FCC PART 15C
TEST REPORT
No. I14Z47557-SRD02

for

TCT Mobile Limited

HSUPA/HSDPA/UMTS dualband / GSM quadband mobile phone

Model Name: 3075M

With

FCC ID: RAD418

Hardware Version: 04

Software Version: A6E

Issued Date: 2014-09-11

DAkkS Deutsche Akkreditierungsstelle D-PL-12123-01-01

FCC 2.948 Listed: No.733176

IC O.A.T.S listed: No.6629A-1

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

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1. Test Laboratory

1.1. Testing Location

Location 1:TMC (Huayuan North Road)

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

Location 2:TMC (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: -20/+55℃

Relative Humidity: 20-75%

1.3. Project data

Testing Start Date: 2013-10-12

Testing End Date: 2013-10-21

1.4. Signature

Xu Zhongfei

(Prepared this test report)

Jiang Afang

(Reviewed this test report)

Xiao Li

Deputy Director of the laboratory

(Approved this test report)

2. Client Information

2.1. Applicant Information

Company Name:	TCT Mobile Limited
Address /Post:	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China.
City:	Shanghai
Postal Code:	201203
Country:	China
Contact Person:	Gong Zhizhou
Contact Email	zhizhou.gong@jrdcom.com
Telephone:	0086-21-61460890
Fax:	0086-21-61460602

2.2. Manufacturer Information

Company Name:	TCT Mobile Limited
Address /Post:	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China.
City:	Shanghai
Postal Code:	201203
Country:	China
Telephone:	0086-21-61460890
Fax:	0086-21-61460602

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

3.1. About EUT

Description	HSUPA/HSDPA/UMTS dualband / GSM quadband mobile phone
Model Name	3075M
FCC ID	RAD418
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 used during the test

EUT ID*	SN or IMEI	HW Version	SW Version
N24	/	04	A6E
N25	/	04	A6E

*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
AE2	Battery
AE3	Charger

AE1

Model	CAB3120000C1
Manufacturer	BYD
Capacitance	850mAh
Nominal Voltage	3.8V

AE2

Model	CAB3120000C3
Manufacturer	BAK
Capacitance	850mAh
Nominal Voltage	3.8V

AE3

Model	CBA3007AG0C2
Manufacturer	Tenpao

*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 HSUPA/HSDPA/UMTS dualband / GSM quadband mobile phone with integrated antenna. It consists of normal options: lithium battery, charger. 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.

4.2. Reference Documents for testing

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

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.	10-1-12
ANSI C63.10	Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz	2009
FCC Public Notice DA 00-705	Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems	March 2000
KDB412172 D01	Guidelines for Determining the Effective Radiated Power (ERP) and Equivalent Isotropically Radiated Power (EIRP) of a RF Transmitting System	2011

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	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.

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

This report only deals with the WLAN function among the features described in section 3.

This model is a variant product which market name is 3075A; all the test result has been derived from test report of 3075A.

7. Test Equipments Utilized

Conducted test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	CALIBRATION INTERVAL
1	Vector Signal Analyzer	FSU26	200030	Rohde & Schwarz	2014-06-12	1 year
2	Bluetooth Tester	CBT32	100649	Rohde & Schwarz	2014-02-03	1 year

Radiated emission test system

No.	Equipment	Model	Serial Number	Manufacturer	Calibration Due date	CALIBRATION INTERVAL
1	Test Receiver	ESU26	100376	Rohde & Schwarz	2013-11-07	1 year
2	EMI Antenna	VULB 9163	9163482	Schwarzbeck	2014-02-17	3 year
3	EMI Antenna	3117	00119024	EMCO	2014-02-03	1 year
4	Dual-Ridge Waveguide Horn Antenna	3116	2663	ETS-Lindgren	2014-06-30	3 year
5	Dual-Ridge Waveguide Horn Antenna	3116	2661	ETS-Lindgren	2014-06-30	3 year
6	Bluetooth Tester	CBT	100153	Rohde & Schwarz	2014-09-15	1 year
7	LISN	ESH2-Z5	829991/012	Rohde & Schwarz	2014-03-17	1 year
8	Pre-amplifier (18GHz)	SCU18	1005277	Rohde & Schwarz	/	/
9	Pre-amplifier (26.5GHz)	SCU26	1006788	Rohde & Schwarz	/	/
10	Loop Antenna	HFH2-Z2	829324/007	Rohde & Schwarz	2014-12-12	3 year

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.

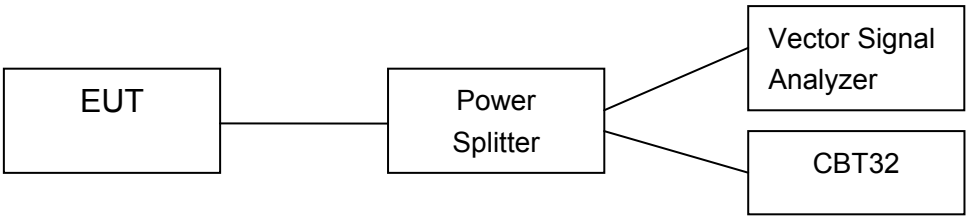
2). Set the EUT to the required work mode (Transmitter, receiver or transmitter & receiver).

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

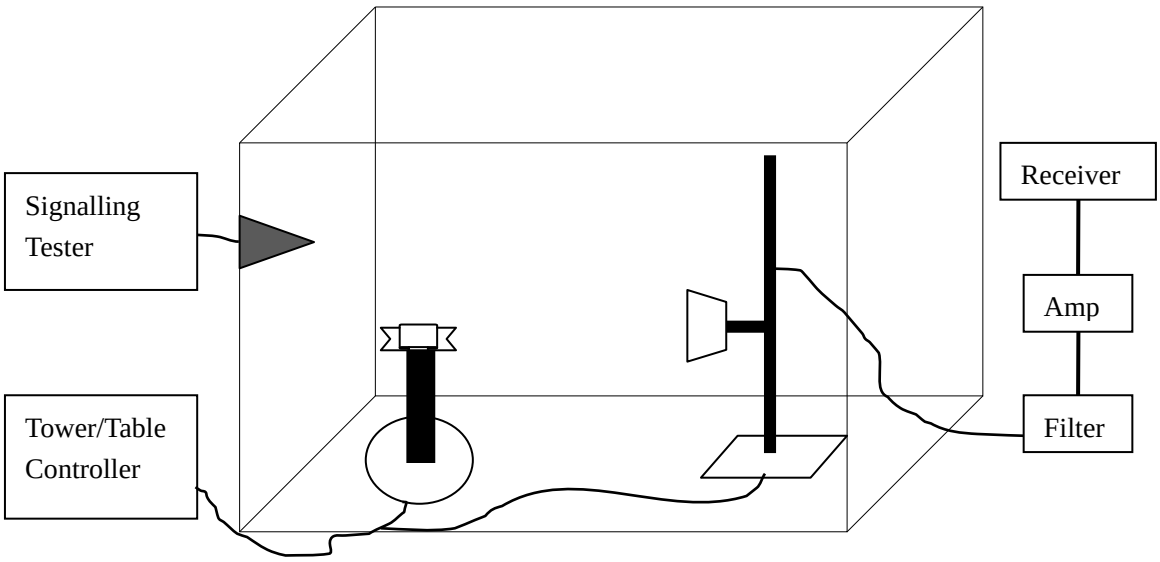
The measurement is made according to ANSI C63.10

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)	< 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)	6.16	7.17	7.40	P

Forπ/4 DQPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	5.94	6.94	7.18	P

For 8DPSK

Channel	Ch 0 2402 MHz	Ch 39 2441 MHz	Ch 78 2480 MHz	Conclusion
Peak Conducted Output Power (dBm)	6.13	7.14	7.38	P

Conclusion: PASS

A.3. Frequency Band Edges - Conducted

Measurement Limit:

Standard	Limit (dBc)
FCC 47 CFR Part 15.247 (d)	> 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	-56.12	P
	Hopping ON	Fig.2	-53.18	P
78	Hopping OFF	Fig.3	-61.31	P
	Hopping ON	Fig.4	-60.86	P

Forπ/4 DQPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.5	-56.24	P
	Hopping ON	Fig.6	-57.13	P
78	Hopping OFF	Fig.7	-59.91	P
	Hopping ON	Fig.8	-58.82	P

For 8DPSK

Channel	Hopping	Band Edge Power (dBc)		Conclusion
0	Hopping OFF	Fig.9	-56.64	P
	Hopping ON	Fig.10	-57.64	P
78	Hopping OFF	Fig.11	-59.62	P
	Hopping ON	Fig.12	-59.08	P

Conclusion: PASS

Test graphs as below

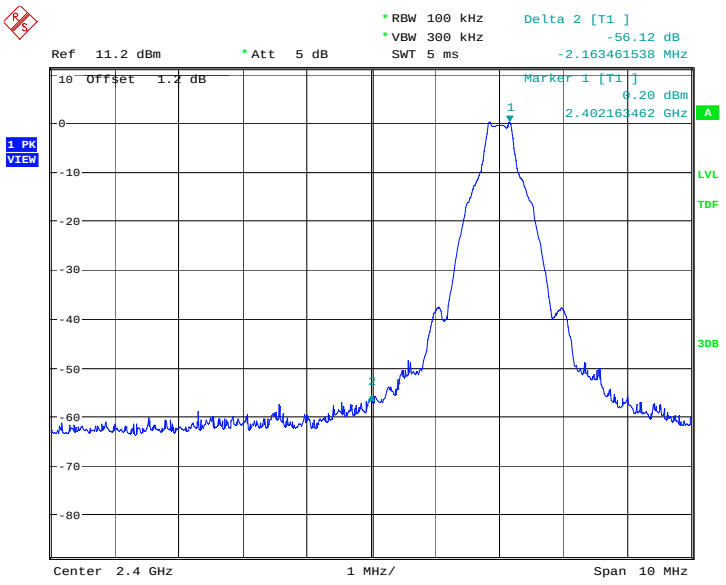


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Fig.1. Frequency Band Edges: GFSK, Channel 0, Hopping Off

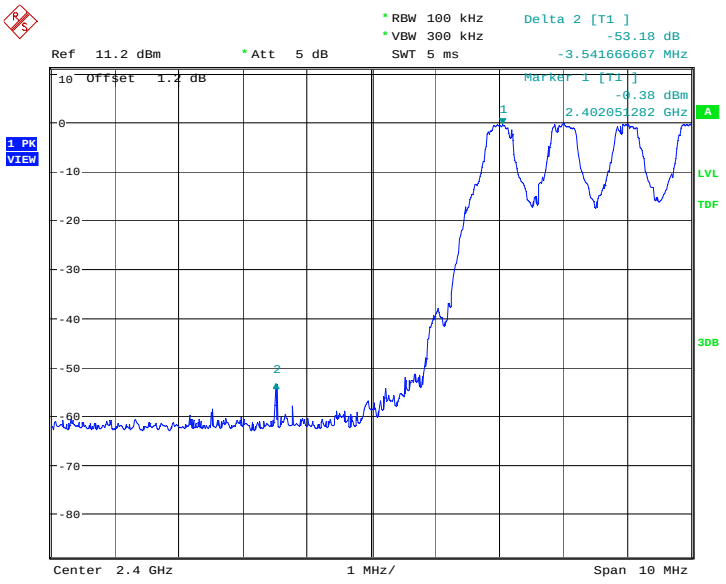

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Fig.2. Frequency Band Edges: GFSK, Channel 0, Hopping On

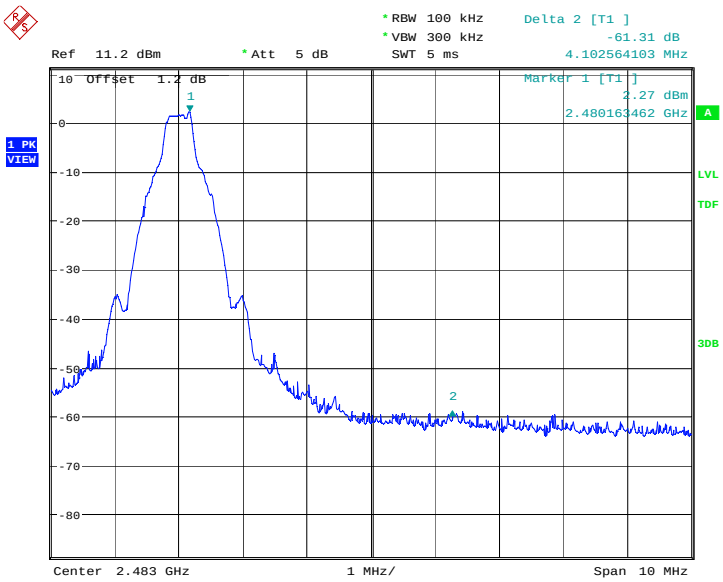

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Fig.3. Frequency Band Edges: GFSK, Channel 78, Hopping Off

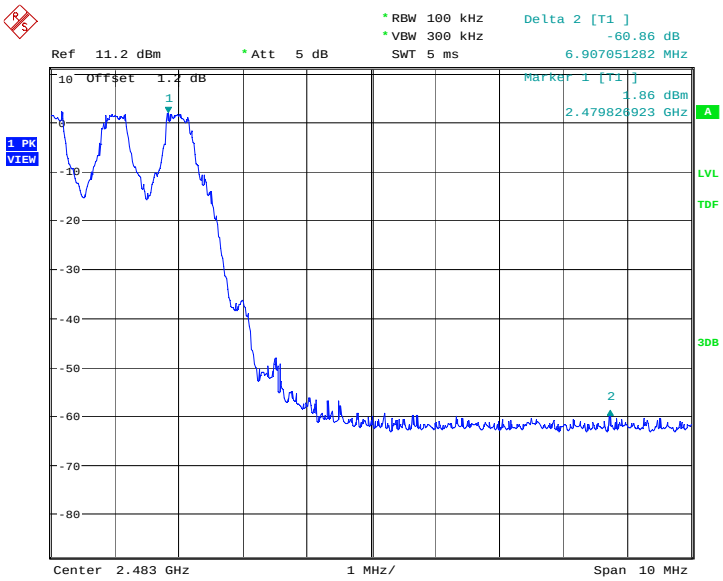

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Fig.4. Frequency Band Edges: GFSK, Channel 78, Hopping On

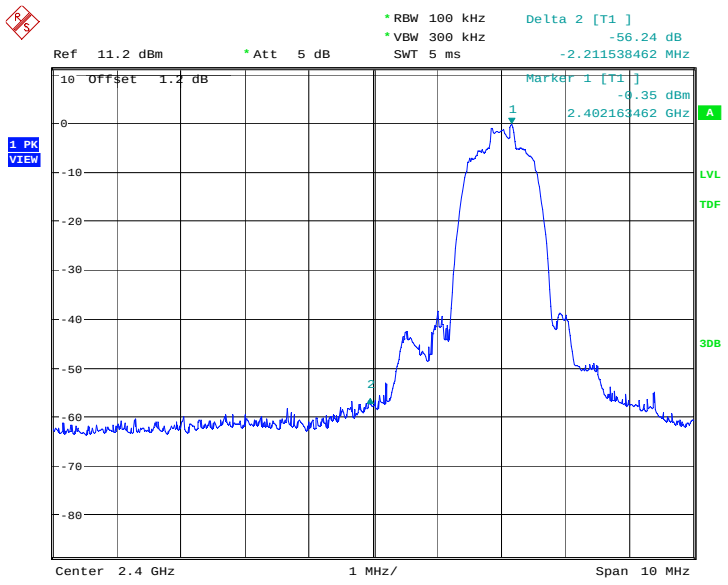

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Fig.5. Frequency Band Edges: π/4 DQPSK, Channel 0, Hopping Off

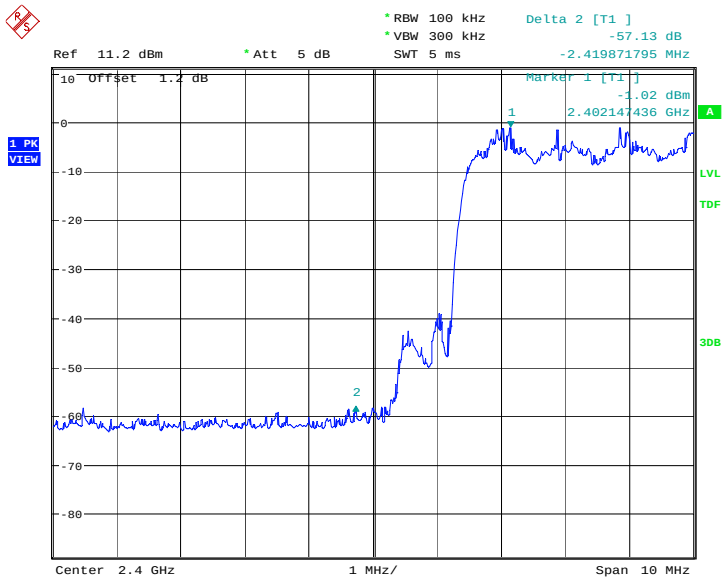

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Fig.6. Frequency Band Edges: π/4 DQPSK, Channel 0, Hopping On

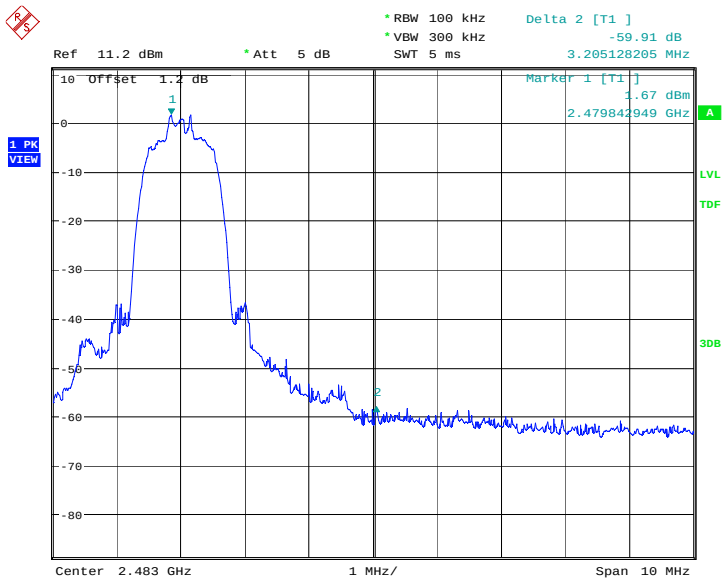

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Fig.7. Frequency Band Edges: π/4 DQPSK, Channel 78, Hopping Off

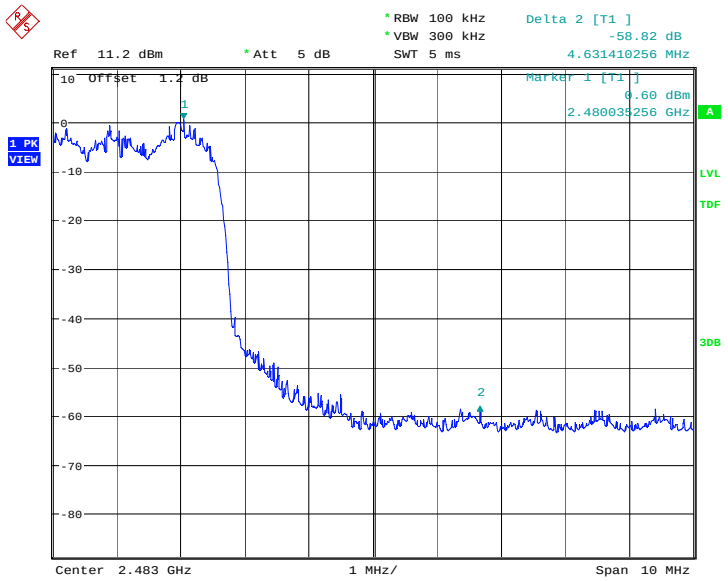

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Fig.8. Frequency Band Edges: π/4 DQPSK, Channel 78, Hopping On

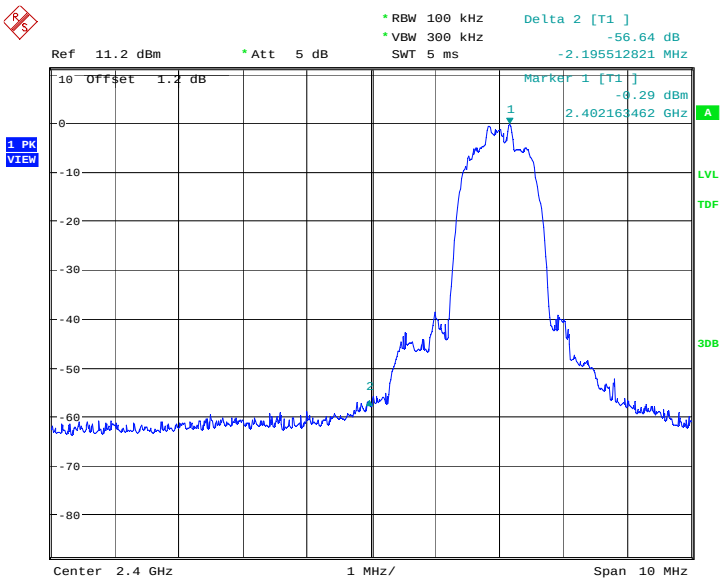

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Fig.9. Frequency Band Edges: 8DPSK, Channel 0, Hopping Off

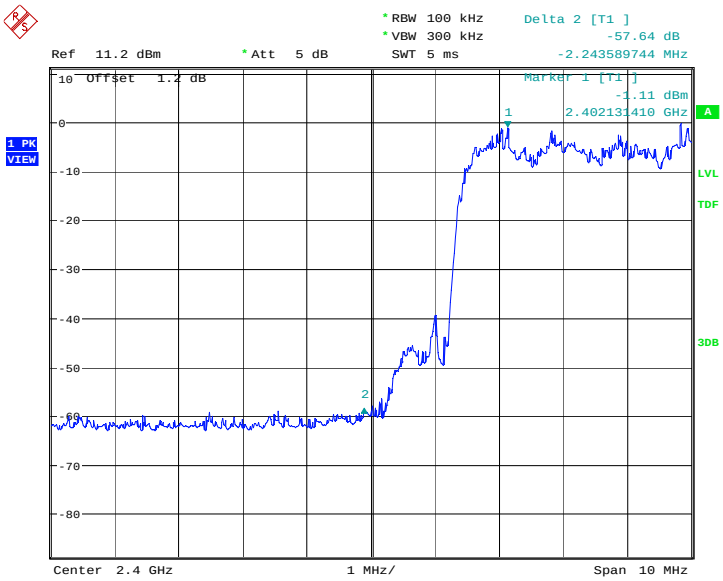

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Fig.10. Frequency Band Edges: 8DPSK, Channel 0, Hopping On

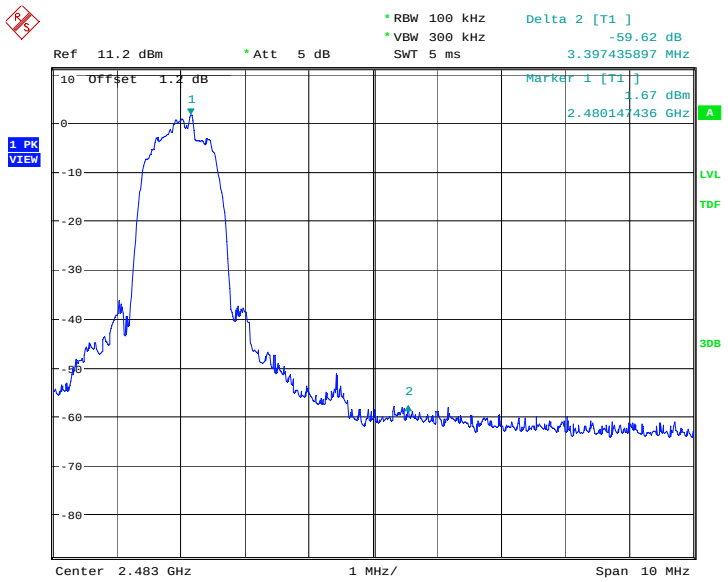

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Fig.11. Frequency Band Edges: 8DPSK, Channel 78, Hopping Off

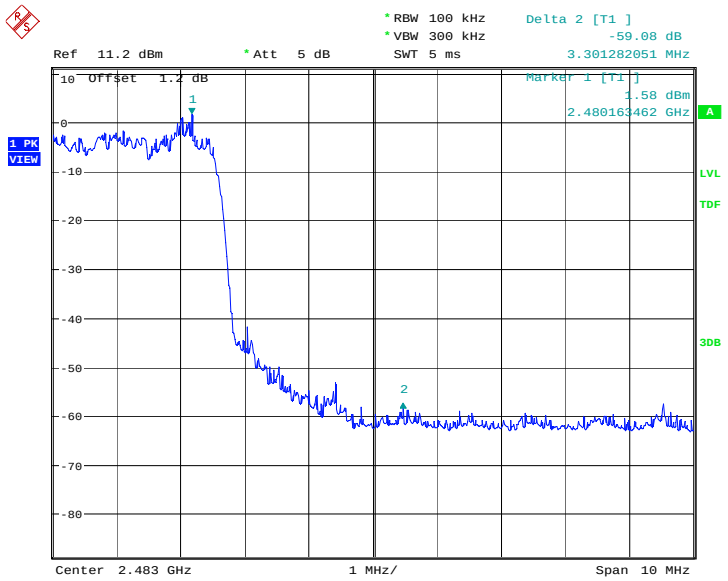

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Fig.12. Frequency Band Edges: 8DPSK, Channel 78, Hopping On

A.4. Conducted Emission

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247 (d)	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 π/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

