FCC PART 15C
TEST REPORT
No. I15Z40451-SRD02

for

ZTE Corporation

WCDMA/GSM（GPRS） Dual-Mode Digital Mobile Phone

MODEL NAME: ZTE Kis II Max/Kis II Max /ZTE KIS II Max /KIS II Max/ZTE Kis II Max plus/ZTE Kis II Max Plus

with

FCC ID: SRQ-ZTEV815W

Hardware Version: TMBI

Software Version: ZTE-CN-FQB25S-P172R10V1.0.0

Issued Date: 2015-04-14

TESTING
CNAS L0570

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.

Test Laboratory:

CTTL, Telecommunication Technology Labs, Academy of Telecommunication Research, MIIT

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

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

Email:cttl_terminals@catr.cn, website:www.chinattl.com

©Copyright. All rights reserved by CTTL.

REPORT HISTORY

Report Number	Revision	Description	Issue Date
I15Z40451-SRD02	Rev.0	1st edition	2015-04-14

©Copyright. All rights reserved by CTTL.

CONTENTS

1. TEST LABORATORY 4
1.1. TESTING LOCATION 4
1.2. TESTING ENVIRONMENT 4
1.3. PROJECT DATA 4
1.4. SIGNATURE 4
2. CLIENT INFORMATION 5
2.1. APPLICANT INFORMATION 5
2.2. MANUFACTURER INFORMATION 5
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE) 6
3.1. ABOUT EUT 6
3.2. INTERNAL IDENTIFICATION OF EUT 6
3.3. INTERNAL IDENTIFICATION OF AE 6
3.4. NORMAL ACCESSORY SETTING 6
3.5. GENERAL DESCRIPTION 6
4. REFERENCE DOCUMENTS 6
4.1. DOCUMENTS SUPPLIED BY APPLICANT 6
4.2. REFERENCE DOCUMENTS FOR TESTING 7
5. TEST RESULTS 7
5.1. SUMMARY OF TEST RESULTS 7
5.2. STATEMENTS 7
6. TEST FACILITIES UTILIZED 8
ANNEX A: DETAILED TEST RESULTS 9
A.1. MEASUREMENT METHOD 9
A.2. PEAK OUTPUT POWER – CONDUCTED 10
A.3. FREQUENCY BAND EDGES – CONDUCTED 11
A.5. RADIATED EMISSION 34
A.6. TIME OF OCCUPANCY (DWELL TIME) 54
A.7. 20DB BANDWIDTH 58
A.8. CARRIER FREQUENCY SEPARATION 64
A.9. NUMBER OF HOPPING CHANNELS 67
A.10. AC POWERLINE CONDUCTED EMISSION 71
ANNEX B: ACCREDITATION CERTIFICATE 74

©Copyright. All rights reserved by CTTL.

1. Test Laboratory

1.1. Testing Location

Location 1:CTTL(huayuan North Road)

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

Location 2:CTTL(Shouxiang)

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

1.2. Testing Environment

Normal Temperature: 15-35℃

Extreme Temperature: -10/+55℃

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2015-01-14

Testing End Date: 2015-03-27

1.4. Signature

Xu Zhongfei

(Prepared this test report)

Li Zhibin

(Reviewed this test report)

Lv Songdong

(Approvedthis test report)

©Copyright. All rights reserved by CTTL.

2. Client Information

2.1. Applicant Information

Company Name:	ZTE Corporation
Address:	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R. China
City:	Shenzhen
Postal Code:	518057
Country:	China
Telephone:	+86-21-68897541
Fax:	+86-21-50801070

2.2. Manufacturer Information

Company Name:	ZTE Corporation
Address:	ZTE Plaza, Keji Road South, Hi-Tech Industrial Park, Nanshan District, Shenzhen, Guangdong, 518057, P.R. China
City:	Shenzhen
Postal Code:	518057
Country:	China
Telephone:	+86-21-68897541
Fax:	+86-21-50801070

©Copyright. All rights reserved by CTTL.

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

3.1. About EUT

Description	WCDMA/GSM（GPRS） Dual-Mode Digital Mobile Phone
Model Name	ZTE Kis II Max/Kis II Max /ZTE KIS II Max /KIS II Max/ZTE Kis II Max plus/ZTE Kis II Max Plus
FCC ID	SRQ-ZTEV815W
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	/	TMBI	ZTE-CN-FQB25S-P172R10V1.0.0
EUT2	/	TMBI	ZTE-CN-FQB25S-P172R10V1.0.0

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

3.3. Internal Identification of AE

AE ID*	Description	SN
AE1	Battery	---
AE2	Charger	---

*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 WCDMA/GSM（GPRS） Dual-Mode Digital Mobile Phone with integrated antenna and inbuilt battery.
It has Bluetooth (EDR) function.
It consists of normal options: travel charger, USB cable and Phone.
Manual and specifications of the EUT were provided to fulfil 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.

©Copyright. All rights reserved by CTTL.

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.	June,2014
ANSI C63.10	American National Standard for Testing Unlicensed Wireless Devices	Sep,2009

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**
Conducted Emission	15.247 (d)	**P**
Radiated Emission	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

©Copyright. All rights reserved by CTTL.

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	2016-01-06
2	Bluetooth Tester	CBT32	100649	Rohde & Schwarz	1 year	2016-02-09
3	Shielding Room	S81	/	ETS-Lindgren	/	/
4	LISN	ENV216	101200	Rohde & Schwarz	1 year	2015-07-07
5	Test Receiver	ESCI	100344	Rohde & Schwarz	1 year	2016-03-03

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Period	Calibration Due date
1	Test Receiver	ESCI 7	100948	Rohde & Schwarz	1 year	2015-07-16
2	Loop antenna	HFH2-Z2	829324/007	Rohde & Schwarz	3 year	2017-12-16
3	BiLog Antenna	VULB9163	234	Schwarzbeck	3 year	2016-09-15
4	Dual-Ridge Waveguide Horn Antenna	3115	6914	EMCO	3 year	2017-12-15
5	Dual-Ridge Waveguide Horn Antenna	3116	2661	ETS-Lindgren	3 year	2017-06-30
6	Vector Signal Analyzer	FSV	101047	Rohde & Schwarz	1 year	2015-07-03
7	Semi-anechoic chamber	/	CT000332-1074	Frankonia German	/	/
8	Bluetooth Tester	CBT	100153	Rohde & Schwarz	1 year	2015-09-18

©Copyright. All rights reserved by CTTL.

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.

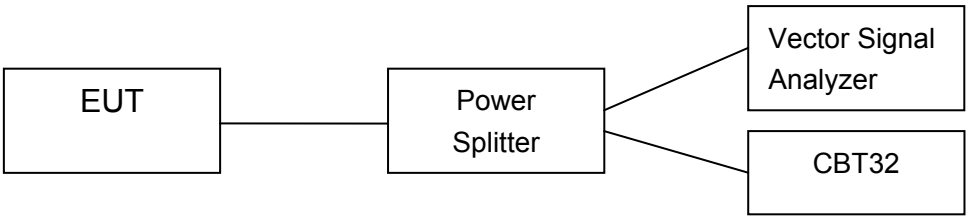
2). Set the EUT to the required work mode (Transmitter, receiver or transmitter & receiver).

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

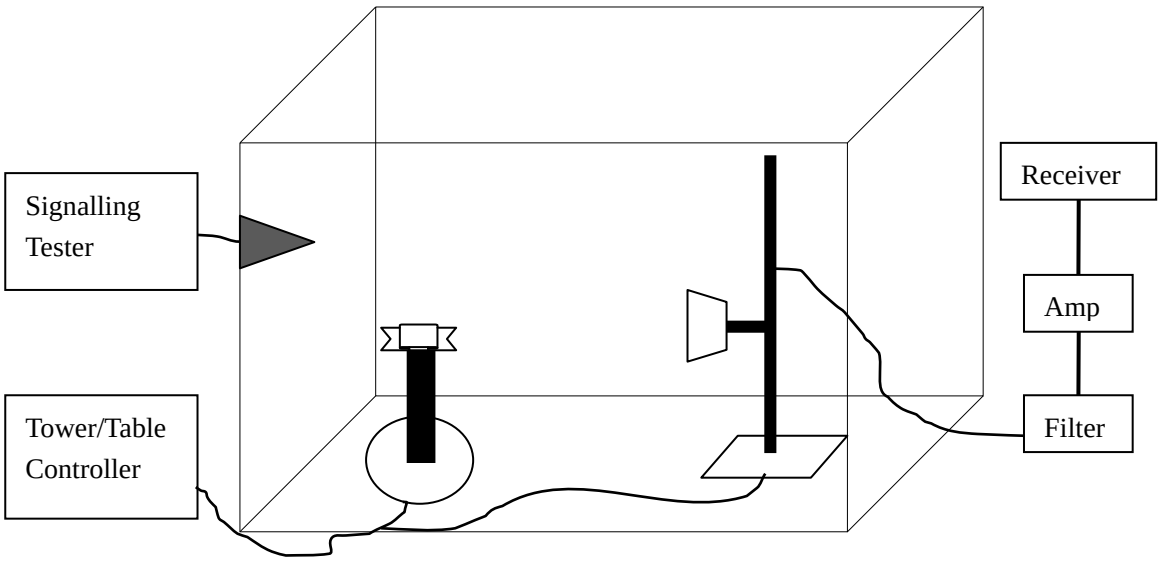
The measurement is made according to ANSI C63.10

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;



©Copyright. All rights reserved by CTTL.

A.2. Peak Output Power – Conducted

Method of Measurement: See ANSI C63.10- clause 6.10

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.

e) A plot of the test results and setup description shall be included in the test report.

Measurement Limit:

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

Test Condition:

Hopping Mode	RBW	VBW	SPAN	Sweeptime
Hopping off	3MHz	3MHz	10MHz	Auto

Measurement Results:

Mode	Test Result (dBm)		
	2402MHz (Ch0)	2441MHz (Ch39)	2480 MHz (Ch78)
GFSK	4.90	4.95	5.01
π /4 DQPSK	4.18	4.20	4.17
8DPSK	4.21	4.24	4.19

Conclusion: PASS

©Copyright. All rights reserved by CTTL.

A.3. Frequency Band Edges – Conducted

Method of Measurement: See ANSI C63.10- clause 6.9

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: 5ms
– 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 abosolute 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:

Measurement Result:

Mode	Channel	Hopping	Test Results	Conclusion
GFSK	0	ON	Fig.1	P
	78	ON	Fig.2	P
π /4 DQPSK	0	ON	Fig.3	P
	78	ON	Fig.4	P
8DPSK	0	ON	Fig.5	P
	78	ON	Fig.6	P

Mode	Channel	Hopping	Test Results	Conclusion
GFSK	0	OFF	Fig.7	P
	78	OFF	Fig.8	P
π /4 DQPSK	0	OFF	Fig.9	P
	78	OFF	Fig.10	P
8DPSK	0	OFF	Fig.11	P
	78	OFF	Fig.12	P

©Copyright. All rights reserved by CTTL.

Conclusion: PASS

Test graphs as below

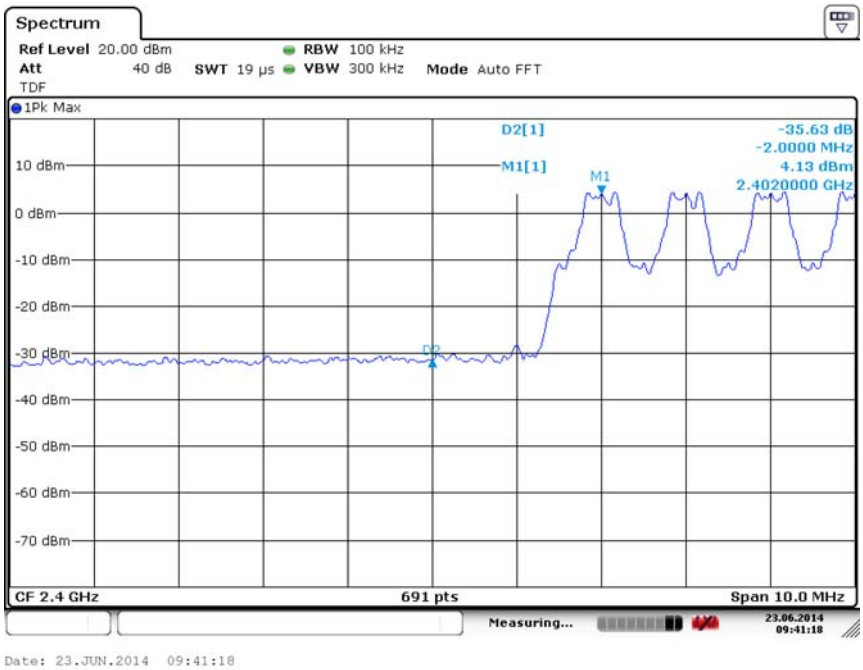


Fig. 1 Band Edges (GFSK, Ch 0, Hopping ON)

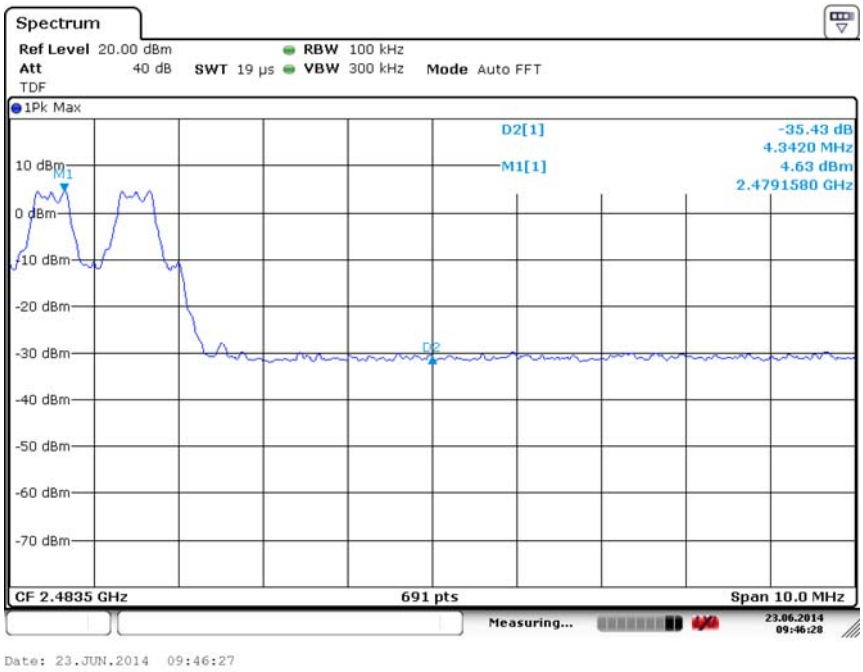


Fig. 2 Band Edges (GFSK, Ch 78, Hopping ON)

©Copyright. All rights reserved by CTTL.

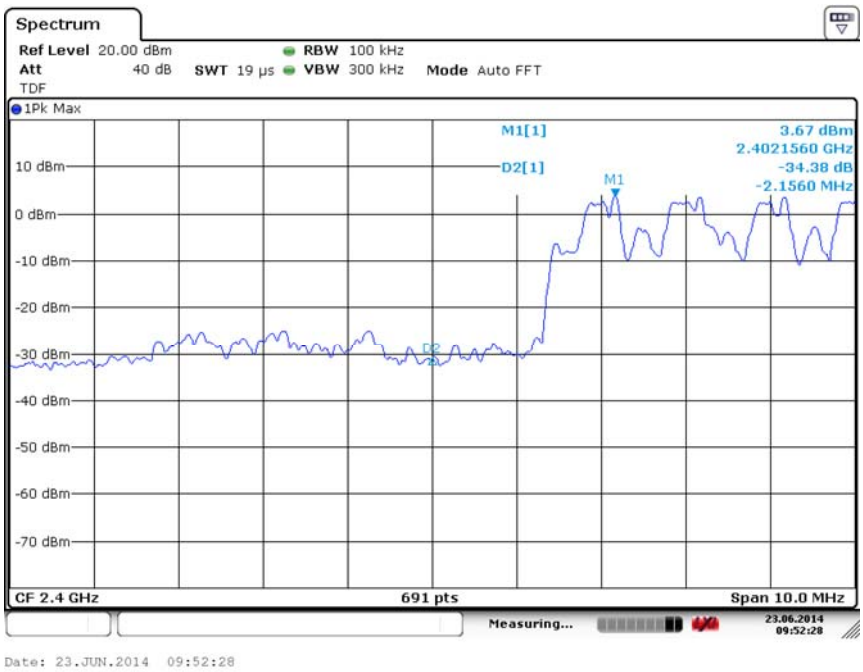


Fig. 3 Band Edges (π /4 DQPSK, Ch 0, Hopping ON)

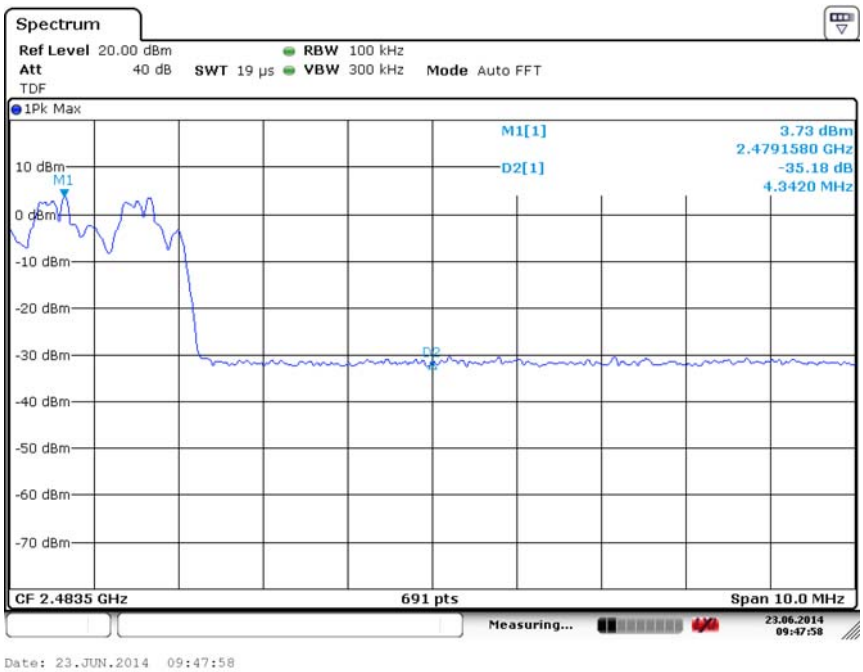


Fig. 4 Band Edges (π /4 DQPSK, Ch 78, Hopping ON)

©Copyright. All rights reserved by CTTL.

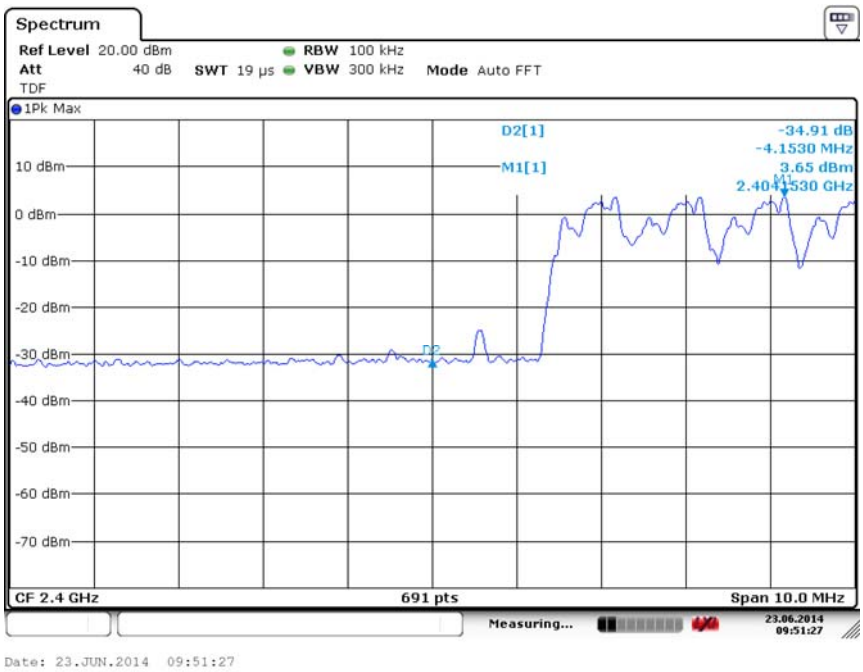


Fig. 5 Band Edges (8DPSK, Ch 0, Hopping ON)

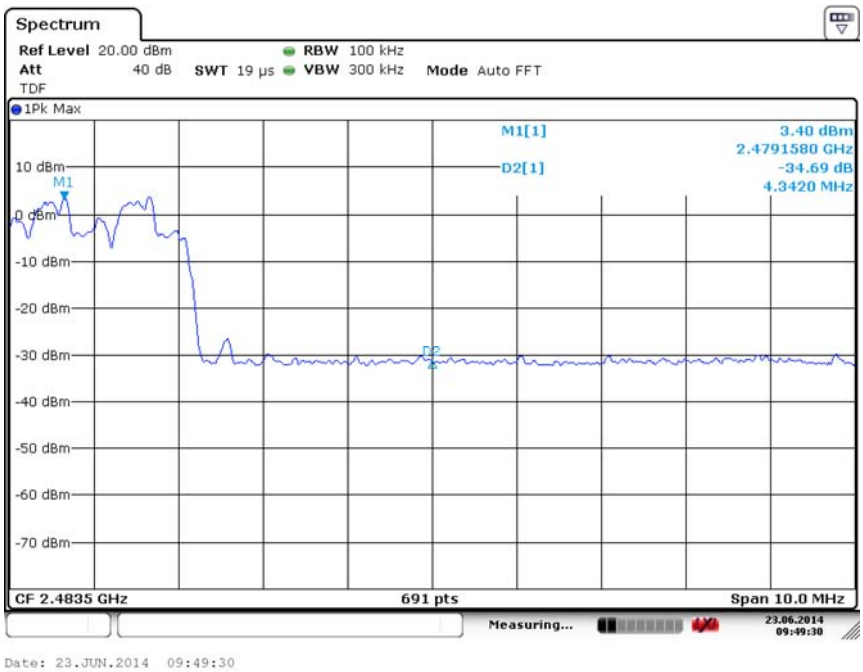


Fig. 6 Band Edges (8DPSK, Ch 78, Hopping ON)

©Copyright. All rights reserved by CTTL.

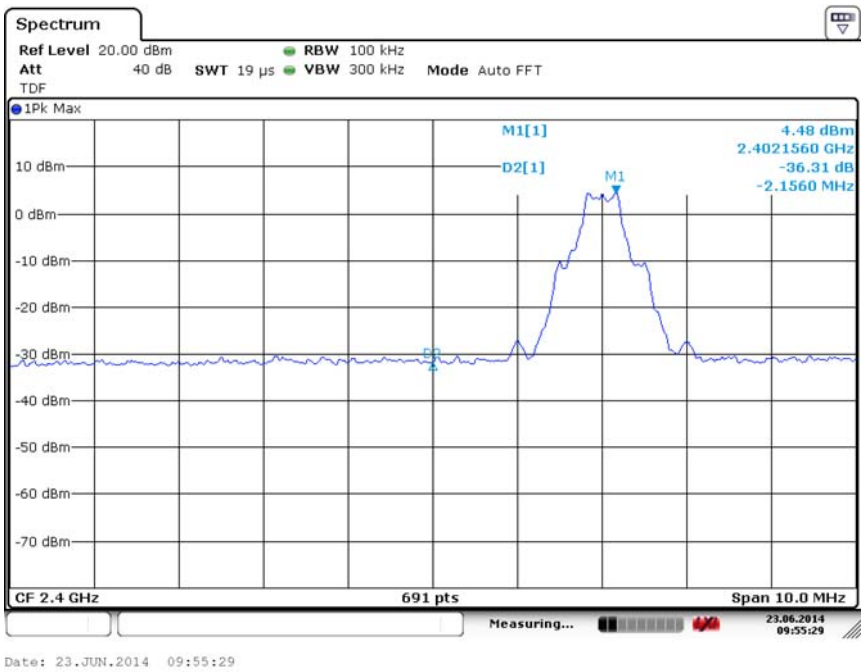


Fig. 7 Band Edges (GFSK, Ch 0, Hopping OFF)

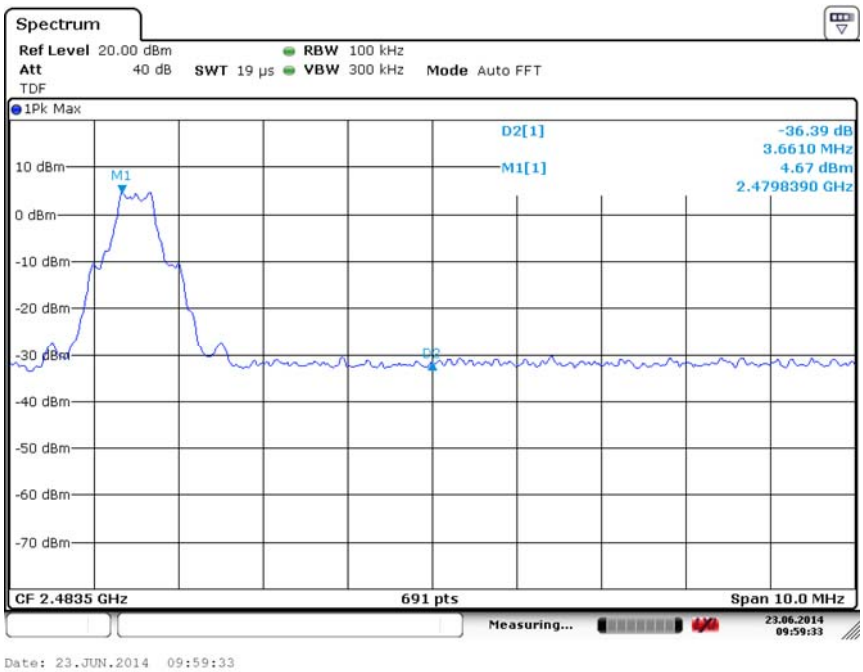


Fig. 8 Band Edges (GFSK, Ch 78, Hopping OFF)

©Copyright. All rights reserved by CTTL.

