FCC PART 15C
TEST REPORT
No. I19Z62263-IOT01

for

Shenzhen Tinno Mobile Technology Corp.

Smart Phone

Model Name: Wiko U520AS

FCC ID: XD6U520AS

with

Hardware Version: V1.0

Software Version: U520ASV01.10.10

Issued Date: 2020-3-13

Note:

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

The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the U.S.Government.

Test Laboratory:

CTTL, Telecommunication Technology Labs, CAICT

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

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I19Z62263-IOT01	Rev.0	1st edition	2020-3-13

CONTENTS

1. Test Laboratory

1.1. Introduction &Accreditation

Telecommunication Technology Labs, CAICT is an ISO/IEC 17025:2005accredited test laboratory under NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM (NVLAP)with lab code600118-0, and is also an FCC accredited test laboratory (CN5017), and ISED accredited test laboratory (CN0066). The detail accreditation scope can be found on NVLAP website.

1.2. Testing Location

Conducted testing Location: CTTL(huayuan North Road)

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

Radiated testing Location: CTTL(Shouxiang)

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

1.3. Testing Environment

Normal Temperature: 15-35℃

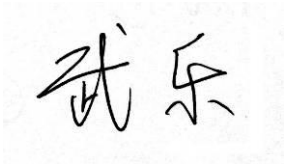
Relative Humidity: 20-75%

1.4. Project data

Testing Start Date: 2019-12-20

Testing End Date: 2020-2-28

1.5. Signature



Wu Le

(Prepared this test report)

Sun Zhenyu

(Reviewed this test report)

Li Zhuofang

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	Shenzhen Tinno Mobile Technology Corp.
Address /Post:	4/F, H-3 Building,OCT Eastern Industrial Park. NO.1 XiangShan East Road, Nan Shan District,Shenzhen, P.R.China
City:	Shenzhen
Postal Code:	/
Country:	China
Telephone:	0755-86095550
Fax:	/

2.2. Manufacturer Information

Company Name:	Shenzhen Tinno Mobile Technology Corp.
Address /Post:	4/F, H-3 Building,OCT Eastern Industrial Park. NO.1 XiangShan East Road, Nan Shan District,Shenzhen, P.R.China
City:	Shenzhen
Postal Code:	/
Country:	China
Telephone:	0755-86095550
Fax:	/

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

3.1. About EUT

Description	Smart Phone
Model Name	Wiko U520AS
FCC ID	XD6U520AS
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	GFSK/π/4 DQPSK/8DPSK
Number of Channels	79
Power Supply	3.8V DC by Battery

3.2. Internal Identification of EUT

EUT ID*	SN or IMEI	HW Version	SW Version
EUT1	860055040007604	V1.0	U520ASV01.10.10
EUT2	860055040006119	V1.0	U520ASV01.10.10

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

3.3. Internal Identification of AE

AE ID*	Description	SN	Remarks
AE1	Battery	/	/
AE2	Charger	/	/
AE3	USB Cable	/	/
AE4	USB Cable	/	/
AE5	USB Cable	/	No test
AE6	USB Cable	/	No test
AE7	USB Cable	/	No test
AE8	USB Cable	/	No test

AE1

Model	LT25H446077J
Manufacturer	Ningbo Veken Battery Co., Ltd. No.2, Area 0212, West Zone, Free Trade Zone, Ningbo, Zhejiang Province, China
Capacitance	2500 mAh
Nominal voltage	3.8V

AE2

Model	TN-050100U6
Manufacturer	Guangdong Beicom Electronics Co.,Ltd
Length of cable	/

AE3

Model	336189
SN	P103-BFT132-010
Manufacturer	/
Length of cable	/
AE4	
Model	T365-004
SN	P103-BL4130-000
Manufacturer	/
Length of cable	/
AE5	
Model	336189
SN	P103-ASH130-000
Manufacturer	/
Length of cable	/
AE6	
Model	336189
SN	P103-BFT131-010
Manufacturer	/
Length of cable	/
AE7	
Model	T365-004
SN	P103-BMX131-000
Manufacturer	/
Length of cable	/
AE8	
Model	T365-004
SN	P103-BL4132-000
Manufacturer	/
Length of cable	/

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

3.4. Normal Accessory setting

Fully charged battery should be used during the test.

3.5. General Description

The Equipment Under Test (EUT) is a model of Smart Phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfill 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 client or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

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

Reference	Title	Version
FCC Part15	FCC CFR 47, Part 15, Subpart C: 15.205 Restricted bands of operation; 15.209 Radiated emission limits, general requirements; 15.247 Operation within the bands 902–928MHz, 2400–2483.5 MHz, and 5725–5850 MHz.	2018
ANSI C63.10	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	June,2013

5. Test Results

5.1. Summary of Test Results

Abbreviations used in this clause:

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

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

NA Not Applicable, The test was not applicable

NP Not Performed, The test was not performed by CTTL

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

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

The measurement is made according to ANSI C63.10.

5.2. Statements

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

6. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Vector Signal Analyzer	FSQ26	200136	Rohde & Schwarz	1 year	2020-11-29
2	Bluetooth Tester	CBT32	100649	Rohde & Schwarz	1 year	2020-11-29
3	LISN	ENV216	101200	Rohde & Schwarz	1 year	2020-04-27
4	Test Receiver	ESCI	100344	Rohde & Schwarz	1 year	2020-03-14
5	Shielding Room	S81	/	ETS-Lindgren	/	/

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESU26	100376	Rohde & Schwarz	1 year	2020-10-30
2	BiLog Antenna	VULB9163	01176	Schwarzbeck	1 year	2020-03-14
3	Dual-Ridge Waveguide Horn Antenna	3117	00139065	ETS-Lindgren	1 year	2020-11-10
4	Dual-Ridge Waveguide Horn Antenna	3116	2663	ETS-Lindgren	1 year	2020-6-18
5	Vector Signal Analyzer	FSV	101047	Rohde & Schwarz	1 year	2020-05-16
6	Bluetooth Tester	CBT	101042	Rohde & Schwarz	1 year	2021-01-01

7. Measurement Uncertainty

7.1. Peak Output Power - Conducted

Measurement Uncertainty:

Measurement Uncertainty (k=2)	0.66dB

7.2. Frequency Band Edges - Conducted

Measurement Uncertainty:

Measurement Uncertainty (k=2)	0.66dB

7.3. Frequency Band Edges - Radiated

Measurement Uncertainty:

Measurement Uncertainty (k=2)	4.32dB

7.4. Transmitter Spurious Emission - Conducted

Measurement Uncertainty:

Frequency Range	Uncertainty (k=2)
30 MHz ~ 8 GHz	1.22dB
8 GHz ~ 12.75 GHz	1.51dB
12.7GHz ~ 26 GHz	1.51dB

7.5. Transmitter Spurious Emission - Radiated

Measurement Uncertainty:

Frequency Range	Uncertainty(dBm) (k=2)
9kHz-30MHz	/
30MHz ≤ f ≤ 1GHz	5.40
1GHz ≤ f ≤18GHz	4.32
18GHz ≤ f ≤40GHz	5.26

7.6. Time of Occupancy (Dwell Time)

Measurement Uncertainty:

Measurement Uncertainty (k=2)	0.88ms

7.7. 20dB Bandwidth

Measurement Uncertainty:

Measurement Uncertainty (k=2)	61.936Hz

7.8. Carrier Frequency Separation

Measurement Uncertainty:

Measurement Uncertainty (k=2)	61.936Hz

7.9. AC Powerline Conducted Emission

Measurement Uncertainty:

Measurement Uncertainty (k=2)	3.38dB

ANNEX A: Detailed Test Results

A.1. Measurement Method

A.1.1. Conducted Measurements

The measurement is made according to ANSI C63.10.

1). Connect the EUT to the test system correctly.

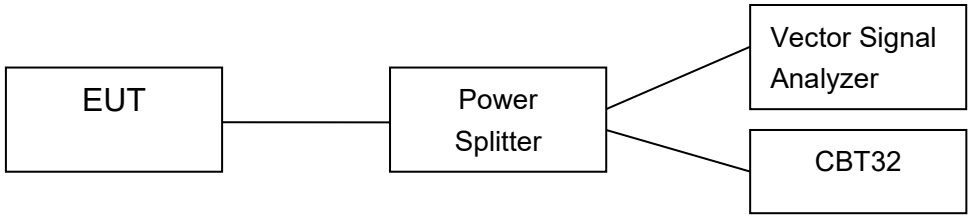
2). Set the EUT to the required work mode (Transmitter, receiver or transmitter & receiver).

3). Set the EUT to the required channel.

4). Set the EUT hopping mode (hopping or hopping off).

5). Set the spectrum analyzer to start measurement.

6). Record the values. Vector Signal Analyzer



A.1.2. Radiated Emission Measurements

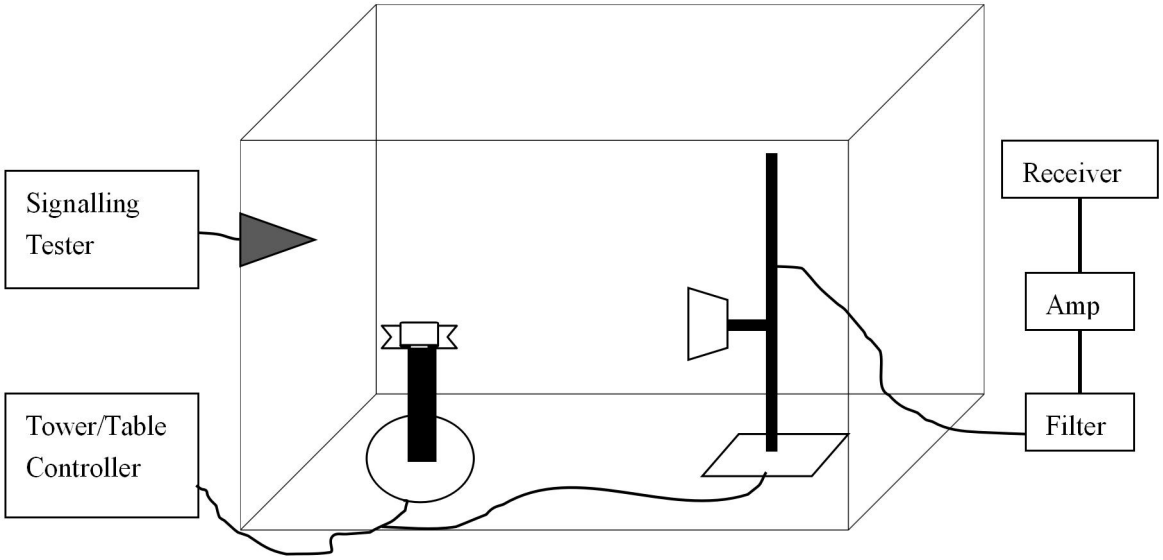
The measurement is made according to ANSI C63.10

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

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

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

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



A.2. Peak Output Power – Conducted

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

a) Use the following spectrum analyzer settings:

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

b) Allow trace to stabilize.

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

d) The indicated level is the peak output power.

Measurement Limit:

Standard	Limits	
FCC Part 15.247 (b)(1)	Bandwidth≤1MHz	30dBm (1W)
	Bandwidth＞1MHz	21dBm (125mW)

Measurement Results:

For GFSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	5.29	5.65	5.53	P

For π/4 DQPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	4.54	4.75	4.67	P

For 8DPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	4.52	4.77	4.69	P

Conclusion: PASS

A.3. Frequency Band Edges – Conducted

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

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

– Span: 10 MHz
– Resolution Bandwidth: 100 kHz
– Video Bandwidth: 300 kHz
– Sweep Time:Auto
– Detector: Peak
– Trace: max hold

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

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

Measurement Limit:

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

Measurement Result:

For GFSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.1	-60.39	P
	Hopping ON	Fig.2	-62.90	P
78	Hopping OFF	Fig.3	-63.07	P
	Hopping ON	Fig.4	-64.44	P

For π/4 DQPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.5	-59.70	P
	Hopping ON	Fig.6	-63.81	P
78	Hopping OFF	Fig.7	-62.19	P
	Hopping ON	Fig.8	-62.99	P

For 8DPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.9	-58.80	P
	Hopping ON	Fig.10	-63.19	P
78	Hopping OFF	Fig.11	-62.59	P

