

TEST REPORT

No.I23N01711-BT

for

Realme Chongqing Mobile Telecommunications Corp., Ltd.

Mobile Phone

Model Name: RMX3840

with

Hardware Version: 11

Software Version: realme UI 5.0

FCC ID: 2AUYFRMX3840

Issued Date: 2023-12-06

Designation Number: CN1210

Note:

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

Test Laboratory:

SAICT, Shenzhen Academy of Information and Communications Technology

Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 518000.

Tel:+86(0)755-33322000, Fax:+86(0)755-33322001

Email: yewu@caict.ac.cn. www.saict.ac.cn



REPORT HISTORY

Report Number	Revision	Description	Issue Date
I23N01711-BT	Rev.0	1st edition	2023-12-06

Note: the latest revision of the test report supersedes all previous versions.



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1. Summary of Test Report

1.1. Test Items

Description	Mobile Phone
Model Name	RMX3840
Applicant's name	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Manufacturer's Name	Realme Chongqing Mobile Telecommunications Corp., Ltd.

1.2. Test Standards

FCC Part15-2021; ANSI C63.10-2013.

1.3. Test Result

Pass

Please refer to "5.2.Test Results"

1.4. Testing Location

Address: Building G, Shenzhen International Innovation Center, No.1006 Shennan Road, Futian District, Shenzhen, Guangdong, P. R. China 51800

1.5. Project data

Testing Start Date:	2023-10-25
Testing End Date:	2023-11-24

1.6. Signature

Lin Zechuang (Prepared this test report)

An Ran (Reviewed this test report)

Zhang Bojun (Approved this test report)



2. Client Information

2.1. Applicant Information

Company Name:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Address:	No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China
Contact Person	Yang LiangPing
E-Mail	ylp@realme.net
Telephone:	(86)13798864426
Fax:	1

2.2. Manufacturer Information

Company Name:	Realme Chongqing Mobile Telecommunications Corp., Ltd.
Address:	No.178 Yulong Avenue, Yufengshan, Yubei District, Chongqing, China
Contact Person	Yang LiangPing
E-Mail	ylp@realme.net
Telephone:	(86)13798864426
Fax:	1



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

3.1.<u>About EUT</u>

Description	Mobile Phone
Model Name	RMX3840
Frequency Band	ISM 2400MHz~2483.5MHz
Equipment type	Bluetooth [®] BR/EDR
Type of Modulation	GFSK/π/4 DQPSK/8DPSK
Number of Channels	79
Antenna Type	Integrated antenna
Antenna Gain	Antenna 12:-1.7dBi; Antenna 2:-4.9dBi.
Power Supply	3.89V DC by Battery
FCC ID	2AUYFRMX3840
Condition of EUT as received	No abnormality in appearance

Note: Components list, please refer to documents of the manufacturer; it is also included in the original test record of Shenzhen Academy of Information and Communications Technology.

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version	Date of Receipt
UT10aa	863994060028495	11	realme UI 5.0	2023-10-17
UTIUda	863994060028487	11		2023-10-17
UT07aa	867815060019513	11	realme UI 5.0	2022-10-19
010788	867815060019505	11		2022-10-13
UT06aa	867815060019497	11	realme UI 5.0	2022-10-19
	867815060019489	11		2022-10-19

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

UT10aa is used for conduction test, UT07aa is used for radiation test, and UT06aa is used for AC Power line Conducted Emission test.

3.3. Internal Identification of AE used during the test

AE No.	Description	AE ID*
AE1	Battery	1
AE2	Charger	1
AE3	USB Cable	/

AE1

Model	BLPA35
Manufacturer	Sunwoda Electronic Co.,Ltd.
Capacity	4880mAh
Nominal Voltage	3.91 V
AE2	
Model	VCB7OAUH



Manufacturer Specification	HUIZHOU GOLDEN LAKE INDUSTRIAL CO., LTD American Standard Charger
AE3	
Model	DL129
Manufacturer	1

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

3.4. General Description

The Equipment under Test (EUT) is a model of Smart Phone with integrated antenna and battery. It consists of normal options: Lithium Battery and Charger and USB Cable. Manual and specifications of the EUT were provided to fulfil the test.

Samples undergoing test were selected by the client.



4. <u>Reference Documents</u>

4.1. Documents supplied by applicant

EUT feature information is supplied by the applicant or manufacturer, which is the basis of testing.

4.2. Reference Documents for testing

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

Reference	Title	Version
FCC Part 15	FCC CFR 47, Part 15, Subpart C:	2021
	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	
ANSI C63.10	American National Standard of Procedures for Compliance	2013
	Testing of Unlicensed Wireless Devices	



5. Test Results

5.1. Testing Environment

Normal Temperature:	15~35°C
Relative Humidity:	20~75%

5.2. Test Results

No	Test cases	Sub-clause of Part 15C	Verdict
0	Antenna Requirement	15.203	Р
1	Maximum Peak Output Power	15.247 (b)	Р
2	Band Edges Compliance	15.247 (d)	Р
3	Conducted Spurious Emission	15.247 (d)	Р
4	Radiated Spurious Emission	15.247,15.205,15.209	Р
5	Occupied 20dB bandwidth	15.247(a)	1
6	Time of Occupancy(Dwell Time)	15.247(a)	Р
7	Number of Hopping Channel	15.247(a)	Р
8	Carrier Frequency Separation	15.247(a)	Р
9	AC Power line Conducted Emission	15.107,15.207	Р

See **ANNEX A** for details.

5.3. <u>Statements</u>

SAICT has evaluated the test cases requested by the applicant/manufacturer as listed in section 5.2 of this report, for the EUT specified in section 3, according to the standards or reference documents listed in section 4.2.

Disclaimer:

A. After confirmation with the customer, the sample information provided by the customer may affect the validity of the measurement results in this report, and the impact and consequences arising therefrom shall be borne by the customer.

B. The samples in this report are provided by the customer, and the test results are only applicable to the samples received.



