



**FCC PART 15C
TEST REPORT
No. I17N00032-BT**

for

Yulong Computer Telecommunication Scientific (Shenzhen) Co.,Ltd.

Smart phone

Model Name: Coolpad 3632A

With

Hardware Version: P2

Software Version: 7.0.013.00.P0.161201.3632A.tmo

FCC ID: R38YL3632A

Issued Date: 2017-02-15

Test Laboratory:

FCC 2.948 Listed: No.342690

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.

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REPORT HISTORY

Report Number	Revision	Description	Issue Date
I17N00032-BT	Rev.0	1st edition	2017-02-15

CONTENTS

1. TEST LABORATORY	7
1.1. TESTING LOCATION	7
1.2. TESTING ENVIRONMENT	7
1.3. PROJECT DATA	7
1.4. SIGNATURE	7
2. CLIENT INFORMATION	8
2.1. APPLICANT INFORMATION	8
2.2. MANUFACTURER INFORMATION	8
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	9
3.1. ABOUT EUT	9
3.2. INTERNAL IDENTIFICATION OF EUT	9
3.3. INTERNAL IDENTIFICATION OF AE	9
4. REFERENCE DOCUMENTS	10
4.1. DOCUMENTS SUPPLIED BY APPLICANT	10
4.2. REFERENCE DOCUMENTS FOR TESTING	10
5. TEST RESULTS	11
5.1. SUMMARY OF TEST RESULTS	11
5.2. STATEMENTS	11
5.3. TERMS USED IN THE RESULT TABLE	11
5.4. LABORATORY ENVIRONMENT	12
6. TEST FACILITIES UTILIZED	13
ANNEX A: MEASUREMENT RESULTS FOR RECEIVER	14
A.0 ANTENNA REQUIREMENT	14
A.1 MAXIMUM PEAK OUTPUT POWER	15
A.2 BAND EDGES COMPLIANCE	16
A.3 CONDUCTED EMISSION	17
A.4 RADIATED EMISSION	19
A.5 OCCUPIED 20dB BANDWIDTH	26
A.6 TIME OF OCCUPANCY (DWELL TIME)	26
A.7 NUMBER OF HOPPING CHANNELS	27
A.8 CARRIER FREQUENCY SEPARATION	27
A.9 AC POWER LINE CONDUCTED EMISSION	28
ANNEX B: TEST FIGURE LIST	30
FIG. 1 MAXIMUM PEAK OUTPUT POWER(GFSK, CH 0)	30
FIG. 2 MAXIMUM PEAK OUTPUT POWER(GFSK, CH 39)	30

FIG. 3	MAXIMUM PEAK OUTPUT POWER(GFSK, Ch 78).....	31
FIG. 4	MAXIMUM PEAK OUTPUT POWER($\pi/4$ DQPSK, Ch 0)	31
FIG. 5	MAXIMUM PEAK OUTPUT POWER($\pi/4$ DQPSK, Ch 39)	32
FIG. 6	MAXIMUM PEAK OUTPUT POWER($\pi/4$ DQPSK, Ch 78)	32
FIG. 7	MAXIMUM PEAK OUTPUT POWER(8DPSK, Ch 0).....	33
FIG. 8	MAXIMUM PEAK OUTPUT POWER(8DPSK, Ch 39).....	33
FIG. 9	MAXIMUM PEAK OUTPUT POWER(8DPSK, Ch 78).....	34
FIG. 10	BAND EDGES (GFSK, Ch 0, HOPPING ON)	34
FIG. 11	BAND EDGES (GFSK, Ch 78, HOPPING ON)	35
FIG. 12	BAND EDGES ($\pi/4$ DQPSK, Ch 0, HOPPING ON)	35
FIG. 13	BAND EDGES ($\pi/4$ DQPSK, Ch 78, HOPPING ON)	36
FIG. 14	BAND EDGES (8DPSK, Ch 0, HOPPING ON)	36
FIG. 15	BAND EDGES (8DPSK, Ch 78, HOPPING ON)	37
FIG. 16	BAND EDGES (GFSK, Ch 0, HOPPING OFF).....	37
FIG. 17	BAND EDGES (GFSK, Ch 78, HOPPING OFF).....	38
FIG. 18	BAND EDGES ($\pi/4$ DQPSK, Ch 0, HOPPING OFF)	38
FIG. 19	BAND EDGES ($\pi/4$ DQPSK, Ch 78, HOPPING OFF)	39
FIG. 20	BAND EDGES (8DPSK, Ch 0, HOPPING OFF).....	39
FIG. 21	BAND EDGES (8DPSK, Ch 78, HOPPING OFF).....	40
FIG. 22	CONDUCTED SPURIOUS EMISSION (GFSK, Ch0, 2.402GHz).....	40
FIG. 23	CONDUCTED SPURIOUS EMISSION (GFSK, Ch0, 30 MHz-1 GHz).....	41
FIG. 24	CONDUCTED SPURIOUS EMISSION (GFSK, Ch0, 1 GHz -3 GHz)	41
FIG. 25	CONDUCTED SPURIOUS EMISSION (GFSK, Ch0, 3 GHz-10 GHz)	42
FIG. 26	CONDUCTED SPURIOUS EMISSION (GFSK, Ch0, 10 GHz-26 GHz)	42
FIG. 27	CONDUCTED SPURIOUS EMISSION (GFSK, Ch39, 2.441GHz).....	43
FIG. 28	CONDUCTED SPURIOUS EMISSION (GFSK, Ch39, 30 MHz-1 GHz).....	43
FIG. 29	CONDUCTED SPURIOUS EMISSION (GFSK, Ch39, 1 GHz -3 GHz)	44
FIG. 30	CONDUCTED SPURIOUS EMISSION (GFSK, Ch39, 3 GHz-10 GHz)	44
FIG. 31	CONDUCTED SPURIOUS EMISSION (GFSK, Ch39, 10 GHz-26 GHz)	45
FIG. 32	CONDUCTED SPURIOUS EMISSION (GFSK, Ch78, 2.480GHz).....	45
FIG. 33	CONDUCTED SPURIOUS EMISSION (GFSK, Ch78, 30 MHz-1 GHz).....	46
FIG. 34	CONDUCTED SPURIOUS EMISSION (GFSK, Ch78, 1 GHz -3 GHz)	46
FIG. 35	CONDUCTED SPURIOUS EMISSION (GFSK, Ch78, 3 GHz-10 GHz)	47
FIG. 36	CONDUCTED SPURIOUS EMISSION (GFSK, Ch78, 10 GHz-26 GHz)	47
FIG. 37	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch0, 2.402GHz).....	48
FIG. 38	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch0, 30 MHz-1 GHz)	48
FIG. 39	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch0, 1 GHz - 3 GHz).....	49
FIG. 40	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch0, 3 GHz-10 GHz)	49
FIG. 41	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch0, 10 GHz-26 GHz)	50
FIG. 42	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch39, 2.441GHz).....	50
FIG. 43	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch39, 30 MHz-1 GHz)	51
FIG. 44	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch39, 1 GHz -3 GHz)	51
FIG. 45	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch39, 3 GHz-10 GHz)	52

FIG. 46	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch39, 10 GHz-26 GHz)	52
FIG. 47	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch78, 2.480GHz)	53
FIG. 48	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch78, 30 MHz-1 GHz)	53
FIG. 49	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch78, 1 GHz-3 GHz)	54
FIG. 50	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch78, 3 GHz-10 GHz)	54
FIG. 51	CONDUCTED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch78, 10 GHz-26 GHz)	55
FIG. 52	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch0, 2.402GHz)	55
FIG. 53	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch0, 30 MHz-1 GHz)	56
FIG. 54	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch0, 1 GHz-3 GHz)	56
FIG. 55	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch0, 3 GHz-10 GHz)	57
FIG. 56	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch0, 10 GHz-26 GHz)	57
FIG. 57	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch39, 2.441GHz)	58
FIG. 58	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch39, 30 MHz-1 GHz)	58
FIG. 59	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch39, 1 GHz-3 GHz)	59
FIG. 60	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch39, 3 GHz-10 GHz)	59
FIG. 61	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch39, 10 GHz-26 GHz)	60
FIG. 62	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch78, 2.480GHz)	60
FIG. 63	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch78, 30 MHz-1 GHz)	61
FIG. 64	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch78, 1 GHz -3 GHz)	61
FIG. 65	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch78, 3 GHz-10 GHz)	62
FIG. 66	CONDUCTED SPURIOUS EMISSION (8DPSK, Ch78, 10 GHz-26 GHz)	62
FIG. 67	RADIATED SPURIOUS EMISSION (GFSK, Ch0, 1 GHz ~18 GHz)	63
FIG. 68	RADIATED SPURIOUS EMISSION (GFSK, Ch39, 9 kHz ~30 MHz)	63
FIG. 69	RADIATED SPURIOUS EMISSION (GFSK, Ch39, 30 MHz ~1 GHz)	64
FIG. 70	RADIATED SPURIOUS EMISSION (GFSK, Ch39, 1 GHz ~18 GHz)	64
FIG. 71	RADIATED SPURIOUS EMISSION (GFSK, Ch39, 18 GHz ~26.5 GHz)	65
FIG. 72	RADIATED SPURIOUS EMISSION (GFSK, Ch78, 1 GHz ~18 GHz)	65
FIG. 73	RADIATED EMISSION POWER (GFSK, Ch0, 2380GHz~2450GHz)	66
FIG. 74	RADIATED EMISSION POWER (GFSK, Ch78, 2450GHz~2500GHz)	66
FIG. 75	RADIATED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch0, 1 GHz ~18 GHz)	67
FIG. 76	RADIATED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch39, 9 kHz ~30 MHz)	67
FIG. 77	RADIATED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch39, 30 MHz ~1 GHz)	68
FIG. 78	RADIATED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch39, 1 GHz ~18 GHz)	68
FIG. 79	RADIATED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch39, 18 GHz ~26.5 GHz)	69
FIG. 80	RADIATED SPURIOUS EMISSION ($\pi/4$ DQPSK, Ch78, 1 GHz ~18 GHz)	69
FIG. 81	RADIATED EMISSION POWER ($\pi/4$ DQPSK, Ch0, 2380GHz~2450GHz)	70
FIG. 82	RADIATED EMISSION POWER ($\pi/4$ DQPSK, Ch78, 2450GHz~2500GHz)	70
FIG. 83	RADIATED SPURIOUS EMISSION (8DPSK, Ch0, 1 GHz ~18 GHz)	71
FIG. 84	RADIATED SPURIOUS EMISSION (8DPSK, Ch39, 9 kHz ~30 MHz)	71
FIG. 85	RADIATED SPURIOUS EMISSION (8DPSK, Ch39, 30 MHz ~1 GHz)	72
FIG. 86	RADIATED SPURIOUS EMISSION (8DPSK, Ch39, 1 GHz ~18 GHz)	72
FIG. 87	RADIATED SPURIOUS EMISSION (8DPSK, Ch39, 18 GHz ~26.5 GHz)	73
FIG. 88	RADIATED SPURIOUS EMISSION (8DPSK, Ch78, 1 GHz ~18 GHz)	73

FIG. 89	RADIATED EMISSION POWER (8DPSK, Ch0, 2380GHz~2450GHz)	74
FIG. 90	RADIATED EMISSION POWER (8DPSK, Ch78, 2450GHz~2500GHz)	74
FIG. 91	OCCUPIED 20dB BANDWIDTH (GFSK, Ch 0)	75
FIG. 92	OCCUPIED 20dB BANDWIDTH (GFSK, Ch 39)	75
FIG. 93	OCCUPIED 20dB BANDWIDTH (GFSK, Ch 78)	76
FIG. 94	OCCUPIED 20dB BANDWIDTH ($\pi/4$ DQPSK, Ch 0)	76
FIG. 95	OCCUPIED 20dB BANDWIDTH ($\pi/4$ DQPSK, Ch 39)	77
FIG. 96	OCCUPIED 20dB BANDWIDTH ($\pi/4$ DQPSK, Ch 78)	77
FIG. 97	OCCUPIED 20dB BANDWIDTH (8DPSK, Ch 0)	78
FIG. 98	OCCUPIED 20dB BANDWIDTH (8DPSK, Ch 39)	78
FIG. 99	OCCUPIED 20dB BANDWIDTH (8DPSK, Ch 78)	79
FIG. 100	TIME OF OCCUPANCY(DWELL TIME) (GFSK, Ch39)	79
FIG. 101	TIME OF OCCUPANCY(DWELL TIME) ($\pi/4$ DQPSK, Ch39)	80
FIG. 102	TIME OF OCCUPANCY(DWELL TIME) (8DPSK, Ch39)	80
FIG. 103	HOPPING CHANNEL CH0~39 (GFSK, Ch39)	81
FIG. 104	HOPPING CHANNEL CH39~78 (GFSK, Ch39)	81
FIG. 105	HOPPING CHANNEL CH0~39 ($\pi/4$ DQPSK, Ch39)	82
FIG. 106	HOPPING CHANNEL CH39~78 ($\pi/4$ DQPSK, Ch39)	82
FIG. 107	HOPPING CHANNEL CH0~39 (8DPSK, Ch39)	83
FIG. 108	HOPPING CHANNEL CH39~78 (8DPSK, Ch39)	83
FIG. 109	CARRIER FREQUENCY SEPARATION (GFSK, Ch39)	84
FIG. 110	CARRIER FREQUENCY SEPARATION ($\pi/4$ DQPSK, Ch39)	84
FIG. 111	CARRIER FREQUENCY SEPARATION (8DPSK, Ch39)	85
FIG. 112	AC POWERLINE CONDUCTED EMISSION (TRAFFIC, AE1)	86
FIG. 113	AC POWER LINE CONDUCTED EMISSION (IDLE, AE1)	87
FIG. 114	AC POWERLINE CONDUCTED EMISSION (TRAFFIC, AE1)	88
FIG. 115	AC POWER LINE CONDUCTED EMISSION (IDLE, AE1)	89
ANNEX C: PERSONS INVOLVED IN THIS TESTING		90

1. Test Laboratory

1.1. Testing Location

Location: CTTL(South Branch)

Address: TCL International E city No. 1001 Zhongshanyuan Road, Nanshan
District, Shenzhen, Guangdong, China 518000

1.2. Testing Environment

Normal Temperature: 15-35℃

Extreme Temperature: -15/+55℃

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2017-01-12

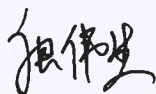
Testing End Date: 2017-02-15

1.4. Signature



Wang Haili

(Prepared this test report)



Tang Weisheng

(Reviewed this test report)



Zhang Bojun

(Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name: Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd.
Address: Coolpad Information Harbor, High-tech Industrial Park (North),
Nanshan District, Shenzhen, P.R.C.
City: Shenzhen
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Country: China
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2.2. Manufacturer Information

Company Name: Yulong Computer Telecommunication Scientific (Shenzhen) Co., Ltd.
Address: Coolpad Information Harbor, High-tech Industrial Park (North),
Nanshan District, Shenzhen, P.R.C.
City: Shenzhen
Postal Code: /
Country: China
Telephone: 0755-83301199-83335
Fax: /

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

3.1. About EUT

Description	Smart phone
Model Name	Coolpad 3632A
Market Name	/
Frequency Band	2402MHz~2480MHz
Type of Modulation	GFSK/ π /4 DQPSK/8DPSK
Number of Channels	79
FCC ID	R38YL3632A

3.2. Internal Identification of EUT

EUT ID*	IMEI	HW Version	SW Version	Receive Date
EUT1	862006030002251	P2	7.0.013.00.P0.161201.3632A.tmo	2017-01-12

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

3.3. Internal Identification of AE

AE ID*	Description	Type	SN
AE1	Charger	CYSN05-050100	/
AE2	Data Cable	SYL-A126A	/

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

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 CFR 47, Part 15, Subpart C:	
	15.205 Restricted bands of operation;	
FCC Part15	15.209 Radiated emission limits, general requirements;	Nov,2015
	15.247 Operation within the bands 902–928MHz, 2400–2483.5 MHz, and 5725–5850 MHz	
ANSI C63.10	American National Standard for Testing Unlicensed Wireless Devices	Jun,2013

5. Test Results

5.1. Summary of Test Results

No	Test cases	Sub-clause of Part15C	Verdict
0.	Antenna Requirement	15.203	P
1.	Maximum Peak Output Power	15.247 (b)	P
2.	Band Edges Compliance	15.247 (d)	P
3.	Conducted Spurious Emission	15.247 (d)	P
4.	Radiated Spurious Emission	15.247,15.205,15.209	P
5.	Occupied 20dB bandwidth	15.247(a)	/
6.	Time of Occupancy(Dwell Time)	15.247(a)	P
7.	Number of Hopping Channel	15.247(a)	P
8.	Carrier Frequency Separation	15.247(a)	P
9.	AC Powerline Conducted Emission	15.107,15.207	P

See **ANNEX B** and **ANNEX C** for details.