	Hopping ON	Fig.12	-64.27	P

Conclusion: PASS

Test graphs as below

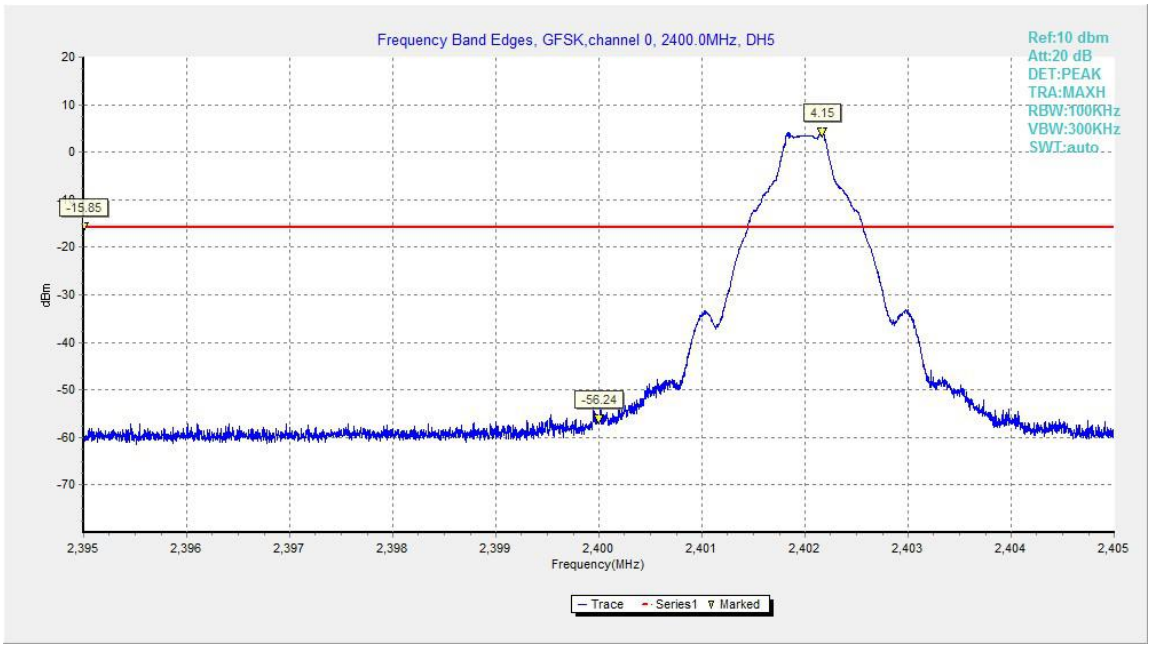


Fig.1. Frequency Band Edges: GFSK, Channel 0, Hopping Off

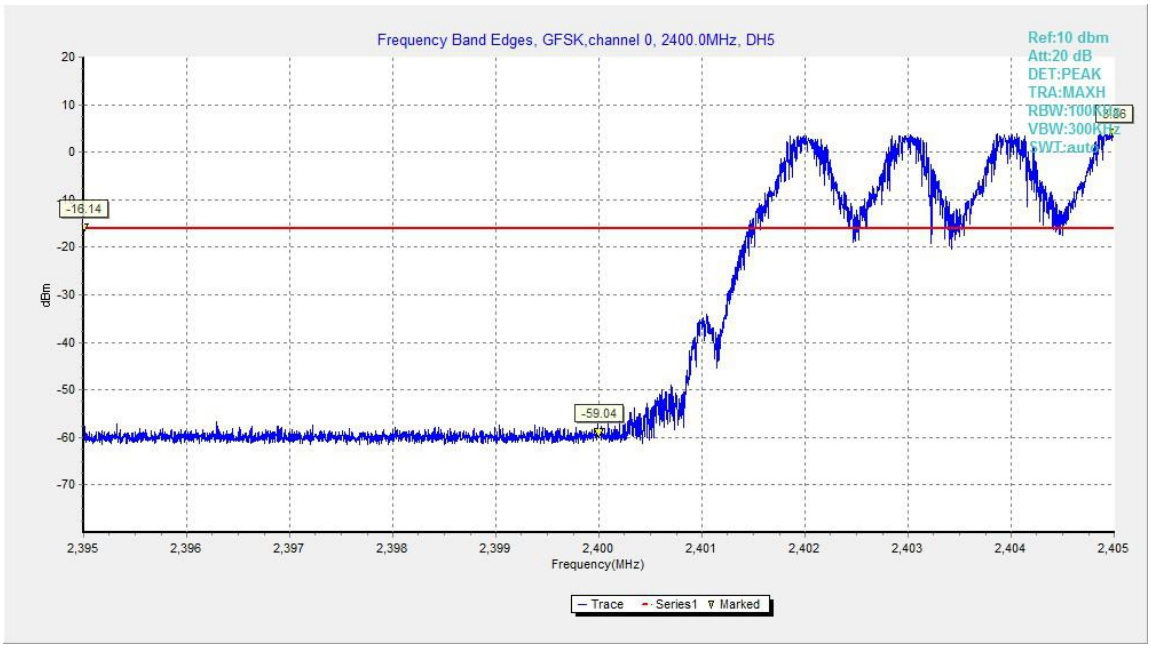


Fig.2. Frequency Band Edges: GFSK, Channel 0, Hopping On

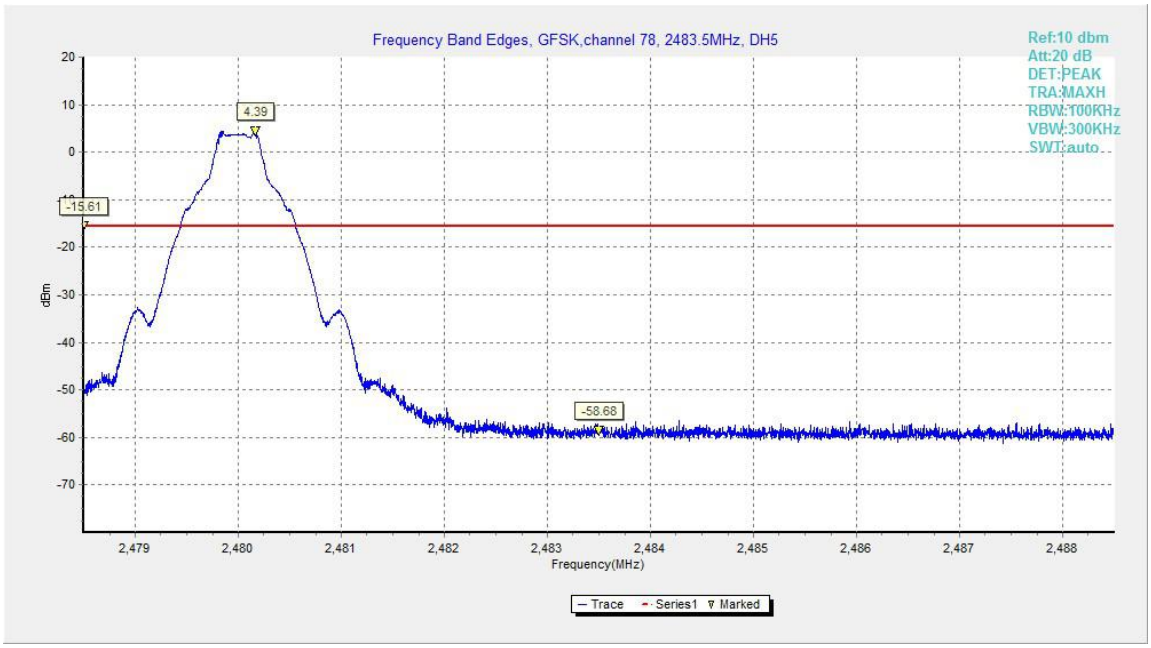


Fig.3. Frequency Band Edges: GFSK, Channel 78, Hopping Off

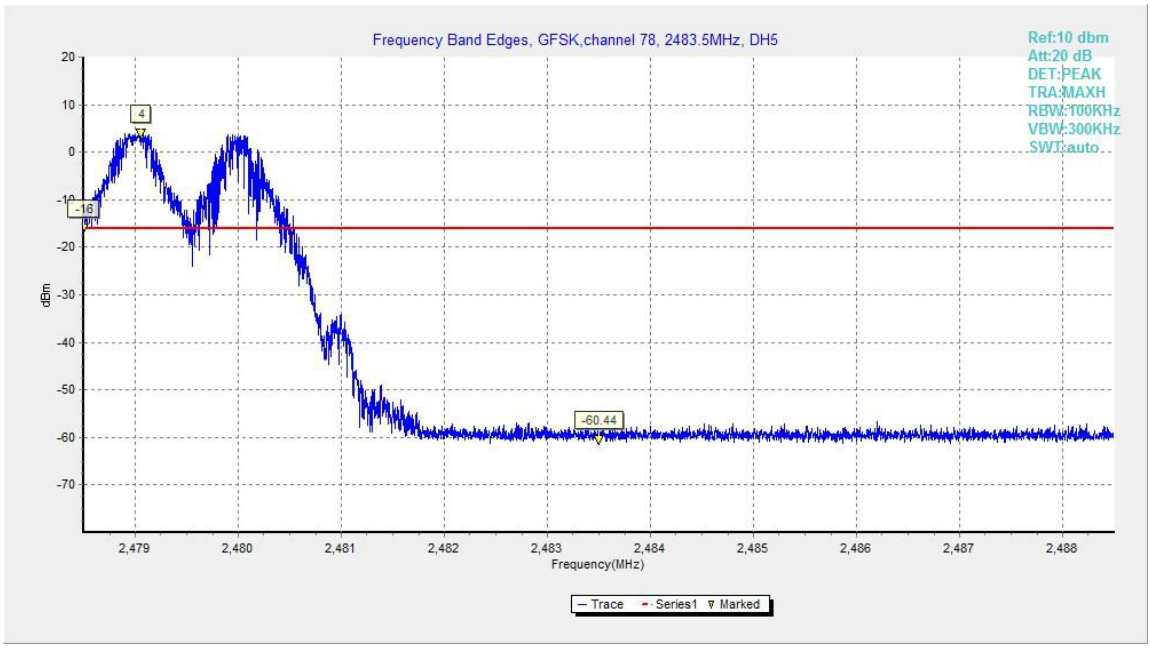


Fig.4. Frequency Band Edges: GFSK, Channel 78, Hopping On

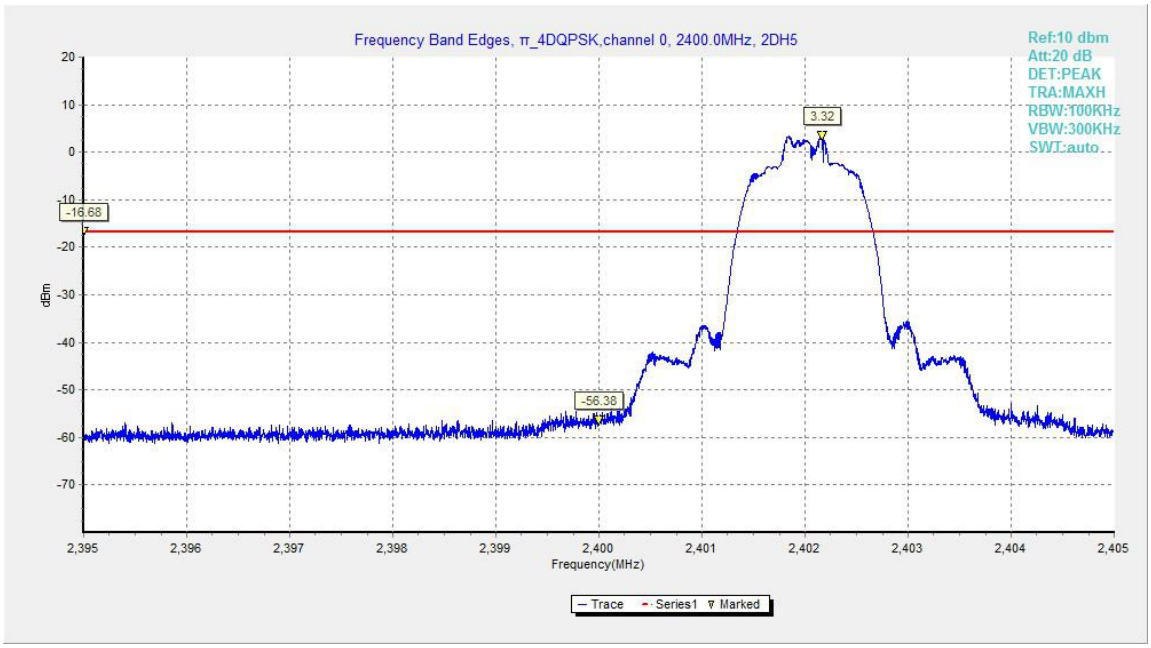


Fig.5. Frequency Band Edges: π/4 DQPSK, Channel 0, Hopping Off

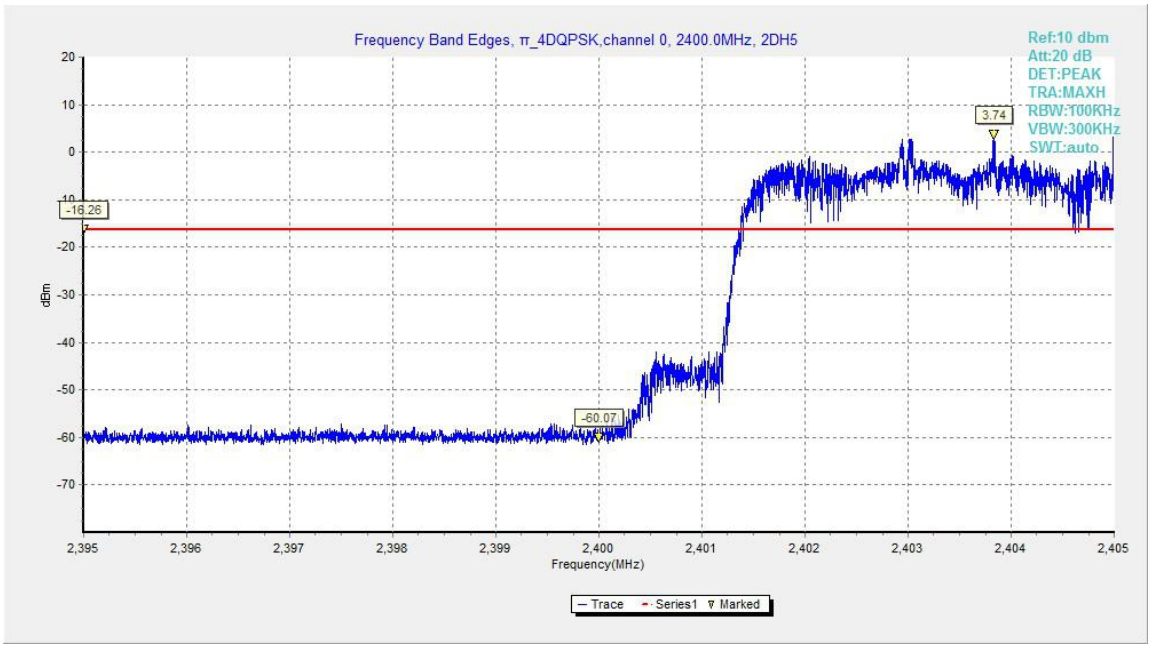


Fig.6. Frequency Band Edges: π/4 DQPSK, Channel 0, Hopping On

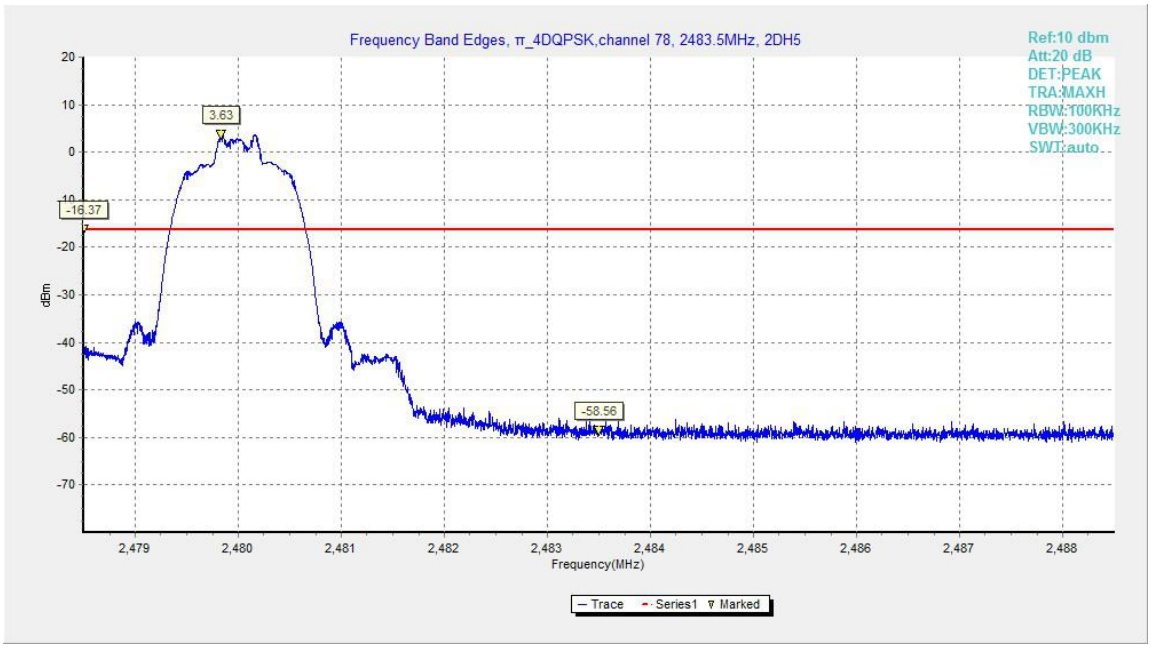


Fig.7. Frequency Band Edges: π/4 DQPSK, Channel 78, Hopping Off

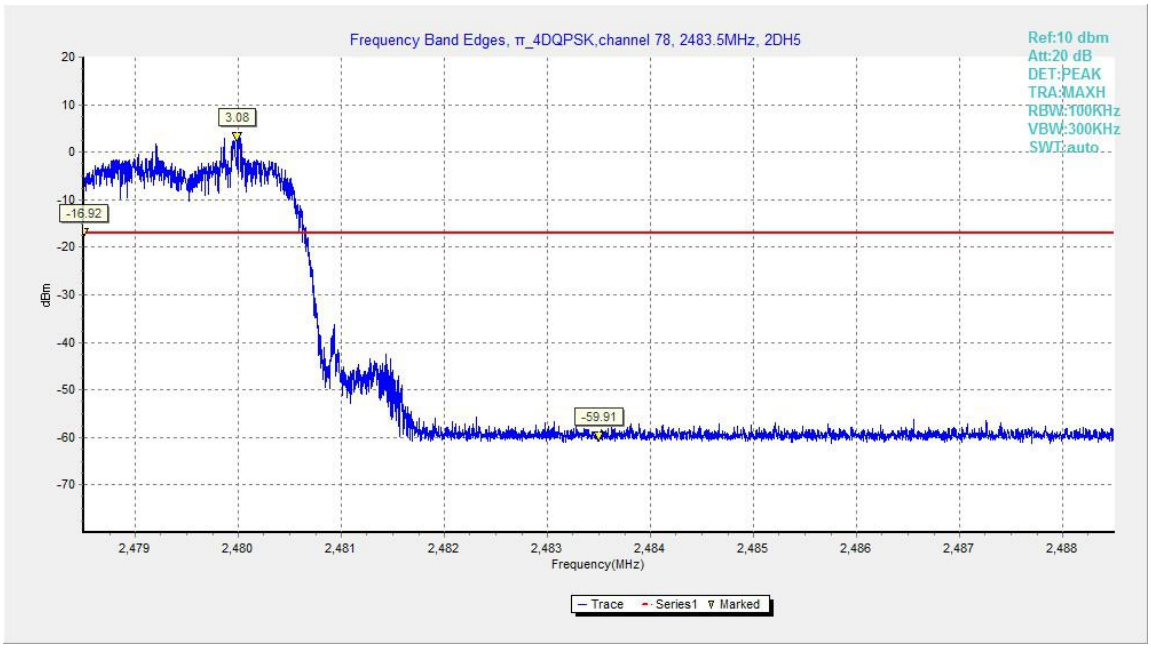


Fig.8. Frequency Band Edges: π/4 DQPSK, Channel 78, Hopping On

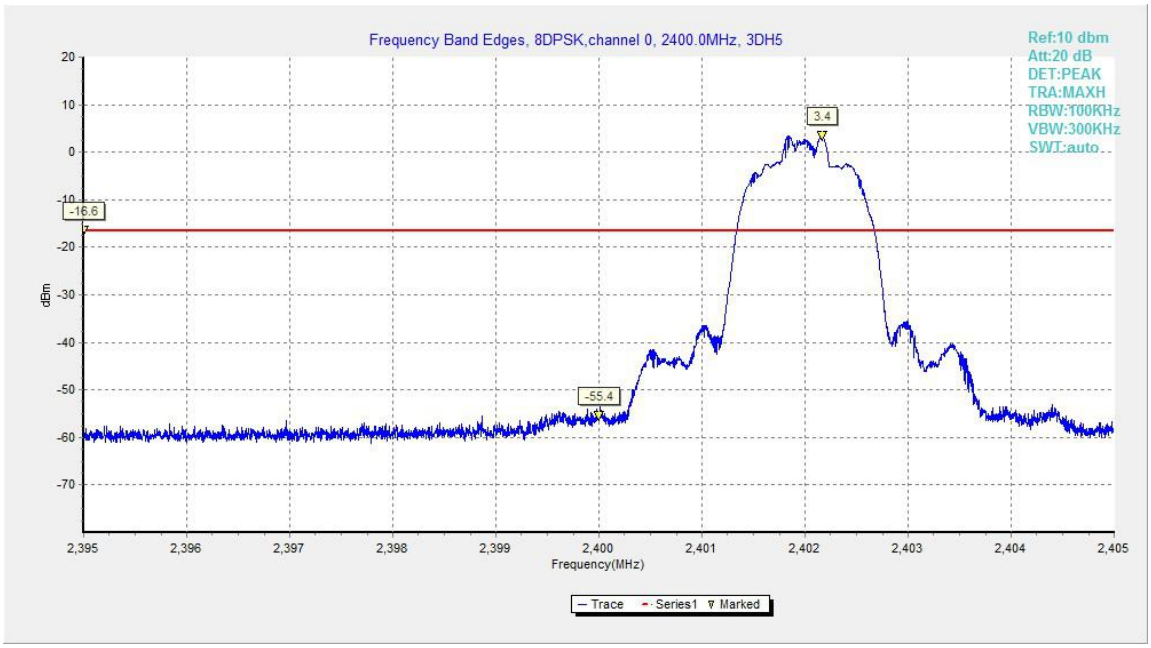


Fig.9. Frequency Band Edges: 8DPSK, Channel 0, Hopping Off

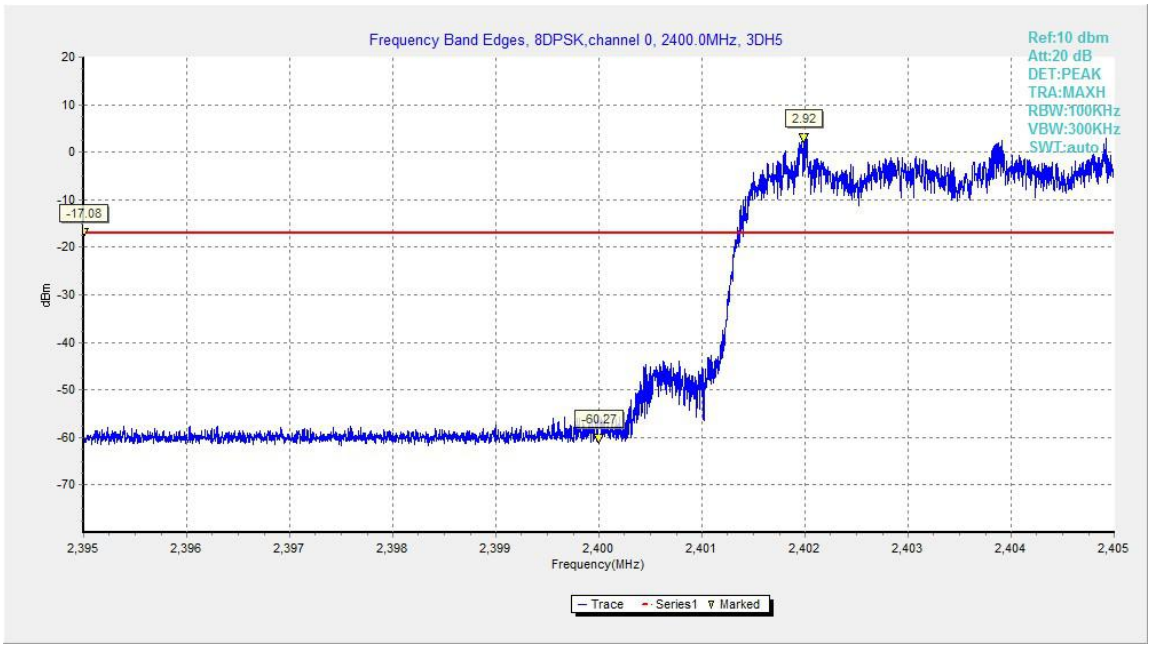


Fig.10. Frequency Band Edges: 8DPSK, Channel 0, Hopping On

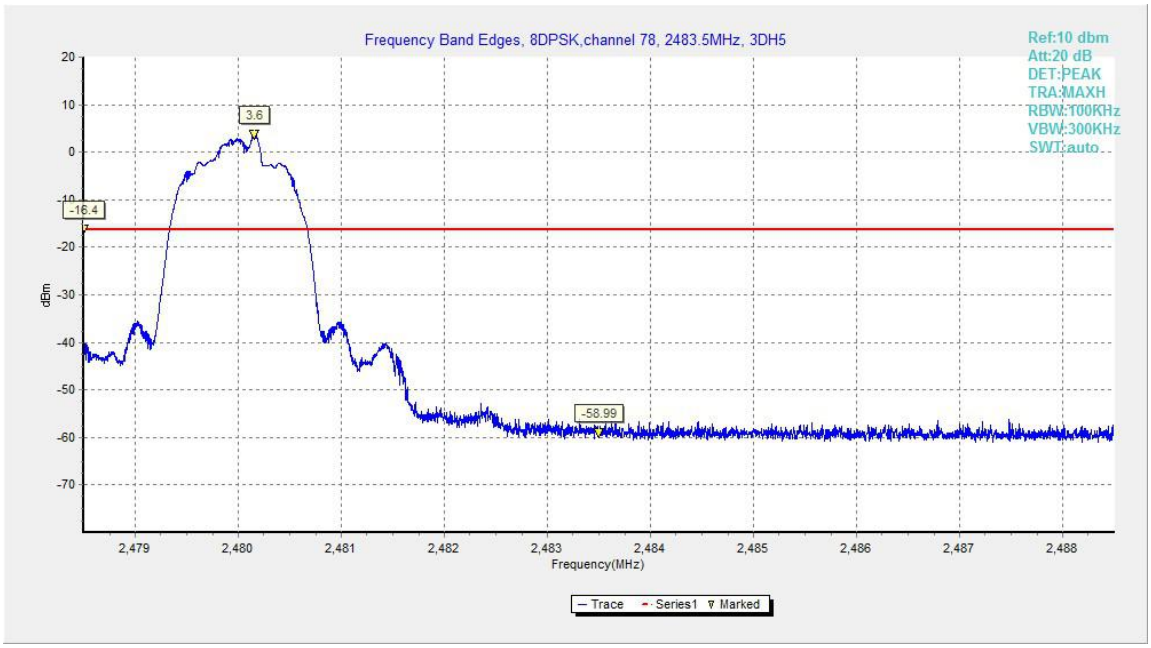


Fig.11. Frequency Band Edges: 8DPSK, Channel 78, Hopping Off

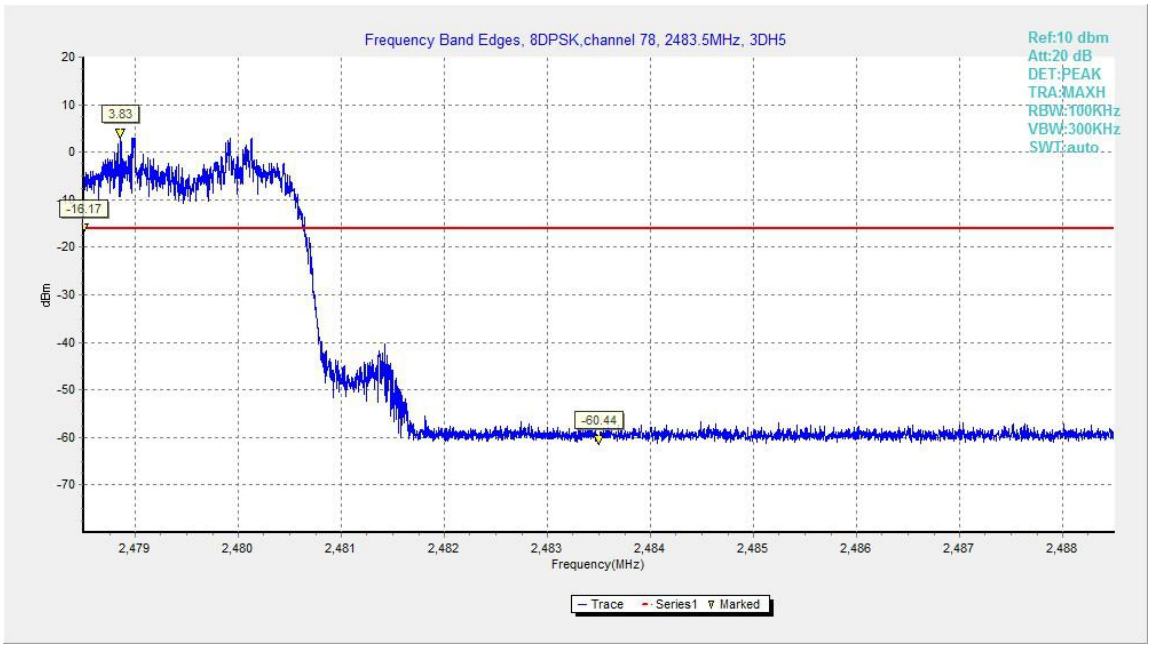


Fig.12. Frequency Band Edges: 8DPSK, Channel 78, Hopping On

A.4. Frequency Band Edges –Radiated

Method of Measurement: See ANSI C63.10-2013-clause 6.4 &6.5 & 6.6

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

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 (MHz)	Field strength(μV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Set up:

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m and the table height shall be 1.5 m.
The EUT and transmitting antenna shall be centered on the turntable.

Test Condition

The EUT shall be tested 1 near top, 1 near middle, and 1 near bottom. Set the unlicensed wireless device to operate in continuous transmit mode. For unlicensed wireless devices unable to be configured for 100% duty cycle even in test mode, configure the system for the maximum duty cycle supported.
When required for unlicensed wireless devices, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage.

Exploratory radiated emissions measurements

Exploratory radiated measurements shall be performed at the measurement distance or at a closer distance than that specified for compliance to determine the emission characteristics of the EUT and, if applicable, the EUT configuration that produces the maximum level of emissions. The frequencies of maximum emission may be determined by manually positioning the antenna close to the EUT, and then moving the antenna over all sides of the EUT while observing a spectral

display. It is advantageous to have prior knowledge of the frequencies of emissions, although this may be determined from such a near-field scan. The near-field scan shall only be used to determine the frequency but not the amplitude of the emissions. Where exploratory measurements are not adequate to determine the worst-case operating modes and are used only to identify the frequencies of the highest emissions, additional preliminary tests can be required.
For emissions from the EUT, the maximum level shall be determined by rotating the EUT and its antenna through 0° to 360°. For each mode of operation required to be tested, the frequency spectrum (based on findings from exploratory measurements) shall be monitored.
Broadband antennas and a spectrum analyzer or a radio-noise meter with a panoramic display are often useful in this type of test. If either antenna height or EUT azimuth are not fully measured during exploratory testing, then complete testing can be required at the OATS or semi-anechoic chamber when the final full spectrum testing is performed.

Final radiated emissions measurements

The final measurements are using the orientation and equipment arrangement of the EUT based on the measurement results found during the preliminary (exploratory) measurements, the EUT arrangement, appropriate modulation, and modes of operation that produce the emissions that have the highest amplitude relative to the limit shall be selected for the final measurement.
For emissions from the EUT, the maximum level shall be determined by rotating the EUT and its antenna through 0° to 360°. Final measurements for the EUT require a measurement antenna height scan of 1 m to 4 m and the antenna rotated to repeat the measurements for both the horizontal and vertical antenna polarizations. For each mode of operation required to be tested, the frequency spectrum (based on findings from exploratory measurements) shall be monitored.
For each mode selected, record the frequency and amplitude of the highest fundamental emission (if applicable), as well as the frequency and amplitude of the six highest spurious emissions relative to the limit. Emissions more than 20 dB below the limit do not need to be reported.
This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The receiver references:

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100KHz/300KHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

EUT ID: EUT1

Measurement Results:

Mode	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	2.38GHz ~2.45GHz	Fig.13	P
	78	2.45GHz ~2.5GHz	Fig.14	P

Mode	Channel	Frequency Range	Test Results	Conclusion
π/4 DQPSK	0	2.38GHz ~2.43GHz	Fig.15	P
	78	2.45GHz ~2.5GHz	Fig.16	P

Mode	Channel	Frequency Range	Test Results	Conclusion
8DPSK	0	2.38GHz ~2.45GHz	Fig.17	P
	78	2.45GHz ~2.5GHz	Fig.18	P

Conclusion: PASS

Test graphs as below

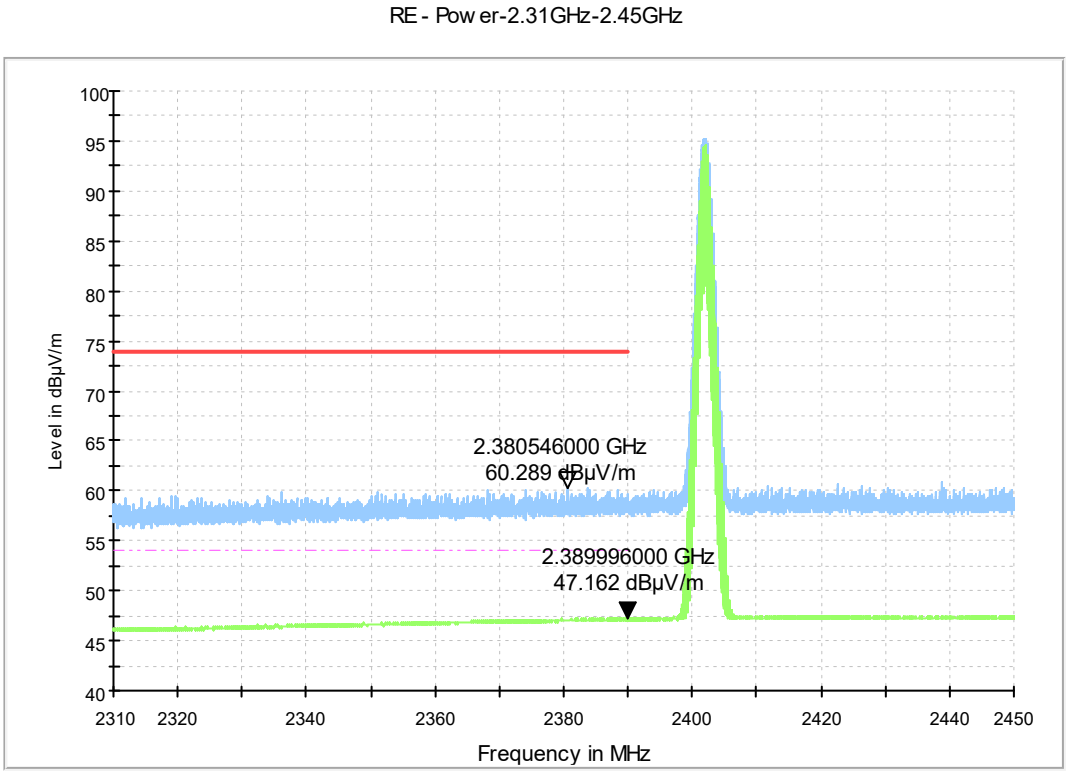


Fig.13. Frequency Band Edges: GFSK, Channel 0, Hopping Off, 2.38 GHz – 2.45GHz

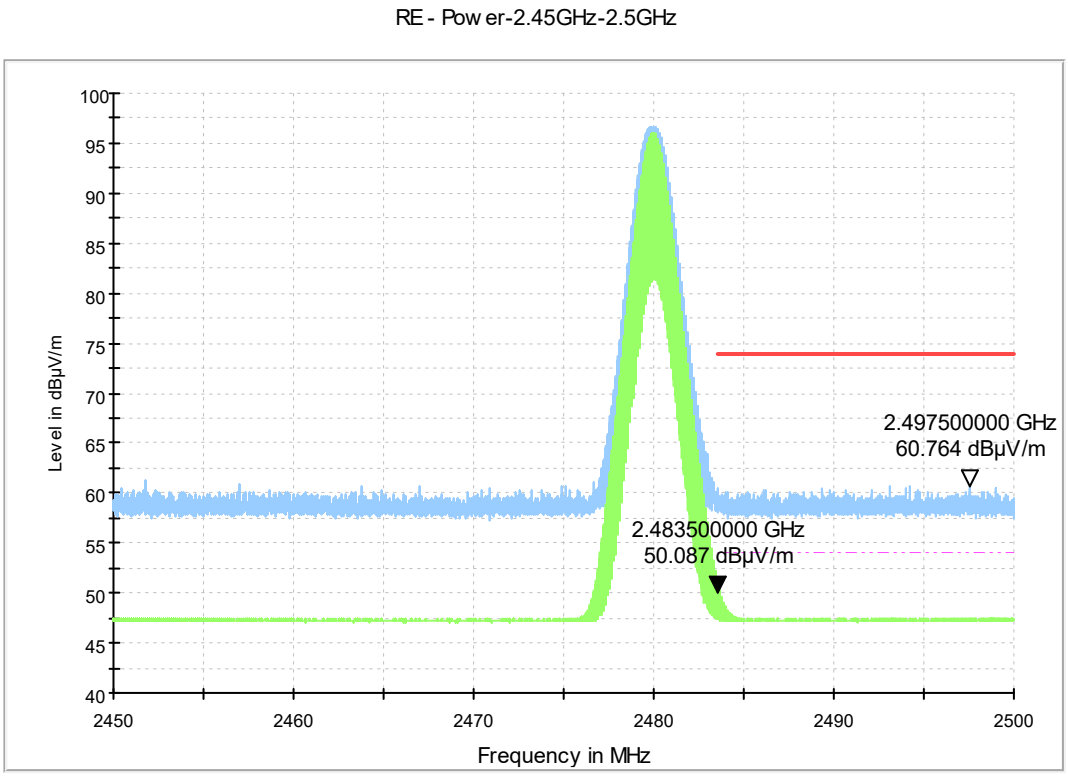


Fig.14. Frequency Band Edges: GFSK, Channel 78, Hopping Off, ch11, 2.45 GHz - 2.50GHz