6. Test Equipments Utilized

Conducted test system

No.	No. Equipment Model Serial Number Manufact		Manufacturer	Calibration	Calibration	
NO.	Equipment	wouer	Serial Nulliber	Manufacturer	Due date	Period
1	Vector Signal	FSV40	100903	Rohde & Schwarz	2023-12-28	1 voor
	Analyzer	F3V40	100903		2023-12-20	1 year
2	Power Sensor	U2021XA	MY55430013	Keysight	2023-12-28	1 year
3	Data Acquisition	U2531A	TW55443507	Keysight	/	/
4	RF Control Unit	JS0806-2	21C8060398	Tonscend	2024-05-07	1 year
5	Wireless	CMW270	100540	Rohde & Schwarz	2024-03-12	1 voor
5	Connective Tester	CIVIVZ70	100540		2024-03-12	1 year
6	Shielding Room	S81	CT000986-1344	ETS-Lindgren	2026-09-12	5 years

Radiated test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	Calibration Period
1	Test Receiver	ESR7	101676	Rohde & Schwarz	2024-11-22	1 year
2	BiLog Antenna	3142E	0224831	ETS-Lindgren	2024-05-27	3 years
3	Horn Antenna	3117	00066577	ETS-Lindgren	2025-04-17	3 years
4	Anechoic Chamber	FACT3-2.0	1285	ETS-Lindgren	2025-05-28	2 years
5	Spectrum Analyzer	FSV40	101192	Rohde & Schwarz	2024-01-11	1 year
6	Loop Antenna	HLA6120	35779	TESEQ	2025-05-12	3 years
7	Horn Antenna	QSH-SL-1 8-26-S-20	17013	Q-par	2026-02-01	3 years
8	Test Receiver	ESCI	100702	Rohde & Schwarz	2024-01-11	1 year
9	LISN	ENV216	102067	Rohde & Schwarz	2024-10-07	1 year

Test software

No.	Equipment	Manufacturer	Version
1	JS1120-3	Tonscend	3.3
2	EMC32	Rohde & Schwarz	10.50.40

EUT is engineering software provided by the customer to control the transmitting signal. The EUT was programmed to be in continuously transmitting mode.



7. Laboratory Environment

Shielded room

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

Anechoic chamber

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. = 20 %, Max. = 75 %
Shielding effectiveness	0.014MHz-1MHz> 60 dB; 1MHz-18000MHz>90 dB
Electrical insulation	> 2MΩ
Ground system resistance	< 4 Ω
Normalised site attenuation (NSA)	< \pm 4 dB, 3 m distance, from 30 to 1000 MHz
Voltage Standing Wave Ratio (VSWR)	≤ 6 dB, from 1 to 18 GHz, 3m distance
Uniformity of field strength	Between 0 and 6 dB, from 80 to 6000 MHz



8. <u>Measurement Uncertainty</u>

Test Name	Uncertainty (<i>k</i> =2)	
1. Maximum Peak Output Power	1.32	dB
2. Band Edges Compliance	1.92	dB
	30MHz≤f<1GHz	1.41dB
2 Transmitter Spurious Emission Conducted	1GHz≤f<7GHz	1.92dB
3. Transmitter Spurious Emission - Conducted	7GHz≤f<13GHz	2.31dB
	13GHz≤f≤26GHz	2.61dB
	9kHz≤f<30MHz	1.70dB
1 Transmitter Spurious Emission Dedicted	30MHz≤f<1GHz	4.80dB
4 Transmitter Spurious Emission - Radiated	1GHz≤f<18GHz	4.62dB
	18GHz≤f≤40GHz	2.36dB
5. 20dB Bandwidth	4.56kHz	
6. Time of Occupancy (Dwell Time) & Number	ber	
of Hopping Channels	0.58ms	
7. Carrier Frequency Separation	4.56kHz	
8. AC Power line Conducted Emission	150kHz≤f≤30MHz 2.68dB	



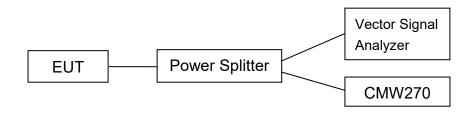
ANNEX A: Detailed Test Results

Test Configuration

The measurement is made according to ANSI C63.10.

1) Conducted Measurements

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

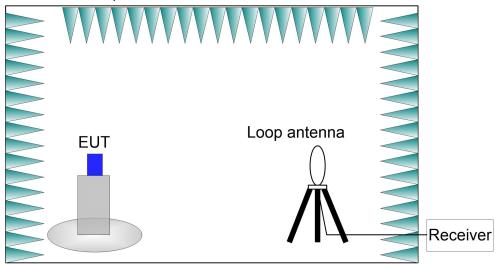


2) Radiated Measurements

Test setup:

9kHz-30MHz:

The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving loop antenna is 1.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.

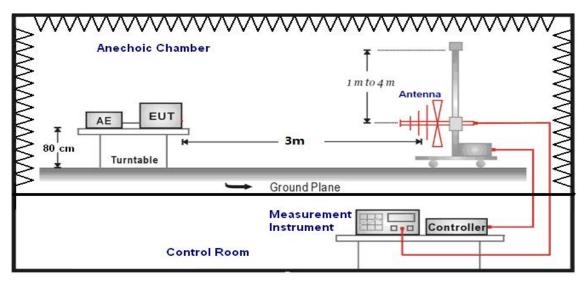




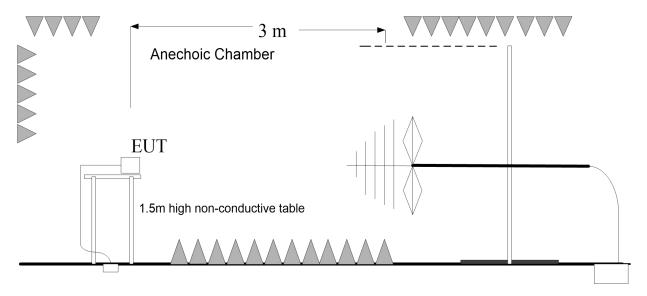
30MHz-26.5GHz:

The EUT are measured in a anechoic chamber. The EUT is placed on a non-conductive stand of 80cm high, and at a measurement distance of 3m from the receiving antenna. The center of the receiving antenna is 1.0 meter to 4.0 meter above the ground. The test setup refers to figure below. Detected emissions were maximized at each frequency by rotating the EUT and adjusting the receiver antenna polarization.

