



TEST REPORT

REPORT NUMBER: I21W00040-BT_Rev2

ON

Type of Equipment: Wireless communication module
Type of Designation: SNM900
Brand Name: MEIGLink
Manufacturer: MeiG Smart Technology Co., Ltd
FCC ID: 2APJ4-SNM900

ACCORDING TO

FCC Part 15, Subpart C, 2020:

15.205 Restricted bands of operation, 15.209 Radiated emission limits; general requirements,
15.247 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz

ANSI C63.4-2014, Methods of Measurement of Radio-Noise Emissions from Low-Voltage
Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz

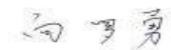
ANSI C63.10-2013: American National Standard of Procedures for Compliance Testing of
Unlicensed Wireless Devices

Chongqing Academy of Information and Communications Technology

Month date, year

Dec 27, 2021

Signature



Xiang Luoyong

Director

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
Chongqing Academy of Information and Communications Technology.

Revision Version

Report Number	Revision	Date	Memo
I21W00040-BT	00	2021-12-17	Initial creation of test report
I21W00040-BT_Rev1	01	2021-12-23	Second creation of test report
I21W00040-BT_Rev2	02	2021-12-27	Third creation of test report

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 used during the test.....	7
3.3. Outline of Equipment under Test.....	7
3.4. Internal Identification of AE used during the test.....	8
3.5. EUT Test RF Confagle Configuration.....	8
4. Reference Documents.....	10
4.1. Documents supplied by applicant.....	10
4.2. Reference Documents for testing.....	10
5. Test Equipments Utilized.....	11
5.1. RF Test System.....	11
5.2. RSE Test System.....	11
5.3. Climate Chamber.....	11
5.4. Vibration table.....	11
5.5. Test software.....	12
6. Test Results.....	13
6.1. Summary of Test Results.....	13
6.2. Maximum Peak Output Power.....	14

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777



Report No.: B21W00040-BT_Rev2

6.3. Peak Power Spectral Density.....	20
6.4. 6dB Occupied Bandwidth.....	28
6.5. 99% Occupied Bandwidth.....	36
6.6. Band Edges Compliance.....	41
6.7. Transmitter Spurious Emission-Conducted.....	48
6.8. Transmitter Spurious Emission-Radiated.....	74
6.9. Power line Conducted Emissions.....	98
Annex A EUT Photos.....	99
ANNEX B Deviations from Prescribed Test Methods.....	103

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

1. Test Laboratory

1.1. Testing Location

Name:	Chongqing Academy of Information and Communications Technology
FCC Registration Number:	CN1239
Address:	Building C, Technology Innovation Center, No.8, Yuma Road, Chayuan New Area, Nan'an District, Chongqing, People's Republic of China
	No.19 East Road, Xiantao Big-data Valley, Yubei District, Chongqing, People's Republic of China
Postal Code:	401336
Telephone:	0086-23-88069965
Fax:	0086-23-88608777

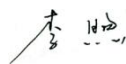
1.2. Testing Environment

Normal Temperature:	15-35°C
Relative Humidity:	30-60%

1.3. Project data

Testing Start Date:	2021-11-08
Testing End Date:	2021-12-23

1.4. Signature



2021-12-27

(Prepared this test report)

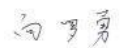
Date



2021-12-27

(Reviewed this test report)

Date



2021-12-27

Director of the laboratory

Date

(Approved this test report)

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

2. Client Information

2.1. Applicant Information

Company Name:	MeiG Smart Technology Co., Ltd
Address /Post:	Floor 2, No.5 Office Building, Lingxia Road, Fenghuang Community, Fuyong Street, Bao 'an District, Shenzhen
City:	Shenzhen
Country:	China
Telephone:	021-54278676
Fax:	--
Email:	louxinwei@meigsmart.com
Contact Person:	louxinwei

2.2. Manufacturer Information

Company Name:	--
Address /Post:	--
City:	--
Country:	--
Telephone:	--
Fax:	--
Email:	--
Contact Person:	--

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

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

3.1. About EUT

EUT Description	Wireless communication module
Model name	SNM900
Brand name	MEIGLink
BLUETOOTH Frequency	2402MHz-2480MHz
Antenna description	External Antenna/PIFA Antenna
Antenna Gain	5.84dBi/2.68dBi
Extreme Temperature	-40/+75°C
Nominal Voltage	3.8
Extreme High Voltage	4.2
Extreme Low Voltage	3.5

Note: Photographs of EUT are shown in ANNEX A of this test report.

Note: High and low voltage values in extreme condition test are given by manufacturer.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of receipt
S5	865171050693608	SLM900_MB_V 1.01_PCB	SNM900Q_EQ000_277 4.DCF921C.0452224_2 01104_100_V01_T04	2021-10-27
S3	865171050693269	SLM900_MB_V 1.01_PCB	SNM900Q_EQ000_277 4.DCF921C.0452224_2 01104_100_V01_T04	2021-10-27
S2	M900332GYA1113 00009	SLM900_MB_V 1.01_PCB	SNM900Q_EQ000_277 4.DCF921C.0452224_2 01104_100_V01_T04	2021-12-06

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

3.3. Outline of Equipment under Test

The SNM900, referred to as “EUT” hereafter, is a multi-Band Wireless communication module operating on the Wi-Fi/BLUETOOTH networks. The table below shows the supported bands for the EUT.

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

Technology	Band	UL Freq.(MHz)	DL Freq.(MHz)	Note
BLUETOOTH	--	2402-2480		--

3.4. Internal Identification of AE used during the test

AE ID*	Description	Gain (dB) *
AE1	RF cable	--
AE2	Antenna 1	5.84
AE3	Antenna 2	2.68

Note:Only Antenna 1 radiation method test data record report.

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

dB*: is provided customer.

3.5. Antenna Requirement

Standard Applicable

For intentional device, according to FCC 47 CFR Section 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 .

Refer to statement below for compliance .

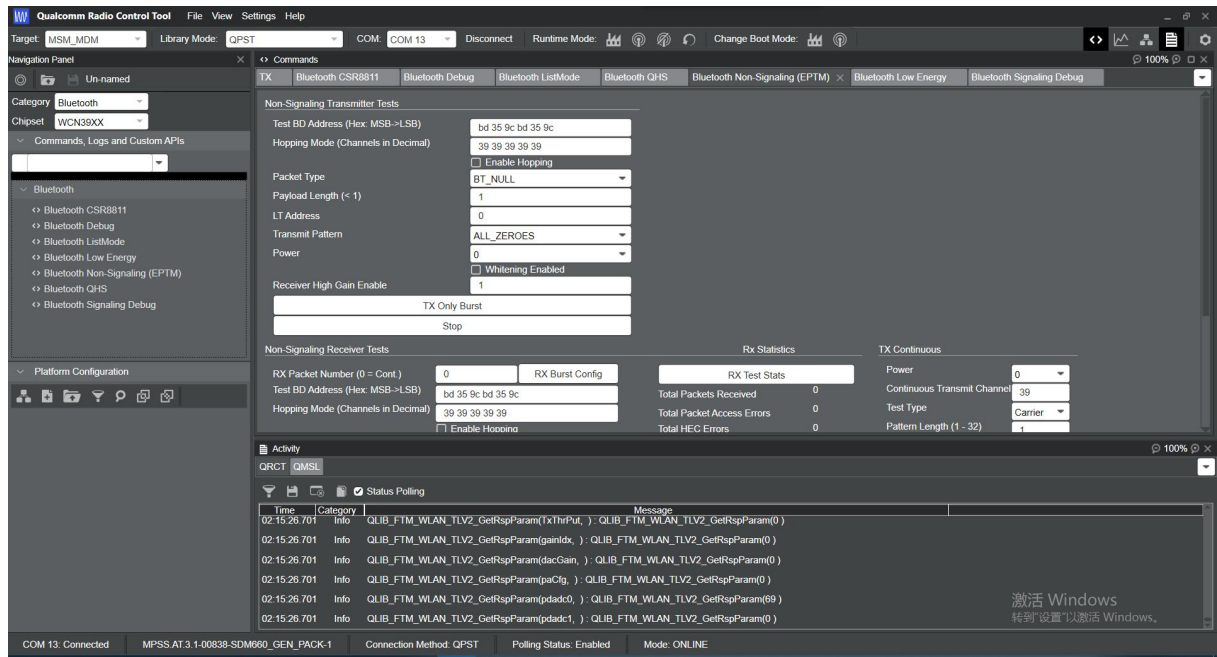
The manufacturer may design the unit so that the user can replace a broken antenna , but the use of a standard antenna jack or electrical connector is prohibited . Further , this requirement does not apply to intentional radiators that must be professionally installed.

Antenna Connected Construction

The antenna used in this product is a External Antenna and PIFA Antenna . It conforms to the standard requirements. The directional gains of External antenna used for transmitting is 5.84dBi,The directional gains of PIFA Antenna used for transmitting is 2.68dBi.

3.6. EUT Test RF Confagle Configuration

Set DUT power, rate and channel through at command, and set the power level to 0.



4. Reference Documents

4.1. Documents supplied by applicant

PICS/PIXIT, referring to Annex B for detailed 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 Part 15, Subpart C, 2020	Intentional Radiators	2020
ANSI C63.4-2014	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2014
ANSI C63.10-2013	American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices	2013

5. Test Equipments Utilized

5.1. RF Test System

No.	Equipment	Model	SN	HW Version	SW Version	Manufacture	Cal. Date	Cal.Due Date
1	spectrum analyzer	FSQ 26	201137/026	--	--	R&S	2021-05-12	2022-06-11
2	DC Power Supply	N6705B	MY50000919	--	--	Agilent	2021-05-12	2022-06-11

5.2. RSE Test System

No.	Equipment	Model	SN	HW Version	SW Version	Manufacture	Cal. Date	Cal.Due Date
1	Test Receiver	ESU40	100350	01	4.43 SP3	R&S	2021-05-12	2022-06-11
2	Ultra-wideband and Log Periodic Antenna	VULB 9163	9163-586	--	--	Schwarzbeck	2020-10-12	2022-11-11
3	Double Ridged Guide Antenna	9120D	9120D-1083	--	--	Schwarzbeck	2021-05-12	2022-06-11
4	Test Receiver	ESW 26	101382	00	1.50 SP1	R&S	2021-05-12	2022-06-11
5	Horn Antenna	DATE 1152	LM7127	--	--	ETS	2020-07-17	2022-08-16
6	Test Receiver	ESR 3	102477	03	3.48 SP2	R&S	2021-05-12	2022-06-11
7	Artificial Main Network	ENV 216	102368	--	--	R&S	2021-05-12	2022-06-11
8	Loop Antenna	6502	00143163	--	--	ETS	2020-07-16	2022-08-15

5.3. Climate Chamber

No.	Name	Type	SN	Manufacture	Cal. Date	Cal.Due Date
1	Climate chamber	SH-241	92010759	ESPEC		2022-06-11
2	Fully anechoic chamber	FAC-5	--	TDK	2020-07-31	2024-08-30

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

3	Semi-anechoic chamber	FAC-10	--	TDK	2020-07-29	2024-08-28
---	-----------------------	--------	----	-----	------------	------------

5.4. Vibration table

No.	Name	version	SN	Manufacture	No.
--	--	--	--	--	--

Anechoic chamber

Fully anechoic chamber by ETS-LINDGREN.

5.5. Test software

No.	Name	version	SN	Manufacture
1	EMC32	V 9.26.01	--	R&S
2	EMC32	V10.20.10	--	R&S

6. Test Results

6.1. Summary of Test Results

A brief summary of the tests carried out is shown as following.

FCC Rules	Name of Test	Result
15.247 (b)	Peak power	Pass
15.247 (d)	Band edge (conducted)	Pass
15.247(a)	Frequency separation	Pass
15.247(a)	Number of hopping frequency	Pass
15.247(a)	Time of occupancy	Pass
15.247(d)	Spurious emission (conducted)	Pass
15.209(a) and 15.205(a)	Spurious emission (radiated)	Pass
15.207	Power line Conducted Emissions	Pass
Note:--		

6.2. Peak Power

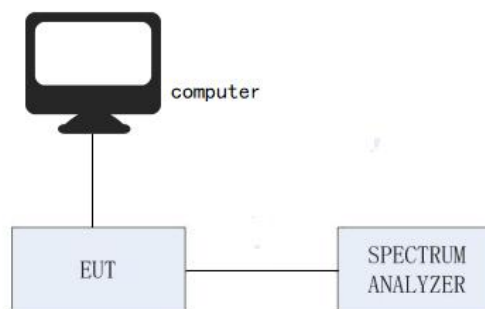
Specifications:	FCC Part 15.247 (b)
DUT Serial Number:	865171050693608
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

Test Setup:

The computer is used to set the transmission channel and power level. The transmitter output is connected to the spectrum analyzer via an RF line.



Test Method:

The transmitter output is connected to the Spectrum Analyzer. The Spectrum Analyzer is set to the peak detector mode. The RBW is set to 3MHz. The VBW is set to 3MHz.

The measurement is made according to ANSI C63.10-2013.