5.2. Statements

CTTL has evaluated the test cases requested by the applicant/manufacture 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

5.3. Terms used in the result table

Terms used in Verdict column

P	Pass
NA	Not Available
F	Fail

Abbreviations

AC	Alternating Current
AFH	Adaptive Frequency Hopping
BW	Band Width
E.I.R.P.	equivalent isotropical radiated power
ISM	Industrial, Scientific and Medical
R&TTE	Radio and Telecommunications Terminal Equipment
RF	Radio Frequency
Tx	Transmitter

5.4. Laboratory Environment

Semi-anechoic chamber did not exceed following limits along the EMC testing

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω
Normalised site attenuation (NSA)	< ±4dB, 3m/10m distance, from 30 to 1000 MHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

Shielded room did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4 Ω

Fully-anechoic chamber did not exceed following limits along the EMC testing

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	0.014MHz - 1MHz, >60dB; 1MHz - 1000MHz, >90dB.
Electrical insulation	> 2 MΩ
Ground system resistance	< 4Ω
Voltage Standing Wave Ratio (VSWR)	≤6dB, from 1 to 18 GHz, 3m distance

6. Test Facilities Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Vector Signal Analyzer	FSV40	100903	Rohde & Schwarz	2017-03-21	1 year
2	Bluetooth Tester	CBT32	100584	Rohde & Schwarz	2018-01-05	1 year

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Chamber	FACT5-2.0	4166	ETS-Lindgren	2018-05-13	3 years
2	Test Receiver	ESCI	100701	Rohde & Schwarz	2017-08-09	1 year
3	BiLog Antenna	VULB9163	9163 330	Schwarzbeck	2017-04-22	3 years
4	Horn Antenna	3117	00066585	ETS-Lindgren	2019-03-05	3 years
5	Spectrum Analyser	FSP40	100378	Rohde & Schwarz	2017-12-15	1 year
6	Universal Radio Communication Tester	CMW270	100540	Rohde & Schwarz	2017-04-13	1 year
7	Loop Antenna	HLA6120	35779	TESEQ	2019-05-02	3 years
8	Test Receiver	ESR7	101675	Rohde & Schwarz	2017-07-21	1 year
9	LISN	ESH2-Z5	100196	Rohde & Schwarz	2018-01-05	1 year

Anechoic chamber

Fully anechoic chamber by ETS-Lindgren.

ANNEX A: MEASUREMENT RESULTS FOR RECEIVER

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 2.1 dBi.
The RF transmitter uses an integrate antenna without connector.

A.1 Maximum Peak Output Power

Measurement Limit:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)(1)	< 21

Measurement Results:

Mode	Test Result (dBm)					
	2402MHz (Ch0)		2441MHz (Ch39)		2480 MHz (Ch78)	
GFSK	Fig.1	-0.73	Fig.2	0.04	Fig.3	-1.63
$\pi/4$ DQPSK	Fig.4	0.07	Fig.5	0.74	Fig.6	-0.89
8DPSK	Fig.7	0.17	Fig.8	0.82	Fig.9	-0.83

Conclusion: Pass

A.2 Band Edges Compliance

Measurement Limit:

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

Measurement Result:

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

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

See ANNEX C for test graphs.

Conclusion: Pass

A.3 Conducted Emission

Measurement Limit:

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

Measurement Results:

MODE	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	2.402 GHz	Fig.22	P
		30 MHz-1GHz	Fig.23	P
		1GHz-3GHz	Fig.24	P
		3GHz-10GHz	Fig.25	P
		10GHz-26GHz	Fig.26	P
	39	2.441 GHz	Fig.27	P
		30 MHz-1GHz	Fig.28	P
		1GHz-3GHz	Fig.29	P
		3GHz-10GHz	Fig.30	P
		10GHz-26GHz	Fig.31	P
	78	2.480 GHz	Fig.32	P
		30 MHz-1GHz	Fig.33	P
		1GHz-3GHz	Fig.34	P
		3GHz-10GHz	Fig.35	P
		10GHz-26GHz	Fig.36	P
$\pi/4$ DQPSK	0	2.402 GHz	Fig.37	P
		30 MHz-1GHz	Fig.38	P
		1GHz-3GHz	Fig.39	P
		3GHz-10GHz	Fig.40	P
		10GHz-26GHz	Fig.41	P
	39	2.441 GHz	Fig.42	P
		30 MHz-1GHz	Fig.43	P
		1GHz-3GHz	Fig.44	P
		3GHz-10GHz	Fig.45	P
		10GHz-26GHz	Fig.46	P
	78	2.480 GHz	Fig.47	P
		30 MHz-1GHz	Fig.48	P
		1GHz-3GHz	Fig.49	P
		3GHz-10GHz	Fig.50	P
		10GHz-26GHz	Fig.51	P
8DPSK	0	2.402 GHz	Fig.52	P
		30 MHz-1GHz	Fig.53	P

		1GHz-3GHz	Fig.54	P
		3GHz-10GHz	Fig.55	P
		10GHz-26GHz	Fig.56	P
	39	2.441 GHz	Fig.57	P
		30 MHz-1GHz	Fig.58	P
		1GHz-3GHz	Fig.59	P
		3GHz-10GHz	Fig.60	P
		10GHz-26GHz	Fig.61	P
	78	2.480 GHz	Fig.62	P
		30 MHz-1GHz	Fig.63	P
		1GHz-3GHz	Fig.64	P
		3GHz-10GHz	Fig.65	P
		10GHz-26GHz	Fig.66	P

See ANNEX C for test graphs.

Conclusion: Pass

A.4 Radiated Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209	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(μ V/m)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Condition

The EUT was placed on a non-conductive table. The measurement antenna was placed at a distance of 3 meters from the EUT. During the tests, the antenna height and the EUT azimuth were varied in order to identify the maximum level of emissions from the EUT. This maximization process was repeated with the EUT positioned in each of its three orthogonal orientations.

Frequency of emission (MHz)	RBW/VBW	Sweep Time(s)
30-1000	120kHz/300kHz	5
1000-4000	1MHz/3MHz	15
4000-18000	1MHz/3MHz	40
18000-26500	1MHz/3MHz	20

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

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

Measurement Results:

Mode	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	1 GHz ~3 GHz	Fig.67	P
	39	9 kHz ~30 MHz	Fig.68	P
		30 MHz ~1 GHz	Fig.69	P
		1 GHz ~18 GHz	Fig.70	P
		18 GHz ~26.5 GHz	Fig.71	P
	78	1 GHz ~18 GHz	Fig.72	P
	Power(CH0)	2.38 GHz ~ 2.45 GHz	Fig.73	P
	Power(CH78)	2.45 GHz ~ 2.5 GHz	Fig.74	P
$\pi/4$ DQPSK	0	1 GHz ~18 GHz	Fig.75	P
	39	9 kHz ~30 MHz	Fig.76	P
		30 MHz ~1 GHz	Fig.77	P
		1 GHz ~18 GHz	Fig.78	P
		18 GHz ~26.5 GHz	Fig.79	P
	78	1 GHz ~18 GHz	Fig.80	P
	Power(CH0)	2.38 GHz ~ 2.45 GHz	Fig.81	P
	Power(CH78)	2.45 GHz ~ 2.5 GHz	Fig.82	P
8DPSK	0	1 GHz ~18 GHz	Fig.83	P
	39	9 kHz ~30 MHz	Fig.84	P
		30 MHz ~1 GHz	Fig.85	P
		1 GHz ~18 GHz	Fig.86	P
		18 GHz ~26.5 GHz	Fig.87	P
	78	1 GHz ~18 GHz	Fig.88	P
	Power(CH0)	2.38 GHz ~ 2.45 GHz	Fig.89	P
	Power(CH78)	2.45 GHz ~ 2.5 GHz	Fig.90	P

GFSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14545.000000	54.28	74.00	19.72	V	11.9
15151.500000	55.29	74.00	18.71	V	12.1
15777.500000	57.22	74.00	16.78	V	12.8
16165.000000	56.96	74.00	17.04	V	13.1
16712.500000	57.57	74.00	16.43	V	13.8
17257.000000	56.95	74.00	17.05	V	13.9

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14550.000000	43.25	54.00	10.75	V	11.9
15184.500000	43.95	54.00	10.05	V	12.2
15772.500000	45.22	54.00	8.78	V	12.8
16200.500000	45.24	54.00	8.76	V	13.1
16791.000000	45.86	54.00	8.14	V	13.9
17293.500000	45.55	54.00	8.45	V	13.9

GFSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14528.500000	54.14	74.00	19.86	V	11.8
15053.000000	54.55	74.00	19.45	V	12.1
15696.000000	57.04	74.00	16.96	V	12.7
16163.500000	57.39	74.00	16.61	V	13.1
16790.500000	57.61	74.00	16.39	V	13.9
17426.500000	56.98	74.00	17.02	V	14.0

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
13995.000000	42.48	54.00	11.52	V	10.8
15181.000000	43.47	54.00	10.53	V	12.2
15688.500000	45.39	54.00	8.61	V	12.7
16220.500000	45.81	54.00	8.19	V	13.1
16800.500000	46.46	54.00	7.54	V	13.9
17339.000000	45.81	54.00	8.19	V	14.0

GFSK CH78 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14552.000000	55.07	74.00	18.93	V	11.9
14582.500000	55.98	74.00	18.02	V	11.9
15761.500000	57.14	74.00	16.86	V	12.8
16279.500000	57.50	74.00	16.50	V	13.3
17205.500000	57.66	74.00	16.34	V	13.8
17474.000000	57.90	74.00	16.10	V	14.0

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14552.000000	55.07	74.00	18.93	V	11.9
14582.500000	55.98	74.00	18.02	V	11.9
15761.500000	57.14	74.00	16.86	V	12.8
16279.500000	57.50	74.00	16.50	V	13.3
17205.500000	57.66	74.00	16.34	V	13.8
17474.000000	57.90	74.00	16.10	V	14.0

$\pi/4$ DQPSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14551.000000	54.20	74.00	19.80	V	11.9
15169.500000	56.57	74.00	17.43	V	12.1
15773.500000	56.38	74.00	17.62	V	12.8
16249.000000	57.51	74.00	16.50	V	13.2
16717.500000	57.31	74.00	16.69	V	13.8
17269.500000	57.59	74.00	16.41	V	13.9

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14526.500000	42.79	54.00	11.21	V	11.8
15151.000000	43.83	54.00	10.17	V	12.1
15758.500000	45.17	54.00	8.83	V	12.8
16192.000000	45.34	54.00	8.66	V	13.1
16752.000000	45.94	54.00	8.06	V	13.9
17319.500000	45.52	54.00	8.48	V	13.9

$\pi/4$ DQPSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14133.000000	53.91	74.00	20.09	V	11.2
15176.000000	55.02	74.00	18.98	V	12.1
15774.000000	56.53	74.00	17.47	V	12.8
16184.000000	57.38	74.00	16.62	V	13.1
16875.500000	57.82	74.00	16.18	V	14.0
17393.500000	57.22	74.00	16.78	V	14.0

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14133.000000	53.91	74.00	20.09	V	11.2
15176.000000	55.02	74.00	18.98	V	12.1
15774.000000	56.53	74.00	17.47	V	12.8
16184.000000	57.38	74.00	16.62	V	13.1
16875.500000	57.82	74.00	16.18	V	14.0
17393.500000	57.22	74.00	16.78	V	14.0

$\pi/4$ DQPSK CH78 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14303.000000	53.31	74.00	20.69	V	11.4
14800.000000	54.55	74.00	19.45	V	11.9
15689.500000	56.68	74.00	17.32	V	12.7
16346.500000	56.47	74.00	17.53	V	13.4
16792.500000	57.09	74.00	16.91	V	13.9
17407.500000	56.98	74.00	17.02	V	14.0

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14458.500000	42.35	54.00	11.65	V	11.7
15160.000000	43.03	54.00	10.97	V	12.1
15684.000000	44.91	54.00	9.09	V	12.6
16227.000000	45.19	54.00	8.81	V	13.1
16805.000000	46.07	54.00	7.93	V	13.9
17380.500000	45.56	54.00	8.44	V	14.0

8DPSK CH0 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14108.000000	54.66	74.00	19.34	V	11.1
14595.000000	55.48	74.00	18.52	V	11.9
15717.000000	56.51	74.00	17.49	V	12.7
16266.000000	56.88	74.00	17.12	V	13.2
16754.000000	57.21	74.00	16.79	V	13.9
17425.500000	57.14	74.00	16.86	V	14.0

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14550.500000	42.62	54.00	11.38	V	11.9
15179.000000	43.64	54.00	10.36	V	12.2
15692.000000	45.37	54.00	8.63	V	12.7
16219.000000	45.68	54.00	8.32	V	13.1
16778.500000	46.34	54.00	7.66	V	13.9
17296.500000	45.71	54.00	8.29	V	13.9

8DPSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14262.000000	53.80	74.00	20.20	V	11.4
14685.500000	55.23	74.00	18.77	V	12.0
15761.000000	57.13	74.00	16.87	V	12.8
16201.000000	56.76	74.00	17.24	V	13.1
16833.500000	57.26	74.00	16.74	V	13.9
17341.500000	57.18	74.00	16.82	V	14.0

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14262.000000	53.80	74.00	20.20	V	11.4
14685.500000	55.23	74.00	18.77	V	12.0
15761.000000	57.13	74.00	16.87	V	12.8
16201.000000	56.76	74.00	17.24	V	13.1
16833.500000	57.26	74.00	16.74	V	13.9
17341.500000	57.18	74.00	16.82	V	14.0

8DPSK CH78 (1-18GHz)

Frequency (MHz)	MaxPeak (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14350.500000	53.57	74.00	20.43	V	11.5
15049.000000	54.45	74.00	19.55	V	12.1
15690.500000	56.37	74.00	17.64	V	12.7
16297.000000	57.50	74.00	16.50	V	13.3
16780.500000	57.75	74.00	16.25	V	13.9
17308.000000	57.37	74.00	16.63	V	13.9

Frequency (MHz)	Average (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Pol	Corr. (dB)
14397.500000	42.25	54.00	11.75	V	11.5
15175.500000	42.95	54.00	11.05	V	12.1
15688.000000	44.98	54.00	9.02	V	12.7
16220.000000	45.11	54.00	8.89	V	13.1
16795.500000	46.04	54.00	7.96	V	13.9
17362.000000	45.42	54.00	8.58	V	14.0

See ANNEX C for test graphs.

Conclusion: Pass

A.5 Occupied 20dB Bandwidth

Measurement Limit:

Standard	Limit (kHz)
FCC 47 CFR Part 15.247 (a)	/

Measurement Result:

Mode	Channel	Occupied 20dB Bandwidth (MHz)		conclusion
GFSK	0	Fig.91	1.118	/
	39	Fig.92	1.119	
	78	Fig.93	1.121	
$\pi/4$ DQPSK	0	Fig.94	1.367	/
	39	Fig.95	1.364	
	78	Fig.96	1.368	
8DPSK	0	Fig.97	1.374	/
	39	Fig.98	1.372	
	78	Fig.99	1.371	

See ANNEX C for test graphs.

Conclusion: PASS

A.6 Time of Occupancy (Dwell Time)

Measurement Limit:

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

Measurement Results:

Mode	Channel	Packet	Dwell Time(ms)		Conclusion
GFSK	39	DH5	Fig.100	307.7	P
$\pi/4$ DQPSK	39	2-DH5	Fig.101	307.9	P
8DPSK	39	3-DH5	Fig.102	308.1	P

See ANNEX C for test graphs.

Conclusion: Pass

A.7 Number of Hopping Channels

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)	At least 15 non-overlapping channels

Measurement Results:

Mode	Channel	Packet	Number of hopping channels		Test result	Conclusion
GFSK	39	DH5	Fig.103	Fig.104	79	P
$\pi/4$ DQPSK	39	2-DH5	Fig.105	Fig.106	79	P
8DPSK	39	3-DH5	Fig.107	Fig.108	79	P

See ANNEX C for test graphs.

Conclusion: Pass

A.8 Carrier Frequency Separation

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)	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 (MHz)	Conclusion
GFSK	39	DH5	Fig.109	1.006	P
$\pi/4$ DQPSK	39	2-DH5	Fig.110	1.006	P
8DPSK	39	3-DH5	Fig.111	1.006	P

See ANNEX C for test graphs.

Conclusion: Pass

A.9 AC Power line Conducted Emission

Test Condition:

Voltage (V)	Frequency (Hz)
120	60

Measurement Result and limit:

BT (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
0.15 to 0.5	66 to 56	Fig.112	P
0.5 to 5	56		
5 to 30	60		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

BT (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
0.15 to 0.5	56 to 46	Fig.112	P
0.5 to 5	46		
5 to 30	50		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

BT (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
0.15 to 0.5	66 to 56	Fig.113	P
0.5 to 5	56		
5 to 30	60		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

BT (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
0.15 to 0.5	56 to 46	Fig.113	P
0.5 to 5	46		
5 to 30	50		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Test Condition:

Voltage (V)	Frequency (Hz)
240	60

Measurement Result and limit:

BT (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
0.15 to 0.5	66 to 56	Fig.114	P
0.5 to 5	56		
5 to 30	60		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

BT (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Traffic	
0.15 to 0.5	56 to 46	Fig.114	P
0.5 to 5	46		
5 to 30	50		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

BT (Quasi-peak Limit)-AE1

Frequency range (MHz)	Quasi-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
0.15 to 0.5	66 to 56	Fig.115	P
0.5 to 5	56		
5 to 30	60		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

BT (Average Limit)-AE1

Frequency range (MHz)	Average-peak Limit (dB μ V)	Result (dB μ V)	Conclusion
		Idle	
0.15 to 0.5	56 to 46	Fig.115	P
0.5 to 5	46		
5 to 30	50		

NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.

Note: The measurement results include the L1 and N measurements.

See ANNEX C for test graphs.