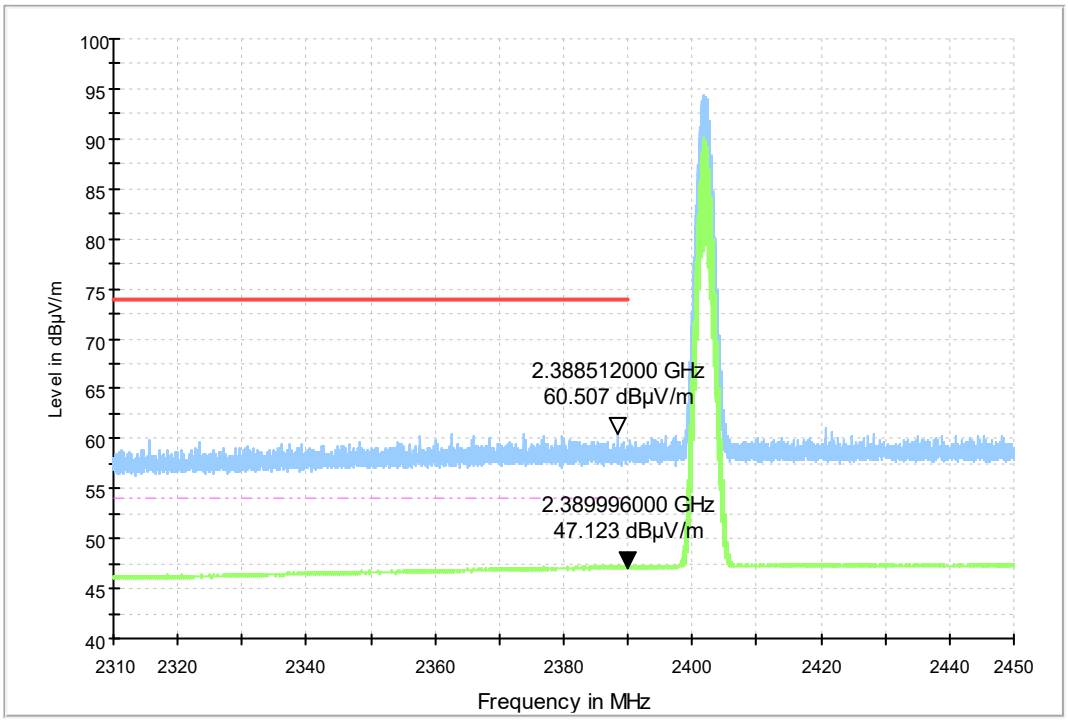


Fig.15. Frequency Band Edges: π/4 DQPSK, Channel 0, Hopping Off, 2.38 GHz - 2.45GHz

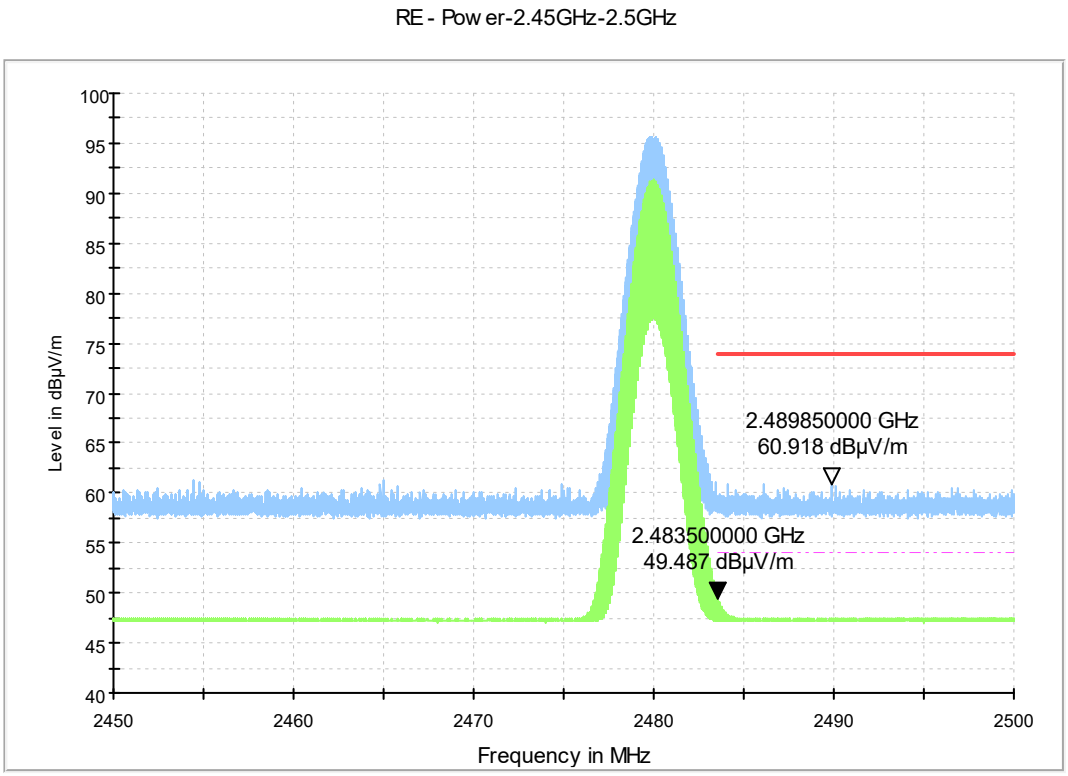


Fig.16. Frequency Band Edges: π/4 DQPSK, Channel 78, Hopping Off, 2.38 GHz - 2.45GHz

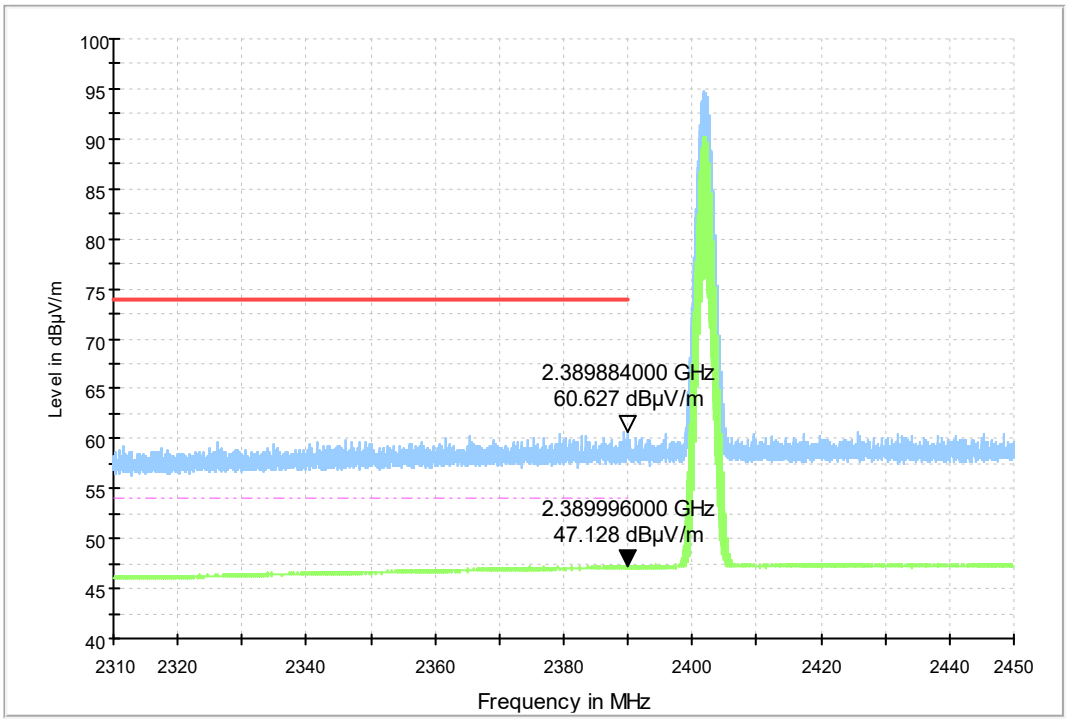


Fig.17. Frequency Band Edges: 8DPSK, Channel 0, 2.38 GHz - 2.45GHz

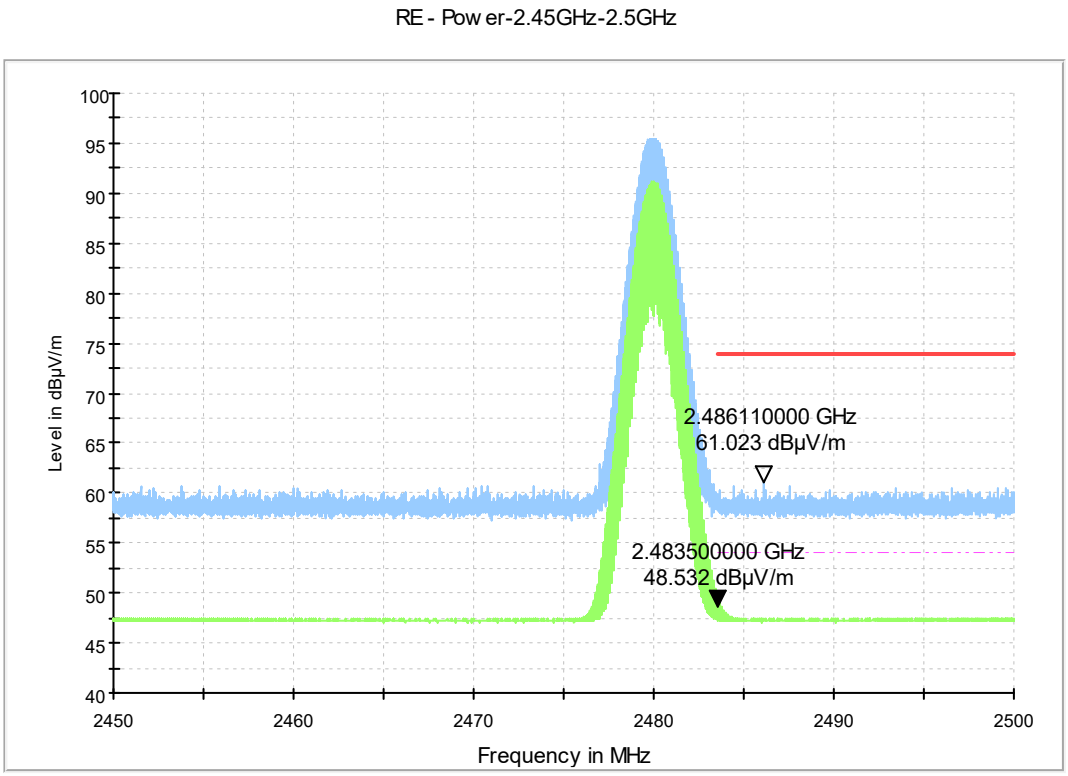


Fig.18. Frequency Band Edges: 8DPSK, Channel 78, 2.38 GHz - 2.45GHz

A.5. Transmitter Spurious Emission - Conducted

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

Measurement Procedure – Reference Level

1. Set the RBW = 100 kHz.

2. Set the VBW = 300 kHz.

3. Set the span to 5-30 % greater than the EBW.

4. Detector = peak.

5. Sweep time = auto couple.

6. Trace mode = max hold.

7. Allow trace to fully stabilize.

8. Use the peak marker function to determine the maximum power level in any 100 kHz band segment within the fundamental EBW. Next, determine the power in 100 kHz band segments outside of the authorized frequency band using the following measurement:

Measurement Procedure - Unwanted Emissions

1. Set RBW = 100 kHz.

2. Set VBW = 300 kHz.

3. Set span to encompass the spectrum to be examined.

4. Detector = peak.

5. Trace Mode = max hold.

6. Sweep = auto couple.

7. Allow the trace to stabilize (this may take some time, depending on the extent of the span).

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

Measurement Limit:

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

Measurement Results:

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0	Center Frequency	Fig.19	P

2402 MHz	30 MHz ~ 1 GHz	Fig.20	P
	1 GHz ~ 3 GHz	Fig.21	P
	3 GHz ~ 10 GHz	Fig.22	P
	10 GHz ~ 26 GHz	Fig.23	P
Ch 39 2441 MHz	Center Frequency	Fig.24	P
	30 MHz ~ 1 GHz	Fig.25	P
	1 GHz ~ 3 GHz	Fig.26	P
	3 GHz ~ 10 GHz	Fig.27	P
	10 GHz ~ 26 GHz	Fig.28	P
Ch 78 2480 MHz	Center Frequency	Fig.29	P
	30 MHz ~ 1 GHz	Fig.30	P
	1 GHz ~ 3 GHz	Fig.31	P
	3 GHz ~ 10 GHz	Fig.32	P
	10 GHz ~ 26 GHz	Fig.33	P

For π/4 DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	Center Frequency	Fig.34	P
	30 MHz ~ 1 GHz	Fig.35	P
	1 GHz ~ 3 GHz	Fig.36	P
	3 GHz ~ 10 GHz	Fig.37	P
	10 GHz ~ 26 GHz	Fig.38	P
Ch 39 2441 MHz	Center Frequency	Fig.39	P
	30 MHz ~ 1 GHz	Fig.40	P
	1 GHz ~ 3 GHz	Fig.41	P
	3 GHz ~ 10 GHz	Fig.42	P
	10 GHz ~ 26 GHz	Fig.43	P
Ch 78 2480 MHz	Center Frequency	Fig.44	P
	30 MHz ~ 1 GHz	Fig.45	P
	1 GHz ~ 3 GHz	Fig.46	P
	3 GHz ~ 10 GHz	Fig.47	P
	10 GHz ~ 26 GHz	Fig.48	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	Center Frequency	Fig.49	P
	30 MHz ~ 1 GHz	Fig.50	P
	1 GHz ~ 3 GHz	Fig.51	P
	3 GHz ~ 10 GHz	Fig.52	P
	10 GHz ~ 26 GHz	Fig.53	P

Ch 39 2441 MHz	Center Frequency	Fig.54	P
	30 MHz ~ 1 GHz	Fig.55	P
	1 GHz ~ 3 GHz	Fig.56	P
	3 GHz ~ 10 GHz	Fig.57	P
	10 GHz ~ 26 GHz	Fig.58	P
Ch 78 2480 MHz	Center Frequency	Fig.59	P
	30 MHz ~ 1 GHz	Fig.60	P
	1 GHz ~ 3 GHz	Fig.61	P
	3 GHz ~ 10 GHz	Fig.62	P
	10 GHz ~ 26 GHz	Fig.63	P