Note: --

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

GFSK Mode:

Channel No.	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
Low: 0	2402.0962	12.19	21	Pass
Middle: 39	2440.888	12.44		Pass
High: 78	2479.936	11.79		Pass

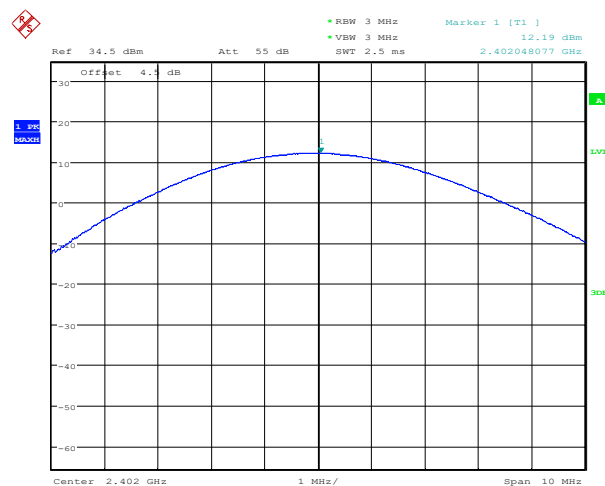
Pi/4 DQPSK Mode:

Channel No.	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
Low: 0	2402.080	11.43	21	Pass
Middle: 39	2440.872	11.74		Pass
High: 78	2480.032	11.23		Pass

8DPSK Mode:

Channel No.	Frequency (MHz)	Output Power (dBm)	Limit (dBm)	Result
Low: 0	2401.872	11.70	21	Pass
Middle: 39	2440.952	11.89		Pass
High: 78	2479.952	11.31		Pass

Graphical results :

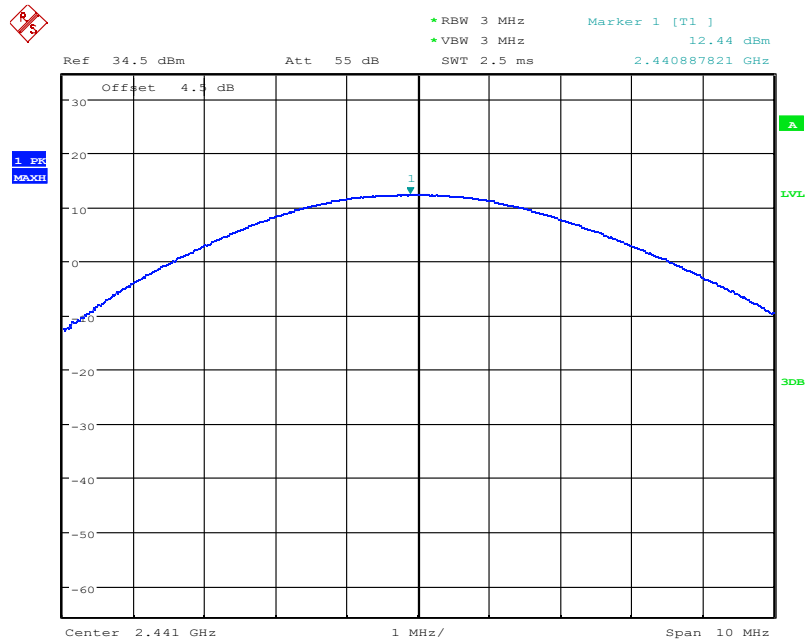


Date: 8.NOV.2021 09:13:11

GFSK Channel 0

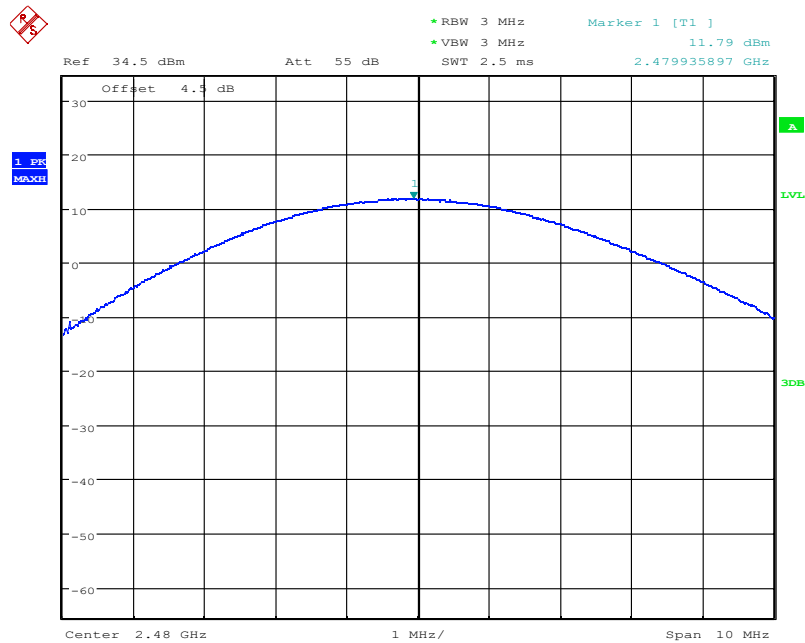
Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777



Date: 8.NOV.2021 09:14:27

GFSK Channel 39

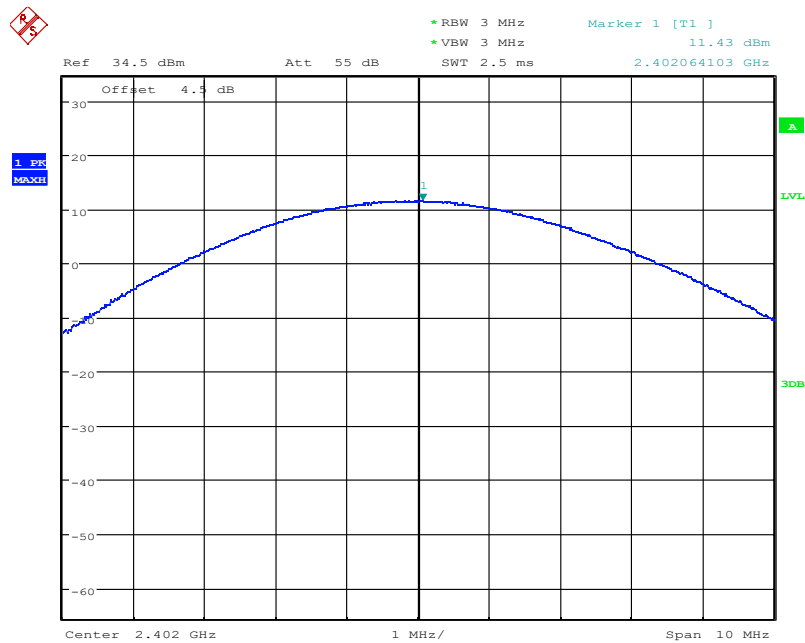


Date: 8.NOV.2021 09:16:02

GFSK Channel 78

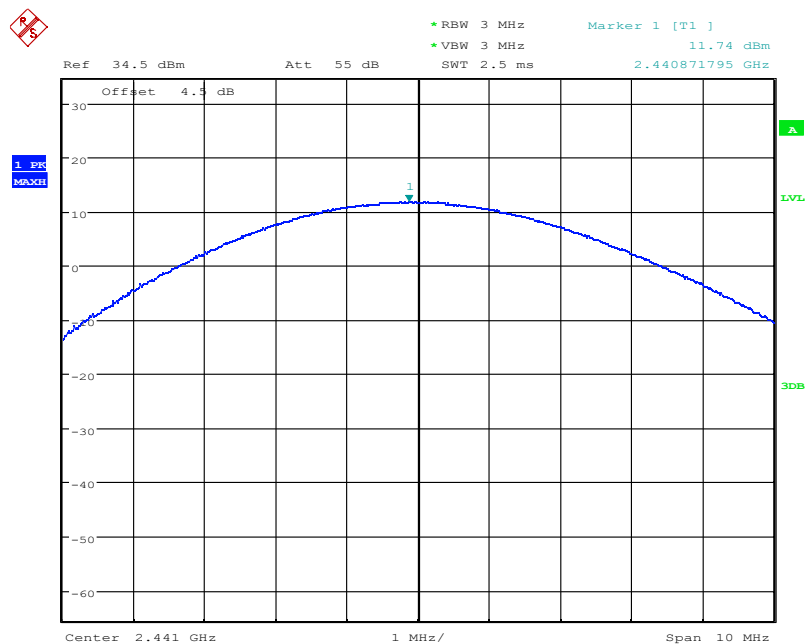
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 09:21:10

Pi/4 DQPSK Channel 0

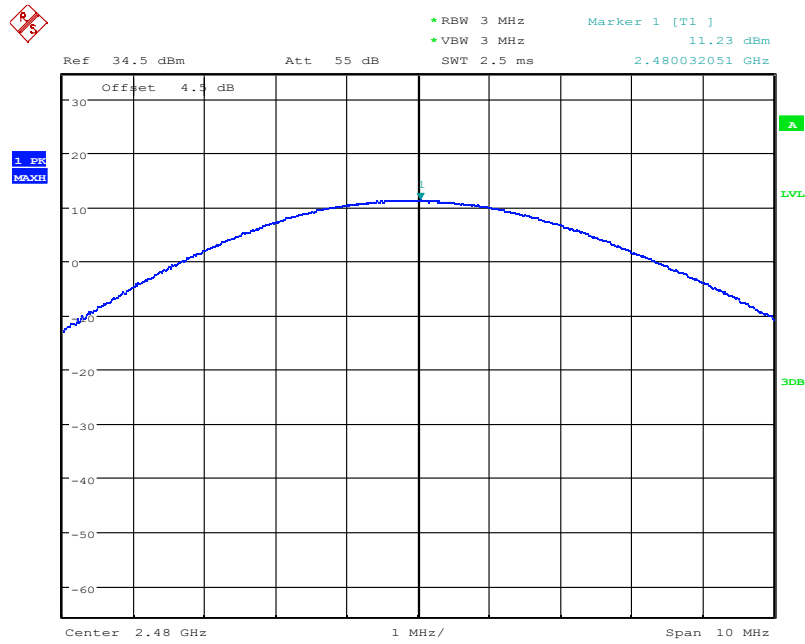


Date: 8.NOV.2021 09:20:08

Pi/4 DQPSK Channel 39

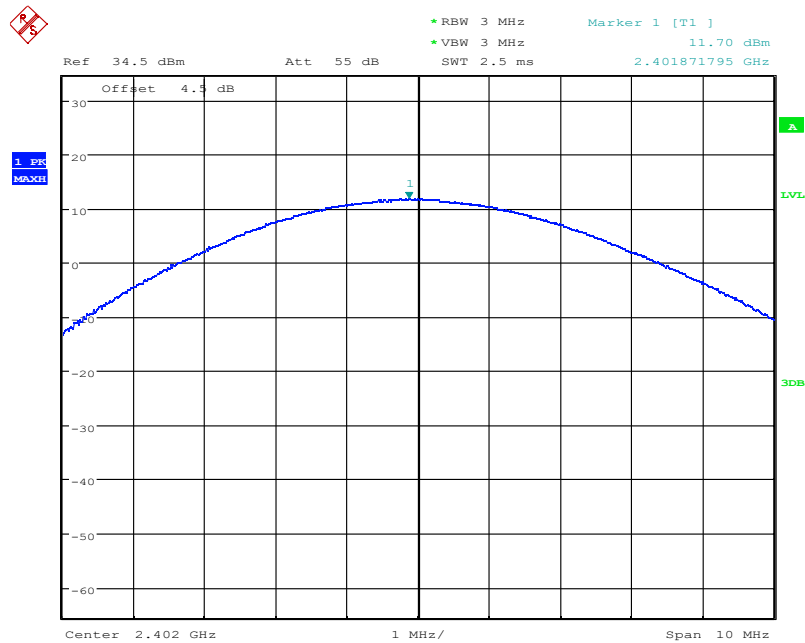
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 09:17:25

Pi/4 DQPSK Channel 78

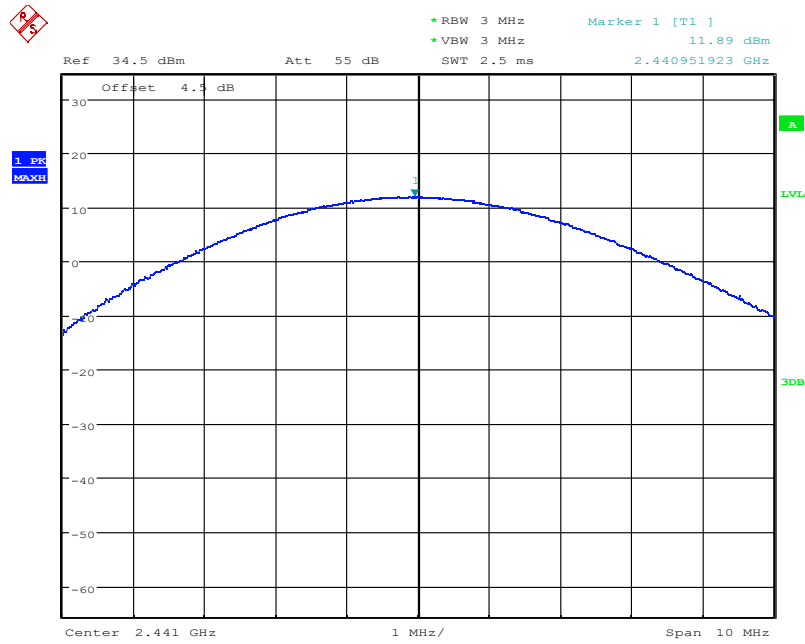


Date: 8.NOV.2021 09:21:51

8DPSK Channel 0

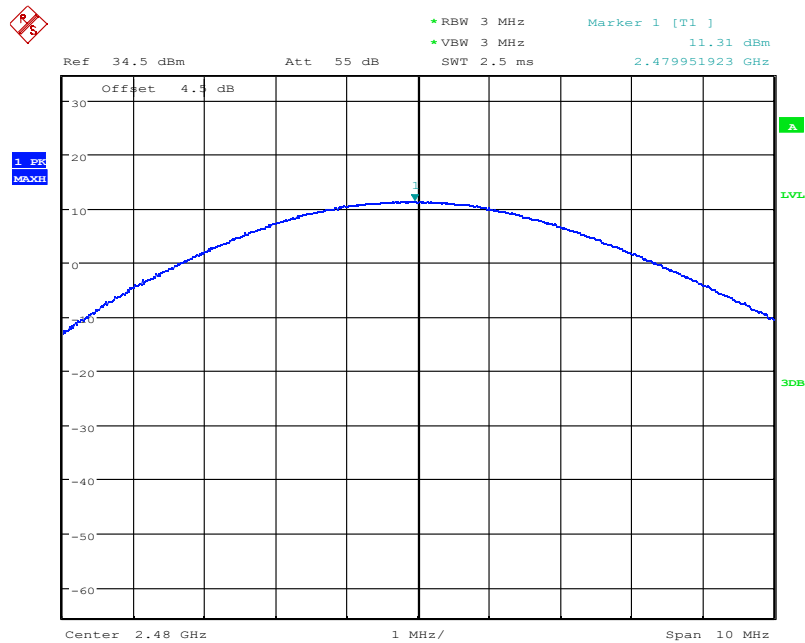
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 09:19:27

8DPSK Channel 39



Date: 8.NOV.2021 09:18:13

8DPSK Channel 78

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

6.3. Band edges

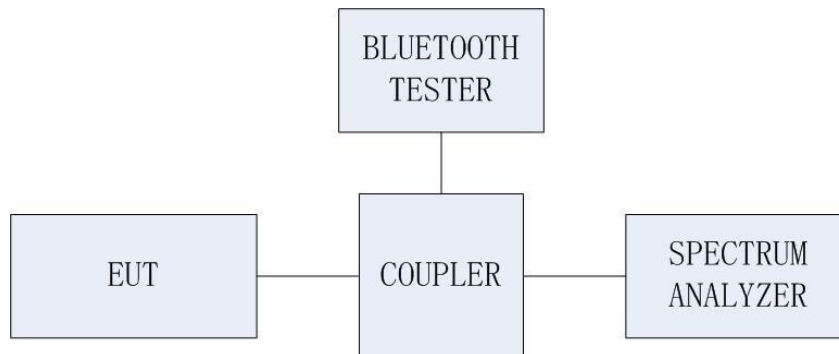
Specifications:	FCC Part 15.247 (d)
DUT Serial Number:	865171050693608
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

According to §15.247(d), in any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits.