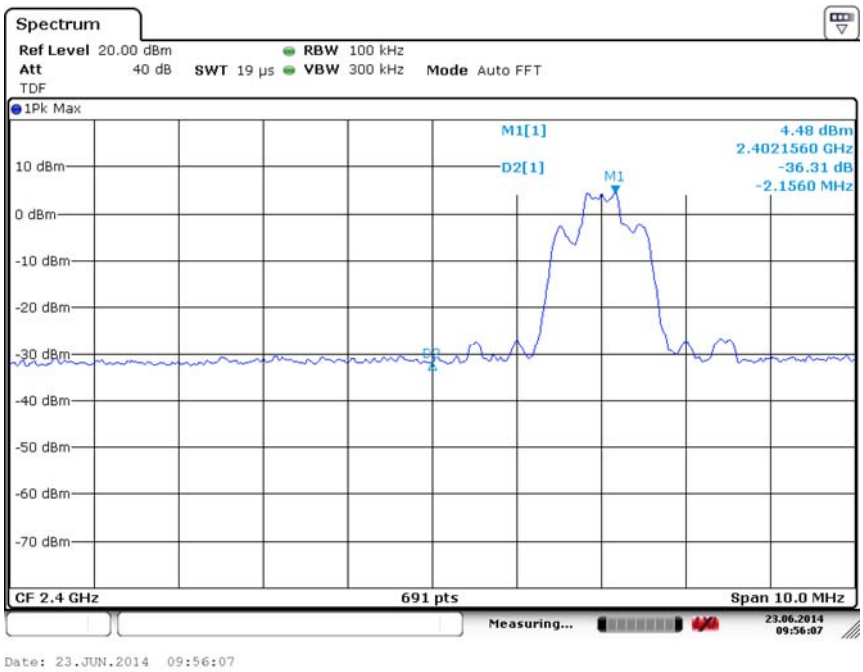


Fig. 9 Band Edges (π /4 DQPSK, Ch 0, Hopping OFF)

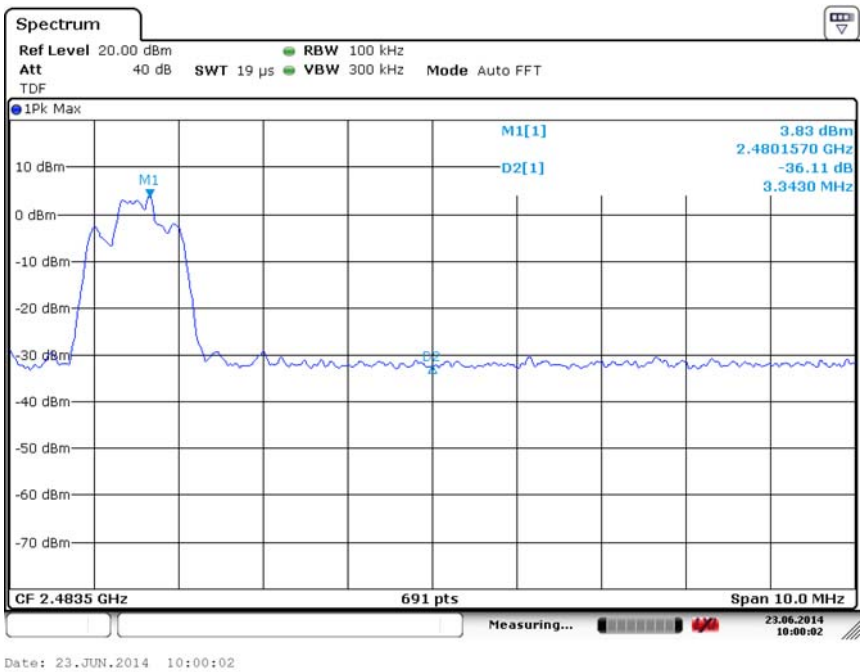


Fig. 10 Band Edges (π /4 DQPSK, Ch 78, Hopping OFF)

©Copyright. All rights reserved by CTTL.

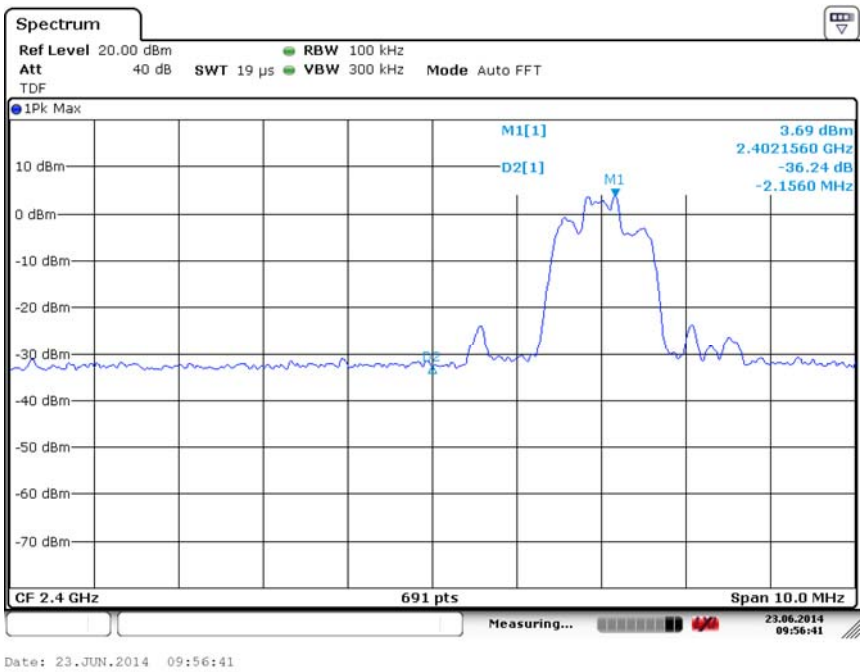


Fig. 11 Band Edges (8DPSK, Ch 0, Hopping OFF)

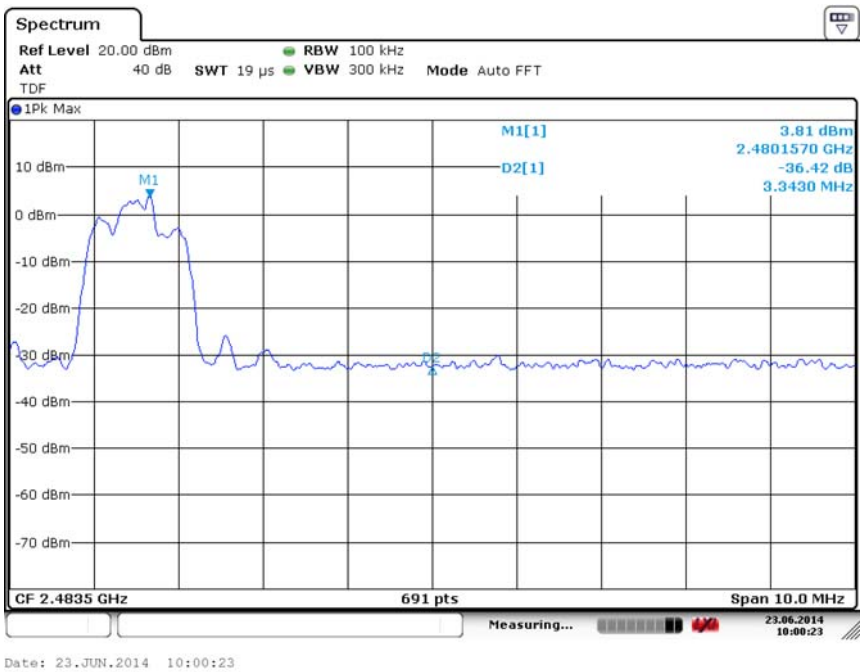


Fig. 12 Band Edges (8DPSK, Ch 78, Hopping OFF)

©Copyright. All rights reserved by CTTL.

A.4. Conducted Emission

Method of Measurement: See ANSI C63.10- clause 6.7

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

©Copyright. All rights reserved by CTTL.

Measurement Results:

MODE	Channel	Frequency Range	Test Results	Conclusion
GFSK	0	2.402 GHz	Fig.13	P
		30 MHz-3GHz	Fig.14	P
		3GHz-18GHz	Fig.15	P
	39	2.441 GHz	Fig.16	P
		30 MHz-3 GHz	Fig.17	P
		3GHz-18GHz	Fig.18	P
	78	2.480 GHz	Fig.19	P
		30 MHz-3GHz	Fig.20	P
		3GHz-18GHz	Fig.21	P
π /4 DQPSK	0	2.402 GHz	Fig.22	P
		30 MHz-3 GHz	Fig.23	P
		3GHz-18GHz	Fig.24	P
	39	2.441 GHz	Fig.25	P
		30 MHz-3GHz	Fig.26	P
		3GHz-18Ghz	Fig.27	P
	78	2.480 GHz	Fig.28	P
		30 MHz-3GHz	Fig.29	P
		3GHz-18Ghz	Fig.30	P
8DPSK	0	2.402 GHz	Fig.31	P
		30 MHz-3GHz	Fig.32	P
		3GHz-18GHz	Fig.33	P
	39	2.441 GHz	Fig.34	P
		30 MHz-3GHz	Fig.35	P
		3GHz-18GHz	Fig.36	P
	78	2.480 GHz	Fig.37	P
		30 MHz-3GHz	Fig.38	P
		3GHz-18GHz	Fig.39	P
/	All channel	18GHz-26GHz	Fig.40	P

Conclusion: PASS

Test graphs as below

©Copyright. All rights reserved by CTTL.

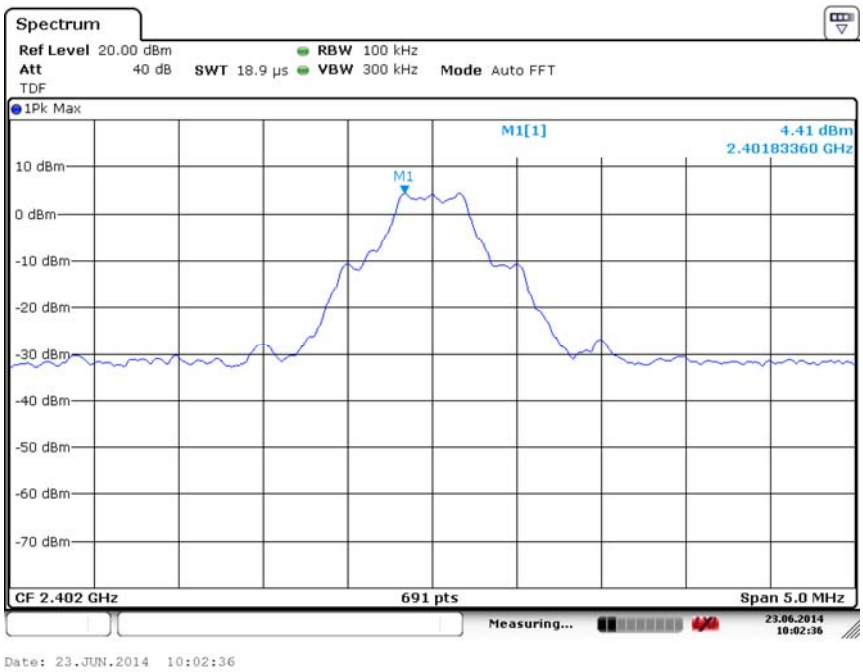


Fig. 13 Conducted Spurious Emission (GFSK, Ch0, 2.402GHz)

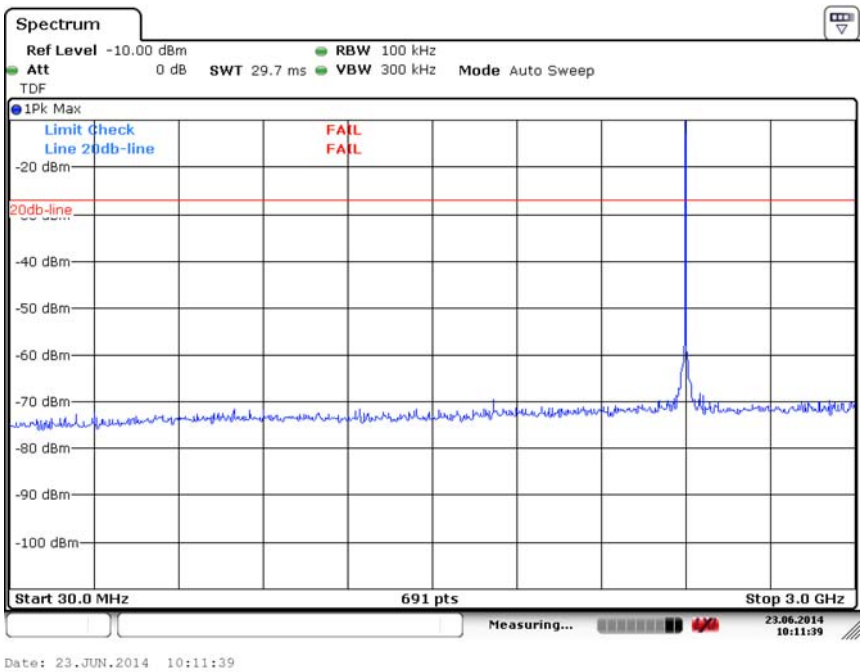


Fig. 14 Conducted Spurious Emission (GFSK, Ch0, 30 MHz-3 GHz)

©Copyright. All rights reserved by CTTL.

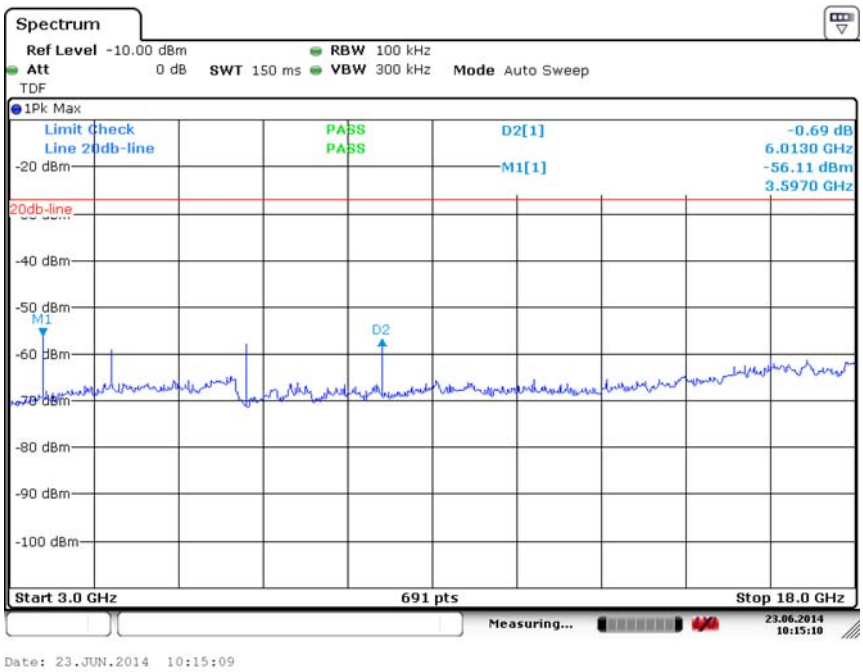


Fig. 15 Conducted Spurious Emission (GFSK, Ch0, 3GHz-18 GHz)

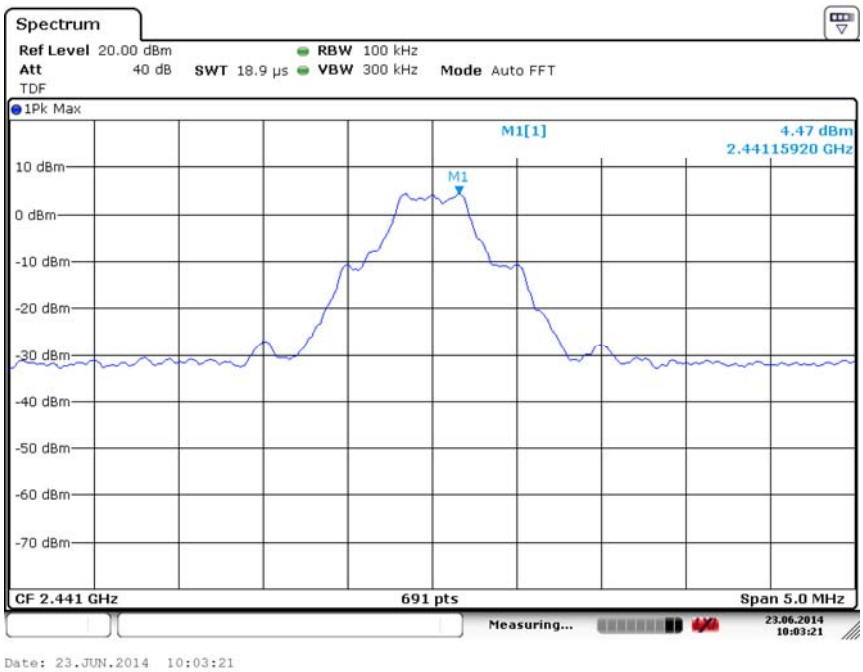


Fig. 16 Conducted Spurious Emission (GFSK, Ch39, 2.441GHz)

©Copyright. All rights reserved by CTTL.

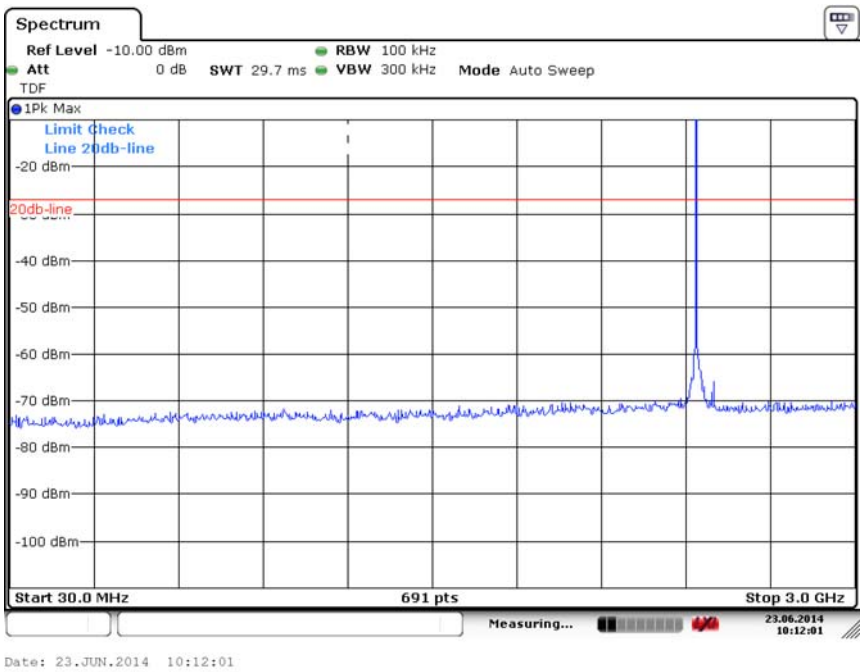


Fig. 17 Conducted Spurious Emission (GFSK, Ch39, 30 MHz-3 GHz)

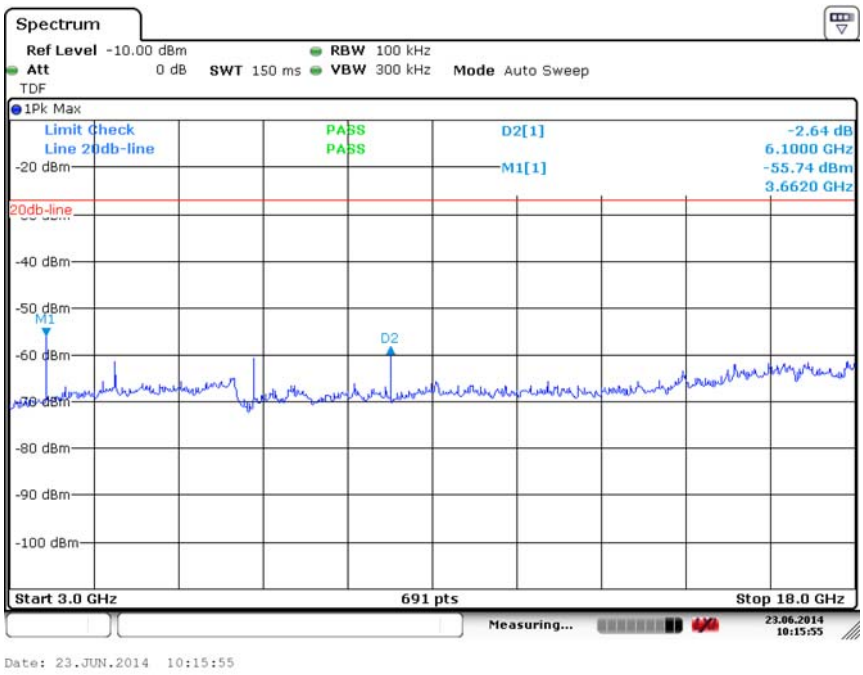


Fig. 18 Conducted Spurious Emission (GFSK, Ch39, 3GHz-18 GHz)

©Copyright. All rights reserved by CTTL.

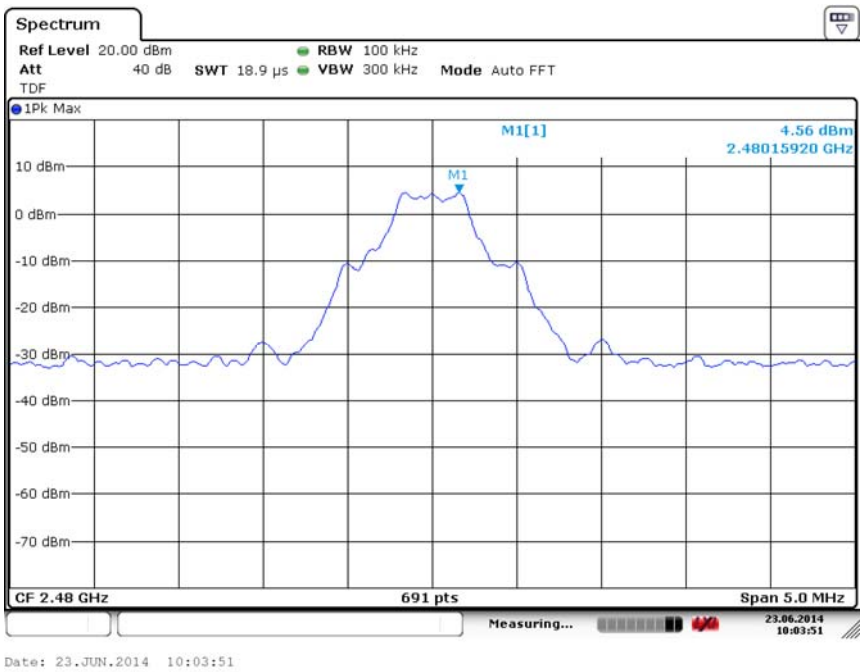


Fig. 19 Conducted Spurious Emission (GFSK, Ch78, 2.480GHz)

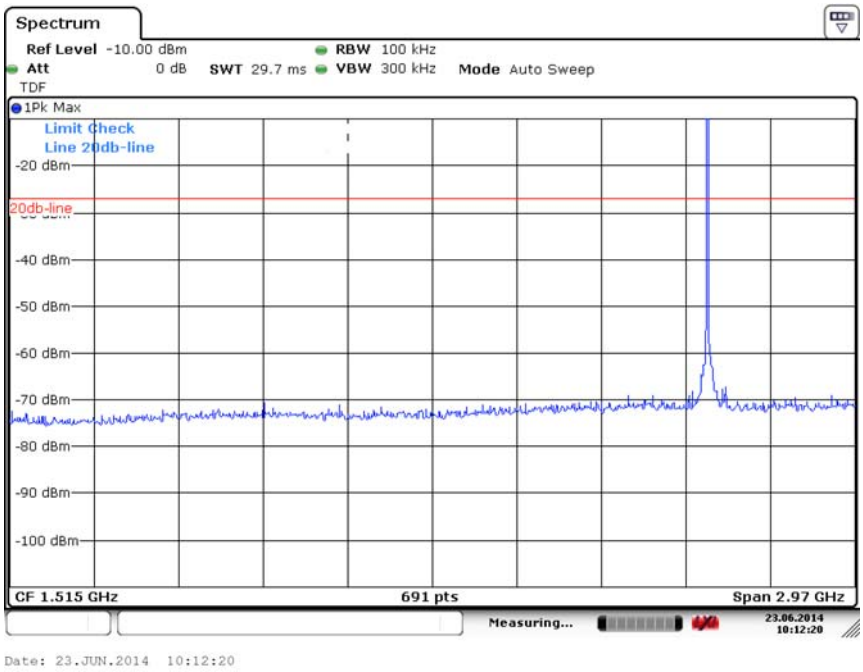


Fig. 20 Conducted Spurious Emission (GFSK, Ch78, 30 MHz-3 GHz)

©Copyright. All rights reserved by CTTL.