Conclusion: PASS

Test graphs as below

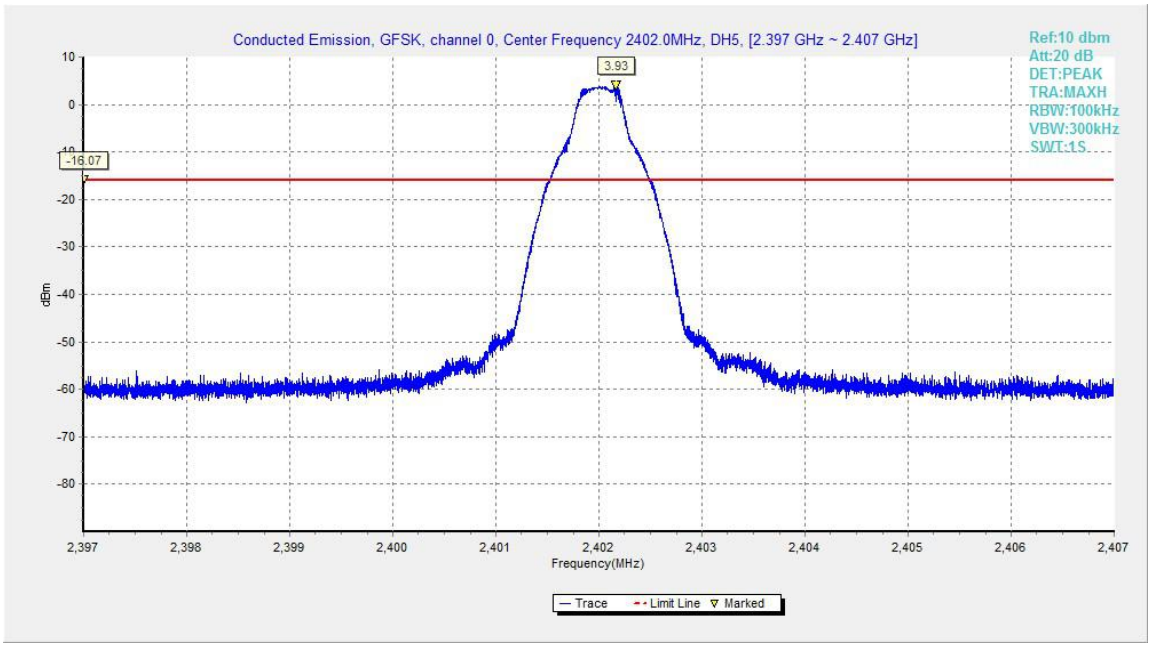


Fig.19. Conducted spurious emission: GFSK, Channel 0,2402MHz

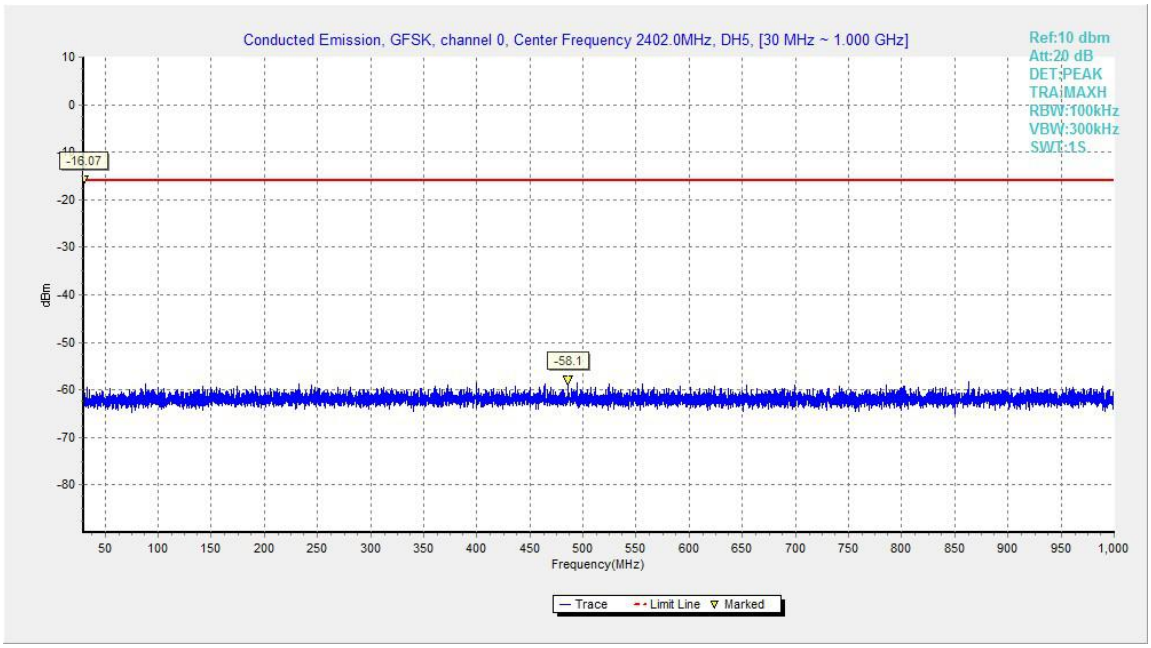


Fig.20. Conducted spurious emission: GFSK, Channel 0, 30MHz - 1GHz

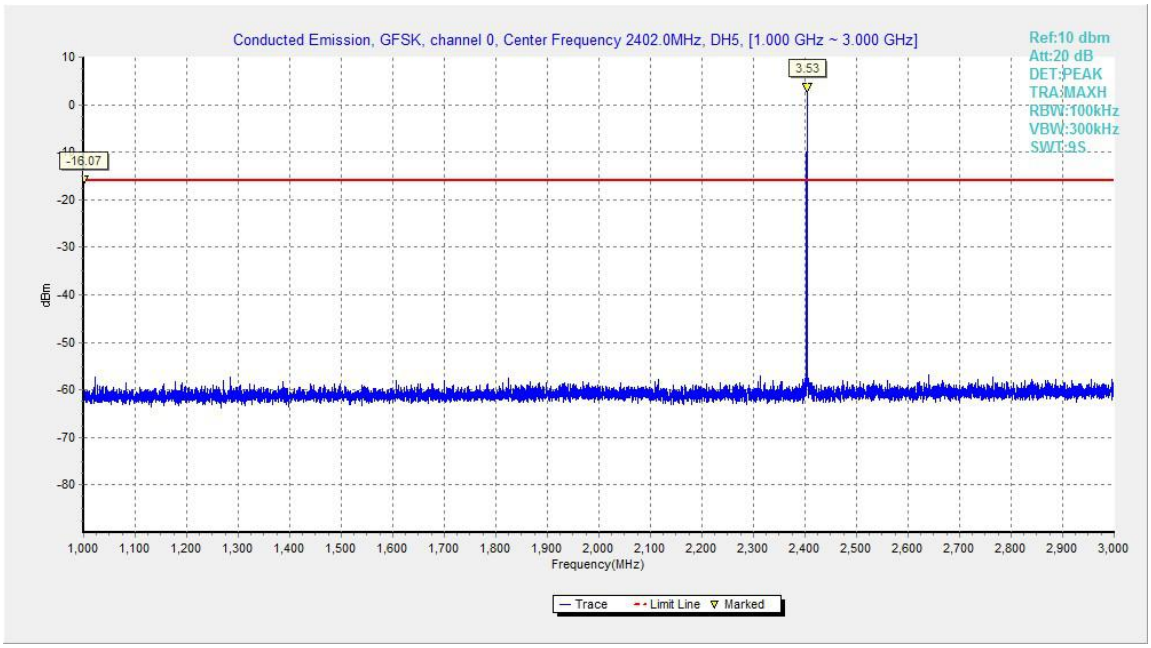


Fig.21. Conducted spurious emission: GFSK, Channel 0, 1GHz - 3GHz

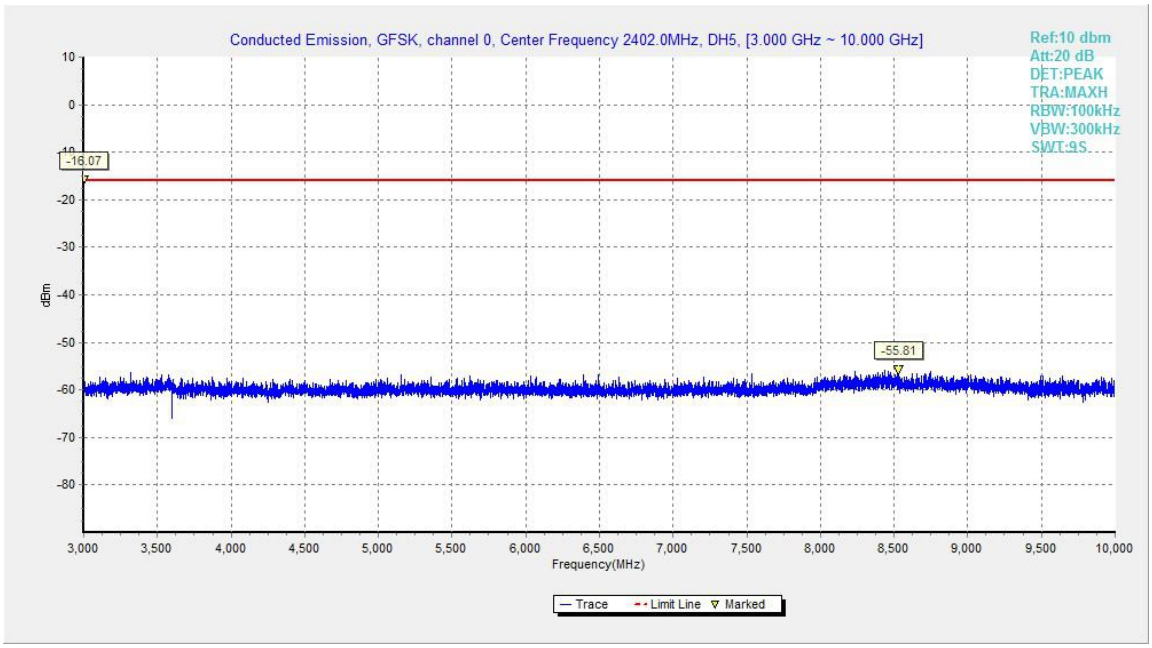


Fig.22. Conducted spurious emission: GFSK, Channel 0, 3GHz - 10GHz

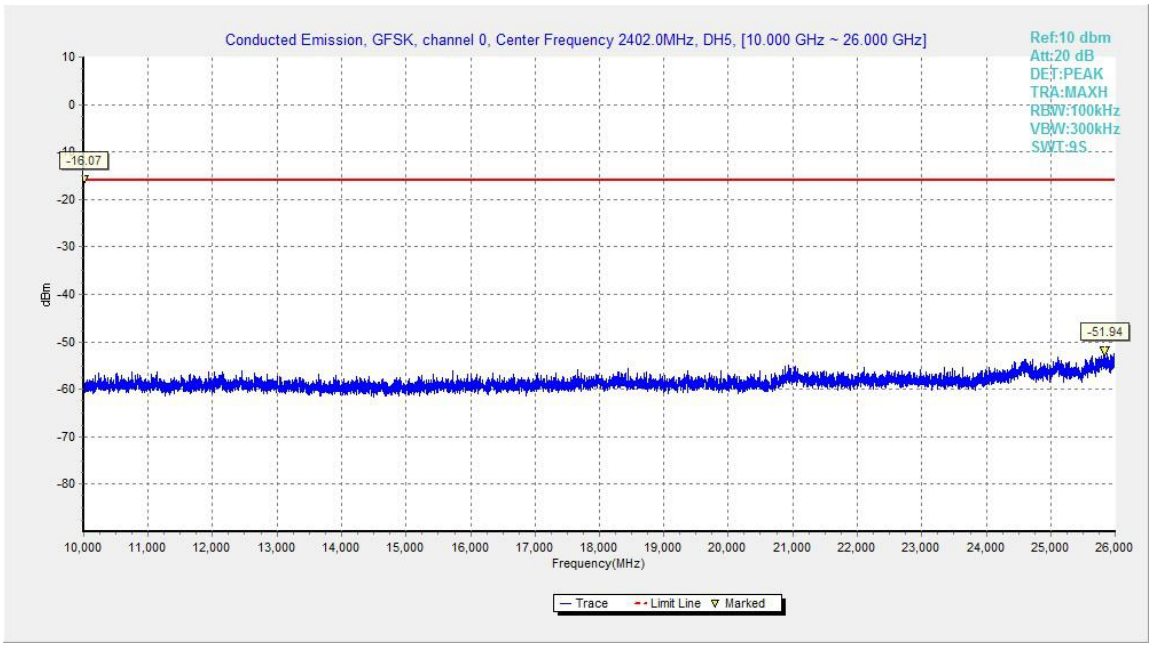


Fig.23. Conducted spurious emission: GFSK, Channel 0,10GHz - 26GHz

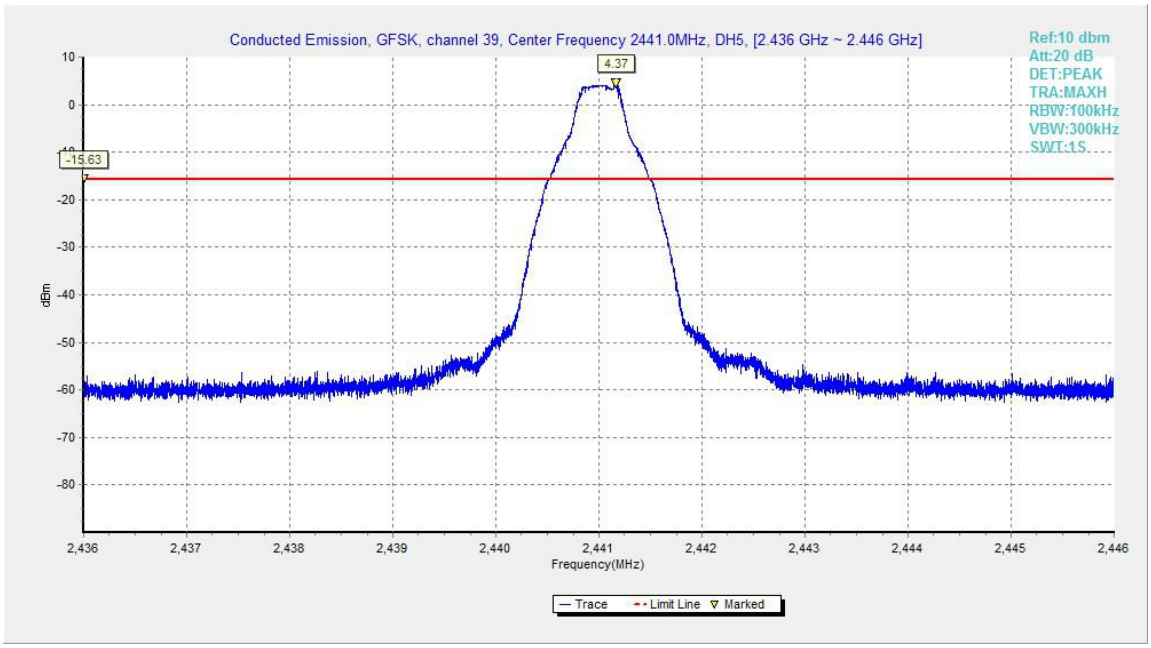


Fig.24. Conducted spurious emission: GFSK, Channel 39, 2441MHz

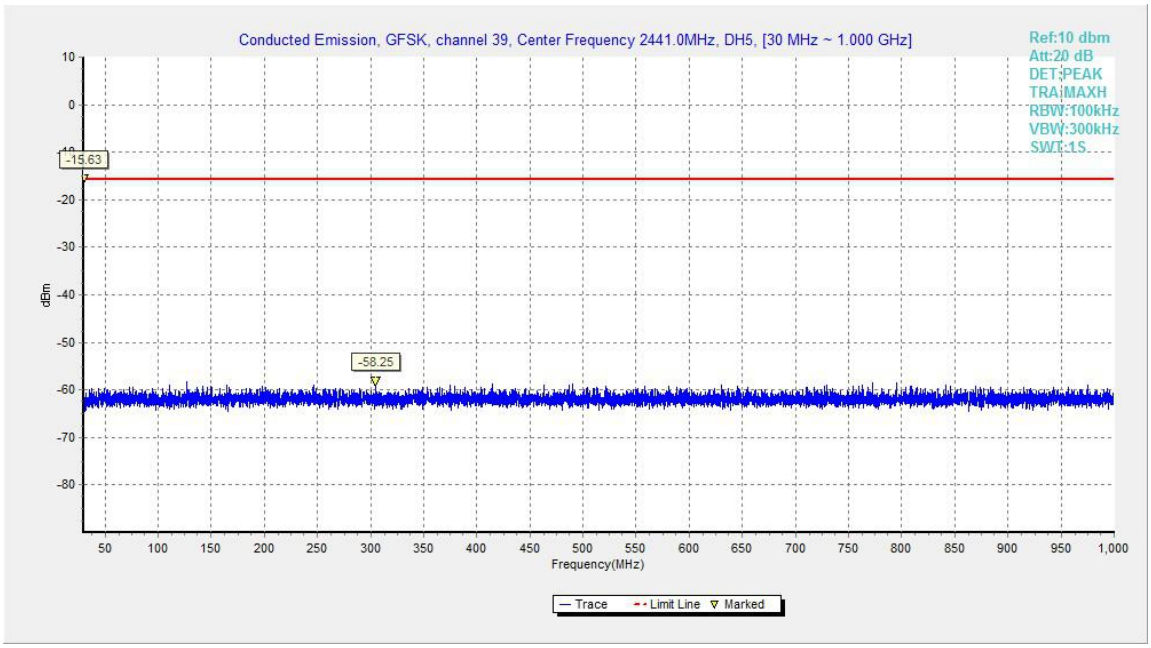


Fig.25. Conducted spurious emission: GFSK, Channel 39, 30MHz - 1GHz

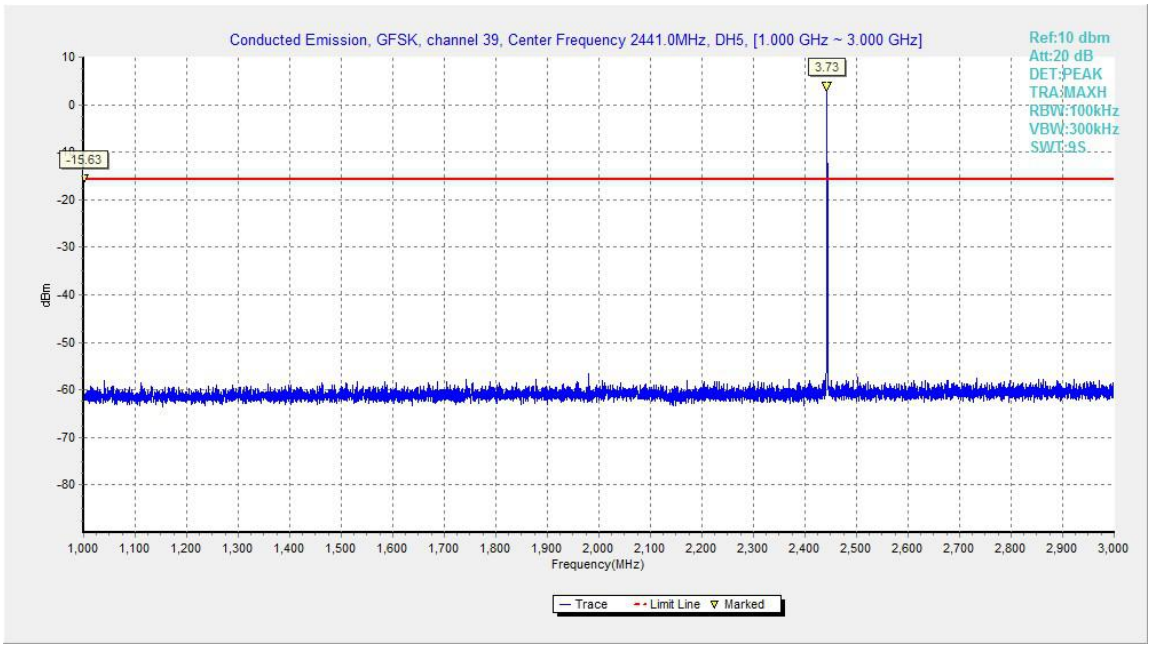


Fig.26. Conducted spurious emission: GFSK, Channel 39, 1GHz – 3GHz

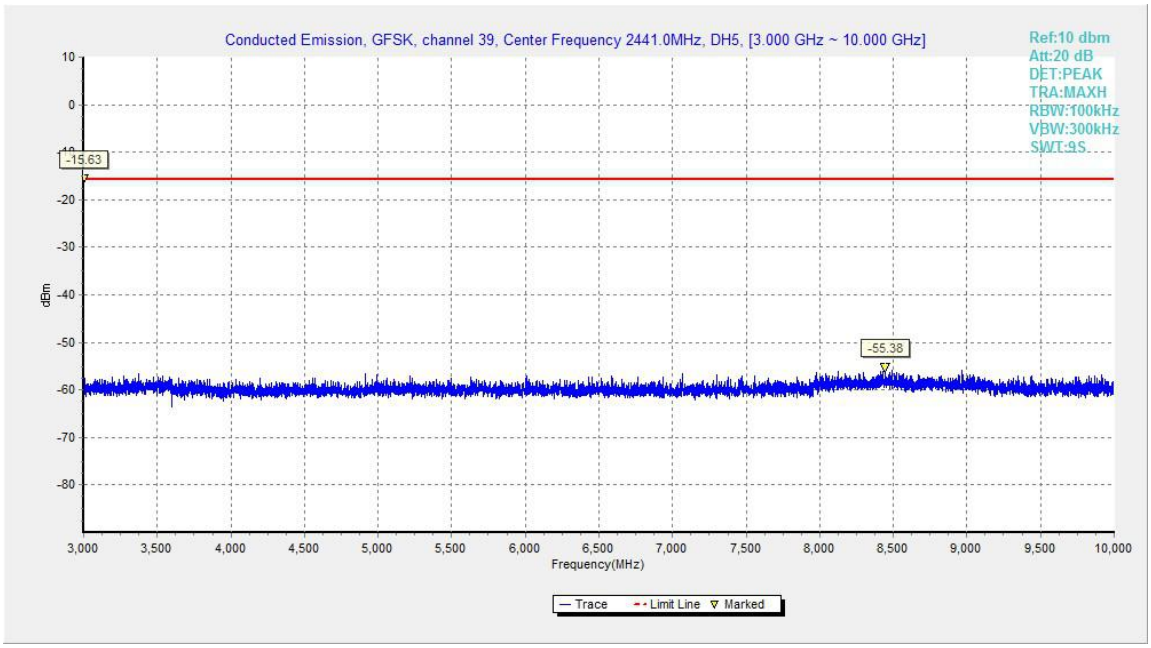


Fig.27. Conducted spurious emission: GFSK, Channel 39, 3GHz – 10GHz

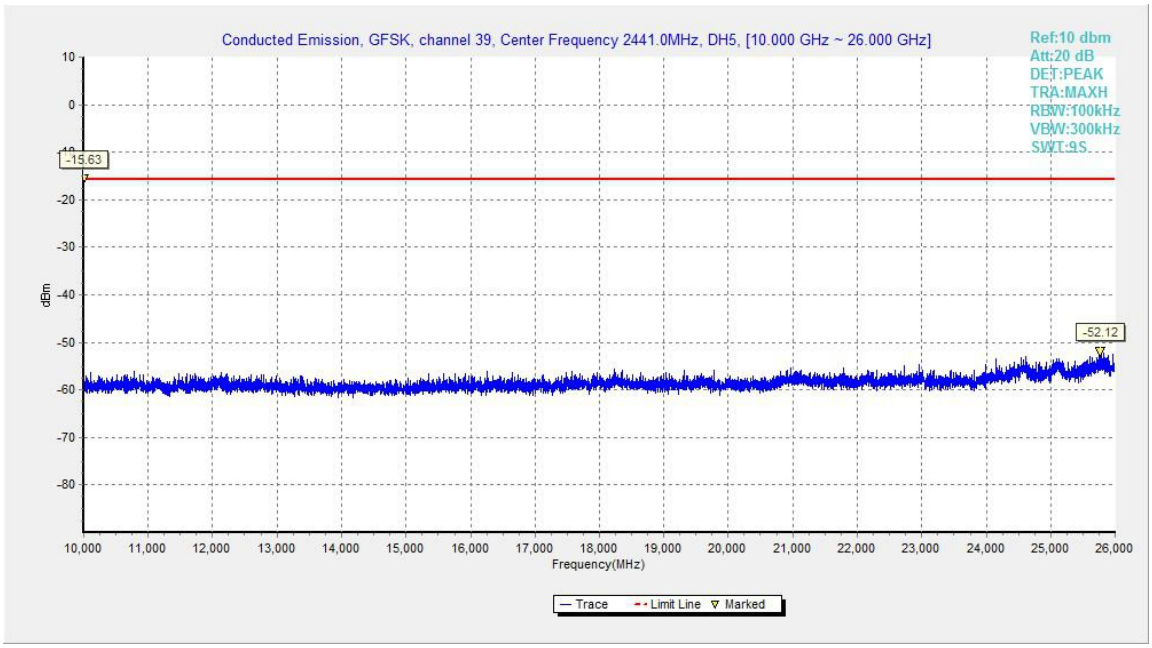


Fig.28. Conducted spurious emission: GFSK, Channel 39, 10GHz – 26GHz

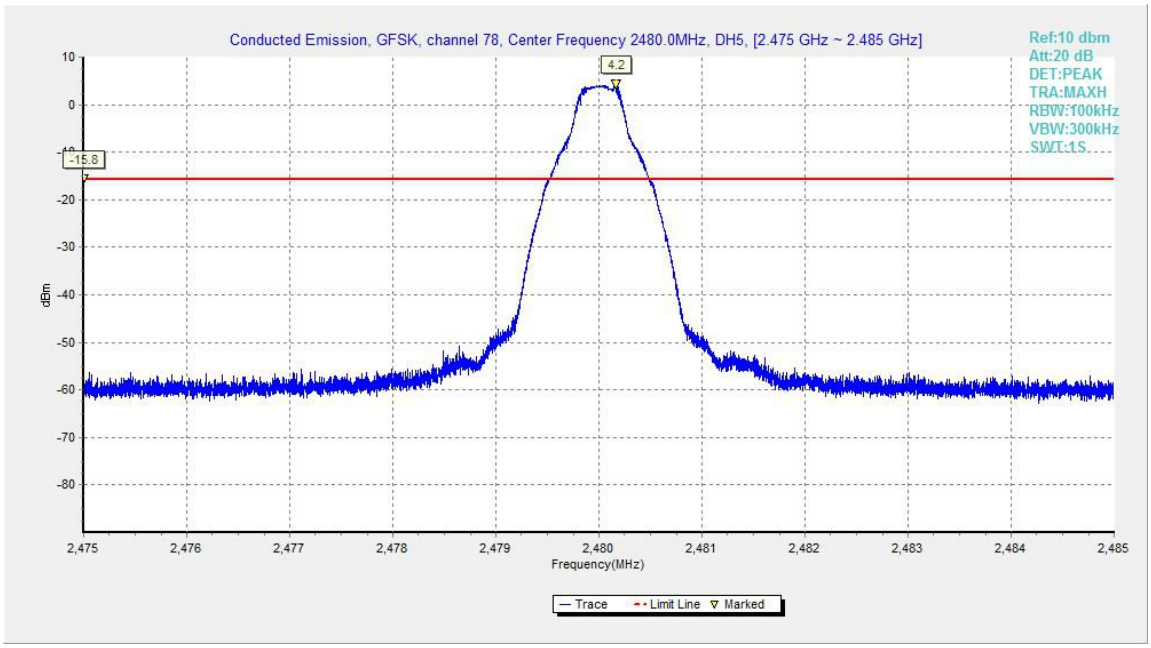


Fig.29. Conducted spurious emission: GFSK, Channel 78, 2480MHz

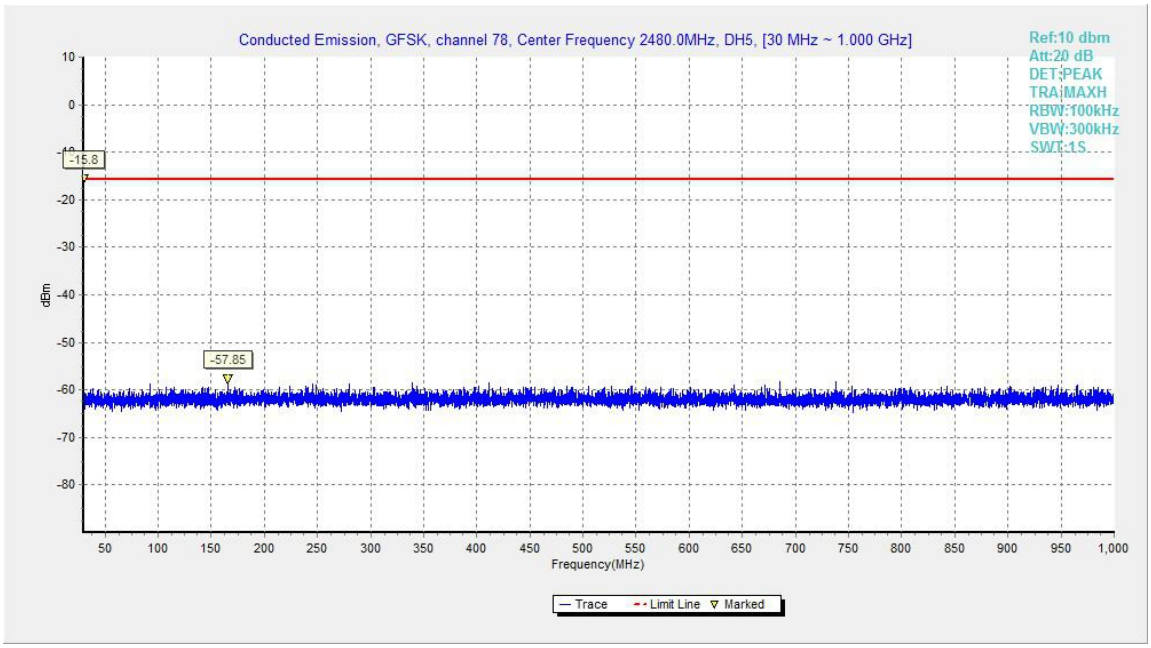


Fig.30. Conducted spurious emission: GFSK, Channel 78, 30MHz - 1GHz

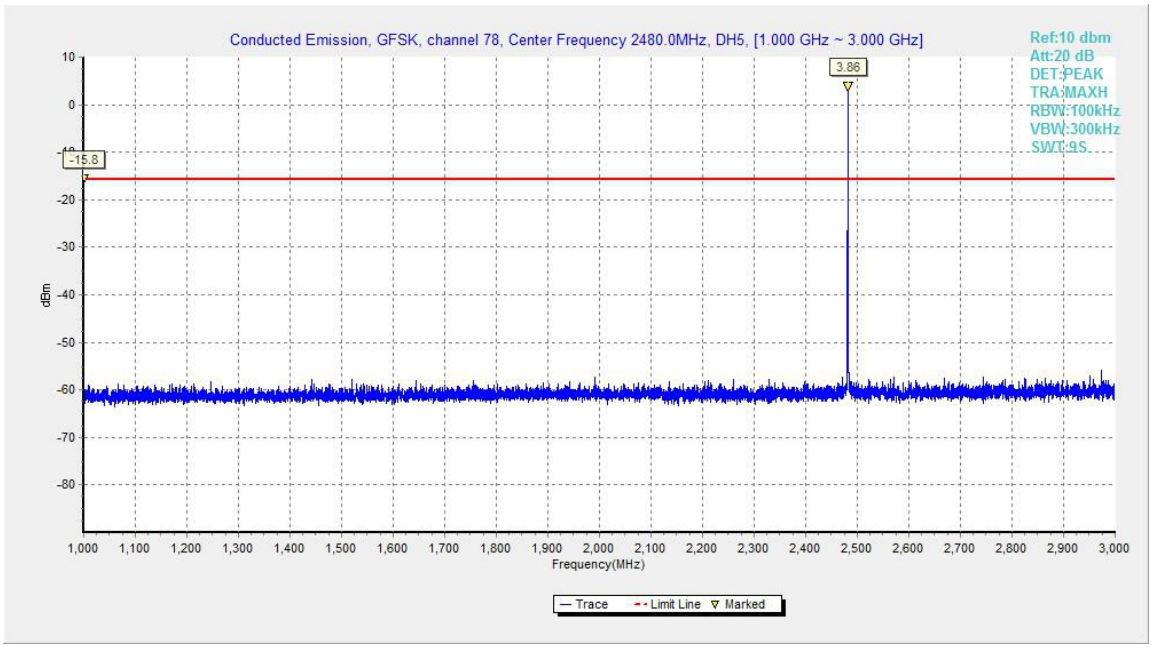


Fig.31. Conducted spurious emission: GFSK, Channel 78, 1GHz - 3GHz

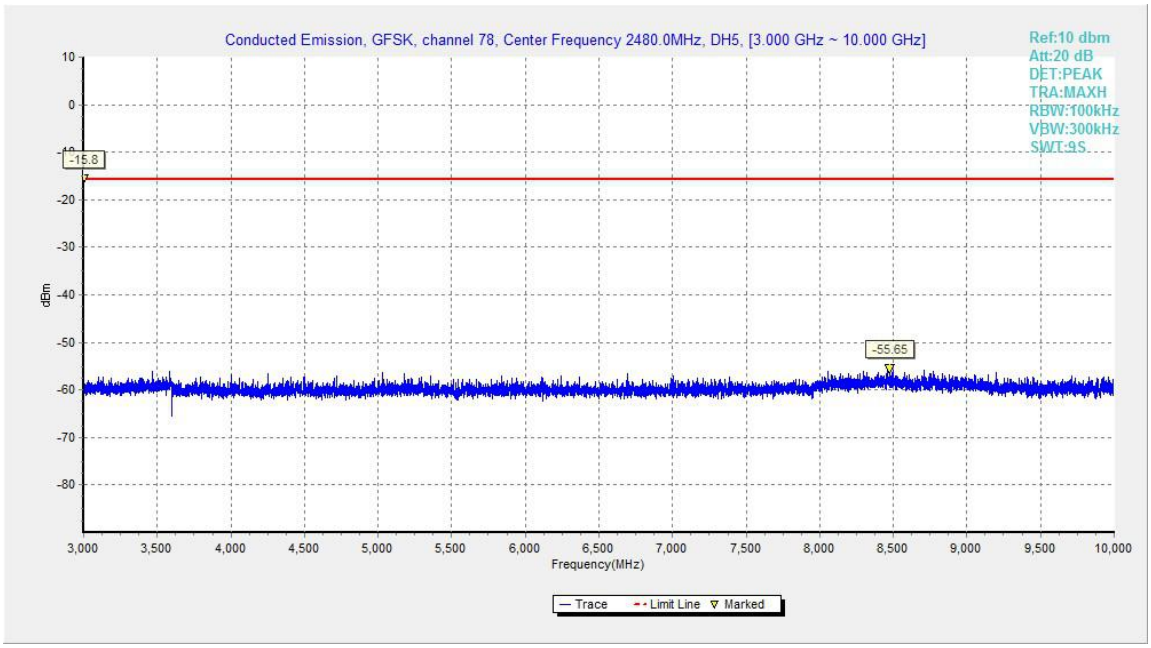


Fig.32. Conducted spurious emission: GFSK, Channel 78, 3GHz - 10GHz

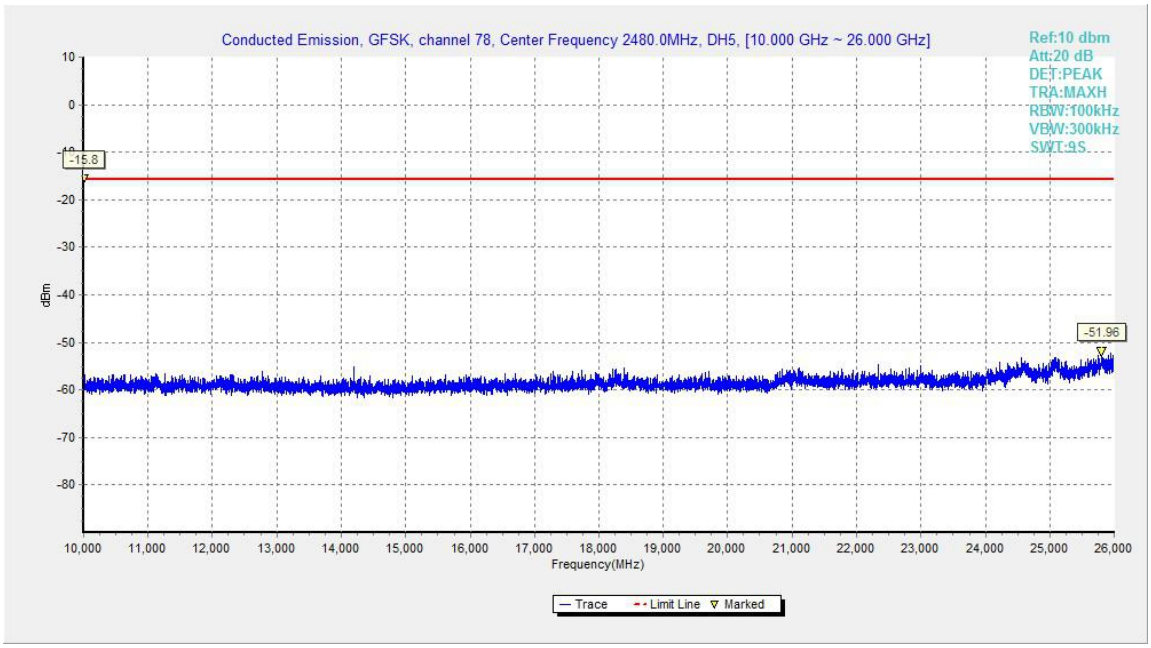


Fig.33. Conducted spurious emission: GFSK, Channel 78, 10GHz - 26GHz

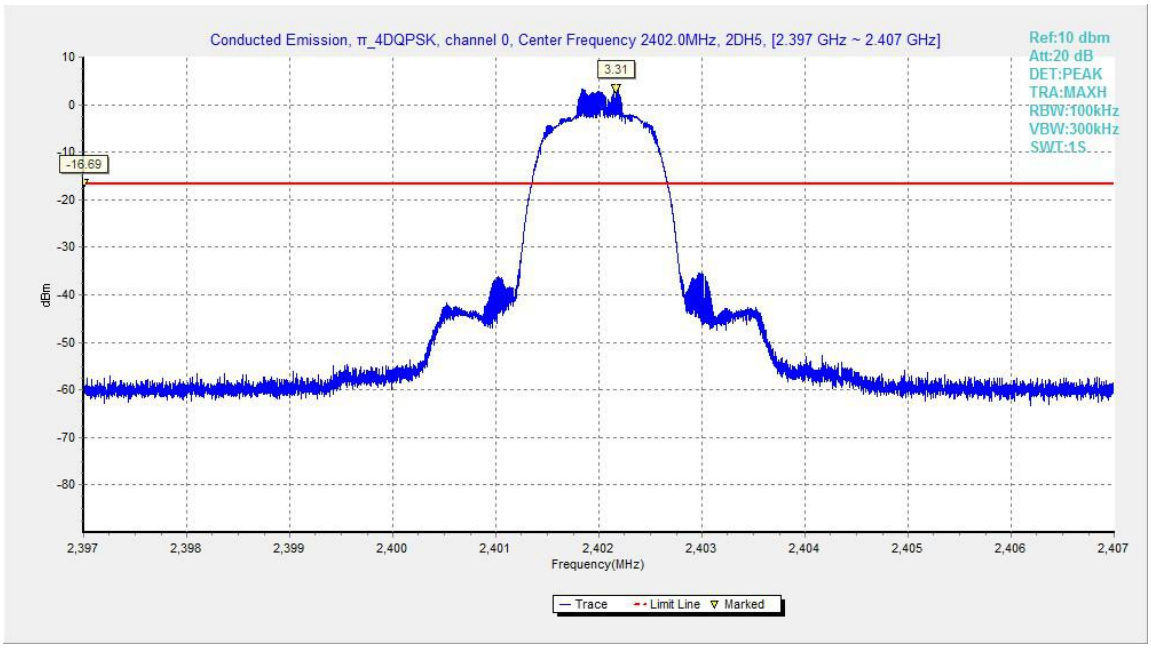


Fig.34. Conducted spurious emission: π/4 DQPSK, Channel 0,2402MHz

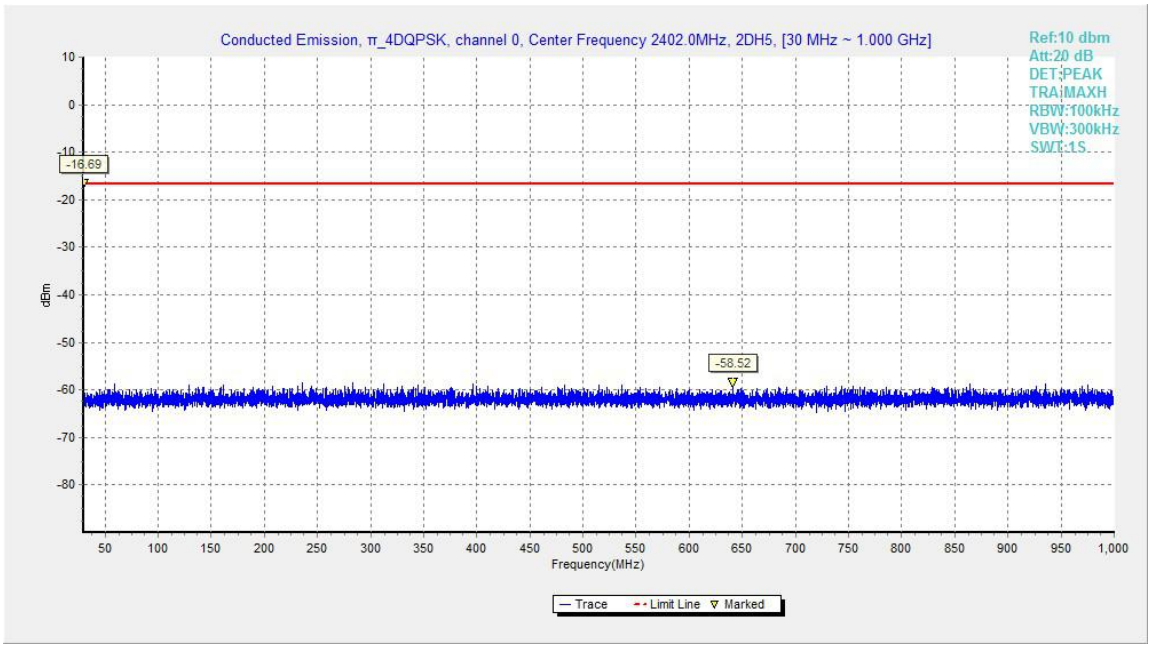


Fig.35. Conducted spurious emission: π/4 DQPSK, Channel 0, 30MHz - 1GHz

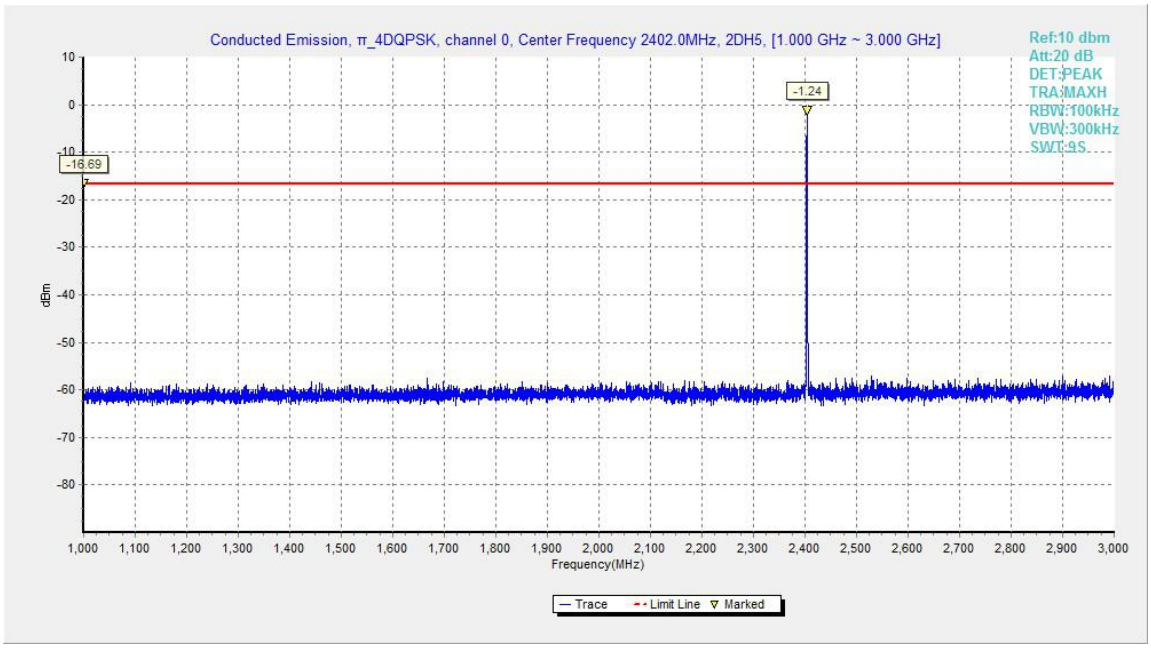


Fig.36. Conducted spurious emission: π/4 DQPSK, Channel 0, 1GHz - 3GHz

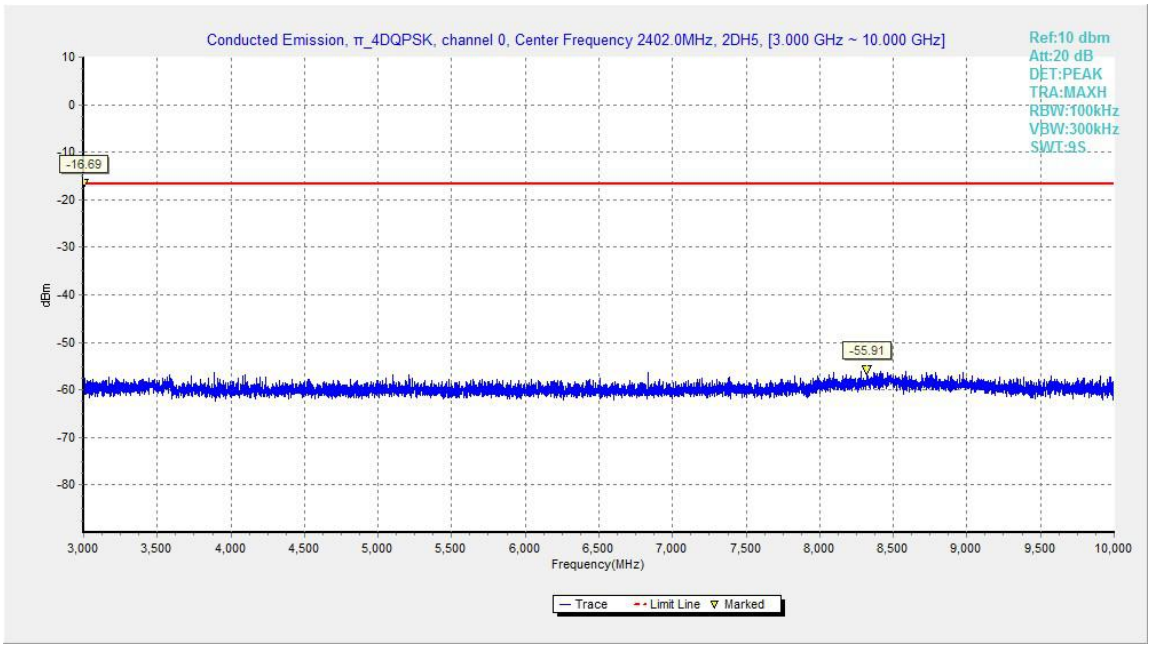


Fig.37. Conducted spurious emission: π/4 DQPSK, Channel 0, 3GHz - 10GHz

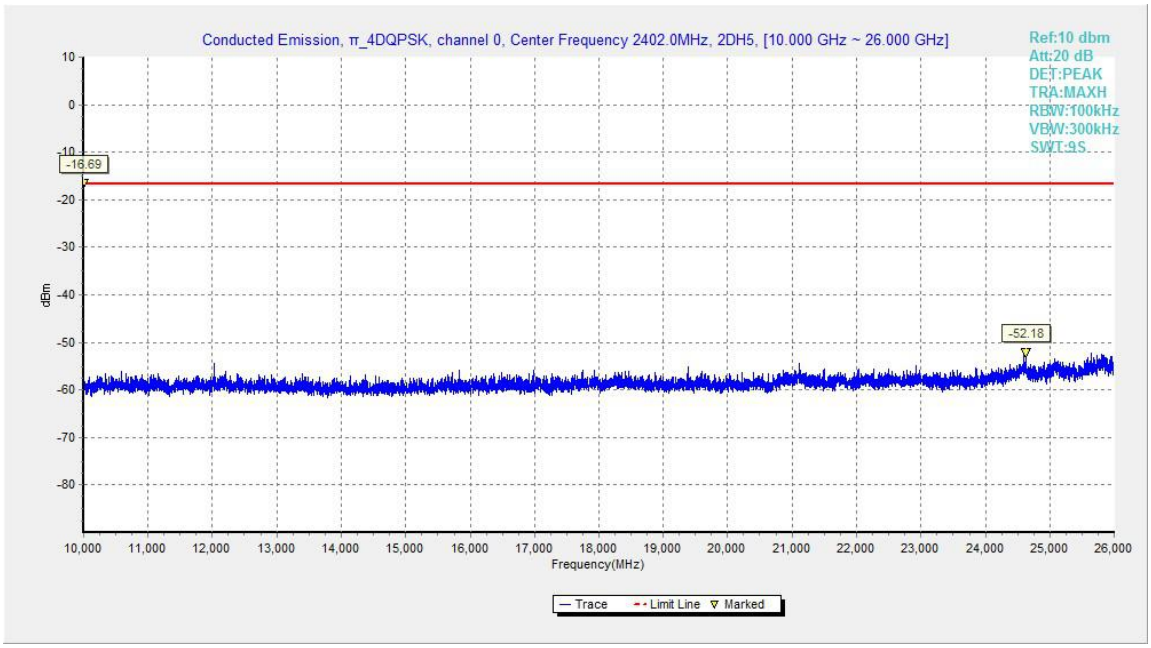


Fig.38. Conducted spurious emission: π/4 DQPSK, Channel 0,10GHz - 26GHz

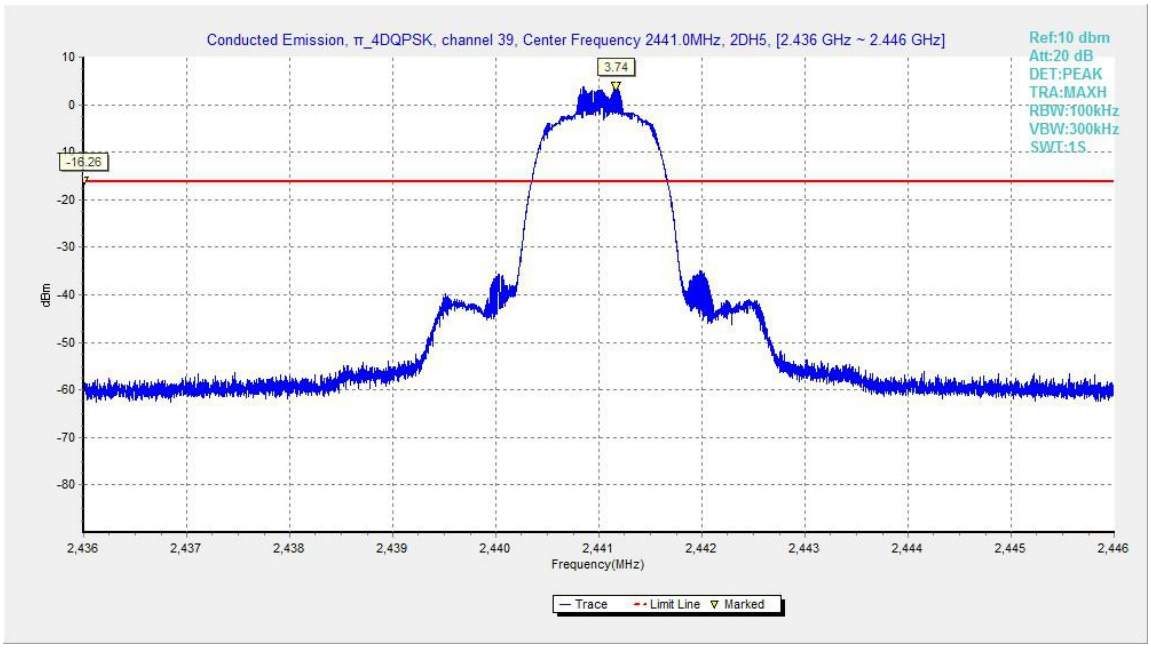


Fig.39. Conducted spurious emission: π/4 DQPSK, Channel 39, 2441MHz

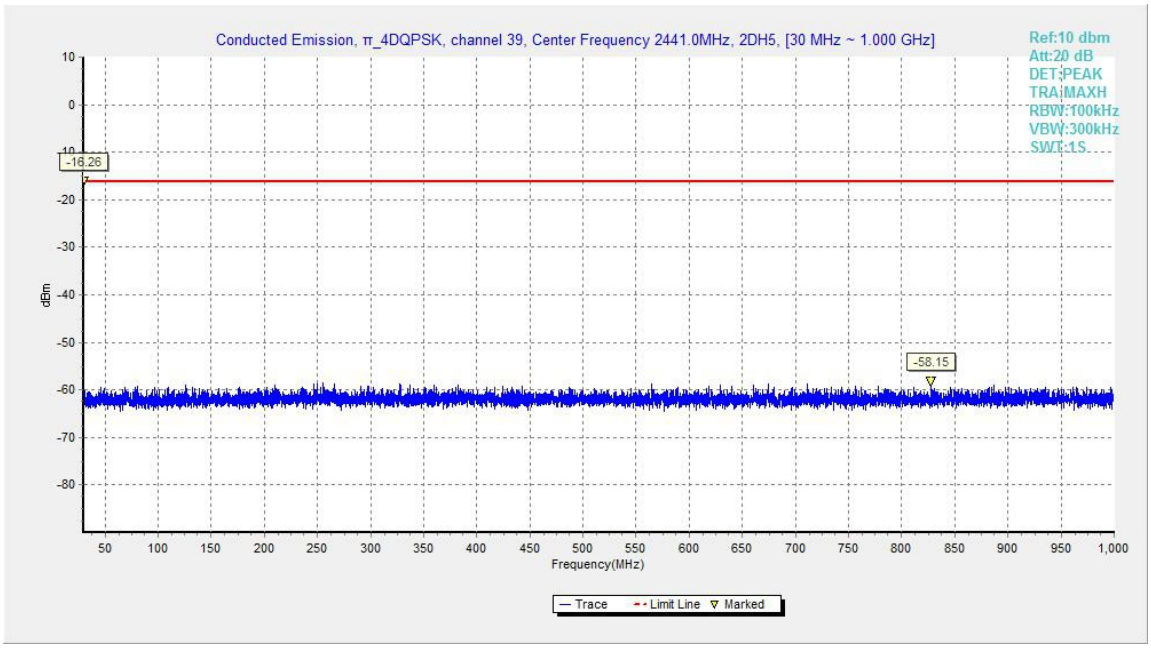


Fig.40. Conducted spurious emission: π/4 DQPSK, Channel 39, 30MHz - 1GHz

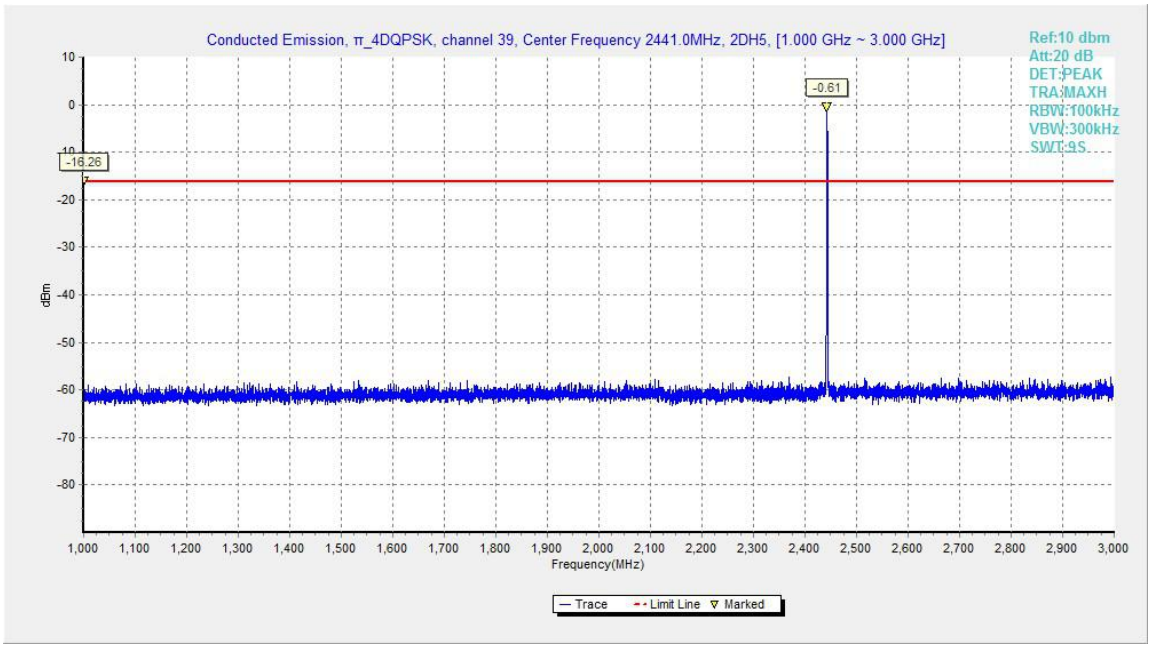


Fig.41. Conducted spurious emission: π/4 DQPSK, Channel 39, 1GHz - 3GHz

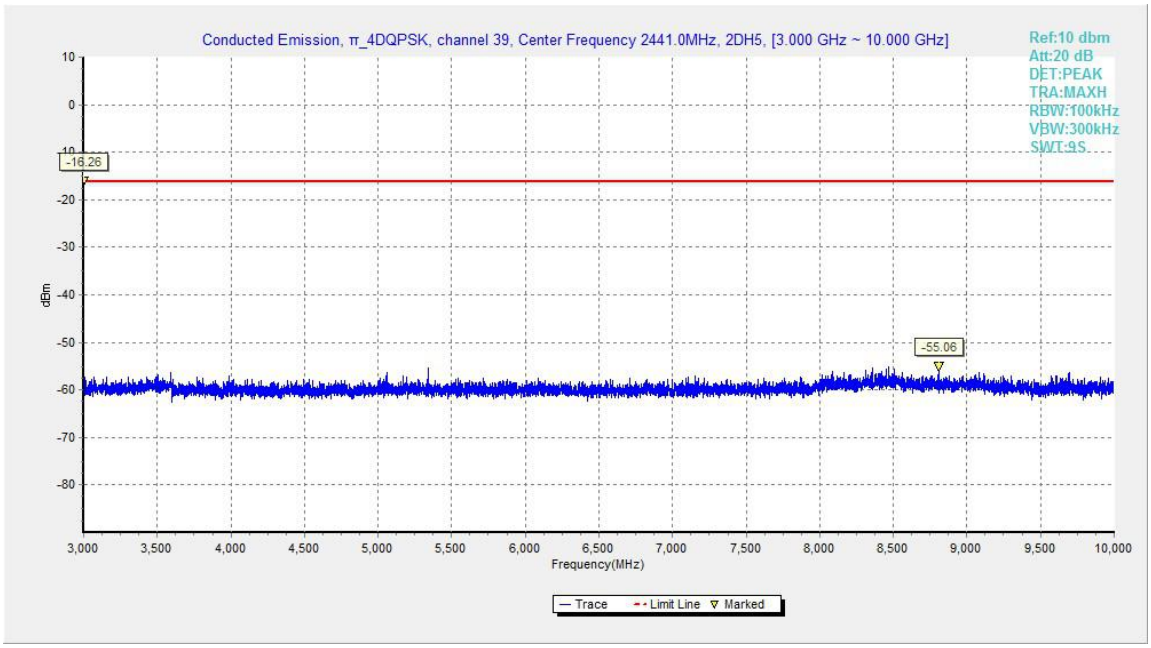


Fig.42. Conducted spurious emission: π/4 DQPSK, Channel 39, 3GHz - 10GHz

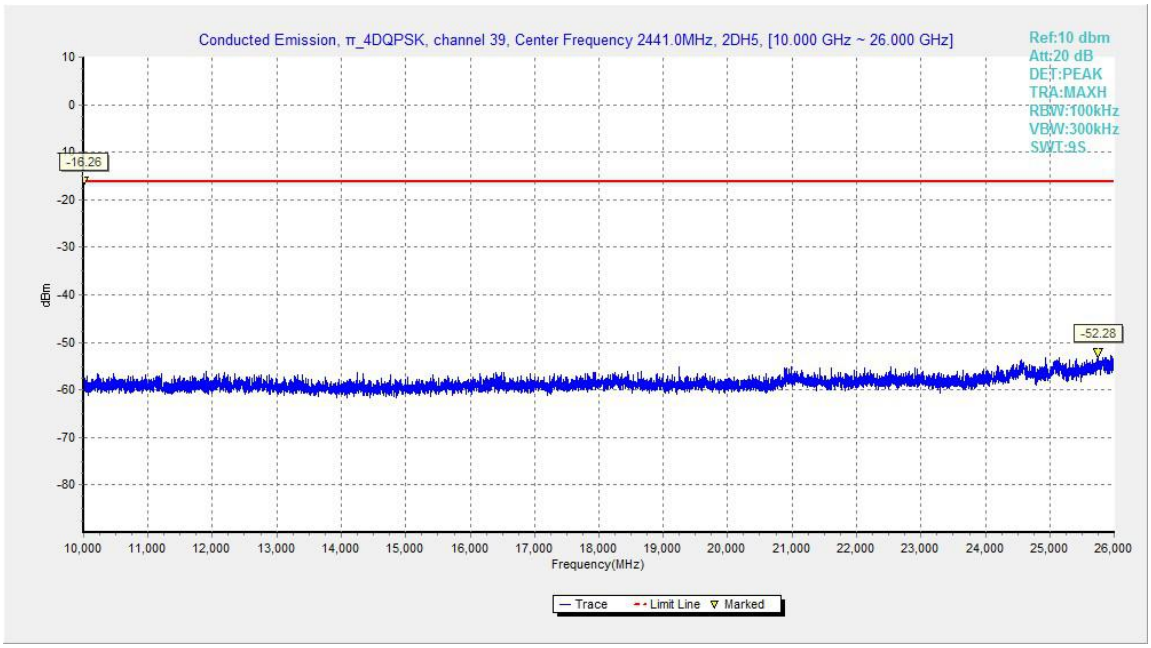


Fig.43. Conducted spurious emission: π/4 DQPSK, Channel 39, 10GHz – 26GHz

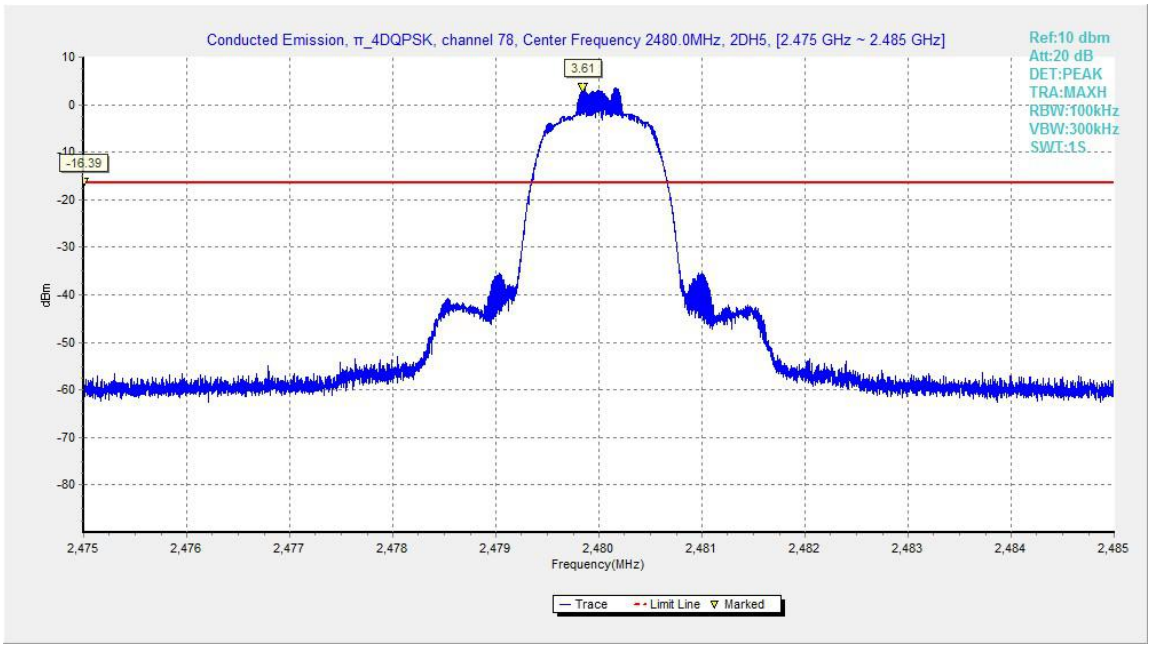


Fig.44. Conducted spurious emission: π/4 DQPSK, Channel 78, 2480MHz

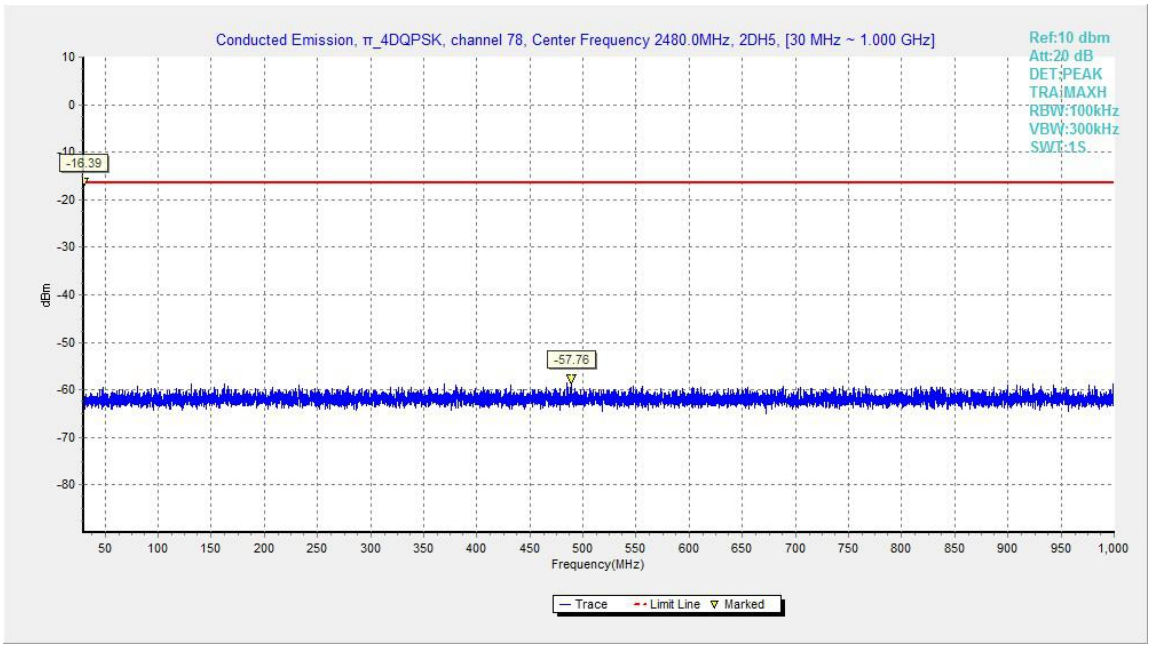


Fig.45. Conducted spurious emission: π/4 DQPSK, Channel 78, 30MHz - 1GHz

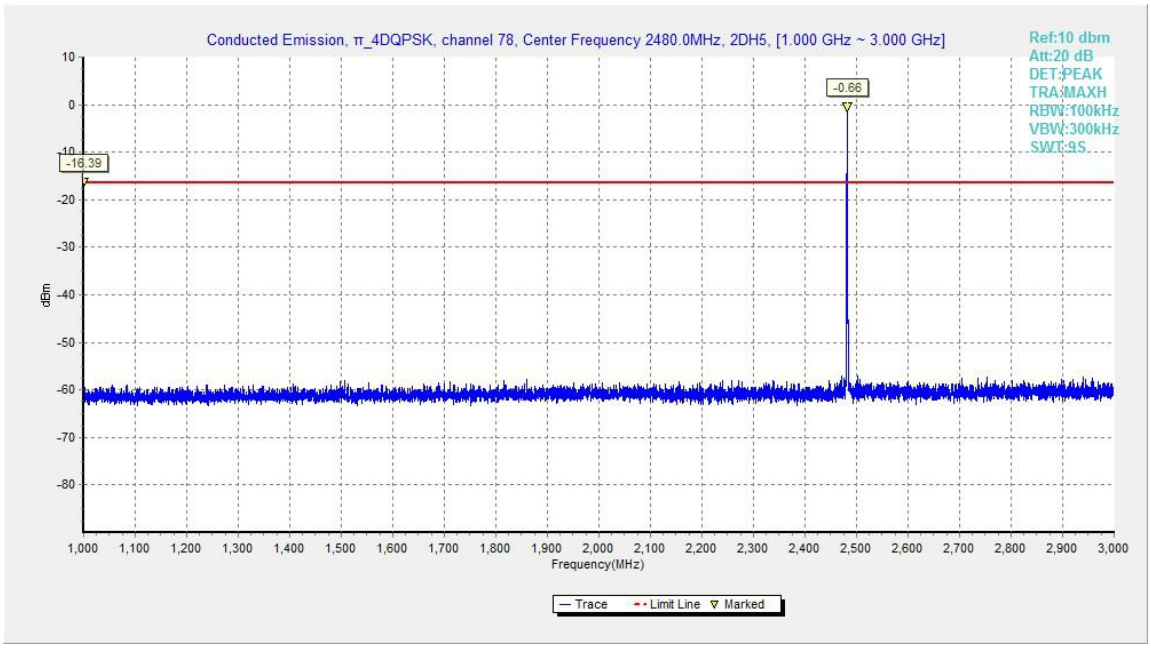


Fig.46. Conducted spurious emission: π/4 DQPSK, Channel 78, 1GHz - 3GHz

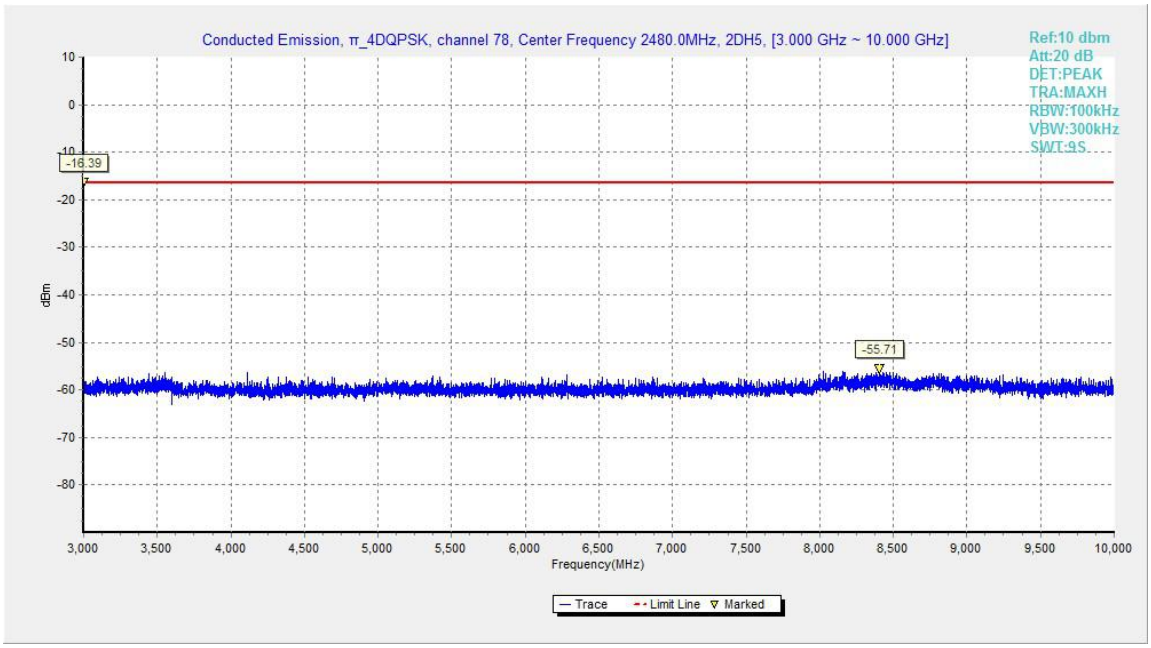


Fig.47. Conducted spurious emission: π/4 DQPSK, Channel 78, 3GHz - 10GHz

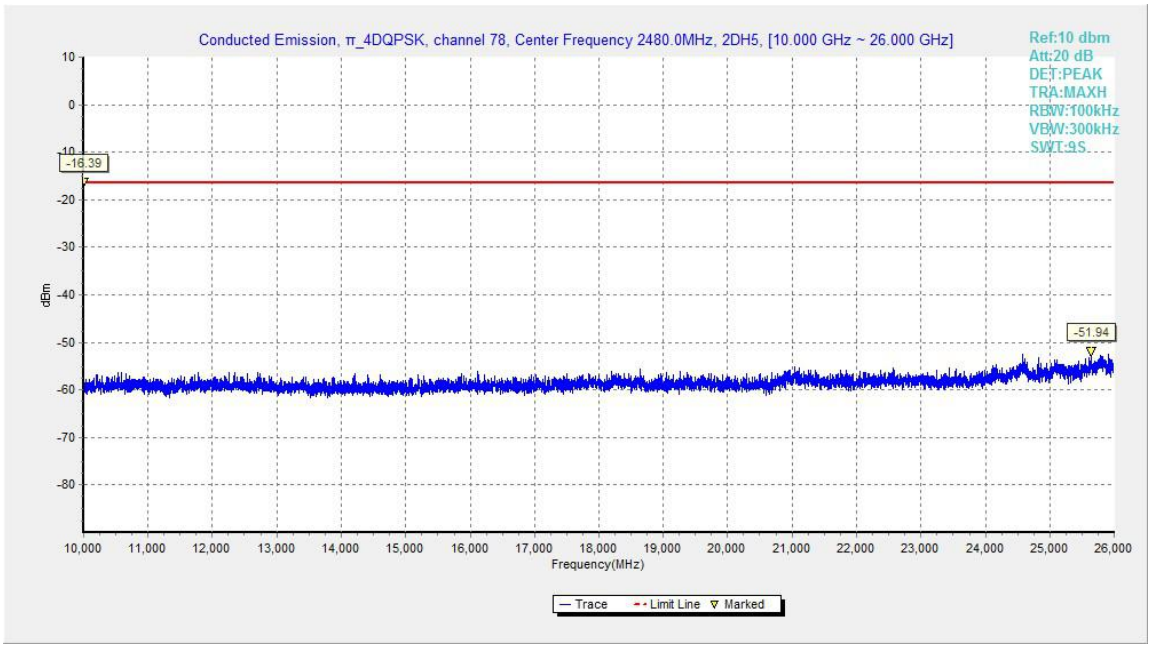


Fig.48. Conducted spurious emission: π/4 DQPSK, Channel 78, 10GHz - 26GHz

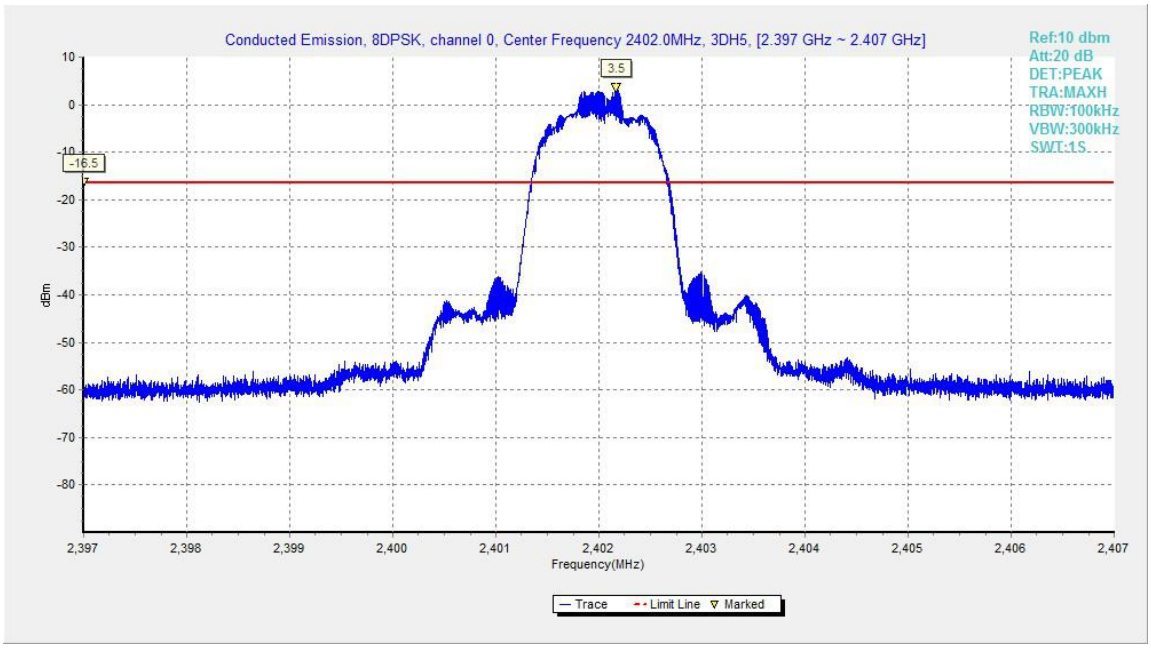