30MHz-1GHz:

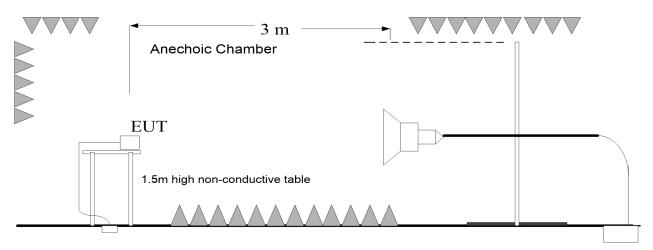


1GHz-3GHz:



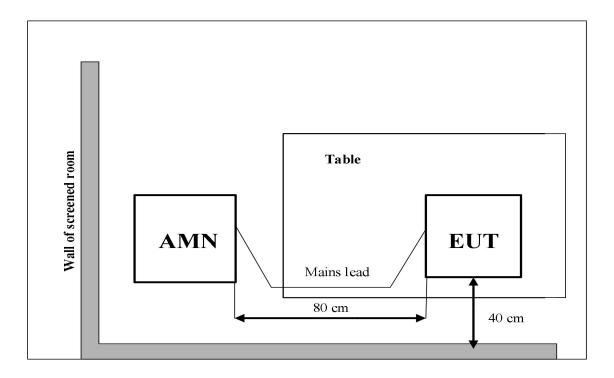


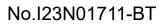
3GHz-26.5GHz:



3) AC Power line Conducted Emission Measurement

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







A.0 Antenna requirement

Measurement Limit:

Standard	Requirement
	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
FCC CRF Part	connector is prohibited. This requirement does not apply to carrier current devices
15.203	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: Antenna 12:-1.7dBi; Antenna 2:-4.9dBi.

The RF transmitter uses an integrate antenna without connector.



A.1 Maximum Peak Output Power

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

A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

Measurement Limit:

Standard	Limit (dBm)
FCC CRF Part 15.247(b)	< 30

Measurement Results:

Antenna 12:

Mode	Peak Conducted Output Power (dBm)		
wode	2402MHz (CH0)	2441MHz (CH39)	2480MHz (CH78)
GFSK	12.19	12.67	12.21
π/4 DQPSK	9.15	9.58	9.17
8DPSK	8.48	8.86	8.52

Antenna 2:

Mada	Peak Conducted Output Power (dBm)		
Mode	2402MHz (CH0)	2441MHz (CH39)	2480MHz (CH78)
GFSK	12.40	12.69	12.24
π/4 DQPSK	9.55	9.62	9.27
8DPSK	8.84	9.04	8.71

Note: According to the customer's description, BLE supports switching between the two antennas, but does not support MIMO. Antenna 2 is selected as the antenna with worst condition.

Conclusion: Pass



A.2 Band Edges Compliance

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

Measurement Limit:

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

Measurement Result:

Mode	Frequency (MHz)	Hopping	Test Res	ults (dBc)	Conclusion
	2402(CH0)	OFF	Fig.1	57.01	Р
GFSK	2480(CH78)	OFF	Fig.2	56.83	Р
GFSK	2402(CH0)	ON	Fig.3	57.08	Р
	2480(CH78)	ON	Fig.4	57.75	Р
	2402(CH0)	OFF	Fig.5	54.70	Р
	2480(CH78)	OFF	Fig.6	53.68	Р
π/4 DQPSK	2402(CH0)	ON	Fig.7	54.14	Р
	2480(CH78)	ON	Fig.8	55.04	Р
	2402(CH0)	OFF	Fig.9	55.09	Р
000ek	2480(CH78)	OFF	Fig.10	54.28	Р
8DPSK	2402(CH0)	ON	Fig.11	54.65	Р
	2480(CH78)	ON	Fig.12	53.87	Р

See below for test graphs.

Conclusion: Pass



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3	N3		1	2.39 GHz	-48.4	5 dBm				
4	N4		1	2.3717609 GH	z -45.5	4 dBm				
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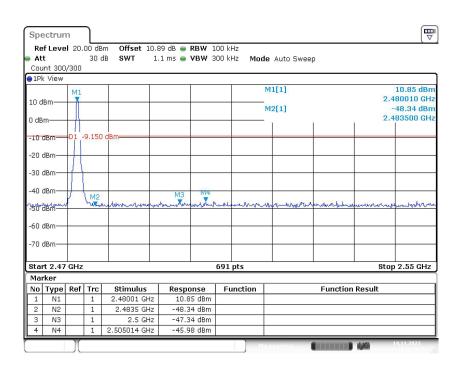
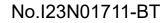


Fig. 2 Band Edges (GFSK, CH78, Hopping OFF)





Ref Level 20.00 dBm Offset 10.69 dB RBW 100 kHz Att 30 dB SWT 1.1 ms VBW 300 kHz Mode Auto Sweep Count 300/300 Int ms VBW 300 kHz Mode Auto Sweep Int ms VBW 300 kHz Int ms VBW 300 kHz Mode Auto Sweep Int ms VBW 300 kHz Mode Auto Sweep Count 300/300 Int ms VBW 300 kHz Mode Auto Sweep Int ms VBW 300 kHz 10 dBm 11.21 dBm 11.21 dBm 4.8.97 dBm 4.8.97 dBm 4.8.97 dBm 4.0.90 dBm	Spe	ctrur	n	٦							Ę
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Store M3 M2 60 dBm	-30 u	IDIII-									ľ
And Construction And Construction<	-40 d	lBm—			-					MB	140
-60 dBm Image: Ima	Sund	march	win	ahure	marghanne	Lawebelleren	human	amathen	mound	delver turnor	million mille
Start 2.35 GHz Stop 2.405 GHz Start 2.35 GHz 691 pts Stark 2.35 GHz 501 pts Marker 1 No Type Ref Trc Stimulus Function 1 N1 2 N2 2 N2 3 N3 1 2.39 GHz -48.24 dBm	50 0	ionn									
Start 2.35 GHz 691 pts Stop 2.405 GHz Marker Function Function Result 1 N1 1 2.404005 GHz 11.21 dBm 2 N2 1 2.404005 GHz -48.97 dBm 3 N3 1 2.39 GHz -48.24 dBm	-60 d	IBm—									
Start 2.35 GHz 691 pts Stop 2.405 GHz Marker Function Function Result 1 N1 1 2.404005 GHz 11.21 dBm 2 N2 1 2.404005 GHz -48.97 dBm 3 N3 1 2.39 GHz -48.24 dBm	-70 d	Bm									
Marker No Type Ref Tro Stimulus Response Function Function Result 1 N1 1 2.404005 GHz 11.21 dBm - 2 N2 1 2.404005 GHz -48.97 dBm - 3 N3 1 2.39 GHz -48.24 dBm -	,00	Din .									
No Type Ref Trc Stimulus Response Function Function Result 1 N1 1 2.404005 GHz 11.21 dBm - </td <td>Star</td> <td>t 2.35</td> <td>GHz</td> <td></td> <td></td> <td></td> <td></td> <td>691 pts</td> <td></td> <td></td> <td>Stop 2.405 GH</td>	Star	t 2.35	GHz					691 pts			Stop 2.405 GH
1 N1 1 2.404005 GHz 11.21 dBm 2 N2 1 2.4 GHz -48.97 dBm 3 N3 1 2.39 GHz -48.24 dBm	Mar	ker									
2 N2 1 2.4 GHz -48.97 dBm 3 N3 1 2.39 GHz -48.24 dBm			Ref	Trc				Function		Function	Result
3 N3 1 2.39 GHz -48.24 dBm	-	201007			7.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0.0	0	2 2 22 2000				
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Measuring Measuring	-	<u>1977</u>	20	-	Eloren F G		, april				1111000



