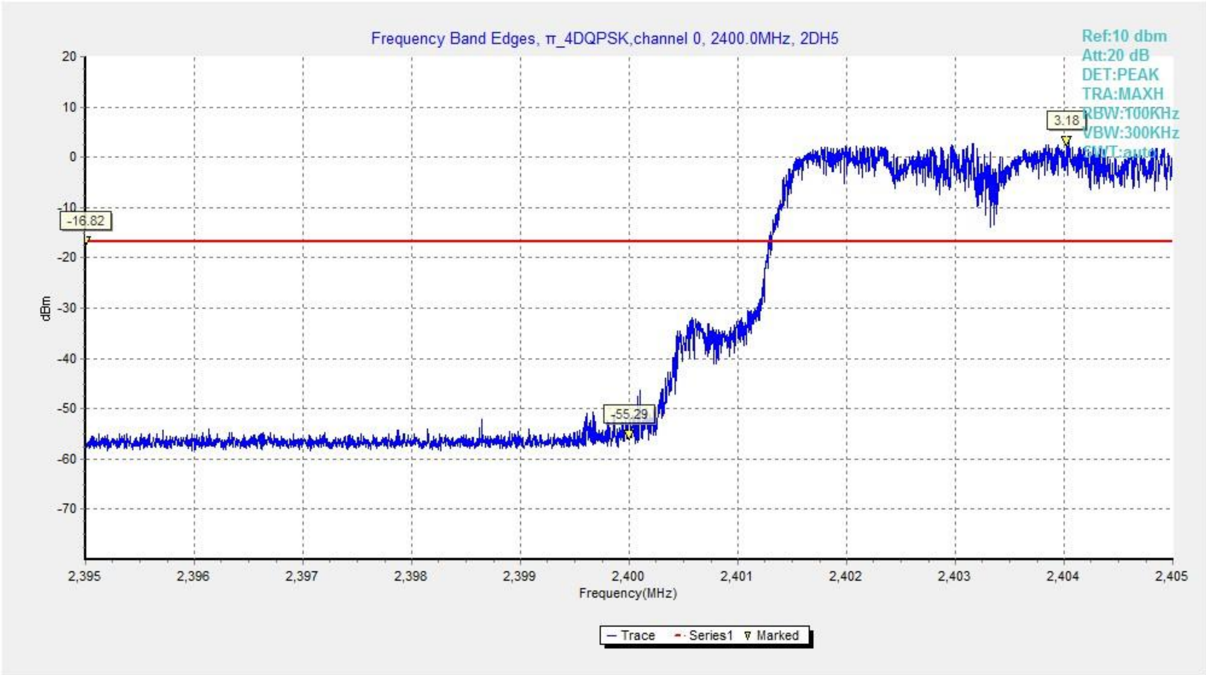


Fig. 3 Band Edges (π /4 DQPSK, Ch 0, Hopping ON)

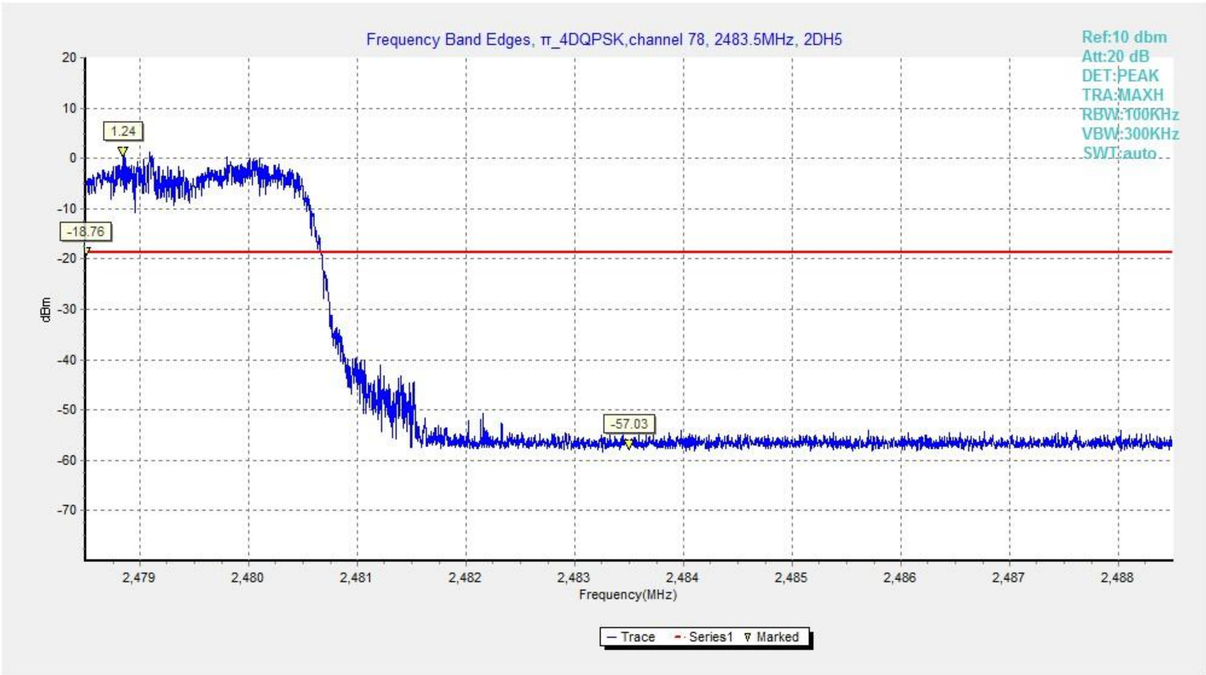


Fig. 4 Band Edges (π /4 DQPSK, Ch 78, Hopping ON)

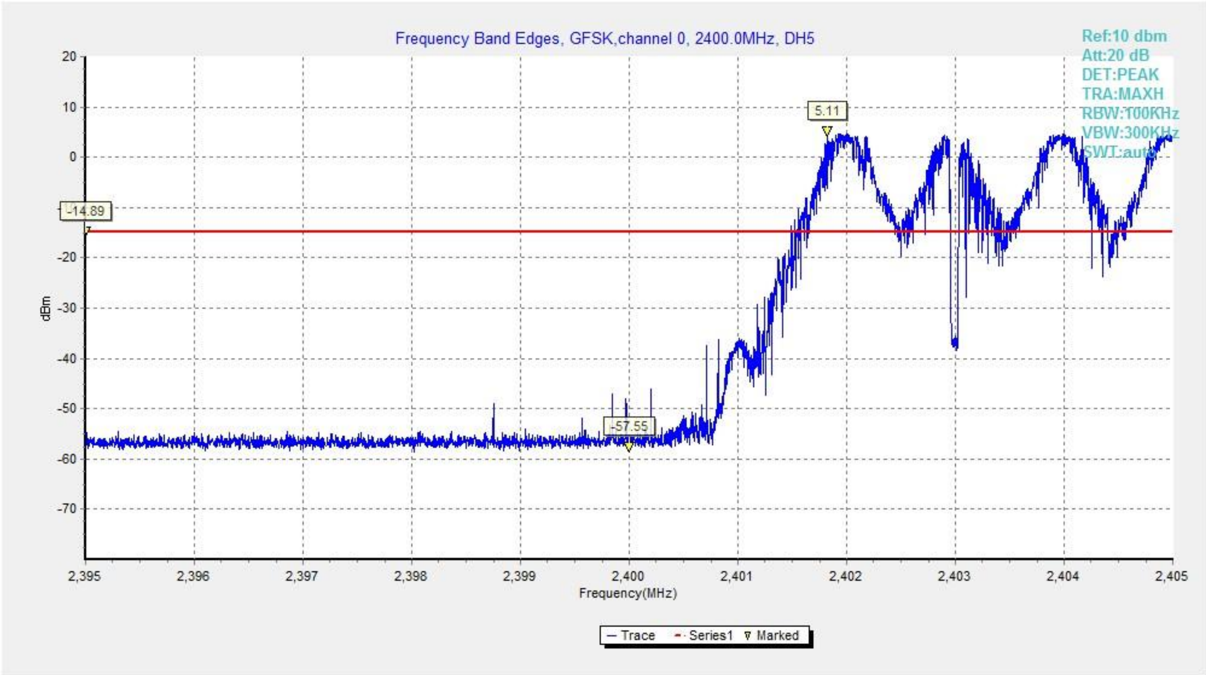


Fig. 5 Band Edges (8DPSK, Ch 0, Hopping ON)

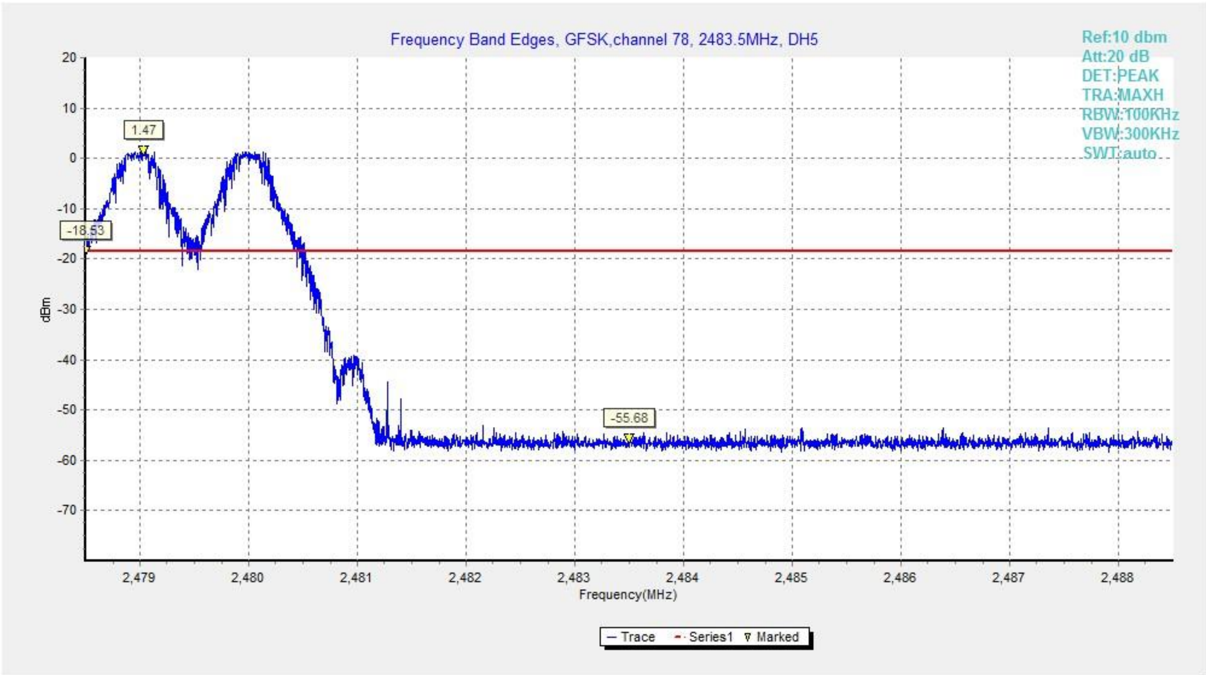


Fig. 6 Band Edges (8DPSK, Ch 78, Hopping ON)

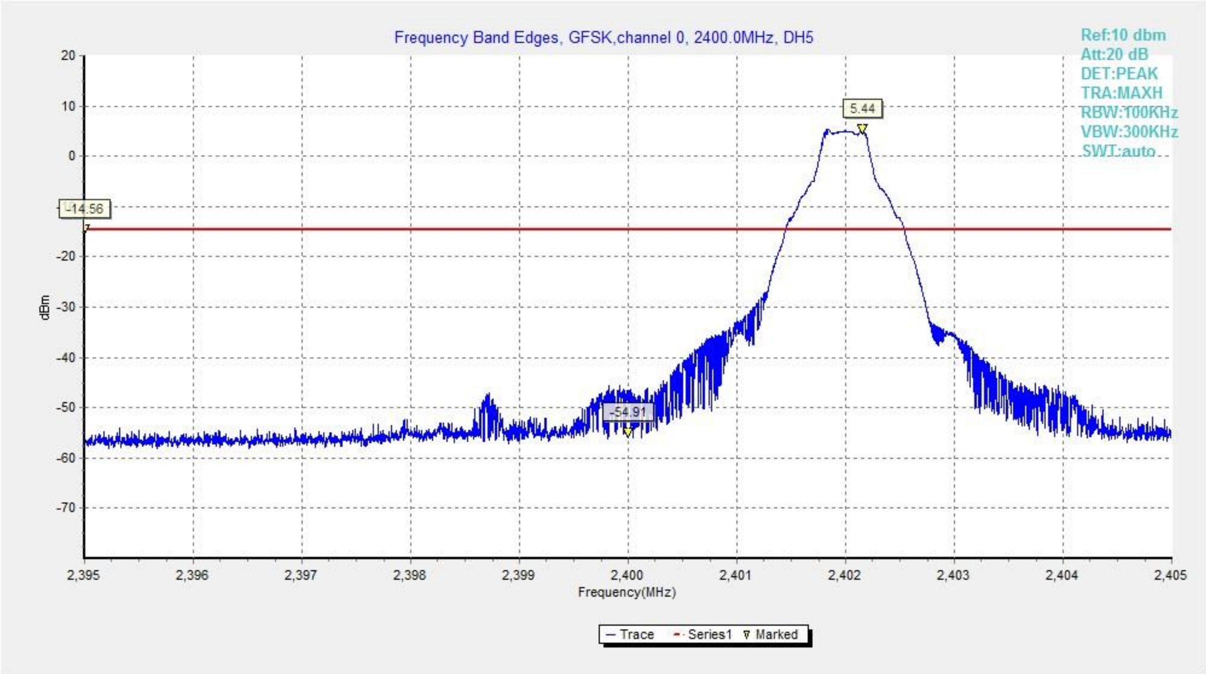


Fig. 7 Band Edges (GFSK, Ch 0, Hopping OFF)

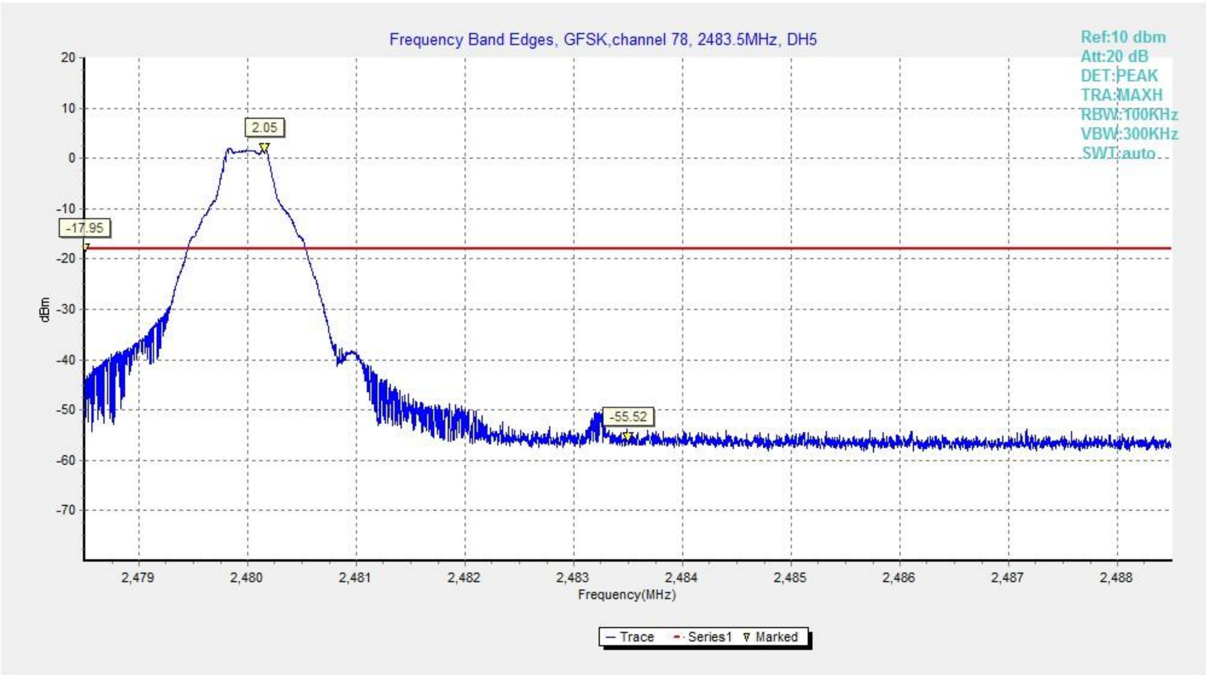


Fig. 8 Band Edges (GFSK, Ch 78, Hopping OFF)

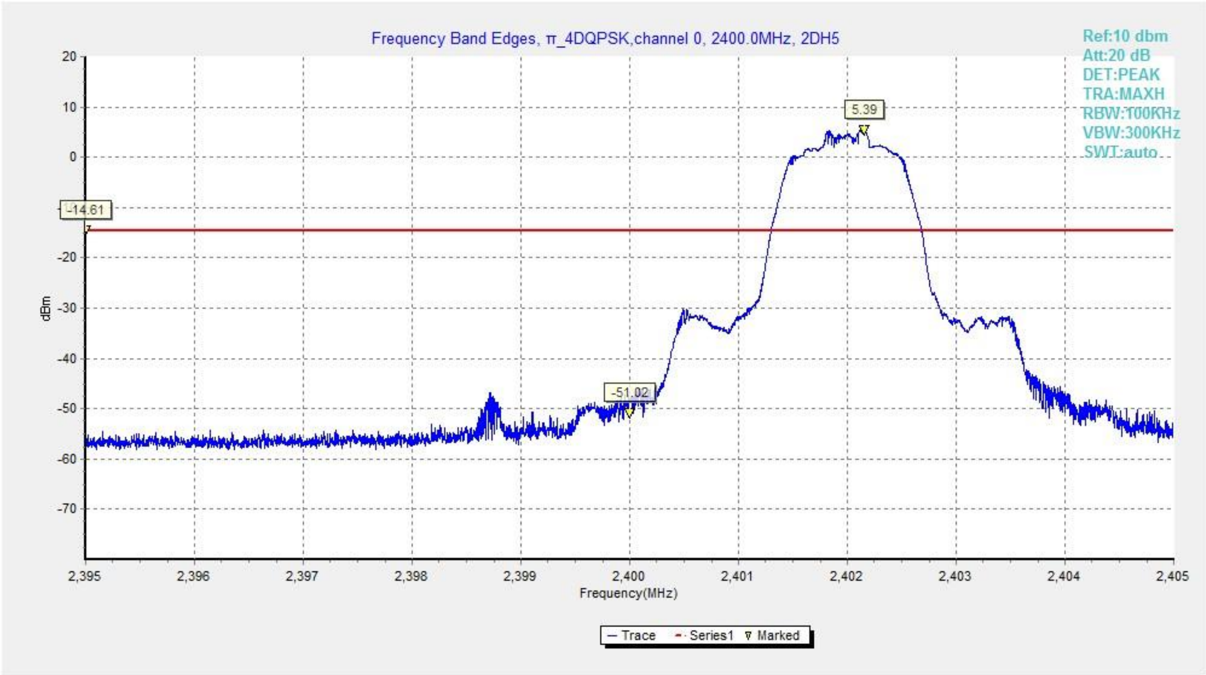


Fig. 9 Band Edges (π /4 DQPSK, Ch 0, Hopping OFF)

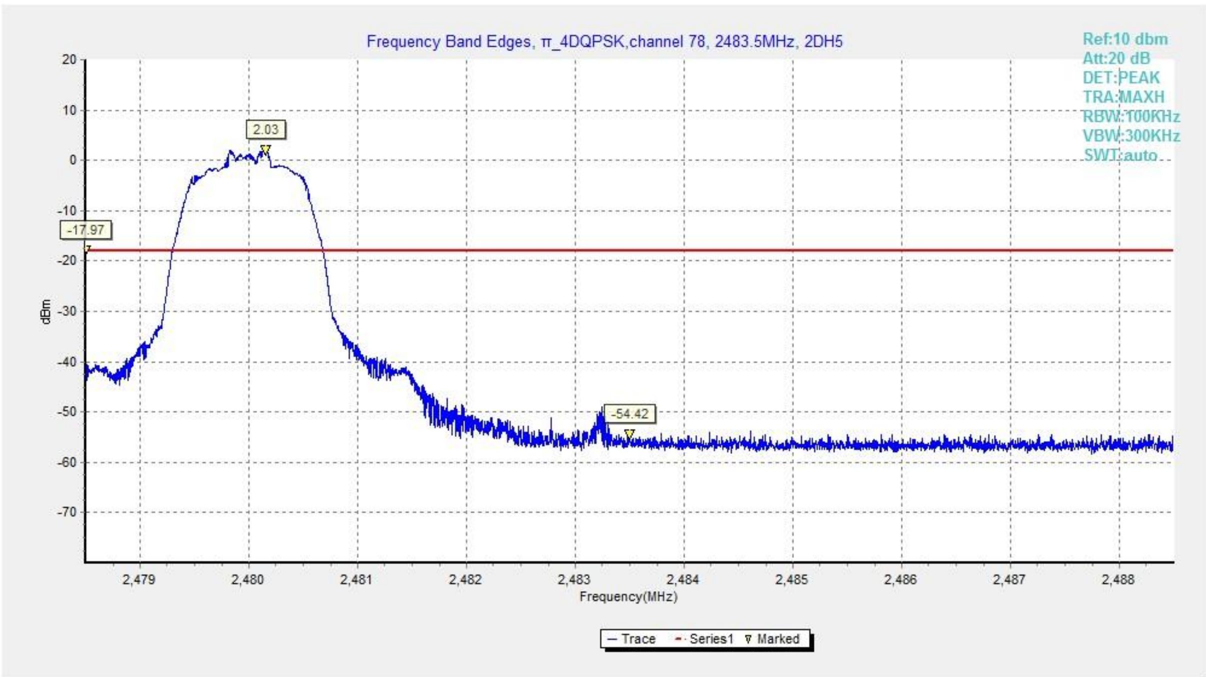


Fig. 10 Band Edges (π /4 DQPSK, Ch 78, Hopping OFF)

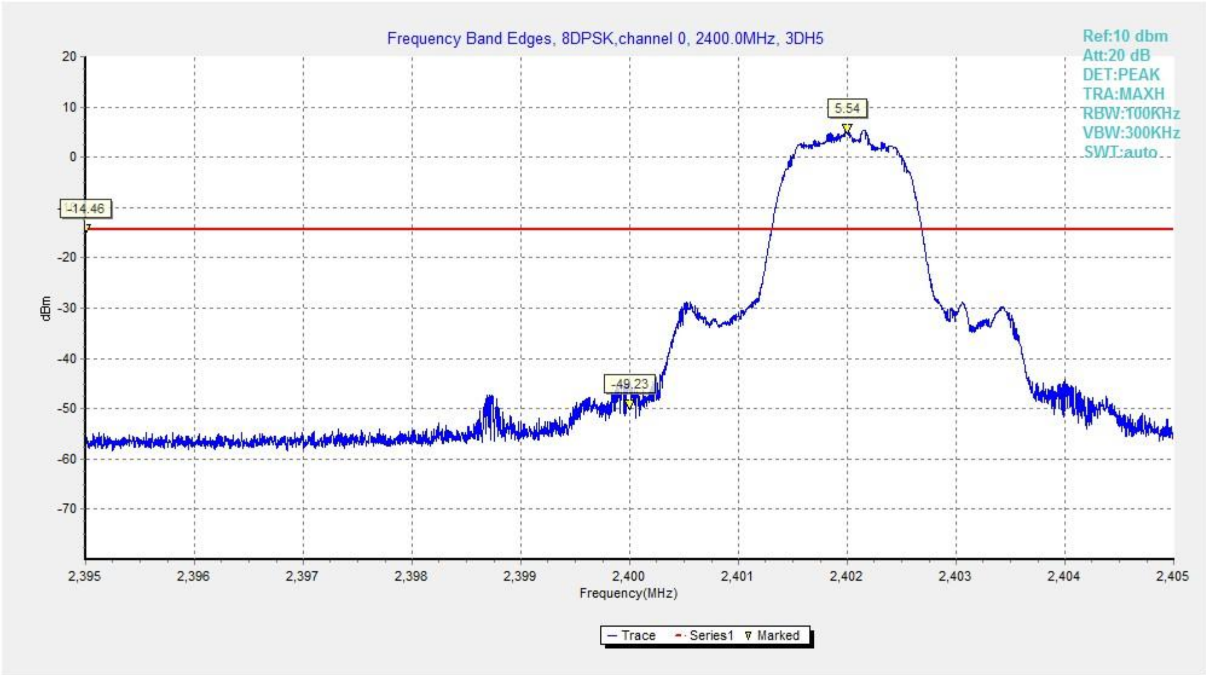


Fig. 11 Band Edges (8DPSK, Ch 0, Hopping OFF)