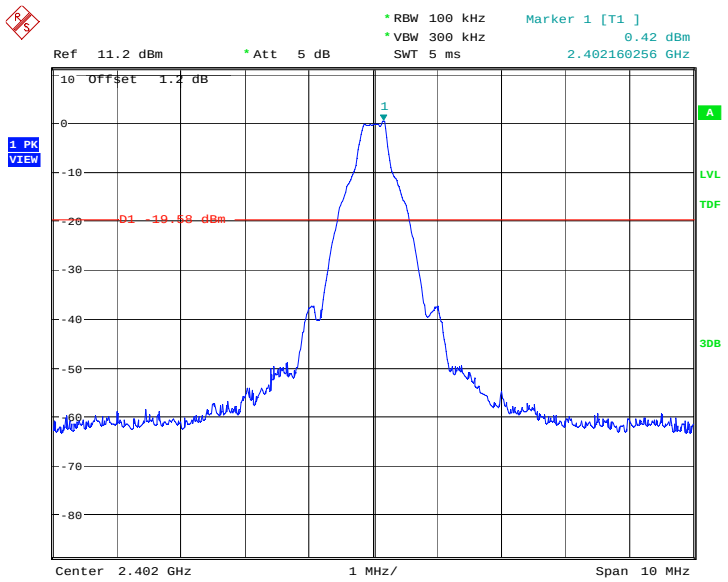

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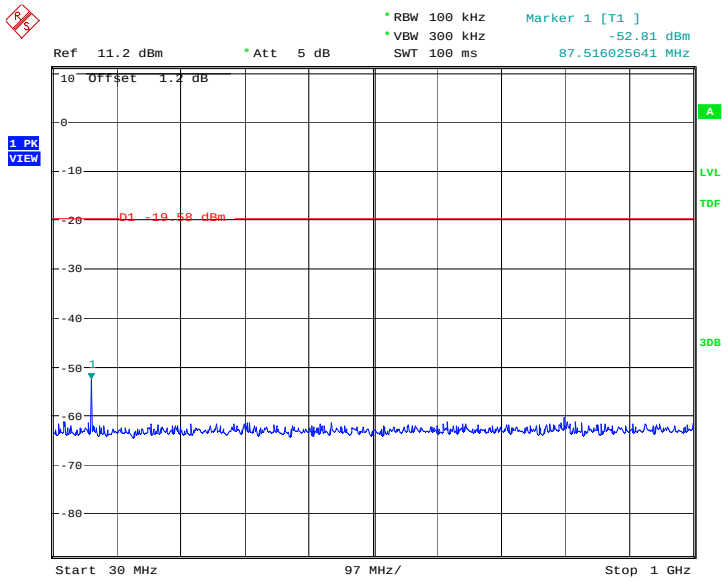
Fig.13. Conducted spurious emission: GFSK, Channel 0,2402MHz



Date: 12.OCT.2013 15:13:54

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

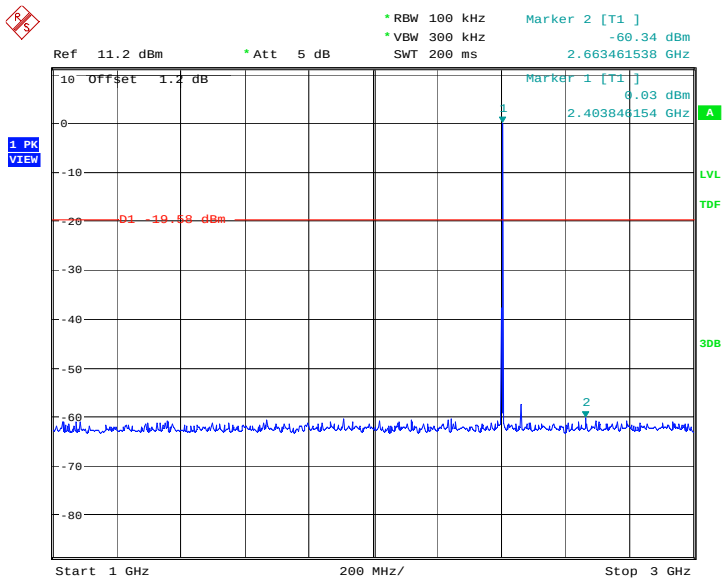


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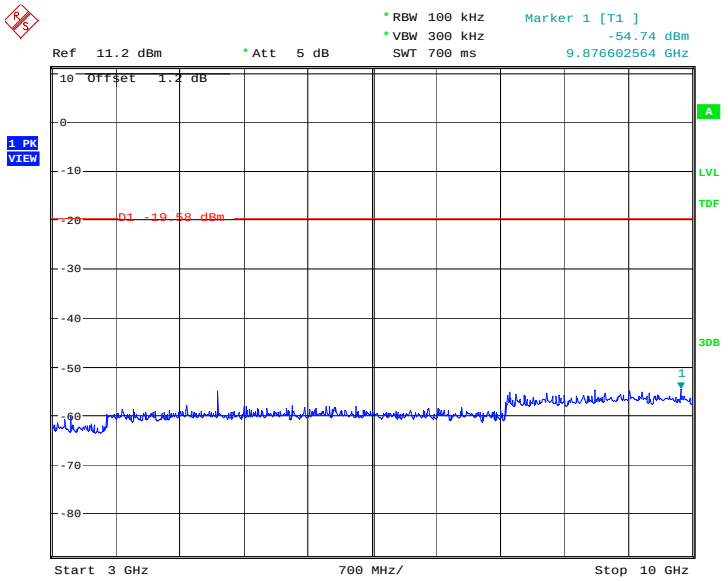
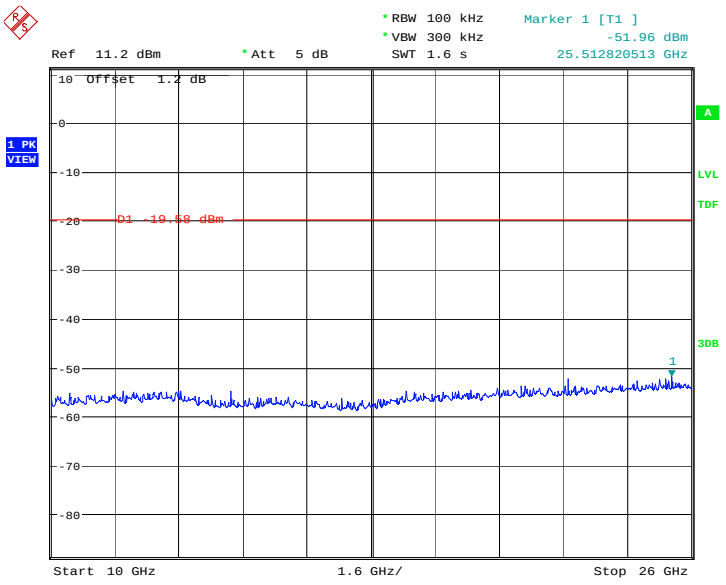
Fig.15. Conducted spurious emission: GFSK, Channel 0, 1GHz - 3GHz



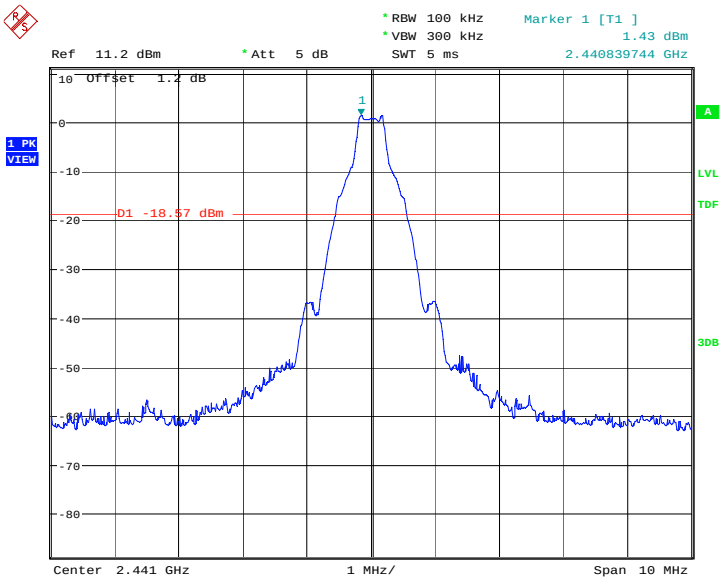
Date: 12.OCT.2013 15:14:42

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



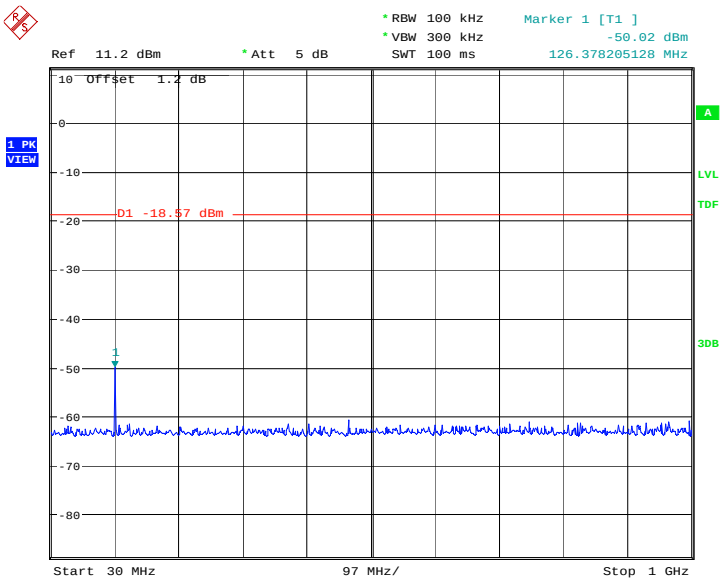
Date: 12.OCT.2013 15:14:58

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



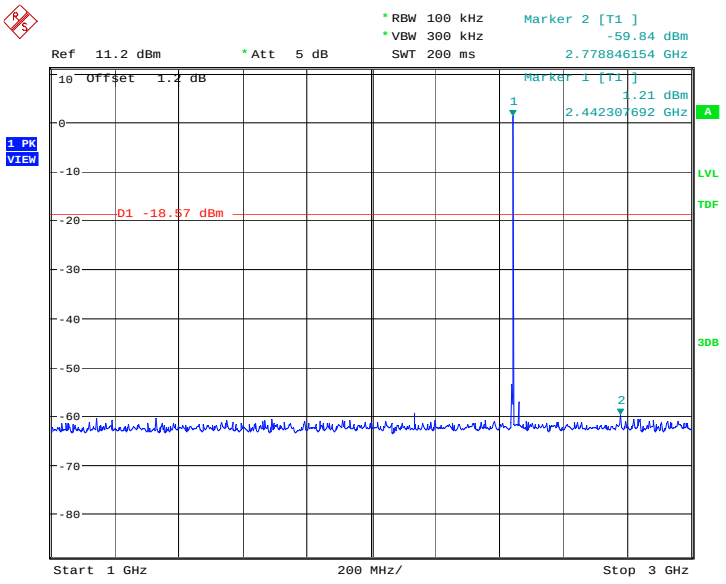
Date: 12.OCT.2013 15:15:15

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



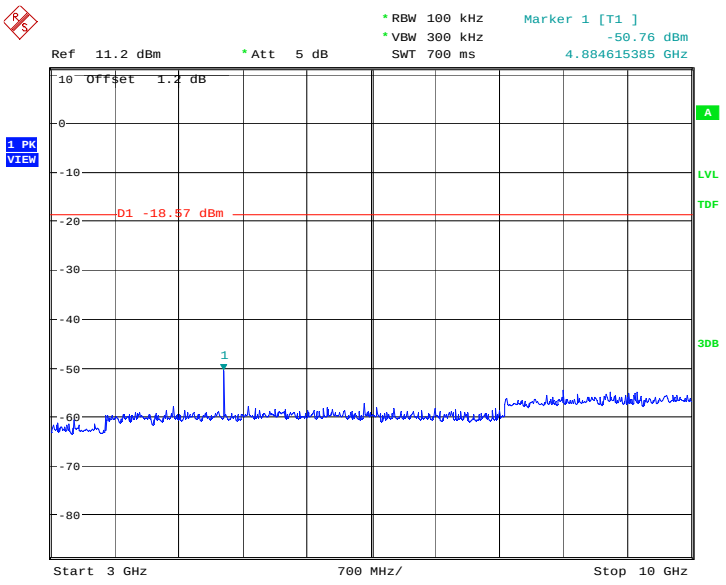
Date: 12.OCT.2013 15:15:32

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



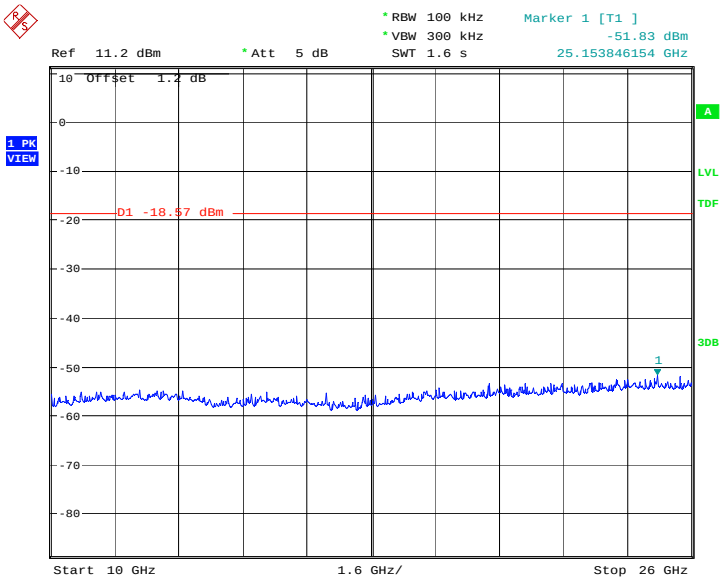
Date: 12.OCT.2013 15:16:03

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



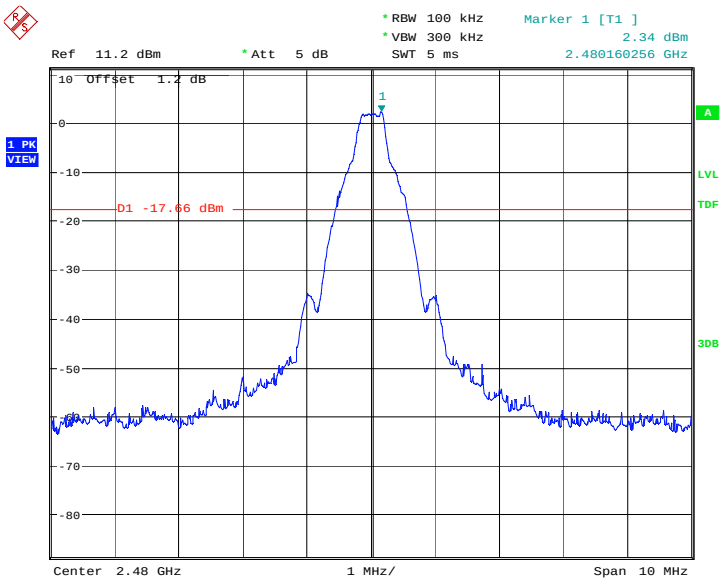
Date: 12.OCT.2013 15:16:20

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



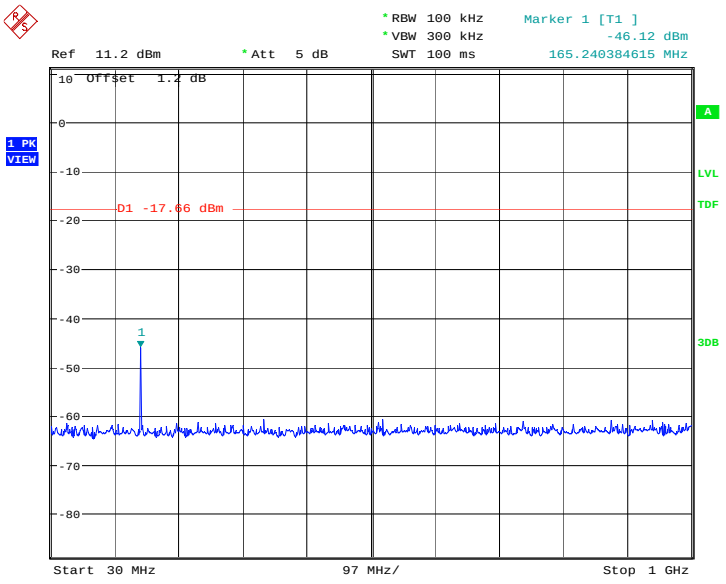
Date: 12.OCT.2013 15:16:36

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



Date: 12.OCT.2013 15:16:53

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



Date: 12.OCT.2013 15:17:10

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

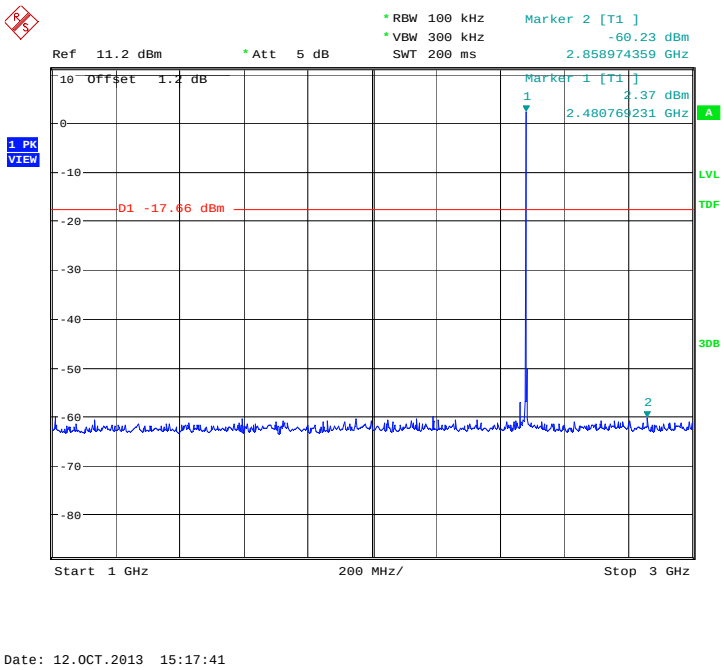


Fig.25. Conducted spurious emission: GFSK, Channel 78, 1GHz - 3GHz

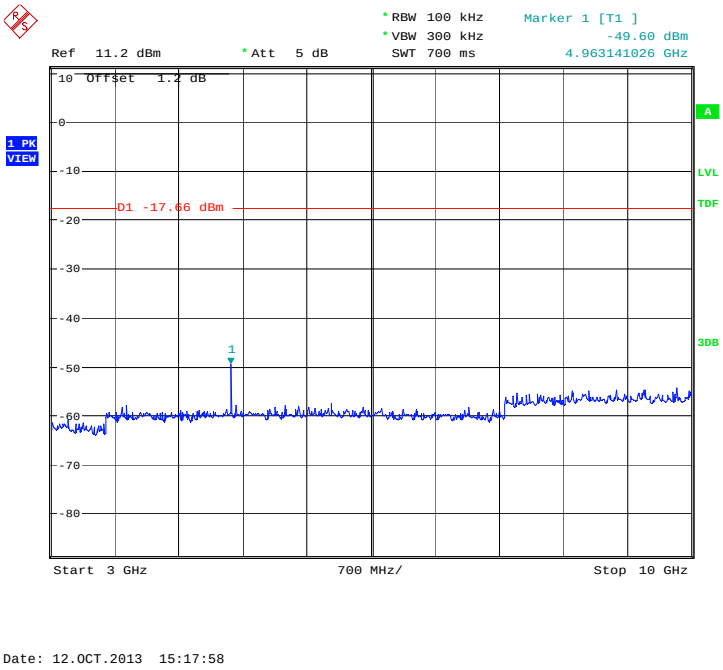
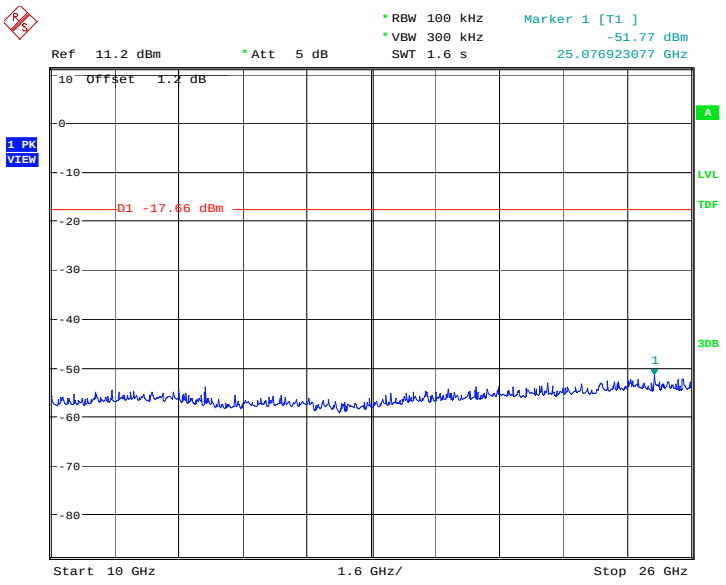
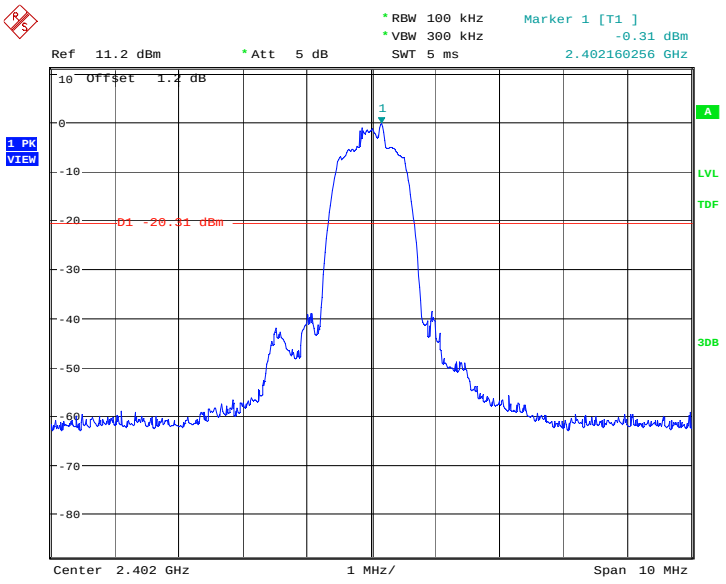