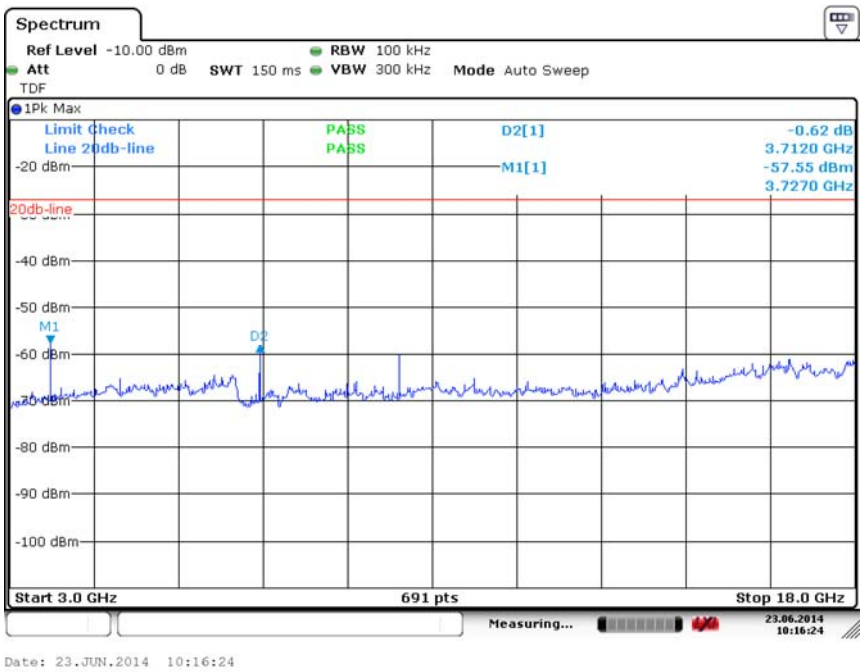


Fig. 21 Conducted Spurious Emission (GFSK, Ch78, 3GHz-18 GHz)

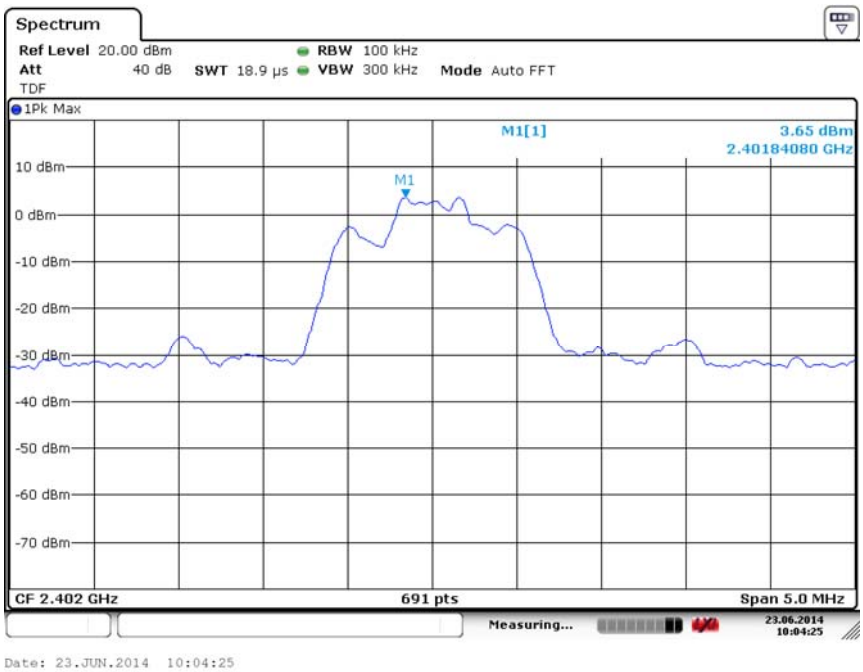


Fig. 22 Conducted Spurious Emission (π /4 DQPSK, Ch0, 2.402GHz)

©Copyright. All rights reserved by CTTL.

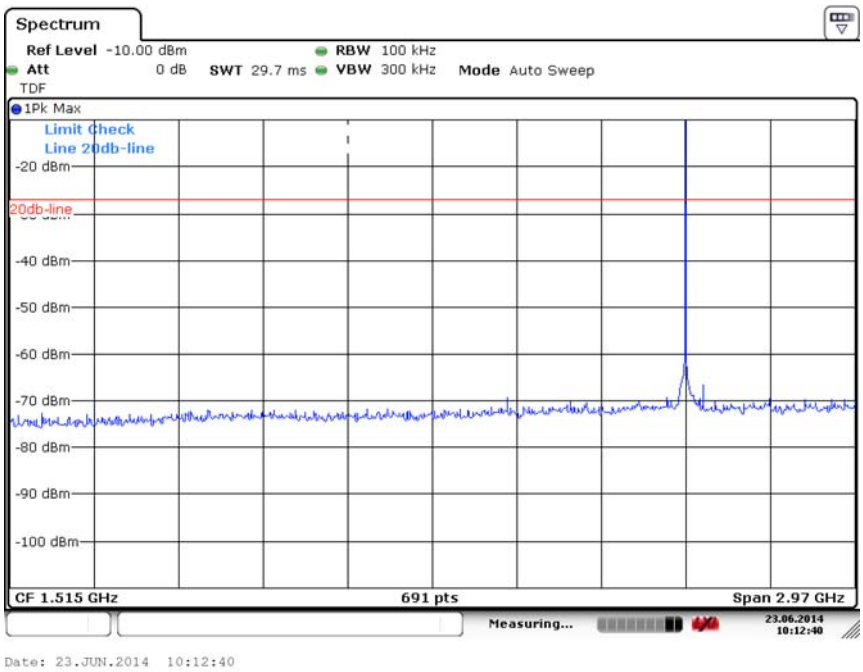


Fig. 23 Conducted Spurious Emission (π /4 DQPSK, Ch0, 30 MHz-3 GHz)

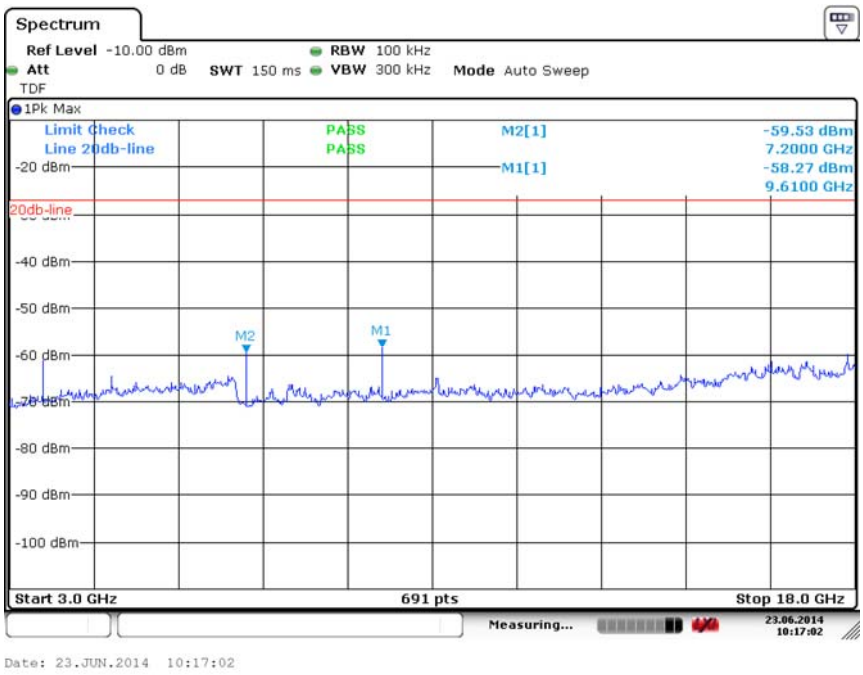


Fig. 24 Conducted Spurious Emission (π /4 DQPSK, Ch0, 3GHz-18 GHz)

©Copyright. All rights reserved by CTTL.

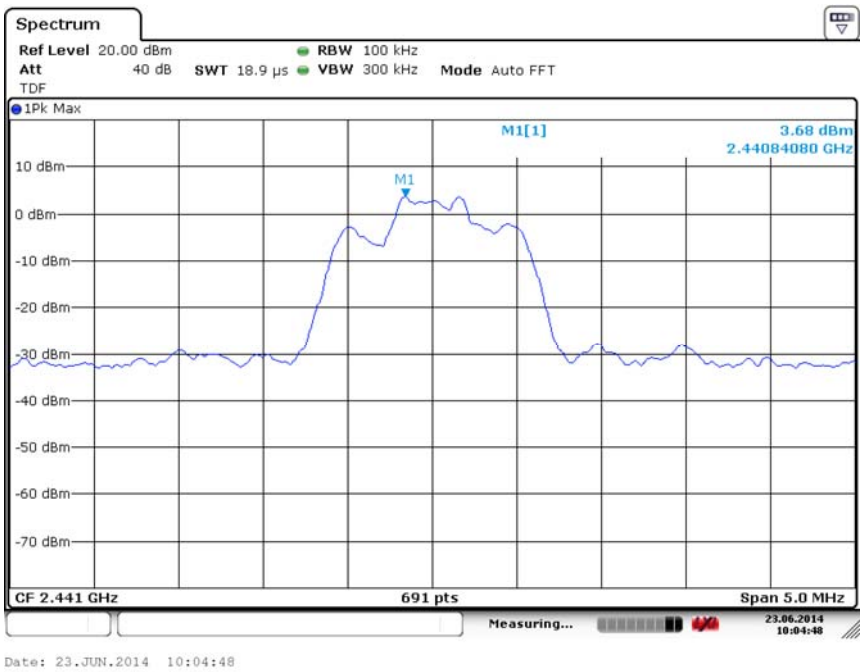


Fig. 25 Conducted Spurious Emission (π /4 DQPSK, Ch39, 2.441GHz)

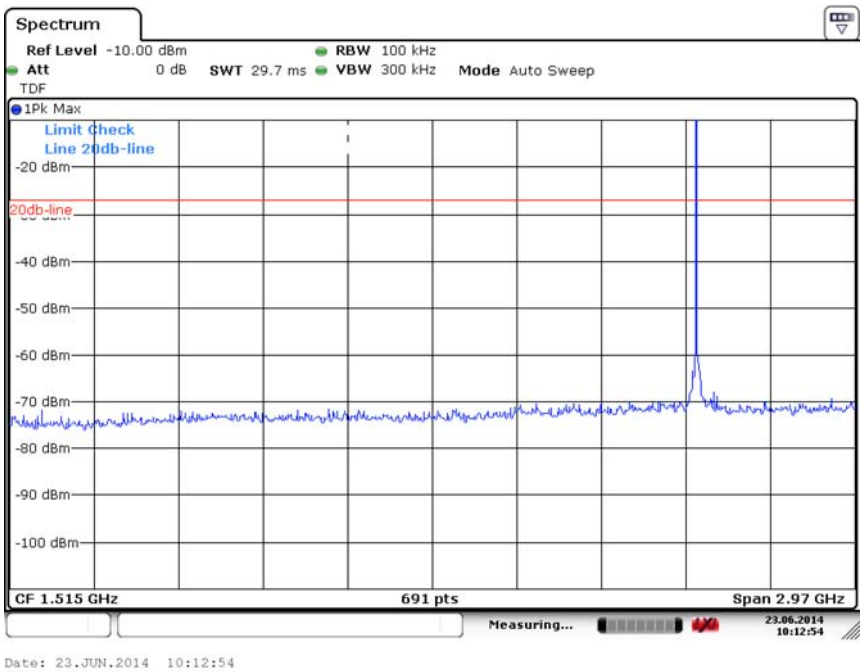


Fig. 26 Conducted Spurious Emission (π /4 DQPSK, Ch39, 30 MHz-3 GHz)

©Copyright. All rights reserved by CTTL.

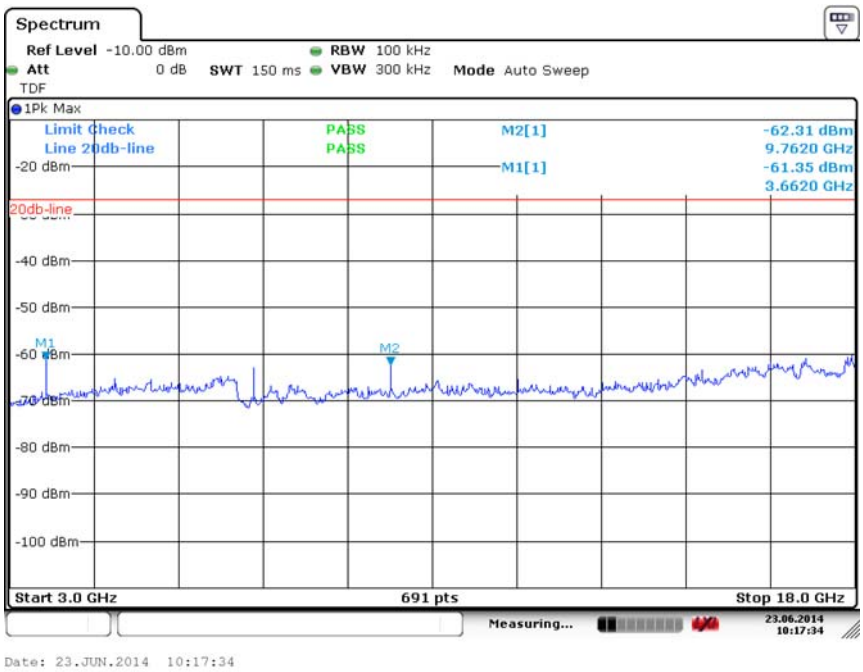


Fig. 27 Conducted Spurious Emission (π /4 DQPSK, Ch39, 3GHz-18 GHz)

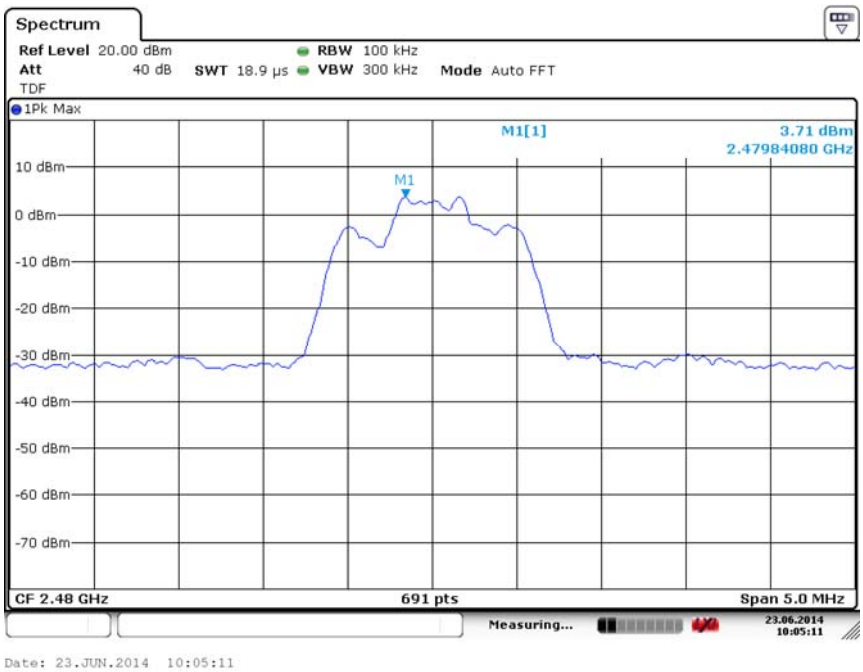


Fig. 28 Conducted Spurious Emission (π /4 DQPSK, Ch78, 2.480GHz)

©Copyright. All rights reserved by CTTL.

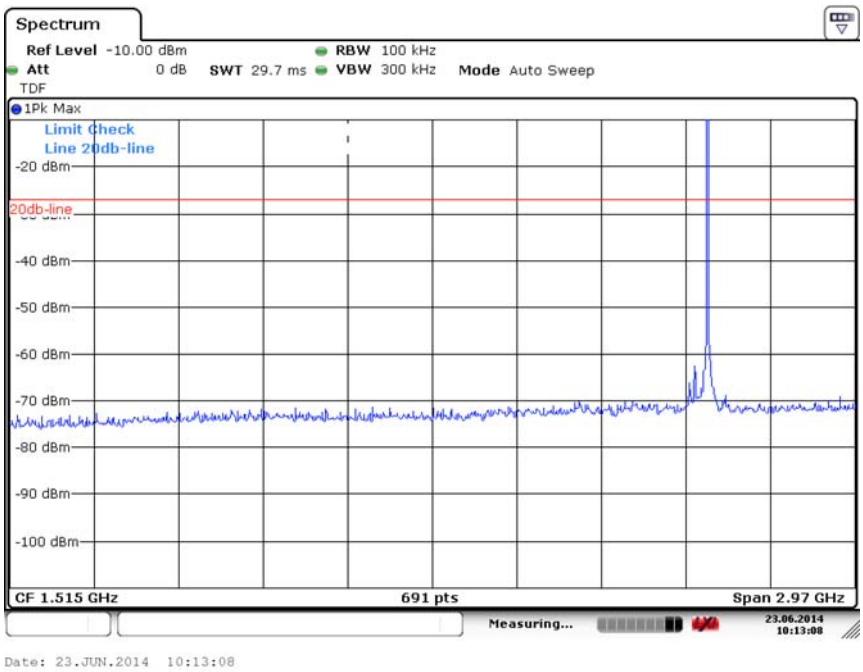


Fig. 29 Conducted Spurious Emission (π /4 DQPSK, Ch78, 30 MHz-3 GHz)

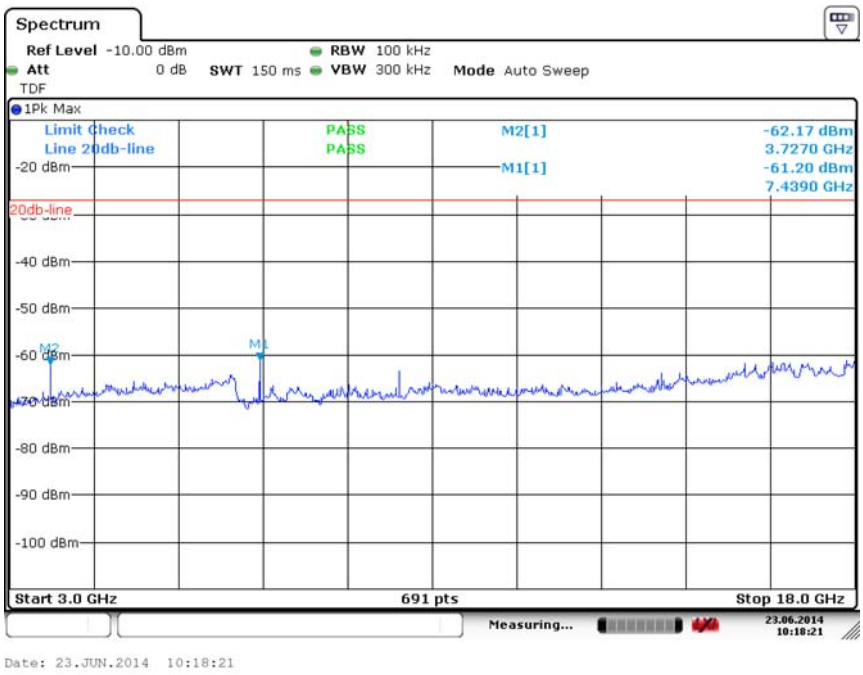


Fig. 30 Conducted Spurious Emission (π /4 DQPSK, Ch78, 3GHz-18 GHz)

©Copyright. All rights reserved by CTTL.

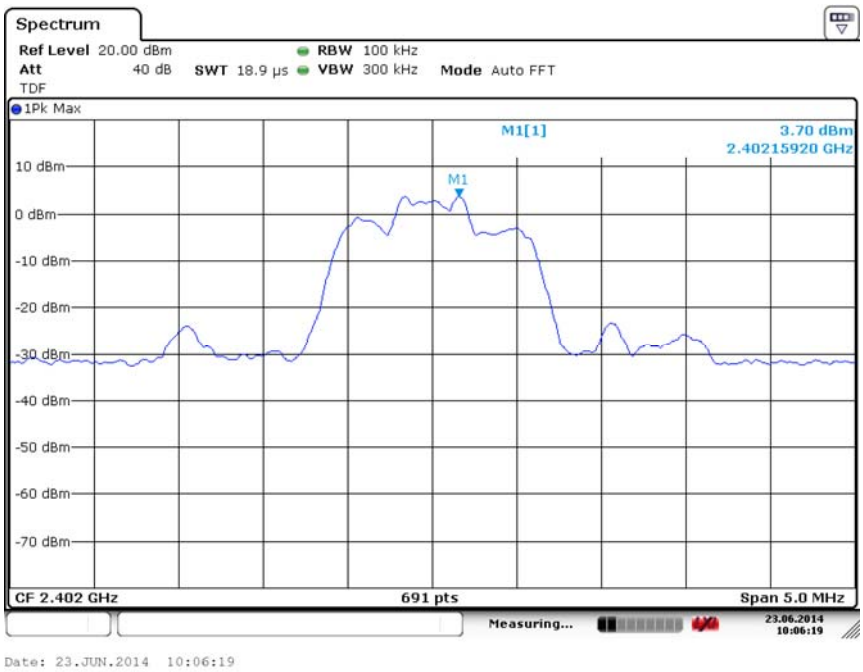


Fig. 31 Conducted Spurious Emission (8DPSK, Ch0, 2.402GHz)

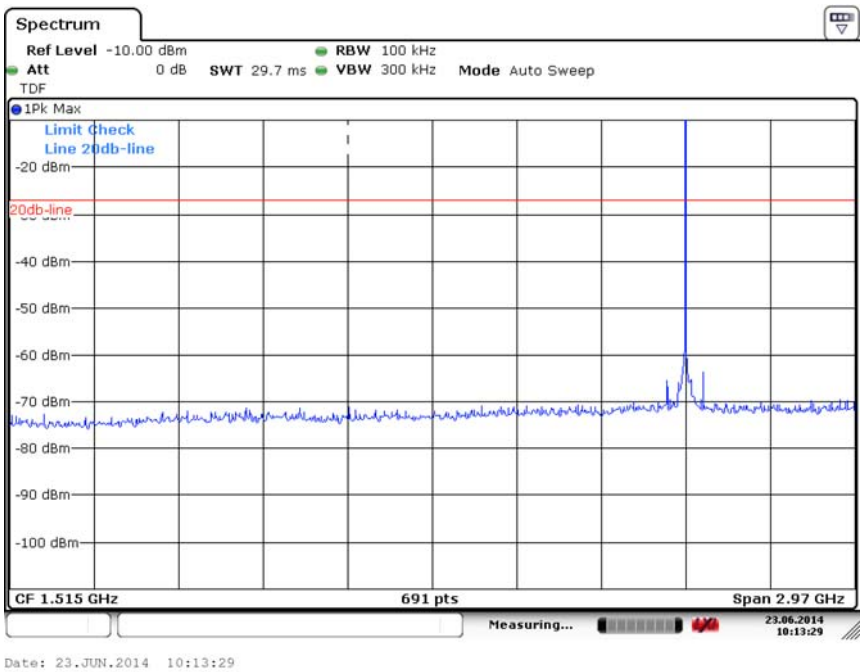


Fig. 32 Conducted Spurious Emission (8DPSK, Ch0, 30 MHz-3 GHz)

©Copyright. All rights reserved by CTTL.

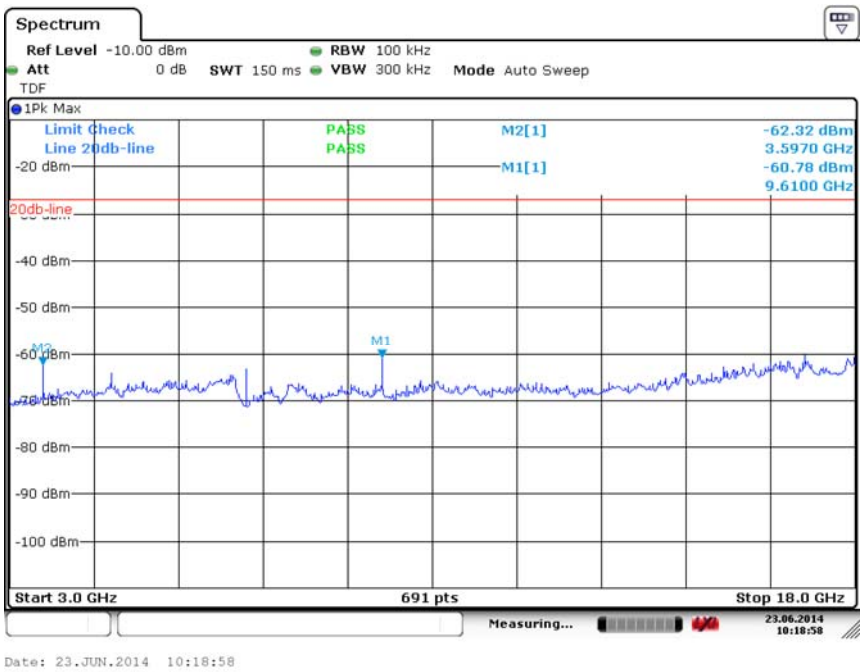


Fig. 33 Conducted Spurious Emission (8DPSK, Ch0, 3GHz-18 GHz)

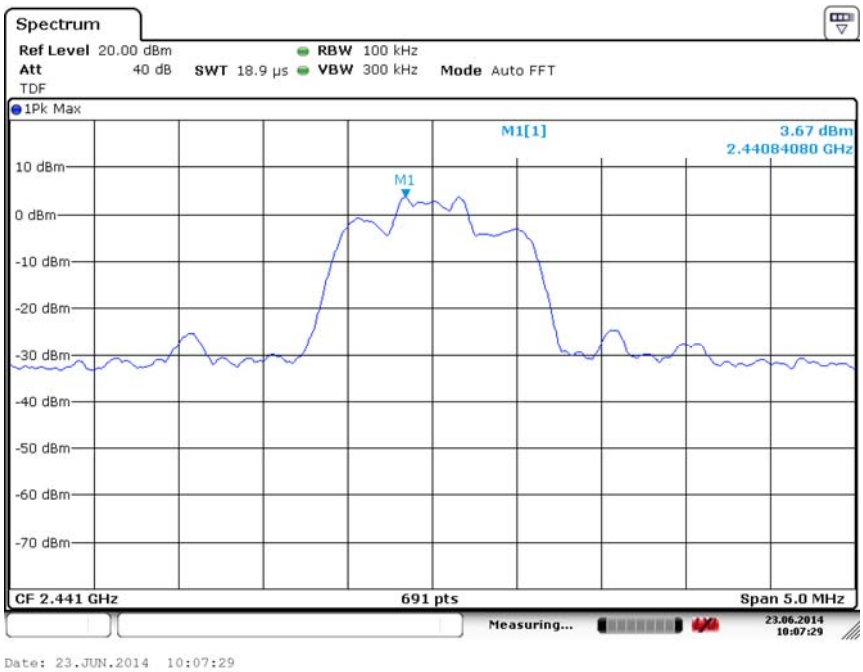


Fig. 34 Conducted Spurious Emission (8DPSK, Ch39, 2.441GHz)

©Copyright. All rights reserved by CTTL.