Conclusion: Pass

ANNEX B: TEST FIGURE LIST

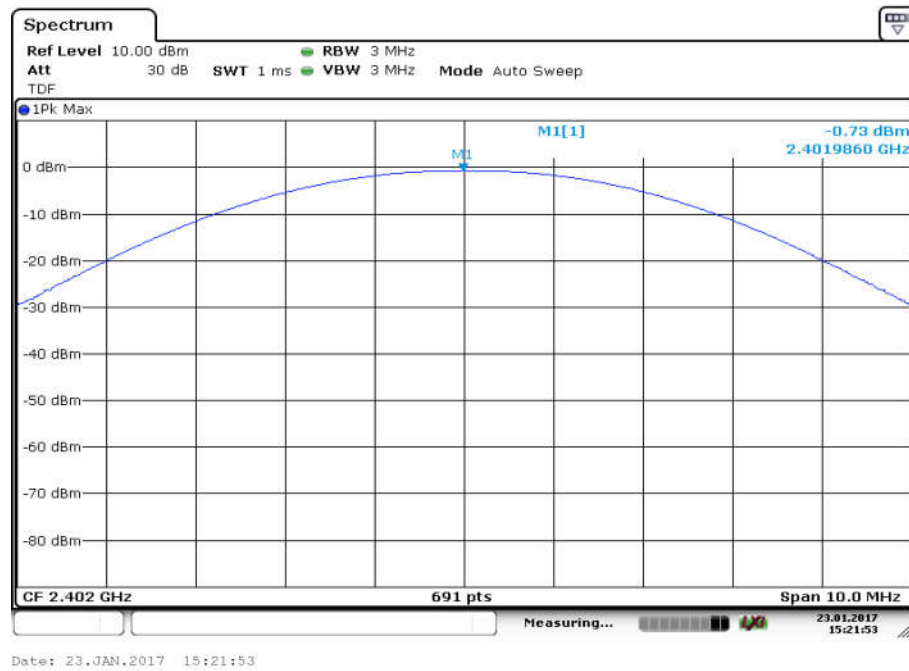


Fig. 1 Maximum Peak Output Power(GFSK, Ch 0)

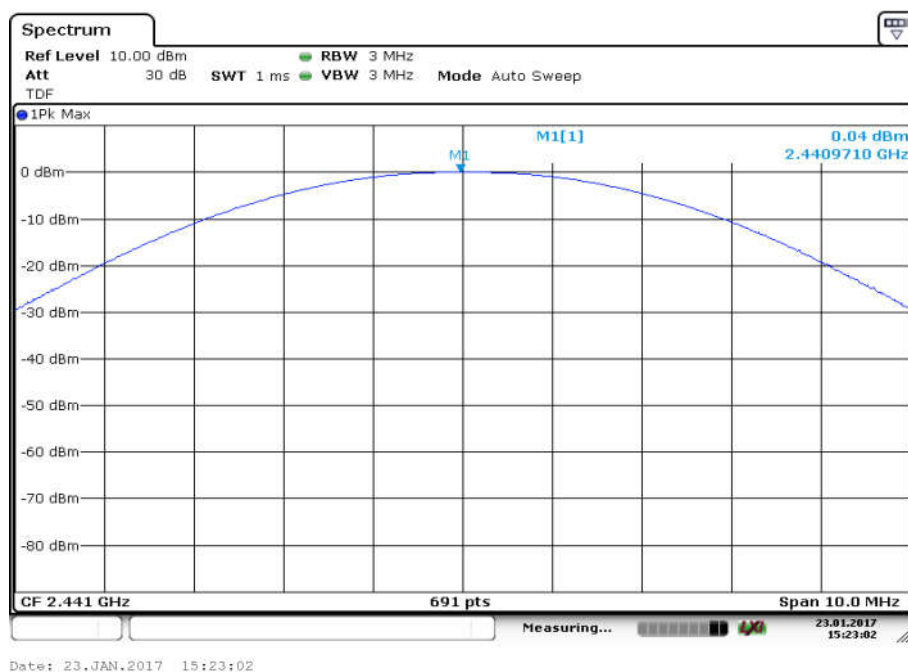


Fig. 2 Maximum Peak Output Power(GFSK, Ch 39)

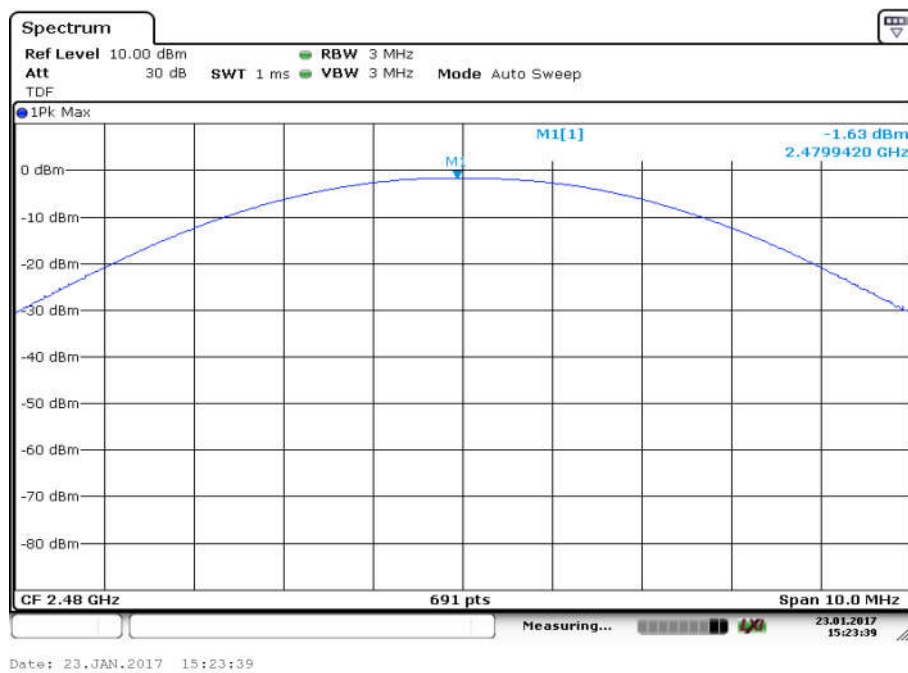


Fig. 3 Maximum Peak Output Power(GFSK, Ch 78)

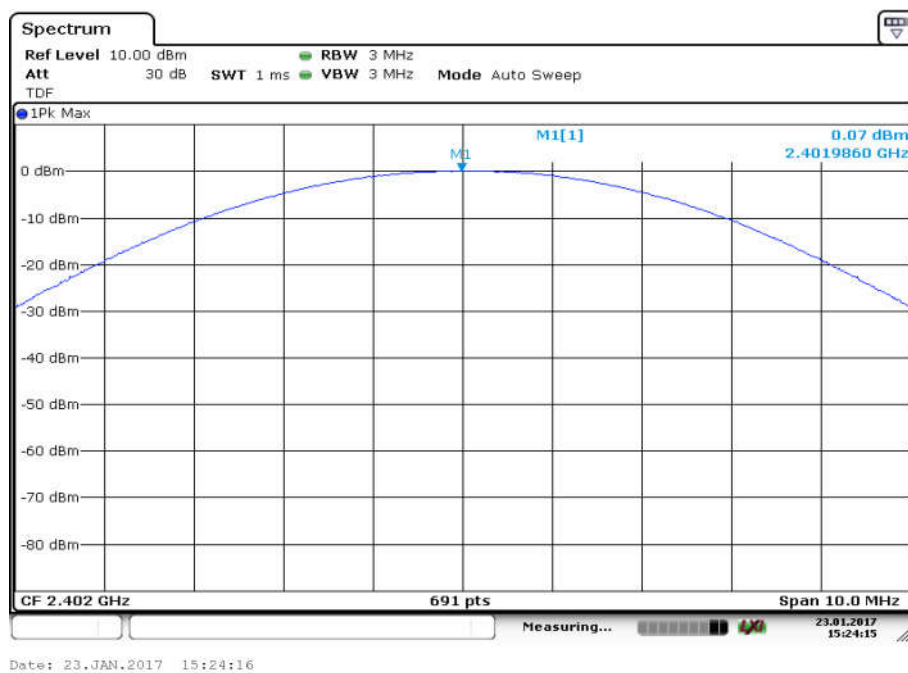


Fig. 4 Maximum Peak Output Power($\pi/4$ DQPSK, Ch 0)

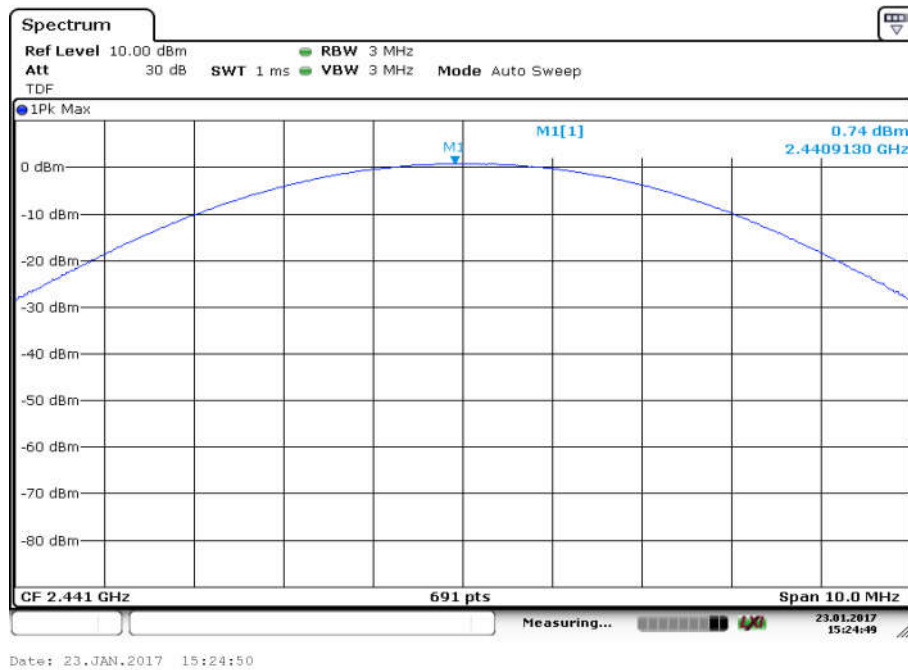


Fig. 5 Maximum Peak Output Power($\pi/4$ DQPSK, Ch 39)

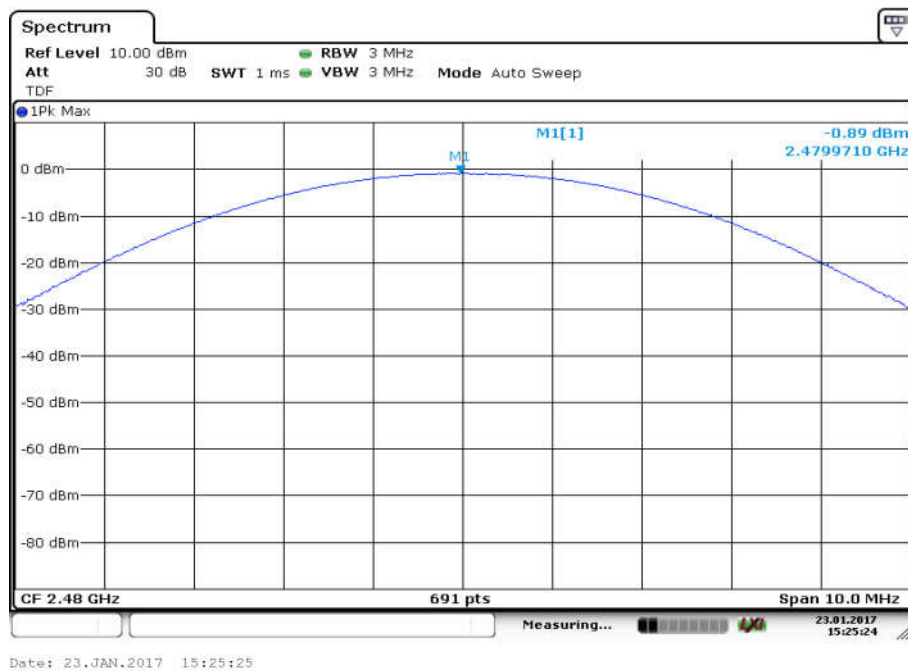


Fig. 6 Maximum Peak Output Power($\pi/4$ DQPSK, Ch 78)

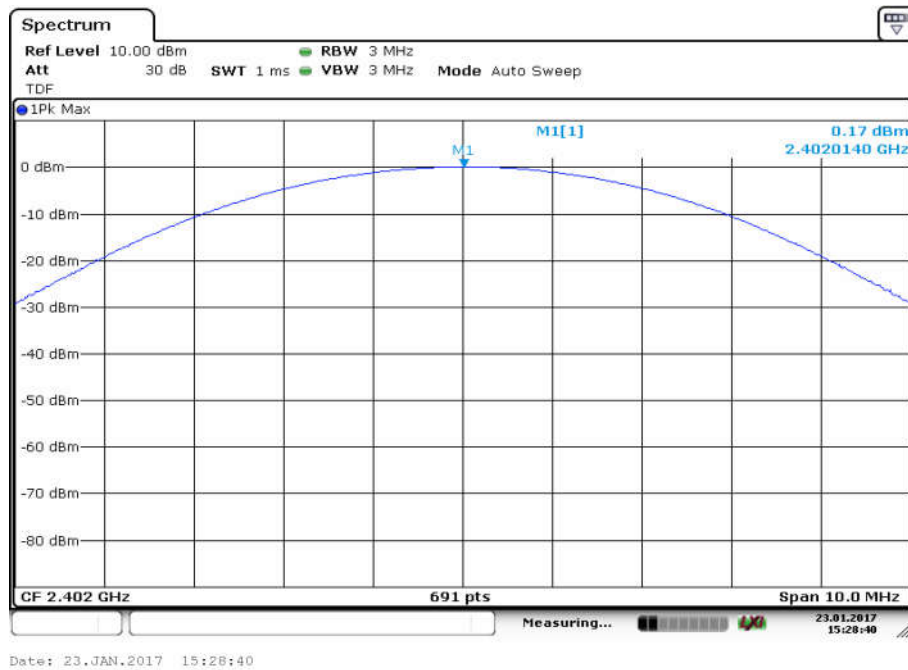


Fig. 7 Maximum Peak Output Power(8DPSK, Ch 0)

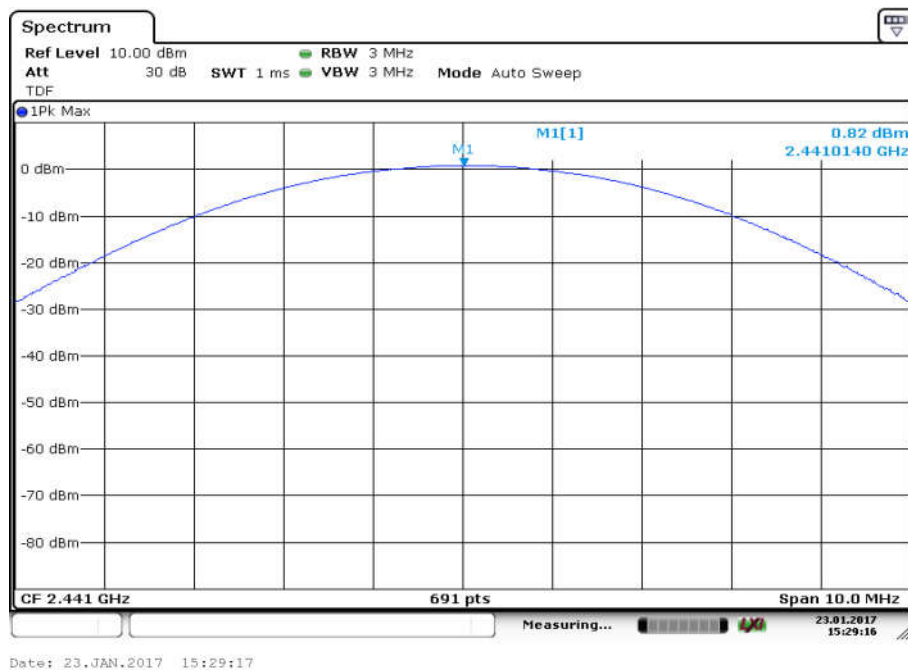


Fig. 8 Maximum Peak Output Power(8DPSK, Ch 39)

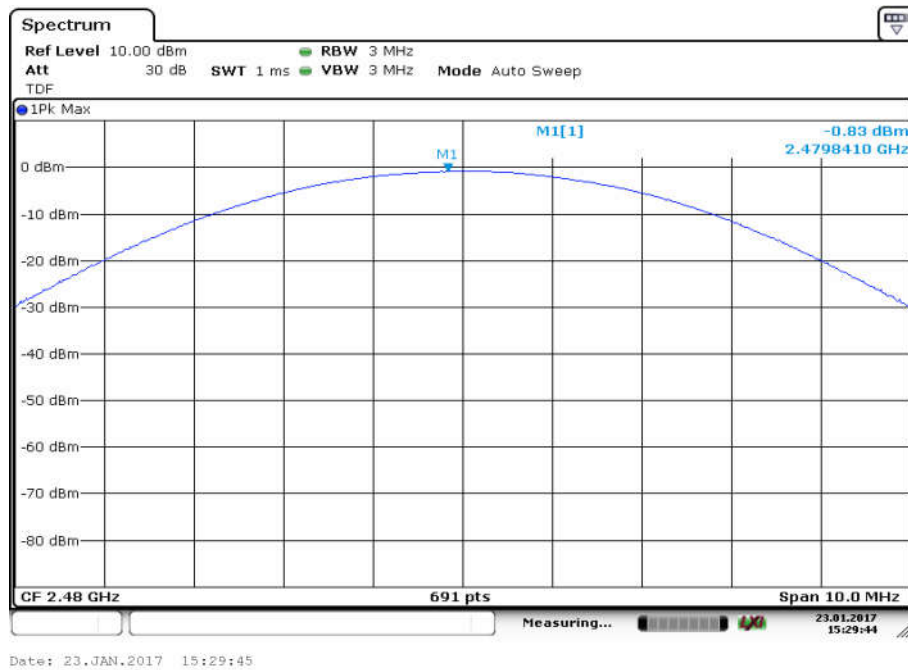


Fig. 9 Maximum Peak Output Power(8DPSK, Ch 78)