Test Setup:

The BLUETOOTH TESTER was used to set the TX channel and power level. The transmitter output is connected to Spectrum analyzer through a coupling.



Test procedure:

The transmitter output is connected to the Spectrum Analyzer. The Spectrum Analyzer is set to the peak detector mode. The spectrum analyzer is set to:

1. Span = 10 MHz
2. RBW = 100 KHz
3. VBW = 300 KHz
4. Sweep = auto

The measurement is made according to ANSI C63.4-2003.

Note: --

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

Test Results:
GFSK Mode:

Hopping mode	Channel	Band-edge Freq.[MHz]	Delta[dB]	Conclusion
Hopping OFF	0, Left band-edge	2399.77	-51.55	Pass
Hopping ON	--, Left band-edge	2399.86	-51.67	Pass
Hopping OFF	78, Right band-edge	2484.23	-51.65	Pass
Hopping ON	--, Right band-edge	2483.58	-51.59	Pass

Pi/4 DQPSK Mode:

Hopping mode	Channel	Band-edge Freq.[MHz]	Delta[dB]	Conclusion
Hopping OFF	0, Left band-edge	2399.85	-47.22	Pass
Hopping ON	--, Left band-edge	2399.62	-47.27	Pass
Hopping OFF	78, Right band-edge	2483.58	-46.83	Pass
Hopping ON	--, Right band-edge	2483.70	-46.97	Pass

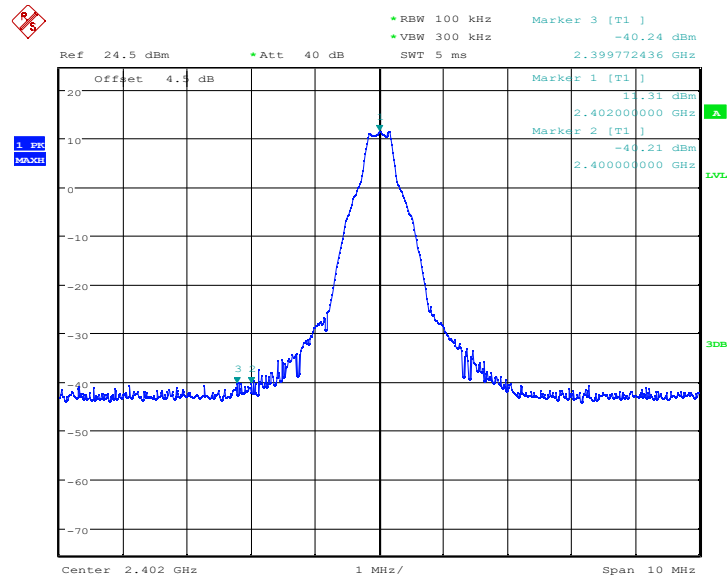
8PSK Mode:

Hopping mode	Channel	Band-edge Freq.[MHz]	Delta[dB]	Conclusion
Hopping OFF	0, Left band-edge	2399.70	-50.82	Pass
Hopping ON	--, Left band-edge	2399.74	-51.76	Pass
Hopping OFF	78, Right band-edge	2483.55	-50.54	Pass
Hopping ON	--, Right band-edge	2483.70	-50.90	Pass

Chongqing Academy of Information and Communication Technology

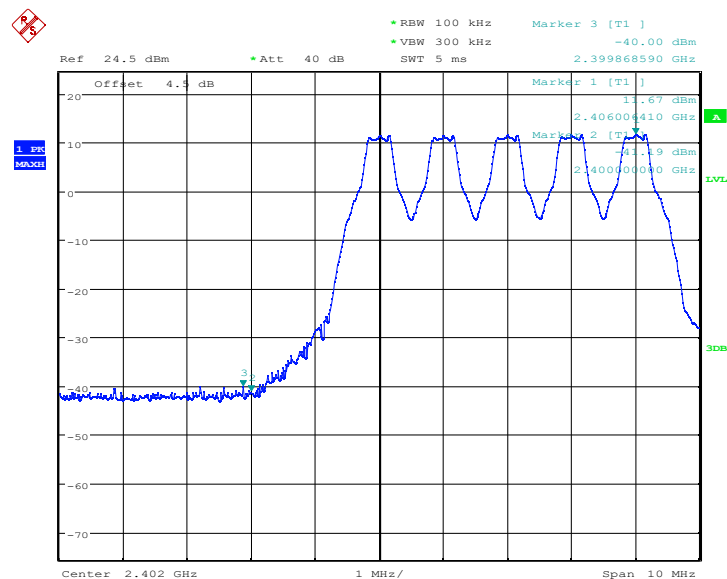
Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

Graphical results:



Date: 8.NOV.2021 10:01:15

GFSK Channel 0, fixed mode, left band-edge

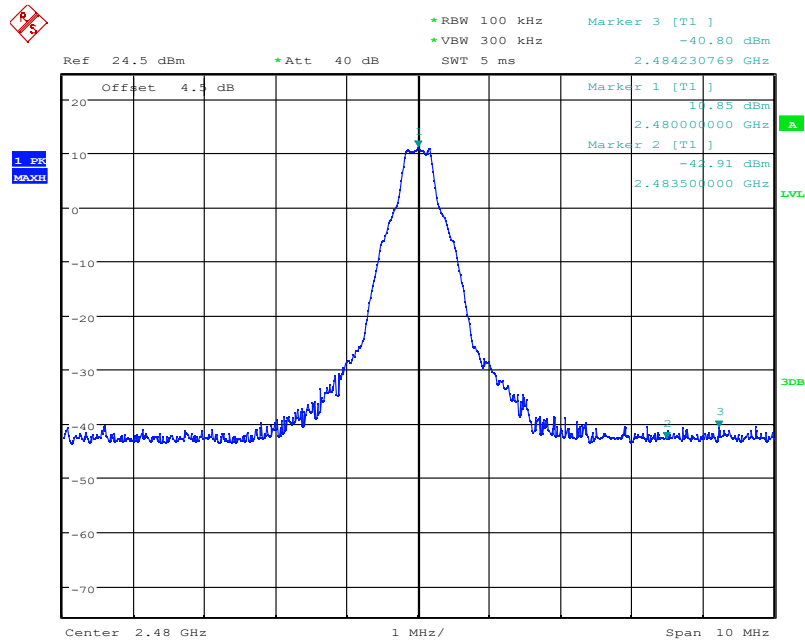


Date: 8.NOV.2021 10:06:09

GFSK Hopping mode, left band-edge

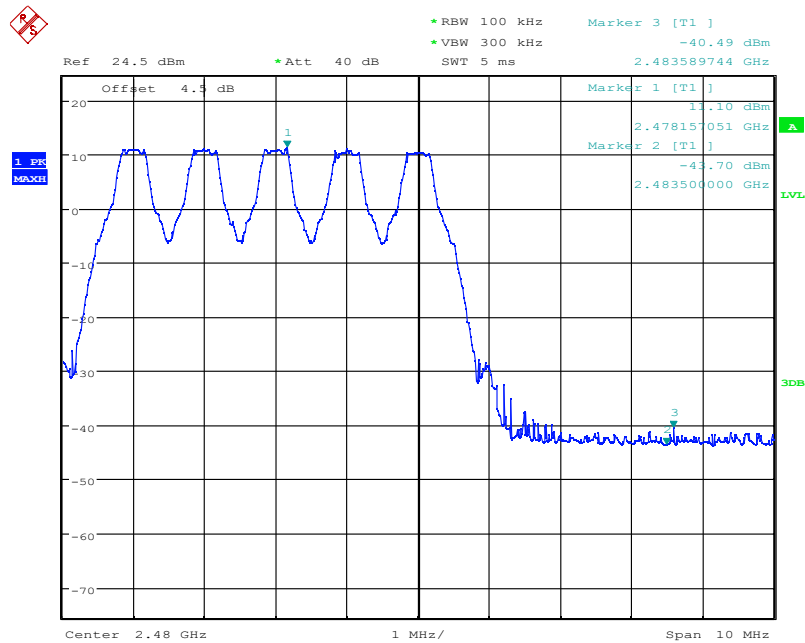
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 09:56:49

GFSK Channel 78, fixed mode, right band-edge

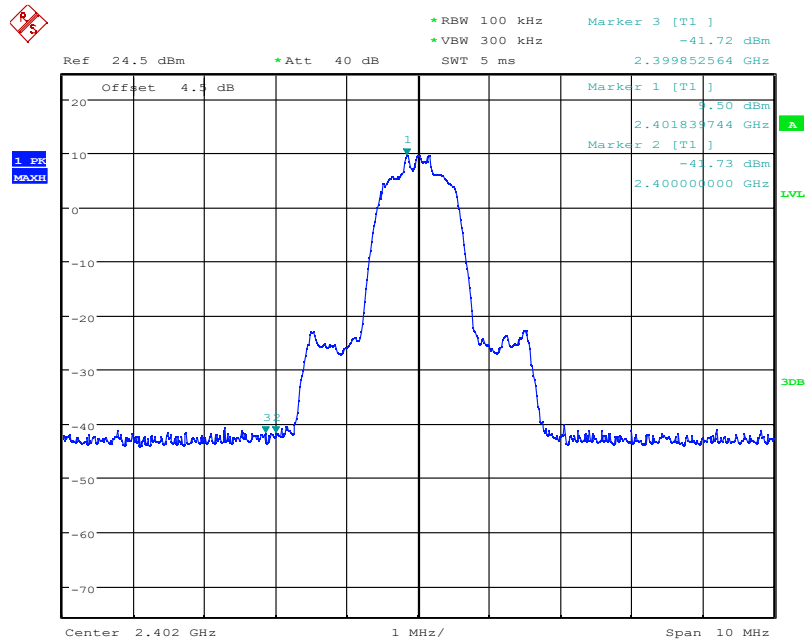


Date: 8.NOV.2021 10:07:36

GFSK Hopping mode, right band-edge

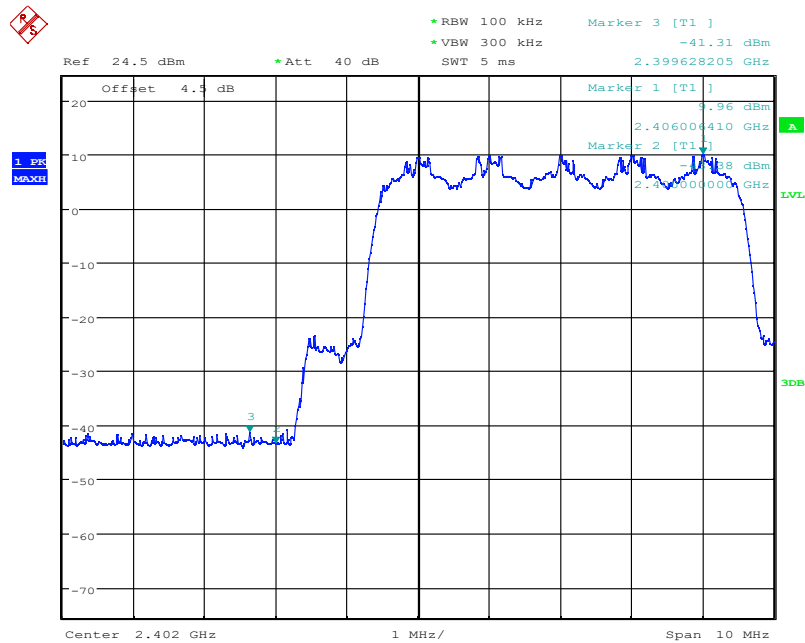
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 10:00:33

Pi/4 DQPSK Channel 0, fixed mode, left band-edge

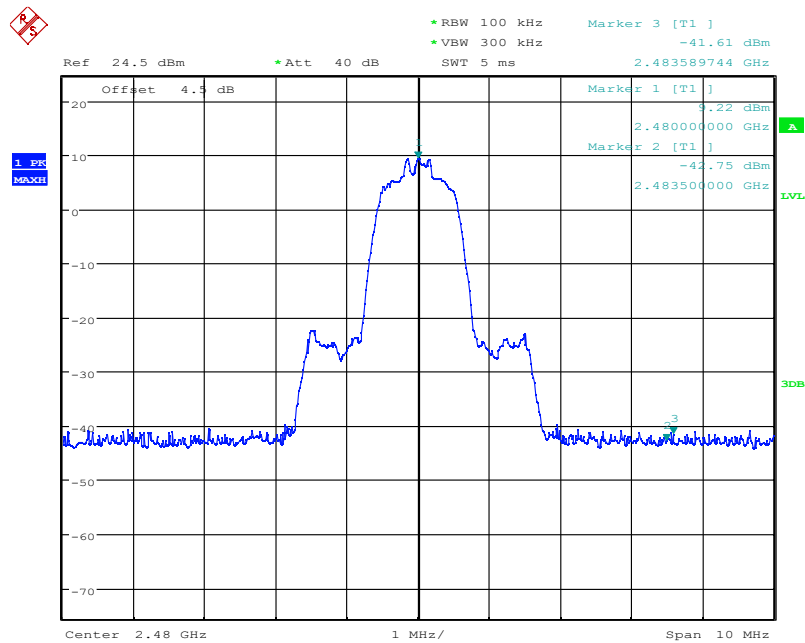


Date: 8.NOV.2021 10:11:04

Pi/4 DQPSK Hopping mode, left band-edge

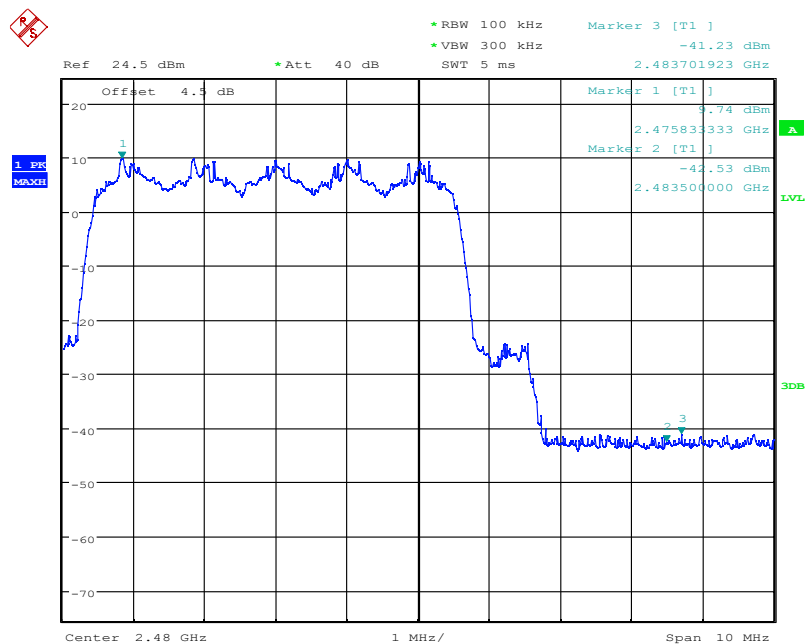
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 09:57:51