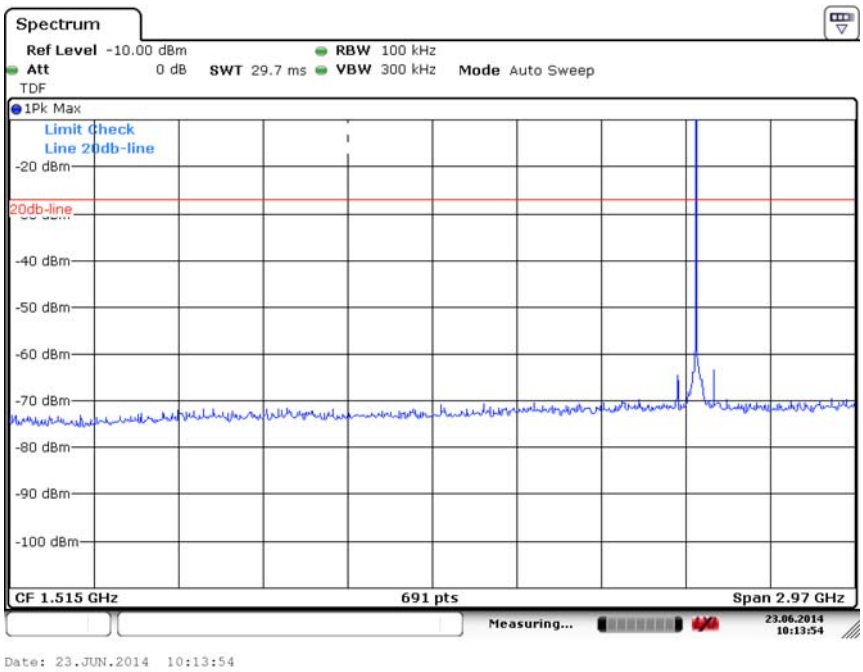


Fig. 35 Conducted Spurious Emission (8DPSK, Ch39, 30 MHz-3 GHz)

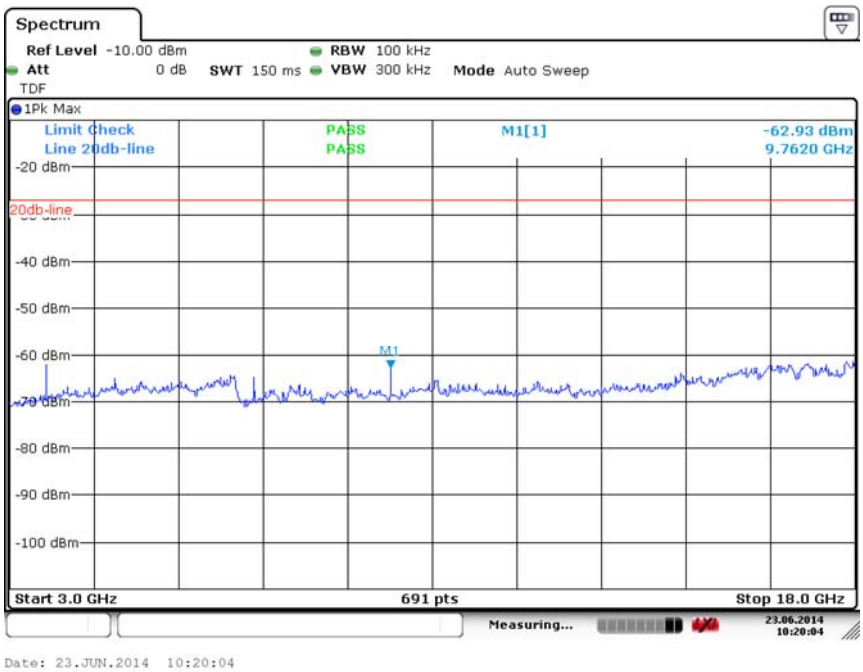


Fig. 36 Conducted Spurious Emission (8DPSK, Ch39, 3GHz-18 GHz)

©Copyright. All rights reserved by CTTL.

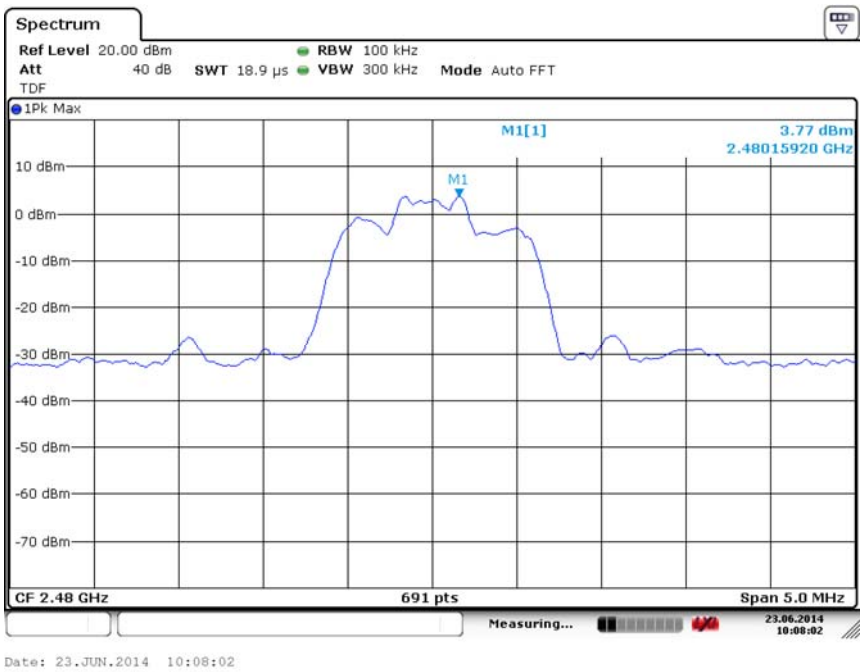


Fig. 37 Conducted Spurious Emission (8DPSK, Ch78, 2.480GHz)

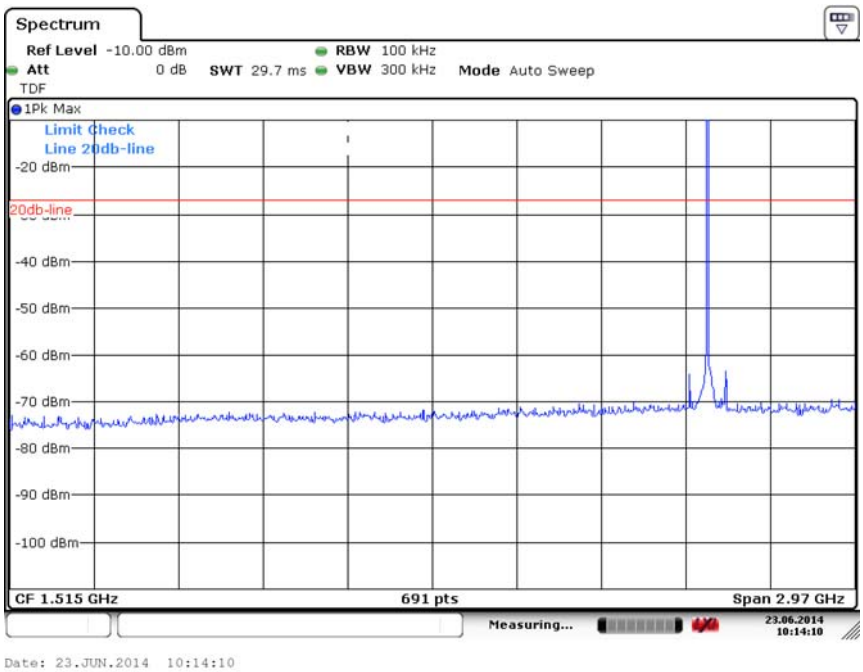


Fig. 38 Conducted Spurious Emission (8DPSK, Ch78, 30 MHz-3 GHz)

©Copyright. All rights reserved by CTTL.

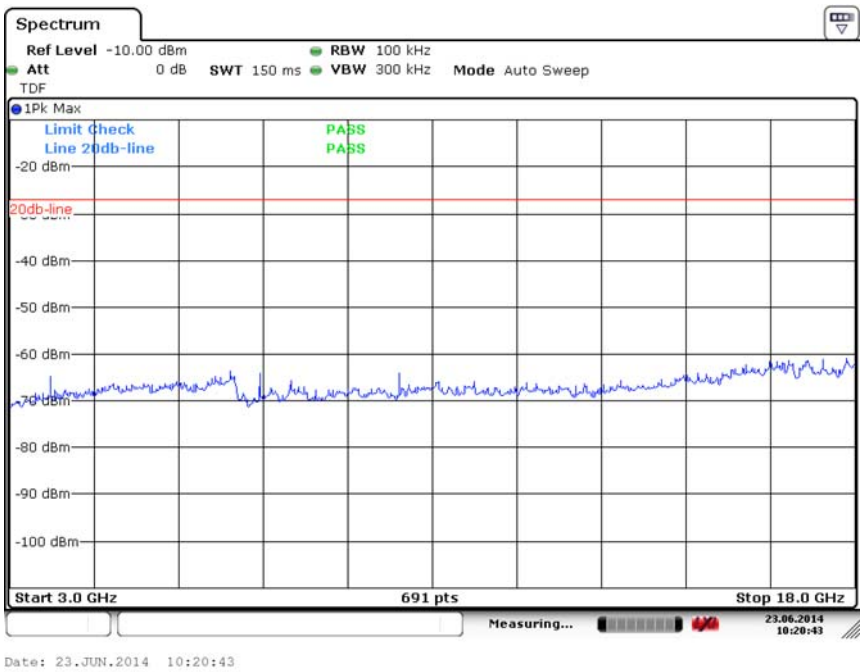


Fig. 39 Conducted Spurious Emission (8DPSK, Ch78, 3GHz-18 GHz)

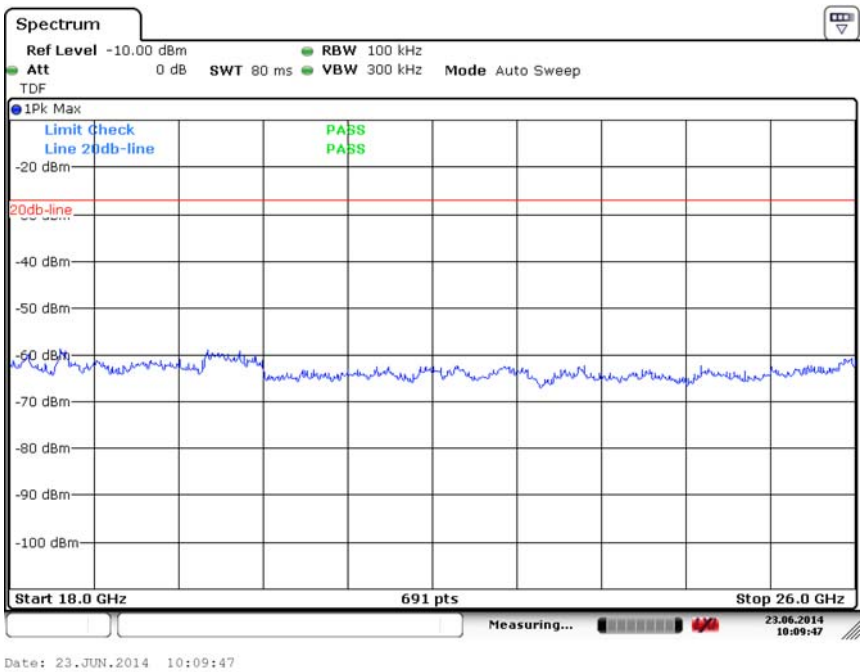


Fig. 40 Conducted Spurious Emission (All channel, 18 GHz-26 GHz)

©Copyright. All rights reserved by CTTL.

A.5. Radiated Emission

Measurement Limit:

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

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

The measurement is made according to ANSI C63.10

Limit in restricted band:

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

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	100KHz/300KHz	5
1000-4000	1MHz/1MHz	15
4000-18000	1MHz/1MHz	40
18000-26500	1MHz/1MHz	20

Measurement Results:

Result=P_{Mea}+ARPL

©Copyright. All rights reserved by CTTL.

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	Fig.41	P
	3 GHz ~ 18 GHz	Fig.42	P
Ch 39 2441 MHz	9 kHz ~ 30 MHz	Fig.43	P
	30 MHz ~ 1 GHz	Fig.44	P
	1 GHz ~ 3 GHz	Fig.45	P
	3 GHz ~ 18 GHz	Fig.46	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	Fig.47	P
	3 GHz ~ 18 GHz	Fig.48	P
Power	2.38GHz~2.4GHz---L	Fig.49	P
Power	2.45GHz~2.5GHz---H	Fig.50	P
For all channels	18 GHz ~ 26 GHz	Fig.51	P

Forπ/4 DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	Fig.52	P
	3 GHz ~ 18 GHz	Fig.53	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.54	P
	1 GHz ~ 3 GHz	Fig.55	P
	3 GHz ~ 18 GHz	Fig.56	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	Fig.57	P
	3 GHz ~ 18 GHz	Fig.58	P
Power	2.38GHz~2.4GHz---L	Fig.59	P
Power	2.45GHz~2.5GHz---H	Fig.60	P
For all channels	18 GHz ~ 26 GHz	Fig.61	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	1 GHz ~ 3 GHz	Fig.62	P
	3 GHz ~ 18 GHz	Fig.63	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.64	P
	1 GHz ~ 3 GHz	Fig.65	P
	3 GHz ~ 18 GHz	Fig.66	P
Ch 78 2480 MHz	1 GHz ~ 3 GHz	Fig.67	P
	3 GHz ~ 18 GHz	Fig.68	P
Power	2.38GHz~2.4GHz---L	Fig.69	P
Power	2.45GHz~2.5GHz---H	Fig.70	P
For all channels	18 GHz ~ 26 GHz	Fig.71	P

©Copyright. All rights reserved by CTTL.

GFSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	PMea(dBuv/m)	Polarization
2389.675	34.7	-11.1	45.8	V
17908.125	46.1	27.1	19.0	V
17894.063	46.1	27.1	19.0	V
17887.500	46.1	27.1	19.0	H
17880.938	46.1	27.1	19.0	V
17875.313	46.1	27.1	19.0	V

GFSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
17893.125	46.3	27.1	19.200	V
17870.625	46.2	27.1	19.100	V
17883.750	46.1	27.1	19.000	V
17898.750	46.1	27.1	19.000	V
17865.938	46.1	27.1	19.000	H
17876.250	46.1	27.1	19.000	V

GFSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
2484.506	38.1	-11.2	49.3	V
17904.375	46.2	27.1	19.1	H
17884.688	46.2	27.1	19.1	V
17907.188	46.2	27.1	19.1	V
17876.250	46.1	27.1	19.0	V
17893.125	46.1	27.1	19.0	V

π/4 DQPSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
2389.975	34.8	-11.1	45.9	V
17877.188	46.5	27.1	19.4	V
17888.438	46.4	27.1	19.3	H
17880.938	46.2	27.1	19.1	V
17883.750	46.2	27.1	19.1	V
17892.188	46.1	27.1	19.0	H

π/4 DQPSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
17879.063	46.3	27.1	19.2	V
17872.500	46.3	27.1	19.2	V
17894.063	46.1	27.1	19.0	V
17896.875	46.1	27.1	19.0	V
17874.375	46.0	27.1	18.9	V
17877.188	46.0	27.1	18.9	H

©Copyright. All rights reserved by CTTL.

π/4 DQPSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
2483.506	50.5	-11.2	61.7	H
17874.375	46.6	27.1	19.5	H
17884.688	46.5	27.1	19.4	V
17896.875	46.4	27.1	19.3	H
17883.750	46.2	27.1	19.1	V
17893.125	46.1	27.1	19.0	V

8DPSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
2384.625	34.7	-11.1	45.8	V
17889.375	46.4	27.1	19.3	V
17891.250	46.3	27.1	19.2	H
17910.000	46.2	27.1	19.1	V
17868.750	46.1	27.1	19.0	V
17876.250	46.1	27.1	19.0	H

8DPSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
17873.438	46.4	27.1	19.3	V
17900.625	46.2	27.1	19.1	V
17890.313	46.2	27.1	19.1	V
17882.813	46.1	27.1	19.0	V
17892.188	46.1	27.1	19.0	V
17865.000	46.1	27.1	19.0	H

8DPSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
2483.513	50.3	-11.2	61.5	H
17895.938	46.3	27.1	19.2	H
17897.813	46.3	27.1	19.2	V
17882.813	46.2	27.1	19.1	H
17891.250	46.2	27.1	19.1	V
17881.875	46.1	27.1	19.0	V

Conclusion: PASS

Test graphs as below:

©Copyright. All rights reserved by CTTL.

RE_BT_1G-3GHz

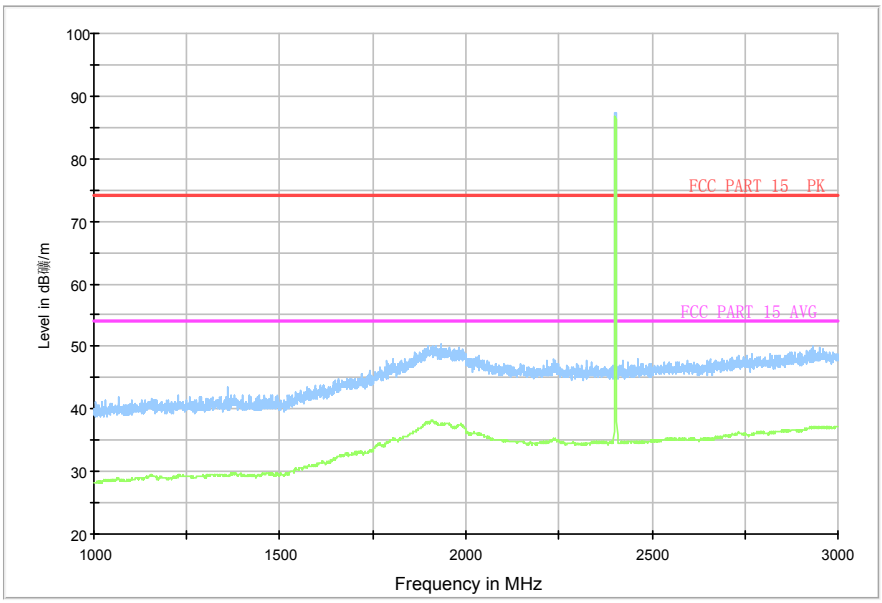


Fig.41 Radiated emission: GFSK, Channel 0, 1 GHz - 3 GHz

Normal RE_3G-18GHz

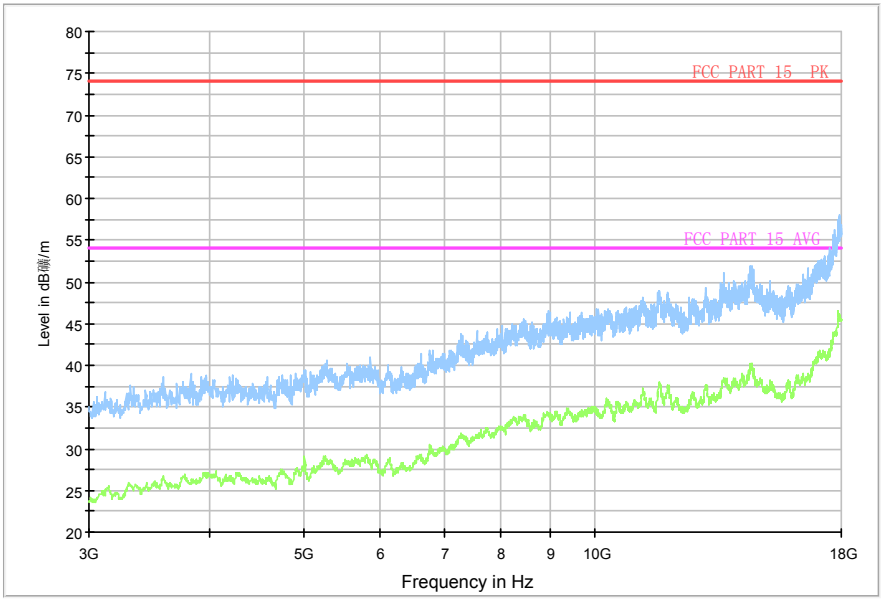


Fig.42 Radiated emission: GFSK, Channel 0, 3 GHz - 18 GHz

©Copyright. All rights reserved by CTTL.

RE_9kHz-30MHz

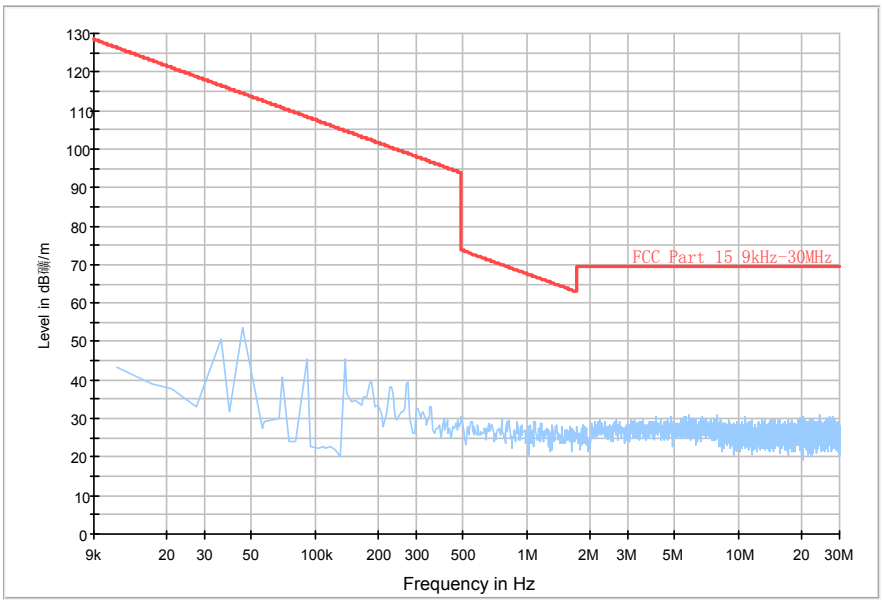


Fig.43 Radiated emission: GFSK, Channel 39, 9 kHz - 30 MHz

Normal RE_30M-1GHz_10m

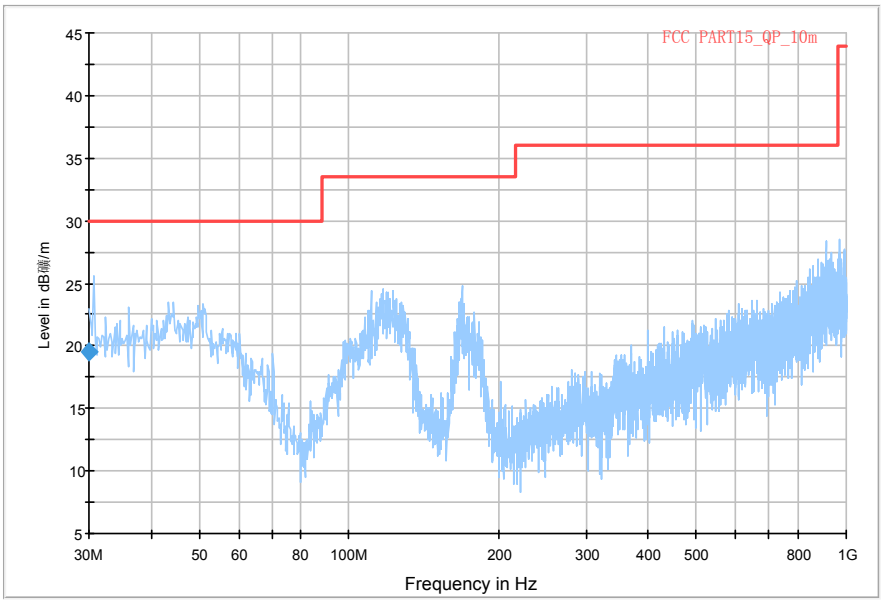


Fig.44 Radiated emission: GFSK, Channel 39, 30 MHz - 1 GHz

©Copyright. All rights reserved by CTTL.

RE_BT_1G-3GHz

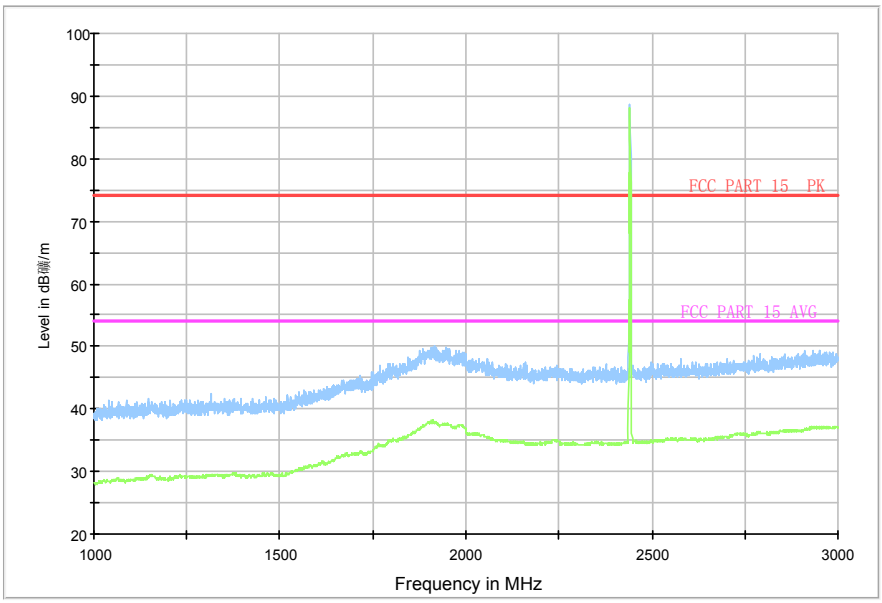


Fig.45 Radiated emission: GFSK, Channel 39, 1 GHz - 3 GHz

Normal RE_3G-18GHz

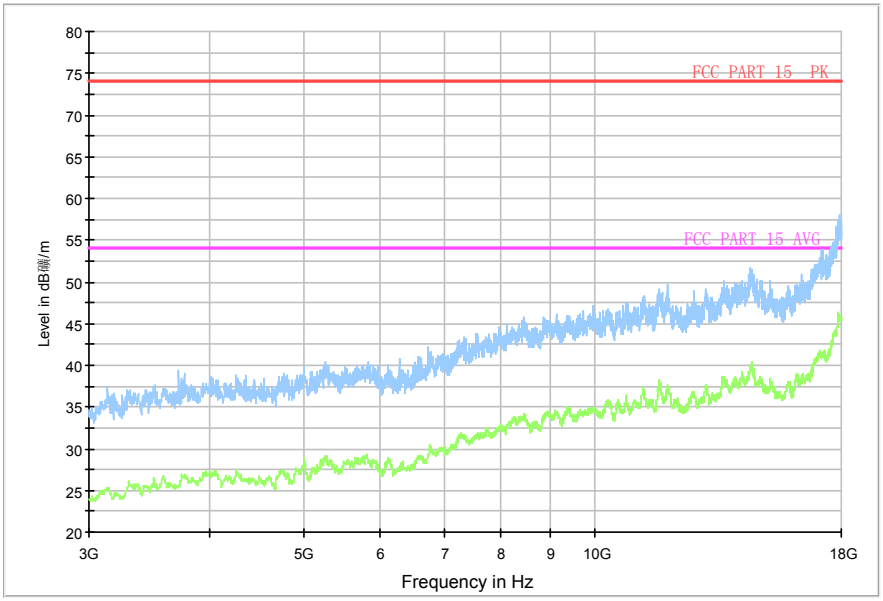


Fig.46 Radiated emission: GFSK, Channel 39, 3 GHz - 18 GHz

©Copyright. All rights reserved by CTTL.