Fig.26. Conducted spurious emission: GFSK, Channel 78, 3GHz - 10GHz



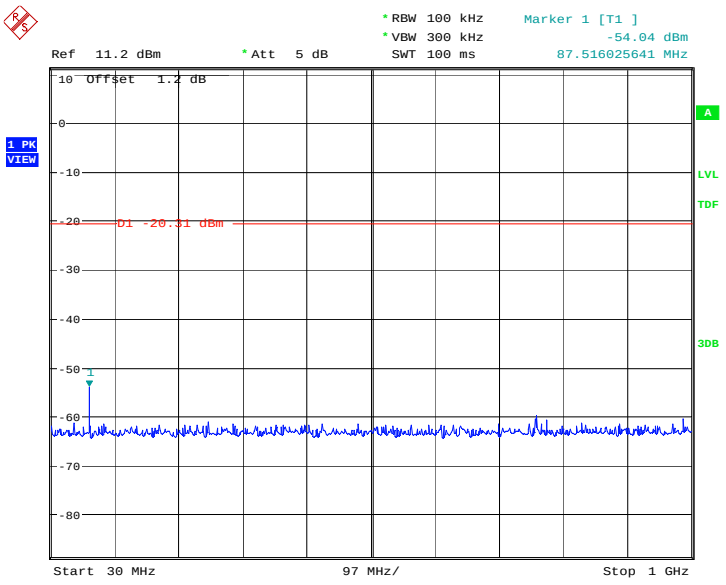
Date: 12.OCT.2013 15:18:14

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



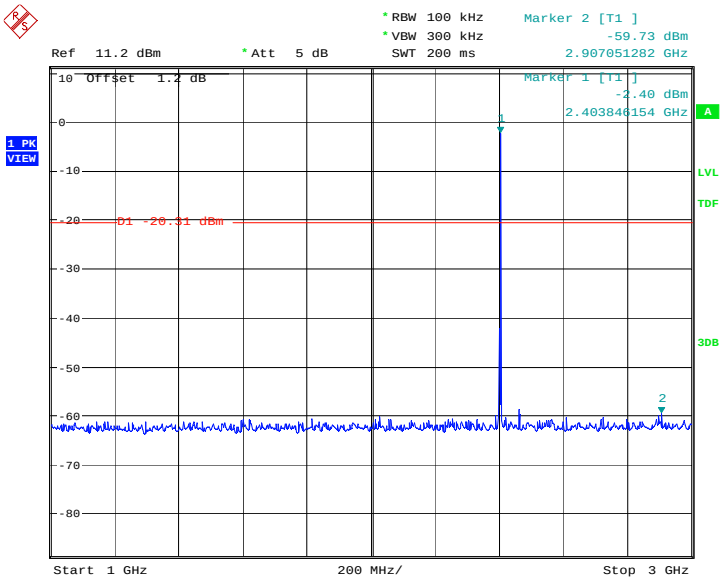
Date: 12.OCT.2013 15:35:02

Fig.28. Conducted spurious emission: π/4 DQPSK, Channel 0,2402MHz



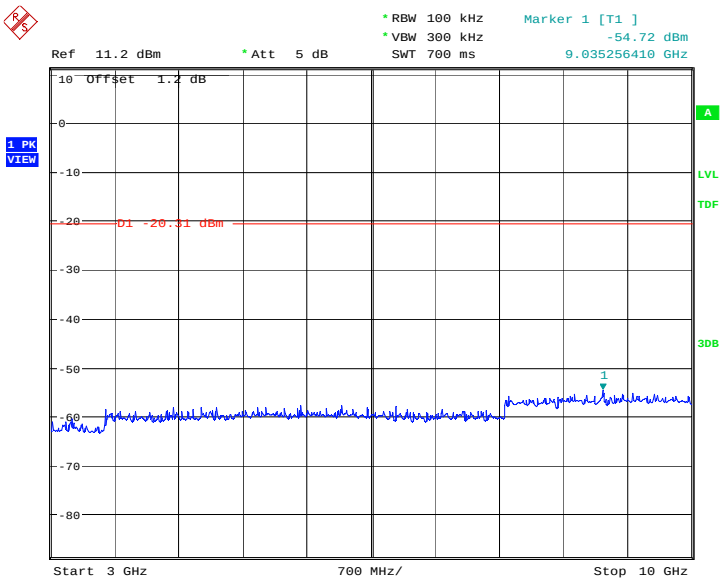
Date: 12.OCT.2013 15:35:19

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



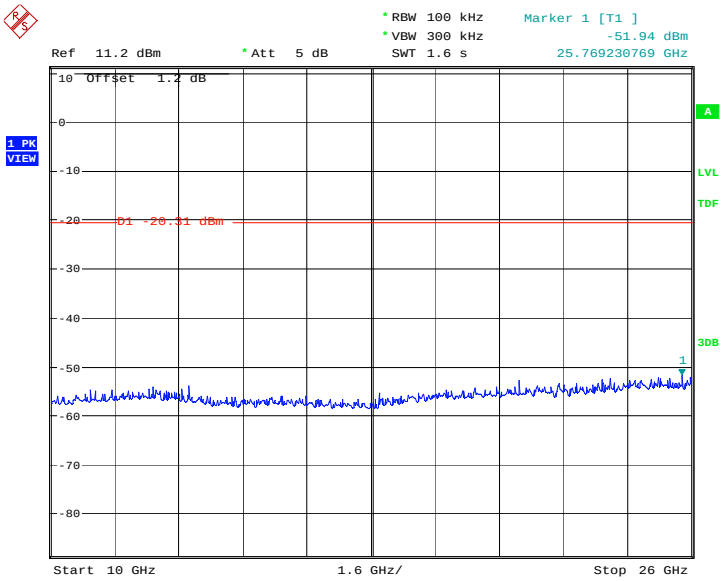
Date: 12.OCT.2013 15:35:50

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



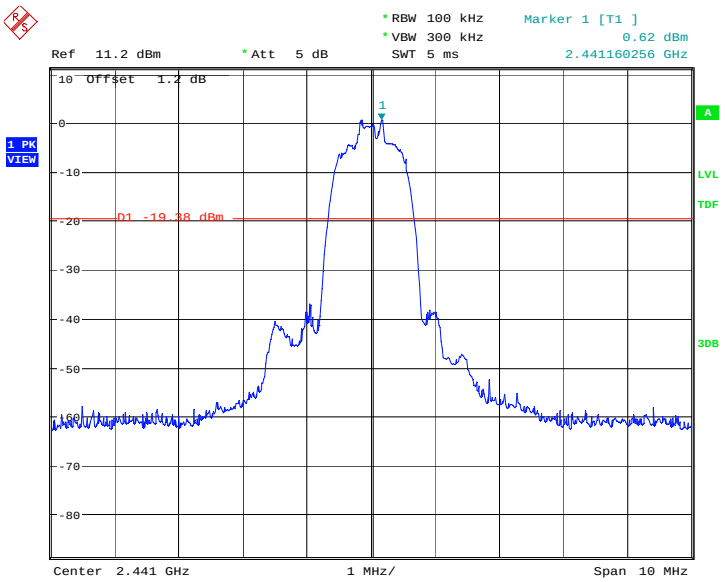
Date: 12.OCT.2013 15:36:07

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



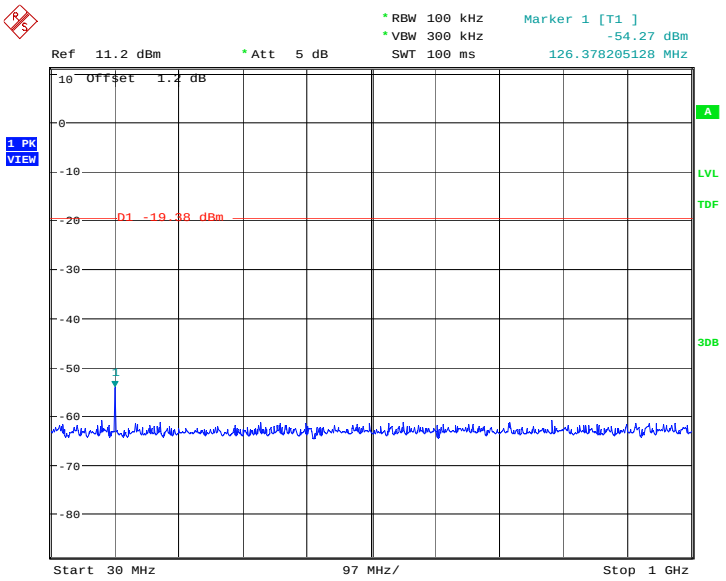
Date: 12.OCT.2013 15:36:23

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



Date: 12.OCT.2013 15:36:40

Fig.33. Conducted spurious emission: π/4 DQPSK, Channel 39, 2441MHz



Date: 12.OCT.2013 15:36:57

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

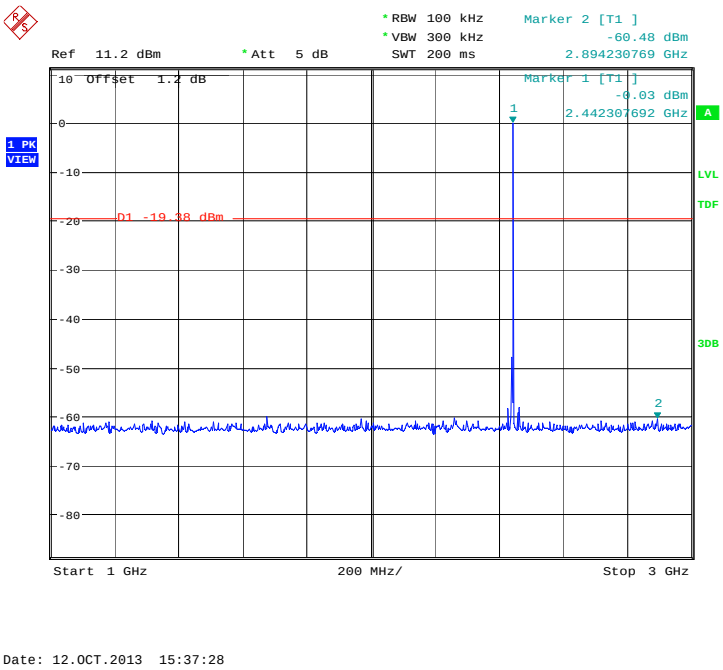


Fig.35. Conducted spurious emission: π/4 DQPSK, Channel 39, 1GHz - 3GHz

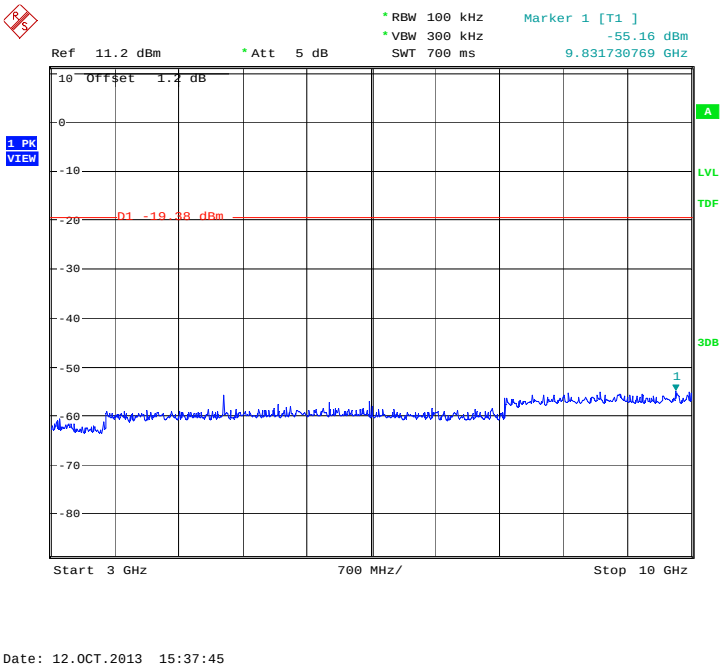


Fig.36. Conducted spurious emission: π/4 DQPSK, Channel 39, 3GHz - 10GHz

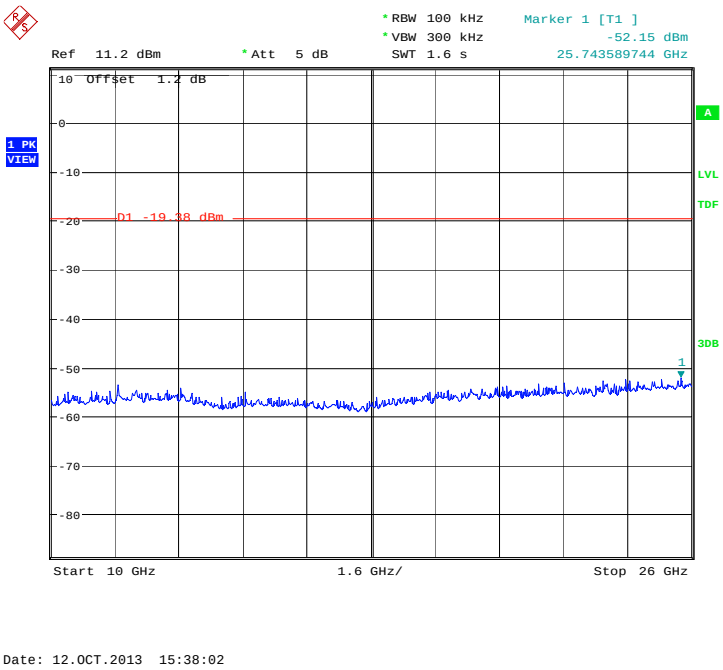


Fig.37. Conducted spurious emission: π/4 DQPSK, Channel 39, 10GHz – 26GHz

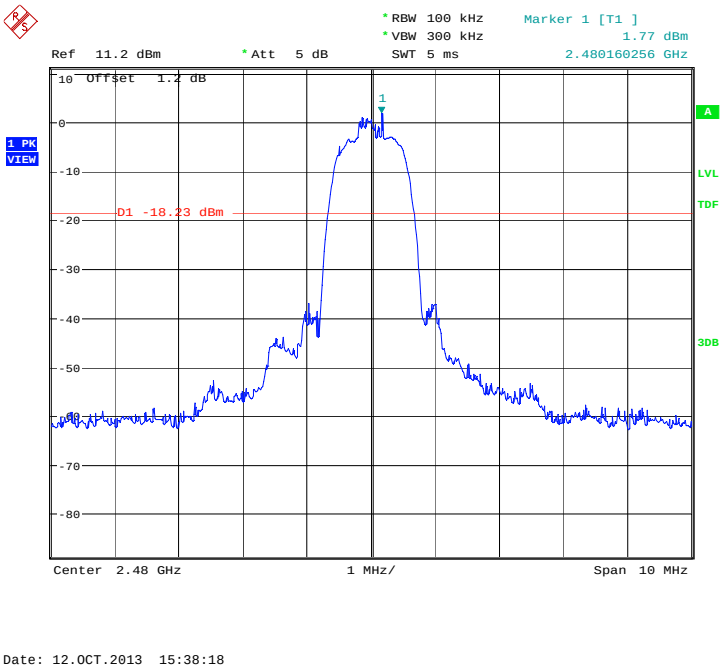


Fig.38. Conducted spurious emission: π/4 DQPSK, Channel 78, 2480MHz

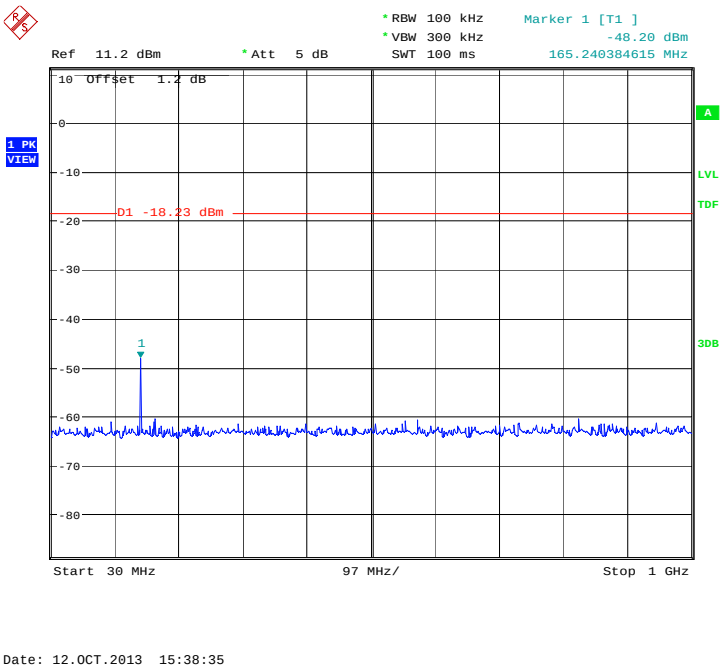


Fig.39. Conducted spurious emission: π/4 DQPSK, Channel 78, 30MHz - 1GHz

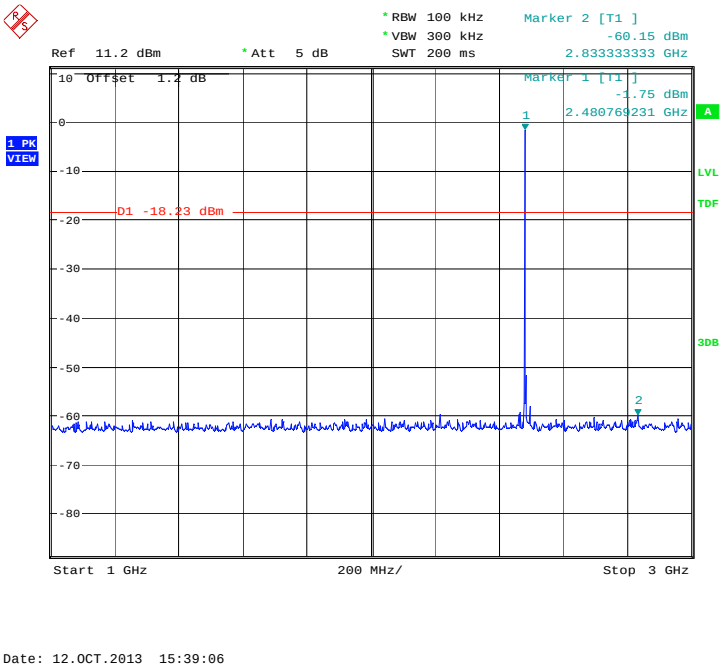
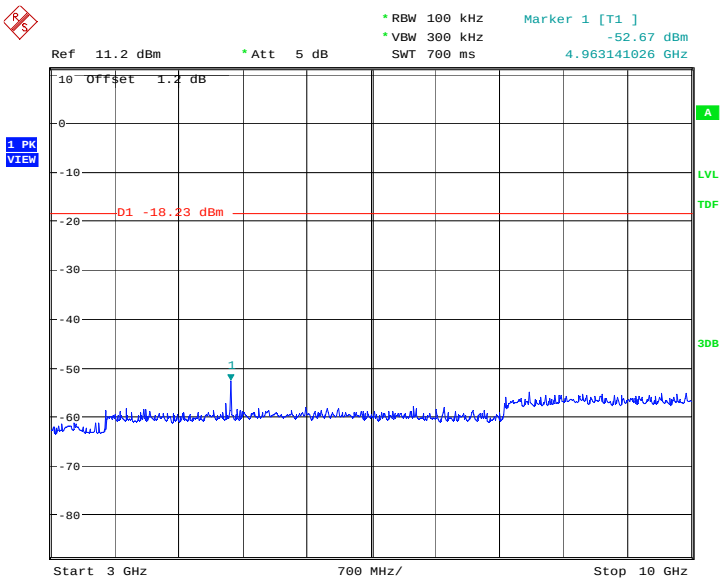
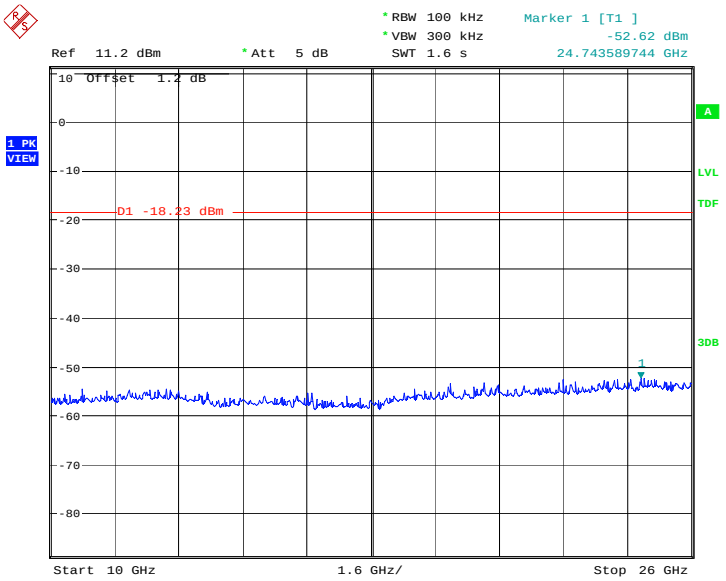


Fig.40. Conducted spurious emission: π/4 DQPSK, Channel 78, 1GHz - 3GHz



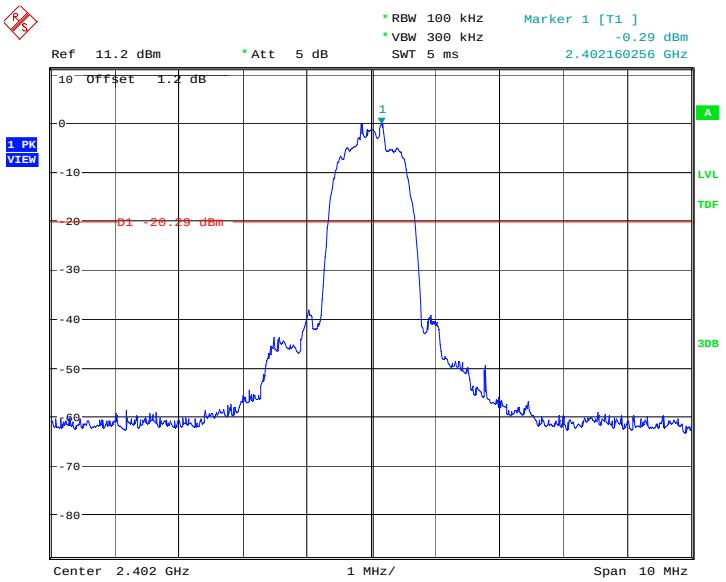
Date: 12.OCT.2013 15:39:23

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



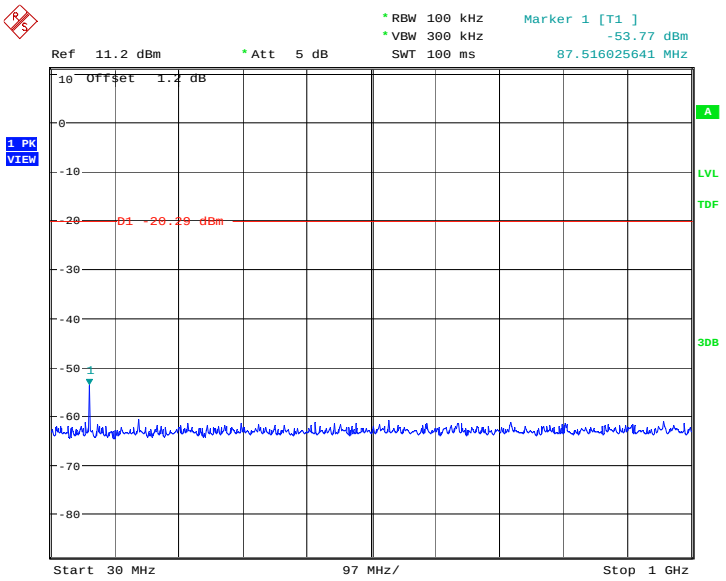
Date: 12.OCT.2013 15:39:39

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



Date: 12.OCT.2013 15:56:30

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



Date: 12.OCT.2013 15:56:47

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

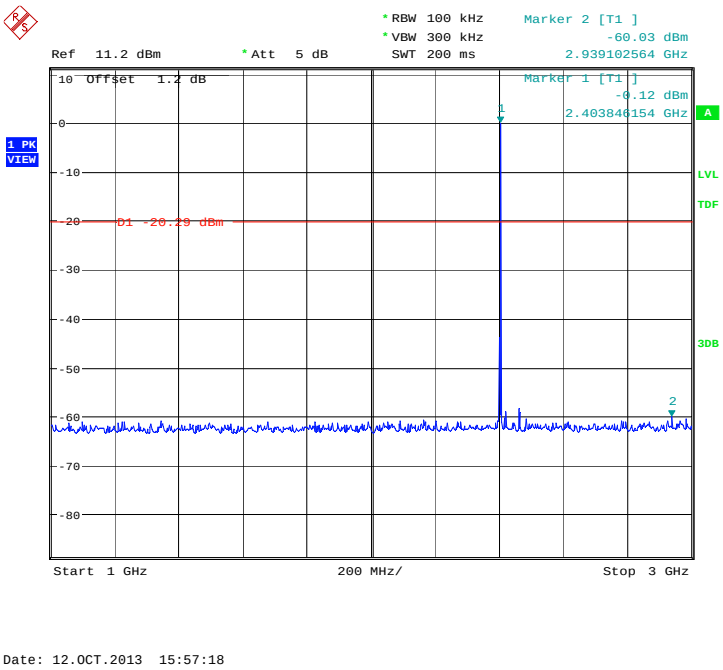


Fig.45. Conducted spurious emission: 8DPSK, Channel 0, 1GHz - 3GHz

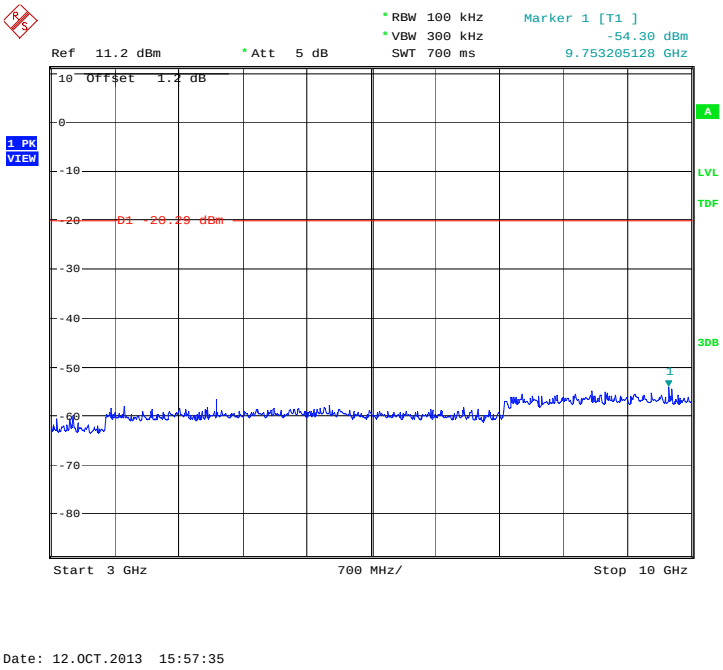
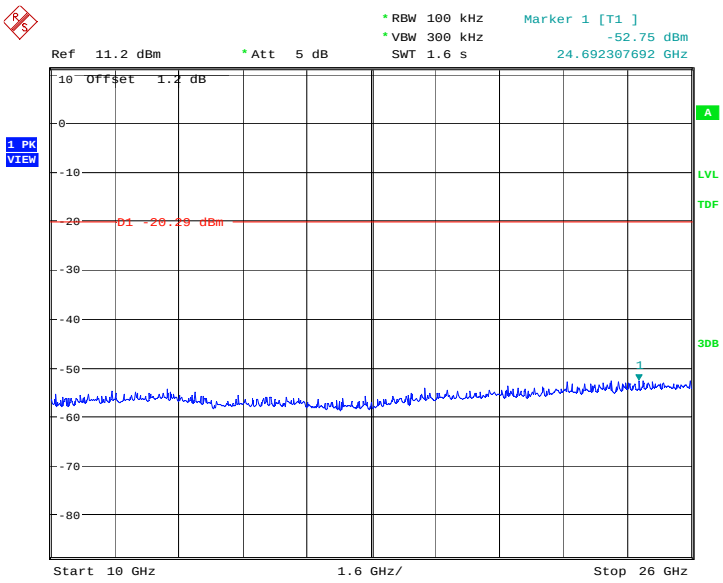
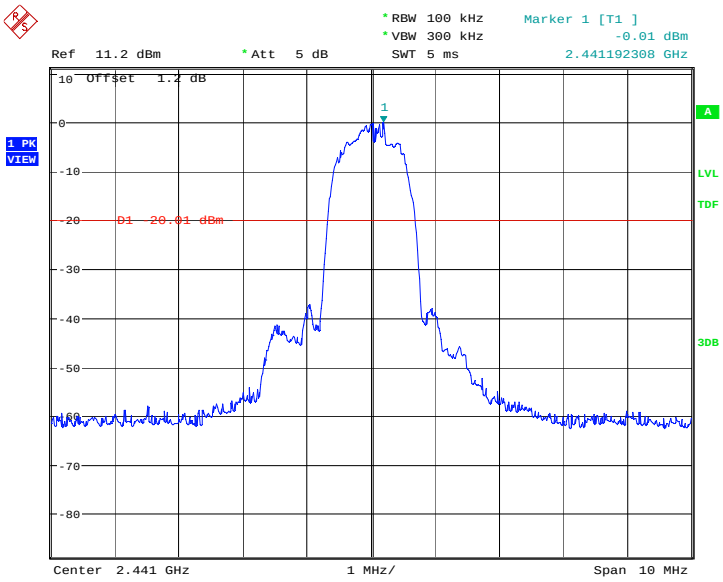


