



**FCC PART 15C
TEST REPORT
No.I18Z61140-IOT02**

for

TCL Communication Ltd.

GSM Quad Band Mobile Phone

Model Name: 2053X/2053D

FCC ID:2ACCJB104

with

Hardware Version:PIO

Software Version:010 01

Issued Date: 2018-8-23



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.

Tel:+86(0)10-62304633-2512,Fax:+86(0)10-62304633-2504

Email:ctl_terminals@caict.ac.cn, website:www.caict.ac.cn



REPORT HISTORY

Report Number	Revision	Description	Issue Date
I18Z61140-IOT02	Rev.0	1st edition	2018-8-23



CONTENTS

1. TEST LABORATORY	5
1.1. TESTING LOCATION	5
1.2. TESTING ENVIRONMENT.....	5
1.3. PROJECT DATA	5
1.4. SIGNATURE	5
2. CLIENT INFORMATION.....	6
2.1. APPLICANT INFORMATION	6
2.2. MANUFACTURER INFORMATION	6
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	7
3.1. ABOUT EUT	7
3.2. INTERNAL IDENTIFICATION OF EUT	7
3.3. INTERNAL IDENTIFICATION OF AE.....	7
3.4. NORMAL ACCESSORY SETTING	8
3.5. GENERAL DESCRIPTION.....	8
4. REFERENCE DOCUMENTS	9
4.1. DOCUMENTS SUPPLIED BY APPLICANT	9
4.2. REFERENCE DOCUMENTS FOR TESTING.....	9
5. TEST RESULTS	10
5.1. SUMMARY OF TEST RESULTS	10
5.2. STATEMENTS.....	10
6. TEST FACILITIES UTILIZED	11
7. MEASUREMENT UNCERTAINTY	12
7.1. PEAK OUTPUT POWER - CONDUCTED.....	12
7.2. FREQUENCY BAND EDGES.....	12
7.3. TRANSMITTER SPURIOUS EMISSION - CONDUCTED.....	12
7.4. TRANSMITTER SPURIOUS EMISSION - RADIATED.....	12
7.5. TIME OF OCCUPANCY (DWELL TIME)	12
7.6. 20DB BANDWIDTH	12
7.7. CARRIER FREQUENCY SEPARATION.....	13
7.8. AC POWERLINE CONDUCTED EMISSION	13
ANNEX A: DETAILED TEST RESULTS.....	14
A.1. MEASUREMENT METHOD	14
A.2. PEAK OUTPUT POWER – CONDUCTED	15
A.3. FREQUENCY BAND EDGES – CONDUCTED	16
A.4. TRANSMITTER SPURIOUS EMISSION - CONDUCTED	23
A.5. TRANSMITTER SPURIOUS EMISSION - RADIATED	48
A.6. TIME OF OCCUPANCY (DWELL TIME)	56



A.7. 20DB BANDWIDTH.....	66
A.8. CARRIER FREQUENCY SEPARATION	72
A.9. NUMBER OF HOPPING CHANNELS.....	75
A.10. AC POWERLINE CONDUCTED EMISSION	79
ANNEX E: ACCREDITATION CERTIFICATE	83

1. Test Laboratory

1.1. 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

1.2. Testing Environment

Normal Temperature: 15-35°C

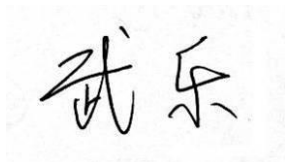
Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2018-7-23

Testing End Date: 2018-8-17

1.4. Signature



Wu Le

(Prepared this test report)



Sun Zhenyu

(Reviewed this test report)



Li Zhuofang

(Approved this test report)



2. ClientInformation

2.1. Applicant Information

Company Name: TCL Communication Ltd.
7/F, Block F4, TCL Communication Technology Building, TCL
Address/Post: International E City, Zhong Shan Yuan Road, Nanshan District,
Shenzhen, Guangdong, P.R. China 518052
City: Shenzhen
Postal Code: 518052
Country: China
Telephone: 0086-755-36611722
Fax: 0086-75536612000-81722

2.2. Manufacturer Information

Company Name: TCL Communication Ltd.
7/F, Block F4, TCL Communication Technology Building, TCL
Address/Post: International E City, Zhong Shan Yuan Road, Nanshan District,
Shenzhen, Guangdong, P.R. China 518052
City: Shenzhen
Postal Code: 518052
Country: China
Telephone: 0086-755-36611722
Fax: 0086-75536612000-81722



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

3.1. About EUT

Description	GSM Quad Band Mobile Phone
Model Name	2053X/2053D
FCC ID	2ACCJB104
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(2053X)	359161090250355	PIO	010 01
EUT2(2053X)	359161090250330	PIO	010 01

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

3.3. Internal Identification of AE

AE ID*	Description		
AE1	Battery	/	/
AE2	Battery	/	/
AE3	Charger	/	/
AE4	Charger	/	/
AE1			
Model		CAB0950006CA	
Manufacturer		Tianmao	
Capacitance		950 mAh	
Nominal voltage		/	
AE2			
Model		CAB0950002C1	
Manufacturer		BYD	
Capacitance		950mAh	
Nominal voltage		/	
AE3			
Model		CBA0066AGAC5	
Manufacturer		PUAN	
Length of cable		/	
AE4			
Model		CBA0066AGAC7	
Manufacturer		Chenyang	



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 GSM Quad Band Mobile 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 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 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.	2016
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	15.247 (d)	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

The 2053X mode is a new product for this testing. The 2053D mode is a variant product of 2053X and shares the 2053X results.

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	2018-09-30
2	Bluetooth Tester	CBT32	100649	Rohde & Schwarz	1 year	2018-09-29
3	LISN	ENV216	101200	Rohde & Schwarz	1 year	2019-04-15
4	Test Receiver	ESCI	100344	Rohde & Schwarz	1 year	2019-02-28
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	2018-12-27
2	BiLog Antenna	VULB9163	514	Schwarzbeck	1 year	2019-02-03
3	Dual-Ridge Waveguide Horn Antenna	3117	00139065	ETS-Lindgren	1 year	2018-11-05
4	Dual-Ridge Waveguide Horn Antenna	3116	2663	ETS-Lindgren	1 year	2019-08-09
5	Vector Signal Analyzer	FSV	101047	Rohde & Schwarz	1 year	2019-07-27
6	Bluetooth Tester	CBT	101042	Rohde & Schwarz	1 year	2019-03-08

7. Measurement Uncertainty

7.1. Peak Output Power - Conducted

Measurement Uncertainty:

Measurement Uncertainty(k=2)	0.66dB
------------------------------	--------

7.2. Frequency Band Edges

Measurement Uncertainty:

Measurement Uncertainty(k=2)	0.66dB
------------------------------	--------

7.3. Transmitter Spurious Emission - Conducted

Measurement Uncertainty:

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

7.4. Transmitter Spurious Emission - Radiated

Measurement Uncertainty:

FrequencyRange	Uncertainty(k=2)
<1 GHz	4.86dB
> 1 GHz	5.26dB

7.5. Time of Occupancy (Dwell Time)

Measurement Uncertainty:

Measurement Uncertainty(k=2)	0.88ms
------------------------------	--------

7.6. 20dB Bandwidth

Measurement Uncertainty:

Measurement Uncertainty(k=2)	61.936Hz
------------------------------	----------



7.7. Carrier Frequency Separation

Measurement Uncertainty:

Measurement Uncertainty(k=2)	61.936Hz
------------------------------	----------

7.8. AC Powerline Conducted Emission

Measurement Uncertainty:

Measurement Uncertainty(k=2)	3.38dB
------------------------------	--------

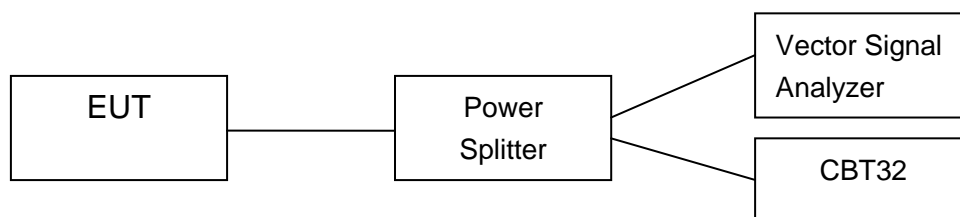
ANNEX A: Detailed Test Results

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

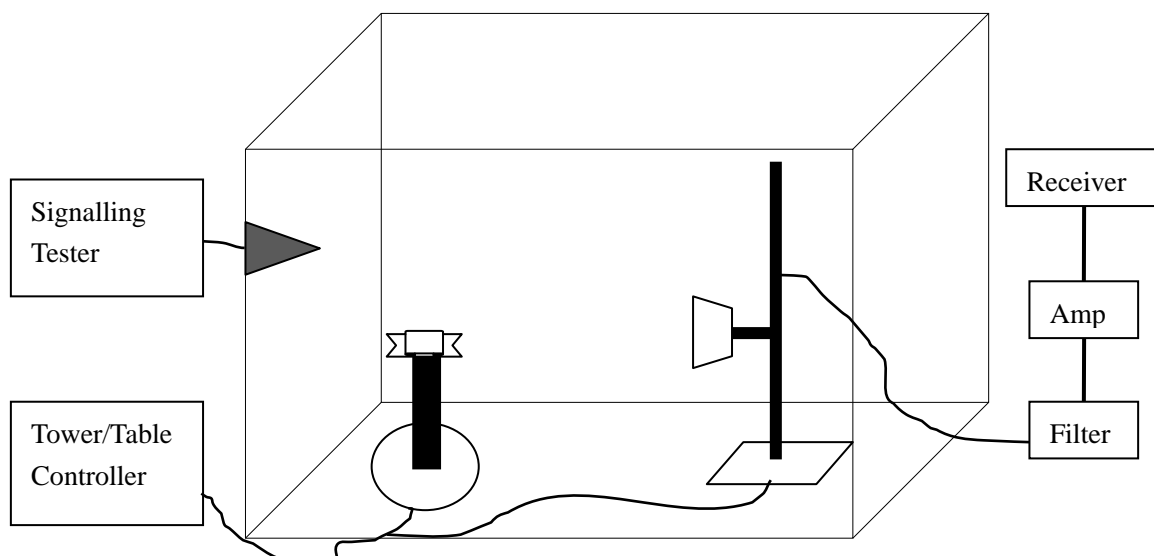
The measurement is made according to ANSI C63.10

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

Measurement Results:

For GFSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	1.41	1.41	-0.42	P

For $\pi/4$ DQPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	2.31	2.58	0.41	P

For 8DPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	2.31	2.83	0.74	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	-58.2	P
	Hopping ON	Fig.2	-62.41	P
78	Hopping OFF	Fig.3	-60.9	P
	Hopping ON	Fig.4	-60.26	P

For $\pi/4$ DQPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.5	-53.45	P
	Hopping ON	Fig.6	-60.13	P
78	Hopping OFF	Fig.7	-60.05	P
	Hopping ON	Fig.8	-56.72	P

For 8DPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.9	-53.42	P
	Hopping ON	Fig.10	-55.41	P