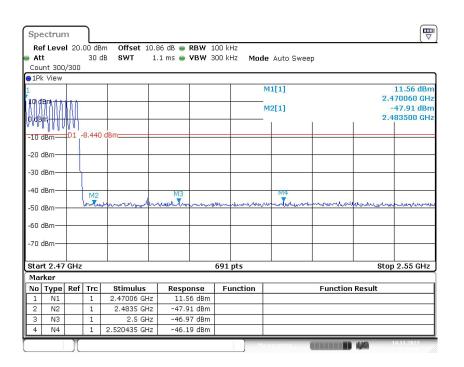
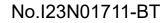


Fig. 4 Band Edges (GFSK, CH78, Hopping ON)





Spe	ectrur	n	٦							
e At	f Leve t int 300		00 dB 30 d		0.72 dB 👄 1.1 ms 👄			le Auto Sw	еер	\
-	< View	/ 500								
10 c	Bm							M1[1] M2[1]		8.73 dBm 2.4021740 GHz -47.66 dBm 2.4000000 GHz
0 dB	m							1	1	2.4000000 GH2
-10	dBm—	D1 -	11.27	0 dBm						
	dBm—									
-30	dBm—									
-40						1714			M3	Ma
-50	abm <u>~~</u>	nend	me	mohandra	montan	man	mound	mother	M3	revenuellingent he
-60	dBm									
-70	dBm									
Sta	t 2.35	GHz				•	691 pts			Stop 2.405 GHz
	rker									
	Туре	Ref		Stimulus	Resp		Function		Function	Result
1	N1		1	2.402174 GH		73 dBm				
2	N2 N3		1	2.4 GH 2.39 GH		55 dBm 52 dBm				
4	N3 N4		1	2.39 GH 2.373913 GH		97 dBm				
								leasuring		14.11.2023



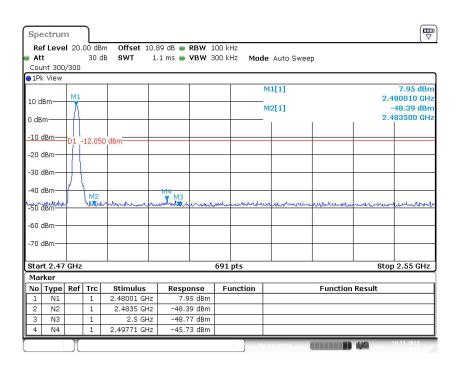


Fig. 6 Band Edges (π /4 DQPSK, CH78, Hopping OFF)



Spe	ectrun	n	٦								
At	e <mark>f Leve</mark> t int 300		00 dB 30 d		1.69 dB 👄 1.1 ms 👄			de Auto Sw	еер		
	k View	7300									
10 d	IBm							M1[1] M2[1]		2.4040	.99 dBb
	dBm—									2.1000	
	dBm	-D1 -	11.75	i0 dBm							
-30 (dBm										
	dBm—	er 100		IVI2	10 T. 100 T	225. 77			МЗ	ма	<i>Р</i>
-507	dBm	nour	Maria	marrianty	Muunhin	whent	were and the	Muchilound	henne	munutur	
-60 (dBm										
-70 (dBm—										
Star	rt 2.35	GHz					691 pts			Stop 2.4	05 GHz
	rker										
	Туре	Ref	_	Stimulus	Respo		Function		Function	Result	
1	N1 N2		1	2.404005 GHz 2.4 GHz	2	5 dBm 9 dBm					
3	NЗ		1	2.39 GHz	-47.7	3 dBm					
4	N4		1	2.3660217 GH	z -45.8	9 dBm					



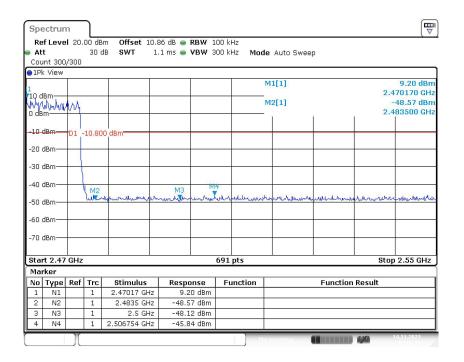
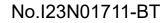


Fig. 8 Band Edges (π/4 DQPSK, CH78, Hopping ON)





Spe	ectrur	n	٦									[,	V
Re	fLeve	1 20.	oo de	m Offset 1	0.72 dB 😑	RBW 1	.00 kH	z					_
🛛 At	t		30 0	ib SWT	1.1 ms 👄	VBW 3	:00 k⊢	z Moc	le Auto Swe	ер			
-	int 300	/300											_
● 1PI	< View												
									M1[1]			8.82 dB	
10 d	Bm—											021740 GI	
									M2[1]			-47.38.dB 200000 GI	
0 dB	m—								1	ĩ	2.40	Juuuhulei	12
-10	dBm—	D1 -	11.18	0 dBm					_				_
-20	dBm—												
-30	dBm												
-40	dBm			M4								J N	
		Leni.		T	a				1 a 2 a 2 a 2	M3	100 P - 1	M2	h.,
-50	dBm-	warn	with	and the second second	anderson	mound	mont	man	ragament	manner	man		~
-60	dBm								_				_
70	dD and												
-70	uBIII-												
01-1	+ 0.05	0.1					601				01	0.405.011	_
_	t 2.35	GHZ					691 p	ots			Stop	2.405 GH	<u>z</u>
_	rker		-	<u></u>			-				n 11		_
	Туре	Ref	Trc	2.402174 GH	Resp	onse 32 dBm	Fu	nction		Function	Result		4
1 2	N1 N2		1	2.402174 GH 2.4 GH		32 dBm 35 dBm							4
3	NZ N3	_	1	2.4 GH 2.39 GH		53 dBm							-
4	N3 N4		1	2.39 GH 2.3641087 GH		27 dBm							\neg
Ē	19 T	26	*	2.3011007 G	12 70.2	a abiii							
								M			4,44	14.11.2023	