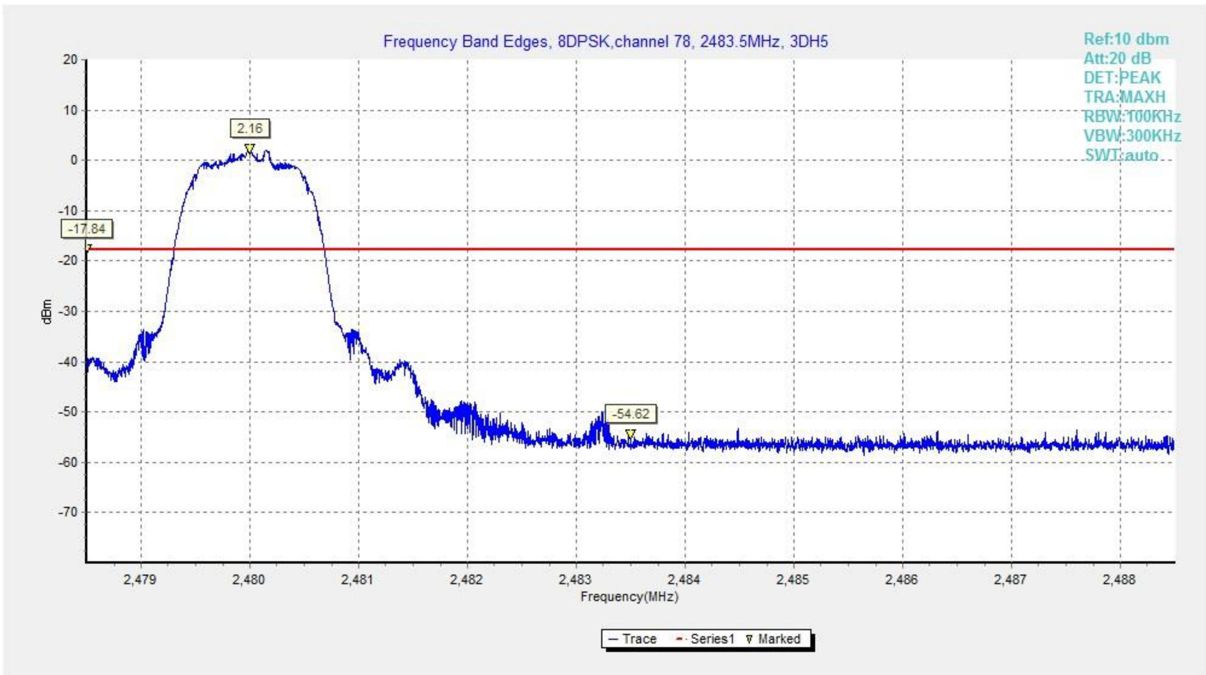


Fig. 12 Band Edges (8DPSK, Ch 78, Hopping OFF)

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	1GHz-3GHz	Fig.13	P
		3GHz-10GHz	Fig.14	P
	39	1GHz-3GHz	Fig.15	P
		3GHz-10GHz	Fig.16	P
	78	1GHz-3GHz	Fig.17	P
		3GHz-10GHz	Fig.18	P
π /4 DQPSK	0	1GHz-3GHz	Fig.19	P
		3GHz-10GHz	Fig.20	P
	39	1GHz-3GHz	Fig.21	P
		3GHz-10GHz	Fig.22	P
	78	1GHz-3GHz	Fig.23	P
		3GHz-10GHz	Fig.24	P
8DPSK	0	1GHz-3GHz	Fig.25	P
		3GHz-10GHz	Fig.26	P
	39	1GHz-3GHz	Fig.27	P
		3GHz-10GHz	Fig.28	P
	78	1GHz-3GHz	Fig.29	P
		3GHz-10GHz	Fig.30	P
/	All channels	30 MHz-1GHz	Fig.31	P
		10GHz-26GHz	Fig.32	P

See below for test graphs.

Conclusion: Pass

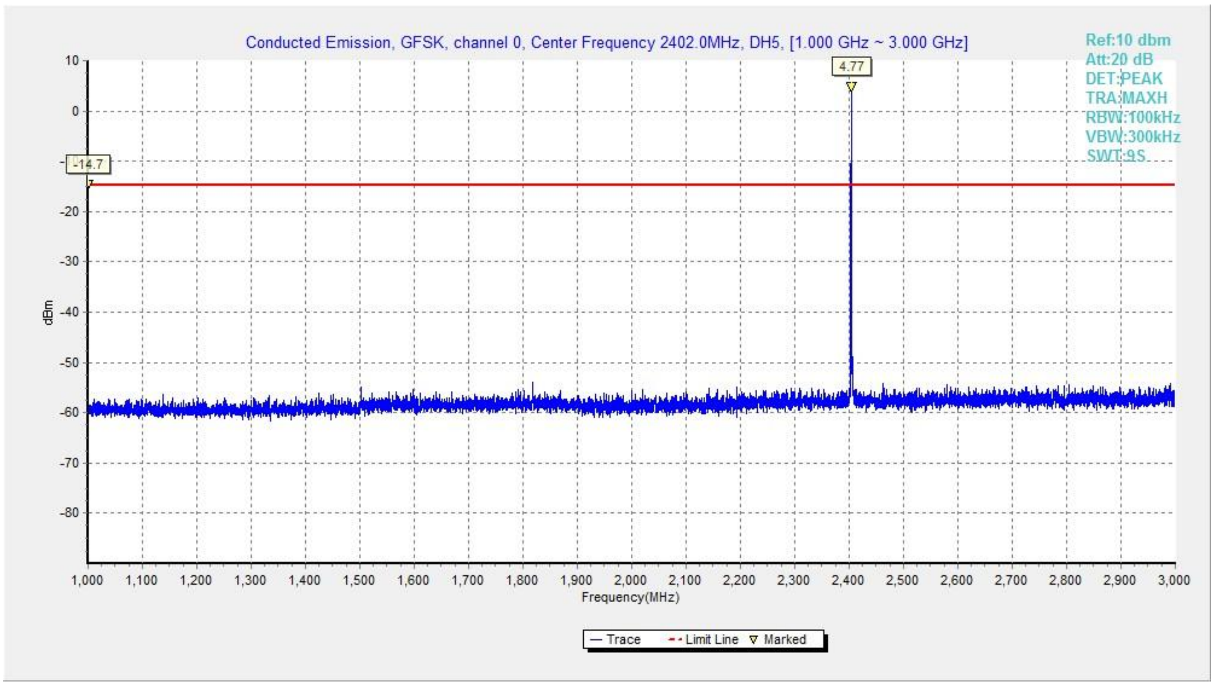


Fig. 13 Conducted Spurious Emission (GFSK, Ch0, 1 GHz-3 GHz)

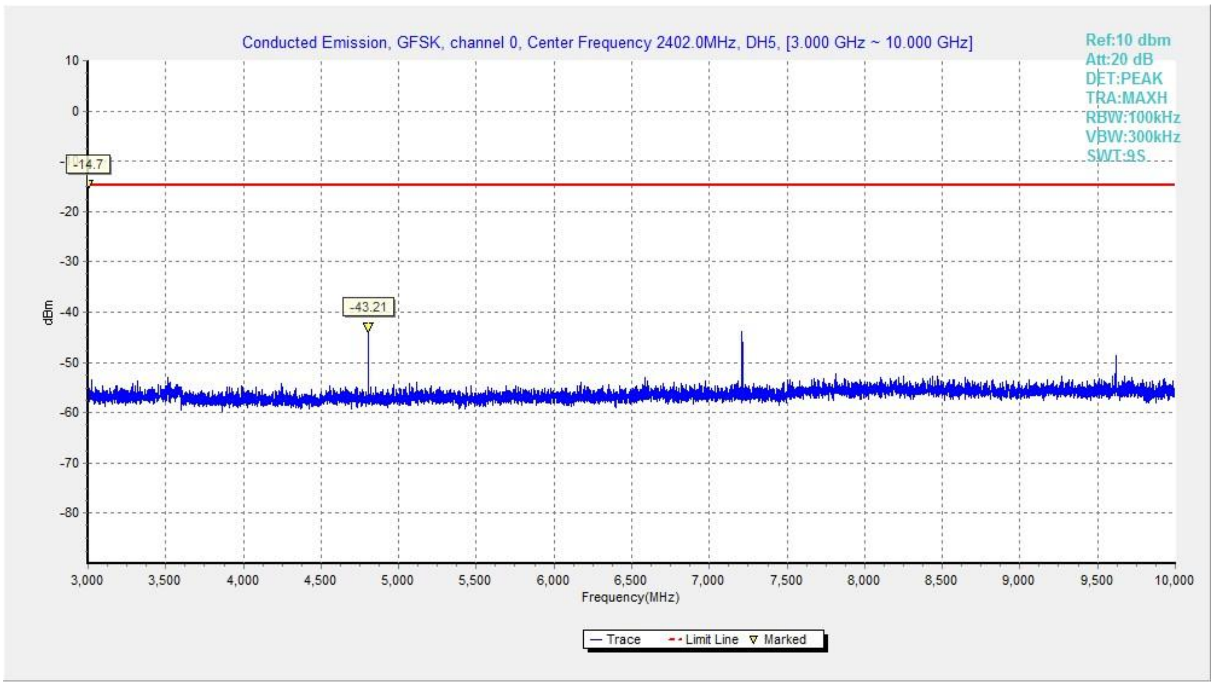


Fig. 14 Conducted Spurious Emission (GFSK, Ch0, 3GHz-10 GHz)

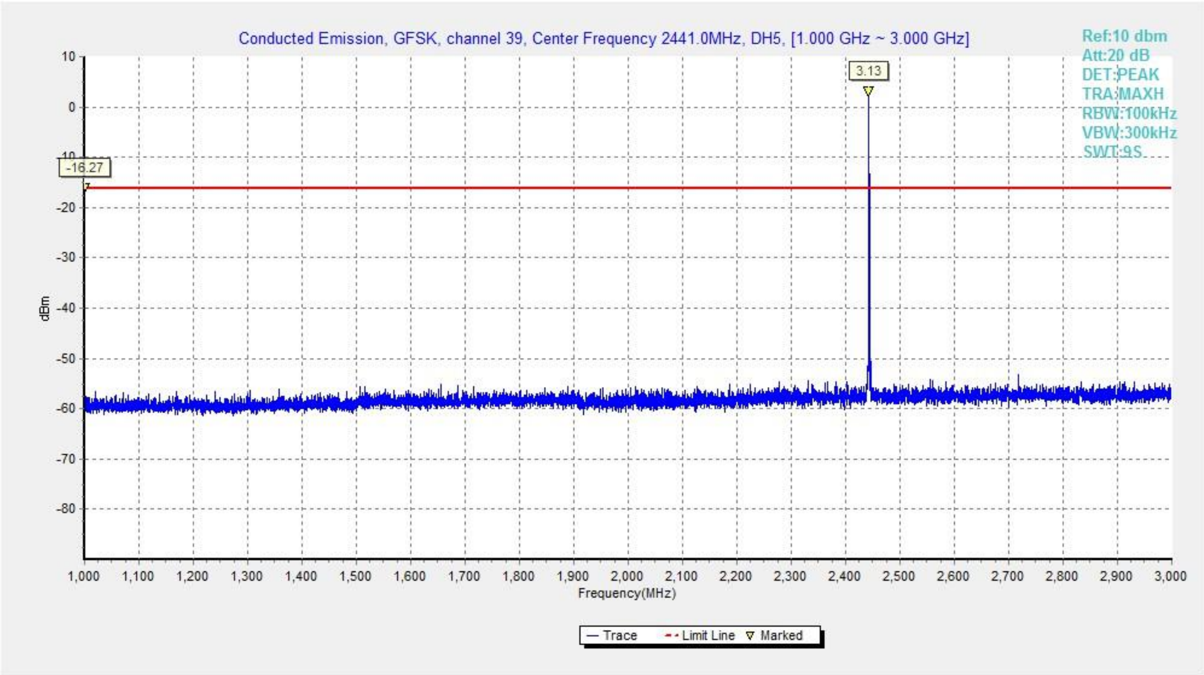


Fig. 15 Conducted Spurious Emission (GFSK, Ch39, 1GHz-3 GHz)

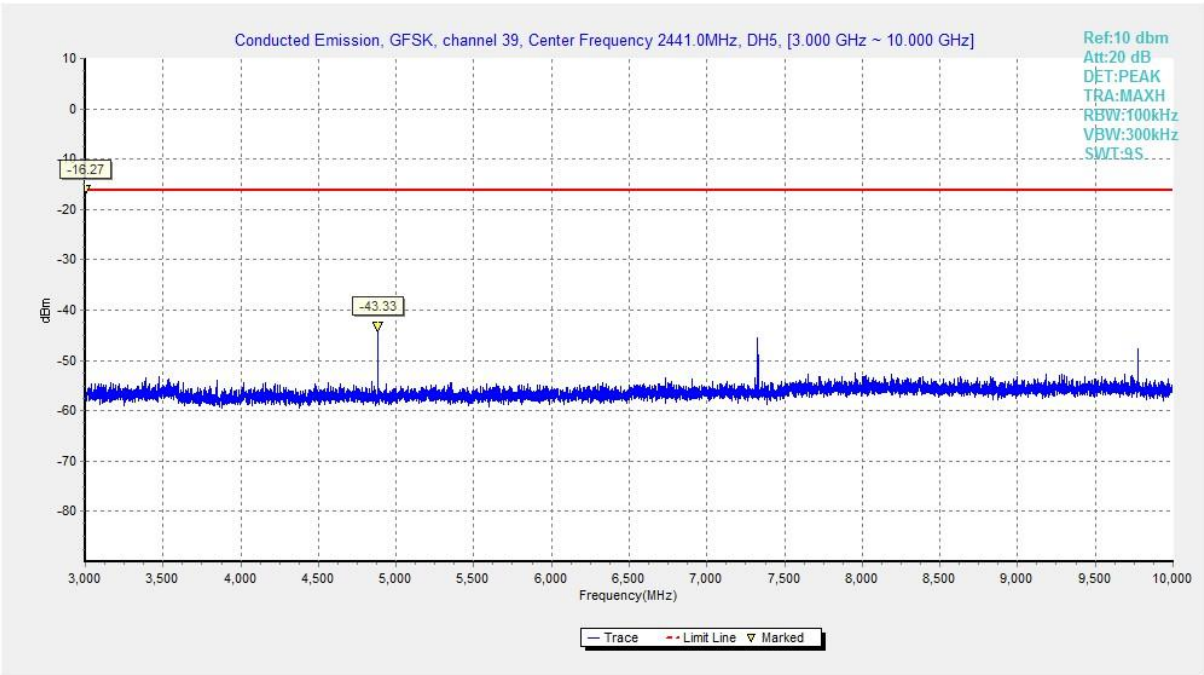


Fig. 16 Conducted Spurious Emission (GFSK, Ch39, 3GHz-10 GHz)

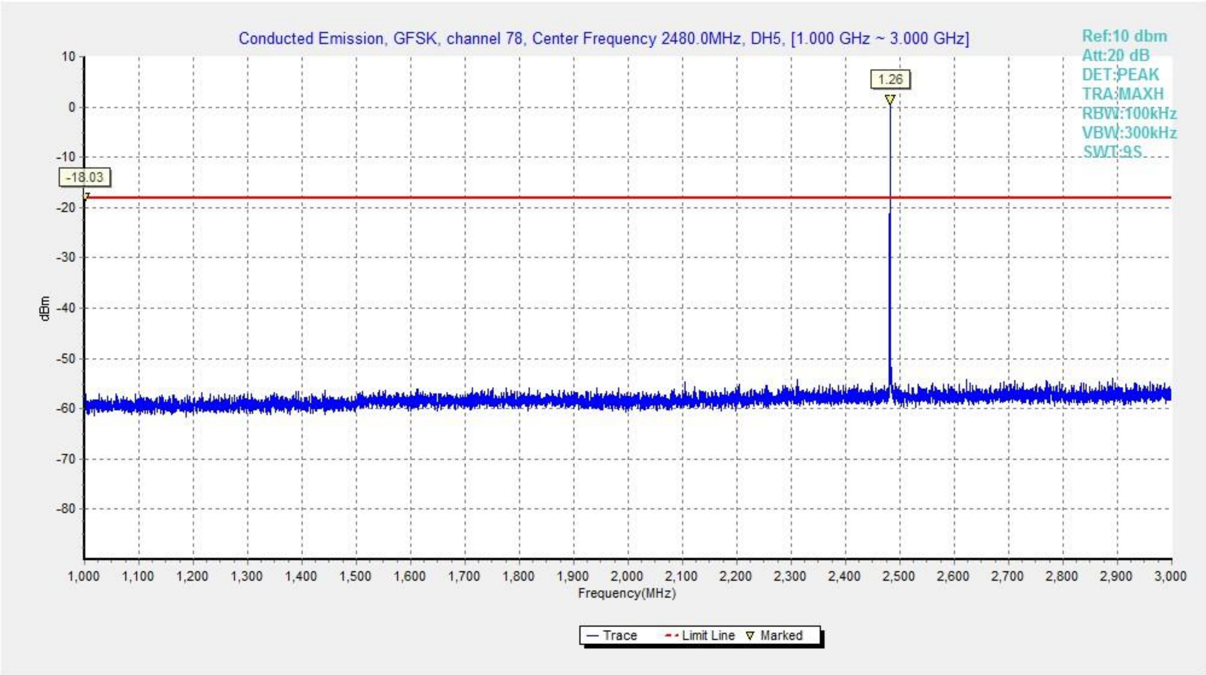


Fig. 17 Conducted Spurious Emission (GFSK, Ch78, 1GHz-3 GHz)

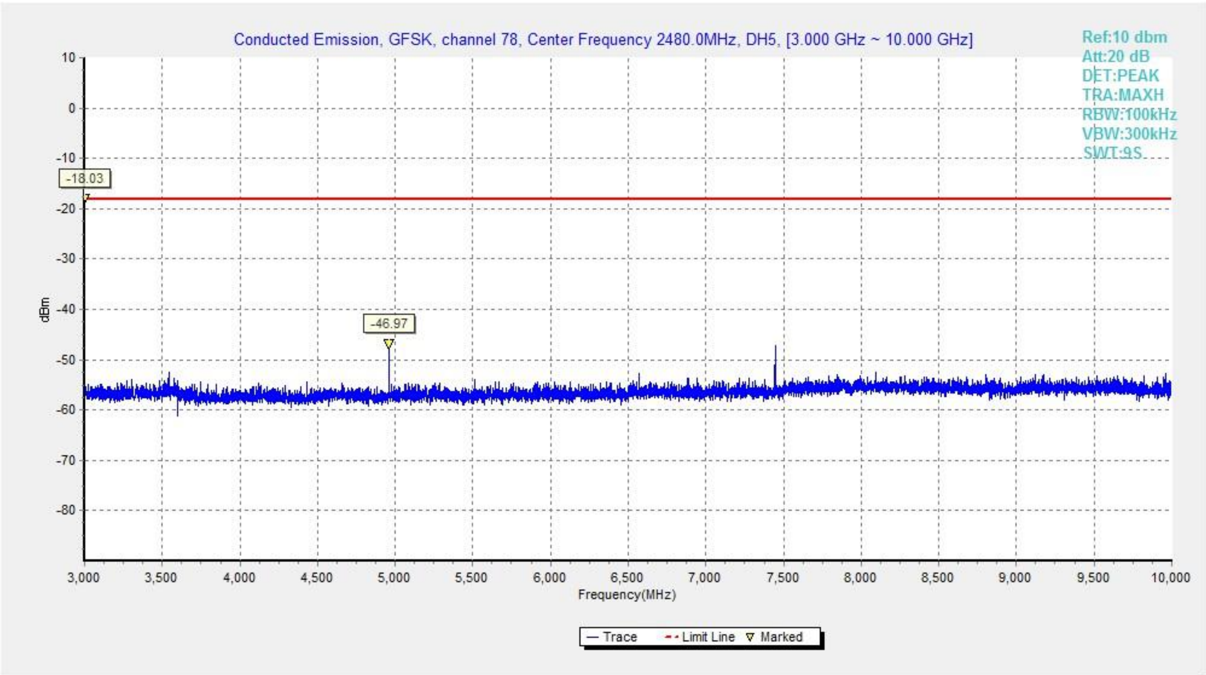


Fig. 18 Conducted Spurious Emission (GFSK, Ch78, 3GHz-10 GHz)

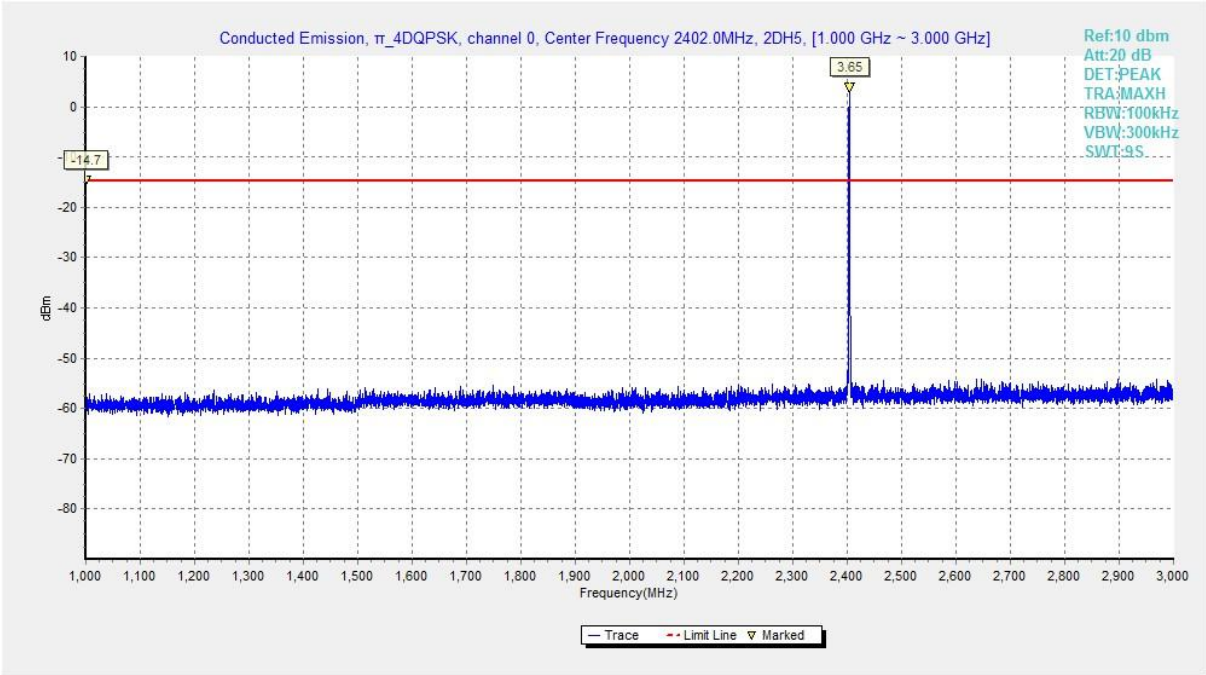


Fig. 19 Conducted Spurious Emission (π/4 DQPSK, Ch0, 1GHz-3 GHz)