78	Hopping OFF	Fig.11	-58.03	P
	Hopping ON	Fig.12	-59.79	P

Conclusion: PASS

Test graphs as below

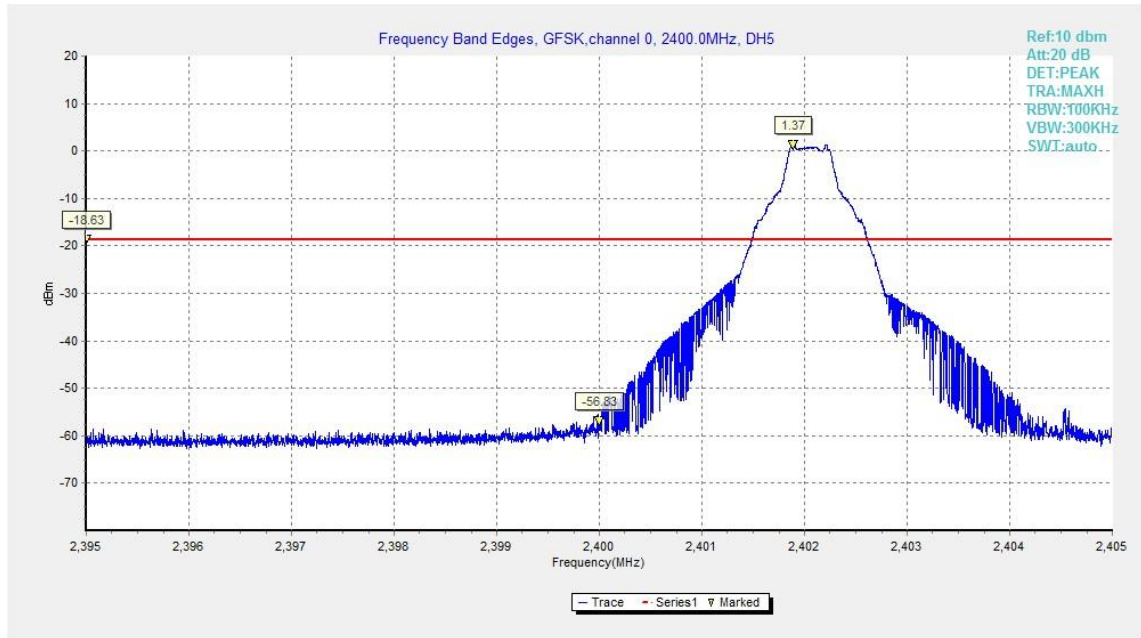


Fig.1. Frequency Band Edges: GFSK, Channel 0, Hopping Off

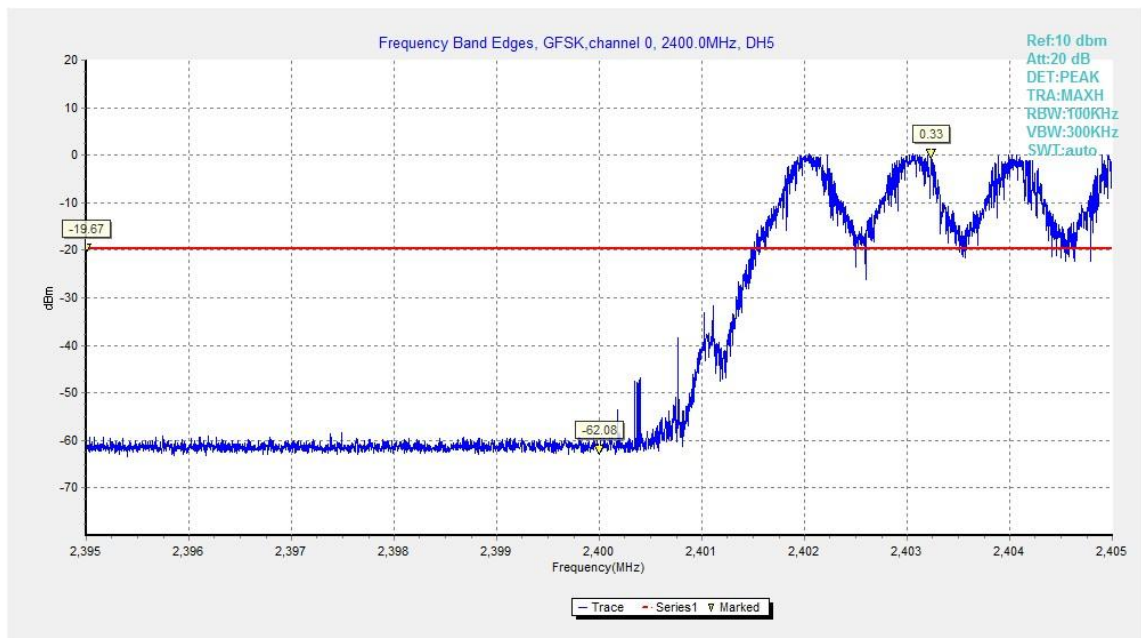


Fig.2. Frequency Band Edges: GFSK, Channel 0, Hopping On

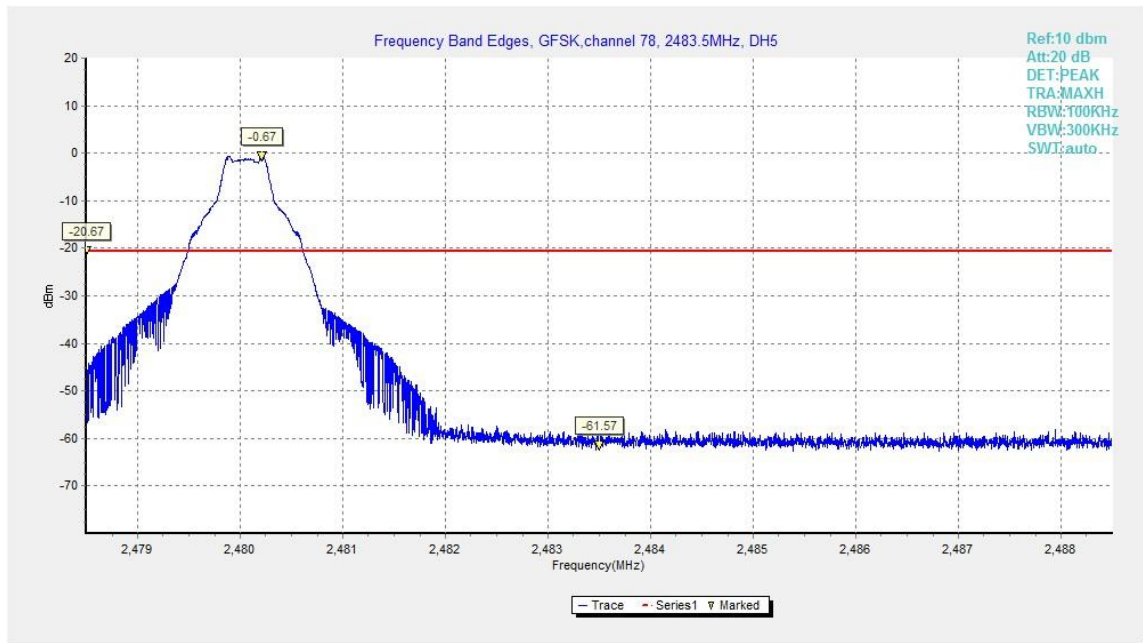


Fig.3. Frequency Band Edges: GFSK, Channel 78, Hopping Off

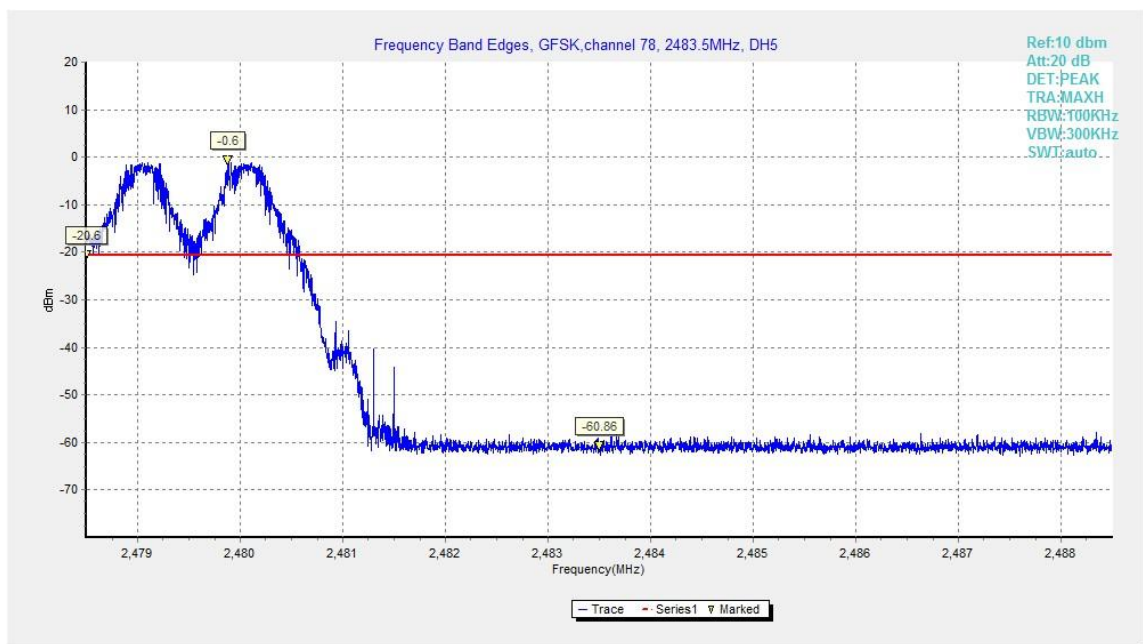