Fig.46. Conducted spurious emission: 8DPSK, Channel 0, 3GHz - 10GHz



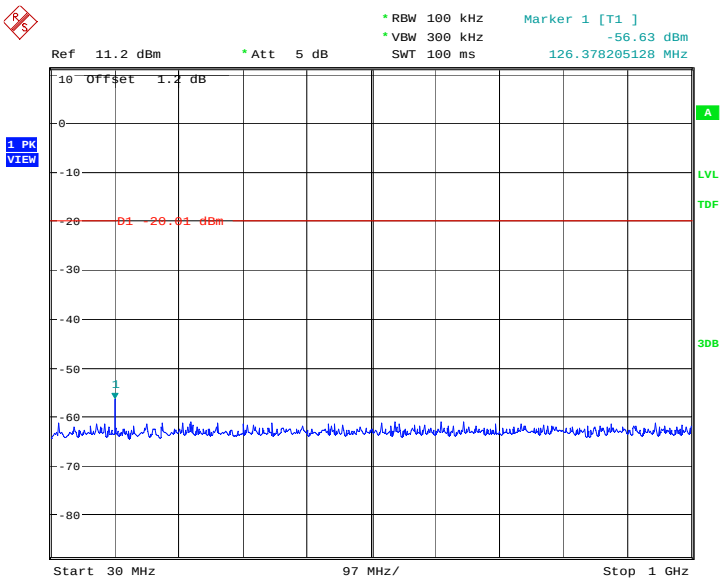
Date: 12.OCT.2013 15:57:51

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



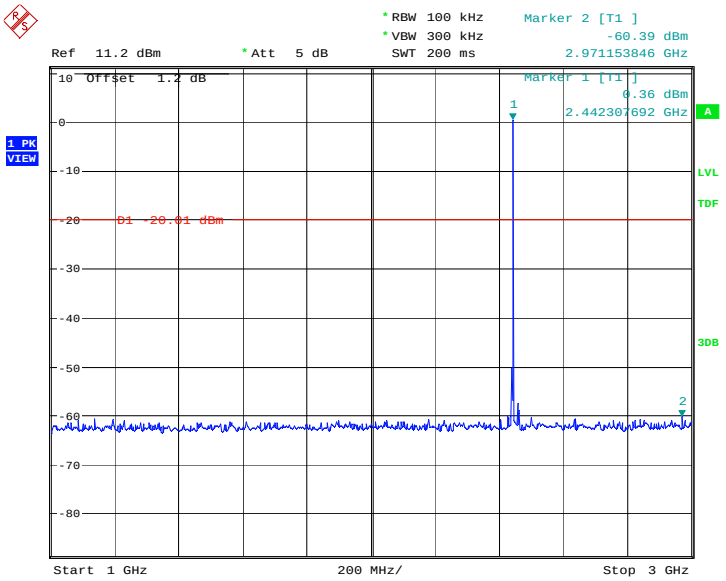
Date: 12.OCT.2013 15:58:08

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



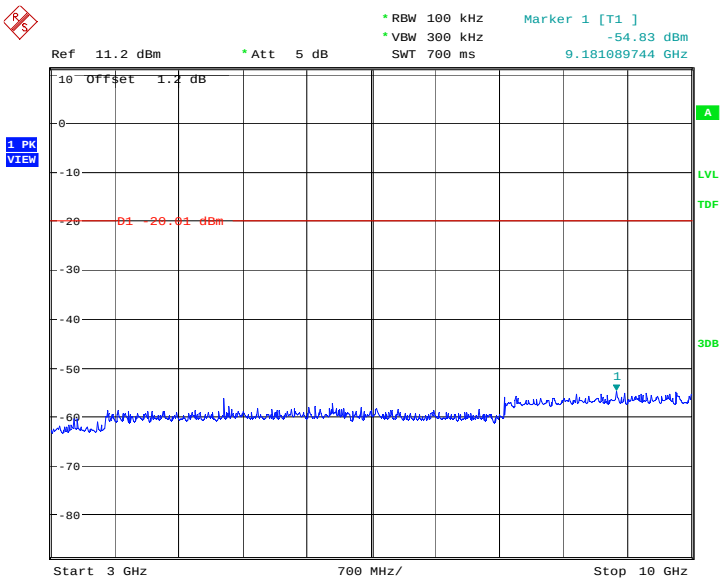
Date: 12.OCT.2013 15:58:25

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



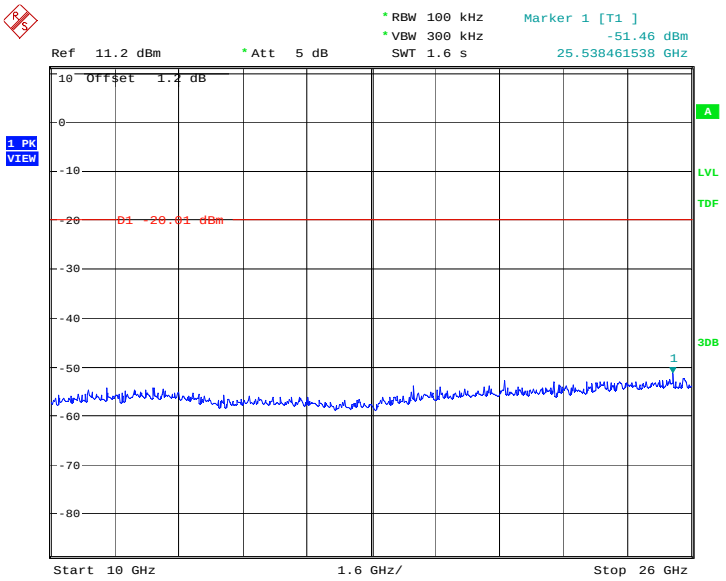
Date: 12.OCT.2013 15:58:56

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



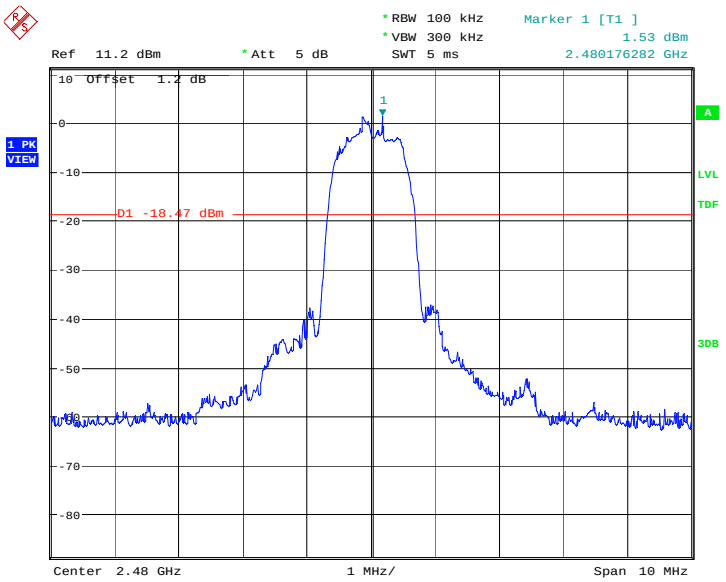
Date: 12.OCT.2013 15:59:13

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



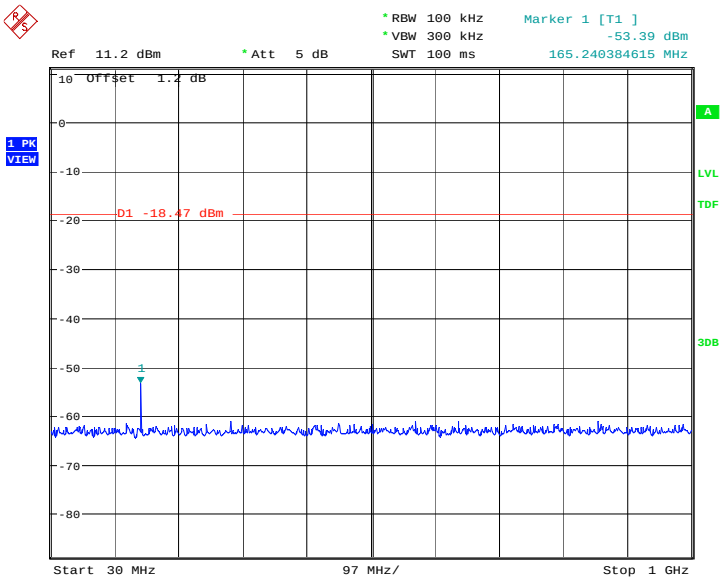
Date: 12.OCT.2013 15:59:29

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



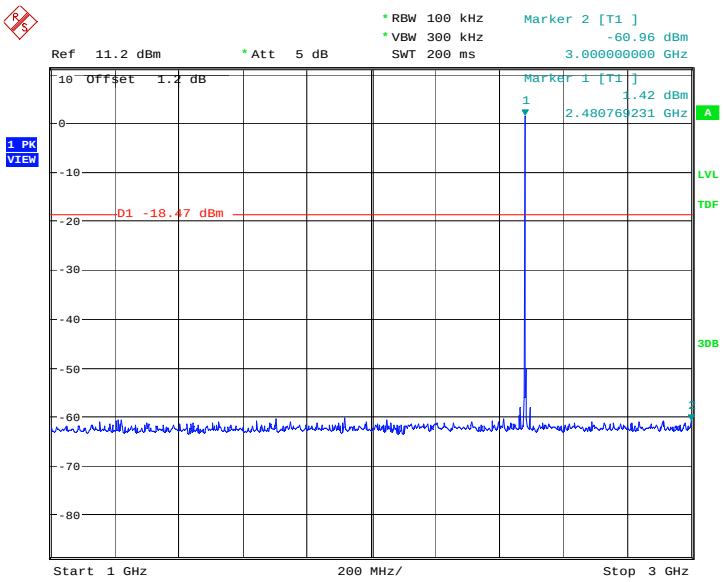
Date: 12.OCT.2013 15:59:46

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



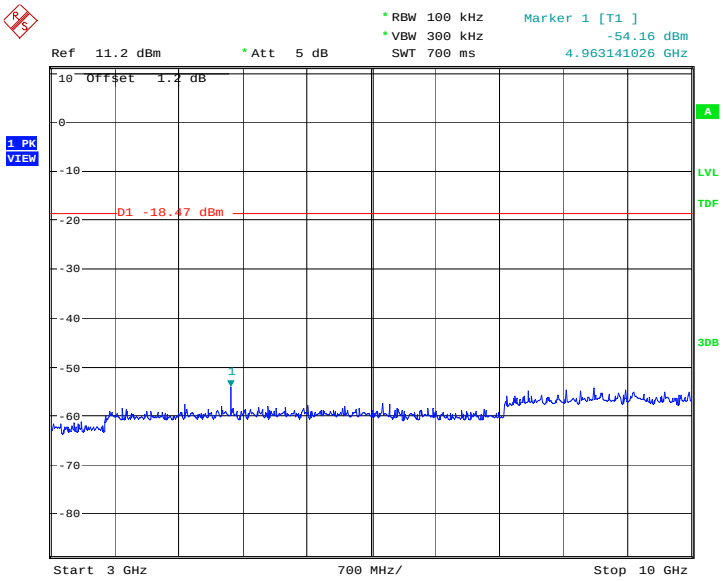
Date: 12.OCT.2013 16:00:03

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



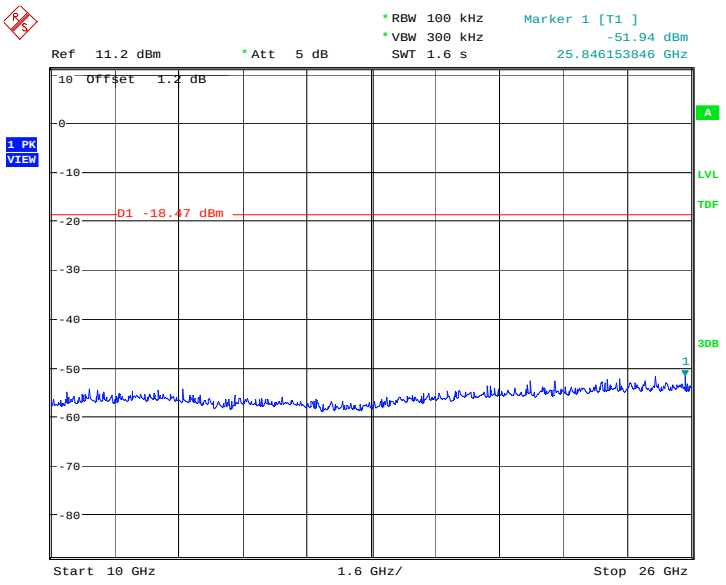
Date: 12.OCT.2013 16:00:34

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



Date: 12.OCT.2013 16:00:51

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



Date: 12.OCT.2013 16:01:07

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	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=$P_{Mea} + G_{PL} + G_A$

For GFSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	30 MHz ~ 1 GHz	Fig.58	P
	1 GHz ~ 18 GHz	Fig.59	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.60	P
	1 GHz ~ 18 GHz	Fig.61	P
Ch 78 2480 MHz	30 MHz ~ 1 GHz	Fig.62	P
	1 GHz ~ 18 GHz	Fig.63	P
Power	2.38GHz~2.4GHz---L	Fig.64	P
Power	2.45GHz~2.5GHz---H	Fig.65	P
For all channels	18 GHz ~ 26 GHz	Fig.66	P

Forπ/4 DQPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	30 MHz ~ 1 GHz	Fig.67	P
	1 GHz ~ 18 GHz	Fig.68	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.69	P
	1 GHz ~ 18 GHz	Fig.70	P
Ch 78 2480 MHz	30 MHz ~ 1 GHz	Fig.71	P
	1 GHz ~ 18 GHz	Fig.72	P
Power	2.38GHz~2.4GHz---L	Fig.73	P
Power	2.45GHz~2.5GHz---H	Fig.74	P
For all channels	18 GHz ~ 26 GHz	Fig.75	P

For 8DPSK

Channel	Frequency Range	Test Results	Conclusion
Ch 0 2402 MHz	30 MHz ~ 1 GHz	Fig.76	P
	1 GHz ~ 18 GHz	Fig.77	P
Ch 39 2441 MHz	30 MHz ~ 1 GHz	Fig.78	P
	1 GHz ~ 18 GHz	Fig.79	P
Ch 78 2480 MHz	30 MHz ~ 1 GHz	Fig.80	P
	1 GHz ~ 18 GHz	Fig.81	P
Power	2.38GHz~2.4GHz---L	Fig.82	P
Power	2.45GHz~2.5GHz---H	Fig.83	P
For all channels	18 GHz ~ 26 GHz	Fig.84	P

GFSK Ch 0-PK

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
16828.063	59.7	-20.5	39.9	40.3	H
16629.375	59.4	-19.9	39.9	39.4	V
17864.000	59.4	-18.5	45.6	32.3	V
17913.406	59.2	-18.5	45.6	32.1	V
17440.063	59.2	-19.2	41.5	36.9	V
16737.750	58.9	-20.5	39.9	39.5	H

GFSK Ch 39-PK

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17840.094	58.6	-18.5	45.6	31.5	V
17848.594	58.6	-18.5	45.6	31.5	H
17833.188	58.6	-18.5	45.6	31.5	V
17808.219	58.5	-18.5	45.6	31.4	V
17603.688	58.3	-18.9	45.6	31.6	V
17479.375	58.3	-19.2	41.5	36.0	V

GFSK Ch 78-PK

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17857.094	58.1	-18.5	45.6	31.0	H
17264.750	57.8	-19.5	41.5	35.8	V
17482.031	57.7	-19.2	41.5	35.4	H
17837.438	57.5	-18.5	45.6	30.4	V
17860.813	57.4	-18.5	45.6	30.3	V
17718.969	57.3	-18.9	45.6	30.6	V

π/4 DQPSK Ch 0-PK

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
16474.250	58.5	-20.5	38.7	40.3	H
17491.594	58.4	-19.2	41.5	36.1	V
17875.156	57.9	-18.5	45.6	30.8	H
17854.969	57.9	-18.5	45.6	30.8	H
17299.281	57.6	-19.5	41.5	35.6	V
17815.656	57.5	-18.5	45.6	30.4	V

π/4 DQPSK Ch 39-PK

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17865.594	59.5	-18.5	45.6	32.4	H
17360.375	58.5	-19.5	41.5	36.5	H
17903.844	58.1	-18.5	45.6	31.0	H
17161.156	58.0	-19.8	41.5	36.3	V
17037.375	57.9	-19.9	41.5	36.3	V
17825.750	57.9	-18.5	45.6	30.8	H

π/4 DQPSK Ch 78-PK

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17867.188	58.6	-18.5	45.6	31.5	H
16590.594	58.5	-19.9	39.9	38.5	H
17895.875	58.5	-18.5	45.6	31.4	H
16432.813	58.4	-20.5	38.7	40.2	V
16465.750	58.2	-20.5	38.7	40.0	H
17406.594	58.0	-19.2	41.5	35.7	H

8DPSK Ch 0-PK

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17918.188	58.9	-17.7	45.6	31.0	H
17859.219	58.3	-18.5	45.6	31.2	H
17898.531	57.9	-18.5	45.6	30.8	H
17865.594	57.7	-18.5	45.6	30.6	V
16460.969	57.7	-20.5	38.7	39.5	V
17810.875	57.7	-18.5	45.6	30.6	H

8DPSK Ch 39-PK

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17940.500	58.8	-17.7	45.6	30.9	H
17799.188	57.8	-18.5	45.6	30.7	H
17311.500	57.4	-19.5	41.5	35.4	H
17827.344	57.4	-18.5	45.6	30.3	H
17984.594	57.4	-17.7	45.6	29.5	V
17092.094	57.3	-19.8	41.5	35.6	V

8DPSK Ch 78-PK

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17884.188	57.9	-18.5	45.6	30.8	V
17412.438	57.9	-19.2	41.5	35.6	V
17082.000	57.6	-19.8	41.5	35.9	V
17289.719	57.5	-19.5	41.5	35.5	H
17934.656	57.5	-17.7	45.6	29.6	V
17928.813	57.4	-17.7	45.6	29.5	V

GFSK Ch 0-AV

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17439.531	53.0	-19.2	41.5	30.7	V
17803.438	53.0	-18.5	45.6	25.9	H
16532.688	52.9	-20.5	39.9	33.5	V
16596.438	52.5	-19.9	39.9	32.5	H
16737.219	52.4	-20.5	39.9	33.0	H
17477.781	52.4	-19.2	41.5	30.1	H

GFSK Ch 39-AV

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17414.563	52.6	-19.2	41.5	30.3	V
17898.531	52.5	-18.5	45.6	25.4	H
16470.531	52.1	-20.5	38.7	33.9	V
17825.750	52.0	-18.5	45.6	24.9	H
17515.500	52.0	-19.2	45.6	25.6	V
17827.344	52.0	-18.5	45.6	24.9	H

GFSK Ch 78-AV

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17857.094	52.4	-18.5	45.6	25.3	H
17866.125	51.8	-18.5	45.6	24.7	V
17805.031	51.7	-18.5	45.6	24.6	V
2416.313	51.5	-38.9	27.7	62.7	V
17439.000	51.5	-19.2	41.5	29.2	H
16968.313	51.4	-19.9	39.9	31.4	V

π/4 DQPSK Ch 0-AV

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity

17863.469	53.0	-18.5	45.6	25.9	V
17883.125	52.5	-18.5	45.6	25.4	H
17374.719	51.9	-19.5	41.5	29.9	V
16702.156	51.8	-19.9	39.9	31.8	V
17871.438	51.8	-18.5	45.6	24.7	H
17782.719	51.6	-18.5	45.6	24.5	H

π/4 DQPSK Ch 39-AV

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17483.094	52.0	-19.2	41.5	29.7	V
17799.719	52.0	-18.5	45.6	24.9	V
17518.156	51.9	-19.2	45.6	25.5	V
17809.281	51.9	-18.5	45.6	24.8	V
17854.969	51.7	-18.5	45.6	24.6	V
17154.781	51.6	-19.8	41.5	29.9	H

π/4 DQPSK Ch 78-AV

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17867.188	52.4	-18.5	45.6	25.3	V
17895.875	52.2	-18.5	45.6	25.1	V
16600.688	52.1	-19.9	39.9	32.1	H
17493.188	52.0	-19.2	41.5	29.7	H
17819.375	51.9	-18.5	45.6	24.8	H
17886.313	51.9	-18.5	45.6	24.8	H

8DPSK Ch 0-AV

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17833.188	52.1	-18.5	45.6	25.0	V
17877.281	52.0	-18.5	45.6	24.9	V
17438.469	51.8	-19.2	41.5	29.5	V
17834.781	51.7	-18.5	45.6	24.6	V
17446.969	51.7	-19.2	41.5	29.4	H
17810.875	51.7	-18.5	45.6	24.6	V

8DPSK Ch 39-AV

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17420.406	52.0	-19.2	41.5	29.7	H
17940.500	51.6	-17.7	45.6	23.7	H
17754.563	51.6	-18.5	45.6	24.5	H
17478.313	51.4	-19.2	41.5	29.1	V
17124.500	51.4	-19.8	41.5	29.7	H
17101.656	51.4	-19.8	41.5	29.7	V

8DPSK Ch 78-AV

Frequency(MHz)	Result(dBuV/m)	G_{PL} (dB)	G_A (dB/m)	P_{Mea}(dBuV)	Polarity
17890.563	52.8	-18.5	45.6	25.7	V
17820.438	52.0	-18.5	45.6	24.9	H

17372.063	51.8	-19.5	41.5	29.8	H
16471.594	51.6	-20.5	38.7	33.4	H
17870.375	51.6	-18.5	45.6	24.5	H
17953.250	51.5	-17.7	45.6	23.6	V

Conclusion: PASS

Note:

The radiated 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:

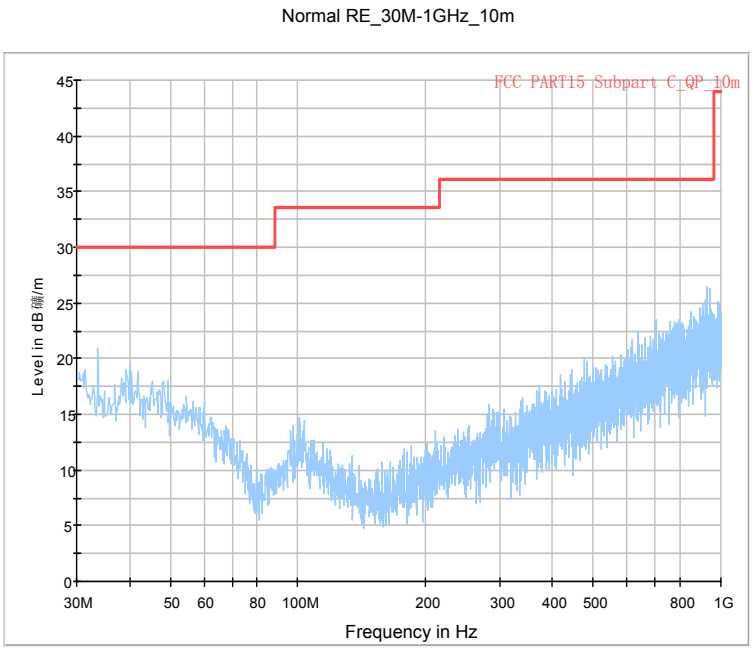


Fig.58. Radiated emission: GFSK, Channel 0, 30 MHz - 1 GHz

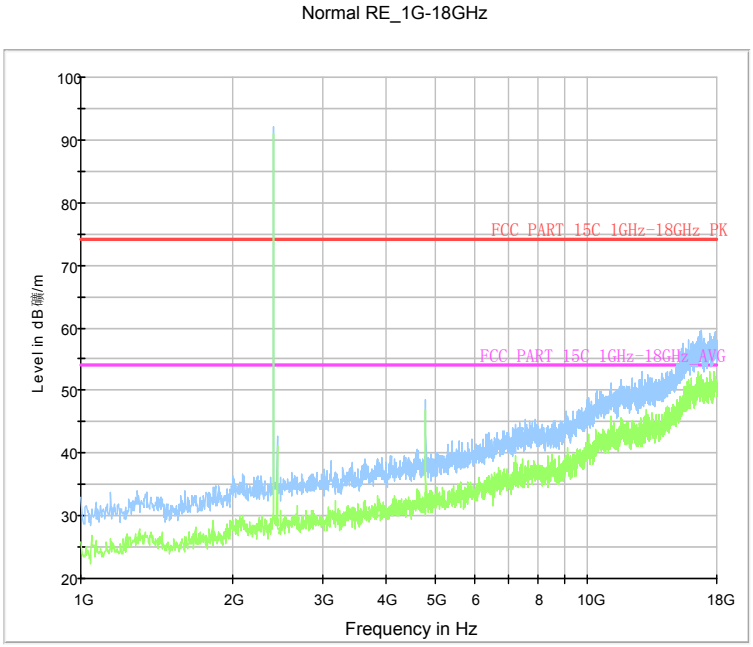


Fig.59. Radiated emission: GFSK, Channel 0, 1 GHz - 18 GHz

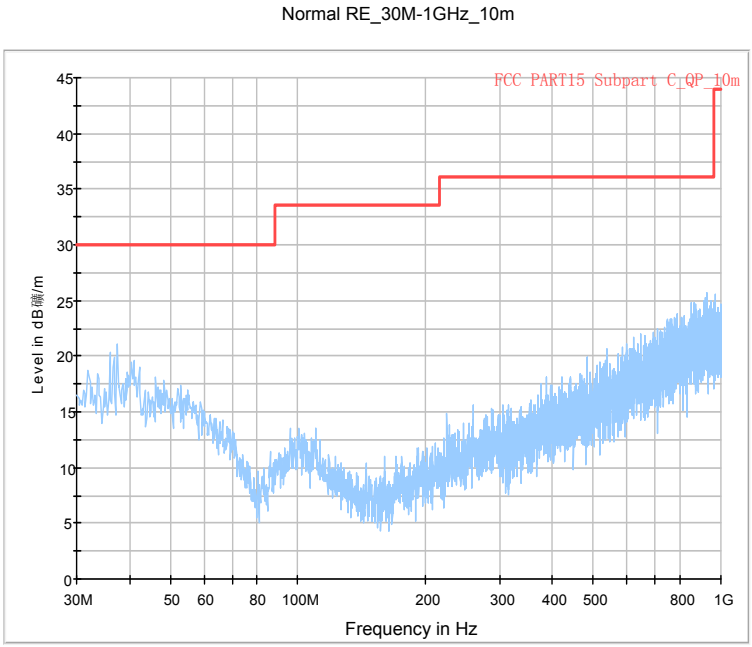


Fig.60. Radiated emission: GFSK, Channel 39, 30 MHz - 1 GHz

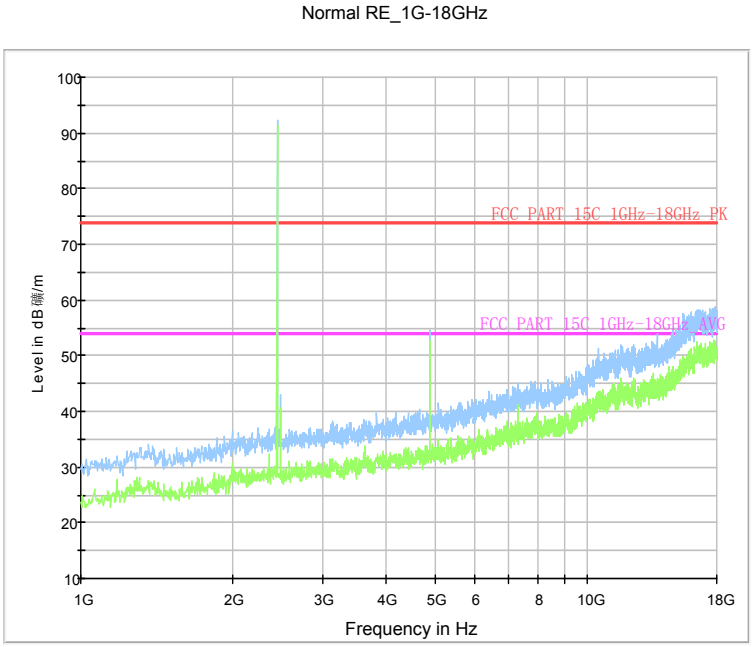


Fig.61. Radiated emission: GFSK, Channel 39, 1 GHz - 18 GHz

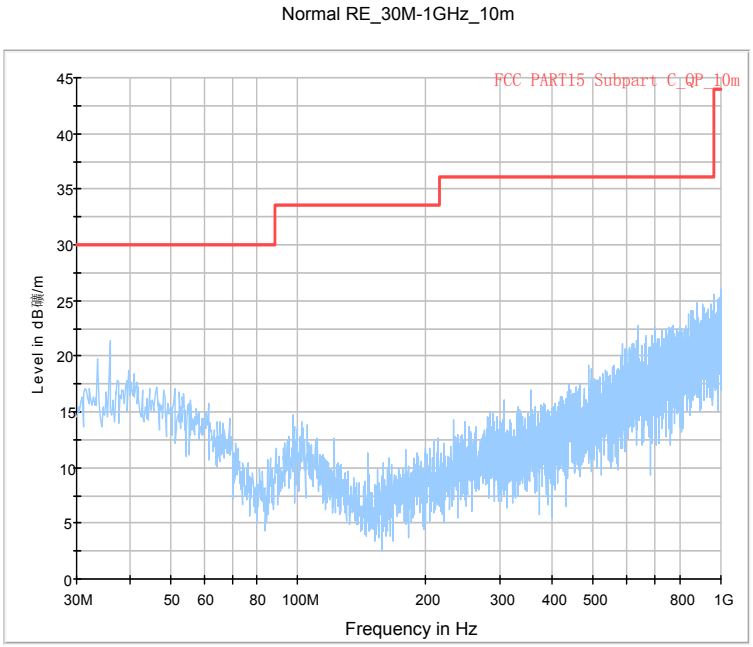


Fig.62. Radiated emission: GFSK, Channel 78, 30 MHz - 1 GHz

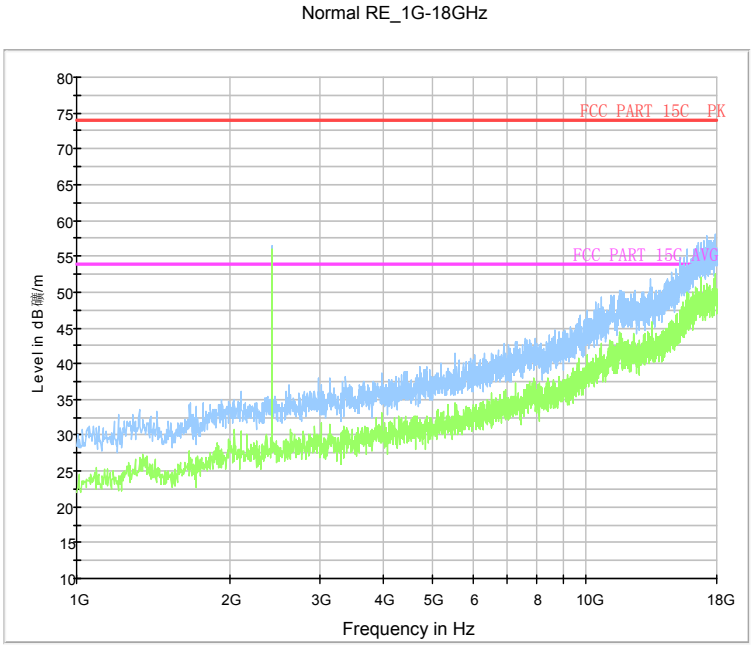


Fig.63. Radiated emission: GFSK, Channel 78, 1 GHz - 18 GHz

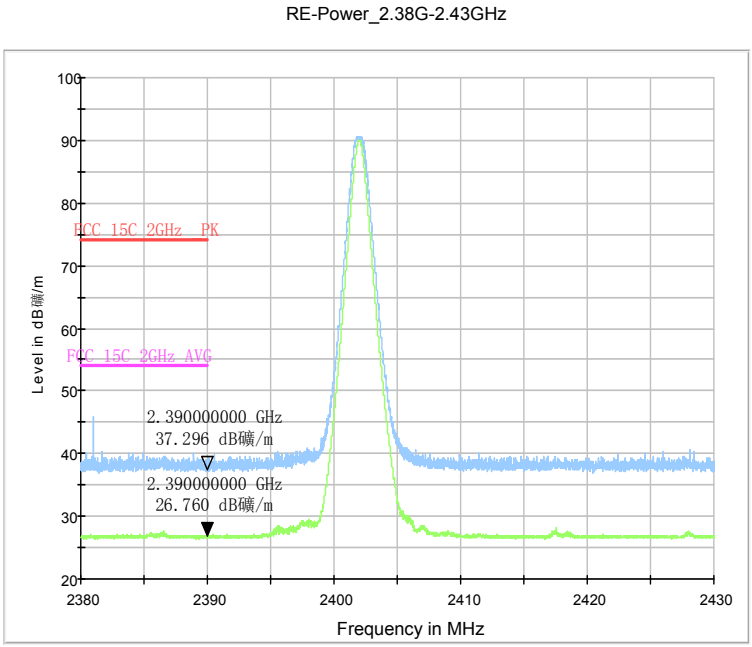


Fig.64. Radiated emission (Power): GFSK, low channel

RE-Power_2.45G-2.5GHz

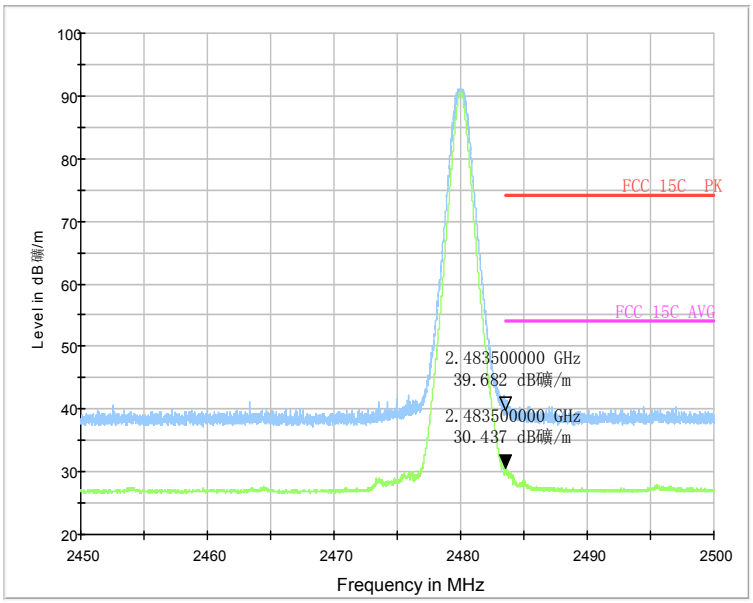


Fig.65. Radiated emission (Power) GFSK, high channel

Normal RE_18G-26.5GHz

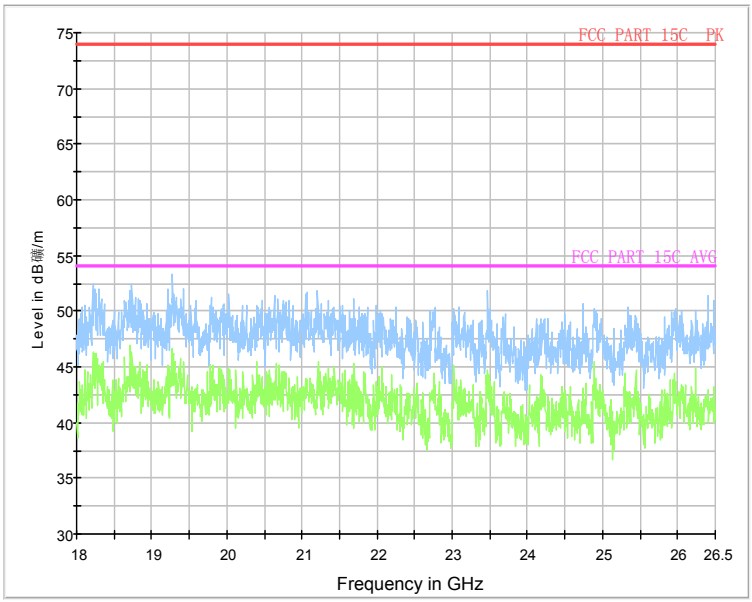


Fig.66. Radiated emission: GFSK, 18 GHz - 26 GHz

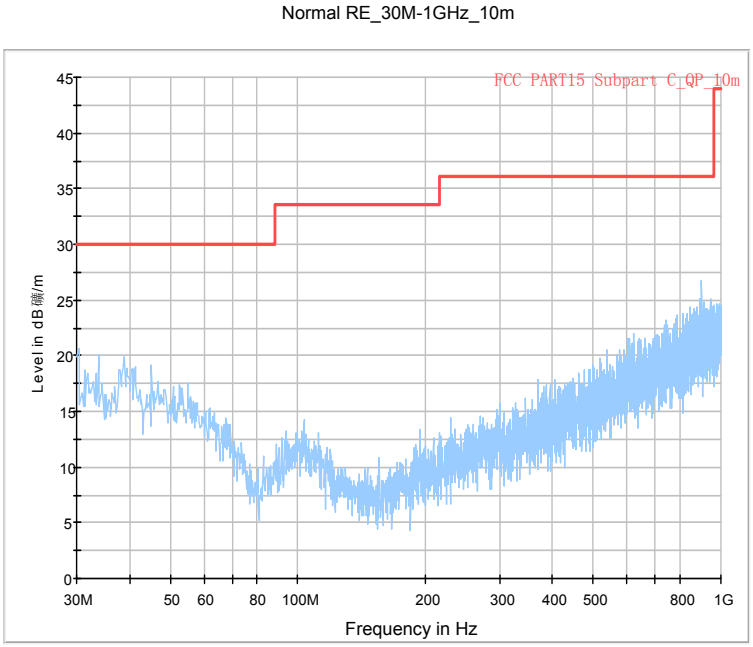


Fig.67. Radiated emission: π/4 DQPSK, Channel 0, 30 MHz - 1 GHz

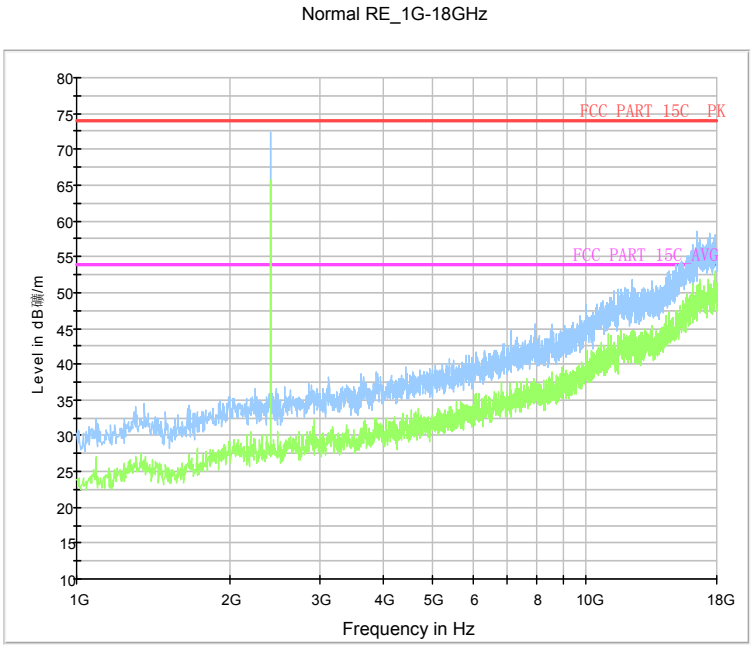


Fig.68. Radiated emission: π/4 DQPSK, Channel 0, 1 GHz - 18 GHz

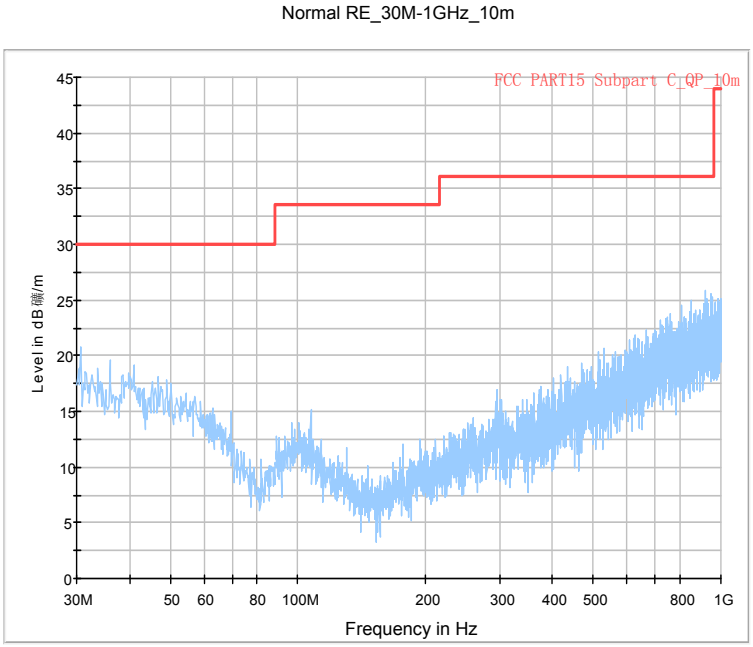


Fig.69. Radiated emission: π/4 DQPSK, Channel 39, 30 MHz - 1 GHz

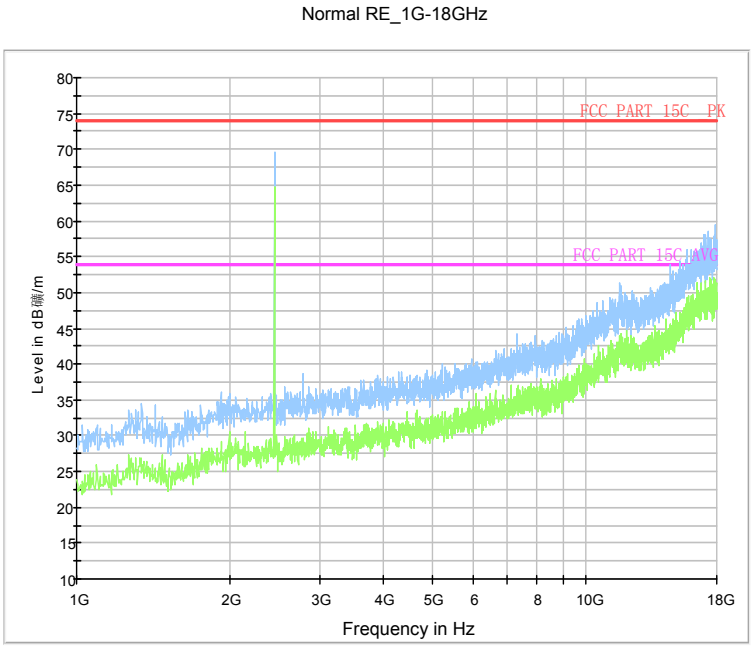


Fig.70. Radiated emission: π/4 DQPSK, Channel 39, 1 GHz - 18 GHz

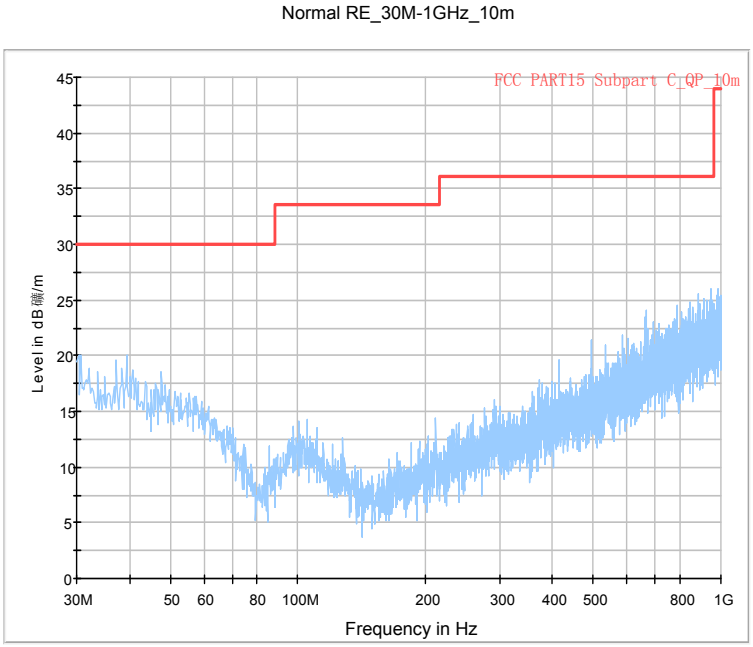


Fig.71. Radiated emission: π/4 DQPSK, Channel 78, 30 MHz - 1 GHz

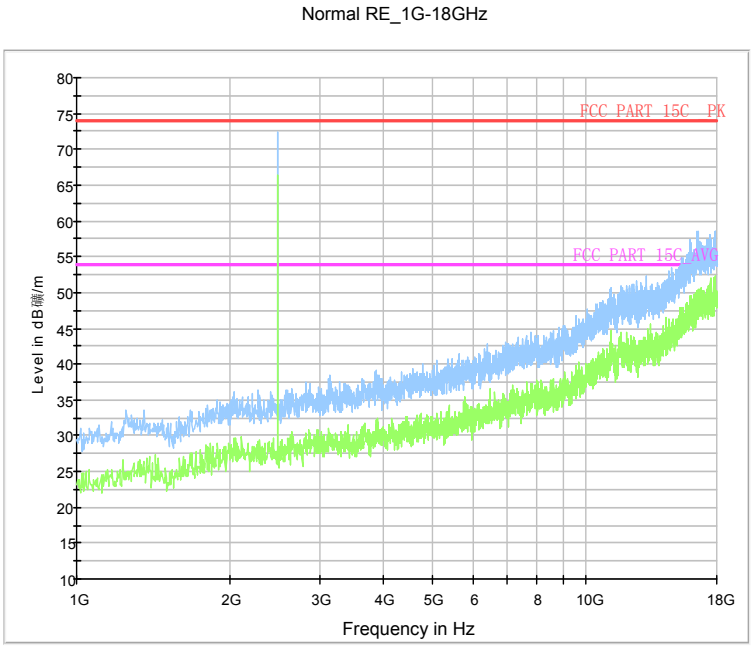


Fig.72. Radiated emission: π/4 DQPSK, Channel 78, 1 GHz - 18 GHz

RE-Power_2.38G-2.43GHz

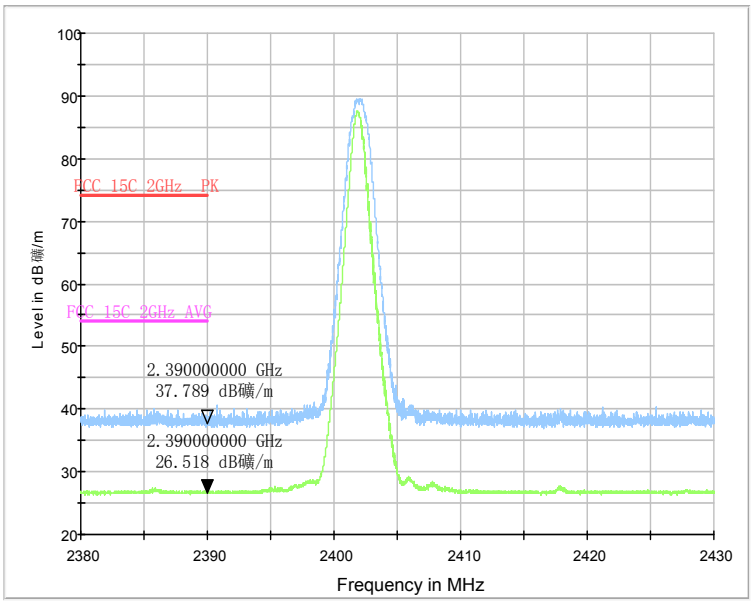


Fig.73. Radiated emission (Power): π/4 DQPSK, low channel

RE-Power_2.45G-2.5GHz

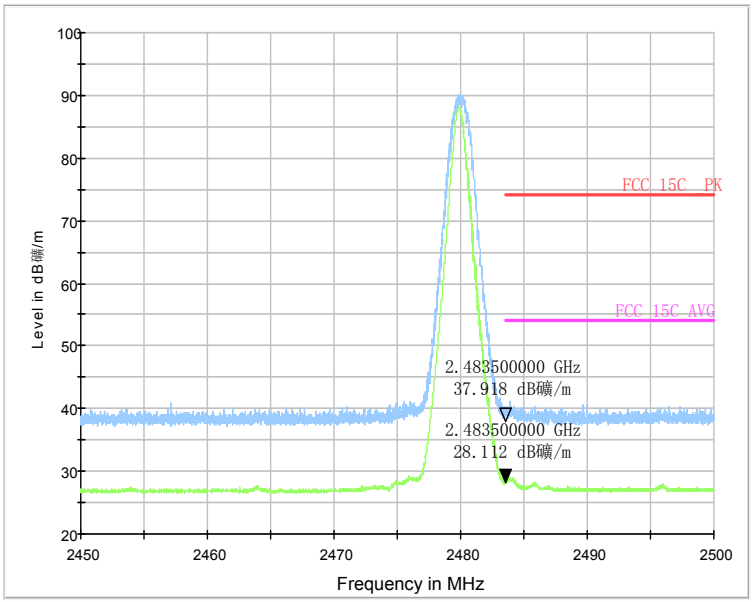


Fig.74. Radiated emission (Power): π/4 DQPSK, high channel

