



FCC PART 15C TEST REPORT No. I14Z45242-GTE03

for

VSN Technologies Inc.

Quad GSM/Dual WCDMA Smart Phone

Model Name: V2000

Marketing Name: R.40

FCC ID: 2AA9WV2000

IC No.: 11665A-V2000

with

Hardware Version: P3

Software Version: TBW972148_8911_V007284

Issued Date : 2014-03-17



DAR accreditation (DIN EN ISO/IEC 17025): No. D-PL-12123-01-01

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629B

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 TMC Beijing.

Test Laboratory:

TMC Beijing, Telecommunication Metrology Center of Ministry of Industry and Information Technology
No.18A, Kangding Street, Beijing Economic-Technological Development Area, Beijing, China 100176
Tel:+86(0)10-67857376, Fax:+86(0)10-67857376 Email:welcome@emcrite.com. www.emcrite.com

CONTENTS

1. TEST LABORATORY	3
1.1. TESTING LOCATION	3
1.2. TESTING ENVIRONMENT.....	3
1.3. PROJECT DATA	3
1.4. SIGNATURE	3
2. CLIENT INFORMATION.....	4
2.1. APPLICANT INFORMATION	4
2.2. MANUFACTURER INFORMATION.....	4
3. EQUIPMENT UNDER TEST (EUT) AND ANCILLARY EQUIPMENT (AE)	5
3.1. ABOUT EUT	5
3.2. INTERNAL IDENTIFICATION OF EUT USED DURING THE TEST	5
3.3. INTERNAL IDENTIFICATION OF AE USED DURING THE TEST	5
3.4. NORMAL ACCESSORY SETTING	6
3.5. GENERAL DESCRIPTION.....	6
4. REFERENCE DOCUMENTS.....	7
4.1. DOCUMENTS SUPPLIED BY APPLICANT	7
4.2. REFERENCE DOCUMENTS FOR TESTING.....	7
5. LABORATORY ENVIRONMENT.....	8
6. SUMMARY OF TEST RESULTS	9
6.1. SUMMARY OF TEST RESULTS.....	9
6.2. STATEMENTS.....	9
7. TEST EQUIPMENTS UTILIZED	10
ANNEX A: MEASUREMENT RESULTS.....	11
A.1. MEASUREMENT METHOD	11
A.2. PEAK OUTPUT POWER - CONDUCTED	13
A.3. FREQUENCY BAND EDGES - CONDUCTED.....	14
A.4. CONDUCTED EMISSION	21
A.5. RADIATED EMISSION.....	46
A.6. TIME OF OCCUPANCY (DWEIL TIME)	69
A.7. 20dB BANDWIDTH.....	79
A.8. CARRIER FREQUENCY SEPARATION	84
A.9. NUMBER OF HOPPING CHANNELS.....	86
A.10. AC POWERLINE CONDUCTED EMISSION	90
A.11.RECEIVER RADIATION EMISSION	93

1. Test Laboratory

1.1. Testing Location

Company Name: TMC Beijing, Telecommunication Metrology Center of MIIT
Address: No.18A, Kangding Street, Beijing Economical Development Area,
Beijing, China
Postal Code: 100176
Telephone: 00861067857376
Fax: 00861067857376

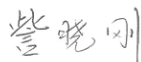
1.2. Testing Environment

Normal Temperature: 15-35℃
Extreme Temperature: -20/+55℃
Relative Humidity: 20-75%

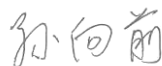
1.3. Project data

Project Leader: Zi Xiaogang
Testing Start Date: 2014-02-26
Testing End Date: 2014-03-14

1.4. Signature



Zi Xiaogang
(Prepared this test report)



Sun Xiangqian
(Reviewed this test report)



Lu Bingsong
Deputy Director of the laboratory
(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name: VSN Technologies Inc.
Address /Post: 1975 E. Sunrise Blvd., #400 Fort Lauderdale, FL
City: fort lauderdale
Postal Code: 33323
Country: United States
Contact Person: Donghailun
Contact Email: amit.verma@vsnmobil.com
Telephone: 9546094912
Fax: 9543068450

2.2. Manufacturer Information

Company Name: Beijing Benywave Technology Co. Ltd.
Address /Post: NO.55 Jiachang 2 Road, OPTO-Mechatronics
Industrial Park, Tongzhou District
City: Beijing
Postal Code: 100111
Country: China
Telephone: +86-10-58928917

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

3.1. About EUT

Description	Quad GSM/Dual WCDMA Smart Phone
Model Name	V2000
Marketing Name	R.40
FCC ID	2AA9WV2000
IC ID	11665A-V2000
Frequency Band	ISM 2400MHz~2483.5MHz
Type of Modulation	GFSK/ $\pi/4$ DQPSK/8DPSK
Number of Channels	79
Power Supply	3.8V DC by Battery

3.2. Internal Identification of EUT used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
UT10a	864513010011580	P3	TBW972148_8911_V007284
UT01a	864513010011689	P3	TBW972148_8911_V007284

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

3.3. Internal Identification of AE used during the test

AE ID*	Description		
AE1	Battery	/	1445242BA003
AE2	Battery	/	1445242BA007
AE3	Battery	/	1445242BA001
AE4	Travel charger	/	1445242CH002
AE5	USB cable	/	/
AE1, AE2, AE3			
	Model	TBT9605	
	Manufacturer	REVEL	
	Capacitance	1700mAh	
	Nominal voltage	3.7V	
AE4			
	Model	/	
	Manufacturer	REVEL	
	Length of cable	/	
AE5			
	Model	/	
	Manufacturer	REVEL	
	Length of cable	98cm	

*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 Quad GSM/Dual WCDMA Smart Phone with integrated antenna. It consists of normal options: lithium battery, charger. Manual and specifications of the EUT were provided to fulfil the test.

4. Reference Documents

4.1. Documents supplied by applicant

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

4.2. Reference Documents for testing

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

	FCC CFR 47, Part 15, Subpart C:	
	15.205 Restricted bands of operation;	10–1–13
FCC Part15	15.209 Radiated emission limits, general requirements;	Edition
	15.247 Operation within the bands 902–928MHz, 2400–2483.5 MHz, and 5725–5850 MHz.	
FCC Part 2	Frequency Allocations and Radio Treaty Matters;	10–1–13
	General Rules and Regulations	Edition
ANSI C63.10	American National Standard for Testing Unlicensed Wireless Devices	2009
	Spectrum Management and Telecommunications - Radio Standards Specification	
RSS - Gen	General Requirements and Information for the Certification of Radiocommunication Equipment	Issue3
RSS -210	Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment	Issue8

5. LABORATORY ENVIRONMENT

Control room / conducted chamber did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 35 °C
Relative humidity	Min. =20 %, Max. = 80 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω

Fully-anechoic chamber 2 (8.6 meters×6.1 meters×3.85 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 110 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 1 Ω
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 4000 MHz

Semi-anechoic chamber 2 / Fully-anechoic chamber 3 (10 meters×6.7 meters×6.15 meters) did not exceed following limits along the EMC testing:

Temperature	Min. = 15 °C, Max. = 30 °C
Relative humidity	Min. = 35 %, Max. = 60 %
Shielding effectiveness	> 100 dB
Electrical insulation	> 2 MΩ
Ground system resistance	< 0.5 Ω
Normalised site attenuation (NSA)	< ±3.5 dB, 3 m distance
Site voltage standing-wave ratio (S_{VSWR})	Between 0 and 6 dB, from 1GHz to 18GHz
Uniformity of field strength	Between 0 and 6 dB, from 80 to 3000 MHz

6. SUMMARY OF TEST RESULTS

6.1. 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 TMC

SUMMARY OF MEASUREMENT RESULTS	Sub-clause	IC	Verdict
Peak Output Power - Conducted	15.247 (b)(1)	RSS-210 A8.4 (2)	P
Frequency Band Edges	15.247 (d)	RSS-210 A8.5	P
Conducted Emission	15.247 (d)	RSS-210 A8.5	P
Radiated Emission	15.247, 15.205, 15.209	RSS-210 A8.5	P
Time of Occupancy (Dwell Time)	15.247 (a) (1)(iii)	RSS-210 A8.1 (4)	P
20dB Bandwidth	15.247 (a)(1)	RSS-210 A8.1 (1)	NA
Carrier Frequency Separation	15.247 (a)(1)	RSS-210 A8.1 (2)	P
Number of hopping channels	15.247 (a)(b)(iii)	RSS-210 A8.1 (4)	P
AC Powerline Conducted Emission	15.107, 15.207	RSS-Gen 7.2.2	P

Please refer to **ANNEX A** for detail.

The measurement is made according to ANSI C63.10.

6.2. Statements

TMC has evaluated the test cases requested by the applicant /manufacturer as listed in section 6.1 of this report for the EUT specified in section 3 according to the standards or reference documents listed in section 4.2

7. Test Equipments Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Vector Signal Analyzer	FSU26	200030	Rohde & Schwarz	2014-06-12
2	Bluetooth Tester	CBT32	100649	Rohde & Schwarz	2015-02-09

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date
1	Test Receiver	ESU26	100376	Rohde & Schwarz	2014-11-05
2	EMI Antenna	VULB 9163	9163 175	Schwarzbeck	2014-07-13
3	EMI Antenna	3117	00119021	ETS-Lindgren	2014-04-19
4	Dual-Ridge Waveguide Horn Antenna	3116	2663	ETS-Lindgren	2014-06-30
5	Dual-Ridge Waveguide Horn Antenna	3116	2661	ETS-Lindgren	2014-06-30
6	Bluetooth Tester	CBT	100153	Rohde & Schwarz	2014-09-15
7	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2014-03-17
8	Loop Antenna	HFH2-Z2	829324/007	Rohde & Schwarz	2014-12-12
9	Pre-amplifier(18GHz)	SCU18	1005277	Rohde & Schwarz	/
10	Pre-amplifier(26.5GHz)	SCU26	1006788	Rohde & Schwarz	/

Anechoic chamber

Fully anechoic chamber by Frankonia German.

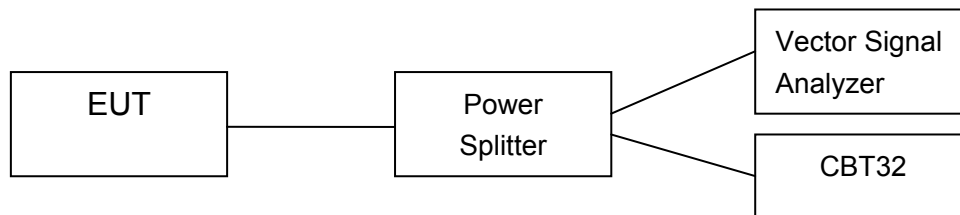
ANNEX A: MEASUREMENT RESULTS

A.1. Measurement Method

A.1.1. Conducted Measurements

The measurement is made according to ANSI C63.10.

- 1). Connect the EUT to the test system correctly.
- 2). Set the EUT to the required work mode (Transmitter, receiver or transmitter & receiver).
- 3). Set the EUT to the required channel.
- 4). Set the EUT hopping mode (hopping or hopping off).
- 5). Set the spectrum analyzer to start measurement.
- 6). Record the values. Vector Signal Analyzer



A.1.2. Radiated Emission Measurements

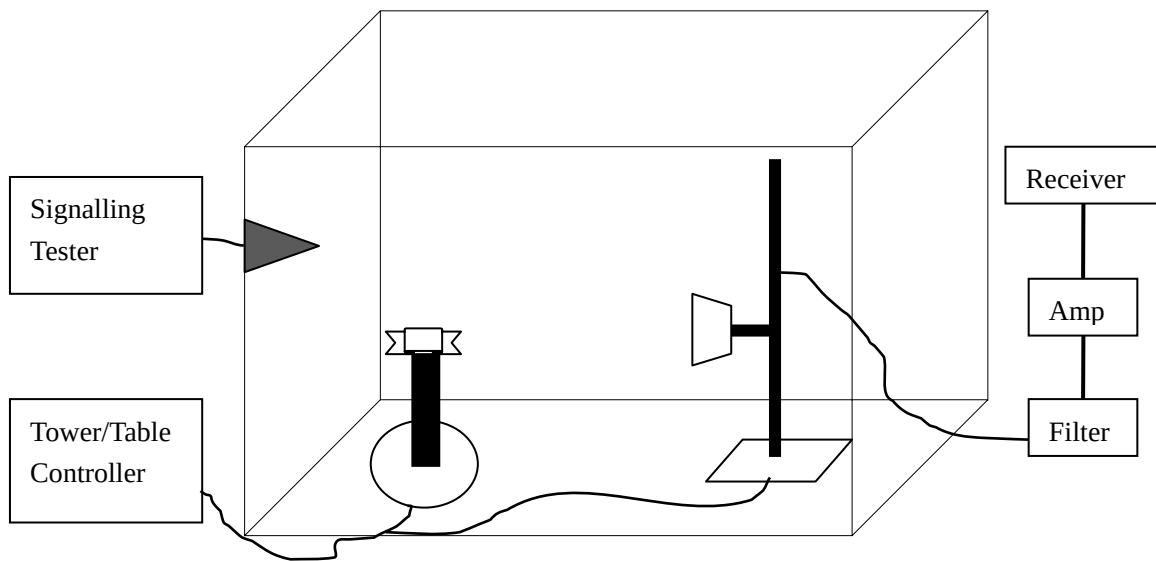
The measurement is made according to ANSI C63.10

The radiated emission test is performed in semi-anechoic chamber. The distance from the EUT to the reference point of measurement antenna is 3m. The test is carried out on both vertical and horizontal polarization and only maximization result of both polarizations is kept. During the test, the turntable is rotated 360° and the measurement antenna is moved from 1m to 4m to get the maximization result.

In the case of radiated emission, the used settings are as follows,

Sweep frequency from 30 MHz to 1GHz, RBW = 100 kHz, VBW = 300 kHz;

Sweep frequency from 1 GHz to 26GHz, RBW = 1MHz, VBW = 1MHz;



A.2. Peak Output Power - Conducted

Measurement Limit:

Standard	Limit (dBm)
FCC Part 15.247(b)(1) / RSS-210 A8.4 (2)	< 30

The measurement is made according to ANSI C63.10.

Test Condition

Hopping Mode	RBW	VBW	Span	Sweeptime
Hopping OFF	3MHz	3MHz	5MHz	2.5ms

Measurement Results:

For GFSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	8.15	8.58	8.55	P

For $\pi/4$ DQPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	7.99	8.43	8.43	P

For 8DPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	8.32	8.71	8.66	P

Conclusion: PASS

A.3. Frequency Band Edges - Conducted

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d) RSS-210 A8.4(2)	> 20

The measurement is made according to ANSI C63.10.

Measurement Result:

For GFSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.1	-56.40	P
	Hopping ON	Fig.2	-49.86	P
78	Hopping OFF	Fig.3	-62.15	P
	Hopping ON	Fig.4	-62.41	P

For $\pi/4$ DQPSK

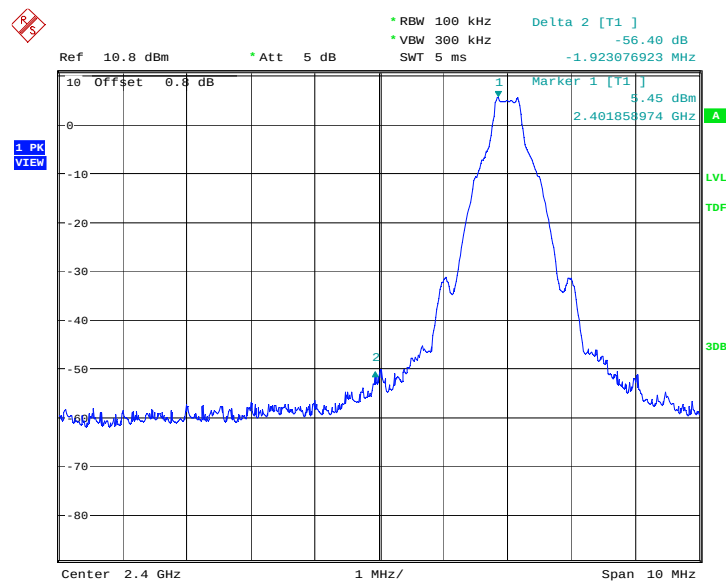
Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.5	-55.17	P
	Hopping ON	Fig.6	-56.36	P
78	Hopping OFF	Fig.7	-60.83	P
	Hopping ON	Fig.8	-58.35	P

For 8DPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.9	-55.61	P
	Hopping ON	Fig.10	-55.65	P
78	Hopping OFF	Fig.11	-59.85	P
	Hopping ON	Fig.12	-60.59	P

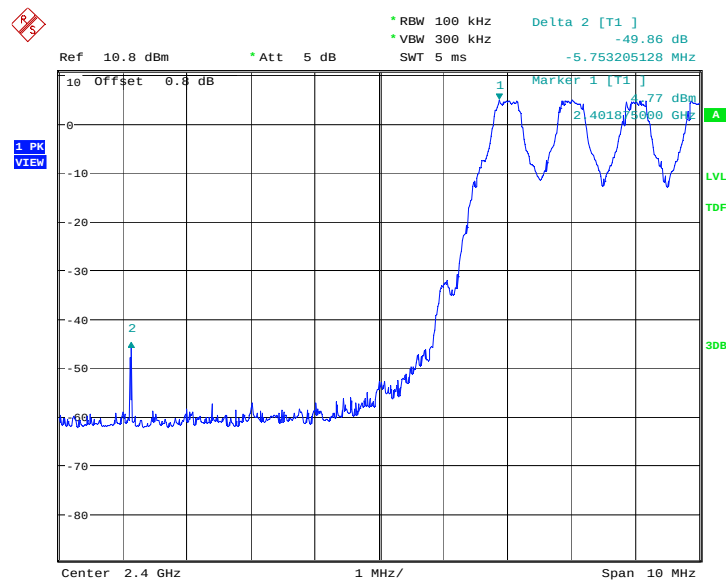
Conclusion: PASS

Test graphs as below



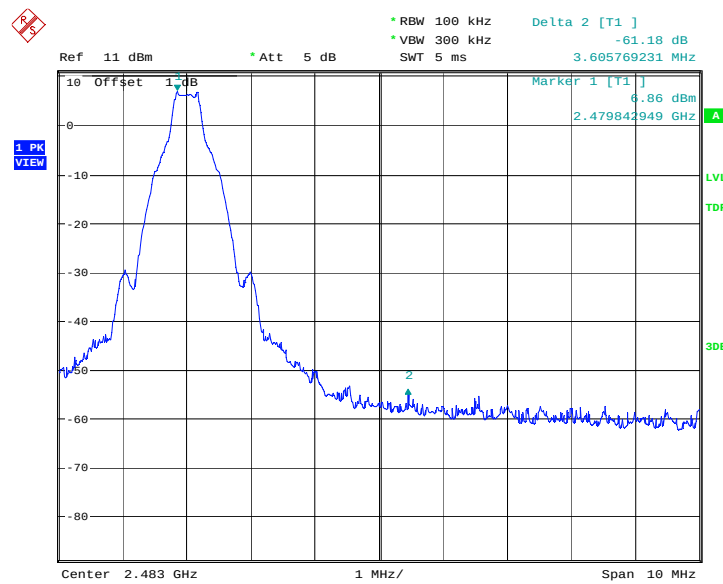
Date: 1.MAR.2014 20:25:09

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



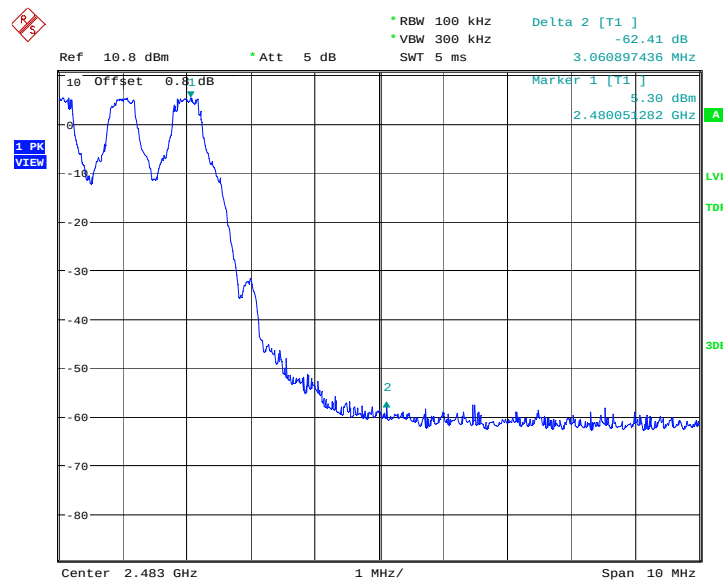
Date: 1.MAR.2014 20:27:29

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



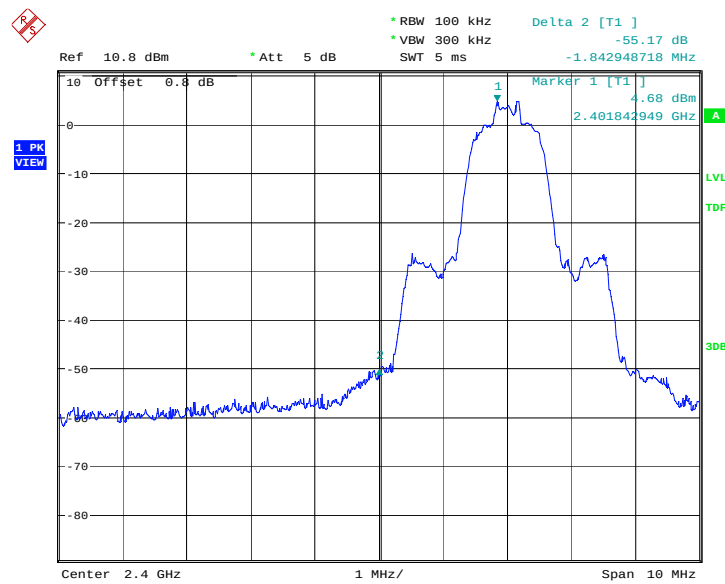
Date: 4.MAR.2014 10:18:21

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



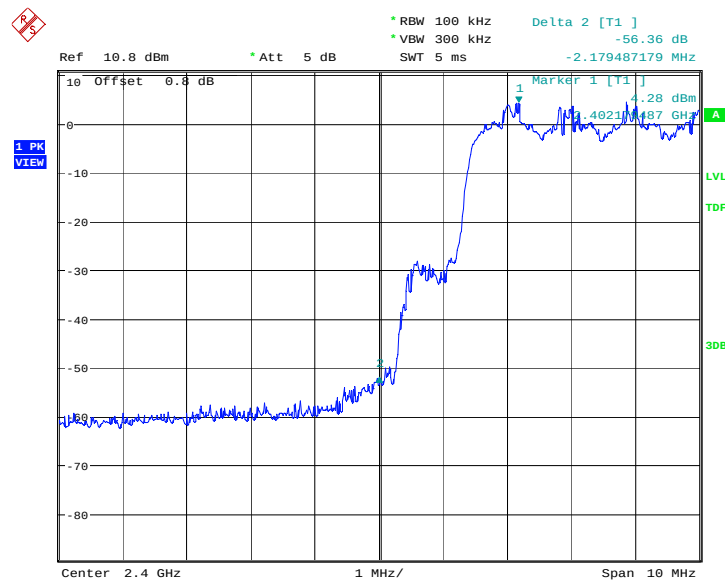
Date: 1.MAR.2014 20:29:31

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



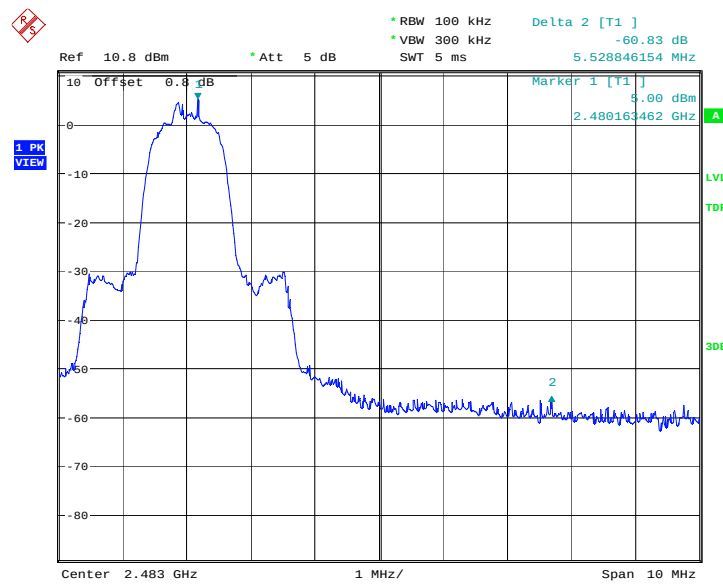
Date: 1.MAR.2014 20:46:40

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



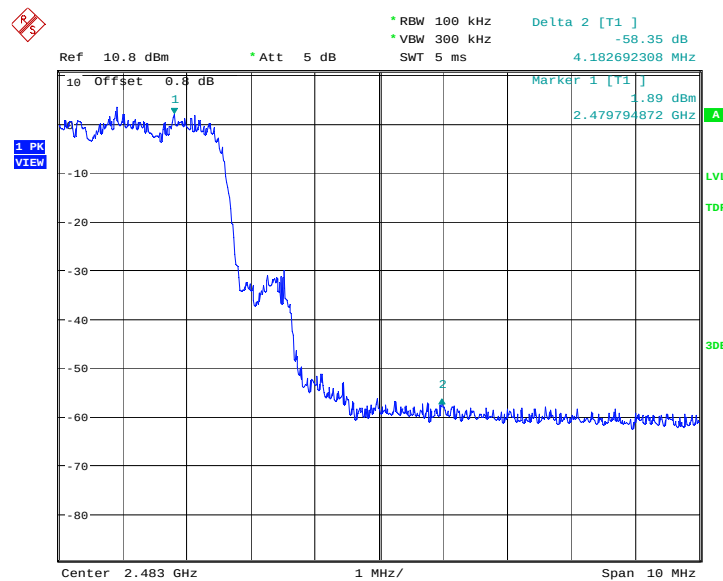
Date: 1.MAR.2014 20:49:00

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



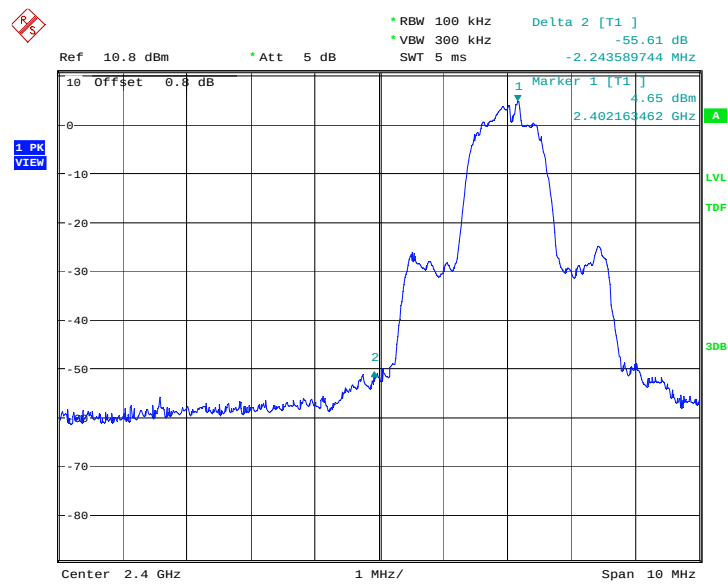
Date: 1.MAR.2014 20:46:57

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



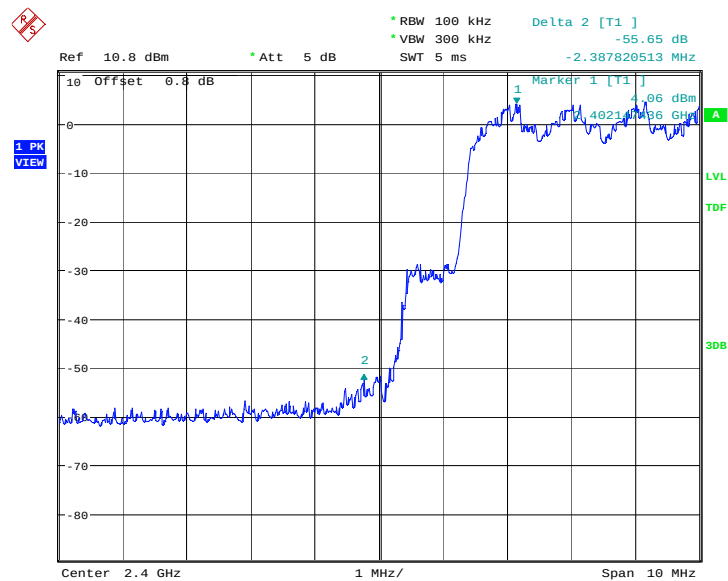
Date: 1.MAR.2014 20:51:01

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



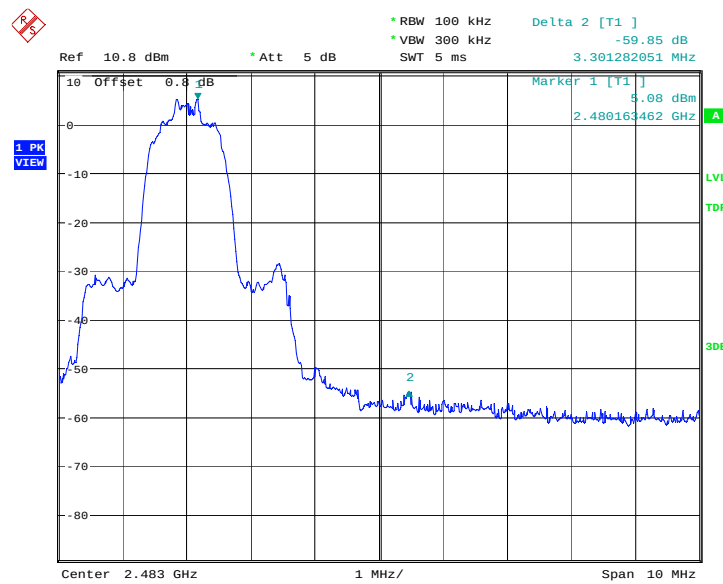
Date: 1.MAR.2014 21:08:10

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



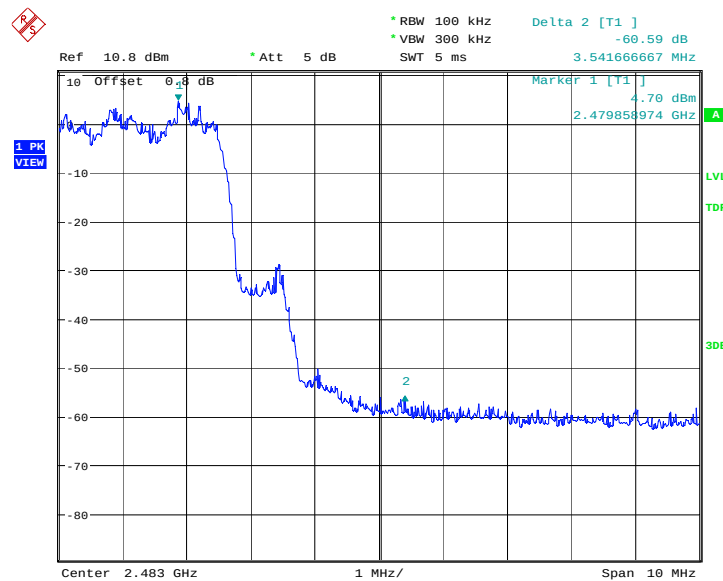
Date: 1.MAR.2014 21:10:30

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



Date: 1.MAR.2014 21:08:27

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



Date: 1.MAR.2014 21:12:33

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

A.4. Conducted Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d) RSS-210 A8.5	20dB below peak output power in 100 kHz bandwidth