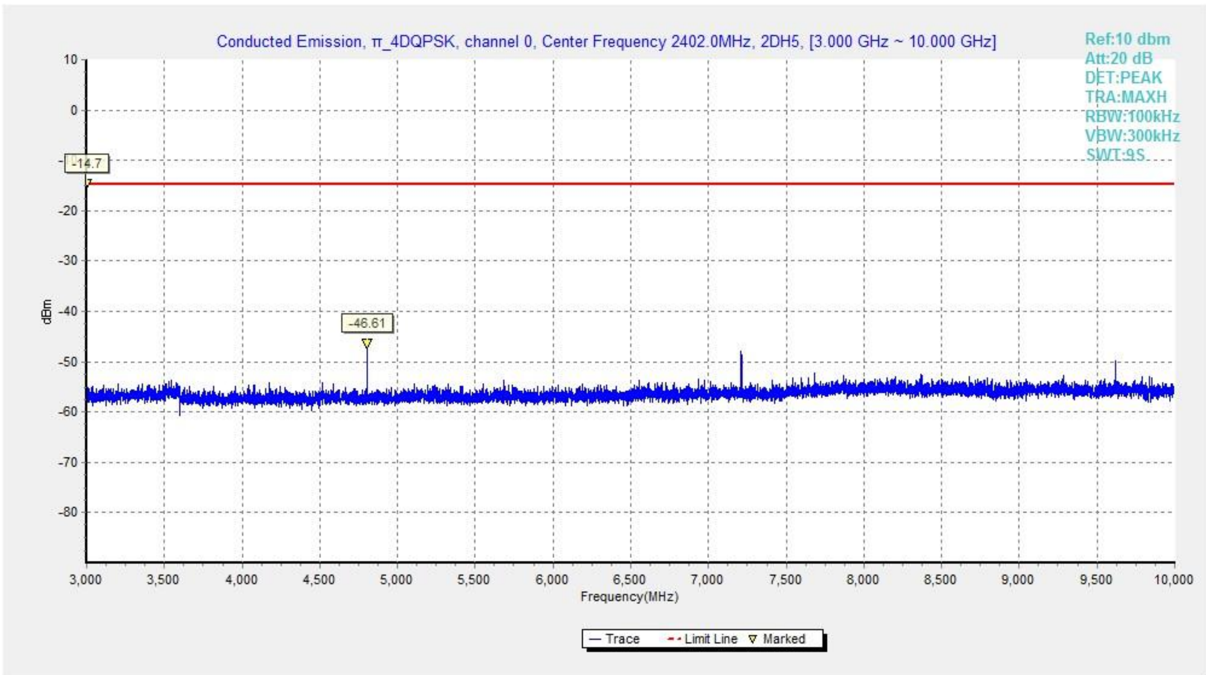


Fig. 20 Conducted Spurious Emission (π/4 DQPSK, Ch0, 3GHz-10 GHz)

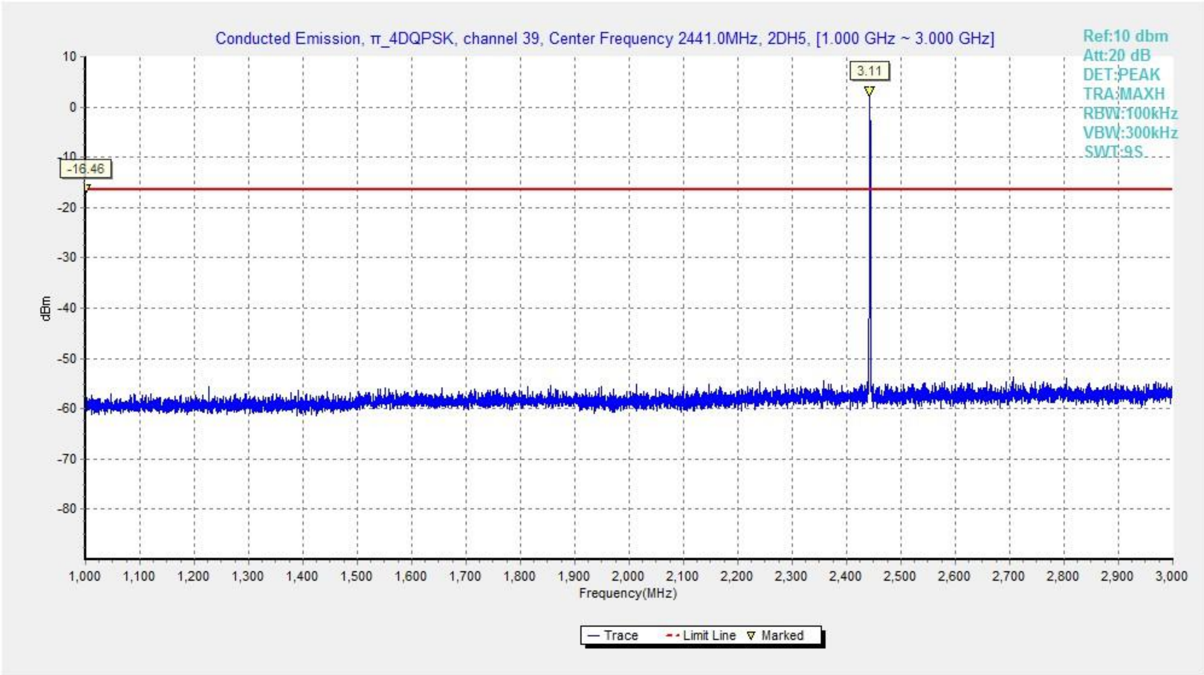


Fig. 21 Conducted Spurious Emission (π /4 DQPSK, Ch39, 1GHz-3 GHz)

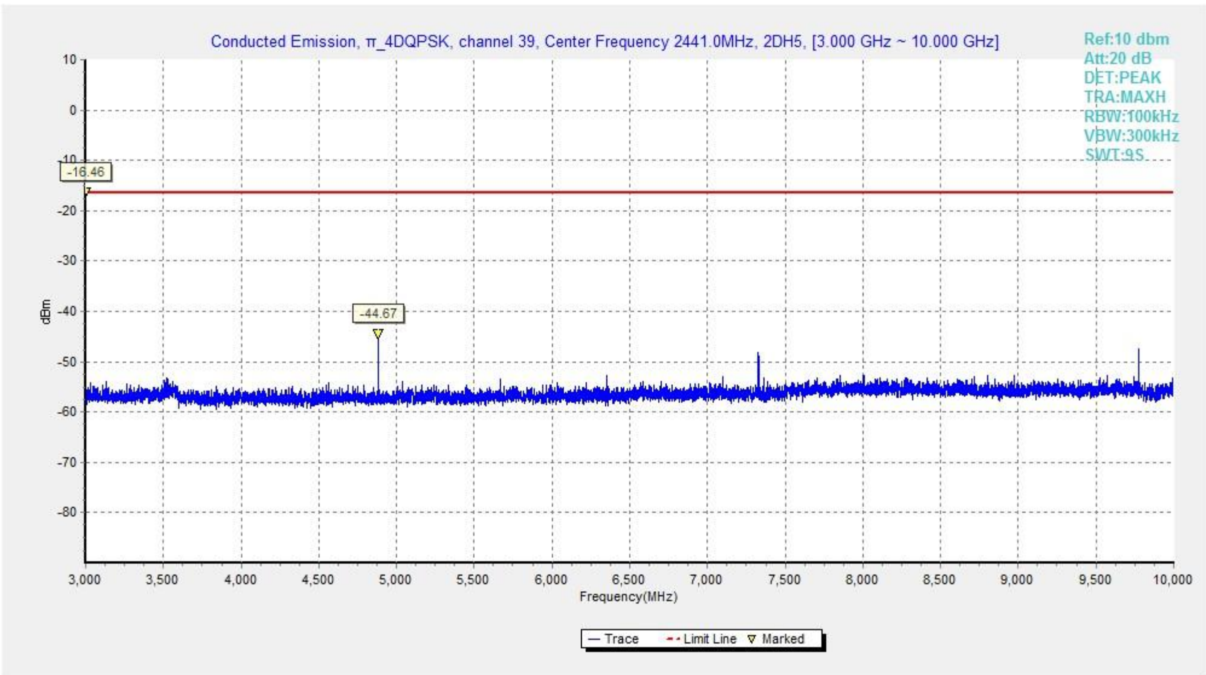


Fig. 22 Conducted Spurious Emission (π /4 DQPSK, Ch39, 3GHz-10 GHz)

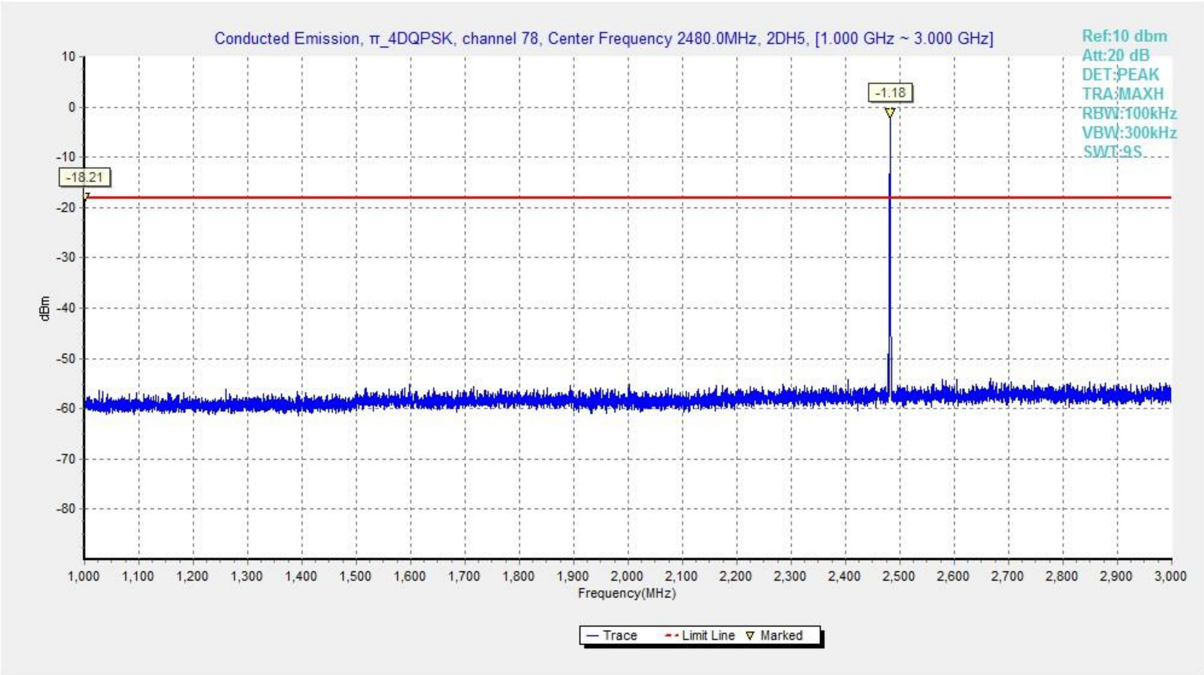


Fig. 23 Conducted Spurious Emission (π /4 DQPSK, Ch78, 1GHz-3 GHz)

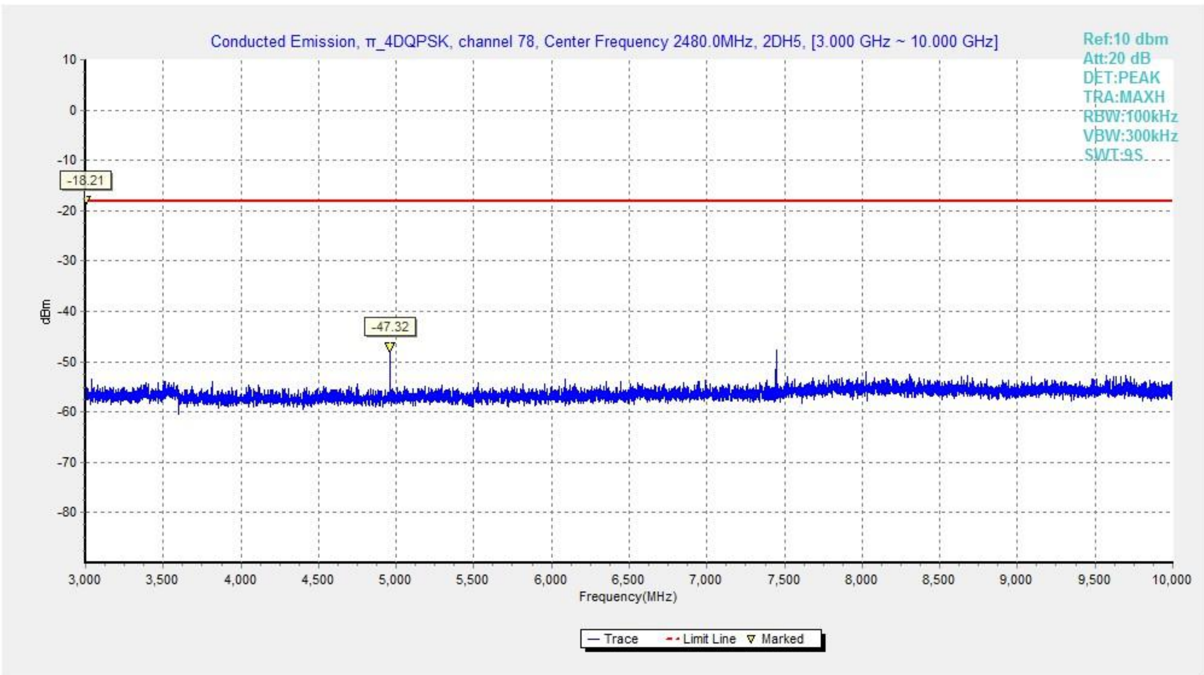


Fig. 24 Conducted Spurious Emission (π /4 DQPSK, Ch78, 3GHz-10 GHz)

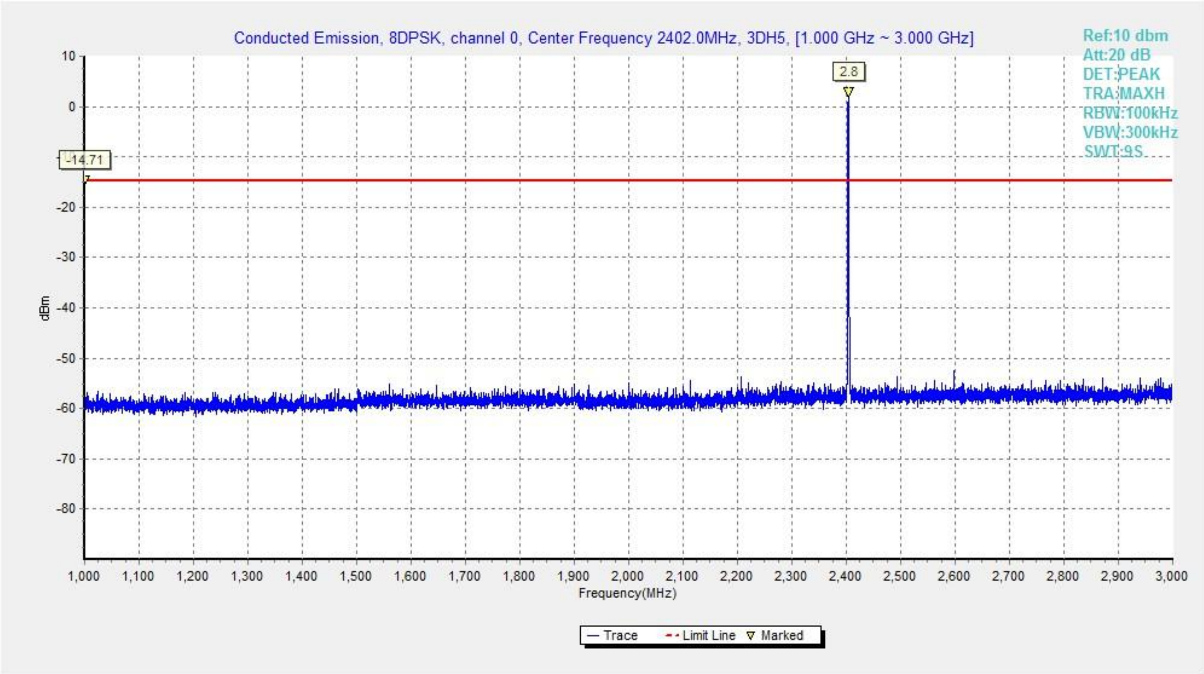


Fig. 25 Conducted Spurious Emission (8DPSK, Ch0, 1GHz-3 GHz)

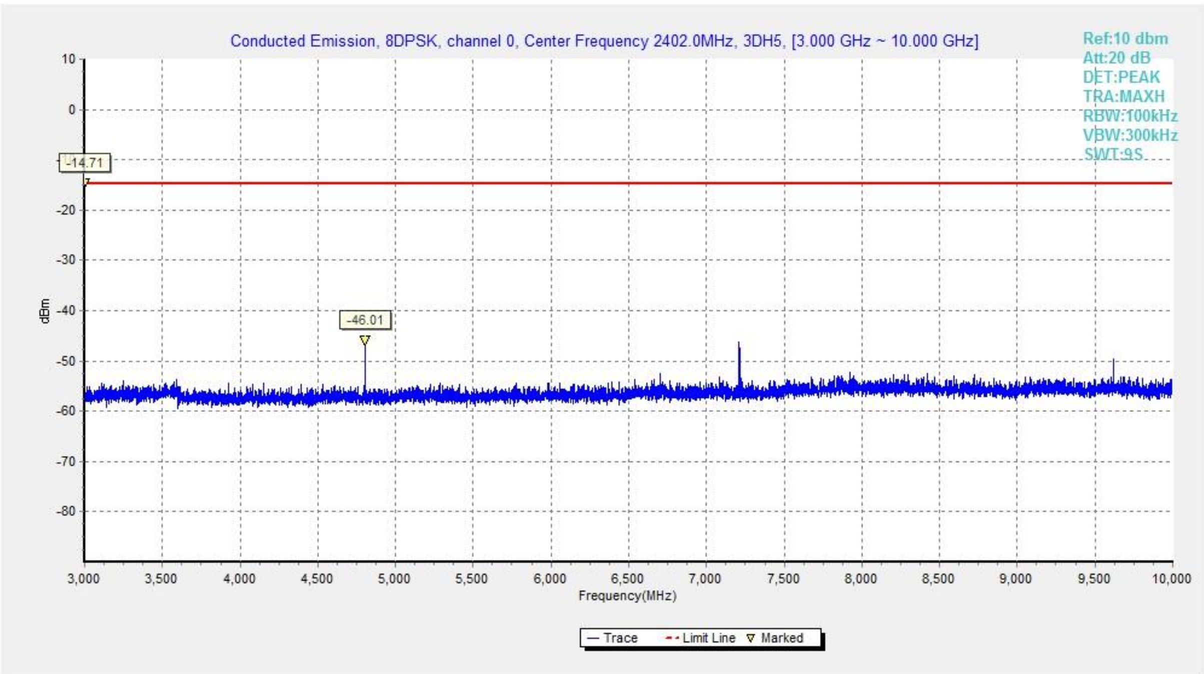


Fig. 26 Conducted Spurious Emission (8DPSK, Ch0, 3GHz-10 GHz)

\

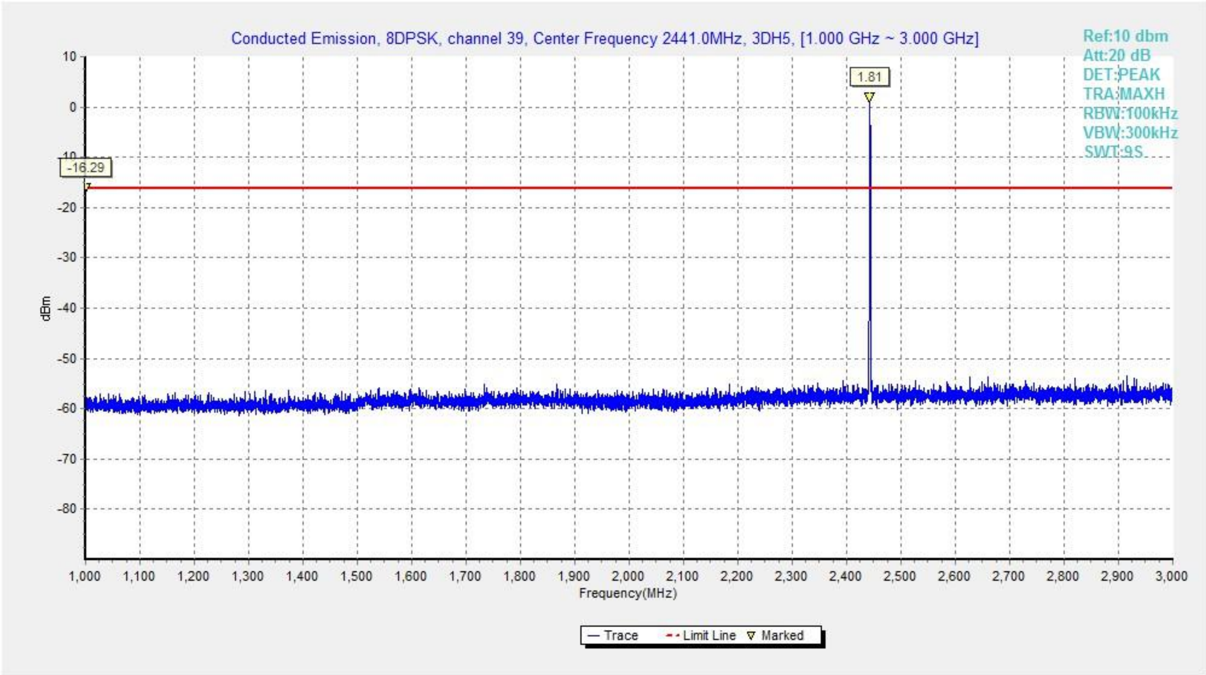


Fig. 27 Conducted Spurious Emission (8DPSK, Ch39, 1GHz-3 GHz)

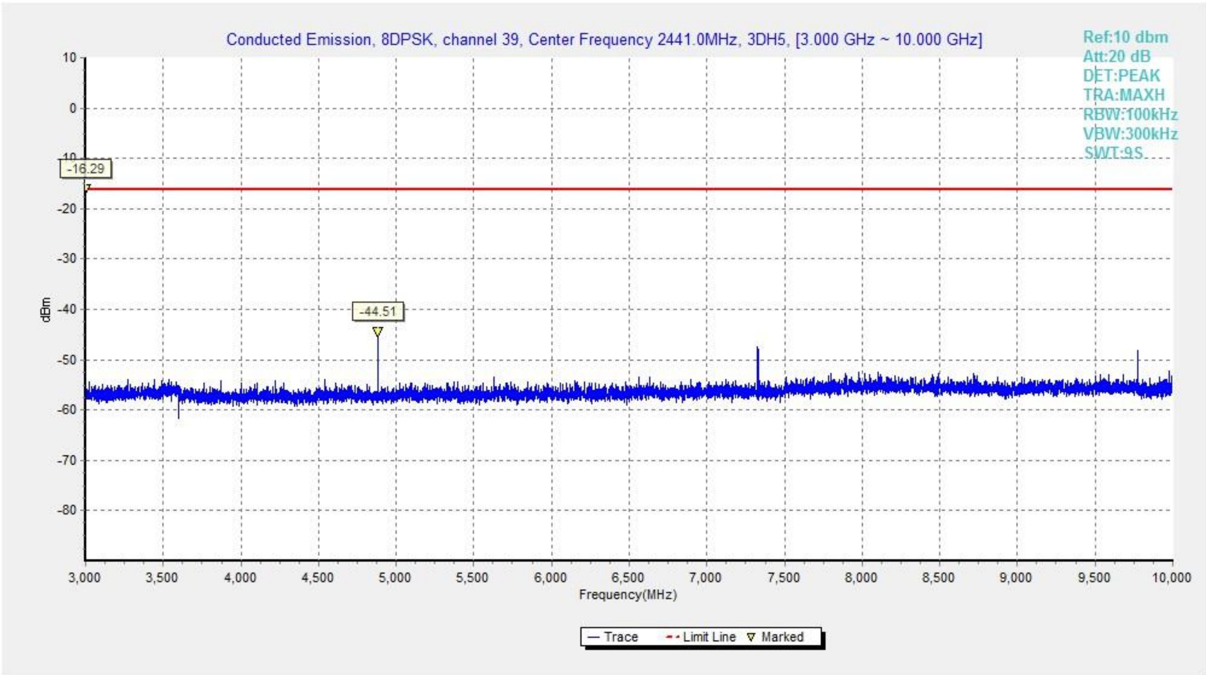


Fig. 28 Conducted Spurious Emission (8DPSK, Ch39, 3GHz-10 GHz)