RE_BT_1G-3GHz

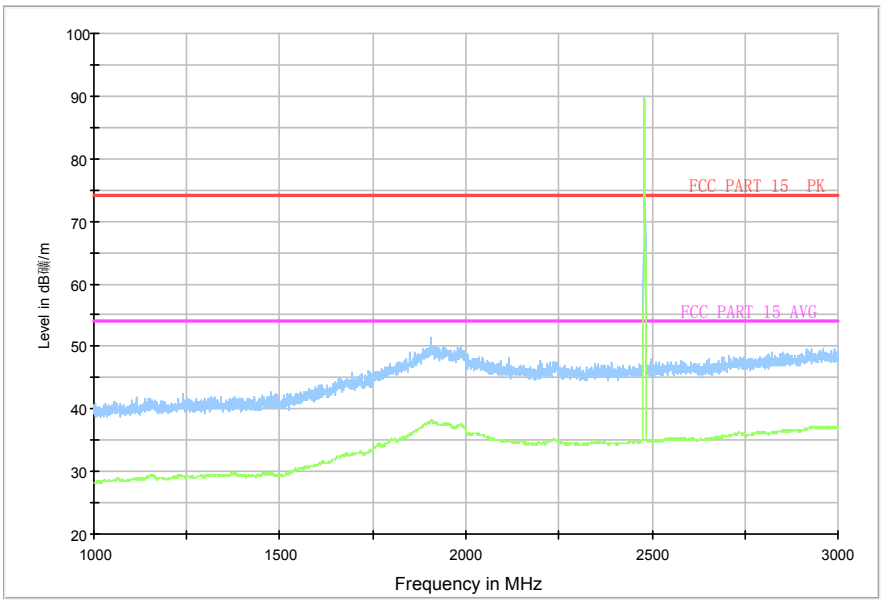


Fig.47 Radiated emission: GFSK, Channel 78, 1 GHz - 3 GHz

Normal RE_3G-18GHz

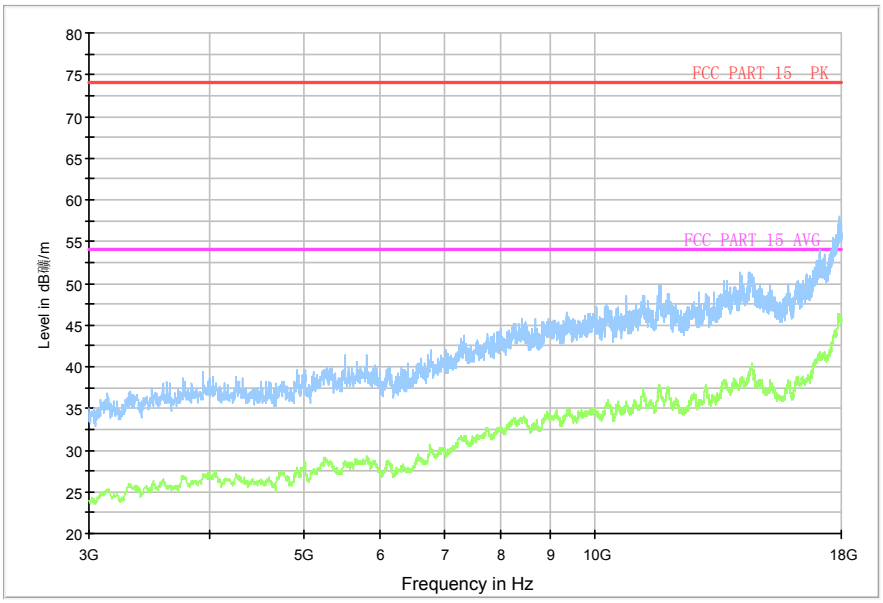


Fig.48 Radiated emission: GFSK, Channel 78, 3 GHz - 18 GHz

©Copyright. All rights reserved by CTTL.

RE-BT-Power_2.38G-2.43GHz

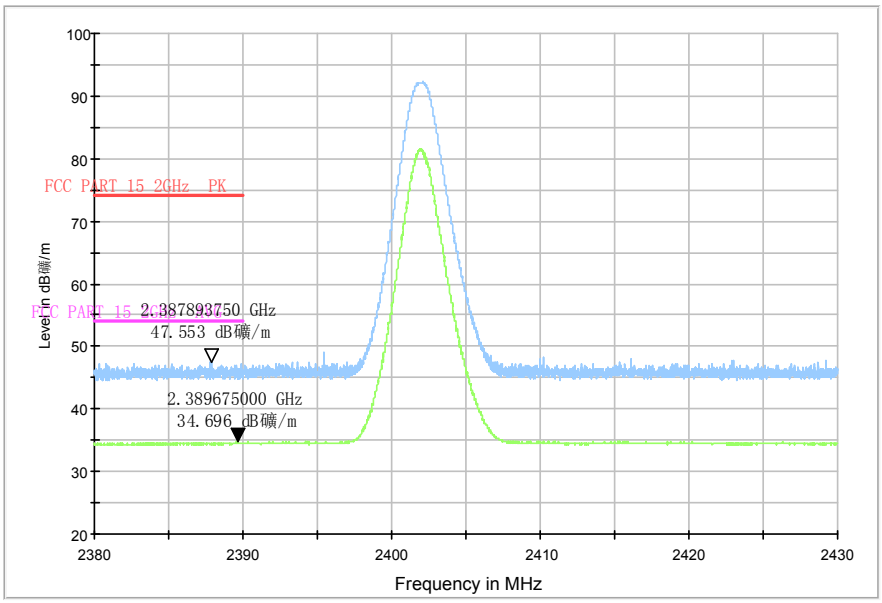


Fig.49 Radiated emission (Power): GFSK, low channel

RE-BT-Power_2.45G-2.5GHz

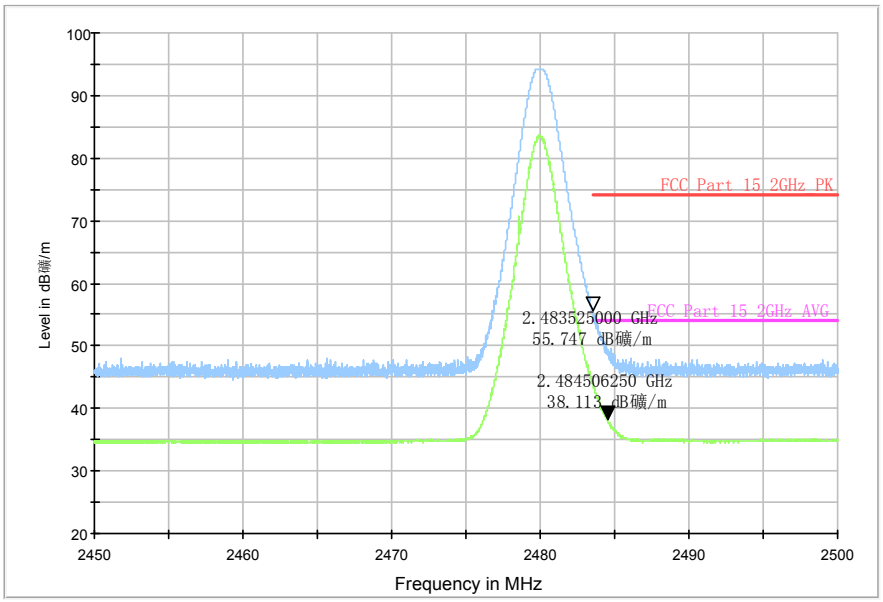


Fig.50 Radiated emission (Power) GFSK, high channel

©Copyright. All rights reserved by CTTL.

Normal RE_18G-26.5GHz

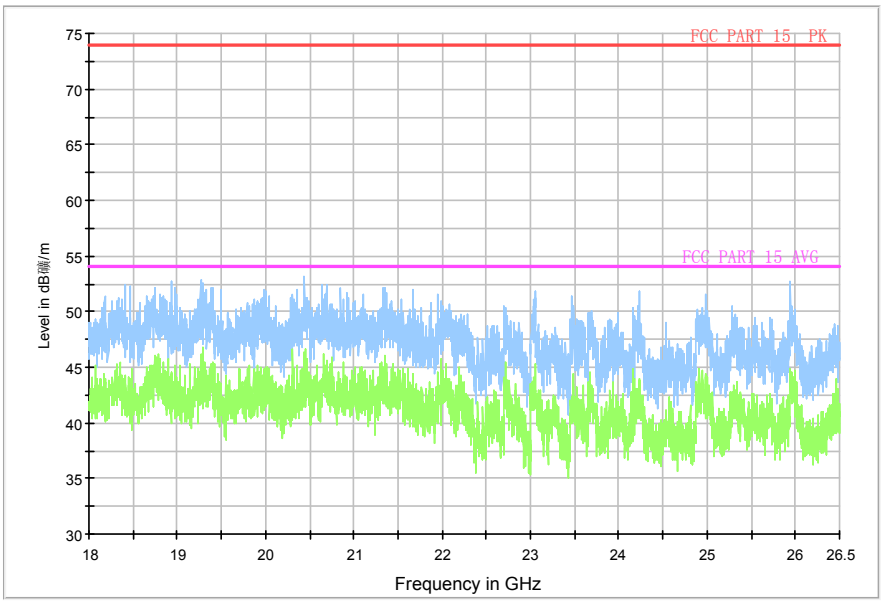


Fig.51 Radiated emission: GFSK, 18 GHz - 26 GHz

RE_BT_1G-3GHz

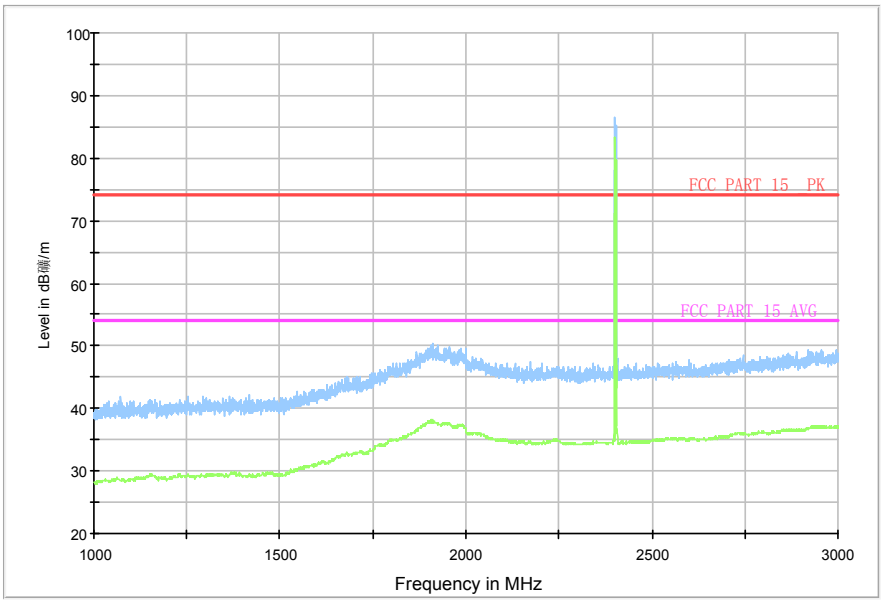


Fig.52 Radiated emission: π/4 DQPSK, Channel 0, 1 GHz - 3 GHz

©Copyright. All rights reserved by CTTL.

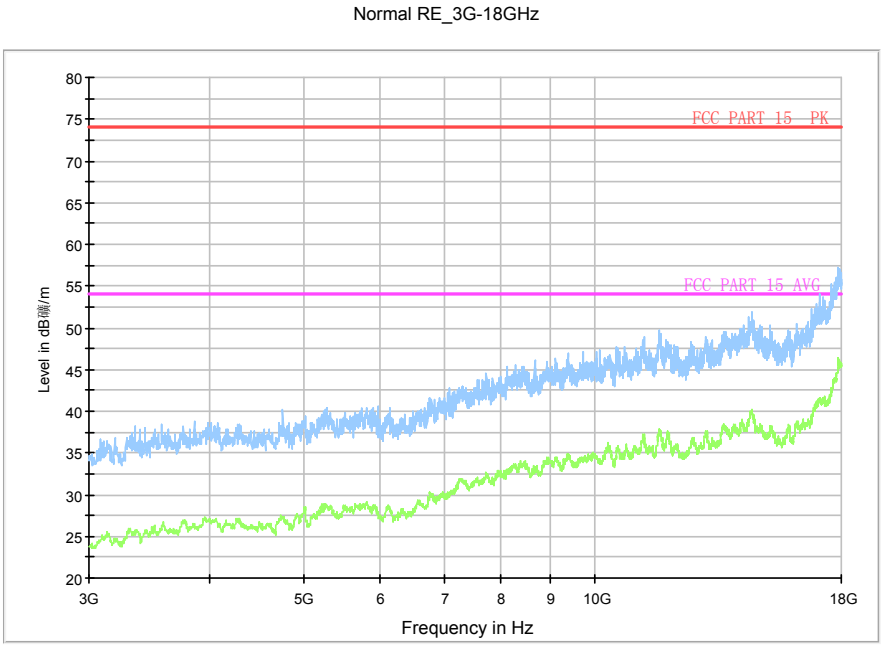


Fig.53 Radiated emission: π/4 DQPSK, Channel 0, 3 GHz - 18 GHz

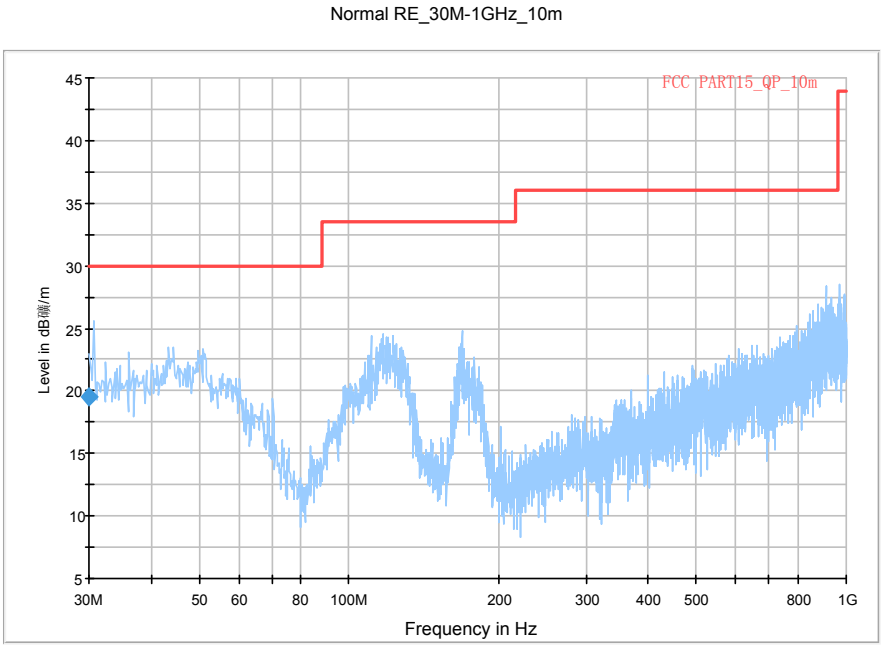


Fig.54 Radiated emission: π/4 DQPSK, Channel 39, 30 MHz - 1 GHz

©Copyright. All rights reserved by CTTL.

RE_BT_1G-3GHz

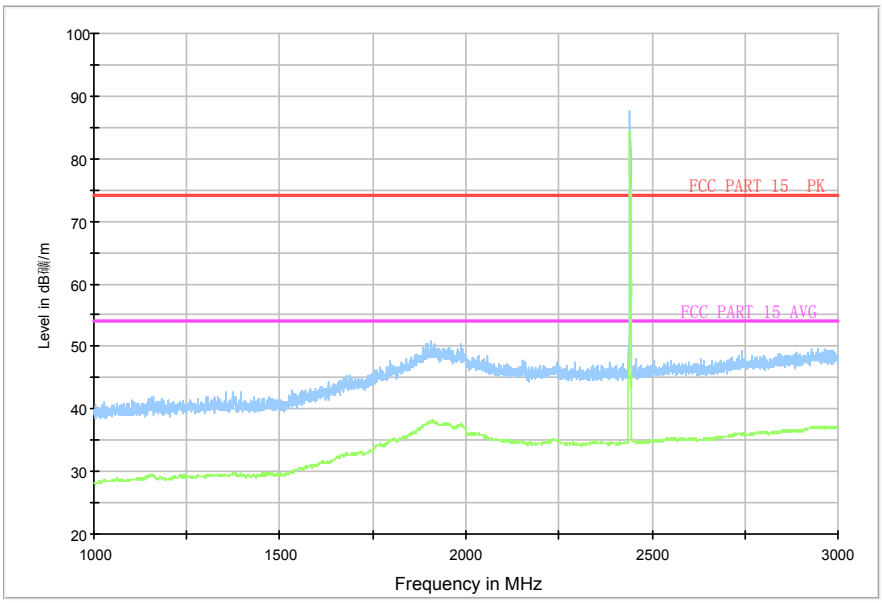


Fig.55 Radiated emission: π/4 DQPSK, Channel 39, 1 GHz - 3 GHz

Normal RE_3G-18GHz

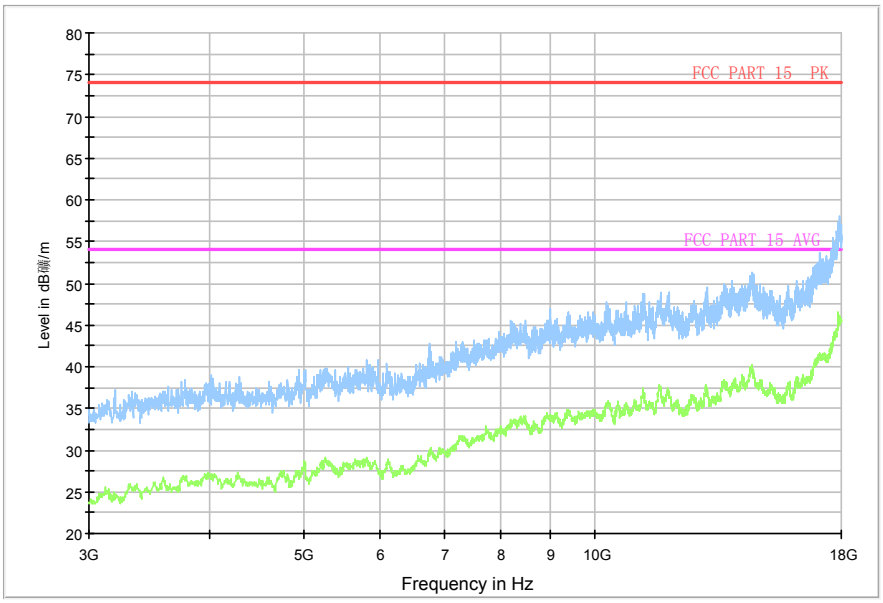


Fig.56 Radiated emission: π/4 DQPSK, Channel 39, 3 GHz - 18 GHz

©Copyright. All rights reserved by CTTL.

RE_BT_1G-3GHz

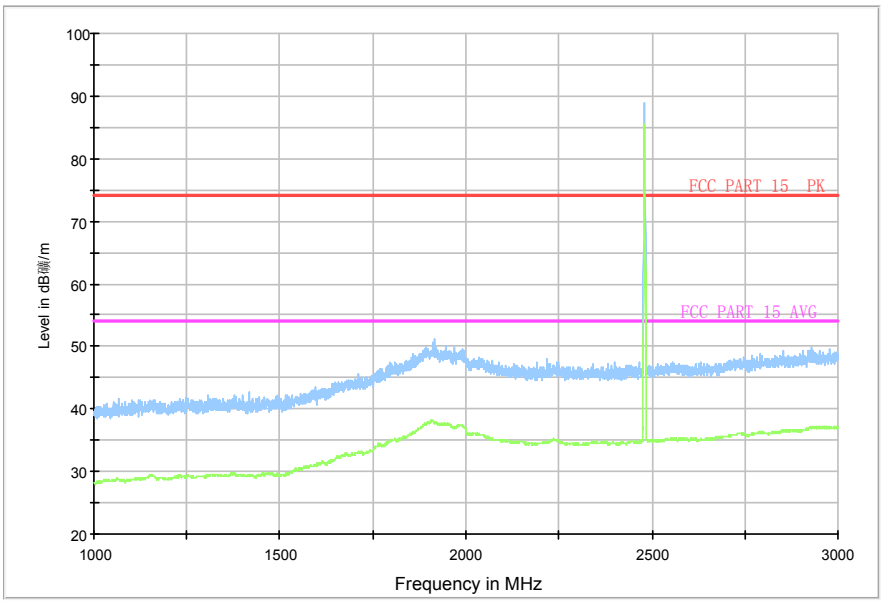


Fig.57 Radiated emission: π/4 DQPSK, Channel 78, 1 GHz - 3 GHz

Normal RE_3G-18GHz

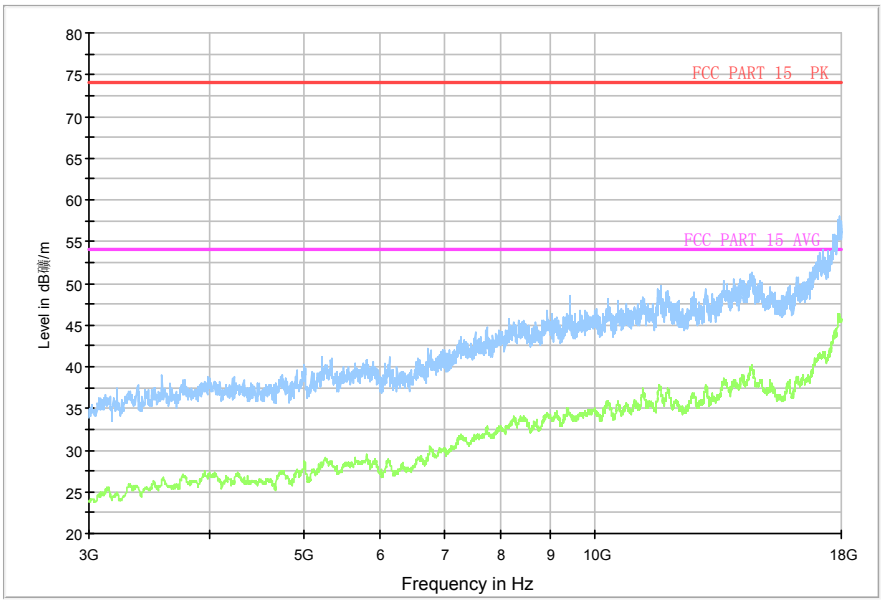


Fig.58 Radiated emission: π/4 DQPSK, Channel 78, 3 GHz - 18 GHz

©Copyright. All rights reserved by CTTL.

RE-BT-Power_2.38G-2.43GHz

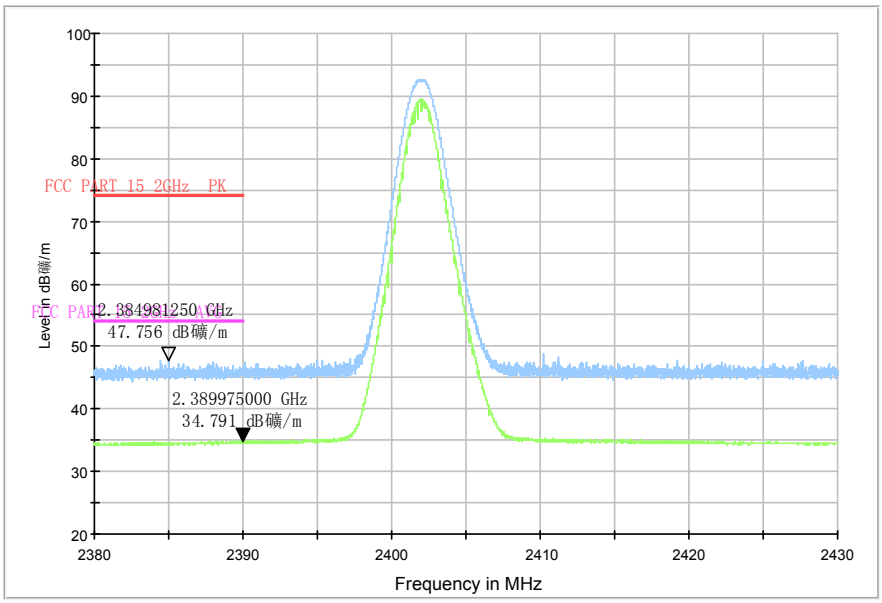


Fig.59 Radiated emission (Power): π/4 DQPSK, low channel

RE-BT-Power_2.45G-2.5GHz

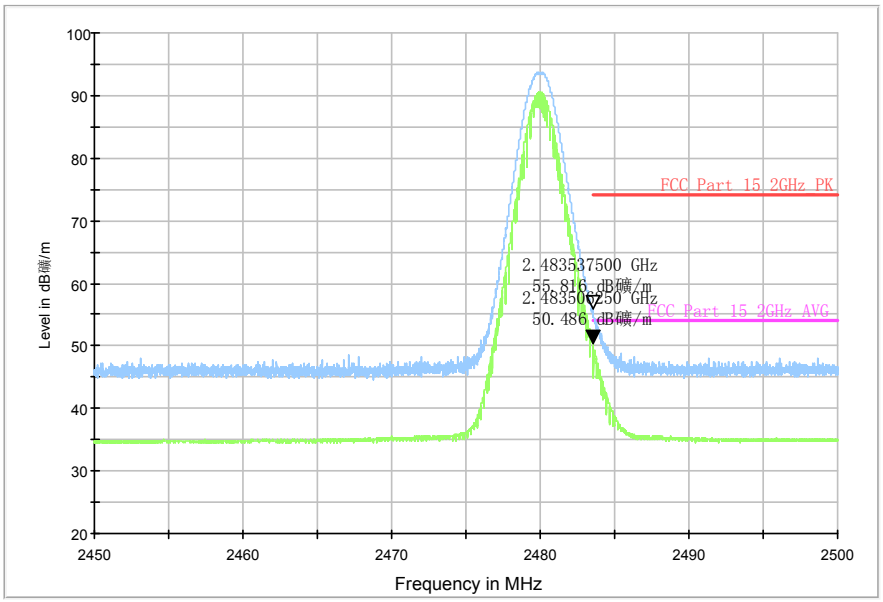


Fig.60 Radiated emission (Power): π/4 DQPSK, high channel

©Copyright. All rights reserved by CTTL.