Pi/4 DQPSK Channel 78, fixed mode, right band-edge

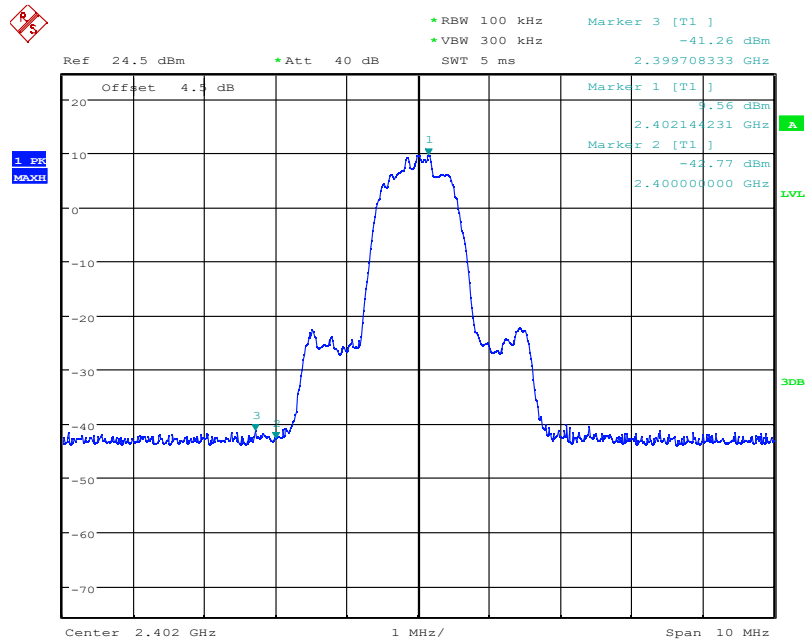


Date: 8.NOV.2021 10:08:23

Pi/4 DQPSK Hopping mode, right band-edge

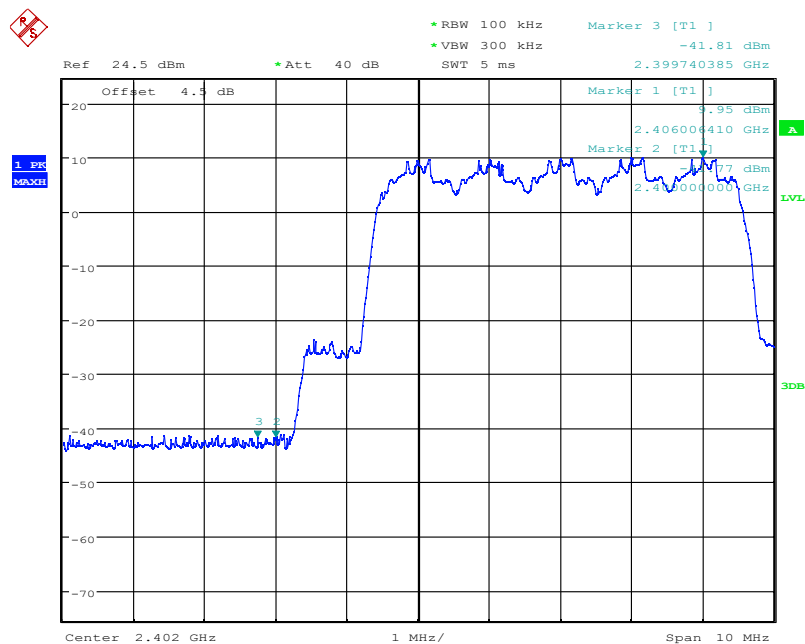
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 09:59:47

8DPSK Channel 0, fixed mode, left band-edge

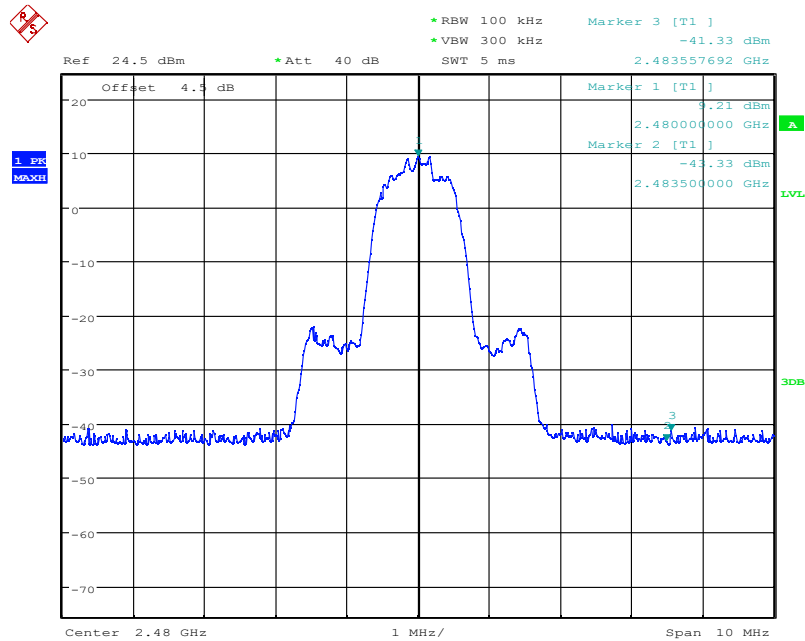


Date: 8.NOV.2021 10:10:29

8DPSK Hopping mode, left band-edge

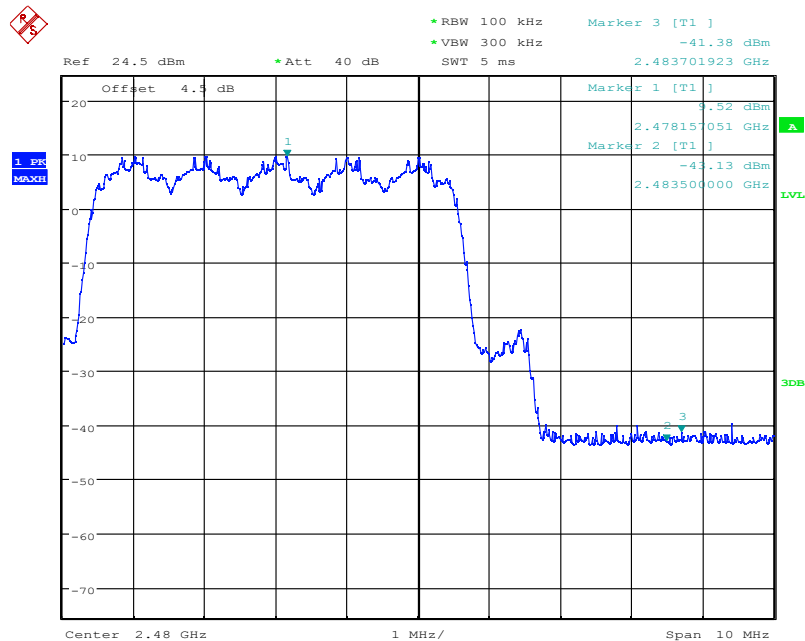
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 09:58:34

8DPSK Channel 78, fixed mode, right band-edge



Date: 8.NOV.2021 10:09:11

8DPSK Hopping mode, right band-edge

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

6.4. Frequency separation

Specifications:	FCC Part 15.247(a)
DUT Serial Number:	865171050693608
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

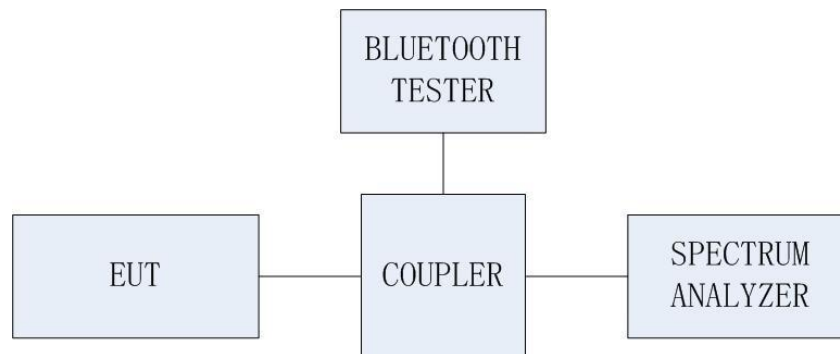
Limit Level Construction:

According to §15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25 kHz or 2/3 of the 20 dB bandwidth of the hopping channel (note), whichever is greater.

Note: it is for the power of less than 125 mw, and for others it is 20 dB bandwidth of the hopping channel.

Test Setup

The BLUETOOTH TESTER was used to set the TX channel and power level. The transmitter output is connected to Spectrum analyzer through a coupling.



Test Procedure

The spectrum analyzer is set to:

1. 20dBc Bandwidth: Span = 3 MHz, RBW=20 kHz, VBW=50 kHz, Sweep=auto.
2. Carrier Frequency Separation: Span = 3 MHz, RBW=100 kHz, VBW=300 kHz, Sweep=auto.

The trace was allowed to stabilize. The marker-delta function was used to determine the separation between the peaks of the adjacent channels.

The measurement is made according to ANSI C63.10-2013.

Note: --

Chongqing Academy of Information and Communication Technology

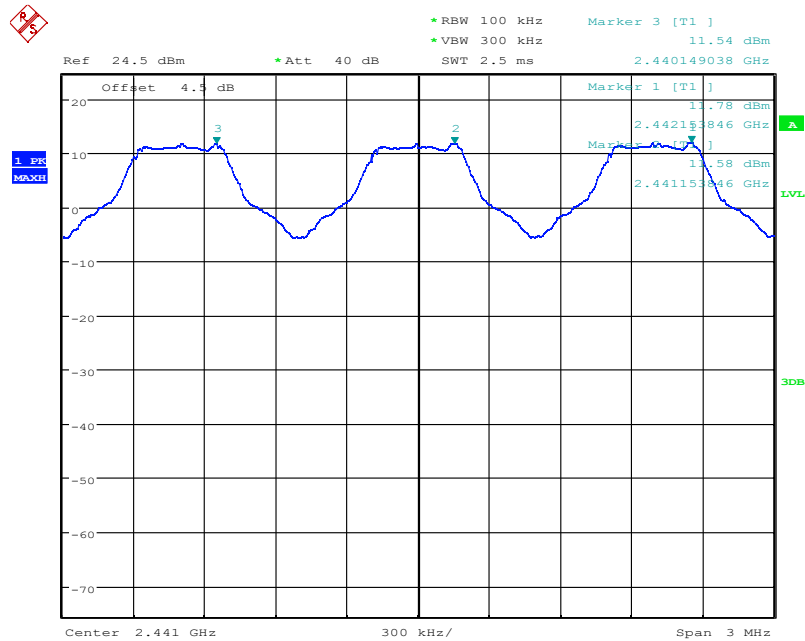
Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

Test Result:

Channel separation(kHz)	20dB Bandwidth(kHz)		Limit(kHz)	Result
GFSK				
1000	Ch 0	813	>542	Pass
	Ch 39	817	>545	Pass
	Ch 78	813	>542	Pass
Pi/4 DQPSK				
986	Ch 0	1264	>843	Pass
	Ch 39	1260	>840	Pass
	Ch 78	1260	>840	Pass
8DPSK				
851	Ch 0	1269	>846	Pass
	Ch 39	1269	>846	Pass
	Ch 78	1269	>846	Pass

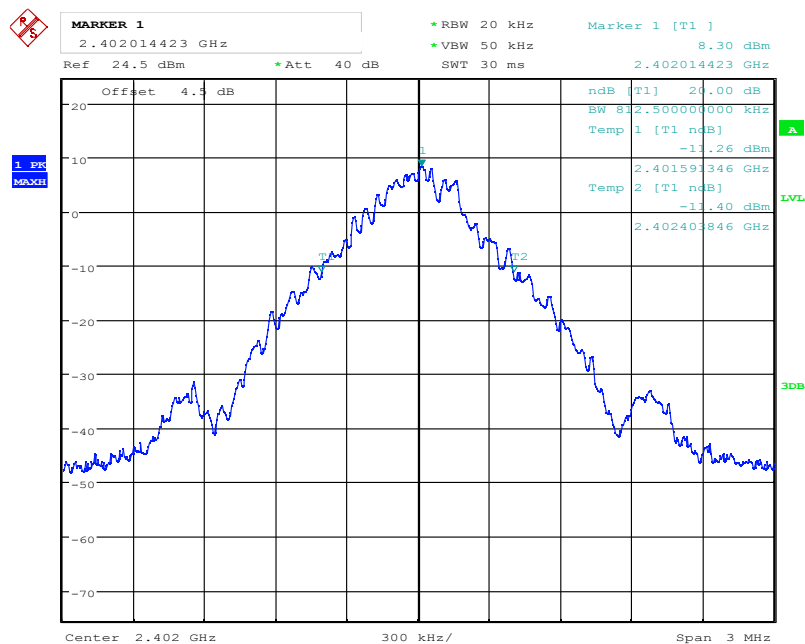
Graphical results:
Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777



Date: 8.NOV.2021 10:15:09

Channel Separation (GFSK)

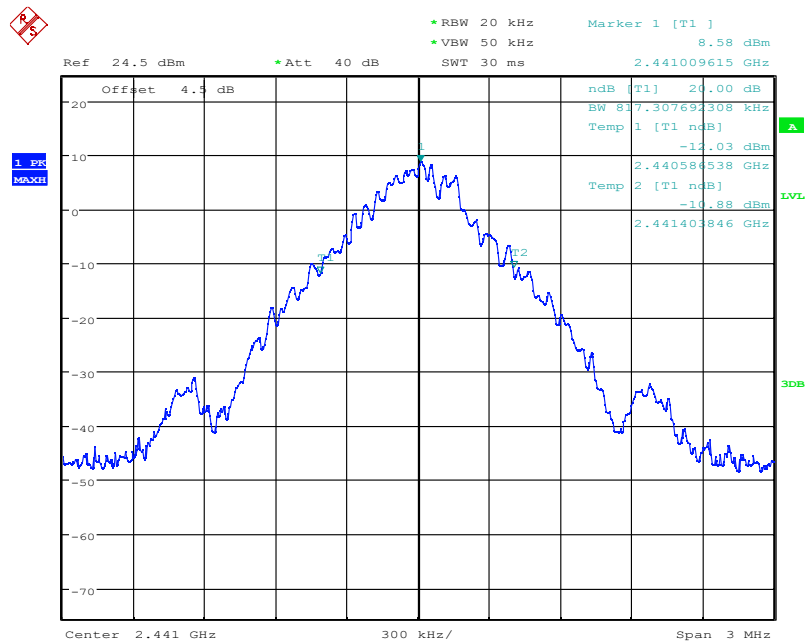


Date: 8.NOV.2021 10:24:23

20dB Bandwidth (GFSK Ch 0)