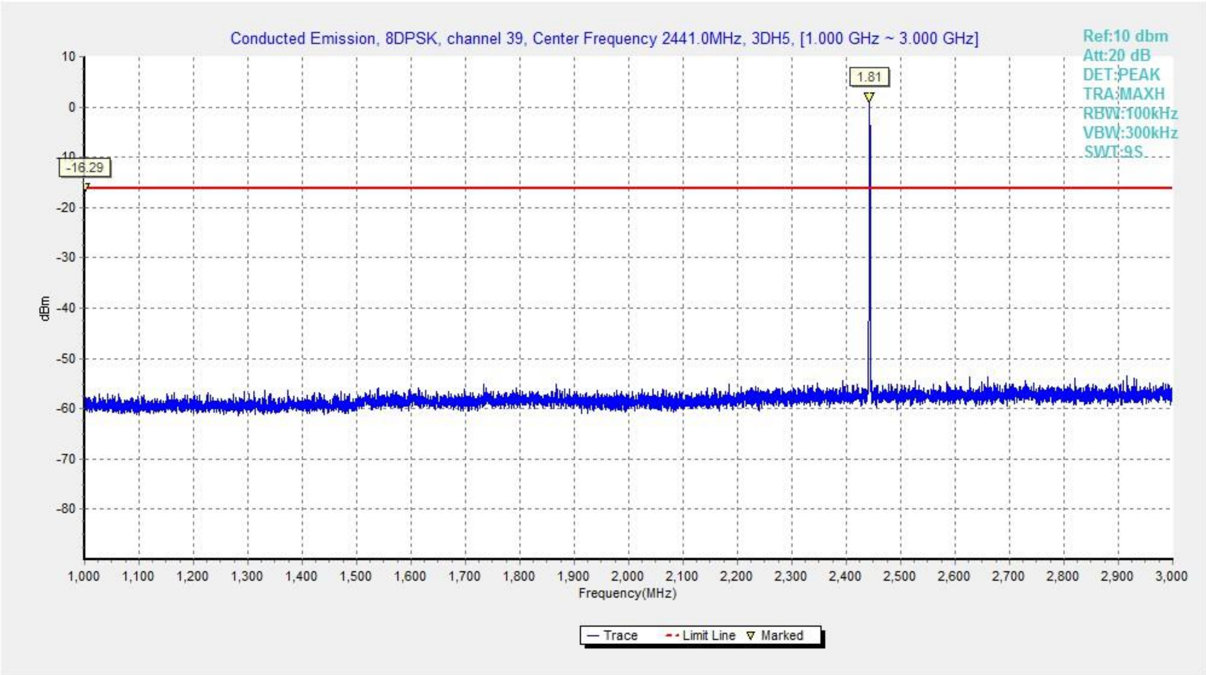


Fig. 29 Conducted Spurious Emission (8DPSK, Ch78, 1GHz-3 GHz)

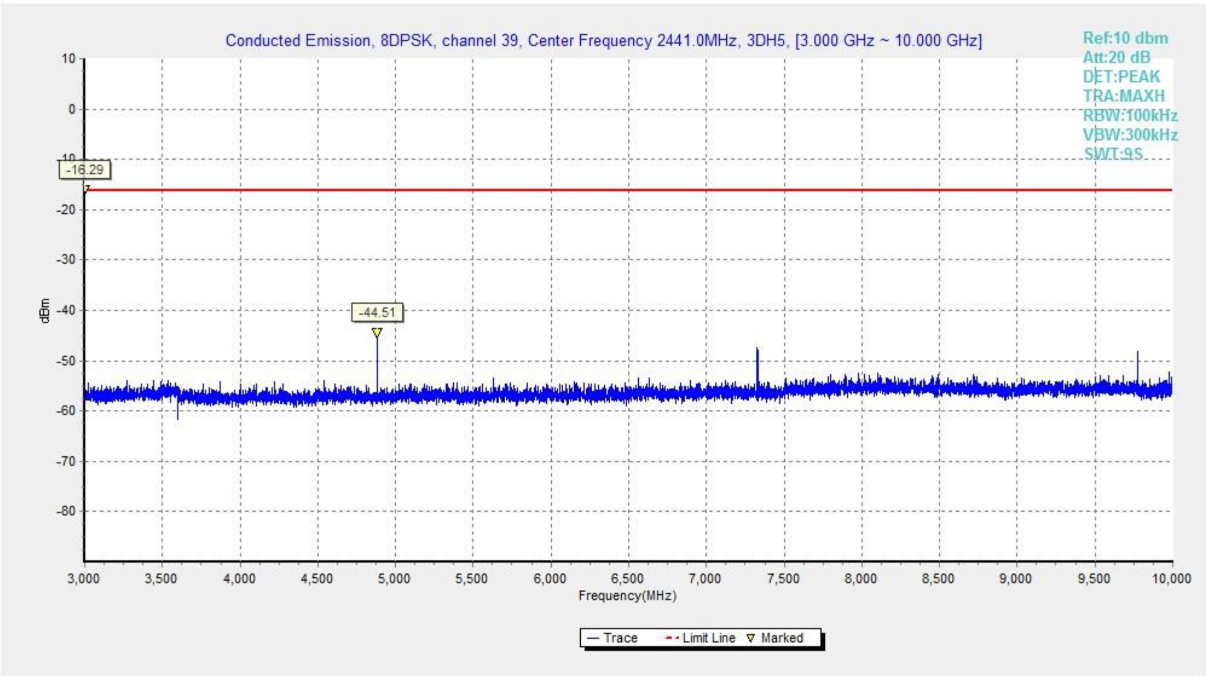


Fig. 30 Conducted Spurious Emission (8DPSK, Ch78, 3GHz-10 GHz)

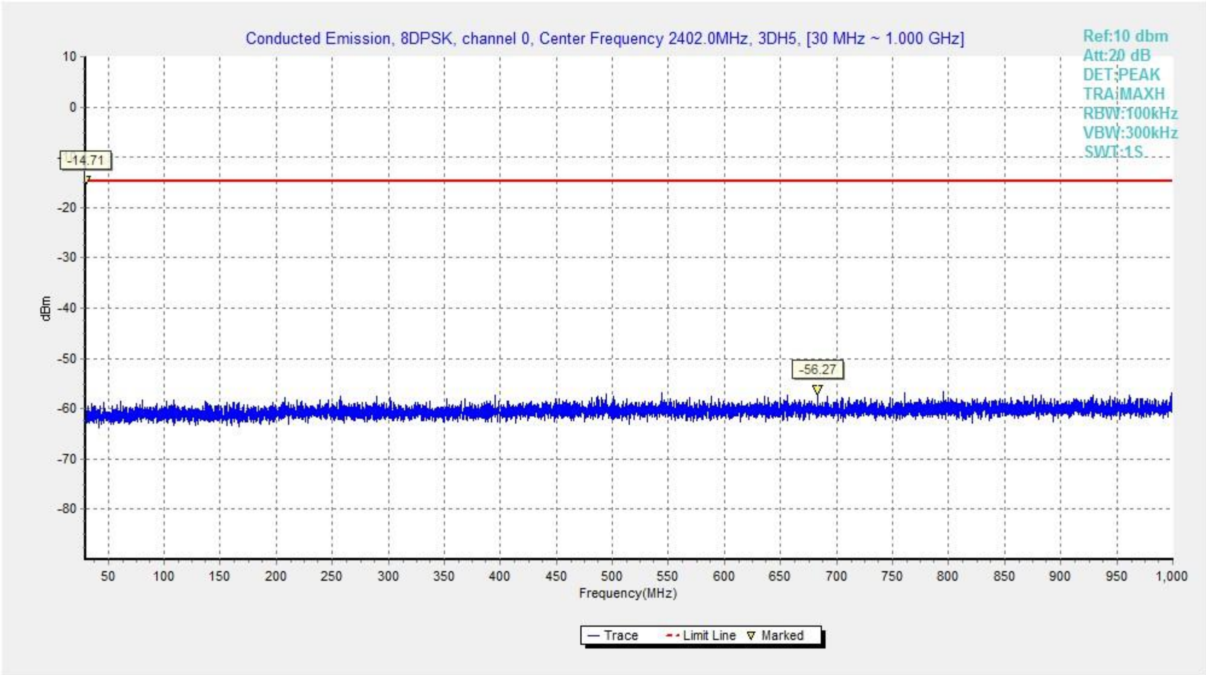


Fig. 31 Conducted Spurious Emission (All channel, 30 MHz-1 GHz)

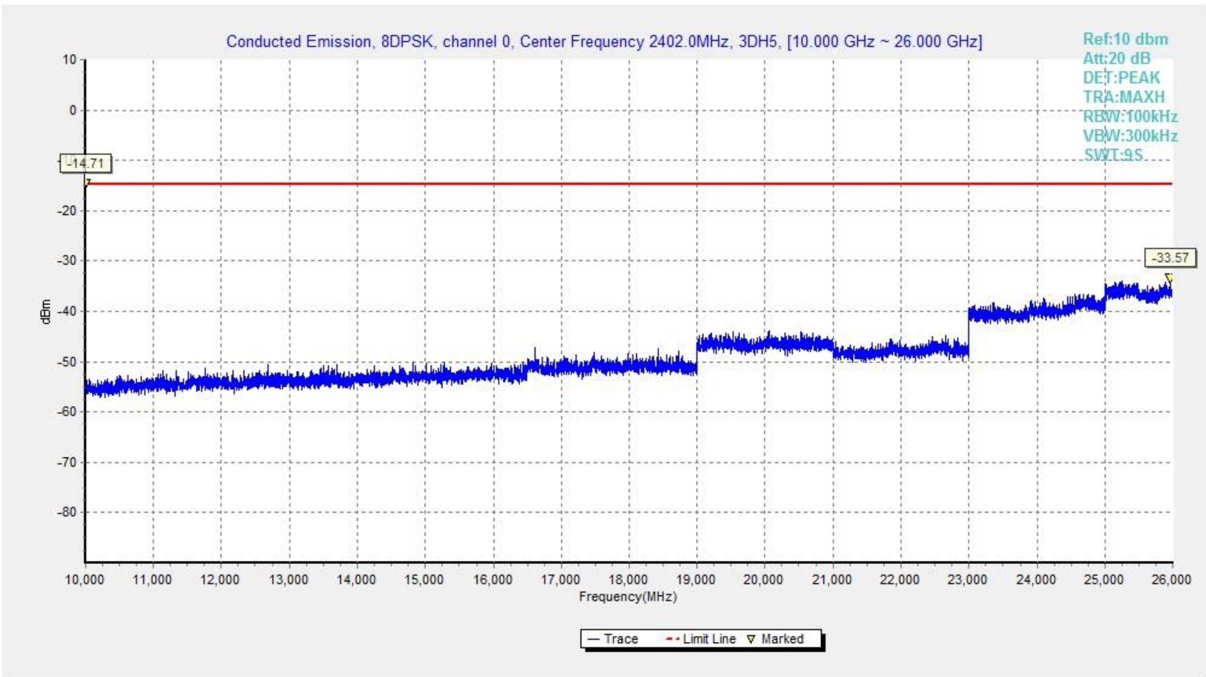


Fig. 32 Conducted Spurious Emission All channel, 10 GHz-26 GHz,)

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 ~18 GHz	Fig.33	**P**
	39	1 GHz ~18 GHz	Fig.34	**P**
	78	1 GHz ~18 GHz	Fig.35	**P**
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.36	**P**
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.37	**P**
π /4 DQPSK	0	1 GHz ~18 GHz	Fig.38	**P**
	39	1 GHz ~18 GHz	Fig.39	**P**
	78	1 GHz ~18 GHz	Fig.40	**P**
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.41	**P**
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.42	**P**
8DPSK	0	1 GHz ~18 GHz	Fig.43	**P**
	39	1 GHz ~18 GHz	Fig.44	**P**
	78	1 GHz ~18 GHz	Fig.45	**P**
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.46	**P**
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.47	**P**
/	All channels	9 kHz ~30 MHz	Fig.48	**P**
		30 MHz ~1 GHz	Fig.49	**P**
		18 GHz ~26.5 GHz	Fig.50	**P**

Worst Case Result

GFSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
4884.571429	54.71	74.00	19.29	V	6.5
8890.714286	45.06	74.00	29.94	H	6.5
12686.142857	46.81	74.00	28.19	H	11.1
13843.000000	47.49	74.00	26.51	V	11.1
16935.428571	52.69	74.00	21.31	H	18.2
17936.285714	52.39	74.00	21.61	H	18.2

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
4884.571429	46.80	54.00	7.20	V	6.5
8890.714286	36.11	54.00	17.89	H	6.5
12686.142857	37.49	54.00	16.51	H	11.1
13843.000000	38.20	54.00	15.80	V	11.1
16935.428571	44.54	54.00	9.46	H	18.2
17936.285714	44.53	54.00	9.47	H	18.2

π /4 DQPSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
4804.250000	54.49	74.00	19.51	V	8
7206.250000	49.20	74.00	24.80	H	11
9607.500000	54.63	74.00	19.37	H	13
16262.000000	58.04	74.00	15.96	H	21
16266.500000	58.28	74.00	15.72	V	21
17017.750000	59.73	74.00	14.27	V	23

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
4804.250000	41.49	54.00	12.51	V	8
7206.250000	41.80	54.00	12.20	H	11
9607.500000	41.66	54.00	12.34	H	13
15552.000000	45.33	54.00	8.67	H	21
16266.500000	45.30	54.00	8.70	V	21
17017.750000	47.14	54.00	6.86	V	23

8DPSK CH78 (1-18GHz)

Frequency (MHz)	MaxPeak (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
4960.250000	63.61	74.00	10.39	H	8
9919.687500	59.63	74.00	14.37	V	14
15583.750000	57.60	74.00	16.40	H	20
16275.500000	58.10	74.00	15.90	V	21
16936.500000	59.08	74.00	14.92	H	22
17917.000000	59.52	74.00	14.48	H	24

Frequency (MHz)	Average (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Pol	Corr. (dB/m)
4960.250000	46.16	54.00	7.84	H	8
9919.687500	47.96	54.00	6.04	V	14
15583.750000	44.89	54.00	9.11	H	20
16275.500000	45.10	54.00	8.90	V	21
16936.500000	46.04	54.00	7.96	H	22
17917.000000	46.57	54.00	7.43	H	24

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

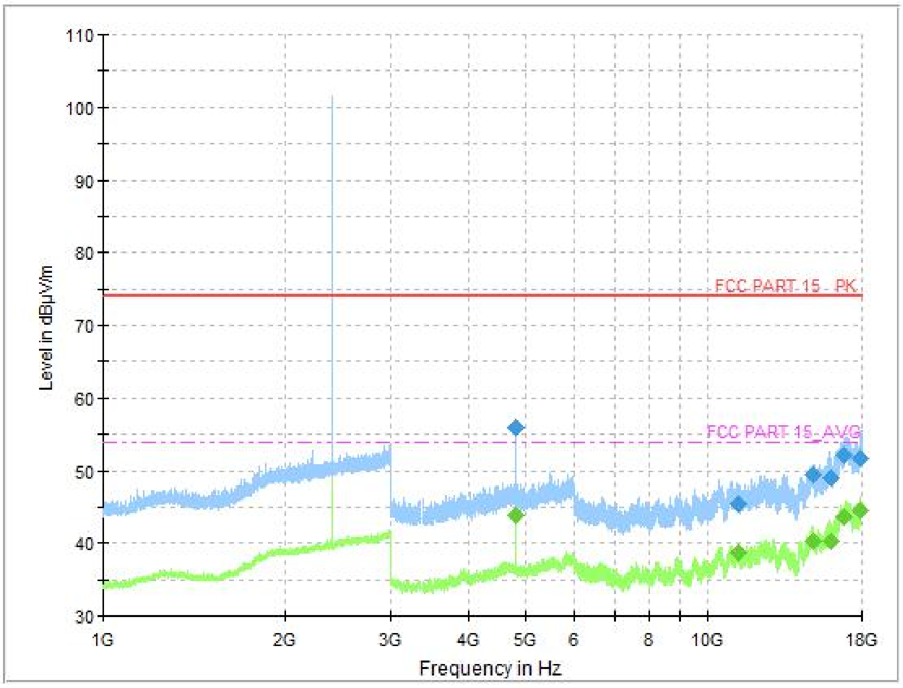


Fig. 33 Radiated Spurious Emission (GFSK, Ch0, 1 GHz ~18 GHz)

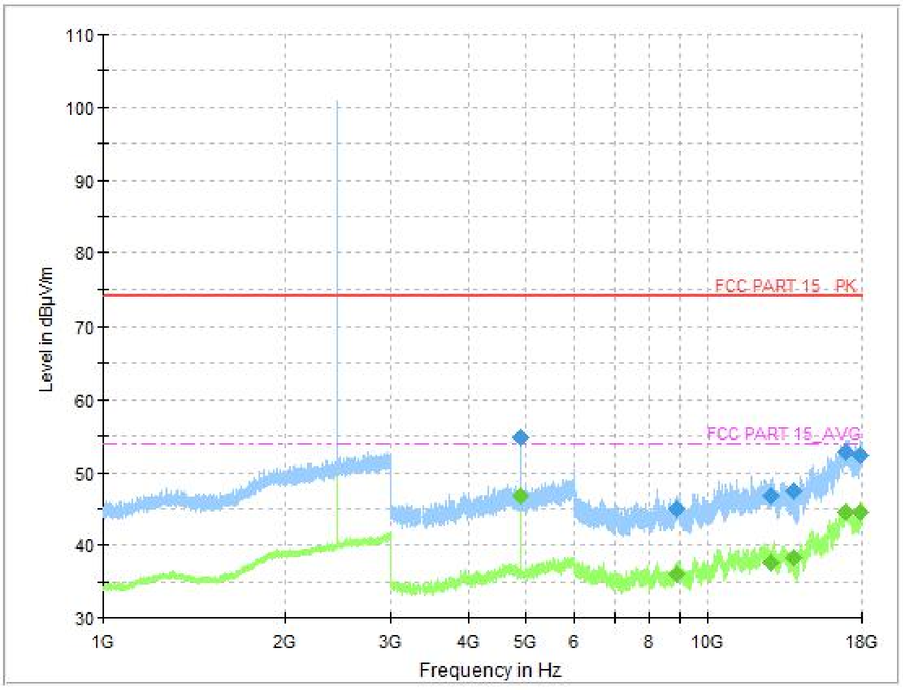


Fig. 34 Radiated Spurious Emission (GFSK, Ch39, 1 GHz ~18 GHz)

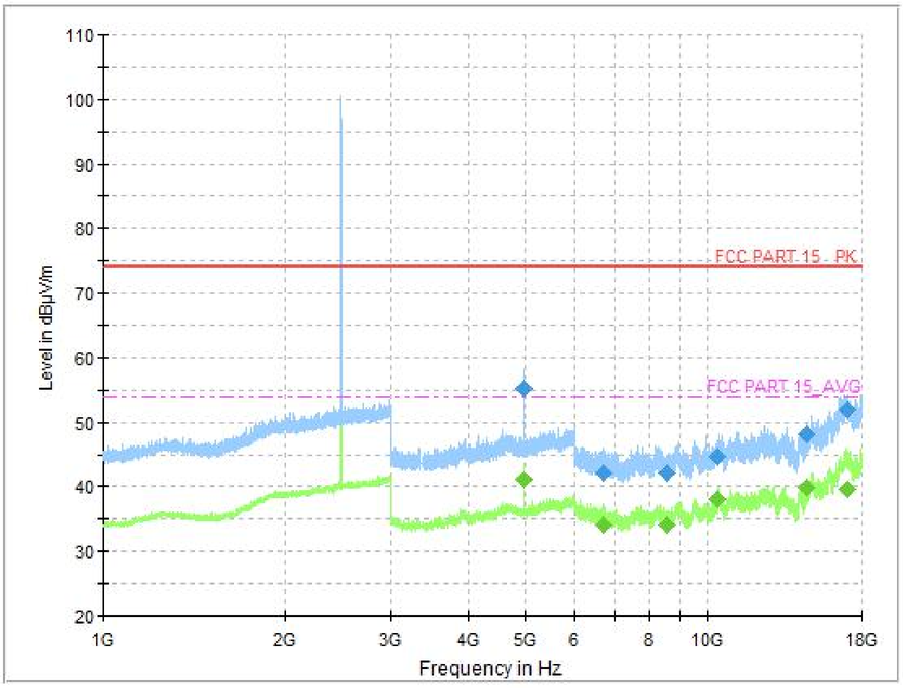


Fig. 35 Radiated Spurious Emission (GFSK, Ch78, 1 GHz ~18 GHz)

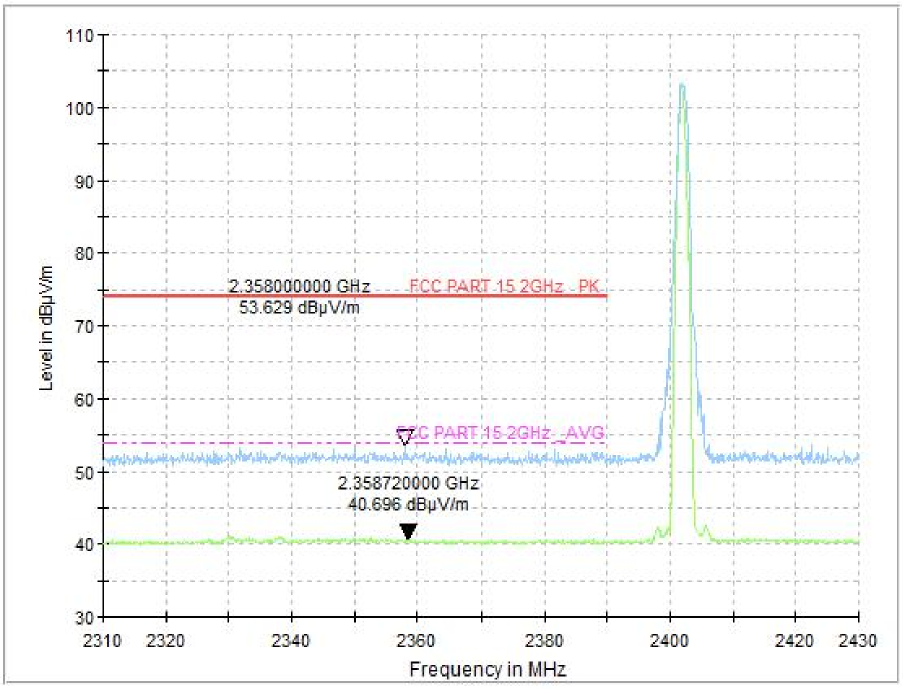


Fig. 36 Radiated Band Edges (GFSK, Ch0, 2380GHz~2450GHz)