Fig.49. Conducted spurious emission: 8DPSK, Channel 0,2402MHz

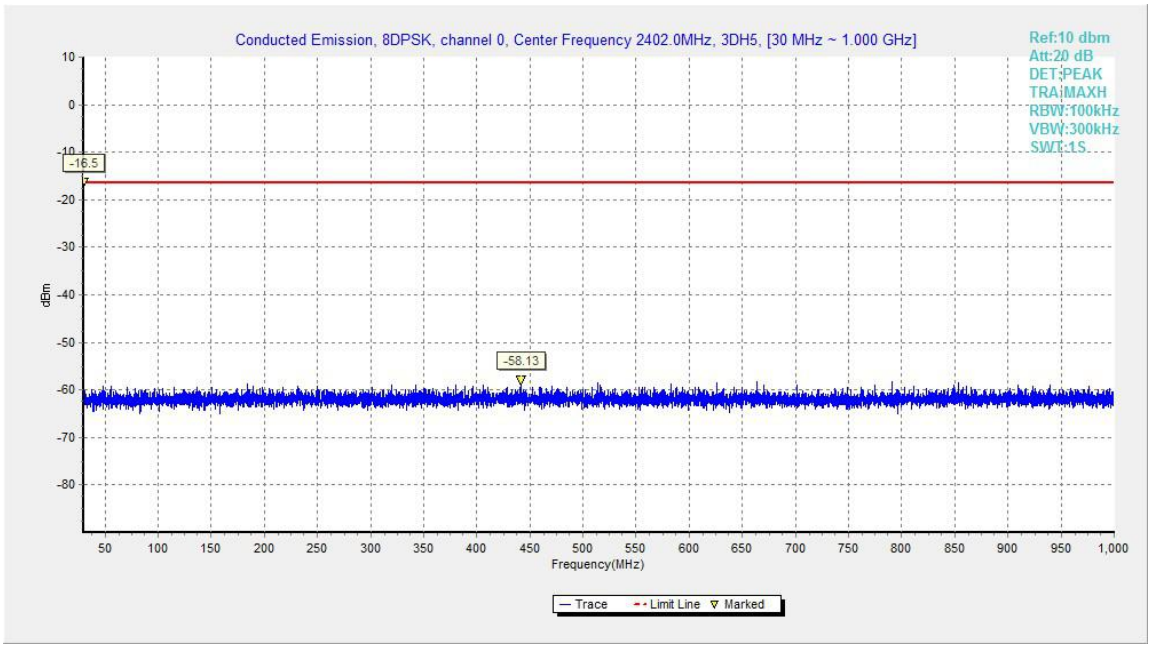


Fig.50. Conducted spurious emission: 8DPSK, Channel 0, 30MHz - 1GHz

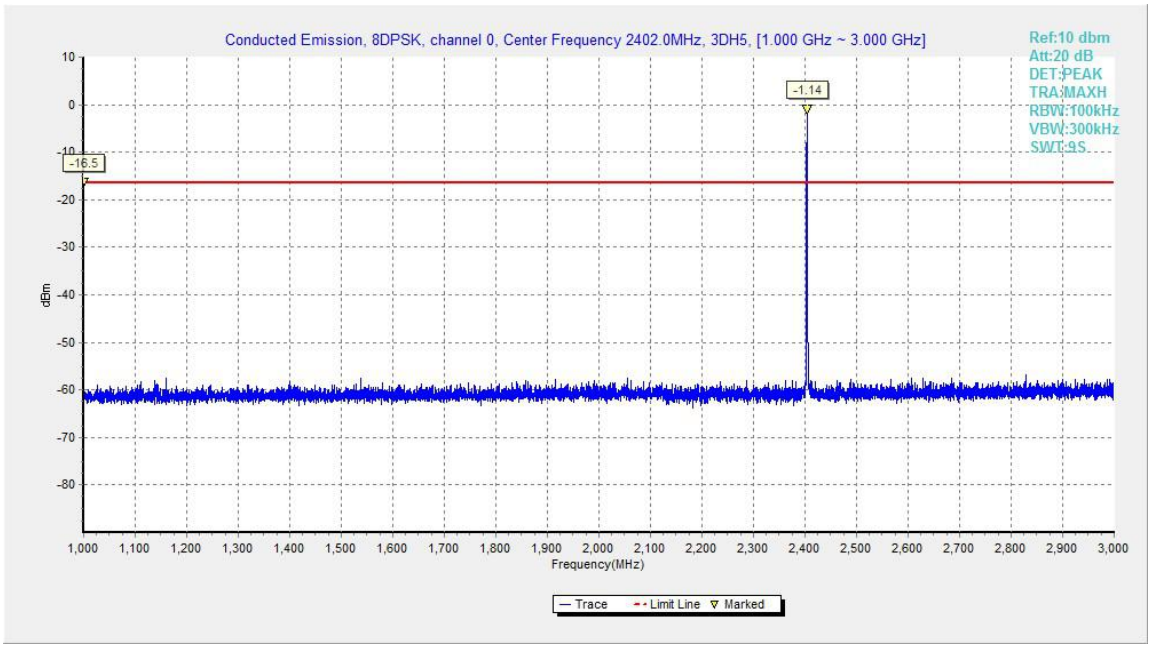


Fig.51. Conducted spurious emission: 8DPSK, Channel 0, 1GHz - 3GHz

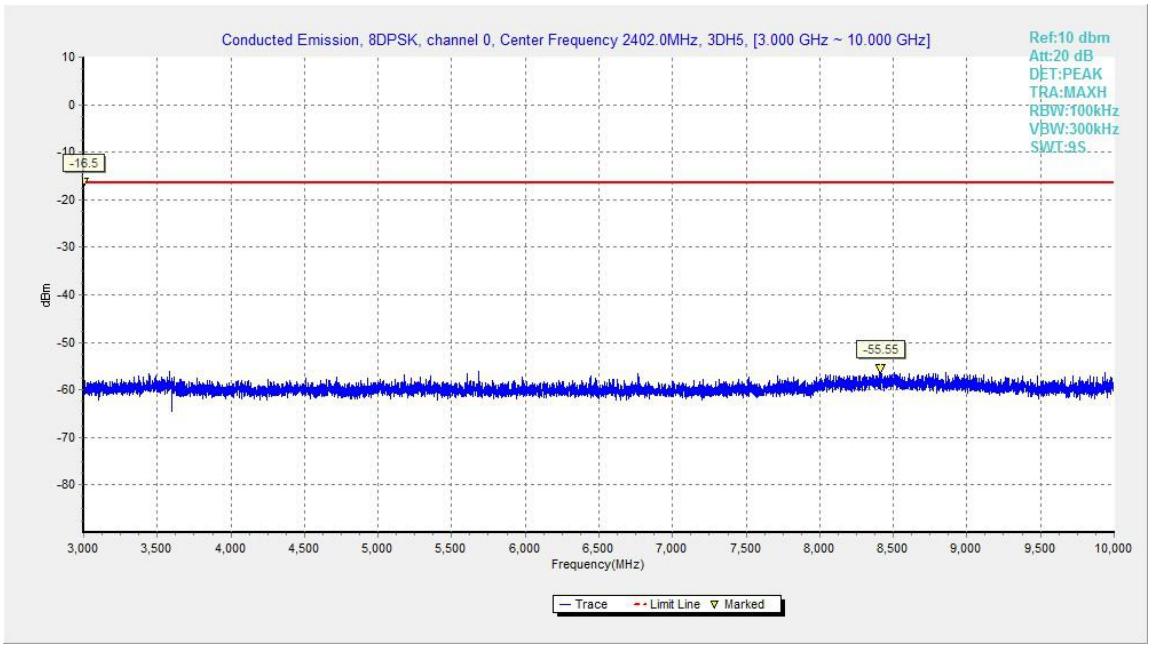


Fig.52. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz

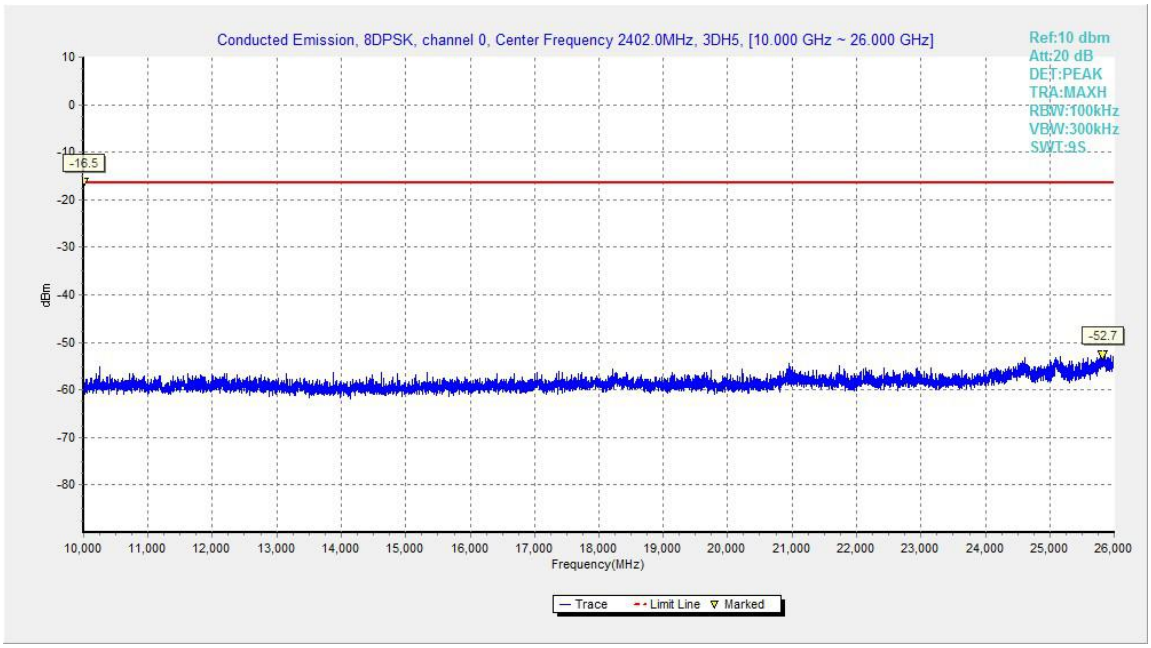


Fig.53. Conducted spurious emission: 8DPSK, Channel 0,10GHz - 26GHz

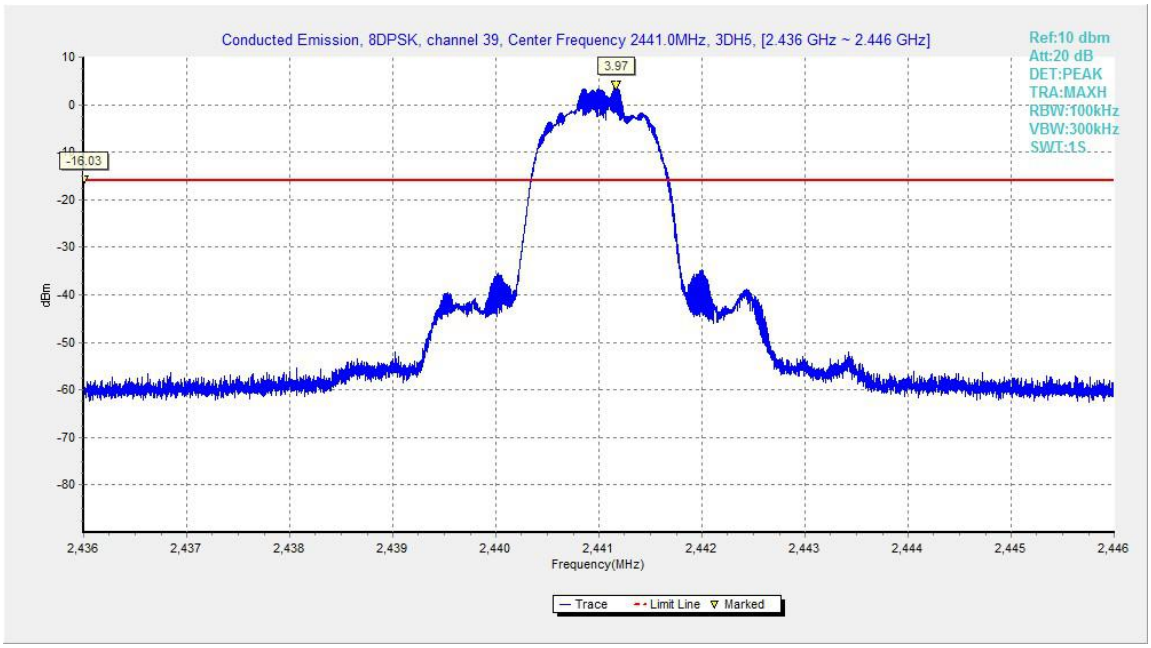


Fig.54. Conducted spurious emission: 8DPSK, Channel 39, 2441MHz

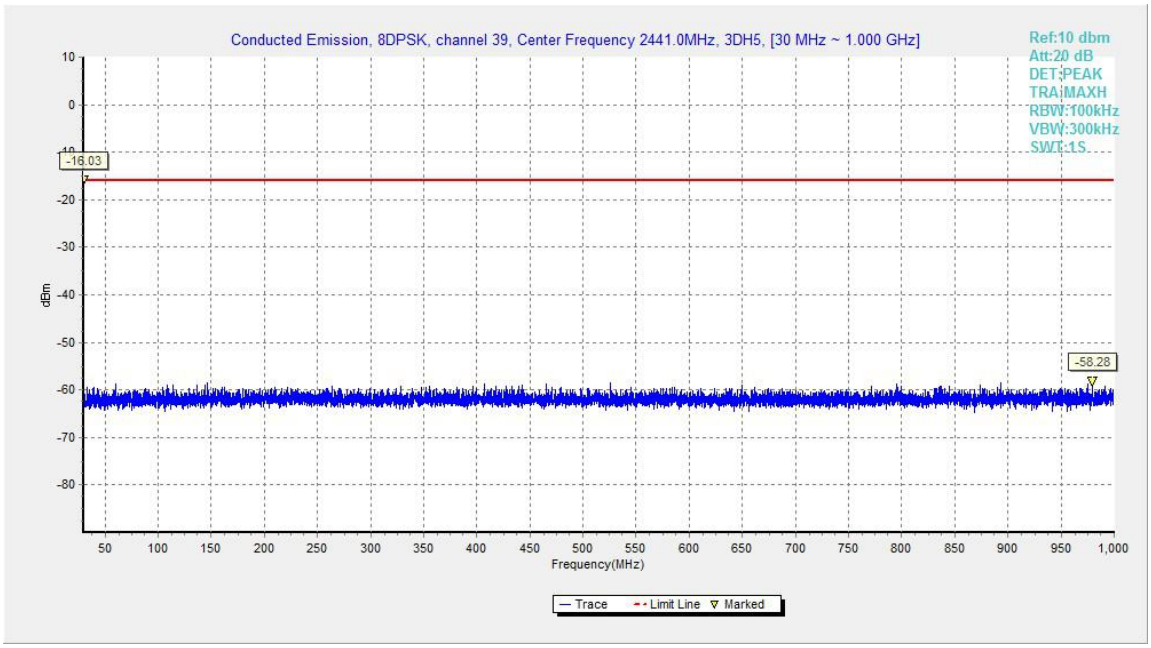


Fig.55. Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz

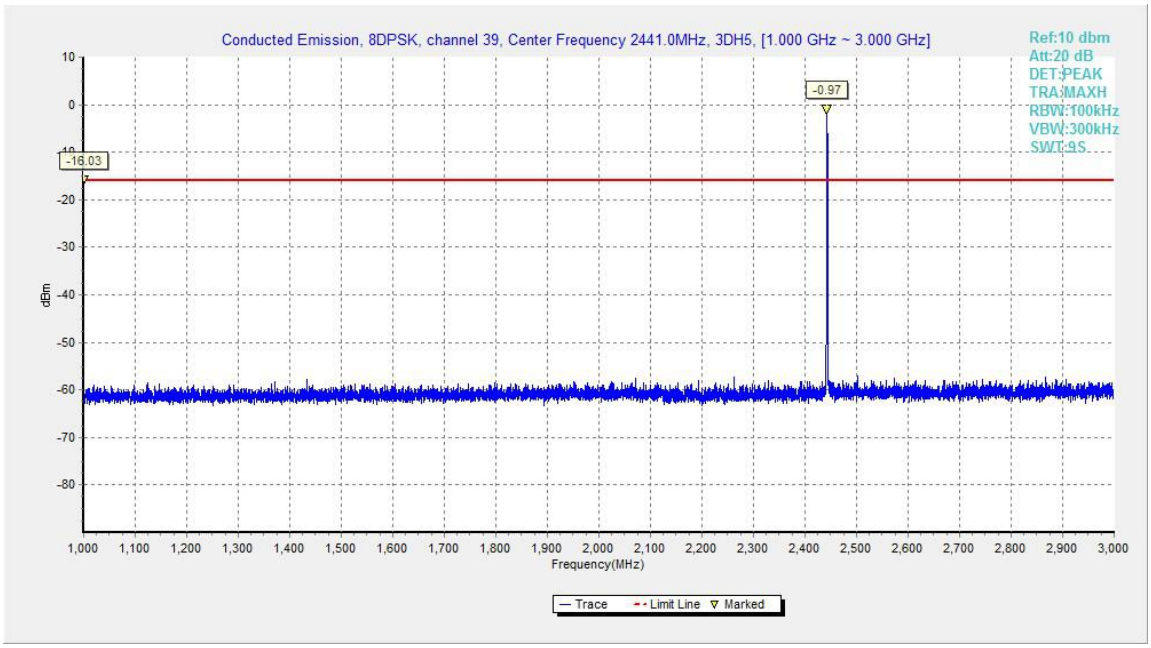


Fig.56. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz

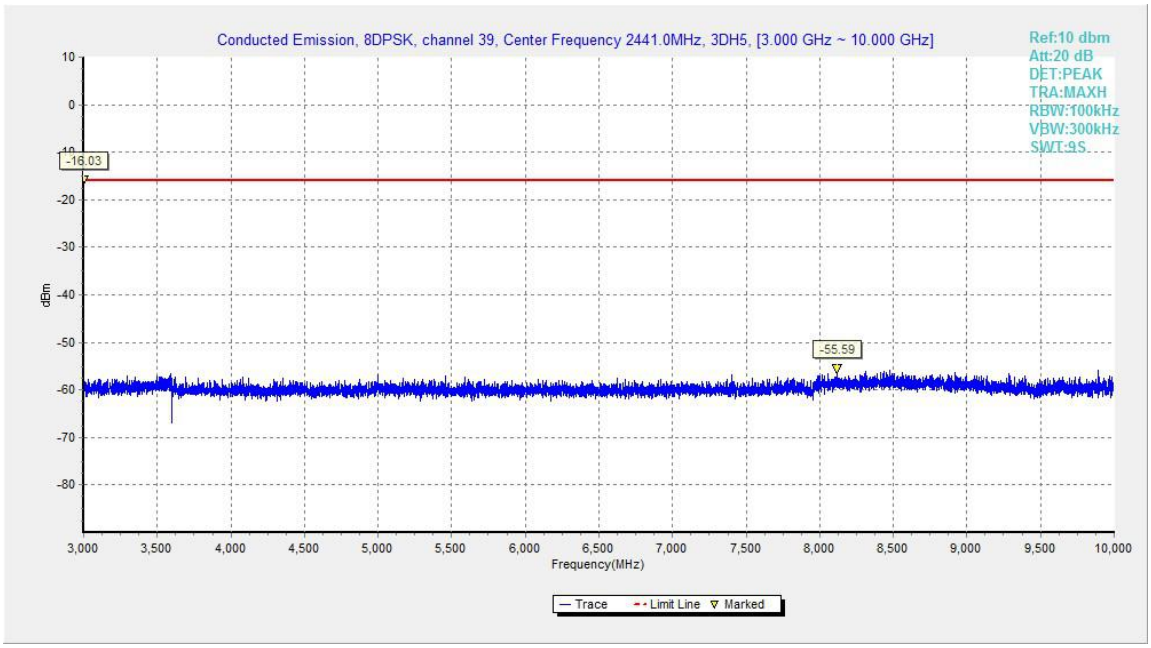


Fig.57. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz

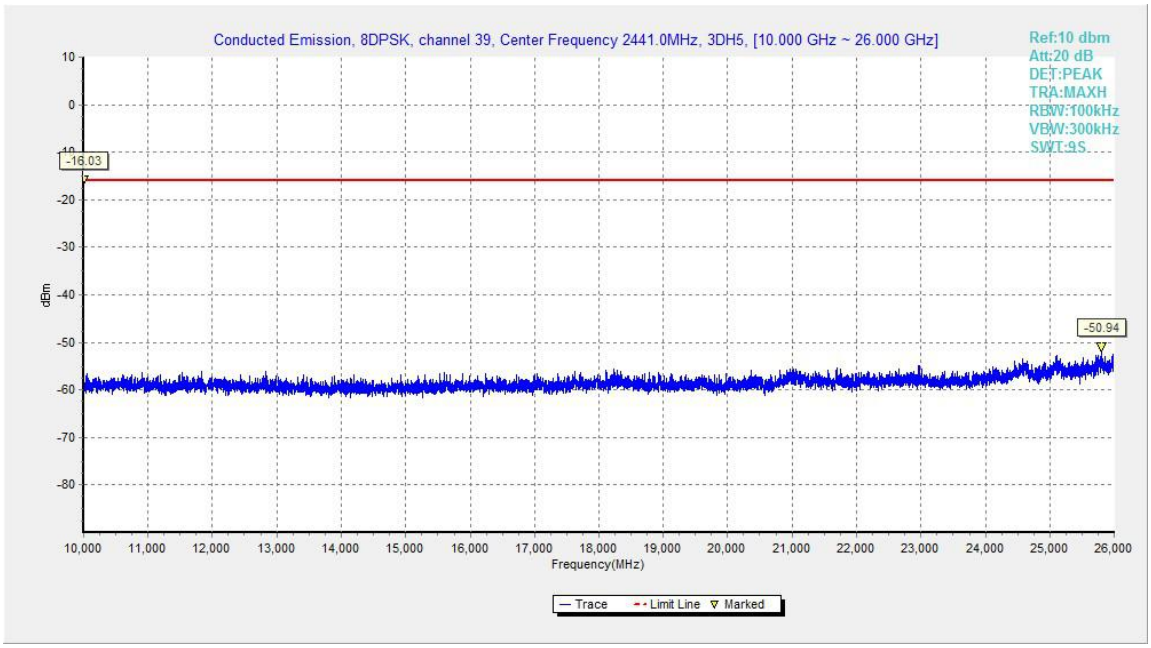


Fig.58. Conducted spurious emission: 8DPSK, Channel 39, 10GHz – 26GHz

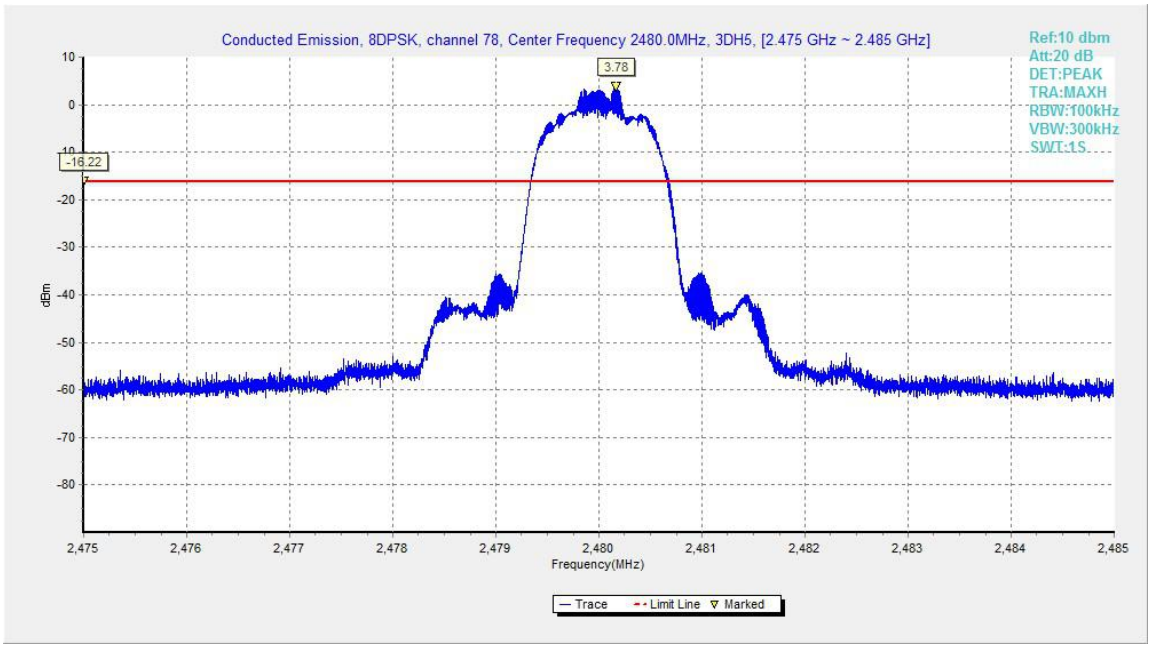


Fig.59. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz

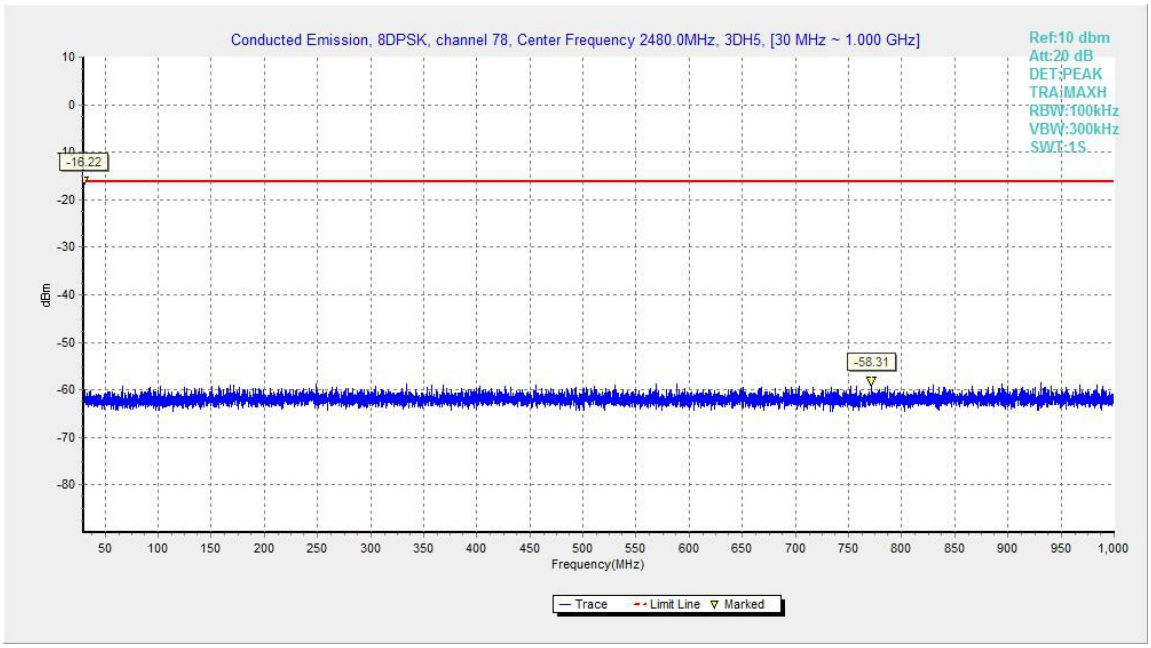


Fig.60. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz

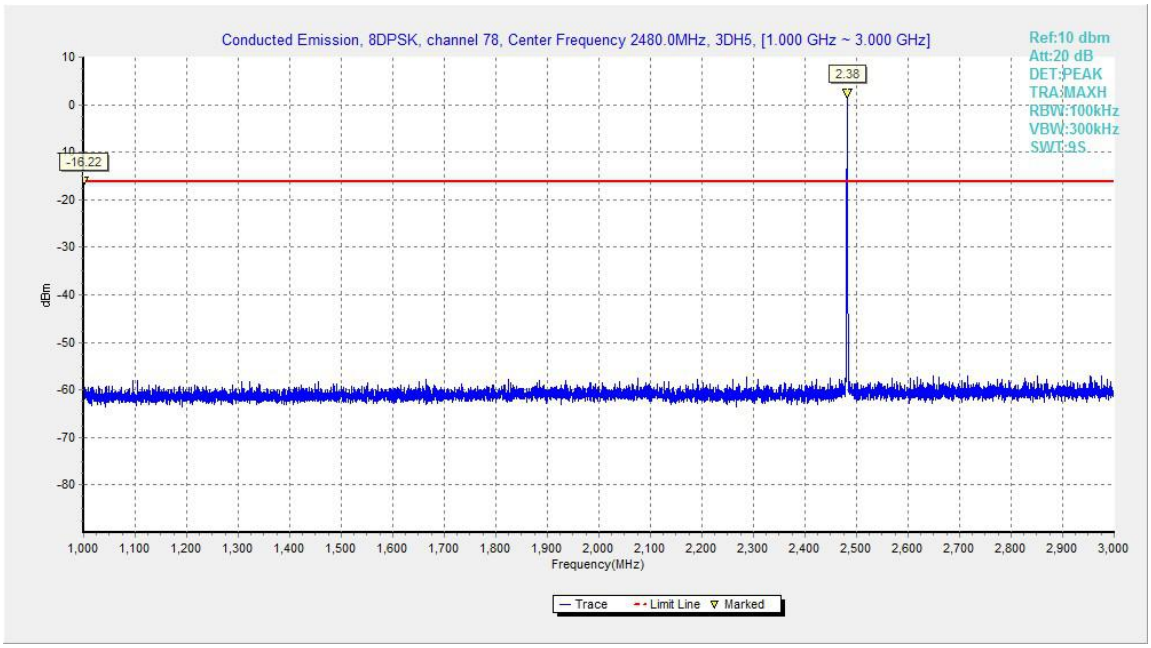


Fig.61. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz

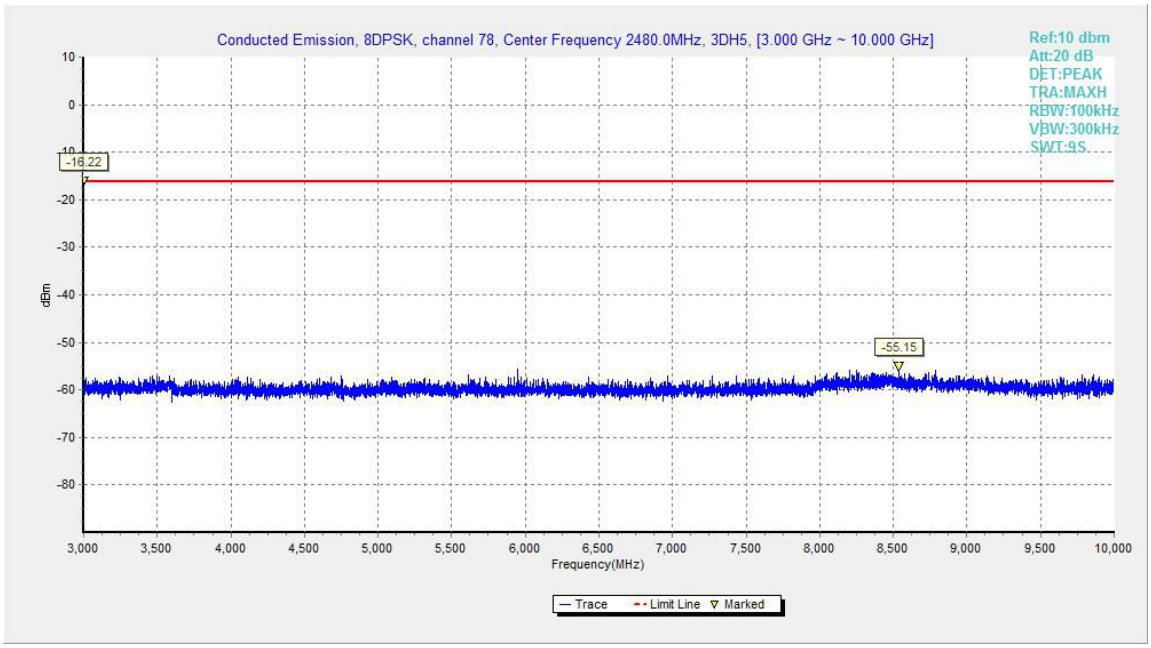


Fig.62. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz

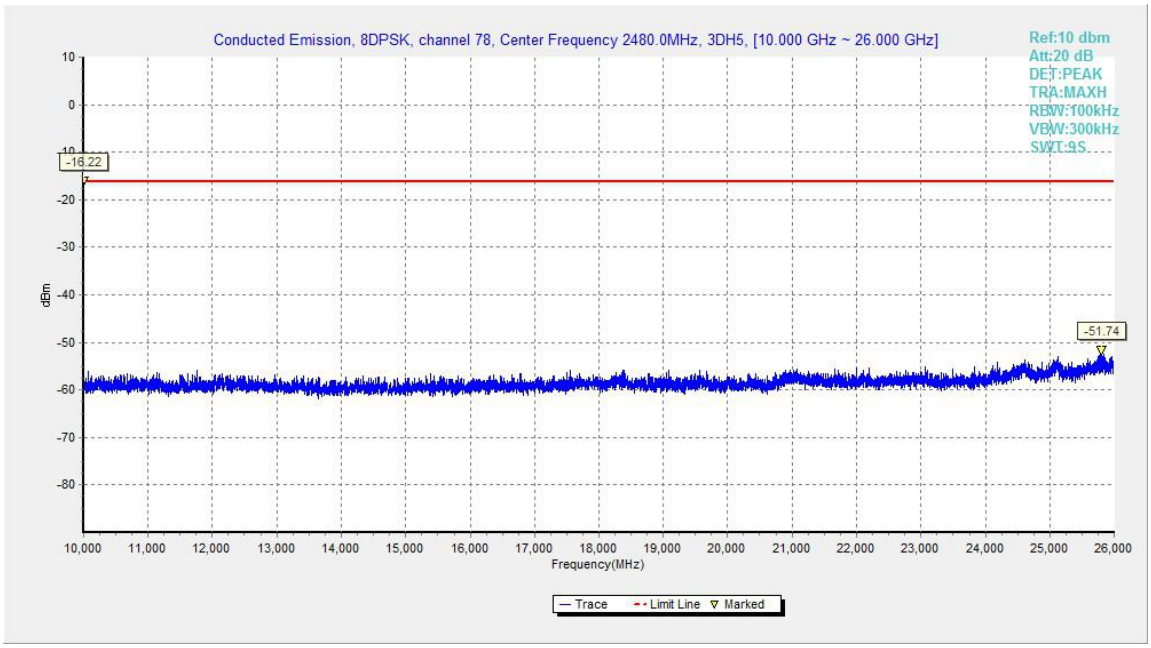


Fig.63. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

A.6. Transmitter Spurious Emission - Radiated

Method of Measurement: See ANSI C63.10-2013-clause 6.4 &6.5 & 6.6

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	20dB below peak output power

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:

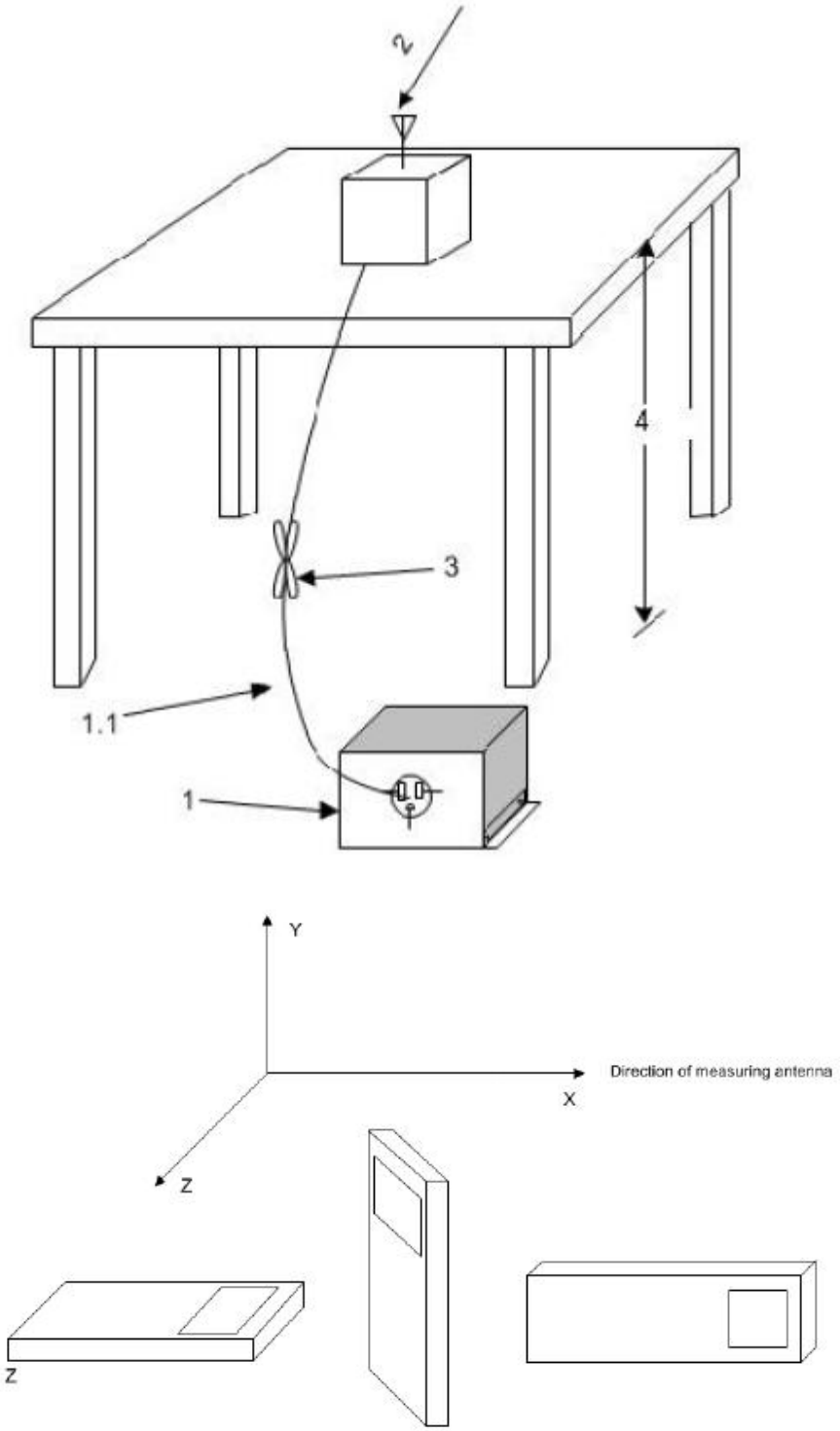
Frequency (MHz)	Field strength(μV/m)	Measurement distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30

Frequency of emission (MHz)	Field strength(uV/m)	Field strength(dBuV/m)
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Set up:

Tabletop devices shall be placed on a nonconducting platform with nominal top surface dimensions 1 m by 1.5 m. For emissions testing at or below 1 GHz, the table height shall be 80 cm above the reference ground plane. For emission measurements above 1 GHz, the table height shall be 1.5 m

The EUT and transmitting antenna shall be centered on the turntable.



Test Condition

The EUT shall be tested 1 near top, 1 near middle, and 1 near bottom. Set the unlicensed wireless device to operate in continuous transmit mode. For unlicensed wireless devices unable to be configured for 100% duty cycle even in test mode, configure the system for the maximum duty cycle supported.

When required for unlicensed wireless devices, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the

nominal rated supply voltage.

Exploratory radiated emissions measurements

Exploratory radiated measurements shall be performed at the measurement distance or at a closer distance than that specified for compliance to determine the emission characteristics of the EUT and, if applicable, the EUT configuration that produces the maximum level of emissions. The frequencies of maximum emission may be determined by manually positioning the antenna close to the EUT, and then moving the antenna over all sides of the EUT while observing a spectral display. It is advantageous to have prior knowledge of the frequencies of emissions, although this may be determined from such a near-field scan. The near-field scan shall only be used to determine the frequency but not the amplitude of the emissions. Where exploratory measurements are not adequate to determine the worst-case operating modes and are used only to identify the frequencies of the highest emissions, additional preliminary tests can be required.