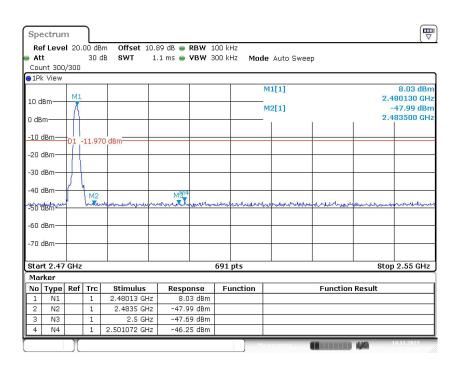


Fig. 10 Band Edges (8DPSK, CH78, Hopping OFF)



Spe	ectrun	n	٦									
	f Leve	1 20.			0.69 dB 😑							
At	-	1000	30 d	IB SWT	1.1 ms 😑	VBW 3	00 kHz Mi	ode .	Auto Swee	р		
-	nt 300	/300										
OIH	View	-							[1]			8.33 dBm
								MIT	[1]		2	4031300 GHz
10 d	Bm—							M2	[1]		2.	-47.56 Bm
0 dB									1.41		2.	4000000 GHZ
0 40										1		
-10	dBm	D1 .	11.67	0 dBm								
			11.07	- abiii								
-20	dBm											
-30	-IBm											
-50	abin											1
-40	dBm—			M4						MIN W		A.
1. Mah	a Auna	in the	rluthmen	. I Americano	Augustan also	. Martine	manund	mi	n mahanan	M3	un man	
-501	Bm—			V. (
-60	dBm											
-70	dBm—											
Sta	t 2.35	GHz		1			691 pts			1	Sto	p 2.405 GHz
Mai	·ker											
No	Туре	Ref	Trc	Stimulus	Resp	onse	Function	Т		Functio	n Result	
1	N1		1	2.40313 GH		3 dBm		+				
2	N2		1	2.4 GH	Iz -47.5	6 dBm		+				
3	NЗ		1	2.39 GH	lz -48.8	32 dBm		+				
4	N4		1	2.361 GH	lz -46.3	32 dBm						
_								Meas	uring		444	14.11.2023



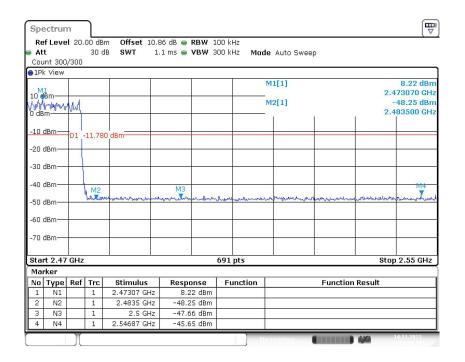


Fig. 12 Band Edges (8DPSK, CH78, Hopping ON)



A.3 Conducted Emission

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

Measurement Limit:

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

Measurement Results:

Mode	Frequency (MHz)	Frequency Range	Test Results	Conclusion
	2402(CH0)	1GHz-26.5GHz	Fig.13	Р
GFSK	2441(CH39)	1GHz-26.5GHz	Fig.14	Р
	2480(CH78)	1GHz-26.5GHz	Fig.15	Р
_//	2402(CH0)	1GHz-26.5GHz	Fig.16	Р
π/4	2441(CH39)	1GHz-26.5GHz	Fig.17	Р
DQPSK	2480(CH78)	1GHz-26.5GHz	Fig.18	Р
	2402(CH0)	1GHz-26.5GHz	Fig.19	Р
8DPSK	2441(CH39)	1GHz-26.5GHz	Fig.20	Р
	2480(CH78)	1GHz-26.5GHz	Fig.21	Р
/	All channels	30MHz -1GHz	Fig.22	Р

See below for test graphs.

Conclusion: Pass



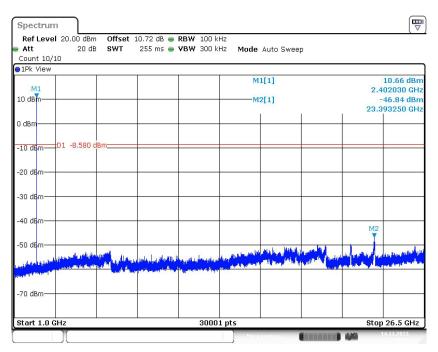


Fig. 13 Conducted Spurious Emission (GFSK, CH0, 1GHz-26.5GHz)

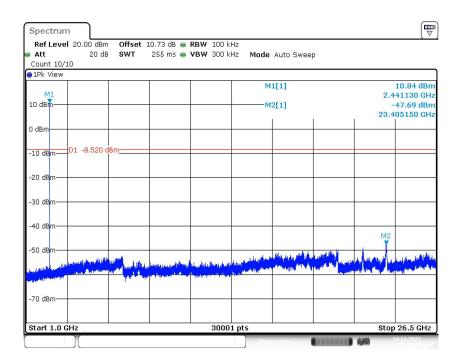
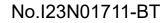


Fig. 14 Conducted Spurious Emission (GFSK, CH39, 1GHz-26.5GHz)





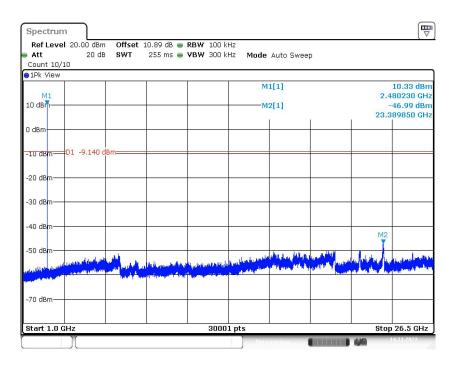


Fig. 15 Conducted Spurious Emission (GFSK, CH78, 1GHz-26.5GHz)

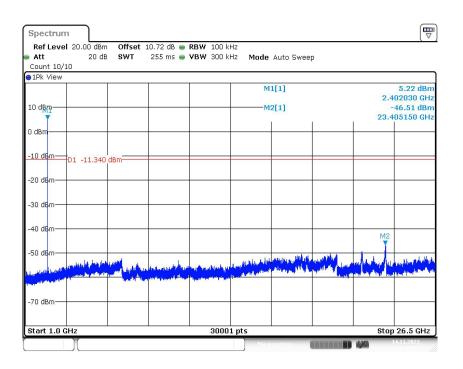


Fig. 16 Conducted Spurious Emission (π/4 DQPSK, CH0, 1GHz-26.5GHz)