Normal RE_18G-26.5GHz

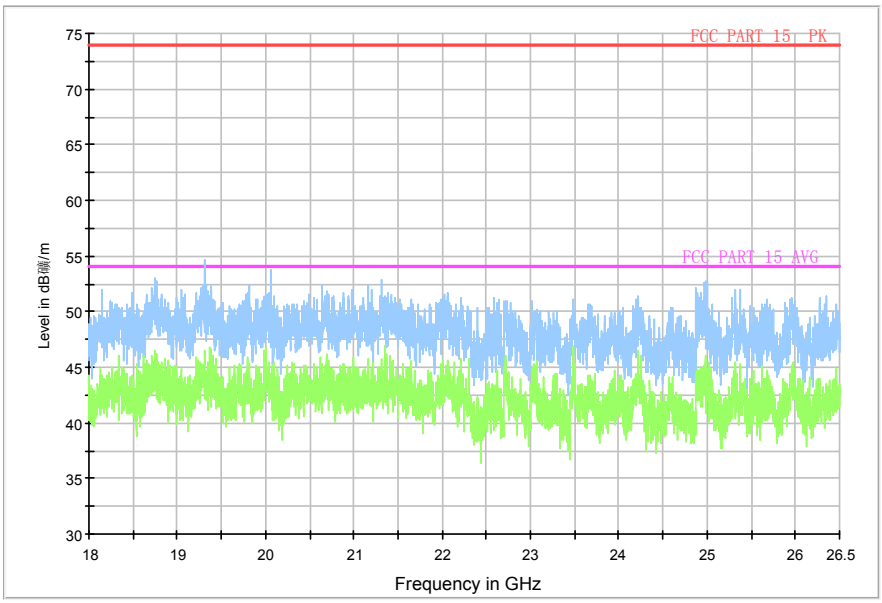


Fig.61 Radiated emission: π/4 DQPSK, 18 GHz - 26 GHz

RE_BT_1G-3GHz

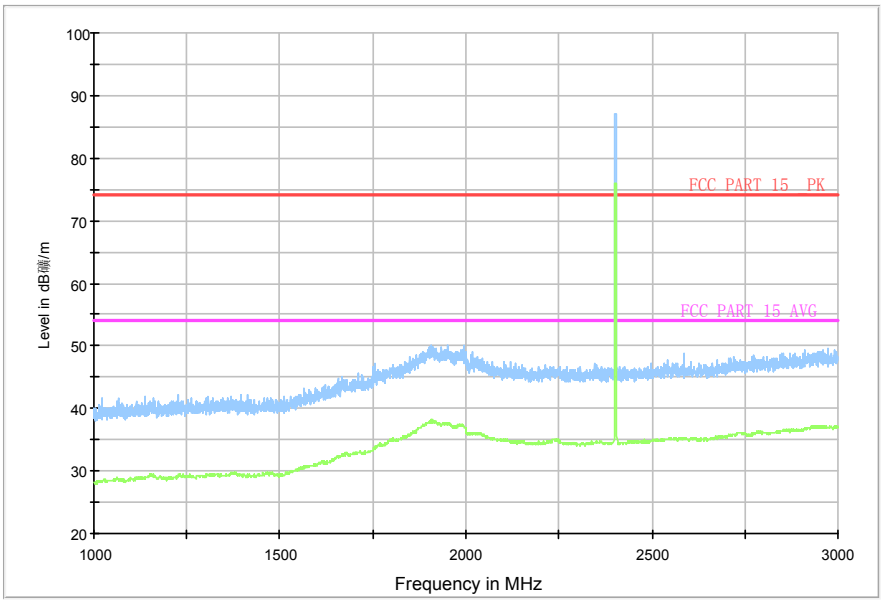


Fig.62 Radiated emission: 8DPSK, Channel 0, 1 GHz - 3 GHz

©Copyright. All rights reserved by CTTL.

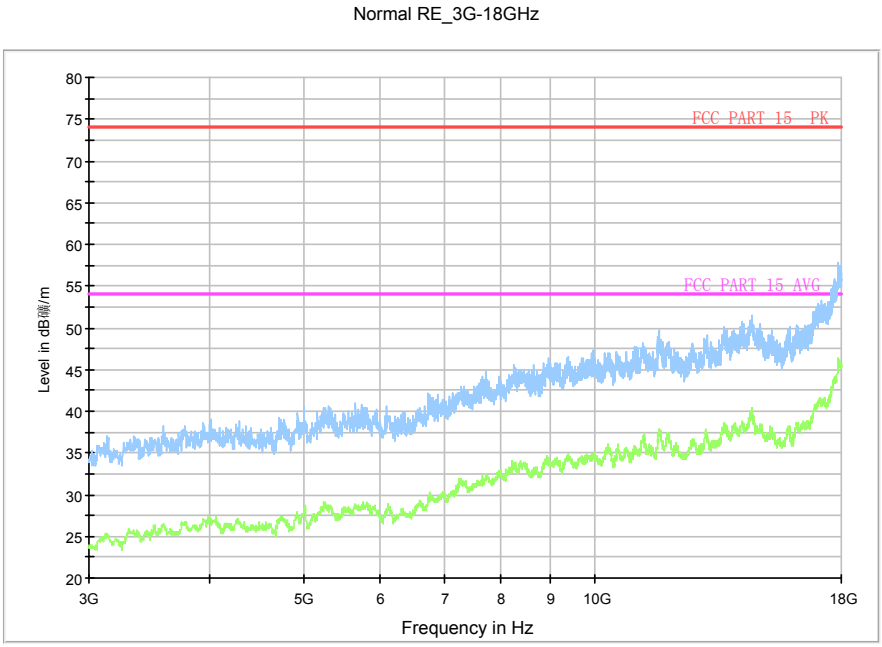


Fig.63 Radiated emission: 8DPSK, Channel 0, 3 GHz - 18 GHz

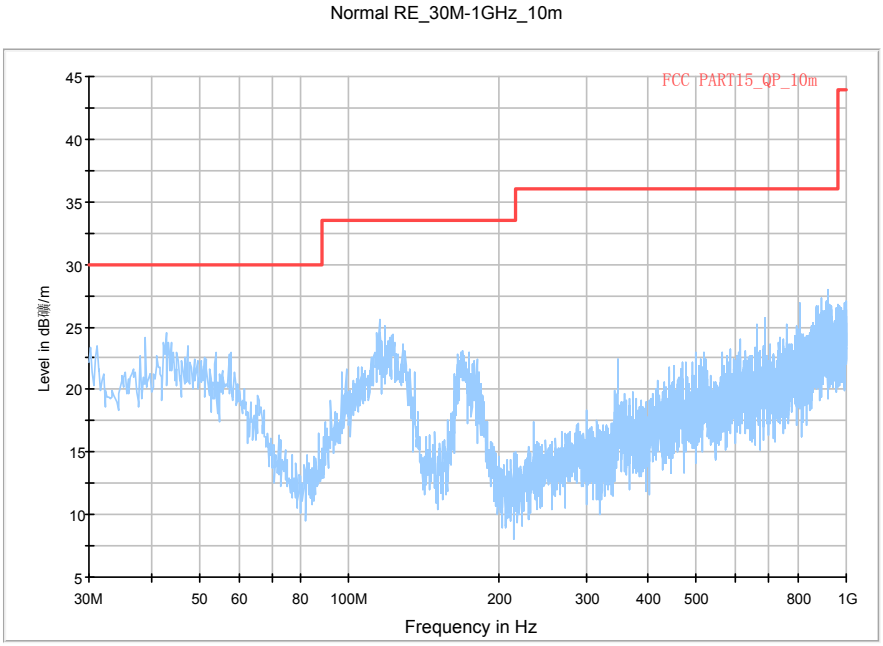


Fig.64 Radiated emission: 8DPSK, Channel 39, 30 MHz - 1 GHz

©Copyright. All rights reserved by CTTL.

RE_BT_1G-3GHz

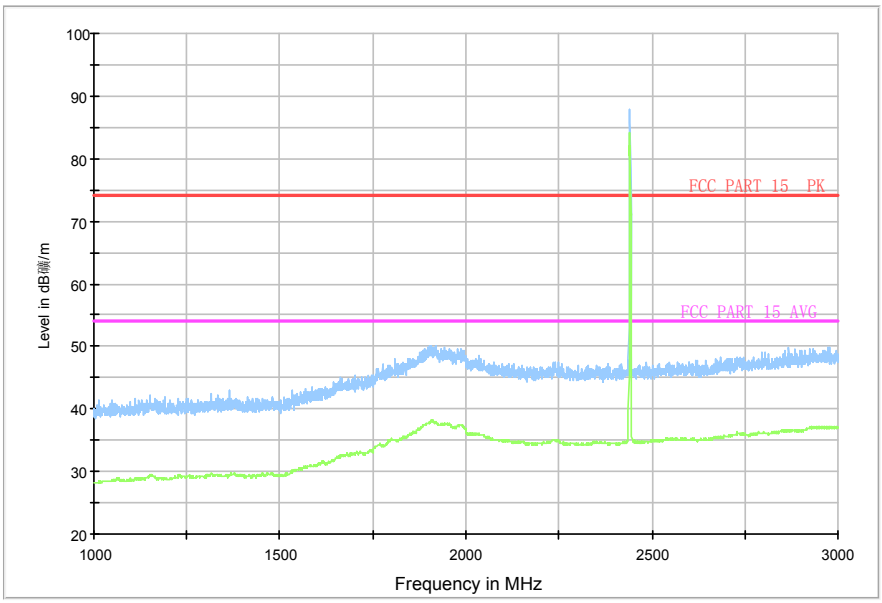


Fig.65 Radiated emission: 8DPSK, Channel 39, 1 GHz - 3 GHz

Normal RE_3G-18GHz

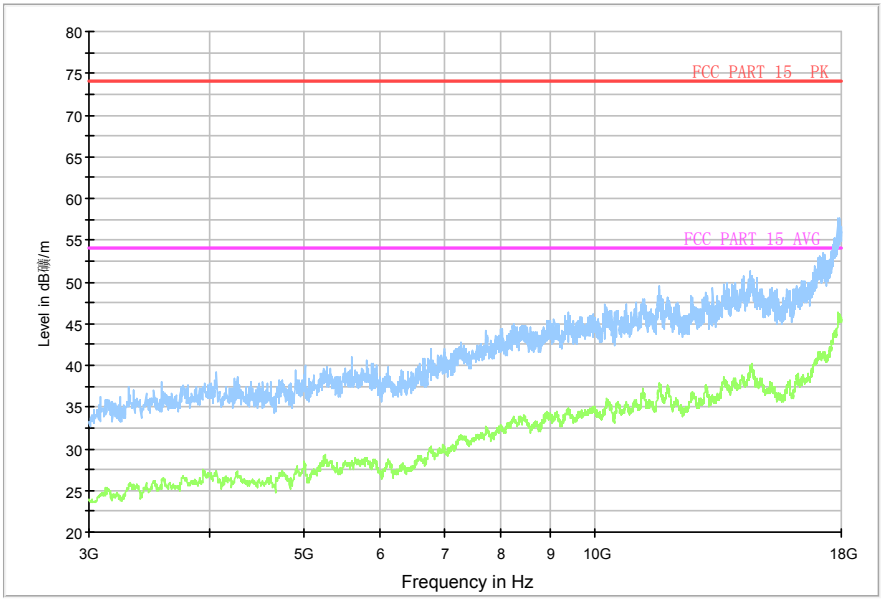


Fig.66 Radiated emission: 8DPSK, Channel 39, 3 GHz - 18 GHz

©Copyright. All rights reserved by CTTL.

RE_BT_1G-3GHz

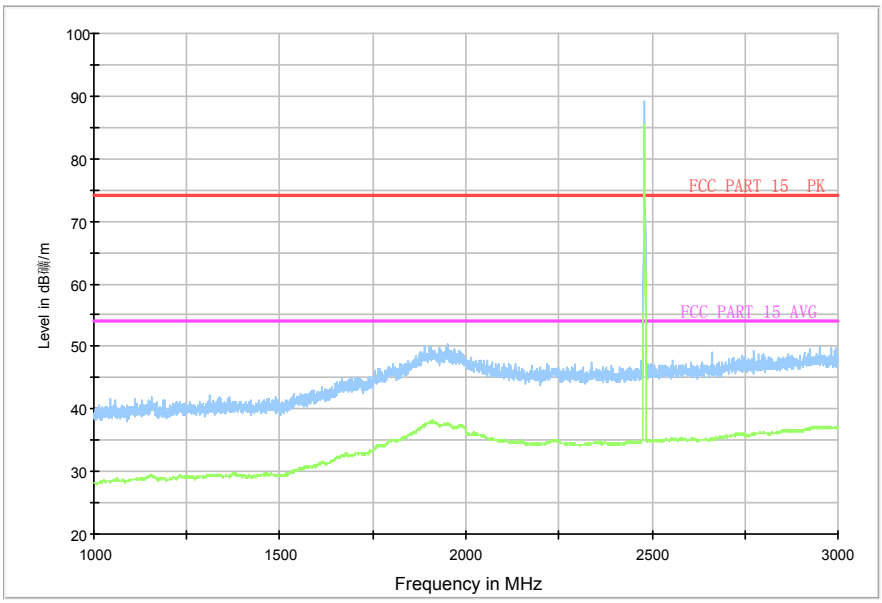


Fig.67 Radiated emission: 8DPSK, Channel 78, 1 GHz - 3 GHz

Normal RE_3G-18GHz

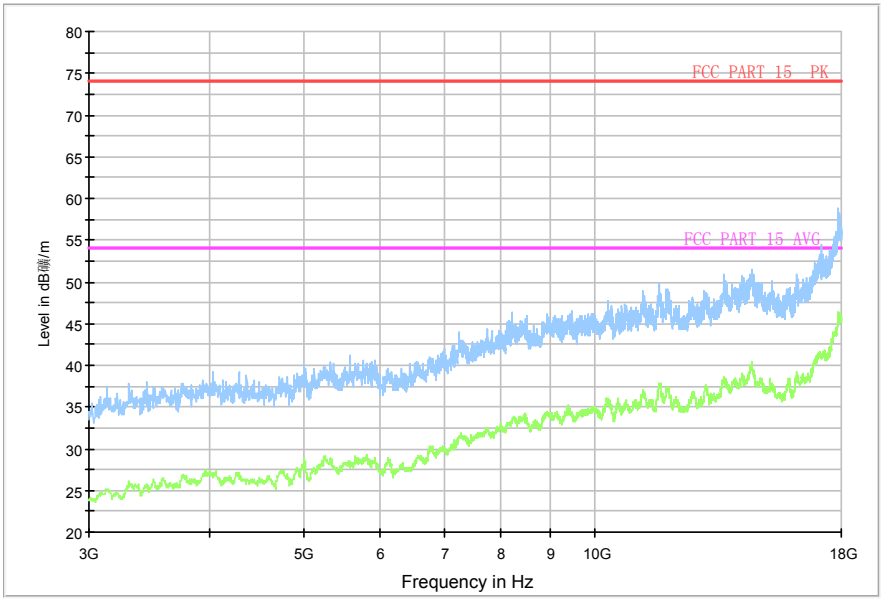


Fig.68 Radiated emission: 8DPSK, Channel 78, 3 GHz - 18 GHz

©Copyright. All rights reserved by CTTL.

RE-BT-Power_2.38G-2.43GHz

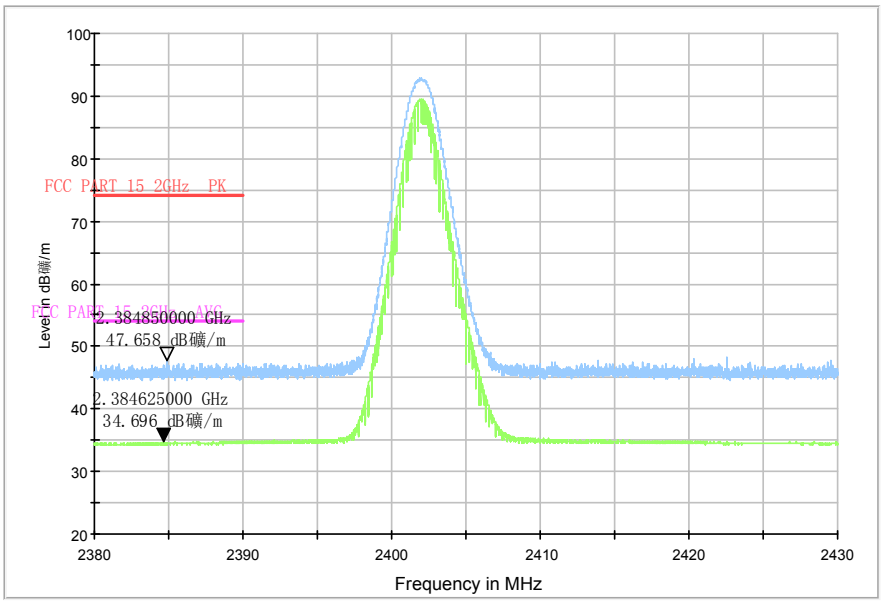


Fig.69 Radiated emission (Power): 8DPSK, low channel

RE-BT-Power_2.45G-2.5GHz

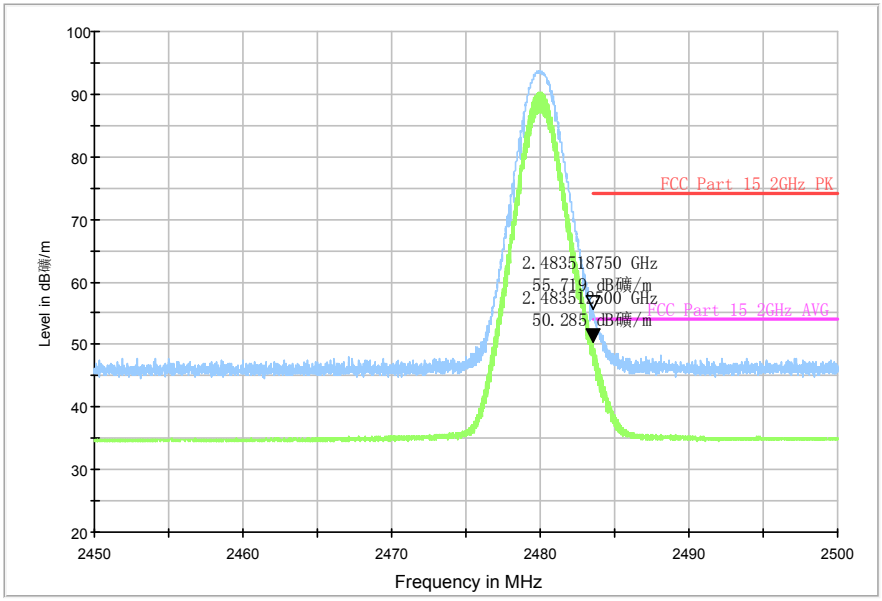


Fig.70 Radiated emission (Power): 8DPSK, high channel

©Copyright. All rights reserved by CTTL.

Normal RE_18G-26.5GHz

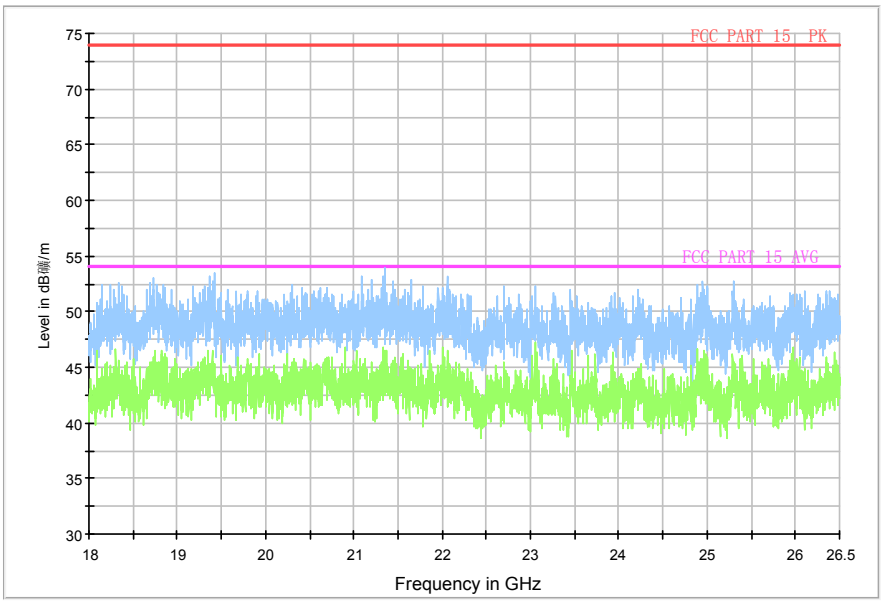


Fig.71 Radiated emission: 8DPSK, 18 GHz - 26 GHz

©Copyright. All rights reserved by CTTL.

A.6. Time of Occupancy (Dwell Time)

Method of Measurement: See ANSI C63.10-clause 7.7.4

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

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

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

Measurement Limit:

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

Measurement Results:

Mode	Channel	Packet	Dwell Time(ms)		Conclusion
GFSK	39	DH5	Fig.72	155.7	**P**
			Fig.73		
π /4 DQPSK	39	2-DH5	Fig.74	152.9	**P**
			Fig.75		
8DPSK	39	3-DH5	Fig.76	173.0	**P**
			Fig.77		

Conclusion: PASS

Test graphs as below:

©Copyright. All rights reserved by CTTL.

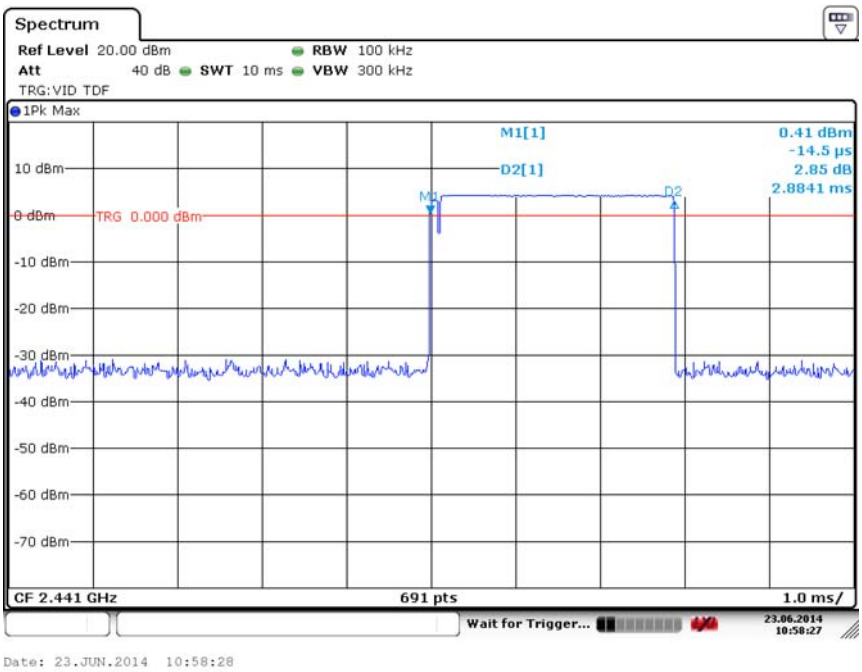


Fig. 72 Time of Occupancy(Dwell Time) (GFSK, Ch39)

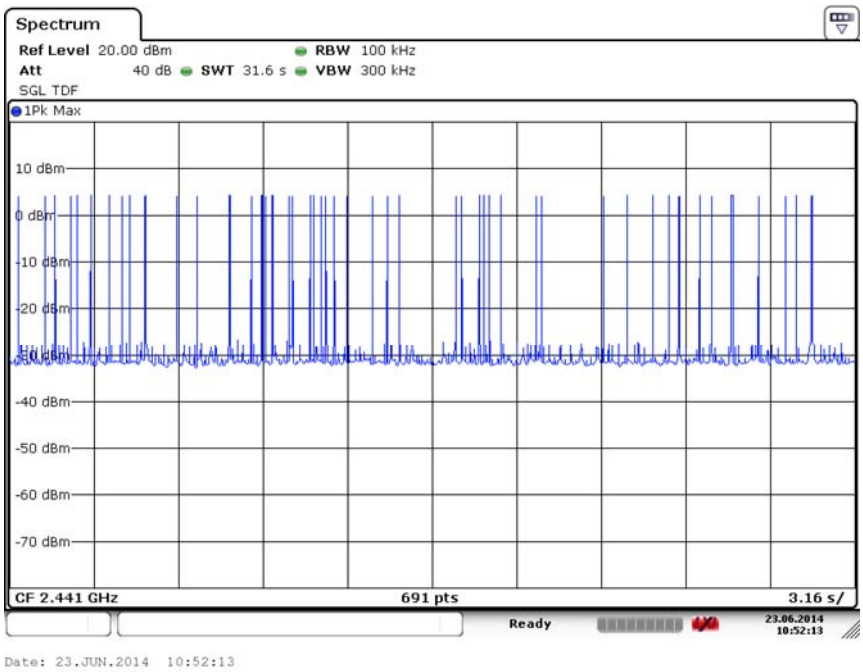


Fig. 73 Number of Transmissions (GFSK, Ch39)

©Copyright. All rights reserved by CTTL.