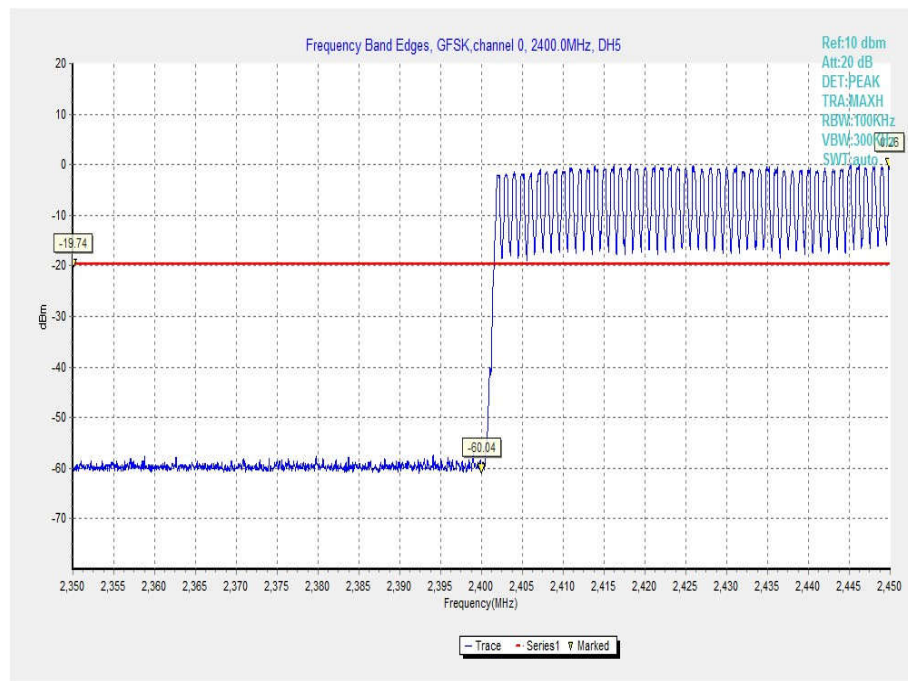


Fig. 10 Band Edges (GFSK, Ch 0, Hopping ON)

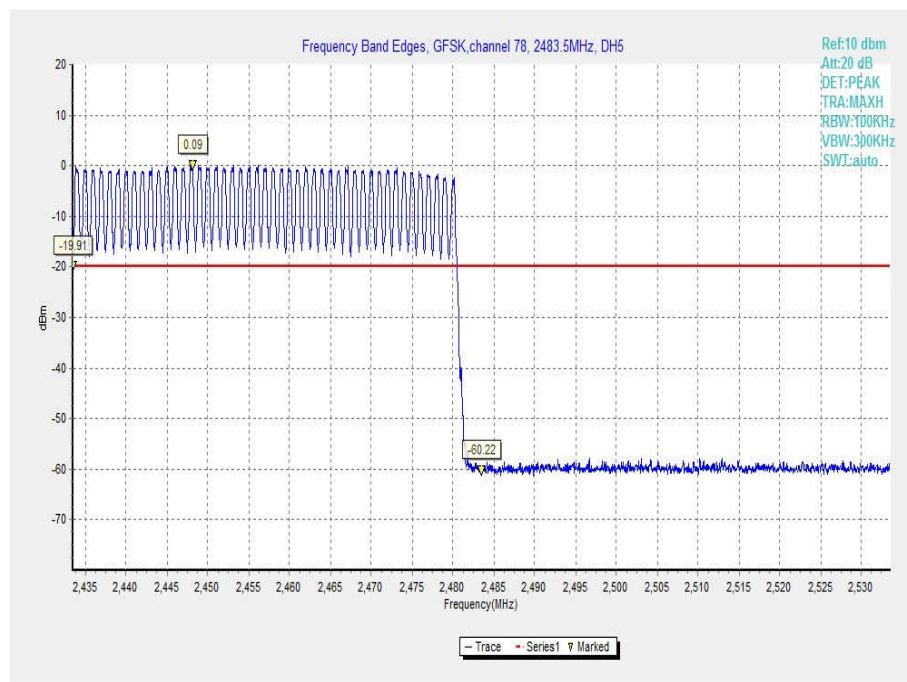


Fig. 11 Band Edges (GFSK, Ch 78, Hopping ON)

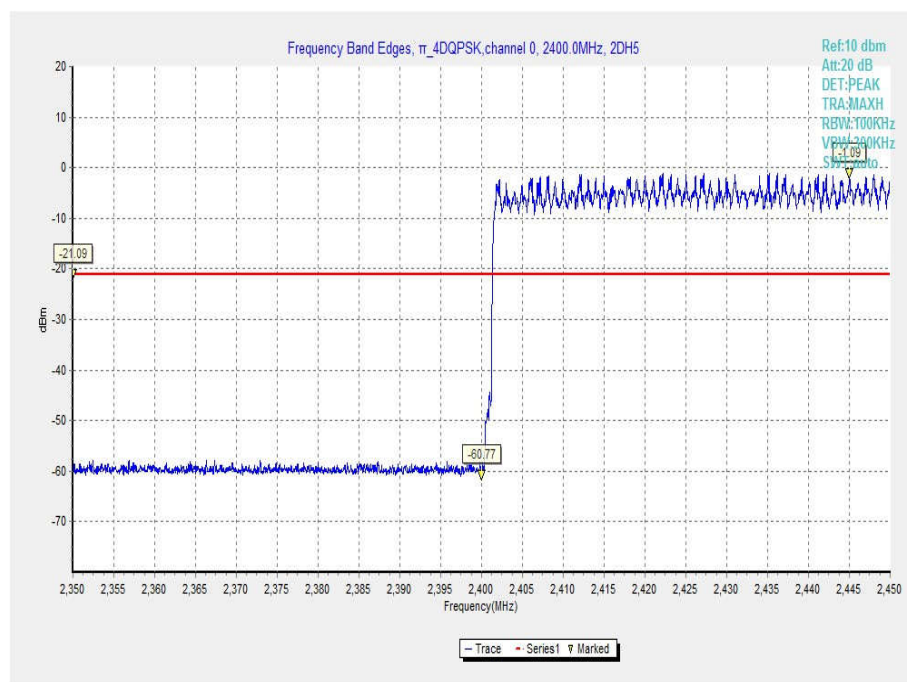


Fig. 12 Band Edges ($\pi/4$ DQPSK, Ch 0, Hopping ON)

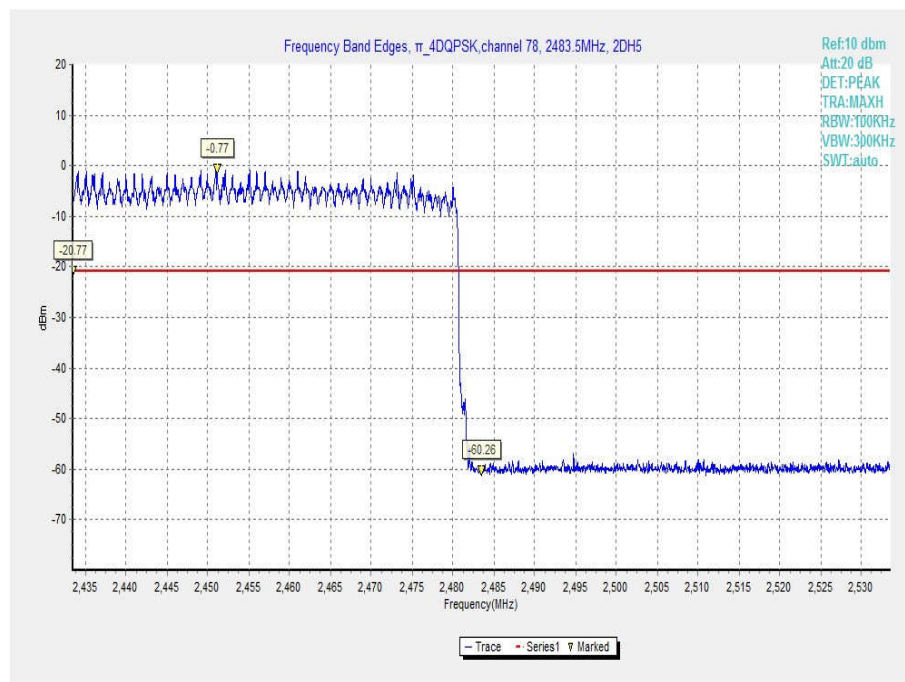


Fig. 13 Band Edges ($\pi/4$ DQPSK, Ch 78, Hopping ON)

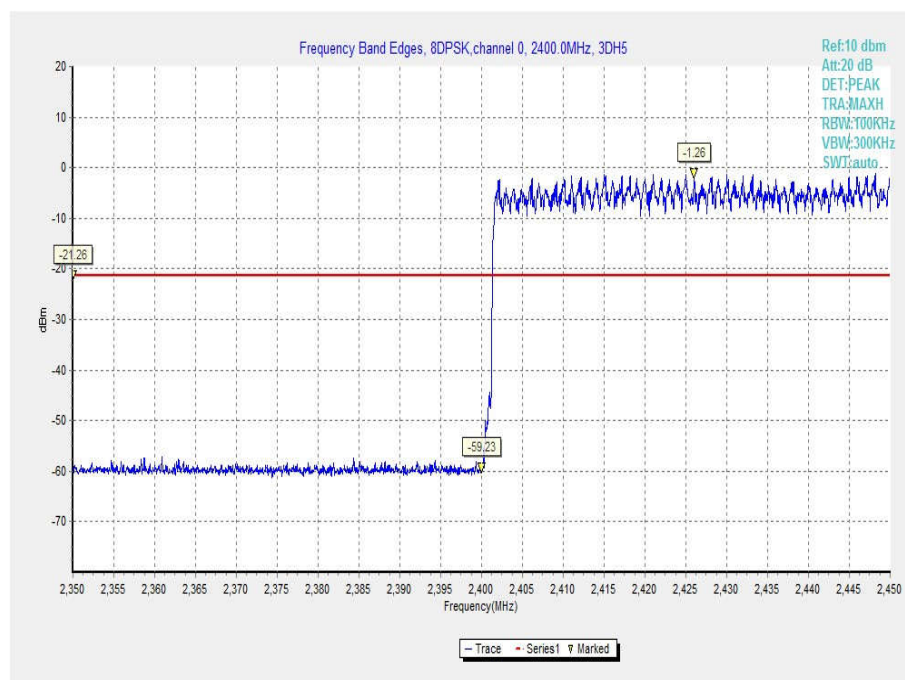


Fig. 14 Band Edges (8DPSK, Ch 0, Hopping ON)

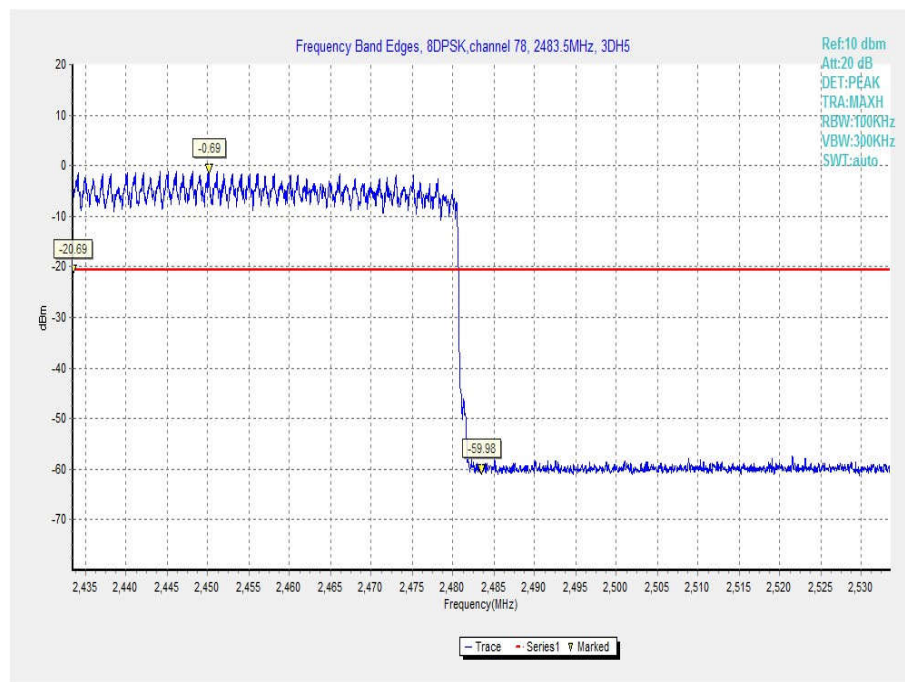


Fig. 15 Band Edges (8DPSK, Ch 78, Hopping ON)

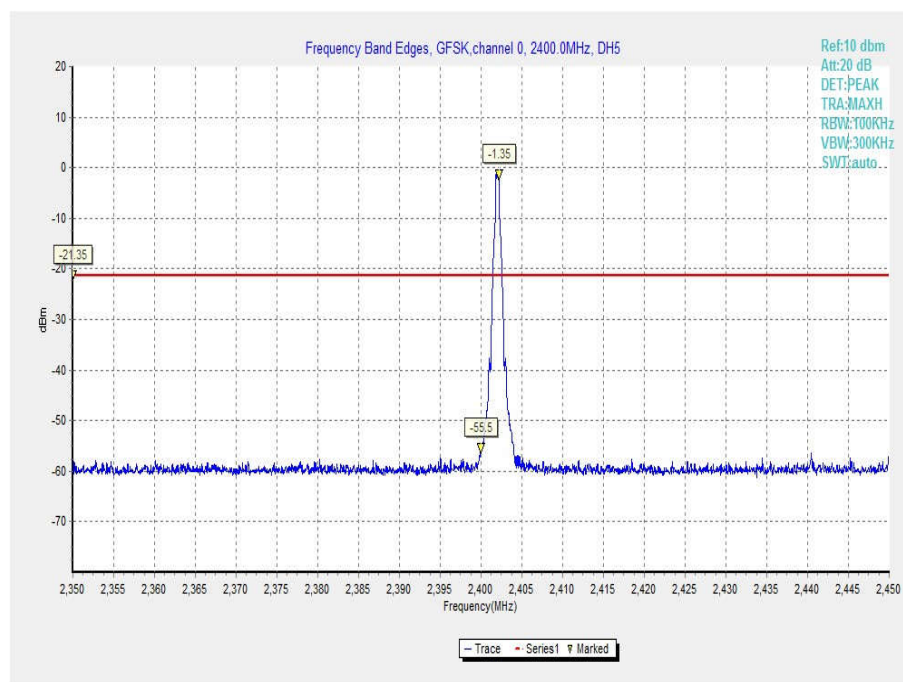


Fig. 16 Band Edges (GFSK, Ch 0, Hopping OFF)

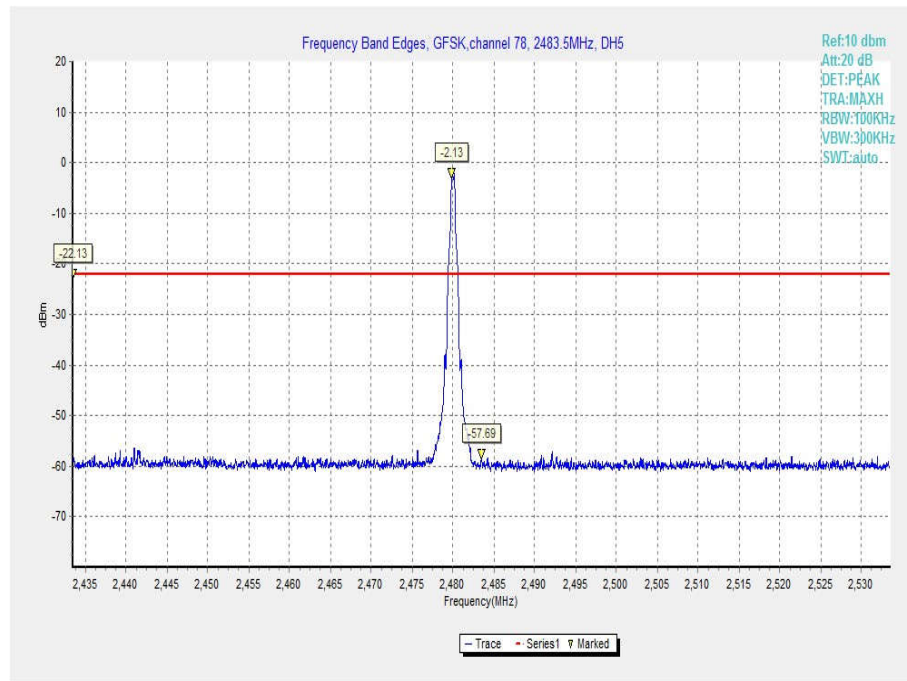


Fig. 17 Band Edges (GFSK, Ch 78, Hopping OFF)