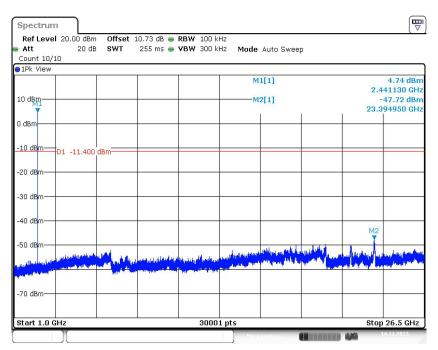


Fig. 17 Conducted Spurious Emission (π/4 DQPSK, CH39, 1GHz-26.5GHz)

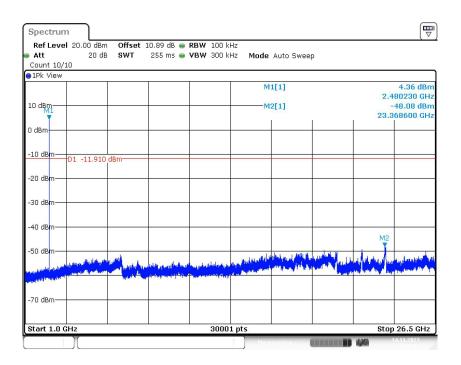


Fig. 18 Conducted Spurious Emission (π/4 DQPSK, CH78, 1GHz-26.5GHz)



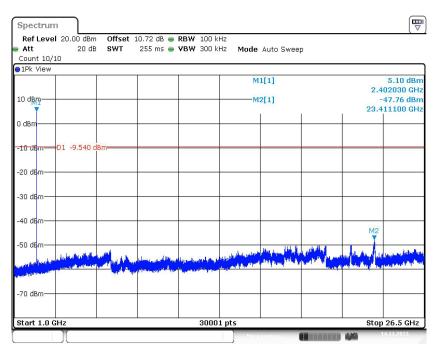


Fig. 19 Conducted Spurious Emission (8DPSK, CH0, 1GHz-26.5GHz)

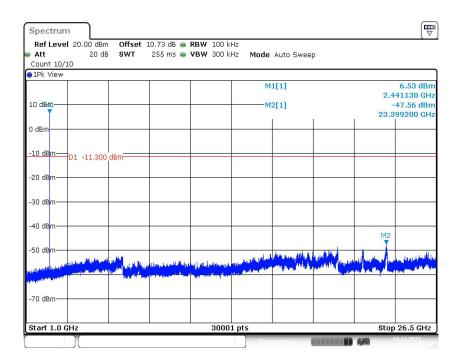
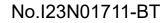


Fig. 20 Conducted Spurious Emission (8DPSK, CH39, 1GHz-26.5GHz)





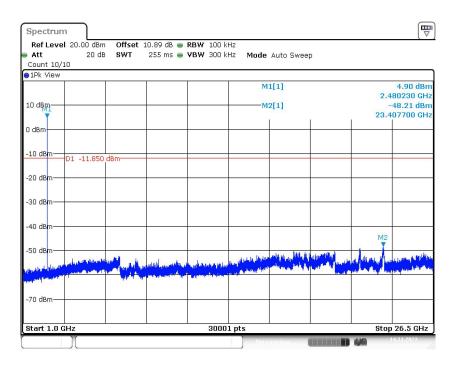


Fig. 21 Conducted Spurious Emission (8DPSK, CH78, 1GHz-26.5GHz)

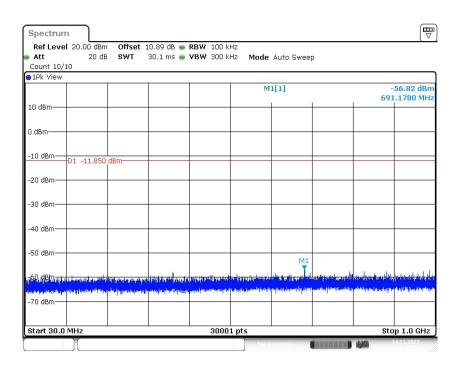


Fig. 22 Conducted Spurious Emission (All Channels, 30MHz -1GHz)



A.4 Radiated Emission

Method of Measurement: See ANSI C63.10-clause 6.3&6.4&6.5&6.6.

Measurement Limit:

Standard	Limit (dBm)
FCC 47 CFR Part 15.247, 15.205, 15.209	20dBm below peak output power

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a) (see § 15.205(c)).

Limit in restricted band:

Frequency of emission (MHz)	Field strength(µV/m)	Measurement distance(meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Test Condition:

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

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

Note: According to the performance evaluation, the radiated emission margin of EUT is over 20dB in the band from 9kHz to 30MHz. Therefore, the measurement starts from 30MHz to tenth harmonic. The measurement results include the horizontal polarization and vertical polarization measurements. For radiated measurement, pre-scanned in three orthogonal panels, X, Y, Z. The worst cases were recorded in this report.



Measurement Results:

Mode	Frequency (MHz)	Frequency Range	Test Results	Conclusion
	2402(CH0)	1 GHz ~18 GHz	Fig.23	Р
	2441(CH39)	1 GHz ~18 GHz	Fig.24	Р
GFSK	2480(CH78)	1 GHz ~18 GHz	Fig.25	Р
	Restricted Band(CH0)	2.38 GHz ~ 2.45 GHz	Fig.26	Р
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.27	Р
	2402(CH0)	1 GHz ~18 GHz	Fig.28	Р
π/4	2441(CH39)	1 GHz ~18 GHz	Fig.29	Р
DQPSK	2480(CH78)	1 GHz ~18 GHz	Fig.30	Р
DQFON	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.31	Р
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.32	Р
	2402(CH0)	1 GHz ~18 GHz	Fig.33	Р
	2441(CH39)	1 GHz ~18 GHz	Fig.34	Р
8DPSK	2480(CH78)	1 GHz ~18 GHz	Fig.35	Р
	Restricted Band (CH0)	2.38 GHz ~ 2.45 GHz	Fig.36	Р
	Restricted Band (CH78)	2.45 GHz ~ 2.5 GHz	Fig.37	Р
		9 kHz ~30 MHz	Fig.38	Р
/	All channels	30 MHz ~1 GHz	Fig.39	Р
		18 GHz ~26.5 GHz	Fig.40	Р

Worst Case Result

GFSK CH39 (1-18GHz)