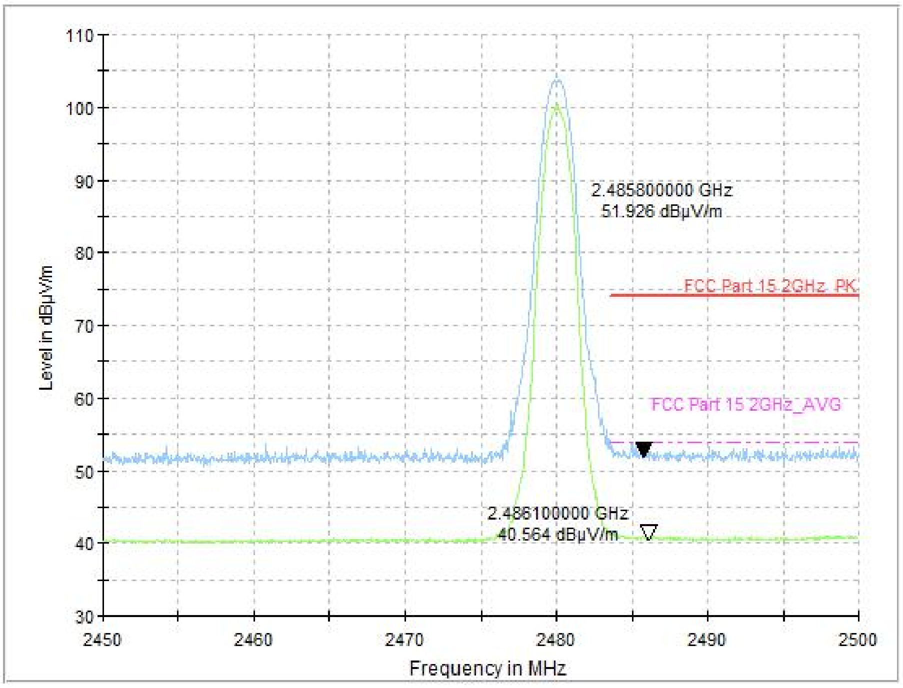


Fig. 37 Radiated Band Edges (GFSK, Ch78, 2450GHz~2500GHz)

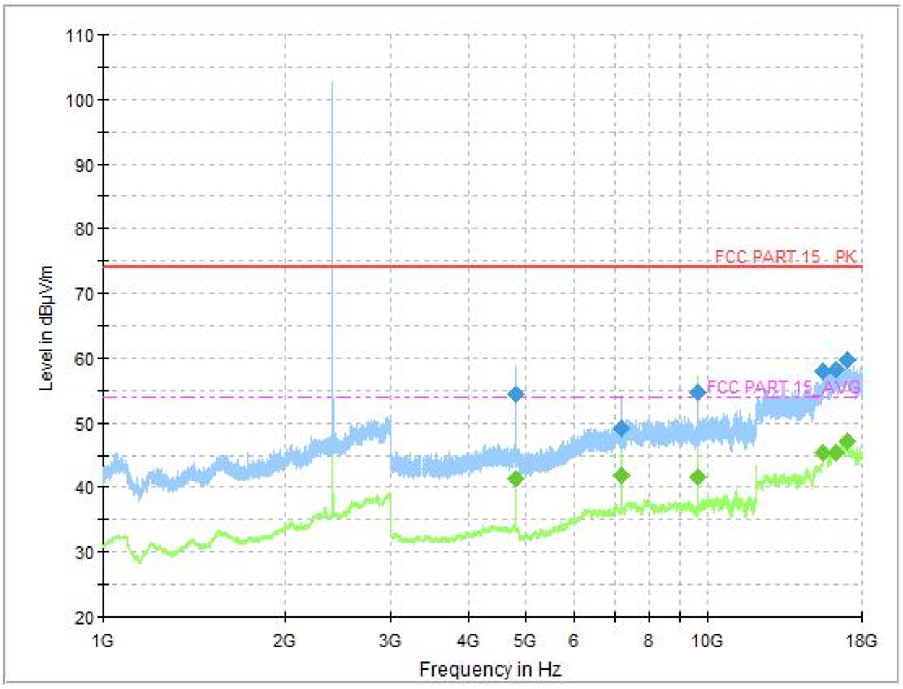


Fig. 38 Radiated Spurious Emission (π/4 DQPSK, Ch0, 1 GHz ~18 GHz)

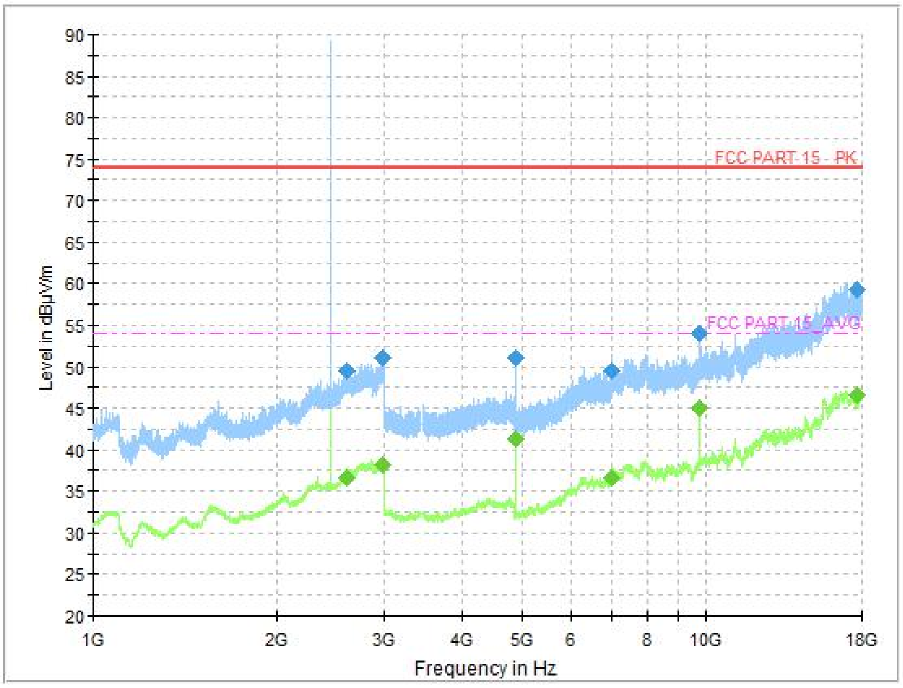


Fig. 39 Radiated Spurious Emission (π /4 DQPSK, Ch39, 1 GHz ~18 GHz)

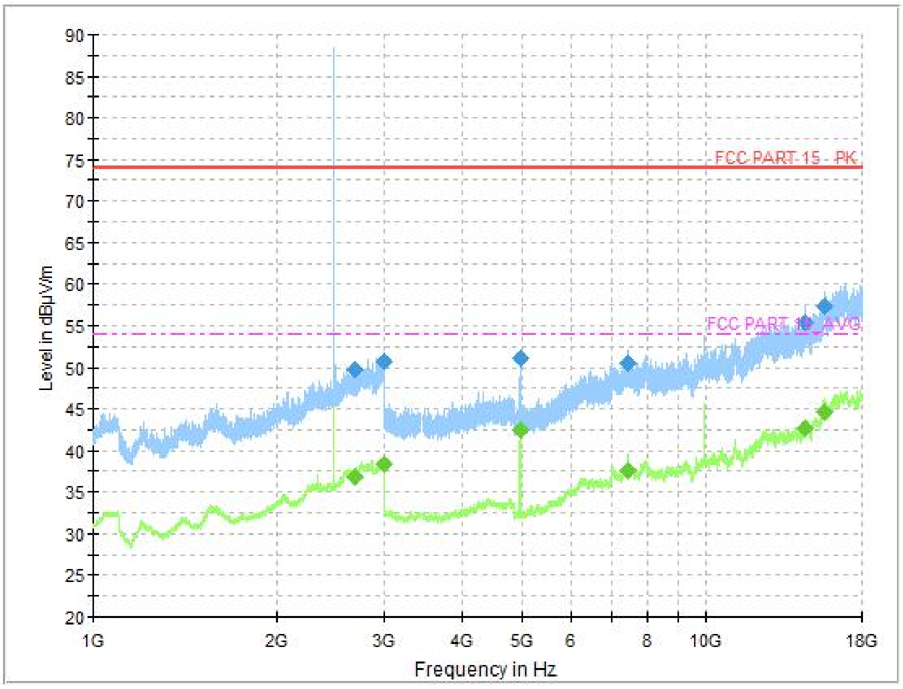


Fig. 40 Radiated Spurious Emission (π /4 DQPSK, Ch78, 1 GHz ~18 GHz)

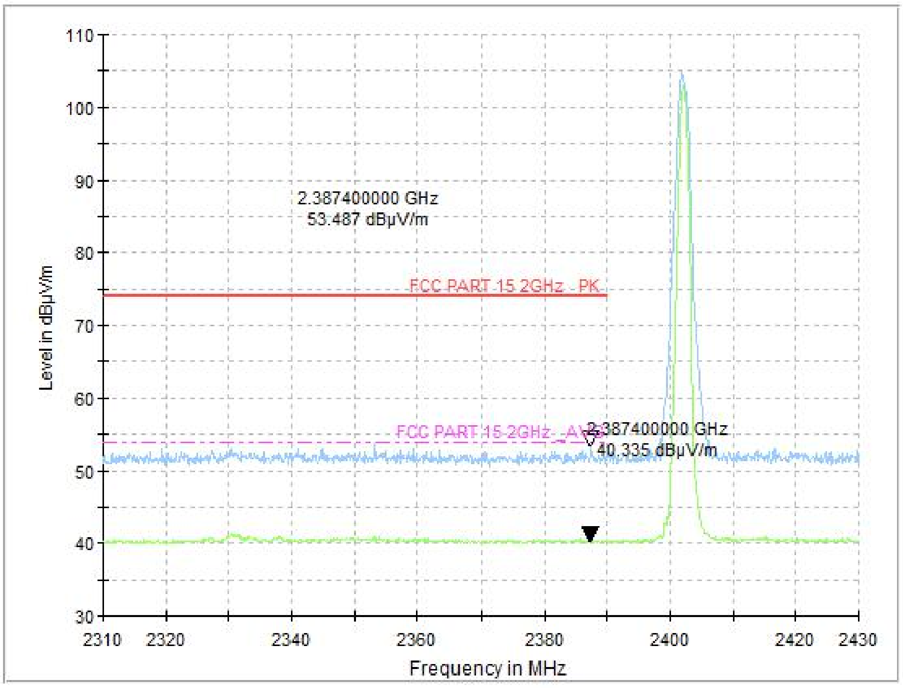


Fig. 41 Radiated Band Edges (π /4 DQPSK, Ch0, 2380GHz~2450GHz)

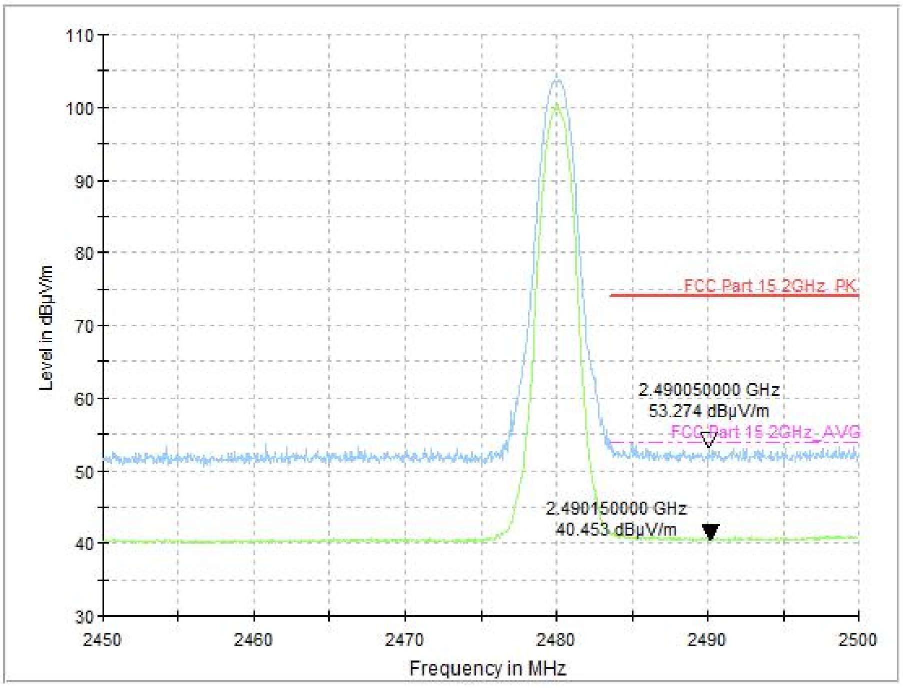


Fig. 42 Radiated Band Edges (π /4 DQPSK, Ch78, 2450GHz~2500GHz)

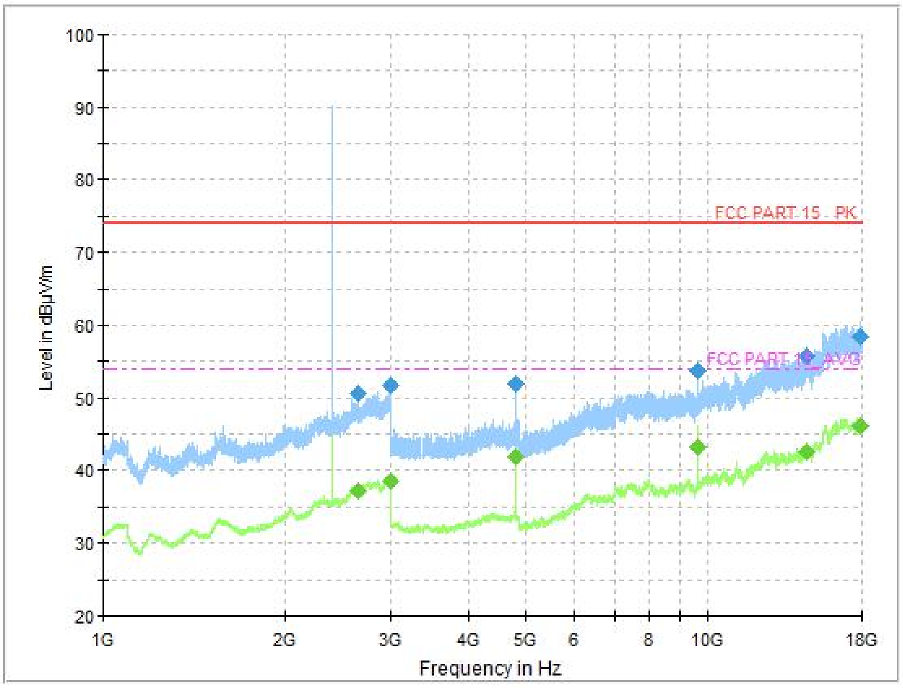


Fig. 43 Radiated Spurious Emission (8DPSK, Ch0, 1 GHz ~18 GHz)

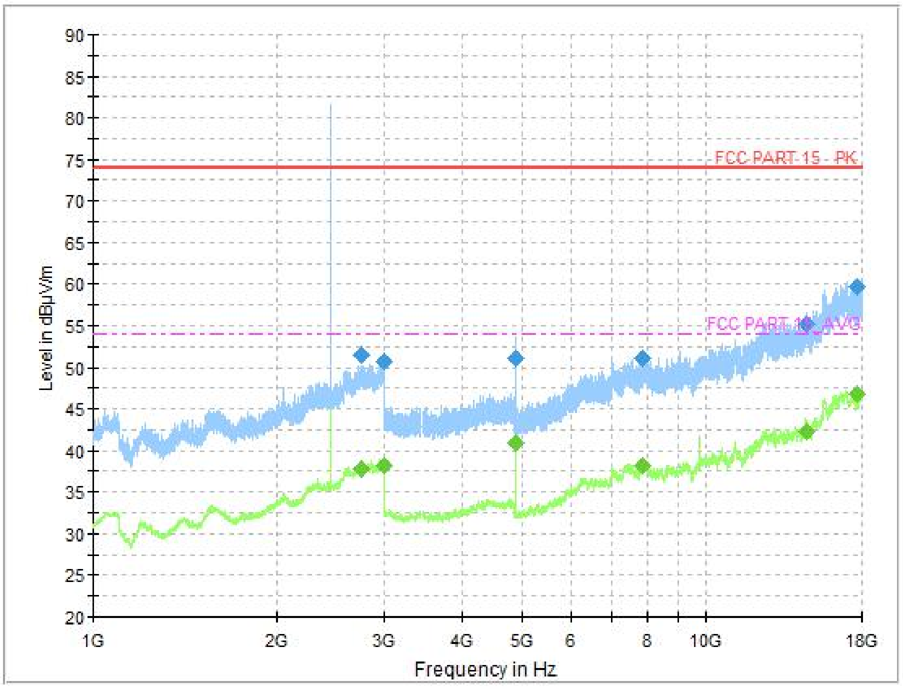


Fig. 44 Radiated Spurious Emission (8DPSK, Ch39, 1 GHz ~18 GHz)

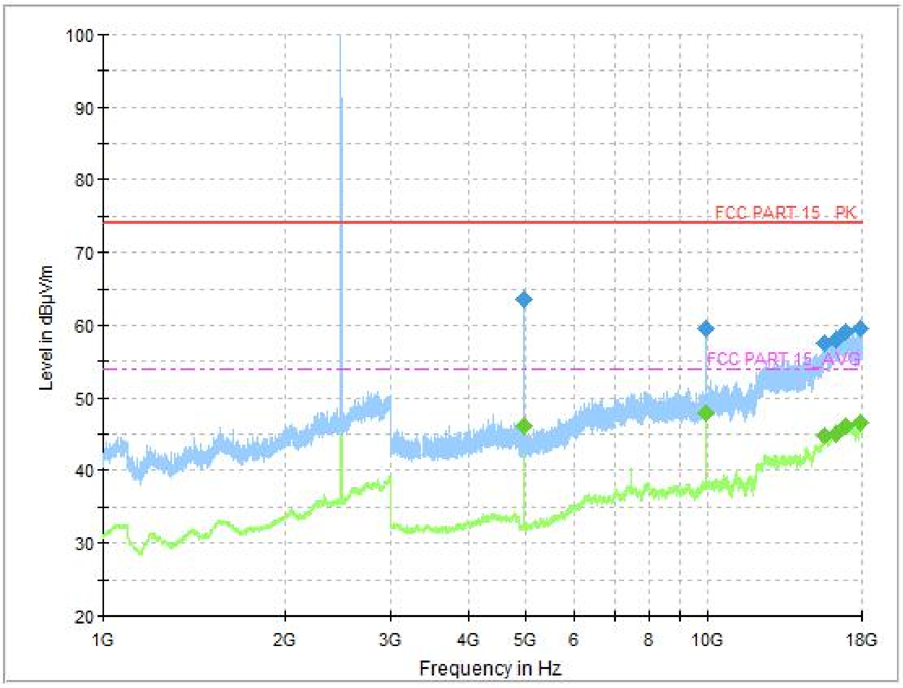


Fig. 45 Radiated Spurious Emission (8DPSK, Ch78, 1 GHz ~18GHz)

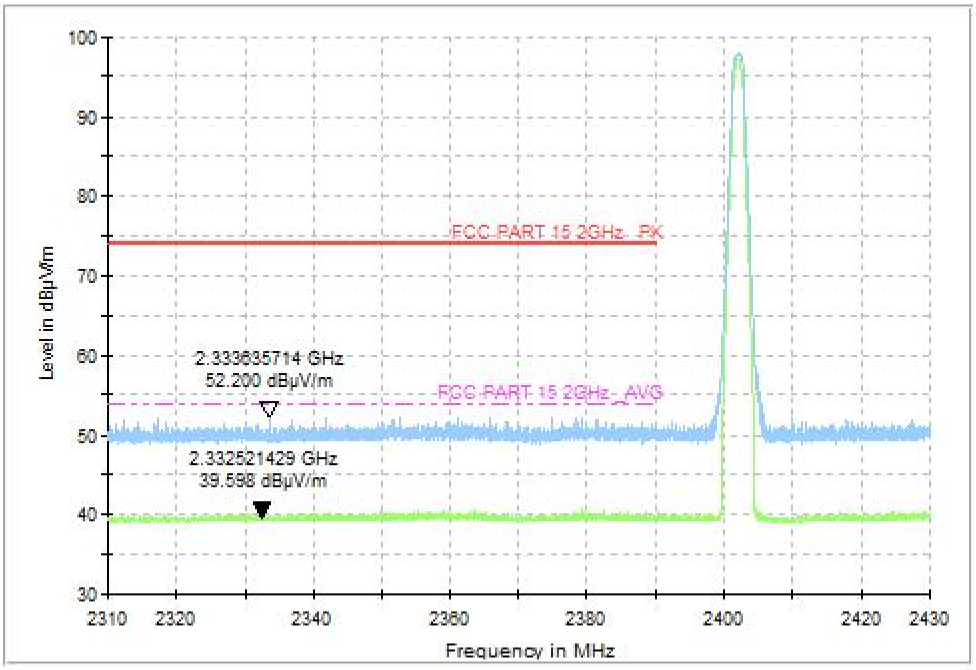


Fig. 46 Radiated Band Edges (8DPSK, Ch0, 2380GHz~2450GHz)

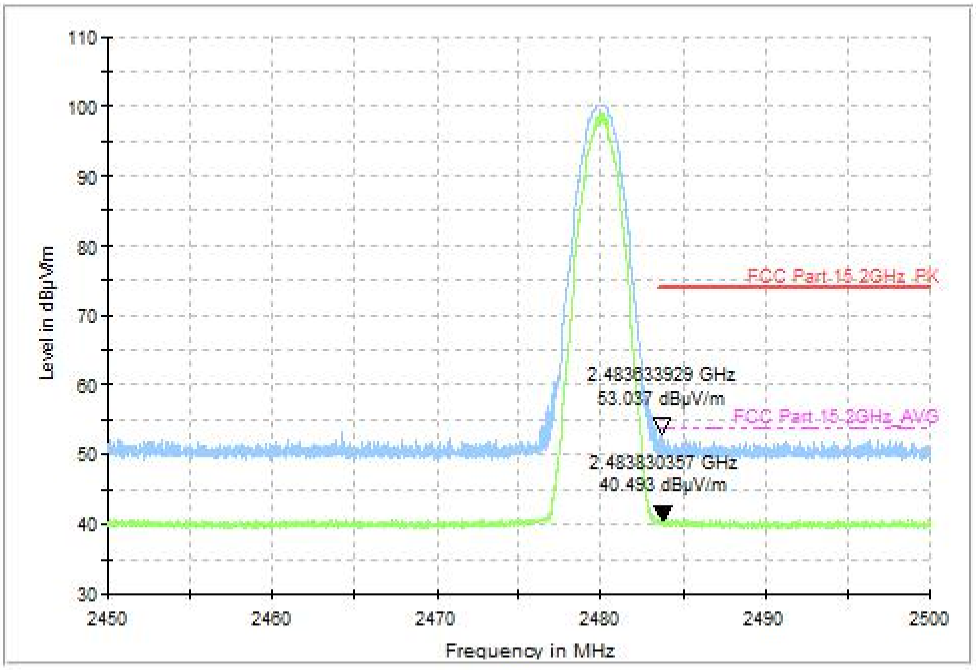


Fig. 47 Radiated Band Edges (8DPSK, Ch78, 2450GHz~2500GHz)

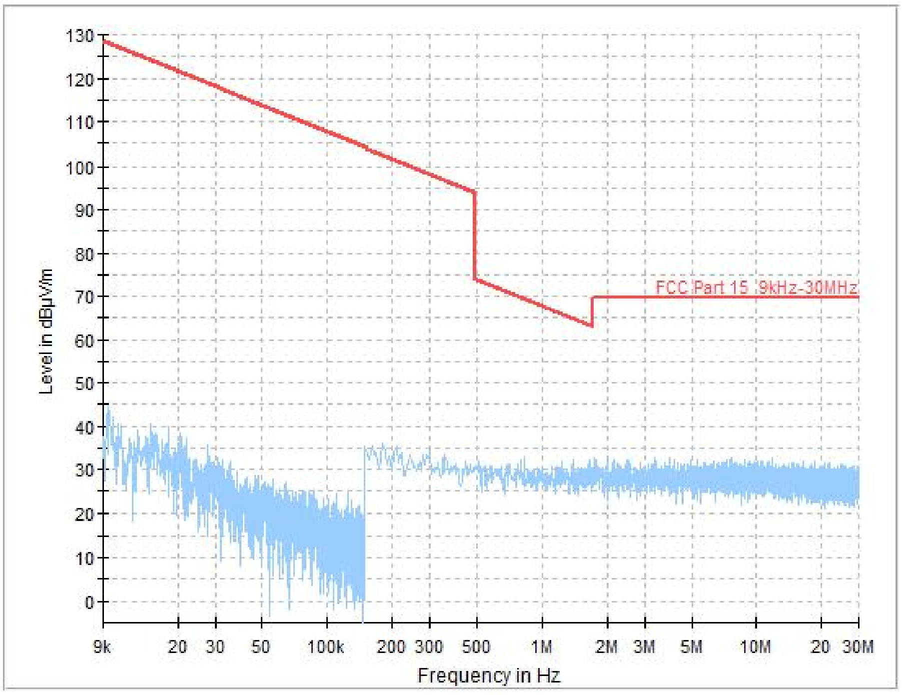


Fig. 48 Radiated Spurious Emission (All Channels, 9 kHz ~30 MHz)