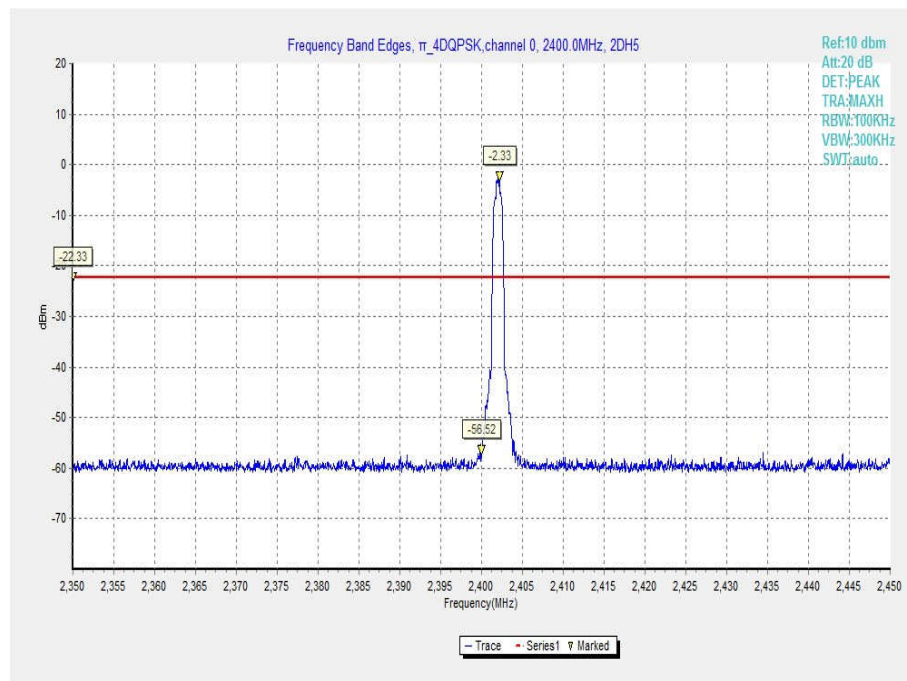


Fig. 18 Band Edges ($\pi/4$ DQPSK, Ch 0, Hopping OFF)

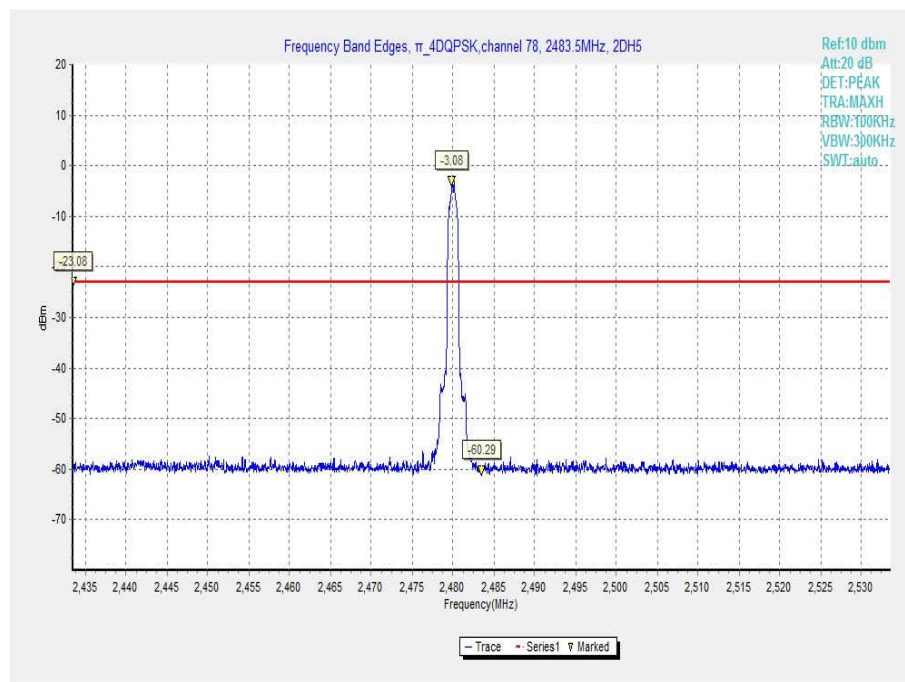


Fig. 19 Band Edges ($\pi/4$ DQPSK, Ch 78, Hopping OFF)

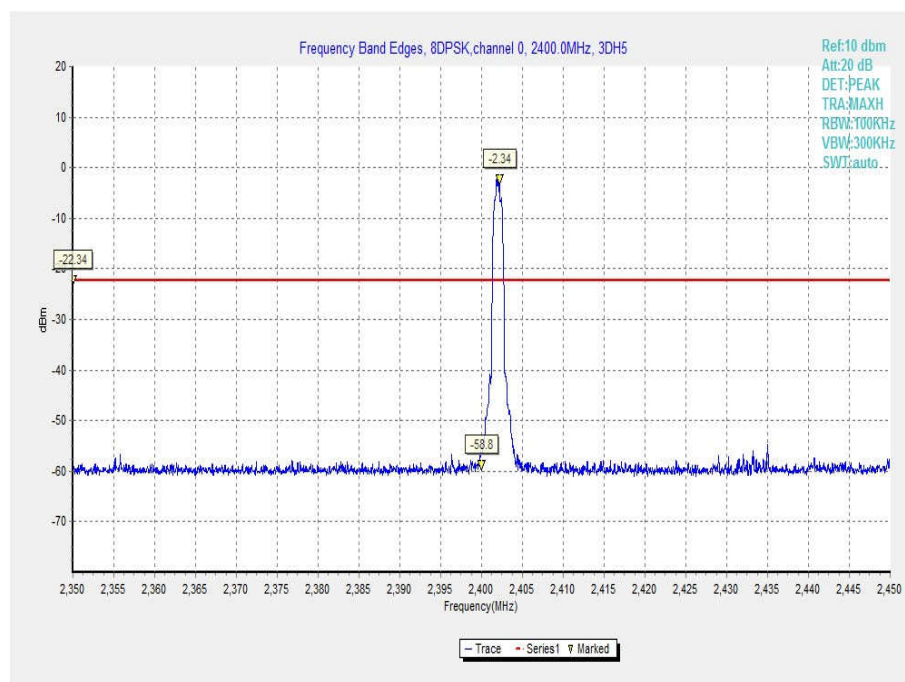


Fig. 20 Band Edges (8DPSK, Ch 0, Hopping OFF)

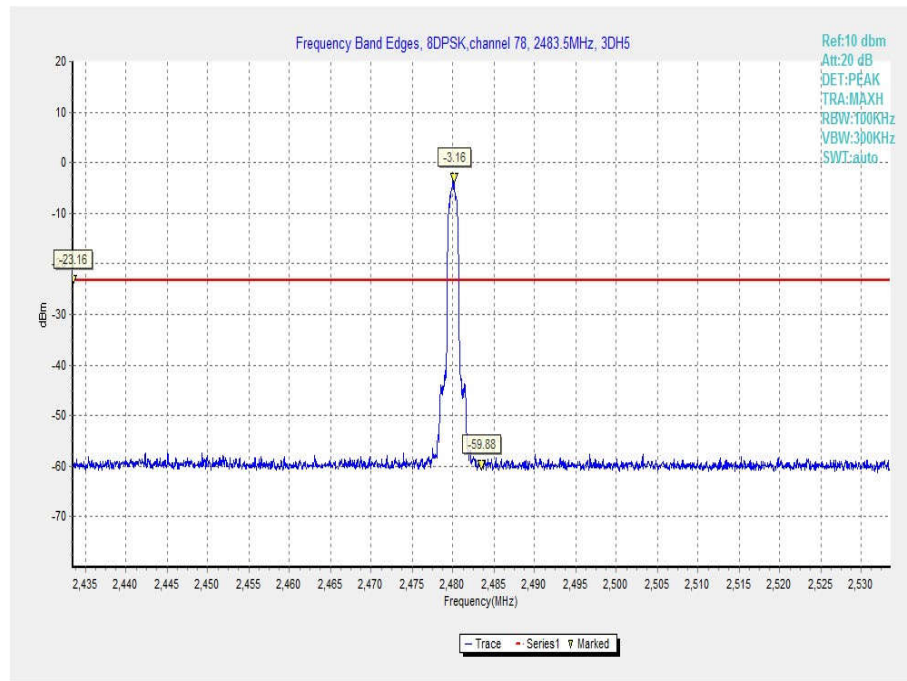


Fig. 21 Band Edges (8DPSK, Ch 78, Hopping OFF)

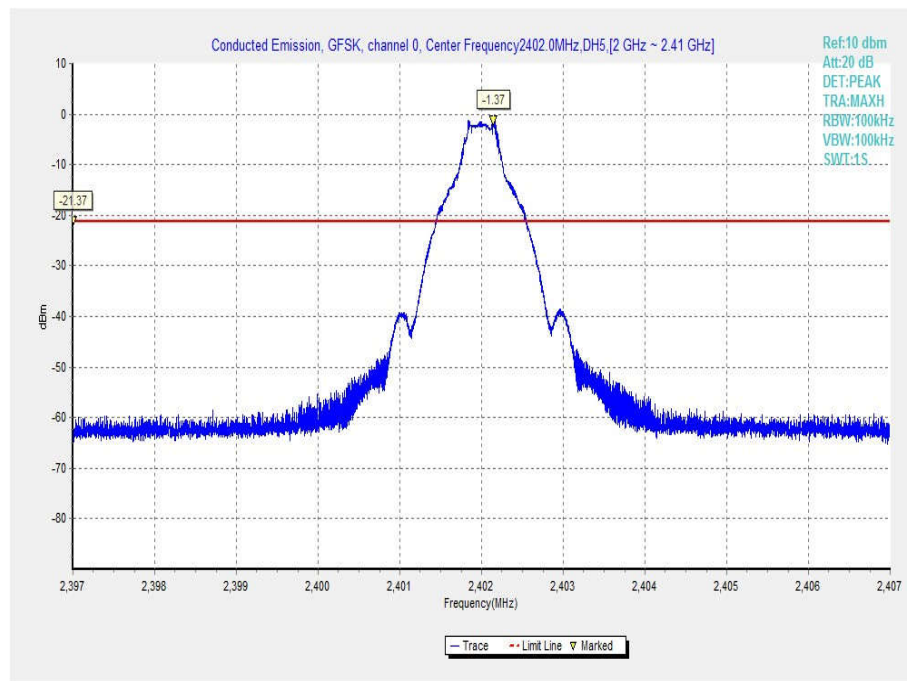


Fig. 22 Conducted Spurious Emission (GFSK, Ch0, 2.402GHz)

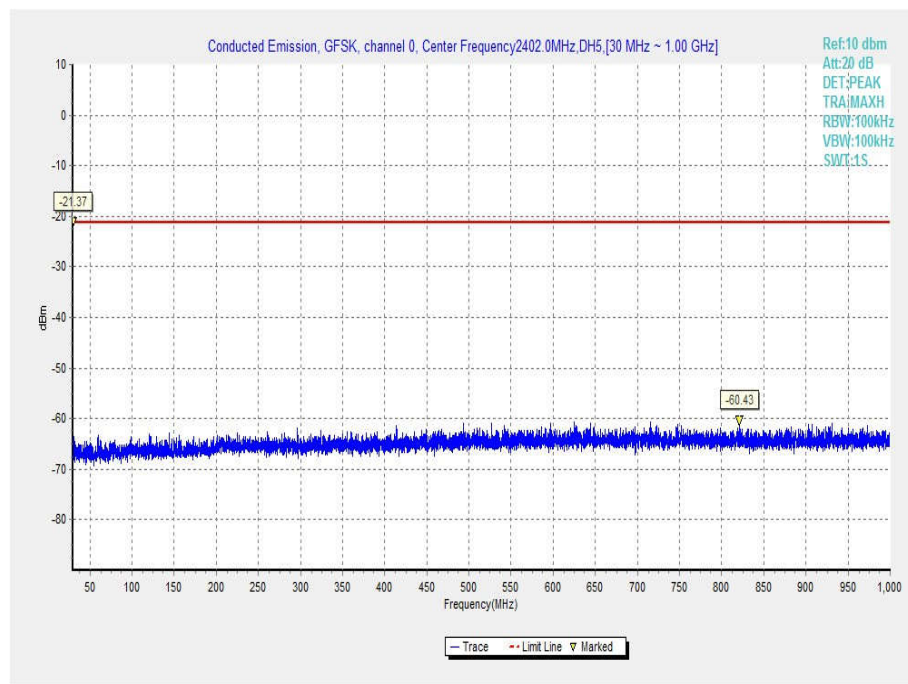


Fig. 23 Conducted Spurious Emission (GFSK, Ch0, 30 MHz-1 GHz)

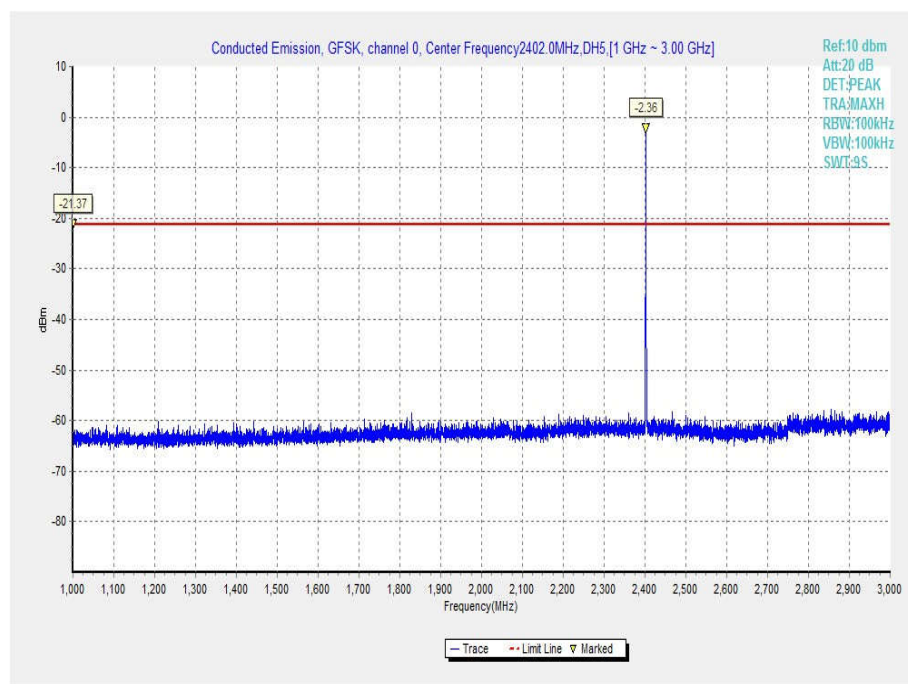


Fig. 24 Conducted Spurious Emission (GFSK, Ch0, 1 GHz -3 GHz)

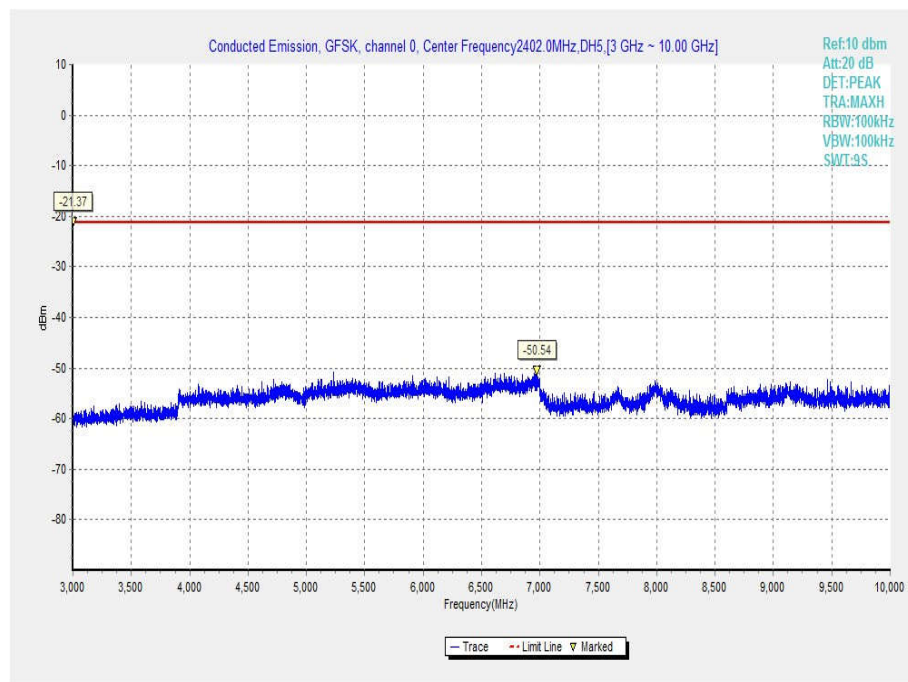


Fig. 25 Conducted Spurious Emission (GFSK, Ch0, 3 GHz-10 GHz)