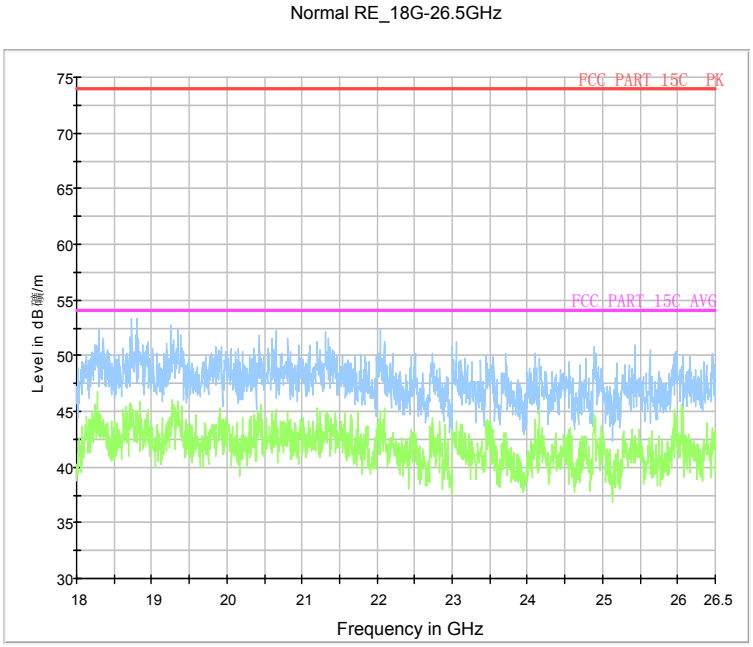


Fig.75. Radiated emission: π/4 DQPSK, 18 GHz - 26 GHz

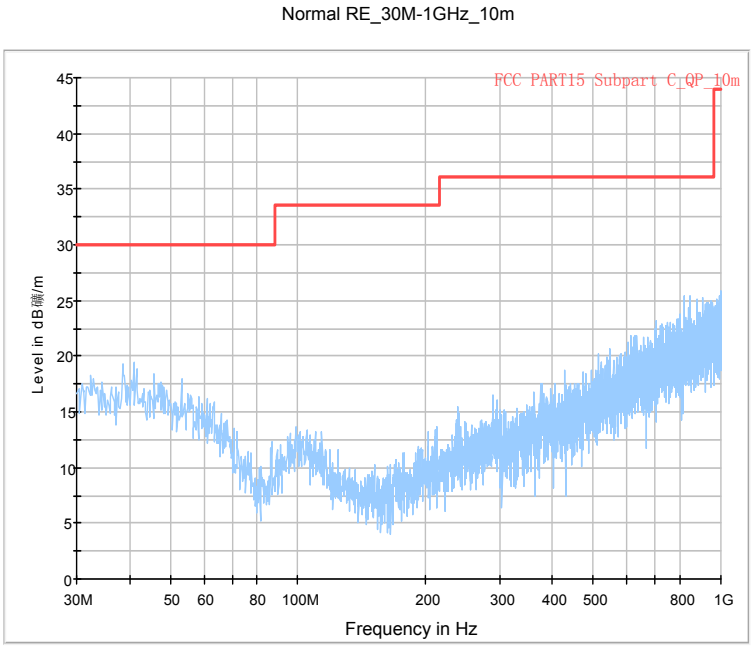


Fig.76. Radiated emission: 8DPSK, Channel 0, 30 MHz - 1 GHz

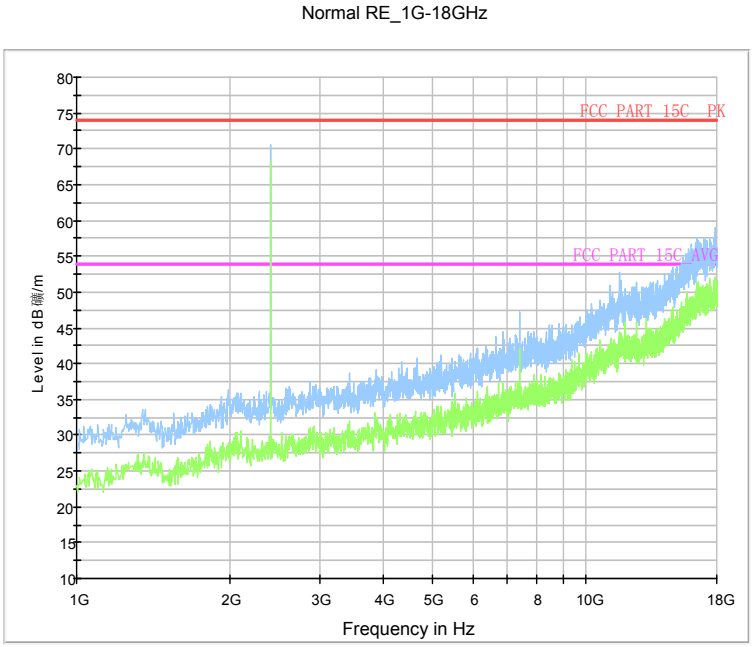


Fig.77. Radiated emission: 8DPSK, Channel 0, 1 GHz - 18 GHz

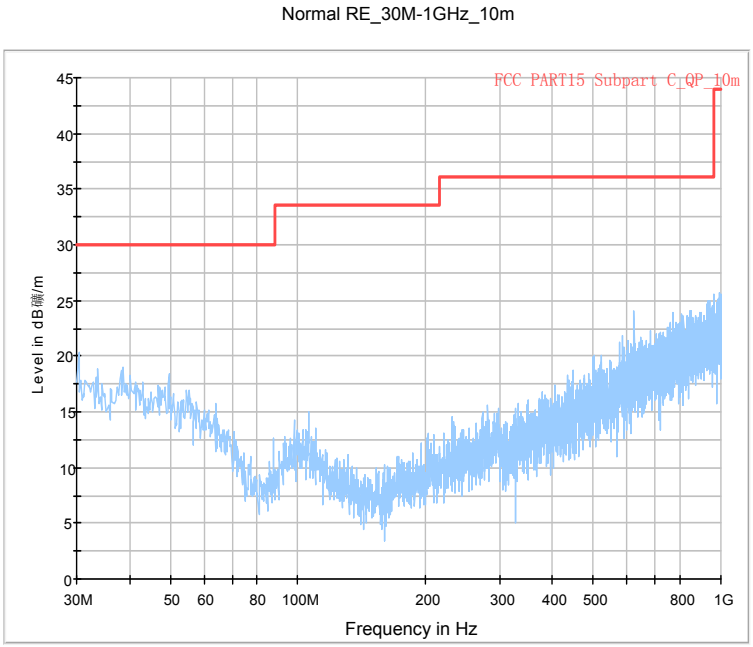


Fig.78. Radiated emission: 8DPSK, Channel 39, 30 MHz - 1 GHz

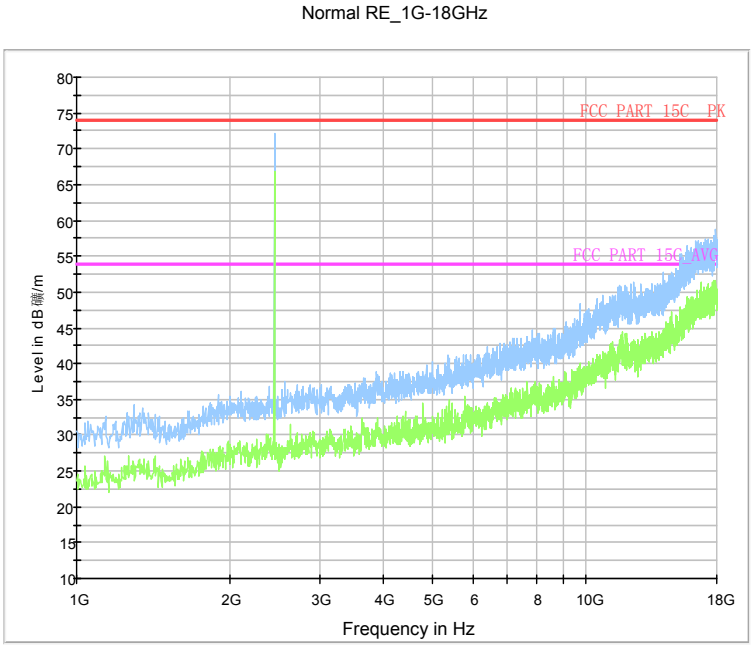


Fig.79. Radiated emission: 8DPSK, Channel 39, 1 GHz - 18 GHz

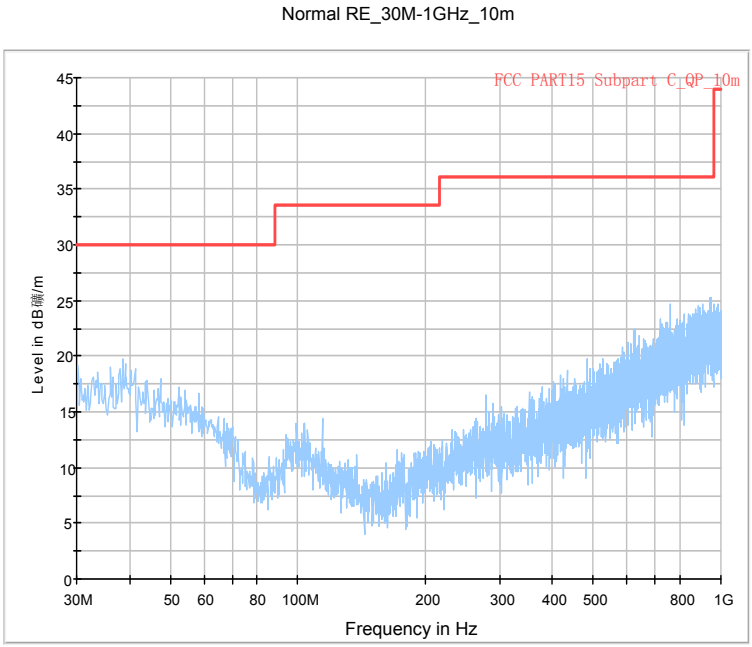


Fig.80. Radiated emission: 8DPSK, Channel 78, 30 MHz - 1 GHz

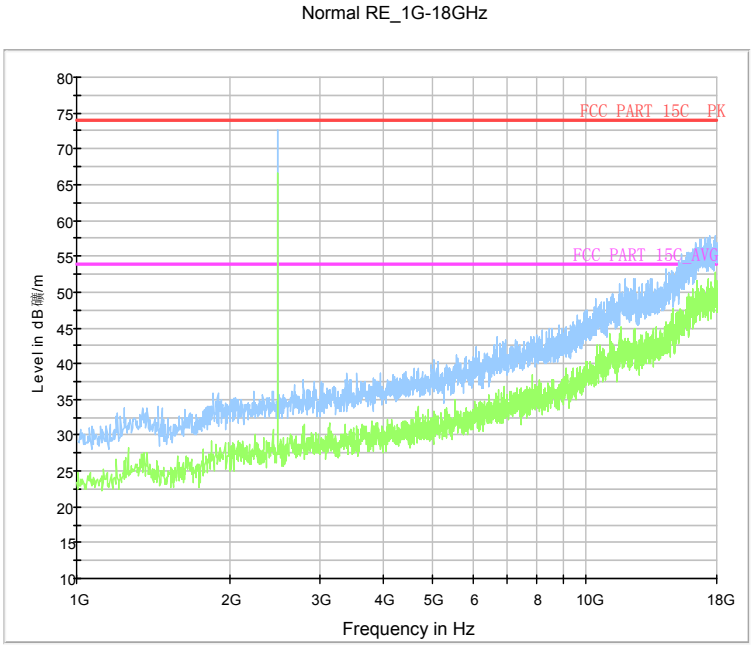


Fig.81. Radiated emission: 8DPSK, Channel 78, 1 GHz - 18 GHz

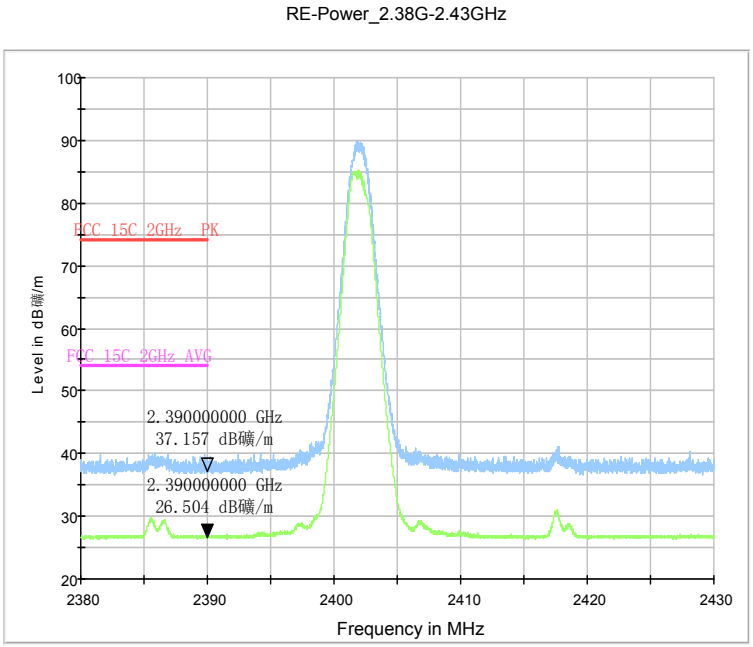


Fig.82. Radiated emission (Power): 8DPSK, low channel

RE-Power_2.45G-2.5GHz

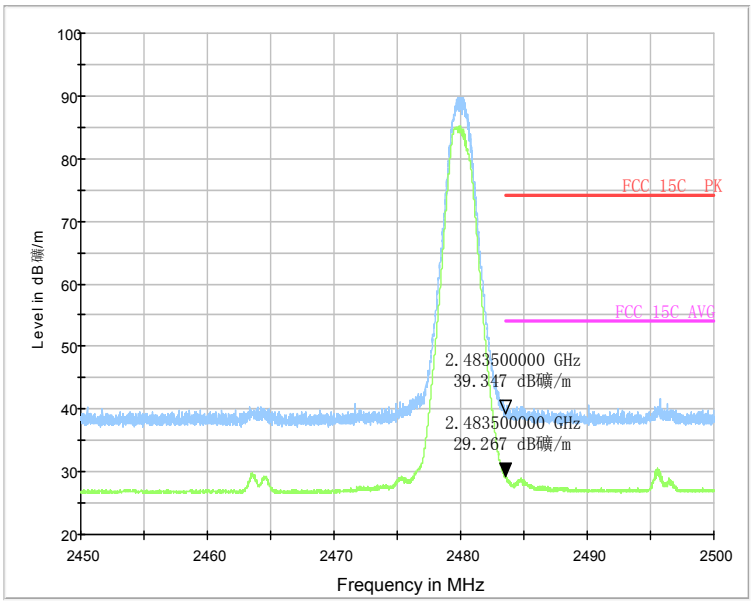


Fig.83. Radiated emission (Power): 8DPSK, high channel

Normal RE_18G-26.5GHz

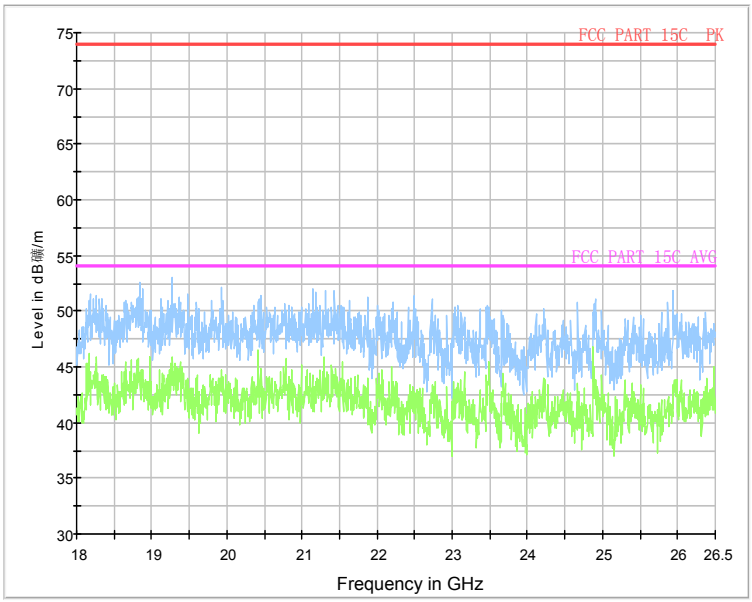


Fig.84. Radiated emission: 8DPSK, 18 GHz - 26 GHz

A.6. Time of Occupancy (Dwell Time)

Measurement Limit:

Standard	Limit (ms)
FCC 47 CFR Part 15.247(a) (1)(iii)	< 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.)×0.4s×79.

Measurement Result:

For GFSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.85	106.25	P
		Fig.86		
	DH3	Fig.87	216.40	P
		Fig.88		
	DH5	Fig.89	217.36	P
		Fig.90		

For π/4 DQPSK

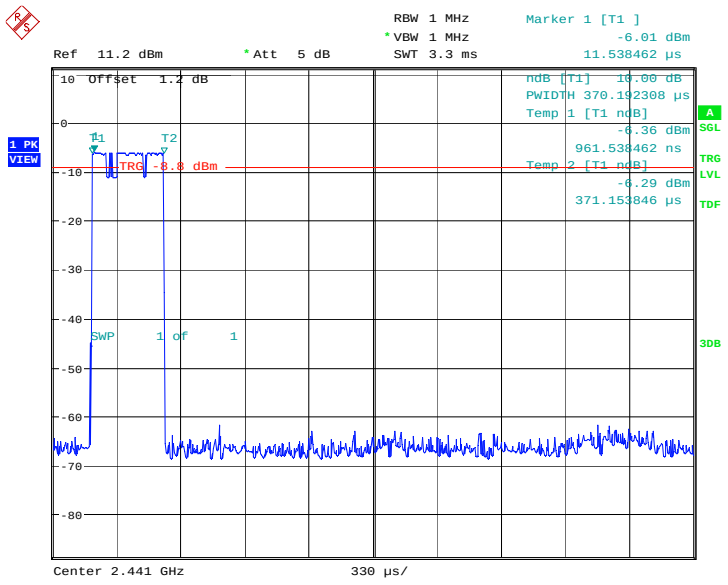
Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.91	106.23	P
		Fig.92		
	DH3	Fig.93	159.02	P
		Fig.94		
	DH5	Fig.95	182.91	P
		Fig.96		

For 8DPSK

Channel	Packet	Dwell Time (ms)		Conclusion
39	DH1	Fig.97	110.03	P
		Fig.98		
	DH3	Fig.99	160.66	P
		Fig.100		
	DH5	Fig.101	197.07	P
		Fig.102		

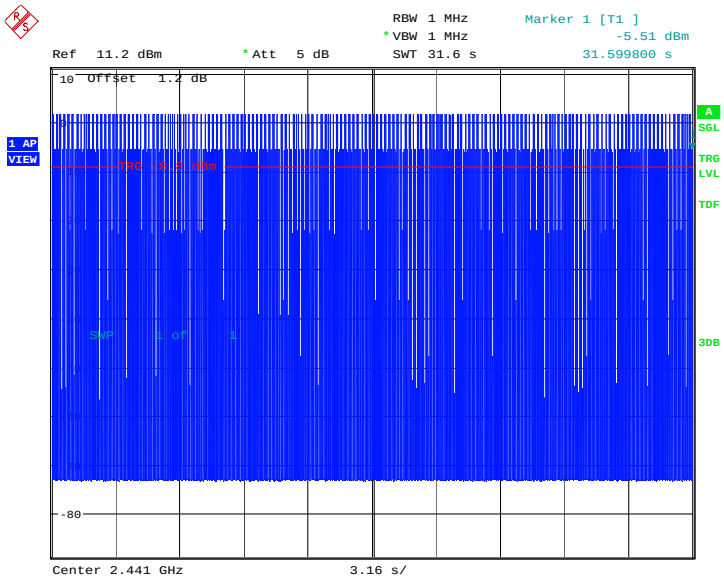
Conclusion: PASS

Test graphs as below:



Date: 12.OCT.2013 15:19:37

Fig.85. Time of occupancy (Dwell Time): Channel 39, Packet DH1



Date: 12.OCT.2013 15:19:25

Fig.86. Number of Transmissions Measurement:Channel 39,Packet DH1

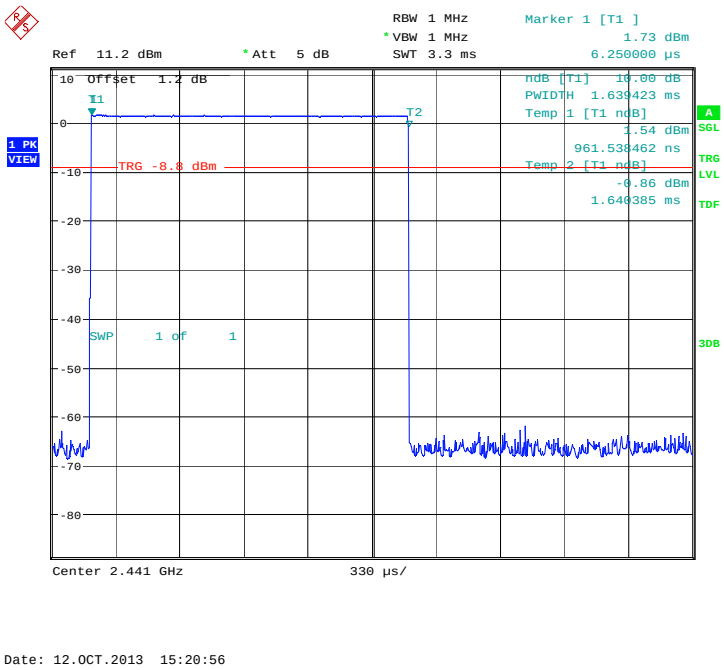


Fig.87. Time of occupancy (Dwell Time): Channel 39, Packet DH3

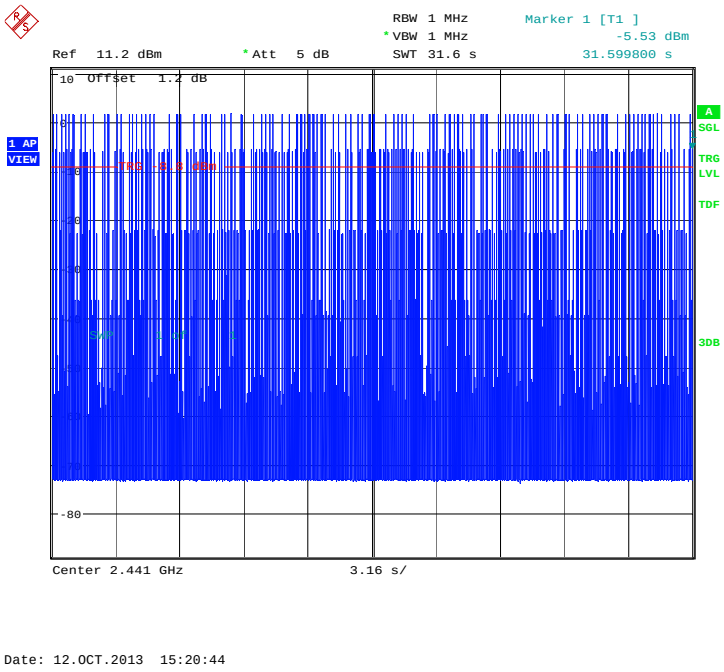


Fig.88. Number of Transmissions Measurement:Channel 39,Packet DH3

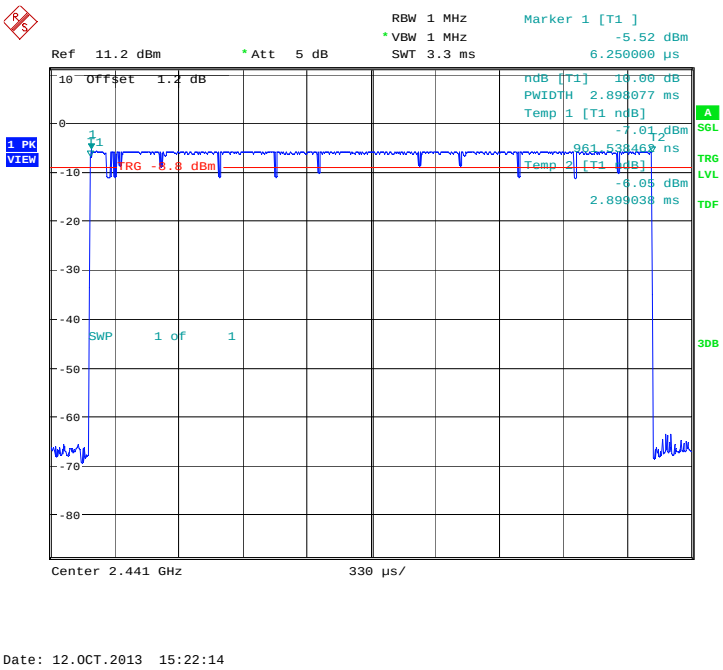


Fig.89. Time of occupancy (Dwell Time): Channel 39, Packet DH5

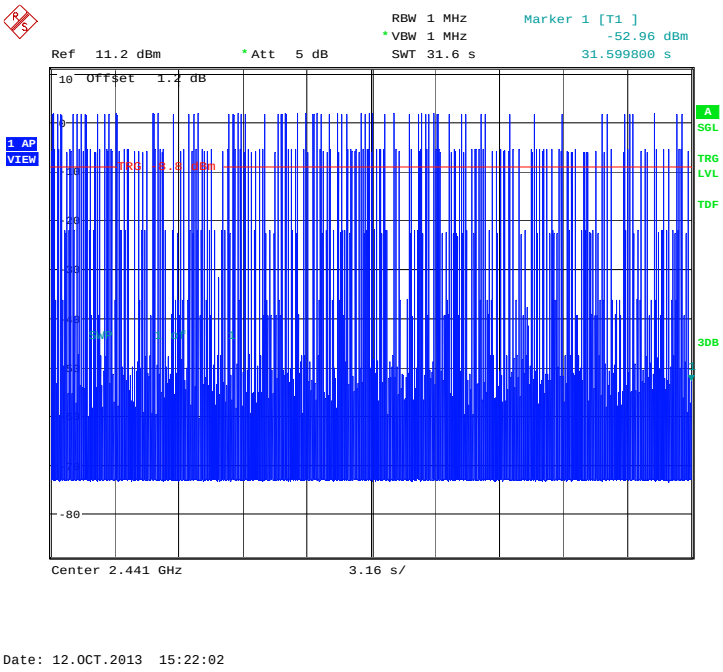


Fig.90. Number of Transmissions Measurement:Channel 39,Packet DH5

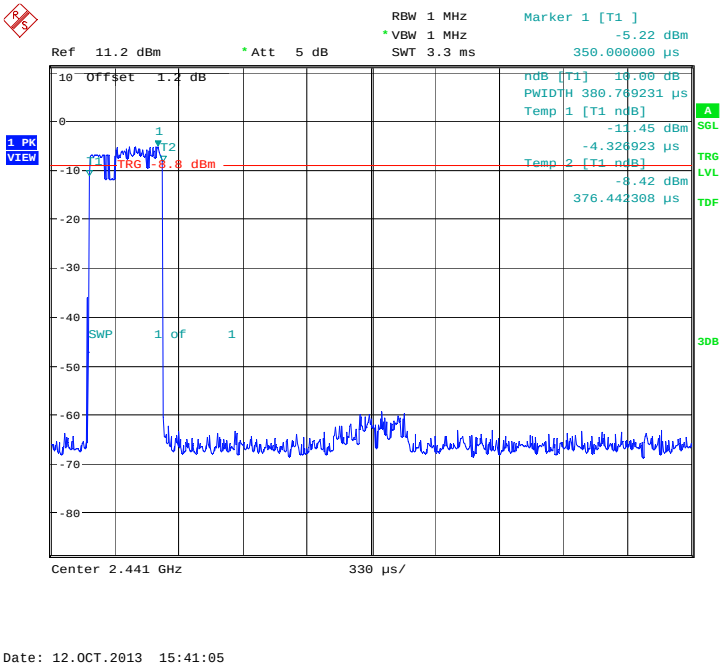


Fig.91. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH1

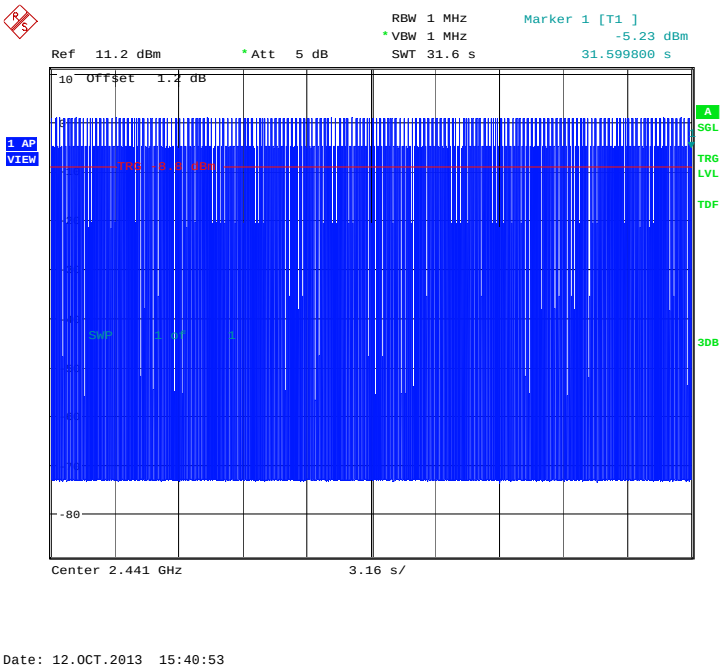


Fig.92. Number of Transmissions Measurement:Channel 39,Packet 2-DH1

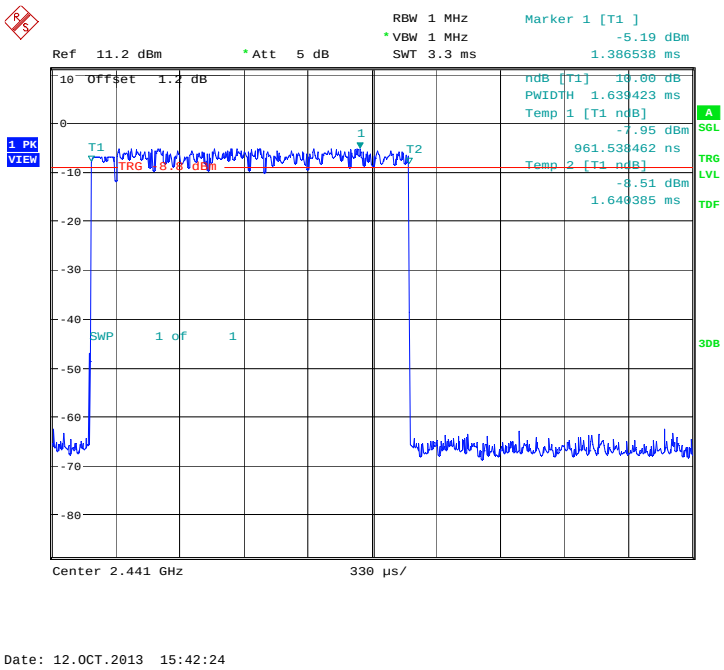


Fig.93. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH3

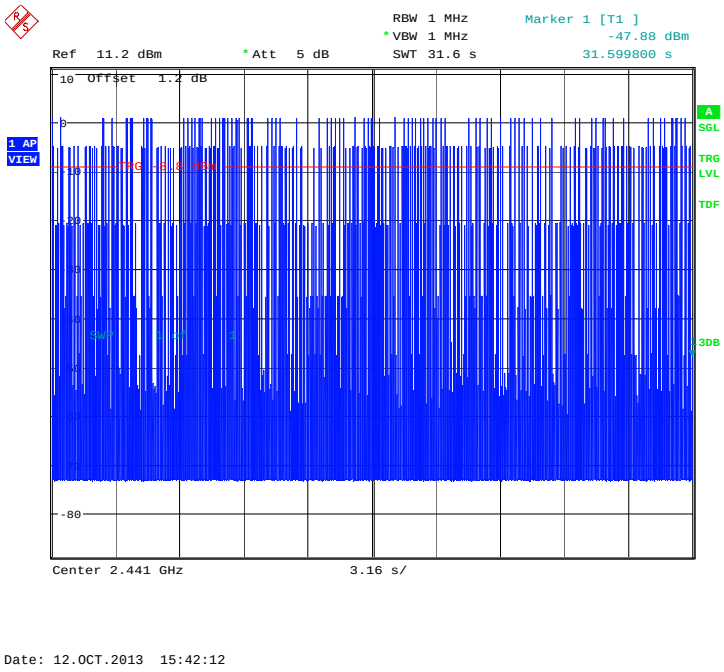


Fig.94. Number of Transmissions Measurement:Channel 39,Packet 2-DH3

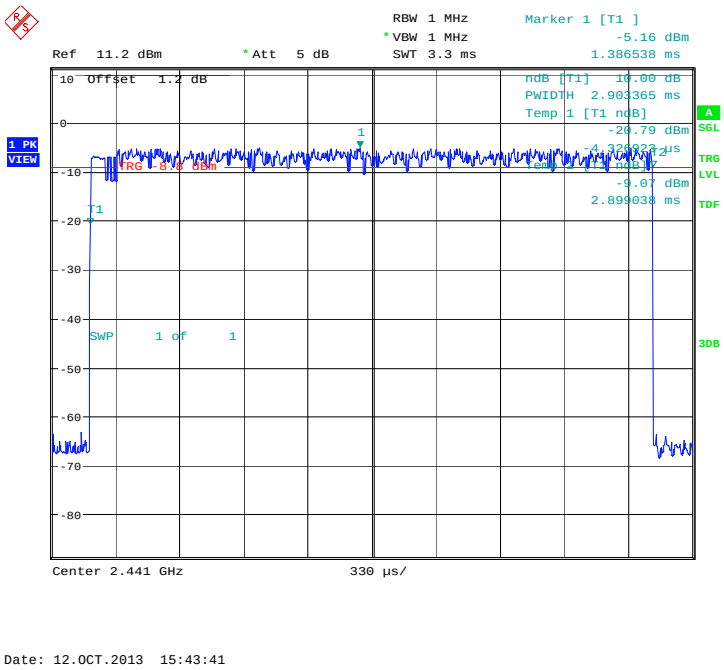


Fig.95. Time of occupancy (Dwell Time): Channel 39, Packet 2-DH5

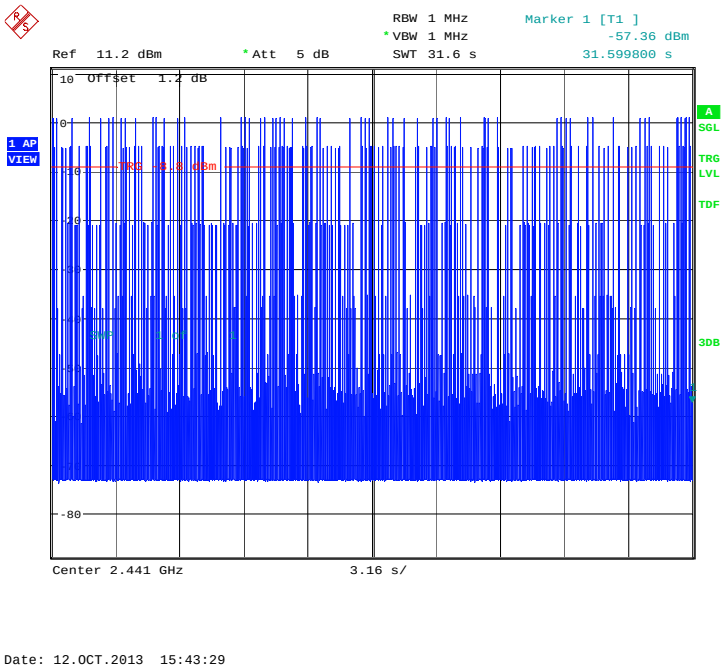


Fig.96. Number of Transmissions Measurement:Channel 39,Packet 2-DH5

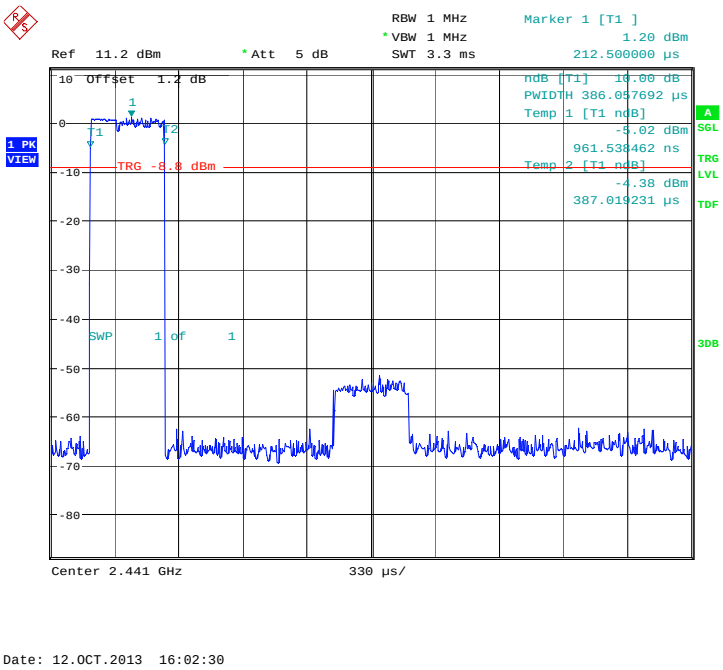


Fig.97. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH1

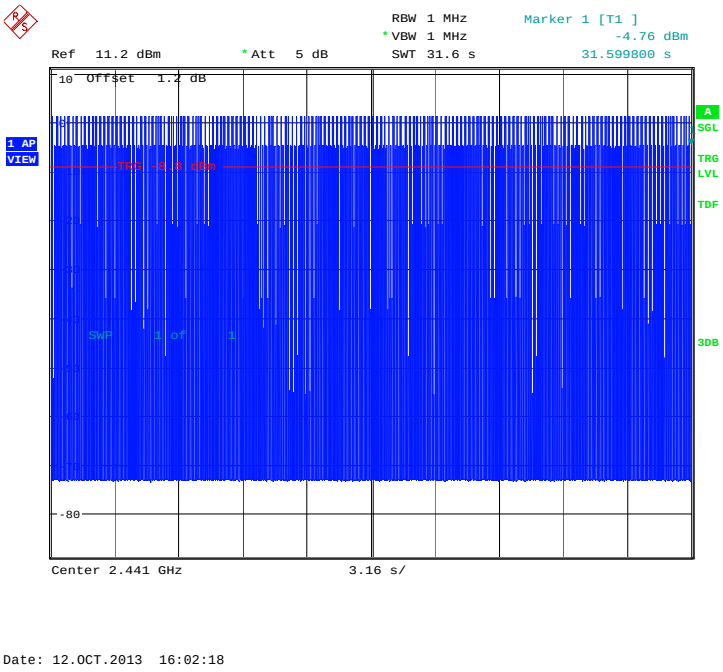


Fig.98. Number of Transmissions Measurement:Channel 39,Packet 3-DH1

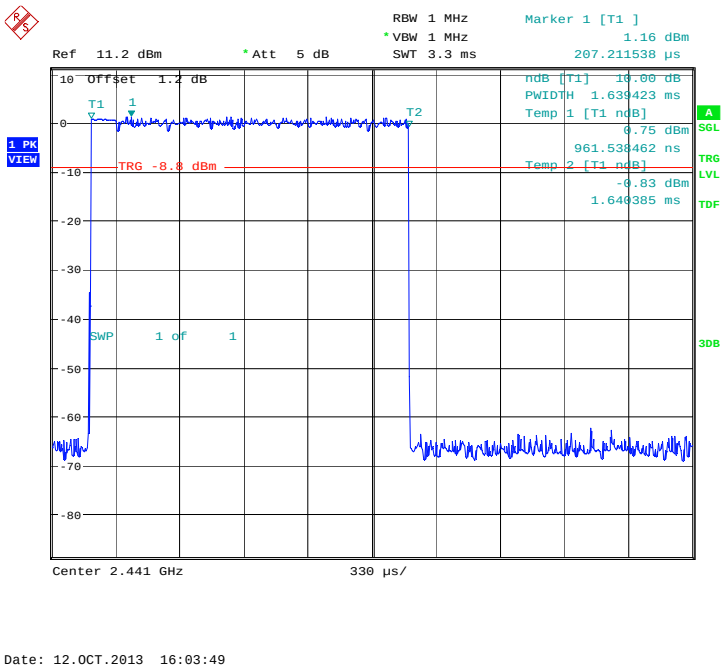


Fig.99. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH3

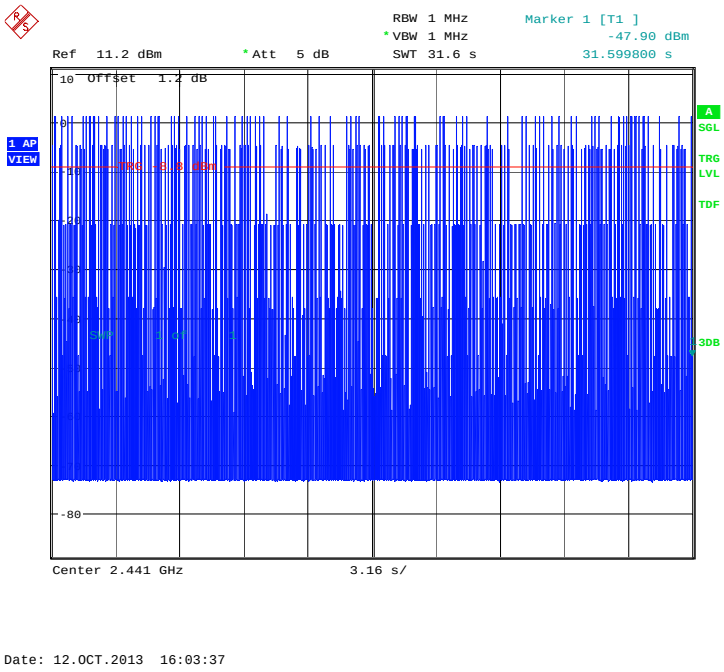


Fig.100. Number of Transmissions Measurement:Channel 39,Packet 3-DH3

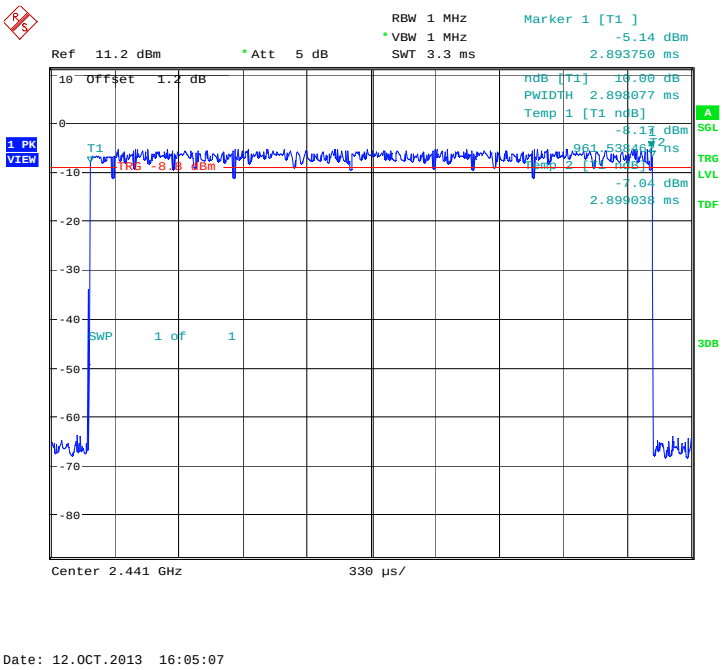


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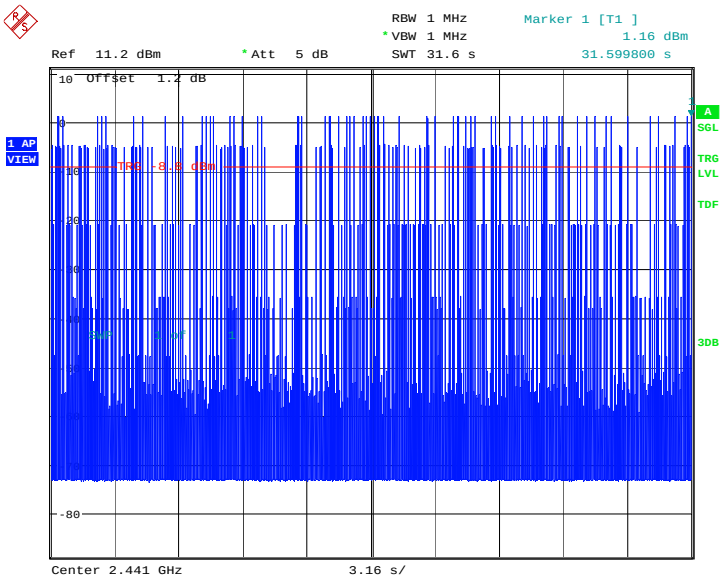
Fig.101. Time of occupancy (Dwell Time): Channel 39, Packet 3-DH5



Date: 12.OCT.2013 16:04:55

Fig.102. 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.103	865.38	NA
39	Fig.104	870.19	NA
78	Fig.105	865.38	NA

Forπ/4 DQPSK

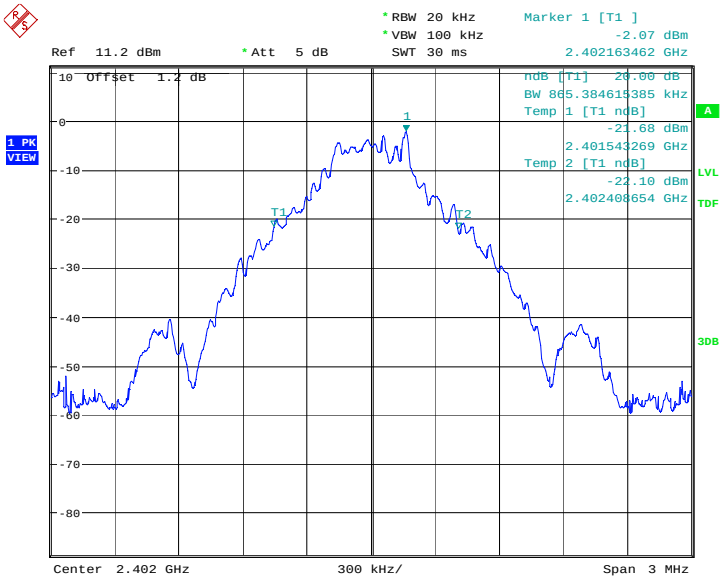
Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.106	1259.62	NA
39	Fig.107	1269.23	NA
78	Fig.108	1254.81	NA

For 8DPSK

Channel	20dB Bandwidth (kHz)		Conclusion
0	Fig.109	1211.54	NA
39	Fig.110	1269.23	NA
78	Fig.111	1211.54	NA

Conclusion: NA

Test graphs as below:



Date: 12.OCT.2013 15:22:47

Fig.103. 20dB Bandwidth: GFSK, Channel 0

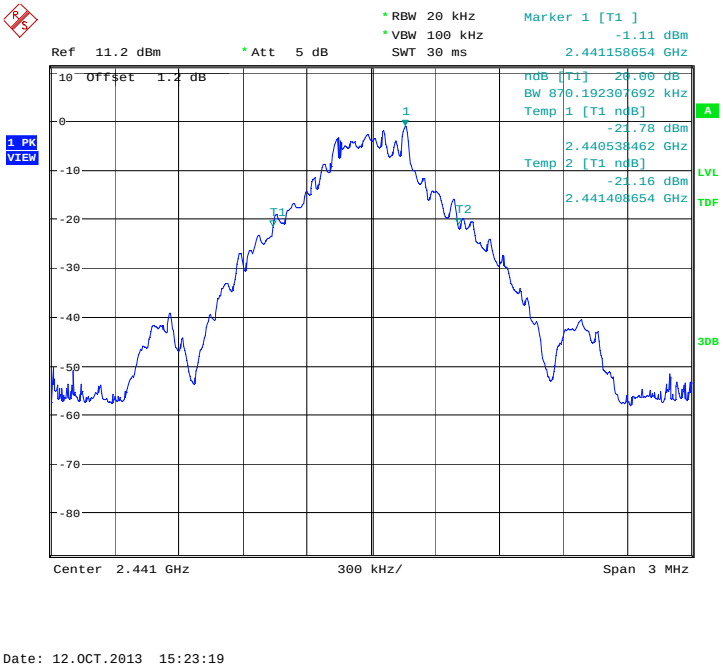


Fig.104. 20dB Bandwidth: GFSK, Channel 39

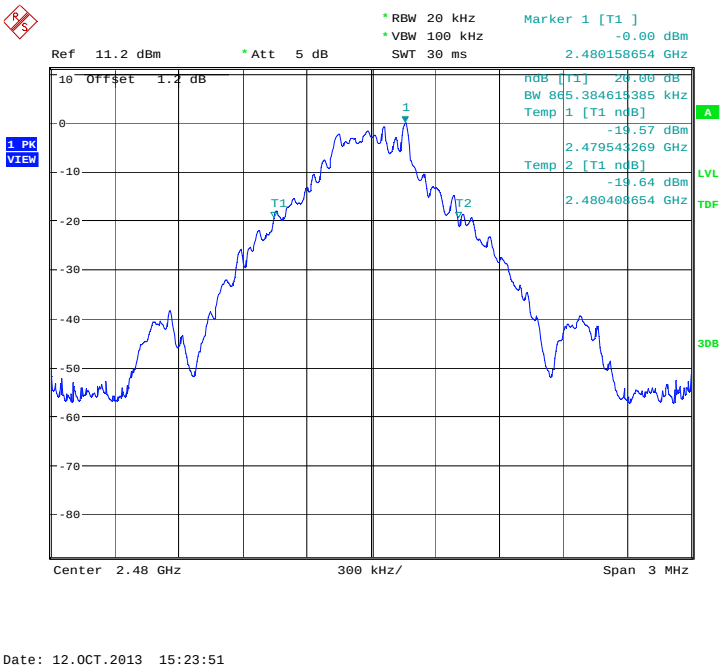
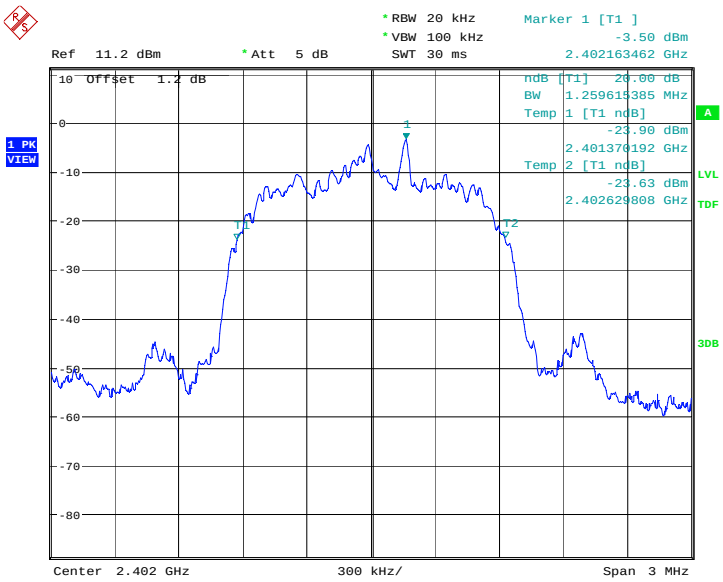
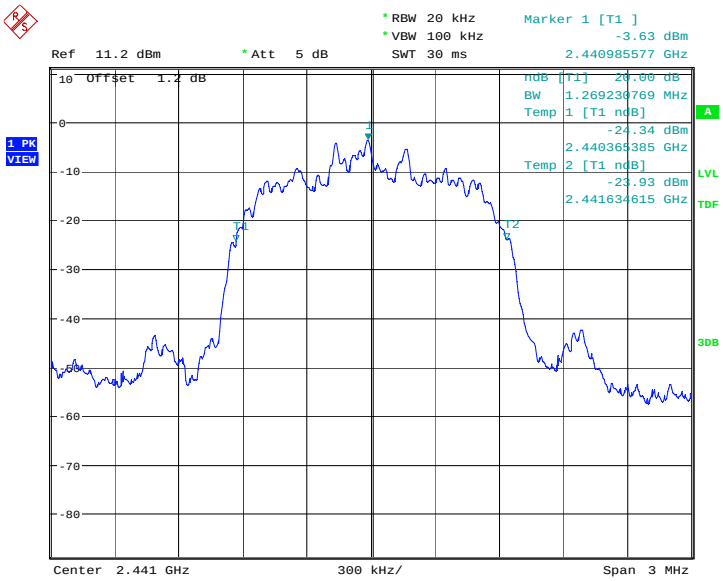