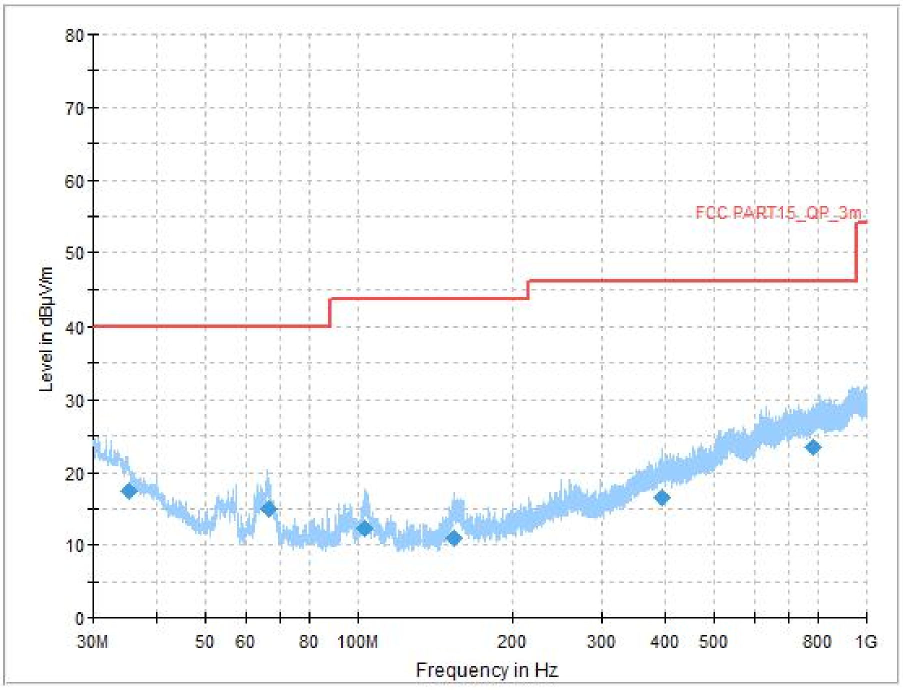


Fig. 49 Radiated Spurious Emission (All Channels, 30 MHz ~1 GHz)

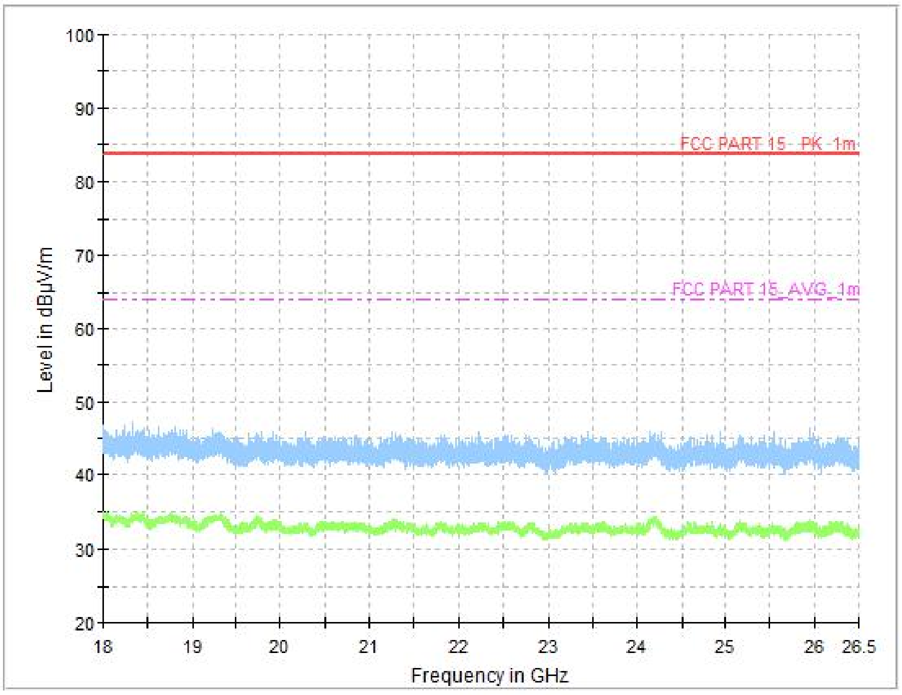


Fig. 50 Radiated Spurious Emission (All Channels, 18 GHz ~26.5 GHz)

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.51	923.25	/
	39	Fig.52	889.50	
	78	Fig.53	888.00	
π /4 DQPSK	0	Fig.54	1326.00	/
	39	Fig.55	1307.25	
	78	Fig.56	1289.25	
8DPSK	0	Fig.57	1302.75	/
	39	Fig.58	1291.50	
	78	Fig.59	1314.00	

See below for test graphs.

Conclusion: PASS

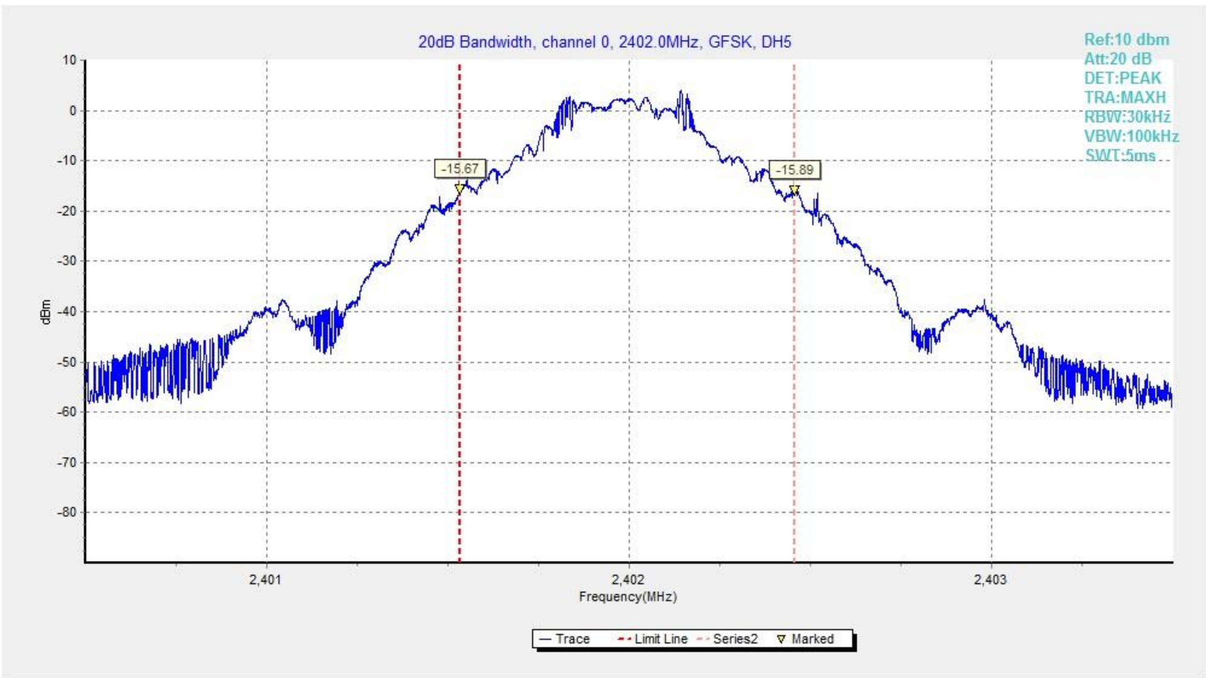


Fig. 51 20dB Bandwidth (GFSK, Ch 0)

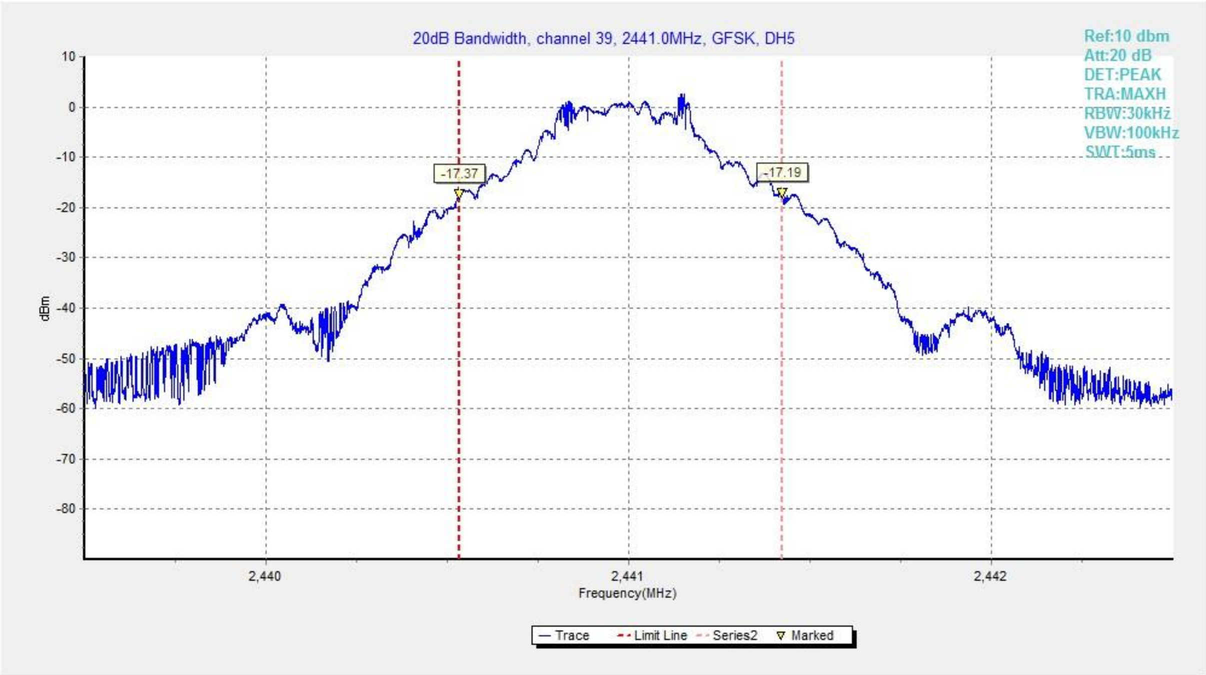


Fig. 52 20dB Bandwidth (GFSK, Ch 39)

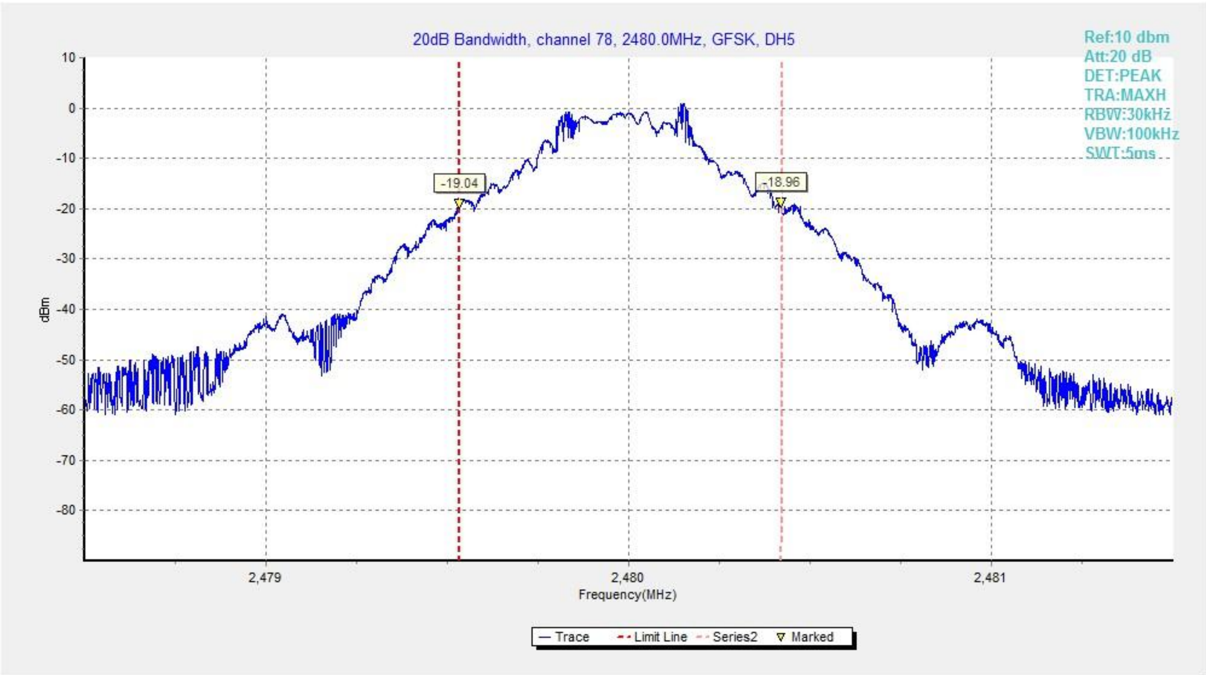


Fig. 53 20dB Bandwidth (GFSK, Ch 78)

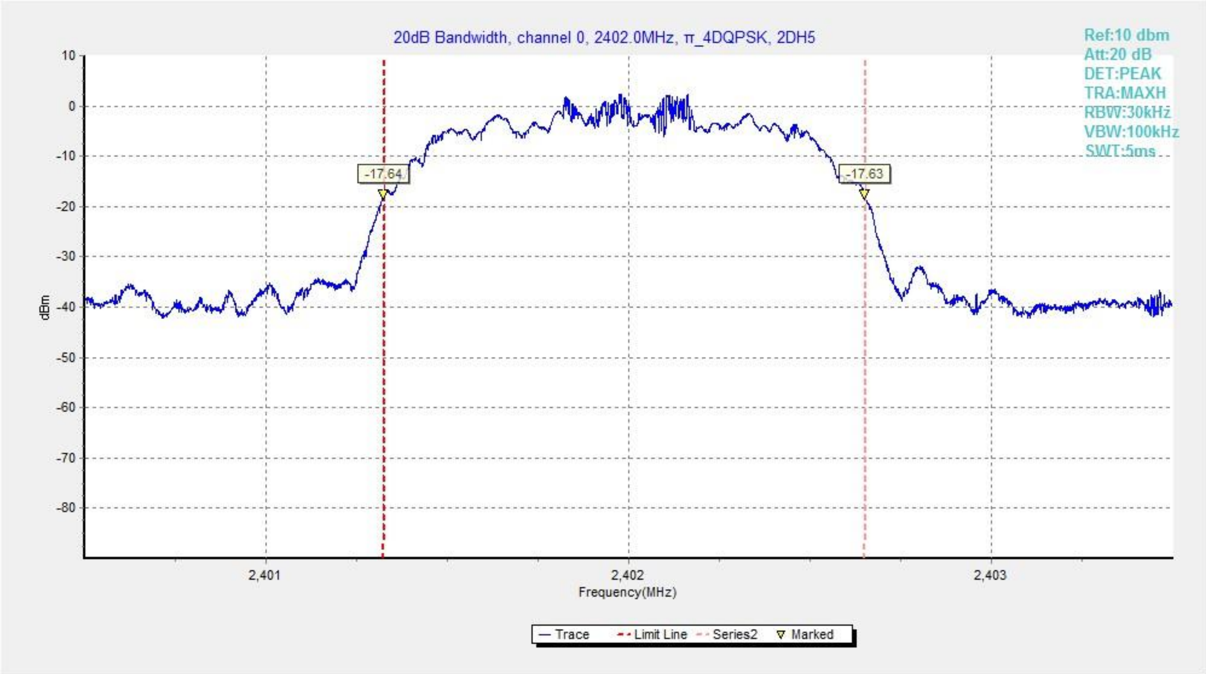


Fig. 54 20dB Bandwidth (π /4 DQPSK, Ch 0)

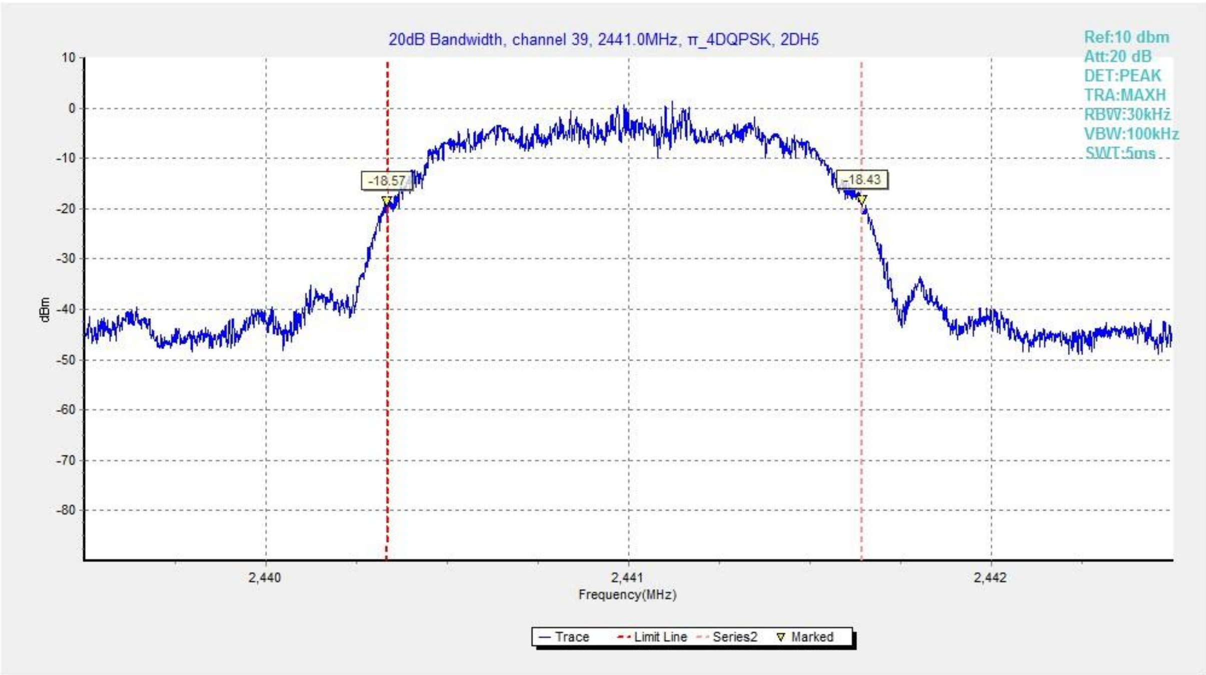


Fig. 55 20dB Bandwidth (π /4 DQPSK, Ch 39)

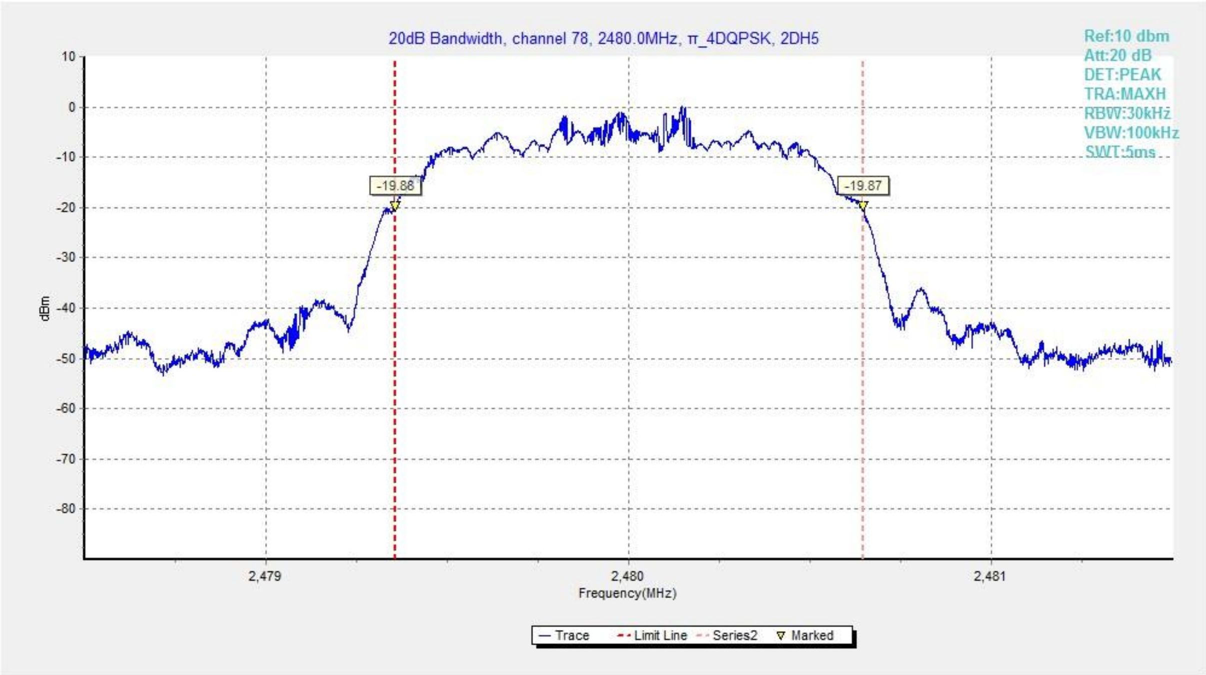


Fig. 56 20dB Bandwidth (π/4 DQPSK, Ch 78)

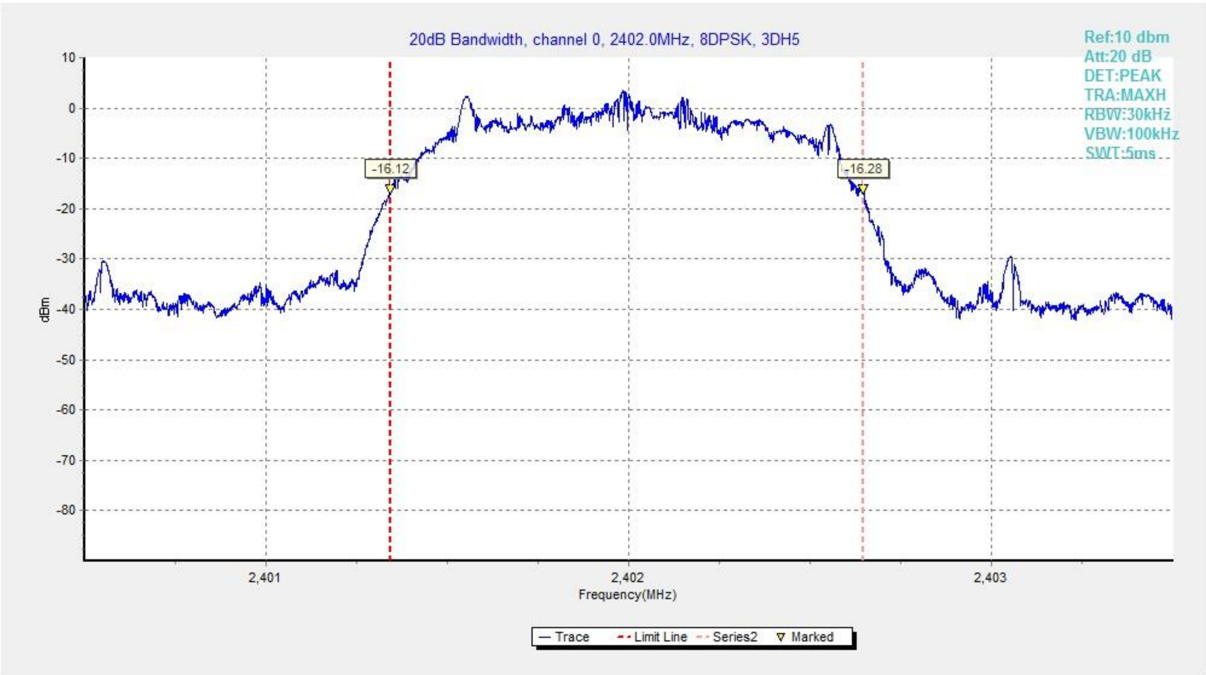


Fig. 57 20dB Bandwidth (8DPSK, Ch 0)