The measurement is made according to ANSI C63.10

Measurement Results:

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	Center Frequency	Fig.13	P
	30 MHz ~ 1 GHz	Fig.14	P
	1 GHz ~ 3 GHz	Fig.15	P
	3 GHz ~ 10 GHz	Fig.16	P
	10 GHz ~ 26 GHz	Fig.17	P
Ch 39 2441 MHz	Center Frequency	Fig.18	P
	30 MHz ~ 1 GHz	Fig.19	P
	1 GHz ~ 3 GHz	Fig.20	P
	3 GHz ~ 10 GHz	Fig.21	P
	10 GHz ~ 26 GHz	Fig.22	P
Ch 78 2480 MHz	Center Frequency	Fig.23	P
	30 MHz ~ 1 GHz	Fig.24	P
	1 GHz ~ 3 GHz	Fig.25	P
	3 GHz ~ 10 GHz	Fig.26	P
	10 GHz ~ 26 GHz	Fig.27	P

For $\pi/4$ DQPSK

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

	1 GHz ~ 3 GHz	Fig.40	P
	3 GHz ~ 10 GHz	Fig.41	P
	10 GHz ~ 26 GHz	Fig.42	P

For 8DPSK

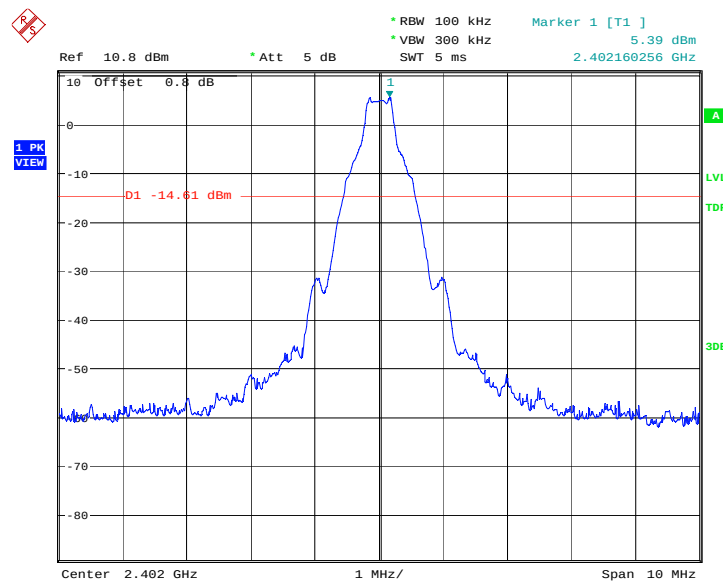
Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	Center Frequency	Fig.43	P
	30 MHz ~ 1 GHz	Fig.44	P
	1 GHz ~ 3 GHz	Fig.45	P
	3 GHz ~ 10 GHz	Fig.46	P
	10 GHz ~ 26 GHz	Fig.47	P
Ch 39 2441 MHz	Center Frequency	Fig.48	P
	30 MHz ~ 1 GHz	Fig.49	P
	1 GHz ~ 3 GHz	Fig.50	P
	3 GHz ~ 10 GHz	Fig.51	P
	10 GHz ~ 26 GHz	Fig.52	P
Ch 78 2480 MHz	Center Frequency	Fig.53	P
	30 MHz ~ 1 GHz	Fig.54	P
	1 GHz ~ 3 GHz	Fig.55	P
	3 GHz ~ 10 GHz	Fig.56	P
	10 GHz ~ 26 GHz	Fig.57	P

Conclusion: PASS

Note:

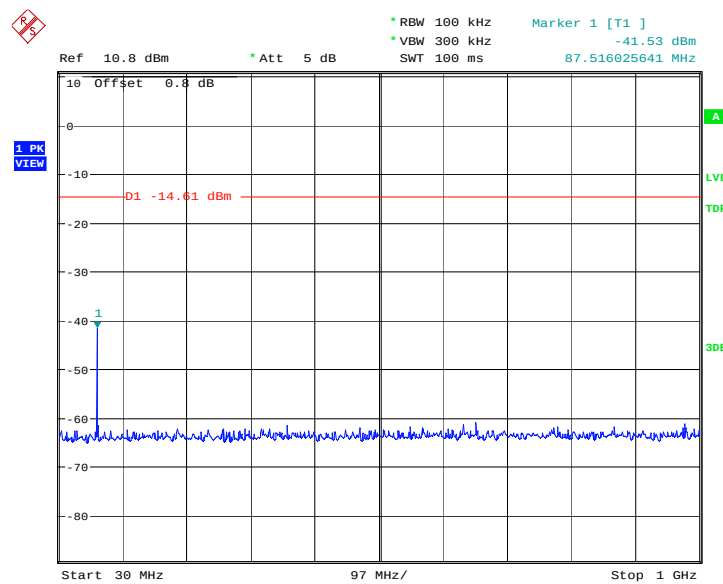
The conducted spurious emission measurement over 9kHz - 30MHz had been investigated.
All spurious emissions were attenuated at least 20dB compared to the limit.

Test graphs as below



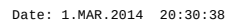
Date: 1.MAR.2014 20:29:50

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



Date: 1.MAR.2014 20:30:07

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



Ref 10.8 dBm Att 5 dB RBW 100 kHz VBW 300 kHz SWT 700 ms Marker 1 [T1] -54.15 dBm 3.594551282 GHz