Fig.4. Frequency Band Edges: GFSK, Channel 78, Hopping On

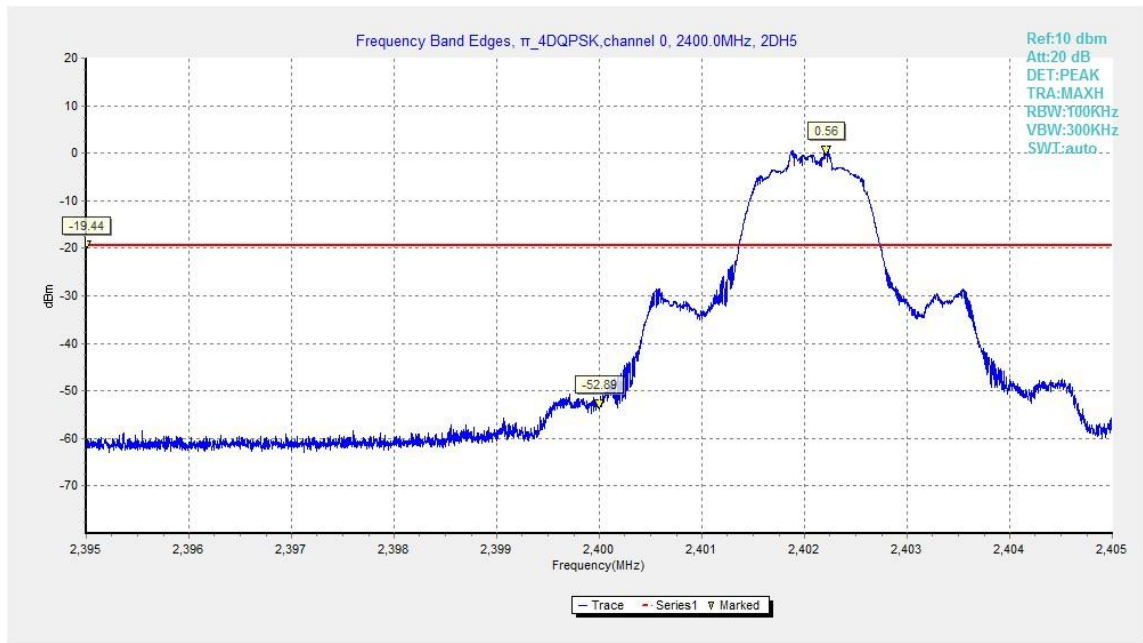


Fig.5. Frequency Band Edges: $\pi/4$ DQPSK, Channel 0, Hopping Off

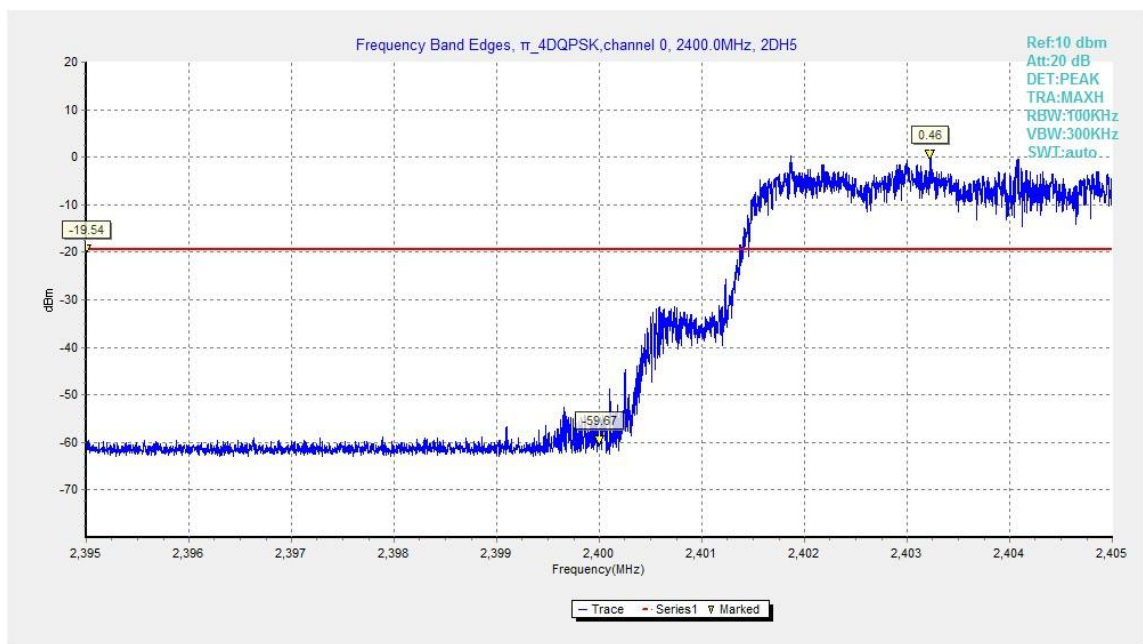


Fig.6. Frequency Band Edges: $\pi/4$ DQPSK, Channel 0, Hopping On

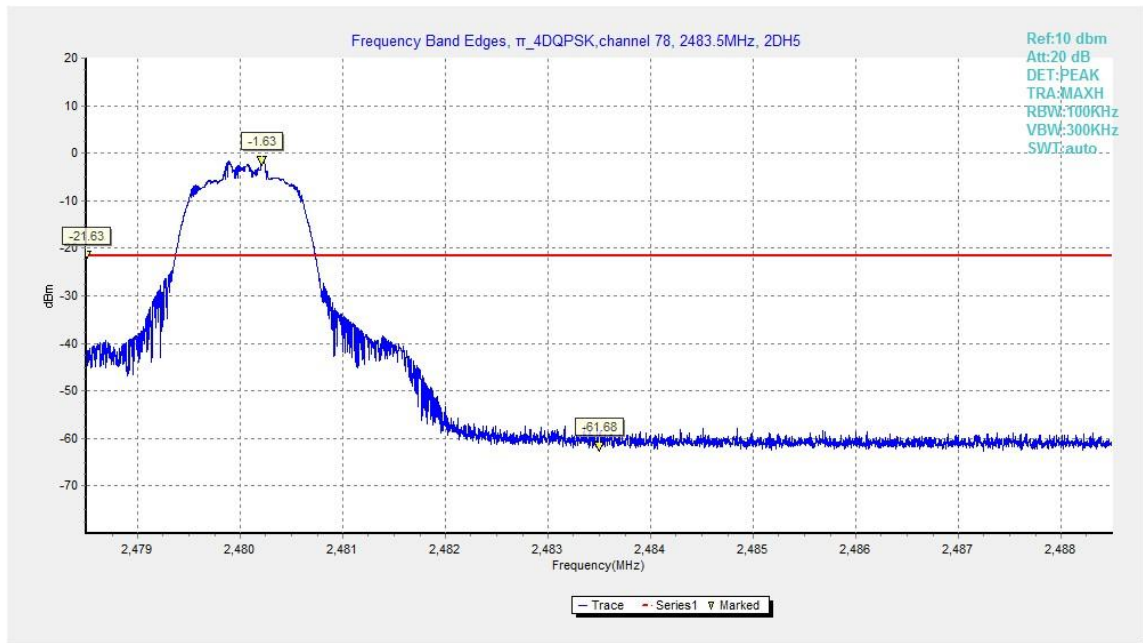


Fig.7. Frequency Band Edges: $\pi/4$ DQPSK, Channel 78, Hopping Off

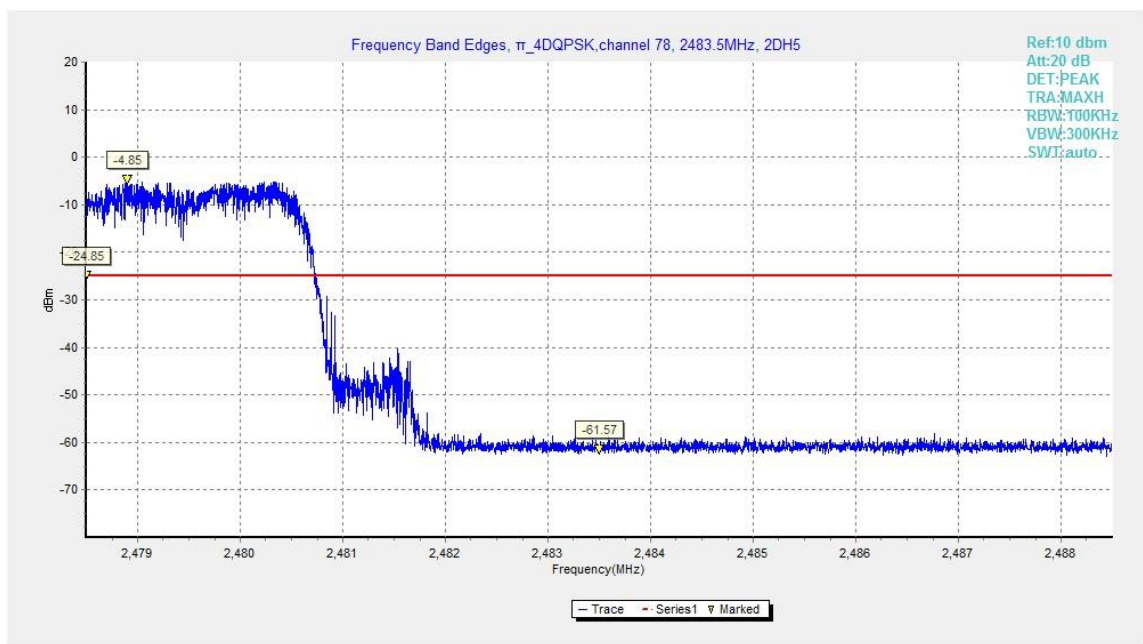