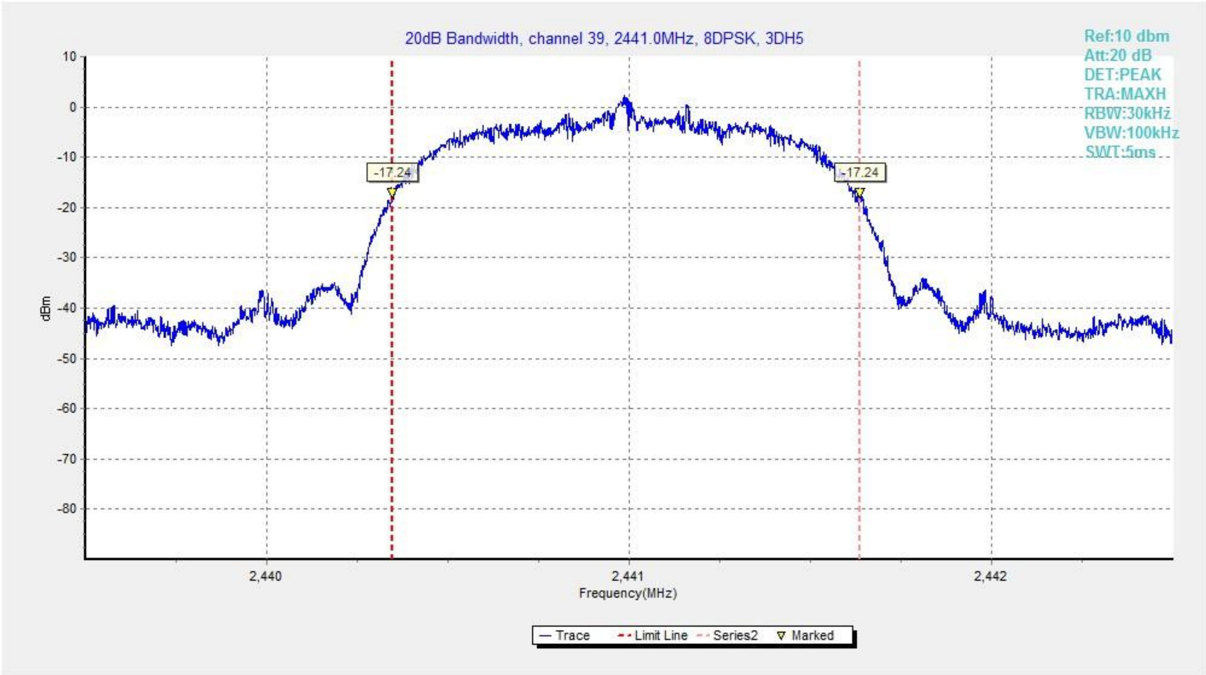


Fig. 58 20dB Bandwidth (8DPSK, Ch 39)

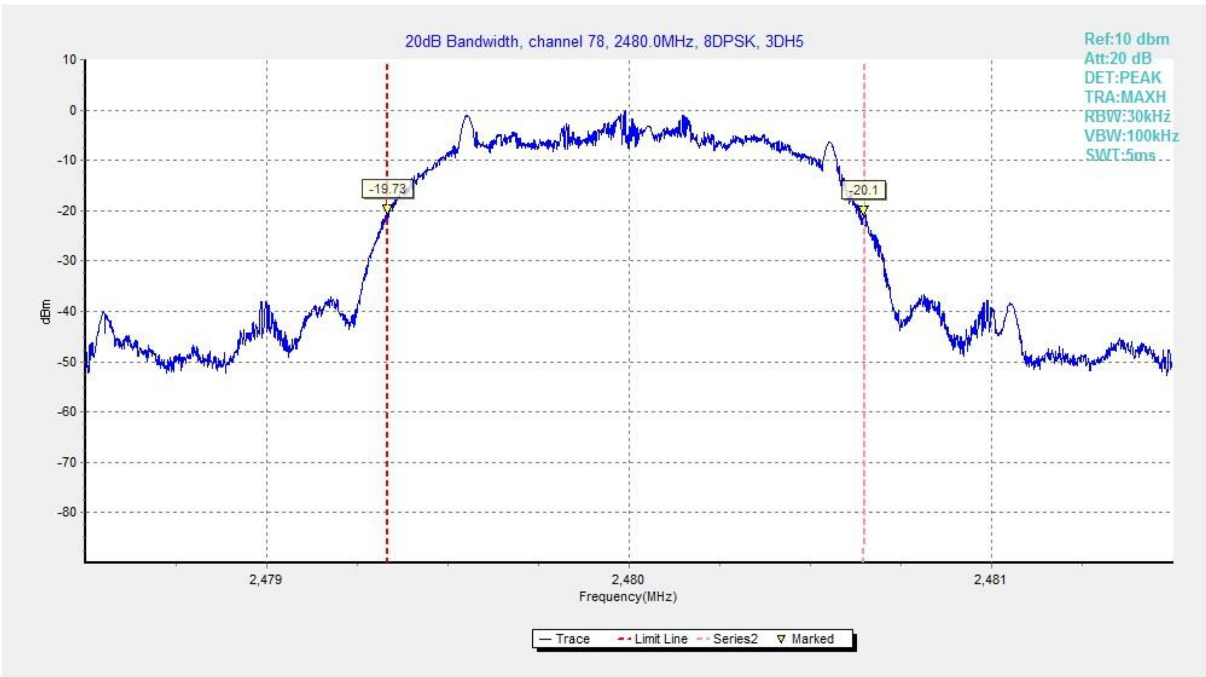


Fig. 59 20dB Bandwidth (8DPSK, Ch 78)

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.60	176.43	**P**
			Fig.61		
π/4 DQPSK	39	2-DH5	Fig.62	144.63	**P**
			Fig.63		
8DPSK	39	3-DH5	Fig.64	146.43	**P**
			Fig.65		

See below for test graphs.

Conclusion: Pass

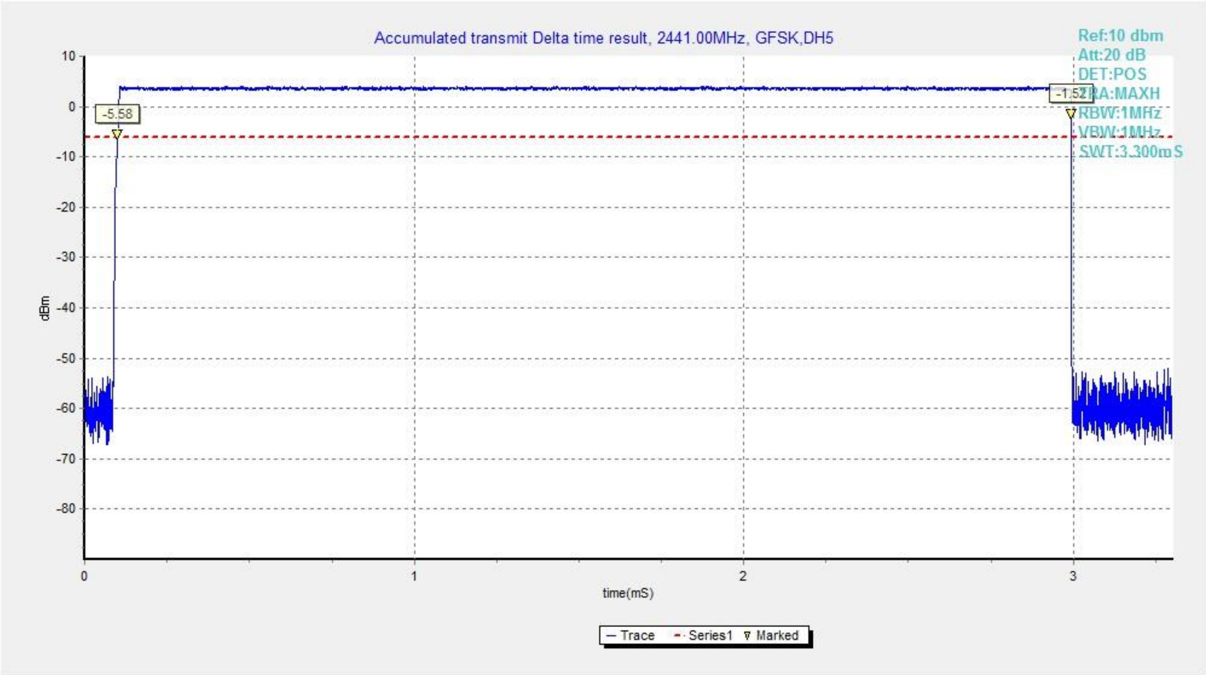


Fig. 60 Time of Occupancy(Dwell Time) (GFSK, Ch39)

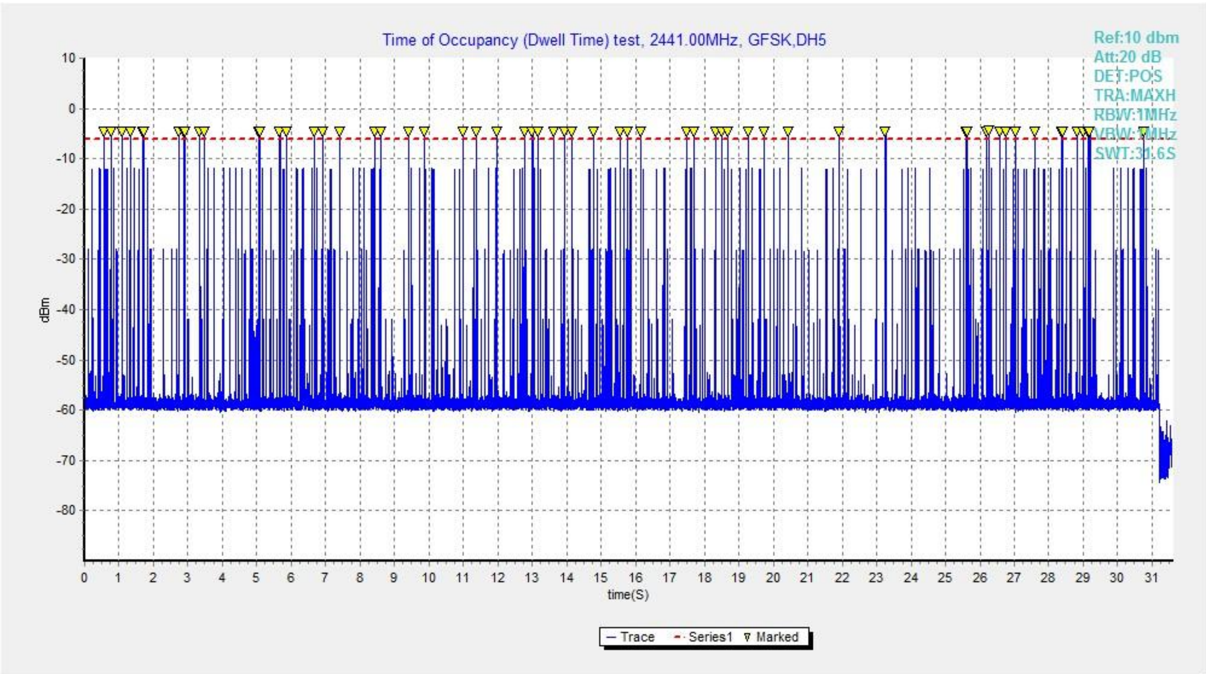


Fig. 61 Time of Occupancy(Dwell Time) (GFSK, Ch39)

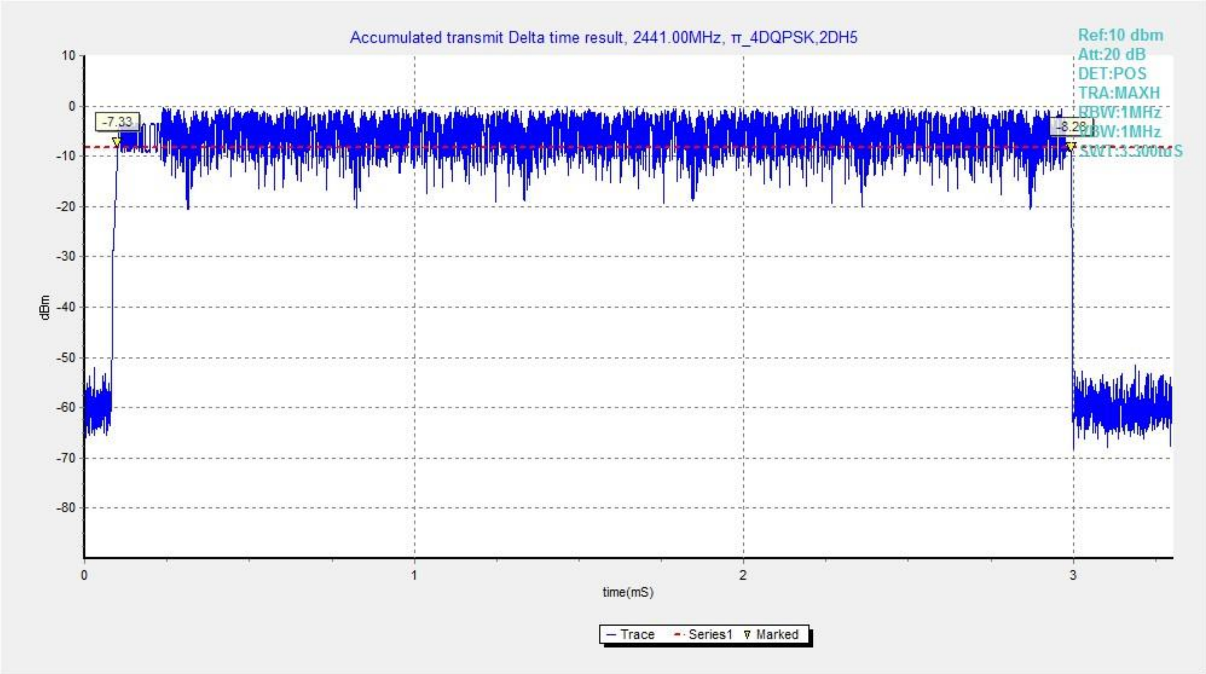


Fig. 62 Time of Occupancy(Dwell Time) (π /4 DQPSK, Ch39)

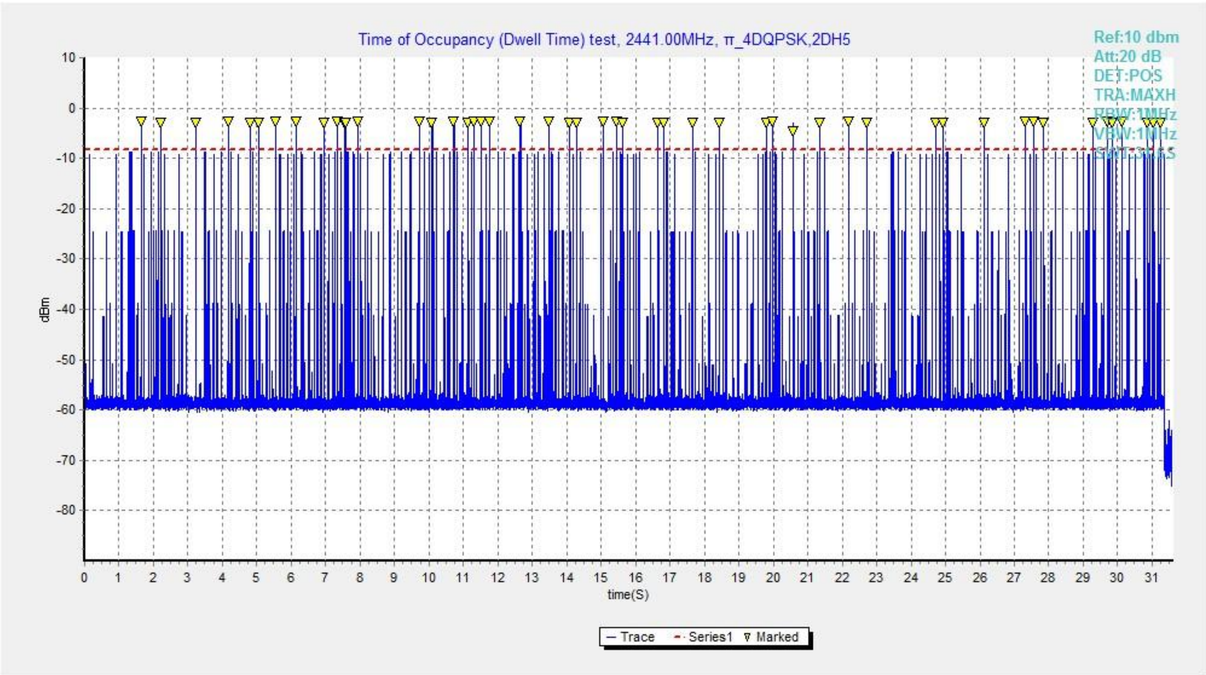


Fig. 63 Time of Occupancy(Dwell Time) (π /4 DQPSK, Ch39)

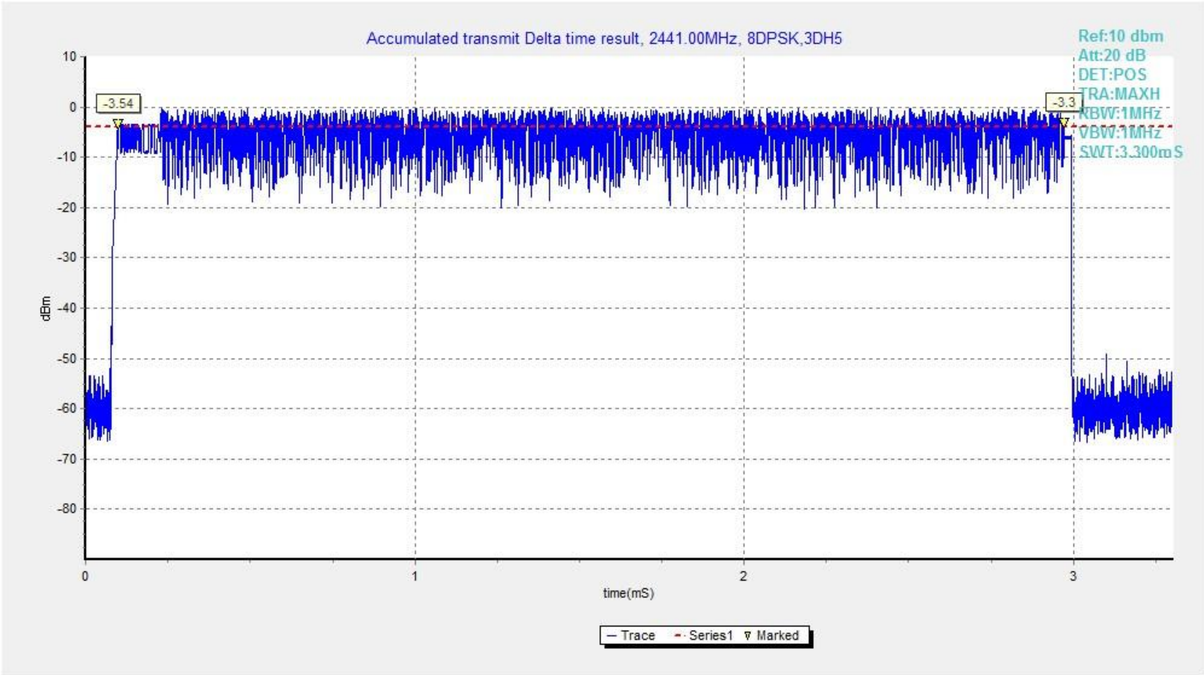


Fig. 64 Time of Occupancy(Dwell Time) (8DPSK, Ch39)

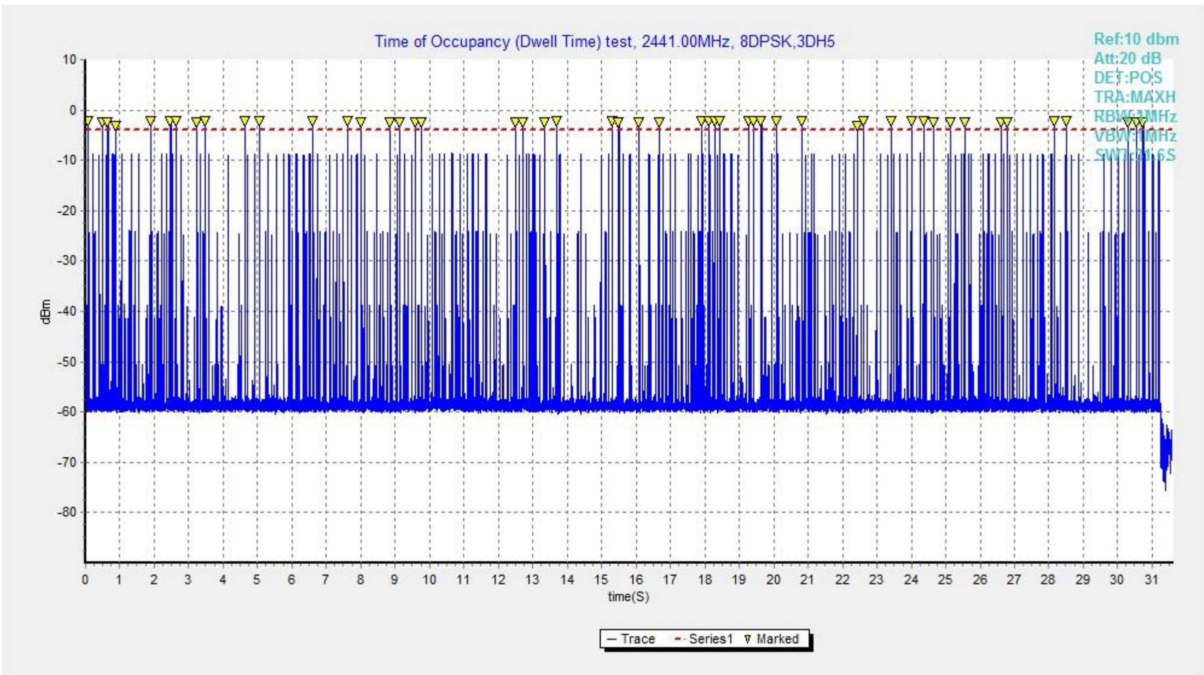


Fig. 65 Time of Occupancy(Dwell Time) (8DPSK, Ch39)

A.7 Number of Hopping Channels

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a) & RSS-247 Section 5.1	At least 15 non-overlapping channels

Measurement Results:

Mode	Packet	Number of hopping		Test result	Conclusion
GFSK	DH5	Fig.66	Fig.67	79	**P**
π/4 DQPSK	2-DH5	Fig.68	Fig.69	79	**P**
8DPSK	3-DH5	Fig.70	Fig.71	79	**P**

See below for test graphs.