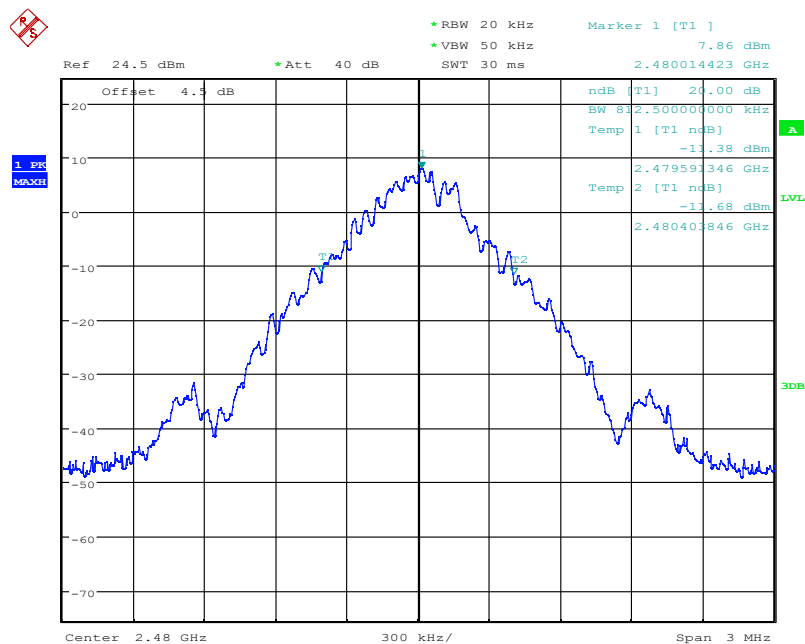
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 10:26:36

20dB Bandwidth (GFSK Ch 39)

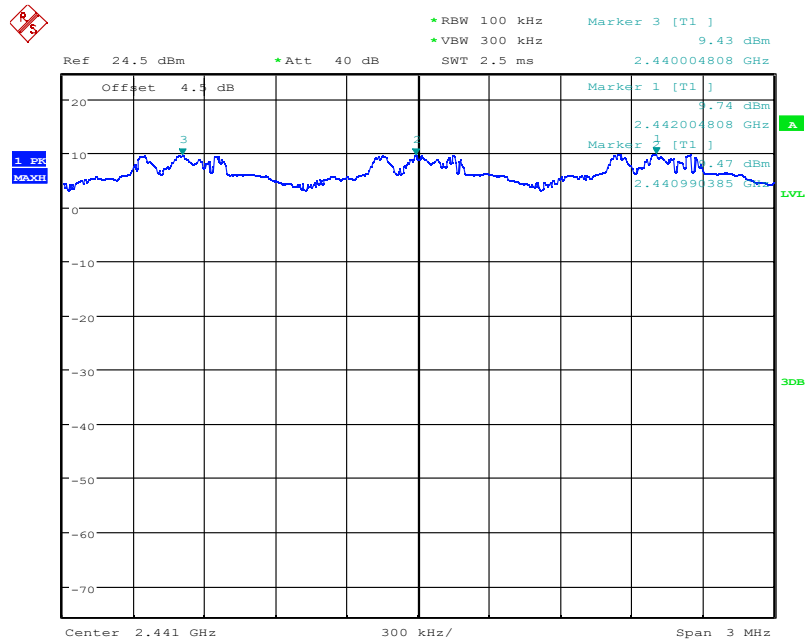


Date: 8.NOV.2021 10:27:15

20dB Bandwidth (GFSK Ch 78)

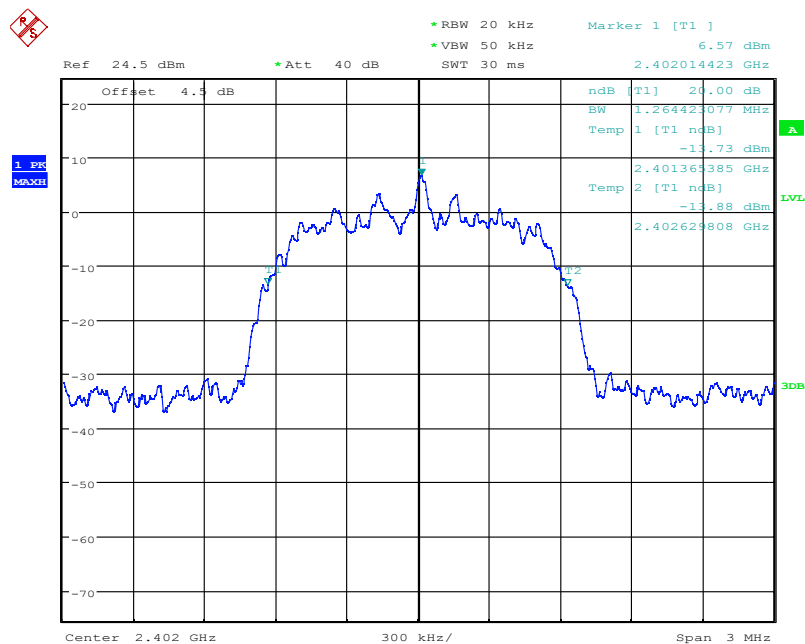
Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777



Date: 8.NOV.2021 10:21:52

Channel Separation (Pi/4 DQPSK)

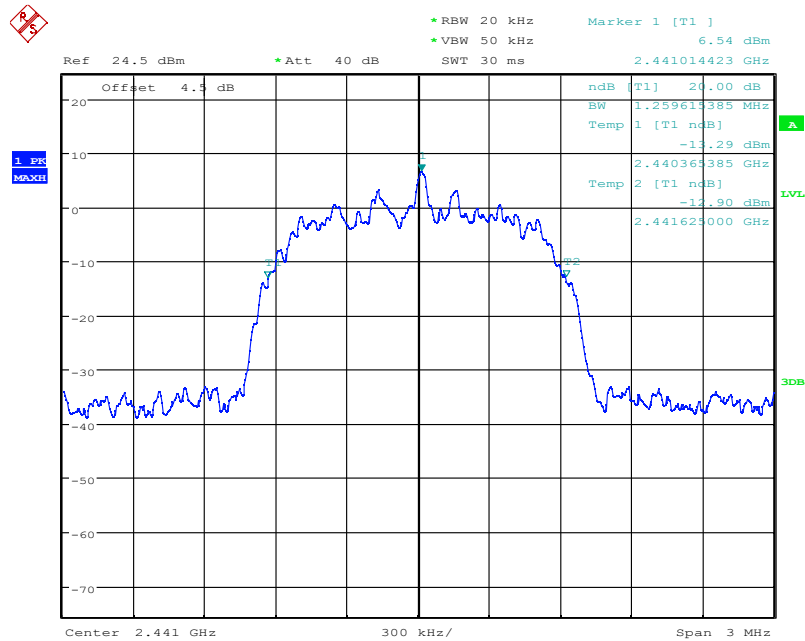


Date: 8.NOV.2021 10:24:51

20dB Bandwidth (Pi/4 DQPSK Ch0)

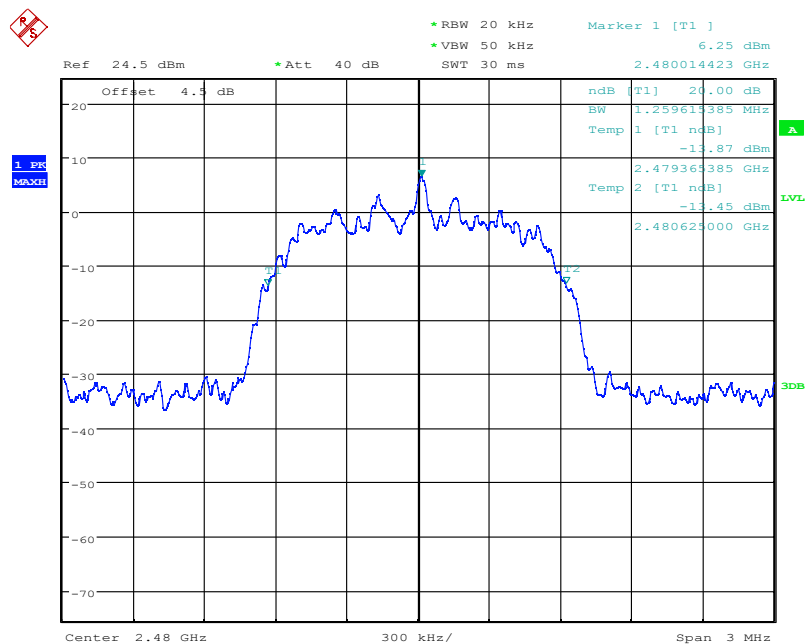
Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777



Date: 8.NOV.2021 10:26:10

20dB Bandwidth (Pi/4 DQPSK Ch39)

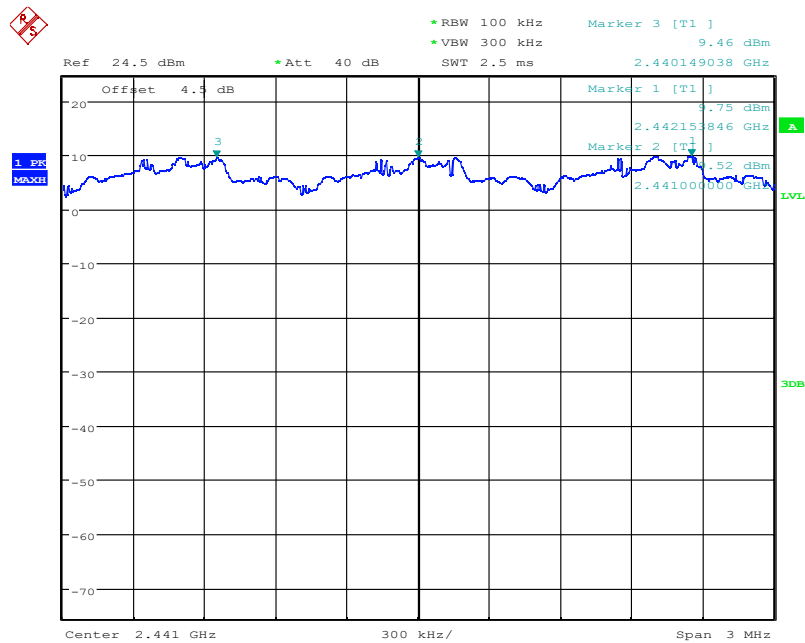


Date: 8.NOV.2021 10:27:38

20dB Bandwidth (Pi/4 DQPSK Ch78)

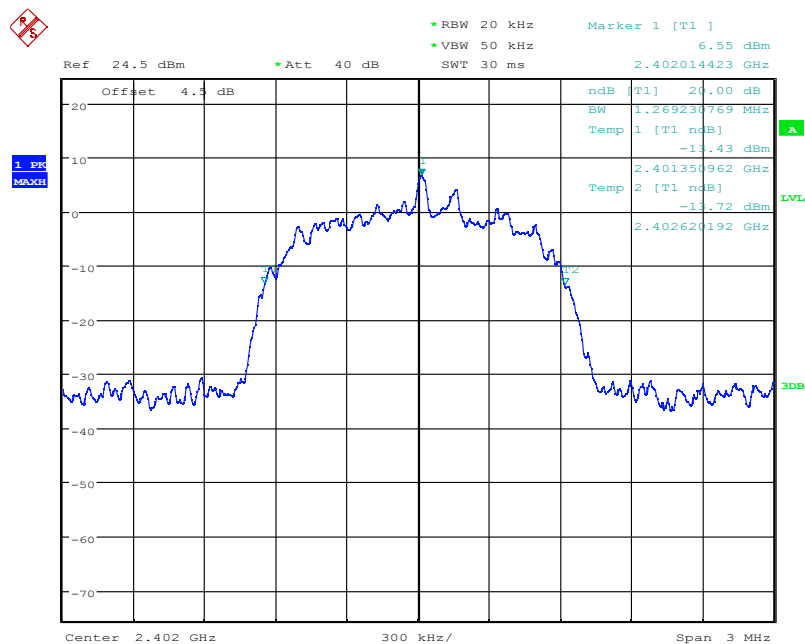
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 10:22:44

Channel Separation (8DPSK)

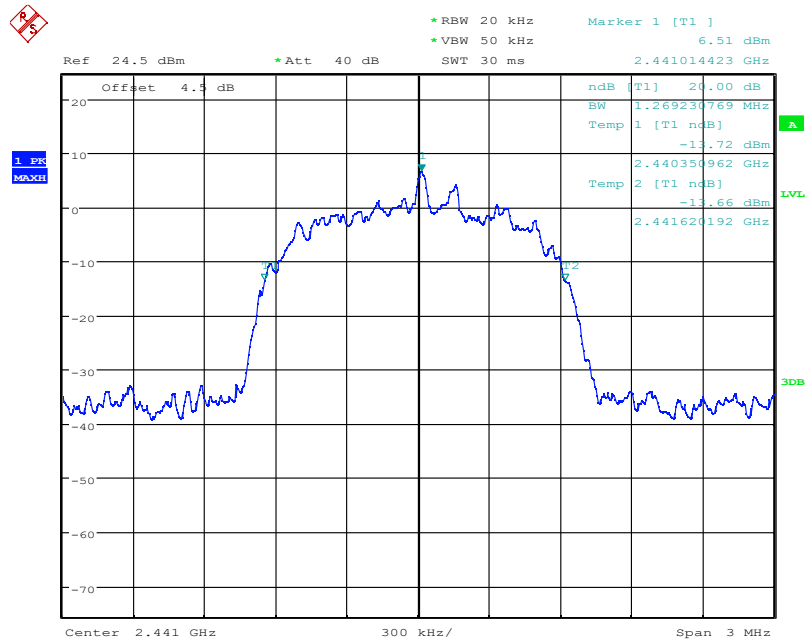


Date: 8.NOV.2021 10:25:15

20dB Bandwidth (8DPSK Ch0)