Fig.8. Frequency Band Edges: $\pi/4$ DQPSK, Channel 78, Hopping On

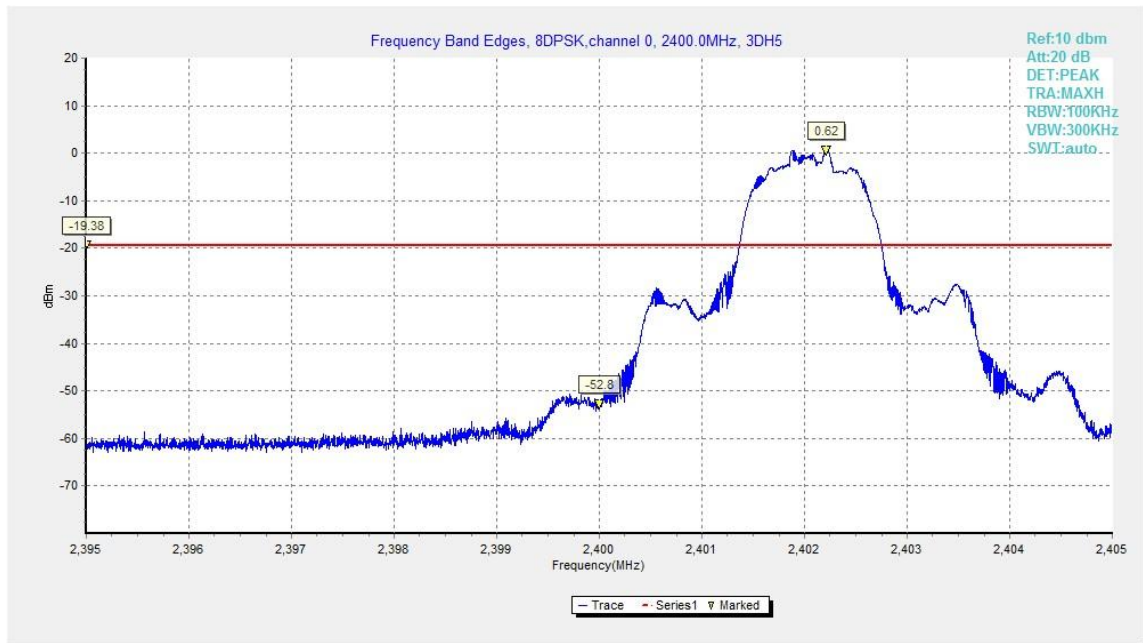


Fig.9. Frequency Band Edges: 8DPSK, Channel 0, Hopping Off

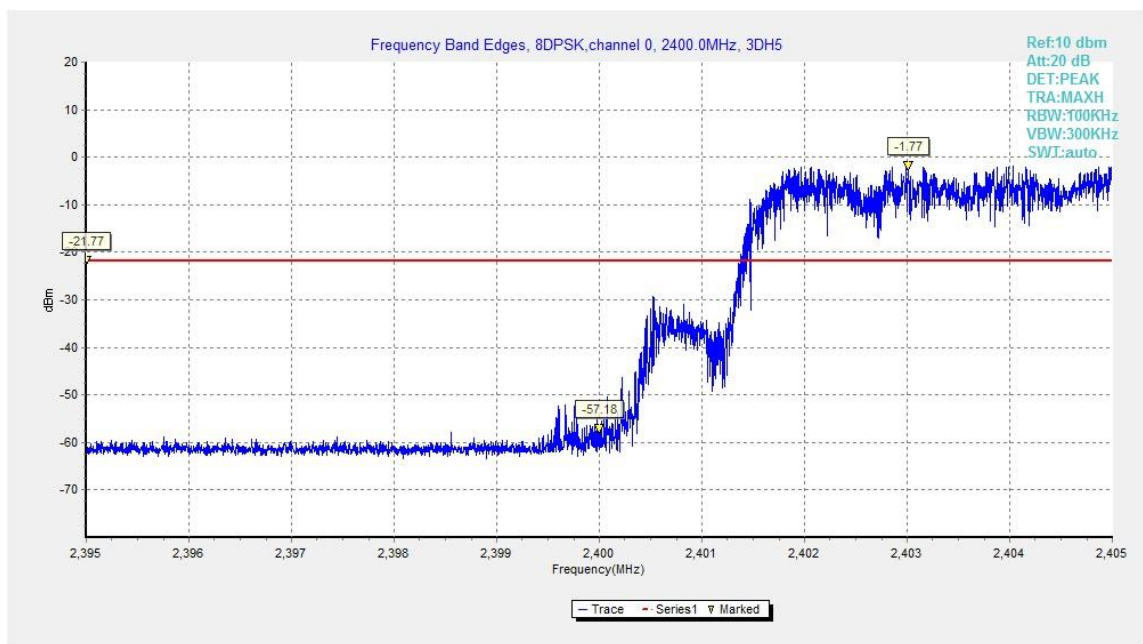


Fig.10. Frequency Band Edges: 8DPSK, Channel 0, Hopping On

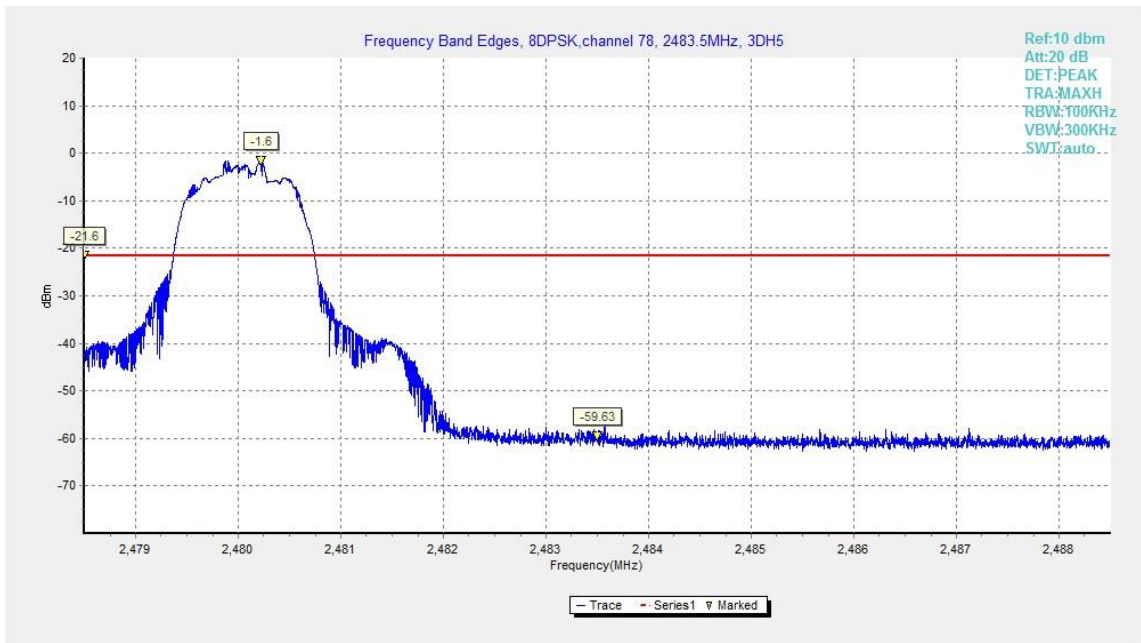


Fig.11. Frequency Band Edges: 8DPSK, Channel 78, Hopping Off

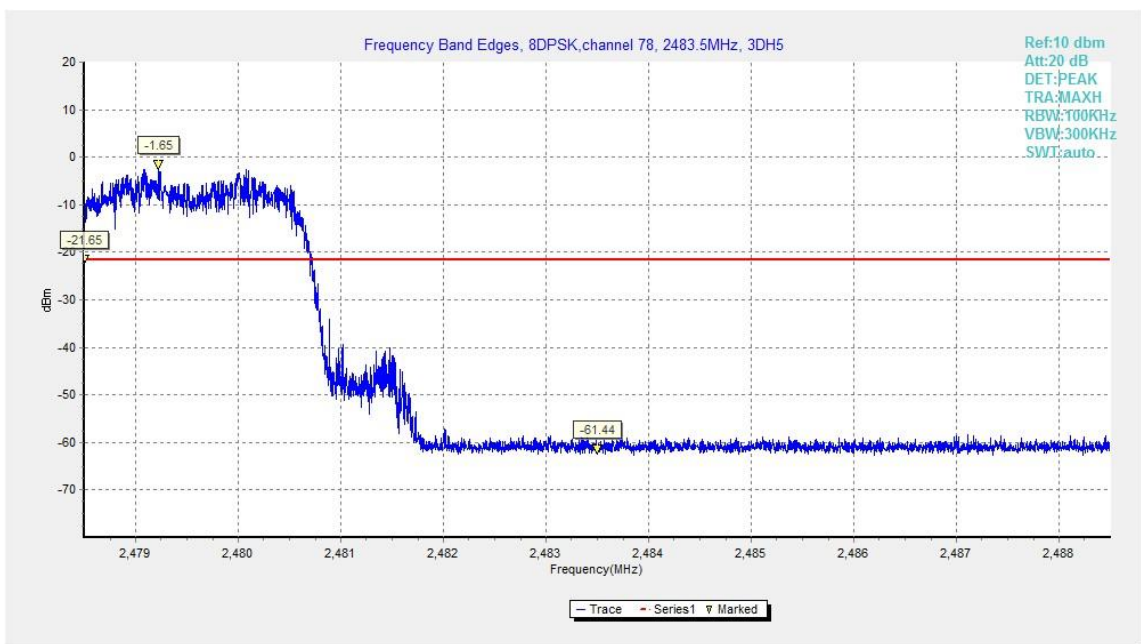


Fig.12. Frequency Band Edges: 8DPSK, Channel 78, Hopping On



A.4. 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.13	P

2402 MHz	30 MHz ~ 1 GHz	Fig.14	P
	1 GHz ~ 3 GHz	Fig.15	P
	3 GHz ~ 10 GHz	Fig.16	P
	10 GHz ~ 26 GHz	Fig.17	P
Ch 39 2441 MHz	Center Frequency	Fig.18	P
	30 MHz ~ 1 GHz	Fig.19	P
	1 GHz ~ 3 GHz	Fig.20	P
	3 GHz ~ 10 GHz	Fig.21	P
	10 GHz ~ 26 GHz	Fig.22	P
Ch 78 2480 MHz	Center Frequency	Fig.23	P
	30 MHz ~ 1 GHz	Fig.24	P
	1 GHz ~ 3 GHz	Fig.25	P
	3 GHz ~ 10 GHz	Fig.26	P
	10 GHz ~ 26 GHz	Fig.27	P