Fig.105. 20dB Bandwidth: GFSK, Channel 78



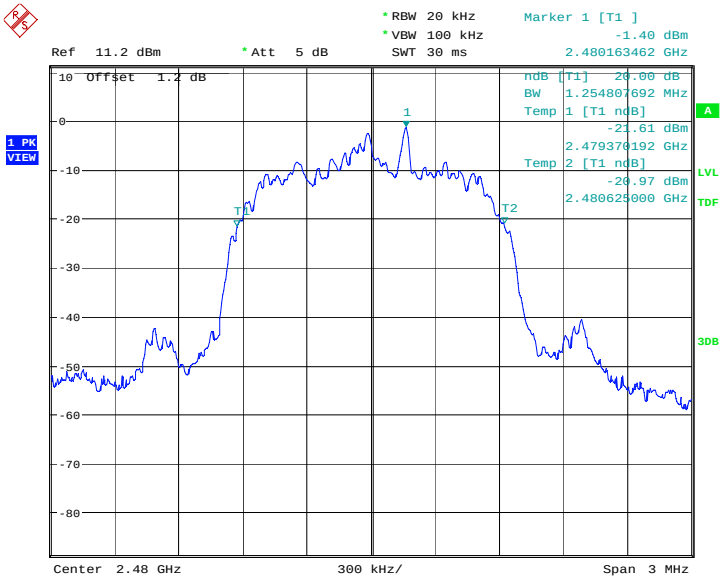
Date: 12.OCT.2013 15:44:15

Fig.106. 20dB Bandwidth: π/4 DQPSK, Channel 0



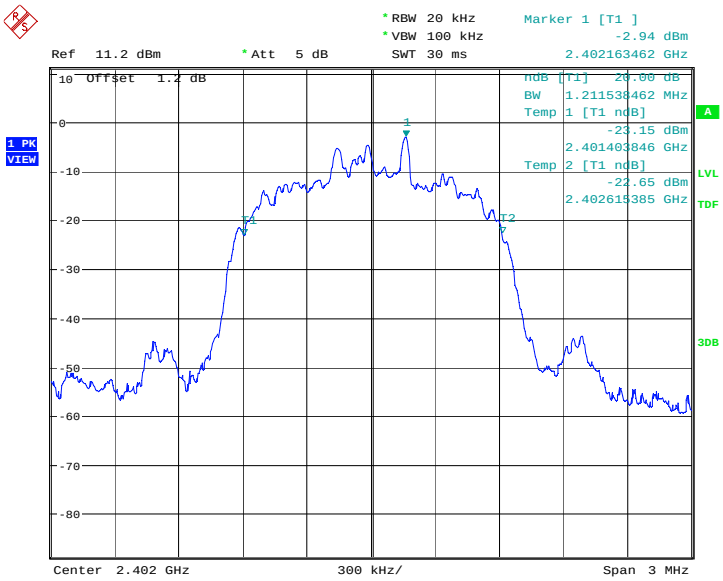
Date: 12.OCT.2013 15:44:46

Fig.107. 20dB Bandwidth: π/4 DQPSK, Channel 39



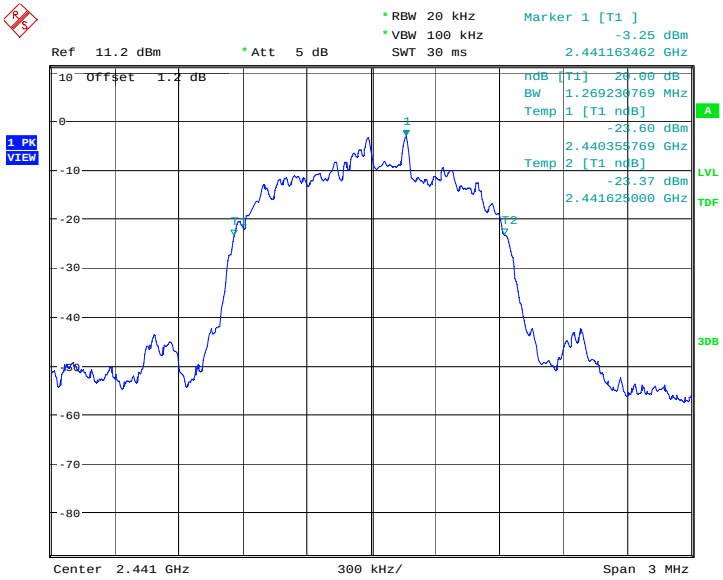
Date: 12.OCT.2013 15:45:18

Fig.108. 20dB Bandwidth: π/4 DQPSK, Channel 78



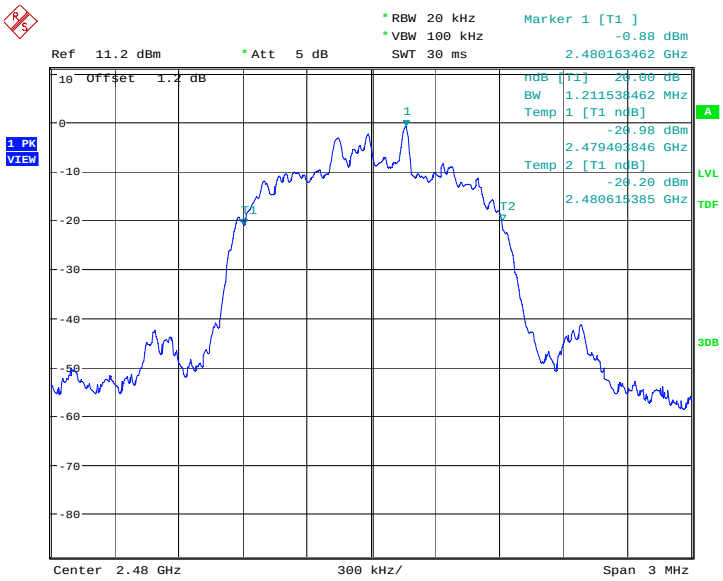
Date: 12.OCT.2013 16:05:40

Fig.109. 20dB Bandwidth: 8DPSK, Channel 0



Date: 12.OCT.2013 16:06:12

Fig.110. 20dB Bandwidth: 8DPSK, Channel 39



Date: 12.OCT.2013 16:06:44

Fig.111. 20dB Bandwidth: 8DPSK, Channel 78

A.8. Carrier Frequency Separation

Measurement Limit:

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

The measurement is made according to ANSI C63.10

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

Measurement Result:

For GFSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.112	1009.62	P

For π/4 DQPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.113	980.77	P

For 8DPSK

Channel	Carrier frequency separation (kHz)		Conclusion
39	Fig.114	990.38	P

Conclusion: PASS

Test graphs as below:

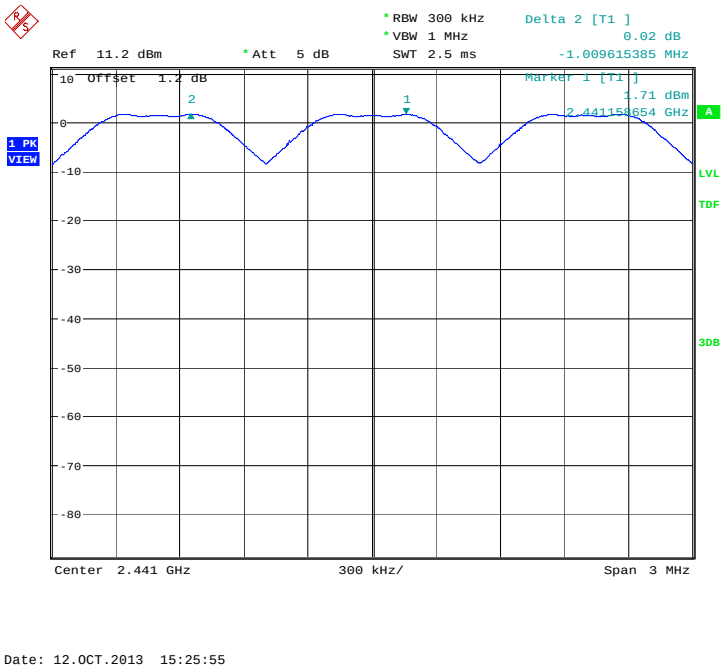


Fig.112. Carrier frequency separation measurement: GFSK, Channel 39

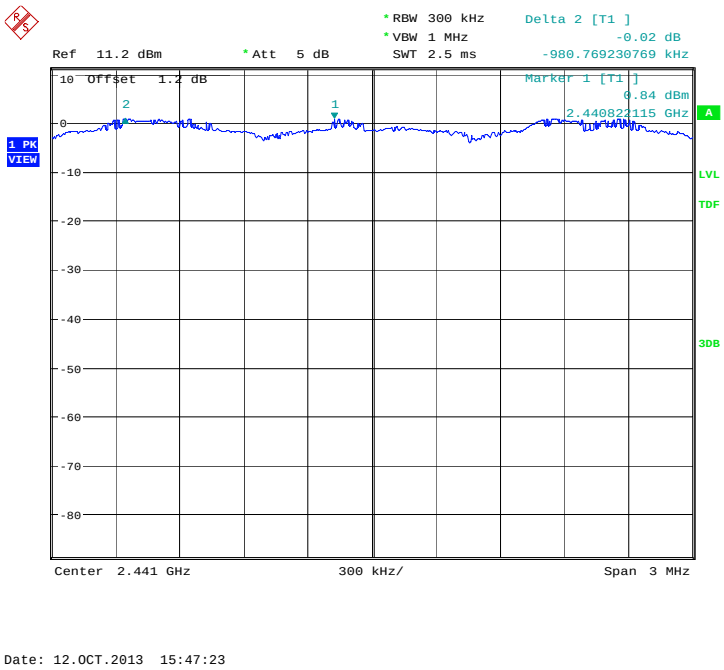


Fig.113. Carrier frequency separation measurement: π/4 DQPSK, Channel 39

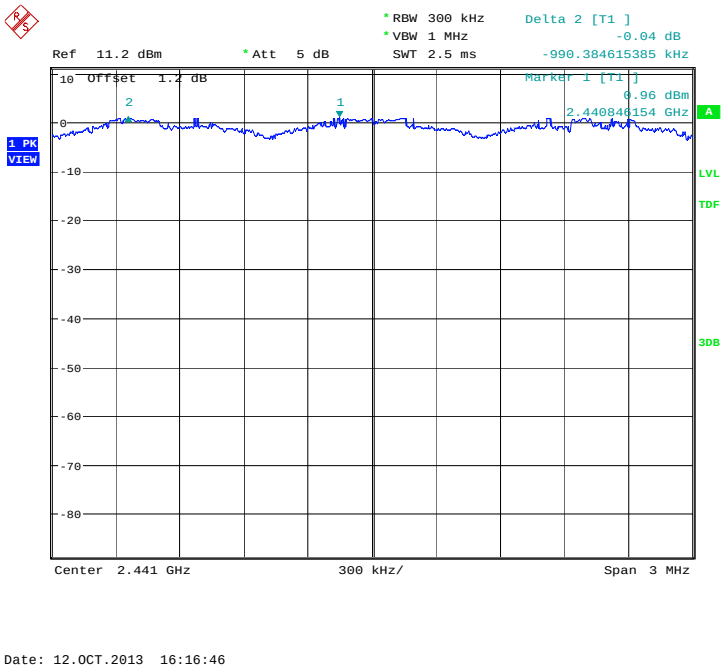


Fig.114. Carrier frequency separation measurement: 8DPSK, Channel 39

A.9. Number of Hopping Channels

Measurement Limit:

Standard	Limit
FCC 47 CFR Part 15.247(a) (1)(iii)	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.115	79	P
40~78	Fig.116		

Forπ/4 DQPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.117	79	P
40~78	Fig.118		

For 8DPSK

Channel	Number of hopping channels		Conclusion
0~39	Fig.119	79	P
40~78	Fig.120		

Conclusion: PASS

Test graphs as below:

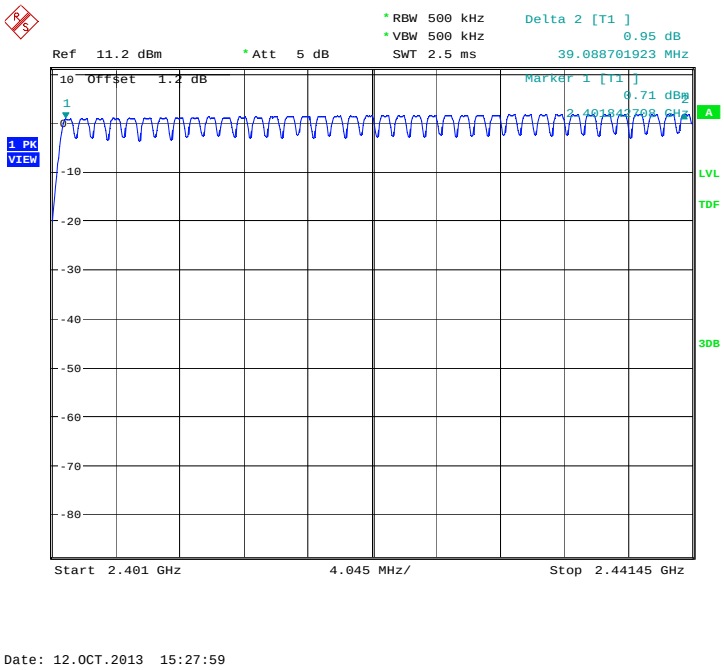


Fig.115. Number of hopping frequencies: GFSK, Channel 0 - 39

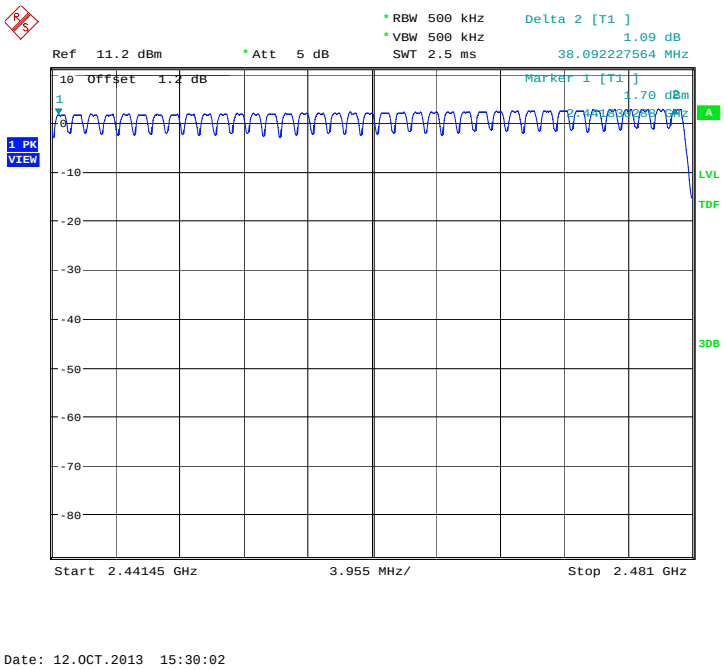


Fig.116. Number of hopping frequencies: GFSK, Channel 40 - 78

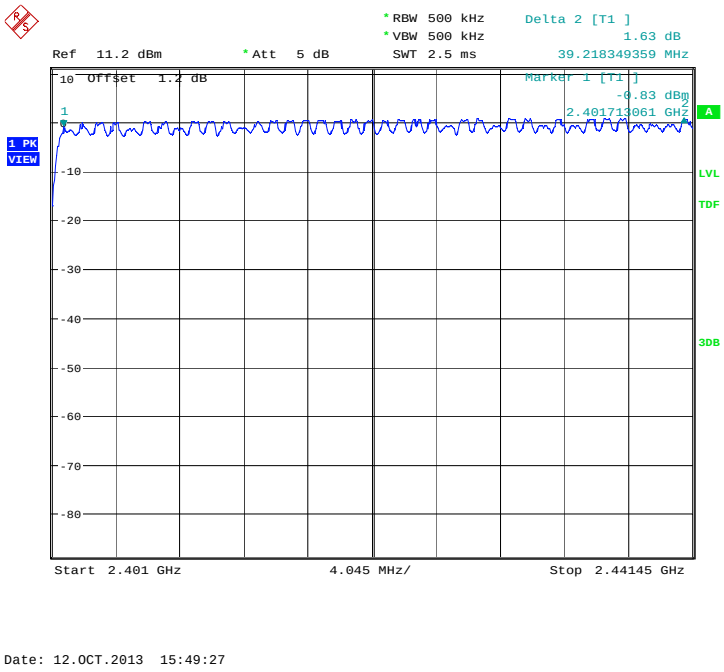


Fig.117. Number of hopping frequencies: π/4 DQPSK, Channel 0 - 39

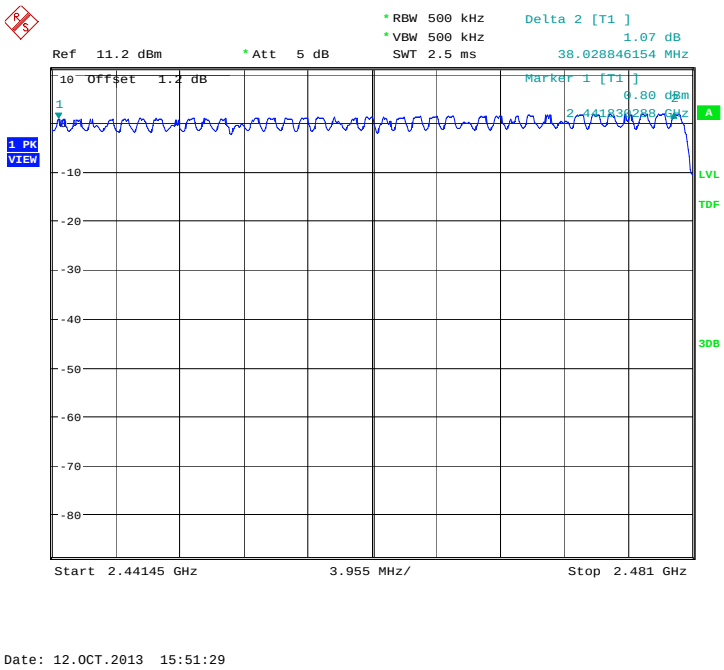


Fig.118. Number of hopping frequencies: π/4 DQPSK, Channel 40 - 78

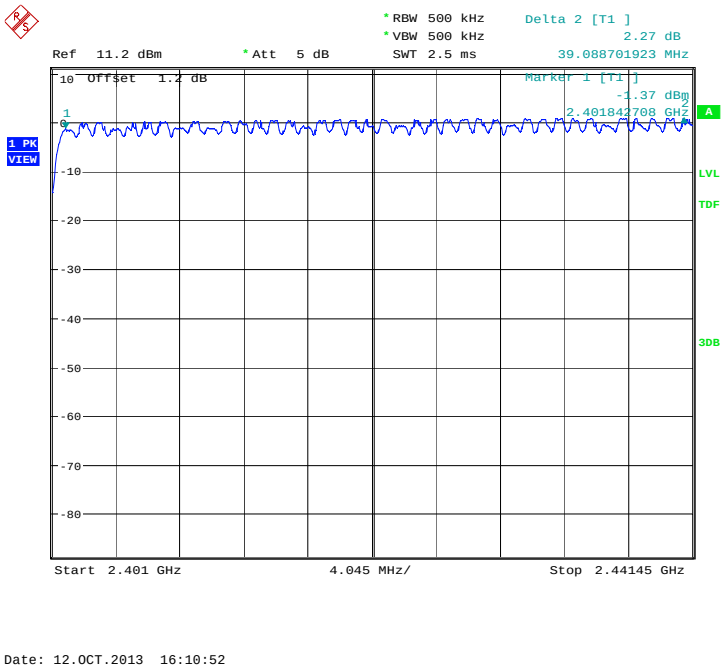


Fig.119. Number of hopping frequencies: 8DPSK, Channel 0 - 39

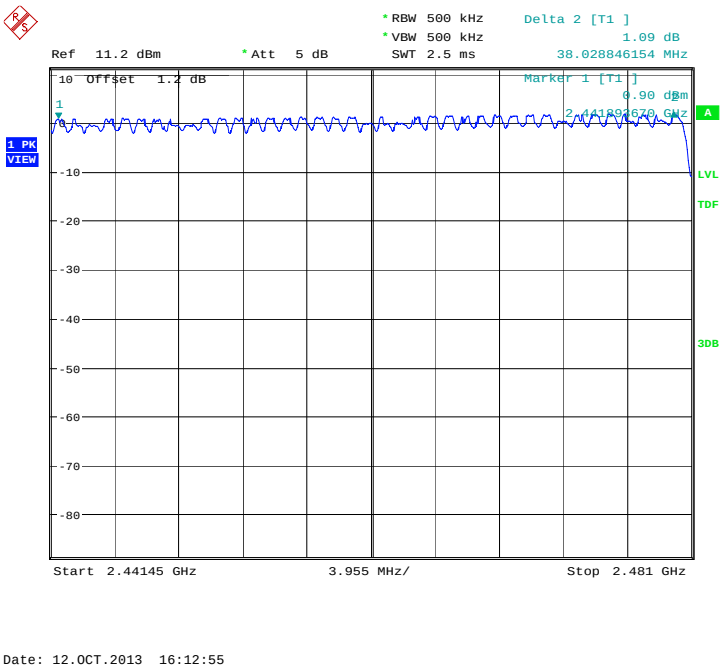


Fig.120. Number of hopping frequencies: 8DPSK, Channel 40 - 78

A.10. AC Powerline Conducted Emission

Test Condition

Voltage（V）	Frequency（Hz）
120	60

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)

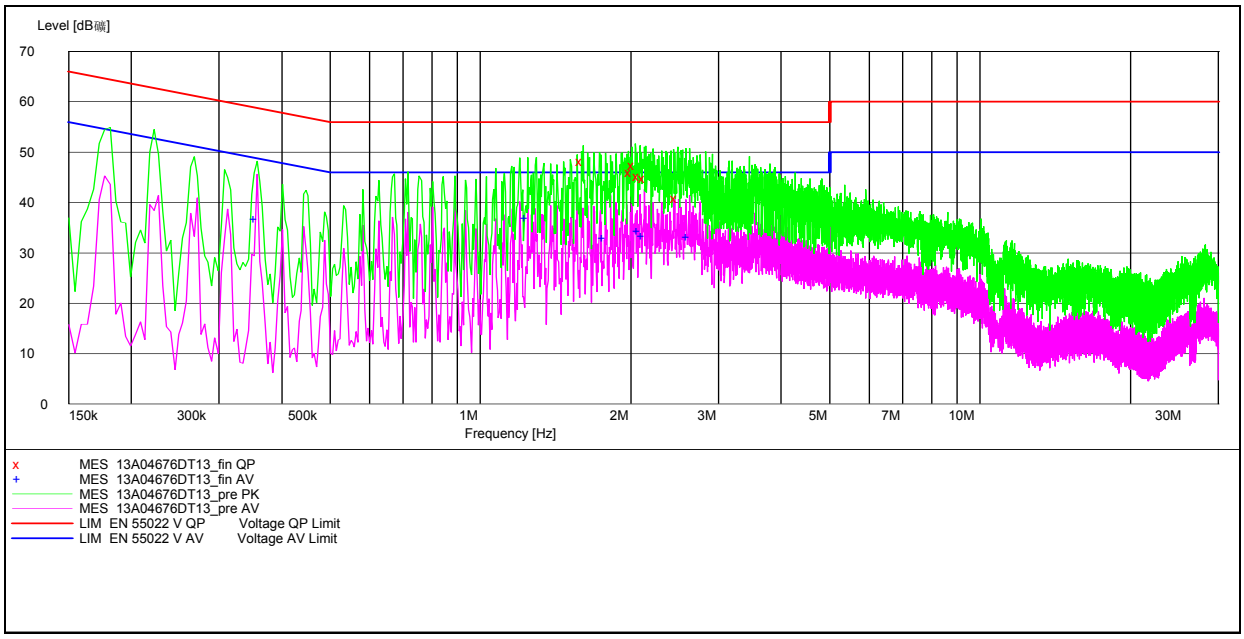
Frequency range (MHz)	Average Limit (dBμV)	Conclusion
0.15 to 0.5	56 to 46	P
0.5 to 5	46	
5 to 30	50	
NOTE: The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.5 MHz.		

The measurement is made according to ANSI C63.10

Conclusion: PASS

Test graphs as below:

Traffic:



MEASUREMENT RESULT: "13A04676DT13_fin QP"

29/10/2013 15:56

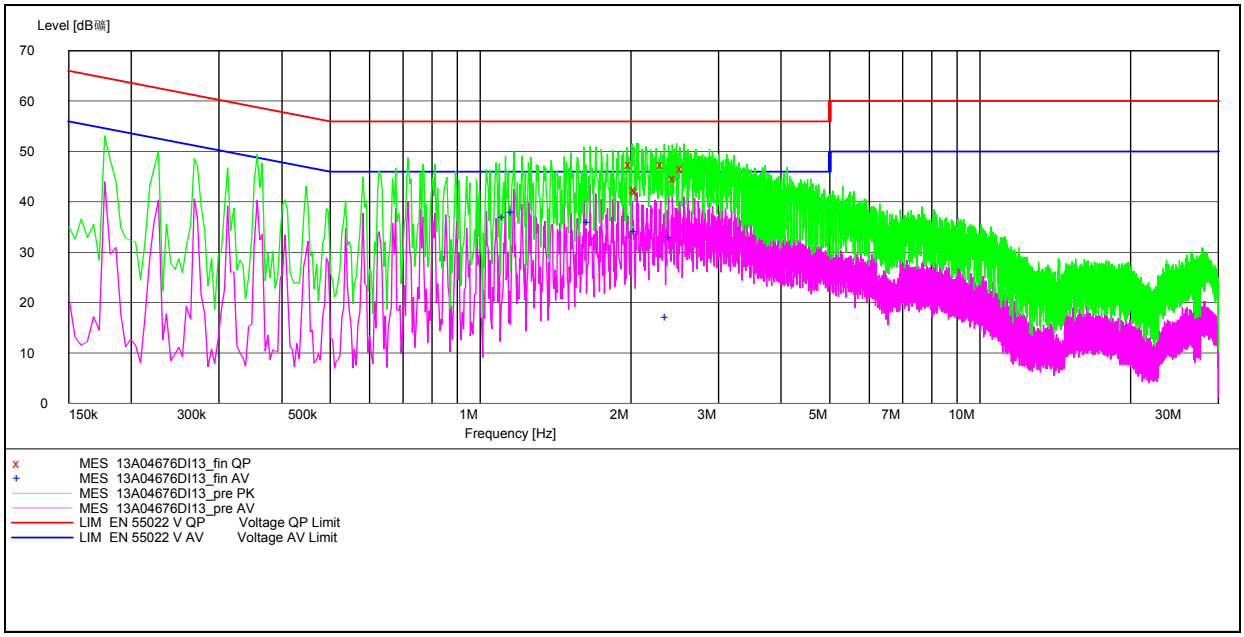
Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
1.608000	48.20	9.7	56	7.8	L1	GND
2.013500	46.00	9.7	56	10.0	L1	GND
2.040500	47.30	9.7	56	8.7	L1	GND
2.085500	45.20	9.7	56	10.8	L1	GND
2.144000	44.80	9.7	56	11.2	N	GND
2.481500	40.90	9.7	56	15.1	N	GND

MEASUREMENT RESULT: "13A04676DT13_fin AV"

29/10/2013 15:56

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Line	PE
0.357000	36.60	9.8	49	12.2	L1	GND
1.243500	36.90	9.7	46	9.1	L1	GND
1.779000	32.80	9.7	46	13.2	N	GND
2.085500	34.30	9.7	46	11.7	L1	GND
2.130500	33.40	9.7	46	12.6	L1	GND
2.625500	33.10	9.7	46	12.9	N	GND

Idle:



MEASUREMENT RESULT: "13A04676DI13_fin QP"

29/10/2013 16:00

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin	Line	PE
2.013500	47.50	9.7	56	8.5	L1	GND
2.058500	42.50	9.7	56	13.5	N	GND
2.072000	42.20	9.7	56	13.8	N	GND
2.333000	47.40	9.7	56	8.6	L1	GND
2.468000	44.60	9.7	56	11.4	N	GND
2.553500	46.60	9.7	56	9.4	L1	GND

MEASUREMENT RESULT: "13A04676DI13_fin AV"

29/10/2013 16:00

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin	Line	PE
1.122000	36.90	9.7	46	9.1	L1	GND
1.167000	37.90	9.7	46	8.1	L1	GND
1.657500	35.90	9.7	46	10.1	L1	GND
2.058500	34.20	9.7	46	11.8	L1	GND
2.378000	17.00	9.7	46	29.0	L1	GND
2.423000	33.00	9.7	46	13.0	L1	GND

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