For emissions from the EUT, the maximum level shall be determined by rotating the EUT and its antenna through 0° to 360°. For each mode of operation required to be tested, the frequency spectrum (based on findings from exploratory measurements) shall be monitored.

Broadband antennas and a spectrum analyzer or a radio-noise meter with a panoramic display are often useful in this type of test. If either antenna height or EUT azimuth are not fully measured during exploratory testing, then complete testing can be required at the OATS or semi-anechoic chamber when the final full spectrum testing is performed.

Final radiated emissions measurements

The final measurements are using the orientation and equipment arrangement of the EUT based on the measurement results found during the preliminary (exploratory) measurements, the EUT arrangement, appropriate modulation, and modes of operation that produce the emissions that have the highest amplitude relative to the limit shall be selected for the final measurement.

For each mode of operation required to be tested, the frequency spectrum (based on findings from exploratory measurements) shall be monitored. The highest signal levels relative to the limit shall be determined by rotating the EUT from 0° to 360° and with varying the measurement antenna height between 1 m and 4 m in vertical and horizontal polarizations.

For each mode selected, record the frequency and amplitude of the highest fundamental emission (if applicable), as well as the frequency and amplitude of the six highest spurious emissions relative to the limit. Emissions more than 20 dB below the limit do not need to be reported.

This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

The receiver references:

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	100KHz/300KHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

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

Where:

P_{Mea} field strength recorded from the instrument

Average Measurement results

EUT ID: EUT1

GFSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2376.800	46.47	2.9	32.0	11.65	54.0	7.5	H	155	170
2386.200	46.54	2.9	32.0	11.72	54.0	7.5	H	155	150
4804.000	30.39	-35.0	34.1	31.33	54.0	23.6	H	155	20
7206.400	33.99	-32.4	35.8	30.58	54.0	20.0	H	155	180
9607.700	39.98	-29.7	36.7	32.92	54.0	14.0	H	155	202
12010.100	37.80	-30.5	38.9	29.39	54.0	16.2	H	155	8

GFSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2388.600	46.63	2.9	32.0	11.80	54.0	7.4	H	155	25
2483.800	46.77	2.9	32.0	11.85	54.0	7.2	H	155	49
4882.100	31.12	-35.5	34.1	32.56	54.0	22.9	H	155	4
7323.000	35.83	-31.3	35.8	31.34	54.0	18.2	H	155	6
9763.900	38.10	-31.4	36.9	32.58	54.0	15.9	H	155	25
12204.800	37.52	-28.8	39.0	27.38	54.0	16.5	H	155	186

GFSK Ch 78

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2483.600	50.55	2.9	32.0	15.63	54.0	3.4	H	155	25
2484.200	47.38	2.9	32.0	12.46	54.0	6.6	H	155	49
4960.200	31.38	-34.9	34.1	32.17	54.0	22.6	H	155	4
7439.600	35.90	-32.2	35.8	32.26	54.0	18.1	H	155	6