For $\pi/4$ DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	Center Frequency	Fig.28	P
	30 MHz ~ 1 GHz	Fig.29	P
	1 GHz ~ 3 GHz	Fig.30	P
	3 GHz ~ 10 GHz	Fig.31	P
	10 GHz ~ 26 GHz	Fig.32	P
Ch 39 2441 MHz	Center Frequency	Fig.33	P
	30 MHz ~ 1 GHz	Fig.34	P
	1 GHz ~ 3 GHz	Fig.35	P
	3 GHz ~ 10 GHz	Fig.36	P
	10 GHz ~ 26 GHz	Fig.37	P
Ch 78 2480 MHz	Center Frequency	Fig.38	P
	30 MHz ~ 1 GHz	Fig.39	P
	1 GHz ~ 3 GHz	Fig.40	P
	3 GHz ~ 10 GHz	Fig.41	P
	10 GHz ~ 26 GHz	Fig.42	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	Center Frequency	Fig.43	P
	30 MHz ~ 1 GHz	Fig.44	P
	1 GHz ~ 3 GHz	Fig.45	P
	3 GHz ~ 10 GHz	Fig.46	P
	10 GHz ~ 26 GHz	Fig.47	P

Ch 39 2441 MHz	Center Frequency	Fig.48	P
	30 MHz ~ 1 GHz	Fig.49	P
	1 GHz ~ 3 GHz	Fig.50	P
	3 GHz ~ 10 GHz	Fig.51	P
	10 GHz ~ 26 GHz	Fig.52	P
Ch 78 2480 MHz	Center Frequency	Fig.53	P
	30 MHz ~ 1 GHz	Fig.54	P
	1 GHz ~ 3 GHz	Fig.55	P
	3 GHz ~ 10 GHz	Fig.56	P
	10 GHz ~ 26 GHz	Fig.57	P