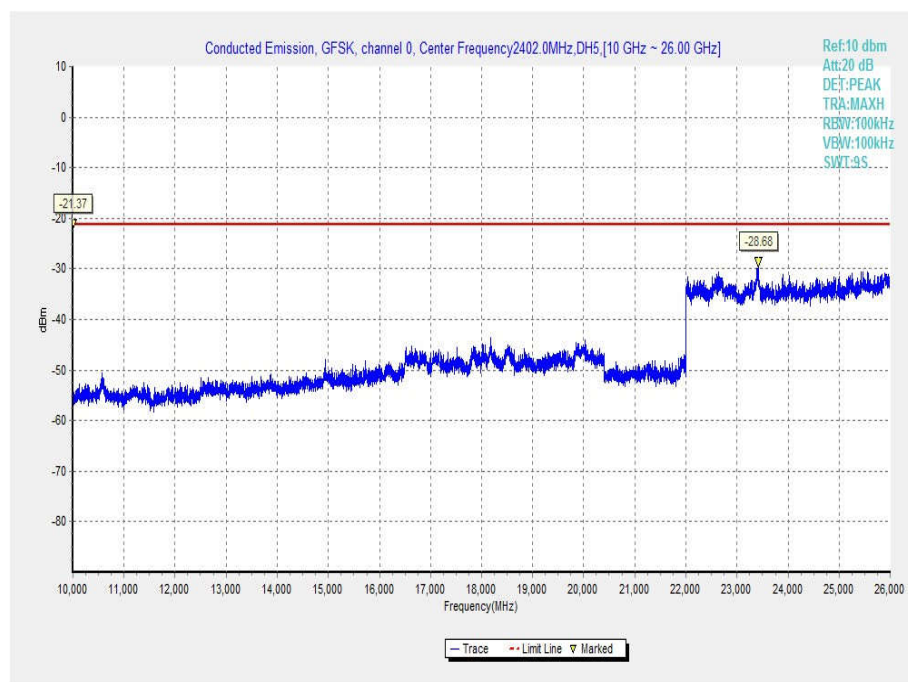


Fig. 26 Conducted Spurious Emission (GFSK, Ch0, 10 GHz-26 GHz)

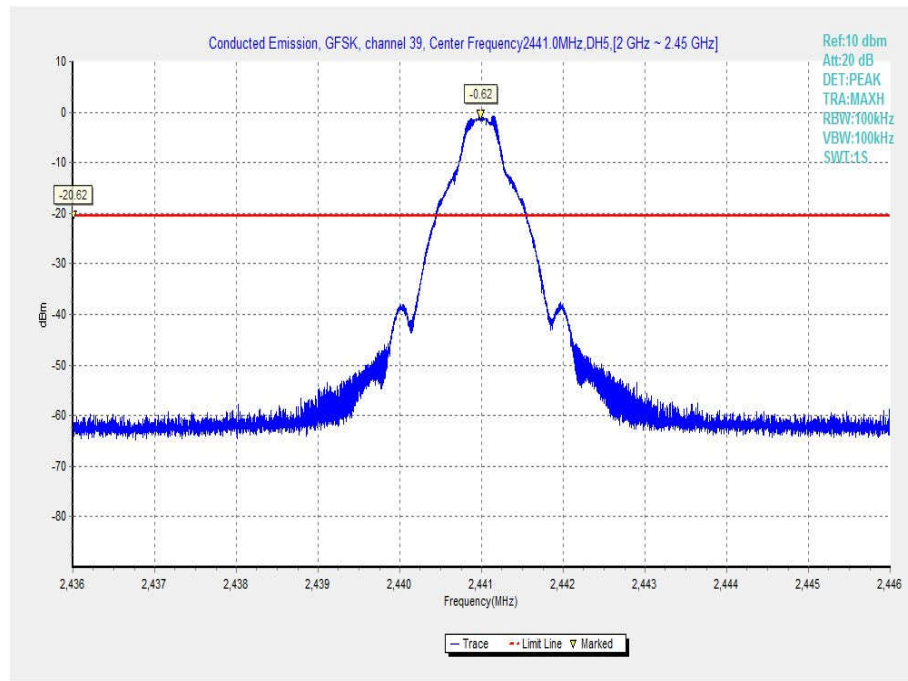


Fig. 27 Conducted Spurious Emission (GFSK, Ch39, 2.441GHz)

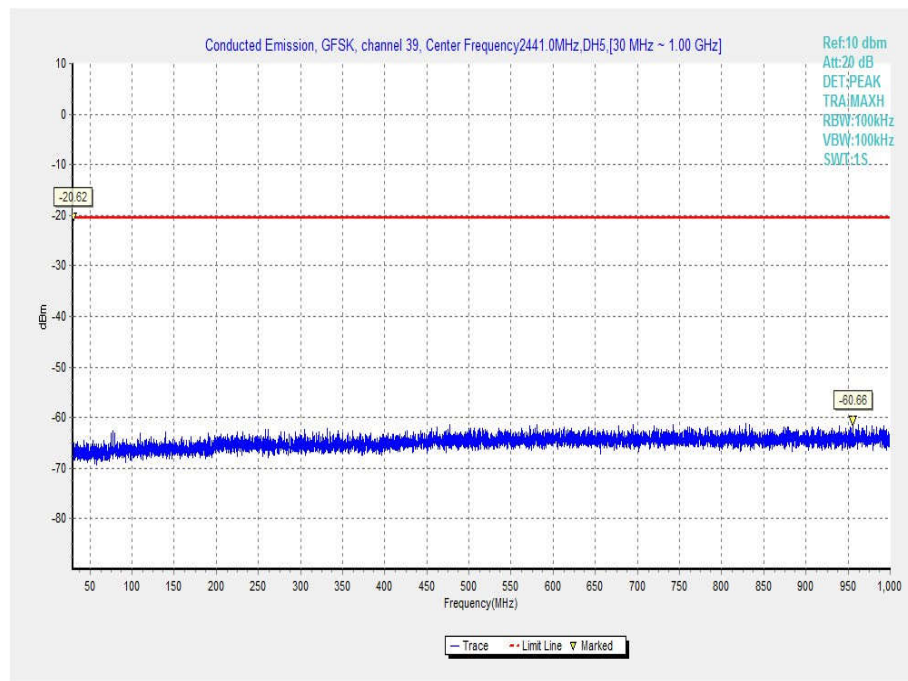


Fig. 28 Conducted Spurious Emission (GFSK, Ch39, 30 MHz-1 GHz)

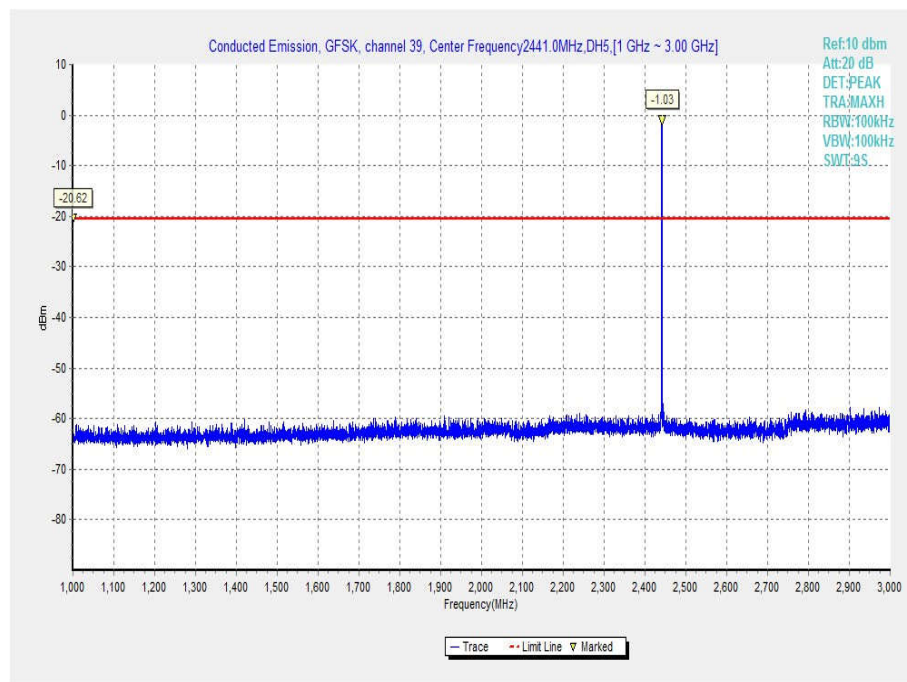


Fig. 29 Conducted Spurious Emission (GFSK, Ch39, 1 GHz - 3 GHz)

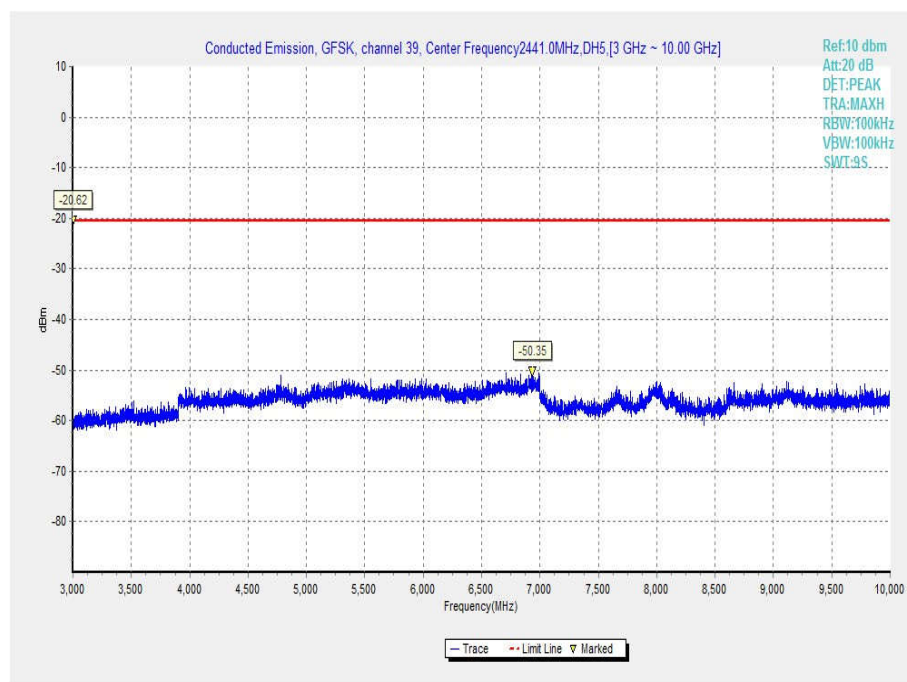


Fig. 30 Conducted Spurious Emission (GFSK, Ch39, 3 GHz - 10 GHz)

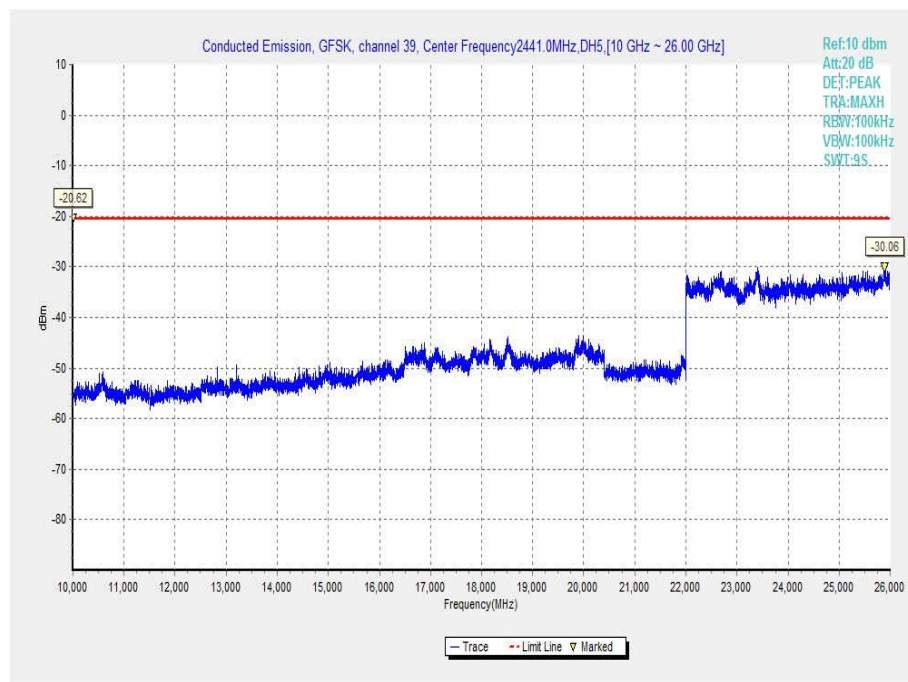


Fig. 31 Conducted Spurious Emission (GFSK, Ch39, 10 GHz-26 GHz)

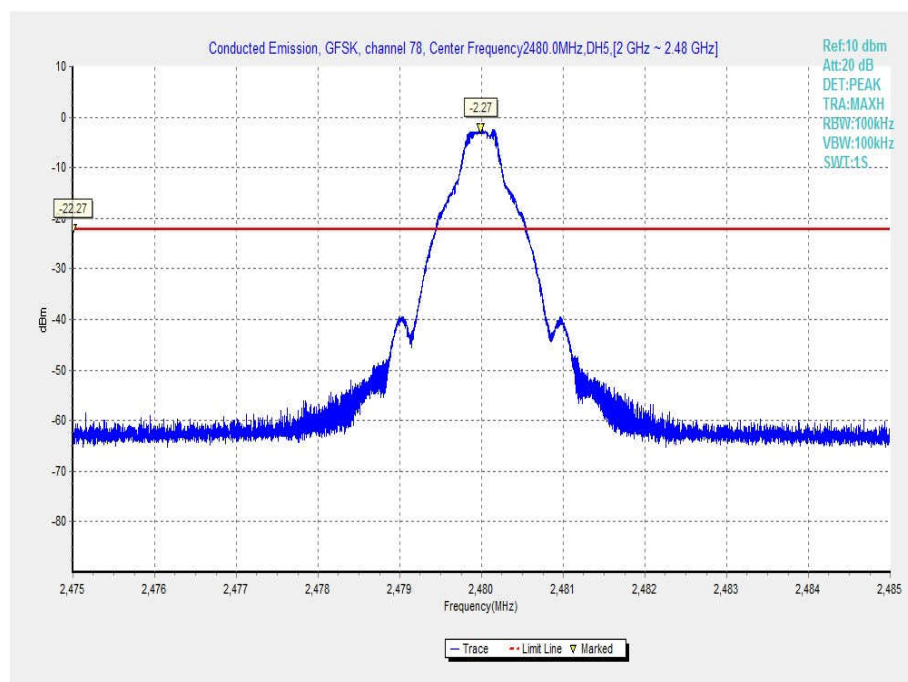


Fig. 32 Conducted Spurious Emission (GFSK, Ch78, 2.480GHz)

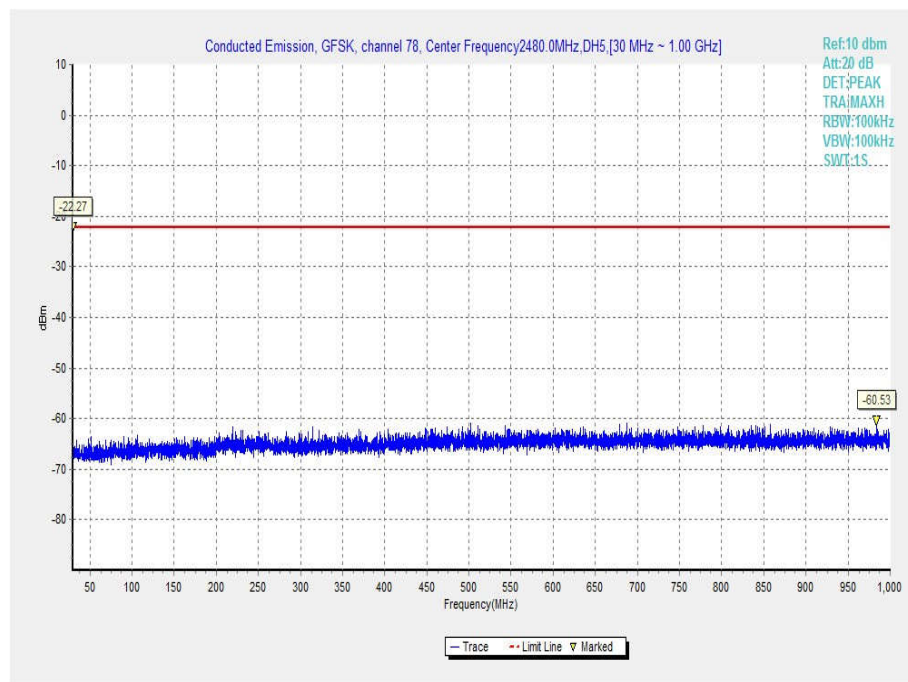


Fig. 33 Conducted Spurious Emission (GFSK, Ch78, 30 MHz-1 GHz)

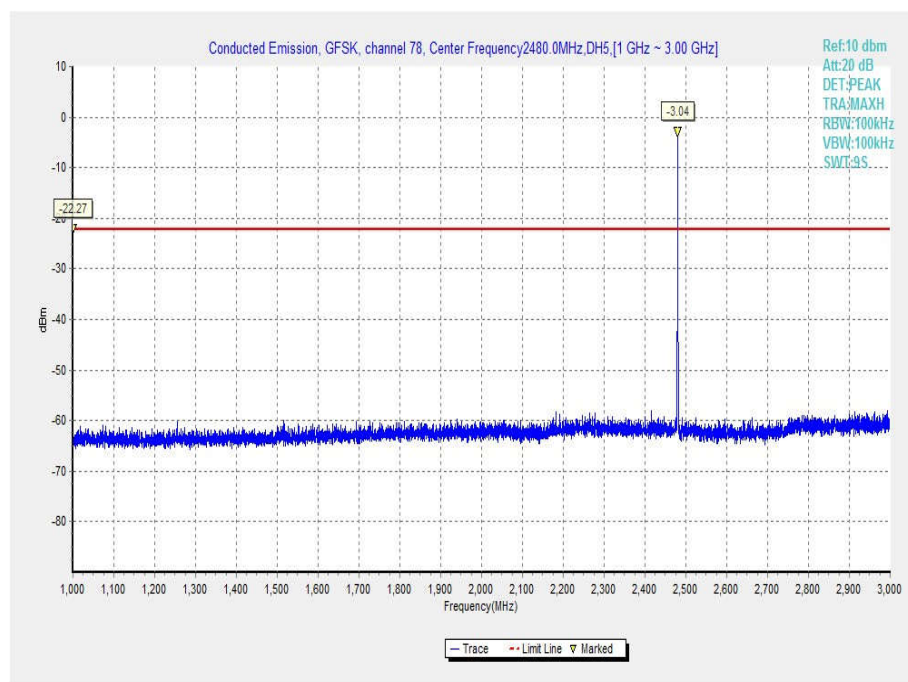


Fig. 34 Conducted Spurious Emission (GFSK, Ch78, 1 GHz -3 GHz)