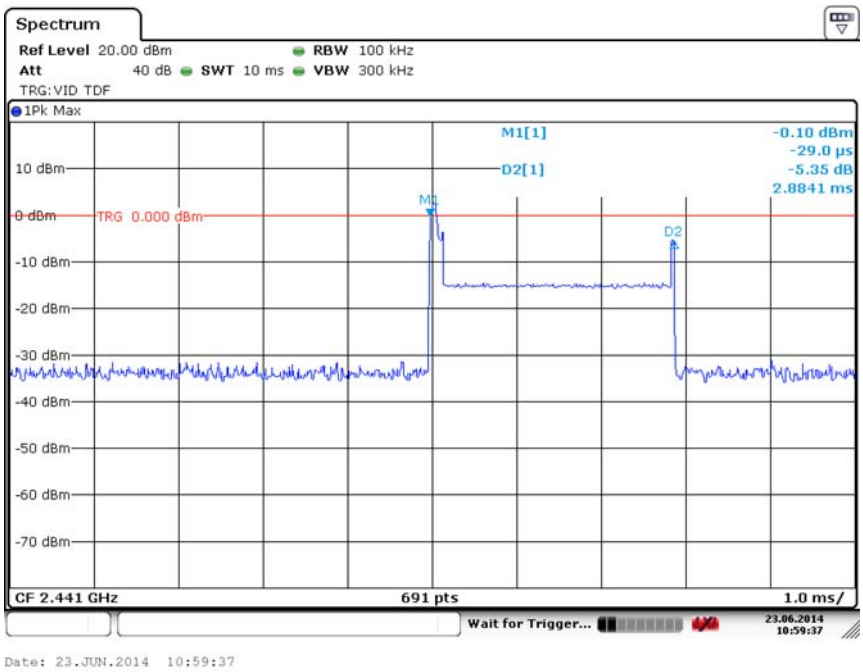


Fig. 74 Time of Occupancy(Dwell Time) (π /4 DQPSK, Ch39)

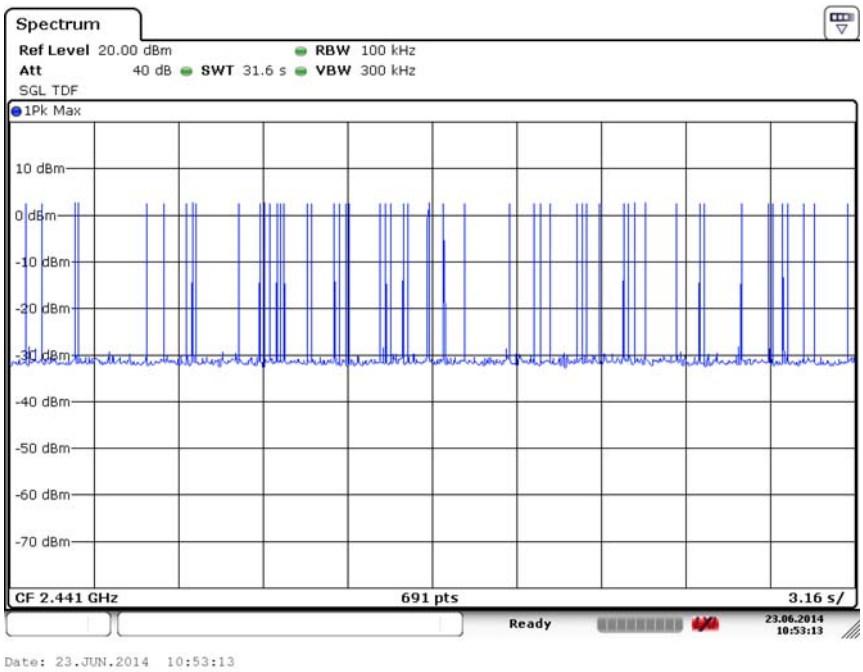


Fig. 75 Number of Transmissions (π /4 DQPSK, Ch39)

©Copyright. All rights reserved by CTTL.

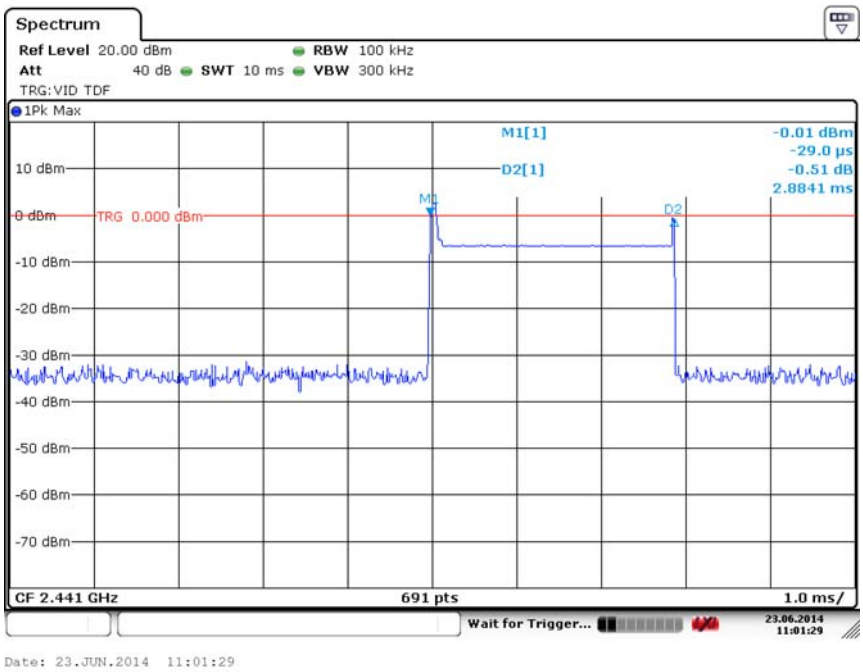


Fig. 76 Time of Occupancy(Dwell Time) (8DPSK, Ch39)

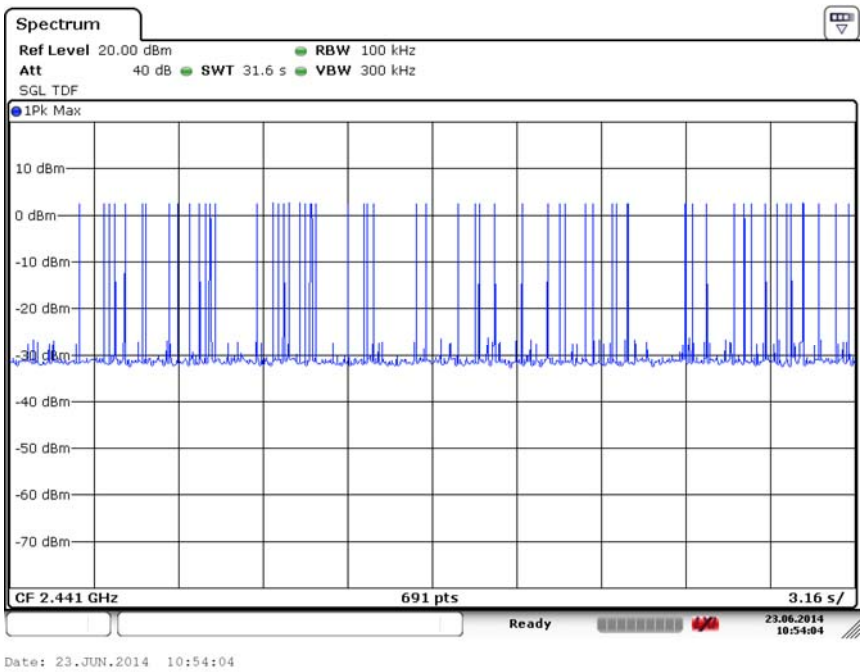


Fig. 77 Number of Transmissions (8DPSK, Ch39)

©Copyright. All rights reserved by CTTL.

A.7. 20dB Bandwidth

Method of Measurement: See ANSI C63.10-clause 6.9.1

Measurement Procedure - Unwanted Emissions

1. Set RBW = 20kHz.

2. Set VBW = 100 kHz.

3. Set span to 3MHz

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).

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a)(1)	NA *

Use NdB Down function of the SA to measure the 20dB Bandwidth
* Comment: This test case is not required according to the latest FCC 47 CFR Part 15.247. But the test results are necessary for “carrier frequency separation” test case, in Annex A.8.

Measurement Result:

Mode	**Channel**	**Occupied 20dB Bandwidth (MHz)**		**conclusion**
GFSK	0	Fig.78	1.143	/
	39	Fig.79	1.136	
	78	Fig.80	1.136	
π /4 DQPSK	0	Fig.81	1.346	/
	39	Fig.82	1.295	
	78	Fig.83	1.302	
8DPSK	0	Fig.84	1.317	/
	39	Fig.85	1.317	
	78	Fig.86	1.317	

Conclusion: NA
Test graphs as below:

©Copyright. All rights reserved by CTTL.

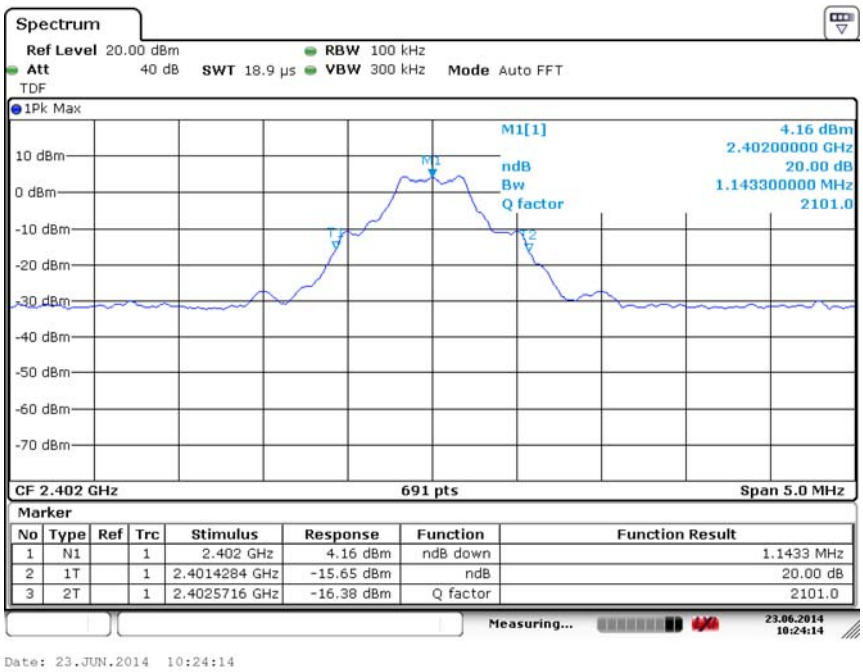


Fig. 78 Occupied 20dB Bandwidth (GFSK, Ch 0)

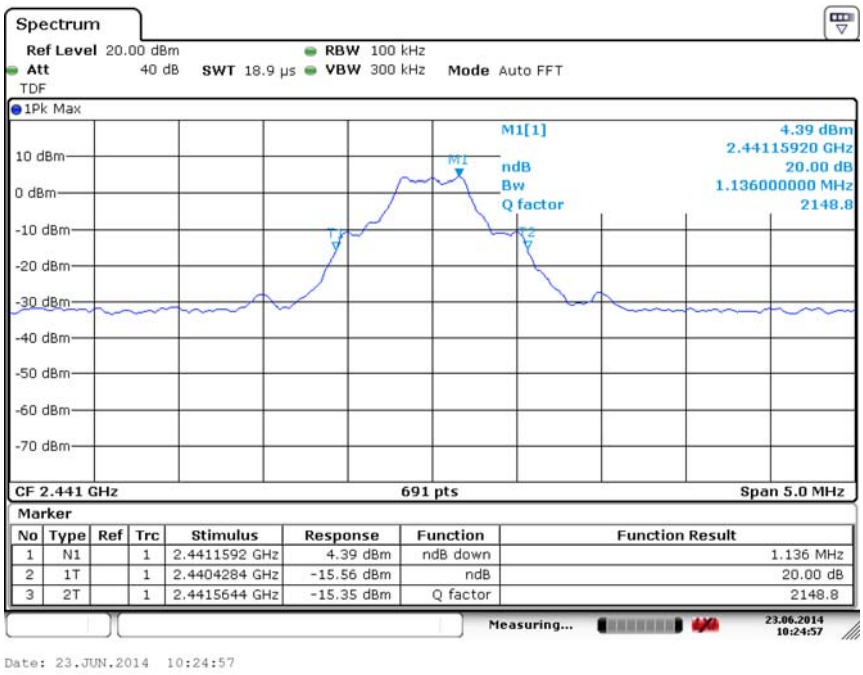


Fig. 79 Occupied 20dB Bandwidth (GFSK, Ch 39)

©Copyright. All rights reserved by CTTL.

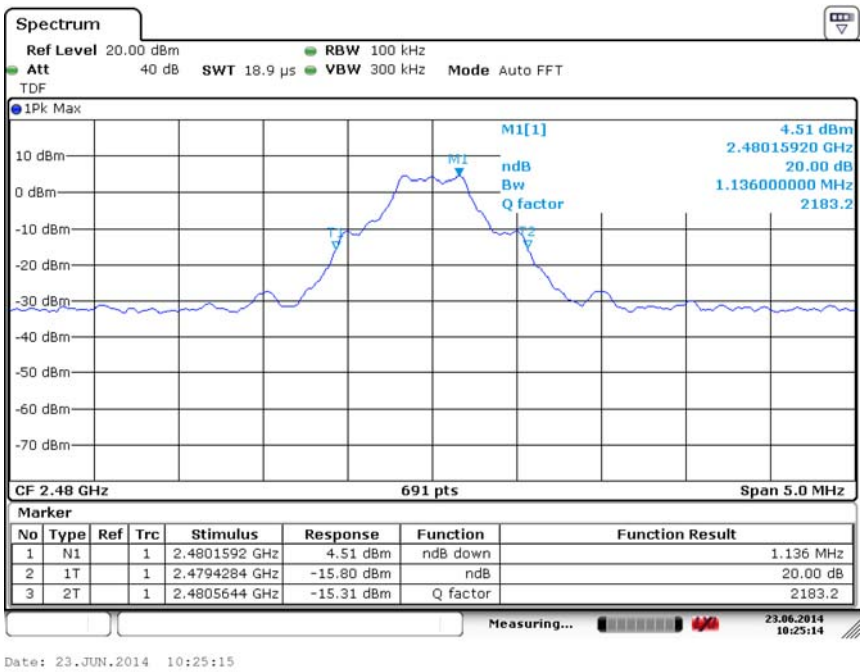


Fig. 80 Occupied 20dB Bandwidth (GFSK, Ch 78)

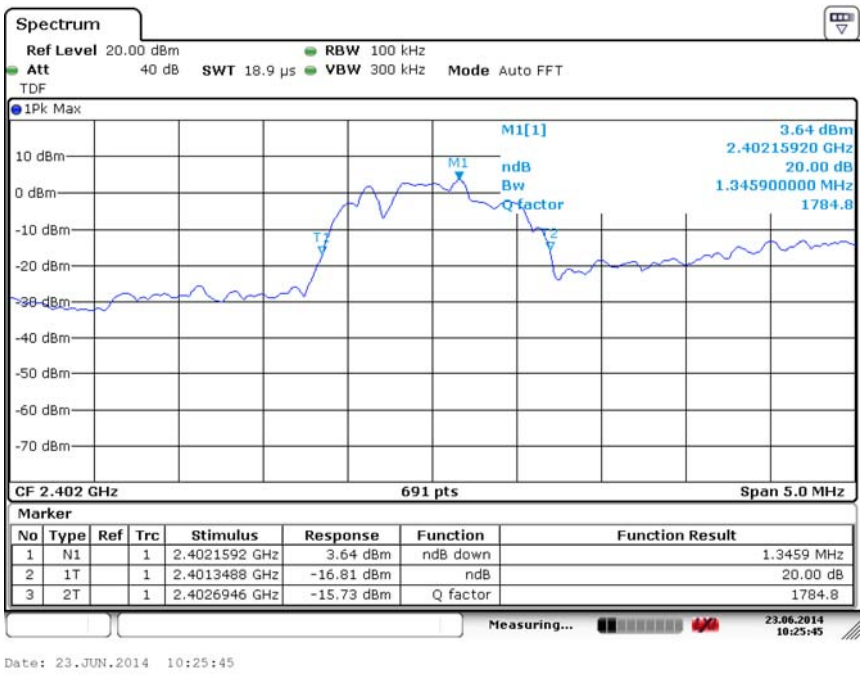


Fig. 81 Occupied 20dB Bandwidth (π /4 DQPSK, Ch 0)

©Copyright. All rights reserved by CTTL.

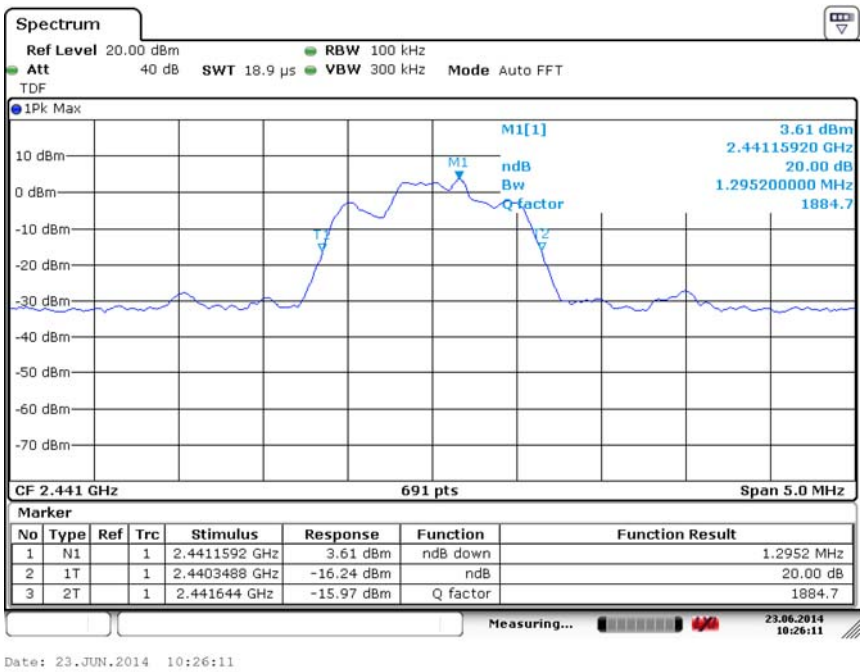


Fig. 82 Occupied 20dB Bandwidth (π /4 DQPSK, Ch 39)

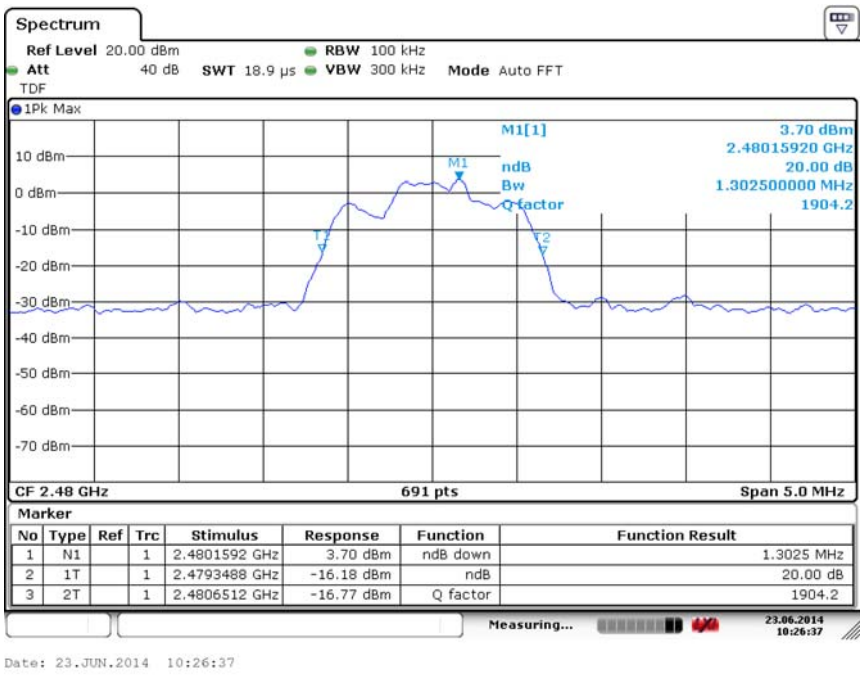


Fig. 83 Occupied 20dB Bandwidth (π /4 DQPSK, Ch 78)

©Copyright. All rights reserved by CTTL.

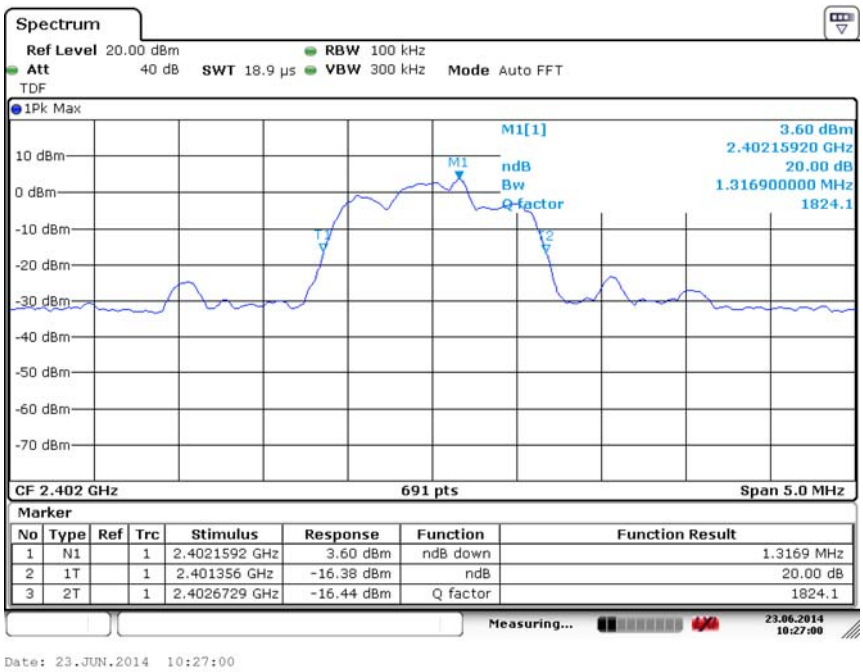


Fig. 84 Occupied 20dB Bandwidth (8DPSK, Ch 0)

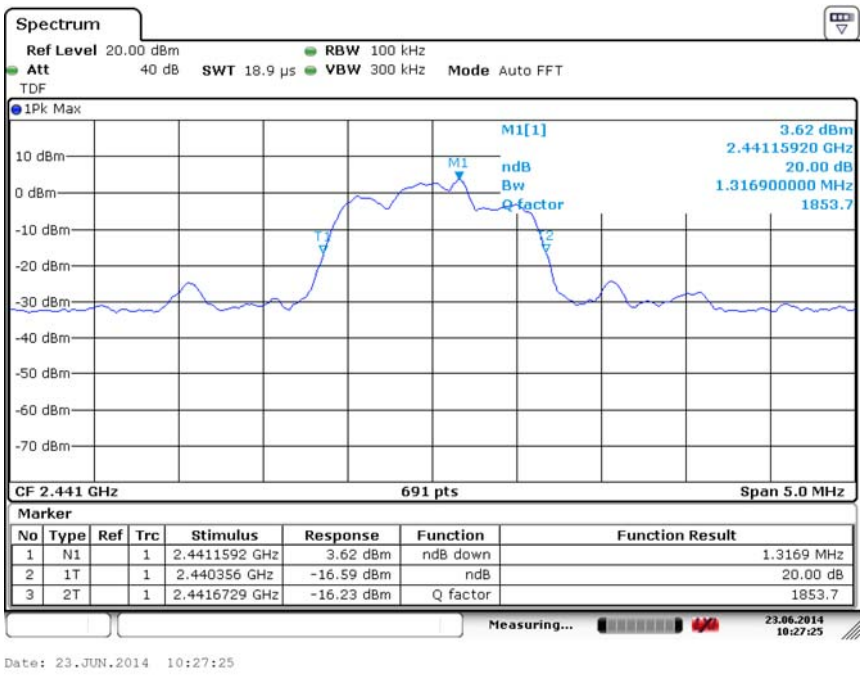


Fig. 85 Occupied 20dB Bandwidth (8DPSK, Ch 39)

©Copyright. All rights reserved by CTTL.

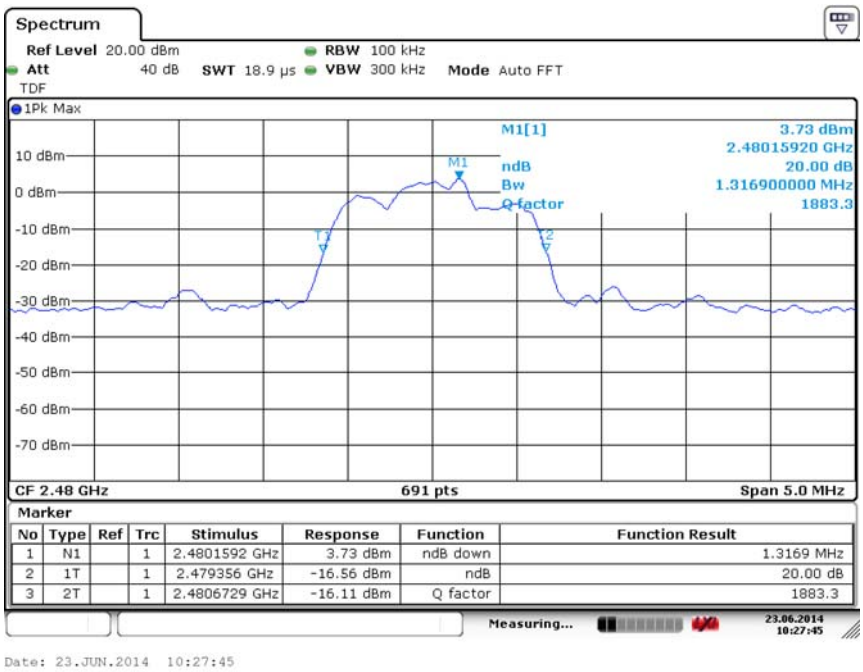


Fig. 86 Occupied 20dB Bandwidth (8DPSK, Ch 78)

©Copyright. All rights reserved by CTTL.