9920.100	36.95	-29.7	37.1	29.51	54.0	17.0	H	155	25
12399.500	38.90	-30.0	39.1	29.88	54.0	15.1	H	155	186

π/4 DQPSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2385.000	46.54	2.9	32.0	11.72	54.0	7.5	H	155	20
2388.800	46.55	2.9	32.0	11.72	54.0	7.5	H	155	45
4804.000	30.36	-35.0	34.1	31.30	54.0	23.6	H	155	240
7206.400	34.00	-32.4	35.8	30.60	54.0	20.0	H	155	180
9607.700	39.99	-29.7	36.7	32.93	54.0	14.0	H	155	85
12010.100	37.79	-30.5	38.9	29.38	54.0	16.2	H	155	25

π/4 DQPSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2387.600	46.60	2.9	32.0	11.78	54.0	7.4	H	155	92
2488.200	46.76	2.9	32.0	11.83	54.0	7.2	H	155	115
4882.100	31.10	-35.5	34.1	32.54	54.0	22.9	H	155	135
7323.000	35.84	-31.3	35.8	31.35	54.0	18.2	H	155	168
9763.900	38.02	-31.4	36.9	32.51	54.0	16.0	H	155	184
12204.800	37.50	-28.8	39.0	27.36	54.0	16.5	H	155	202

π/4 DQPSK Ch 78

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2483.600	48.95	2.9	32.0	14.02	54.0	5.1	H	155	180
2484.400	47.01	2.9	32.0	12.08	54.0	7.0	H	155	204
4960.200	31.25	-34.9	34.1	32.04	54.0	22.7	H	155	222
7439.600	35.96	-32.2	35.8	32.33	54.0	18.0	H	155	245
9920.100	36.89	-29.7	37.1	29.44	54.0	17.1	H	155	72
12399.500	39.01	-30.0	39.1	30.00	54.0	15.0	H	155	94

8DPSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2383.400	46.60	2.9	32.0	11.78	54.0	7.4	H	155	48
2389.600	46.58	2.9	32.0	11.75	54.0	7.4	H	155	70
4804.000	30.31	-35.0	34.1	31.24	54.0	23.7	H	155	92
7206.400	33.99	-32.4	35.8	30.58	54.0	20.0	H	155	112
9607.700	39.95	-29.7	36.7	32.89	54.0	14.1	H	155	136
12010.100	37.70	-30.5	38.9	29.29	54.0	16.3	H	155	156

8DPSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2388.000	46.61	2.9	32.0	11.78	54.0	7.4	H	155	8
2487.200	46.81	2.9	32.0	11.88	54.0	7.2	H	155	26
4882.100	31.11	-35.5	34.1	32.56	54.0	22.9	H	155	72
7323.000	35.86	-31.3	35.8	31.37	54.0	18.1	H	155	136
9763.900	38.05	-31.4	36.9	32.53	54.0	16.0	H	155	94
12204.800	37.45	-28.8	39.0	27.30	54.0	16.6	H	155	48

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Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2483.600	48.51	2.9	32.0	13.58	54.0	5.5	H	155	46
2492.400	46.81	2.9	32.0	11.87	54.0	7.2	H	155	70
4960.200	31.23	-34.9	34.1	32.02	54.0	22.8	H	155	92
7439.600	35.87	-32.2	35.8	32.24	54.0	18.1	H	155	268
9920.100	36.91	-29.7	37.1	29.46	54.0	17.1	H	155	292
12399.500	38.90	-30.0	39.1	29.89	54.0	15.1	H	155	316

Peak Measurement results

GFSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2380.546	60.29	2.9	32.0	25.47	74.0	13.7	H	155	176
2383.710	60.23	2.9	32.0	25.42	74.0	13.8	V	155	154
4804.000	40.80	-35.0	34.1	41.74	74.0	33.2	H	155	22
7206.000	45.05	-32.4	35.8	41.64	74.0	29.0	H	155	176
9608.000	49.36	-29.7	36.7	42.29	74.0	24.6	V	155	198
12010.000	47.88	-30.5	38.9	39.47	74.0	26.1	V	155	0

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Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2340.600	48.22	2.8	31.9	13.44	74.0	25.8	H	155	22
2522.000	48.92	3.0	32.0	13.93	74.0	25.1	H	155	44
4882.000	42.26	-35.5	34.1	43.70	74.0	31.7	V	155	0
7323.000	45.47	-31.3	35.8	40.98	74.0	28.5	V	155	0
9764.000	47.36	-31.4	36.9	41.84	74.0	26.6	V	155	22
12205.000	47.42	-28.8	39.0	37.28	74.0	26.6	H	155	176

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Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2494.245	60.63	2.9	32.0	25.69	74.0	13.4	H	155	22
2497.500	60.76	2.9	32.0	25.82	74.0	13.2	H	155	44
4960.000	40.89	-34.9	34.1	41.67	74.0	33.1	H	155	0
7440.000	46.09	-32.2	35.8	42.47	74.0	27.9	V	155	0