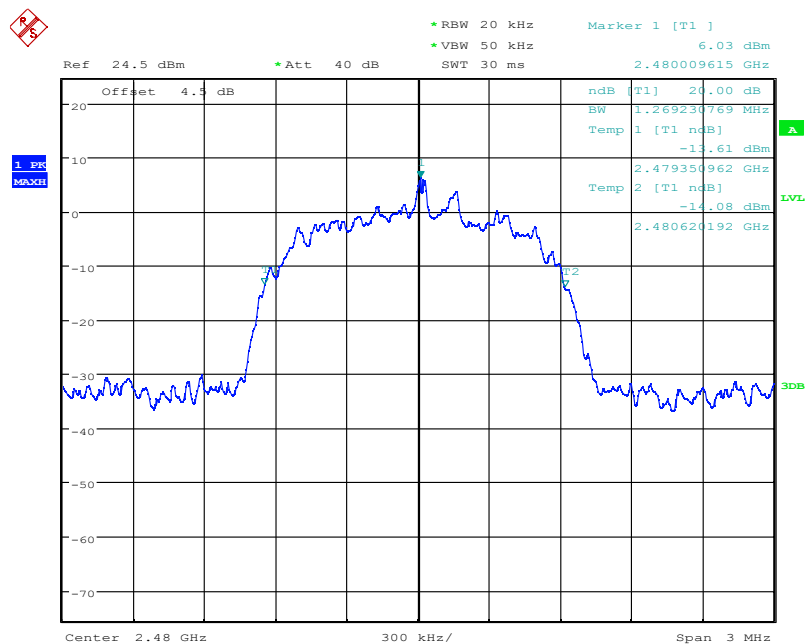
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 10:25:47

20dB Bandwidth (8DPSK Ch39)



Date: 8.NOV.2021 10:27:59

20dB Bandwidth (8DPSK Ch78)

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

6.5. Number of hopping frequency

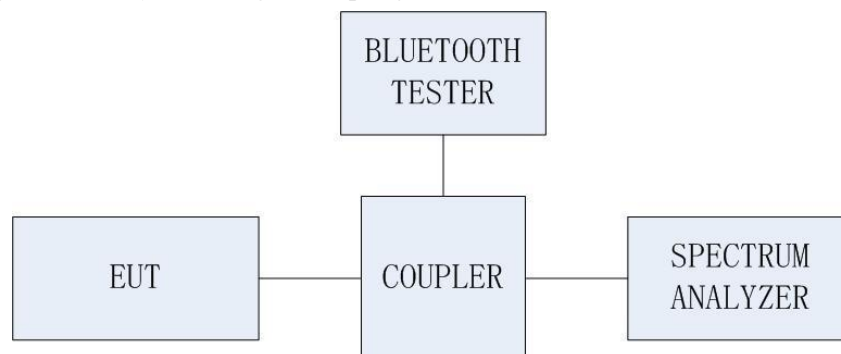
Specifications:	FCC Part 15.247(a)
DUT Serial Number:	865171050693608
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit Level Construction:

According to §15.247(a)(1)(ii), Frequency hopping systems operating in the 2400 MHz - 2483.5 MHz bands shall use at least 15 hopping frequencies.

Test Setup

The BLUETOOTH TESTER was used to set the TX channel and power level. The transmitter output is connected to Spectrum analyzer through a coupling.



Test Procedure

The Bluetooth frequency hopping function of the EUT was enabled. The spectrum analyzer was set to:

1. Span = the frequency band of operation, i.e. 2400-2441MHz and 2441-2484 MHz
2. RBW = 500 KHz
3. VBW = 500 KHz
4. Sweep = auto

The trace was allowed to stabilize.

The measurement is made according to ANSI C63.10-2013.

Note: --

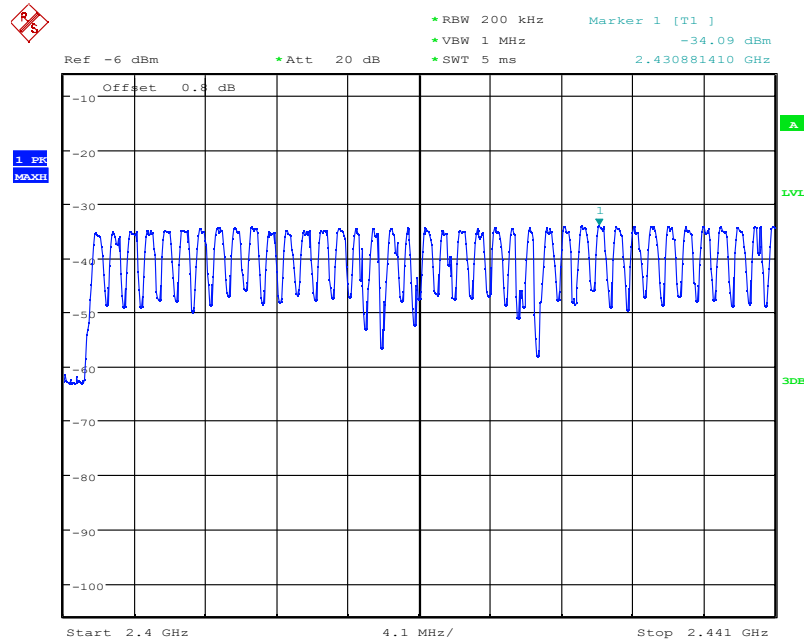
Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

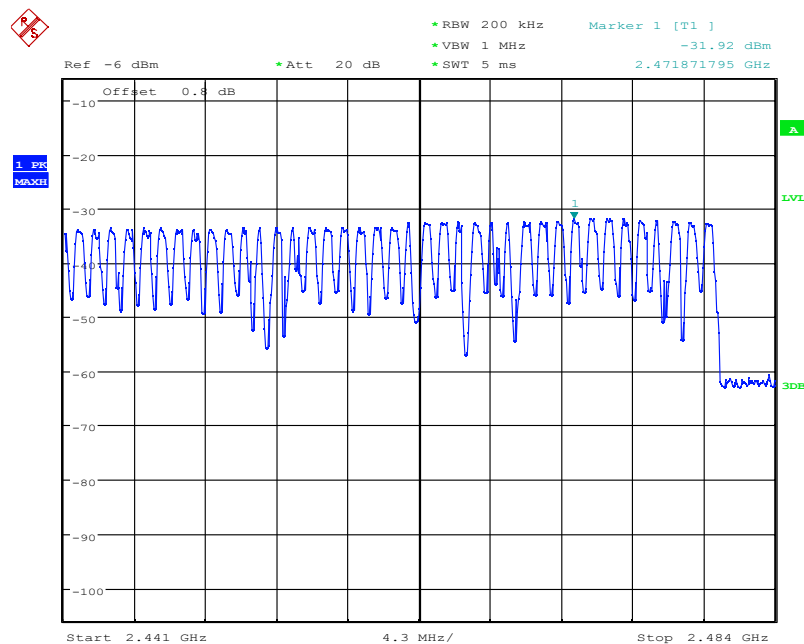
Test Result:

Modulation	No. of channels	Limit (No. of Ch)	Result
GFSK	79	>75	Pass
Pi/4 DQPSK	79	>75	Pass
8DPSK	79	>75	Pass

Graphical results:



Date: 20.DEC.2021 15:27:51

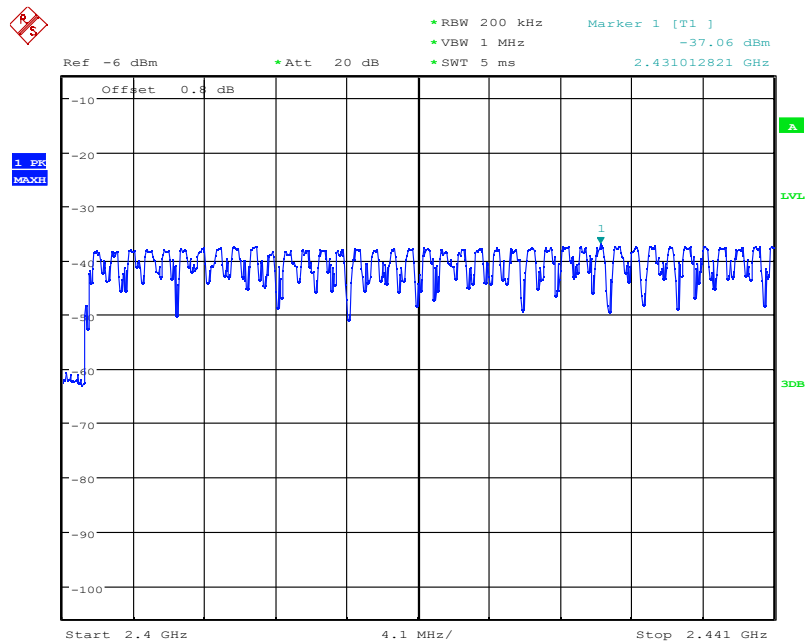


Date: 20.DEC.2021 15:31:53

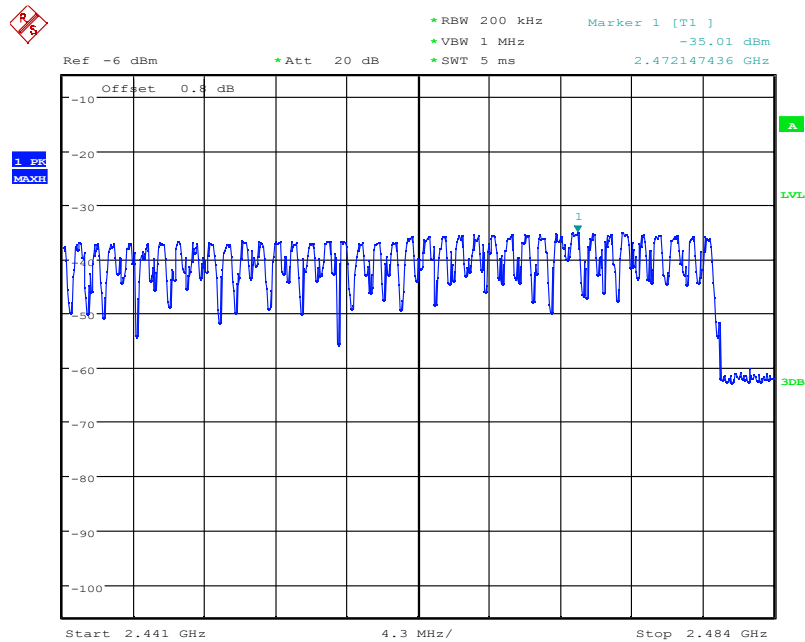
Channel Number (GFSK)

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
 Tel: 0086-23-88069965 FAX:0086-23-88608777



Date: 20.DEC.2021 15:49:53

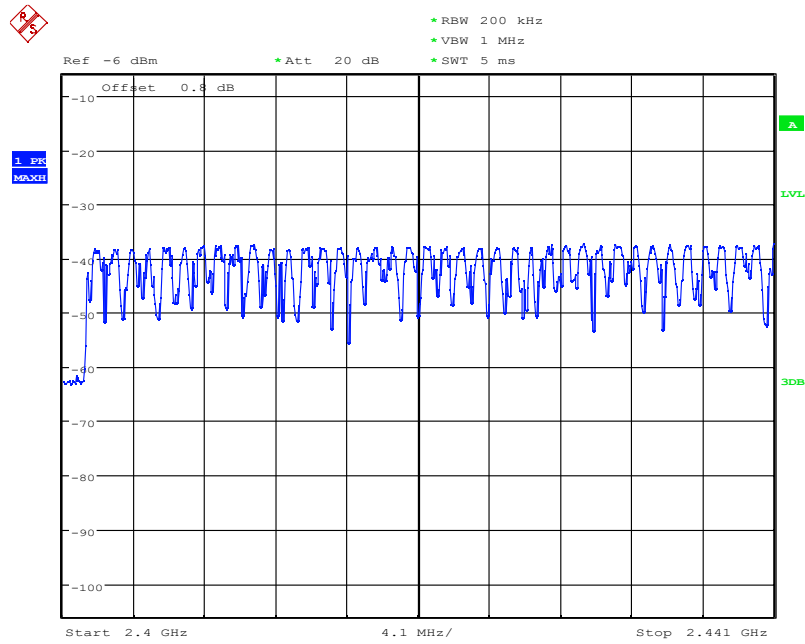


Date: 20.DEC.2021 15:38:16

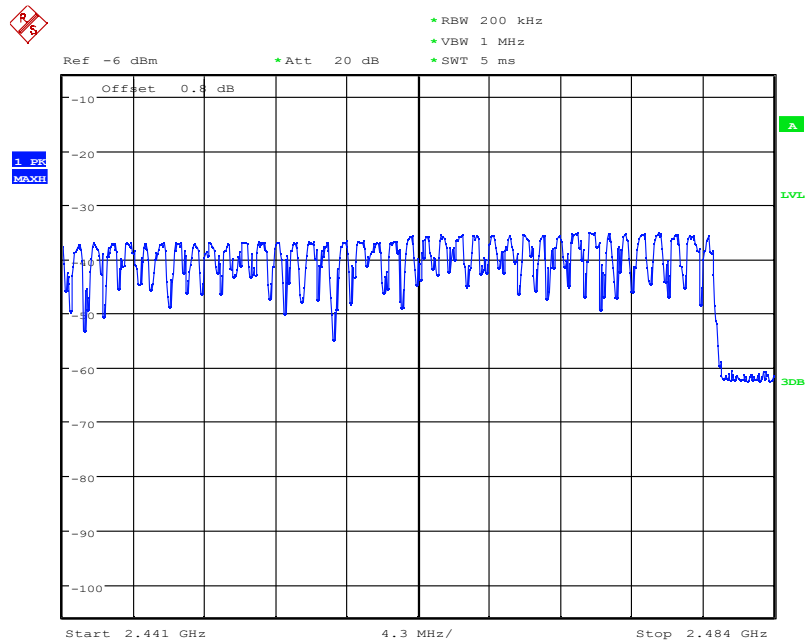
Channel Number (Pi/4 DQPSK)

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 20.DEC.2021 15:54:54



Date: 20.DEC.2021 16:01:04

Channel Number (8DPSK)

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

6.6. Time of occupancy

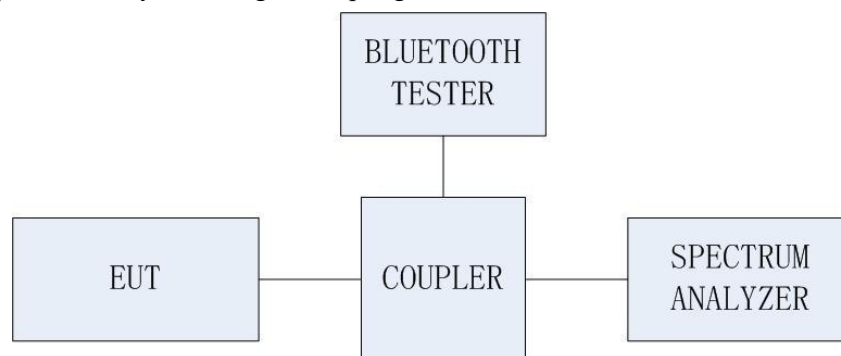
Specifications:	FCC Part 15.247(a)
DUT Serial Number:	865171050693608
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400 MHz - 2483.5 MHz bands. The average time of occupancy on any channels shall not greater than 0.4 s within a period 0.4 s multiplied by the number of hopping channels employed.