Conclusion: Pass

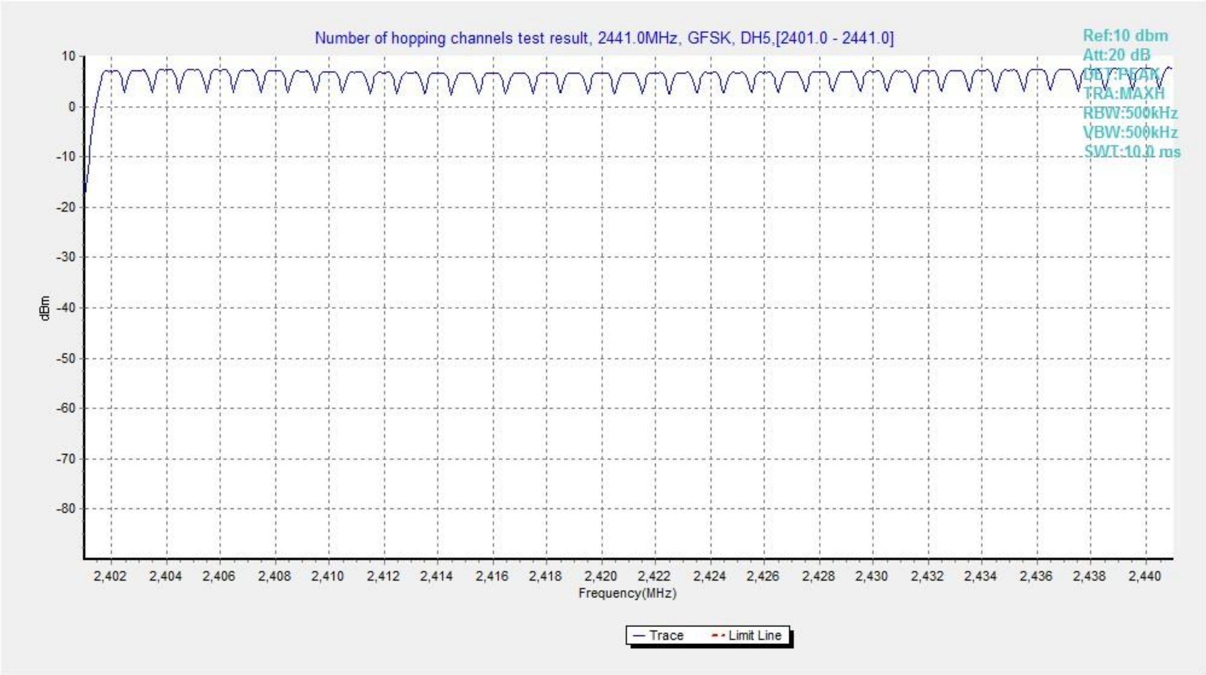


Fig. 66 Hopping channel ch0~39 (GFSK, Ch39)

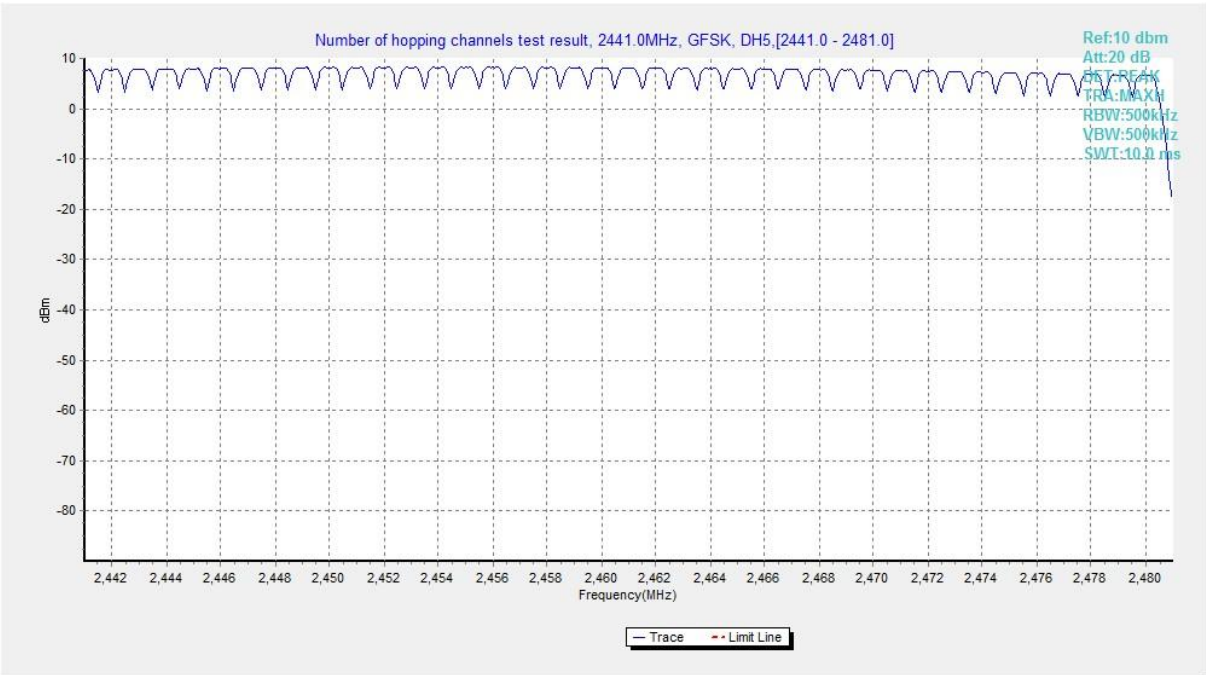


Fig. 67 Hopping channel ch39~78 (GFSK, Ch39)

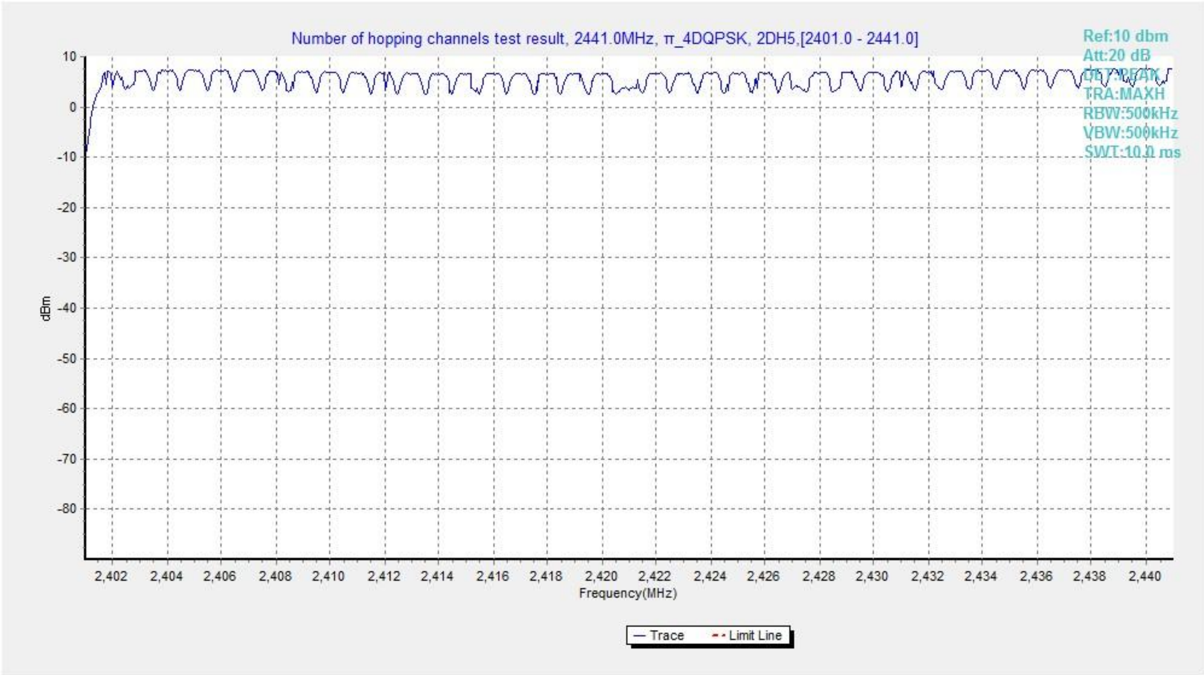


Fig. 68 Hopping channel ch0~39 (π /4 DQPSK, Ch39)

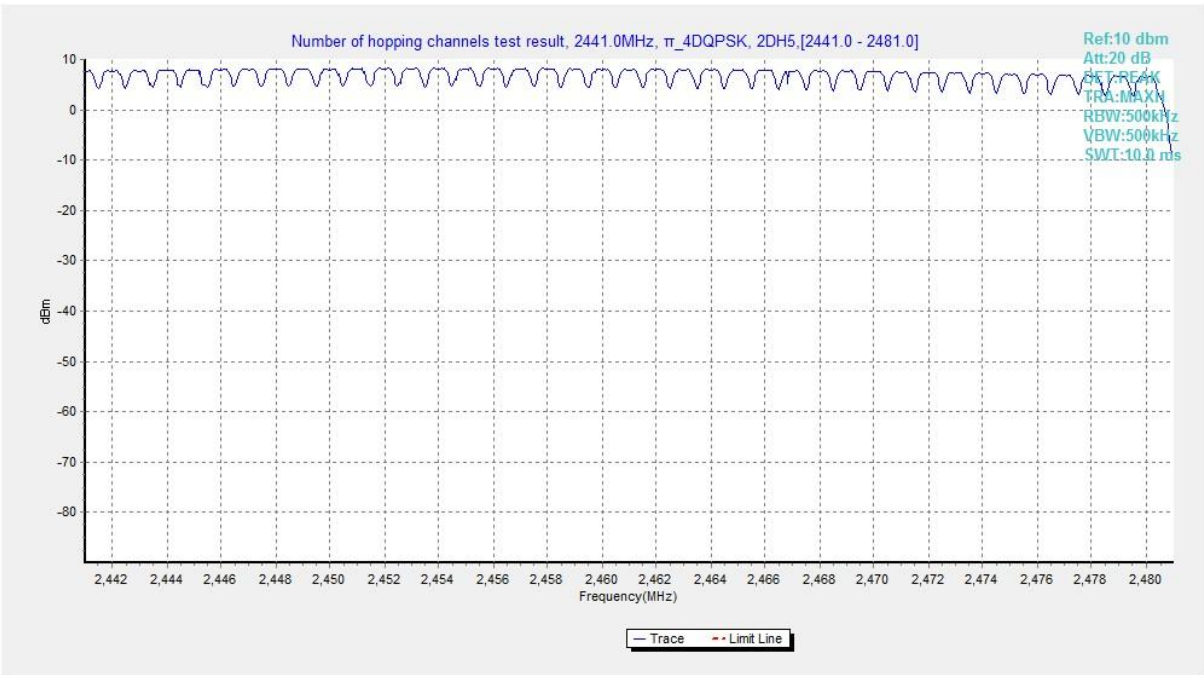


Fig. 69 Hopping channel ch39~78 (π /4 DQPSK, Ch39)

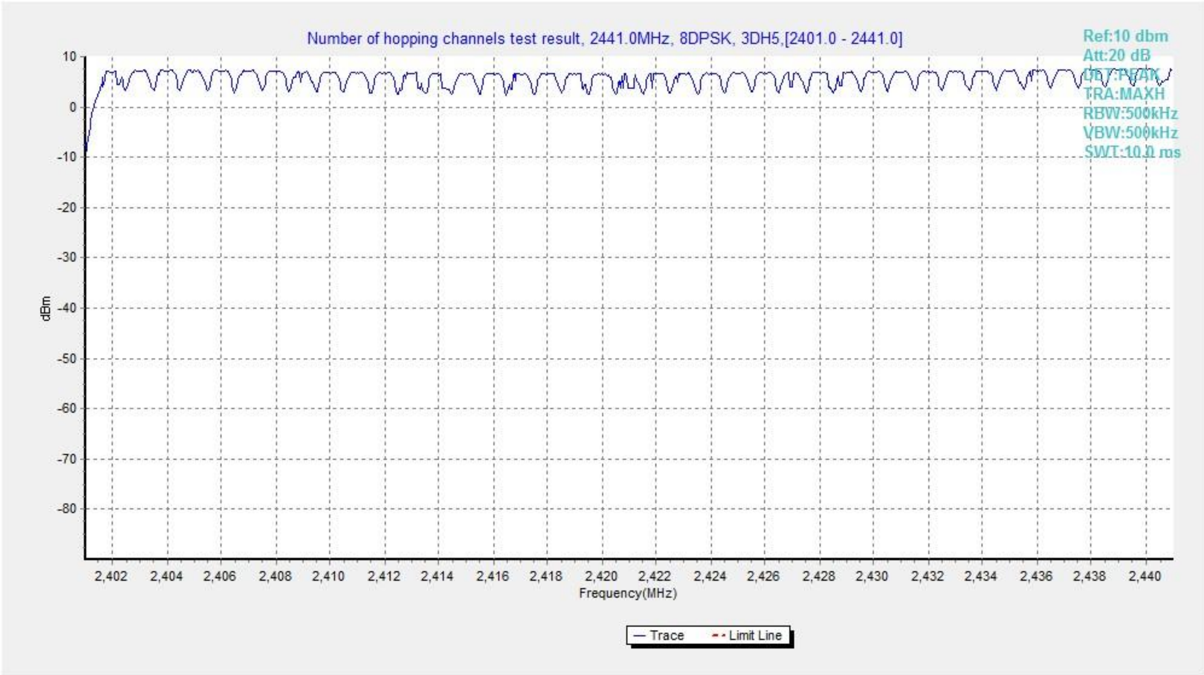


Fig. 70 Hopping channel ch0~39 (8DPSK, Ch39)

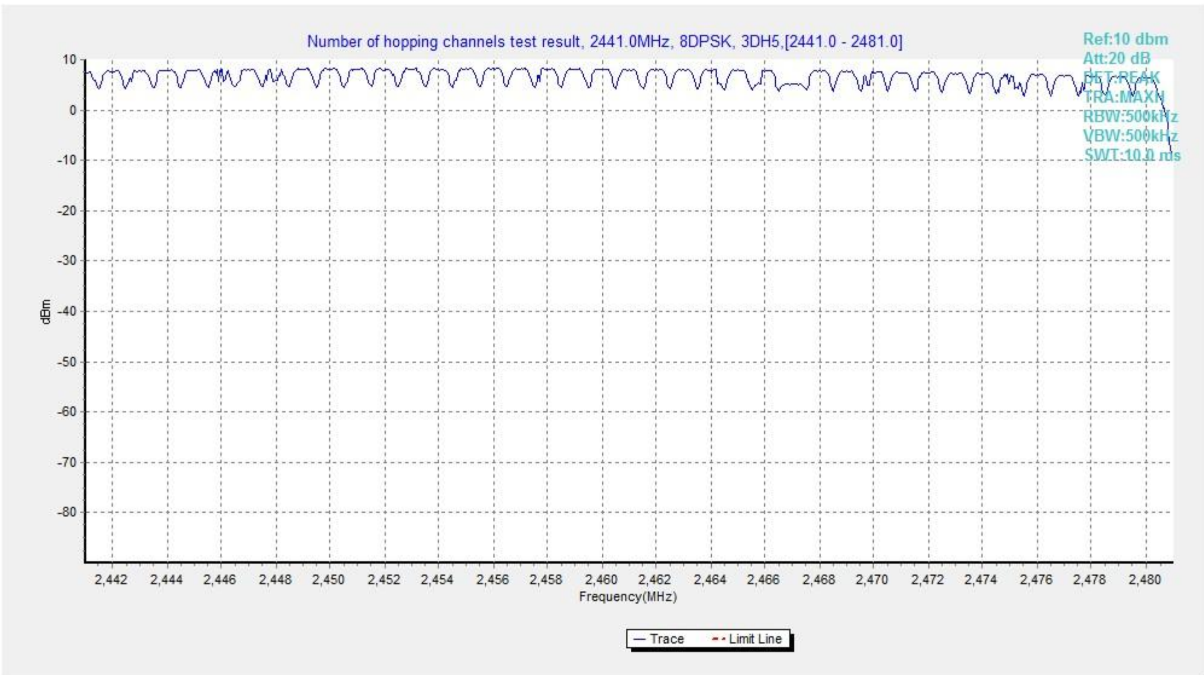


Fig. 71 Hopping channel ch39~78 (8DPSK, Ch39)

A.8 Carrier Frequency Separation

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a) & RSS-247 Section 5.1	By a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater

Measurement Results:

Mode	Channel	Packet	Separation of hopping channels	Test result (kHz)	Conclusion
GFSK	39	DH5	Fig.72	998.25	**P**
π /4 DQPSK	39	2-DH5	Fig.73	1004.25	**P**
8DPSK	39	3-DH5	Fig.74	835.50	**P**

See below for test graphs.

Conclusion: Pass

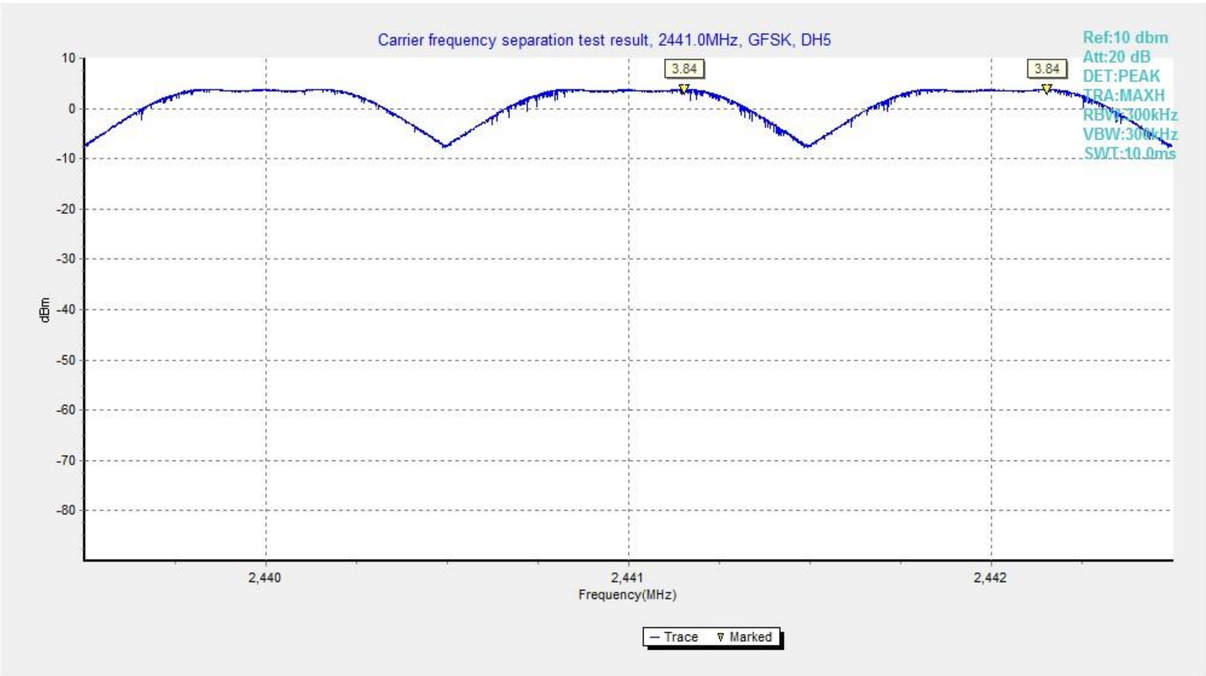


Fig. 72 Carrier Frequency Separation (GFSK, Ch39)

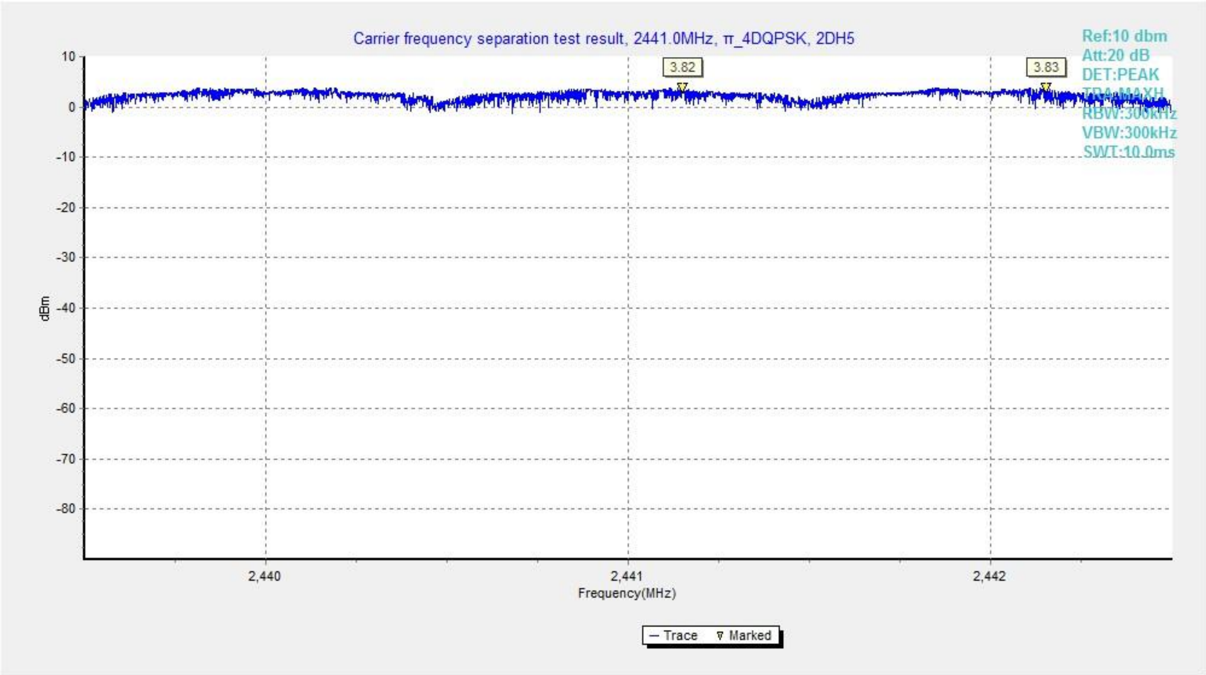


Fig. 73 Carrier Frequency Separation (π /4 DQPSK, Ch39)

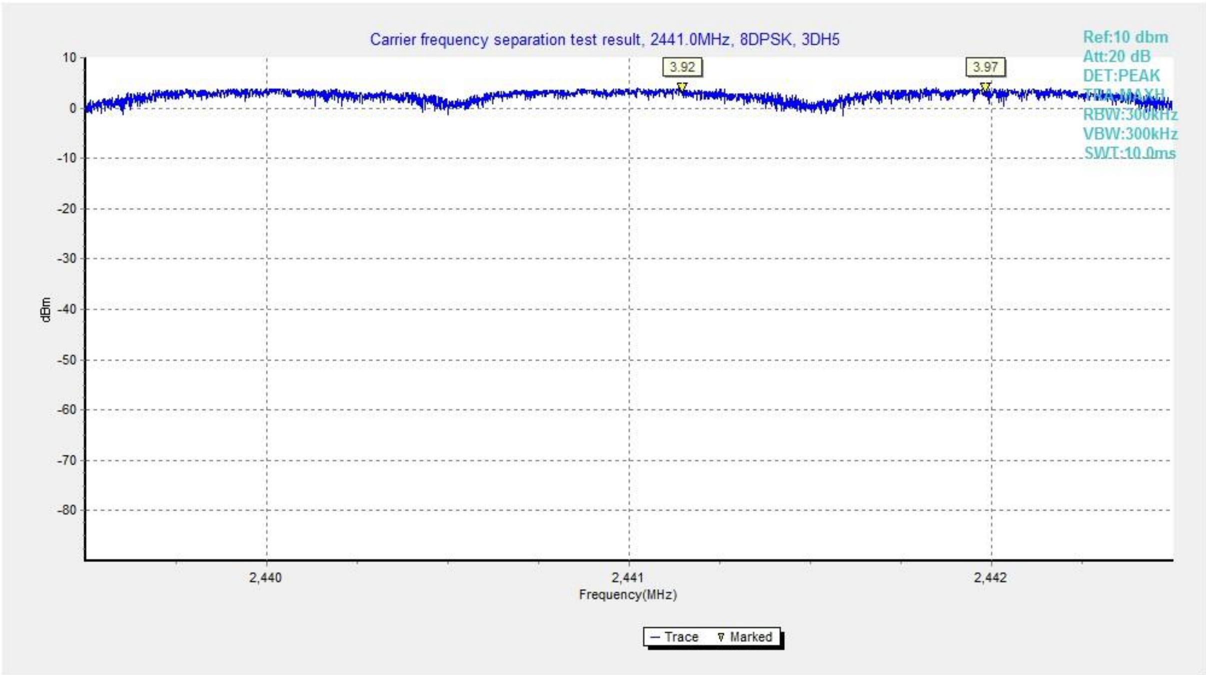


Fig. 74 Carrier Frequency Separation (8DPSK, Ch39)

*****END OF REPORT*****