Offset 0.8 dB

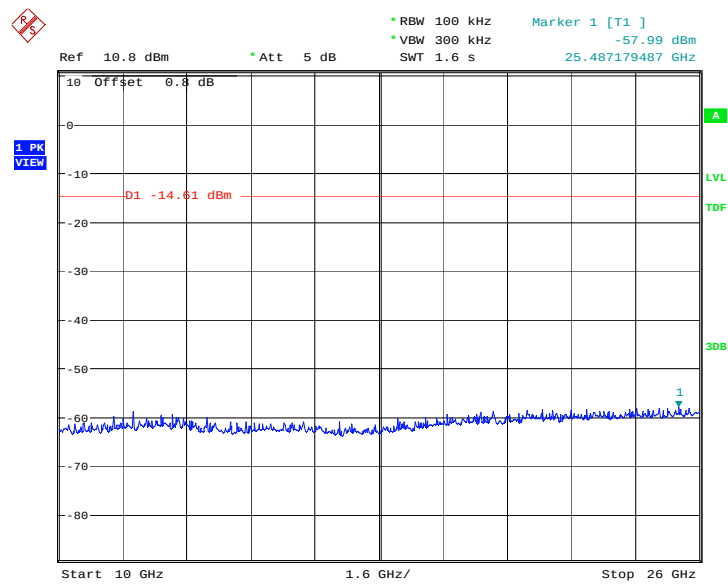
1 PK VIEW

D1 -14.61 dBm

Start 3 GHz 700 MHz/ Stop 10 GHz

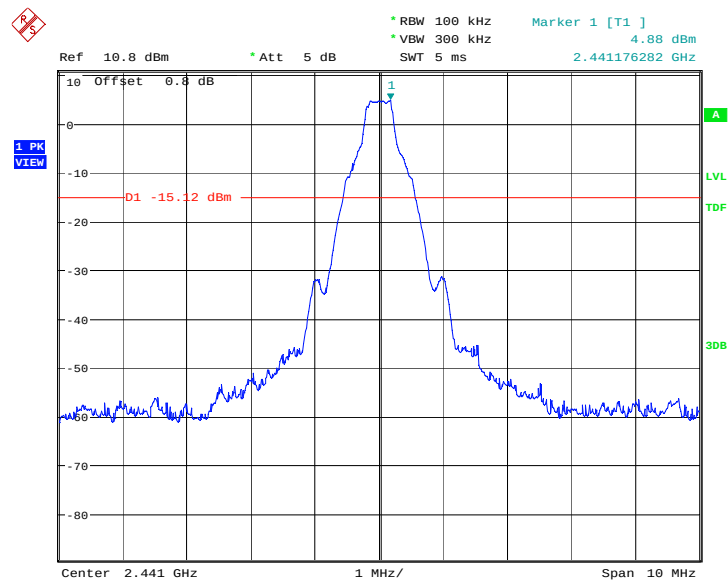
Date: 1.MAR.2014 20:30:55

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



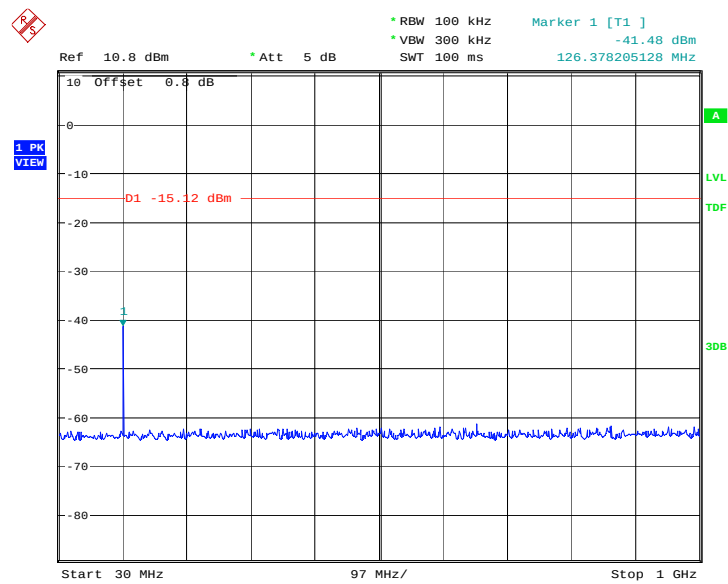
Date: 1.MAR.2014 20:31:11

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



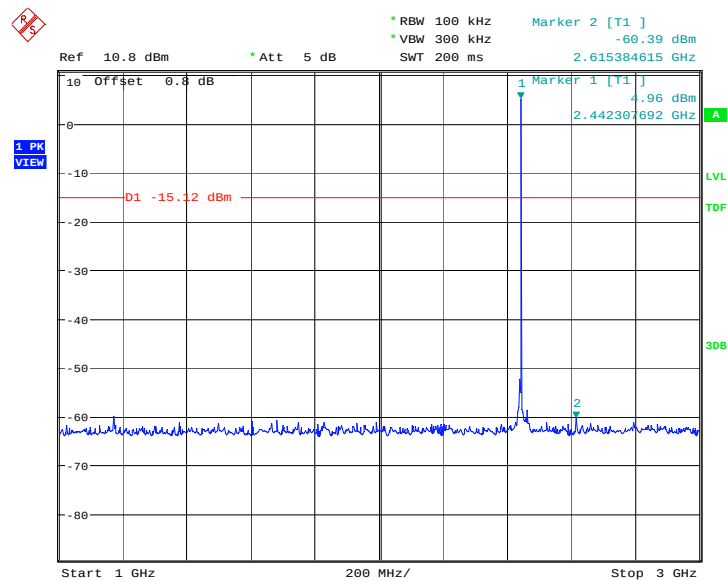
Date: 1.MAR.2014 20:31:28

Fig.18. Conducted spurious emission: GFSK, Channel 39, 2441MHz



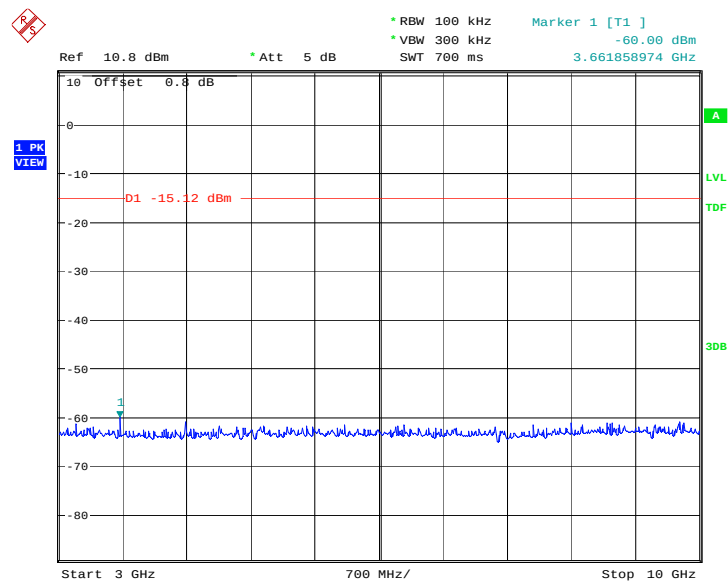
Date: 1.MAR.2014 20:31:45

Fig.19. Conducted spurious emission: GFSK, Channel 39, 30MHz - 1GHz



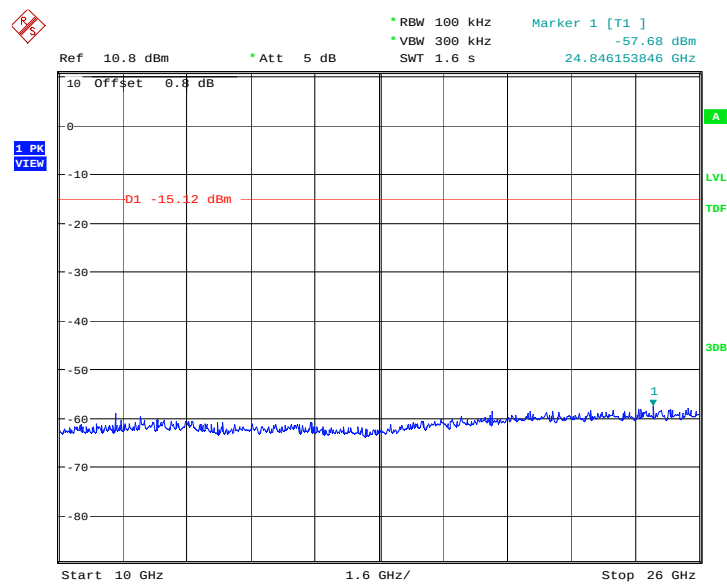
Date: 1.MAR.2014 20:32:16

Fig.20. Conducted spurious emission: GFSK, Channel 39, 1GHz - 3GHz



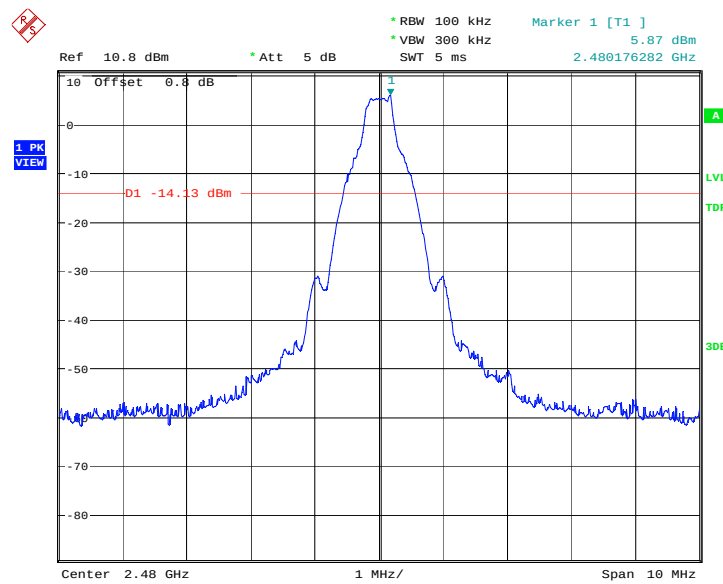
Date: 1.MAR.2014 20:32:33

Fig.21. Conducted spurious emission: GFSK, Channel 39, 3GHz – 10GHz



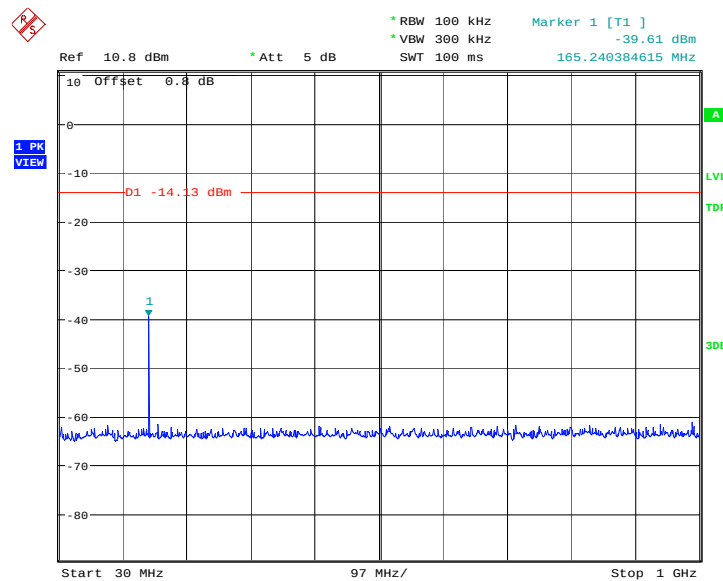
Date: 1.MAR.2014 20:32:50

Fig.22. Conducted spurious emission: GFSK, Channel 39, 10GHz – 26GHz



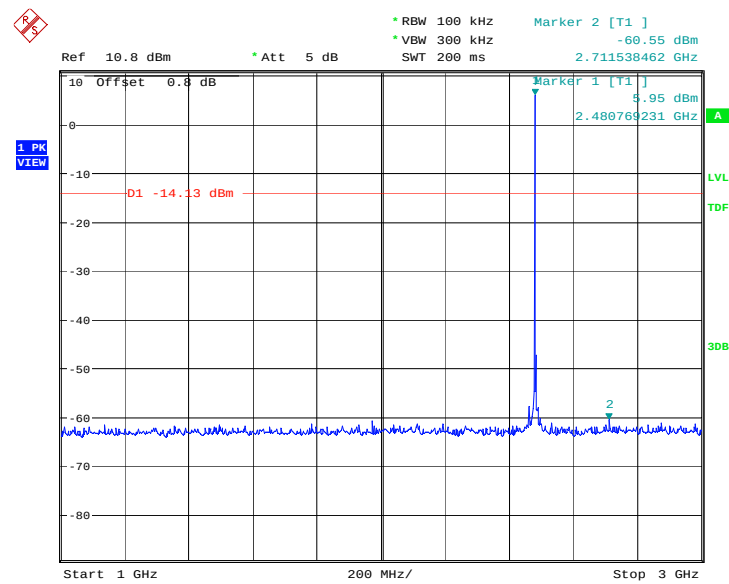
Date: 1.MAR.2014 20:33:06

Fig.23. Conducted spurious emission: GFSK, Channel 78, 2480MHz



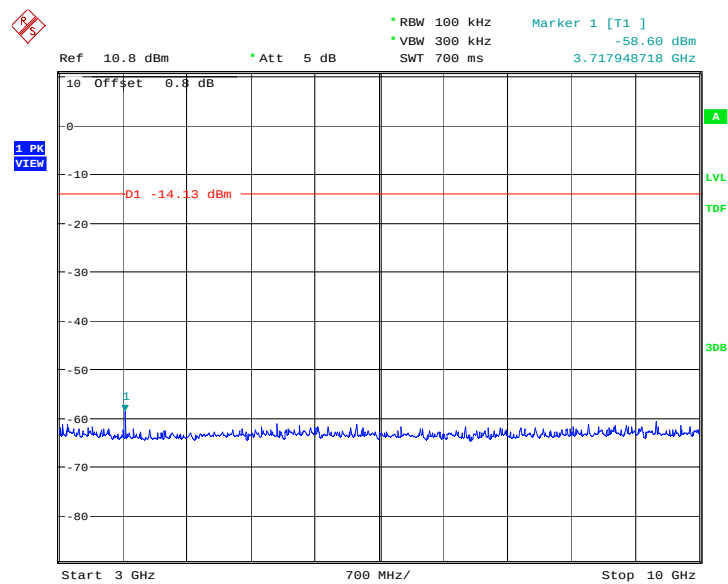
Date: 1.MAR.2014 20:33:23

Fig.24. Conducted spurious emission: GFSK, Channel 78, 30MHz - 1GHz



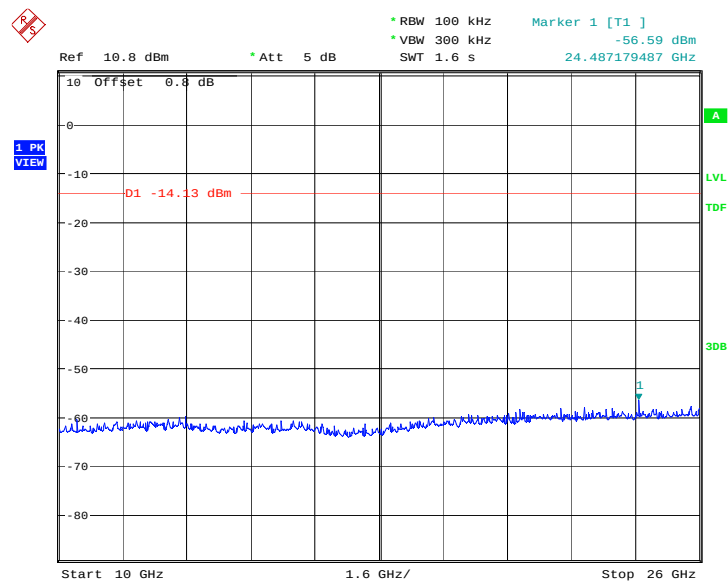
Date: 1.MAR.2014 20:33:54

Fig.25. Conducted spurious emission: GFSK, Channel 78, 1GHz - 3GHz



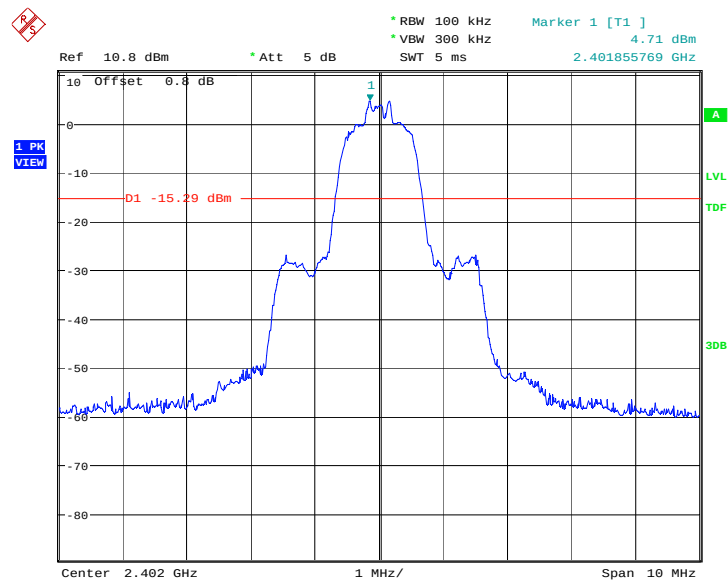
Date: 1.MAR.2014 20:34:11

Fig.26. Conducted spurious emission: GFSK, Channel 78, 3GHz - 10GHz



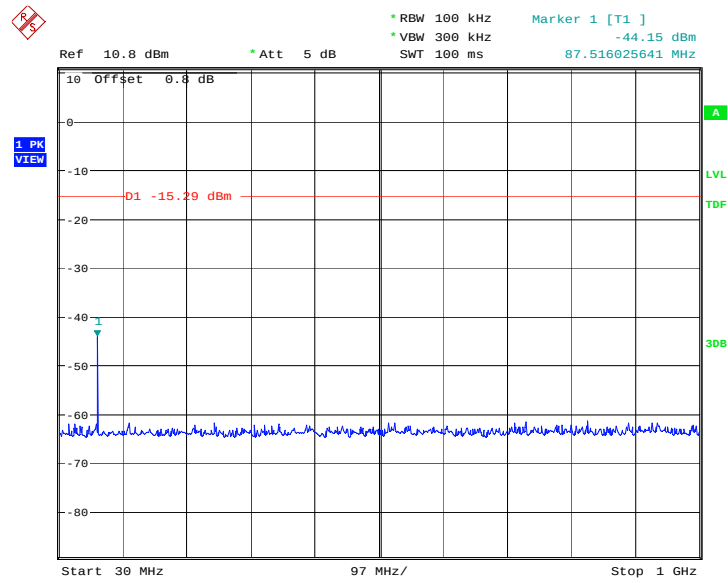
Date: 1.MAR.2014 20:34:28

Fig.27. Conducted spurious emission: GFSK, Channel 78, 10GHz - 26GHz



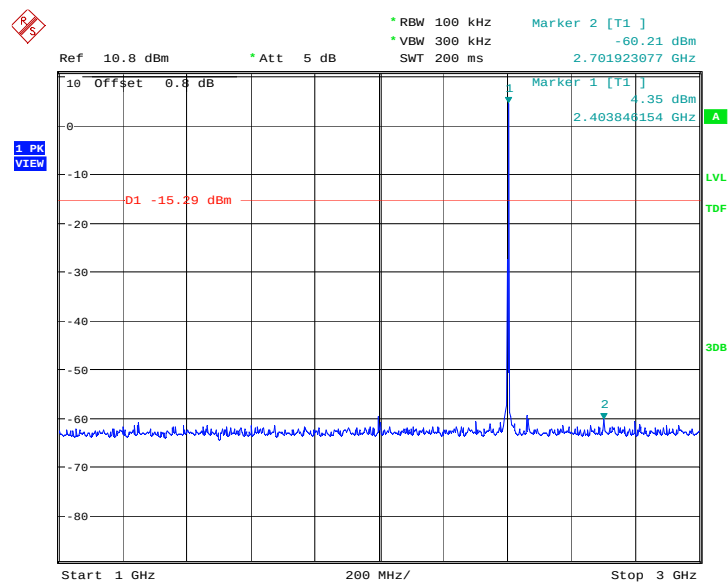
Date: 1.MAR.2014 20:51:19

Fig.28. Conducted spurious emission: $\pi/4$ DQPSK, Channel 0, 2402MHz



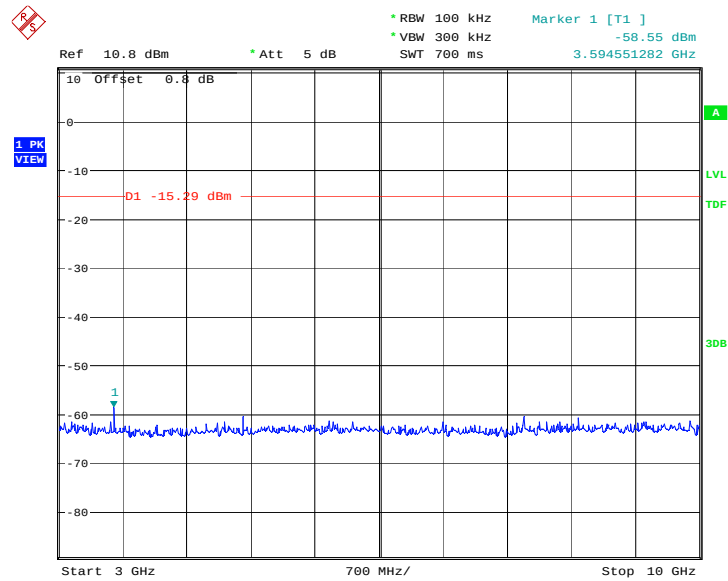
Date: 1.MAR.2014 20:51:36

Fig.29. Conducted spurious emission: $\pi/4$ DQPSK, Channel 0, 30MHz - 1GHz



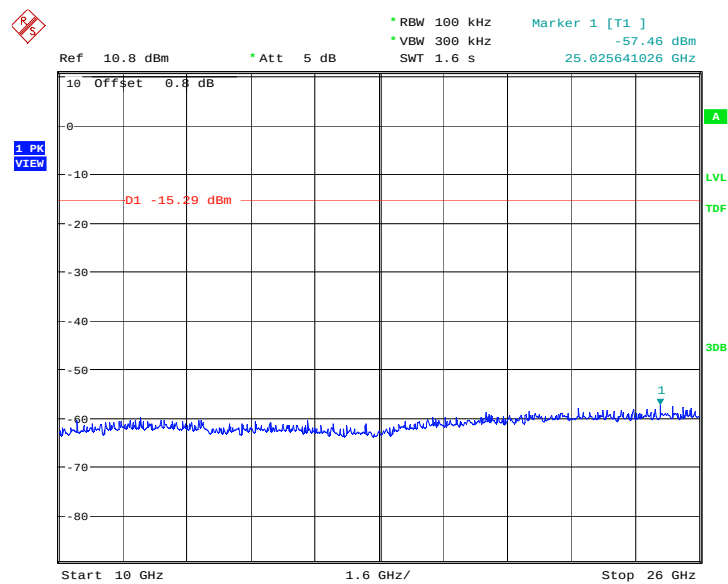
Date: 1.MAR.2014 20:52:08

Fig.30. Conducted spurious emission: $\pi/4$ DQPSK, Channel 0, 1GHz - 3GHz



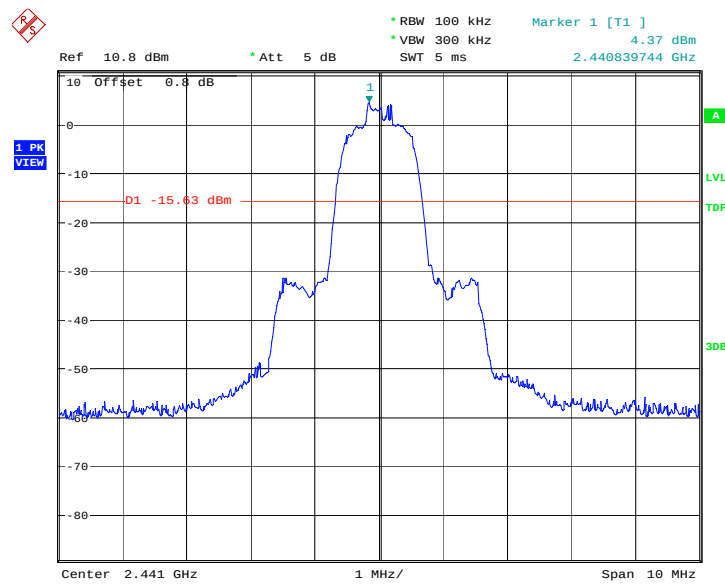
Date: 1.MAR.2014 20:52:24

Fig.31. Conducted spurious emission: $\pi/4$ DQPSK, Channel 0, 3GHz - 10GHz



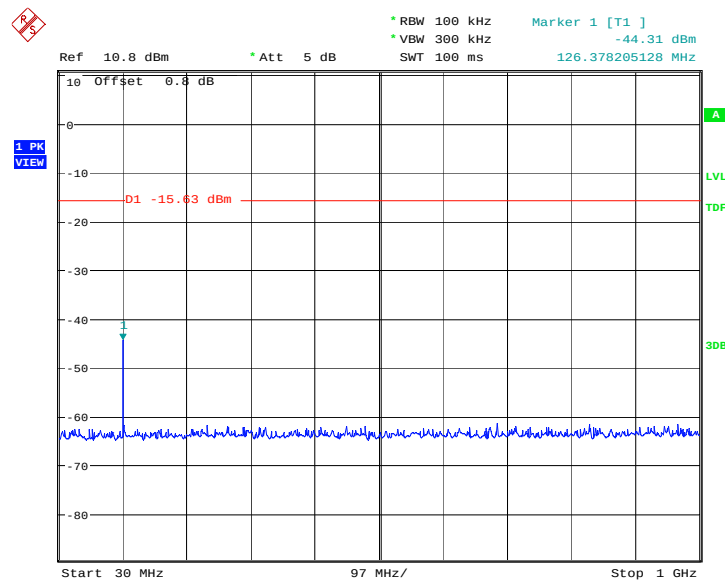
Date: 1.MAR.2014 20:52:41

Fig.32. Conducted spurious emission: $\pi/4$ DQPSK, Channel 0, 10GHz - 26GHz



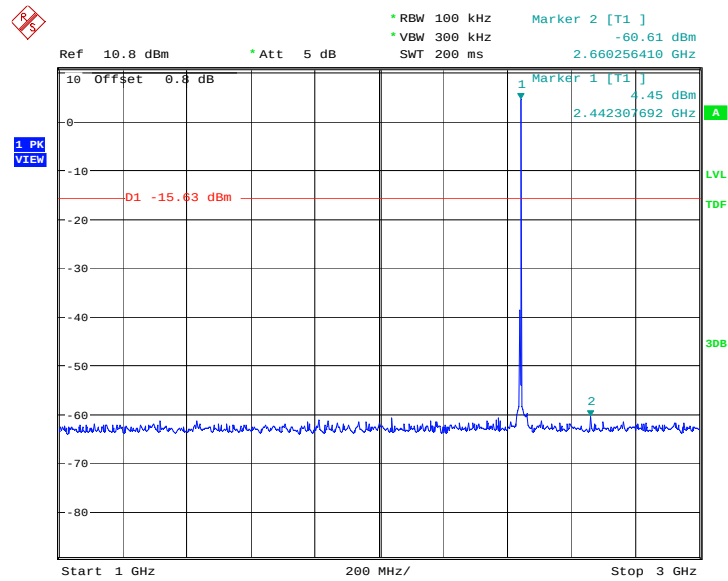
Date: 1.MAR.2014 20:52:57

Fig.33. Conducted spurious emission: $\pi/4$ DQPSK, Channel 39, 2441MHz



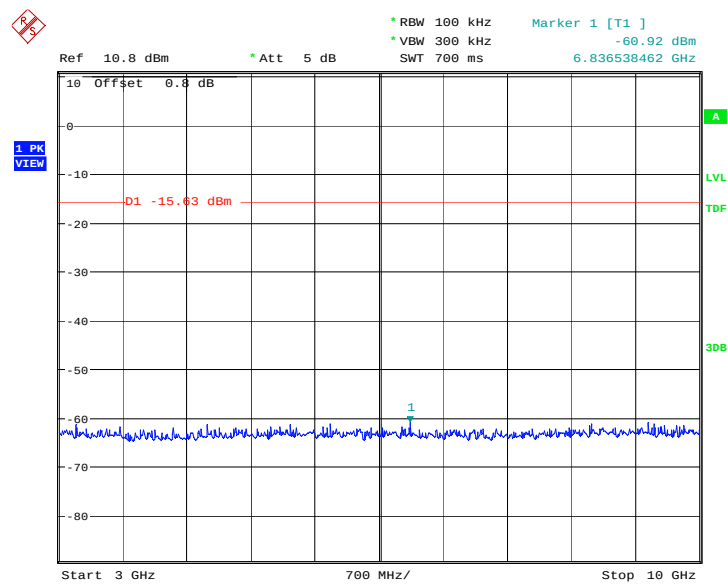
Date: 1.MAR.2014 20:53:14

Fig.34. Conducted spurious emission: $\pi/4$ DQPSK, Channel 39, 30MHz - 1GHz



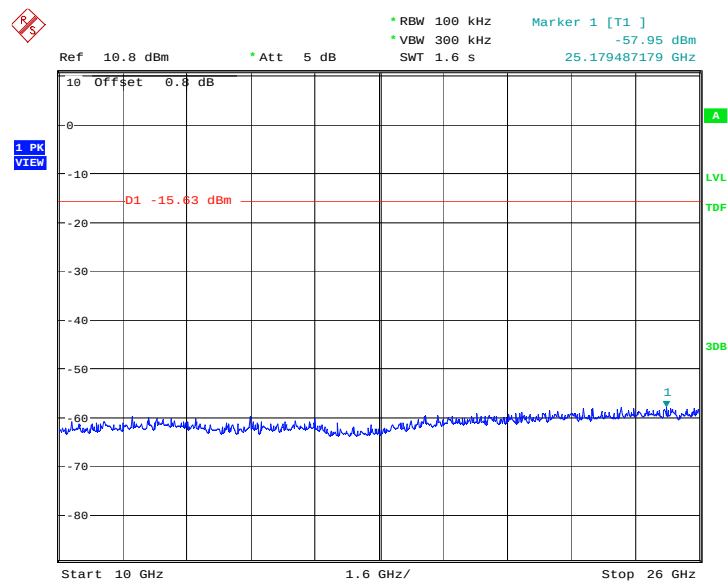
Date: 1.MAR.2014 20:53:46

Fig.35. Conducted spurious emission: $\pi/4$ DQPSK, Channel 39, 1GHz - 3GHz



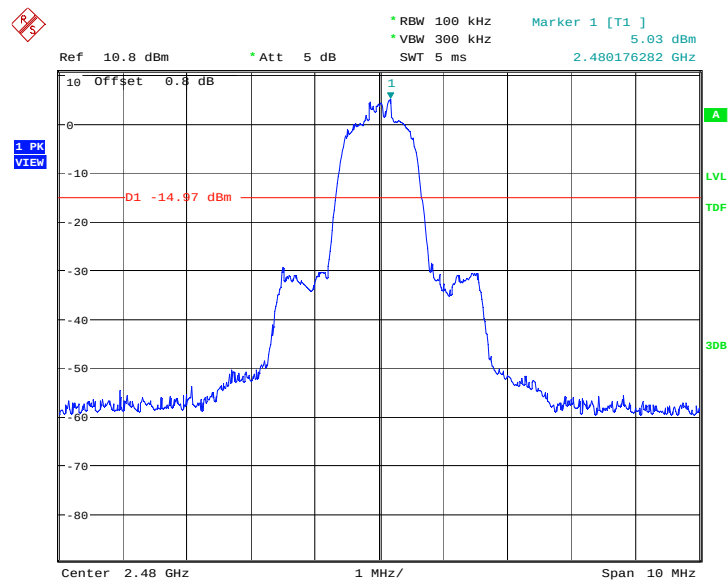
Date: 1.MAR.2014 20:54:02

Fig.36. Conducted spurious emission: $\pi/4$ DQPSK, Channel 39, 3GHz - 10GHz



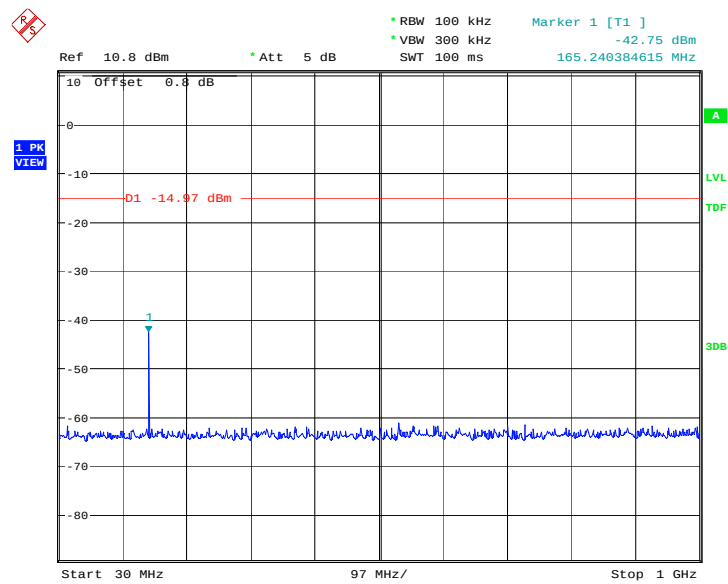
Date: 1.MAR.2014 20:54:19

Fig.37. Conducted spurious emission: $\pi/4$ DQPSK, Channel 39, 10GHz – 26GHz



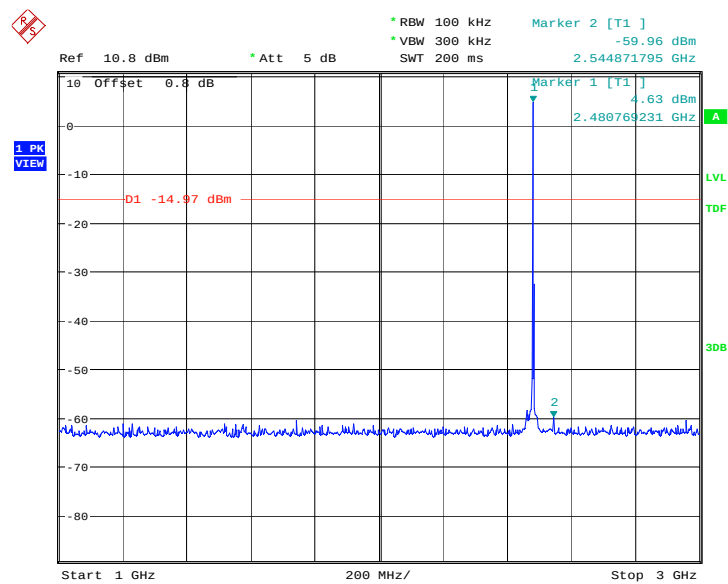
Date: 1.MAR.2014 20:54:36

Fig.38. Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 2480MHz



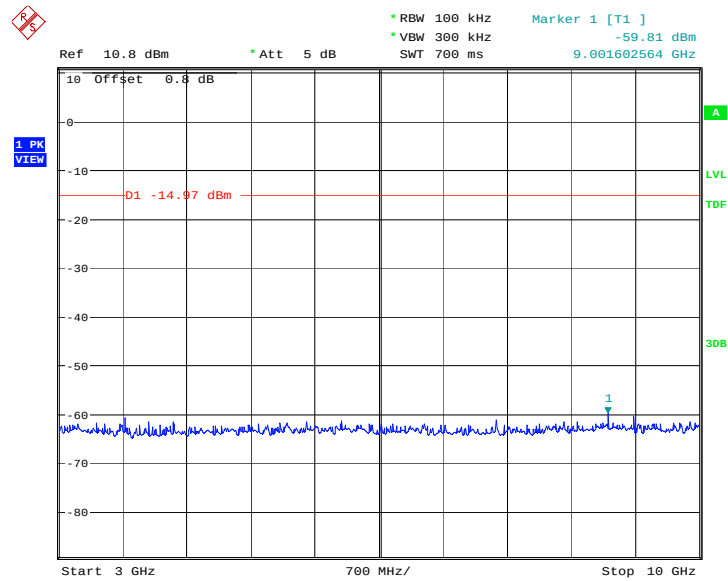
Date: 1.MAR.2014 20:54:52

Fig.39. Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 30MHz - 1GHz



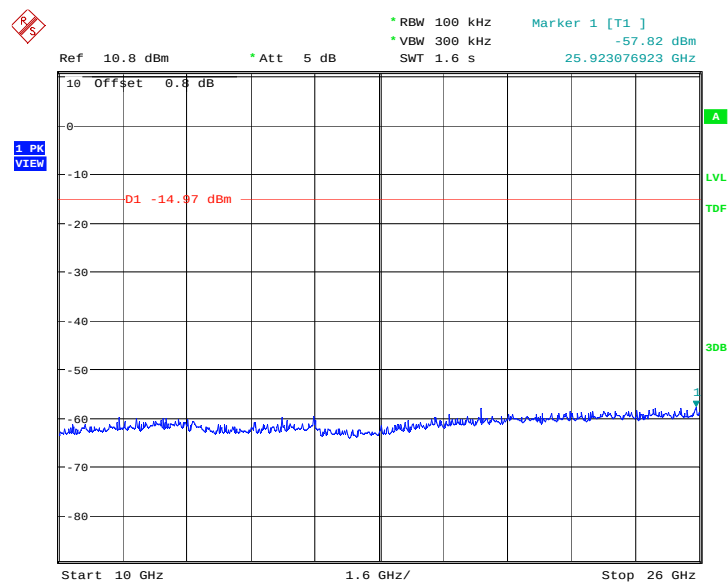
Date: 1.MAR.2014 20:55:24

Fig.40. Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 1GHz - 3GHz



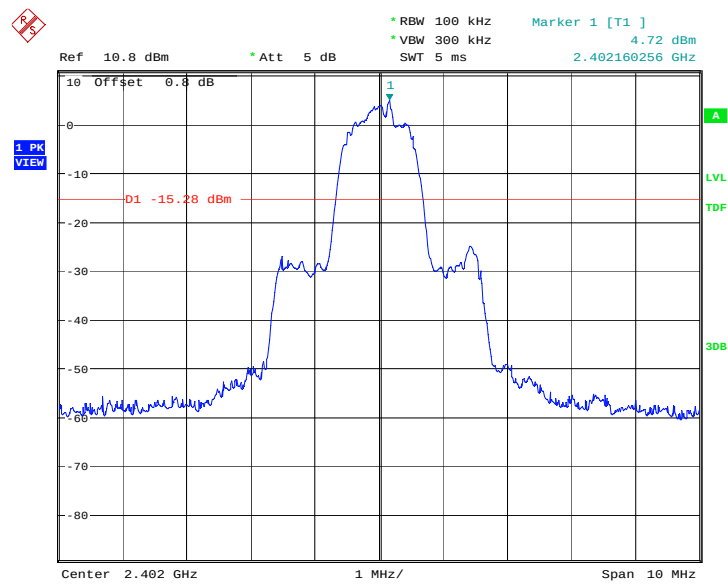
Date: 1.MAR.2014 20:55:40

Fig.41. Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 3GHz - 10GHz



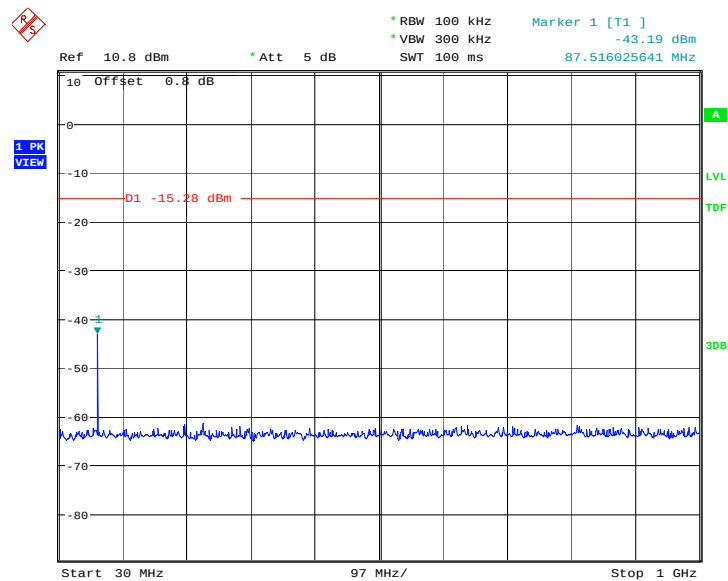
Date: 1.MAR.2014 20:55:57

Fig.42. Fig.30 Conducted spurious emission: $\pi/4$ DQPSK, Channel 78, 10GHz - 26GHz