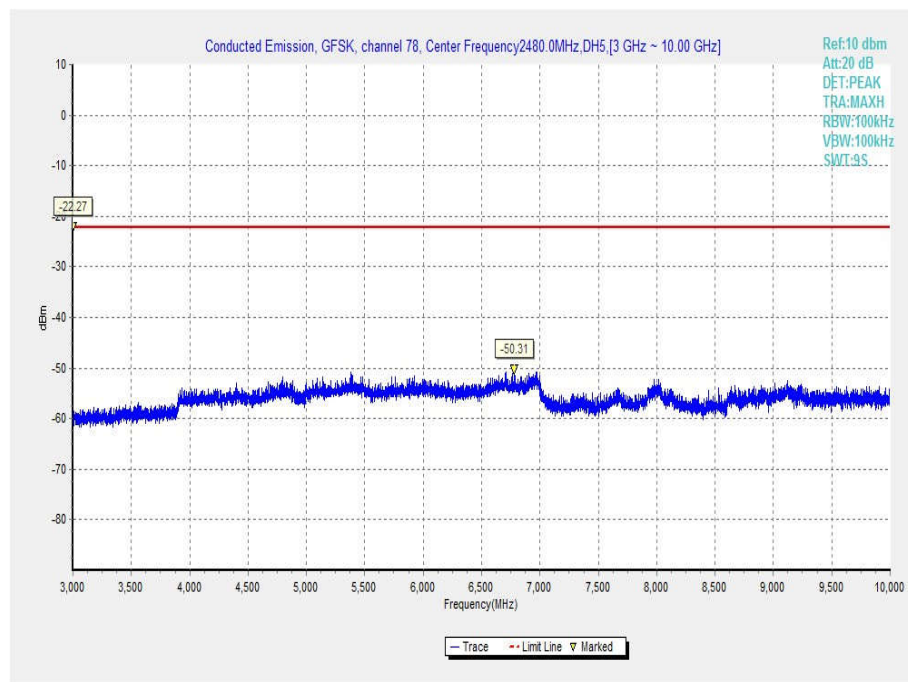


Fig. 35 Conducted Spurious Emission (GFSK, Ch78, 3 GHz-10 GHz)

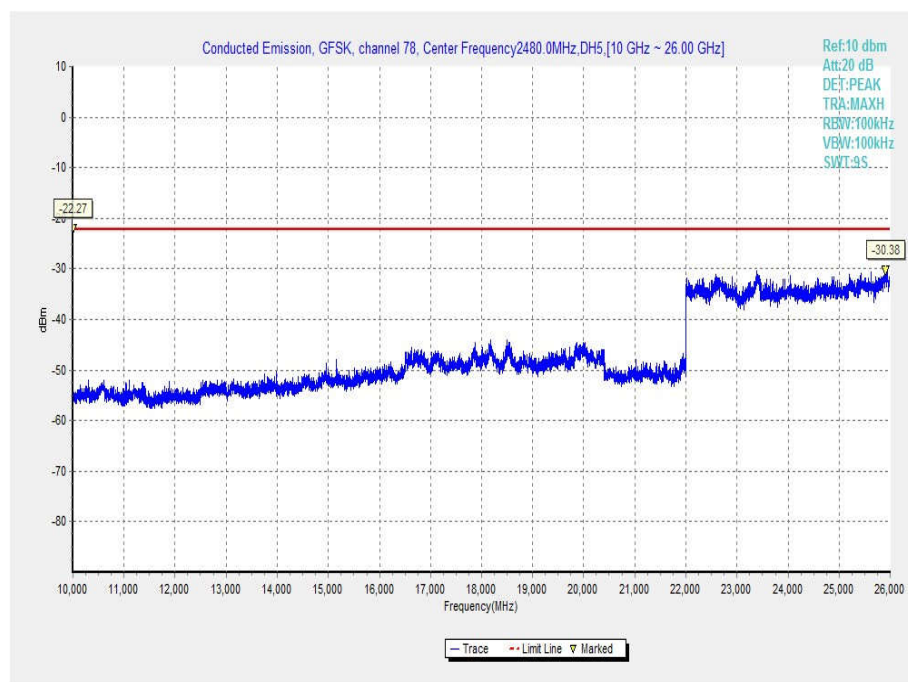


Fig. 36 Conducted Spurious Emission (GFSK, Ch78, 10 GHz-26 GHz)

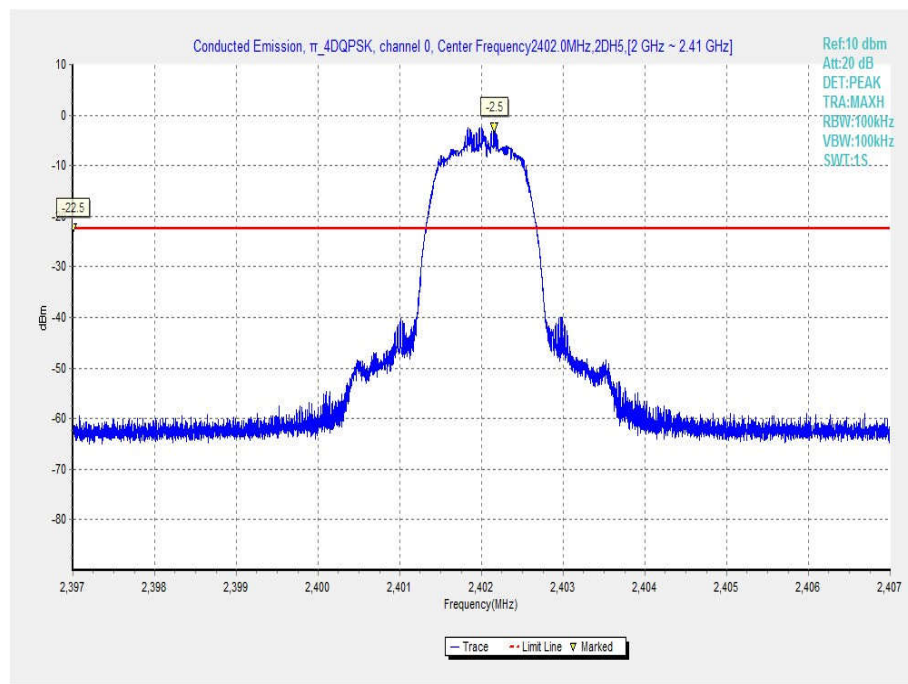


Fig. 37 Conducted Spurious Emission ($\pi/4$ DQPSK, Ch0, 2.402GHz)

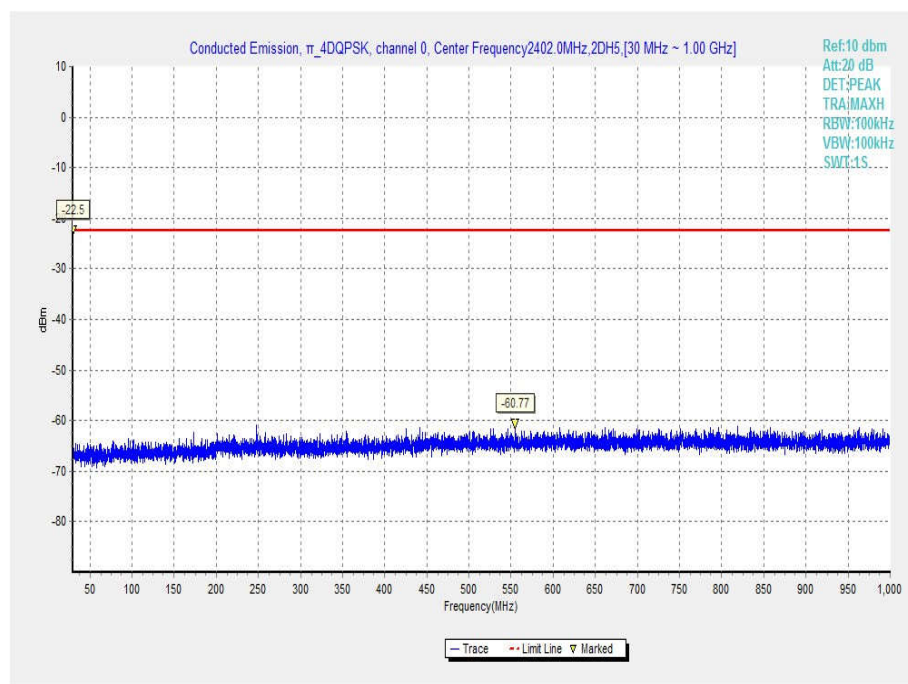


Fig. 38 Conducted Spurious Emission ($\pi/4$ DQPSK, Ch0, 30 MHz-1 GHz)

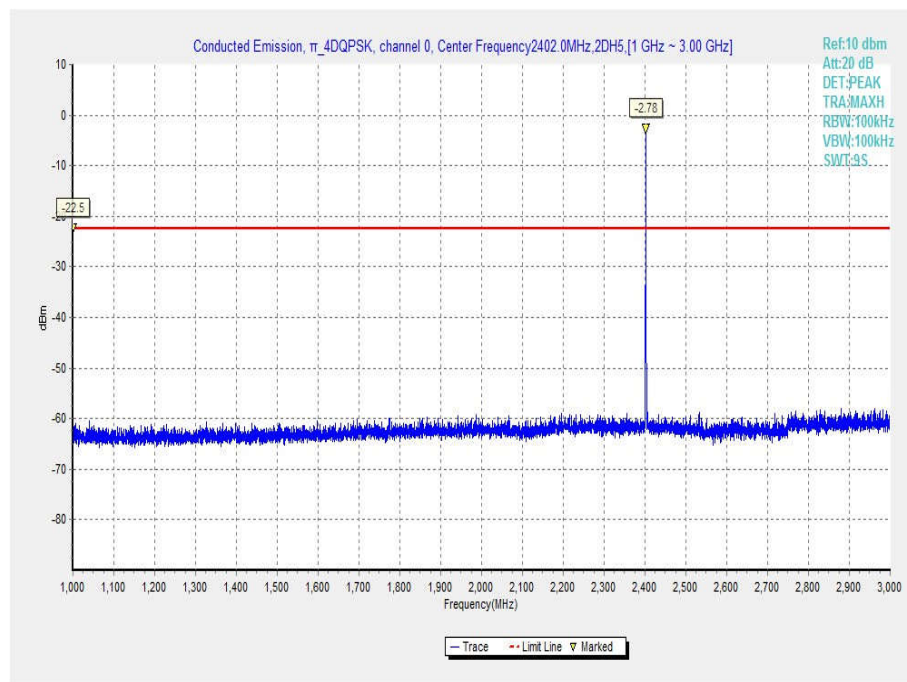


Fig. 39 Conducted Spurious Emission (π /4 DQPSK, Ch0, 1 GHz - 3 GHz)

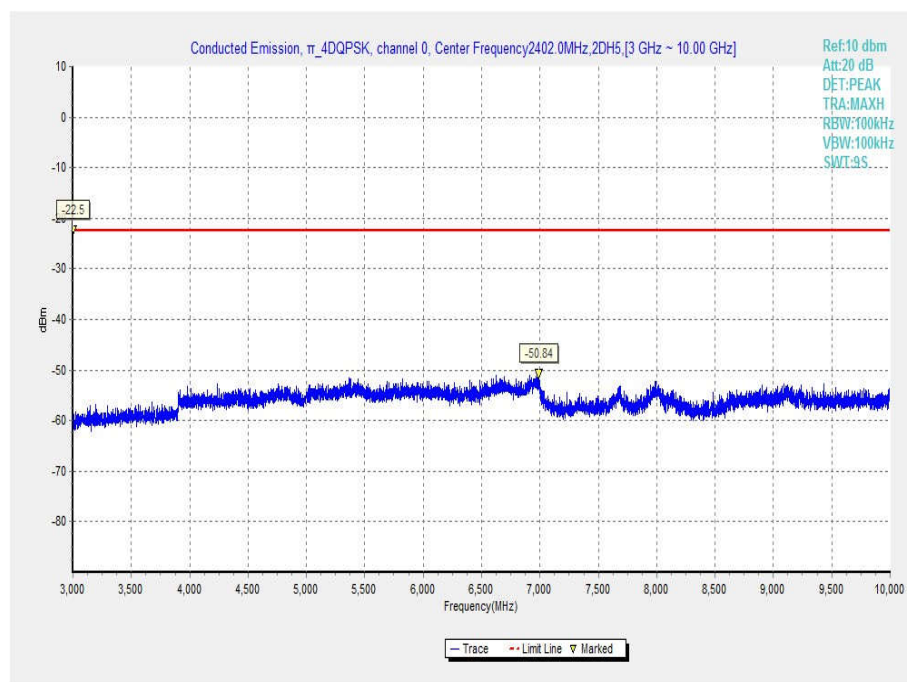


Fig. 40 Conducted Spurious Emission (π /4 DQPSK, Ch0, 3 GHz-10 GHz)

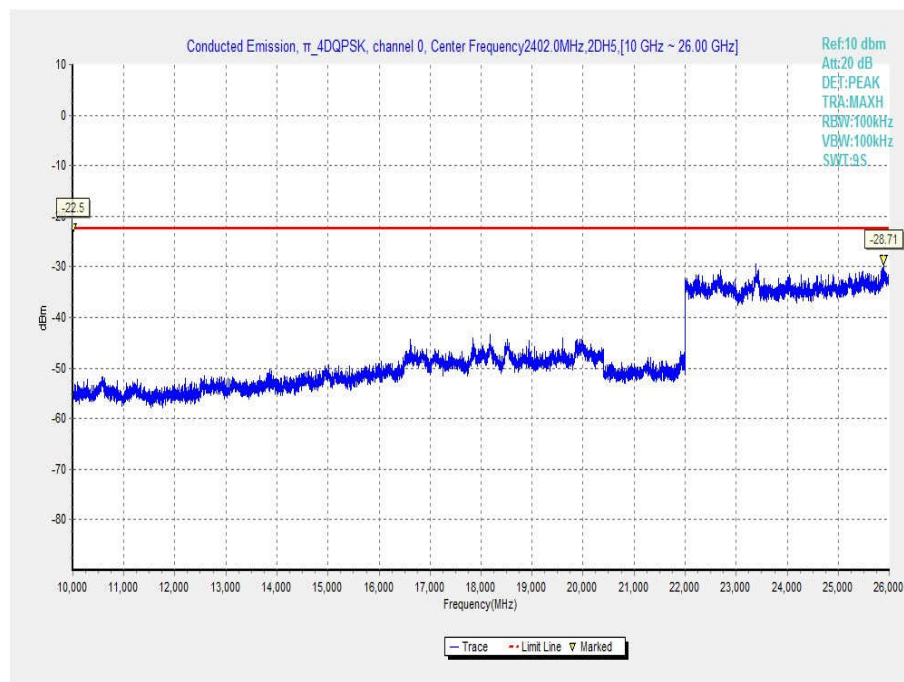


Fig. 41 Conducted Spurious Emission ($\pi/4$ DQPSK, Ch0, 10 GHz-26 GHz)

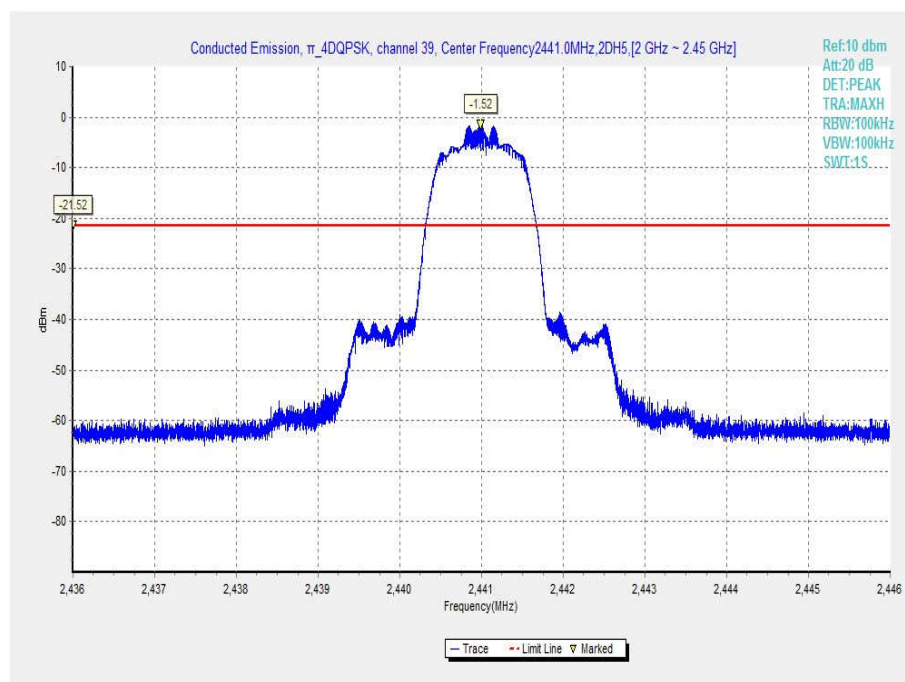


Fig. 42 Conducted Spurious Emission ($\pi/4$ DQPSK, Ch39, 2.441GHz)