9920.000	47.13	-29.7	37.1	39.69	74.0	26.9	H	155	22
12400.000	47.69	-30.0	39.1	38.67	74.0	26.3	V	155	176

π/4 DQPSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2362.542	60.48	2.8	31.9	25.69	74.0	13.5	H	155	22
2388.512	60.51	2.9	32.0	25.68	74.0	13.5	H	155	44
4804.000	41.07	-35.0	34.1	42.01	74.0	32.9	H	155	242
7206.000	43.24	-32.4	35.8	39.83	74.0	30.8	V	155	176
9608.000	49.64	-29.7	36.7	42.57	74.0	24.4	V	155	88
12010.000	46.96	-30.5	38.9	38.55	74.0	27.0	H	155	22

π/4 DQPSK Ch 39

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2344.800	48.00	2.8	31.9	13.22	74.0	26.0	V	155	88
2506.600	49.07	2.9	32.0	14.11	74.0	24.9	V	155	110
4882.000	40.60	-35.5	34.1	42.04	74.0	33.4	H	155	132
7323.000	45.32	-31.3	35.8	40.83	74.0	28.7	H	155	154
9764.000	46.53	-31.4	36.9	41.02	74.0	27.5	H	155	176
12205.000	46.90	-28.8	39.0	36.76	74.0	27.1	H	155	198

π/4 DQPSK Ch 78

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2486.095	60.81	2.9	32.0	25.88	74.0	13.2	V	155	176
2489.850	60.92	2.9	32.0	25.99	74.0	13.1	V	155	198
4960.000	42.29	-34.9	34.1	43.07	74.0	31.7	H	155	220
7440.000	45.72	-32.2	35.8	42.09	74.0	28.3	V	155	242
9920.000	47.17	-29.7	37.1	39.73	74.0	26.8	H	155	66
12400.000	48.97	-30.0	39.1	39.94	74.0	25.0	V	155	88

8DPSK Ch 0

Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2379.440	60.38	2.9	32.0	25.57	74.0	13.6	H	155	44
2389.884	60.63	2.9	32.0	25.80	74.0	13.4	V	155	66
4804.000	41.49	-35.0	34.1	42.42	74.0	32.5	H	155	88
7206.000	44.43	-32.4	35.8	41.02	74.0	29.6	V	155	110
9608.000	50.25	-29.7	36.7	43.18	74.0	23.8	V	155	132
12010.000	46.71	-30.5	38.9	38.30	74.0	27.3	V	155	154

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Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2362.200	47.06	2.8	31.9	12.27	74.0	26.9	V	155	0
2540.400	48.83	3.0	32.1	13.81	74.0	25.2	H	155	22
4882.000	40.21	-35.5	34.1	41.66	74.0	33.8	V	155	66
7323.000	45.12	-31.3	35.8	40.63	74.0	28.9	H	155	132
9764.000	48.60	-31.4	36.9	43.08	74.0	25.4	H	155	88
12205.000	46.12	-28.8	39.0	35.98	74.0	27.9	V	155	44

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Frequency (MHz)	Measurement Result (dBμV/m)	Cable loss (dB)	Antenna Factor (dB/m)	Receiver Reading (dBμV)	Limit (dBμV/m)	Margin (dB)	Antenna Pol. (H/V)	Antenna Height (cm)	Turntable angle (deg)
2484.420	60.77	2.9	32.0	25.84	74.0	13.2	H	155	44
2486.110	61.02	2.9	32.0	26.09	74.0	13.0	V	155	66
4960.000	41.87	-34.9	34.1	42.66	74.0	32.1	V	155	88
7440.000	45.05	-32.2	35.8	41.43	74.0	28.9	V	155	264
9920.000	50.06	-29.7	37.1	42.62	74.0	23.9	V	155	286
12400.000	48.67	-30.0	39.1	39.64	74.0	25.3	H	155	308

Sample:

2484.420MHz

Result (60.77 dBμV/m)= P_{Mea}(25.84 dBμV/m)+ Cable Loss(2.9 dB) + Antenna Factor(32.0 dB/m)

Conclusion: PASS

A.7. Time of Occupancy (Dwell Time)

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

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

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

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

Measurement Limit:

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

Measurement Result:

For GFSK

Channel	Packet	Pulse time (ms)		Number of Transmissions		Dwell Time (ms)	Conclusion
39	DH1	Fig.64	0.38	Fig.65	319	121.22	P
	DH3	Fig.66	1.63	Fig.67	106	172.78	P
	DH5	Fig.68	2.88	Fig.69	67	192.96	P

For π/4 DQPSK

Channel	Packet	Pulse time (ms)		Number of Transmissions		Dwell Time (ms)	Conclusion
39	2DH1	Fig.70	0.38	Fig.71	319	121.22	P
	2DH3	Fig.72	1.64	Fig.73	107	175.48	P
	2DH5	Fig.74	2.88	Fig.75	72	207.36	P

For 8DPSK