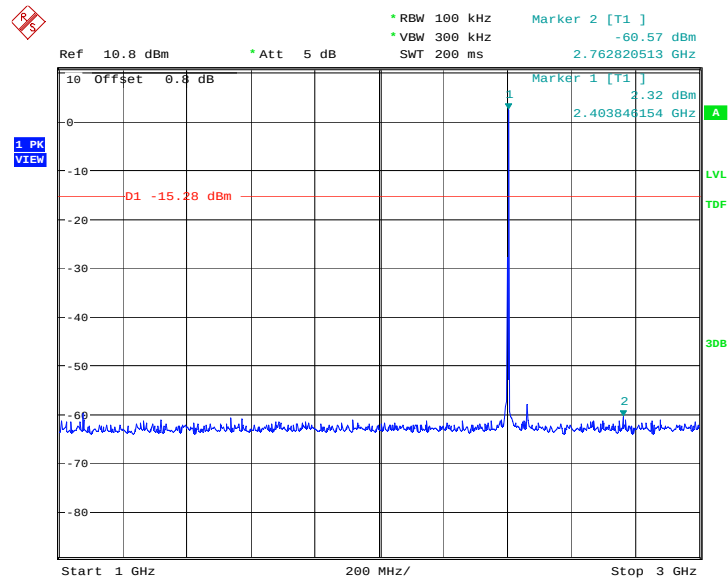
Date: 1.MAR.2014 21:12:52

Fig.43. Conducted spurious emission: 8DPSK, Channel 0,2402MHz



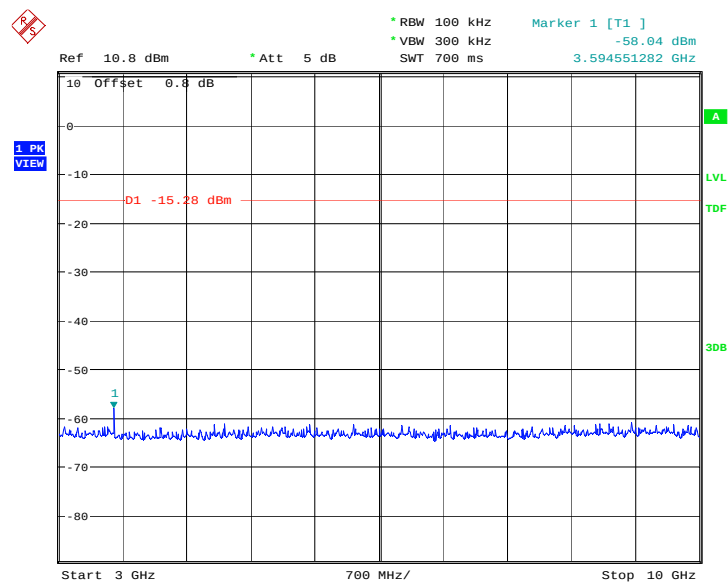
Date: 1.MAR.2014 21:13:08

Fig.44. Conducted spurious emission: 8DPSK, Channel 0, 30MHz - 1GHz



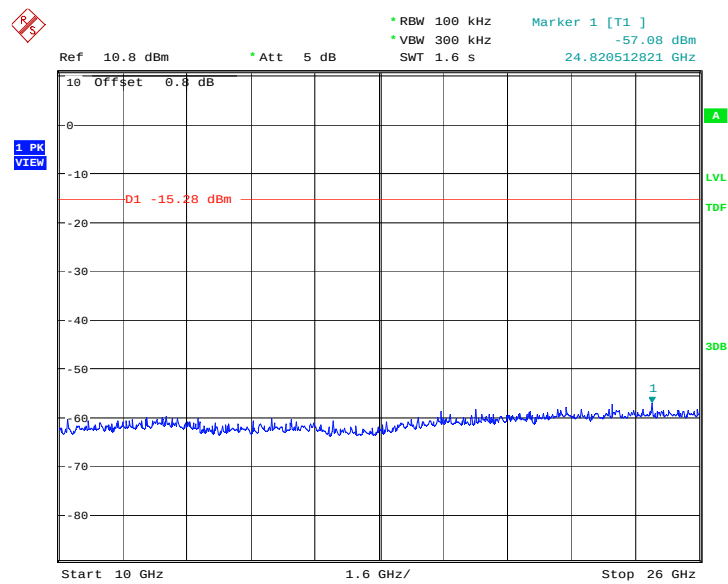
Date: 1.MAR.2014 21:13:40

Fig.45. Conducted spurious emission: 8DPSK, Channel 0, 1GHz - 3GHz



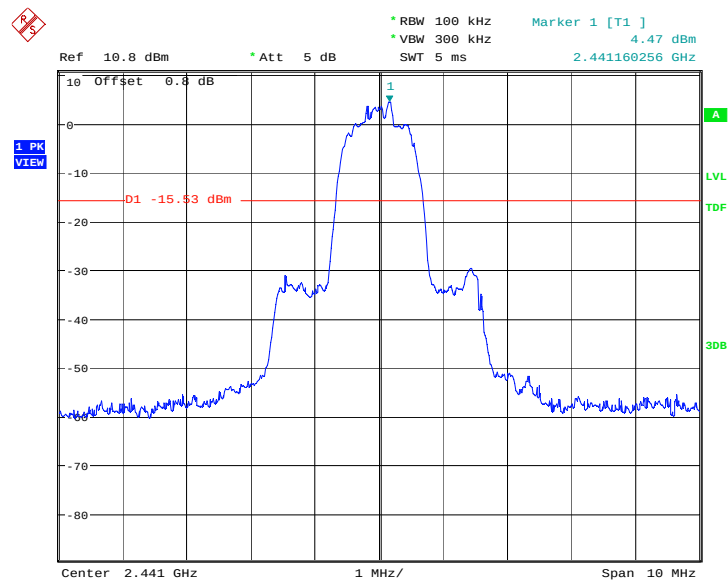
Date: 1.MAR.2014 21:13:57

Fig.46. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz



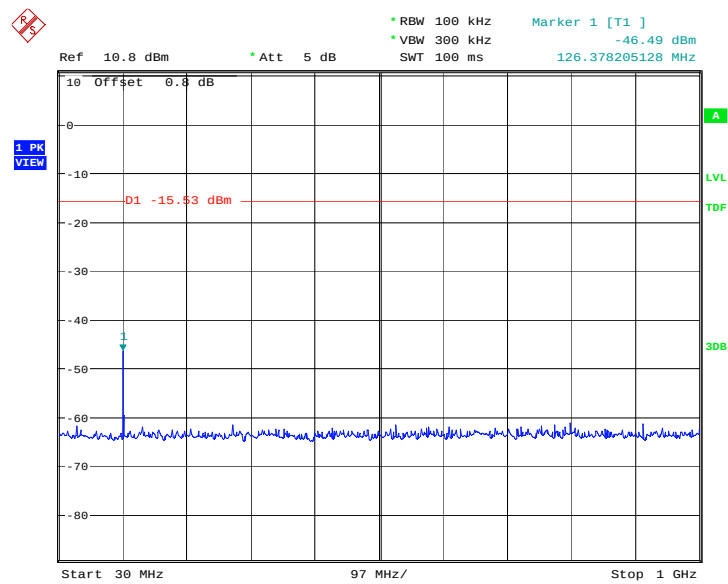
Date: 1.MAR.2014 21:14:13

Fig.47. Conducted spurious emission: 8DPSK, Channel 0,10GHz - 26GHz



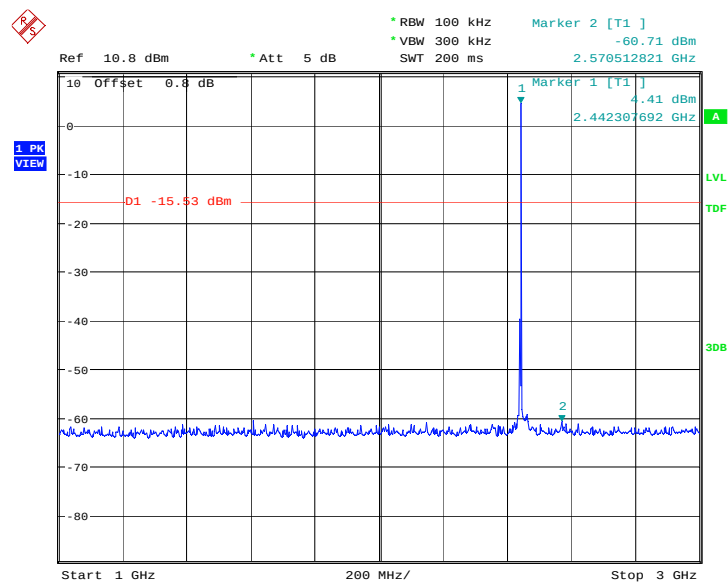
Date: 1.MAR.2014 21:14:30

Fig.48. Conducted spurious emission: 8DPSK, Channel 39, 2441MHz



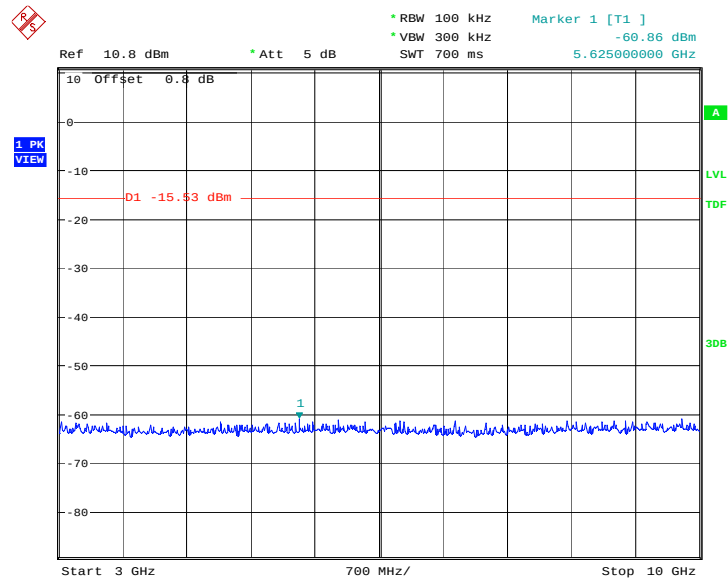
Date: 1.MAR.2014 21:14:46

Fig.49. Conducted spurious emission: 8DPSK, Channel 39, 30MHz - 1GHz



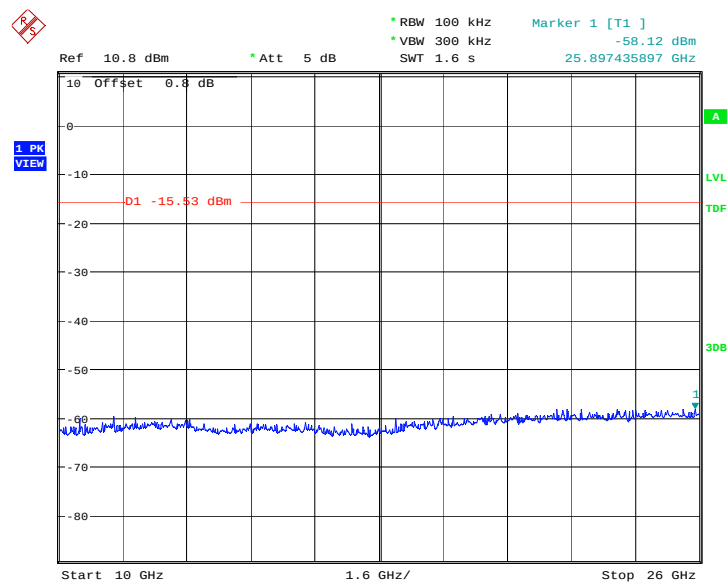
Date: 1.MAR.2014 21:15:18

Fig.50. Conducted spurious emission: 8DPSK, Channel 39, 1GHz - 3GHz



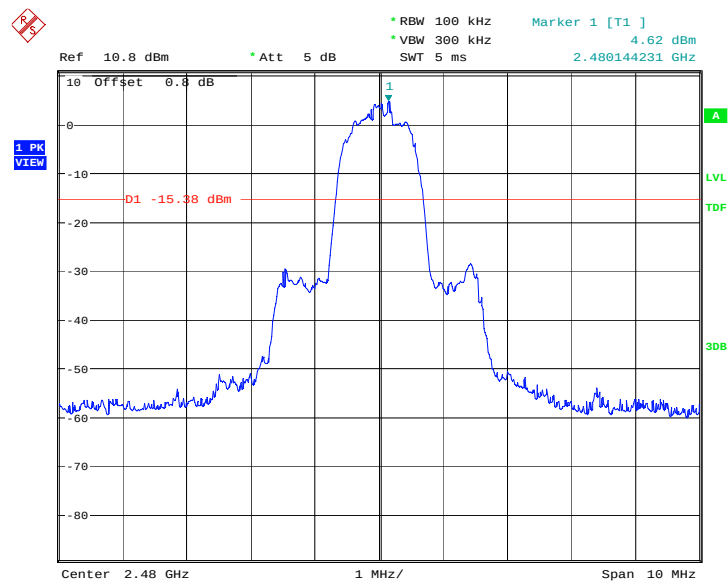
Date: 1.MAR.2014 21:15:35

Fig.51. Conducted spurious emission: 8DPSK, Channel 39, 3GHz - 10GHz



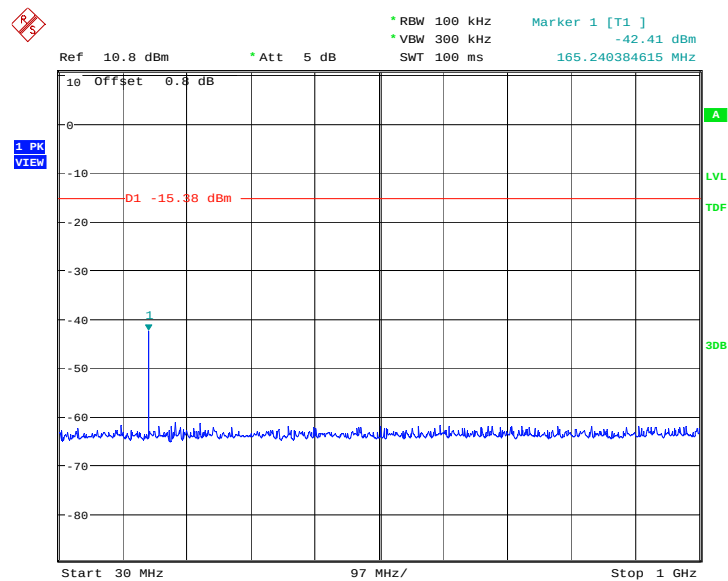
Date: 1.MAR.2014 21:15:51

Fig.52. Conducted spurious emission: 8DPSK, Channel 39, 10GHz - 26GHz



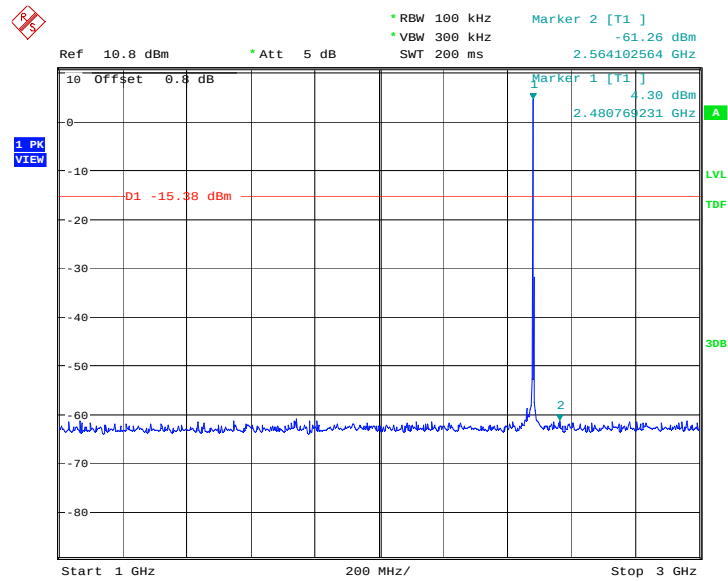
Date: 1.MAR.2014 21:16:08

Fig.53. Conducted spurious emission: 8DPSK, Channel 78, 2480MHz



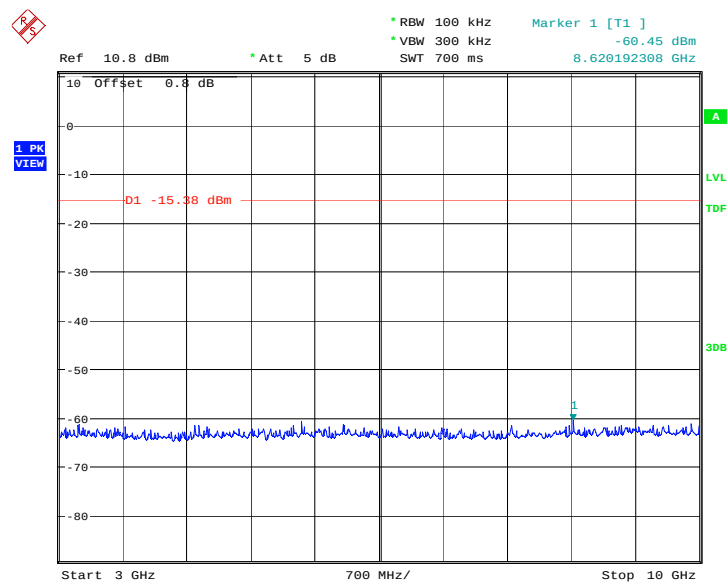
Date: 1.MAR.2014 21:16:25

Fig.54. Conducted spurious emission: 8DPSK, Channel 78, 30MHz - 1GHz



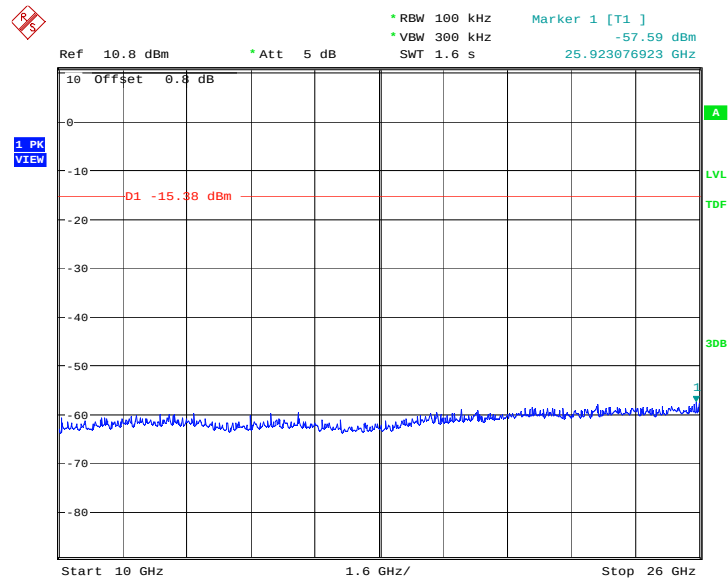
Date: 1.MAR.2014 21:16:56

Fig.55. Conducted spurious emission: 8DPSK, Channel 78, 1GHz - 3GHz



Date: 1.MAR.2014 21:17:13

Fig.56. Conducted spurious emission: 8DPSK, Channel 78, 3GHz - 10GHz



Date: 1.MAR.2014 21:17:29

Fig.57. Conducted spurious emission: 8DPSK, Channel 78, 10GHz - 26GHz

A.5. Radiated Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247, 15.205, 15.209 RSS-210 A8.5	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)
0.009-88	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)
0.009-1000	100KHz/300KHz	5
1000-4000	1MHz/1MHz	15
4000-18000	1MHz/1MHz	40
18000-26500	1MHz/1MHz	20

Measurement Results:

Result= P_{Mea} +ARPL

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	30 MHz ~ 1 GHz	Fig.58	P
	1 GHz ~ 3 GHz	Fig.59	P
	3 GHz ~ 18 GHz	Fig.60	P
Ch 39 2441 MHz	9 KHz ~ 30 MHz	Fig.61	P
	30 MHz ~ 1 GHz	Fig.62	P
	1 GHz ~ 3 GHz	Fig.63	P
	3 GHz ~ 18 GHz	Fig.64	P
Ch 78	30 MHz ~ 1 GHz	Fig.65	P

2480 MHz	1 GHz ~ 3 GHz	Fig.66	P
	3 GHz ~ 18 GHz	Fig.67	P
Power	2.38GHz~2.4GHz---L	Fig.68	P
Power	2.45GHz~2.5GHz---H	Fig.69	P
For all channels	18 GHz ~ 26 GHz	Fig.70	P

For $\pi/4$ DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	30 MHz ~ 1 GHz	Fig.71	P
	1 GHz ~ 3 GHz	Fig.72	P
	3 GHz ~ 18 GHz	Fig.73	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.74	P
	1 GHz ~ 3 GHz	Fig.75	P
	3 GHz ~ 18 GHz	Fig.76	P
Ch 78 2480 MHz	30 MHz ~ 1 GHz	Fig.77	P
	1 GHz ~ 3 GHz	Fig.78	P
	3 GHz ~ 18 GHz	Fig.79	P
Power	2.38GHz~2.4GHz---L	Fig.80	P
Power	2.45GHz~2.5GHz---H	Fig.81	P
For all channels	18 GHz ~ 26 GHz	Fig.82	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	30 MHz ~ 1 GHz	Fig.83	P
	1 GHz ~ 3 GHz	Fig.84	P
	3 GHz ~ 18 GHz	Fig.85	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.86	P
	1 GHz ~ 3 GHz	Fig.87	P
	3 GHz ~ 18 GHz	Fig.88	P
Ch 78 2480 MHz	30 MHz ~ 1 GHz	Fig.89	P
	1 GHz ~ 3 GHz	Fig.90	P
	3 GHz ~ 18 GHz	Fig.91	P
Power	2.38GHz~2.4GHz---L	Fig.92	P
Power	2.45GHz~2.5GHz---H	Fig.93	P
For all channels	18 GHz ~ 26 GHz	Fig.94	P

GFSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	PMea(dBuv/m)	Polarization
2390.000	33.4	-11.10	44.5	H
17971.500	41.5	27.90	13.6	H
17941.500	41.5	27.90	13.6	H
17965.500	41.5	27.90	13.6	V

17955.000	41.5	27.90	13.6	V
17968.500	41.4	27.90	13.5	H

GFSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
17949.000	41.5	27.90	13.6	V
17968.500	41.4	27.90	13.5	H
17965.500	41.4	27.90	13.5	V
17938.500	41.3	27.90	13.4	H
17941.500	41.3	27.90	13.4	V
17971.500	41.3	27.90	13.4	V

GFSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
2484.300	33.3	-11.20	44.5	V
17941.500	41.7	27.90	13.8	V
17952.000	41.6	27.90	13.7	V
17968.500	41.5	27.90	13.6	H
17962.500	41.5	27.90	13.6	V
17976.000	41.5	27.90	13.6	H

 $\pi/4$ DQPSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
2390.000	33.4	-11.10	44.5	H
17968.500	41.6	27.90	13.7	H
17955.000	41.5	27.90	13.6	H
17941.500	41.4	27.90	13.5	V
17952.000	41.4	27.90	13.5	H
17965.500	41.4	27.90	13.5	V

 $\pi/4$ DQPSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
17968.500	41.7	27.90	13.8	H
17965.500	41.5	27.90	13.6	V
17941.500	41.5	27.90	13.6	V
17952.000	41.5	27.90	13.6	H
17976.000	41.5	27.90	13.6	H
17949.000	41.4	27.90	13.5	V

 $\pi/4$ DQPSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
2383.500	34.0	-11.10	45.1	V
17952.000	41.7	27.90	13.8	H
17941.500	41.4	27.90	13.5	V
17971.500	41.4	27.90	13.5	V

17965.500	41.4	27.90	13.5	H
17955.000	41.3	27.90	13.4	H

8DPSK Ch 0 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
2390.000	33.4	-11.10	44.5	V
17941.500	41.6	27.90	13.7	H
17971.500	41.6	27.90	13.7	H
17952.000	41.5	27.90	13.6	V
17965.500	41.4	27.90	13.5	V
17968.500	41.4	27.90	13.5	V

8DPSK Ch 39 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
17968.500	41.6	27.90	13.700	H
17965.500	41.6	27.90	13.700	V
17955.000	41.5	27.90	13.600	H
17941.500	41.4	27.90	13.500	V
17962.500	41.3	27.90	13.400	H
17971.500	41.3	27.90	13.400	H

8DPSK Ch 78 - Average

Frequency(MHz)	Result(dBuv/m)	ARPL (dB)	Pmea(dBuv/m)	Polarization
2483.500	34.9	-11.20	46.1	H
17949.000	41.6	27.90	13.7	V
17968.500	41.5	27.90	13.6	H
17955.000	41.5	27.90	13.6	V
17965.500	41.4	27.90	13.5	V
17971.500	41.3	27.90	13.4	H

Conclusion: PASS

Note: The worst case is given.

Test graphs as below:

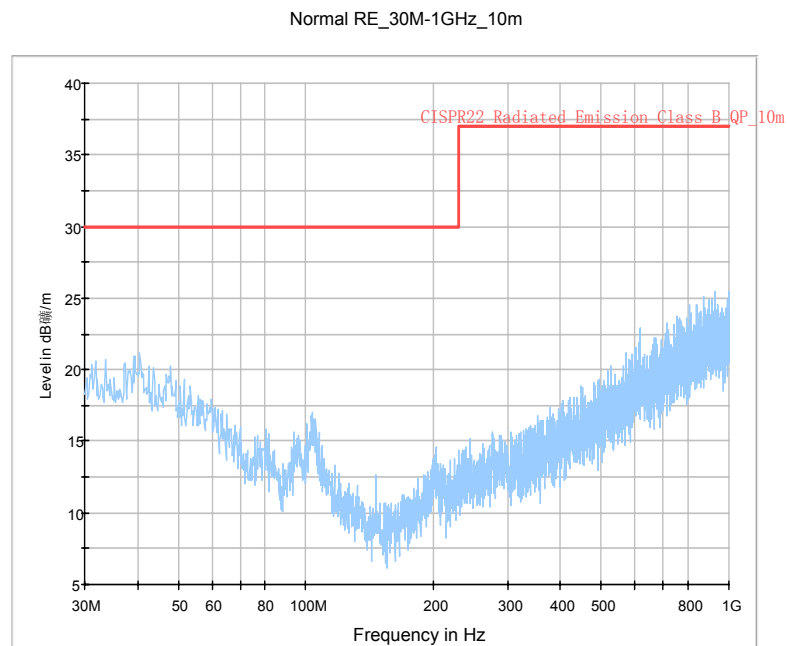


Fig.58. Radiated emission: GFSK, Channel 0, 30 MHz - 1 GHz

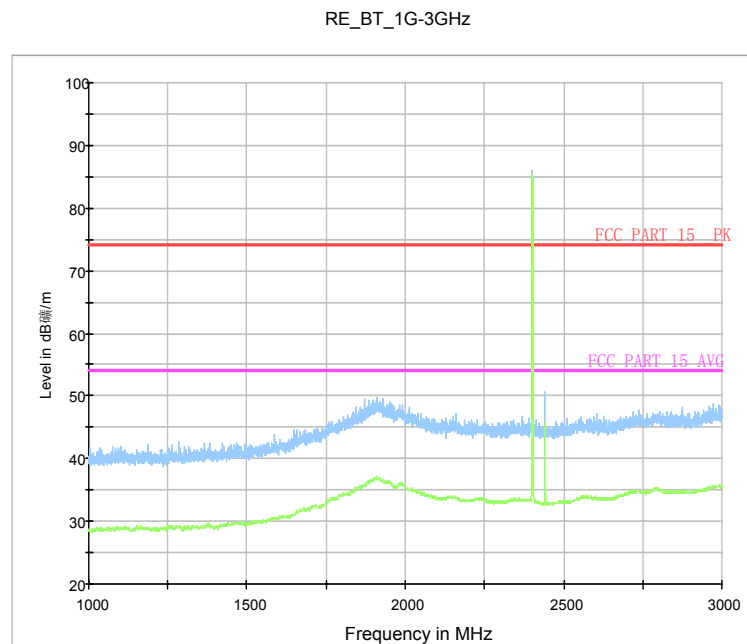


Fig.59. Radiated emission: GFSK, Channel 0, 1 GHz - 3 GHz

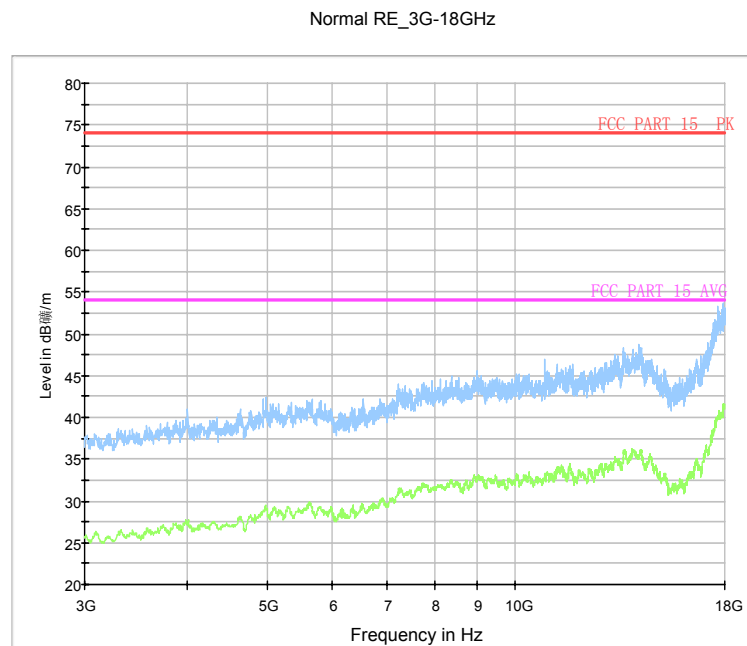


Fig.60. Radiated emission: GFSK, Channel 0, 3 GHz - 18 GHz

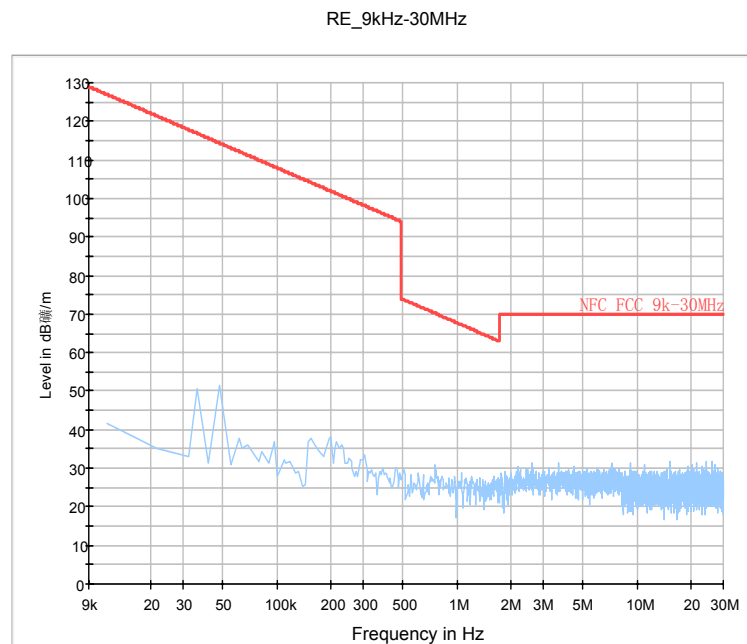


Fig.61. Radiated emission: GFSK, Channel 39, 9 KHz - 30 MHz

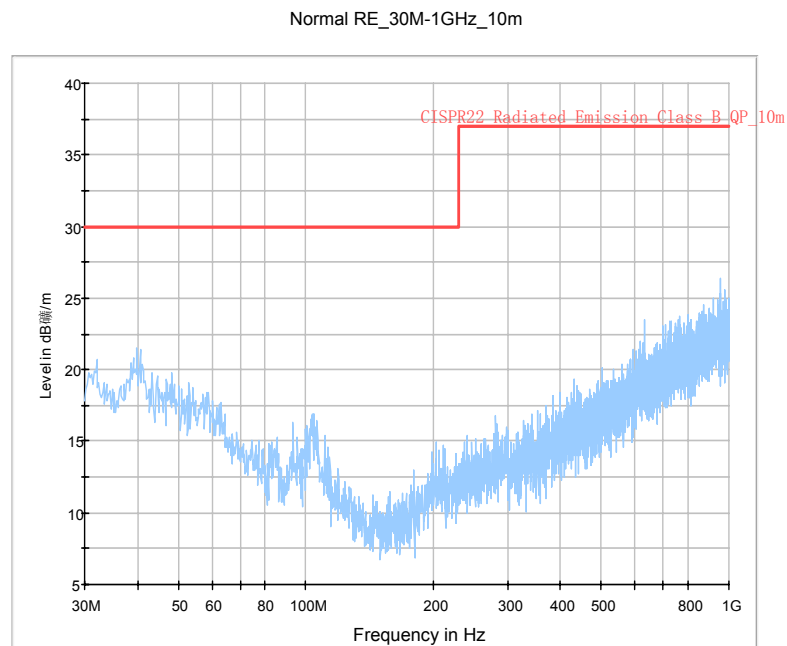


Fig.62. Radiated emission: GFSK, Channel 39, 30 MHz - 1 GHz

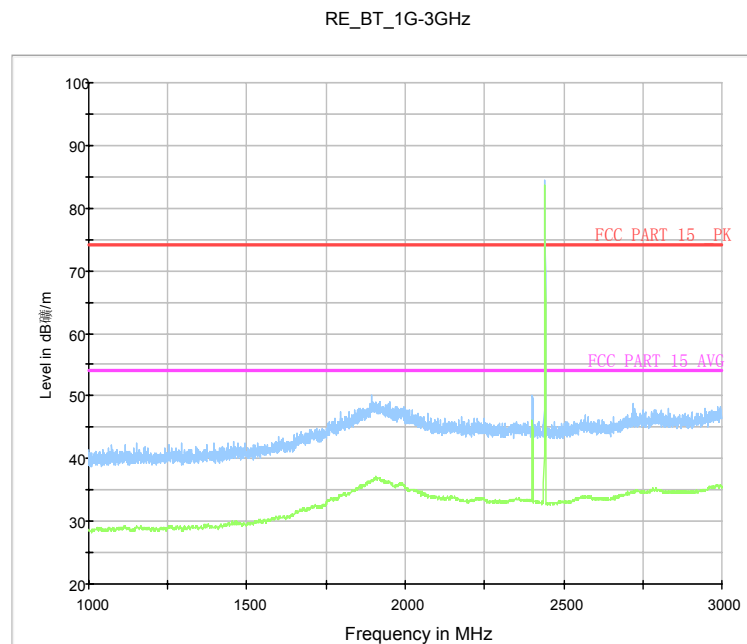


Fig.63. Radiated emission: GFSK, Channel 39, 1 GHz - 3 GHz

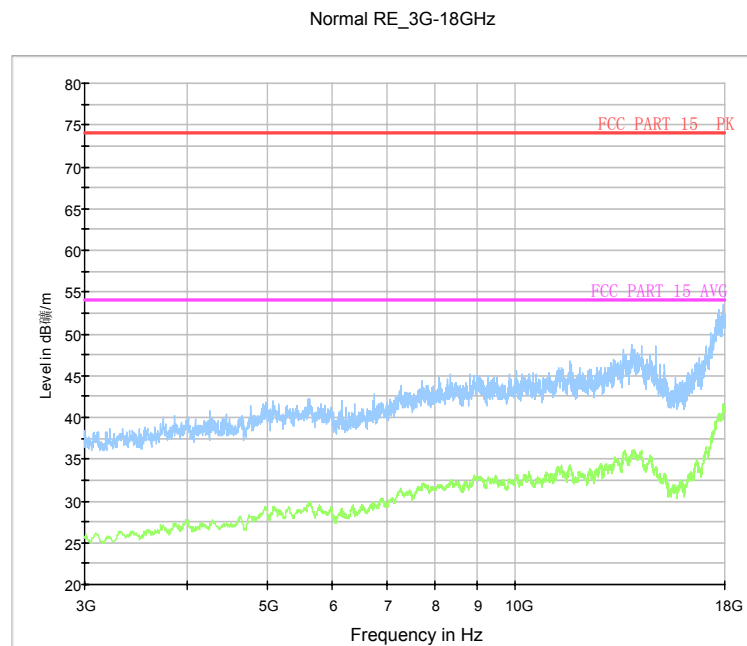


Fig.64. Radiated emission: GFSK, Channel 39, 3 GHz - 18 GHz

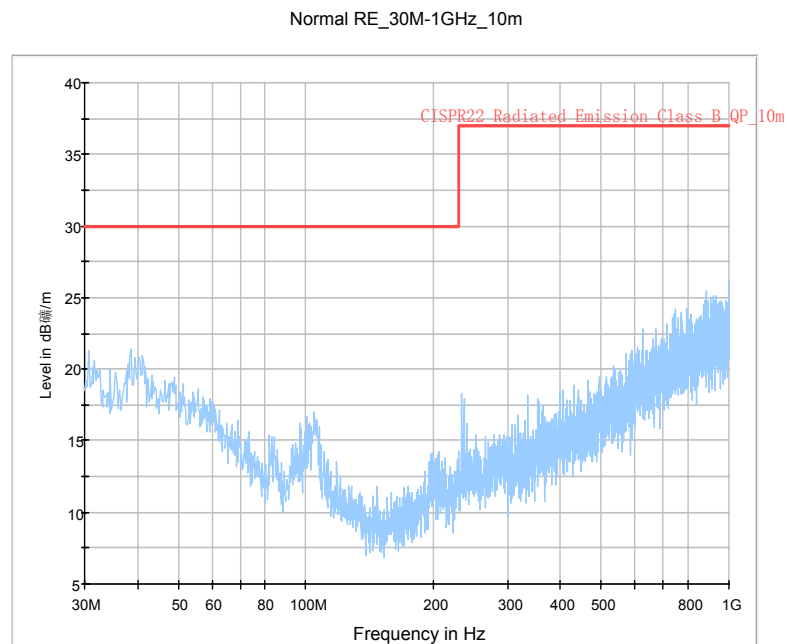


Fig.65. Radiated emission: GFSK, Channel 78, 30 MHz - 1 GHz

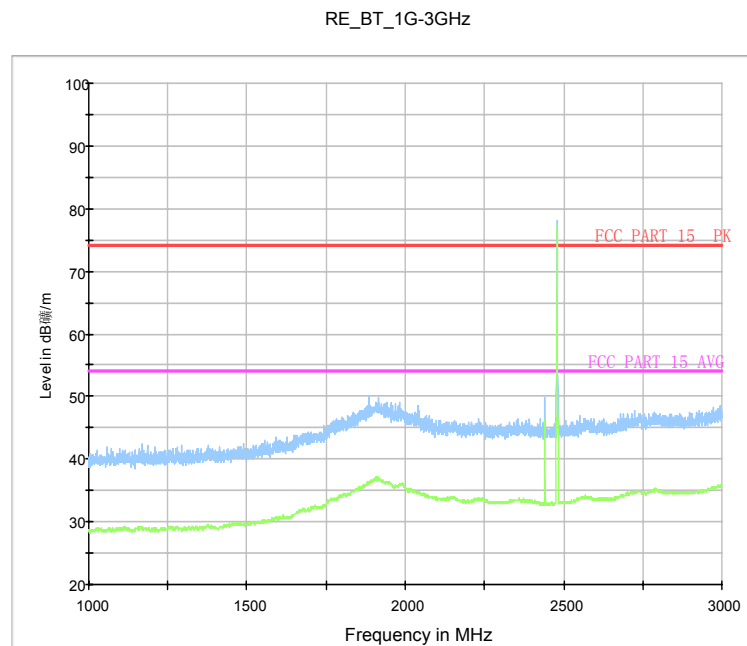


Fig.66. Radiated emission: GFSK, Channel 78, 1 GHz - 3 GHz

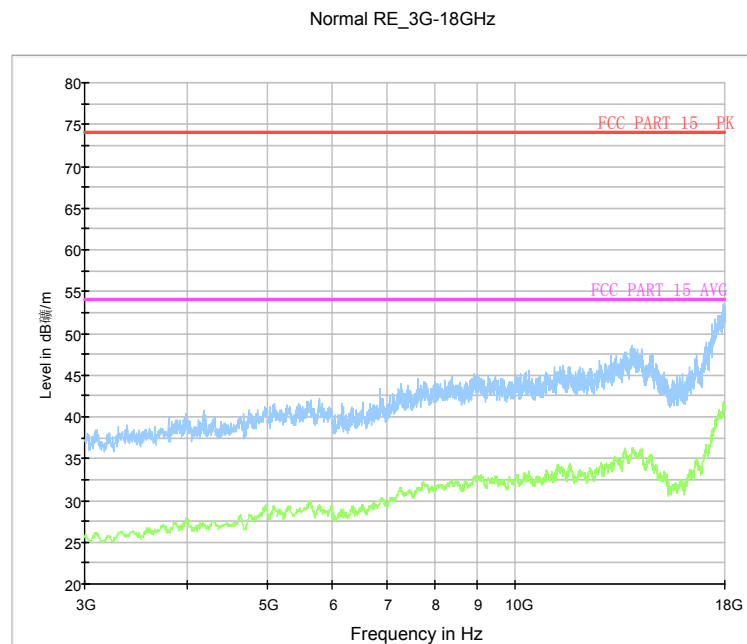


Fig.67. Radiated emission: GFSK, Channel 78, 3 GHz - 18 GHz



Fig.68. Radiated emission (Power): GFSK, low channel

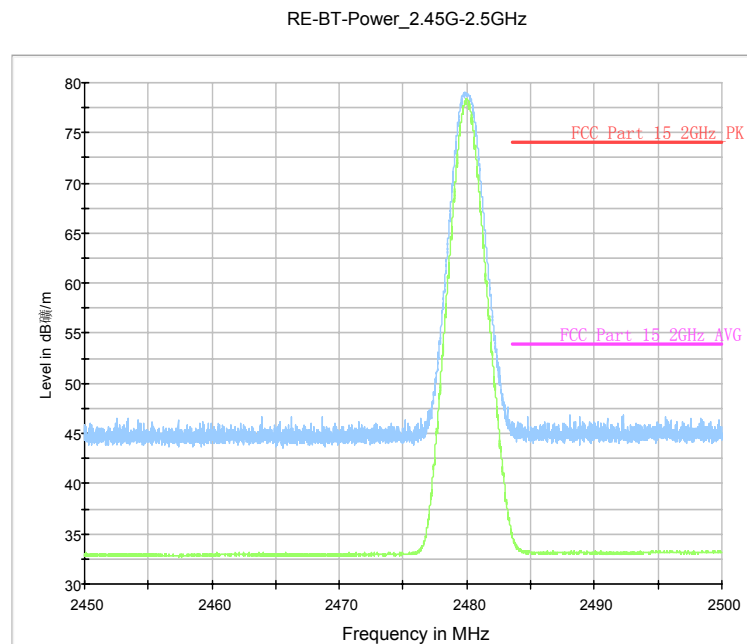


Fig.69. Radiated emission (Power) GFSK, high channel

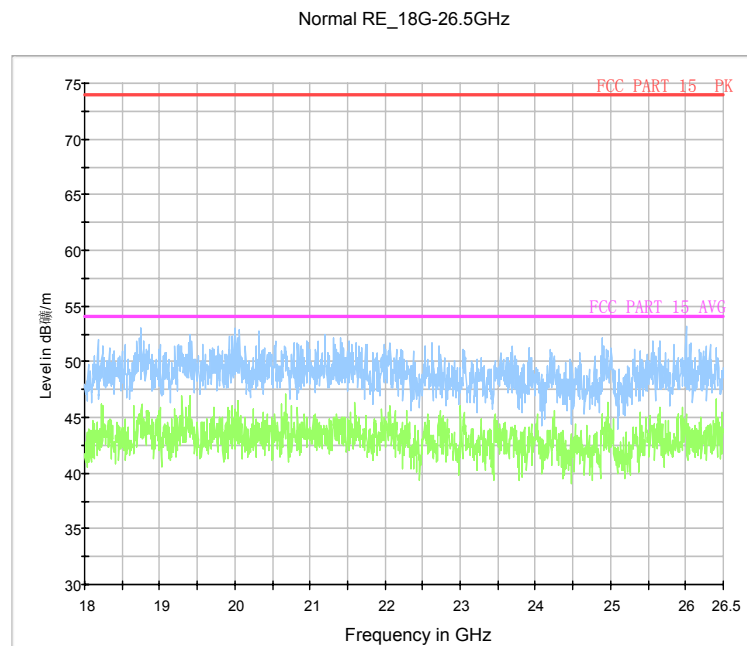


Fig.70. Radiated emission: GFSK, 18 GHz – 26.5 GHz

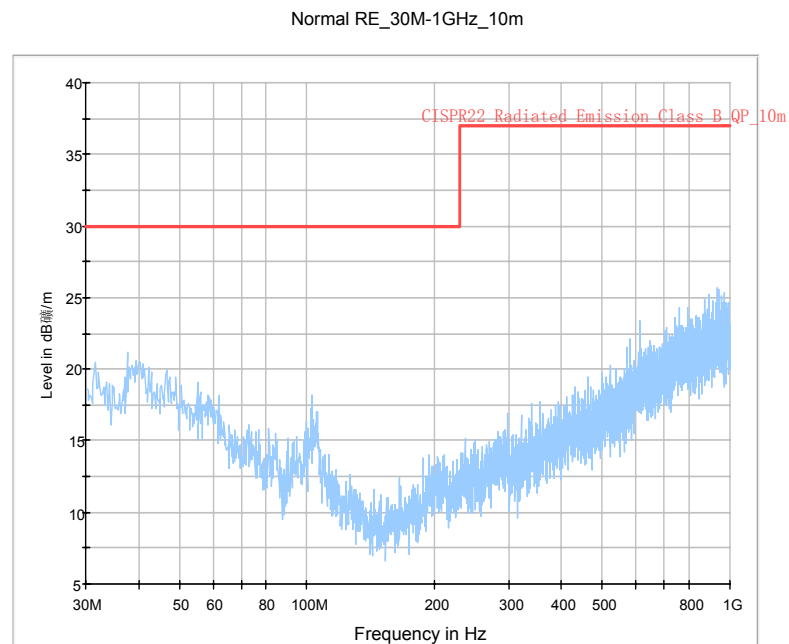


Fig.71. Radiated emission: $\pi/4$ DQPSK, Channel 0, 30 MHz - 1 GHz

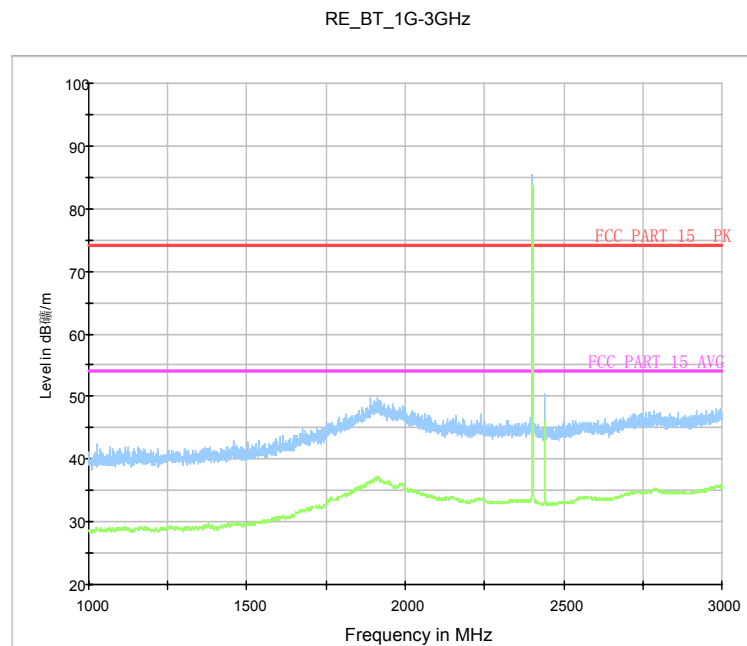


Fig.72. Radiated emission: $\pi/4$ DQPSK, Channel 0, 1 GHz - 3 GHz

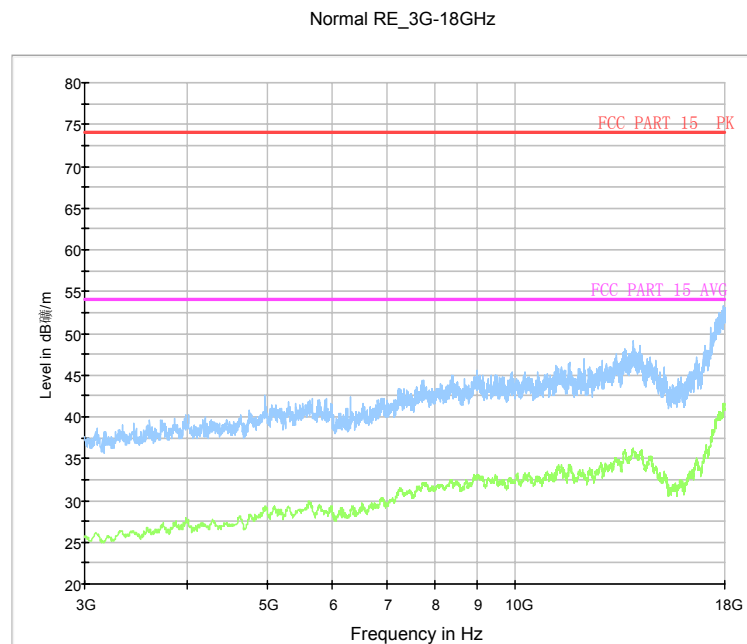


Fig.73. Radiated emission: $\pi/4$ DQPSK, Channel 0, 3 GHz - 18 GHz

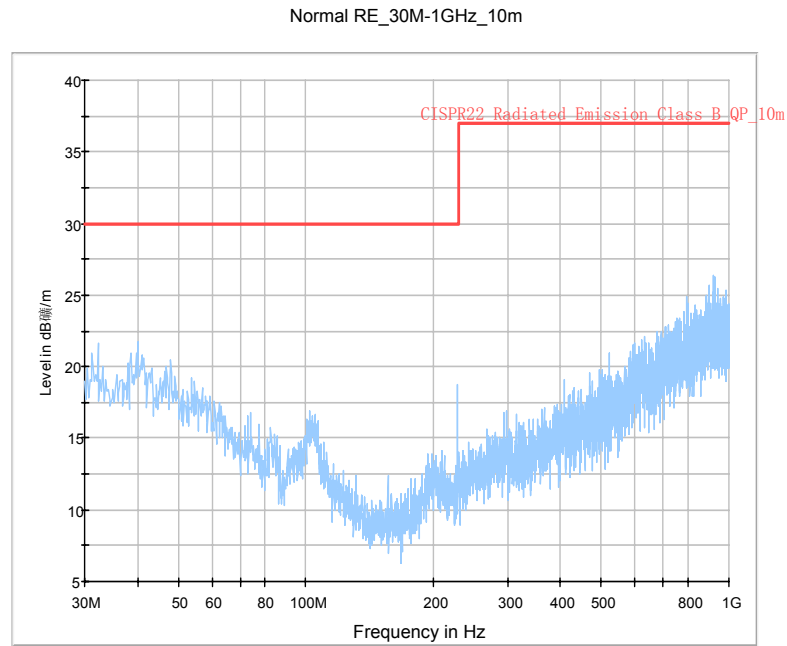


Fig.74. Radiated emission: $\pi/4$ DQPSK, Channel 39, 30 MHz - 1 GHz

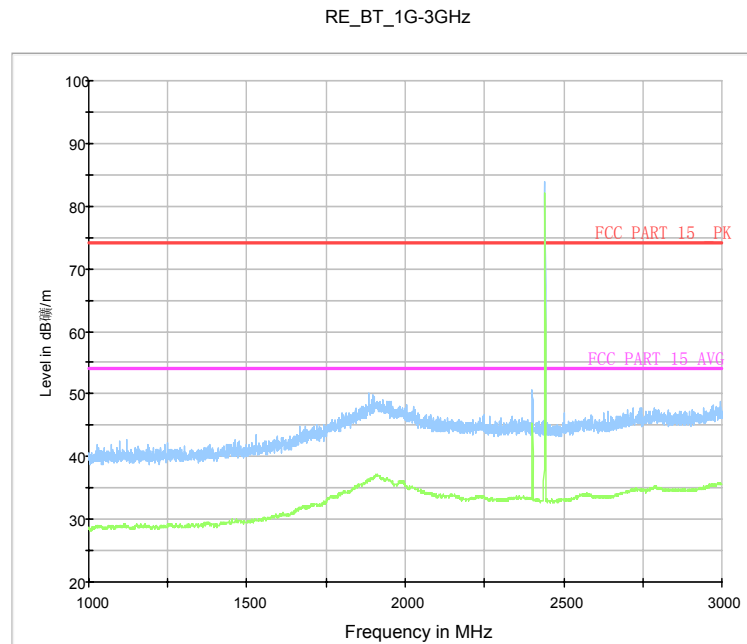


Fig.75. Radiated emission: $\pi/4$ DQPSK, Channel 39, 1 GHz - 3 GHz

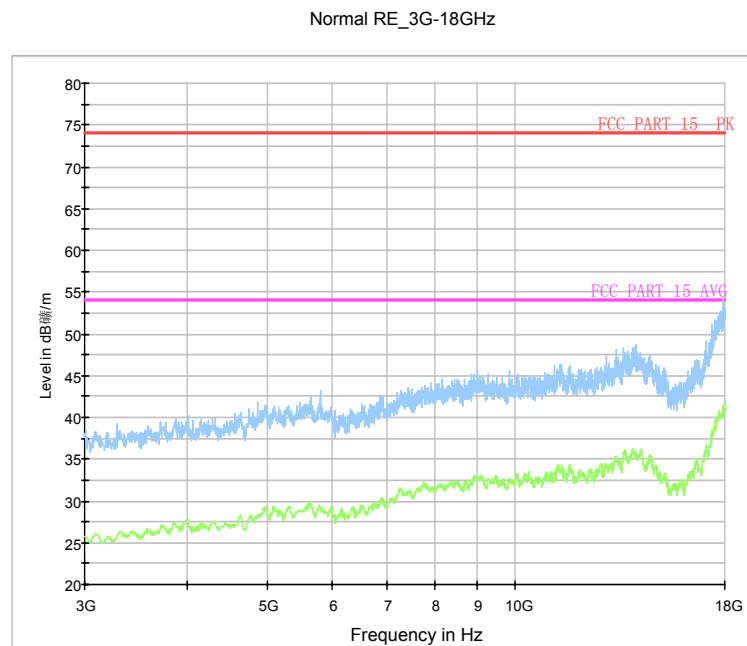


Fig.76. Radiated emission: $\pi/4$ DQPSK, Channel 39, 3 GHz - 18 GHz

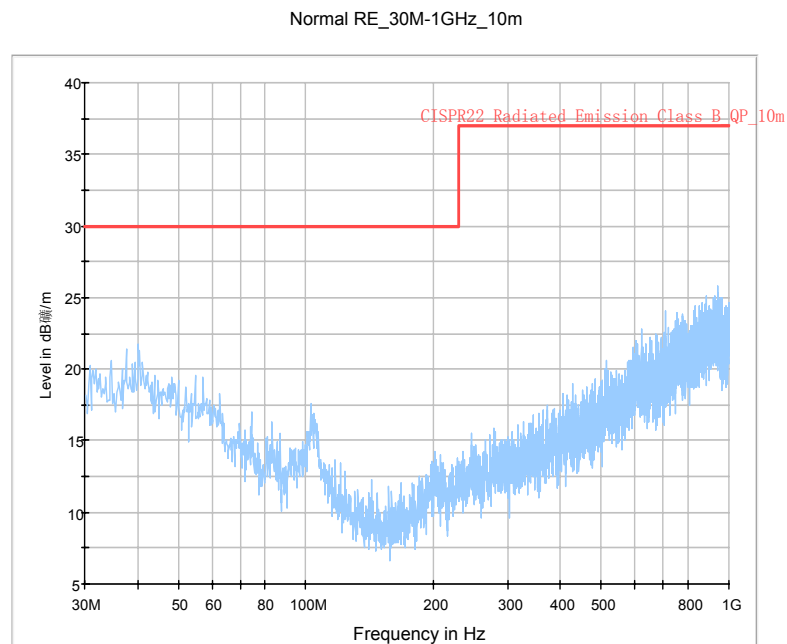


Fig.77. Radiated emission: $\pi/4$ DQPSK, Channel 78, 30 MHz - 1 GHz

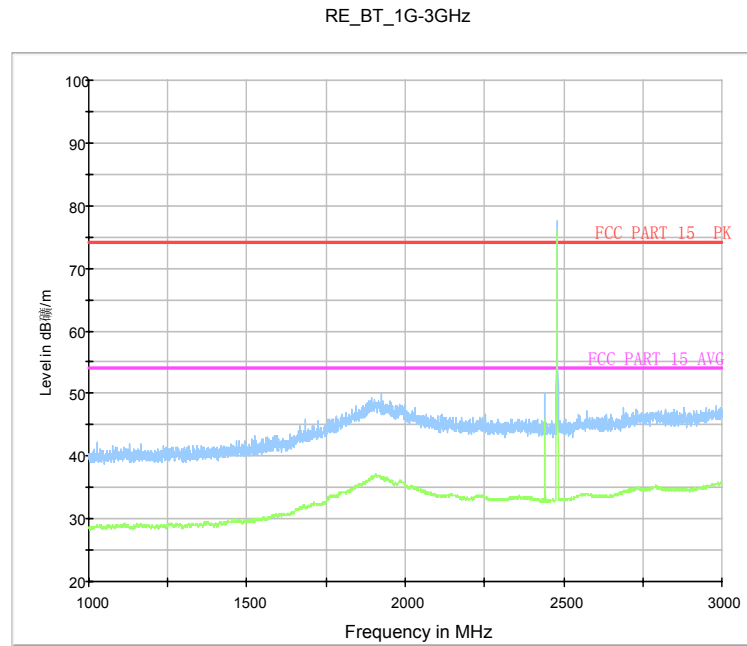


Fig.78. Radiated emission: $\pi/4$ DQPSK, Channel 78, 1 GHz - 3 GHz

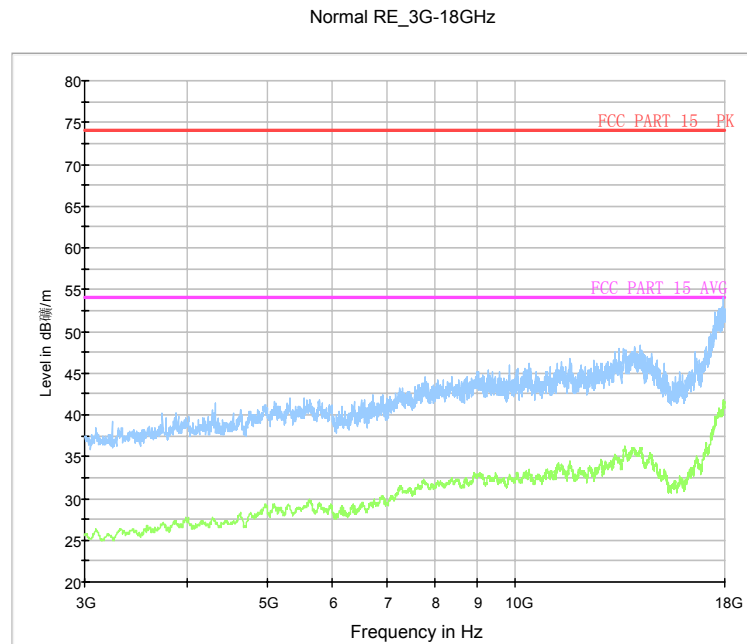


Fig.79. Radiated emission: $\pi/4$ DQPSK, Channel 78, 3 GHz - 18 GHz

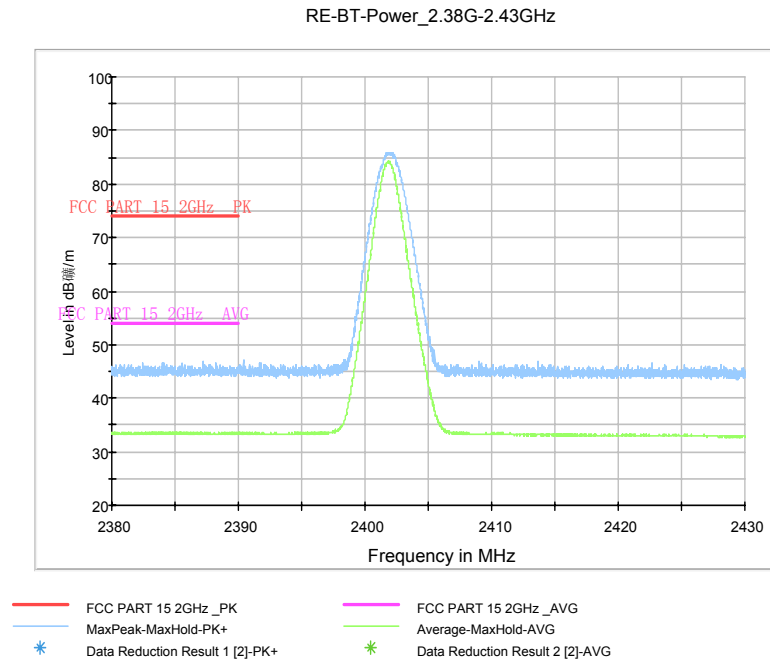


Fig.80. Radiated emission (Power): $\pi/4$ DQPSK, low channel

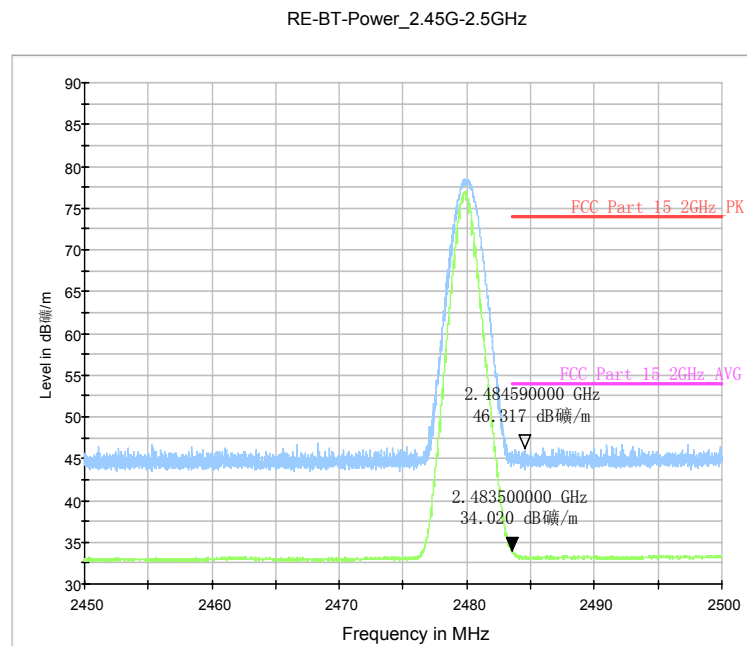