A.8. Carrier Frequency Separation

Method of Measurement: See ANSI C63.10-clause 7.7.2

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

- Span = 3MHz
- RBW=300kHz
- VBW=1MHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

Search the peak marks of the middle frequency and adjacent channel, then record the separation between them.
* Comment: This limit should be over 25 kHz or (2/3) * 20dB bandwidth, whichever is greater.

Measurement Limit:

Standard	Limit(kHz)
FCC 47 CFR Part 15.247(a)(1)	over 25 kHz or (2/3) * 20dB bandwidth

Measurement Results:

Mode	Channel	Packet	Separation of hopping channels	Test result (MHz)	Conclusion
GFSK	39	DH5	Fig.87	1.006	P
π /4 DQPSK	39	2-DH5	Fig.88	1.006	P
8DPSK	39	3-DH5	Fig.89	1.006	P

Conclusion: PASS
Test graphs as below:

©Copyright. All rights reserved by CTTL.

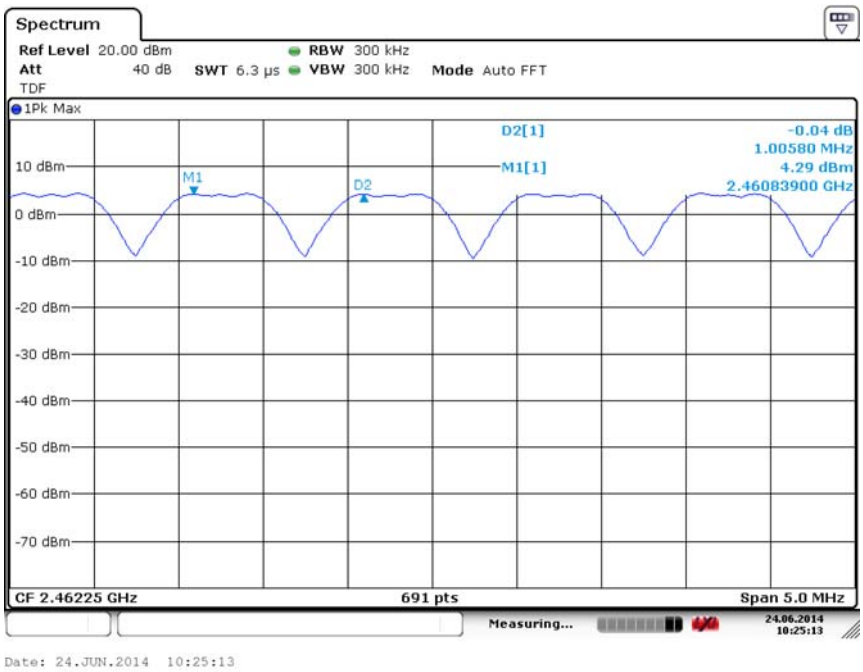


Fig. 87 Carrier Frequency Separation (GFSK, Ch39)

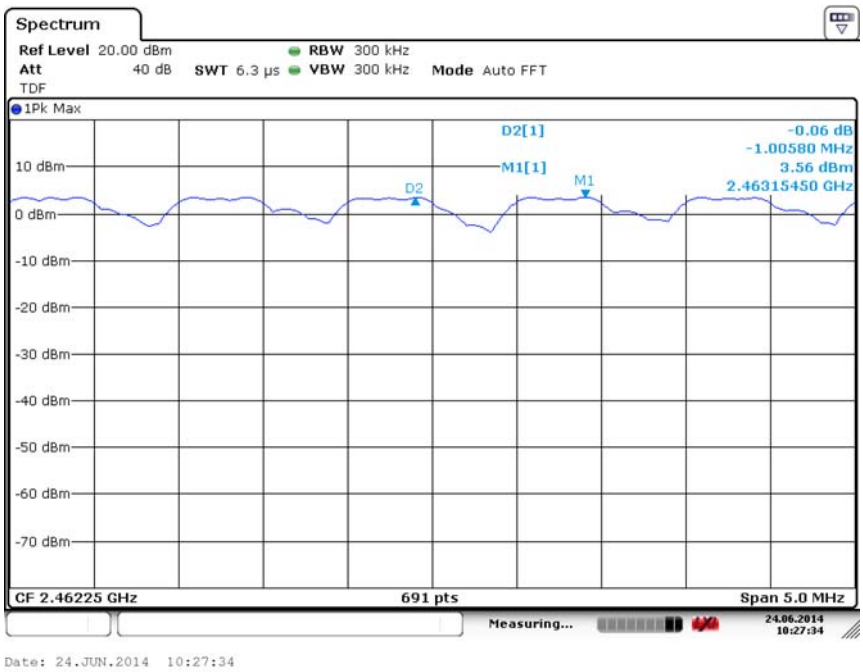


Fig. 88 Carrier Frequency Separation (π /4 DQPSK, Ch39)

©Copyright. All rights reserved by CTTL.

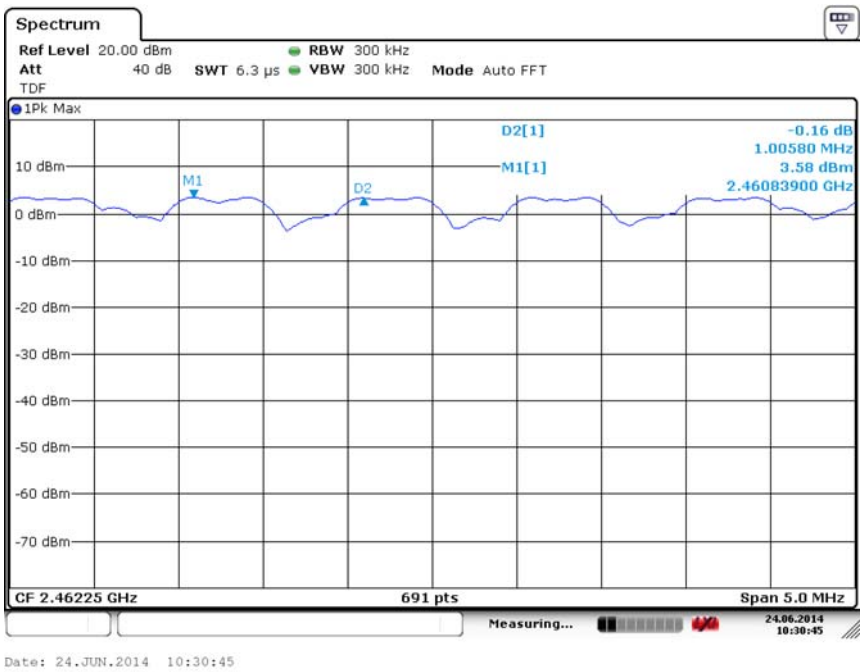


Fig. 89 Carrier Frequency Separation (8DPSK, Ch39)

©Copyright. All rights reserved by CTTL.

A.9. Number of Hopping Channels

Method of Measurement: See ANSI C63.10-clause 7.7.3

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

- Span = the frequency band of operation
- RBW = 500kHz
- VBW = 500kHz
- Sweep = auto
- Detector function = peak
- Trace = max hold
- Allow the trace to stabilize

It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a) (1)(iii)	At least 15 non-overlapping channels

Measurement Results:

Mode	Channel	Packet	Number of hopping channels		Test result	Conclusion
GFSK	39	DH5	Fig.90	Fig.91	79	**P**
π /4 DQPSK	39	2-DH5	Fig.92	Fig.93	79	**P**
8DPSK	39	3-DH5	Fig.94	Fig.95	79	**P**

Conclusion: PASS

Test graphs as below:

©Copyright. All rights reserved by CTTL.

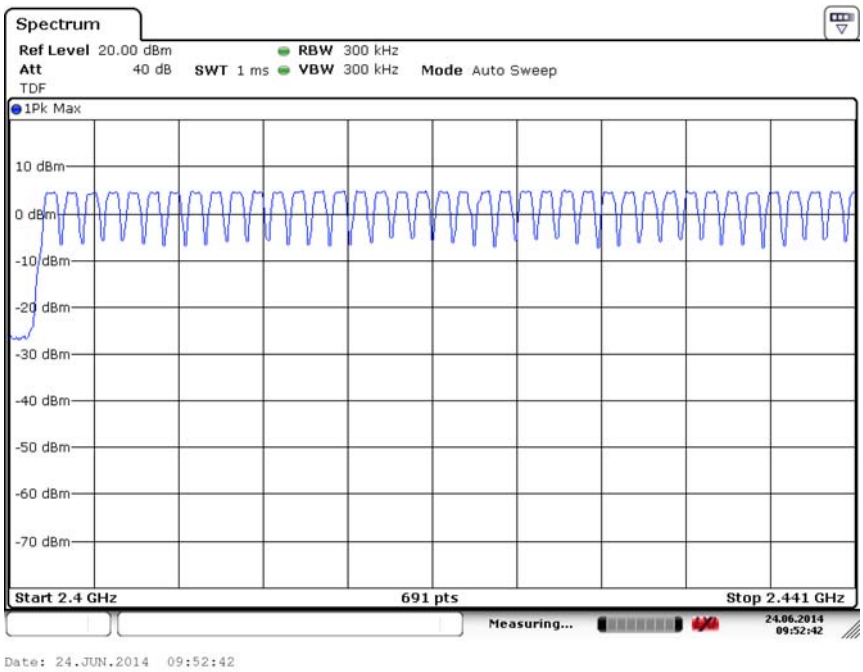


Fig. 90 Hopping channel ch0~39 (GFSK, Ch39)

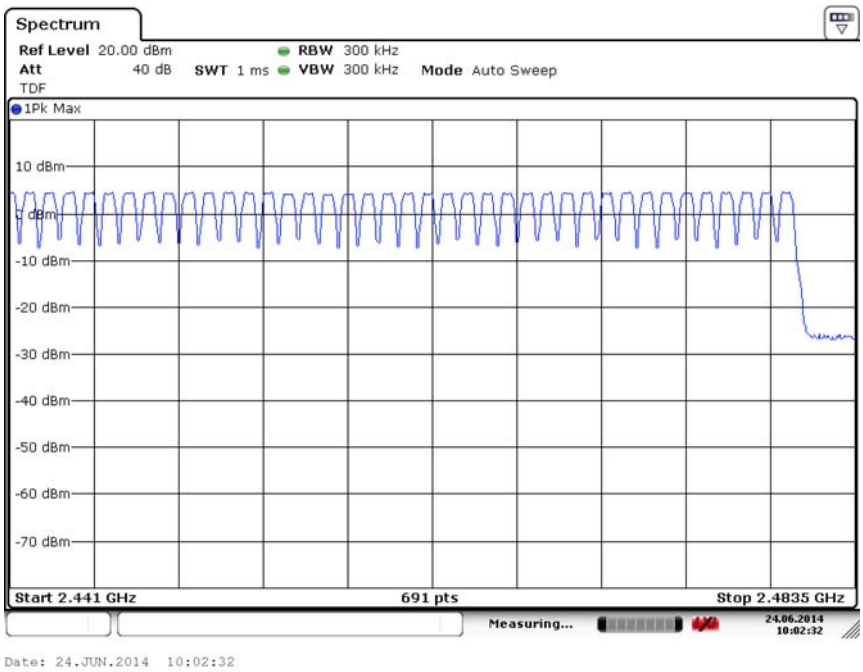


Fig. 91 Hopping channel ch39~78 (GFSK, Ch39)

©Copyright. All rights reserved by CTTL.

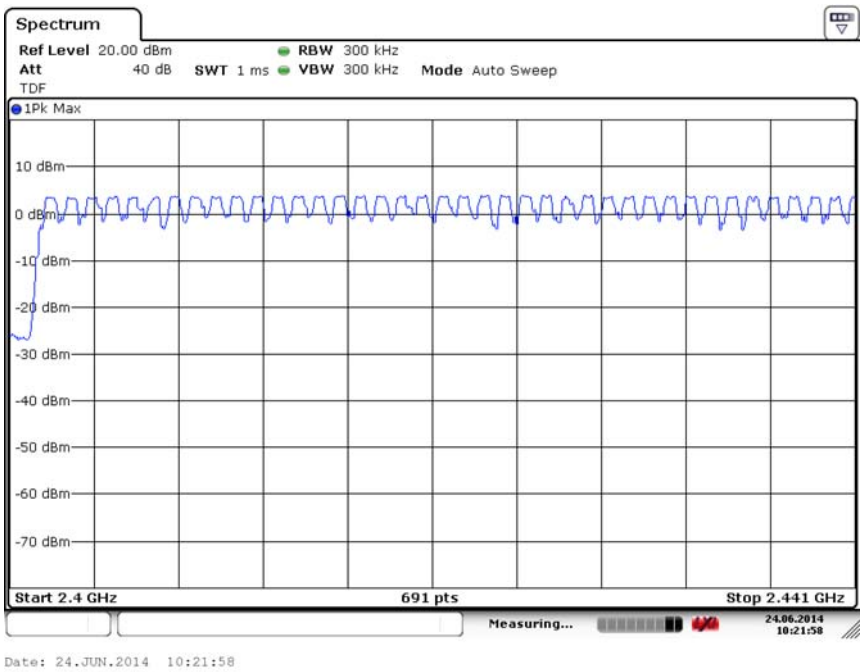


Fig. 92 Hopping channel ch0~39 (π /4 DQPSK, Ch39)

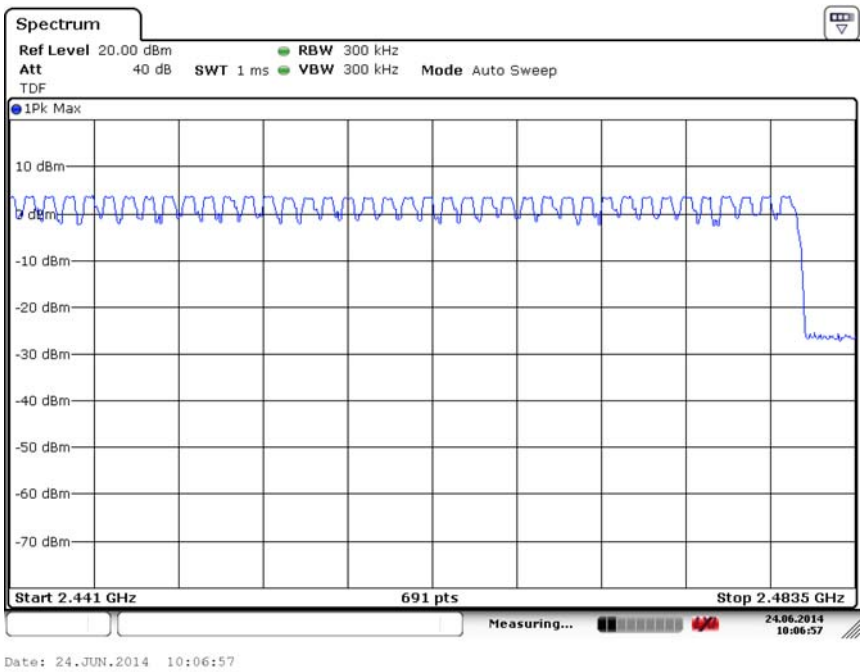


Fig. 93 Hopping channel ch39~78 (π /4 DQPSK, Ch39)

©Copyright. All rights reserved by CTTL.

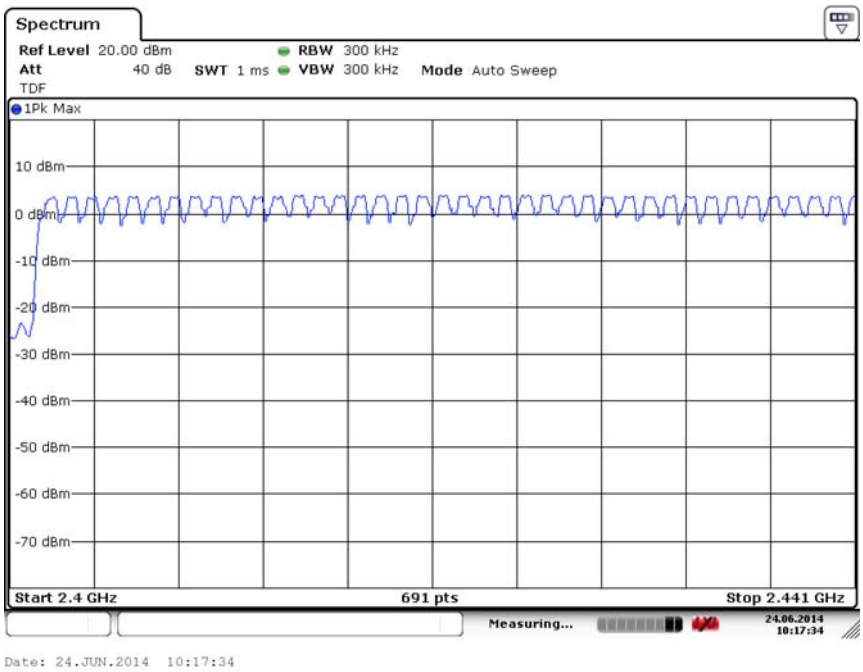


Fig. 94 Hopping channel ch0~39 (8DPSK, Ch39)

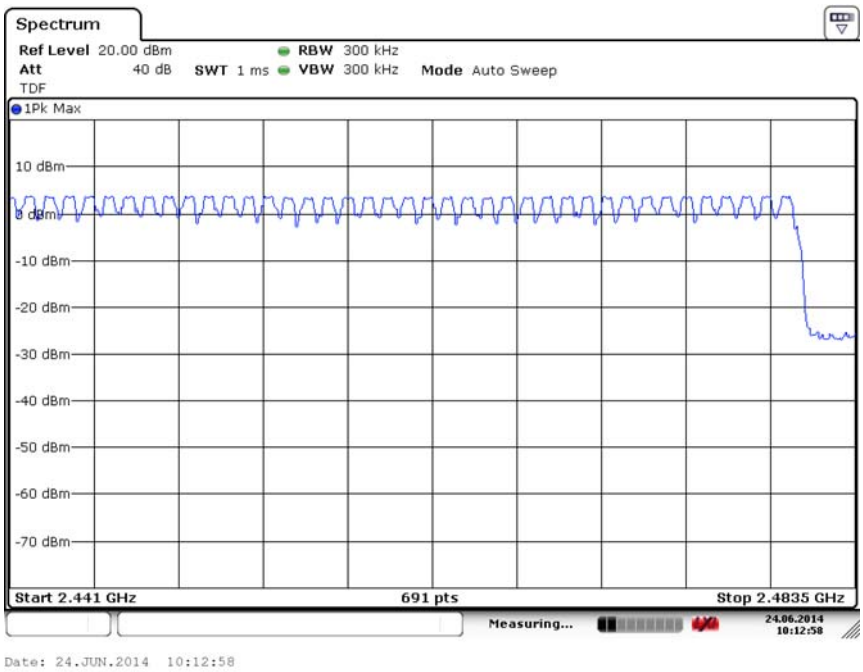


Fig. 95 Hopping channel ch39~78 (8DPSK, Ch39)

©Copyright. All rights reserved by CTTL.

A.10. AC Powerline Conducted Emission

Test Condition

Voltage（V）	Frequency（Hz）
120	60

Measurement Result and limit:

BT (Quasi-peak Limit)-AE2

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	66 to 56	Fig.96	Fig.97	P
0.5 to 5	56			
5 to 30	60			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

BT (Average Limit)-AE2

Frequency range (MHz)	Average-peak Limit (dBμV)	Result (dBμV)		Conclusion
		Traffic	Idle	
0.15 to 0.5	56 o 46	Fig.96	Fig.97	P
0.5 to 5	46			
5 to 30	50			
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.				

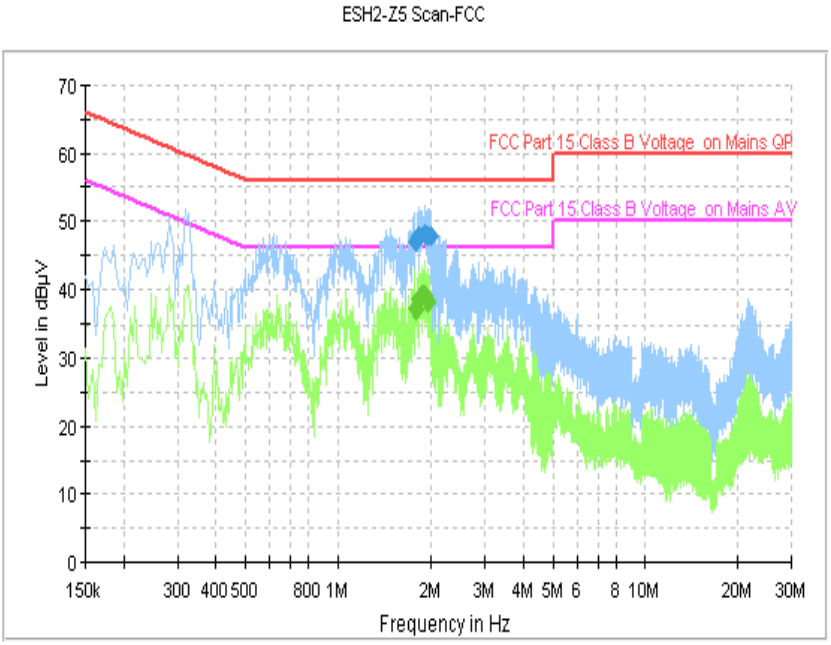
Note: The measurement results include the L1 and N measurements.

Conclusion: PASS

Test graphs as below:

©Copyright. All rights reserved by CTTL.

Traffic:



Final Result 1

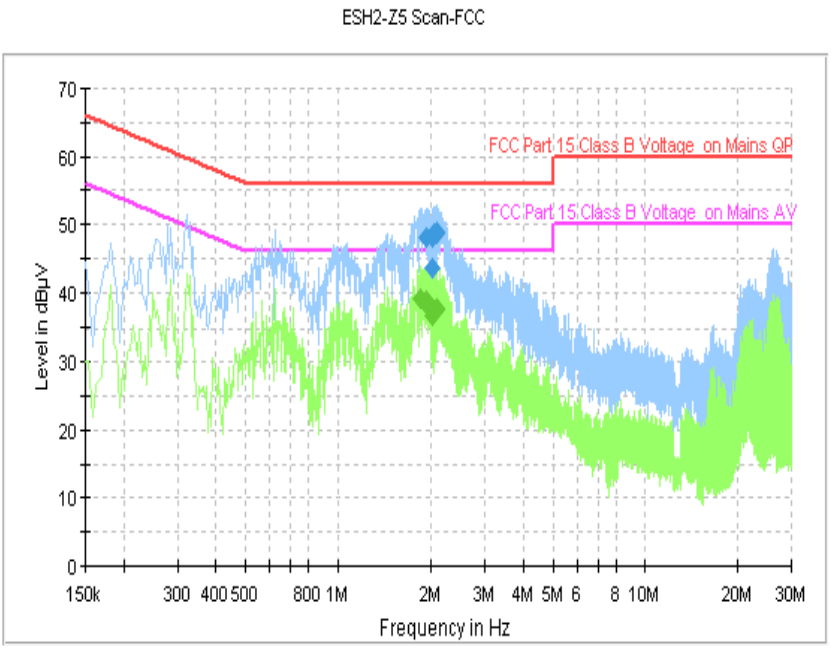
Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.782000	46.9	FLO	L1	10.1	9.1	56.0
1.826000	47.9	FLO	L1	10.1	8.1	56.0
1.914000	48.2	FLO	L1	10.1	7.8	56.0
1.942000	47.9	FLO	L1	10.1	8.1	56.0
1.958000	47.8	FLO	L1	10.1	8.2	56.0
1.986000	47.8	FLO	L1	10.1	8.2	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.782000	37.0	FLO	L1	10.1	9.0	46.0
1.826000	38.6	FLO	L1	10.1	7.4	46.0
1.870000	39.2	FLO	L1	10.1	6.8	46.0
1.886000	39.0	FLO	L1	10.1	7.0	46.0
1.914000	39.0	FLO	L1	10.1	7.0	46.0
1.958000	38.1	FLO	L1	10.1	7.9	46.0

©Copyright. All rights reserved by CTTL.

Idle:



Final Result 1

Frequency (MHz)	QuasiPeak (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.938000	48.1	FLO	L1	10.1	7.9	56.0
2.006000	43.5	FLO	N	10.1	12.5	56.0
2.026000	48.1	FLO	L1	10.1	7.9	56.0
2.038000	48.5	FLO	L1	10.1	7.5	56.0
2.082000	48.7	FLO	L1	10.1	7.3	56.0
2.094000	48.8	FLO	L1	10.1	7.2	56.0

Final Result 2

Frequency (MHz)	CAverage (dBµV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBµV)
1.850000	39.0	FLO	L1	10.1	7.0	46.0
1.938000	38.7	FLO	L1	10.1	7.3	46.0
1.954000	38.2	FLO	L1	10.1	7.8	46.0
1.982000	37.8	FLO	L1	10.1	8.2	46.0
2.026000	36.8	FLO	L1	10.1	9.2	46.0
2.094000	37.8	FLO	L1	10.1	8.2	46.0

©Copyright. All rights reserved by CTTL.

ANNEX B: Accreditation Certificate

China National Accreditation Service for Conformity Assessment

LABORATORY ACCREDITATION CERTIFICATE

(No. CNAS L0570)

Telecommunication Technology Labs,

Academy of Telecommunication Research, MIIT

No.52, Huayuan North Road, Haidian District, Beijing, China

No.51, Xueyuan Road, Haidian District, Beijing, China

to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories(CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing and calibration.

The scope of accreditation is detailed in the attached schedule bearing the same accreditation number as above. The schedule forms an integral part of this certificate.

Date of Issue: 2014-10-29

Date of Expiry: 2017-06-19

Date of Initial Accreditation: 1998-07-03

Signed on behalf of China National Accreditation Service for Conformity Assessment

China National Accreditation Service for Conformity Assessment (CNAS) is authorized by Certification and Accreditation Administration of the People's Republic of China (CNCA) to operate the national accreditation schemes for conformity assessment. CNAS is the signatory to International Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (ILAC MRA) and Asia Pacific Laboratory Accreditation Cooperation Multilateral Recognition Arrangement (APLAC MRA).

No.CNAS AL 2 0011149

*****END OF REPORT*****

©Copyright. All rights reserved by CTTL.