Frequency	MaxPeak	Limit	Margin	Pol	Corr.
(MHz)	(dBµV/m)	(dBµV/m)	(dB)		(dB/m)
4890.300000	47.13	74.00	26.87	Н	4.8
7032.428572	45.33	74.00	28.67	н	6.3
8979.000000	45.86	74.00	28.14	V	7.5
10367.571429	47.66	74.00	26.34	V	10.4
12340.714286	49.51	74.00	24.49	V	12.8
17911.714286	57.39	74.00	16.61	Н	21.8

Frequency	Average	Limit	Margin	Pol	Corr.
(MHz)	(dBµV/m)	(dBµV/m)	(dB)		(dB/m)
4890.300000	34.50	54.00	19.50	Н	4.8
7032.428572	33.59	54.00	20.41	Н	6.3
8979.000000	33.80	54.00	20.20	V	7.5
10367.571429	35.67	54.00	18.33	V	10.4
12340.714286	36.94	54.00	17.06	V	12.8
17911.714286	45.26	54.00	8.74	Н	21.8



π/4 DQPSK CH39 (1-18GHz)

Frequency	MaxPeak	Limit	Margin	Pol	Corr.
(MHz)	(dBµV/m)	(dBµV/m)	(dB)		(dB/m)
6897.000000	44.70	74.00	29.30	V	6.9
8280.000000	45.82	74.00	28.18	V	6.8
10345.714286	48.29	74.00	25.71	Н	10.5
12929.571429	50.03	74.00	23.97	V	13.2
16614.857143	55.55	74.00	18.45	Н	19.0
17912.142857	57.37	74.00	16.63	V	21.8

Frequency	Average	Limit	Margin	Pol	Corr.
(MHz)	(dBµV/m)	(dBµV/m)	(dB)		(dB/m)
6897.000000	32.78	54.00	21.22	V	6.9
8280.000000	33.87	54.00	20.13	V	6.8
10345.714286	35.84	54.00	18.16	Н	10.5
12929.571429	37.84	54.00	16.16	V	13.2
16614.857143	43.08	54.00	10.92	Н	19.0
17912.142857	45.40	54.00	8.60	V	21.8

8DPSK CH39 (1-18GHz)

Frequency (MHz)	MaxPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
6906.428572	45.62	74.00	28.38	V	7.1
7550.571429	45.21	74.00	28.79	V	6.9
9495.000000	46.94	74.00	27.06	Н	8.3
11910.000000	49.21	74.00	24.79	V	12.4
16576.714286	54.90	74.00	19.11	Н	18.7
17935.714286	57.23	74.00	16.77	Н	21.7

Frequency (MHz)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Pol	Corr. (dB/m)
6906.428572	39.17	54.00	14.83	V	7.1
7550.571429	32.91	54.00	21.09	V	6.9
9495.000000	34.61	54.00	19.39	Н	8.3
11910.000000	36.81	54.00	17.20	V	12.4
16576.714286	43.06	54.00	10.94	Н	18.7
17935.714286	44.91	54.00	9.09	Н	21.7

Note:

A "reference path loss" is established and the A_{Rpl} is the attenuation of "reference path loss", and Antenna Factor, the gain of the preamplifier, the cable loss. P_{Mea} is the field strength recorded from the instrument. The measurement results are obtained as described below:

Result= P_{Mea} +Cable Loss +Antenna Factor-Gain of the preamplifier.

See below for test graphs.

Conclusion: Pass



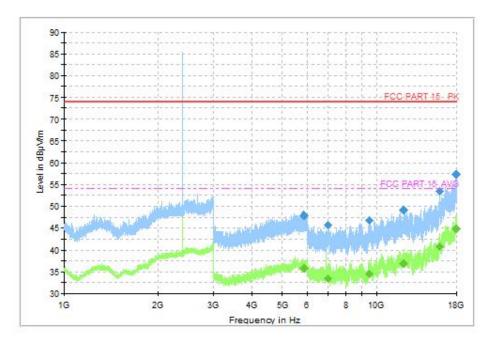


Fig. 23 Radiated Spurious Emission (GFSK, CH0, 1GHz ~18GHz)

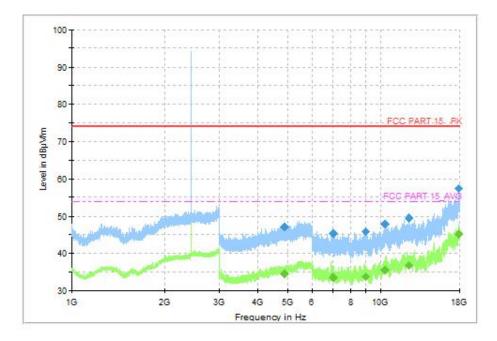


Fig. 24 Radiated Spurious Emission (GFSK, CH39, 1GHz ~18GHz)



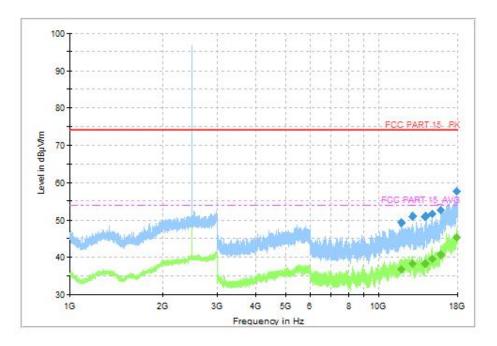


Fig. 25 Radiated Spurious Emission (GFSK, CH78, 1GHz ~18GHz)

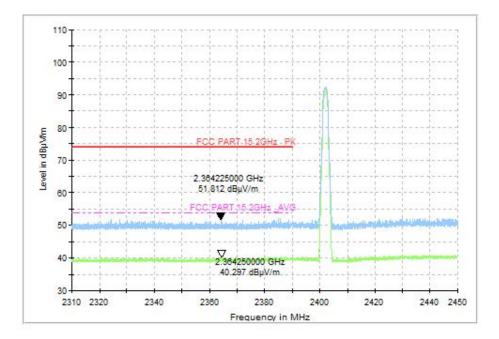


Fig. 26 Radiated Band Edges (GFSK, CH0, 2.38GHz~2.45GHz)



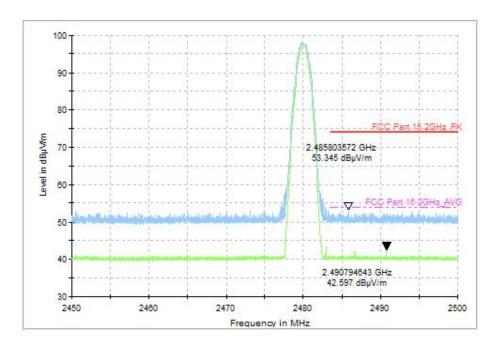


Fig. 27 Radiated Band Edges (GFSK, CH78, 2.45GHz~2.50GHz)