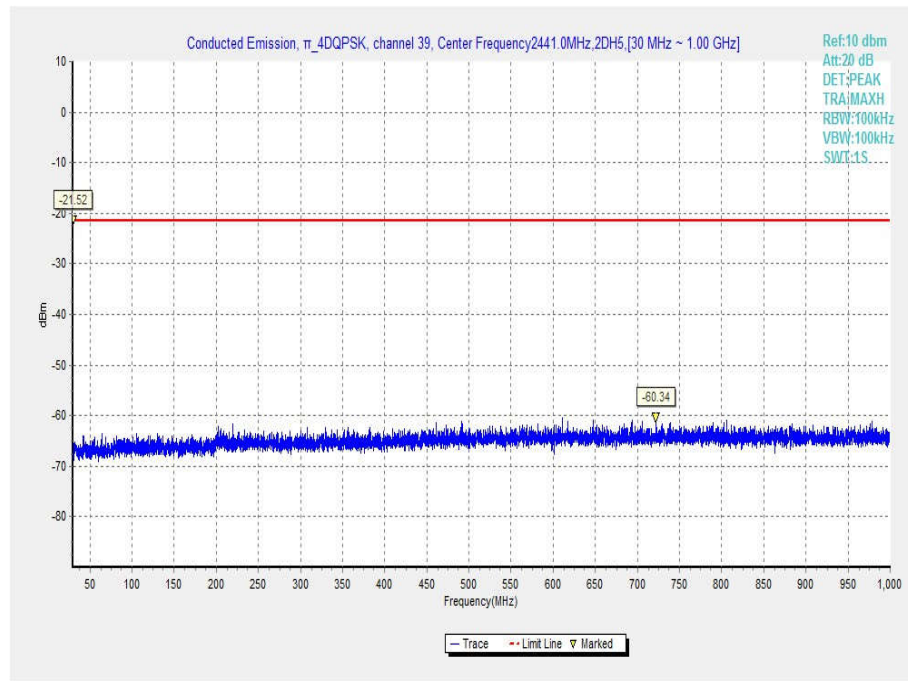


Fig. 43 Conducted Spurious Emission (π /4 DQPSK, Ch39, 30 MHz-1 GHz)

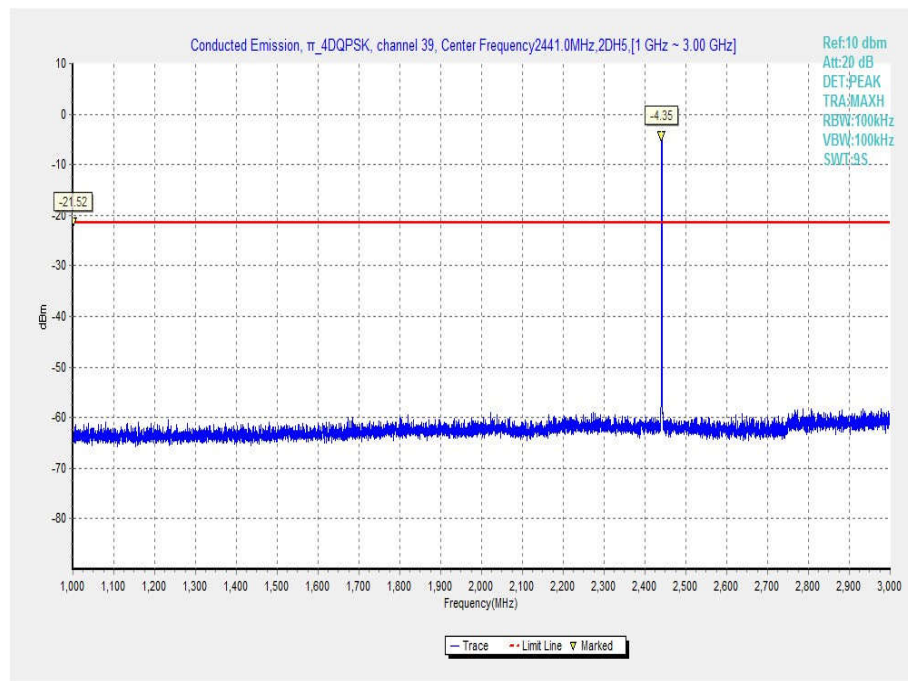


Fig. 44 Conducted Spurious Emission (π /4 DQPSK, Ch39, 1 GHz -3 GHz)

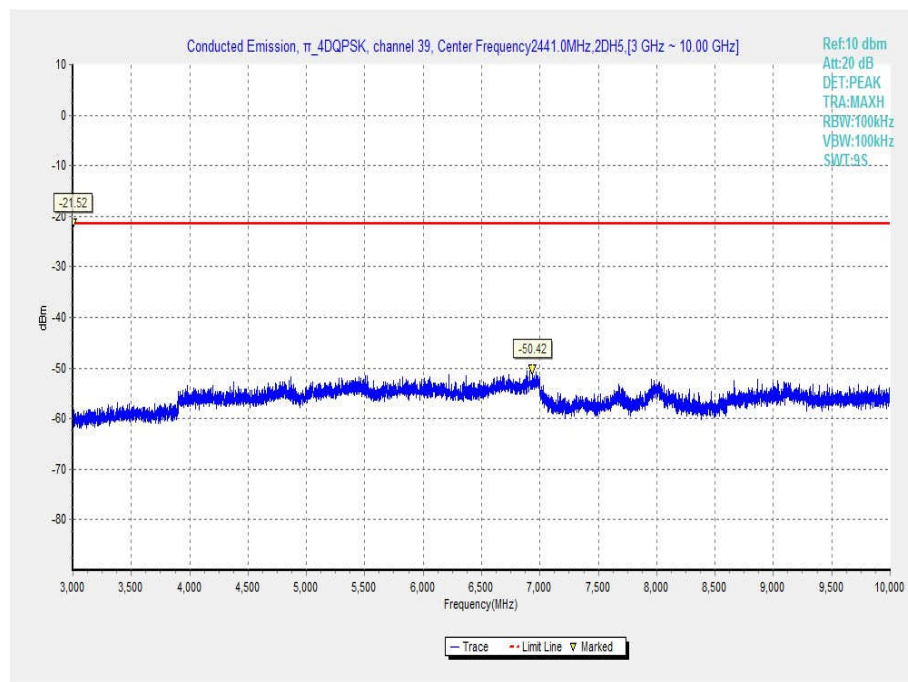


Fig. 45 Conducted Spurious Emission ($\pi/4$ DQPSK, Ch39, 3 GHz-10 GHz)

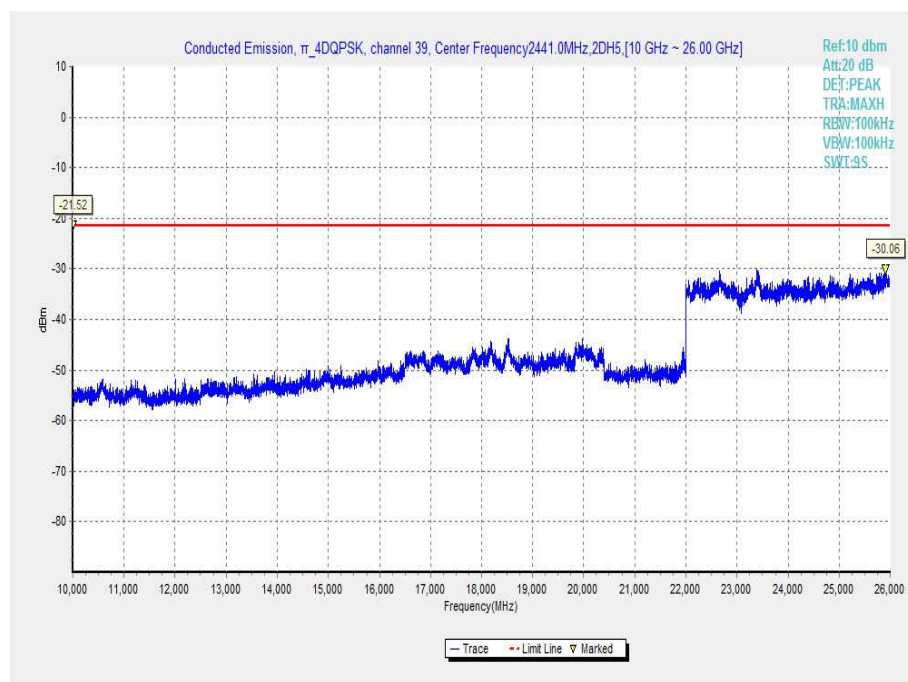


Fig. 46 Conducted Spurious Emission ($\pi/4$ DQPSK, Ch39, 10 GHz-26 GHz)

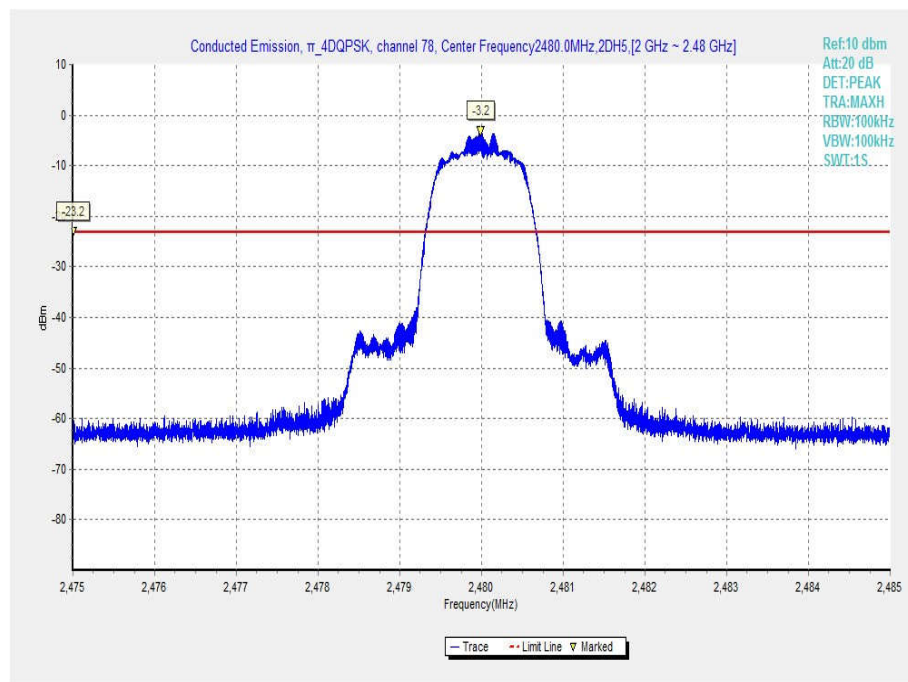


Fig. 47 Conducted Spurious Emission ($\pi/4$ DQPSK, Ch78, 2.480GHz)

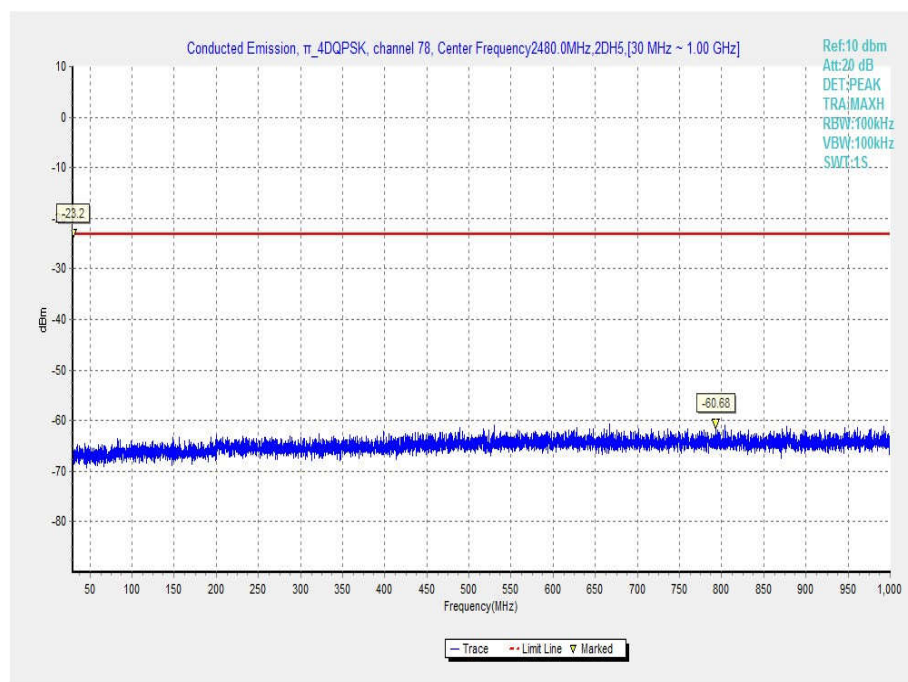


Fig. 48 Conducted Spurious Emission ($\pi/4$ DQPSK, Ch78, 30 MHz-1 GHz)

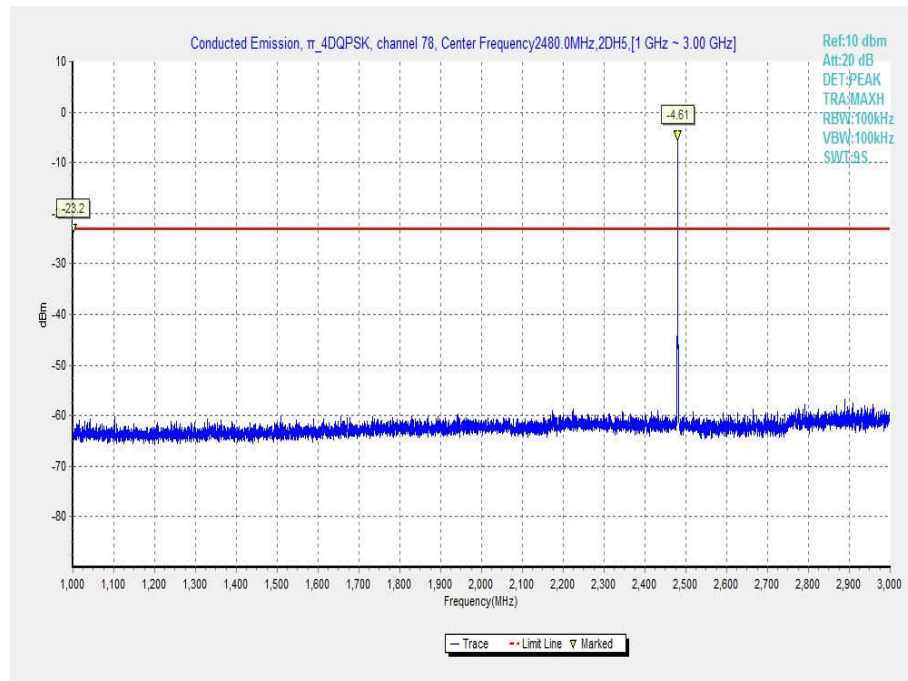


Fig. 49 Conducted Spurious Emission ($\pi/4$ DQPSK, Ch78, 1 GHz-3 GHz)

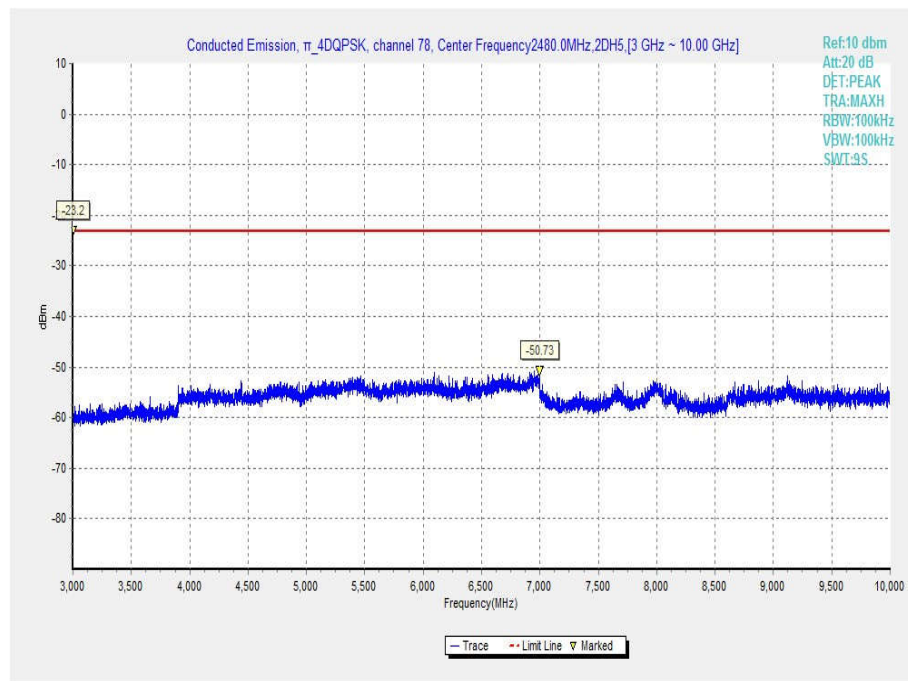


Fig. 50 Conducted Spurious Emission ($\pi/4$ DQPSK, Ch78, 3 GHz-10 GHz)