Test Setup

The BLUETOOTH TESTER was used to set the TX channel and power level. The transmitter output is connected to Spectrum analyzer through a coupling.



Test Procedure

The spectrum analyzer is set to:

1. Span = zero span
2. RBW = 1 MHz
3. VBW = 3 MHz
4. Sweep = as necessary to capture the entire dwell time per channel

The marker-delta function was used to determine the dwell time.

The measurement is made according to ANSI C63.10-2013.

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

Test Result:GFSK DH1:

$$0.375 \times (1600/2) / 79 \times 31.6 = 120\text{ms}$$

Pulse time[ms]	Total dwell[ms]	Period time[s]	Result
0.375	120	31.6	Pass

GFSK DH3:

$$1.637 \times (1600/4) / 79 \times 31.6 = 262\text{ms}$$

Pulse time[ms]	Total dwell[ms]	Period time[s]	Result
1.637	262	31.6	Pass

GFSK DH5:

$$2.878 \times (1600/6) / 79 \times 31.6 = 307\text{ms}$$

Pulse time[ms]	Total dwell[ms]	Period time[s]	Result
2.878	307	31.6	Pass

Pi/4 DQPSK 2DH1:

$$0.375 \times (1600/2) / 79 \times 31.6 = 120\text{ms}$$

Pulse time[ms]	Total dwell[ms]	Period time[s]	Result
0.375	120	31.6	Pass

Pi/4 DQPSK 2DH3:

$$1.649 \times (1600/4) / 79 \times 31.6 = 264\text{ms}$$

Pulse time[ms]	Total dwell[ms]	Period time[s]	Result
1.649	264	31.6	Pass

Pi/4 DQPSK 2DH5:

$$2.371 \times (1600/6) / 79 \times 31.6 = 253\text{ms}$$

Pulse time[ms]	Total dwell[ms]	Period time[s]	Result
2.371	253	31.6	Pass

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777

8DPSK 3DH1:

$$1.144 \times (1600/2) / 79 \times 31.6 = 366 \text{ ms}$$

Pulse time[ms]	Total dwell[ms]	Period time[s]	Result
1.144	366	31.6	Pass

8DPSK 3DH3:

$$0.381 \times (1600/4) / 79 \times 31.6 = 61 \text{ ms}$$

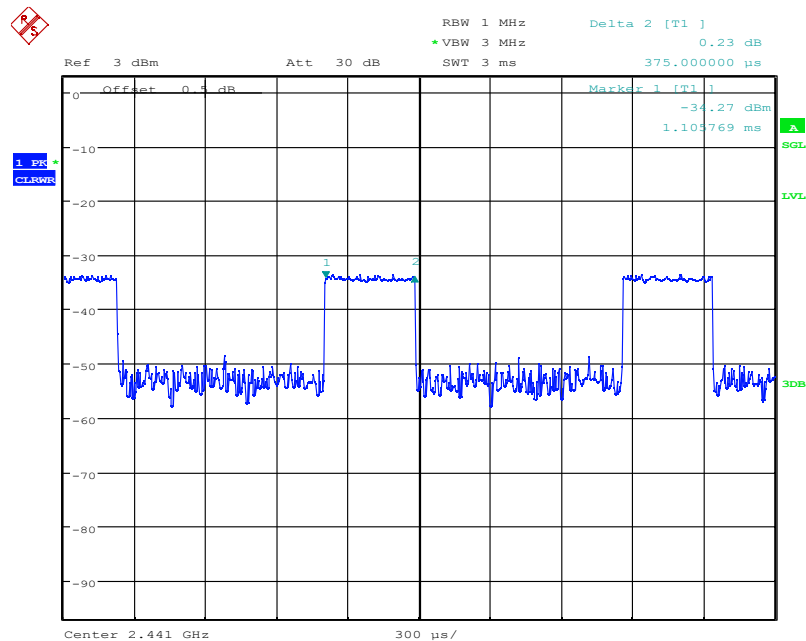
Pulse time[ms]	Total dwell[ms]	Period time[s]	Result
0.381	61	31.6	Pass

8DPSK 3DH5:

$$2.881 \times (1600/6) / 79 \times 31.6 = 307 \text{ ms}$$

Pulse time[ms]	Total dwell[ms]	Period time[s]	Result
2.881	307	31.6	Pass

Graphical results:

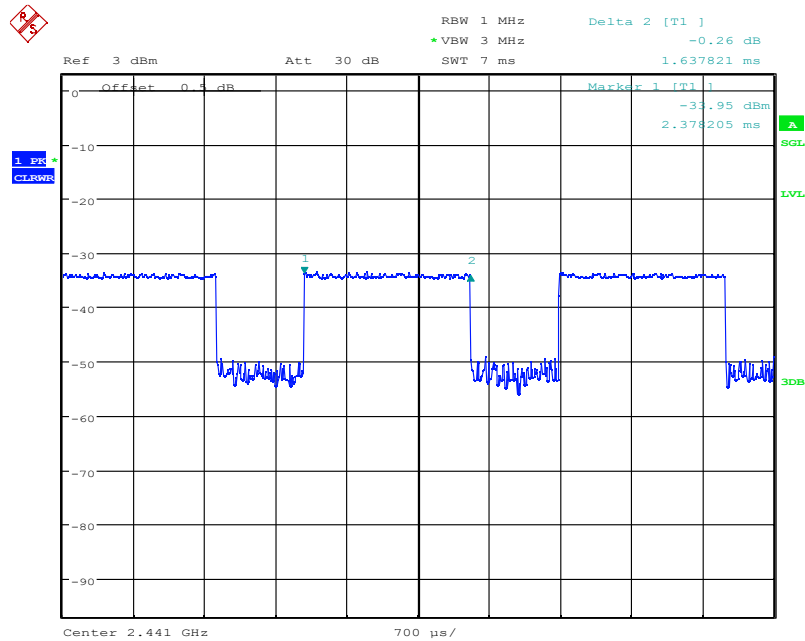


Date: 11.NOV.2021 17:58:49

GFSK DH1

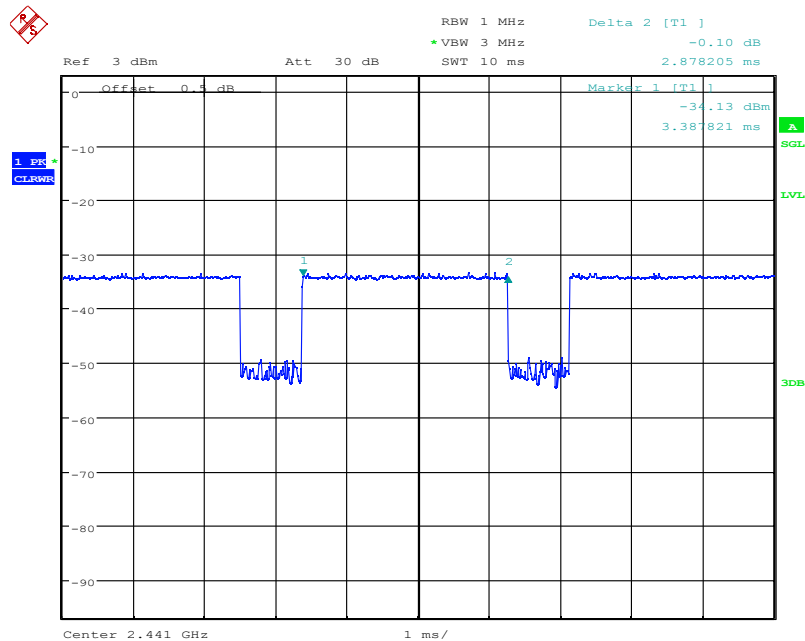
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 11.NOV.2021 18:14:19

GFSK DH3

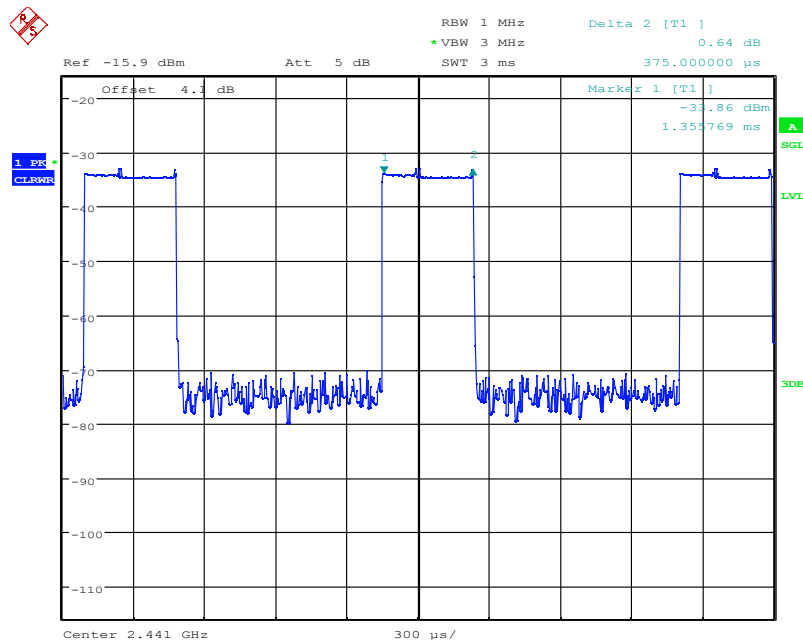


Date: 11.NOV.2021 18:15:38

GFSK DH5

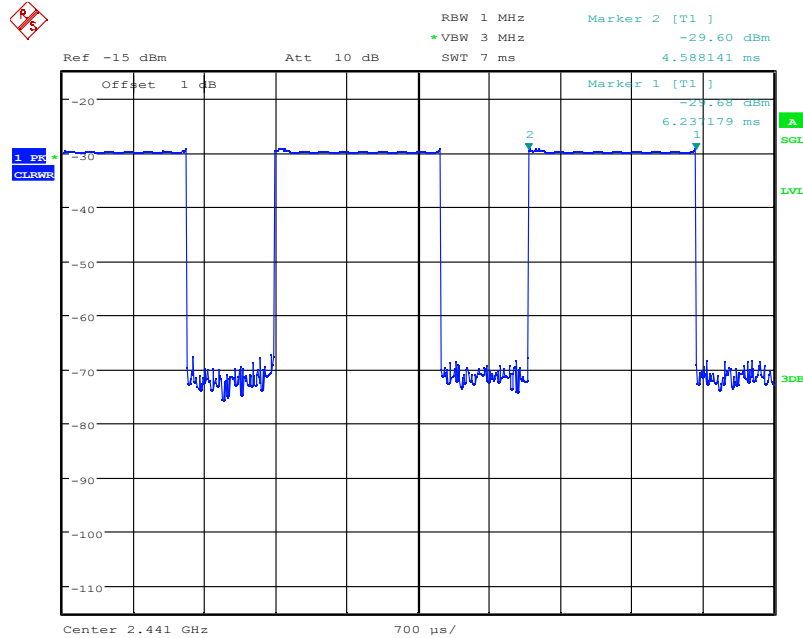
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
 Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 11.NOV.2021 22:24:32

Pi/4 DQPSK 2DH1

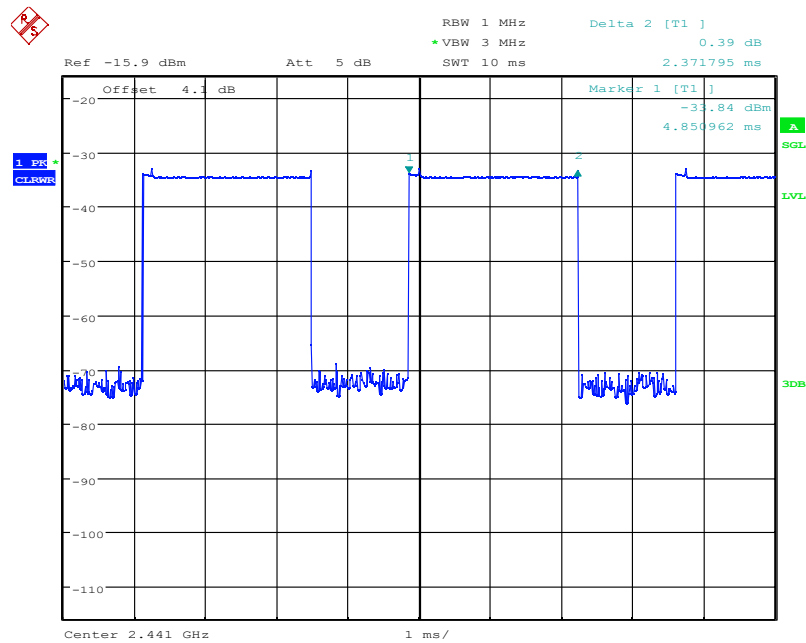


Date: 11.DEC.2021 14:55:27

Pi/4 DQPSK 2DH3

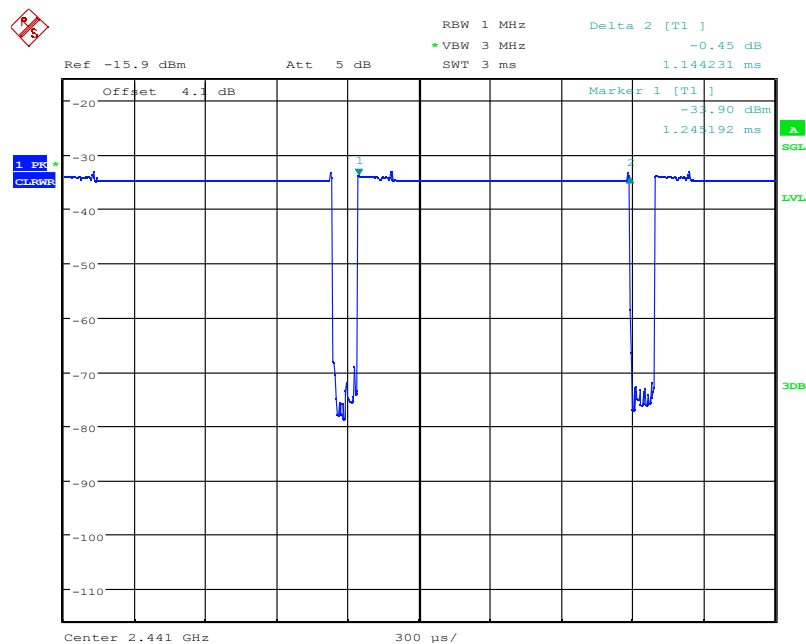
Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
 Tel: 0086-23-88069965 FAX:0086-23-88608777