Conclusion: PASS

Test graphs as below

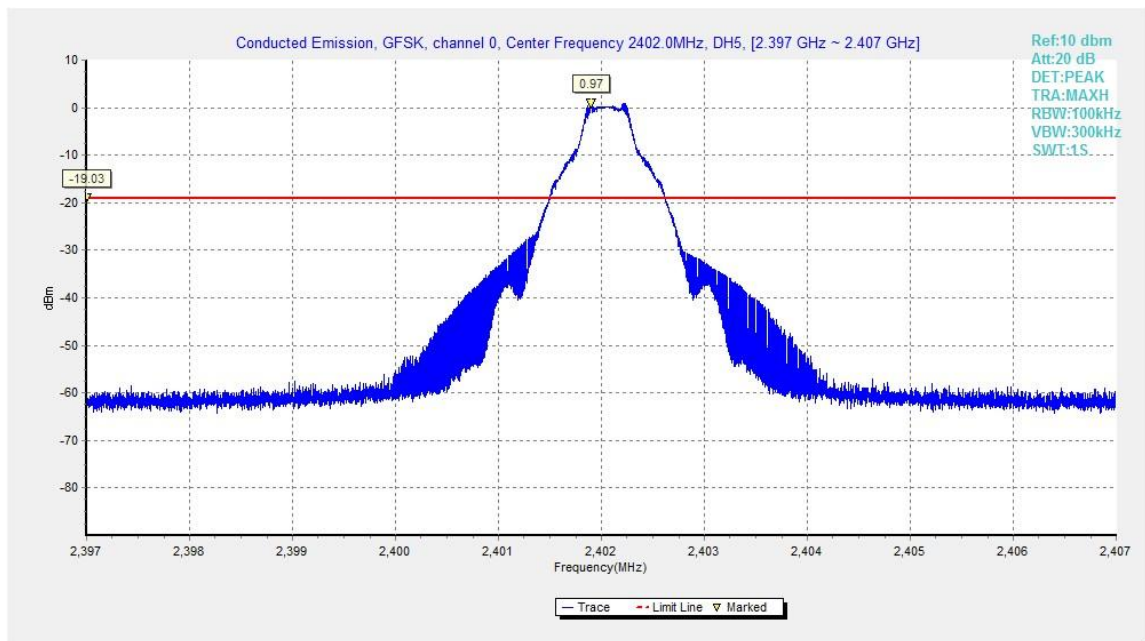


Fig.13. Conducted spurious emission: GFSK, Channel 0,2402MHz

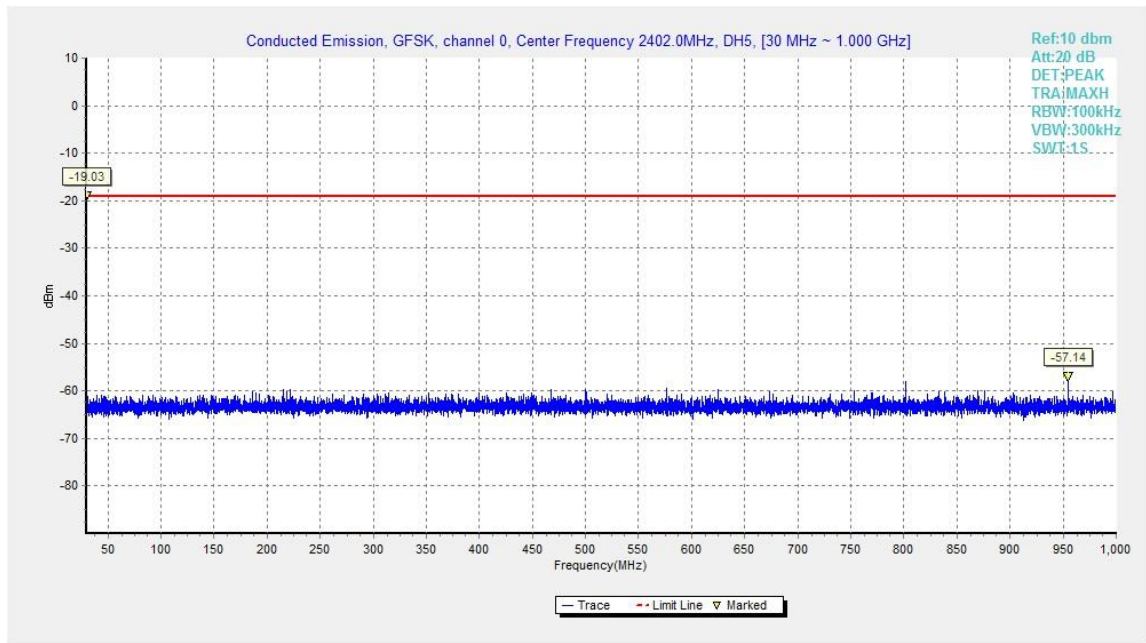


Fig.14. Conducted spurious emission: GFSK, Channel 0, 30MHz - 1GHz

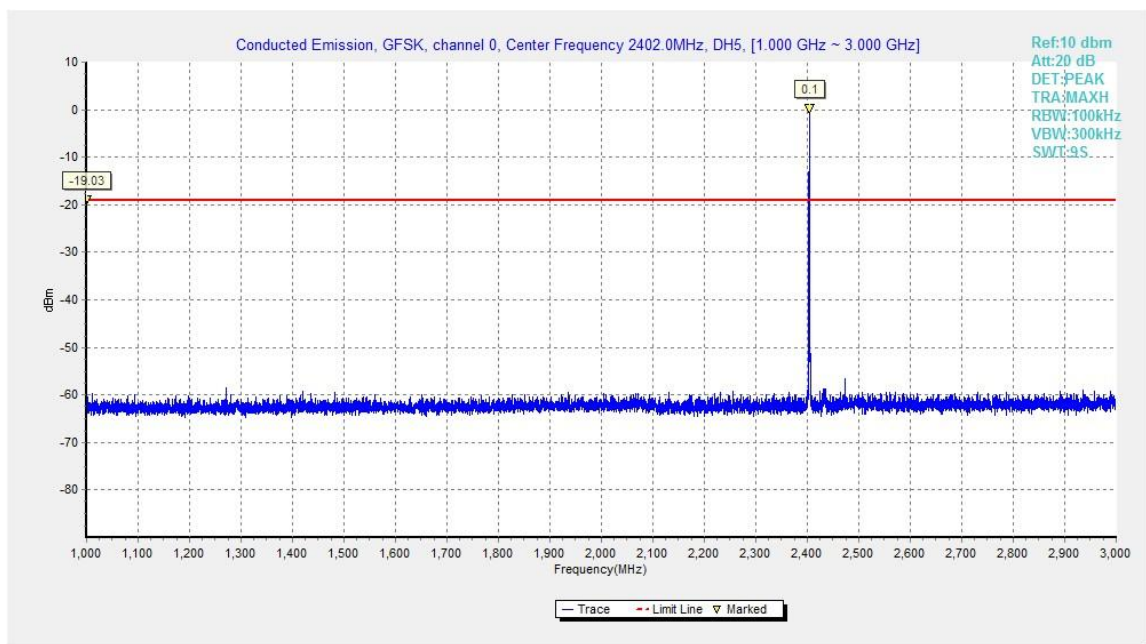


Fig.15. Conducted spurious emission: GFSK, Channel 0, 1GHz - 3GHz

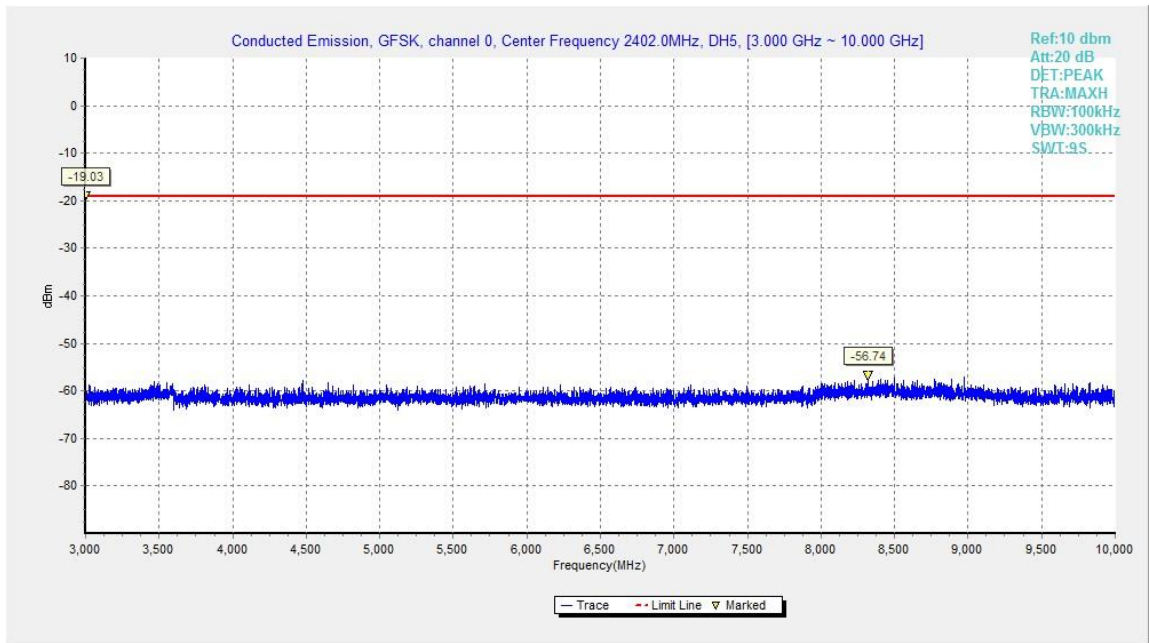


Fig.16. Conducted spurious emission: GFSK, Channel 0, 3GHz - 10GHz

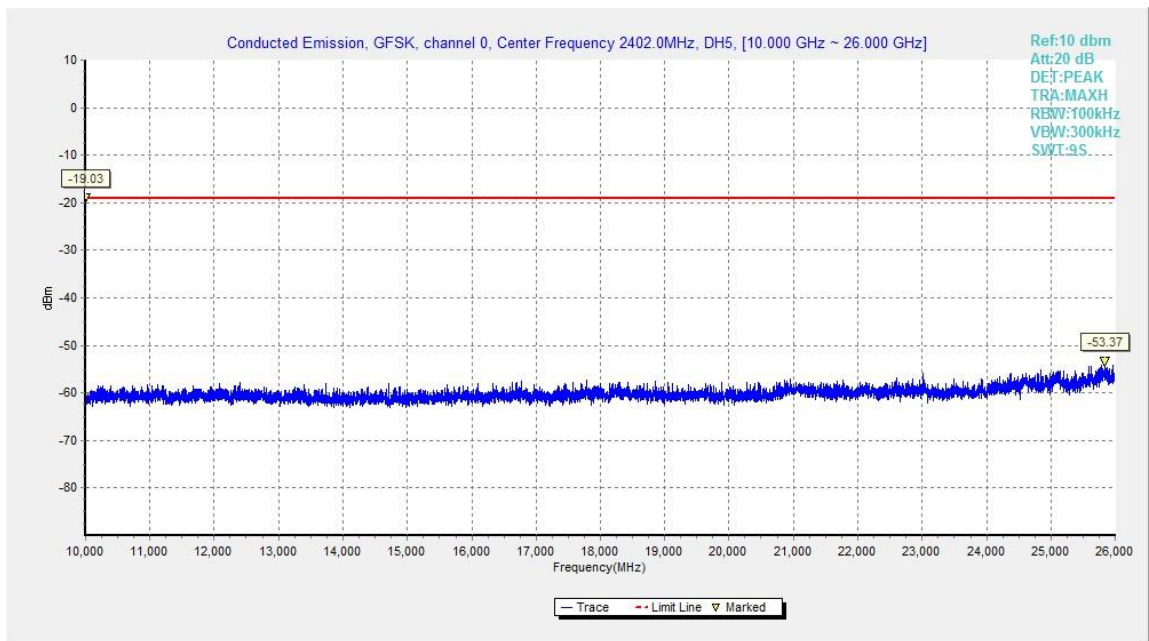


Fig.17. Conducted spurious emission: GFSK, Channel 0, 10GHz - 26GHz