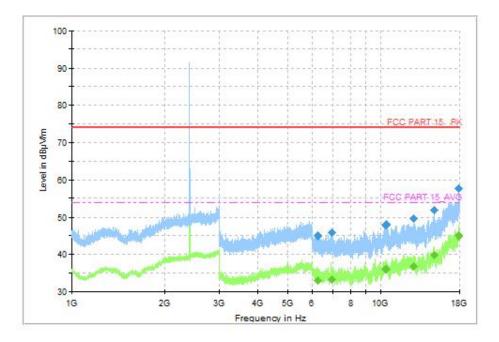


Fig. 28 Radiated Spurious Emission (π/4 DQPSK, CH0, 1GHz ~18GHz)



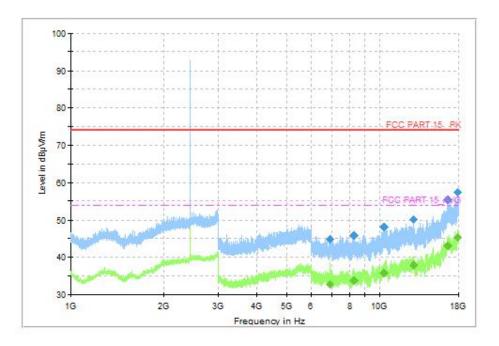


Fig. 29 Radiated Spurious Emission ($\pi/4$ DQPSK, CH39, 1GHz ~18GHz)

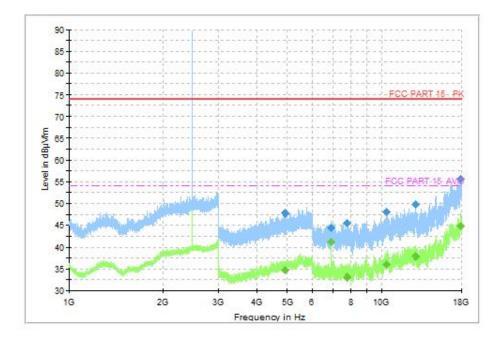


Fig. 30 Radiated Spurious Emission (π/4 DQPSK, CH78, 1GHz ~18GHz)



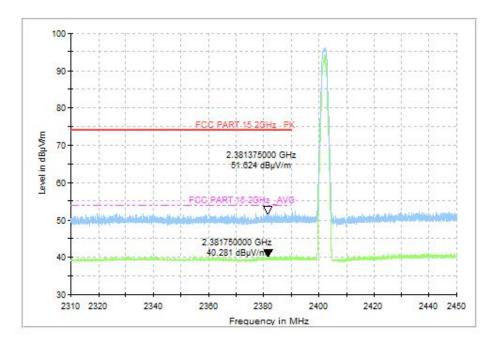


Fig. 31 Radiated Band Edges (π/4 DQPSK, CH0, 2.38GHz~2.45GHz)

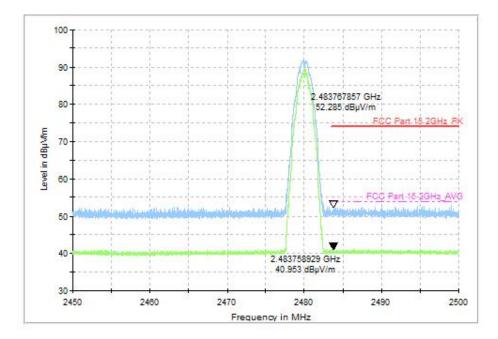


Fig. 32 Radiated Band Edges (π/4 DQPSK, CH78, 2.45GHz~2.50GHz)



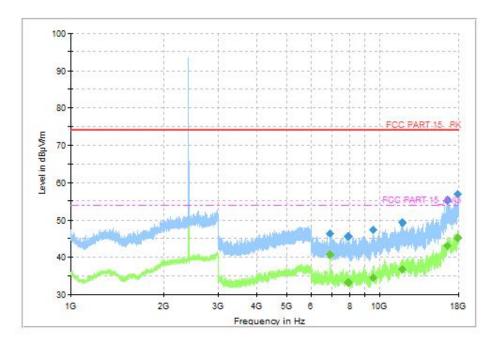


Fig. 33 Radiated Spurious Emission (8DPSK, CH0, 1GHz ~18GHz)

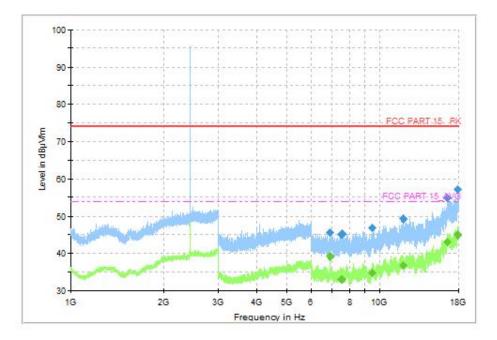


Fig. 34 Radiated Spurious Emission (8DPSK, CH39, 1GHz ~18GHz)



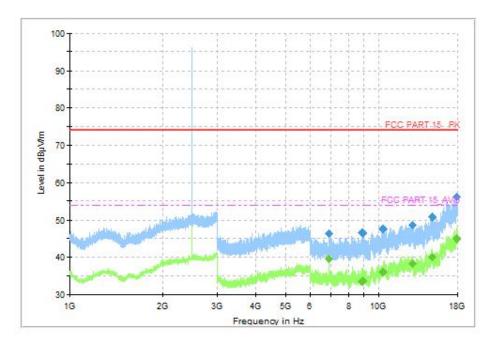


Fig. 35 Radiated Spurious Emission (8DPSK, CH78, 1GHz ~18GHz)

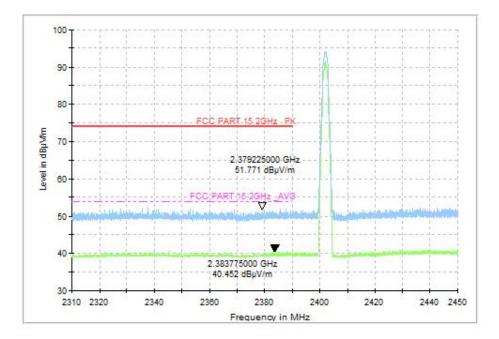


Fig. 36 Radiated Band Edges (8DPSK, CH0, 2.38GHz~2.45GHz)