Date: 11.NOV.2021 22:25:50

Pi/4 DQPSK 2DH5

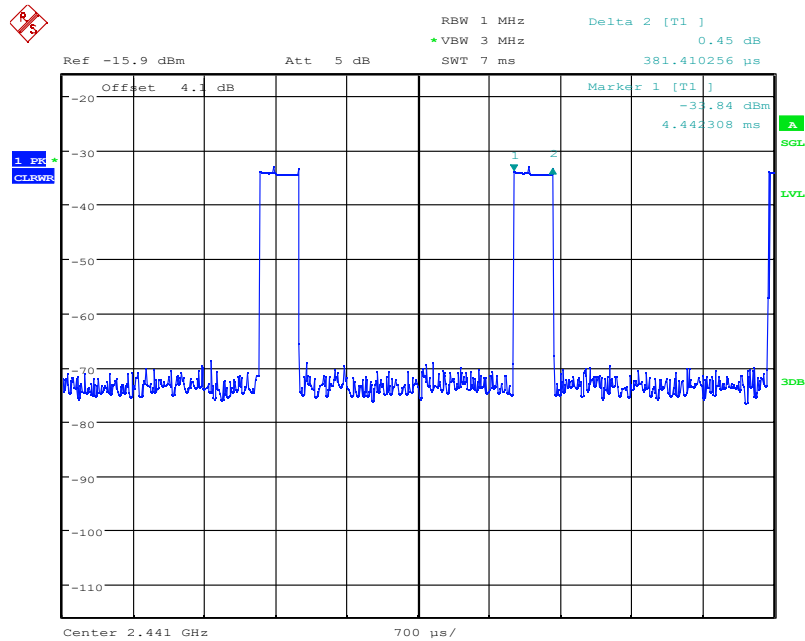


Date: 11.NOV.2021 22:26:20

8DPSK 3DH1

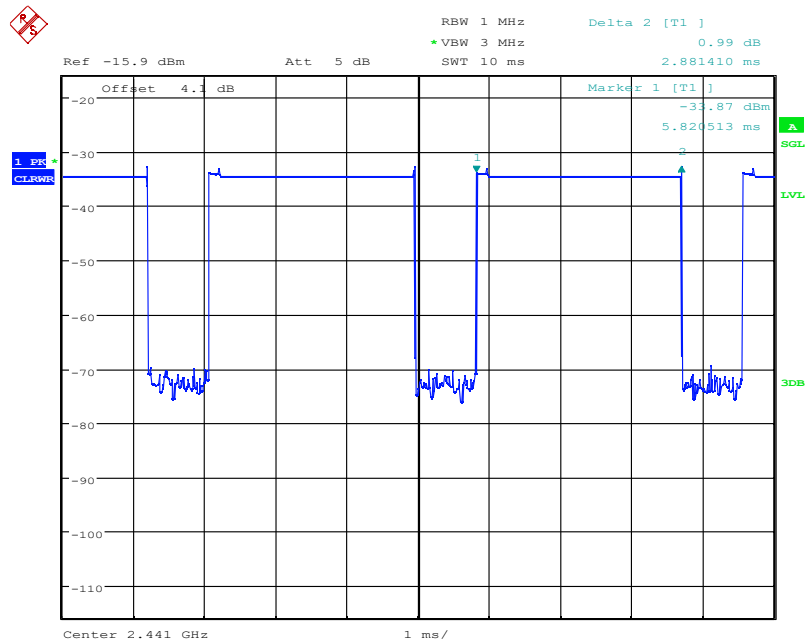
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
 Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 11.NOV.2021 22:26:55

8DPSK 3DH3



Date: 11.NOV.2021 22:27:20

8DPSK 3DH5

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
 Tel: 0086-23-88069965 FAX: 0086-23-88608777

6.7. Transmitter Spurious Emission-Conducted

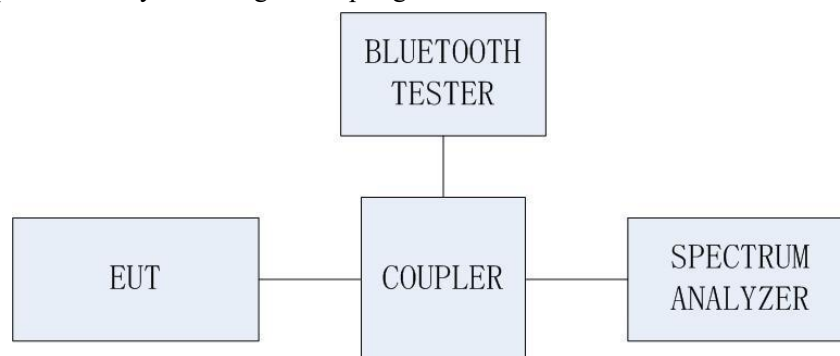
Specifications:	FCC Part 15.247(d)
DUT Serial Number:	865171050693608
Test conditions:	Ambient Temperature:15℃-35℃ Relative Humidity:30%-60% Air pressure: 86-106kPa
Test Results:	Pass

Limit

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

Test Setup

The BLUETOOTH TESTER was used to set the TX channel and power level. The transmitter output is connected to Spectrum analyzer through a coupler.



Test Procedure

Conducted RF measurements of the transmitter output were made to confirm that the EUT antenna port conducted emissions meet the specified limit and to identify any spurious signals that require further investigation or measurements on the radiated emissions site. The transmitter output is connected to the spectrum analyzer. The resolution bandwidth is set to 100 KHz. The video bandwidth is set to 300 KHz. Measurements are made over the 30 MHz to 26 GHz range with the transmitter set to the lowest, middle, and highest channels.

Chongqing Academy of Information and Communication Technology

Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336
Tel: 0086-23-88069965 FAX:0086-23-88608777

The measurement is made according to ANSI C63.10-2013.

Test Result:
GFSK

Channel	Frequency Range	Results
0	Center Frequency	Pass
	30 MHz – 1 GHz	Pass
	1 GHz – 3 GHz	Pass
	3 GHz – 10 GHz	Pass
	10 GHz – 26.5 GHz	Pass
39	Center Frequency	Pass
	30 MHz – 1 GHz	Pass
	1 GHz – 3 GHz	Pass
	3 GHz – 10 GHz	Pass
	10 GHz – 26.5 GHz	Pass
78	Center Frequency	Pass
	30 MHz – 1 GHz	Pass
	1 GHz – 3 GHz	Pass
	3 GHz – 10 GHz	Pass
	10 GHz – 26.5 GHz	Pass

Pi/4 DQPSK

Channel	Frequency Range	Results
0	Center Frequency	Pass
	30 MHz – 1 GHz	Pass
	1 GHz – 3 GHz	Pass
	3 GHz – 10 GHz	Pass
	10 GHz – 26.5 GHz	Pass
39	Center Frequency	Pass
	30 MHz – 1 GHz	Pass

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
 Tel: 0086-23-88069965 FAX: 0086-23-88608777

	1 GHz – 3 GHz	Pass
	3 GHz – 10 GHz	Pass
	10 GHz – 26.5 GHz	Pass
78	Center Frequency	Pass
	30 MHz – 1 GHz	Pass
	1 GHz – 3 GHz	Pass
	3 GHz – 10 GHz	Pass
	10 GHz – 26.5 GHz	Pass

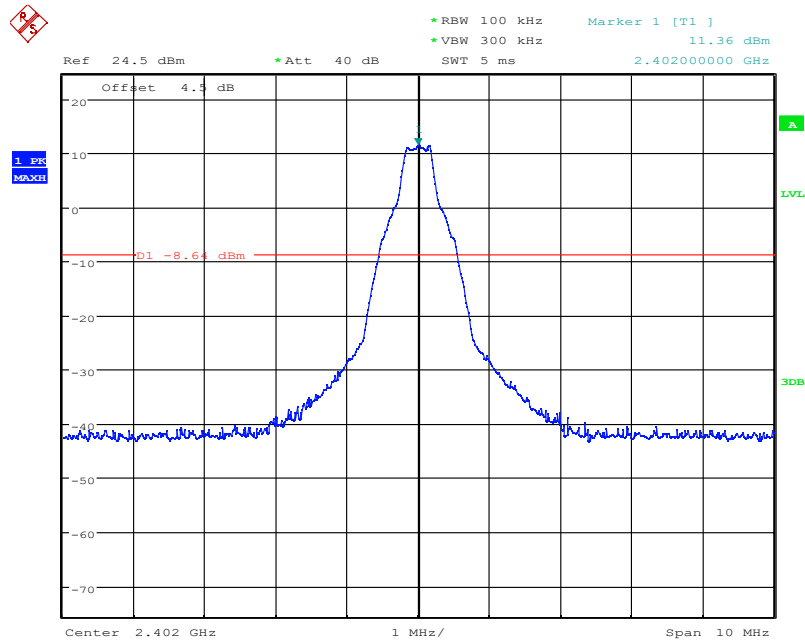
8DPSK

Channel	Frequency Range	Results
0	Center Frequency	Pass
	30 MHz – 1 GHz	Pass
	1 GHz – 3 GHz	Pass
	3 GHz – 10 GHz	Pass
	10 GHz – 26.5 GHz	Pass
39	Center Frequency	Pass
	30 MHz – 1 GHz	Pass
	1 GHz – 3 GHz	Pass
	3 GHz – 10 GHz	Pass
	10 GHz – 26.5 GHz	Pass
78	Center Frequency	Pass
	30 MHz – 1 GHz	Pass
	1 GHz – 3 GHz	Pass
	3 GHz – 10 GHz	Pass
	10 GHz – 26.5 GHz	Pass

Graphical results:

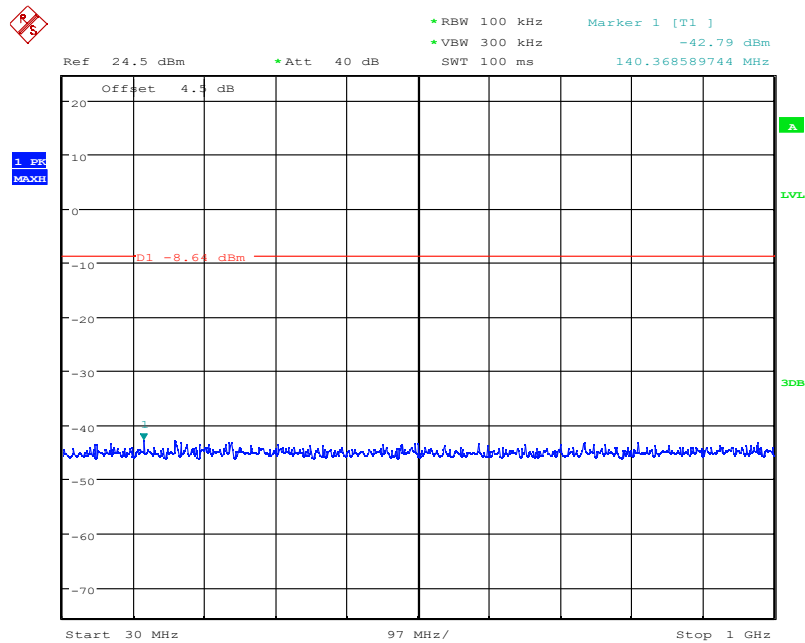
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
 Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 10:37:57

GFSK CH0 Center Frequency

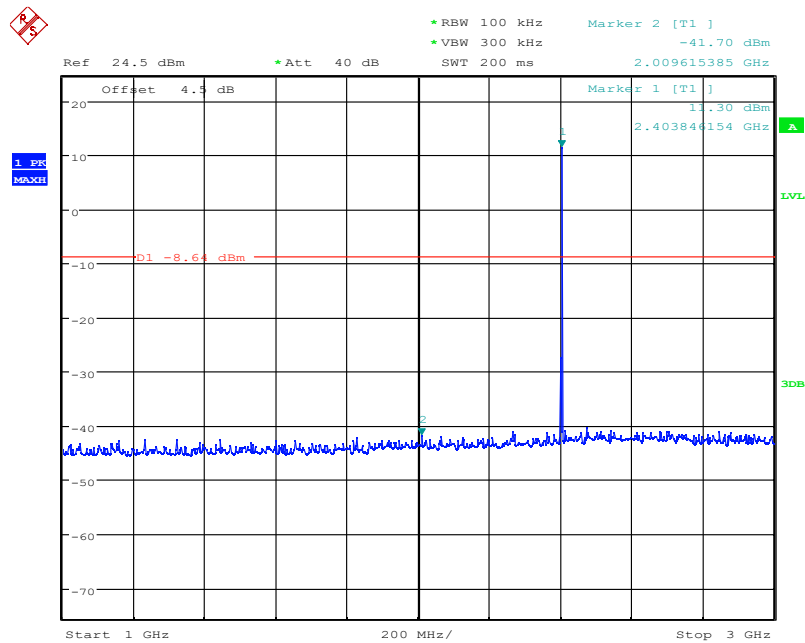


Date: 8.NOV.2021 10:40:07

GFSK CH0 30MHz – 1GHz

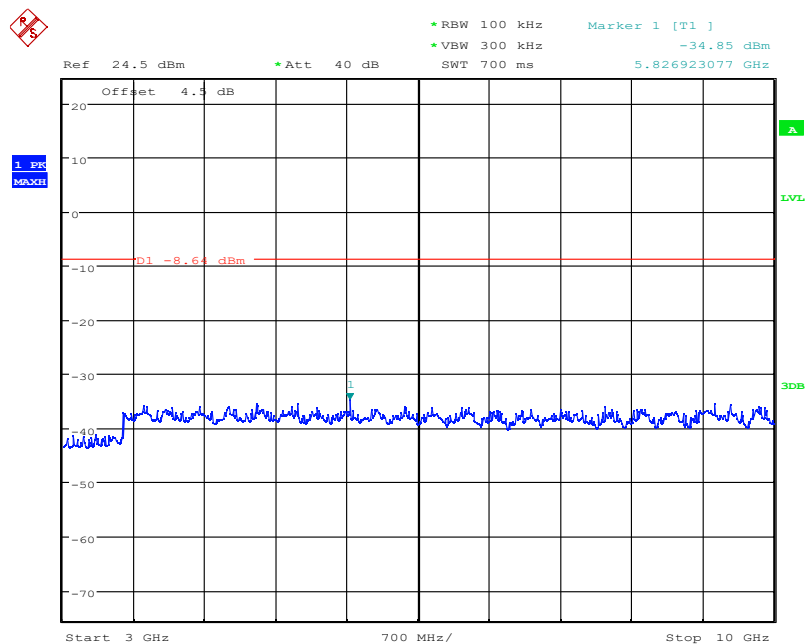
Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777



Date: 8.NOV.2021 10:40:32

GFSK CH0 1GHz – 3GHz



Date: 8.NOV.2021 10:40:50

GFSK CH0 3GHz – 10GHz

Chongqing Academy of Information and Communication Technology

Address: No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China, 401336
Tel: 0086-23-88069965 FAX: 0086-23-88608777