Fig.81. Radiated emission (Power): $\pi/4$ DQPSK, high channel

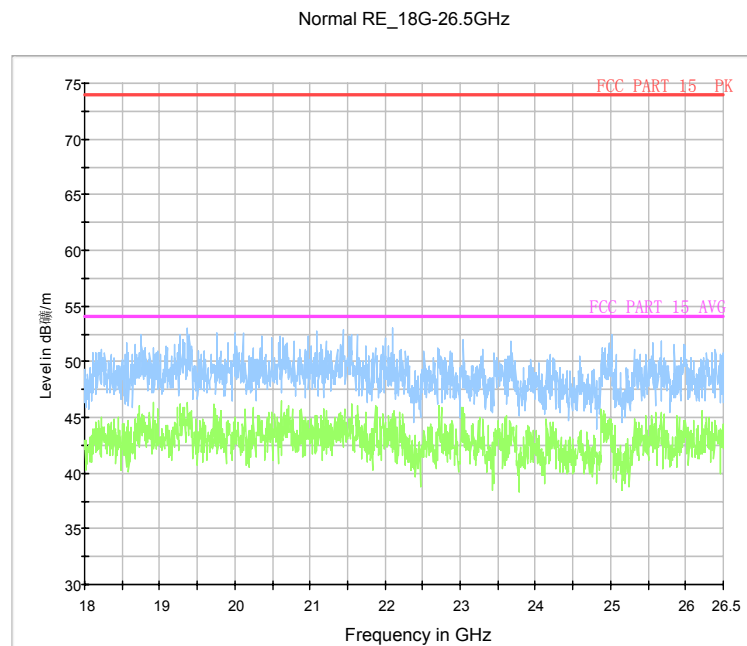


Fig.82. Radiated emission: $\pi/4$ DQPSK, 18 GHz - 26 GHz

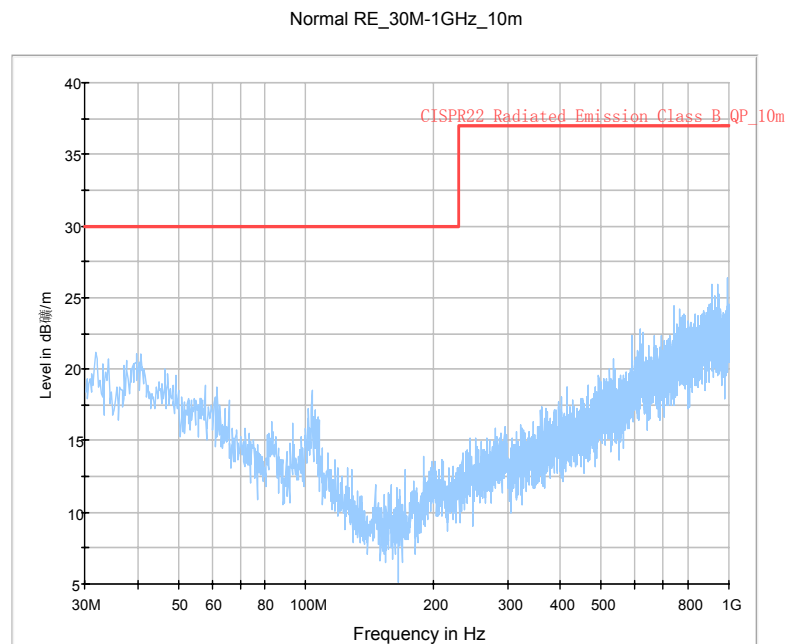


Fig.83. Radiated emission: 8DPSK, Channel 0, 30 MHz - 1 GHz

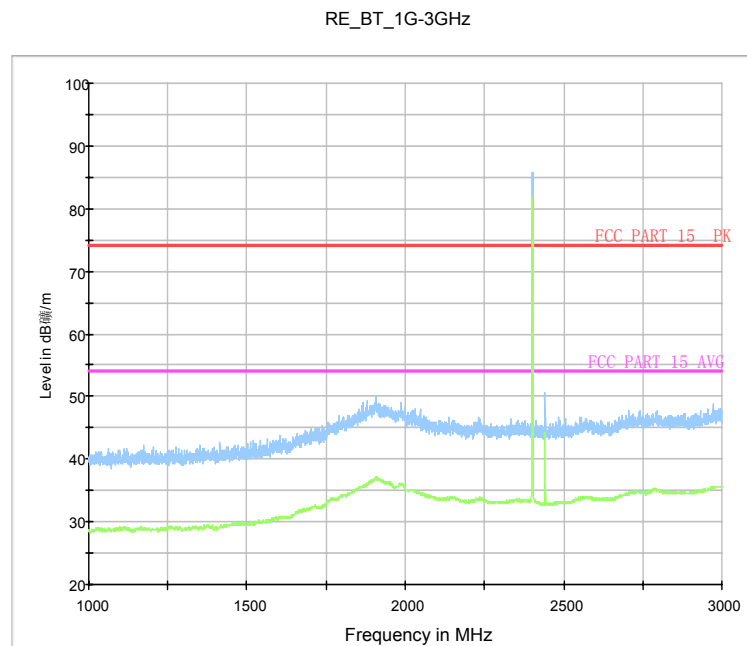


Fig.84. Radiated emission: 8DPSK, Channel 0, 1 GHz - 3 GHz

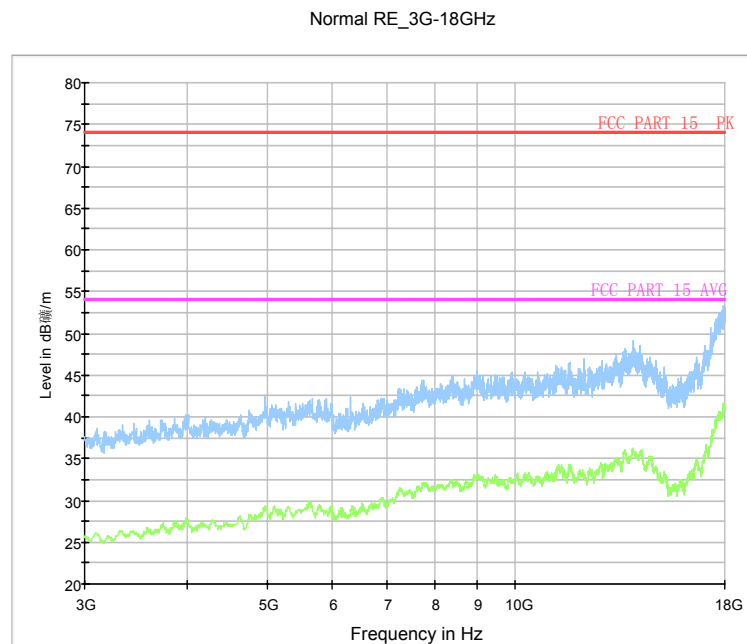


Fig.85. Radiated emission: 8DPSK, Channel 0, 3 GHz - 18 GHz

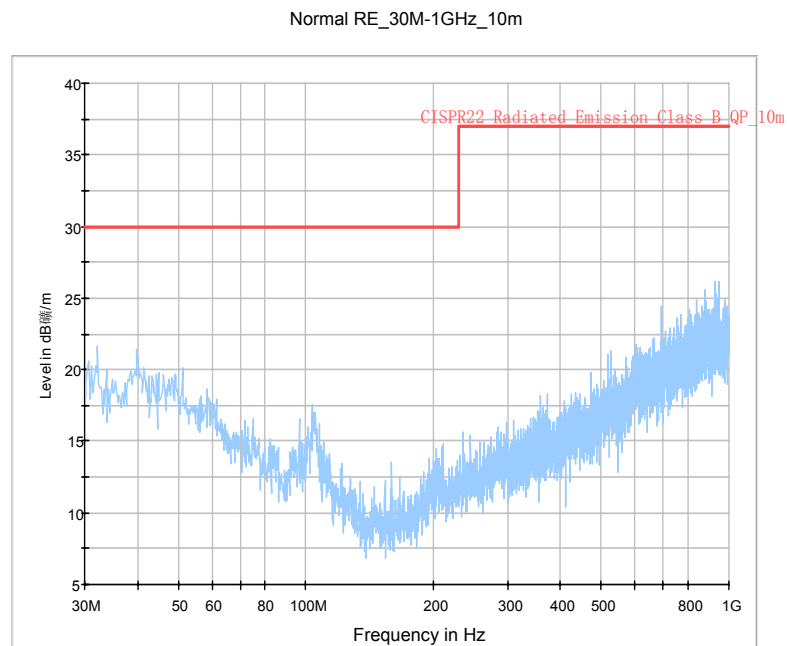


Fig.86. Radiated emission: 8DPSK, Channel 39, 30 MHz - 1 GHz

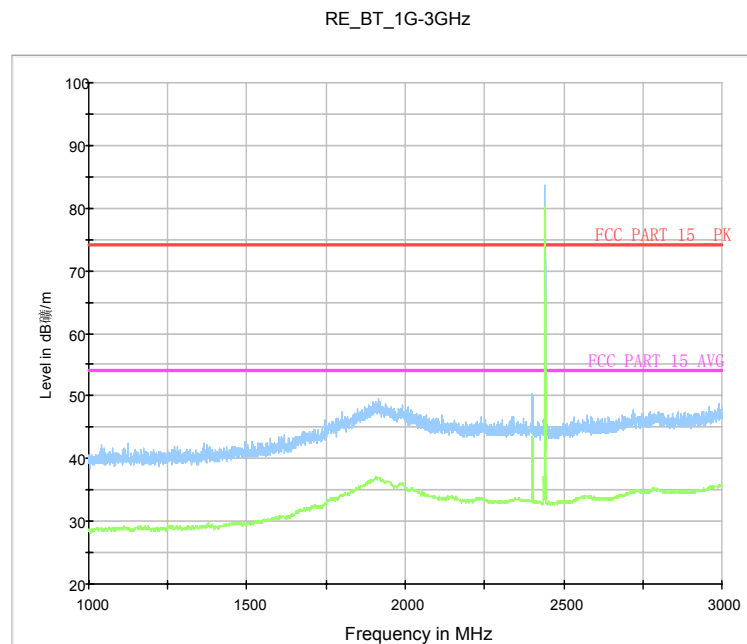


Fig.87. Radiated emission: 8DPSK, Channel 39, 1 GHz - 3 GHz

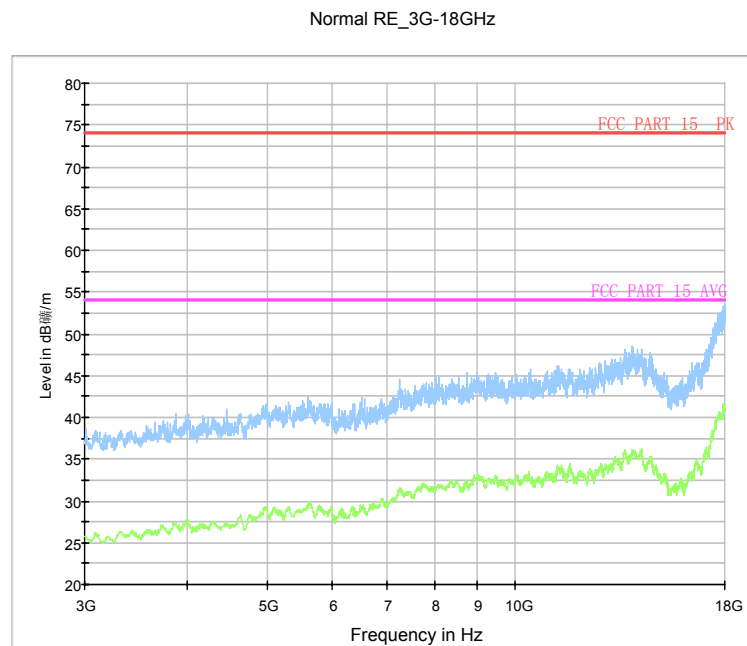


Fig.88. Radiated emission: 8DPSK, Channel 39, 3 GHz - 18 GHz

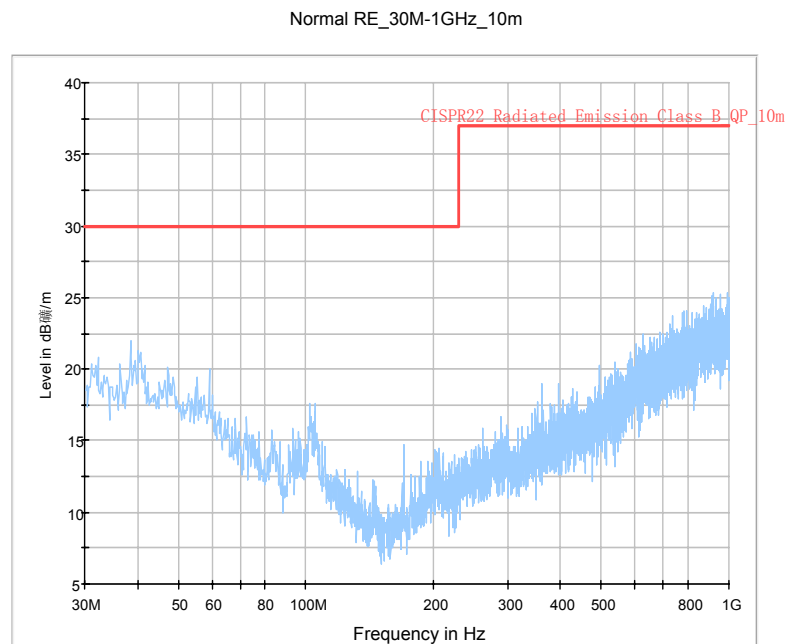


Fig.89. Radiated emission: 8DPSK, Channel 78, 30 MHz - 1 GHz

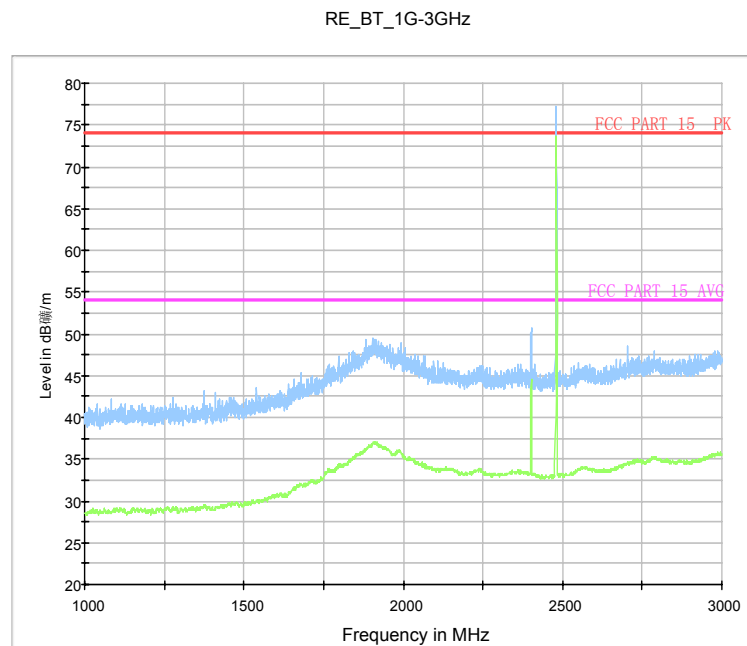


Fig.90. Radiated emission: 8DPSK, Channel 78, 1 GHz - 3 GHz

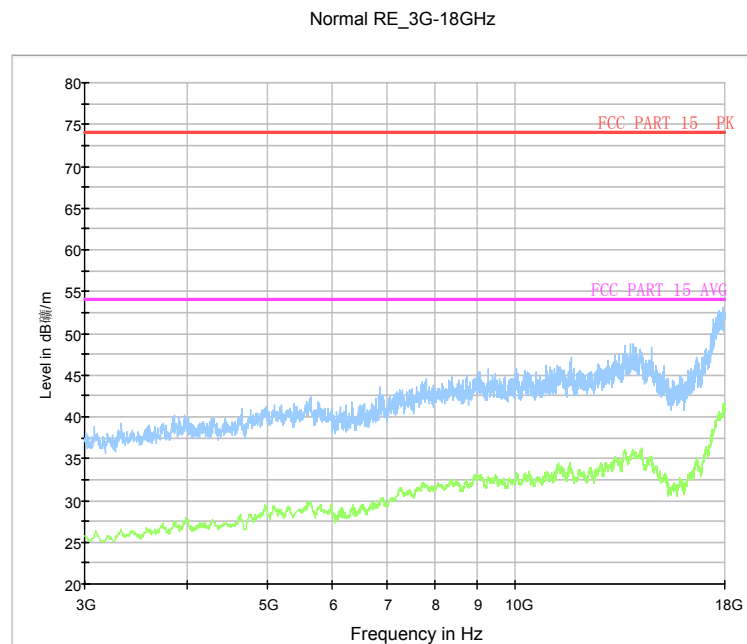


Fig.91. Radiated emission: 8DPSK, Channel 78, 3 GHz - 18 GHz

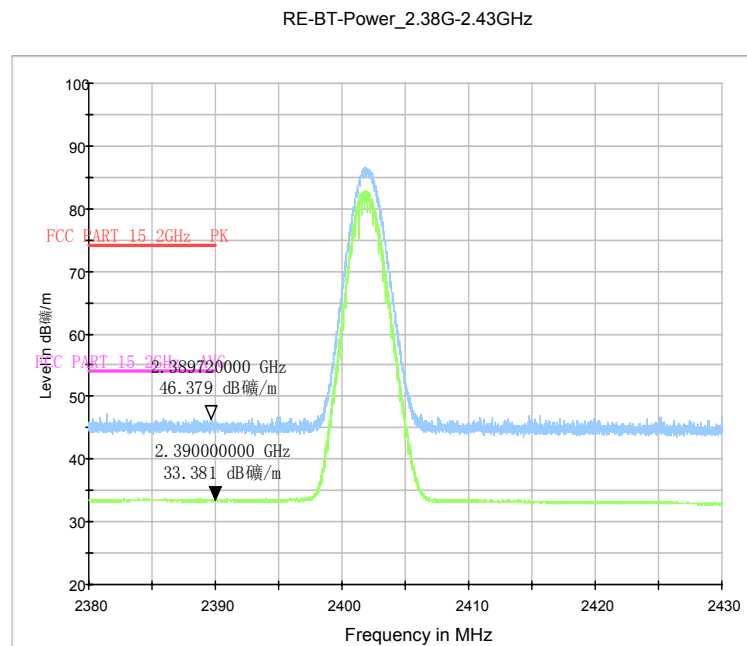


Fig.92. Radiated emission (Power): 8DPSK, low channel

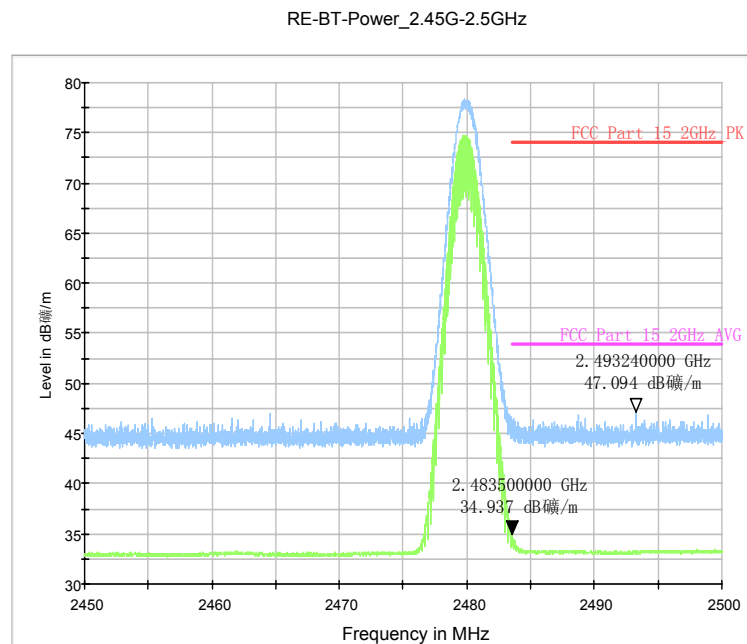


Fig.93. Radiated emission (Power): 8DPSK, high channel

Normal RE_18G-26.5GHz

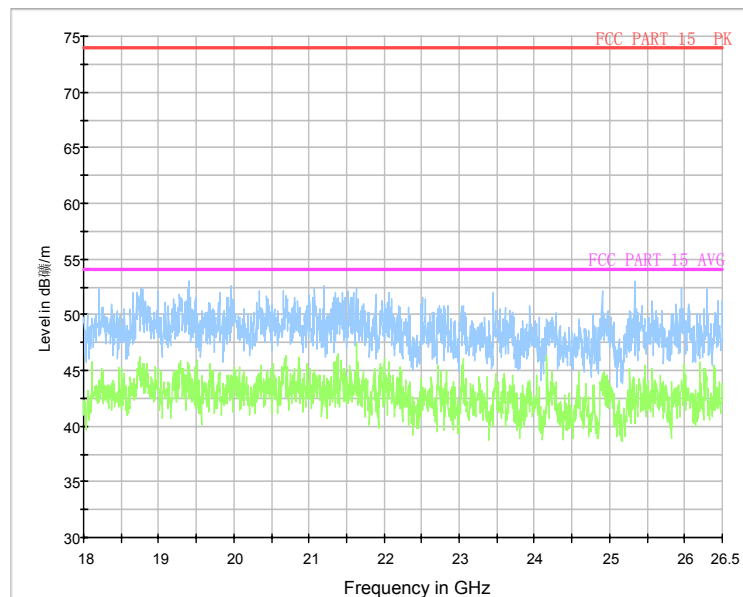


Fig.94. Radiated emission: 8DPSK, 18 GHz - 26 GHz

A.6. Time of Occupancy (Dwell Time)

Measurement Limit:

Standard	Limit (ms)
FCC 47 CFR Part 15.247(a) (1)(iii) RSS-210 A8.1 (4)	< 400

The measurement is made according to ANSI C63.10

According to Part 15.247(a) (1)(iii), the average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. So the dwell time results below are calculated by the width per pulse (Fig.85 e.g.) $\times 0.4s \times 79$.

Measurement Result:

For GFSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.95	103.63	P
		Fig.96		
	DH3	Fig.97	163.94	P
		Fig.98		
	DH5	Fig.99	196.71	P
		Fig.100		

For $\pi/4$ DQPSK

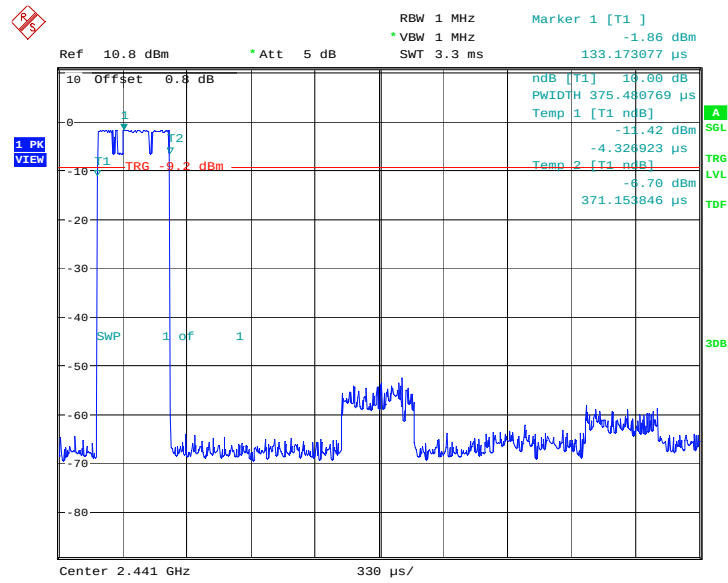
Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.101	109.28	P
		Fig.102		
	DH3	Fig.103	151.31	P
		Fig.104		
	DH5	Fig.105	156.50	P
		Fig.106		

For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.107	105.85	P
		Fig.108		
	DH3	Fig.109	193.45	P
		Fig.110		
	DH5	Fig.111	200.33	P
		Fig.112		

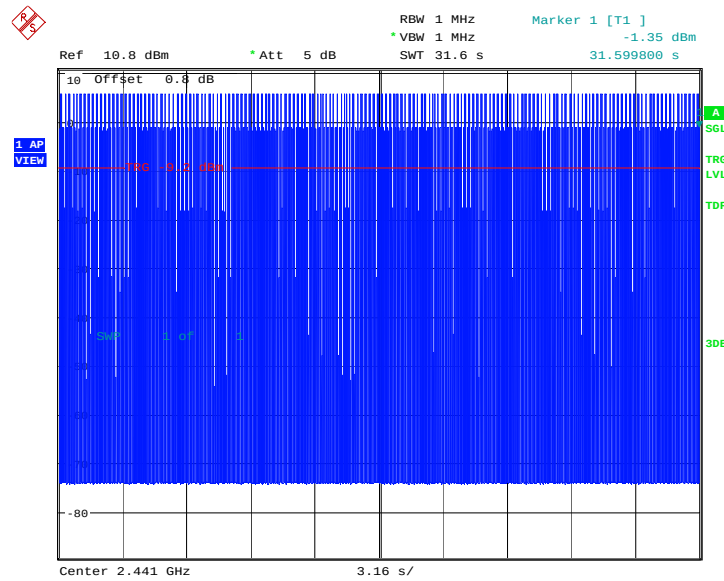
Conclusion: PASS

Test graphs as below:



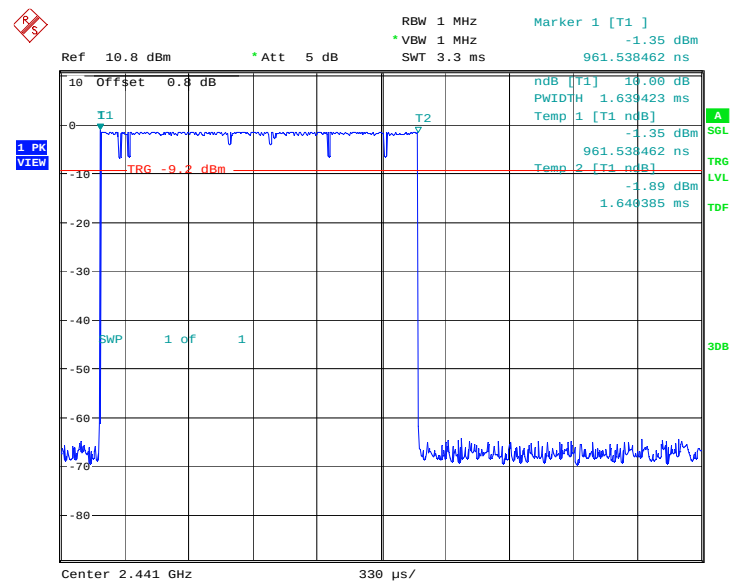
Date: 1.MAR.2014 20:35:54

Fig.95. Time of occupancy (Dwell Time): Channel 39, Packet DH1



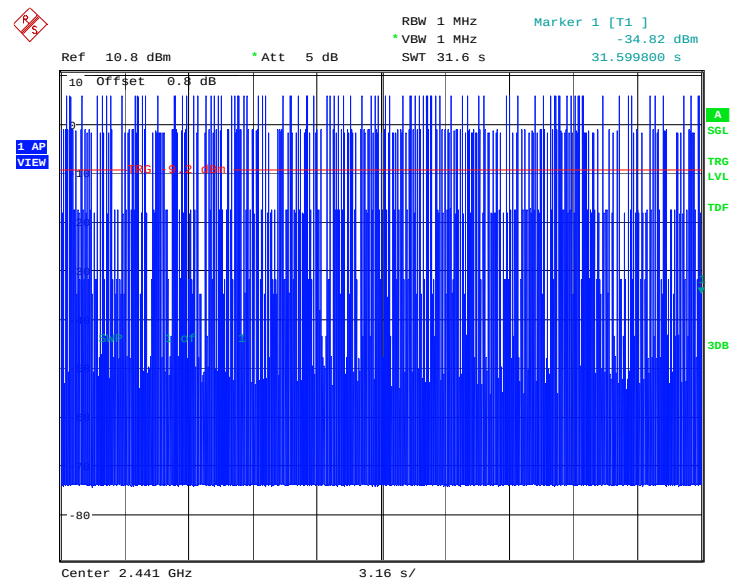
Date: 1.MAR.2014 20:35:42

Fig.96. Number of Transmissions Measurement:Channel 39,Packet DH1



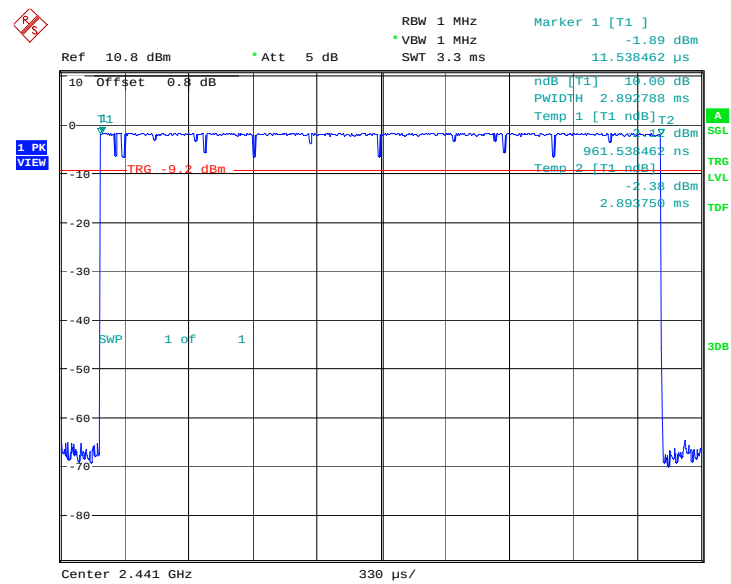
Date: 1.MAR.2014 20:37:14

Fig.97. Time of occupancy (Dwell Time): Channel 39, Packet DH3



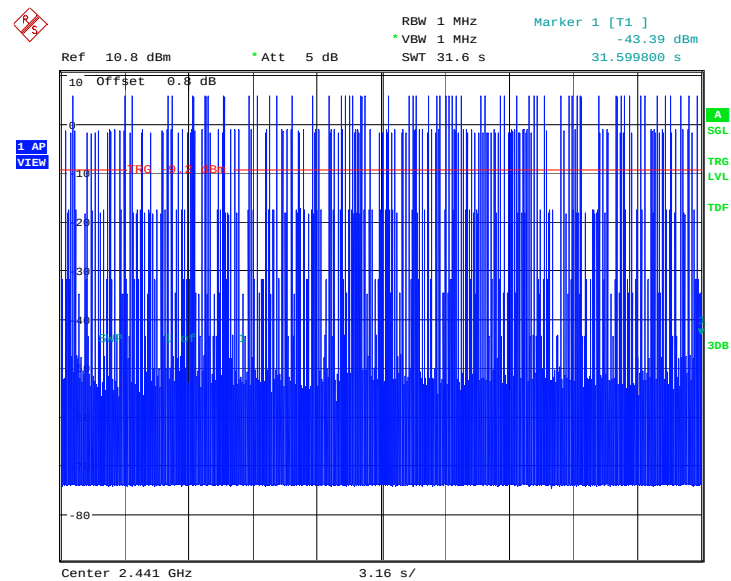
Date: 1.MAR.2014 20:37:02

Fig.98. Number of Transmissions Measurement:Channel 39,Packet DH3



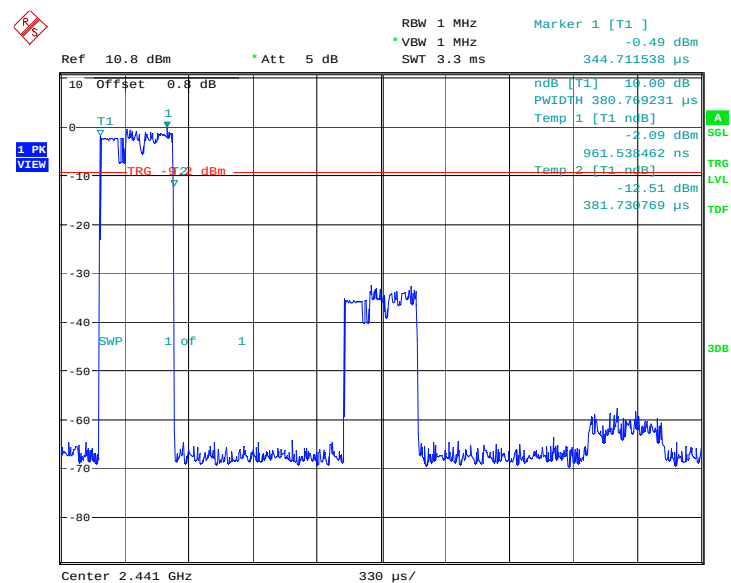
Date: 1.MAR.2014 20:38:32

Fig.99. Time of occupancy (Dwell Time): Channel 39, Packet DH5



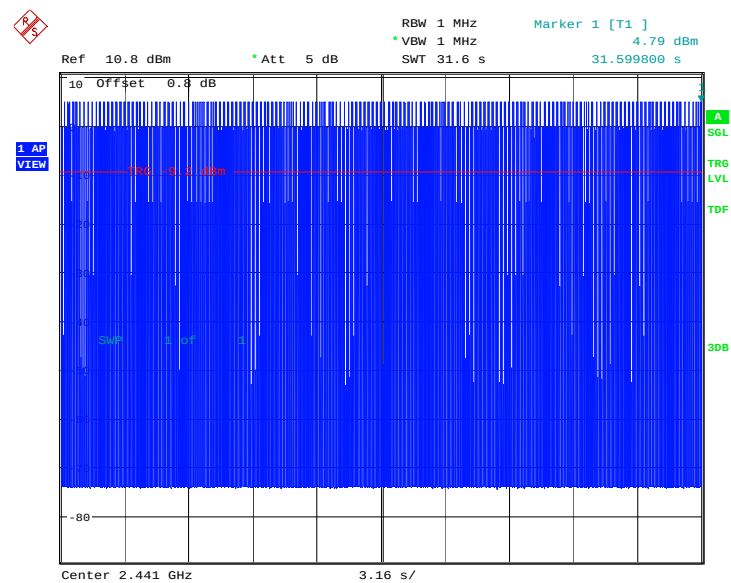
Date: 1.MAR.2014 20:38:20

Fig.100. Number of Transmissions Measurement:Channel 39,Packet DH5



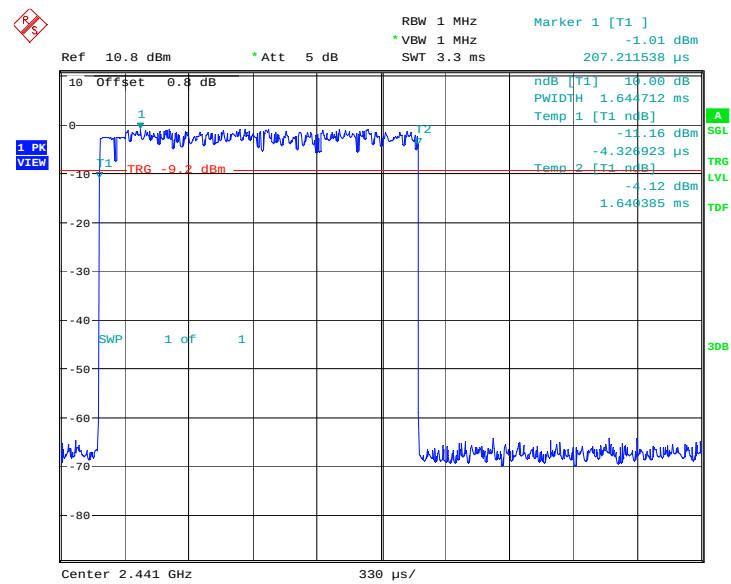
Date: 1.MAR.2014 20:57:23

Fig.101. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1



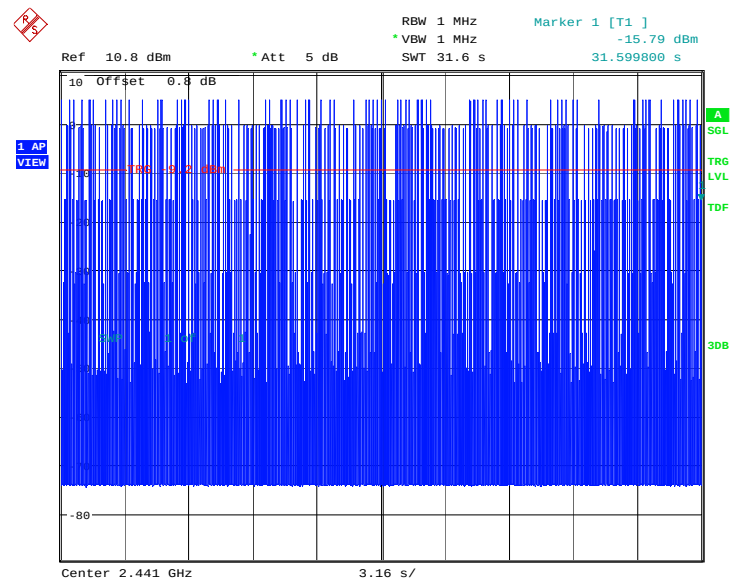
Date: 1.MAR.2014 20:57:11

Fig.102. Number of Transmissions Measurement:Channel 39,Packet 2-DH1



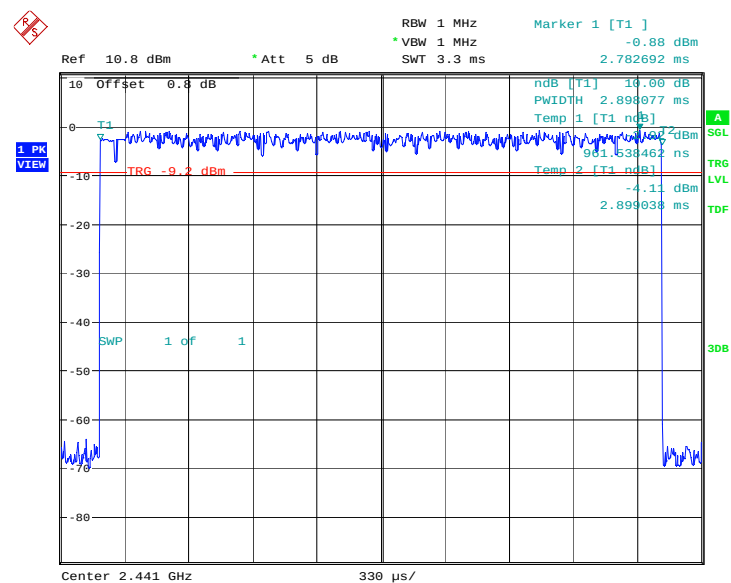
Date: 1.MAR.2014 20:58:44

Fig.103. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3



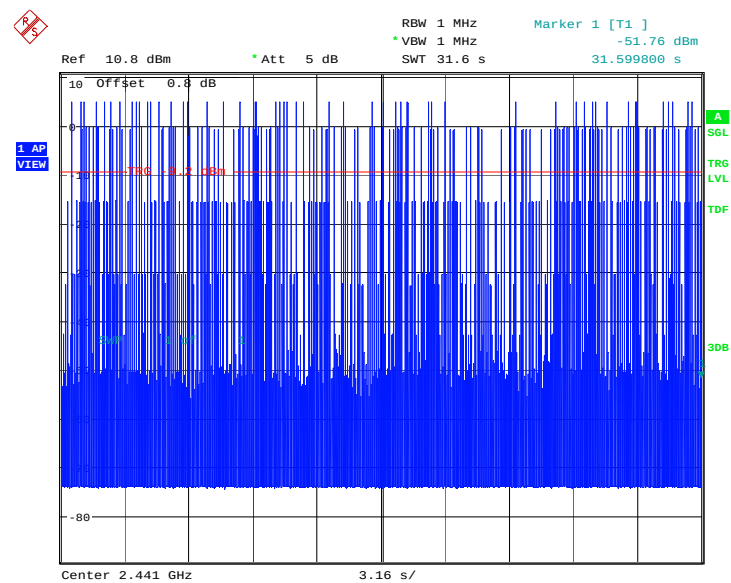
Date: 1.MAR.2014 20:58:32

Fig.104. Number of Transmissions Measurement:Channel 39,Packet 2-DH3



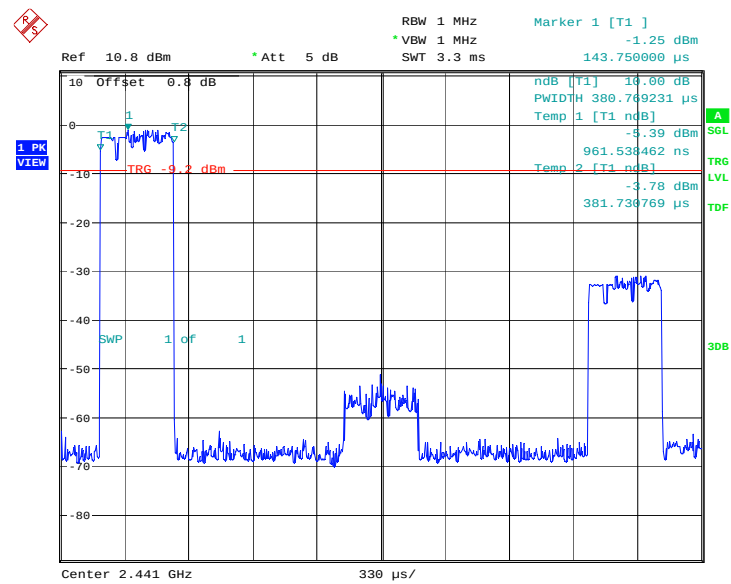
Date: 1.MAR.2014 21:00:02

Fig.105. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5



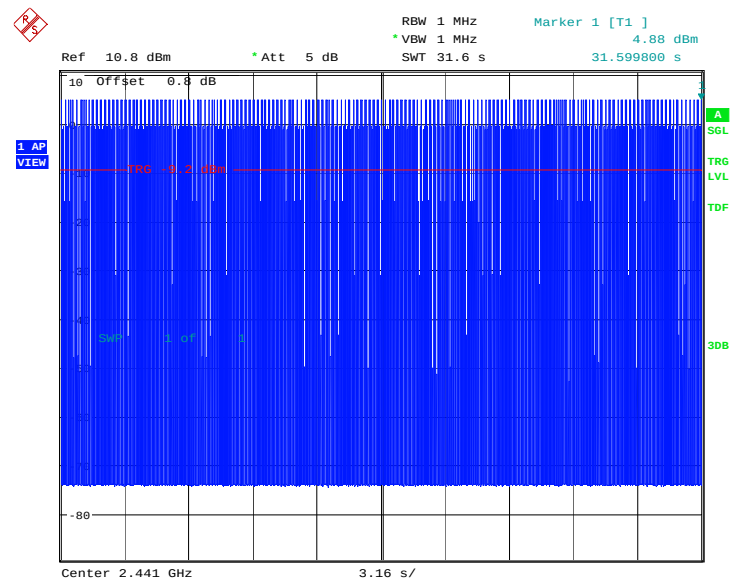
Date: 1.MAR.2014 20:59:50

Fig.106. Number of Transmissions Measurement:Channel 39,Packet 2-DH5



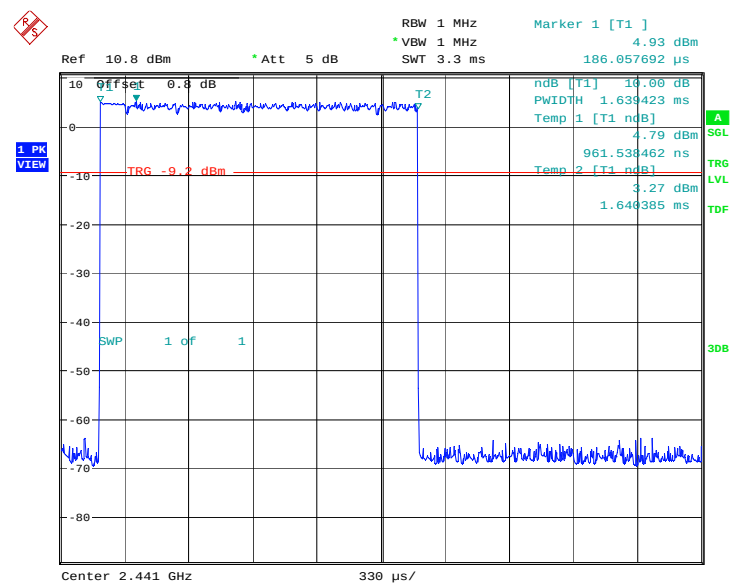
Date: 1.MAR.2014 21:18:53

Fig.107. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1



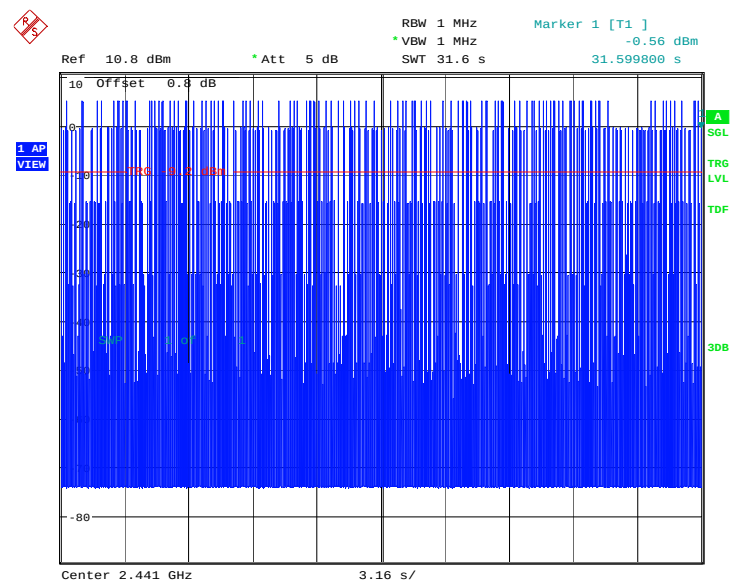
Date: 1.MAR.2014 21:18:41

Fig.108. Number of Transmissions Measurement:Channel 39,Packet 3-DH1



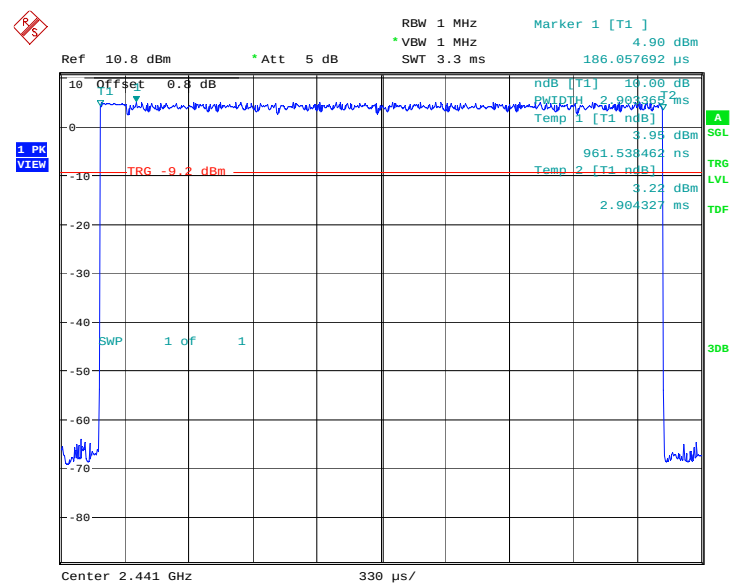
Date: 1.MAR.2014 21:20:14

Fig.109. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3



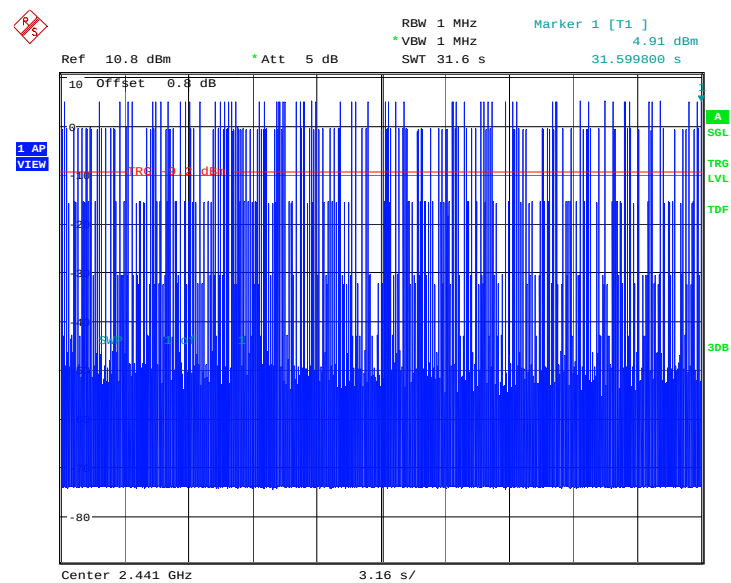
Date: 1.MAR.2014 21:20:02

Fig.110. Number of Transmissions Measurement:Channel 39,Packet 3-DH3



Date: 1.MAR.2014 21:21:32

Fig.111. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5



Date: 1.MAR.2014 21:21:20

Fig.112. Number of Transmissions Measurement:Channel 39,Packet 3-DH5

A.7. 20dB Bandwidth

Measurement Limit:

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

The measurement is made according to ANSI C63.10

* 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 Results:

For GFSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.113	870.19	NA
39	Fig.114	908.65	NA
78	Fig.115	908.65	NA

For $\pi/4$ DQPSK

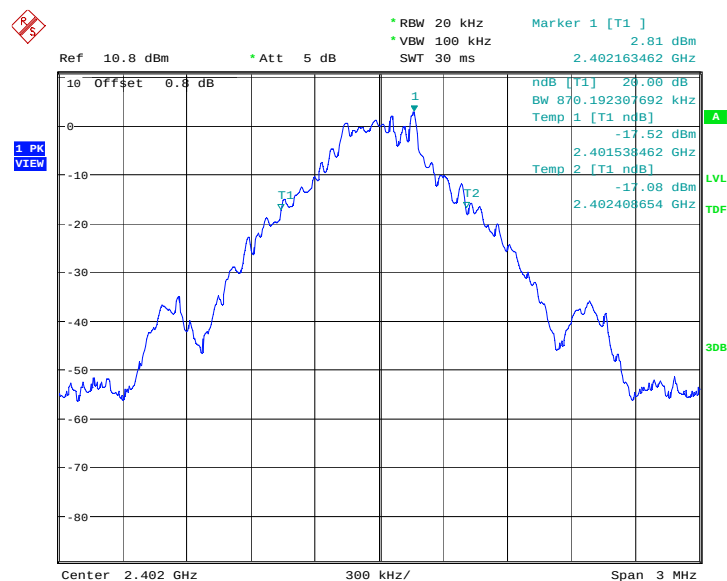
Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.116	1274.04	NA
39	Fig.117	1259.62	NA
78	Fig.118	1274.04	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.119	1283.65	NA
39	Fig.120	1269.23	NA
78	Fig.121	1269.23	NA

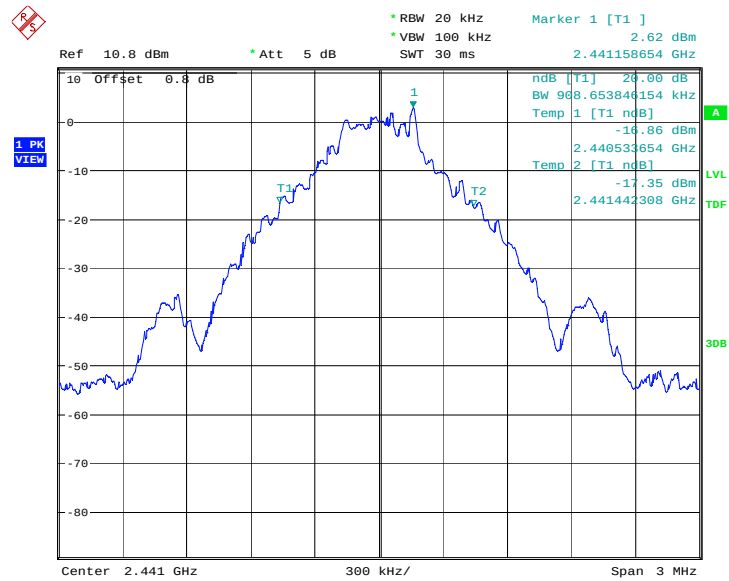
Conclusion: NA

Test graphs as below:



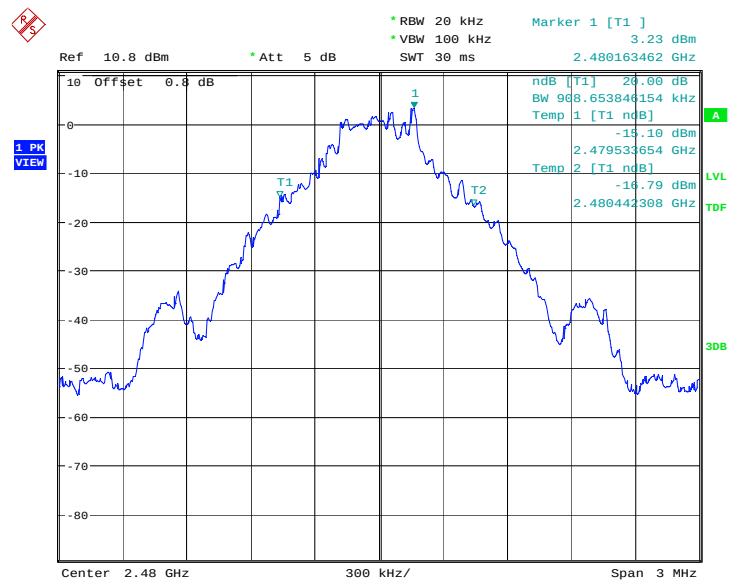
Date: 1.MAR.2014 20:39:06

Fig.113. 20dB Bandwidth: GFSK, Channel 0



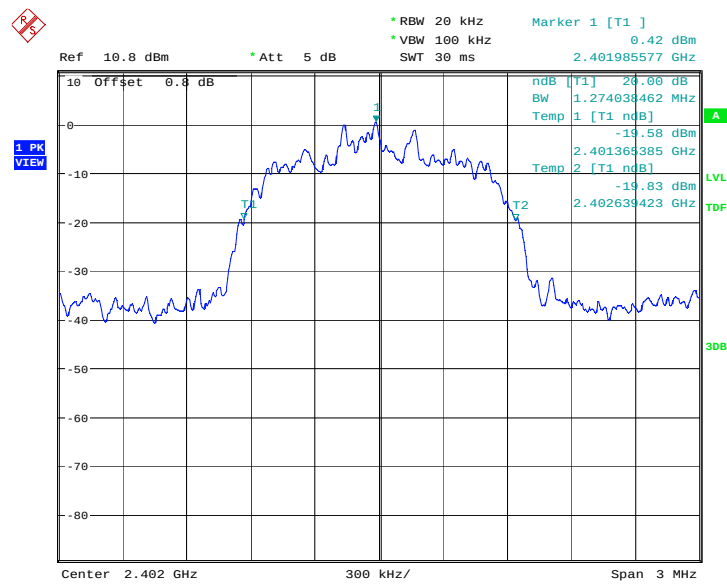
Date: 1.MAR.2014 20:39:38

Fig.114. 20dB Bandwidth: GFSK, Channel 39



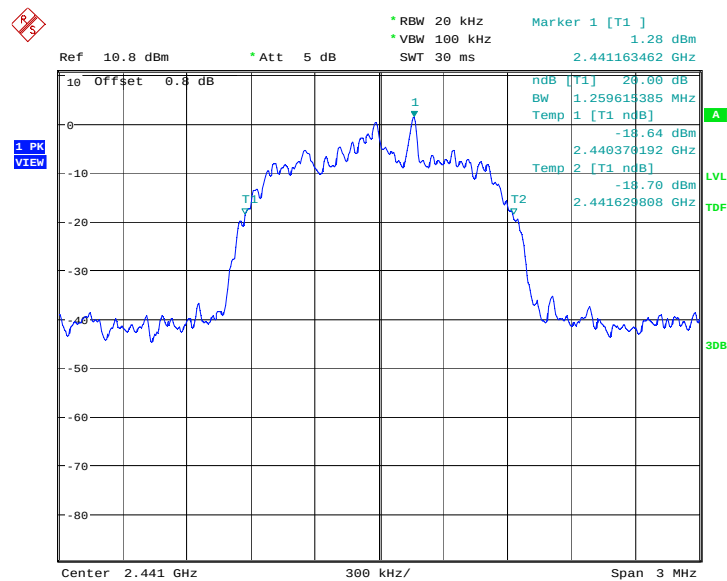
Date: 1.MAR.2014 20:40:10

Fig.115. 20dB Bandwidth: GFSK, Channel 78



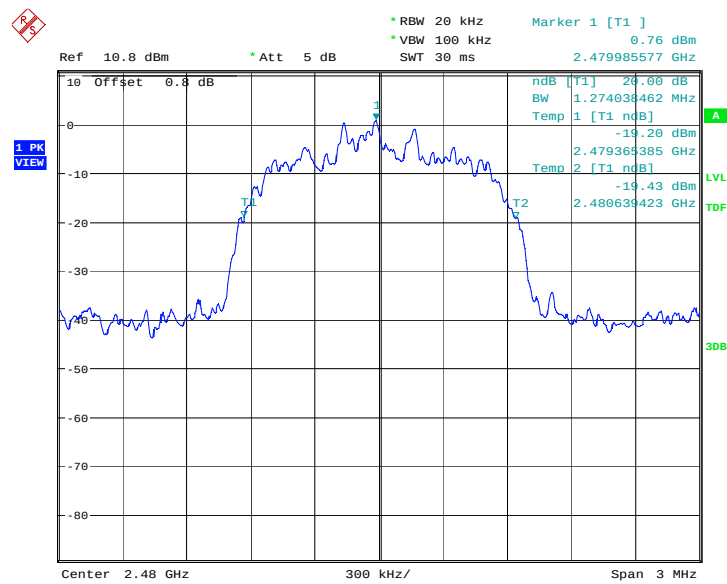
Date: 1.MAR.2014 21:00:36

Fig.116. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 0



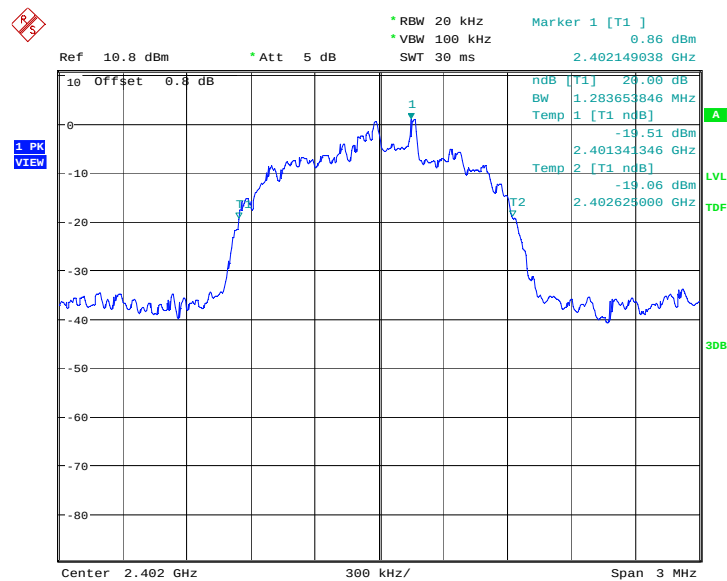
Date: 1.MAR.2014 21:01:08

Fig.117. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 39



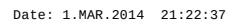
Date: 1.MAR.2014 21:01:40

Fig.118. 20dB Bandwidth: $\pi/4$ DQPSK, Channel 78



Date: 1.MAR.2014 21:22:05

Fig.119. 20dB Bandwidth: 8DPSK, Channel 0



Ref 10.8 dBm Att 5 dB RBW 20 kHz VBW 100 kHz SWT 30 ms Marker 1 [T1] 1.16 dBm 2.480163462 GHz

1 PK VIEW

Offset 0.8 dB

1

T1

T2

ndB [T1] 24.00 dB
BW 1.269239769 MHz
Temp 1 [T1 ndB] -18.09 dBm
2.479355769 GHz
Temp 2 [T1 ndB] -18.69 dBm
2.480625000 GHz

A

LVL

TDF

3dB

Center 2.48 GHz 300 kHz/ Span 3 MHz

Date: 1.MAR.2014 21:23:09

©Copyright. All rights reserved by TMC Beijing.

A.8. Carrier Frequency Separation

Measurement Limit:

Standard	Limit(kHz)
FCC 47 CFR Part 15.247(a)(1) RSS-210 A8.1 (2)	over 25 kHz or $(2/3) * 20\text{dB bandwidth}$

The measurement is made according to ANSI C63.10

* Comment: This limit should be over 25 kHz or $(2/3) * 20\text{dB bandwidth}$, whichever is greater.

Measurement Result:

For GFSK

Channel	Carrier frequency separation (kHz)	Conclusion
39	Fig.122	P

For $\pi/4$ DQPSK

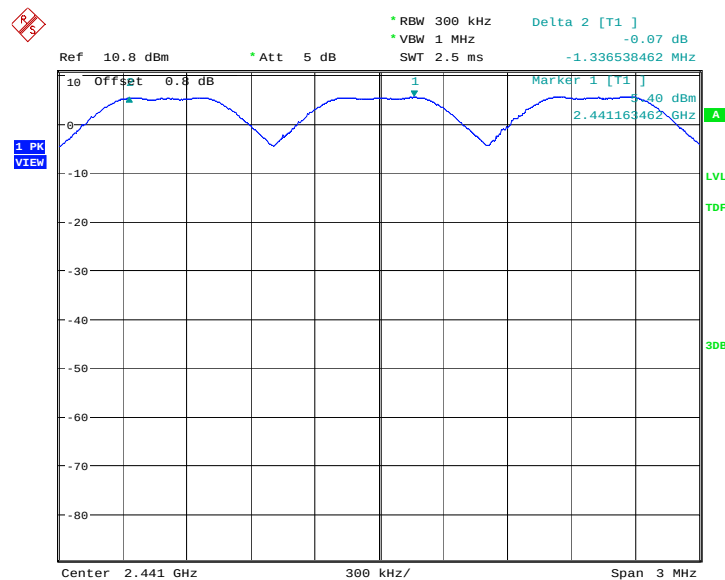
Channel	Carrier frequency separation (kHz)	Conclusion
39	Fig.123	P

For 8DPSK

Channel	Carrier frequency separation (kHz)	Conclusion
39	Fig.124	P

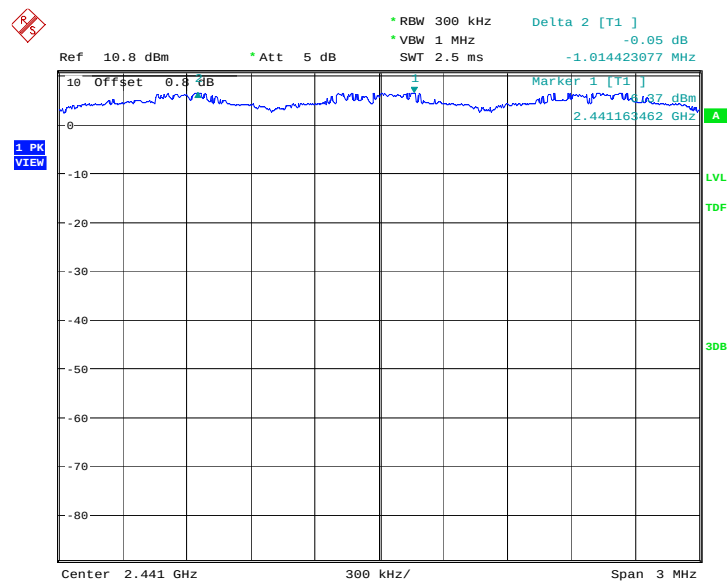
Conclusion: PASS

Test graphs as below:



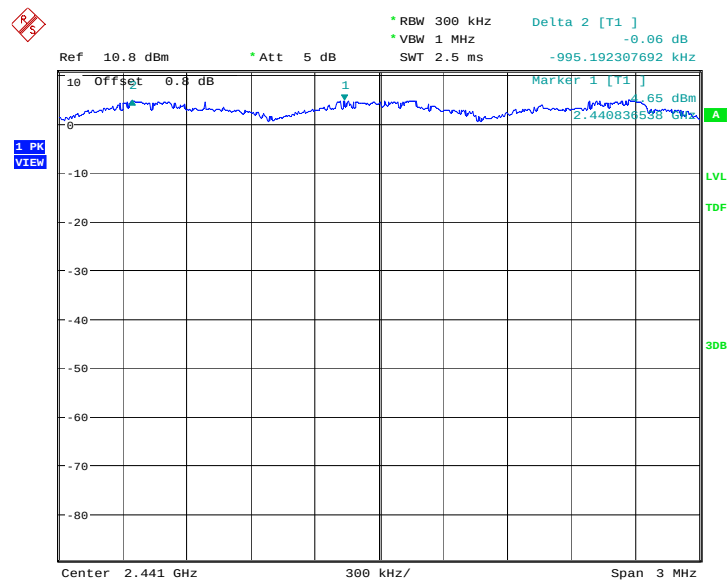
Date: 1.MAR.2014 20:42:14

Fig.122. Carrier frequency separation measurement: GFSK, Channel 39



Date: 14.MAR.2014 09:34:58

Fig.123. Carrier frequency separation measurement: $\pi/4$ DQPSK, Channel 39



Date: 1.MAR.2014 21:25:13

Fig.124. Carrier frequency separation measurement: 8DPSK, Channel 39

A.9. Number of Hopping Channels

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a) (1)(iii) RSS-210 A8.1 (4)	At least 15 non-overlapping channels

The measurement is made according to ANSI C63.10

Measurement Result:

For GFSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.125	79	P
40~78	Fig.126		

For $\pi/4$ DQPSK

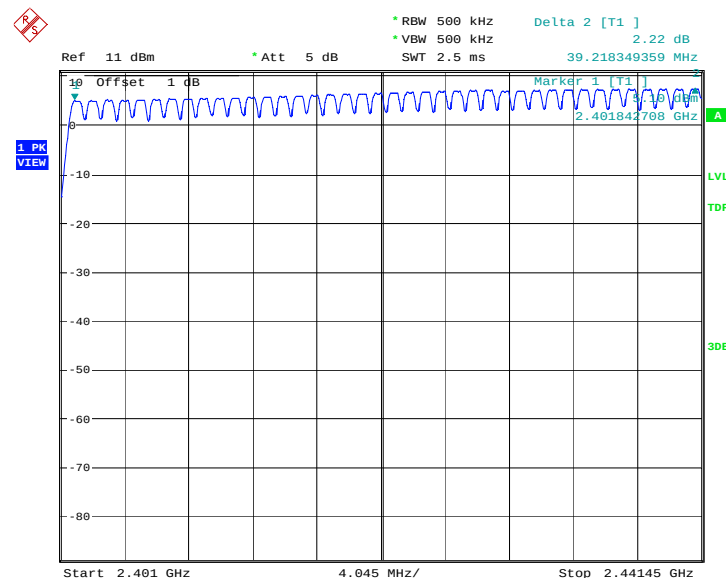
Channel	Number of hopping channels		Conclusion
0~39	Fig.127	79	P
40~78	Fig.128		

For 8DPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.129	79	P
40~78	Fig.130		

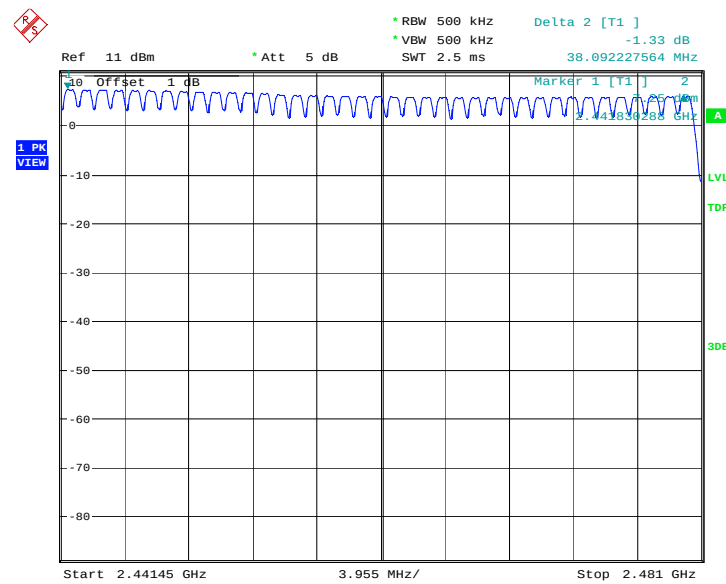
Conclusion: PASS

Test graphs as below:



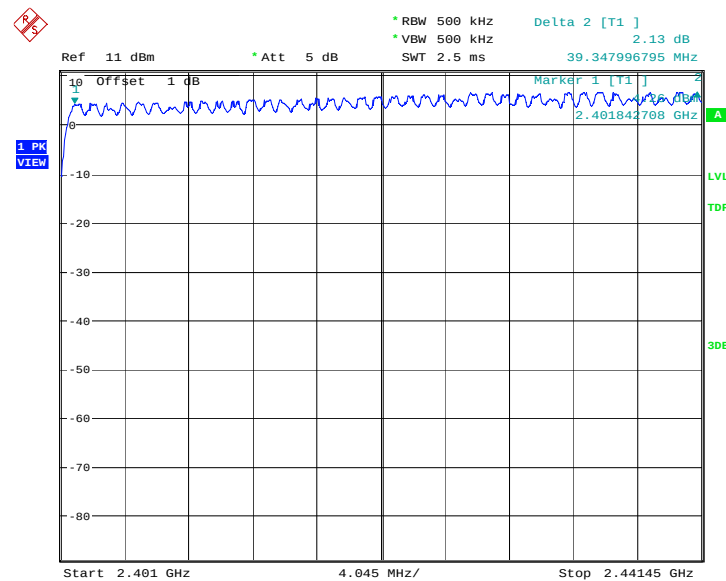
Date: 4.MAR.2014 10:58:02

Fig.125. Number of hopping frequencies: GFSK, Channel 0 - 39



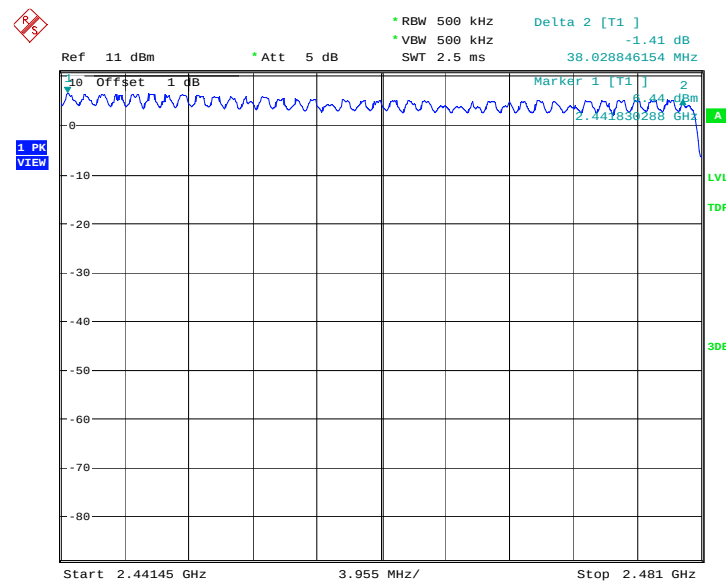
Date: 4.MAR.2014 11:00:05

Fig.126. Number of hopping frequencies: GFSK, Channel 40 - 78



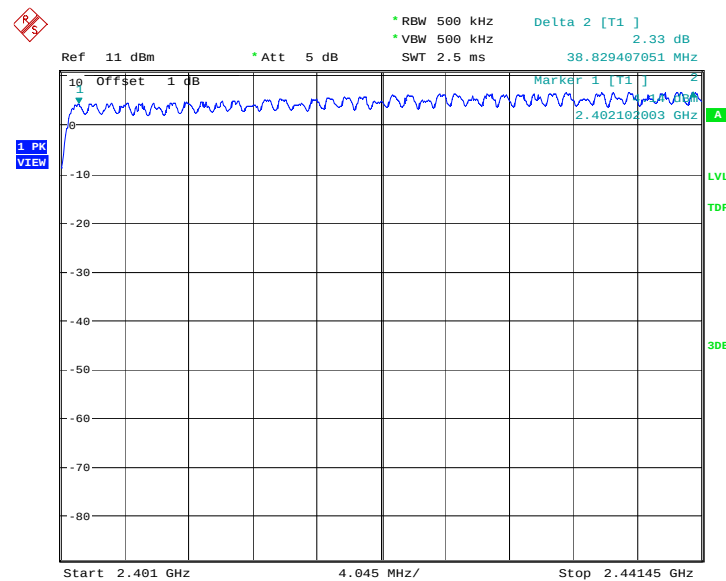
Date: 4.MAR.2014 11:02:09

Fig.127. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 0 - 39



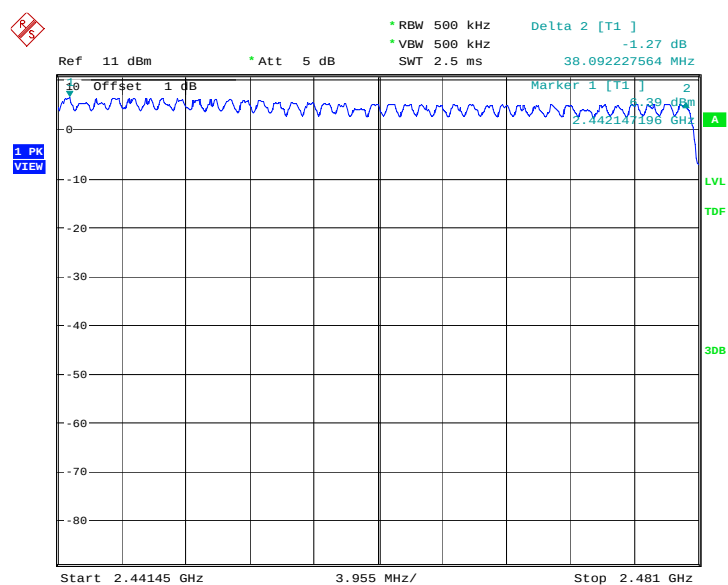
Date: 4.MAR.2014 11:04:12

Fig.128. Number of hopping frequencies: $\pi/4$ DQPSK, Channel 40 - 78



Date: 4.MAR.2014 11:06:16

Fig.129. Number of hopping frequencies: 8DPSK, Channel 0 - 39



Date: 4.MAR.2014 11:08:18

Fig.130. Number of hopping frequencies: 8DPSK, Channel 40 - 78

A.10. AC Powerline Conducted Emission**Test Condition**

Voltage (V)	Frequency (Hz)
120	60

The measurement is made according to ANSI C63.10

Measurement Method:

The EUT is connected to the travel adapter, and travel adapter is connected to the LISN directly. EUT is under test mode, and the modulation method is GFSK.

Measurement Result and limit:**Bluetooth (Quasi-peak Limit)**

Frequency range (MHz)	Quasi-peak Limit (dBμV)	Conclusion
0.15 to 0.5	66 to 56	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.		

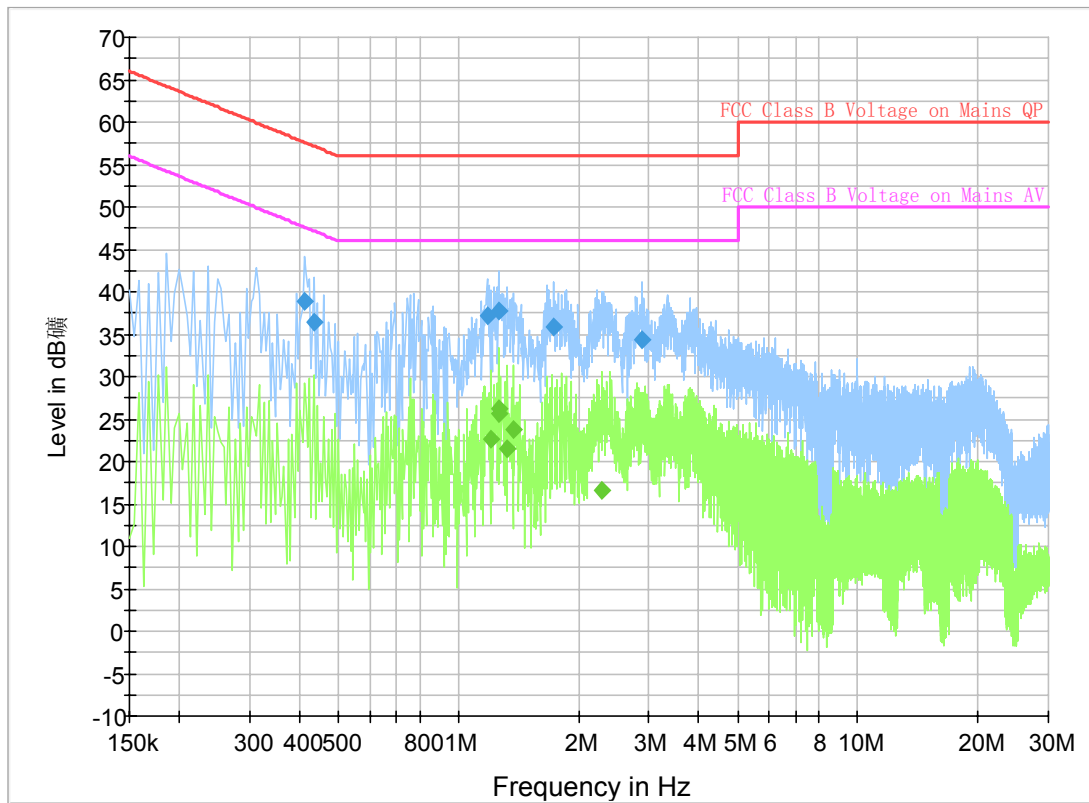
Bluetooth (Average Limit)

Frequency range (MHz)	Average Limit (dBμV)	Conclusion
0.15 to 0.5	56 to 46	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.		

The measurement is made according to ANSI C63.10

Conclusion: PASS

Test graphs as below:

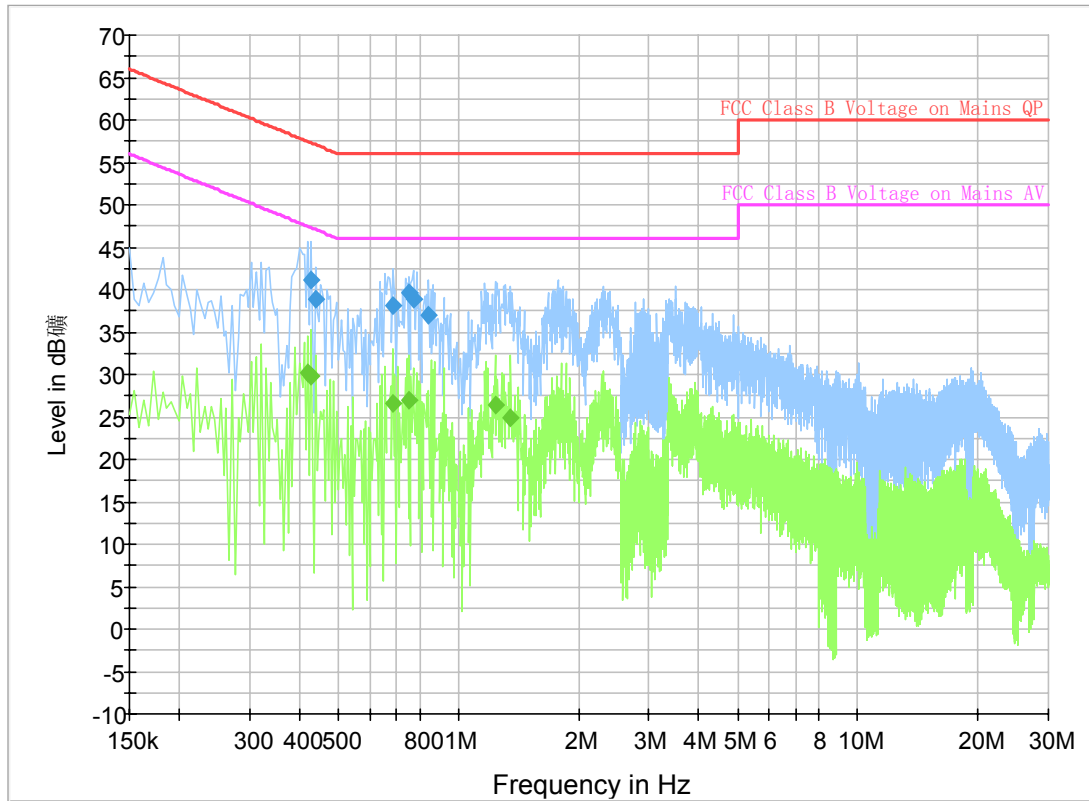
Traffic:**Final Result 1**

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.411000	38.9	GND	N	9.8	18.7	57.6
0.433500	36.4	GND	N	9.8	20.8	57.2
1.180500	37.1	GND	L1	9.7	18.9	56.0
1.257000	37.8	GND	L1	9.7	18.2	56.0
1.729500	35.9	GND	L1	9.7	20.1	56.0
2.886000	34.3	GND	L1	9.7	21.7	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
1.207500	22.6	GND	L1	9.7	23.4	46.0
1.257000	26.2	GND	L1	9.7	19.8	46.0
1.266000	25.8	GND	L1	9.7	20.2	46.0
1.324500	21.5	GND	L1	9.7	24.5	46.0
1.374000	23.7	GND	L1	9.7	22.3	46.0
2.283000	16.6	GND	L1	9.7	29.4	46.0

Idle:



Final Result 1

Frequency (MHz)	QuasiPeak (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.429000	41.1	GND	L1	9.8	16.2	57.3
0.438000	38.8	GND	L1	9.8	18.3	57.1
0.685500	38.1	GND	L1	9.8	17.9	56.0
0.753000	39.5	GND	L1	9.8	16.5	56.0
0.771000	38.9	GND	L1	9.8	17.1	56.0
0.843000	37.0	GND	L1	9.8	19.0	56.0

Final Result 2

Frequency (MHz)	Average (dBμV)	PE	Line	Corr. (dB)	Margin (dB)	Limit (dBμV)
0.420000	30.3	GND	L1	9.8	17.2	47.4
0.429000	29.8	GND	L1	9.8	17.5	47.3
0.685500	26.7	GND	L1	9.8	19.3	46.0
0.753000	26.9	GND	L1	9.8	19.1	46.0
1.234500	26.4	GND	L1	9.7	19.6	46.0
1.351500	25.0	GND	L1	9.7	21.0	46.0

A.11.Receiver Radiation Emission

Reference

FCC: CFR Part 15.109, 2.1053/ RSS-Gen 7.2.2

A.11.1 Method of Measurement

The measurement procedure in ANSI C63.10-2009 is used. The EUT is placed on a 80cm height non-conductive table locating on the center of turntable. From 30MHz-1GHz, the measurement distance is 10m. For frequency range above 1GHz, the measurement distance is 3m.

The EUT is measured with travel charger and the operating mode is idle without CMU200's signaling.

A.11.2 Method of Measurement

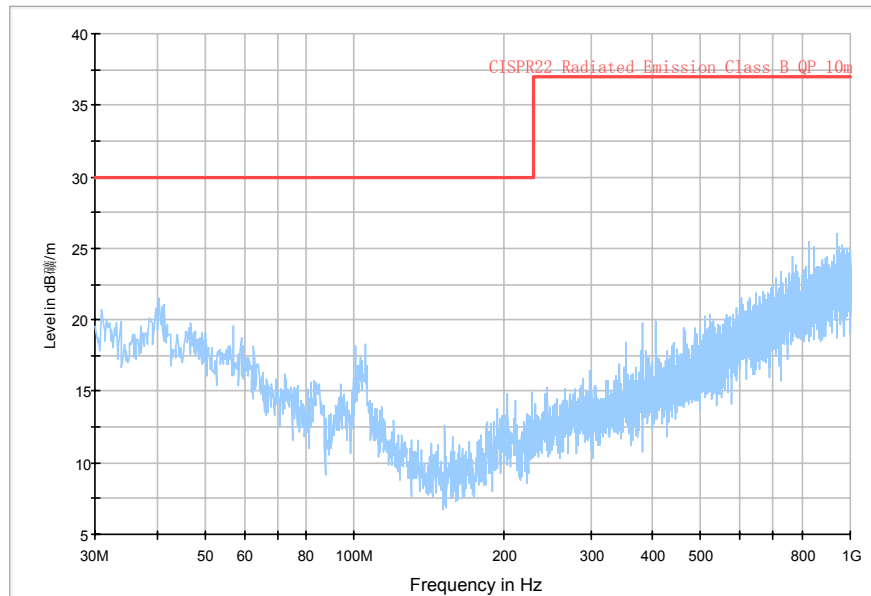
Frequency of Emission (MHz)	Limit (dB μ V/m)	Measurement Distance (m)
30-88	30	10
88-216	33.5	10
216-960	36	10
960-1000	44	10
>1000	54	3

A. 11.3 Measurement results

IF bandwidth: 120 kHz

Idle Mode: 30MHz-1GHz

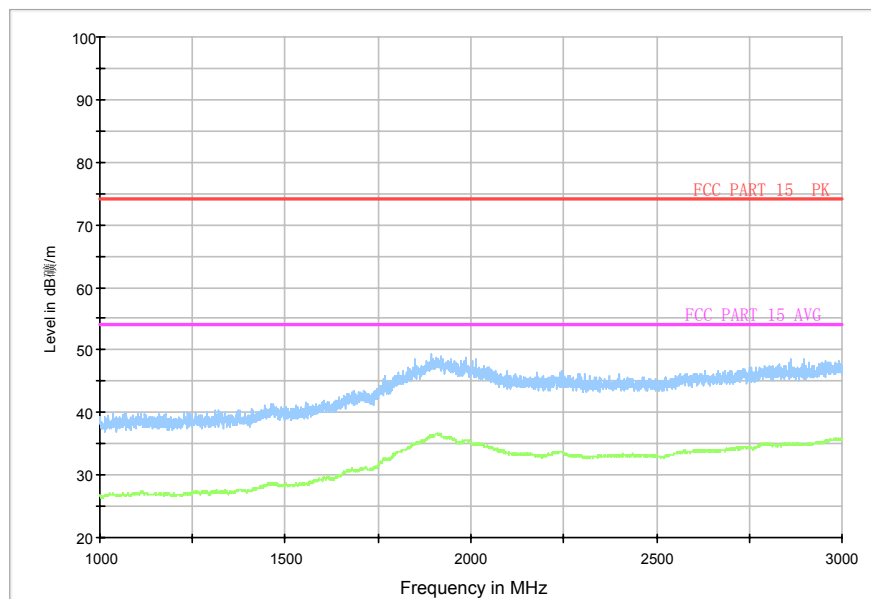
Normal RE_30M-1GHz_10m



RBW / VBW 1 MHz

Idle Mode: 1GHz-3GHz

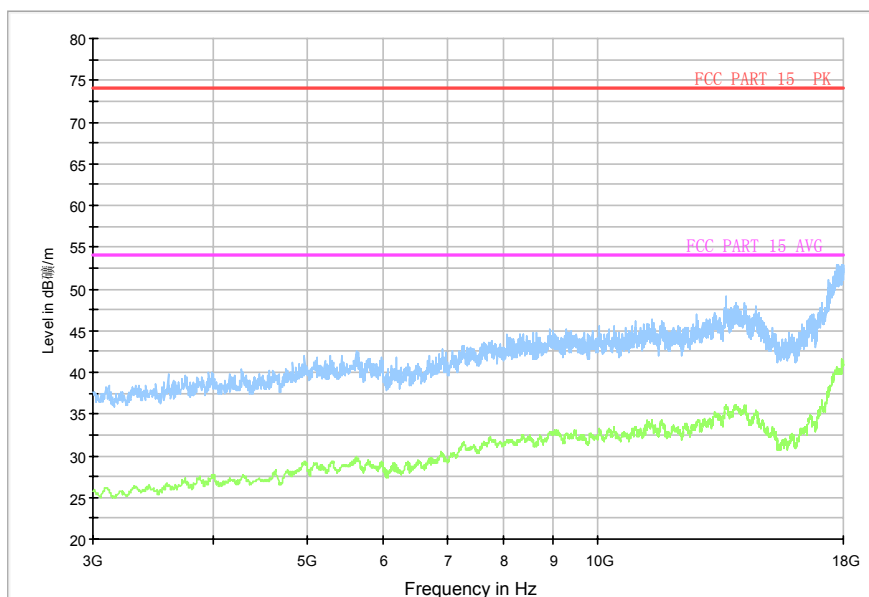
RE_BT_1G-3GHz



RBW / VBW 1 MHz

Idle Mode: 3GHz-18GHz

Normal RE_3G-18GHz



*** END OF REPORT BODY ***